LIST OF SECTIONS

Introduction

This manual contains information on how to perform the usual vehicle service procedures. This manual does not describe all of the procedures necessary to repair and service the vehicle in detail.

This publication is intended for use by **aprilia** dealers and their trained, experienced mechanics.
The descriptions of many service and repair operations have been intentionally omitted, as it is assumed that the users of this manual have basic mechanical training and basic knowledge of the procedures used for motor vehicle repair, as well as safety rules necessary to ensure their safety and that of the public while repairing motor vehicles.
Therefore, it is imperative that you do not attempt to perform any maintenance or repair procedure with which you are not throughly familiar, and fully qualified to perform. Such an attempt can result in defective repairs, which can be dangerous both to you, to the owner or user of the vehicle, and to the public in general.

The information and illustrations in this manual are current as of the manual's date of issue.
Since **aprilia s.p.a.** continually improves its products, there may be some differences between the vehicle you are servicing and the illustrations and instructions given in this manual. If you have any questions regarding the applicability of any service procedure given in this manual, contact **aprilia** consumer services (A.C.S.). A.C.S. Technical Counselors, will be able to assist you with any problems you might face as well as providing you with information on any updates and technical changes to the vehicle you are servicing.

Any change made to technical specifications and vehicle servicing procedures will be documented and distributed to **aprilia** dealers all over the world. These changes will be incorporated in later editions of this manual.

aprilia s.p.a. reserves the right to modify specifications and characteristics of any of its models at any time.
aprilia makes no representation that this manual covers any such changes.

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1

General information

SAFETY WARNINGS

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

⚠ Safety warning. When you find this symbol on the vehicle or in the manual, be careful to the potential risk of personal injury. 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 personal injury or damage to the vehicle or other property.

NOTE The word "NOTE" in this manual precedes important information or instructions.

PRECAUTIONS AND GENERAL INFORMATION

Keep strictly to the following instructions when repairing, disassembling or reassembling the motorcycle.

⚠ WARNING

Never use a naked flame for any operation whatsoever.
Before starting any servicing or inspection job on the motorcycle, stop the engine, remove the key, wait until the engine and exhaust have cooled down and, if possible, raise up the motorcycle, using the correct equipment standing on a solid, level floor. Be especially careful about the parts of the engine and exhaust that are still hot, to avoid burns.

Motorcycle parts are not edible; do not bite, suck, chew or swallow any of the motorcycle parts for any reason whatsoever.

Unless expressly stated otherwise, follow the disassembly steps in reverse order when reassembling units.
The overlapping of operations in references to other chapters must be interpreted in a logical way, to avoid the unnecessary removal of components.

Never use the fuel as a solvent to clean the motorcycle.

Disconnect the battery negative lead (-) if electric welding has to be performed.

Always be careful about the safety of the others when two or more people are working at the same time.

BEFORE DISASSEMBLY

Remove all dirt, mud, dust and foreign bodies from the motorcycle before removing any components.
When specified, use the service tools specially designed for this motorcycle.

DISASSEMBLY OF COMPONENTS

Never loosen and/or tighten nuts and bolts with pliers or other similar tools; always use a proper wrench.
Mark the positions of all unions and connections (hoses, wires, etc.) before disconnecting them with clearly distinguishable marks.
Each component must be clearly marked so that it can be identified for refitting.
Clean and wash each removed component with fire-proof solvent.
Paired components must be kept together, as they become "matched" after normal wear. Some paired components must either be used together or both replaced.

REFITTING COMPONENTS

⚠ CAUTION

Never use a circlip twice. When a circlip is removed, it must be replaced with a new one. When assembling a new circlip, be careful not to stretch its ends more than strictly necessary to place it on the shaft. After installing a circlip, make sure that it is completely and firmly inserted in its seat.

NOTE Bearings must turn freely with no sticking and/or noise. Replace bearings that show any roughness when the inner race is turned.

Use only Original **aprilia** Spare Parts for replacement.
Use only the recommended lubricants and sealing agents.
Lubricate all metal parts before refitting them.
Pay particular attention to lubricate internal engine parts such as piston rings, valves, etc..
Use proprietary assembly lubricants when appropriate.
When tightening nuts and bolts, start with the larger diameter or inner ones and proceed in diagonal order.
Tighten them in gradual steps before applying the final tightening torque.
Always replace all gaskets, circlips, snap rings and O-rings. Replace self-locking nuts if the finger torque allows the nut to be run on to its matching bolt more than one half turn. Replace the pins, screws and bolts if they are nicked, cracked, or if there is any sign of thread damage.
Thoroughly clean all mating surfaces before reassembly.
Apply a thin film of lithium-based grease to oil seal rims.
Always replace oil seals. Upon reassembly, apply a thin film of lithium-based grease to the sealing lip of all oil seal before it is assembled over its matching shaft.
Thoroughly lubricate bearings when fitting them.
Check to make sure that each component has been fitted properly.
After carrying out repairs or routine servicing, go through the pre-ride checklist thoroughly before riding the motorcycle or allowing it to be ridden. Take a trial run in a parking lot or other low traffic area before returning the motorcycle to its owner.

USING THE MANUAL

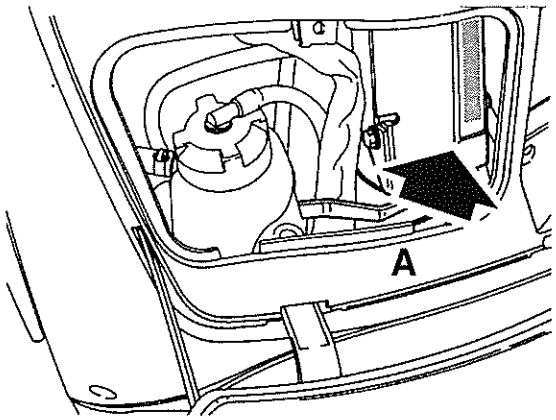
HOW TO CONSULT THE MANUAL

This manual is divided into chapters. Each chapter is based on a category of main components.
Refer to the "MAIN CONTENTS" list.
Unless expressly stated otherwise, follow the disassembly steps in reverse order when reassembling units.
The terms "right" and "left" are intended as the rider's right and left when sitting in the normal riding position.
Consult the "USE AND MAINTENANCE" handbook for information on the normal use and servicing of the motorcycle.

POSITION OF SERIAL NUMBERS

These numbers are required for vehicle registration.

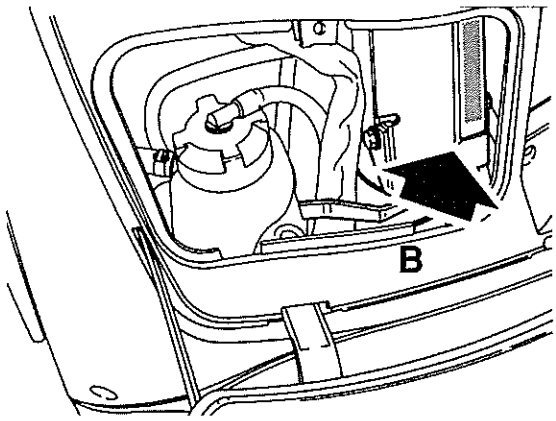
NOTE The alteration of the identification numbers is an offence, punishable with criminal and administrative sanctions. In particular, the alteration of the frame number will result in the immediate invalidation of the warranty.



VEHICLE IDENTIFICATION NUMBER (V.I.N.) (FRAME NUMBER)

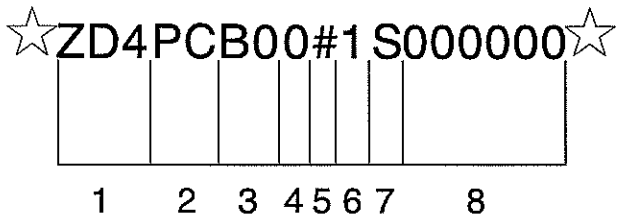
Every vehicle produced by **aprilia** receives a vehicle identification number (V. I. N.) stamped:
- on the steering head of the frame (A), as shown above;

and also:
- on the identification plate (B) which is located on the front portion near the steering head of the frame.



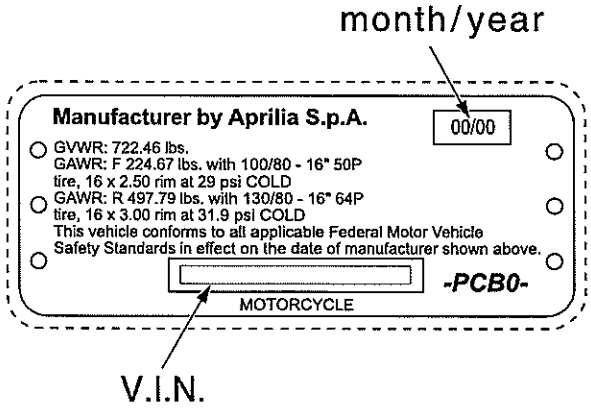
INFORMATION CONTAINED IN THE VEHICLE IDENTIFICATION NUMBER

Description of the vehicle identification number (V. I. N.), stamped on the steering head of the frame (A) and on the identification plate (B).

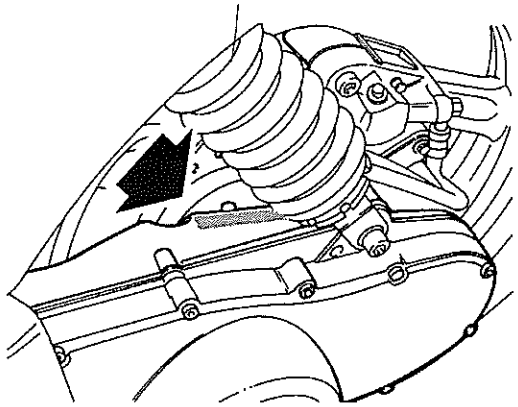


DIGIT MEANING

1) Manufacturer's identification alphanumeric code.
2) Vehicle type.
3) Model.
4) Country for which the vehicle is intended.
5) #= Check digit number.
6) Model year.
7) Assembling factory designation
   (N = NOALE- VE-,
   S = SCORZÉ -VE-,
   0 = NOT SPECIFIED).
8) Sequential serial number.



ENGINE NUMBER
The engine number is stamped next to the rear shock absorber support.



SAFETY WARNINGS FOR FUEL, LUBRICANTS COOLANT AND OTHER COMPONENTS

FUEL

⚠ WARNING

The fuel used for the propulsion of combustion engines is extremely inflammable and can become explosive under certain conditions.
Refueling and servicing operations should be carried out in well-ventilated areas with the engine switched off.
Do not smoke when refueling or in the vicinity of fuel vapors. All contact with naked flames, sparks or any other possible source of ignition or explosion must be absolutely avoided.

Do not allow fuel to spill out when filling the tank, as it could ignite on contact with the hot surfaces of the engine.
If fuel is accidentally spilt, check that the zone is perfectly dry before starting the motorcycle.
Fuel expands with heat and under direct sunlight.
For this reason, never fill the fuel tank right up to the brim.
Close the filler cap properly after refueling.
Do not allow fuel to come into contact with the skin. Do not swallow fuel or inhale the vapors. Do not transfer fuel from one container to another with a tube.

DO NOT DISPOSE OF FUELIN DRAINS, WATER COURSES OR THE SOIL.
KEEP OUT OF REACH OF CHILDREN.

Use only leaded (4-star ⛽) or unleaded petrol with minimum octane rating 95 (N.O.R.M.) and 85 (N.O.M.M.)

ENGINE OIL

⚠ WARNING

Engine oil can cause serious skin damage if handled on a daily basis over a long period of time.
You are advised to wash your hands thoroughly after handling the oil.
Do not dispose of the oil in drains, watercourses or the soil.
Take the oil to (or have it collected by) the nearest used oil disposal agency or the supplier.

You are advised to wear rubber gloves when carrying out maintenance work.

Change the engine oil after the first 1000 km (625 miles) and then every 6000 km (3750 miles), see CHANGING THE ENGINE OIL AND THE ENGINE OIL FILTER.

TRANSMISSION OIL

⚠ WARNING

Transmission oil can cause serious skin damage if handled on a daily basis over a long period of time.
You are advised to wash your hands thoroughly after handling the oil.
Do not dispose of the oil in drains, watercourses or the soil.
Take the oil to (or have it collected by) the nearest used oil disposal agency or the supplier.

You are advised to wear rubber gloves when carrying out maintenance work.

Change the transmission oil after the first 1000 Km (625 miles) and then every 12000 km (7500 miles) (see engine workshop manual).

BRAKE FLUID

⚠ WARNING

The following information refers to a single braking system, but is applicable to both.
Brake fluid can cause irritation if it comes into contact with the skin or eyes. Thoroughly wash any parts of the body that come into contact with the fluid and contact an eye specialist or doctor if the fluid comes into contact with the eyes.

DO NOT DISPOSE OF THE FLUID IN DRAINS, WATER COURSES OR THE SOIL.

KEEP OUT OF REACH OF CHILDREN.

Avoid splashing brake fluid on the plastic or painted parts of the motorcycle, as it will cause damage.
Check the brake fluid level every 3750 miles (6000 km), (CHECKING AND TOPPING UP THE FRONT BRAKE FLUID) and (CHECKING AND TOPPING UP THE REAR BRAKE FLUID); change the fluid every year, (CHANGING THE FRONT BRAKE FLUID) and (CHANGING THE REAR BRAKE FLUID).

⚠ CAUTION

Do not use fluids other than those specified and do not top up with different fluids, as this will damage the braking system.
Do not use fluids that have been stored in old containers or that have been open for a long time.
Sudden variations in the play or looseness of the brake levers are caused by problems in the hydraulic circuits.
Check very carefully to ensure that there is no oil or grease on the brake discs and friction gaskets, especially after servicing or inspections.
Check that the brake hoses are not twisted or worn.
Make sure no water or dust gets into the circuit accidentally.
You are advised to wear rubber gloves when working on the hydraulic circuit.

FORK OIL

⚠ WARNING

Fork oilcan cause serious skin damage if handled on a daily basis over a long period of time.
You are advised to wash your hands thoroughly after handling the oil.
Do not dispose of the oil in drains, water courses or the soil.
Take the oil to (or have it collected by) the nearest used oil disposal agency or the supplier.

You are advised to wear rubber gloves when carrying out maintenance work.

Altering the setting of the dampers and/or the viscosity of the oil in them could partially change the responsiveness of the suspension.

The viscosity grades can be chosen on the basis of the kind of ride wanted for the motorcycle (SAE 5W soft, 20W hard).

Two types of oil can be used in varying percentage mixes to obtain the kind of ride desired.
A characteristic of F.A. or FORK oil is that their viscosity varies very little with temperature changes, thus keeping the responsiveness of the suspension constant.

COOLANT

⚠ WARNING

Coolant is harmful if swallowed; it may cause irritation if it comes into contact with the eyes or skin. Rinse for a long time with water and call a doctor if coolant comes into contact with the skin or eyes. If swallowed, induce vomiting, rinse the mouth and throat with lots of water and call a doctor immediately.

DO NOT DISPOSE OF THE FLUID IN DRAINS, WATER COURSES OR THE SOIL.

KEEP OUT OF REACH OF CHILDREN.

⚠ WARNING

Be careful not to spill coolant on the hot parts of the engine; it may catch fire and burn with invisible flames.

You are advised to wear rubber gloves when carrying out maintenance work.

Do not use the motorcycle if the coolant is below the minimum level.

Check the coolant level before starting and every 1250 miles (2000 km), (CHECKING AND TOPPING UP THE COOLANT); change the coolant every two years, (CHANGING THE COOLANT).

The coolant solution is made up of 50% water and 50% antifreeze. This is the ideal mixture for most running temperatures and ensures good protection against corrosion.

You are advised to keep the same mixture in the warmer season as well, to reduce loss by evaporation and avoid frequent topping-up.
This will also reduce the quantity of mineral salt deposits left in the radiator when the water evaporates and ensure that the cooling system keeps working at the same level of efficiency.

If the external temperature falls to below zero degrees centigrade, check the coolant circuit frequently, adding a higher concentration of antifreeze if necessary (up to a maximum of 60%).

Use only distilled water in the solution, to avoid damaging the engine.

Add the coolant in the percentages indicated in the following table, according to the desired freezing temperature of the coolant mixture:

Freezing point °C (°F)	Coolant % of volume
-20° (4°)	35
-30° (-22°)	45
-40° (-40°)	55

NOTE Different antifreeze fluids have different characteristics. The guaranteed grade of protection is given on the label on the product container.

⚠ CAUTION

Use only antifreeze and anti-corrosion fluids without nitrite, as these guarantee protection to -35°C (-31°F).

CARBON MONOXIDE

If a servicing operation has to be carried out with the engine running, make sure this is done in the open air or in a well-ventilated area.
Never run the engine in enclosed spaces. If you have to work in an enclosed space, use an exhaust fume extraction system.

⚠ WARNING

Exhaust fumes contain carbon monoxide, a poisonous gas that can cause loss of consciousness and death.
Run the engine in the open air or, if you have to work in an enclosed space, use an exhaust fume extraction system.

COMPONENTS AT HIGH TEMPERATURES

⚠ WARNING

The engine and the exhaust system components get very hot and stay hot for a certain time after the engine has been switched off.

Wear heat-proof gloves if you have to handle these components, or else wait until the engine and exhaust system have cooled down.

RUNNING-IN RULES

⚠ WARNING

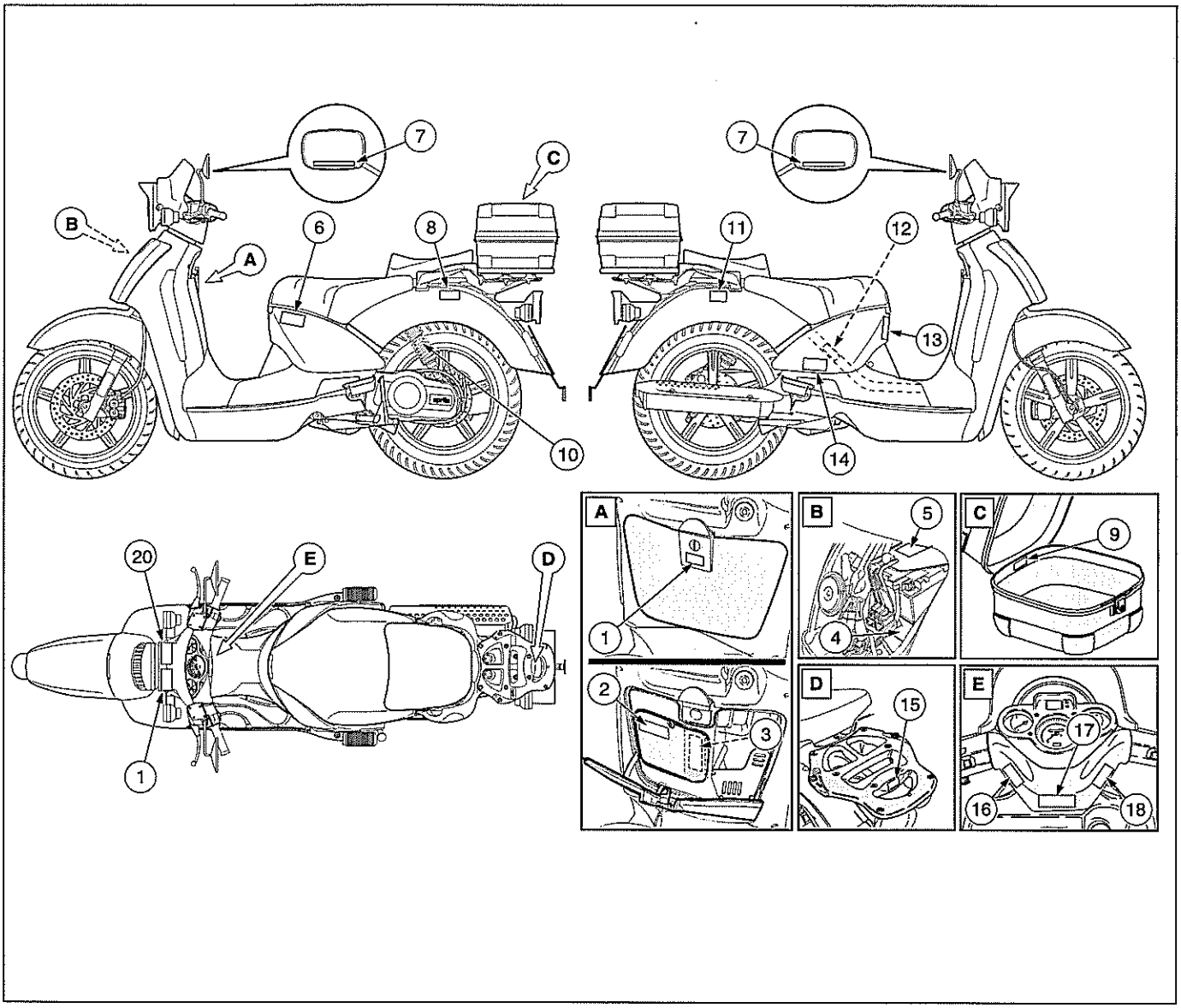
After the motorcycle has been operated for 625 miles (1000 km), perform the checking operation shown in the column "After running-in" of the REGULAR SERVICE INTERVALS CHART.

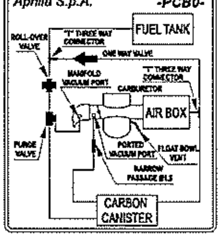
Failure to heed this warning can lead to damage to your motorcycle, engine seizure or other malfunction which could cause an upset and lead to serious injury or even death.
The internal parts of the engine and transmission must be properly run-in to ensure their long life and dependable operation. If possible, while breaking in your motorcycle, ride on hilly roads and/or roads with many curves so that the engine and transmission undergo lots of speed changes.
It is also important that, during the run-in period, the suspension and brakes be treated gently to allow the mating parts to bed.
Therefore, avoid hard braking, high speeds or very bumpy roads during the break in period.

0 - 62 mi (0 - 100 km):
Apply the brakes gently, avoiding sudden or prolonged braking.

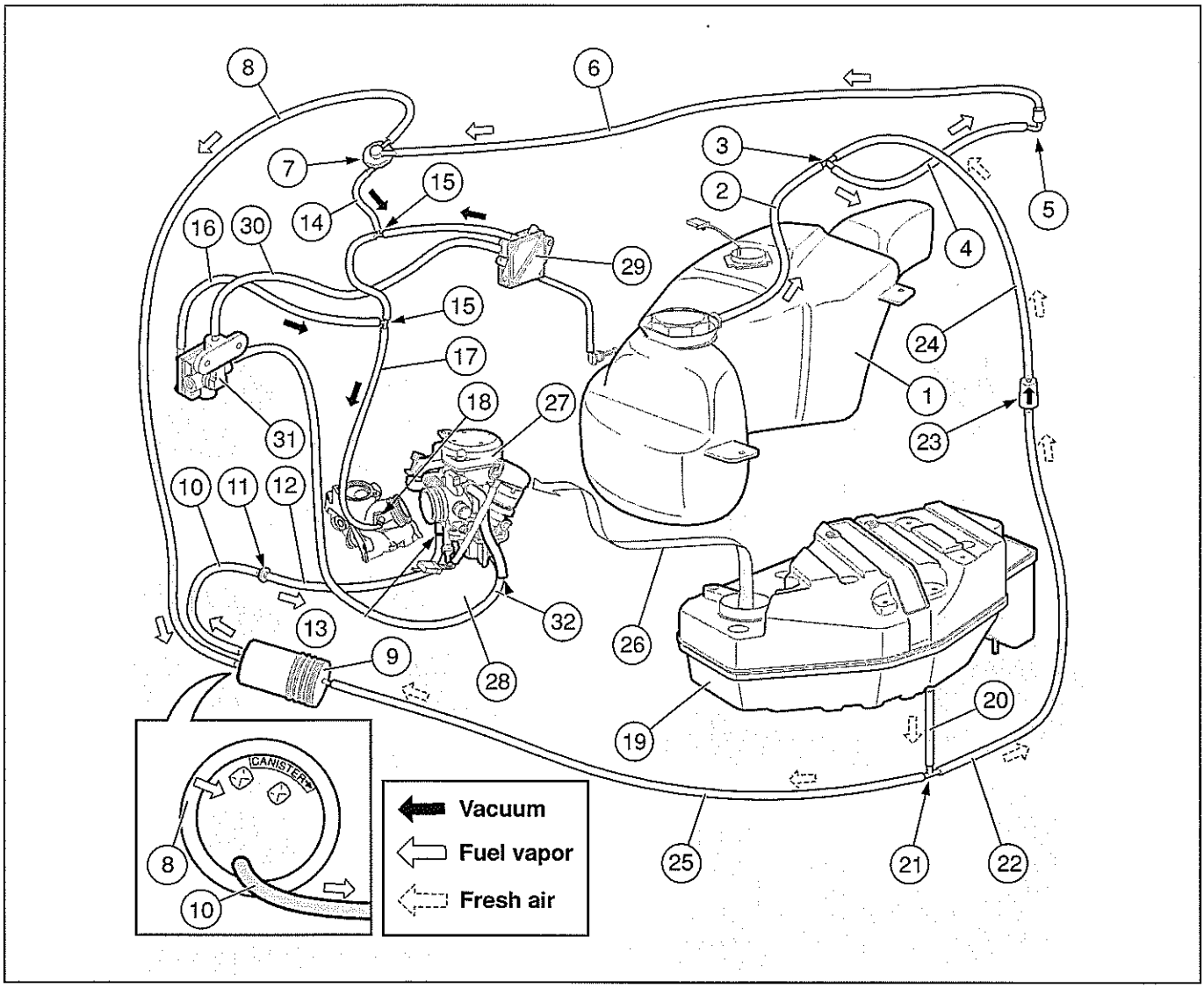
0 - 312 mi (0 - 500 km):
Open the throttle no more than three-quarters for extended periods.

POSITION OF THE WARNING ADHESIVE LABELS



Ref.	Description
1	**ATTENTION !** TO ACCESS THE CERTIFICATION LABEL, OPEN THE GLOVE COMPARTMENT AND REMOVE THE PLASTIC PANEL. SEE OWNER' S MANUAL.
2	**WARNING!** DO NOT REMOVE THE CAP UNTIL THE ENGINE IS ENTIRELY COOL. COOLANT IS HOT AND UNDER PRESSURE. FAILURE TO OBSERVE THIS WARNING MAY LEAD TO SERIOUS BURNS. USE ONLY FLUID FOR SEALED CIRCUITS. USE ONLY ANTIFREEZE AND ANTICORROSIVE WITHOUT NITRATE, ENSURING PROTECTION -35°C AT LEAST.
3	**Manufacturer by Aprilia S.p.A.** GVWR: 722.46 lbs. GAWR: F 224.67 lbs. with 100/80 - 16" 50P tire, 16 x 2.50 rim at 29 psi COLD GAWR: R 497.79 lbs. with 130/80 - 16" 64P tire, 16 x 3.00 rim at 31.9 psi COLD This vehicle conforms to all applicable Federal Motor Vehicle Safety Standards in effect on the date of manufacturer shown above. -PCB0- MOTORCYCLE
4	**WARNING!** Contain sulfuric acid which can cause severe injuries. Avoid contact with skin, eyes or clothing. Antidote: EXTERNAL - Flush with water, INTERNAL - Drink large quantities of water or milk. Follow with milk of magnesia, beaten egg or veg. oil. Call physician immediately. Eyes: Flush with water for 15 minutes and get prompt medical attention. KEEP OUT OF REACH OF CHILDREN. Batteries produce explosive gases. Keep sparks, flames, cigarettes away. Charge only in well-ventilated space. Always wear protective goggles when working around batteries. Always connect the battery vent tube. Failure to heed this warning will cause corrosion of the electrical system.
5	aprilia BATTERY SERVICE **WARNING!** + − MAX min Maintain electrolyte level between the two level marks. Use only distilled water. Always keep the battery charged. Never disconnect the battery or regulator with the engine running. This will destroy the entire electrical system.
6	**WARNING!** • Wear a helmet, eye protection, and bright protective clothing. • Don' t ride after consuming alcohol or other drugs. • Slow down on slippery surface, unfamiliar terrain or when visibility is reduced. • Read owner's manual carefully • Failure to follow these warnings can lead to an accident and serious injuries or death. • USE UNLEADED FUEL MINIMUM OCTANE RATING (R + M) / 2 METHOD 90. • See owner's manual for the correct running in and maintenance of the vehicle.
7	OBJECTS IN MIRROR ARE CLOSER THAN THEY APPEAR.
8	**WARNING!** Never install accessories or replacement parts not approved by Aprilia as original equipment. This can degrade the handling and safety of your motorcycle, and can cause an upset with subsequent accident and serious injury or even death. The stability and safety of any motorcycle is adversely affected by the addition of any load carrying accessory. See owner's manual.
9	**WARNING!** MAXIMUM WEIGHT LOAD ALLOWED lbs 7 (kg 3)
10	**WARNING!** •CONTAINS HIGH PRESSURE NITROGEN GAS. •SEE WORKSHOP MANUAL FOR DISPOSAL AND ADJUSTING UNIT. •DO NOT OPEN. DO NOT INCINERATE. INCINERATION, PUNCTURE OR DISASSEMBLY MAY CAUSE THIS UNIT TO EXPLODE.
11	VEHICLE EMISSION CONTROL INFORMATION -PCB0- ENGINE DISPLACEMENT: 150,95 cc ENGINE FAMILY: 1ASPC0.15PCB THIS VEHICLE CONFORMS TO U.S. EPA AND CALIFORNIA REGULATIONS APPLICABLE TO 2001 MODEL YEAR NEW MOTORCYCLES AND IS CERTIFIED TO 1.0 HC G/KM ENGINE FAMILY EXHAUST EMISSION STANDARD IN CALIFORNIA. ENGINE EXHAUST CONTROL SYSTEM: CAT. ENGINE TUNE UP SPECIFICATIONS IGNITION TIMING: 8° ± 2° AT 2500 RPM IDLE SPEED: 1600 ± 100 RPM IN NEUTRAL VALVE CLEARANCE: INLET 0.0019÷0.0035 inch (0.05÷0.09 mm) OUTLET 0.0039÷0.0055 inch (0.10÷0.14 mm) SPARK PLUG: NGK CR8E - NGK CR8EVX FUEL: MINIMUM OCTANE RATING (M+R)/2 METHOD 90 OIL: ENGINE OIL VISCOSITY SAE 5W40 Aprilia S.p.A. Via G.Galilei 1 30033 Noale (VE) ITALY aprilia
12	aprilia SPARE PARTS IDENTIFICATION YEAR: Y 1 2 3 4 LOT: A B C D E I UK A P SF B D F E GR NL CH DK J SGP SLO IL ROK MAL RCH HR AUS USA BR RSA NZ CDN
13	**WARNING!** Do not use any tire other than those recommended and approved by Aprilia. Maintain proper tire inflation. Do not use any tire with less than 1/8" (3mm) tread remaining. Do not repair any tire, nor use a repaired tire. Do not ride your motorcycle overloaded or with an unbalanced load. Failure to follow these warnings can lead to an accident and serious injuries or death. Always ensure that the chain is correctly adjusted. See owner's manual. -PCB0- aprilia Tires pressure bar - (psi): rider — Front tire 1.9 (27.55), Rear tire 1.9 (27.55); rider + passenger — Front tire 2.0 (29), Rear tire 2.2 (31.9); rider + passenger + luggage — Front tire 2.0 (29), Rear tire 2.2 (31.9) Tires size: Front tire — Pirelli - Metzeler, Cheng Shin, Dunlop 100/80-16" 50P; Rear tire — Pirelli - Metzeler, Cheng Shin, Dunlop 130/80-16" 64P
14	EVAP FAMILY: 1ASPE0024MLA HOSE ROUTING DIAGRAM Aprilia S.p.A. -PCB0- 
15	**WARNING!** MAXIMUM WEIGHT LOAD ALLOWED lbs 20 (kg 9)
16	**WARNING!** Warm the engine up before using the vehicle. See owner's manual.
17	MOTORCYCLE NOISE EMISSION CONTROL INFORMATION THIS 2001 ASP41A0150 MOTORCYCLE, B-1120 MEETS EPA NOISE EMISSION REQUIREMENTS OF 80 dBA AT 8075 closing r.p.m. BY FEDERAL TEST PROCEDURE. MODIFICATIONS WHICH CAUSE THIS MOTORCYCLE TO EXCEED FEDERAL NOISE STANDARDS ARE PROHIBITED BY FEDERAL LAW. SEE OWNER'S MANUAL. -PCB0- aprilia
18	ATTENTION! STARTING PROCEDURE Set on brakes and push START button. See owner's manual.
19	**WARNING!** •Keep windshield clean at all times. •Clean only with a soft cloth and warm water with a mild detergent. •Replace windshield if becomes scratched or discoloured so as to interfere with view. •Do not allow any alkaline or strong acid cleaner, gasoline, brake fluid or any other solvent to contact the windshield. •When replacing windshield, use only Aprilia original replacement windshield.
20	THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT IN Nov-2000 aprilia

CALIFORNIA EVAPORATIVE EMISSION SYSTEM



The system consists of:

1) Fuel tank
2) Fuel tank breather line (to tee)
3) Tee
4) Breather line (to roll-over valve)
5) Roll-over valve

NOTE The roll-over valve prevents the escape of fuel from the fuel tank in the event this vehicle overturns.

6) Breather line (to purge valve)
7) Purge valve
8) Breather line (to carbon canister)
9) Carbon canister
10) Drain line (to narrow passage)
11) Narrow passage Ø 0.06 in (Ø 1.5 mm)
12) Drain line (to ported vacuum port)
13) Ported vacuum port (right front part of throttle body)
14) Vacuum line (from purge valve)
15) Tee
16) Vacuum line (from fuel valve)
17) Vacuum line (to manifold vacuum port)
18) Manifold vacuum port (on the intake manifold)
19) Air box
20) Warm air inlet (from air box)
21) Tee
22) Warm air inlet (to one way valve)
23) One way valve
24) Warm air inlet (from one way valve)
25) Warm air inlet (to carbon canister)
26) Air flow
27) Carburetor
28) Float bowl vent
29) Fuel pump
30) Fuel line (from fuel pump)
31) Fuel valve
32) Fuel line (from fuel valve)

SPARE PARTS

If any parts have to be replaced, use only original **aprilia** spare parts.
aprilia original spare parts are high quality and have been designed and built specifically for **aprilia** motor cycles.

⚠ CAUTION

The use of non-original aprilia replacement parts may impair the motorcycle's performance, and even can cause lasting damage. Damage caused by the use of non-original spare parts is not covered by the warranty.

TECHNICAL DATA

DIMENSIONS	
Max. length	2075 mm (81.7 in)
Max. width	900 mm (35.4 in)
Max. height (front part of the fairing included)	1225 mm (48.2 in)
Seat height	800 mm (31.5 in)
Wheelbase	1380 mm (54.3 in)
Min. ground clearance	154 mm (6.1 in)
Curb weight	148 Kg (326.3 lbs)

ENGINE	
Model 150	150 S
Type	one- cylinder, 4- stroke engine with overhead camshaft
Number of valves	4
Number of cylinders	1
Total displacement 150	150.95 cm^3 (5.1 US fl oz)
Bore / stroke 150	62.0 mm / 50.0 mm (2.4 in / 2 in)
Compression ratio	12.5 ± 0.5 : 1
Starting	electric
Engine idling rpm	1600 ± 100 rpm
Clutch	automatic, dry centrifugal clutch
Change gear	automatic
Lubrication system	wet sump lubrication, forced circulation with mechanical pump; oil level check by means of a graduated dipstick
Cooling	liquid cooling, forced circulation with centrifugal pump

CAPACITY	
Fuel (reserve included)	9 ℓ (2.4 gal)
Fuel reserve	2 ℓ (0.5 gal)
Engine oil	
engine oil change only	1050 cm^3 (35.5 US fl oz)
engine oil and engine oil filter change	1100 cm^3 (37.1 US fl oz)
change for engine overhaul	1150 cm^3 (38.8 US fl oz)
Transmission oil	110 cm^3 (3.7 US fl oz)
Coolant	1.2 ℓ (0.3 gal) (50% water + 50% antifreeze with ethylene glycol)
Fork oil	130 cm^3 (4.3 US fl oz) (for each fork leg)
Seats	2
Vehicle max. load (rider + luggage)	105 Kg (231.4 lbs)
Vehicle max. load (rider + passenger + luggage)	180 Kg (396.8 lbs)

CONTINUED ›

TRANSMISSION	
Speed change gear	automatic and stepless
Primary	V - belt
Secondary	with gears
Total engine/wheel ratio 125	
minimum	26.88
maximum	8.06
Total engine/wheel ratio 150	
minimum	25.98
maximum	7.57

CARBURETOR	
Model	KEIHIN CVK 26
Choke tube	equivalent diameter 25 mm (0.9 in)

FUEL SUPPLY	
Type	vacuum pump
Fuel	Use only unleaded gasoline with a minimum octane rating R+M/2 of 92

FRAME	
Type	front single beam, rear cradle, high strength steel tubing
Rake	27°
Trail	85 mm (3.3 in)

SUSPENSIONS	
Front	hydraulically operated telescopic fork
Stroke	110 mm (4.3 in)
Rear	hydraulic, double- effect shock absorber with preload adjustment
Wheel stroke	105 mm (4.1 in)

BRAKES	
Front	disc brake Ø 260 mm (Ø 10. 2 in); with hydraulic actuation
Rear	disc brake Ø 220 mm (Ø 8.6 in); with hydraulic actuation

WHEEL RIMS	
Type	light alloy
Front	2.50 x 16"
Rear	3.00 x 16"

TIRE	
Type	tubeless
Front	100/80 16" 50P
Rear	130/80 16" 64P
INFLATION PRESSURE FOR SOLO RIDER	
Front	190 kPa (1.9 bar/27.5 psi)
Rear	190 kPa (1.9 bar/27.5 psi)
INFLATION PRESSURE FOR RIDER AND PASSENGER	
Front	200 kPa (2.0 bar/29 psi)
Rear	220 kPa (2.2 bar/31.9 psi)

IGNITION	
Type	C.D.I. / inductive
Ignition timing	8° ± 2° before T.D.C. at 1600 rpm

CONTINUED ›

SPARK PLUG	
Standard	NGK CR8 E - NGK CR8 E VX
Spark plug gap	0.6 - 0.7 mm (0.02 - 0.03 in)

ELECTRIC SYSTEM	
Battery	12 V - 12 Ah
Fuses	20 - 15 - 7.5 A
Generator (with permanent magnet)	12 V - 180 W

BULBS	
Low / high beam (halogen)	12 V - 65 W
Front parking light	12 V - 3 W
Direction indicators	12 V - 10 W
Rear parking light / stoplight	12 V - 5 / 21 W
License plate light	12 V - 5 W
Dashboard lighting	12 V - 1.2 W

WARNING LIGHTS	
Direction indicators	12 V - 2 W
Engine oil pressure	12 V - 2 W
Low beam	12 V - 2 W
High beam	12 V - 2 W
Low fuel	12 V - 2 W

RECOMMENDED LUBRICANT

Engine oil (recommended): SUPERBIKE 4, SAE 5W - 40.
As an alternative to the recommended oil, it is possible to use high- quality oils with characteristics in compliance with or superior to the A. P. I. SG. specifications.

Transmission oil (recommended): F.C., SAE 75W - 90.
As an alternative to the recommended oil, it is possible to use high- quality oils with characteristics in compliance with or superior to the A. P. I. GL4 specifications.

Fork oil (recommended): F. A. 5W or F. A. 20W fork oil;
If you need an oil with intermediate characteristics in comparison with the F. A. 5W and F. A. 20W or FORK 5W and FORK 20W, these can be mixed as indicated below:

SAE 10W = F. A. 5W 67% of the volume + F. A. 20W 33% of the volume
SAE 15W = F. A. 5W 33% of the volume + F. A. 20W 67% of the volume

Bearings and other lubrication points (recommended): BIMOL GRASE 481.

As an alternative to the recommended product, use high- quality grease for rolling bearings, working temperature range -30°C.... +140°C (-22°F.... +284°F), dripping point 150°C... 230°C (302°F... 446°F), high protection against corrosion, good resistance to water and oxidation.

Protection of the battery poles: neutral grease or vaseline.

Spray grease for chains (recommended): CHAIN SPRAY.

Brake fluid (recommended): F.F., DOT 5 (Compatible DOT 4).

⚠ WARNING

Use new brake fluid only. Use of used or contaminated brake fluid can lead to brake failure with subsequent accident, serious injury, or even death.

⚠ WARNING

Use only antifreeze and anticorrosive without nitrite, ensuring protection at least -35° C (-31°F).

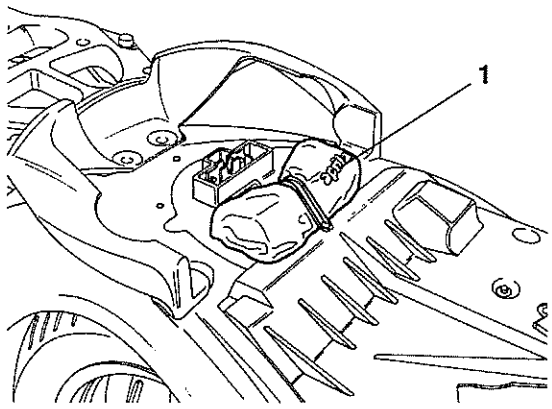
Engine coolant (recommended): ECOBLU - 40° C (-40°F) or AGIP COOL.
Failure to use appropriate antifreeze, mixed with distilled water, as coolant, can lead to serious damage to the motorcycle's cooling system, which can cause engine seizure, and subsequent upset with serious injury or even death.

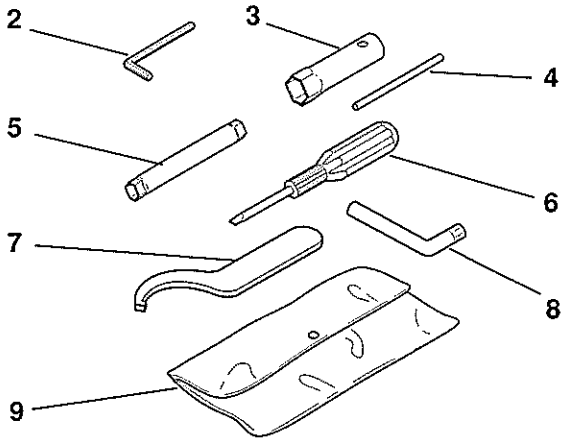
TOOL KIT

The tool kit (1) is located in its own compartment under the saddle area.

To gain access to the tools:
Lift the saddle, see UNLOCKING / LOCKING THE SADDLE.

The tool kit (1) includes:
- a 4 mm (0.2 in) Allen wrench (2);
- a 16 mm (0.6 in) spark plug socket wrench (3);
- a socket wrench handle (4);
- an 8 mm (0.3 in) and 10 mm (0.4 in) combination socket wrench (5);
- a combination Phillips / slotted screwdriver (6);
- a shock adjusting spanner wrench (7);
- a special socket wrench (8);
- a tool pouch (9).





GENERAL SPECIFICATIONS FOR TORQUE WRENCH SETTINGS

The standard torque wrench settings for screws and bolts with ISO metric thread are given in the table below.

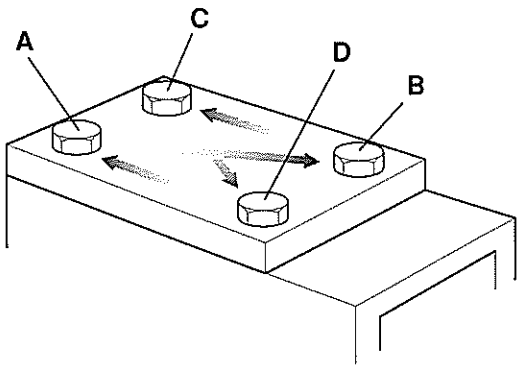
Thread screw or bolt	Wrench	Torque wrench setting	
		Nm (Ft-lbs)	Kgm
M6	10	6 (4.4)	0.6
M8	12	15 (11.1)	1.5
M10	14	30 (22.1)	3.0
M12	17	55 (40.5)	5.5
M14	19	85 (64.7)	8.5
M16	22	130 (95.9)	13.0

For the specific settings for the unions and couplings on the motorcycle in question, see FASTENERS.

Unless otherwise specified, the torque wrench settings refer to clean, dry threads at ambient temperature.

NOTE To avoid deforming the components, or having a leaking joint, tighten the screws and bolts as follows.
First, screw in all the fasteners by hand. Second, snug each fastener to approximately one-half of the specified torque setting, working in the diagonal pattern as shown, (A), (B), (C) and (D). Finally, bring each fastener up to its specified torque, working in the same order.

NOTE When this procedure is followed, the clamping pressure exerted by the fasteners will be uniformly distributed over the surface of the joint.



ABBREVIATIONS / SYMBOLS / INITIALS

#	= number
<	= less than
>	= greater than
≤	= equal to or less than
≥	= equal to or greater than
~	= approximately
∞	= infinity
°C	= degrees Centigrade
°F	= degrees Fahrenheit
±	= plus or minus
a.c.	= alternating current
A	= Ampere
Ah	= Ampere-hour
API	= American Petroleum Institute
AT	= high tension (HT)
bar	= unit of pressure (1 bar = 100 kPa)
Psi	= internal static pressure
c.c.	= direct current (d.c.)
cm³	= cubic centimeters
CO	= carbon monoxide
DIN	= Deutsche Industrie Norm
d.c.	= direct current
giri/min	= revolutions per minute (rpm)
HC	= unburnt hydrocarbons
ISC	= idle speed control
kg	= kilograms
kgm	= kilograms per meter (1 kgm = 10 Nm)
km	= kilometers
km/h	= kilometers per hour
k	= kilohm
kPa	= kiloPascal (1 kPa = 0.01 bar)
kW	= kilowatt
ℓ	= liters
gal	= gallons
LED	= light emitting diode
m/s	= meters / second
MAX	= maximum
mbar	= millibar
mi	= mile
MIN	= minimum
MPH	= miles per hour
MΩ	= megaohm
N.O.M.M.	= "Motor" method octane rating
N.O.R.M.	= "Research" method octane rating
R+M/2	= average of research and motor octane rating method
Nm	= Newton-meter (1 Nm = 0.1 kgm)
Ft-lbs	= foot-pounds
Ft	= feet
cu.in³	= cubic inches
in	= inches
Ω	= ohm
PICK-UP	= pick-up
PMI	= bottom dead center (BDC)
PMS	= top dead center (TDC)
rpm	= revolutions per minute
SAE	= Society of Automotive Engineers
TEST	= diagnostic check
T.C.E.I.	= hex socket screw
T.E.	= hex head screw
T.P.	= slotted head screw
UPSIDE-DOWN	= Upside-down forks
V	= Volts
W	= Watts
Ø	= diameter

Routine maintenance operations

2

This section describes the routine maintenance procedures for the main components of the motorcycle.

⚠ WARNING

Before starting any maintenance or inspection job on the motorcycle, stop the engine and remove the key, and wait until the engine and exhaust system have cooled down. Place the motorcycle on a workstand, which is solidly attached to the floor. Raise the motorcycle up to the point where it may conveniently be worked on.

Use extreme caution when working aroun parts of the engine and exhaust, or brakes, which may remain hot for a long time.

Avoid the temptation to hold any part of the motorcycle in your mouth.

Coatings and plainings are used on many of the parts used in this motorcycle, which are poisonous.

Unless expressly stated otherwise, reassemble the motorcycle in the reverse order from the disassembly steps given in this manual.

ROUTINE MAINTENANCE PLAN

In order to keep the motorcycle in excellent working order, **aprilia** urges you to keep to the specified intervals when servicing the various components.

REGULAR SERVICE INTERVALS CHART
THESE OPERATIONS MAY BE CARRIED OUT BY YOUR Local aprilia Dealer, OR BY THE OWNER OF THE VEHICLE.

COMPONENT	End of running-in 1,000 km (625 mi)	every 6,000 km (3,750 mi) or 12 months	every 12,000 km (7,500 mi) or 24 months
Tightness of the battery terminals/ electrolyte level	①	①	–
Spark plug	①	③	–
Air cleaner	–	②	–
Accelerator operation	①	①	–
Brake locking operation	①	①	–
Light system	①	①	–
Brake fluid	①	①	–
Coolant	①	every 2,000 km (1,250 mi): ①	
Engine oil	every 1,000 km (625 mi): ①		
Light operation/direction	–	①	–
Tires pressure	every month: ④		
Engine oil pressure warning light "🛢"	on every start: ①		
Front and rear brake pad wear	①	every 2,000 km (1,250 mi): ①	
Safety switch	①	①	–
Stop light switches	–	①	–
Tires	–	①	–
Tire pressure (*a)	④	④	–
Engine idling rpm	④	④	–
Center stand	①	①	–
Headlight beam operation/direction	–	①	–
Front and rear suspension	①	①	–
Swinging arm pivot	①	①	–
Steering	①	①	–

(*a) = Check at least once a week and at the specified intervals.

THESE MAINTENANCE OPERATIONS SHOULD ONLY BE PERFORMED OUT BY Local **aprilia** Dealer.

COMPONENT	End of running-in 1,000 km (625 mi)	every 6,000 km (3,750 mi) or 12 months	every 12,000 km (7,500 mi) or 24 months
Rear shock absorber	–	–	①
Transmission cables and controls Abr. Cables	①	①	–
Throttle cable (adjustment)	①	①	–
Variator belt	–	①	③
Steering bearings and steering slack	①	①	–
Wheel bearings	–	①	–
Brake discs	①	①	–
Engine oil filter	③	③	–
General operation of the vehicle	①	①	–
Valve clearance	④	④	–
Variator grease	–	–	③
Braking systems	①	①	–
Cooling system	①	①	–
Brake fluid	every 6,000 km (3,750 mi): ① / every 2 years: ③		
Coolant	every 2,000 km (1,250 mi): ① / every 2 years: ③		
Fork oil and oil seal	every 12,000 km (7,500 mi): ①		
Engine oil	③	①	③
Transmission oil	③	①	③
Guide pins (# 3 pieces) (rear)	every 12,000 km (7,500 mi): ③		
Front pulleys (# 2 pieces)	every 18,000 km (11,250 mi): ③		
Engine oil filter grid and magnetic drain plugs	①	①	–
Guide rollers (# 3 pieces) (rear)	every 12,000 km (7,500 mi): ③		
Variator rollers and variator plastic guides	–	①	③
Wheels/tyres	–	①	–
Spring inner cap (rear)	every 12,000 km (7,500 mi): ③		
Nut, bolt, screw tightening	①	①	–
Engine head nut tightening	①	–	–
Fuel lines	–	①	every 4 years: ③
Clutch wear	–	①	–
Carburation, CO setting	①	①	–
Shed system	①	①	–
Brake fluid bleeding	①	–	–
Brake pads	if worn: ③		
Brake lines	–	①	every 4 years: ③
Coolant lines	–	①	–
Tappet clearance - valve clearance	④	–	④
Carburetor	–	②	–

Key
① = check and clean, adjust, lubricate or change, if necessary;
② = clean;
③ = change;
④ = adjust.

⚠ CAUTION

Perform these maintenance operations at one-half of the specified intervals, if this vehicle is often used in rainy or very dusty conditions, on unpaved roads.

LUBRICATION POINTS

Regular lubrication, using the correct lubricants, is an important factor in ensuring the long life and excellent performance of the motorcycle.

NOTE Before lubricating any part of the motorcycle, clean any rust, dirt, or dust from the part which is to be lubricated.
Any exposed parts subject to rusting, must be lubricated with engine oil or grease (see LUBRICANT CHART).

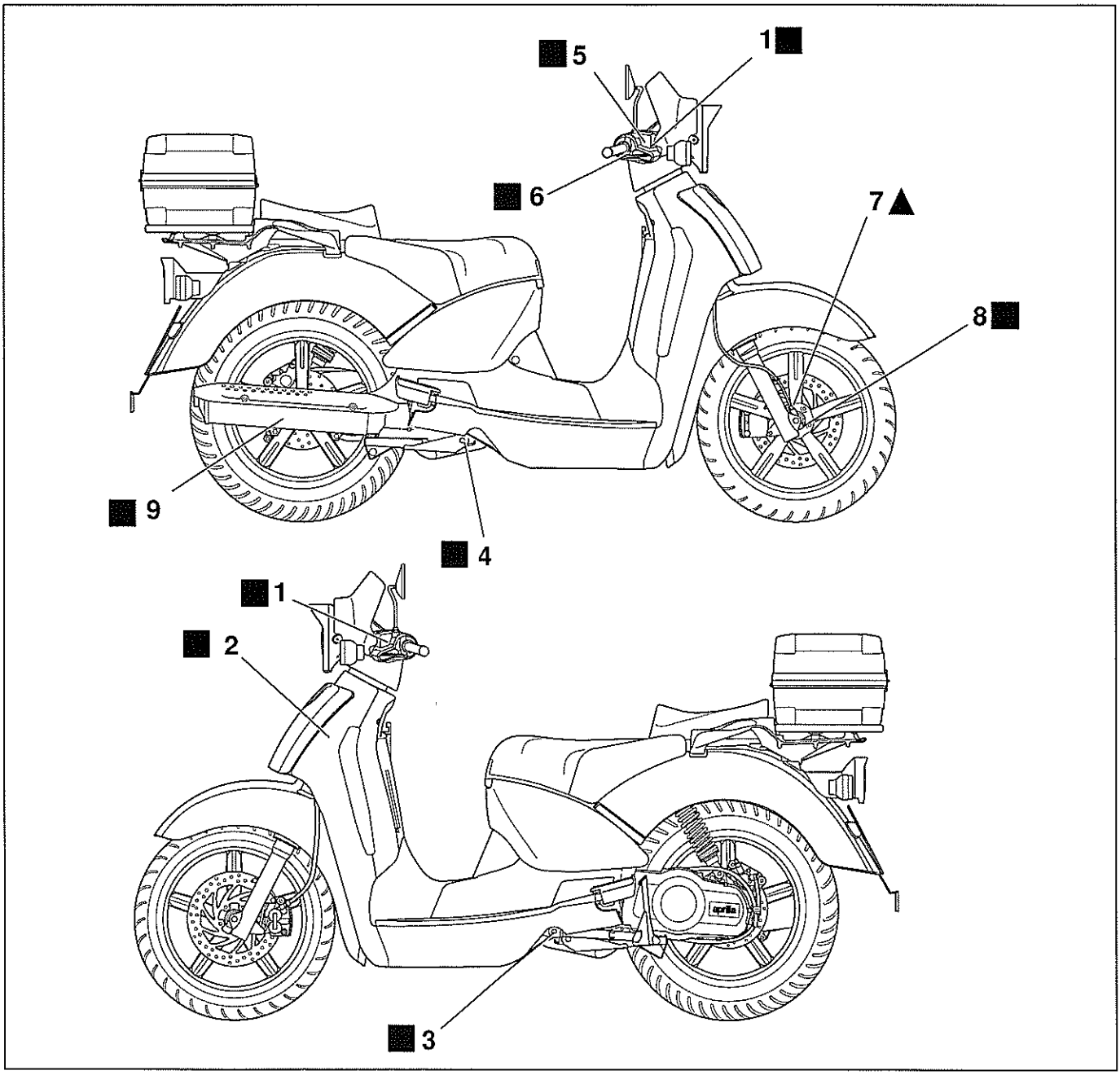
The "LUBRICATION DIAGRAM" shows the lubrication points.

KEY TO LUBRICATION DIAGRAM

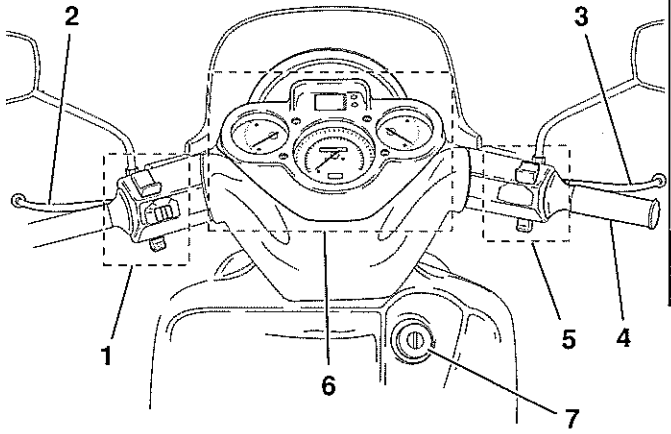
1) Brake lever pivot
2) Steering bearings
3) Side stand pivot
4) Center stand pivot
5) Throttle control
6) Throttle cable
7) Tachometer-odometer cable
8) Tachometer-odometer drive
9) Rear wheel spindle

■ = Grease
▲ = Oil

LUBRICATION DIAGRAM

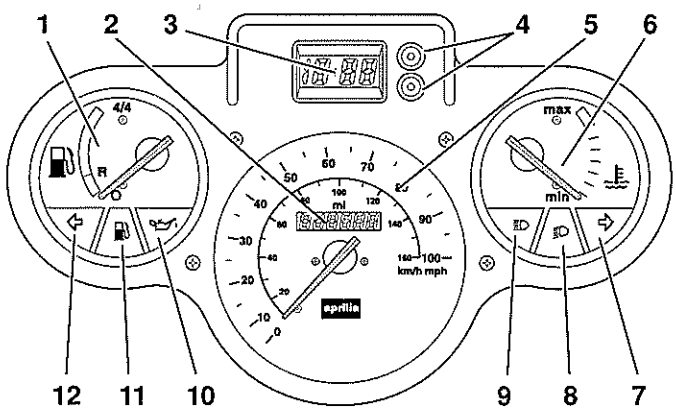


ARRANGEMENT OF THE INSTRUMENTS / CONTROLS



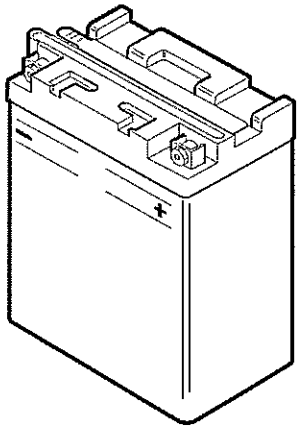
1) Electrical controls on the left side of the handlebar, see CONTROLS AT THE LEFT HAND GRIP
2) Rear brake lever
3) Front brake lever
4) Throttle grip
5) Electrical controls on the right side of the handlebar, see CONTROLS AT THE RIGHT HAND GRIP
6) Instruments and indicators
7) Ignition switch / steering lock (○ - ⊗ - 🔒) / saddle unlocking device (OPEN)

INSTRUMENTS AND INDICATORS



1) Fuel level indicator (⛽)
2) Odometer odometer
3) Digital clock
4) Digital clock function and setting push buttons
5) Speedometer
6) Coolant temperature indicator (🌡)
7) Green right direction indicator warning light (⇨)
8) Green low beam warning light (≡D)
9) Blue high beam warning light (≡D)
10) Red engine oil pressure warning light (🛢)
11) Amber low fuel warning light (⛽)
12) Green left direction indicator warning light (⇦)

BATTERY



Read carefully MAINTENANCE.
Two types of batteries are sold for motorcycles: coventional, which has a removable cap on each cell, and maintenance free, which has no removable caps and cannot be inspected.

⚠ CAUTION

This motorcycle is equipped with a conventional type battery. Do not replace it with a maintenance free battery. Doing so will damage the electrical system and could lead to a dangerous explosion.

Check the electrolyte level and the tightness of the terminals after the first 500 km (300 mi) and thereafter every 4,000 km (2,500 mi) or 8 months.

⚠ WARNING

Batteries, when charged, give off hydrogen gas, which is highly explosive. Therefore, do not smoke while working on or around the battery, and keep naked flames or sparks away from the battery. Keep gasoline and other flammable substances well away from the battery, since a battery spark could easily ignite them and cause a devastating fire.

Battery electrolyte is toxic and caustic and can severely burn your eyes or skin. Always wear tight fitting goggles and protective clothing when handling battery electrolyte. It is particularly important for you to protect your eyes since even a minuscule amount of battery acid could destroy your vision.

Should you accidentally get even the smallest amount of battery electrolyte on your skin or eyes, immediately flush with large quantities of clear cool water and immediately seek professional medical attention.

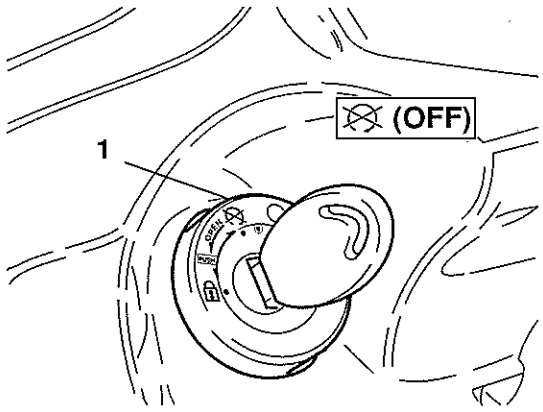
If someone should accidentally swallow battery electrolyte, drink a large quantity of milk or cool clear water and continue with milk of magnesia or vegetable oil. Seek professional medical assistance immediately.

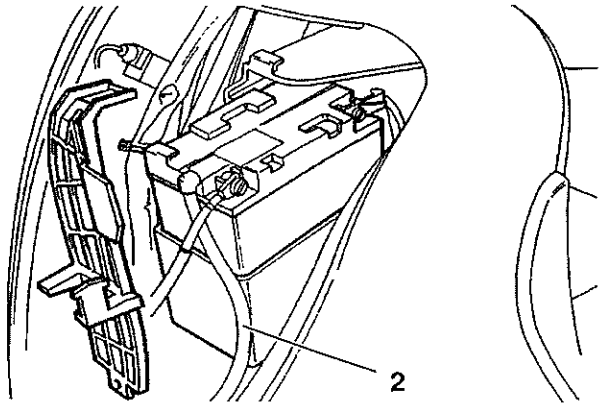
Since the battery gives off explosive hydrogen gas, especially when it is being charged, when you are charging a battery, make sure that the room is properly ventilated. Do not inhale the gases released during charging. Do not permit any open flames, sparks or cigarettes or any other source of heat anywhere near the battery while it is charging.

