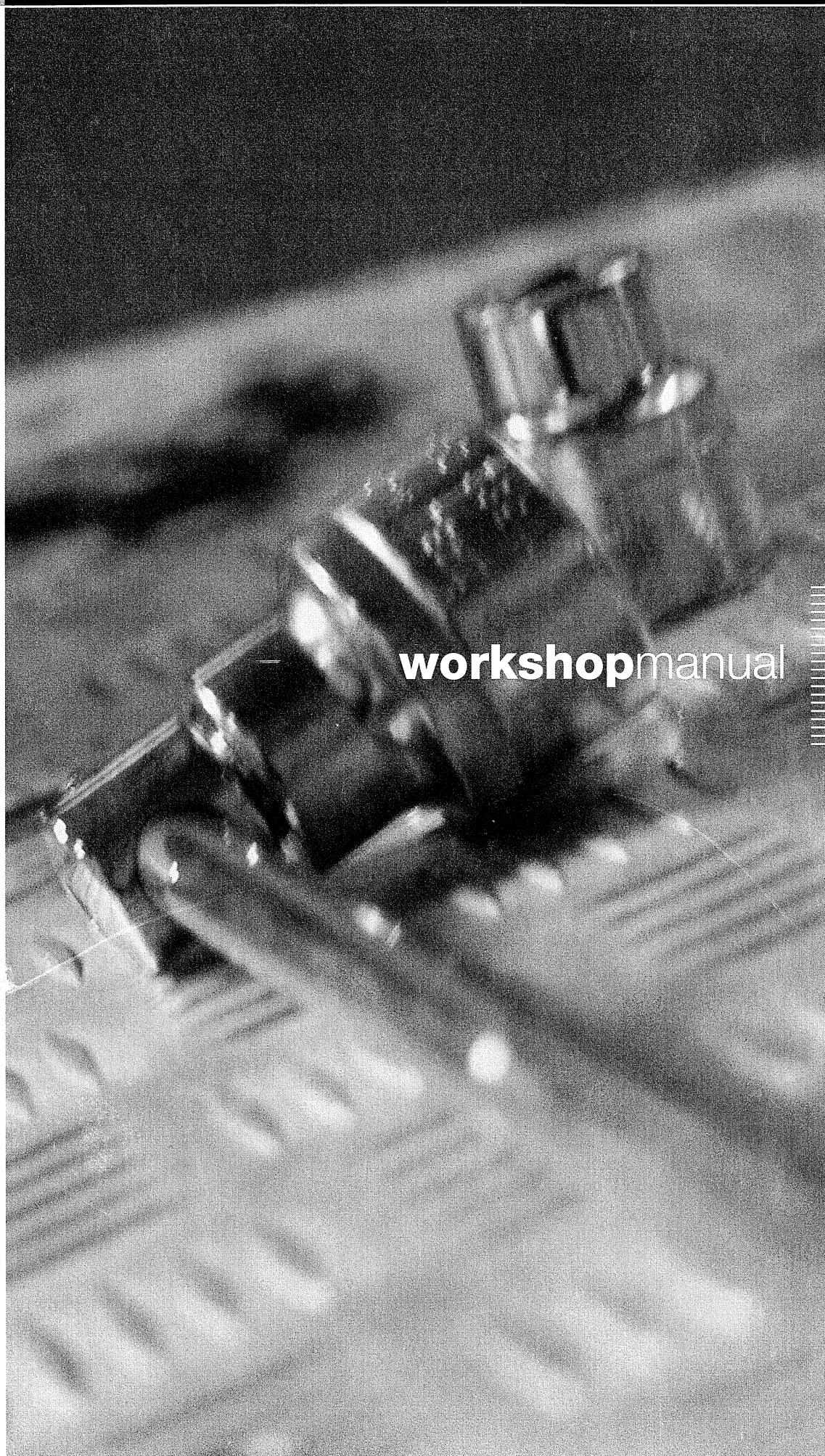
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workshopmanual

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SERVICE AND SETTING UP 2

ENGINE 3

FUEL SUPPLY SYSTEM 4

COOLING SYSTEM 5

ELECTRIC SYSTEM 6

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0.1 UPDATE OF RELEASE 00/2001-05

Date of the first edition (Release 00) and of the following Releases:

First edition (Release 00) ..... may 2001

0.1.1 INFORMATION ON THE UPDATING OF THE MANUAL

The manual must be updated every time a new "Release" is received.

Insert the pages of the last Release in the manual and eliminate the corresponding obsolete pages (even if belonging to a previous Release).

⚠ WARNING

The failure to update the manual and to eliminate the obsolete pages makes it more difficult to consult the manual and may lead to the performance of incorrect operations on the vehicle, with serious consequences for the safety of the vehicle and of persons and property.

The manual consists of # 10 sections, for a total amount of # 328 pages, as listed below.

NOTE For the nomenclature of the standard page of the manual (and specifically for the definition of the page number) see 0.2 (HOW TO CONSULT THE MANUAL).

0.1.2 UPDATED MANUAL GENERAL LIST

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0.2 HOW TO CONSULT THE MANUAL

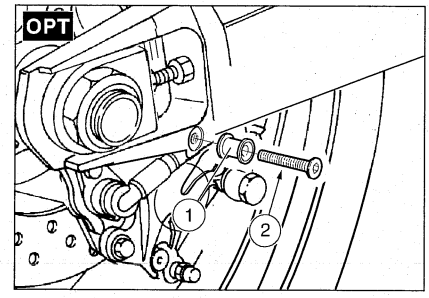
8 **1.8 POSITIONING THE VEHICLE ON THE SUPPORT STAND**

9 **1.8.1 ASSEMBLING THE PINS FOR THE REAR SUPPORT STAND OPT**

NOTE Have the appropriate special tool OPT to hand:
– **aprilia** part# 8140194 (rear support stand complete with pins).

10 ◆ Position the vehicle on the side stand on firm and level ground.
◆ ★Position the pin (1) on the appropriate seat on the rear fork.

11 ◆ ★Screw and tighten the screw (2) in the appropriate threaded hole in the rear fork.



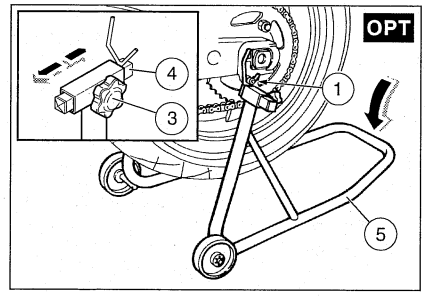
1.8.2 POSITIONING THE VEHICLE ON THE REAR SUPPORT STAND OPT

NOTE Have the appropriate special tool OPT to hand:
– **aprilia** part# 8140194 (rear support stand complete with pins).

◆ Fit the relevant pins, see 1.8.1 (ASSEMBLING THE PINS FOR THE REAR SUPPORT STAND OPT).

NOTE Have someone help you keep the vehicle in vertical position with the two wheels on the ground.

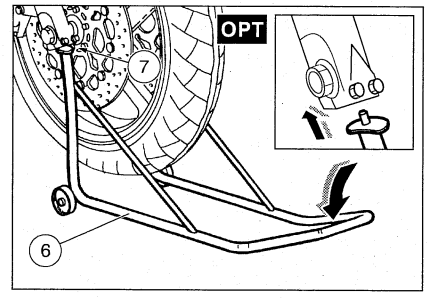
◆ ★Loosen the knob (3).
◆ ★Move the fork support (4), positioning it so that the width corresponds to the distance between the two pins (1) on the rear fork.
◆ ★Tighten the knob (3).
◆ At the same time introduce the two fork-shaped seats (4) of the stand (5) under the two pins (1) provided on the vehicle.
◆ Rest one foot on the rear part of the stand (5).
◆ Push the stand (5) downwards until it reaches the end of its stroke.



1.8.3 POSITIONING THE VEHICLE ON THE FRONT SUPPORT STAND OPT

NOTE Have the appropriate special tool OPT to hand:
– **aprilia** part# 8140195 (front support stand).

◆ Position the vehicle on the appropriate rear support stand, see 1.8.2 (POSITIONING THE VEHICLE ON THE REAR SUPPORT STAND OPT).
◆ Insert the two ends of the stand (6) in the two holes (7) positioned on the lower ends of the front fork.
◆ Rest one foot on the front part of the stand (6).
◆ Push the stand (6) downwards until it reaches the end of its stroke.



1) Vehicle (or engine) model
2) Section
3) Release consecutive number ("00" indicates the first edition)
4) Year and month of publication of the Release
5) Section number
6) Section page consecutive number
7) Updated page consecutive number
8) Chapter title (numbered consecutively)
9) Paragraph title (numbered consecutively)
10) Description of the operation (always preceded by a rhombus)
11) Description of the operation: the star means that the operation must be repeated on the other side of the vehicle.

0.3 FOREWORD

- This manual supplies the main information for normal servicing procedures.
- In the future, the information and illustrations that make up this manual will be updated by means of "Releases", see 0.1 (UPDATE OF RELEASE 00/2001-05).
- This publication is intended for the **aprilia** Dealers and their qualified engineers; many notions were voluntarily omitted, because they were considered superfluous. Since it is not possible to include complete mechanical information in this publication, the persons using this manual must have a basic mechanical training and a basic knowledge of the procedures regarding motor vehicles repair systems.
  Without this knowledge, the repair or servicing of the vehicle may be ineffective or even dangerous.
  The manual does not describe all the procedures for the repair and servicing of the vehicle in detail, therefore it is important to be particularly careful, in order to avoid any damage to components and persons.
  In order to grant its customers more and more satisfaction in the use of the vehicle, **aprilia s.p.a.** will keep improving its products and the relevant documentation.
  The main technical modifications and the modifications in the vehicle repair procedures are communicated to all **aprilia** Outlets and Branches the world over.
  These modifications will be described in the successive editions of this manual.
  In case of need or in case there are any doubts regarding the repair and servicing procedures, contact the **aprilia** Consumer Service (A.C.S.), which will give you any information required and will also inform you about any updating and technical modifications of the vehicle.
  For further information, refer to:

aprilia part# (description)
8140582 (Engine service and repair manual V990 1051-1)
392Y (Spare parts catalogue SL mille)
8102721 (Use and maintenance manual SL mille)
8202278 (Special tools manual)

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0.4 SAFETY WARNINGS

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

⚠ Safety warning. When you find this symbol on the vehicle or in the manual, be careful to the potential risk of personal injury. Non-compliance with the indications given in the messages preceded by this symbol may result in grave risks for your and other people's safety and for the vehicle!

⚠ WARNING

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

⚠ CAUTION

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

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

0.4.1 PRECAUTIONS AND GENERAL INFORMATIONS

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

⚠ WARNING

The use of naked flames is forbidden for any type of operation.
Before beginning any maintenance operation or any inspection of the vehicle, stop the engine, extract the key from the ignition block, wait until the engine and the exhaust system have cooled down and if possible lift the vehicle by means of the proper equipment, on firm and flat ground.
Keep away from the red-hot parts of the engine and of the exhaust system, in order to avoid burns.

Do not hold any mechanical piece or other parts of the vehicle with your mouth: the components are not edible and some of them are noxious or even toxic.

If not expressly indicated otherwise, for the reassembly of the units repeat the disassembly operations in reverse order.
Any reference to operations from other chapters must be interpreted logically in order to avoid components being removed unnecessarily.
Do not use polishing pastes on matt paints.

Never use fuel as a solvent for cleaning the vehicle.

Do not use alcohol, petrol or solvents to clean the rubber and plastic parts and the saddle: use only water and mild soap.

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.

BEFORE DISASSEMBLY

- Remove any dirt, mud, dust and foreign matters from the vehicle before disassembling the components.
- Use, when necessary, the special tools designed for this vehicle.

0.4.2 DISASSEMBLING THE COMPONENTS

- Do not loosen and/or tighten the screws and nuts using pliers or other tools: instead, always use the proper spanner.
- 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.
- Clean and wash carefully any disassembled parts with low inflammability detergents.
- Keep the parts that are used in pairs together, since they have adapted to each other following the normal wear.
  Some components must be used together or replaced completely.
- Keep away from heat sources.

0.4.3 REASSEMBLING THE COMPONENTS

⚠ CAUTION

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

Do not use compressed air to clean the bearings.

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

- Use only original **aprilia** SPARE PARTS.
- Use the recommended lubricants.
- Whenever possible, lubricate the parts before reassembly.
- 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.
- Always replace lock nuts, seals, sealing rings, snap rings, O-rings, split pins and screws, whenever the thread appears damaged, with new ones.
- Before the assembly, clean all the connection surfaces, the oil seal edges and the gaskets.
  Apply a thin layer of lithium-based grease on the oil seal edges.
  Put back the oil seals and the bearings with the mark or serial number facing towards the outside (visible side).
- When installing the bearings, lubricate them abundantly.
- Make sure that each component has been reassembled correctly.
- After a repair or periodic maintenance operation, carry out the preliminary checks and test the vehicle in a private area or, in any case, in a low-traffic area.

0.5 HOW TO USE YOUR SERVICE AND REPAIR MANUAL

0.5.1 ADVICE FOR CONSULTATION

- This manual is divided into section and chapters, each one of which corresponds to a category of main components.
  To consult them, see the sections' index, see page 0-1.
- If not expressly indicated otherwise, for the reassembly of the units repeat the disassembly operations in reverse order.
- The terms "right" and "left" are referred to the rider seated on the vehicle in the normal riding position.
- For normal maintenance operations and for the use of the vehicle, consult the "USE AND MAINTENANCE" manual.

★ **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:

ASD **automatic light switching version (Automatic Switch-on Device)**

OPT **optional**

VERSION:

I **Italy**	GR **Greece**	MAL **Malaysia**
UK **United Kingdom**	NL **Holland**	RCH **Chile**
A **Austria**	CH **Switzerland**	HR **Croatia**
P **Portugal**	DK **Denmark**	AUS **Australia**
SF **Finland**	J **Japan**	USA **United States of America**
B **Belgium**	SGP **Singapore**	BR **Brazil**
D **Germany**	SLO **Slovenia**	RSA **South Africa**
F **France**	IL **Israel**	NZ **New Zealand**
E **Spain**	ROK **South Korea**	CDN **Canada**

NOTE

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GENERAL INFORMATION

1

GENERAL INFORMATION

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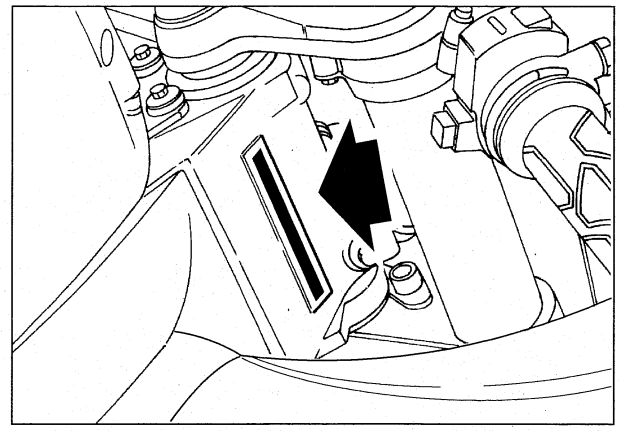
1.1 POSITION OF THE SERIAL NUMBERS

These numbers are necessary for the registration of the vehicle.

NOTE Do not alter the identification numbers if you do not want to incur severe penal and administrative sanctions. In particular, the alteration of the frame number results in the immediate invalidity of the guarantee.

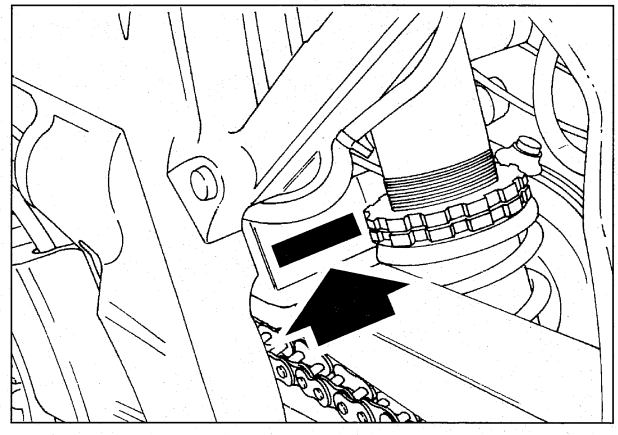
1.1.1 FRAME NUMBER

The frame number is stamped on the right side of the steering column.



1.1.2 ENGINE NUMBER

The engine number is stamped on the rear part of the engine, near the pinion.



1.2 INSTRUCTIONS FOR USE OF FUEL, LUBRICANTS, COOLANT AND OTHER COMPONENTS

1.2.1 FUEL

⚠ WARNING

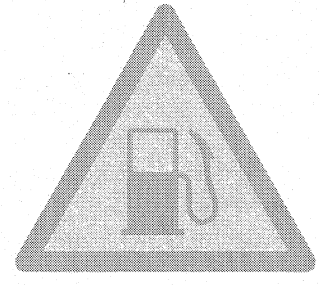
The fuel used for internal combustion engines is extremely inflammable and in particular conditions it can become explosive.
It is important to carry out the refuelling and the maintenance operations in a well-ventilated area, with the engine off.
Do not smoke while refuelling or near fuel vapours, in any case avoid any contact with naked flames, sparks and any other heat source to prevent the fuel from catching fire or from exploding.

Further, prevent fuel from flowing out of the fuel filler, as it could catch fire when getting in contact with the red-hot surfaces of the engine.
In case some fuel has accidentally been spilt, make sure that the area has completely dried and before starting the vehicle verify that there is no fuel inside the fuel filler neck.
Since petrol expands under the heat of the sun and due to the effects of sun radiation.
Never fill the tank to the brim.
Screw the plug up carefully after refuelling.
Avoid any contact of the fuel with the skin and the inhalation of vapours; do not swallow fuel or pour it from a receptacle into another by means of a tube.

DO NOT DISPOSE OF FUEL IN THE ENVIRONMENT.

KEEP AWAY FROM CHILDREN.

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



1.2.2 ENGINE OIL

⚠ WARNING

Engine oil may cause serious damage to the skin if handled daily and for long periods.
Wash your hands carefully after use.
Do not dispose of the oil in the environment.
Deliver it to or have it collected by the nearest oil salvage center or by the supplier.

In case any maintenance operation has to be carried out, it is advisable to use latex gloves.

Change engine oil after the first 1000 km (625 mi) and successively every 7500 km (4687 mi) (*), see 2.14 (CHANGING THE ENGINE OIL AND THE OIL FILTER).

(*) = In case of use on racetracks, change every 3750 km (2343 mi).

Engine oil (recommended):
IP EXTRA RAID 4, SAE 15W - 50 or Agip TEC 4T, SAE 15 W - 50.
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.

1.2.3 FORK OIL

⚠ WARNING

Fork oil may cause serious damage to the skin if handled daily and for long periods.
Wash your hands carefully after use.
Do not dispose of the oil in the environment.
Deliver it to or have it collected by the nearest oil salvage center or by the supplier.

In case any maintenance operation has to be carried out, it is advisable to use latex gloves.

By changing the damper settings and/or the viscosity of the oil contained in them, the suspension response may be altered partially.

Standard oil viscosity: SAE 20 W.

The viscosity ratings which can be chosen based on the type of fork stiffness desired (SAE 5W soft, 20W stiff).

The two products can be used in different percentages until the desired response is obtained.

One of the properties of IP F.A. and Agip FORK is that their viscosity alters little with changes in temperature and their damping response therefore remains constant.

Fork oil (recommended):

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

SAE 10W = IP F.A. 5W 67% of the volume, + IP F.A. 20W 33% of the volume or Agip FORK 5W 67% of the volume, + Agip FORK 20W 33% of the volume.

SAE 15W = IP F.A. 5W 33% of the volume, + IP F.A. 20W 67% of the volume or Agip FORK 5W 33% of the volume, + Agip FORK 20W 67% of the volume.

1.2.4 BRAKE FLUID

NOTE 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.

⚠ WARNING

If the brake fluid gets in contact with the skin or the eyes, it can cause serious irritations.
Carefully wash the parts of your body that get in contact with the liquid. Consult a doctor or an oculist if the liquid gets in contact with your eyes.

DO NOT DISPOSE OF THE FLUID IN THE ENVIRONMENT.

KEEP AWAY FROM CHILDREN.

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

Every 7500 km (4687 mi) check the level of the brake fluid, see 2.17 (CHECKING THE FRONT BRAKE FLUID LEVEL AND TOPPING UP) and 2.18 (CHECKING AND TOPPING UP THE REAR BRAKE FLUID); change the fluid every two years, see 2.22 (CHANGING THE FRONT BRAKE FLUID) and 2.23 (CHANGING THE REAR BRAKE FLUID).

Brake fluid (recommended):
IP F.F., DOT 5 (compatible DOT 4) or Agip BRAKE 5.1, DOT 5 (compatible DOT 4).

⚠ CAUTION

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.
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 neither twisted nor worn out.
Prevent water or dust from accidentally getting into 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

⚠ WARNING

The coolant is noxious: do not swallow it; if the coolant gets in contact with the skin or the eyes, it can cause serious irritations. If the coolant gets in contact with your skin or eyes, rinse with plenty of water and consult a doctor.
If it is swallowed, induce vomit, rinse mouth and throat with plenty of water and consult a doctor without delay.

DO NOT DISPOSE OF THE FLUID IN THE ENVIRONMENT.

KEEP AWAY FROM CHILDREN.

⚠ WARNING

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

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

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

Before setting off, and every 15000 km (9375 mi), check the level of the coolant, see 2.15 (CHECKING AND TOPPING UP COOLANT); change the coolant every two years, see 2.16 (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 th cooling circuit frequently and inf necessary increase the antifreeze concentration (up to maximum 60%).

For the cooling solution use distilled water, in order not to damage the engine.

Engine coolant (recommended):

ECOBLU - 40°C or Agip COOL.

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

NOTE 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.

⚠ CAUTION

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

1.2.6 CLUTCH FLUID

NOTE This vehicle is provided with hydraulic clutch control.

⚠ WARNING

If the clutch fluid gets in contact with the skin or the eyes, it can cause serious irritations.
Carefully wash the parts of your body that get in contact with the liquid. Consult a doctor or an oculist if the liquid gets in contact with your eyes.

DO NOT DISPOSE OF THE FLUID IN THE ENVIRONMENT.

KEEP AWAY FROM CHILDREN.

When using the clutch fluid, take care not to spill it on the plastic and painted parts, since it damages them.

Every 7500 km (4687 mi) check the level of the clutch fluid, see 2.19 (CHECKING AND TOPPING UP THE CLUTCH FLUID); change the fluid every two years, see 2.24 (CHANGING THE CLUTCH FLUID).

Clutch fluid (recommended):

F.F., DOT 5 (compatible DOT 4) or Agip BRAKE 5.1, DOT 5 (compatible DOT 4).

⚠ CAUTION

To avoid serious damage to the system, do not use fluids other than the recommended ones nor mix different fluids for topping up.
Do not use clutch fluid taken from old or already opened containers.

Sudden variations in clearance or an elastic resistance in the clutch levers may be due to trouble in the hydraulic circuits.
Check that the clutch hoses are not twisted or worn.
Prevent water or dust from accidentally getting into the circuit.

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

1.2.7 CARBON MONOXIDE

If it is necessary to let the engine run in order to carry out some work, make sure that the area in which you are operating is properly ventilated.
Never run the engine in enclosed spaces.
If it is necessary to work indoors, use an exhaust evacuation system.

⚠ WARNING

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

Run the engine in an open area or, if it is necessary to work indoors, use an exhaust evacuation system.

1.2.8 HOT COMPONENTS

⚠ WARNING

The engine and the components of the exhaust system become very hot and remain hot for some time after the engine has been stopped.

Before handling these components, wear insulating gloves or wait until the engine and the exhaust system have cooled down.

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

During running-in, change speed.
In this way the components are first "loaded" and then "relieved" and the engine parts can thus cool down.
Even if it is important to stress the engine components during running-in, take care not to exceed.

⚠ CAUTION

Only after the first 1500 km (937 mi) of running-in is it possible to obtain the best performance.

Keep to the following indications:

- Do not open the throttle completely if the speed is low, both during and after the running-in.
- During the first 100 km (62 mi) put on the brakes with caution, avoiding sharp and prolonged brakings. This ensures a correct bedding-in of the pads on the brake disc.
- During the first 1000 km (625 mi) never exceed 6000 rpm. (see table).

⚠ CAUTION

After the first 1000 km (625 mi) perform the checking operations indicated in the "after running-in" column, see 2.1.1 (REGULAR SERVICE INTERVALS CHART) in order to avoid injuring yourself or others a/o damaging the vehicle.

- Between the first 1000 km (625 mi) and 1500 km (937 mi) drive more briskly, change speed and use the maximum acceleration only for a few seconds, in order to ensure better coupling of the components; never exceed 7500 rpm (see table).
- After the first 1500 km (937 mi) you can expect better performance from the engine, however, without exceeding the maximum allowed (10500 rpm).

Engine maximum rpm recommended	
Mileage km (mi)	**rpm**
0 – 1000 (0 – 625)	6000
1000 – 1500 (625 – 937)	7500
over 1500 (937)	10500

1.4 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.

⚠ CAUTION

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

1.5 TECHNICAL SPECIFICATIONS

DIMENSIONS	
Max. length	2065 mm
Max. length (rear mudguard extension included) OPT	2170 mm
Max. width	750 mm
Max. height (front part of the fairing included)	1180 mm
Seat height	820 mm
Distance between centres	1415 mm
Min. ground clearance	140 mm
Weight ready for starting (fuel and fluid included)	222 kg

ENGINE	
Model	V990
Type	60° longitudinal V-type, two-cylinder, 4-stroke, with 4 valves per cylinder, DOHC.
Number of cylinders	2
Total displacement	997.6 cm^3
Max. rated power (to driving shaft)	86.5 kW (118 HP) at 9250 rpm
Max. rated power (to driving shaft) (F)	77 kW (104 HP) at 9250 rpm
Max. torque	96.5 Nm (9.78 kgm) at 7250 rpm
Max. torque (F)	90 Nm (9.17 kgm) at 7000 rpm
Bore/stroke	97 mm / 67.5 mm
Compression ratio	11.4 ± 0.5: 1
Average piston speed	22.5 m/s at 10000 rpm
Camshaft during intake stroke	262°, valve lifting= 10.6 mm
Camshaft during exhaust stroke	259°, valve lifting= 10.6 mm
Valve advance (with valve clearance 1mm) opening during intake stroke closing during intake stroke opening during exhaust stroke closing during exhaust stroke	20° before TDC 62° after BDC 64° before TDC 15° after BDC
Valve clearance during intake stroke	0.12-0.17 mm
Valve clearance during exhaust stroke	0.23-0.28 mm
# Engine revolutions at minimum rpm	1250 ± 100 rpm
# Engine revolutions at peak rpm	10250 ± 100 rpm
Ignition	electronically controlled
Starting	electric
Spark advance	At start: 5° before TDC, additional advance depending on specific consumption levels
Starter motor gear ratio	i= 49/9 * 30/11 * 64/30 = 31.677
Clutch	multidisc in oil bath, with hydraulic control on the left side of the handlebar and PPC device - # 9 lined discs; thick 3.5 mm - # 9 internal discs; thick 1.5 mm
Transmission	Mechanical, 6 gears with foot control on the left side of the engine

Follow ▶

Follow ▶

ENGINE	
Lubrication system	dry pan with separate oil tank, # 2 trochoidal pumps and cooling radiator
Lubrication pressure	min 500 kPa (5 bar) at max 80 °C (176 °F) and 6000 rpm
Air cleaner	with dry filter cartridge
Cooling	liquid-cooled
Coolant pump gear ratio	i_{wp}= 28/27 * 28/28 = 1.037
Coolant pump delivery (with thermal expansion valve open)	90 ℓ/min and 9000 rpm
Thermal expansion valve opening start temperature	65 ± 2 °C (149 ± 5 °F)
Engine dry weight	~ 67 kg

CAPACITY	
Fuel (reserve included)	19 ℓ
Fuel reserve	4.5 ± 1 ℓ
Engine oil	oil change 3700 cm^3 oil and oil filter change 3900 cm^3
Fork oil (per rod)	520 ± 2.5 cm^3
Coolant	2.5 ℓ (50% water + 50% antifreeze with ethylene glycol)
Seats	2
Vehicle max. load (driver + passenger + luggage)	182 kg

DRIVE					
GEAR RATIOS	Ratio	Primary	Secondary	Final ratio	Total ratio
	1ª	31/60 = 1: 1,935	14/35 = 1: 2,500	16/41 = 1: 2,563	12,399
	2ª		16/28 = 1: 1,750		8,679
	3ª		19/26 = 1: 1,368		6,787
	4ª		22/24 = 1: 1,090		5,411
	5ª		23/22 = 1: 0,956		4,744
	6ª		27/23 = 1: 0,851		4,225
# sprocket teeth			16		
Drive chain			endless type (with no connection link) with sealed links, model 525, dimensions 5/8" x 5/16"		

FUEL SUPPLY SYSTEM	
Type	electronic injection
Choke	Ø 51 mm

FUEL SUPPLY	
Type	indirect injection (MULTIPOINT)
Fuel	premium grade unleaded petrol, min. O.N. 95 (N.O.R.M.) and 85 (N.O.M.M.).

FRAME	
Type	two-beam frame with light alloy cast elements and extruded elements
Steering inclination angle	25°
Fore stroke	97 mm

SUSPENSIONS	
Front	UPSIDE-DOWN telescopic adjustable fork with hydraulic operation, rod Ø 43 mm
Stroke	127 mm
Rear	oscillating rear fork in light alloy with differentiated profile arms and hydropneumatic adjustable mono-shock absorber
Wheel stroke	129 mm

BRAKES	
Front	with double floating disc - Ø 320 mm, calipers with four pins with differentiated diameter
Rear	disc brake - Ø 220 mm, caliper with double pin

WHEEL RIMS	
Type	in light alloy with withdrawable pin
Front	3.50 x 17"
Rear	6.00 x 17"

Follow ▶

Follow ▶

TYRES										
Wheel	Make	Model	Type	Size	Recommended		Alternative	Pressure kPa (bar)		
								▲		⁘
								Solo rider	Rider and passenger	Solo rider
Front (series)	**PIRELLI**	**DRAGON EVO**	**MTR21 CORSA**	**120/65-ZR17"**	▲	⁘	–	**220 (2.2)**	**240 (2.4)**	**220-230 (2.2-2.3)**
Rear (series)	**PIRELLI**	**DRAGON EVO**	**MTR22 CORSA**	**180/55-ZR17"**	▲	–	–	**250 (2.5)**	**270 (2.7)**	–
Front	METZELER	STELL RADIAL	MEZ3	120/70-17"	▲	⁘	–	–	–	–
Rear	METZELER	STELL RADIAL	MEZ3	180/55-17"	▲	–	–	–	–	–
Front	MICHELIN	PILOT SPORT	–	120/65-ZR17"	▲	–	–	220 (2.2)	240 (2.4)	–
Rear	MICHELIN	PILOT SPORT	–	190/50-ZR17"	▲	–	–	250 (2.5)	270 (2.7)	–
Front	BRIDGESTONE	BATTLAX	BT56	120/70-17"	–	–	▲	220 (2.2)	240 (2.4)	–
Rear	BRIDGESTONE	BATTLAX	BT56	190/50-17"	–	–	▲	250 (2.5)	270 (2.7)	–

▲ = Normal use; ⁘ = Use on racetracks

SPARK PLUGS	
Standard	NGK R DCPR9E
Spark plug gap	0.6 – 0.7 mm
Resistance	5 kΩ

ELECTRIC SYSTEM	
Battery	12 V – 12 Ah
Main fuses	30 A
Secondary fuses	15 A
Generator (with permanent magnet)	12 V – 400 W
Starter	12 V / 0.9 kW

BULBS	
Low beam (halogen)	12 V – 55 W
High beam (halogen)	12 V – 55 W
Front parking light	12 V – 5 W
Direction indicators	12 V – 10 W
Rear parking lights/Stoplight	12 V – 5/21 W
Number plate light	12 V – 3 W
Revolution counter	12 V – 2 W
Right multifunction display	12 V – 2 W
Left multifunction display	12 V – 2 W

WARNING LIGHTS	
Neutral	12 V – 3 W
Direction indicators	12 V – 3 W
Fuel reserve	12 V – 3 W
High beam	12 V – 2 W
Stand down	12 V – 3 W
Engine oil pressure	LED
Red line	LED

1.6 LUBRICANT CHART

Engine oil (recommended): IP EXTRA RAID 4, SAE 15W - 50 or Agip TEC 4T SAE 15W - 50.
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): IP F.A. 5W or IP F.A. 20 W fork oil;
an alternative Agip FORK 5W or Agip FORK 20W fork oil.
If you need an oil with intermediate characteristics in comparison with the IP F.A. 5W and IP F.A. 20 W or Agip FORK 5W and Agip FORK 20W, these can be mixed as indicated below:

SAE 10W = IP F.A. 5W 67% of the volume, + IP F.A. 20W 33% of the volume or
Agip FORK 5W 67% of the volume + Agip FORK 20W 33% of the volume.

SAE 15W = IP F.A. 5W 33% of the volume, + IP F.A. 20W 67% of the volume or
Agip FORK 5W 33% of the volume + Agip FORK 20W 67% of the volume.

Bearings and other lubrication points (recommended): IP AUTOGREASE MP or Agip GREASE 30.
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): IP CHAIN SPRAY or Agip CHAIN LUBE.

⚠ WARNING

Use new brake fluid only.

Brake fluid (recommended): IP F.F., DOT 5 (DOT 4 compatible) or Agip BRAKE 5.1, DOT 5 (DOT 4 compatible).

⚠ WARNING

Use new clutch fluid only.

Clutch fluid (recommended): IP F.F., DOT 5 (DOT 4 compatible) or Agip BRAKE 5.1, DOT 5 (DOT 4 compatible).

⚠ WARNING

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

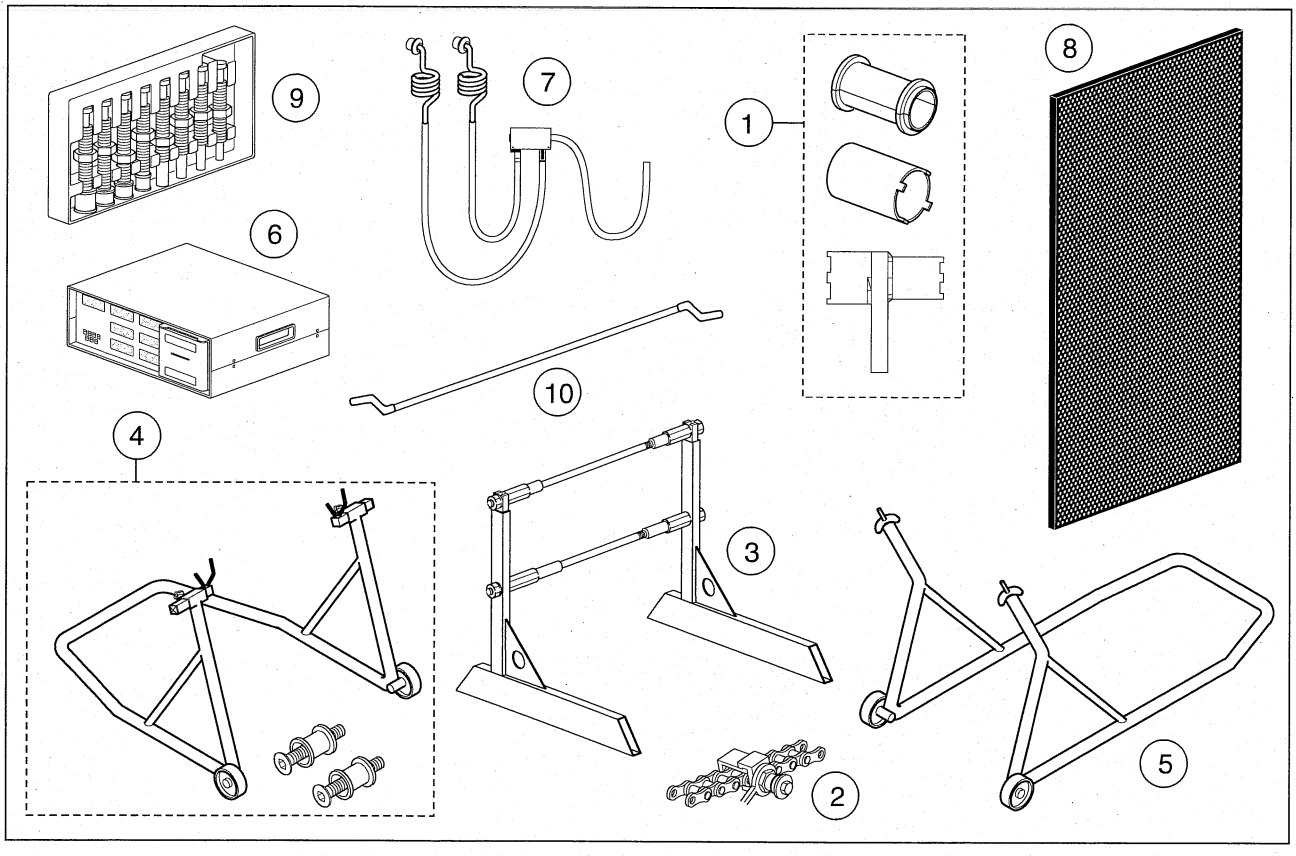
Engine coolant (recommended): IP ECOBLU -40 °C or Agip COOL.

1.7 SPECIAL TOOLS OPT

In order to perform assembly, reassembly and settings correctly, special tools suitable for the task must be used. The use of special tools avoids the potential risk of damage as a result of inappropriate tools and/or improvised methods.
Below is a list of the special tools designed especially for this specific vehicle.
If necessary, request the multi-purpose special tools, see **aprilia** part# 8202278 (Special tools manual).

⚠ CAUTION

Before using the special tools, consult any documents attached.

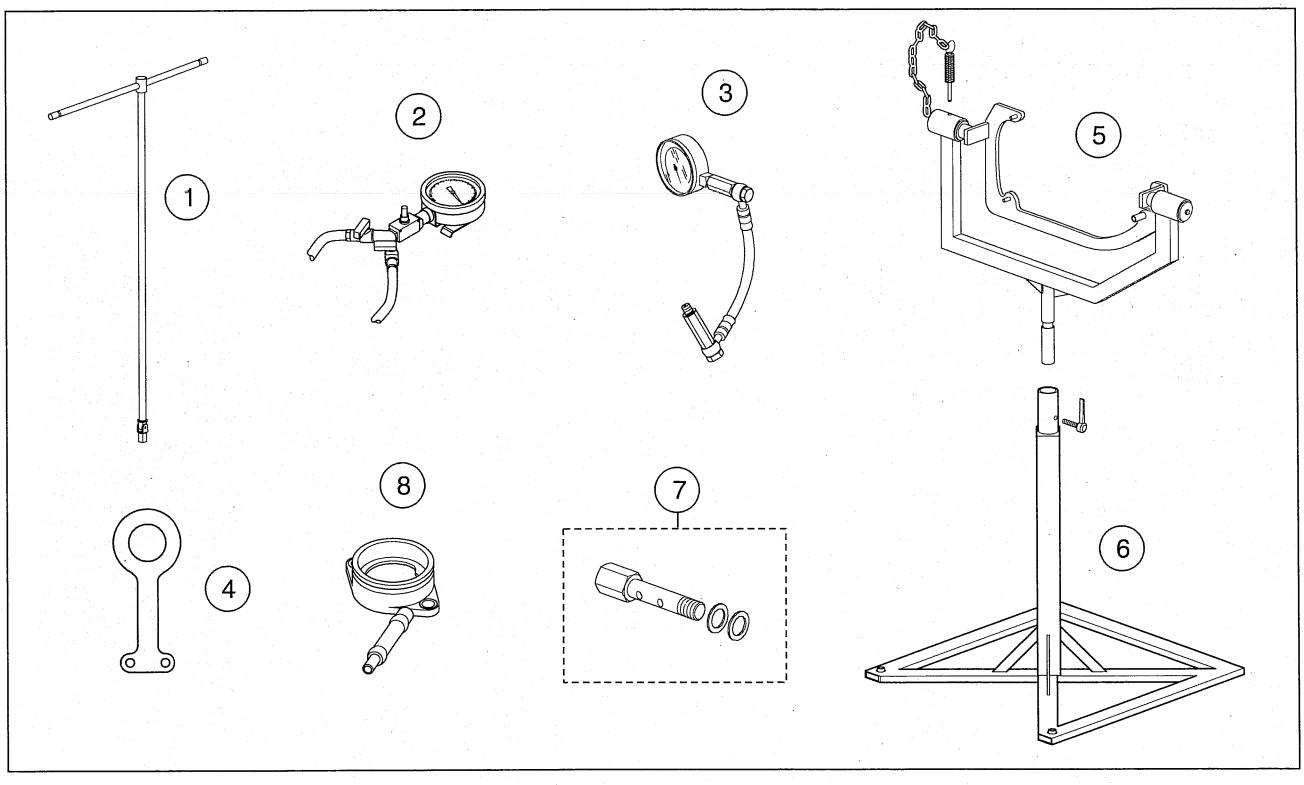


1.7.1 MISCELLANEOUS TOOLS

Pos.	**aprilia** part# (tool description)
1	Complete tool kit for frame parts including: **8140203** (semi-shells for assembling oil seals, front fork) **8140203** (socket spanner for adjusting steering) **8140203** (socket spanner for adjusting fork pin - engine mounts)
2	**8140192** (chain disassembly/reassembly tool)
3	**8140176** (centre stand)
4	**8140194** (rear support stand complete with pins)
5	**8140195** (front support stand)
6	**8140196** (exhaust fume analyser)
7	**8140202** (exhaust fume analyser pipe kit)
8	**8140199** (tool holder panel)
9	**8140180** (Kit for bearings in the range Ø10 mm to Ø 30 mm)
10	**8134396** (fuel tank support rod)

1.7.2 ENGINE TOOLS

NOTE The tools indicated below belong to a kit [**aprilia** part# 8140175 (complete engine tool kit)] including also other tools, see **aprilia** part# 8140582 (Engine service and repair manual V990 1051-1).
These tools are shown because they serve to carry out some operations on the engine, either when this is installed on the vehicle and when it is removed from the same.



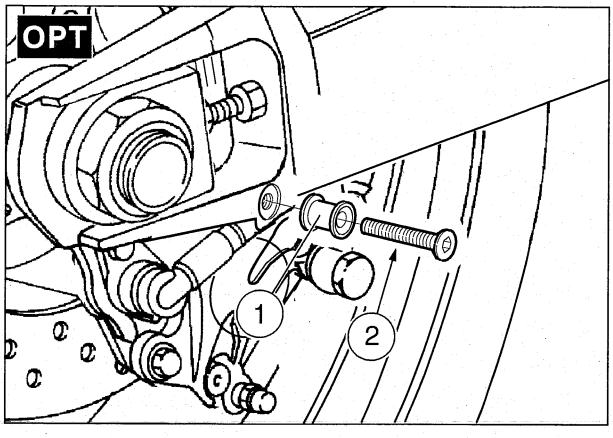
Pos.	**aprilia** part# (tool description)
–	**8140175** (complete engine tool kit)
1	**8140177** (plug socket spanner)
2	**8140256** (vacuometer)
3	**8140181** (Fuel - oil pressure gauge)
4	**8140183** (engine lifting eye hook)
5	**8140188** (engine support)
6	**8140187** (engine support stand)
7	**8140197** (perforated bolt for fuel pressure test)
8	**8140267** (intake flange for vacuometer)

1.8 POSITIONING THE VEHICLE ON THE SUPPORT STAND

1.8.1 ASSEMBLING THE PINS FOR THE REAR SUPPORT STAND OPT

NOTE Have the appropriate special tool OPT to hand:
– **aprilia** part# 8140194 (rear support stand complete with pins).

◆ Position the vehicle on the side stand on firm and level ground.
◆ ★Position the pin (1) on the appropriate seat on the rear fork.
◆ ★Screw and tighten the screw (2) in the appropriate threaded hole in the rear fork.



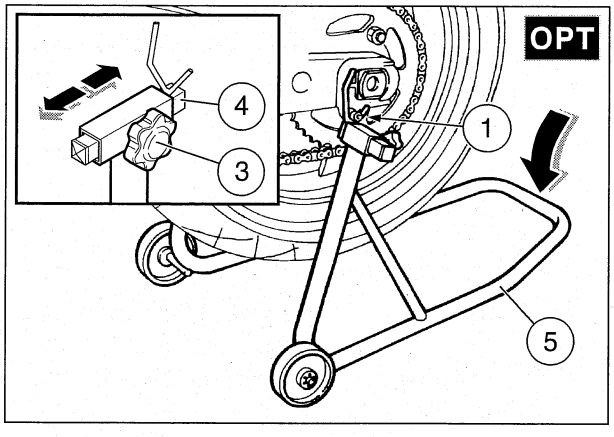
1.8.2 POSITIONING THE VEHICLE ON THE REAR SUPPORT STAND OPT

NOTE Have the appropriate special tool OPT to hand:
– **aprilia** part# 8140194 (rear support stand complete with pins).

◆ Fit the relevant pins, see 1.8.1 (ASSEMBLING THE PINS FOR THE REAR SUPPORT STAND OPT).

NOTE Have someone help you keep the vehicle in vertical position with the two wheels on the ground.

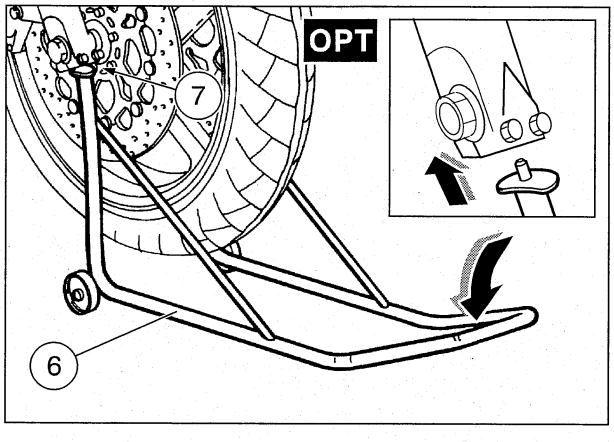
◆ ★Loosen the knob (3).
◆ ★Move the fork support (4), positioning it so that the width corresponds to the distance between the two pins (1) on the rear fork.
◆ ★Tighten the knob (3).
◆ At the same time introduce the two fork-shaped seats (4) of the stand (5) under the two pins (1) provided on the vehicle.
◆ Rest one foot on the rear part of the stand (5).
◆ Push the stand (5) downwards until it reaches the end of its stroke.



1.8.3 POSITIONING THE VEHICLE ON THE FRONT SUPPORT STAND OPT

NOTE Have the appropriate special tool OPT to hand:
– **aprilia** part# 8140195 (front support stand).

◆ Position the vehicle on the appropriate rear support stand, see 1.8.2 (POSITIONING THE VEHICLE ON THE REAR SUPPORT STAND OPT).
◆ Insert the two ends of the stand (6) in the two holes (7) positioned on the lower ends of the front fork.
◆ Rest one foot on the front part of the stand (6).
◆ Push the stand (6) downwards until it reaches the end of its stroke.



1.8.4 POSITIONING THE VEHICLE ON THE CENTRE SUPPORT STAND OPT

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

NOTE Have the appropriate special tool OPT to hand:
– **aprilia** part# 8140176 (centre stand).

- Set the vehicle on the relevant front support stand, see 1.8.3 (POSITIONING THE VEHICLE ON THE FRONT SUPPORT STAND OPT).
- ★Hold the nut on the inside (1) still.

Driving torque of the engine-frame rear fastening screw: 50 Nm (5.0 kgm).

- ★Unscrew and remove the engine upper rear fastening screw (2).

NOTE The screw (2) on the left-hand side is longer.

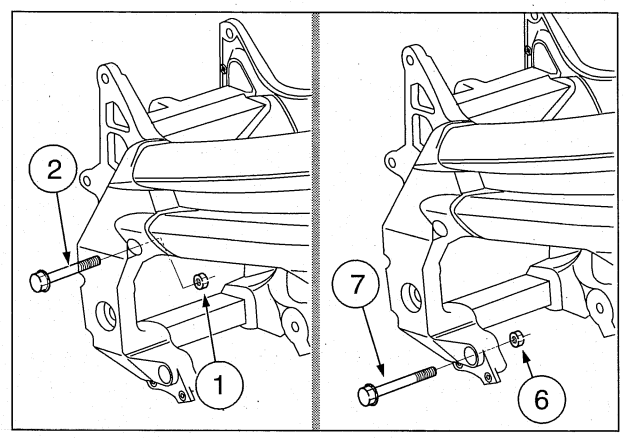
- ★Retrieve the nut (1).
- Insert the upper right support pin (3) in the upper hole on the right-hand side.
- Insert the stud bolt (4) in the upper hole on the left-hand side and screw it all the way onto the pin (3).
- Screw the upper left support pin (5) all the way onto the stud bolt (4) and tighten.
- ★Hold the nut on the inside (6) still.

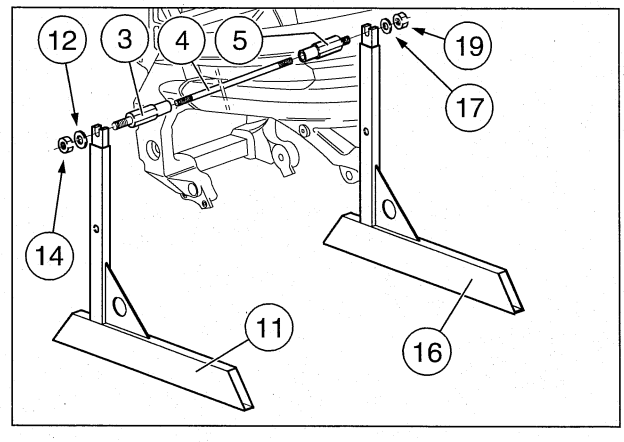
Driving torque of the engine-frame lower fastening screw: 50 Nm (5.0 kgm).

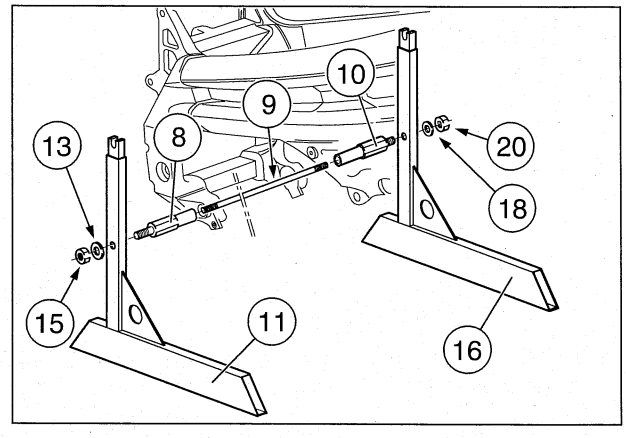
- ★Unscrew and remove the engine lower rear fastening screw (7).

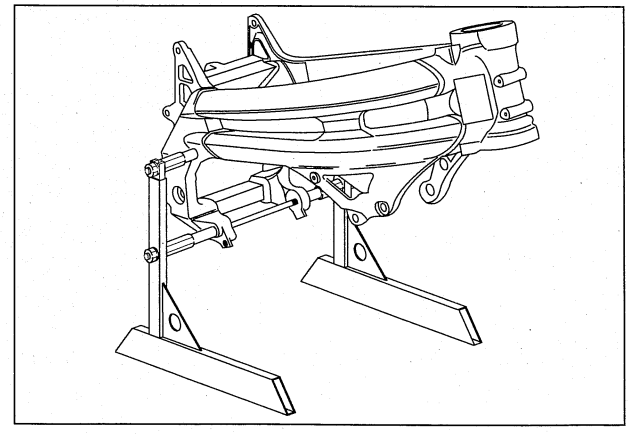
NOTE The screw (7) on the right-hand side is longer.

- Insert the lower right support pin (8) in the lower hole on the right-hand side.
- Insert the stud bolt (9) in the lower hole on the left-hand side and screw it all the way onto the pin (8).
- Screw the lower left support pin (10) all the way onto the stud bolt (9) and tighten.
- Place the support bracket (11) with the longer side of the base facing forwards, on the two support pins (3 - 8).
- Insert the two washers (12) (13) and two nuts (14) (15), screwing them on by hand.
- Tighten the two nuts (14) (15).
- Place the support bracket (16) with the longer side of the base facing forwards, on the two support pins (5) (10).
- Insert the two washers (17) (18) and two nuts (19) (20), screwing them on by hand.
- Tighten the two nuts (19) (20).
- Remove the front and rear support stands.









1.9 CONSUMABLES

Only use the products given below for any maintenance work.
The materials mentioned have been tested for many years and are suitable for all the application conditions indicated by the manufacturer.

NOTE The consumables, which are coded, are available on application, see 1.9.2 (USE OF CONSUMABLES).

1.9.1 PRODUCT PROPERTIES

Product	Use and properties
LOCTITE® 243 blu 	Adhesive in paste for screws and nuts up to M36 and for couplings with medium hold. It can be used on parts which have not been completely degreased. The hardening time depends on the temperature and the material (maximum one hour). Resistance to temperatures in the range – 55 to 150 °C (– 99 to 302 °F).
LOCTITE® 574 orange 	Solvent-free seal in paste, to be used instead of seals where there is a high friction factor and where a precise distance is required between the two components. Applied in its liquid state, it hardens after assembly on contact with the metal within a few hours. A seal is created whose surface structure adapts to the surfaces to be sealed. Resistance to temperatures in the range – 55 to 200 °C (– 99 to 392 °F); where applied, it seals the surfaces against corrosion.
LOCTITE® 8150 	Paste to be used on components subjected to high temperature.
LOCTITE® Anti Seize 15378 	Lubricant and anticorodal resistant to high temperatures. It must be sprayed on both components and makes sure the sliding surfaces remain maintenance free for a long time. It prevents corrosion.
MOLYKOTE® G-n 	Lubricating paste to be used on support points subjected to heavy loads, for standard lubrication and on couplings under pressure, in order to prevent corrosion which would prevent subsequent disassembly. To apply on the two surfaces.

1.9.2 USE OF CONSUMABLES

(*) = see 1.6 (LUBRICANT CHART). (**) = see 1.9.1 (PRODUCT PROPERTIES).

Product	aprilia part#	Description of use
Engine oil (*)	8116050	– Assembly of rivets on fork, dashboard/front fairing mount, saddle support and frame. – Assembly of frame/engine and frame/fork adjusting bushes. – Assembly of fairlead screws on frame. – Insertion of steering head bearings. – Steering head upper bush.
LOCTITE® 243 (**)	0897651	– Fastening of steering shock absorber bush. – Fastening of rear brake caliper lock pin. – Fastening of pinion. – Fastening of rear brake lever pin. – Fastening of cooling electrofan on support. – Fastening of fuel return pipe connection. – Fastening of fuel filler cap. – Throttle cable pullet fastening nut. – Throttle cable support bracket fastening screws. – Throttle valve pin fastening nut. – Throttle valve potentiometer fastening screws.
LOCTITE® 572	–	– Fastening of coolant thermal switch. – Fastening of the coolant draining screws positioned on the radiators.
Bimol Grease 481	8116053	– Assembly of front and rear wheel seals. – Assembly of fork pin bearings. – Assembly of clutch pump control rod. – On rear wheel pin thread. – On steering head bearings. – Assembly of rear brake pump control rod. – On rear brake lever pin.
LUBERING ST grease	8116038	– Assembly of cold-start control.
AP-LUBE temporary lubricant	–	– Assembly of handlebar counterweights rubber element. – Assembly of throttle cable adjuster rubber elements. – Assembly of rubber element on gearshift lever. – Insertion of radiator lower pins on supporting rubber elements. – Assembly of breather pipe on radiator and three-way manifold. – Assembly of coolant couplings on radiators. – Assembly of water and fuel drainage pipes on fuel pump flange. – Assembly of throttle body torsion springs.
DID CHAIN LUBE grease	–	– Lubrication of driving chain.
"Biosolvent" frame detergent	8116031	– Washing of engine oil tank.
"ACRILON 28" cyanoacrylic glue	8116945	– Assembly gasket air filter casing.
MOTUL MOTOWASH degreaser	–	– Cleaning of frame and fork.
LOCTITE® 8150 (**)	–	– Assembly of plugs for checking CO on exhaust pipes.

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Product	aprilia part#	Description of use
Alcohol	–	– Cleaning of left handlebar prior to assembly of grip. – Insertion of radiator breather pipes on "T" union. – Assembly of HV coil support rubber element. – Assembly of side fairing rubber elements. – Cleaning of lower part of engine. – Assembly of start relay rubber element. – Assembly of flexible couplings on rear wheel sprocket. – Assembly of rubber elements on engine oil radiator. – Assembly of coupling on coolant filler. – Cleaning of engine oil tank prior to application of transfers. – Assembly of dashboard/front fairing mount rubber elements. – Assembly of rubber element on rear brake lever. – Assembly of pipes on fuel filter (inside tank). – Assembly of coolant radiator union coupling. – Assembly of fuel pipes on tank. – Cleaning of fuel tank prior to application of transfers.

1.10 GENERAL SPECIFICATIONS OF THE DRIVING TORQUES

The following table indicates the standard driving torques for screws and bolts with metric ISO thread.

Screw or bolt thread	Spanner	Driving torque	
		Nm	kgm
M 6	10	6	0.6
M 8	12	15	1.5
M 10	14	30	3.0
M 12	17	55	5.5
M 14	19	85	8.5
M 16	22	130	13.0

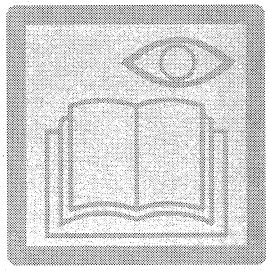
For specific joints or couplings of the vehicle, see 1.11 (FASTENING ELEMENTS).

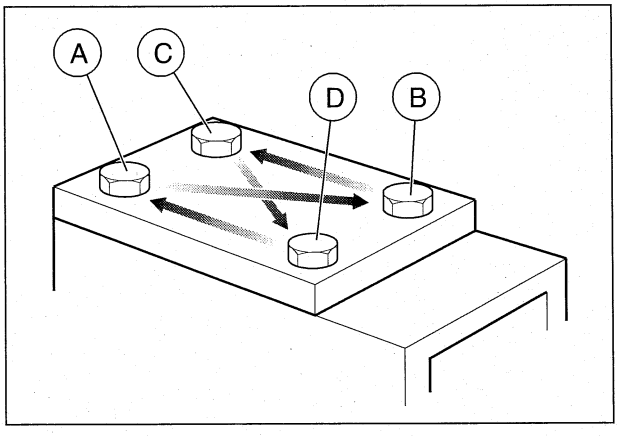
If not specified otherwise, the indicated driving torques are valid for clean and dry threads, at room temperature.

NOTE In order to avoid any deformation and/or imperfect coupling, tighten the screws or bolts by proceeding as described below:

- Manually screw all the fastening elements.
- Applying half the prescribed driving torque, tighten the elements that are diametrically opposite each other: (A) and (B); (C) and (D).
- Repeat the previous operation by applying the prescribed driving torque.

NOTE In this way the pressure exerted by the fastening elements will be uniformly distributed on the joint surface.





1.11 FASTENING ELEMENTS

Check, and where necessary, tighten after the first 1000 km (625 mi) and then every 7500 km (4687 mi) or 8 months.

⚠ CAUTION

The fastening elements featured in the table must be torqued to specification using a torque spanner and LOCTITE® applied, where indicated.
The elements marked (●) are particularly important for safety.

NOTE

L243 = fasten with LOCTITE® 243
L572 = fasten with LOCTITE® 572
man. = fasten by hand

Steel/aluminium fastening screws with similar coefficient of elasticity

SCREW	Nm	kgm
M4	3	0.3
M5	6	0.6
M6	10	1.0
M8	25	2.5
M10	50	5.0
M12	86	8.6

ENGINE

Fastening of engine to frame

Description	Q.ty	Screw / nut	Nm	kgm	Note
● Front connection	2+2	M10	40	4.0	
● Left-side upper and lower rear connection	2	M10	40	4.0	
● Adjusting bush right-side upper and lower rear connection	2	M20x1.5	12	1.2	
● Lock ring right-side upper and lower rear connection	2	M20x1.5	50	5.0	
● Screw right-side upper and lower rear connection	2	M10	50	5.0	

Elements fastened to the engine

Description	Q.ty	Screw / nut	Nm	kgm	Note
Engine oil inlet flange	2	M6	12	1.2	
Engine oil drain plug	1	M8	12	1.2	
Rear brake lever mount fastening	1	M6	10	1.0	
	1	M8	17	1.7	
Rear brake pump mount fastening	2	M8	17	1.7	
● Pinion fastening	1	M10	50	5.0	L243
Clutch control cylinder fastening	3	M6	12	1.2	
Pinion case fastening	3	M6	5	0.5	
Fastening of fuel delivery pipe to throttle body	1	M12x1.5	22	2.2	
Coolant drain screw	1	M6	10	1.0	
Coolant thermistors	2	M14	30	3.0	

REAR FORK

Description	Q.ty	Screw / nut	Nm	kgm	Note
● Fork pin metal ring	1	M30x1.5	12	1.2	
● Fork pin lock ring	1	M30x1.5	60	6.0	
● Fork pin nut	1	M20x1.5	90	9.0	
● Caliper mount locking pin	1	M12	50	5.0	L243
Chain tightener screw and nut	1+1	M8	man.		
Brake pipe grommet fastening	2	M5	2	0.2	
Chain case fastening	2	M5	4	0.4	
Chain tightener shoe fastening	2	M5	2	0.2	

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SIDE STAND					
Description	**Q.ty**	**Screw / nut**	**Nm**	**kgm**	**Note**
Fastening of stand plate to frame	2	M10	40	4.0	
Stand fastening pin	1	M10x1.25	10	1.0	
Switch fastening screw	1	M6	10	1.0	
Lock nut	1	M10x1.25	30	3.0	

FRONT SUSPENSION					
Front fork					
Description	**Q.ty**	**Screw / nut**	**Nm**	**kgm**	**Note**
● Fastening of upper plate on fork tubes	1+1	M8	25	2.5	
● Fastening of lower plate on fork tubes	2+2	M8	25	2.5	
Steering head metal ring	1	M35x1	40	4.0	
Steering head lock ring	1	M35x1	man. +90°		
Upper plate fastening bush	1	M29x1	80	8.0	
Lower plate travel-end bush fastening screw	1+1	M8	22	2.2	
● Closing of fork / wheel pin clamps	2-2	M8	22	2.2	

REAR SUSPENSION					
Shock absorber					
Description	**Q.ty**	**Screw / nut**	**Nm**	**kgm**	**Note**
● Fastening of shock absorber to frame	1	M10	50	5.0	

Linkage					
Description	**Q.ty**	**Screw / nut**	**Nm**	**kgm**	**Note**
● Fastening of single connecting rod to frame	1	M10	50	5.0	
● Fastening of single/double connecting rod to frame	1	M10	50	5.0	
● Fastening of double connecting rod fork	1	M10	50	5.0	
● Fastening of double connecting rod / shock absorber	1	M10	50	5.0	

ELECTRIC SYSTEM					
Description	**Q.ty**	**Screw / nut**	**Nm**	**kgm**	**Note**
Fastening of battery clamping bracket	1	M6	3	0.3	
Fastening of horn mount	1	M8x1.25	25	2.5	
Fastening of speed sensor on rear brake caliper mount	1	M6	10	1.0	
Fastening of rear indicators	2	M6	2	0.2	
Fastening of electronic unit protection case	3	M6	4	0.4	
Fastening of voltage regulator	2	M6	10	1.0	
Fastening of front indicators	2	M6	2	0.2	
Fastening of coil to mount	8	M5	6	0.6	
Fastening of the rear light to the light-holders	2	SWP3.9	1	0.1	
Fastening of headlight to front fairing	4	T.C.B. 4x30	0.5	0.05	
Fastening of the fuse box and of the relevant protection cover to the dash-board/front part of the fairing support	2	M6	3	0.3	

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FRONT WHEEL					
Description	**Q.ty**	**Screw / nut**	**Nm**	**kgm**	**Note**
● Wheel pin nut	1	M25x1.5	80	8.0	

REAR WHEEL					
Description	**Q.ty**	**Screw / nut**	**Nm**	**kgm**	**Note**
● Fastening of sprocket on sprocket holder	5	M10	50	5.0	
● Wheel pin nut	1	M25x1.5	120	12.0	

COOLING SYSTEM					
Description	**Q.ty**	**Screw / nut**	**Nm**	**kgm**	**Note**
Thermal switch on 3-way manifold	1	M14x1.5	30	3.0	L572
Fastening of electrofan mount	2+2	M6	5	0.5	
Fastening of electrofan motor to mount	3+3	M4	1	0.1	L243
Radiator coolant drain screws	1+1	M6	10	1.0	L572
Fastening of expansion tank to coils mount	2	M6	10	1.0	
Fastening of expansion tank cap	1	M28x3	man.		
Fastening of coolant filler neck	1	M5	5	0.5	

BRAKING SYSTEMS					
Front system					
Description	**Q.ty**	**Screw / nut**	**Nm**	**kgm**	**Note**
● Fastening of right and left brake caliper	2+2	M10x1.25	50	5.0	
Fastening of brake fluid tank	1	M6	10	1.0	
Fastening of brake fluid tank bracket	1	M6	10	1.0	
● Fastening of brake discs	6+6	M8	30	3.0	L243
● Fastening of the front brake pipe	1	M10x1	20	2.0	
● Brake fluid bleeder	3	M10x1	15	1.5	

Rear system					
Description	**Q.ty**	**Screw / nut**	**Nm**	**kgm**	**Note**
Brake caliper fastening	2	M8	25	2.5	
Brake lever pin	1	M8	25	2.5	L243
Fastening of brake fluid tank	1	M5	2	0.2	
Brake pump fastening	2	M6	12	1.2	
Brake rod lock nut	1	M6	man.		
Brake disc fastening	5	M8	30	3.0	L243
Brake pipe fastening	1	M10x1	20	2.0	

CLUTCH CONTROL					
Description	**Q.ty**	**Screw / nut**	**Nm**	**kgm**	**Note**
Fastening of clutch fluid pipe	1	M10x1	20	2.0	
Fastening of fluid tank bracket	1	M6	12	1.2	
Fastening of clutch fluid tank on mount	1	M5	2	0.2	
Clutch fluid bleeder	1	M10x1	15	1.5	

EXHAUST SYSTEM					
Description	**Q.ty**	**Screw / nut**	**Nm**	**kgm**	**Note**
Fastening of exhaust pipes to engine	3+3	M8	25	2.5	
Exhaust silencer fastening	1+1	M8	25	2.5	

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FUEL TANK					
Fuel pump flange					
Description	**Q.ty**	**Screw / nut**	**Nm**	**kgm**	**Note**
Fuel return fitting	1	M6	6	0.6	L243
Fastening of pump mount to flange	3	M5	4	0.4	
Fastening of electric terminals on flange	2	M5	6	0.6	
Closing of fuel return	1	M6	10	1.0	L243
● Fastening of fuel delivery pipe on flange	1	M12x1.5	22	2.2	
Petrol level sensor on pump mount	2	SWP 2.9x12	1	0.1	
Fastening of fuel pump cables on flange	2	M6	10	1.0	
Tank					
Description	**Q.ty**	**Screw / nut**	**Nm**	**kgm**	**Note**
Fastening of cap on tank	4	M5	5	0.5	
Fastening of fuel pump flange on tank	8	M5	6	0.6	
Fastening of tank front on frame	2	M6	10	1.0	
Fastening of tank rear on mount	1	M6	10	1.0	

ENGINE OIL TANK AND RADIATOR					
Description	**Q.ty**	**Screw / nut**	**Nm**	**kgm**	**Note**
Tank upper fastening screw	1	M8	15	1.5	
Tank fastening nuts	2	M6	10	1.0	
Oil filter	1	M20x1.5	30	3.0	
Oil drain plug	1	M8	15	1.5	
Oil level pipe fittings	2	M10x1	20	2.0	
Radiator fastening screws	3	M6	12	1.2	

FRAME / FAIRINGS					
Description	**Q.ty**	**Screw / nut**	**Nm**	**kgm**	**Note**
Radiator spoiler fastening	3	M6	4	0.4	
Fastening of number plate holder to rear mudguard extension	2	M5	2	0.2	
Fastening of reflector holder to number plate holder	2	M5	6	0.6	
Front mudguard fastening	4	M5	5	0.5	
Rearview mirror fastening screws	1+1	M6	4	0.4	
Fastening of rearview mirror mounts and front fairing to mount	4	M6	4	0.4	
Lower fastening of front fairing to conveyors	4	M5	2	0.2	
Fastening of the rear lower part of the front part of the fairing to the upper part of the air conveyors	2	M5	4	0.4	
Fastening of the air conveyors to the frame	2	M6	3	0.3	
Fastening of dashboards upper protection moulding	8	M5	1	0.1	
Fastening of lower fairing to frame	2	M6	4	0.4	
Fastening of saddle support lower moulded cover	6	M6	10	1.0	
Fastening of rear fairing to saddle support lower moulded cover	4	M5	3	0.3	
Fastening of the rear light-holders and of the rear part of the fairing to the saddle pillar	2	M6	3	0.3	
Fastening of the rear part of the fairing to the saddle pillar	2	M6	3	0.3	
Fastening of internal fairing and side fairing	10	SWP 3.9	0.5	0.05	
Fastening of dashboard to mount	3	M6	5	0.5	
Fastening of riders's saddle	2	M6	5	0.5	
Fastening of passenger seat lock	2	M6	10	1.0	
Fastening of passenger seat lock key-operated control	2	M6	12	1.2	
Fastening of passenger footrest supports	4	M8	25	2.5	
Fastening of riders's footrest supports	4	M8	25	2.5	
Fastening of riders's footrest protection	4	M5	6	0.6	
Fastening of saddle support	4	M10	50	5.0	
Fastening of coil mounts	4	M6	10	1.0	

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RIGHT/LEFT HANDLEBARS AND CONTROLS					
Description	**Q.ty**	**Screw / nut**	**Nm**	**kgm**	**Note**
Fastening of anti-vibration weights	1+1	M6	12	1.2	
Anti-vibration weights metal ring	1+1	M18x1	35	3.5	
● Fastening of right/left handlebars to the fork	1+1	M8	25	2.5	
Handlebars lock screw	1+1	M6	10	1.0	
Fastening of left dimmer switch	1+1	M5x1	1	0.1	
Fastening of right dimmer switch	1	M4	1	0.1	
● Fastening of the front brake control lever	2	M6	8	0.8	
● Fastening of clutch lever	2	M6	8	0.8	

AIR FILTER CASING					
Description	**Q.ty**	**Screw / nut**	**Nm**	**kgm**	**Note**
Fastening of air filter casing cover	7	M5	2	0.2	
Fastening of air filter casing to throttle body	6	M6	7	0.7	
Fastening of the front part of the air suction conveyors	2	SWP3.9	1	0.1	
Fastening of the rear part of the air suction conveyors	2	SWP4.2x25	0.5	0.05	
Fastening of air sensor support plate	1	SWP3.9	1.5	0.15	
Reduction diaphragm	1	SWP3.9	1	0.1	
Suction coupling clamp	1	–	2	0.2	
Filter case front support	2	M6	8	0.8	
Coupling unions on the frame	3+3	M6	3	0.3	

1.12 INSTRUCTIONS FOR APPLYING TRANSFERS

When removing parts of the frame:

⚠ CAUTION

Handle the plastic and painted components with care to avoid scraping or damaging them.
Proceed with care.
Do not damage the tangs and/or their seats.

When applying the transfers, follow the instructions given below carefully.

It is advisable to use the following tools:

– relatively stiff spatula (1);

NOTE Generally, soft, squeegee-type spatulas do not remove enough water from under the transfer.

– sponge or sprayer (2) with water.

NOTE Add detergent to the water (1-3%) and shake until you get soap bubbles.

Apply as follows:

◆ Place the transfer (3) upside down on a work surface.
◆ Keeping the transfer spread out on the work surface, remove the protective backing (4) completely.

NOTE It is advisable to use a sprayer (2).
When using a sponge, dab the surface with the sponge, without pressing hard so as to avoid damaging the adhesive.

◆ Wet the surface of the adhesive with soapy water.
◆ Apply the transfer (3) on the surface to be decorated and move it into the right position.

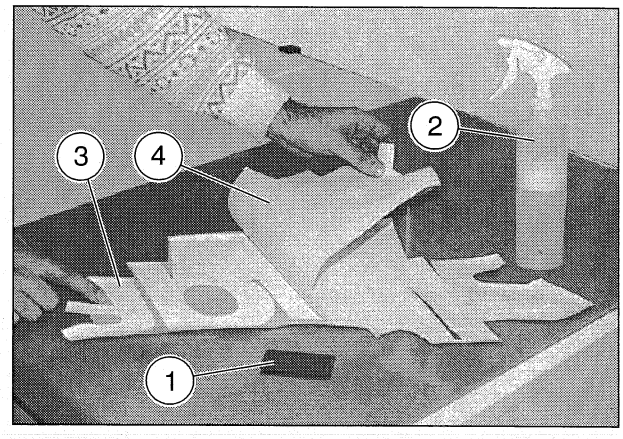
NOTE Always move the spatula in constant strokes from the centre of the transfer out.

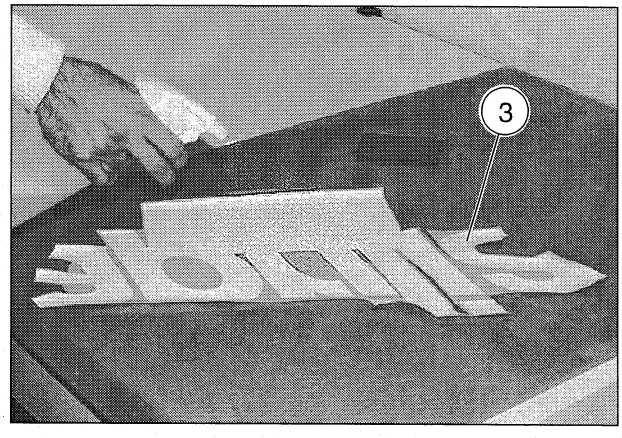
◆ Using the spatula (1), press down reasonably hard and move the spatula across the surface of the transfer until the excess soap and water has been removed from underneath.

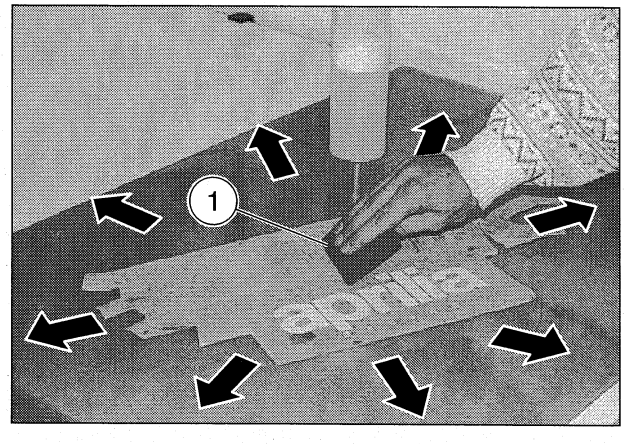
NOTE Do not lift the corners and/or sides of the transfer.

◆ Use an absorbent cloth and, working from the centre out, dry the transfer.
◆ Move the spatula over the transfer again with firm, even strokes, pressing down as hard as possible.
Move the spatula in strokes from the centre out, taking special care with the corners and sides to make sure the whole surface sticks evenly.

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NOTE Where the transfer features application tape (5)*, the tape must be removed 20-30 minutes after the application of the transfer.

* The application tape is used to facilitate the application of trademarks and letters, arranging them in the correct place on the surface to be decorated, and to give the self-adhesive more body during application.

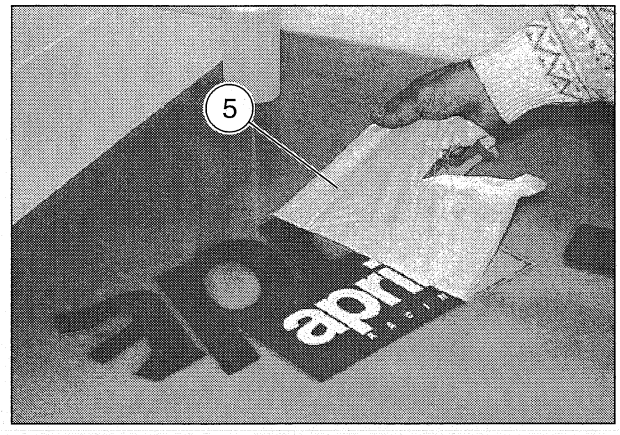
◆ Remove the application tape (5) from the surface of the transfer.
◆ In order to assure good adhesion, move the spatula over the transfer again, concentrating in particular on the edges and corners.

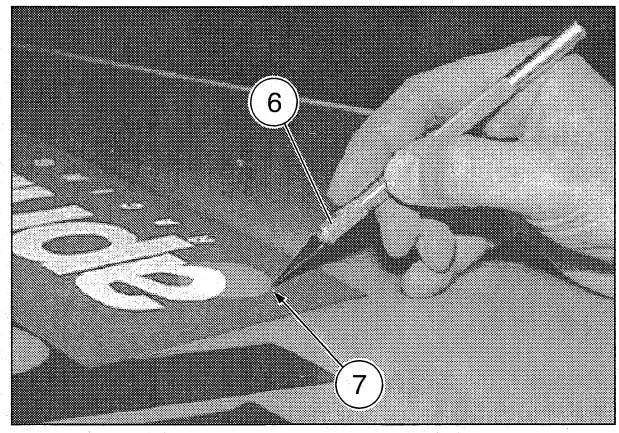
NOTE With the wet method, the final level of the transfer is reached approx. 48 hours after application.

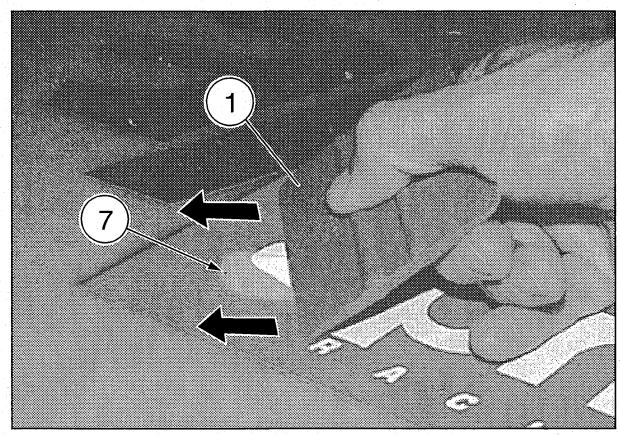
◆ Once the application tape has been removed, make sure there are no air bubbles anywhere on the surface.

In the event air bubbles are encountered:

◆ Use a pin or paper cutter (6) to make a hole in the edge (7) of the air bubble.
◆ Using the spatula (1), work from the edge opposite the hole and push the bubble so the air escapes.







1.13 ABBREVIATIONS / SYMBOLS / INITIALS

= number
< = is less than
> = is greater than
≤ = is equal to or less than
≥ = is equal to or greater than
~ = approximately
∞ = infinity
°C = degrees Celsius (centigrade)
°F = degrees Fahrenheit
± = plus or minus
a.c. = alternating current
A = ampère
Ah = ampere per hour
API = American Petroleum Institute
HV = high voltage
AV/DC = AntiVibration Double Countershaft
bar = unit of pressure (1 bar = 100 kPa)
d.c. = direct current
cm³ = cubic centimetres
CO = carbon monoxide
CPU = Central Processing Unit
DIN = German industrial normative (Deutsche Industrie Norm)
DOHC = Double Overhead Camshaft
ECU = Engine Control Unit
rpm = revolutions per minute
HC = unburnt hydrocarbons
ISC = idle speed control
ISO = International Standardization Organization
kg = kilograms
kgm = kilograms per metre (1 kgm = 10 Nm)
km = kilometres
km/h = kilometres an hour
kΩ = kilo-ohms
kPa = kiloPascal (1 kPa = 0.01 bar)
KS = clutch side (Kupplungseite)
kW = kilowatt
ℓ = litres
LAP = lap (race course)
LED = Light Emitting Diode
m/s = metres an second
MAX = maximum
mbar =millibar (1mbar = 0.1 kPa)
mi = mile
MIN = minimum
MPH = miles per hour
MS = flywheel side (Magnetoseite)
MΩ = megaohm
N.O.M.M. = "Motor" method octane number
N.O.R.M. = "Research" method octane number
Nm = newton per meter (1 Nm = 0.1 kgm)
Ω = ohm
PICK-UP = pick-up
BDC = bottom dead centre
TDC = top dead centre
PPC = Pneumatic Power Clutch
SAE = Society of Automotive Engineers
TEST = diagnostics test
T.C.B. = convex cheese head
T.C.E.I. = hexagonal socket head
T.E. = hex-head
T.P. = flat head
TSI = Twin Spark Ignition
UPSIDE-DOWN = upside-down rods
V = volt
W = watt
Ø = diameter

NOTE

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SERVICE AND SETTING UP

2

SERVICE AND SETTING UP

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



⚠ WARNING

Before beginning any maintenance operation or any inspection of the vehicle, stop the engine, extract the key from the ignition block, wait until the engine and the exhaust system have cooled down and if possible lift the vehicle by means of the proper equipment, on firm and flat ground.

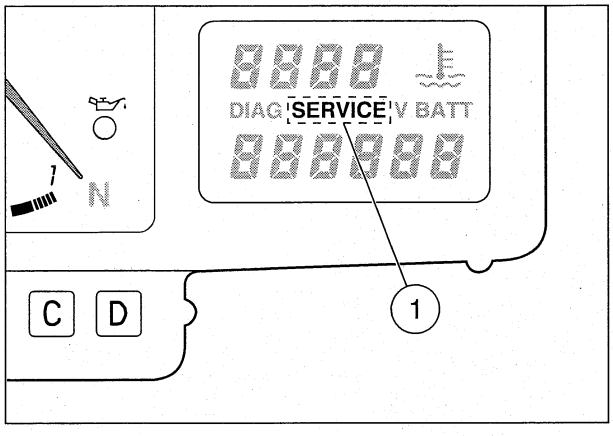
Keep away from the red-hot parts of the engine and of the exhaust system, in order to avoid burns.

Do not hold any mechanical piece or other parts of the vehicle with your mouth: the components are not edible and some of them are noxious or even toxic.

If not expressly indicated otherwise, for the reassembly of the units repeat the disassembly operations in reverse order.

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.



⚠ CAUTION

After the first 1000 km (625 mi) and successively every 7500 km (4687 mi), the writing "SERVICE" (1) appears on the right display.
In this case, carry out the operations prescribed in the periodic service plan. If the bike is being used for competition, perform the operations more frequently, see 2.1.1 (REGULAR SERVICE INTERVALS CHART).

2.1.1 REGULAR SERVICE INTERVALS CHART

OPERATIONS TO BE CARRIED OUT BY THE aprilia Official Dealer (WHICH CAN BE CARRIED OUT EVEN BY THE USER).

KEY

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

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

(*) = In case of use on racetracks, change every 3750 km (2343 mi).

(**) = Check every two weeks or according to the intervals indicated.

Component	After running-in [1000 km (625 mi)]	Every 7500 km (4687 mi) or 12 months	Every 15000 km (9375 mi) or 24 months
Air cleaner	–	①	③
Engine oil filter (*)	③	③	–
Engine oil filter (on oil tank)	②	–	②
Fork	①	–	①
Light operation/direction	–	①	–
Light system	①	①	–
Safety switches			
Clutch fluid	–	①	–
Brake fluid	–	①	–
Coolant	–	–	①
Engine oil	③	③ (*)	–
Tyres	①	①	–
Tyre pressure (**)	④	④	–
Engine idling rpm	④	④	–
Engine oil pressure warning light LED	at every start: ①		
Drive chain tension and lubrication	every 1000 km (625 mi): ①		
Brake pad wear	①	before every trip and every 2000 km (1250 mi): ①	

OPERATIONS TO BE CARRIED OUT BY THE aprilia Official Dealer.

KEY

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

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

(*) = In case of use on race tracks, check every 3750 km (2343 mi).

Component	After running-in [1000 km (625 mi)]	Every 7500 km (4687 mi) or 12 months	Every 15000 km (9375 mi) or 24 months
Rear shock absorber	–	–	①
Spark plugs (*)	–	①	③
Transmission cables and controls	①	①	–
Rear suspension linkage bearings	–	–	①
Steering bearings and steering clearance	①	①	–
Wheel bearings	–	①	–
Brake discs	①	①	–
General running of the vehicle			
Braking systems	①	①	–
Cooling system	–	①	–
Clutch fluid	every 2 years: ③		
Brake fluid			
Coolant			
Fork oil	after the first 7500 km (4687 mi) and successively every 22500 km (14000 mi): ③		
Fork oil seals	after the first 30000 km (18750 mi) and successively every 22500 km (14000 mi): ③		
Brake pads	if worn: ③		
Adjusting the valve clearance	④	–	④
Wheel/Tyres	①	①	–
Nut, bolt, screw tightening			–
Cylinder synchronization	①	①	–
Suspensions and attitude	①	–	①
Final transmission (chain, crown and pinion)	–	①	–
Fuel pipes	–	①	every 4 years: ③
Clutch wear (*)	–	①	–

2.2 POINTS REQUIRING LUBRICATION

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

NOTE Before lubricating, completely clean all parts, removing rust, grease, dirt and dust.

The exposed parts subject to rust are to be lubricated with motor oil or grease, see 1.6 (LUBRICANT CHART).

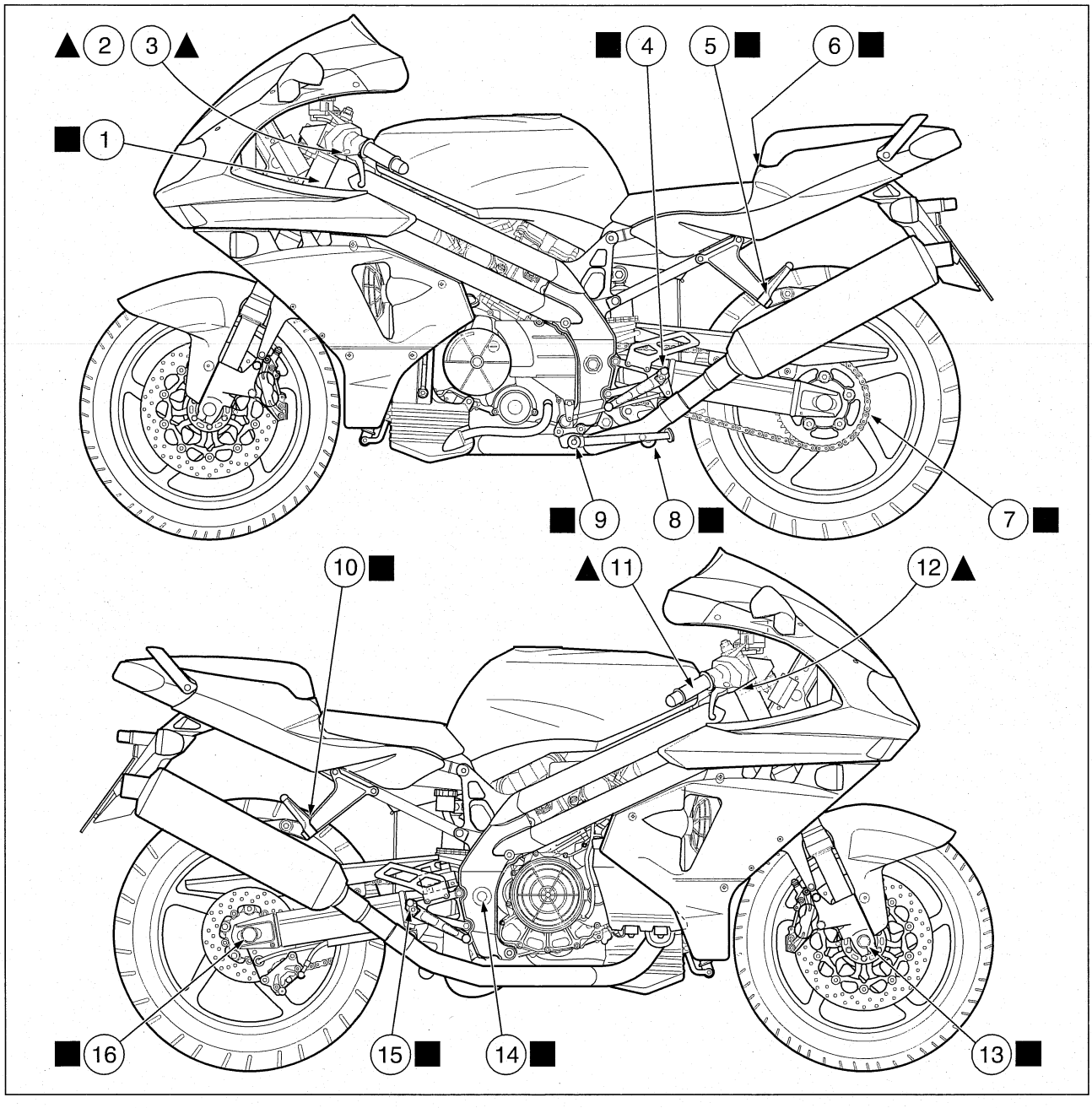
The points to be lubricated are indicated in the "LUBRICATION CHART".

LUBRICATION CHART KEY

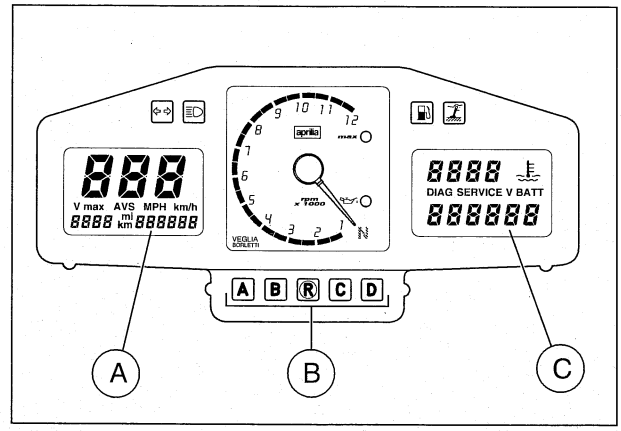
1) Steering bearings
2) Clutch lever pin
3) Lever cable for cold starting
4) Rider left footrest pin
5) Passenger left footrest pin
6) Passenger seat lock
7) Drive chain
8) Rear suspension leverage
9) Side stand pin
10) Passenger right footrest pin
11) Throttle grip
12) Accelerator cables
13) Front wheel pin and bearings
14) Rear fork pin
15) Rider right footrest pin
16) Rear wheel pin and bearings

■ = Grease
▲ = Oil

LUBRICATION CHART



2.3 MULTIFUNCTION COMPUTER

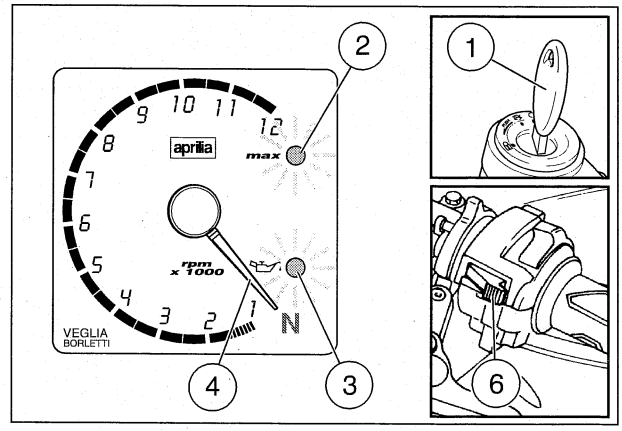


KEY

A) Left multifunction digital display (speedometer - odometer).
B) Multifunction computer programming push buttons.
C) Right multifunction digital display (coolant temperature - clock - battery voltage - chronometer - diagnostic).

When the ignition key (1) is rotated to position "○", the following warning lights come on on the dashboard:
- red line warning light LED "***max***" (2);
- red engine oil pressure warning light LED "🛢" (3), which remains on until the engine starts.

The pointer (4) of the revolution counter shifts to the maximum value (rpm) set by the user.
After about three seconds the red line warning light LED "***max***" (2) goes off; the pointer (4) of the revolution counter returns to its initial position.
The writing "*E F I*" (5) appears on the right side of the multifunction display for three seconds.
In this way the component operation is tested.



⚠ CAUTION

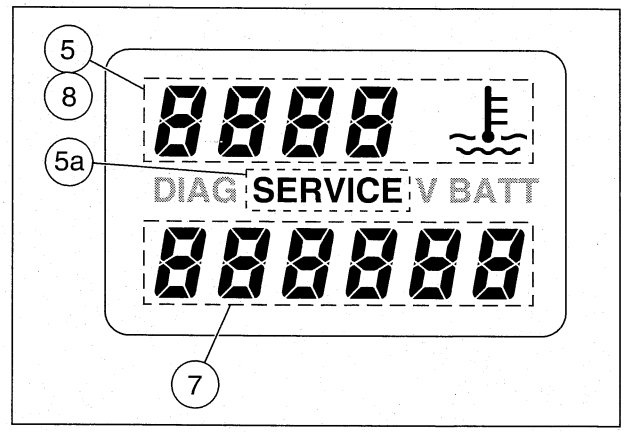
After the first 1000 km (625 mi) and successively every 7500 km (4687 mi), the writing "SERVICE" (5a) appears on the right display.
In this case, carry out the operations prescribed in the periodic service plan, see 2.1.1 (REGULAR SERVICE INTERVALS CHART).
To make the writing "SERVICE" disappear, press the "LAP" push button (6) and then the push button R and keep them pressed for about five seconds.

With the ignition key (1) in position "○" the standard settings on the dashboard are the following:

Right display: Clock (7), coolant temperature in °C (8).

Left display: Instantaneous speed in km/h (9), trip 1 (trip odometer) (10), total kilometres/miles odometer (11).

Upon installation of the battery or of the 30A main fuses:
- the revolution counter pointer (4) makes twelve clockwise clicks, thus checking the operation of the revolution counter itself;
- the instantaneous, maximum and average speed function is set in "**km/h**";
- the coolant temperature is set in °C;
- the digital clock is set to zero;
- the red line is set at 6000 rpm, indicated by the coming on of the red line warning light LED "***max***" (red) (2).

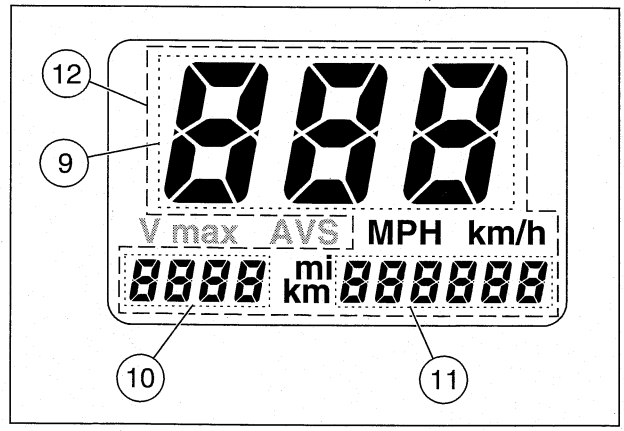


NOTE If necessary, carry out the appropriate adjustments.

2.3.1 SEGMENT OPERATION CHECK

◆ Press the push buttons A and B at the same time.
◆ Rotate the ignition key (1) from position "🔑" to position "○".

All the segments will remain on until the push buttons A and B are released.



2.3.2 SWITCHING FROM km TO mi (from km/h to MPH) AND VICEVERSA (LEFT DISPLAY)

◆ Press the push button A until, after about five seconds, all the writings (12) on the left display start blinking.
◆ Release the push button A.

Follow ▶

Follow ▶

- ◆ Press the push button **B** to change the unit of measurement from "**km**" to "**mi**" (from "**km/h**" to "**MPH**") or viceversa.
- ◆ To confirm the setting, press the push button **A** for about five seconds.

2.3.3 SETTING THE INSTANTANEOUS, MAXIMUM AND AVERAGE SPEED (LEFT DISPLAY)

NOTE Two seconds after the vehicle has started moving, the instantaneous speed is automatically shown on the display, even if a different function is set.

When the ignition key is rotated to position "○", the instantaneous speed (1) and the partial number of kilometres/miles covered "trip 1" (2) appear on the left display.

Resetting "trip 1" (2): with the odometer set on the instantaneous speed function, press the push button **R** for about two seconds.

- ◆ To display the maximum speed (3) and the distance "trip 1" (2), press the push button **B** for about one second.
  The writing "**V max**" (4), the maximum speed (3) and the distance "trip 1" (2) are displayed.

Resetting the maximum speed (3): with the odometer set on the "**V max**" function, press the push button **R** for about 2 seconds.

NOTE The measurement of the maximum speed is relevant to the distance covered from the last setting to zero of the maximum speed itself.
The distance "trip 1" (2) shown on the display indicates the number of kilometres/miles covered from the last setting to zero, to the distance "trip 1".

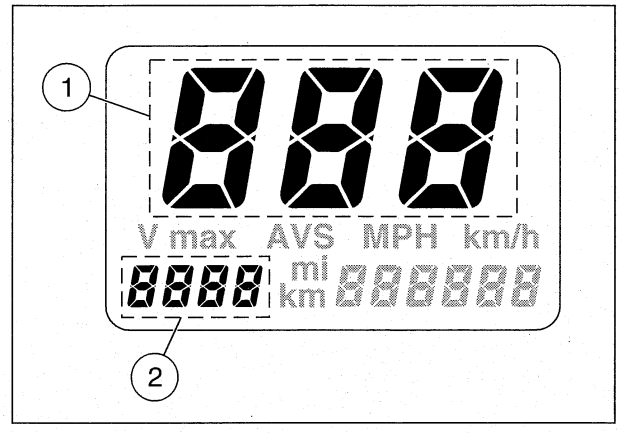
- ◆ To display the average speed (5) and the distance "trip 2" (6), press the push button **B** again for about 1 second.

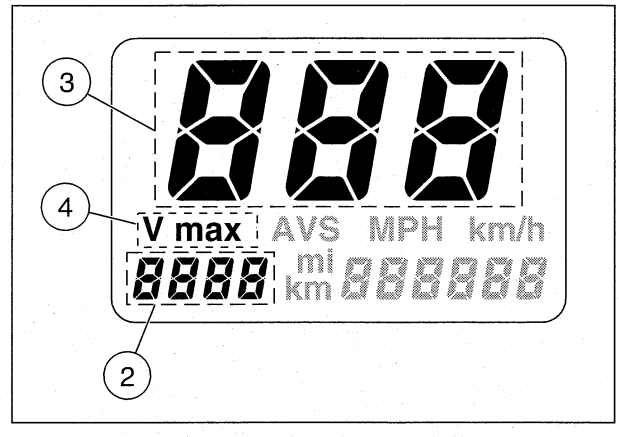
The writing "**AVS**" (7), the average speed (5) and the distance "trip 2" (6) are displayed.

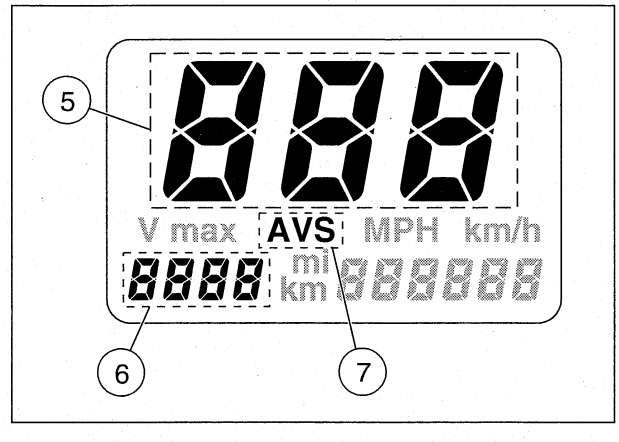
Resetting the average speed (5) and the distance "trip 2" (6): with the odometer set on the "**AVS**" function, press the push button **R** for about 1 second.

NOTE The measurement of the average speed is relevant to the distance "trip 2" (odometer).
The distance "trip 2" (6) shown on the display indicates the number of kilometres/miles covered from the last setting to zero. If more than 1000 km (625 mi) are covered without setting "trip 2" to zero, the value of the average speed will be wrong.

- ◆ To display the instantaneous speed (1) and the distance "trip 1" (2), press the push button **B** again.







2.3.4 SETTING THE RED LINE THRESHOLD (WITH ENGINE OFF ONLY)

When the maximum rpm set is exceeded, the red line warning light LED "*max*" (2) positioned on the dashboard starts blinking.

If the push button C is pressed for less than one second, the pointer of the revolution counter (1) shifts to the red line value set for three seconds, after which it returns to its initial position.

For the adjustment, proceed as follows:

- Press the push button C, release it and press it C again within 3 seconds.
  The pointer (1) moves increasing the value by 1000 rpm at each click, as long as C is kept pressed; when it has reached the maximum value, it starts again from the beginning.
- Press the push button C until the desired rpm value has been set.
- If the push button C is released and then pressed again within three seconds, intermittently, the pointer (1) moves increasing the value by 100 rpm at each click; when it has reached the maximum value, it starts again from the beginning.

NOTE It is not possible to set the red line at values lower than 2000 rpm or higher than 12000 rpm.

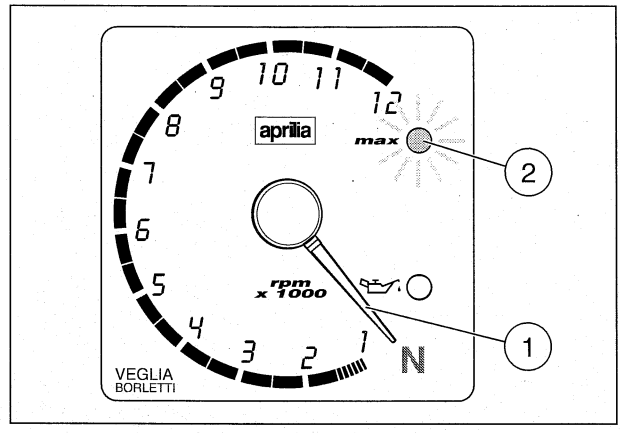
⚠ CAUTION

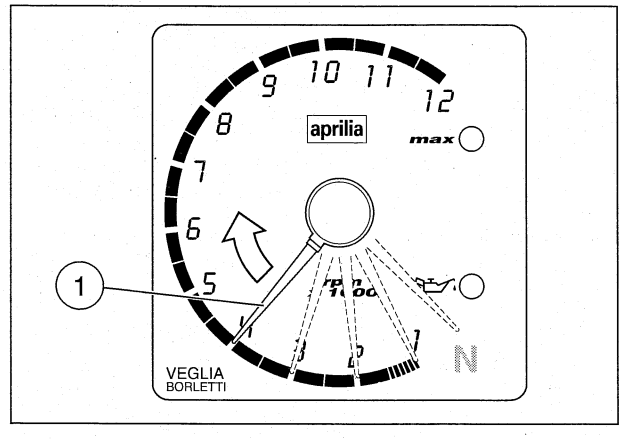
Never exceed the recommended rpm, see table.

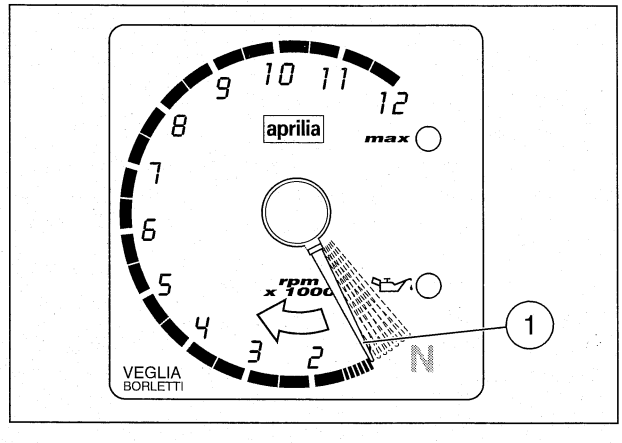
Engine maximum rpm recommended	
Mileage km (mi)	**rpm**
0 – 1000 (0 – 625)	6000
1000 – 1500 (625 – 937)	7500
over 1500 (937)	10500

- To confirm, release the push button C.
  After three seconds, the red line threshold setting is stored.

NOTE The setting is confirmed by the coming on of the red line warning light LED "*max*" (2).







2.3.5 MULTIFUNCTION (RIGHT DISPLAY)

The right display (multifunction) includes the coolant temperature in °C (°F) and the digital clock as standard settings.

NOTE When the engine is cold, the writing "cold" blinks.

By pressing the push button D, the following functions can be obtained in sequence:

Standard setting: Temperature in °C and digital clock

↓ D

Battery voltage (V BATT)

↓ D

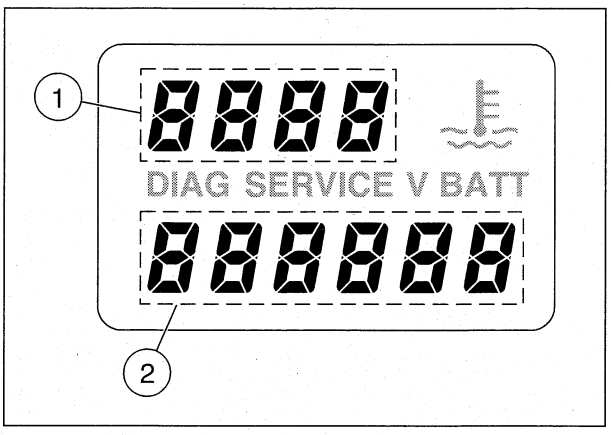
Setting the hour

↓ D

Setting the minutes

↓ D

Setting °C or °F



2.3.6 STANDARD SETTING: COOLANT TEMPERATURE AND DIGITAL CLOCK

The coolant temperature value (1) is shown in the upper part of the right display.
It is possible to switch from °C to °F and viceversa, see 2.3.10 (SETTING °C OR °F).

- When the temperature is below 35°C (95°F), the writing "cold" (1) blinks on the right display.
- When the temperature is over 115°C (239°F), the value (1) blinks on the right display, even if a function different from the standard setting has been set.
- When the temperature is over 130°C (266°F), the writing "LLL" (1) appears on the right display.

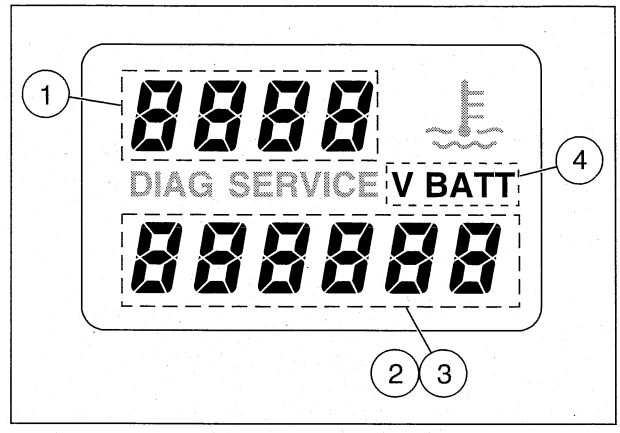
NOTE If the writing "LLL" is displayed with a temperature below 130°C (266°F), there may be a failure of the electric circuit, see 6.10.3 (COOLANT TEMPERATURE DISPLAY).

Thermometer range on the display: 35 – 130°C (95 – 266 °F).

The digital clock (2) appears in the lower part of the right display.
To set or modify hour and minutes, see 2.3.8 (SETTING THE HOUR) and 2.3.9 (SETTING THE MINUTES).

2.3.7 BATTERY VOLTAGE - VBATT

◆ If the push button D is pressed once, the battery voltage expressed in volt (3) appears in the lower part of the right display, while the coolant temperature (1) is displayed in the upper part.
The writing "**V BATT**" (4) is displayed.
The recharge circuit functions correctly if at 4000 rpm the battery voltage with low beam on is included between 13 and 15 V.



2.3.8 SETTING THE HOUR

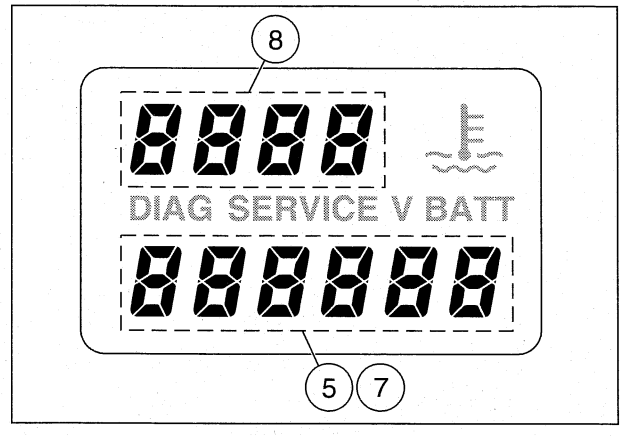
◆ When the push button D is pressed for the second time, the hour segments (5) start blinking in the lower part of the right display (digital clock).
◆ To modify the hour setting, press the "LAP" push button (6) on the left part of the handlebar.
◆ To confirm the hour setting, press the push button D.

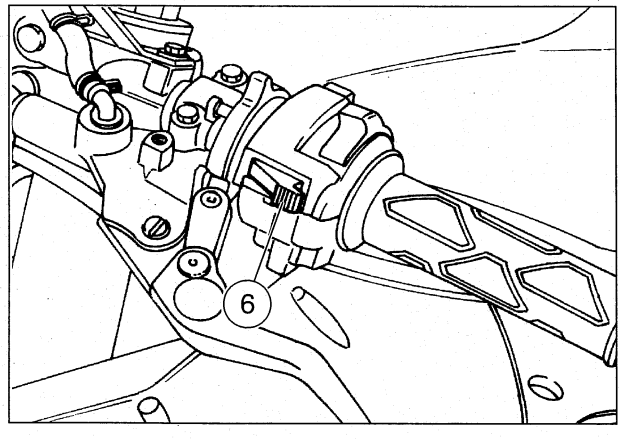
2.3.9 SETTING THE MINUTES

◆ When the push button D is pressed for the third time, the minute segments (7) start blinking in the lower part of the right display (digital clock).
◆ To modify the minute setting, press the "LAP" push button (6) on the left part of the handlebar.
◆ To confirm the minute setting, press the push button D.

2.3.10 SETTING °C OR °F

◆ When the push button D is pressed for the fourth time, the segments of the coolant temperature in °C or °F (8) start blinking in the upper part of the display.
◆ To modify from °C to °F setting, or vice versa, press the "LAP" push button (6) on the left part of the handlebar.
◆ To confirm the setting, press the push button D.





2.3.11 CHRONOMETER (RIGHT DISPLAY)

The chronometer makes it possible to measure the time per lap with the vehicle on a racetrack and to store the data, in such a way as to be able to consult them successively.

When the "CHRONOMETER" function has been selected, it is not possible to recall the following functions:

- maximum speed "**V max**";
- average speed "**AVS**";
- distance "trip 2".

◆ To operate the chronometer, press the "LAP" push button (1) and, within seven seconds, the push button **D**.
◆ To start timing, press the "LAP" push button (1) and release it immediately.
◆ To store the time acquired, press the "LAP" push button (1).

The "LAP" push button (1) is not enabled for ten seconds and the last time stored (2) is shown on the display.
After which, the chronometer with the current timing (3) is displayed, starting from ten seconds.

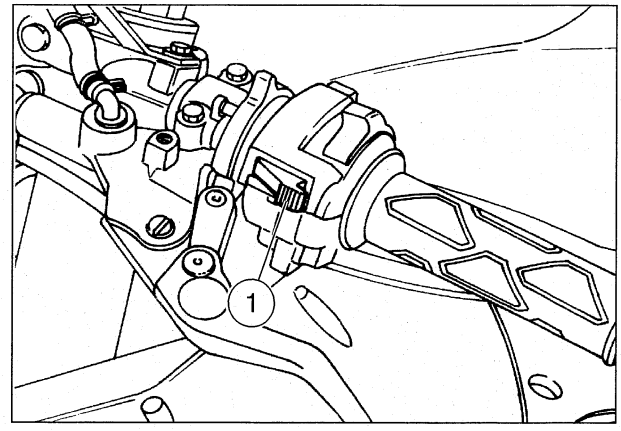
◆ To display the first time stored (4), press the push button **B**.
◆ To be able to see the stored times in sequence, press the "LAP" push button (1).
The writings L1, L2, L3, L4, etc. (5) are displayed.
◆ To start timing again, press the push button **B**.

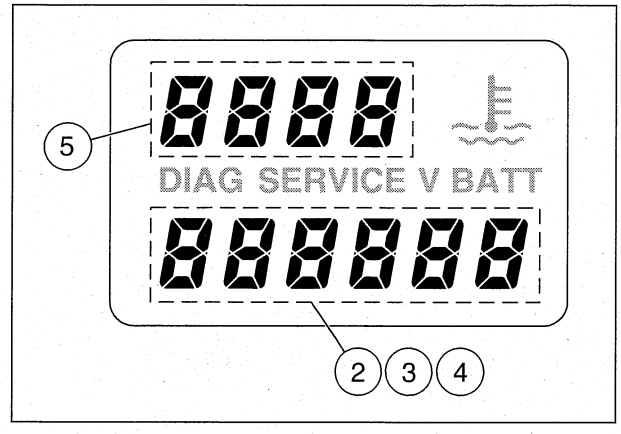
NOTE It is possible to store max. forty times, after which the "LAP" push button (1) is not effective any longer.

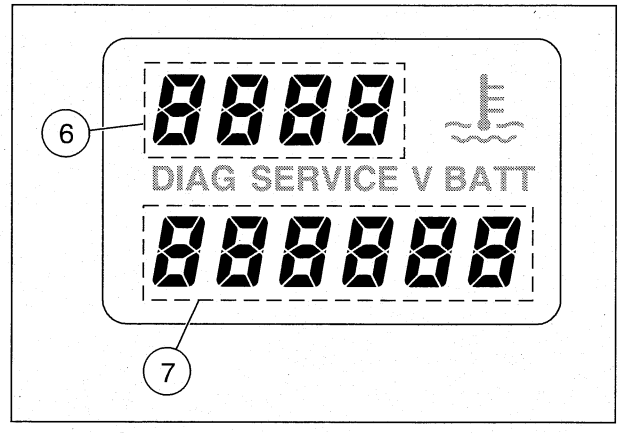
◆ To set the memory to zero, press the push button **A** and the "LAP" push button (1) at the same time for two seconds.
◆ To leave the chronometer function, press the "LAP" push button (1) and the push button **D**.

The coolant temperature (6) and the digital clock (7) appear on the right display (multifunction).

NOTE When the engine is cold, the writing "cold" blinks.





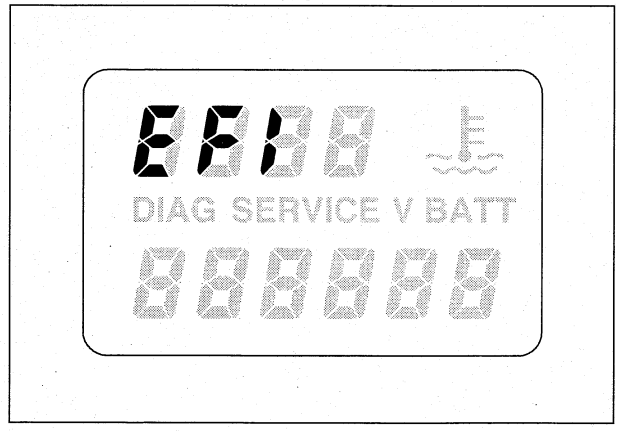


2.3.12 DIAGNOSTICS

Whenever the ignition switch is turned to position "○", the writing "EFI" is displayed for about three seconds.

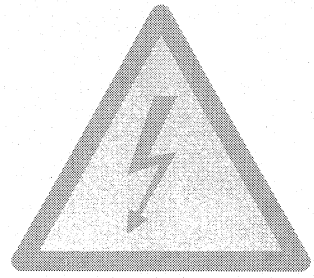
⚠ CAUTION

If the writing "EFI" is displayed during the normal operation of the engine, this means that the electronic unit has detected an anomaly.
In many cases, the engine keeps running with reduced performance levels, see 6.4 (IGNITION SYSTEM).



2.4 BATTERY

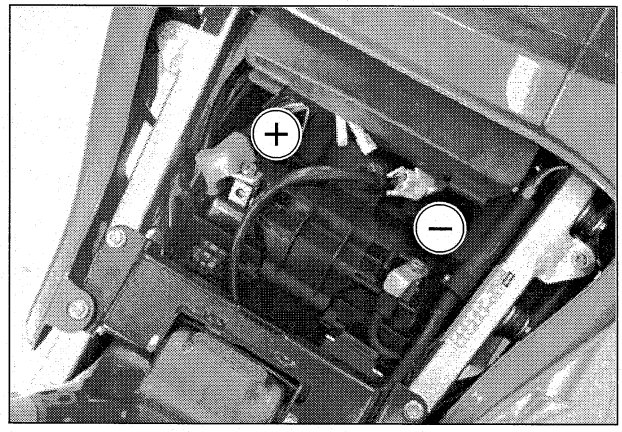
Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).



There are two kinds of commercially available batteries:
- batteries requiring **maintenance** featuring cell plugs;
- **maintenance-free** batteries with no cell plugs as they do not call for the electrolyte level to be checked and topped up.

NOTE This vehicle is provided with a maintenance-free battery and no operation is necessary, excepting occasional checks and the recharge when required.

When changing batteries, replace with a battery of the same type.
For further information, see 6.11 (BATTERY).



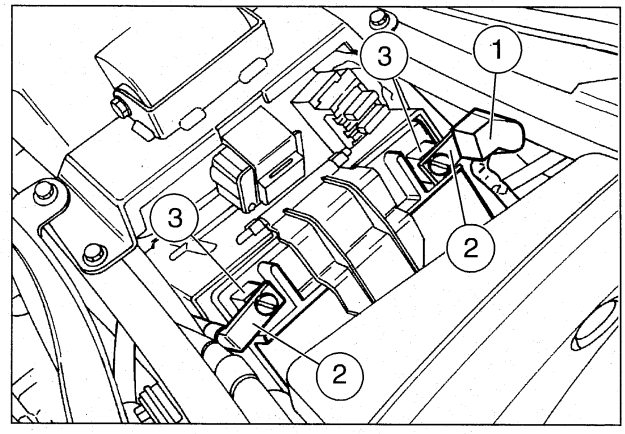
⚠ CAUTION

Never invert the connection of the battery cables.
Connect and disconnect the battery with the ignition switch in position "⚿", otherwise some components may be damaged.
Connect first the positive cable (+) and then the negative cable (–).
Disconnect following the reverse order.

NOTE Check battery voltage with a portable tester.
If voltage is less than 12V, the battery must be recharged.
If the voltage drops below 8V, the electronic unit is not working and is preventing engine operation.

2.4.1 CHECKING AND CLEANING THE TERMINALS

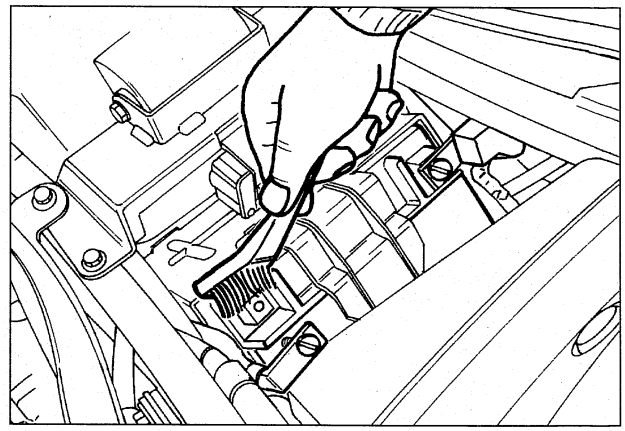
Carefully read 2.4 (BATTERY).



- ◆ Make sure that the ignition switch is in position "⚿".
- ◆ Put back the rider saddle, see 7.1.1 (REMOVING THE RIDER SADDLE).
- ◆ Remove the red protection element (1).
- ◆ Make sure that the cable terminals (2) and the battery terminals (3) are:
  - in good conditions (and not corroded or covered with deposits);
  - covered with neutral grease or vaseline.

If necessary, proceed as follows:

- ◆ Disconnect first the negative (–) and then the positive cable (+).
- ◆ Brush with a wire brush to eliminate any sign of corrosion.
- ◆ Reconnect first the positive (+) and then the negative cable (–).
- ◆ Cover the terminals of the cables and of the battery with neutral grease or vaseline.
- ◆ Put back the rider saddle, see 7.1.1 (REMOVING THE RIDER SADDLE).



2.4.2 RECHARGING THE BATTERY

Carefully read 2.4 (BATTERY).

NOTE If the start relay emits a vibration-type noise when the start pushbutton is pressed "⚷", it is a sure sign that the battery is almost completely flat.

NOTE Do not remove the battery plugs: without plugs the battery may be damaged.

- Remove the battery, see 7.1.7 (REMOVING THE BATTERY).
- Prepare an appropriate battery charger.
- Set the charger for the desired type of recharge (see table).
- Connect the battery to a battery charger.
- Switch on the battery charger.

Type of recharge	Volt (V)	Ampere (A)	Time (hours)
Normal	12	1.2	8 - 10
Quick	12	12	0.5

2.4.3 LONG INACTIVITY OF THE BATTERY

Carefully read 2.4 (BATTERY).

⚠ CAUTION

If the vehicle remains unused for more than twenty days, disconnect the 30A fuses, in order to avoid the deterioration of the battery caused by the current consumption due to the multifunction computer.

The removal of the 30 A fuses requires the setting to zero of the following functions: digital clock and red line setting.

To reset these functions, see 2.3 (MULTIFUNCTION COMPUTER).

If the vehicle remains unused for more than fifteen days, it is necessary to recharge the battery, in order to prevent its sulphation, see 2.4.2 (RECHARGING THE BATTERY):

- Remove the battery, see 7.1.7 (REMOVING THE BATTERY) and put it in a cool and dry place.

It is important to check the charge periodically (about once a month), during the winter or when the vehicle remains unused, in order to prevent the deterioration of the battery.

