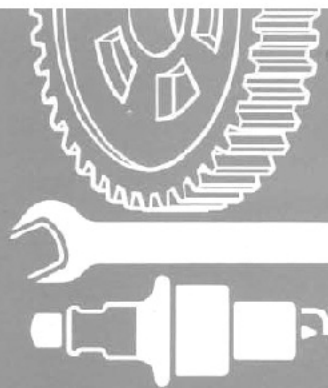
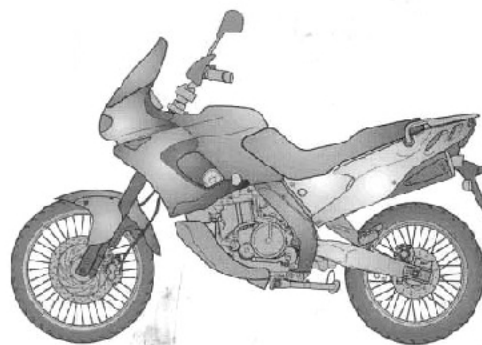


aprilia



Service and repair manual

Pegaso 650



942V

FOREWORD

- This manual supplies the main information for normal servicing procedures.
 - The information and illustrations contained in this manual are updated to the moment of its publication.
 - This publication is meant for professional mechanics, therefore many notions have been intentionally omitted, as they were regarded as superfluous.
- For any further information, contact **aprilia s.p.a. SERVICE DEPARTMENT**.
- For any further information see the ENGINE SERVICE MANUAL, No 933 (D-UK) / No 934 (I-E-F), the ENGINE SPARE PARTS CATALOGUE and the "CHASSIS PARTS" SPARE PARTS CATALOGUE, No 261V.

aprilia s.p.a. reserves the right to modify its models at any time, without prejudice to the main characteristics here described.


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aprilia s.p.a. takes no responsibility as to the performance or the use of said products.

HOW TO USE YOUR SERVICE AND REPAIR MANUAL

- + **ADVICE FOR CONSULTATION**
 - If not expressly described otherwise, the reassembly of the groups is to be carried out repeating the disassembly phases in the reverse order.
 - For each single operation on the engine, consult the specific manual.
 - For ordinary maintenance, consult the "USE AND MAINTENANCE" manual.

 **Remember:** 1 mile = 1.6 km
1 km = 0.625 miles

- + **SYMBOLS**
Carefully observe the instructions preceded by the following warning signs:

 Safety norms and regulations to protect the pilot, the mechanic and other people from severe injuries or grave risks.

 Indications to make the operations easier.
Technical information.

- * The operations preceded by this symbol must be repeated on the opposite side of the vehicle.

In this manual the various versions are indicated by the following symbols:

-  **OPT** optional
-  catalytic version
-  **UK** United Kingdom version
-  **A** Austria version
-  **CH** Switzerland version

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GENERAL INFORMATION

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GENERAL INFORMATION

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1.1 POSITION OF SERIAL NUMBERS

These numbers are necessary in order to register the vehicle.

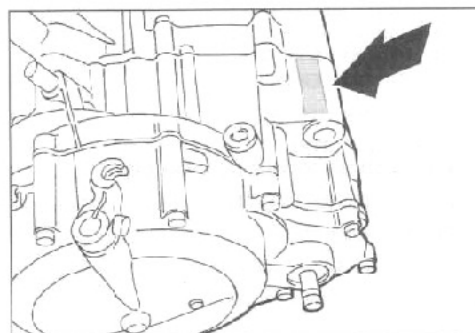
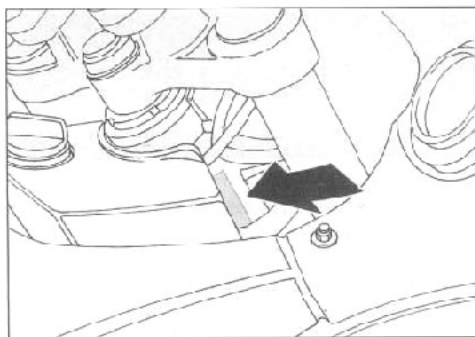
 Do not alter the identification numbers if you do not want to incur severe penal and administrative sanctions and to cause the immediate invalidation of the guarantee.

1.1.1 FRAME NUMBER

The frame number is printed on the vehicle right side of the steering tube.

1.1.2 ENGINE NUMBER

The engine number is printed high up on the rear part of the vehicle.



1.2 INSTRUCTIONS FOR USE OF FUEL, LUBRICANTS AND COOLANT

1.2.1 FUEL

 The fuel used for internal combustion engines is extremely inflammable and in certain conditions can become explosive.

It is advisable to perform the operations of refuelling and maintenance in a well-ventilated area with the engine switched off. Do not smoke while refuelling or when near fuel vapours and, in any case, avoid contact with naked flames, sparks and any other source of heat that might cause the fuel to catch fire or to explode. Avoid escape of fuel from the fuel filler as it could ignite on contact with the red-hot surfaces of the engine. In case fuel has accidentally been spilt, make sure that the area is completely dry before starting the vehicle.

Never fill the tank to the brim as fuel expands under the heat of the sun and reacts to the effects of sun radiation.

Close the cap securely after refuelling.


Avoid contact of the fuel with the skin and inhalation of the fumes; do not swallow fuel or pour it from one container into another by means of a tube.

Do not dispose of fuel in the environment.

KEEP FUEL AWAY FROM CHILDREN.

Normal version:


premium grade petrol (4 Stars ) according to the DIN 51 600 standard, min. O.N. 98 (N.O.R.M.) and 88 (N.O.M.M.).

Catalytic version :

unleaded petrol according to the DIN 51 607 standard, min. O.N. 95 (N.O.R.M.) and 85 (N.O.M.M.).



1.2.2 ENGINE OIL

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

It is advisable to wash your hands thoroughly after using.

Do not dispose of oil in the environment.

Deliver it to or have it collected by the nearest used oil recovery firm or by the supplier.

Check engine oil level every 500 km; see 2.12 (CHECKING THE ENGINE OIL LEVEL AND TOPPING UP).

Change engine oil after the first 1000 km and successively every 6000 km; see 2.13 (CHANGING ENGINE OIL AND OIL FILTER).

Recommended engine oil:


IF SUPERBIKE 4, SAE 5W - 40.

As an alternative to the recommended oil, high quality oils with performance conforming or superior to CCMC G-4, A.P.I.SG. specifications may be used.



GENERAL INFORMATION

1.2.3 FORK OIL

 Fork oil may cause serious damage to the skin if handled daily and for long periods. It is advisable to wash your hands thoroughly after using. Do not dispose of oil in the environment. Deliver it to or have it collected by the nearest used oil recovery firm or by the supplier.


Recommended fork oil: IP F.A. 5W or IP F.A. 20W fork oil.


If an intermediate performance is desired (between those of IP F.A. 5W and IP F.A. 20W) the products can be mixed as follows:

67% of volume SAE 10W IP F.A. 5W +
33% of volume IP F.A. 20W


33% of volume SAE 15W IP F.A. 5W +
67% of volume IP F.A. 20W

1.2.4 BRAKE FLUID


 This vehicle is provided with front and rear disc brakes, with separate hydraulic circuits. The following information refers to a single braking system, but is valid for both.

 Brake fluid may cause irritation if it comes into contact with the skin or eyes. Carefully wash the part of the body that has come into contact with the fluid. Consult an oculist or a physician if the fluid comes into contact with your eyes. Do not dispose of brake fluid in the environment.

KEEP BRAKE FLUID AWAY FROM CHILDREN


 Use the brake fluid; it may chemically alter painted surfaces and the parts in plastic, rubber, etc.


Recommended brake fluid:
IP F.F. DOT 5 (DOT 4 compatible)

 To avoid serious damage to the braking system, do not use fluids other than the recommended ones nor mix different fluids for topping up. Do not use brake fluid taken from old or already opened containers. Do not use brake fluid left from previous repairs if they were done some time ago. Sudden variations in clearance or an elastic resistance in the brake levers may be due to trouble in the hydraulic circuits. Make sure that the brake discs and the friction pads are completely free of grease or oil, especially after maintenance or checking operations. Check that the brake cables are not twisted or worn. Make sure that neither water nor dust accidentally enter the circuit.


In case maintenance operations are to be performed on the hydraulic circuit, it is advisable to use latex gloves.

1.2.5 COOLANT

 The coolant can be harmful if swallowed or if it touches the skin or eyes. If it comes in contact with the skin or eyes, rinse thoroughly with large quantities of water. If the coolant is swallowed, induce vomiting and immediately consult a doctor.

 Do not remove the radiator cap when the engine is hot as the coolant is under pressure and at a very high temperature.

KEEP COOLANT AWAY FROM CHILDREN.

 Do not use vehicle if the coolant level is below the minimum prescribed.

Check coolant level every 1000 km and after long runs, see 2.14 (CHECKING AND TOPPING UP COOLANT); change it every ~2000 km or every 2 years (whichever occurs first), see 2.15 (CHANGING THE COOLANT).

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

It is advisable to keep the same mixture in the hot season as well, since in this way losses due to evaporation are reduced and it is not necessary to top up so frequently. The mineral salt deposits left in the radiator by evaporated water are thus lessened and the efficiency of the cooling system remains unaltered.


If the outdoor temperature is below 0°, check the cooling circuit frequently and if necessary increase the antifreeze concentration (up to maximum 60%).


Use distilled water for the cooling solution so as not to damage the engine.

Recommended coolant: IP ECOBLU - 40°

On the basis of the desired freezing temperature of the coolant mixture, add to the water the percentage of coolant indicated in the following table:

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

 The characteristics of the various antifreeze liquids are different. Be sure to read the label on the product to learn the degree of protection it guarantees.

 Use only antifreeze and anticorrosive without nitrite in order to ensure protection at least -35°C.

1.3 RUNNING-IN RULES

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

If possible, drive on hilly roads or roads with many curves where the engine, the suspensions and the brakes are submitted to a more efficacious running-in.



Only after the first 1500 km of running-in is it possible to obtain the best performance.

Keep in mind these important indications:

- Do not open the throttle completely if the speed is low, both during and after the running-in.
- During the first 100 km put on the brakes with caution, avoiding sharp and prolonged brakings. This ensures a correct bedding-in of the pads on the brake disc.
- Do not open the throttle at low speeds, both during and after running-in.
- Brake cautiously during the first 100 km, avoiding abrupt and prolonged braking to ensure a correct adaptation of the brake disc pads.
- Do not exceed 4000 rpm during the first 500 km (see table).
- Do not exceed 5000 rpm between the first 500 and 1000 km (see table).



After the first 1000 km perform the checking operations indicated in the "after running-in" column, see 2.1.1 (PERIODIC SERVICE

CHART FOR THE COMPONENTS) in order to avoid injuring yourself or others a/o damaging the vehicle.

- Between the first 1000 and 2000 km increase and vary your speed, using the maximum acceleration only briefly to ensure better coupling of the components subject to wear.
NEVER exceed 5500 rpm (see table).
- After the first 2000 km you may expect better performance from the engine without, however, exceeding a maximum 6250 rpm.

Engine maximum rpm for the running-in	
Mileage km	Max. rpm
0 - 500	4000
500 - 1000	5000
1000 - 2000	5500
over 2000	6250

1.4 PRECAUTIONS AND GENERAL INFORMATION

Follow with care these recommendations when repairing, disassembling and reassembling the vehicle.



The use of naked flames is forbidden for any type of operation.

Before commencing any service or inspection operation on the vehicle, switch off the engine and remove the key, wait until the engine and the exhaust system have cooled down and, if possible, raise the vehicle with the suitable equipment onto firm flat ground.

In order to avoid burns, be careful not to touch any parts of engine or exhaust system which have not cooled down completely.

The vehicle is constructed of inedible parts.

Do not bite, suck, chew or swallow any part of the vehicle for any reason whatever.

If not expressly described, the reassembly of the units is carried out by reversing the order of operations. Do not run the engine in closed or badly ventilated places.

Handle fuel with the greatest caution.

Never use fuel as a solvent for cleaning the vehicle.

Disconnect the negative cable (-) from the battery when electric welding.

When two or more persons are working together, make sure that each is working in safe conditions.

- Use only original **aprilia** SPARE PARTS.
- Use the recommended lubricants.
- Use, when necessary, the special tools designed for this vehicle.
- Always use the centre stand, if the vehicle is provided with it.
- In order to carry out certain interventions we recommend using a stand to hold the vehicle in a vertical position.
- When tightening screws and nuts, begin with those having greater diameters or with inner ones, proceeding diagonally.
Tighten screws or nuts in successive passages before applying driving torque.
- Clean and wash carefully any disassembled parts with low inflammability detergents.
- Whenever possible, lubricate the parts before reassembly.
- Make sure that each component has been reassembled correctly.
- Always replace gaskets, grommets, circlips, O-rings and split pins with new ones.
- Before disconnecting the joints (pipes, cables, etc.), mark the positions on all of them and mark them with different distinguishing signs.
Each piece must be marked clearly, in order not to have problems during installation.

The bearings must rotate freely, without halting a/o noise otherwise they must be replaced.



Never re-use a circlip.

When a circlip is disassembled from a shaft 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 put it on the shaft.

After installing a circlip, make sure that it is completely and firmly inserted in its seat.

1.5 SPARE PARTS

For any replacement, use **aprilia** Genuine Spare Parts only. **aprilia** Genuine Spare Parts are high-quality parts, expressly designed and manufactured for **aprilia** vehicles.




Failure to use **aprilia** Genuine Spare Parts may result in incorrect performance and damages.

1.6 TECHNICAL SPECIFICATIONS

DIMENSIONI / DIMENSIONES / DIMENSIONS	
Max. length	2218 mm
Max. width	880 mm
Max. height (height of instruments)	1265 mm
Saddle height	840 mm
Distance between centres	1480 mm
Min. ground clearance	200 mm
Weight without driver (ready for starting)	200 kg
MOTORE / MOTOR / ENGINE	
Type	ROTAX 655- single-cylinder, 4-stroke with 5 valves, dry-sump lubrication
Number of cylinders	1
Displacement	651,88 cm ³
Bore and stroke	100 mm / 83 mm
Compression ratio	9 ± 0,5 : 1
Starting	electric
Idling engine	1400 ± 100 rpm
Clutch	Multiple disc in oil bath with control lever on left side of handlebar
Change gear	Mechanical gearshift, 5 gears with foot lever on left side of engine
Cooling	liquid-cooled
CAPACITY	
Fuel (reserve included)	22 l
Fuel reserve	4 l
Engine oil	2200 cm ³ (2150 cm ³ oil change - 2200 cm ³ oil and filter change)
Fork oil (right fork tube and left fork tube)	430 cm ³
Coolant	1,1 l
Seats	2
VEHICLE MAX. LOAD (driver + passenger + luggage)	182 kg

GENERAL INFORMATION

TRANSMISSION					
GEAR RATIOS	Gear	Primary transmission	Secondary transmission	Final gear ratio	Total gear ratio
	1 ^a	37/72 = 1 : 1,946	12/33 = 1 : 2,750	16/47 = 1 : 2,937	15,720
	2 ^a		16/28 = 1 : 1,750		10,003
	3 ^a		16/21 = 1 : 1,312		7,502
	4 ^a		22/33 = 1 : 1,045		5,976
	5 ^a		24/21 = 1 : 0,875		5,001
CARBURETTORS					
Modello / Modelo / Model			Mikuni BST 33		
			Ø 31.5mm		
FUEL SUPPLY					
Type			gravity feed		
Fuel normal version			premium grade petrol (4 Stars  DIN 51 600, O.N. 98 (N.C.R.M.) and 88		
			premium grade unleaded petrol DIN 51 607 /min, O.N. 95 (N.C.R.M.) and 85		
FRAME					
Type			Composite structure made of steel and light alloy, with removable cradle and saddle pillar.		
Steering inclination angle			28°		
Fore stroke			109 mm		
SUSPENSIONS					
Front			hydraulically operated telescopic fork		
Stroke			180 mm		
Rear			hydraulic shock absorber		
Stroke			49 mm		
BRAKES					
Front			disc brake, 300 mm with hydraulic transmission		
Rear			disc brake, 220 mm with hydraulic transmission		
WHEELS					
Type			Aluminium tangent spoke wheels		
RIMS					
Front			2,15 x 19"		
Rear			3,00 x 17"		
TYRES					
Front			100/90 - 19 57H		
Rear			130/80 - R17 65H		
STANDARD INFLATION PRESSURE					
Front			180 kPa (1,8 bar)		
Rear			190 kPa (1,9 bar)		
INFLATION PRES. WITH PASSENGER					
Front			180 kPa (1,8 bar)		
Rear			220 kPa (2,2 bar)		



GENERAL INFORMATION

IGNITION	
Type	C.D.I. (capacitive discharge) / NIPPONDENSO
Standard spark plug	NGK DR 8 EA - NGK DR 8 ES
Spark plug gap	0,6 ÷ 0,7 mm
ELECTRIC SYSTEM	
Battery	12 V - 12 Ah
Fuses	20 - 15 - 7,5 A
Generator (with permanent magnet)	12 V - 280 W
BULBS	
Low/high beam	12 V - 55 / 60 W
High beam	12 V - 3 W
Parking light	12 V - 5 W
Direction indicators	12 V - 10 W
Rear parking and stop light	12 V - 5/21 W
Plate light	12 V 3 W
Speedometer	12 V - 3 W
Revolution counter	12 V - 2 W
Coolant temperature indicator	12 V - 1,2 W
WARNING LIGHTS	
Direction indicators	12 V - 3 W
Low fuel	12 V - 3 W
Engine oil pressure	12 V - 2 W
Gear in neutral	12 V - 3 W
High beam	12 V - 2 W
Low beam	12 V - 3 W

1.7 LUBRICANT CHART



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 CCMC G-4, A.P.I. SG specifications.

Fork oil (recommended): fork oil  F.A. 5W or  F.A. 20 W.

If you need an oil with intermediate characteristics in comparison with the two recommended products, 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):  AUTOGREASE MP.

As an alternative to the recommended product, use high-quality grease for rolling bearings, working temperature range -30°C...+140°C, dripping point 150°C...230°C, 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 with DOT 4).



Use new brake fluid only.

Engine coolant (recommended):  ECOBLU -40°C.



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

Engine oil (recommended):  SUPERBIKE 4, SAE 5W-40.

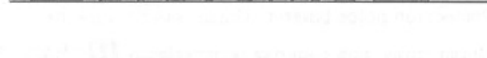
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SAE 15W  F.A. 5W 33% of the volume, +  F.A. 20W 67% of the volume.



1. The first step in the process of identifying a problem is to define the problem clearly. This involves identifying the symptoms of the problem and determining the scope of the problem. Once the problem is defined, the next step is to identify the causes of the problem. This involves identifying the factors that are contributing to the problem and determining the underlying causes of the problem. Once the causes are identified, the next step is to develop a plan to address the problem. This involves identifying the actions that need to be taken to address the problem and determining the resources that are needed to implement the plan. Once the plan is developed, the next step is to implement the plan. This involves taking the actions that are outlined in the plan and monitoring the progress of the plan. Finally, the last step in the process is to evaluate the results of the plan. This involves determining whether the plan has been successful in addressing the problem and identifying any lessons learned from the process.

**PERIODIC SERVICE
AND SETTING UP OPERATIONS**

**PERIODIC SERVICE
AND SETTING UP OPERATIONS**

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This section describes the procedures for periodic service on the principal components of the vehicle.



Before beginning any service operations or inspection of the vehicle, switch off the engine and remove the key, wait until the engine and the exhaust system have cooled down and, if possible, lift the vehicles with the proper equipment onto firm and flat ground.

In order to avoid burns, be careful not to touch any parts of the engine or exhaust system which have not cooled down completely. The vehicle is constructed of non-edible parts.

Do not bite, suck, chew or low any part of the vehicle for any reason whatever.



If not expressly described otherwise, reassembly of the units is carried out repeating the disassembly operations in the reverse order.



Remember:

1 mile = 1.6 km

1 km = 0.625 miles

2.1 PERIODIC SERVICE PLAN

aprilia recommends respecting the intervals indicated for the periodic service on the various components in order to ensure the best operating conditions of the vehicle.

PERIODIC SERVICE AND SETTING UP OPERATIONS

2.1.1 PERIODIC SERVICE CHART FOR THE COMPONENTS

SERVICE	After running-in (1000 km or 4 months)	Every 6000 km or 6 months	Every 12000 km or 16 months
Battery - liquid level	C	C	
Spark plug		C	S
Carburettors	C	P	
Driving chain	500 km: C		
Timing chain		C	
Suspension linkage bearings	every 20000 km: C		
Wheel tuning		C	
Steering bearings and steering	C	C	
Wheel bearings		C	
Air cleaner		C	S*
Engine oil filter (on the frame)	S	S	
Engine oil filter	S	S	
Clutch clearance	R	R	
Throttle clearance	C	R	
Braking system	C	C	
Cooling system	C	C	
Lighting system	C	C	
Brake fluid	C	every year: S	
Coolant	every 1000 km: C		every 2 year: S
Fork oil			S
Engine oil	S	500 km: C / 6000 km: S	
Tyre pressure	R	every month: R	
Engine idling rpm	R	R	
Fuel cock	C	C	
Tightening bolts and nuts	C	C	
Suspensions and position	C		C
Brake fluid bleeding	C		
Spoke tension	C	C	
Tubi carburante / Tubos del combustible / Fuel pipes		C	every 4 year: S
C = check and clean, adjust, lubricate or change, if necessary.			
P = clean S = change R = adjust			
Carry out service operations more frequently if the vehicle is used in rainy, dusty areas or on uneven roads.			

2.2 POINTS TO LUBRICATE

Correct lubrication is important for a good performance and long life of the vehicle.



Before lubricating, completely clean all parts, removing rust, grease, dirt and dust. The exposed parts subject to rust are to be lubricated with engine oil or grease. See 1.7 (LUBRICANT CHART).

The points to be lubricated are indicated in the "LUBRICATION CHART"

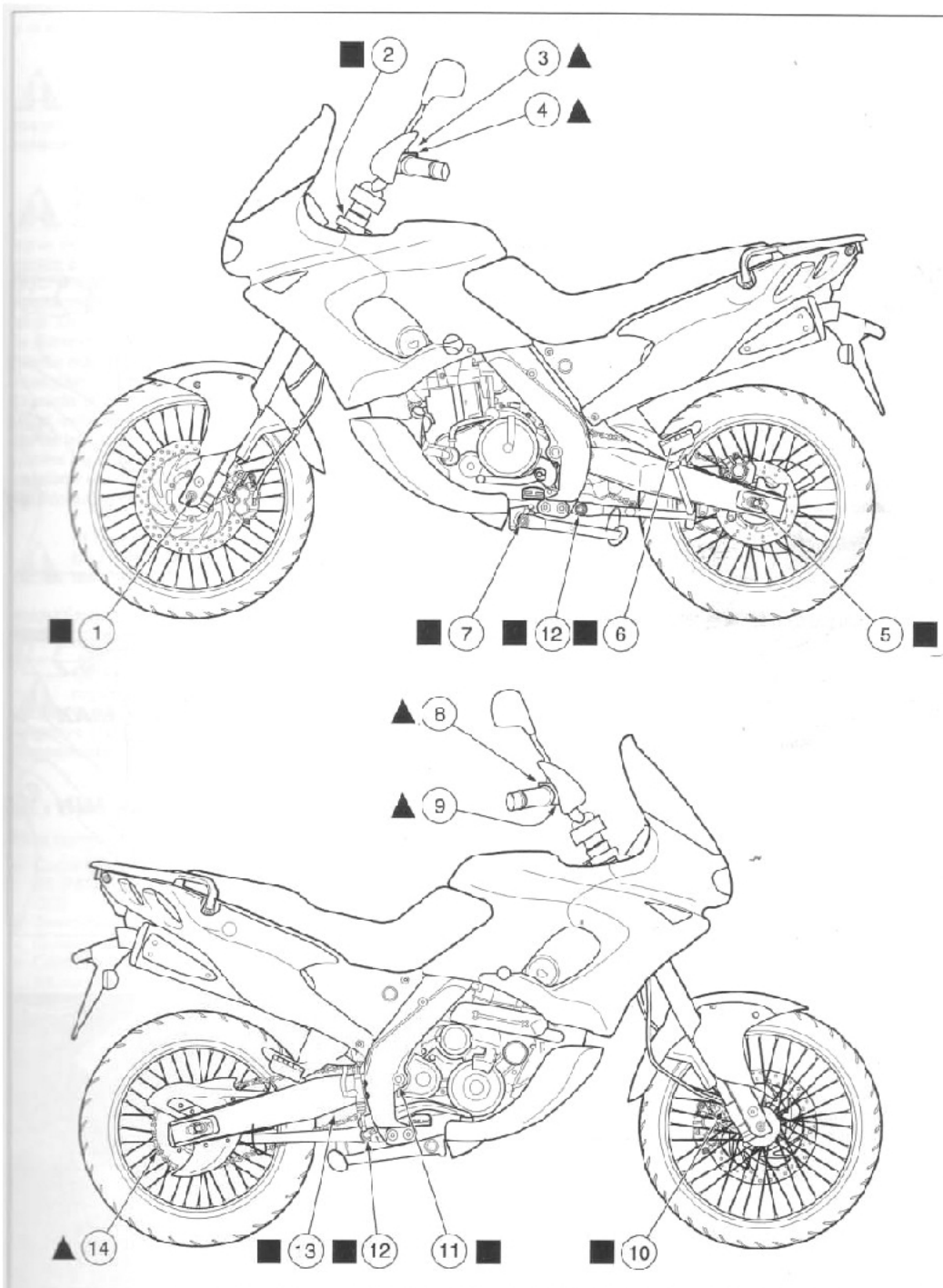
LUBRICATION CHART KEY

- 1) Front wheel pin and bearings
- 2) Steering bearings
- 3) Clutch lever pin /clutch cable
- 4) Lever cable for cold starting
- 5) Rear wheel pin and bearings
- 6) Passenger footrest pin
- 7) Side stand pin
- 8) Accelerator control handgrip
- 9) Accelerator cables
- 10) Speedometer/total kilometres
odometer transmission
- 11) Rear fork pin
- 12) Centre stand fulcrum screws **2pt**
(n. 2 lubricators)
- 13) Rear suspension leverage
- 14) Driving chain

PERIODIC SERVICE AND SETTING UP OPERATIONS

LUBRICATION CHART

■ = Grease
▲ = Oil



2.3 BATTERY

Carefully read 1.4 (PRECAUTIONS AND GENERAL INFORMATION).

Check the electrolyte level and the tightening of the terminals after the first 1000 km (or 4 months) and then every 6000 km (or 8 months).



The electrolyte in the battery is toxic and caustic and may cause burns on contact with the skin as it contains sulphuric acid. Wear protective clothing, a face mask and/or goggles during service operations.



If electrolyte liquid comes in contact with the skin, wash with large quantities of running water. In case of contact with the eyes, wash with large quantities of water for fifteen minutes and consult an oculist without delay.

If the liquid is accidentally swallowed, drink large amounts of water or milk, then continue drinking milk of magnesia or vegetable oil and promptly call a doctor. The battery gives off explosive gases, particularly during the phase of starting and/or recharging; keep it away from flames, sparks, cigarettes and any other source of heat.

During recharging or using, make sure the room is properly ventilated and avoid inhaling the gases released during recharging. Never invert the connection of the battery cables.



The battery fluid which is very corrosive. Do not pour or spill it, especially on the plastic parts.

KEEP AWAY FROM CHILDREN.



Connect and disconnect the battery with the ignition switch in position "0". Connect first the positive cable (+) and then the negative cable (-). Disconnect following the reverse order.

2.3.1 CHECKING THE ELECTROLYTE LEVEL

To check the electrolyte level:

- Remove the left side, see 7.1.4 (REMOVING THE RIGHT AND LEFT SIDES).
- Unscrew and remove the screw (1).
- Remove the battery cover (2).
- Make sure that the fluid level is included between the two "MIN" and "MAX" notches stamped on the battery side.

Otherwise:

- Remove the element plugs.

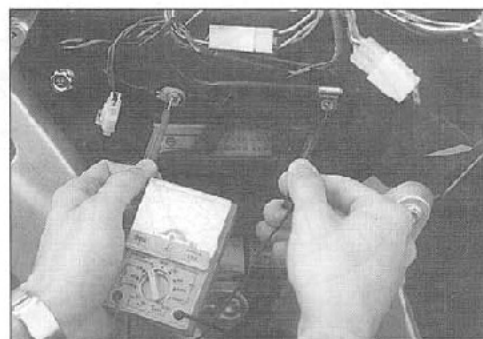
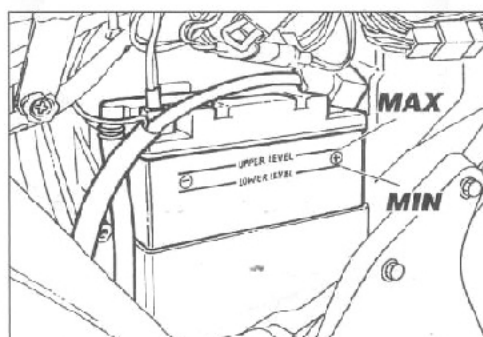
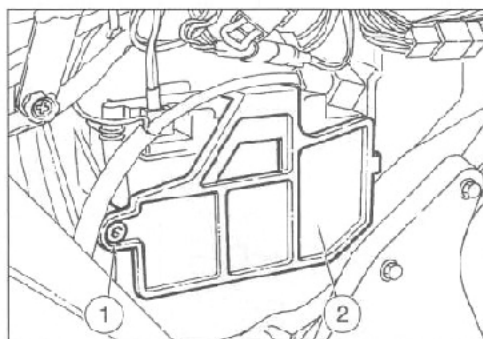


Never exceed the "MAX" notch, since the level increases during the recharge.

- Top up by adding distilled water only.



Check battery voltage with a portable tester. If voltage is less than 12V, the battery must be recharged.



2.3.2 RECHARGING THE BATTERY

Check the electrolyte level, if necessary top up, then:

- ♦ Make sure that the ignition switch is in position "0".
- ♦ Disconnect, in order, the negative (-) and positive (+) cable.



Upon reassembly, connect first the positive cable (+) and then the negative cable (-).

- ♦ Remove the battery breather pipe.



Upon reassembly, always connect the battery breather pipe, to prevent the sulphuric acid vapours from corroding the electric system, painted parts, rubber elements or gaskets when they exit the breather pipe itself.

- ♦ Extract the battery from its container and put it in a cool and dry place.
- ♦ Remove the element plugs.
- ♦ Connect the battery with a battery charger.
- ♦ A recharge with an amperage equal to 1/10th of the battery capacity is recommended.
- ♦ After the recharging operation, check the electrolyte level again and if necessary top up with distilled water.



2.3.3 LONG INACTIVITY OF THE BATTERY

If the vehicle remains unused for long periods, remove the battery and recharge it completely, using a trickle charge.

Keep the battery in a cool, dry place. If the battery remains on the vehicle, disconnect the cables from the terminals.

During the winter months or whenever the vehicle is not in use, it is important to check the charge (about once a month) in order to prevent deterioration of the battery.

For maintenance of the battery refer to chapter 6.9.2 (MAINTENANCE).

2.4 EXHAUST MANIFOLD NUTS

Read 1.4 carefully (PRECAUTIONS AND GENERAL INFORMATION).

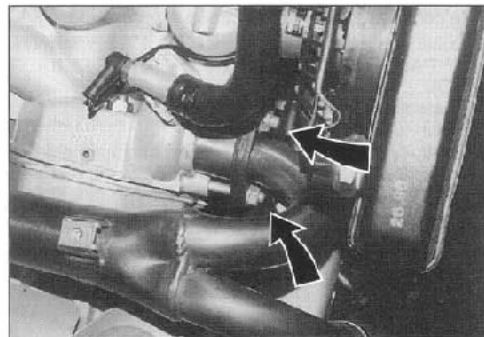
Tighten nuts after the first 1000 km (or 4 months) and then after every 6000 km (or 3 months).



Allow the engine to cool down until it reaches room temperature.

- ♦ Remove the front fairing, see 7.1.14 (REMOVING THE FRONT FAIRING).
- ♦ ★ Tighten the exhaust manifold nuts (see figure) to the prescribed torque.

Driving torque: 25 Nm (2.5 kgm)



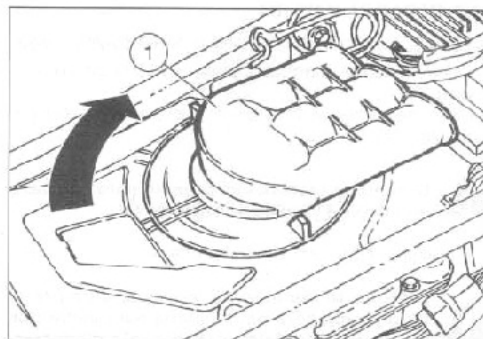
2.5 AIR CLEANER

Read 1.4 carefully (PRECAUTIONS AND GENERAL INFORMATION).

Clean every 6000 km. Replace every 12000 km.

! The partial cleaning of the filter does not exclude or postpone the replacement of the filter itself. Do not start the engine if the air cleaner has been removed.

Do not use petrol or solvents to clean the filtering element; they may cause a fire in the fuel system, with serious risks for people and for the vehicle itself.



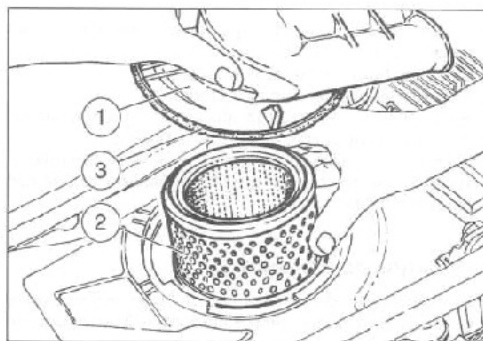
REMOVAL

- Remove the saddle, see 7.1.3 (REMOVING THE SADDLE).
- Rotate the air conveyor (1) clockwise, raise and remove it.
- Extract the air cleaner (2).

Partial cleaning

! Do not press or strike the metal net of the air cleaner.
Do not use screwdrivers or alike.

- Seize the air cleaner vertically and strike it more than once on a clean surface.
- If necessary, clean the filter with a compressed air jet (directing 1 from the inside towards the outside of the filter).
- Clean the outer part of the air cleaner with a cloth.



Changing

- Replace the air cleaner with a new one of the same type.
- Make sure that the gasket (3) is intact; if it is damaged, change it.
- Every 6000 km, remove the plug (4), so that any impurity that may have accumulated inside the filter case can be discharged.

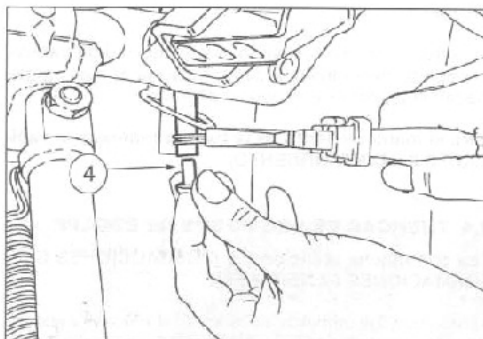
! During above cleaning operations, check to see that there are no tears or rips in the filtering element. Otherwise replace it.

Make sure that the filtering element is correctly positioned so as not to allow passage of non-filtered air. Remember that premature wear and tear on the segments of the piston or the cylinder is often caused by a defective and badly positioned filtering element.

If the vehicle is used in dusty areas, clean the filtering element more frequently.

Using the vehicle without the filtering element, or with the element damaged, considerably increases wear and tear on the engine.

Make sure the filtering element is always in perfect condition: the life of the engine depends, for the most part, on this component.



2.6 SPARK PLUG

Read 1.4 carefully (PRECAUTIONS AND GENERAL INFORMATION).

Check every 6000 km and replace every 12000 km.

For removing and cleaning:



Allow the engine to cool down until it reaches room temperature.

- ♦ Remove the fuel tank, see 7.1.1 (REMOVING THE FUEL TANK).



Never disconnect the spark plug cap with the engine running, since you may get an electric shock from the ignition system.

- ♦ Take off the spark plug cap (1).
- ♦ Remove every trace of dirt from the base of the spark plug.
- ♦ Unscrew the spark plug (spanner to be found in tool kit) and extract it from its seat, taking care that no dust or other substances enter the cylinder.
- ♦ Make sure there are no carbon deposits or corrosion marks on the electrode or the central porcelain part. If necessary, clean them with the special spark plug cleaner, with an iron wire and/or metal brush. Blow a jet of air into the spark plug to prevent any residual material from entering the engine. The spark plug must be replaced if it shows cracks on the insulating material, corroded electrodes or excessive deposits.
- ♦ Check the spark plug gap with a thickness gauge; it should be 0.6 ± 0.7 mm (see figure). Adjust it, if necessary, carefully bending the earth electrode. Make sure the washer is in good condition.
- ♦ With the washer in place, screw the spark plug completely by hand so as not to damage the thread.
- ♦ Tighten the spark plug with the special spanner, giving it half a turn to compress the washer.

Spark plug driving torque: 20 Nm (2 kgm).

- ♦ Put back the spark plug cap.



The spark plug must be tightened well otherwise the engine could overheat and be seriously damaged. Use the recommended type of spark plug only so as not to endanger the performance and life of the engine.

When changing the spark plug we recommend using the standard type, see 1.6 (TECHNICAL SPECIFICATIONS). Remove the spark plug and check the insulator.

The heat rating is correct if both the insulators are coloured light brown. If the insulators are seen to be blackened from carbon deposits, use spark plugs with a hotter heat rating.

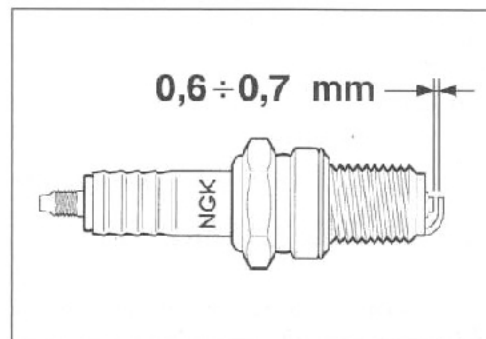
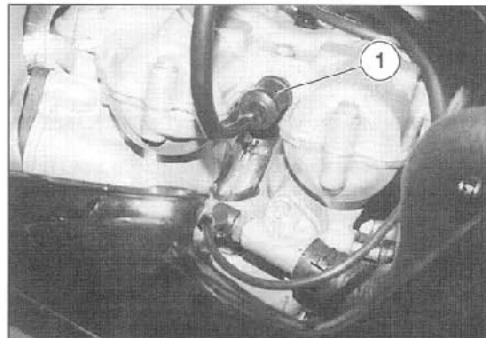
If the insulator is white, replace the spark plug with one with a colder heat rating.

Spark plugs with a cold heat rating are used for high speed driving.

They are designed to cool sufficiently and to prevent overheating and are called "cold" spark plugs.



When replacing a spark plug, check the pitch and length of the thread. If the threaded part is too short, carbon deposits will settle on the thread seat and may result in damage to the engine when the correct one is positioned back in place.



2.7 CARBURETTORS

Check the carburettor after the first 1000 km (or 4 months) and then after every 6000 km (or 8 months).

For further information, see 4.5 (CARBURETTORS).



2.8 FUEL TUBING

Check every 6000 km (or 8 months).
Replace every 4 years.

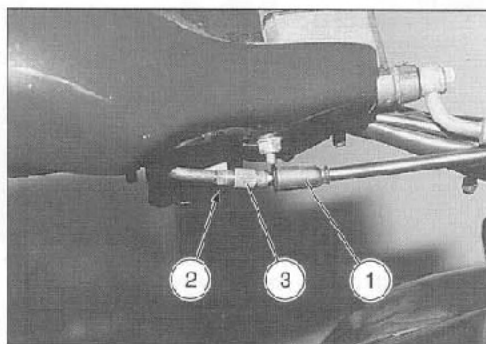
For further information see 4.0 (FUEL SUPPLY SYSTEM).

2.9 ACCELERATOR CABLE

2.9.1 ADJUSTING THE ACCELERATOR CONTROL

The idle stroke of the accelerator control handgrip should be 2 to 3 mm, measured on the edge of the handgrip itself. If this is not confirmed, proceed as follows:

- ✦ Position the vehicle on stand.
- ✦ Remove the protection guard (1)
- ✦ Loosen the lock nut (2)
- ✦ Rotate the adjuster (3) so as to return to the prescribed value.
- ✦ After this adjustment, tighten the lock nut (2) and check the idle stroke again.
- ✦ Put the protection guard in place again (1)



! After completing the adjustment, check that the rotation of the handlebar does not modify the idling rpm of the engine and that the accelerator handgrip returns smoothly and automatically into a rest position when released.

2.9.2 ADJUSTMENT OF IDLING RPM

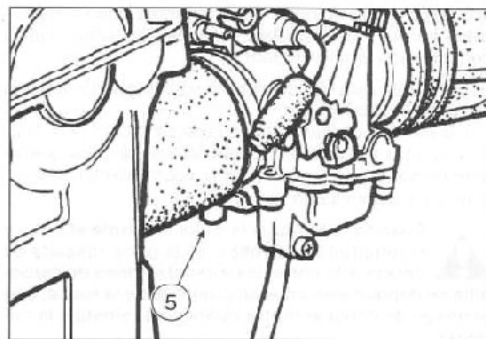
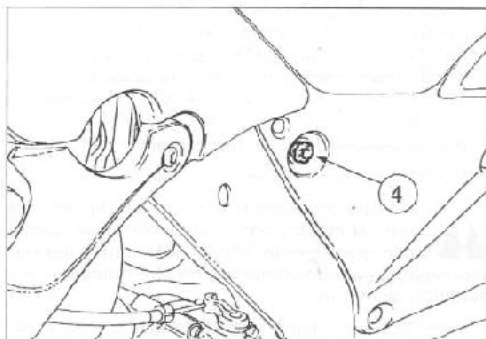
Adjust the idling every time it is irregular.

To carry out this operation, proceed as follows:

- ✦ Ride for a few miles until reaching the normal running temperature.
- ✦ Keep the vehicle in vertical position.
- ✦ Check the engine idling rpm on the revolution counter. The engine idling speed must be about 1400 ± 100 rpm.

If necessary:

- ✦ Adjust the knob (1) positioned on the left side of the vehicle.
By **SCREWING IT** (clockwise), you increase the engine rpm.
By **UNSCREWING IT** (anticlockwise), you decrease the engine rpm.
- ✦ Twist the throttle grip, accelerating and decelerating a few times to make sure that it functions correctly and to check if the idling speed is constant.
- ✦ ★ If necessary, adjust the air screw (5) by means of the apposite 90° screwdriver, see 1.8 (SPECIAL TOOLS).



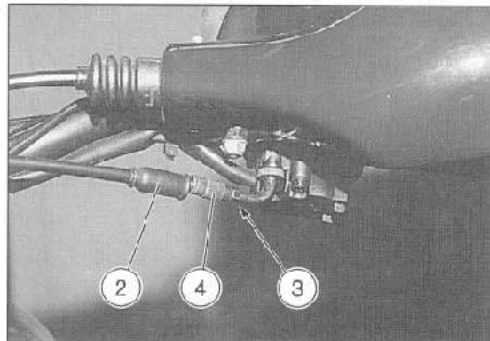
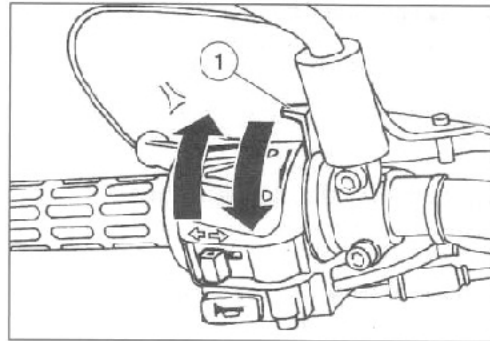
2.10 COLD START CABLE

The cold start cable must be adjusted so that the hand lever (1) has an idle stroke of **2-3 mm**. If adjustment is necessary, proceed as follows:

- Position vehicle on stand.
- Remove the protection guard (2).
- Loosen the lock nut (3).
- Rotate the adjuster (4) in one of the two directions to obtain the prescribed idle stroke.
- After this adjustment, tighten the lock nut (3) and check the hand lever play once more.
- Put the protection guard (2) in place again.



On completion of adjustment check that the rotation of the handlebar does not influence the engine rpm.



2.11 CLUTCH CABLE

Adjust after first 1000 km and then after every 6000 km.

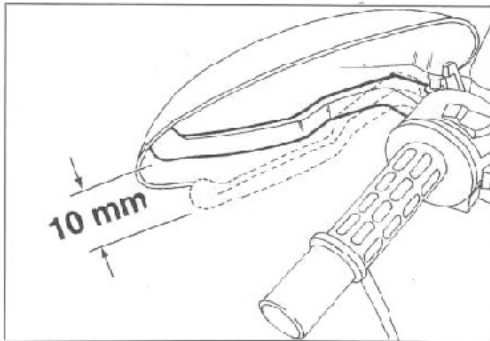
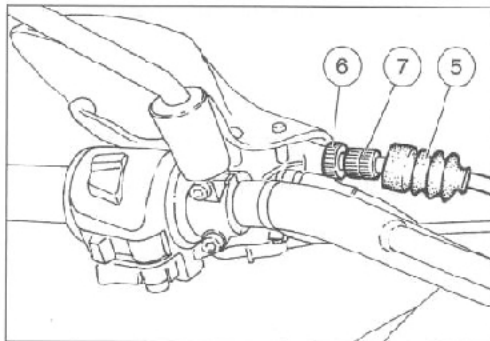
Adjustment of the clutch should be done when the engine stops or the vehicle tends to move ahead (with the clutch lever pulled and gear engaged) or else the clutch slips, causing a delay in acceleration in respect of the engine rpm.

To adjust the clutch, proceed as follows:

- Position the vehicle on stand.
- Remove the protection guard (5).
- Loosen the lock nut (6).
- Rotate the adjuster (7) until the idle stroke of the clutch lever is ca. **10 mm**.
- Tighten the lock nut (6) and check the adjustment again.
- Put the protection guard in place again (5).
- Switch on the engine and engage the 1st gear, making sure that the engine does not stop or that the vehicle does not tend to move ahead or the clutch slip during the phase of acceleration or during a run.



Make sure the clutch cable is sound: it should not have flattened parts and the sheath should not be worn at any place along the entire length.




2.12 CHECKING THE ENGINE OIL LEVEL AND TOPPING UP


Read carefully 1.2.2 (ENGINE OIL) and 1.4 (PRECAUTIONS AND GENERAL INFORMATION).

Check oil every 500 km.

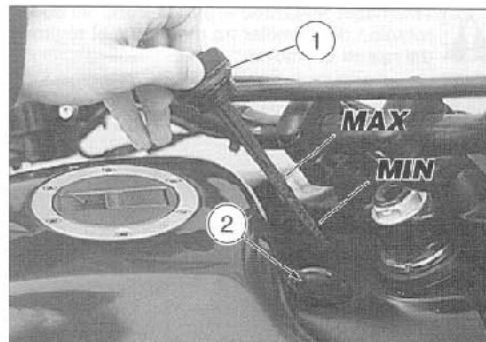
- ✦ Switch off engine and let it to cool down for at least ten minutes, thus allowing the oil to flow back into the oil pan and cool down.
- ✦ Switch on engine again and let it idle for at least one minute in order to fill the oil tank.
- ✦ Switch off the engine.
- ✦ Keep vehicle in a vertical position, with both wheels resting on the ground.

 If you fail to carry out the above operations you will risk making an incorrect measurement of the oil level.

- ✦ Unscrew and take out the plug/dipstick (1)
- ✦ Clean the part in contact with the oil with a clean cloth.
- ✦ Insert plug/dipstick completely into inlet hole (2) without screwing it.
- ✦ Take out plug/dipstick again (1) and read the oil level:
MAX = maximum level.
MIN = minimum level.
 The difference between "MAX" and "MIN" is circa 300 cm³.
- ✦ The level is correct if oil approximately reaches the "MAX" mark on the dipstick.

 Do not exceed the "MAX" mark nor allow oil to go below the "MIN" mark in order to avoid serious damage to the engine.

- ✦ If necessary, top up the engine oil tank through the inlet hole (2) after removing the plug/dipstick (1).



2.13 CHANGING ENGINE OIL AND OIL FILTER

Read carefully 1.2.2 (ENGINE OIL) and 1.4 (PRECAUTIONS AND GENERAL INFORMATION).

Change it after the first 1000 km (or 4 months) and successively every 6000 km (or 12 months).



We recommend changing the oil more frequently if vehicle is used in dusty areas.

After a long period of use, engine oil deteriorates and hastens the wear of sliding or connecting surfaces. Change engine oil periodically, proceeding as follows:

- ✦ Switch off engine and let it cool down for at least 10 minutes, thus allowing the oil to flow back into the oil pan and cool down.
- ✦ Start the engine and let it idle for a few minutes to facilitate the flow of oil into the oil pan during the successive phase of draining.



Position the vehicle on firm and flat ground.

- ✦ Keep vehicle in a vertical position with the two wheels resting on the ground.



When warmed up, the engine contains very hot oil; pay particular attention not to be burnt during the course of the following operations.

- ✦ Unscrew and extract the plug/dipstick (1).
- ✦ Remove the oil pan, see 7.1.9 (REMOVING THE OIL PAN GUARD).
- ✦ Put a container (2) with at least 2500 cm³ capacity in correspondence with the drain plug (3) on the frame.
- ✦ Unscrew and remove the drain plug (3) positioned on the frame.
- ✦ Drain the oil and let it drip into the container (2) for a few minutes.
- ✦ Check and if necessary change the sealing washer of the drain plug (3) positioned on the frame.
- ✦ Screw and tighten the drain plug (3) positioned on the frame.

Driving torque of the drain plug (3) positioned on the frame: 27 Nm (2.7 kgm).

- ✦ Move the container (2) and position it under the engine base, in correspondence with the drain plug positioned on the engine (4).
- ✦ Unscrew and remove the drain plug positioned on the engine (4).
- ✦ Drain the oil and let it drip inside the container (4) for a few minutes.

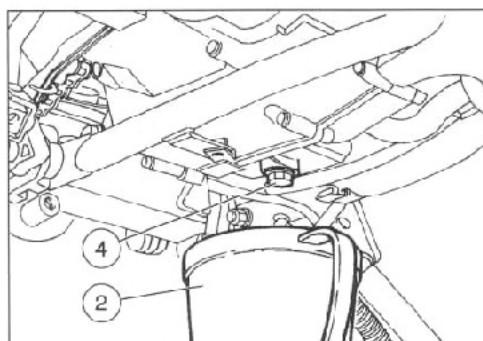
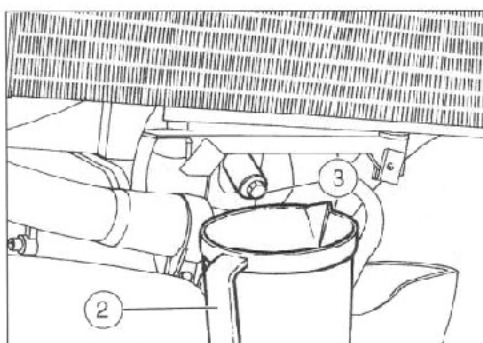
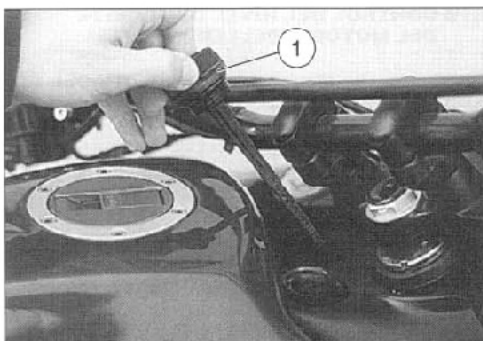
DO NOT DISPOSE OF ENGINE OIL IN THE ENVIRONMENT.

- ✦ Remove the metal residues from the drain plug (4) magnet.
- ✦ Check and if necessary replace the sealing washer of the drain plug (4).


Change the sealing washer of the drain plug (4) every 12000 km (or every second engine oil change).

- ✦ Screw and tighten the drain plug (4).

Driving torque of the drain plug (4) positioned on the engine: 40 Nm (4 kgm).



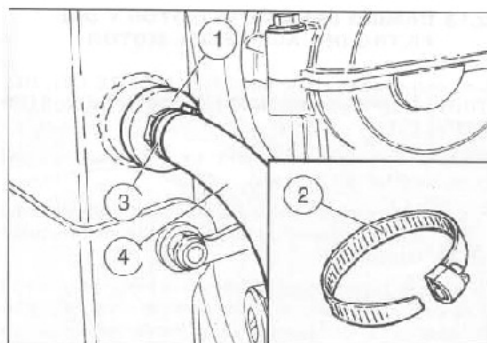
Clean the engine oil filter positioned on the frame (1) every 12000 km (or every second engine oil change).

 Prepare a pipe clamp (2) to replace the original one (special type).

- ✦ Loosen the clamp (3) and disconnect the pipe (4).
- ✦ Unscrew and remove the engine oil filter positioned on the frame (1) and clean it with a compressed air jet.
- ✦ Check the seal of the engine oil filter positioned on the frame (1), screw and tighten it.

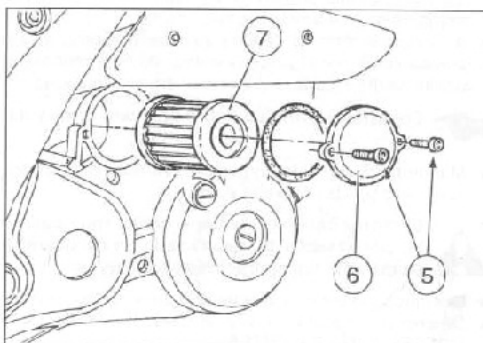
Driving torque of the engine oil filter (1) positioned on the frame: 35 Nm (3.5 kgm).

- ✦ Connect the pipe (4) and tighten the new clamp (2).





Change the engine oil filter (7) after the first 1000 km and successively every 6000 km (or every time you change the oil).

- ✦ Unscrew the two screws (5) and remove the cover (6).
- ✦ Remove the engine oil filter (7).
- ✦ Spread an oil film on the sealing ring of the new engine oil filter.
- ✦ Fit the new engine oil filter.
- ✦ Put back the cover (6), screw and tighten the two screws (5).
- ✦ Pour about 1600 cm³ of engine oil through the filling opening (9), see 1.7 (LUBRICANT CHART).
- ✦ Tighten the plug/dipstick (8).
- ✦ Start the engine and let it idle for about one minute, in order to ensure the filling up of the engine oil circuit.
- ✦ Unscrew and extract the plug/dipstick (8).
- ✦ Pour other 800 cm³ of oil through the filling opening (9).
- ✦ Check the oil level, see 2.12 (CHECKING THE ENGINE OIL LEVEL AND TOPPING UP).

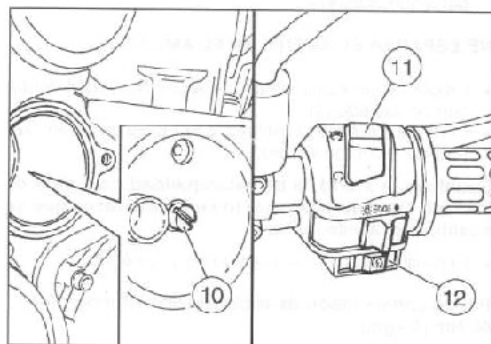
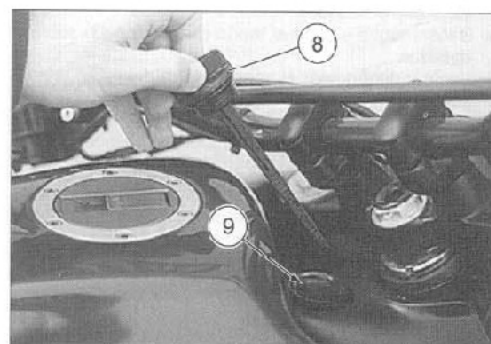


2.13.1 AIR BLEEDING FROM OIL DELIVERY PUMP

 The bleeding of air must always be carried out when the oil has been completely discharged from both tank and engine (engine overhaul).

 The following operations are to be performed during the phases of changing oil after removing the oil filter on the engine and before attaching the new one.

- ✦ Unscrew and remove the small valve (10) located on the bottom of the engine oil filter housing.
- ✦ Position the ignition switch on "O".
- ✦ Position the engine stop switch on "OFF" (11).
- ✦ Press the starter button "P" (12) and run the starter until oil begins to escape from the seat of the small valve (10) (a few seconds are sufficient).
- ✦ Insert and completely screw the valve (10).



2.14 CHECKING AND TOPPING UP COOLANT

Read carefully 1.2.5 (COOLANT) and 1.4 (PRECAUTIONS AND GENERAL INFORMATION).

Check every 1000 km.



Do not remove the expansion tank cap when the engine is hot, since the coolant is under pressure and its temperature is high.



Check the coolant level and top up the expansion tank with cold engine.

- ♦ Stop the engine and wait until it has cooled down.

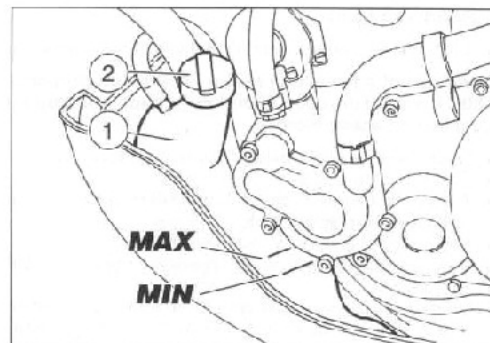


Position the vehicle on firm and flat ground.

- ♦ Keep the vehicle in vertical position, with the two wheels resting on the ground.
- ♦ Make sure that the level of the fluid contained in the expansion tank (1) is included between the "MIN" and "MAX" marks (see figure).
- ♦ If not, unscrew and remove the filling plug (2).
- ♦ Top up until the fluid reaches approx. the "MAX" mark. Do not exceed this level, otherwise the fluid will flow out of the tank when the engine is running.
- ♦ Put back the filling plug (2).



In case of excessive consumption of coolant and in case the tank (1) remains empty, make sure that there are no leaks in the circuit.



2.15 CHANGING THE COOLANT

Read carefully 1.2.5 (COOLANT) and 1.4 (PRECAUTIONS AND GENERAL INFORMATION).

Replace the coolant every 2 years.



Allow the engine to cool down to room temperature.

- Remove the oil pan, see 7.1.9 (REMOVING THE OIL PAN GUARD).
- Remove the front fairing, see 7.1.14 (REMOVING THE FRONT FAIRING).
- Place a container under the drain plug (3) to collect the liquid (ca. 1,4 l).
- Unscrew and remove the drain plug (3) recovering the copper washer.



Do not remove the radiator plug when the engine is hot as the coolant is under pressure and is very hot.

- To facilitate the liquid outflow, rotate the radiator plug (4) anticlockwise of one step.
- Wait a few seconds, in order to allow any residual pressure present in the system to be eliminated.
- Rotate the radiator plug (4) anticlockwise again and remove it.
- Rinse out the radiator with clean water.

DO NOT DISPOSE OF ENGINE OIL IN THE ENVIRONMENT.

In reassembling, apply LOCTITE® 574 on the thread of the drain plug (3).

- Reassemble the drain plug (3) with a new copper washer.

Driving torque of drain plug (4): 12 Nm (1,2 kgm)

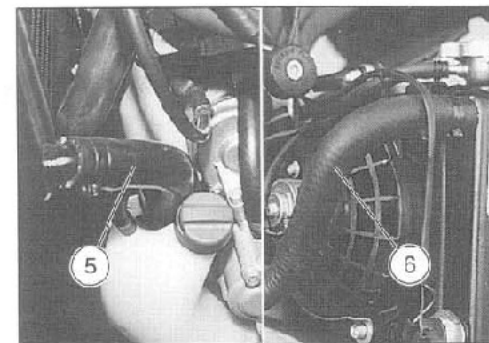
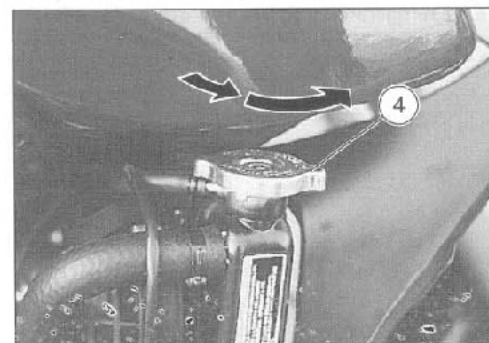
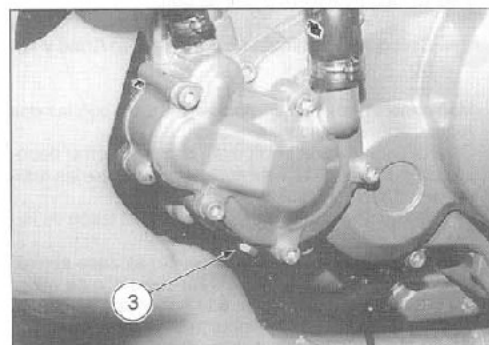
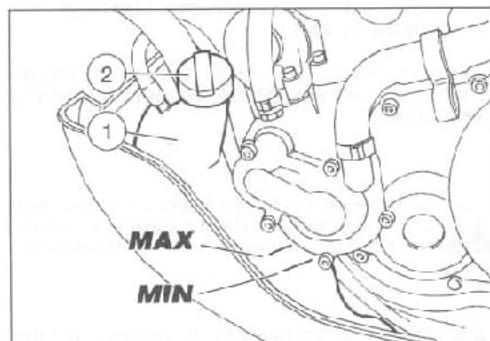
- Top up the radiator until filling it completely.
- Repeatedly press the two couplings (5-6) with your hand and release them, in such a way as to create a slight pressure and to allow the liquid to flow into the pipes.
- Top up the radiator again until filling it completely.
- Put the plug back on radiator (4).
- Remove the cap (2) from expansion tank (1).
- Top up until the liquid reached the "MAX" level, see 1.7 (LUBRICANT CHART). Do not exceed this level otherwise there will be an escape of the coolant during running of the engine.
- Reinsert the cap (2) of the expansion tank (1).
- Start the engine and let it run for a few minutes, then let it cool down and check the level of coolant in the expansion tank again.
- If necessary, top up.