Do not tip the vehicle too much, or tip the battery too much, to avoid electrolyte leaking out. Should you accidentally spill battery electrolyte on any part of this vehicle, immediately wash it off with lots of cool clear water. Spills may be neutralized with a mixture of baking soda and water, as well. This is particularly important, as the battery electrolyte will severely corrode metallic parts and destroy the finish of plastic and painted parts.

⚠ CAUTION

Never switch the battery cables. Observe the proper polarity of the battery. Incorrectly attaching the battery to this vehicle will destroy the electrical system of this vehicle.
Connect and disconnect the battery only with the ignition switch (1) in the "⊗" (OFF) position.
First connect the positive cable red (+), then the negative (-).
Disconnect the negative cable (-) first, then the positive red (+).
If your battery needs to be charged, use a constant voltage, or "taper" charger, with a current rating no greater than 1/10th the capacity of the battery (i. e., for a 50 amp hour battery, the maximum charging current should be 5 amps).
Use of a more powerful charger can not only damage the battery irreparably, but could cause it to overheat and explode.
The battery is equipped with a breather tube (2). Always ensure that the battery breather tube is properly installed and routed to prevent fumes from the tube causing serious corrosion damage to this vehicle.





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BATTERY STORAGE

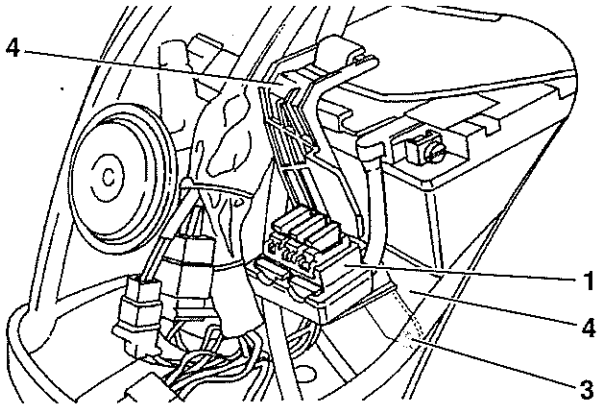
Read carefully BATTERY.
If this vehicle remains unused for more than a couple of weeks, it will be necessary to "trickle charge" the battery, to prevent battery damage, see RECHARGING THE BATTERY.

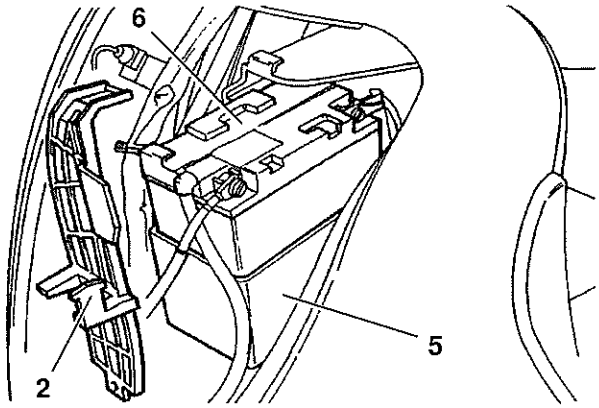
Remove the battery, see REMOVING THE BATTERY, and put it in a cool, dry place.
The best way to prevent battery deterioration is to constantly leave a "trickle" charger with a capacity of about 1/ 10th amp attached.
If this cannot be done, charge the battery for about 30 minutes using a battery charger with a current capacity of no greater than 1/ 10th the capacity of the battery, see RECHARGING THE BATTERY.

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 charge, see RECHARGING THE BATTERY.
While we recommend removing the battery from the vehicle, if you must leave it in this vehicle, disconnect both battery cables.

REMOVING THE BATTERY CASE

Read carefully BATTERY.
Make sure that the ignition switch is in "⊗" (OFF) position.
Remove the front cover, see REMOVING THE FRONT COVER.
Remove the fuse block (1) from the clip (2).
Unscrew and remove the screw (3).
Remove the battery cover (4).
Withdraw the battery case (5) together with the battery (6).

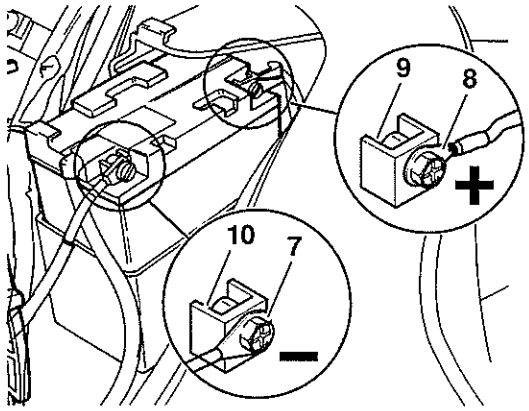




CHECKING AND CLEANING THE TERMINALS

Read carefully BATTERY.
Make sure that the ignition switch (1) is in "⊗" (OFF) position.
Extract the battery case, see REMOVING THE BATTERY CASE.
Make sure that the cable terminals (7) (8) and the battery terminals (9) (10) are:
- in good conditions (and not corroded or covered with deposits);
- covered with neutral grease or Vaseline.

If it is necessary to clean the battery terminals and the cable terminals:
Remove the battery, see REMOVING THE BATTERY.
Brush the cable terminals (7) (8) and the battery terminals (9) (10) with a wire brush to eliminate any sign of corrosion.
Install the battery, see INSTALLING THE BATTERY.



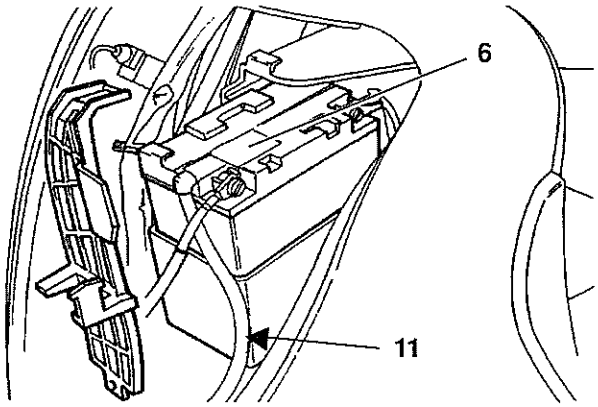
REMOVING THE BATTERY

Read carefully BATTERY.
Make sure that the ignition switch (1) is in "⊗" (OFF) position.
Remove the battery case, see REMOVING THE BATTERY CASE. Disconnect first the negative (–) cable terminal (7) and then the positive red (+) cable terminal (8).
Remove the battery breather tube (11).
Remove the battery (6) from its compartment and put it on a flat surface, in a cool and dry place.

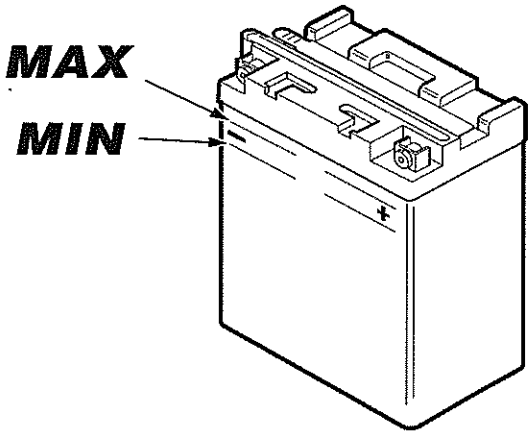
⚠ CAUTION

Once it has been removed, store the battery in a safe place and keep it away from children. Even a completely sealed, maintenance free battery can present a danger of injury.

Replace the battery case, see REMOVING THE BATTERY CASE.



CHECKING THE ELECTROLYTE LEVEL



Carefully read BATTERY.
To check the electrolyte level, proceed ad follows:
Extract the battery case, (see REMOVING THE BATTERY CASE).
Make sure that the fluid level falls between the " **MIN** " and " **MAX** " lines marked on the side of the battery.
If it does not:
Remove the battery plugs.

⚠ CAUTION

Top up with distilled water only. Do not exceed the "MAX" mark, since the electrolyte level increases during the recharge.

Top up by adding distilled water.

RECHARGING THE BATTERY

Carefully read BATTERY.
Remove the battery, (see REMOVING THE BATTERY).
Remove the battery plugs.

⚠ WARNING

The battery gives off noxious and explosive gases; keep it away from flames, sparks, cigarettes and any other sources of heat.
During the recharging or the use, make sure that the room is properly ventilated and avoid inhaling the gases released.
Check the electrolyte level, (see CHECKING THE ELECTROLYTE LEVEL).
Connect the battery charger to the battery.
Set the charger for the desired type of recharge (see table).
Charge the battery using a battery charger with a current capacity of no greater than 1/ 10th the capacity of the battery.

NOTE Charge at voltage at amperage and time stated below.

Recharge	Tension (Amperage)	Time (hours)
Normal	1.2	8 - 10
Quick	12	0.5

Switch on the battery charger.

⚠ WARNING

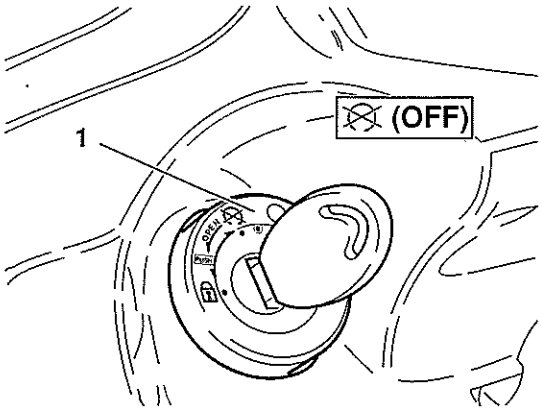
Wait for 5 or 10 minutes after you have finished charging the battery before replace the battery plugs and reinstalling it, the battery continues to produce gas for a short period of time after the charger is removed.
After the battery is fully charged, check the electrolyte level again and if necessary top up with distilled water.
Replace the battery plugs.

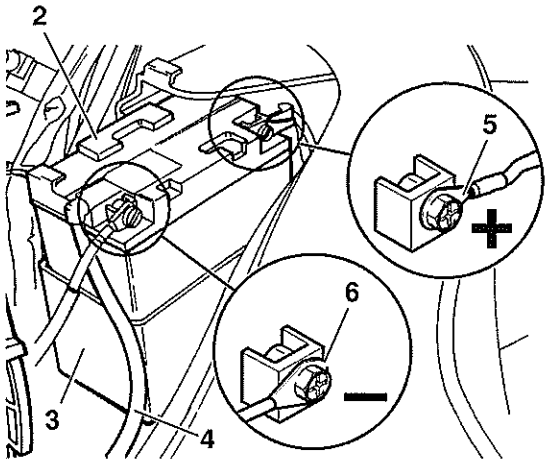
INSTALLING THE BATTERY

Read carefully BATTERY.
Check the charge of the battery, (see RECHARGING THE BATTERY).
Make sure that the ignition switch (1) is in the "⊗" (OFF) position.
Extract the battery case, (see REMOVING THE BATTERY CASE).
Put the battery (2) in its container (3).

⚠ CAUTION

Always ensure that the battery breather tube is properly installed, and properly routed, to prevent the sulphuric acid vapours from corroding the electric system, painted parts, plastic parts, rubber elements or gaskets when they exit the breather pipe itself.
Connect the battery breather tube (4).
Connect, in order, the positive red (+) cable terminal (5) and negative (–) cable terminal (6).
Cover the terminals of the cables and of the battery with neutral grease or Vaseline.
Replace the battery case, (see REMOVING THE BATTERY CASE).





SPARK PLUG

Read carefully MAINTENANCE.

⚠ CAUTION

Perform these maintenance operations at one-half of the specified intervals, if this vehicle is often used in rainy or very dusty conditions, on unpaved roads.

Clean the spark plug after the first 1,000 km (600 mi), replace it every 6,000 km (3,750 mi).
If you suspect that there is a problem with the spark plug, remove it and clean it carefully.
If it is defective in any way, replace it.
How often this operation will be required depends on how this vehicle is used.
However, the spark plug must be cleaned and replaced at intervals no longer than those given above.

TO GAIN ACCESS TO THE SPARK PLUG

⚠ WARNING

Before carrying out the following operations, let the engine and the exhaust silencer cool down until they reach room temperature.
Failure to observe this warning can lead to serious burns.

Remove the central inspection cover, (see REMOVING THE CENTRAL INSPECTION COVER).

TO REMOVE THE SPARK PLUG

Remove the spark plug cap (1).

⚠ WARNING

Always wear goggles, which provide your eyes with 360° protection, when using compressed air. Never direct compressed air at any part of your body. Failure to heed this warning can lead to serious personal injury.

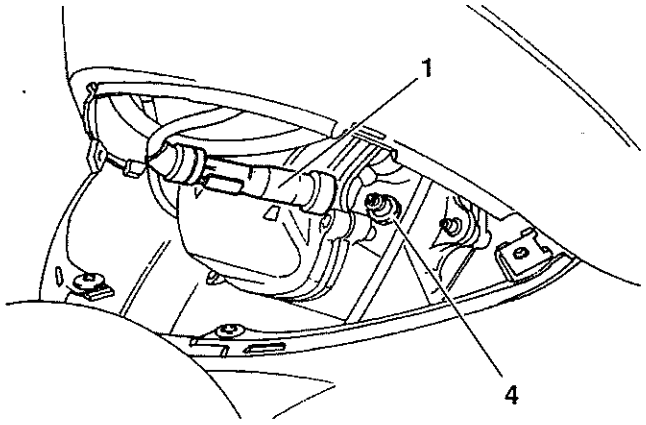
Using compressed air, blow all the dirt away from the base of the spark plug.

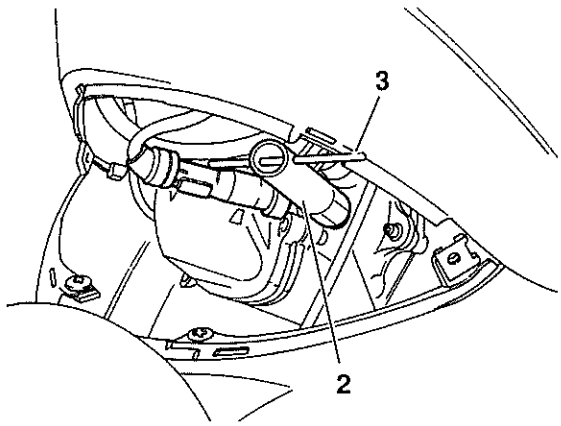
NOTE Use the 16 mm (0.6 in) spark plug socket wrench (2) and socket wrench handle (4) from the tool kit, (see TOOL KIT).
Place the 16 mm (0.6 in) spark plug socket wrench (2) completely over the spark plug (4).
Place the socket wrench rod (3) in the appropriate hole of the 16 mm (0.6 in) spark plug socket wrench (2).

⚠ CAUTION

Make sure that no dirt falls into the cylinder through the spark plug hole.

Unscrew the spark plug and extract it from its seat.

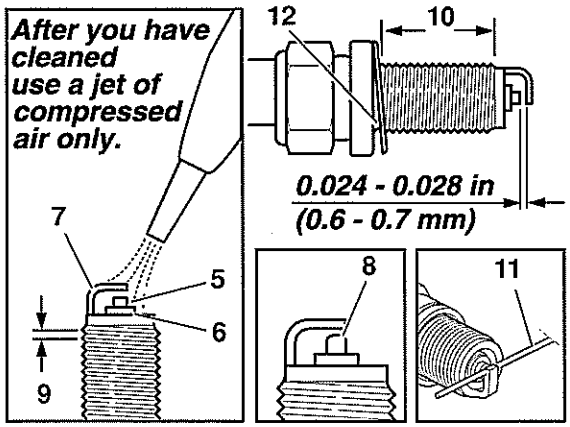




TO CHECK AND CLEAN THE SPARK PLUG

⚠ CAUTION

Key:
5) center electrode;
6) ceramic nose;
7) ground (outside) electrode.
Inspect the spark plug, and make sure that there are neither carbon deposits, nor corrosion marks on the electrodes (5) and (7) and on the ceramic nose (6); if necessary, clean it with a proprietary spark plug cleaning, and a stainless steel brush.



NOTE After you have cleaned the spark plug carefully blow out it with a jet of compressed air.

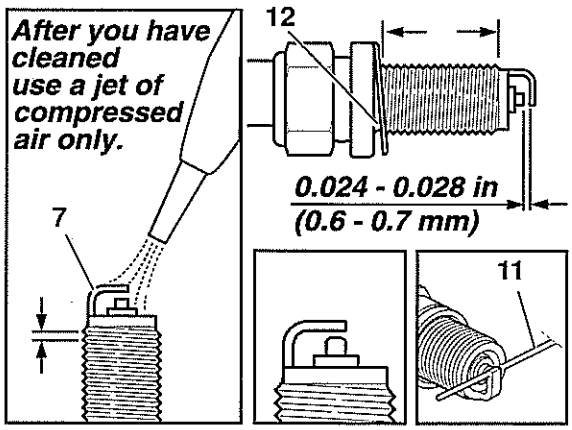
If the spark plug ceramic nose is cracked, or the electrodes are corroded, or there are excessive deposits on the tip (8) of the central electrode, or the central electrode (5) is rounded, the spark plug must be replaced.

⚠ CAUTION

When replacing a spark plug, always check the pitch (9) and length (10) of the thread.

⚠ CAUTION

Using a spark plug with too short a reach will result in carbon deposits building up on the spark plug threads in the head. This can result in damage to the engine when the proper spark plug is installed.
Using a spark plug with too long a reach can cause the plug to strike the piston, with consequent serious damage.
Use only the recommended spark plug type, (see TECHNICAL DATA).
Failure to observe this caution can result in a reduction in service life and performance of the engine.
Use a round wire feeler gauge (11) to check the spark plug gap in order to avoid damaging the platinum coating.
The gap must be 0.6 - 0.7 mm (0.024 - 0.028 in).
If it is not, adjust the gap by carefully bending the ground (outside) electrode (7).



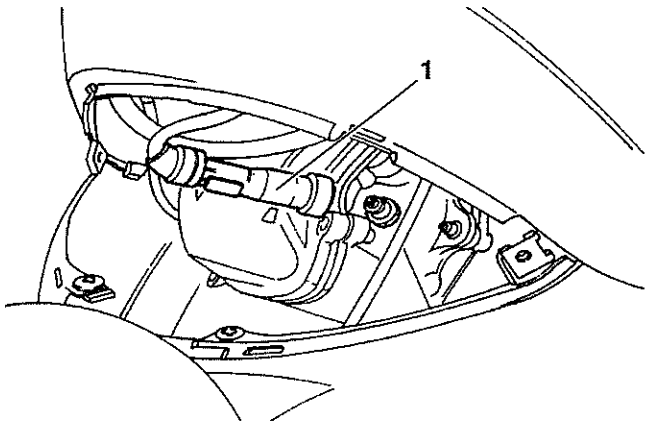
⚠ CAUTION

Never attempt to adjust a spark plug gap by bending the center electrode.
This will destroy the spark plug.
Make sure the gasket (12) is in good condition.

TO INSTALL THE SPARK PLUG

With the gasket (12) in place, screw the spark plug into the head finger tight.
Tighten the spark plug with the 16 mm (0.6 in) spark plug socket wrench (completely with the socket wrench handle), approximately one-half turn after it first snugly contacts the cylinder head.

Spark plug tightening torque:
14.47 Ft lbs (20 Nm).



⚠ CAUTION

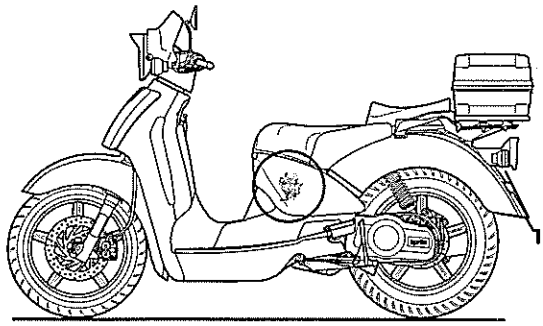
The spark plug must be well tightened, otherwise the engine may overheat and be seriously damaged.

⚠ CAUTION

Install the spark plug cap (1) properly, so that it does not come off due to the vibrations of the engine.
Replace the central inspection cover, (see REMOVING THE CENTRAL INSPECTION COVER).

IDLE ADJUSTMENT

Read carefully MAINTENANCE.
If the idle becomes irregular, too fast, or too slow, it must be adjusted.
To adjust the idle:

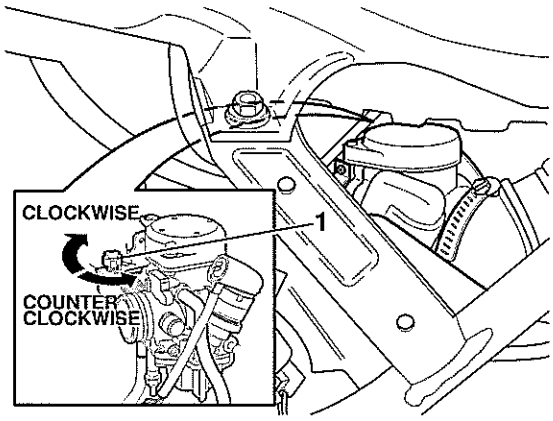


⚠ WARNING

Exhaust gases contain carbon monoxide, which is extremely poisonous if inhaled.
Do not start the engine in closed or badly-ventilated rooms.
Failure to observe this warning may cause loss of consciousness or even lead to death.
Ride for a few miles until the engine reaches normal running temperature, (see Coolant temperature indicator "🌡").

Remove the central inspection cover, (see REMOVING THE CENTRAL INSPECTION COVER).
Connect an electronic tachometer to the spark plug cable.
While the vehicle is on its the center stand, and with no one sitting on the vehicle, start the engine.
The engine must idle 1,600 ± 100 rpm, CO 2% [+ 0.5% – 1% (total range from 1% to 2.5%)].
This is sufficiently fast to keep the engine running smoothly, but sufficiently slow to prevent the transmission from engaging and rotating the rear wheel.

If it does not:



⚠ WARNING

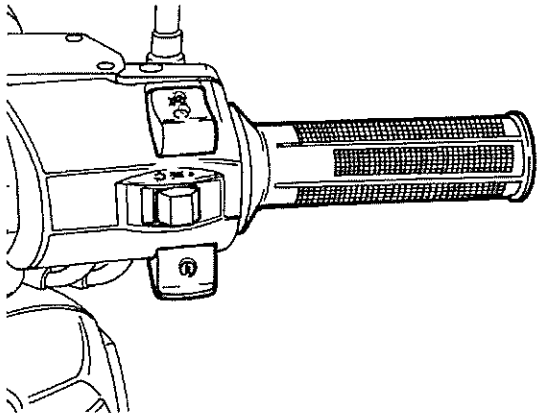
Do not adjust the air adjusting screw.
Doing so will upset the idling performance of your engine, as well as increasing exhaust emissions.

Working from the front left side of the vehicle:
Adjust the knob (1) positioned on the right side of the carburetor.
Rotate the knob clockwise to increase engine rpm.
Rotate the knob counterclockwise to decrease the engine rpm.
Accelerate and decelerate the engine a few times to make sure, when the throttle returns to idle, that the engine idle speed is still correct.

⚠ WARNING

After you have adjusted the idle, rotate the handlebars full left and full right with the engine idling. Check to ensure that the idle sound is not affected by this. Also check that the throttle smoothly and fully closes when released.

ADJUSTING THE THROTTLE CONTROL

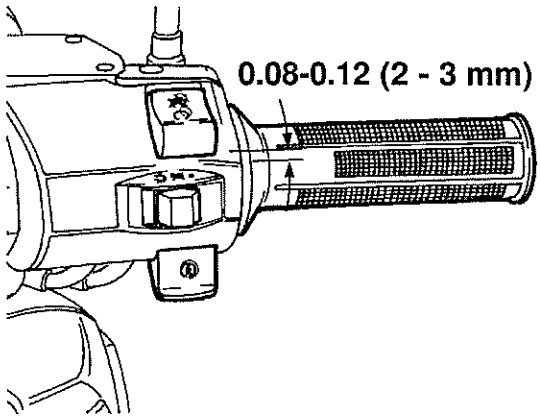


Read carefully MAINTENANCE.
This vehicle is equipped with two throttle cables.
The following information may refer to just one throttle cable but should be observed with regard to both throttle cables.

⚠ WARNING

If the throttle sticks open, it may cause a collision with another vehicle, or an upset.
If the throttle sticks, kill the engine with the engine stop switch located on the right handlebar.
Do not attempt to restart the engine until the throttle has been repaired and works perfectly.
Failure to obey this warning can lead to a runaway with seriously injuries or even death.
If any fastener in the throttle system becomes loose, likewise you will lose control of this vehicle.
Either situation can lead to an upset or collision with subsequent serious injury or death.

This vehicle is equipped with a double cable throttle. One cable opens the throttle when you rotate the throttle grip toward you; the other closes the throttle when you rotate the grip away from you. It is essential, when you release the throttle grip, that it automatically return to the idle position.
This double cable arrangement enhances safety by providing for positive closing of the throttle.



⚠ WARNING

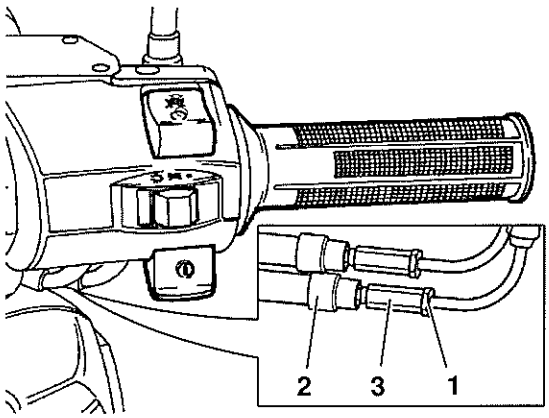
In the event of a throttle sticking emergency, always kill the engine using the engine stop switch located near the throttle grip on the right handlebar. Never use this vehicle if the throttle does not automatically fully return to the idle position when the throttle grip is released.
Failure to heed this warning can lead to a serious accident and subsequent injury or even death.

⚠ CAUTION

Perform these maintenance operations at one-half of the specified intervals, if this vehicle is often used in rainy or very dusty conditions, on unpaved roads.
Check the throttle cables after the first 1,000 km (600 mi) and thereafter every 6,000 km (3,750 mi).

The play of the throttle cable must be between **2 - 3 mm (0.08 - 0.12 in)**, measured at the edge of the grip, see the illustration above.

To adjust the cable:
Place the vehicle on the center stand, (see PLACING THE VEHICLE ON THE STAND).
Pull back the rubber boot (1).
Loosen the lock nut (2).
Rotate the adjustor (3) so as to provide the proper clearance.
After the adjustment, tighten the lock nut (2) and check the play again.
Replace the rubber boot (1).
Repeat the adjustment for the second cable.



⚠ WARNING

Exhaust gases contain carbon monoxide, which is extremely poisonous if inhaled.
Do not start the engine in closed or badly-ventilated rooms.
Failure to observe this warning may cause loss of consciousness or even lead to death.

⚠ WARNING

After you have adjusted the throttle, rotate the handlebars full left and full right with the engine idling. Check to ensure that the idle sound is not affected by this.
Also check that the throttle smoothly and fully closes when released.

AIR CLEANER

Read carefully MAINTENANCE.

⚠ WARNING

Use only fire-proof solvent or middle detergent to wash the air cleaner.

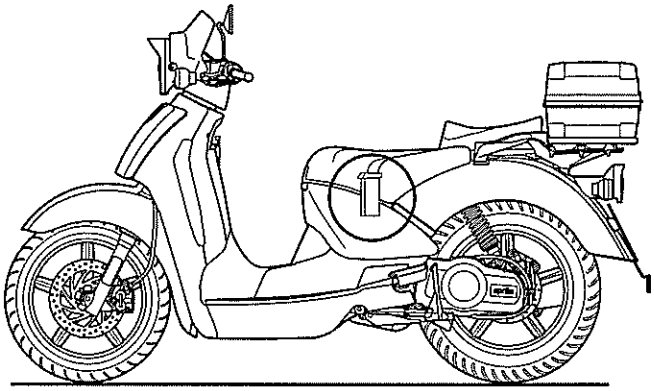
⚠ WARNING

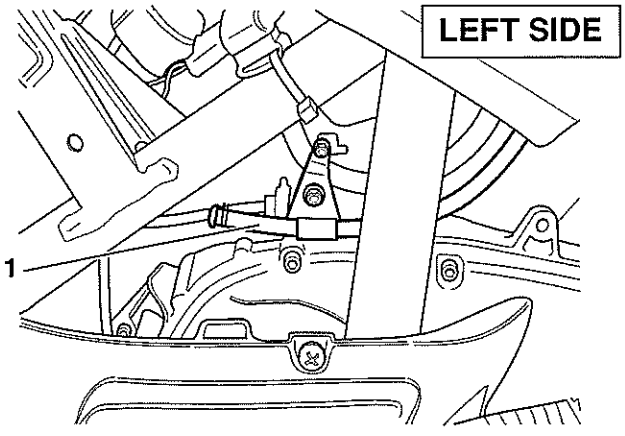
Always wear rubber or latex gloves when servicing the air cleaner. Failure to observe this warning can lead to health problems.

⚠ CAUTION

Perform these maintenance operations at one-half of the specified intervals, if this vehicle is often used in rainy or very dusty conditions, on unpaved roads.

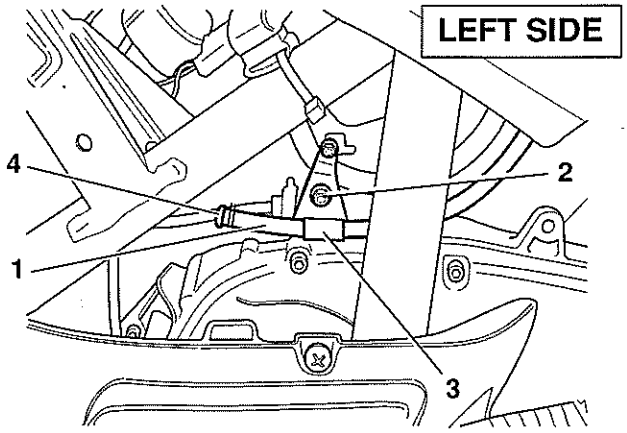
Inspect the air cleaner every 6,000 km (3,750 mi) or 12 months of use, to ensure that it has not become clogged.
The air cleaner must be inspected more frequently, cleaned if necessary, and replaced more frequently if the vehicle is used on dusty or wet roads.
More frequent cleaning of the air cleaner is suggested, especially if your bike is used under very dusty conditions.
Every 6,000 km (3,750 mi):
Remove the central fairing, (see REMOVING THE CENTRAL FAIRING) and check to see if there is dirt or contamination in the lower part of the drain tube (1).





If any contamination or dirt, coming from the filter case, is found, clean the tube as follows:
Loosen the screw (2).
Withdraw the drain tube (1) from the clamp (3).

Before cleaning, remove the air cleaner, (see REMOVING THE AIR CLEANER).
Withdraw the drain tube (1) from the clamp (3).
Remove the plug (4).
Empty the tube into some kind of container, and dispose of the material removed properly.



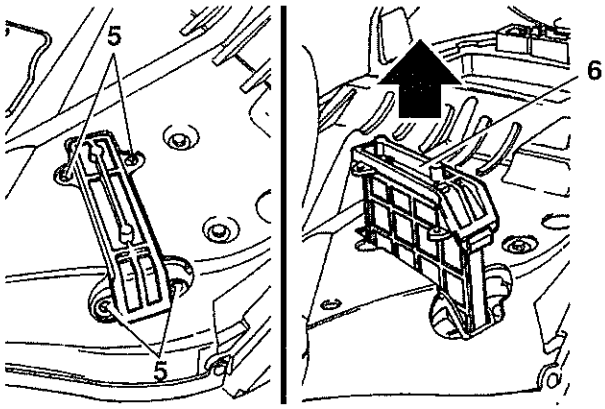
REMOVING THE AIR CLEANER

Lift the saddle, (see UNLOCKING / LOCKING THE SADDLE).

⚠ CAUTION

Before unscrewing and removing the screws (5), clean the air cleaner cover (6) and the area around it with a clean cloth. Prevent any foreign matter from getting into the inlet tubes. This could cause severe engine damage.

Unscrew and remove the four screws (5) that fasten the air cleaner cover (6).
Withdraw the air cleaner cover (6) (complete of the air cleaner assembly) by pulling it upwards.
Remove the air cleaner (5).
Make sure that the gasket (7) of the air cleaner cover (6) is intact; if it is damaged, replace it.



⚠ CAUTION

Plug the opening with a clean cloth to prevent any foreign matter from entering the intake tubes. Upon reassembly, before putting back the air cleaner cover (6), make sure that you have not left the cloth or other objects inside the case. Make sure that the air cleaner cover (6) (complete with air cleaner assembly) is positioned correctly, in such a way as to prevent non- filtered air from entering. Improperly installing the air cleaner can lead to premature wear of the piston rings, piston and cylinder.

CLEANING THE AIR CLEANER

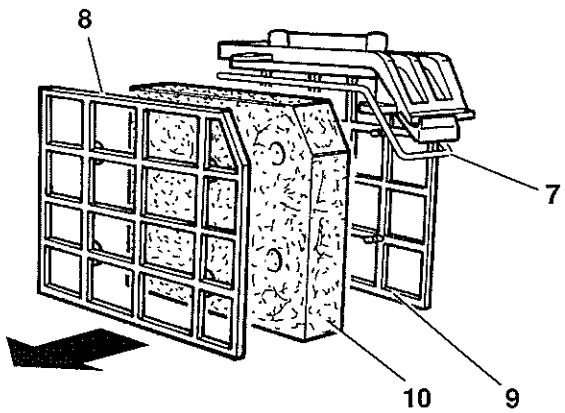
⚠ CAUTION

Take great care not to deform the grid (8) and the support (9). It is very fragile and can be easily damaged. Never use a screwdriver or other sharp hard tool to remove the air cleaner itself.

Separate the grid (8) from the support (9).
Remove the air cleaner (10).

⚠ CAUTION

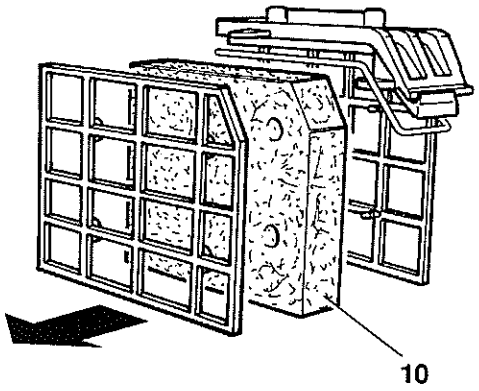
Never use compressed air to clean the air cleaner, this will destroy it.



⚠ CAUTION

When you are cleaning the air cleaner, inspect it for any tearing or holes. If it is not in perfect condition, replace it.
To clean the air cleaner (10), rinse it in non- flammable solvent, then allow it to dry thoroughly. Sparingly apply air cleaner oil, or heavy engine oil (SAE 80W - 90), then squeeze the air cleaner to eliminate any excess oil.

NOTE The air cleaner must be completely wet with oil, but not dripping.



CHANGING THE AIR CLEANER

Replace the air cleaner with a new one of the same type.

CHECKING THE ENGINE OIL LEVEL AND TOPPING UP

Read carefully LUBRICANTS, MAINTENANCE and RECOMMENDED LUBRICANT CHART.

⚠ WARNING

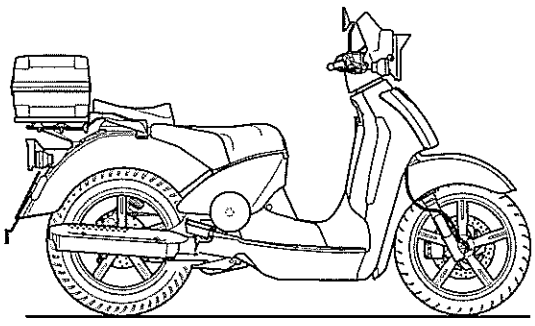
It is critical to the safe operation of this vehicle that the proper lubricants, maintained at the proper levels, are used.
Failure to heed this warning can lead to an engine seizure with subsequent accident, serious injury or death.

CHECKING

NOTE Place the vehicle on firm and flat ground. Stop the engine and let it cool down for at least ten minutes, in order to allow the oil to flow back to the oil pan and to cool down.

NOTE If you attempt to check the oil with the vehicle leaned in either direction from the vertical, your measurement will be inaccurate.

Place the vehicle on the center stand, (see PLACING THE VEHICLE ON THE STAND).

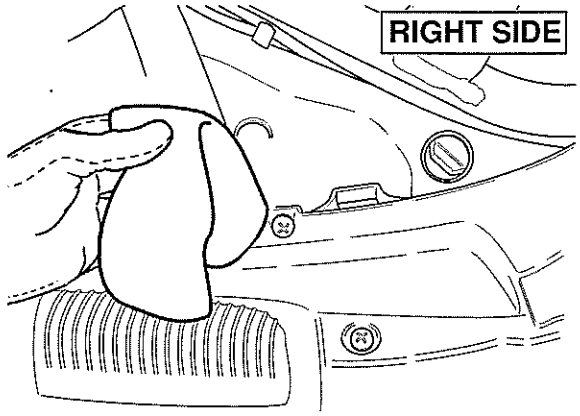


⚠ WARNING

The engine and all parts of the exhaust system, become very hot and remain hot for some time after the vehicle and the engine are stopped. Before handling any component of this vehicle after riding, insure that it has cooled sufficiently to be safe to handle.

NOTE Be sure to follow the instructions above when checking the oil. If you do not, you will get an inaccurate reading of the engine oil level.

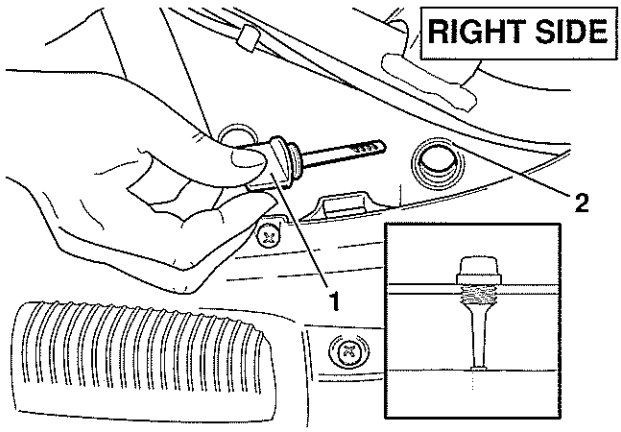
Remove the central fairing, (see REMOVING THE CENTRAL FAIRING).



⚠ WARNING

Before unscrewing and removing the plug- dipstick (1), clean it and the area of the tank around it with a clean cloth.
Prevent any foreign matter from falling into the oil tank, this could cause serious engine damage.
Do not use any flammable solvents such as alcohol or gasoline when wiping the oil tank. The oil tank is hot enough to cause ignition of flammable solvents.
Use only a nature fiber cloth, i. e. cotton.

Man made fabrics such as polyester, etc. could ignite.
Unscrew and extract the plug- dipstick (1).
Clean the part in contact with the oil with a clean cloth.



⚠ WARNING

To check the oil level, the plug- dipstick (1) must be screwed completely in the filler neck (2).

Insert the plug- dipstick (1) and screw it completely in the filler neck (2).
Unscrew and extract the plug- dipstick (1) again and read the oil level on the graduated marking:

MAX = maximum level
MIN = minimum level

The difference between "**MAX**" and "**MIN**" is about 150 cm^3 (5.1 US fl oz).

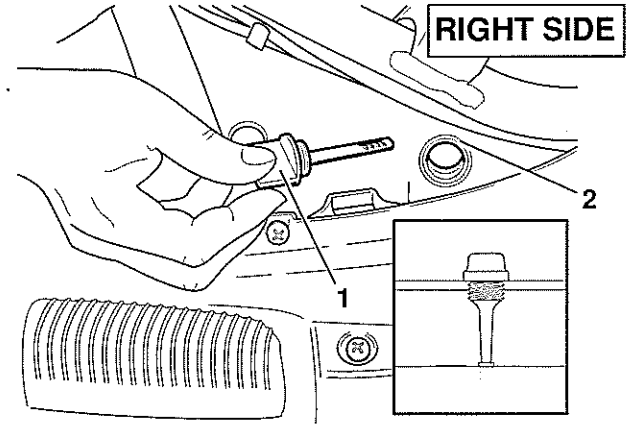
The level is correct if the oil reaches approx the "**MAX**" mark on the dipstick.

⚠ WARNING

Never exceed the "MAX" mark, nor allow the engine to be run with less oil than the "MIN". Failure to observe this warning can result in an engine seizure, with serious damage to the engine, loss of control of the vehicle, and consequent upset, serious injury, and even death.

If necessary, top up the engine oil tank:

NOTE Before topping up the engine oil tank, always check the engine oil level.



TOPPING UP

If necessary, top up the engine oil tank through the filler neck (2), after extracting the plug- dipstick (1).

⚠ CAUTION

If you use any container or funnel for topping up, make sure that it is perfectly clean.
Any foreign matter getting into the oil tank may lead to severe damage.

⚠ WARNING

Do not add any additives or other substances to the engine oil.

⚠ CAUTION

When topping up, never exceed the "MAX" level.

NOTE Top up the engine oil tank with high- quality engine oil, (see RECOMMENDED LUBRICANT CHART).

Pour a small quantity of oil in the filler neck (2) and wait about one minute, so that the oil flows uniformly into the oil pan.
Check the oil level and top up if necessary.
Top up by adding small quantities of oil, until reaching the prescribed level.

At the end of the operation:
When you have finished, replace and tighten the plug-dipstick (1).

⚠ CAUTION

Tighten the plug- dipstick (1) snugly to prevent oil from seeping out around the plug or from losing the plug.

Replace the central fairing, (see REMOVING THE CENTRAL FAIRING).

⚠ WARNING

Never ride this vehicle with low engine oil, or with contaminated oil, or with unapproved oil. Any of these will greatly accelerate the wear of your engine, and could lead to an engine seizure with subsequent upset, serious injury, or even death.

CHANGING THE ENGINE OIL AND THE ENGINE OIL FILTER

DO NOT IMPROPERLY DISPOSE OF THE DRAINED OIL. COLLECT THE DRAINED OIL, AND RETURN IT TO A RECYCLING CENTER OR OTHER APPROVED PETROLEUM PRODUCT DISPOSAL FACILITY.
Read carefully PRECAUTIONS AND GENERAL INFORMATION, LUBRICANTS, MAINTENANCE and RECOMMENDED LUBRICANT.

Check the engine oil level every 1000 km (625 mi) and change the engine oil every 6,000 km (3,750 mi).

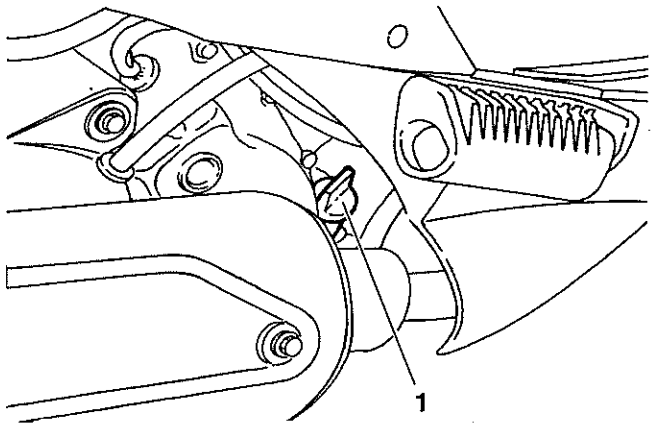
To change the engine oil, proceed as follows:
Stop the engine, and allow it to cool down for at least ten minutes, to allow the oil to drain down into the sump and cool down.
Position the motorcycle on the central stand.

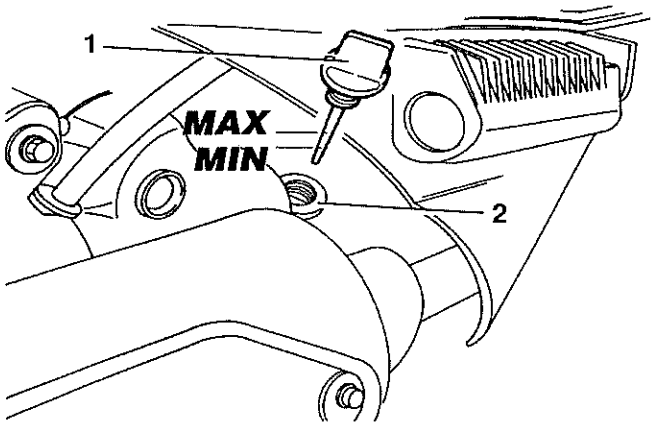
⚠ CAUTION

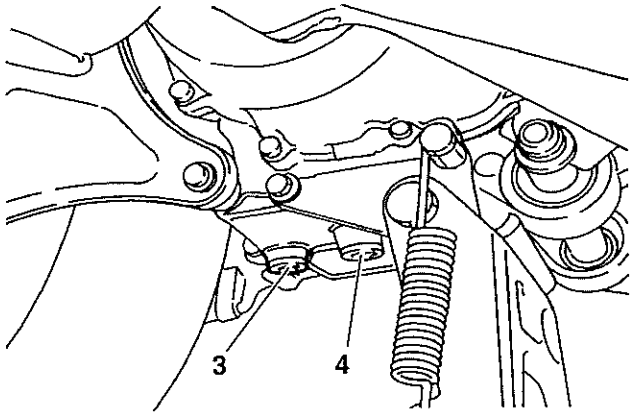
The engine oil becomes very hot in operation, and remains hot for a long time after the engine is shut down. Be very careful to avoid contact with the engine oil, or hot engine parts, in order to avoid serious burns.
Remove the central fairing, (see REMOVING THE CENTRAL FAIRING).
Unscrew and remove the oil plug-dipstick (1).
Place a pan or other container, of at least 2 quart capacity, under the sump drain plug (3).
Unscrew and remove the drain plug (3).
Drain off the oil into the container, allowing it to drip down for a few minutes.
Remove the metal residue from the magnet on the drain plug (3).
Unscrew and remove the bottom filter plug (4) and clean any residue off the bottom filter.

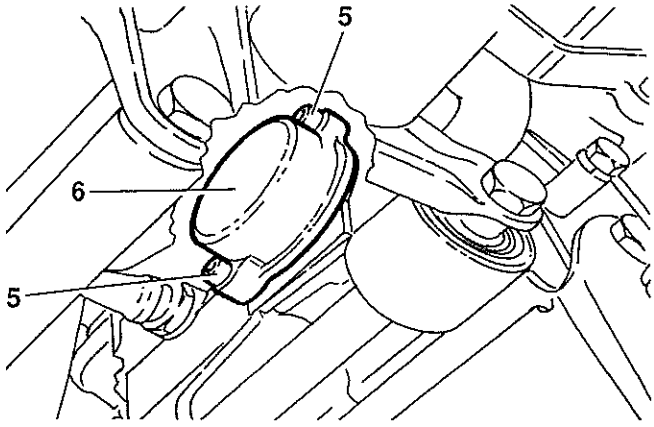
Change the engine oil filter every 6000 km (3750 miles) (or every oil change).

Unscrew the two screws (5) and remove the cover (6).
Remove the engine oil filter and replace it with a new one.
Spread a film of oil on the new oil filter ring seal.
Refit the cover (6) and tighten up the two screws (5).
Check the seal washer on the drain plug (3) then screw on and tighten up the plug.
Check the seal washer on the bottom filter plug (4), then screw on and tighten up the plug.
Pour about 1050 cm³ (35.5 US fl oz) of engine oil into the filler hole (2) (see RECOMMENDED LUBRICANT).
Screw in the plug-dipstick (1).
Start the engine and keep it idling until the engine oil pressure warning light "🛢" switches off.
Stop the engine and check the oil level (with the motorcycle on the central stand), (see CHECKING AND TOPPING UP THE ENGINE OIL).
At this point another 50 cm³ (1.7 US fl oz) of oil will have to be added, in order to fill up to approximately the "**MAX**" level.







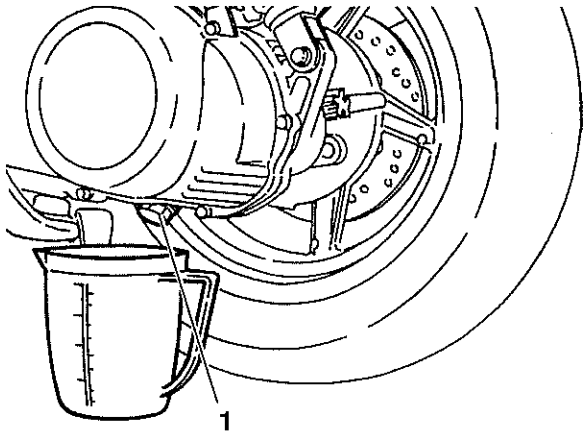


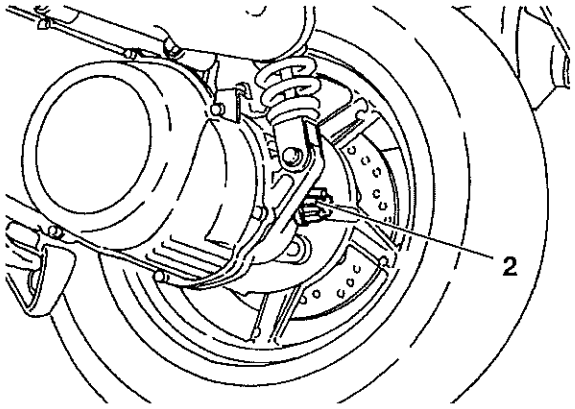
CHECKING THE TRANSMISSION OIL LEVEL

DO NOT IMPROPERLY DISPOSE OF THE DRAINED OIL. COLLECT THE DRAINED OIL, AND RETURN IT TO A RECYCLING CENTER OR OTHER APPROVED PETROLEUM PRODUCT DISPOSAL FACILITY.

Read carefully PRECAUTIONS AND GENERAL INFORMATION, LUBRICANTS, MAINTENANCE and RECOMMENDED LUBRICANT.

Every 6,000 km (3,750 miles), or 8 months, check the transmission oil level, as follows:
Remove the filler cap (2). Using a flashlight, check the level of the oil in the transmission casing.
The oil should be just level with the bottom edge of the filler hole.
If the oil level is not proper, using an oil gun or similar tool, add oil to the appropriate level. Reinstall the filler cap.





⚠ WARNING

Be sure that the filler cap is reinstalled properly and snugly. Failure to follow these instructions can lead to loss of oil, seizure of the transmission, and loss of control of the motorcycle and subsequent serious injury or even death.

NOTE Turn the rear wheel by hand while adding oil. This allows you to add it more quickly.

CHANGING THE TRANSMISSION OIL

DO NOT IMPROPERLY DISPOSE OF THE DRAINED OIL. COLLECT THE DRAINED OIL, AND RETURN IT TO A RECYCLING CENTER OR OTHER APPROVED PETROLEUM PRODUCT DISPOSAL FACILITY.

Read carefully PRECAUTIONS AND GENERAL INFORMATION.

To ensure the efficient operation and long life of the motorcycle, change the oil after the first 1000 km (625 miles) and then every 12,000 km (7,500 miles) or every 16 months.
Ride the motorcycle for a few miles, until it reaches normal running temperature, then turn off the engine.
Position the motorcycle on the center stand.
Place a 1 quart container under the drain plug (1).
Allow the oil to drain completely, until it stops dripping.
Inspect the drain plug and gasket, to be sure that it is in good condition. Reinstall and tighten it snugly.

Drain plug tightening torque: 11.1 Ft lbs (15 Nm)

Using an oil gun or similar system, add 110 cm^3 (3.7 US fl oz) of the appropriate oil through the filler hole (see RECOMMENDED LUBRICANT).

NOTE Turn the rear wheel by hand while adding oil. This allows you to add it more quickly.

⚠ WARNING

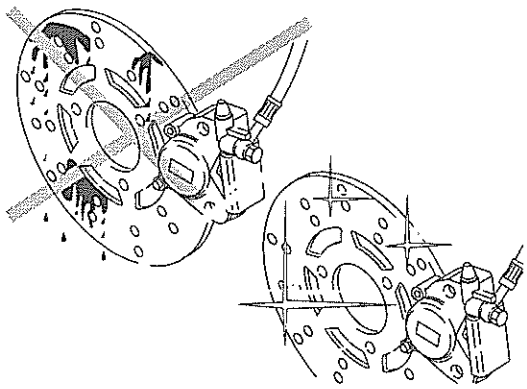
Thoroughly tighten the filler and drain plugs and make sure the oil doesn't leak out.
Check at periodic intervals to make sure there are no leaks around the sump cover gasket.
Do not use the motorcycle with insufficient lubricant, dirty lubricant or the wrong type of lubricant, as this will accelerate the wearing down of the moving parts and may cause irreparable damage.
Failure to observe this warning could lead to seizure of the transmission, with subsequent upset or loss of control, and serious injury or even death.

DISC BRAKES

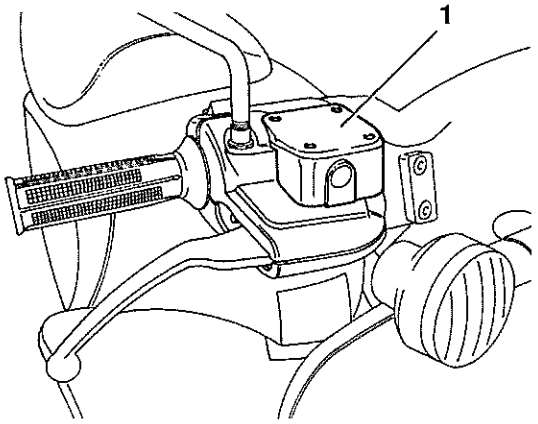
Read carefully BRAKE FLUID and PRECAUTIONS AND GENERAL INFORMATION.

⚠ WARNING

As mentioned above, the brakes are the most important safety system on this vehicle.
For your safety, they must be in perfect repair, so they should be checked every time you ride this vehicle.
Oil or other fluid on a disc will contaminate the brake pads. Dirty pads must be discarded and replaced, a dirty or oily disc must be cleaned with a high quality degreaser.
Perform these maintenance operations at one-half of the specified intervals, if this vehicle is often used in rainy or very dusty conditions, on unpaved roads.

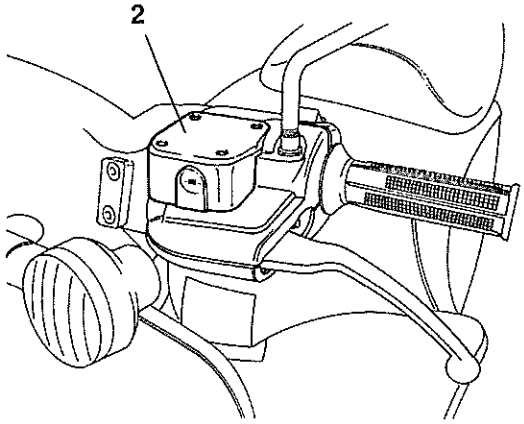


NOTE This vehicle is provided with front and rear disc brakes with separate hydraulic systems.
When the pads wear out the brake fluid level in the reservoir decreases to automatically compensate for their wear.
The front brake fluid reservoir (1) is located on the right end of the handlebar near the front brake lever.
The rear brake fluid reservoir (2) is located on the left end of the handlebar near the rear brake lever.
Check the levels of the brake fluid in the reservoirs every 6,000 km (3,750 mi), or 12 months, (see FRONT BRAKE and REAR BRAKE).
Check the wear of the pads after the first 600 mi (1,000 km) and thereafter every 2,000 km (1,250 mi), (see CHECKING THE BRAKE PAD WEAR).



⚠ WARNING

Never use this vehicle if any portion of either brake system is leaking.

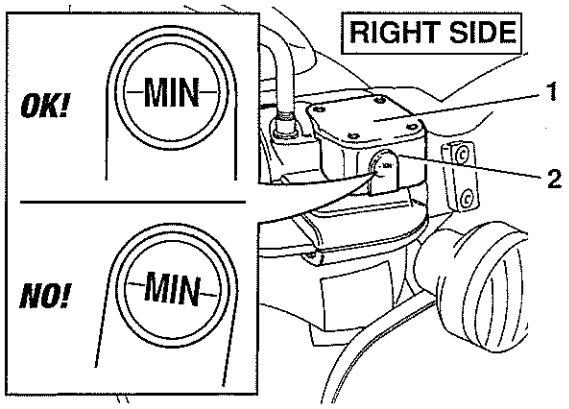


⚠ CAUTION

Check the efficiency of the brakes.
If the brake lever has too much play or is too loose, or if there are air bubbles in the circuit, check the gaskets and components of the braking system; then bleed the air from the circuit (see BLEEDING THE BRAKE CIRCUIT).

FRONT BRAKE

CHECKING THE SYSTEM



NOTE Carry out these checks only on a firm, flat surface such as a concrete garage floor.
Place the vehicle on the center stand, (see PLACING THE VEHICLE ON THE STAND).
MIN = minimum level.
Rotate the handlebar clockwise (rightwards), so that the fluid contained in the brake reservoir (1) is parallel to the "**MIN**" mark stamped on the glass gauge (2), if not, level lines in the reservoir will give an inaccurate indication.
Ensure that the fluid contained in the reservoir exceeds the "**MIN**" mark stamped on the glass gauge (2).

⚠ CAUTION

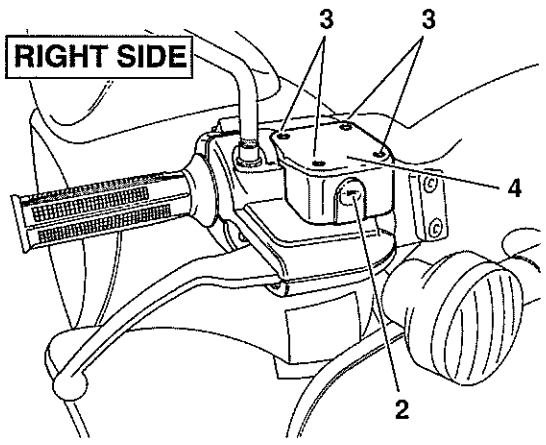
If the fluid does not reach the "MIN" mark:
When the disc pads wear out, the level of the fluid decreases progressively to compensate for their wear.

Check the front brake pad wear, (CHECKING THE BRAKE PAD WEAR) and the front disc wear.

If the pads and/or the disc do not need replacing:
Top up the reservoir, (see TOPPING UP).

TOPPING UP

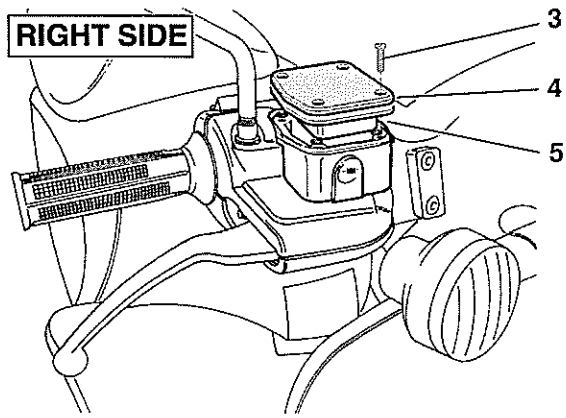
Read carefully BRAKES and DISC BRAKES.



⚠ CAUTION

To remove the two screws (3) which hold the reservoir cover (4) in place, the handlebar must be rotated so that the fluid contained in the brake reservoir is parallel to the "MIN" mark molded into the glass gauge (2).
If you do not do this, brake fluid will spill from the reservoir.

Rotate the handlebar clockwise (rightwards), so that the fluid contained in the brake reservoir is parallel to the "**MIN**" mark molded into the glass gauge (2).



⚠ CAUTION

Do not squeeze the front brake lever, and do not rotate the handlebar from its fully clockwise position with the screws (3) and the cover (4) removed. This will cause brake fluid to spill from the reservoir.

Using a Phillips screwdriver, unscrew the four screws (3) and retrieve them.
Lift and remove the cover (4), along with its gasket (5).

NOTE The gasket (5) remains located in its seat on the cover (4), however, should it come out, fit it onto its seat properly.

⚠ WARNING

Avoid any prolonged exposure of the brake fluid to the air.
The brake fluid is hygroscopic and when in contact with the air it absorbs its humidity.
Leave the brake fluid reservoir open ONLY for the time necessary for topping up.

NOTE In order not to spill the brake fluid while topping up, keep the fluid in the reservoir parallel to the reservoir rim, and do not shake the vehicle.

⚠ CAUTION

When topping up, never exceed the "MAX" level.
Top up to "MAX" only when new pads are installed.
Do not fill the reservoir to "MAX" with worn pads; this will cause fluid to overflow the reservoir when the pads are replaced.

⚠ WARNING

Use only DOT 5 or 4 fluid taken from a clean, sealed container. Never reuse used brake fluid.

- Not 5, only 3, 4, or 5.1

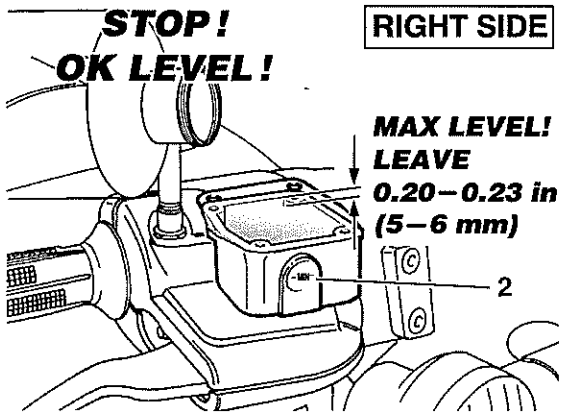
⚠ CAUTION

If you use any container or funnel for topping up, make sure that it is perfectly clean.
Any foreign matter getting into the brake reservoir may lead to severe damage.