- Recharge it completely with a normal charge, see 2.4.2 (RECHARGING THE BATTERY).

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

2.5 ELECTRIC COMPONENTS

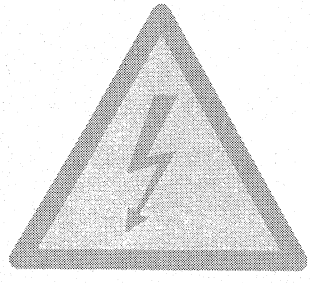
Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

Check after the first 1000 km (625 mi) and successively every 7500 km (4687 mi) or 8 months.

- Position the vehicle on the stand.
- Check all the lighting devices are working.
- Check the direction of the headlight beam is correct, see 6.13 (ADJUSTING THE VERTICAL HEADLIGHT BEAM) and 6.14 (HORIZONTAL ADJUSTMENT OF THE HEADLIGHT BEAM).
- Make sure all connectors are inserted properly.
- Make sure all switches are correctly fastened and in proper working order, see:
  - 6.6.4 (CHECKING THE SIDE STAND AND THE SAFETY SWITCH).
  - 6.16 (CHECKING THE SWITCHES).
- Make sure the air sensor and speedometer sensor are correctly fastened and in proper working order.

⚠ CAUTION

The sensitive area on the sensors must be kept clean at all times. Any mud, dirt etc. on them is liable to alter the measurements and the subsequent data transfer.



2.6 JUMP-STARTING

Carefully read 2.4 (BATTERY).

⚠ WARNING

The vehicle should only be jump-started when the vehicles battery is partially/completely flat and recharging is not possible.
Do not attempt to start the vehicle by pushing or towing it.

The vehicle providing assistance must have a battery (the recharge source) with exactly the same rated voltage (data to be found on the battery) as the battery of the vehicle to be started, see 1.5 (TECHNICAL SPECIFICATIONS).

Follow the procedure below to the letter so as to avoid the danger of the battery exploding and possibly injuring people and/or property (this is liable to compromise the electric components of both vehicles).

- Prepare the auxiliary vehicle, in such a way as to have access to the battery of the same.
- Make sure that the ignition switch is in position "⚿".
- Put back the rider saddle, see 7.1.1 (REMOVING THE RIDER SADDLE).

NOTE Leave the battery cables of both vehicles connected.

⚠ CAUTION

Take care never to let the clamps of one cable touch those of another.

- Remove the red protection element (1).

NOTE Always connect the positive poles (+) first, following the order indicated below.

⚠ WARNING

The jump leads must not be placed near any moving parts on either vehicle.

- Connect one end of jump lead to the positive pole **(+)** of the battery on the vehicle providing assistance (A); and the other end on the positive pole **(+)** of the battery on the vehicle to be started (B).
- Connect one end of the other jump lead to the negative pole **(–)** of the battery on the vehicle providing assistance (A); and earth the other end on the frame (far from the battery) of the vehicle to be started (B).

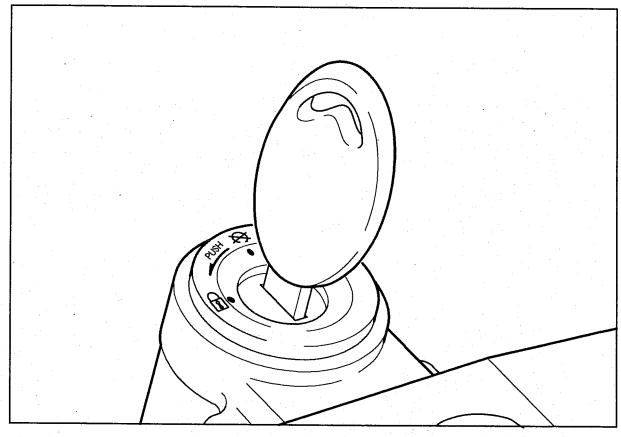
DO NOT CONNECT TO THE NEGATIVE POLE (–).

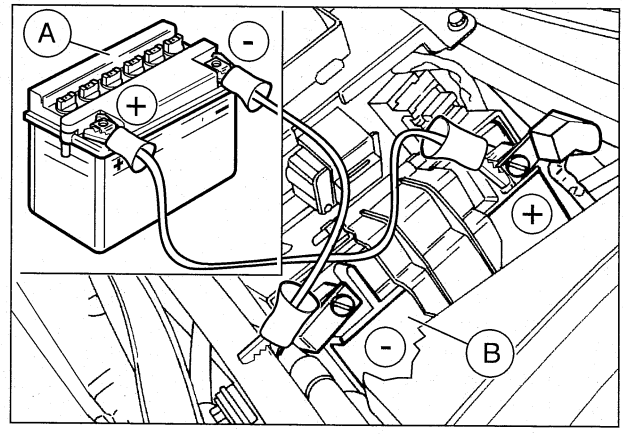
- Start the engine of the auxiliary vehicle.

NOTE During the starting phase, the engine of the auxiliary vehicle must keep running.

- Proceed to the starting of the broken-down vehicle.

NOTE Attempt to start the vehicle for no more than ten seconds at a time, where necessary, repeating the attempt at intervals of approx. one minute.





NOTE Once started, keep both engines running for approx. two minutes.

- Stop both engines.
- Disconnect the negative booster cable (-) from both batteries.
- Disconnect the positive booster cable (+) from both batteries.

2.7 SPARK PLUGS

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

Check the spark plugs every 7500 km (4687 mi) or 8 months, change them every 15000 km (9375 mi) or 16 months.
Periodically remove the spark plugs and clean them carefully, removing carbon deposits; change them if necessary.

In case of use on racetracks, change the spark plugs every 3750 km (2343 mi).

To reach the spark plugs:

⚠ WARNING

Let the engine cool down until it reaches room temperature.

- Remove the air filter casing, see 7.1.6 (REMOVING THE AIR CLEANER CASE).

NOTE The vehicle is equipped with two spark plugs per cylinder.
The following operations refer to one spark plug only, but are valid for both.

To remove and clean the spark plug, proceed as follows:

⚠ WARNING

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

- Remove the cap (1) of the spark plug (2).
- Remove any trace of dirt from the spark plug base.
- Introduce the special spanner provided in the tool kit on the spark plug.
- Insert the 13 mm fork spanner provided in the tool kit in the hexagonal seat of the spark plug spanner.
- Unscrew the spark plug and extract it from its seat, taking care to prevent dust or other substances from getting inside the cylinder.

⚠ CAUTION

This vehicle is fitted with spark plugs featuring platinum-type electrodes.
To clean the spark plugs, do not use wire brushes and/or abrasive products, but only a pressurized air jet.

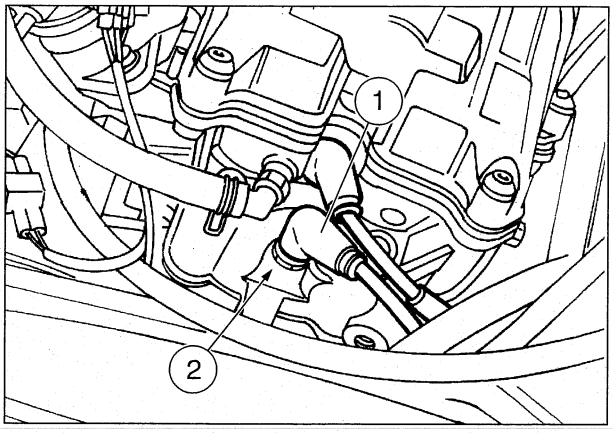
- centre electrode (3);
- insulating (4);
- side electrode (5).

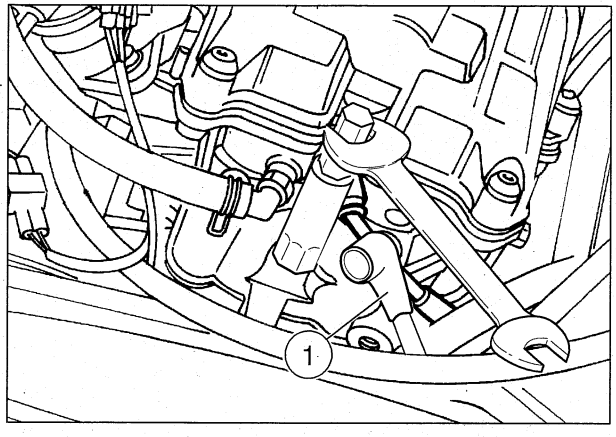
- Make sure that there are neither carbon deposits, nor corrosion marks on the electrodes and on the insulating material; if necessary, clean them with a pressurized air jet.

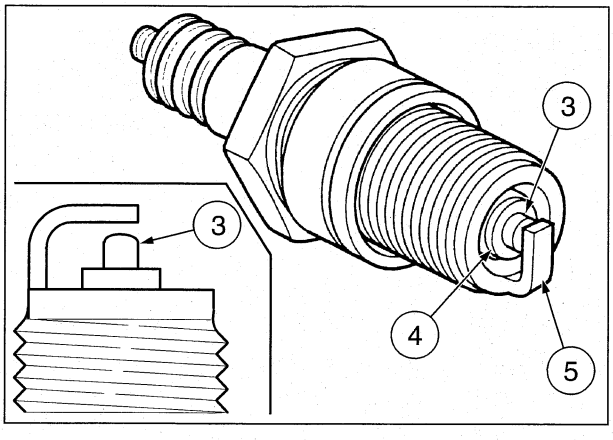
If the spark plug should feature cracks on the insulator, corroded electrodes or excessive deposits, or if the centre electrode (3) has a rounded end (see figure), the spark plug must be replaced.

⚠ CAUTION

You are strongly advised to replace spark plugs with standard plugs, see 1.5 (TECHNICAL SPECIFICATIONS).







⚠ CAUTION

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

Only use the recommended spark plug type, otherwise the performance and service life of the engine may be compromised.

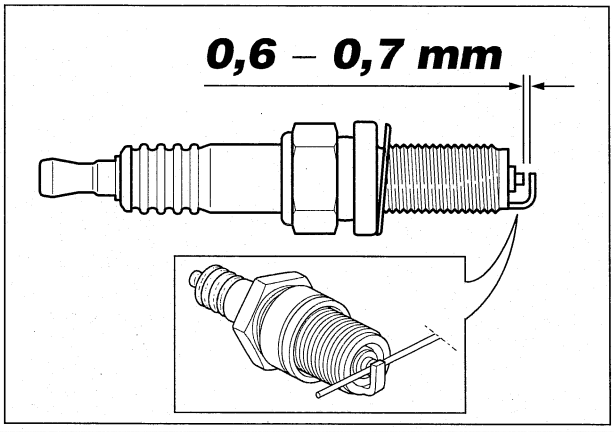
Follow ▶

Follow ▶

⚠ CAUTION

Use a feeler gauge (see figure) to check the distance between the electrodes to avoid damaging the platinum coating.

- Check the distance between the electrodes with a feeler gauge.
  The gap must be in the range **0.6 – 0.7 mm**. Where necessary, adjust it by carefully bending the ground electrode.
- Make sure that the washer is in good conditions. With the washer on, screw the spark plug by hand to avoid damaging the thread.
- Tighten the spark plug by means of the spanner you will find in the tool kit, giving it half a turn to compress the washer.

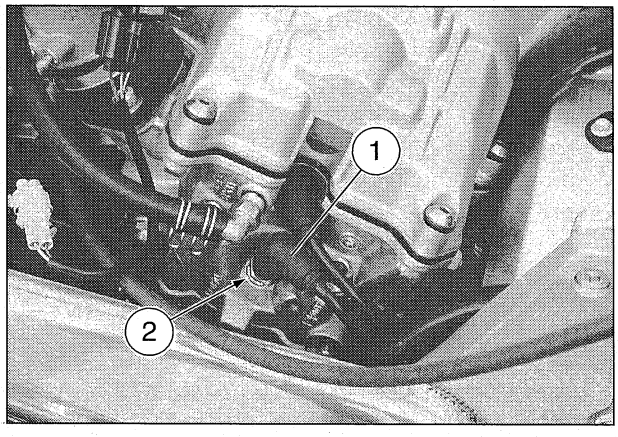


Spark plug driving torque: 20 Nm (2.0 kgm).

⚠ CAUTION

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

- Position the spark plug cap (1) properly, so that it does not come off due to the vibrations of the engine.
- Put back the air filter case.
- Put back the fuel tank.



2.8 LIFTING THE FUEL TANK

Carefully read 1.2.1 (FUEL).

⚠ WARNING

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

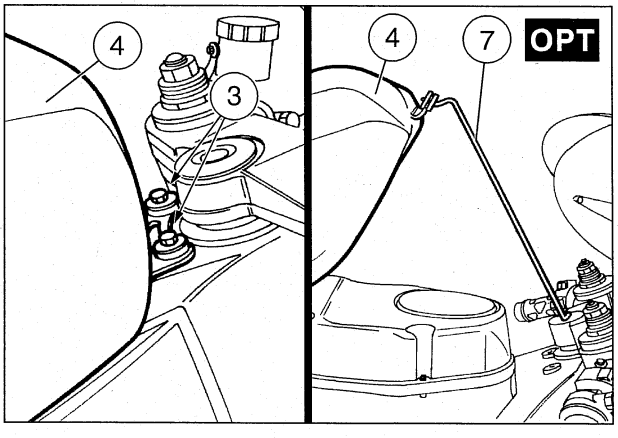
- Remove the passenger seat, see 7.1.2 (UNLOCKING/ LOCKING THE PASSENGER SEAT).
- Put back the rider saddle, see 7.1.1 (REMOVING THE RIDER SADDLE).
- Turn the handlebar, in such a way as to position the front wheel straight, in the driving direction.

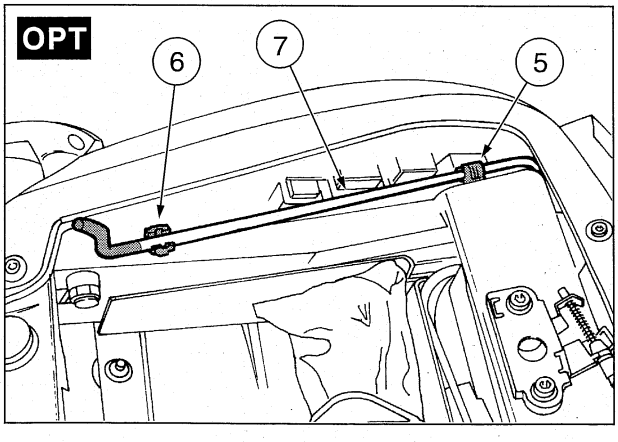
Fuel tank front screw driving torque: 10 Nm (1.0 kgm).

- Unscrew and remove the two screws (3) that fasten the front part of the fuel tank (4).
- OPT Remove the fuel tank support rod (7) from the relevant anchorage seats (5) (6).

NOTE The rubber-covered end of the rod (7) OPT must be introduced in the central hole of the steering pin.

- Lift the front part of the fuel tank (4) and introduce the rod (7) OPT as indicated in the figure.





2.9 DRAINING THE FUEL TANK

Carefully read 1.2.1 (FUEL).

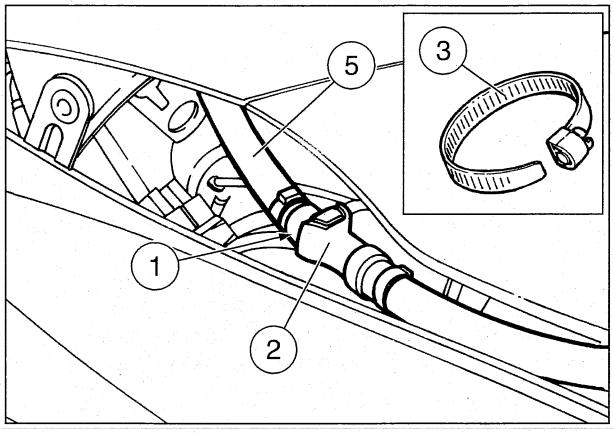
⚠ WARNING

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

Fuel vapours are noxious for your health.
Before proceeding, make sure that the room in which you are working is properly ventilated.
Do not inhale fuel vapours.

Do not smoke and do not use naked flames.

Do not dispose of fuel in the environment.

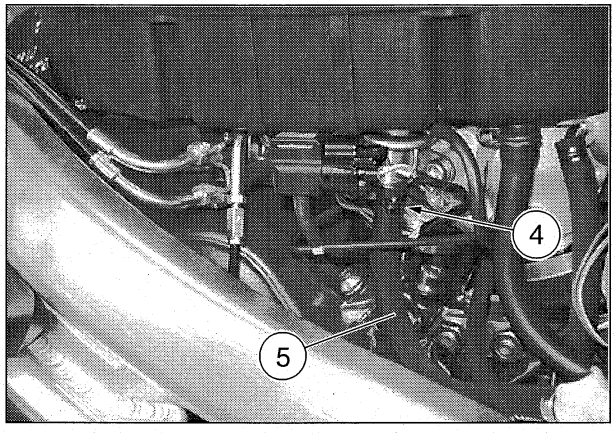


- Stop the engine and wait until it has cooled down.
- Lift the fuel tank, see 2.8 (LIFTING THE FUEL TANK).
- Prepare a container with capacity exceeding the fuel quantity present in the tank and put it on the ground on the left side of the vehicle.

NOTE Place a cloth under the male quick-release coupling (1) to catch any fuel spills.

- Disconnect the male quick-release coupling (1) from the receptacle (2) by pressing the relevant button.

NOTE Prepare a screwdriver-type pipe clamp (3) to replace the original one (special type).



- Loosen the clamp (4) and disconnect the pipe (5).
- Place the free end of the pipe (5) inside the container prepared beforehand.
- Insert the male quick-release coupling (1) of the pipe (5) all the way into the quick-release receptacle (2). The petrol starts draining out immediately.
- Open the tank cap.
- Wait until all the petrol has drained out of the tank.

Once all the petrol has drained out:

- Refit the free end of the pipe (5), securing it in place using the clamp (3).
- Insert the male quick-release coupling (1) into the receptacle (2).

NOTE Make sure the male quick coupling (1) has been correctly inserted into the receptacle (2).

- Put back the fuel tank.
- Close the tank cap again.

2.10 AIR CLEANER

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

Check the air cleaner every 7500 km (4687 mi) or 12 months, change it every 15000 km (9375 mi) or more frequently if the vehicle is used on dusty or wet roads.
It is possible to clean the air cleaner partially after using the vehicle on this kind of roads.

⚠ CAUTION

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 clean the filtering element with petrol or solvents, since they may cause a fire in the fuel supply system, with serious danger for the persons in the vicinity and for the vehicle.

REMOVAL

◆ Lift the fuel tank, see 2.8 (LIFTING THE FUEL TANK).

Filter case cover screw driving torque: 2 Nm (0.2 kgm).

◆ Unscrew and remove the seven screws (1) that fasten the filter case cover (2).
◆ Remove the filter case cover (2).
◆ Extract the air cleaner (3).

⚠ CAUTION

Plug the opening with a clean cloth, in order to prevent any foreign matter to get ito.

PARTIAL CLEANING

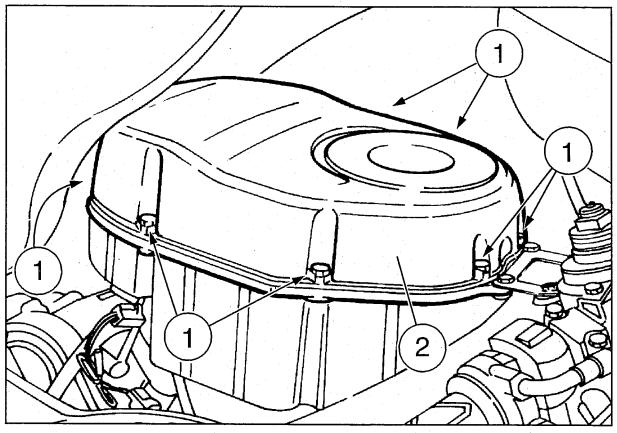
⚠ CAUTION

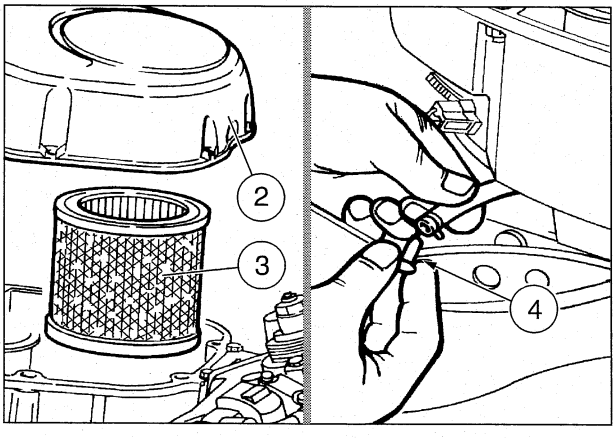
Do not press or strike the metal net of the air cleaner (3).
Do not use screwdrivers or alike.

◆ Seize the air cleaner (3) vertically and strike it more than once on a clean surface.
◆ If necessary, clean the air cleaner (3) with a compressed air jet (directing it from the inside towards the outside of the filter).
◆ Clean the outer part of the air cleaner (3) with a clean cloth.

CHANGING

◆ Replace the air cleaner (3) with a new one of the same type.
◆ Every 7500 km (4687 mi), remove the plug (4). Empty its content into a container and deliver it to a salvage centre.





⚠ CAUTION

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

Make sure that the filtering element is positioned correctly, in such a way as to prevent non-filtered air from entering.
Remember that the untimely wear of the piston segments and the cylinder may be caused by a faulty or uncorrectly positioned filtering element.

⚠ CAUTION

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.

2.11 ACCELERATOR

Check after the first 1000 km (625 mi) and successively every 7500 km (4687 mi) or 8 months.

2.11.1 CHECKING THE OPERATION OF THE ACCELERATOR CONTROL

⚠ WARNING

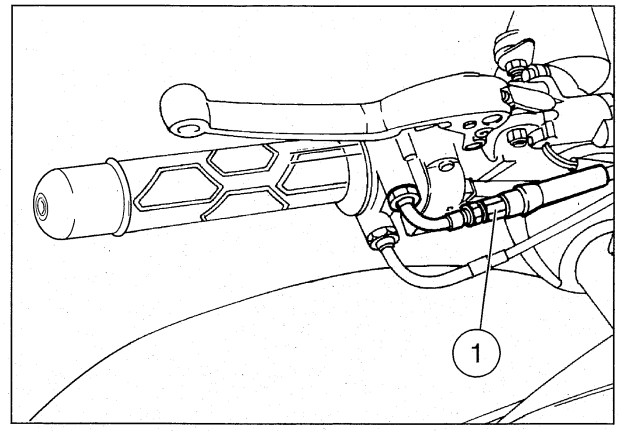
The use of the vehicle with damaged, excessively bent or twisted accelerator cable may hinder the regular operation of the accelerator and make you lose control of the vehicle while riding.

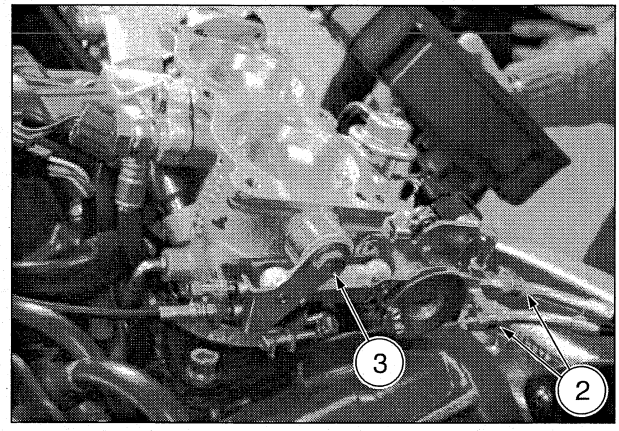
Make sure that the rotation of the handlebar does not modify the engine idle speed and that the throttle grip returns smoothly and automatically to its original position after being released.

If necessary, proceed as follows:

NOTE For the lubrication of the components use the specific lubricant available on the market.

- Check the correct position and the lubrication of the following components:
  - sheath;
  - throttle grip adjuster (1);
  - throttle body adjuster (2);
  - throttle body pin (3);
  - cable couplings (ends);
  - accelerator control.
- Check the idle speed, 2.11.2 (ADJUSTING THE ENGINE IDLING SPEED).
- Check the accelerator control adjustment, 2.11.3 (ADJUSTING THE ACCELERATOR CONTROL).





2.11.2 ADJUSTING THE ENGINE IDLING SPEED

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.
- Position the gear lever in neutral (green warning light "N" on).
- Check the engine idling rpm on the revolution counter. The engine idling speed must be about 1250 ± 100 rpm.

If necessary, proceed as follows:

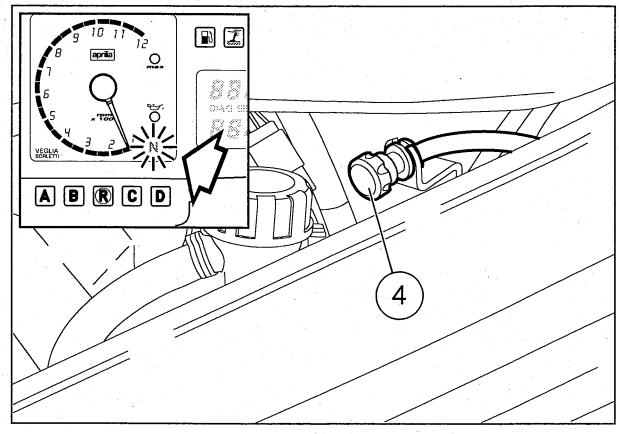
- Turn the adjusting knob (4).

– BY SCREWING IT (clockwise), you increase the rpm.

– BY UNSCREWING IT (anticlockwise), you decrease the 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.

For further information, see section 4 (FUEL SUPPLY SYSTEM).



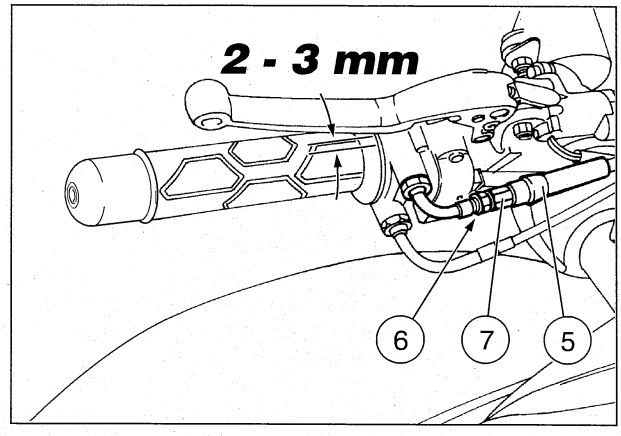
2.11.3 ADJUSTING THE ACCELERATOR CONTROL

The idle stroke of the throttle grip must be **2 – 3 mm**, measured on the edge of the grip itself.
If this is not the case, proceed as follows:

- Position the vehicle on the stand.
- Withdraw the protection element (5).
- Loosen the lock nut (6).
- Rotate the adjuster (7) in such a way as to restore the prescribed value.
- After the adjustment, tighten the lock nut (6) and check the idle stroke again.
- Put back the protection element (5).

⚠ CAUTION

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



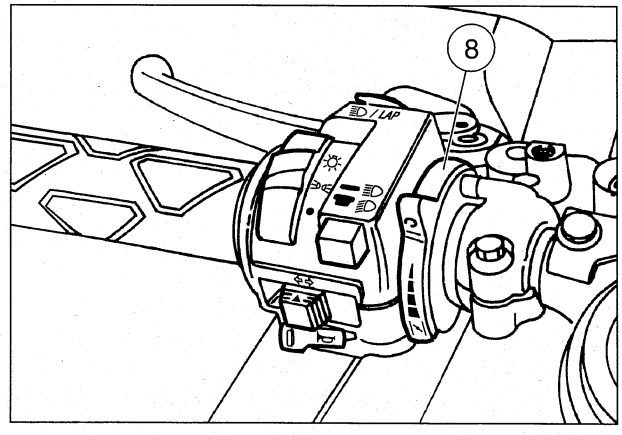
2.12 COLD START CABLE

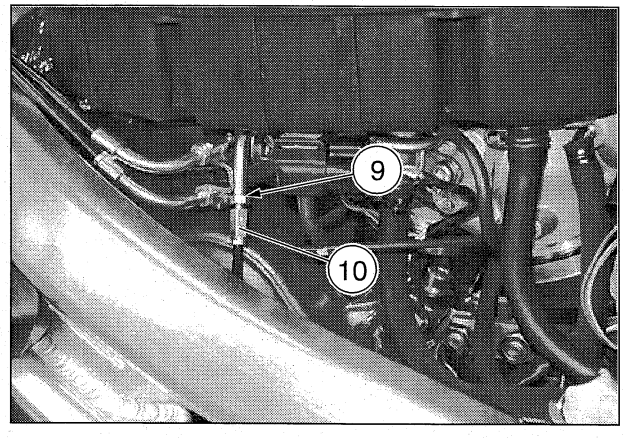
The cold start cable must be adjusted so that the hand lever (8) has **2 – 3 mm** of freeplay. If adjustment is necessary, proceed as follows:

- Position the vehicle on the stand.
- Lift the fuel tank, see 2.8 (LIFTING THE FUEL TANK).
- Loosen the lock nut (9).
- Rotate the adjuster (10) in such a way as to restore the prescribed value.
- After the adjustment, tighten the lock nut (9) and check the idle stroke again.

⚠ CAUTION

Once the adjustment has been made, check that the rotation of the handlebar does not influence the engine rpm.





2.13 CHECKING THE ENGINE OIL LEVEL AND TOPPING UP

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.2 (ENGINE OIL).

Periodically check the engine oil level, change the oil after the first 1000 km (625 mi) and successively every 7500 km (4687 mi), or 8 months, see 2.14 (CHANGING THE ENGINE OIL AND THE OIL FILTER).
In case of use on racetracks, change every 3750 km (2343 mi).

For the check, proceed as follows:

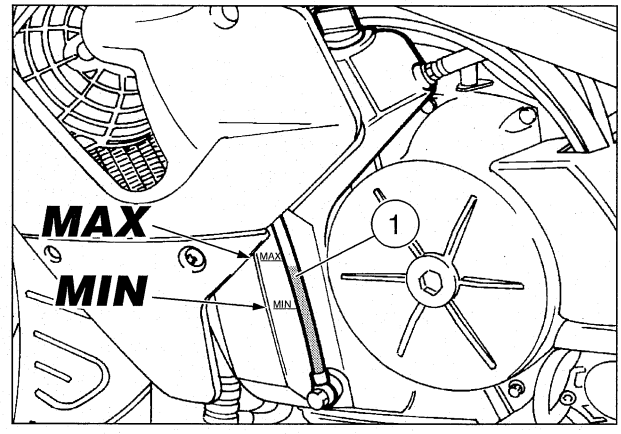
NOTE Position the vehicle on the side stand on firm and level ground.

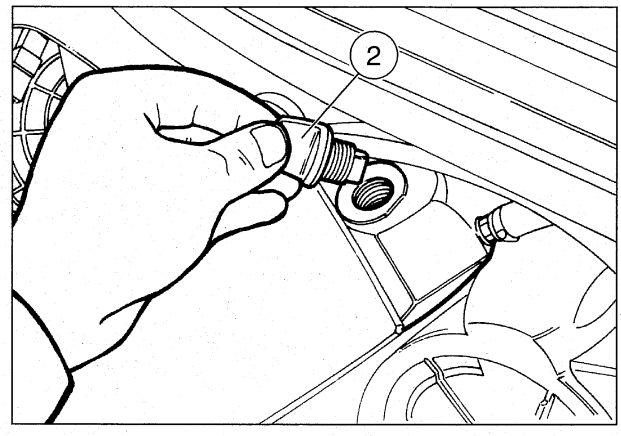
⚠ CAUTION

The engine oil level must be checked with warm engine.
If the check is carried out with cold engine, the oil level may temporarily lower below the "MIN" mark.

This is not a problem, provided that the engine oil pressure warning light LED "🛢" does not come on.

- Start the engine.
- Allow the engine to idle for about 15-20 minutes, or ride the vehicle on a country road for approximately 15 km (9.5 mi).
- Stop the engine.
- Keep the vehicle in vertical position, with the two wheels resting on the ground.
- Check the oil level in the transparent pipe (1) through the appropriate slot provided on the left fairing.
  MAX = maximum level
  MIN = minimum level.
  The difference between "**MAX**" and "**MIN**" amounts to approximately 460 cm^3.
- The level is correct when the oil almost reaches the "**MAX**" mark.





⚠ CAUTION

Never exceed the "MAX" mark, nor leave the oil below the "MIN" mark, in order to avoid serious damage to the engine.
Do not put additives or other substances into the oil.
If you use a funnel or other similar items, make sure that they are perfectly clean.

If necessary, top up the engine oil by proceeding as follows:

- Unscrew and remove the filling plug (2).
- Top up the tank and restore the correct level, see 1.6 (LUBRICANT CHART).

2.14 CHANGING THE ENGINE OIL AND THE OIL FILTER

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.2 (ENGINE OIL).

Periodically check the engine oil level, see 2.13 (CHECKING THE ENGINE OIL LEVEL AND TOPPING UP) change the oil after the first 1000 km (625 mi) and successively every 7500 km (4687 mi) or 8 month.

⚠ CAUTION

If the vehicle is used in dusty areas, change the oil more frequently.
In case of use on racetracks, change every 3750 km (2343 mi).

ENGINE OIL DRAIN

NOTE The oil flows out completely and without problems when it is warm and therefore more fluid: to achieve this condition, the engine should run for approximately twenty minutes.

⚠ WARNING

When warmed up, the engine contains hot oil; therefore, while carrying out the operations described here below be particularly careful, in order to avoid burns.

NOTE Position the vehicle on the side stand on firm and level ground.

- Position a container (1) with more than 4000 cm^3 capacity in correspondence with the drain plug (2) positioned on the tank.

Driving torque of the engine oil drain plug positioned on the tank: 15 Nm (1.5 Kgm).

- Unscrew and remove the drain plug (2) positioned on the tank.
- Unscrew and remove the filling plug (3).
- Drain the oil and let it drip into the container (1) for a few minutes.
- Check and if necessary replace the sealing washer of the drain plug (2) positioned on the tank.
- Screw and tighten the drain plug (2) on the tank.

Driving torque of the engine oil drain plug positioned on the tank: 15 Nm (1.5 Kgm).

NOTE Upon reassembly, apply LOCTITE® 572 to the drain plug thread.

- Move the container (1) 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 into the container (1) for a few minutes.

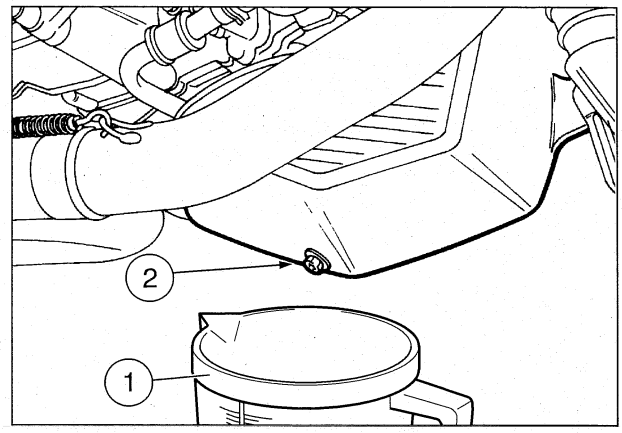
⚠ CAUTION

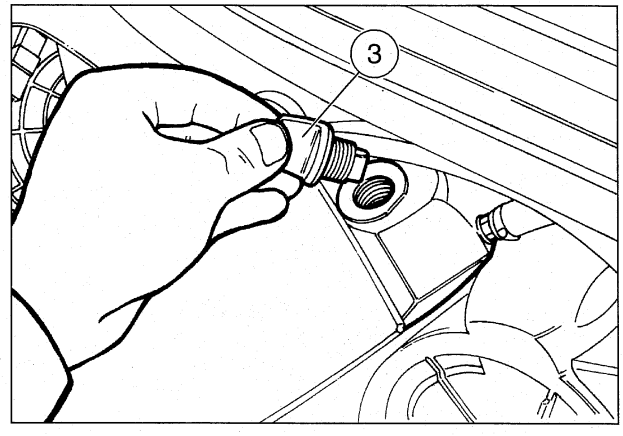
Do not dispose of the oil in the environment.
Deliver it to or have it collected by the nearest oil salvage center or by the supplier.

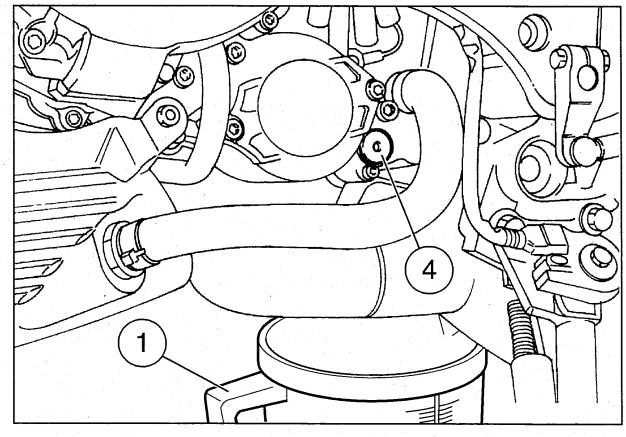
- Remove the metal residues from the drain plug (4) magnet.
- Screw and tighten the drain plug (4).

Driving torque of the drain plug positioned on the engine: 12 Nm (1.2 kgm).

Follow ▶







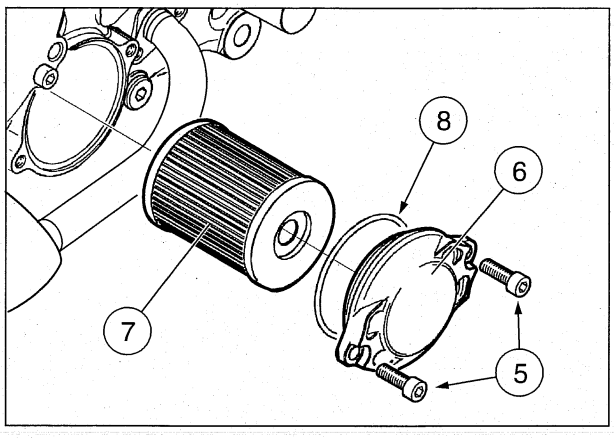
Follow ▶

CHANGING THE ENGINE OIL FILTER

Change the engine oil filter after the first 1000 km (625 mi) and successively every 7500 km (4687 mi) (or every time you change the oil).

Driving torque of the engine oil filter flange screws: 10 Nm (1.0 kgm).

- ◆ Unscrew the two screws (5) and remove the cover (6).
- ◆ Remove the engine oil filter (7).



⚠ CAUTION

Do not use filters that have already been used.

- ◆ Spread an oil film on the sealing ring (8) of the new engine oil filter.
- ◆ Fit the new engine oil filter.
- ◆ Put back the cover (6), screw and tighten the two screws (5).

CLEANING THE ENGINE OIL FILTER ON THE TANK

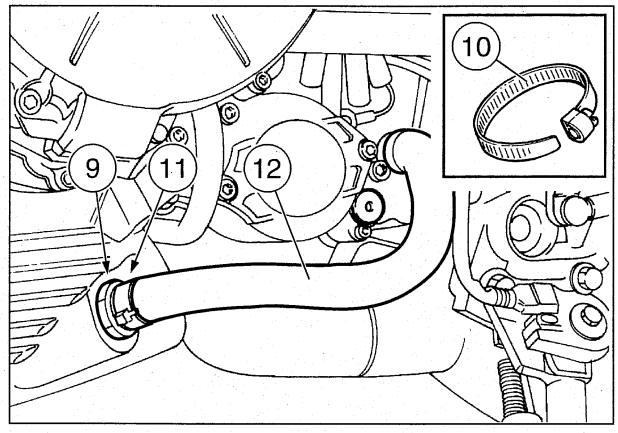
Clean the engine oil filter (9) on the tank after the first 1000 km (625 mi) and successively every 15000 km (9375 mi) (or every two engine oil changes).

NOTE Prepare a screwdriver-type pipe clamp (10) to replace the original one (special type).

- ◆ Loosen the clamp (11) and disconnect the pipe (12).
- ◆ Unscrew and remove the engine oil filter (9) positioned on the tank and clean it with a jet of compressed air.
- ◆ Check the seal of the engine oil filter (9) positioned on the tank; screw and tighten it.

Driving torque of engine oil filter on tank: 30 Nm (3.0 kgm).

- ◆ Connect the pipe (12) and tighten the new clamp (10).

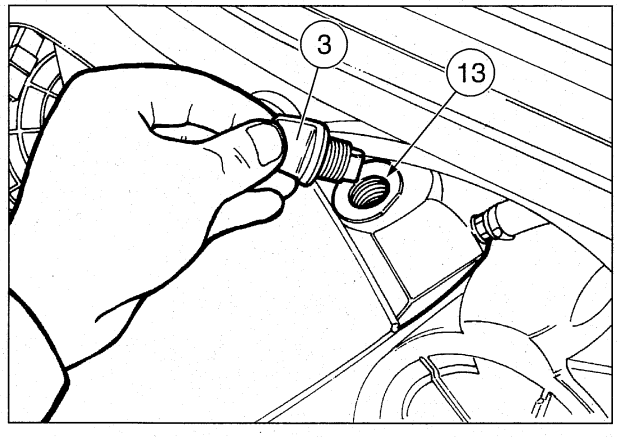


⚠ CAUTION

Do not put additives or other substances into the oil. If you use a funnel or other similar items, make sure that they are perfectly clean.

CHANGING THE ENGINE OIL

- ◆ Pour about 3500 cm^3 of engine oil through the filling opening (13), see 1.6 (LUBRICANT CHART).
- ◆ Tighten the filling plug (3).
- ◆ Start the engine and let it idle for about one minute, in order to ensure the filling up of the engine oil circuit.
- ◆ Check the oil level and top up if necessary, see 2.13 (CHECKING THE ENGINE OIL LEVEL AND TOPPING UP).



2.15 CHECKING AND TOPPING UP COOLANT

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.5 (COOLANT).

Before departure, check the coolant level, change it every two years.

⚠ CAUTION

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

◆ Stop the engine and wait until it has cooled down.

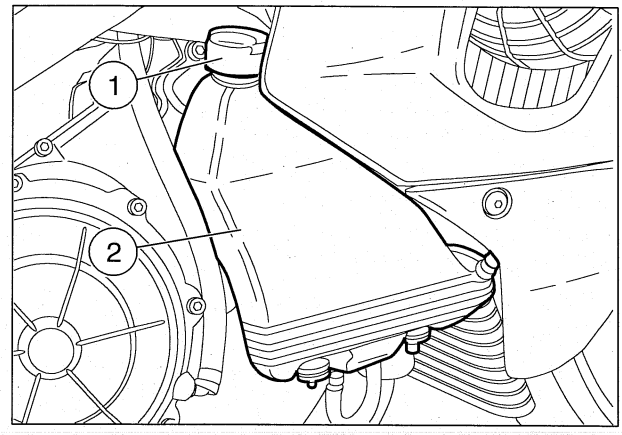
NOTE Position the vehicle on the side stand on firm and level ground.

◆ Rotate the handlebar completely leftwards.
◆ Make sure that the level of the fluid contained in the expansion tank (2) is included between the "**MIN**" and "**MAX**" marks stamped on the transparent pipe (3).

MAX= maximum level
MIN= minimum level

If not, proceed as follows:

◆ Unscrew and remove the filling cap (1).



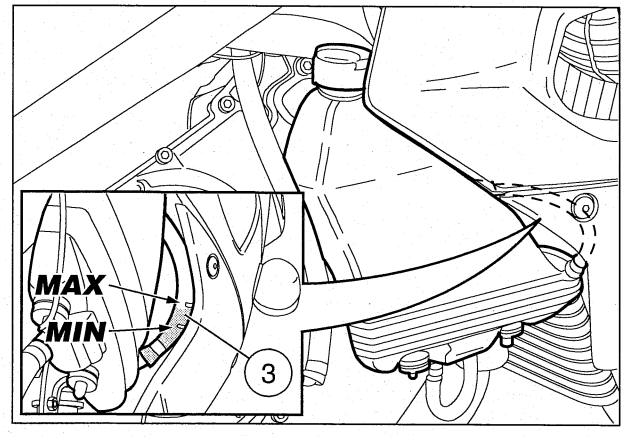
⚠ WARNING

The coolant is noxious: do not swallow it; if the coolant gets in contact with the skin or the eyes, it can cause serious irritations.
Do not use your fingers or any other object to check if there is enough coolant.

⚠ CAUTION

Do not put additives or other subtances into the fluid. If you use a funnel or other similar items, make sure that they are perfectly clean.

◆ Top up the expansion tank by adding coolant, see , until this almost reaches the "**MAX**" level.
Do not exceed this level, otherwise the fluid will flow out while the engine is running.
◆ Put back the filling cap (1).



⚠ CAUTION

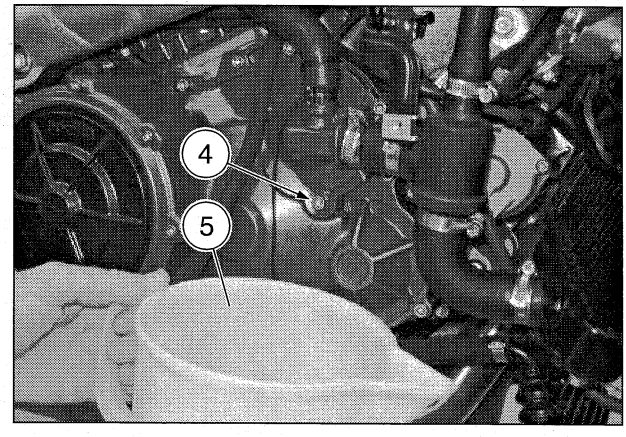
In case of excessive consumption of coolant and in case the tank (2) remains empty, make sure that there are no leaks in the circuit.

2.16 CHANGING THE COOLANT

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.5 (COOLANT).

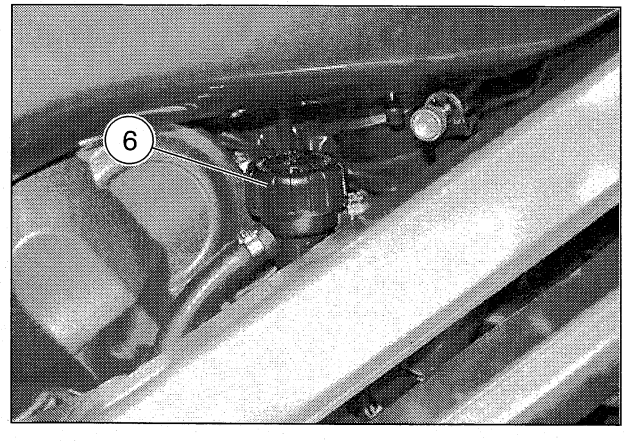
Replace the coolant every two years.

◆ Remove the side fairings, see 7.1.25 (REMOVING THE SIDE FAIRINGS).
◆ Partially remove the expansion tank, see 5.10 (PARTIAL REMOVING THE EXPANSION TANK).
◆ Place a container (5) under the drain screw (4) to catch the coolant (capacity over 2.5 ℓ).
◆ Unscrew and remove the drain screw (4) retrieving the copper washer.



⚠ CAUTION

Do not remove the filler cap (6) when the engine is hot as the coolant is under pressure and is very hot.



Follow ▶

Follow ▶

- Remove the filler cap (6) followed by the expansion tank cap (1) to help the coolant out.
- Once all the coolant has drained out, move the container (5) under the right-hand radiator.

Driving torque of the coolant drain plug positioned on the radiator: 10 Nm (1.0 kgm).

- Unscrew and remove the drain plug (7), retrieving the aluminium washer.
- Once all the coolant has drained out, move the container under the left-hand radiator.
- Unscrew and remove the drain plug (8), retrieving the aluminium washer.

DO NOT DISPOSE OF THE FLUID IN THE ENVIRONMENT.

NOTE When reassembling, apply LOCTITE® 574 on the thread of the drain screw (4).

- Reassemble the drain screw (4) with a new copper washer.

Driving torque of the coolant drain screw positioned on the engine: 12 Nm (1.2 kgm).

NOTE When reassembling, apply LOCTITE® 572 on the thread of the drain plug (7) (8).

- Reassemble the two radiator drain plugs (7) (8) with two new aluminium washers.

Driving torque of the coolant drain plug positioned on the radiator: 10 Nm (1.0 kgm).

- Top up through the filler neck (9) until full.
- Squeeze and release the couplings (10) (11) a few times with your hands so as to create a slight pressure and enable the coolant to flow into the pipes.
- Top up again until full.

NOTE The level is correct when the coolant stabilizes immediately below the filler neck (9).

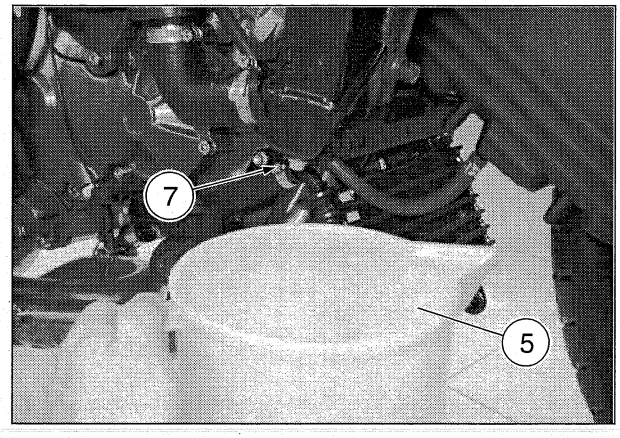
- Refit the filler cap (6).
- Top up the coolant in the expansion tank, see 2.15 (CHECKING AND TOPPING UP COOLANT).
- Start the engine and let it run for a few minutes, then allow it to cool and check the level of coolant in the expansion tank again.
- If necessary, top up, see 2.15 (CHECKING AND TOPPING UP COOLANT).

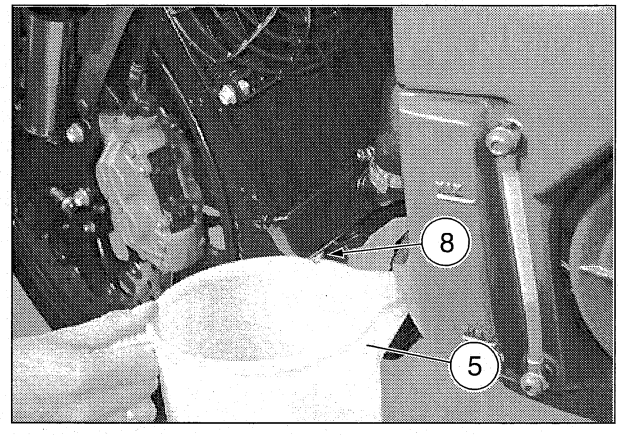
Total quantity:

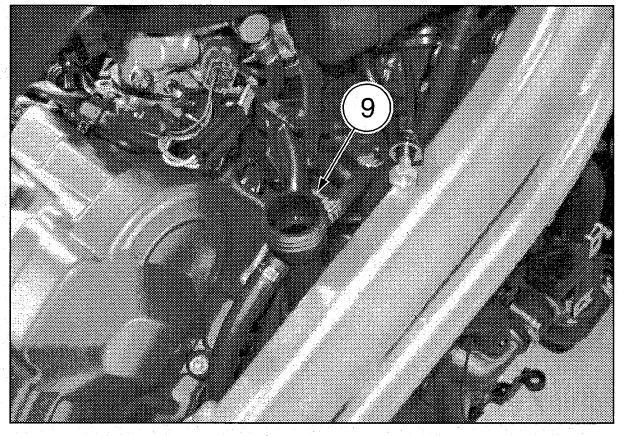
2,5 ℓ (including the expansion tank).

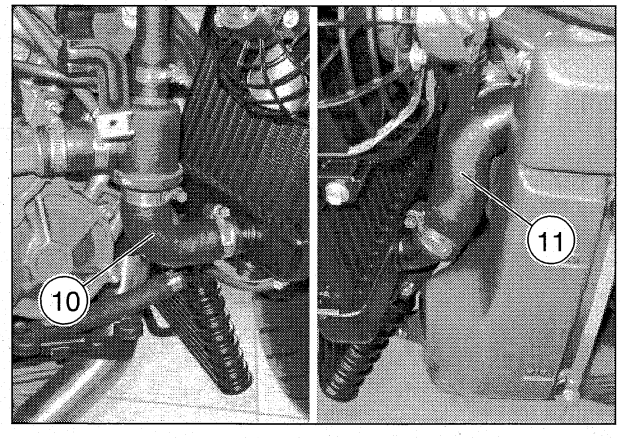
NOTE The bleeding of the system is not required for this vehicle.

For further information, see section 5 (COOLING SYSTEM).









2.17 CHECKING THE FRONT BRAKE FLUID LEVEL AND TOPPING UP

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.4 (BRAKE FLUID).

Check the brake fluid every 7500 km (4687 mi) or 8 months, change it every two years.

⚠ CAUTION

If the brake lever features excessive free play, if it is excessively spongy or in the event of air bubbles in the circuit, bleed the system, see 2.20 (BLEEDING THE BRAKING SYSTEMS).

The leak of brake fluid damages painted or plastic surfaces.

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

Do not use or mix different types of silicone or oil-based liquids.

Do not use brake fluids taken from old containers, or not sealed.

Prevent water or dust from accidentally getting into the circuit.

CHECK

NOTE Position the vehicle on firm and flat ground.

- Position the vehicle on the stand.
- Turn the handlebar completely rightwards.
- Make sure that the fluid level exceeds the "**MIN**" mark.

MIN= minimum level.
MAX= maximum level.

If the fluid does not reach at least the "**MIN**" mark:

⚠ CAUTION

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

- Check the brake pad wear, see 2.27 (CHECKING THE BRAKE PAD WEAR) and the disc wear.

If the pads and/or the disc do not need replacing, provide for topping up.

TOPPING UP

⚠ CAUTION

The brake fluid may flow out of the tank.
Do not operate the front brake lever if the screws (1) are loose or, most important, if the brake fluid tank cover has been removed.

- Unscrew the two screws (1) of the brake reservoir (2) by means of a short, cross-headed screwdriver.

⚠ WARNING

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

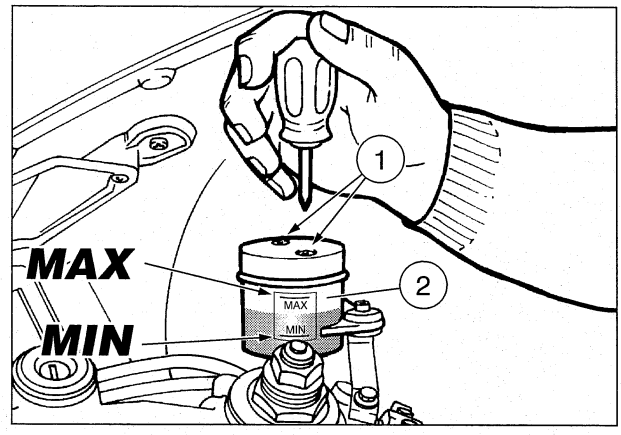
- Raise and remove the cover (3) together with the screws (1) and the gasket (4).

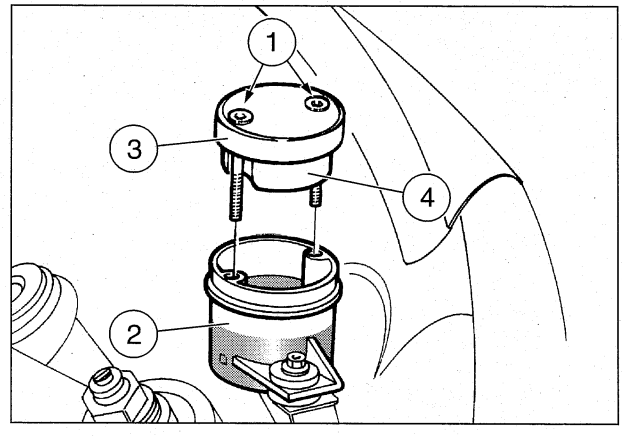
NOTE In order not to spill the brake fluid while topping up, do not shake the vehicle.

⚠ CAUTION

Do not put additives or other subtances into the fluid.
If you use a funnel or other similar items, make sure that they are perfectly clean.

- Fill the tank (2) with brake fluid, see , until reaching the correct level between the "**MIN**" and "**MAX**" marks.





⚠ CAUTION

Do not exceed the "MAX" level while topping up.
It is advisable to top up until reaching the "MAX" level only with new pads. When the disc pads wear out, the level of the fluid decreases progressively to compensate for their wear.

Do not reach the "MAX" level with worn out pads, since this will cause a fluid outflow when the pads are changed.

Check the braking efficiency.

- To reassemble the components, follow the reverse order.

2.18 CHECKING AND TOPPING UP THE REAR BRAKE FLUID

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.4 (BRAKE FLUID).

Check the brake fluid every 7500 km (4687 mi) or 8 months, change it every two years.

⚠ CAUTION

If the brake lever features excessive free play, if it is excessively spongy or in the event of air bubbles in the circuit, bleed the system, see 2.20 (BLEEDING THE BRAKING SYSTEMS).

The leak of brake fluid damages painted or plastic surfaces.
Before setting out, make sure that the hoses are not twisted or holed and that there are no leakage from the connectors.

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

Prevent water or dust from accidentally getting into the circuit.

CHECK

NOTE Position the vehicle on firm and flat ground.

◆ Make sure that the fluid level exceeds the "**MIN**" mark.
MIN= minimum level
MAX= maximum level

◆ If the fluid does not reach at least the "**MIN**" mark:

⚠ CAUTION

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

◆ Check the brake pad wear, see 2.27 (CHECKING THE BRAKE PAD WEAR) and the disc wear.

If the pads and/or the disc do not need replacing, provide for topping up.

TOPPING UP

⚠ CAUTION

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.

⚠ WARNING

Avoid any prolonged exposure of the brake fluid to the air.

The brake fluid is hygroscopic and when in contact with the air it absorbs its humidity.
Leave the brake fluid tank open ONLY for the time necessary for topping up.

◆ Unscrew and remove the plug (1).

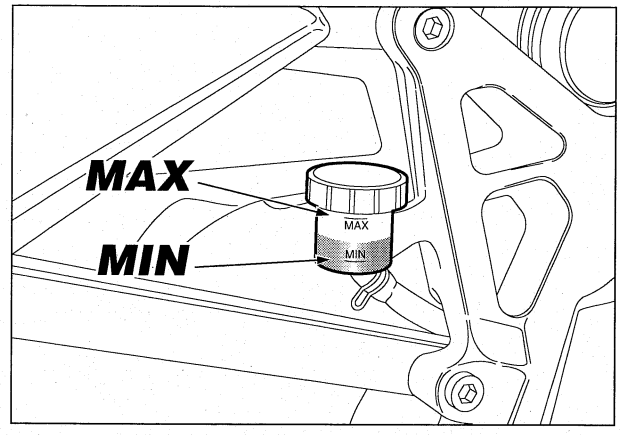
NOTE In order not to spill the brake fluid while topping up, keep the fluid in the tank parallel to the tank rim (in horizontal position).

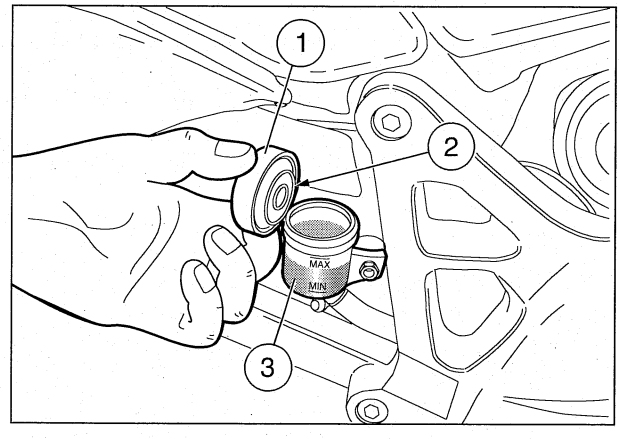
◆ Remove the gasket (2).

⚠ CAUTION

Do not put additives or other subtances into the fluid. If you use a funnel or other similar items, make sure that they are perfectly clean.

◆ Fill the tank (3) with brake fluid, see 1.6 (LUBRICANT CHART), until reaching the correct level between the "**MIN**" and "**MAX**" marks.





⚠ CAUTION

It is advisable to top up until reaching the "MAX" level only with new pads. When the disc pads wear out, the level of the fluid decreases progressively to compensate for their wear.

Do not reach the "MAX" level with worn out pads, since this will cause a fluid outflow when the pads are changed.

Check the braking efficiency.

◆ To reassemble the components, follow the reverse order.

2.19 CHECKING AND TOPPING UP THE CLUTCH FLUID

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.6 (CLUTCH FLUID).

Check the clutch fluid every 7500 km (4687 mi) or 8 months change it every two years.

⚠ CAUTION

If the clutch control lever features excessive free play, if it is excessively spongy or in the event of air bubbles in the circuit, bleed the system, see 2.21 (BLEEDING THE CLUTCH SYSTEMS).

The leak of cluth fluid damages painted or plastic surfaces.
Before setting out, make sure that the hoses are not twisted or holed and that there are no leakage from the connectors.

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

Prevent water or dust from accidentally getting into the circuit.

CHECK

NOTE Position the vehicle on firm and flat ground.

- Turn the handlebar completely rightwards.
- Make sure that the fluid level exceeds the "**MIN**" mark.

  MIN= minimum level.

  MAX= maximum level.
- If the fluid does not reach the "**MIN**" mark, provide for topping up.

TOPPING UP

⚠ CAUTION

The fluid may flow out.
Do not operate the clutch control lever if the reservoir plug is loose or has been removed.

⚠ WARNING

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

- Unscrew and remove the plug (1).

NOTE Do not shake the vehicle, in order not to spill fluid while topping up.

- Remove the gasket (2).

⚠ CAUTION

Do not put additives or other subtances into the fluid.
If you use a funnel or other similar items, make sure that they are perfectly clean.

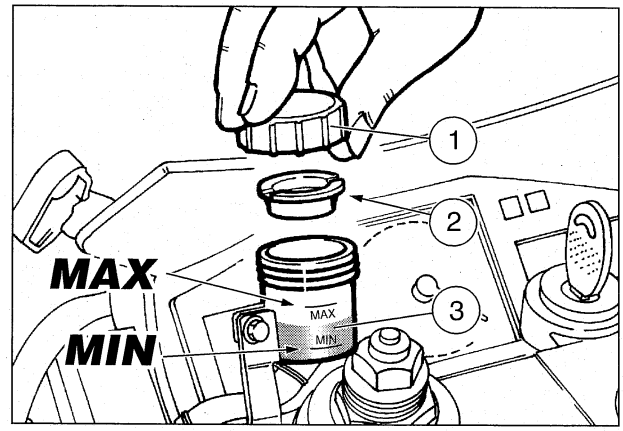
- Top up the reservoir (3) by adding clutch fluid, see 1.6 (LUBRICANT CHART), until reaching the correct level included between the "**MIN**" and "**MAX**" marks.

⚠ CAUTION

Do not exceed the "MAX" level while topping up.

Check the clutch efficiency.

- To reassemble the components, follow the reverse order.



2.20 BLEEDING THE BRAKING SYSTEMS

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.4 (BRAKE FLUID).

Bleed the braking system after the first 1000 km (625 mi). 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 revealed by the "sponginess" of the brake lever and by the reduced braking capacity.

⚠ CAUTION

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

DO NOT DISPOSE OF THE FLUID IN THE ENVIRONMENT.

⚠ WARNING

Considering the danger for both rider and vehicle, it is absolutely essential to bleed the hydraulic circuit once the brakes have been refitted and the braking system restored to its normal conditions. Proceed as follows:

NOTE Only for the front braking system.
First bleed the system using the bleeder (1) located on the pump, and then using the one (2) located on the caliper.

- Top up the brake fluid tank, see 2.17 (CHECKING THE FRONT BRAKE FLUID LEVEL AND TOPPING UP) and 2.18 (CHECKING AND TOPPING UP THE REAR BRAKE FLUID).
- Remove the plastic protection cap.

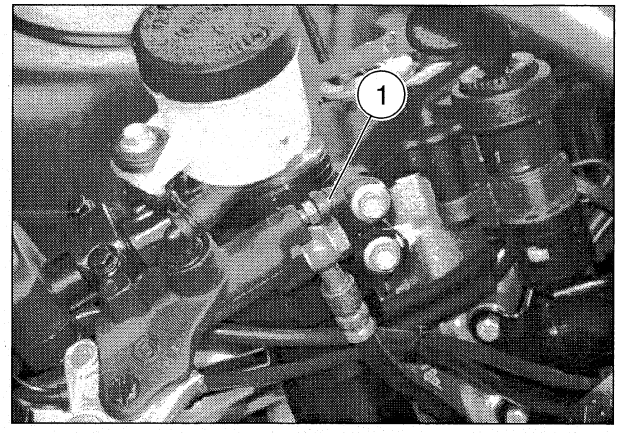
Brake caliper bleeder valve driving torque: 15 Nm (1.5 Kgm).

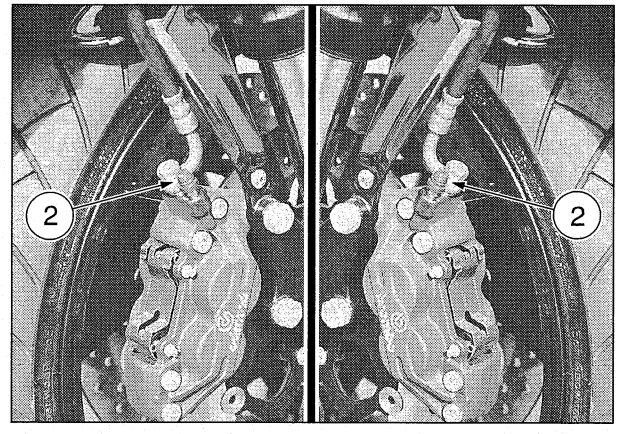
- Insert a transparent plastic tube on the bleeder (1) on the pump and then on the bleeder (2) or (3) on the caliper and put the other end of the tube in a container.
- Rapidly pull and release the lever several times, then keep it completely pulled.
- Loosen the bleeder a quarter turn so that the brake fluid flows into the container; this eliminates the tension on the brake lever, allowing it to touch 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.

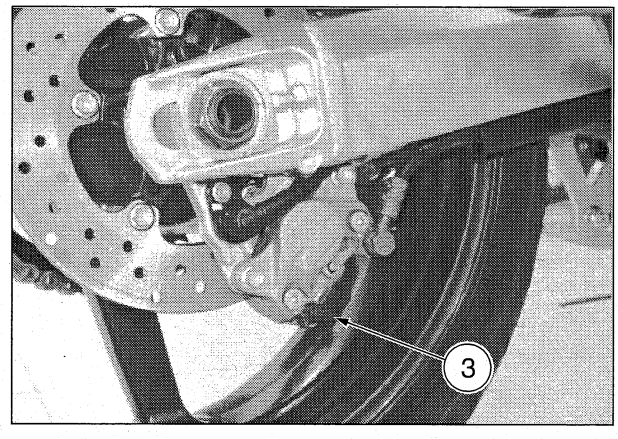
NOTE During the bleeding of the braking system, fill the tank with as much brake fluid as needed.
Make sure that the brake fluid is always present in the tank during the operation.

- Tighten the bleeder and remove the plastic tube.

Brake caliper bleeder valve driving torque:15 Nm (1.5 Kgm).







- Top up the brake fluid tank to the right level, see 2.17 (CHECKING THE FRONT BRAKE FLUID LEVEL AND TOPPING UP) and 2.18 (CHECKING AND TOPPING UP THE REAR BRAKE FLUID).
- Refit the rubber protection cap.

2.21 BLEEDING THE CLUTCH SYSTEMS

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.6 (CLUTCH FLUID).

Bleed the braking system after the first 1000 km (625 mi). 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 clutch cylinder.
The presence of air is revealed by the "sponginess" of the clutch lever and by the reduced the capacity.

⚠ CAUTION

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

DO NOT DISPOSE OF THE FLUID IN THE ENVIRONMENT.

⚠ WARNING

Considering the danger for both rider and vehicle, it is absolutely essential to bleed the hydraulic circuit once the clutch cylinder have been refitted and the system restored to its normal conditions. Proceed as follows:

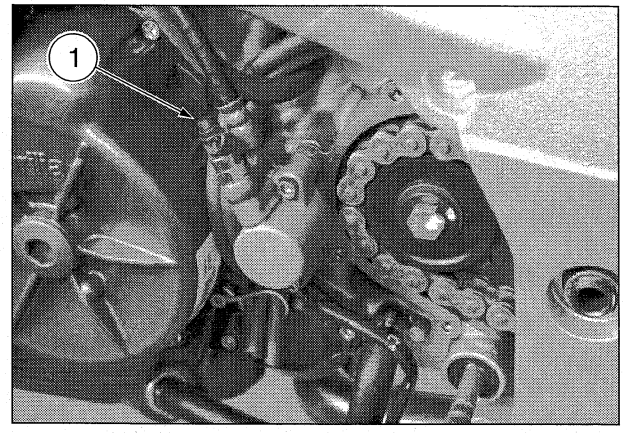
- Top up the clutch fluid tank, see 2.19 (CHECKING AND TOPPING UP THE CLUTCH FLUID).
- Remove the pinion cover, see 3.2.3 (REMOVE THE PINION COVER).
- Remove the plastic protection cap.
- Insert a transparent plastic tube on the bleeder (1) and put the other end of the tube in a container.
- Rapidly pull and release the lever several times, then keep it completely pulled.
- Loosen the bleeder a quarter turn so that the clutch fluid flows into the container; this eliminates the tension on the clutch lever, allowing it to touch 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.

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

- Tighten the bleeder and remove the plastic tube.

Clutch control cylinder bleeder valve driving torque: 15 Nm (1.5 Kgm).

- Top up the clutch fluid tank to the right level, see 2.19 (CHECKING AND TOPPING UP THE CLUTCH FLUID).
- Refit the rubber protection cap.



2.22 CHANGING THE FRONT BRAKE FLUID

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.4 (BRAKE FLUID).

Change the front brake fluid every two year.

⚠ CAUTION

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

DO NOT DISPOSE OF THE FLUID IN THE ENVIRONMENT.

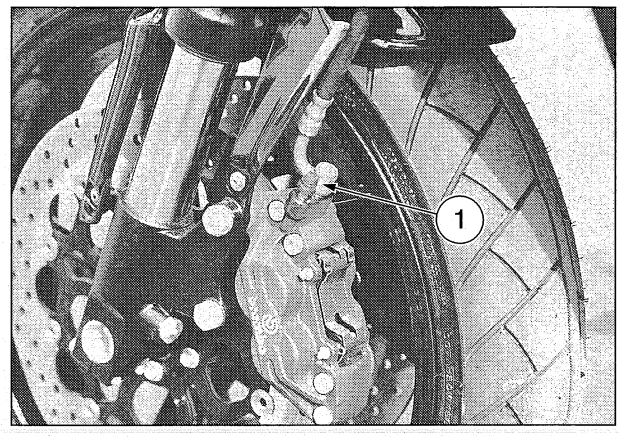
- ★Remove the plastic protection cap.
- ★Insert a transparent plastic tube on the bleeder (1) of the caliper and put the other end of the tube in a container.
- ★Loosen the bleeder (1) approx. one turn.

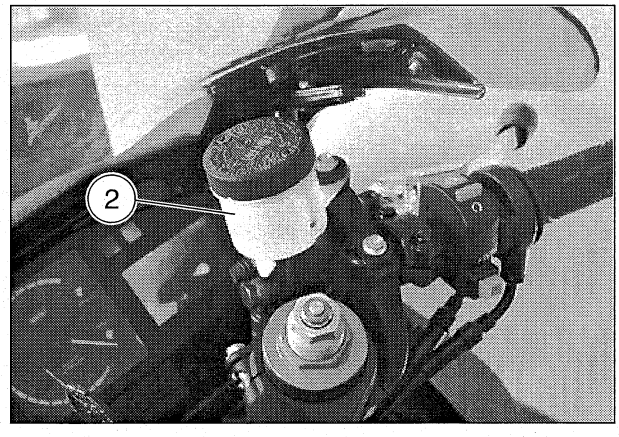
NOTE Make sure that there is always fluid in the tank during the operation; otherwise, once finished, the system will need bleeding, see 2.20 (BLEEDING THE BRAKING SYSTEMS).

- Keep an eye on the tank (2) as the fluid flows out and tighten the bleeder (1) before it empties entirely.
- Top up the tank (2), see 2.17 (CHECKING THE FRONT BRAKE FLUID LEVEL AND TOPPING UP).
- ★Loosen the bleeder (1) again approx. half a turn.
- ★Watch as the liquid flows out through the tube and as soon as the colour of the fluid starts to change (from dark to light), tighten the bleeder (1) again and remove the tube.

Brake caliper bleeder valve driving torque:15 Nm (1.5 Kgm).

- ★Refit the rubber protection cap.
- Top up the fluid tank (2) to the right level, see 2.17 (CHECKING THE FRONT BRAKE FLUID LEVEL AND TOPPING UP).





2.23 CHANGING THE REAR BRAKE FLUID

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.4 (BRAKE FLUID).

Change the rear brake fluid every two year.

⚠ CAUTION

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

DO NOT DISPOSE OF THE FLUID IN THE ENVIRONMENT.

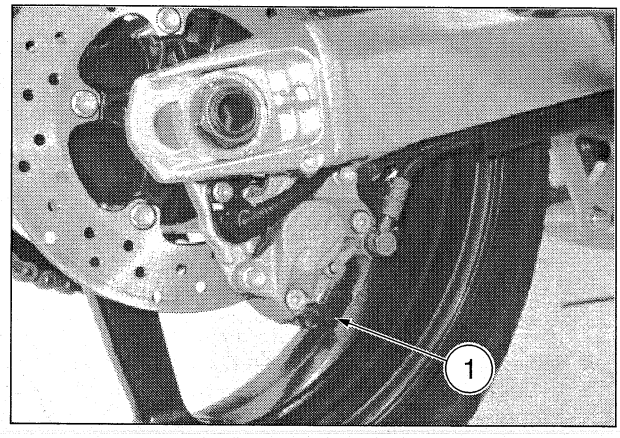
- Remove the plastic protection cap.
- Insert a transparent plastic tube on the bleeder (1) of the caliper and put the other end of the tube in a container.
- Loosen the bleeder (1) approx. one turn.

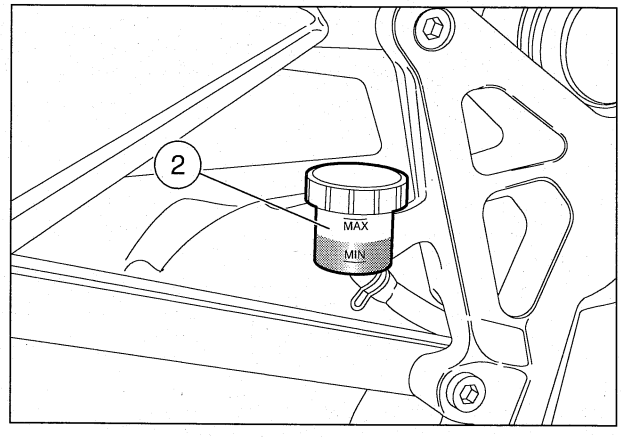
NOTE Make sure that there is always fluid in the tank during the operation; otherwise, once finished, the system will need bleeding, see 2.20 (BLEEDING THE BRAKING SYSTEMS).

- Keep an eye on the tank (2) as the fluid flows out and tighten the bleeder (1) before it empties entirely.
- Top up the tank (2), see 2.18 (CHECKING AND TOPPING UP THE REAR BRAKE FLUID).
- Loosen the bleeder (1) again approx. half a turn.
- Watch as the liquid flows out through the tube and as soon as the colour of the fluid starts to change (from dark to light), tighten the bleeder (1) again and remove the tube.

Brake caliper bleeder valve driving torque:15 Nm (1.5 Kgm).

- Refit the rubber protection cap.
- Top up the fluid tank (2) to the right level, see 2.18 (CHECKING AND TOPPING UP THE REAR BRAKE FLUID).





2.24 CHANGING THE CLUTCH FLUID

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.6 (CLUTCH FLUID).

Change the clutch fluid every two year.

⚠ CAUTION

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

DO NOT DISPOSE OF THE FLUID IN THE ENVIRONMENT.

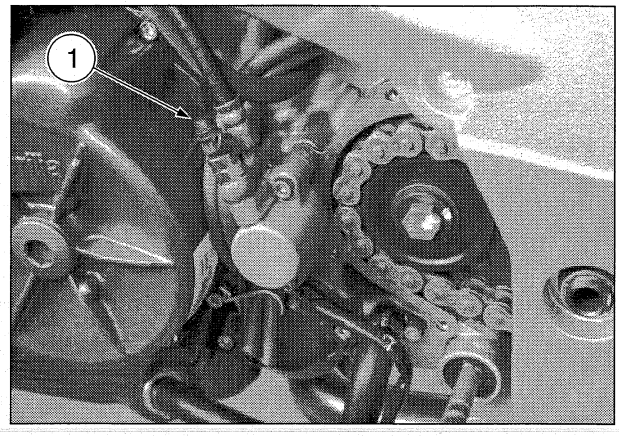
- ◆ Remove the plastic protection cap.
- ◆ Insert a transparent plastic tube on the bleeder (1) and put the other end of the tube in a container.
- ◆ Loosen the bleeder (1) approx. one turn.

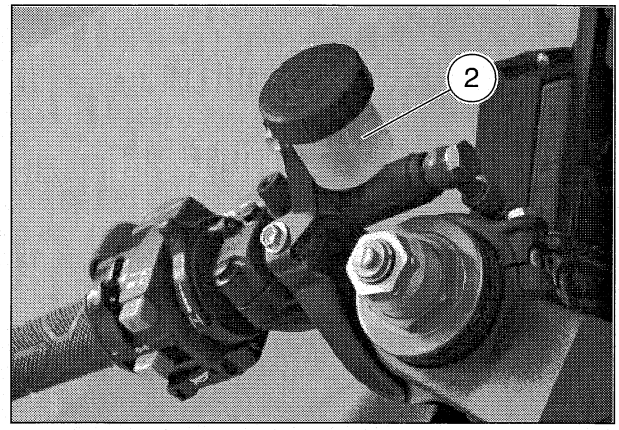
NOTE Make sure that there is always fluid in the tank during the operation; otherwise, once finished, the system will need bleeding, see 2.21 (BLEEDING THE CLUTCH SYSTEMS).

- ◆ Keep an eye on the tank (2) as the fluid flows out and tighten the bleeder (1) before it empties entirely.
- ◆ Top up the tank (2), see 2.19 (CHECKING AND TOPPING UP THE CLUTCH FLUID).
- ◆ Loosen the bleeder (1) again approx. half a turn.
- ◆ Watch as the liquid flows out through the tube and as soon as the colour of the fluid starts to change (from dark to light), tighten the bleeder (1) again and remove the tube.

Clutch control cylinder bleeder valve driving torque:15 Nm (1.5 Kgm).

- ◆ Refit the rubber protection cap.
- ◆ Top up the fluid tank (2) to the right level, see 2.19 (CHECKING AND TOPPING UP THE CLUTCH FLUID).



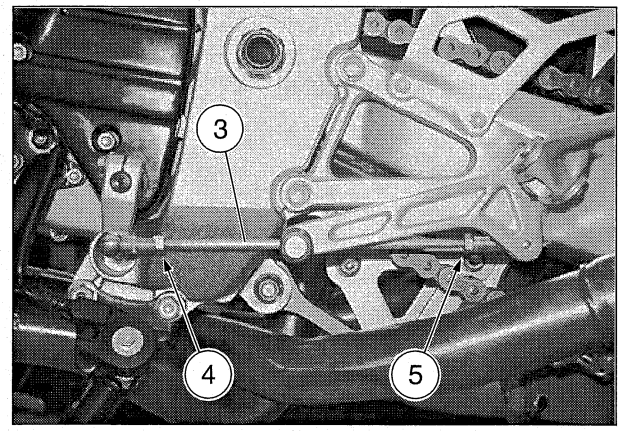


2.25 ADJUSTING THE GEAR LEVER

It is possible to adjust the position of the gear lever by means of the rod (3), proceeding as follows:

- ◆ Loosen the nuts (4, 5).
- ◆ Rotate the rod and adjust the gear lever height.
- ◆ Tighten the nuts (4, 5).

Regularly grease the gear lever pin.

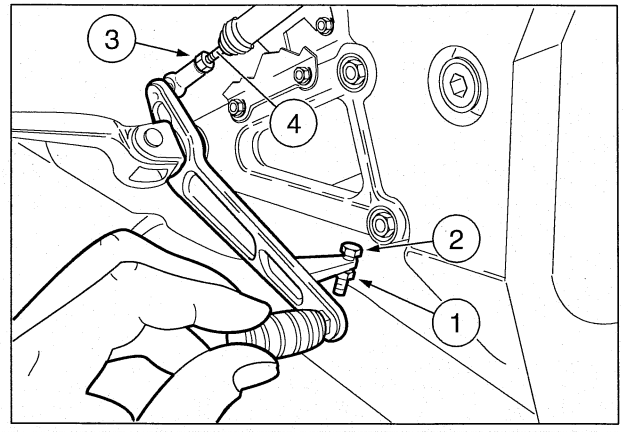


2.26 ADJUSTING THE REAR BRAKE CONTROL LEVER CLEARANCE

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

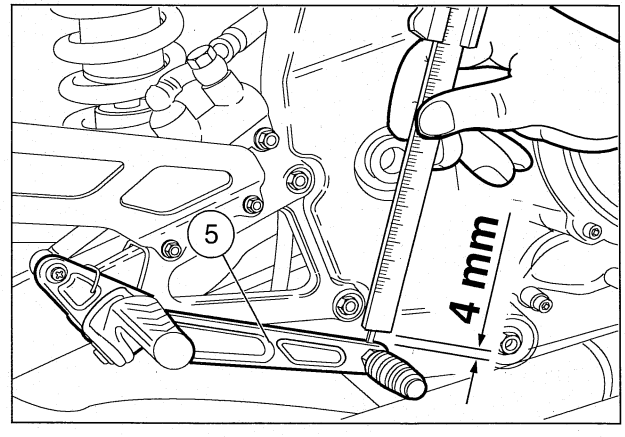
The brake control lever is positioned ergonomically during the assembly of the vehicle.
If necessary, it is possible to adjust the brake control lever clearance:

- 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.
- Screw 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.



⚠ CAUTION

Make sure that there is a certain idle stroke in the movement of the lever (5), to prevent the brake from remaining applied and the consequent untimely wear of the braking elements.
Lever (5) idle stroke: 4 mm (measured at the lever end).



- Lock the pump control rod (4) by means of the lock nut (3).

⚠ CAUTION

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

Check the braking efficiency.

2.27 CHECKING THE BRAKE PAD WEAR

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.4 (BRAKE FLUID).

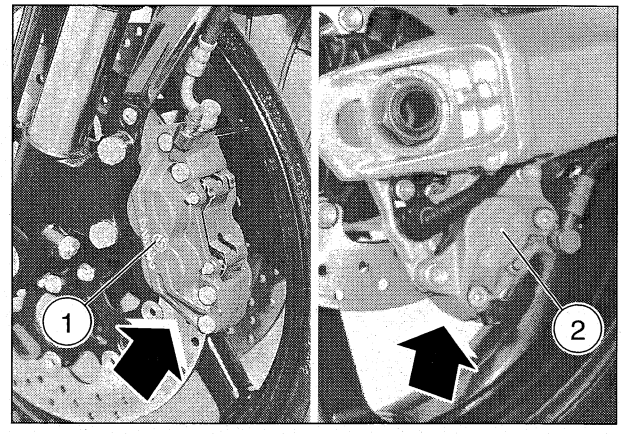
NOTE The following information refer to a single braking system, but are valid for both.

Check the brake pad wear after the first 1000 km (625 mi) and successively every 2000 km (1250 mi) and before every trip.

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

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

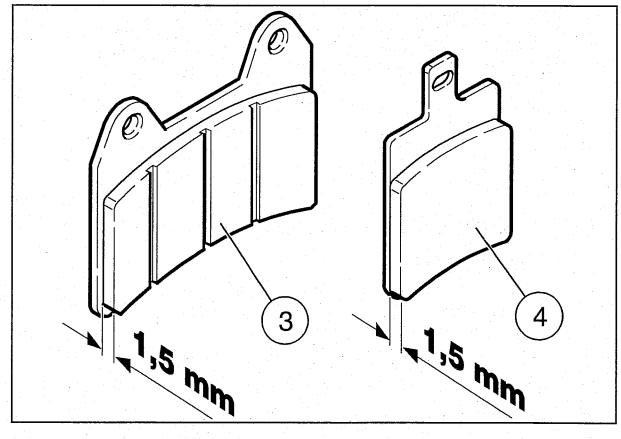
- Position the vehicle on the stand.
- Carry out a visual check between the disc and the pads, proceeding:
  - from below, on the front part, for the front brake calipers front brake (1);
  - from below, on the rear part, for the rear brake caliper (2).



⚠ CAUTION

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

- If the thickness of the friction material (even of one pad only) has reduced to about **1.5 mm** (or if even only one of the wear indicators is not visible any longer), change both pads.
  - Front pad (3), see 7.5.1 (CHANGING THE FRONT BRAKE PADS).
  - Rear pad (4) see 7.6.1 (CHANGING THE REAR BRAKE PADS).

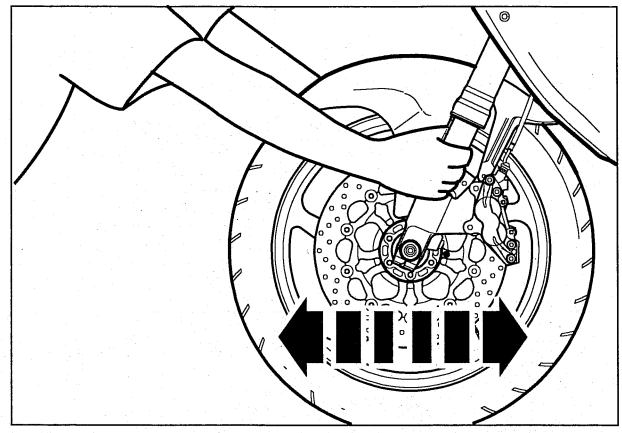


2.28 STEERING

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

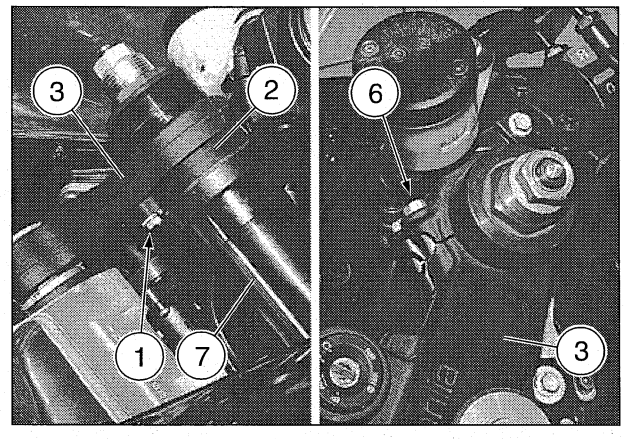
Check after the first 1500 km (937 mi) and successively every 7500 km (4687 mi) or 8 months.

To assure 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.
Tight steering hinders the smooth rotation of the handlebar whereas slack steering implies inadequate stability.



2.28.1 CHECKING THE BEARING SLACK STEERING

- Position the vehicle on the special centre stand, see 1.8.4 (POSITIONING THE VEHICLE ON THE CENTRE SUPPORT STAND OPT).
- Shake the fork in the direction of travel.
- In the event any slack is encountered, adjust the steering.



2.28.2 ADJUSTING THE BEARING SLACK STEERING

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

NOTE The following procedure does not necessarily have to be performed with the front fairing removed, though it is advisable to remove it in order to gain more room for manoeuvre, see 7.1.19 (REMOVING THE FRONT PART OF THE FAIRING).

Half-handlebar safety screw driving torque: 10 Nm (1.0 kgm).

- ★Unscrew and remove the screw (1) securing the handlebar (2) to the upper plate (3).

Driving torque of the clutch control lever tank support screw: 10 Nm (1.0 kgm).

- Partially unscrew the screw (4) fastening the clutch fluid tank (5).
- Move the clutch fluid tank (5) sideways.

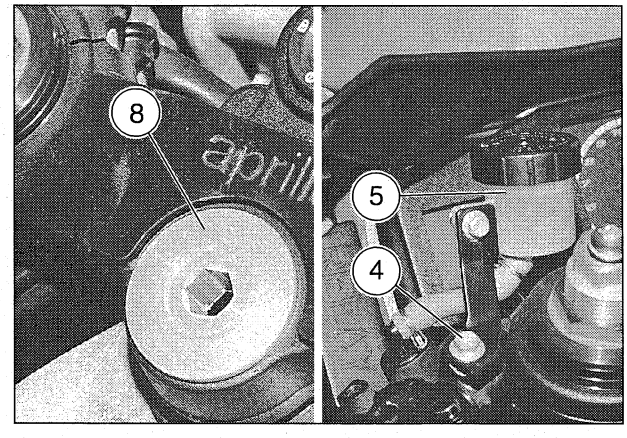
Fork upper plate screw driving torque: 25 Nm (2.5 kgm).

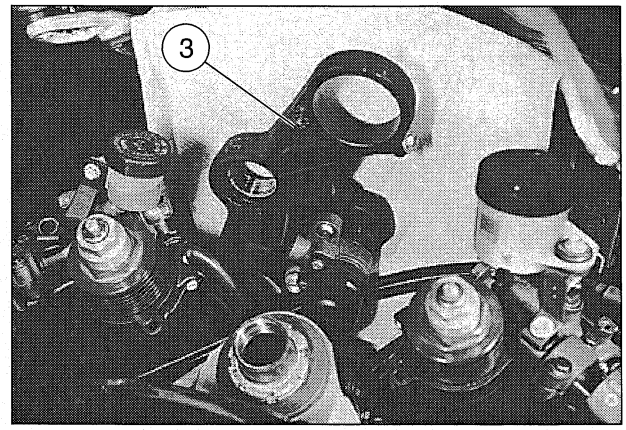
- ★Unscrew the screw (6) securing the upper plate (3) to the front fork (7).

Fork upper plate bush driving torque: 80 Nm (8.0 kgm).

- Unscrew and remove the upper bush (8).
- Using a plastic hammer, tap the upper plate (3), complete with ignition switch /steering lock, from underneath until it is pushed off upwards.
- Bend the upper plate (3) over forwards, placing a cloth between it and the dashboard to avoid damage.

Follow ▶





Follow ▶

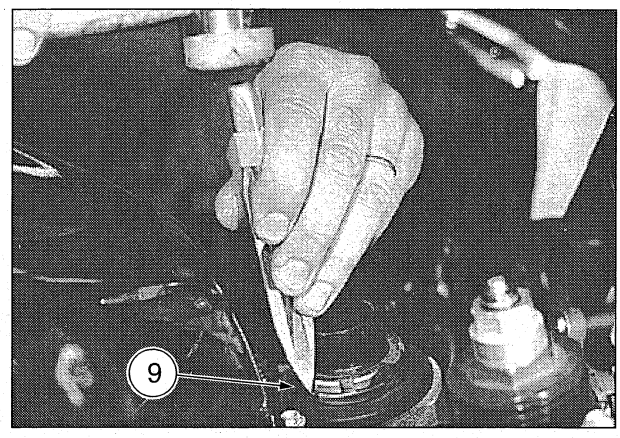
◆ Use a small flat-tip screwdriver to straighten the tabs (those bent upwards) of the tab washer (9).

NOTE Have the appropriate special tool OPT to hand:
– **aprilia** part# 8140194 (rear support stand complete with pins).

◆ Use the special setscrew spanner to loosen and remove the lock ring (10).
◆ Remove the tab washer (9).

⚠ CAUTION

When reassembling, the tab washer (9) must be replaced.



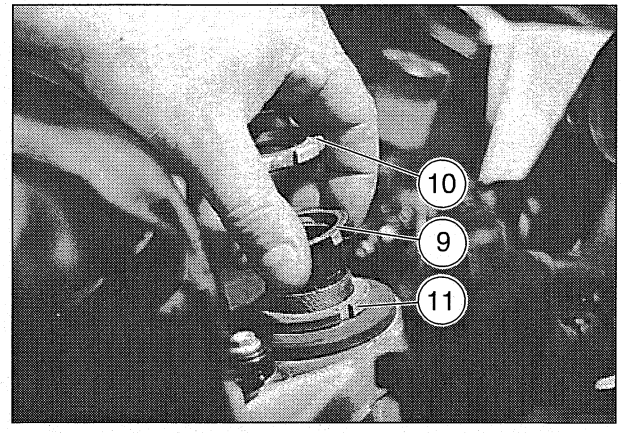
◆ Use the special setscrew spanner to tighten the adjuster ring (11) and eliminate the slack.

Steering adjuster metal ring driving torque: 40 Nm (4.0 kgm)

◆ Refit the tab washer (9), making sure the tabs coincide with the grooved sectors of the metal ring (11).
◆ Use the special setscrew spanner to screw on and tighten the lock ring (10).

Tightening of lock ring (10):

manual until contact + 1/4 turn.



NOTE Bend the tabs of the tab washer (9) upwards.

◆ Bend the four tabs of the tab washer (9) upwards onto the grooved sectors of the lock ring (10).
◆ Refit the upper plate (3), making sure it is correctly housed.
◆ Lubricate the thread and base on which the bush (8) rests using motor oil, see 1.6 (LUBRICANT CHART).
◆ Screw and tighten the upper bush (8).

Fork upper plate bush driving torque:100 Nm (10 kgm).

◆ ★Screw and tighten the screw (6).

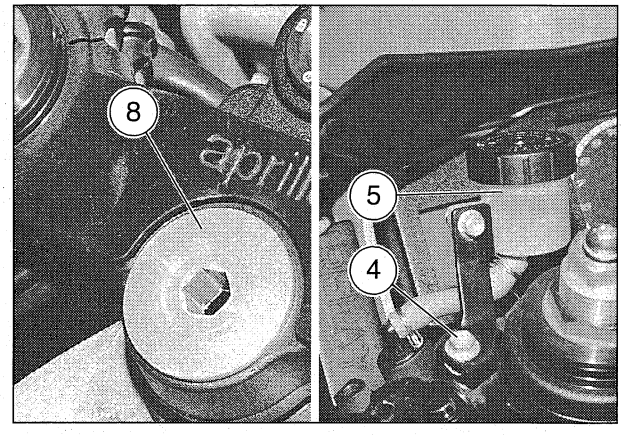
Fork upper plate screw driving torque:25 Nm (2.5 kgm)

◆ ★Screw and tighten the screw (1).

Half-handlebar safety screw driving torque:10 Nm (1.0 kgm).

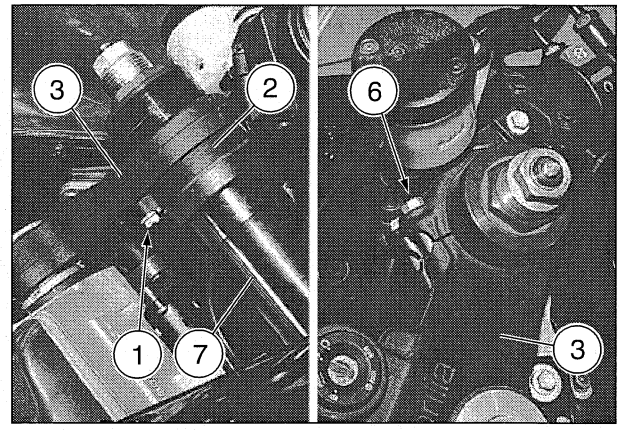
◆ Refit the clutch fluid tank (5).
◆ Tighten the screw (4).

Driving torque of the clutch control lever tank support screw:10 Nm (1.0 kgm).



⚠ CAUTION

Once the operation is complete, 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.



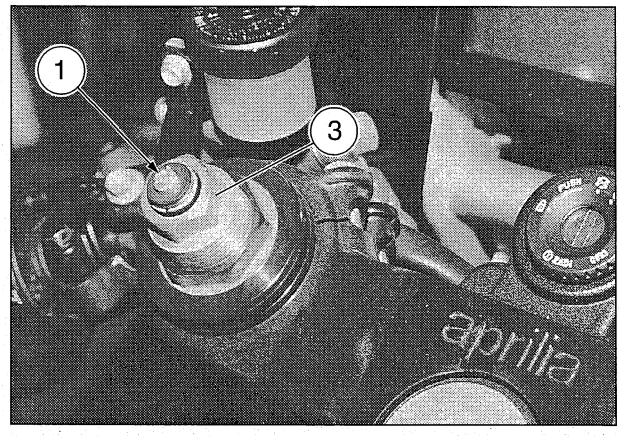
2.29 INSPECTING THE FRONT AND REAR SUSPENSION

2.29.1 FRONT SUSPENSION

The front suspension consists of an hydraulic fork connected to the steering column by means of two plates.

For the setting of the vehicle attitude, each rod of the fork is provided with an upper screw (1) for the adjustment of the hydraulic braking with extended shock absorber, a lower screw (2) for the adjustment of the hydraulic braking with compressed shock absorber and an upper nut (3) for the adjustment of the spring preload.

The riding position of the vehicle can be further altered by varying the height of the forecarriage.



Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

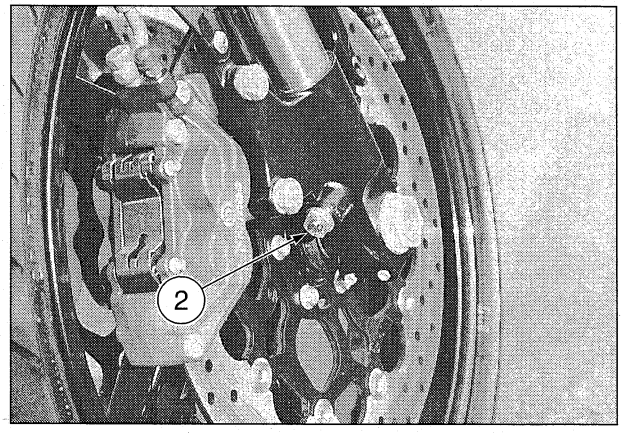
Change the front fork oil after the first 7500 km (4687 mi) and successively every 22500 km (14000 mi).

Carry out the following checks after the first 1000 km (625 mi) and successively every 15000 km (9375 mi):

- With pulled front brake lever, press the handlebar repeatedly, thrusting the fork downwards. The stroke must be gentle and there must be no trace of oil on the rods.

If the fork tends to "bottom out", carry out a adjusting, see 2.29.2 (ADJUSTING THE FRONT FORK) and the oil must be changed if necessary, see 7.8.1 (CHANGING THE FORK OIL).
Make sure the fork does not feature oil leaks and that the outer surface of the tubes is not marked with scratches or grooves.
If this is the case, replace all the damaged parts that cannot be repaired, see 7.8.3 (DISASSEMBLING THE WHEEL-HOLDER TUBE - SLIDER UNIT).

- Check the fastening of all the components and the functionality of the front suspension joints.



2.29.2 ADJUSTING THE FRONT FORK

The standard setting of the front fork is such as to satisfy most driving conditions at low and high speed, either with reduced load and full load.
However, it is possible to adjust the setting according to how the vehicle is going to be used.

⚠ CAUTION

For the adjustment, always start from the most rigid setting [complete clockwise rotation of the adjusters (1) (2)].

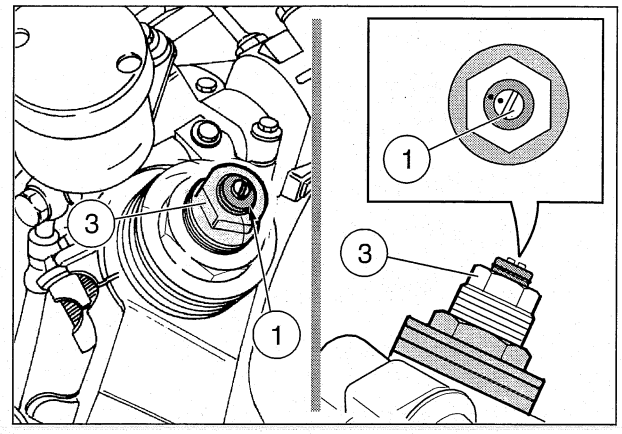
Do not rotate the adjusters (1) (2) beyond their limit position, to avoid damaging the thread.

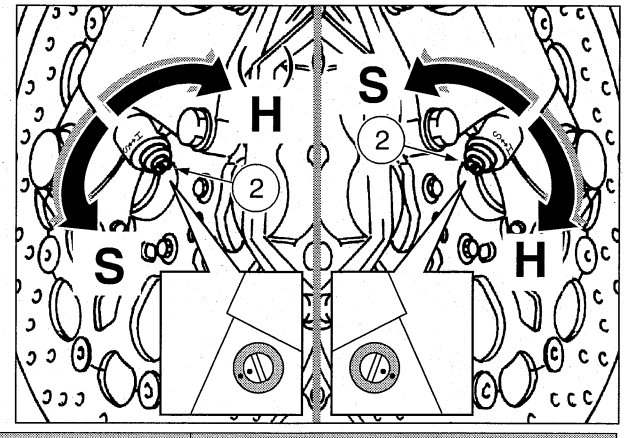
Use the notches (1) (2) provided on the adjusters as reference marks for the adjustment of the hydraulic braking with compressed and extended shock absorber.

Give the adjusters (1) (2) 1/8 turn at a time and turn the adjusting nut (3) one notch at a time.
Test the vehicle repeatedly on the road, until obtaining the optimal adjustment.

Set the same spring preload and hydraulic braking for both rods: a different setting of the rods decreases the stability of the vehicle while riding.

When the spring preload is increased, it is necessary to increase also the hydraulic braking, in order to avoid sudden jerks while riding.





Upper screw adjusters (1) (2.25 turns in total)	By rotating them clockwise (H)	By rotating them anticlockwise (S)
Function	Increase of the hydraulic braking with extended shock absorber	Decrease of the hydraulic braking with extended shock absorber
Recommended kind of road	Smooth or normal roads	Roads with uneven surface
Note	Drive with passenger	Drive without passenger
Standard adjustment	From the end of stroke (completely closed), give 1.5 anticlockwise turns (opening)	

Lower screw adjusters (2) (2 turns in total)	By rotating them clockwise (H)	By rotating them anticlockwise (S)
Function	Increase of the hydraulic braking with compressed shock absorber	Decrease of the hydraulic braking with compressed shock absorber
Recommended kind of road	Smooth or normal roads	Roads with uneven surface
Note	Drive with passenger	Drive without passenger
Standard adjustment	From the end of stroke (completely closed), give 1.5 anticlockwise turns (opening)	

Upper adjusting nuts (3) (8 notches in total)	By rotating them clockwise (screwing)	By rotating them anticlockwise (unscrewing)
Function	Spring preload increase	Spring preload decrease
Attitude	The vehicle is more rigid	The vehicle is less rigid
Recommended kind of road	Smooth or normal roads	Roads with uneven surface
Note	Drive with passenger	Drive without passenger
Standard adjustment	From the end of stroke (completely closed), give 5 anticlockwise clicks (opening)	

2.29.3 ADJUSTING THE HEIGHT OF THE FORECARRIAGE

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

◆ Position the vehicle on the special centre stand, see 1.8.4 (POSITIONING THE VEHICLE ON THE CENTRE SUPPORT STAND OPT).

NOTE Procure suitable shims to place between the front tyre and the support (1).
The number of shims depends on the desired riding position (maximum number: six, like the number of possible variations, 4 mm at a time).

Thickness for each element: 4 mm.

◆ Place a support (1) under the front tyre so as to keep the forecarriage in place once it is released.

Fork lower plate screw driving torque: 25 Nm (2.5 kgm).

◆ ★Loosen the two screws (2) securing the lower plate (3) to the slider (4).

Fork upper plate screw driving torque:25 Nm (2.5 kgm).

◆ ★Loosen the screw (5) securing the upper plate (6) to the slider (4).

Half-handlebar screw driving torque: 25 Nm (2.5 kgm).

◆ ★Loosen the screw (7) securing the handlebar (8) to the slider (4).

⚠ CAUTION

Due to the weight of the forecarriage, the following operations require the assistance of another operator.
Fix the operating procedure before starting work.
The removal must be carried out with the greatest care.

◆ Grip the forecarriage firmly and lift it slightly in the direction in which the sliders (4) are inserted on the two fastening plates (3) (6).
◆ Place one or more of the shims between the tyre and the support (1) depending on the desired variation.
◆ Release the forecarriage.

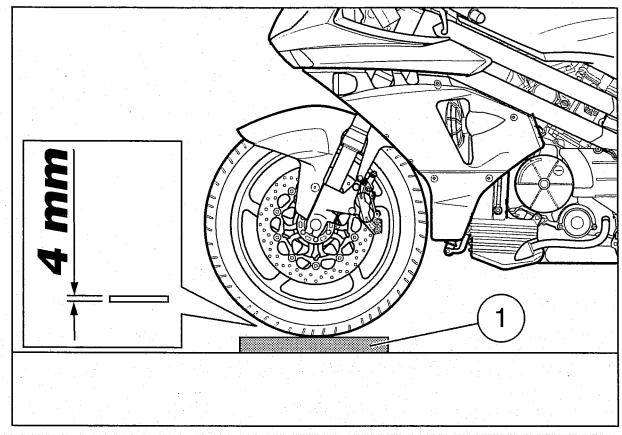
NOTE There are six notches to be found in the upper part of each fork slider, to be used as reference for the six different positions possible (see figure).

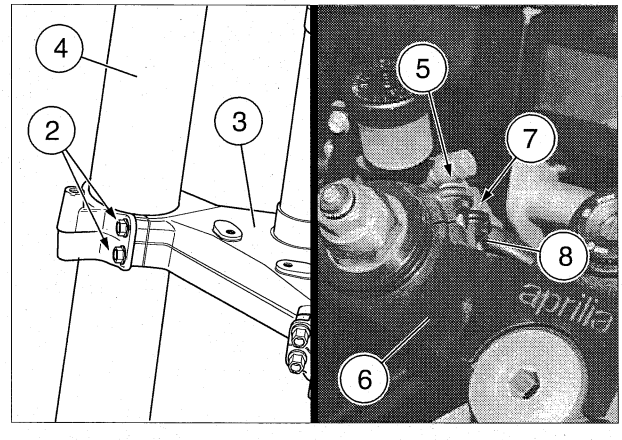
◆ Make sure the notch in the fork sliders which the upper plate is lined up with corresponds to the desired variation.

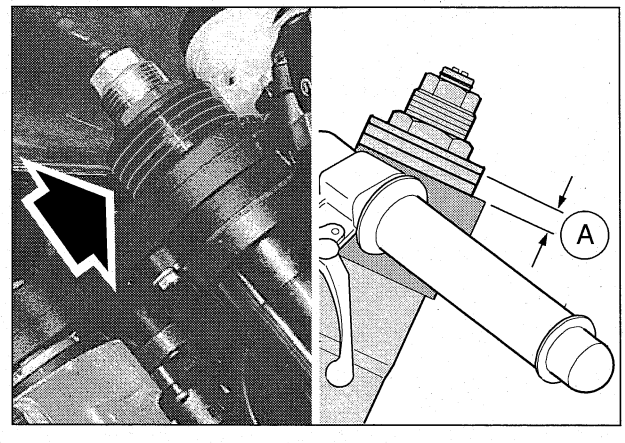
⚠ CAUTION

The upper plate must be lined up with the same reference notch on both fork sliders.

Any variation, whether up or down, must always be made in the range between the first reference notch and the last.







Front suspension	Standard adjustment	Adjustment for racetrack use
Protrusion of the rods (A) from the upper plate (plug excluded)	12 mm (3 notches)	16 mm (4 notches)

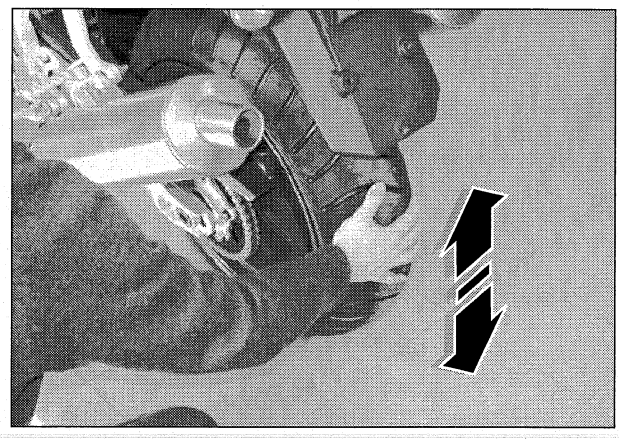
2.30 REAR FORK

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

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

For the check, proceed as follows:

- ◆ Position the vehicle on the special centre stand, see 1.8.4 (POSITIONING THE VEHICLE ON THE CENTRE SUPPORT STAND OPT).
- ◆ Shake the fork in the direction of travel (see figure).
  If you find any slack, adjust the rear fork, see 2.30.1 (ADJUSTING THE REAR FORK).
  If the slack persists, adjust the bearings, see 7.9.2 (DISASSEMBLING THE REAR FORK).



2.30.1 ADJUSTING THE REAR FORK

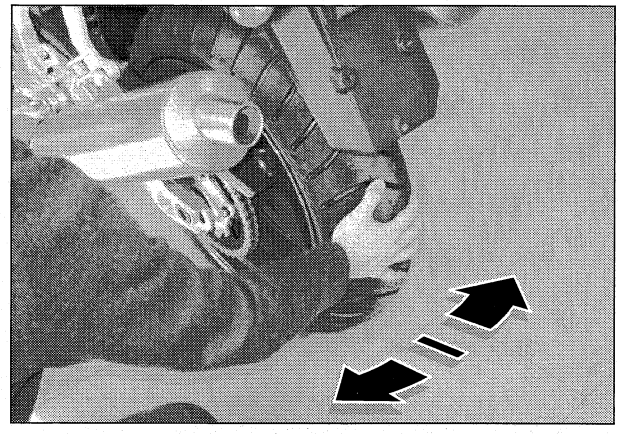
Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

- ◆ Position the vehicle on the special centre stand, see 1.8.4 (POSITIONING THE VEHICLE ON THE CENTRE SUPPORT STAND OPT).

Rear fork pin nut driving torque: 60 Nm (6.0 kgm).

- ◆ Loosen the nut (1) completely.

NOTE Have the appropriate special tool OPT to hand:
– **aprilia** part# 8140203 (socket spanner for adjusting fork pin - engine mounts).

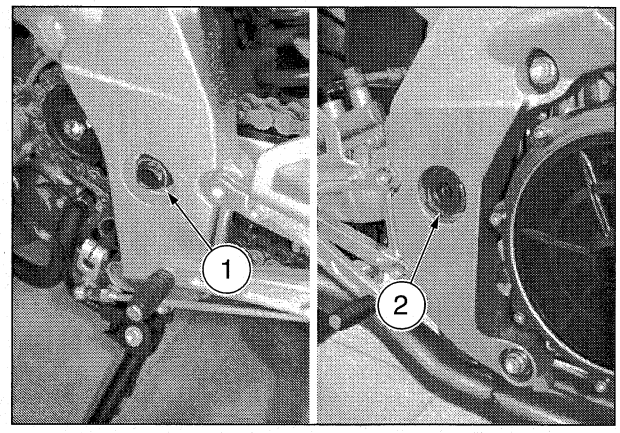


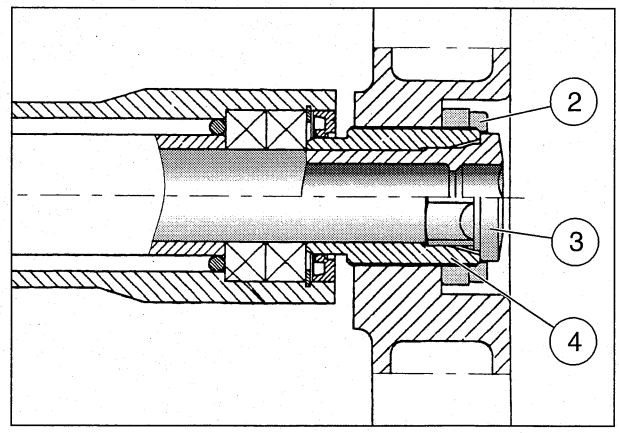
Rear fork pin metal ring driving torque: 60 Nm (6.0 kgm).

- ◆ Use the special setscrew spanner to loosen the lock ring (2) completely.

Rear fork adjusting bush driving torque: 12 Nm (1.2 kgm).

- ◆ Working from the right-hand side of the vehicle, rotate the fork pin (3) clockwise, which will cause the bush (4) to rotate with it, in turn pushing the fork to its stop.
- ◆ Use the special setscrew spanner to tighten the lock ring (2).
- ◆ Tighten the nut (1).





2.31 INSPECTING THE REAR SUSPENSION

2.31.1 REAR SUSPENSION

The rear suspension consists of a spring-shock absorber unit, fixed to the frame by means of a uni-ball and to the rear fork by means of lever systems.
For the setting of the vehicle attitude, the shock absorber is provided with a screw adjuster (1) for the adjustment of the hydraulic braking with extended shock absorber, a ring nut (2) for the adjustment of the spring preload and a locking ring nut (3).

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

Check after the first 1000 km (625 mi) and successively every 15000 km (9375 mi) or 16 months.
- ◆ Check all the rear suspension joints are working properly and that the relevant components are properly tightened.

2.31.2 ADJUSTING THE REAR SHOCK ABSORBER

The standard setting of the rear shock absorber is such as to satisfy most driving conditions at low and high speed, either with reduced load and full load.
However, it is possible to adjust the setting according to how the vehicle is going to be used.

⚠ CAUTION

For the adjustment, always start from the most rigid setting.
Do not rotate the screw adjuster (1) beyond its limit position, to avoid damaging the thread.
Make sure that the screw adjuster (1) always snaps and is not in any intermediate position.

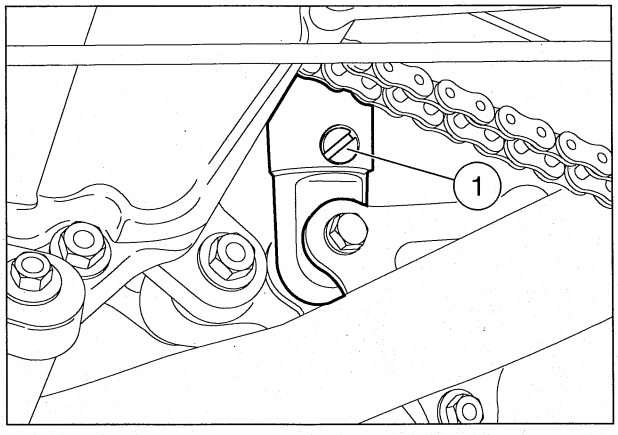
The adjusting ring nut must not be screwed more than 44 mm from the beginning of the thread (see figure).

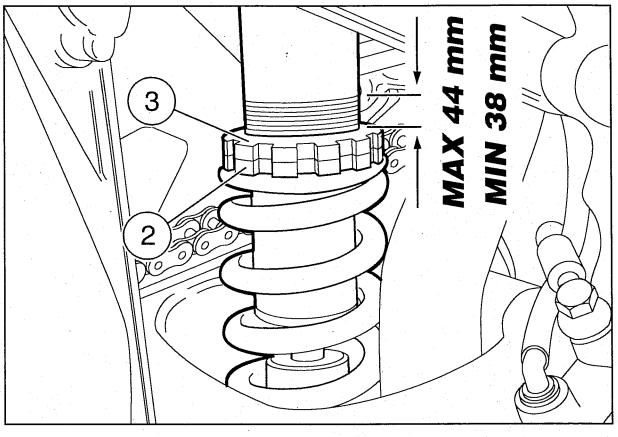
MIN = 38 mm
MAX = 44 mm

If this measure is exceeded, even the slightest unevenness on the road surface will cause sudden jerks and it will be useless to adjust the screw (1).

- ◆ Slightly unscrew the locking ring nut (3) by means of the appropriate spanner.
- ◆ Act on the adjusting ring nut (2) (shock absorber spring preload adjustment) (see figure).
- ◆ If necessary, adjust the screw (1) (adjustment of the hydraulic braking with extended shock absorber) (see table).
- ◆ Once the optimal attitude has been obtained, tighten the locking ring nut (3) completely.

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Follow ▶

⚠ CAUTION

Adjust the spring preload and the hydraulic braking with extended shock absorber according to the conditions of use of the vehicle.

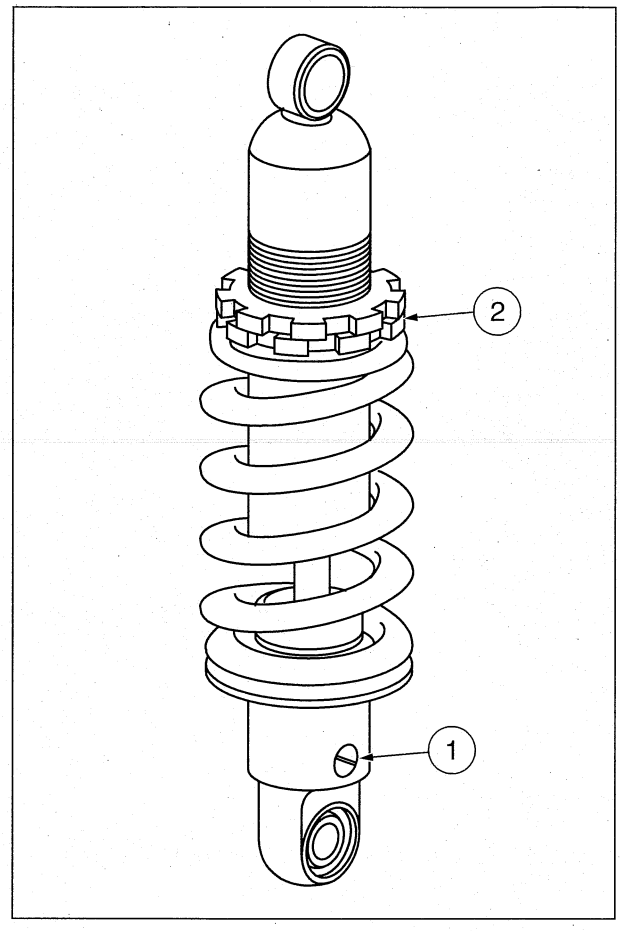
When the spring preload is increased, it is necessary to increase also the hydraulic braking with extended shock absorber, in order to avoid sudden jerks while riding.

⚠ WARNING

If the vehicle attitude is set for full-load riding, it is advisable not to rotate the screw (1) leftwards (anticlockwise), in order to avoid sudden jerks while riding.

Gradually turn the screw adjuster (1) giving 2-3 clicks per time, and the adjusting ring nut (2) giving one turn per time.

Test the vehicle repeatedly on the road, until obtaining the optimal adjustment.



Screw adjuster (1) (27 clicks)	By screwing it (clockwise) (H)	By unscrewing it (anticlockwise) (S)
Function	Increase of the hydraulic braking with extended shock absorber	Decrease of the hydraulic braking with extended shock absorber
Recommended kind of road	Smooth or normal roads	Roads with uneven surface
Note	Drive with passenger	Drive without passenger
Standard adjustment	From the end of stroke (completely closed), give 15 anticlockwise clicks (opening)	

Adjusting ring nut (2)	By screwing it	By unscrewing it
Function	Spring preload increase	Spring preload decrease
Attitude	The vehicle is more rigid	The vehicle is less rigid
Recommended kind of road	Smooth or normal roads	Roads with uneven surface
Note	Drive with passenger	Drive without passenger

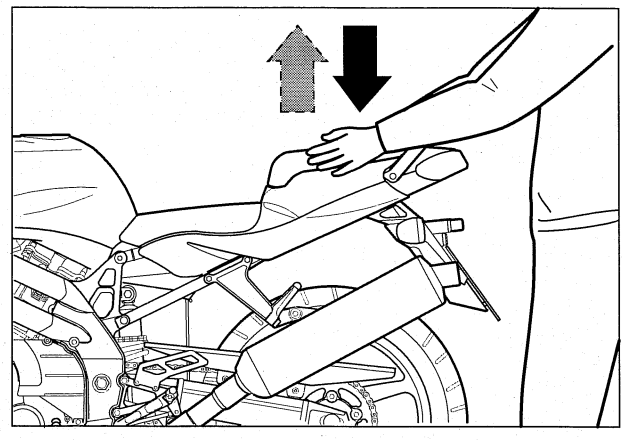
2.31.3 CHECKING THE REAR SUSPENSION LINKAGE

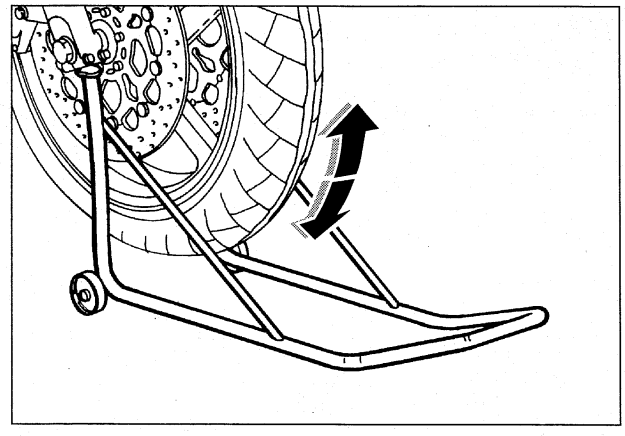
Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

Check the conditions of the bearings every 30000 km (18750 mi).

NOTE Have someone help you keep the vehicle upright during this operation.

- Grip the rear part of the vehicle firmly (see figure), press down and release a few times.
- If the movement is not smooth and is accompanied by squeaks and/or if you notice any slack, change the bearings of the rear suspension linkage, see 7.10.2 (DISASSEMBLING THE REAR SUSPENSION LINKAGE).
- If, after you pressed the vehicle downwards, it returns to its original position very slowly, check if the rear suspension is adjusted correctly, see 2.31.2 (ADJUSTING THE REAR SHOCK ABSORBER).
- If, after the adjustment, the defect persists, this means that the shock absorber bumps through and must therefore be reloaded.