Total quantity: 1,4 l (including the expansion tank).



The bleeding of the system is not required for this vehicle.

For further information see 5.0 (COOLING SYSTEM).



2.16 DRIVING CHAIN

Read 1.4 carefully (PRECAUTIONS AND GENERAL INFORMATION).

Check every 500 km. Lubricate every 1000 km.

The vehicle is fitted with an endless chain, which does not utilise the connecting link.

Chain type: DID mod. 520 V6



The driving chain is equipped with O rings between the links designed to keep the grease on the inside.

Use the maximum caution in adjusting, lubricating, washing and replacing the chain.

Position the vehicle on the special stand and slowly rotate, manually, the rear wheel with the gear in neutral.

Visually check that the chain presents none of the defects listed below:

- ◆ Pins loosened
- ◆ Rollers damaged
- ◆ Links rusted or seized
- ◆ Links deformed or with rims
- ◆ Excessive wear
- ◆ Chain not adjustable correctly
- ◆ Leak of O rings

If the chain presents even one of the listed defects, it must be replaced, see 7.1.23 (REMOVING THE GEARING CHAIN).



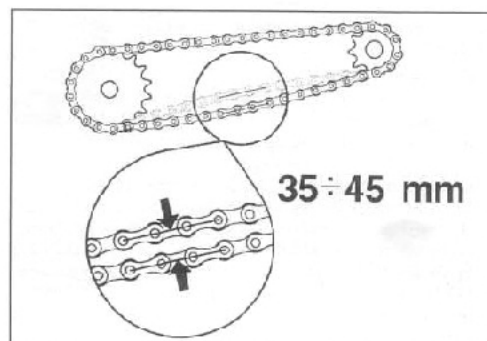
2.16.1 CLEARANCE CONTROL

To check the clearance:

- ◆ Check that the vertical oscillation - in an intermediate point between pinion and crown gear in the lower branch of the chain - is approx. **35 to 45 mm**.
- ◆ Check the vertical oscillation of the chain, also when the wheel is turning; the clearance should remain constant in all the phases of the wheel rotation.

If there is a larger clearance in certain positions, it means that there are crushed or seized links. Lubricate the chain frequently to avoid the risk of seizing, see 2.16.4 (CLEANING AND LUBRICATION).

If the clearance is uniform but higher than **35 to 45 mm**, make the adjustment, see 2.16.3 (ADJUSTMENT).



An excessive slackening of the chain may cause it to come away from the pinion, causing an accident or serious damage to the vehicle and people.



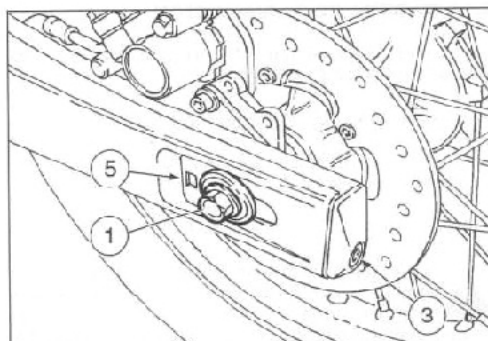
Incorrect maintenance may cause the untimely wear of the chain and/or damages to the pinion and/or the crown.

Carry out the maintenance operations more frequently if you use the vehicle in difficult conditions or on dusty and/or muddy roads.

2.16.2 CHECKING WEAR

- Lock the rotation of the wheel pin (1) by means of the suitable spanner.
- Loosen the nut (2).
- Act on the left (3) and right (4) adjusters until the chain is completely tightened.
- Count 21 pins (20 steps) on a branch of the chain and measure the distance between the two end pins. If the distance is larger than the limit indicated below, replace the chain, see 7.1.23 (REMOVING THE GEARING CHAIN).

Limit of wear: 304 mm



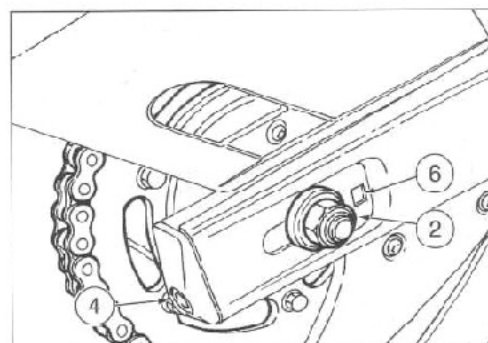
2.16.3 ADJUSTMENT

If after the checks it is necessary to adjust the chain tension, proceed as follows:

- Lock the rotation of the wheel pin (1) by means of the suitable spanner.
- Loosen the nut (2).

For the wheel centering numbered reference marks are provided, which are connected with the movement of the adjusters (3) and (4). These reference marks can be seen inside two slots (5) and (6) positioned on the rods of the rear fork, before the wheel pin.

- Act on the left (3) and right (4) adjusters and adjust the chain slack, making sure that the slots (5) and (6) coincide with the same reference marks on both sides of the vehicle.
- Lock the wheel pin (1) rotation by means of the suitable spanner.
- Tighten the nut (2).



Wheel pin-nut driving torque (1-2):
100 Nm (10 kgm).

- Check the chain slack, see 2.16.1 (CLEARANCE CONTROL).

2.16.4 CLEANING AND LUBRICATION

Do not wash the chain with jets of steam, water at high pressure, or with high inflammability solvents.

- Wash the chain with kerosene. If it tends to rust easily, repeat maintenance more frequently.



Do not use trichloroethylene, petrol, or other similar liquids: they may have an excessive dissolving power for this chain and, even more important, they can damage the O-rings that hold the grease in the gaps between the rollers and the pins.

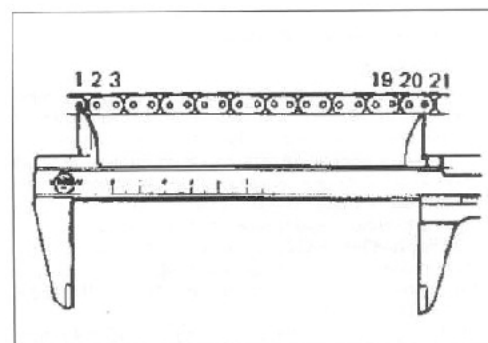
- After washing and drying the chain, lubricate it with a spray grease for sealed chains, see 1.7 (LUBRICANT CHART).



In any case, do not use lubricants found on the market which are not specific for "sealed" chains: they can damage the O-rings.



The standard chain is the DID type 520 V6 model. When replacing, we recommend using the same model.



2.17 CHECKING AND TOPPING UP THE FRONT BRAKE FLUID

Read carefully 1.2.4 (BRAKE FLUID) and 1.4 (PRECAUTIONS AND GENERAL INFORMATION).

Check brakes after the first 1000 km (or 4 months) and then every 5000 kms (or 8 months).



In case of excessive stroke of the brake lever, of excessive elasticity or in case there is air in the circuit.

The leak of brake fluid damages painted or plastic surfaces.

Before setting out, make sure that the cables are not twisted or holed and that there are no leakage from the connectors.

The braking systems on this vehicle have been filled with a glycol-based liquid.

Do not use or mix different types of silicone or oil-based liquids. Do not use brake fluids taken from old containers, used or not sealed.

Do not use liquids left over from earlier repair jobs and stored for long periods.



Make sure that neither water nor dust accidentally enter the circuit.



Position the vehicle on firm and flat ground.

- + Keep the vehicle in vertical position and rotate the handlebar, so that the fluid contained in the tank is parallel to the brake fluid tank cover.
- + Make sure that the fluid level exceeds the "MIN" mark.
- + If the fluid does not reach the "MIN" mark, provide for topping up.

Topping up



The brake fluid may flow out of the tank.

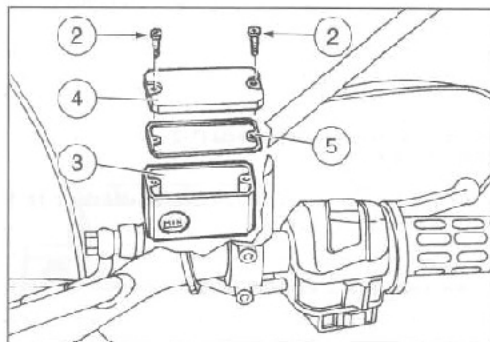
Do not operate the front brake lever if the screws (2) are loose or, most important, if the brake fluid tank cover has been removed.

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



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


- + Remove the gasket (5).
- + Fill the tank (3) with brake fluid, see 1.7 (LUBRICANT CHART), until it covers the glass (1) completely.
- + To reassemble the components, follow the reverse order.



2.18 CHECKING AND TOPPING UP THE REAR BRAKE FLUID

Read carefully 1.2.4 (BRAKE FLUID) and 1.4 (PRECAUTIONS AND GENERAL INFORMATION).

Check brakes after the first 1000 km (or 4 months) and then every 6000 kms (or 8 months).

 In case of excessive stroke of the brake lever, of excessive elasticity or in case there is air in the circuit.

The leak of brake fluid damages painted or plastic surfaces.

Before setting out, make sure that the cables are not twisted or holed and that there are no leakage from the connectors.

The braking systems on this vehicle have been filled with a glycol-based liquid.

Do not use or mix different types of silicone or oil-based liquids. Do not use brake fluids taken from old containers, used or not sealed.

Do not use liquids left over from earlier repair jobs and stored for long periods.


 Make sure that neither water nor dust accidentally enter the circuit.

 Position the vehicle on firm and flat ground.


- ♦ Keep the vehicle in vertical position, so that the fluid contained in the tank (1) is parallel to the tank edge.
- ♦ Make sure that the fluid level exceeds the "MIN" mark.
- ♦ If the fluid does not reach the "MIN" mark, provide for topping up.

Topping up:

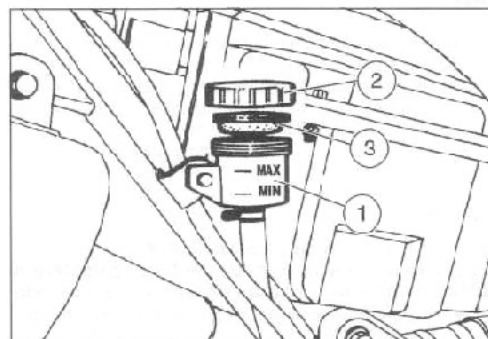
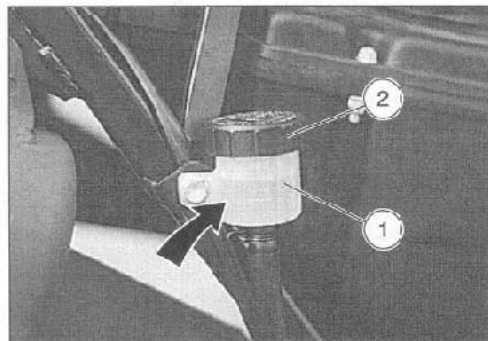
- ♦ Remove the right side, see 7.1.4 (REMOVING THE RIGHT AND LEFT SIDES).

 The brake fluid may flow out of the tank. Do not operate the rear brake lever if the brake fluid tank plug is loose or has been removed.

- Unscrew and remove the plug (2).

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

- Remove the gasket (3).
- Fill the tank (1) with brake fluid, see 1.7 (LUBRICANT CHART), until it reaches the "MAX" mark.
- ♦ To reassemble the components, follow the reverse order.



2.19 BLEEDING THE BRAKING SYSTEM

Read carefully 1.2.4 (BRAKE FLUID) and 1.4 (PRECAUTIONS AND GENERAL INFORMATION).

The air present in the hydraulic system acts as a bearing, absorbing most of the pressure exerted by the brake pump and reducing the effectiveness of the caliper action during braking.

The presence of air is demonstrated by the "sponginess" of the brake control and by the reduced braking capacity.



Handle brake fluid with care; it may chemically alter painted surfaces and the parts in plastic, rubber, etc.

DO NOT DISPOSE OF ENGINE OIL IN THE ENVIRONMENT.



Considering the danger for both driver and vehicle, it is absolutely essential to bleed the hydraulic system after reassembly of the brakes and the restoration of the braking system to its normal conditions, proceeding as follows:

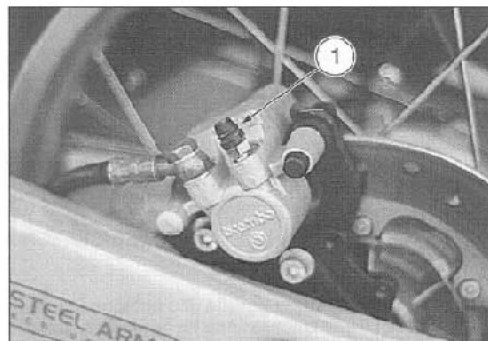
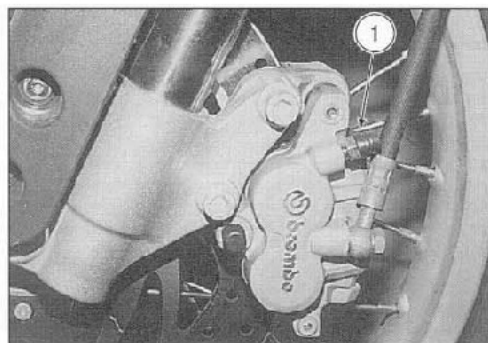
- ♦ Top up the brake fluid tank see 2.17 (CHECKING AND TOPPING UP THE FRONT BRAKE FLUID) and 2.18 (CHECKING AND TOPPING UP THE REAR BRAKE FLUID).
- ♦ Remove the rubber protection cap.
- ♦ Insert a transparent plastic tube on the bleeder (1) of the caliper and put the other end of the tube in a container.
- ♦ Rapidly pull and release the brake lever several times, then keep it completely pulled.
- ♦ Loosen the bleeder one fourth turn so that the brake fluid flows into the container; this eliminates the tension on the brake lever, allowing it to come in contact with the handgrip.
- ♦ Tighten the bleeder (1): pull the lever several times, then keep it completely pulled and unscrew the bleeding screw again.
- ♦ Repeat this operation until the liquid flowing into the container is completely free of air bubbles.

During the bleeding of the braking system, fill the tank with as much brake fluid as needed. Make sure that brake fluid is always present in the tank during the operation.

- ♦ Tighten the bleeder and remove the plastic tube.

Driving torque of bleeder (1): 15 Nm (1.5 kgm).

- ♦ Top up the brake fluid tank to the right level.
- ♦ Put back the rubber protection cap.



2.20 REAR BRAKE PEDAL ADJUSTMENT

The brake pedal is positioned ergonomically during the assembly of the vehicle.

If necessary, it is possible to adjust the height of the brake pedal:

- ◆ Position vehicle on stand.
- ◆ Loosen the lock nut (1).
- ◆ Screw the brake adjuster (2) completely.
- ◆ Screw the lock nut (3) completely on the pump control rod (4).
- ◆ Screw the pump control rod (4) completely, then unscrew it by giving 3-4 turns.
- ◆ Unscrew the brake adjuster (2) until the brake pedal reaches the desired height.
- ◆ Lock the brake adjuster (2) by means of the lock nut (1).
- ◆ Unscrew the pump control rod (4) and bring it in contact with the pump piston.
- ◆ Screw the rod in order to ensure a minimum clearance of 0.5 ± 1 mm between the pump control rod (4) and the pump piston.



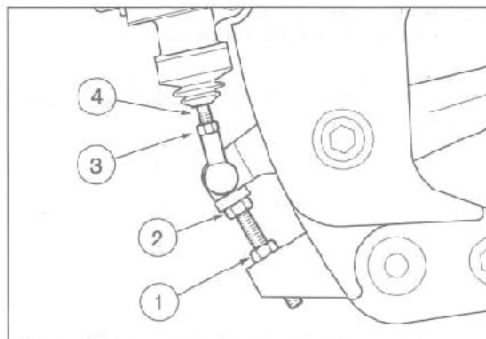
Make sure that there is a certain clearance between the brake adjuster (2) and the point of contact, to prevent the brake from remaining operated and the consequent untimely wear of the braking elements.

Clearance between brake adjuster and point of contact: 0.5 ± 1 mm.

- ◆ Lock the pump control rod by means of the lock nut (3).



After the adjustment, make sure that the wheel rotates freely with released brake.



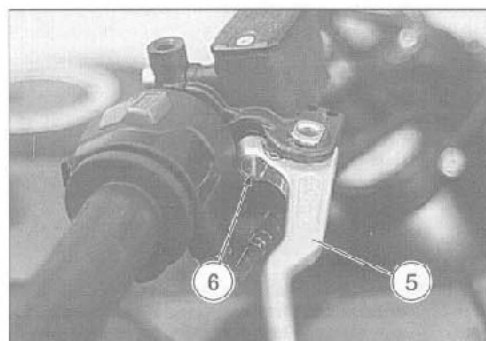
2.21 FRONT BRAKE LEVER ADJUSTMENT

If play is observed in the movement of the lever (5) proceed as follows:

- ◆ Position the vehicle on stand.
- ◆ Adjust the screw (6), eliminating the play.



The screw should be in contact with the pumping element but must not press beyond it otherwise there will be a minimum but continuous braking.



2.22 CHECKING THE BRAKE PAD WEAR

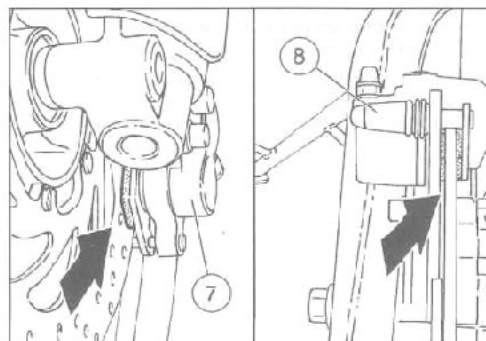
Check the brake pad wear after the first 1000 km and successively every 6000 km.

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

The wear will be greater when the vehicle is driven on dirty or wet roads.

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

- ◆ Position the vehicle on the stand, see p. 35 (POSITIONING THE VEHICLE ON THE STAND).
- ◆ Carry out a visual checking of the friction material thickness by looking between the brake caliper and the pads. Proceed:
 - ◆ from below for the front brake caliper (7).
 - ◆ from above for the rear brake caliper (8).
- ◆ If the thickness of the friction material (even on one pad only) has reduced to about 1 mm, replace both pads, see 7.5.1 and 7.6.1 (CHANGING THE BRAKE PADS).



2.23 TYRES

Read 1.4 carefully (PRECAUTIONS AND GENERAL INFORMATION).

Check condition of tyres after the first 1000 km (or 4 months) and then after every 6000 km (or 8 months).

The inflation pressure must be checked every month and at room temperature.

2.23.1 CONDITION OF TREAD



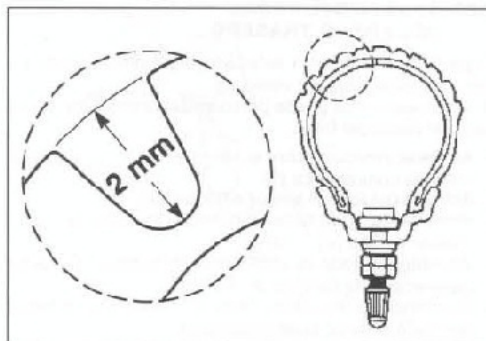
Check the surface of tyres and their wear in as a faulty condition of the tyres compromises their grip as well as the manoeuvrability of the vehicle.

Change the tyre if worn or if an eventual puncture in the area of the tread is larger than 5 mm.

Limit of tread thickness

Front: 2 mm

Rear: 2 mm



2.23.2 INFLATION PRESSURE



Periodically check the pressure of the tyres at room temperature. If the tyres are hot, the measurement is not correct.

Measure pressure without fail after every long journey.

If the inflation pressure is too high, the bumps in the road/ground are not absorbed and are therefore transmitted to the handlebar, compromising the comfort of the drive as well as reducing roadholding in curves.

If, contrarily, the inflation pressure is insufficient, the sides of the tyres are more exposed and may slip on the rim or even become detached from it, with the consequent loss of control of the vehicle.

In case of abrupt braking, the tyres can come away from the rims.

Moreover the vehicle may easily skid in curves.

Inflation pressure

Front: 100 kPa (1.0 bar)

Rear: 150 kPa (1.5 bar)

(at full load 220 kPa (2.2 bar))



After repairing a tyre, have the wheel balanced.

Make sure the tyres always have their valve sealing caps to prevent them from suddenly going flat. The operations of changing, repairing, maintenance and balancing are very important and must be performed with the proper equipment and necessary experience.

When tyres are new they may still be covered with a slippery film therefore drive carefully for the first kilometres. Do not oil tyres with unsuitable liquids.



This vehicle is equipped with standard tyres 100/90-19 57H (front) and 130/80-R17 65H (rear). The size of the tyres is indicated in the log-book and any dissimilarity is punishable by law.

Using tyres with different dimensions may cause the instability of the vehicle, endangering its driving safety and manoeuvrability.

Use only tyres recommended by **aprilia**.



For further information see 7.4 (TYRES).

2.24 STEERING

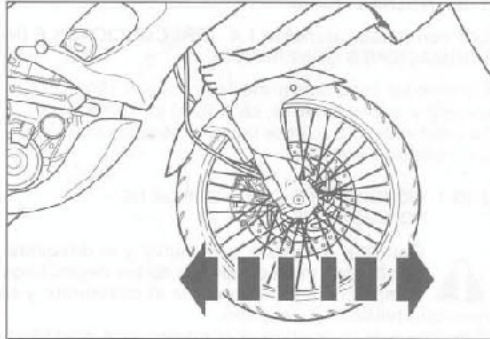
Read 1.4 carefully (PRECAUTIONS AND GENERAL INFORMATION).

Check after the first 1000 km (or 4 months) and then after every 6000 km (or 8 months).

To ensure improved handling the steering is equipped with rolling bearings.

The steering must be adjusted correctly to provide smooth rotation of the handlebar and safe driving.

A tight steering hinders the smooth rotation of the handlebar whereas a slack steering implies inadequate stability.



2.24.1 CHECKING THE BEARING SLACKS

- ♦ Remove the oil pan guard, see 7.1.9 (REMOVING THE OIL PAN GUARD).



Due to the weight and dimensions of the vehicle, the following operation cannot be performed by one person only.

Proceed with care and make sure that you can support the weight of the vehicle.



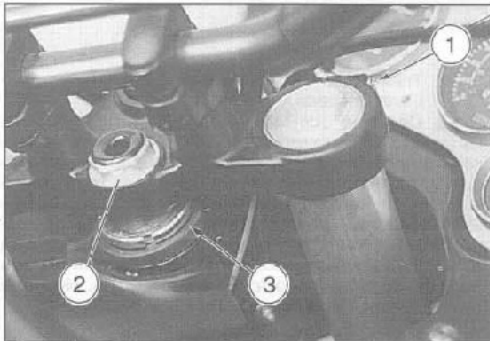
Weight of the vehicle without driver (ready for starting): 200 kg

- ♦ Raise the front part of the vehicle and have a suitable support (the weight of which should be about 350 mm) placed under the front engine, so that the front wheel can rotate freely and the vehicle cannot fall down.
- ♦ Keep the rear part of the vehicle down.
- ♦ Shake the fork in the direction of travel (see figure).
- ♦ In case you find any slack, adjust the steering.



2.24.2 ADJUSTING THE BEARING SLACKS

- ♦ ★ Loosen the screw (1).
 - ♦ Loosen the upper screw (2).
 - ♦ Tighten the ring nut (3) with the suitable spanner, eliminating the slack.
 - ♦ Repeat the check-up until the inconvenience is remedied.
 - ♦ Completely tighten the upper screw (2).
 - ♦ ★ Tighten the screw (1).
- Driving torque of upper screw (2): 100 Nm (10 kgm)
- Driving torque of screw (1): 50 Nm (5 kgm).



On completion of operation make sure that the rotation of the handlebar is smooth in order to avoid damage to the balls and the loss of manoeuvrability of the vehicle.

2.25 FRONT FORK

Read 1.4 carefully (PRECAUTIONS AND GENERAL INFORMATION).

Replace the front fork oil every 12000 km (or 16 months).

Should the fork reach the end of its stroke, check the oil level of the fork tubes, see 7.8.1 (CHECKING THE OIL LEVEL).

Make sure there are no oil leaks and that the outer surface of the tubes is neither scratched nor grooved. If so, replace all the damaged parts.

2.26 REAR FORK

Read 1.4 carefully (PRECAUTIONS AND GENERAL INFORMATION).

Periodically check the tightening of the pin and of the needle bearings of the rear fork.

To carry out this operation, proceed as follows:

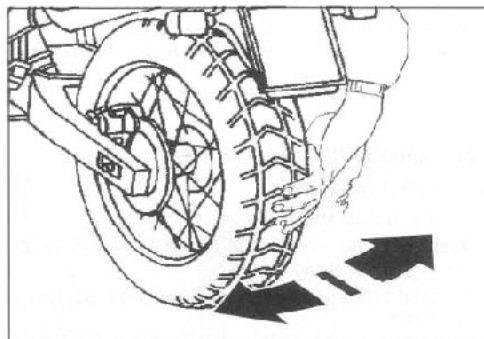
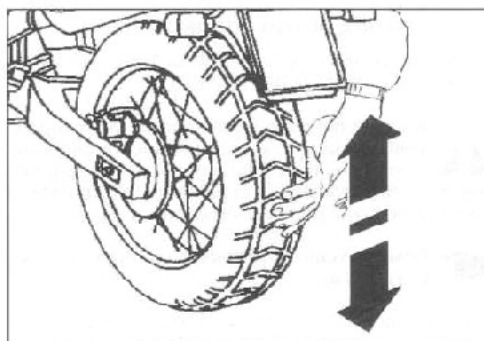
- Remove the oil pan guard, see 7.1.9 (REMOVING THE OIL PAN GUARD).

Due to the weight and dimensions of the vehicle, the following operation cannot be performed by one person only.

Proceed with care and make sure that you can support the weight of the vehicle.

Weight of the vehicle without driver (ready for starting): 200 kg.

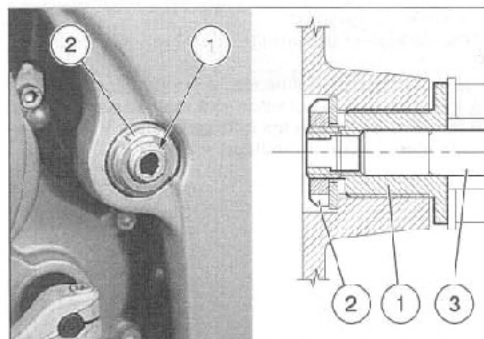
- Raise the rear part of the vehicle, have a suitable support (the height of which should be 350 mm) placed under the engine, so that the rear wheel can rotate freely and the vehicle cannot fall down.
- Shake the fork in the direction of travel (see figure). If you find any slack, adjust the rear fork, see 2.26.1 (ADJUSTING THE REAR FORK). If the slack persists, adjust the bearings, see 7.10 (REAR SUSPENSION).



2.26.1 ADJUSTING THE REAR FORK

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- Position the vehicle on the centre stand **OPT** or on an apposite support fixed to the centre stand couplings.
- Lock the adjusting bush (1), unscrew the locking ring (2) by means of the apposite socket spanner, see 1.8 (SPECIAL TOOLS).
- Screw the adjusting bush (1) until it strikes against the rear fork, then give it another one fourth turn.
Adjusting bush (1) driving torque: contact + one fourth turn.
- Lock the adjusting bush (1), tighten the rear fork pin (3).
Pin (3) driving torque: 100 Nm (10 kgm).
- Hold the adjusting bush (1) and at the same time screw the locking ring (2).
Locking ring (2) driving torque: 100 Nm (10 kgm).



2.27 REAR SUSPENSION

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

Check the rear suspension after the first 1000 km (or 4 months) and successively every 12000 km (or 16 months). The rear suspension consists of a spring-shock absorber unit, fixed to the frame by means of silent-blocks and to the rear fork by means of levers. The standard adjustment, set by the manufacturer, is suitable for a driver weighing about 70 kg. If your weight and needs are different, for example in case of ride with passenger and full load, adjust the rear suspension.

2.27.1 ADJUSTING THE REAR SUSPENSION

- Remove the rear shock absorber, see 7.10.1 (REMOVAL).
- Position the shock absorber on a vice as indicated in the figure.

! The adjusting ring must not be screwed for more than 12 mm from the beginning of the thread (see figure). If this length is exceeded, even the slightest unevenness of the ground may cause sudden jerks during the drive, and any adjustment of the screw (3) will be useless.

- Slightly unscrew the locking ring (2).
- By means of the apposite spanner, adjust the ring (1) (shock absorber spring preload adjustment) (see table).
- If necessary, adjust the screw (3) (adjusting the hydraulic braking with extended shock absorber) (see table).
- Once the optimal attitude has been reached, tighten the locking ring (2) completely.

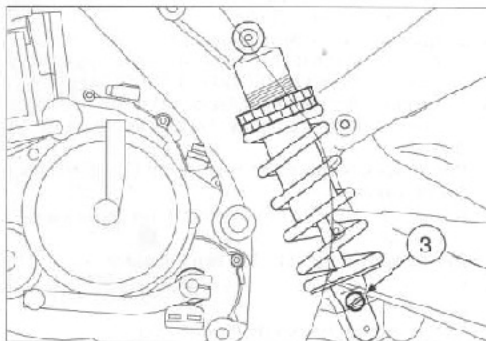
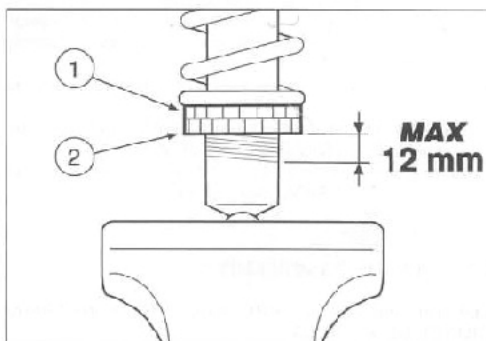
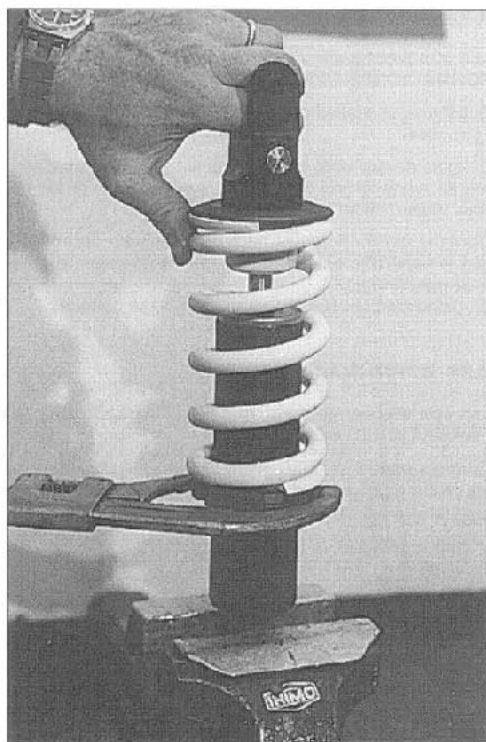
! By means of the screw (3), adjust the hydraulic braking with extended shock absorber according to the conditions of use of the vehicle.

! If the vehicle attitude has been set for full load, do not turn the screw (3) to the left (anticlockwise), in order to avoid sudden jerks while riding.

Function	ADJUSTING RING (1)	
	By screwing it	By unscrewing it
Spring preload	increase	decrease
Attitude	Harder	Softer
Recommended kind of road	Normal - regular road surface	Raveled road surface
Notes	Rider, passenger and luggage, if any	Solo rider

Function	ADJUSTING SCREW (1)	
	Rotation to the right (clockwise)	Rotation to the left (anticlockwise)
Increased braking with extended shock absorber		Decreased braking with extended shock absorber
Attitude	Harder	Softer
Recommended kind of road	Raveled road surface	Normal - regular road surface
Notes	Rider, passenger and luggage, if any	Solo rider

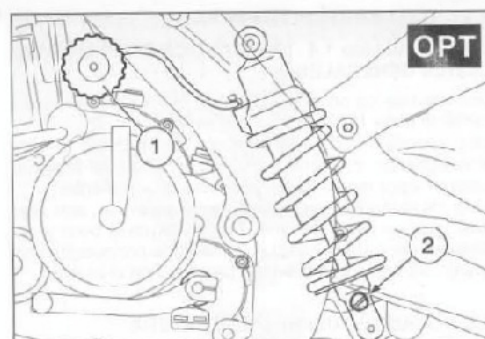
! Various intermediate positions are possible between the hard and soft attitude.



2.27.2 ADJUSTING THE REAR SUSPENSION WITH PRELOAD HYDRAULIC ADJUSTMENT **OPT**

- Rotate the flywheel (1) (shock absorber spring preload adjustment) in one sense or the other, in order to obtain the optimal attitude (see table).
- If necessary, adjust the screw (2) (hydraulic braking adjustment with extended shock absorber) (see table).

! Adjust the preload of the spring and of the hydraulic braking with extended shock absorber according to the conditions of use of the vehicle. When the spring preload is increased, it is necessary to increase also the hydraulic braking with extended shock absorber, in order to avoid sudden jerks while riding.



ADJUSTING FLYWHEEL (1)		
	Rotation to the right (clockwise)	Rotation to the left (anticlockwise)
Function	Preload increase	Preload decrease
Attitude	Harder	Softer
Recommended kind of road	Normal - regular road surface	Raveled road surface
Notes	Rider, passenger and luggage, if any	Solo rider

ADJUSTING SCREW (2)		
	Rotation to the right (clockwise)	Rotation to the left (anticlockwise)
Function	Increased braking with extended shock absorber	Decreased braking with extended shock absorber
Attitude	Harder	Softer
Recommended kind of road	Raveled road surface	Normal - regular road surface
Notes	Rider, passenger and luggage, if any	Solo rider

! Various intermediate positions are possible between the hard and soft attitude.

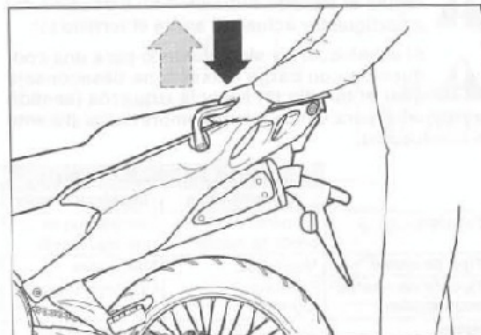
VITE DI REGOLAZIONE (2)		
	Rotazione verso destra (senso orario)	Rotazione verso sinistra (senso antiorario)
Funzione	Aumento della frenatura in estensione	Diminuzione della frenatura in estensione
Tipo di assetto	Più rigido	Più morbido
Tipo di strade consigliate	Con fondo sconnesso	Normali - regolari
Note	Guida con passeggero ed eventuale bagaglio	Guida senza passeggero

2.27.3 CHECKING THE REAR SUSPENSION LINKAGE

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

Check the conditions of the bearings every 30,000 km.

- Position the vehicle on the centre stand **OPT** or require the assistance of another operator to keep the vehicle in vertical position.
- Firmly grasp the rear part of the vehicle (see figure), press downwards and release for a few times.
- If the movement isn't smooth and is accompanied by squeaks and/or if you notice any slack, change the bearings of the rear suspension linkage, see 7.10 (REAR SUSPENSION).
- If after you pressed the vehicle downwards, it returns to its original position very slowly, check if the rear suspension is adjusted correctly, see 2.27.1 (ADJUSTING THE REAR SUSPENSION) and 2.27.2 (ADJUSTING THE REAR SUSPENSION WITH PRELOAD HYDRAULIC ADJUSTMENT **OPT**).
- If after the adjustment the defect persists, this means that the shock absorber bumps through, therefore it is necessary to change it, see 7.10.1 (REMOVAL).



2.28 FRONT WHEEL

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

Check the front wheel every 6000 km (or 8 months).

- ◆ Remove the oil pan guard, see 7.1.9 (REMOVING THE OIL PAN GUARD).



Due to the weight and dimensions of the vehicle, the following operation cannot be performed by one person only. Proceed with care and make sure that you can support the weight of the vehicle.



Weight of the vehicle without driver (ready for starting): 200 kg.

- ◆ Raise the front part of the vehicle and have a suitable support (the height of which should be about 350 mm) placed under the engine, so that the front wheel can rotate freely and the vehicle cannot fall down.
- ◆ Keep down the rear part of the vehicle.
- ◆ Make the wheel rotate in one sense or the other manually.
- ◆ Make sure that the wheel rotation is regular and that there are no obstacles or noise, otherwise change the bearings, see 7.2.2 (CHANGING THE BEARINGS).
- ◆ If during the rotation of the wheel any oscillation should be noticed, check the involved components, see 7.2.3 (CHECKING).



2.29 REAR WHEEL

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

Check the rear wheel every 6000 km (or 8 months).

- ◆ Remove the oil pan guard, see 7.1.9 (REMOVING THE OIL PAN GUARD).



Due to the weight and dimensions of the vehicle, the following operation cannot be performed by one person only. Proceed with care and make sure that you can support the weight of the vehicle.



Weight of the vehicle without driver (ready for starting): 200 kg.

- ◆ Raise the front part of the vehicle and have a suitable support (the height of which should be about 350 mm) placed under the engine, so that the front wheel can rotate freely and the vehicle cannot fall down.
- ◆ Make the wheel rotate in one sense or the other manually.
- ◆ Make sure that the wheel rotation is regular and that there are no obstacles or noise, otherwise change the bearings, see 7.3.2 (CHANGING THE BEARINGS).
- ◆ If during the rotation of the wheel any oscillation should be noticed, check the involved components, see 7.3.3 (CHECKING).



2.30 TIGHTENING SCREWS AND NUTS

Tighten after the first 1000 km (or 4 months) and then every 5000 km (or 8 months)



The screws and nuts indicated in the table are part of components important for safety.
In case of necessity, tighten to the prescribed torque, using a dynamometric spanner.

Frame screws and nuts driving torques		
Component	N m	kgm
Steering head nuts	100	10
Upper handlebar fastening screw	25	2,5
Lower handlebar fastening screw and nuts	30	3
Upper and lower fork plate screws	50	5
Front fork tube caps	20	2
Fork slider lower screw (assemble with LOCTITE® 270)	50	5
Front wheel pin	80	8
Front wheel pin locking screws	12	1,2
Front brake pump fastening screws	12	1,2
Front brake caliber fastening screws	50	5
Front brake caliber pipe fitting screw	15	1,5
Front and rear brake bleeder	15	1,5
Front and rear brake disc fastening screws (assemble with thread-locking LOCTITE® medium)	12	1,2
Rear fork adjusting bush	Contact + one fourth turn	
Rear fork pin adjusting ring	40	4
Rear fork pin	100	10
Inner fastening screws of the rear shock absorber upper support	25	2,5
Outer fastening screws of the rear shock absorber upper support	80	8
Fastening screw/nut of the rear shock absorber upper part	50	5
Fastening screw/nut of the rear shock absorber lower part	35	3,5
Fastening screws/nuts of the rear shock absorber single connecting rod	80	8

PERIODIC SERVICE AND SETTING UP OPERATIONS

Fastening screws/nuts of the rear shock absorber double connecting rod	80	8
Rear brake pedal fastening nut	25	2,5
Rear brake caliper fastening screws	25	2,5
Rear brake pump fastening screws	12	1,2
Rear brake caliper pipe fitting screw	25	2,5
Rear brake pump pipe fitting screw	25	2,5
Rear wheel nut/pin	100	10
Crown gear fastening screws/nuts	25	2,5
Engine upper part fastening screws/nuts	50	5
Engine front part fastening screws/nuts	50	5
Engine rear part fastening nut	50	5
Exhaust manifold fastening screws	25	2,5
Exhaust silencer fastening screws	25	2,5
Oil drain plug on the engine	40	4
Oil drain plug on the frame	20	2
Engine oil filter on the frame	35	3,5
Coolant drain plug (fit with <i>LOCTITE</i> ® 574)	12	1,2
Coolant thermostat (fit with <i>LOCTITE</i> ® 574)	30	3
Thermal switch (fit with <i>LOCTITE</i> ® 574)	30	3
Fastening screws frame/double lever support/cradle	50	5
Fastening screws/nuts of the engine upper support plates	25	2,5
Fastening screws saddle pillar/frame	25	2,5
Fastening screws pilot footboard/frame/cradle	50	5
Passenger footrest support fastening screws	25	2,5
Side stand fastening nut	30	3
Centre stand <i>OPT</i> fastening screws/nuts	80	8
Luggage rack fastening screws	M5 = 8 M8 = 10	M6 = 0,8 M8 = 1

ENGINE

3

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3.1 COMPONENTS THAT CAN BE DISASSEMBLED WITHOUT REMOVING THE ENGINE

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

The parts listed below can be disassembled and reassembled without removing the engine from the frame.

UPPER SIDE

- Carburettor, see 4.5.3 (REMOVING THE CARBURETTORS).
- Tappet cover (1).
- Engine oil pressure sensor (2).

FRONT AND RIGHT SIDE

- Exhaust pipes, see 3.1.1 (REMOVING THE EXHAUST PIPES).

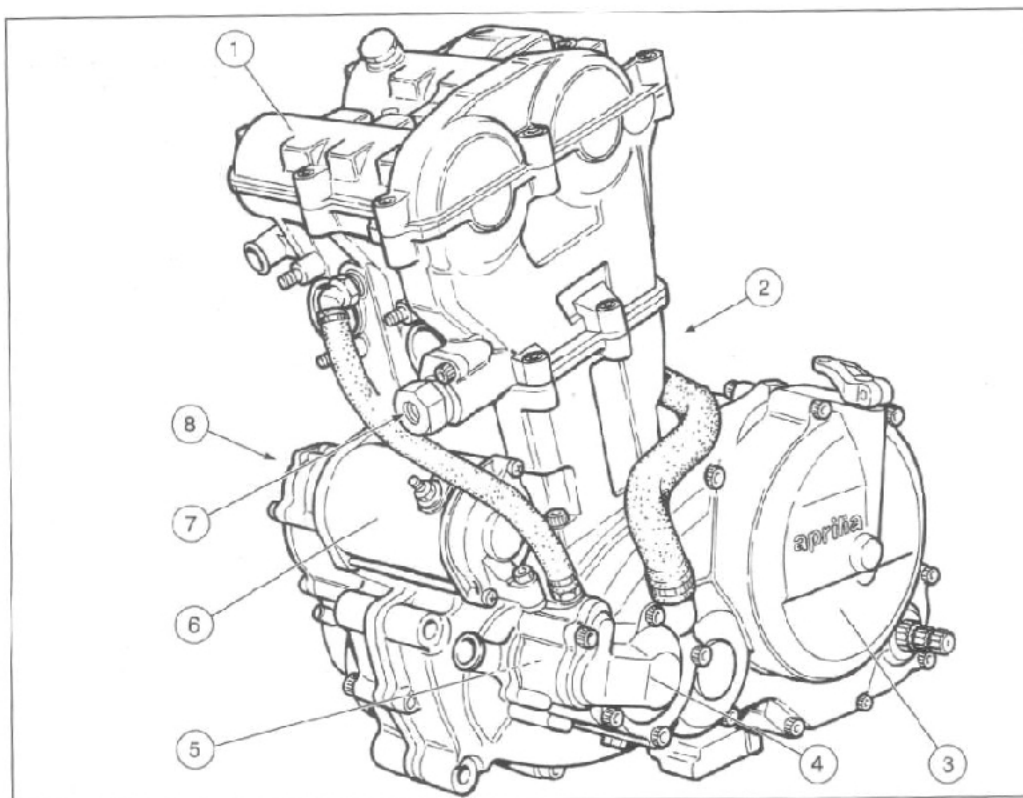
LEFT SIDE

- Clutch cover (3).
- Cooling pump (4).
- Thermostatic valve (5).
- Starter (6).
- Timing chain adjuster (7).
- Gearshift foot lever, see 3.1.2 (REMOVING THE GEARSHIFT FOOT LEVER).

RIGHT SIDE

- Transmission pinion protection casing, see 3.1.3 (REMOVING THE TRANSMISSION PINION PROTECTION CASE).
- Transmission pinion.
- Flywheel cover (8).
- Coolant temperature thermistor, see 5.5 (REMOVING THE COOLANT THERMISTOR).
- Sensor for gear neutral position.

For certain components the procedures of disassembling and reassembling are indicated in this chapter; for the other components please refer to the ENGINE SERVICE MANUAL, n. 933 (D-UK)/ n. 934 (I-E-F).



3.1.1 REMOVING THE EXHAUST PIPES

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.



Let the engine cool down until it reaches room temperature.

- Remove the right side, see 7.1.4 (REMOVING THE RIGHT AND LEFT SIDES).
- Remove the radiator, see 5.2 (REMOVING THE RADIATOR).
- Unscrew and remove the two screws (1-2).
- Remove the radiator support (3).
- Unscrew and remove the two screws (4-5), taking the washers.
- Remove the guard (6).
- Loosen the two screws (7-8) on the clamps (9-10).
- Unscrew and remove the two nuts (11) that fasten the exhaust pipe flange to the cylinder.

Nut (11) driving torque: 25 Nm (2.5 kgm).

- Move the exhaust pipe unit (12) forward as much as necessary to withdraw them from the seats on the cylinder.



To facilitate the withdrawing of the exhaust pipe unit (12), strike slightly (by means of a rubber hammer) one of the two supports of the guard (see figure).

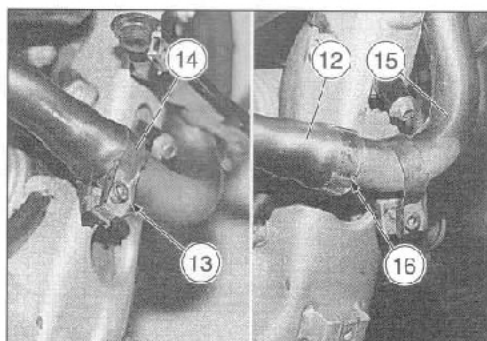
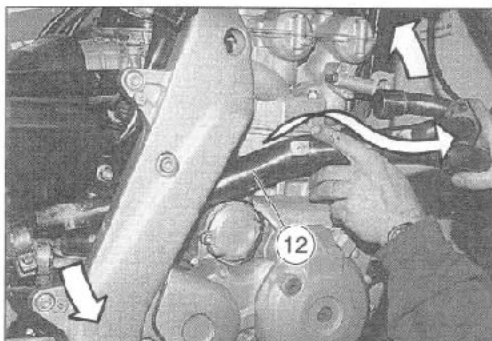
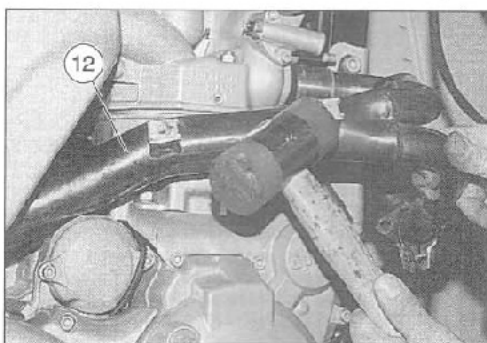
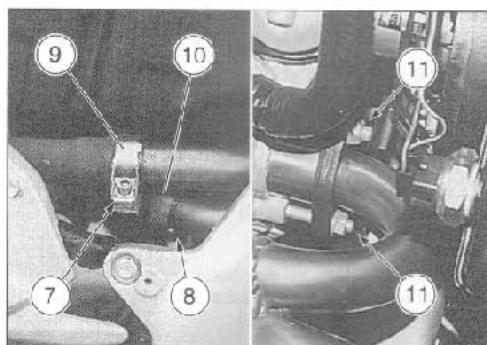
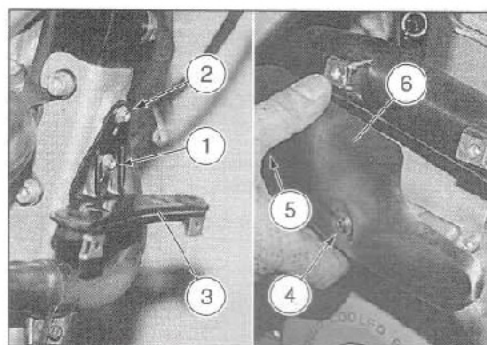
- Loosen the screw (13) on the clamp (14).
- Withdraw the pipe (15) from the exhaust pipe unit (12).
- If the graphite sealing ring (16) is broken or worn, change it.
- Remove the exhaust pipe unit (12) by withdrawing it from the front part.



Shift the exhaust pipe unit (12) with small movements, trying to find the right position to withdraw it (lift the front part, lower the rear part giving the whole unit a forward screwing movement; the rear lower part must pass through the turns of the rear shock absorber spring) (see figure).



Plug the engine exhaust openings, in order to avoid any accidental introduction of foreign matters.



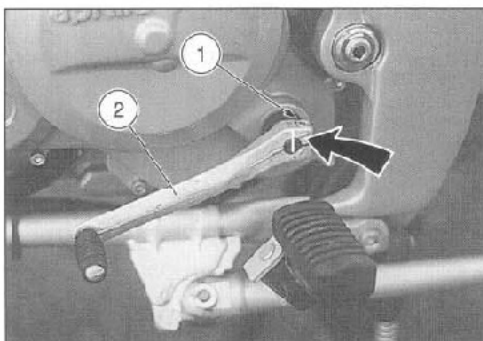
ENGINE

3.1.2 REMOVING THE GEARSHIFT FOOT LEVER



Before removing the gearshift foot lever, mark foot lever and pinion (see figure), in order to be able to reassemble them correctly.

- ✦ Position the vehicle on the stand.
- ✦ Loosen the screw (1).
- ✦ Withdraw the gearshift foot lever (2).



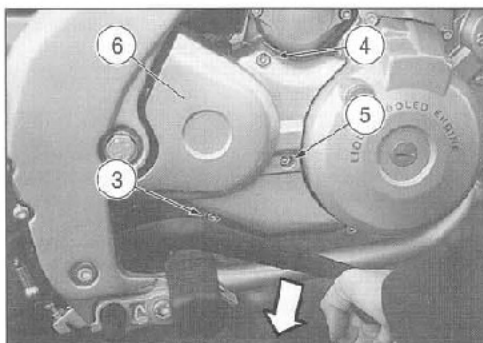
3.1.3 REMOVING THE TRANSMISSION PINION PROTECTION CASE

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.



Let the engine cool down until it reaches room temperature.

- ✦ Position the vehicle on the stand.
- ✦ Unscrew the screw (3), keeping the rear brake pedal pushed downwards.
- ✦ Unscrew and remove the two screws (4-5).
- ✦ Remove the case (6) by lifting it slightly and rotating it outwards.



3.2 REMOVING THE ENGINE FROM THE FRAME

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.



Before performing the operations described below, consider that the engine must be removed from the left side of the vehicle; therefore, provide for positioning the necessary equipment correctly.

- ✦ Position the vehicle on the centre stand **CPT**, or on an apposite support stand fixed to the couplings of the centre stand.
- ✦ Disconnect first the negative cable (-) and then the positive cable (+) from the battery.



Upon reassembly, connect first the positive (+) and then the negative (-) cable.





To clean the outer parts of the engine, use a degreaser, brushes and cloths.
Do not use corrosive detergents and solvents or penetrants, in order to avoid damaging the rubber and plastic parts.

If it is necessary to use a steam cleaning machine, do not direct high pressure water or air jets towards the following parts: wheel hubs, controls on the right and left side of the handlebar, brake pumps, instruments and indicators, silencer outlets, glove compartment, ignition switch/steering lock, electrical components.

- Clean the engine thoroughly.
- Drain the engine oil completely, see 2.13 (CHANGING ENGINE OIL AND OIL FILTER).
- Remove the exhaust pipes, see 3.1.1 (REMOVING THE EXHAUST PIPES).
- Remove the expansion tank, see 5.6 (REMOVING THE EXPANSION TANK).
- Remove the carburetors, see 4.5.3 (REMOVING THE CARBURETTORS).
- Remove the gearshift foot lever, see 3.1.2 (REMOVING THE GEARSHIFT FOOT LEVER).
- Disconnect the clutch cable (1) from the lever (2).



Mark the cables, couplings, pipes, etc., in order to avoid confusing them during the reassembly.

- Lift the protection element (3), unscrew and remove the nut (4) and disconnect the starter cable (5).
- Unscrew and remove the screw (6), disconnecting the earth cable (7).
- Remove the transmission pinion protection case, see 3.1.3 (REMOVING THE TRANSMISSION PINION PROTECTION CASE).
- Remove the stop ring (8).
- Withdraw the transmission pinion (9) complete with chain from the shaft.



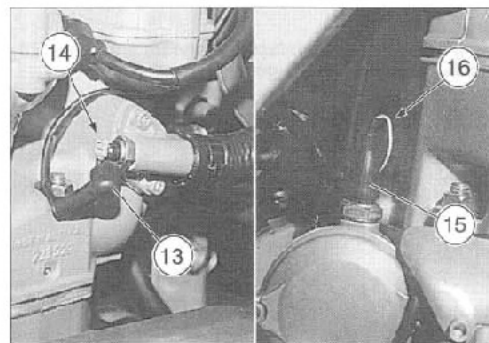
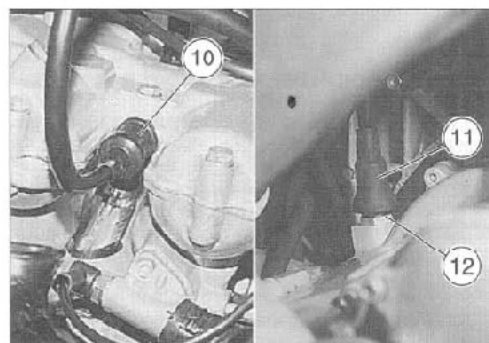
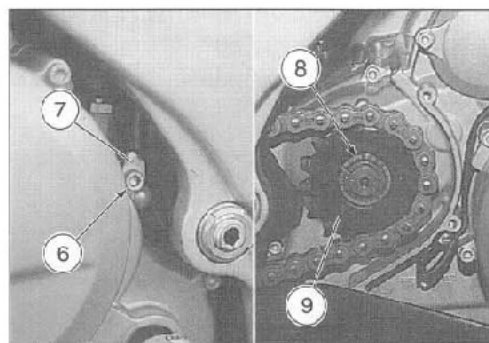
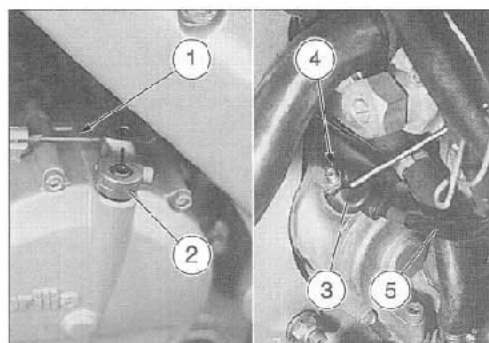
If the withdrawing of the transmission pinion (9) results difficult, slacken the chain slightly, see 2.16.3 (ADJUSTMENT).

- Remove the transmission pinion (9).





Upon reassembly, apply LOCTITE® Anti-Seize on the inner toothing of the transmission pinion (9).


- Disconnect the cap (10) from the spark plug.
- Lift the protection element (11), unscrew the metal ring and withdraw the cable from the revolution counter control (12).
- Withdraw the protection element (13) and disconnect the cable of the coolant temperature thermistor (14).
- Withdraw the protection element (15) and disconnect the cable of the engine oil pressure sensor (16).



- ✦ Unscrew the screw (17), disconnecting the neutral gear switch cable (18).
- ✦ Disconnect the connector of the alternator (19) and of the pick-up (20) (left side of the vehicle).

 **The alternator and pick-up cables must be completely released and upon reassembly they must be put back in the original position.**

 **Release all the cables from the fastening clamps positioned along them. Get other clamps to be used for the reassembly.**

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


- ✦ Cut the heads of the pipe clamps in the following order (21-22-23-24-25-26).
- ✦ Withdraw the oil breather pipe (27) (on the flywheel guard).


 **Release the pipe from the connection (28) on the cradle.**

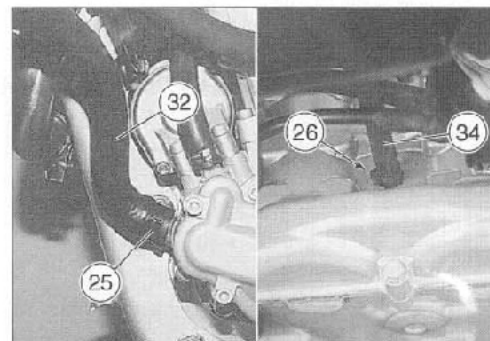
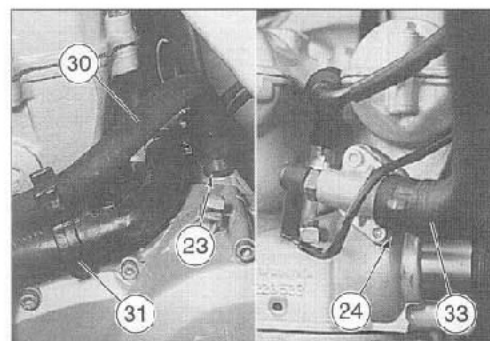
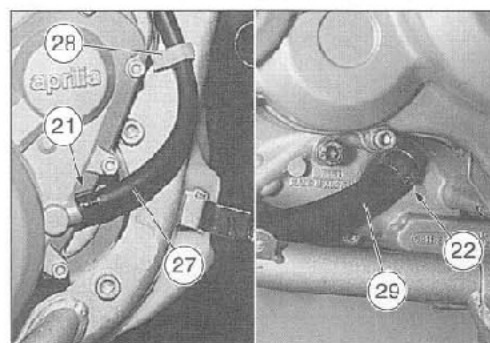
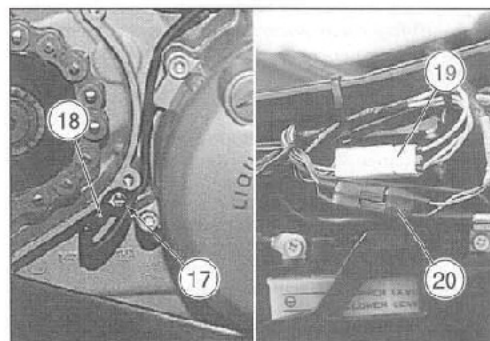
- ✦ Withdraw the engine oil pipe (29) from the engine (from engine to tank).
- ✦ Withdraw the engine oil pipe (30) from the engine (from tank to engine).

 **Release the pipe from the connection (31).**

- ✦ Withdraw the coolant coupling (32) (to the pump).
- ✦ Withdraw the coolant coupling (33) (from the engine).
- ✦ Withdraw the engine oil breather pipe (34) (on the tapet cover).

 **Release all the cables from the fastening clamps positioned along them. Get other clamps to be used for the reassembly.**

 **Plug all the engine openings, pipes and pipe couplings, in order to avoid any accidental introduction of foreign matters.**

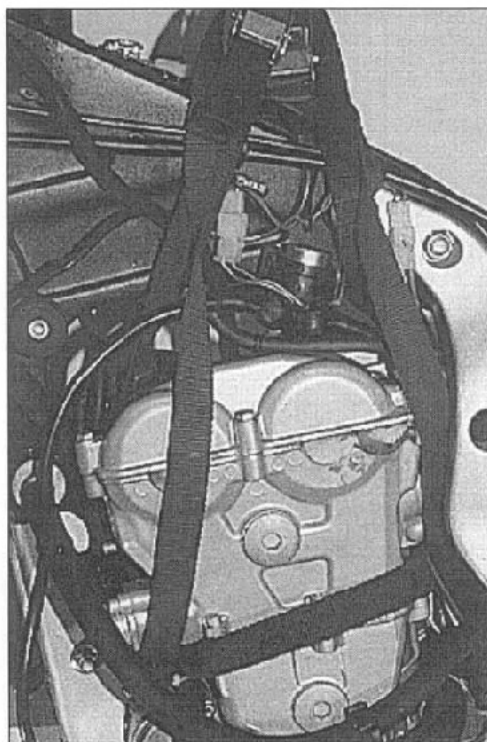


ENGINE

- Sling the engine as indicated in the figure and hook the bands (passing them on the left side of the frame) to a hoist for support.



The bands and the hoist must be suitable for bearing the weight of the engine, which is about 50 kg, in total safety.



- ♦ Unscrew and remove the two nuts (35-36) and withdraw the two screws (37-38) that fasten the frame to the front part of the cradle.