⚠ WARNING

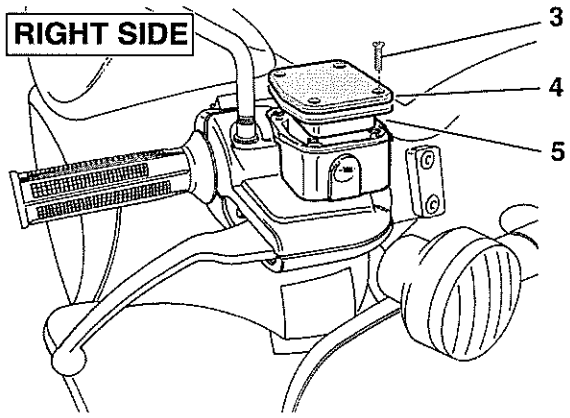
Do not add any additives or other substances to the brake fluid.

NOTE In order to reach the "**MAX**" level, top up until covering the glass (2) completely, but leave a space of 5 - 6 mm (0.20 - 0.23 in) from the brake fluid reservoir rim.
Top up the reservoir with brake fluid, until the fluid reaches the "**MAX**" level.
Replace the cover (4) and the gasket (5).
Install and tighten the four screws (3).



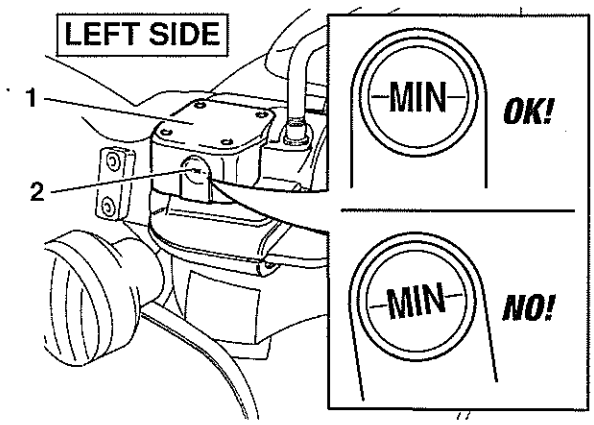
⚠ WARNING

After servicing the brakes, always check them for function.
If the brake lever is spongy or soft, or moves too close to the handle grip when it is applied, it may be necessary to bleed the brakes.
Before returning the vehicle to the customer, ride it in a safe area at a low speed, making several brake applications, to ensure that the brakes are working properly. Failure to observe this warning could lead to a serious accident with subsequent serious injury or even death.



REAR BRAKE

CHECKING THE SYSTEM



NOTE Carry out these checks only on a firm, flat surface such as a concrete garage floor.
Place the vehicle on the center stand, (see PLACING THE VEHICLE ON THE STAND).
MIN = minimum level.
Rotate the handlebar clockwise (rightwards), so that the fluid contained in the brake reservoir (1) is parallel to the "**MIN**" mark molded into the glass gauge (2), if not, level lines in the reservoir will give an inaccurate indication.
Ensure that the fluid contained in the reservoir exceeds the "**MIN**" mark molded into the glass gauge (2).

⚠ CAUTION

If the fluid does not reach the "MIN" mark:
When the disc pads wear out, the level of the fluid decreases progressively to compensate for their wear.

Check the rear brake pad wear, (CHECKING THE BRAKE PAD WEAR) and the rear disc wear.

If the pads and/or the disc do not need replacing:
Top up the reservoir, (see TOPPING UP).

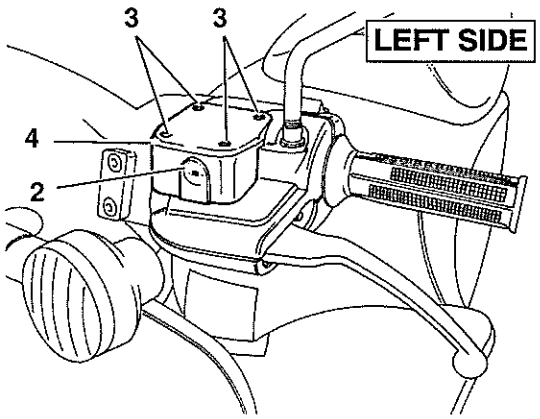
TOPPING UP

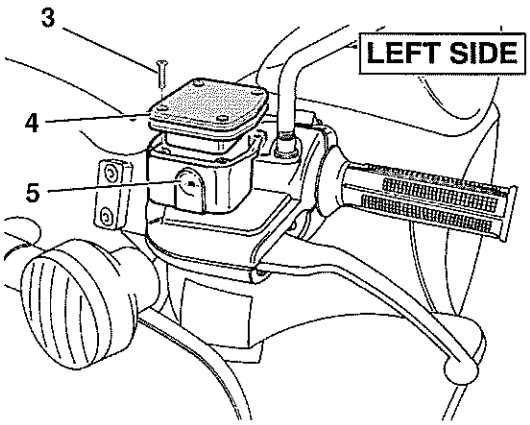
Read carefully BRAKES and DISC BRAKES.

⚠ CAUTION

To remove the four screws (3) which hold the reservoir cover (4) in place, the handlebar must be rotated so that the fluid contained in the brake reservoir is parallel to the "MIN" mark stamped on the glass gauge (2).
If not, brake fluid will spill from the reservoir.

Rotate the handlebar clockwise (leftwards), so that the fluid contained in the brake reservoir is parallel to the "**MIN**" mark stamped on the glass gauge (2).





⚠ WARNING

After servicing the brakes, always check them for function.
If the brake lever is spongy or soft, or moves too close to the handle grip when it is applied, it may be necessary to bleed the brakes.
Before returning the vehicle to the customer, ride it in a safe area at a low speed, making several brake applications, to ensure that the brakes are working properly.
Failure to observe this warning could lead to a serious accident with subsequent serious injury or even death.

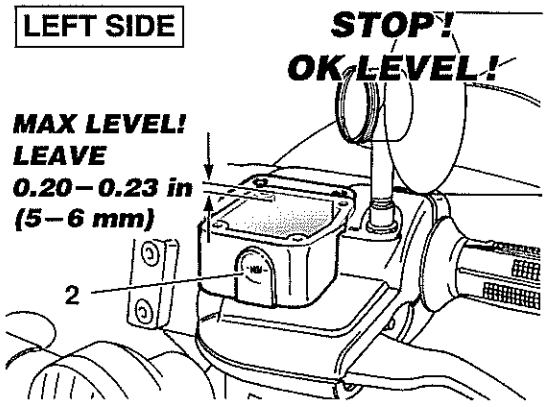
Using a short Phillips screwdriver, unscrew the four screws (3) and retrieve them.
Raise and remove the cover (4) together with the gasket (5).

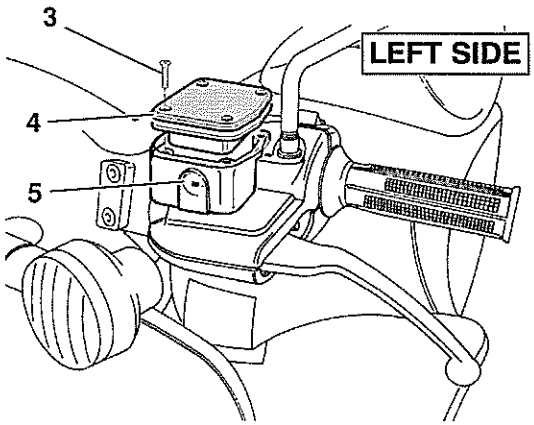
NOTE The gasket (5) remains located in its seat on the cover (4); but if it has come out, correclty replace it.

NOTE In order to reach the "**MAX**" level, top up until covering the glass (2) completely, but leave a space of 5 - 6 mm (0.20 - 0.23 in) from the brake fluid reservoir rim.

Top up the reservoir with brake fluid, until the fluid reaches the "**MAX**" level.

Replace the cover (4) together with the gasket (5).
Install and tighten the four screws (3).





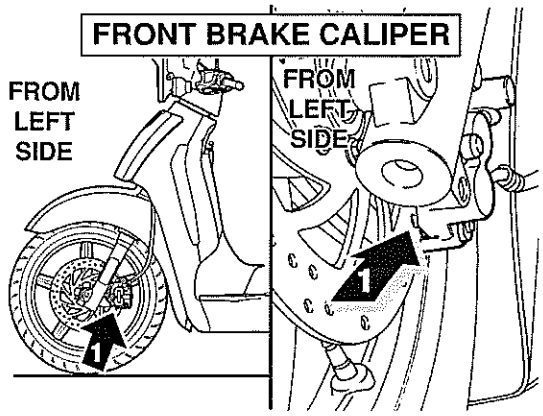
CHECKING THE BRAKE PAD WEAR

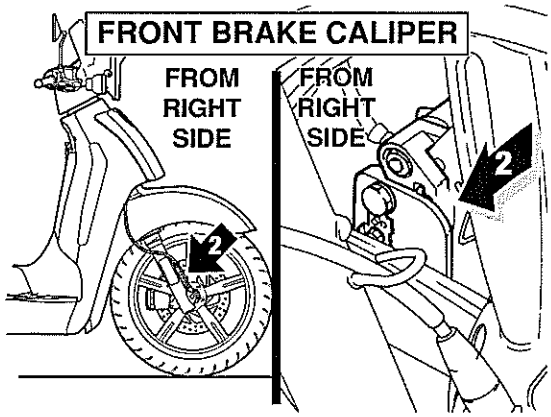
Read carefully BRAKES, DISC BRAKES and MAINTENANCE.

NOTE This vehicle is equipped with disc brakes and two separate brake systems.
The front brake system is equipped with a single disc on the left side of the front wheel.
The rear brake system is equipped with a single disc on the left side of the wheel.
The following information may refer to a single braking system, but is applicable for both braking systems.

⚠ CAUTION

Perform these maintenance operations at one-half of the specified intervals. If this vehicle is often used in rainy or very dusty conditions, on unpaved roads.
Check the brake pad wear after the first 1,000 km (600 mi), before every trip and thereafter every 2,000 km (1,250 mi).
The amount of wear that the brake pads experience depends on how the vehicle is used, how aggressively it is driven, and the condition of the roads upon which it is operated. Wear will be faster than normal when the vehicle is driven aggressively, or on dusty or wet roads.





CHECKING WEAR OF THE BRAKE PADS

Place the vehicle on the center stand, (see PLACING THE VEHICLE ON THE STAND).

NOTE The front brake caliper is equipped with two pads.

The rear brake caliper is equipped with two pads.
Perform a visual check of the friction material thickness. Use a flashlight and a mirror if necessary.

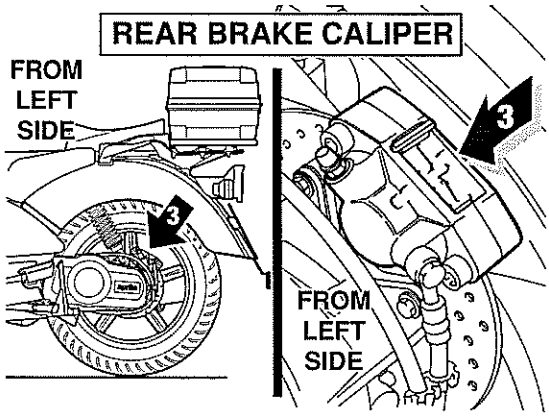
See:
- the arrow (1) for the left front pad;
- the arrow (2) for the right front pad;
- the arrow (3) for the left and right rear pad.

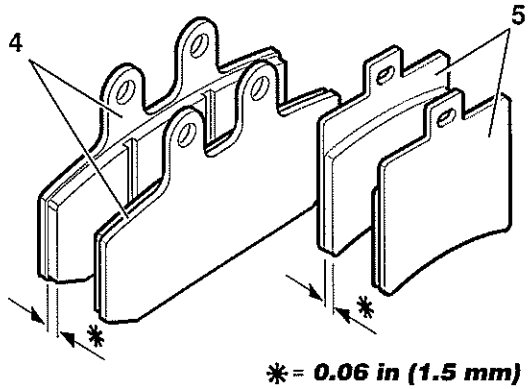
If the friction material on one pad, front (4) or rear (5), is worn to **1.5 mm (0.06 in)** or less:

- **for the front brake calipers**, replace both pads of the front brake caliper.
- **for the rear brake caliper**, replace both pads of the rear brake caliper.

⚠ WARNING

Excessive wear of the friction material will cause the pad metal support to contact the disc.
Metal to metal contact will greatly reduce braking efficiency, and safety will be seriously compromised.
Also, the discs will inevitably be destroyed.
Failure to heed this warning could lead to a crash with subsequent serious injury or even death.





***= 0.06 in (1.5 mm)**

BLEEDING THE BRAKES

Read carefully DISC BRAKES.
If there is air in the hydraulic system, it acts as a cushion and absorbs much of the pressure exerted by the brake master cylinder, thus reducing the effectiveness of the brake calipers when braking. If there is air in the circuit, the brake control has a "spongy" feel and the braking capacity is reduced.

NOTE The following instructions apply to both brake circuits (FRONT and REAR).

⚠ WARNING

Air in the hydraulic system will cause loss of braking efficiency. Be sure that before the motorcycle is used, the brakes are properly bled. Failure to adhere to these instructions can lead to loss of braking efficiency and control of the motorcycle with subsequent serious injury or even death.

Unscrew the four screws (1) on the brake fluid reservoir (2). Remove the cover (3).

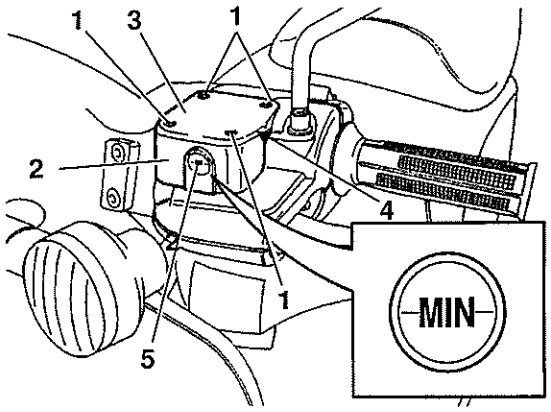
NOTE When topping up the brake fluid, make sure the fluid in the reservoir is kept parallel to the ground, otherwise the fluid will spill out.

Remove the gasket (4).

Make sure that the fluid completely covers the glass gauge (5), topping up if necessary.

Remove the protective rubber cap from the bleed valve (6).

Fit one end of a transparent plastic tube (7) on to the bleed valve (6).

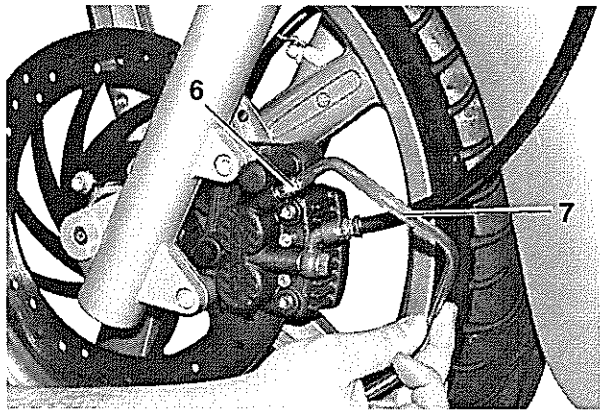


⚠ WARNING

Contamination of the brake pads or disc can cause complete loss of brake effectiveness.
Be very careful not to contaminate either the disc or the pads with brake fluid while bleeding the brakes. Failure to adhere to this warning can lead to a complete loss of brake effectiveness, loss of control, a crash, and subsequent serious injury or even death.

Place the other end of the transparent tube into an appropriate container. Pull the brake lever slowly and completely two or three times. Loosen the bleed valve (6), then pull the lever and observe whether or not bubbles of air are coming out of the brake caliper through the plastic tube. Pull the lever with the bleeder valve (6) open, tighten the bleeder valve, and then release the lever. This technique will prevent air from entering the system through the bleed nipple.

When bubble-free brake fluid is seen in the tube, snugly tighten the bleed nipple, then release the brake lever.

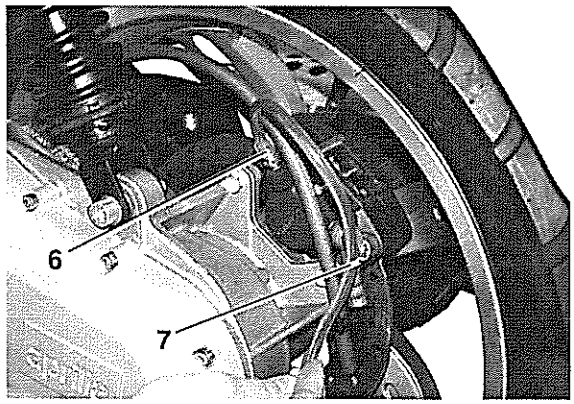


Bleed valve (6) tighten torque:
14 Nm (1.4 kgm) [10.3 ft-lbs].

NOTE Repeat this process until no more bubbles are seen.

⚠ WARNING

After completing bleeding, pull the brake lever several times, until you see that it always pulls the same amount. Check the proper operation of the brakes. Ride the motorcycle in a safe area, without traffic, and apply the brakes several times, before returning the motorcycle to the customer.



COOLANT

⚠ CAUTION

The vehicle must not be used if the coolant is below the minimum prescribed level.
Perform these maintenance operations at one-half of the specified intervals, if this vehicle is often used in rainy or very dusty conditions, on unpaved roads.

Check the coolant level after the first 1,000 km (600 mi), thereafter every 2,000 km (1,250 mi), before riding and after long trips.

⚠ WARNING

Coolant is poisonous! Do not ingest coolant under any circumstance.
Should you get coolant in your mouth, rinse with cool water and immediately seek medical attention. Coolant is also very dangerous to your skin and eyes.
Should you accidentally get coolant on your clothing or skin, change clothes immediately. Wash coolant from your skin with hot water and soap. Should you get coolant in your eyes, flush with plenty of cool water and seek professional medical help at once. Should someone swallow coolant accidentally, induce vomiting, rinse mouth with water, and immediately seek professional medical attention.

DISPOSE OF THE COOLANT PROPERLY.
BE SURE TO KEEP THE DRAINED COOLANT AWAY FROM CHILDREN AND PETS. IT IS SWEET TASTING, AS WELL AS EXTREMELY POISONOUS, AND IS VERY ATTRACTIVE TO CHILDREN AND PETS.

Use extra caution not to spill the coolant on any hot parts of the engine. It is flammable, and can emit invisible, noxious fumes.
Always wear rubber or latex gloves when servicing the cooling system.

The coolant is composed of 50% distilled water and 50% nitrite-free antifreeze.
This mixture is optimum for all temperatures down to -35°C. This mixture of antifreeze and distilled water should be used year-round, winter and summer, since evaporative losses are thus minimized and excellent corrosion protection is provided.

⚠ CAUTION

Never use tap water in the cooling system.
Use only distilled water. This will minimize the deposition of minerals in the radiator, as coolant evaporates, and minimize also the reduction in the efficiency of the cooling system, which occurs when hard, mineral laden water is used.

If your motorcycle is used at temperatures below freezing, check the coolant often.
If it is used at temperatures below -35°C, increase the proportion of antifreeze in the coolant as instructed by the antifreeze manufacturer, up to a maximum of 60% (40% water).

CHECKING AND TOPPING UP

⚠ WARNING

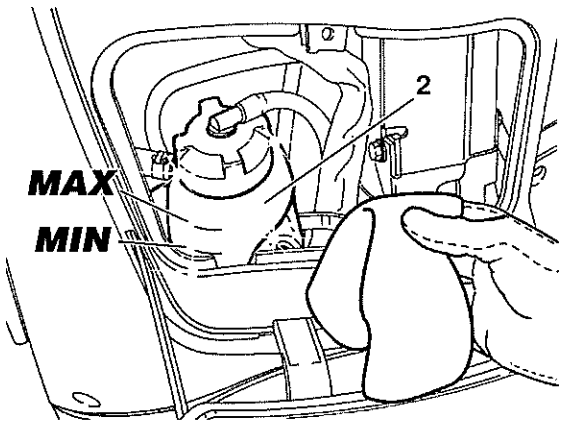
Be aware of the risk of burns from the coolant. Check the coolant level and top up the expansion tank only after the engine has thoroughly cooled.

NOTE Place the vehicle on firm and flat ground.
Remove the front inspection cover, (see REMOVING THE FRONT INSPECTION COVER).

NOTE If the expansion tank is dirty, wipe it with a clean cloth so that you can see the "**MIN**" and "**MAX**" marks.

Ensure that the level of the fluid in the expansion tank (2) is between the "**MIN**" and "**MAX**" marks.
If not:
MIN = minimum level.
MAX = maximum level.
If not, proceed as follows:

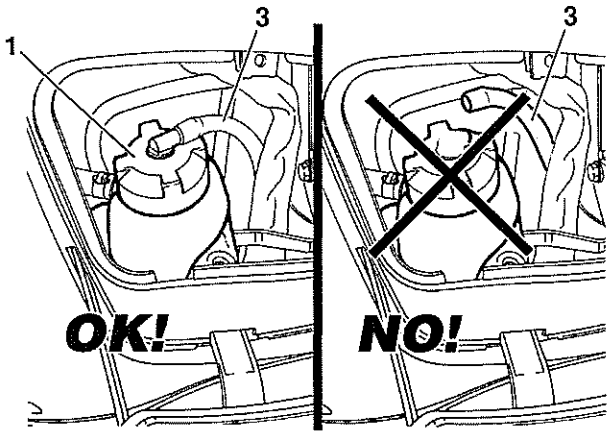
NOTE The filler cap (1) is equipped with a breather tube (3). Do not disconnect the breather tube (3).



⚠ CAUTION

If dirt has accumulated on or around the filler cap, wipe the cap and the area around the cap with a clean cloth. Prevent any foreign material from getting into the expansion tank, this could lead to serious engine damage.

Loosen the filler cap (1) one-half turn counterclockwise (not more), without removing it.
Wait a few seconds in order that any pressure may be released.
Unscrew and remove the filler cap (1).



⚠ WARNING

Never use your fingers or any other object to check the coolant level.

⚠ CAUTION

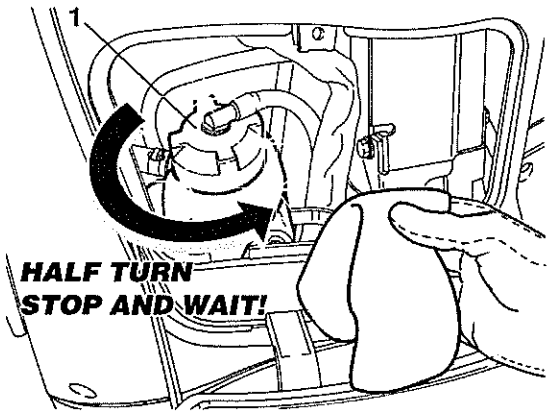
If you use any container or funnel for topping up, make sure that it is perfectly clean.
Any foreign matter getting into the expansion tank may lead to severe damage.

Top up with coolant, (see RECOMMENDED LUBRICANT) until the coolant level reaches approximative the "**MAX**" mark.

Do not exceed this level, otherwise the coolant will flow out while the engine is running.

Replace the filler cap (1).

Replace the front inspection cover, (see REMOVING THE FRONT INSPECTION COVER).



CHANGING THE COOLANT

Read carefully COOLANT and PRECAUTIONS AND GENERAL INFORMATION.

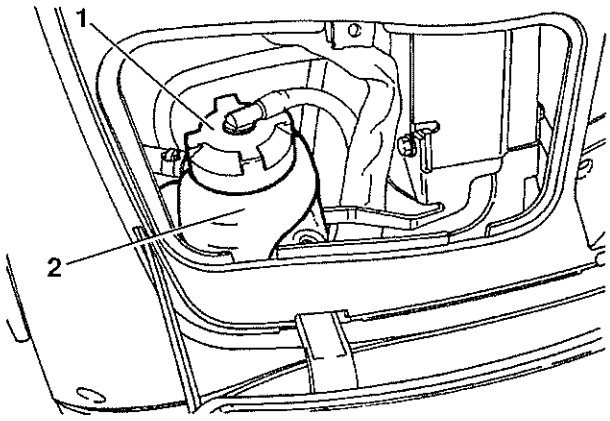
Do not use the motorcycle if the coolant is below the minimum level.

Check the coolant every 2,000 km (1,250 miles), and after long trips. Change the coolant every 24 months, regardless of mileage.

⚠ WARNING

Stop the engine and wait until the engine and exhaust system have cooled down.
DO NOT IMPROPERLY DISPOSE OF THE DRAINED OIL. COLLECT THE DRAINED OIL, AND RETURN IT TO A RECYCLING CENTER OR OTHER APPROVED PETROLEUM PRODUCT DISPOSAL FACILITY.

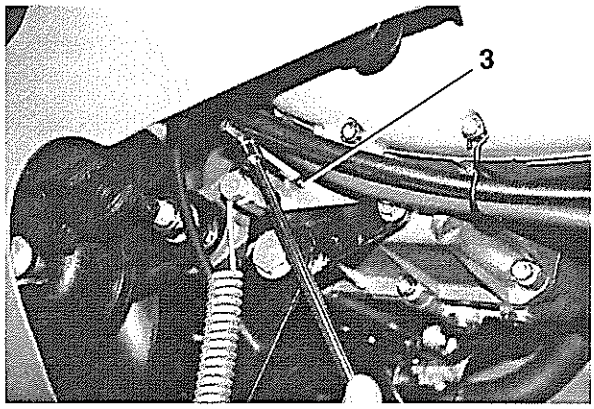
Place the motorcycle on the center stand.
Remove the front inspection cover (see REMOVING THE FRONT INSPECTION COVER).

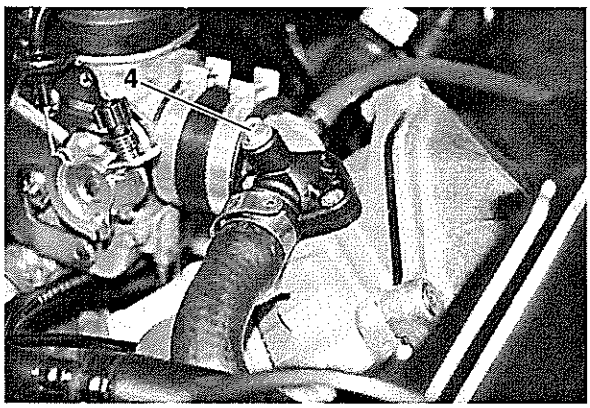


⚠ WARNING

Do not remove the coolant expansion tank cap while the engine is still hot.
This will cause hot coolant to spill out.
If this hot coolant comes in contact with your skin or clothing, you will be seriously burned.
Wait until the engine is cool to remove the cap.

Unscrew and remove the cap (1) from the expansion tank (2).
Place a 2 quart container under the drain plug (3).
Unscrew and remove the drain plug (3).
Wait until the coolant has all drained out into the container, then dispose of it properly.
Screw in and tighten up the drain plug (3).
Pour 1200 cm³ (40.5 US fl oz) of coolant into the expansion tank.
Check that the fluid comes out of the breather screw (4).
Top up until the fluid is approximately at the "**MAX**" level.
Do not exceed this level, as this will cause the fluid to spill out when the engine is running.
Replace the filler cap (1).





⚠ CAUTION

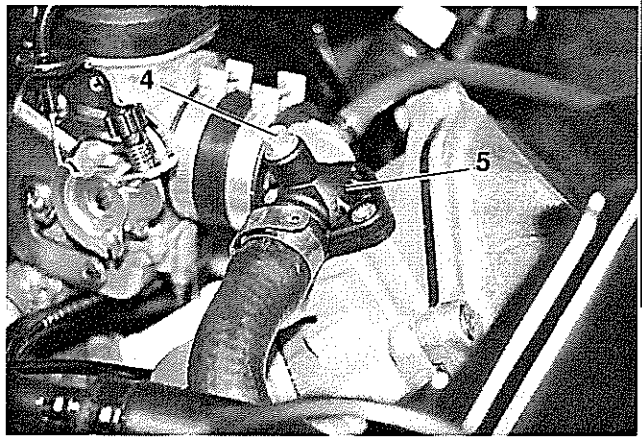
The exhaust fumes contain carbon monoxide, a poisonous gas that can cause loss of consciousness and even death.
Work in a well-ventilated area.

Start the engine and allow it to idle.

⚠ WARNING

The coolant is under pressure; unscrew the breather screw (4) slowly to avoid hot fluid squirting out.

Place a container under the engine to catch any coolant which spills from the bleed screw (4).
Loosen the bleed screw (4) on the thermostat valve (5); allow a little fluid to flow out, to ensure that the system is purged, then tighten the bleed screw (4).
Ride the motorcycle for a few kilometers.



2

Stop the engine and wait until the engine and exhaust system have cooled down.

Bleed the thermostat valve again.

Replace the front inspection cover (see REMOVING THE FRONT INSPECTION COVER).

⚠ CAUTION

If the coolant level in the expansion tank decreases, check the entire cooling system for leaks.

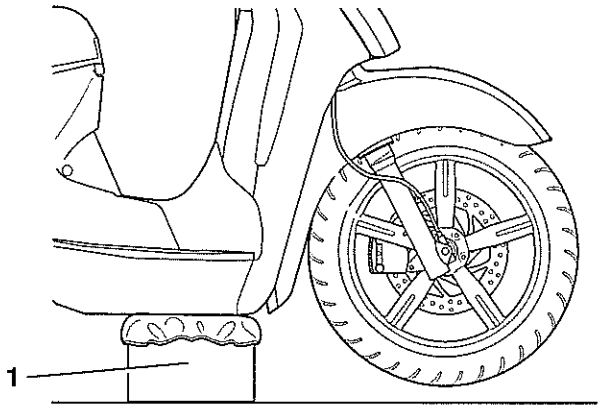
⚠ CAUTION

Use only antifreeze and anticorrosive without nitrite, ensuring protection at least -35°C (-31°F).
Engine coolant (recommended): ECOBLU -40°C (-40°F) or AGIP COOL.
Failure to use appropriate antifreeze, mixed with distilled water, as coolant, can lead to serious damage to the motorcycle's cooling system, which can cause engine seizure, and subsequent upset with serious injury or even death.

CHECKING THE STEERING

Read carefully MAINTENANCE.
Periodically check the steering slack.
To check the steering:
Place the vehicle on the center stand, (see PLACING THE VEHICLE ON THE STAND).

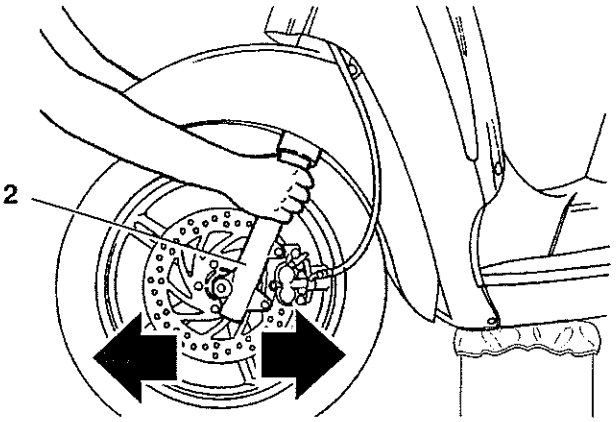
NOTE Prepare a 200 mm (7.87 in) high support, the base of which must measure 200 x 200 mm (7.87 x 7.87 in).
Place the support (1) under the vehicle and a soft cloth between them, so that the front wheel can move freely and the vehicle cannot fall down.



⚠ WARNING

Once placed on the stand, the vehicle can fall off. If it does, it will surely be damaged and can injure you and bystanders as well. Make sure that the vehicle is stable on the stand.

Move the fork (2) back and forth in the direction of travel as shown in the illustration (**Pos A**).
NOTE Do not shake the fork excessively. If you do, you may get the false impression that the steering bearings are loose, when in reality what you are feeling is slack in the center stand.
Repeat the check several times, using great care.
If you detect any slack in the steering head, the steering head must be adjusted.



To adjust:
Remove the inner front shield (REMOVING THE INNER FRONT SHIELD).
Slacken the locknut (3).

⚠ CAUTION

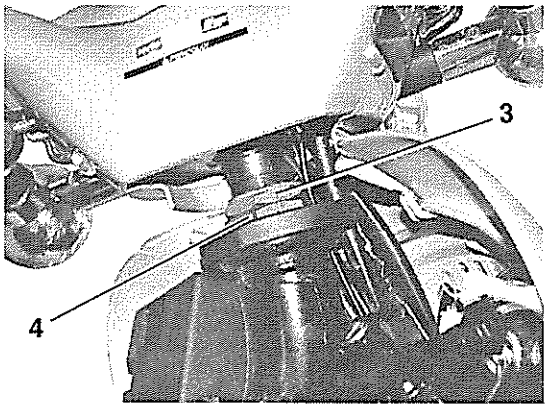
Do not overtighten the adjustment nut (4), as this will damage the steering bearings.

Screw in the adjustment nut (4) to take up the play in the bearings.
Check the play by shaking the fork back and forward in the direction of travel and ensuring that the steering turns smoothly and freely.

Using a narrow wrench, hold the adjustment nut (4).
Snug up the lock nut (3), using the appropriate wrench.

Torque wrench setting for locknut (3):
110 Nm (11 kgm) [81.1 Ft-lbs].

Repeat the examination of the fork bearings.
Should any slack be detected, or should the slightest trace of roughness or binding be felt when the handlebars are turned from locked to locked, the adjustment procedure must be repeated.



CHECKING THE SWINGING ARM PIVOT

Read carefully MAINTENANCE.

Every 6,000 km (3,750 miles), check the play in the swinging arm pivot bushings.

Place the vehicle on the center stand, (see PLACING THE VEHICLE ON THE STAND).

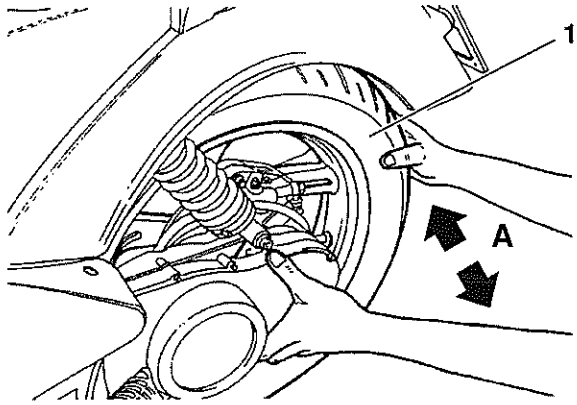
⚠ WARNING

Ensure that the motorcycle is stable.
If it falls, it may injure you or bystanders, as well as damaging property, and being damaged itself.

⚠ WARNING

Before carring out the following operations, let the engine and the exhaust silencer cool down until they reach room temperature, in order to avoid burns.

Move the wheel back and forth (1).
If any slack is detected, the bushings and pivot must be repaired.



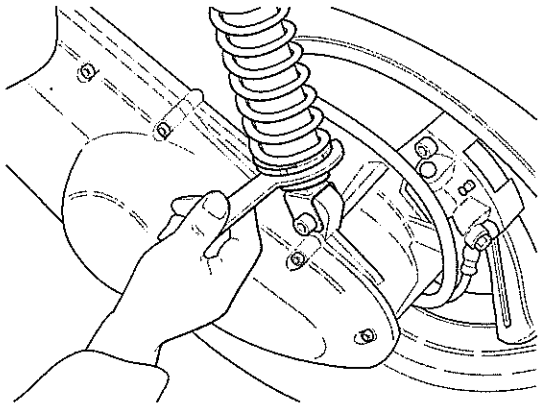
INSPECTING THE FRONT SUSPENSION

Read carefully PRECAUTIONS AND GENERAL INFORMATION and MAINTENANCE.

Inspect the front suspension after the first 1,000 km (625 miles) and then every 6,000 km (3,750 miles) or 8 months.
Change the front suspension oil every 30,000 km (18,750 miles) or 4 years, (see FRONT SUSPENSION).
Check the fork for signs of oil leaks and inspect the legs to make sure there are no surface scratches or score marks. Replace all damaged parts with new ones.

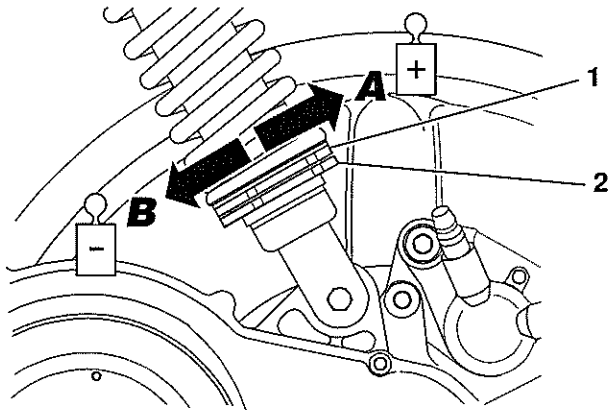
Perform the following checks:
While pulling the front brake lever firmly, push up and down on the handlebars so the fork moves up and down.
The action must be smooth, and there must be no traces of oil on the fork legs.
Check that all the components are properly tightened and that the front suspension joints are working efficiently (see FRONT SUSPENSION).

INSPECTING THE REAR SUSPENSION



The rear suspension uses a double-acting shock absorber, which provides damping on both compression and extension strokes.
It is attached to the engine through silent block bushings.
The shock absorber is provided with a ring nut to adjust the spring preload.

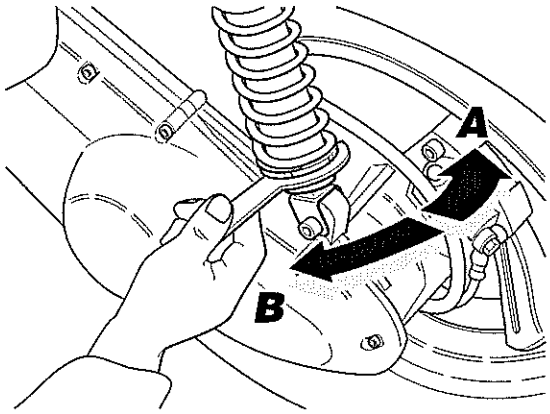
ADJUSTING THE SHOCK ABSORBER SPRING PRELOAD



The rear shock absorber's factory setting is suitable for a rider weighing about 70 kg (155 lbs). However, it is possible to tune the suspension to your preference by using the adjusting ring nut.

⚠ CAUTION

When adjusting the rear shock absorber spring preload, always start from the least rigid setting. This is the fully clockwise (arrow B) position of the ring nut (1). The ring nut (1) must not be screwed [counterclockwise rotation (arrow A)] for more than 14 mm (0.55 in). If this limit is exceeded, even the slightest unevenness of the ground will make the vehicle jerk while running.



Working from the left side of the vehicle:
Loosen the locking ring nut (2) by means of the appropriate spanner.
Adjust the ring nut (1) to adjust the shock absorber spring preload (see table).

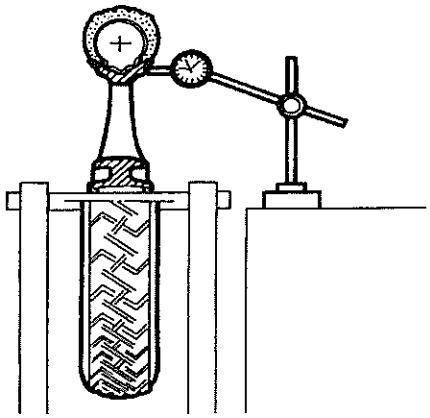
After the adjustment:
Hold the ring nut (1) from rotating with the appropriate spanner and tighten the locking ring nut (2) by means of the appropriate spanner.

NOTE Ride the vehicle for several miles on the road between each adjustment to determine which adjustments are most suitable.

Adjusting ring nut (1)	Counter-clockwise rotation (arrow A)	Clockwise rotation (arrow B)
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	Rider and passenger	Solo rider

WHEELS

Read carefully PRECAUTIONS AND GENERAL INFORMATION.



Inspect the rim and wheel for any dents or cracks or other damage.
If any damage is present, replace the wheel.
Never attempt to repair a wheel.
Check the runout of the wheels using an indicator as shown in the figure.
If the runout exceeds the limit, carefully inspect the wheel and the bearings.
If you cannot resolve the problem, replace the wheel.

Runout limit:
Vertical: 2 mm (0.07 in)
Lateral: 2 mm (0.07 in)

Check the balance of the wheel by revolving the wheel slowly a few times in its stand, as shown.
Note where the wheel stops.
If it is not statically balanced, it will always stop at the same point. Install a balance weight at the lightest point, and recheck, until the wheel stops at random places when it is rotated slowly.

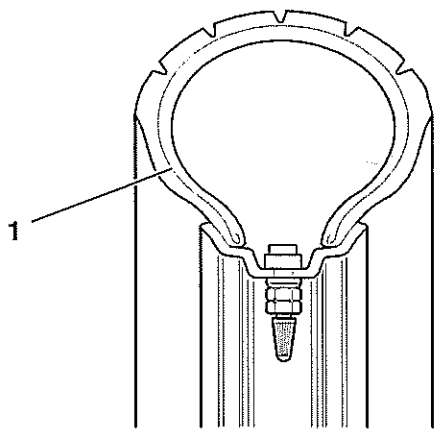
TIRES

This vehicle is equipped with tubeless tires.

⚠ WARNING

Perform these maintenance operations at one-half of the specified intervals, if this vehicle is often used in rainy or very dusty condition, on unpaved roads, or in any kind of competition.
Check the tire inflation at room temperature at least once a week. Check the conditions of the tire and the inflation pressure at room temperature after the first 1,000 km (600 mi) and thereafter every 6,000 km (3,750 mi), see TECHNICAL DATA.
Pressure measurement must always be carried out when the tires are cold, as when the tires are warmed up, pressure will increase, and if they are checked at this time erroneous readings will be seen.
If the tire is inflated to too high a pressure, an uncomfortably harsh ride will result, and riding comfort will be compromised. Also, road holding, especially during turns and in wet conditions, will likewise be compromised. If the tire is underinflated (pressure is too low), the tire may slip on the rim with consequent loss of control. Again, road holding and handling characteristics will be degraded, and brake performance will be reduced.
When the tire is worn to a point where any tread is less than 3 mm (0.12 in) deep, the tire is worn out, and must be replaced. Also, if a tire suffers a puncture that is larger than 5 mm (0.20 in) in its longest dimension, the tire must not be repaired, but should be replaced. Failure to follow these instructions can result in loss of control, with subsequent upset, serious injury, and even death.

INFLATION PRESSURE		
RIDER ONLY	front	190 KPa (1,9 bar/27.5 psi)
	rear	190 KPa (1,9 bar/27.5 psi)
WITH PASSENGER	front	200 KPa (2.0 bar/29 psi)
	rear	220 KPa (2.2 bar/31.9 psi)



After you have repaired and reinstalled the tire, balance the wheel. Use only tires that are listed in the technical data, see TECHNICAL DATA.

Ensure that valve caps are installed on all tires. This is important to prevent sudden flats.

If the wear indicators show that the tire is worn out, the vehicle upon which it is mounted must not be used.
Failure to heed this warning can lead to an accident with subsequent serious injury or even death.

Some of the original equipment tires for this vehicle are provided with wear indicators.
There are several kinds of wear indicators.

Visually check to see if the tires are worn out. If they are, replace them.

You should inform your customers that if a tire should go flat while they are riding, they must not attempt to continue riding.
Also, they must avoid abrupt braking and steering inputs, and avoid shutting the throttle quickly. They should slowly decrease the throttle setting, moving to the side of the road, using engine compression to slow the vehicle. Non-compliance with these instructions may cause an accident with consequent risk of serious injury or even death.

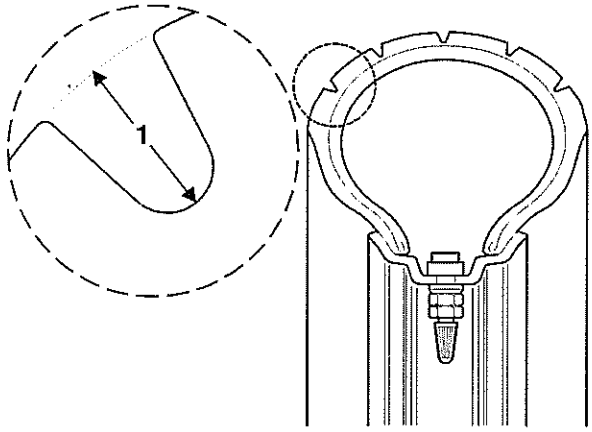
If the tires are very old, even if they are not completely worn out, they may have become so hard that road holding is compromised. In this case, replace the tires.

Do not install tires with inner tube on rims for tubeless tires and viceversa.

Repair, maintenance, changing and balancing of tires are very important to your safety, and should only be performed by qualified mechanics using the appropriate tools.

New tires are often covered with a slippery mold release compound. Inform your customer that they should scrub new tires in by riding slowly and making numerous turns for the first few miles. Do not use any kind of tire dressing or other liquid on your tires. Especially do not permit any petroleum products, such as oil, gasoline or brake fluid to come in contact with the tires. If you do, wipe it immediately, then scrub the tire with soap and water and a stiff brush.

Do not use a tire that is worn out.
Minimum tread depth is measured as shown above. The minimum tread depth (1) for both the front and the rear tires is 3 mm (0.12 in).



TORQUE WRENCH SETTINGS TABLE

Component	Size	Torque	
		[Nm] (Ft-lbs)	[Kgm]
Front wheel axle bolt	M14	80 (59)	8,0
Rear wheel nut	M14	110 (81.1)	11,0
Connecting rod-to-frame nut	M12	50 (36.9)	5,0
Connecting rod joint nut	M12	50 (36.9)	5,0
Connecting rod-to-engine nut	M12	50 (36.9)	5,0
Connecting rod silent block-to-frame bolt	M10	40 (29.5)	4,0
Connecting rod silent block-to-connecting rod nut	M10	40 (29.5)	4,0
Handlebar fastener bolt	M10	40 (29.5)	4,0
Handlebar safety pin	M8		
Shock absorber upper mounting bolt	M10	40 (29.5)	4,0
Shock absorber lower mounting bolt	M10	40 (29.5)	4,0
Exhaust-to-cylinder nut	M8	30 (22.1)	3,0
Exhaust-to-plate nut	M8	27 (19.9)	2,7
Exhaust-to-plate bolt	M8	27 (19.9)	2,7
Exhaust plate-to-engine bolt	M8	27 (19.9)	2,7
Rear brake calliper fastener bolt	M8	27 (19.9)	2,7
Front brake calliper fastener bolt	M8	27 (19.9)	2,7
Brake master cylinder clips fastener screw	M6	9 (6.6)	9,0
Brake tubes-to-master cylinders fastener screws	M10	20 (14.7)	2,0
Brake tubes-to-brake callipers fastener screws	M10	20 (14.7)	2,0
Brake calliper bleed screw	M8	14 (10.3)	1,4
Steering set self-locking nut	M36	110 (81.1)	11,0
Fork head to fork tube bolt	M8	27 (19.9)	2,7
Fork pinch screw-to-wheel bolt	M6	12 (8.8)	1,2
Parcel grid and passenger handle bolt	M8	27 (19.9)	2,7
Center stand-to-plate fastener bolt	M10	35 (25.8)	3,5
Center stand plate-to-engine bolt	M8	27 (19.9)	2,7
Coolant drain plug (on engine)	M16	10 (7.4)	1,0
Engine oil drain plug	M12	15 (11.1)	1,5
Engine oil filter cover fastener screw	M6	10 (7.4)	1,0
Transmission oil drain plug	M12	15 (11.1)	1,5
Fuel pump-to-tank fastener nut	M5	2 (1.5)	0,2

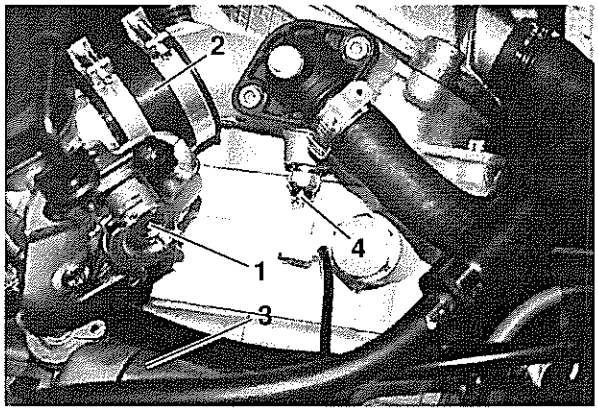
Note: the torque settings given are the standard rated values. Acceptable tolerance is ± 5%

NOTE

3 Engine

ENGINE COMPONENTS THAT CAN BE REMOVED WITHOUT REMOVING THE ENGINE

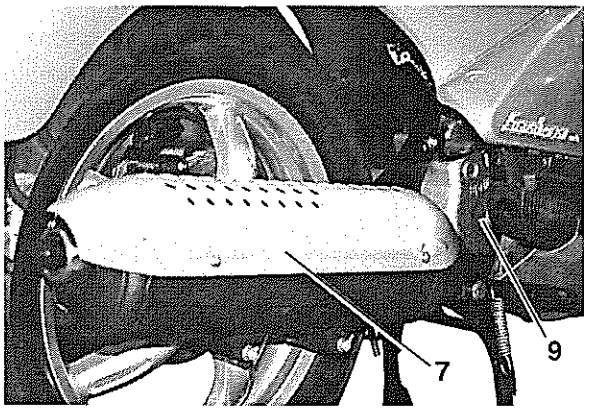
The parts listed below can be removed and refitted without removing the engine from the frame.



TOP
Carburetor (1) see CARBURETOR
Inlet manifold (2)
Starter motor (3)
Coolant thermistor (4) (above cylinder head)

FRONT
Tappet cover (5)

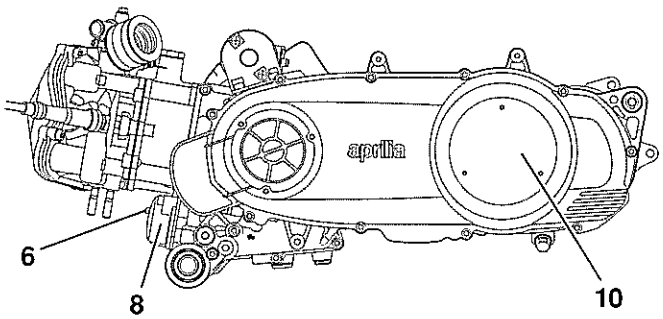
UNDERNEATH
Oil pressure sensor (6) (under cylinder head) see REMOVING THE EXHAUST MUFFLER
Exhaust muffler (7)
Engine oil filter (8)

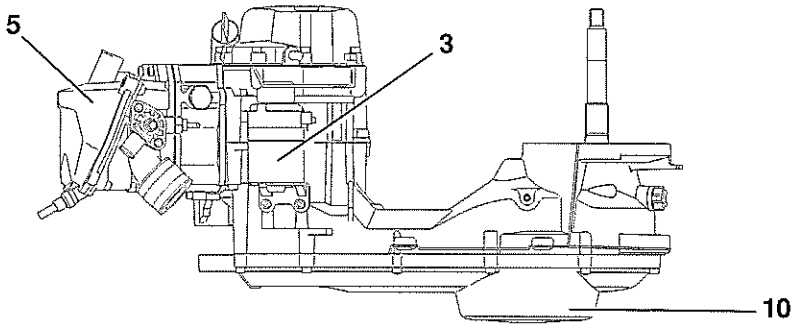


RIGHT SIDE
Ignition cover (9)
Flywheel
Stator coil
Pick-up
Oil pump
Water pump

LEFT SIDE
Transmission cover (10)
Speed centrifugal clutch unit
Clutch unit
Drive belt

For removals of parts not described here, see ENGINE WORKSHOP MANUAL N°1000 (I-D), N°1001 (I-USA) and N°1002 (F-E).





REMOVING THE ENGINE FROM THE FRAME

Read carefully PRECAUTIONS AND GENERAL INFORMATION.

⚠ WARNING

Stop the engine and wait until the engine and exhaust system have cooled down.
Drain the carburetor completely (see REMOVING THE CARBURETOR).
Drain the cooling system completely (see CHANGING THE COOLANT).
Remove the central inspection cover (see REMOVING THE CENTRAL INSPECTION COVER).

Remove the saddle compartment (see REMOVING THE SADDLE COMPARTMENT).
Remove the lower guard (see REMOVING THE FLOOR PANEL LOWER GUARD).
Remove the centrifugal clutch air intake (REMOVING THE CENTRIFUGAL CLUTCH AIR INTAKE).

⚠ CAUTION

Use fire-proof solvent or mild, neutral detergent, and brushes and rags, to clean the engine exterior. Do not use harsh solvents such as acetone, as this will destroy plastic and rubber parts. Never use gasoline to clean the engine.

If you use a steam cleaner, do not direct high-pressure streams of water, air, or steam directly at the wheel hubs, the right and left handlebar controls, the brake master cylinders, the instruments and gauges, the exhaust outlet, the registration holder, or the ignition switch / steering lock.
Clean the engine and connected components.

⚠ CAUTION

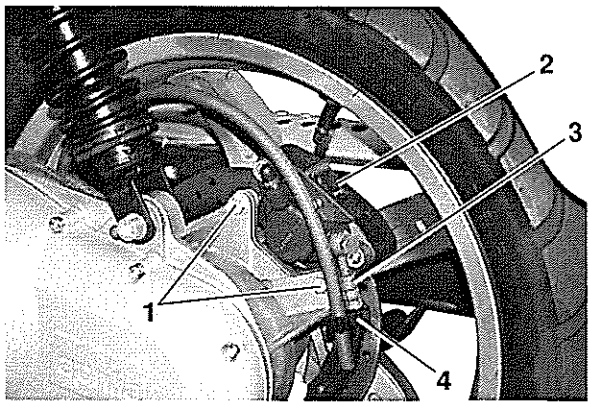
Mark all cables, hoses, pipes, etc. to avoid getting them mixed up when refitting.

⚠ CAUTION

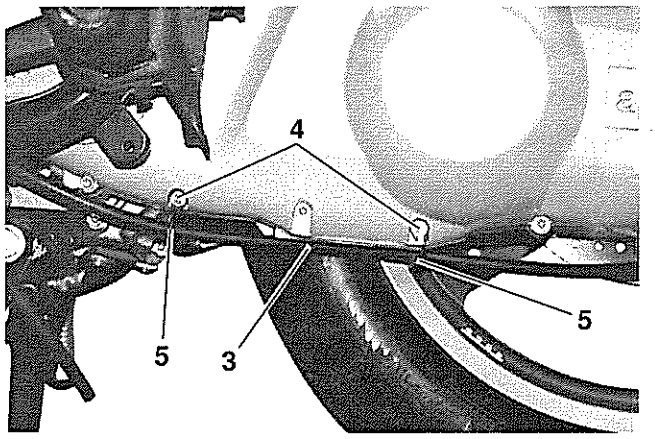
Be careful not to damage the brake lines, disc and pads when refitting them.
Never touch a brake lever after removing a brake caliper, the pistons may be forced outward, spilling brake fluid, and necessitating bleeding the system.
Unscrew and remove the two rear brake calliper bolts (1).

Brake calliper bolt tightening torque:
27 Nm (2.7 kgm) [19.9 Ft-lbs].

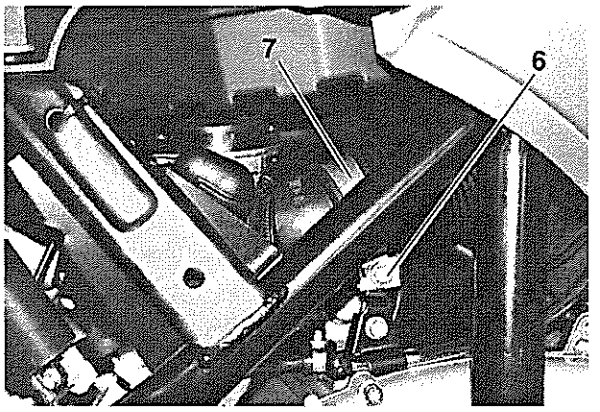
Carefully withdraw the brake disc and remove the rear brake calliper (2) withdrawing the line (3) from the guide (4).



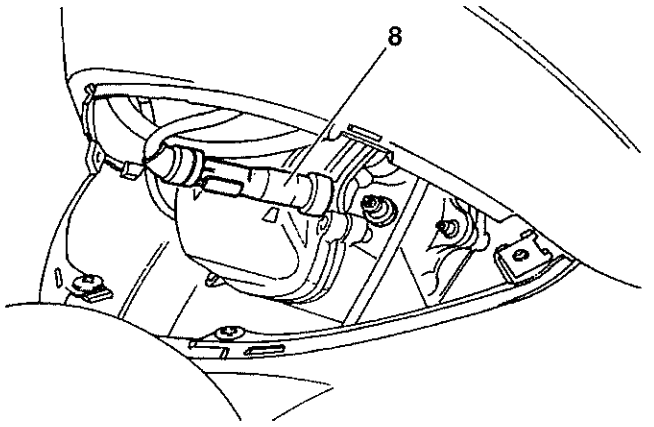
Unscrew and remove the two transmission case cover screws (4) and free the rear brake line (3) from the cable guide clips (5).



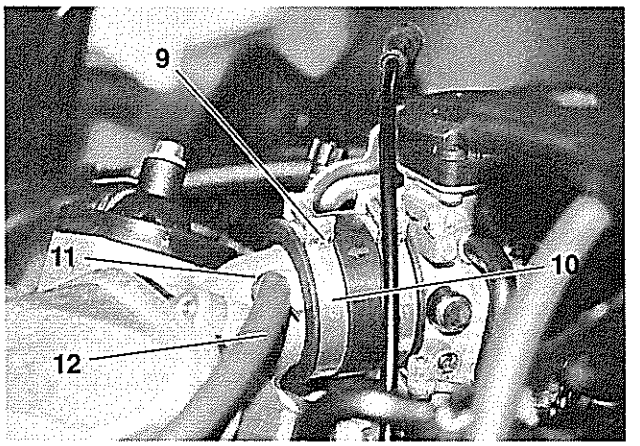
Unscrew and remove the screw (6) that holds the clamp (7) on the engine intake hose.



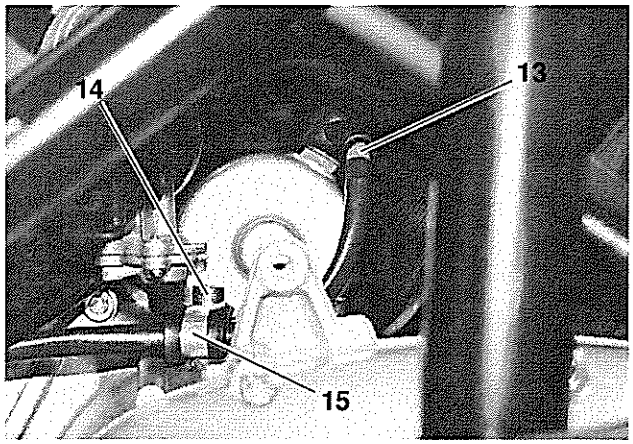
Take off the spark plug cap (8) and free the plug lead from any fasteners.



Unscrew and remove the screw (9) that holds the clamp (10) on the carburetor intake hose.
Loosen and move the clamp (11) in order to be able to withdraw the vacuum control hose (12).

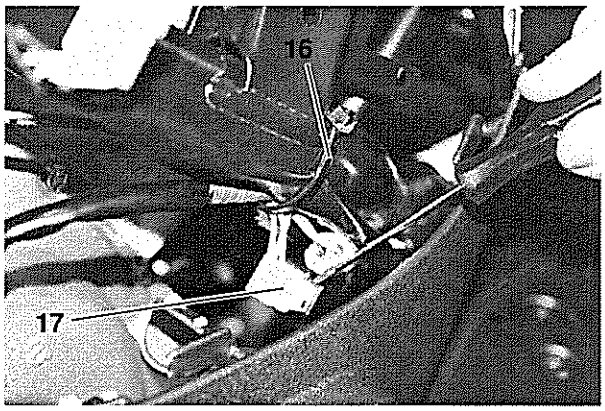


Disconnect the starter motor power supply lead (13). Unscrew and remove the screw (14) to free the starter motor power supply lead (13) from the cable guide clamp (15).

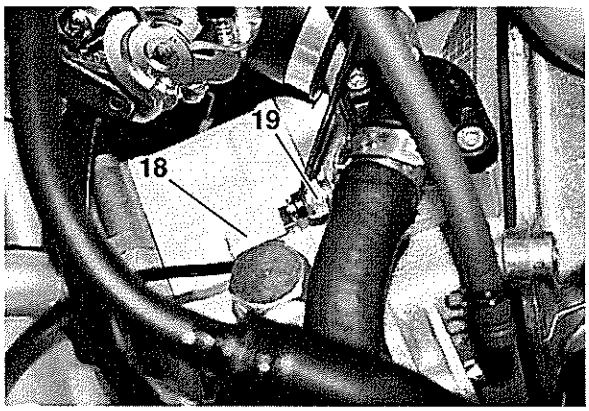


NOTE Use new clamps when refitting.

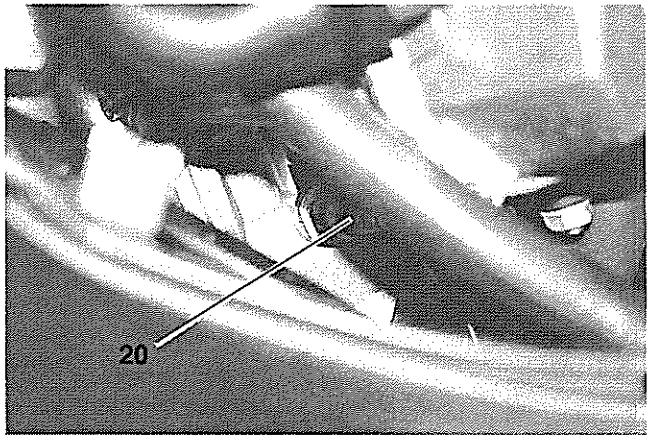
Take off the clamp (16) in order to be able to disconnect and free the ignition connectors (17).