2.32 FRONT WHEEL

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

Check every 7500 km (4687 mi).

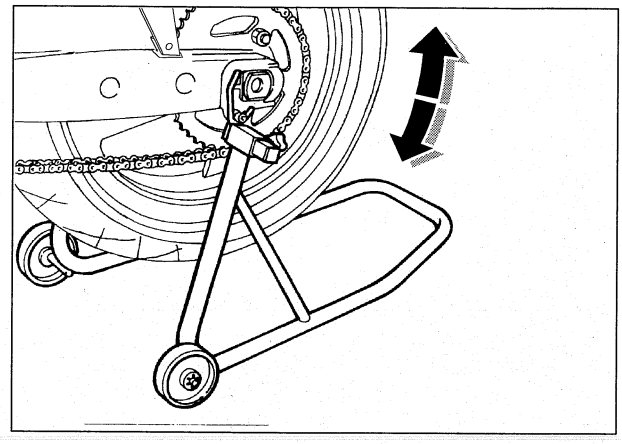
- Position the vehicle on the special front support stand OPT.
- Spin the wheel in either direction by hand.
- Make sure that the wheel rotation is regular and that there are no obstacles or noise, otherwise change the bearings, see 7.2.2 (DISASSEMBLING THE WHEEL).
- Should any wobbling be noticed as the wheel spins, check the relevant components, see 7.2.3 (CHECKING THE COMPONENTS).
- If, after various spins, the wheel continues to stop in the same place, the wheel needs balancing.

2.33 REAR WHEEL

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

Check every 7500 km (4687 mi).

- Position the vehicle on the special rear support stand OPT.
- Spin the wheel in either direction by hand.
- Make sure that the wheel rotation is regular and that there are no obstacles or noise, otherwise change the bearings, see 7.2.2 (DISASSEMBLING THE WHEEL).
- Should any wobbling be noticed as the wheel spins, check the relevant components, see 7.2.3 (CHECKING THE COMPONENTS).
- If, after various spins, the wheel continues to stop in the same place, the wheel needs balancing.



2.34 EXHAUST MANIFOLD NUTS

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

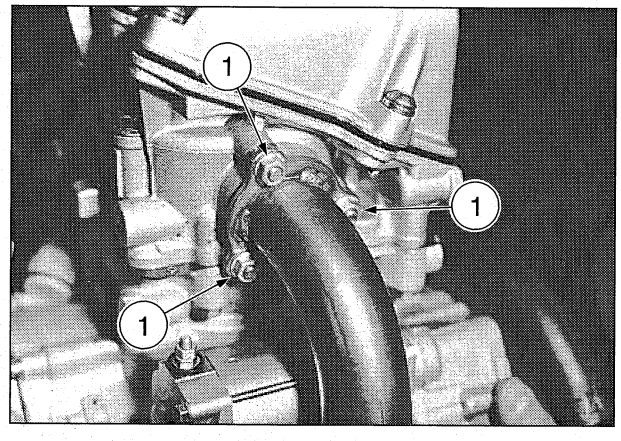
Tighten the exhaust manifold nuts after the first 1000 km (625 mi) and then every 7500 km (4687 mi) or 8 months.

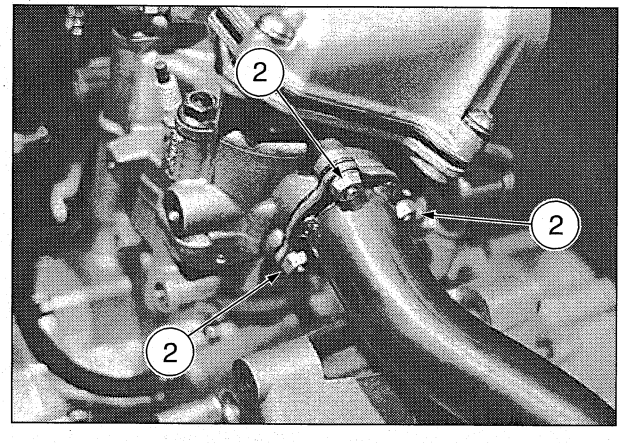
⚠ WARNING

Let the engine cool down until it reaches room temperature.

- Remove the side fairings, see 7.1.25 (REMOVING THE SIDE FAIRINGS).
- Remove the radiator spoiler, see 7.1.30 (REMOVING THE RADIATOR SPOILER).
- Torque the three nuts (1) of the front cylinder exhaust manifold to specification.
- Torque the three nuts (2) of the rear cylinder exhaust manifold to specification.

Exhaust manifold nut driving torque: 25 Nm (2.5 kgm).





2.35 DRIVE CHAIN

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

Check and, where necessary, lubricate every 1000 km (625 mi).

The vehicle is equipped with an endless chain, in which a ring link joint is not used.

Chain type: 525

⚠ CAUTION

The drive chain is provided with O rings among the links, in order to keep the grease inside them.
Carry out the adjustment, lubrication, cleaning and change of the chain with great care.

- Position the vehicle on the special rear support stand OPT.
- Position the gear lever in neutral.
- Turn the rear wheel slowly by hand.
- Further, check the chain and sprockets and make sure that they do not present:

– damaged rollers;
– loose pins;
– dry, rusty, crushed or seized links;
– excessive wear;
– lacking O rings;
– sprocket or teeth excessively worn or damaged.

⚠ CAUTION

If the chain rollers are damaged, the pins are loose and/or the O rings are damaged or lacking, it is necessary to change the whole chain unit (both sprockets and chain), see 7.3.2 (DISASSEMBLING THE FINAL DRIVE UNIT).

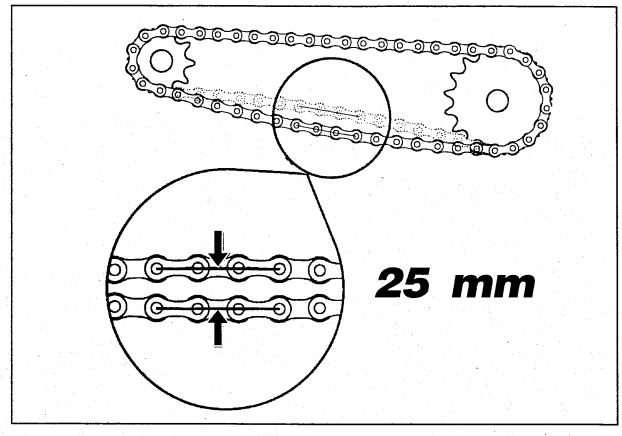
2.35.1 CHECKING THE DRIVE CHAIN

To check the slack, proceed as follows:

- Position the vehicle on the special rear support stand OPT.
- Position the gear lever in neutral.
- Make sure that the vertical oscillation, in an intermediate point between pinion and crown in the lower part of the chain, is about **25 mm**.
- Move the vehicle forwards, or turn the wheel, in order to be able to check the vertical oscillation of the chain even when the wheel turns; the slack must be constant in all the rotation phases of the wheel.

⚠ CAUTION

If in some positions the slack is higher than in others, this means that there are crushed or seized links.
To prevent the risk of seizures, lubricate the chain frequently, see 2.35.4 (DRIVE CHAIN TENSION AND LUBRICATION).



If the slack is uniform, but higher or lower than **25 mm**, adjust it, see 2.35.3 (ADJUSTING THE DRIVING CHAIN).

⚠ CAUTION

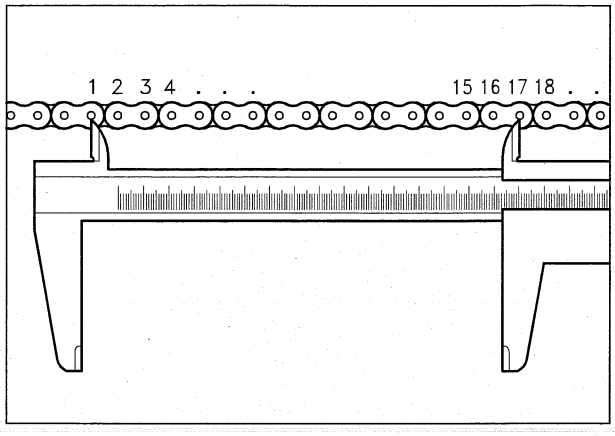
An excessive slackening of the chain may cause noise or make the chain rattle, with consequent wear of the shoe and of the chain guide plate.

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.

2.35.2 CHECKING THE DRIVING CHAIN, PINION AND SPROCKET WEAR

- To put a driving chain under tension, see 2.35.3 (ADJUSTING THE DRIVING CHAIN).
- Count 17 pins (16 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 7.11 (DISASSEMBLING THE DRIVING CHAIN).

Wear limit: 255.5 mm (MAX 0.5%).



2.35.3 ADJUSTING THE DRIVING CHAIN

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

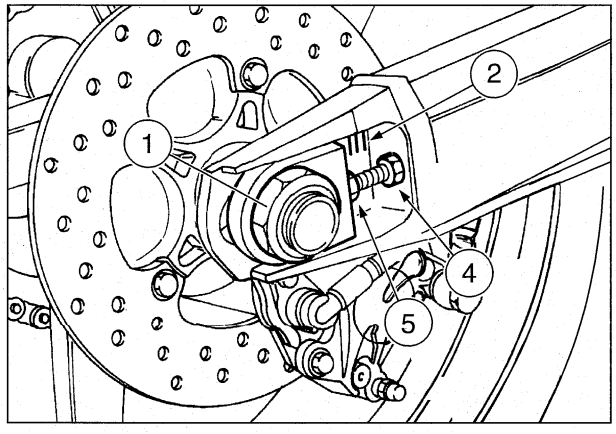
- Position the vehicle on the special rear support stand OPT.
- Loosen the nut (1).

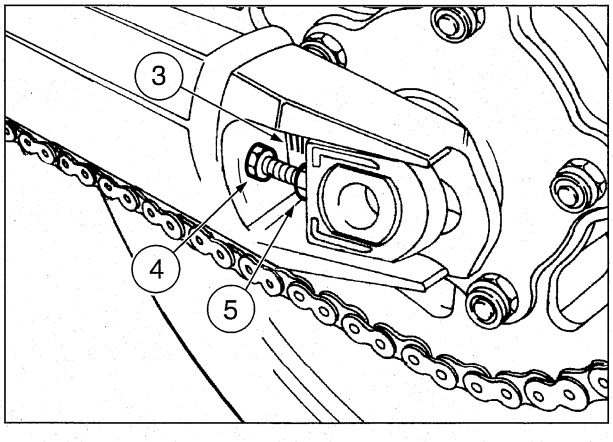
NOTE For the wheel centering fixed reference marks (2-3) are provided, which can be seen inside the chain tightener seats on the rear fork arms, before the wheel pin.

- Loosen the two lock nuts (4).
- Act on the adjusters (5) and adjust the chain slack, making sure that the reference marks (2-3) are correctly positioned on both sides of the vehicle.
- Tighten the two lock nuts (4).
- Tighten the nut (1).

Wheel nut driving torque: 120 Nm (12.0 kgm).

- Check the chain slack, see 2.35.1 (CHECKING THE DRIVE CHAIN).

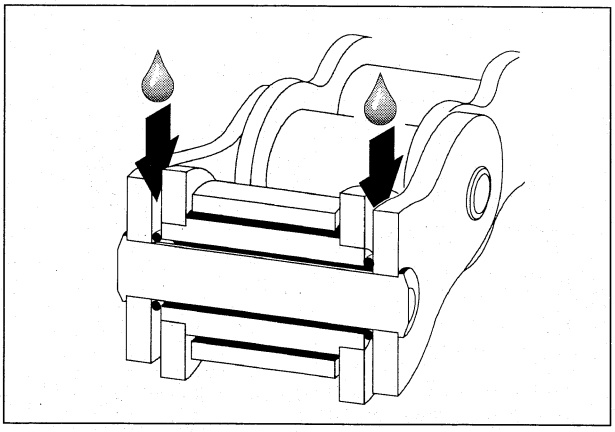




2.35.4 DRIVE CHAIN TENSION AND LUBRICATION

Never wash the chain with water jets, steam jets, high-pressure water jets and highly inflammable solvents.

◆ Wash the chain with naphtha or kerosene.
If it tends to rust quickly, intensify the maintenance intervals.



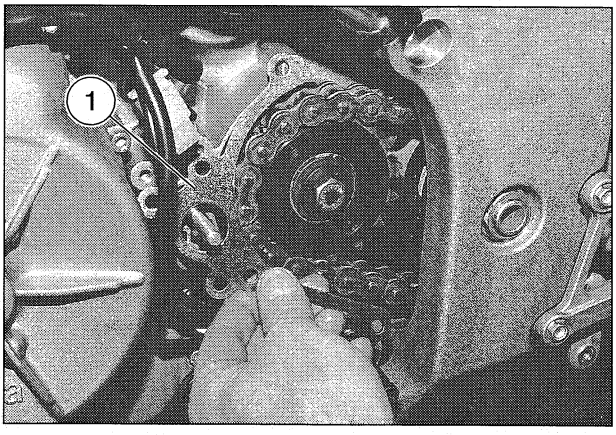
⚠ CAUTION

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

Lubricate the chain every 1000 km (625 mi) or whenever necessary.

◆ After washing the chain and letting it dry, lubricate it with spray grease for chains provided with sealing rings, see 1.6 (LUBRICANT CHART).

NOTE Do not use the vehicle soon after lubricating the chain, since due to the centrifugal force the lubricant would be sprayed outwards and dirty the surrounding areas.



⚠ CAUTION

The lubricants for chains available on the market may contain substances that are dangerous for the rubber sealing rings of the chain.

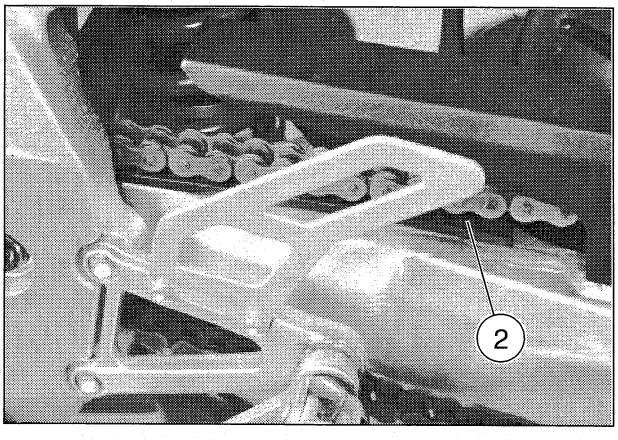
The standard chain is of the type 525.

When replacing the chain, you are strongly recommended to use a chain of the exact same type.

2.35.5 INSPECTING THE DRIVING CHAIN GUIDE PLATE

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

◆ Remove the guide plate, see 3.2.5 (REMOVAL THE DRIVING CHAIN GUIDE PLATE).
◆ Make sure the guide plate (1) is not worn or damaged; if so, replace with a new one.



2.35.6 INSPECTING THE DRIVING CHAIN SHOE

◆ Position the vehicle on the stand.
◆ Make sure the shoe (2) is not worn or damaged; if so, replace with a new one, see 7.1.49 (REMOVING THE DRIVING CHAIN SHOE).

2.36 TYRES

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

Check condition of tyres after the first 1000 km (625 mi) and then after every 7500 km (4687 mi) or 12 months.
The inflation pressure must be checked every month and at room temperature.

This vehicle is provided with tubeless tyres.

2.36.1 CONDITION OF TREAD

⚠ CAUTION

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

Some types of tyres homologated for this vehicle are provided with wear indicators.
There are several kinds of wear indicators.
For more information on how to check the wear, contact your Dealer.

Do not install tyres with air tube on rims for tubeless tyres and viceversa.
Make sure that the inflation valves (1) always have their sealing caps on, to prevent the tyres from suddenly going flat.

Change, repair, maintenance and balancing operations are very important and therefore they must be performed by qualified technicians with appropriate tools.

MINIMUM TREAD DEPTH LIMIT (A):

front and rear .....2 mm (USA 3 mm).

2.36.2 INFLATION PRESSURE

⚠ CAUTION

Periodically check the tyre inflation pressure at room temperature.
If the tyres are hot, the measurement is not correct.
Carry out the measurement especially before and after long rides.
If the inflation pressure is too high, the ground unevenness cannot be dampened and is therefore transmitted to the handlebar, thus compromising the driving comfort and reducing the road holding during turns.
If, on the contrary, the inflation pressure is too low, the tyre sides (2) are under greater stress and the tyre itself may slip on the rim or it may become loose, with consequent loss of control of the vehicle. In case of sudden braking the tyres could even come off the rims. Further, the vehicle could skid while turning.

Inflation pressure

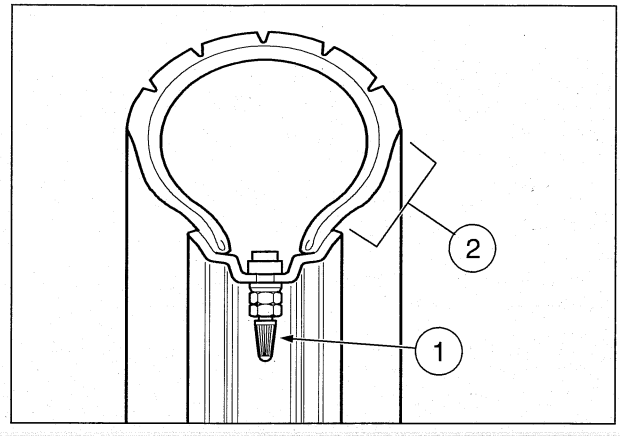
Front: .....240 kPa (2.4 bar)
..... [at full load 250±10 kPa (2.5 ±0,1 bar)]

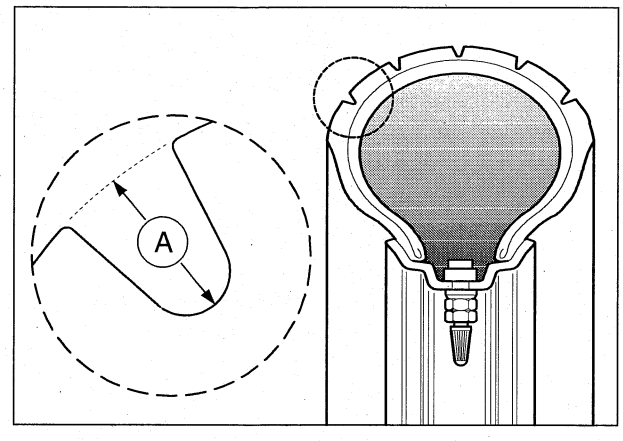
Rear: .....250 kPa (2.5 bar)

..... [at full load 280±10 kPa (2.8 ±0,1 bar)]

⚠ CAUTION

After repairing a tyre, have the wheels balanced.
If the tyres are new, they may still be covered with a slippery film: drive carefully for the first miles.
Do not oil the tyres with unsuitable fluids.





⚠ CAUTION

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, see 1.5 (TECHNICAL SPECIFICATIONS).

For further information, see 7.4 (TYRES).

2.37 FUEL PIPES

Carefully read 1.2.1 (FUEL).

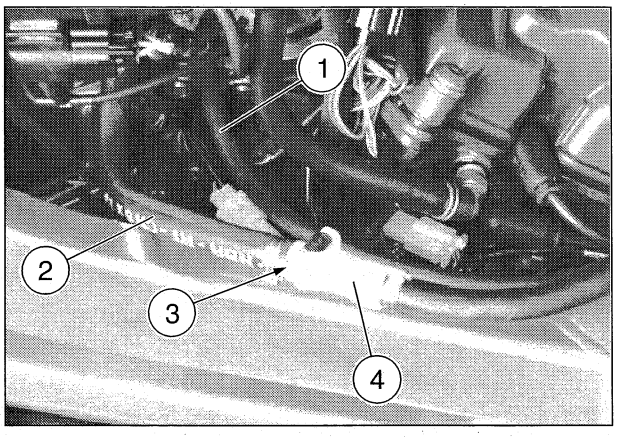
Check the fuel pipes every 7500 km (4687 mi) or 8 months.
Replace every four years.

If you should encounter signs of wear, cracking, etc., replace the fuel pipes.

- High-pressure delivery pipe [~ 450 kpa (4.5 bar)].
- Return pipe (2).

NOTE Make sure the male quick coupling (3) has been correctly inserted into the receptacle (4).

For further information, see section 4 (FUEL SUPPLY SYSTEM).



2.38 BRAKE AND CLUTCH PIPES

Carefully read 1.2.4 (BRAKE FLUID) and 1.2.6 (CLUTCH FLUID).

Check the pipes every 7500 km (4687 mi) or 8 months.
Replace every four years.

If you should encounter signs of wear, cracking, etc., replace the pipes.

2.39 COOLING SYSTEM PIPES

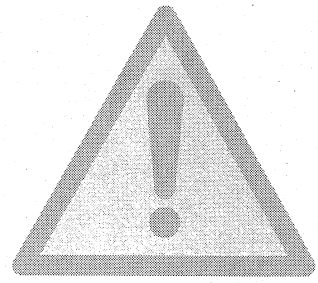
Carefully read 1.2.5 (COOLANT).

Check the cooling system pipes every 7500 km (4687 mi) or 8 months.

If you should encounter signs of wear, cracking, etc., replace the cooling system pipes.

2.40 NUT, BOLT, SCREW TIGHTENING

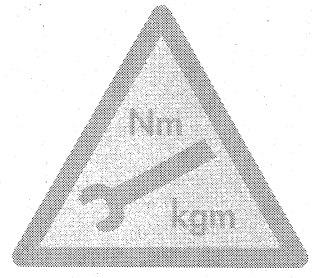
Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).



Check after the first 1000 km (625 mi) and successively every 7500 km (4687 mi) or 8 months.

Check all the fastening elements carefully, especially all those components essential for safety, i.e.:

- right/left handlebar;
- front brake lever;
- clutch lever;
- fuel delivery pipe;
- front fork to plates;
- front fork / wheel pin clamps;
- front wheel;
- front brake pipe fittings front brake;
- front brake discs;
- front brake calipers;
- engine;
- pinion;
- rear brake lever;
- rear fork;
- rear fork leverage;
- rear shock absorber;
- rear wheel;
- rear brake disc;
- rear brake caliper;
- rear brake pipe fittings.



⚠ CAUTION

The fastening elements must be torqued to specification and LOCTITE® applied, where indicated, see 1.11 (FASTENING ELEMENTS).

NOTE

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ENGINE

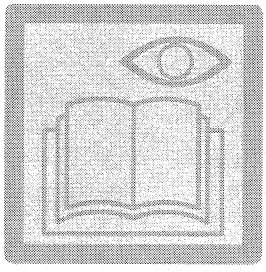
3

ENGINE

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3.1 TECHNICAL INFORMATION



3.1.1 TECHNICAL DATA

See 1.5 (TECHNICAL SPECIFICATIONS).

3.1.2 MAINTENANCE INTERVALS

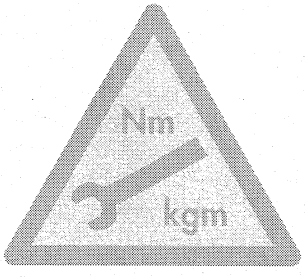
See 2.1.1 (REGULAR SERVICE INTERVALS CHART).

3.1.3 TROUBLESHOOTING

See 8.1 (TROUBLESHOOTING).

3.1.4 SEALANTS

See 1.9 (CONSUMABLES).



3.1.5 LUBRICANTS

See 1.6 (LUBRICANT CHART).

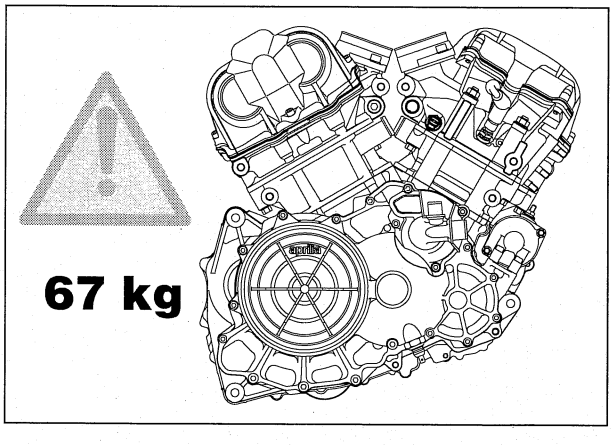
3.1.6 SPECIAL TOOLS

See 1.7 (SPECIAL TOOLS OPT).

3.1.7 DRIVING TORQUE

See 1.11 (FASTENING ELEMENTS).

3.1.8 PRECONDITIONS TO BE MET WHEN PERFORMING MAINTENANCE AND REPAIR WORK



⚠ WARNING

During the assembly phase, bear in mind the engines weight (approx. 67 kg) and centre of gravity: support accordingly.
Take care around any potentially hazardous points where you might be squashed or cut.

⚠ CAUTION

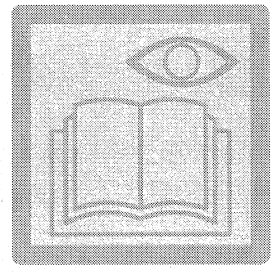
The maintenance of engines and systems calls for specific experience and the use of special tools.
Any maintenance and repair work must be performed by suitably trained technical personnel only.

NOTE Comply with the instructions furnished by the manufacturer of the vehicle.

3.1.9 GENERAL INDICATIONS ON MAINTENANCE AND REPAIR WORK

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

3.2 ENGINE PARTS WHICH CAN BE DISASSEMBLED WITHOUT REMOVING THE ENGINE FROM THE FRAME



Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

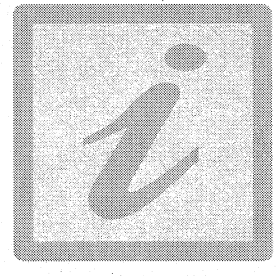
The parts underlined can be removed and refitted without removing the engine from the frame.

⚠ CAUTION

This chapter describes the relevant procedures progressively and in sequential order.

Any reference to operations from other chapters must be interpreted logically in order to avoid components being removed unnecessarily.

Only perform those operations necessary to remove the component in question.



TOP SIDE

- Tappet cover (1), see **aprilia** part# 8140582 (Engine service and repair manual V990 1051-1).
- Tappet cover (2), head, cylinder and rear piston, see **aprilia** part# 8140582 (Engine service and repair manual V990 1051-1).
- Front (3) and rear (4) cylinder intake flange.
- Camshaft position sensor and camshafts, see **aprilia** part# 8140582 (Engine service and repair manual V990 1051-1).
- Chain, chain tightener and front and rear cylinder timing drive assembly, see **aprilia** part# 8140582 (Engine service and repair manual V990 1051-1).
- Valves, see **aprilia** part# 8140582 (Engine service and repair manual V990 1051-1).

FRONT SIDE

- Front cylindrical exhaust pipe, see **aprilia** part# 8140582 (Engine service and repair manual V990 1051-1).
- Starter motor (5), see **aprilia** part# 8140582 (Engine service and repair manual V990 1051-1).

REAR SIDE

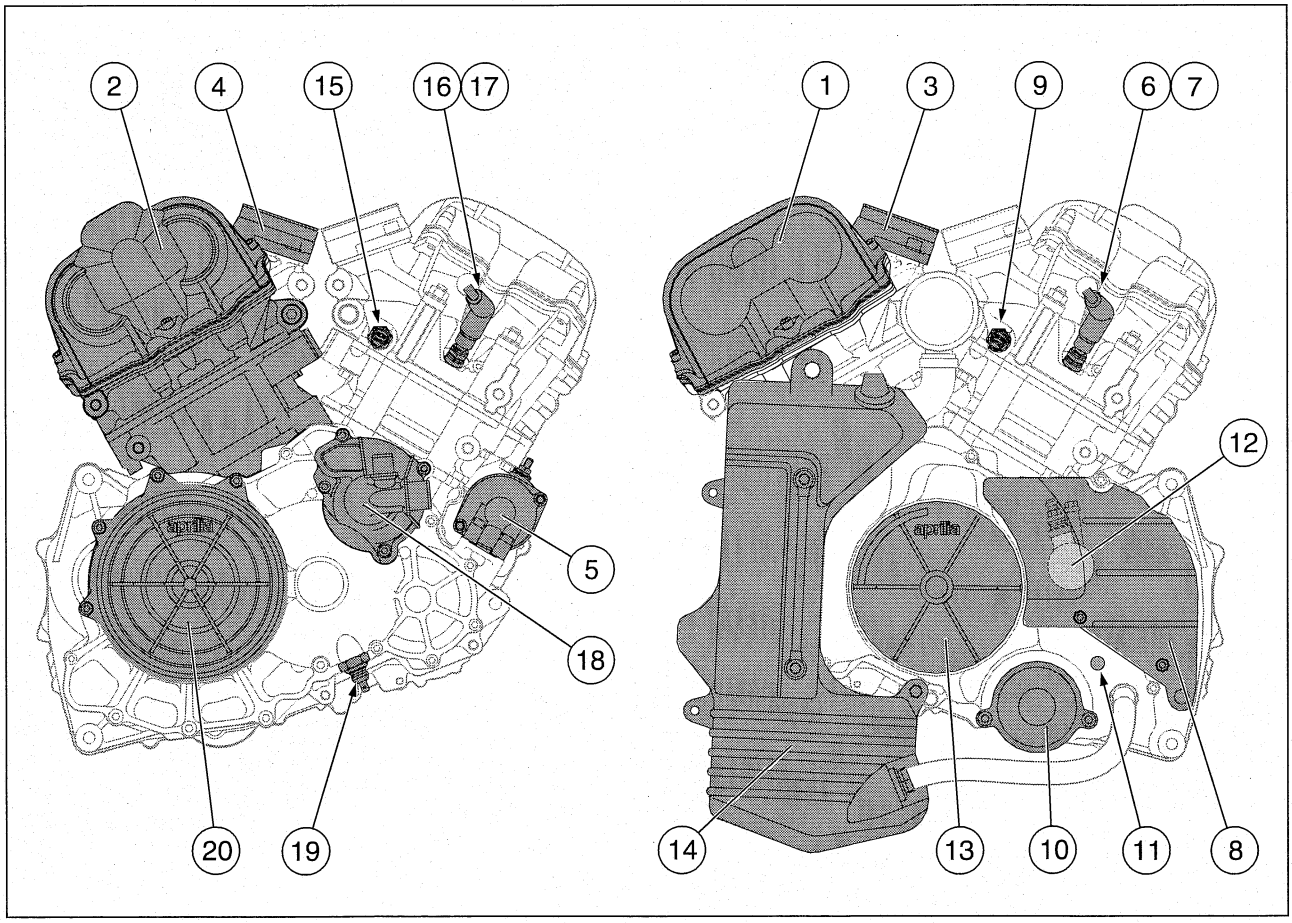
- Rear cylindrical exhaust pipe, see **aprilia** part# 8140582 (Engine service and repair manual V990 1051-1).

LEFT SIDE

- Rear cylinder spark plugs (6-7), see 2.7 (SPARK PLUGS).
- Drive pinion protection case (8), see 2.35.5 (INSPECTING THE DRIVING CHAIN GUIDE PLATE).
- Gearshift lever, see 3.2.2 (REMOVING THE GEARCHANGE CONTROL CONNECTION ELEMENT).
- Rear cylinder coolant thermistor (9), see 5.6 (REMOVING THE COOLANT THERMISTORS).
- Engine oil filter (10), see 2.14 (CHANGING THE ENGINE OIL AND THE OIL FILTER).
- Neutral gear switch (11).
- Clutch control cylinder (12), see 3.2.4 (REMOVING THE CLUTCH CONTROL CYLINDER).
- Flywheel cover (13) and ignition system, see **aprilia** part# 8140582 (Engine service and repair manual V990 1051-1).
- Engine oil tank (14), see 7.1.47 (REMOVING THE ENGINE OIL TANK).

RIGHT SIDE

- Front cylinder coolant thermistor (15), see 5.6 (REMOVING THE COOLANT THERMISTORS).
- Front cylinder spark plugs (16 - 17), see 2.7 (SPARK PLUGS).
- Coolant pump (18), see **aprilia** part# 8140582 (Engine service and repair manual V990 1051-1).
- Engine oil pressure sensor (19).
- Clutch cover (20) and clutch assembly, see **aprilia** part# 8140582 (Engine service and repair manual V990 1051-1).



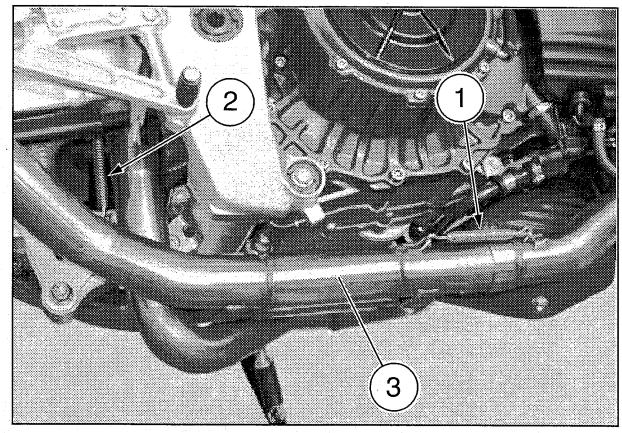
3.2.1 REMOVING THE EXHAUST PIPES

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

⚠ WARNING

Let the engine cool down until it reaches room temperature.

- Remove the exhaust silencer, see 7.1.45 (REMOVING THE EXHAUST SILENCER).
- Remove the side fairings, see 7.1.25 (REMOVING THE SIDE FAIRINGS).
- Remove the lower fairing, see 7.1.29 (REMOVING THE LOWER FAIRING).
- Remove the radiator spoiler, see 7.1.30 (REMOVING THE RADIATOR SPOILER).
- Unhook the two springs (1 - 2) from the relevant hooks on the exhaust manifold (3).
- Remove the two springs (1 - 2).



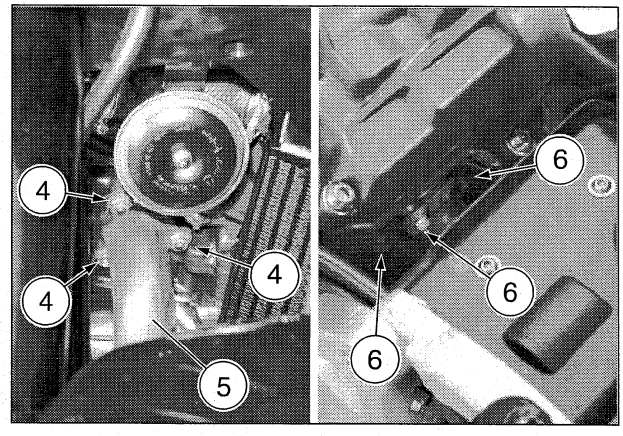
⚠ CAUTION

Check the two springs (1 - 2) and, where necessary, replace them.

Exhaust manifold nut driving torque: 25 Nm (2.5 kgm).

- Loosen the three nuts (4) fastening the flange of the exhaust pipe (5) to the front cylinder.
- Loosen and remove the three nuts (6) fastening the flange of the exhaust pipe (7) to the rear cylinder.
- Move the exhaust manifold (3), together with the exhaust pipe (5), back and slightly downwards until the exhaust pipes flange is released from the stud bolts on the front cylinder.
- Remove the exhaust manifold (3).

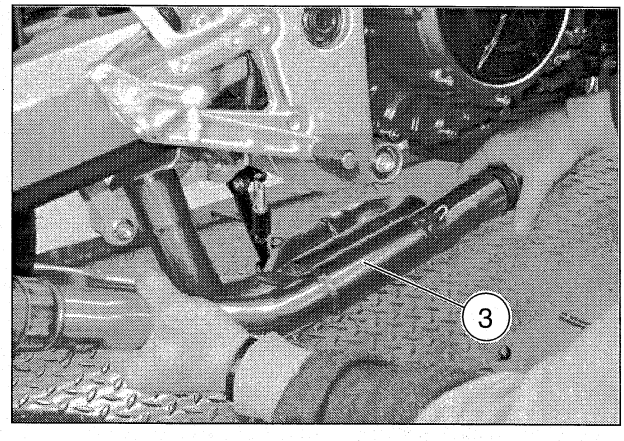
Driving torque of nuts (6): 25 Nm (2.5 kgm).



⚠ CAUTION

When slipping the exhaust pipes (5 - 7) off the relevant cylinders, take care not to damage the thread of the fastening stud bolts.

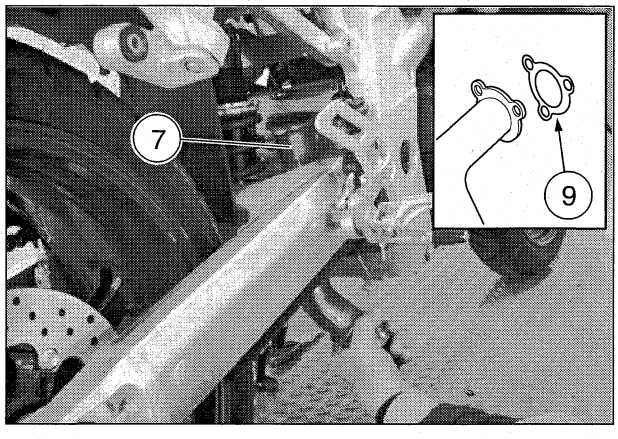
- Remove the exhaust pipe (5) trying to find the most suitable position for its withdrawal.
- Remove the exhaust pipe (7).

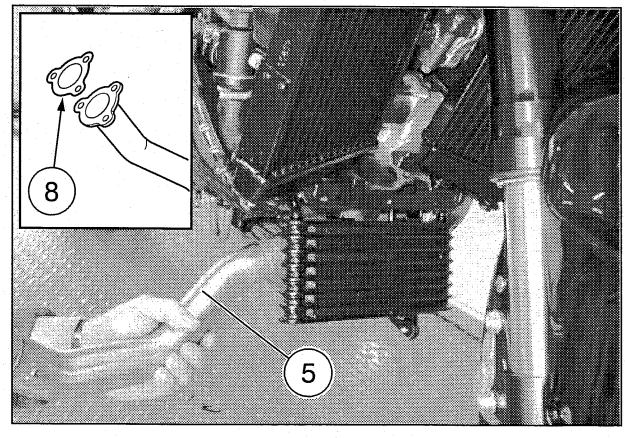


⚠ CAUTION

Check and, where necessary, replace the gaskets (8 - 9) with two new ones of the same type.

Plug the engines exhaust pipe openings so as to prevent any foreign bodies entering.





3.2.2 REMOVING THE GEARCHANGE CONTROL CONNECTION ELEMENT

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

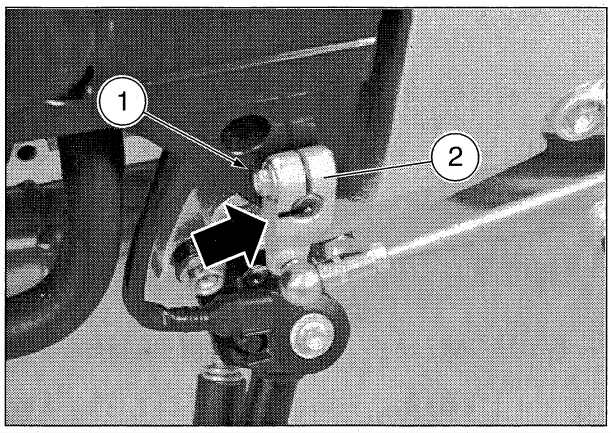
⚠ CAUTION

Before removing the gearshift pedal, mark the pedal and shaft (see figure) so that it can be refitted correctly.

◆ Position the vehicle on the stand.

Driving torque of the gearchange control connection element fastening screw (1): 10 Nm (1.0 kgm).

◆ Loosen and remove the screw (1).
◆ Withdraw the gearchange control connection element (2).

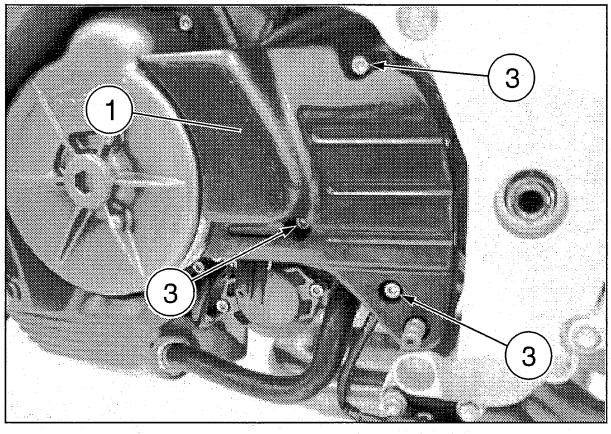


3.2.3 REMOVE THE PINION COVER

◆ Remove the gearchange control connection element, see 3.2.2 (REMOVING THE GEARCHANGE CONTROL CONNECTION ELEMENT).

Pinion casing screw driving torque: 5 Nm (0.5 kgm).

◆ Unscrew and remove the three screws (3).
◆ Partially remove the pinion cover.
◆ Release the safety switch cable from the coupling (5).
◆ Remove the pinion cover (4).



3.2.4 REMOVING THE CLUTCH CONTROL CYLINDER

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.6 (CLUTCH FLUID).

◆ Remove the pinion cover, see 3.2.3 (REMOVE THE PINION COVER).
◆ Release the drain pipes (6) from the cable guide (7).

Driving torque of the clutch control cylinder screws: 10 Nm (1.0 kgm).

◆ Unscrew and remove the screws (8).
◆ Slide off the cylinder (9).

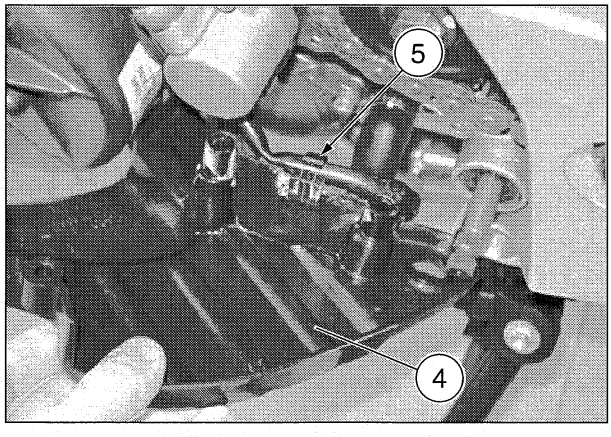
⚠ CAUTION

Perform the operations with the utmost care: the cylinder (9) remains connected to the pipe.

Once the cylinder (9) has been removed, do not pull the clutch lever as the piston is liable to come out of its slot, resulting in the spillage of clutch fluid.

For safetys sake, secure the piston, locking it in place with a plastic clamp.

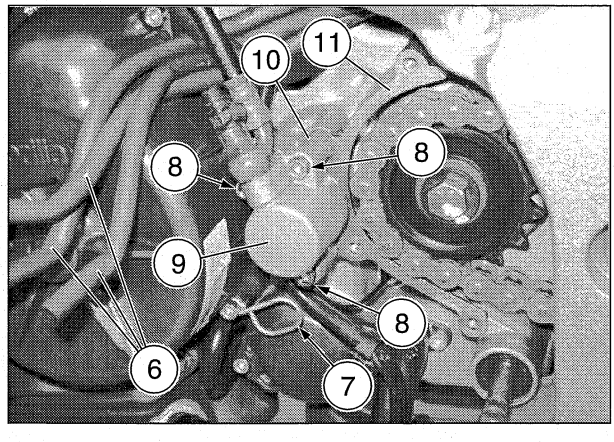
◆ Where necessary, remove the flange (10).



3.2.5 REMOVAL THE DRIVING CHAIN GUIDE PLATE

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

◆ Remove the clutch control cylinder (9), see 3.2.4 (REMOVING THE CLUTCH CONTROL CYLINDER).
◆ Remove the guide plate (11).



3.3 REMOVING THE WHOLE ENGINE FROM THE FRAME

⚠ CAUTION

The engine must be removed by an authorized centre or by an aprilia Official Dealer only.

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

⚠ CAUTION

The removal of the engine is a particularly complex operation. Therefore, inspect the vehicle carefully before proceeding.

This chapter describes the relevant procedures progressively and in sequential order.
Any reference to operations from other chapters must be interpreted logically in order to avoid components being removed unnecessarily.

Only perform those operations necessary to remove the component in question.

Before going ahead with the following operations, bear in mind that the engine must be removed from the frame from underneath; the equipment for the job must therefore be gathered and set in place beforehand.

Dry weight of the engine ~ 67 kg.

- Turn the ignition switch to position "⚿".
- Position the vehicle on the special rear support stand OPT.
- Disconnect the negative cable (–) and positive cable (+) from the battery, in that order.

⚠ CAUTION

When refitting, first connect the positive cable (+) and then the negative one (–).

- Remove the fuel tank completely, see 7.1.4 (COMPLETE REMOVAL OF THE FUEL TANK).
- Remove the throttle body, see 4.8.2 (REMOVING THE THROTTLE BODY).
- Remove the exhaust pipes, see 3.2.1 (REMOVING THE EXHAUST PIPES).
- Release the wiring from the special clamp (1).

⚠ CAUTION

Mark the cables so as to prevent them being mixed up by mistake during refitting.

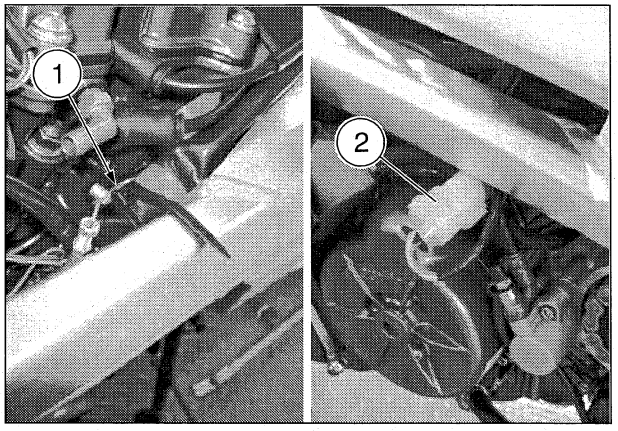
- Disconnect the following electric connectors in the order given:
  - generator (2);
  - camshaft position sensor (3);
  - front cylinder coolant thermistor (4);
  - rear cylinder coolant thermistor (5).

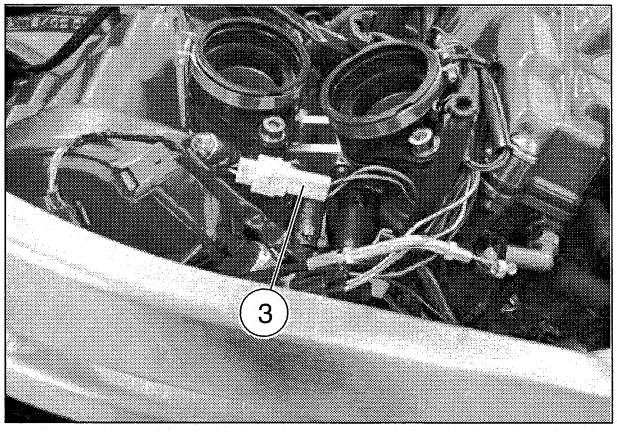
⚠ CAUTION

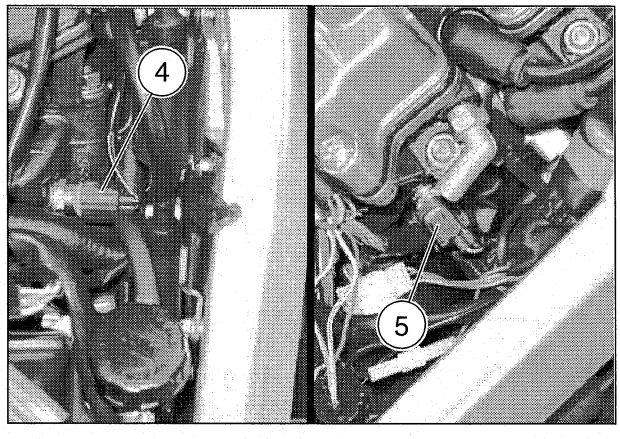
When refitting, make sure the electric connectors are plugged in properly.

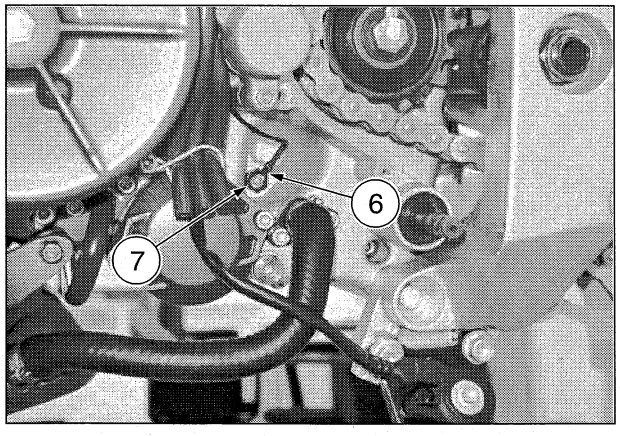
- Unscrew and remove the screw (6) and disconnect the cable from the "neutral" gear switch (7).

Follow ▶









Follow ▶

◆ Move the protection element (8) aside and disconnect the cable from the engine oil pressure sensor (9).

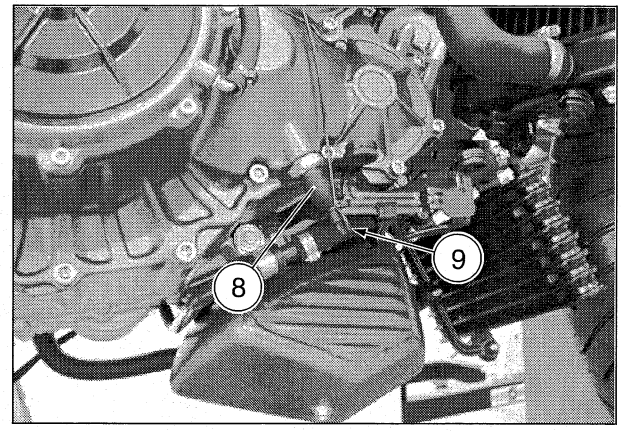
Earth cable screw driving torque: 10 Nm (1.0 kgm).

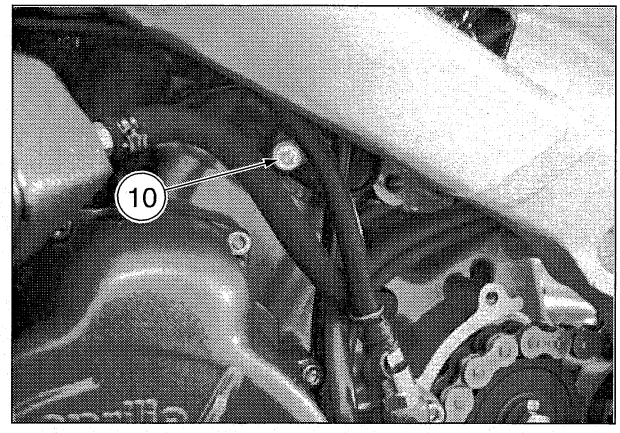
◆ Unscrew and remove the screw (10), releasing the earth cables.

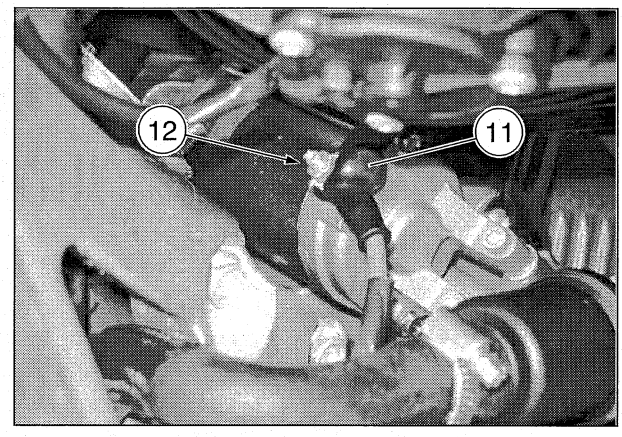
Starter cable nut driving torque: 5 Nm (0.5 kgm).

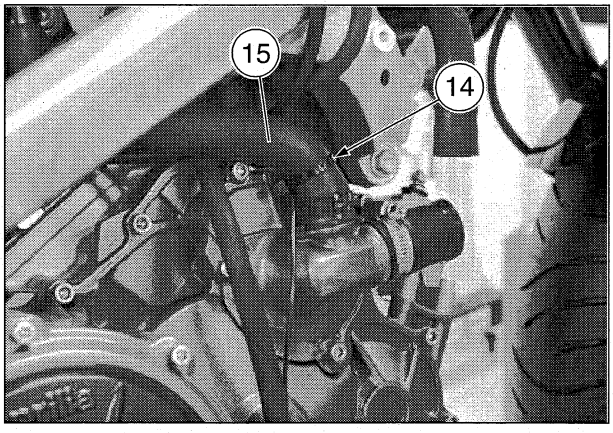
◆ Move the protection element (11) aside, unscrew and remove the nut (12), recover the washer and disconnect the starter motor cable.
◆ Remove the clutch control cylinder, see 3.2.4 (REMOVING THE CLUTCH CONTROL CYLINDER).
◆ Remove the drive pinion, see 7.1.49 (REMOVING THE DRIVING CHAIN SHOE).
◆ Remove the gearchange control connection element, see 3.2.2 (REMOVING THE GEARCHANGE CONTROL CONNECTION ELEMENT).
◆ Partially remove the expansion tank, see 5.10 (PARTIAL REMOVING THE EXPANSION TANK).
◆ ★Disconnect the spark plug caps (13).
◆ Remove the engine oil tank, see 7.1.47 (REMOVING THE ENGINE OIL TANK).
◆ Remove the thermal expansion valve, see 5.7 (REMOVING THE THERMAL EXPANSION VALVE).
◆ Remove the assembled radiators, complete with engine oil cooler, see 5.3 (REMOVING THE ASSEMBLED RADIATORS COMPLETE WITH ENGINE OIL COOLER).
◆ Release the head off the pipe clamp (14).
◆ Slip the coupling (15) off the coolant pump.

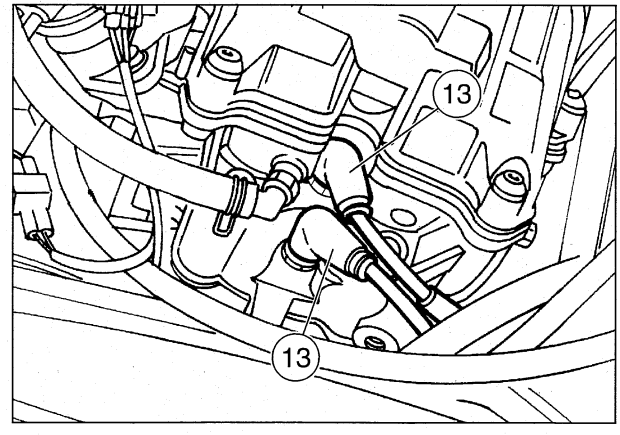
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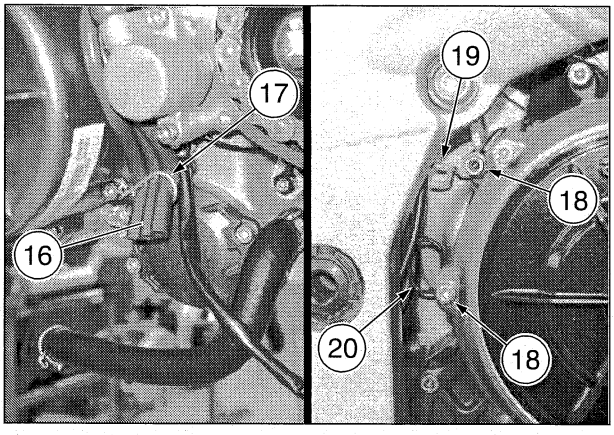
Follow ▶

⚠ CAUTION

To clean the outer parts of the engine use a degreaser, brushes and wipers.
Avoid damaging rubber and plastic parts with corrosive or penetrating detergents and solvents.

Should the use of a steam cleaner prove necessary, do not point the high-pressure jets of water, steam or air at the following parts: wheel hubs, controls on the right and left handlebars, brake pumps, instruments and gauges, silencer openings, document compartment, ignition switch/steering lock, electrical components.

◆ Clean the outside of the engine thoroughly.



⚠ CAUTION

Free all the cables and pipes from the respective clamps located at intervals along their routes.

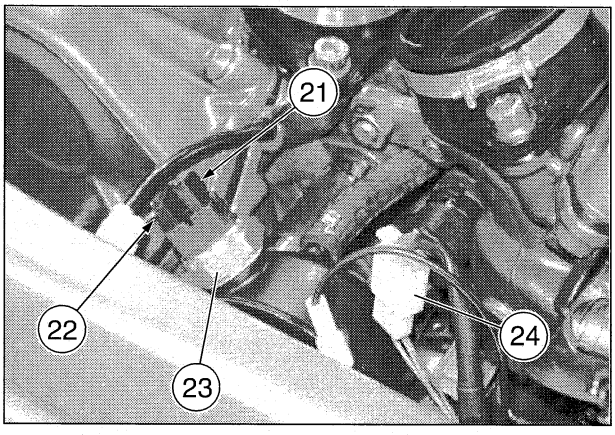
Procure an equal number of clamps to be used for refitting.

Plug all openings on the engine, pipes and couplings to prevent foreign bodies getting in.

◆ Gather the electric cables together and secure them in place with adhesive tape so that they do not get in the way of the engine being lifted out from underneath.
◆ Release the three pipes (16) from the cable guide (17).

Membrane cover fastening screw driving torque: 5 Nm (0.5 kgm).

◆ Unscrew and remove the screws (18).



⚠ CAUTION

Upon reassembly, correctly position the two cable guides (19) and (20).

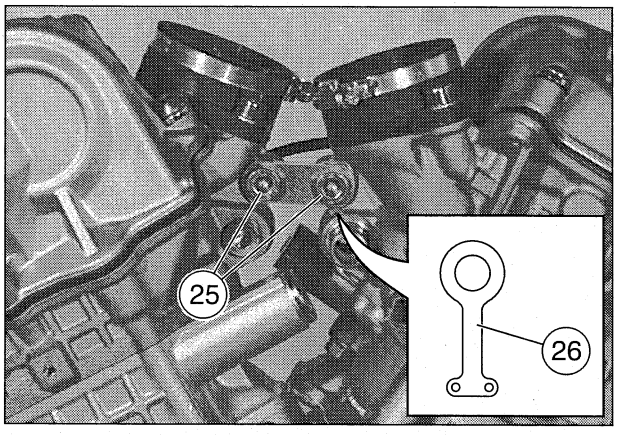
◆ Disconnect the electric connectors (21) (22) from the thermal switch (23).

⚠ CAUTION

Upon reassembly, make sure that the electric connectors (21) (22) are correctly coupled with the thermal switch (23).

◆ Disconnect the electric connector (24) of the stand switch.
◆ Unscrew and remove the screws (25) and recover the plate.

Head plate screw driving torque: 40 Nm (4.0 kgm).

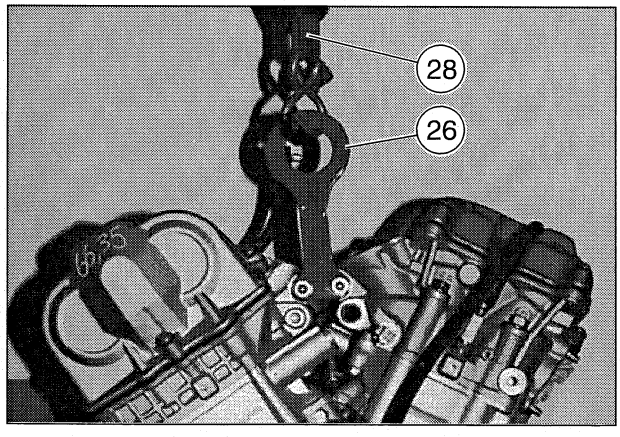


NOTE Have the appropriate special tool OPT to hand:
– **aprilia** part# 8140183 (engine lifting eye hook) (26), a hoist (27) and lifting straps (28).

⚠ WARNING

The hoist (27) and the bands (28) for the lifting operation must be suitable for safely bearing the weight of the engine. The engine weight approx. 67 kg.

◆ Fasten the special engine lifting hook (26) [**aprilia** part# 8140183 (engine lifting eye hook) OPT] on and secure it in place with the screws (24).



Follow ▶

Follow ▶

◆ Hook the bands (28) onto the hoist (27) and the hook (26) as illustrated.

⚠ WARNING

The entire engine and hoist setup must be stable, ensuring that the subsequent operations can be performed safety.

◆ Lift the hoist arm (27) until the bands (28) are taught.

⚠ CAUTION

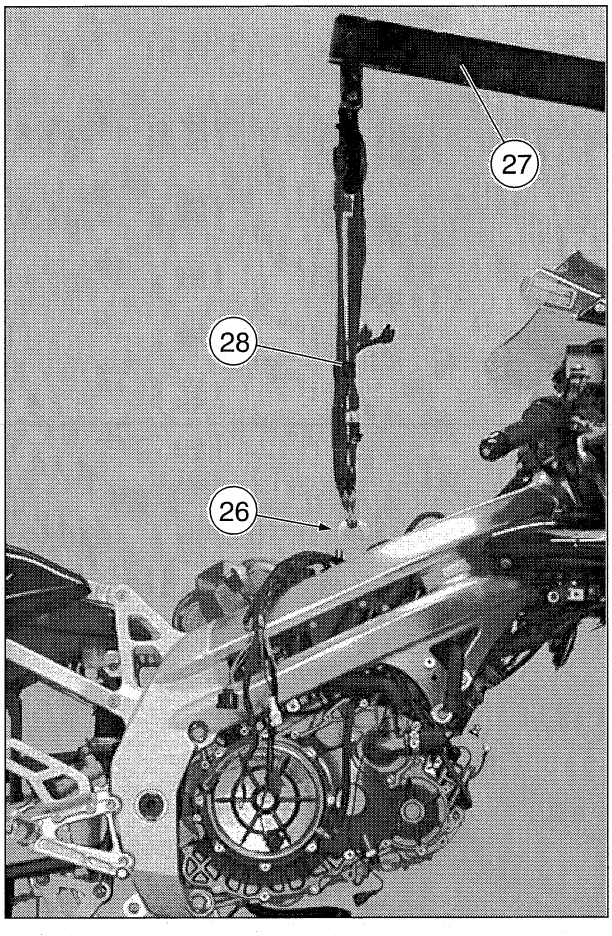
The hoist arm (27) must be lifted just enough for the engine to be held in place during the removal of the elements fastening it to the frame.

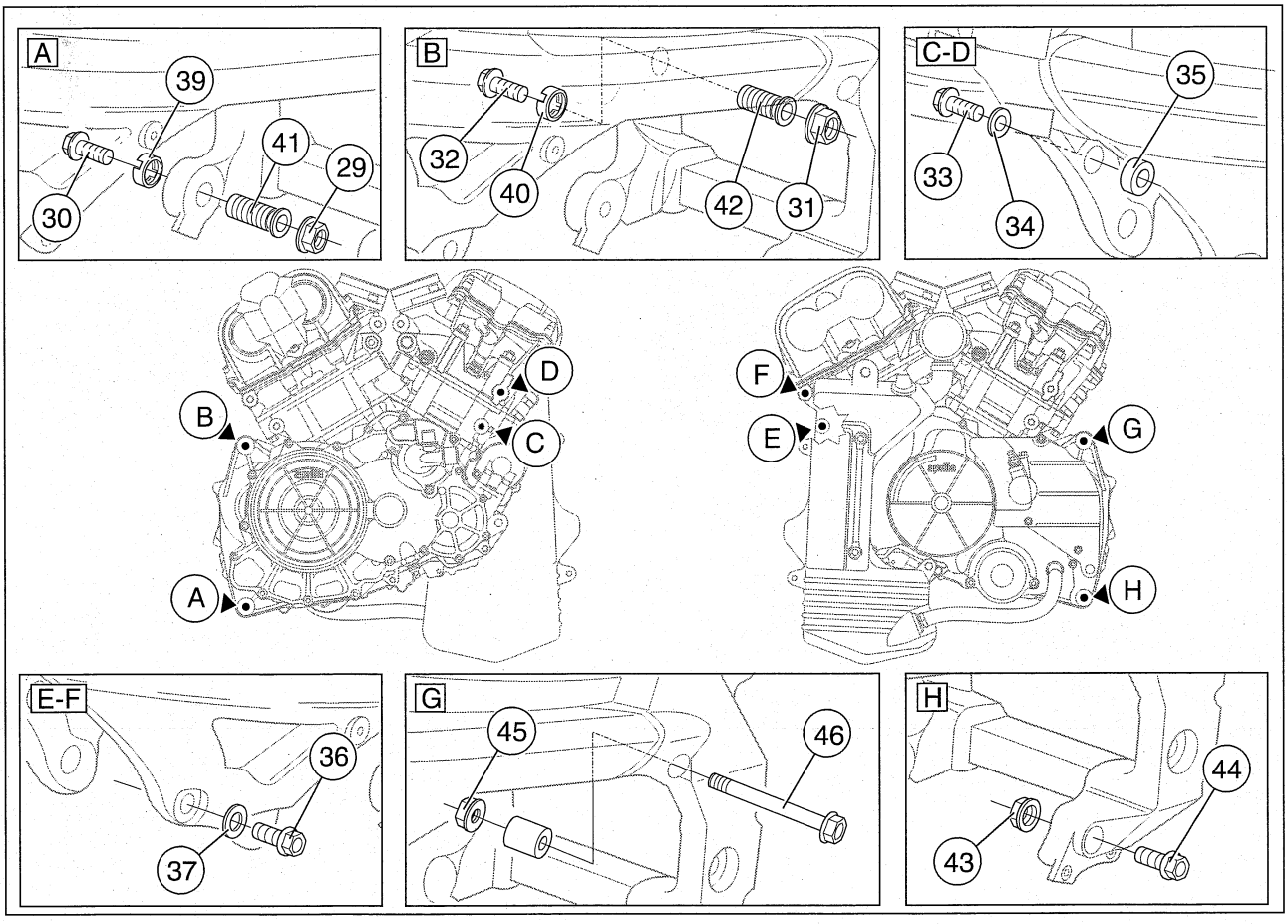
NOTE The elements fastening the engine to the frame must be removed in the order given:

RIGHT SIDE → A → B → C → D.

LEFT SIDE → E → F → G → H.

Follow ▶





Follow ▶

Driving torque of the engine-frame lower fastening screw: 50 Nm (5.0 kgm).

◆ Holding the inside nut (29) still, loosen the screw (30).

Driving torque of the engine-frame rear fastening screw: 50 Nm (5.0 kgm).

◆ Holding the inside nut (31) still, loosen the screw (32).
◆ Unscrew and remove the two screws (33) and recover the relevant washers (34).
◆ Recover the two spacers (35).

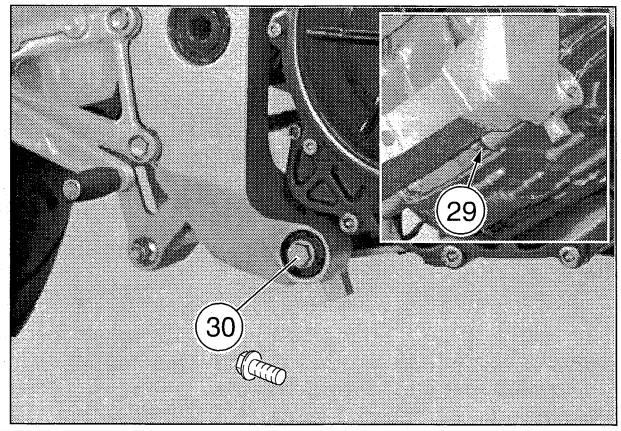
Driving torque of the engine-frame front fastening screws: 50 Nm (5.0 kgm).

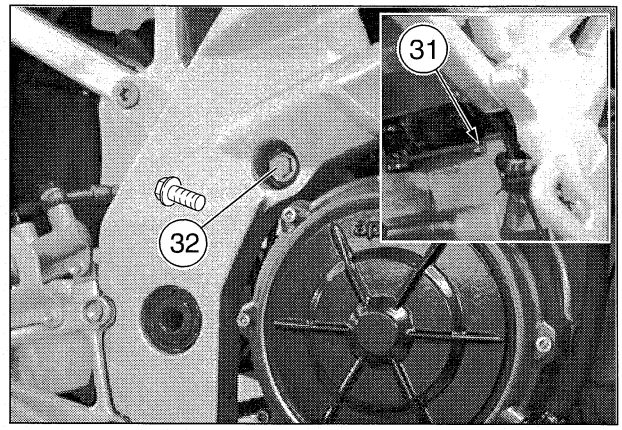
◆ Unscrew and remove the two screws (36) and recover the washers (37).

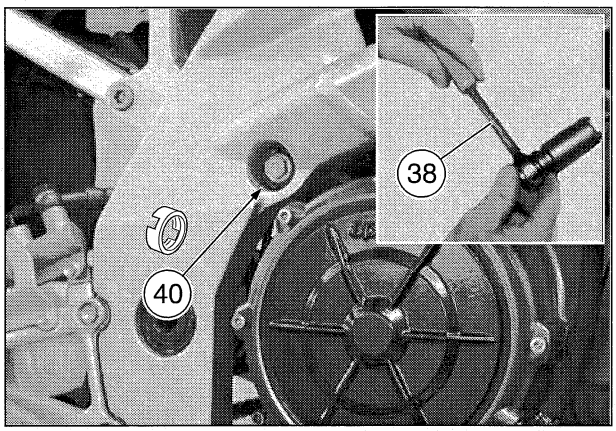
Engine locking ring nut driving torque: 50 Nm (5.0 kgm).

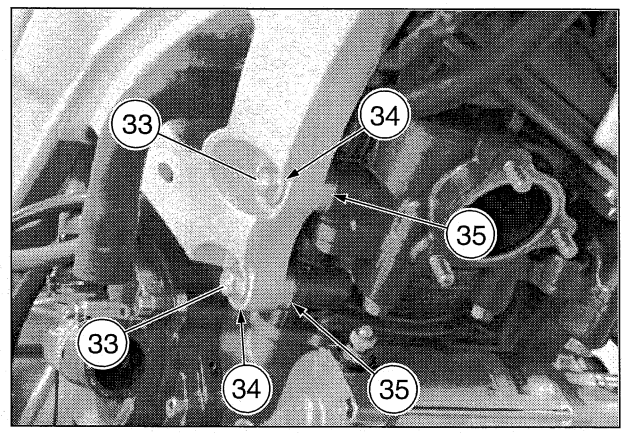
◆ Use the special setscrew spanner OPT (38) [**aprilia** part# 8140203 (socket spanner for adjusting fork pin - engine mounts)] to loosen and remove the lock rings (39 - 40).

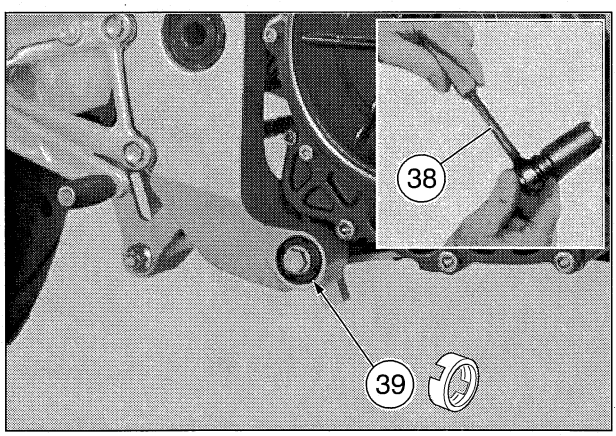
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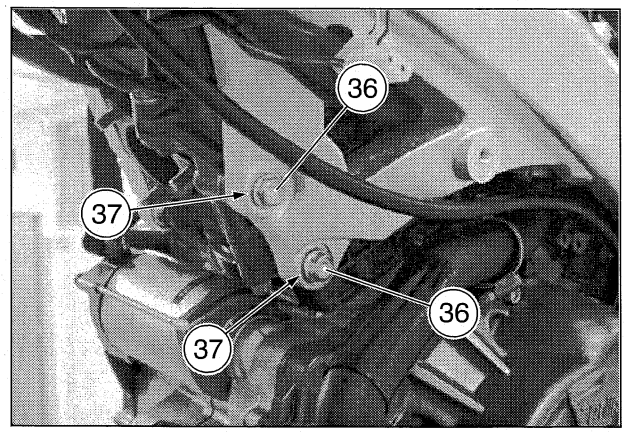












Follow ▶

Engine adjusting bush driving torque: 12 Nm (1.2 kgm).

◆ Unscrew the adjusting bushes (41) (42) all the way until they touch the frame.

⚠ CAUTION

When reassembling, screw the adjusting bushes (41) (42) on by hand all the way until they touch the engine before torquing them to specification.

◆ Holding the inside nut still, loosen and remove the screw (30).
◆ Holding the inside nut still, loosen and remove the screw (32).

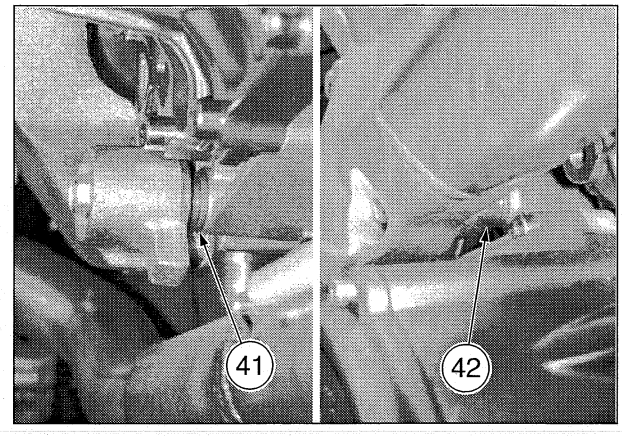
Driving torque of the engine-frame lower fastening screw: 50 Nm (5.0 kgm).

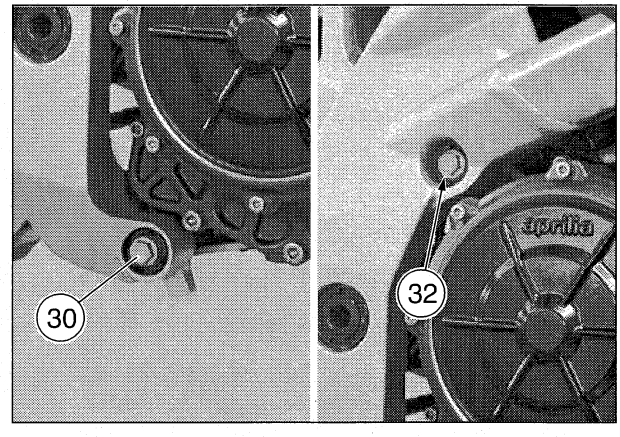
◆ Holding the inside nut (43) still, loosen and remove the screw (44).

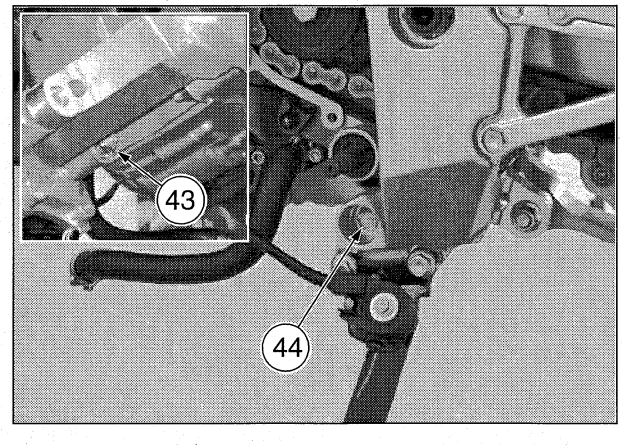
Driving torque of the engine-frame rear fastening screw: 50 Nm (5.0 kgm).

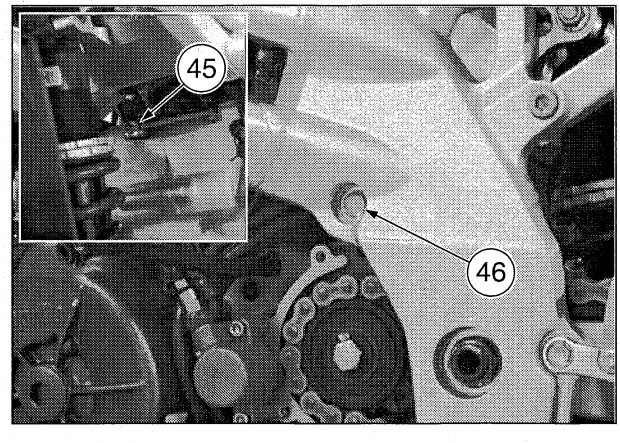
◆ Holding the inner nut (45) in its position, unscrew and remove the screw (46), taking the spacer.

Follow ▶









Follow ▶

⚠ WARNING

The engine is now freed and has nothing fastening it.

Handle with care: watch your fingers and limbs.

Clear the floor, on which the engine is to be set down, of any tools and clean thoroughly.

- ◆ Lift the hoist arm by a few millimeters in order to "release" the engine from the frame.
- ◆ Lower the hoist arm until the engine is gently set down on the floor.
- ◆ Secure the engine so that it does not fall over if poorly balanced.
- ◆ Unhook the bands (28) from the hoist.
- ◆ Slide the bands (28) out from the frame.
- ◆ Move the engine from under the frame.
- ◆ Hook the bands (28) back up to the engine.

NOTE If the engine is to be worked on, set it on the relevant stand OPT (47) [**aprilia** part# 8140187 (engine support stand) + **aprilia** part# 8140188 (engine support)].

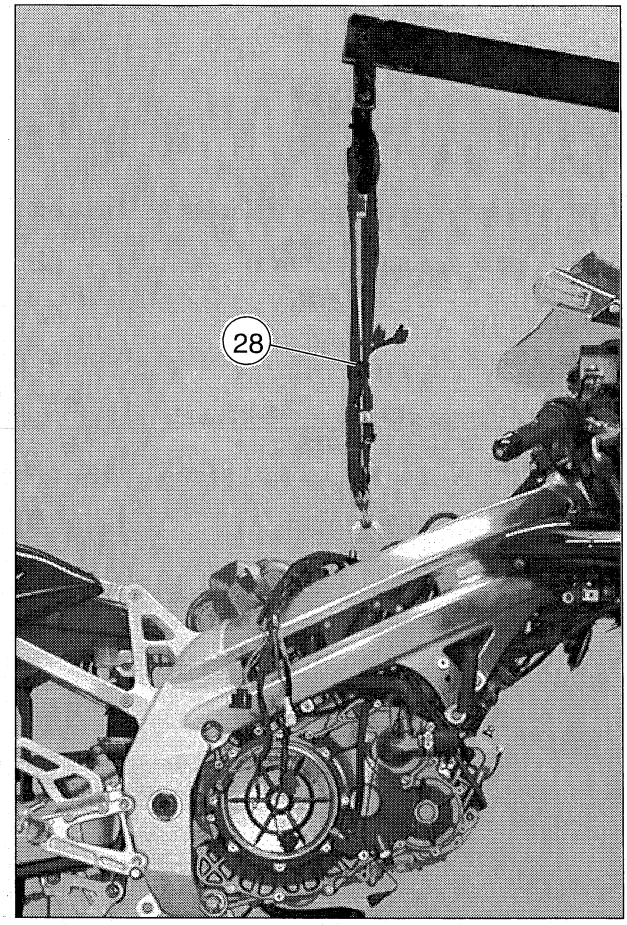
⚠ CAUTION

If no work is to be performed on the engine, leave it rested on the floor and attached to the bands (28) and hoist for extra safety.

- ◆ Clean the outside of the engine thoroughly.

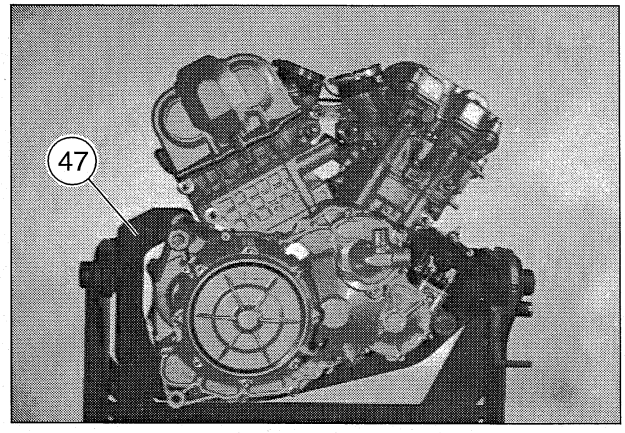
⚠ CAUTION

Use a detergent, brushes and rags to clean the engines outer surfaces.
Avoid damaging rubber and plastic parts with corrosive or penetrating detergents and solvents.



3.4 DISASSEMBLING THE ENGINE

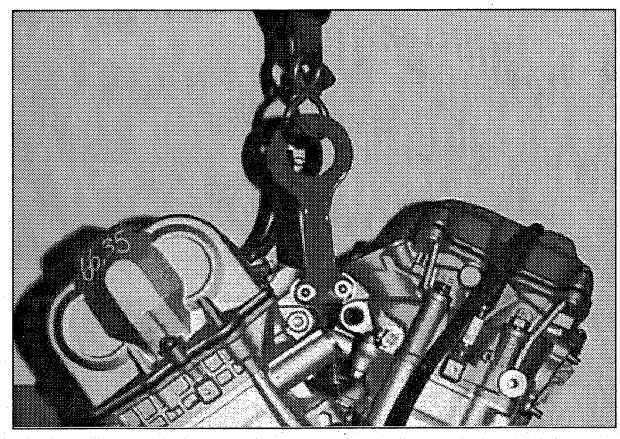
See **aprilia** part# 8140582 (Engine service and repair manual V990 1051-1).



3.5 REFITTING THE WHOLE ENGINE ON THE FRAME

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

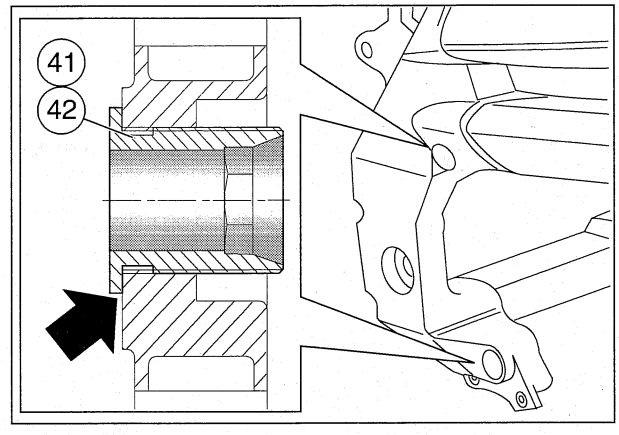
NOTE In order to refit the whole engine on the frame, the same procedure used for its removal must be followed in the reverse order, see 3.3 (REMOVING THE WHOLE ENGINE FROM THE FRAME).
Nonetheless, before commencing, the operations indicated below must be performed.



⚠ WARNING

Handle with care.
Watch your fingers and limbs.

- Make sure the adjusting bushes (41) (42) are unscrewed all the way so that they touch the frame.
- Nudge the engine along gradually until the engine/frame fastening holes (A) (B) (C) (D) are perfectly aligned).



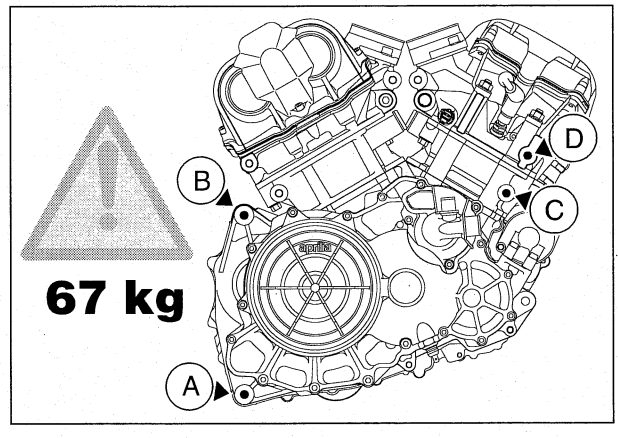
Once the engine refitting procedure is complete, perform the operations indicated below.

- Make sure all the nuts/screws securing the engine are properly torqued.
- Top up the coolant, see 2.15 (CHECKING AND TOPPING UP COOLANT).
- Top up the motor oil, see 2.13 (CHECKING THE ENGINE OIL LEVEL AND TOPPING UP).
- If the engine has been overhauled, bleed the engine oil circuit, see 3.6.1 (BLEEDING THE ENGINE OIL CIRCUIT) and check the engine oil pressure, 3.6.2 (CHECKING THE ENGINE OIL PRESSURE).
- Check the driving chain is taught and, where necessary, adjust, see 2.35.1 (CHECKING THE DRIVE CHAIN) and 2.35.3 (ADJUSTING THE DRIVING CHAIN).

⚠ CAUTION

Perform a general check of all the components affected by the procedure, in particular make sure:

– the electric cables are fastened with relevant clamps;



⚠ CAUTION

None of the cables must be twisted and/or squashed.

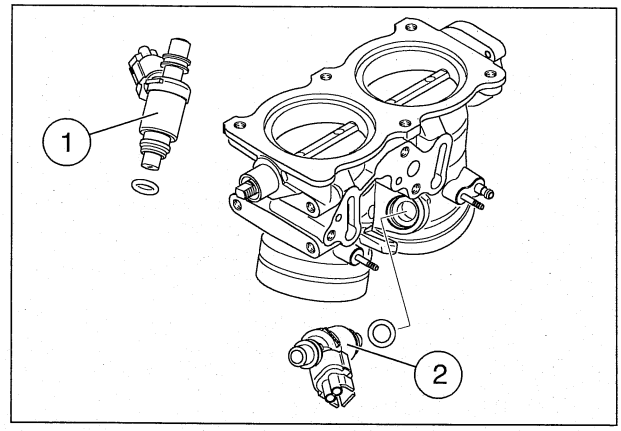
– the electric connectors are plugged in properly;
– the pipes and couplings are connected properly and secured with relevant clamps;
– the throttle cable and cold-start cable slide freely and are not pulled too tight when the handlebar is turned;
– the gearshift lever is positioned correctly;
– the rear brake lever is positioned correctly.

3.6 ENGINE CHECKS SUBSEQUENT TO REASSEMBLY

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

3.6.1 BLEEDING THE ENGINE OIL CIRCUIT

- Refill the engine with motor oil, see 2.14 (CHANGING THE ENGINE OIL AND THE OIL FILTER).
- Slip the two electric connectors off the two injectors (1-2).
- Press the start push button and let the engine run until the engine oil pressure warning light LED goes out.
- Insert the two electric connectors on the two injectors (1-2).
- Top up with motor oil until the tank level reaches the prescribed limit, see 2.13 (CHECKING THE ENGINE OIL LEVEL AND TOPPING UP).
- Start the engine and let it idle for approx. 10 minutes.
- Check the oil level again and, where necessary, top up.



3.6.2 CHECKING THE ENGINE OIL PRESSURE

NOTE Have the appropriate special tool OPT to hand:
– **aprilia** part# 8140181 (Fuel - oil pressure gauge) (3).

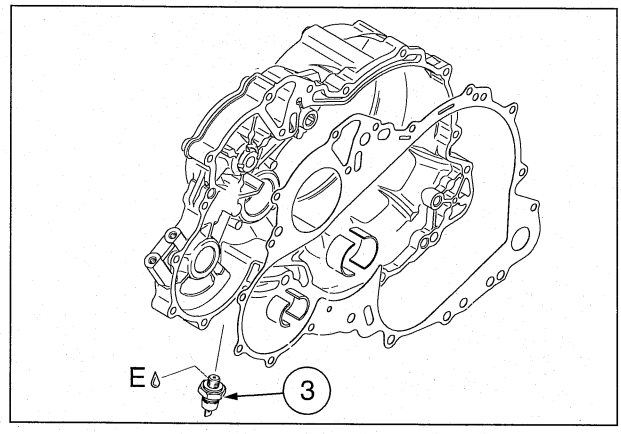
- Connect the oil pressure gauge (4) in place of the engine oil pressure sensor (3).

Engine oil pressure: min. 50 kPa (0.5 bar).

NOTE Check the oil pressure at a temperature of 80 °C (176 °F) and at a speed of at least 1200 rpm.

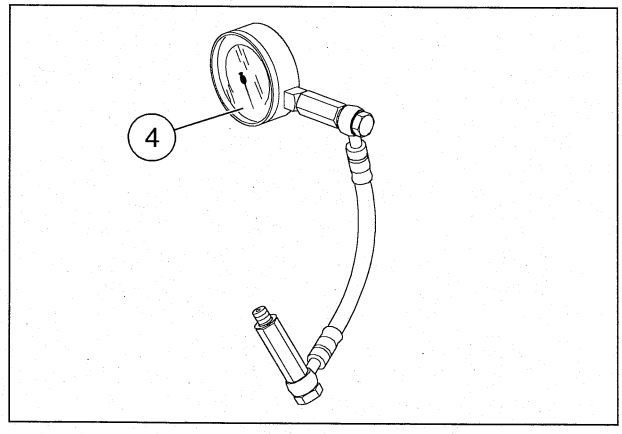
⚠ CAUTION

If the oil pressure is below the minimum limit, check the oil pump and relevant drive assembly.



- During reassembly, coat the thread of the engine oil pressure sensor (3) with LOCTITE® 243.

Engine oil pressure sensor driving torque: 15 Nm (1.5 kgm).



3.6.3 SYNCHRONIZING CYLINDERS

see 4.8.10 (SYNCHRONIZING CYLINDERS).

NOTE

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FUEL SUPPLY SYSTEM

4

FUEL SUPPLY SYSTEM

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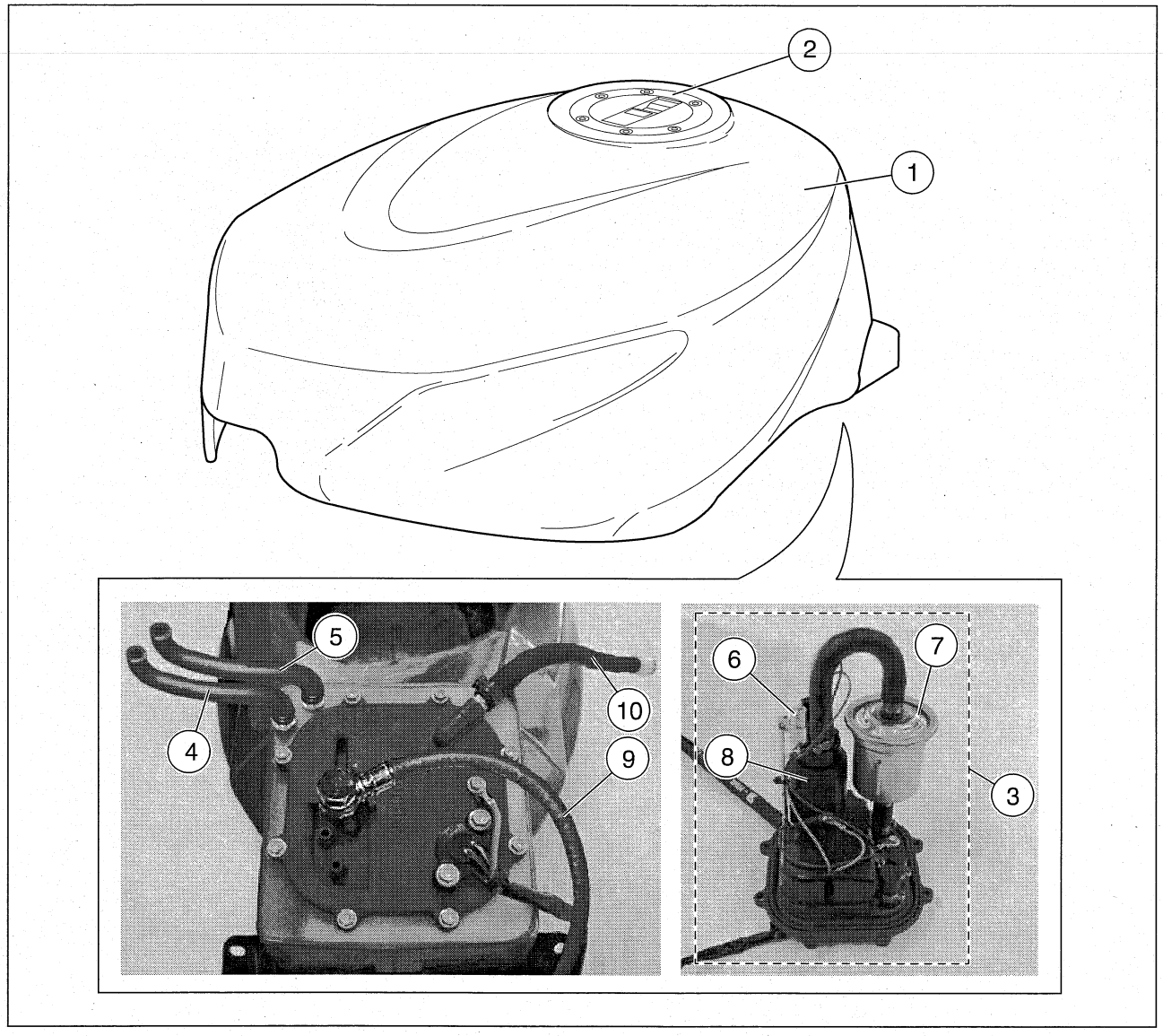
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4.1 FUEL TANK

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.1 (FUEL).

The filler cap is to be found on the top of the tank, whilst the bottom part houses:

- the fuel supply pump unit;
- a pipe for draining water from the filler cap in the event of rain or during washing;
- a pipe for draining off petrol in the event the tank is overfilled.



KEY

1) Fuel tank
2) Filler cap
3) Fuel supply pump unit
4) Filler cap water drainage pipe
5) Fuel "overflow" drainage pipe
6) Fuel level sensor
7) Fuel delivery filter
8) Fuel supply pump
9) Fuel delivery pipe
10) Fuel return pipe

⚠ WARNING

Fuel vapours are noxious for your health.
Before proceeding, make sure that the room in which you are working is properly ventilated.
Do not inhale fuel vapours.

Avoid any contact of the fuel with the skin.
Do not smoke and do not use naked flames.
Do not dispose of fuel in the environment.

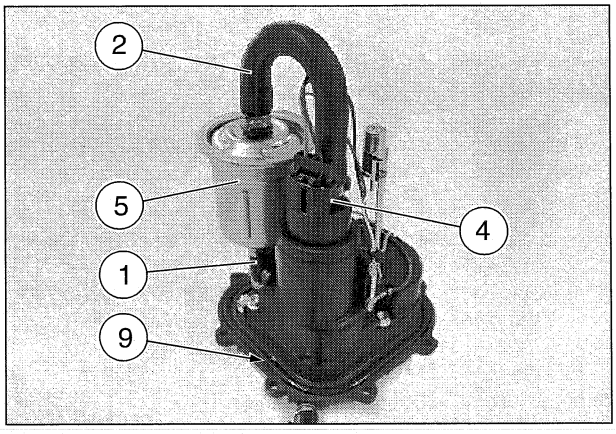
4.1.1 MAINTENANCE

◆ When the fuel supply pump is to be removed, see 4.3 (REMOVING THE WHOLE FUEL SUPPLY PUMP UNIT), it is advisable to make sure the pipes (1 - 2) are intact and that the following are working properly:

– fuel level sensor (3), see 6.10.2 (LOW FUEL WARNING LIGHT);
– fuel supply pump (4), see 6.5.2 (CHECKING THE FUEL PUMP).

◆ Change the delivery filter (5).

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



4.1.2 CHECKING THE FUEL SUPPLY

Check the fuel pipes every 7500 km (4687 mi) or 8 months; replace every 4 years.

⚠ WARNING

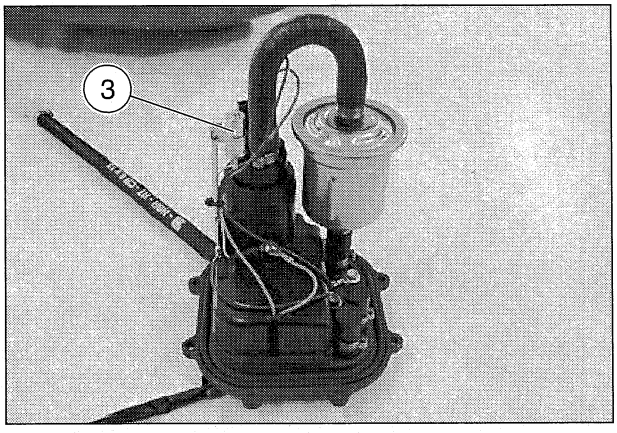
Check the delivery pipe (6), return pipe (7) and relevant connections extremely carefully; the operating pressure of the delivery pipe (6) is approx. 450 kPa (4.5 bar).

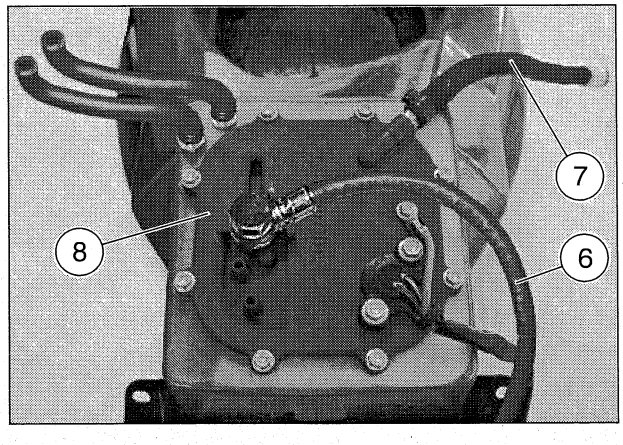
Any fuel pipes featuring cracks or cuts must be replaced, without exception.

Fuel leaking from the flange (8) might be due to a damaged O-ring (9), consequently:

◆ Remove the whole fuel supply pump unit, see 4.3 (REMOVING THE WHOLE FUEL SUPPLY PUMP UNIT), check its state of repair and, where necessary, replace it.
◆ Open the filler cap and make sure the vent on the tank is not clogged. Where necessary, unclog it using a compressed air jet.

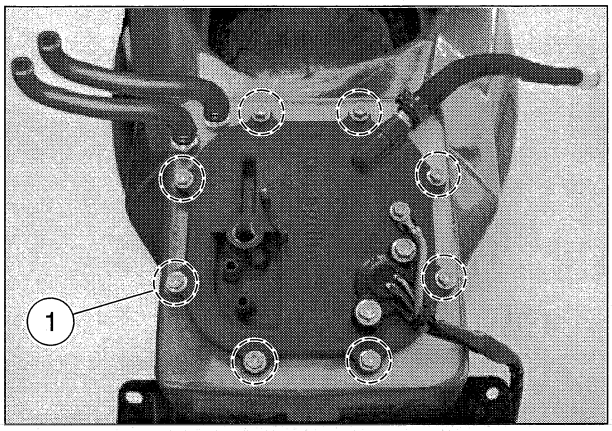
NOTE For further details see 6.5.2 (CHECKING THE FUEL PUMP).





4.2 DRAINING THE FUEL TANK

See 2.9 (DRAINING THE FUEL TANK) for the fuel tank draining procedure.



4.3 REMOVING THE WHOLE FUEL SUPPLY PUMP UNIT

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS), 1.2.1 (FUEL) and 4.1.1 (MAINTENANCE).

◆ Remove the fuel tank completely, see 7.1.4 (COMPLETE REMOVAL OF THE FUEL TANK).

⚠ CAUTION

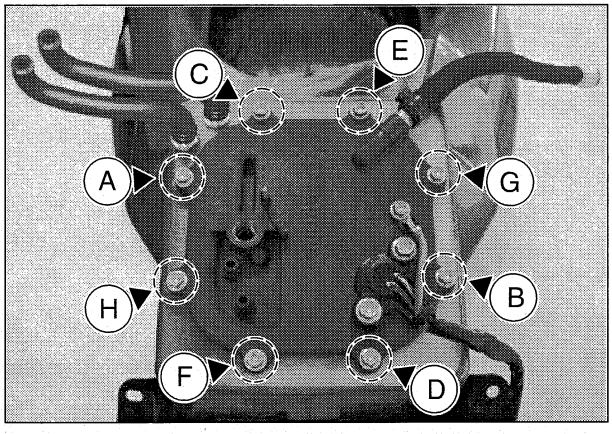
Handle the fuel tank with care and avoid scraping or damaging them.

NOTE Set the tank on a clean surface with the pump unit facing up.

◆ Unscrew and remove the screws (1).

NOTE When reassembling, screw all the screws on manually and tighten them in a crisscross pattern in the following order: A-B-C-D-E-F-G-H.

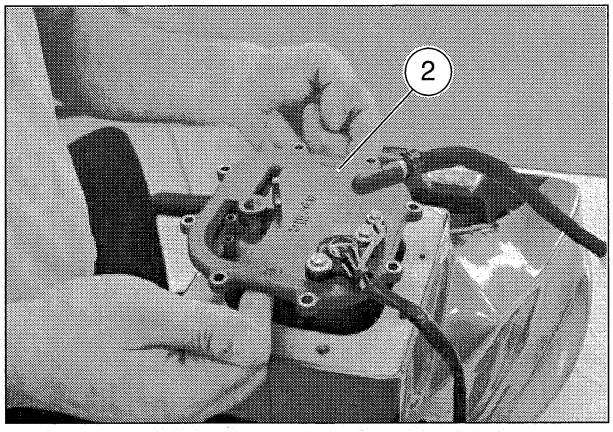
Fuel pump screw driving torque: 6 Nm (0.6 kgm).



⚠ CAUTION

When removing the pump unit (2), take care not to damage the pipes and the fuel level sensor (3).

◆ Remove the whole pump unit (2).



4.4 REMOVING THE FUEL LEVEL SENSOR

◆ Remove the whole fuel supply pump unit, see 4.3 (REMOVING THE WHOLE FUEL SUPPLY PUMP UNIT).
◆ Release and remove the clamp (4).

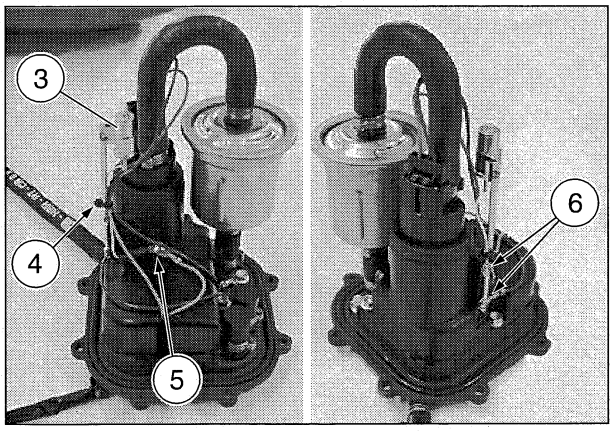
Before removing the screws (5) (6), make sure the relevant electric terminals fastened on them are positioned correctly.

◆ Unscrew and remove the screw (5).

Fuel level sensor screw driving torque: 1 Nm (0.1 kgm).

◆ Unscrew and remove the screws (6).
◆ Remove the sensor (3).

NOTE When reassembling, position the terminals of the electric cables correctly, in the relevant fastening positions, using the screws (5) (6).



4.5 REMOVING THE FUEL SUPPLY PUMP

◆ Remove the whole fuel supply pump unit, see 4.3 (REMOVING THE WHOLE FUEL SUPPLY PUMP UNIT).

NOTE Obtain appropriate pliers to attach the clamps, or screwdriver-type pipe clamps to replace the original ones (special type without screw).

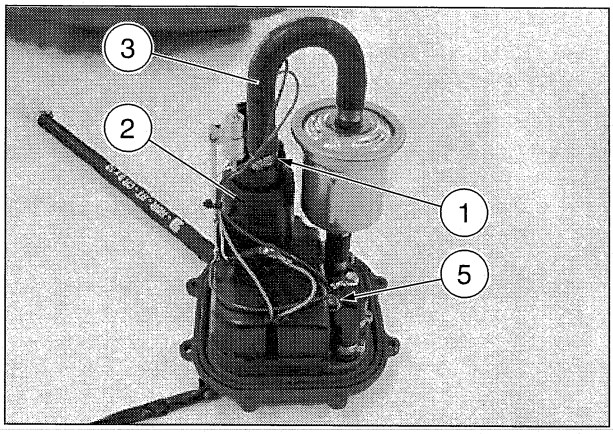
◆ Release the head off the pipe clamp (1).
◆ Pull the fuel pipe (3) off the pump (2).
◆ Disconnect the electric connector (4).

⚠ CAUTION

When reassembling, make sure the electric connector (4) is plugged in properly.

Pump support screw driving torque: 4 Nm (0.4 kgm).

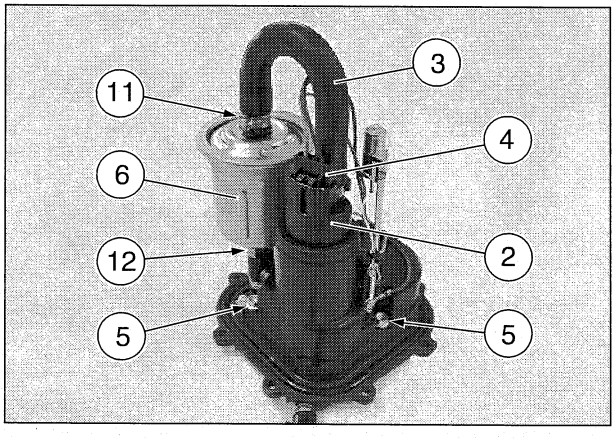
◆ Unscrew and remove the screws (5).



⚠ CAUTION

When performing the operations below, take care not to entangle the electric cables.

◆ Bend the fuel filter (6) over sideways and keep it held down.
◆ Lift the pump mount (7) just enough to be able to slide out the fuel pump (2).
◆ Slide the fuel pump (2) off the mount (7) and recover the O-ring (8).



⚠ CAUTION

If the rubber element (9) supporting the pump proves damaged, replace it.

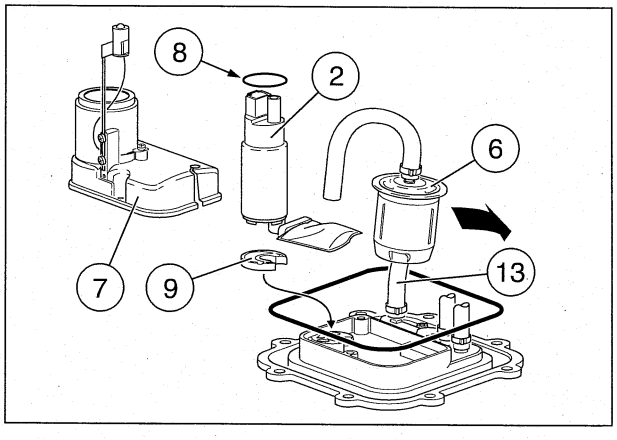
If the filtering mesh (10) features traces of sediments, clean it using a compressed air jet directed so that the impurities do not get inside.

4.6 REMOVING THE DELIVERY FILTER

◆ Remove the whole fuel supply pump unit, see 4.3 (REMOVING THE WHOLE FUEL SUPPLY PUMP UNIT).

NOTE Obtain appropriate pliers to attach the clamps, or screwdriver-type pipe clamps to replace the original ones (special type without screw).

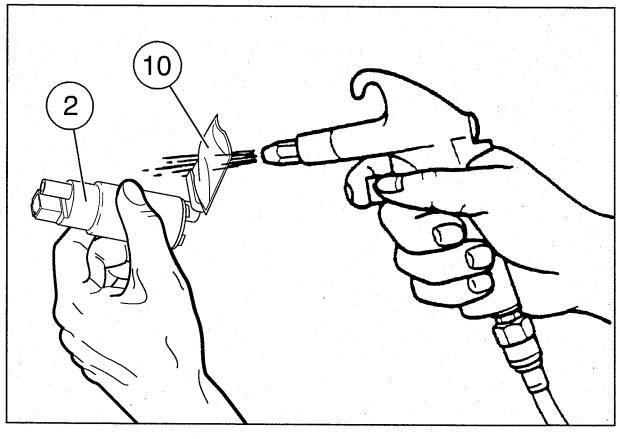
◆ Release the head off the pipe clamps (11-12).
◆ Slip the pipe (3) off the filter (6).
◆ Slip the filter (6) off the pipe (13).



⚠ CAUTION

Do not use filters that have already been used.

◆ Replace the filter (6) with a new one of the same type.



4.7 ENGINE MANAGEMENT

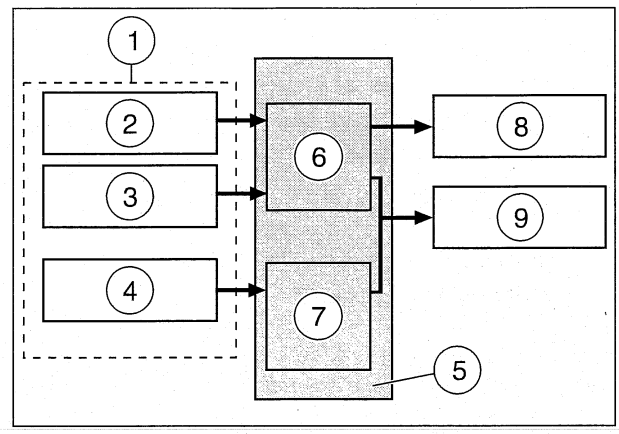
4.7.1 FOREWORD

The "heart" of the engine's management consists in the electronic Engine Control Unit which manages and optimizes the ignition and injection of the fuel.

- The ignition management depends on the specific consumption levels. The engine control unit measures the exact ignition angle based on the engine rpm signals and on the position of the throttle valves (quantity of air).
- The engine control unit manages the injection time (quantity of fuel) based on the rpm signal, the throttle valve signal (quantity of air, pressure of induction pipe) and correction factors of the various sensors.
- Every time the engine is switched on, the engine control unit checks the sensors and ignition coils, making sure they are working correctly. If any anomalies are encountered, the message "EFI" flashes on the display.
- The safety devices inside the engine control unit stop ignition and the injection of the fuel when the speed exceeds the permissible peak rpm, which is 10500 rpm, or if the vehicle falls over.
  When the vehicle is set on the side stand and a gear is engaged, ignition is stopped, preventing the vehicle from starting.

⚠ CAUTION

Any modifications or variations made to the exhaust system, intake system or the engine control unit may result in serious damage to the engine.
The assembly, modification or use of non-original parts shall cause any warranty to become void and shall exempt the manufacturer from any liability.



KEY

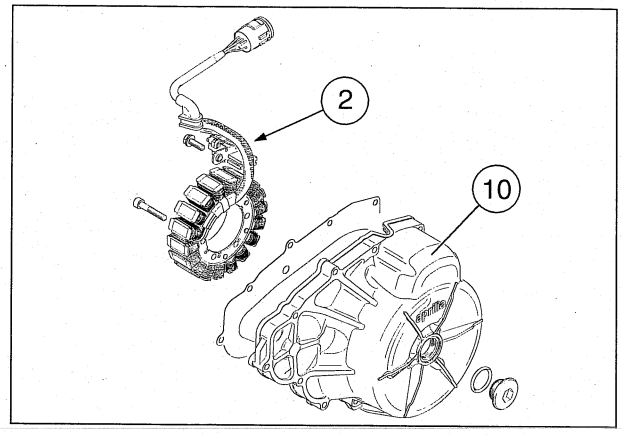
1) Signals
2) Driving shaft position sensor (engine rpm)
3) Throttle valve potentiometer (position of the throttle valves)
4) Other sensors
5) Electronic unit
6) Standard data
7) Correction factors
8) Ignition coil (ignition angle)
9) Injector (injection time)

4.7.2 SENSORS

Driving shaft position sensor (2)

Location: in the flywheel cover (10)

The signals are emitted by the transducers located on the rotor.
The engine speed and the position of the driving shaft are calculated based on the signals emitted.



Camshaft position sensor (11)

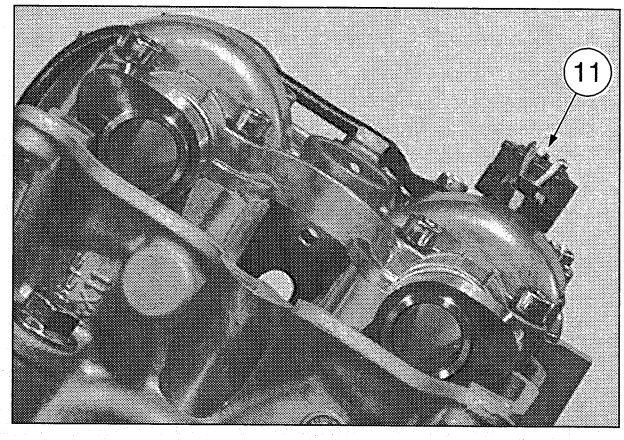
Location: in head "1" (12) (front).

The signal is emitted by a transducer located on the control gear of the output camshaft.
Based on this signal, the engine control unit calculates the position of cylinder "1" (front) and "2" (rear) during the work cycle.

Intake pressure sensor (13)

Location: in the intake manifold.

The pressure measured in the induction pipe is converted into a voltage signal.
Moreover, the injection time also depends on the induction pipe pressure, especially when the throttle valve opening angle is limited (during idling).

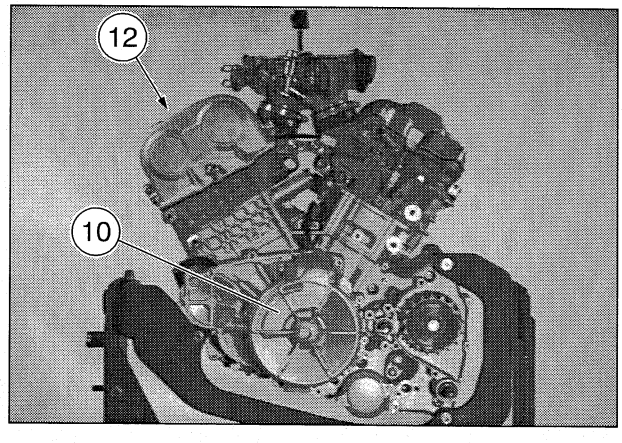


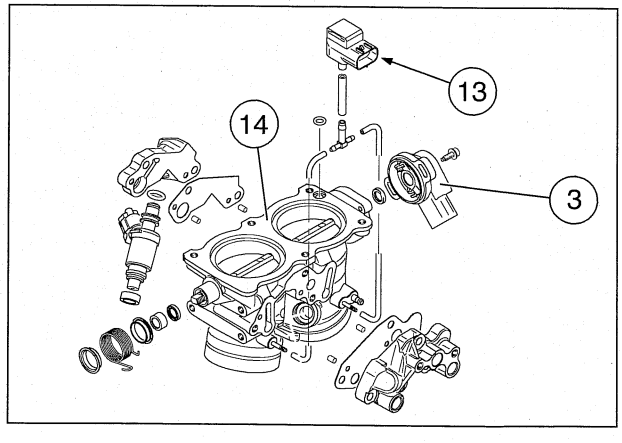
Throttle valve potentiometer (3)

Location: on the throttle body (14).

The throttle valve potentiometer measures the position of said valves and acts as the main parameter in determining the injection time and ignition angle.

Follow ▶



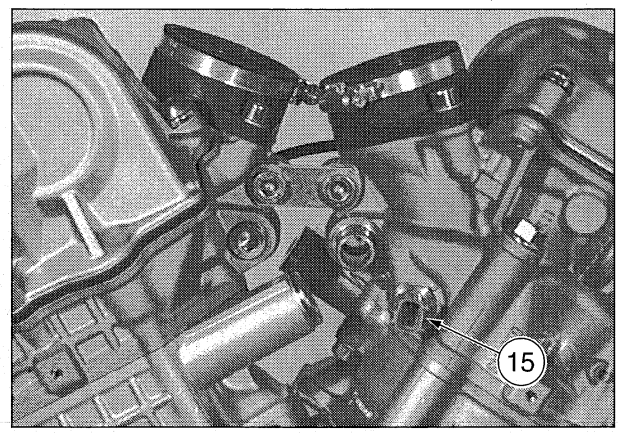


Follow ▶

Coolant thermistor (15)

Location: on head "2" (16) (rear cylinder).

The temperature sensor detects the coolant temperature and is required to correct the injection time. The injection time is increased if the coolant has not yet reached the working temperature.



Atmospheric pressure sensor

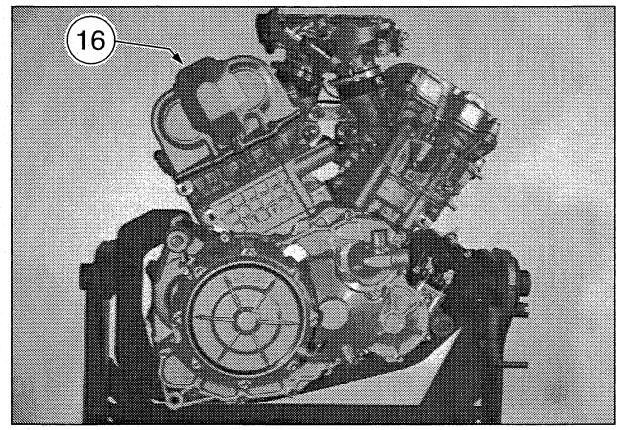
Location: inside the engine control unit (5).

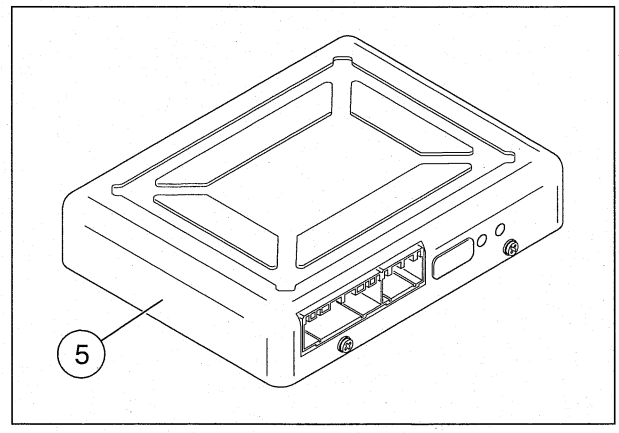
The intake pressure measured by the sensor is converted into a voltage signal and is required by the engine control unit to correct the injection time.

Air thermistor

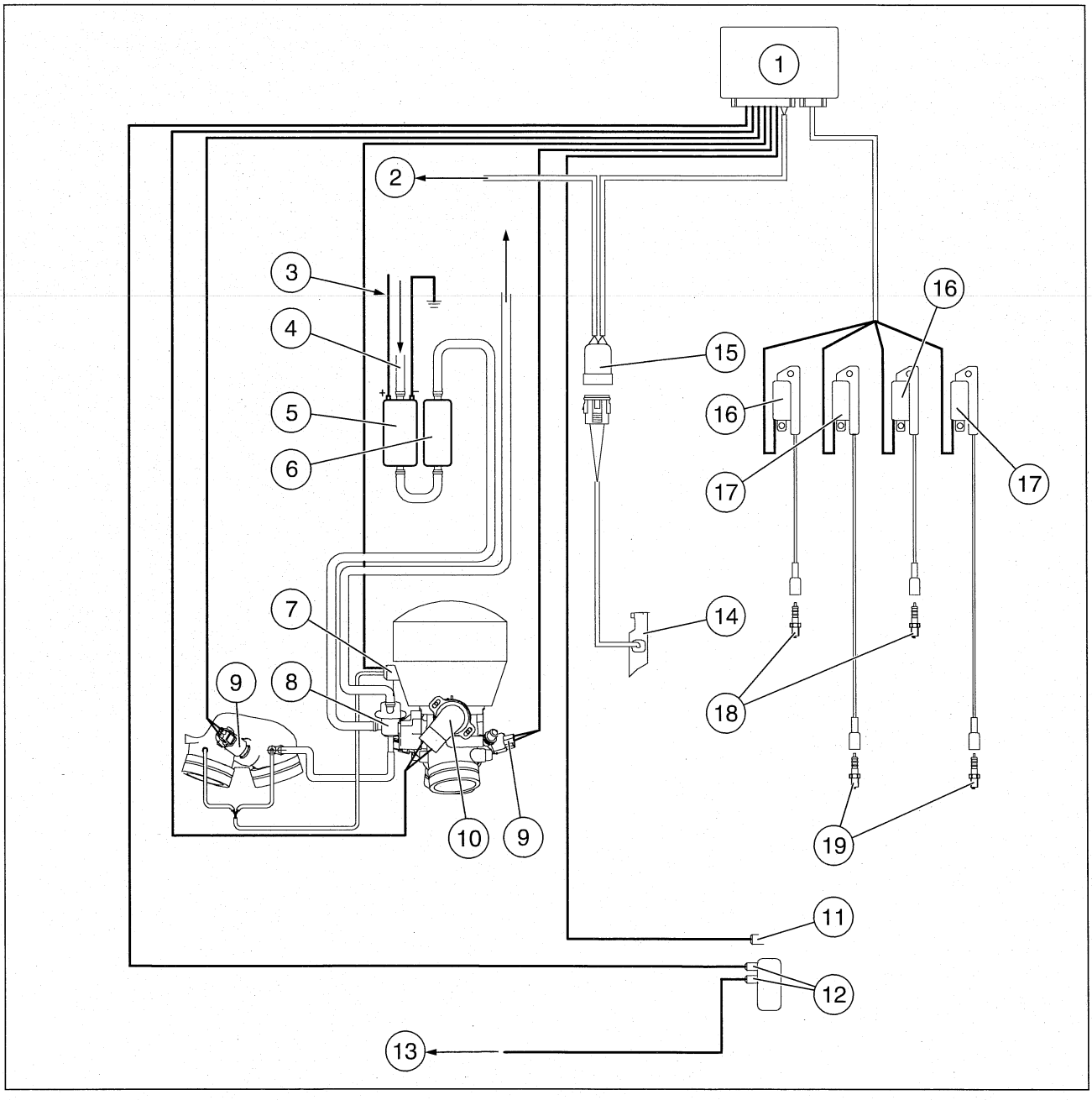
Location: in the intake pipe of the left-hand air conveyor.

The resistance measured by the thermistor is converted into a voltage signal and is required by the engine control unit to correct the injection time.