Nut/screw (35-36/37-38) driving torque:
50 Nm (5 kgm).

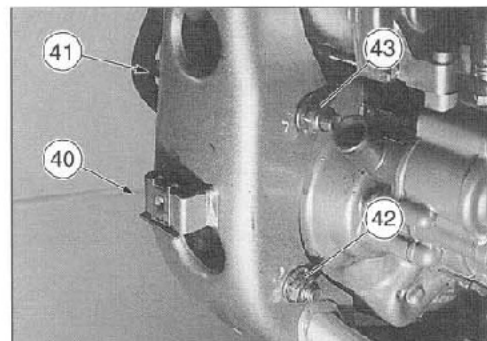
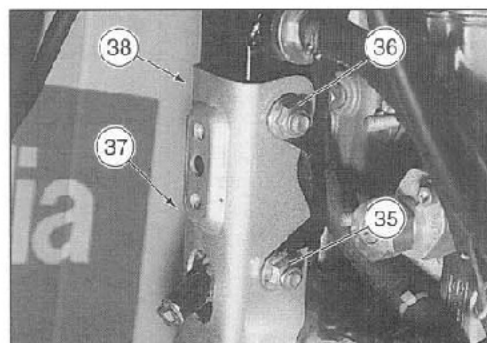
- Take the pipe covering plate (39).



When reassembling the pipe covering plates, position the oil breather pipe (27), the engine oil pipe (29) and the coolant compensating pipe correctly with respect to one another.

- ♦ Unscrew and remove the two nuts (40-41) and withdraw the two screws (42-43) that fasten the engine to the cradle.


Nut/screw (40-41/42-43) driving torque:
50 Nm (5 kgm).



- ★ Unscrew and remove the nut (44) and withdraw the screw (45) that fastens the frame to the rear part of the cradle.

Nut/screw (44-45) driving torque:
50 Nm (5 kgm).


- Remove the cradle (46) (complete with side stand and expansion tank front support) by moving it forwards.

 When reassembling the cradle (46), position the coolant compensating pipe and the engine oil pipe (29) inside it.


 NOTE (X)

From this point onward, for the reassembly of the engine on the frame proceed according to the specific procedures, see 3.3 (REINSTALLING THE ENGINE ON THE FRAME).


- Hold the bush (47) and loosen the pin (48).
- Hold the bush (47), unscrew and remove the lock ring (49) by means of the apposite socket spanner, see 1.8 (SPECIAL TOOLS), then take the washer.
- Unscrew the adjusting bush (47) completely.

 The rear fork pin (48) must not be withdrawn completely, rather, it must be left in its position as much as necessary to maintain the connection frame/fork on the right side, thus preventing the whole rear wheel/fork unit from moving downwards and getting therefore misaligned. In this case the reassembly would be particularly difficult.

- Unscrew the pin (48) completely.
- Introduce the apposite tool, see 1.8 (SPECIAL TOOLS), in the adjusting bush (47).
- By means of a rubber hammer, strike the tool slightly until it reaches the end of stroke on the adjusting bush (47).


 Due to the weight (about 50 kg) and dimensions of the engine, the following operations must be performed by two persons. Previously check the execution procedures. The removal must be carried out with the greatest care.

- Unscrew and remove the nut (50) and withdraw the rear lower screw (51) that fastens the engine to the frame.

 After the screw (51) has been withdrawn, the engine will tend to rotate slightly forwards (with fulcrum on the screw "53").

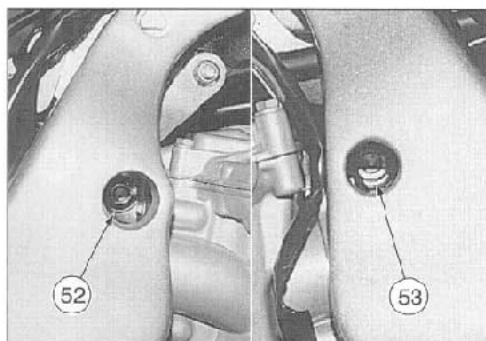
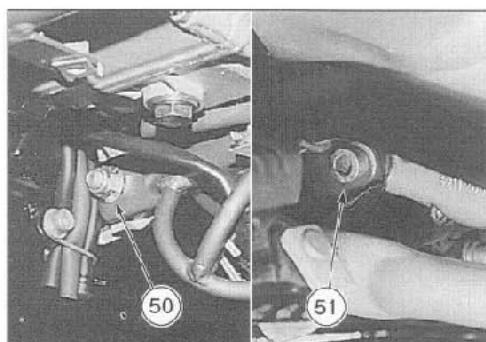
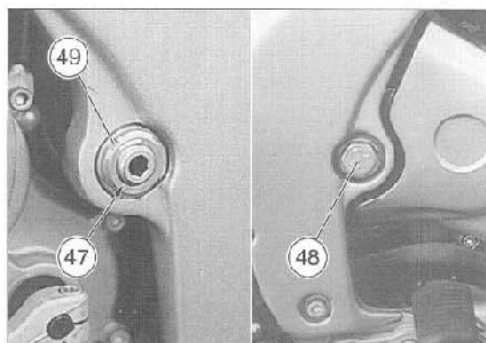
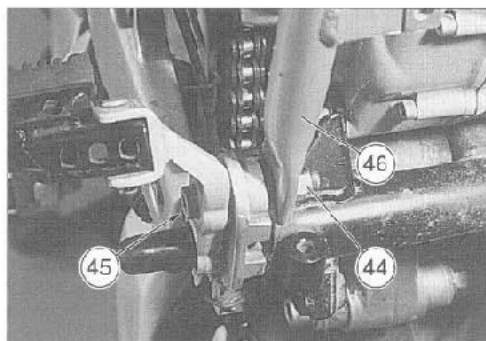
 To facilitate the withdrawing of the screw (51), slightly lift the engine.

- Unscrew and remove the nut (52) and withdraw the upper screw (53) that fastens the engine to the frame, taking the washer.

 The engine is now completely free and is not fixed in any point. Handle it with caution and be careful not to hurt your fingers, arms or legs.

Grasp the engine on the right and left side, in the points where your hold is safer, and extract it from the left side with slight shifts, trying to find the most effective combination of movements.

Place it on the ground on a clean surface and make sure it remains in position by putting wooden blocks around it.



3.3 REINSTALLING THE ENGINE ON THE FRAME

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- Sling the engine as indicated in the figure and hook the bands to a hoist for support.



The bands and the hoist must be suitable for bearing the weight of the engine, which is about 50 kg, in total safety.



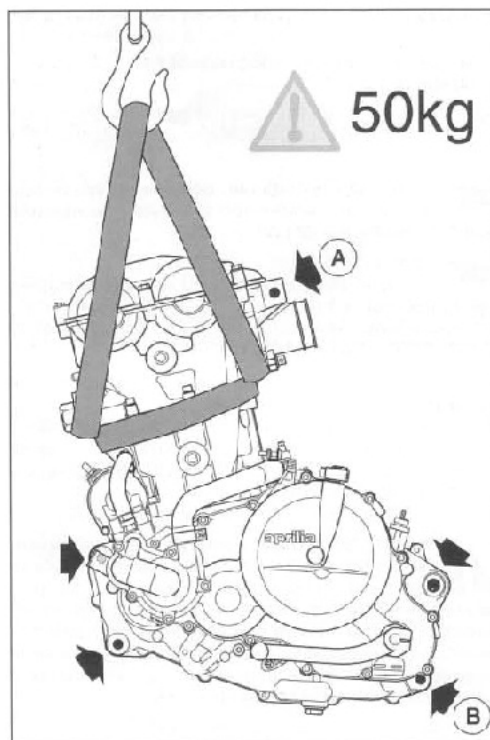
Due to the weight (about 50 kg) and dimensions of the engine, the following operations must be performed by two persons. Previously check the execution procedures. The reinstallation must be carried out with the greatest care.



Handle with caution.

Be careful not to hurt your fingers, arms or legs.

- Firmly grasp the engine and put it in the right position on the frame on the left side of the vehicle.
- Shift the engine with slight movements until reaching the perfect alignment of the holes "A" for the fastening of the engine to the frame.

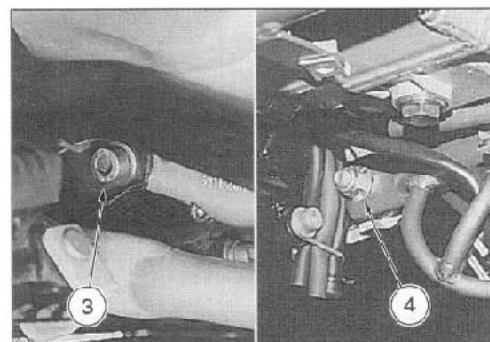
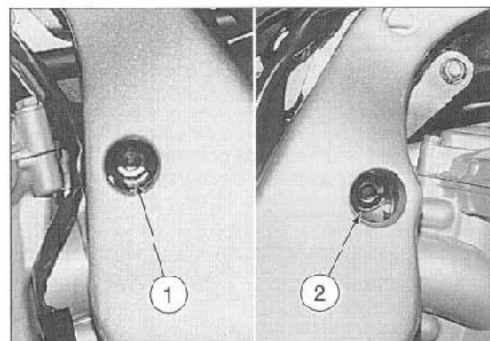


- Introduce the screw (1) with the washer and screw the upper nut (2) that fastens the engine to the frame, without tightening it.
- Push the engine from the front lower side, making it perform a slight backward rotation (with fulcrum on the holes "A"), until the rear lower holes "B" for the fastening of the engine to the frame are perfectly aligned, and at the same time introduce the fastening screw (3) and screw the nut (4).

Nut/screw (4-3) driving torque:
50 Nm (5 kgm).

- Tighten the nut (2).

Nut/screw (2-1) driving torque:
50 Nm (5 kgm).



! In the first phase, the pin (5), the adjusting bush (6) and the lock ring (7) must be screwed by hand.

- Introduce and screw the pin (5) that fastens frame, engine and rear fork, holding the adjusting bush (3) and using the apposite socket spanner, see 1.8 (SPECIAL TOOLS).
- Screw the adjusting bush (6) until it reaches the end of stroke, then give it another one fourth turn.

Tightening of the adjusting bush (6):
contact + one fourth turn.

- Hold the adjusting bush (6) and tighten the fork pin (5).
- **Pin (5) driving torque: 100 Nm (10 kgm).**
- Put back the washer.
- Hold the adjusting bush and at the same time screw the lock ring (7).

Lock ring (7) driving torque:
40 Nm (4 kgm).

! From this point onwards, proceed with the re-installation of the engine on the frame starting from NOTE (X), see 3.2 (REMOVING THE ENGINE FROM THE FRAME) and following the reverse order with respect to the removal.

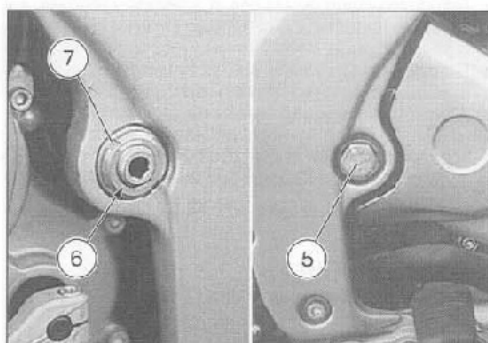
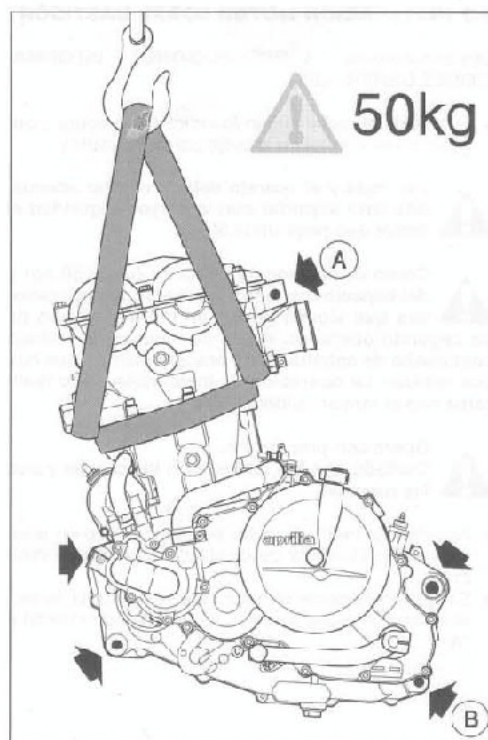
- Top up the expansion tank, see 2.14 (CHECKING AND TOPPING UP COOLANT).
- Top up the engine oil tank, see 2.12 (CHECKING THE ENGINE OIL LEVEL AND TOPPING UP).
- If the engine has been overhauled, bleed the oil delivery pump, see 2.13.1 (AIR BLEEDING FROM OIL DELIVERY PUMP).
- Check the gearing chain tension and if necessary adjust it, see 2.16.1 (CLEARANCE CONTROL) and 2.16.3 (ADJUSTMENT).

! Carry out a general check of all the components involved in the operations mentioned above, and in particular check the following:

- Correct fastening of the electric cables.
- Correct introduction of pipes and couplings.

! Cables, pipes, couplings must be neither twisted nor crushed.

- Clutch, accelerator, cold start cables must all move freely and must not stretch excessively when the handlebar is rotated.
- Correct positioning of the gearshift foot lever.
- Correct oil and coolant level.
- Correct driving torque of the engine fastening screws/nuts.



FUEL SYSTEM

4

FUEL SYSTEM

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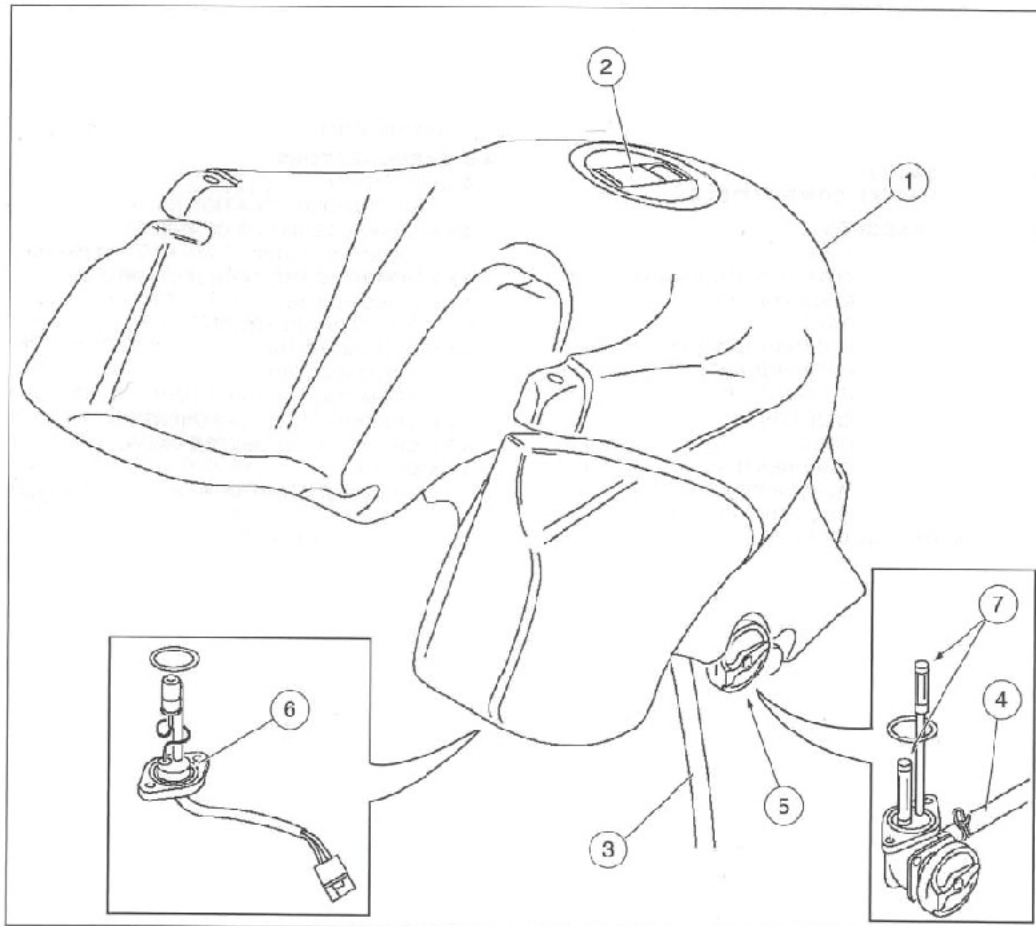
FUEL SYSTEM

4.1 FUEL TANK

The fuel tank is fitted with the filler cap, the cock (with the relevant filters) and the fuel level sensor.

The filler cap is provided with a vent that ensures a slow, regular flow of the fuel from the cock. In the lower part it is also provided with a pipe that permits the drainage of water from the filler cap.

The feed from the tank to the carburetors takes place through gravity.



Key

- 1) Fuel tank.
- 2) Filler cap.
- 3) Water drainage from the fuel tank filler cap.
- 4) Delivery pipe to the carburettor.
- 5) Fuel cock.

Three positions are possible by rotating the lever on the cock: OFF-ON-RES.

OFF = cock closed (both passages are closed).

ON = cock open (the main passage is open).

RES = cock in reserve position (the auxiliary passage opens).

6) Fuel level sensor.

7) Filters on the main cock.

Read 1.2.1 (FUEL) and 1.4 (PRECAUTIONS AND GENERAL INFORMATION).



Fuel vapours are noxious for the health.
Before proceeding, make sure that the room in which you are working is properly ventilated. Do not inhale fuel vapours.
Avoid any contact of the fuel with the skin.
Neither smoke, nor use naked flames.
Do not dispose of fuel in the environment.



4.1.1 MAINTENANCE



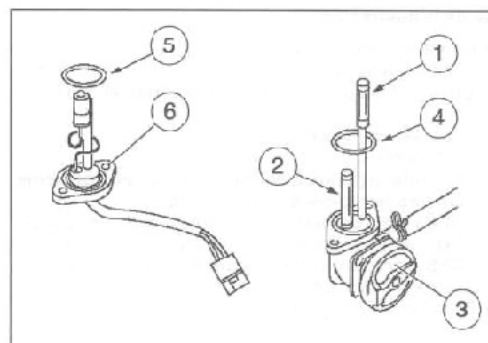
Remember: 1 mile = 1.6 km
1 km = 0.625 miles

Check the fuel cock after the first 1000 km (or 4 months) and successively every 6000 km (or 3 months).

The filters (1-2) located on the cock must be cleaned periodically, see 4.3 (REMOVING THE FUEL COCK), since any impurities in the fuel are held back on the filters and in the long run this may result in the flowing of an insufficient quantity of fuel for the regular running of the engine.



During this operation, it is also advisable to wash the tank completely.



4.1.2 CHECKING THE FUEL SUPPLY

Check the fuel pipes every 6000 km (or 3 months).

If fuel leaks occur near the cock (3) and/or near the fuel level gauge unit (6), this may be caused by damaged O-rings (4-5).

Check their conditions and replace them if necessary, see 4.3 (REMOVING THE FUEL COCK) and 4.4 (REMOVING THE FUEL LEVEL GAUGE UNIT).

Open the fillercap and make sure that the vent on the tank is not clogged; if necessary clean it by means of a compressed air jet.

Fuel pipes showing cracks or cuts must always be changed.

4.2 DRAINING THE FUEL TANK AND THE CARBURETTORS

Read 1.2.1 (FUEL) and 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.



Let the engine cool down until it reaches room temperature.



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

- Position the vehicle on the stand.
- Empty the fuel tank by means of a manual pump or a similar system.
- To drain the float chamber, introduce a flexible pipe (1) (inner Ø 4 mm and length 300 mm) into the draining union of the chamber.
- Position the free end of the pipe (1) inside a container.
- Acting through the hole positioned on the frame (2), open the carburettor drain outlet by loosening the drain screw (3).

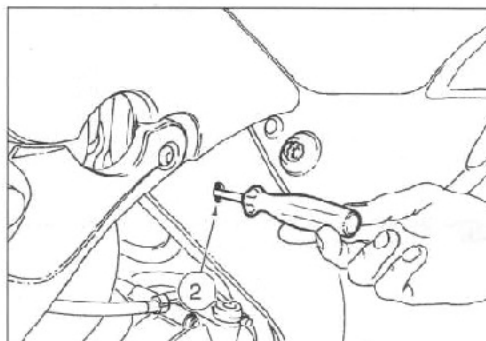
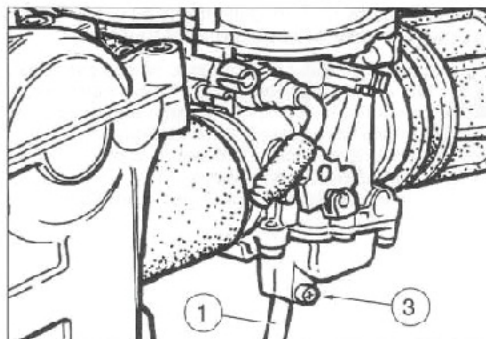
When all the fuel has flowed out:



Tighten the drain screw (3) carefully, to avoid fuel leaks from the carburettor during refilling.



Empty the float chambers of both carburettors.



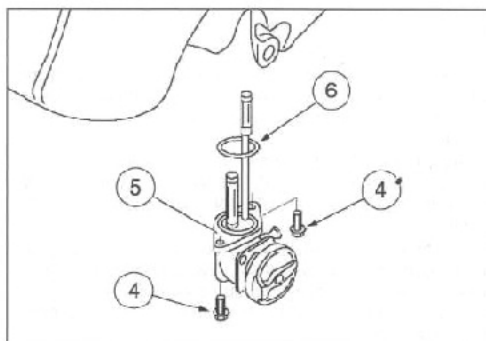
4.3 REMOVING THE FUEL COCK

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- Drain the fuel from the tank, see 4.2 (DRAINING THE FUEL TANK AND THE CARBURETTORS).
- Remove the fuel tank, see 7.1.1 (REMOVING THE FUEL TANK).
- Unscrew and remove the two screws (4).
- Withdraw the cock (5) and take the O-ring (6).



Upon reassembly, make sure that the O-ring (6) is sound and position it correctly.



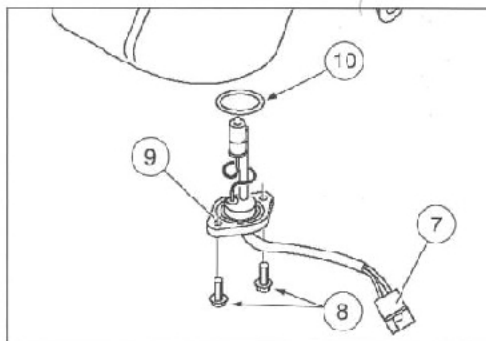
4.4 REMOVING THE FUEL LEVEL GAUGE UNIT

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.


- Drain the fuel from the tank, see 4.2 (DRAINING THE FUEL TANK AND THE CARBURETTORS).
- Disconnect the electric connector (7).
- Unscrew and remove the two screws (8).
- Withdraw the gauge unit (9) and take the O-ring (10).

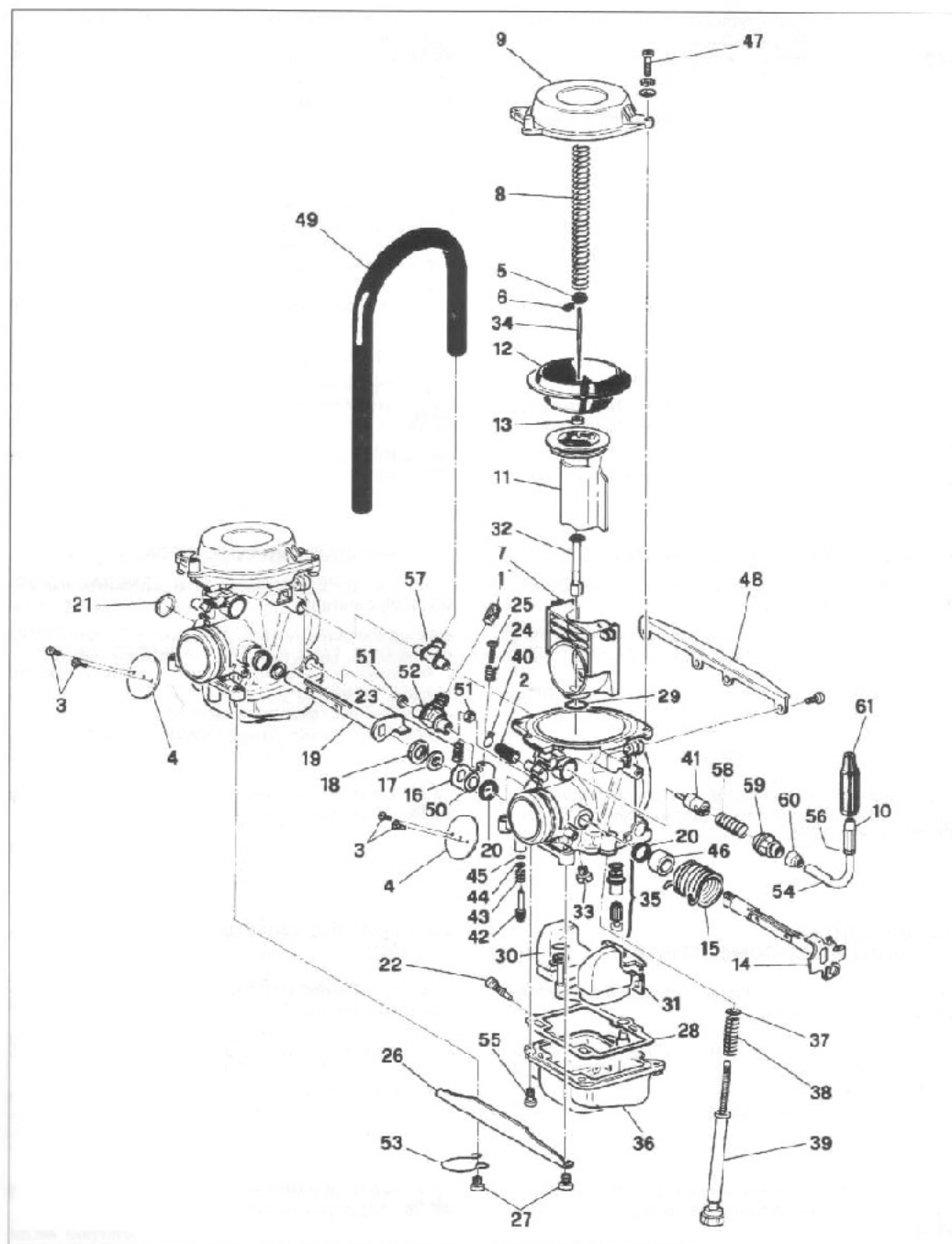


Upon reassembly, make sure that the O-ring (10) is sound and position it correctly.



4.5 CARBURETTORS

 This vehicle is provided with two carburetors that are integral to each other. Their operation is synchronous.



FUEL SYSTEM

Key

- 1) Fuel filter
- 2) Cover
- 3) Screw
- 4) Throttle valve
- 5) Washer
- 6) O-ring
- 7) Valve-holder unit
- 8) Spring
- 9) Cover
- 10) Adjusting nut
- 11) Gate valve
- 12) Membrane
- 13) Ring
- 14) Valve shaft
- 15) Spring
- 16) Adjusting lever
- 17) Washer
- 18) Nut
- 19) Valve shaft
- 20) Ring
- 21) Plug
- 22) Drain screw
- 23) Spring
- 24) Spring
- 25) Screw
- 26) Plate
- 27) Screw
- 28) Gasket
- 29) O-ring
- 30) Float
- 31) Float support
- 32) Spray nozzle
- 33) Max. speed mixture
- 34) Needle
- 35) Needle valve
- 36) Fuel chamber
- 37) Washer
- 38) Spring
- 39) Idling adjuster
- 40) Clamp
- 41) Actuator
- 42) Air screw
- 43) Spring
- 44) Washer
- 45) O-ring
- 46) Ring
- 47) Screw
- 48) Plate
- 49) Breather pipe
- 50) Gasket
- 51) Seal
- 52) Pipe fitting
- 53) Collar
- 54) Bend
- 55) Screw
- 56) Lock nut
- 57) Pipe fitting
- 58) Spring
- 59) Actuator guide
- 60) Rubber element
- 61) Rubber element

4.5.1 POSITION OF THE IDENTIFICATION NUMBER

The carburetors have an identification number, which identifies their characteristics (see figure), stamped on their body (left side).

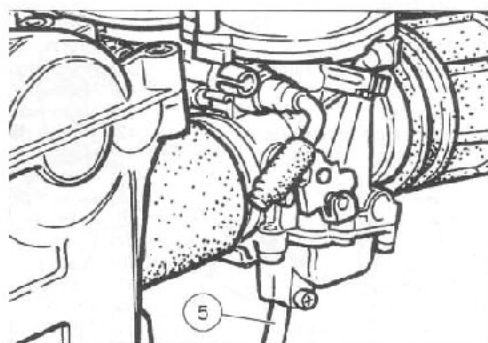
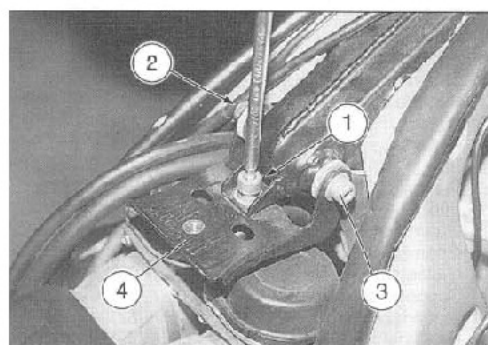
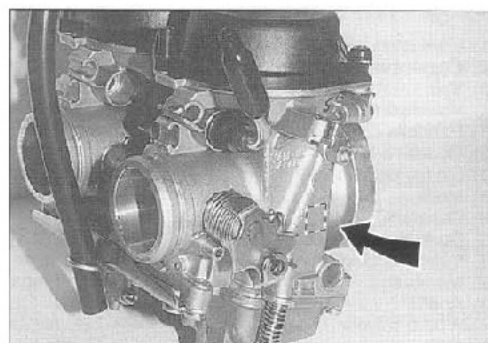
4.5.2 CHARACTERISTICS OF THE CARBURETTORS

COMPONENTS	CHARACTERISTICS
Type of carburetor	MIKUNI BST33
Choke diameter	31,5 mm
Identification number	BST 33 412
Idling	1400 rpm
Main jet (M.J.)	107,5
	110 A CH
Needle (J.N.) 6gh8-55-2	5E 76 - 2
Spray nozzle (N.J.)	0 - 2
Idling mixture jet (P.J.)	17,5
By-pass (B.P.)	Ø 0,8
Idling mixture outlet (P.O.)	Ø 0,8
Valve seating (V.S.)	Ø 2,3
Starting jet (G.S.)	65
Idling air jet (P.A.J.)	Ø 1,5
Air screw (P.S.)	2 revolutions (standard adjustment)
Accelerator cable clearance	2 mm

4.5.3 REMOVING THE CARBURETTORS

Read 1.2.1 (FUEL) and 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- Position the vehicle on the centre stand OPT, or on an apposite support stand fixed to the couplings of the centre stand.
- Drain the fuel from the tank and from the carburetors, see 4.2 (DRAINING THE FUEL TANK AND THE CARBURETTORS).
- Remove the fuel tank, see 7.1.1 (REMOVING THE FUEL TANK).
- Remove the sides, see 7.1.4 (REMOVING THE RIGHT AND LEFT SIDES).
- Remove the exhaust silencers, see 7.1.10 (REMOVING THE EXHAUST SILENCERS).
- Unscrew and remove the screw (1), taking the washer.
- Unscrew and remove the nut (2).
- Withdraw the screw (3), taking the washer.
- Remove the plate (4) that supports the fuel tank.
- Withdraw the drain pipe (5) from the float chamber.

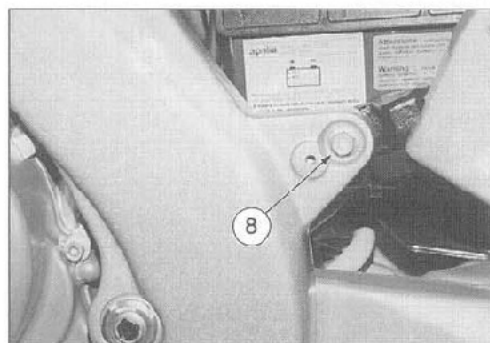
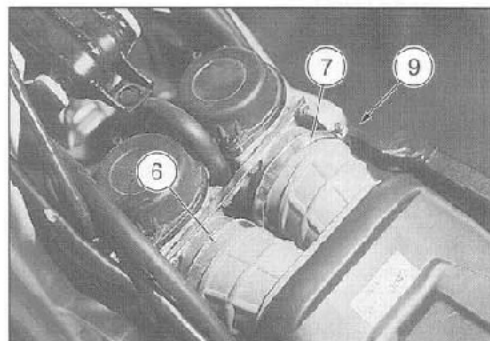


FUEL SYSTEM

- ▶ Loosen the two clamps (6-7).
- ▶ ★ Loosen the saddle pillar lower fastening screw (8) by giving it about one turn.
- ★ Screw (8) driving torque: 25 Nm (2,5 kgm).
- ▶ ★ Unscrew and remove the saddle pillar upper fastening screw (9) and take the washer.
- ★ Screw (9) driving torque: 25 Nm (2,5 kgm).

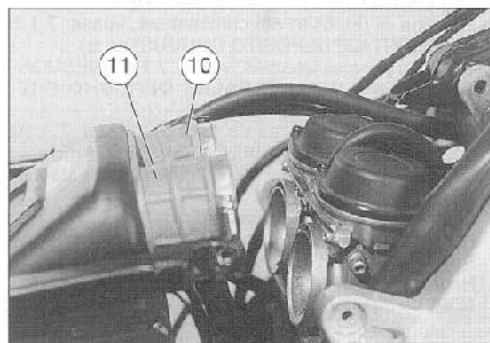
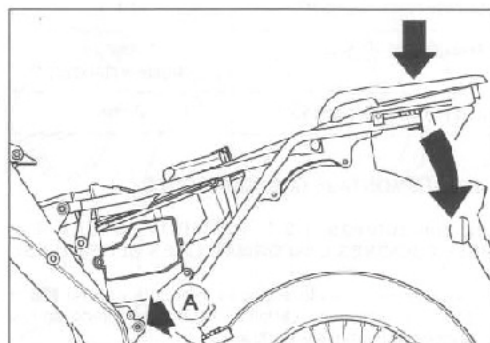
NOTE (Y)

From this point onwards, for the reinstallation of the carburetors proceed according to the specific procedures, see 4.5.4 (REINSTALLING THE CARBURETTORS).



- ▶ Strike the luggage rack with the palm of your hand (firmly, but moderately) until the whole saddle pillar/filter case unit performs a slight downward rotation (with fulcrum in "A"), thus allowing the two couplings (10-11) to be released from the carburetors.

! Do not make the saddle pillar/filter case unit rotate more than is necessary to extract the carburetors.

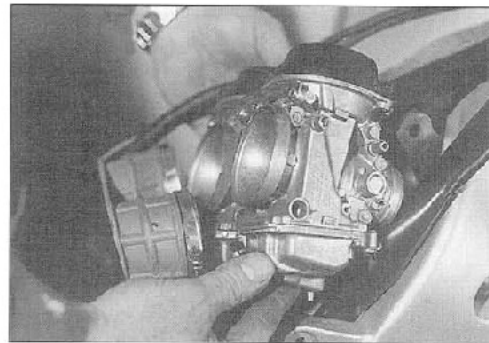
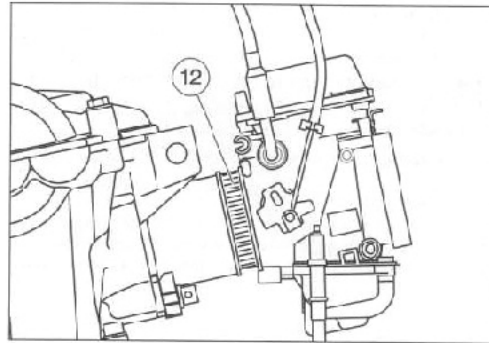


- ◆ ★ Loosen the clamp (12).



Do not extract the carburetors completely, but only as much as necessary to facilitate the disconnection of the accelerator cable and of the cold start device cable.

- ◆ Grasp the carburetors firmly with your hands and withdraw them from the two manifolds on the cylinder, by shaking them moderately in vertical direction.

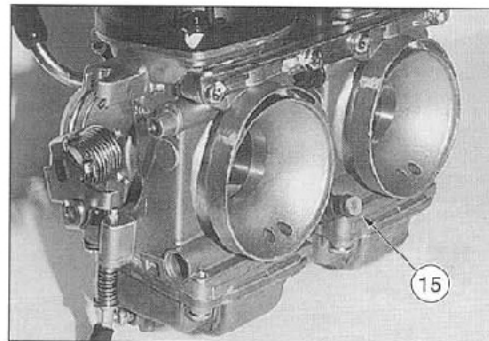
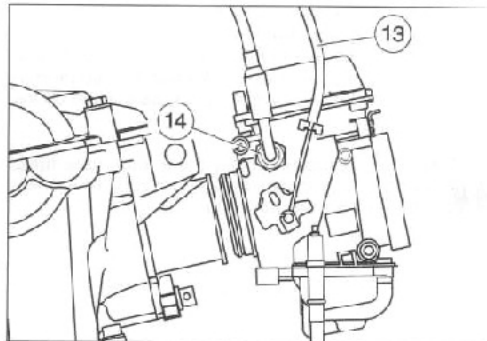


- ◆ Disconnect the accelerator control cable (13) from the left carburettor.
- ◆ Unscrew the fastening screw (14) completely and withdraw the whole cold start device.
- ◆ Remove the carburetors completely.



Plug the coupling openings (on cylinder and filter case), to avoid any accidental introduction of foreign matters.

- ◆ Before proceeding to the reinstallation of the carburetors, withdraw the fuel pipe from the pipe fitting, extract the filter (15) and clean it.



4.5.4 REINSTALLING THE CARBURETTORS

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

! Before proceeding to the reinstallation of the carburetors, make sure that the two throttle valves (1-2) are perfectly aligned and if necessary adjust the screw (3).

! Tighten the fastening screw (3) moderately, since it is made of plastic.

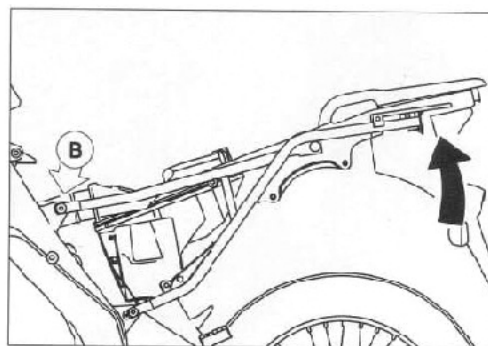
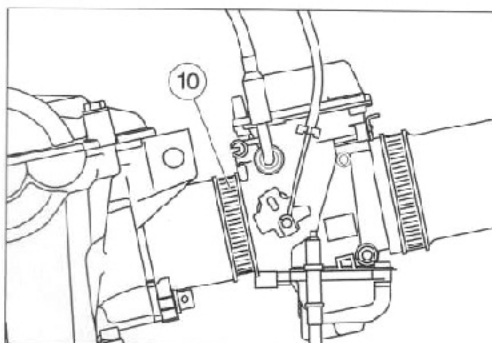
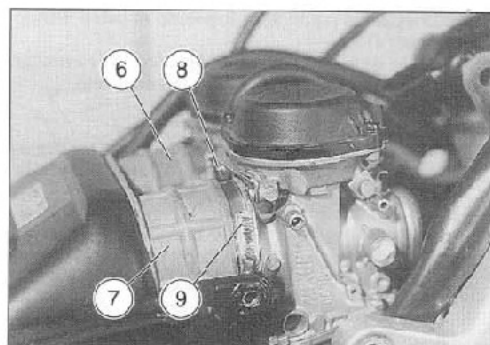
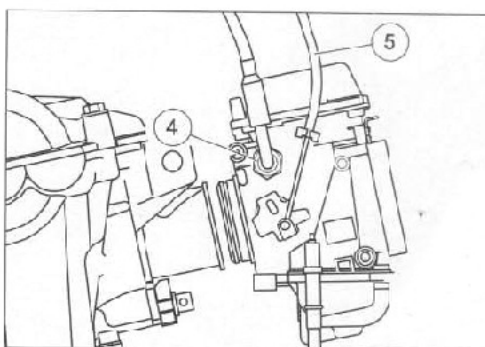
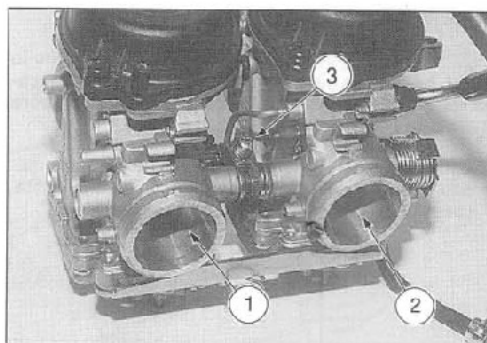
- ♦ Introduce the cold start device in the apposite seat on the left carburetor, tightening the fastening screw (4).
- ♦ Reconnect the accelerator control cable (5) on the left carburetor.
- ♦ Introduce the carburetors in the two manifolds (6-7).
- ♦ Tighten the two screws on the clamps (8-9).
- ♦ Grasp the luggage rack, lift the saddle pillar/filter case unit and gradually insert the carburetors in the two manifolds of the cylinder, at the same time aligning the fastening holes (B).

! Make sure that the carburetors are correctly inserted in the two manifolds of the cylinder.

- ♦ ★ Tighten the screw on the clamp (10).

! From this point onwards, proceed with the reinstallation of the carburetors starting from NOTE (Y), see 4.5.3 (REMOVING THE CARBURETTORS) and following the reverse order with respect to the removal.

! Once the carburetors have been reinstalled, it may be necessary to adjust the accelerator cable, see 2.9 (ACCELERATOR CABLE) and the cold start cable, see 2.10 (COLD START CABLE).



4.5.5 DISASSEMBLING THE MAIN COMPONENTS FROM THE CARBURETTORS

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- Remove the carburetors from the vehicle, see 4.5.3 (REMOVING THE CARBURETTORS).

! The following operations refer to the disassembly of the left carburettor, but are obviously valid also for the right carburettor. If both carburetors are disassembled, be careful not to mix up the components (some of them look alike, but they aren't).

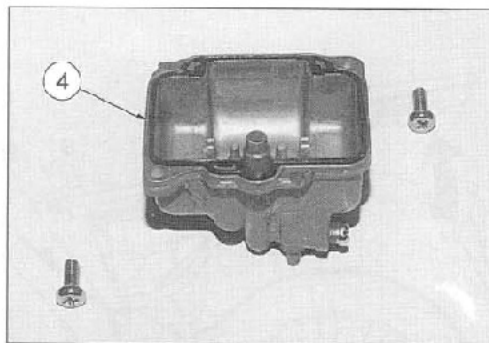
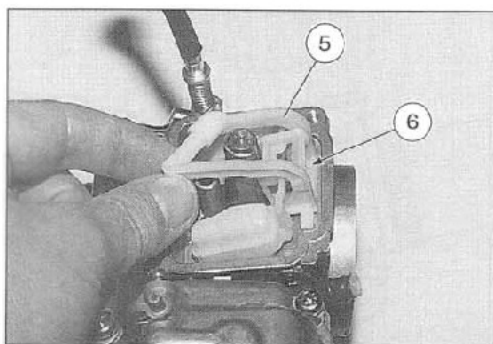
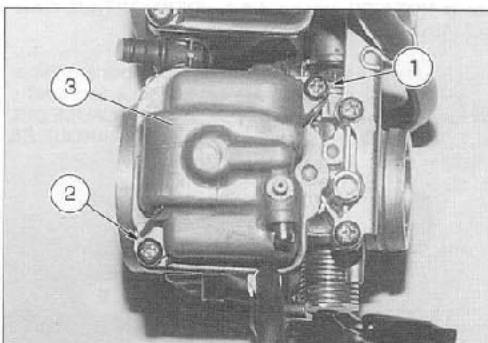
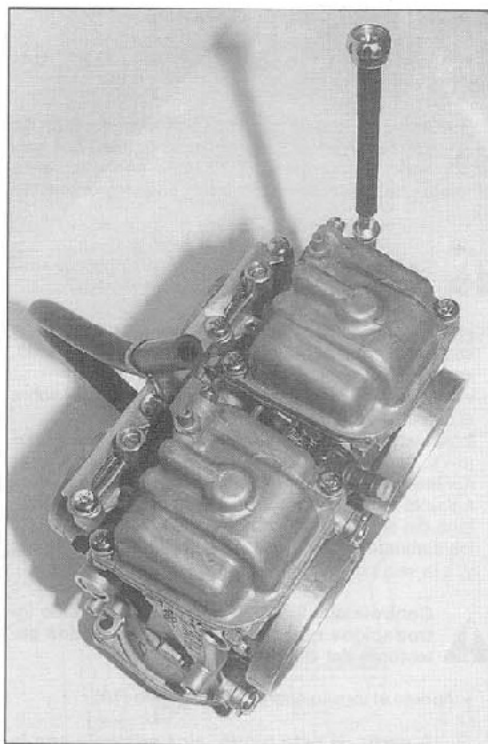
- Position the carburetors with the chambers facing upwards on a clean and clear surface.
- Unscrew and remove the two screws (1-2) that fasten the chamber.
- Lift and remove the chamber (3).

! Upon reassembly make sure that the gasket (4) is not damaged and that it is correctly positioned in the hollow seat on the chamber.

! The disassembly and the successive reassembly of the components must be carried out with the greatest care, since even the slightest damage to any of them may negatively affect the carburetion and therefore the engine efficiency.

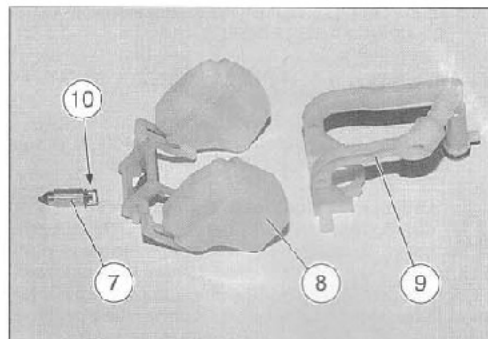
- Firmly press the float unit (5) with two fingers (see figure) and withdraw it from its seat by lifting it.

! Upon reassembly make sure that the needle valve correctly fits in its seat (6).

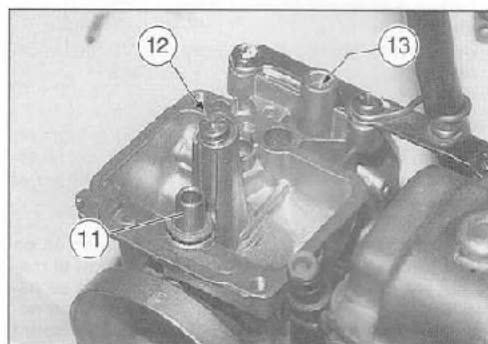


FUEL SYSTEM

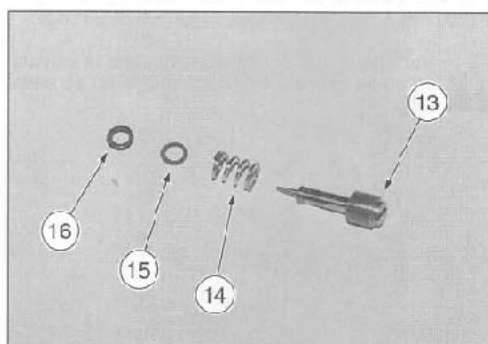
- ♦ By forcing slightly on the two fulcrum points, separate the float (7) from the support (8) and take the needle valve (9), being careful not to damage the clip (10).



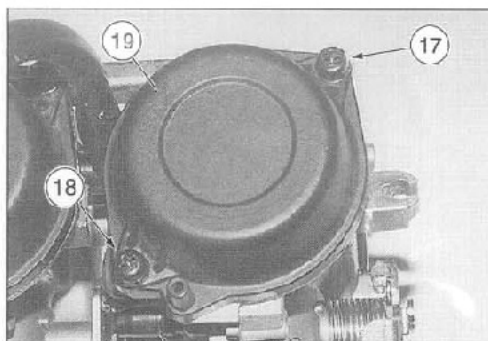
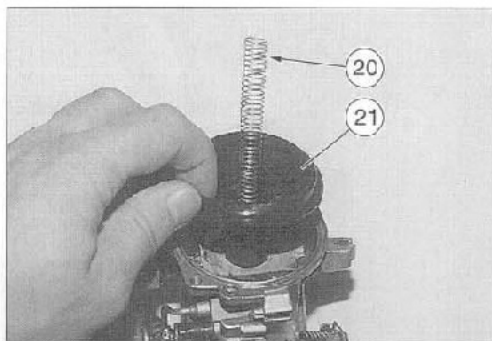
- ♦ Withdraw the needle valve seating (11) and remove it from its housing.
- ♦ Unscrew and remove the maximum speed mixture jet (12).



- ♦ Unscrew and remove the air screw (13), taking the spring (14), the washer (15) and the O-ring (16).
- ♦ Overturn the carburetors.
- ♦ Unscrew and remove the two screws (17-18) and take the washers.
- ♦ Remove the cover (19).
- ♦ Withdraw the spring (20).
- ♦ Take the membrane (21) as indicated in the figure and lift it, thus withdrawing the whole unit.



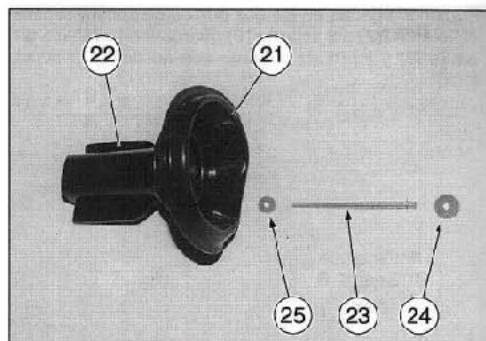
⚠ Upon reassembly make sure that the membrane (21) is sound and that its outer edge is correctly positioned on the hollow seat of the carburettor body.



- Over-turn the membrane/gate valve unit (21-22) and take the conical needle (23), the washer (24) and the ring (25).



Upon reassembly make sure that the conical needle (23) correctly fits in the seat hole.

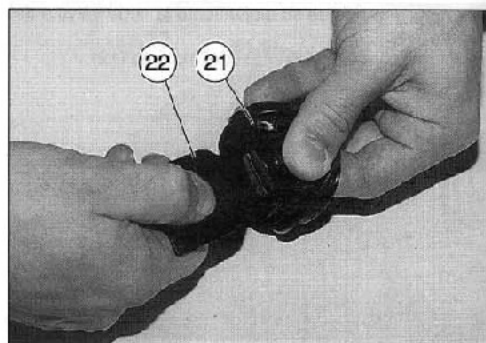


- Proceeding as indicated in the figure, remove the membrane (21) from the gate valve (22).

4.5.6 CHECKING THE COMPONENTS

Make sure that the components listed below are sound, with no damaged point, and that no clogging is present:

- Chamber gasket (4).
- Float (7).
- Support (8).
- Needle valve seating (11).
- Maximum speed mixture jet (12).
- Air screw (13).
- O-ring (16).
- Membrane (21).
- Gate valve (22).
- Conical needle (23).



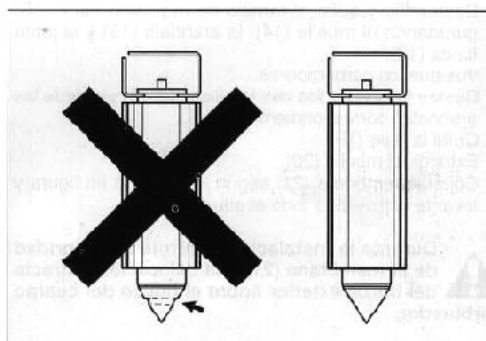
4.5.7 CHECKING THE NEEDLE VALVE

Should any foreign matter enter the carburettor and penetrate between the needle seating and the needle, the fuel will continue to flow until it overflows.

The same problem may arise if the needle is worn beyond the tolerance limit.

If the rubber part of the needle shows evident wear (see figure), change the needle.

Prior to reassembling the components, thoroughly wash with petrol and successively eliminate any residues by means of a jet of compressed air.

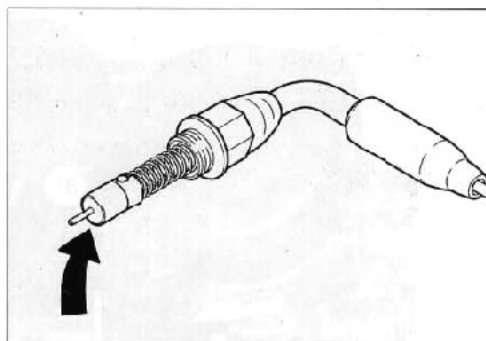


4.5.8 CHECKING THE COLD START DEVICE

Make sure that the device is sound; it must not show dents, scratches, etc.

The rubber part indicated in the figure must not show evident signs of wear.

If you notice any of the anomalies described above, change the device.



COOLING SYSTEM

5

COOLING SYSTEM

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COOLING SYSTEM

5.1 DESCRIPTION

The centrifugal pump (positioned inside the engine and driven by this latter) draws coolant from the coupling (5) and distributes it to the galleries in the cylinder and in the head, in order to cool the overheated parts of the engine.

The warmed liquid that comes out of the head meets:

- The thermistor (1) that takes its temperature and transmits the relevant value to the coolant temperature indicator (2) (on the dashboard) that displays it.
- The radiator (3) through the coupling (4): the fluid first occupies its upper part and then flows to the lower part and out of the coupling (5).
- The thermostatic valve (type with heat-sensitive wax) that, according to the coolant temperature, regulates its flow into the radiator (3).
At 60° - 70°C the thermostatic valve starts opening; at about 85°C it opens completely and lets the fluid flow with maximum delivery.

For further information, see the ENGINE SERVICE MANUAL, n. 933 (E-UK) / n. 934 (I-E-F).

The radiator is provided with the thermal switch (6), which snaps and operates the electrofan (7) if the liquid temperature in this area reaches 90°C.

When the operation of the electrofan brings the coolant temperature back to 80°C, the thermal switch snaps again and disconnects the electrofan.

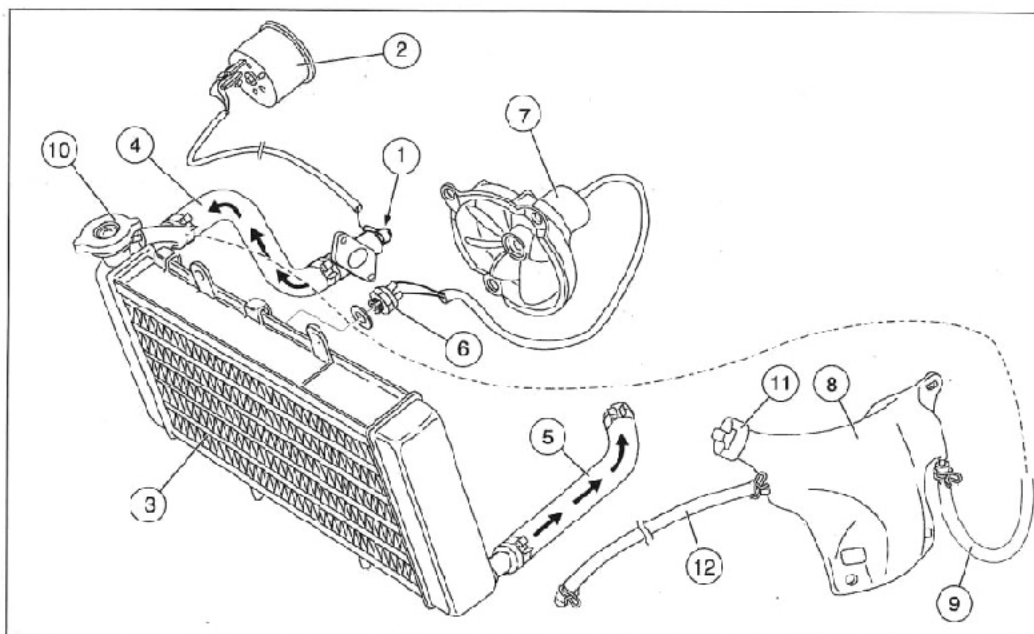
The coolant volume increase (caused by the temperature increase) is compensated for in the expansion tank (8), through the pipe (9).

5.1.1 COOLANT

For any information regarding the coolant, see 1.2.5 (COOLANT).

Key:

- 1) Thermistor
- 2) Coolant temperature indicator
- 3) Radiator
- 4) Coupling to radiator
- 5) Coupling from radiator
- 6) Thermal switch
- 7) Electrofan
- 8) Expansion tank
- 9) Coolant compensating pipe
- 10) Radiator plug
- 11) Expansion tank plug
- 12) Breather pipe



5.2 REMOVING THE RADIATOR

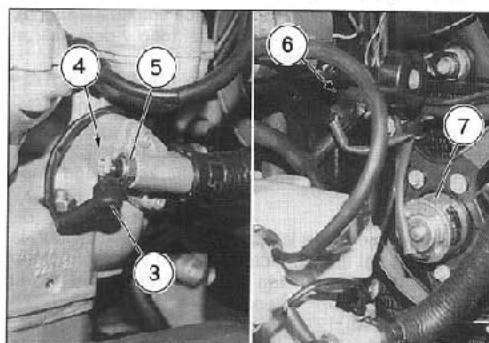
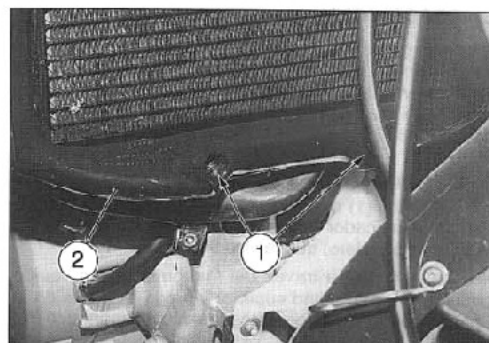
Read 1.2.5 (COOLANT) and 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- Position the vehicle on the stand.



Let the engine cool down until it reaches room temperature.

- Drain the cooling circuit completely, see 2.15 (CHANGING THE COOLANT).
- Remove the fuel tank, see 7.1.1 (REMOVING THE FUEL TANK).
- Remove the front fairing, see 7.1.14 (REMOVING THE FRONT FAIRING).
- Unscrew and remove the screws (1).
- Remove the air conveyor (2).
- Withdraw the protection element (3) and disconnect the electric terminal (4) from the thermistor (5).
- Disconnect the electric connector (6) of the electrofan (7).



Release all the cables and pipes from the fastening clamps positioned along them. Get other clamps to be used for the reassembly.

- Disconnect the two electric connectors (8-9) from the thermal switch (10).
- Move the pipe clamp (11) and withdraw the coolant compensating pipe (12) through the filler neck.



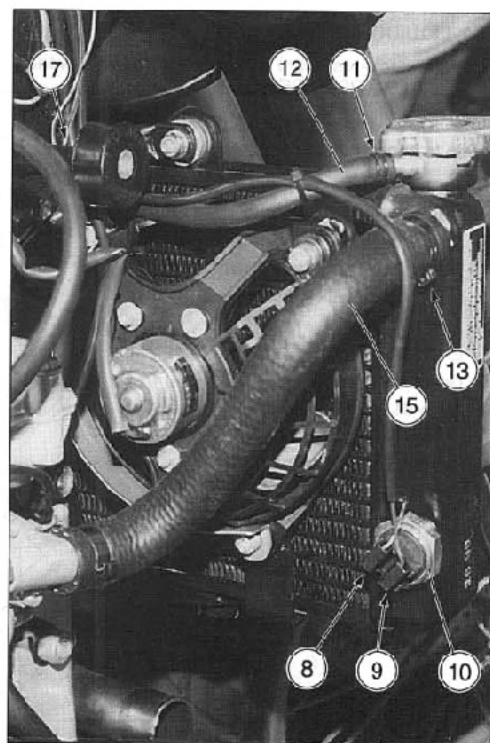
Get screwdriver-type pipe clamps, to replace the original ones (special type without screw).

- Cut the head of the pipe clamps (13) and (14).




Upon reassembly, replace the clamps (13) and (14) with new ones.

- Withdraw the two couplings (15) and (16) from the radiator connections.



COOLING SYSTEM

- ♦ Withdraw the electric cables of the thermistor and of the thermal switch and the compensating pipe (12) from the cable guide ring (17).
- ♦ ★ Unscrew and remove the self-locking nut (18).
- ♦ ★ Withdraw the screw (19), taking the washer and if necessary also the bush and the rubber element.

 **Upon reassembly, position the cable guide ring (20) correctly (on the left side of the vehicle).**



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

- ♦ Incline the radiator (21) slightly forwards and at the same time lift it, withdrawing the two lower anchorage pins (23-24) from their seat on the radiator support (22).
- ♦ Remove the radiator (21), complete with the electrofan (7) and the thermal switch (10).



Plug the coupling openings, to avoid any accidental introduction of foreign matters.

If necessary:

- ♦ Unscrew and remove the thermal switch (10), taking the gasket.
- ♦ Remove the cooling electrofan, see 5.3 5.3 (REMOVING THE COOLING ELECTROFAN) (point six).