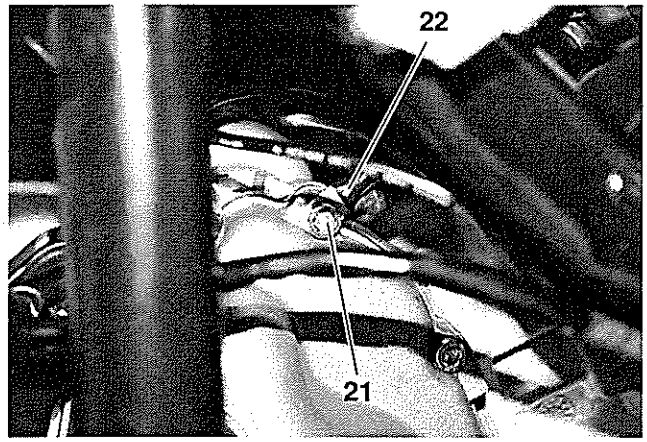
Disconnect the connector (18) on the coolant temperature thermistor (19).



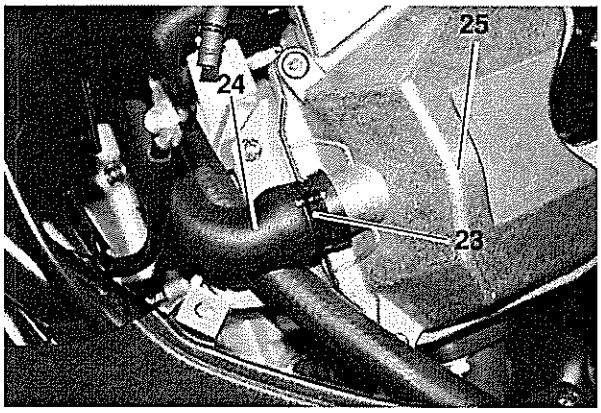
Take off the rubber guard (20) and disconnect the engine oil pressure sensor lead connector.



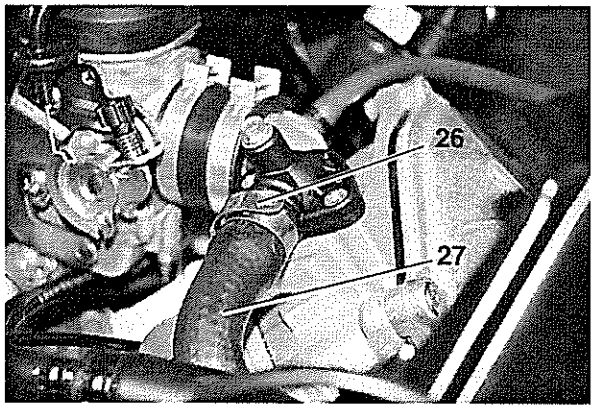
Loosen and remove screw (21) to free the engine ground lead (22).



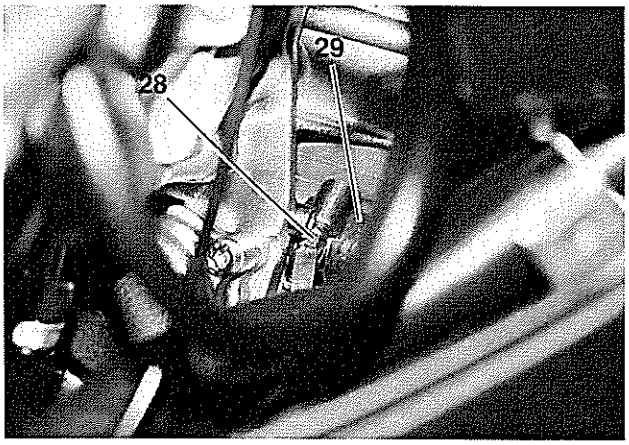
Remove the clamp (23) and disconnect the oil vapor recovery hose (24) from the tappet cover (25).



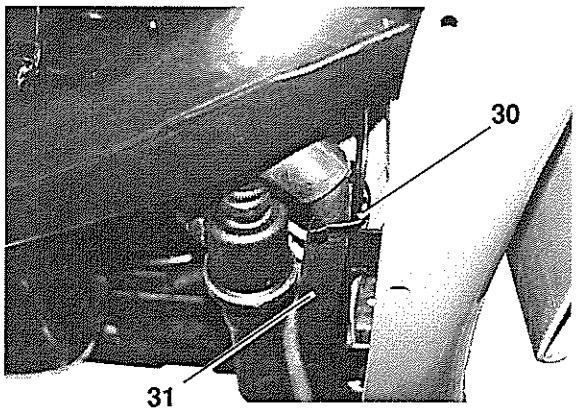
Remove the self-locking clamp (26) from the cylinder head-radiator hose (27).



Loosen the screw (28) on the clamp on the radiator pump hose (29) and disconnect the hose.



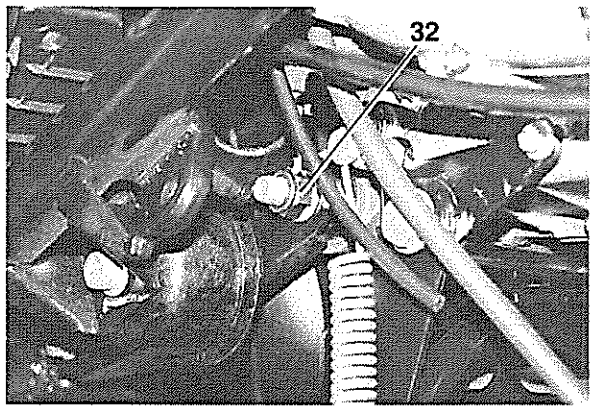
Cut the clamp (30) under the radiator so that the hose (31) can be bent slightly to gain an extra few centimeters when refitting the engine.



Unscrew and remove the engine-connecting rod pivot pin nut (32) along with its washer.

Engine-connecting rod pivot pin nut torque wrench setting: 50 Nm (5 kgm) [36.9 Ft-lbs].

NOTE Prepare a suitable block to place between the engine connecting rod pivot pin mountings.
To support the motorcycle when the engine and center stand are removed.



⚠ WARNING

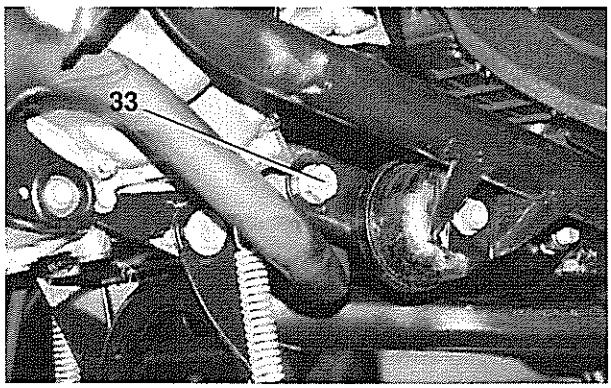
The following operations require the assistance of a second operator, because of the weight and size of the components and motorcycle.
Agree beforehand on how to divide up the tasks (the tasks are marked as follows: those marked "A" are to be done by the first operator and those marked "B" by the second operator), the procedure to follow. This procedure is designed to ensure the safety of both mechanics.

PROCEED WITH GREAT CARE.

⚠ WARNING

The size and weight of the motorcycle may cause it to tilt dangerously during the lifting, with the possibility of the whole motorcycle tipping over. PROCEED WITH CARE AND MAKE SURE YOU ARE ABLE TO BEAR THE WEIGHT OF THE MOTORCYCLE.

"**A**" Lift the rear of the motorcycle by the frame.
"**B**" Completely remove the engine-connecting rod pivot bolt (33) along with its washer.



⚠ WARNING

The front wheel, if not held, may turn to one side when the motorcycle is moved forward, putting the vehicle out of balance and threatening the safety of the mechanics. Follow the procedures below exactly, to avoid danger to yourselves. Failure to follow these procedures may lead to serious injury.

"**A**" and "**B**" Holding the handlebar, push the motorcycle forward far enough to move it off the engine.

"**A**" Support the motorcycle.

"**B**" Take the previously prepared prop and position it between the engine-connecting rod pivot bolt mountings.

"**A**" Lower the motorcycle, making sure it is set down safely.

The engine, complete with the rear wheel and exhaust muffler, will be left in position on the center stand.

⚠ CAUTION

Proceed with care.
Beware of finger and limb injuries.
Take care when lifting and moving the motorcycle: there is a risk of crushing or injuring your fingers or limbs when the stand goes back into the rest position.

⚠ CAUTION

Seal off the engine inlet manifold to stop any impurities or foreign bodies getting into it.

"**A**" and "**B**" Lift up the engine, complete with the wheel, exhaust muffler and center stand, and position it on the workbench.

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4 Fuel system

MAINTENANCE

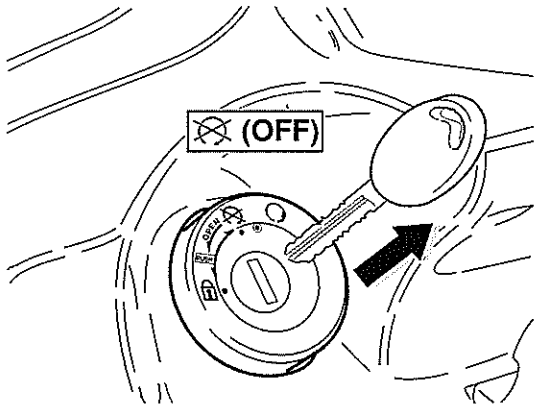
Check the condition of the tubing in the fuel system every 6,000 km (3,750 miles).
Any tubing that shows signs of perishing, scrapes, abrasions, or cuts must be replaced.
Ensure that the tubing is not twisted and there are no kinks. Either of these conditions calls for replacement of the tubing.
Periodically check and clean the fuel pump filter (see REMOVING THE FUEL PUMP).

DRAINING THE FUEL TANK

Read carefully FUEL.

⚠ WARNING

Risk of fire.
Wait until the engine and the exhaust silencer have completely cooled down.
Fuel vapours are noxious for your health.
Before proceeding, make sure that the room in which you are working is properly ventilated.
Do not inhale fuel vapours.
Do not smoke or allow open flames near the vehicle while you are draining the fuel.
DISPOSE OF UNWANTED FUEL PROPERLY.



If it is necessary to run the engine in order to carry out a maintenance operation, make sure that the area in which you are operating is properly ventilated.
Never run the engine in enclosed spaces. It is necessary to work indoors, use an exhaust evacuation system. Keep cigarettes, flames or sparks away from the work area and from the place where gasoline is stored.

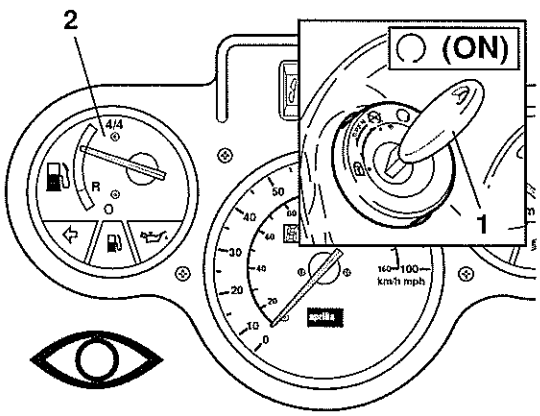
⚠ WARNING

The exhaust fumes contain carbon monoxide, a poisonous gas that can cause loss of consciousness and even death.

⚠ WARNING

The engine and components of the exhaust system become very hot and remain hot for some time after the engine has been stopped. Before handling these components, wear insulting golves or wait until the engine and the exhaust system have cooled down.
KEEP GASOLINE AWAY FROM CHILDREN. DO NOT DISPOSE OF FUEL IN THE ENVIRONMENT.

Place the vehicle on the center stand, (see PLACING THE VEHICLE ON THE STAND). Stop the engine and wait until it has cooled down. Rotate the ignition key (1) to the "○" (ON) position. Observe the fuel level indicator (2) on the dashboard and verify the fuel quantity present in the tank, (see TECHNICAL DATA). Rotate the ignition key (1) to the "⊗" (OFF) position and extract it.



⚠ CAUTION

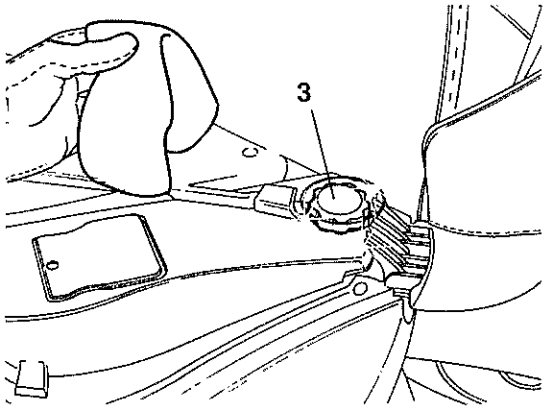
When you use any container or funnel for draining, make sure that it is perfectly clean.
Any foreign matter which gets into the fuel can lead to severe carburetor or engine damage.

Prepare a clean container with capacity exceeding the fuel quantity present in the tank and put it on the ground on the left side of the vehicle.
Lift the saddle, (see UNLOCKING/LOCKING THE SADDLE).

⚠ CAUTION

If dirt has accumulated on or around the fuel filler cap, wipe the cap and the area around the cap with a clean cloth. Prevent any foreign material from getting into the fuel tank, this could lead to serious engine damage.

Unscrew and remove the fuel filler cap (3).
Empty the fuel tank by means of a manual pump or a similar system.



⚠ WARNING

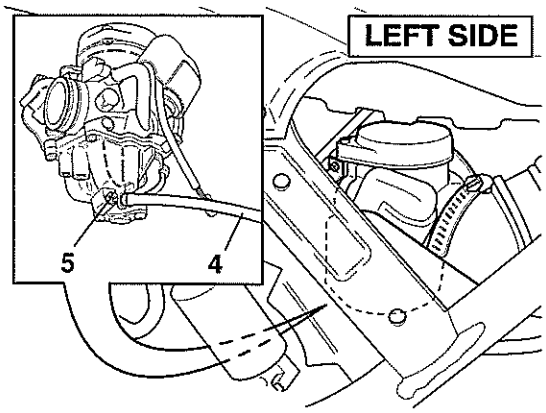
Do not add any additives or other substances to the gasoline. Close the container.
Make sure that the container is properly closed.
After draining the tank, replace the fuel filler cap (3) in the correct position.
Replace the fuel filler cap (3).

⚠ WARNING

Make sure that the fuel filler cap (3) is properly closed.
Lower and lock the saddle, (see UNLOCKING/LOCKING THE SADDLE).

To drain the carburetor completely:
Remove the central inspection cover, (see REMOVING THE CENTRAL INSPECTION COVER).

Working from the front left side of the vehicle:
Put the free end of the tube (4) into a clean receptacle.
Open the carburetor drain by unscrewing the drain screw (5) positioned under the float chamber.
When all the fuel has flowed out of the carburetor:
Tighten the drain screw (5) completely.



⚠ CAUTION

Do not overtighten the screw.

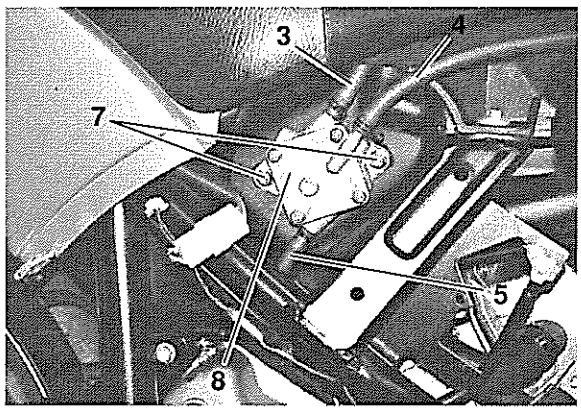
⚠ CAUTION

Do not dispose of fuel in the environment.
Put the drained fuel, contained in the receptacle, into the container. Close the container.

⚠ WARNING

Make sure that the container is properly closed.
ALWAYS KEEP GASOLINE AWAY FROM CHILDREN.
DISPOSE OF UNWANTED GASOLINE PROPERLY, DO NOT DUMP IT INTO STORM SEWERS OR INTO A SINK OR TOILET.
Dispose of gasoline properly: return it to a gas station or refuel immediately another vehicle.
Replace the central inspection cover, (see REMOVING THE CENTRAL INSPECTION COVER).

REMOVING THE FUEL PUMP

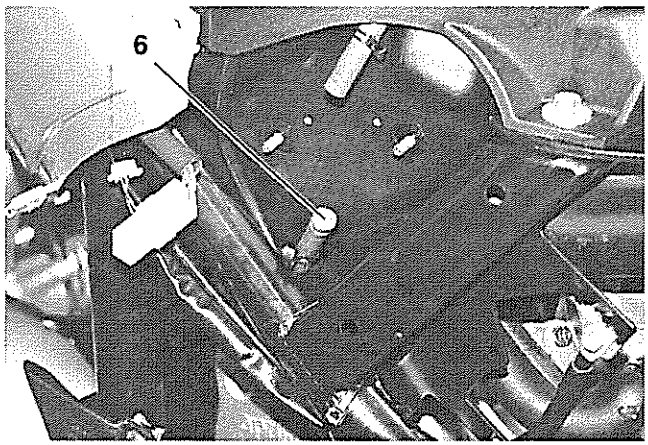


Read carefully PRECAUTIONS AND GENERAL INFORMATION and FUEL.
Before removing the pump, empty the fuel from the tank (EMPTYING THE FUEL TANK).
Remove the central inspection cover (REMOVING THE CENTRAL INSPECTION COVER).

⚠ CAUTION

Mark the tubes before disconnecting them, to avoid getting them mixed up when refitting.

Disconnect tube (3) (i.e. the tube that delivers fuel to the carburetor) from the fuel pump. Disconnect the vacuum hose (4) and the fuel feed line (5), removing the clamps where necessary.

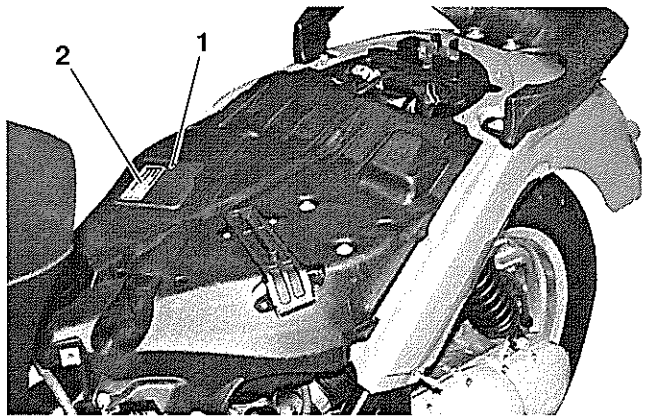


NOTE Plug the inlet of the petrol feed line with a screw (6) or a plug, to prevent foreign bodies or dirt from entering.
Slacken and remove the two nuts (7).
Remove the fuel pump (8).

⚠ CAUTION

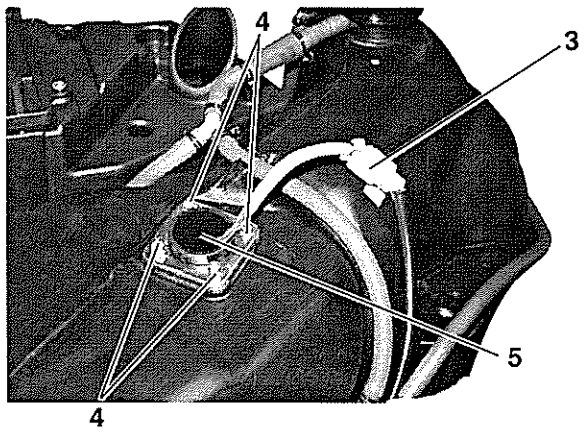
When refitting, make sure the tube that delivers fuel to the carburetor (3) and the vacuum hose (4) are not crushed.

REMOVING THE FUEL LEVEL SENSOR



Read carefully PRECAUTIONS AND GENERAL INFORMATION and FUEL.
Position the motorcycle on the center stand.
Raise up the saddle (UNLOCKING/LOCKING THE SADDLE).
Loosen and remove the screw (1).
Remove the sensor door (2) on the saddle compartment.

Disconnect the electrical connector (3).
Loosen and remove the four nuts (4).

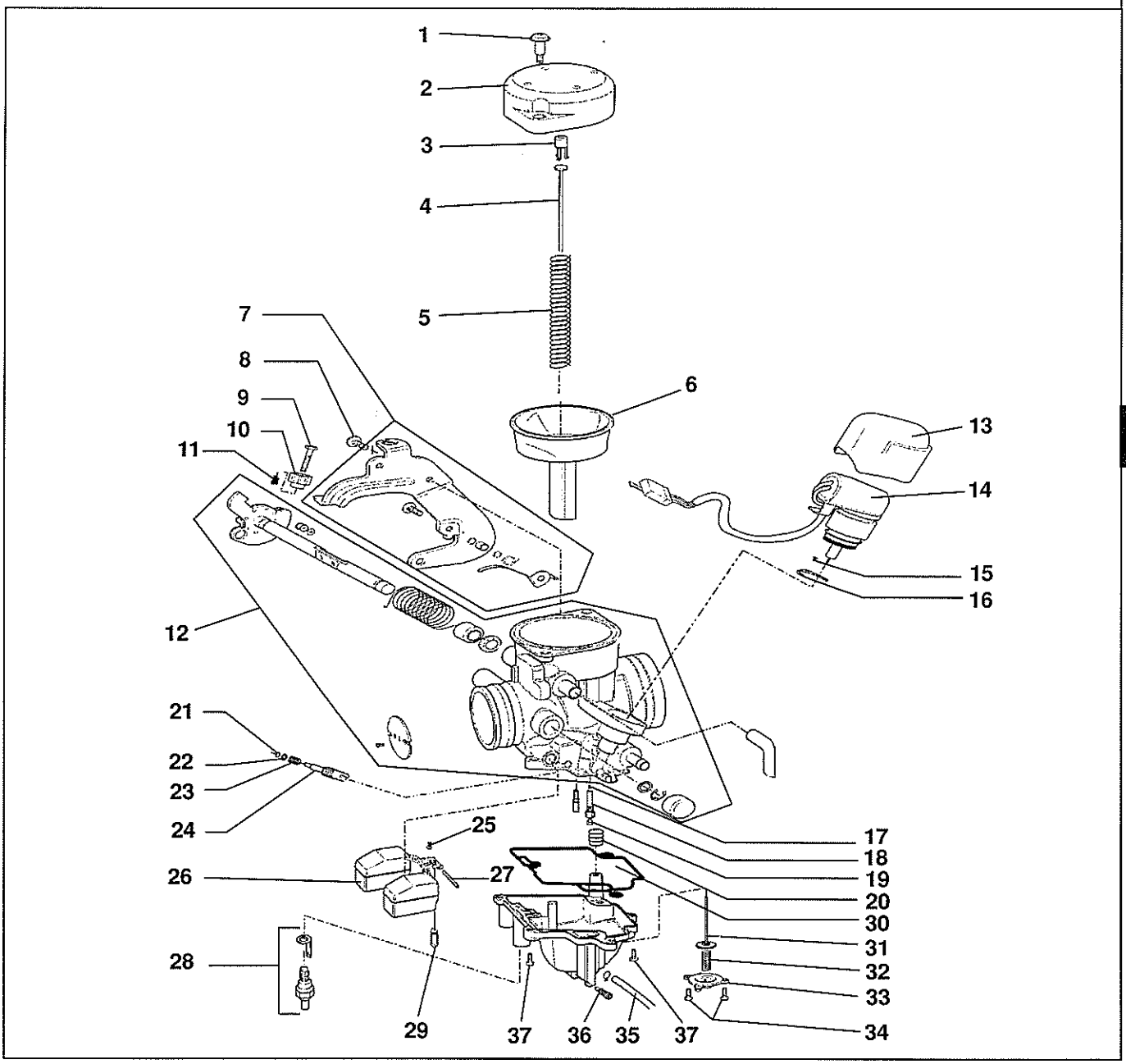


⚠ CAUTION

Handle with care.
Do not damage the sensor when removing it.
Seal off the sensor housing on the fuel tank to stop impurities or foreign bodies from getting in and fuel vapor from getting out.

Remove the fuel level sensor upwards (5).

CARBURETOR



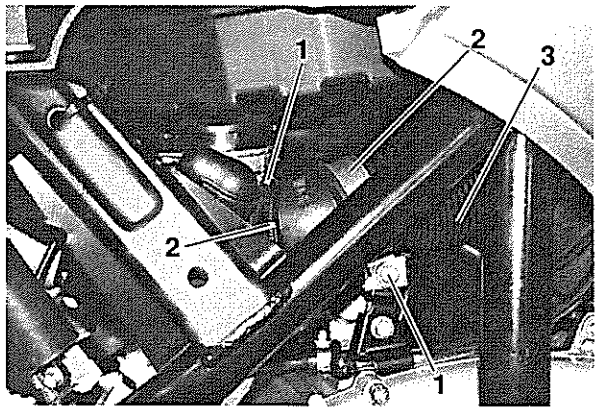
Description

1) Screw
2) Cover
3) Needle clip
4) Needle
5) Spring
6) Diaphragm
7) Complete plate
8) Screw
9) Screw
10) Idle speed adjustment knob
11) Spring
12) Complete casing
13) Choke valve cover
14) Choke valve
15) Screw
16) Plate
17) Jet
18) Atomiser
19) Main jet
20) Bellows
21) O-ring
22) Washer
23) Spring
24) Calibrated screw
25) Screw
26) Float
27) Pin
28) Heater kit
29) Needle valve
30) Float chamber gasket
31) Diaphragm pump
32) Spring
33) Cover
34) Screw
35) Rubber tube
36) Float chamber drain screw
37) Screw

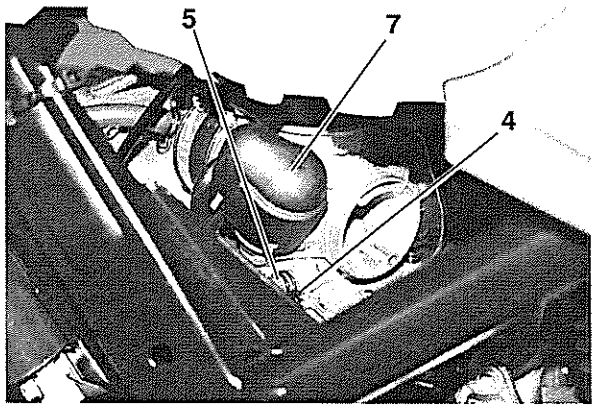
COMPONENT	Specifications Version 150
Type of Carburetor	KEIHIN
Choke diameter (oval)	26 mm (1.02 in)
Identification n°	CVK 26
Idle speed	1600 ± 100 rpm
Float height	/
Float weight	8.158 g (0.02 lbs)
Float needle	1.2 mm (0.05 in)
Main jet	105
Tapered needle	4HGGN
Spray nozzle	27 A Ø
Idle jet	38
Air jet	1.5 mm (0.06 in)
By-pass	Ø 0.7 mm (0.03 in)
Idle outlet	Ø 0.7 mm (0.03 in)
Starter jet	52
Fuel adjustment screw (mixture)	2 1/4 CH = 1 + 3/4
Throttle cable play	2 - 3 mm (0.08 - 0.12 in)

REMOVING THE CARBURETOR

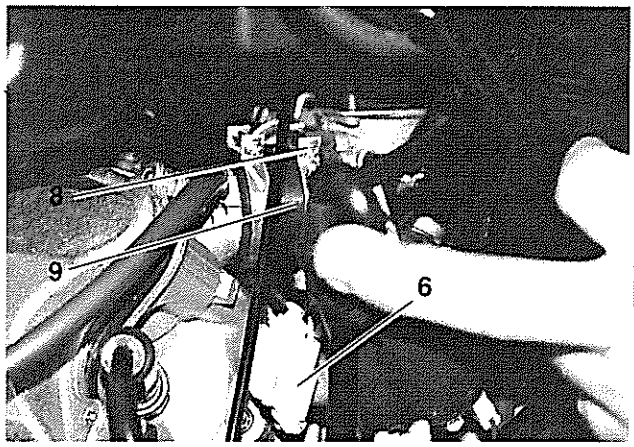
Read carefully PRECAUTIONS AND GENERAL INFORMATION and FUEL.
Drain the fuel completely, as described in EMPTYING THE FUEL TANK.
Remove the saddle compartment (REMOVING THE SADDLE COMPARTMENT).
Loosen the screws (1).
Remove the clamps (2) from their grooves.
Remove the intake hose (3) from its fitting on the carburetor.



Remove the clamp (4) from its groove.
Withdraw the fuel feed tube (5).



Disconnect the electrical connection (6) from the start valve (7, in previous figure).



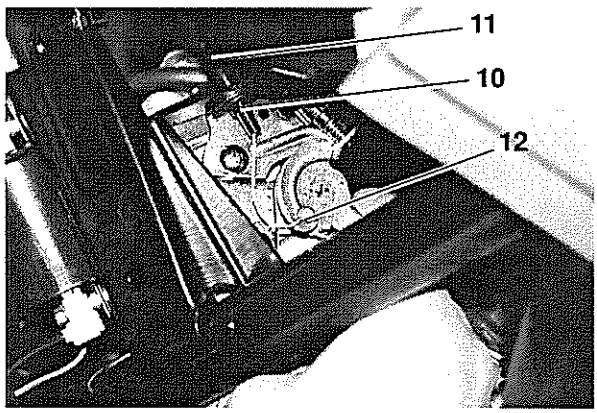
Loosen the clamp (8) on the inlet manifold hose (9).

NOTE The carburetor is still connected to the throttle cable. Proceed with care to avoid damaging the components.
Free the carburetor from the hose (9) and partially extract it.

⚠ CAUTION

Proceed with care.
Do not damage the fitting tabs when removing the carburetor.

Fully unscrew the nut (10) that secures the fixed bend in the throttle cable (11).
Withdraw the throttle cable bend (11) from its fitting.
Unhook the head of the throttle cable (12) from the lever mechanism coupling.
Completely remove the carburetor.



NOTE

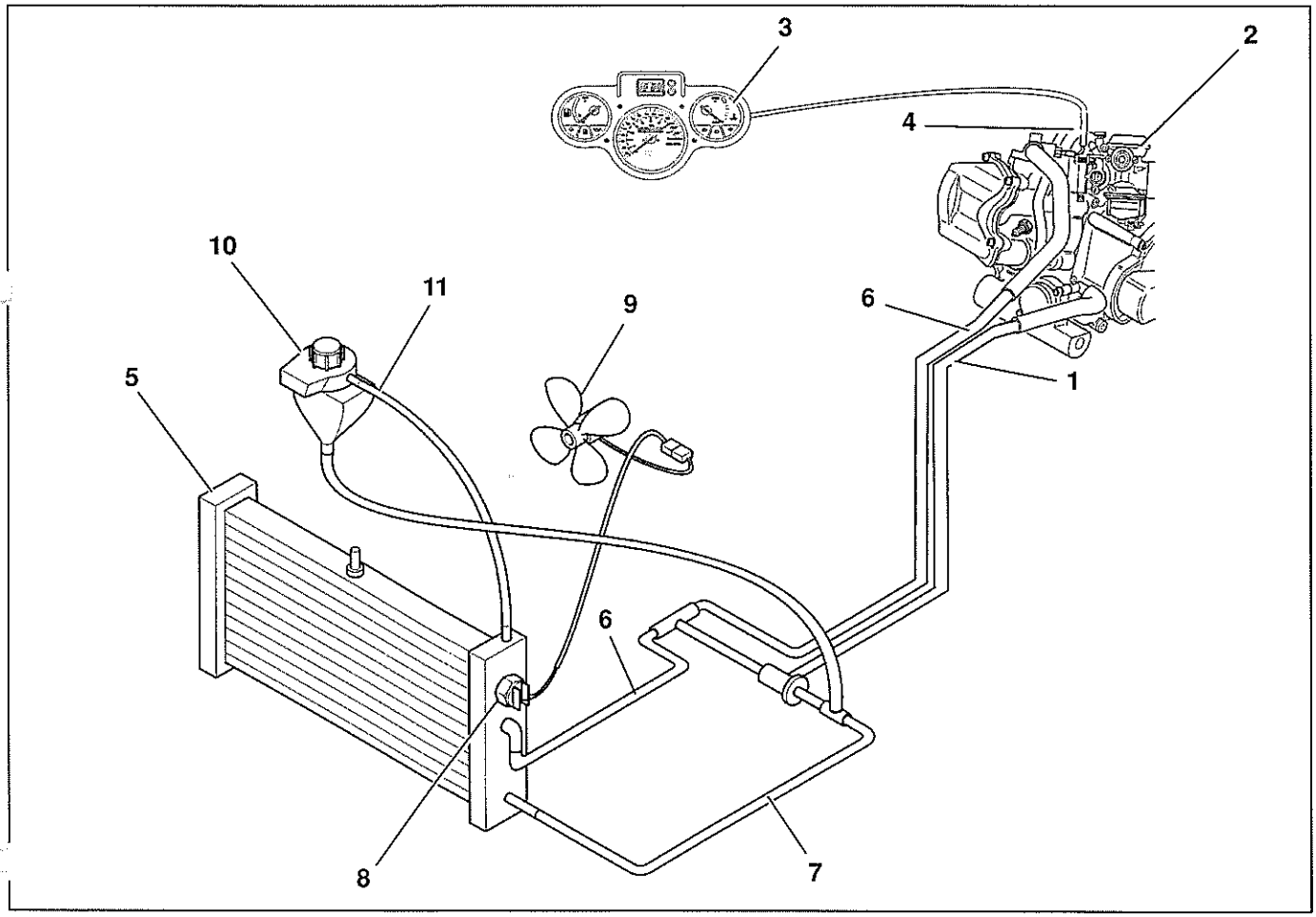
5 Cooling system

DESCRIPTION

The water pump, a centrifugal design, is located inside the engine, and driven mechanically by the engine. Coolant from hose (1) is drawn by the pump into the engine through ducts in the cylinder head, to cool these parts, and maintain the correct operating temperature. The hot coolant is forced out of the cylinder head, past the thermistor tube which reads its temperature and transmits to the coolant temperature gauge (3) on the dashboard for display.
The thermostatic valve (4) regulates the flow of coolant into the radiator according to the temperature (5) of the coolant. When the temperature of the coolant is less than 74°C (165.2°F), the valve is closed, allowing a minimum flow of coolant.
As the temperature of the coolant increases above this point, the valve opens, and proportionally increases the flow into the radiator.

When the fluid reaches the radiator, through hose (6), it goes first into the top half of the radiator, then down into the bottom half, and out through hose (7).
The thermal switch (8) on the radiator energizes and switches on the electric fan (9) if the coolant temperature exceeds 95°C (203°F).
When the air drawn over the radiator by the fan reduces the coolant temperature below 90°C (194°F), the thermal switch turns the electric fan off.

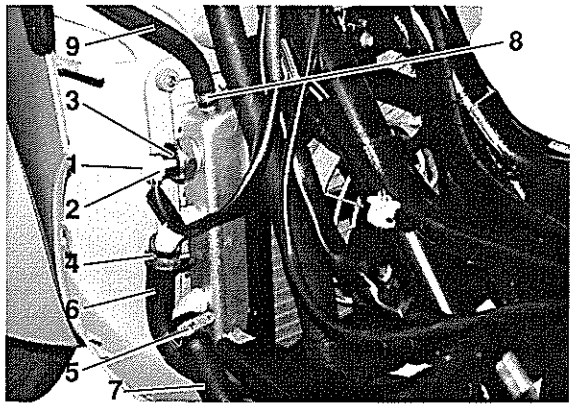
The increase in volume caused by the heating of the fluid is compensated for in the expansion tank (10). The radiator breather tube (11) connects the radiator to this tank.



REMOVING THE RADIATOR

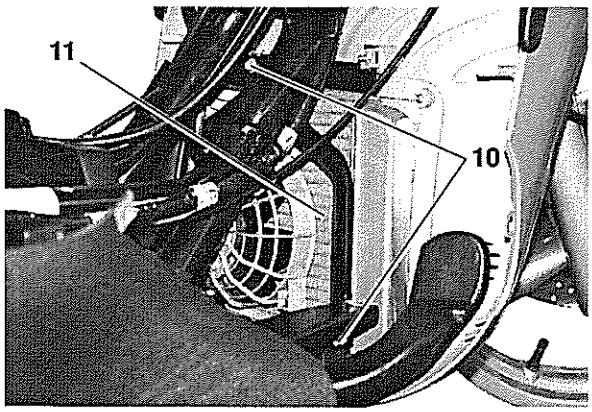
Read carefully COOLANT and PRECAUTIONS AND GENERAL INFORMATION.
Drain off the coolant completely (see CHANGING THE COOLANT).
Remove the inner front shield (see REMOVING THE INNER FRONT SHIELD).
Remove the floor panel lower guard (REMOVING THE FLOOR PANEL LOWER GUARD).
Remove the footrests (REMOVING THE FOOT-REST).
Remove the tunnel (REMOVING THE TUNNEL).

Disconnect the two electrical connectors (1) and (2) from the thermal switch (3).
NOTE Obtain new screwdriver-type hose clamps to replace the old clamps (special screwless type).
Cut the clamps (4) and (5).
NOTE Always use new clamps (4) and (5) when refitting.
Disconnect the two hoses (6) and (7) from the radiator fittings.
Cut off the head of the hose clamp (8).
NOTE Use a new clamp (8) when refitting.
Disconnect the breather tube (9) from its connector on the radiator.



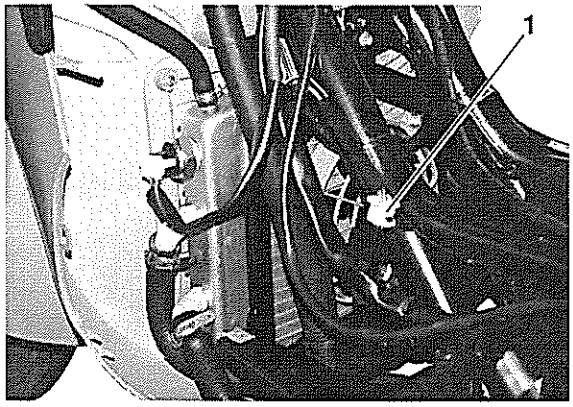
Unscrew and remove the three screws (10). (There are two lateral screws, one on each side).
Lift the radiator up out of its mounting pin holes.

⚠ CAUTION
Proceed with care.
Do not damage the radiator fins.
Remove the radiator (11) in a downward direction.



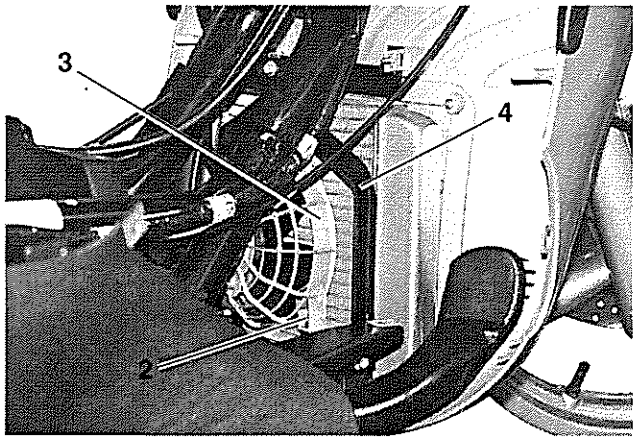
REMOVING THE ELECTRIC COOLING FAN

Read carefully COOLANT and PRECAUTIONS AND GENERAL INFORMATION.
Remove the inner front shield (see REMOVING THE INNER FRONT SHIELD).
Remove the footrests (REMOVING THE FOOT-REST).
Remove the tunnel (REMOVING THE TUNNEL).
Disconnect the electrical connection (1) on the fan motor.



Loosen and remove the two bolts (2) (one from the other side), keeping the nuts.
Lower the electric fan (3) off its support (4).
Remove the electric fan in a downward direction, freeing it from the top pin.

NOTE When refitting the fan, fit it to the top pin first and then to the support plate at the bottom.

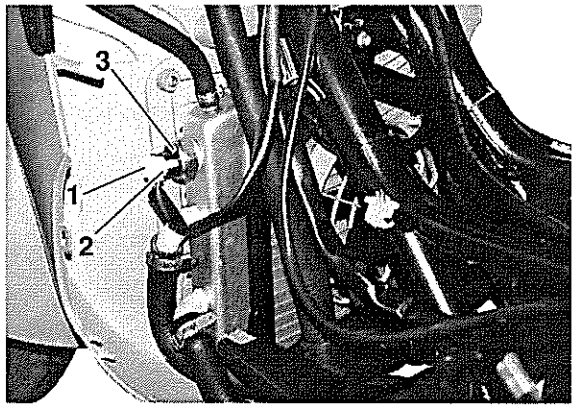


REMOVING THE COOLANT THERMAL SWITCH

Read carefully COOLANT and PRECAUTIONS AND GENERAL INFORMATION.
Position the motorcycle on the center stand.

⚠ WARNING

Stop the engine and wait until the radiator cools down.
Remove the inner front shield (see REMOVING THE INNER FRONT SHIELD).
Disconnect the two electrical terminals (1) and (2).



⚠ WARNING

DO NOT DISPOSE OF COOLANT IN THE ENVIRONMENT.
When you unscrew and remove the thermal switch (3) a certain amount of coolant will come out of its mounting hole.
Put a container of approximate capacity 1 liter in position to catch the coolant as it comes out.
Position an absorbent cloth at the bottom of the radiator to catch any coolant that spills out.

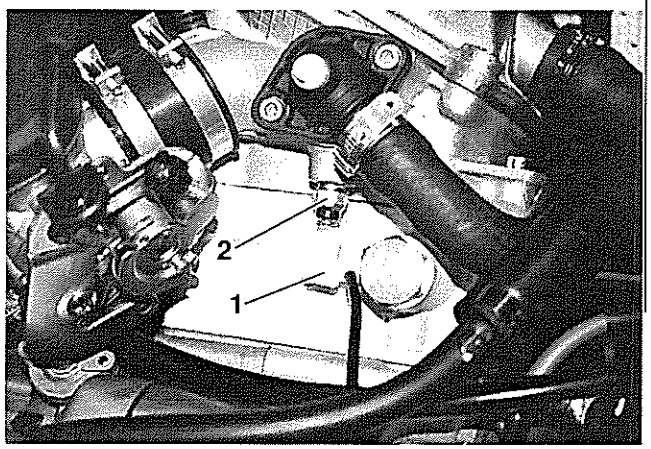
Unscrew and remove the thermal switch (3), along with the seal washer.

⚠ CAUTION

When refitting, apply LOCTITE ® to the thermal switch thread (3).

REMOVING THE COOLANT THERMISTOR

Read carefully COOLANT and PRECAUTIONS AND GENERAL INFORMATION.
Drain off the coolant completely (see CHANGING THE COOLANT).
Remove the center inspection cover (see REMOVING THE CENTRAL INSPECTION COVER).
Disconnect the electrical connector (1).
Unscrew and remove the thermistor (2).



Thermistor tightening torque:
15 Nm (1.5 kgm) [11.1 Ft-lbs].

⚠ CAUTION
When refitting, apply LOCTITE ® to the thermistor threads (2).

5

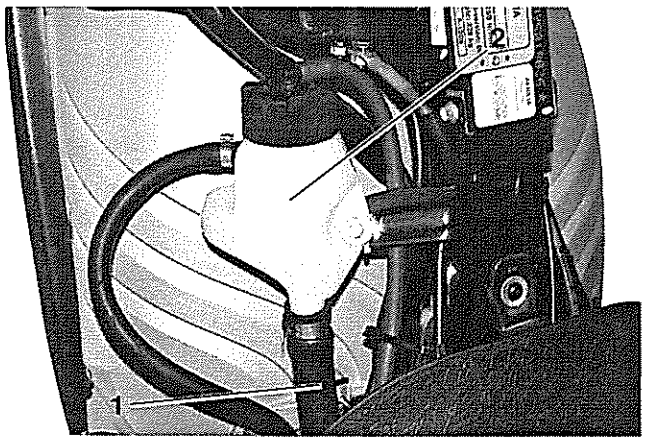
REMOVING THE EXPANSION TANK

Read carefully COOLANT and PRECAUTIONS AND GENERAL INFORMATION.
Position the motorcycle on the center stand.
Remove the inner front shield (see REMOVING THE INNER FRONT SHIELD).

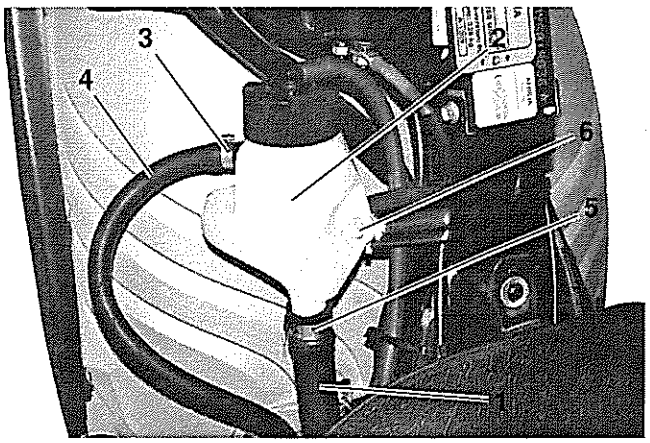
⚠ WARNING
DISPOSE OF COOLANT PROPERLY. DO NOT DISPOSE OF IT IN THE ENVIRONMENT.
USE A SYRINGE AND TUBE TO SUCK THE FLUID OUT OF THE EXPANSION TANK.

When the hose (1) is disconnected, the coolant contained in the expansion tank (2) will run out. Put a container of approximate capacity 1 liter in position to catch the fluid as it comes out. Place an absorbent cloth under the expansion tank to catch any coolant that spills out.

NOTE Obtain screwdriver-type hose clamps to replace the original special screwless type.



Cut the clamp (3) off.
Disconnect the hose (4) from its connector on the expansion tank. Cut the head off the clamp (5).
Disconnect the hose (1) from its connector on the expansion tank.
Quickly place the container under the expansion tank to catch the coolant.



⚠ WARNING

Coolant is harmful.
Keep the container in a safe place.

KEEP OUT OF REACH OF CHILDREN

Unscrew and remove the screw (6).
Remove the expansion tank (2).

THERMOSTAT VALVE

For information on the thermostat valve, see ENGINE WORKSHOP MANUAL n°1000 (I-D), n°1001 (I-USA) and n°1002 (F-E).

COOLANT PUMP

For information on the coolant pump, see ENGINE WORKSHOP MANUAL n°1000 (I-D), n°1001 (I-USA) and n°1002 (F-E).

Electrical system

6

BULBS

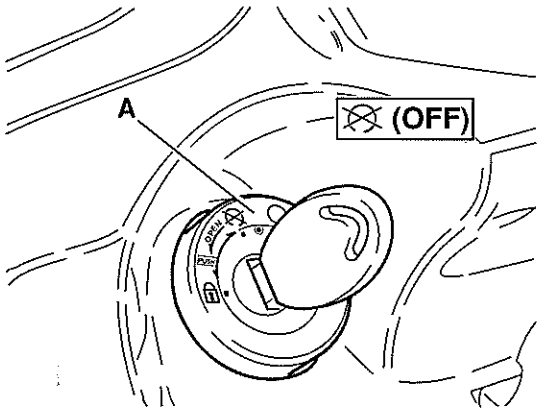
Read carefully MAINTENANCE.

⚠ WARNING

The vehicle must not be used if the lights are not functioning properly.
The vehicle must not be used if the headlight is adjusted incorrectly. This could temporarily blind oncoming cars, and also reduce the rider's ability to see any obstacle along the road while riding at night.
It is always advisable to reduce speed when riding during the night, in such a way as to have the time necessary to avoid any obstacle and to adapt to the poorer visibility that inevitably results from darkness. Failure to observe this warning can lead to a collision with another object, with consequent risk of serious injury or even death.

⚠ WARNING

Risk of fire.
Keep fuel and other flammable substances away from the electrical components.

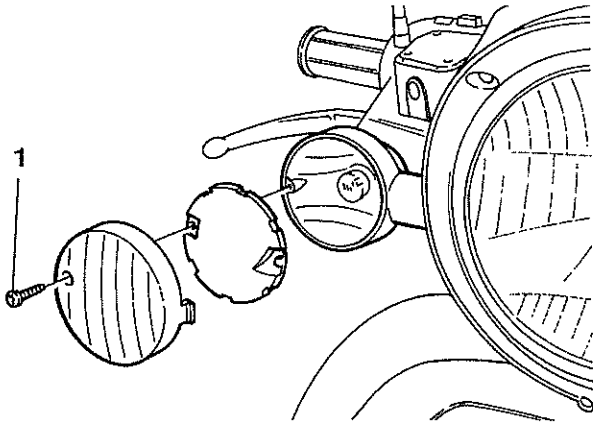


⚠ CAUTION

Before changing a bulb, turn the ignition switch (A) to the "⊗" (OFF) position and wait a few minutes so that the bulb cools down.
Change the bulb wearing clean gloves or using a clean and dry cloth.
Do not leave fingerprints on the bulb, since these may cause its overheating and consequent breakage.
If you touch the bulb with your bare fingers, remove any fingerprints with alcohol in order to avoid any damage.
TAKE CARE TO AVOID DAMAGING THE ELECTRIC CABLES.

NOTE Before changing a bulb, check the fuses, (see CHANGING FUSES).

CHANGING THE FRONT AND REAR DIRECTION INDICATOR BULBS



Read carefully BULBS.

NOTE Before changing a bulb, check the fuses, (see CHANGING FUSES).

To change the bulb:

NOTE The following information refers to one direction indicator only, but is valid for all of them.
Place the vehicle on the center stand, (see PLACING THE VEHICLE ON THE STAND).
Unscrew and remove the screw (1).

⚠ CAUTION

Upon reassembly tighten the screw (1) moderately and with care to avoid damaging the lens and the colored screen.

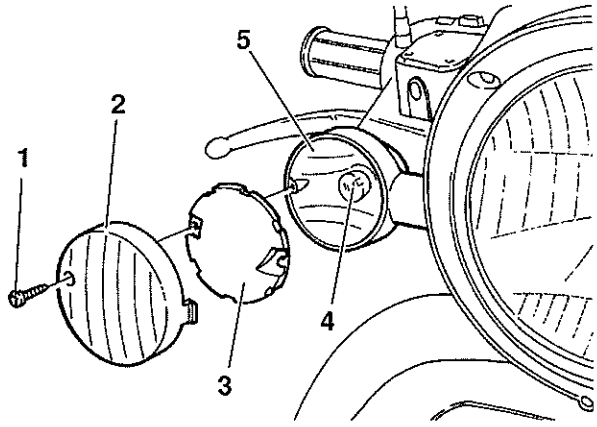
NOTE While removing the lens, use extra care to be sure that you do not break the key.
Remove the lens (2).

NOTE Upon reassembly, place the lens correctly in its seat.
Remove the colored screen (3).

NOTE Upon reassembly, place the colored screen correctly in its seat.
Push the bulb (4) in slightly and rotate it counterclockwise.
Extract the bulb from its seat.

NOTE Insert the bulb in the bulb socket, carefully aligning the two bulb pins with their guides in the socket.
Correctly install a new bulb of the same type.

NOTE Upon reassembly if the bulb socket (5) has fallen out of its seat, replace it correctly, ensuring that the slot in the reflector aligns with the screw hole in the body of the turn signal lamp.



6

CHANGING THE HEADLIGHT BULBS

Read carefully BULBS.

NOTE Before changing a bulb, check the fuses, (see CHANGING FUSES).
The headlight contains:
- one low/high beam halogen bulb (1) (central position).
- one parking light bulb (2) (central lower position);

TO GAIN ACCESS TO THE BULBS
Unscrew and remove the screw (3).

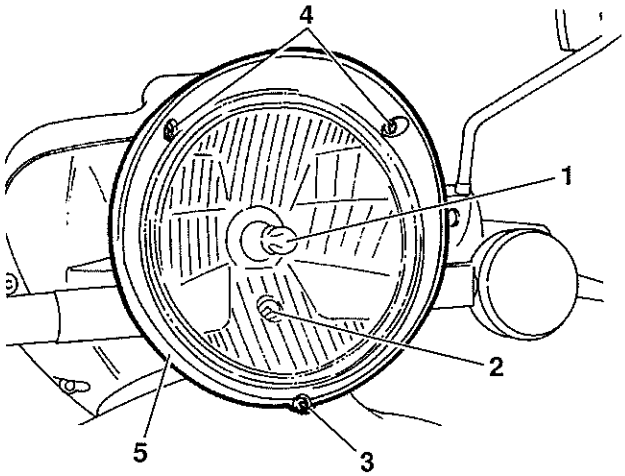
NOTE Do not mix the screws. Upon reassembly, take care not to invert the position of the screw (3) and the screws (4).
Unscrew and remove the two screws (4).
Remove the frame (5).
Extract the reflector (6).

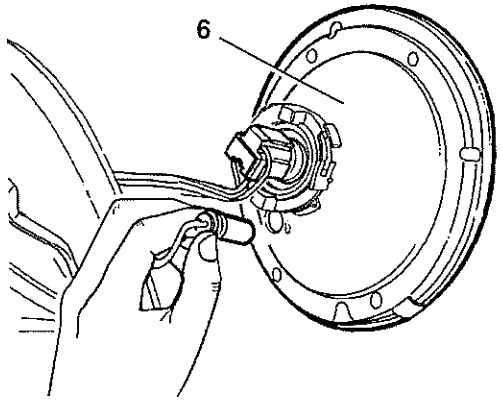
NOTE Upon reassembly, install the reflector (6) correctly, making the insertion seats coincide with the headlight body seats.

⚠ CAUTION

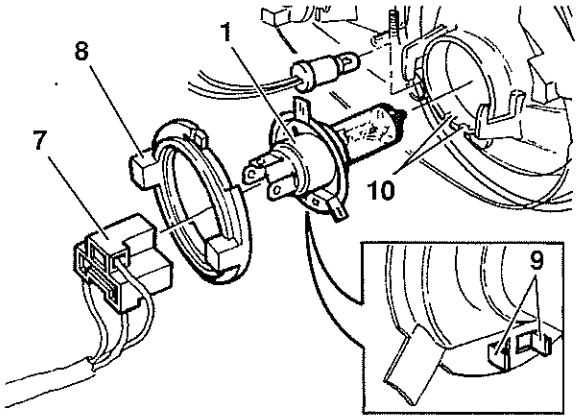
Support the reflector (6), in order to prevent it from accidentally falling down.

To change the bulbs:
Working, from the central front part of the vehicle, and operating on the rear part of the reflector (6).





LOW/HIGH BEAM HALOGEN BULB (CENTRAL POSITION)



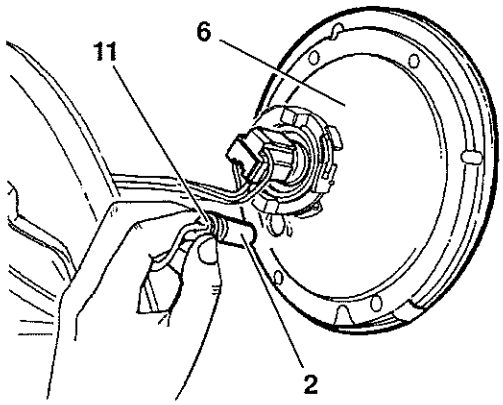
⚠ CAUTION

To extract the bulb electric connector, do not pull its electric wires.

Grasp the bulb electric connector (7), pull it and disconnect it from the bulb (1).
Rotate the bulb socket (8) counterclockwise and extract it from the reflector.
Remove the bulb (1) from the seat.

NOTE Be sure to maintain the same orientation as the old bulb when you install the new bulb. Do not try to force the bulb, it will go easily if it is properly oriented.
Insert the new bulb (1) into the reflector, by aligning the two tabs (9) on the bulb with the respective guides (10) in the reflector.
Position the bulb socket (8) in the reflector and rotate it clockwise.
Connect the bulb electric connector (7).
Replace the reflector (6), (see TO GAIN ACCESS TO THE BULBS).

PARKING LIGHT BULB (CENTRAL LOWER POSITION)



⚠ CAUTION

While removing a bulb socket, do not pull on the wires.
Grasp the bulb socket (11), pull it and remove it from its seat.
Remove the parking light bulb (2) and replace it with an identical bulb.

NOTE Ensure that the bulb is correctly inserted in the bulb socket.
Insert the bulb socket (11) in its seat.
Replace the reflector (6), (see TO GAIN ACCESS TO THE BULBS).

CHANGING THE REAR LIGHT BULBS

Read carefully (BULBS).

⚠ WARNING

Do not ride this vehicle if the tail light and the stoplight are not working properly.
The stoplight is particularly important to prevent other vehicles from rearending you. Obviously, failure to comply with these instructions could lead to a serious accident with subsequent injuries or even death.

NOTE Before changing a bulb, check the fuses, (see CHANGING FUSES), also check the operation of the stoplight switches, (see CHECKING THE SWITCHES).

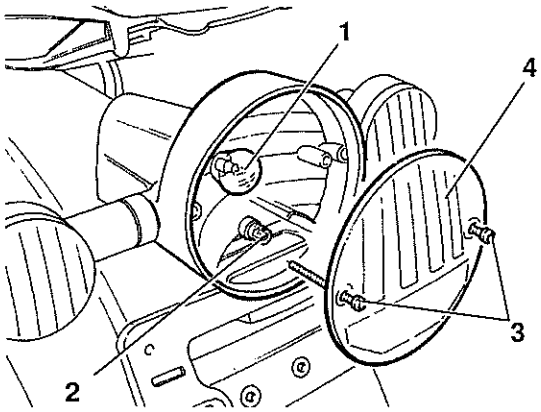
The rear light contains:
- one parking light /stoplight (1) (central position);
- one license plate bulb (2) (central lower position).

TO GAIN ACCESS TO THE BULBS
Place the vehicle on the center stand, (see PLACING THE VEHICLE ON THE STAND).
Unscrew and remove the two screws (3).
Remove the lens (4).

NOTE Upon reassembly, make sure that the lens seats properly.

⚠ CAUTION

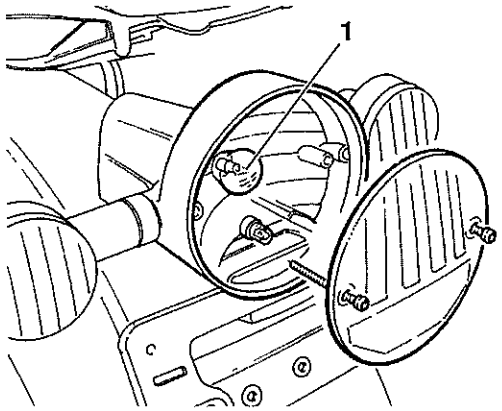
Upon reassembly, do not overtighten the two screws (3). Overtightening will crack the lens.



To change the bulb:

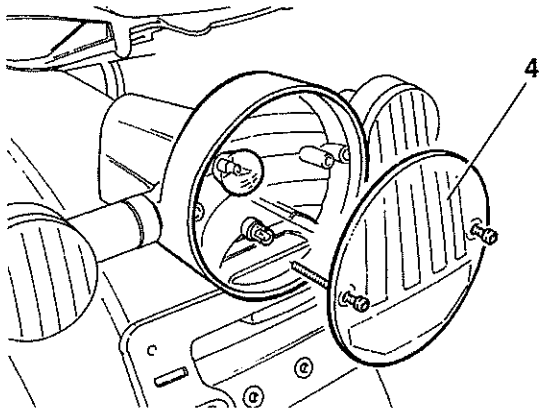
PARKING LIGHT/STOPLIGHT BULB (CENTRAL POSITION)

To remove the parking light/stoplight bulb (1), push the bulb slightly forward and rotate it counterclockwise. Pull it from its seat.
Correctly install a new bulb of the same type.



NOTE Ensure that the orientation of your replacement bulb is identical to that of the original bulb. Do not try to force the bulb, it will fit easily if it is properly oriented.

Replace the lens (4), (see TO GAIN ACCESS TO THE BULBS).

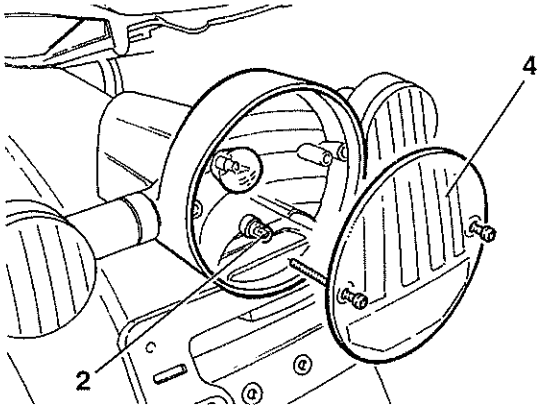


LICENSE PLATE BULB (CENTRAL LOWER POSITION)

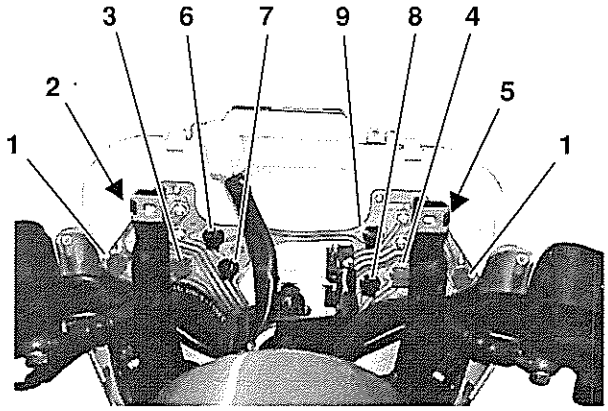
Remove the license plate bulb (2) and replace it with an identical bulb.

NOTE Ensure that the bulb is correctly inserted in its seat.

Replace the lens (4), (see TO GAIN ACCESS TO THE BULBS).



CHANGING THE DASHBOARD BULBS



Read carefully CHANGING BULBS.
On the dashboard there are:
the warning lights, the dashboard lights and the clock battery (CHANGING THE CLOCK BATTERY).

To change the bulbs and battery, proceed as follows:
Remove the headlight support (see REMOVING THE HEADLIGHT SUPPORT).

Warning light bulbs

Remove the bulb holder for the bulb that needs to be changed:

Pos.	Light	Color	Notes
1	turn signal	green	
2	low beam	green	*warning light not visible in figure
3	high beam	blue	
4	oil pressure warning light	red	
5	fuel reserve	yellow amber	*warning light not visible in figure

Remove the bulb and replace it with a bulb of the same type.