4.7.3 INJECTION SYSTEM DIAGRAM

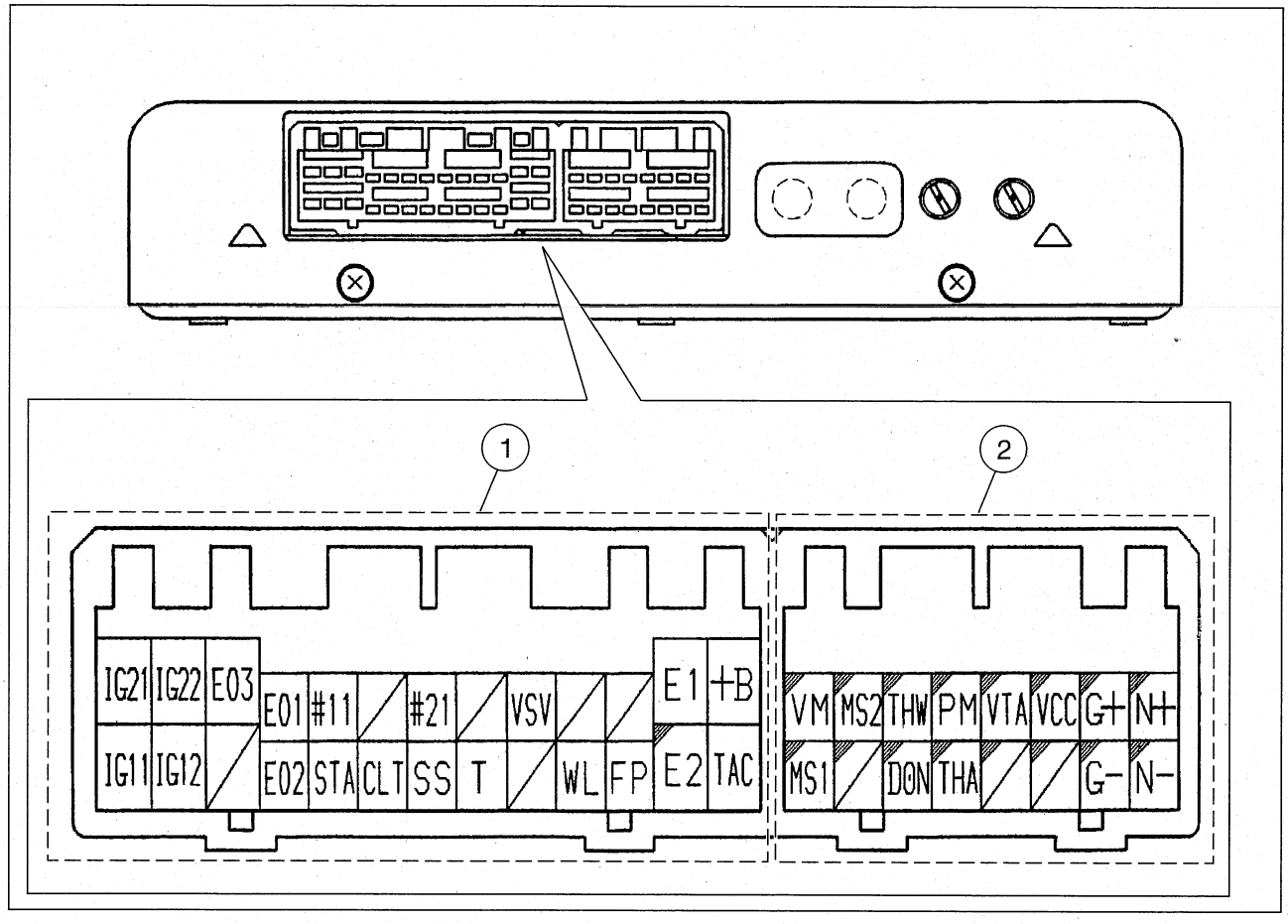


KEY

1) Electronic unit
2) To voltage regulator
3) Supply voltage
4) Fuel suction from tank
5) Fuel pump
6) Fuel filter
7) Intake pressure sensor
8) Fuel pressure regulator
9) Injectors
10) Throttle valve potentiometer
11) Camshaft position sensor
12) Thermistors
13) To multifunction display, right-hand side
14) Driving shaft position sensor and generator
15) Driving shaft position sensor and generator connector
16) HV ignition coil cylinder "1" (front)
17) HV ignition coil cylinder "2" (rear)
18) Spark plug cylinder "1" (front)
19) Spark plug cylinder "2" (rear)

4.7.4 ENGINE CONTROL UNIT CONNECTORS

For further information, see 6.17 (CONNECTIONS TO THE ENGINE CONTROL UNIT).



26-pin connector (1)	
Terminal labelling	**Connections**
+ B	Battery connection positive pole "+"
E 1	Earth (for control circuit)
VSV	Empty
# 21	Injector cylinder "2" (rear)
# 11	Injector cylinder "1"" (front)
E 01	Earth
E 03	Earth
IG 22	HV ignition coil cylinder "2" (rear)
IG 21	HV ignition coil cylinder "2" (rear)
TAC	Revolution counter
E 2	Sensor earth
FP	Fuel pump relay
WL	Multifunction display
T	Test (automatic fault search, dealer mode)
SS	Side stand switch
CLT	Clutch control lever switch
STA	Starter motor relay
E 02	Earth
IG 12	HV ignition coil cylinder "1" (front)
IG 11	HV ignition coil cylinder "1" (front)

16-pin connector (2)	
Terminal labelling	**Connections**
N +	Driving shaft position sensor "+"
G +	Camshaft position sensor
VCC	Intake pressure sensor and throttle valve potentiometer
VTA	Throttle valve potentiometer
PM	Intake pressure sensor
THW	Coolant thermistor
MS 2	Earth
VM	Fuel pump
N -	Driving shaft position sensor "–"
G -	Camshaft position sensor
THA	Air thermistor - Intake pressure sensor
DON	Fall sensor
MS 1	Earth

4.7.5 AUTOMATIC TESTING

See 6.4 (IGNITION SYSTEM).

4.7.6 ELIMINATING ELECTRONIC SYSTEM FAULTS ACCORDING TO THE INFORMATION SENT UP ON THE DISPLAY

⚠ WARNING

Take care around the high voltage in the ignition system.

Never disconnect connections with the engine running.

Whenever work is performed in the ignition system, always make sure the ignition switch is set to "⊠" and the battery disconnected, unless otherwise indicated (when disconnecting the battery, disconnect the negative pole "–" first).

⚠ CAUTION

All measurements must be taken with the components at a temperature of 20°C (68°F).

General instructions regarding the elimination of faults: as soon as the fault has been located, remove the defective component.

4.7.7 CAMSHAFT POSITION SENSOR

Fault code "11".

See 6.4.6 (CHECKING THE CAMSHAFT POSITION SENSOR).

4.7.8 DRIVING SHAFT POSITION SENSOR

Fault code "12".

See 6.4.5 (CHECKING THE PICK-UP).

4.7.9 INTAKE PRESSURE SENSOR

Fault code "13".

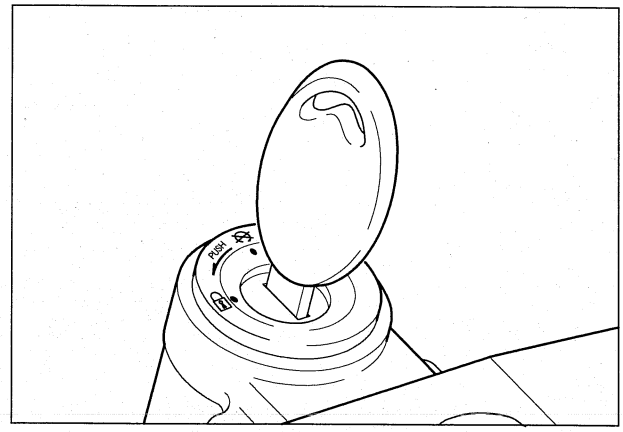
See 6.4.11 (CHECKING THE INTAKE PRESSURE SENSOR).

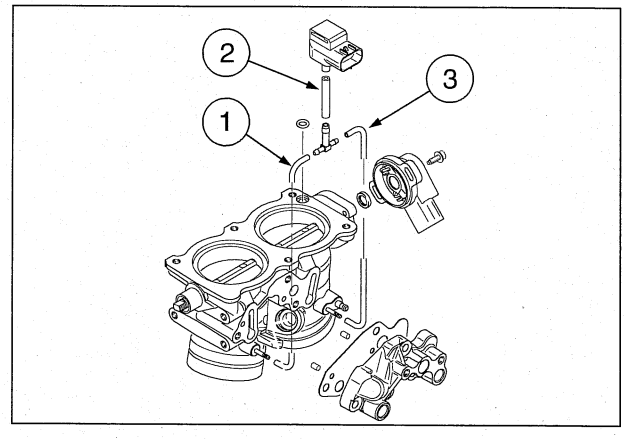
4.7.10 INTAKE PRESSURE SENSOR

Fault code "14".

- Check for pressure loss in the connection pipes (1) (2) (3) and make sure the flow is regular.
- Check the wiring and connections of the pressure sensor.

NOTE Where necessary, replace the pressure sensor or engine control unit.





4.7.11 THROTTLE VALVE POTENTIOMETER

Fault code “15”.

See 6.4.10 (CHECKING THE THROTTLE VALVE POTENTIOMETER).

4.7.12 COOLANT THERMISTORS

Fault code “21”.

See 6.4.8 (CHECKING THE COOLANT THERMISTOR OPERATION).

4.7.13 AIR THERMISTOR

Fault code “22”.

See 6.4.9 (CHECKING THE AIR THERMISTOR OPERATION).

4.7.14 IGNITION COILS

Fault code “33”, “34”, “35”, “36”.

See 6.4.4 (CHECKING THE IGNITION COILS).

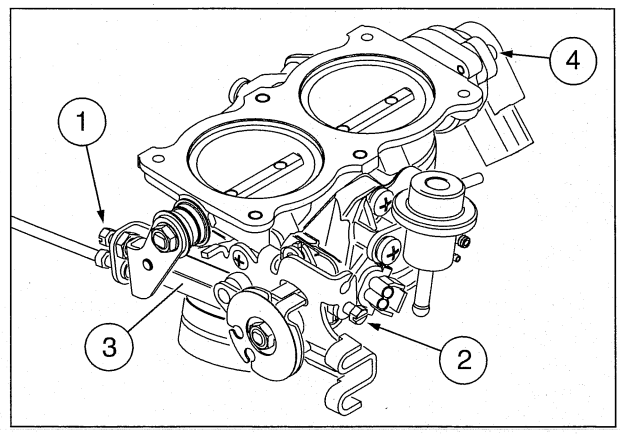
4.8 THROTTLE BODY

⚠ CAUTION

The screws (1) for the standard adjustment of the throttle valves and for increasing idling (2) are painted and cannot be adjusted.

Only when the whole cable support bracket (3) is replaced can the two adjusting screws be turned.

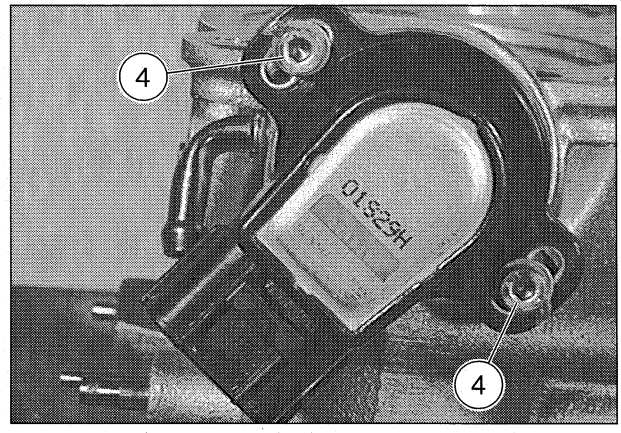
The two M4x12 screws (4) fastening the throttle valve potentiometer are painted and can only be removed in the event the actual sensor is replaced.



4.8.1 REMOVING THE INJECTORS

See 4.8.2 (REMOVING THE THROTTLE BODY).

See 6.4.12 (CHECKING THE INJECTORS) for the checking procedure.



4.8.2 REMOVING THE THROTTLE BODY

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

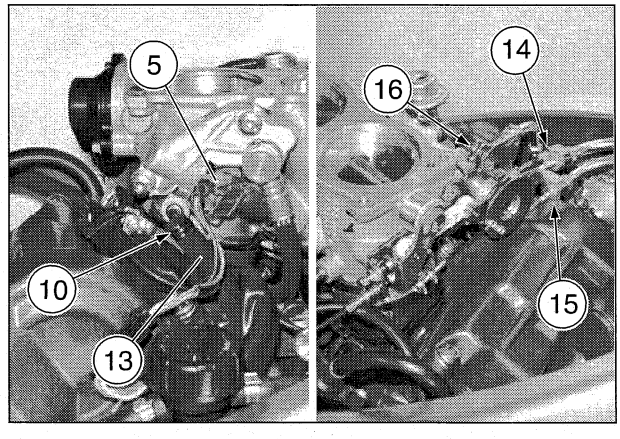
- ◆ Partially remove the fuel tank, see 7.1.3 (PARTIAL REMOVAL OF THE FUEL TANK).
- ◆ Remove the air filter casing, see 7.1.6 (REMOVING THE AIR CLEANER CASE).
- ◆ Disconnect the electric connectors:
  - – right injector (5);
  - – left injector (6);
  - – intake pressure sensor (7);
  - – throttle valve potentiometer (8).

⚠ CAUTION

When reassembling, make sure the electric connectors are plugged in properly.

NOTE Obtain appropriate pliers to attach the clamps, or screwdriver-type pipe clamps to replace the original ones (special type without screw).

- ◆ Release the head off the pipe clamps (9 - 10).
- ◆ Pull the pipes (12) (13) off the throttle body (11).
- ◆ Disconnect the two throttle cables (14 - 15).



⚠ CAUTION

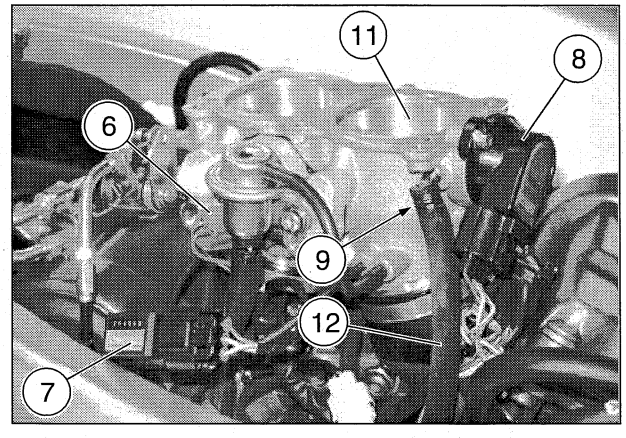
Upon reassembly, make sure that the two accelerator cable adjusters are properly fastened to the corresponding couplings; check and if necessary restore the correct slack, see 2.11.3 (ADJUSTING THE ACCELERATOR CONTROL).

- ◆ Disconnect the cold-start control cable (16).

⚠ CAUTION

When reassembling, make sure the cold-start control cable adjuster is properly fastened to the respective coupling and check and, where necessary, restore the correct freeplay, see 2.12 (COLD START CABLE).

Follow ▶



Follow ▶

- ◆ Remove the stop ring (17).
- ◆ Withdraw the idling speed adjustment cable (18) from its seat.
- ◆ Loosen the two clamps (19) (20).

⚠ CAUTION

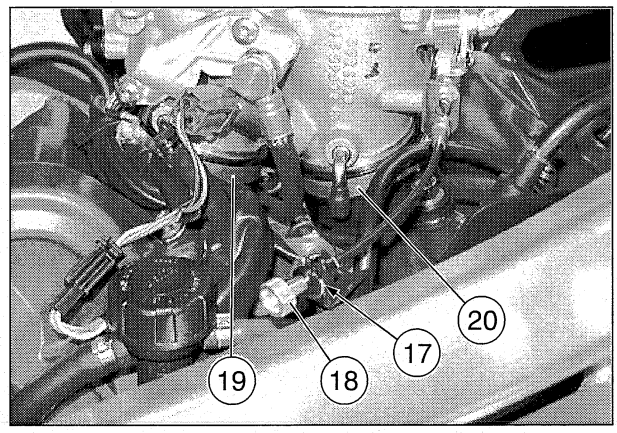
When removing the throttle body (11), be careful to make sure it remains connected to the fuel tank (22) by means of the fuel pipe (21).

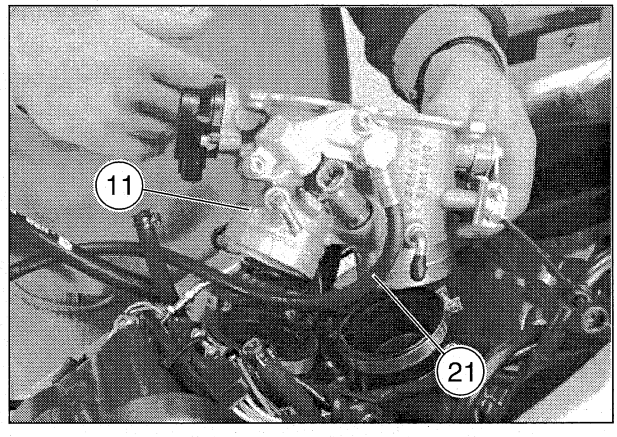
- ◆ Grip the throttle body (11) firmly and hitch it one way and the other to lift it and slide it off the intake flanges.
- ◆ Place the whole throttle body (11) and fuel tank (22), still connected together, on a clean surface.

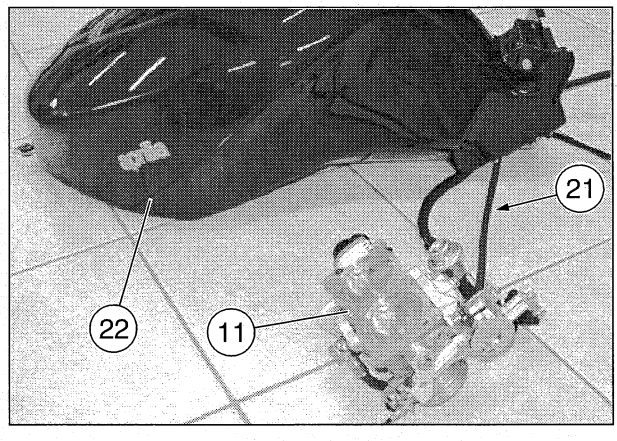
⚠ CAUTION

Upon reassembly:

– the fuel delivery pipe (21) must not be entangled or positioned where it is likely to be squashed by other components; should it appear damaged or deteriorated, it must be replaced;
– the fuel delivery pipe (21) must be placed so that it reaches the right-hand side of the throttle body (11), passing under said body between the two intake flanges;
– the throttle body (11) must be fitted perfectly on the intake flanges;
– the clamps (19) (20) must be properly tightened.



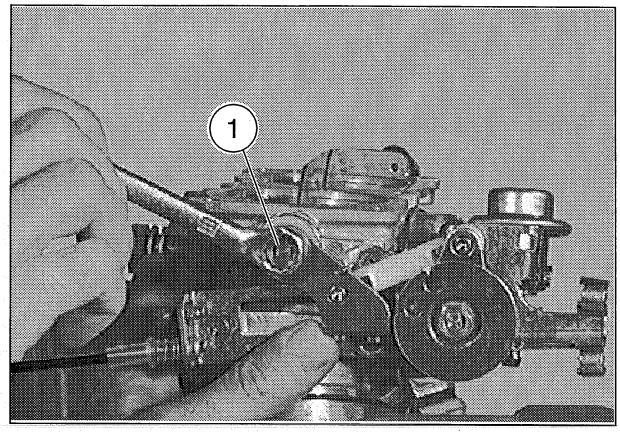




4.8.3 DISASSEMBLING THE THROTTLE BODY

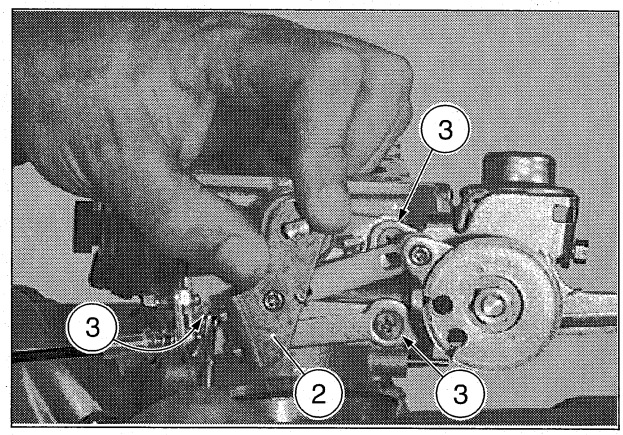
Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

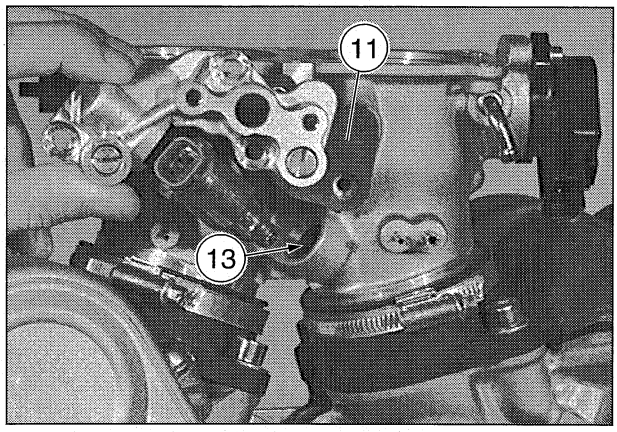
- Unscrew and remove the M8x1 nut (1) and remove the spring washer.
- Turn the throttle valve control lever (2) slightly, unscrew and remove three T.E. M5x12 screws (3).
- Slip the whole support bracket (4) securing the throttle cables, with the two bushes (5) and the torsion spring (6), off the throttle body.
- Unscrew and remove the two M6x16 screws (7) and remove the fuel pressure regulator (8) complete with O-ring.
- Unscrew and remove the three screws (9) and remove the left injector support (10) - together with the relevant gasket (11), injector (12) and sealing ring (13) - from the throttle body.

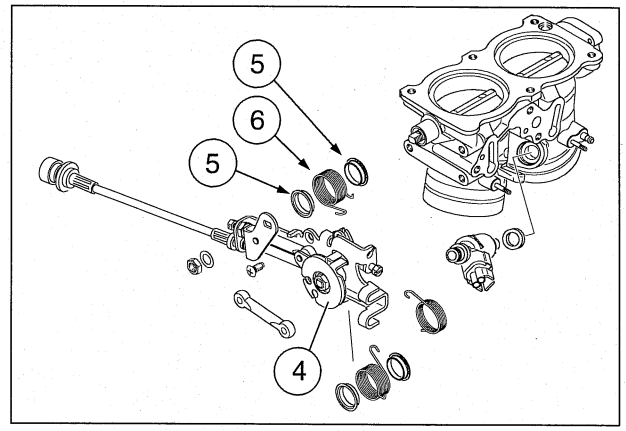


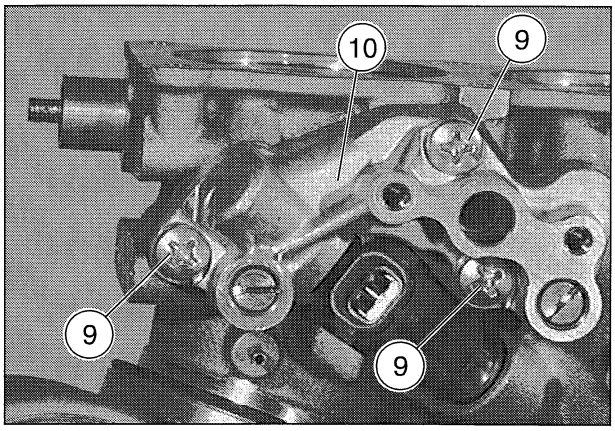
NOTE The injector's sealing ring (13) may be kept inserted in the slot on the throttle body.

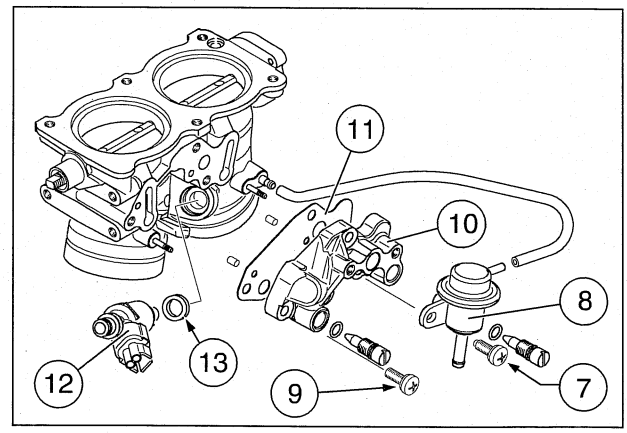
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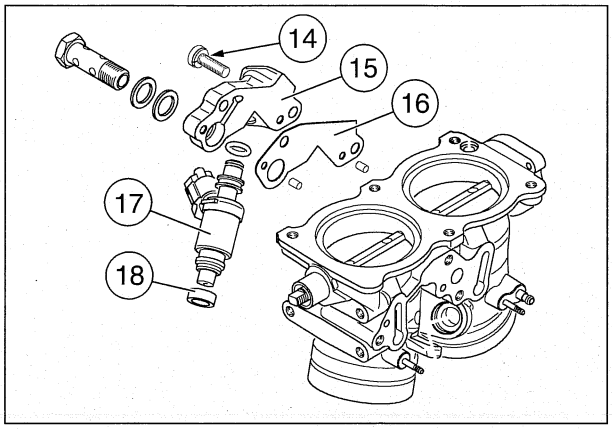


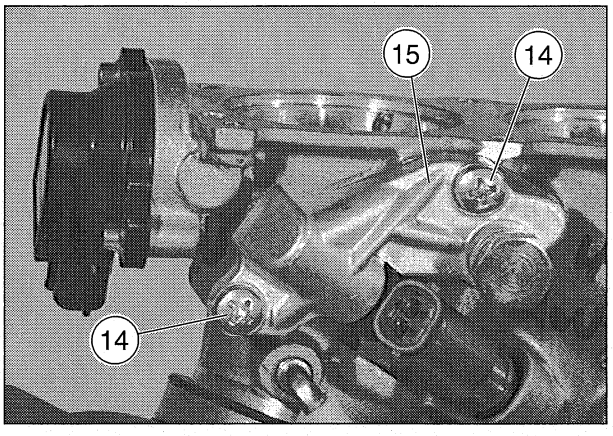
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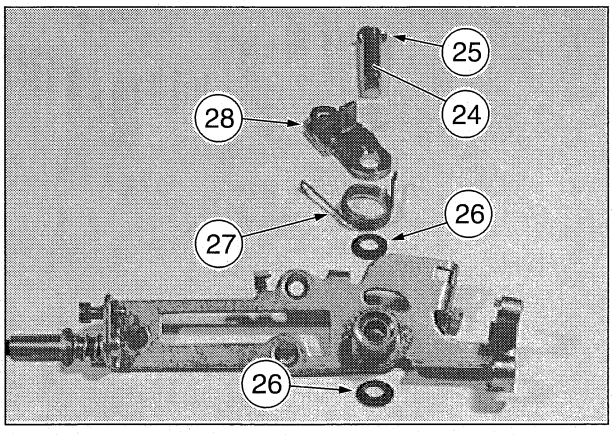
◆ Unscrew and remove the two M6x25 screws (14) and the right injector support (15), together with the relevant gasket (16), injector (17) and sealing ring (18).

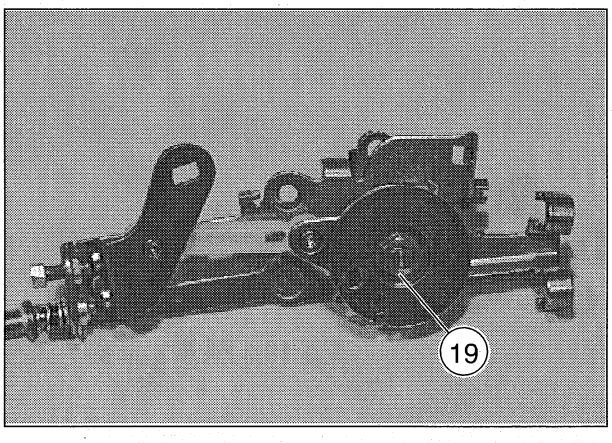
NOTE The injector's sealing ring (18) may be kept inserted in the slot on the throttle body.

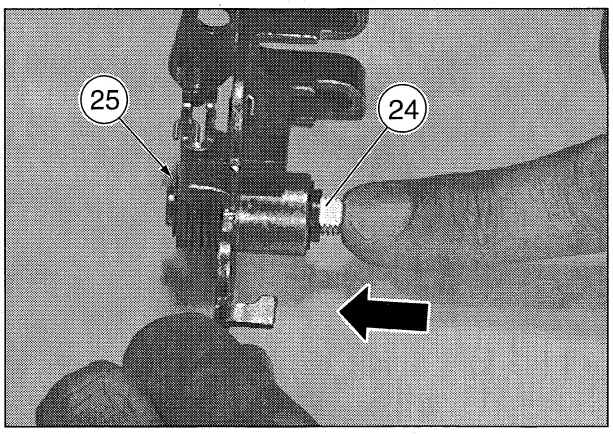
◆ Unscrew and remove the M8x1 nut (19) and remove the spring washer (20), the pulley (21), the two bushes (22) and torsion spring (23).
◆ Slide the fulcrum pin (24), together with the lock washer (25), out of the hole on the throttle cable support bracket and remove the two shaft sealing rings (26) with the torsion spring (27) and cold-start lever (28).

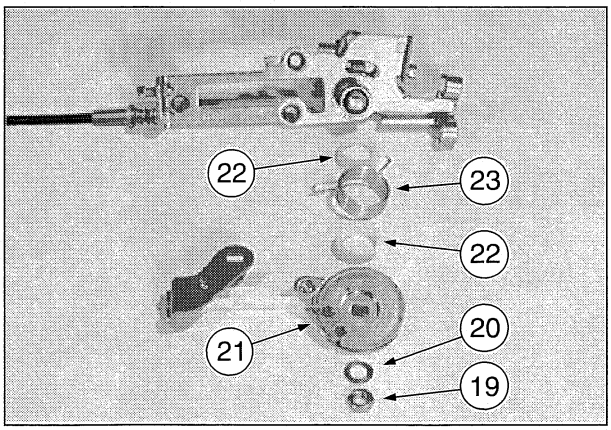












4.8.4 INSPECTING THE THROTTLE BODY

TESTING THE INJECTOR

⚠ WARNING

The fuel is explosive and highly inflammable. Keep fuel away from ignition sparks, heat and flames.

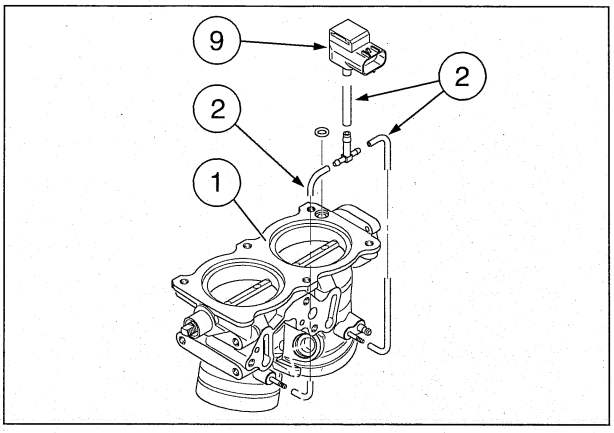
NOTE The injection valves may also be checked whilst fitted.

◆ Check the following components:

– wiring and connections;
– injector or injection signal of the engine control unit, see 6.4 (IGNITION SYSTEM).

Checking injector resistance:

See 6.4.12 (CHECKING THE INJECTORS).

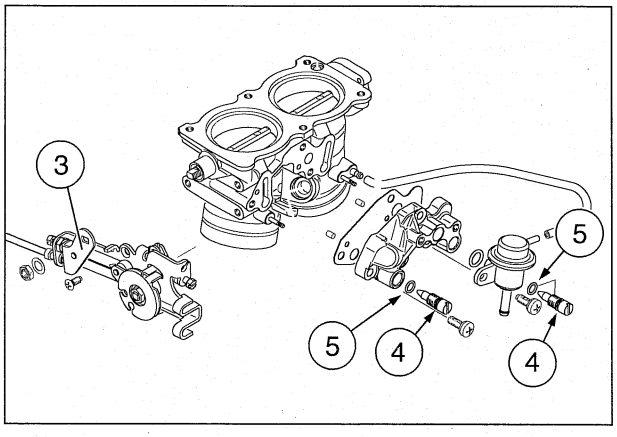


THROTTLE BODY

⚠ CAUTION

Use neutral detergents only.
For cleaning, use a product for removing sealing, a degreasing product or a detergent for cleaning when cold.

◆ Clean all the openings and pipes of the throttle body (1) using compressed air.



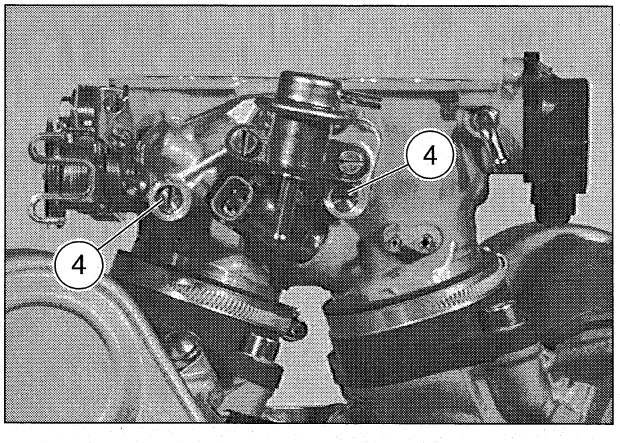
⚠ CAUTION

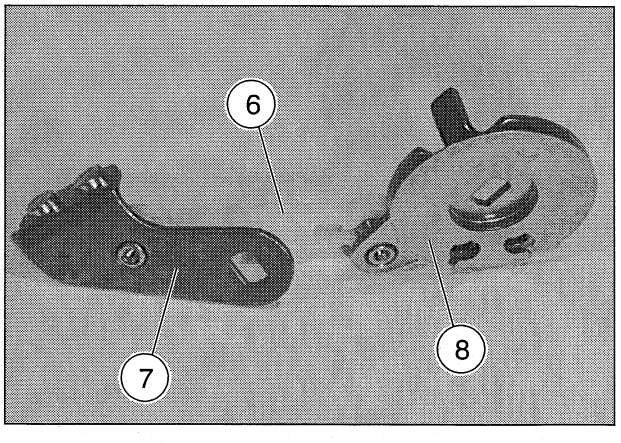
Once the intake pressure sensor (9) its installed, not utilice the compressed air for the pipes cleaning; danger for damages.

◆ Check the pipes of the intake pressure sensor (2), watching out for any clogging.
◆ Check the throttle valves unit and the cable fastening mechanism (3), watching out for any signs of mechanical damage.

NOTE In the event the synchronization screws (4) or O-rings (5) are replaced, synchronize the cylinders, see 4.8.10 (SYNCHRONIZING CYLINDERS).

◆ Only unscrew the two cylinder synchronizing screws (4) when there are leaks.
◆ When replacing the tie rod of the ball joint (6), disengage the tie rod from the throttle valve control lever (7) and throttle cable pulley (8).
◆ Once a new ball joint tie rod (6) has been fitted, make sure it moves freely.





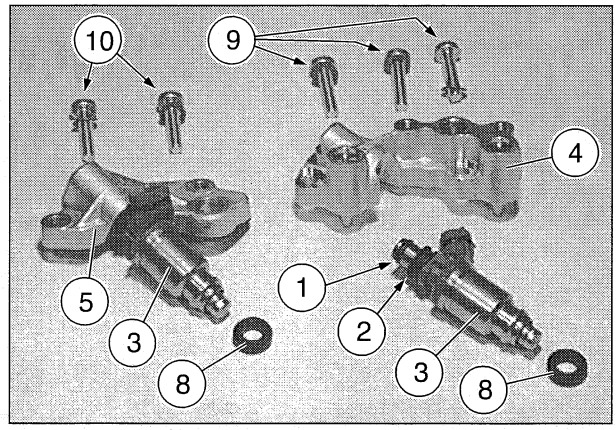
4.8.5 REFITTING THE THROTTLE BODY

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

⚠ CAUTION

After disassembling the throttle body, replace all the gaskets, O-rings, torsion springs, bushes and seals. These components are supplied with the repair kit.

- ◆ Fit the new O-rings (1) and seals (2) on both injector.
- ◆ Insert the injector (3) in the left injector support (4) and in the right injector support (5).
- ◆ Fit the left injector support gasket (6), right injector support gasket (7) and the two seals (8) on the throttle body.
- ◆ Install the complete left injector support (4) and right injector support (5) in the throttle body, fastening them with the new M6x25 screws respectively (9) (10).



Injector support screw driving torque: 9 Nm (0.9 kgm).

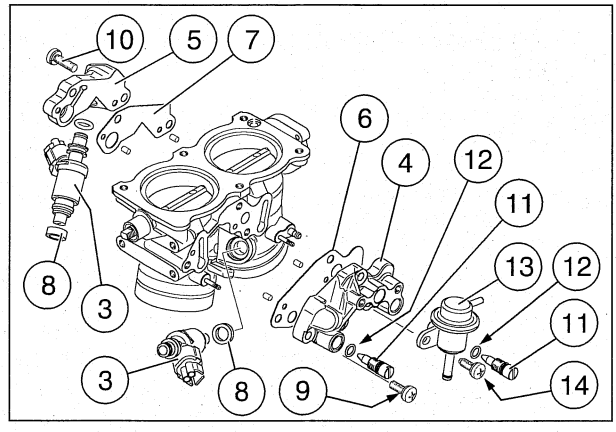
- ◆ If the synchronizing screws (11) and respective O-rings (12) have been replaced, screw on the screws (11) fairly tight until they touch the stop and then unscrew them a single turn.

Presetting of synchronizing screws (11): 1 turn.

⚠ CAUTION

The precise adjustment of the screws (11) must be performed using a vacuum gauge, see 4.8.10 (SYNCHRONIZING CYLINDERS).

- ◆ Fasten the fuel pressure regulator (13) using the two M6x16 screws (14).



Fuel pressure regulator screw driving torque: 3.5 Nm (0.35 kgm).

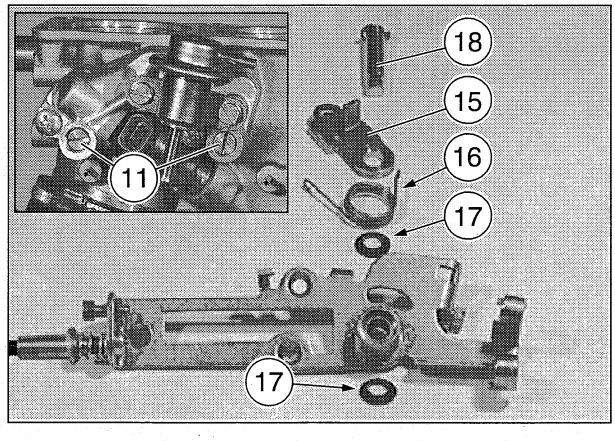
NOTE Smear a film of grease over the surfaces of the fulcrum pin (18), see 1.6 (LUBRICANT CHART).

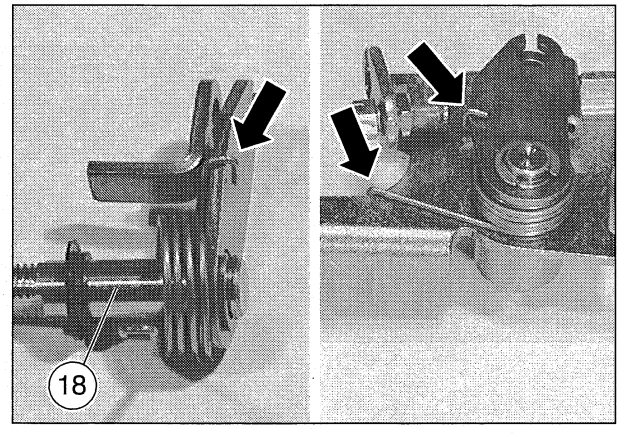
- ◆ Insert the cold-start lever (15), torsion spring (16) and shaft sealing ring (17) on the fulcrum pin (18).
- ◆ Insert the complete fulcrum pin (18) in the throttle cable support bracket.

NOTE Make sure the torsion spring is hooked to the cold-start lever (15) and cable support bracket.

- ◆ Spray chain grease onto the spring (16), see 1.6 (LUBRICANT CHART).

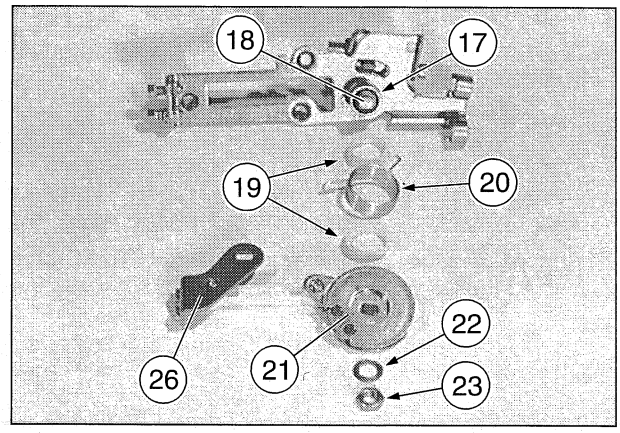
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◆ Insert the shaft sealing ring (17) on the fulcrum pin (18).
◆ Fit the two bushes (19) and torsion spring (20).
◆ Fit the pulley (21) on the throttle cable support bracket.



⚠ CAUTION

Make sure that the ends of the torsion spring (20) are hooked onto the throttle cable support bracket and pulley (21).

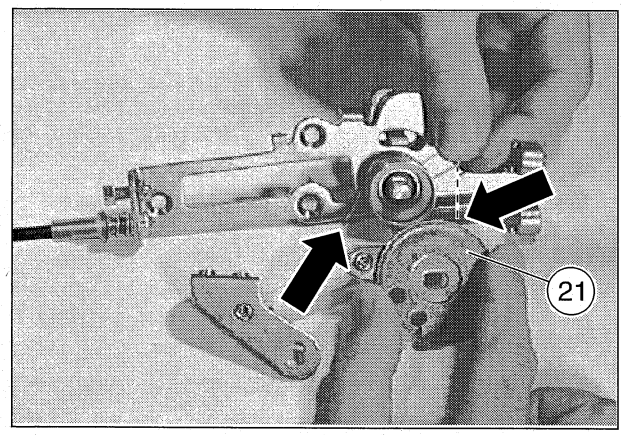
NOTE Spray a temporary lubricant AP-LUBE on the spring (20), see 1.9.2 (USE OF CONSUMABLES).

◆ Fit the spring washer (22).

NOTE Apply LOCTITE® 243 on the thread of the nut (23).

◆ Screw the M8x1 nut (23) and tighten it.

Driving torque of the throttle cable pulley nut: 3 Nm (0.3 kgm).

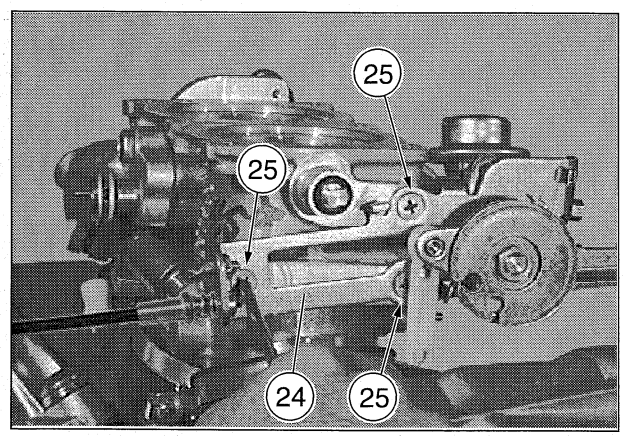


NOTE Apply LOCTITE® 243 on the thread of the screws (25).

◆ Fasten the throttle cable support bracket (24) using the three M5x12 T.E. screws (25).

Driving torque of the throttle cable support bracket screws: 3 Nm (0.3 kgm).

◆ Fit the throttle valve control lever (26), see 4.8.6 (REPLACING THE THROTTLE VALVE CONTROL LEVER).

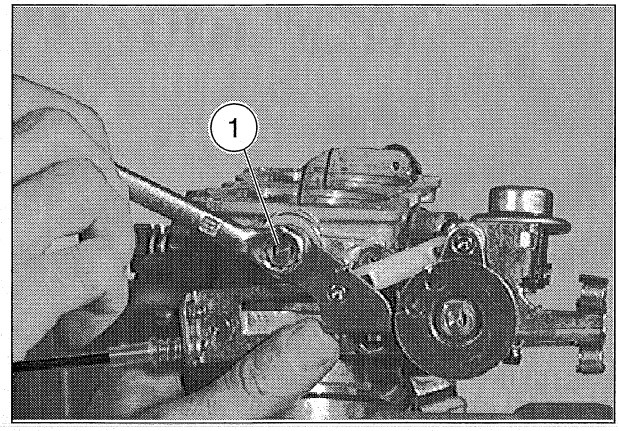


4.8.6 REPLACING THE THROTTLE VALVE CONTROL LEVER

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

DISASSEMBLY

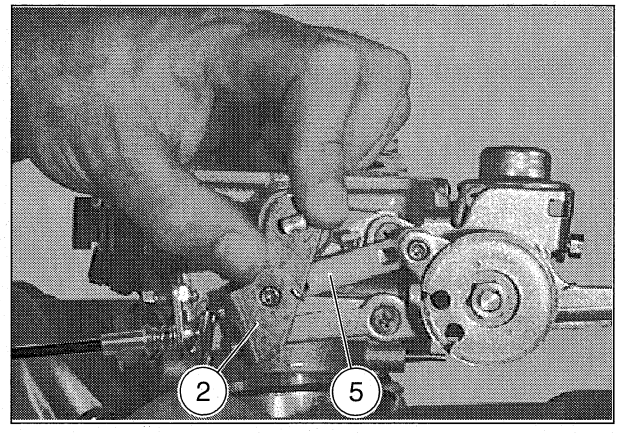
- ◆ Partially remove the fuel tank, see 7.1.3 (PARTIAL REMOVAL OF THE FUEL TANK).
- ◆ Remove the air filter casing, see 7.1.6 (REMOVING THE AIR CLEANER CASE).
- ◆ Unscrew and remove the M8x1 nut (1) and remove the spring washer.
- ◆ Slide out the control lever (2) and retrieve the two bushes (3) and torsion spring (4).
- ◆ Remove the control lever (2) from the tie rod of the ball joint (5).



ASSEMBLY

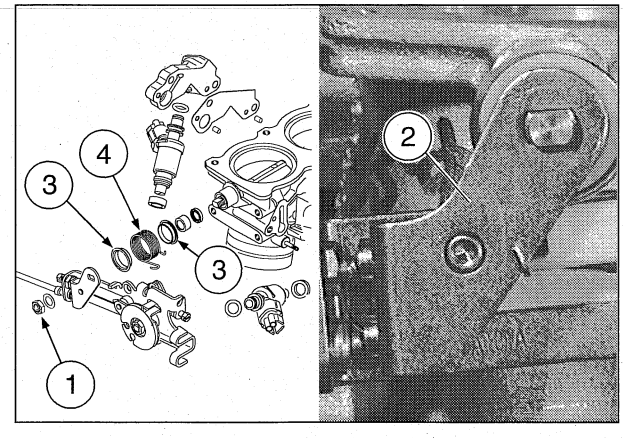
⚠ CAUTION

For the vehicles with the following engine numbers, the throttle valve control lever (2) must be replaced with the new grey-coloured lever.



523579	525113 - 525118	525443 - 525597
523582	525120 - 525124	525605
523587	525126 - 525139	525609
523590 - 523592	525141 - 525148	525621
523594 - 523602	525150 - 525236	525629 - 525631
523604	525238 - 525275	525633 - 525635
523607 - 523609	525277 - 525278	525639
523612 - 523618	525280 - 525295	525641 - 525645
523621	525300 - 525302	525647 - 525648
523623 - 523624	525306 - 525321	525651
523626 - 523635	525324 - 525327	525653 - 525654
523637 - 523640	525329 - 525331	525657
523643	525344	525659
523645	525346 - 525347	525662
523648 - 523651	525350 - 525351	525665
523654 - 523656	525356 - 525358	525667
523658 - 523660	525365	525676 - 525681
523662 - 523673	525368 - 525371	525684
523675 - 523676	525373 - 525374	525686 - 525687
523678 - 523691	525376	525689 - 525690
523693 - 523698	525378	525699
523700 - 523713	525382 - 525387	525704
523715 - 523752	525389	525713
523754 - 523778	525392 - 525404	525731
523780 - 523793	525406	525750
523795 - 523892	525408	525765
523894 - 523948	525410 - 525412	525767
523950 - 523966	525414 - 525420	525883
523970 - 524610	525422	526070
524612 - 524679	525424 - 525427	526075
524683 - 524686	525430	526235 - 526237
524688 - 524999	525432 - 525435	526246 - 526249
525001 - 525007	525439	526254 - 526265
525009 - 525111	525441	–

Follow ▶



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- ◆ Fit the two bushes (3) and torsion spring (4) on the throttle body.
- ◆ Fit the throttle valve control lever (2) on the throttle valve spindle.

NOTE Spray a temporary lubricant AP-LUBE on the spring (4), see 1.9.2 (USE OF CONSUMABLES).

⚠ CAUTION

Make sure the ends of the torsion spring (4) are hooked onto the throttle body and throttle valve control lever (2).

- ◆ Fit the spring washer.

NOTE Apply LOCTITE® 243 on the thread of the nut (1).

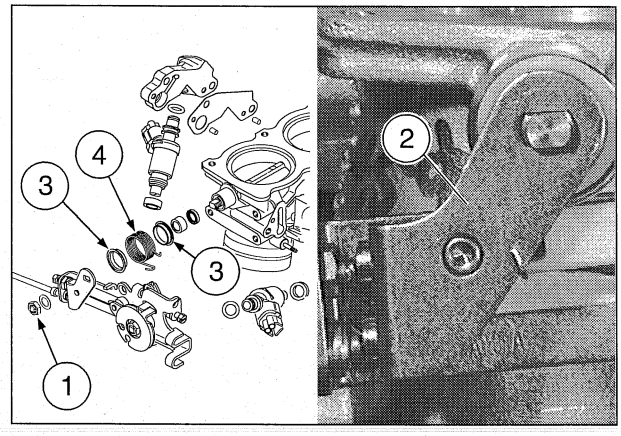
- ◆ Screw the nut (1) and tighten it.

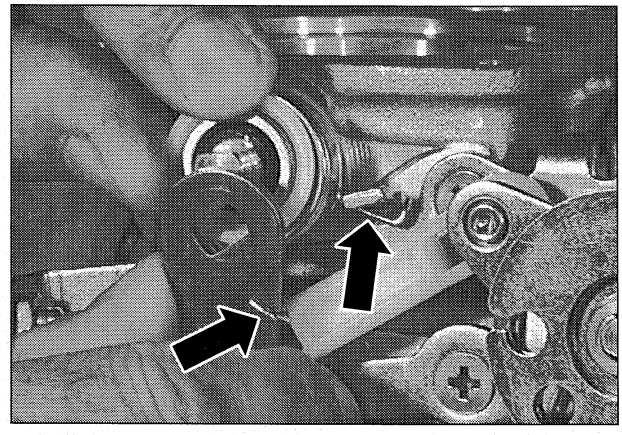
Driving torque of the throttle valve control lever nut: 3 Nm (0.3 kgm).

NOTE Once assembly is complete, make sure the levers rotate freely.

The throttle valve control lever (2) must be returned to its original position by the torsion spring.

Check for end play on the throttle valve control shaft, see 4.8.7 (CHECKING THROTTLE VALVE CONTROL SHAFT END PLAY) and adjust as necessary, see 4.8.8 (ADJUSTING THE THROTTLE BODY).

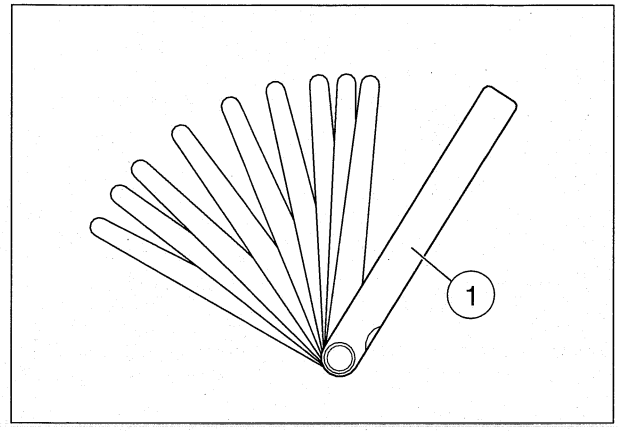




4.8.7 CHECKING THROTTLE VALVE CONTROL SHAFT END PLAY

- Partially remove the fuel tank, see 7.1.3 (PARTIAL REMOVAL OF THE FUEL TANK).
- Remove the air filter casing, see 7.1.6 (REMOVING THE AIR CLEANER CASE).

NOTE Have an appropriate thickness gauge (1) to hand with a 0.05 mm scale.



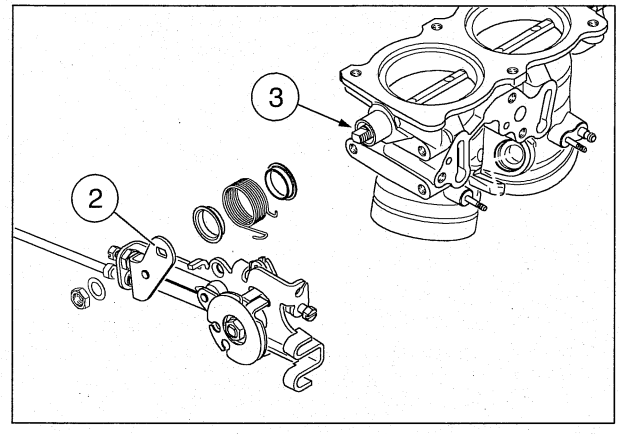
With throttle valves closed:

- Use the thickness gauge (1) to measure the minimum play between the lever (2) and the contact surface (3) on the throttle body in a number of points.

End play: min. 0.1 mm.

⚠ CAUTION

If the minimum value measured is less than 0.1 mm, the whole throttle body see aprilia part# 392Y (Spare parts catalogue SL mille) must be replaced.



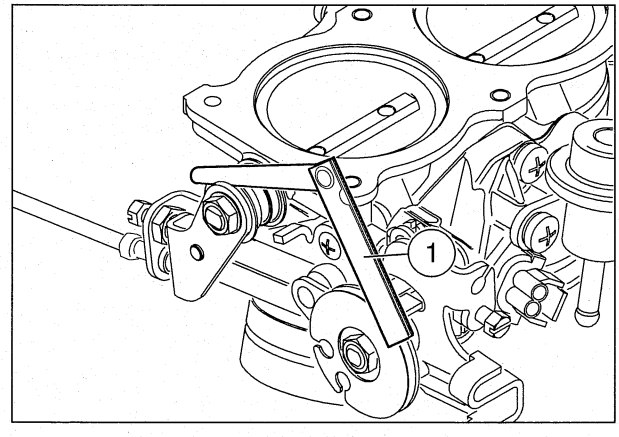
With throttle valves open:

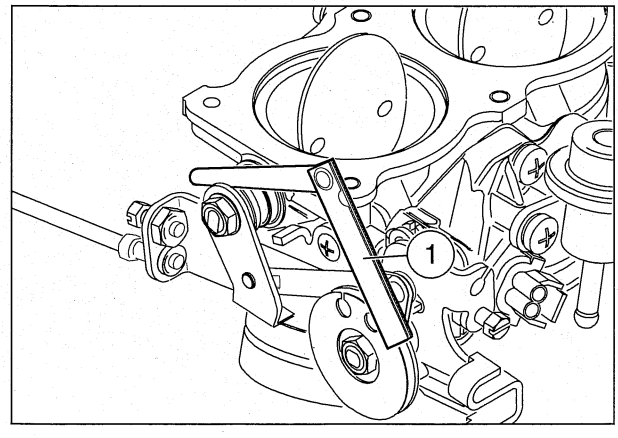
- Repeat the above procedure.

End play: min. 0.15 mm.

⚠ CAUTION

If the minimum value measured is less than 0.15 mm, the whole throttle body see aprilia part# 392Y (Spare parts catalogue SL mille) must be replaced.





4.8.8 ADJUSTING THE THROTTLE BODY

- Partially remove the fuel tank, see 7.1.3 (PARTIAL REMOVAL OF THE FUEL TANK).
- Remove the air filter casing, see 7.1.6 (REMOVING THE AIR CLEANER CASE).

SETTING IDLING

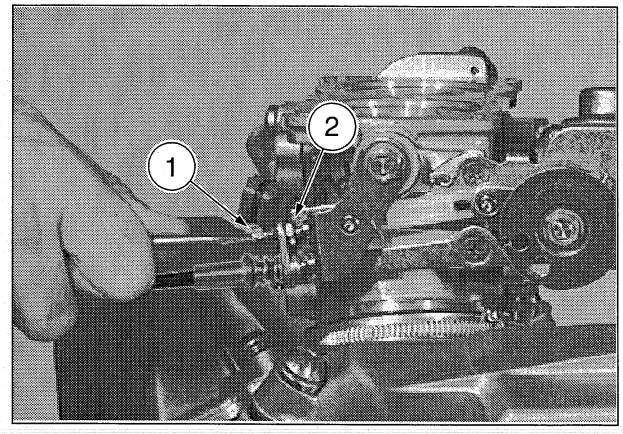
⚠ CAUTION

The screw (1) of the throttle valve end of stroke is painted and cannot be adjusted.

Only when the whole throttle cable support bracket is replaced can the adjusting screw (1) be turned again.

- Loosen the nut (2).
- Unscrew the adjusting screw (1) of the throttle valve end of stroke, until the throttle valves (3) adhere to the throttle body (4).
- Screw the adjusting screw (1) until it touches the stop onto the throttle valve control lever (5), and turn it another 1/2 – 3/4 turn before tightening the M5x0.5 nut (2).

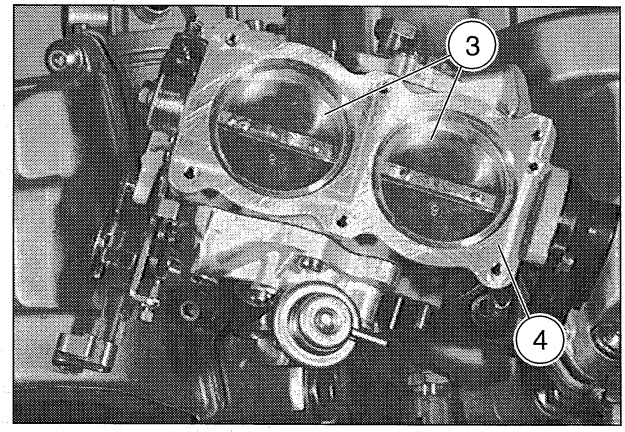
Idling setting: 1/2 – 3/4 turn.



SETTING THE COLD-START DEVICE

⚠ CAUTION

When the whole throttle cable support bracket must be replaced, it is necessary to adjust the cold start control screw (6) again, after setting the screw (1) of the throttle valve end of stroke.

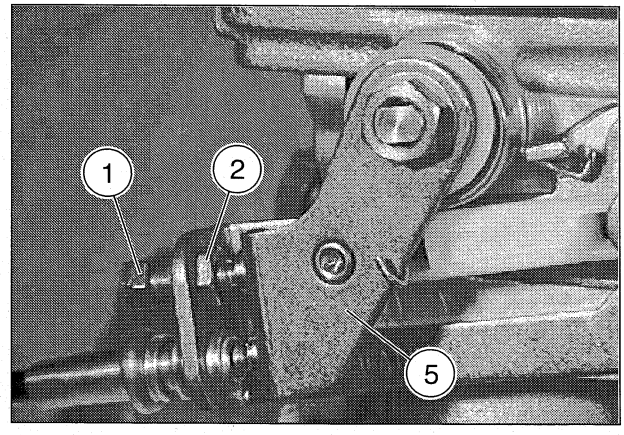


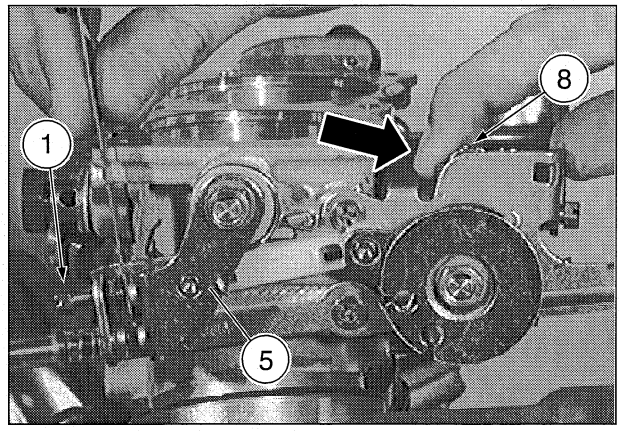
NOTE Have an appropriate thickness gauge.

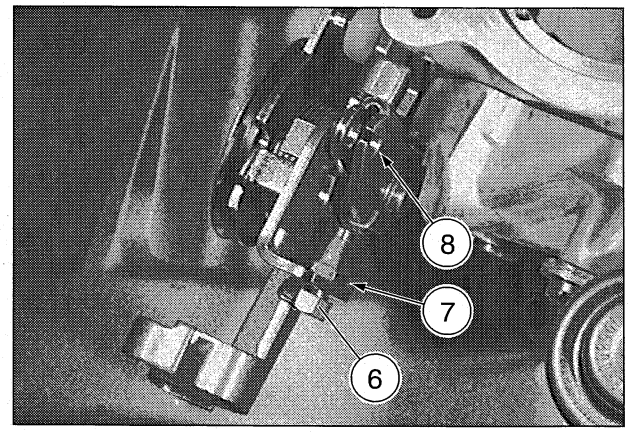
- Loosen the nut (7).
- Pull back the cold-start lever (8) until it touches the screw (6).
- Adjust the screw (6) so that the clearance between the idling adjusting screw (1) and the throttle valve control lever (5) is in the range 1.6 to 1.8 mm.

Adjustment: 1.6 – 1.8 mm.

- Secure the screw (6) by tightening the nut (7).



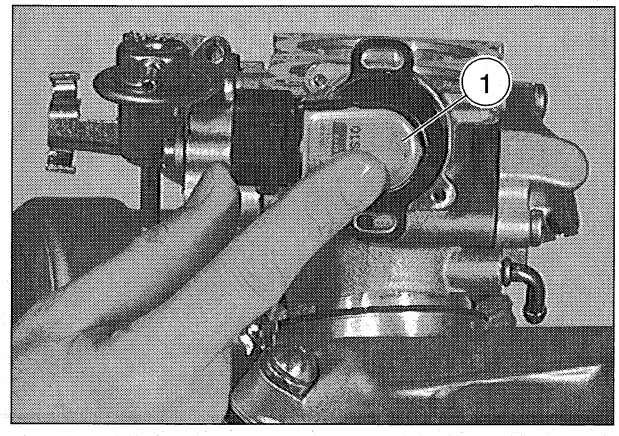




4.8.9 ADJUSTING THE THROTTLE VALVE POTENTIOMETER

⚠ CAUTION

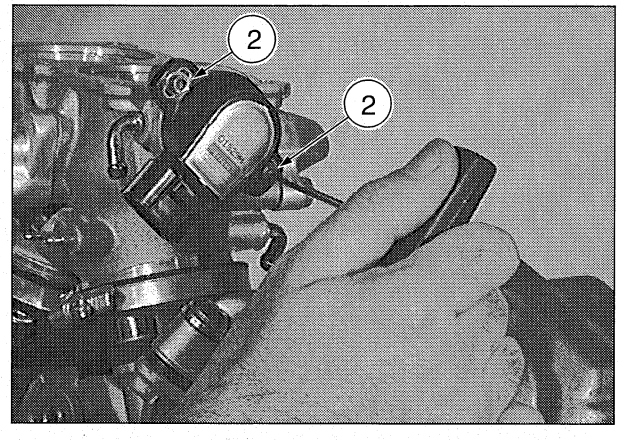
The two T.C.E.I. screws fastening the throttle valve potentiometer (1) are painted during production and cannot be loosened.
The throttle valve potentiometer can only be adjusted in the event of replacement.



◆ Place the throttle valve potentiometer (1) in a horizontal position on the throttle valve shaft and rotate it downwards.

NOTE Apply LOCTITE® 243 on the thread of the screws (2).

◆ Screw on the two M4x12 T.C.E.I. screws (2) and tighten the throttle valve potentiometer quite firmly, but so that the screws can still be turned further.
◆ Turn the ignition switch to position "○".
◆ To connect the TEST connectors (3).
◆ Turn the throttle valve potentiometer until the display longer reads "0".



⚠ CAUTION

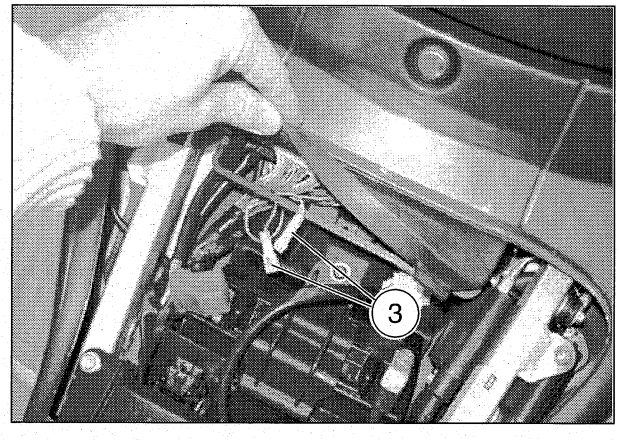
Any adjustment of the position sensor must be performed with the valves closed, meaning the throttle valve control lever (4) must touch the adjusting screw (5).

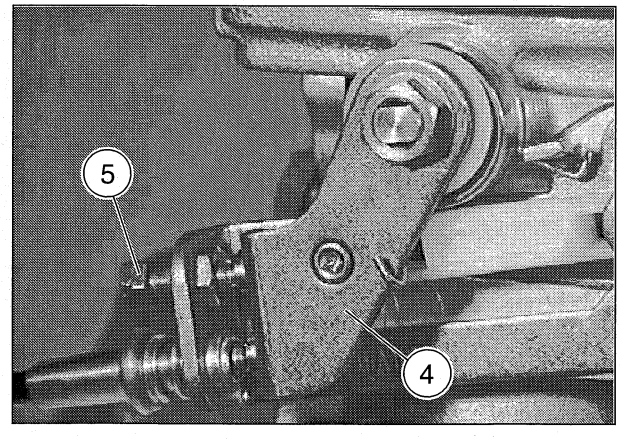
◆ Tighten the two M4x12 T.C.E.I. screws (2).

Driving torque of the throttle valve position sensor screws: 1.6 Nm (0.16 kgm).

◆ Turn the ignition switch to position "⚿".

For further information, see 6.4.11 (CHECKING THE INTAKE PRESSURE SENSOR).



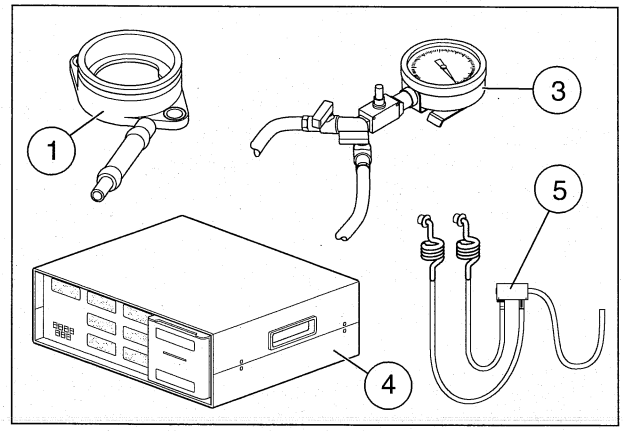


4.8.10 SYNCHRONIZING CYLINDERS

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.1 (FUEL).

The cylinders must be synchronized whenever the engine runs smoothly no longer when idling.

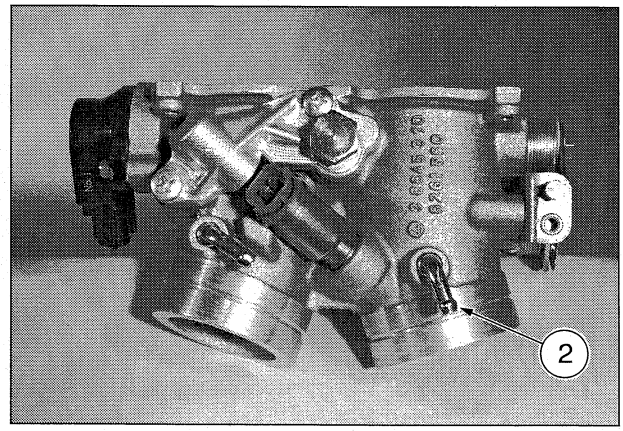
◆ Ride for a few miles until reaching the normal running temperature.



⚠ CAUTION

The cylinder syncronization must be carried out with the engine warmed up:
- coolant temperature 80-100 °C (176-212 °F);
- room temperature 20-30 °C (68-86 °F).

NOTE Have the appropriate special tool OPT to hand:
- **aprilia** part# 8140267 (intake flange for vacuometer) (1); (from engine # 686065 it is no longer necessary);
- **aprilia** part# 8140256 (vacuometer) (3);
- **aprilia** part# 8140196 (exhaust fume analyser) (4);
- **aprilia** part# 8140202 (exhaust fume analyser pipe kit) (5).

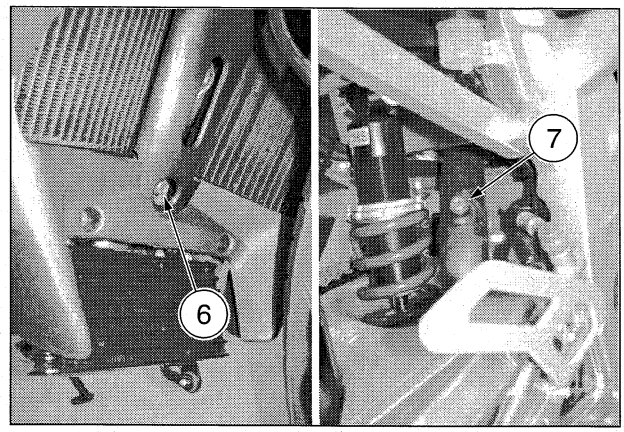


⚠ WARNING

Fuel vapours are noxious for your health.
Before proceeding, make sure that the room in which you are working is properly ventilated.
Do not inhale fuel vapours.

Avoid any contact of the fuel with the skin.
Do not smoke and do not use naked flames.
Do not dispose of fuel in the environment.

◆ Lift the fuel tank, see 2.8 (LIFTING THE FUEL TANK).
◆ Loosen and remove the two front and rear exhaust pipe plugs (6) (7).

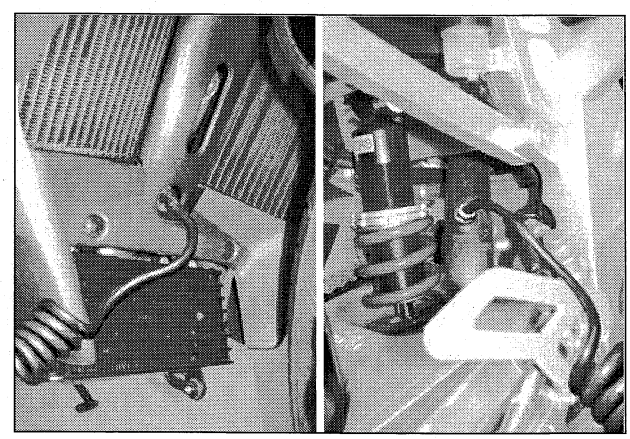


NOTE Upon reassembly, apply LOCTITE® 8150 on the threaded of the plugs (6) (7).

◆ Connect the exhaust gas tester pipes (5):
– connect the two rigid pipes to the appropriate exhaust pipe outlets;
– connect the other pipe to the exhaust gas tester (4).
◆ Start the engine and make sure the idling rpm is 1250 ± 100 rpm. If this is not the case, adjust accordingly, see 2.11.2 (ADJUSTING THE ENGINE IDLING SPEED).
◆ Check the tester (4) for the CO values. They should correspond to the values indicated and be the same for both cylinders.

CO values for both cylinders: 0.8-1.3% at 1250 ± 100 rpm.

◆ If the CO value measured in one or both of the cylinders is different from the value indicated, adjust one or both of the screws (8) (9) accordingly to restore the correct value.
◆ Check the idling rpm and, if it does not correspond to 1250 ± 100 rpm, adjust accordingly, see 2.11.2 (ADJUSTING THE ENGINE IDLING SPEED) and then check the CO values again and, where necessary, repeat the sychronization procedure.



NOTE If it is not possible to obtain the preset CO values, the sparking plugs must be replaced, see 2.7 (SPARK PLUGS).

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CHECKING THE CYLINDER VACUUM VALUES

NOTE The checking of the cylinder vacuum values from the engine # 686065 requires the intake flange to be replaced with the vacuometer attachment (1) since the throttle body is already fitted with the suitable connector (2).

◆ Loosen the two clamps (10) (11).

⚠ CAUTION

Take extreme care when removing the throttle body (12) as it remains connected to cables and pipes.

◆ Grip the throttle body firmly (12), complete with air filter casing (13), and shift it slightly one way and the other, lifting and sliding it off the intake flanges.
◆ Move the throttle body off to the left-hand side of the vehicle.
◆ Unscrew and remove the two screws (14) fastening the intake flange (15) to the front cylinder and recover the washers.
◆ Remove the intake flange (15) of cylinder "1" (front).
◆ Fit the vacuometer intake flange (1) in place, and position it so that the connector (16) is on the right-hand side of the vehicle.
◆ Fit the two screws (14) back in place with their respective washers and tighten them.

Suction flange screw driving torque: 19 Nm (1.9 kgm).

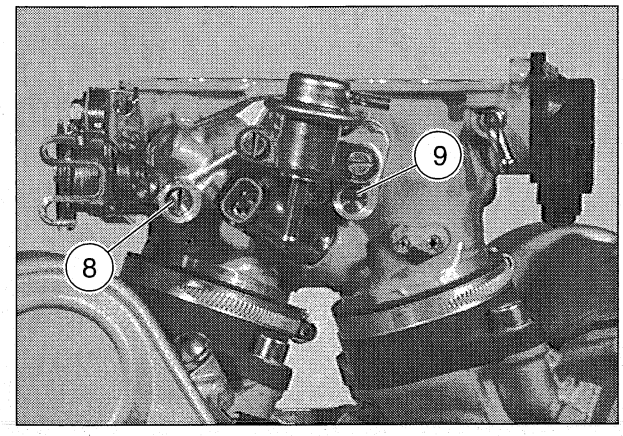
⚠ CAUTION

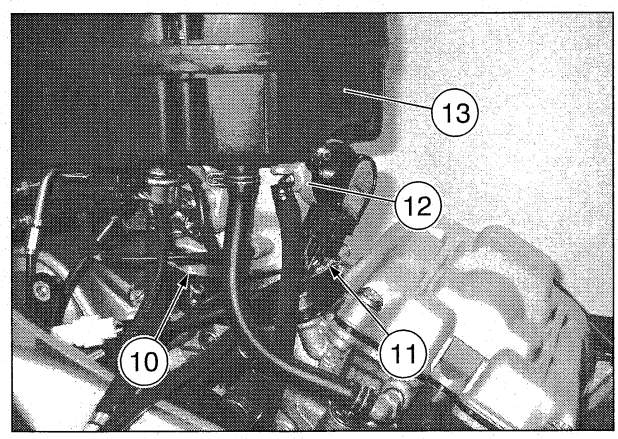
The throttle body (12) must be fitted perfectly to the intake flanges.

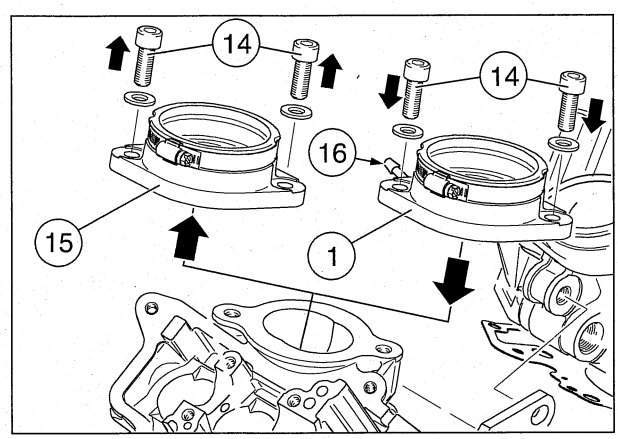
The clamps (10) (11) must be properly tightened.

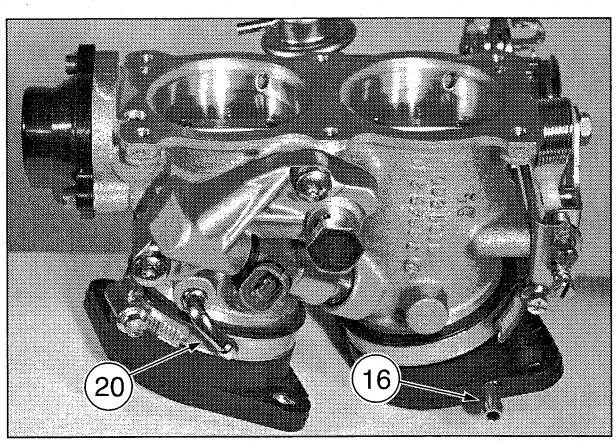
◆ Fit the throttle body (12) again, complete with air filter casing (13), to the two intake flanges.
◆ Tighten the two clamps (10) (11).
◆ Slide the pipe (17) off the vacuum connector.
◆ Hang the vacuometer (3) on the handlebars.
◆ Insert the two ends of the vacuometer pipes (18) (19) in the connectors (16) (20).

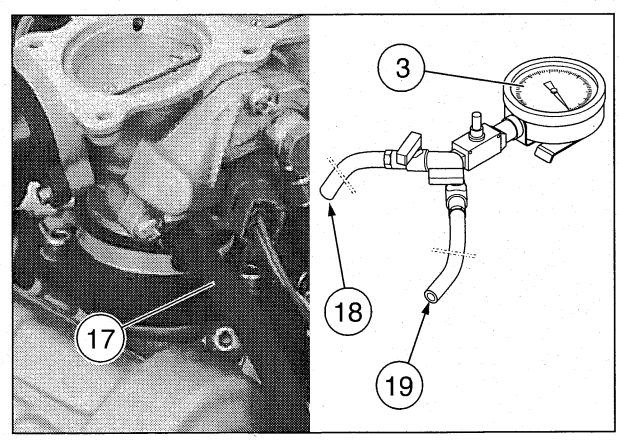
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◆ Check the vacuometer (3) for the vacuum value of a cylinder and then of the other one.

NOTE The vacuum value reading should be the same for both cylinders.

Vacuum values for both cylinders: 300±30 mbar at 1250± 100 rpm.

◆ Once the cylinders have been synchronized correctly and the idling rpm adjusted, remove the vacuometer attachment (1) and fit the intake flange (15).

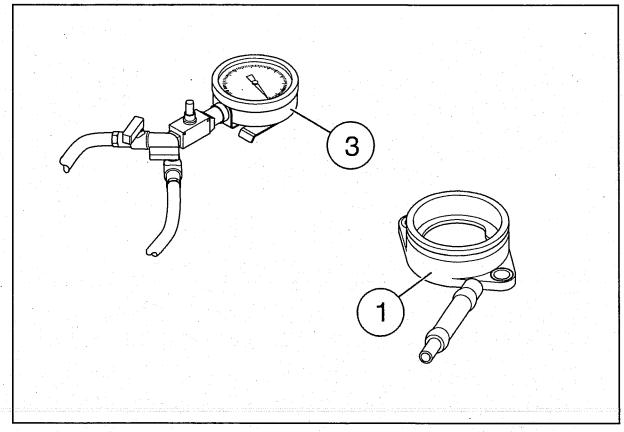
⚠ CAUTION

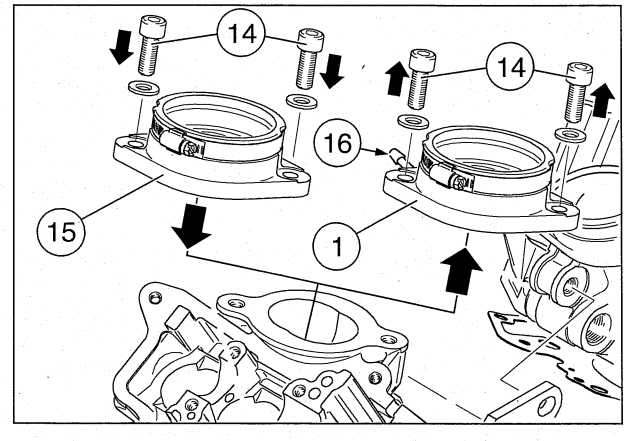
It is vital that the vacuometer intake flange (1) be replaced with the original intake flange (15).

⚠ CAUTION

Slight differences in the vacuum values between the two cylinders are acceptable only if the CO values fall within the range of the preset parameters (from 0.8 to 1.3%).

If the CO values and/or the vacuum values do not fall within the range of the preset parameters, the adjusting procedures must be repeated to restore the correct values.





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COOLING SYSTEM 5

COOLING SYSTEM

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5.9 REMOVING THE THREE-WAY MANIFOLD 5-12-*00*

5.10 PARTIAL REMOVING THE EXPANSION TANK 5-13-*00*

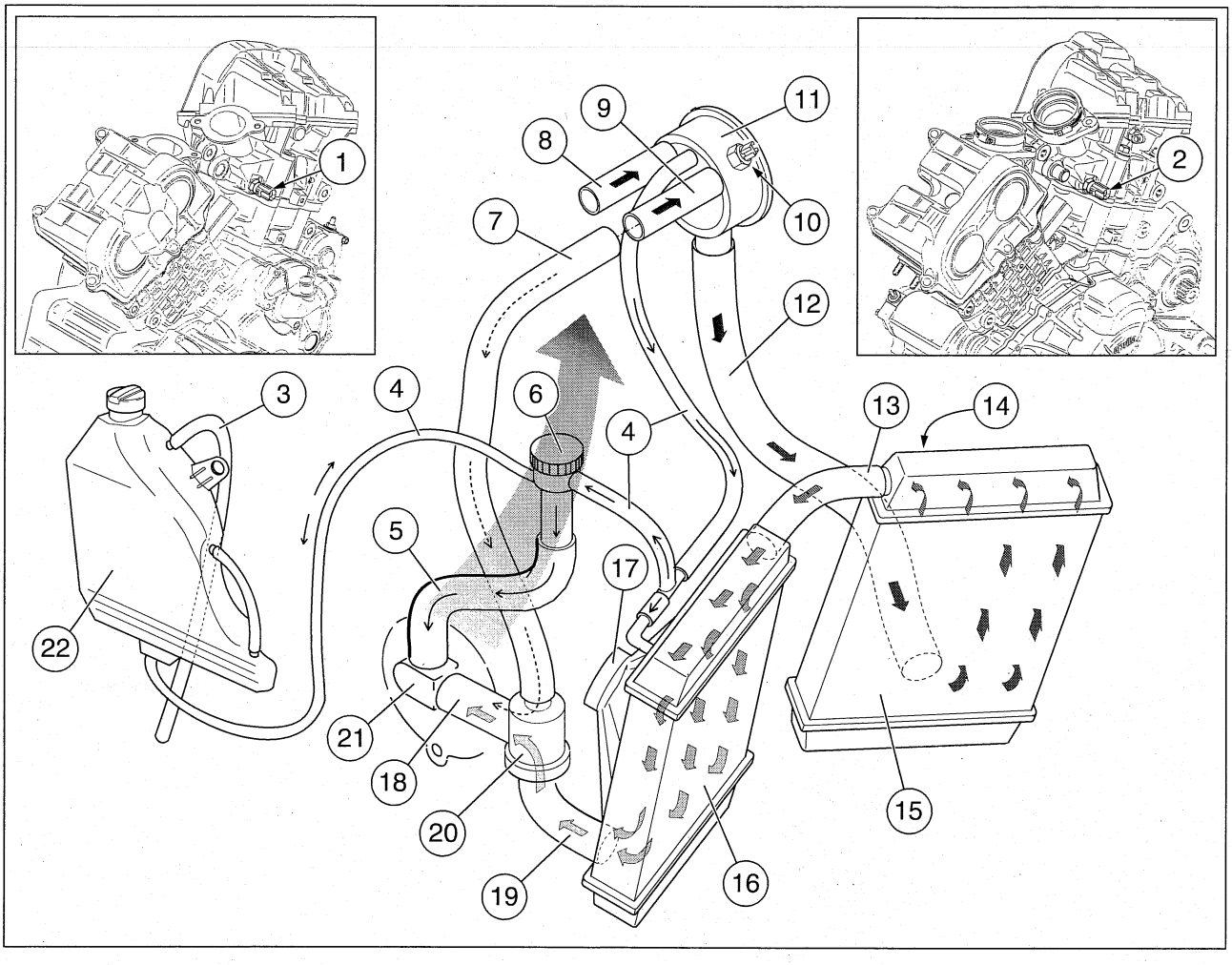
5.11 COOLANT PUMP 5-13-*00*

5.1 DESCRIPTION

The centrifugal pump (positioned inside the engine and driven by the latter) draws coolant and distributes it to the galleries in the cylinders and in the heads in order to cool the internal parts of the engine.
The path of the coolant on leaving the engine varies depending on the temperature of the actual coolant, and is illustrated below.
The coolant volume increase (caused by the temperature increase) is compensated for in the expansion tank.

To check and top up the coolant, refer to the "LOW" and "FULL" reference marks, see 2.15 (CHECKING AND TOPPING UP COOLANT).

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



KEY

1) Front cylinder thermistor
2) Rear cylinder thermistor
3) Breather pipe
4) Coolant compensation pipes
5) Filler hose
6) Filler neck
7) Engine hose (right side) - thermal expansion valve
8) Rear cylinder hose - three-way manifold
9) Front cylinder hose - three-way manifold
10) Thermal switch
11) Three-way manifold
12) Three-way manifold hose - left radiator
13) Radiator link hose
14) Left radiator electrofan
15) Left radiator (vertical flow)
16) Right radiator (vertical flow)
17) Right radiator electrofan
18) Thermal expansion valve hose - pump
19) Right radiator hose - thermal expansion valve
20) Three-way thermal expansion valve (type with heat-sensitive wax)
21) Centrifugal pump
22) Expansion tank

——————> = **Direction of flow with thermal expansion valve open**

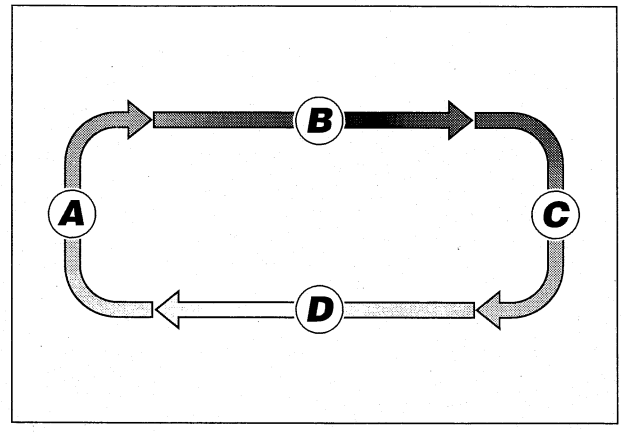
- - - - - -> = **Direction of flow with thermal expansion valve shut**

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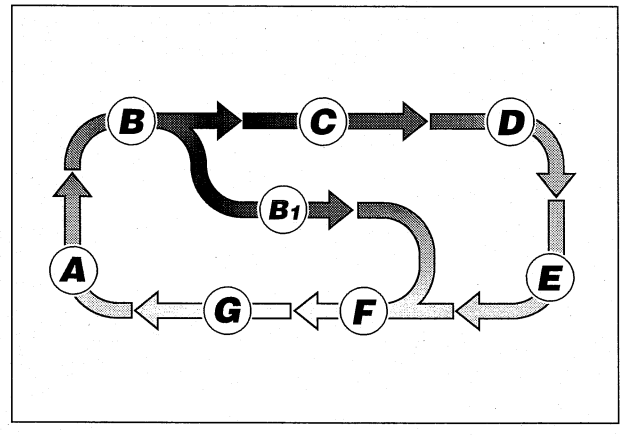
Path with coolant temperature below 65°C (149°F).

Pump "**A**" coolant enters the galleries (temperature taken by thermistors and sent up on the right-hand display on the dashboard) "**B**" coolant leaves the gallery (right-hand side of engine) "**C**" thermal expansion valve (completely shut) "**D**" pump.



Path with coolant temperature in the range 65°C (149°F) to 80°C (176°F).

Pump "**A**" coolant enters the galleries (temperature taken by thermistors and sent up on the right-hand display on the dashboard) "**B**"coolant leaves the galleries (at the same time,"**B1**" coolant leaves the gallery, right-hand side of engine, and is conveyed directly to the thermal expansion valve) "**C**" three-way manifold "**D**" left radiator "**E**" right radiator "**F**" thermal expansion valve (gradually opening) "**G**" pump.

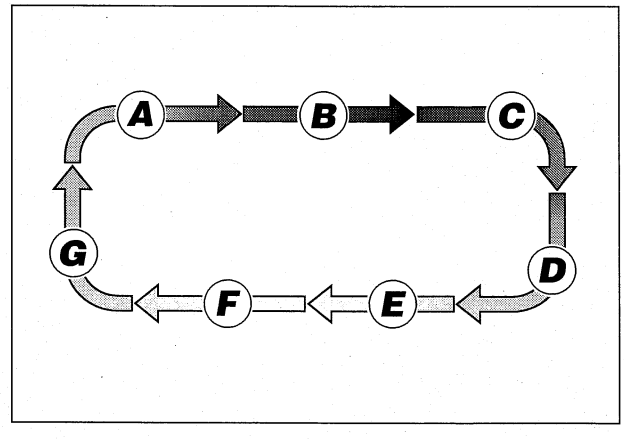


Path with coolant temperature over 80°C (176°F).

Pump "**A**" coolant enters the galleries (temperature taken by thermistors and sent up on the right-hand display on the dashboard) "**B**" coolant leaves the galleries "**C**" three-way manifold (temperature taken by thermal switch: if over 100°C (212°F), the operation of the electrofans is enabled; when it drops below 85°C (185°F), the electrofans are switched off) "**D**" left radiator "**E**" right radiator "**F**" thermal expansion valve (completely open) "**G**" pump.

⚠ CAUTION

When the ignition switch is set to "⊗" the electrofans switch off regardless of the coolant temperature.



5.2 REMOVING THE RADIATORS

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.5 (COOLANT).

NOTE The following procedure refers to a single radiator, though it is applicable to both.

- Turn the ignition switch to position "⊗".
- Drain the cooling circuit completely, see 2.16 (CHANGING THE COOLANT).
- Disconnect the electric connector (1).

⚠ CAUTION

Upon reassembly, make sure that the electric connector (1) is correctly coupled.

- Remove the radiator spoiler, see 7.1.30 (REMOVING THE RADIATOR SPOILER).

Clamp driving torque: 7 Nm (0.7 kgm).

- Loosen and move the clamp (2).
- Pull the coupling (3) off the radiator (4).

Clamp driving torque: 7 Nm (0.7 kgm).

- Loosen and move the clamp (5).
- Pull the coupling (6) off the radiator (4).

NOTE Obtain appropriate pliers to attach the clamps, or screwdriver-type pipe clamps to replace the original ones (special type without screw).

- Release the head off the pipe clamp (7).
- Pull the pipe (8) off the radiator (4).

Driving torque of perforated screw radiator: 10 Nm (1.0 kgm).

- Unscrew and remove the screw (9), retrieving the bush and the rubber element (10) if necessary.

NOTE If the rubber element (10) is damaged, replace it.

⚠ CAUTION

Proceed with care.
Do not damage the radiator fins.

- Tilt the radiator (4) slightly forwards and at the same time lift it, sliding the two lower anchorage pins (12-13) from their slot on the radiator mount (11).
- Remove the radiator (4) complete with the electrofan.

⚠ CAUTION

Plug the coupling openings, in such a way as to prevent any foreign matters from getting in.

NOTE If the rubber elements (14) are damaged, replace them.

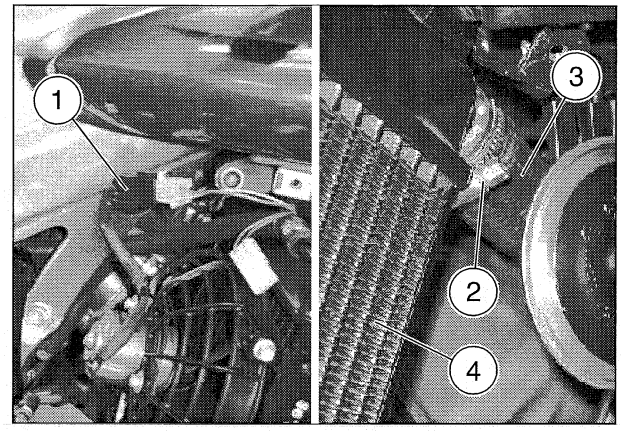
If necessary, proceed as follows:

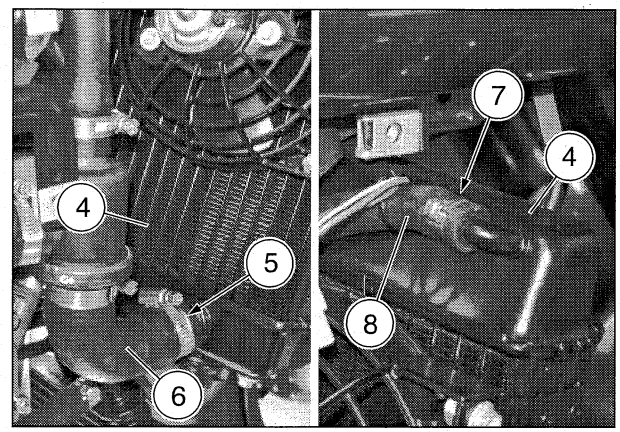
- Remove the cooling electrofan, see 5.3 (REMOVING THE ASSEMBLED RADIATORS COMPLETE WITH ENGINE OIL COOLER).

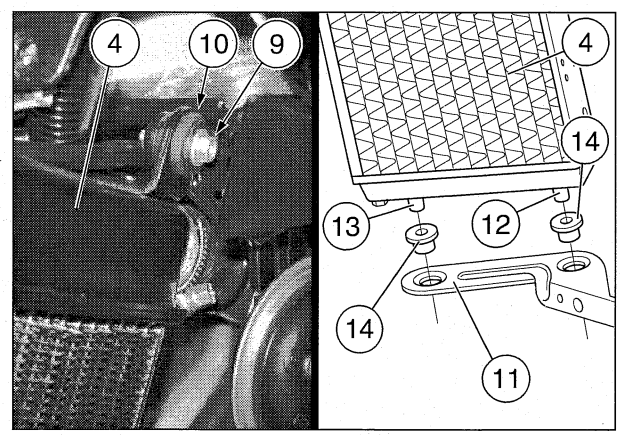
⚠ CAUTION

Foreign bodies, 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 flat-tip screwdriver.
If the couplings (3-6) feature cuts and/or cracks, they must be replaced.
Before reassembly, thoroughly wash the inside of the radiator with clean water only.

NOTE Where necessary, remove the other radiator.







5.3 REMOVING THE ASSEMBLED RADIATORS COMPLETE WITH ENGINE OIL COOLER

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.5 (COOLANT).

- Remove the engine oil tank, see 7.1.47 (REMOVING THE ENGINE OIL TANK).
- Drain the cooling circuit completely, see 2.16 (CHANGING THE COOLANT).
- ★Disconnect the electric connector (1).

⚠ CAUTION

Upon reassembly, make sure that the electric connector (1) is correctly coupled.

Clamp driving torque: 7 Nm (0.7 kgm).

- ★Loosen and move the clamp (2).
- ★Pull the coupling (3) off the radiator (4).
- Release the head off the pipe clamp (5).
- Pull the pipe (6) off the radiator (4).

Driving torque of the engine oil outlet flange screws: 10 Nm (1.0 kgm).

- Unscrew and remove the two screws (7).

Driving torque of the engine oil pipe clamp screw: 10 Nm (1.0 kgm).

- Unscrew and remove the screw (8), taking the washer.

⚠ CAUTION

Upon reassembly, position the clamp (9) correctly.

- ★Unscrew and remove the two screws (10).
- Take the expansion tank support (11).
- Cut the clamp head (12).

Driving torque of perforated screw radiator: 10 Nm (1 kgm).

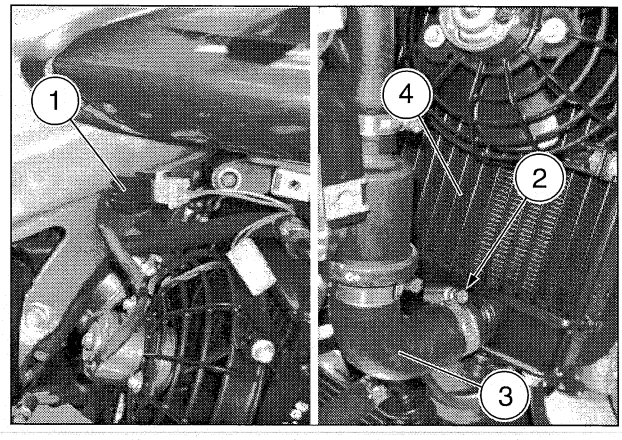
- ★Unscrew and remove the screw (13), retrieving the bush and the rubber element (14) if necessary.

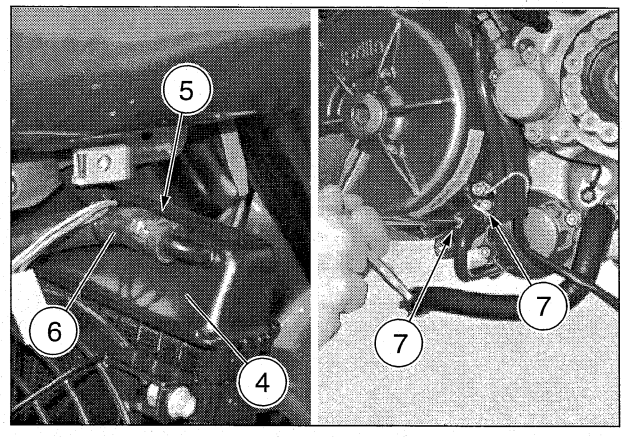
NOTE If the rubber element (14) is damaged, replace it.

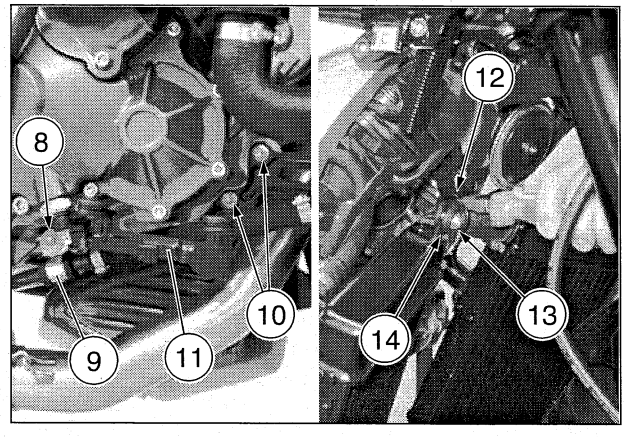
⚠ CAUTION

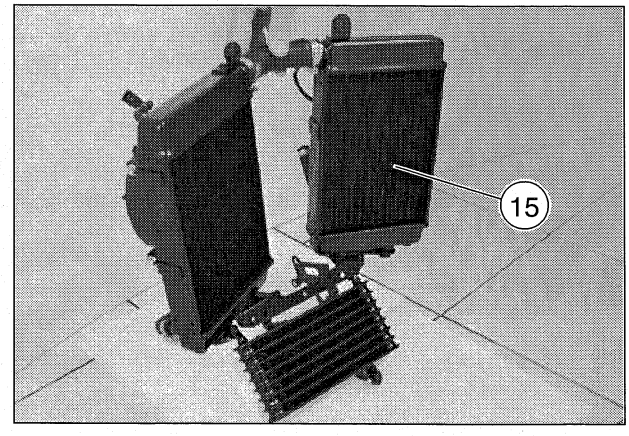
Proceed with care.

- Remove the two assembled radiators (15) complete with engine oil cooler.







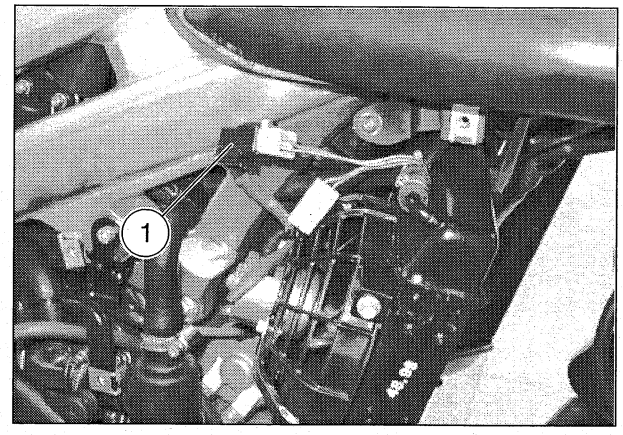


5.4 REMOVING THE COOLING ELECTROFANS

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

NOTE The following procedure refers to a single electrofan, though it is applicable to both.

- Turn the ignition switch to position "⊠".
- Remove the relevant side fairing, see 7.1.25 (REMOVING THE SIDE FAIRINGS).
- Disconnect the electric connector (1).

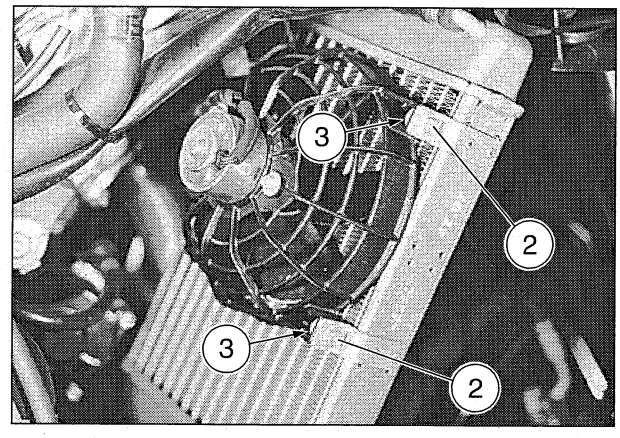


⚠ CAUTION

Upon reassembly, make sure that the electric connector (1) is correctly coupled.

Electric fan support screw driving torque: 5 Nm (0.5 kgm).

- Unscrew and remove the two screws (2).
- Retrieve the two nuts (3).
- Tilt the whole electrofan (4) slightly forwards, at the same time moving it outwards, pulling the internal anchorage pin out of its slot on the radiator (5).
- Remove the electrofan (4).



NOTE If the rubber element (6) is damaged, replace it.

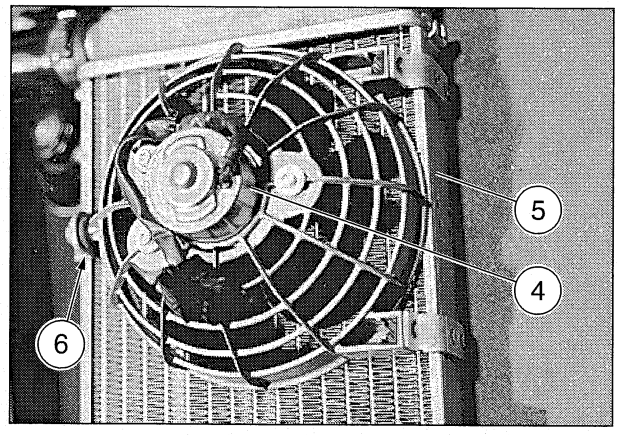
If necessary, proceed as follows:

Electric fan screw driving torque: 1 Nm (0.1 kgm).

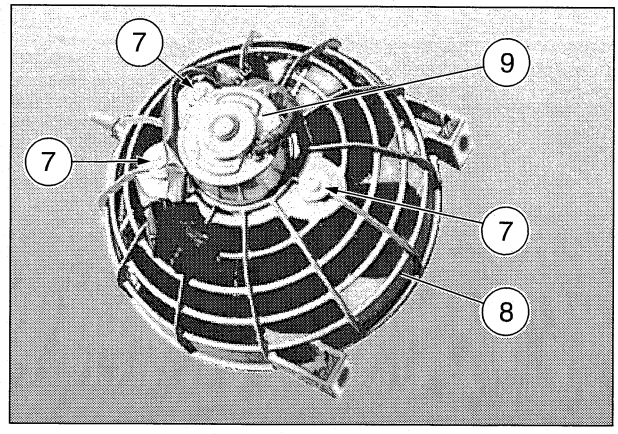
- Unscrew and remove the three screws (7) and retrieve the washers.

NOTE When reassembling, apply LOCTITE® 243 on the thread of the screws (7).

- Slide out the grating (8) protecting the electrofan motor (9).



NOTE Where necessary, remove the other electrofan. See 6.9 (COOLING ELECTROFAN) for further details.



5.5 REMOVING THE COOLANT THERMAL SWITCH

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.5 (COOLANT).

- Turn the ignition switch to position "⊗".
- Lift the fuel tank, see 2.8 (LIFTING THE FUEL TANK).
- Disconnect the electric connectors (1) (2) from the thermal switch (3).

⚠ CAUTION

When reassembling, make sure the electric connectors (1) (2) are plugged in properly.

- Prepare a new thermal switch and apply LOCTITE® 572 on its thread.

Driving torque of thermal switch: 30 Nm (3.0 kgm).

- Unscrew and remove the thermal switch (3) and retrieve the gasket.
- Insert the gasket on the new thermal switch.
- Screw the thermal switch (3) on by hand before tightening it.
- If any coolant spilled during removal, once the operation is complete, top up the coolant, see 2.15 (CHECKING AND TOPPING UP COOLANT).

NOTE See 6.9.3 (CHECKING THE THERMAL SWITCH OPERATION) for further details on the thermal switch.

⚠ CAUTION

Plug the hole on the three-way manifold so as to prevent any foreign bodies from falling in.

5.6 REMOVING THE COOLANT THERMISTORS

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.5 (COOLANT).

NOTE The following procedure refers to a single thermistor, though it is applicable to both.

- Lift the fuel tank, see 2.8 (LIFTING THE FUEL TANK).
- Disconnect the electric connector (1).

⚠ CAUTION

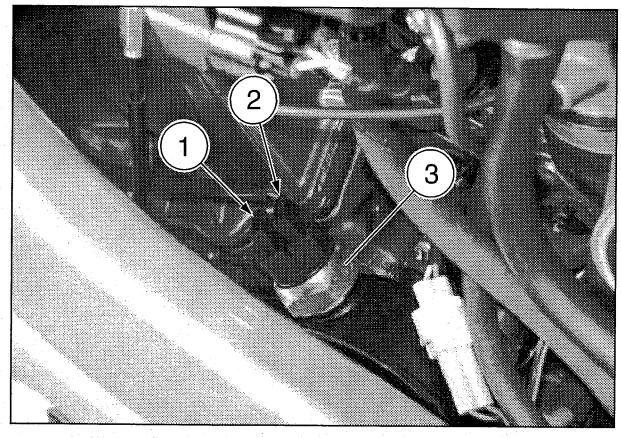
Upon reassembly, make sure that the electric connector (1) is correctly coupled.

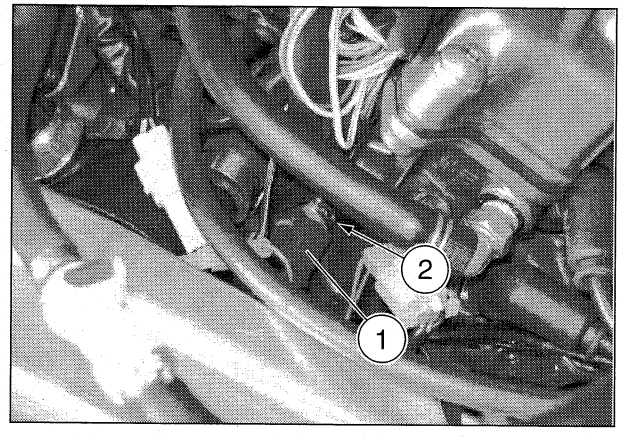
- Prepare a new thermistor and apply LOCTITE® 574 on its thread.

Driving torque of thermistor: 30 Nm (3.0 kgm).

- Unscrew and remove the thermistor (2).
- Screw the thermistor (2) on by hand before tightening it.
- If any coolant spilled during removal, once the operation is complete, top up the coolant, see 2.15 (CHECKING AND TOPPING UP COOLANT).

NOTE Where necessary, remove the other thermistor. See 6.4.8 (CHECKING THE COOLANT THERMISTOR OPERATION) for further details on the thermistors.





5.7 REMOVING THE THERMAL EXPANSION VALVE

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.5 (COOLANT).

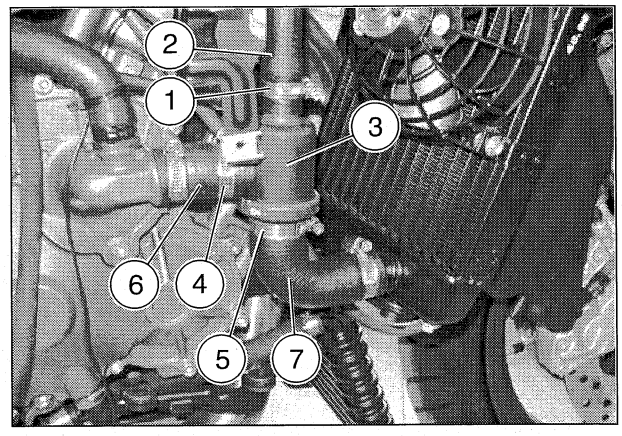
- Drain the cooling circuit completely, see 2.16 (CHANGING THE COOLANT).

NOTE Obtain appropriate pliers to attach the clamps, or screwdriver-type pipe clamps to replace the original ones (special type without screw).

- Release the head off the pipe clamp (1).
- Pull the pipe (2) off the thermal expansion valve (3).

Clamp driving torque: 7 Nm (0.7 kgm).

- Loosen the clamps (4) (5).
- Grip the thermal expansion valve (3) and pull it free of the two couplings (6) (7) one small step at a time.



⚠ CAUTION

Plug the coupling openings, in such a way as to prevent any foreign matters from getting in.

5.7.1 CHECKING THE THERMAL EXPANSION VALVE

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.5 (COOLANT).

- Remove the thermal expansion valve, see 5.7 (REMOVING THE THERMAL EXPANSION VALVE).
- Check the heat-sensitive wax for signs of cracking or excessive wear: in this case, replace the whole valve (3).

Check the valve (3) is working properly as follows:

- Tie a piece of string around the valve (3).
- Place a container (8) holding coolant on a burner (9).
- Immerse the valve (3) in the container.

NOTE The valve (3) must be fully submersed without allowing it to touch the walls or bottom of the container (8).

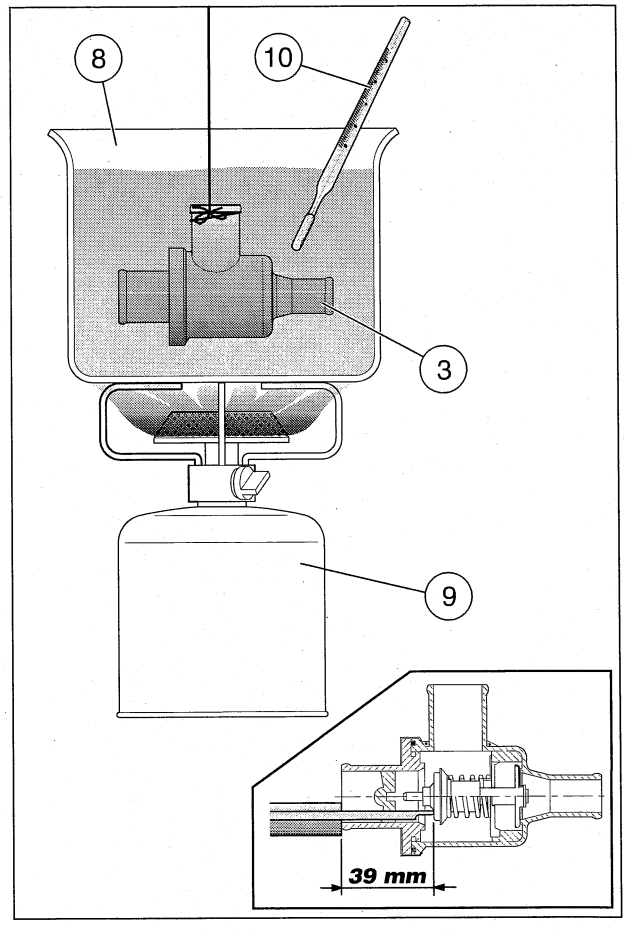
- Secure the string so that the valve (3) remains in place.
- Heat the coolant, using a thermometer (10) with a 0 to 150 °C (32 to 302 °F) range to check the rise in temperature.
- Take note of the temperature reading when the valve (3) starts to open.

Valve (3) opening temperature: 65 ±2 °C (149 ± 3.6 °F).

- Continue heating the coolant.
- When the temperature of the coolant reaches 80 °C (176 °F), the valve (3) should have opened by at least 7 mm (39 mm measured from the edge).

Valve (3) opening: ≥ 7 mm at 80 °C (176 °F).

NOTE If the valve does not meet both conditions (initial opening temperature and maximum opening), it must be replaced.



5.8 REMOVING THE FILLER NECK

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.5 (COOLANT).

- ◆ Drain the cooling circuit completely, see 2.16 (CHANGING THE COOLANT).
- ◆ Lift the fuel tank, see 2.8 (LIFTING THE FUEL TANK).

NOTE Obtain appropriate pliers to attach the clamps, or screwdriver-type pipe clamps to replace the original ones (special type without screw).

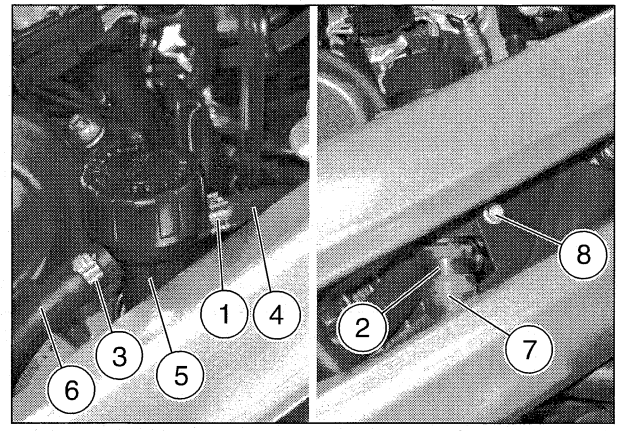
- ◆ Release the head off the pipe clamps (1) (2) (3).
- ◆ Pull the pipe (4) off the neck (5).
- ◆ Pull the pipe (6) off the neck (5).
- ◆ Pull the coupling (7) off the neck (5).

⚠ CAUTION

Plug the coupling openings, in such a way as to prevent any foreign matters from getting in.

Coolant filler screw driving torque: 1 Nm (0.1 kgm).

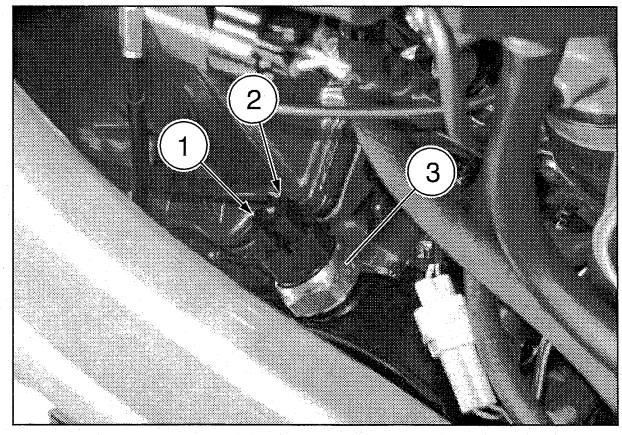
- ◆ Unscrew and remove the screw (8) and take the bushing.
- ◆ Remove the filler neck (5).



5.9 REMOVING THE THREE-WAY MANIFOLD

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.5 (COOLANT).

- ◆ Turn the ignition switch to position "⚿".
- ◆ Lift the fuel tank, see 2.8 (LIFTING THE FUEL TANK).
- ◆ Drain the cooling circuit completely, see 2.16 (CHANGING THE COOLANT).
- ◆ Disconnect the electric connectors (1) (2) from the thermal switch (3).



⚠ CAUTION

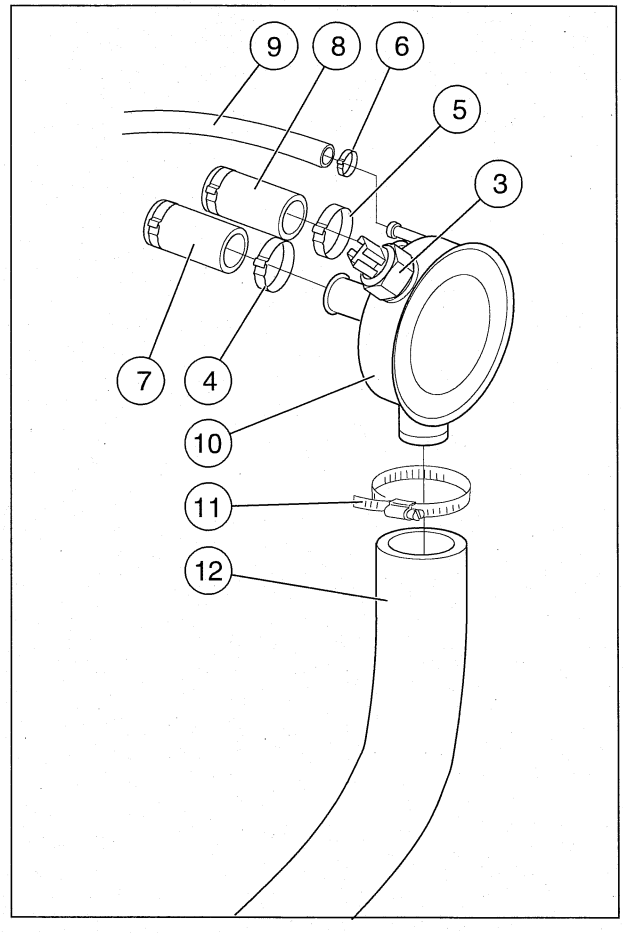
When reassembling, make sure the electric connectors (1) (2) are plugged in properly.

NOTE Obtain appropriate pliers to attach the clamps, or screwdriver-type pipe clamps to replace the original ones (special type without screw).

- ◆ Release the head off the pipe clamps (4) (5) (6).
- ◆ Pull the three pipes (7) (8) (9) off the manifold (10).

Clamp driving torque: 7 Nm (0.7 kgm).

- ◆ Loosen the pipe clamp (11) and move it downwards.
- ◆ Grip the manifold (10) and slide it up off the coupling (12) one small step at a time.



⚠ CAUTION

Plug the coupling openings, in such a way as to prevent any foreign matters from getting in.

If necessary, proceed as follows:

Driving torque of thermal switch: 30 Nm (3.0 kgm).

- ◆ Unscrew and remove the thermal switch (3) and retrieve the gasket.

NOTE When reassembling, apply LOCTITE® 572 on the thread of the thermal switch (3).

5.10 PARTIAL REMOVING THE EXPANSION TANK

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.5 (COOLANT).

- ◆ Remove the right fairing, see 7.1.25 (REMOVING THE SIDE FAIRINGS).
- ◆ Unscrew the breather pipe (1).

⚠ CAUTION

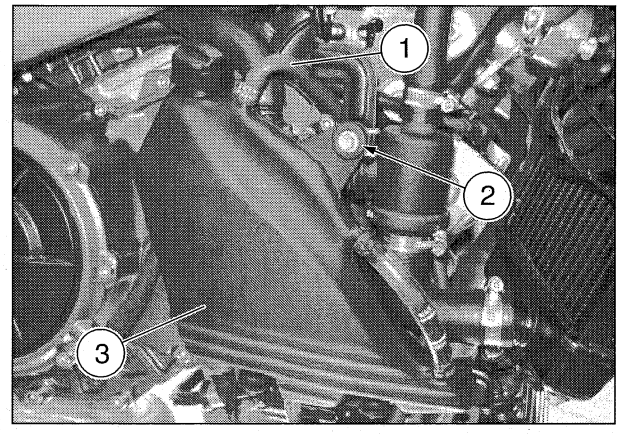
Upon reassembly, position the breather pipe (1) correctly in its seat.

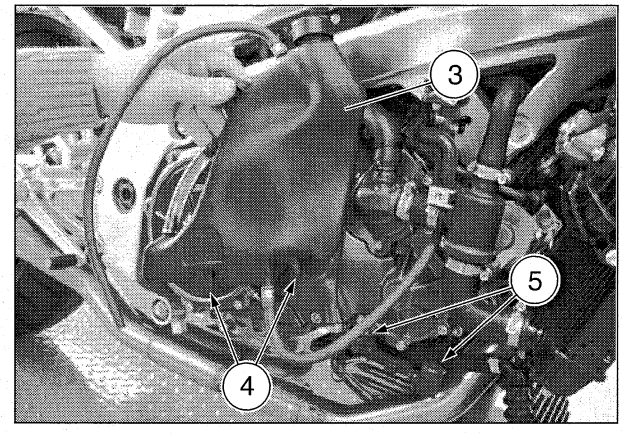
Expansion tank screw driving torque: 10 Nm (1.0 kgm).