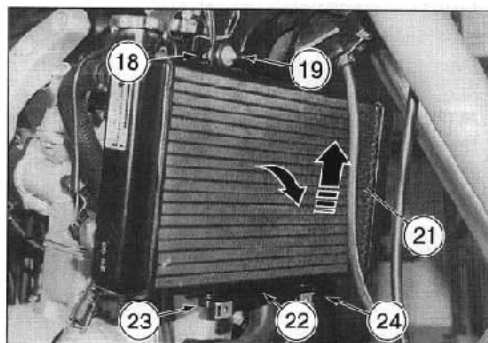
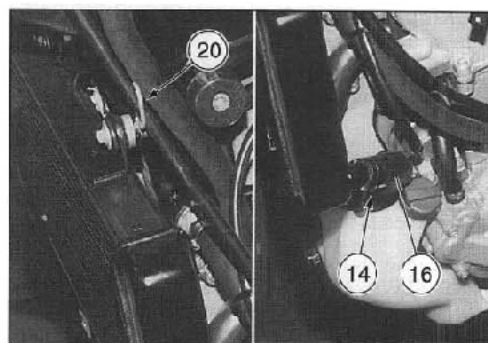
Foreign matters, filth, etc. sticking to the radiator fins must be removed by means of a jet of compressed air.

Any bent fins are to be straightened using a small slotted screwdriver.

If the couplings (15-16) show cuts and/or cracks, they must be replaced.



Before reassembly, thoroughly wash the inside of the radiator with clean water only.



5.3 REMOVING THE COOLING ELECTROFAN

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- Position the vehicle on the stand.



Let the engine cool down until it reaches room temperature.

- Remove the fuel tank, see 7.1.1 (REMOVING THE FUEL TANK).
- Remove the front fairing, see 7.1.14 (REMOVING THE FRONT FAIRING).
- Disconnect the electric connector (1) of the electrofan (2).



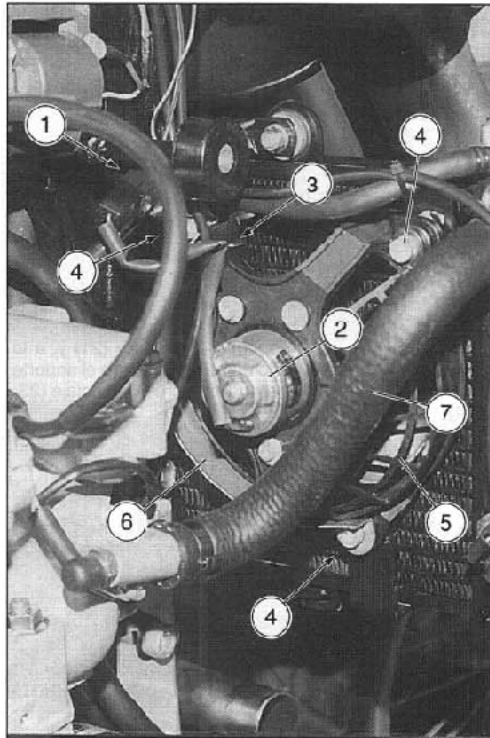
Release the cable from the fastening clamp (3). Get another clamp to be used for the reassembly.

- Unscrew and remove the three fastening screws (4) and take the protection grid (5), the guard (6), the washers and the bushes and rubber elements, if any.



Upon reassembly, correctly position the cable guide ring fixed by the screw (4).

- Remove the whole electrofan (2) withdrawing it downwards and at the same time shift the coupling (7) slightly.



5.4 REMOVING THE COOLANT THERMAL SWITCH

Read 1.2.5 (COOLANT) and 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- Position the vehicle on the stand.



Let the engine cool down until it reaches room temperature.

- Disconnect the electric connectors (8-9) from the thermal switch (10).
- Partially drain the coolant (about half the content), see 2.15 (CHANGING THE COOLANT).



The level of the remaining coolant must be below the hole in which the thermal switch is inserted.

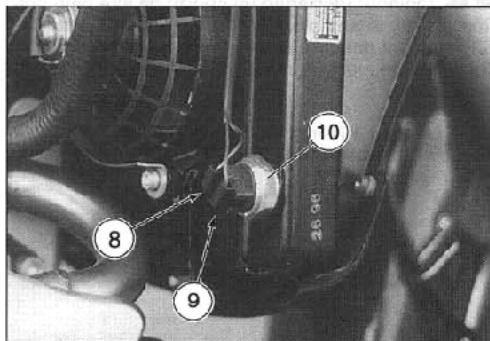
- Unscrew and remove the thermal switch (10) and take the gasket.



Upon reassembly, apply LOCTITE® 574 on the thread of the thermal switch.

Thermal switch (10) driving torque: 30 Nm (3 kgm).

- Top up the expansion tank, see 2.14 (CHECKING AND TOPPING UP COOLANT).



5.5 REMOVING THE COOLANT THERMISTOR

Read 1.2.5 (COOLANT) and 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- ♦ Position the vehicle on the stand.



Let the engine cool down until it reaches room temperature.

- ♦ Withdraw the protection element (1) and disconnect the electric terminal (2).
- ♦ Unscrew and remove the thermistor (3).

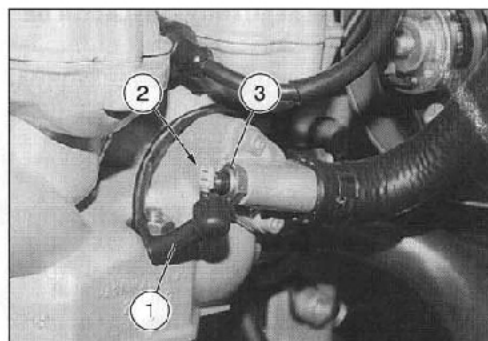


Do not remove the radiator cap and/or the expansion tank cap, otherwise the coolant will overflow.



Upon reassembly, apply LOCTITE® 574 on the thread of the thermistor (3).

Thermistor (3) driving torque: 30 Nm (3kgm).



5.6 REMOVING THE EXPANSION TANK

Read 1.2.5 (COOLANT) and 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- ♦ Position the vehicle on the stand.



Let the engine cool down until it reaches room temperature.

- ♦ Remove the oil pan guard, see 7.1.9 (REMOVING THE OIL PAN GUARD).
- ♦ Withdraw the breather pipe (4) from the pipe fitting.
- ♦ Unscrew and remove the fastening screw (5) and take the brush.
- ♦ Unscrew and remove the fastening screw (6) and take the washer.



The following operation must be performed rather quickly, in order to avoid even the least overflow of coolant from the expansion tank (7).

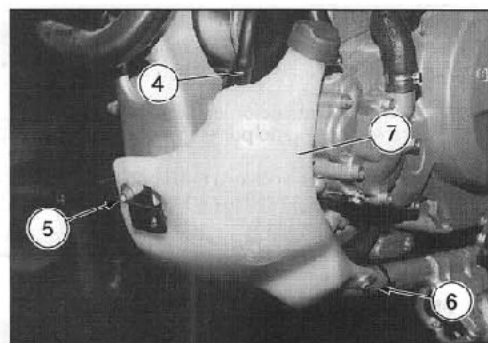
- ♦ Withdraw the pipe (8) and at the same time plug the hole on the expansion tank (7) with a finger.



The coolant is noxious. Put the expansion tank (7) in a safe place.

KEEP AWAY FROM CHILDREN.

- ♦ Remove the expansion tank (7), keeping it right and take the oil pan guard front support.



5.7 THERMOSTATIC VALVE

See the ENGINE SERVICE MANUAL, n. 933 (D-UK) / n. 934 (I-E-F).

5.8 COOLING PUMP

See the ENGINE SERVICE MANUAL, n. 933 (D-UK) / n. 934 (I-E-F).

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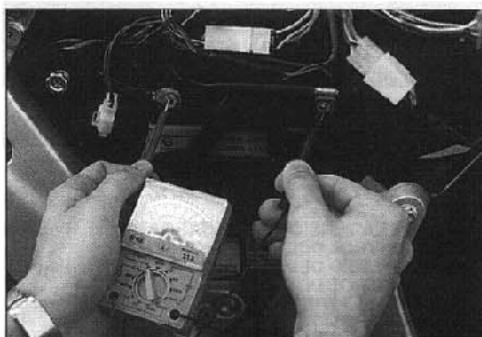
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6.1 CHECKING THE RECHARGING SYSTEM

The following key will be useful in consulting this section.

CABLE COLOURS

Ar	orange
Az	light blue
B	blue
Bi	white
G	yellow
Gr	grey
M	brown
N	black
R	red
Ro	pink
V	green
Vi	violet

**6.1.1 CHECKING THE RECHARGING VOLTAGE**

- Check the electrolyte level, see 2.3.1 (CHECKING THE ELECTROLYTE LEVEL).
- Check battery voltage, see 2.3.2 (RECHARGING THE BATTERY).
- Start the engine and let it run until it reached 5000 rpm.
- Put light switch on position "X" and dimmer switch to position "E".
- Using a pocket tester, take the direct voltage between the positive (+) and negative (-) terminals,

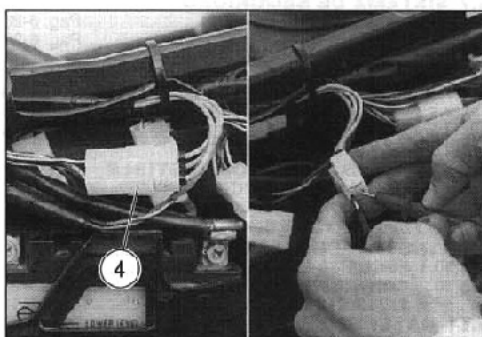
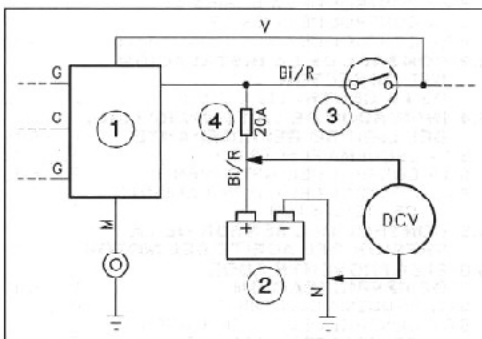
If the tester indicates voltage values lower than 13V or higher than 15 V:

- Check the loadless operation and the continuity of the alternator, see 6.1.2 (CHECKING THE ALTERNATOR LOADLESS OPERATION) and 6.1.3 (CHECKING THE ALTERNATOR CONTINUITY). Also check voltage regulator, see 6.1.4 (CHECKING THE VOLTAGE REGULATOR).

Key of second figure

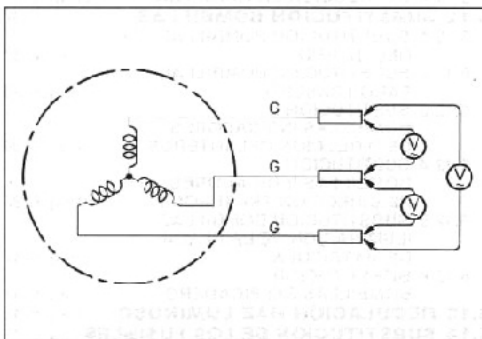
- Voltage regulator
- Battery
- Ignition switch (O - X - A)
- 20 A fuse

Standard charging voltage:
13 to 15 V (d.c.) at 5000 rpm

**6.1.2 CHECKING THE ALTERNATOR LOADLESS OPERATION**

- Remove left side panel cover, see 7.1.4 (REMOVING THE RIGHT AND LEFT SIDES).
 - Disconnect the alternator cable connector (4).
 - Start the engine and let it run until it reaches 5000 rpm.
 - Using a pocket tester, take the voltage (alternating current a.c.) from the three internal male terminals (yellow cables (G)) in rotation.
- If the value indicated by the tester is lower than 70 V, the alternator is defective.

Standard loadless voltage:
more than 70 V (a.c.) at 5000 rpm



ELECTRICAL SYSTEM

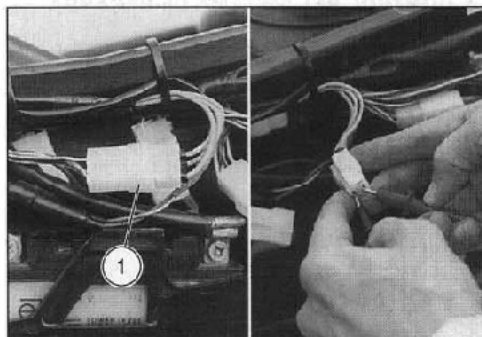
6.1.3 CHECKING THE ALTERNATOR CONTINUITY

With the engine switched off:

- ♦ Remove left side panel, see 7.1.4 (REMOVING THE RIGHT AND LEFT SIDES).
- ♦ Disconnect the alternator cable connector (1).
- ♦ Using a pocket tester, check the voltage continuity between the cables of the stator (on the internal female terminals, yellow cables (G)).
Also check the insulation of the stator support.

Standard resistance value: 0.1 - 1 Ω

Standard value of resistance between stator cables and support: ∞ (infinite)



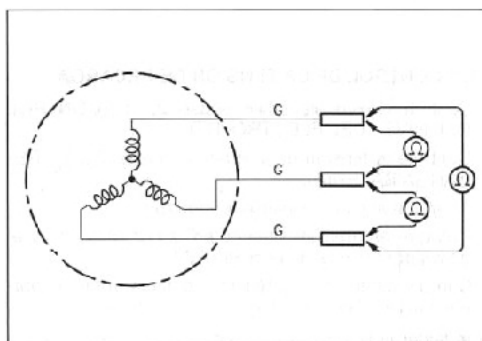
6.1.4 CHECKING THE VOLTAGE REGULATOR

- ♦ Remove saddle, see 7.1.3 (REMOVING THE SADDLE).
- ♦ Disconnect the connectors (2-3).
- ♦ Unscrew and remove screw (4) and disconnect the terminal of cable (5) and cable (6) (earth cables).

! On reassembly, re-connect both cables (5) and (6).

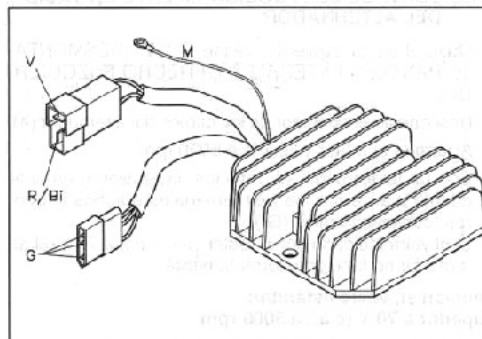
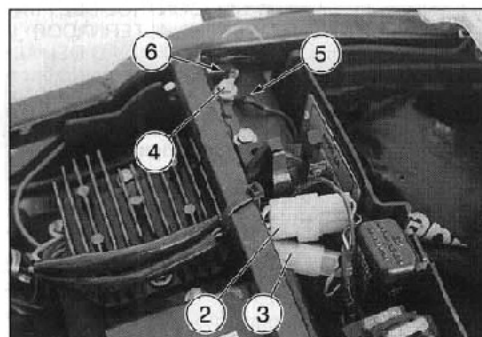
- ♦ Using a pocket tester (scale x 1 k Ω), measure from the regulator side (internal male terminals) the resistance between the cables indicated in the table below.

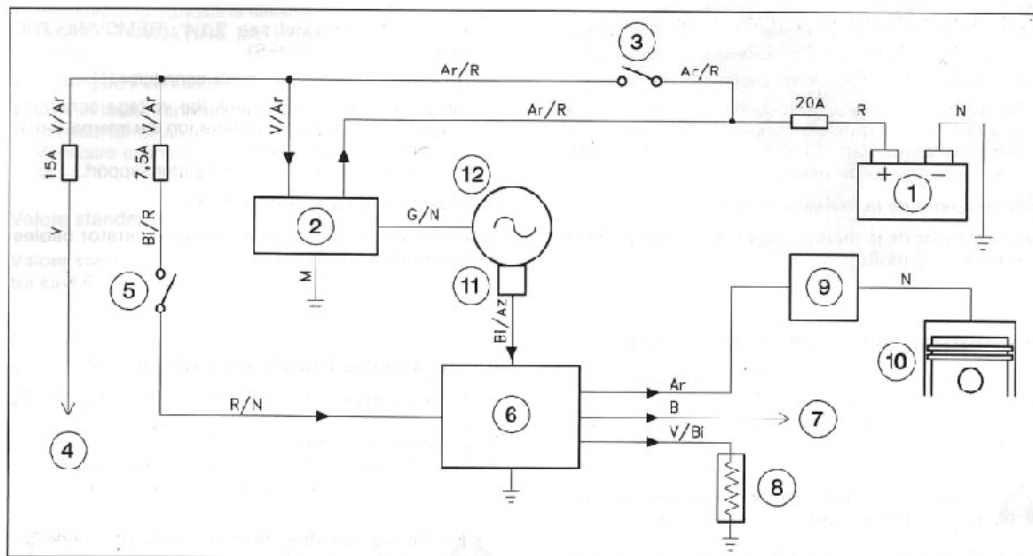
If the resistance measured is not correct, replace the regulator.



		Positive terminal (+) of the tester on:					
		G	G	G	V	R/Bi	M
Negative terminal (-) of the tester on:	G	∞	∞	∞	1 - ∞	∞	1 - ∞
	G	∞	∞	∞	1 - ∞	∞	1 - ∞
	G	∞	∞	∞	1 - ∞	∞	1 - ∞
	V	∞	∞	∞		∞	1 - ∞
	R/Bi	1 - ∞	1 - ∞	1 - ∞	2 - ∞		2 - ∞
	M	∞	∞	∞	1 - ∞	1 - ∞	

! This measuring method is approximate; if possible check the correct operation of the re-charging system using another regulator in perfect condition.





6.2 IGNITION SYSTEM

6.2.1 WIRING DIAGRAM

Wiring diagram key

- 1) Battery
- 2) Voltage regulator
- 3) Ignition switch (○ - ⊗ - ⊕)
- 4) To the auxiliary equipment (lights)
- 5) Engine stop switch (○ - ⊗)
- 6) C.D.I.
- 7) To the starting safety logic (stand, clutch lever)
- 8) Spark advance resistance
- 9) H.V. coil
- 10) Cylinder
- 11) Pick-up
- 12) Generator

6.2.2 CHECKING THE H.V. COIL

- Remove fuel tank, see 7.1.1 (REMOVING THE FUEL TANK).
- Disconnect the terminal (13) from the H.V. coil (9).
- Slip off the spark plug cap (14) and disconnect it from cable.
- Measure the values of (A) and (B) indicated in the figure by means of a pocket tester.

It is important to check the continuity of the primary and secondary windings.

The reading in Ohms does not necessarily have to be exact but if the windings are sound, the resistance values must correspond approximately with those indicated.

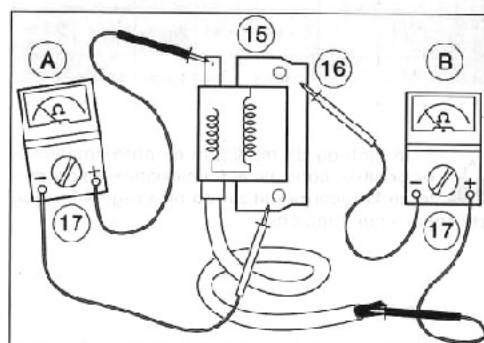
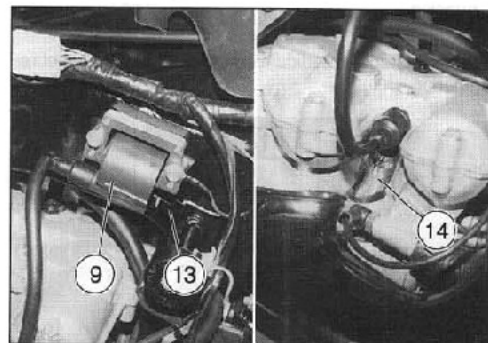
Figure key

A-B Measurements

- 15) H.V. coil
- 16) Iron core of coil (earth)
- 17) Tester

Standard values:

- Measurement A : $0,1 \pm 0,4 \Omega$
 Measurement B : $6 \pm 12 \text{ k}\Omega$



This measuring method is approximate; if possible, check the correct operation of the coil by replacing the same with another one which surely works.

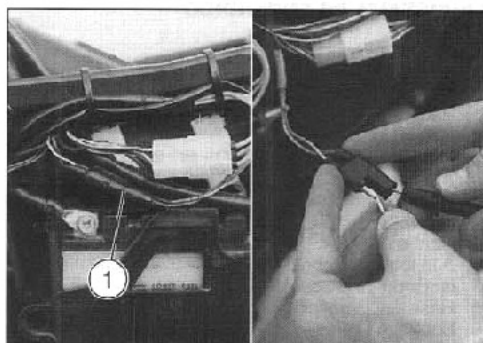
6.2.3 CHECKING THE PICK-UP

With the engine switched off :

- ♦ Remove the left side panel, see 7.1.4 (REMOVING THE RIGHT AND LEFT SIDES).
- ♦ Disconnect the connector (1) and take the measurements (on the pick-up side terminals).
- ♦ Using a pocket tester (scale $\times 100\Omega$) measure the resistance between the terminals of the blue/yellow (B/G) and green/white (V/Bi) cables.

Standard value: $150 \pm 350 \Omega$

If the resistance is infinite (∞), or lower than the prescribed level, the pick-up must be changed.



6.2.4 CHECKING THE C.D.I.

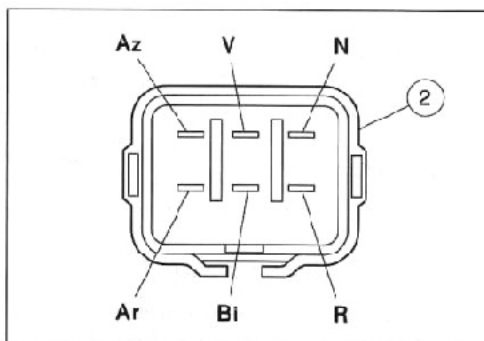
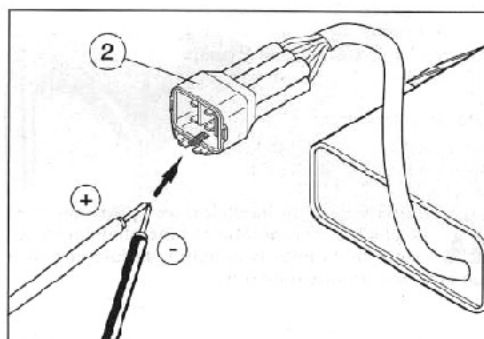
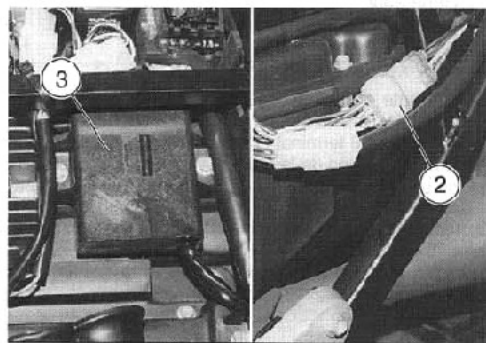
- ♦ Remove the left side panel, see 7.1.4 (REMOVING THE RIGHT AND LEFT SIDES).
- ♦ Free the electric connector (2) from the couplings.
- ♦ Disconnect the electric connector (2) of the C.D.I. (3).
- ♦ Connect the positive (+) and negative (-) terminals of a tester to all the internal male terminals of electric connector (2) C.D.I. side and check the voltage continuity and measuring the resistance value.

If the continuity and resistance values correspond to those indicated in the following table, the C.D.I. may be considered normal.

- ♦ Measure the resistance between the terminals.
- ♦ Tester scale: $\times k\Omega$

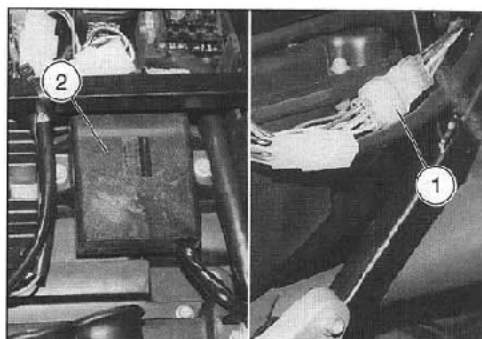
		Positive terminal (+) of the tester on:					
		Az	V	Ar	N	Bi	R
Negative terminal (-) of the tester on:	Az		1 - ∞	1 - ∞	1 - ∞	1 - ∞	1 - ∞
	V	1 - ∞		1 - ∞	1 - ∞	1 - ∞	1 - ∞
	Ar	1 - ∞	1 - ∞		∞	∞	∞
	N	1 - ∞	1 - ∞	1 - ∞		1 - ∞	1 - ∞
	Bi	1 - ∞	1 - ∞	1 - ∞	1 - ∞		1 - ∞
	R	1 - ∞	1 - ∞	1 - ∞	1 - ∞	1 - ∞	

! The C.D.I. contains diodes, condensers and other electronic components therefore the measuring method indicated is approximate. It is advisable to carry out a further check by replacing the C.D.I. with another one known to be in perfect condition, or to carry out the checking operations indicated in chapter 6.3 (CHECKING THE ELECTRICAL SYSTEM FROM THE C.D.I. CONNECTOR).

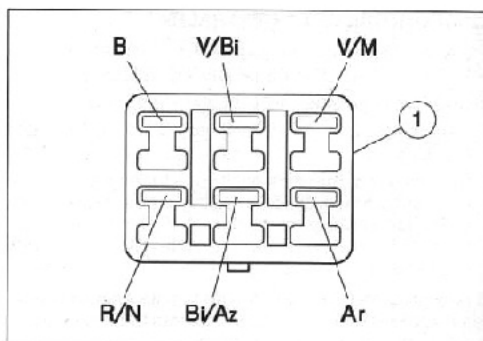


6.3 CHECKING THE ELECTRICAL SYSTEM FROM THE C.D.I. CONNECTOR

- Remove the left side panel, see 7.1.4 (REMOVING THE RIGHT AND LEFT SIDES).
- Disconnect the electric connector (1) of the C.D.I. (2).
- Using a tester, carry out the measurements indicated in the table on the internal female terminals of electric connector (1) on the side opposite the C.D.I.



- Pick-up terminal (white/blue cable (Bi/Az)).
- Supply terminal (red/black cable (R/N)).
- Earth terminal (blue cable (B)).
- F.V. coil terminal (orange cable (Ar)).
- Spark advance resistance terminal (green/white cable (V/Bi)).
- Starting safety terminal (green/brown cable (V/M)).



Cables	Ignition switch in position	Unit of measurement	Value	If value different, check
white/light blue (Bi/Az) and engine earth	⊗	ohm (Ω)	$150 \div 350$	pick-up wiring
blue (B) and engine earth	⊗	ohm (Ω)	$0 \div 1$	wiring
green/white (V/Bi) and engine earth	⊗	ohm (Ω)	$4 \div 11 \text{ k}\Omega$	wiring
orange (Ar) and engine earth	⊗	ohm (Ω)	$0 \div 2$	coil wiring AT
orange/white (Ar/Bi) and engine earth	⊗ (coil primary disconnected)	ohm (Ω)	infinite	wiring
red/grey (R/G) and blue (B)	○ (engine off)	volt (V)	12 V*	wiring of earth alternator, fuses, ignition switch, emergency switch for engine starting.
green/brown (V/M) and blue (B)	⊗	ohm (Ω)	$0 \div 1$ (gear in neutral and stand lifted)	starting safety wiring

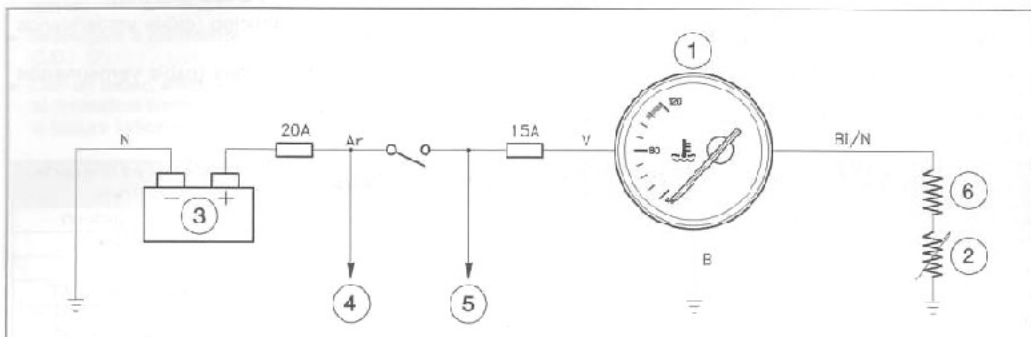
If the values are correct but there is still a malfunction, change the C.D.I., which is certainly defective.

(*) Values must indicate the battery voltage ($\pm 0.5\text{V}$).

ELECTRICAL SYSTEM

6.4 COOLANT TEMPERATURE INDICATOR

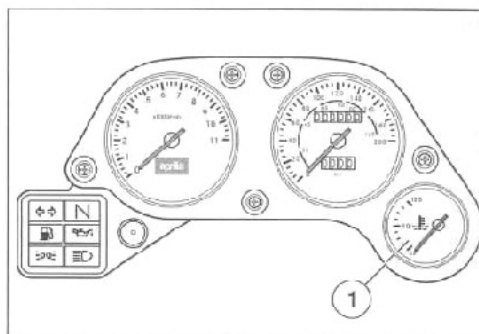
6.4.1 SCHEMA ELETTRICO



6.4.1 WIRING DIAGRAM

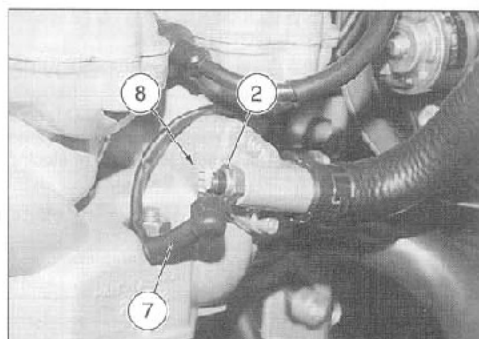
Wiring diagram key

- 1) Coolant temperature indicator (1)
- 2) Thermistor
- 3) Battery
- 4) To cooling fan and voltage regulator
- 5) To ignition
- 6) Resistance

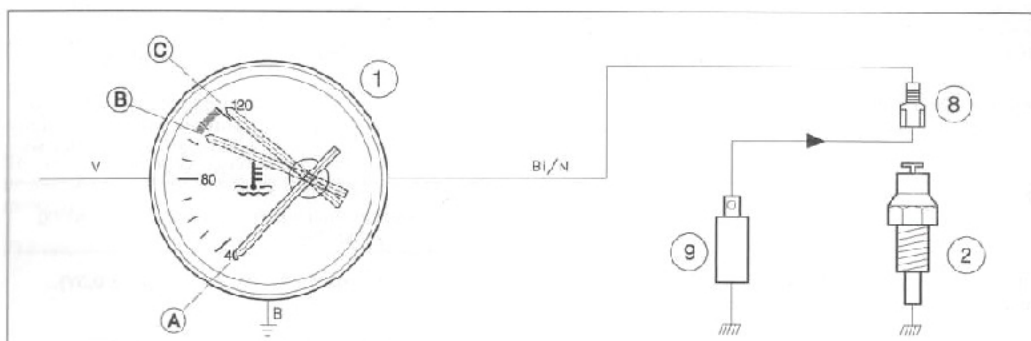


6.4.2 CHECKING THE INSTRUMENT

- Slip off the rubber protection (7).
- Disconnect terminal (8) (white/black cable (BI/N)) from thermistor (2).
- Connect three resistances of 1000 Ω / 65 Ω / 15 Ω to the terminal (9) in succession.
- Rotate ignition switch to "O" position.
- Make sure the pointer is positioned as indicated in figure and in table (A-B-C).

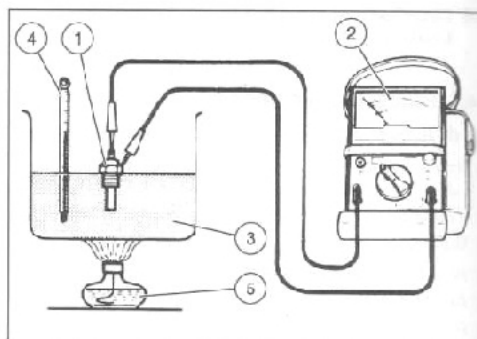


Connected resistance	Position of pointer $\pm 3^\circ$
1000 Ω	40°C (A)
65 Ω	Beginning of the red area (B)
15 Ω	120°C (C)



6.4.3 CHECKING THE THERMISTOR OPERATION

- Remove thermistor (1), see 5.5 (REMOVING THE COOLANT THERMISTOR).
- Connect, as indicated in the figure, a tester (2) (set as an ohmmeter) to the thermistor (1).
- Dip the thermistor in a container (3) holding coolant.
- Dip in the same container a thermometer (4) with a 0° to 150° C range.
- Place the container on a burner (5) and slowly warm up the coolant.
- Check the temperature indicated on thermometer and the thermistor value indicated by the tester.



Make sure that the thermistor varies according to the temperature, as indicated.

Coolant temperature (°C)	Standard values (Ω)
60°	600 - 470
90°	215 - 175
120°	93 - 73



If values do not vary, or if they depart excessively from those indicated in the table, change the thermistor.

6.5 CHECKING THE ENGINE OIL LOW PRESSURE SENSOR

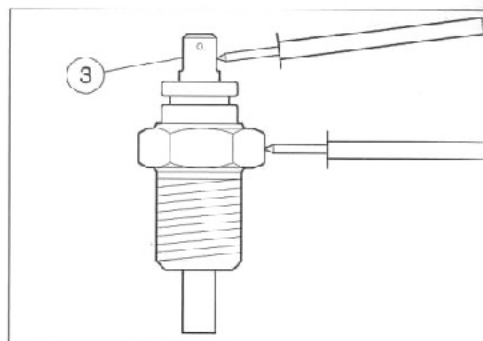
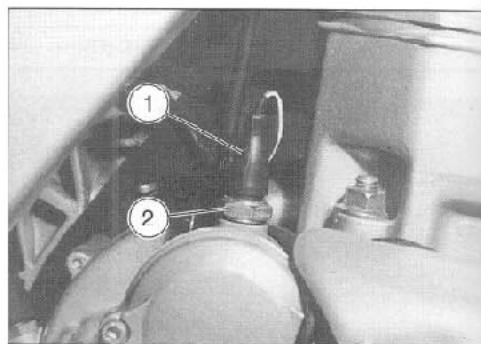
To check the operation of the sensor:

- Slip off the rubber protection (1).
- Disconnect the electric terminal from the sensor (2).
- With a tester (scale x 100Ω) check the continuity between the tongued terminal (3) and the casing of the sensor.

Correct value with engine off : 0 Ω

Correct value with engine in motion: ∞ Ω

If the values do not correspond to the indicated ones, check that the engine oil level is correct and change the sensor if necessary.

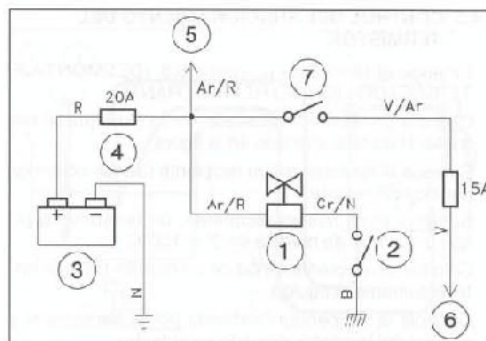


6.6 COOLING ELECTROFAN

6.6.1 WIRING DIAGRAM

Wiring diagram key

- 1) Electrofan
- 2) Thermal switch
- 3) Battery
- 4) Fuse (20A)
- 5) To voltage regulator
- 6) To light loads
- 7) Ignition switch (○ - ● - ■)



6.6.2 CHECKING THE ELECTROFAN OPERATION

To check operation of electrofan (1):

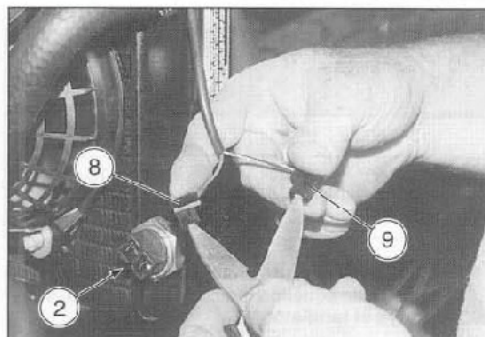
- Disconnect the two electrical terminals (8-9) from the thermal switch (2) and connect them together.

If the electrofan does not function:

- Make sure the connector (10) is correctly inserted.
- Rotate the fan manually, making sure the blades do not touch the support.

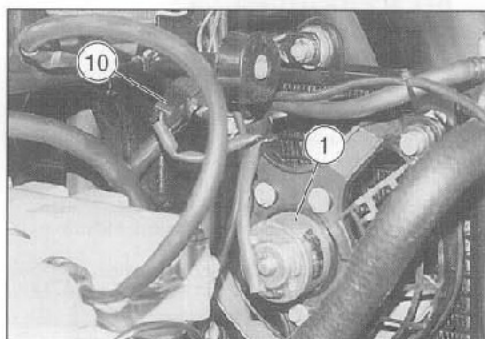
If the rotation is free from impediments:

- Check the recharging system, see 6.1 (CHECKING THE RECHARGING SYSTEM) and the 20A fuse, see 6.14 (CHANGING THE FUSES).



6.6.3 CHECKING THE THERMAL SWITCH OPERATION

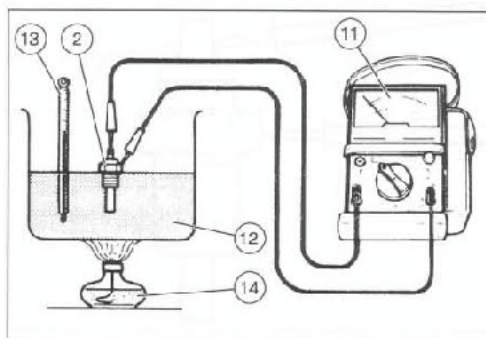
- Remove the thermal switch (2), see 5.4 (REMOVING THE COOLANT THERMAL SWITCH).
- Connect, as illustrated in diagram, a tester (11) (set as an ohmmeter) to the thermal switch (2).
- Dip the thermal switch in a container (12) holding coolant.
- Dip in the same container a thermometer (13) with a 0° to 150°C range.
- Place the container on a burner (14) and slowly warm up the liquid.
- Check that the temperature reading on the thermometer and the value of the thermal switch indicated on the tester correspond to the data in the table.



Coolant temperature (°C)	Standard values (Ω)
below 90°	∞
over 80°	0

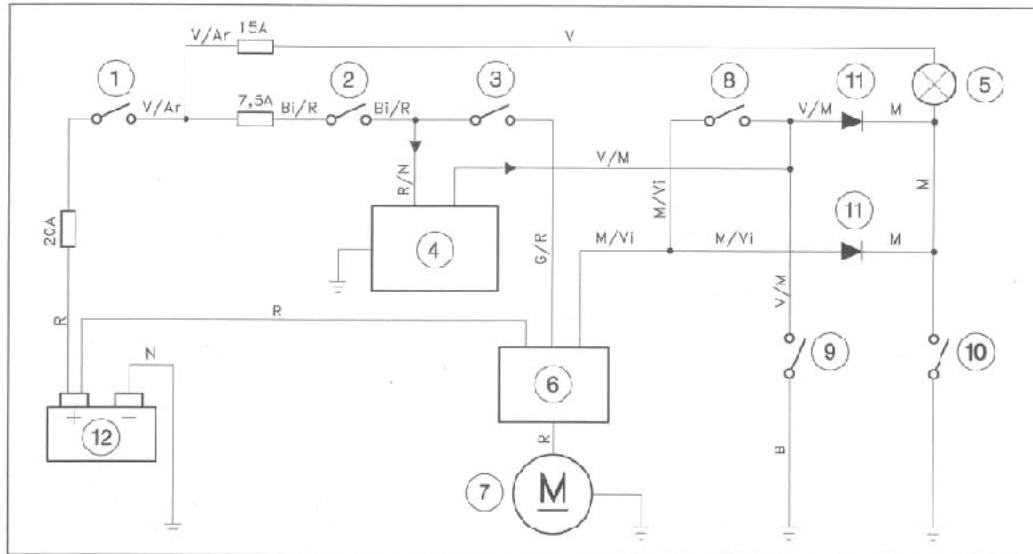


If the values depart excessively from those indicated in the table, change the thermal switch.










6.7 STARTING SAFETY SYSTEM

6.7.1 WIRING DIAGRAM



Wiring diagram key

- 1) Ignition switch ( -  - )
- 2) Engine stop switch ( - )
- 3) Starting pushbutton ()
- 4) C.D. .
- 5) Neutral gear pilot light ()
(green color)
- 6) Starting relay
- 7) Starter
- 8) Clutch lever switch
- 9) Stand switch
- 10) Neutral gear switch
- 11) Diodes
- 12) Battery

ELECTRICAL SYSTEM

6.7.2 STARTING SAFETY OPERATING LOGIC



With the engine stop switch in position "X", the starter does not turn.

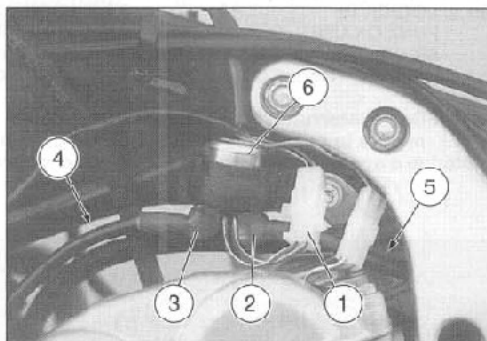
GEAR POSITION	STAND POSITION	CLUTCH LEVER	ENGINE IGNITION	STARTER
IN NEUTRAL	LIFTED	PULLED UP	WORKING	TURNING OVER
		RELEASED		
	LOWERED	PULLED UP		
		RELEASED		
GEAR ENGAGED	LIFTED	PULLED UP	NOT WORKING	NOT TURNING OVER
		RELEASED		
	LOWERED	PULLED UP		
		RELEASED		

ELECTRICAL SYSTEM

6.7.3 CHECKING THE STARTING RELAY

To check operation of relay :

- Remove the fuel tank, see 7.1.1 (REMOVING THE FUEL TANK).
- Disconnect the connector (1).
- Slip off the two rubber protections (2-3).
- Disconnect the cables (4-5) from the relative terminals on relay (6).
- From relay side, feed with a 12V battery the two internal terminals of connector (1).

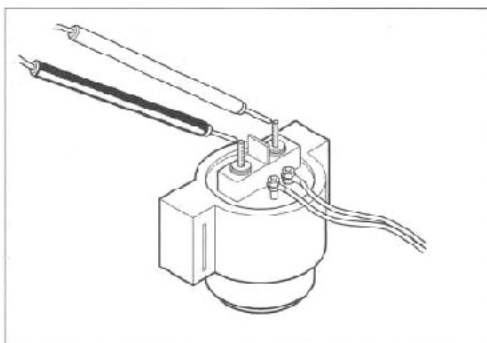


- Using a tester (acting as Ohmmeter) check the continuity between the two screw contacts on the relay.

Correct value with relay fed: 0Ω

Correct value with relay not fed: $\infty\Omega$

If the values do not correspond to those indicated, change the relay.



6.7.4 CHECKING THE STAND SWITCH

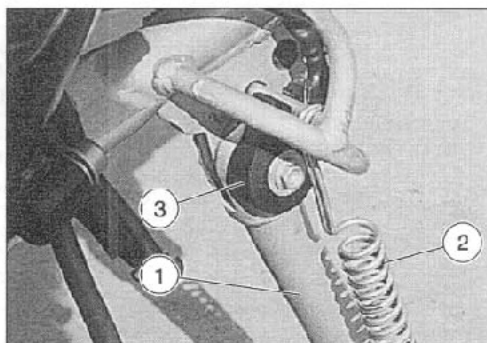
Perform the following checks:

- The stand (1) should rotate freely.
- The springs (2) must not be damaged, rusted and/or weakened.
- The switch (3) must be fixed correctly.

To check the operation of the ignition disabling system:

- Sit on the saddle.
- Lift up the stand and put the gear in neutral.
- Start the engine with clutch pulled and engage the gear.
- Lower the stand.
- At this point the stand will press the switch, causing switching off of engine.

If this does not occur, change the switch.



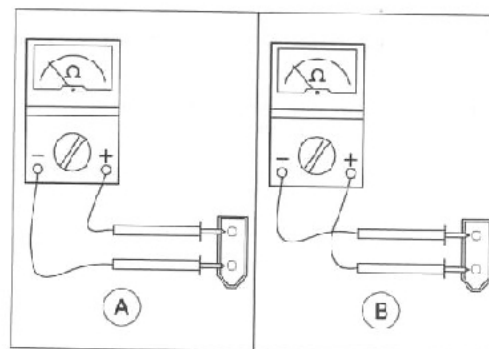
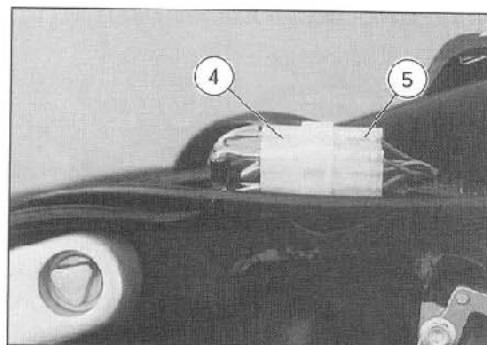
6.7.5 CHECKING THE DIODES

To check operation of diodes:

- Remove the fuel tank, see 7.1.1 (REMOVING THE FUEL TANK).
- Disconnect the two electric connectors holding the diodes (4-5).
- Using a tester (acting as diode tester) check the values between the two internal male terminals of each diode, as indicated in figure.

Correct value (measurement A): 0 to 1

Correct value (measurement B): ∞



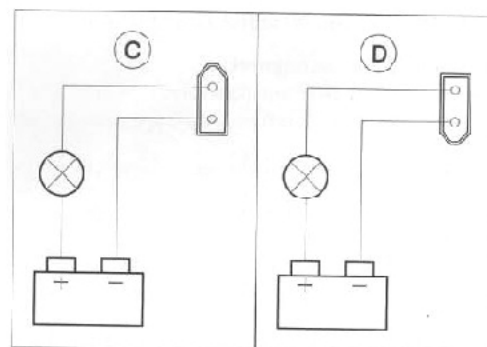
If the tester does not include the diode test function, use a 12V battery and a 12V-2W bulb, connecting the diode as indicated in the figure.



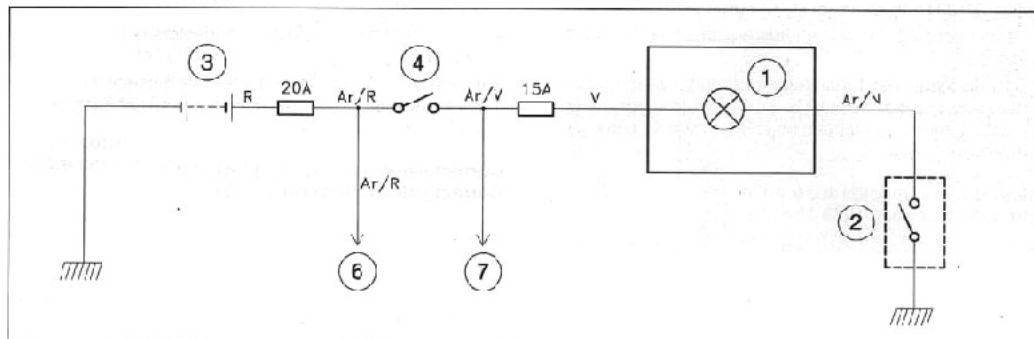
Do not use bulbs over 2W, since the diode may be damaged.

Test (C): the bulb does not light up.

Test (D): the bulb lights up.






6.8.1 SCHEMA ELETTRICO

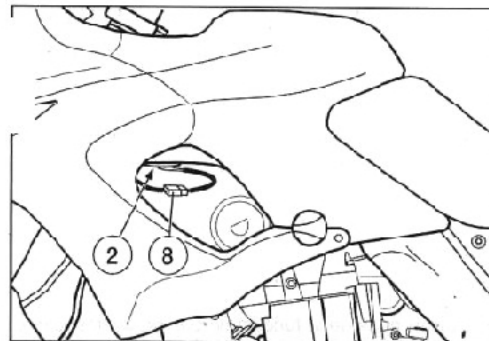


6.8 FUEL LEVEL CIRCUIT

6.8.1 WIRING DIAGRAM

Wiring diagram key

- 1) Low fuel warning light () (amber yellow)
- 2) Fuel level gauge unit
- 3) Battery
- 4) Ignition switch ( - )
- 5) To voltage regulator
- 6) To ignition



6.8.2 FUEL LEVEL INDICATOR

- ♦ Disconnect the electrical connector (8) from the fuel level gauge unit (2).

Checking the operation of the low fuel warning light

- ♦ Directly connect (resistance 0Ω) the orange/black (Ar/N) and blue (B) cables of the connector (8) (harness side); make sure that the low fuel warning light comes on.

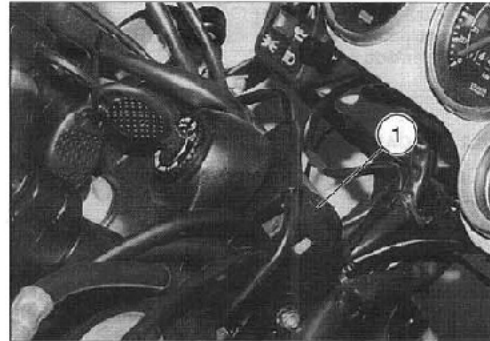
Between cables	Resistance	Correct indication
orange/black (Ar/N) - blue (B)	0 Ω	warning light on

6.9 SWITCHES

Using a tester, check the continuity of the switches, referring to the specific diagram below. In case any anomalies are observed, change the corresponding switch set.

IGNITION SWITCH

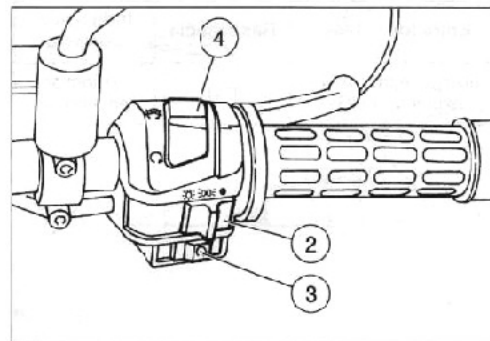
Pos.	Cavi / Cables / Cables			
	Ar	V/N	B	Bi/R



RIGHT SIDE SWITCH SET

- 2) Light switches
- 3) Starting switch
- 4) Engine stop switch

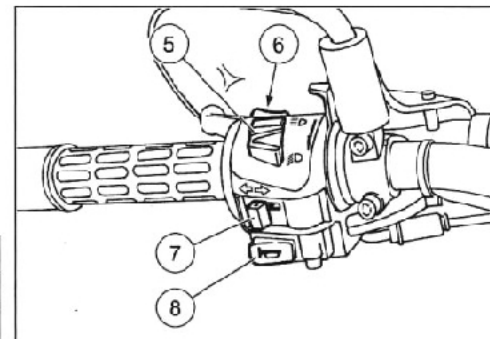
Pos	Cables						
	V/N	R/Gr	R/N	G/R	G/N	V	G
●							
☼	○	—	—	—	○	○	○
≡≡						○	○
Ⓢ				○	—	○	
○		○	○				
☼							



LEFT SIDE SWITCH SET

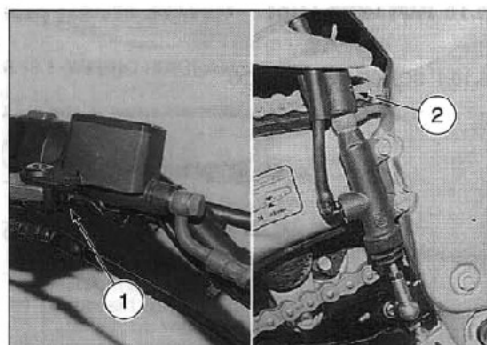
- 5) Dimmer switch
- 6) High beam blinking switch
- 7) Direction indicator switch
- 8) horn push button

Pos	Cables								
	Gr	B	B/N	Az	R	V/N	Bi	N	G/N



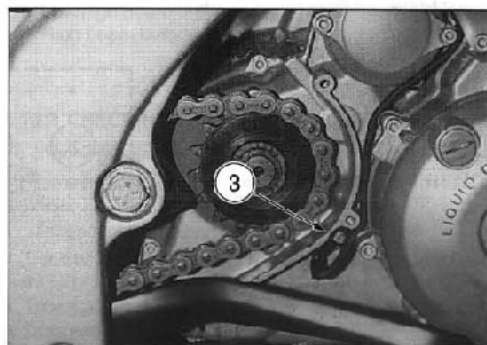
1) FRONT BRAKE STOPLIGHT SWITCH

Pos.	Cavi / Cables / Cables	
	N	N
Azionato Accionado Not operating	<input type="radio"/>	<input type="radio"/>




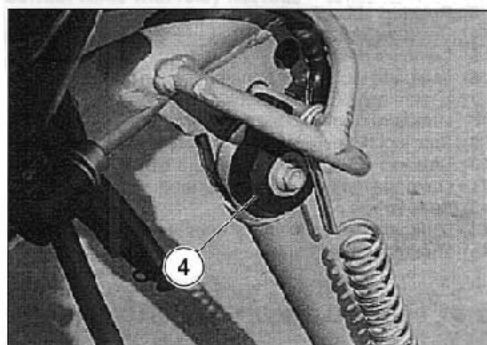
2) REAR BRAKE STOPLIGHT SWITCH

Pos.	Cavi / Cables / Cables	
	LINGUETTA 6.3 mm LENGUETA 6.3 mm TONGUE 6.3 mm	LINGUETTA 6.3 mm LENGUETA 6.3 mm TONGUE 6.3 mm
Azionato Accionado Operating	<input type="radio"/>	<input type="radio"/>



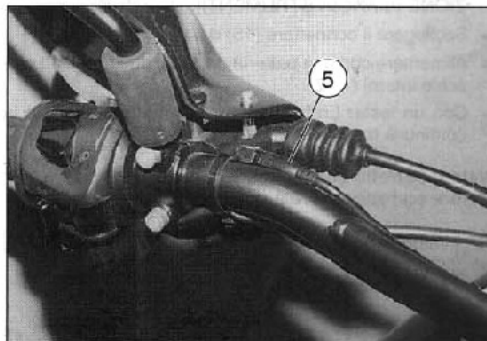
3) NEUTRAL GEAR SWITCH

Pos	Cables	
	SCREW	
Neutral	<input type="radio"/>	<input type="radio"/>



4) STAND SWITCH

Pos. cavalletto Caballete Stand	Cavi / Cables / Cables		
	M	V	N
Abbassato Bajado Down	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sollevato Levantado Up	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

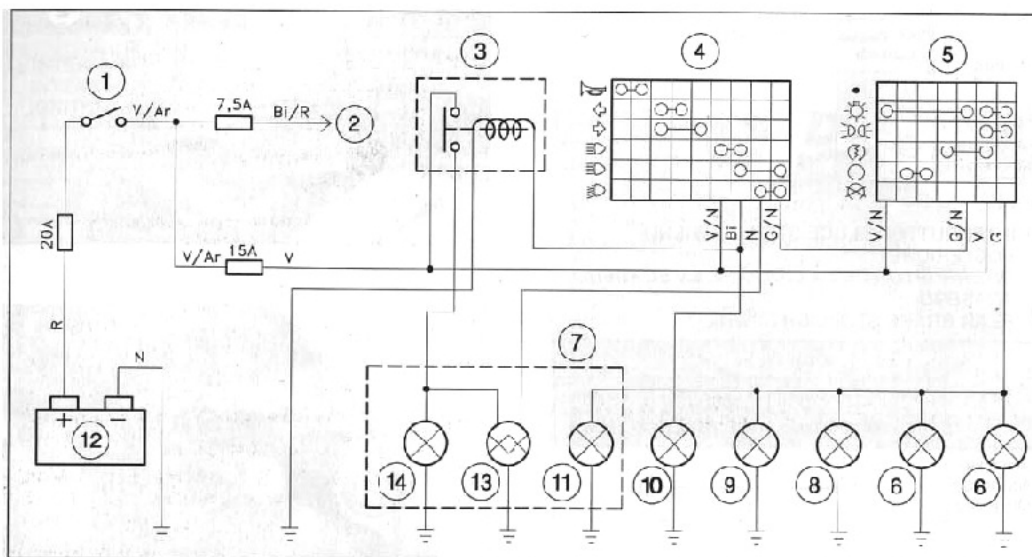


5) CLUTCH LEVER SWITCH

Pos.	Cavi / Cables / Cables	
	M	V
Azionato Accionado Operating	<input type="radio"/>	<input type="radio"/>

6.10 LIGHTS SYSTEM

6.10.1 SCHEMA ELETTRICO



6.10 LIGHTS SYSTEM

6.10.1 WIRING DIAGRAM

Legenda schema elettrico

- 1) Ignition switch (C - ⌘ - ⑆)
- 2) To ignition
- 3) High beam relay
- 4) Left dimmer switch
- 5) Right dimmer switch
- 6) Rear parking lights bulbs
- 7) Headlight assembly
- 8) Dashboard bulbs
- 9) Parking lights warning light (><) (green color)
- 10) High beam warning light (≡) (blue color)
- 11) Front parking light
- 12) Battery
- 13) Low/high beam bulb
- 14) High beam bulb

6.10.2 CHECKING THE HIGH BEAM LIGHTS RELAY

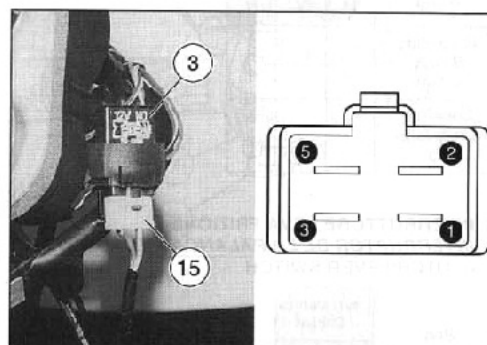
To check operation of relay:

- Remove the dashboard fairing, see 7.1.17 (REMOVING THE DASHBOARD FAIRING).
- Disconnect connector (15) from relay (3).
- Feed with a 12V battery the two internal male terminals (1 - 2).
- Using a tester (acting as ohmmeter) check continuity between the other two terminals (3 - 5).

Correct value with relay fed: 0Ω

Correct value with relay not fed: $\infty\Omega$

If the values do not correspond to those indicated, change the relay.



6.11 BATTERY

Type: 12V-12Ah

Read 2.3 (BATTERY) carefully.



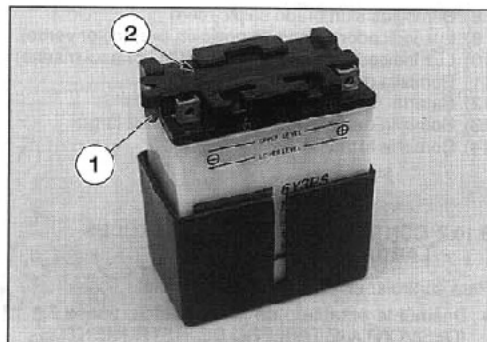
6.11.1 ACTIVATING THE BATTERY

- Remove battery from vehicle, see 7.1.13 (REMOVING THE BATTERY).
- Remove the cap (1) from the vent.
- Remove the caps (2) from the elements.
- Fill the element cells with electrolyte liquid until MAX level is reached.



It is advisable to use an electrolyte liquid with a 1.3 specific weight.

- Recharge the battery for at least 10 hours, using a trickle charge (amperage corresponding to 1/10 battery capacity).
- Put battery back on vehicle at delivery of vehicle to client.



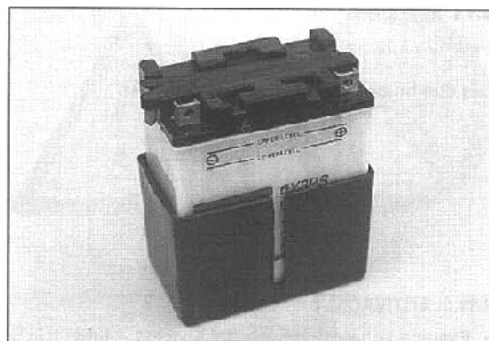
6.11.2 MAINTENANCE

- ◆ In the event the vehicle remains inactive for a long period (e.g. winter), recharge the battery completely at least once a month, using a trickle charge.
- ◆ Correct the level of the electrolyte liquid at least once a month, using distilled water only.



Check the level more frequently during the summer as the increase in environmental temperature means a more rapid evaporation of the liquid.

- ◆ Spread a film of neutral grease or vaseline on the terminals.



6.11.3 CHECKING

In case any anomalies are observed, firstly carry out a check on the recharging circuit, making sure that it is functioning correctly, see 6.1 (CHECKING THE RECHARGING SYSTEM).

In addition, make sure that:

- ◆ The elements do not present signs of sulphation (whitish colour).
- ◆ The electrolyte liquid level is between the MIN and the MAX notches.
- ◆ There are no signs of damage (external case cracked) and no electrolyte leakage.
- ◆ The cables are firmly connected to the terminals.
- ◆ Proceed to the trickle charge for at least 10 hours.