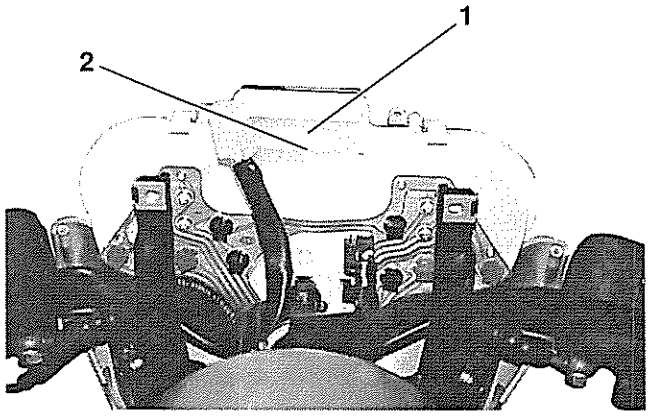
Dashboard light

Remove the bulb holder corresponding to the poorly illuminated part of the dashboard:

Pos.	Illuminated zone
6	top right
7	bottom right
8	bottom left
9	top left

Remove the bulb and replace it with a bulb of the same type.

CHANGING THE CLOCK BATTERY



Remove the headlight support (see REMOVING THE HEADLIGHT SUPPORT).
Free the clock support (1) on the back of the dashboard by releasing the catch (2).
Take out the clock and change the battery.

ADJUSTING THE HEADLIGHT BEAM VERTICALLY

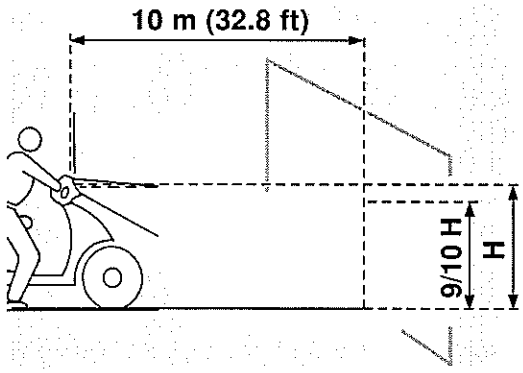
⚠ WARNING

Do not use the vehicle if the lights are not functioning properly.
Do not use the vehicle if the headlight is adjusted incorrectly. This could temporarily blind oncoming cars, and also reduce the rider's ability to see any obstacle along the road while riding at night.
It is always advisable to reduce speed when riding during the night, in such a way as to have the time necessary to avoid any obstacle and to adapt to the poorer visibility that inevitably results from darkness. Failure to observe this warning can cause you to collide with another object, with consequent risk of serious injury or even death.

NOTE The procedure described here is in compliance with the Italian standard that establishes the maximum height of the headlight beam.
For vehicles used in other countries, you must conform with the local regulations.

To quickly check the correct adjustment of the beam, place the vehicle on flat ground, **10 m (32.81 ft)** away from a wall.

Turn on the low beam, sit on the vehicle and make sure that the beam projected on the wall is slightly under the horizontal line of the headlight (about 9/10th of the total height).

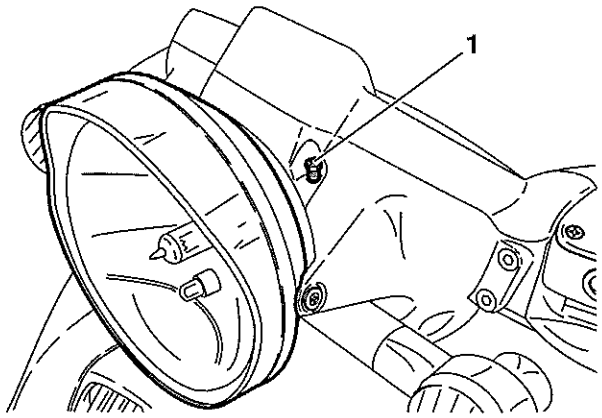


To adjust the headlight beam vertically:

⚠ CAUTION

Do not force the screw beyond its limits.

Adjust the screw (1) with a bent box wrench (2).
Turn the screw clockwise to adjust the beam higher (upwards).
Turn the screw counterclockwise to adjust the beam lower (downwards).

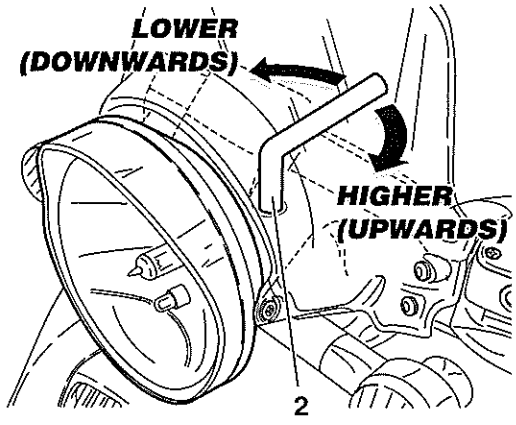


⚠ WARNING

Make sure that the vertical adjustment of the headlight beam is correct.

⚠ WARNING

Make sure that the horizontal adjustment of the headlight beam is correct, (see ADJUSTING THE HEADLIGHT BEAM HORIZONTALLY).



ADJUSTING THE HEADLIGHT BEAM HORIZONTALLY

⚠ WARNING

Do not use the vehicle if the lights are not functioning properly. Do not use the vehicle if the headlight is adjusted incorrectly. This could temporarily blind oncoming cars, and also reduce the rider's ability to see any obstacle along the road while riding at night. It is always advisable to reduce speed when riding during the night, in such a way as to have the time necessary to avoid any obstacle and to adapt to the poorer visibility that inevitably results from darkness. Failure to observe this warning can cause you to collide with another object, with consequent risk of serious injury or even death.

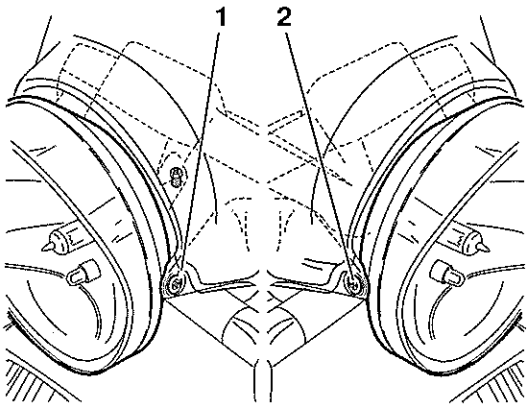
NOTE The terms "right" and "left" are referred to the rider seated on the vehicle in the normal riding position. It is possible to adjust the horizontal position both to the right and to the left.

To adjust the headlight beam horizontally:

⚠ CAUTION

Do not completely unscrew nor remove the screws (1) and (2).

Loosen the screws (1) and (2).
Once the screws (1) and (2) are loose, you may adjust the beam to the left and right as you wish. Proceed very carefully, as follow.

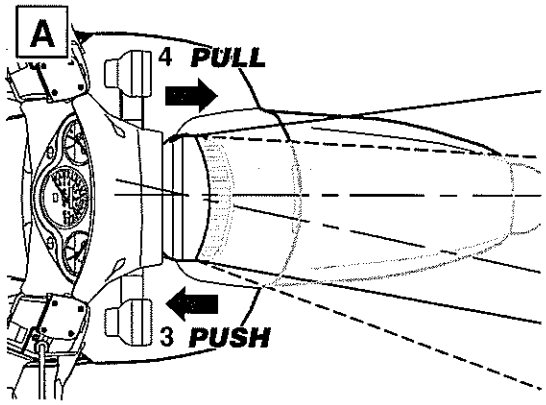


⚠ CAUTION

Do not force the sides of headlights beyond their limits.

To adjust the beam to the right, apply force as shown in figure A:

Push on the right side of the headlight (3) and pull on the left side of the headlight (4).

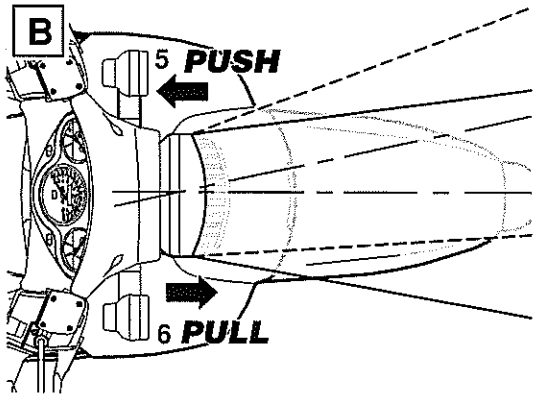


To adjust the beam to the left, apply force as shown in figure B:

Push on the left side of the headlight (5) and pull on the right side of the headlight (6).
When you are satisfied with the adjustment, tighten the screws snugly. Do not overtighten.

⚠ CAUTION

Tighten the screws (1) and (2) with care.



⚠ WARNING

Make sure that the horizontal adjustment of the headlight beam is correct.

⚠ WARNING

Make sure that the vertical adjustment of the headlight beam is correct, (see ADJUSTING THE HEADLIGHT BEAM VERTICALLY).

CHANGING FUSES

Read carefully MAINTENANCE.

⚠ WARNING

Risk of fire. Keep fuel and other flammable substances away from the electrical components. Do not repair faulty fuses. Use only recommended fuses.

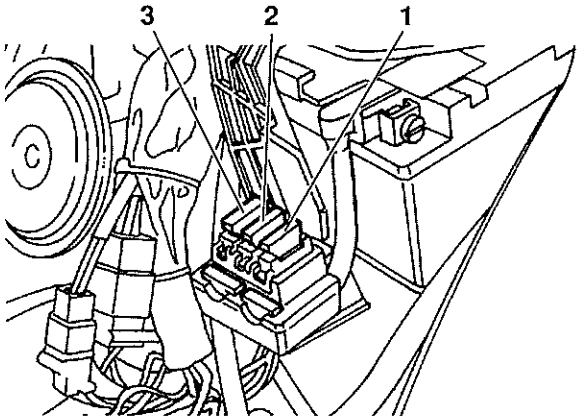
⚠ CAUTION

Using fuses of an improper capacity can cause damage to the electrical system or an electrical fire, which could result in total destruction of this vehicle as well as injury to you.

NOTE If a fuse blows frequently, there probably is a short circuit or an overload in the electrical system. If an electric component does not work or works irregularly, or if the vehicle fails to start, it is necessary to check the fuses.

TO GAIN ACCESS TO THE FUSES:

Remove the front cover, (see REMOVING THE FRONT COVER).



FUSE CIRCUIT

This vehicle is equipped with three fuses:

7,5 A fuse (1).
From the ignition switch to: ignition.

15 A fuse (2).
From the ignition switch to: all light loads and horn.

20 A fuse (3).
From the battery to: ignition switch, voltage regulator, electric fan.

TO CHECK THE FUSES

Turn the ignition switch (4) in the "⊗" (OFF) position.

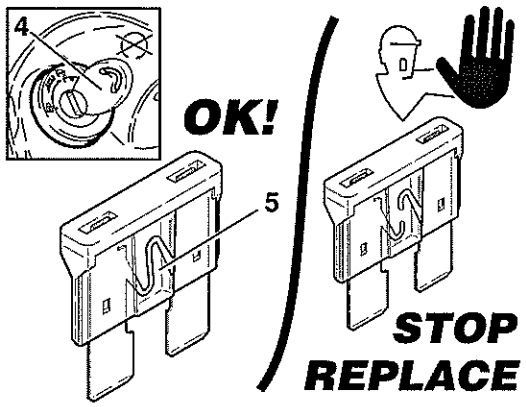
NOTE Three fuses are spare fuses.

⚠ CAUTION

Extract the fuses one by one, in such a way as to avoid replacing them incorrectly during reassembly.

Remove, one by one, the fuse and inspect the filament (5). If it is open, the fuse must be replaced.

Replace the blown fuse with the appropriate spare fuse or with a new fuse having the same amperage rating.

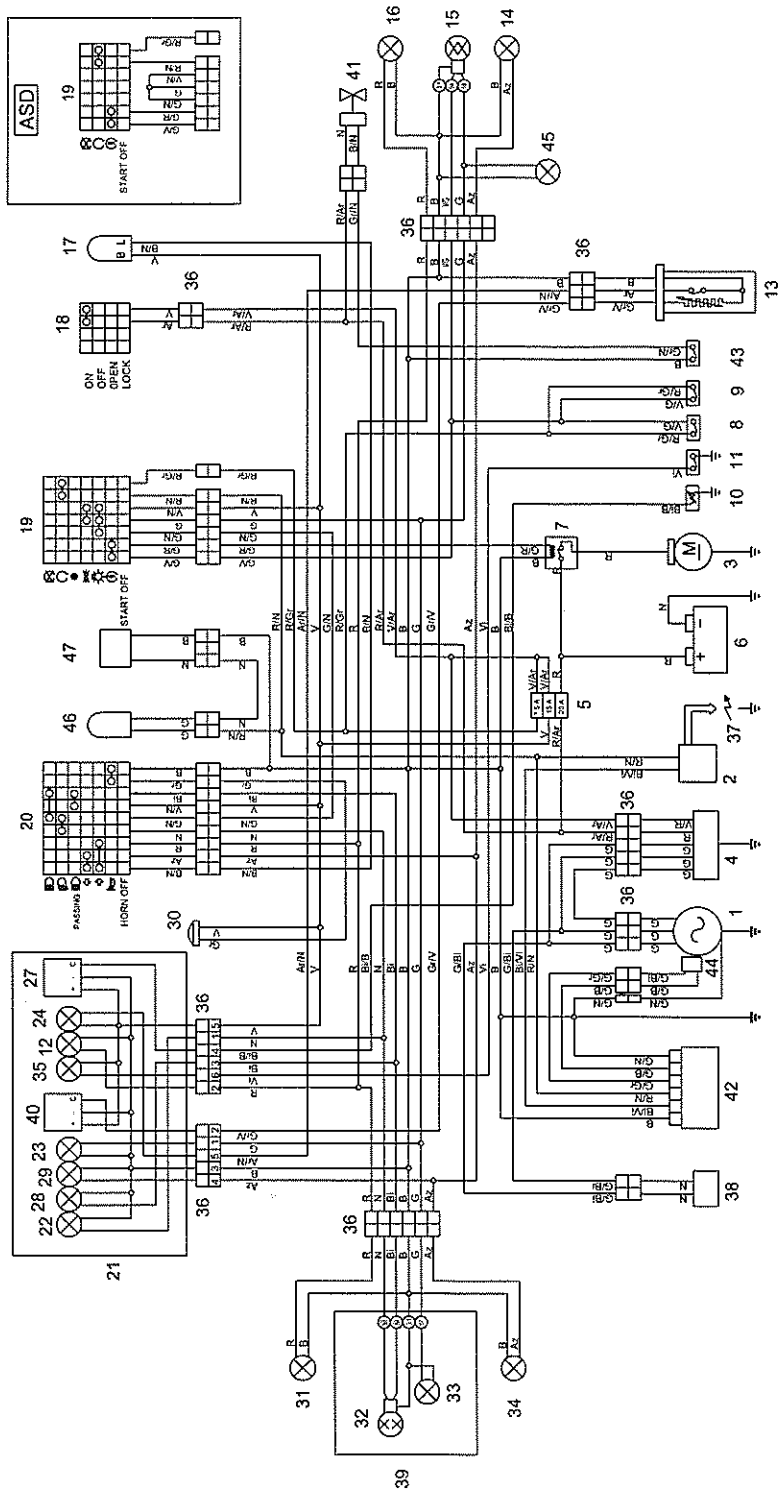


⚠ WARNING

If you replace the fuse and it blows again immediately, there is a serious problem with the electrical system of this vehicle. Do not attempt to continue using this vehicle.

NOTE Check the spare fuse holder. If the appropriate spare fuses are not there, replace them.

WIRING DIAGRAM



WIRING DIAGRAM KEY

1) Generator
2) Ignition coil
3) Starter motor
4) Voltage regulator
5) Fuses
6) Battery
7) Starting relay
8) Brake light front switch
9) Brake light rear switch
10) Water temperature thermistor
11) Engine oil pressure sensor
12) Right direction indicators warning light
13) Fuel sensor
14) Rear left direction indicator
15) Taillight
16) Rear right direction indicator
17) Flasher
18) Ignition key switch
19) Right high/low beam selector
20) Left high/low beam selector
21) Complete dashboard
22) Low beam warning light
23) Dashboard lights
24) Fuel reserve warning light
27) Water temperature gauge
28) High beam warning light
29) Left direction indicators warning light
30) Horn
31) Front right direction indicator
32) Low/high beam light
33) Front park light
34) Front left direction indicator
35) Engine oil pressure warning light
36) Multiple connectors
37) Spark plug
38) Automatic starter
39) Headlight
40) Fuel level indicator
41) Fan
42) CDI control unit
43) Thermo switch
44) Pick up
45) License plate light
46) Thermometric switch STARTER
47) PTC

WIRE COLORS

Ar orange
Az Light blue
B blue
Bi white
G yellow
Gr gray
M brown
N black
R red
V green
Vi purple
Ro pink

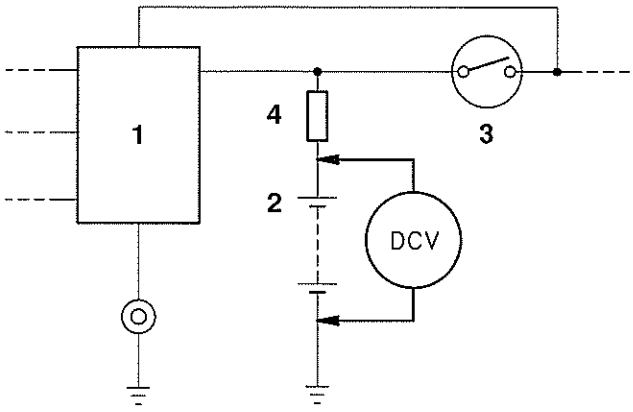
CHECKING THE RECHARGE SYSTEM

Refer to the following key when consulting this section.

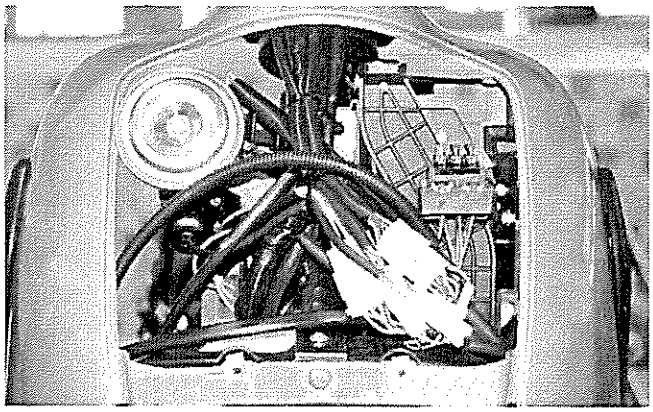
WIRE COLORS

Ar orange
Az Light blue
B blue
Bi white
G yellow
Gr gray
M brown
N black
R red
V green
Vi purple
Ro pink

CHECKING THE RECHARGE VOLTAGE



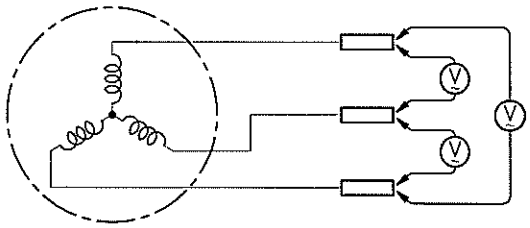
Check the electrolyte level (see CHECKING THE ELECTROLYTE LEVEL).
Check the battery voltage (see RECHARGING THE BATTERY).
Position the motorcycle on the center stand.
Start the engine and take it to 3000 rpm (throttle control turned approximately 1/4 of its range).
Switch the light switch to the "☼" position and the light selector to the "≡D" position.
Using a portable tester, check the continuous voltage between the battery positive (+) and negative (-) terminals.
If the tester reading is less than 13 V or greater than 15 V:
Check the function and continuity of the alternator without load, (CHECKING THE ALTERNATOR WITHOUT LOAD) and (CHECKING THE ALTERNATOR CONTINUITY) and the voltage regulator (see VOLTAGE REGULATOR).



Key to second figure
1) Voltage regulator
2) Battery
3) Ignition switch
4) Fuse

Standard charge voltage: 13 to 15 V (d.c.) at 3000 rpm.

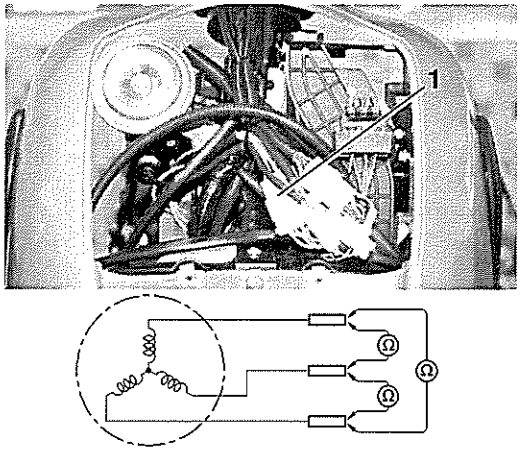
CHECKING THE ALTERNATOR WITHOUT LOAD



Remove the front shield.
Disconnect the regulator wire connector (1).
Start the engine and take it to 3000 rpm (throttle control turned approximately 1/4 of its range).
Position the motorcycle on the center stand.
Using a portable tester, test the voltage (alternating current, a.c.) between the three yellow wires (G), testing them two at a time.
If the tester reading is less than 45 V, the alternator is defective.

Standard voltage without load: greater than 45 V (a.c.) at 3000 rpm.

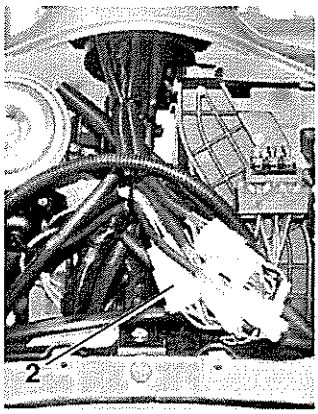
CHECKING THE ALTERNATOR CONTINUITY

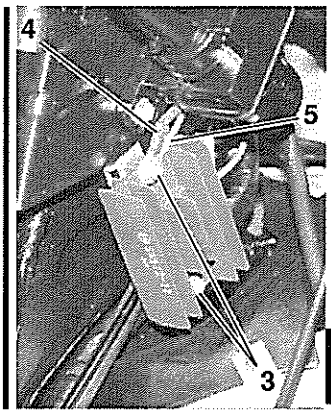


With the engine off:
Remove the front shield.
Disconnect the regulator wires connector (1).
Using a portable tester, test the continuity between the yellow wires (G) of the stator.
Also, check the isolation of the stator support.

Standard resistance: 0.1 - 1Ω
Standard resistance between wires and stator support: ∞ (infinity)

VOLTAGE REGULATOR



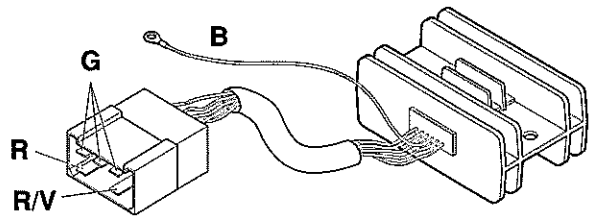


Remove the front shield.
Disconnect the connector (2).
Unscrew and remove the screws (3) and disconnect the terminal of wire (4) and wire (5).

⚠ CAUTION

When reassembling, reconnect both wires (4) and (5).
Using a portable tester (scale x 1 kΩ), test (from the regulator side) the resistance between the wires indicated in the table below.
If the resistance reading is incorrect, change the regulator.

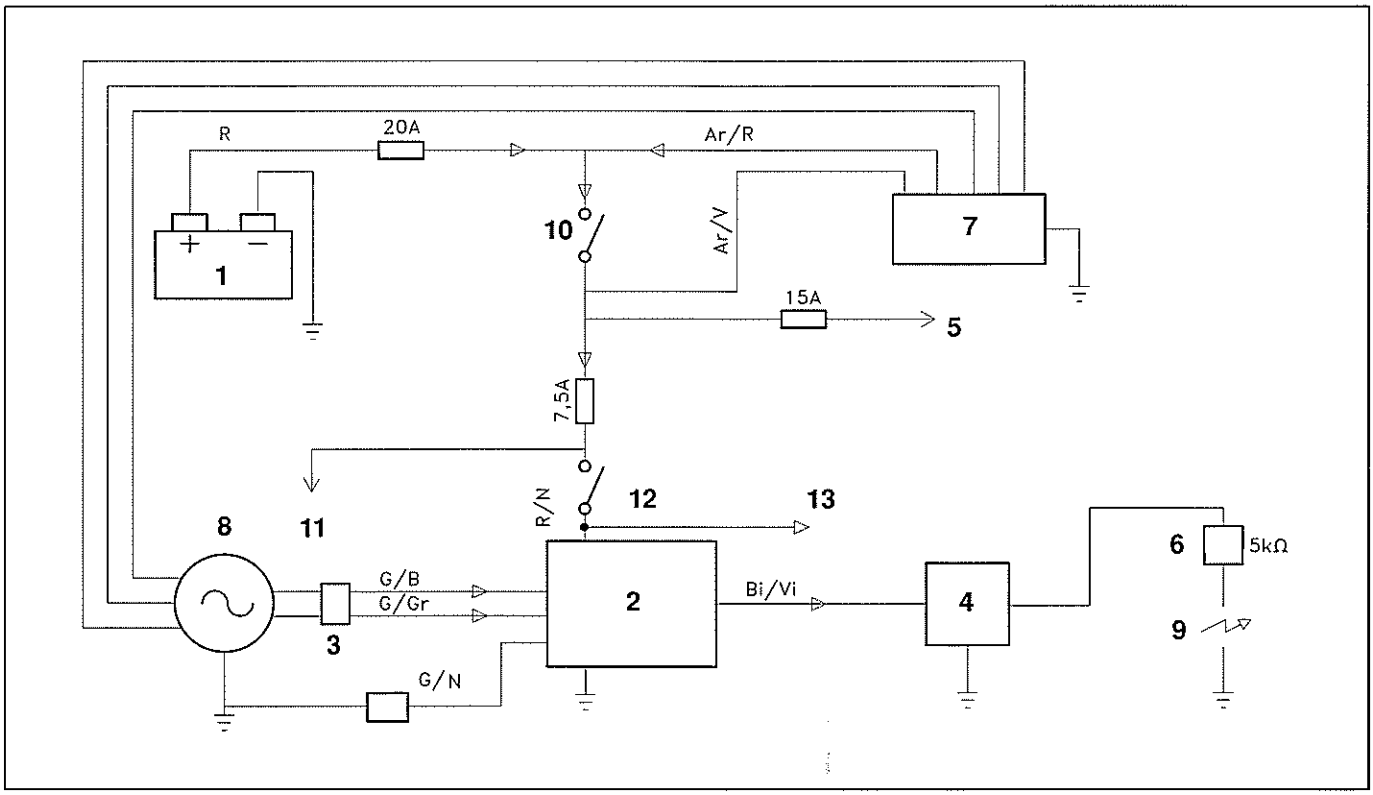
		Tester positive terminal (+) on:					
		G	G	G	R	B	R/V
Tester negative terminal (-) on:	G		∞	∞	∞	∞	∞
	G	∞		∞	∞	∞	∞
	G	∞	∞		∞	∞	∞
	R	∞	∞	∞		∞	∞
	B	∞	∞	∞	∞		1-∞
	R/V	∞	∞	∞	∞	1-∞	



NOTE This inspection method is only approximate.
If possible, substitute a voltage regulator that you know works, to check the charging circuit.

IGNITION SYSTEM

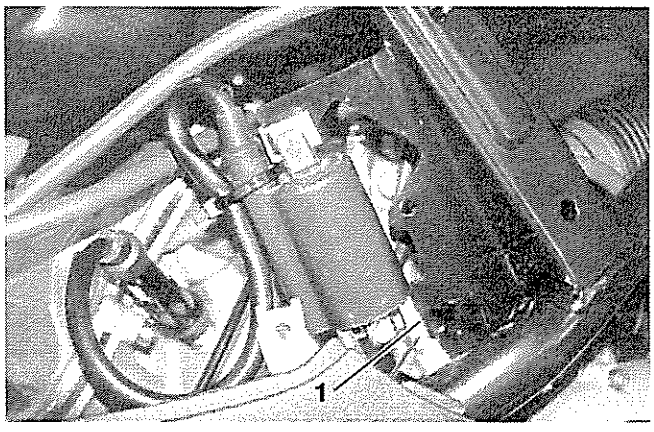
WIRING DIAGRAM



1) Battery
2) C.D.I. control unit
3) Pick-up
4) HT coil
5) To auxiliary services
6) Spark plug cap
7) Voltage regulator
8) Alternator
9) Spark plug
10) Ignition switch
11) Stop/start
12) Engine stop switch
13) To carburetor heater system

CHECKING THE HT COIL

Remove the left side inspection cover (see REMOVING THE LEFT INSPECTION COVER).
Disconnect the terminal (1).
Disconnect the spark plug cap from the lead.
Take readings (A) and (B) shown in the figure, using a portable tester.

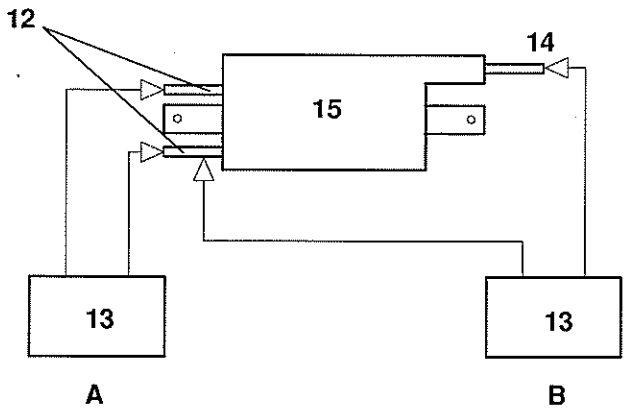


Key to figure
A) Measurement 1
B) Measurement 2
12) Tabs
13) Resistance tester
14) Black HT lead
15) HT coil

Standard readings:
Measurement 1 : 0.5 ÷ 3.5Ω
Measurement 2 : 13.5 kΩ ± 20%

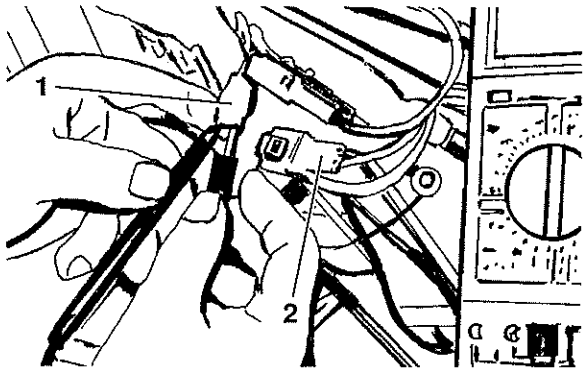
⚠ CAUTION

The measurement method is only approximate. If you can, substitute a coil that you know to be good.



CHECKING THE PICK-UP

With the engine off:
Disconnect the connector (1) and take the readings (on the pick-up wires terminal).
Using a portable tester (scale x 100Ω), measure the resistance between the blue/yellow (B/G) wire and green/white (G/Bi) wire terminals.
Standard reading: 240Ω ± 20%
Disconnect the connector (2).
Using a tester, test the resistance between the terminal on the flywheel side and the engine block.
Standard reading: 0Ω
If the resistance reading is infinity or less than the stated value, the pick-up must be replaced.

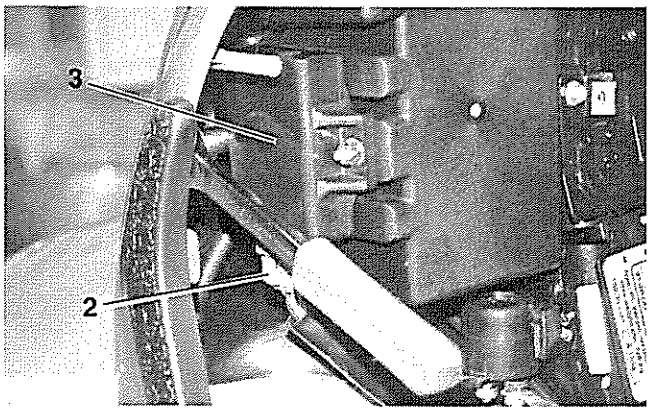


6

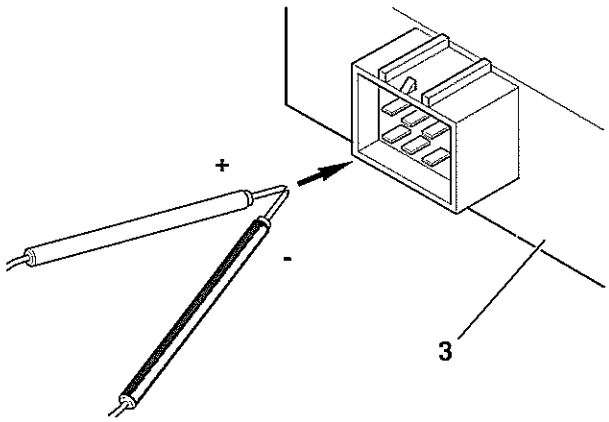
CHECKING THE C.D.I. CONTROL UNIT

Remove the front shield.
Disconnect the electrical connector (2) from the C.D.I. control unit.
Connect the positive (+) and negative (-) terminals of a portable tester to all the terminals on the C.D.I. control unit (3), checking the continuity and measuring the resistance.

If the continuity and resistance readings correspond to the values shown in the table below, the C.D.I. control unit is probably good.
Test the resistance between the terminals, as shown.

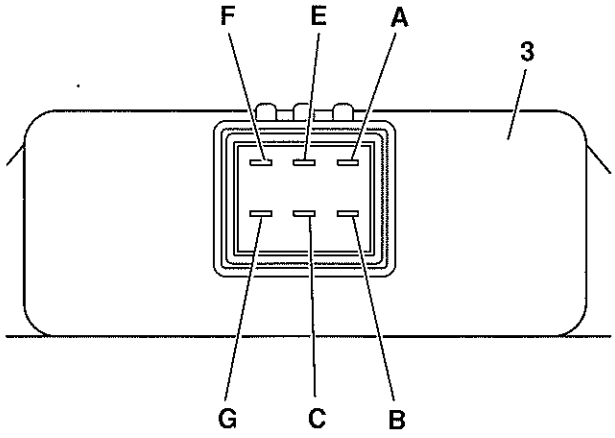


Tester negative terminal (-) on:	Tester positive terminal (+) on: A	B	C	E	F	G
A		1-∞	0	1-∞	∞	1-∞
B	1-∞		1-∞	1-∞	∞	1-∞
C	0	1-∞		1-∞	∞	1-∞
E	1-∞	1-∞	1-∞		∞	1-∞
F	∞	∞	∞	∞		∞
G	1-∞	1-∞	1-∞	1-∞	∞	



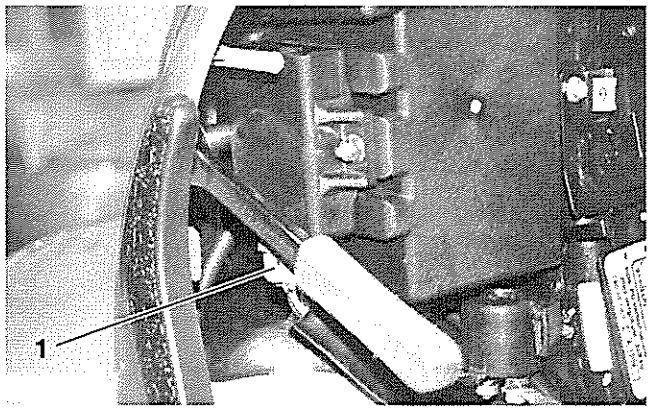
⚠ CAUTION

As there are diodes, condensers and other electronic components inside the C.D.I. control unit, the measurement method described here is only approximate.
In order to make a more definitive check, either replace the control unit with one that you are sure is good, or carry out the checks described in CHECKING THE ELECTRICAL SYSTEM FROM THE C.D.I. CONTROL UNIT CONNECTOR.

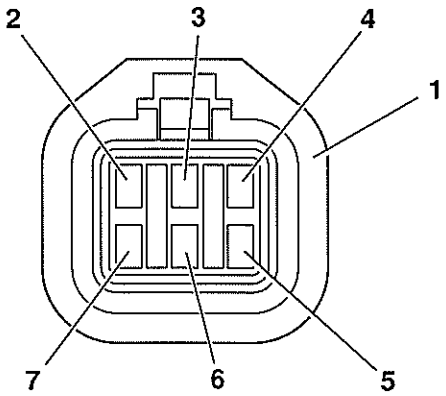


CHECKING THE ELECTRICAL SYSTEM FROM THE C.D.I. CONTROL UNIT CONNECTOR

Remove the front shield.
Disconnect the electrical connector (1) from the C.D.I. control unit.
Using a portable tester on the electrical connector (1), take the readings described in the table.



2) Pick-up terminal (yellow/gray wire (G/Gr)).
3) 7.5 fuse terminal (red/black wire (R/N)).
4) HT coil terminal (white/purple wire (Bi/Vi)).
5) Ground terminal (blue wire (B)).
6) Flywheel ground terminal (yellow/black wire (G/N)).
7) Pick-up terminal (yellow/blue wire (G/B))

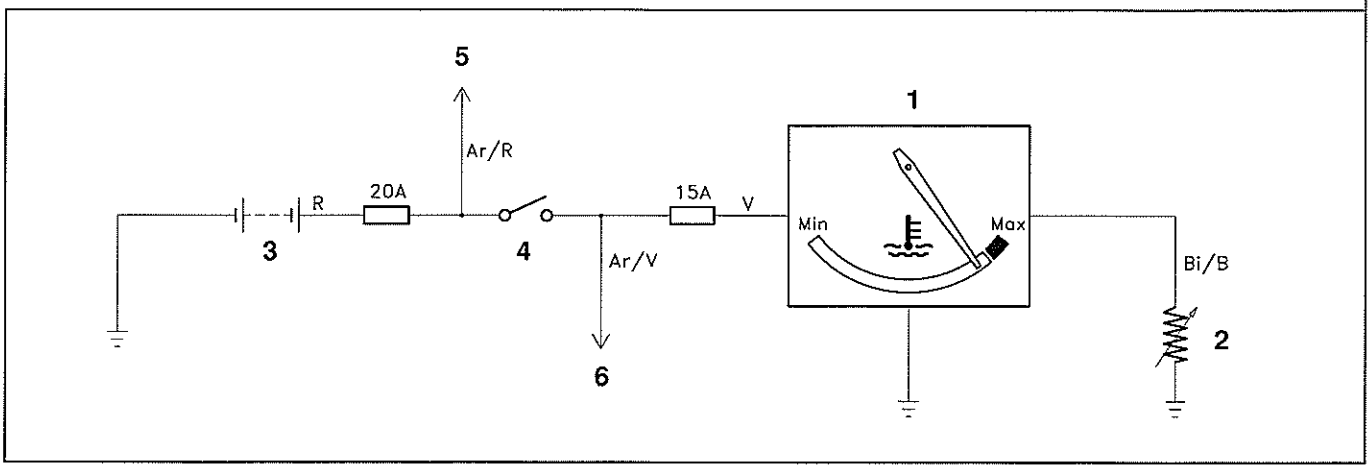


Wires	Ignition switch position	Measurement	Value	If reading out of range check the following:
yellow/gray(G/Gr) and blue/yellow (B/G)	⊗	ohms (Ω)	240 ± 48	pick-up wiring
blue (B) and engine ground	⊗	ohms (Ω)	0 ÷ 1	wiring
yellow/black (G/N) and engine ground	⊗	ohms (Ω)	0 ÷ 1	wiring
white/purple (Bi/Vi) and engine ground	⊗	ohms (Ω)	0 ÷ 2	HT coil wiring
white/purple (Bi/Vi) and engine ground	⊗ (coil primary disconnected)	ohms (Ω)	infinity	wiring
red/black (R/N) and yellow/black (G/N)	○ (engine off)	volts (V)	12V *	wiring alternator-ground, fuses
gray/yellow (Gr/G) and engine ground	⊗	ohms (Ω)	infinity	pick-up wiring

If the values are correct and a malfunction occurs, then the C.D.I. control unit is definitely defective and must be replaced.
(*) This reading must show the battery voltage.

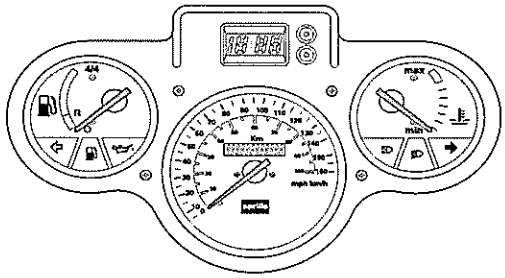
COOLANT TEMPERATURE GAUGE

WIRING DIAGRAM



Wiring diagram key

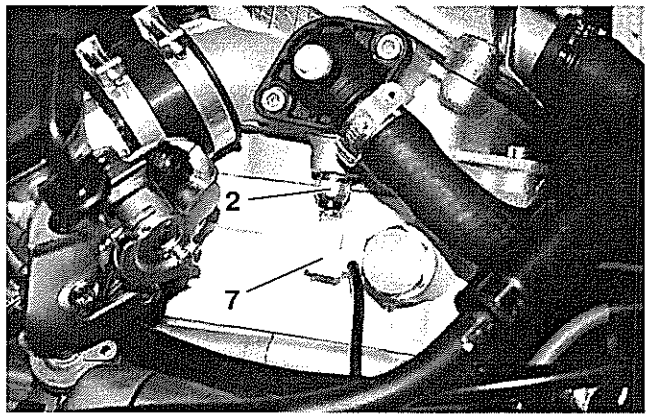
1) Coolant temperature gauge
2) Thermistor
3) Battery
4) Ignition switch
5) to voltage regulator
6) to ignition

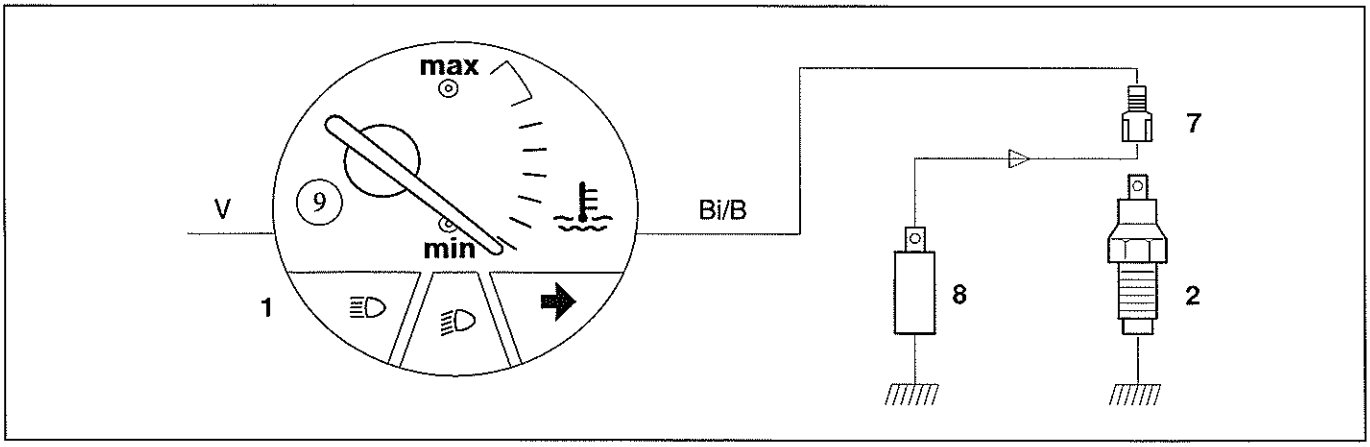


6

CHECKING THE GAUGE

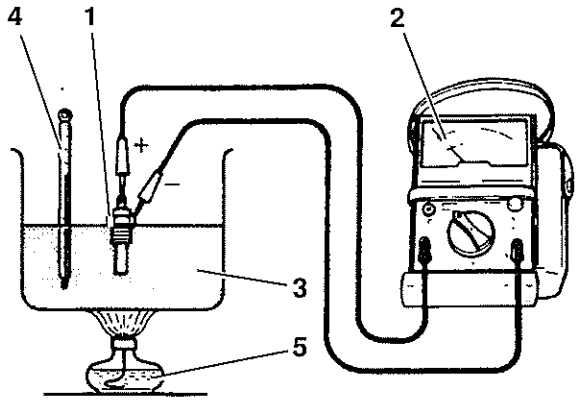
Remove the rear fairing and the air box.
Disconnect terminal (7) (white/blue wire (Bi/B)) from the thermistor (2).
Connect a 25 W resistor (8) to terminal (7).
Turn the ignition switch to position "○".
Check that the pointer (9) goes to the start of the red zone ("**Max**") with a tolerance of ± 5°.





CHECKING THE CONDITION OF THE THERMISTOR

Remove the thermistor (1), (see REMOVING THE COOLANT THERMISTOR).
As illustrated in the figure, connect a pocket tester (2) (set to ohmmeter mode) to the thermistor (1).
Immerse the thermistor in a receptacle (3) containing coolant.
Immerse a thermometer (4) with a range of 0° to 150°C (32° to 302°F) in the same receptacle.
Position the receptacle over a burner (5) and slowly heat the liquid.
Check the temperature reading on the thermometer and the thermistor reading on the tester.
Check that the thermistor responds to the temperature as shown below.

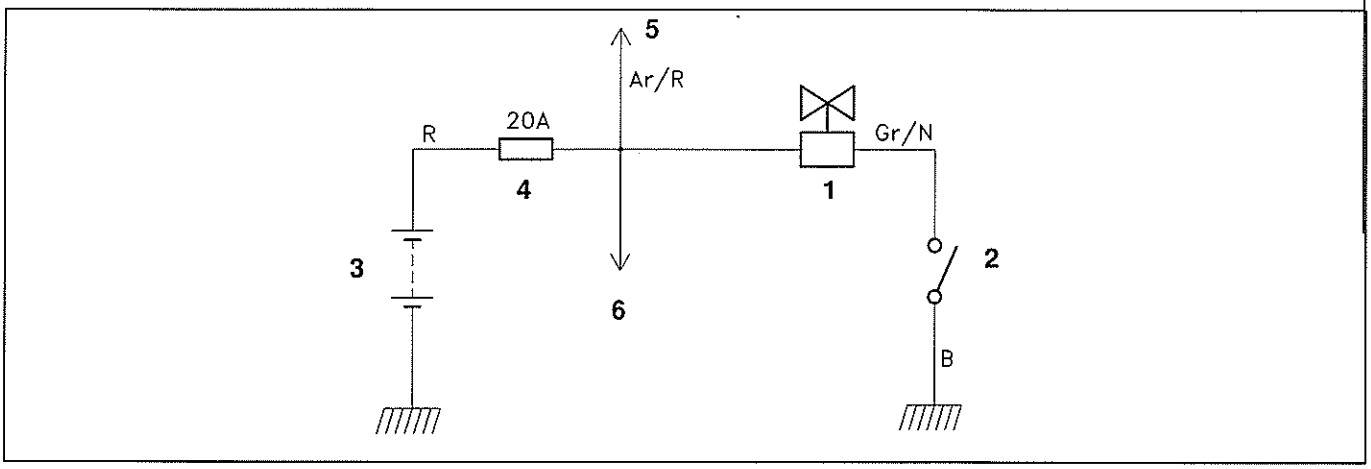


Coolant temperature °C (°F)	Standard values (Ω)
50° (122°)	~ 226 ± 50
115° (239°)	~ 26 ± 10

⚠ CAUTION

If the values do not change, or if they differ too much from those in the table, replace the thermistor with a new one.

ELECTRIC COOLING FAN



WIRING DIAGRAM

Wiring diagram key

1) Electric fan
2) Thermal switch
3) Battery
4) Main fuse
5) to voltage regulator
6) to ignition switch

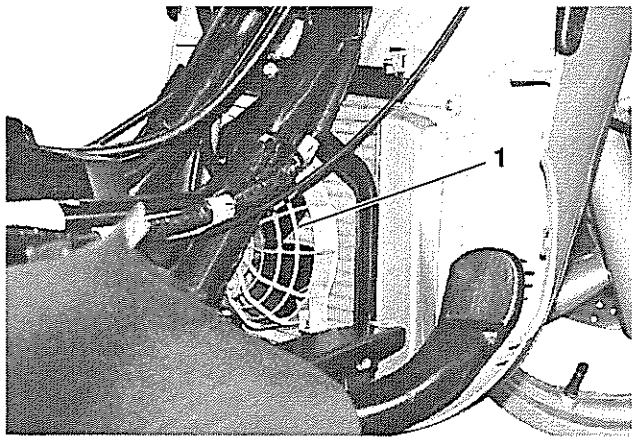
6

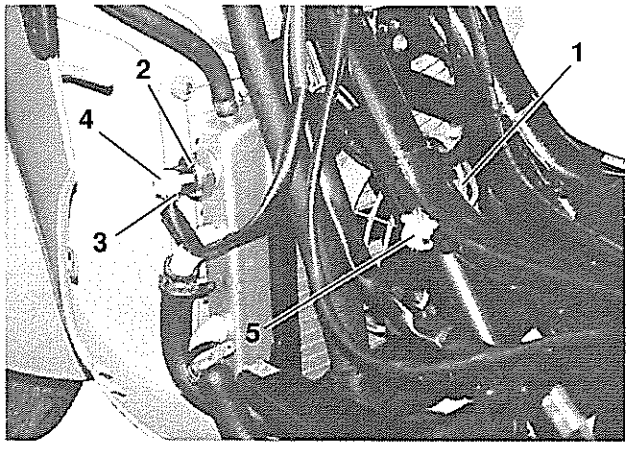
CHECKING THE CONDITION OF THE ELECTRIC FAN

To check the working state of the fan (1), proceed as follows:
Remove the floor panel.
Disconnect two electrical terminals (3) and (4) from the thermal switch (2) and connect them up together.

If the fan doesn't run:
Check that the connector (5) is plugged in properly.
Turn the fan manually and check that the blades do not touch the support.

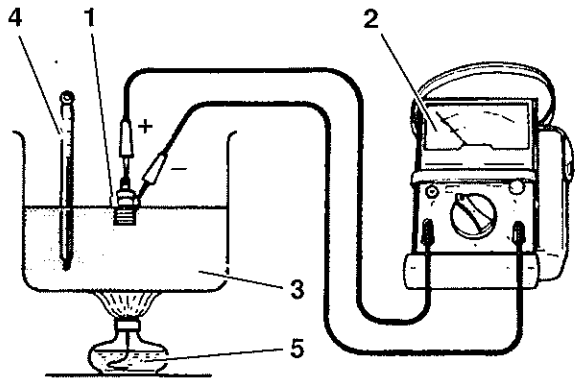
If the fan rotates freely:
Check the recharging system (see CHECKING THE RECHARGE SYSTEM) and the main fuse (see CHANGING FUSES).





CHECKING THE CONDITION OF THE THERMAL SWITCH

Remove the floor panel.
Remove the thermal switch (1) (see REMOVING THE COOLANT THERMAL SWITCH).
As illustrated in the figure, connect a portable tester (2) (set to ohmmeter mode) to the thermal switch (1).
Immerse the thermal switch in a receptacle (3) containing coolant.
Immerse a thermometer (4) with a range of 0° to 150°C (32° to 302°F) in the same receptacle.
Position the receptacle over a burner (5) and slowly heat the liquid.
Check that the temperature reading on the thermometer and the thermal switch reading on the tester correspond to the data in the table.

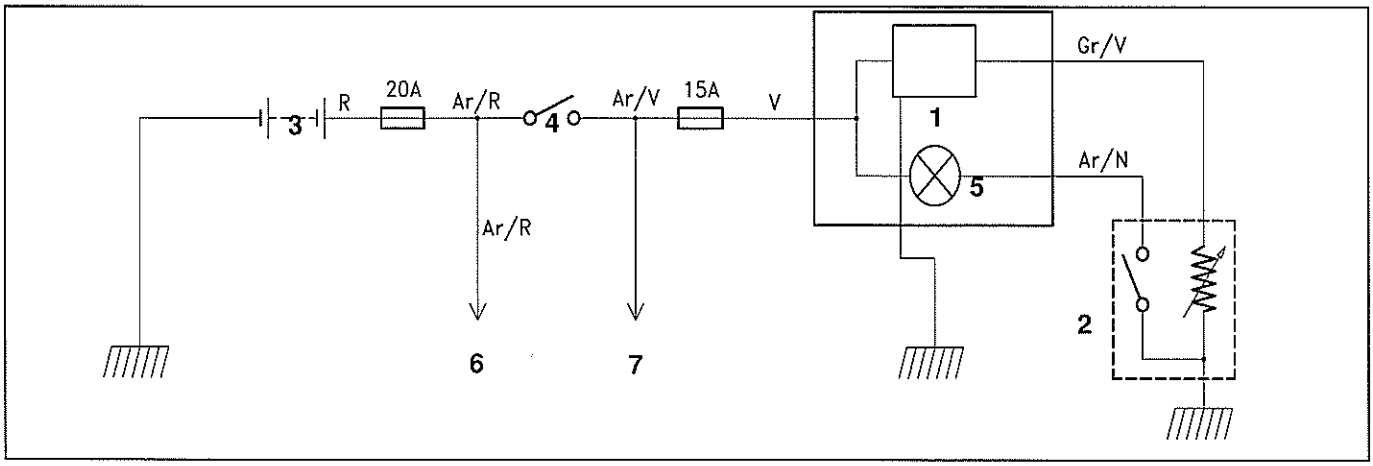


Coolant temperature °C (°F)	Standard values (Ω)
less than 90° (194°)	∞
greater than 100° (212°)	0

If the values differ from those shown in the table, change the thermal switch.

FUEL LEVEL CIRCUIT

WIRING DIAGRAM



Wiring diagram key
1) Fuel level indicator
2) Fuel level sensor
3) Battery
4) Ignition switch
5) Fuel reserve warning light (yellow amber color)
6) to voltage regulator
7) to ignition switch

FUEL LEVEL INDICATOR

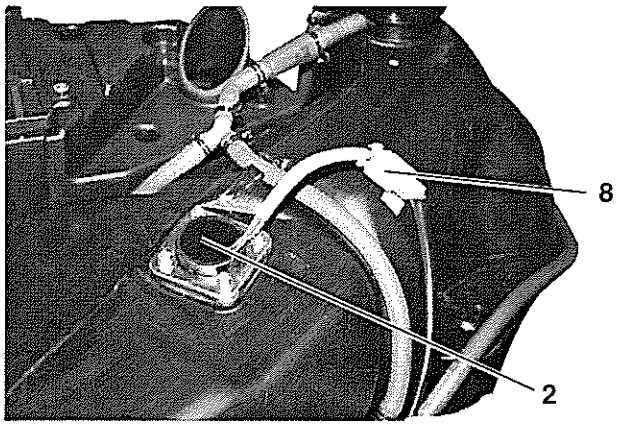
Remove the rear fairing.
Disconnect the 3-way connector (8) from the fuel level sensor (2).

Checking the pointer

Connect a 10 Ω resistor to the gray/green (Gr/V) and blue (B) wires of connector (8) (wiring side).
Check that the pointer (9) goes to 4/4, with a tolerance of ± 5°.
Repeat the operation using a 90 Ω resistor and check that the pointer (9) goes to 0 (zero) with a tolerance of ± 5°.

Checking the fuel reserve warning light

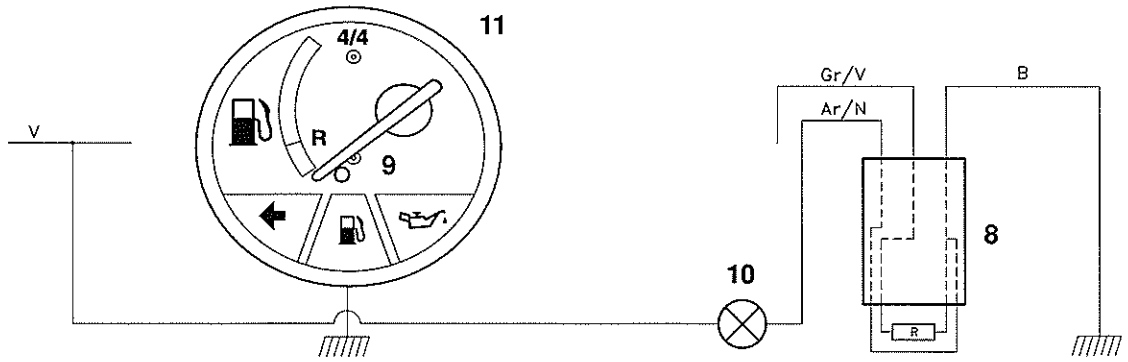
Make a direct connection (resistance 0 Ω) between the orange/black (Ar/N) and blue (B) wires on connector (8) (wiring side); check that the fuel reserve warning light lights up.



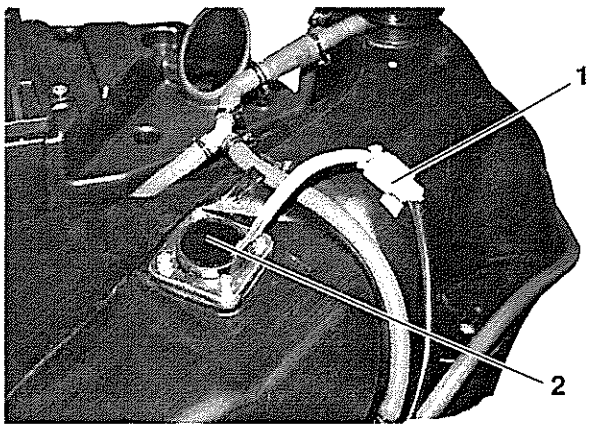
Between wires:	Resistance	Correct reading
gray/green (Gr/V)-blue (B)	10 Ω	4/4 ± 5°
gray/green (Gr/V)-blue (B)	90 Ω	0 ± 5°
orange/black (Ar/N)-blue (B)	0 Ω	warning light lit

Wiring diagram key

8) 3-way connector
9) Pointer
10) Fuel reserve warning light
11) Fuel level indicator

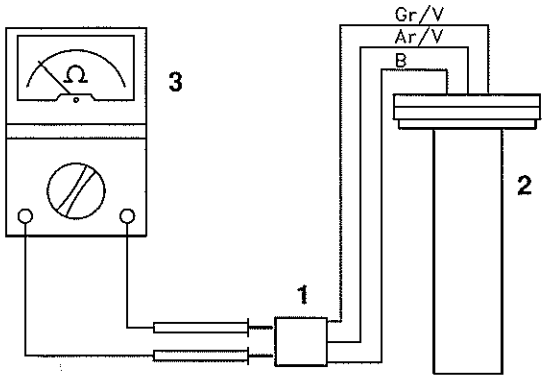


FUEL LEVEL SENSOR

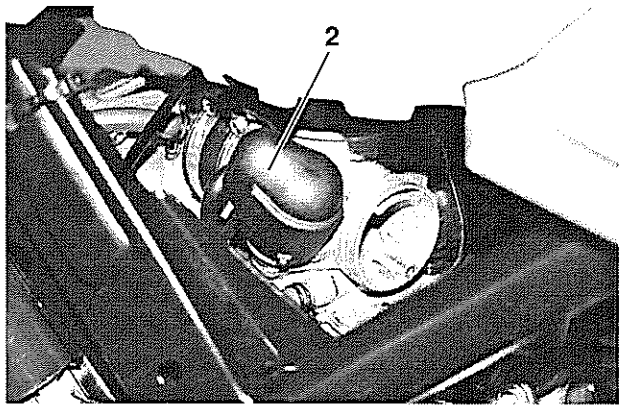


Checking the condition
Remove the rear fairing.
Disconnect the 3-way connector (1) on the fuel level sensor (2).
Using a portable tester (3) (set to ohmmeter mode) on the connector (1) (sensor side):
Connect up the gray/green (Gr/V) and blue (B) wires and check that the readings match the table values in the two sensor positions (vertical and upside-down).
Connect up the orange/black (Ar/N) and blue (B) wires and check that the readings match the table values in the two sensor positions (vertical and upside-down).

Between wires:	Sensor position	Correct reading
gray/green (Gr/V) -blue (B)	VERTICAL	80 to 100 Ω
gray/green (Gr/V) -blue (B)	UPSIDE-DOWN	4 to 10 Ω
orange/black (Ar/N)-blue (B)	VERTICAL	0 Ω
orange/black (Ar/N)-blue (B)	UPSIDE-DOWN	∞ Ω

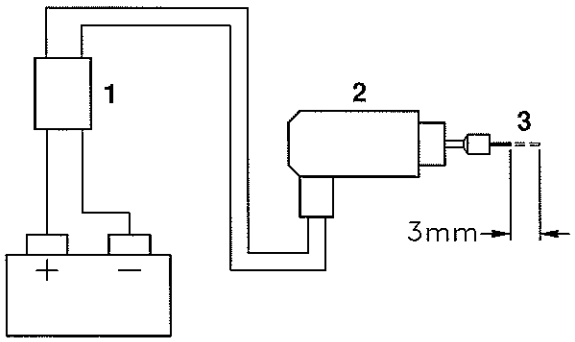


CHECKING THE AUTOMATIC CHOKE (COLD START)



Remove the air box.
Disconnect the corresponding electrical connector.
Remove the automatic choke (2) from the carburetor, (see DISASSEMBLING THE CARBURETOR).
Wait until the choke gets to ambient temperature (10° to 25°C/50° to 77°F).
Power up the choke with 12 V d.c.
After three minutes, check that the pointer (3) has moved forward at least 3 mm (0.1 in).