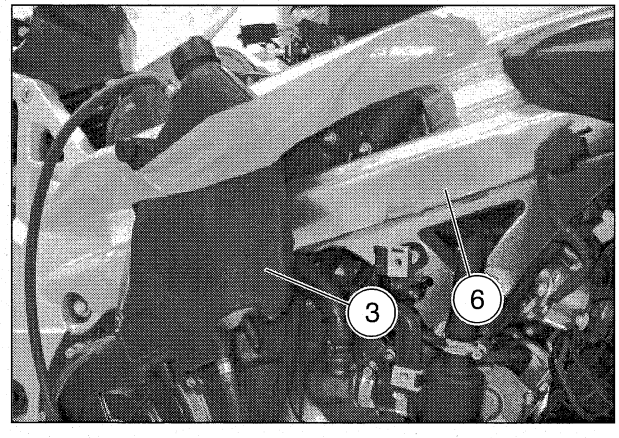
- ◆ Unscrew and remove the screw (2).
- ◆ Lift the expansion tank (3), withdrawing the two lower anchorage pins (4) from their seat.

NOTE If the rubber elements (5) are damaged, replace them.

- ◆ Fasten the expansion tank (3) to the frame (6), positioning it vertically with respect to the frame itself.







5.11 COOLANT PUMP

See **aprilia** part# 8140582 (Engine service and repair manual V990 1051-1) for information on the coolant pump.

NOTE

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ELECTRIC SYSTEM

6

ELECTRIC SYSTEM

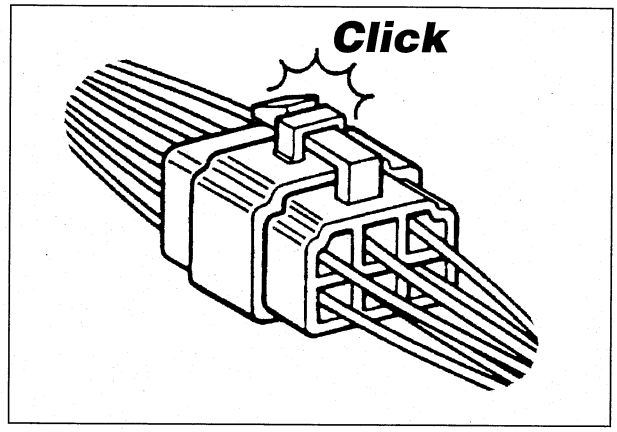
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6.1 INTRODUCTION

The following key will be useful in consulting this section.

NOTE The numbering to be found on the specific wiring diagrams corresponds to that on the general wiring diagram.



6.1.1 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

6.1.2 ELECTRICAL CONNECTORS

The disconnection of two electrical connectors must be carried out by proceeding as follows:

◆ Press the appropriate safety couplings, if provided.

⚠ CAUTION

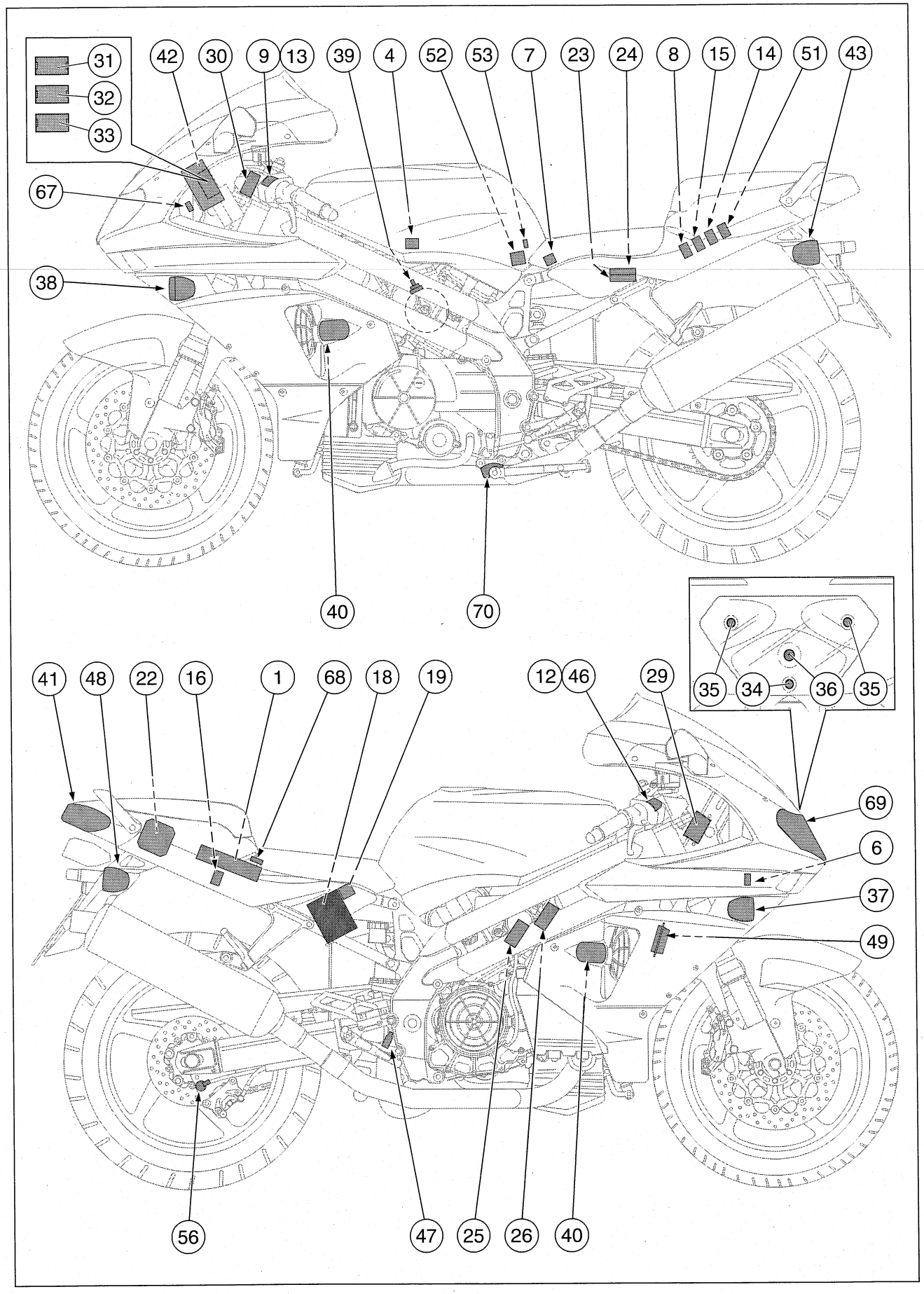
Do not pull the cables to disconnect the two connectors.

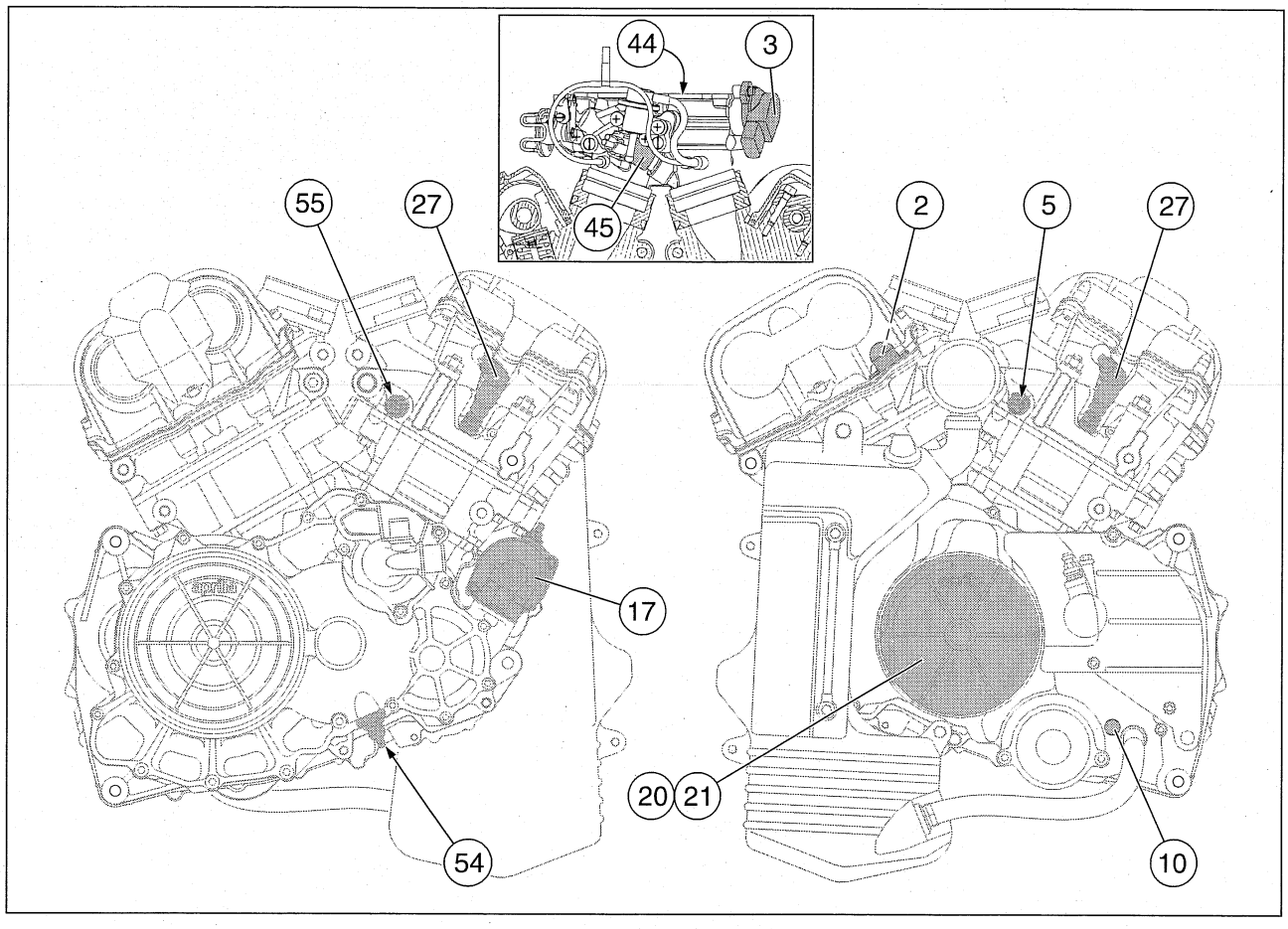
◆ Grasp the two connectors and disconnect them by pulling in opposite directions.
◆ If dirt, rust, dampness, etc. can be noticed, carefully clean the inside of the connector by means of a pressurized air jet.
◆ Make sure that the cables are correctly crimped to the terminals positioned inside the connectors.

NOTE The two connectors have one insertion direction only, therefore it is important to couple them in the correct direction.

◆ Insert the two connectors, making sure that the coupling direction is correct (if the appropriate safety couplings are provided, the typical "click" sound will be heard).

6.2 ELECTRIC COMPONENTS LAYOUT





KEY

NOTE The numbering corresponds to that on the general wiring diagram.

1) Electronic unit
2) Cam position sensor
3) Throttle valve potentiometer
4) Intake pressure sensor
5) Coolant temperature thermistor (dashboard)
6) Air thermistor
7) Fall sensor
8) Diode module
9) Clutch control lever switch
10) Neutral gear switch
12) Right dimmer switch
13) Left dimmer switch
14) Engine stop relay
15) Fuel pump relay
16) Start relay
17) Starter
18) Battery
19) Main fuses (30A) (ignition)
20) Generator
21) Pick up
22) Voltage regulator
23) Rear cylinder coil "1"
24) Rear cylinder coil "2"
25) Front cylinder coil "1"
26) Front cylinder coil "2"
27) Spark plugs
29) Secondary fuses (15 A)
30) Ignition switch
31) Low beam relay
32) High beam relay
33) Cooling fan relay
34) Front parking light bulb
35) High beam bulbs
36) Low beam bulb
37) Front right direction indicator
38) Front left direction indicator
39) Thermal switch
40) Cooling fans
41) Rear light
42) Dashboard
43) Rear left direction indicator
44) Front cylinder injector
45) Rear cylinder injector
46) Front stoplight switch
47) Rear stoplight switch
48) Rear right direction indicator
49) Horn
51) Blinking
52) Fuel pump
53) Low fuel sensor
54) Engine oil pressure sensor
55) Coolant temperature thermistor (injection)
56) Speed sensor
67) Light diode / LAP
68) TEST connectors
69) Headlight
70) Side stand switch

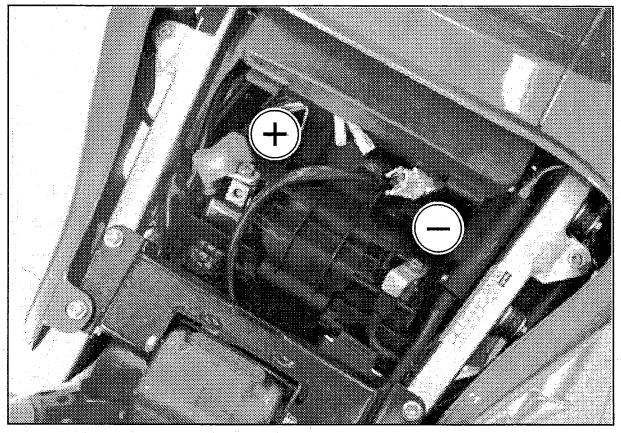
6.3 CHECKING THE RECHARGING SYSTEM

6.3.1 CHECKING THE RECHARGING VOLTAGE

- Check battery voltage, see 2.4.2 (RECHARGING THE BATTERY).
- Start the engine and let it run until it reaches 4000 rpm.
- Set the light switch to "☼" and dimmer switch to "≡D".
- ASD Set the dimmer switch to "≡D".
- Using a pocket tester, measure the direct voltage between the positive (+) and negative (–) terminals.

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

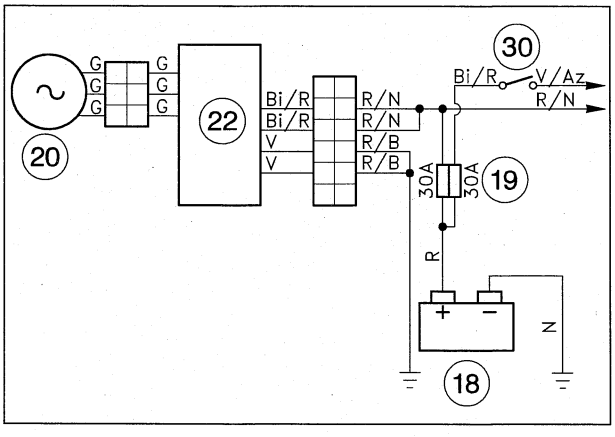
- Check the loadless operation and the continuity of the alternator, see 6.3.2 (CHECKING THE ALTERNATOR LOADLESS OPERATION), 6.3.3 (CHECKING THE ALTERNATOR CONTINUITY).
- Check the operation of the voltage regulator, see 6.3.4 (CHECKING THE VOLTAGE REGULATOR).



Wiring diagram key

NOTE See 6.2 (ELECTRIC COMPONENTS LAYOUT) for the positioning of the components.

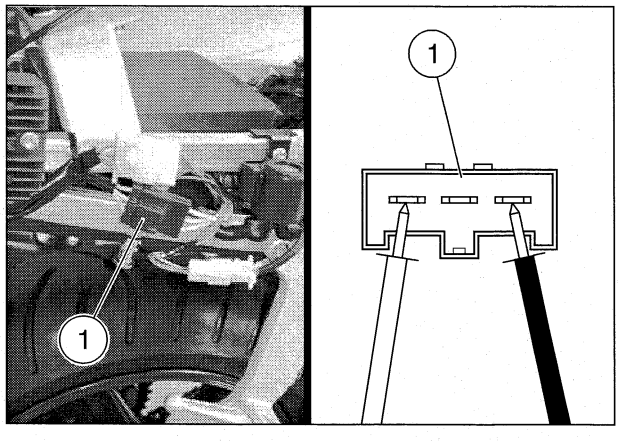
18) Battery
19) Main fuse (30A)
20) Generator
22) Voltage regulator
30) Ignition switch (○ - ⊠ - ⚿)



Standard charging voltage: 13 to 15 V (d.c.) at 4000 rpm.

6.3.2 CHECKING THE ALTERNATOR LOADLESS OPERATION

- Remove the rear fairing, see 7.1.36 (REMOVING THE SADDLE SUPPORT LOWER MOULDED COVER).
- Disconnect the three-way connector (1) (coloured brown).



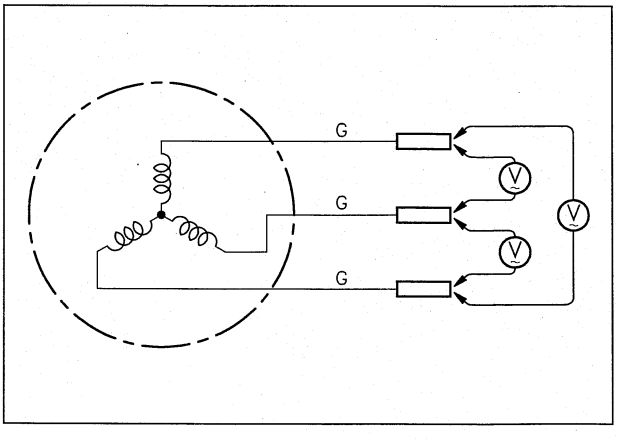
⚠ CAUTION

Upon reassembly, make sure that the electric connector (1) is correctly coupled.

- Start the engine and let it run until it reaches 4000 rpm.
- Using a pocket tester, measure the voltage (a.c.) from the three internal male terminals [yellow cables (G)] in rotation.

If the value indicated by the tester is lower than 60 V, the alternator is faulty and needs replacing.

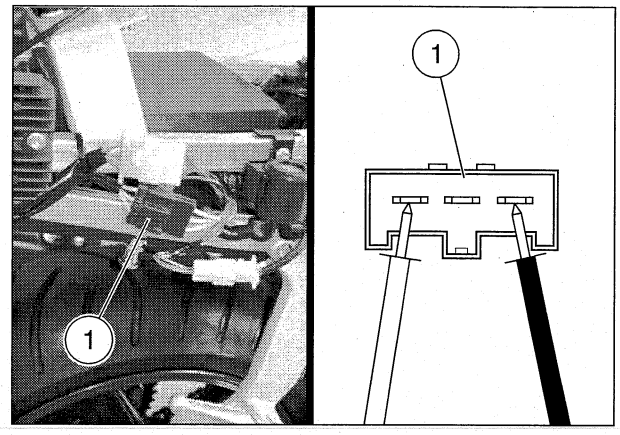
Standard loadless voltage: more than 60 V (a.c.) at 4000 rpm.



6.3.3 CHECKING THE ALTERNATOR CONTINUITY

With the engine switched off:

- Remove the rear fairing, see 7.1.36 (REMOVING THE SADDLE SUPPORT LOWER MOULDED COVER).
- Disconnect the three-way connector (1) (coloured brown).



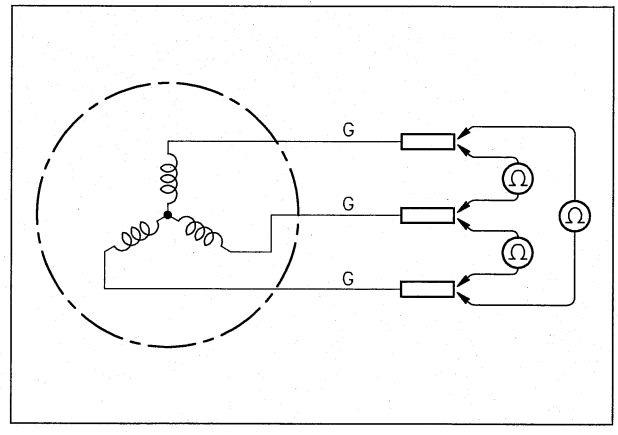
⚠ CAUTION

Upon reassembly, make sure that the electric connector (1) is correctly coupled.

- Using a pocket tester (Ω scale), check for breaks between the cables of the stator [on the internal male terminals, yellow cables (G)].
  Also check the isolation of the stator mount.

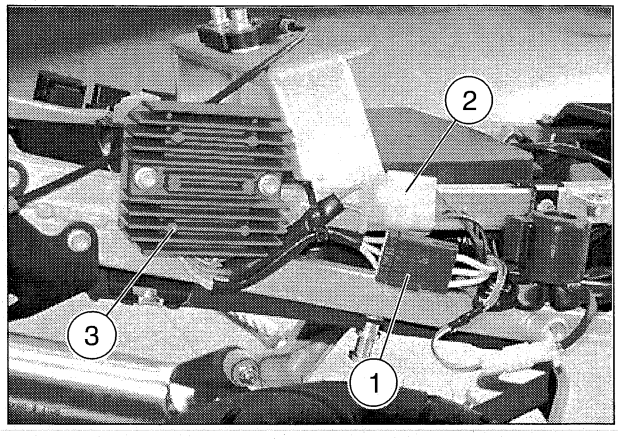
Standard resistance value: 0.1 - 1Ω.

Standard resistance value (between cables and stator mount): ∞.



6.3.4 CHECKING THE VOLTAGE REGULATOR

- Remove the rear fairing, see 7.1.36 (REMOVING THE SADDLE SUPPORT LOWER MOULDED COVER).
- Disconnect the three-way connector (1) (coloured brown).
- Disconnect the six-way connector (2) (coloured white).



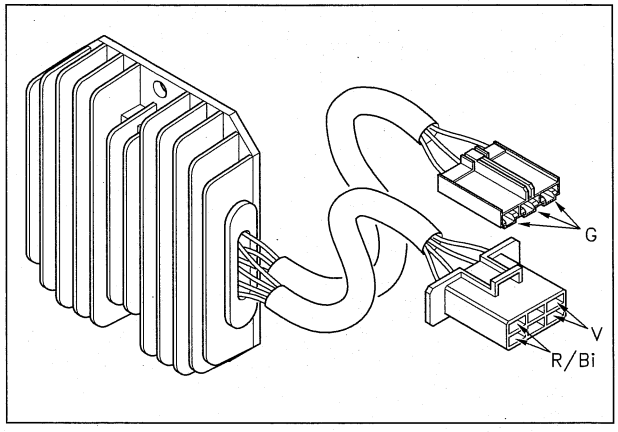
⚠ CAUTION

When reassembling, make sure the electric connectors (1-2) are plugged in properly.

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

NOTE The green (V) and white/red (Bi/R) cables are double, though connected together.
Take the measurements on either of the two.

		Positive terminal (+) of the tester on:				
		G	G	G	V	R/Bi
Negative terminal (–) of the tester on:	G		∞	∞	2 - ∞	∞
	G	∞		∞	2 - ∞	∞
	G	∞	∞		2 - ∞	∞
	V	∞	∞	∞		∞
	R/Bi	2 - ∞	2 - ∞	2 - ∞	3 - ∞	



⚠ CAUTION

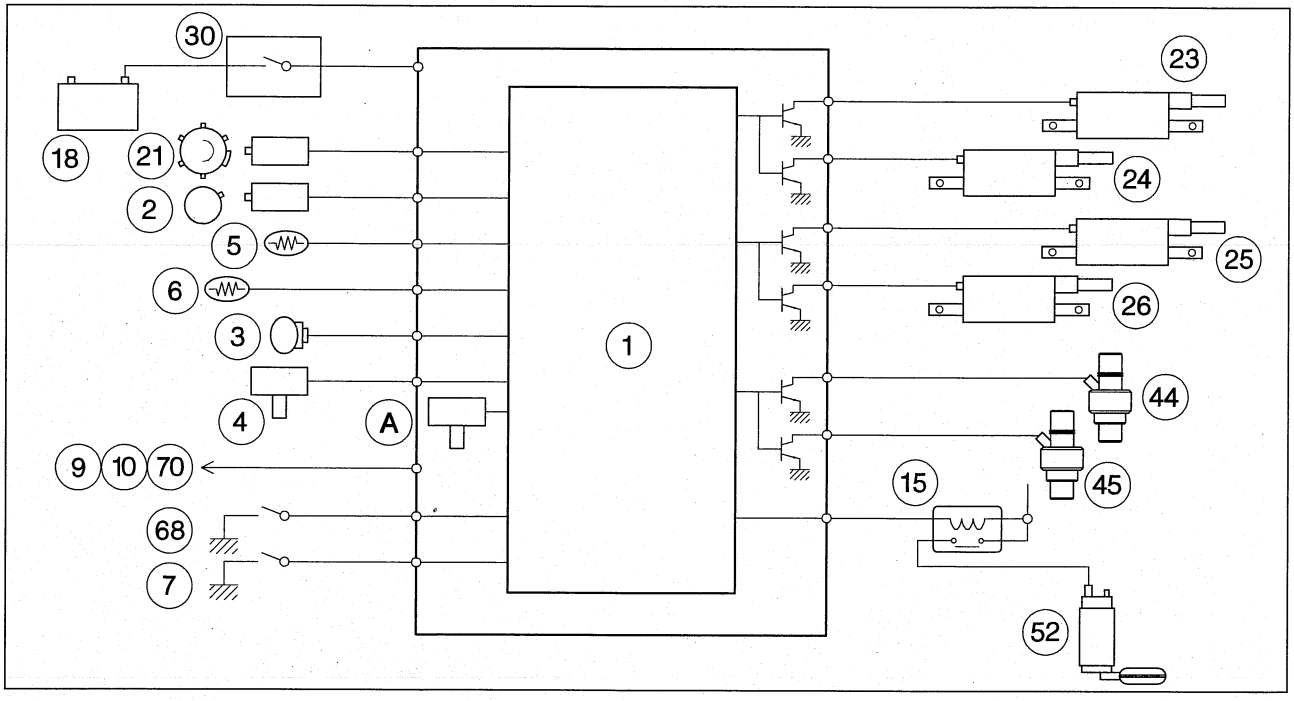
This measuring method is approximate; if possible, check the correct operation of the recharging system using another regulator in perfect condition.

If the resistance measured is incorrect, replace the voltage regulator (3).

6.4 IGNITION SYSTEM

6.4.1 WIRING DIAGRAM

NOTE See 6.2 (ELECTRIC COMPONENTS LAYOUT) for the positioning of the components.



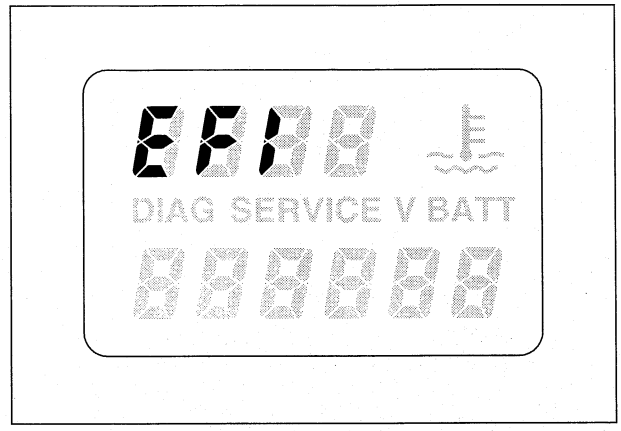
WIRING DIAGRAM KEY

A) Intake pressure sensor (inside electronic unit)
1) Electronic unit
2) Camshaft position sensor
3) Throttle valve potentiometer
4) Intake pressure sensor
5) Coolant thermistor
6) Air thermistor
7) Fall sensor
9) Clutch control lever switch
10) Neutral gear switch
15) Fuel pump relay
18) Battery
21) Driving shaft position sensor
23) Rear cylinder coil "1"
24) Rear cylinder coil "2"
25) Front cylinder coil "1"
26) Front cylinder coil "2"
30) Ignition switch
44) Front cylinder injector
45) Rear cylinder injector
52) Fuel pump
68) TEST connectors
70) Side stand switch

6.4.2 TROUBLESHOOTING (IF THE ENGINE DOES NOT START)

Locating a fault in the electrical system

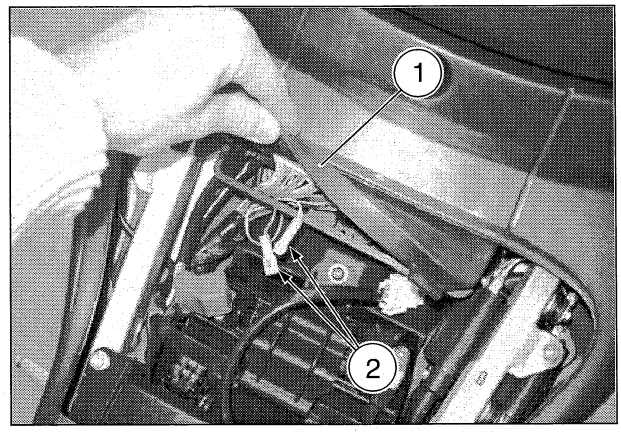
- Position the vehicle on the stand.
- Turn the ignition switch to position "○".
  The message "EFI" comes up on the right-hand display for approx. three seconds.
- Press the start pushbutton "⊛"for more than four seconds.
  If the ignition system is malfunctioning, the message "EFI"reappears.



NOTE If a fault is detected in the electronic system or if the "EFI" message flashes on the multifunction display, do not start the vehicle so as to avoid secondary damage.

If the ignition system is malfunctioning and the message "EFI" fails to reappear, make sure there are no breaks in the white/purple (Bi/Vi) cable between the electronic unit and the display.

- Put back the rider saddle, see 7.1.1 (REMOVING THE RIDER SADDLE).
- Raise the protection element (1).
- Connect the two one-way TEST connectors (2).
- Turn the ignition switch to position "○".
- Start the engine or attempt to start it.

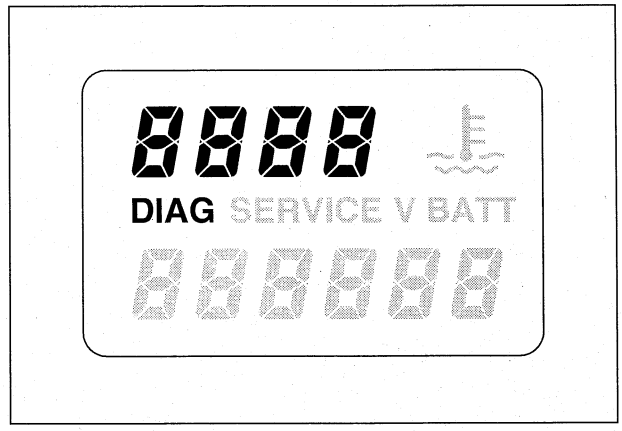


The message "DIAG" comes up on the left display along with a number corresponding to the reference code relating to the fault (see table); the fault detected may be caused by breaks in the cables and/or connections not made properly.

Checking an electric system fault:

⚠ CAUTION

Before commencing the automatic search for a fault, stop the engine.



NOTE When a fault comes up on the display, it is possible that the fault may also be attributable to the engine control unit.

The ECU may only be tested by connecting a new ECU.

Should the engine control unit work properly, remember to refit the previous unit.

The ECU features an anti-breakdown device which, where necessary, means the engine can be started and run despite there being a fault on the display.

Follow ▶

Follow ▶

Component	Fault code	Cause	To view "EFI" on the display	Components to be checked	Starting motor running	Engine runs	Engine runs (emergency conditions)
Camshaft position sensor	11	Sensor not connected. Sensor broken. Wiring faulty.	Press the starter button for more than four seconds.	Connector, sensor cable and sensor	Yes	No (the cylinder cannot be identified)	No
Driving shaft position sensor	12				Yes	No	
Intake pressure sensor	13				Yes	Yes	Yes (irregular running for throttle valves rotation insufficient)
Intake pressure sensor	14	Excessive difference between the sensor signals.	Engine shut off	Sensor pipes (air pipe)			
Throttle valve potentiometer	15	Sensor not connected. Sensor broken. Wiring faulty.	Engine running or engine shut off	Connector, sensor cable and sensor			Yes
Coolant thermistor	21					Yes (cold-starting difficult)	
Air thermistor	22					Yes	Yes (there is no altimetric compensation)
Atmospheric pressure sensor (ECU inside)	23	Sensor faulty		Cannot be checked: replace the ECU			
Ignition coil "1" of front cylinder	33	Ignition coil faulty or wiring not connected	Engine running	Connector, ignition cable		Yes (power loss)	Yes (power loss)
Ignition coil "2" of front cylinder	34						
Ignition coils "1" and "2" of front cylinder	33, 34					Yes (only one cylinder, power loss)	Yes (only one cylinder, power loss)
Ignition coil "1" of rear cylinder	35					Yes (power loss)	Yes (power loss)
Ignition coil "2" of rear cylinder	36				Yes		
Ignition coils "1" and "2" of rear cylinder	35, 36				Yes	Yes (only one cylinder, power loss)	Yes (only one cylinder, power loss)
Fall sensor	41	Sensor not connected. Sensor broken. Wiring faulty.	Engine running or engine shut off	Connector, sensor cable and sensor	Yes	Yes	Yes

6.4.3 ELIMINATING ELECTRONIC SYSTEM FAULTS ACCORDING TO THE INFORMATION SENT UP ON THE DISPLAY

⚠ WARNING

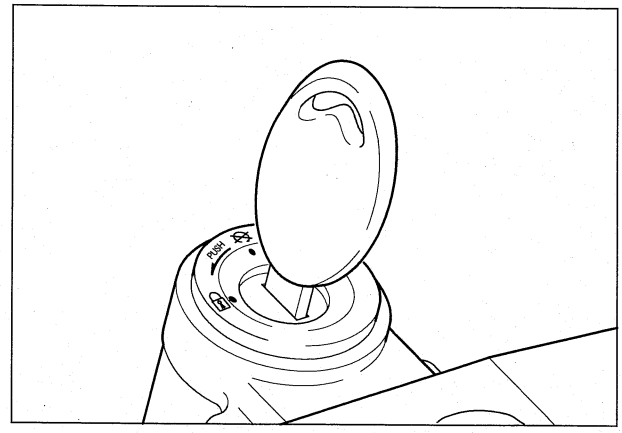
Take care around the high voltage in the ignition system.
Never disconnect connections with the engine running.
Whenever work is performed in the ignition system, always make sure the ignition switch is set to "⚿" and the battery disconnected, unless otherwise indicated (when disconnecting the battery, disconnect the negative pole "–" first).

⚠ CAUTION

All measurements must be taken with the components at a temperature of 20°C (68°F).
General instructions regarding the elimination of faults: as soon as the fault has been located, remove the defective component.

◆ Perform the checks indicated in the following chapters:
- 6.4.6 (CHECKING THE CAMSHAFT POSITION SENSOR);
- 6.4.5 (CHECKING THE PICK-UP);
- 6.4.11 (CHECKING THE INTAKE PRESSURE SENSOR);
- 6.4.10 (CHECKING THE THROTTLE VALVE POTENTIOMETER);
- 6.4.8 (CHECKING THE COOLANT THERMISTOR OPERATION).

If the engine does not start and the diagnostics fail to detect any fault, check (in the given order) whether:
- the fuel pump is working properly, see 6.5.2 (CHECKING THE FUEL PUMP);
- the injectors are working properly, see 6.4.12 (CHECKING THE INJECTORS);
- the connector for the antitheft device fitting is connected properly (located under the passenger seat and coloured white);
- the ignition switch is working properly, see 6.7 (SWITCHES);
- the engine shutoff switch is working properly, see 6.7 (SWITCHES);
- the main 30A fuses and secondary 15A fuses have blown, see 6.15 (CHANGING THE FUSES);
- the engine shutoff relay is working properly, see 6.5.4 (CHECKING THE ENGINE SHUTOFF RELAY);
- the battery is working properly, see 2.4 (BATTERY) and 6.11 (BATTERY);
- the safety logic is working properly, see 6.6 (IGNITION SAFETY SYSTEM);
- the fall sensor is working properly, see 6.4.7 (CHECKING THE FALL SENSOR).



6.4.4 CHECKING THE IGNITION COILS

- ◆ Remove the rear fairing, see 7.1.33 (REMOVING THE REAR FAIRING).
- ◆ Lift the fuel tank, see 2.8 (LIFTING THE FUEL TANK).

NOTE The following procedure refers to a single coil, though it is applicable to both.

- ◆ Disconnect the terminals (1-2) from the ignition coil (3).

⚠ CAUTION

Upon reassembly, make sure that the electric terminals (1-2) are properly connected.

- ◆ Slip off the spark plug cap (4) (belonging to the coil of interest) and disconnect it from the 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 to those indicated.

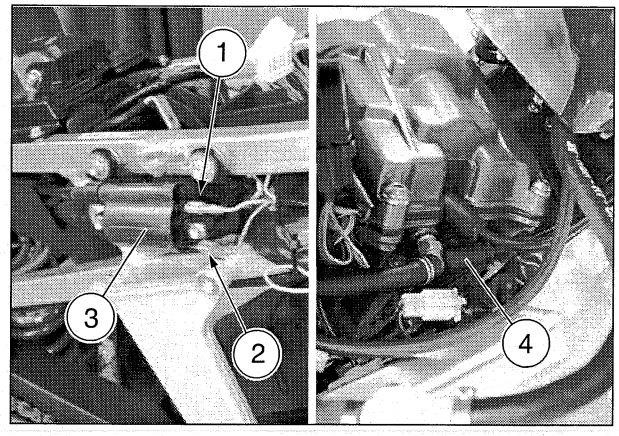
Standard values:

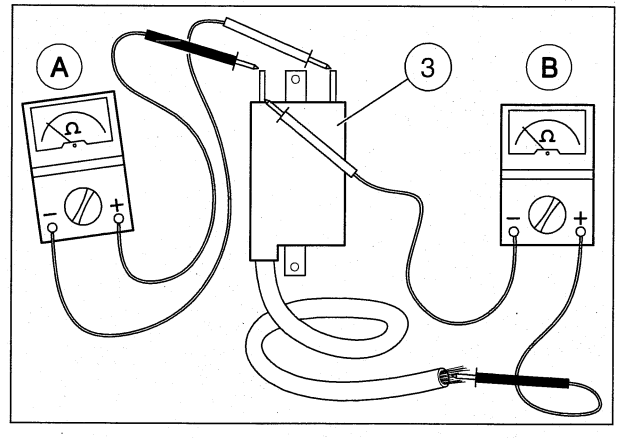
measurement (A): 2.8 - 5.2 Ω;
measurement (B): 9.1 - 16.5 kΩ.

⚠ CAUTION

This measuring method is approximate; if possible, check the correct operation of the coil by replacing it with another one in perfect condition.

- ◆ Repeat the procedure for the other coils.





6.4.5 CHECKING THE PICK-UP

With the engine switched off:

- ◆ Lift the fuel tank, see 2.8 (LIFTING THE FUEL TANK).
- ◆ Release the wiring from the special clamp (5).
- ◆ Release the five-way connector (6) (white) from the frame structure, moving it downwards.
- ◆ Disconnect the two-way connector (6) and take the measurements (on the engine-side terminals).

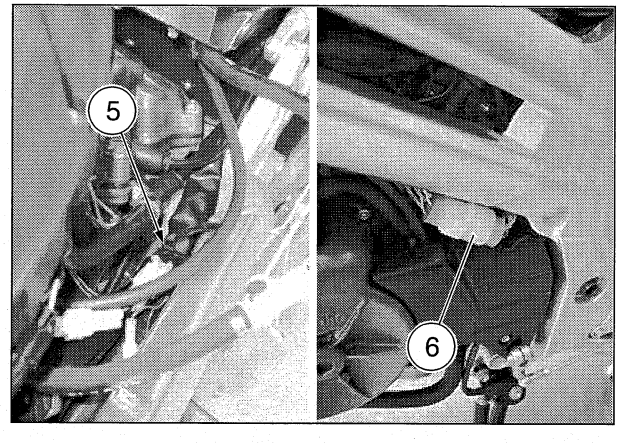
⚠ CAUTION

Upon reassembly, make sure that the electric connector (6) is correctly coupled.

- ◆ Using a pocket tester (scale x 100 Ω), measure the resistance between the terminals of the blue/yellow (B/G) and white/yellow (Bi/G) cables.

Standard value: 150 - 350 Ω.

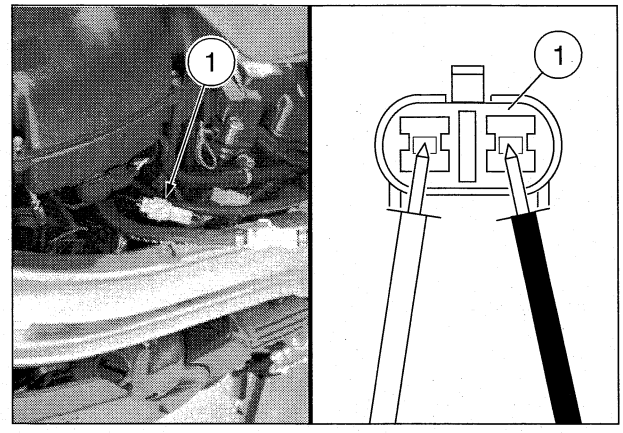
If the resistance is infinite (∞) or lower than the prescribed level, the sensor must be changed.



6.4.6 CHECKING THE CAMSHAFT POSITION SENSOR

With the engine switched off:

- Lift the fuel tank, see 2.8 (LIFTING THE FUEL TANK).
- Disconnect the two-way connector (1) (coloured white) and take the measurements (on the engine-side terminals).



⚠ CAUTION

Upon reassembly, make sure that the electric connector (1) is correctly coupled.

- Using a pocket tester (scale x 100 Ω), measure the resistance between the terminals of the blue/yellow (B/G) and white/yellow (Bi/G) cables.

Standard value: 150 - 350 Ω.

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

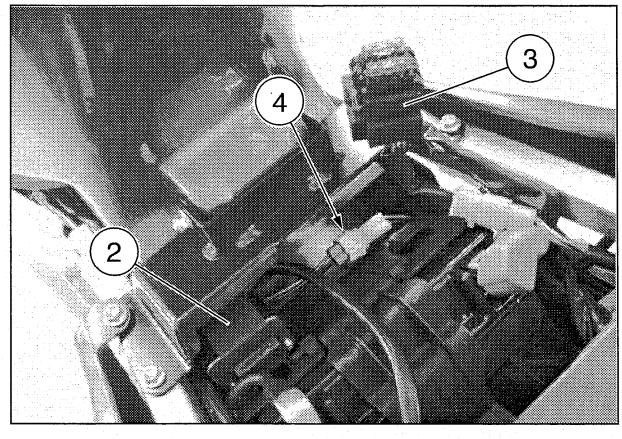
6.4.7 CHECKING THE FALL SENSOR

With the engine switched off:

- Put back the rider saddle, see 7.1.1 (REMOVING THE RIDER SADDLE).

Check whether the sensor (2) is fitted correctly (with the arrow inscribed on the rubber element pointing up).

- Partially remove the fuse carrier (3).
- Disconnect the two-way connector (4) (coloured white/grey) and take the measurements (on the sensor-side terminals).



⚠ CAUTION

Upon reassembly, make sure that the electric connector (4) is correctly coupled.

- Using a pocket tester (scale x 100 kΩ), measure the resistance between the terminals of the black and white/black (N - Bi/N) cables.

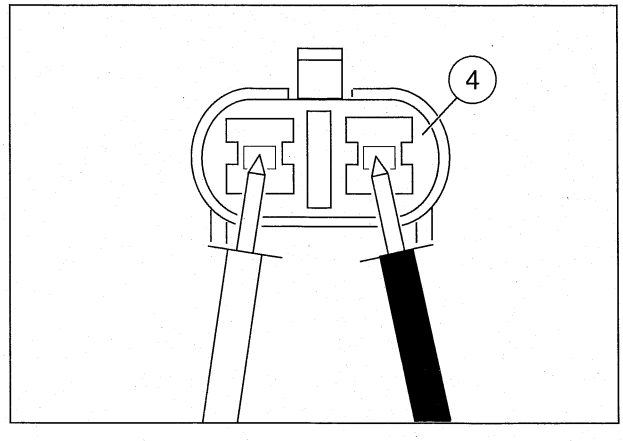
Standard value: resistance 62 kΩ ± 15 %.

- Remove the sensor (2) complete with rubber element from its housing and tilt it sideways at an angle of over 45° (simulating the condition of a vehicle resting on the ground).

Standard value: 0 - 1 Ω.

If the resistance is any value other than that prescribed, the sensor (2) must be changed.

- Repeat the procedure, tilting the sensor in the opposite direction.



6.4.8 CHECKING THE COOLANT THERMISTOR OPERATION

NOTE The value of the temperature measured by the front cylinder thermistor (right-hand side) is sent up on the right-hand display; that measured by the rear cylinder thermistor (left-hand side) is sent to the electronic unit.

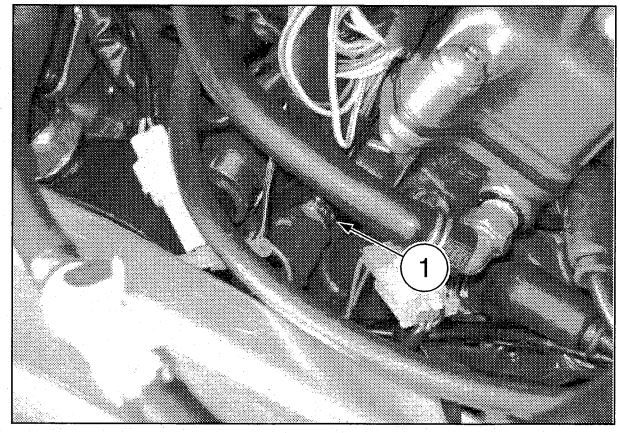
- Remove the thermistor (1), see 5.5 (REMOVING THE COOLANT THERMAL SWITCH).
- Connect a tester (2) (set as an ohmmeter) to the thermistor (1), as illustrated in the figure.
- Immerse the thermistor (1) in a container (3) holding coolant.
- Immerse a thermometer (4) with a 0 to 150 °C (32 to 302 °F) range in the same container.
- Place the container on a burner (5) and slowly warm up the liquid.
- Check the temperature indicated on the thermometer (4) and the thermistor (1) value indicated by the tester.

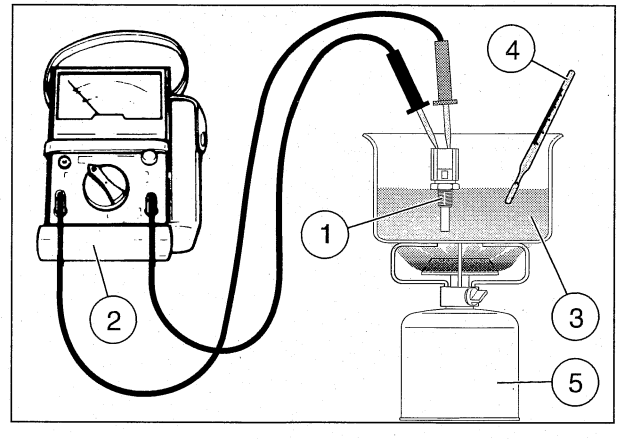
Make sure that the value varies according to the temperature, as indicated.

Coolant temperature (°C)	(°F)	Standard values (Ω) (± 10%)
20	68	1960 - 2940
40	104	800 - 1200
60	140	400 - 700
80	176	200 - 400
100	212	120 - 250

If values do not vary, or if they depart excessively from those indicated in the table, change the thermistor (1).

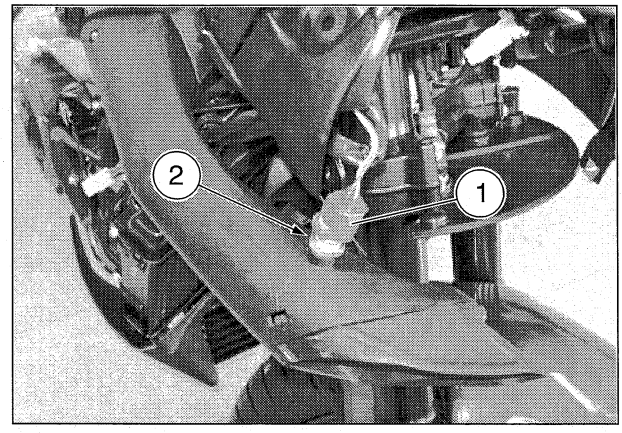
- Repeat the procedure for the other thermistor.





6.4.9 CHECKING THE AIR THERMISTOR OPERATION

- Remove the front part of the fairing, see 7.1.19 (REMOVING THE FRONT PART OF THE FAIRING).
- Disconnect the two-way connector (1) (coloured green).

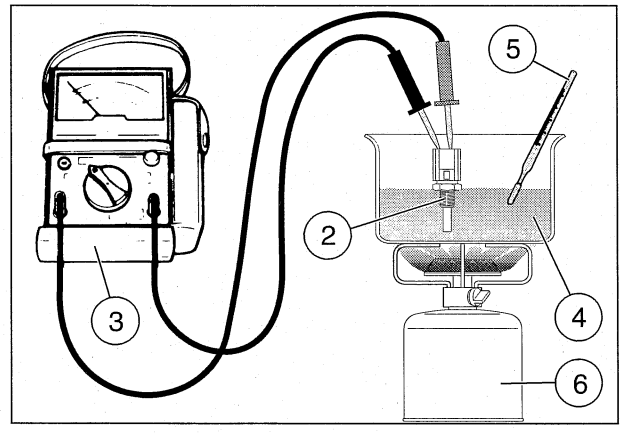


⚠ CAUTION

Upon reassembly, make sure that the electric connector (1) is correctly coupled.

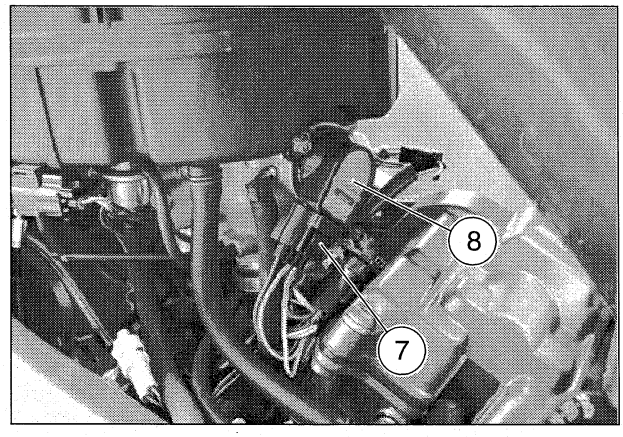
- Unscrew and remove the thermistor (2).
- Connect a tester (3) (set as an ohmmeter) to the thermistor (2), as illustrated in the figure.
- Immerse the thermistor in a container (4) holding water.
- Immerse a thermometer (5) with a 0 to 150 °C (32 to 302 °F) range in the same container.
- Place the container on a burner (6) and slowly warm up the liquid.
- Check the temperature indicated on the thermometer (5) and the thermistor value indicated by the tester.

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



Water temperature (°C)	(°F)	Standard values (Ω) (± 10%)
20	68	1960 - 2940
40	104	800 - 1200
60	140	400 - 700
80	176	200 - 400
100	212	120 - 250

If values do not vary, or if they depart excessively from those indicated in the table, change the thermistor (2).



6.4.10 CHECKING THE THROTTLE VALVE POTENTIOMETER

With the engine switched off:

- Lift the fuel tank, see 2.8 (LIFTING THE FUEL TANK).
- Disconnect the four-way connector (7) (coloured black).

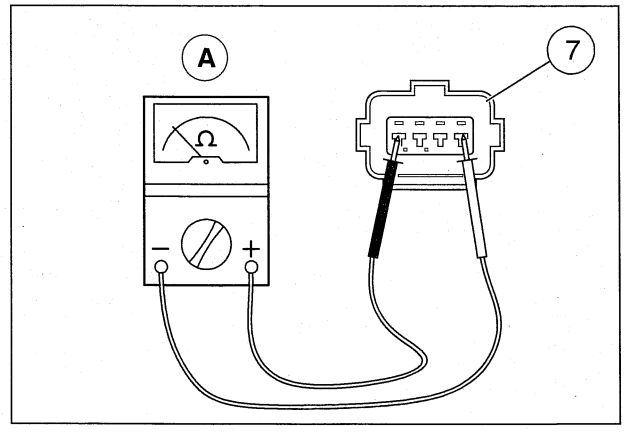
⚠ CAUTION

Upon reassembly, make sure that the electric connector (7) is correctly coupled.

- Turn the ignition switch to position "○".
- By means of a tester, measure the supply voltage between the external terminals of the connector (7); measure (A).

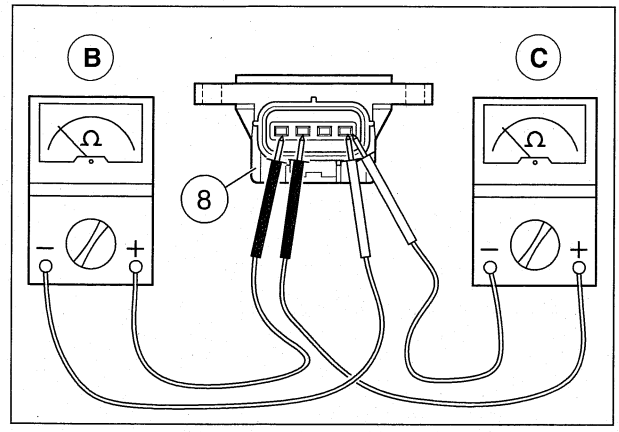
Standard value: 4.5 - 5.5 V.

Follow ▶



Follow ▶

◆ Turn the ignition switch to position "⚿".
◆ Using a pocket tester (scale kΩ), measure the resistance between the terminals of the potentiometer (8).



MEASUREMENT (B)

Resistance between the two terminals whatever the position of the throttle valves:

Standard value: 2.87 - 5.33 kΩ.

MEASUREMENT (C)

Starting with the throttle valve fully closed, accelerating progressively until completely open, the resistance should vary as follows.

standard value:

– **with throttle valves closed 0.34 - 5.69 kΩ;**
– **with throttle valves open 2.87 - 8.41 kΩ.**

NOTE In order to make it easier to unscrew the screws (9) secured using LOCTITE® 243, heat them first with a hot air blower.

◆ Turn the ignition switch to position "⚿".

Potentiometer screw driving torque: 1.6 Nm (0.16 kgm).

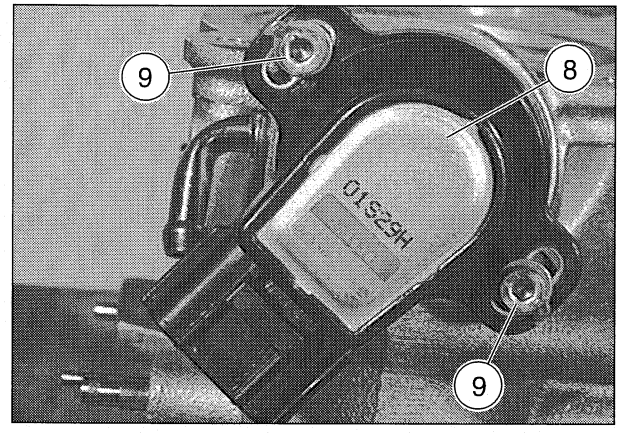
◆ Unscrew and remove the screws (9).
◆ Remove the potentiometer (8) and make sure that the inner spring is not broken.
◆ Using a tester (kΩ scale), measure the resistance between the potentiometer terminals (8); measurement (B).

Standard value:

– **in rest position < 5.2 kΩ;**
– **with potentiometer rotated to the end of stroke 3.34 – 8.88 kΩ.**

If the measurements result in any resistance values other than those given, replace the potentiometer (8).

◆ With the throttle valves in the closed position, place the potentiometer in its housing (8).



NOTE Apply LOCTITE® 243 on the thread of the screws (9).

◆ Screw the screws (9) on by hand so that they hold the potentiometer (8) in place but do not prevent it from rotating.
◆ Connect the TEST connectors.
◆ Turn the ignition switch to position "○".
◆ Turn the potentiometer (8) until the display reads "0".
◆ Tighten the screws (9).

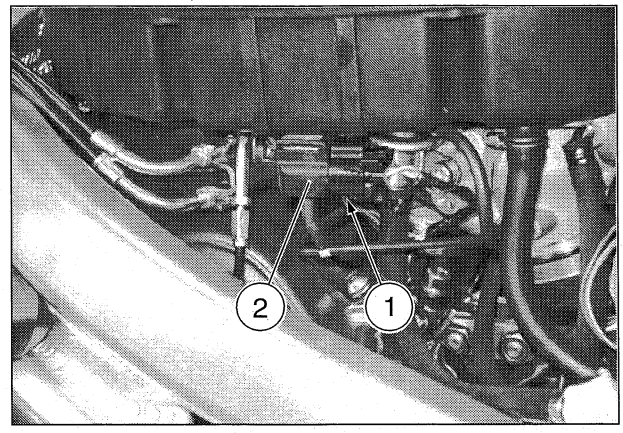
Potentiometer screw driving torque: 1.6 Nm (0.16 kgm).

◆ Turn the ignition switch to position "⚿".
◆ Disconnect the TEST connectors.

6.4.11 CHECKING THE INTAKE PRESSURE SENSOR

With the engine switched off:

- Lift the fuel tank, see 2.8 (LIFTING THE FUEL TANK).
- Disconnect the three-way connector (1) (coloured black).

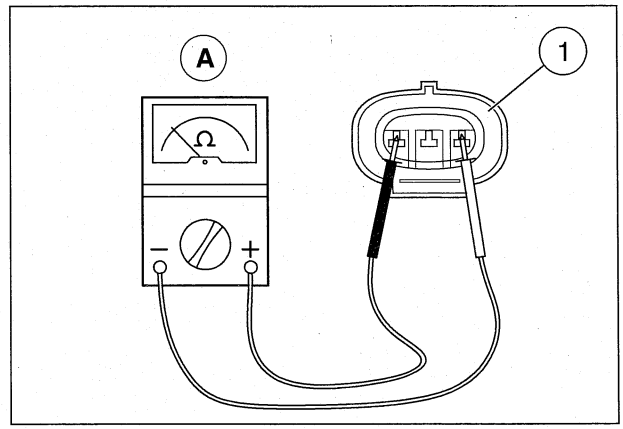


⚠ CAUTION

Upon reassembly, make sure that the electric connector (1) is correctly coupled.

- Turn the ignition switch to position "○".
- By means of a tester, measure the supply voltage between the external terminals of the connector (1); measure (A).

  Standard value: 4.5 – 5.5 V.
- Turn the ignition switch to position "⛐".
- Using a pocket tester (scale kΩ), measure the resistance between the terminals of the sensor (2).



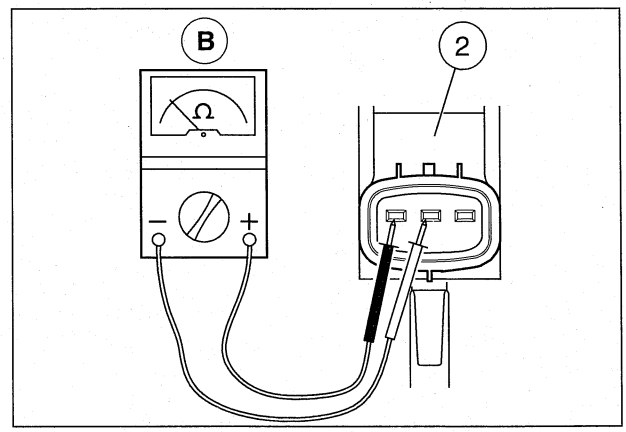
NOTE Measurements (B), (C) and (D) must be taken individually, not at the same time.

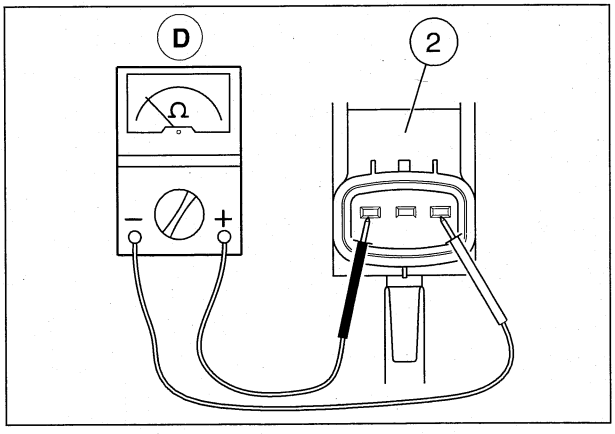
Measurements (B), (C) and (D) must produce the following values:

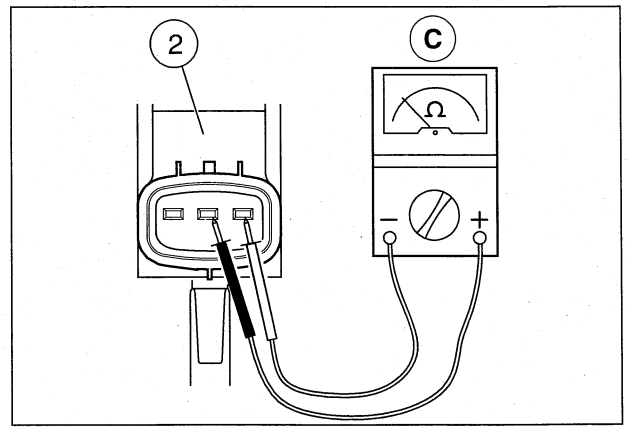
Standard values:

- **measurement (B) 12 kΩ** ± 10%;
- **measurement (C) 11.50 kΩ** ± 10%;
- **measurement (D) 4 kΩ** ± 10%.

If the resistance proves to be any value other than that prescribed, the sensor (2) must be changed.







6.4.12 CHECKING THE INJECTORS

With the engine switched off:

◆ Lift the fuel tank, see 2.8 (LIFTING THE FUEL TANK).

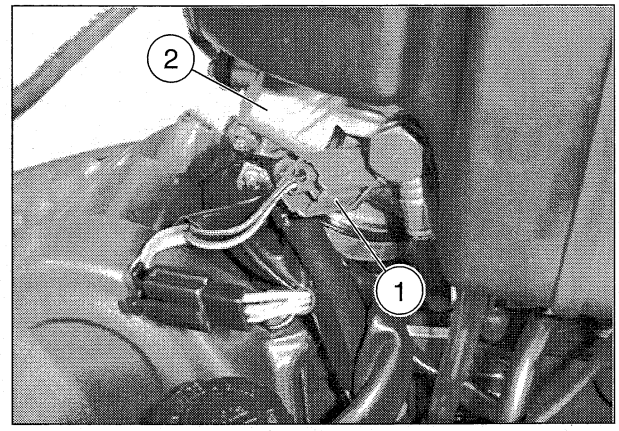
NOTE The following procedure refers to a single injector, though it is applicable to both.

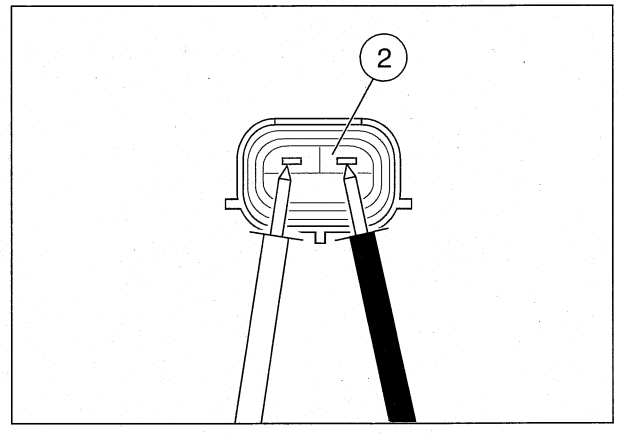
◆ Disconnect the two-way connector (1) (coloured grey) and take the measurements (on the injector-side terminals).
◆ Using a pocket tester (scale 100 Ω), measure the resistance between the terminals of the injector.

Standard value: 11 – 17 Ω to 20 °C (68 °F).

If the resistance is infinite (∞) or lower than the prescribed level, the injector (2) must be changed.

◆ Repeat the procedure for the other injector.

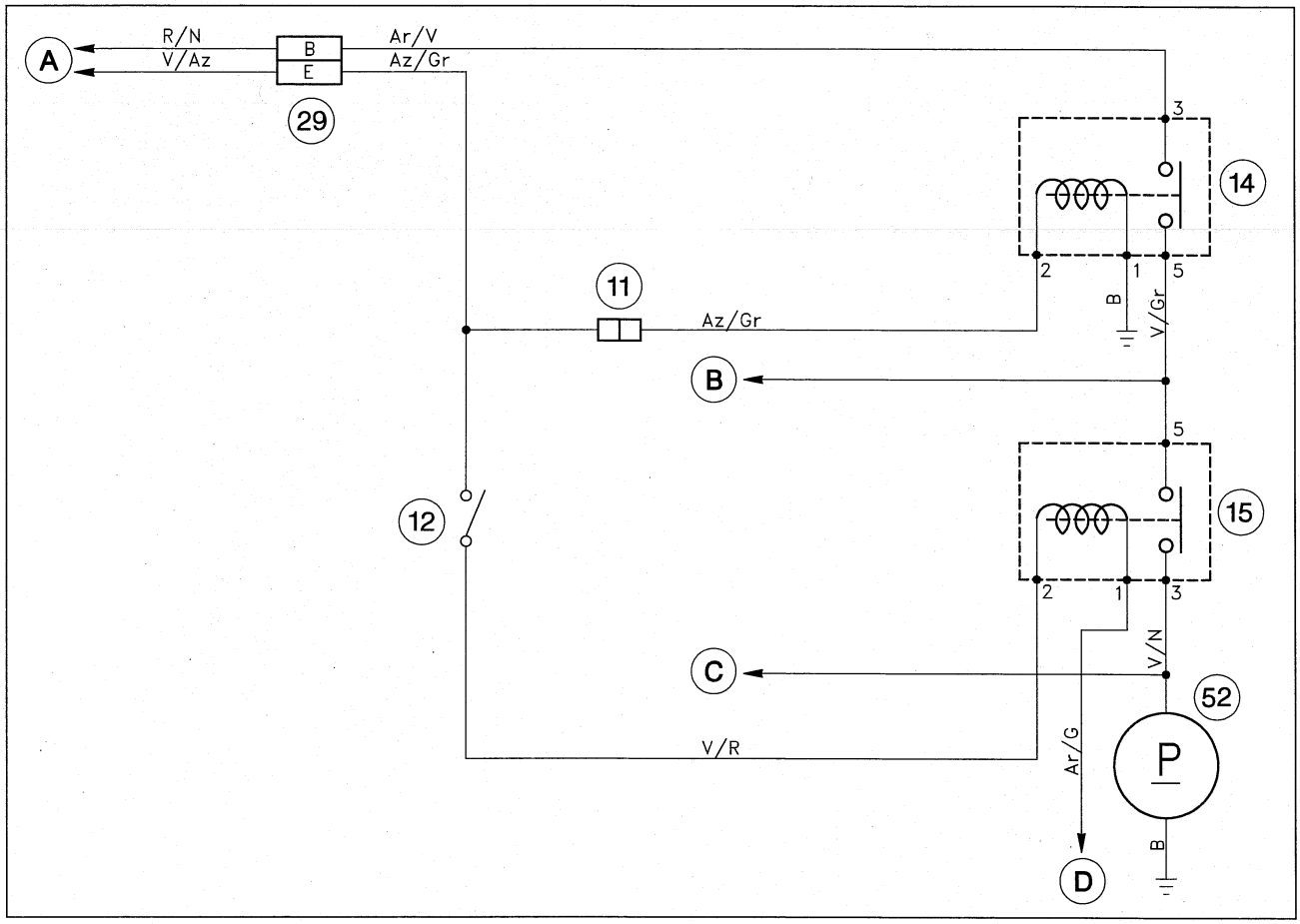




6.5 FUEL PUMP SYSTEM

6.5.1 WIRING DIAGRAM

NOTE See 6.2 (ELECTRIC COMPONENTS LAYOUT) for the positioning of the components.



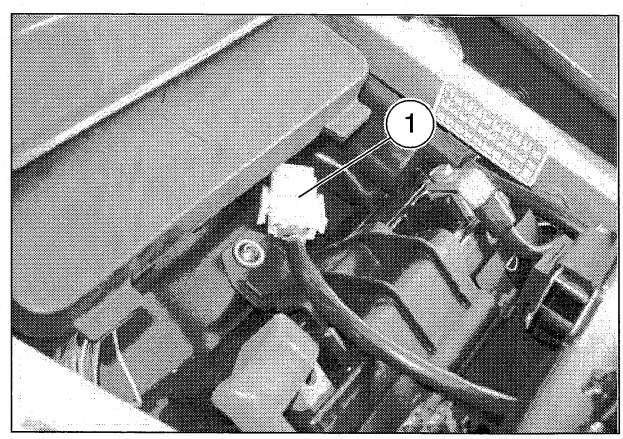
WIRING DIAGRAM KEY

11) Arrangement for the installation of the anti-theft device
12) Engine stop switch
14) Engine stop relay
15) Fuel pump relay
29) Secondary fuses (15 A)
52) Fuel pump
A) To the battery / ignition switch
B) To the HV coil
C) To the injectors / electronic unit
D) To the electronic unit

6.5.2 CHECKING THE FUEL PUMP

In order to check the pump is operating properly:

- Put back the rider saddle, see 7.1.1 (REMOVING THE RIDER SADDLE).
- Disconnect the pump units three-way connector (1) (coloured white).



⚠ CAUTION

Upon reassembly, make sure that the electric connector (1) is correctly coupled.

Follow ▶

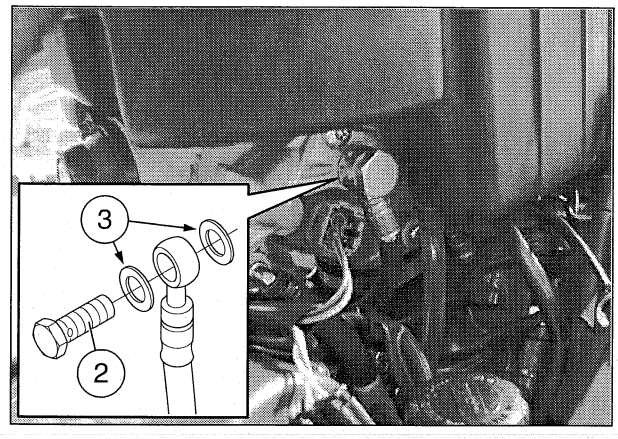
Follow ▶

⚠ CAUTION

Place a cloth under the perforated screw (2) to catch any fuel spills.

- ◆ Loosen the perforated screw (2) by approx. half a turn and wait a few seconds to allow the system to depressurize.
- ◆ Unscrew and remove the perforated screw (2) and take the two gaskets (3).

Driving torque of the drilled screw positioned on the carburettor: 22 Nm (2.2 kgm).

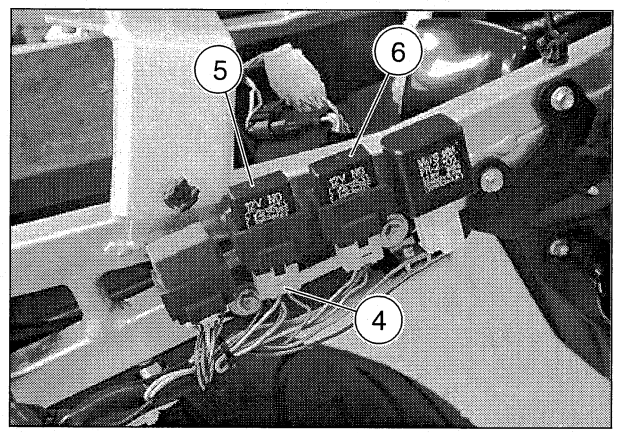


⚠ WARNING

Upon reassembly, change the two gaskets (3) and tighten the perforated screw (2) applying the prescribed torque in order to ensure perfect seal. This is essential, since the injection pressure is approx. 450 kPa (4.5 bar) and any fuel leakage would prove extremely dangerous, in fact the leaking fuel might end up on high-temperature parts of the engine.

NOTE Have the appropriate special tool OPT to hand:
– **aprilia** part# 8140181 (Fuel - oil pressure gauge).

- ◆ Fit the appropriate special tool.
- ◆ Insert the free end of the pipe inside a container.
- ◆ Power the positive (+) green (V) and negative (–) blue (B) cables with a voltage of 12 V (d.c.) (from the pump unit side).
- ◆ Make sure the pump is working and produces the characteristic humming sound and check the pressure gauge gives a supply pressure reading of at least 350 kPa (3.5 bar).



6.5.3 CHECKING THE FUEL PUMP RELAY

In order to check the operation of the relay:

- ◆ Remove the rear fairing, see 7.1.33 (REMOVING THE REAR FAIRING).
- ◆ Disconnect the four-way connector (4) (coloured white) from the relay (5).

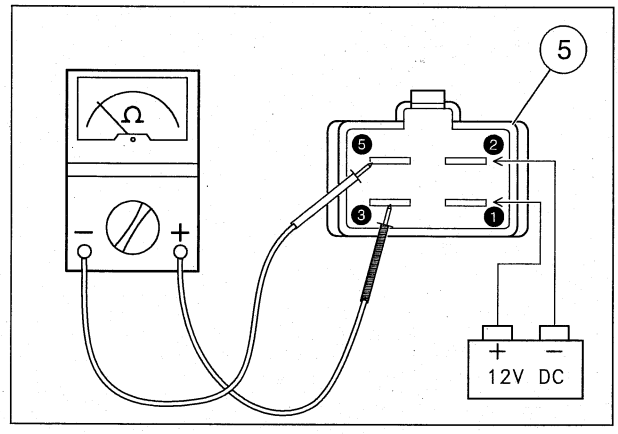
⚠ CAUTION

Upon reassembly, make sure that the electric connector (4) is correctly coupled.

- ◆ Power the two internal male terminals "**1**" - "**2**" at 12 V.
- ◆ Using a tester (acting as ohmmeter), check for breaks between the other two terminals "**3**" - "**5**".

Correct value with relay powered: 0 Ω.
Correct value with relay not powered: ∞ Ω.

If the resulting values do not correspond to those indicated, change the relay (5).



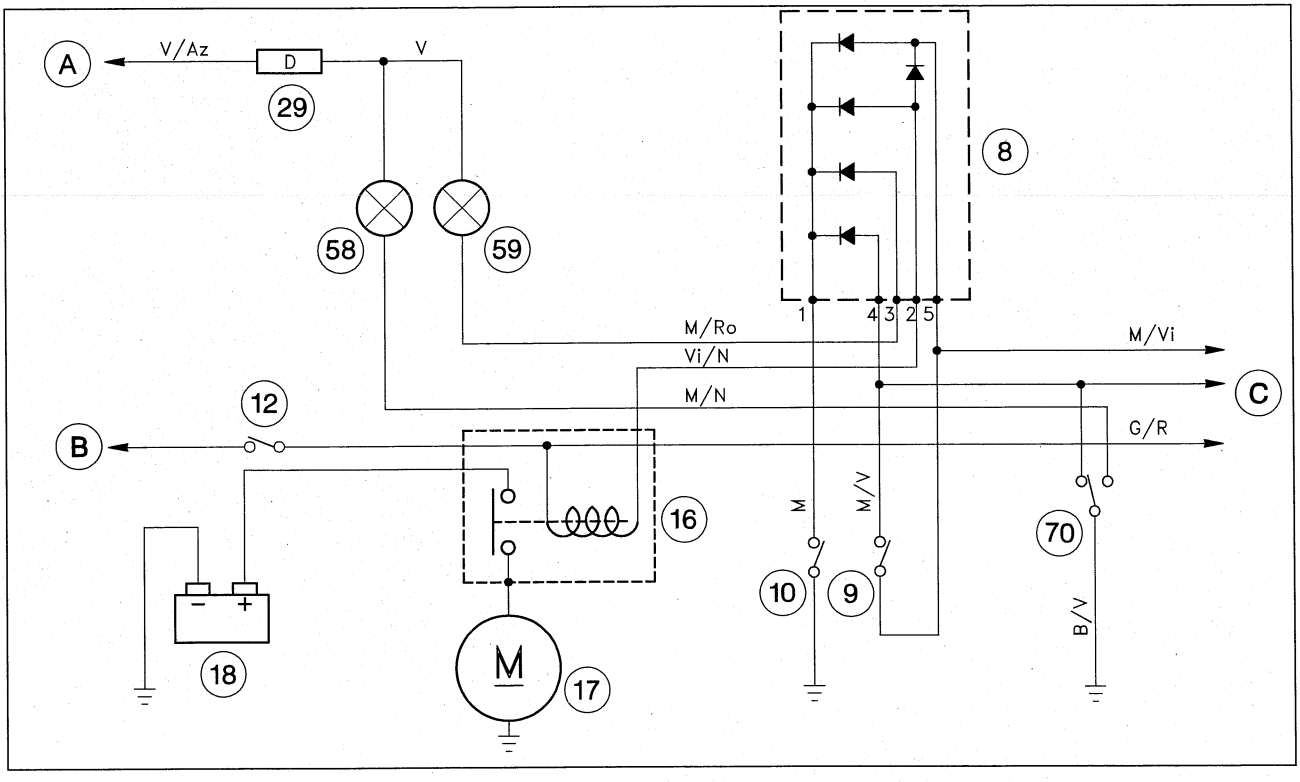
6.5.4 CHECKING THE ENGINE SHUTOFF RELAY

The procedure is exactly the same as that used to check the fuel pump relay (6), see 6.5.3 (CHECKING THE FUEL PUMP RELAY).

6.6 IGNITION SAFETY SYSTEM

6.6.1 WIRING DIAGRAM

NOTE See 6.2 (ELECTRIC COMPONENTS LAYOUT) for the positioning of the components.



WIRING DIAGRAM KEY

8) Diode module
9) Clutch control lever switch
10) Neutral gear switch
12) Start push button
16) Start relay
17) Starter
18) Battery
29) Secondary fuses (15 A)
58) Side stand down warning light
59) Neutral warning light
70) Stand switch
A) To the battery / ignition switch
B) To the secondary fuses (15 A)
C) To the electronic unit

6.6.2 STARTING SAFETY OPERATING LOGIC

NOTE With the engine shutoff switch in position "⊗" the starter motor does not turn over.

GEAR POSITION	STAND POSITION	CLUTCH LEVER	STAND WARNING LIGHT	ENGINE IGNITION	STARTER
IN NEUTRAL	UP	PULLED UP	OFF	WORKING	TURNING OVER
		RELEASED			
	DOWN	PULLED UP	ON		
		RELEASED			
GEAR ENGAGED	UP	PULLED UP	OFF		
		RELEASED			NOT TURNING OVER
	DOWN	PULLED UP	ON	NOT WORKING	
		RELEASED			

6.6.3 CHECKING THE STARTING RELAY

In order to check the operation of the relay:

- ◆ Remove the rear fairing, see 7.1.33 (REMOVING THE REAR FAIRING).
- ◆ Disconnect the two-way connector (1) (coloured white).

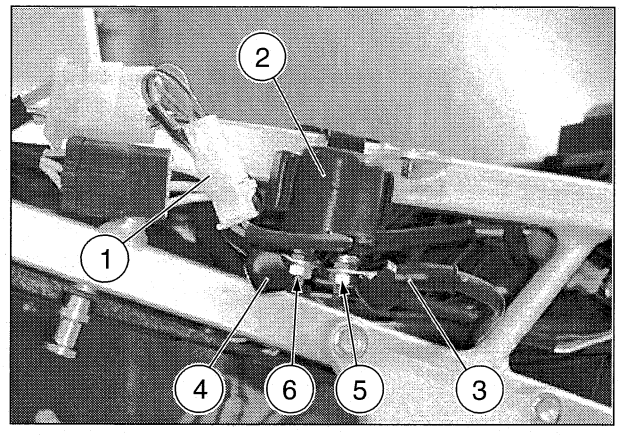
⚠ CAUTION

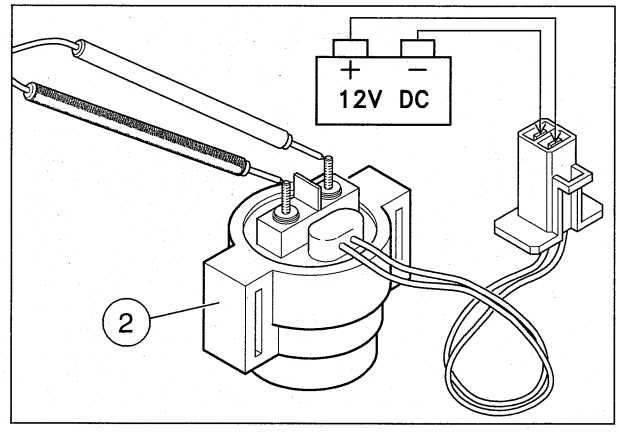
Upon reassembly, make sure that the electric connector (1) is correctly coupled.

- ◆ Lift the relay and slip it off the relevant couplings (2).
- ◆ Slip off the two rubber protections (3) (4).
- ◆ Disconnect the cables (5) (6) from the relevant terminals on the relay (2).
- ◆ From the relay side, power the two internal terminals of connector (1) at 12V.
- ◆ Using a tester (acting as ohmmeter), check the for breaks between the two screw contacts on the relay (2).

Correct value with relay powered: 0 Ω.
Correct value with relay not powered: ∞ Ω.

If the resulting values do not correspond to those indicated, change the relay (2).





6.6.4 CHECKING THE SIDE STAND AND THE SAFETY SWITCH

The side stand (1) must rotate without hindrances.

Carry out the following checks:

- The springs (2) must not be damaged, worn, rusty or weakened.
- The side stand must rotate freely, if necessary grease the joint, see 1.6 (LUBRICANT CHART).

The side stand (1) is provided with a safety switch (3) that has the function to prevent or interrupt the operation of the engine with the gears on and the side stand (1) down.

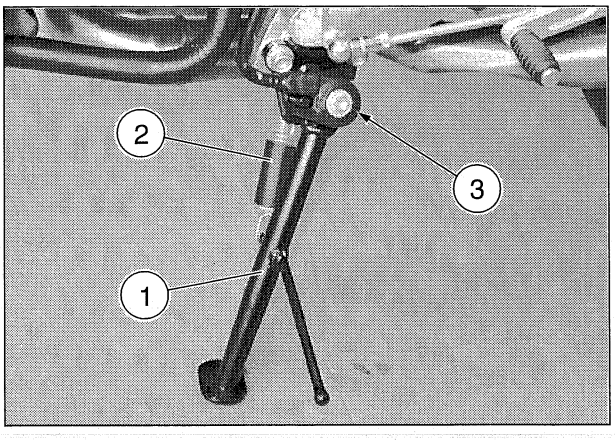
To check the proper functioning of the safety switch (3), proceed as follows:

- Seat on the vehicle in driving position.
- Fold the side stand (1).
- Start the engine.
- With released throttle grip and engine idling, pull the clutch lever completely.
- Engage the first gear, pushing the gear lever downwards.
- Lower the side stand (1), thus operating the safety switch (3).

At this point:

– the engine must stop;
– the "side stand down" warning light "" must come on.

Should this fail to happen, replace the switch (3).



6.6.5 CHECKING THE DIODE MODULE

- Remove the rear fairing, see 7.1.33 (REMOVING THE REAR FAIRING).
- Disconnect the five-way connector (4) (coloured white) from the module (5).

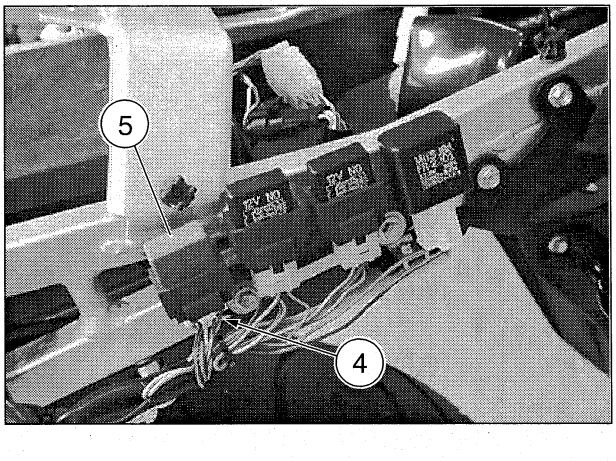
⚠ CAUTION

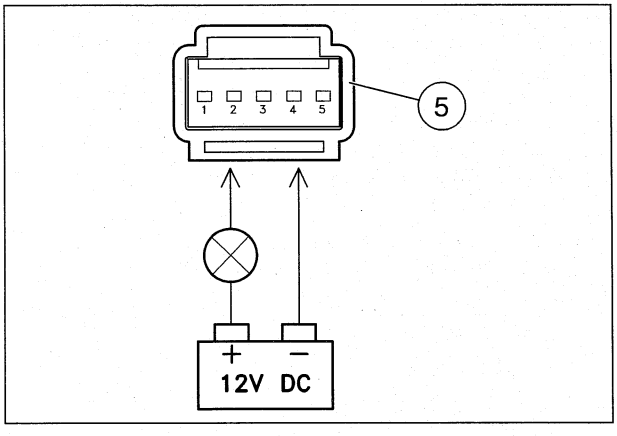
Upon reassembly, make sure that the electric connector (4) is correctly coupled.

- Power the various terminals at 12 V, placing a 12V - 2W bulb on the positive cable (+), as indicated.

⚠ CAUTION

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





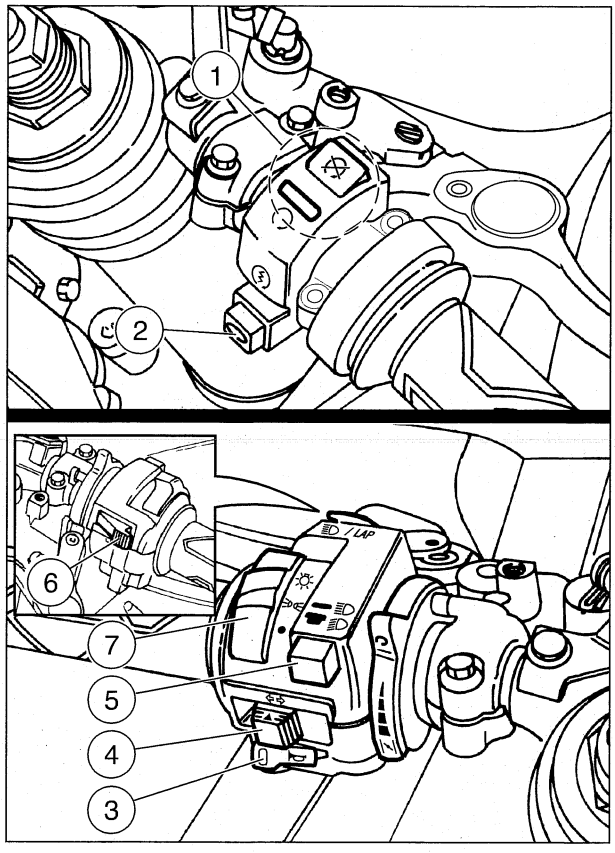
– \ +	1	2	3	4	5
1		☼	☼	☼	☼
2	●		●	●	●
3	●	●		●	●
4	●	●	●		●
5	●	☼	●	●	

⚠ CAUTION

The bulb should only light up in the positions indicated.
If this is not the case, replace the module (5).

6.7 SWITCHES

Using a tester, check the continuity of the switches, referring to the specific diagram below.
Should any anomalies be encountered, change the corresponding switch set.



RIGHT SIDE SWITCH SET

1) Engine stop switch
2) Start push button

Pos.		Cables			
		Ar/Gr	V/R	G/R	V/R
				○—○	
	RUN	○—○			
	OFF				

LEFT SIDE SWITCH SET

3) Horn push button
4) Direction indicator switch
5) Dimmer switch
6) High beam signaller push button / LAP push button (multifunction)
7) Light switch (not provided for ASD)

Pos.	Cables									
	Gr	V	G	N	Bi	Bi / B	R	Az	B / N	
≡D / LAP		○	——	——	——	○				
	○	○								
•										
≡D		○	○							
☼		○	○	——	——	——	——	——	——	○
≡D				○	——	——	——	——	——	○
≡D					○	——	——	——	——	○
⇨							○	——	○	
⇦								○	○	

LEFT SIDE SWITCH SET ASD

3) Horn push button
4) Direction indicator switch
5) Dimmer switch
6) High beam signaller push button / LAP push button (multifunction)

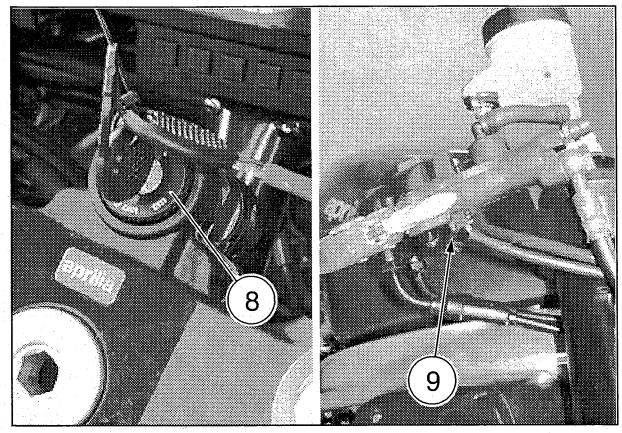
Pos.	Cables								
	Gr	V	G	N	Bi	Bi / B	R	Az	B / N
≡D / LAP		○	——	——	——	○			
	○	○							
≡D		○	○	○					
≡D		○	○	——	○				
⇨							○	——	○
⇦								○	○

Follow ▶

Follow ▶

8) Ignition switch

Pos.	Cables	
	Ar	V
○	○——	——○
⊗		
🔒		

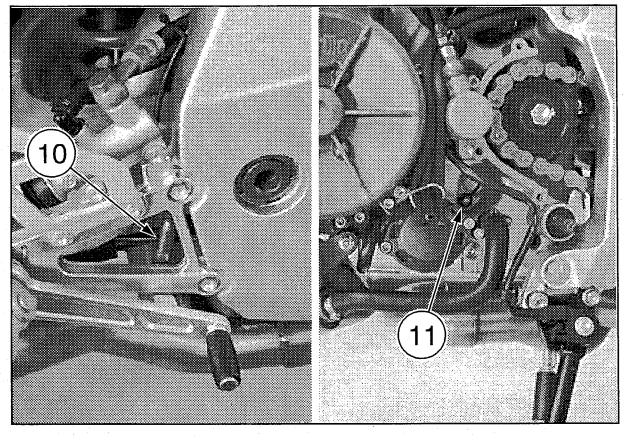


9) Front brake stoplight switch

Pos.	Cables	
	Gr	M
Operating	○——	——○

10) Rear brake stoplight switch

Pos.	Cables	
	G	G
Operating	○——	——○

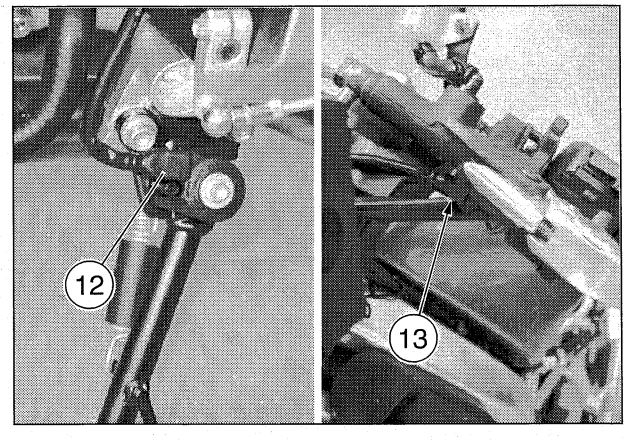


11) Neutral gear switch

Pos.	Cables	
	Screw	⏚
Neutral	○——	——○

12) Stand switch

Stand	Cables		
	M	V	N
Down	○——		——○
Up		○——	——○



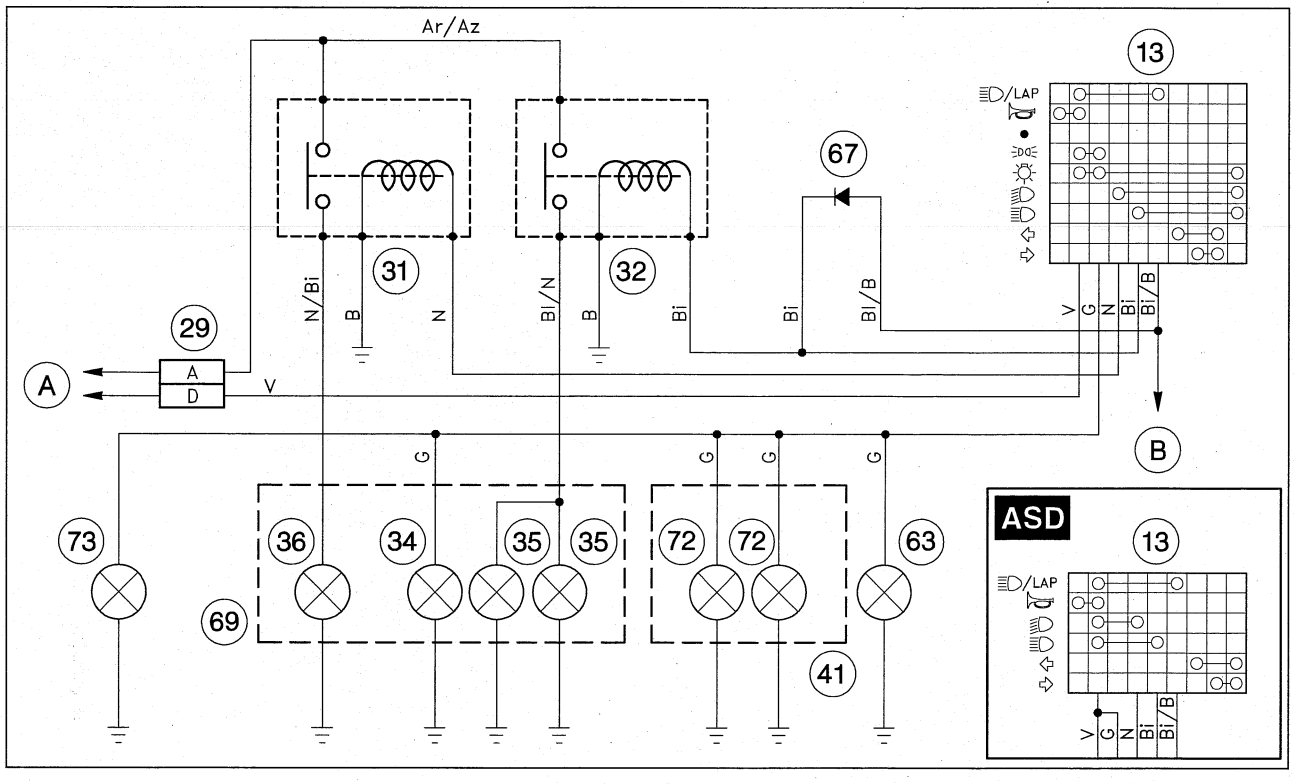
13) Clutch lever switch

Pos.	Cables	
	Gr	M
Operating	○——	——○

6.8 LIGHT SYSTEM

6.8.1 WIRING DIAGRAM

NOTE See 6.2 (ELECTRIC COMPONENTS LAYOUT) for the positioning of the components.



WIRING DIAGRAM KEY

13) Left dimmer switch
29) Secondary fuses (15 A)
31) Low beam relay
32) High beam relay
34) Front parking light bulb
35) High beam bulbs
36) Low beam bulb
41) Rear light
63) Dashboard bulbs
67) Dimmer switch diode / LAP (multifunction)
69) Headlight
72) Rear parking light / stoplight bulbs
73) Number plate light
A) To the battery / ignition switch
B) To the right display / chronometer

6.8.2 CHECKING THE LIGHTS RELAY

In order to check the operation of the relay:

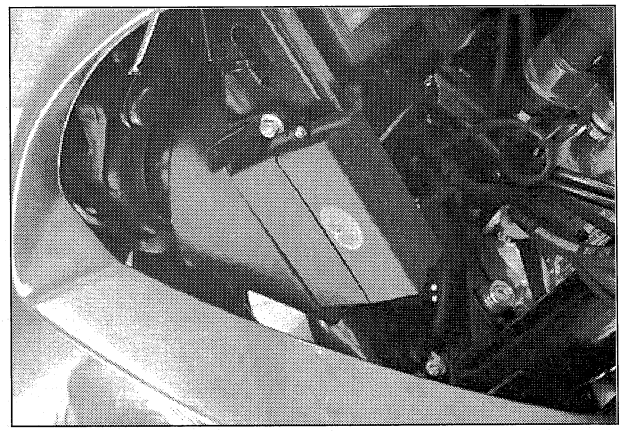
- ◆ Remove the relay box lid located on the left next to the dashboard.
- ◆ Remove the relevant relay (identifiable thanks to the label on the lid):

– high beam light relay (1);
– dimmers relay (2).

- ◆ Power the two internal male terminals "**85**" - "**86**" at 12V.
- ◆ Using a tester (acting as ohmmeter), check for breaks between the other two terminals "**87**" - "**30**".

Correct value with relay powered: 0 Ω.
Correct value with relay not powered: ∞ Ω.

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



6.8.3 CHECKING THE LIGHTS / LAP DIODE (multifunction)

To check operation of diode:

- ◆ Remove the front part of the fairing, see 7.1.19 (REMOVING THE FRONT PART OF THE FAIRING)
- ◆ Disconnect the three-way connector (3) (coloured white).

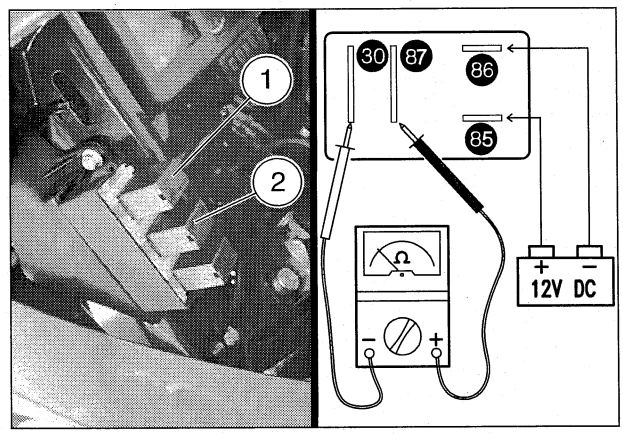
⚠ CAUTION

Upon reassembly, make sure that the electric connector (3) is correctly coupled.

- ◆ Using a tester (in diode test mode), check the values between the two male terminals in the diode, as illustrated in the figure.

Correct value (measurement A): 0 – 1 Ω.
Correct value (measurement B): ∞.

In the event the tester does not feature the diode test mode, power with a voltage of 12 V, placing a 12V - 2W bulb on the positive cable and connecting the diode as illustrated in the figure.

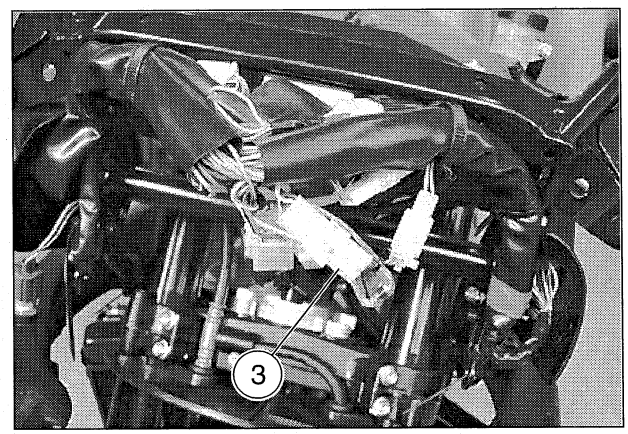


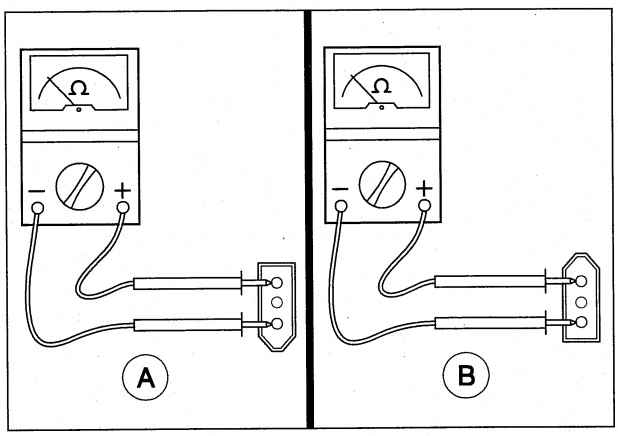
⚠ CAUTION

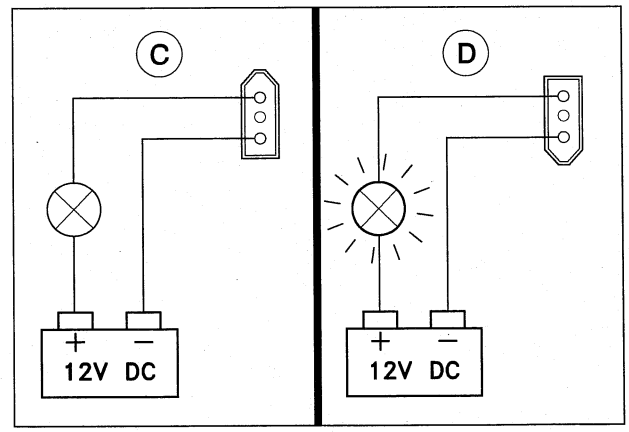
Do not use bulbs over 2 W, since the diode may be damaged.

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

Test (D): the bulb lights.



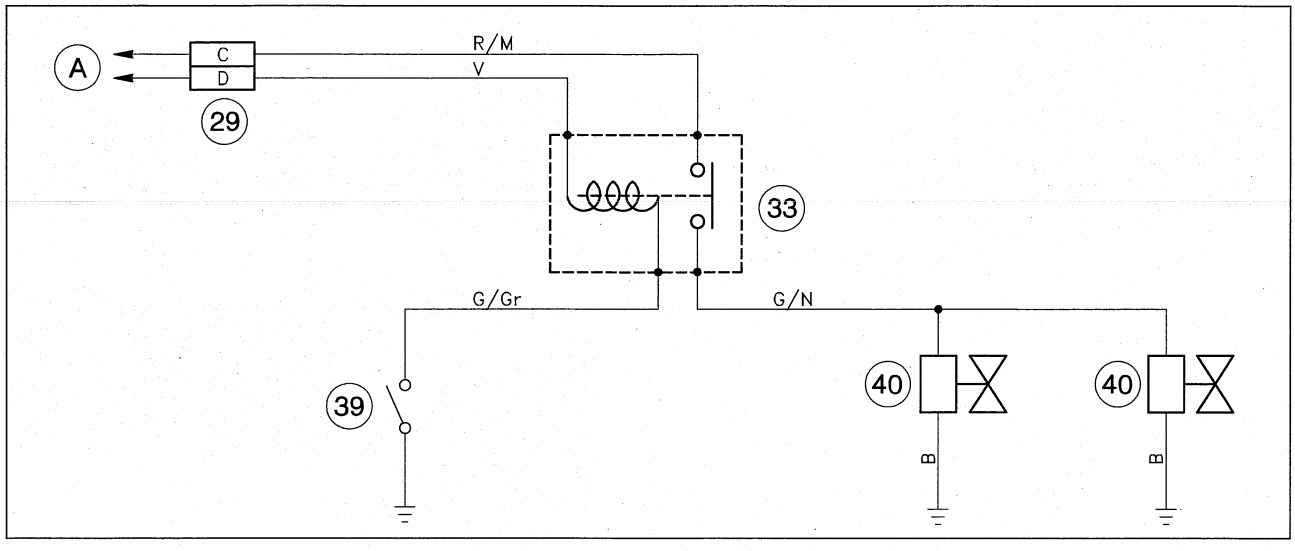




6.9 COOLING ELECTROFAN

6.9.1 WIRING DIAGRAM

NOTE See 6.2 (ELECTRIC COMPONENTS LAYOUT) for the positioning of the components.



WIRING DIAGRAM KEY

29) Secondary fuses (15 A)
33) Electric fan relay
39) Thermal switch
40) Cooling fans
A) To the battery / ignition switch

6.9.2 CHECKING THE ELECTROFAN OPERATION

NOTE The following procedure refers to a single electrofan, though it is applicable to both.

To check operation of electrofan (1):

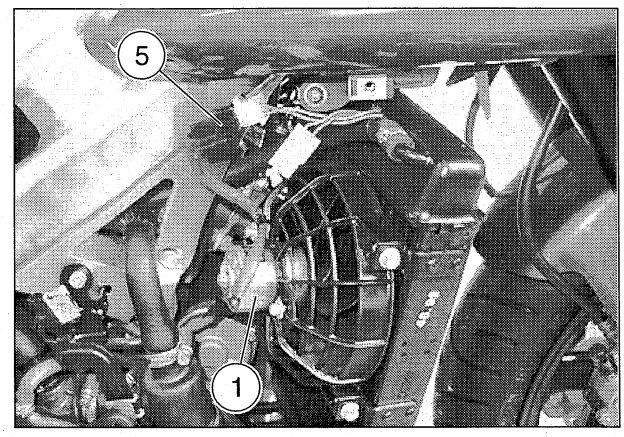
- Remove the left fairing, see 7.1.25 (REMOVING THE SIDE FAIRINGS).
- Lift the fuel tank, see 2.8 (LIFTING THE FUEL TANK).
- Disconnect the two electric terminals (2-3) from the thermal switch (4) and connect them together.
- Turn the ignition switch to position "○".

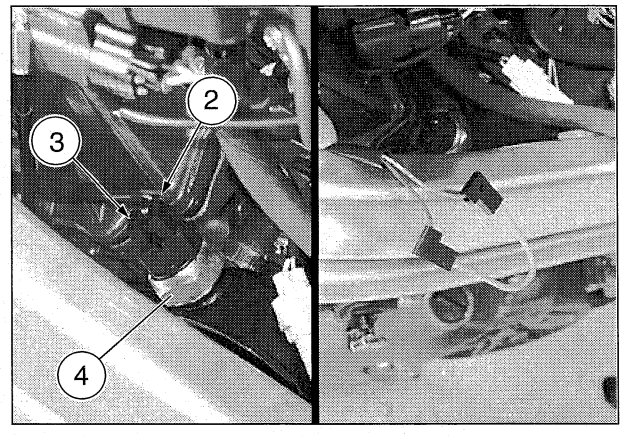
⚠ CAUTION

Upon reassembly, make sure that the electric terminals (2-3) are properly connected.

If the electrofan does not work:

- Turn the ignition switch to position "⊠".
- Make sure the connector (5) is correctly inserted.
- Rotate the fan manually, making sure the blades do not touch the mount.
- Check the recharging system, see 6.3 (CHECKING THE RECHARGING SYSTEM) and the secondary fuses (15 A).
- Repeat the procedure for the other electrofan.

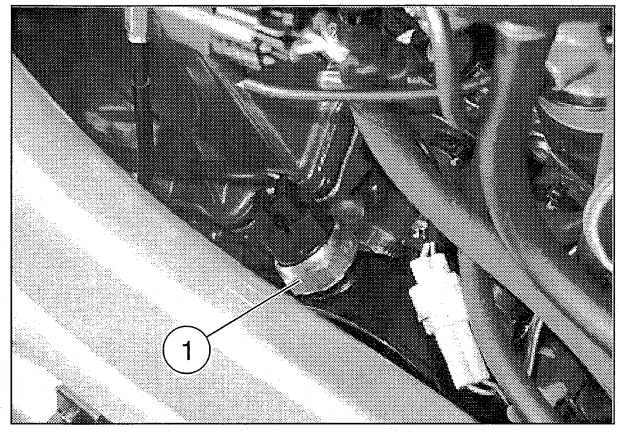




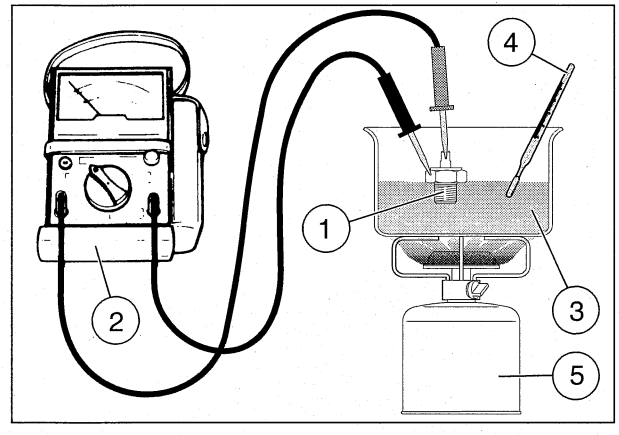
6.9.3 CHECKING THE THERMAL SWITCH OPERATION

Thermal switch	Temperature
switch on	~ 100° C (212°F)
switch off	~ 85° C (185°F)

NOTE The thermal switch switches to on at a temperature of ~ 100°C (212°F) and to off at ~ 85°C (185°F); within this range of values, it may switch to on or off indifferently.



- Remove the thermal switch (1), see 5.5 (REMOVING THE COOLANT THERMAL SWITCH).
- Connect a tester (2) (set as an ohmmeter) to the thermal switch (1) as illustrated in the figure.
- Immerse the thermal switch (1) in a container (3) holding coolant.
- Immerse a thermometer (4) with a 0 to 150 °C (32 to 302 °F) range in the same container.
- Place the container on a burner (5) and slowly warm up the liquid.
- Check that the temperature reading on the thermometer (4) and the value indicated by the tester (2) correspond to the data in the table.



Coolant temperature (°C)	(°F)	Standard values (Ω) (± 10%)
> 100	> 212	0
< 85	< 185	∞

If the values depart excessively from those indicated in the table, change the thermal switch (1).

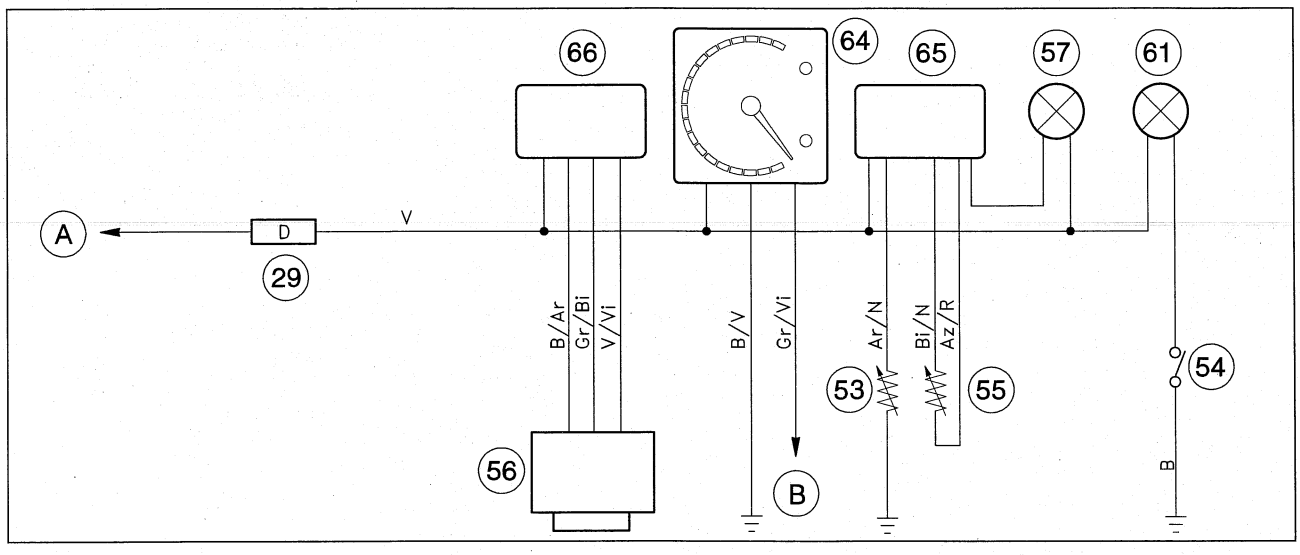
6.9.4 CHECKING THE ELECTROFAN RELAY

The procedure is the same as that required to check the lights relay, see 6.8.2 (CHECKING THE LIGHTS RELAY).

6.10 INDICATORS ON THE DASHBOARD

6.10.1 WIRING DIAGRAM

NOTE See 6.2 (ELECTRIC COMPONENTS LAYOUT) for the positioning of the components.

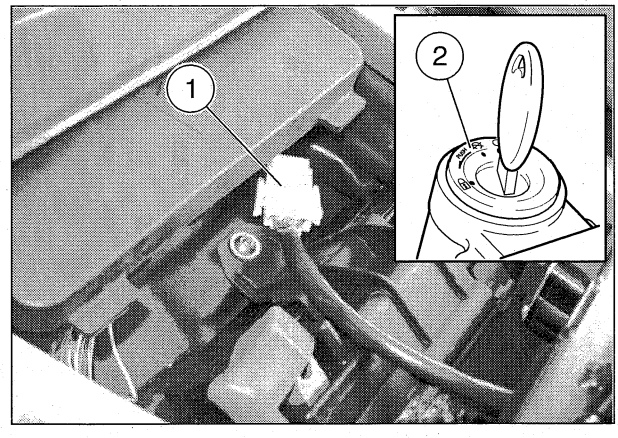


WIRING DIAGRAM KEY

29) Secondary fuses (D) (15 A)
53) Low fuel sensor
54) Engine oil pressure switch
55) Coolant temperature thermistor
56) Speed sensor
57) Low fuel warning light
61) Engine oil pressure warning light LED
64) Revolution counter
65) Multifunction display right side (coolant temperature)
66) Multifunction display (left side)
A) To the ignition switch
B) To the electronic unit

6.10.2 LOW FUEL WARNING LIGHT

- ◆ Lift the fuel tank, see 2.8 (LIFTING THE FUEL TANK).
- ◆ Disconnect the three-way electric connector (1) (coloured white) of the fuel pump unit.

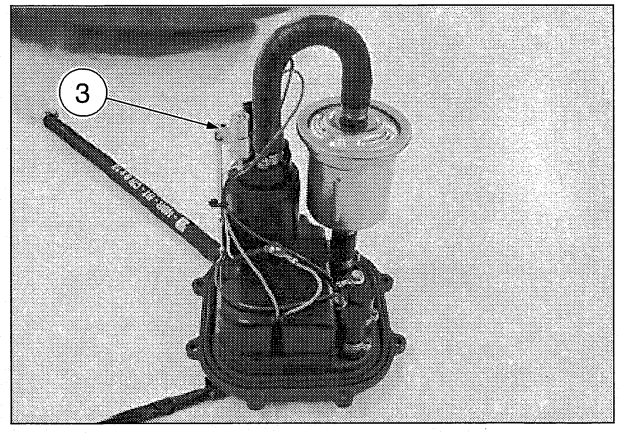


⚠ CAUTION

Upon reassembly, make sure that the electric connector (1) is correctly coupled.

- ◆ Connect together the orange black (Ar / N) and blue (B) cables from the system side.
- ◆ With the ignition switch (2) set to "○" the "⛽" low fuel warning light should come on after a second.
- ◆ If the"⛽" light does not come on as expected, make sure the sensor (3) is working properly:
- ◆ Fill the tank with petrol.
  - – With the sensor (3) fully submersed by petrol: the "⛽" light remains unlit.
- ◆ Drain the fuel tank completely, see 4.2 (DRAINING THE FUEL TANK).
  - – With the sensor (3) fully submersed by petrol: the "⛽" light comes on after 30 to 60 seconds.

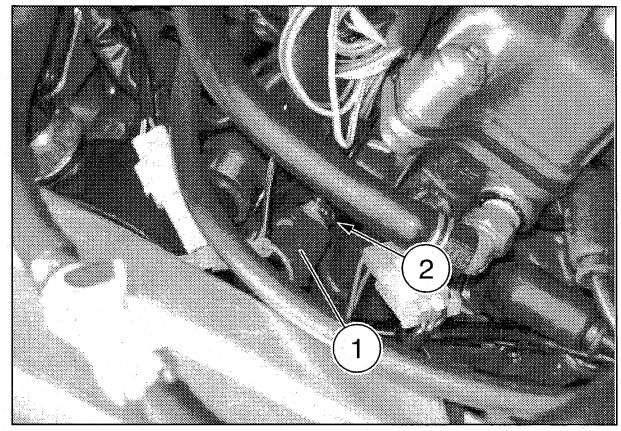
If these conditions are not achieved, replace the sensor, see 4.4 (REMOVING THE FUEL LEVEL SENSOR).



6.10.3 COOLANT TEMPERATURE DISPLAY

NOTE In the event the message "LLL", appears on the right-hand display, with a temperature below 130 °C (266 °F), there might be a problem with the wiring or the coolant thermistor might have short-circuited (right-hand side of engine, see 6.4.8 (CHECKING THE COOLANT THERMISTOR OPERATION).

- Lift the fuel tank, see 2.8 (LIFTING THE FUEL TANK).
- Disconnect the two-way connector (1) (coloured green) from the thermistor (2) (right-hand side of the engine).

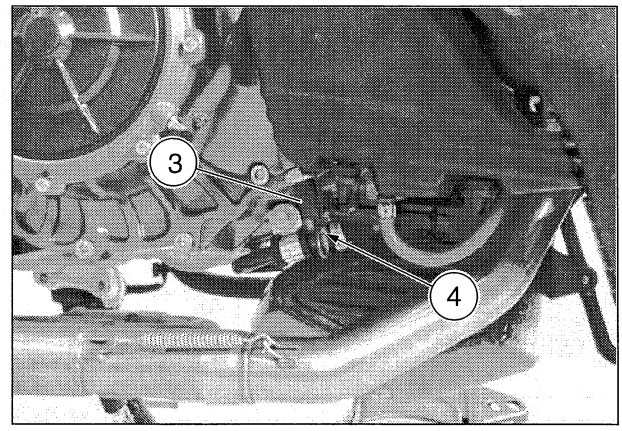


⚠ CAUTION

Upon reassembly, make sure that the electric connector (1) is correctly coupled.

- Connect the following resistors to the connector (1) and check the message sent up on the right-hand display.

Resistance (Ω)	Message on right display °C (± 10%)	°F (± 10%)
> 1400	cold	cold
580	60	140
245	90	194
115	120	248
< 90	LLL	LLL



- If the messages are correct, check the coolant thermistor on the right-hand side of the engine, see 6.4.8 (CHECKING THE COOLANT THERMISTOR OPERATION).

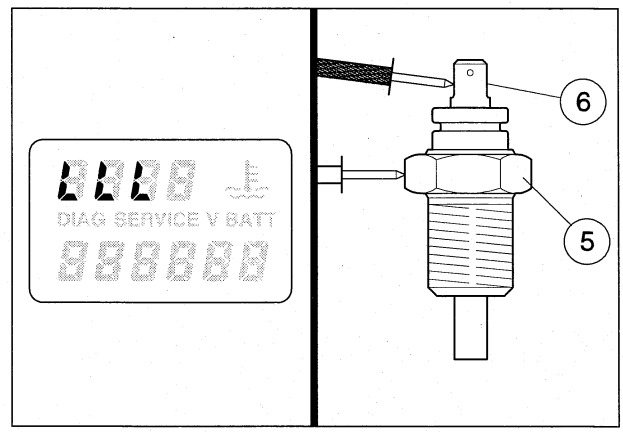
6.10.4 ENGINE OIL PRESSURE SENSOR

- Remove the right fairing, see 7.1.25 (REMOVING THE SIDE FAIRINGS).
- Slip off the rubber protection (3).
- Disconnect the electric terminal (4) from the sensor (5) and earth it.

⚠ CAUTION

When reassembling, make sure the electric terminal (4) is connected properly.

- With the ignition switch set to "○ ", the red low engine oil pressure "🛢 " LED should come on.
- If the "🛢" LED comes on as expected, check the sensor is working properly.
- With a tester (scale x 100 Ω) check for breaks between the tongued terminal (6) and the casing of the sensor (5) (see figure).



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

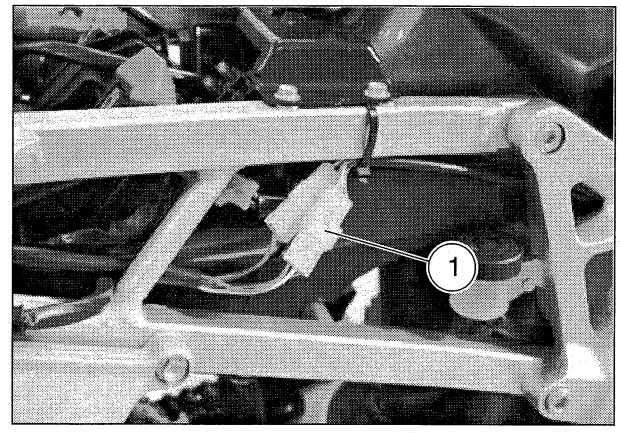
If the values do not correspond to those indicated, check that the engine oil level is correct, see 2.13 (CHECKING THE ENGINE OIL LEVEL AND TOPPING UP) and change the sensor (5), if necessary.

6.10.5 SPEEDOMETER

- Remove the rear fairing, see 7.1.33 (REMOVING THE REAR FAIRING).
- Make sure that the coupling of the speed sensor connector (1) is correct.
- Remove the front part of the fairing, see 7.1.19 (REMOVING THE FRONT PART OF THE FAIRING).
- Make sure that the coupling of the dashboard connector (2) is correct.
- Check the distance between the speed sensor (3) and the five screws (4) securing the rear brake disc.

Distance between sensor (3) and screws (4): 1.5 ± 1 mm.

- Make sure all five screws are present (4).

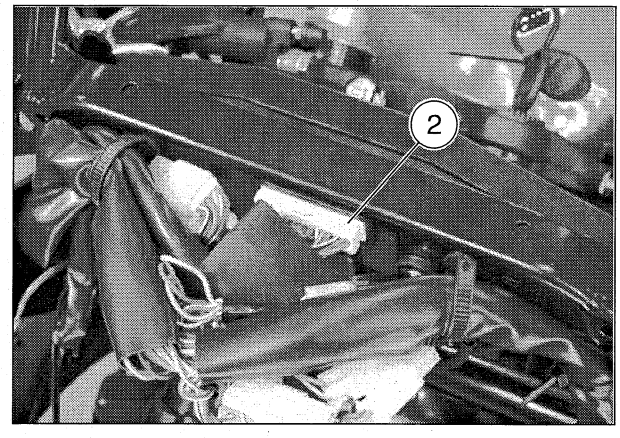


With the engine off and the ignition switch set to "○", perform the following tests:

Test 1st

- Without disconnecting the speed sensor connector (1), use a tester to measure the voltage between the green/violet (V/Vi) and blue/orange (B/Ar) cables.