After recharging, check the density of the electrolyte using a densimeter. If the density is lower than 1.26 and the no-load voltage is lower than 12V in any of the compartments, it is absolutely necessary to change the battery.



6.11.4 RETURN UNDER GUARANTEE

The guarantee is not valid if the battery shows:

- ◆ Damages (dented box, bent poles, etc.)
- ◆ Diffuse sulphation (incorrect activation and/or use of the battery).
- ◆ Insufficient level of electrolyte liquid (to avoid electrolyte leakage during shipment, it is sufficient to close the vent with the suitable plug).
- ◆ Components missing (plugs, etc.).

6.12 CHANGING THE BULBS

Read 1.4 carefully (PRECAUTIONS AND GENERAL INFORMATION).



Before changing a bulb, turn the ignition switch to the "X" position.
Change the bulb wearing clean gloves or using a clean, dry cloth.



Do not leave fingerprints on the bulb as they may cause its overheating and consequent breakage.
If you touch the bulb with bare hands, remove any fingerprints with alcohol to avoid damaging it ahead of time.

DO NOT FORCE THE ELECTRIC CABLES.



6.12.1 CHANGING THE HEADLIGHT BULBS

The headlight contains:

- One high beam bulb (1) (left side).
- One parking light bulb (2).
- One low/high beam bulb (3) (right side).

To change the bulbs, proceed as follows:

PARKING LIGHT BULB

- Position the vehicle on the stand.



To extract the bulb socket, do not pull the electric wires.

- Move the protection element (4) with your hands.
- Seize the bulb socket (5), pull it and remove it from its seat.
- Withdraw the parking light bulb (2) and replace it with one of the same type.

HIGH BEAM BULB (LEFT SIDE)

- Position the vehicle on the stand.
- Move the protection element (6) with your hands.
- Release the check spring (7) positioned at the rear of the bulb socket (8).
- Extract the bulb (1) and replace it.

LOW/HIGH BEAM BULB (RIGHT SIDE)

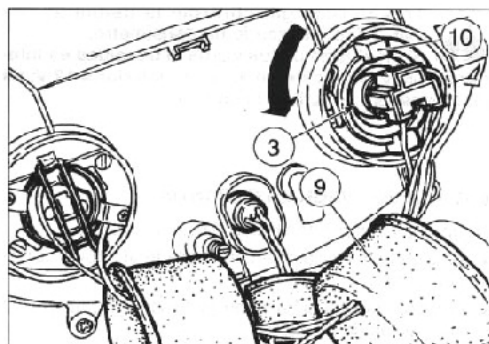
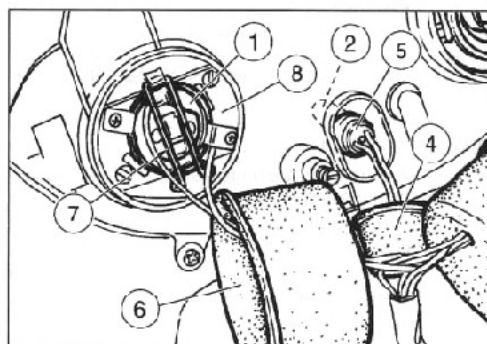
- Position the vehicle on the stand.
- Move the protection element (9) with your hands.
- Rotate the bulb socket (10) anticlockwise and extract it from its seat.
- Slightly press the bulb (3) and rotate it anticlockwise.
- Extract the bulb.

For the installation:



Insert the bulb in the bulb socket, making the two bulb pins coincide with the relevant guides on the socket.

- Correctly install a new bulb of the same type.



6.12.2 CHANGING THE REAR LIGHT BULB

To change the bulb, proceed as follows:

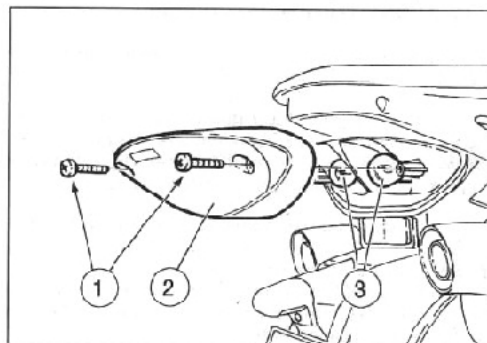
- ◆ Position the vehicle on the stand.
- ◆ Unscrew and remove the two screws (1).
- ◆ Pull the protection glass outwards (2), by exerting pressure on the lower area.
- ◆ Press the bulb (3) slightly and rotate it anticlockwise.
- ◆ Extract the bulb from its seat.

For the installation:



Insert the bulb in the bulb socket, making the two bulb pins coincide with the relevant guides on the socket.

- ◆ Correctly install a new bulb of the same type.



6.12.3 CHANGING THE FRONT DIRECTION INDICATOR BULBS

To change the bulbs, proceed as follows:

- ◆ Position the vehicle on the stand.
- ◆ Unscrew and remove the two screws (4).
- ◆ Remove the protection glass (5).



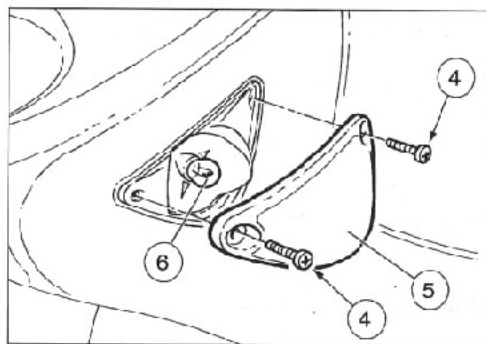
Upon reassembly, tighten the two screws (4) carefully, in order not to damage the protection glass.

- ◆ Press the bulb (6) slightly and rotate it anticlockwise.
- ◆ Extract the bulb from its seat.



Insert the bulb in the bulb socket, making the two bulb pins coincide with the relevant guides on the socket.

- ◆ Correctly install a new bulb of the same type.



6.12.4 CHANGING THE REAR DIRECTION INDICATOR BULBS

To change the bulbs, proceed as follows:

- ◆ Position the vehicle on the stand.
- ◆ Unscrew and remove the screw (7).
- ◆ Remove the protection glass (8).



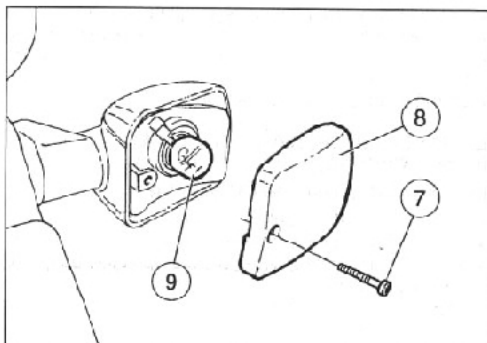
Upon reassembly, tighten the screw (7) carefully, in order not to damage the protection glass.

- ◆ Press the bulb (9) slightly and rotate it anticlockwise.
- ◆ Extract the bulb from its seat.



Insert the bulb in the bulb socket, making the two bulb pins coincide with the relevant guides on the socket.

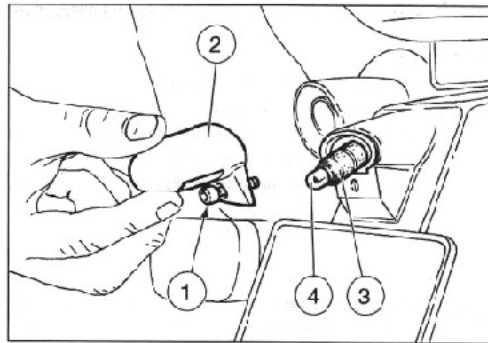
- ◆ Correctly install a new bulb of the same type.



6.12.5 CHANGING THE NUMBER PLATE BULB

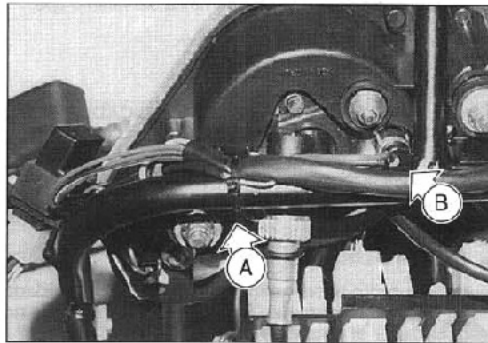
To change the bulb, proceed as follows:

- Position the vehicle on the stand.
- Unscrew and remove the screw (1).
- Remove the light unit (2).
- Extract the bulb socket (3).
- Withdraw the number plate bulb (4) and replace it with a new one of the same type.

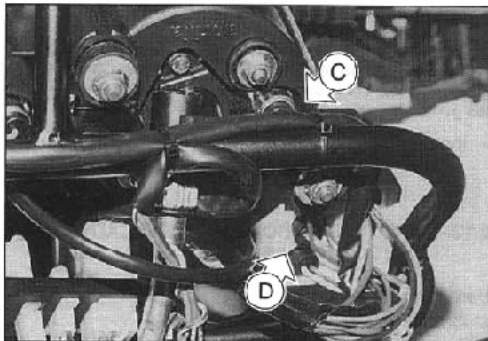
**6.12.6 CHANGING THE DASHBOARD BULBS**

To change the bulb, proceed as follows:

- Position vehicle on stand.
- Remove the front fairing, see 7.1.14 (REMOVING THE FRONT FAIRING).
- Remove the relative rubber bulb socket and change the bulb if necessary.
 One bulb under coolant temperature indicator (A).
 One bulb under speedometer/odometer (B).
 Six bulb under the dashboard of the warning lights (D).
 One bulb under revolution counter



Warning light	Description
	driving beam
	direction indicators
	gear in neutral
	engine oil low pressure



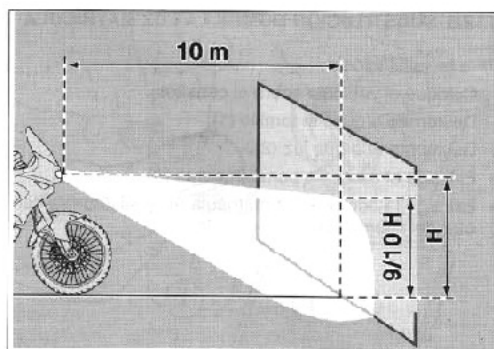
5.13 ADJUSTING HEADLIGHT BEAM

For a rapid check on the correct direction of the beam, place the vehicle on flat ground 10 metres 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 (approx. 9/10 of the total height - see figure).

To adjust the headlight beam:

- Adjust the screw (1) with an 8 mm fixed spanner.
By **SCREWING IT** (clockwise), you set the beam upwards.
By **UNSCREWING IT** (anticlockwise), you set the beam downwards.

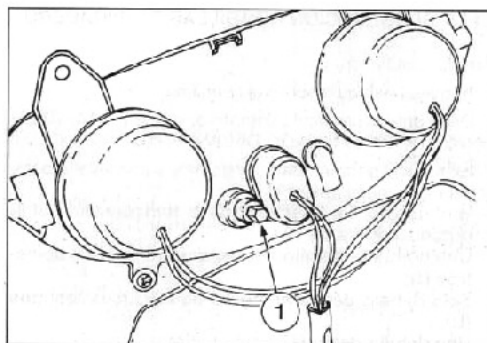
**5.14 CHANGING THE FUSES**

Read 1.4 carefully (PRECAUTIONS AND GENERAL INFORMATION).

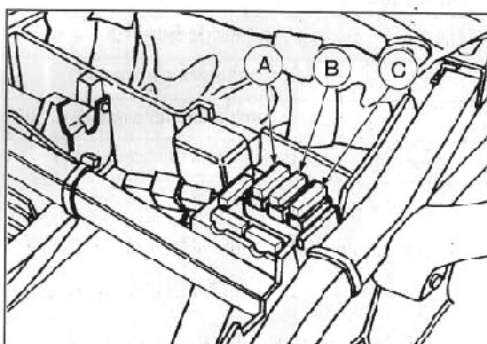
If an electric component does not work or works irregularly, or if the vehicle fails to start, the fuses must be checked:

- Turn the ignition switch to the "0" position to prevent any accidental short circuit.
- Remove saddle, see 7.1.3 (REMOVING THE SADDLE).
- Extract one fuse at a time (A-B-C) and check to see if the filament is interrupted.
- Before replacing a fuse, try to discover the cause of the trouble, if possible.
- Replace the damaged fuse with a new one having the same amperage.

☞ Three spare fuses are to be found on the fuse carrier.

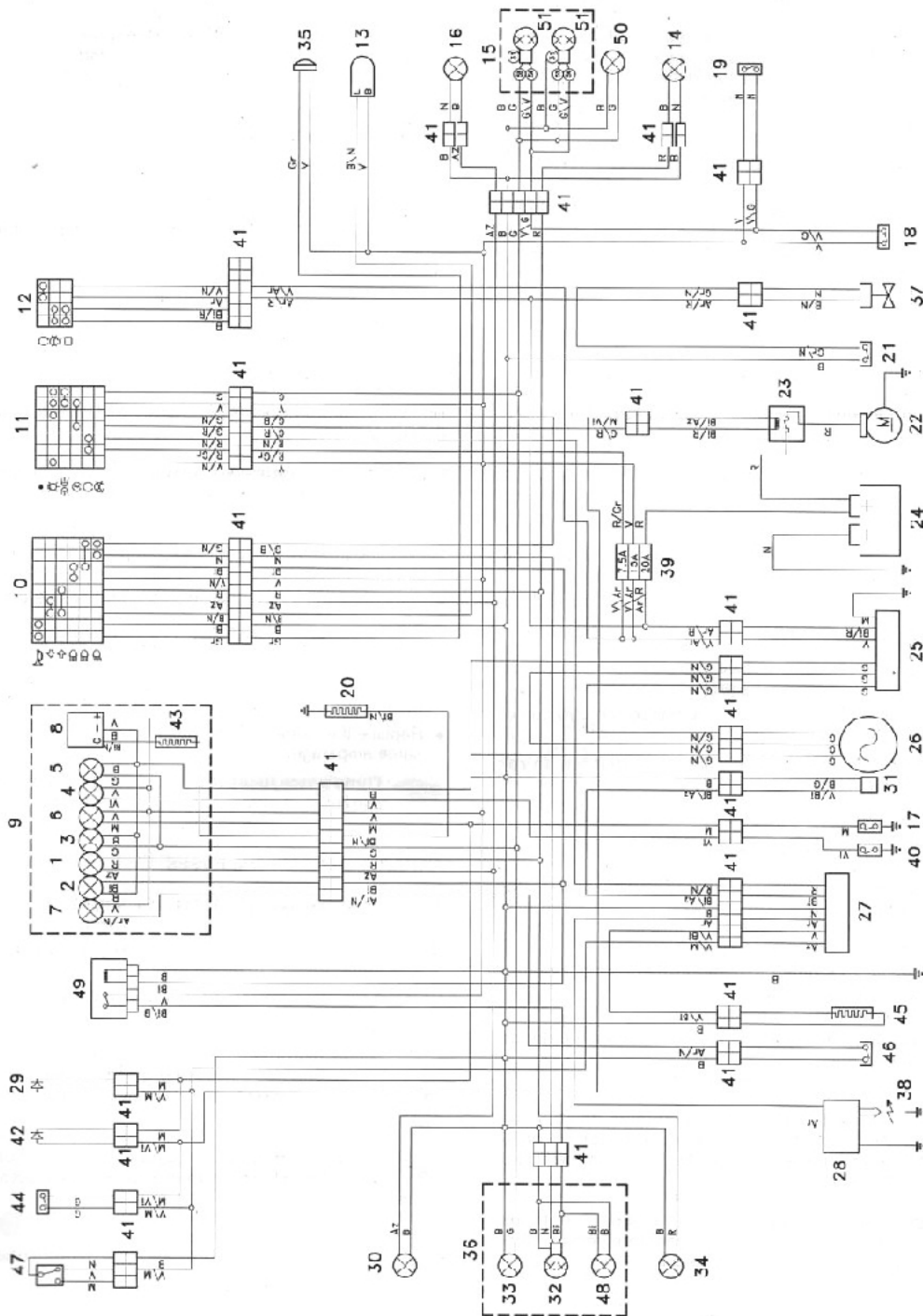
**ARRANGEMENT OF THE FUSES**

- A) 20 A fuse (yellow color) - from battery to: key switch, voltage regulator, cooling electrofan.
- B) 15 A fuse (light blue color) - from key switch to: all light loads.
- C) 7.5 A fuse (red color) - from key switch to: ignition, starting safety logic.



⚠ Never use fuses different from the specified ones. The use of unsuitable fuses may cause damage to the electric system or, in case of a short circuit, even fire.

☞ When a fuse blows frequently, there is probably a short circuit or an overload in the electric system.

6.15 WIRING DIAGRAM
Moto 6.5

ELECTRICAL SYSTEM

WIRING DIAGRAM KEY Pegaso 650

- 1) Direction indicator warning light
- 2) High beam warning light
- 3) Parking light warning light
- 4) Engine oil pressure warning light
- 5) Dashboard bulbs
- 6) Neutral warning light
- 7) Low fuel warning light
- 8) Coolant temperature indicator
- 9) Dashboard
- 10) Left dimmer switch
- 11) Right dimmer switch
- 12) Ignition switch
- 13) Blinking
- 14) Rear right direction indicator
- 15) Rear light
- 16) Rear left direction indicator
- 17) Neutral switch
- 18) Rear stoplight switch
- 19) Front stoplight switch
- 20) Coolant temperature thermistor
- 21) Cooling electrofan thermal switch
- 22) Starter
- 23) Start relay
- 24) Battery
- 25) Voltage regulator
- 26) Generator
- 27) CDI
- 28) Spool
- 29) Diode 1
- 30) Front left direction indicator
- 31) Pick up
- 32) Low/high beam bulb
- 33) Front parking light
- 34) Front right direction indicator
- 35) Horn
- 36) Headlight
- 37) Cooling electrofan
- 38) Spark plug
- 39) Fuses
- 40) Engine oil pressure sensor
- 41) Multiple connectors
- 42) Diode 2
- 43) Dashboard resistance
- 44) Clutch switch
- 45) Spark advance resistance
- 46) Reserve fuel sensor
- 47) Side stand switch
- 48) High beam bulb
- 49) Light relay
- 50) Number plate light
- 51) Stoplight/parking light bulb

CABLE COLOURS

Ar	orange
Az	light blue
B	blue
Bi	white
G	yellow
Gr	grey
M	brown
N	black
R	red
Ro	pink
V	green
Vi	violet

CHASSIS PARTS

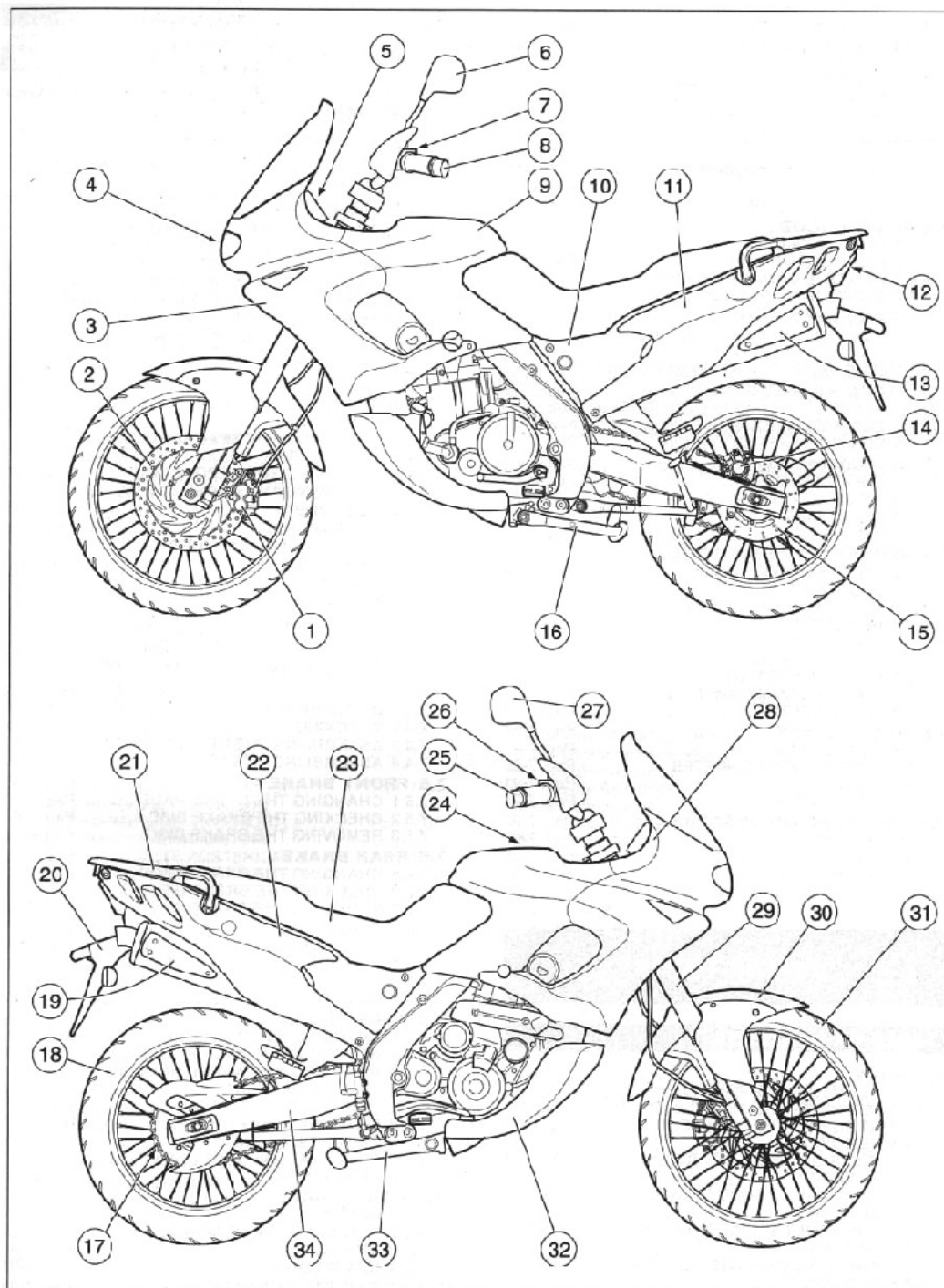
7

CHASSIS PARTS

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7.1 BODY



CHASSIS PARTS

Key

- 1) Front brake caliper
- 2) Front brake disc
- 3) Front fairing
- 4) Head light
- 5) Dashboard-instruments-ignition switch/steering lock
- 6) Left rear-view mirror
- 7) Controls on the left side of the handlebars
- 8) Left handgrip
- 9) Fuel tank
- 10) Shock absorber
- 11) Left side
- 12) Rear light
- 13) Left exhaust silencer
- 14) Rear brake caliper
- 15) Rear brake disc
- 16) Side stand
- 17) Gearing chain
- 18) Rear wheel
- 19) Right exhaust silencer
- 20) Number plate holder
- 21) Rear luggage rack
- 22) Right side
- 23) Saddle
- 24) Fuel tank plug
- 25) Right handgrip (accelerator control)
- 26) Controls on the right side of the handlebars
- 27) Right rear-view mirror
- 28) Dashboard fairing
- 29) Front fork
- 30) Front mudguard
- 31) Front wheel
- 32) Oil pan guard
- 33) Centre stand **opt**
- 34) Rear fork

7.1.1 REMOVING THE FUEL TANK

Read 1.2.1 (FUEL), 1.4 (PRECAUTIONS AND GENERAL INFORMATION) and 4.1 (FUEL TANK) carefully.



Fuel vapours are noxious for the health.

Before proceeding, make sure that the room in which you are working is properly ventilated.

Do not inhale fuel vapours.

Neither smoke, nor use naked flames.

Do not dispose of fuel in the environment.

RISK OF FIRE AND/OR EXPLOSION.

- ◆ Position the vehicle on the stand.



Let the engine cool down until it reaches room temperature.

- ◆ Remove the saddle, see 7.1.3 (REMOVING THE SADDLE).



It is possible to remove the tank from the vehicle either with or without fuel inside it. If the tank is full, before proceeding with the following operations, empty it, see 4.2 (DRAINING THE FUEL TANK AND THE CARBURETTORS).

- ◆ Rotate the fuel cock (1) to position "OFF".



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

- ◆ Disconnect the electric connector (2) of the low fuel sensor.
- ◆ Disconnect the fuel pipe (3) from the fuel cock and plug it.
- ◆ Disconnect the water drain pipe (4) from the filler cap.
- ◆ Unscrew and remove the central screw (5).
- ◆ Take the rubber element (6), the washer and if necessary the bush.
- ◆ ★ Unscrew and remove the three screws (7).
- ◆ Slightly raise the rear part of the tank (8) and at the same time withdraw it from its two seats (in the front part), by pulling it backwards.

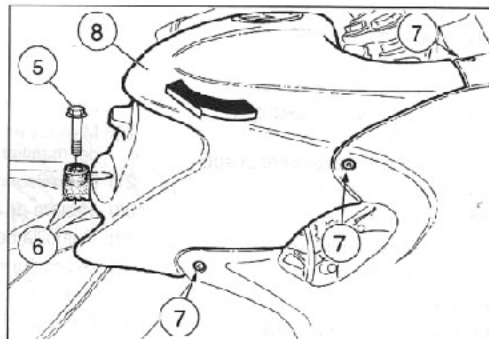
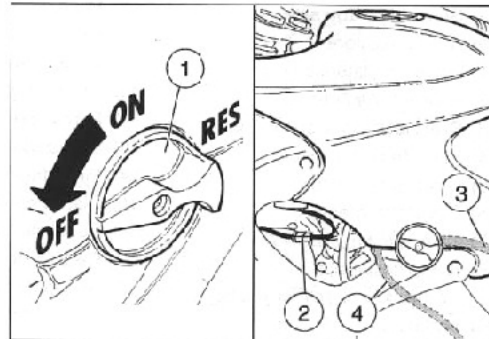


Upon reassembly, make sure that the tank fits correctly into the relative seats in the front part.

- ◆ If necessary, remove the fuel cock, see 4.3 (REMOVING THE FUEL COCK), the fuel level gauge unit, see 4.4 (REMOVING THE FUEL LEVEL GAUGE UNIT) and the cap, see 7.1.2 (REMOVING THE FILLER CAP).



For further information, see 4.1 (FUEL TANK).



7.1.2 REMOVING THE FILLER CAP

Read 1.2.1 (FUEL) and 4.1 (FUEL TANK) carefully.



Fuel vapours are noxious for the health. Before proceeding, make sure that the room in which you are working is properly ventilated.

Do not inhale fuel vapours.

Neither smoke, nor use naked flames.

Do not dispose of fuel in the environment.

RISK OF FIRE AND/OR EXPLOSION.

- Position the vehicle on the stand.
- Unscrew and remove the three screws (1).



The other three screws can be left on the vehicle, since they have only an aesthetic function.

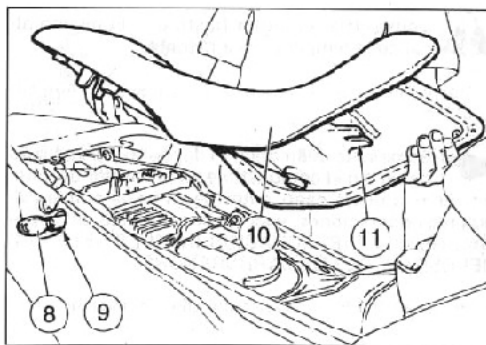
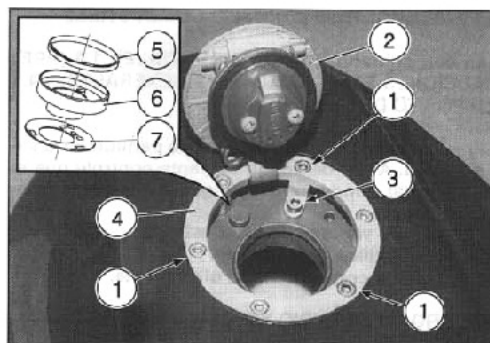
- Open the cap (2).
- Unscrew and remove the screw (3).
- Remove the cap (2) together with the metal ring (4).
- Remove the gasket (5), the small container (6) and the container seal (7) in the given order.



Upon reassembly, position the container seal (7) and the container (6) correctly, so that the holes coincide.



Plug the tank opening, in order to avoid any accidental introduction of foreign matters.



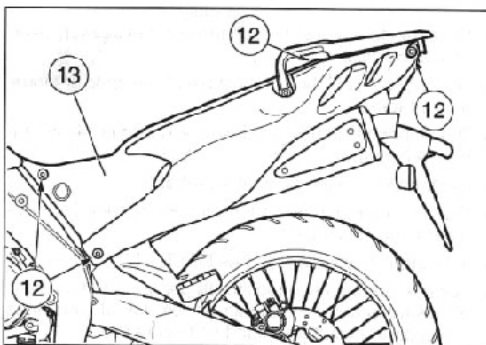
7.1.3 REMOVING THE SADDLE

- Position the vehicle on the stand.
- Insert the key (8) in the saddle lock (9).
- Turn the key clockwise, raise and remove the saddle (10).



Before lowering and locking the saddle, make sure that you have not left the key in the glove compartment.

- To lock the saddle, position the tang (11) in its seat, then lower and press the saddle, thus making the lock snap shut.



7.1.4 REMOVING THE RIGHT AND LEFT SIDES

- Remove the saddle, see 7.1.3 (REMOVING THE SADDLE).



Let the engine cool down until it reaches room temperature.



Proceed with care.

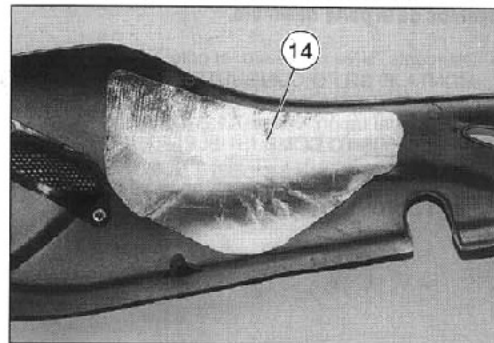
Do not damage the tangs and/or the relevant seatings.

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

- ★ Unscrew and remove the four screws (12).
- ★ Remove the side (13).

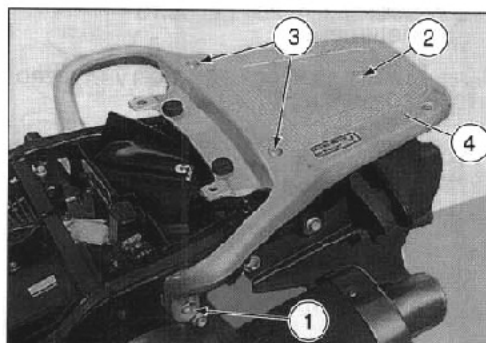


If the antiheat guard (14) (on the inner side) is in bad conditions, change it.



7.1.5 REMOVING THE REAR LUGGAGE RACK

- Position the vehicle on the stand.
- Remove the sides, see 7.1.4 (REMOVING THE RIGHT AND LEFT SIDES).
- ★ Unscrew and remove the screw (1).
Screw (1) driving torque: 10 Nm (1 kgm).
- Unscrew and remove the screw (2) and the two screws (3).
Screw (2-3) driving torque: 8 Nm (0.8 kgm).
- Remove the luggage rack (4) and take the bushes and the rubber elements.



7.1.6 REMOVING THE FRONT MUDGUARD UNIT

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- Position the vehicle on the stand.



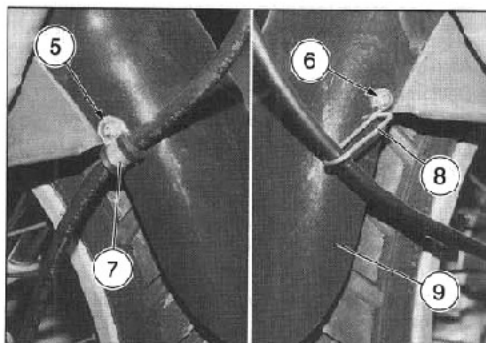
Handle the painted components with care and avoid scraping or damaging them.

- Unscrew and remove the screw (5).
- Unscrew and remove the screw (6).



Upon reassembly, position the clamp (7) and the collar (8) correctly.

- Withdraw the mudguard (9) from the front part.
- ★ Unscrew and remove the two screws (10).
- Remove the mudguard support (11).



7.1.7 REMOVING THE NUMBER PLATE HOLDER

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- Remove the sides, see 7.1.4 (REMOVING THE RIGHT AND LEFT SIDES).
- Disconnect the electric connector (12) (on the left side of the vehicle).
- Release the wiring from the fastening clamp (13).



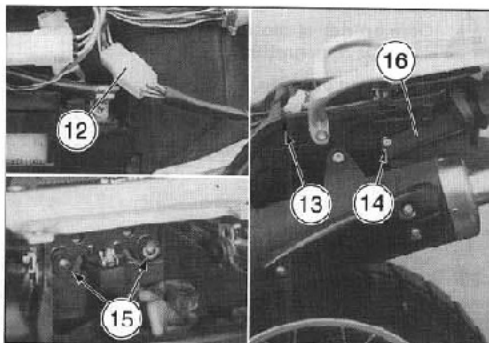
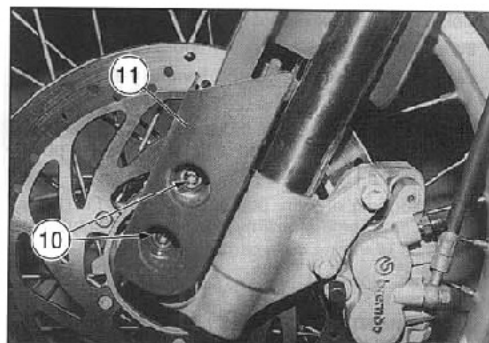
Get another clamp to be used for the reassembly.

- Unscrew and remove the screw (14).
- Unscrew and remove the two screws (15), taking the washers and if necessary the rubber elements.



Upon reassembly, tighten the two screws (15) moderately, since they are screwed onto plastic material.

- Remove the number plate holder (16) together with rear direction indicators, number plate light and rear light.
- To remove the rear light, see 7.1.22 (REMOVING THE REAR LIGHT).



7.1.8 REMOVING THE GLOVE COMPARTMENT

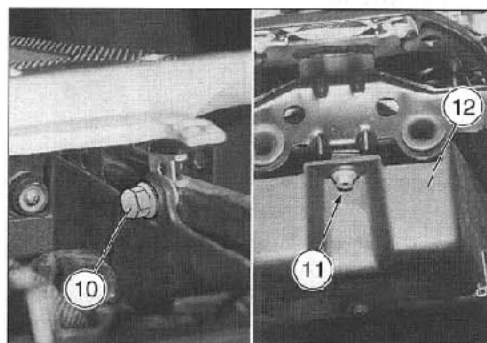
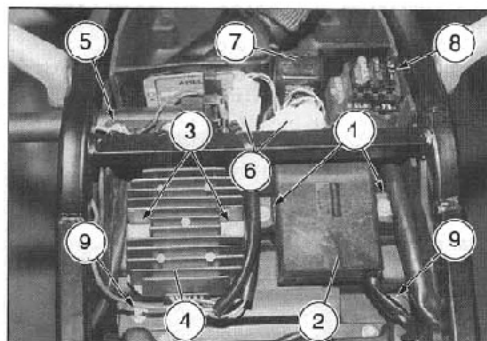
Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- ♦ Remove the saddle, see 7.1.3 (REMOVING THE SADDLE).
- ♦ Unscrew and remove the two screws (1) that fasten the C.D.I. (2) and take the relevant nuts from the lower part.
- ♦ Disconnect the relevant electric connector and remove the C.D.I. (2).
- ♦ Unscrew and remove the two screws (3) that fasten the voltage regulator (4), take the two washers and the relevant nuts from the lower part.
- ♦ Unscrew and remove the screw (5), releasing the two earth cables.
- ♦ Disconnect the two electric connectors (6) and remove the voltage regulator (4).
- ♦ Withdraw the blinking device (7) from its own coupling.
- ♦ Disconnect the two relevant electric connectors and remove the blinking device (7).
- ♦ Withdraw the fuse unit (8) from its coupling.
- ♦ Unscrew and remove the two screws (9) and take the relevant nuts from the lower part.



Upon reassembly, make sure that the electric components and the relevant wiring are positioned correctly.

- ♦ ★ Unscrew and remove the screw (10), take the bush and if necessary the rubber element.
- ♦ Acting on the lower part with a socket spanner, unscrew and remove the screw (11), take the bush and if necessary the rubber element.
- ♦ Lower the glove compartment (12) and remove it by withdrawing it from the rear part.



7.1.9 REMOVING THE OIL PAN GUARD

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- ♦ Position the vehicle on the stand.

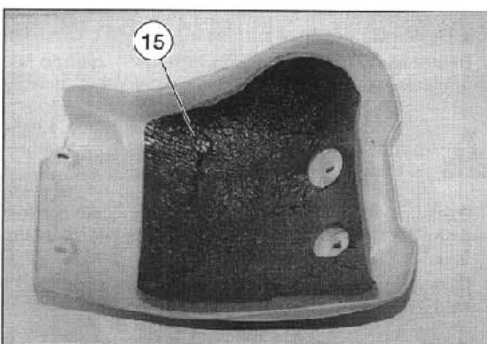
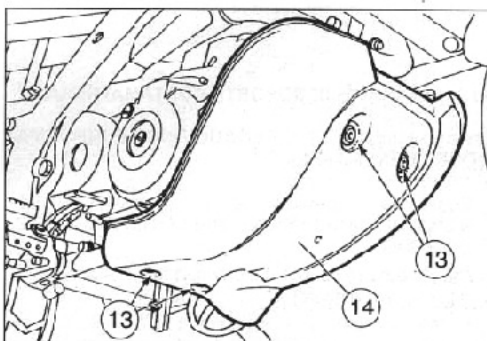


Let the engine cool down until it reaches room temperature.

- ♦ Unscrew and remove the four screws (13).
- ♦ Remove the oil pan guard (14).



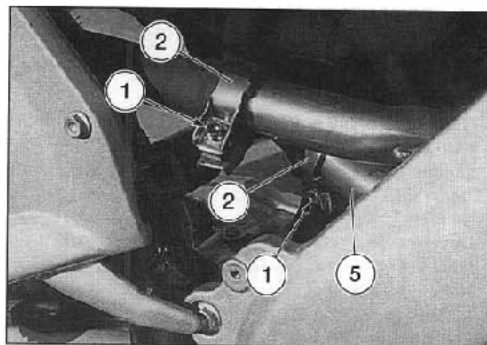
If the internal deadening material (15) (hydraulic sponge) is in bad conditions, change it.



7.1.10 REMOVING THE EXHAUST SILENCERS

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- Remove the sides, see 7.1.4 (REMOVING THE RIGHT AND LEFT SIDES).
- Loosen the two screws (1) on the two clamps (2).
- ★ Unscrew and remove the two screws (7).
- Screw (7) driving torque: 25 Nm (2.5 kgm).**
- ★ Remove the whole passenger's footrest (8).
- ★ Unscrew and remove the three screws (3).
- Screw (3) driving torque: 25 Nm (2.5 kgm).**
- ★ Withdraw the left exhaust silencer (4) from the relevant exhaust pipe (5).
- ★ Remove the left exhaust silencer (4).

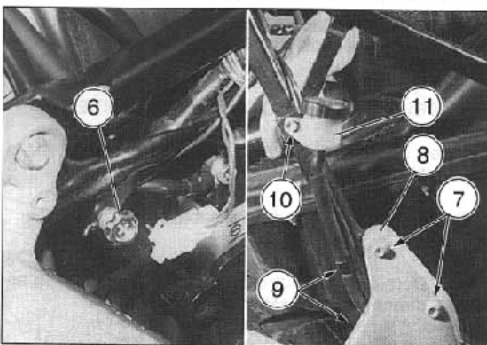
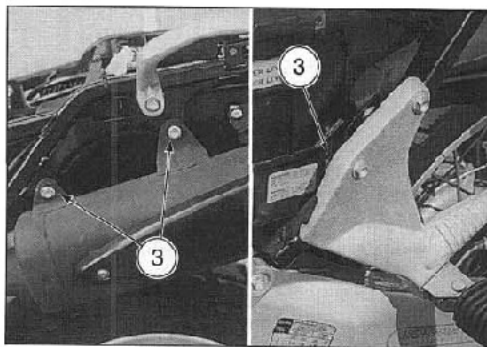


Plug the exhaust pipe openings, to avoid any accidental introduction of foreign matters.

7.1.11 REMOVING THE SADDLE PILLAR

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- Position the vehicle on the centre stand **DPT** or on an apposite support stand fixed to the centre stand couplings.
- Remove the exhaust silencers, see 7.1.10 (REMOVING THE EXHAUST SILENCERS).
- Remove the luggage rack, see 7.1.5 (REMOVING THE REAR LUGGAGE RACK).
- Remove the number plate holder, see 7.1.7 (REMOVING THE NUMBER PLATE HOLDER).
- Remove the glove compartment, see 7.1.8 (REMOVING THE GLOVE COMPARTMENT).
- Remove the filter casing, see 7.1.12 (REMOVING THE AIR CLEANER CASING).
- Release the idling adjusting knob (6) from the relevant support.
- ★ Unscrew and remove the two screws (7).
- Screw (7) driving torque: 25 Nm (2.5 kgm).**
- ★ Remove the whole passenger's footrest (8).
- Slightly open the two tangs (9), thus releasing the pipe and the electric cable.
- Unscrew and remove the screw (10) and take the washer.

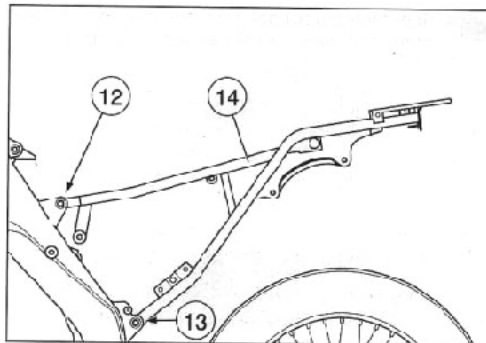


Make sure that the rear brake fluid tank (11) remains in vertical position and does not overturn, in order to avoid any outflow of brake fluid.



Release all the cables and pipes from the fastening clamps positioned along them. Get other clamps to be used for the reassembly.

- ★ Unscrew and remove the screw (12) and take the washer.
- Screw (12) driving torque: 25 Nm (2.5 kgm).**
- ★ Unscrew and remove the screw (13) and take the washer.
- Screw (13) driving torque: 25 Nm (2.5 kgm).**
- Remove the saddle pillar (14).



7.1.12 REMOVING THE AIR CLEANER CASING

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) and 2.3 (BATTERY) carefully.

- ◆ Position the vehicle on the centre stand **DPT** or on an apposite support stand fixed to the centre stand couplings.
- ◆ Remove the battery, see 7.1.13 (REMOVING THE BATTERY).
- ◆ Remove the exhaust silencers, see 7.1.10 (REMOVING THE EXHAUST SILENCERS).

✎ Get a screwdriver-type pipe clamp, to replace the original one (special type without screw).

- ◆ Cut the head of the pipe clamp (1).
- ◆ Withdraw the oil breather pipe (2).
- ◆ Shift the pipe clamp (3).
- ◆ Withdraw the impurities drain pipe (4).
- ◆ Shift the pipe clamp (5).
- ◆ Withdraw the exhaust pipe (6).
- ◆ Unscrew and remove the screw (7), releasing the clamp (8).

⚠ Upon reassembly, position the exhaust pipe (6) and the clamp (8) correctly.

- ◆ Withdraw the two pipes (4-6) from the collar on the lower part of the air cleaner casing.
- ◆ Loosen the two clamps (9-10).
- ◆ ★ Loosen (about one turn) the screw (11) that fastens the lower part of the saddle pillar.

Screw (11) driving torque: 25 Nm (2.5 kgm).

- ◆ ★ Unscrew and remove the screw (12) that fastens the upper part of the saddle pillar and take the washer.

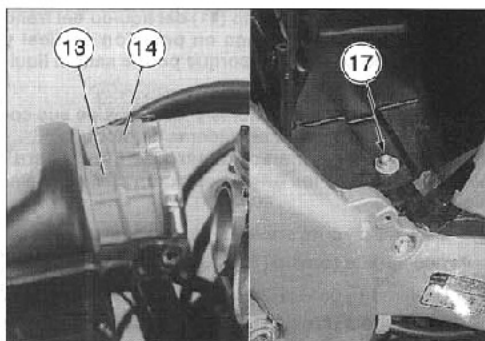
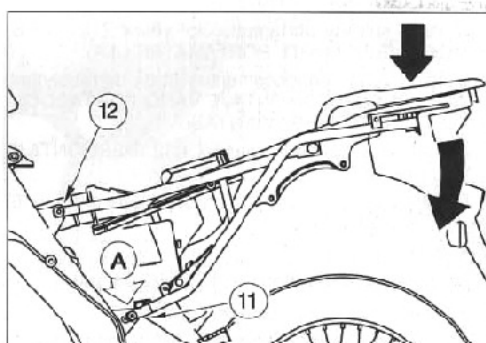
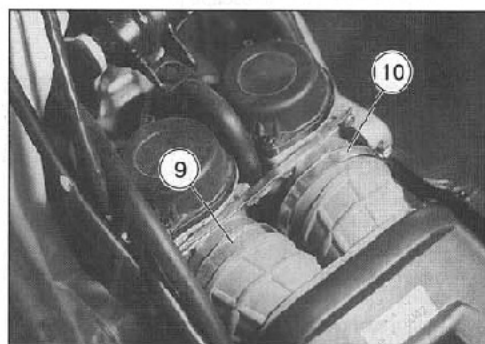
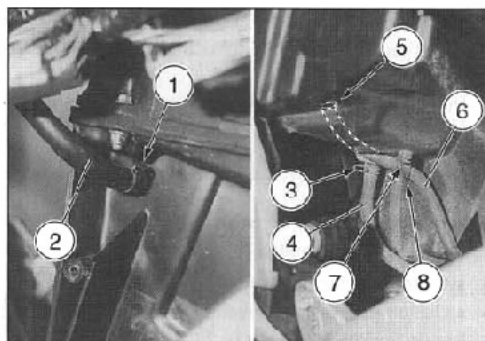
Screw (12) driving torque: 25 Nm (2.5 kgm).

- ◆ Strike the luggage rack with the palm of your hand until the whole saddle pillar/filter casing unit performs a slight downward rotation (with fulcrum in "A"), thus allowing the two couplings (13-14) to be released from the carburetors.

⚠ Do not make the saddle pillar/filter casing unit rotate more than necessary.

- ◆ ★ Tighten the screw (11) temporarily, in such a way as to keep the saddle pillar unit in the right position.

⚠ Plug the carburettor openings, to avoid any accidental introduction of foreign matters.



- Unscrew and remove the two screws (15) and take the washers, the crash helmet cable and if necessary the bushes and the rubber elements.
- Unscrew and remove the two screws (16) and take the relevant nuts in the lower part.
- Unscrew and remove the screw (17), taking the washers and if necessary the rubber element.
- Press the filter casing (18) and the glove compartment (19) downwards (see figure), separating the two components.



Upon reassembly, make sure that the coupling seats on the filter casing (18) and on the glove compartment (19) are positioned correctly.

- Remove the filter casing (18), withdrawing it as indicated in the figure.



During the removal, shift the filter casing (18), trying to find the best position to withdraw it.

- Rotate and remove the air conveyor (20) and clean the filtering element, see 2.5 (AIR CLEANER).
- Unscrew and remove the seven screws (21) and take the relevant nuts in the lower part.
- Remove the filter casing cover (22).
- Thoroughly clean the inside of the filter casing.

7.1.13 REMOVING THE BATTERY

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) and 2.3 (BATTERY) carefully.

- Remove the left side, see 7.1.4 (REMOVING THE RIGHT AND LEFT SIDES).
- Unscrew and remove the screw (1).



Upon reassembly, tighten the screw (1) moderately, since it is screwed onto plastic material.

- Remove the battery cover (2).
- Disconnect the cable (3) from the negative terminal (-).
- Shift the protection element (4).
- Disconnect the cable (5) and the cable (6) of the start relay (red) from the positive terminal (+).
- Withdraw the breather pipe (7).

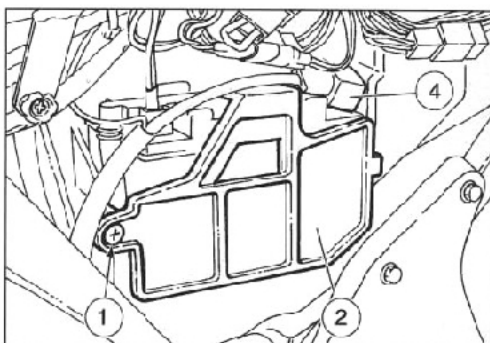
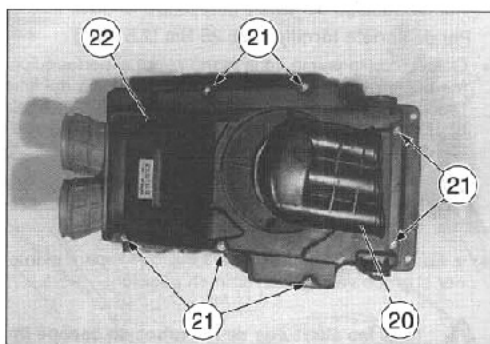
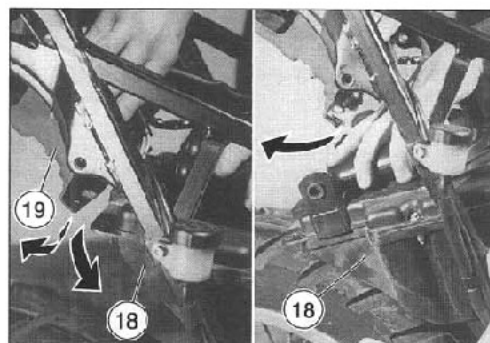
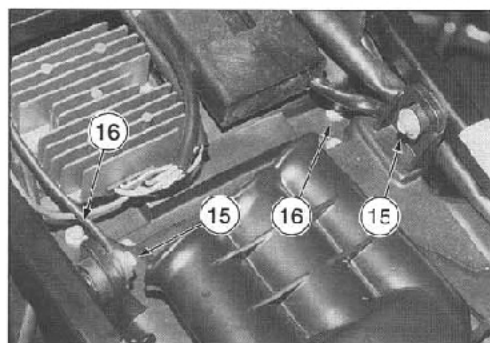
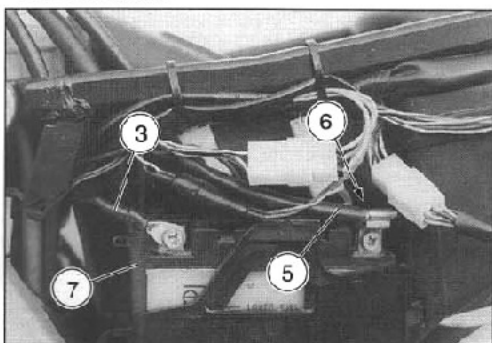


Upon reassembly, first connect the cables on the positive terminal (+) and then the cable on the negative terminal (-). Insert the breather pipe (7).

- Bond the battery slightly outwards and remove it from its container by lifting it.



Once it has been removed, the battery must be stored in a safe place and kept away from children.



7.1.14 REMOVING THE FRONT FAIRING

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.



Let the engine cool down until it reaches room temperature.

- ◆ Remove the dashboard fairing, see 7.1.17 (DESMONTAJE TABLERO DE INSTRUMENTOS).
- ★ Unscrew and remove the two screws (1).
- ★ Unscrew and remove the screw (2).
- ★ Unscrew and remove the two screws (3).
- ◆ Unscrew and remove the screw (4), releasing the cable guide collar (5) and taking the rubber element if necessary.



Upon reassembly, position the cable guide collar (5) correctly (see figure).



Proceed with care.

Do not damage the tangs and/or the relevant seatings.

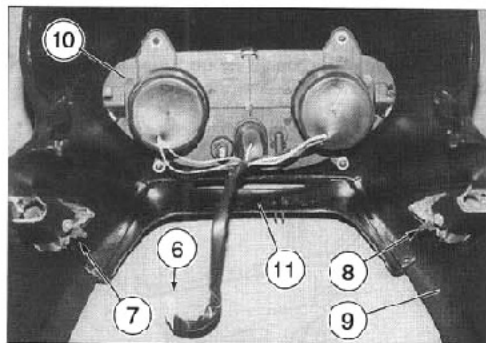
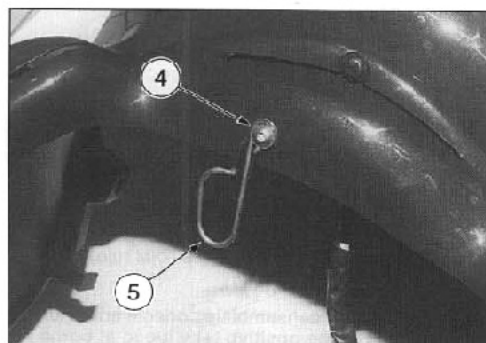
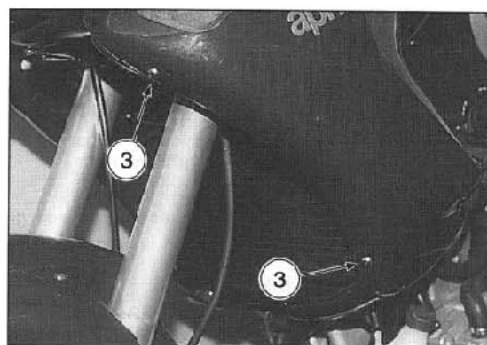
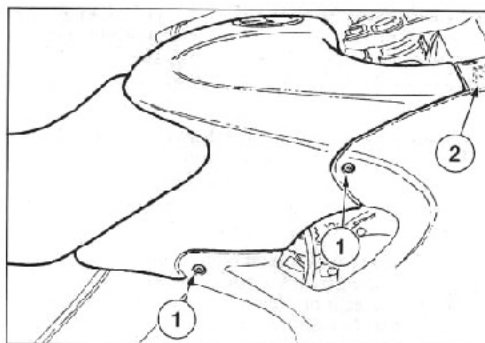
Handle the painted components with care and avoid scraping or damaging them.

- ◆ Slightly separate the lower part of the front fairing and at the same time move it slightly forwards.
- ◆ Disconnect the electric connector (6) of the headlight.
- ★ Disconnect the electric connector (7-8) of the front direction indicator.
- ◆ Remove the fairing (9) together with the headlight (10), the front direction indicators (7-8) and the guard (11).



Upon reassembly, position the front fairing correctly, making all the fastening and coupling points coincide.

- ◆ If necessary, remove the headlight, see 7.1.15 (REMOVING THE HEADLIGHT) and the direction indicator, see 7.1.30 (REMOVING THE FRONT DIRECTION INDICATORS).



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7.1.15 REMOVING THE HEADLIGHT

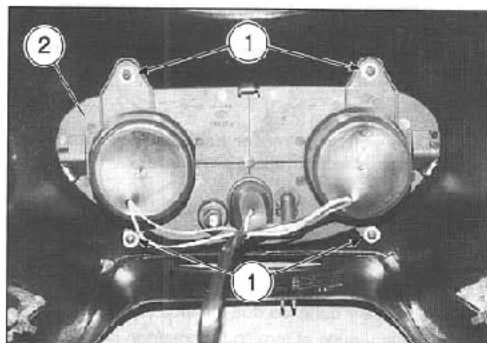
Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- ◆ Remove the front fairing, see 7.1.14 (REMOVING THE FRONT FAIRING).
- ◆ Unscrew and remove the four screws (1), taking the washers.



Upon reassembly, tighten the screws (1) moderately, since they are screwed onto plastic material.

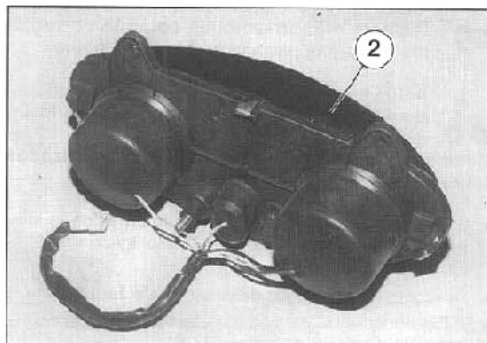
- ◆ Remove the headlight unit (2).



7.1.16 REMOVING THE DASHBOARD

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- ◆ Remove the front fairing, see 7.1.14 (REMOVING THE FRONT FAIRING).
- ◆ Disconnect the three electric connectors (3) under the coolant temperature indicator.
- ◆ Withdraw the three bulbs (4) for the lighting of the instruments.
- ◆ Withdraw the six warning light bulbs (5).
- ◆ Disconnect the revolution counter control (6).
- ◆ Disconnect the speedometer/odometer control (7).
- ◆ Loosen and remove the three fastening nuts (8) and if necessary take the rubber elements.
- ◆ Remove the dashboard (9) together with the following instruments:
 - Revolution counter (10).
 - Speedometer/odometer (11).
 - Coolant temperature indicator (12).



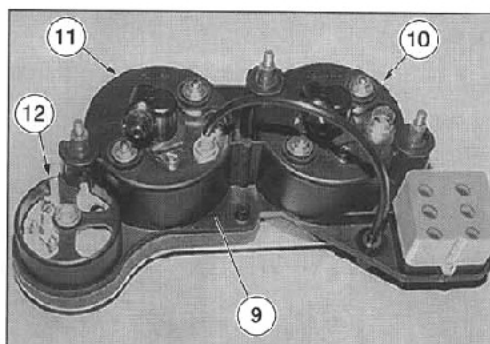
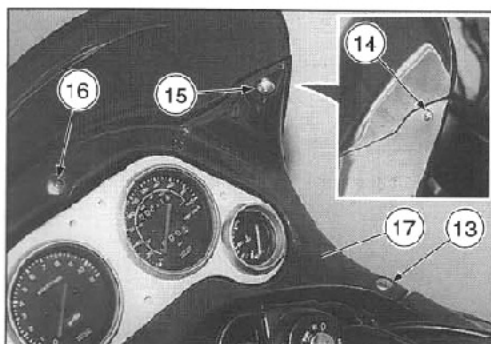
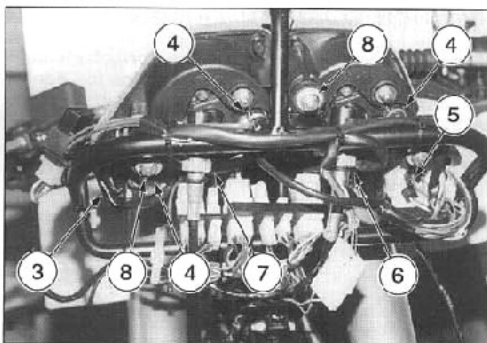
7.1.17 REMOVING THE DASHBOARD FAIRING

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- ◆ Position the vehicle on the stand.
- ◆ ★ Unscrew and remove the screw (13).
- ◆ ★ Unscrew and remove the screw (14).
- ◆ ★ Take the rubber element (15).
- ◆ Unscrew and remove the screw (16).

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

- ◆ Remove the dashboard fairing (17), by lifting it.




7.1.18 REMOVING THE INSTRUMENTS

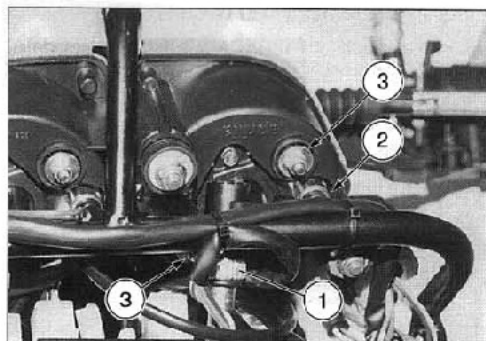
Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- ♦ Remove the front fairing, see 7.1.14 (REMOVING THE FRONT FAIRING).

REMOVING THE REVOLUTION COUNTER


- ♦ Disconnect the revolution counter control (1).
- ♦ Withdraw the bulb (2) from its seat.
- ♦ Loosen and remove the two nuts (3), take the washers and if necessary the rubber elements.
- ♦ Withdraw the revolution counter from its housing.

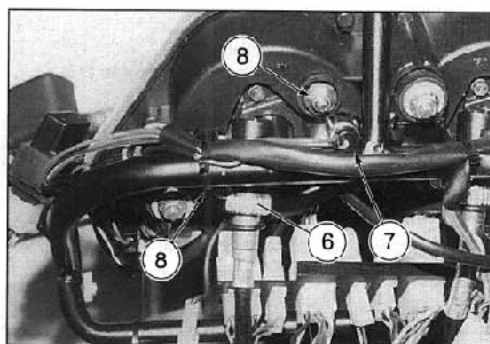
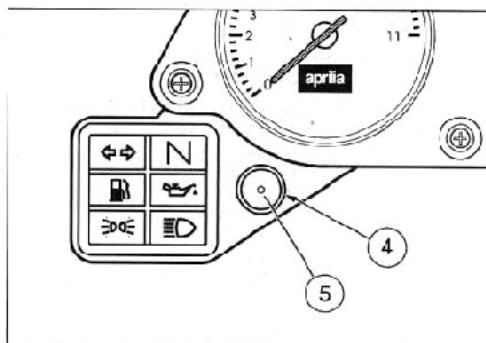
 To facilitate the removal of the instrument, turn the control trying to find the most convenient position.