Checking the circuit



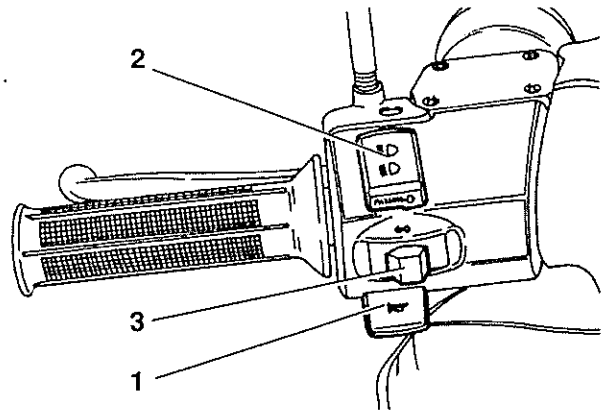
This test can be done in two ways, either:
with the engine off, using a special multitester;

or:

with the engine idling (1600 rpm), checking that there is voltage at the terminals of connector (1) (circuit side) (if the circuit is working properly a 10 W bulb should light up).

SWITCHES

Using a portable tester, check the continuity of the switches, and refer to the specific table for each switch. Replace the switch if it is faulty.

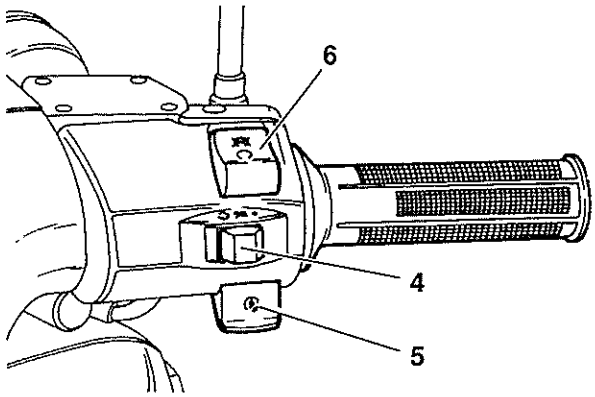


1) HORN BUTTON

Wires / Rs	Gr	B
	○	○

2) HIGH/LOW BEAM SELECTOR

Wires / Rs	N	G/N	V/N	Bi
		○		○
	○	○		
Passing			○	○

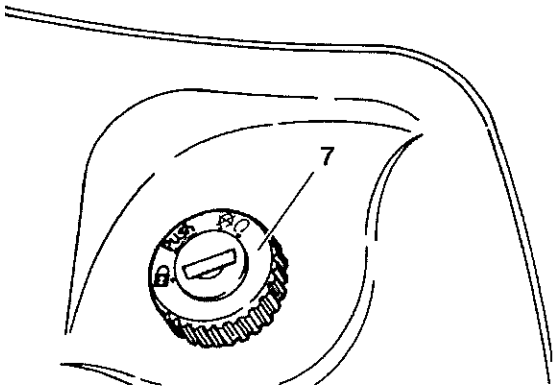


3) DIRECTION INDICATOR SWITCH

Wires / Rs	B/N	Az	R
	○	○	
	○		○

4) LIGHTS SWITCH

Wires / Rs	G/N	G	V/N
•			
		○	○
	○	○	○



5) STARTER BUTTON

Wires / Rs	G/V	G/R
	○	○

6) IGNITION BUTTON

Wires / Rs	R/N	R/Gr
	○	○

7) IGNITION SWITCH

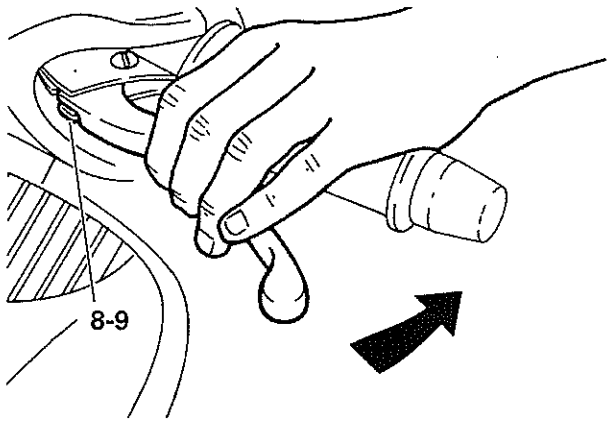
Wires / Rs	Ar	V
	○	○
OPEN		

8) BRAKE LIGHT FRONT SWITCH

Wires / Rs	R/Gr	V/G
ON	○	○

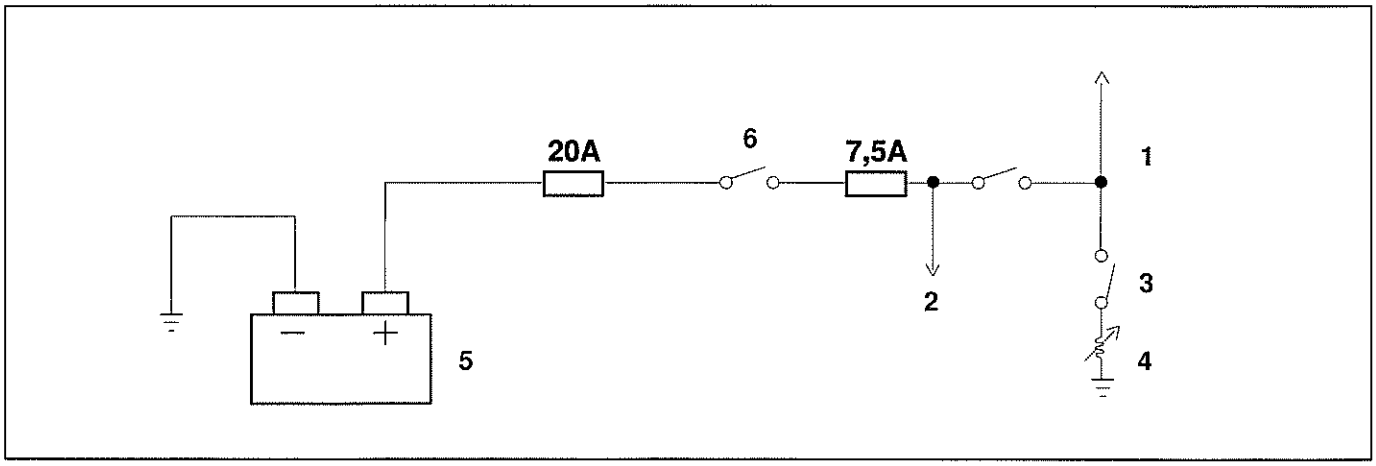
9) BRAKE LIGHT REAR SWITCH

Wires / Rs	R/Gr	V/G
ON	○	○



CARBURETOR HEATER

WIRING DIAGRAM



Wiring diagram key
1) to ignition circuit
2) to starter circuit
3) Thermal switch
4) Heater
5) Battery
6) Ignition switch

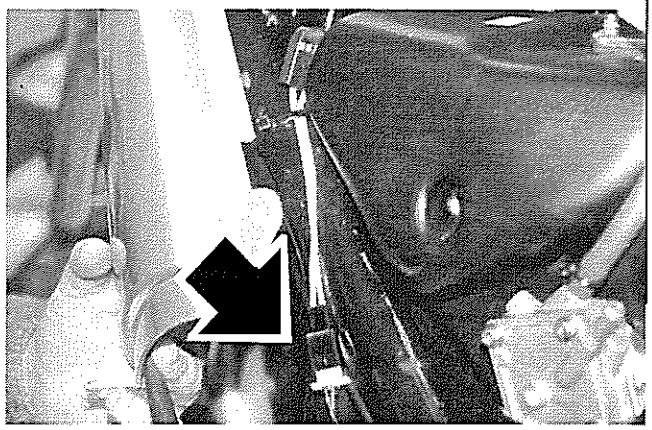
CHECKING THE HEATER

Using a tester in ohmmeter mode, test the resistance at the terminals.

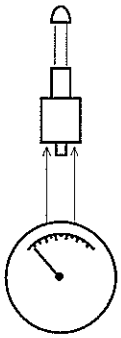
Correct value: 5 to 15Ω at 25°C (77°F)

CHECKING THE THERMAL SWITCH

Using a tester in ohmmeter mode, test the continuity of the thermal switch at different temperatures.

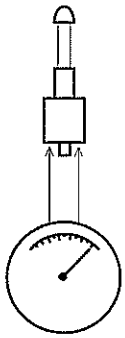


Less than 3°C (37.4°F)



Correct value ØΩ

Greater than 16°C (60.8°F)



Correct value ∞Ω

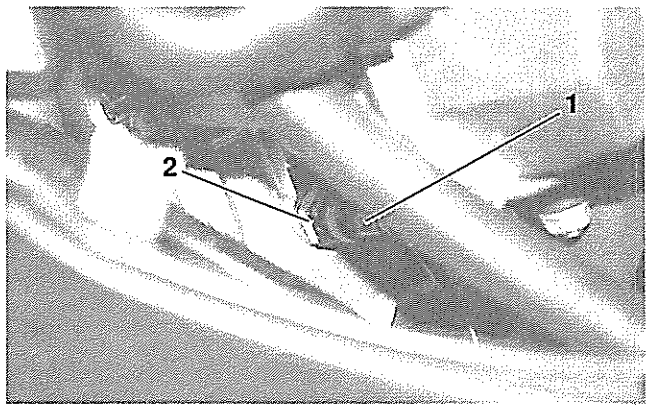
6

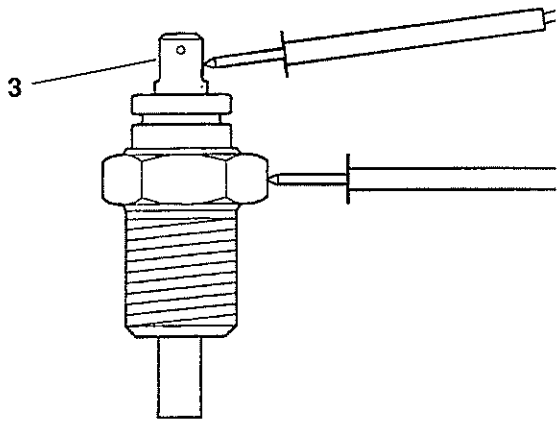
CHECKING THE PRESSURE SENSOR

To check the condition of the sensor, proceed as follows:
Take off the rubber cover (1).
Disconnect the electrical terminal from the sensor (2).
Using a tester (scale x 100Ω), check the continuity between the tab terminal (3) and the sensor body.

Correct value with engine off: 0Ω
Correct value with engine running: ∞Ω

If the readings do not correspond to the stated values, check the engine oil level and replace the sensor with a new one, if necessary.

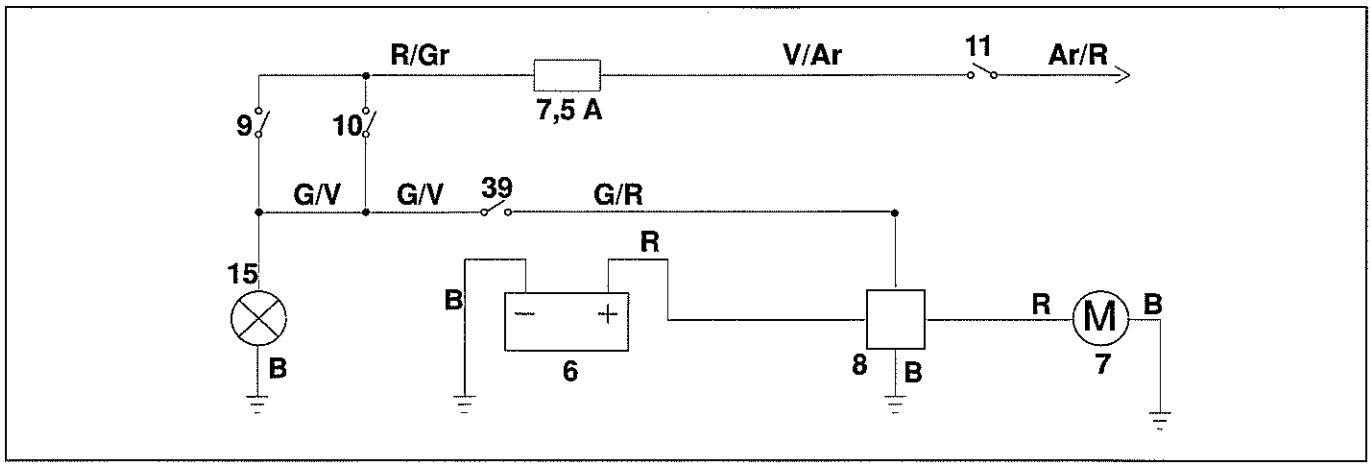




STARTER CIRCUIT

Location of components (see LOCATION OF COMPONENTS).

WIRING DIAGRAM



Wiring diagram key
6) Battery
7) Starter motor
8) Starter relay
9) Brake light front switch
10) Brake light rear switch
11) Ignition switch
15) Brake light
39) Starter button

IMPORTANT:
For safety reasons, the engine will start with the "ⓘ" button only when one of the two brake levers is pulled.

TROUBLESHOOTING

A. STARTER MOTOR DOESN'T TURN

Check the battery (CHECKING THE BATTERY).
Check the 7.5 A fuse.
Check the starter motor wiring connections.
Check the starter relay (CHECKING THE STARTER RELAY).
Check the starter button "ⓘ" (CHECKING THE STARTER BUTTON).
Check the brake light switches (CHECKING THE BRAKE LIGHT SWITCHES).

B. STARTER MOTOR TURNS BUT ENGINE DOESN'T TURN OVER

Check the starter motor, the sprag clutch and the sprag clutch gear.

C. STARTER MOTOR TURNS BY ITSELF, WITHOUT PRESSING THE BUTTON

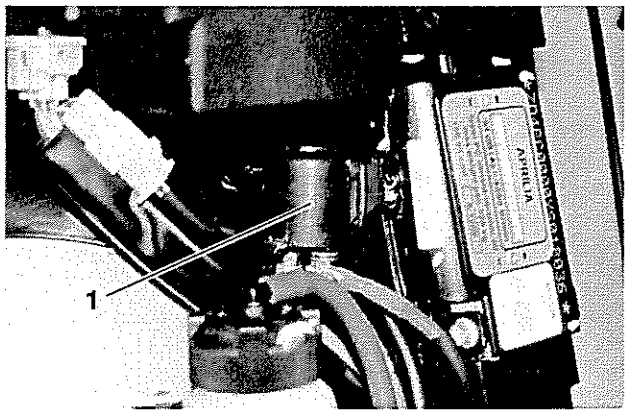
Check the starter motor wiring connections.
Check the starter relay (CHECKING THE STARTER RELAY).

INSPECTION DATA

CHECKING THE STARTER RELAY

Disconnect all the wires from the relay (1).
Using a tester in ohmmeter mode, test the continuity between the power terminals (M5 screws).
Correct value: infinity.

Power up the power contacts (connector) with a 12 V battery.
Using a tester in ohmmeter mode, test the continuity between the power terminals. Correct value: 0 Ω.



CHECKING THE STARTER MOTOR

Disconnect the spark plug cap, switch the ignition switch to ON and start up with the ammeter connected to the starter motor circuit.
Normal values: 45 A ± 15 % at running speed.

Using a tester in ohmmeter mode, test the resistance between the positive and negative terminals of the starter motor. Normal value: 0.5 Ω ± 10 %.

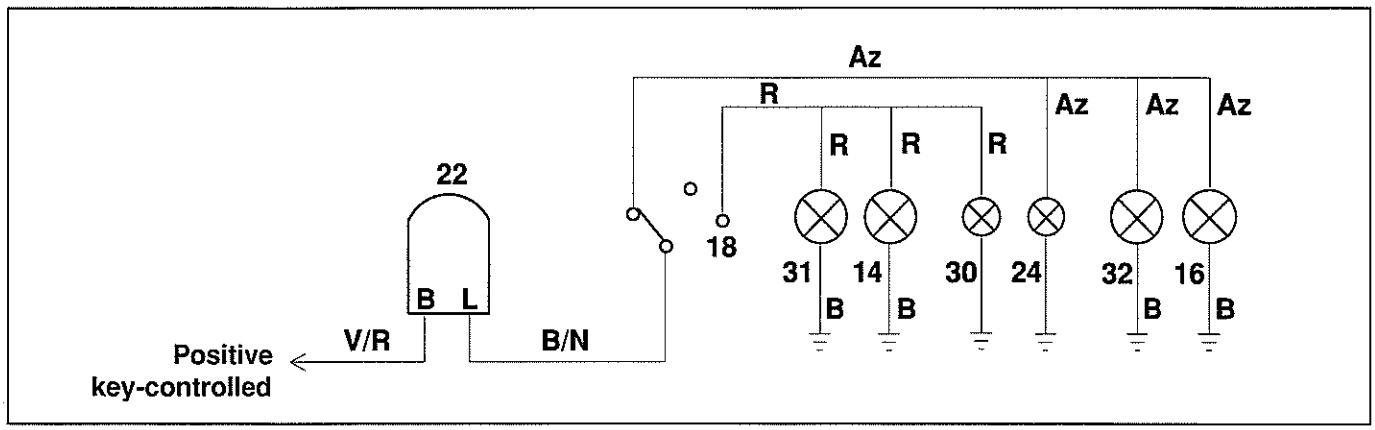
CHECKING THE STARTER BUTTON "⏀"

Disconnect the button connector.
Using a tester in ohmmeter mode, test the continuity between the contacts in the pressed and rest positions by testing the connections (MAIN WIRING DIAGRAM).

TURN SIGNAL CIRCUIT

Location of components (see LOCATION OF COMPONENTS).

WIRING DIAGRAM



14) Right rear turn signal
16) Left rear turn signal
18) Turn signal selector
22) Flasher
24) Left turn signal warning light
30) Right turn signal warning light
31) Front right turn signal
32) Front left turn signal

TROUBLESHOOTING

A. INDICATORS DON'T WORK

Check the bulbs.
Check the turn signal wiring connections.
Check the turn signal selector.
Check the general power supply circuit.
Replace the flasher.

B. INDICATORS STAY LIT PERMANENTLY WITHOUT FLASHING

Check the bulb specifications.
Check the battery (CHECKING THE BATTERY).
Replace the flasher.

INSPECTION DATA

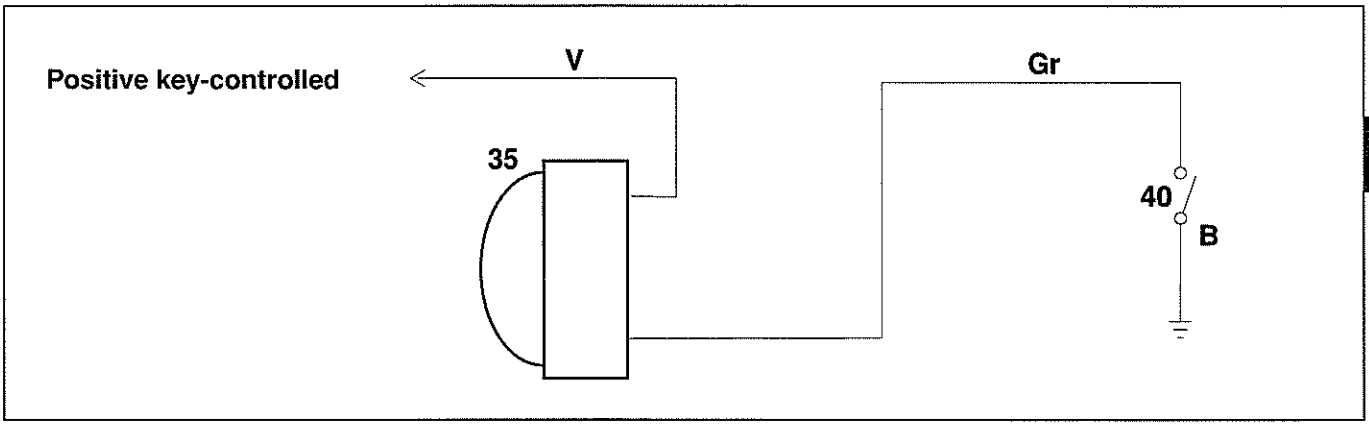
CHECKING THE TURN SIGNAL SELECTOR

Disconnect the selector connector.
Using a tester in ohmmeter mode, test the continuity between the wires in the different positions by testing the connections (see MAIN WIRING WIRING DIAGRAM).

HORN CIRCUIT

Location of components (see LOCATION OF COMPONENTS).

WIRING DIAGRAM



35) Horn
40) Horn button

TECHNICAL DATA

Horn ..... 12 V D.C.

TROUBLESHOOTING

A. DOESN'T SOUND, OR SOUNDS BADLY

Check the battery (CHECKING THE BATTERY).
Check the horn wiring connections.
Check the horn button (CHECKING THE HORN BUTTON).
Check the horn (CHECKING THE HORN).

B. SOUNDS CONTINUOUSLY

Check the horn wiring connections.
Check the horn button (CHECKING THE HORN BUTTON).

INSPECTION DATA

CHECKING THE HORN

Disconnect the horn and then power it directly from a 12 V battery. Replace it if it doesn't sound.
Adjust the horn adjustor if the horn note is unsatisfactory.

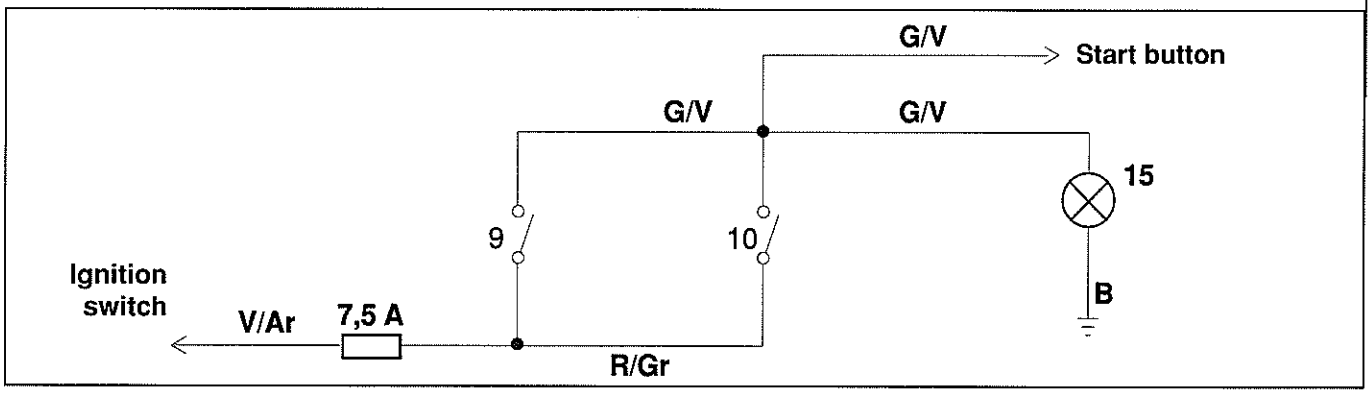
CHECKING THE HORN BUTTON

Disconnect the button connector.
Using a tester in ohmmeter mode, test the continuity between the contacts in the pressed and rest positions by testing the connections (MAIN WIRING DIAGRAM).

BRAKING LIGHTS CIRCUIT

Location of components (see LOCATION OF COMPONENTS).

WIRING DIAGRAM



9) Brake light front switch
10) Brake light rear switch
15) Taillight BRAKE light

6

TROUBLESHOOTING

A. BRAKE LIGHT STAYS LIT CONTINUOUSLY

Check the taillight connections.
Check the brake light front switch (CHECKING THE BRAKE LIGHT FRONT AND REAR SWITCH).
Check the brake light rear switch (CHECKING THE BRAKE LIGHT FRONT AND REAR SWITCH).

B. BRAKE LIGHT DOESN'T SWITCH ON

Check the bulb and bulb holder.
Check the brake circuit wiring connections.
Check the general power supply circuit.
Check the brake light front switch (CHECKING THE BRAKE LIGHT FRONT AND REAR SWITCH).
Check the brake light rear switch (CHECKING THE BRAKE LIGHT FRONT AND REAR SWITCH).

INSPECTION DATA

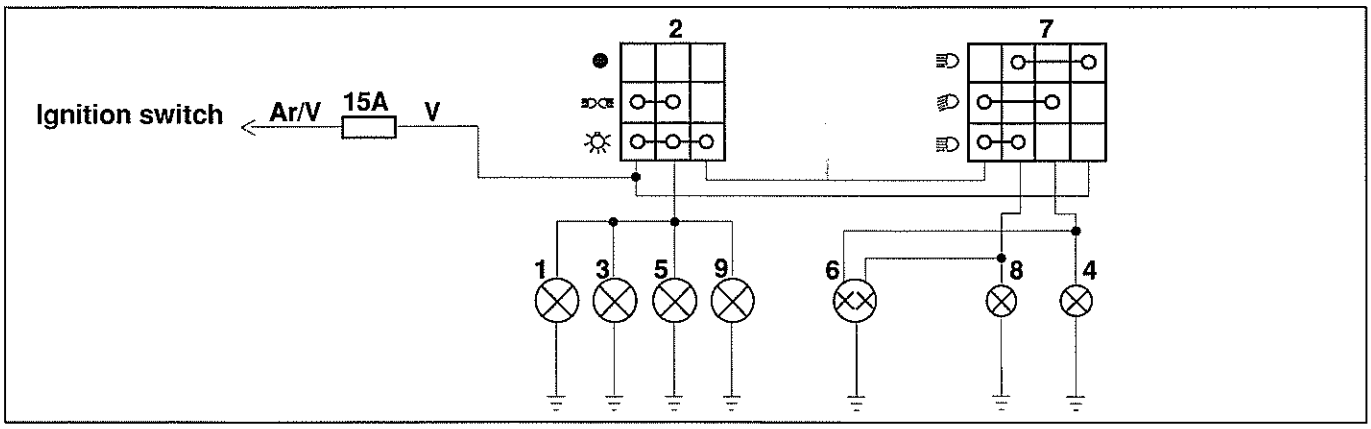
CHECKING THE BRAKE LIGHT FRONT AND REAR SWITCH

Disconnect the switch wires.
Operate the brake and test the resistance between the 2 switch terminals, using a tester in ohmmeter mode.
Normal value with brake engaged: 0 Ω.
Normal value with brake not engaged: infinity.

LIGHT CIRCUIT

Location of components (see LOCATION OF COMPONENTS).

WIRING DIAGRAM

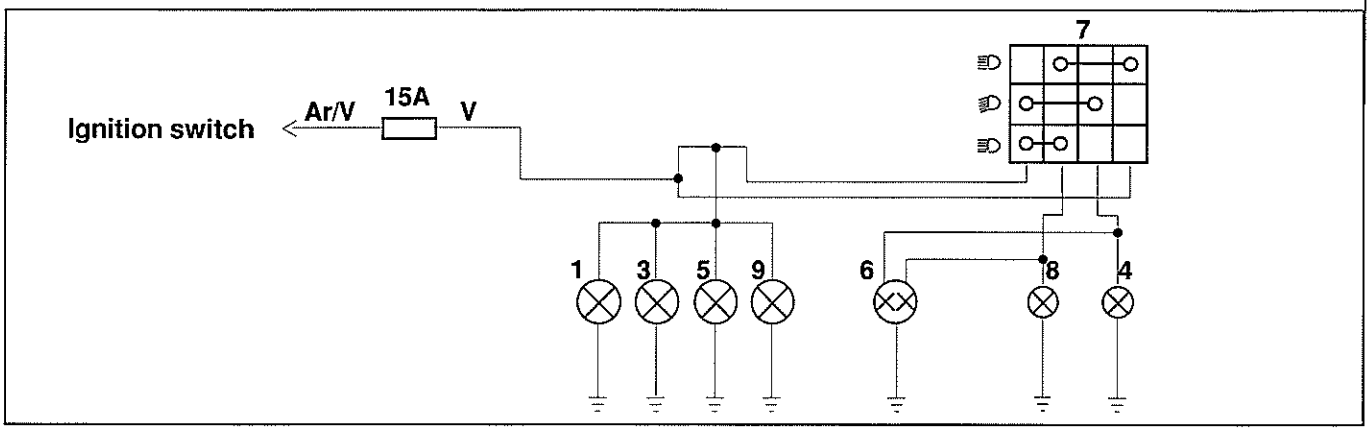


1) Rear parking light
2) Right high/low beam selector
3) Dashboard light
4) Low beam warning light
5) Front parking light
6) Low/high beam light
7) Left high/low beam selector
8) High beam warning light
9) License plate light

LIGHT CIRCUIT ASD USA

Location of components (see LOCATION OF COMPONENTS).

WIRING DIAGRAM



1) Rear parking light
3) Dashboard light
4) Low beam warning light
5) Front parking light
6) Low/high beam light
7) Left high/low beam selector
8) High beam warning light
9) License plate light

6

TROUBLESHOOTING

A. A BULB DOESN'T WORK

Check the bulb.
Check for voltage on the bulb holder terminals.
Check the wiring connections.

B. NONE OF THE LIGHTS WORK

Check the RH high/low beam selectors ("EU" version only).
Check the 15 A fuse.

C. BULBS BURN OUT FREQUENTLY

Check for excessive vibration on the lights and check that none of the lights are touching against parts of the motorcycle without flexible couplings.
Check the wiring connections.
Check the voltage regulator (CHECKING THE VOLTAGE REGULATOR).

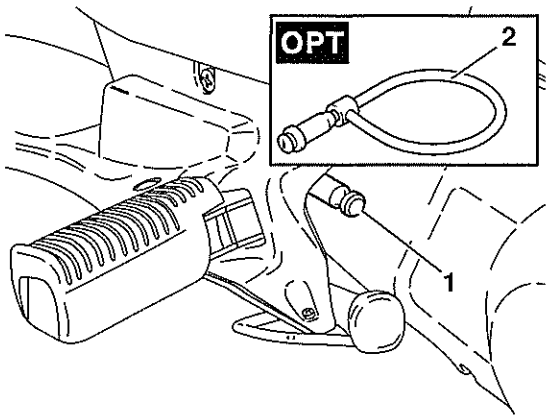
NOTE

7 Chassis

⚠ CAUTION

Many of the bodywork components of this vehicles employ tangs and slots, as well as threaded fasteners, to retain them in place.
Upon reassembly of any of these components, ensure that the tangs fit correctly into the appropriate slots.
Also, upon reassembly, tighten the screws only moderately.
Be careful not to overtighten the screws. If you do, the component you are attaching, as well as the surrounding plastic and painted components, will be irreparably damaged.

ANTI-THEFT HOOK

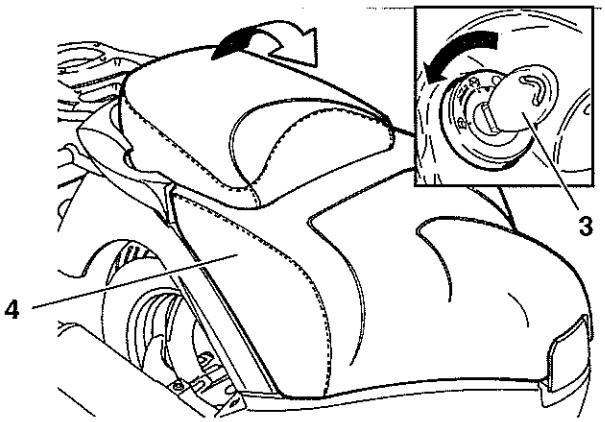


The anti-theft hook (1) is positioned on the left side of the vehicle, near the passenger footrest.
To prevent the vehicle from being stolen, it is advisable to secure it with the **aprilia** "Body-Guard" armored cable OPT (2).

⚠ CAUTION

Do not use the hook to lift the vehicle or for any purpose other than securing the vehicle once it has been parked.

UNLOCKING / LOCKING THE SADDLE



OPERATION

To unlock the saddle, proceed as follows:
Place the vehicle on the center stand, (see PLACING THE VEHICLE ON THE STAND).
Place the ignition key (3) in the ignition switch/steering lock.

NOTE Turn the key (3) without pressing it.
Turn the key (3) counterclockwise (leftwards) until you hear the snap that indicates that the saddle lock is open.
Turn the key (3) back to position "⊗".
Lift the saddle (4), (see UNLOCKING/LOCKING THE SADDLE).

NOTE Instruct your customers that before lowering and locking the saddle (4) they should make sure that they have not left the ignition key under the saddle area.

To lock the saddle:
Lower and press it (without exerting too much pressure), thus making the saddle lock snap shut.

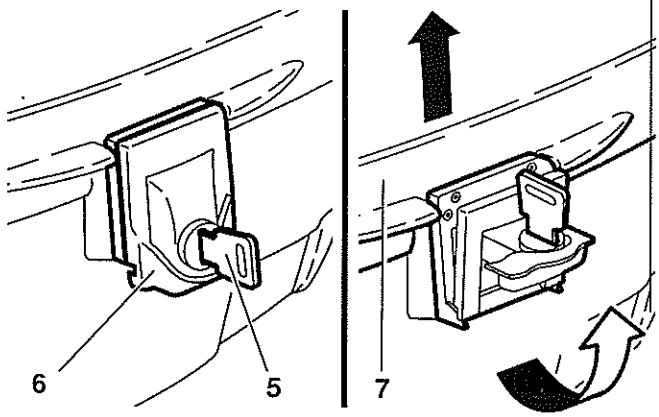
⚠ CAUTION

The vehicle should never be left unattended without the saddle being properly locked.

SAFETY HELMET

Thanks to the safety helmet case, you no longer have to carry the crash helmet or other objects with you every time you park the vehicle.

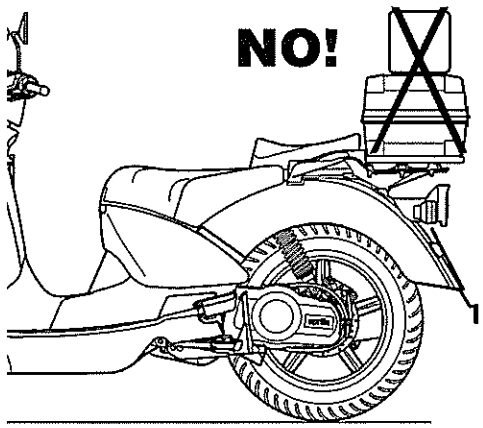
To reach the safety helmet case:
Place the case key (5) in the safety helmet case lock.
Turn the case key (5) counterclockwise (leftwards).
Lift the lock unit (6).
Lift and open the case cover (7).



NOTE The case can contain one safety helmet: Two case keys are supplied together with the vehicle (one spare key).
NOTE Instruct your customer not to keep the spare case key with his vehicle.

⚠ WARNING

The safety helmet case must never be overloaded. Maximum allowed weight: 6.62 lb (3 kg).
NOTE Before lowering and locking the case cover (3), make sure that you have not left the case key (5) in the safety helmet.
NOTE When you have locked the case cover, remove the case key (5) from the safety helmet lock.



⚠ CAUTION

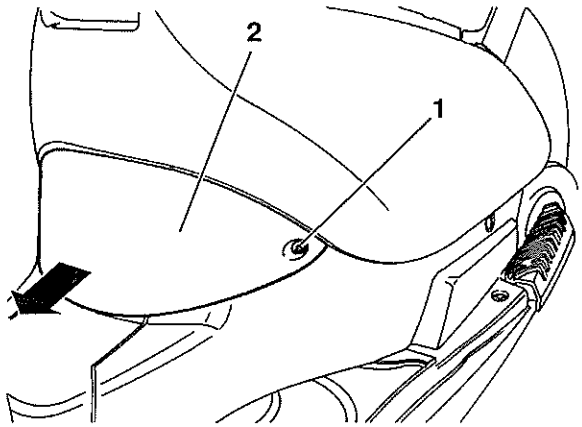
Do not leave this vehicle unattended without ensuring that the case cover (7) is properly locked.
Never carry any bags or parcels to the safety helmet case, as this may seriously compromise the manoeuvrability and the stability of the vehicle.

REMOVING THE CENTRAL INSPECTION COVER

Read carefully MAINTENANCE.

⚠ WARNING

Before carrying out the following operations, let the engine and the exhaust silencer cool down until they reach room temperature.
Failure to observe this warning can lead to serious burns.
Place the vehicle on the center stand, (see PLACING THE VEHICLE ON THE STAND).
Unscrew and remove the screw (1).



⚠ CAUTION

Proceed with care.
Do not damage the tangs and/or the slots in wich they fit.
Handle the plastic and painted components with care and avoid scraping or damaging them.
Remove the central inspection cover (2).

⚠ CAUTION

Upon reassembly, fit the tangs correctly in the appropriate slots.
Upon reassembly, tighten the screws only moderately. Be careful not to overtighten the screws, this will damage the surrounding plastic and painted components.

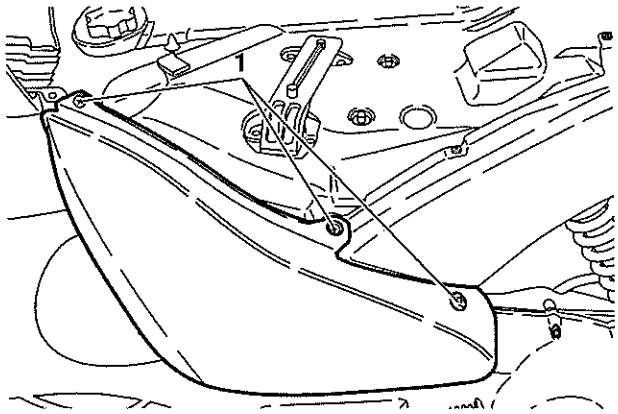
REMOVING THE SADDLE

Read carefully MAINTENANCE.

⚠ WARNING

Before carrying out the following operations, let the engine and the exhaust silencer cool down until they reach room temperature.
Failure to observe this warning can lead to serious burns.
Remove the central inspection cover, (see REMOVING THE CENTRAL INSPECTION COVER).
Lift the saddle, (see UNLOCKING/LOCKING THE SADDLE).

Unscrew and remove the screws (1).



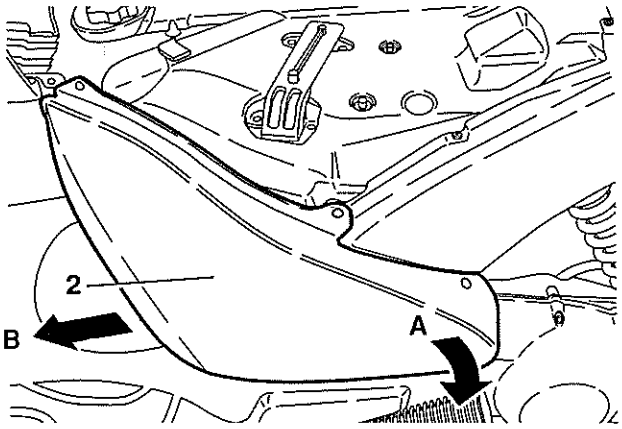
⚠ CAUTION

Proceed with care.
Do not damage the tangs and/or the slots in which they fit.

⚠ CAUTION

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

Pull the rear parts gently outward (**Pos. A**) (left and right) of the central fairing (2).
Remove the central fairing (2) by withdrawing it forward (**Pos. B**).



⚠ CAUTION

Upon reassembly, fit the tangs correctly in the appropriate slots.
Upon reassembly, tighten the screws only moderately. Be careful not to overtighten the screws, this will damage the surrounding plastic and painted components.

REMOVING THE SAFETY HELMET CASE

Read carefully MAINTENANCE.
Place the vehicle on the center stand, (see PLACING THE VEHICLE ON THE STAND).
Open the safety helmet case (1), (see SAFETY HELMET).
Take the helmet and/or any other object out of the case (1).

⚠ CAUTION

Unscrew and remove only the three nuts (2) and the three screws (3) (inside the crash helmet case). Do not unscrew any of the nuts and screws that fix the parcel grid to the vehicle.

Hold the three nuts (2), unscrew and remove the three screws (3).

Screw (3) tightening torque: 12 Nm (1.2 kgm).

Retrieve the three nuts (2) and withdraw the three spacers (4).
Close the safety helmet case (1), raise and remove it.

NOTE The two front spacers (5) must be withdrawn from the parcel grid (8) by pulling them upwards, while the rear spacer (7) must be withdrawn by pulling it downwards.
Withdraw the two front spacers (5) and retrieve the washers (6).
Withdraw the rear spacer (7).

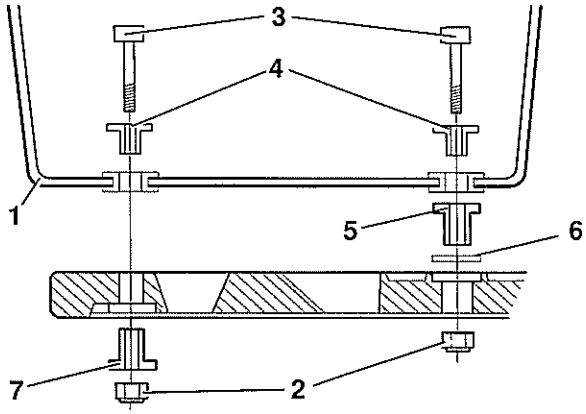
Maximum allowed weight: 3 kg (6.61 lbs).

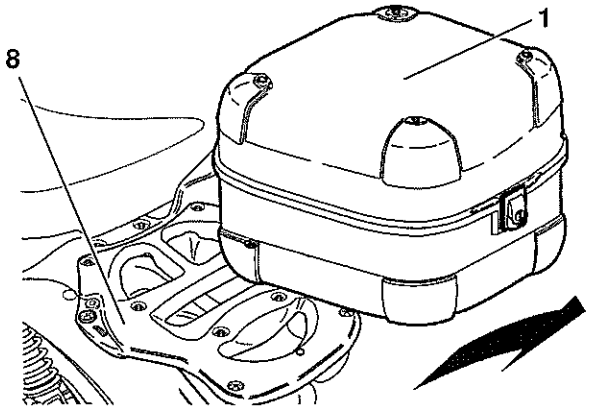
Maximum allowed weight on the parcel grid (8): 9 kg (19.84 lbs).

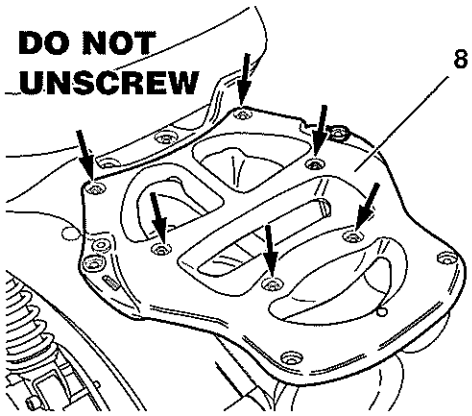
NOTE Store the removed components together:

- the safety helmet case (1);
- the three nuts (2);
- the three screws (3);
- the three spacers (4);
- the two front spacers (5) and washer (6);
- the rear spacer (7);

in order to be able to reassemble them correctly when you reinstall the safety helmet case.

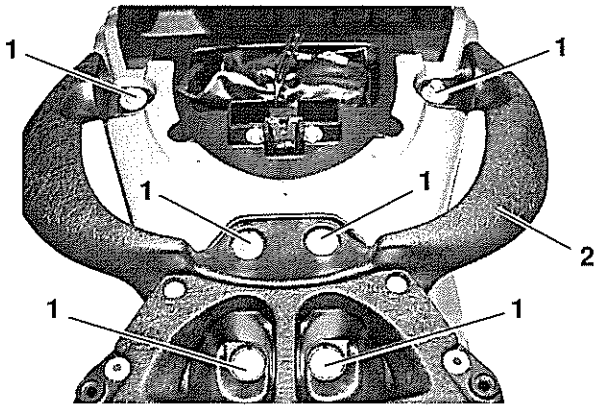






7

REMOVING THE PARCEL GRID SUPPORT



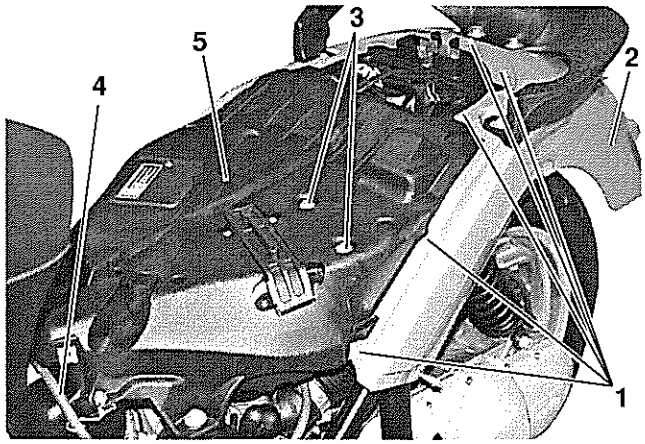
Read carefully PRECAUTIONS AND GENERAL INFORMATION.

Raise up the saddle (UNLOCKING/LOCKING THE SADDLE).
Remove the safety helmet case (REMOVING THE SAFETY HELMET CASE).
Loosen and remove the 6 screws (1).

Tightening torque for screws (1):
27 Nm (2.7 kgm) [19.9 Ft-lbs].

Take out the bushings from the parcel grid support housings.
Remove the complete parcel grid support (2).

REMOVING THE FUEL TANK COVER (SADDLE COMPARTMENT)

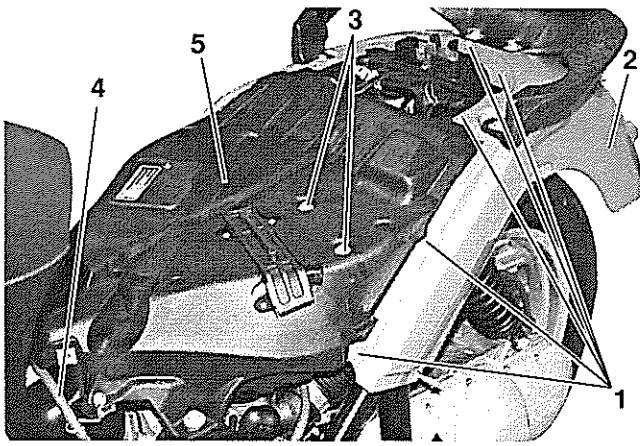


Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Remove the parcel support grid (REMOVING THE PARCEL SUPPORT GRID).
Remove the saddle compartment (REMOVING THE SADDLE COMPARTMENT).
Remove the saddle lock (REMOVING THE SADDLE LOCK).
Remove the air cleaner (REMOVING THE AIR CLEANER).
Loosen and remove the 9 screws (1) that secure the rear fairing (2).
Unscrew and remove the screws (3) and keep the washers.
Withdraw the petrol breather tube (4).

⚠ CAUTION

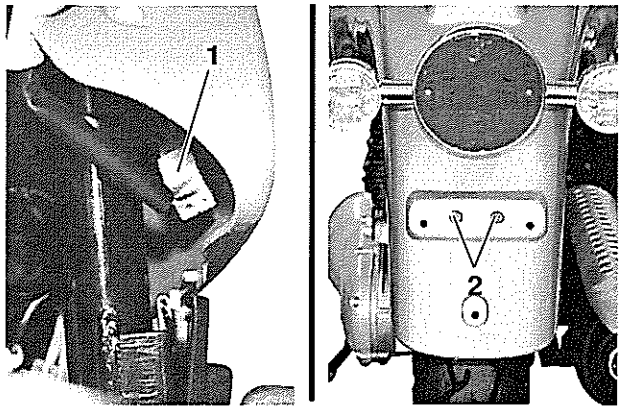
Proceed with care.
Do not damage the tabs and/or corresponding tab slots.
Handle painted parts carefully, without scraping or damaging them.

Withdraw the complete saddle compartment (5).



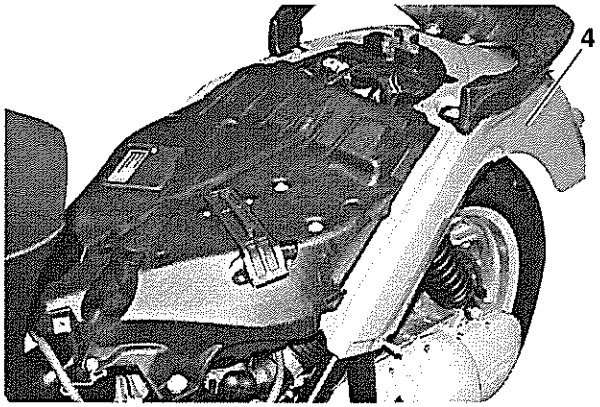
REMOVING THE REAR FAIRING

Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Remove the saddle compartment (REMOVING THE SADDLE COMPARTMENT).
Disconnect the electrical connections (1).
Remove the license plate holder and the license plate.
Loosen and remove the screws (2).
Withdraw the rear fairing from the back.



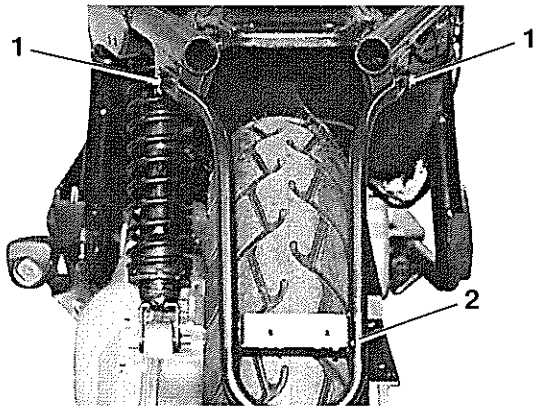
⚠ CAUTION
Proceed with care.
Do not damage the tabs and/or corresponding tab slots.
Handle painted parts carefully, without scraping or damaging them.

Remove the complete rear fairing (4) (along with the taillight) from the back.



REMOVING THE REAR ARCH

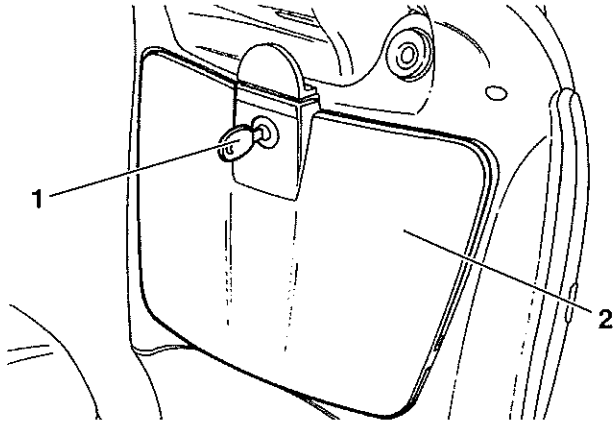
Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Remove the rear fairing (REMOVING THE REAR FAIRING).
Loosen and remove the 2 screws (1).
Remove the complete rear arch (2) from behind.



GLOVE COMPARTMENT

It is positioned under the handlebar, on the inner part of the inner shield.
To reach it:
Place the ignition key (1) in the glove compartment lock.
Turn the ignition key clockwise, pull it and open the door (2).

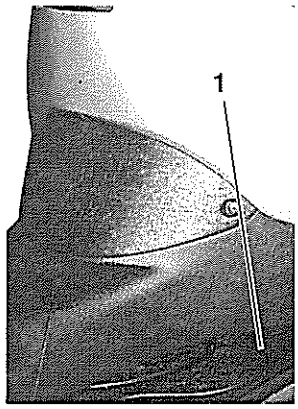
⚠ CAUTION
Before locking the door (1), make sure that you have not left the ignition key in the glove compartment.
To lock the door (1):
NOTE It is not necessary to use the key. Lift and press door (1).
Maximum allowed weight: 3.31 lbs (1.5 kg).

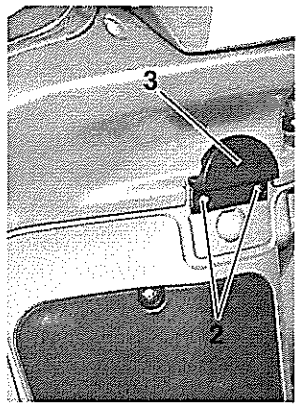


REMOVING THE INNER FRONT SHIELD

Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Position the motorcycle on the center stand.
NOTE These instructions must be carried out for both sides of the motorcycle.

Remove the footrest mat (1).
Open the glove compartment door (GLOVE COMPARTMENT).
Unscrew and remove the two bag-hook screws (2).
Remove the bag hook (3).

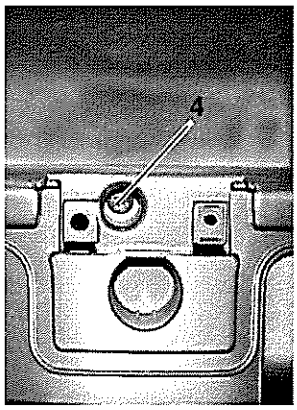


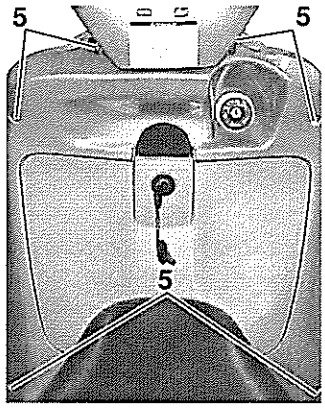


Unscrew and remove the screw (4).
Unscrew and remove the 6 screws (5).

⚠ CAUTION

Proceed with care.
Do not damage the tabs and/or corresponding tab slots.
Handle painted parts carefully, without scraping or damaging them.
Withdraw and remove the inner front shield, rotating it towards the saddle.

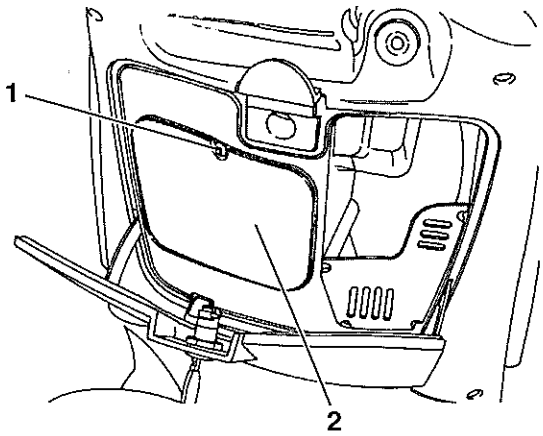




REMOVING THE FRONT INSPECTION COVER

Read carefully MAINTENANCE.

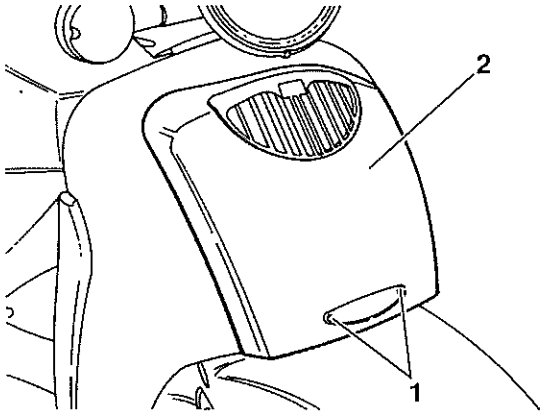
Open the glove compartment, (see GLOVE COMPARTMENT).
Unscrew and remove the screw (1).
Remove the front inspection cover (2).



⚠ CAUTION

Upon reassembly, fit the tangs correctly in the appropriate slots.
Upon reassembly, tighten the screws only moderately. Be careful not to overtighten the screws, this will damage the surrounding plastic and painted components.

REMOVING THE FRONT COVER



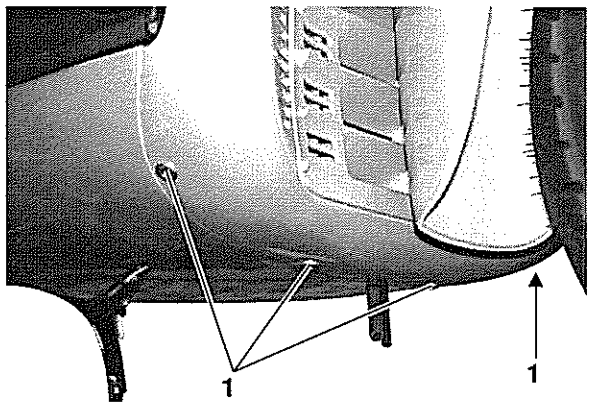
Read carefully MAINTENANCE.
Place the vehicle on the center stand, (see PLACING THE VEHICLE ON THE STAND).
Unscrew and remove the screws (1).

⚠ CAUTION
Proceed with care. Do not damage the tangs and/ or the slots in wich they fit.
Handle the plastic and painted components with care and avoid scraping or damaging them.

Remove the front cover (2) by pulling it downwards.

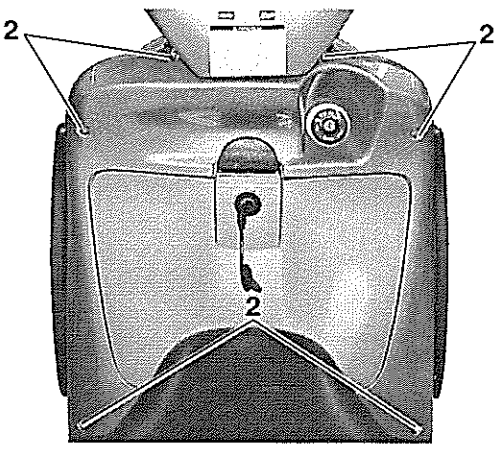
⚠ CAUTION
Upon reassembly, fit the tangs correctly in the appropriate slots.
Upon reassembly, tighten the screws only moderately. Be careful not to overtighten the screws, this will damage the surrounding plastic and painted components.

REMOVING THE FRONT SHIELD



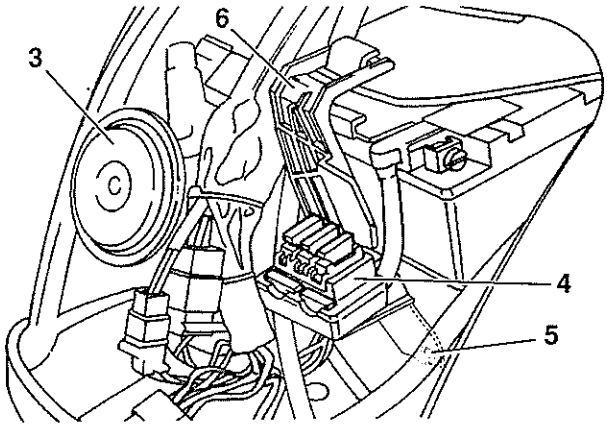
Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Position the motorcycle on the center stand.
Remove the front cover (see REMOVING THE FRONT COVER).
Remove the front mudguard (REMOVING THE FRONT MUDGUARD).
Unscrew and remove the 4 screws (1).

⚠ CAUTION
Proceed with care.
Do not damage the tabs and/or corresponding tab slots.
Handle painted parts carefully, without scraping or damaging them.



Unscrew and remove the 6 screws (2) that fix the inner front shield to the outer front shield.

Rotate the horn (3) on its mounting bolt so that it does not scrape against the shield when the shield is being removed.
Remove the fuse holder (4).
Unscrew and remove the screw (5).
Remove the clip (6).

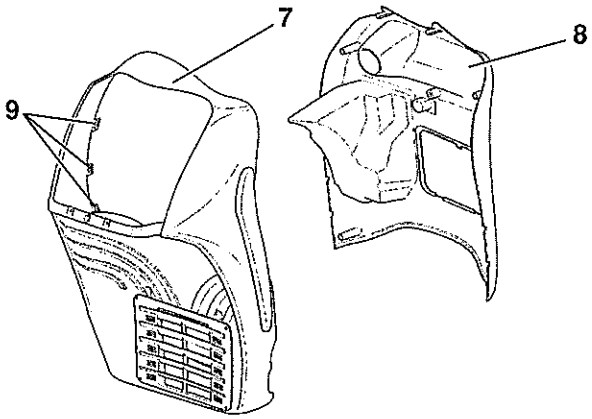


Pull the outer shield (7) away from the front inner shield (8).

NOTE A firm tug will be necessary to separate the two components. Ensure that the tabs snap out cleanly, and are not damaged, as you pull these components apart.

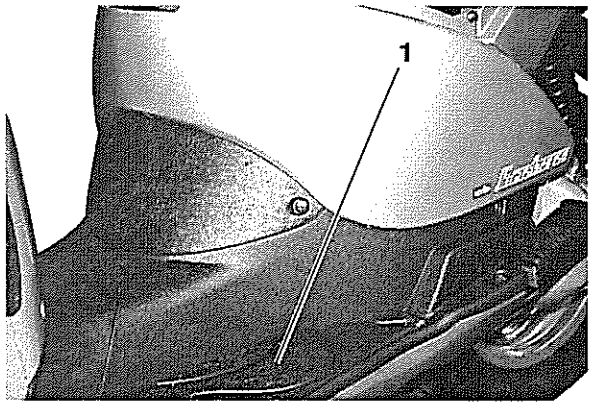
⚠ CAUTION

When refitting, fit the tabs properly into their slots (9).



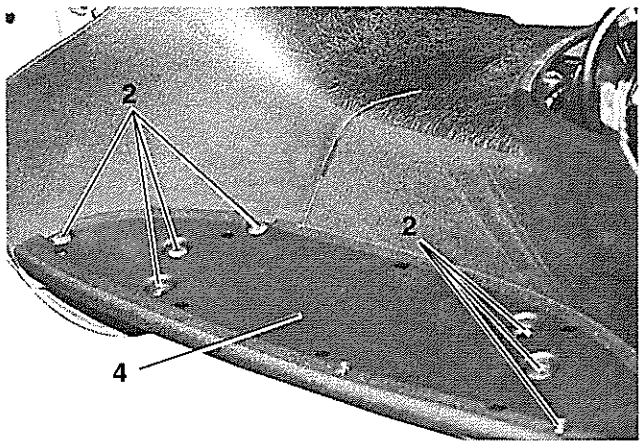
REMOVING THE FOOTREST

Read carefully PRECAUTIONS AND GENERAL INFORMATION and FUEL.
Position the motorcycle on the center stand.
Remove the footrest mats (1).
Remove the central inspection cover (REMOVING THE CENTRAL INSPECTION COVER).

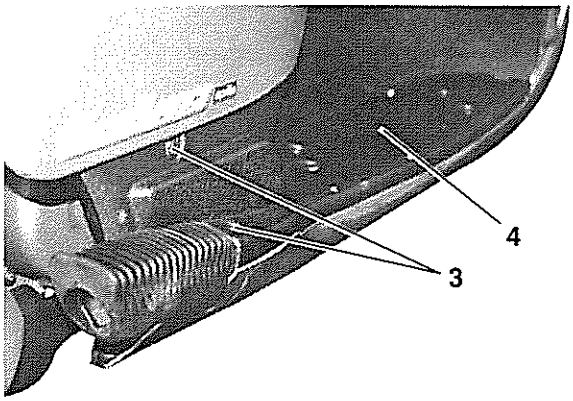


Unscrew and remove the 7 screws (2).