Correct value: > 9 V (c.c.).



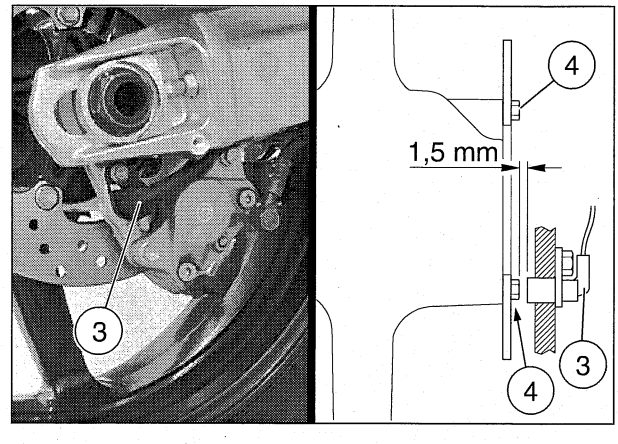
Test 2nd

- Without disconnecting the speed sensor connector (1), use a tester to measure the voltage between the grey/white (Gr/Bi) and blue/orange (B/Ar) cables.

Correct value: > 6 V (c.c.).

Test 3rd

- Position the vehicle on the special rear support stand OPT.
- Position the gear lever in neutral.
- Perform test 2nd.
- Spin the rear wheel by hand until one of the five screws (4) is in line with the sensor (3). The tester should read **zero V** for approx. two seconds before returning to **> 6 V**.



– If test 1st gives an incorrect result, disconnect the sensor (3) and repeat test 1st; If the wrong value persists, the dashboard is faulty and must be replaced with one in perfect condition.

– If test 1st gives a correct result and test 2nd an incorrect value, the sensor (3) is faulty and must be replaced.

– If both tests 1st and 2nd give a correct result and test 3rd an incorrect value, the sensor (3) is faulty and must be replaced.

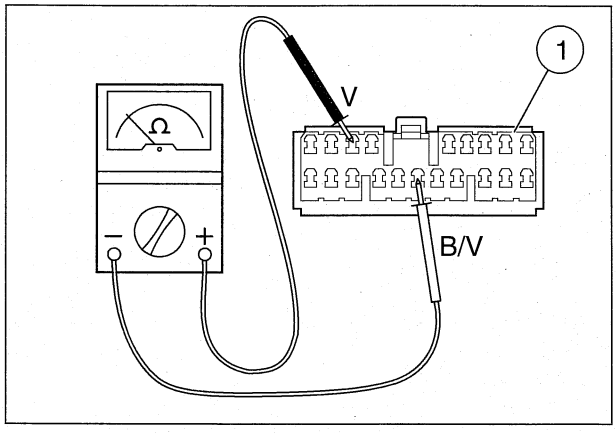
– If all three tests give a correct result and no speed comes up on the left-hand display, the dashboard is faulty and must be replaced with one in perfect condition.

6.10.6 REVOLUTION COUNTER

- Disconnect the dashboard connector (1).
- Turn the ignition switch to position "○".
- By means of a tester check, on the connector side, if there is voltage between the green (V) and blue/green (B/V) power supply cables of the revolution counter.

Correct value: 12 – 15 V.

- Use a tester in ohmmeter mode to check for any breaks on the grey/purple cable (Gr/Vi) between the dashboard and the electronic unit; otherwise try replacing the dashboard with one in perfect condition.
- If the rev counter still does not work even after the dashboard is replaced, the fault is to be found in the electronic unit.



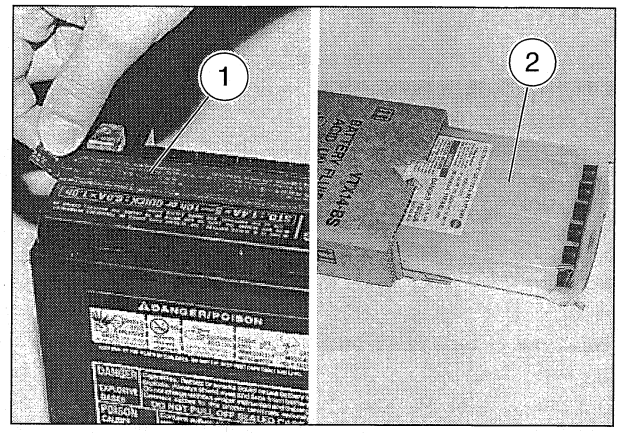
6.11 BATTERY

NOTE This vehicle is provided with a maintenance-free battery and no operation is necessary, excepting occasional checks and the recharge when required.

When changing batteries, replace with a battery of the same type.

Type: see 1.5 (TECHNICAL SPECIFICATIONS).

Carefully read 2.4 (BATTERY).



6.11.1 ACTIVATING THE BATTERY

◆ Remove the battery, see 7.1.7 (REMOVING THE BATTERY).

⚠ WARNING

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.

In case of contact with the skin, rinse with plenty of water.

In case of contact with the eyes, wash with large quantities of water for fifteen minutes and consult an oculist without delay.

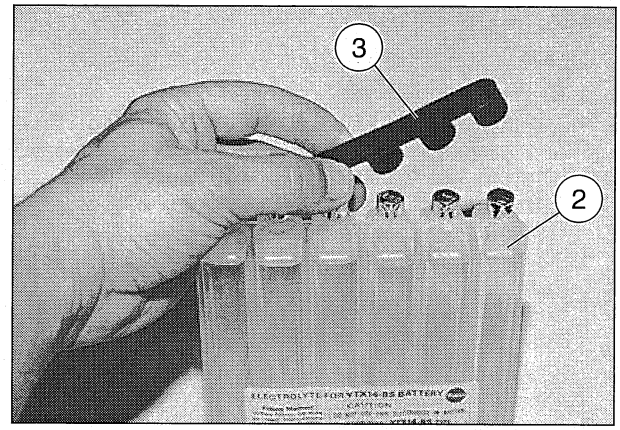
If the liquid is accidentally swallowed, drink large amounts of water or milk, then continue drinking milk of magnesia or vegetable oil and promptly call a doctor.

The battery gives off explosive gases; keep it away from flames, sparks, cigarettes and any other source of heat.
During the recharging or the use, make sure that the room is properly ventilated and avoid inhaling the gases released during the recharging.

KEEP AWAY FROM CHILDREN.

The battery fluid which is very corrosive.

Do not pour or spill it, especially on the plastic parts.



⚠ CAUTION

Make sure the electrolyte liquid is specific for the battery to be activated.

◆ Place the battery on a flat surface.
◆ Remove the adhesive sealing label (1).
◆ Remove the sealed bag from the cardboard container containing the relevant six reservoirs (2).
◆ Take the reservoirs (2) out of the bag.

NOTE Keep the row of stoppers (3) handy as you will need them later to plug the battery cells.

◆ Disconnect the row of stoppers (3) from the top of the reservoirs (2).

Follow ▶

Follow ▶

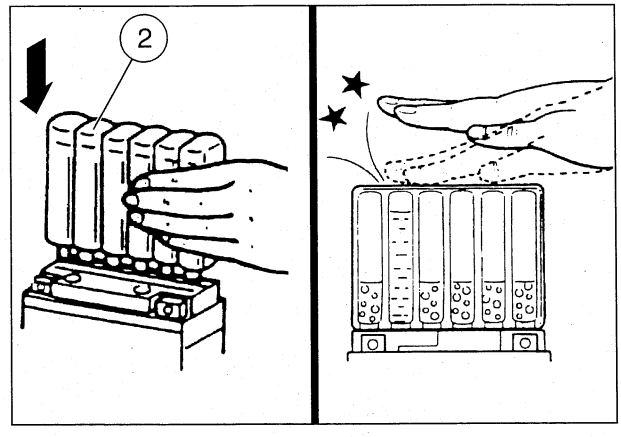
⚠ CAUTION

Do not cut or make holes in the sealed parts on the reservoirs (2).

- ◆ Turn the reservoirs (2) upside down and place them so that the sealed parts are over the openings of the battery cells.
- ◆ Press on the reservoirs (2) so that the seals break and the acid is allowed to pour into the battery cells.

NOTE Make sure the reservoirs (2) are positioned above the battery as vertically as possible to enable the liquid to flow out.

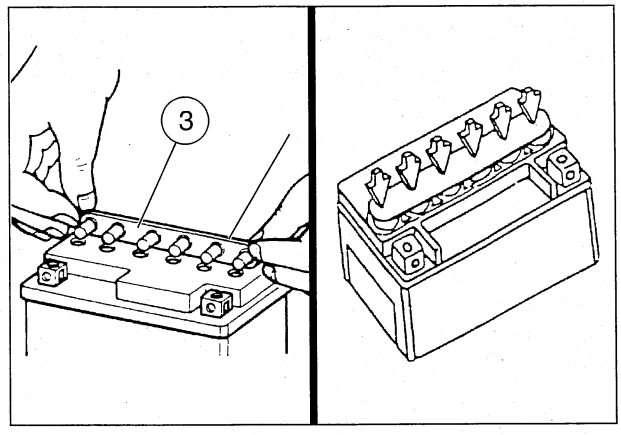
- ◆ Leave the reservoirs (2) in place on the battery for approx. twenty minutes, checking the liquid flows out properly.



⚠ CAUTION

Do not remove the reservoirs (2) from the battery until all the liquid has poured out.

- ◆ Should any liquid still be left in the reservoirs (2) once the twenty minutes are up, tap your fingers on the top of the reservoirs to help the remaining liquid out.
- ◆ Lift the reservoirs (2) with care, disengaging them from the battery.
- ◆ Place the row of stoppers (3) over the battery cell openings.
- ◆ Press down firmly until the tops of the stoppers (3) are flush with the top of the battery.



⚠ CAUTION

The row of stoppers (3) must NEVER be removed.

- ◆ Connect the battery to a battery charger.
- ◆ Subject the battery to a normal charge cycle (see table).

Type of charge	Volt (V)	Ampère (A)	Time (hours)
Normal	12	1.2	8 ÷ 10

- ◆ Put back the battery on the vehicle when this must be delivered to the customer.

6.11.2 MAINTENANCE

- If the vehicle remains unused for more than fifteen days, the battery must be recharged to prevent sulphation, recharge the battery using a normal charge, see 2.4.2 (RECHARGING THE BATTERY).
- Smear a film of neutral grease or vaseline on the terminals.

6.11.3 CHECK

Should any anomalies be encountered, first check the recharging circuit, making sure that it is working correctly, see 6.3 (CHECKING THE RECHARGING SYSTEM).

In addition, make sure that:

- There are no signs of damage (external case cracked) and no electrolyte leak.
- The cables are firmly connected to the terminals.
- Proceed with the normal charge for at least 10 hours.

⚠ CAUTION

After recharging, check the no-load voltage; if it is lower than 12 V, it is absolutely necessary to change the battery.

6.11.4 RETURN UNDER GUARANTEE

The guarantee is not valid if the battery features:

- Damage (dented box, bent poles, etc.).
- Widespread sulphation (incorrect activation and/or use of the battery).

6.12 BULBS

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

⚠ WARNING

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

⚠ CAUTION

Before changing a bulb, move the ignition switch to position "⊗".
Change the bulb wearing clean gloves or using a clean and dry cloth.
Do not leave fingerprints on the bulb, since these may cause its overheating and consequent breakage.
If you touch the bulb with bare hands, remove any fingerprint with alcohol, in order to avoid any damage.

DO NOT FORCE THE ELECTRIC CABLES.

NOTE Before changing a bulb, check the fuses, see 6.15 (CHANGING THE FUSES).

6.12.1 CHANGING THE HEADLIGHT BULBS

The headlight contains:
- two high beam bulbs (1) (side);
- one parking light bulb (2) (lower).
- one low beam bulb (3) (lower).

To change, proceed as follows:
- ◆ Position the vehicle on the side stand on firm and level ground.
- ◆ For the left and lower bulbs, turn the handlebar completely leftwards and work on the left rear side of the front part of the fairing.
- ◆ For the right bulb, turn the handlebar completely rightwards and work on the rear right side of the front part of the fairing.

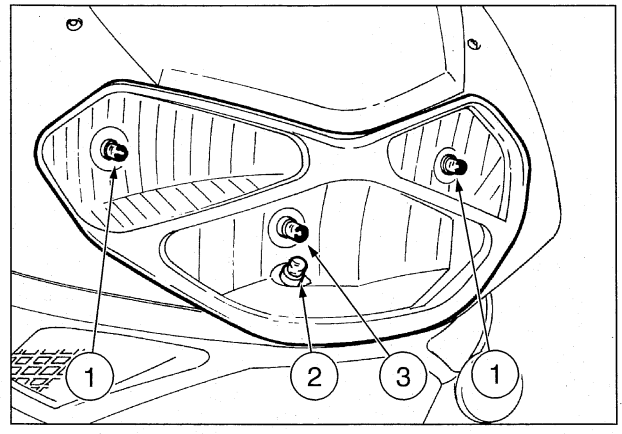
HIGH BEAM BULBS

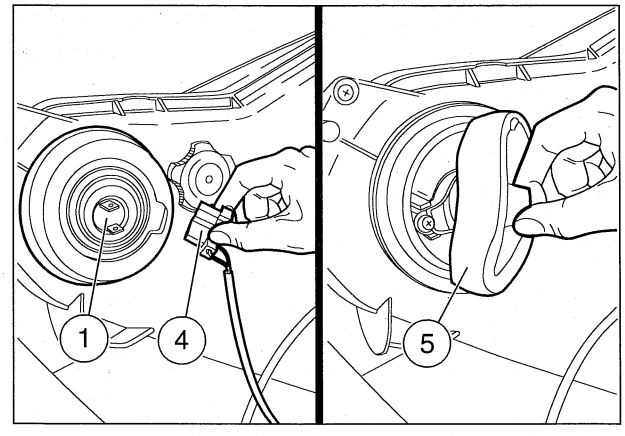
⚠ CAUTION

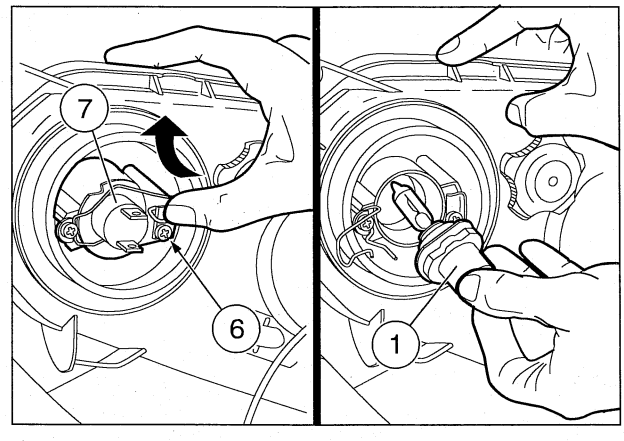
To extract the bulb electric connector, do not pull its electric wires.

- ◆ Grasp the electric connector of the bulb to be replaced (4), pull it and disconnect it from the bulb (1).
- ◆ Move the protection element (5) with your hands.
- ◆ Release the check spring (6) positioned at the rear of the bulb socket (7).
- ◆ Extract the bulb (1) from its seat and replace it with a new one of the same type.

NOTE Insert the bulb in the bulb socket, making the relevant positioning seats coincide.





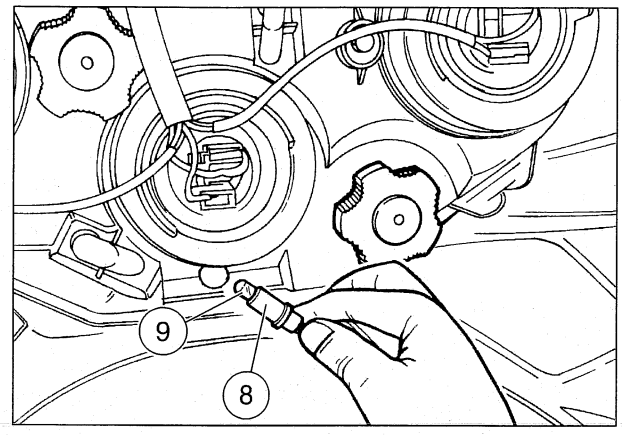


PARKING LIGHT BULB

⚠ CAUTION

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

- ◆ Grasp the parking light bulb socket (8), pull it and remove it from its seat.
- ◆ Withdraw the bulb (9) and replace it with one of the same type.



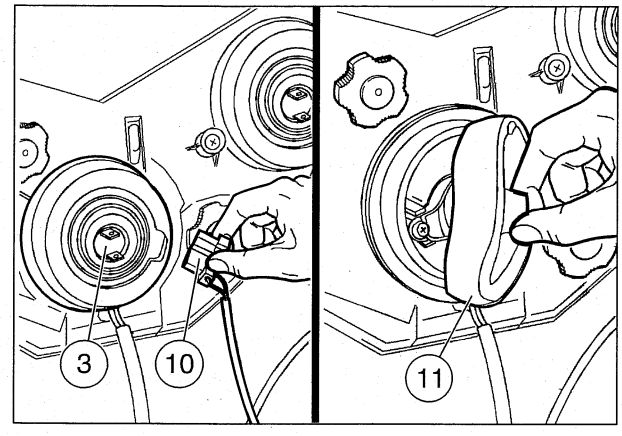
LOW BEAM BULB

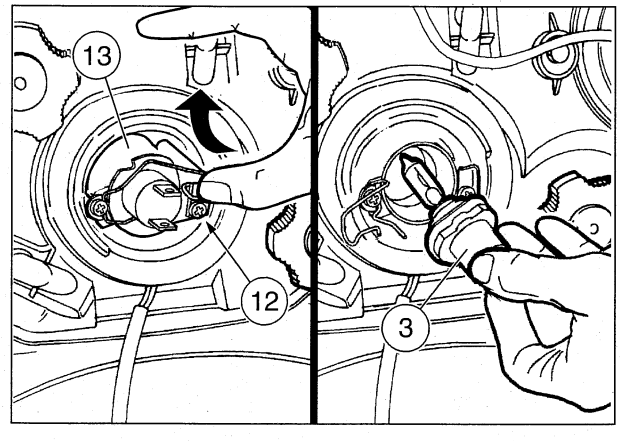
⚠ CAUTION

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

- ◆ Grasp the bulb electric connector (10), pull it and disconnect it from the bulb (3).
- ◆ Move the protection element (11) with your hands.
- ◆ Release the check spring (12) positioned at the rear of the bulb socket (13).
- ◆ Extract the bulb (3) from its seat and replace it with a new one of the same type.

NOTE Insert the bulb in the bulb socket, making the relevant positioning seats coincide.





6.12.2 CHANGING THE FRONT AND REAR DIRECTION INDICATOR BULBS

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

- ◆ Position the vehicle on the side stand on firm and level ground.
- ◆ Unscrew and remove the screw (1).

⚠ CAUTION

While removing the protection screen, proceed carefully in order not to break the cog.

- ◆ Remove the protection screen (2).

⚠ CAUTION

Upon reassembly, correctly position the protection screen in its seat.
Tighten the screw (1) moderately and carefully, to avoid damaging the protection screen.

- ◆ Press the bulb (3) slightly and rotate it anticlockwise.
- ◆ Extract the bulb (3) from its seat.

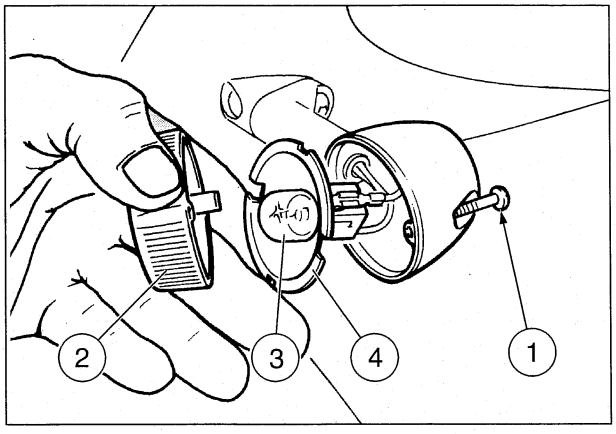
⚠ CAUTION

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.

⚠ CAUTION

If the bulb socket (4) goes out of its seat, insert it correctly, making the bulb socket opening coincide with the screw seat.



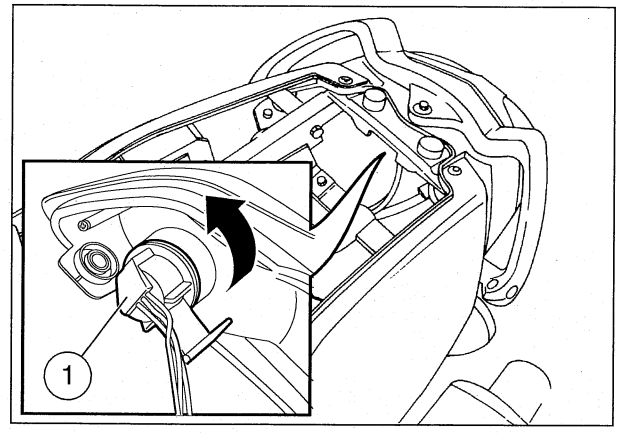
6.12.3 CHANGING THE REAR LIGHT BULB

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

NOTE The rear light houses two parking light/stoplight bulbs. The following operations refer to a single bulb, but are valid for both.

Before changing a bulb, check the efficiency of the stoplight switches, see 6.16 (CHECKING THE SWITCHES).

- Remove the passenger seat, see 7.1.2 (UNLOCKING/LOCKING THE PASSENGER SEAT).

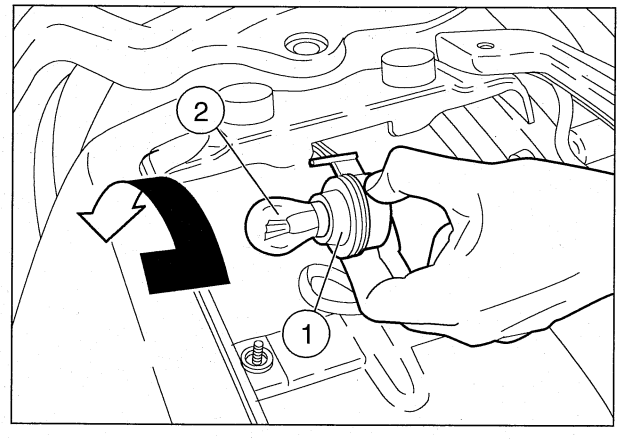


⚠ CAUTION

Do not pull the electric wires to extract the bulb socket.

NOTE The bulb socket (1) is provided with a special wing to facilitate the rotation of the socket itself.

- Working on the glove/tool kit compartment side, grasp the bulb socket (1) and rotate it anticlockwise.
- Slide out the bulb holder (1).
- Press the bulb (2) slightly and rotate it anticlockwise.
- Extract the bulb (2) from its seat.



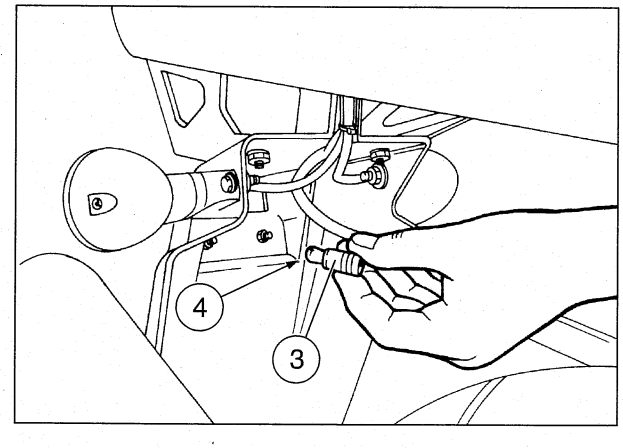
⚠ CAUTION

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 NUMBER PLATE BULB

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).



⚠ CAUTION

Do not pull the electric wires to extract the bulb socket.

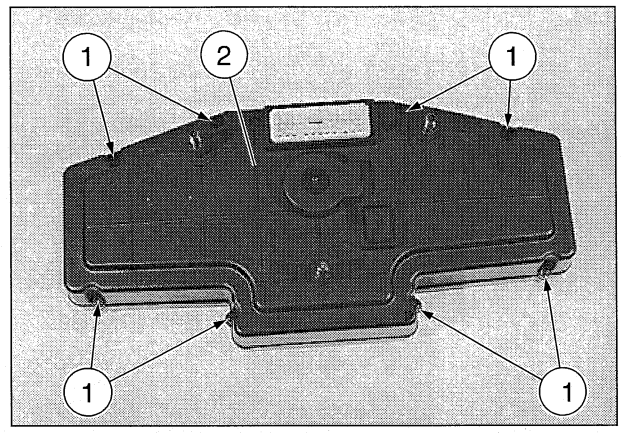
- Working on the lower side of the number plate holder, grasp the bulb socket (3), pull it and extract it from its seat.
- Withdraw the bulb (4) and replace it with a new one of the same type.

6.12.5 CHANGING THE DASHBOARD BULBS / LIGHTS

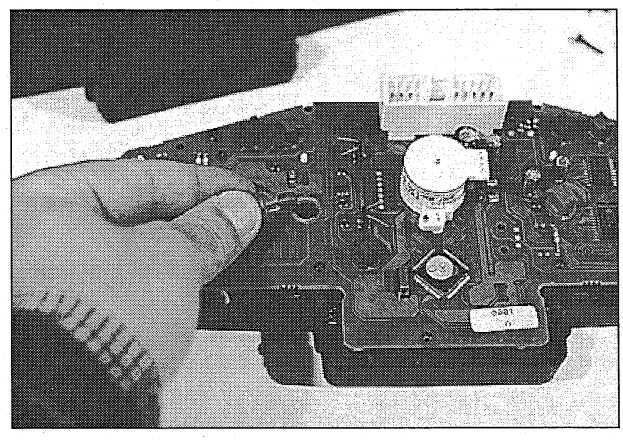
NOTE Before replacing a bulb/light, check the fuses, see 6.15 (CHANGING THE FUSES).

To change, proceed as follows:

- ◆ Remove the dashboard, see 7.1.22 (REMOVING THE DASHBOARD).
- ◆ Unscrew and remove the eight fastening screws (1).
- ◆ Remove the rear cover (2).
- ◆ Slide out the relevant bulb holder and, where necessary, replace the bulb:



Pos.	Description
3	Bulbs for right-hand display lighting
4	Bulbs for left-hand display lighting
5	Bulbs for rev counter lighting

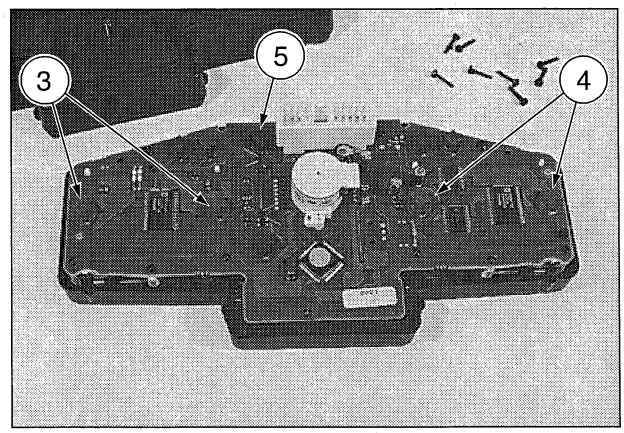


Pos.	Warning light	Description
6		Side stand down
7		fuel reserve
8		High beam
9		direction indicators
10	N	neutral

⚠ CAUTION

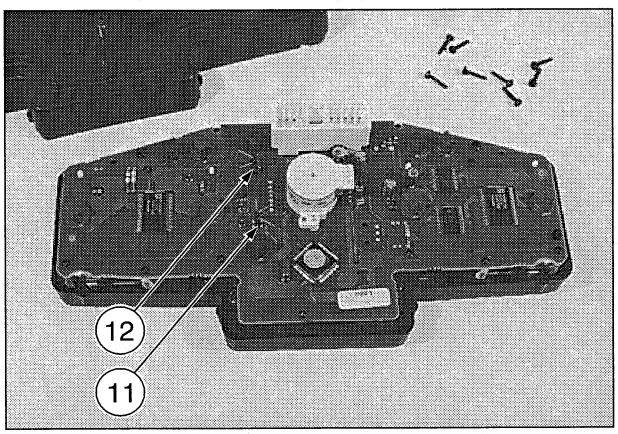
If the defect persists even after the bulb/light has been changed, check the relevant sensor/switch, see:

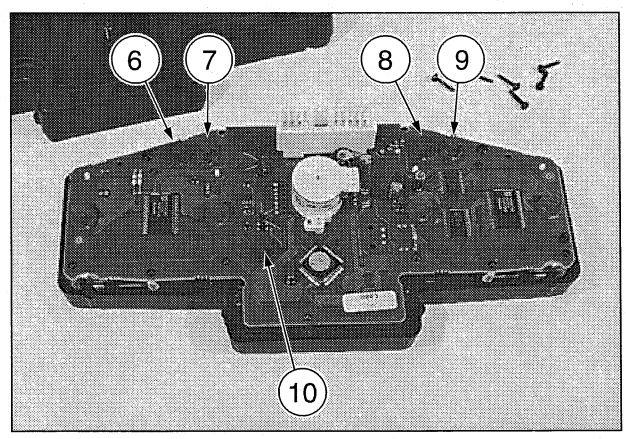
- 6.6.4 (CHECKING THE SIDE STAND AND THE SAFETY SWITCH);
- 6.10.2 (LOW FUEL WARNING LIGHT);
- 6.10.4 (ENGINE OIL PRESSURE SENSOR).



NOTE The two LEDs (11) and (12) cannot be removed.

Pos.	LED	Description
11		engine oil pressure
12	*max*	red line



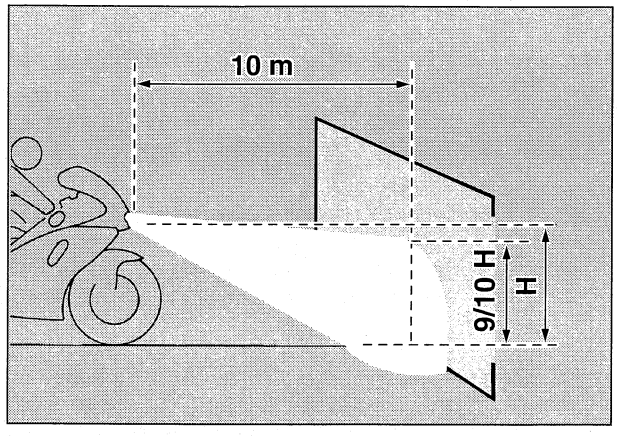


6.13 ADJUSTING THE VERTICAL HEADLIGHT BEAM

NOTE To check the direction of the headlight beam, specific procedures must be adopted, in accordance with the regulations in force in the country where the vehicle is used.

To rapidly check the correct direction of the beam, place the vehicle on flat ground, 10 m away from a wall.

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

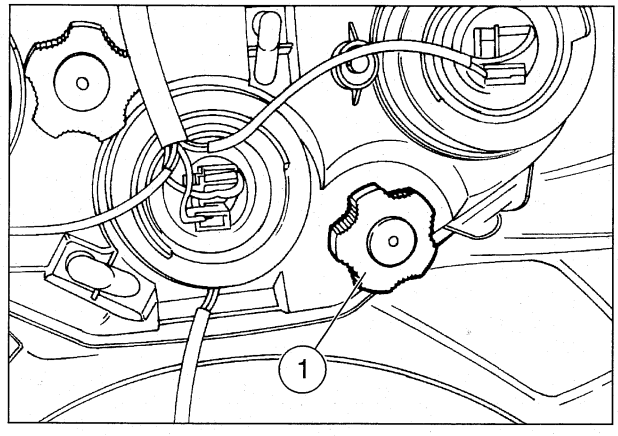


To adjust the headlight beam:

- Position the vehicle on the side stand on firm and level ground.
- Turn the handlebar completely rightwards.
- Working on the rear right side of the front part of the fairing, adjust the appropriate knob (1).

  BY TURNING IT CLOCKWISE, you set the beam downwards.

  BY TURNING IT ANTICLOCKWISE, you set the beam upwards.



6.14 HORIZONTAL ADJUSTMENT OF THE HEADLIGHT BEAM

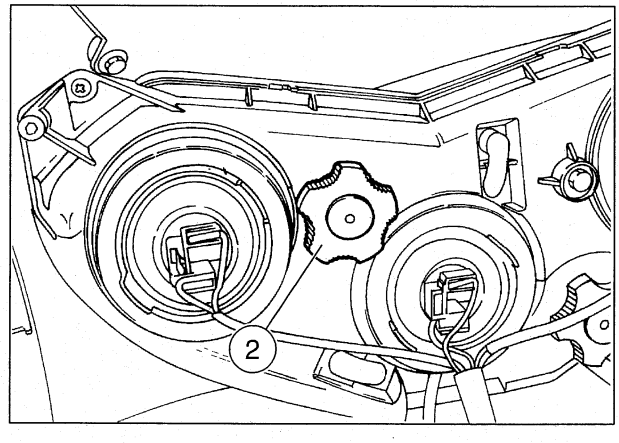
NOTE To check the direction of the headlight beam, specific procedures must be adopted, in accordance with the regulations in force in the country where the vehicle is used.

To adjust the headlight beam:

- Position the vehicle on the side stand on firm and level ground.
- Turn the handlebar completely leftwards.
- Working on the rear left side of the front part of the fairing, adjust the appropriate knob (2).

  BY TURNING IT CLOCKWISE, you turn the beam to the left.

  BY TURNING IT ANTICLOCKWISE, you turn the beam to the right.



6.15 CHANGING THE FUSES

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

⚠ CAUTION

Do not repair faulty fuses.
Never use fuses different from the recommended ones.
The use of unsuitable fuses may cause damages to the electric system or, in case of short circuit, even a fire.

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

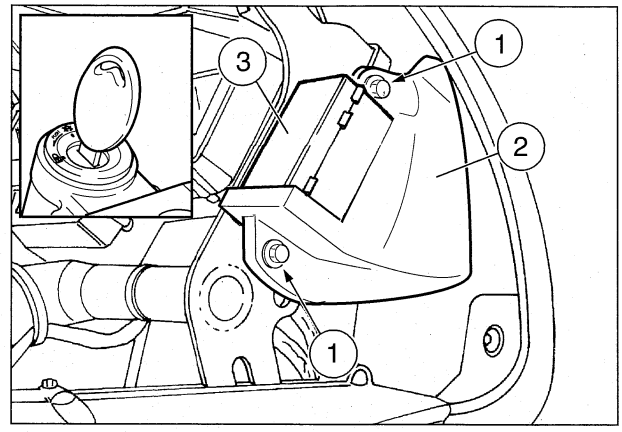
If an electric component does not work or works irregularly, or if the vehicle fails to start, it is necessary to check the fuses.
Check first the 15A secondary fuses and then the 30 A primary fuses.

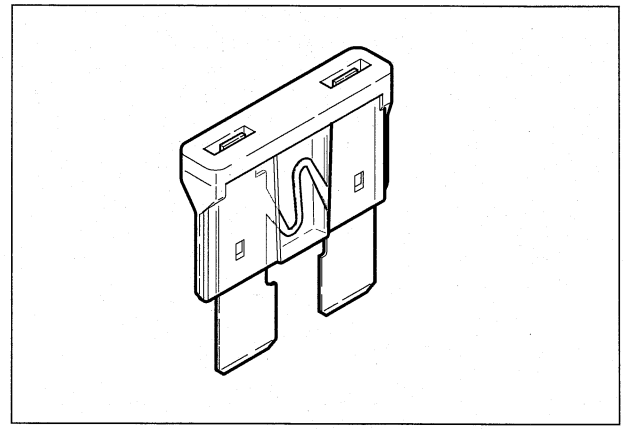
For the check, proceed as follows:

- Turn the ignition switch to position "⚿", to avoid any accidental short circuit.

NOTE The screws (1) fasten the wiring guard (2) and also the secondary fuse box (3).

When reassembling, make sure the components are refitted correctly.
- Unscrew and remove the screws (1).
- Remove the wiring guard (2).
- Keep the secondary fuse box (3) in the correct position.

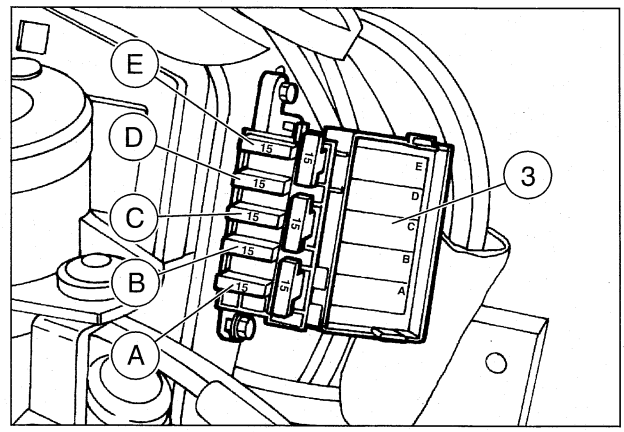




⚠ CAUTION

Upon reassembly, position the electric cables correctly inside the wiring guard (2), in order to avoid any squashing.

- Open the cover of the box (3) containing the secondary fuses.
- Extract the fuses one by one and check if the filament is broken.
- Before replacing a fuse, try to find out the cause of the trouble, if possible.
- Replace the damaged fuse with a new one having the same amperage.



NOTE If you use one of the spare fuses, put a new fuse in the proper seat.

- Put back the rider saddle, see 7.1.1 (REMOVING THE RIDER SADDLE).
- Carry out the operations previously described for the secondary fuses also for the main fuses.

NOTE The removal of the 30A fuses requires the setting to zero of the following functions: digital clock and red line setting. To reset these functions, see 2.3 (MULTIFUNCTION COMPUTER).

ARRANGEMENT OF THE 15 A SECONDARY FUSES

A) From voltage regulator to:
high beam relay, low beam relay.
B) From voltage regulator to:
coils, engine stop relay, fuel pump.
C) From ignition switch to:
electric fans, clock.

Follow ▶

Follow ▶

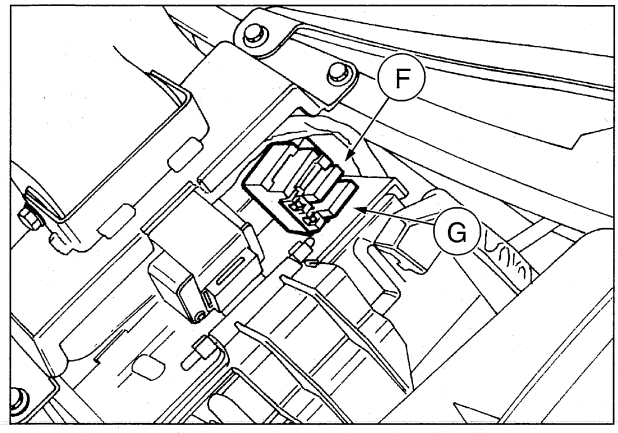
D) From ignition switch to:
parking lights, rear stoplights, horn, dashboard lights, direction indicators.
E) From ignition switch to:
electronic unit, fuel pump relay, engine stop relay.

NOTE Three fuses are spare fuses.

ARRANGEMENT OF THE 30 A MAIN FUSES

F) From battery to: ignition.
G) From battery to: ignition.

NOTE One fuse is a spare fuse.



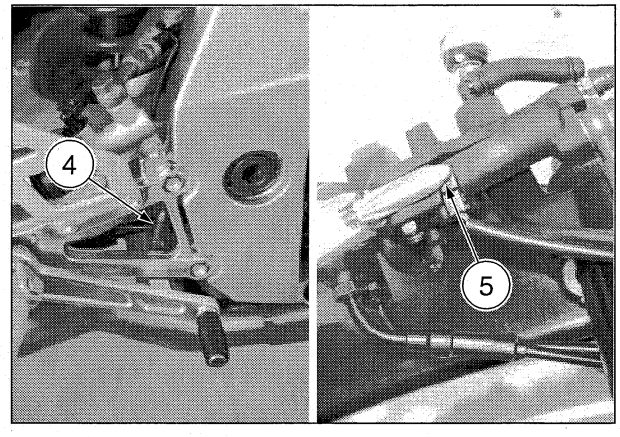
6.16 CHECKING THE SWITCHES

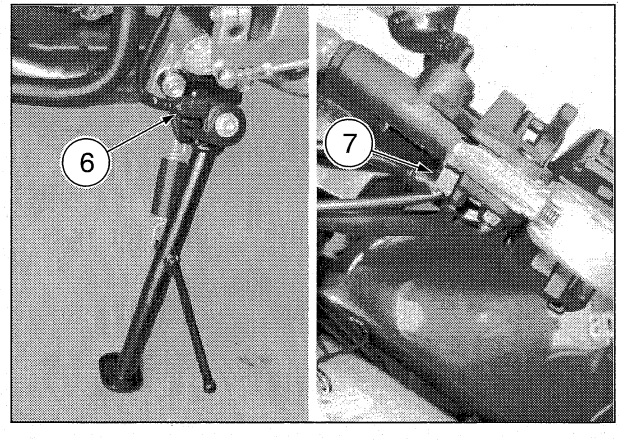
Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

The vehicle is provided with four switches:

- Stoplight switch on the rear brake control lever (4).
- Stoplight switch on the front brake control lever (5).
- Safety switch on the side stand (6).
- Switch on the clutch control lever (7).

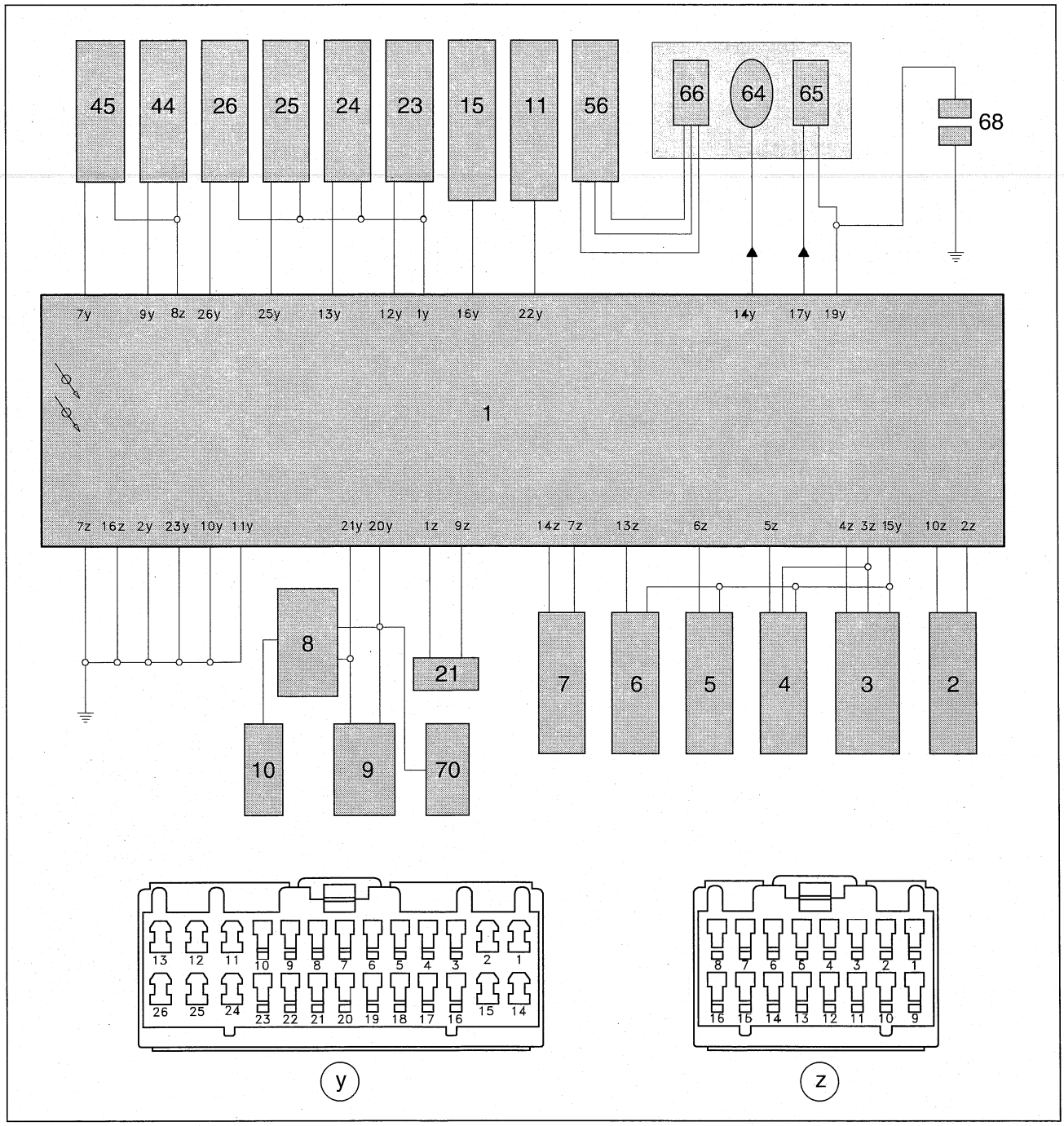
◆ Make sure that there are no dirt or mud deposits on the switch; the pin must be able to move without interferences, returning automatically to its initial position.
◆ Make sure that the cables are connected correctly.





6.17 CONNECTIONS TO THE ENGINE CONTROL UNIT

NOTE See 6.2 (ELECTRIC COMPONENTS LAYOUT) for the positioning of the components.
For further information, see 4.7.4 (ENGINE CONTROL UNIT CONNECTORS).



NOTE The initials (y) and (z) appearing in the diagram, next to the relevant numbers, mark the respective terminals on both connectors.

y) Electronic unit connector (26-way).
z) Electronic unit connector (16-way)

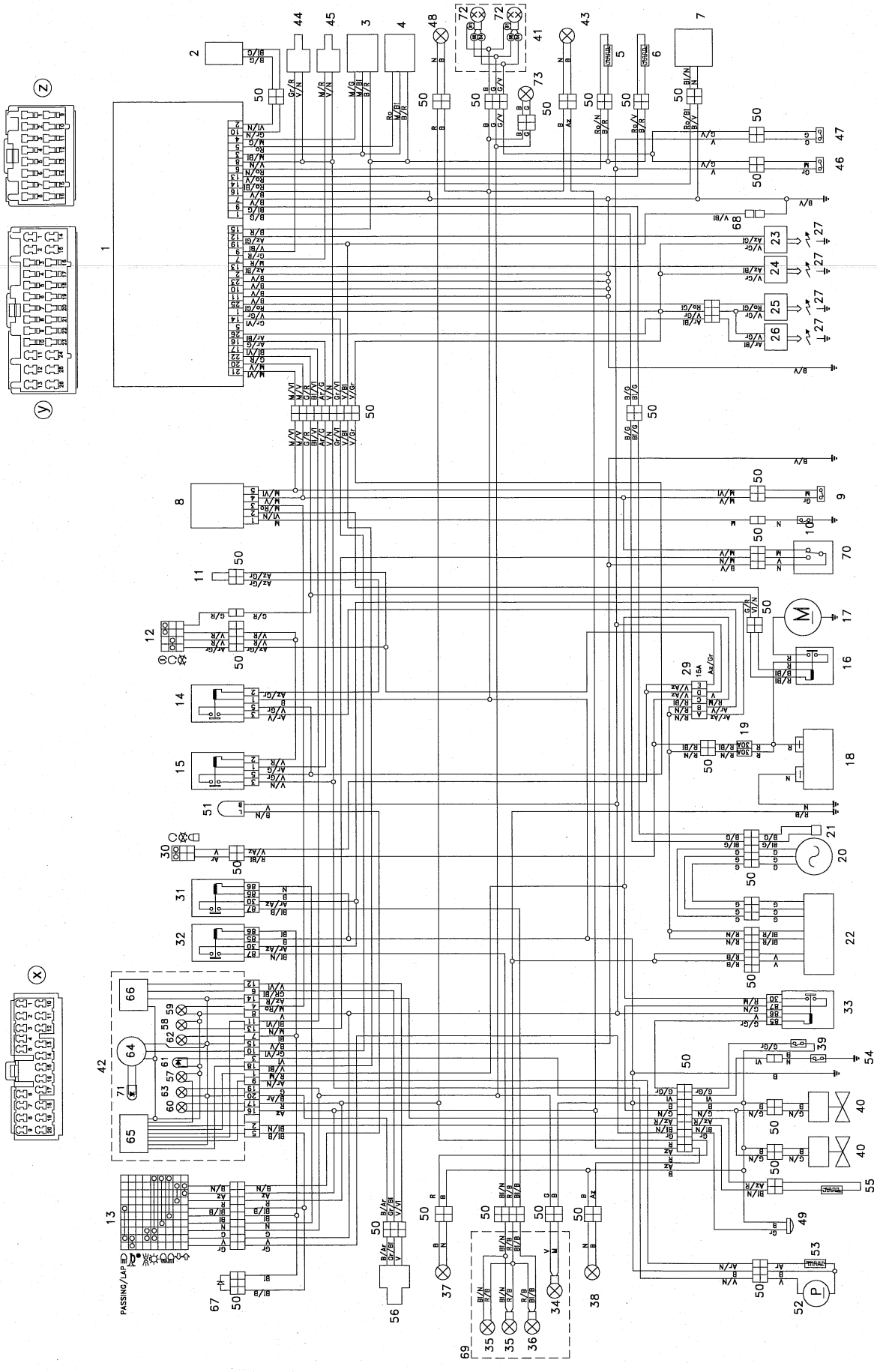
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Follow ▶

ELECTRONIC UNIT CONNECTION KEY .

Position	Component	Connector	Terminal #	Nominal value	Cable colours
1	Electronic unit	–	–	–	–
2	Camshaft position sensor	z	2	150 - 300 Ω	Vi /N
		z	10		Gr/N
3	Throttle valve potentiometer	y	15	2.8 - 3.4 kΩ (angle variable)	B/R
		z	3		M/Bi
		z	4		M/G
4	Intake pressure sensor	y	15	10 - 15 kΩ	B/R
		z	3		M/Bi
		z	5		Ro
5	Coolant thermistor	y	15	1.9 - 2.9 kΩ	B/R
		z	6		Ro/N
6	Air thermistor	y	15	–	B/R
		z	13		Ro/V
7	Fall sensor	z	7	> 10 kΩ	Earth
		z	14		Ro/Bi
8	Diode module	y	20	–	M/V
		y	21		M/Vi
9	Clutch control lever switch	y	20	–	M/V
		y	21		M/Vi
10	Neutral gear switch	–	–	–	M
11	Start relay	y	22	–	G/R
15	Fuel pump relay	y	16	–	Ar/G
21	Driving shaft position sensor	z	9	150 - 300 Ω	Bi/G
		z	1		B/G
–	Earth	y	2-10-11-23	–	B/V
		z	7 - 16		
23	Rear cylinder coil	y	1	4 - 5 Ω	V/Gr
		y	12		Az/G
24	Rear cylinder coil	y	1	4 - 5 Ω	V/Gr
		y	13		Ro/G
25	Front cylinder coil	y	1	4 - 5 Ω	V/Gr
		y	25		Ro/G
26	Front cylinder coil	y	1	4 - 5 Ω	V/Gr
		y	26		Ar/Bi
44	Front cylinder injector	z	8	11 -17 Ω	V/N
		y	9		Gr/R
45	Rear cylinder injector	z	8	11 - 17 Ω	V/N
		y	7		M/R
56	Speed sensor	–	–	–	B/Ar Gr/Bi V/Vi
64	Revolution counter	y	14		Gr/Vi
65	Multifunction display (right side) - Diagnostics	y	17		B/Vi
66	Multifunction display (left side)	–	–	–	B/Ar Gr/Bi V/Vi
68	TEST connectors	y	19	–	V/Bi

6.18 WIRING DIAGRAM - SL mille



WIRING DIAGRAM KEY - SL mille

1) Electronic unit
2) Camshaft position sensor
3) Throttle valve potentiometer
4) Intake pressure sensor
5) Coolant thermistor
6) Air thermistor
7) Fall sensor
8) Diode module
9) Clutch control lever switch
10) Neutral gear switch
11) Arrangement for the installation of the anti-theft device
12) Right dimmer switch
13) Left dimmer switch
14) Engine stop relay
15) Fuel pump relay
16) Start relay
17) Starter
18) Battery
19) Main fuses (30A) (ignition)
20) Generator
21) Driving shaft position sensor
22) Voltage regulator
23) Rear cylinder coil "1"
24) Rear cylinder coil "2"
25) Front cylinder coil "1"
26) Front cylinder coil "2"
27) Spark plugs
28) –
29) Secondary fuses (15 A)
    A - High beam, low beam
    B - ISC, coils, fuel pump
    C - Electric fans, clock
    D - Parking lights, stoplights, horn, dashboard lights, direction indicators.
    E - Electronic unit, fuel pump relay, engine stop relay.
30) Ignition switch
31) Low beam relay
32) High beam relay
33) Cooling fan relay
34) Front parking light bulb
35) High beam bulbs
36) Low beam bulb
37) Front right direction indicator
38) Front left direction indicator
39) Thermal switch
40) Cooling fans
41) Rear light
42) Dashboard
43) Rear left direction indicator
44) Front cylinder injector
45) Rear cylinder injector
46) Front stoplight switch
47) Rear stoplight switch
48) Rear right direction indicator
49) Horn
50) Multiple connectors
51) Blinking
52) Fuel pump
53) Low fuel sensor
54) Engine oil pressure sensor
55) Coolant thermistor
56) Speed sensor
57) Low fuel warning light
58) Side stand down warning light
59) Neutral warning light
60) Direction indicator warning light
61) Engine oil pressure warning light LED
62) High beam warning light
63) Dashboard bulbs
64) Revolution counter
65) Multifunction display (right side)
66) Multifunction display (left side)
67) Light diode / LAP
68) TEST connectors
69) Headlight
70) Side stand switch
71) Red line warning light LED
72) Rear parking light/stoplight bulbs
73) Number plate light

x) Dashboard connector (20-way)
y) Electronic unit connector (26-way)
z) Electronic unit connector (16-way)

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

NOTE

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CHASSIS

7

CHASSIS

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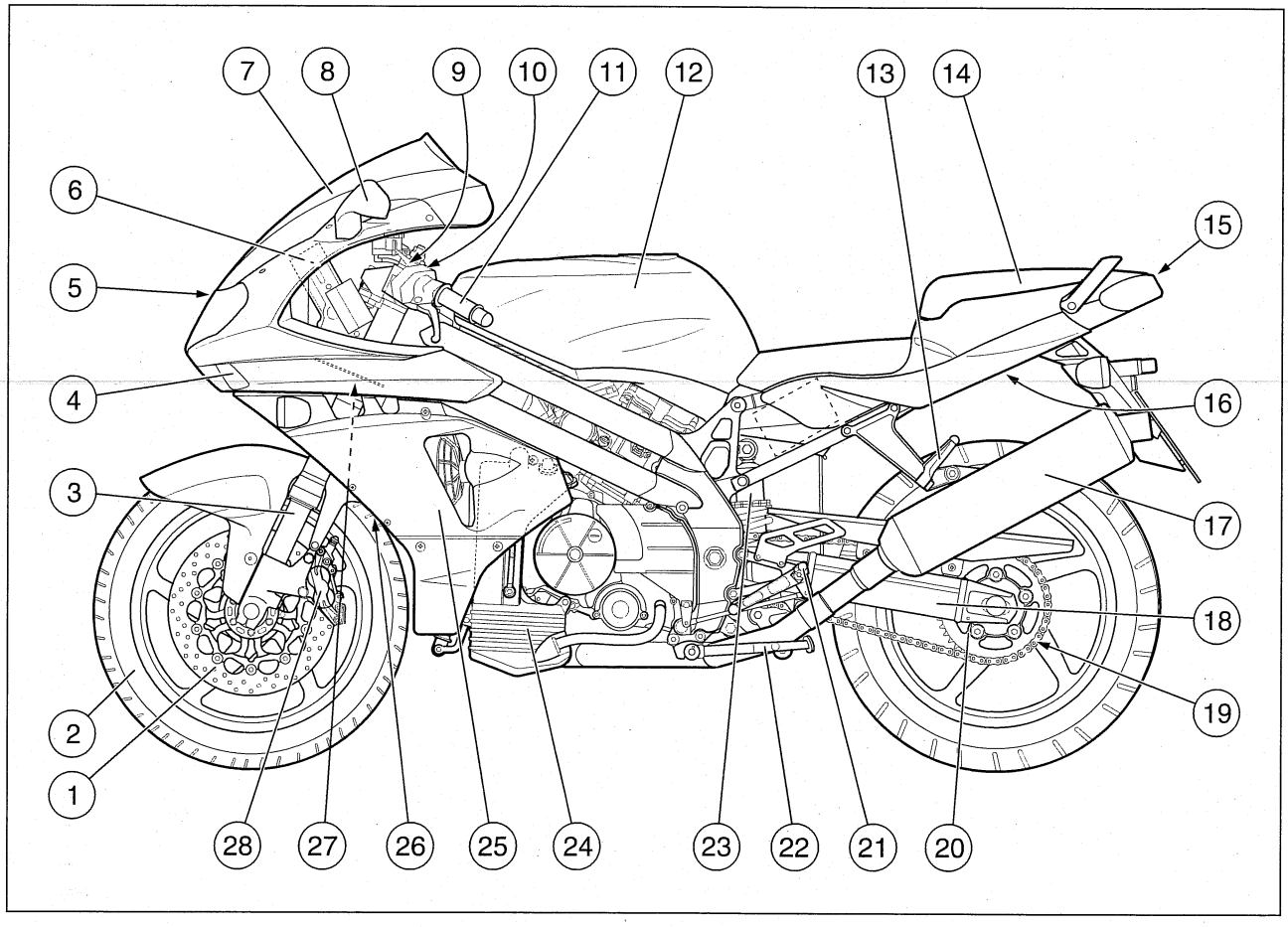
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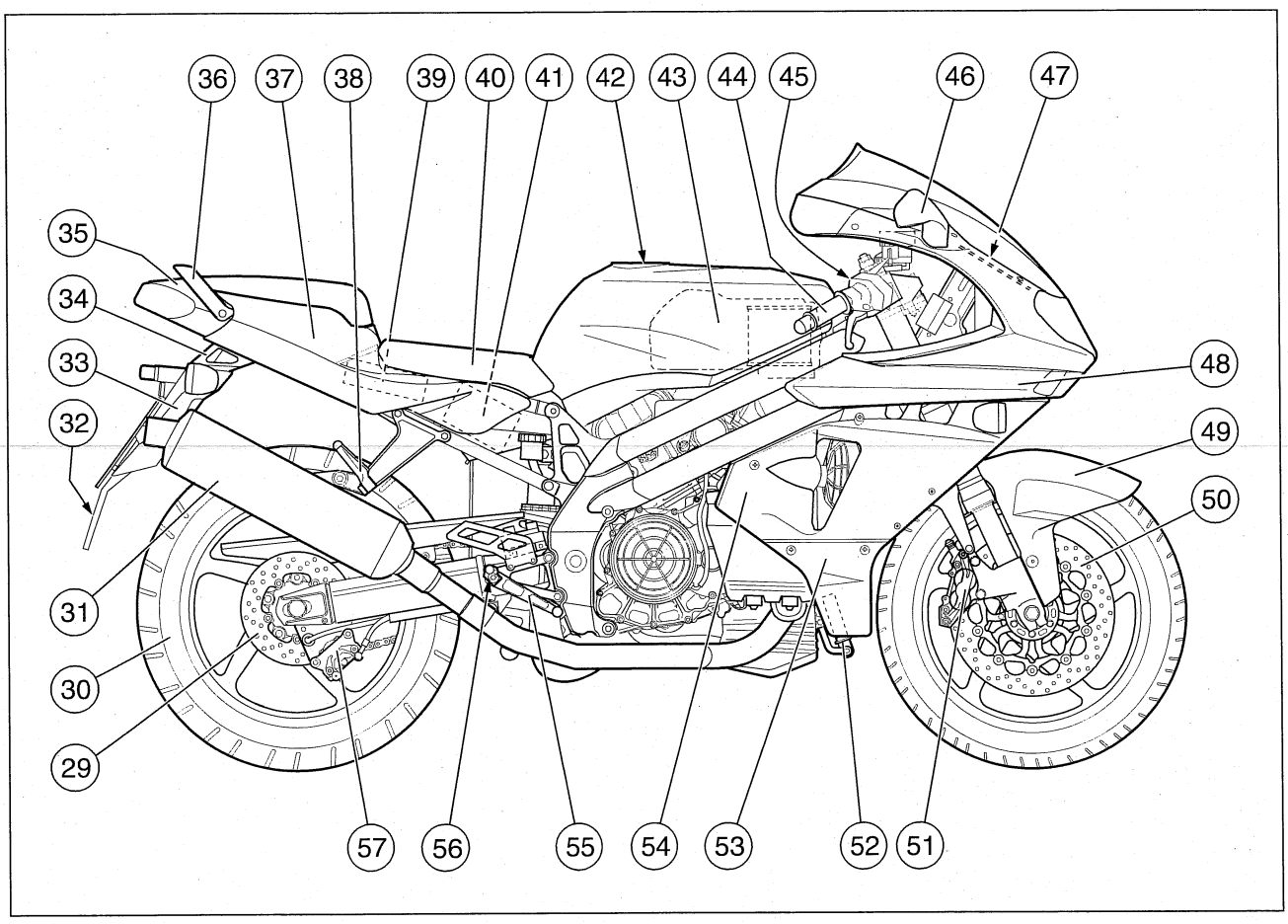
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7.1 BODY



KEY

1) Left front brake disc
2) Front wheel
3) Front fork
4) Left air conveyor
5) Headlight
6) Dashboard
7) Front fairing
8) Left rear-view mirror
9) Controls on left handlebar
10) Ignition switch/steering lock
11) Left handgrip
12) Fuel tank
13) Passenger left footrest
14) Passenger seat
15) Rear light
16) Saddle support lower moulded cover
17) Left exhaust silencer
18) Rear fork
19) Drive chain
20) Sprocket
21) Rider left footrest
22) Side stand
23) Shock absorber
24) Engine oil tank
25) Left fairing
26) Radiator spoiler
27) Front fairing lower lockup
28) Front brake left caliper



KEY

29) Rear brake disc
30) Rear wheel
31) Right exhaust silencer
32) Mudguard extension
33) Number plate holder
34) Number plate holder support
35) Rear light-holder
36) Passenger handle
37) Rear fairing
38) Passenger right footrest
39) Electronic unit
40) Rider saddle
41) Battery
42) Fuel tank filler cap
43) Air filter casing
44) Right handgrip (throttle grip)
45) Controls on the right part of the handlebar
46) Right rear-view mirror
47) Dashboard's upper protection moulding
48) Right air conveyor
49) Front mudguard
50) Right front brake disc
51) Right front brake caliper
52) Engine oil radiator
53) Lower fairing
54) Right side fairing
55) Rear brake control lever
56) Rider right footrest
57) Rear brake caliper

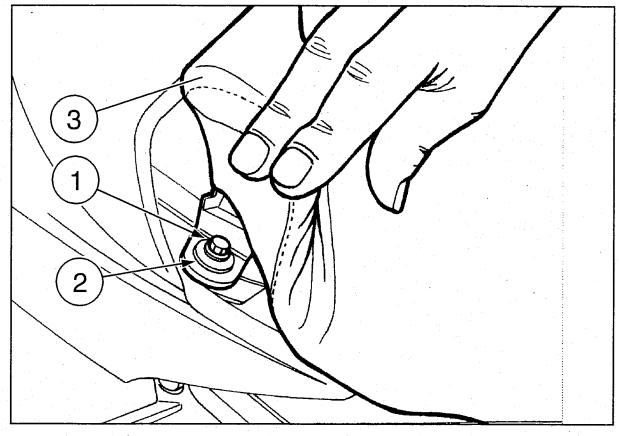
7.1.1 REMOVING THE RIDER SADDLE

- Position the vehicle on the stand.
- ★Partially raise the rear side edge of the saddle.

Rider saddle screw (1) driving torque: 12 Nm (1.2 kgm).

- ★Unscrew and remove the screw (1) and take the bushing (2).
- Raise and remove the saddle (3).

NOTE Upon reassembly, insert the front tang of the saddle in the appropriate seat.



⚠ CAUTION

Before leaving, make sure that the saddle (3) is properly positioned and locked.

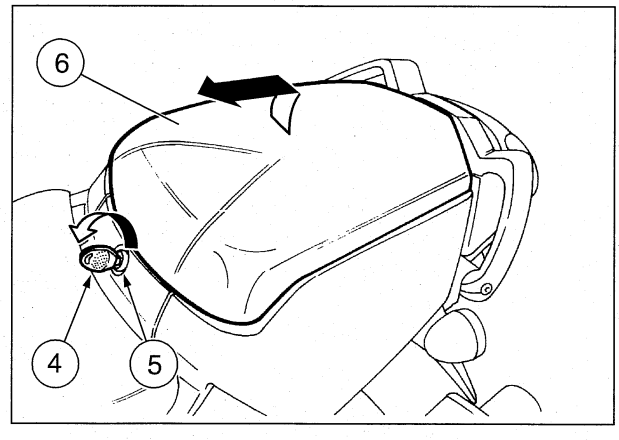
7.1.2 UNLOCKING/LOCKING THE PASSENGER SEAT

- Position the vehicle on the stand.
- Introduce the key (4) in the seat lock (5).
- Turn the key (4) anticlockwise, lift the passenger seat (6) and withdraw it from the front.

NOTE Before lowering and locking the seat (6), make sure that you have not left the key in the glove/tool kit compartment.

To lock the seat (6), proceed as follows:

- Introduce the lower point (7) under the rear saddle support plate.
- Position the seat and press it, making the lock snap.



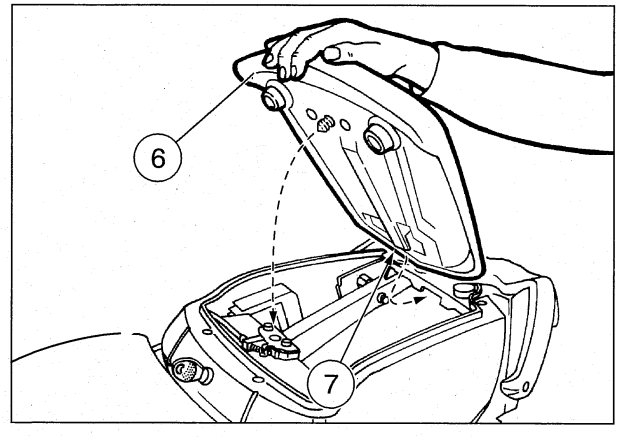
⚠ WARNING

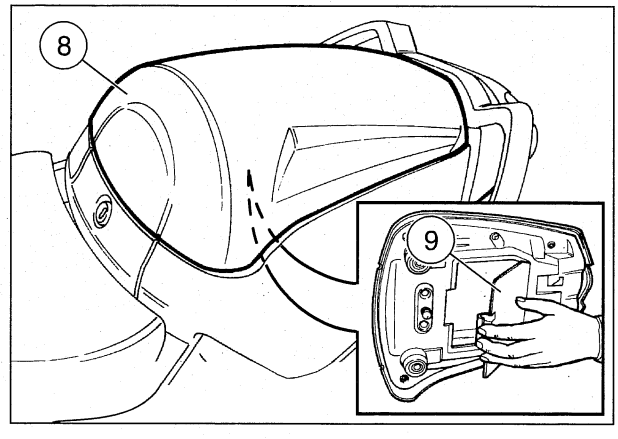
Before leaving, make sure that the seat (6) is properly locked.

NOTE The glove/tool kit compartment cover (8), to be used as an alternative to the passenger seat, is supplied together with the vehicle.

For the installation and removal, see 7.1.2 (UNLOCKING/LOCKING THE PASSENGER SEAT).

A useful compartment is available under the glove / tool kit compartment cover; to reach it, it is sufficient to release and remove the flap (9).





7.1.3 PARTIAL REMOVAL OF THE FUEL TANK

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS), 1.2.1 (FUEL) and 4.1 (FUEL TANK).

⚠ WARNING

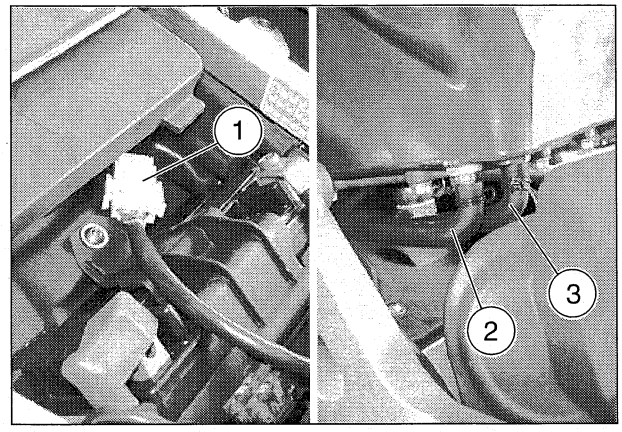
Fuel vapours are noxious for your health.
Before proceeding, make sure that the room in which you are working is properly ventilated.
Do not inhale fuel vapours.
Do not smoke and do not use naked flames.
Do not dispose of fuel in the environment.

RISK OF FIRE AND/OR EXPLOSION.

Let the engine cool down until it reaches room temperature.

NOTE It is possible to remove the tank from the vehicle when it is full of petrol.

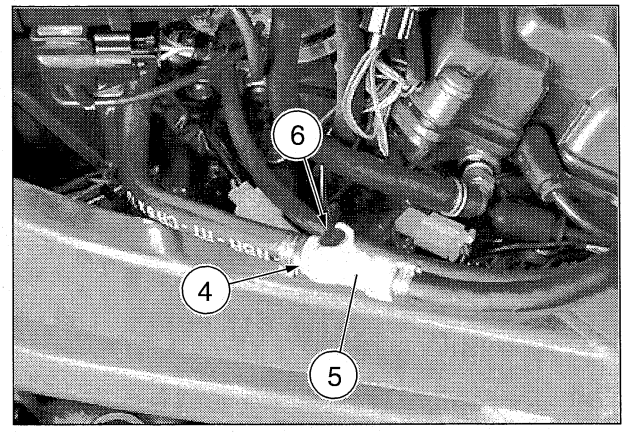
- Turn the ignition switch to position "⚿".
- Put back the rider saddle, see 7.1.1 (REMOVING THE RIDER SADDLE).
- Lift the fuel tank, see 2.8 (LIFTING THE FUEL TANK).
- Disconnect the electric connector (1) from the fuel pump.



⚠ CAUTION

Upon reassembly, make sure that the electric connector (1) is correctly coupled.

- Disconnect the overflow pipe (2) from the fuel pump and the water drain pipe (3) from the filler cap.



⚠ CAUTION

Place a cloth under the male quick-release coupling (6) to catch any fuel spills.

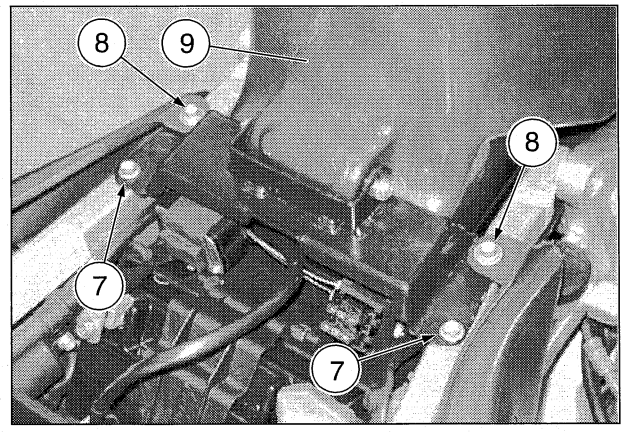
- Disconnect the male quick-release coupling (4) from the receptacle (5) by pressing the relevant button (6).

⚠ CAUTION

When reassembling, make sure the male quick-release coupling (4) is fitted into the receptacle (5) correctly.

Fuel tank support screw driving torque: 10 Nm (1 kgm).

- Unscrew and remove the two screws (7).
- Unscrew and remove the two screws (8), taking the bushes.
- Set up a work stand approx. 60 cm high next to the vehicle, on its left side, sufficiently wide so that the tank (9) can be set down on it.



⚠ CAUTION

The tank (9) is not completely free, as it is still attached by the fuel delivery pipe which should not be disconnected unless absolutely necessary, see 7.1.4 (COMPLETE REMOVAL OF THE FUEL TANK).

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

- Get a firm hold on the tank (9) at the front and rear, lift it and set it down carefully on the relevant rest without tipping it over.

⚠ CAUTION

When reassembling, make sure the tank is positioned correctly (pipes and electric cables must not be twisted and/or squashed).

7.1.4 COMPLETE REMOVAL OF THE FUEL TANK

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS), 1.2.1 (FUEL) and 4.1 (FUEL TANK).

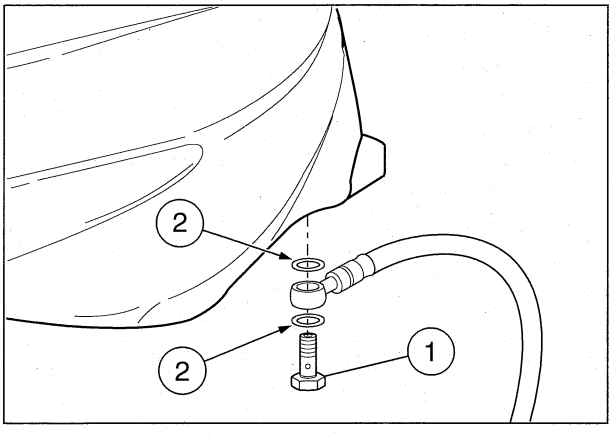


⚠ WARNING

Fuel vapours are noxious for your health.
Before proceeding, make sure that the room in which you are working is properly ventilated.
Do not inhale fuel vapours.
Do not smoke and do not use naked flames.
Do not dispose of fuel in the environment.

RISK OF FIRE AND/OR EXPLOSION.

- Drain the tank of petrol, see 2.9 (DRAINING THE FUEL TANK).
- Partially remove the tank, see 7.1.3 (PARTIAL REMOVAL OF THE FUEL TANK).
- Turn the tank upside down.



⚠ CAUTION

Place a cloth under the perforated screw (1) to catch any fuel spills.

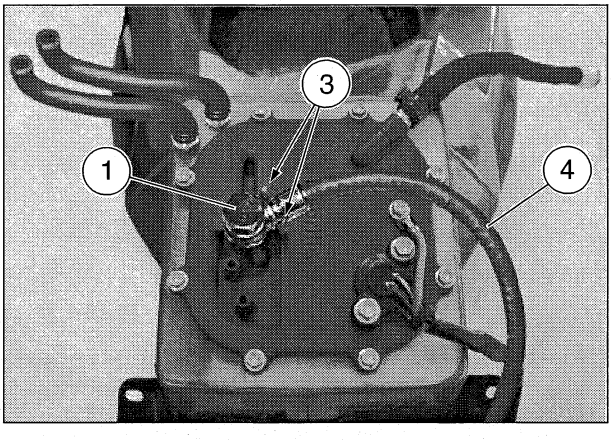
Fuel tank perforated screw (1) driving torque: 22 Nm (2.2 kgm).

- Loosen the perforated screw (1) by approx. half a turn and wait a few seconds to allow the system to depressurize.
- Unscrew and remove the perforated screw (1) and take the two gaskets (2).

⚠ WARNING

Upon reassembly, change the two gaskets (2) and tighten the perforated screw (1) applying the prescribed torque in order to ensure perfect seal. This is essential, since the injection pressure is approx. 450 kPa (4.5 bar) and any fuel leakage would prove extremely dangerous, in fact the leaking fuel might end up on high-temperature parts of the engine.

When reassembling, a special seat (3) indicates the correct direction in which the pipe (4) must be placed.



The fuel delivery pipe (4) must not be entangled or positioned where it is likely to be squashed by other components; should it appear damaged or deteriorated, it must be replaced.

- Remove the tank completely.
- If the lower acoustic insulation edging at the front and lower antiheat edging at the rear prove damaged, replace them.

7.1.5 REMOVING THE FUEL TANK FILLER CAP

Carefully read 1.2.1 (FUEL) and 4.1 (FUEL TANK).

⚠ WARNING

Fuel vapours are noxious for your health.
Before proceeding, make sure that the room in which you are working is properly ventilated.
Do not inhale fuel vapours.
Do not smoke and do not use naked flames. Do not dispose of fuel in the environment.

RISK OF FIRE AND/OR EXPLOSION.

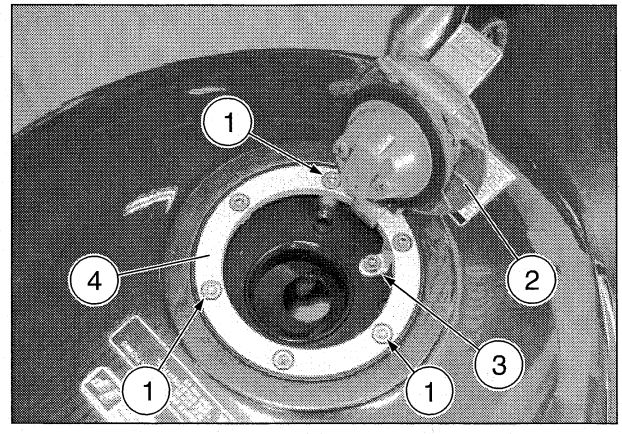
◆ Position the vehicle on the stand.

Fuel tank filler cap screws driving torque: 5 Nm (0.5 kgm).

◆ Unscrew and remove the three screws (1).

NOTE The other three screws can be left on the vehicle as they are just for show.

◆ Open the cap (2).

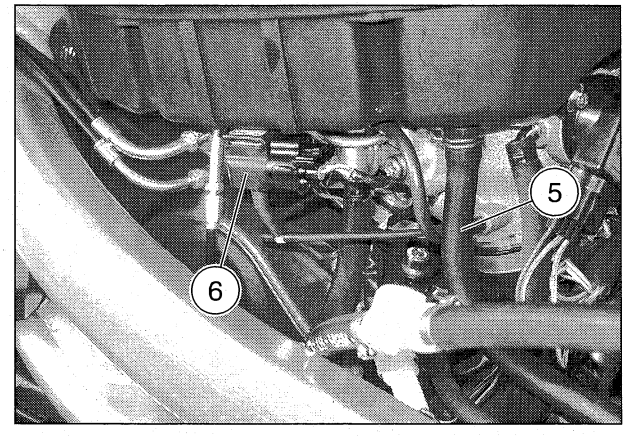


⚠ CAUTION

When removing the screw (3), take care not to allow it to fall inside the tank.

Filler cap inner screw driving torque: 5 Nm (0.5 kgm).

◆ Unscrew and remove the screw (3).
◆ Remove the cap (2) together with the metal ring (4).



⚠ CAUTION

Plug the tank opening so as to prevent any foreign bodies falling in.

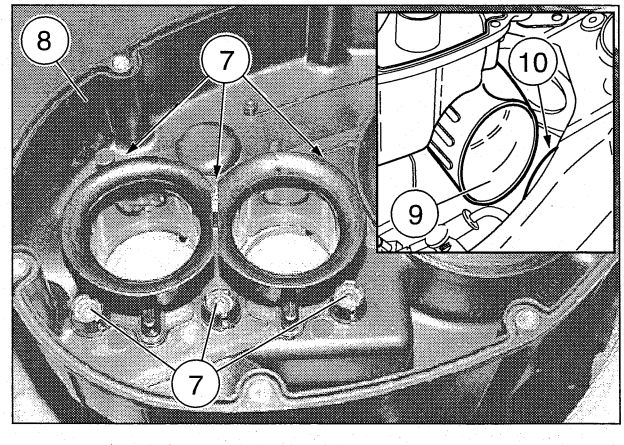
7.1.6 REMOVING THE AIR CLEANER CASE

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

◆ Remove the air cleaner, see 2.10 (AIR CLEANER).
◆ Disconnect the pipe (5).
◆ Withdraw the suction pressure sensor (6) from its coupling.

Filter case screws driving torque: 7 Nm (0.7 kgm).

◆ Unscrew and remove the six screws (7).



⚠ CAUTION

For the removal of the air cleaner case (8) proceed with the greatest care, lifting it with slight movements.

◆ Raise and remove the air cleaner case (8).

⚠ CAUTION

Plug the openings with a clean cloth, to prevent any foreign matters from getting into the suction ducts.

Upon reassembly:

- **Make sure that the O-ring is correctly positioned on the throttle body.**
- **The two conveyors (9) must be positioned correctly and adhere perfectly to the spongy material (10) around the front air intake holes.**
- **Before tightening the screws (7), make sure that the air cleaner case (8) rests completely on the throttle body.**

7.1.7 REMOVING THE BATTERY

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 2.4 (BATTERY).

NOTE To remove the battery it is necessary to set to zero the digital clock and the red line setting.

To reset these functions, see 2.3 (MULTIFUNCTION COMPUTER).

- Turn the ignition switch to position "⚿".
- Put back the rider saddle, see 7.1.1 (REMOVING THE RIDER SADDLE).
- Unscrew and remove the screw (1) on the negative terminal (–).
- Move the negative cable (2) sidewards.
- Remove the red protection element (3).
- Unscrew and remove the screw (4) on the positive terminal (+).
- Move the positive cable (5) sidewards.

Battery bracket screw driving torque: 3 Nm (0.3 kgm).

- Unscrew and remove the screw (6).
- Rotate the battery locking bracket (7) upwards.

NOTE To remove the battery cover (8), it is neither necessary to remove the fuses (9) and the fall sensor (10), nor to disconnect the relevant electric connectors.

⚠ CAUTION

During the removal of the battery cover (8) proceed with care, without forcing the electric cables; the fuses (9) and the fall sensor (10) remain connected to the electric cables.

- Move the battery cover (8), complete with bracket (7), fuses (9) and fall sensor (10), forward and withdraw it from above.
- Fold the whole battery cover (8) and position it laterally.
- Grasp the battery (11) firmly and remove it from its compartment by lifting it.

⚠ WARNING

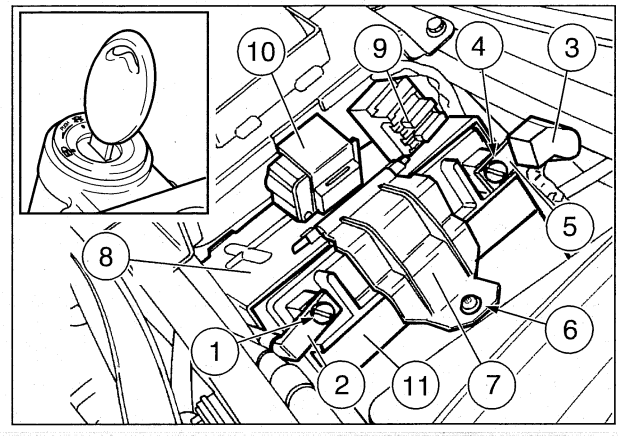
Once it has been removed, the battery must be stored in a safe place and kept away from children.

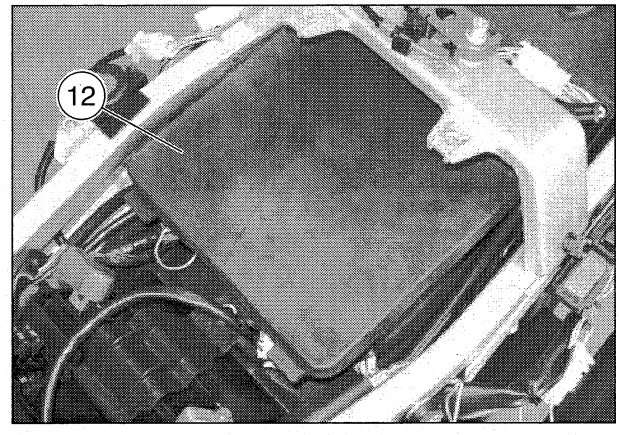
- Position the battery on a flat surface, in a cool and dry place.

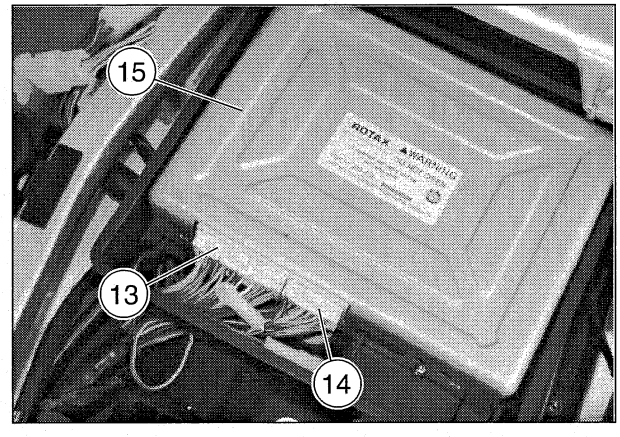
⚠ CAUTION

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

- Position the battery on a flat surface, in a cool and dry place.







7.1.8 REMOVING THE ELECTRONIC UNIT

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

- Turn the ignition switch to position "⚿".
- Remove the rear fairing, see 7.1.33 (REMOVING THE REAR FAIRING).
- Remove the upper protection element (12).
- Disconnect the two electric connectors (13-14) from the electronic unit (15).

⚠ CAUTION

When reassembling, make sure the two electric connectors (13-14) are plugged in properly.

- Remove the electronic unit (15), lifting it out of the compartment under the saddle.

7.1.9 REMOVING THE GRIP ON THE LEFT HANDLEBAR

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

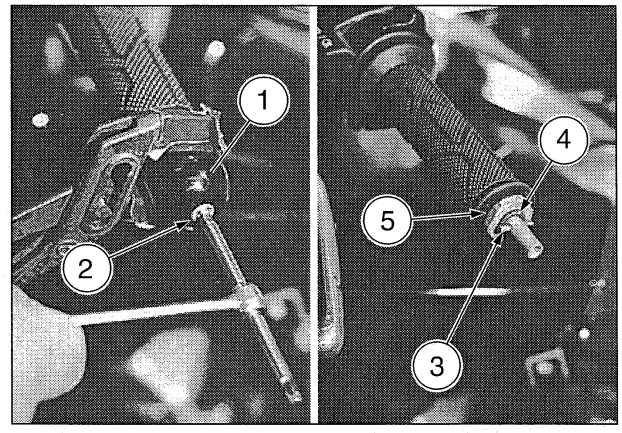
- Position the vehicle on the stand.
- Turn the ignition switch to position "⚿".
- Use a pair of adjustable pliers, with the jaws wrapped in adhesive tape so as not to damage the counterweight (1), to hold the counterweight still.

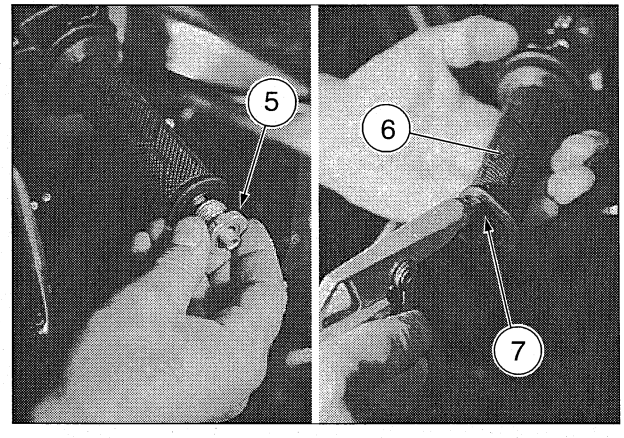
Counterweight screw driving torque: 10 Nm (1.0 kgm).

- Unscrew and remove the screw (2).
- Remove the counterweight (1).
- Slide out the pin (3).
- Slide off the O-ring (4).

Grip end driving torque: 35 Nm (3.5 kgm).

- Slide off the end piece (5).
- Insert the nozzle of a compressed air gun between the grip (6) and handlebar (7).
- Blow air, moving the gun's nozzle with a rotary movement and, at the same time, seize the other grip (6) with the other hand and slide it off.

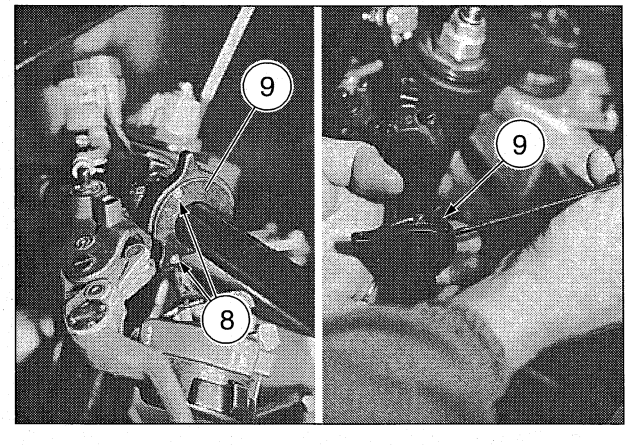


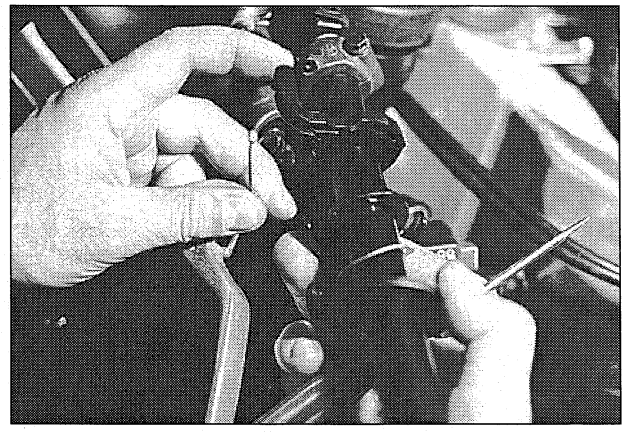


7.1.10 REMOVING THE COLD-START CONTROL

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

- Remove the grip from the left handlebar, see 7.1.9 (REMOVING THE GRIP ON THE LEFT HANDLEBAR).
- Remove the electric controls, see 7.1.12 (REMOVING THE ELECTRIC CONTROLS ON THE LEFT HANDLEBAR).
- Unscrew and remove the two screws (8).
- Use a small flat-tip screwdriver to split open the cold-start control (9).
- Disconnect the cold-start cable.
- Slide off, holding the cold-start control components together.





7.1.11 REMOVING THE CLUTCH LEVER

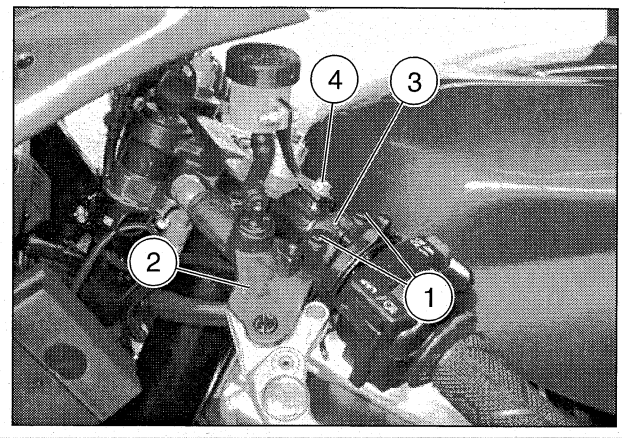
Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

- Position the vehicle on the stand.
- Turn the ignition switch to position "⚿".
- Remove the cold-start control, see 7.1.10 (REMOVING THE COLD-START CONTROL).

Clutch control screws driving torque: 8 Nm (0.8 kgm).

- Unscrew and remove the two screws (1) fastening the clutch lever (2).
- Remove the U bolt (3) and move the clutch lever (2) which, nonetheless, remains connected to the clutch fluid tank via the pipe.

NOTE When refitting, the U bolt (3) must be positioned with the arrow inscribed on the top facing forwards.



Driving torque of the clutch control lever tank support screw: 10 Nm (1.0 kgm).

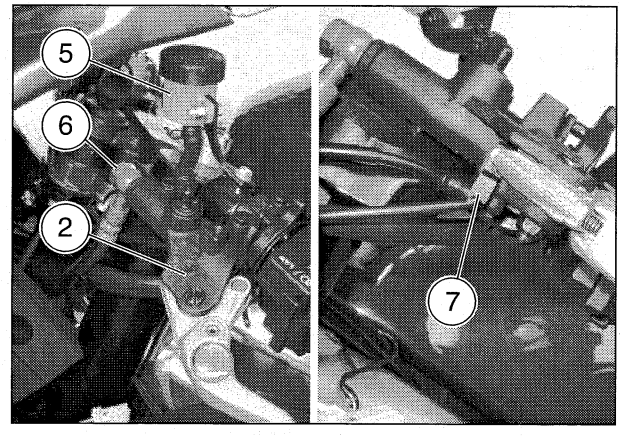
- Unscrew and remove the screw (4).
- Move the clutch lever (2) and clutch fluid tank (5), still connected together, making sure the latter is held vertically to prevent fluid spilling out.

In the event the clutch lever (2) must be removed completely:

- Perform the first three operations described in chapter 2.22 (CHANGING THE FRONT BRAKE FLUID).

Driving torque of the clutch control pipe coupling screw: 20 Nm (2.0 kgm).

- Once all the fluid has been emptied out, unscrew and remove the screw (6) and recover the two sealing washers.



⚠ CAUTION

Upon reassembly, replace the two sealing washers with two new washers of the same type.

- Use a small Phillips screwdriver to prise the clutch switch (7) from the two slots on the clutch lever (2).
- Remove the clutch lever (2).

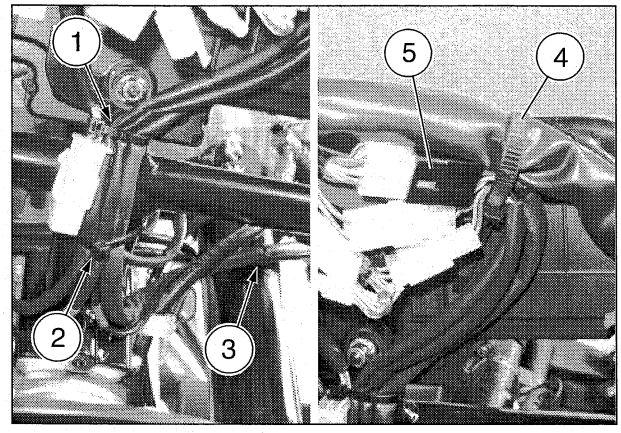
7.1.12 REMOVING THE ELECTRIC CONTROLS ON THE LEFT HANDLEBAR

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

- Position the vehicle on the stand.
- Turn the ignition switch to position "⚿".
- Remove the dashboard's upper protection moulding, see 7.1.21 (REMOVING THE DASHBOARD'S UPPER PROTECTION MOULDING).
- Free the cabling from the three clamps (1) (2) (3).

NOTE Prepare the same number of clamps, which will be required for reassembly.

- Release the wiring from the special clamp (4).



⚠ CAUTION

When reassembling, make sure the connector (5) is plugged in properly.

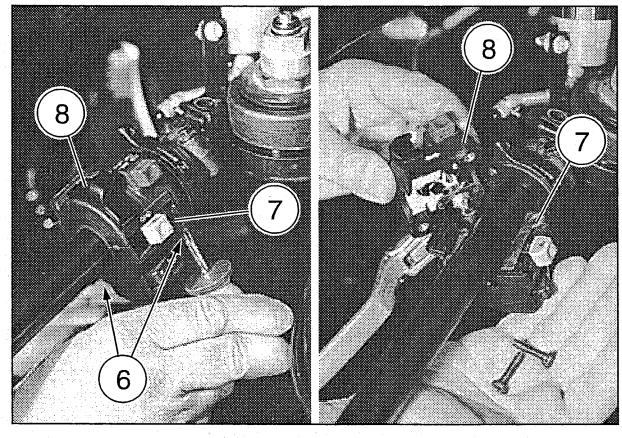
Left dimmer switch screws driving torque: 3 Nm (0.3 kgm).

- Disconnect the left-hand dip switch electric connector (5).
- Unscrew and remove the two screws (6) fastening the two halves of the casing (7) (8) at the bottom.
- Split the two halves of the casing (7) (8) apart.

⚠ CAUTION

When reassembling, first set the lower half of the casing (7) in place, making sure the special locating dowel enters the relevant hole on the handlebar.

- Remove the two halves of the casing (7) (8).



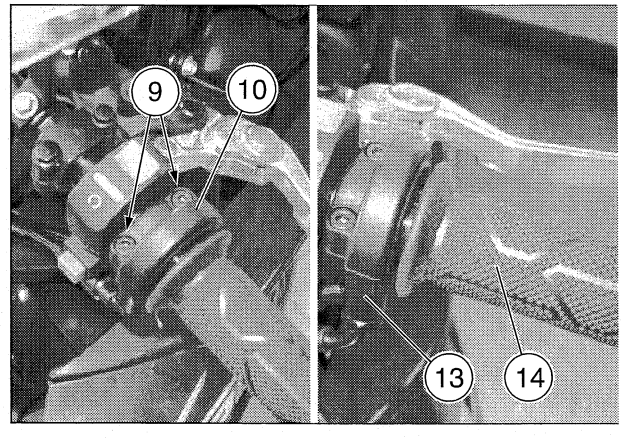
7.1.13 REMOVING THE THROTTLE GRIP

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

- Perform the first nine operations described in chapter 7.1.9 (REMOVING THE GRIP ON THE LEFT HANDLEBAR).
- Unscrew and remove the two screws (9).

Throttle grip screws driving torque: 10 Nm (1.0 kgm).

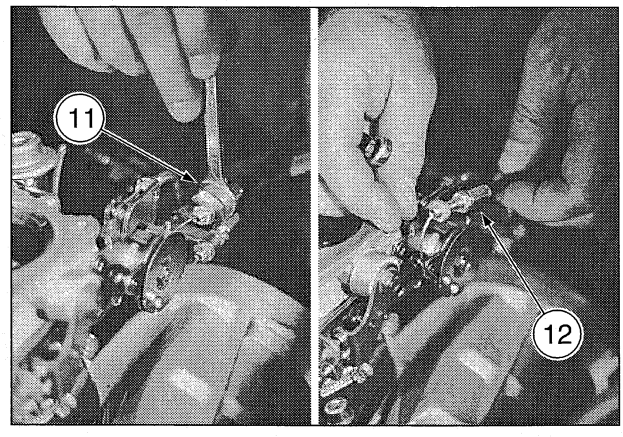
- Remove the upper half (10) of the throttle control casing.
- Remove the air filter casing, see 7.1.6 (REMOVING THE AIR CLEANER CASE).
- Loosen the lock nut (11).
- Release the throttle cable adjuster (12) from the relevant coupling.
- Disconnect the throttle cable.
- Repeat the last three operations for the other throttle cable.



⚠ CAUTION

Upon reassembly, make sure that the two accelerator cable adjusters are properly fastened to the corresponding couplings; check and if necessary restore the correct slack, see 2.11.3 (ADJUSTING THE ACCELERATOR CONTROL).

- Move the half-casing of the throttle control (13) and disconnect the two throttle cables.
- Slide off the throttle grip (14).



7.1.14 REMOVING THE FRONT BRAKE LEVER

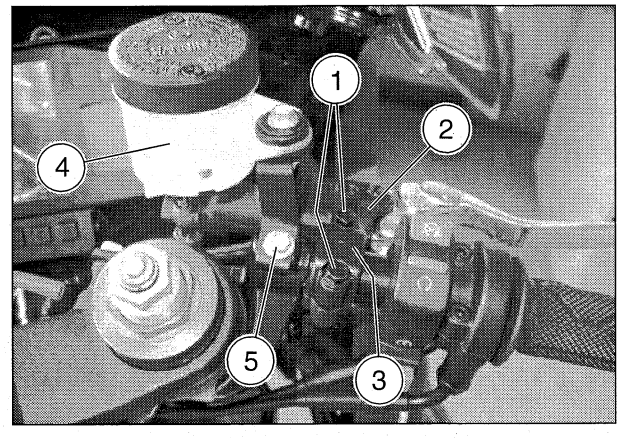
Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

- Position the vehicle on the stand.
- Turn the ignition switch to position "⚿".

NOTE Before removing the U bolt (3), mark its position on the handlebar so it can be refitted in the right place.

Front brake lever screws driving torque: 8 Nm (0.8 kgm).

- Unscrew and remove the two screws (1) fastening the front brake lever (2).
- Remove the U bolt (3) and move the front brake control lever (2), which in any case remains connected to the front brake reservoir (4) through the pipe.



NOTE When refitting, the U bolt (3) must be positioned with the arrow inscribed on the top facing forwards.

Driving torque of the front brake lever tank support screw: 10 Nm (1.0 kgm).

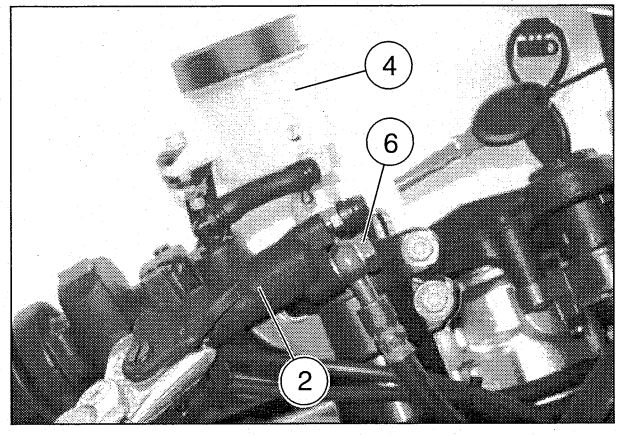
- Unscrew and remove the screw (5).
- Move the front brake control lever (2) and the front brake reservoir (4) keeping them connected and holding the latter in vertical position in order to prevent the fluid from flowing out of the reservoir.

In the event the front brake lever (2) must be removed completely:

- Perform the first three operations described in chapter 2.22 (CHANGING THE FRONT BRAKE FLUID).

Driving torque of the front brake pipe coupling screw: 20 Nm (2.0 kgm).

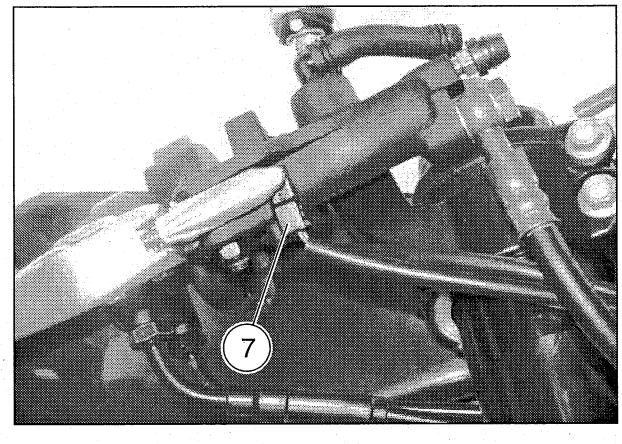
- Once all the fluid has been emptied out, unscrew and remove the screw (6) and recover the two sealing washers.



⚠ CAUTION

Upon reassembly, replace the two sealing washers with two new washers of the same type.

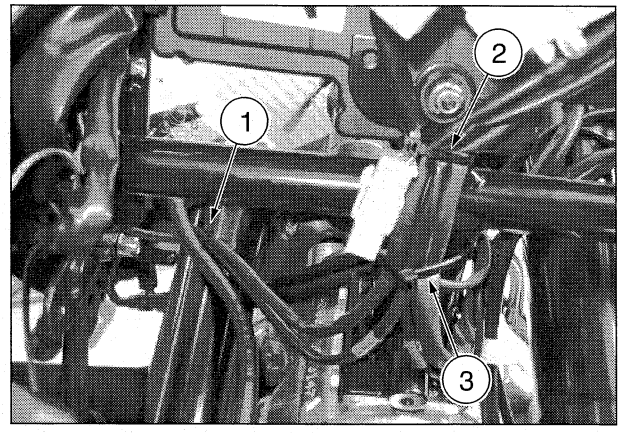
- Using a small cut-headed screwdriver, lift the front stop switch (7) and remove it from the two seats on the front brake control lever (2).
- Remove the front brake lever (2).



7.1.15 REMOVING THE ELECTRIC CONTROLS ON THE RIGHT HANDLEBAR

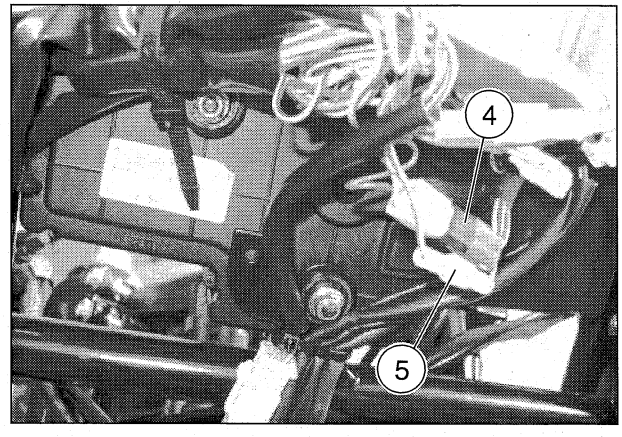
Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

- Position the vehicle on the stand.
- Turn the ignition switch to position "⊠".
- Remove the front part of the fairing, see 7.1.19 (REMOVING THE FRONT PART OF THE FAIRING).
- Free the cabling from the three clamps (1) (2) (3).



NOTE Prepare the same number of clamps, which will be required for reassembly.

- Disconnect the right dimmer switch electric connectors (4) (5).



⚠ CAUTION

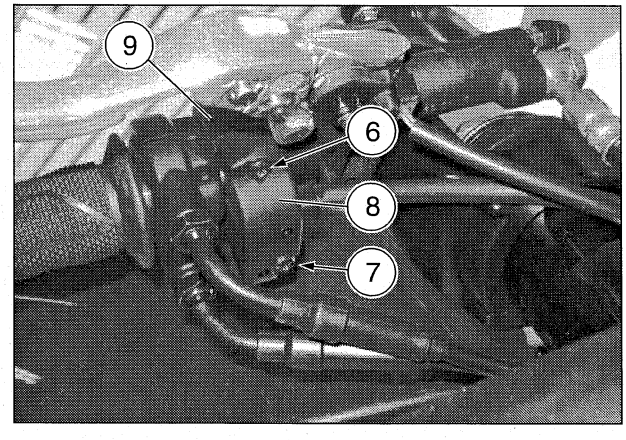
When refitting, make sure the connectors are plugged in properly (4) (5).

Right dimmer switch screws driving torque: 3 Nm (0.3 kgm).

- Unscrew and remove the two screws (6) (7) fastening the two halves of the casing (8) (9) at the bottom.

NOTE When reassembling, the shorter of the two screws (6) must be positioned at the front.

- Split the two halves of the casing (8) (9) apart and remove them.



⚠ CAUTION

When reassembling, first set the lower half of the casing (8) in place, making sure the special locating dowel enters the relevant hole on the handlebar.

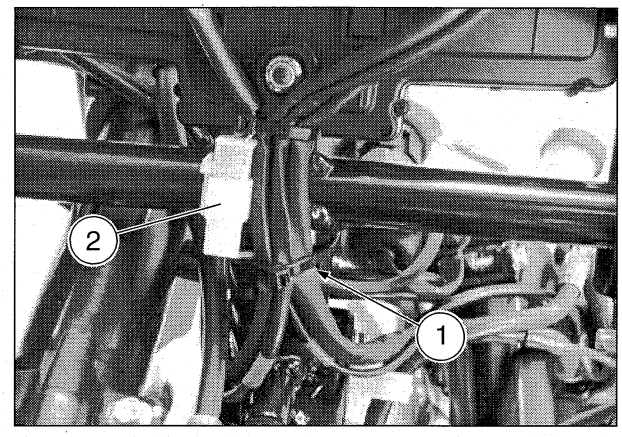
7.1.16 REMOVING THE IGNITION SWITCH/ STEERING LOCK

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

- ◆ Position the vehicle on the stand.
- ◆ Turn the ignition switch to position "⚿".
- ◆ Remove the front part of the fairing, see 7.1.19 (REMOVING THE FRONT PART OF THE FAIRING).
- ◆ Release the wiring from the fastening clamp (1).

NOTE Prepare the same number of clamps, which will be required for reassembly.

- ◆ Disconnect the electric connector (2).



⚠ CAUTION

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

Ignition switch/steering lock screw driving torque: 25 Nm (2.5 kgm).

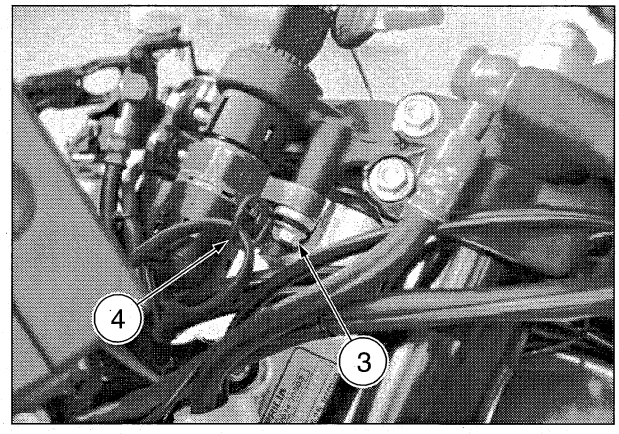
- ◆ Unscrew and remove the screw (3) and take the bushing.

NOTE When reassembling, position the cable guide (4) correctly.

- ◆ Use a chisel to cut into the head of the special screw (5) and turn it until it loosens.
- ◆ Unscrew the screw (5) by hand and remove it.

NOTE When reassembling, use another screw of the same type, tightening it until the head comes off.

- ◆ Remove the ignition switch/steering lock (6), sliding it out form underneath.



7.1.17 REMOVING THE RIGHT AND LEFT HANDLEBARS

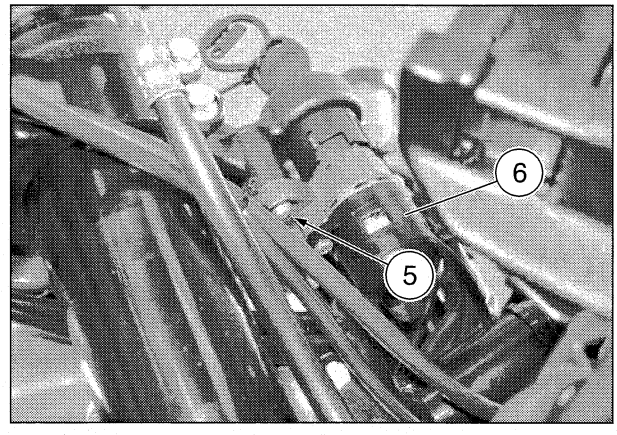
Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

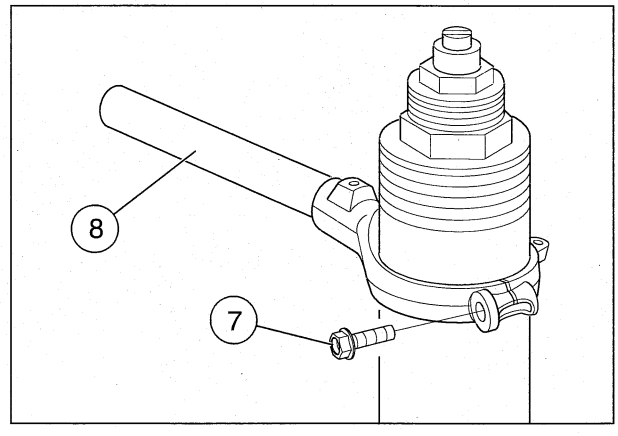
- ◆ In order to remove the left handlebar, remove the controls, see 7.1.9 (REMOVING THE GRIP ON THE LEFT HANDLEBAR).
- ◆ In order to remove the right handlebar, remove the controls, see 7.1.13 (REMOVING THE THROTTLE GRIP).
- ◆ Perform the operations described in chapter 2.28.2 (ADJUSTING THE BEARING SLACK STEERING).

Handlebar screw driving torque: 25 Nm (2.5 kgm).

- ◆ Loosen the screw (7).
- ◆ Slide the left/right handlebar (8) off the fork.

NOTE Where necessary, repeat the last two operations to remove the other handlebar.



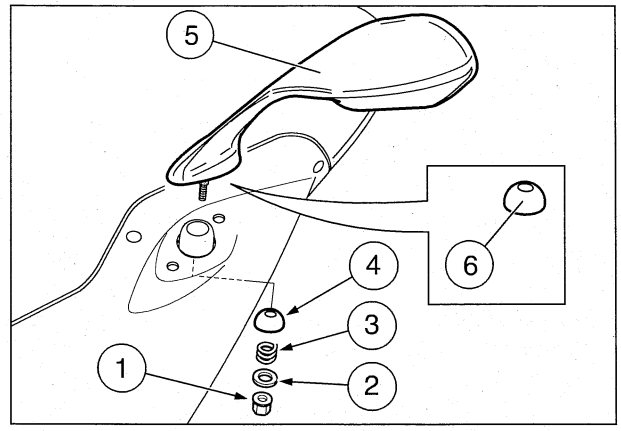


7.1.18 REMOVING THE REAR-VIEW MIRRORS

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

Rear-view mirror nut driving torque: 4 Nm (0.4 kgm).

◆ Unscrew and remove the nut (1), take the washer (2), the spring (3) and the half sphere (4).



⚠ CAUTION

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

◆ Remove the rear-view mirror (5).
◆ If it has gone out of its seat, take the cup (6).

NOTE Repeat these operations to remove the other rear-view mirror.

⚠ CAUTION

After reassembly, correctly adjust the rear-view mirrors and tighten the nuts in such a way as to ensure their stability.

7.1.19 REMOVING THE FRONT PART OF THE FAIRING

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

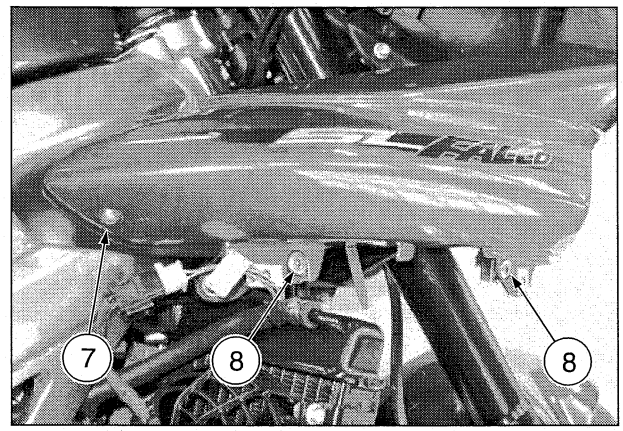
◆ Position the vehicle on the stand.
◆ Turn the ignition switch to position "⚿".
◆ Remove the side fairings, see 7.1.25 (REMOVING THE SIDE FAIRINGS).

Front fairing rear screw driving torque: 4 Nm (0.4 kgm).

◆ ★Unscrew and remove the screw (7).

Front fairing side screws driving torque: 4 Nm (0.4 kgm).

◆ ★Unscrew and remove the two screws (8).

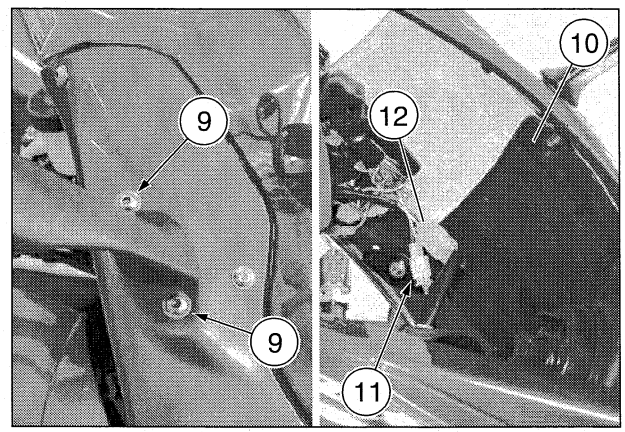


⚠ CAUTION

Upon reassembly, tighten the screws (8) applying the prescribed torque, since it is fixed on plastic.

Front fairing upper screws driving torque: 4 Nm (0.4 kgm).

◆ ★Unscrew and remove the two screws (9).



NOTE Upon reassembly, rotate the rear-view mirror support so that the fastening holes coincide with those provided on the front part of the fairing.
The whole unit must be correctly positioned on the support.

⚠ CAUTION

Handle the plastic and painted components with care to avoid scraping or damaging them.
Do not force the electric cables.

◆ Partially remove the front fairing (10).
◆ Disconnect the headlight electric connectors (11-12).

⚠ CAUTION

When reassembling, make sure the electric connectors (11-12) are plugged in properly.

◆ Remove the front part of the fairing (10), together with the headlight and the rear-view mirrors.
◆ Where necessary, remove the headlight, see 7.1.20 (REMOVING THE HEADLIGHT) and rearview mirrors, see 7.1.18 (REMOVING THE REAR-VIEW MIRRORS).

7.1.20 REMOVING THE HEADLIGHT

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

◆ Remove the front part of the fairing, see 7.1.19 (REMOVING THE FRONT PART OF THE FAIRING).

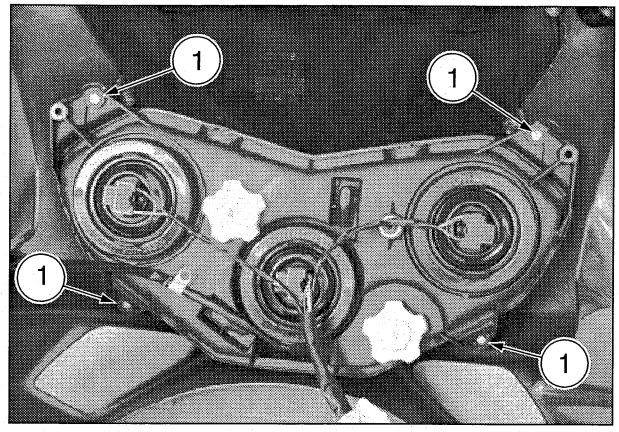
Headlight screws driving torque: 0.5 Nm (0.05 kgm).

◆ Unscrew and remove the four screws (1).

⚠ CAUTION

Handle the transparent part with care to avoid scraping or damaging it.

◆ Remove the headlight.

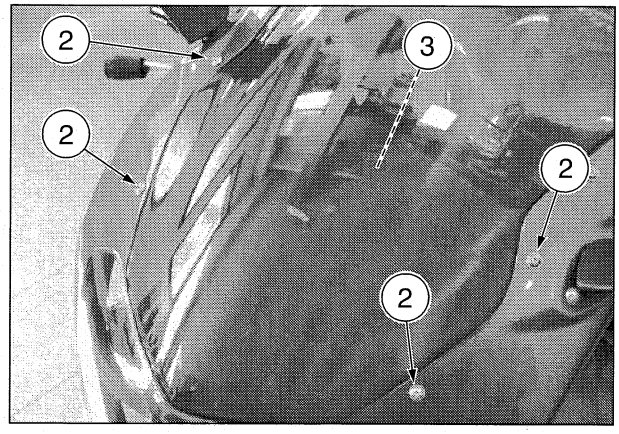


7.1.21 REMOVING THE DASHBOARD'S UPPER PROTECTION MOULDING

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

Protection moulding screws driving torque: 2 Nm (0.2 kgm).

◆ ★Unscrew and remove the four fastening screws (2).
◆ Remove the protection moulding (3), sliding it out from the back.



7.1.22 REMOVING THE DASHBOARD

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

◆ Remove the front part of the fairing, see 7.1.19 (REMOVING THE FRONT PART OF THE FAIRING).
◆ Slip off the protection element (4).
◆ Withdraw the electric connector (5).

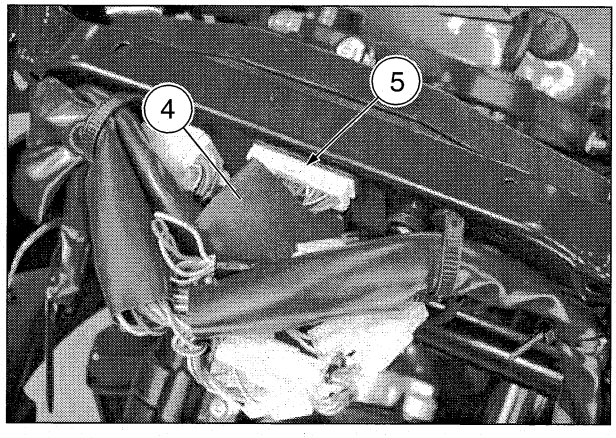
⚠ CAUTION

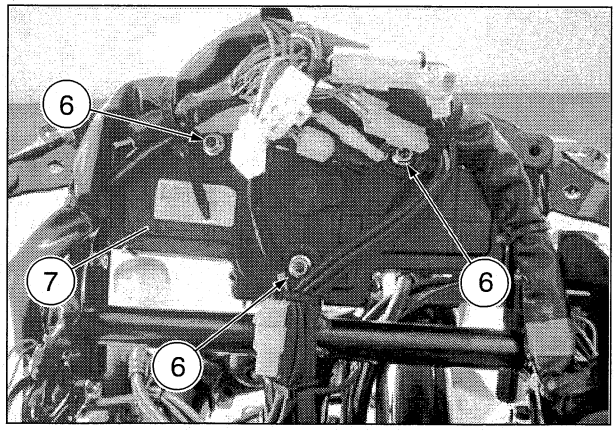
Upon reassembly, make sure that the electric connector (5) is correctly coupled.

Dashboard nuts driving torque: 5 Nm (0.5 kgm).

◆ Loosen and remove the three nuts (6) taking the washer.
◆ Remove the dashboard (7).

NOTE If the rubber elements are damaged, change them.





7.1.23 REMOVING THE DASHBOARD/FRONT FAIRING MOUNT

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

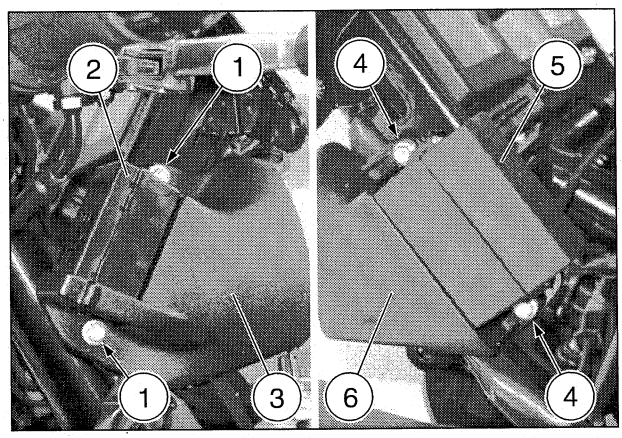
◆ Remove the dashboard, see 7.1.22 (REMOVING THE DASHBOARD).