REMOVING THE SPEEDOMETER/ODOMETER

- ♦ Loosen and remove the metal ring (4).
- ♦ Push the control knob (5) out of its seat.
- ♦ Disconnect the speedometer/odometer control (6).
- ♦ Withdraw the bulb (7) from its seat.
- ♦ Loosen and remove the two nuts (8), take the washers and if necessary the rubber elements.
- ♦ Withdraw the speedometer/odometer from its housing.

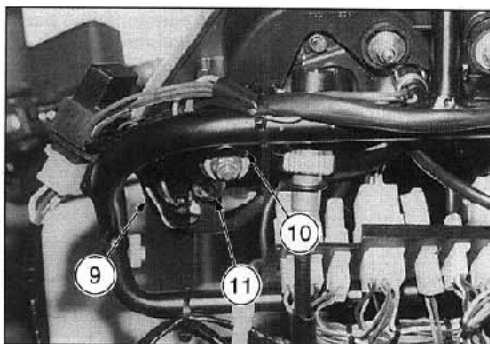
 To facilitate the removal of the instrument, turn the control trying to find the most convenient position.



REMOVING THE COOLANT TEMPERATURE INDICATOR

 Mark the connectors, in order to be able to re-connect them in the right position.

- ♦ Disconnect the three electric connectors (9).
- ♦ Withdraw the bulb (10) from its seat.
- ♦ Loosen and remove the nut (11), take the washer and if necessary the rubber element.
- ♦ Withdraw the coolant temperature indicator from its housing.



7.1.19 REMOVING THE DASHBOARD SUPPORT

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- Remove the dashboard, see 7.1.18 (REMOVING THE DASHBOARD).



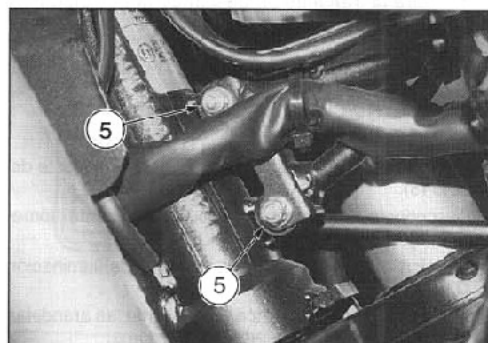
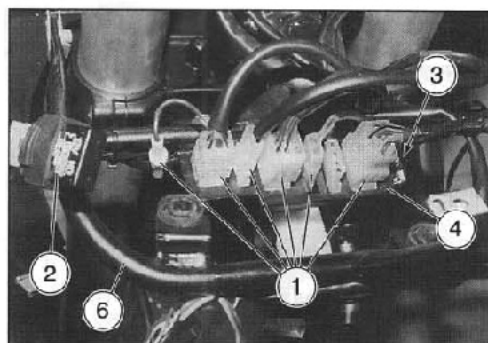
Upon reassembly, put the wiring and the fastening clamps in the same position.

- Release the cables from all the fastening clamps (seven).



Get other clamps to be used for the reassembly.

- Disconnect the six electric connectors (1).
- Withdraw the high beam relay (2) from its coupling.
- Unscrew and remove the screw (3), releasing the support (4) of the electric connectors.
- Loosen and remove the two nuts (5) and withdraw the corresponding screws from the opposite side.
- Remove the dashboard support (6).



7.1.20 REMOVING THE IGNITION SWITCH/STEERING LOCK

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- Remove the front fairing, see 7.1.14 (REMOVING THE FRONT FAIRING).
- Release the wiring from the two fastening clamps (7-8).



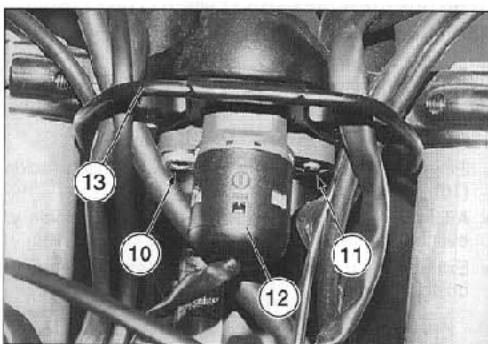
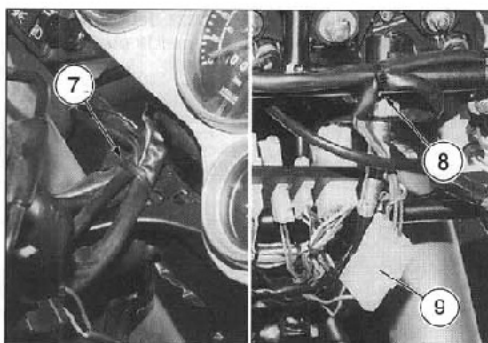
Get other clamps to be used for the reassembly.

- Disconnect the electric connector (9).
- Unscrew and remove the screw (10).
- By means of chisel, cut into the head of the special screw (11) and turn it until it loosens.
- Unscrew the screw (11) by hand and remove it.



For the reassembly, use another screw of the same type, tightening it until the head comes off.

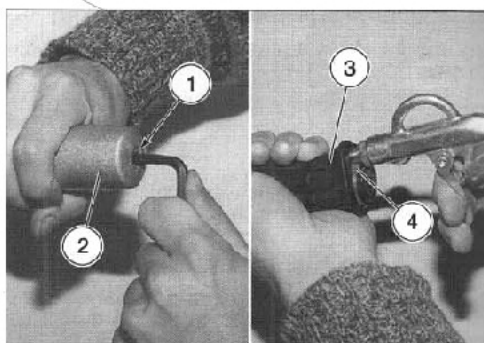
- Remove the ignition switch/steering lock (12) by withdrawing it from below and take the cable guide arch (13).



7.1.21 REMOVING THE CONTROLS/HANDGRIPS

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- ★ Unscrew and remove the screw (1) that fastens the vibrator-damping mass (2).
- ◆ Insert the tip of a compressed air gun between the handgrip (3) and the accelerator control tube (4) (on the right side) or handlebars tube (on the left side) (see figure).
- ★ Blow air by rotating the gun tip and at the same time seize the handgrip (3) with the other hand and withdraw it.
- ◆ Take the two slide washers (5).



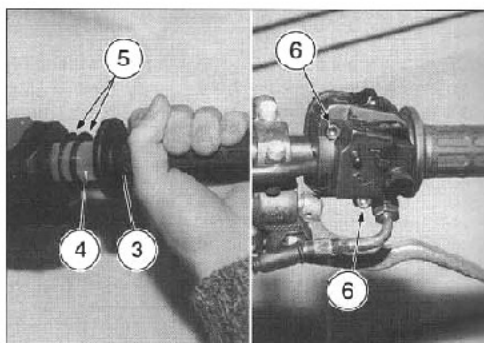
! Upon reassembly, remember to fit the two slide washers (5).

- ◆ ★ Unscrew and remove the two screws (6).

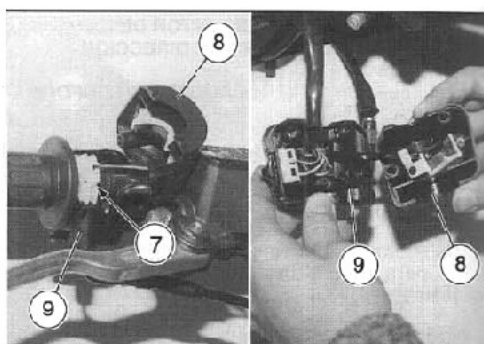
! Upon reassembly, tighten the two screws (6) moderately, since they are screwed onto plastic material.
On the right side of the handlebars the front screw is shorter.

- ◆ ★ Separate the two half-shells (8-9).

! Upon reassembly, the centering pin on the lower shell (9) must fit into the relevant seat on the handlebars.



- ◆ Disconnect the accelerator cable (7) (withdraw the cold start cable on the left side of the handlebars).
- ◆ Withdraw the accelerator control tube (4) (take the cold start control on the left side of the handlebars).



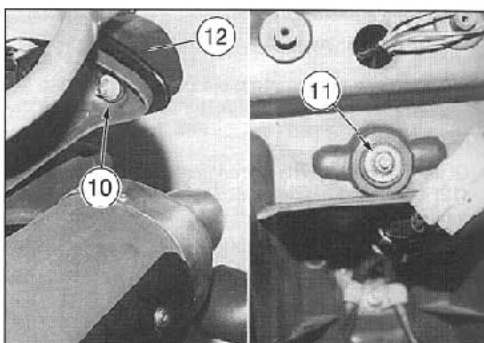
7.1.22 REMOVING THE REAR LIGHT

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- ◆ Remove the sides, see 7.1.4 (REMOVING THE RIGHT AND LEFT SIDES).
- ★ Unscrew and remove the nut (10), take the washer and if necessary the bush and the rubber element.
- ◆ Working under the glove compartment with a socket spanner, unscrew and remove the nut (11), take the washer and if necessary the bush and the rubber element.
- ◆ Shift the rear light (12) slightly backwards.

! Mark the electric connectors, in order to be able to reconnect them in the right position.

- ◆ Disconnect the electric connectors.
- ◆ Remove the rear light (12).



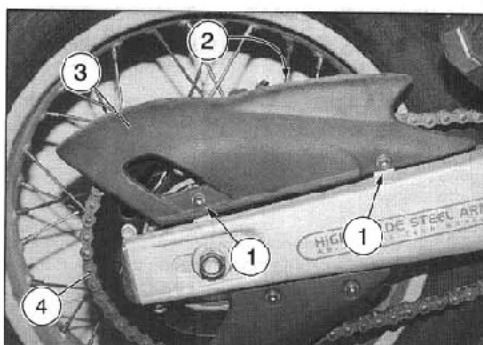
7.1.23 REMOVING THE GEARING CHAIN

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) and 2.16 (DRIVING CHAIN) carefully.

- Unscrew and remove the two screws (1).
- Unscrew and remove the screw (2) from the opposite side.
- Remove the casing (3).
- Remove the rear fork complete with wheel, suspension unit and brake unit, see 7.9.1 (REMOVAL).
- Remove the gearing chain (4).



If the chain is excessively worn, change it together with the transmission pinion, see 7.1.24 (REMOVING THE CHAIN ROLLERS AND THE CHAIN SHOE), and with the crown gear, see 7.3 (REAR WHEEL).

**7.1.24 REMOVING THE CHAIN ROLLERS AND THE CHAIN SHOE**

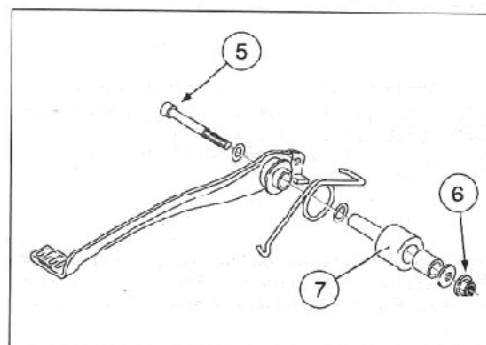
Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

REMOVING THE LOWER ROLLER

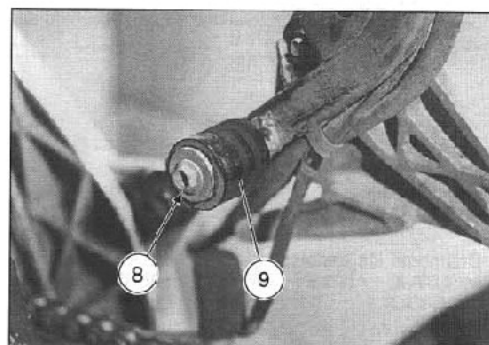
- Position the vehicle on the stand.
- Unscrew and partially withdraw the screw (5) (let the screw in as much as necessary to keep the rear brake pedal in the right position) and take the nut (6).

Screw/nut (5-6) driving torque: 25 Nm (2.5 kgm).

- Take the washer, the roller (7) and the special spacing bush (plastic + metal).

**REMOVING THE UPPER ROLLER**

- Position the vehicle on the stand.
- Unscrew and remove the screw (8).
- Take the two washers, the roller (9) and the special spacing bush (plastic + metal).

**REMOVING THE SHOE**

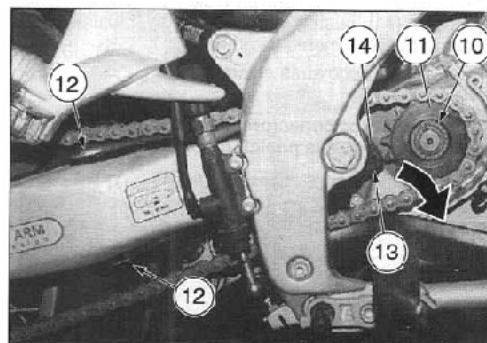
- Remove the transmission pinion protection case, see 3.1.3 (REMOVING THE TRANSMISSION PINION PROTECTION CASE).
- Remove the stop ring (10).
- Withdraw the transmission pinion (11) complete with chain from the shaft.

It is difficult to withdraw the transmission pinion (11), slightly slacken the chain, see 2.16.3 (ADJUSTMENT).

- Remove the transmission pinion (11).

Upon reassembly, apply LOCTITE® Anti-Seize on the inner toothing of the transmission pinion (11).

- Unscrew and remove the two screws (12).
- Insert a screwdriver in the opposite hole (13).
- Remove the shoe (14) by withdrawing it from the front part.



7.1.25 REMOVING THE SIDE STAND

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- Position the vehicle on the centre stand **off** or on an apposite support stand fixed to the centre stand couplings.



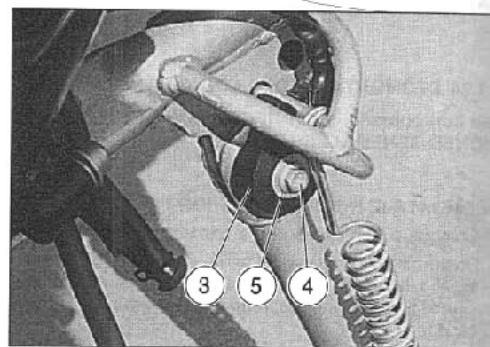
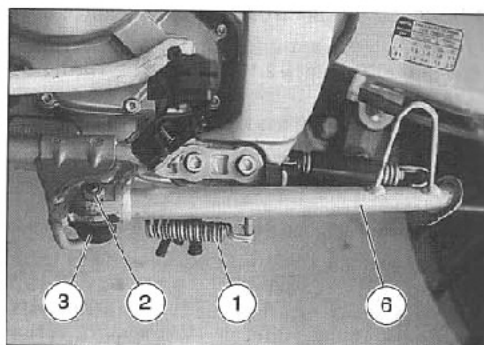
Proceed with the stand up.

- Disconnect the two springs (1).
 - Loosen and remove the nut (2) and take the washer.
- Nut (2) driving torque: 30 Nm (3 kgm).**



Proceed with care, in order to avoid damaging the switch (3).

- Unscrew and remove the screw (4).
- Withdraw the switch (3).
- Withdraw the pin (5).
- Remove the stand (6).



7.1.26 REMOVING THE CENTRE STAND **off**

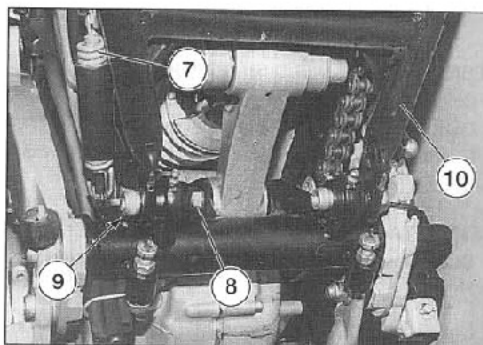
Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- Position the vehicle on the side stand.



Proceed with the stand up.

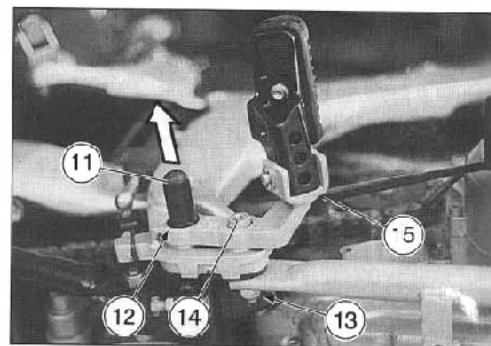
- Disconnect the two springs (7).
 - ★ Loosen and remove the nut (8).
 - ★ Withdraw the screw (9).
- Nut/screw (8-9) driving torque: 80 Nm (8 kgm)**
- Remove the stand (10).



7.1.27 REMOVING THE RIDER'S FOOTBOARD

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- Position the vehicle on the stand.
 - Remove the protection cap (11).
 - ★ Unscrew and remove the screw (12).
 - Loosen and remove the nut (13).
 - Withdraw the screw (14).
- Screw (12) and nut/screw (13-14) driving torque: 50 Nm (5 kgm).**
- Remove the rider's footboard (15).



7.1.28 REMOVING THE HANDLEBARS

- ♦ Remove the controls and handgrips, see 7.1.21 (REMOVING THE CONTROLS/HANDGRIPS).
- ♦ ★ Release the cables from the two fastening clamps (1).

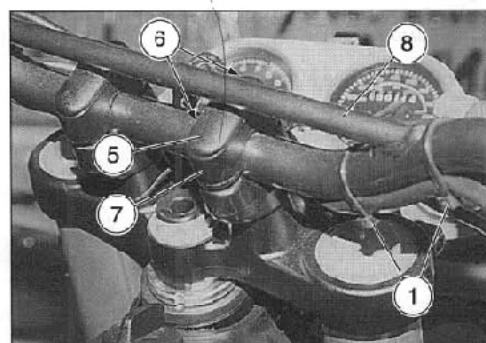
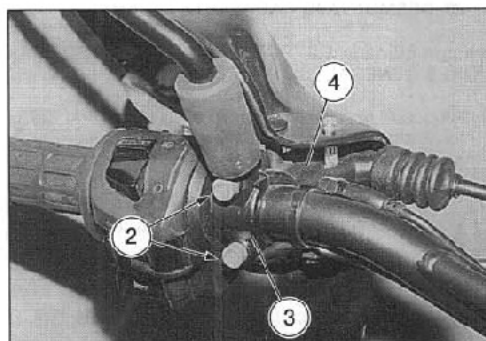


Get other clamps to be used for the reassembly.

- ♦ ★ Unscrew and remove the two screws (2).
- ♦ ★ Remove the half-shell (3) complete with the rear-view mirror.
- ♦ Shift the half-shell (4) complete with the clutch control lever (on the right side of the front brake lever/pump).
- ♦ ★ Remove the rubber protection element (5).
- ♦ ★ Unscrew and remove the two screws (6).
- ♦ Screw (6) driving torque: 25 Nm (2.5 kgm).
- ♦ ★ Remove the U-bolt (7).
- ♦ Remove the handlebars (8).



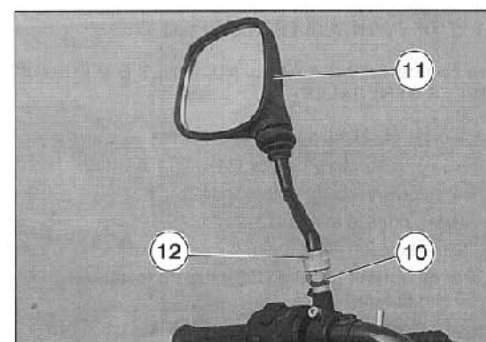
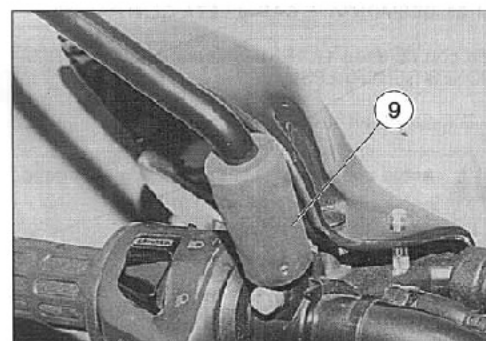
Upon reassembly, position the front brake lever and the clutch control lever at the right height.

**7.1.29 REMOVING THE REAR-VIEW MIRRORS**

- ♦ ★ Lift the protection element (9).
- ♦ ★ Unscrew the screw (10) completely and remove the whole rear-view mirror (11).

After the reassembly, if necessary adjust the mirror:

- ♦ ★ Loosen the nut (12).
- ♦ ★ Turn the mirror (11) to its optimal position.
- ♦ ★ Tighten the nut (12).
- ♦ ★ Put back the protection element (9).



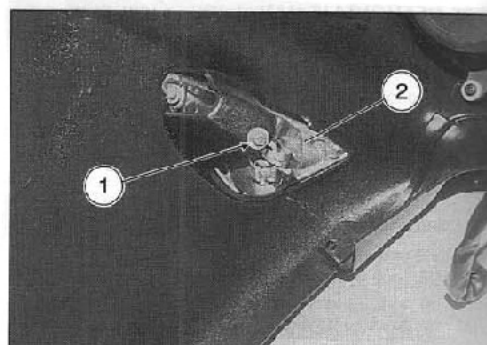
7.1.30 REMOVING THE FRONT DIRECTION INDICATORS

- ◆ Remove the front fairing, see 7.1.14 (REMOVING THE FRONT FAIRING).
- ◆ ★ Unscrew and remove the screw (1) and take the washer.



Upon reassembly, tighten the screw (1) moderately, since it is screwed onto plastic material.

- ◆ ★ Remove the whole direction indicator (2).

**7.1.31 REMOVING THE REAR DIRECTION INDICATORS**

Carefully read 1.4 (PRECAUTIONS AND GENERAL INFORMATION).

- ◆ Position the vehicle on the stand.
- ◆ Unscrew and remove the screw (3).
- ◆ Remove the glass protection cover (4).



Upon reassembly, tighten the screw (3) carefully, without exerting too much pressure, in order to avoid damaging the glass protection cover.

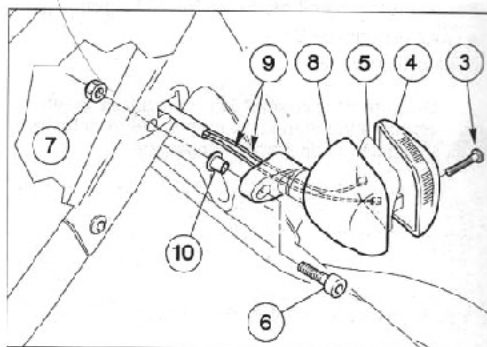


Handle with care.
Do not force the electric cables.

- ◆ Extract the parabolic indicator (5) as much as necessary to disconnect its two electric terminals.
- ◆ Unscrew the screw (6) and take the nut (7).
- ◆ Remove the indicator support (8) and withdraw it from the cables (9).



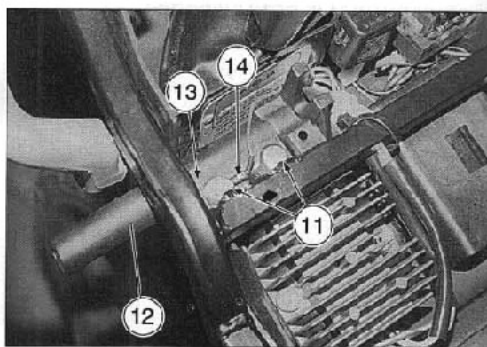
Upon reassembly, correctly position the bush (10) in the indicator support seat.

**7.1.32 REMOVING THE SADDLE LOCK**

- ◆ Remove the saddle, see 7.1.3 (REMOVING THE SADDLE).
- ◆ Unscrew and remove the two screws (11).
- ◆ Remove the saddle lock (12).



Upon reassembly, put back the two electric cables (13-14).



7.1.33 REMOVING THE FRAME



The frame must be removed only by an authorized centre or by an **aprilia** Official Dealer.

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.



The removal of the frame is particularly difficult to carry out, therefore it is necessary to check the vehicle carefully before proceeding to this operation.

This chapter describes the relevant procedures progressively and in sequential order.

Any coincidence of operations in the references to other chapters must be understood according to a logic principle, in order to avoid the unnecessary removal of certain components.



Neither unscrew, nor tamper with the two screws and the relevant nuts that fasten the frame for any reason whatsoever (see figure).

- Remove the engine, see 3.2 (REMOVING THE ENGINE FROM THE FRAME) and 3.3 (REINSTALLING THE ENGINE ON THE FRAME).
- Unscrew and remove the screw (1).
- Remove the guard (2).
- Disconnect the electric connectors on the left side of the vehicle.



Mark cables and pipes to avoid confusing them during the reassembly.
For further information on the lines of cables and pipes, see 8.2 (LINES, FIXING, HARNESS OF CABLES AND PIPES).



Release the cables and pipes from the tangs positioned on the frame and on the shock absorber upper support and withdraw them from the collars positioned on the components that must be removed.

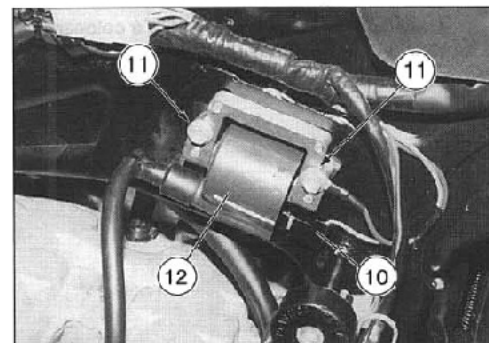
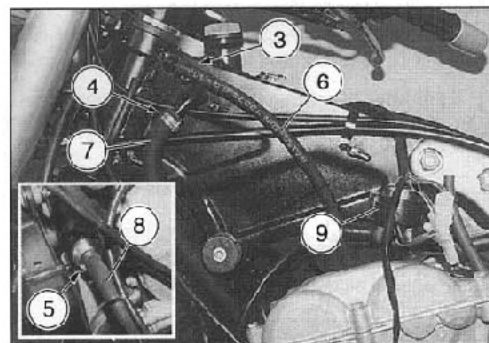
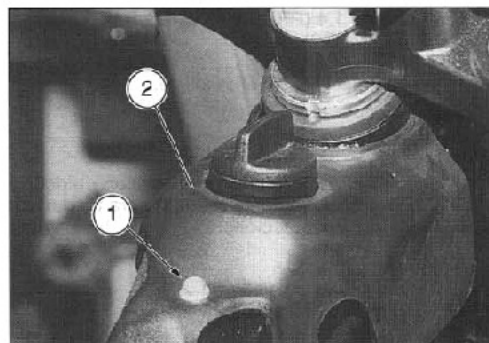
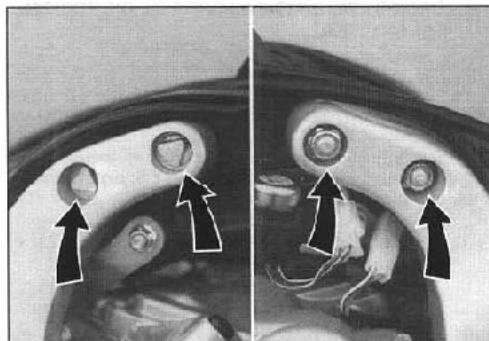
- Disconnect the electric connectors positioned on the switch of the rear brake pump.
- Remove the caddle pillar complete with filter casing and battery, passenger's footrest, luggage rack, glove compartment, number plate holder with rear light and exhaust silencers, see 7.1.11 (REMOVING THE SADDLE PILLAR) (from point nine onwards).



Release all the cables from the fastening clamps positioned along them.
Get other clamps to be used for the reassembly.

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

- Cut the heads of the pipe clamps (3-4-5) in the given order.
- Withdraw first the oil breather pipe (6) and then the engine oil pipes (7-8).
- Release the start relay (9) from its coupling.
- Disconnect the electric connector (10).
- Unscrew and remove the two screws (11).
- Remove the H.T. coil (12).



- Remove the rear fork complete with wheel, suspension unit and brake unit, see 7.9.1 (REMOVAL).
- Remove the rear brake pedal, see 7.1.24 (REMOVING THE CHAIN ROLLERS AND THE CHAIN SHOE).
- Remove the dashboard support, see 7.1.19 (REMOVING THE DASHBOARD SUPPORT).
- Sling the engine as indicated in the figure and hook the bands to a hoist for support.



The bands and the hoist must be suitable for bearing the weight of the frame, complete with forecarriage in total safety.

- Lift the frame, complete with forecarriage (wheel + mudguard + fork + handlebars with controls) as much as necessary to have a distance of about 250 mm between the wheel and the ground.
- Withdraw the whole forecarriage (13) from the steering tube (14), see 7.7 (STEERING).
- ★ Unscrew and remove the screw (15) and take the two washers.

Screw (15) driving torque: 50 Nm (5 kgm).

- ★ Unscrew and remove the screw (16) and take the washer.

Screw (16) driving torque: 50 Nm (5 kgm).

- Remove the shock absorber upper support (17).

- ★ Unscrew and remove the screw (18).

Screw (18) driving torque: 80 Nm (8 kgm).

- Take the rider's footboard and the double connecting rod support (19) complete with the centre stand **optional**, if this is provided.

- Unscrew and remove the oil plug (20) and take the O-ring (21).

- Unscrew and remove the oil filter (22) and take the gasket (23).

Oil filter (22) driving torque: 35 Nm (3.5 kgm).

- Unscrew and remove the oil drain plug (24) and take the sealing washer (25).

Oil drain plug (24) driving torque: 27 Nm (2.7 kgm).

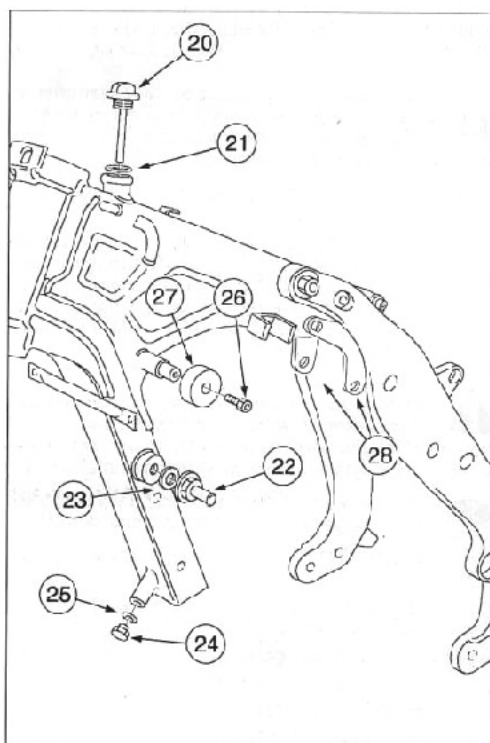
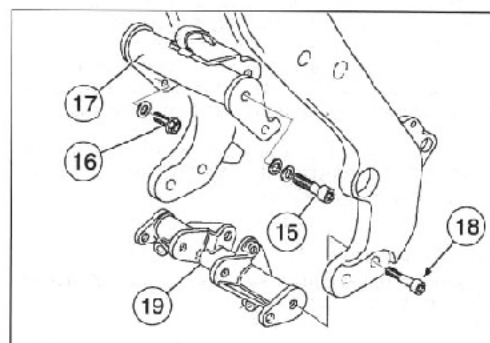
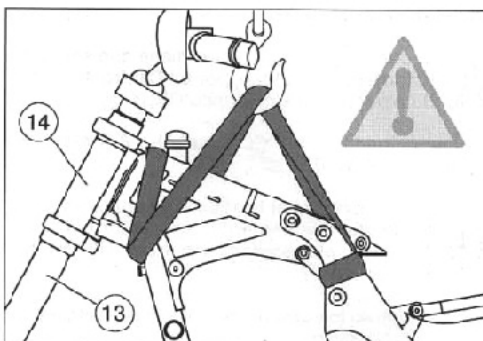
- Unscrew and remove the screw (26) and take the buffer (27).

- Loosen and remove the nut, withdraw the screw and take the washer and the two engine support plates (28).

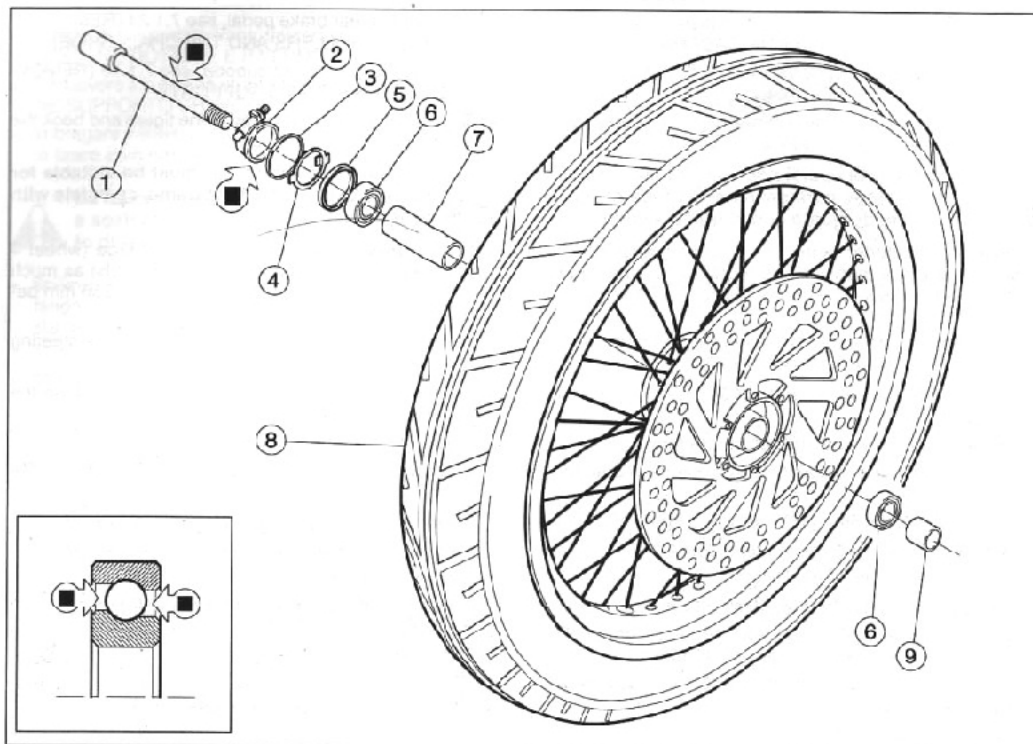
Driving torque of the engine support plate (28) fastening screw/nut: 25 Nm (2.5 kgm).

Once the frame has been completely reinstalled, proceed to the following operations:

- Check and if necessary adjust the steering bearing slacks, see 2.24.1 (CHECKING THE BEARING SLACKS) and 2.24.2 (ADJUSTING THE BEARING SLACKS).
- Check and if necessary adjust the rear fork, see 2.26 (REAR FORK) and 2.26.1 (ADJUSTING THE REAR FORK).
- Make sure that pipes and cables are correctly positioned and fastened.
- Make sure that the rear brake pedal is positioned correctly, see 2.20 (REAR BRAKE PEDAL ADJUSTMENT).



7.2 FRONT WHEEL



Key

- 1) Wheel pin
- 2) Speedometer/odometer control
- 3) Control sealing ring
- 4) Traction ring
- 5) Seal
- 6) Bearings
- 7) Inner spacer
- 8) Complete wheel
- 9) Outer spacer

■ = GREASE, see 1.7 (LUBRICANT CHART).

7.2.1 DISASSEMBLY

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) and 2.28 (FRONT WHEEL) carefully.

- ◆ Position the vehicle on the centre stand OPT or on an apposite support stand fixed to the centre stand couplings.
- ◆ Remove the oil pan guard, see 7.1.9 (REMOVING THE OIL PAN GUARD).



Due to the weight and dimensions of the vehicle, the following operation cannot be performed by one person only.

Proceed with care and make sure that you can support the weight of the vehicle.



Weight of the vehicle without driver (ready for starting): 200 kg.

- ◆ Raise the front part of the vehicle and have a suitable support (the height of which should be about 350 mm) placed under the engine, so that the front wheel can rotate freely and the vehicle cannot fall down.




The vehicle may fall down.


Provide for balancing the vehicle, in order to prevent it from falling down.

- ◆ Position and fix a load weighing about 40 kg on the rear luggage rack, in order to support the front part of the vehicle.


- Have the handlebars held still in driving position, so that the steering is locked.
- Loosen the two screws (1) of the wheel pin clamp.
- Unscrew and remove the two screws (2).
- Move the mudguard support (3) as much as necessary and unscrew the wheel pin (4).

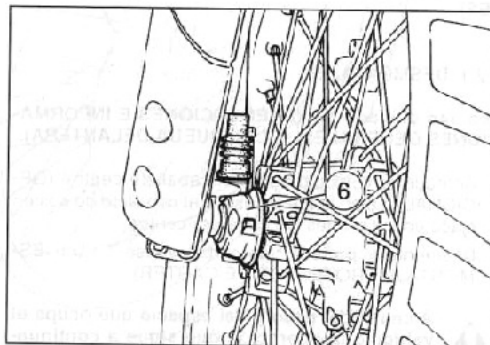
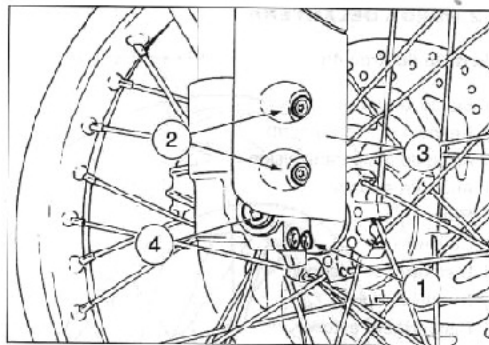
 **To facilitate the extraction of the wheel pin, slightly raise the wheel.**

- Extract the wheel pin (4) manually.
- Take the spacer (5) (left side).

 **Upon removal, check the position of the speedometer/odometer control: it will be useful during the reassembly.**


- Remove the speedometer/odometer control (6) from the wheel seat, taking the control sealing ring (7) and the traction ring (8).
- Remove the wheel, carefully withdrawing the disc from the brake caliper.

 **Never pull the front brake lever after removing the wheel, otherwise the caliper pins may go out of their seats, thus causing the outflow of the brake fluid.**




7.2.2 CHANGING THE BEARINGS

Read 1.4 carefully (PRECAUTIONS AND GENERAL INFORMATION).

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

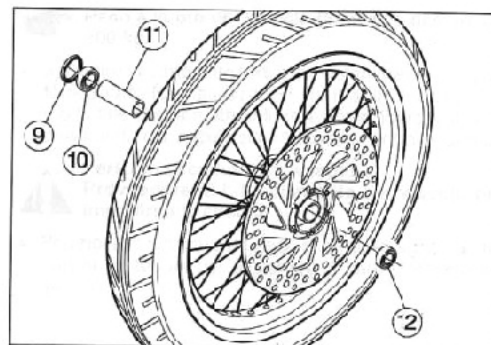
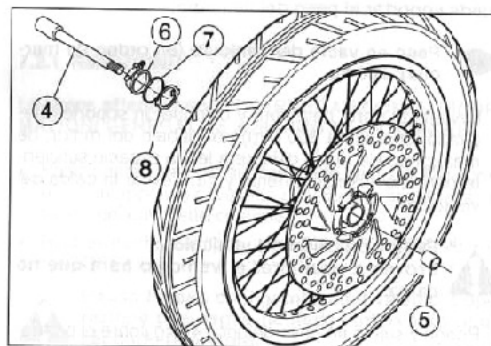
- Clean both sides of hub with a clean cloth.
- Hit against a suitable punch (with diameter equal to the inner ring of the bearings) resting on the inner ring of the left bearing.
Push out the following parts in the given order: the seal (9), the right bearing (10), the inner spacer (11), and the left bearing (12).
- Thoroughly clean the inside of the hub.

 **Upon reassembly, to insert the bearings use a punch with diameter equal to the outer ring of the bearings.**

The components must be reassembled from the opposite side of the brake disc, making sure that the bearing (12) is perfectly in contact.

Do not strike against the balls and/or the inner ring.

 **Wash all the components with a clean detergent.**



7.2.3 CHECKING



Make sure that all the components are sound, particularly the following:

BEARINGS

- Manually rotate the inner ring (1). It should rotate smoothly, without jamming and/or noise. There should be no axial clearance. The bearings showing the defects mentioned above should be changed.



Apply grease on the balls (or rollers) on both sides of the bearings, see 1.7 (LUBRICANT CHART).

WHEEL PIN

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

Maximum eccentricity: 0.25 mm.



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

RIM

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

If, after changing the bearings, the value does not return within the indicated limit, change the rim.

Maximum radial and axial eccentricity: 2 mm.

SPEEDOMETER CONTROL

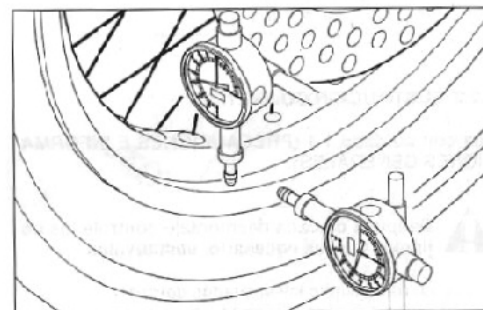
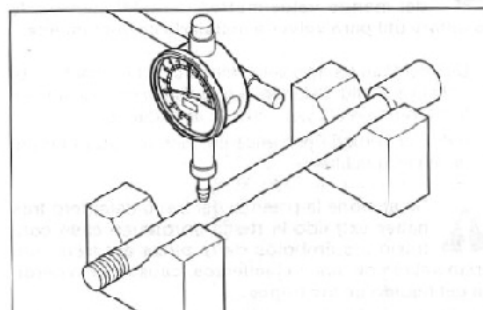
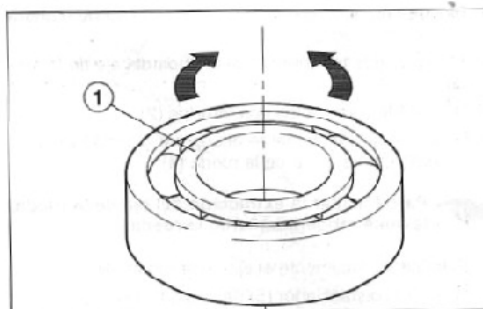
- Make sure there are no evident signs of damage and/or excessive wear.



Apply grease inside the speedometer control, see 1.7 (LUBRICANT CHART).

TYRE

- Check the conditions of the tyre, see 2.23 (TYRES) and 7.4 (TYRES).



7.2.4 REASSEMBLY

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.



While reassembling the wheel, be careful not to damage the brake pipe, the disc and the pads.



Insert the disc in the brake caliper with care.

- Position the wheel between the fork tubes.



Grease the inside of the speedometer/odometer control, see 1.7 (LUBRICANT CHART).

- Position the speedometer/odometer control tang (1) in the relevant seat in the wheel hub.
- Correctly position the traction ring (2), the sealing ring (3) and the odometer control seat in correspondence with the apposite antirotation pin (4).
- Shift the mudguard support as much as necessary to insert the wheel pin partially (from the right side of the vehicle).
- Insert the spacer (7) between the wheel hub and the fork left tube.



Grease the wheel pin, see 1.7 (LUBRICANT CHART).

- Insert the wheel pin (6) completely (fitting the spacer) and tighten it.

Wheel pin driving torque: 80 Nm (8 kgm).

- Correctly position the mudguard support (5).



Due to the weight and dimensions of the vehicle, the following operation cannot be performed by one person only. Proceed with care and make sure that you can support the weight of the vehicle.



Weight of the vehicle without driver (ready for starting): 200 kg.

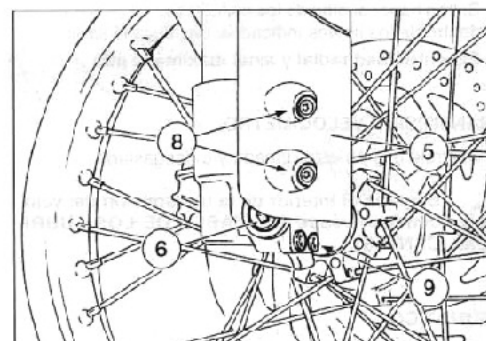
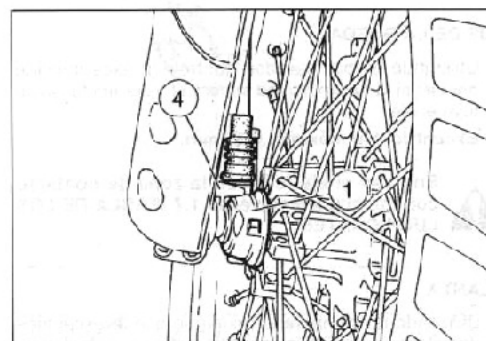
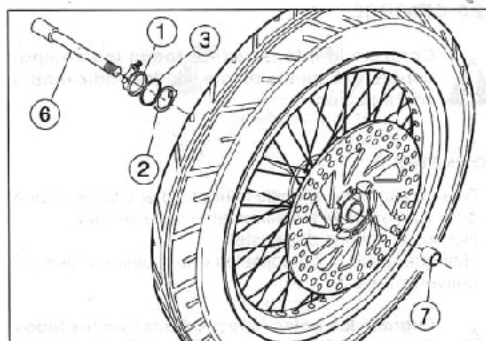
- Raise the front part of the vehicle and remove the support positioned under the engine during the disassembly.
- Lower the vehicle and position it on the stand.
- Correctly position the oil pan guard, see 7.1.9 (REMOVING THE OIL PAN GUARD).
- With pulled front brake lever, press the handlebars repeatedly, thrusting the fork downwards. In this way the fork tubes will settle properly.
- Screw and tighten the two screws (8).
- Tighten the wheel pin clamp screws (9).

Wheel pin clamp screw driving torque: 12 Nm (1,2 kgm).

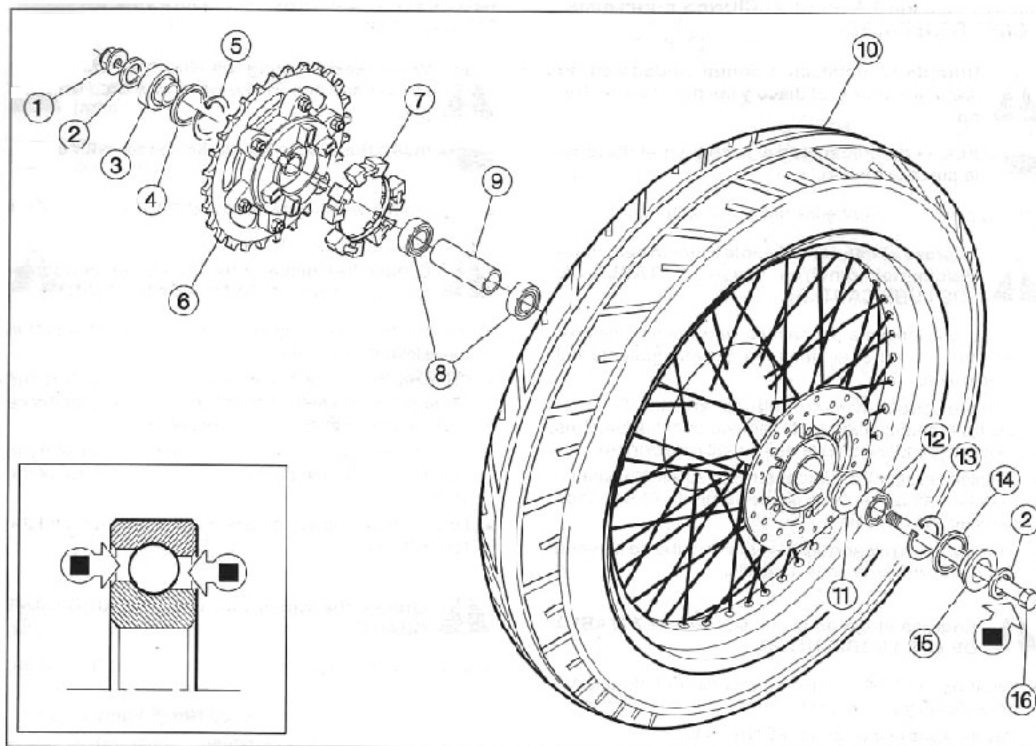


After reassembly, pull the front brake lever repeatedly and check the correct functioning of the braking system.

Check the centering and balancing of the wheel.



7.3 REAR WHEEL



Key

- 1) Nut
- 2) Washers
- 3) Right side spacer
- 4) Right seal
- 5) Right snap ring
- 6) Crown gear complete with flexible coupling hub
- 7) Flexible coupling
- 8) Bearings
- 9) Central spacer
- 10) Complete wheel
- 11) Spacer
- 12) Bearing
- 13) Left snap ring
- 14) Left seal
- 15) Left side spacer
- 16) Rear wheel pin

■ = GREASE, see 1.7 (LUBRICANT CHART).

7.3.1 DISASSEMBLY

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) and 2.29 (REAR WHEEL) carefully.

- ◆ Position the vehicle on the centre stand **up** or on an apposite support stand fixed to the centre stand couplings.
- ◆ Remove the oil pan guard, see 7.1.9 (REMOVING THE OIL PAN GUARD).



Due to the weight and dimensions of the vehicle, the following operation cannot be performed by one person only. Proceed with care and make sure that you can support the weight of the vehicle.



Weight of the vehicle without driver (ready for starting): 200 kg.

- ◆ Raise the rear part of the vehicle, have a suitable support (the height of which should be 350 mm) placed under the engine, so that the rear wheel can rotate freely and the vehicle cannot fall down.



The vehicle may fall down. Provide for balancing the vehicle, in order to prevent it from falling down.

- ◆ Lock the wheel pin (1) rotation, by means of the suitable spanner.
- ◆ Unscrew and remove the nut (2) and take the washer (3).

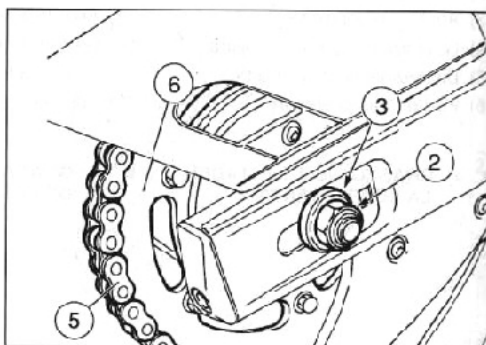
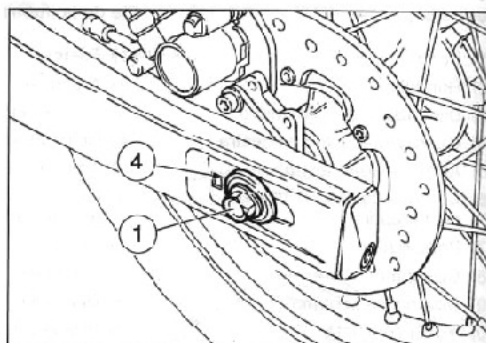


To facilitate the extraction of the wheel pin, slightly raise the wheel.

- ◆ Extract the wheel pin (1) manually and take the washer (4).
- ◆ Make the rear wheel advance and release the gearing chain (5) from the crown gear (6).
- ◆ Withdraw the wheel from the rear fork from behind, carefully withdrawing the disc from the brake caliper.



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



7.3.2 CHANGING THE BEARINGS

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.



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

- ◆ Remove the right side spacer (7).
- ◆ Clean both sides of hub with a cloth.
- ◆ ★ Remove the seal (8).
- ◆ ★ Remove the snap ring (9).
- ◆ Remove the crown gear complete with hub (10) and flexible coupling (11).

Push out, in this order:

- ◆ The bearing (12), by hitting against a suitable punch (with diameter equal to the inner ring of the bearings) resting on the inner ring of the bearing (16).
- ◆ The bearing (14).
- ◆ On the opposite side, hitting against the same punch resting on the central spacer (13), push out the bearing (16), the left side spacer (15) and the spacer itself.
- ◆ Thoroughly clean the inside of the hub.

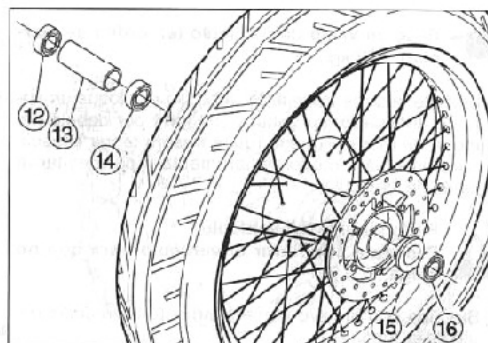
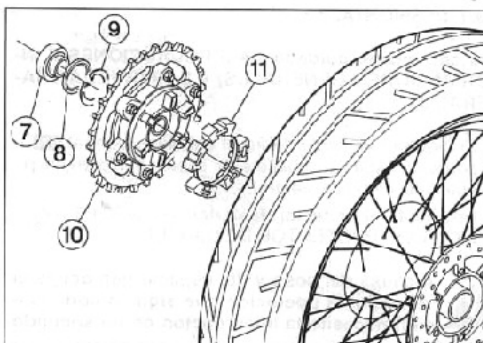


Upon reassembly, to insert the bearings use a punch with diameter equal to the outer ring of the bearings.

Do not strike against the balls and/or the inner ring.



Wash all the components with a clean detergent.



7.3.3 CHECKING



Make sure that all the components are sound, particularly the following:

BEARINGS

See 7.2.3 (CHECKING; BEARINGS).

WHEEL PIN

See 7.2.3 (CHECKING; WHEEL PIN).

RIM

See 7.2.3 (CHECKING; RIM)

FLEXIBLE COUPLING

- ◆ Check that the small blocks on the flexible coupling (1) are not damaged and/or excessively worn. If necessary, change the flexible coupling. If excessive clearance is noticed, the coupling must be changed.
- ◆ Manually rotate the crown gear (2) and check the clearance between crown gear and wheel hub (3).

CROWN GEAR

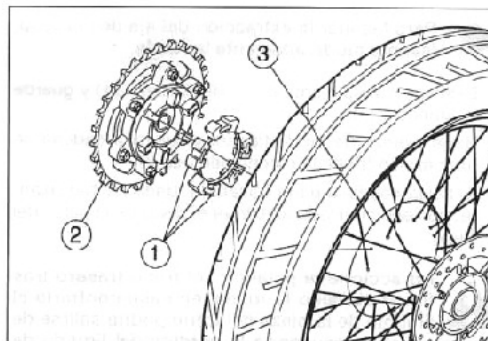
- ◆ Check the conditions of the crown gear teeth (2) and of the pinion. If you notice excessive wear, change the crown gear, the pinion and the gearing chain, see 7.1.23 (REMOVING THE GEARING CHAIN).



To avoid premature wear of the new components, change them all.

TYRE

- ◆ Check the conditions of the tyre, see 2.23 (TYRES).



7.3.4 REASSEMBLY

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.



Insert the disc in the brake caliper with care.

- ◆ Position the rear wheel between the tubes of the rear fork.
- ◆ Make the wheel advance and position the gearing chain (1) on the crown gear (2).



Risk of injuries.

Do not use your fingers to align the seats.

- ◆ Make the wheel move backwards and align the pin seat on the wheel hub with the pin seats on the tubes of the rear fork.



Grease the wheel pin, see p. 1.7 (LUBRICANT CHART).



To facilitate the insertion of the wheel pin, slightly raise the wheel.

- ◆ Insert the wheel pin (3) complete with washer (4) from the left side of the vehicle.



Make sure that the wheel pin has been inserted completely.

- ◆ Fit the washer (5) and screw the nut (6) completely.
- ◆ Check the chain tension, see 2.16.1 (CLEARANCE CONTROL).
- ◆ Lock the wheel pin (3) rotation by means of the suitable spanner and tighten the nut (6).

Wheel pin-nut (6-3) driving torque:
100 Nm (10 kgm).



Due to the weight and dimensions of the vehicle, the following operation cannot be performed by one person only.

Proceed with care and make sure that you can support the weight of the vehicle.



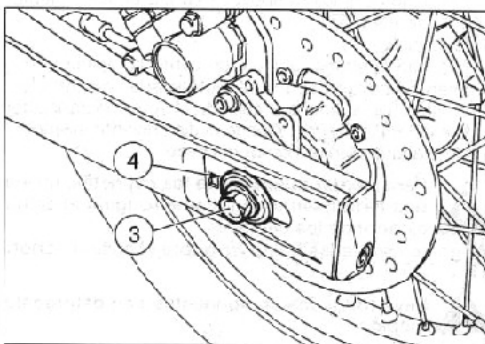
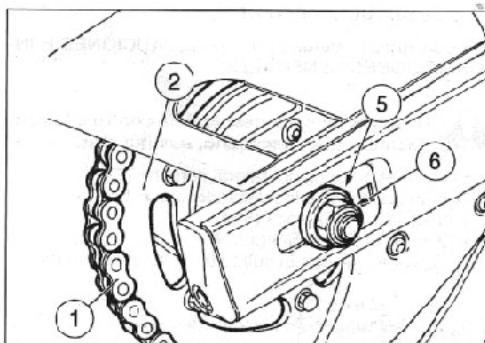
Weight of the vehicle without driver (ready for starting): 200 kg.

- ◆ Raise the rear part of the vehicle and remove the support: positioned under the engine during the disassembly.
- ◆ Lower the vehicle and position it on the stand.
- ◆ Correctly position the oil pan guard, see 7.1.9 (REMOVING THE OIL PAN GUARD).



After reassembly, pull the rear brake lever repeatedly and check the correct functioning of the braking system.

Check the centering and balancing of the wheel.

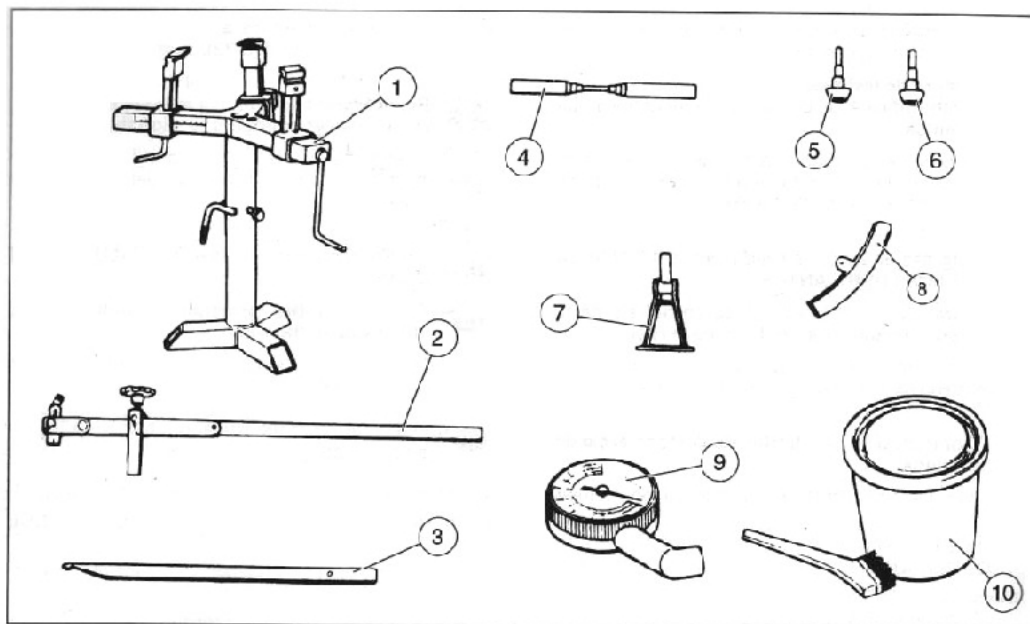


7.4 TYRES

7.4.1 DISASSEMBLY

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) and 2.23 (TYRES) carefully.


It is advisable to use the indicated tools when disassembling the tyre from the rim.

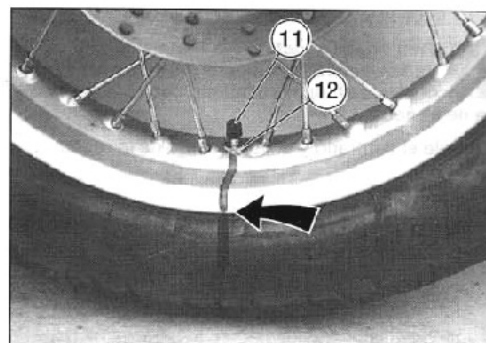


Key

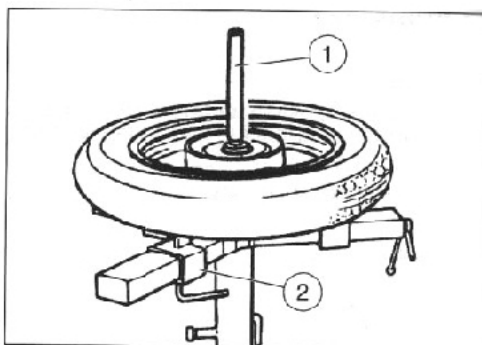
- 1) Wheel support
- 2) Control lever
- 3) Tyre iron
- 4) Truing shaft
- 5) Bead pressing roller
- 6) Rim guide roller
- 7) Bead separator
- 8) Rim protector
- 9) Tyre gauge
- 10) Lubricant for tyres.

- Unscrew and remove the closing cap (11).
- Deflate the inner tube completely.
- Unscrew and remove the valve lock ring (12).

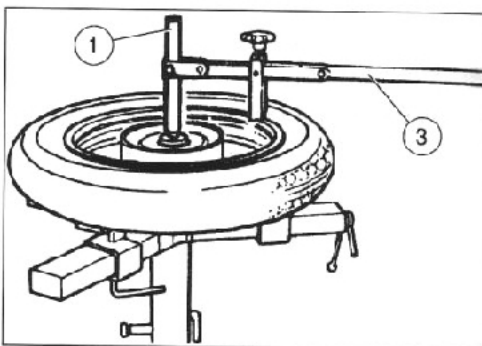
 Mark the tyre with chalk, to show its position with respect to the rim and to the rotation direction.