NOTE The following operations must be carried out on both sides of the motorcycle.



Unscrew and remove the 2 screws (3).
Remove the footrest (4).

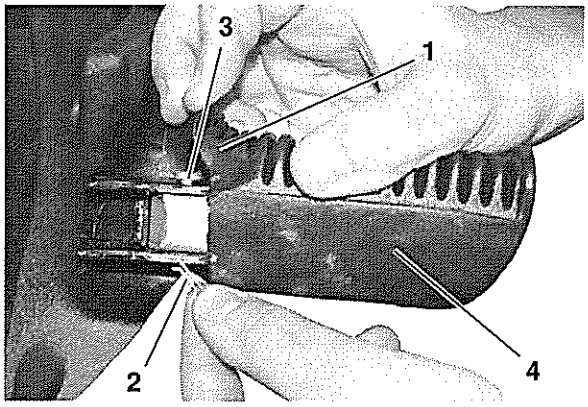


REMOVING THE REAR FOOTRESTS

Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Position the motorcycle on the center stand.

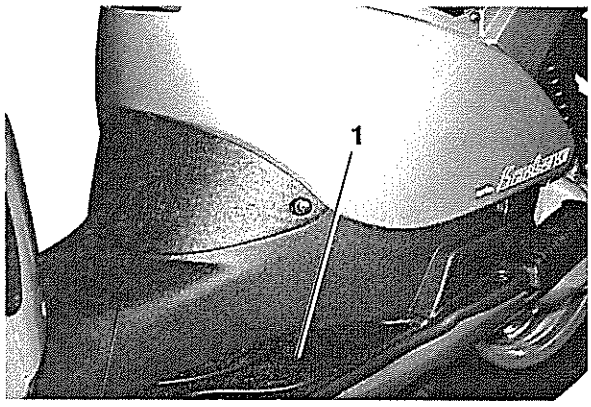
⚠ CAUTION

Be careful not to injure your hands.
NOTE The following instructions apply to both footrests.
Lift the footrest rubber pad (1) manually.
Remove the clip (2).
Withdraw the pin from the top (3).
Remove the rear footrest (4).

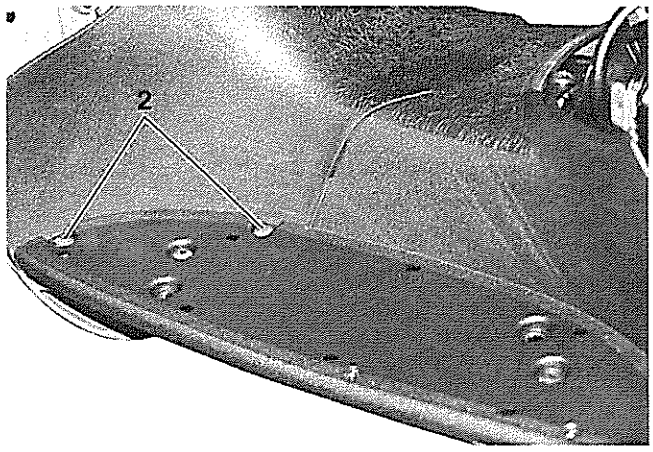


REMOVING THE FLOOR PANEL LOWER GUARD

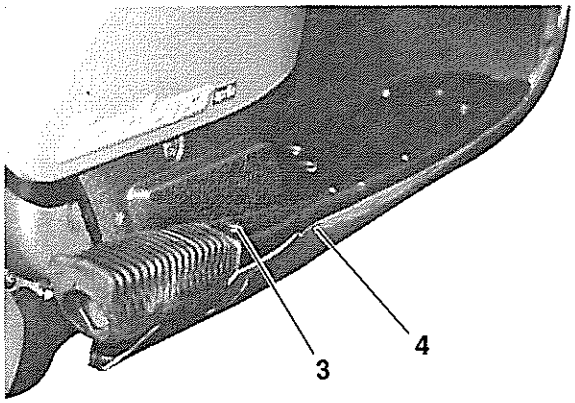
Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Position the motorcycle on the center stand.
Remove the footrest mats (1).



Unscrew and remove the 2 screws (2).



Unscrew and remove the screw (3).
Remove the floor panel lower guard (4).



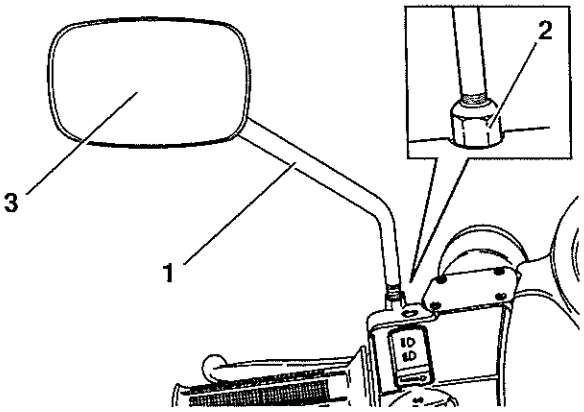
⚠ CAUTION

Proceed with care.
Do not damage the tabs and/or corresponding tab slots.
Handle painted parts carefully, without scraping or damaging them.

REMOVING THE REAR-VIEW MIRRORS

Carefully read MAINTENANCE.
Place the vehicle on the center stand, (see PLACING THE VEHICLE ON THE STAND).

NOTE The right-hand rearview mirror has a right-hand thread, and the left-hand mirror, a left-hand thread. This is so that in case of accidental impact, the rear-view mirror will rotate backwards, thus reducing the effective width of the motorcycle. To restore the mirror to its initial proper position, rotate it in the opposite direction until the mirror is properly located, then snug up the nut (2).

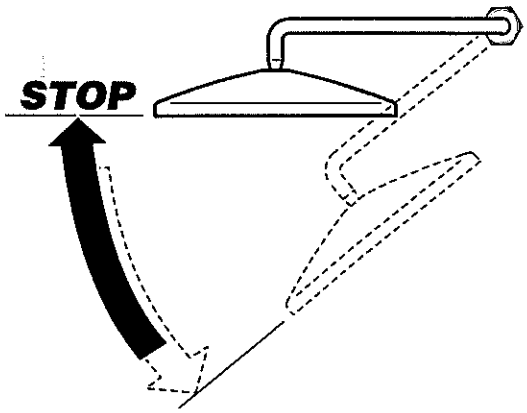


DISASSEMBLY

⚠ CAUTION

When removing the mirrors (1), make sure that you maintain a grip on them to avoid allowing them to drop.

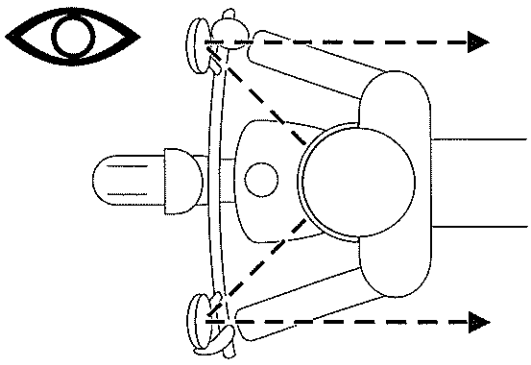
NOTE The left mirror has a right-hand thread. The right mirror has a left-hand thread. Unscrew and remove the rear-view mirror (1) (counterclockwise rotation for the left mirror and clockwise rotation for the right mirror).



REASSEMBLY

Screw the mirror (1) in by turning it at least three times turns (clockwise rotation for the left mirror and counter-clockwise rotation for the right mirror).
Locate the mirror (1) in such a way to optimize the rearward visibility.

NOTE The right mirror locking nut is provided with a line that distinguishes it from the left mirror locking nut. Hold the mirror (1) in its position by adjusting the locking nut (2) (clockwise rotation for the left mirror locking nut, counterclockwise rotation for the right mirror locking nut).

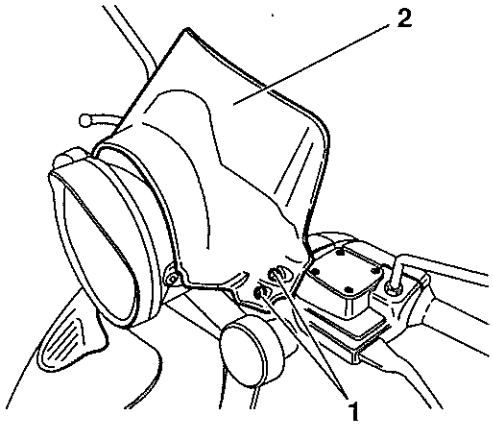


⚠ WARNING

After reassembly, correctly adjust the rear-view mirrors and tighten the nuts in such a way that the mirrors are secure. Failure to heed this warning can prevent you from seeing danger approaching from behind and lead to a serious accident.

After reassembly:
Correctly adjust the reflecting surface (3) of the rear view mirrors.

REMOVING THE FRONT FAIRING

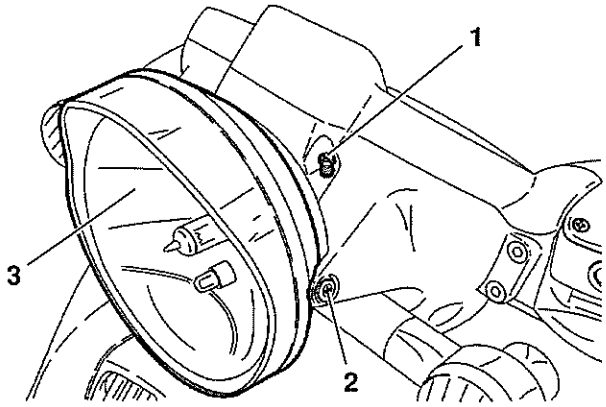


Read carefully MAINTENANCE.
Place the vehicle on the center stand, (see PLACING THE VEHICLE ON THE STAND).
Unscrew and remove the two screws (1).
Remove the front part of the fairing (2).

⚠ CAUTION

Upon reassembly, tighten the screws only moderately. Be careful not to over tighten the screws, this will damage the surrounding plastic and painted components.

REMOVING THE HEADLIGHT

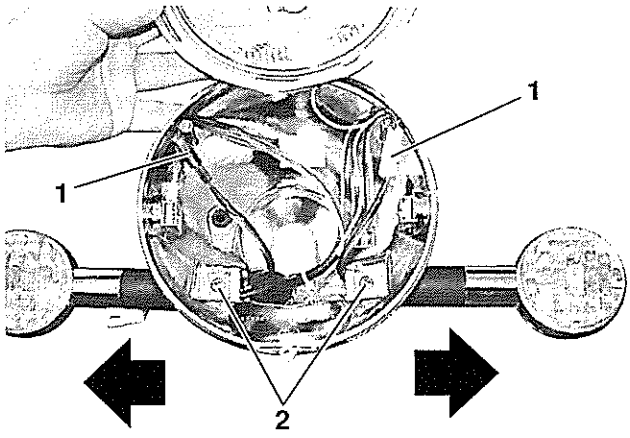


Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Position the motorcycle on the center stand.
Remove the front fairing (REMOVING THE FRONT FAIRING).
Fully unscrew the headlight beam adjustment screw (1).
NOTE Repeat the following operation from the other side as well.
Unscrew and remove the screw (2).

⚠ CAUTION

Proceed with care.
Do not damage the tabs and/or corresponding tab slots. Handle plastic and painted parts carefully, without scraping or damaging them. Do not damage the lens.
Remove the headlight retainer screw bushings.
Disconnect the electrical connection.
Remove the headlight (3) together with the direction indicators.
NOTE For instructions on removing the bulbs (see CHANGING THE HEADLIGHT BULBS). For instructions on removing the turn signals, (see REMOVING THE TURN SIGNALS).

REMOVING THE TURN SIGNALS

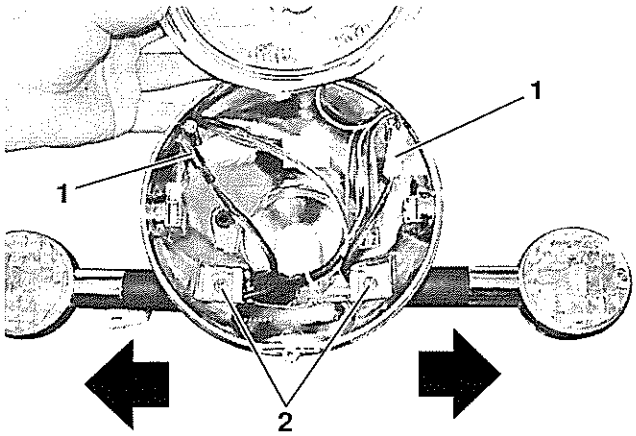


Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Position the motorcycle on the center stand.
Remove the headlight (REMOVING THE HEADLIGHT).
Remove the headlight reflector, following the instructions in CHANGING THE HEADLIGHT BULBS.
Disconnect the electrical connections (1).
Unscrew and remove the screws (2).

⚠ CAUTION

Proceed with care.
Do not damage the tabs and/or corresponding tab slots. Handle plastic and painted parts carefully, without scraping or damaging them.

Pull out the turn signal signals (3).

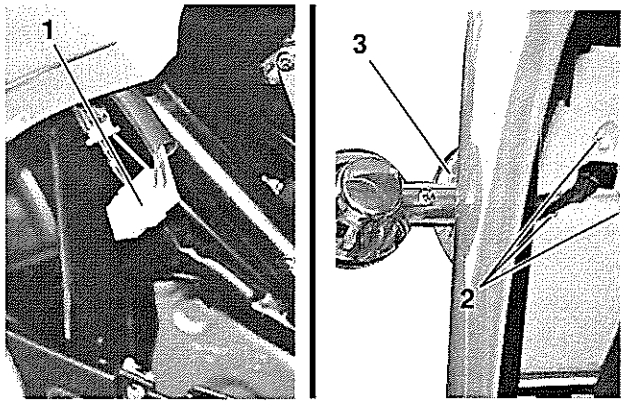


REMOVING THE REAR LIGHT

Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Position the motorcycle on the center stand.

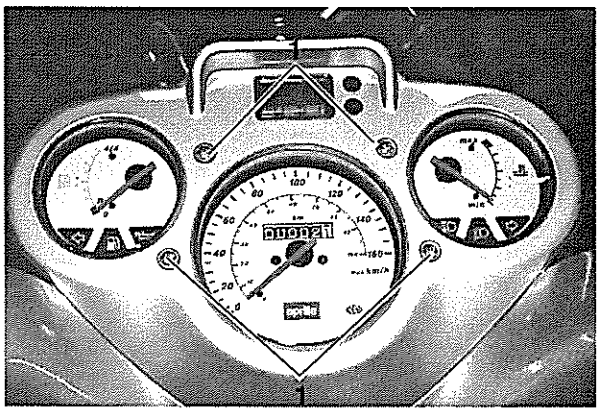
⚠ CAUTION

Wait until the engine and exhaust muffler cool down completely.
Disconnect the electrical connection (1) under the saddle compartment and release the wires from their clips on the frame.
Loosen and remove the screws (2) along with the turn signals.
Remove the taillight (3) together with the turn signals.



REMOVING THE DASHBOARD PANEL

Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Position the motorcycle on the center stand.
Remove the front fairing (REMOVING THE FRONT FAIRING).
Unscrew and remove the 4 screws (1).

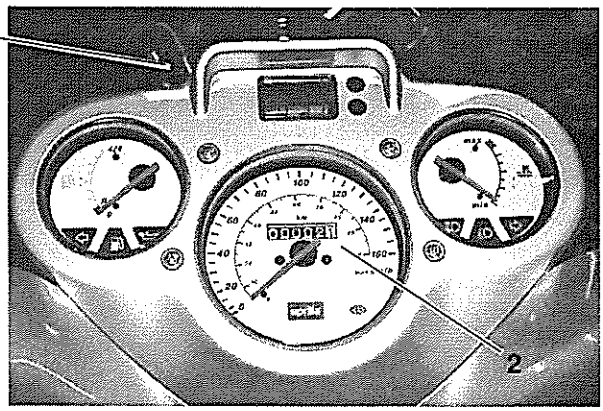


⚠ CAUTION

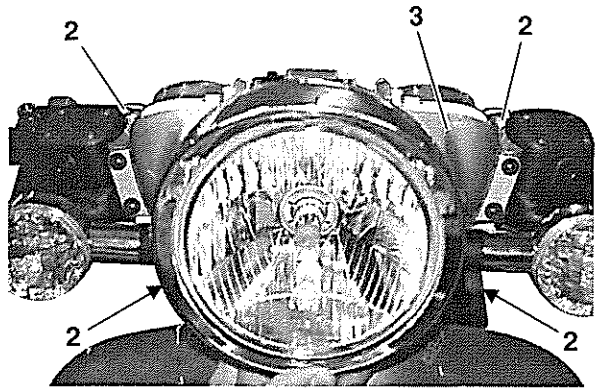
Proceed with care.
Do not damage the tabs and/or corresponding tab slots. Handle plastic and painted parts carefully, without scraping or damaging them.
Do not damage the lens.

Using a flat-blade screwdriver, gently pry, at several points, around the dash panel.
Separate the panel (2) from the headlight support (3).
Remove the panel (2).

3 Tabs: 1) above clock
2) near left brake fluid container
3) near right " "

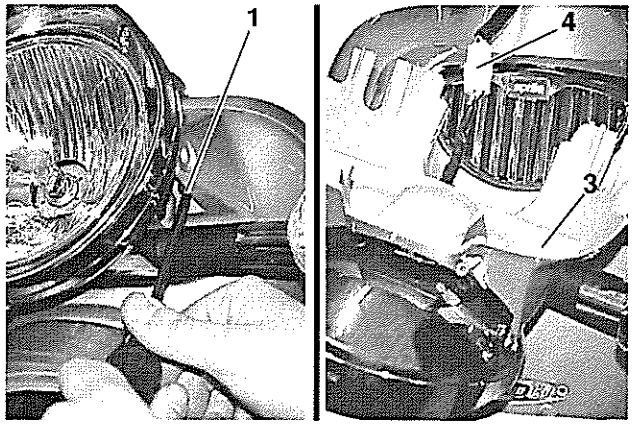


REMOVING THE HEADLIGHT SUPPORT



Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Position the motorcycle on the center stand.
Remove the front fairing (REMOVING THE FRONT FAIRING).
Remove the dashboard panel (REMOVING THE DASHBOARD PANEL).
Unscrew and remove the screw (1).
Unscrew and remove the screws (2).

⚠ CAUTION
Proceed with care.
Do not damage the tabs and/or corresponding tab slots. Handle plastic and painted parts carefully, without scraping or damaging them.
Do not damage the lens.



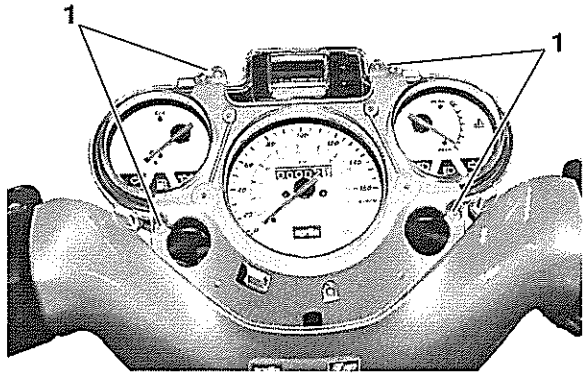
Separate the headlight support (3), complete with headlight, from the handlebar cover.
Disconnect the electrical connection (4).

Remove the complete headlight support (3).

NOTE If necessary, remove the headlight (REMOVING THE HEADLIGHT) and the front turn signals (REMOVING THE FRONT TURN SIGNALS).

7

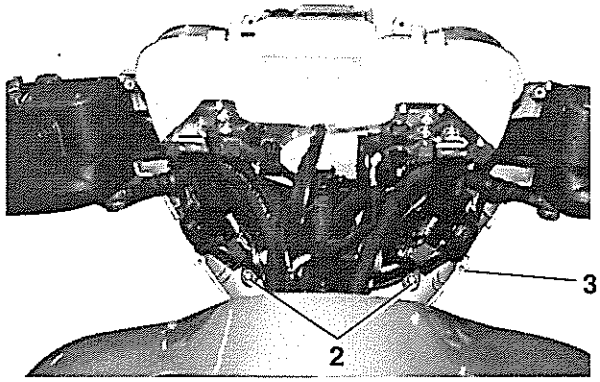
REMOVING THE HANDLEBAR COVER



Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Position the motorcycle on the center stand.
Remove the front fairing (REMOVING THE FRONT FAIRING).
Remove the dashboard panel (REMOVING THE DASHBOARD PANEL).
Remove the headlight support (REMOVING THE HEADLIGHT SUPPORT).
Unscrew and remove the 4 screws (1).

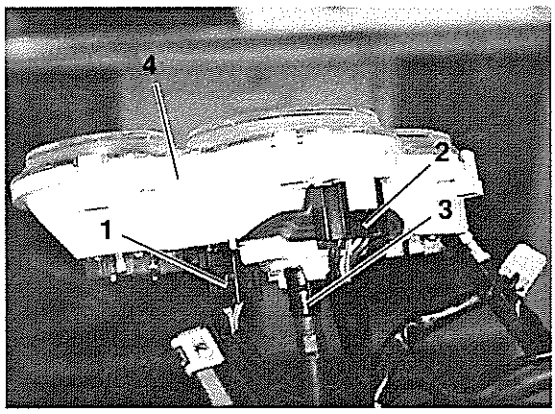
⚠ CAUTION
Proceed with care. Do not damage the tabs and/or corresponding tab slots. Handle plastic and painted parts carefully, without scraping or damaging them.

Unscrew and remove the 2 screws (2).
Remove the handlebar cover (3).



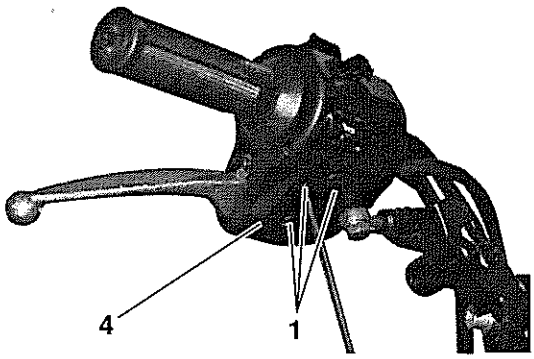
REMOVING THE DASHBOARD

Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Position the motorcycle on the center stand.
Remove the handlebar cover (REMOVING THE HANDLEBAR COVER).
Disconnect the 2 electrical connections, (1) and (2).
Disconnect the tachometer/odometer cable (3).
Remove the dashboard (4), pulling it forward.



REMOVING THE LEFT HANDLEBAR ELECTRICAL CONTROLS

Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Position the motorcycle on the center stand.
Unscrew and remove the 3 screws (1) that secure the left high/low beam selector from below.



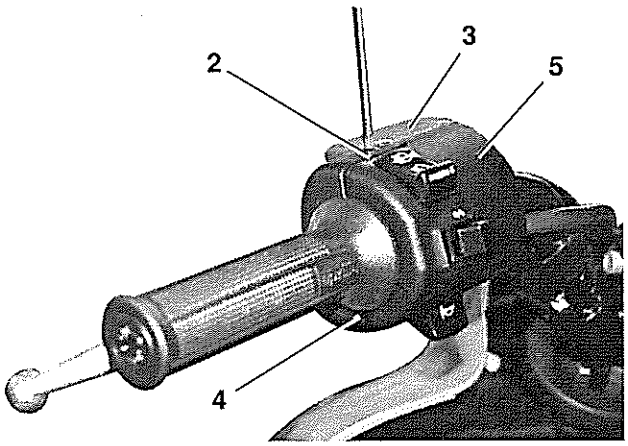
Unscrew and remove the screw (2) above the control.
Separate the two covers, (3) and (4), and remove them.
Free the wiring from the clamps that fix it to the frame.

NOTE Prepare the same number of new clamps for refitting.
Disconnect the left high/low beam selector connector.

⚠ CAUTION

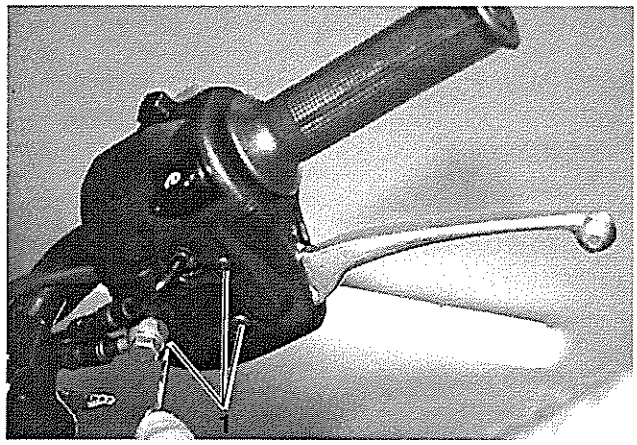
When refitting, make sure the connector is plugged in properly.

Remove the left high/low beam selector (5).



REMOVING THE ~~LEFT~~ Right HANDLEBAR ELECTRICAL CONTROLS

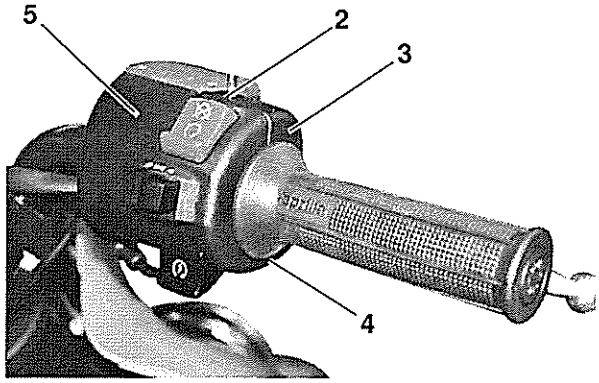
Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Position the motorcycle on the center stand.
Unscrew and remove the 3 screws (1) that secure the cover to the right high/low beam selector from below.



Unscrew and remove the screw (2) above the control.
Separate the two covers, (3) and (4), and remove them.
Free the wiring from the clamps that fix it to the frame.
NOTE Prepare the same number of new clamps for refitting.
Disconnect the electrical connector on the right high/low beam selector.

⚠ CAUTION

When refitting, make sure the connector is plugged in properly.
Remove the right high/low beam selector (5).



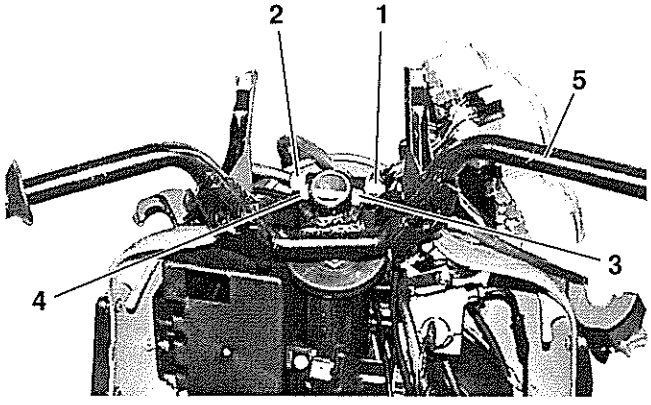
REMOVING THE HANDLEBAR

Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Remove the handlebar cover (REMOVING THE HANDLEBAR COVER).
Remove the dashboard (REMOVING THE DASH-BOARD).
Remove the electrical controls on the right and left handlebars (REMOVING THE LEFT AND RIGHT HANDLEBAR ELECTRICAL CONTROLS).

Loosen and remove the nut (1).

Tightening torque for nut (1):
40 Nm (4.0 kgm) [29.5 Ft-lbs].

Withdraw the bolt that attaches the handlebar to the fame (2). Take off the washer.
Loosen and remove the nut (3).
Take out the safety screw (4).
Remove the complete handlebar (5).



REMOVING THE FUEL TANK

Read carefully PRECAUTIONS AND GENERAL INFORMATION and FUEL.
Position the motorcycle on the center stand.

⚠ WARNING

Wait until the engine and exhaust muffler cool down completely.
Remove the central inspection cover (REMOVING THE CENTRAL INSPECTION COVER).
Remove the saddle compartment (REMOVING THE FUEL TANK COVER - SADDLE COMPARTMENT).

⚠ WARNING

If it is necessary to run the engine in order to carry out a maintenance operation, make sure that the area in which you are operating is properly ventilated.
Never run the engine in enclosed spaces.
It is necessary to work indoors, use an exhaust evacuation system.
Exhaust fumes contain carbon monoxide, a poisonous gas that can cause loss of consciousness and even death.
Keep cigarettes, flames or sparks away from the work area and from the place where gasoline is stored.

⚠ WARNING

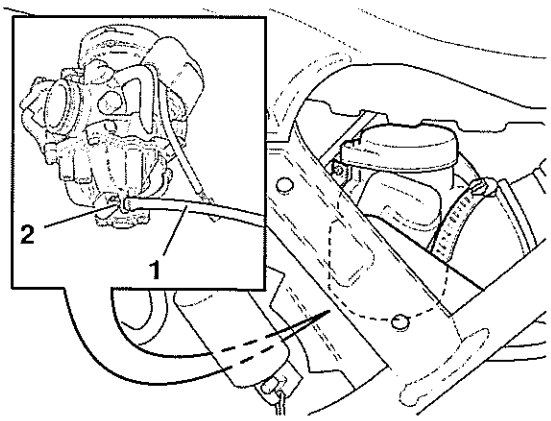
The engine and components of the exhaust system become very hot and remain hot for some time after the engine has been stopped.
Before handling these components, wear insulating golves or wait until the engine and the exhaust system have cooled down.
DO NOT DISPOSE OF FUEL IN THE ENVIRONMENT.

Position the motorcycle on the center stand.
Stop the engine and wait for it to cool down.
Get a container, big enough to hold the quantity of fuel remaining in the tank and place it on the ground to the left of the motorcycle.
Remove the fuel tank cap.
Use a hand-operated pump or similar system to empty the fuel out of the tank.

⚠ WARNING

After emptying, close the tank cap.

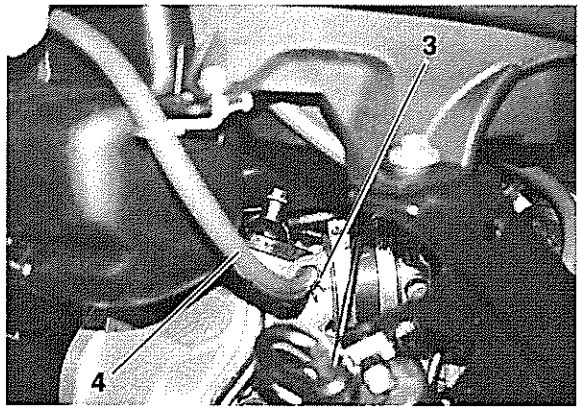
To empty the carburetor completely:
Remove the central inspection cover.
Place the free end of the tube (1) in a container.
Working from the front left of the motorcycle, open the carburetor drain plug by looseningnge drain screw (2) under the chamber.
When all the fuel in the carburetor has come out:
Screw in the drain screw (2) completely.



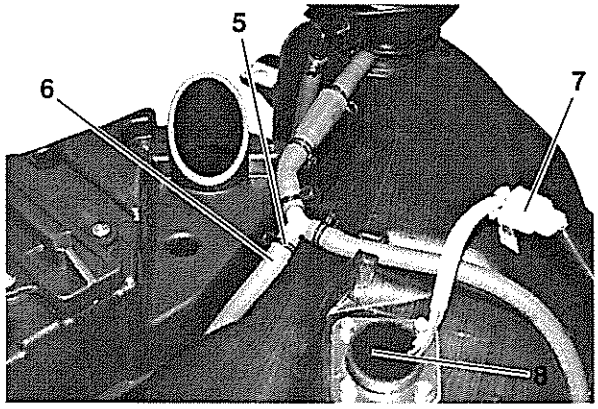
⚠ CAUTION

Screw the drain plug (2) in thoroughly to avoid fuel leaks from the carburetor when filling up with fuel.

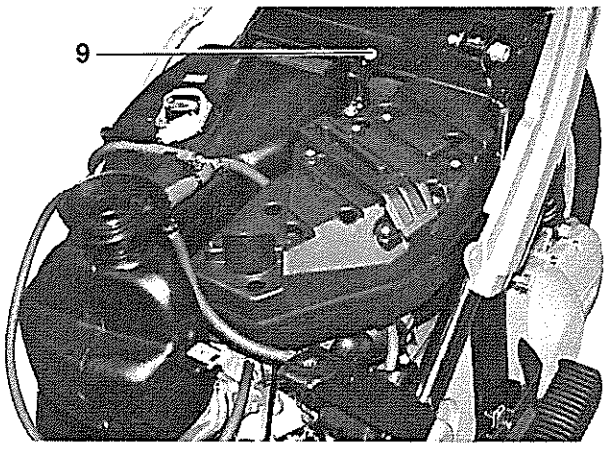
Pour the fuel into a can, close the can and put it in a safe place.
Remove the clamp (3) and disconnect the vacuum hose (4).



Remove the clamp (5) and disconnect the tube that feeds the carburetor (6).
Disconnect the electrical connector (7) on the fuel level sensor (8).

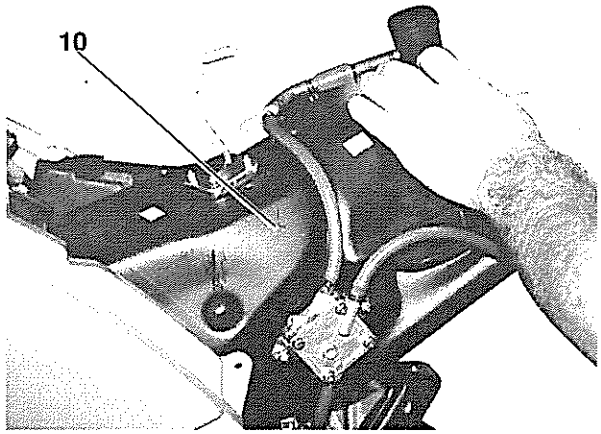


Unscrew and remove the bolt (9) that secures the tank to the frame, taking off the washer and nut.



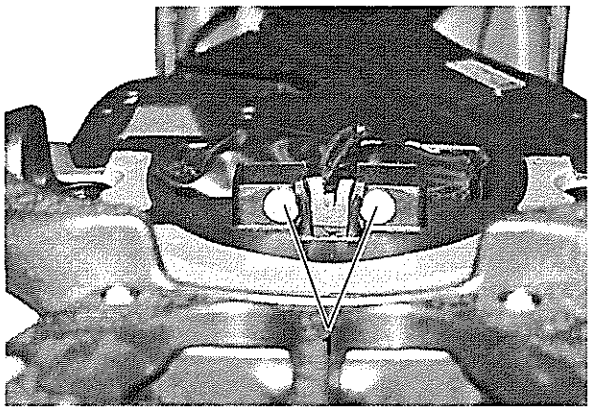
Remove the fuel tank (10) with the fuel pump, by moving it forward and lifting it out.

NOTE If necessary, remove the fuel pump (REMOVING THE FUEL PUMP).

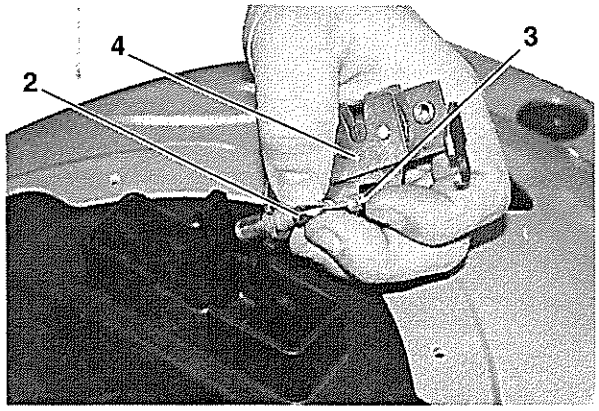


REMOVING THE SADDLE LOCK

Read carefully PRECAUTIONS AND GENERAL INFORMATION and FUEL.
Raise up the saddle (UNLOCKING/LOCKING THE SADDLE).
Unscrew and remove the two screws (1), taking off the bushings.

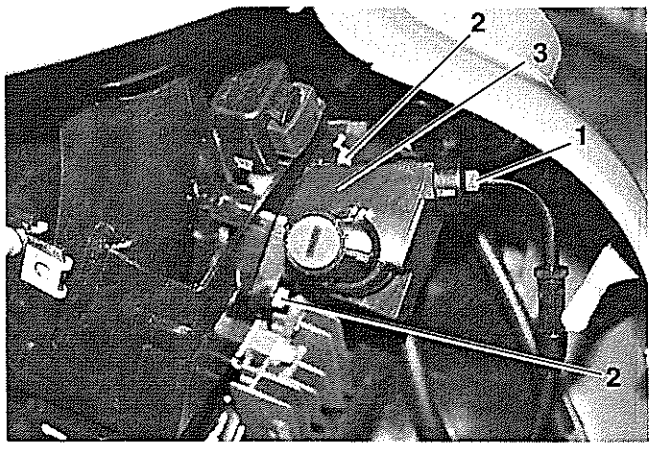


Holding on to the lock, remove the protective cap (2).
Withdraw the lock control cable (3) from its fitting.
Remove the saddle lock mechanism (4).



REMOVING THE IGNITION SWITCH/STEERING LOCK

Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Remove the inner front shield (REMOVING THE INNER FRONT SHIELD).
Disconnect the saddle lock cable (1).
Disconnect the ignition switch electrical connector.
Unscrew and remove the two screws (2).
Remove the ignition switch/steering lock (3).



REMOVING THE AIR BOX

Read carefully PRECAUTIONS AND GENERAL INFORMATION.

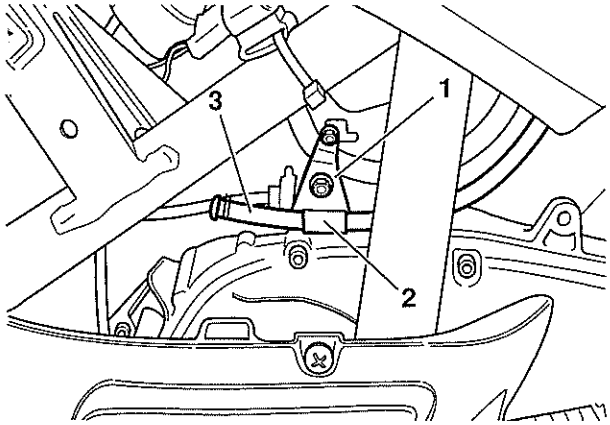
⚠ WARNING

Wait until the engine and exhaust muffler cool down completely.

Remove the saddle compartment (REMOVING THE SADDLE COMPARTMENT).

Loosen the screw (1).

Withdraw the tube (3) from the clamp (2).



⚠ CAUTION

Proceed with care.

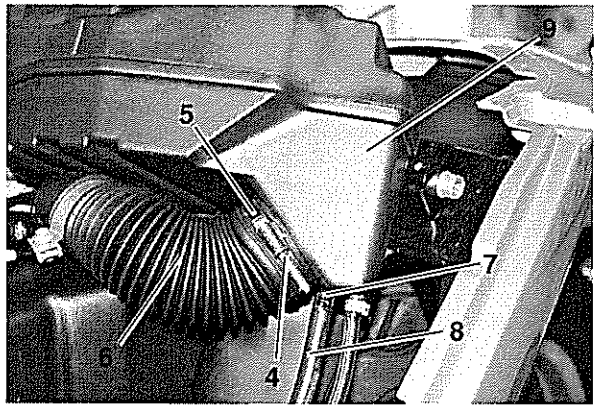
Do not force the fuel lines.

Loosen the screw (4) on the clamp (5) to be able to withdraw the intake hose (6).

Remove the clamp (7) from the blow-by tube (8).

Remove the complete air box (9).

NOTE For instructions on cleaning the air filter, (see AIR CLEANER).



REMOVING THE EXHAUST PIPE

Read carefully PRECAUTIONS AND GENERAL INFORMATION.

Position the motorcycle on the center stand.

⚠ WARNING

Wait until the engine and exhaust muffler cool down completely.

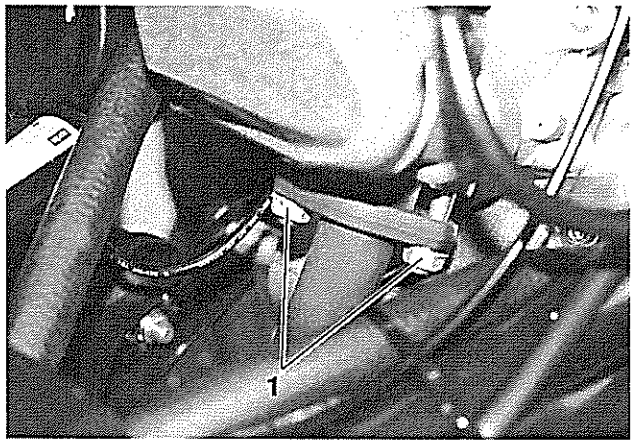
Remove the central inspection cover (REMOVING THE CENTRAL INSPECTION COVER).

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

Torque wrench setting for exhaust manifold nuts (1): 30 Nm (22.1 Ft-lbs).

⚠ CAUTION

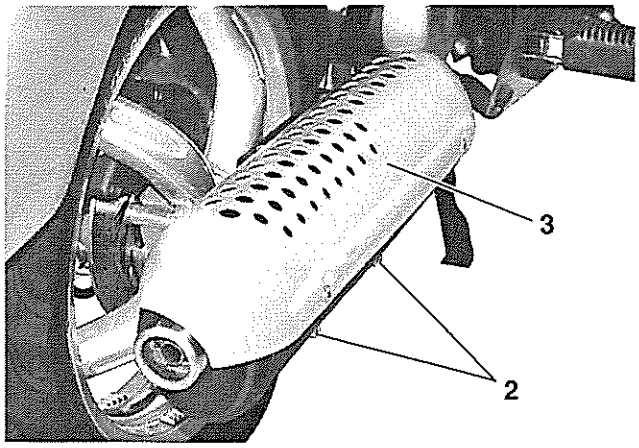
When refitting, replace the exhaust manifold-muffler gasket with a new one.



Unscrew and remove the two screws (2) that secure the muffler to the support.

Tightening torque for screws (2):
27 Nm (19.9 Ft-lbs).

Remove the complete exhaust pipe (3).



REMOVING THE EXHAUST PIPE SUPPORT

Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Position the motorcycle on the center stand.

⚠ WARNING

Wait until the engine and exhaust muffler cool down completely.

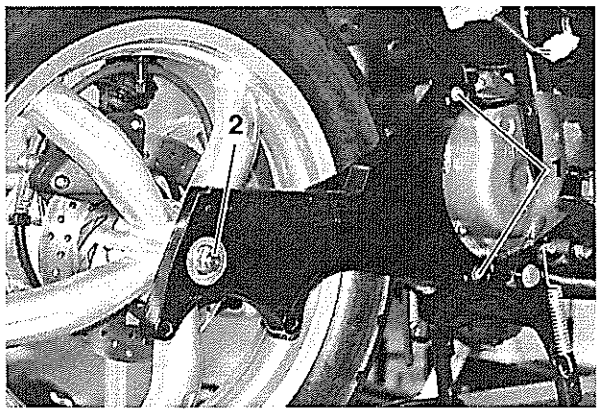
Remove the exhaust pipe (REMOVING THE EXHAUST PIPE).
Unscrew and remove the two screws (1).
Tightening torque for screws (1):
27 Nm (19.9 Ft-lbs).

Unscrew and remove the nut (2).
Tightening torque for nut (2):
110 Nm (81.1 Ft-lbs).

Remove the exhaust pipe support (3).

⚠ CAUTION

Always replace the wheel nut with a new one when refitting.



REMOVING THE CENTER STAND

Read carefully PRECAUTIONS AND GENERAL INFORMATION.

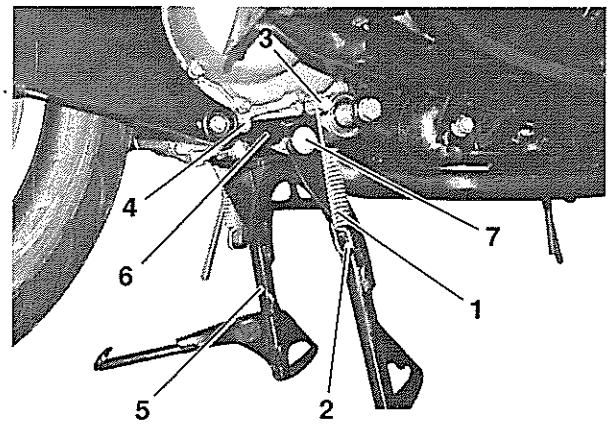
⚠ WARNING

Wait until the engine and exhaust muffler cool down completely.
Support the motorcycle so that you can work in complete safety without the use of the centralerand.
Remove the floor panel lower guard (REMOVING THE FLOOR PANEL LOWER GUARD).
Remove the variator air intake (REMOVING THE VARIATOR AIR INTAKE).

NOTE The following operations must be performed from the side to the stand.
Uncouple the spring (1) from its hook on the stand (2).
Unscrew and remove screws (3) and (4).
Remove the center stand (5), complete with support (6).
Unscrew and remove the bolt (7) and take off the self-locking nut.

Tightening torque for bolt (7):
27 Nm (19.9 Ft-lbs).

Remove the center stand (5) from the support (6).



REMOVING THE ENGINE CONNECTING ROD

Read carefully PRECAUTIONS AND GENERAL INFORMATION.

⚠ WARNING

Wait until the engine and exhaust muffler cool down completely.
Support the motorcycle so that you can work in complete safety without the use of the center stand.

In addition to supporting the motorcycle from underneath, attach two tie-down straps or other props so that the scooter will not rotate forward when the engine connecting rod is removed.
Remove the floor panel lower guard (REMOVING THE FLOOR PANEL LOWER GUARD).
Remove the variatorair intake (REMOVING THE VARIATOR AIR INTAKE).
Remove the footrest (REMOVING THE FOOTREST).

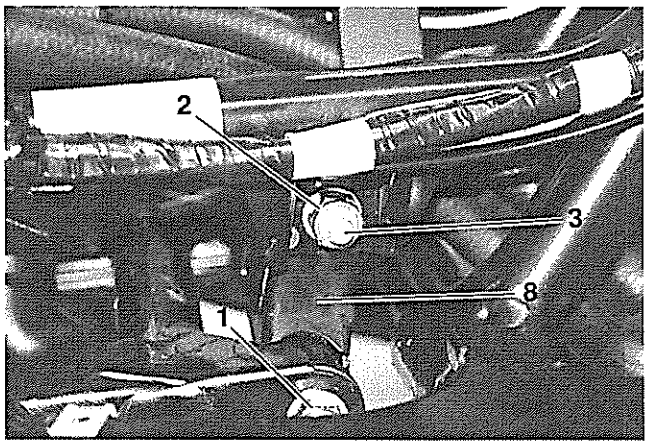
⚠ CAUTION

Do not unscrew the nut (1) that holds the connecting rod arm/connecting rod bolt.

Unscrew and remove the nut (2) and take off the washer.

Tightening torque for nut (2):
50 Nm (36.9 Ft-lbs).

Withdraw the bolt (3).

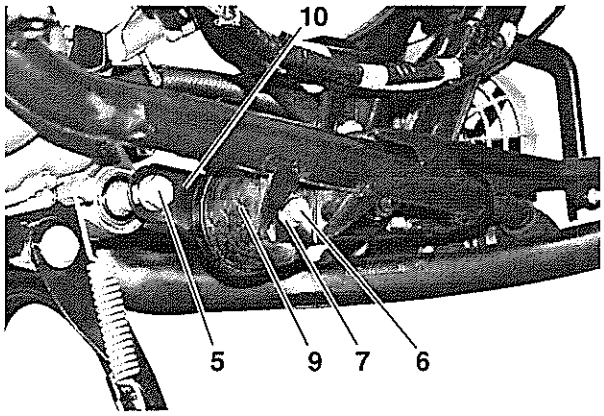


Unscrew and remove the nut (4) and take off the washer (on the opposite side to pin 5).
Tightening torque for nut (4):
50 Nm (36.9 Ft-lbs).

Withdraw the pin (5) and take off the washer.

NOTE Repeat the following operations on the other side of the motorcycle.
Unscrew and remove the screw (6) and take off the washers (7).
Tightening torque for screw (6): 40 Nm (29.5 Ft-lbs).

Remove the connecting rod (8) from underneath, together with the two silent-blocks (9) and the arm (10).

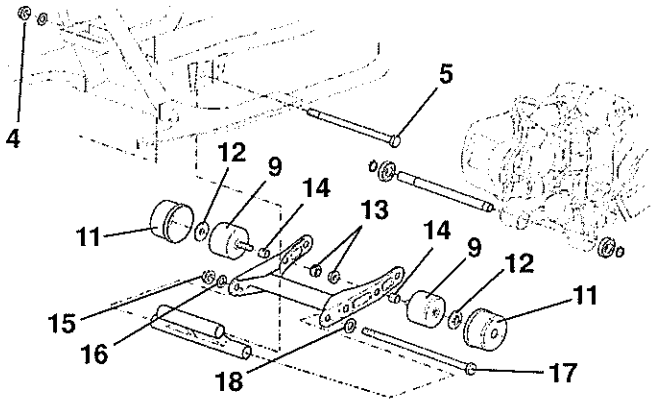


Take off the two silent-block end housings (11) with their bushes (12).

⚠ CAUTION

Check the condition of the silent blocks (9). If there is any deformation, cracking, or other signs of wear or deterioration, replace them.

Unscrew and remove the nut (13).
Tightening torque for nut (13):
40 Nm (29.5 Ft-lbs).
Withdraw the silent-block (9), taking off the bushing (14).



⚠ CAUTION

Check the condition of the bushings (14). If necessary, replace them.

Unscrew and remove the nut (15) and take off the washer (16).

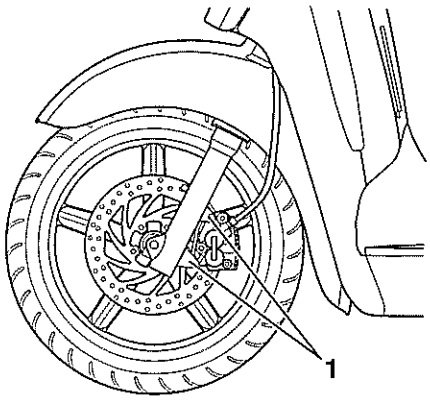
Tightening torque for nut (15):
50 Nm (36.9 Ft-lbs).

Withdraw the bolt (17), taking off the washer (18).

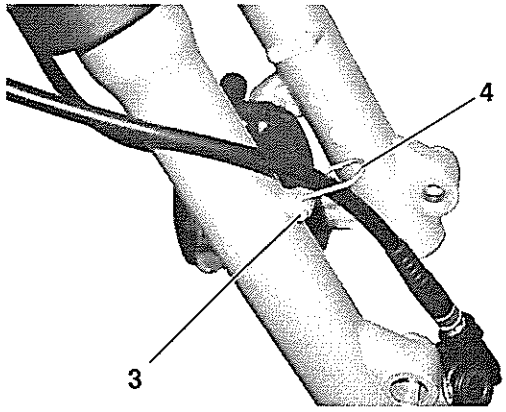
REMOVING THE FRONT MUDGUARD

Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Position the motorcycle on the center stand.
Tightening torque for screws (1):
27 Nm (19.9 Ft-lbs).

Remove the front wheel (REMOVING THE FRONT WHEEL).



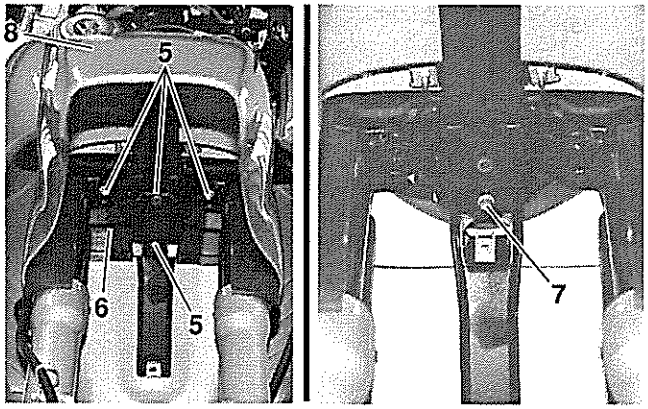
Unscrew and remove the screw (3).
Remove the cable guide (4) to free the odometer cable.



Unscrew and remove the 4 screws (5).
Remove the mudguard protection (6).
Unscrew and remove the screw (7).
Pull the front mudguard down firmly and remove it from below (8).

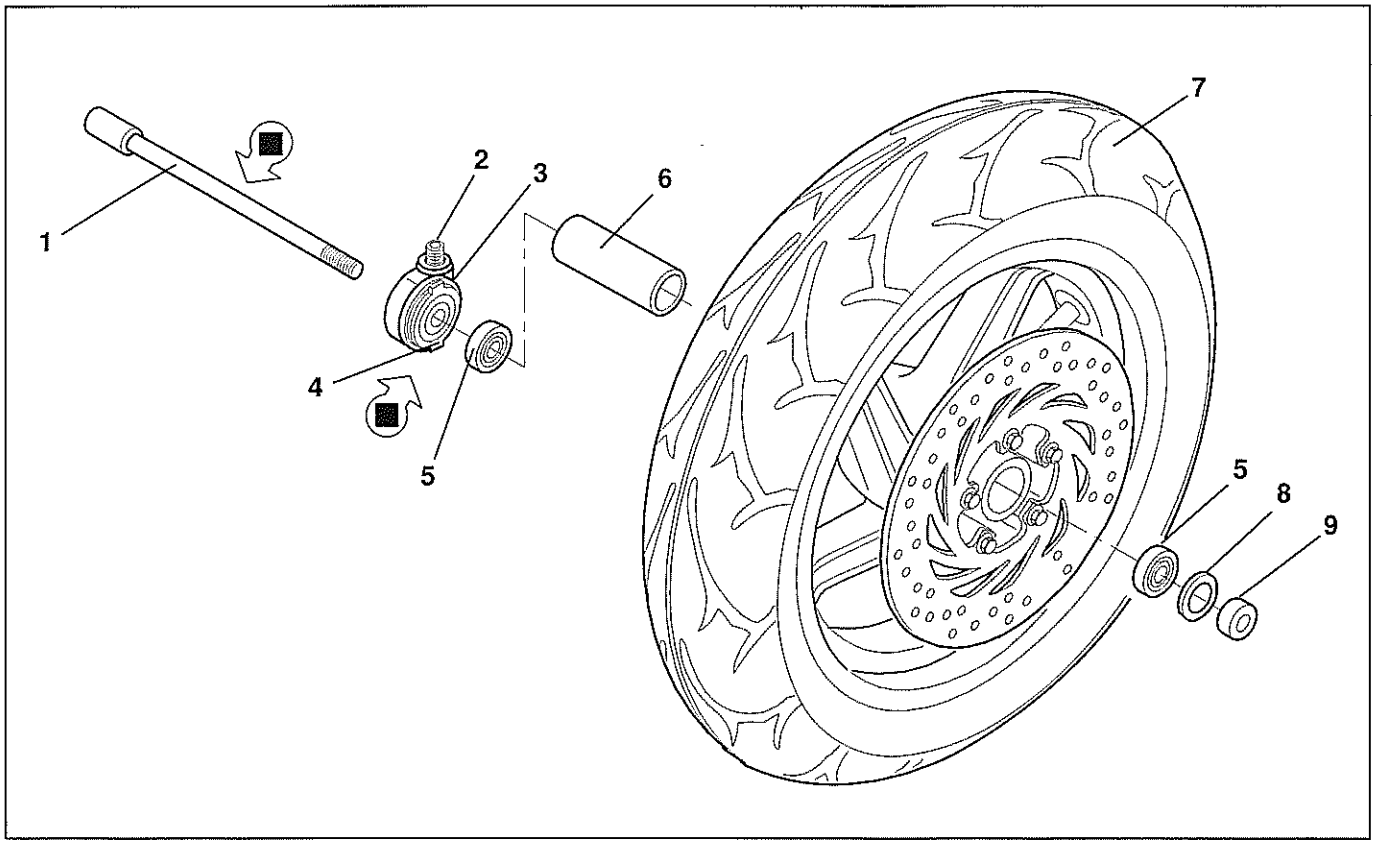
⚠ CAUTION

Proceed with care.
Handle painted parts carefully, without scraping or damaging them.



7

FRONT WHEEL



Key

1) Front axle
2) Tachometer drive
3) Circlip
4) Driving tang
5) Bearing
6) Internal spacer
7) Complete wheel
8) Oil seal
9) External spacer

REMOVING THE FRONT WHEEL

Read carefully PRECAUTIONS AND GENERAL INFORMATION.

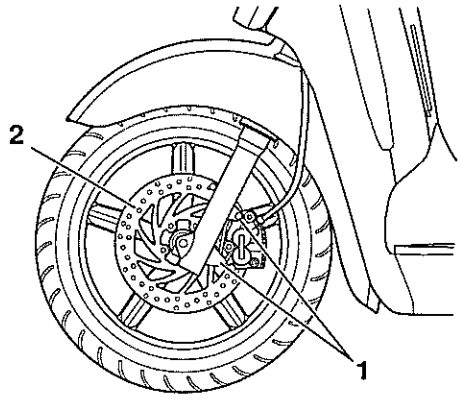
⚠ WARNING

Take care not to damage the brake hoses, disc and pads when removing/refitting the wheel.
Position the motorcycle on the center stand.

⚠ WARNING

Position a block or support under the motorcycle so that front wheel is free of the ground and that the motorcycle is stable and will not fall backward when the front wheel is removed.

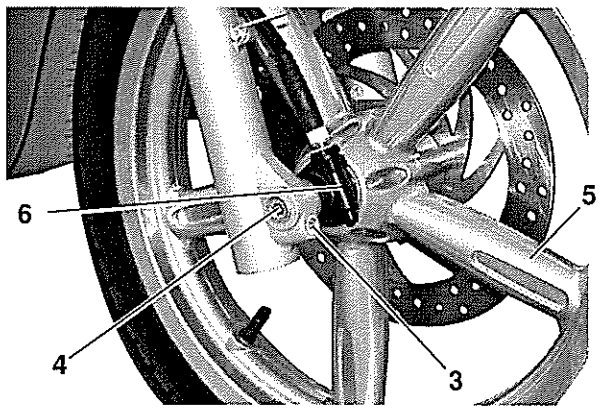
Unscrew and remove the two screws (1).
Remove the brake calliper by withdrawing it carefully from the brake disc (2).



Loosen the screw on the wheel spindle clamp (3).
Loosen the wheel spindle (4) with a hex wrench.

⚠ WARNING

Observe the assembly order of the parts, washers and spacers, in order to be able to reassemble them correctly.
Hold the front wheel and take out the axle (4) manually.
Remove the wheel (5).
Disengage the tab on the tachometer/odometer (6) drive.



⚠ CAUTION

Never touch the front brake lever after removing the brake caliper from the disc.
If you do, the caliper pistons may be pushed down in their seats and brake fluid will be spilled.

To refit, (see REFITTING).

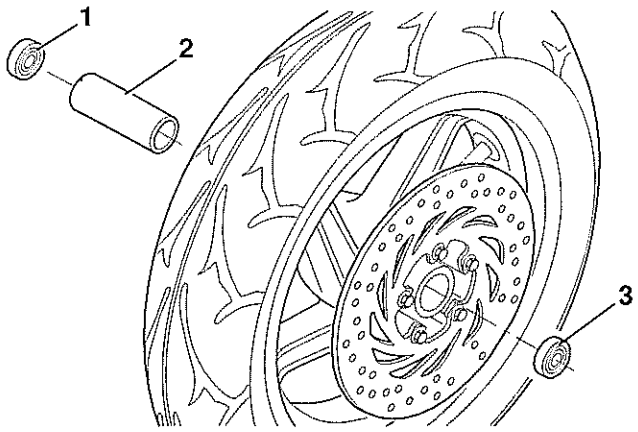
CHANGING THE BEARINGS

Read carefully PRECAUTIONS AND GENERAL INFORMATION.

⚠ WARNING

Each time they are disassembled the bearings must be checked and, if necessary, renewed.

Clean both sides of the hub with a cloth.



Removal
Working from the left side of the wheel, insert a blunt drift into the hub and tap on the internal race of the right bearing (1), moving the contact points 90° with each tap.
If you are careful, you can remove the bearing without damaging it.

Retrieve the right bearing, and remove the spacer (2).
Working from the left side of the wheel, using a drift which engages the outer race of the left bearing (3), tap it out of its seat.

Refitting
Working from the right side of the wheel, place the bearing in the wheel hub.

⚠ CAUTION

Ensure that the bearing axis is perfectly aligned with the hub.
Using a drift that engages only the outer race of the bearing, gently tap the bearing into place. Ensure that it is completely seated against the seat at the bottom of the bearing recess.
Then, working from the left side of the wheel, insert the spacer, and, using an appropriate drift that engages the outside race of the bearing only, likewise install the left front wheel bearing.

NOTE Never use a drift which touches the ball cages or shields of the bearing.

Knock the drift moderately several times with a rubber hammer until the right bearing (1) is fully inserted.
Insert the spacer (2).

Working from the left side of the motorcycle:
Repeat the first three operations for the left bearing (3).

INSPECTION

⚠ CAUTION

Inspect the condition of all the components, especially those listed below.

Bearings
Carefully wash the bearings, until they are completely clean and free of old grease.
Holding the outer race, turn the inner race with your fingers. You must not be able to perceive any unevenness.
While slight end play permissible, there must be no radial play whatsoever.
Any bearings that fail to meet these inspection criteria must be replaced.