Fuse box screw driving torque: 3 Nm (0.3 kgm).

◆ Unscrew and remove the two screws (1).
◆ Partially remove the fuse box (2), taking the guard (3).
◆ Unscrew and remove the two screws (4).

Relay box screws driving torque: 3 Nm (0.3 kgm).

◆ Partially remove the relay box (5), taking the guard (6).
◆ Release the wiring from the special clamps (7) (8) (9) (10).
◆ Release the wiring from the clamps (13) (14).



NOTE Prepare the same number of clamps, which will be required for reassembly.

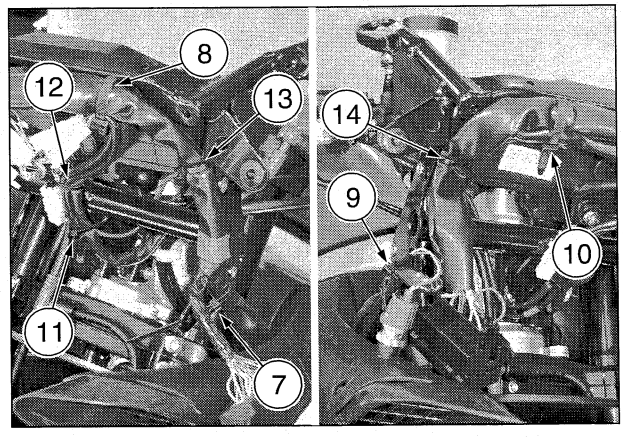
◆ Open the collar (15) and release the clutch fluid pipe and the cold start cable.

⚠ CAUTION

When reassembling, refit the pipe and cable inside the collar (15).

Dashboard/front fairing mount nuts driving torque: 10 Nm (1.0 kgm).

◆ Unscrew and remove the two nuts (16).
◆ Unscrew and remove the two screws (17).
◆ Remove the dashboard /front fairing mount (18) by lifting it out.



7.1.24 REMOVING THE FRONT MUDGUARD

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

◆ Position the vehicle on the stand.

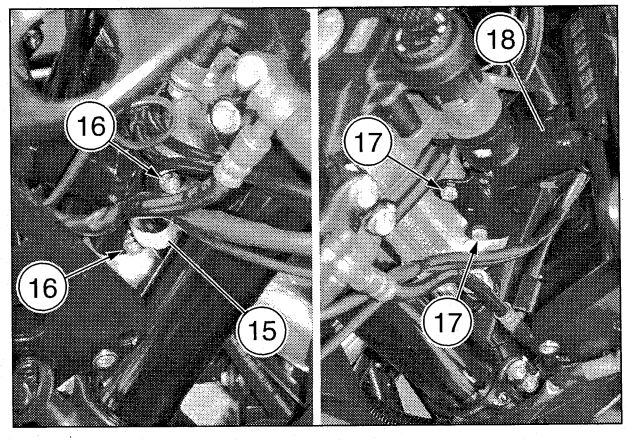
Front mudguard screws driving torque: 5 Nm (0.5 kgm).

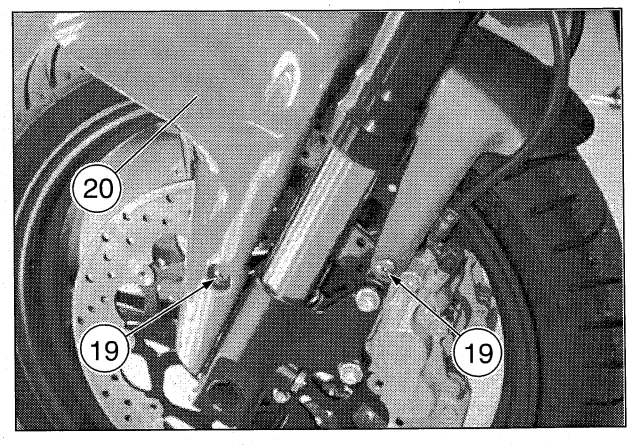
◆ ★Unscrew and remove the two screws (19).

⚠ CAUTION

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

◆ Pull the mudguard (20) out from the front.





7.1.25 REMOVING THE SIDE FAIRINGS

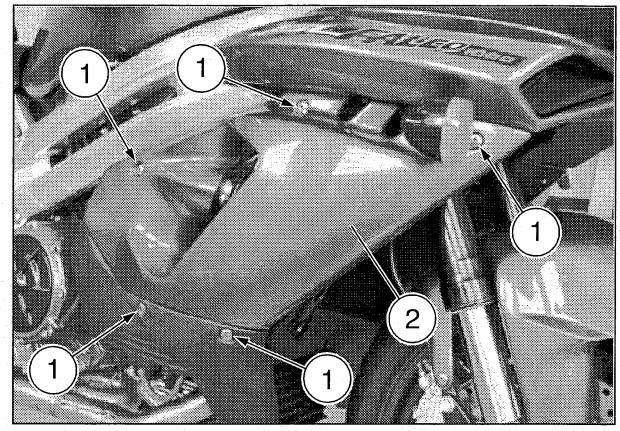
⚠ CAUTION

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

◆ Position the vehicle on the stand.

Side fairing screws driving torque: 2 Nm (0.2 kgm).

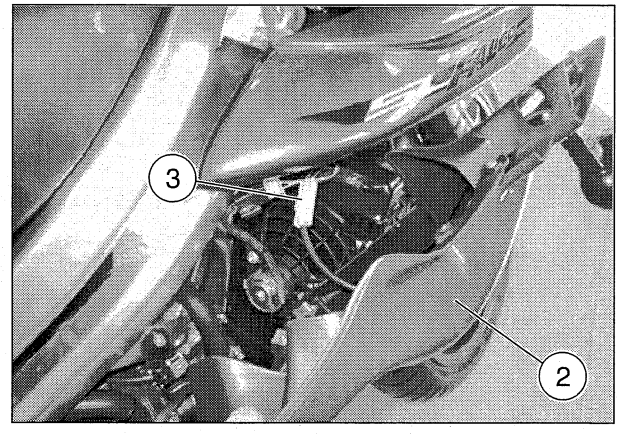
◆ Unscrew and remove the five screws (1).



⚠ CAUTION

Handle the plastic and painted components with care to avoid scraping or damaging them.
Do not force the electric cables.

◆ Partially remove the side fairing (2).
◆ Disconnect the direction indicator connector (3).



⚠ CAUTION

When reassembling, correctly refit the direction indicator connector (3).

◆ Remove the side fairing (2).

NOTE Repeat these operations to remove the other side fairing.

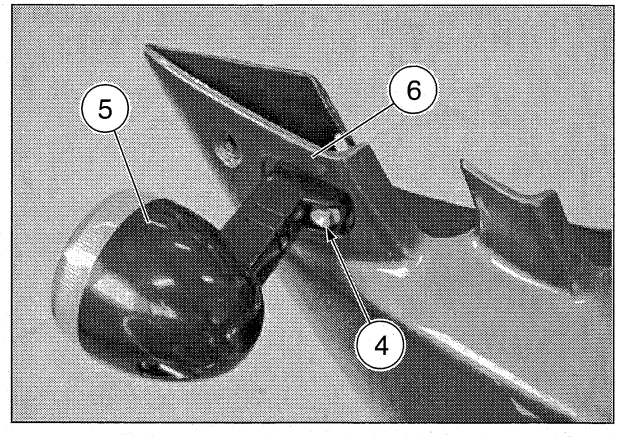
7.1.26 REMOVING THE FRONT DIRECTION INDICATORS

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

◆ Remove the side fairing, see 7.1.25 (REMOVING THE SIDE FAIRINGS).

Front direction indicator screw driving torque: 2 Nm (0.2 kgm).

◆ Unscrew and remove the screw (4), taking the nut and the washer.
◆ Remove the direction indicator (5).



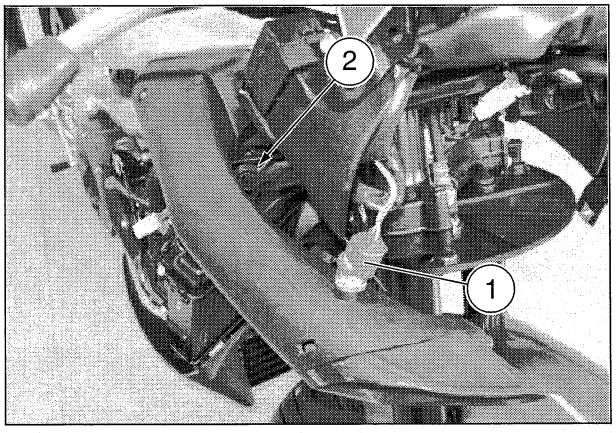
⚠ CAUTION

When removing the direction indicator (5), help the electric cable, complete with connector, through the relevant slot to be found on the cover (6).

7.1.27 REMOVING THE AIR CONVEYOR

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

- Turn the ignition switch to position "⊠".
- Remove the front part of the fairing, see 7.1.19 (REMOVING THE FRONT PART OF THE FAIRING).
- **Only for the right air conveyor** : disconnect the air temperature sensor connector (1).



⚠ CAUTION

Upon reassembly, make sure that the electric connector (1) is correctly coupled.

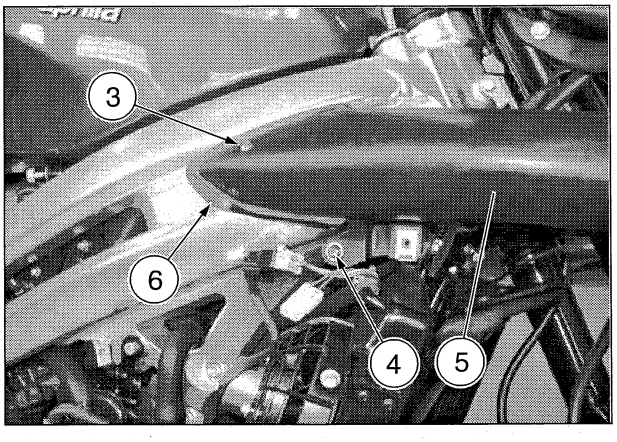
- Release the wiring from the special clamp (2).

Air conveyor rear screw driving torque: 2 Nm (0.2 kgm).

- Unscrew and remove the screw (3).

Air conveyor side screw driving torque: 3 Nm (0.3 kgm).

- Unscrew and remove the screw (4).
- Remove the air conveyor (5).



NOTE If the conveyor gasket (6) is damaged, change it.

To remove the air intake grid (7), proceed as follows:

- Unscrew and remove the screw (8).
- Release the coupling (9) from its seat.
- Remove the air intake grid (7).

NOTE Where necessary, repeat the procedure to remove the other air conveyor cover.

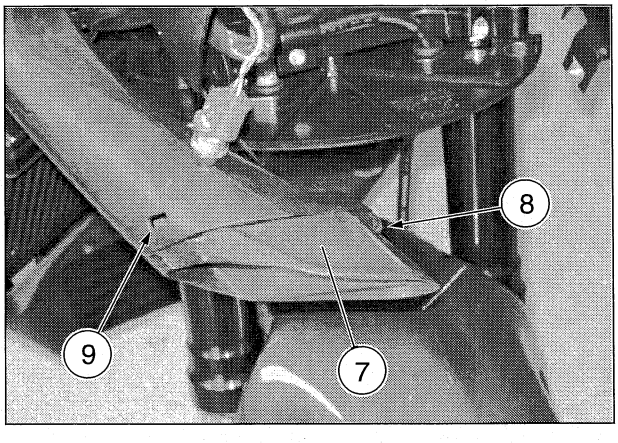
7.1.28 REMOVING THE FRONT FAIRING LOWER LOCKUP

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

- Position the vehicle on the stand.

Front fairing lower lockup screws driving torque: 7 Nm (0.7 kgm).

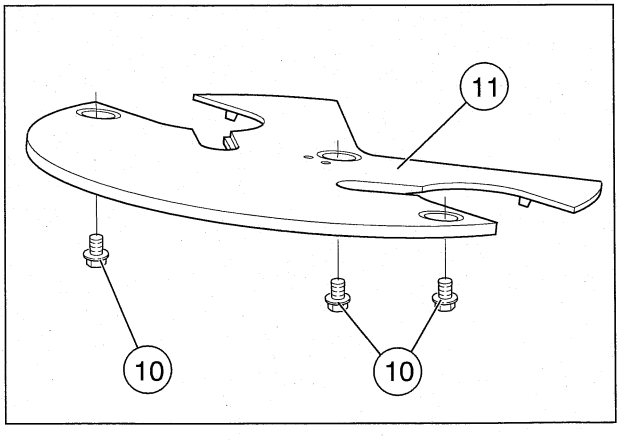
- Unscrew and remove the three screws (10).



⚠ CAUTION

Take care not to damage the brake fluid pipes. Nudge the front fairing lower lockup (11) along gradually to determine the best position for sliding it out.

- Remove the front fairing lower lockup (11).



7.1.29 REMOVING THE LOWER FAIRING

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

◆ Position the vehicle on the stand.

⚠ CAUTION

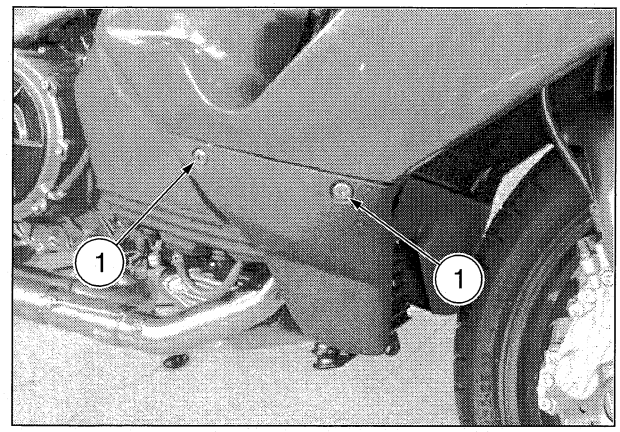
Wait until the engine and the exhaust silencer have completely cooled down.

Side fairing screws driving torque: 5 Nm (0.5 kgm).

◆ ★Unscrew and remove the two screws (1).

Lower fairing front screws driving torque: 4 Nm (0.4 kgm).

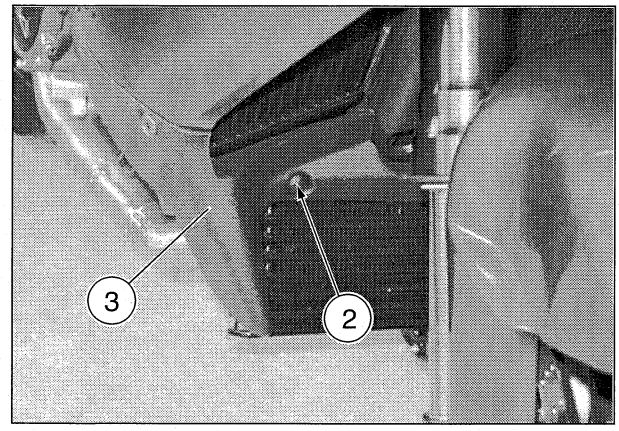
◆ ★Unscrew and remove the screw (2).



⚠ CAUTION

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

◆ Remove the the lower fairing (3).



7.1.30 REMOVING THE RADIATOR SPOILER

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

◆ Position the vehicle on the stand.

⚠ WARNING

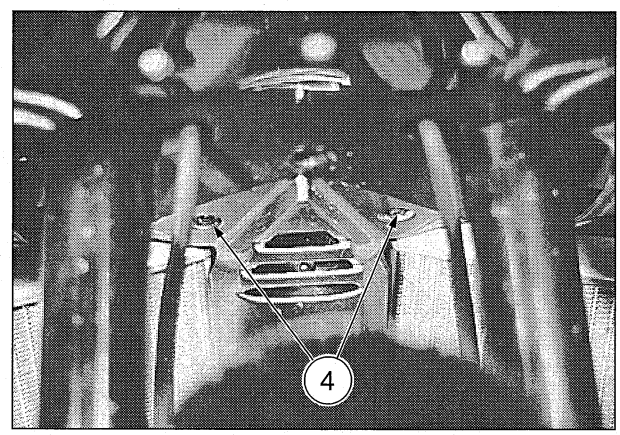
Wait until the engine and the exhaust silencer have completely cooled down.

Radiator spoiler upper screws driving torque: 4 Nm (0.4 kgm).

◆ Unscrew and remove the two upper fastening screws (4).
◆ Remove the lower fairing, see 7.1.29 (REMOVING THE LOWER FAIRING).

Radiator spoiler lower screw driving torque: 4 Nm (0.4 kgm).

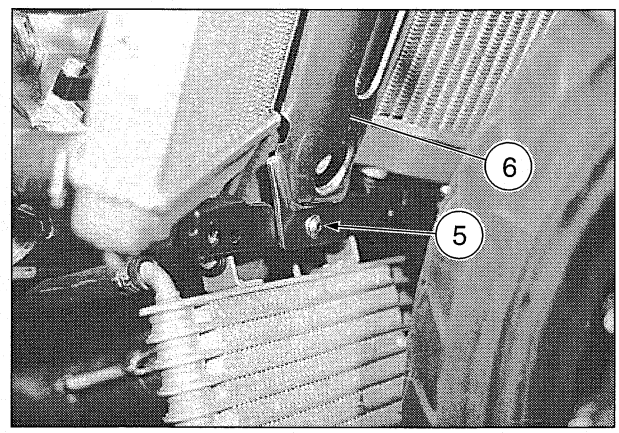
◆ Unscrew and remove the lower fastening screw (5).



⚠ CAUTION

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

◆ Move the radiator spoiler (6) forwards and slide it out from the bottom.
◆ If the inner antiheat edging proves damaged, replace it.

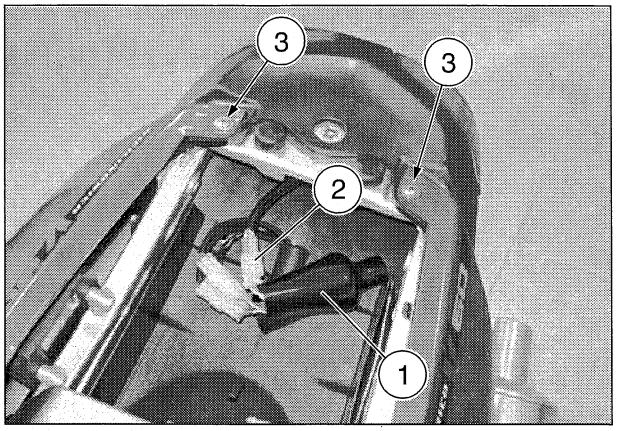


7.1.31 REMOVING THE REAR LIGHT

PARTIAL REMOVAL

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

- Turn the ignition switch to position "⚿".
- Remove the passenger seat, see 7.1.2 (UNLOCKING/ LOCKING THE PASSENGER SEAT).
- Remove the passenger handle, see 7.1.32 (REMOVING THE PASSENGER HANDLE).
- Remove the protection element (1).
- Disconnect the rear light electric connector (2).



⚠ CAUTION

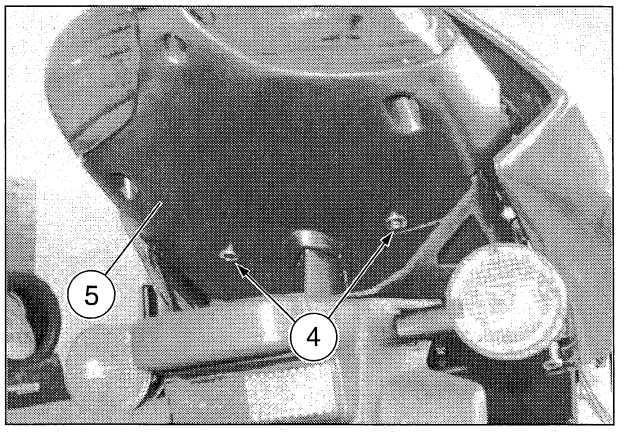
Upon reassembly, make sure that the electric connector (2) is correctly coupled.

Rear fairing rear screws driving torque: 3 Nm (0.3 kgm).

- Unscrew and remove the two upper fastening screws (3).

Rear light lower screws driving torque: 3 Nm (0.3 kgm).

- Unscrew and remove the two lower fastening screws (4).



⚠ CAUTION

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

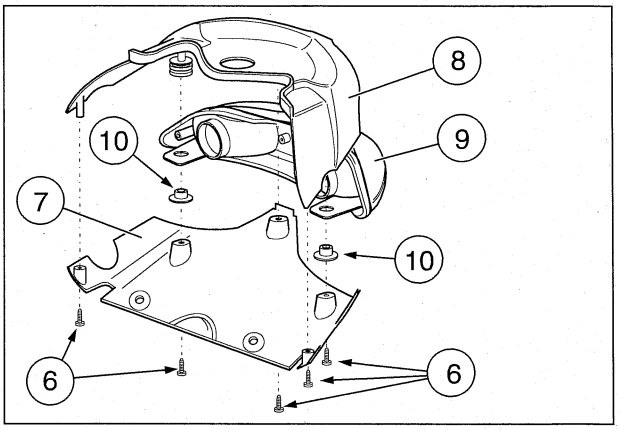
- Remove the rear light (5), complete with light-holder.

COMPLETE REMOVAL

- Follow the procedure indicated under PARTIAL REMOVAL.

Light-holder lower screw driving torque: 1 Nm (0.1 kgm).

- Unscrew and remove the five screws (6).
- Remove the lower part of the light-holder (7).



⚠ CAUTION

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

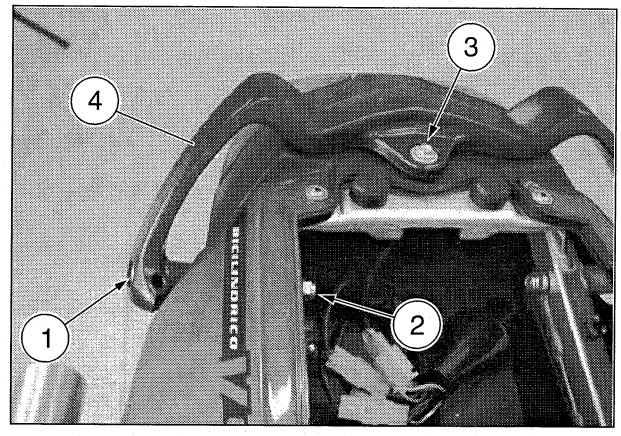
- Remove the upper part of the light-holder (8), taking the washers.
- Retrieve the rear light (9).

⚠ CAUTION

If the bushes (10) have come off their seats, position them correctly.

7.1.32 REMOVING THE PASSENGER HANDLE

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).



- Remove the passenger seat, see 7.1.2 (UNLOCKING/ LOCKING THE PASSENGER SEAT).

Passenger handle side screw driving torque: 12 Nm (1.2 kgm).

- ★Unscrew and remove the screw (1), taking the nut (2).

Air conveyor upper screw driving torque: 10 Nm (1.0 kgm).

- Unscrew and remove the screw (3), taking the washer and the bushing
- Remove the passenger handle (4).

7.1.33 REMOVING THE REAR FAIRING

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

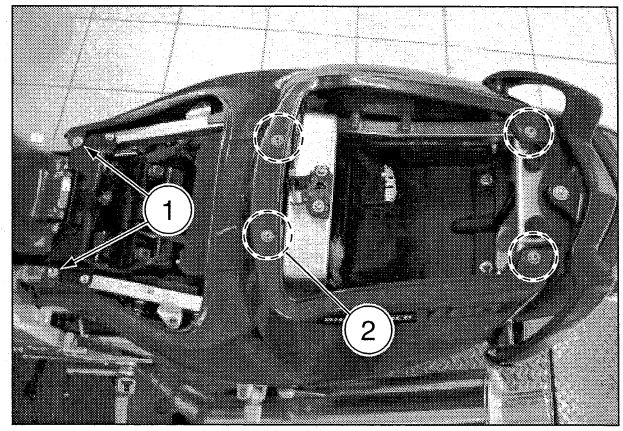
⚠ CAUTION

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

- ◆ Put back the rider saddle, see 7.1.1 (REMOVING THE RIDER SADDLE).
- ◆ Remove the passenger seat, see 7.1.2 (UNLOCKING/ LOCKING THE PASSENGER SEAT).

Rear fairing front screws driving torque: 10 Nm (1.0 kgm).

- ◆ Unscrew and remove the two screws (1), taking the bushes.

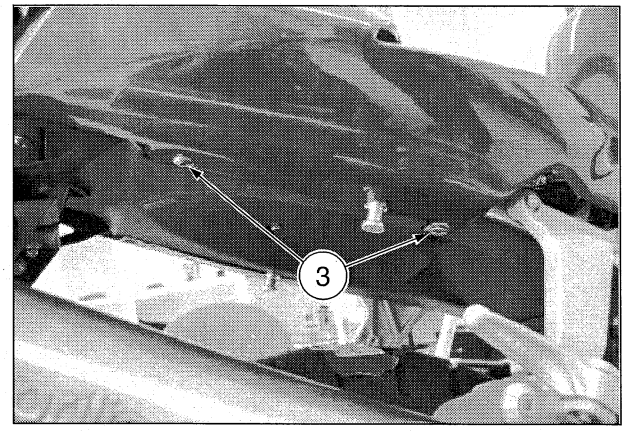


Rear fairing rear screws driving torque: 3 Nm (0.3 kgm).

- ◆ Unscrew and remove the four screws (2).

Rear fairing lower screws driving torque: 3 Nm (0.3 kgm).

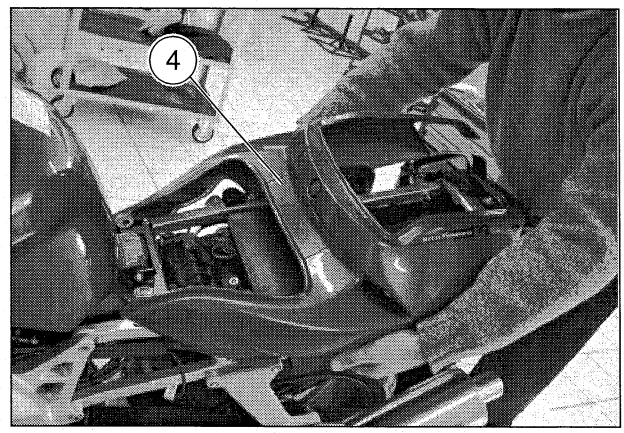
- ◆ ★Unscrew and remove the two lower screws (3).

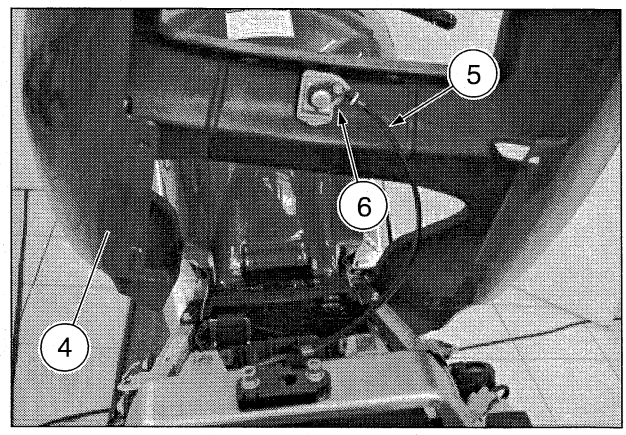


⚠ CAUTION

Handle the plastic and painted components with care to avoid scraping or damaging them.
Do not force the cables.

- ◆ Slightly open the lower part of the rear part of the fairing (4) and remove it partially.
- ◆ Disconnect the passenger seat lock cable (5) from the lock seat (6).
- ◆ Remove the rear fairing (4).





7.1.34 REMOVING THE PASSENGER SEAT LOCK

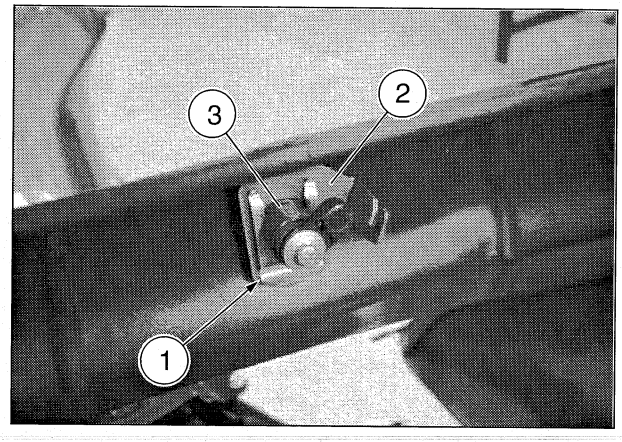
Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

◆ Remove the rear fairing, see 7.1.33 (REMOVING THE REAR FAIRING).

⚠ CAUTION

Observe the position of the components, in order to be able to reassemble them correctly.

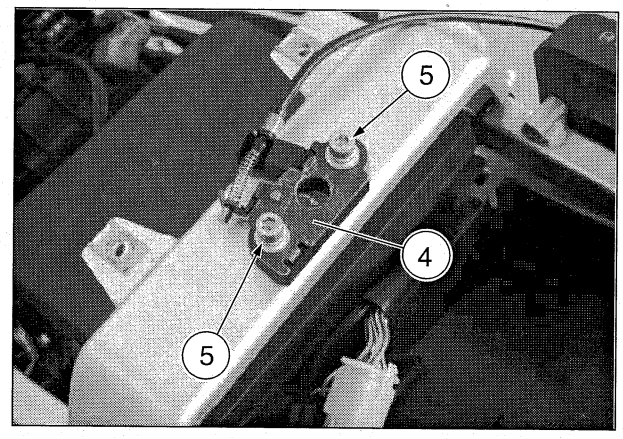
◆ Remove the fork spring (1).
◆ Remove the cable support plate (2).
◆ Remove the saddle lock (3).



To remove the passenger seat coupling plate (4), proceed as follows:

Driving torque of the passenger seat coupling plate screws: 10 Nm (1.0 kgm).

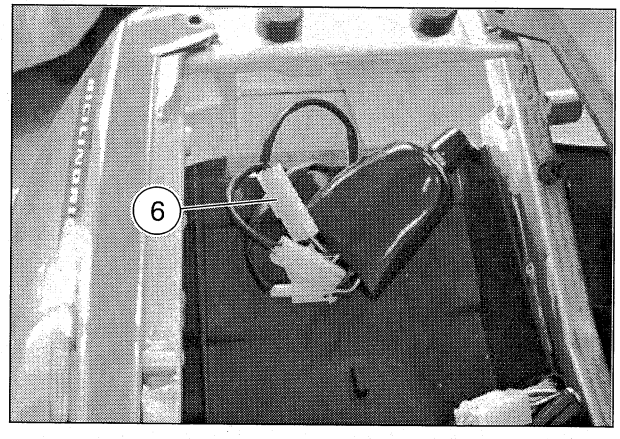
◆ Unscrew and remove the two screws (5), taking the bushes.
◆ Remove the passenger seat coupling plate (4).



7.1.35 REMOVING THE REAR DIRECTION INDICATORS

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

◆ Turn the ignition switch to position "⊠".
◆ Remove the rear light, see 7.1.31 (REMOVING THE REAR LIGHT).
◆ Disconnect the electric connector (6).



⚠ CAUTION

Upon reassembly, make sure that the electric connector (6) is correctly coupled.

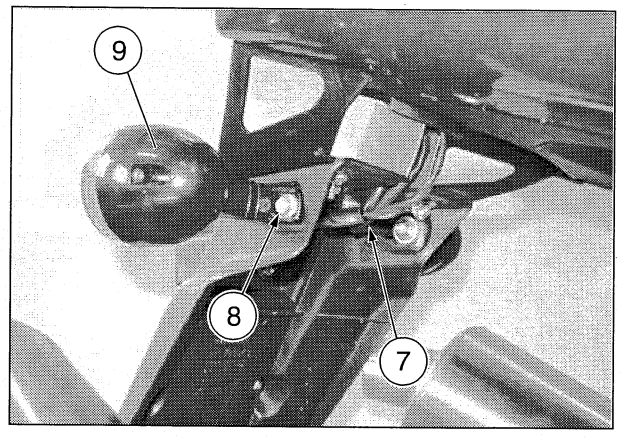
◆ Release the wiring from the clamp (7).

⚠ CAUTION

Prepare a clamp (7) to be used for the reassembly.

Rear direction indicator screw driving torque: 2 Nm (0.2 kgm).

◆ Unscrew and remove the screw (8), taking the nut and the washer.
◆ Remove the direction indicator (9).



⚠ CAUTION

When removing the direction indicator (9), help the electric cable, complete with relevant connector, through the special slots to be found on the saddle support lower moulded cover and on the number plate holder.

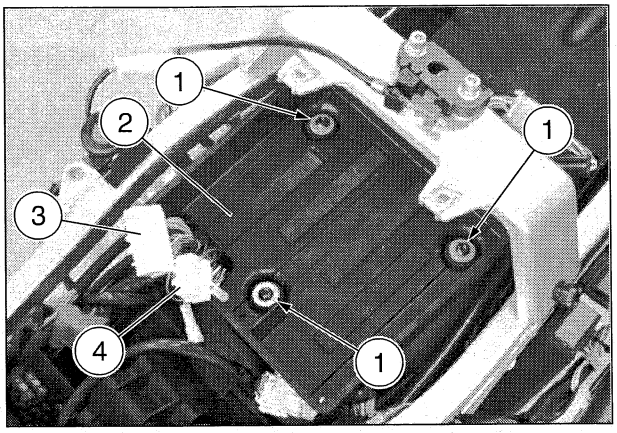
NOTE Where necessary, repeat the procedure to remove the other direction indicator.

7.1.36 REMOVING THE SADDLE SUPPORT LOWER MOULDED COVER

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

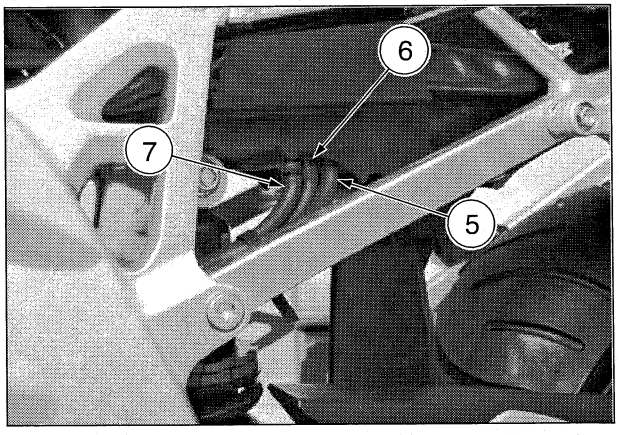
- Remove the rear fairing, see 7.1.33 (REMOVING THE REAR FAIRING).
- Remove the rear light, see 7.1.31 (REMOVING THE REAR LIGHT).
- Remove the fuel tank, see 7.1.3 (PARTIAL REMOVAL OF THE FUEL TANK).
- Remove the tools supplied and any other objects from the glove compartment.
- Remove the battery, see 7.1.7 (REMOVING THE BATTERY).
- Remove the electronic unit, see 7.1.8 (REMOVING THE ELECTRONIC UNIT).

Central unit box screw driving torque: 4 Nm (0.4 kgm).



- Unscrew and remove the three screws (1) securing the electronic unit casing (2) to the saddle support lower moulded cover and retrieve the three washers.
- Lift out the electronic unit casing (2); help the two electric connectors (3) (4) out through the special slot.

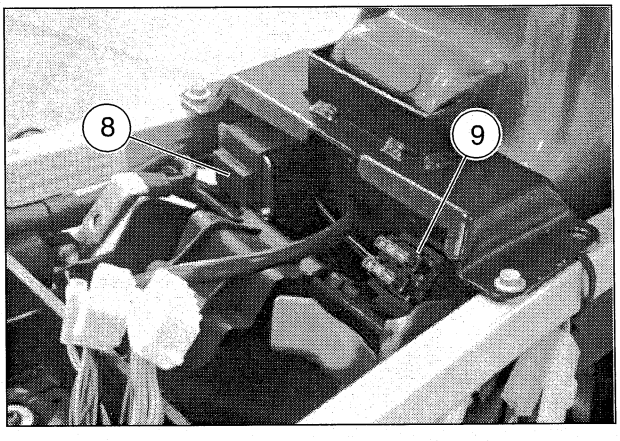
NOTE Should the three rubber parts in the lower part of the casing (2) prove damaged, replace them.



- Withdraw the fuel tank overflow pipe (5), the filler cap water drain pipe (6) and the drain pipe (7) downwards.
- Release the fall sensor (8) from its coupling.
- Release the fuse carrier (9) from its coupling.

⚠ CAUTION

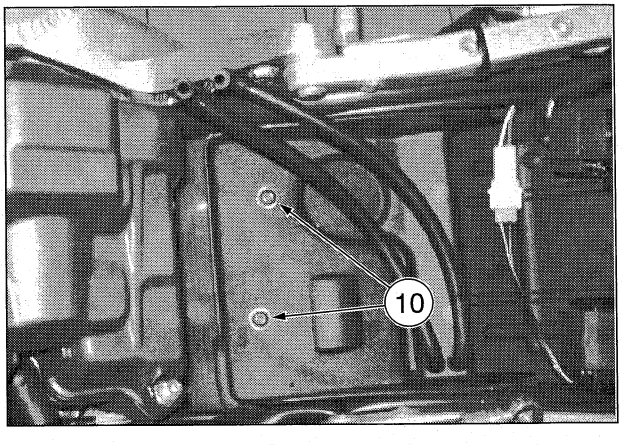
When reassembling, make sure the electric components and relevant wiring are refitted correctly.



Saddle support lower moulded cover front screws driving torque: 5 Nm (0.5 kgm).

- Unscrew and remove the two front fastening screws (10).

Follow ▶



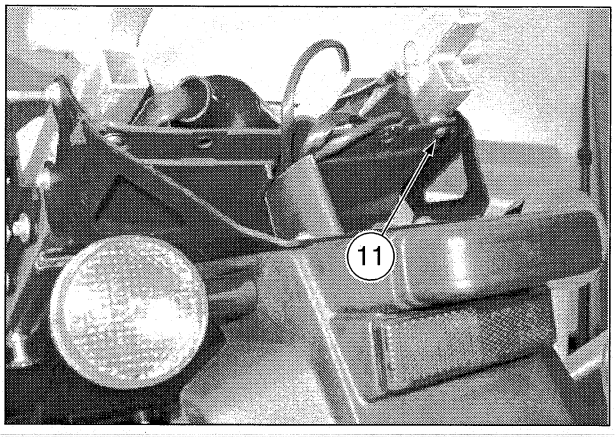
Follow ▶

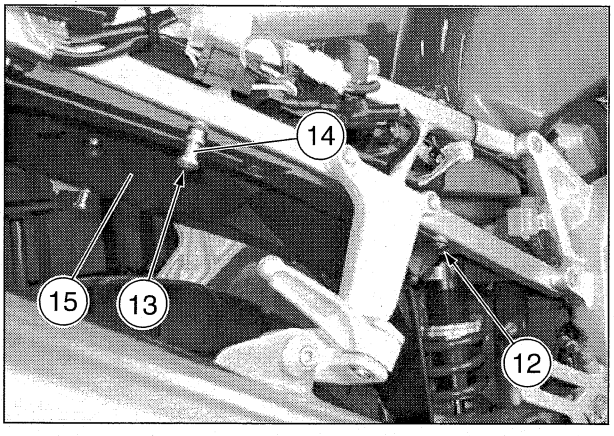
Saddle support rear screws driving torque: 5 Nm (0.5 kgm).

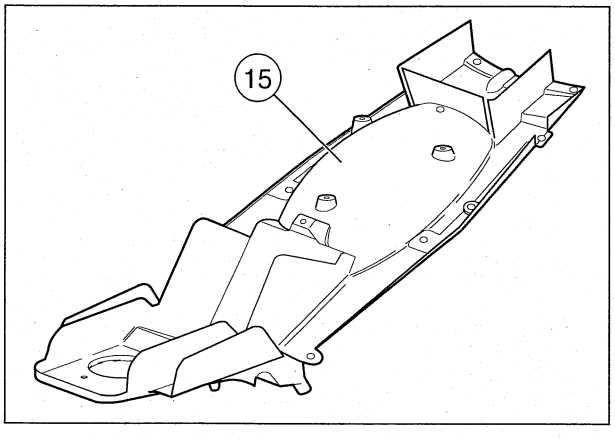
◆ ★Unscrew and remove the rear screw (11).

Saddle support lower screws driving torque: 5 Nm (0.5 kgm).

◆ ★Unscrew and remove the lower fastening screw (12).
◆ ★Unscrew and remove the lower fastening screw (13) and retrieve the bush (14) for securing luggage.
◆ Remove the saddle support lower moulded cover (15).







7.1.37 REMOVING THE NUMBER PLATE HOLDER SUPPORT

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

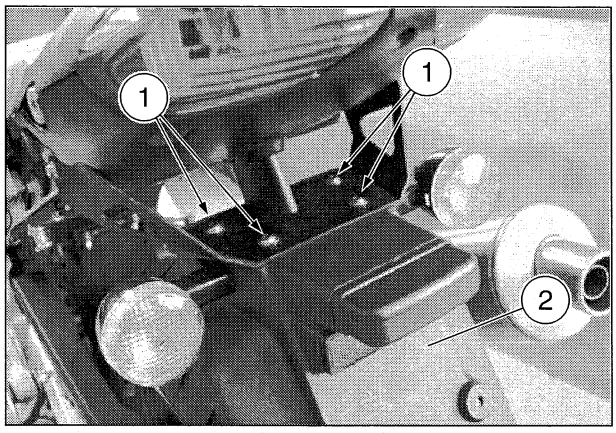
◆ Remove the rear fairing, see 7.1.33 (REMOVING THE REAR FAIRING).

Number plate holder upper screws driving torque: 8 Nm (0.8 kgm).

◆ Unscrew and remove the four screws (1), taking the nuts and washers.
◆ Partially remove the number plate holder (2), without forcing the electric cables.
◆ Unscrew and remove the two screws (3).

Number plate holder side screws driving torque: 10 Nm (1.0 kgm).

◆ Remove the number plate holder support (4).



7.1.38 REMOVING THE NUMBER PLATE HOLDER

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

◆ Remove the rear light, see 7.1.31 (REMOVING THE REAR LIGHT).

⚠ CAUTION

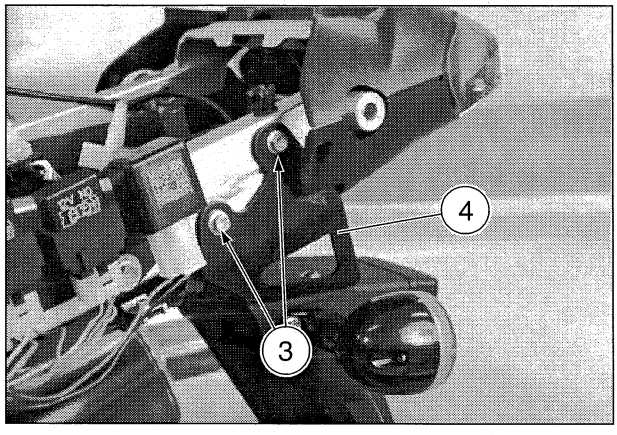
Mark the electric connectors, in order to be able to re-assemble them correctly.

◆ Disconnect the electric connectors (5), (6) and (7).

Number plate holder upper screws driving torque: 8 Nm (0.8 kgm).

◆ Unscrew and remove the four screws (1).
◆ Remove the number plate holder (2), complete with the direction indicators.

NOTE If necessary, remove the direction indicators, see 7.1.35 (REMOVING THE REAR DIRECTION INDICATORS).



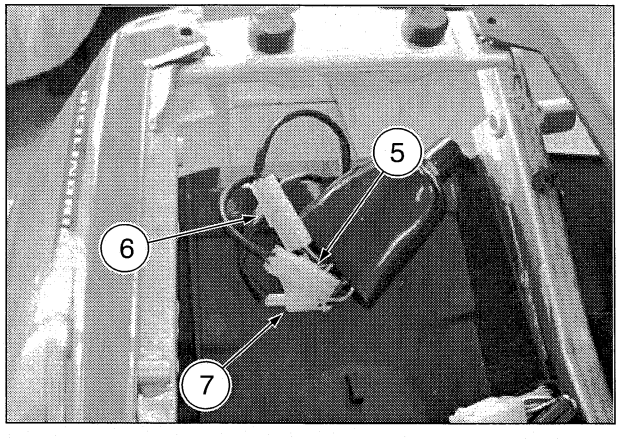
7.1.39 REMOVING THE MUDGUARD EXTENSION

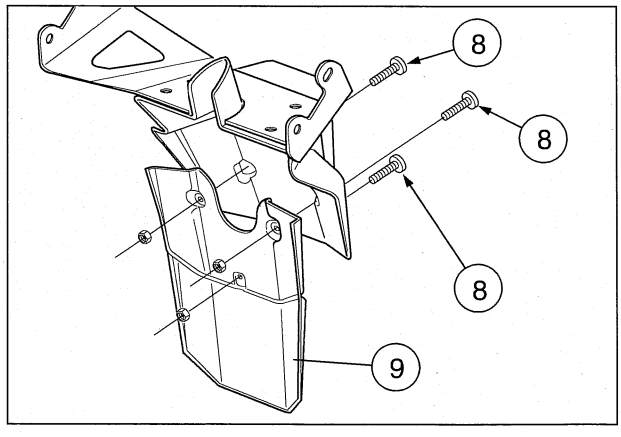
Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

◆ Position the vehicle on the stand.

Mudguard extension screws driving torque: 5 Nm (0.5 kgm).

◆ Unscrew and remove the three screws (8), taking the nuts.
◆ Remove the rear mudguard extension (9).





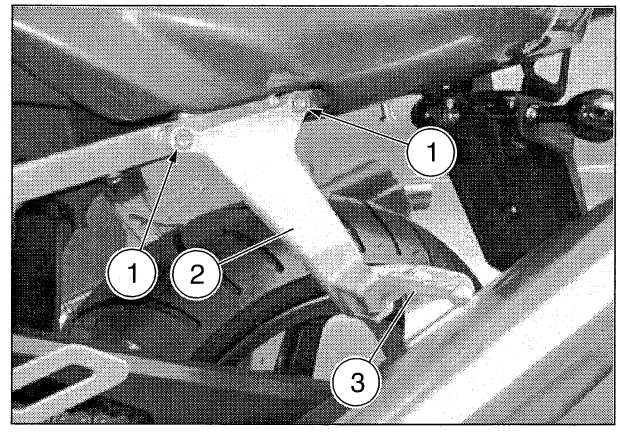
7.1.40 REMOVING THE PASSENGER FOOTREST SUPPORTS

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

- Position the vehicle on the stand.
- Remove the exhaust silencer, see 7.1.45 (REMOVING THE EXHAUST SILENCER).

Footrest support screws driving torque: 25 Nm (2.5 kgm).

- Unscrew and remove the two screws (1).
- Remove the footrest support (2) complete with footrest.
- Where necessary, remove the footrest (3), see 7.1.41 (REMOVING THE PASSENGER FOOTREST).



NOTE Where necessary, repeat the procedure to remove the other passenger footrest support, skipping the operation described in point second.

7.1.41 REMOVING THE PASSENGER FOOTREST

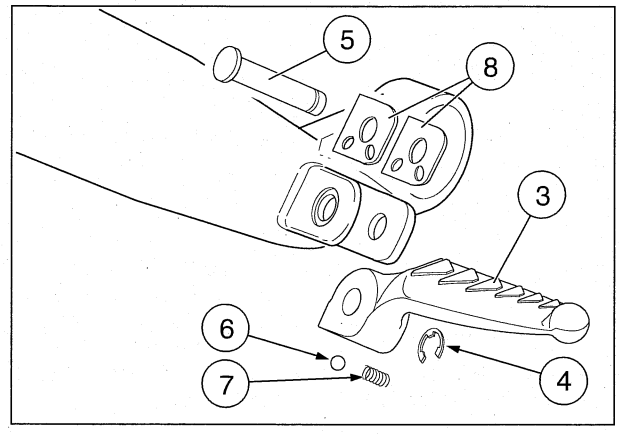
Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

- Position the vehicle on the stand.

⚠ WARNING

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

- Remove the stop ring (4).
- Slide out the pin (5).



⚠ CAUTION

Take care not to loose the ball (6) ejected by the spring (7) in the process.

- Remove the footrest (3) and retrieve the two shims (8), ball (6) and spring (7).

NOTE Where necessary, repeat the procedure to remove the other footrest.

7.1.42 REMOVING THE RIDER'S FOOTREST

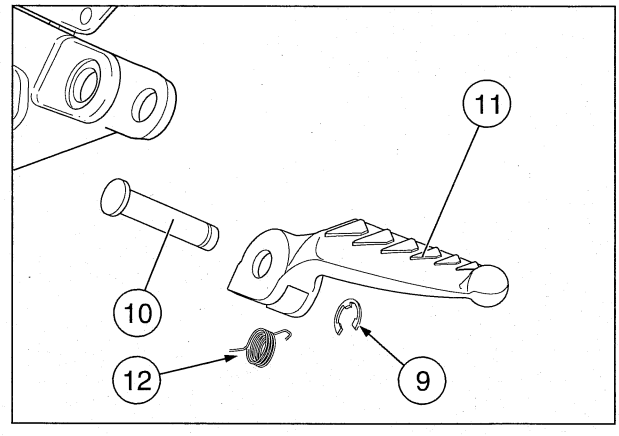
Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

- Position the vehicle on the stand.

⚠ WARNING

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

- Remove the stop ring (9).
- Slide out the pin (10).
- Retrieve the footrest (11) and the spring (12).



NOTE Where necessary, repeat the procedure to remove the other rider's footrest.

7.1.43 REMOVING THE RIDER FOOTREST - GEAR LEVER LEFT SUPPORT UNIT

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

◆ Position the vehicle on the stand.

⚠ CAUTION

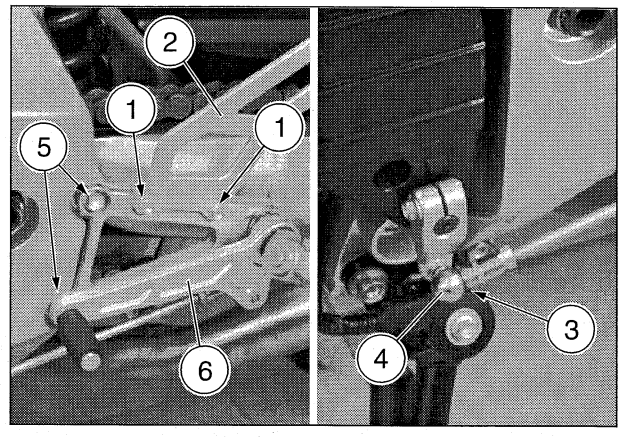
Wait until the engine and the exhaust silencer have completely cooled down.

Driving torque of the rider footrest left guard screws: 6 Nm (0.6 kgm).

◆ Unscrew and remove the two screws (1).
◆ Remove the protection element (2).
◆ Loosen and remove the spring (3).
◆ Release the ball joint (4) from its seat.

Rider's footrest left support screws driving torque: 25 Nm (2.5 kgm).

◆ Unscrew and remove the two screws (5).

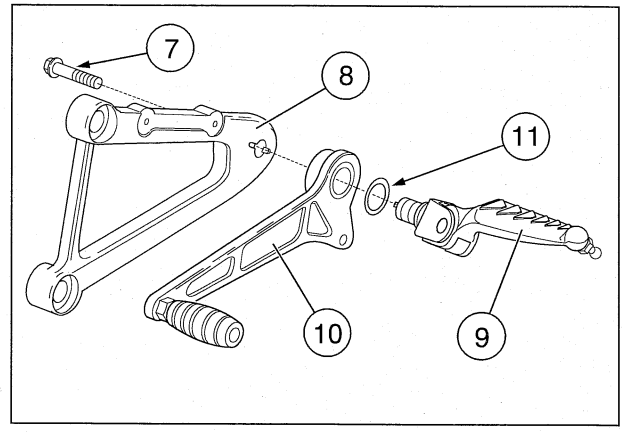


⚠ CAUTION

When reassembling, apply LOCTITE® 243 on the thread of the screws (5).

◆ Remove the whole unit (6).

To disassemble the unit (6), proceed as follows:



⚠ CAUTION

Observe the position of the components, in order to be able to reassemble them correctly.

Rider left footrest screw driving torque: 25 Nm (2.5 kgm).

◆ Unscrew and remove the screw (7), taking the washer.
◆ Disassemble the three elements:
– rider's footrest support (8);
– rider's footrest (9);
– gear lever (10), complete with gearchange control connection rod.

⚠ CAUTION

Upon reassembly, correctly position the washer (11), coupling the rider footrest (9) with the rider footrest support (8) correctly.

⚠ WARNING

After reassembly, adjust the gear lever, see 2.25 (ADJUSTING THE GEAR LEVER).

7.1.44 REMOVING THE RIDER FOOTREST - REAR BRAKE CONTROL LEVER RIGHT SUPPORT UNIT

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

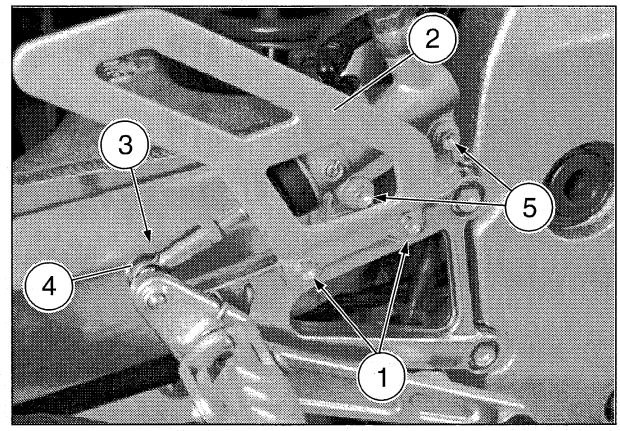
◆ Position the vehicle on the stand.

⚠ WARNING

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

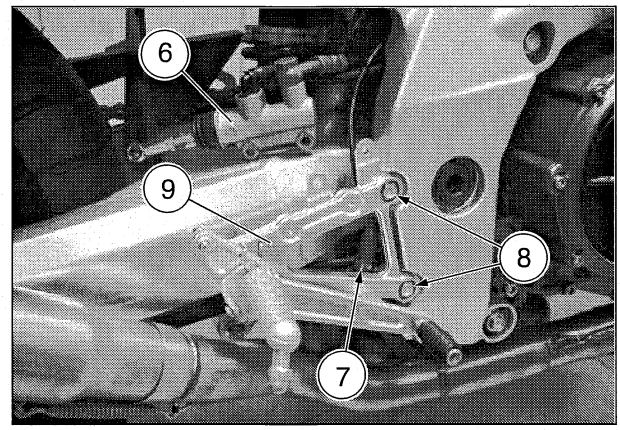
Driving torque of the rider footrest right guard screws: 6 Nm (0.6 kgm).

◆ Unscrew and remove the two screws (1).
◆ Remove the protection element (2).
◆ Withdraw and remove the spring (3).
◆ Release the ball joint (4) from its seat.



Brake pump screws driving torque: 12 Nm (1.2 kgm).

◆ Unscrew and remove the two screws (5), taking the nuts.
◆ Move the rear brake pump (6).
◆ Unscrew and remove the stoplight switch (7).



Rider's footrest left support screws driving torque: 25 Nm (2.5 kgm).

◆ Unscrew and remove the two screws (8).
◆ Remove the whole unit (9).

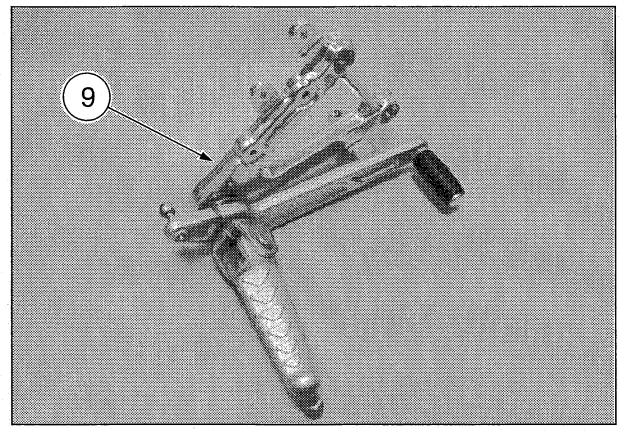
To disassemble the unit (9), proceed as follows:

⚠ CAUTION

Observe the position of the components, in order to be able to reassemble them correctly.

Rider right footrest screw driving torque: 25 Nm (2.5 kgm).

◆ Unscrew and remove the screw (10), taking the washer.



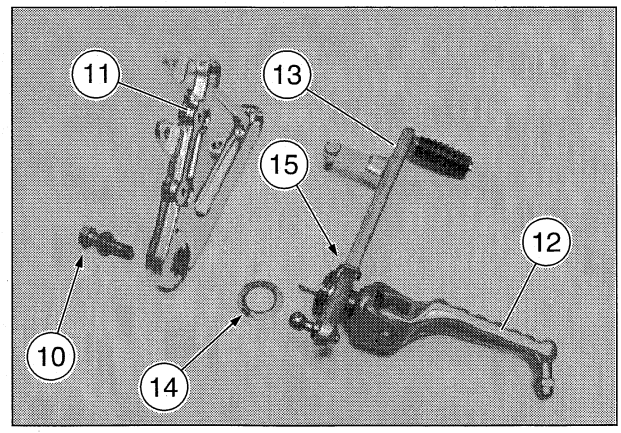
⚠ CAUTION

When reassembling, apply LOCTITE® 243 on the thread of the screw (10).

◆ Disassemble the three elements:
– rider's footrest support (11);
– rider's footrest (12);
– rear brake lever (13).

⚠ CAUTION

Upon reassembly, correctly position the washer (14) and the spring (15), coupling the rider footrest (12) with the rider footrest support (11) correctly.



7.1.45 REMOVING THE EXHAUST SILENCER

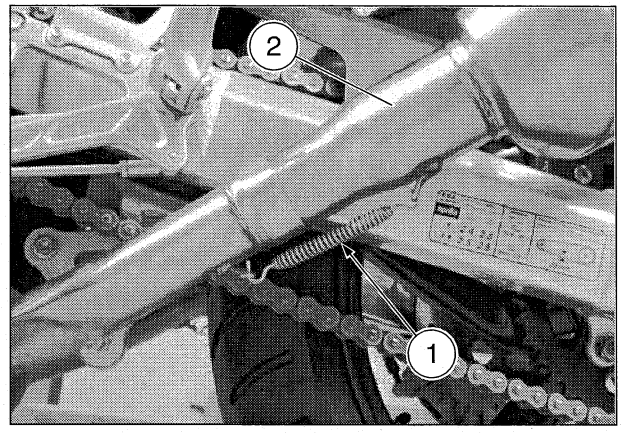
Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

◆ Position the vehicle on the stand.

⚠ WARNING

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

◆ Release the spring (1) from their respective hooks on the exhaust silencer (2).

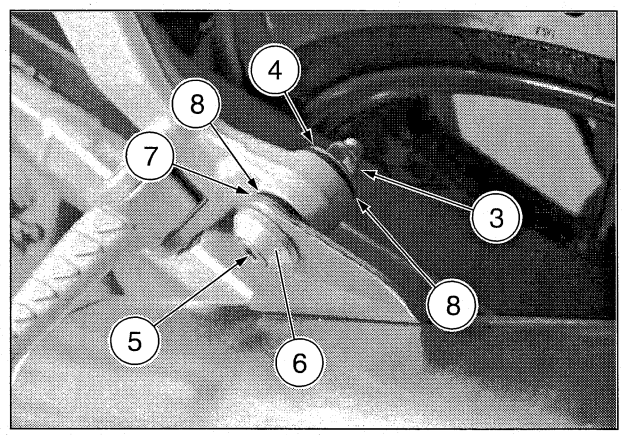


⚠ CAUTION

Check the spring (1) and change it if damaged.

Exhaust silencer nut driving torque: 25 Nm (2.5 kgm).

◆ Loosen and remove the self-locking nut (3) and retrieve the washer (4).
◆ Unscrew and remove the screw (5) and retrieve the bush (6) and washer (7).
◆ If the rubber elements (8) are damaged, replace them.
◆ Rotate the exhaust silencer (2) slightly both ways in order to dislodge any deposits preventing it from being removed.
◆ Slide out the exhaust silencer (2).



⚠ CAUTION

Plug the exhaust pipe openings so as to prevent any foreign bodies entering.

NOTE Where necessary, repeat the procedure to remove the other exhaust silencer.

7.1.46 REMOVING THE SIDE STAND

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

◆ Position the vehicle on the special rear support stand OPT.

⚠ CAUTION

Proceed with care, in order to avoid damaging the switch (1). Do not adjust the nut (2) with switch (1) fitted.

◆ Release the two springs (3).

Side stand switch screw driving torque: 10 Nm (1.0 kgm).

◆ Unscrew and remove the screw (4) and retrieve the washer (5).

NOTE When reassembling, apply LOCTITE® 243 on the screw (4).

◆ Slide out the switch (1).

⚠ CAUTION

When reassembling, make sure the switch (1) is positioned correctly with the seat inserted in the relevant anti-rotation pin.

Proceed with the stand up.

Side stand nut (2) driving torque: 30 Nm (3.0 kgm).

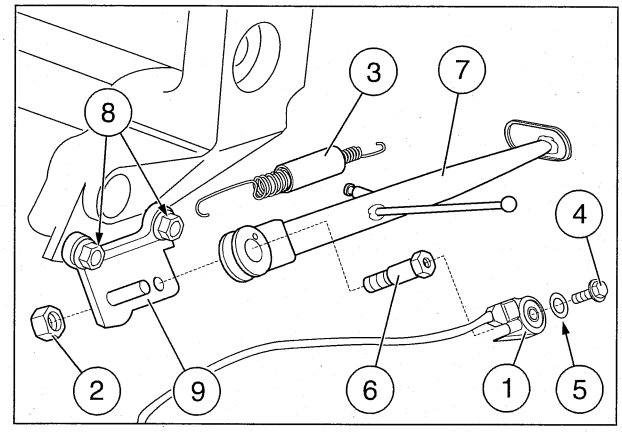
◆ Loosen and remove the nut (2).

Side stand screw (6) driving torque: 10 Nm (1.0 kgm).

◆ Unscrew and remove the screw (6).
◆ Remove the stand (7).

Stand plate screws driving torque: 40 Nm (4.0 kgm).

◆ If necessary, unscrew and remove the screws (8), taking the stand plate (9).



7.1.47 REMOVING THE ENGINE OIL TANK

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.2 (ENGINE OIL).

◆ Drain the engine oil tank completely, see 2.14 (CHANGING THE ENGINE OIL AND THE OIL FILTER).

NOTE Obtain appropriate pliers to attach the clamps, or screwdriver-type pipe clamps (1) to replace the original ones (special type without screw).

◆ Loosen the clamps (2) (3) (4).
◆ Pull off the couplings (5) (6) (7).

Driving torque of the left fairing support screw: 10 Nm (1.0 kgm).

◆ Unscrew and remove the screw (8).
◆ Remove the fairing fastening plate (9).

Engine oil tank upper screw driving torque: 15 Nm (1.5 kgm).

◆ Unscrew and remove the upper fastening screw (10).

NOTE If the rubber element proves damaged, replace it.

Engine oil tank lower nuts driving torque: 10 Nm (1.0 kgm).

◆ Loosen and remove the two nuts (11) (12).

NOTE If the two silent-blocks prove damaged, replace them.

◆ Remove the whole tank (13).

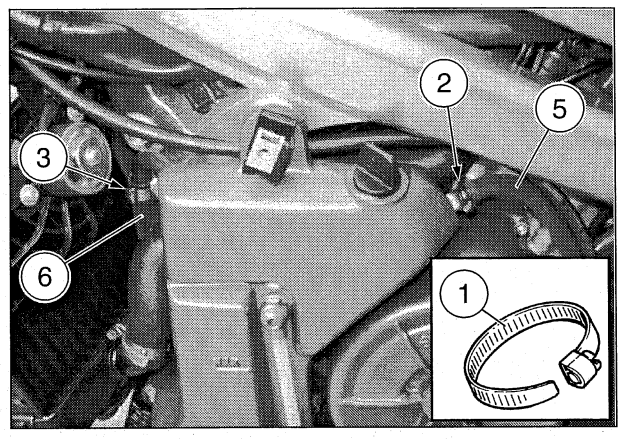
Engine oil filter on tank driving torque: 35 Nm (3.5 kgm).

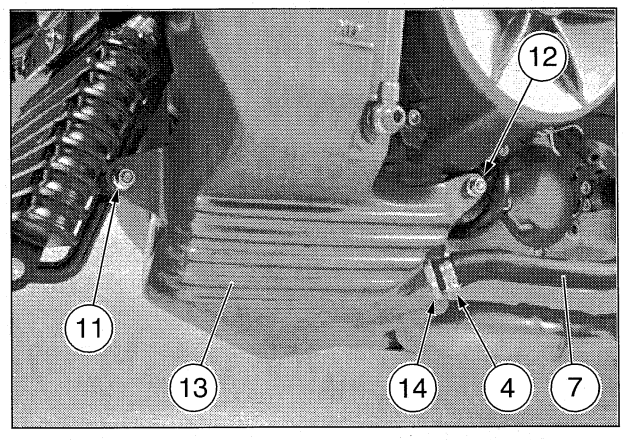
◆ Unscrew and remove the engine oil filter (14) positioned on the tank and clean it with a jet of compressed air.
◆ Check the engine oil filter gasket on the tank (13).
◆ Screw and tighten the engine oil filter (14) positioned on the tank.

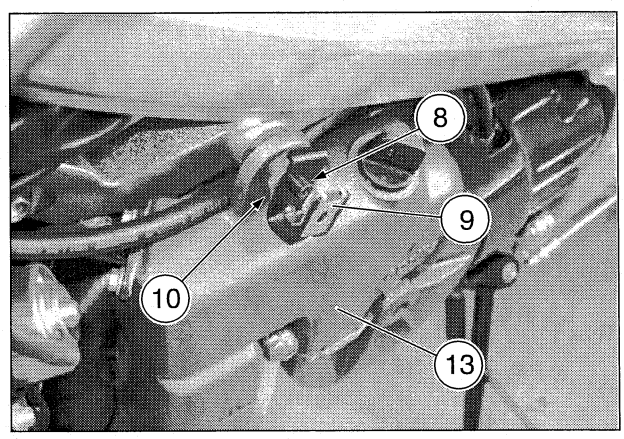
Oil level pipe fittings screws driving torque: 20 Nm (2.0 kgm).

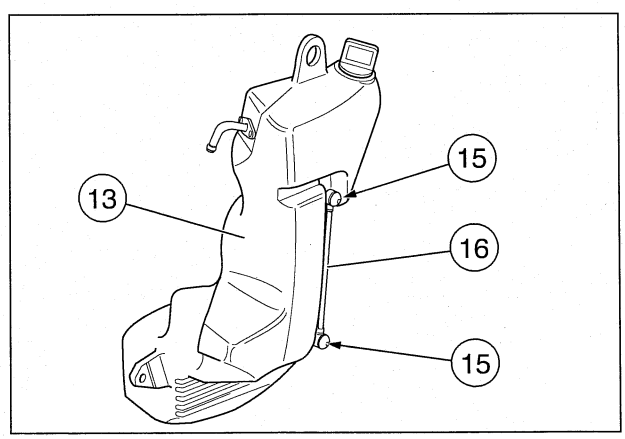
◆ Where necessary, unscrew and remove the two screws (15), remove the oil level pipe (16) and retrieve the gaskets.

NOTE If the oil level pipe and gaskets prove damaged, replace them.









7.1.48 REMOVING THE ENGINE OIL RADIATOR

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 1.2.2 (ENGINE OIL).

◆ Drain the engine oil tank completely, see 2.14 (CHANGING THE ENGINE OIL AND THE OIL FILTER).

NOTE Obtain appropriate pliers to attach the clamps, or screwdriver-type pipe clamps (1) to replace the original ones (special type without screw).

◆ Loosen the clamps (2) (3).
◆ Pull off the couplings (4) (5).

Engine oil radiator upper nuts driving torque: 10 Nm (1.0 kgm).

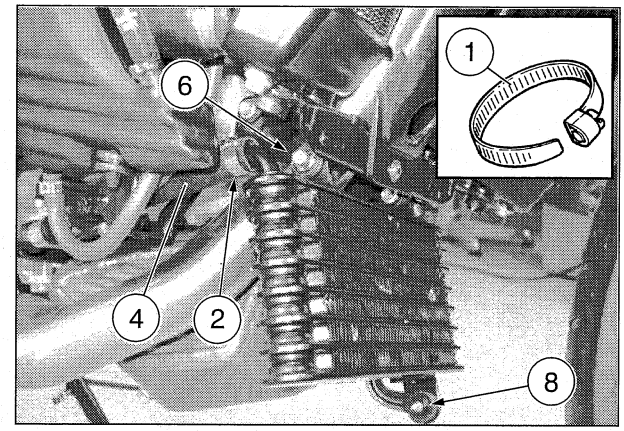
◆ Unscrew and remove the two fastening nuts (6) and (7), taking the screws.

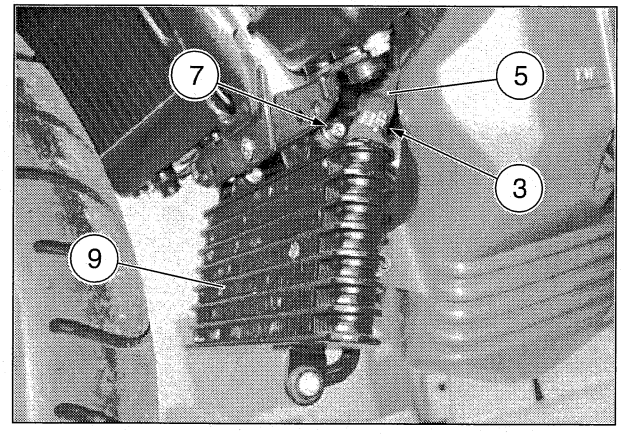
Engine oil radiator lower nut driving torque: 10 Nm (1.0 kgm).

◆ Unscrew and remove the nut (8), taking the screw.

NOTE If the rubber elements are damaged, change them.

◆ Remove the radiator (9).





7.1.49 REMOVING THE DRIVING CHAIN SHOE

◆ Remove the guide plate, see 3.2.5 (REMOVAL THE DRIVING CHAIN GUIDE PLATE).

NOTE In order to stop the pinion (13) from turning and enable the screw (10) to be unscrewed, put the vehicle in first gear.

Driving chain pinion screw driving torque: 50 Nm (5.0 kgm).

◆ Unscrew and remove the screw (10) and retrieve the two washers (11-12).

NOTE When reassembling, apply LOCTITE® 243 on the thread of the screw (10).

NOTE In order to make it easier to slide off the drive pinion (13), slacken the chain slightly, see 2.35.3 (ADJUSTING THE DRIVING CHAIN).

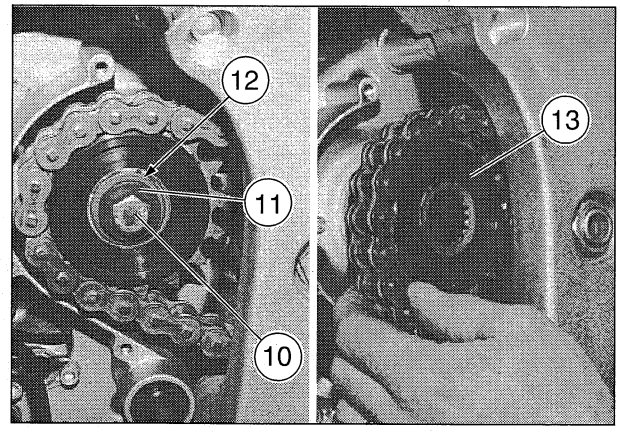
◆ Slide the drive pinion (13), complete with chain, off the shaft.
◆ Remove the drive pinion (13).

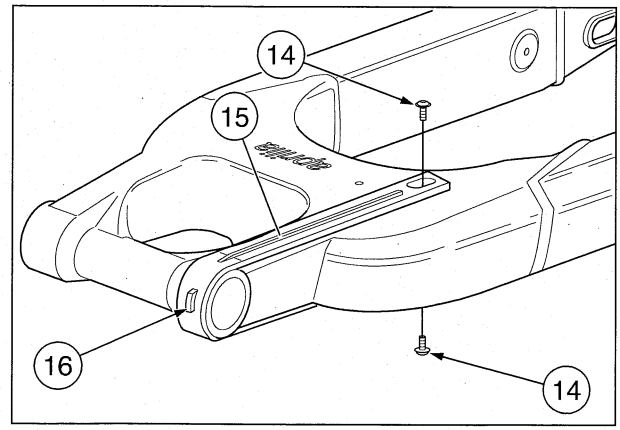
NOTE When reassembling, apply Anti-Seize LOCTITE® on the inner toothing of the drive pinion (13).

Driving chain shoe screws driving torque: 2 Nm (0.2 kgm).

◆ Unscrew and remove the two screws (14).
◆ Remove the shoe (15) by pulling it off towards the front.

NOTE When reassembling, make sure the slot in the shoe (15) is correctly positioned on its seat (16) built into the fork.

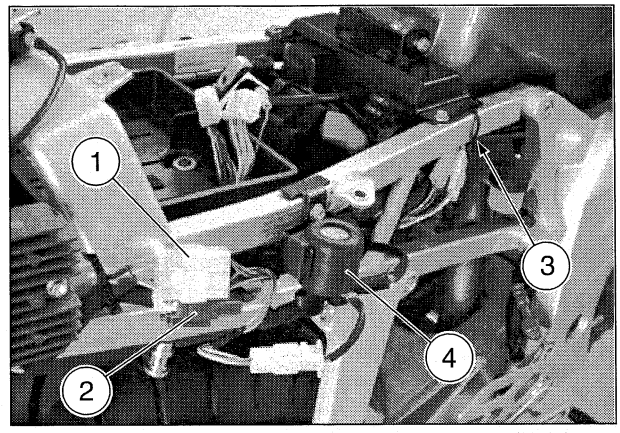




7.1.50 REMOVING THE SADDLE SUPPORT

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

- Position the vehicle on the special rear support stand OPT.
- Remove the saddle support lower moulded cover, see 7.1.36 (REMOVING THE SADDLE SUPPORT LOWER MOULDED COVER).
- Remove the number plate holder support, see 7.1.37 (REMOVING THE NUMBER PLATE HOLDER SUPPORT).
- Remove the exhaust silencers, see 7.1.45 (REMOVING THE EXHAUST SILENCER).
- Disconnect the two electric connectors (1) (2).



⚠ CAUTION

When reassembling, make sure the electric connectors (1) (2) are plugged in properly.

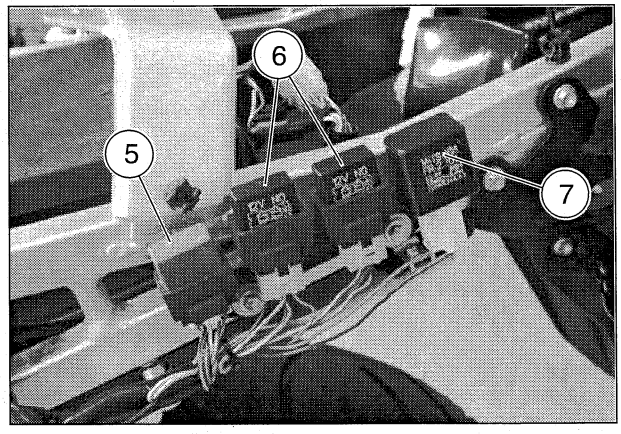
- Release the wiring from the clamps (3).

NOTE Prepare a clamp to be used for the reassembly.

⚠ CAUTION

Do not force the electric cables.

- Partially remove the start relay (4).
- Partially remove the diode (5), the two relays (6) and the blinking unit (7).



⚠ CAUTION

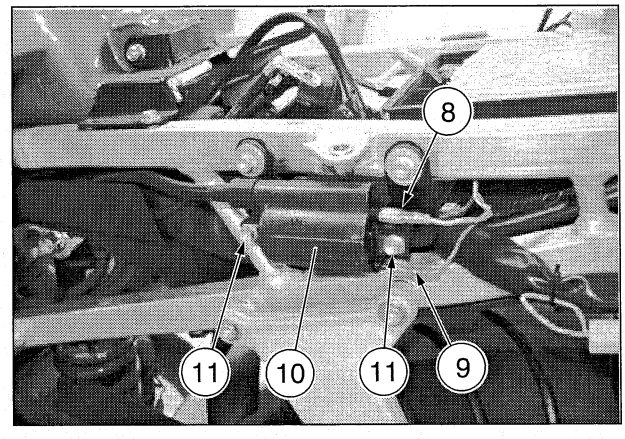
Mark the terminals (8) and (9), in order to be able to reconnect them correctly upon reassembly.

- Disconnect the terminals (8) (9) from the HT coil (10).

HT coil screw driving torque: 6 Nm (0.6 kgm).

- Unscrew and remove the two screws (11).
- Partially remove the HT coil (10).

Follow ▶



Follow ▶

HT coil screw driving torque: 6 Nm (0.6 kgm).

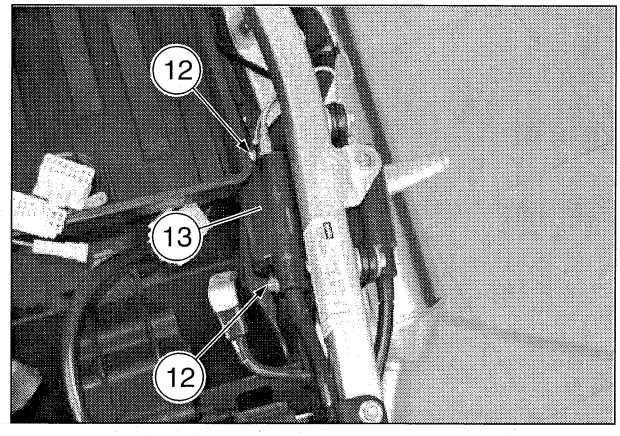
- ◆ Unscrew and remove the two screws (12).
- ◆ Partially remove the inner HT coil (13).
- ◆ Release the pipes (14) from the special clamp (15).

Voltage regulator screws driving torque: 10 Nm (1.0 kgm).

- ◆ Unscrew and remove the two screws (16) and remove the voltage regulator (17).

Saddle support front screws driving torque: 50 Nm (5.0 kgm).

- ◆ Unscrew and remove the screw (18), taking the nut.
- ◆ Unscrew and remove the screw (19).
- ◆ Remove the saddle support (20), sliding it off the back.



Where necessary, remove the components attached to the saddle support (18), i.e.:

Start relay support screw driving torque: 10 Nm (1.0 kgm).

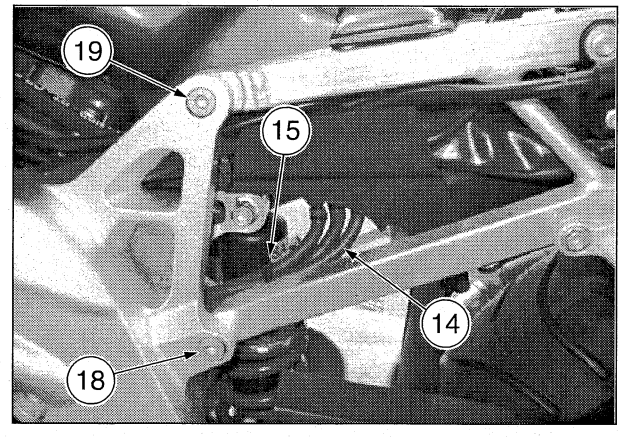
- ◆ Unscrew and remove the screw (21).
- ◆ Remove the start relay support (22).

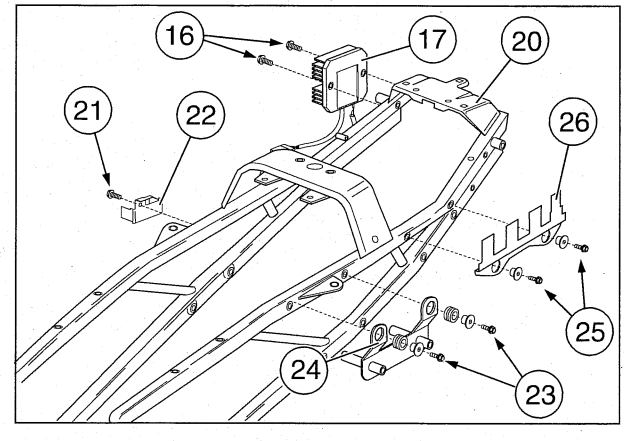
Ignition coils support screws driving torque: 10 Nm (1.0 kgm).

- ◆ Unscrew and remove the two screws (23), taking the washers.
- ◆ Remove the relay support (24).

Relay support screws driving torque: 10 Nm (1 kgm).

- ◆ Unscrew and remove the two screws (25), taking the bushing.
- ◆ Remove the relay support (26).
- ◆ Remove the passenger seat lock, see 7.1.34 (REMOVING THE PASSENGER SEAT LOCK).
- ◆ Remove the passenger footrest supports, see 7.1.40 (REMOVING THE PASSENGER FOOTREST SUPPORTS).
- ◆ Remove the fuel tank support rod OPT.





7.1.51 REMOVING THE FRAME

⚠ CAUTION

The frame must be removed by an authorized centre or by an aprilia Official Dealer only.

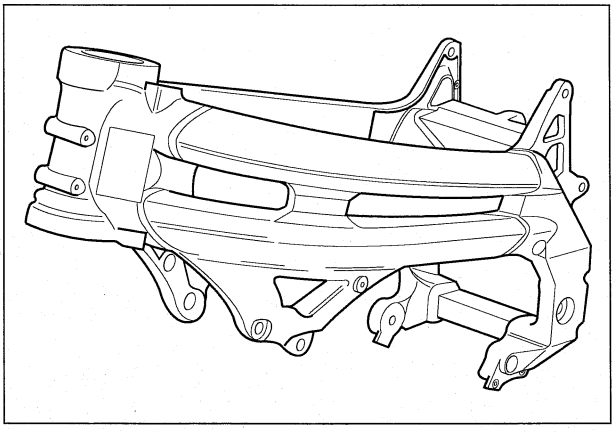
Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

⚠ CAUTION

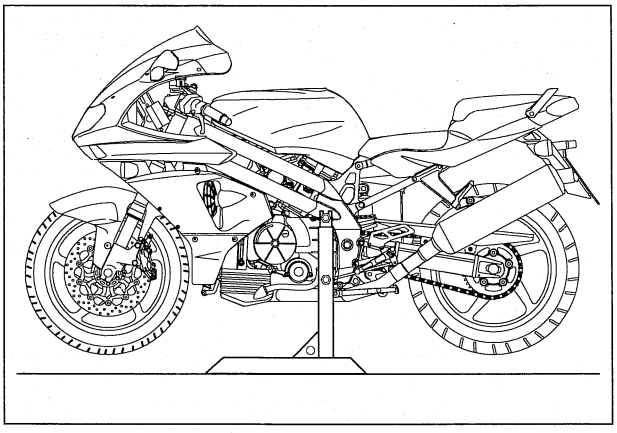
The removal of the frame is a particularly complex operation. Therefore, inspect the vehicle carefully before proceeding.

This chapter describes the relevant procedures progressively and in sequential order.
Any reference to operations from other chapters must be interpreted logically in order to avoid components being removed unnecessarily.

Only perform those operations necessary to remove the component in question.



- Remove the engine, see 3.3 (REMOVING THE WHOLE ENGINE FROM THE FRAME).
- Position the vehicle on the special centre stand, see 1.8.4 (POSITIONING THE VEHICLE ON THE CENTRE SUPPORT STAND OPT).
- Remove the forecarriage complete with front wheel, see 7.7.1 (DISASSEMBLING THE STEERING).
- Remove the dashboard mount, see 7.1.23 (REMOVING THE DASHBOARD/FRONT FAIRING MOUNT).
- Remove the air conveyor cases, see 7.1.27 (REMOVING THE AIR CONVEYOR).
- Remove the saddle support complete with footrest, see 7.1.50 (REMOVING THE SADDLE SUPPORT).
- Remove the rear axle complete with rear wheel, see 7.9.1 (REMOVING THE REAR FORK).
- Remove the rear shock absorber, see 7.10.1 (REMOVING THE SHOCK ABSORBER).
- Remove the filler neck, see 5.8 (REMOVING THE FILLER NECK).



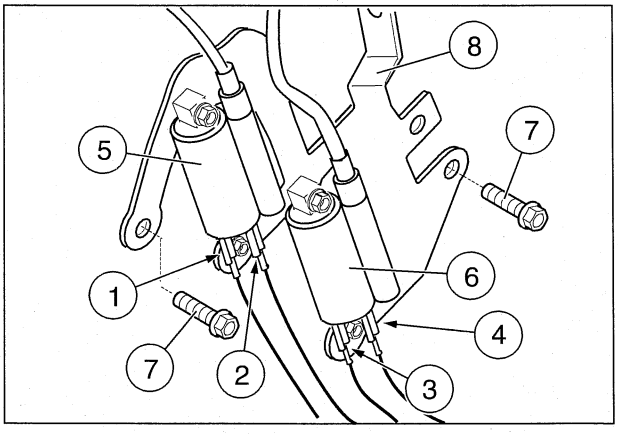
⚠ CAUTION

Mark the terminals (1) (2) and (3) (4), in order to be able to reconnect them correctly upon reassembly.

- Disconnect the terminals (1) (2) and (3) (4) from the H.V. coils (5) (6).

Front HT coil screw driving torque: 10 Nm (1.0 kgm).

- Unscrew and remove the two screws (7).



⚠ CAUTION

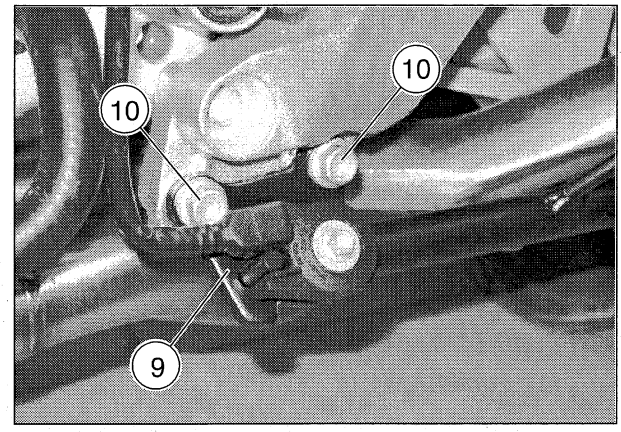
When removing the coil mount (8), be extremely careful not to damage the H.V. coils (5) (6).

- Remove the coil mount (8) complete with H.V. coils (5) (6).

Follow ▶

Follow ▶

- Remove the footrest support right unit, see 7.1.44 (REMOVING THE RIDER FOOTREST - REAR BRAKE CONTROL LEVER RIGHT SUPPORT UNIT).
- Remove the footrest support left unit, see 7.1.43 (REMOVING THE RIDER FOOTREST - GEAR LEVER LEFT SUPPORT UNIT).



⚠ CAUTION

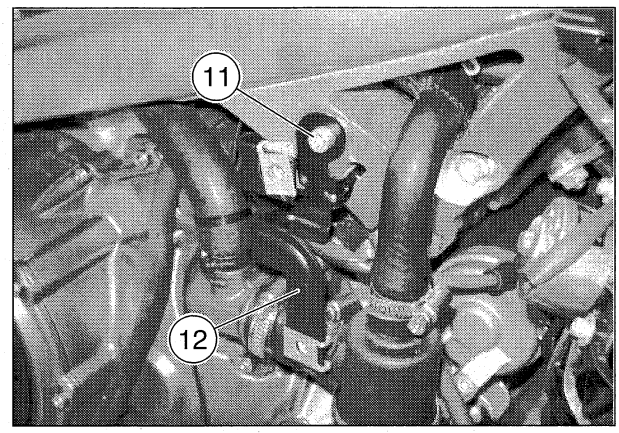
Release all the cables from the fastening clamps positioned along them.
Prepare the same number of clamps, which will be required for reassembly.

⚠ CAUTION

When removing the side stand mount (9), be extremely careful not to damage the switch.

Side stand mount screws driving torque: 40 Nm (4.0 kgm).

- Unscrew and remove the two screws (10) and remove the side stand mount (9) complete with stand and switch.

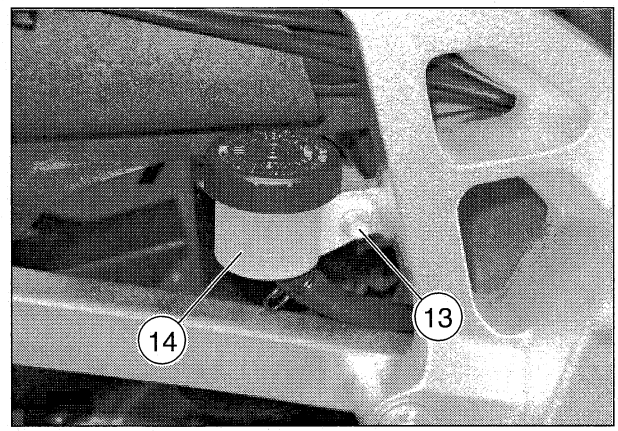


Right side fairing support screw driving torque: 6 Nm (0.6 kgm).

- Unscrew and remove the screw (11).
- Remove the right side fairing support (12).

Rear brakes fluid tank screw driving torque: 6 Nm (0.6 kgm).

- Unscrew and remove the screw (13).
- Partially remove the rear brake reservoir (14).
- Place the frame in an appropriate sling and attach the bands to a hoist for support.



⚠ CAUTION

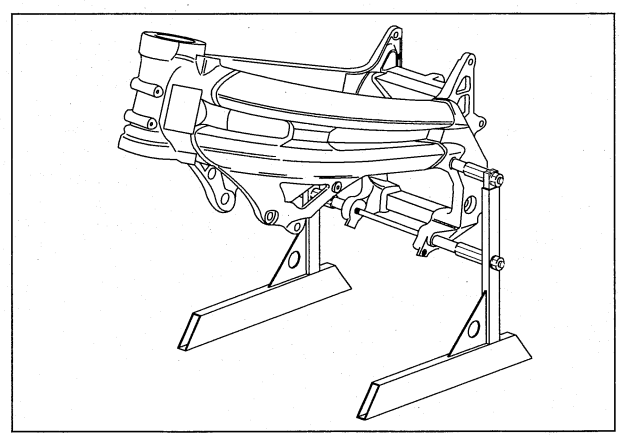
The bands and the hoist must be suitable for bearing the weight of the frame.

The frame weighs: 10.5 kg.

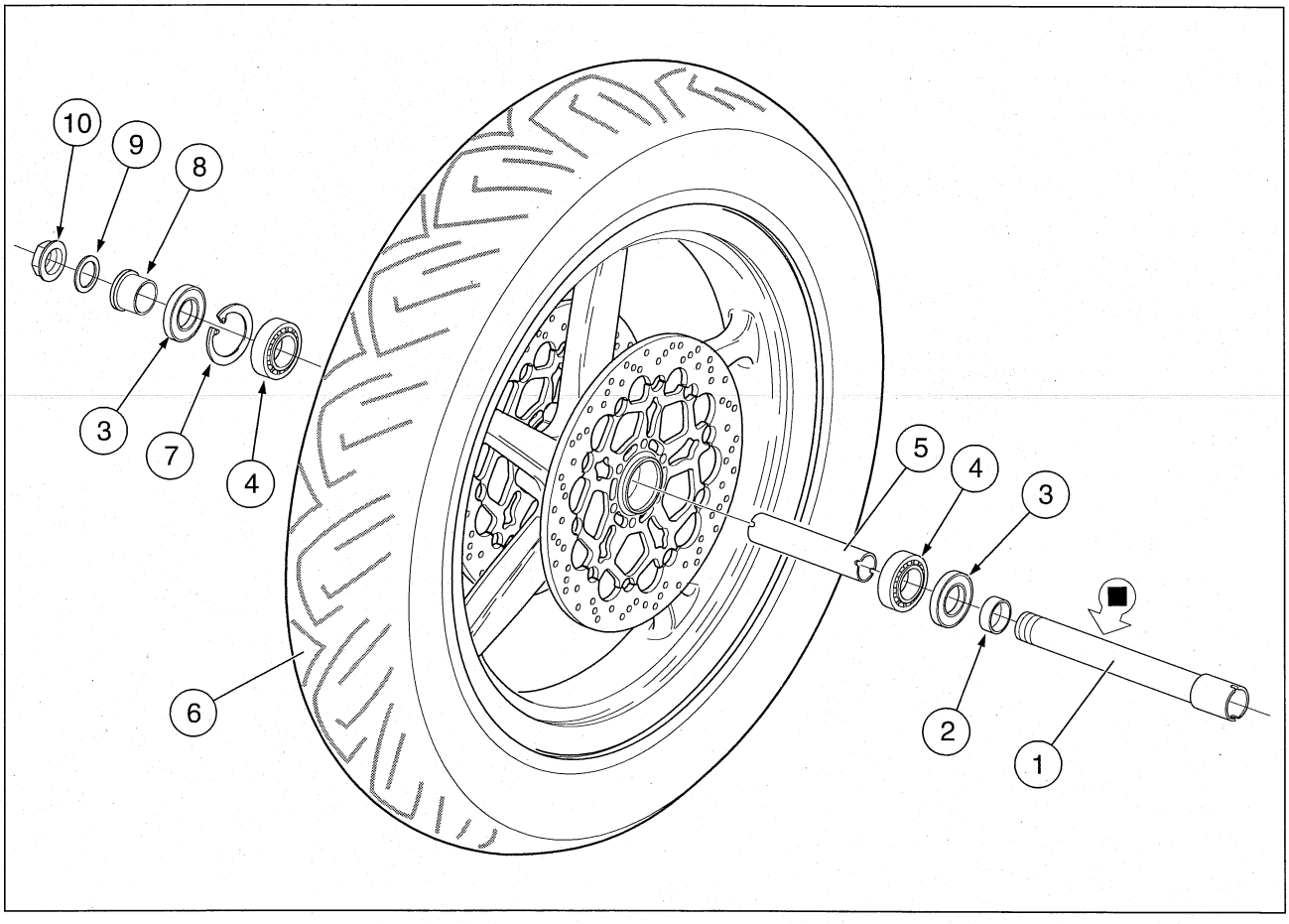
- Lift the frame just enough to remove the special centre support stand OPT.
- Remove the centre stand, see 1.8.4 (POSITIONING THE VEHICLE ON THE CENTRE SUPPORT STAND OPT).

Once the frame has been completely reinstalled, proceed as follows:

- Make sure that all the components are correctly fastened.
- Make sure that cables and electric wiring are correctly positioned and fastened.
- Make sure the electric connectors are plugged in properly.
- Make sure that turning the handlebars does not result in any of the cables or pipes being pulled too tight.



7.2 FRONT WHEEL



KEY

1) Wheel pin
2) Left spacer
3) Seal
4) Bearing
5) Inner spacer
6) Complete wheel
7) Snap ring
8) Right spacer
9) Washer
10) Nut

■ = GREASE, see 1.6 (LUBRICANT CHART).

7.2.1 REMOVING THE WHOLE WHEEL

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 2.32 (FRONT WHEEL).

⚠ CAUTION

While disassembling and reassembling the wheel, be careful not to damage the brake pipes, the discs and the pads.

- Position the vehicle on the special rear support stand OPT.
- Position the vehicle on the special front support stand OPT.

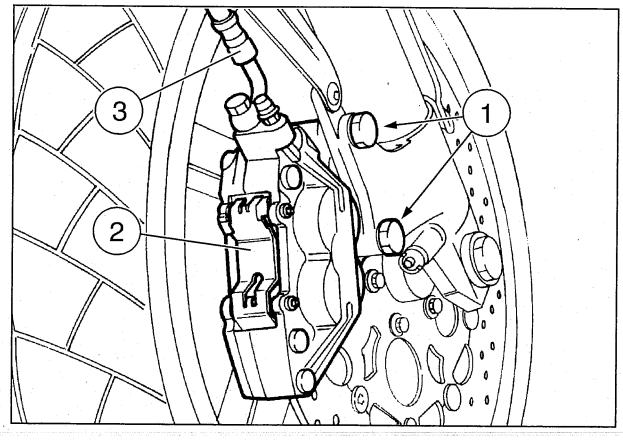
⚠ CAUTION

Make sure that the vehicle is stable.

- Have someone keep the handlebar steady in running position, so that the steering is locked.

Front brake caliper screws driving torque: 50 Nm (5.0 kgm).

- ★Unscrew and remove the two screws (1) that fasten the front brake caliper (2).
- ★Withdraw the brake caliper (2) from the disc, leaving it attached to the pipe (3).



⚠ CAUTION

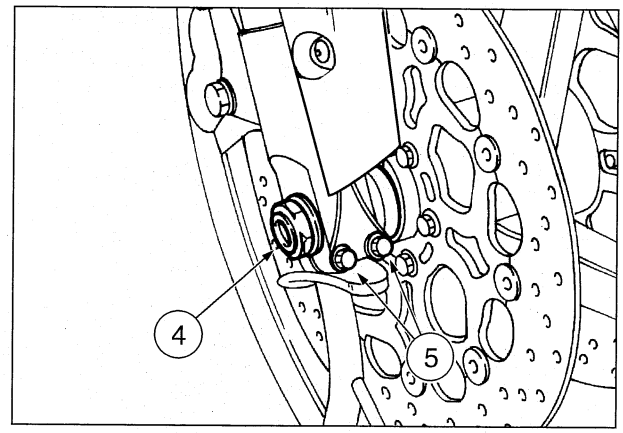
Never pull the front brake lever after removing the calipers, otherwise the pistons may go out of their seats, thus causing the outflow of the brake fluid.

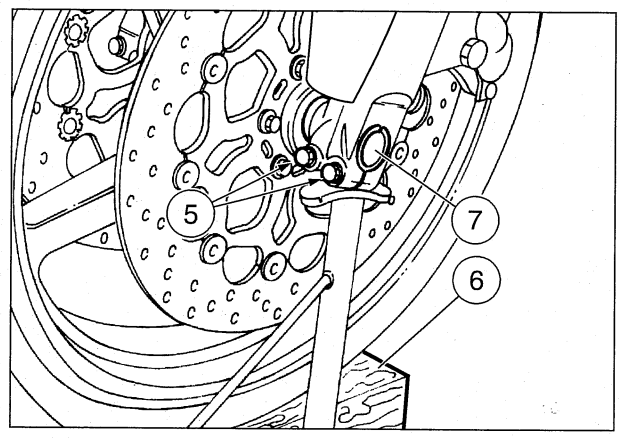
Front wheel nut driving torque: 80 Nm (8.0 kgm).

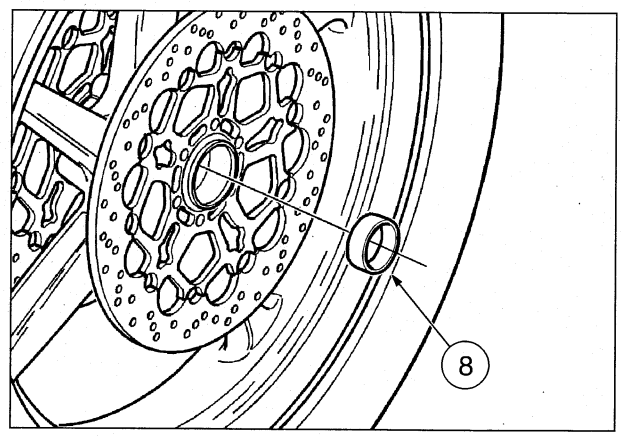
- Loosen and remove the nut (4), taking the washer.
- ★Partially unscrew the two screws (5) from the wheel pin clamp.

Front wheel pin clamp screws driving torque: 22 Nm (2.2 kgm).

- Put a support (6) under the tyre, in such a way as to keep the wheel in its position after loosening it.
- Withdraw the wheel pin (7) from the left side.
- Remove the wheel withdrawing it from the front and take the left spacer ring (8) if it has come out of its seat.
- Where necessary, disassemble the wheel completely, see 7.2.2 (DISASSEMBLING THE WHEEL).







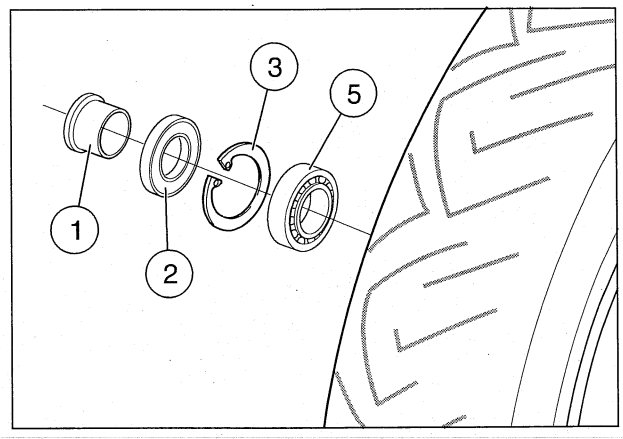
7.2.2 DISASSEMBLING THE WHEEL

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

- Remove the wheel, see 7.2.1 (REMOVING THE WHOLE WHEEL).
- Use a cloth to clean both sides of the hub.
- Remove the right spacer (1).

NOTE When reassembling, the right spacer (1) must be positioned with the side featuring the greatest diameter facing the fork's right tube.

- ★Remove the seal (2).
- Use a special extractor to extract the left bearing (4).
- Remove the snap ring (3).
- Use a special extractor to extract the right bearing (5).

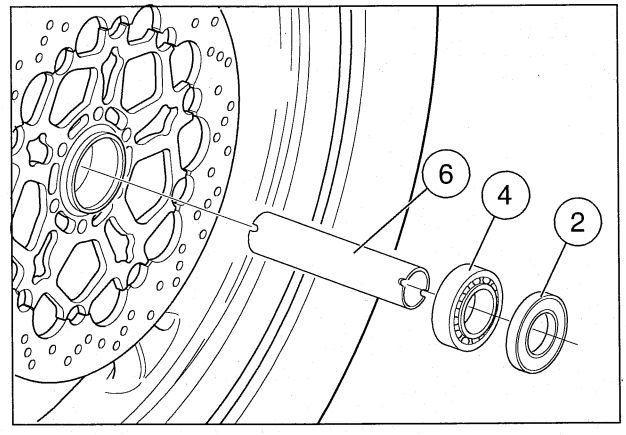


⚠ CAUTION

The bearings must be checked, see 7.2.3 (CHECKING THE COMPONENTS) and, if necessary, changed every time they are disassembled.

- Retrieve the inner spacer (6).
- Thoroughly clean the inside of the hub.

NOTE Wash all the components with a clean detergent.



⚠ CAUTION

When reassembling, use a drift with the same diameter as the outer race to insert the bearings.
Do not strike the balls and/or the inner race.

Make sure the following components rest perfectly on each other:

- **the right bearing (5) and the hub;**
- **the spacer (6) on the right bearing (5);**
- **the left bearing (4) and the spacer (6).**

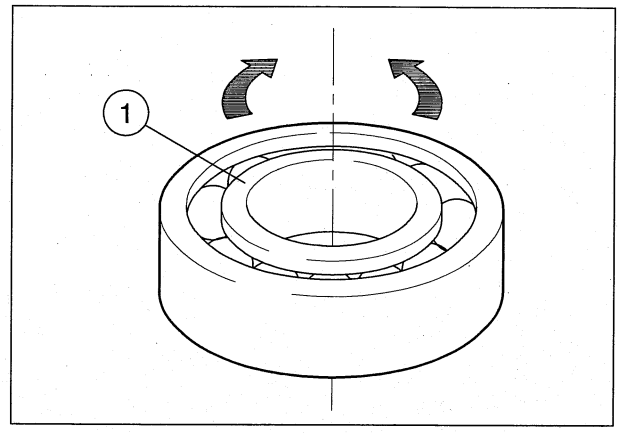
7.2.3 CHECKING THE COMPONENTS

⚠ CAUTION

Make sure that all the components are intact, particularly the following.

BEARINGS

◆ Manually rotate the inner race (1). It should rotate smoothly without jamming and/or noise.
There should be no end play.
Any bearings featuring said defects should be changed.

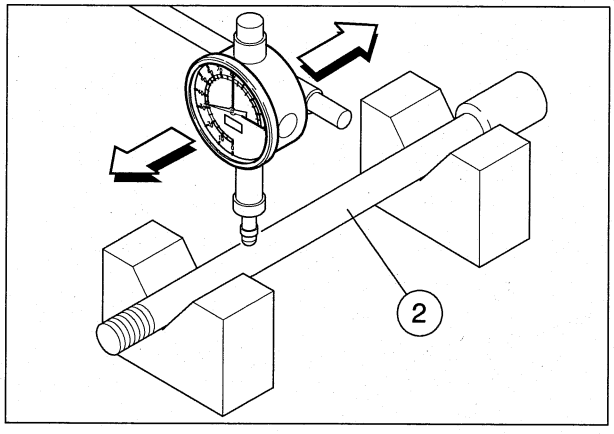


SEALS

◆ Make sure the seals are intact; should they prove damaged or feature signs of excessive wear, change them.

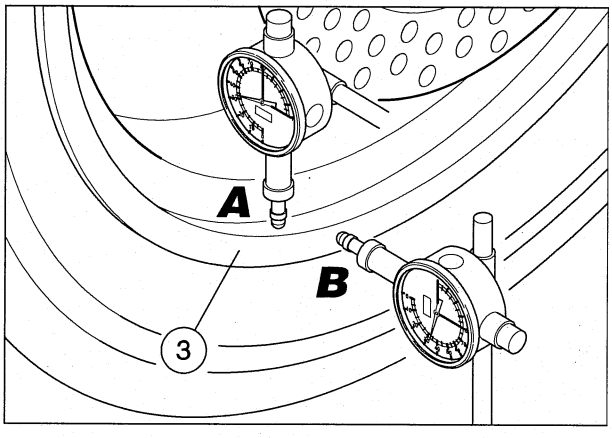
WHEEL PIN

◆ Check the eccentricity of the pin (2) by means of a comparator. If the eccentricity exceeds the limit value, change the pin (2).
Maximum eccentricity: 0.25 mm.



RIM

◆ Using a comparator, make sure that the radial (A) and axial (B) eccentricity of the rim (3) 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 fall within the indicated limit, change the rim (3).
Maximum radial and axial eccentricity: 2 mm.



TYRE

◆ Check the state of the tyre, see 2.36 (TYRES) and 7.4 (TYRES).

7.2.4 WHEEL REASSEMBLY

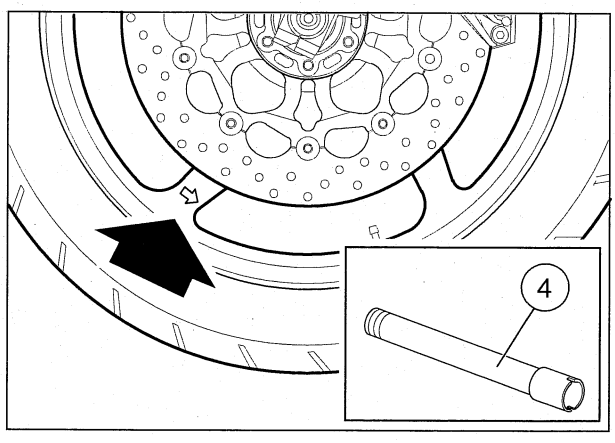
Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

⚠ CAUTION

While reassembling the wheel, be careful not to damage the brake pipes, discs and pads.
The arrow on the wheel side indicates the rotation direction. Upon reassembly, make sure that the wheel is positioned correctly: the arrow must be visible on the left side of the vehicle.

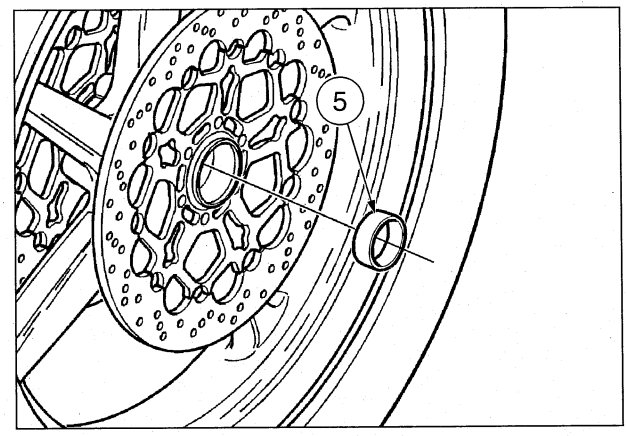
◆ Spread a film of lubricating grease on the whole length of the wheel pin (4), see 1.6 (LUBRICANT CHART).

Follow ▶



Follow ▶

- If the left spacer (5) has come off during the disassembly operations, position it in its seat on the wheel.
- Position the wheel between the fork rods on the support (6).



⚠ CAUTION

Danger of injury.
Do not introduce your fingers to align the holes.

- Move the wheel until its central hole and the holes on the fork are aligned.
- Introduce the wheel pin (4) completely.
- Position the washer and tighten the nut (7) manually.
- In order to stop the wheel pin (4) from turning, tighten the two wheel pin clamp screws (8).

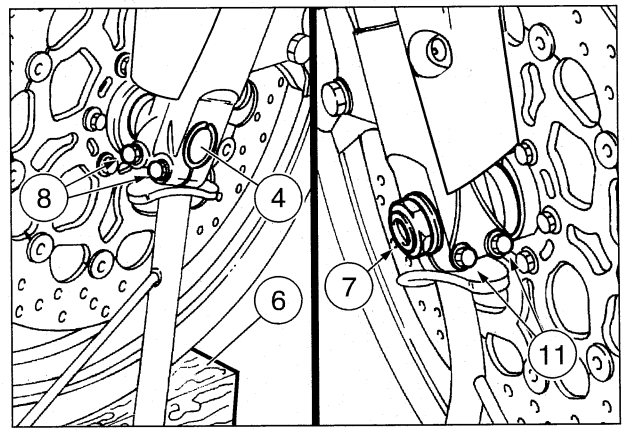
Front wheel pin clamp screws driving torque: 22 Nm (2.2 kgm).

- Tighten the nut (7) thoroughly.

Front wheel nut driving torque: 80 Nm (8.0 kgm).

- Tighten the two screws (11) of the wheel pin clamp.

Front wheel pin clamp screws driving torque: 22 Nm (2.2 kgm).



⚠ CAUTION

Proceed with care, in order not to damage the brake pads.

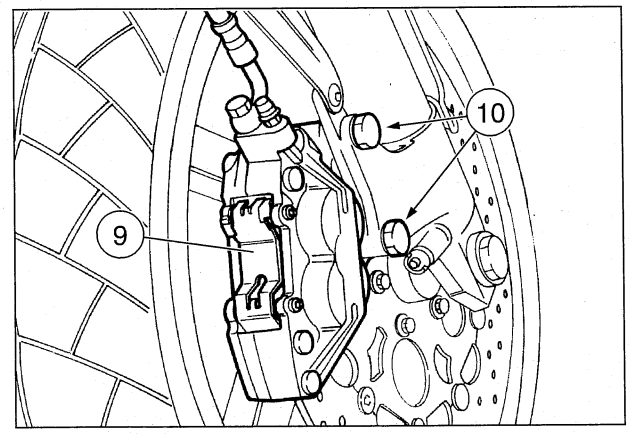
- ★Insert the brake caliper (9) on the disc and position it so that its fastening holes and the holes on the support are aligned.

⚠ CAUTION

Replace the caliper (9) fastening screws (10) with two new screws of the same type.

- ★Screw and tighten the two screws (10) that fasten the brake caliper.

Front brake caliper screws driving torque: 50 Nm (5.0 kgm).



- Loosen the two wheel pin clamp screws (8).
- With pulled front brake lever, press the handlebar repeatedly, thrusting the fork downwards. In this way the fork rods will settle properly.
- Tighten the two screws (8) of the wheel pin clamp.

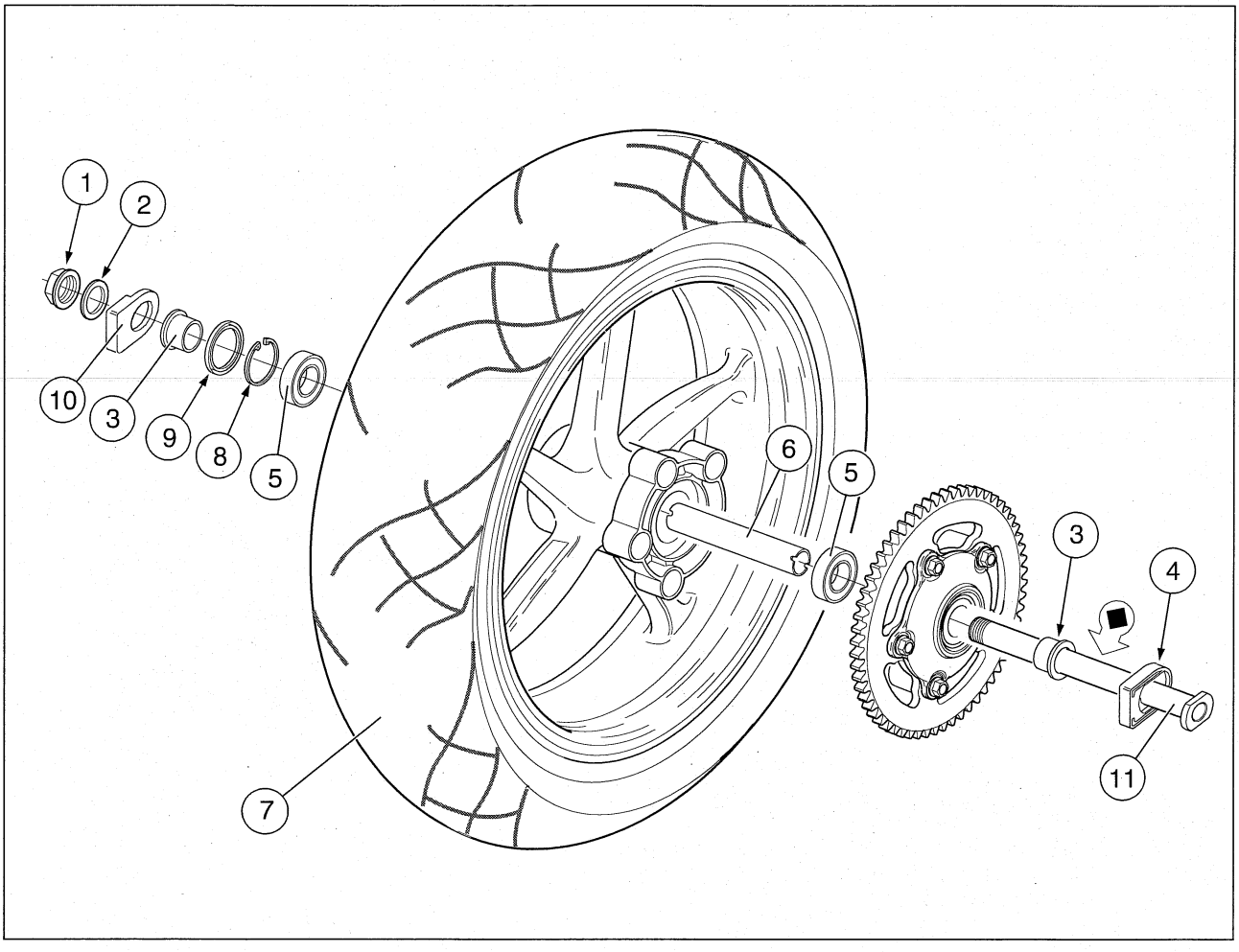
Front wheel pin clamp screws driving torque: 22 Nm (2.2 kgm).

⚠ CAUTION

After reassembly, pull the front brake lever repeatedly and check the correct functioning of the braking system.

Check the wheel centering.

7.3 REAR WHEEL



KEY

1) Nut
2) Washer
3) Side spacers
4) Left chain tightener shoe
5) Bearings
6) Central spacer
7) Complete wheel
8) Snap ring
9) Seal
10) Right chain tightener shoe
11) Wheel pin

■ = GREASE, see 1.6 (LUBRICANT CHART).

7.3.1 REMOVING THE WHOLE WHEEL

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 2.33 (REAR WHEEL).

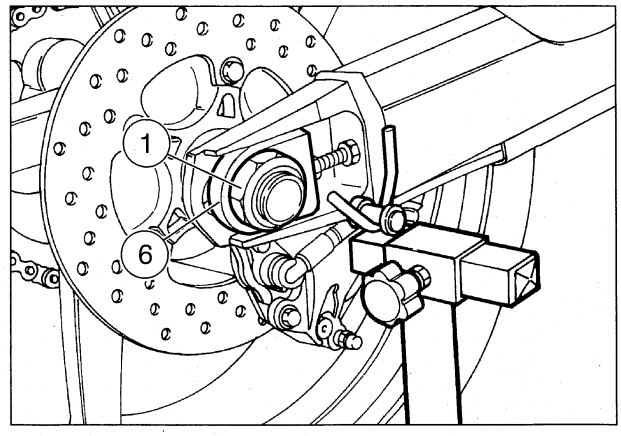
⚠ WARNING

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

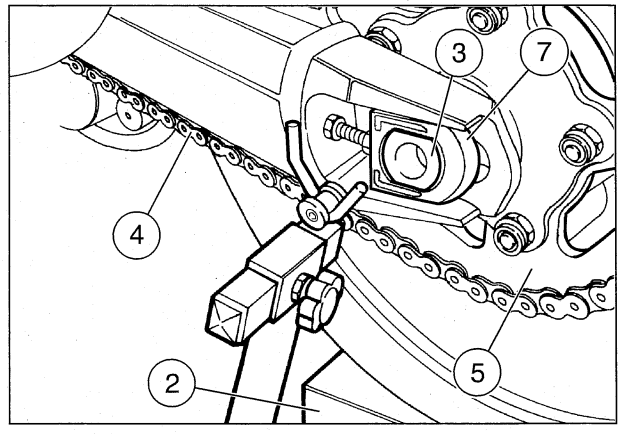
While disassembling and reassembling the wheel, be careful not to damage the brake pipe, the disc and the pads.

- Position the vehicle on the special rear support stand OPT.

Rear wheel nut driving torque: 120 Nm (12.0 kgm).



- Loosen and remove the nut (1), taking the washer.
- Put a support (2) under the tyre, in such a way as to keep the wheel in its position after loosening it.
- Withdraw the wheel pin (3) from the left side.
- Make the wheel advance and release the drive chain (4) from the crown gear (5).



⚠ CAUTION

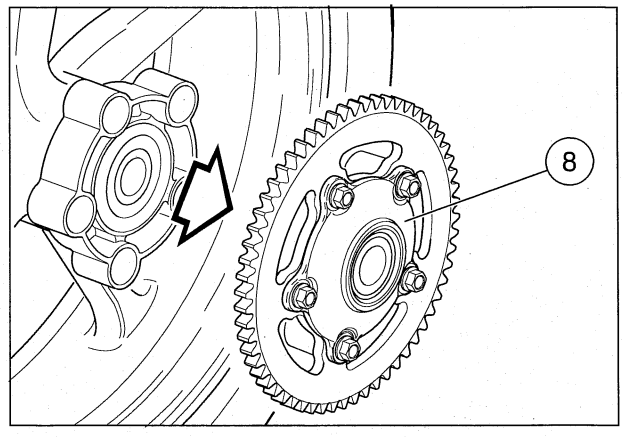
Check the position of the chain tighteners (6-7), in order to be able to reassemble them correctly.

- Remove the right (6) and left (7) chain tighteners.
- Remove the entire wheel withdrawing it from behind.

⚠ CAUTION

Do not operate the rear brake lever after removing the wheel, since the pins may go out of their seats and cause brake fluid leakages.

- Grip the complete final drive unit (8) and slide it off the wheel.
- Check the state of repair of the components, see 7.3.4 (CHECKING THE COMPONENTS).
- Where necessary, disassemble the final drive unit completely, see 7.3.2 (DISASSEMBLING THE FINAL DRIVE UNIT) and the wheel, see 7.3.3 (DISASSEMBLING THE WHEEL).



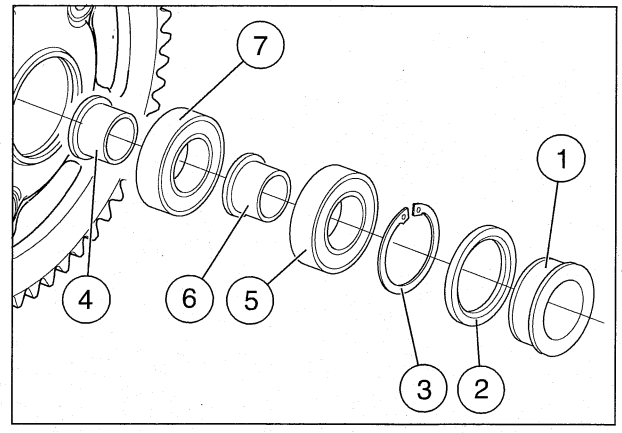
7.3.2 DISASSEMBLING THE FINAL DRIVE UNIT

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

◆ Remove the wheel, see 7.3.1 (REMOVING THE WHOLE WHEEL).

NOTE In the event only the sprocket is to be removed, skip the operations described in the following eight points.

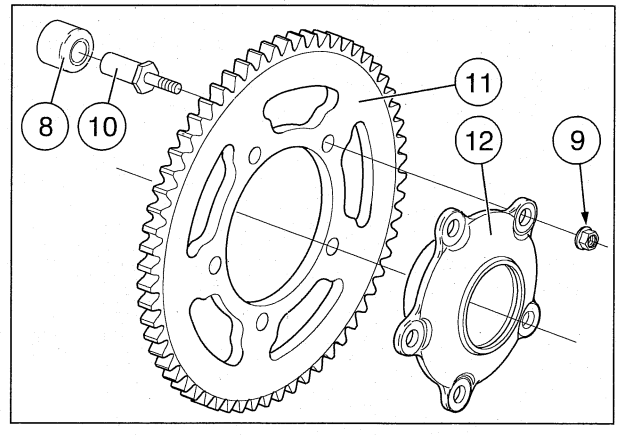
◆ Use a cloth to clean both sides of the hub.
◆ Remove the left spacer (1).