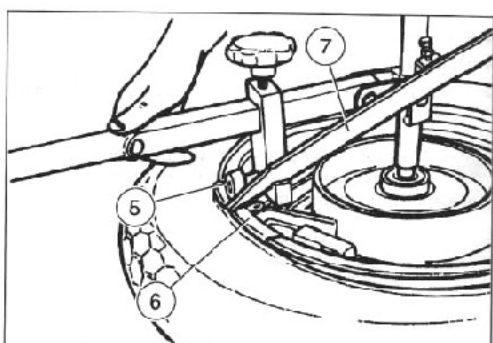
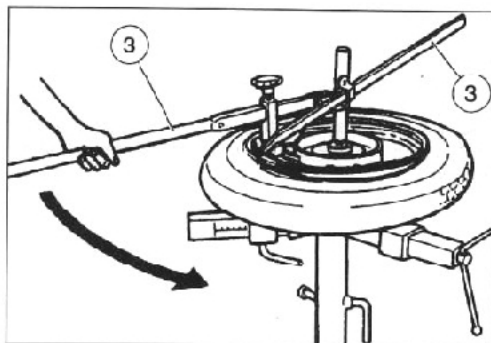
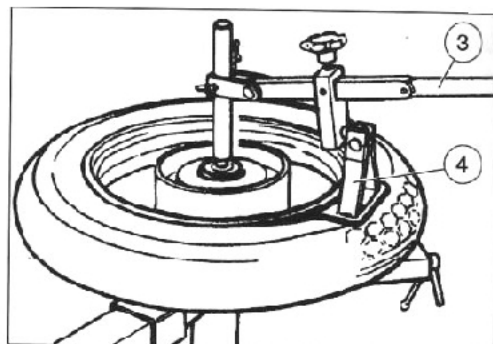
- Fit the truing shaft (1) in the wheel hub and then lock it with the wheel support (2).



- Fasten the control lever (3) to the truing shaft (1).



- Fasten the bead separator (4) to the control lever (3) and separate the bead from the rim.
- Turn the wheel and separate the other bead from the rim.
- Install the rim guide roller (5).
- Position the rim protector (6) and withdraw the tyre bead with the help of the tyre iron (7).
- Place the tyre iron (7) against the control lever (3) and make it rotate around the rim.
- Repeat the above procedure to disassemble the other bead from the rim.
- Remove the tyre.
- Remove the inner tube.



7.4.2 CHECKING

RIM

Before checking the rim, eliminate all rubber or rust residues.

If one or more of the listed defects are present, change the rim.

- ◆ Deformation or cracking.
- ◆ Marks/lines or defects.

TYRE

Thoroughly check the tyre after removing it. If one or more of the listed defects are present, do not repair the tyre, but change it.

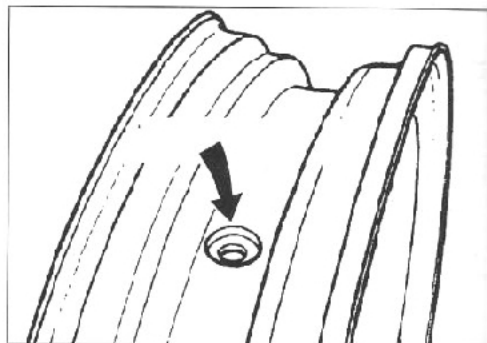
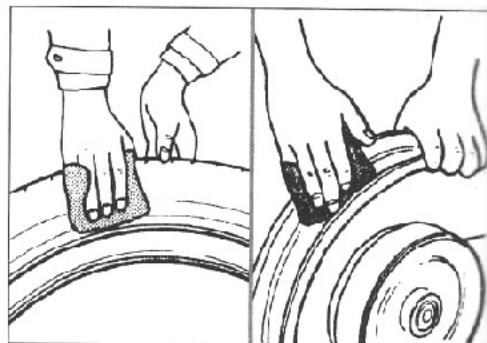
- ◆ Hole or crack exceeding 5 mm in diameter or length.
- ◆ Mark or cracking on the side.
- ◆ Tread depth less than 2 mm.
- ◆ Ply unglued.
- ◆ Separated tread.
- ◆ Deformation or wear of tread not uniform.
- ◆ Marks/lines on the bead.
- ◆ Damage due to skidding (flattened areas).
- ◆ Anomalies in the inner seal.



When repairing a punctured tyre, follow the instructions and use only the components recommended for repairing.



In case the axial and radial eccentricity exceed 2 mm, adjust the tension of the spokes until the normal conditions are reestablished.

**INNER TUBE**

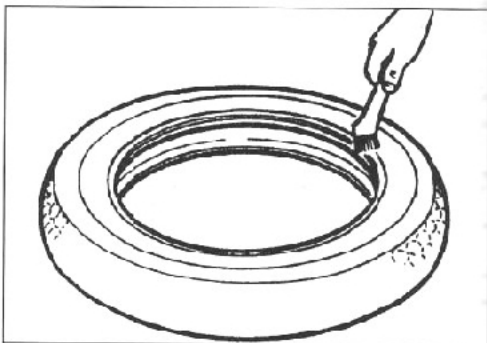
Carefully check the inner tube, trying to find possible holes or cuts, then proceed to the repair.

If one or more of the listed defects are present, do not repair the inner tube, but replace it with a new one.

- ◆ Hole or crack exceeding 5 mm in diameter or length.
- ◆ Evident cracking around the base of the valve.
- ◆ Bubbles or anomalous swelling when the tube is inflated in order to find out any hole.



When repairing a punctured inner tube, follow the instructions and use only the components recommended for repairing.



7.4.3 ASSEMBLING THE INNER TUBE

Eliminate any trace of dirt or rust from the valve seat.

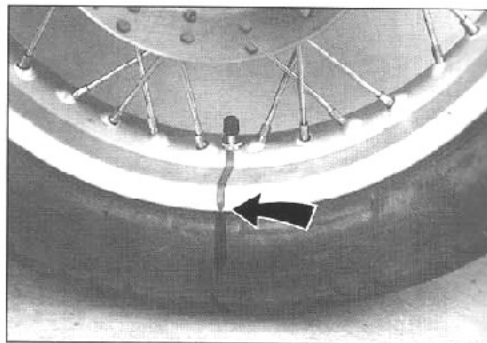
7.4.4 ASSEMBLING THE TYRE

- ◆ Apply the special lubricant for tyres, or soapy water, to the beads of the tyre.

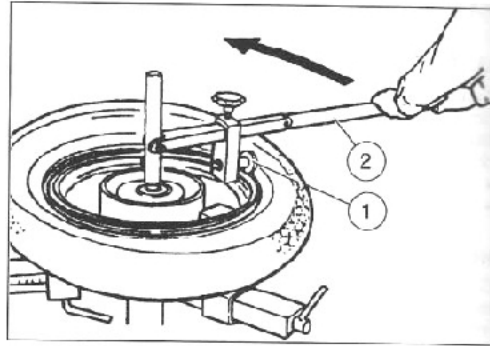


Never apply grease, oil or petrol to the beads of the tyre for any reason whatsoever.

- ◆ If a disassembled tyre is to be reassembled, make sure that the arrow stamped on it is pointed in the wheel rotation direction and make the chalk mark made on the tyre upon disassembly coincide with the mark on the rim.



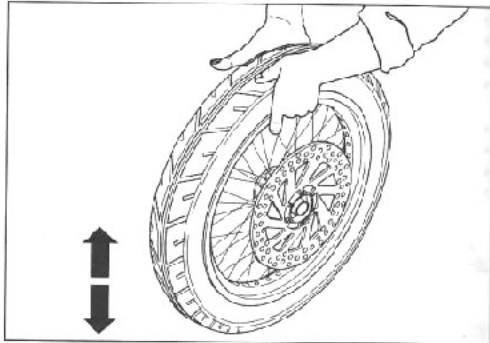
- Position the bead pressing roller (1).
- Make the control lever (2) rotate around the rim in order to insert the bead completely in the rim. Position the lower bead first, then the upper bead.
- Remove the wheel from the support.



- Make the tyre bounce several times and at the same time rotate it. This operation pushes the beads towards the seats on the rim, thus facilitating the inflation of the tyre.



Before inflating the tyre, make sure that the mark on the tyre still coincides with the mark on the rim.



- Inflate the tyre.



To use the vehicle, do not inflate the tyre more than:
FRONT TYRE 180 kPa (1.8 bar)
REAR TYRE 190-220 kPa (2.2 bar)
It may explode, causing serious injuries.
Never sit on the tyre while inflating it.



Check the "line" of the rim on the tyre side. It must be equidistant from the edge of the rim along its entire circumference.

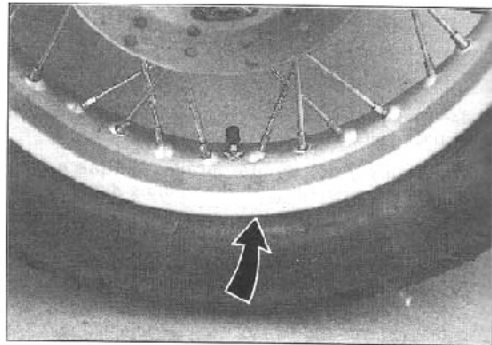
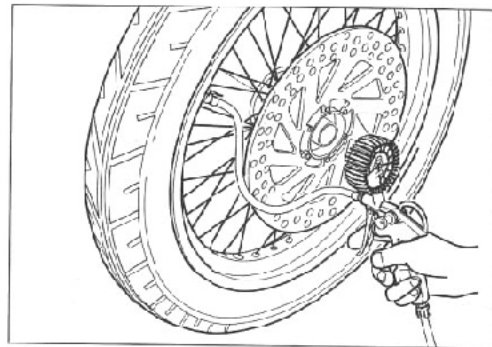
If the distance between the line of the tyre and the rim varies along the circumference, this means that the bead is not positioned properly. In this case, deflate the tyre completely and separate both beads from the rim.

Spread the special lubricant on the beads and inflate the tyre again.

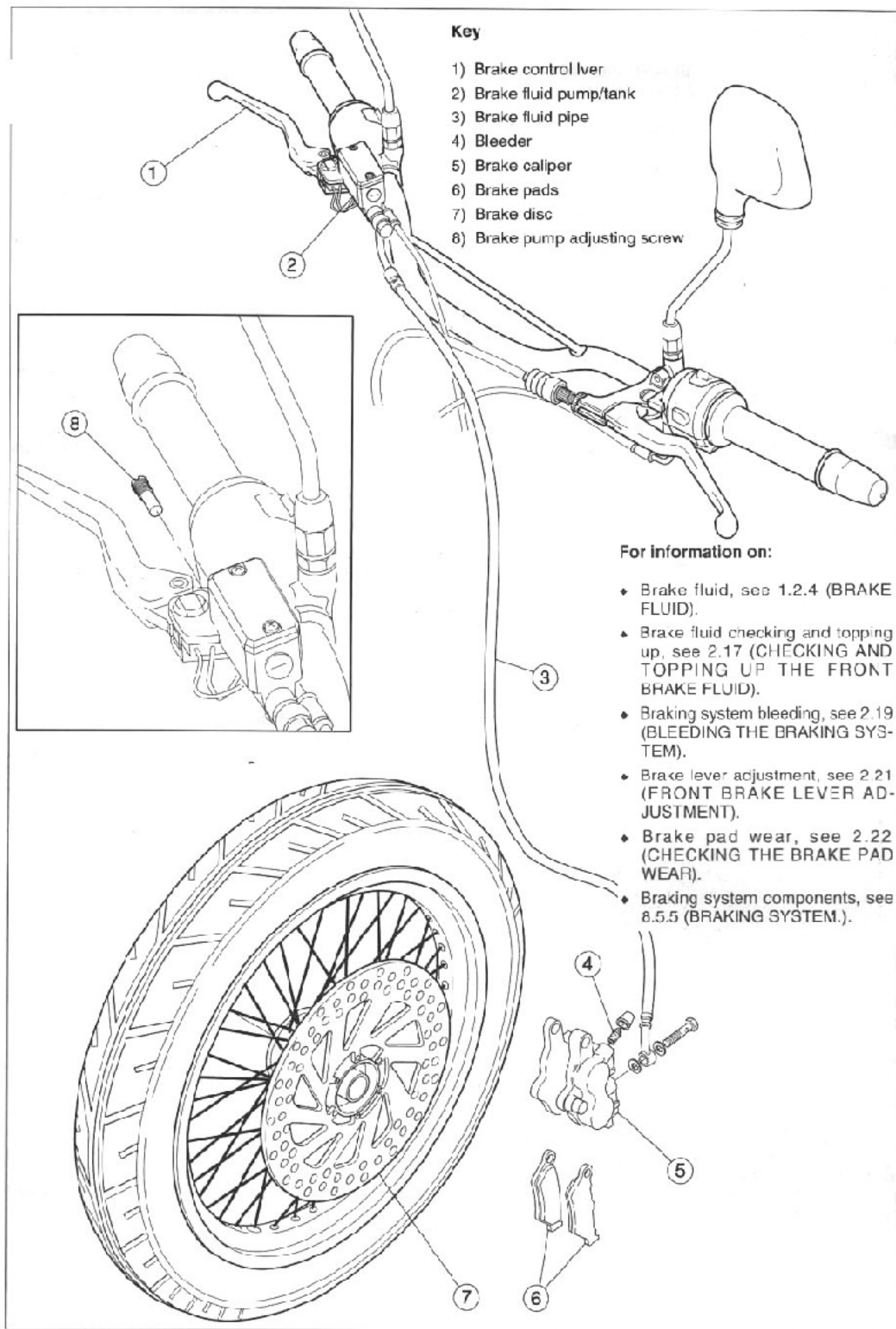
- When the tyre is properly installed on the rim, regulate the pressure to the prescribed value.
- If necessary, balance the wheel.



Do not exceed 50 km/h in the first 24 hours following the repair of the tyre; the insert or the patch might not be completely glued.
Do not exceed the speed of 130 km/h with a repaired tyre.



7.5 FRONT BRAKE



7.5.1 CHANGING THE BRAKE PADS

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- ◆ Position the vehicle on the stand.
- ◆ Withdraw the flexible stop pin (1).
- ◆ Using a punch, push out the pin (2) (from left to right).
- ◆ Extract the two pads (3).



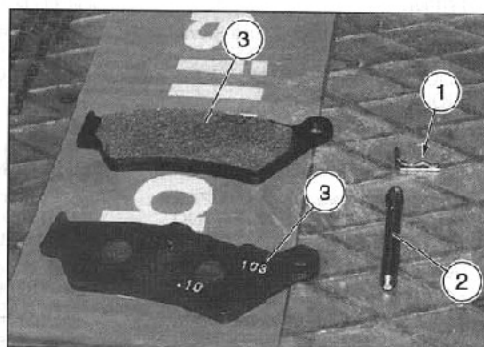
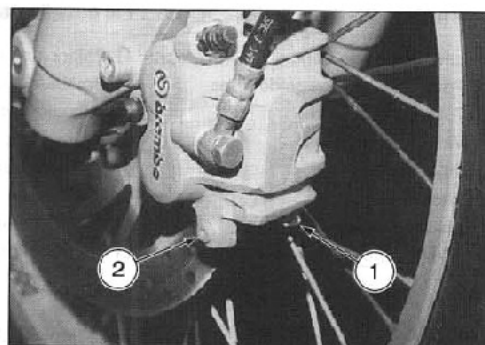
After removing the pads, do not pull the brake control lever, otherwise the caliper pins may go out of their seats and cause the outflow of the brake fluid.

- ◆ Insert two new pads.



Always change both pads and make sure that they are correctly positioned inside the caliper.

- ◆ Insert the pin (2).
- ◆ Insert the flexible stop pin (1).
- ◆ Check the brake fluid level, see 2.17 (CHECKING AND TOPPING UP THE FRONT BRAKE FLUID).



7.5.2 CHECKING THE BRAKE DISC



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

- ◆ Check the wear on the disc by measuring the minimum thickness in several places by means of a micrometer. If, even in one point of the disc only, the minimum thickness is below the minimum value, change the disc.

Brake disc min. thickness: 4.5 mm.

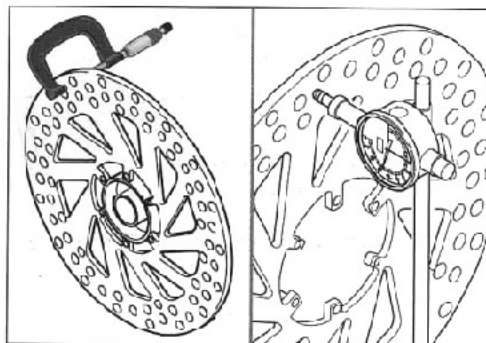
- ◆ Using a comparator, make sure that the maximum wobbling of the disc does not exceed the limit value, otherwise change it.

Brake disc max. wobbling: 0.3 mm

Disc fastening screw driving torque:

12 Nm (1.2 kgm).

Assemble with medium LOCTITE® thread restrainer.



7.5.3 REMOVING THE BRAKE DISC

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- ◆ Remove the front wheel, see 7.2.1 (DISASSEMBLY).
- ◆ Unscrew and remove the six brake disc screws (4).

Brake disc screw driving torque:

12 Nm (1.2 kgm).

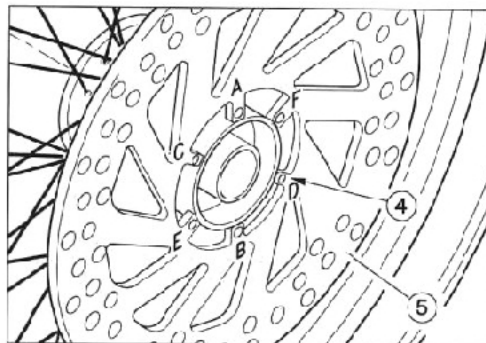


Upon reassembly, apply medium LOCTITE® thread restrainer on the thread of the brake disc screws.

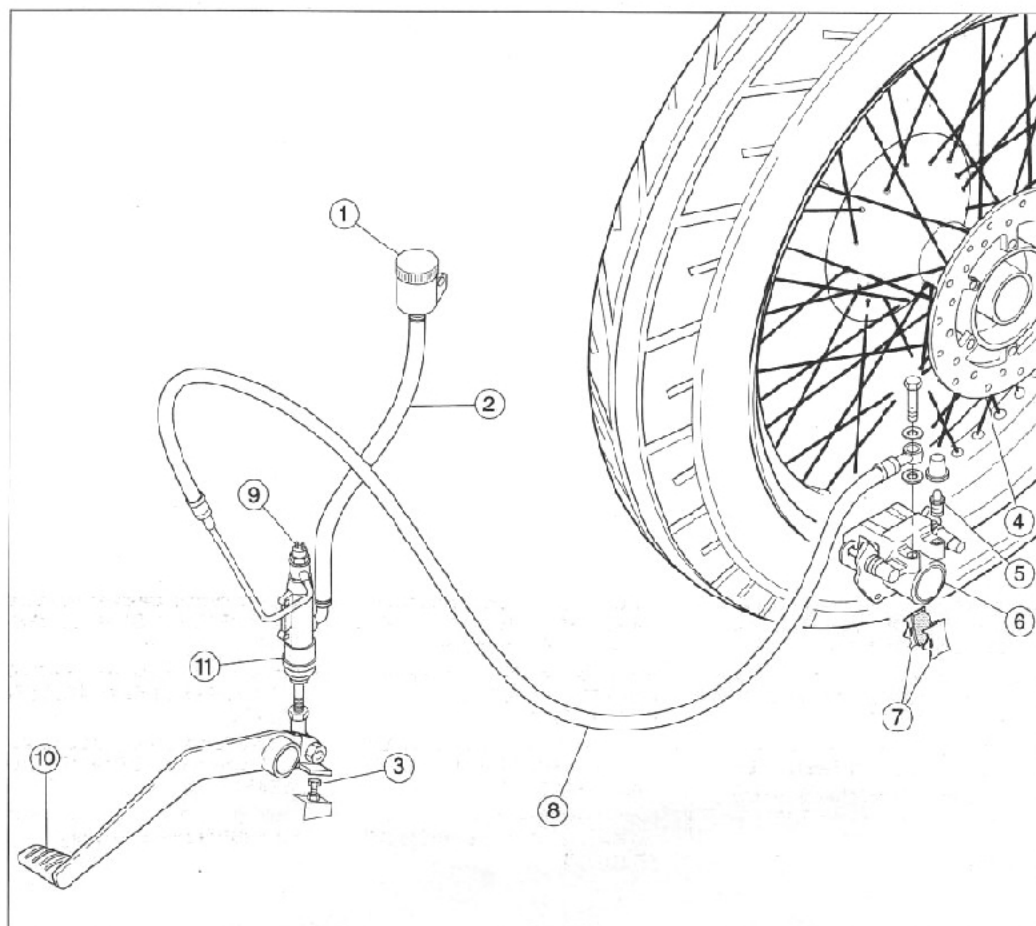


Upon reassembly, screw all the screws manually and tighten them proceeding diagonally in the following order: A-B-C-D-E-F.

- ◆ Remove the brake disc (5).



7.6 REAR BRAKE



Key

- 1) Brake fluid tank
- 2) Brake fluid pipe from tank to pump
- 3) Pedal adjusting screw
- 4) Brake disc
- 5) Bleeder
- 6) Brake caliper
- 7) Brake pads
- 8) Brake fluid pipe from pump to caliper
- 9) Rear stop light switch
- 10) Brake control pedal
- 11) Brake pump


For information on:

- ♦ Brake fluid, see 1.2.4 (BRAKE FLUID).
- ♦ Brake fluid checking and topping up, see 2.18 (CHECKING AND TOPPING UP THE REAR BRAKE FLUID).
- ♦ Braking system bleeding, see 2.19 (BLEEDING THE BRAKING SYSTEM).
- ♦ Brake pedal adjustment, see 2.20 (REAR BRAKE PEDAL ADJUSTMENT).
- ♦ Brake pad wear, see 2.22 (CHECKING THE BRAKE PAD WEAR).
- ♦ Braking system components, see 8.5.5 (BRAKING SYSTEM).


7.6.1 CHANGING THE BRAKE PADS

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.


- ◆ Position the vehicle on the stand.
- ◆ Unscrew and remove the two screws (1) that fasten the caliper (2) to the support plate (3).
- ◆ Withdraw the caliper from the disc and move it sideways.

 It is not necessary to disconnect the brake fluid pipe.

- ◆ Press, as indicated in the figure, moving the float (4) uniformly towards the caliper pin.
- ◆ Extract the two pads (the inner one first).

 After removing the pads, do not pull the brake control lever, otherwise the caliper pin may go out of its seat and cause the outflow of the brake fluid.

- ◆ Insert two new pads.

 Always change both pads and make sure that they are correctly positioned inside the caliper.

Pad wear limit: 1 mm.

- ◆ Insert the caliper (2) on the disc and position it on the support plate (3).
- ◆ Tighten the two fastening screws (1).

 Screw (1) driving torque: 25 Nm (2.5 kgm).

- ◆ Check the brake fluid level, see 2.18 (CHECKING AND TOPPING UP THE REAR BRAKE FLUID).

7.6.2 CHECKING THE BRAKE DISC

See 7.5.2 (CHECKING THE BRAKE DISC).

Brake disc min. thickness: 4.5 mm.

Brake disc max. wobbling: 0.3 mm


7.6.3 REMOVING THE BRAKE DISC

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

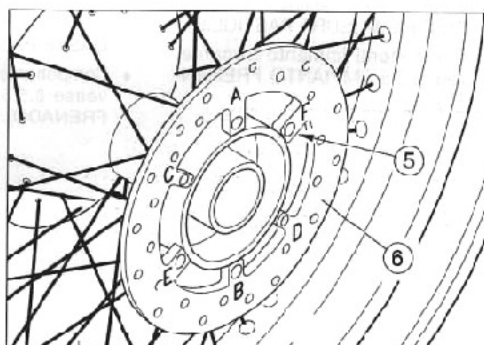
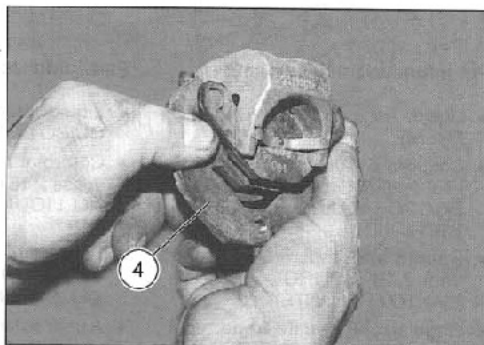
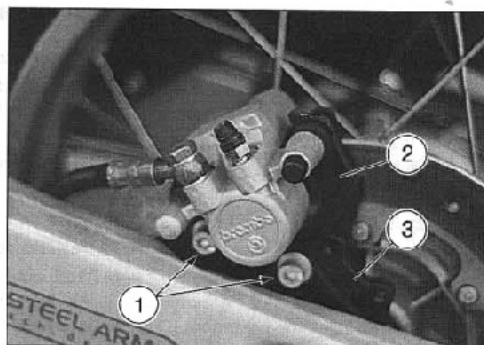
- ◆ Remove the rear wheel, see 7.3.1 (DISASSEMBLY).
- ◆ Unscrew and remove the six brake disc screws (5).

Brake disc screw driving torque:
12 Nm (1.2 kgm).

Upon reassembly, apply medium LOCTITE® thread restrainer on the thread of the brake disc screws.

 Upon reassembly, screw all the screws manually and tighten them proceeding diagonally in the following order: A-B-C-D-E-F.

- ◆ Remove the brake disc (6).



7.7 STEERING**7.7.1 DISASSEMBLY**

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

- Remove the oil pan guard, see 7.1.9 (REMOVING THE OIL PAN GUARD).
- Position the vehicle on the centre stand **OFF** or on an apposite support stand fixed to the centre stand couplings, on a lifting platform, with the front wheel protruding from the platform edge.



Put a proper support under the vehicle, in order to prevent it from falling down. Make sure that the vehicle is stable.

- Raise the lifting platform of about 250 mm.
 - Unscrew and remove the screw (1), releasing the clamp (2).
 - Unscrew and remove the screw (3) and take the washer, releasing the collar (4).
 - Unscrew and remove the two screws (5) that fasten the front brake caliper (6) and take the relative washers.
- Screw (5) driving torque: 50 Nm (5 kgm).**
- Withdraw the brake caliper (6) from the disc.



To perform the following operations it is not necessary to remove the front fairing, but it is advisable to do it in order to be able to move more comfortably, see 7.1.14 (REMOVING THE FRONT FAIRING).

- Working on the lower part of the front fairing, disconnect the speedometer/odometer control from the dashboard and withdraw it from the collar.
- ★ Unscrew the screw (7):
Screw (7) driving torque: 50 Nm (5 kgm).
- Loosen and remove the upper nut (8).
Nut (8) driving torque: 100 Nm (10 kgm).

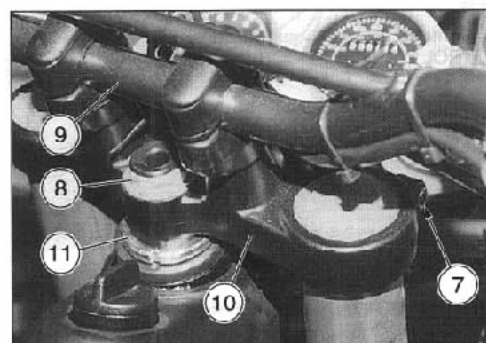
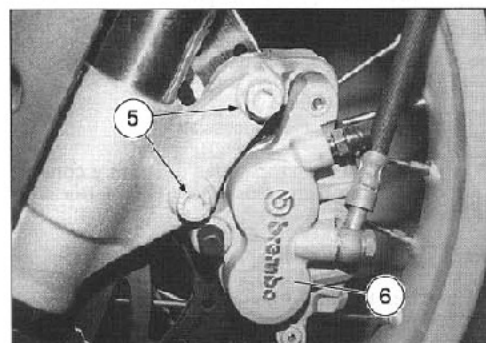
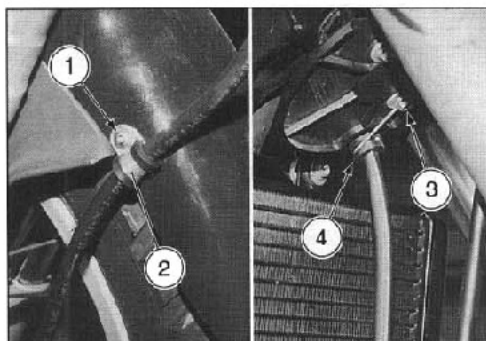


Use a proper support for the handlebars, which remain connected to the vehicle through the electric cables and the brake pipe. Proceed with care. Do not force the electric cables or the brake pipe.

- Lift the handlebars (9) together with the upper plate (10), withdrawing the latter from the fork.
- Bend the handlebars (9), complete with upper plate (10), forwards and fix it temporarily.



When reassembling the upper plate (10), insert it in the fork slider until the upper edges coincide.





Due to the weight and dimensions of the forecarriage, the following operations cannot be performed by one person only. Verify the procedures in advance.
The removal must be carried out with the greatest care.



Support the fork, in order to avoid any accidental fall.

- While one operator keeps the forecarriage in the right position, loosen and remove the metal ring (11).

Withdraw the forecarriage (12) from the steering tube and take the following parts, in the given order:

- Antidust gasket (13);
- Seals (14);
- Bearings (15).



Wash all the components with a clean detergent.

7.7.2 CHECKING THE BEARINGS

See 7.2.3 (CHECKING; BEARINGS)

7.7.3 REASSEMBLY

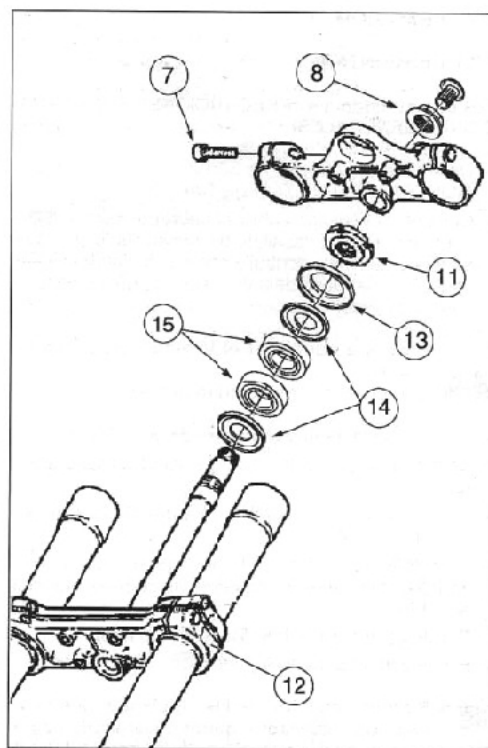


For the reassembly, proceed in the reverse order with respect to the disassembly.

- Make sure that the upper plate (10) and the lower plate are perfectly aligned.
- Before tightening the adjusting metal ring (11) and the upper nut (8) definitively, turn the handlebars more than once in both directions, in order to ensure the settling of the bearings.
- When turning the handlebars, make sure that cables and pipes are not taut and that they are neither twisted, nor overlapping in an incorrect way.

7.7.4 ADJUSTMENT

See 2.24 (STEERING).



7.8 FRONT FORK**7.8.1 CHECKING THE OIL LEVEL**

Read 1.2.3 (FORK OIL) and 2.25 (FRONT FORK) carefully.

If the fork is found to reach the end of its stroke, it is necessary to check the oil level of the fork tubes.

- ★ Unscrew and remove the plug (1) and take the O-ring (2).

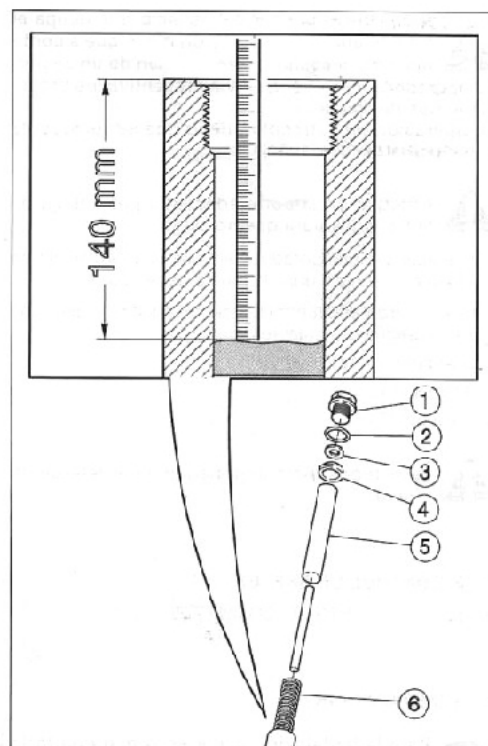
Plug (1) driving torque: 20 Nm (2 kgm).

- ★ Withdraw the half-ring (3).
- ★ Withdraw the spring ring (4).



The preload tube (5) and the spring (6) guide tube are immersed in oil.
Avoid dripping oil during the extraction.

- ★ Withdraw the preload tube (5)
- ★ Withdraw the spring (6).
- ★ Move the fork to the end-of-stroke, insert a calibrated dipstick (metre) in one of the fork tubes and make sure that 140 mm of air remain between the upper edge of the fork and the oil.
- ★ If necessary, top up, see 1.7 (LUBRICANT CHART).

**7.8.2 REMOVING THE WHOLE FORK**

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) and 2.25 (FRONT FORK) carefully.

- ★ Remove the front mudguard, see 7.1.6 (REMOVING THE FRONT MUDGUARD UNIT).
- ★ Remove the front wheel, see 7.2.1 (DISASSEMBLY).

For the removal of the whole fork (in case of replacement), keep to the instructions, see 7.7.1 (DISASSEMBLY).

7.8.3 REMOVING THE WHEEL-HOLDER TUBE/SLIDER UNIT (WITH INSTALLED FORK)

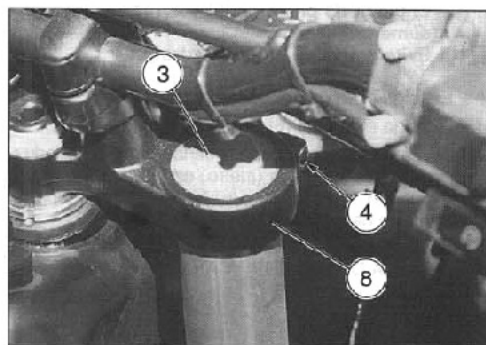
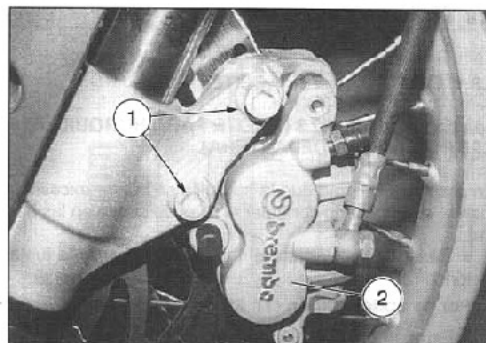
Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) and 2.25 (FRONT FORK) carefully.

- ◆ Remove the front wheel, see 7.2.1 (DISASSEMBLY).
- ◆ (For the left wheel-holder tube only)
Unscrew and remove the two screws (1) that fasten the brake caliper (2) and take the two washers.

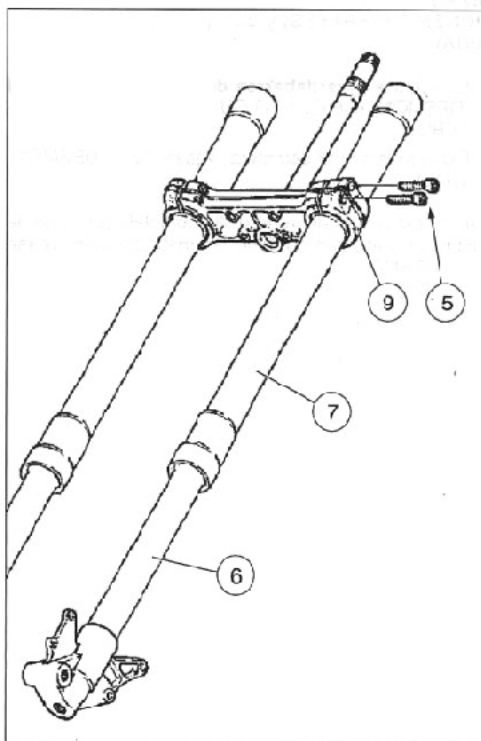


Do not pull the front brake lever after removing the brake caliper, since the pin may go out of its seat, thus causing the outflow of the brake fluid.

- ◆ (For the left wheel-holder tube only)
Remove the brake caliper (2) (without disconnecting the brake fluid pipe).
- ◆ ★ Loosen the plug (3).
Plug (3) driving torque: 20 Nm (2 kgm).
- ◆ ★ Unscrew the screw (4).
Screw (4) driving torque: 50 Nm (5 kgm).




- ◆ ★ Unscrew the two screws (5).
- ◆ ★ Withdraw the wheel-holder tube (6) complete with slider (7) from the upper plate (8) and from the lower plate (9).




7.8.4 DISASSEMBLING THE WHEEL-HOLDER TUBE/SLIDER UNIT


Read 1.2.3 (FORK OIL), 1.4 (PRECAUTIONS AND GENERAL INFORMATION) and 2.25 (FRONT FORK) carefully.


 The right and left fork tubes have the same inner components. The operations described below are therefore valid for both tubes.

- ◆ Remove the wheel-holder tube/slider unit, see 7.8.3 (REMOVING THE WHEEL-HOLDER TUBE/SLIDER UNIT (WITH INSTALLED FORK)).

 **Warning! The oil may flow out.**
The wheel-holder tube/slider unit is full of oil. Neither overturn it, nor incline it excessively during the removal.


- ◆ Unscrew and remove the plug (1) and take the O-ring (2).
- ◆ Withdraw the following parts in the given order:
 - spring holder ring (4);
 - preload tube (5);
 - spring guide tube (6).
- ◆ Prepare a graduated container with at least 450 cm³ capacity.
- ◆ Make the tube get into the slider completely, overturn the tube/slider unit and drain the oil in the container.
- ◆ Unscrew and remove the screw (7) and take the sealing washer (8).

 To unscrew the screw (7), it is advisable to use a percussion screwdriver, thanks to which it will be possible to detach the screw from the LOCTITE® 270.

 Upon reassembly, apply LOCTITE® 270 on the thread of the screw (7).

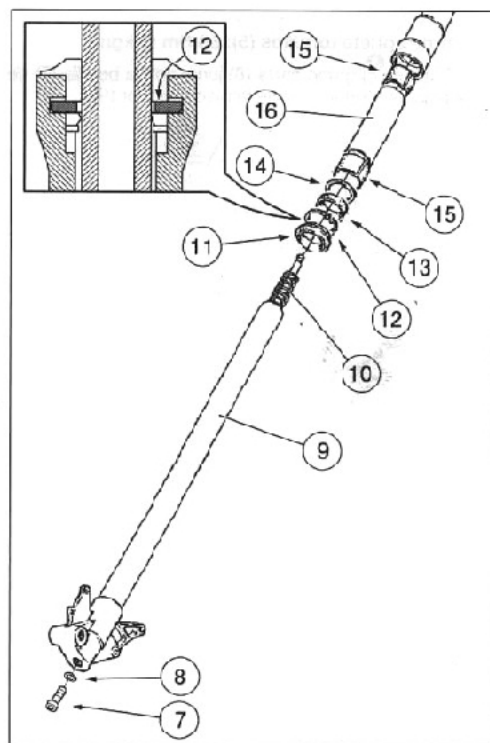
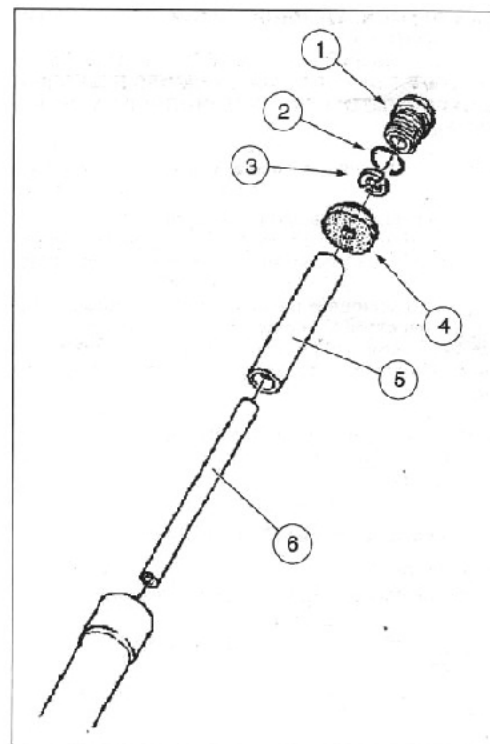
Screw (7) driving torque: 50 Nm (5 kgm).

- ◆ Withdraw first the wheel-holder tube (9) and then the spring (10).
- ◆ Remove the following parts in the given order:
 - antidust gasket (11);
 - retaining ring (seeger) (12);

 Upon reassembly, position the retaining ring (seeger) (12) with its sharp edge resting on the adjacent elements (see figure).

- seal (13);
- guide bush (14);
- slide bush (15);
- spacer (16);
- the other slide bush (* 5).

 Wash all the components with a clean detergent.




7.9 REAR FORK**7.9.1 REMOVAL**

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) and 2.26 (REAR FORK).


- ♦ Position the vehicle on the centre stand **OPT** or on an apposite support stand fixed to the centre stand couplings.
- ♦ Loosen and remove the nut (1) that joins the pedal (2) and the rear brake pump (3).
- ♦ Unscrew and remove the two screws (4), taking the relevant nuts.

Screw/nut (4) driving torque:
12 Nm (1.2 kgm).


- ♦ Temporarily fix the tank and the rear brake pump to the rear fork.
- ♦ Remove the sides, see 7.1.4 (REMOVING THE RIGHT AND LEFT SIDES).
- ♦ Open the two tangs (5) on the shock absorber upper support and release the brake pipe.
- ♦ Loosen and remove the nut (6).
- ♦ Withdraw the screw (7) and take the washer.

 To facilitate the withdrawing of the screw (7), slightly raise the rear fork.


Nut (6) driving torque: 50 Nm (5 kgm)

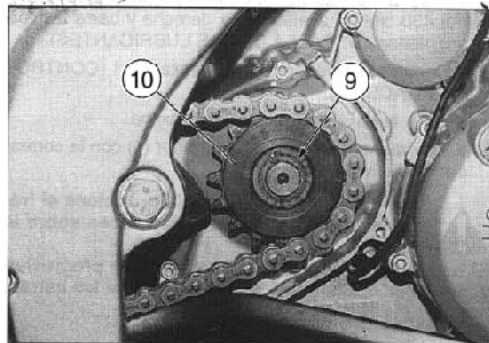
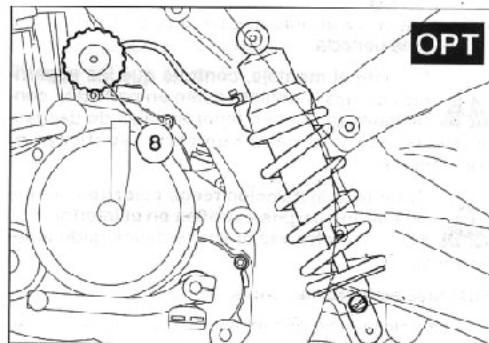
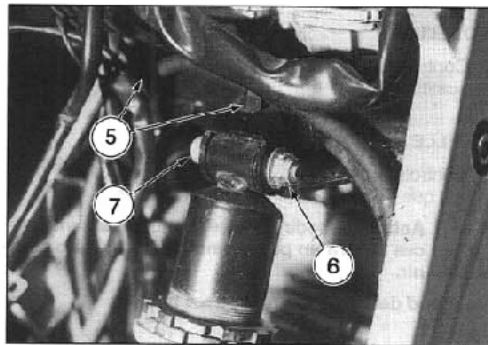
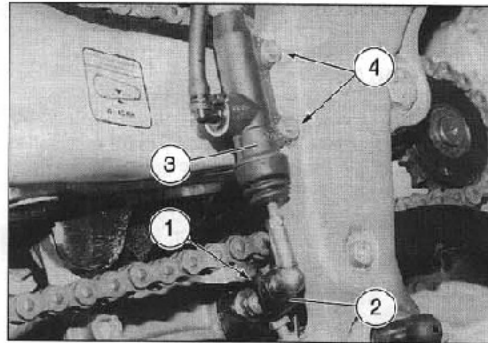
 In the version with rear suspension with preload hydraulic adjustment **OPT**, release the handwheel (8) by loosening the two nuts and withdraw the two fastening screws, taking the two spacers.

- ♦ Remove the transmission pinion protection case, see 3.1.3 (REMOVING THE TRANSMISSION PINION PROTECTION CASE).
- ♦ Remove the stop ring (9).
- ♦ Withdraw the transmission pinion (10) complete with chain from the shaft.

 If it is difficult to withdraw the transmission pinion (10), slightly slacken the chain, see 2.15.3 (ADJUSTMENT).

- ♦ Remove the transmission pinion (10).

 Upon reassembly, apply **LOCTITE® Anti-Seize** on the inner toothing of the transmission pinion (10).



- ♦ Loosen and remove the nut (11) and take the washer.
- ♦ Withdraw the screw (12) and take the washer.

NOTE (Y)

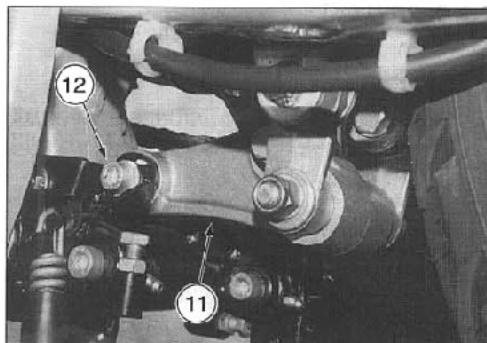
For the reassembly of the rear fork, from this point onwards proceed with the specific procedures, see 7.9.4 (REASSEMBLY).

- ♦ Lock the bush (13) and loosen the pin (14).
- ♦ Lock the bush (13), unscrew and remove the lock ring (15) by means of the apposite socket spanner, see 1.8 (SPECIAL TOOLS), then take the washer.
- ♦ Unscrew the pin completely.



Support the rear fork and of the shock absorber on their front part.

- ♦ Withdraw and remove the pin (14) and take the washers.
- ♦ Remove the rear fork complete with wheel, suspension unit and brake unit.



7.9.2 CHANGING THE BEARINGS

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

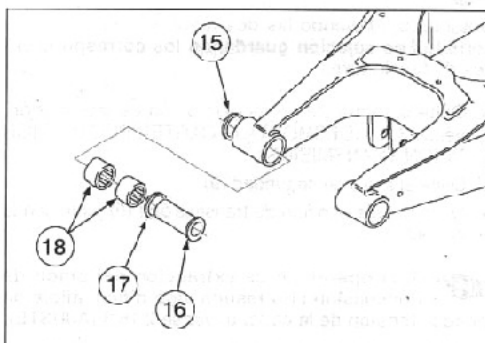
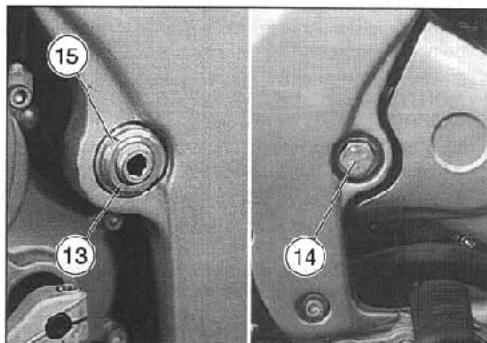


The bearings must be checked and if necessary changed every time they are disassembled.

- ♦ ★ Clean the two sides of the bearing seat with a cloth.
- ♦ ★ Remove the seal (15).
- ♦ Hit on an apposite punch (with diameter equal to the outer ring of the bearings) resting on the outer ring of the bearing (18).
- ♦ Push out (from the outside towards the inside):
 - ★ the bush (16);
 - ★ the seal (17);
 - ★ the bearings (18).
- ♦ ★ Thoroughly clean the inside of the bearing seat.



Wash all the components with a clean detergent.



7.9.3 CHECKING



Make sure that none of the components shows deformations, breaks, cracks and/or evident dents.
Replace all the damaged components.

BEARINGS

- Manually rotate the rollers, which must turn smoothly and noiselessly.
No axial clearances should be noticed.
The bearings showing these defects must be changed.



Apply grease on the rollers, see 1.7 (LUBRICANT CHART).

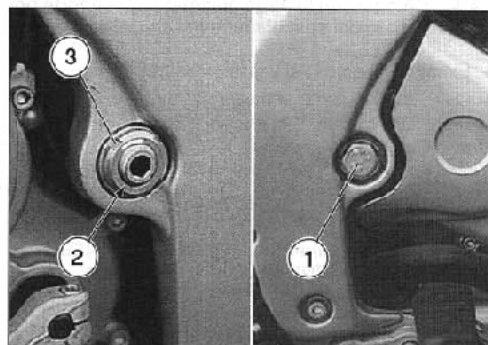
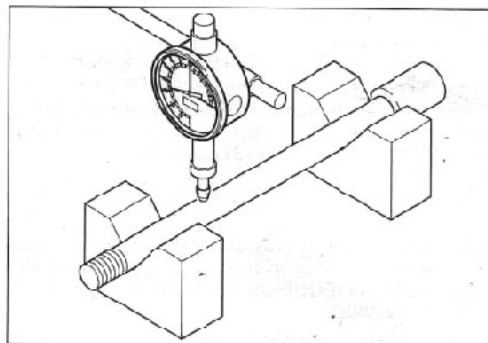
REAR FORK PIN

Using a comparator, make sure that the eccentricity of the pin does not exceed the limit value.
Otherwise, change the pin.

Max. eccentricity of the pin: 0.3 mm.



Apply grease on the whole length of the pin, see 1.7 (LUBRICANT CHART).



7.9.4 REASSEMBLY

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) carefully.

In the first phase, the pin (1), the adjusting bush (2) and the lock ring (3) must be screwed by hand.

- Introduce and screw the pin (1) that fastens frame, engine and rear fork, holding the adjusting bush (2) by means of the opposite socket spanner, see 1.8 (SPECIAL TOOLS).
- Screw the adjusting bush (2) until it reaches the end of stroke on the rear fork, then give it another one fourth turn.

Tightening of the adjusting bush (2):
contact + one fourth turn.

- Hold the adjusting bush (2) and tighten the rear fork pin (1).

Pin (1) driving torque: 100 Nm (10 kgm).

- Put back the washer.
- Lock the adjusting bush (2) and at the same time screw the lock ring (3).

Lock ring (3) driving torque:
100 Nm (10 kgm).

40 Nm only



From this point onwards, proceed with the re-assembly starting from NOTE (Y), see 7.9.1 (REMOVAL) and following the reverse order with respect to the removal.

7.10 REAR SUSPENSION

7.10.1 REMOVAL

Read 1.4 (PRECAUTIONS AND GENERAL INFORMATION) and 2.27 (REAR SUSPENSION) carefully.

- Remove the rear fork complete with wheel, suspension unit and brake unit, see 7.9.1 (REMOVAL).
- Unscrew and remove the screw (1) and take the washer.



When tightening the screw (1), do not exceed the indicated torque, since it is fixed directly onto the shock absorber.

Any damage to the thread inevitably makes the replacement of the whole shock absorber necessary.

Screw (1) driving torque: 50 Nm (5 kgm).

- ★ Loosen and remove the nut (2).
- ★ Withdraw the screw (3) and take the washer.



The screw (3) on the left side of the vehicle is longer than the screw on the right side of the vehicle.

Nut/screw (2-3) driving torque: 80 Nm (8 kgm).

- Loosen and remove the nut (4) and take the washer.
- Withdraw the screw (5) and take the washer.

Nut/screw (4-5) driving torque: 80 Nm (8 kgm).

- ★ Remove the single connecting rod (6).
- Withdraw all the inner components in the given order (A-E).
- ★ Withdraw all the inner components in the given order (C-D).
- Thoroughly clean the inside of the bearing seats.



Wash all the components with a clean detergent.

7.10.2 CHECKING



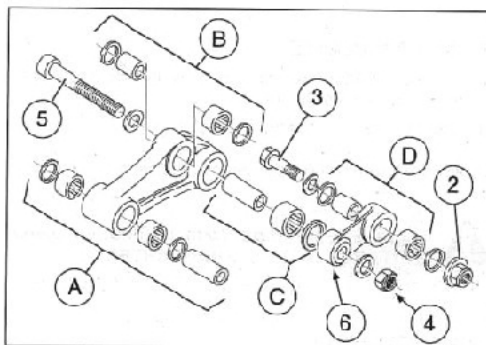
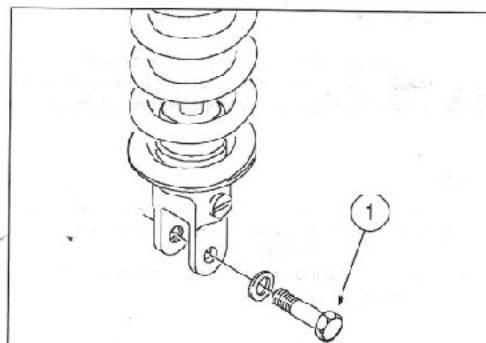
Make sure that none of the components shows deformations, breaks, cracks and/or evident dents. Replace all the damaged components.

BEARINGS

- Manually rotate the rollers, which must turn smoothly and noiselessly.
No axial clearances should be noticed.
The bearings showing these defects must be changed.



Apply grease on the rollers, see 1.7 (LUBRICANT CHART).



SHOCK ABSORBER

Make sure that there are no oil leaks from the shock absorber and that its travel is smooth and progressive. Otherwise, change the shock absorber.

If necessary, adjust the suspension, see 2.27.1 (ADJUSTING THE REAR SUSPENSION) and 2.27.2 (ADJUSTING THE REAR SUSPENSION WITH PRELOAD HYDRAULIC ADJUSTMENT **CPT**).

7.10.3 REASSEMBLY



Upon reassembly, grease the linkage fulcrum points, see 1.7 (LUBRICANT CHART) and be careful to the correct position of the components, making sure that the articulations move smoothly.

REPAIRS

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REPAIRS

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8.1 TROUBLE-SHOOTING

8.1.1 ENGINE

For further information see ENGINE SERVICE MANUAL No 933 (D-UK) / No 934 (I-E-F).

DEFECT	SYMPTOM AND POSSIBLE CAUSE	REMEDY
Engine does not start or starts with difficulty.	Insufficient compression. 1) Insufficient valve clearance. 2) Fault camshaft timing. 3) Valves or valve guides worn or valve seats defective. 4) Decompressor off too late. 5) Piston segments worn. 6) Cylinder bore worn. 7) Excessive clearance between pick-up and rotor. 8) Spark plugs loose. 9) Starter does not run, or runs intermittently. No spark on spark plug. 1) Dirty spark plug. 2) Damp spark plug. 3) Faulty ignition system. 4) Ignition coil or spark plug cable defective. 5) Ignition system in short circuit. Fuel does not reach carburettor. 1) Vent hole clogged on tank cap. 2) Fuel filters clogged or defective. 3) Needle valve of carburettor defective. 4) Fuel system pipes clogged. 5) Fuel pump defective.	Adjust valve clearance. Adjust. Change valve guide, valve seats. Check free movement of decompressor, replace decompressor spring. Replace segments. Replace cylinder. Adjust clearance. Tighten spark plug. Check free wheel, change. Clean spark plug. Clean and dry spark plug. Check rotor, stator, and unit, change faulty component. Change. Check circuit, change commutator. Clean. Clean or replace. Change. Clean. Clean or replace.
Engine stops too frequently.	1) Spark plug dirty. 2) Ignition system defective. 3) Fuel system pipes clogged. 4) Carburettor jets clogged. 5) Air cleaner clogged. 6) Fuel filters clogged.	Clean. Repair or replace. Replace. Clean. Clean. Clean or replace.
Engine idles with difficulty.	1) Insufficient valve clearance. 2) Valve guide worn or valve seats defective. 3) Decompressor off too late. 4) CO content too low at idling. 5) Infiltrations of air from intake flange. 6) Excessive gap between spark plug electrodes. 7) Ignition system faulty. 8) Fuel supply insufficient.	Adjust valve clearance. Change valve guides, lower valve seats. Check easy movement of decompressor, change decompressor spring. Check carburettor and jets (clogged). Change flange. Change spark plug. Check rotor, stator, and unit, change defective component. Check.
Engine does not reach maximum rpm.	1) Insufficient spark plug gap. 2) Jets clogged. 3) Faulty ignition coil. 4) Faulty ignition system. 5) Fuel level in carburettor float chamber too low. 6) Clogged air cleaner. 7) Fuel pipes clogged, resulting in scarce flow of fuel to carburettor.	Adjust. Clean. Change. Repair or change. Adjust. Clean. Clean and top up.
Dirty or oily exhaust gases.	1) Sealing elements, valve guides, scraper rings and gaskets worn or damaged. 2) Any porosity	Check. Check.

REPAIRS

DEFECT	SYMPTOM AND POSSIBLE CAUSE	REMEDY
Engine knocks under stress.	<ol style="list-style-type: none"> 1) Ignition system defective. 2) Incorrect thermal value of spark plug. 3) Fuel octane rating too low. 	<p>Check rotor, stator, and unit, change defective component.</p> <p>Use spark plugs with prescribed thermal value.</p> <p>Use fuel with prescribed octane rating.</p>
Engine lacks power, or power is insufficient.	<ol style="list-style-type: none"> 1) Piston or cylinder segments worn. 2) Spark plug gap incorrect or faulty ignition system. 3) Carburettor jets clogged. 4) Incorrect fuel level in carburettor float chamber. 5) Air cleaner clogged. 6) Air infiltration from intake pipe. 7) Lack of valve clearance. 8) Faulty camshaft timing. 9) Decompressor does not start. 10) Valve seats defective. 11) Valve springs broken. 12) Excessive oil in engine. 	<p>Change.</p> <p>Adjust or change.</p> <p>Clean.</p> <p>Adjust.</p> <p>Clean.</p> <p>Tighten or change.</p> <p>Adjust valve clearance.</p> <p>Adjust.</p> <p>Check decompressor.</p> <p>Change valves, bore the valve seats.</p> <p>Change valve springs.</p> <p>Check oil nonreturn valve.</p>
Engine overheats.	<ol style="list-style-type: none"> 1) Fuel level in carburettor float chamber too low. 2) Air infiltrations from intake pipe. 3) Unsuitable engine oil. 4) Faulty cooling system. 5) Insufficient engine oil quantity. 6) Oil pump defective or oil circuit clogged. 	<p>Adjust.</p> <p>Tighten or change.</p> <p>Use engine oil prescribed.</p> <p>See radiator section</p> <p>Top up oil level.</p> <p>Repair and clean.</p>
Engine shoots thick, bluish smoke.	<ol style="list-style-type: none"> 1) Excessive oil in engine. 2) Piston segments worn. 3) Valve rod oil seal worn. 4) Head gasket defective. 	<p>Drain excess oil, check oil level.</p> <p>Change segments.</p> <p>Change oil seal.</p> <p>Change head gasket.</p>
Engine vibrates.	<ol style="list-style-type: none"> 1) A bearing or a bearing housing is worn. 2) Countershaft not positioned in correspondence with signs. 	<p>Change bearing or worn component.</p> <p>Time the countershaft.</p>
Oil pressure too low.	<ol style="list-style-type: none"> 1) Insufficient quantity of oil in the circuit. 2) Oil pump worn. 3) Oil pump control gears broken. 4) Low pressure circuit valve defective (remains open). 	<p>Top up oil level.</p> <p>Replace oil pump.</p> <p>Replace the gears.</p> <p>Replace valve spring.</p>
Oil pressure too high.	<ol style="list-style-type: none"> 1) Low pressure circuit valve defective (remains closed). 2) Oil circuit clogged. 	<p>Replace valve spring.</p> <p>Clean oil circuit.</p>
Engine too noisy.	<p>Noise seems to come from head.</p> <ol style="list-style-type: none"> 1) Excessive valve clearance. 2) Valve springs broken. 3) Decompressor does not switch off. 4) Discharge camshaft showing end play. 5) Camshafts or camshaft seats worn. 6) Camshaft control gears worn or loose. <p>Noise seems to come from timing chain.</p> <ol style="list-style-type: none"> 1) Chain tightener defective. 2) Chain extension too long, chain guide worn. <p>Noise seems to come from piston.</p> <ol style="list-style-type: none"> 1) Piston or cylinder bore worn. 2) Piston or pin worn. 3) Piston segments worn or broken, or grooves worn. 	<p>Adjust valve clearance.</p> <p>Change valve springs.</p> <p>Change decompressor spring.</p> <p>Adjust clearance.</p> <p>Change shafts or head.</p> <p>Change gears or loosen screws.</p> <p>Change preload spring of chain tightener.</p> <p>Change chain or chain guides.</p> <p>Grind cylinder or change piston, or cylinder.</p> <p>Change piston or piston pin.</p> <p>Change piston segments or complete piston.</p>

REPAIRS

DEFECT	SYMPTOM AND POSSIBLE CAUSE	REMEDY
Engine too noisy.	<p>Noise seem to come from engine shaft or from countershaft.</p> <ol style="list-style-type: none"> 1) Engine shaft or countershaft bearings worn. 2) Bearing of big end of connecting rod worn. 3) Excessive end play of engine shaft or countershaft. 4) Countershaft gear unit defective. <p>Noise seems to come from clutch.</p> <ol style="list-style-type: none"> 1) Tooth flanks of primary transmission worn. 2) Clutch case, clutch disc hub and disc spring carrier worn. 3) Clutch discs (lined or smooth) worn or defective. 4) Clutch case bearings worn. <p>Noise seems to come from primary transmission or from gearshift.</p> <ol style="list-style-type: none"> 1) Tooth flanks of gearshift gears worn. 2) Gear shaft bearings worn. 3) Speed gear roller cages worn. 	<p>Change bearings. Change connecting rod kit or complete engine shaft. Restore clearance using special washer or shim washers. Change the springs of split gears.</p> <p>Change complete primary transmission. Change the worn component. Change. Change the bearings or the complete transmission.</p> <p>Change the gears. Change the bearings. Change.</p>
The clutch slips.	<ol style="list-style-type: none"> 1) Clutch control badly adjusted. 2) Insufficient clutch play. 3) Clutch springs weakened. 4) Lined clutch discs worn out. 	<p>Adjust. Adjust clutch play. Change the springs. Change the lined discs.</p>
Clutch disengages badly.	<ol style="list-style-type: none"> 1) Unsuitable type of oil. 	<p>Use prescribed oil.</p>
Clutch jerks on engaging.	<ol style="list-style-type: none"> 1) Clutch control badly adjusted. 2) Clutch discs (smooth or lined) deformed or worn out. 3) Guide grooves for lined discs in clutch case worn. 4) Guide grooves for smooth discs in clutch disc hub worn. 	<p>Adjust. Change discs. Change primary transmission. Change disc hub.</p>
Engaging gears difficult or impossible.	<ol style="list-style-type: none"> 1) Clutches or slits of speed gears worn. 2) Ratchet gear of gear selector deformed. 3) Ratchet gear spring broken or worn. 4) Index lever spring broken or worn. 5) Return spring of selector lever broken or worn. 	<p>Change the gears. Change complete gear selector shaft. Change. Change. Change.</p>
The gears do not remain engaged.	<ol style="list-style-type: none"> 1) Clutches or slits of speed gears worn. 2) Gearshift forks deformed or worn. 3) Fork rods deformed. 4) Index lever spring broken or worn. 	<p>Change the gears. Change the forks. Change. Change.</p>

REPAIRS

8.1.2 CARBURETTOR

DEFECT	SYMPTOM AND POSSIBLE CAUSE	REMEDY
Difficult starting.	<ol style="list-style-type: none"> 1) Starting jet clogged. 2) Starting duct clogged. 3) Air infiltration from gasket between cold start device body and carburettor. 4) Cold start device choke not working correctly. 5) Battery partially exhausted. 	Clean. Clean. Check and tighten. Repair. Check and recharge.
Irregular operation at idling or slow running.	<ol style="list-style-type: none"> 1) Idling jet clogged or loose. 2) Air infiltration from carburettor or cold start device sleeve. 3) Cold start device choke not completely closed. 	Check and clean. Check. Check and clean.
Irregular operation at medium or high speed.	<ol style="list-style-type: none"> 1) Full-power jet clogged. 2) Taper needle encrusted and/or worn. 3) Throttle valve not working properly. 4) Filter clogged. 	Check and clean. Check and clean. Check operation of throttle valve. Check and clean.
Overflow and fuel level variations.	<ol style="list-style-type: none"> 1) Needle valve worn or damaged. 2) Float not working properly. 3) Foreign matter sticking to needle valve. 4) Carburettor breather pipe clogged. 5) Needle valve spring broken or deformed. 6) Fuel level too high or too low. 	Change. Check and adjust. Clean. Clean. Change. Adjust fuel level.