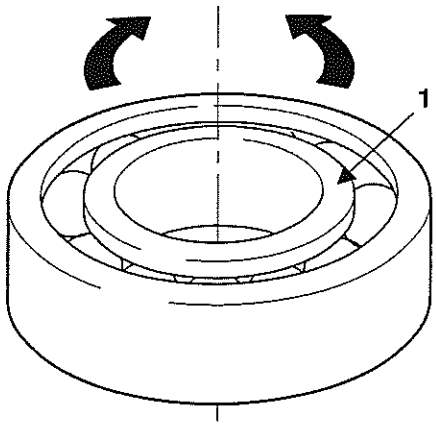
⚠ CAUTION

Do not attempt to reuse shielded or sealed permanently lubricated bearings. They must be replaced whenever they are removed.
For standard bearings, thoroughly work grease around the balls and the inside of the ball cage, (see RECOMMENDED LUBRICANT).

⚠ CAUTION

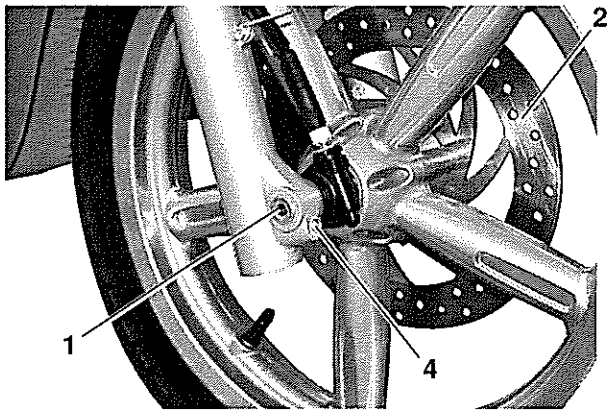
Apply grease to the spindle (only in the bearing contact zone) (see RECOMMENDED LUBRICANT).

NOTE Before reinstalling the axle, grease it over its entire length lightly.



7

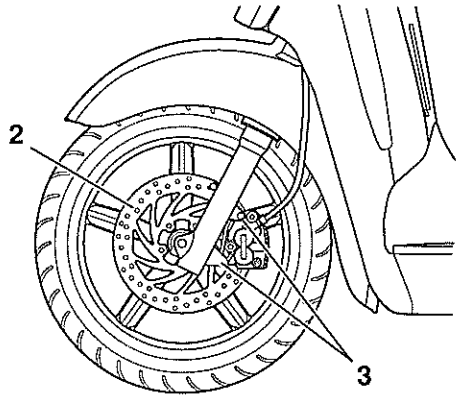
REFITTING THE FRONT WHEEL



⚠ CAUTION

Be careful not to damage the brake lines, disc and pads when refitting.

Position the wheel between the fork legs.
Fit the odometer drive tang into its seat in the wheel hub.
Line up the odometer drive seat with the anti-rotation pin.
Put the circlip and driver in position.
Insert the axle (1), from the right of the motorcycle.
Insert the spacer between the hub and the left fork leg.
Screw in the axle (1). – Head of axel may be tight fit into fork leg. Tap lightly w/hammer, then screw in.
Tightening torque for axle (1): 80 Nm (8 kgm) [59 Ft-lbs].



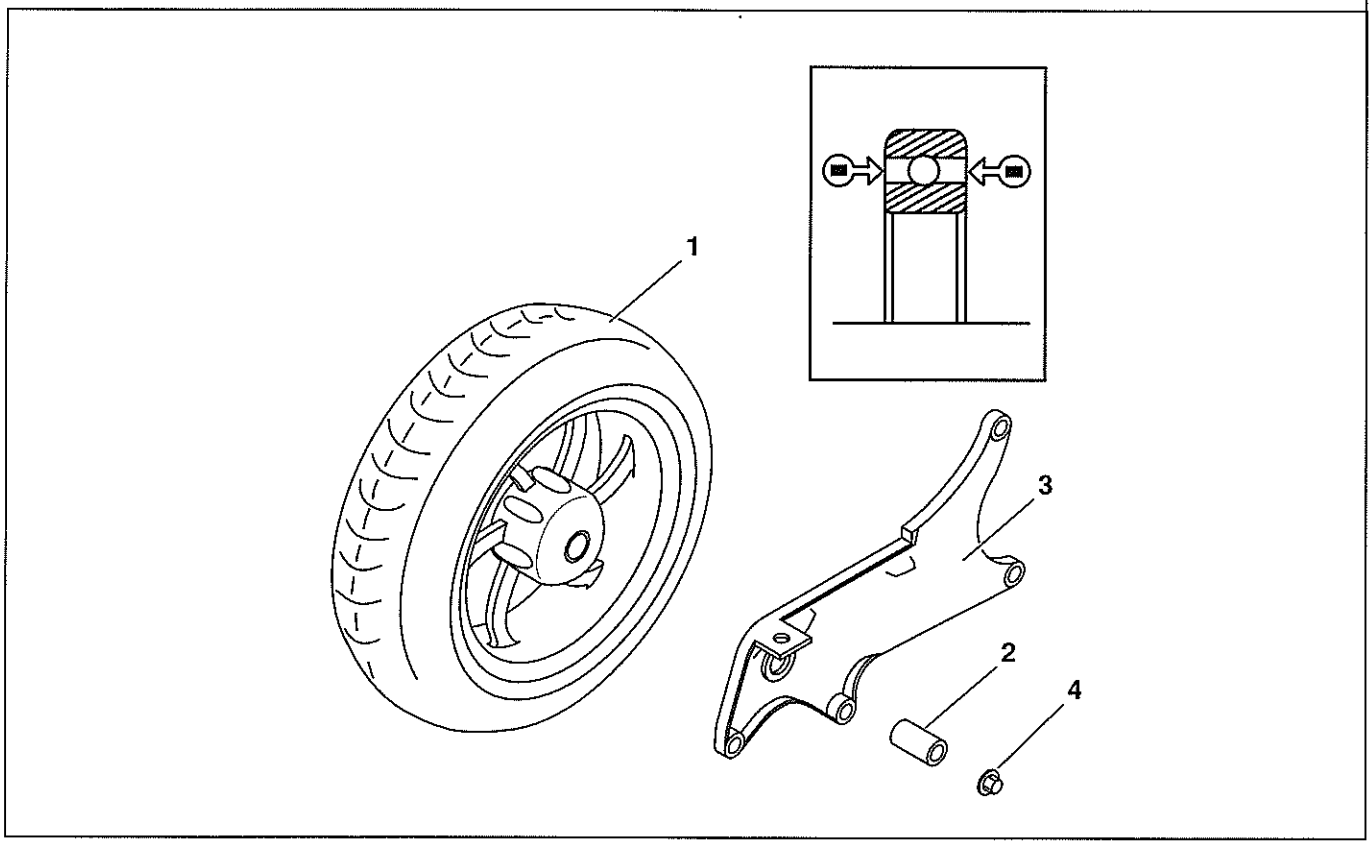
Refit the brake caliper by fitting it carefully on to the brake disc (2).
Screw in and tighten up the two screws (3).
Tightening torque for brake caliper screws (3): 27 Nm (19.9 Ft-lbs).

With the front brake lever pulled, press down repeatedly on the handlebar so the fork is forced down.
In this way, the fork legs will be positioned properly.
Tighten up the screw on the axle clamp (4).
Tightening torque for screw on axle clamp (4): 12 Nm (1.2 kgm) [8.8 Ft-lbs].

⚠ CAUTION

After refitting, apply the front brake lever repeatedly to ensure that the brake system is working properly.

REAR WHEEL



Key

1) Complete wheel
2) Spacer
3) Exhaust pipe support plate
4) Nut

■ = Grease see (RECOMMENDED LUBRICANT)

REMOVING THE REAR WHEEL

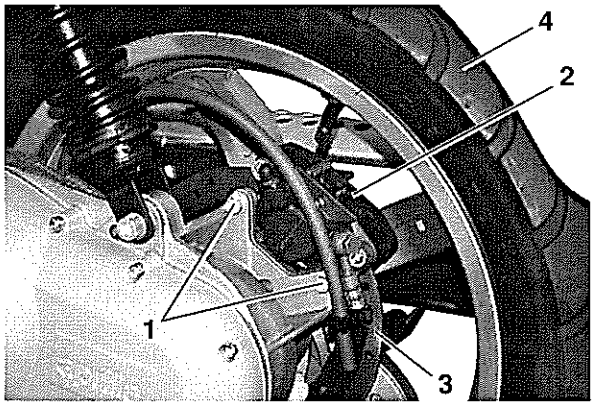
Read carefully PRECAUTIONS AND GENERAL INFORMATION.

⚠ WARNING

Wait until the engine and exhaust muffler cool down completely. When removing/refitting, be careful not to damage the brake lines, disc and pads.
Remove the exhaust pipe support (REMOVING THE EXHAUST PIPE SUPPORT).

Unscrew and remove the two screws (1).
Tightening torque for screws (1): 27 Nm (19.9 Ft-lbs).

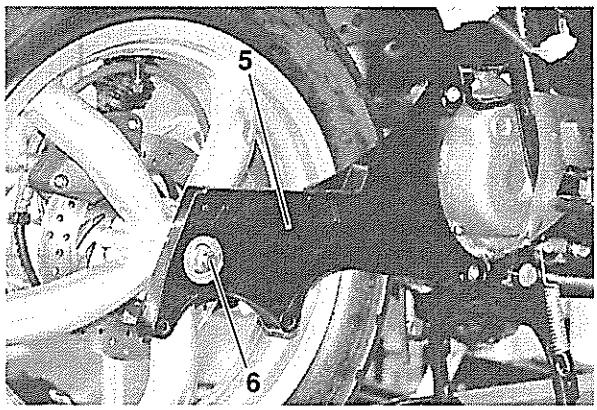
Carefully remove the brake caliper (2) from the brake disc (3). Remove the complete wheel (4) together with its spacer.



⚠ WARNING

Never touch the front brake lever after removing the brake caliper from the disc. If you do, the caliper pistons may be pushed down in their seats and brake fluid will be spilled.

After refitting:
Position the motorcycle on the center stand.
Rotate the rear wheel slowly.
Check that the exhaust pipe support (5) doesn't oscillate sideways.
If there is a problem:
Loosen the wheel nut (6).
Change the position of the wheel.
Tighten the wheel nut (6).
Tightening torque for wheel nut (6): 110 Nm (81.1 Ft-lbs).



⚠ CAUTION

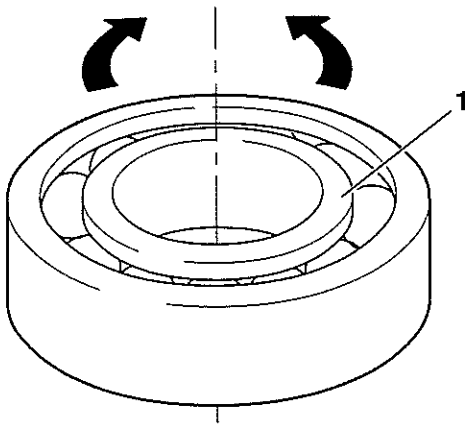
Always replace the wheel nut with a new one when refitting.

INSPECTION

⚠ CAUTION

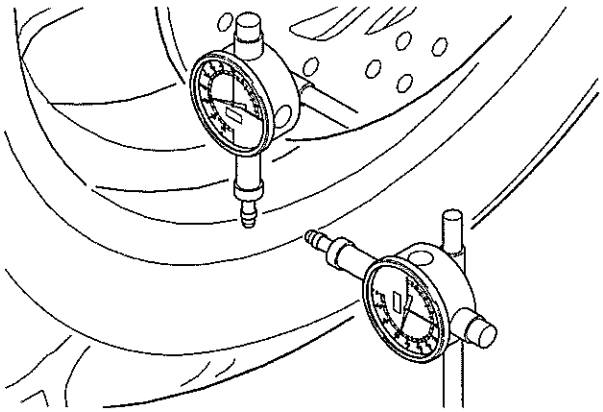
Inspect the condition of all the components, especially the ones listed below.

Bearings
Rotate the internal ring (1) manually: there must be no catching or noise.
There must be no end float.
Any bearings not meeting these requirements must be renewed.



Rear axle
See ENGINE WORKSHOP MANUAL n°1000 (I-D), n°1001 (I-USA) and n°1002 (F-E).
Maximum eccentricity: 0.25 mm (0.001 in)

Rim
Using a dial indicator, determine that the radial and axial runout of the rim are within specification. Excessive runout is usually caused by worn or damaged bearings or a bent axle. If after checking these components, you determine the rim still does not meet specification, the rim must be replaced.
Maximum eccentricity: 2 mm (0.08 in)



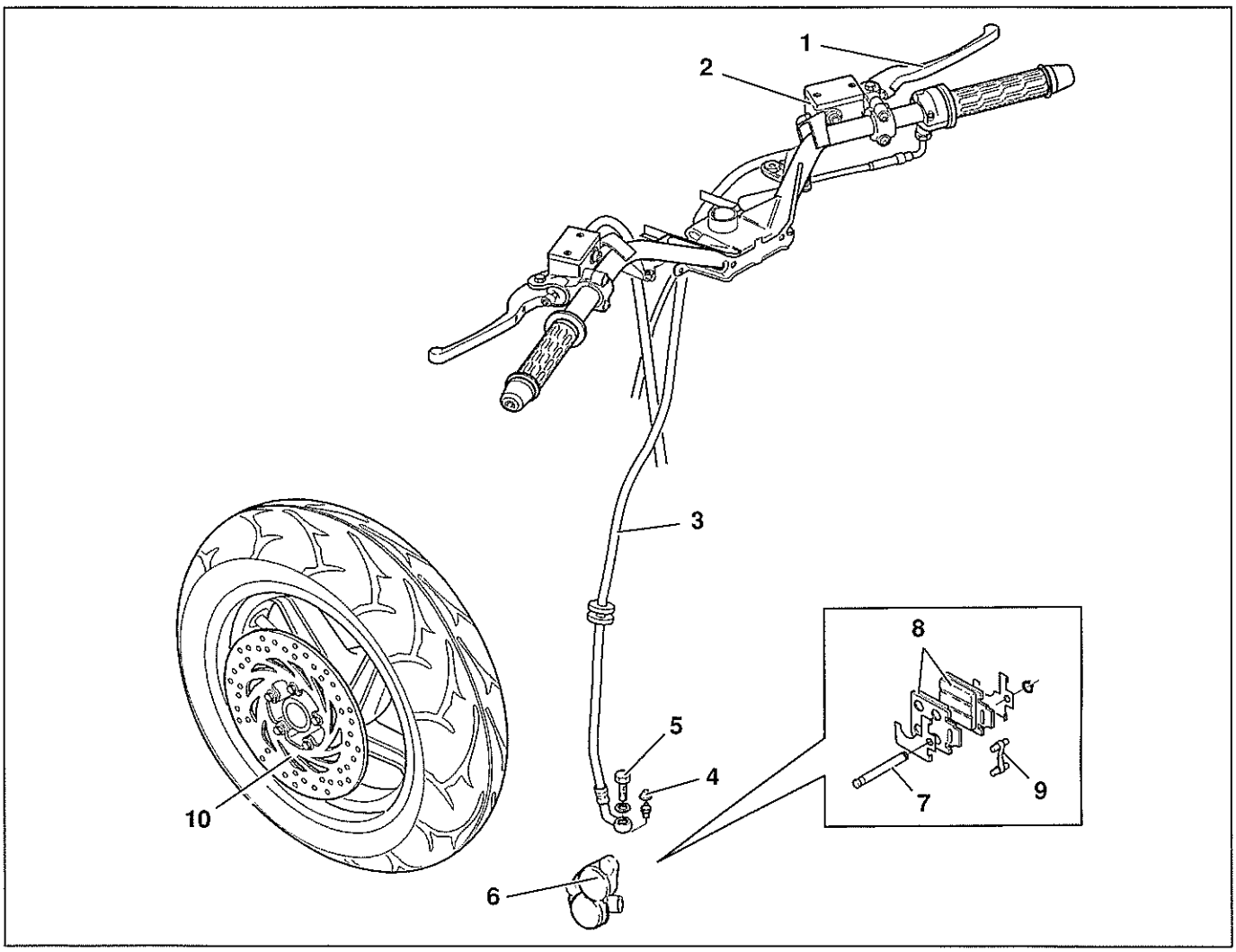
Tires
Check the condition of the tires, (see TIRES).

7

FRONT BRAKE

For general information, (see COOLANT).

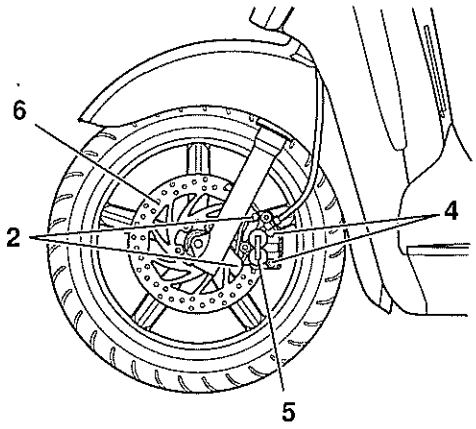
For information on:
checking brake pad wear, (see CHECKING THE BRAKE PAD WEAR).
bleeding the brake circuit, (see BLEEDING THE BRAKE CIRCUIT).



Key:

1) Brake lever
2) Brake fluid master cylinder/reservoir
3) Brake line
4) Bleed valve
5) Union screw
6) Brake calliper
7) Pad pin
8) Brake pads
9) Pad spring
10) Brake disc

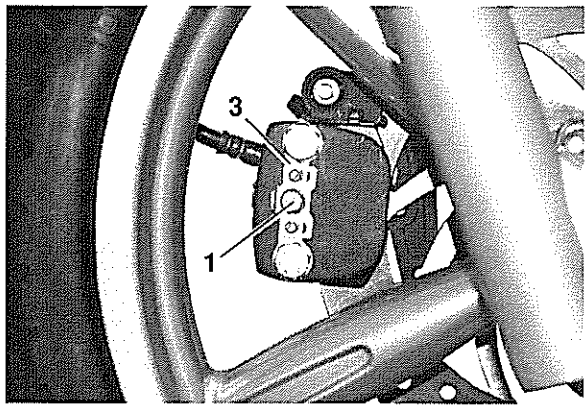
CHANGING THE BRAKE PADS



Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Position the motorcycle on the center stand.
Unscrew and remove the screw (1).
Unscrew and remove the screws (2).
Tightening torque for screws (2): 27 Nm (19.9 Ft-lbs).
Remove the plate (3).
Withdraw the two pins (4).
Remove the front brake caliper (5) from the brake disc (6).
Extract the pads one at a time.

⚠ CAUTION

Never touch the front brake lever after removing the brake caliper from the disc. If you do, the caliper pistons may be pushed down in their seats and brake fluid will be spilled.

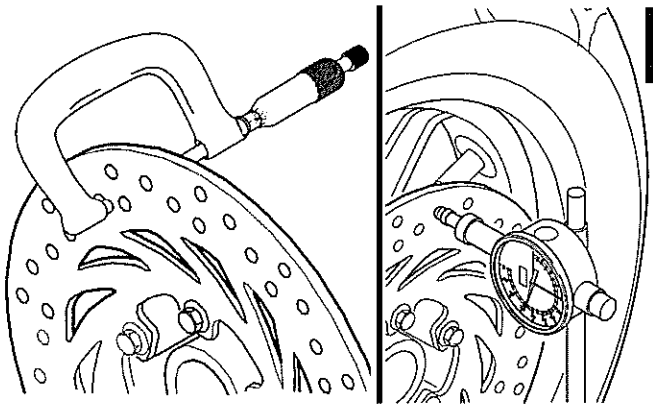


Insert two new pads.
Insert the two pins (4).
Position the plate (3) correctly.
Install the screw (1).

CHECKING THE BRAKE DISC

⚠ CAUTION

This check must be done with the brake disc installed on the wheel.

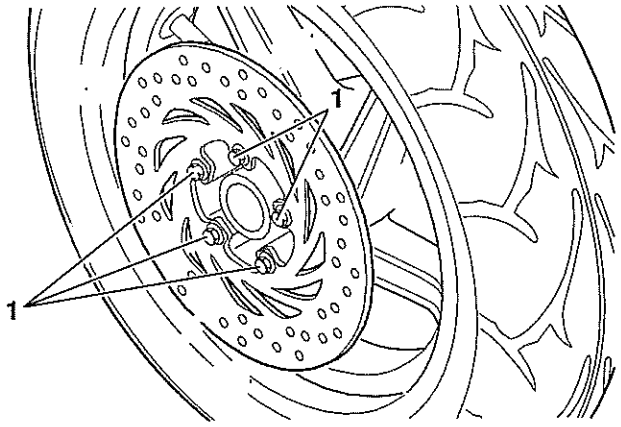


Light, circumferential scoring and moderate discoloration are acceptable. However, if there are any deep scores, or evidence of the surface being roughened, the disc must be replaced.

Measure the disc thickness using a micrometer, at least four points, equally spaced around the disc.
If the thickness varies by more than 0.004 of an inch (0.1 mm), or is below the specified minimum, even at just one point, the disc must be replaced.
Minimum thickness for front and rear brake discs: 3.5 mm (0.1 in)

Check the disc for runout, using a dial indicator, as shown.
Maximum permissible runout: 0.3 mm (0.0012 in)

REMOVING THE BRAKE DISC



Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Take off the front wheel (see REMOVING THE FRONT WHEEL).
Unscrew and remove the five brake disc screws (1).
Tightening torque for brake disc screws: 27 Nm (19.9 Ft-lbs).

NOTE Screw in the screws manually and tighten them up in diagonal order, in the following sequence: A-B-C-D-E.

⚠ CAUTION

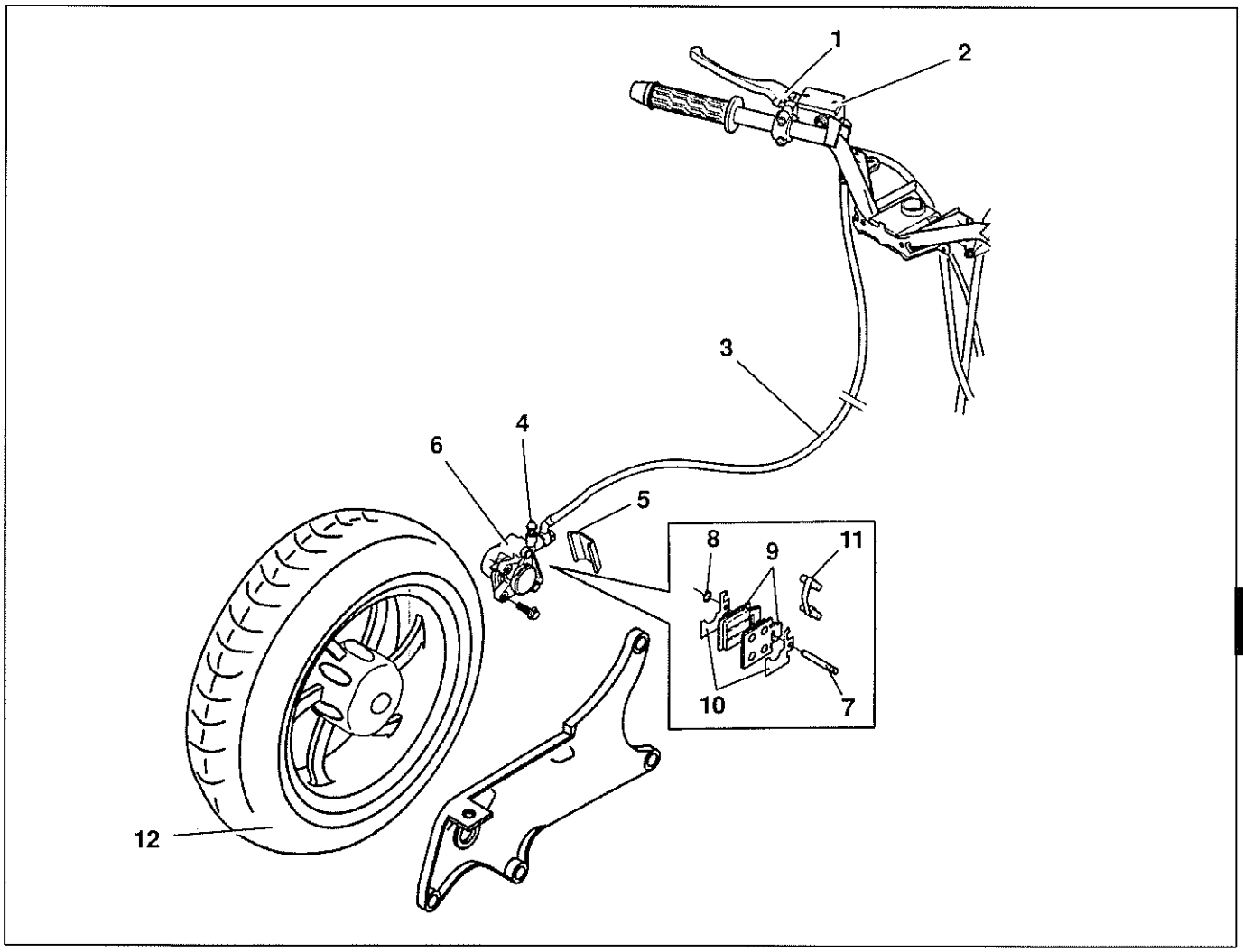
When refitting, apply LOCTITE ® 270 to the brake disc screw threads.

Remove the brake disc.

REAR BRAKE

For general information, (see COOLANT).

For information on:
checking brake pad wear, (see CHECKING THE BRAKE PAD WEAR).
bleeding the brake circuit, (see BLEEDING THE BRAKE CIRCUIT).



Key:

1) Brake lever
2) Brake fluid master cylinder/reservoir
3) Brake line
4) Valve
5) Tube union screw
6) Brake calliper
7) Pad pin
8) Retainer ring
9) Brake pads
10) Anti-vibration springs
11) Pad springs
12) Complete wheel

STEERING

For information on checking and adjusting the steering, (see CHECKING AND ADJUSTING THE STEERING).

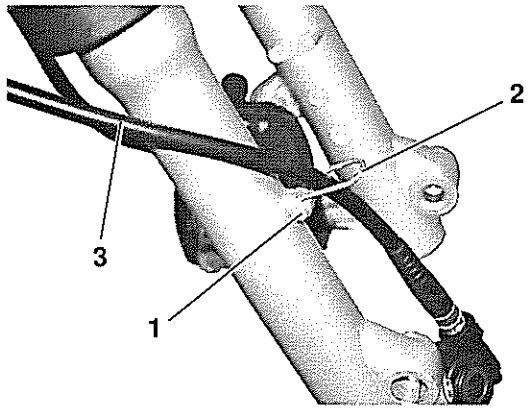
REMOVING THE FRONT FORK
Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Remove the rear view mirrors (see REMOVING THE REAR VIEW MIRRORS).
Remove the front fairing (see REMOVING THE FRONT FAIRING).

Remove the lower shield (see REMOVING THE INNER FRONT SHIELD).
Position the motorcycle on its center stand, on a lift platform, so that the front wheel can overhang the front of the platform.

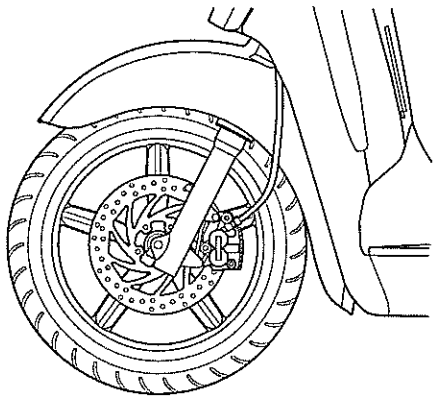
⚠ WARNING

Tie the rear end of the motorcycle down using tie-down straps. Also, place a prop under the front of the frame. The prop must contact the frame and not the fuel tank under any circumstance. Ensure that the motorcycle is stable. Failure to observe this warning could lead to the motorcycle falling off of the lift, with consequent damage to the motorcycle, as well as potential injury to the mechanics.

Remove the front wheel (REMOVING THE FRONT WHEEL).
Unscrew and remove the screw (1).
Remove the cable guide clamp (2).
Pull the speedometer drive free of the front wheel.



Remove the front mudguard (REMOVING THE FRONT MUDGUARD).

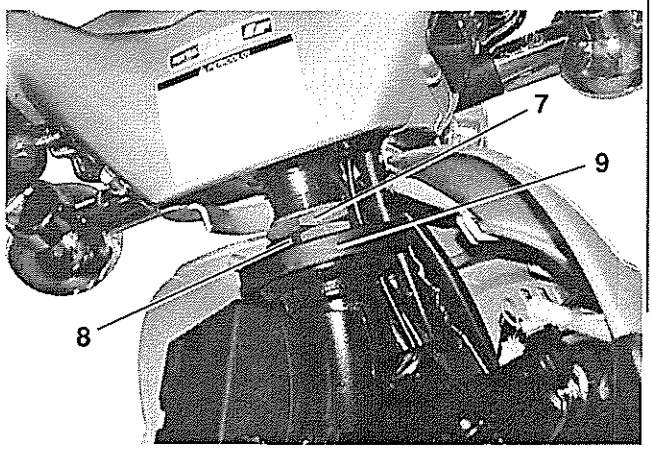


Unscrew and remove the locknut (7).

⚠ WARNING

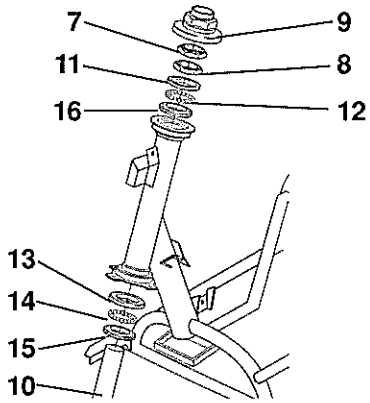
Hold on to the fork to stop the motorcycle falling over accidentally.

NOTE Take care: the lower bearing balls may come out when the fork is removed.
Unscrew and remove the adjustment nut (8).
Remove the rubber seal (9).



Remove the fork stem (10), from below, complete with the fork tubes.
Remove the upper inner race (11) and balls (12).
Remove the lower inner race (15) and balls (14).
Remove the lower outer race (13).
Clean the grease off all of the parts including the lower inner race (15) and upper outer race (16).
Inspect all the components for wear and pitting.
Any sign of pitting or fatigue indicates that the entire bearing set, both upper and lower bearings, must be replaced.

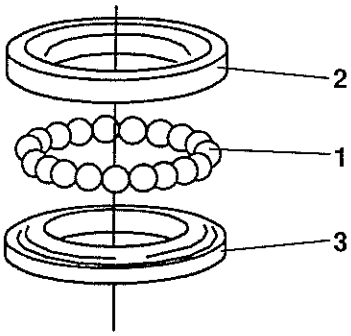
NOTE See RECOMMENDED LUBRICANT for information on appropriate bearing grease.



INSPECTION OF THE BEARINGS

Inspect the condition of all the components, as instructed above. If any portion of the bearings are damaged, both complete bearings must be replaced.

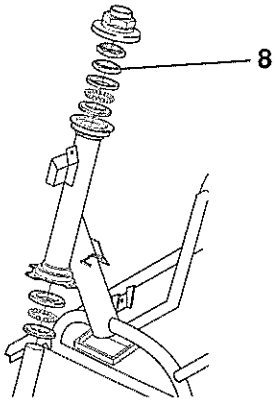
Apply appropriate grease liberally to both inner and outer race and balls (1-3), (see RECOMMENDED LUBRICANT).



REFITTING
To refit , follow the removal procedure in reverse order, taking the additional steps described below.

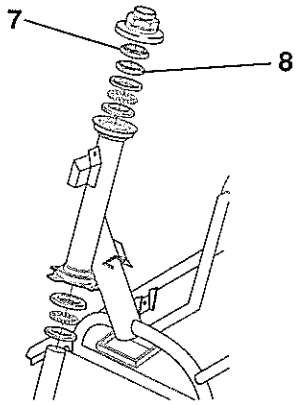
⚠ CAUTION

Check to see that all of the handlebar controls are in their appropriate position and not twisted or kinked.
Do not overtighten the adjustment nut (8), as this will damage the steering bearings.

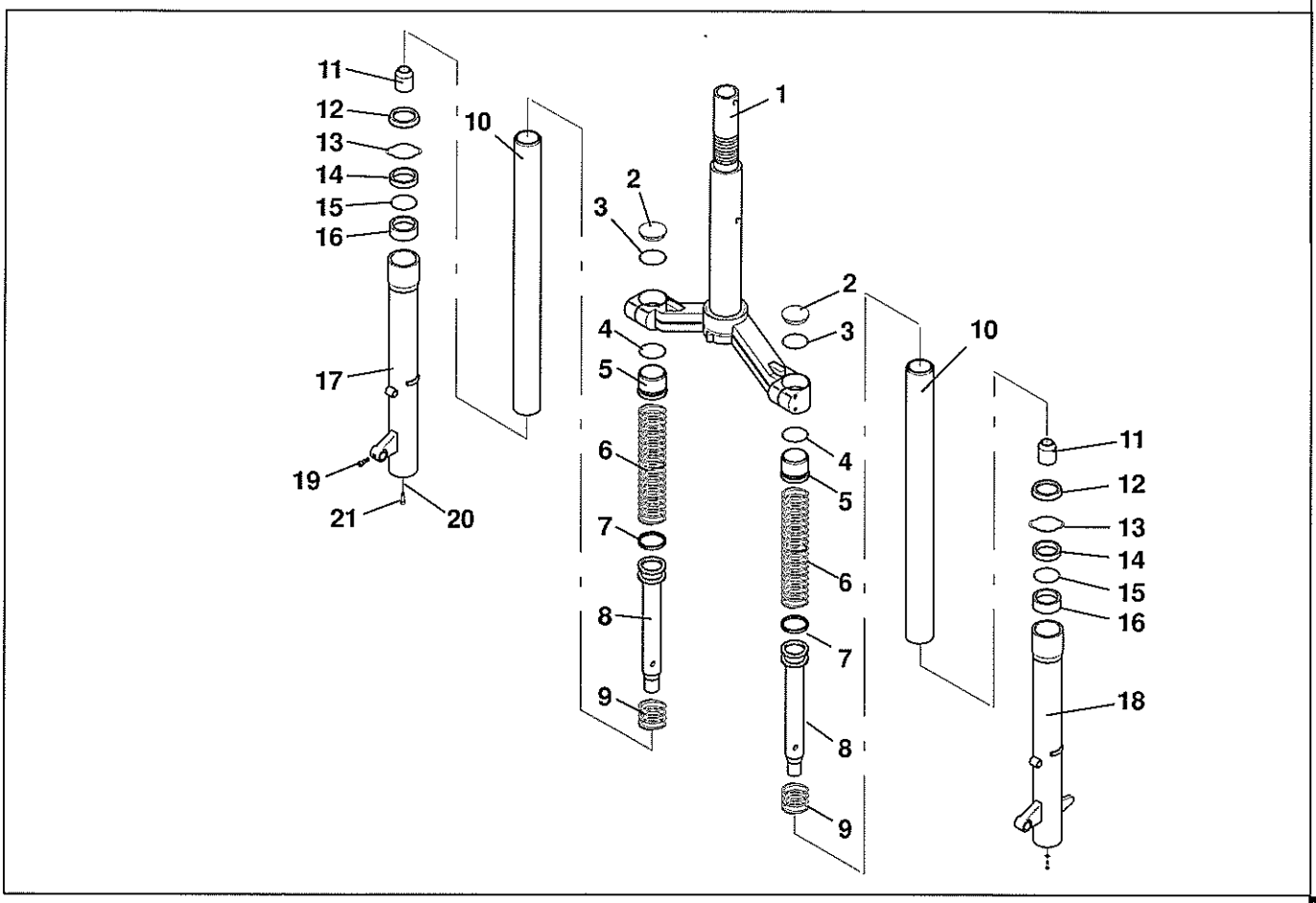


After the bearings have been installed, adjust them, (see ADJUSTING THE STEERING BEARING).
Screw in the adjustment nut (8) to take up the play in the bearings.
Check the play by shaking the fork back and forward in the direction of travel and ensuring that the steering turns smoothly and freely.
Hold the adjustment nut (8) still and using a wrench, tighten up the locknut (7).
Tightening torque for locknut (7):
110 Nm (81.1 Ft-lbs).

Check the play by shaking the fork back and forward in the direction of travel and ensuring that the steering turns smoothly and freely.



FRONT FORK



Key:

1) Fork head
2) Rubber plug
3) Snap ring
4) O-ring
5) Leg seal plug
6) Spring
7) Ring
8) Plunger rod
9) Spring
10) Fork tube
11) End bumper
12) Dust cover
13) Retainer ring
14) Oil seal
15) Oil seal washer
16) Sliding bush
17) Right lower fork leg
18) Left lower fork leg
19) Retainer screw
20) Seal washer
21) Bottom screw

REMOVING THE FORK TUBES

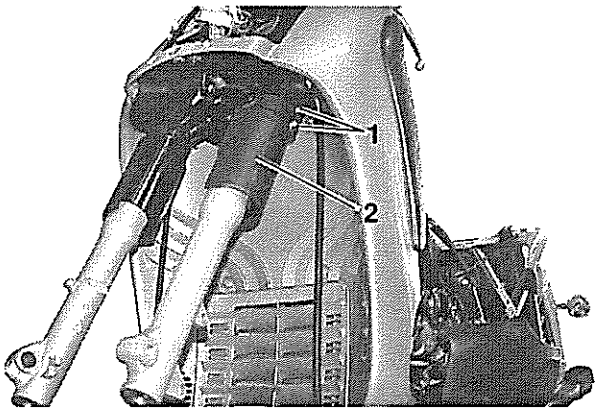
Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Remove the front wheel (REMOVING THE FRONT WHEEL).
Remove the front mudguard (REMOVING THE FRONT MUDGUARD).
Position the motorcycle on its center stand, on a lift platform, so that the front wheel can overhang the front of the platform.

⚠ WARNING

Tie the rear end of the motorcycle down using tie-down straps. Also, place a prop under the front of the frame. The prop must contact the frame and not the fuel tank under any circumstance. Ensure that the motorcycle is stable. Failure to observe this warning could lead to the motorcycle falling off of the lift, with consequent damage to the motorcycle, as well as potential injury to the mechanics.

NOTE The following instructions are applicable to both fork tubes.

Unscrew and remove the screw (1).
Withdraw the fork leg cover (2) from underneath.

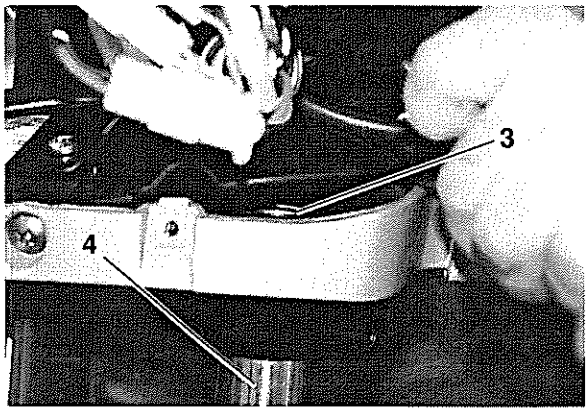


⚠ CAUTION

Proceed with great care when removing the fork tubes.

NOTE Before removing the snap ring (3), ensure that the fork tube will not fall from the fork head and be damaged.

Hold the snap ring (3) still with your finger to prevent it from turning during removal.
Using a flat-blade screwdriver, gently pry the snap ring out of its groove.
Withdraw the fork (4) downward, freeing it from the fork head.



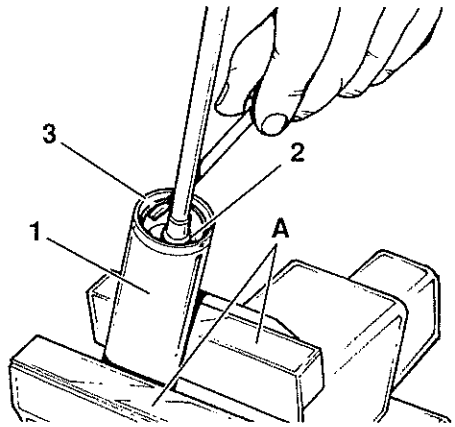
DISASSEMBLING THE FORK

Read carefully PRECAUTIONS AND GENERAL INFORMATION and FORK OIL.

NOTE The left and right fork have the same internal components. The procedure described below refers to a single fork, but is applicable to both.

Remove the fork tube (REMOVING THE FRONT FORK).
Clean the tube assembly carefully.

NOTE Before proceeding with the operations described below, set up a vice with jaws (A) made of soft material and prepare a pneumatic driver and a container to collect the oil, with a capacity greater than 350 cm^3 (11.8 US fl oz).



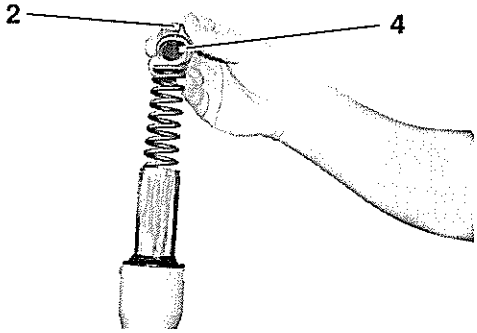
⚠ CAUTION

Take great care when disassembling the fork.

Position the fork (1) in a vice between the 2 jaws (A) and tighten the jaws moderately.
Keeping the leg plug (2) pressed away from the snap ring (3) with a drift pin, carefully pry out the snap ring (3) with a small screwdriver.
Remove the snap ring (3) and release the fork plug (2).

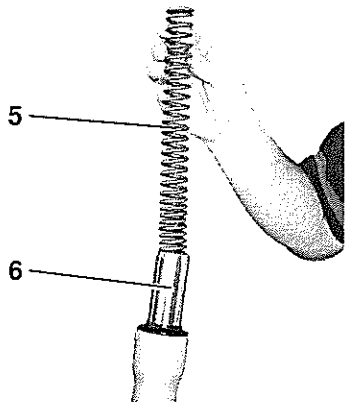
⚠ CAUTION

The fork contains oil; do not turn it upside down or tilt it too much during the disassembly.



Remove the fork plug (2) and the O-rings (4) on the fork plug.

NOTE Before completely removing the spring (5), hold it just out of the leg (6) for a few seconds so that part of the oil runs downinto the leg.

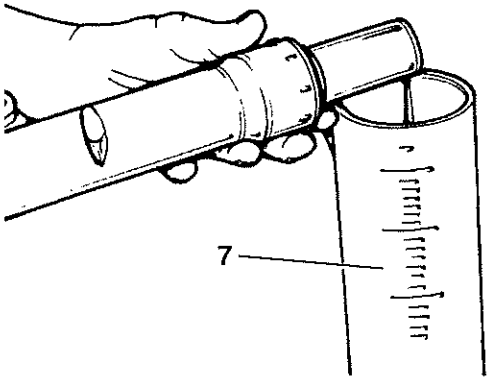


Take out the spring (5).

⚠ CAUTION

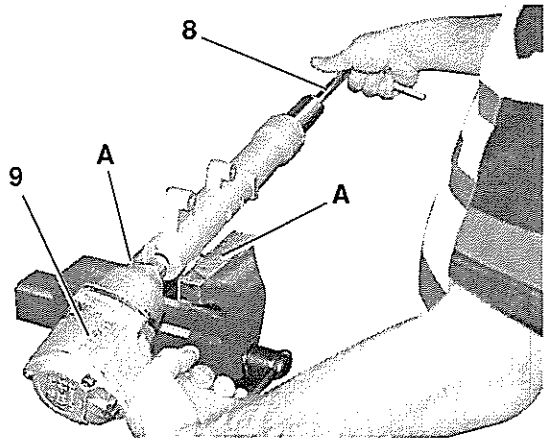
Make sure the spring is fitted the right way round when reassembling, i.e. with the tighter coils (Zone A) to the bottom.

Turn the fork upside down to empty the oil into the container (7). Wait until you have drained the entire fork.

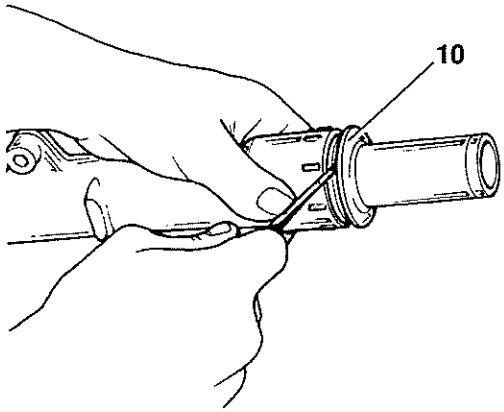


NOTE Pump the fork tube in and out of the lower fork leg several times. This will assist you in emptying the fork.

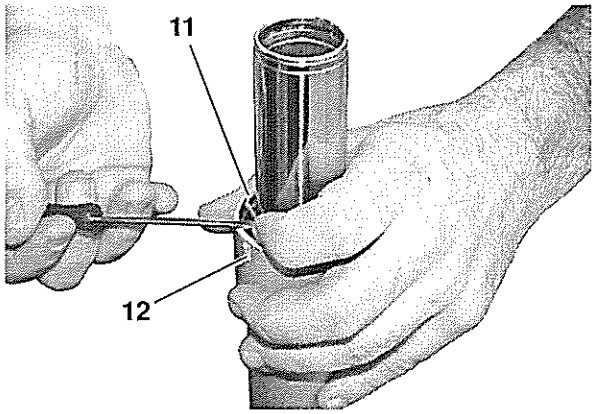
Place the fork in the vice between the 2 jaws (A), gripping the sleeve.
Using a socket, prevent the plunger rod (8) from rotating.
Using an impact wrench (9), remove the plunger retaining screw.



Remove the dust cover seal by tying it gently off at different points around its periphery, with a flat-blade screwdriver (10).



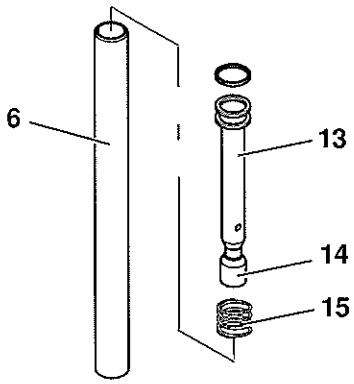
Using a small, flat-blade screwdriver, remove the retainer ring (11) from the lower fork leg by gently prying the retainer ring out, with the screwdriver engaging the concave portion of the ring.



Withdraw the fork tube (6), complete with plunger (13) and end bumper (14) with its spring (15).
A few firm tugs will be required to free the fork tubes from the lower fork leg.

⚠ CAUTION

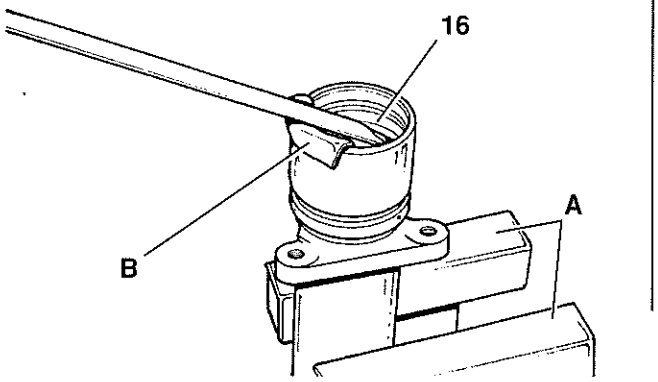
Do not disassembly the plunger (13).



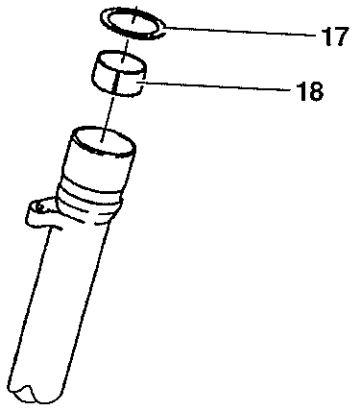
⚠ CAUTION

Reposition the lower fork leg in the vice between the 2 soft jaws (A).
Place a piece of tough plastic or aluminum (B), sufficiently strong enough to prevent damage to the fork leg, on the rim of the leg.

Using a flat-bladed screwdriver, remove the oil seal (16) by prying on it at different locations around the circumference.



Remove the cap (17) and then the sliding bushing (18).
Wash all the components with clean detergent.

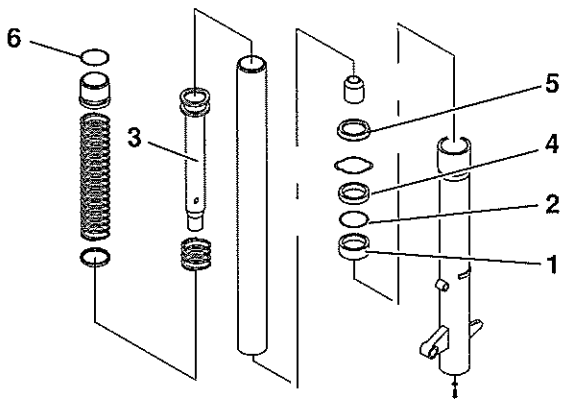


SLEEVE

Inspect the lower fork legs for any damage, dents, or cracks. If any are seen, the fork leg must be replaced.

Inspect the condition of the following components:
sliding bushing (1);
cap (2);
plunger (3).
Replace any component if it shows excessive wear, or damage.

Always replace the following parts:
oil seal (4);
dust seal (5);
the 2 O-rings on the leg plug (6).



REFITTING THE FORK

Read carefully PRECAUTIONS AND GENERAL INFORMATION.
When refitting, ensure that the sliding surfaces are in perfect condition.
Very slight longitudinal scoring on the fork tube is acceptable, provided it is so small and shallow that it will not catch your fingernail when you rub your fingernail across it.
It is permissible to polish the fork leg using 1000 grit wet or dry paper, used with kerosene as a fluid.

⚠ CAUTION

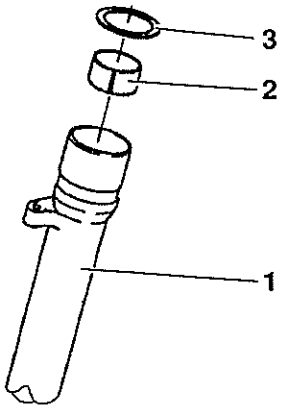
Never attempt to clean up a fork leg by polishing it circumferentially (ie, putting it in a lathe and spinning it while holding a polishing cloth against it). The only permissible way of polishing the fork leg is to lightly polish out any scratches along the length of the fork tube. Also, when reassembling, everything must be scrupulously cleaned. If any dirt or other foreign matter is assembled into the fork, it will very quickly be destroyed.

⚠ CAUTION

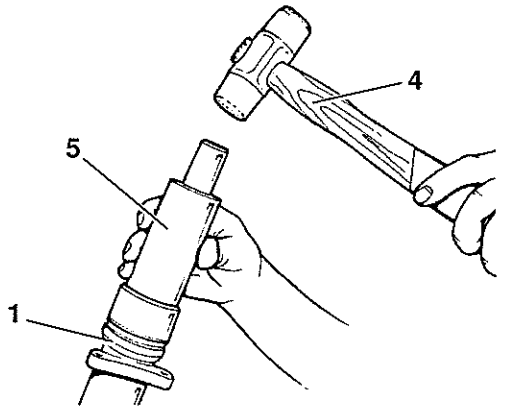
Never reuse old fork oil. Never reuse seals. Always replace them with new ones.

NOTE Before proceeding with the operations described below, set up a vice with jaws made of a soft material (aluminum) (A).
Apply a film of fork oil to the seals and bushings before fitting them (see RECOMMENDED LUBRICANT).

Place the lower fork leg (1) between the soft jaws with the open end pointing upward.
Fit the sliding bushing (2) into the fork leg (1).
Insert the cap (3).



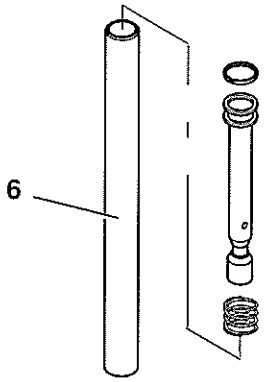
Using a drift of appropriate diameter (5), install the new oil sleeve (1) into the fork leg.
Tap gently, but ensure that the seal is fully seated.



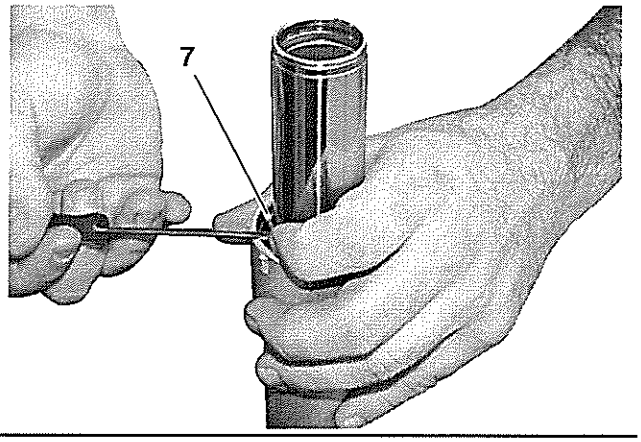
NOTE Be careful that the plunger remains in place inside the fork tube when you install the tube.

Insert the complete plunger with the spring end down, into the fork tube.
Insert the tube into the lower fork leg.
Push it fully downward.

NOTE The tube (6) must slide freely into the lower fork leg, with no sign of sticking or snagging.



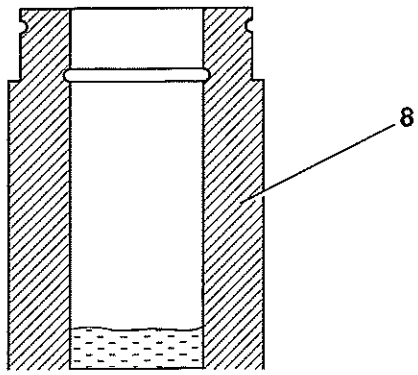
Install the snap ring (7) into the lower fork leg, making sure that is snaps fully into its groove.



Holding the fork (8) assembly vertically, pour fork oil (see RECOMMENDED LUBRICANT) into the fork until it reaches the correct level.

NOTE The fork must be perfectly vertical when measuring the oil level. The oil level must be the same in both legs.

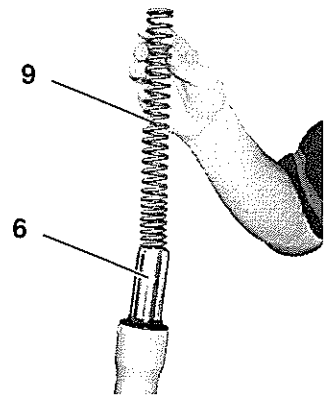
Description	Oil level/millimeters of air
Showa fork	105 mm (4.1 in)
Marzocchi fork	155 ± 2 cc (5.2 ± 0.06 US fl oz)/95 mm (3.7 in)



Insert the spring (9) into the leg (6).

⚠ CAUTION

Check that the spring is the right way round, with the tighter coils (Zone A) at the bottom.

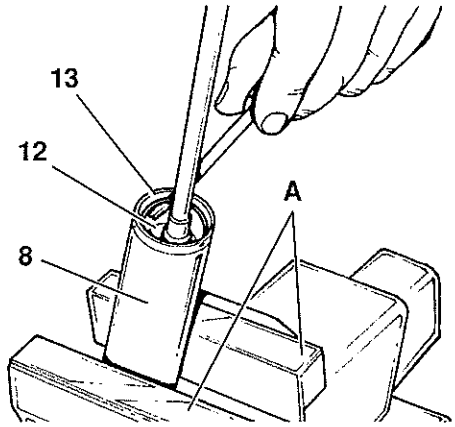


Place the fork (8) in a vice with the 2 soft jaws (A), tightening the vice moderately.

⚠ CAUTION

Do not bend or otherwise damage the fork leg by overtightening the vice.
Always fit two new O-rings on the leg plug (12).

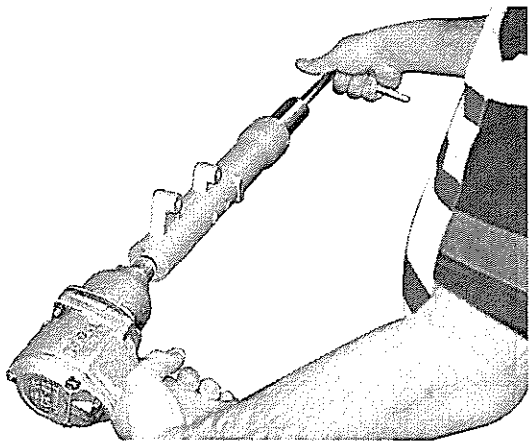
Using a drift, push the leg seal plug into the fork leg, using a drift. Fit the snap ring (13).
Gradually release the leg plug (12) until you feel the snap ring (13) click into its groove in the fork leg (8).



Install a new seal washer on the bottom screw and, using the impact wrench and socket, hold the plunger in place and tighten the bottom screw.

Tightening torque for the bottom screw:
12 Nm (8.8 Ft-lbs).

Finally, refit the dust cover.



REAR SUSPENSION

The rear shock absorber's factory setting is suitable for a rider weighing about 70 kg (155 lbs). However, it is possible to tune the suspension to your preference by using the following adjustments.

⚠ CAUTION

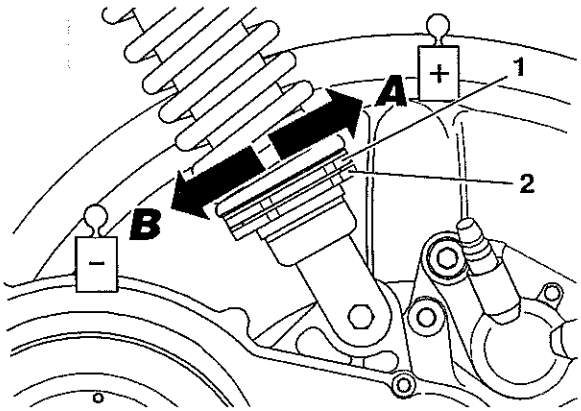
When adjusting the rear shock absorber spring preload, always start from the least rigid setting. This is the fully clockwise (arrow B) position of the ring nut (1). The ring nut (1) must not be adjusted [counterclockwise rotation (arrow A)] more than 14 mm (0.55 in). If this limit is exceeded, even the slightest unevenness of the road surface will make the vehicle bounce and lurch.

Working from the left side of the vehicle:
Loosen the locking ring nut (2) by means of the appropriate spanner.
Adjust the ring nut (1) to adjust the shock absorber spring preload (see table).

After the adjustment, prevent the ring nut (1) from rotating with the appropriate spanner, and tighten the locking ring nut (2) using the appropriate spanner.

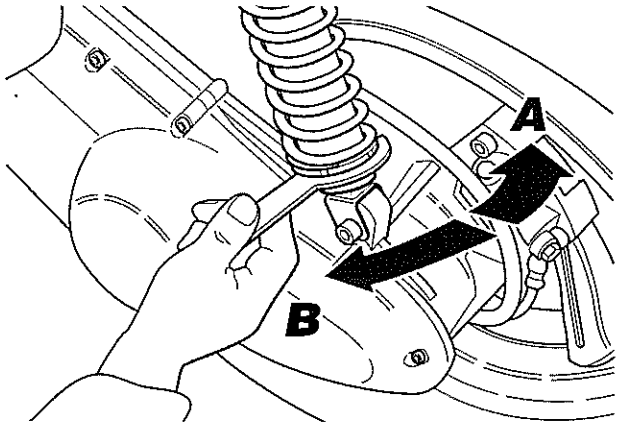
⚠ CAUTION

A ride of several miles will be needed to determine whether the adjustment is appropriate for the particular rider.



REAR SUSPENSION SPRING PRELOADING SETTING TABLE

Adjusting ring nut (1)	Counter-clockwise rotation (arrow A)	Clockwise rotation (arrow B)
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	Rider and passenger	Solo rider

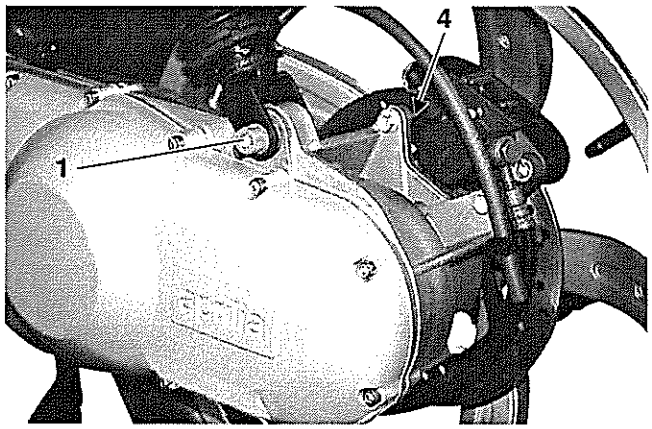


REMOVING THE REAR SUSPENSION

Read carefully PRECAUTIONS AND GENERAL INFORMATION.
Remove the saddle compartment (REMOVING THE SADDLE COMPARTMENT).

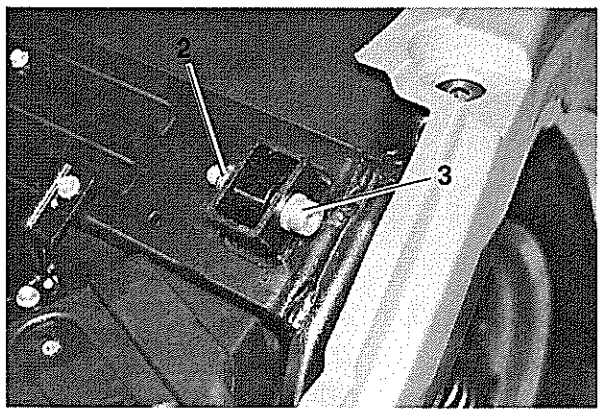
⚠ CAUTION

Place a support of suitable thickness between the rear wheel and the lower part of the subframe.
Position the motorcycle on the center stand.
Loosen and remove the screw (1).
Tightening torque for screw (1):
40 Nm (29.5 Ft-lbs).
Take off the washer.



Loosen and remove the nut (2).
Tightening torque for nut (2):
40 Nm (29.5 Ft-lbs).

Remove the bolt (3) completely, taking off the washer and the damper bushing.
Remove the complete rear suspension unit (4) from below.



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NOTE