8.1.3 RADIATOR

DEFECT	SYMPTOM AND POSSIBLE CAUSE	REMEDY
Engine overheats.	<ol style="list-style-type: none"> 1) Insufficient coolant. 2) Radiator blade unit clogged by dirt or foreign matter. 3) Thermostat valve defective, locked in closing position. 4) Coolant passages clogged. 5) Air in cooling circuit. 6) Coolant pump defective. 7) Use of unsuitable coolant. 8) Thermal switch defective. 9) Electrofan disconnected or faulty. 	Add coolant. Clean. Change. Clean. Bleed. Change. Change coolant. Change. Connect or change.
Engine does not reach proper temperature.	<ol style="list-style-type: none"> 1) Thermostat valve defective, locked in complete open position. 2) Room temperature too cold. 3) Thermal switch defective. 4) Electrofan defective. 	Change. Put protective shield on radiator. Change. Check or change.

REPAIRS

8.1.4 ELECTRIC SYSTEM

DEFECT	SYMPTOM AND POSSIBLE CAUSE	REMEDY
Spark plug becomes dirty immediately with carbon deposits.	1) Carburation too rich. 2) Idling rpm too high. 3) Unsuitable fuel. 4) Dirty air cleaner. 5) Spark plug too cold.	Adjust carburettor. Adjust carburettor. Change carburettor. Clean. Replace with "hot" spark plug.
Spark plug gets dirty too quickly.	1) Piston segments worn. 2) Piston or cylinder worn. 3) Carburation too rich.	Change. Change. Adjust.
Spark plug electrodes overheated or burnt.	1) Spark plug too hot. 2) Engine overheats. 3) Spark plug loose. 4) Carburation too poor.	Replace with "cold" spark plug. Adjust. Tighten. Adjust carburettor.
Alternator does not charge.	1) Connection terminals interrupted, in short circuit or loose. 2) Alternator coils in short circuit, earthed or interrupted. 3) Regulator/rectifier in short circuit or defective.	Repair, change or tighten. Change. Change.
The alternator does charge but the current intensity is lower than the prescribed value.	1) The terminals are subject to short circuit, interruption or excessive separation. 2) Alternator stator coils earthed or interrupted. 3) Regulator/rectifier defective. 4) Battery faulty.	Repair or tighten. Change. Change. Change.
Alternator charges too much.	1) Short circuit inside battery. 2) Regulator/rectifier damaged or defective. 3) Unstable earth of regulator/rectifier.	Repair or change. Change. Change.
Charge not constant.	1) Terminal insulation worn due to vibrations, with consequent temporary short circuits. 2) Internal generator short circuits. 3) Regulator/rectifier defective.	Repair or change. Change. Change.

8.1.5 BATTERY

DEFECT	SYMPTOM AND POSSIBLE CAUSE	REMEDY
Battery runs down too quickly.	1) Recharging system defective. 2) Battery elements have lost much active material consequent on excessive charge. 3) Presence of short circuits inside battery owing to excessive accumulation of sediments due to unsuitable electrolyte. 4) Old battery.	Check the alternator, the regulator/rectifier, the circuit connections and carry out operations necessary to restore correct re-charge. Change the battery and repair charging system. Change the battery. Change the battery.
Battery polarity inverted.	1) Battery has been incorrectly connected to the system.	Change the battery and make sure new one is connected properly.
Battery runs down too quickly.	1) Dirt on top and sides of battery box. 2) Old battery.	Clean. Change the battery.

REPAIRS

8.1.6 BRAKES

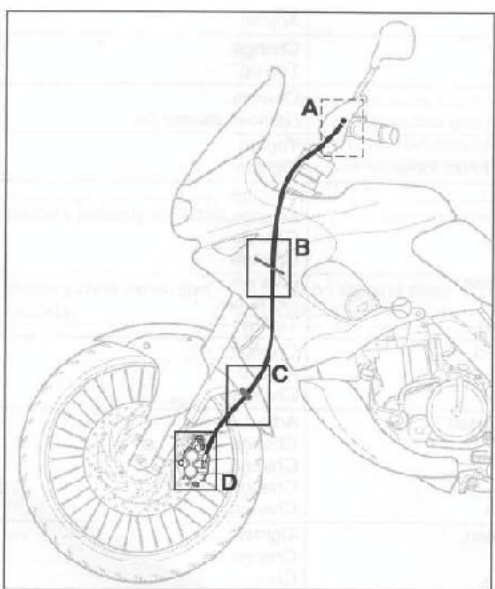
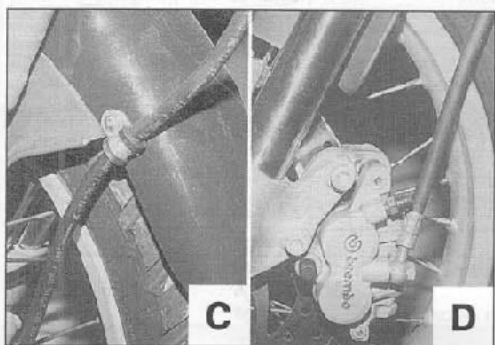
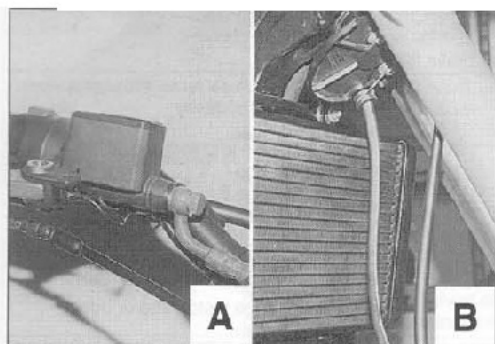
DEFECT	SYMPTOM AND POSSIBLE CAUSE	REMEDY
Poor braking power.	<ol style="list-style-type: none"> 1) Brake fluid leakage from hydraulic system. 2) Brake pads worn. 3) Contact surfaces of pads soiled by oil, grease or brake fluid. 4) Brake disc worn. 5) Air in hydraulic circuit. 6) Brake disc dirty with oil, grease or brake fluid. 	Repair or change. Change. Change pads. Change disc. Bleed circuit. Clean.
Brakes squeak.	<ol style="list-style-type: none"> 1) Pad contact surfaces hardened. 2) Pads installed backwards. 3) Wheel bearing damaged. 4) Front or rear wheel pin loose. 5) Pads worn. 6) Foreign matter in brake fluid. 7) Brake pump return hole clogged. 	Restore surfaces with sandpaper. Install correctly. Change. Tighten to prescribed driving torque. Change. Change brake fluid. Disassemble and clean brake pump.
Excessive stroke of brake lever.	<ol style="list-style-type: none"> 1) Air in hydraulic circuit. 2) Insufficient brake fluid. 3) Unsuitable brake fluid. 4) Brake caliper pins locked. 	Tighten to prescribed driving torque. Change. Change piston and/or body. Check.
Brake fluid leakage.	<ol style="list-style-type: none"> 1) Insufficient tightening of connection fittings. 2) Cracked pipes. 3) Pumping element and/or body worn. 	Tighten to prescribed driving torque. Change. Change the pumping element and/or body.

8.1.7 CHASSIS

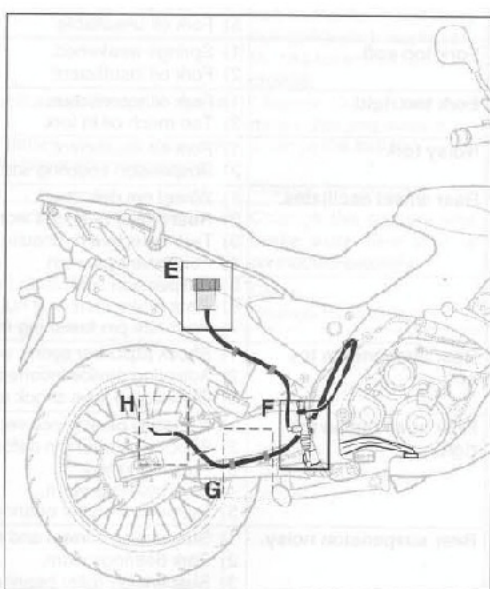
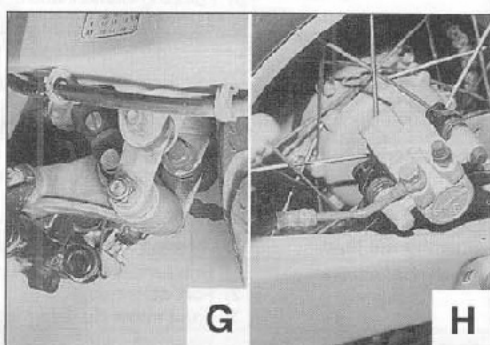
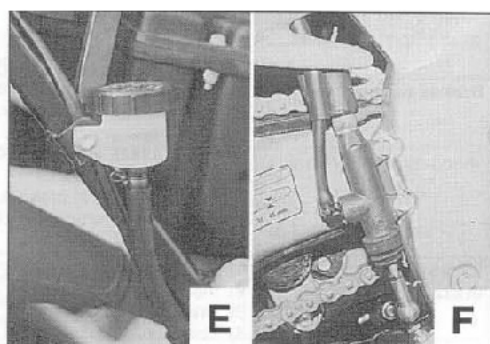
DEFECT	SYMPTOM AND POSSIBLE CAUSE	REMEDY
Hard steering.	<ol style="list-style-type: none"> 1) Steering adjustment ring nut too tight. 2) Steering bearings broken. 3) Steering axis deformed. 4) Insufficient tyre pressure. 	Adjust. Change. Change. Adjust.
Steering not fluid.	<ol style="list-style-type: none"> 1) Steering bearings damaged. 	Change.
Handlebar oscillates.	<ol style="list-style-type: none"> 1) Unbalanced adjustment of fork tubes. 2) Fork deformed. 3) Front wheel pin deformed or tyre deformed. 	Adjust. Change. Change.
Rear wheel oscillates.	<ol style="list-style-type: none"> 1) Wheel rim deformed. 2) Front wheel bearings worn. 3) Tyre defective or unsuitable type. 4) Wheel pin nut loose. 5) Fork oil unsuitable. 	Change. Change. Change. Tighten. Adjust.
Fork too soft.	<ol style="list-style-type: none"> 1) Springs weakened. 2) Fork oil insufficient. 	Change. Top up.
Fork too rigid.	<ol style="list-style-type: none"> 1) Fork oil too viscous. 2) Too much oil in fork. 	Change. Remove excess oil.
Noisy fork.	<ol style="list-style-type: none"> 1) Fork oil insufficient. 2) Suspension coupling screws and nuts loose. 	Top up. Tighten.
Rear wheel oscillates.	<ol style="list-style-type: none"> 1) Wheel rim deformed. 2) Rear wheel bearings worn. 3) Tyre defective or unsuitable type. 4) Fork bearings worn. 5) Suspension screws and nuts loose. 6) Rear brake fastening nut loose. 7) Rear fork pin fastening ring loose. 	Change. Change. Change. Change. Change. Tighten. Tighten.
Rear suspension too soft.	<ol style="list-style-type: none"> 1) Shock absorber spring weakened. 2) Adjusting device incorrectly adjusted. 3) Oil leakage from shock absorber. 	Change. Adjust. Change.
Rear suspension too rigid.	<ol style="list-style-type: none"> 1) Adjusting device incorrectly adjusted. 2) Shock absorber pin deformed. 3) Fork deformed. 4) Fork bearings worn. 5) Suspension roller bearings worn. 	Adjust. Change. Change. Change. Change.
Rear suspension noisy.	<ol style="list-style-type: none"> 1) Suspension screws and nuts loose. 2) Fork bearings worn. 3) Suspension roller bearings worn. 	Tighten. Change. Change.

8.2 RUN, FASTENING, WIRING, CABLES AND PIPES

8.2.1 FRONT BRAKE PIPE

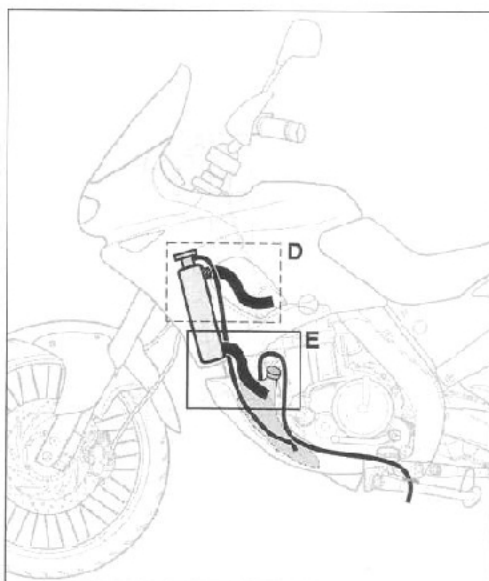
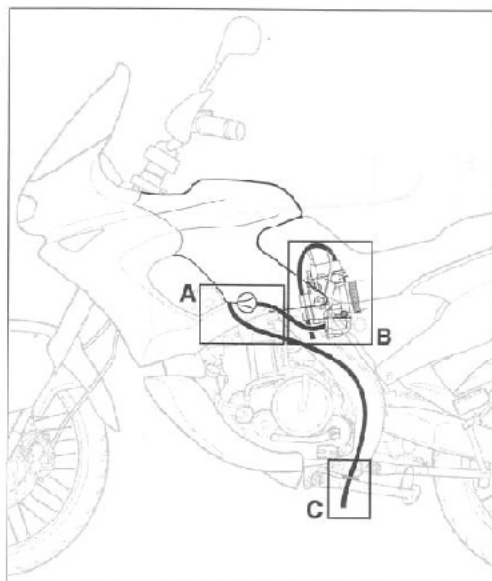
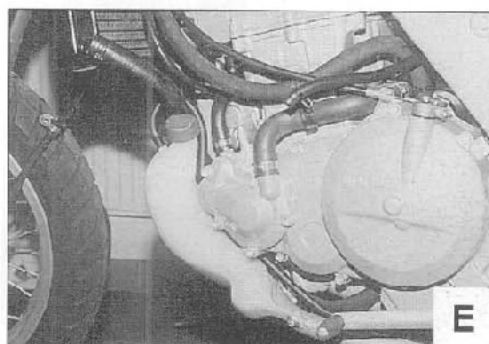
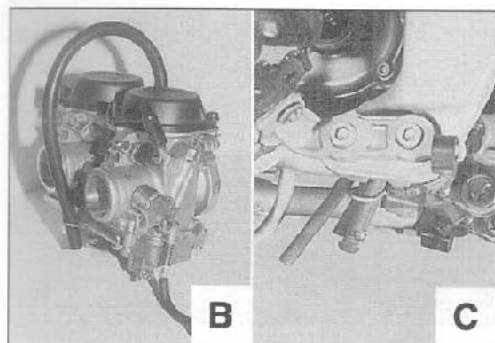
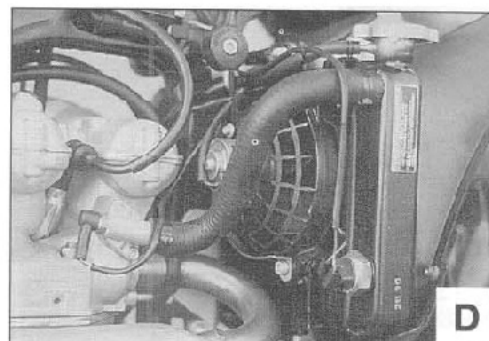
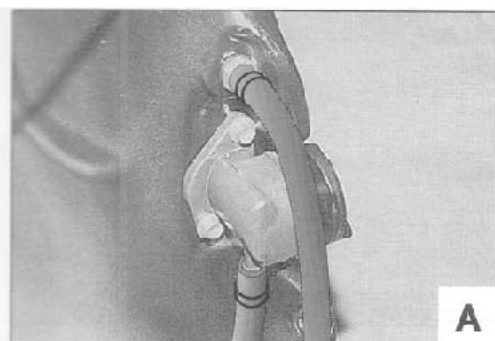


8.2.2 REAR BRAKE PIPE

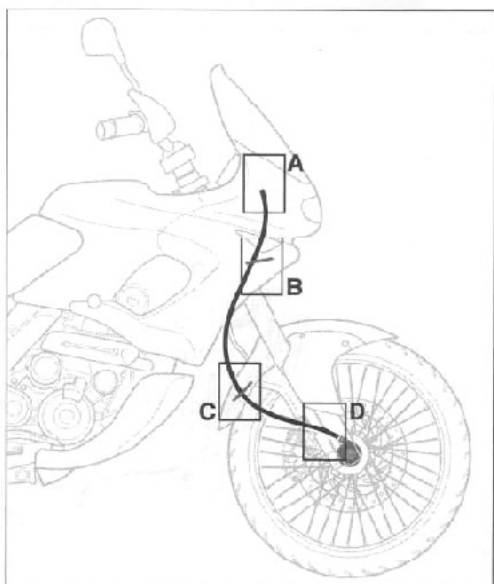
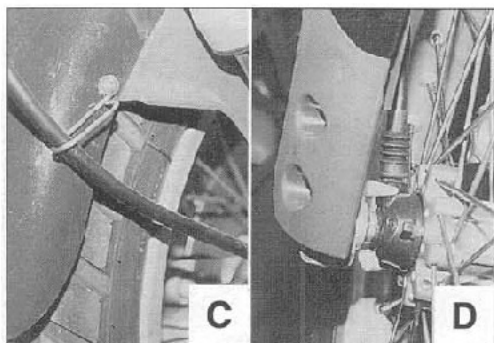
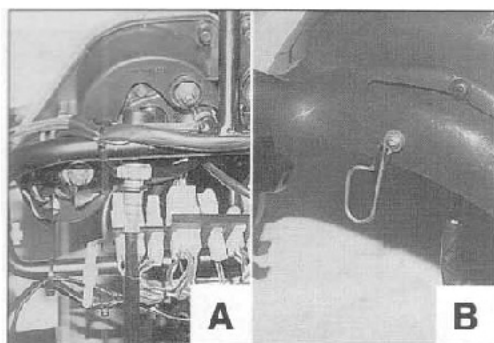


8.2.3 FUEL SYSTEM PIPES

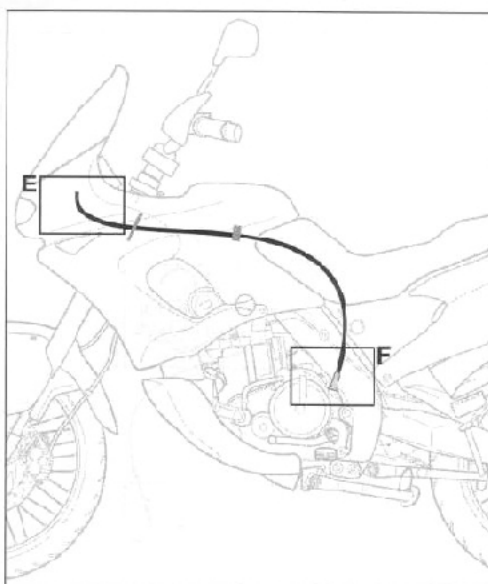
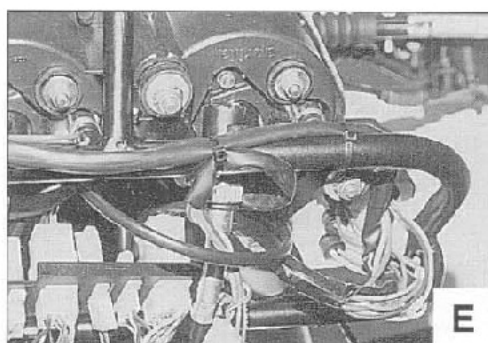
8.2.4 COOLING SYSTEM PIPES AND CABLES



8.2.5 SPEEDOMETER-ODOMETER CABLE

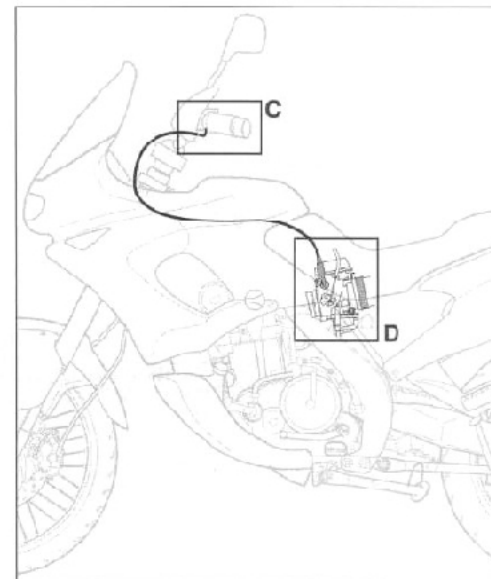
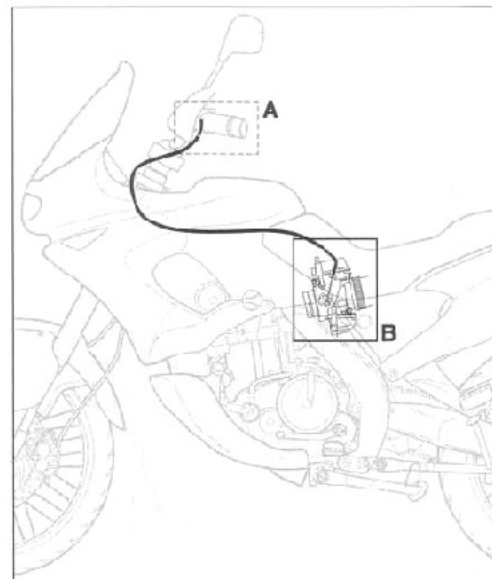
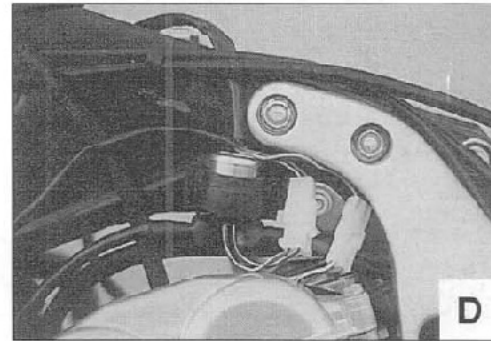
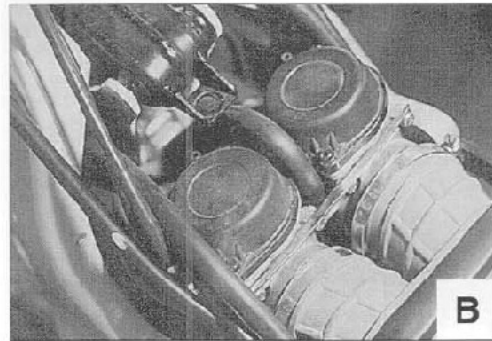
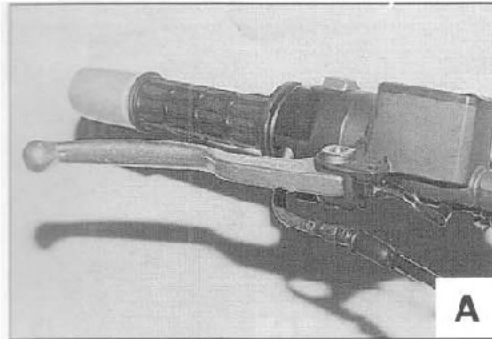


8.2.6 REVOLUTION COUNTER CABLE

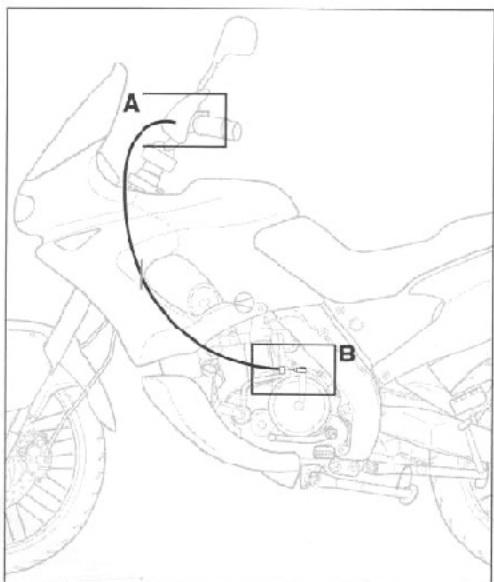
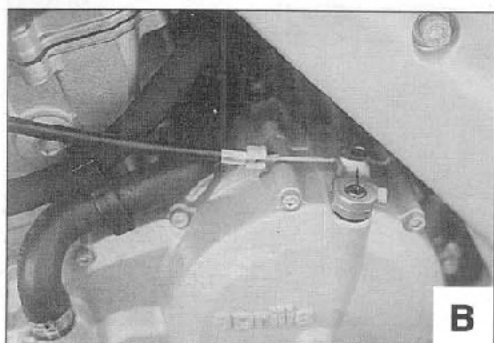
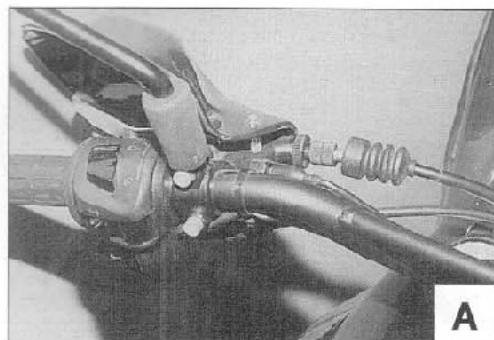


8.2.7 ACCELERATOR CONTROL CABLES

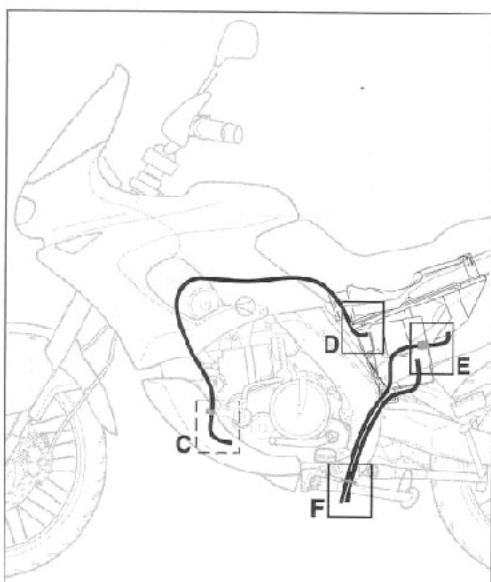
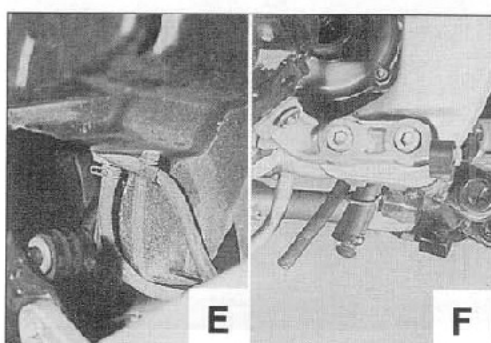
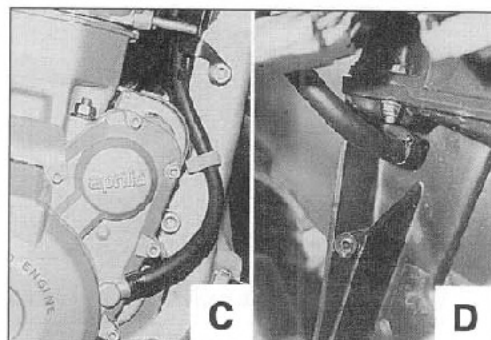
8.2.8 COLD START CONTROL CABLE



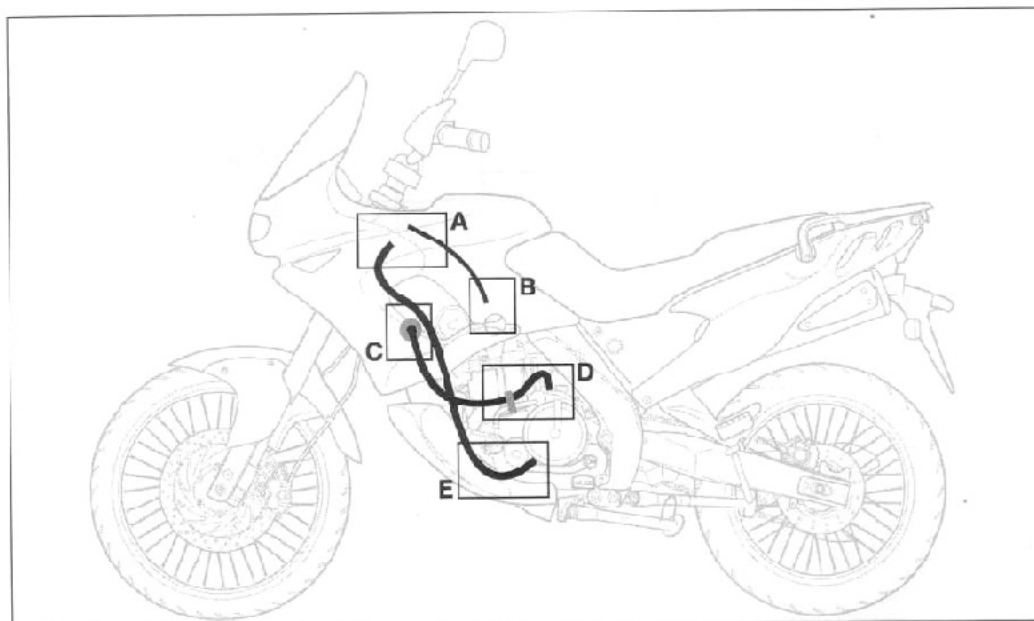
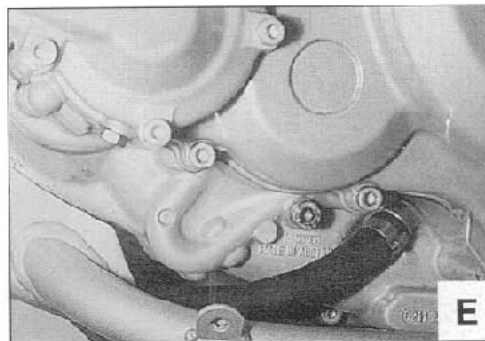
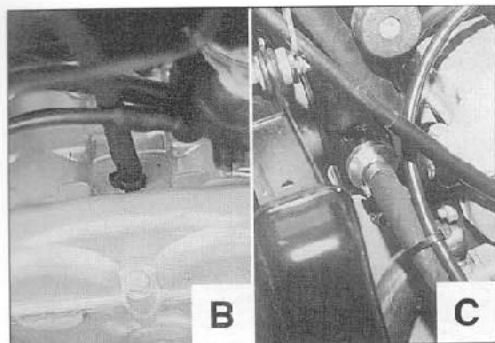
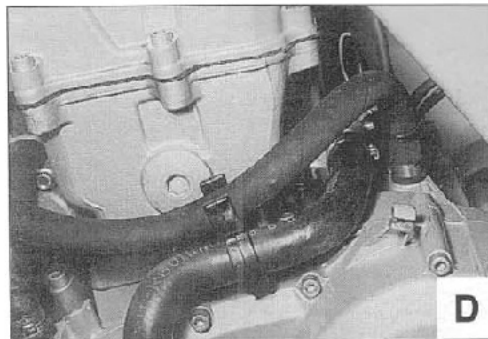
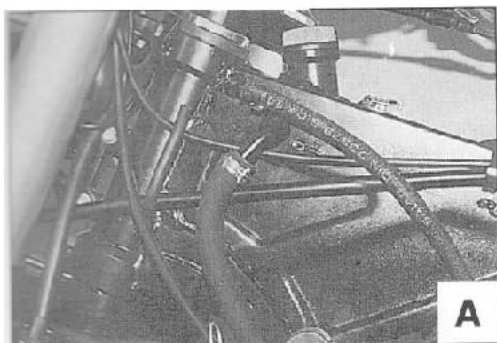
8.2.9 CLUTCH CONTROL CABLE



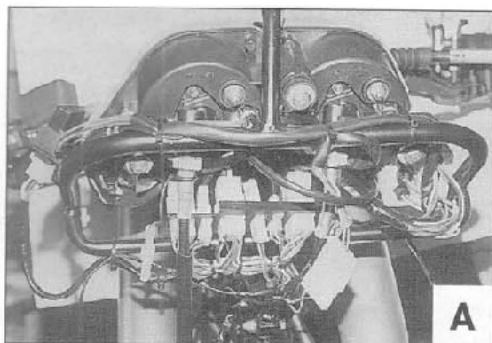
8.2.10 IMPURITIES DRAIN / BREATHER PIPES



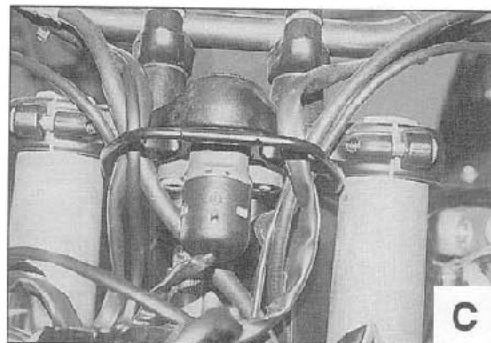
2.11 ENGINE OIL PIPES



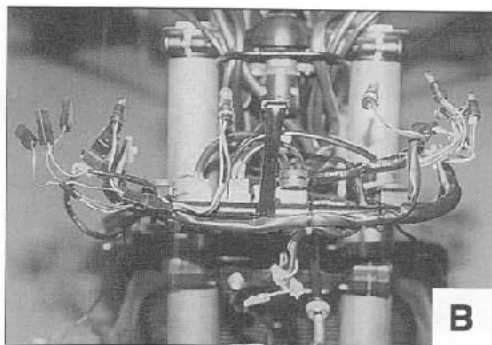
8.2.12 CABLES OF ELECTRIC COMPONENTS



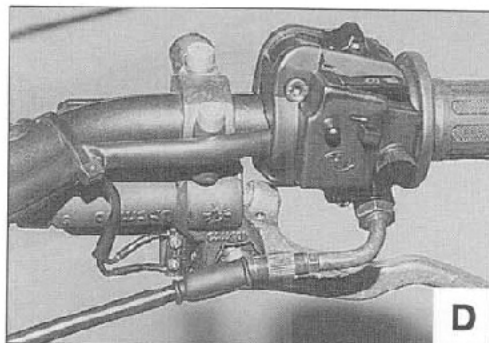
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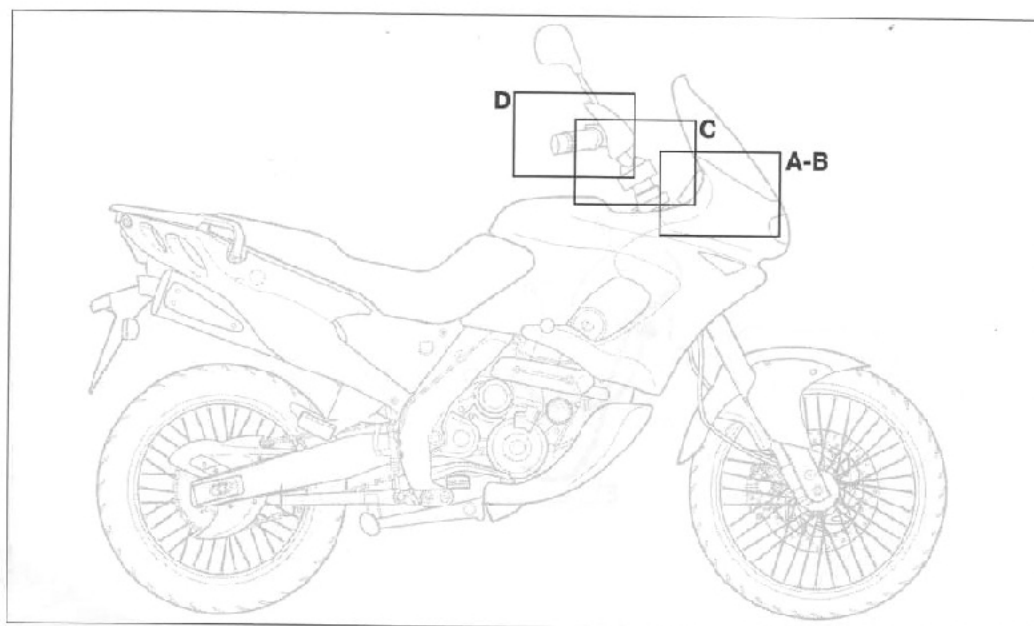
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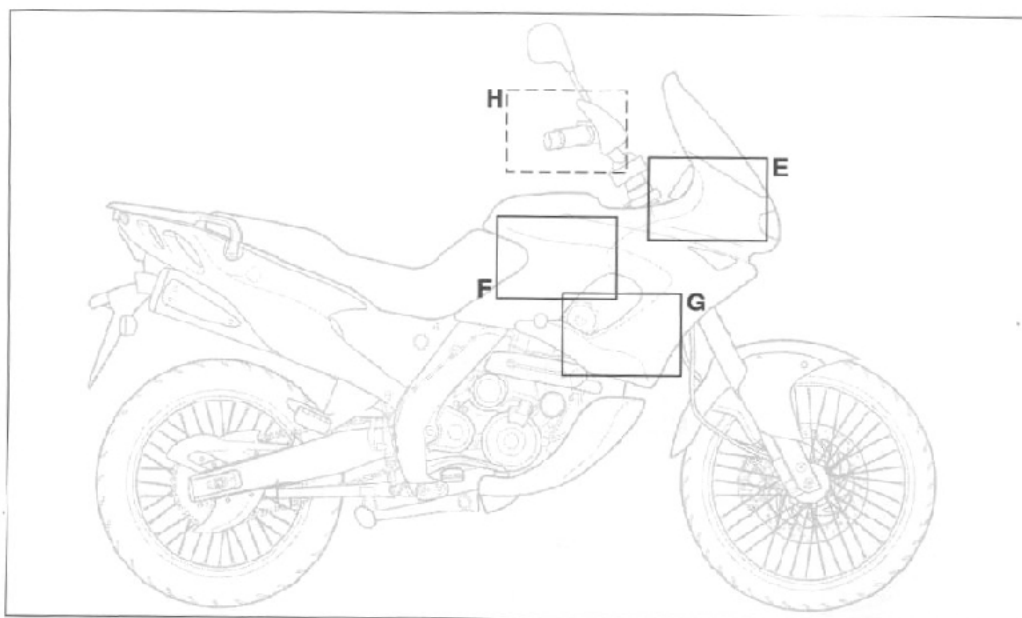
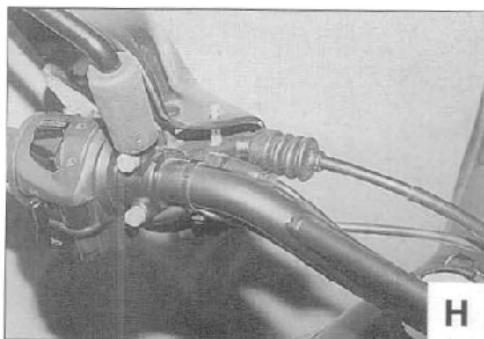
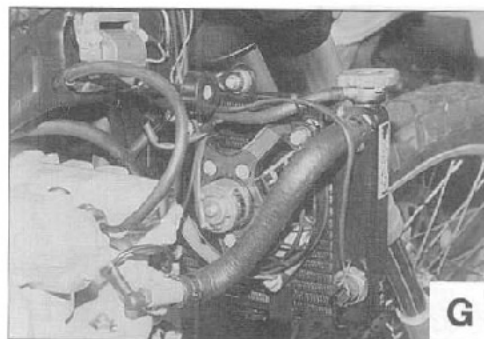


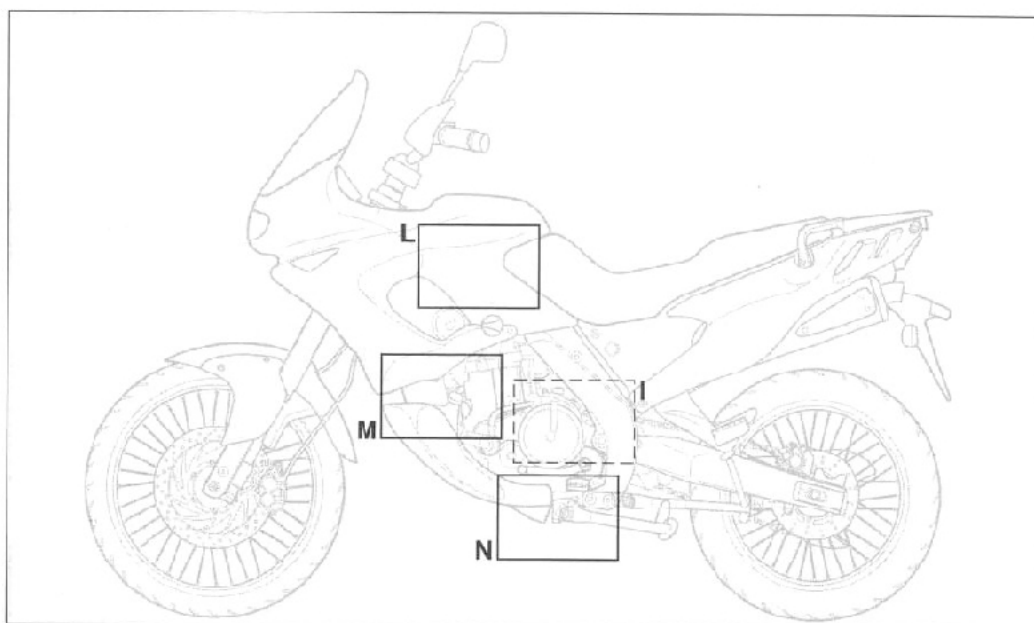
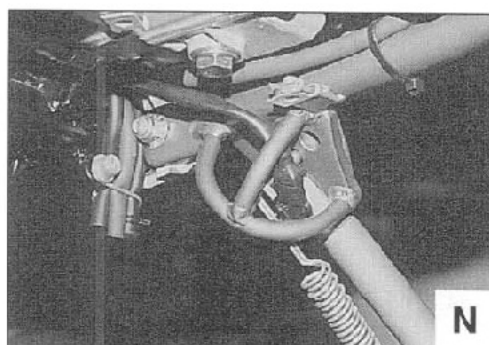
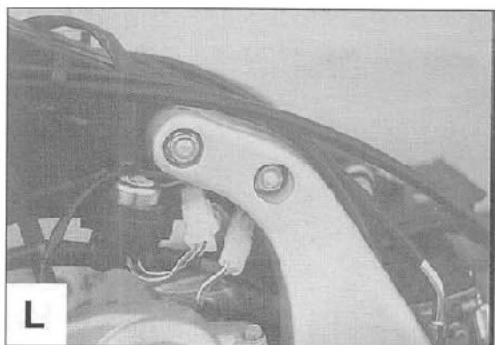
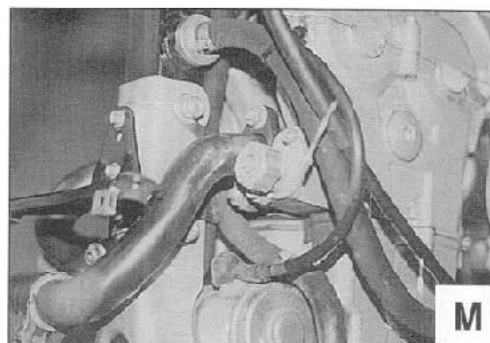
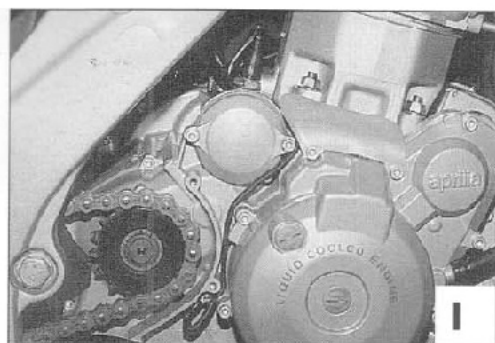
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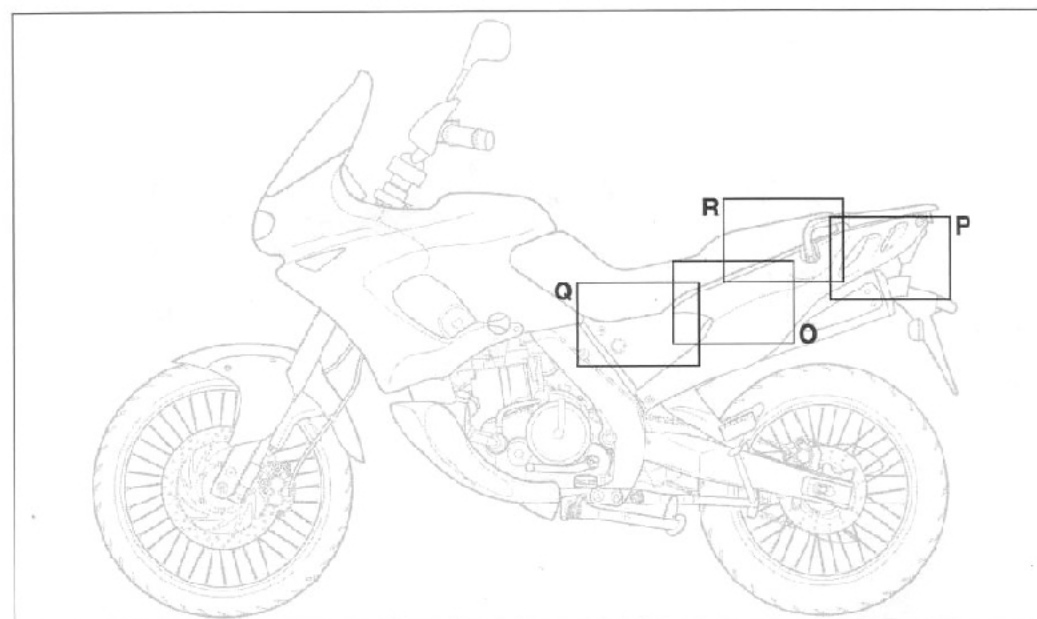
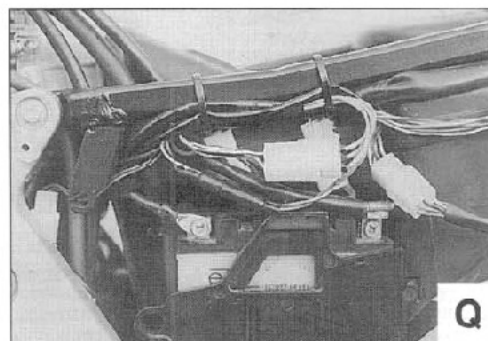
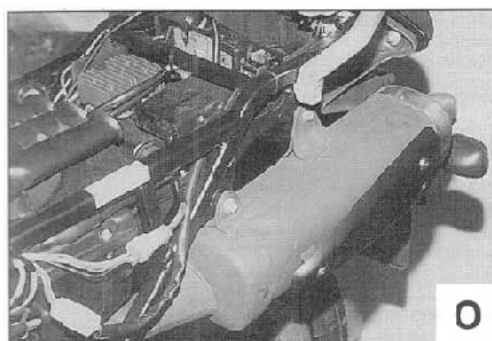


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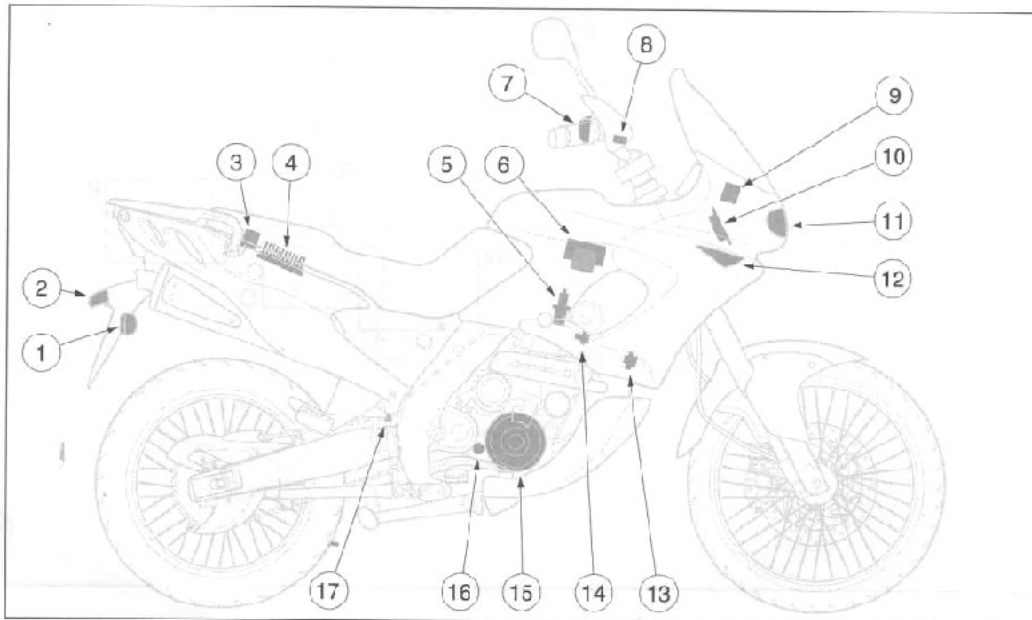




8.3 POSITION OF ELECTRIC COMPONENTS

Key

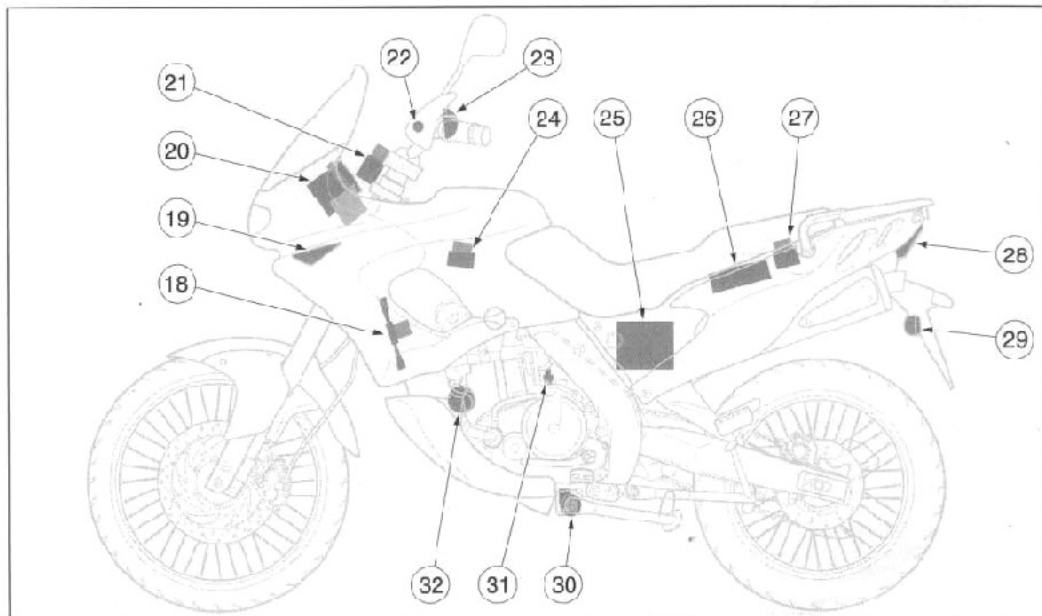
- 1) Rear right direction indicator.
- 2) Number plate light.
- 3) Binker.
- 4) Voltage regulator.
- 5) Spark plug.
- 6) Ignition coil.
- 7) Switches on right side of handle-bar:
 - engine stop (⊖ - ⌘)
 - lights (⊖ - ⌘ - ●)
 - starting push-button (⌘)
- 8) Stop light switch (on front brake control lever).
- 9) High beam relay.
- 10) Horn.
- 11) Front headlight.
- 12) Front right direction indicator.
- 13) Electrofan thermal switch.
- 14) Coolant thermistor.
- 15) Alternator.
- 16) Neutral gear switch.
- 17) Stop light switch (on rear brake pump).



REPAIRS

Key

- 18) Cooling electrofan.
- 19) Front left direction indicator.
- 20) Dashboard:
 - speedometer/odometer
 - revolution counter
 - coolant temperature indicator (油)
 - warning lights (E - 灯 - N - 灯 - 灯 - 灯)
- 21) Ignition switch/steering lock (O - 灯 - 灯).
- 22) Clutch lever switch.
- 23) Switches on left side of handlebar:
 - dimmer switch (E - 灯)
 - high beam signalling push button (E)
 - Direction indicator switch (灯)
 - Horn push button (灯)
- 24) Start relay.
- 25) Battery.
- 26) C.D.I.
- 27) Fuses.
- 28) Rear headlight.
- 29) Rear left direction indicator.
- 30) Stand switch.
- 31) Engine oil pressure sensor.
- 32) Starter.



**8.4 CHECKING THE
ELECTRIC SYSTEM**

8.4.1 See 6.1.1 (CHECKING THE
RECHARGING VOLTAGE)

8.4.2 See 6.1.2 (CHECKING THE
ALTERNATOR LOADLESS
OPERATION)

8.4.3 See 6.1.3 (CHECKING THE
ALTERNATOR CONTINUITY)

8.4.4 See 6.1.4 (CHECKING THE
VOLTAGE REGULATOR)

8.4.5 SPARK PLUG (NO SPARK)

First check:

- ◆ Check fuses.
- ◆ Check spark plugs
- ◆ Check stop light switch and stop light.

Second check:

- ◆ See 6.2.2 (CHECKING THE H.V.
COIL).

Third Check:

- ▶ See 6.2.3 (CHECKING THE
PICK-UP).

Fourth check:

- ▶ See 6.2.4 (CHECKING THE
C.D.I.).

**8.4.6 See 6.3 (CHECKING THE
ELECTRICAL SYSTEM
FROM THE C.D.I. CONNEC-
TOR)**

8.5 TECHNICAL DATA AND SPECIFICATIONS

8.5.1 ENGINE COMPONENTS.

For data and technical specifications of the engine components see 1.6 (TECHNICAL CHARACTERISTICS) and the ENGINE SERVICE MANUAL No. 933 (D-UK), No. 934 (I-E-F).

8.5.2 CARBURETTOR COMPONENTS

For data and technical specifications of carburetors components see 4.5 (CARBURETTORS) and relative chapters

8.5.3 ELECTRIC SYSTEM

Spark advance:
See 1.6 (TECHNICAL CHARACTERISTICS).

Spark plug:
See 1.6 (TECHNICAL CHARACTERISTICS).

Recharging voltage:
See 6.1.1 (CHECKING THE RECHARGING VOLTAGE).

Alternator loadless voltage:
See 6.1.2 (CHECKING THE ALTERNATOR LOADLESS OPERATION).

Alternator continuity:
See 6.1.3 (CHECKING THE ALTERNATOR CONTINUITY).

Voltage regulator:
See 6.1.4 (VOLTAGE REGULATOR).

H.V. coil:
See 6.2.2 (CHECKING THE H.V. COIL).

Pick-up:
See 6.2.3 (CHECKING THE PICK-UP).

C.D.I.
See 6.2.4 (CHECKING THE C.D.I.).

Coolant temperature indicator:
See 6.4.2 (CHECKING THE INSTRUMENT).

Coolant thermistor:
See 6.4.3 (CHECKING THE THERMISTOR OPERATION).

Cooling electrofan:
See 6.6.2 (CHECKING THE ELECTROFAN OPERATION).

Coolant thermal switch:
See 6.6.3 (CHECKING THE THERMAL SWITCH OPERATION).

Engine low pressure sensor:
See 6.5 (CHECKING THE ENGINE LOW PRESSURE SENSOR).

Starting relay:
See 6.7.3 (CHECKING THE STARTING RELAY).

Stand switch:
See 6.7.4 (CHECKING THE STAND SWITCH).

Diodes:
See 6.7.5 (CHECKING THE DIODES).

Switches:
See 6.9 (SWITCHES)

Battery - Type:
See 1.6 (TECHNICAL CHARACTERISTICS).

Fuses:
See 1.6 (TECHNICAL CHARACTERISTICS).

8.5.4 ABSORPTIONS

See 1.6 (TECHNICAL CHARACTERISTICS), items LIGHTBULBS AND WARNING LIGHTS.

8.5.5 BRAKING SYSTEM.

Front:

- Brake disc: Ø 300 mm, thickness 5 mm (min. thickness 3.6 mm).
- Brake caliper: 1 piston Ø 32 mm + 1 piston Ø 30 mm.
- Pads: 30 x 88 mm, thickness 4,05 mm (min. thickness 1 mm). Friction material: FERIT ID450FF.
- Brake pipe: Ø10 mm, Ø3.2 mm.
- Brake pump: control piston Ø13 mm.

Rear:

- Brake disc: Ø 220 mm, thickness 5 mm.
- Brake caliper: 1 piston Ø34 mm.
- Pads: 48 x 30 mm, thickness 4,3/5.5 mm (min. thickness 1 mm). Friction material: FERIT ID450FF.
- Brake pipe: Ø10 mm, Ø3.2 mm.
- Brake pump: control piston Ø11 mm.

8.5.6 WHEELS

Rims:
See 1.6 (TECHNICAL CHARACTERISTICS).

Rim eccentricity:
See 7.2.3 (CHECKING).

Wheel pin eccentricity:
See 7.2.3 (CHECKING).

Tyres:
See 1.6 (TECHNICAL CHARACTERISTICS) and 7.4 (TYRES).

8.5.7 SUSPENSIONS

See 1.6 (TECHNICAL CHARACTERISTICS).

8.5.8 CAPACITIES - CHARACTERISTICS OF FLUIDS

See 1.6 (TECHNICAL CHARACTERISTICS) and 1.7 (LUBRICANT CHART).