⚠ CAUTION

When reassembling, the left spacer (1) must be positioned with the side featuring the greatest diameter facing the fork's left leg.

◆ Remove the seal (2).
◆ Remove the snap ring (3).
◆ Tap on an appropriate drift rested on the spacer (4) to remove the following components in the given order:
  – bearing (5) with spacer (6);
  – bearing (7) with spacer (4).
◆ Slide the bearing (5) off the spacer (6).
◆ Slide the bearing (7) off the spacer (4).



⚠ CAUTION

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

◆ Thoroughly clean the inside of the hub.

NOTE Wash all the components with a clean detergent.

⚠ CAUTION

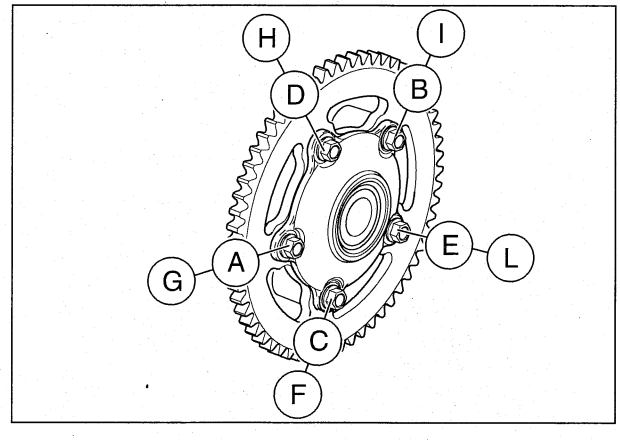
When reassembling, use a drift with the same diameter as the outer race to insert the bearings.
Do not strike the balls and/or the inner race.
Make sure that the inner bearing (7) is perfectly in contact.

◆ Slide off the five flexible coupling bushes (8).

If necessary, proceed as follows:

Sprocket holder nuts driving torque: 50 Nm (5.0 kgm).

◆ Unscrew and remove the five nuts (9).



⚠ CAUTION

After each disassembly, change the crown nuts (9) with new nuts of the same type.

◆ Slide off the five screws (10).
◆ Remove the sprocket (11).
◆ Clean the seat of the sprocket (11) and sprocket holder (12) thoroughly.

⚠ CAUTION

When reassembling, tighten the nuts (9) without the sprocket holder (12) fitted on the wheel.

The tightening operation must be performed in two phases, proceeding as illustrated.

1° phase (tightening) = A-B-C-D-E.

2° phase (checking) = F-G-H-I-L.

7.3.3 DISASSEMBLING THE WHEEL

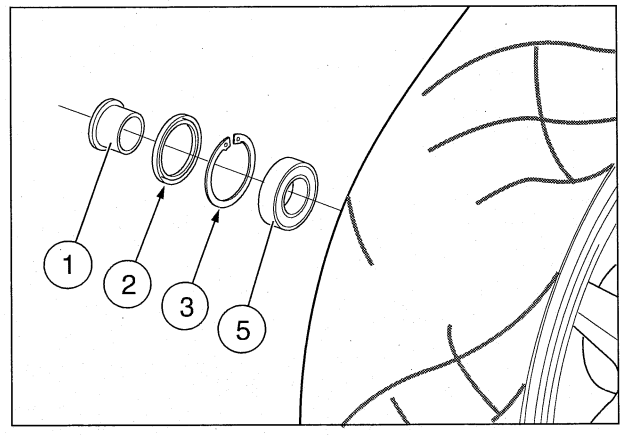
Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

- Remove the wheel, see 7.3.1 (REMOVING THE WHOLE WHEEL).
- Use a cloth to clean both sides of the hub.
- Remove the right spacer (1).

⚠ CAUTION

When reassembling, the right spacer (1) must be positioned with the side featuring the greatest diameter facing the fork's right leg.

- Remove the seal (2).
- Remove the snap ring (3).
- Use a special extractor to extract the left bearing (4) followed by the right bearing (5).



⚠ CAUTION

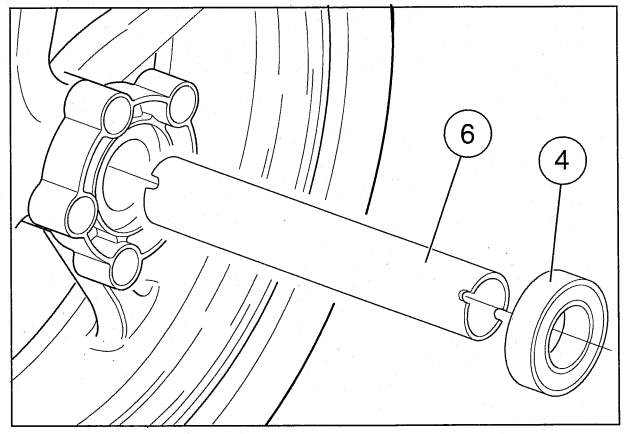
The bearings must be checked and, if necessary, changed every time they are disassembled.

- Retrieve the inner spacer (6).
- Thoroughly clean the inside of the hub.

NOTE Wash all the components with a clean detergent.

⚠ CAUTION

When reassembling, use a drift with the same diameter as the outer race to insert the bearings.
Do not strike the balls and/or the inner race.
Make sure the right bearing (5) is perfectly in contact.



7.3.4 CHECKING THE COMPONENTS

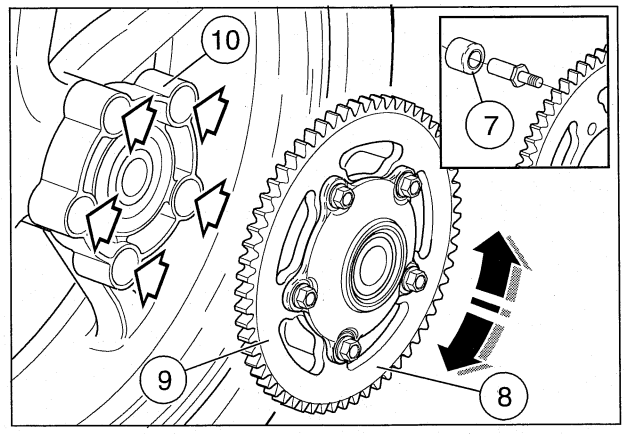
⚠ CAUTION

Make sure that all the components are intact, particularly the following.

BEARINGS, SEALS, WHEEL PIN AND RIM, see 7.2.3 (CHECKING THE COMPONENTS).

FLEXIBLE COUPLINGS

- Make sure the rubber elements (7) of the flexible couplings are not damaged and/or feature excessive wear. Where necessary, replace the rubber elements (7).
- Fit the whole final drive unit (8) on the wheel, turn the sprocket (9) by hand both ways and check the slack between the flexible coupling rubber elements (7) and the flexible coupling holders (10).
  If slack is excessive, all the rubber elements (7) must be replaced.



SPROCKET

- Check the state of the sprocket's (9) and pinion's teeth. If there are signs of excessive wear, replace the sprocket, pinion and driving chain, see 7.3.2 (DISASSEMBLING THE FINAL DRIVE UNIT) and 7.11 (DISASSEMBLING THE DRIVING CHAIN).

⚠ CAUTION

To avoid the untimely wear of the new components, crown, pinion and drive chain must be replaced all together.

TYRE

- Check the state of the tyre, see 2.36 (TYRES) and 7.4 (TYRES).

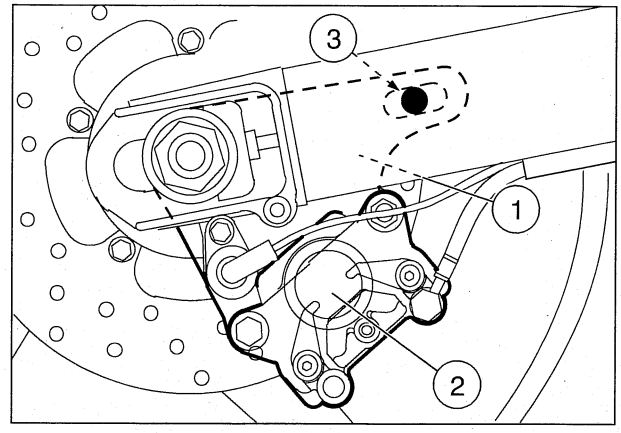
7.3.5 WHEEL REASSEMBLY

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

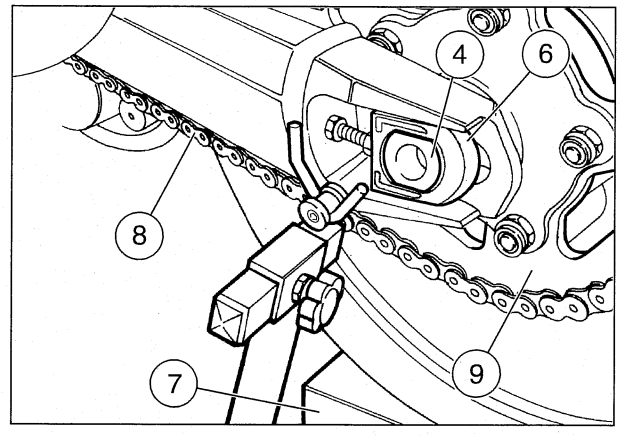
⚠ CAUTION

Before proceeding with the reassembly, make sure that support plate (1) of the brake caliper (2) is positioned correctly; the plate slot must be inserted in the appropriate stop pin (3) in the inner part of the rear fork right rod.

Insert the disc in the brake caliper carefully.
When reassembling, take care not to damage the hose, disc, brake pads and speed sensor cable.



- Spread a film of lubricating grease on the whole length of the wheel pin (4), see 1.6 (LUBRICANT CHART).
- Position the right (5) and left (6) chain tighteners in their seats on the rear fork arms.
- Position the wheel between the rear fork rods on the support (7).
- Make the wheel advance and position the drive chain (8) on the crown gear (9).

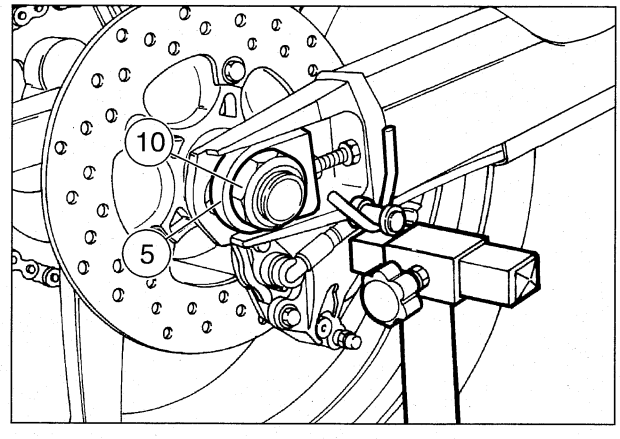


⚠ CAUTION

Danger of injury.
Do not introduce your fingers to align the holes.

- Move the wheel backwards, until its central hole and the holes on the rear fork are aligned.
- Rotate the support plate (1), complete with brake caliper (2) and with fulcrum on the stop pin (3), until it is aligned with the holes.
- Introduce the wheel pin (4) completely from the left side.

NOTE Make sure that the wheel pin (4) is inserted completely, with the head in the appropriate seat on the left chain tightener (6).



- Position the washer and tighten the nut (10) manually.
- Check the chain tension, see 2.35.3 (ADJUSTING THE DRIVING CHAIN).
- Tighten the nut (10).

Rear wheel nut driving torque: 120 Nm (12.0 kgm).

⚠ CAUTION

After reassembly, pull the rear brake lever repeatedly and check the correct functioning of the braking system.

Check the wheel centering.

7.4 TYRES

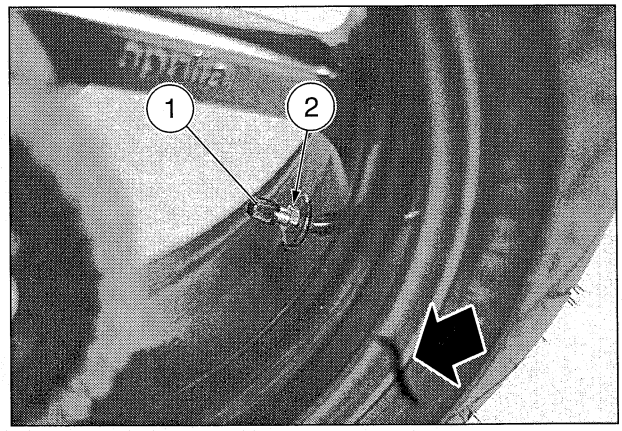
7.4.1 TYRE DISASSEMBLY

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 2.36 (TYRES).

- ◆ Unscrew and remove the closing cap (1).
- ◆ Deflate the inner tube completely.
- ◆ Unscrew and remove the valve lock ring (2).

NOTE Mark the tyre with chalk, to show its position with respect to the rim and to the rotation direction.

- ◆ Proceed to the disassembly of the tyre using special equipment and following specific procedures.



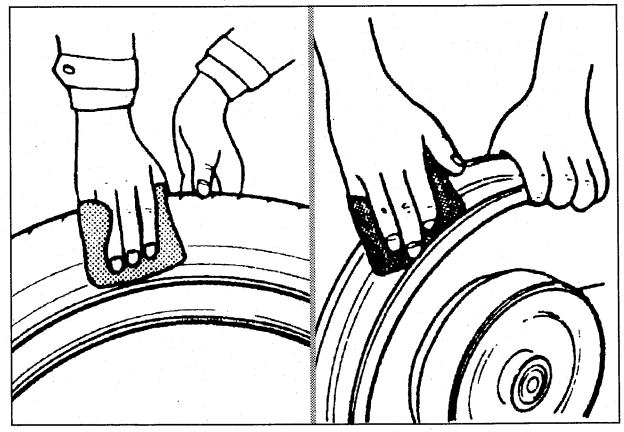
7.4.2 CHECKING THE COMPONENTS

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.

For further information, see 7.2.3 (CHECKING THE COMPONENTS).



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.

⚠ CAUTION

When repairing a punctured tyre, follow the instructions and use only the components recommended for repairing.

For further information, see 2.36 (TYRES).

7.4.3 ASSEMBLING THE TYRE

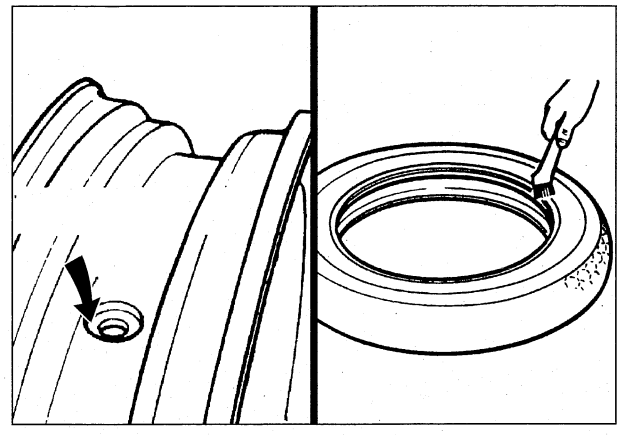
- ◆ Eliminate any trace of dirt or rust from the valve seat.
- ◆ Apply the special lubricant for tyres, or soapy water, to the beads of the tyre.

⚠ CAUTION

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.

- ◆ Proceed to the assembly of the tyre using special equipment and following specific procedures.

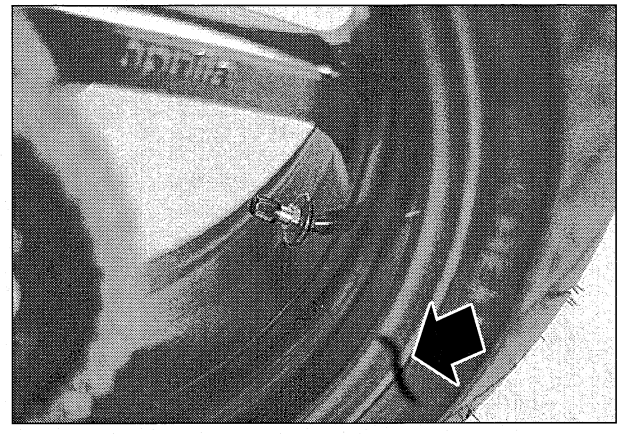


NOTE Before inflating the tyre, make sure that the mark on the tyre still coincides with the mark on the rim.

⚠ WARNING

The tyre it may explode, causing serious injuries. Never sit on the tyre while inflating it.

- ◆ Slightly inflate the tyre; do not over inflate.



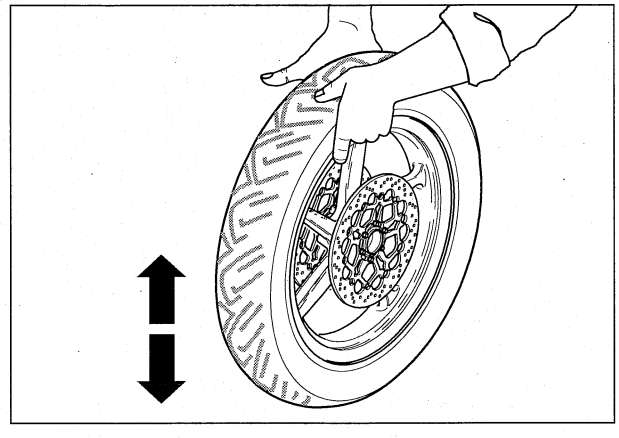
NOTE Check the "line" of the rim on the tyre side. It must be equidistant from the edge of the rim along its entire circumference.
If the distance between the line of the tyre and the rim varies along the circumference, this means that the bead is not positioned properly.

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.

⚠ WARNING

The tyre it may explode, causing serious injuries. Never sit on the tyre while inflating it.

- ◆ When the tyre is properly installed on the rim, regulate the pressure to the prescribed value.



Inflation pressure - solo rider:

- – FRONT 240 kPa (2.4 bar);
- – REAR 250 kPa (2.5 bar).

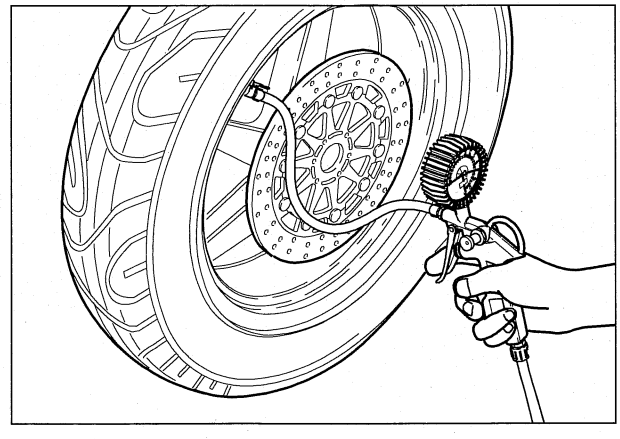
Inflation pressure rider with passenger:

- – FRONT 250 ± 10 kPa (2.5 ± 0.1 bar);
- – REAR 280 ± 10 kPa (2.8 ± 0.1 bar).

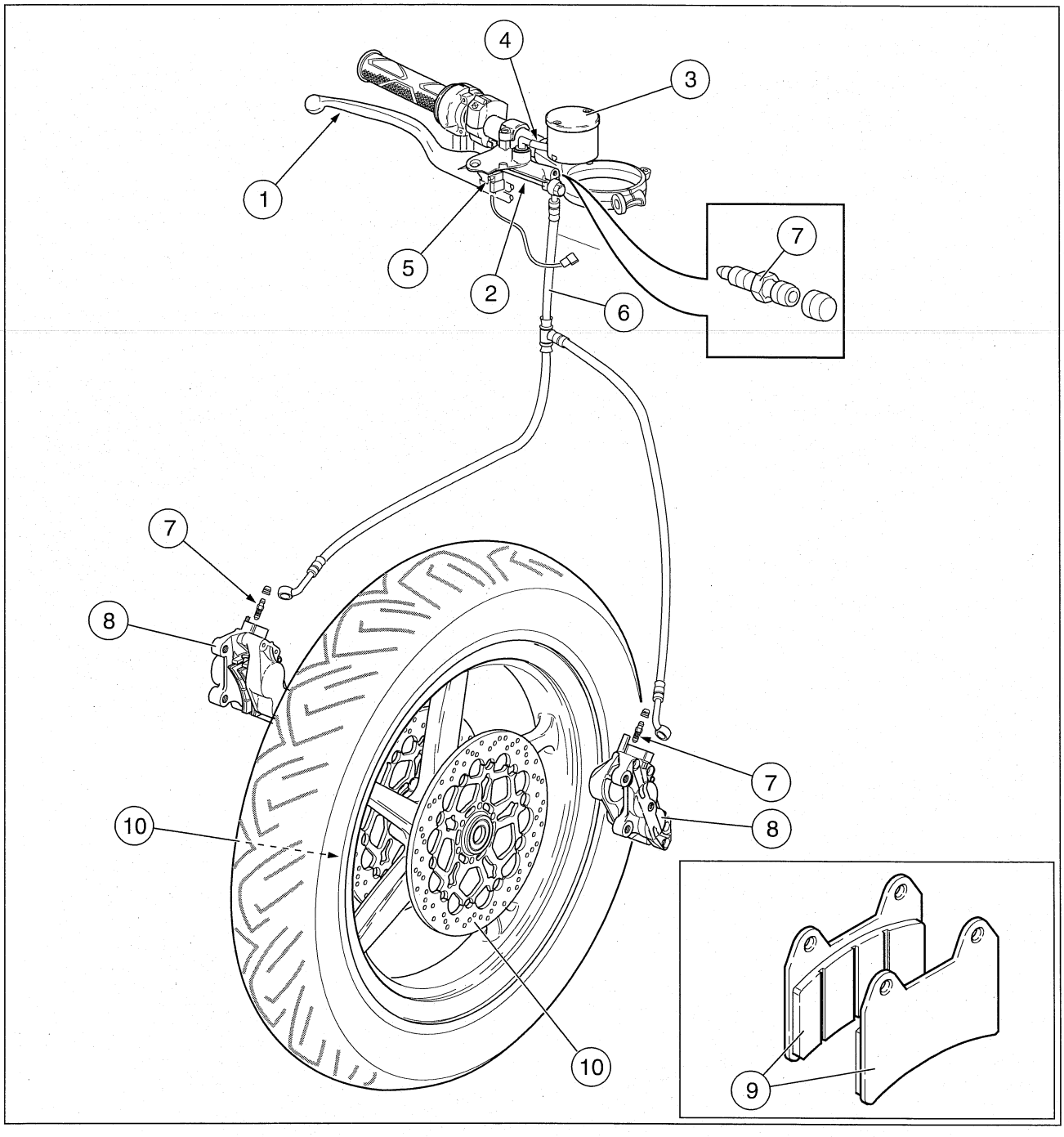
- ◆ Check the wheel centering.

⚠ WARNING

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



KEY

1) Brakes lever
2) Brakes fluid pump
3) Brakes fluid tank
4) Brakes fluid pipe from tank to pump
5) Rear brake light switch
6) Brakes fluid pipes from pump to calipers
7) Bleeder
8) Brakes caliper
9) Brake pads
10) Brake discs

For further details, see:

- 1.2.4 (BRAKE FLUID);
- 2.17 (CHECKING THE FRONT BRAKE FLUID LEVEL AND TOPPING UP);
- 2.20 (BLEEDING THE BRAKING SYSTEMS);
- 2.27 (CHECKING THE BRAKE PAD WEAR);
- 8.4.5 (FRONT BRAKING SYSTEM).

⚠ CAUTION

When disassembling/reassembling the brake caliper, replace the caliper fastening screws with two new ones of the same type.

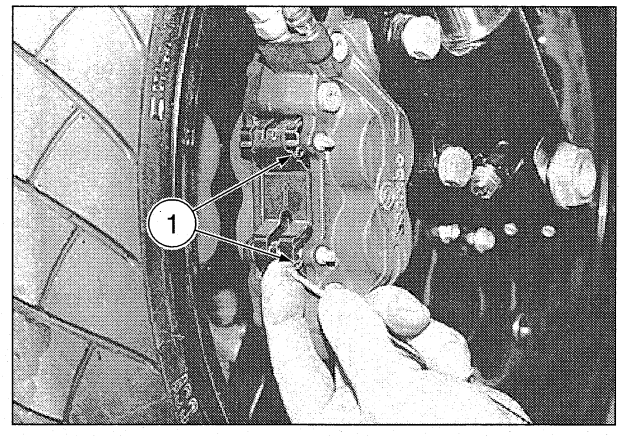
7.5.1 CHANGING THE FRONT BRAKE PADS

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 2.27 (CHECKING THE BRAKE PAD WEAR).

◆ Position the vehicle on the stand.

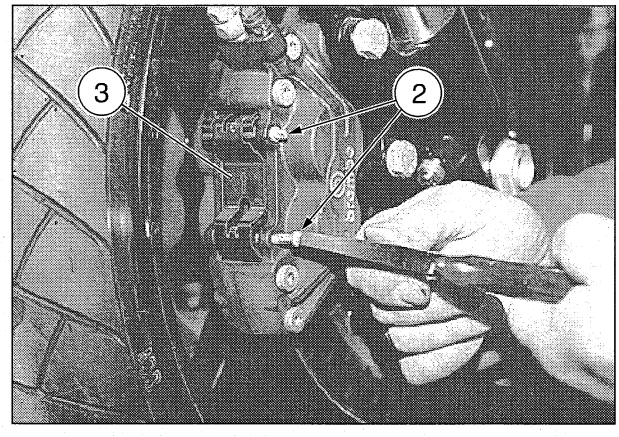
NOTE The following procedure refers to a single caliper, though it is applicable to both.

◆ Using pliers, clamp the head of one pin then the other, turning them just enough so that the two flexible stop pins (1) can be pulled out.
◆ Pull out the two flexible stop pins (1).
◆ Pull out the two pins (2).
◆ Retrieve the protective cover (3).



NOTE Using pliers, clamp one pad and then the other, shaking them slightly crosswise so as to eliminate any pressure exerted by the caliper pins, making it easier to extract the pads.

◆ Extract the two pads (4).



⚠ CAUTION

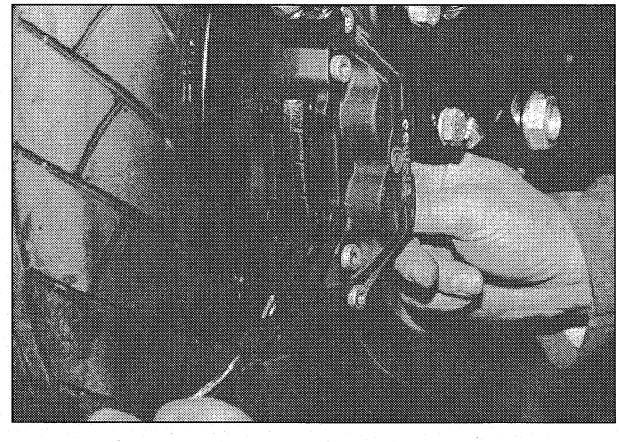
Do not pull the brake lever once the pads have been removed as the caliper pins are liable to come out of their slot, resulting in the spillage of brake fluid.

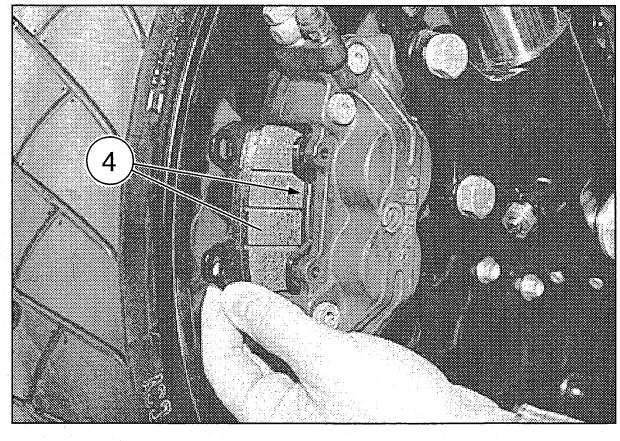
◆ Insert two new pads, positioning them so that the holes are lined up with those in the caliper.

⚠ CAUTION

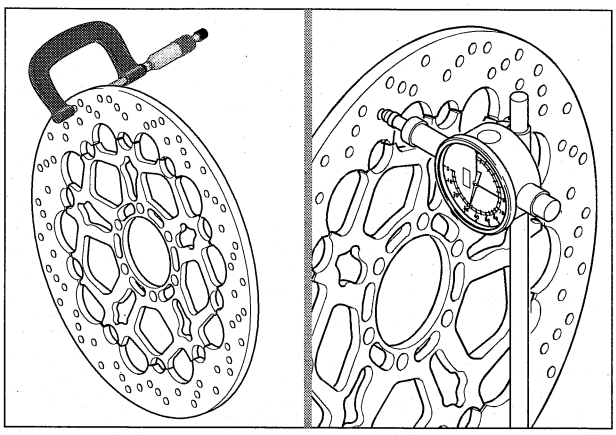
Always change both pads and make sure that they are correctly positioned inside the caliper.

◆ Refit the protective cover (3) with the arrow inscribed on it pointing up.
◆ Insert the two pins (2).
◆ Insert the two flexible stop pins (1).
◆ Check the front brake fluid level, see 2.17 (CHECKING THE FRONT BRAKE FLUID LEVEL AND TOPPING UP).





7.5.2 CHECKING THE FRONT BRAKE DISCS



NOTE These operations must be performed with the brakes discs installed on the wheel; they refer to a single disc, though they are applicable to both.

- Check the wear on the disc by measuring the minimum thickness in several places by means of a micrometer. If the minimum thickness is below the minimum value, even in a single point, change the disc.

Brake disc min. thickness: 4.5 mm.

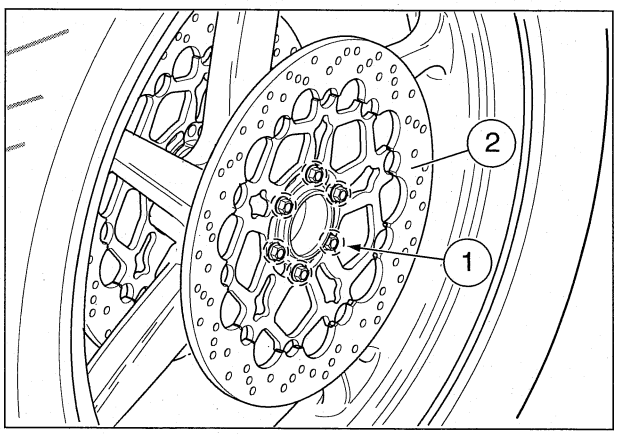
- Using a comparator, make sure that the maximum wobbling of the disc does not exceed the limit value, otherwise change it, see 7.5.3 (REMOVING THE FRONT BRAKE DISCS).

Brake disc max. wobbling: 0.3 mm.

7.5.3 REMOVING THE FRONT BRAKE DISCS

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

- Remove the front wheel, see 7.2.1 (REMOVING THE WHOLE WHEEL).

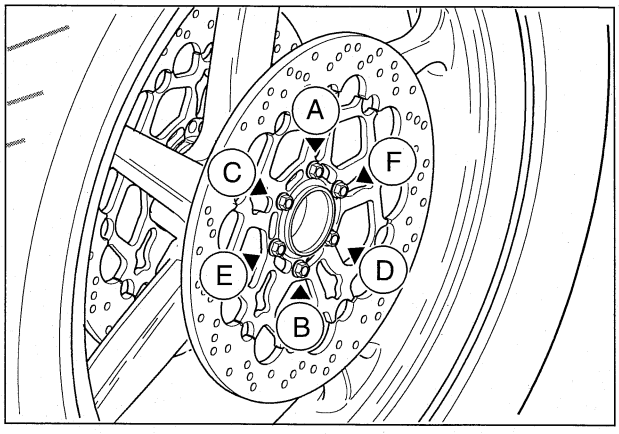


NOTE The following procedure refers to a single disc, though it is applicable to both.
To unscrew the screws (1), it is advisable to use a percussion screwdriver, thanks to which it will be possible to detach the screws from the LOCTITE® 243.

- Unscrew and remove the six brake disc screws (1).

⚠ CAUTION

When reassembling, apply LOCTITE® 243 on the thread of the brake disc screws (1).



NOTE When reassembling, screw all the screws (1) on manually and tighten them in a crisscross pattern in the following order: A-B-C-D-E-F.

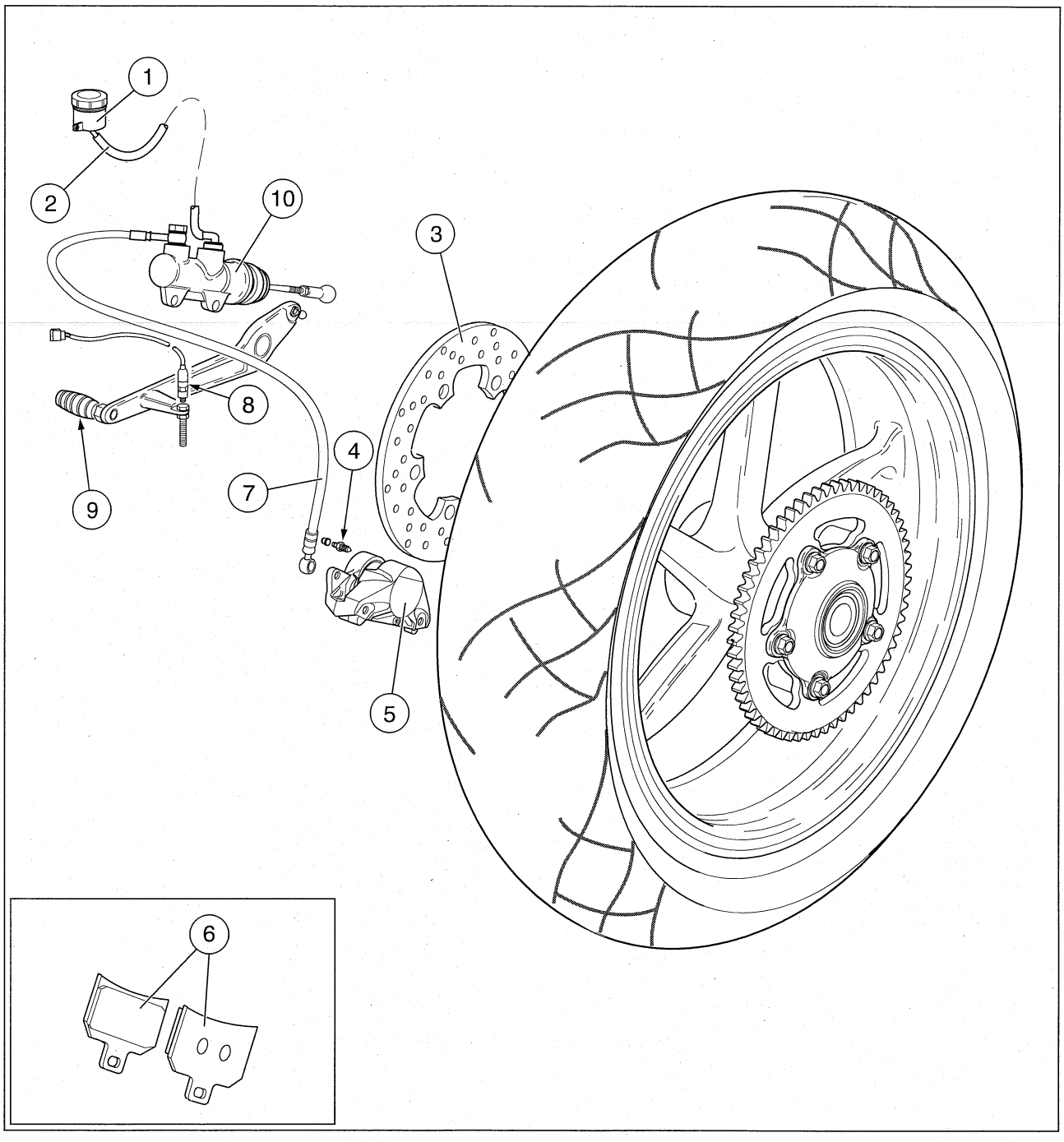
Front brake disc screws driving torque: 30 Nm (3.0 kgm).

- Remove the brake disc (2).

7.5.4 REMOVING THE FRONT BRAKE PUMP

See 7.1.14 (REMOVING THE FRONT BRAKE LEVER).

7.6 REAR BRAKE



KEY

1) Brake fluid tank
2) Brake fluid pipe from tank to pump
3) Brake disc
4) Bleeder
5) Brake caliper
6) Brake pads
7) Brake fluid pipe from pump to caliper
8) Rear brake light switch
9) Brake pedal
10) Brake pump

For further details, see:

- 1.2.4 (BRAKE FLUID);
- 2.18 (CHECKING AND TOPPING UP THE REAR BRAKE FLUID);
- 2.20 (BLEEDING THE BRAKING SYSTEMS);
- 2.26 (ADJUSTING THE REAR BRAKE CONTROL LEVER CLEARANCE);
- 2.27 (CHECKING THE BRAKE PAD WEAR);
- 8.4.6 (REAR BRAKING SYSTEM).

⚠ CAUTION

When disassembling/reassembling the brake caliper, replace the caliper fastening screws with two new ones of the same type.

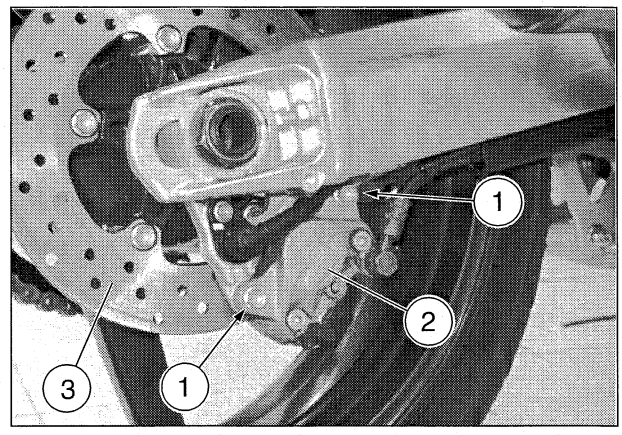
7.6.1 CHANGING THE REAR BRAKE PADS

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 2.27 (CHECKING THE BRAKE PAD WEAR).

◆ Position the vehicle on the stand.

Rear brake caliper screws driving torque: 25 Nm (2.5 kgm).

◆ Unscrew and remove the two screws (1).



⚠ CAUTION

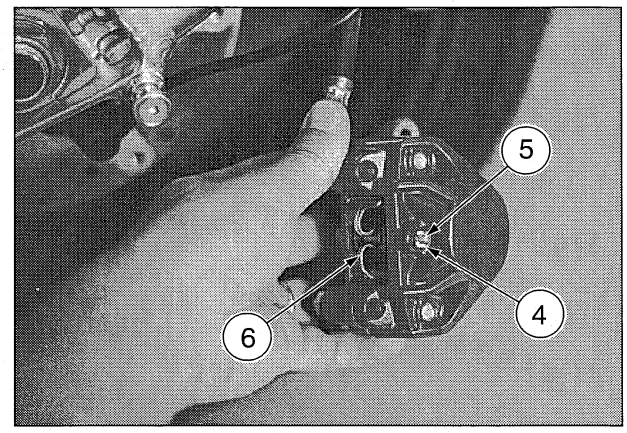
When reassembling the brake caliper, replace the caliper (2) fastening screws (1) with two new ones of the same type.

◆ Pull the caliper (2) off the disc (3).
◆ Remove the stop ring (4).

⚠ CAUTION

Before sliding out the pin (5), take note of the positioning of the safety spring (6); when reassembling, it must be refitted in the same way.

◆ Pull out the pin (5) and retrieve the safety spring (6).
◆ Extract the two pads (7).



⚠ CAUTION

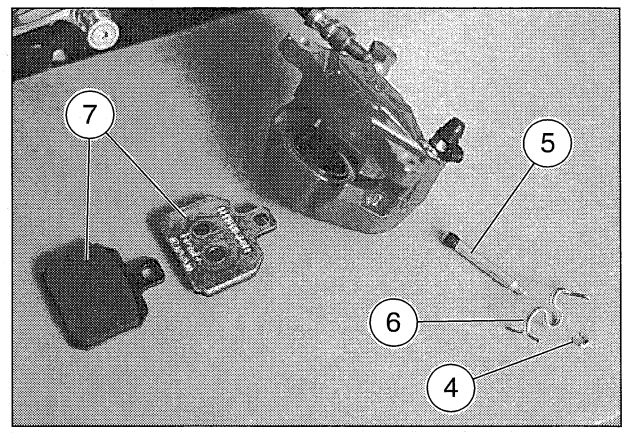
Do not pull the brake lever once the pads have been removed as the caliper pins are liable to come out of their slot, resulting in the spillage of brake fluid.

◆ Insert two new pads, positioning them so that the holes are lined up with those in the caliper.

⚠ CAUTION

Always change both pads and make sure that they are correctly positioned inside the caliper.

◆ Refit the safety spring (6).
◆ Keeping the safety spring (6) pressed in the middle, insert the pin (5) so that it passes over it.
◆ Refit the stop ring (4).
◆ Check the rear brake fluid level, see 2.18 (CHECKING AND TOPPING UP THE REAR BRAKE FLUID).



7.6.2 CHECKING THE REAR BRAKE DISC

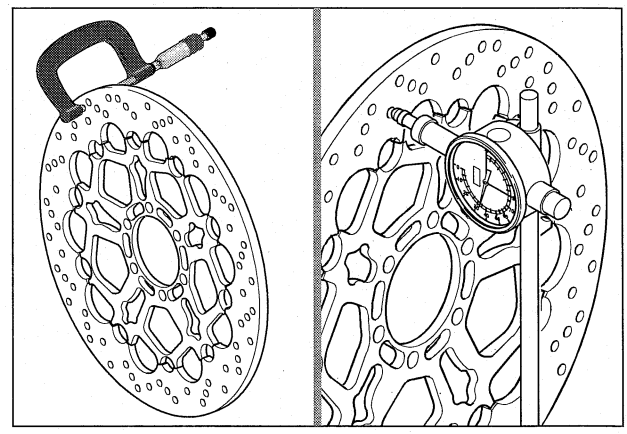
NOTE These operations must be performed with the brake disc installed on the wheel.

◆ 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 see 7.6.3 (REMOVING THE REAR BRAKE 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, see 7.6.3 (REMOVING THE REAR BRAKE DISC).

Brake disc max. wobbling: 0.3 mm.



7.6.3 REMOVING THE REAR BRAKE DISC

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

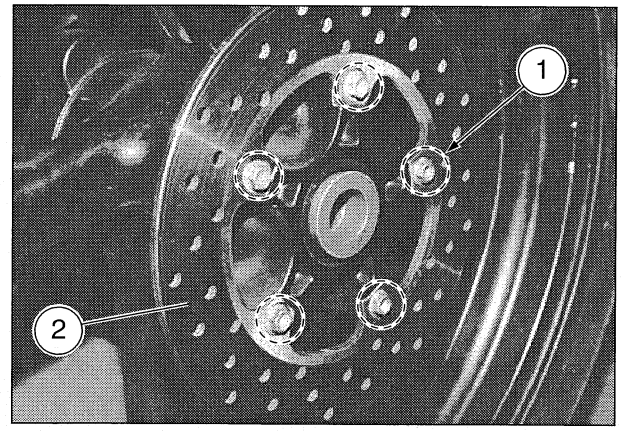
◆ Remove the rear wheel, see 7.3.1 (REMOVING THE WHOLE WHEEL).

NOTE To unscrew the screws (1), it is advisable to use a percussion screwdriver, thanks to which it will be possible to detach the screws from the LOCTITE® 243.

◆ Unscrew and remove the five brake disc screws (1).

⚠ CAUTION

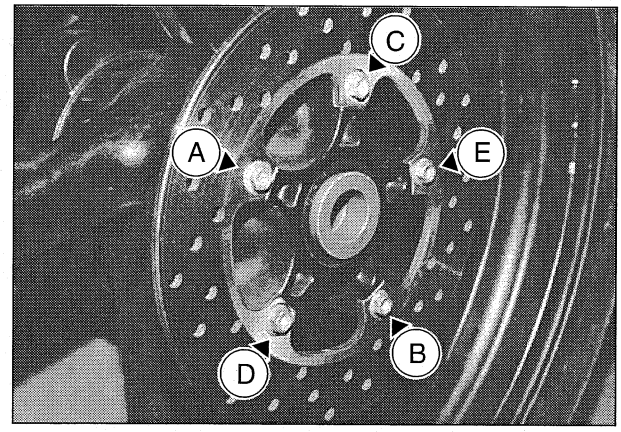
When reassembling, apply LOCTITE® 243 on the thread of the brake disc screws (1).



NOTE When reassembling, screw all the screws on manually and tighten them in a crisscross pattern in the following order: A-B-C-D-E.

Rear brake disc screws driving torque: 30 Nm (3.0 kgm).

◆ Remove the brake disc (2).



7.6.4 REMOVING THE REAR BRAKE PUMP

◆ Perform the first three operations described in chapter 2.23 (CHANGING THE REAR BRAKE FLUID).

Rear brake pipe coupling screw (3) driving torque: 20 Nm (2.0 kgm).

◆ Once all the fluid has been drained out, unscrew and remove the screw (3) and retrieve the two O-rings.
◆ Loosen and move the pipe clamp (4).
◆ Slide the pipe (5) from its fitting on the pump.

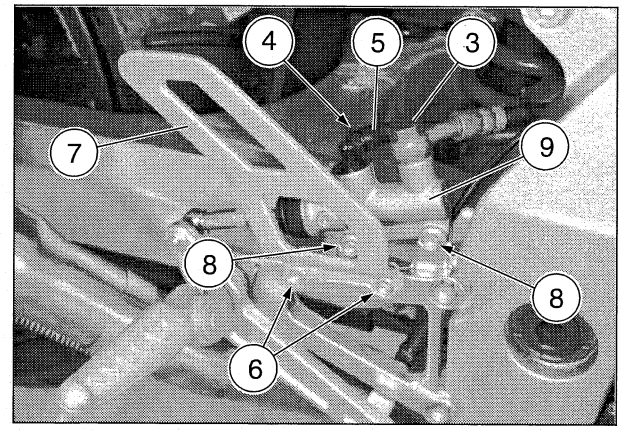
Driving torque of the rider footrest (6) right guard screws: 8 Nm (0.8 kgm).

◆ Unscrew and remove the two screws (6).
◆ Retrieve the protection element (7).

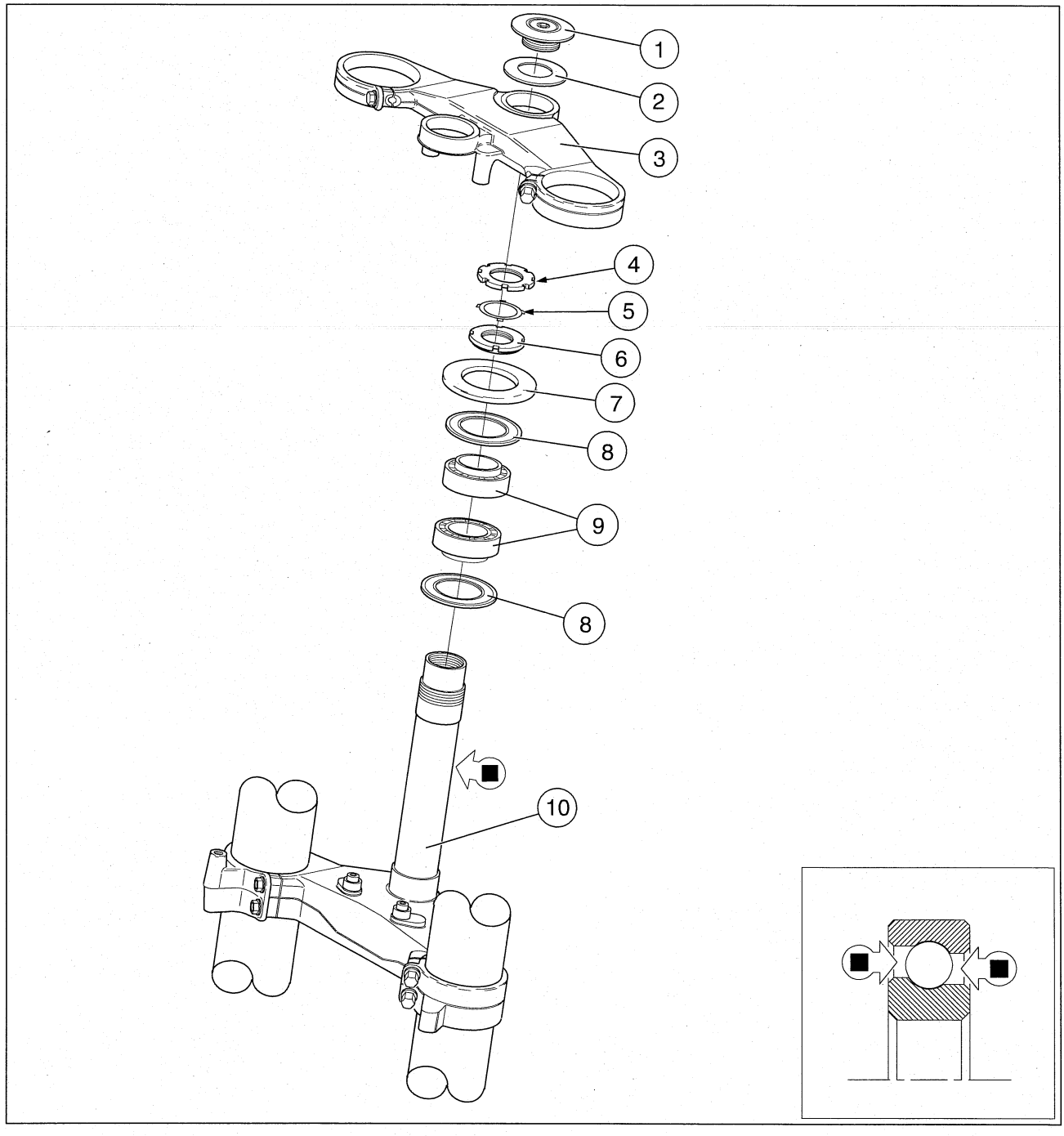
Brake pump screws driving torque: 10 Nm (1.0 kgm).

◆ Unscrew and remove the two nuts and the relevant screws (8).
◆ Remove the pump (9), sliding it off the front.

NOTE When reassembling, top up the brake fluid, see 2.18 (CHECKING AND TOPPING UP THE REAR BRAKE FLUID) and bleed the braking system, see 2.20 (BLEEDING THE BRAKING SYSTEMS).



7.7 STEERING



KEY

1) Upper bush
2) Washer
3) Upper plate
4) Lock ring
5) Lock washer
6) Adjuster ring
7) Protective cover
8) Antidust gasket
9) Bearings
10) Lower plate

■ = **GREASE, see 1.6 (LUBRICANT CHART).**

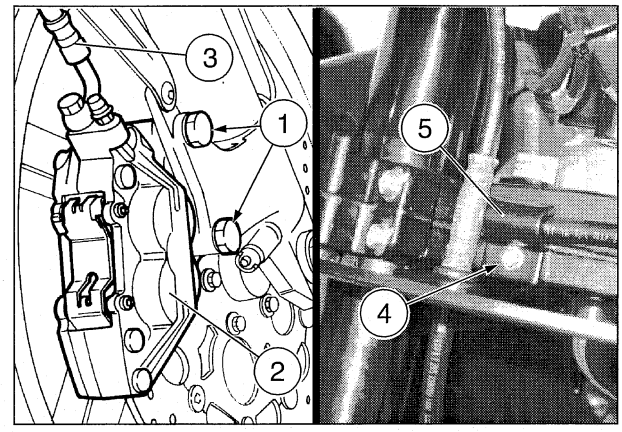
For further details, see:

- 2.28 (STEERING);
- 2.29 (INSPECTING THE FRONT AND REAR SUSPENSION).

7.7.1 DISASSEMBLING THE STEERING

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 2.28 (STEERING).

- Position the vehicle on the relevant centre stand OPT on a lifting platform, with the front wheel sticking out over the edge of the platform, see 1.8.4 (POSITIONING THE VEHICLE ON THE CENTRE SUPPORT STAND OPT).
- Place a support under the front wheel.
- Remove the front part of the fairing, see 7.1.19 (REMOVING THE FRONT PART OF THE FAIRING).
- Remove the front fairing lower lockup, see 7.1.28 (REMOVING THE FRONT FAIRING LOWER LOCKUP).
- ★Unscrew and remove the two screws (1) that fasten the front brake caliper (2).



Front brake caliper screws driving torque: 50 Nm (5.0 kgm).

- ★Withdraw the brake caliper (2) from the disc, leaving it attached to the pipe (3).

⚠ CAUTION

Never pull the front brake lever after removing the calipers, otherwise the pistons may go out of their seats, thus causing the outflow of the brake fluid.

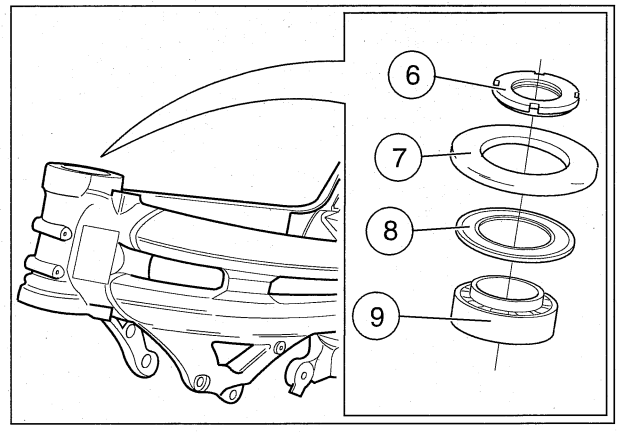
- Perform the first ten operations described in chapter 2.28.2 (ADJUSTING THE BEARING SLACK STEERING).

Front brake pipe grommet screw driving torque: 3 Nm (0.3 kgm).

- Unscrew and remove the screw (4).
- Recover the bracket (5).

Adjuster ring driving torque: 40 Nm (4.0 kgm).

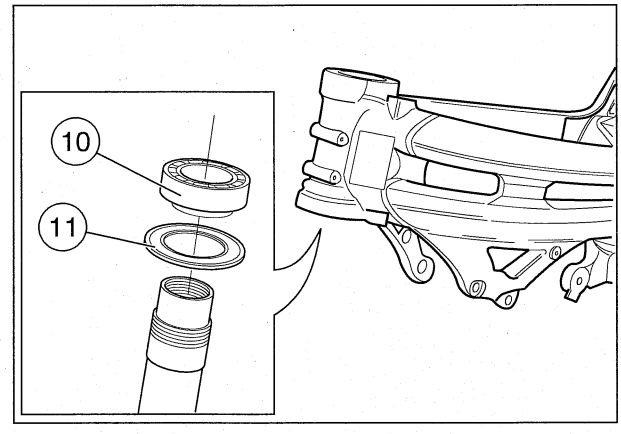
- Use the relevant socket spanner to loosen and remove the adjuster ring (6).



⚠ CAUTION

Due to the weight of the forecarriage, the following operations require the assistance of another operator.
Fix the operating procedure before starting work.
The removal must be carried out with the greatest care.
Support the forecarriage to prevent it accidentally dropping.
Whilst removing the forecarriage, take care not to let the brake fluid pipe get entangled.

- With one operator holding the forecarriage in place, raise the lifting platform slowly until the forecarriage steering head slides off.
- Recover the protective cover (7).
- Remove the upper antidust gasket (8).
- Slide off the bearing (9).
- Use a special extractor to remove the lower bearing (10) and the lower antidust gasket (11).



⚠ CAUTION

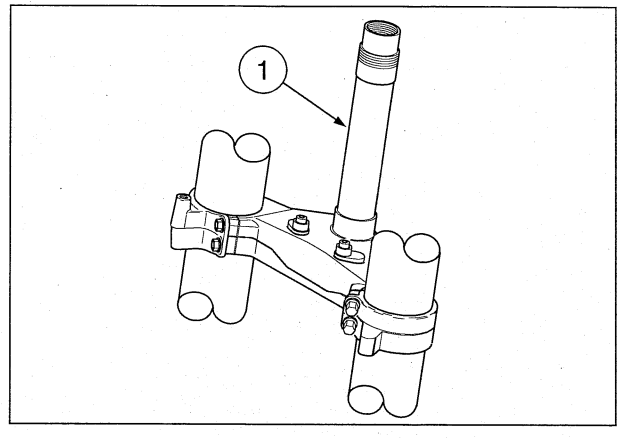
When reassembling, use a drift with the same diameter as the outer race to insert the bearings.
Do not strike the balls and/or the inner race.
Make sure the bearings are perfectly in contact.
Wash all the components with a clean detergent.

7.7.2 CHECKING THE COMPONENTS

⚠ CAUTION

Make sure that all the components are intact, particularly the following.

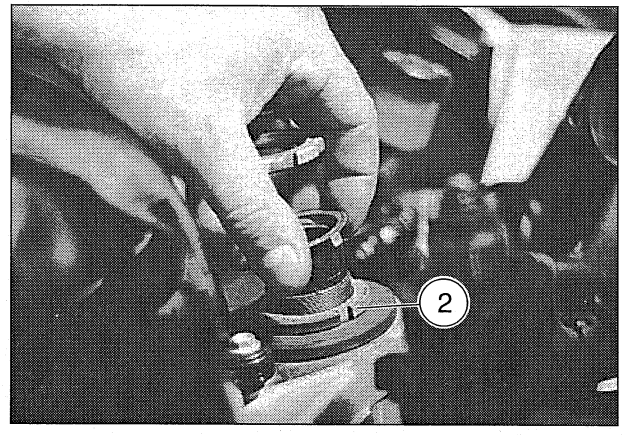
BEARINGS AND SEALS, see 7.2.3 (CHECKING THE COMPONENTS).



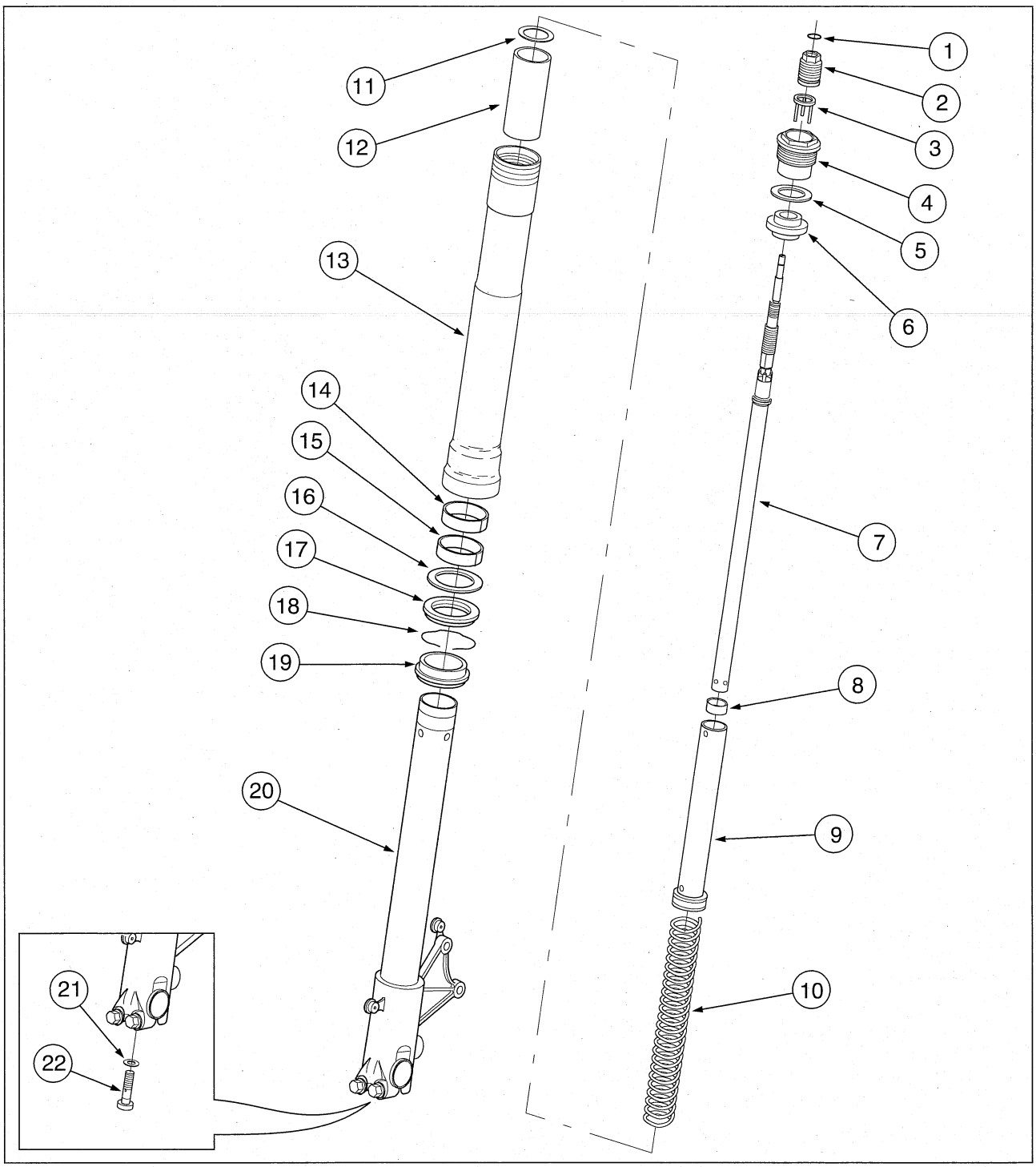
7.7.3 REASSEMBLING THE STEERING

NOTE When reassembling, the vehicle and the forecarriage must be positioned as for disassembly and the disassembly procedure then followed in reverse order.

- Smear a film of grease over the entire length of the pin (1), see 1.6 (LUBRICANT CHART).
- Before tightening the adjuster ring (2) completely, turn the steering a number of times both ways so as to enable the bearings to set.
- Proceed to adjust the bearing slack, see 2.28.2 (ADJUSTING THE BEARING SLACK STEERING).
- Make sure that turning the handlebars does not result in any of the cables or pipes being pulled too tight, and that none are entangled and/or overlap incorrectly.
- Top up the brake fluid, see 2.17 (CHECKING THE FRONT BRAKE FLUID LEVEL AND TOPPING UP).



7.8 FRONT FORK



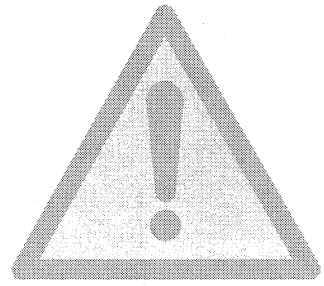
KEY

1) Retainer ring
2) Spring preload adjuster
3) Spring preload pusher
4) Slider upper plug
5) Washer
6) Slide bush
7) Piston assembly
8) Centring bush
9) Spring-press tube
10) Spring
11) Spring rest washer
12) Lower collar
13) Slider
14) Slide bush
15) Guide bush
16) Stop ring
17) Gasket
18) Retainer ring
19) Antidust gasket
20) Wheel-holder tube
21) Copper washer
22) Centre screw

7.8.1 CHANGING THE FORK OIL

Carefully read 1.2.3 (FORK OIL) and 2.29.2 (ADJUSTING THE FRONT FORK).

- Carry out the operations marked with the symbol "*" described at 7.8.3 (DISASSEMBLING THE WHEEL-HOLDER TUBE - SLIDER UNIT).
- Carry out the operations marked with the symbol "*" described at 7.8.5 (REASSEMBLING THE WHEEL-HOLDER TUBE - SLIDER UNIT).



7.8.2 REMOVING THE WHEEL-HOLDER TUBE - SLIDER UNITS

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 2.29 (INSPECTING THE FRONT AND REAR SUSPENSION).

NOTE The operations described below are referred to a single wheel-holder tube - slider unit, but are valid for both.

⚠ CAUTION

Do not remove a wheel-holder tube - slider unit before having correctly reinstalled the other wheel-holder tube - slider unit on the vehicle.

- Remove the front wheel, see 7.2.1 (REMOVING THE WHOLE WHEEL).
- Remove the rear mudguard, see 7.1.24 (REMOVING THE FRONT MUDGUARD).
- Position the vehicle on the special centre stand, see 1.8.4 (POSITIONING THE VEHICLE ON THE CENTRE SUPPORT STAND OPT).
- Remove the front support stand.

Fork upper plate screw driving torque: 25 Nm (2.5 kgm).

- Loosen the screw (1) locking the upper plate (2) in place on the slider unit (3).

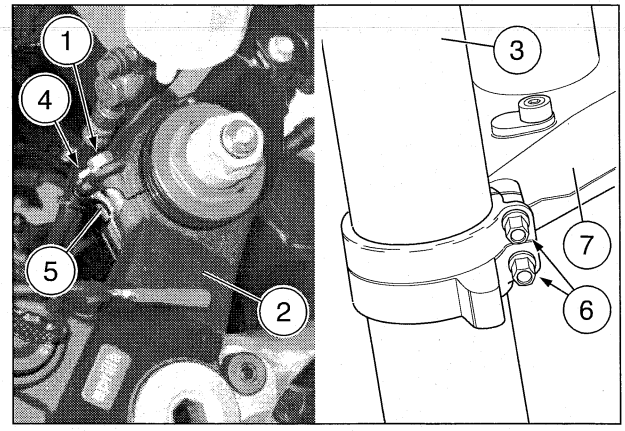
Handlebar screw driving torque: 25 Nm (2.5 kgm).

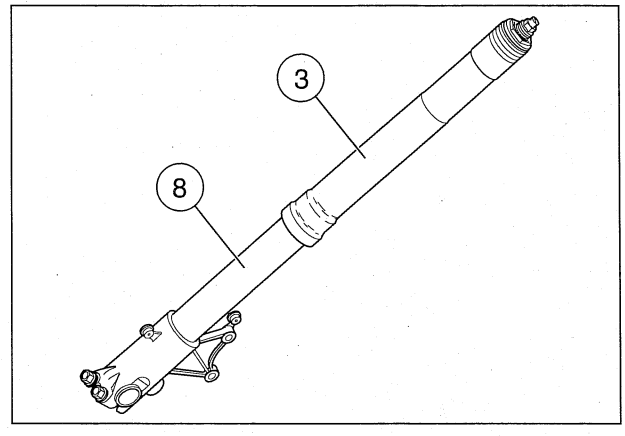
- Loosen the screw (4) locking the handlebar (5) in place on the slider unit (3).

Fork lower plate screws driving torque: 25 Nm (2.5 kgm).

- Loosen the two screws (6) locking the lower plate (7) in place on the slider unit (3).
- Pull the wheel-holder tube (8) complete with slider unit (3) off the upper (2) and lower (7) plates.

NOTE Where necessary, remove the other wheel-holder tube - slider unit.





7.8.3 DISASSEMBLING THE WHEEL-HOLDER TUBE - SLIDER UNIT

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS), 1.2.3 (FORK OIL) and 2.29 (INSPECTING THE FRONT AND REAR SUSPENSION).

NOTE The right and left wheel-holder tube - slider units have the same inner components.

The operations described below are referred to a single wheel-holder tube - slider unit, but are valid for both.

The operations marked with the symbol "✱" are valid also for the fork oil change.

- ✱ Remove the wheel-holder tube - slider unit, see 7.8.2 (REMOVING THE WHEEL-HOLDER TUBE - SLIDER UNITS).
- ✱ Carefully clean the whole wheel-holder tube - slider unit.

NOTE Before proceeding with the following operations, prepare the appropriate special tools OPT (A), (B), (C) and a container with capacity exceeding 550 cm^3.

⚠ CAUTION

The disassembly must be performed very carefully.

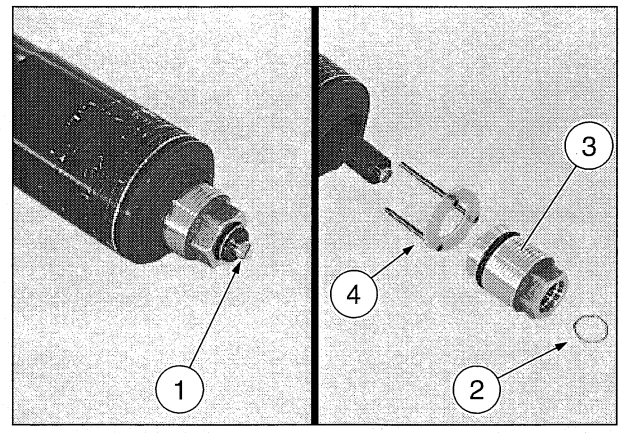
- ✱ Rotate the upper screw adjuster (1) completely anti-clockwise, in order to reduce the hydraulic braking with extended unit.
- ✱ Remove the stop ring (2).
- ✱ Unscrew and remove the adjusting element (3).
- ✱ Withdraw the spring preload pushing element (4).
- ✱ Position the wheel-holder tube - slider unit on a vice, interposing the two half-shells of the special tool (C).

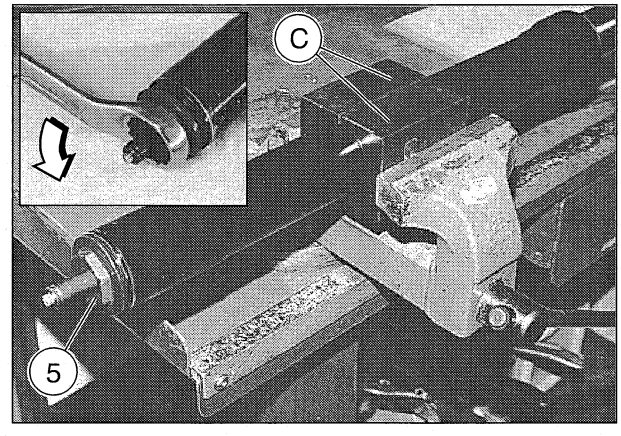
⚠ CAUTION

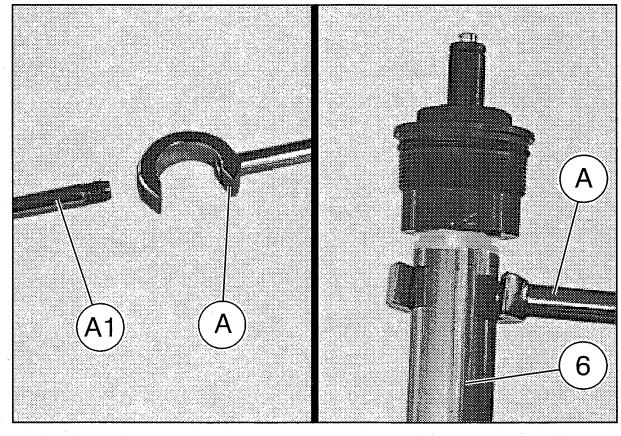
The wheel-holder tube - slider unit is full of oil; do not overturn or incline it excessively during disassembly.

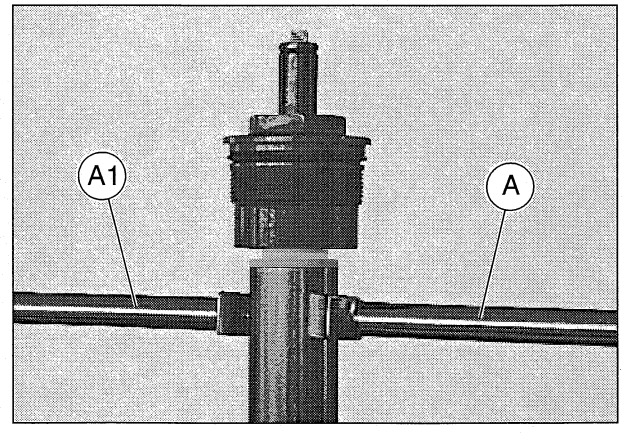
- ✱ Loosen the slider upper plug (5).
- ✱ Remove the wheel-holder tube - slider unit from the vice.
- ✱ Keeping the wheel-holder tube - slider unit in vertical position, unscrew the slider upper plug (5) completely.
- ✱ Unscrew and remove the threaded pin (A1) from the tool (A).
- ✱ Position the fixed part of the tool (A) on the spring pressing tube (6), so that the tooth fits in the hole.
- ✱ Position the threaded pin (A1) in the hole on the fixed part of the tool (A), making sure that when screwed completely it fits in the hole on the spring pressing tube (6).

Follow ▶







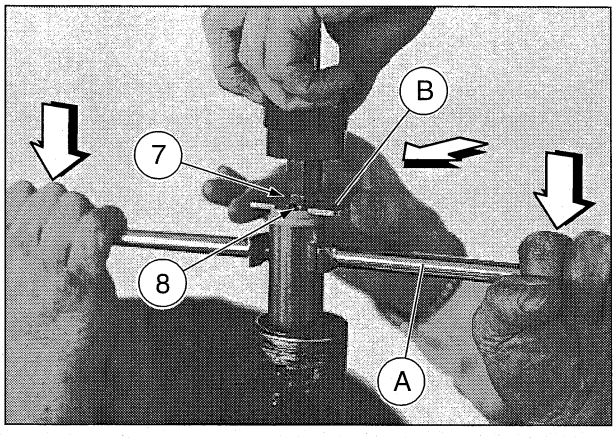


Follow ▶

⚠ CAUTION

The following operations must be performed by two persons. Fix the operating procedure before starting work.

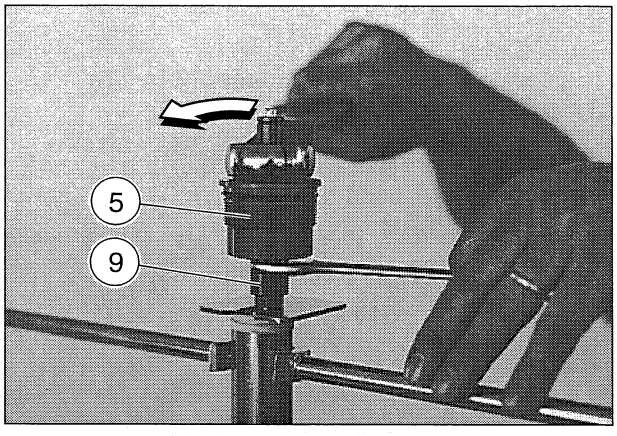
- ◆ ✱ Rest both hands on the tool (A).
- ◆ ✱ Push downwards and at the same time insert the tool (B) between the locking nut (7) and the washer (8).
- ◆ ✱ Keeping the pumping element (9) still, unscrew the slider upper plug (5) by means of a fork spanner inserted in the appropriate seat.
- ◆ ✱ Rest both hands on the tool (A).
- ◆ ✱ Push downwards and at the same time withdraw the tool (B).
- ◆ ✱ Remove the tool (A).
- ◆ ✱ Remove the washer (8).
- ◆ ✱ Remove the sliding ring (10).

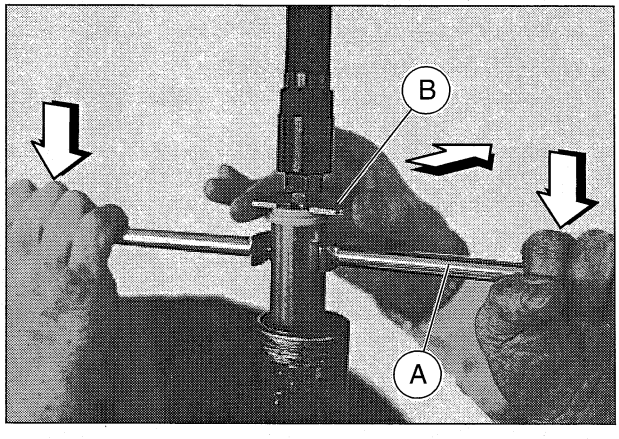


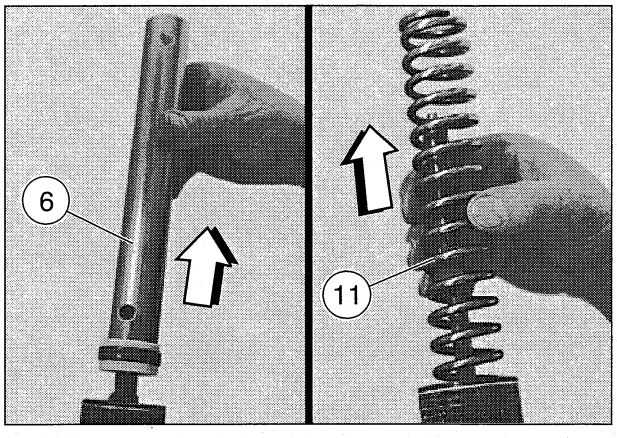
NOTE Before removing them completely, keep the spring pressing tube (6) and the spring (11) out of the fork tube for a few seconds, so that part of the oil drops inside the fork tube itself.

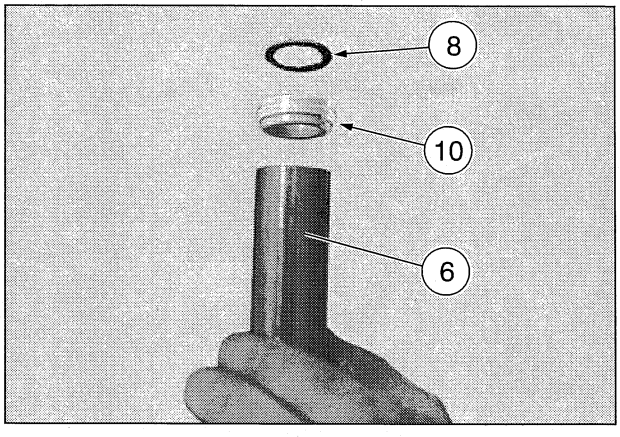
- ◆ ✱ Remove the spring-press tube (6) complete with spring press and slide ring.
- ◆ ✱ Withdraw and remove the spring (11).

Follow ▶









Follow ▶

◆ ✱ Overturn the wheel-holder tube together with the slider, pouring the oil inside the container (12).

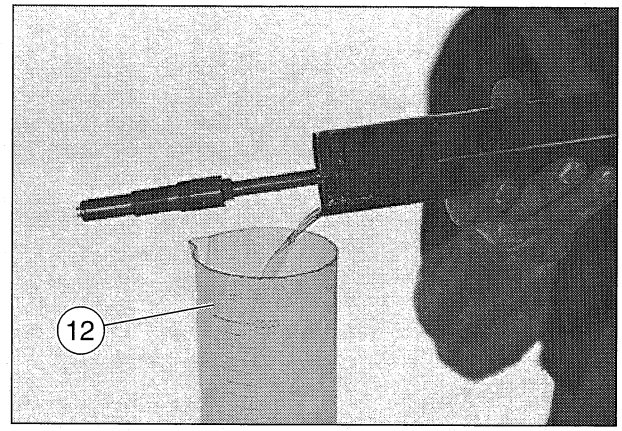
NOTE ✱ In order to have all the oil flow out, slowly and alternately push the pumping element (9) in the slider (eight-ten times).
At the end of this operation, the tube will slide inside the slider freely.

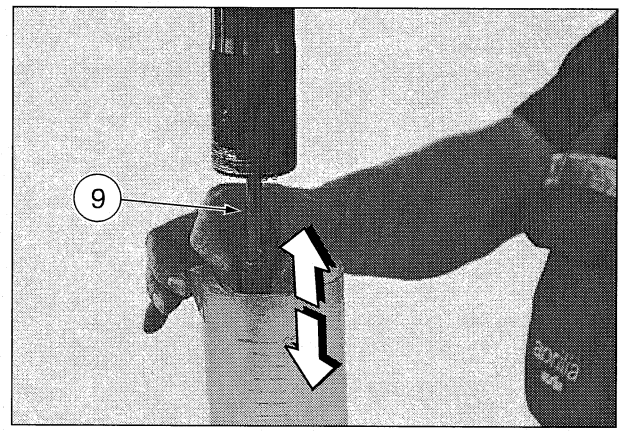
◆ If it does not come out during the oil draining process, slide off the following components in the order given:
  – spring rest washer (13);
  – lower collar (14).

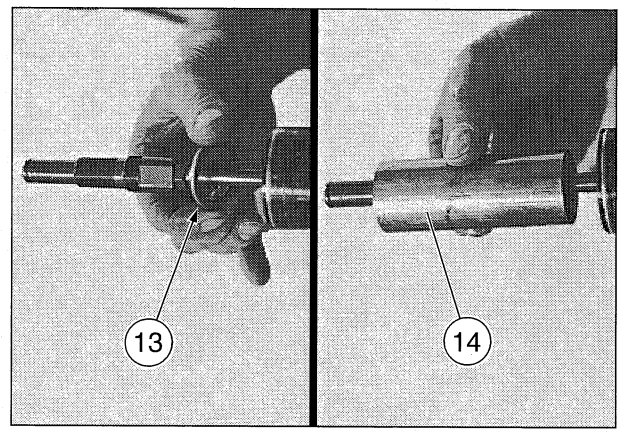
◆ Remove the antidust gasket (15) from the slider by alternately levering on more points with a cut-tipped screwdriver.

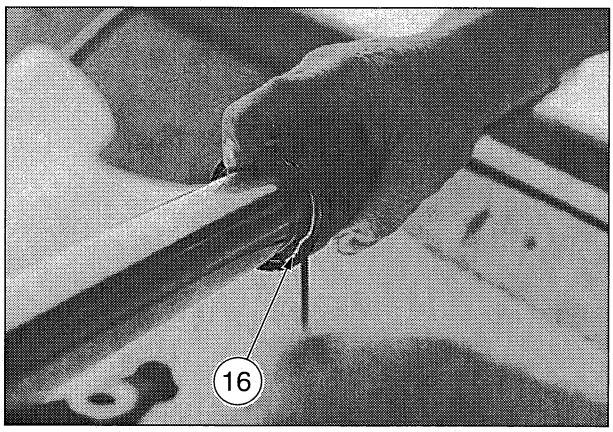
◆ Remove the stop ring (16) by means of a cut-tipped screwdriver.

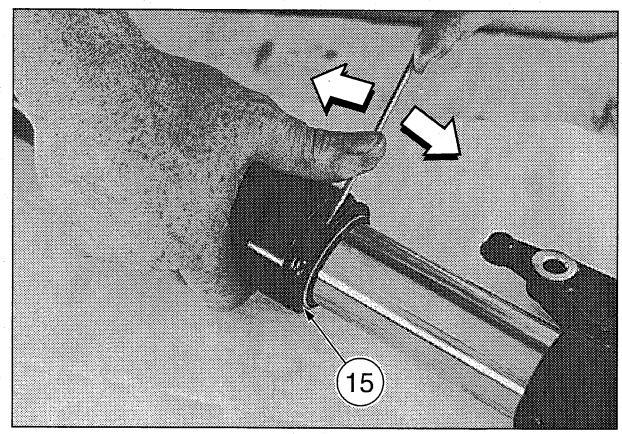
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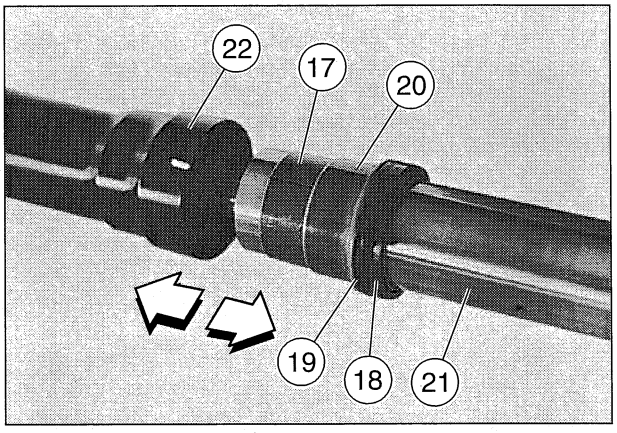


Follow ▶

⚠ CAUTION

The following operation must be performed with force, since the slide bushing (17) must push the gasket (18), the ring (19) and the guide bushing (20), which will all resist the withdrawing action.

◆ Withdraw the whole wheel-holder tube (21) from the slider (22).



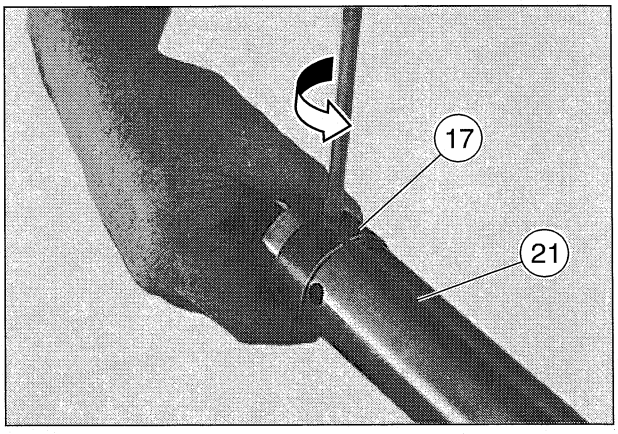
⚠ CAUTION

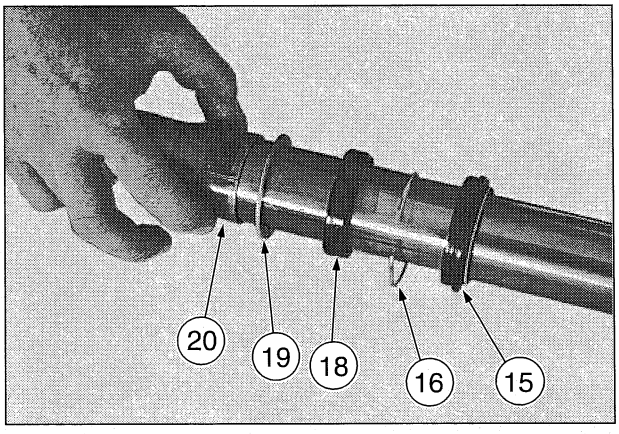
When withdrawing the slide bushing (17), be careful not to damage it (especially its sliding surface).

◆ With a cut-tipped screwdriver, to enlarge moderately and withdraw the slide bushing (17) from the tube (21).
◆ Withdraw and remove the following components from the tube (21), in the given order:

– guide bushing (20);
– ring (19);
– gasket (18);
– stop ring (16);
– antidust gasket (15).

Follow ▶





Follow ▶

- ◆ Position the wheel-holder tube (21) on a vice, interposing clamps made of soft material (aluminium).
- ◆ Unscrew and remove the centre screw (23) and take the copper washer (24).
- ◆ Withdraw the complete pumping element (9) from the tube (21).

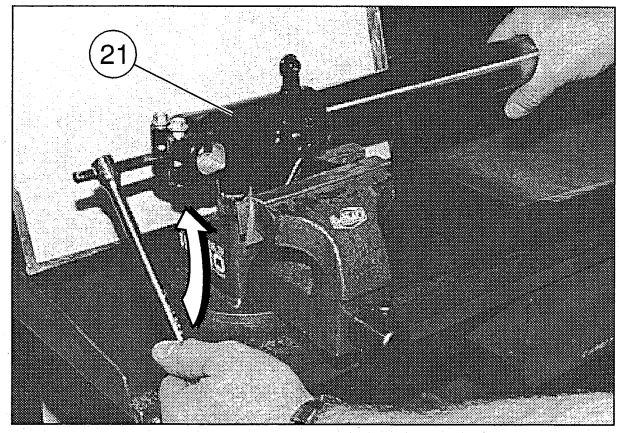
⚠ CAUTION

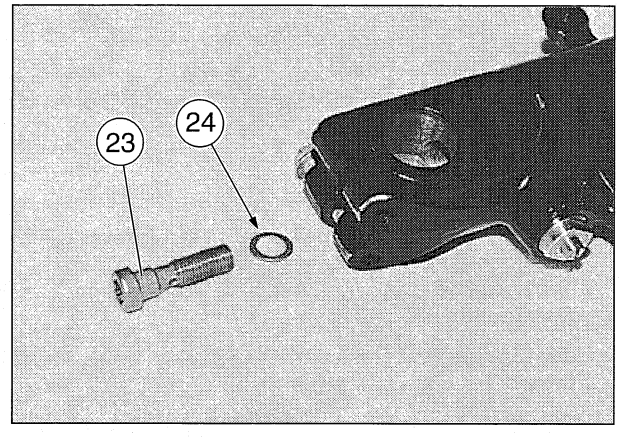
The pumping element (9) must not be removed.

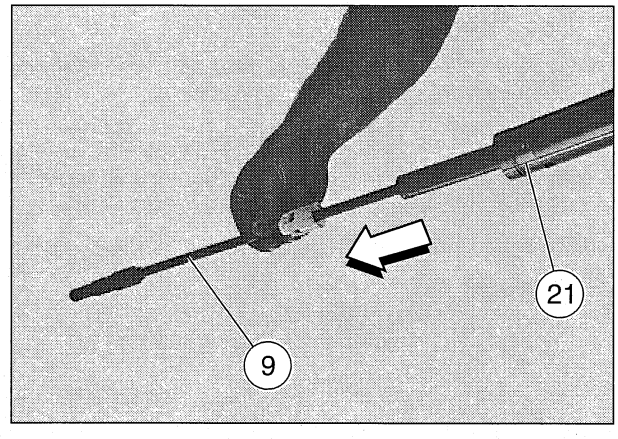
- ◆ Take the centering bushing (25).

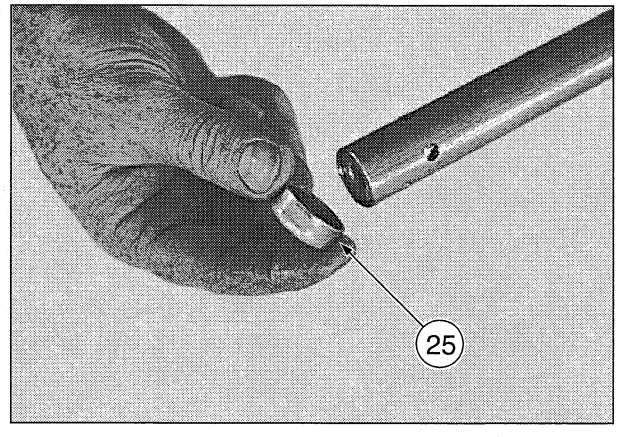
⚠ CAUTION

Wash all the components with a clean detergent.







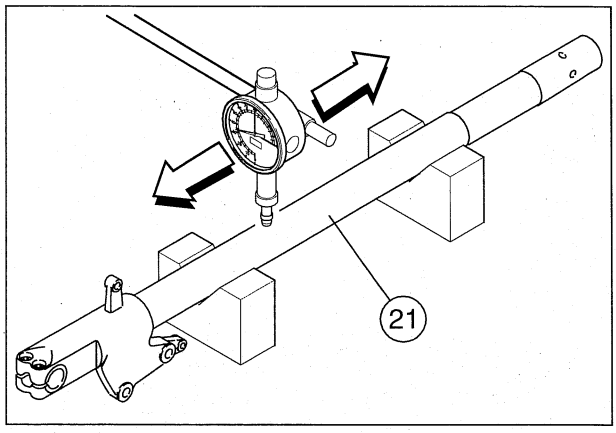


7.8.4 CHECKING THE COMPONENTS

WHEEL-HOLDER TUBE

- Check the sliding surface, which must be neither lined, nor scratched.
  Slight lines can be eliminated by sanding the surface with wet sandpaper (grain 1).
  If the lines are deep, change the tube (21).
- By means of a comparator, make sure that any curving of the tube (21) be lower than the limit value.
  If it exceeds the limit value, change the tube.

Curving limit: 0.2 mm.



⚠ WARNING

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

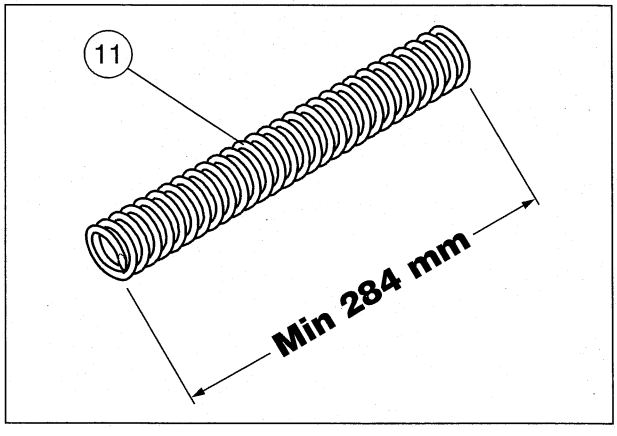
SLIDER

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

SPRING

- Check the integrity of the spring (11), making sure that its length does not exceed the limit value.
- If the length does not correspond to the limit value, change the spring (11).

Minimum length of the spring when not compressed: 284 mm.



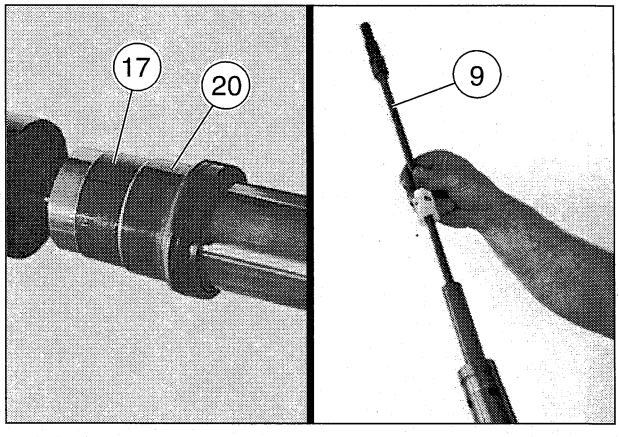
- Check the condition of the following components:

  – slide bushing (17);
  – guide bushing (20);
  – pumping element (9).

  If excessive wear or any damage are observed, change the component in question.

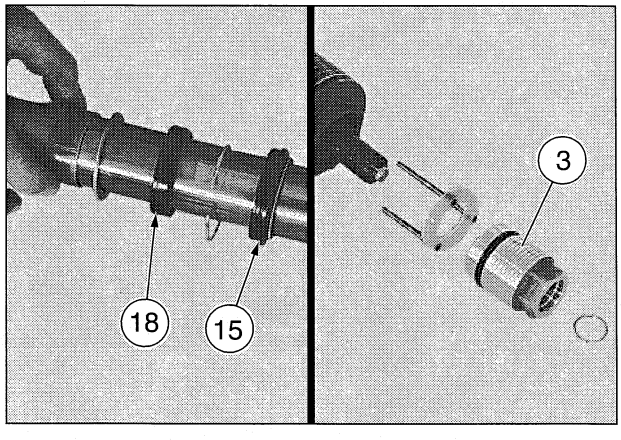
⚠ CAUTION

Remove any accumulation of impurities from the bushings, taking care not to scratch their surfaces.



- Replace the following components with new ones:

  – gasket (18);
  – antidust gasket (15);
  – the two O rings on the adjusting element (3).



7.8.5 REASSEMBLING THE WHEEL-HOLDER TUBE - SLIDER UNIT

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS), 1.2.3 (FORK OIL) and 2.29 (INSPECTING THE FRONT AND REAR SUSPENSION).

NOTE The operations marked with the symbol "✱" are valid also for the fork oil change.

⚠ CAUTION

Upon reassembly, proceed with the greatest care and make sure that the sliding surfaces are in perfect conditions (there must no be signs of wear, lines, etc.), otherwise change the component.
Be careful to prevent any foreign matter from getting inside.

Do not reuse any oil that has already been drained.

Always replace the gaskets.

The reassembly must be carried out with the greatest care.

NOTE Before proceeding with the following operations, prepare the appropriate special tools OPT (A), (B), (C), (D) and before reinstalling the gaskets and bushings cover them with a layer of fork oil, see 1.6 (LUBRICANT CHART).

- Position the wheel-holder tube (21) on a vice with the open part facing upwards, interposing clamps made of soft material (aluminium).

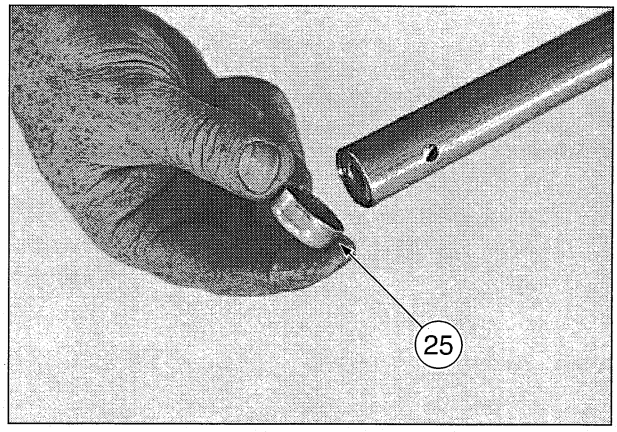
NOTE Apply some grease inside the centering bushing (25), see 1.6 (LUBRICANT CHART).

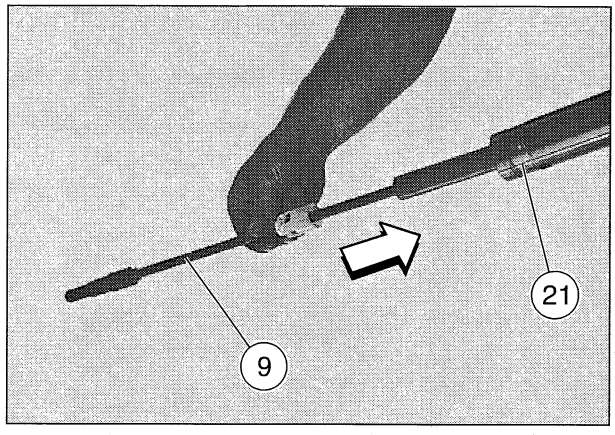
- Insert the centering bushing (25) on the bottom of the pumping element (9).
- Insert the pumping element (9) in the wheel-holder tube (21), making sure that it rests on the base.
- Position the copper washer (24) on the centre screw (23).
- Insert and tighten the centre screw (23).

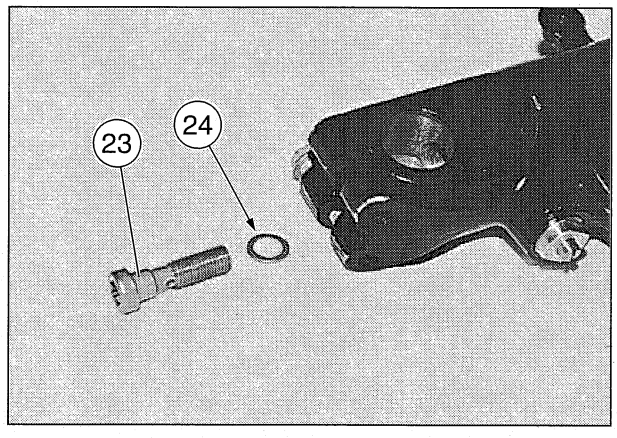
Stem centre screw driving torque: 35 Nm (3.5 kgm).

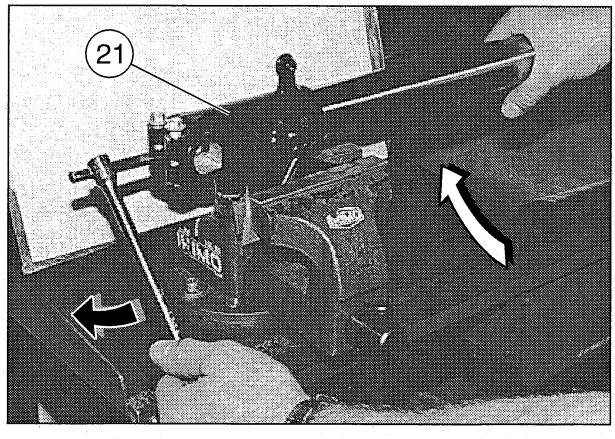
- Remove the wheel-holder tube (21) from the vice.

Follow ▶









Follow ▶

◆ Taking care not to form tape layers, apply some adhesive tape on the end of the wheel-holder tube (21), in such a way as to protect the gaskets during the reassembly.
◆ Insert the following components on the wheel-holder tube (21), in the given order:

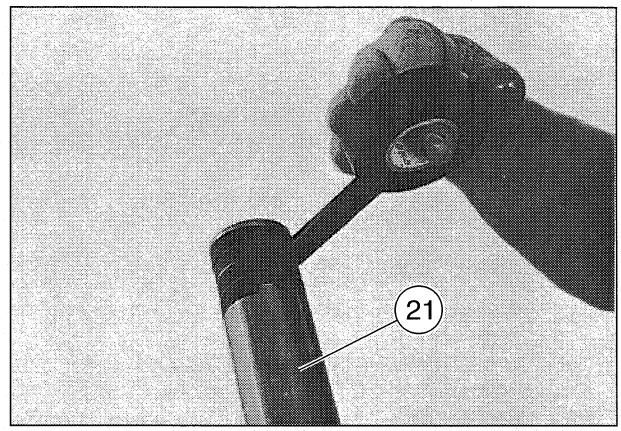
– antidust gasket (15);
– stop ring (16).

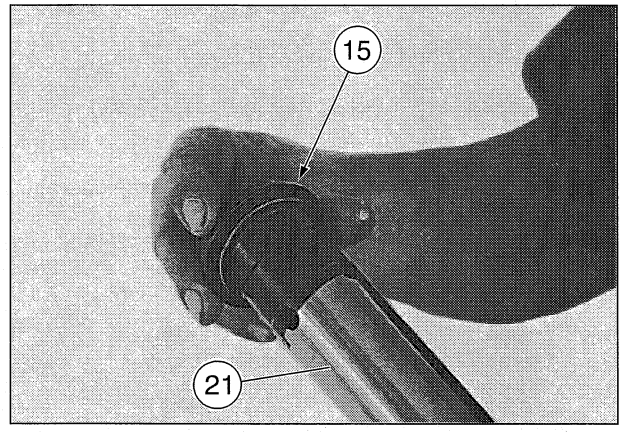
NOTE Introduce the gasket (18), positioning the side with the writings towards the stop ring (16).

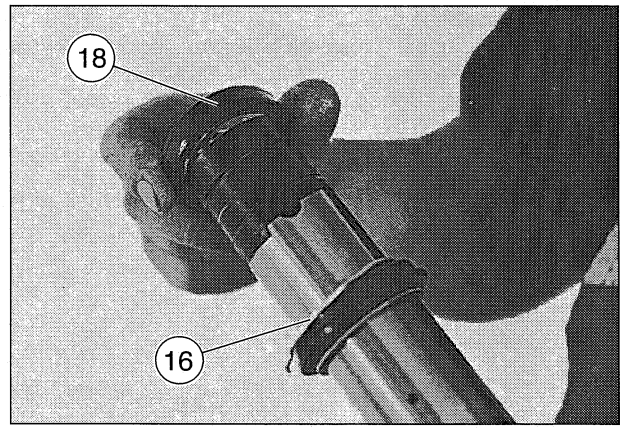
– gasket (18);
– ring (19);
– guide bushing (20).

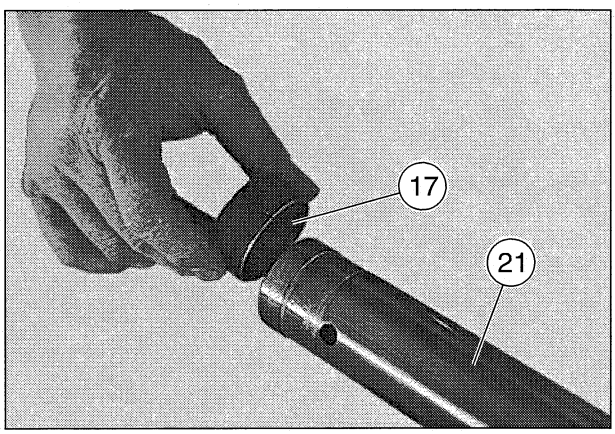
◆ Move the five components mentioned above completely towards the wheel-holder.
◆ Lock the guide bushing (20) in its position by means of some adhesive tape.
◆ Remove the adhesive tape from the end of the wheel-holder tube (21).
◆ Put back the slide bushing (17) on the wheel-holder tube (21).

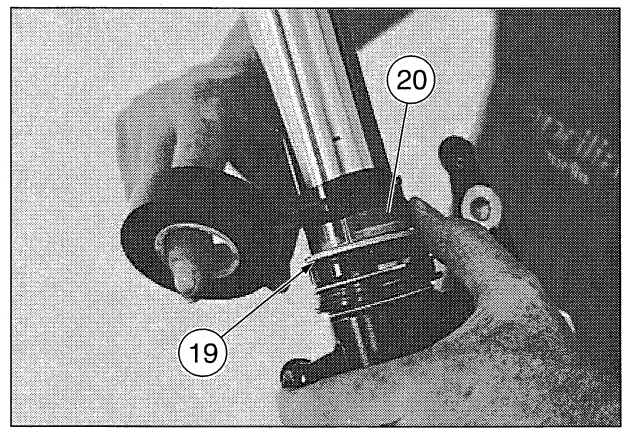
Follow ▶





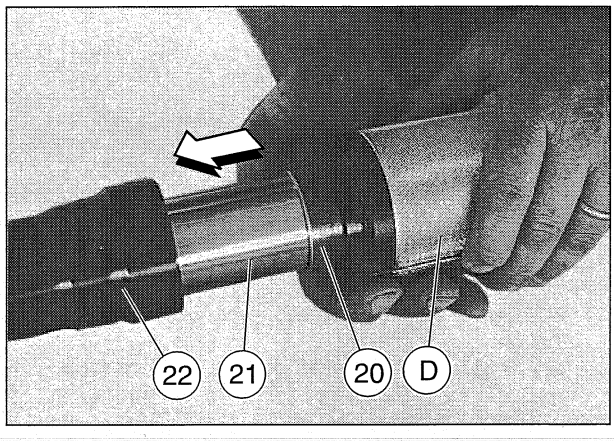






Follow ▶

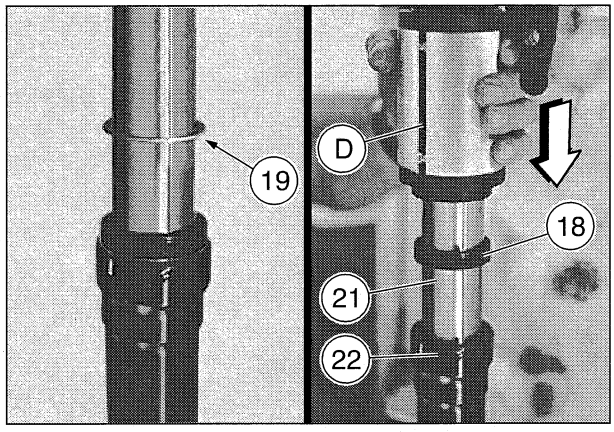
- ◆ Insert the tube (21) in the slider (22).
- ◆ Remove the adhesive tape from the bush (20).
- ◆ Position the two half-shells of the tool (D) on the wheel-holder tube (21), before the guide bushing (20).
- ◆ Grasping the tool (D), push the guide bushing (20) in the correct position in its seat on the slider (22).
- ◆ Remove the tool (D).
- ◆ Insert the ring (19), making sure that it is in the correct position.
- ◆ Position the two half-shells of the tool (D) on the wheel-holder tube (21), before the gasket (18).
- ◆ Grasping the tool (D), push the gasket (18) in its seat on the slider (22) with force, making sure that it is in the correct position.
- ◆ Remove the tool (D).
- ◆ Insert the stop ring (16) in the appropriate seat on the slider (22).
- ◆ Position the two half-shells of the tool (D) on the wheel-holder tube (21), before the antidust gasket (15).
- ◆ Grasping the tool (D), push the antidust gasket (15) in the appropriate seat on the slider (22) and make sure that it is correctly positioned.
- ◆ ★Grasp the tube (21) and move it slowly and alternately more than once.



⚠ CAUTION

The tube (21) must slide inside the slider (22) smoothly, without finding any obstacle; if this does not happen, it means that the guide bushing (20), the slide bushing (17) or the gasket (18) are damaged.

- ◆ ✱ Keep the slider (22) in vertical position.
- ◆ ✱ Push the slider (22) to the end of its stroke.
- ◆ ✱ Pour fork oil inside the tube, see 1.6 (LUBRICANT CHART) until reaching the correct level, which can be measured by introducing a graduated stick (26) in the tube.

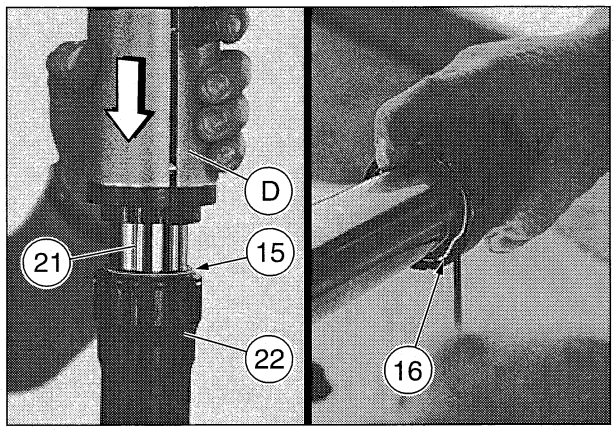


Oil quantity: 520 ± 2.5 cm³.

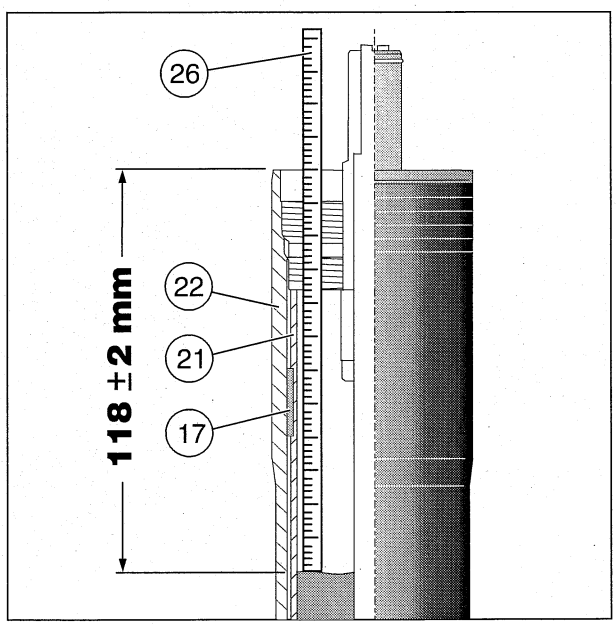
Oil level: 118 ± 2 mm (from the slider edge).

NOTE In order to obtain a correct measurement of the oil level, the slider (22) must be perfectly vertical. The oil level must be the same for both tubes.

- ◆ ✱ Grasp the slider (22) and make it slide slowly and alternately, with a stroke of approx. 150 mm, about 10 times, thus letting out all the air that is inside the slider.
- ◆ ✱ Push the slider (22) to the end of its stroke.
- ◆ ✱ Wait for a few minutes and check the oil level again; top up if necessary.



Follow ▶



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◆ ✱ Insert the following components in the tube (21) in the given order:

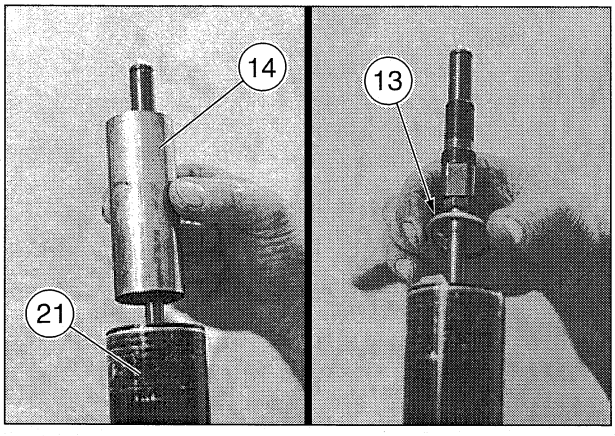
- lower collar (14);
- spring rest washer (13);
- spring (11);
- spring pressing tube (6) complete with spring pressing element;
- sliding ring (10);
- washer (8).

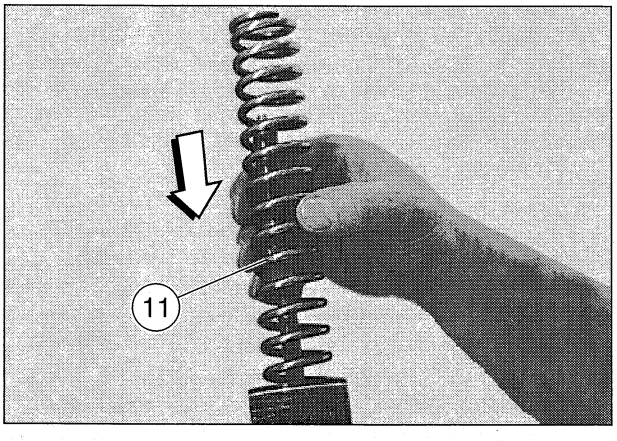
◆ ✱ Unscrew and remove the threaded pin (A1) from the tool (A).

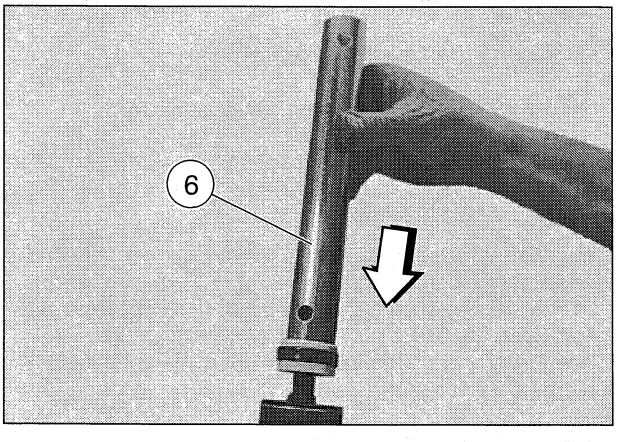
◆ ✱ Position the fixed part of the tool (A) on the spring pressing tube (6), so that the tooth fits in the hole.

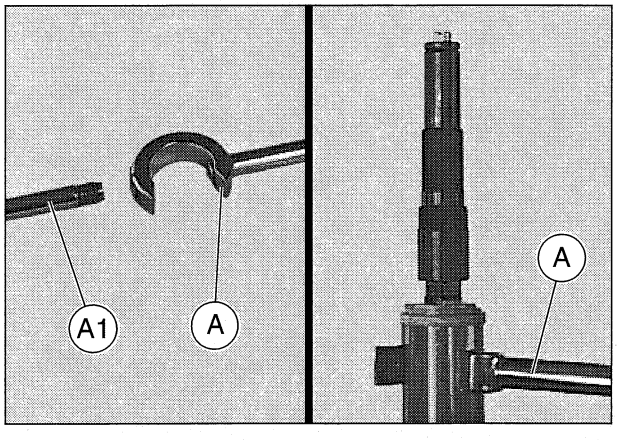
◆ ✱ Position the threaded pin (A1) in the hole on the fixed part of the tool (A), making sure that when screwed completely it fits in the hole on the spring pressing tube (6).

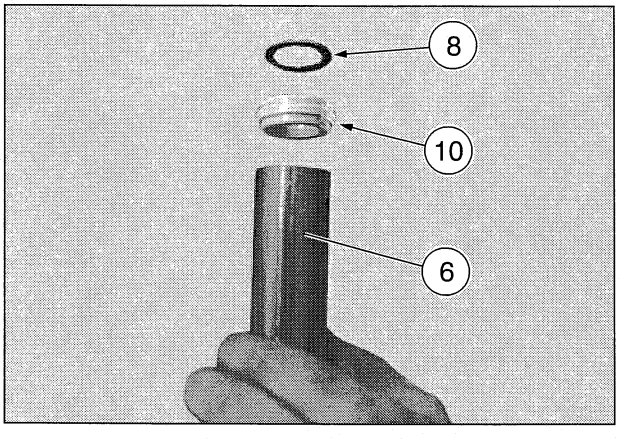
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⚠ CAUTION

The following operations must be performed by two persons.
Fix the operating procedure before starting work.

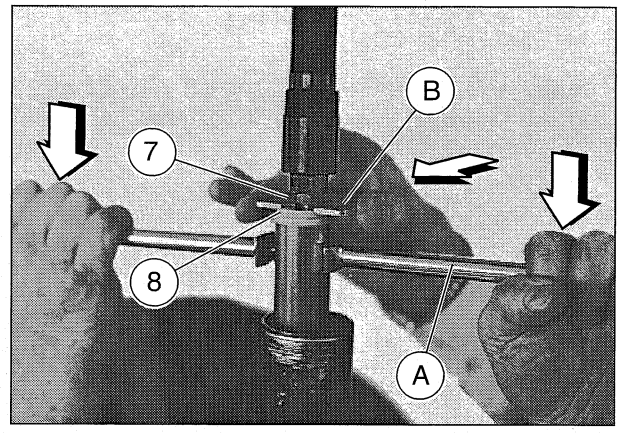
- ◆ ✱ Rest both hands on the tool (A).
- ◆ ✱ Push downwards and at the same time insert the tool (B) between the locking nut (7) and the washer (8).
- ◆ ✱ Keeping the pumping element (9) still, tighten the slider upper plug (5) on the pumping element (9) by means of a fork spanner inserted in the appropriate seat.

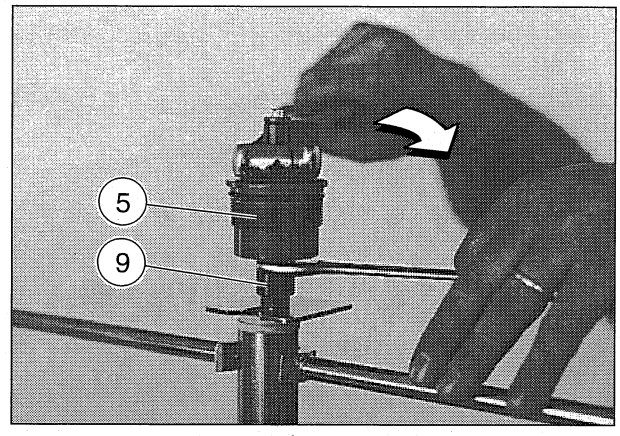
Slider upper plug/pumping element (9) driving torque: 35 Nm (3.5 kgm).

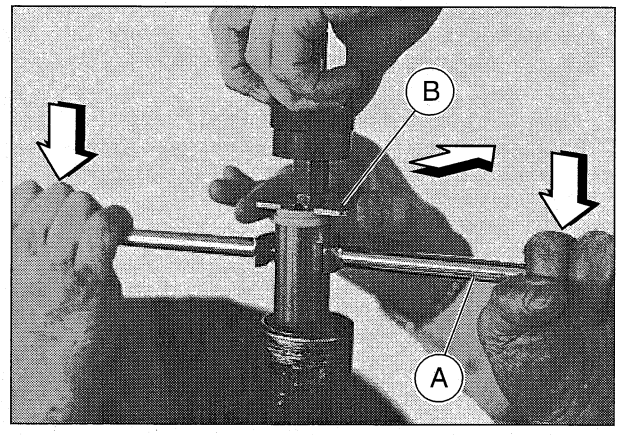
- ◆ ✱ Rest both hands on the tool (A).
- ◆ ✱ Push downwards and at the same time withdraw the tool (B).
- ◆ ✱ Remove the tool (A).
- ◆ ✱ Position the wheel-holder tube - slider unit on a vice, interposing the two half-shells of the special tool (C).
- ◆ ✱ Screw and tighten the slider upper plug (5) on the slider.

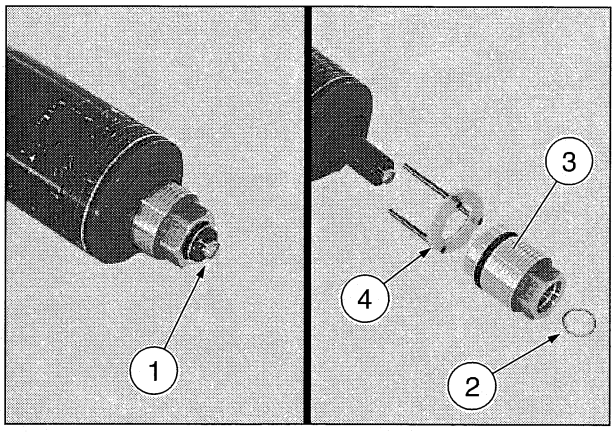
Slider upper plug/slider driving torque: 35 Nm (3.5 kgm).

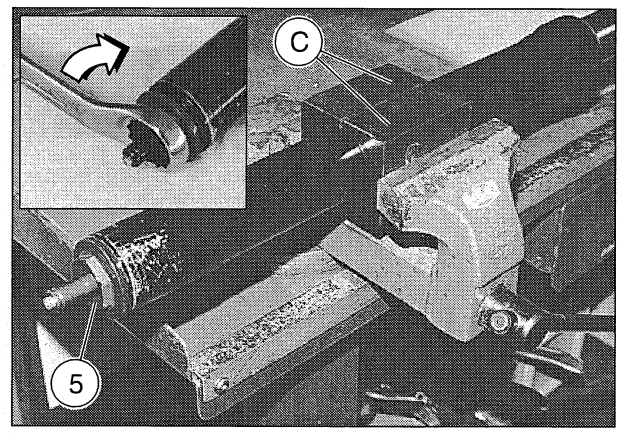
- ◆ ✱ Insert the spring preload pushing element (4).
- ◆ ✱ Screw the adjusting element (3).
- ◆ ✱ Position the stop ring (2) in its seat.
- ◆ ✱ Act on the adjusting element (3) and on the adjuster (1) to restore the correct attitude, which must be the same as that of the other wheel-holder tube - slider unit, see 2.29.2 (ADJUSTING THE FRONT FORK).











7.8.6 INSTALLING THE WHEEL-HOLDER TUBE - SLIDER UNITS

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 2.29 (INSPECTING THE FRONT AND REAR SUSPENSION).

- Insert the slider (1) complete with the wheel-holder tube (2) on the lower plate (3) and on the upper plate (4).
- Insert the wheel pin (5) on both tubes in order to align the hole of the wheel-holder tube (2) with the hole of the other wheel-holder tube.
- Make sure that the slider (1) is correctly inserted on the lower plate (3) and on the upper plate (4).

Fork lower plate screws driving torque: 25 Nm (2.5 kgm).

- Tighten the two screws (6) that fix the lower plate (3) to the slider (1).

Fork upper plate screw driving torque: 25 Nm (2.5 kgm).

- ★Tighten the screw (7) that fixes the handlebar (8) to the slider (1).

Handlebar screw driving torque: 25 Nm (2.5 kgm).

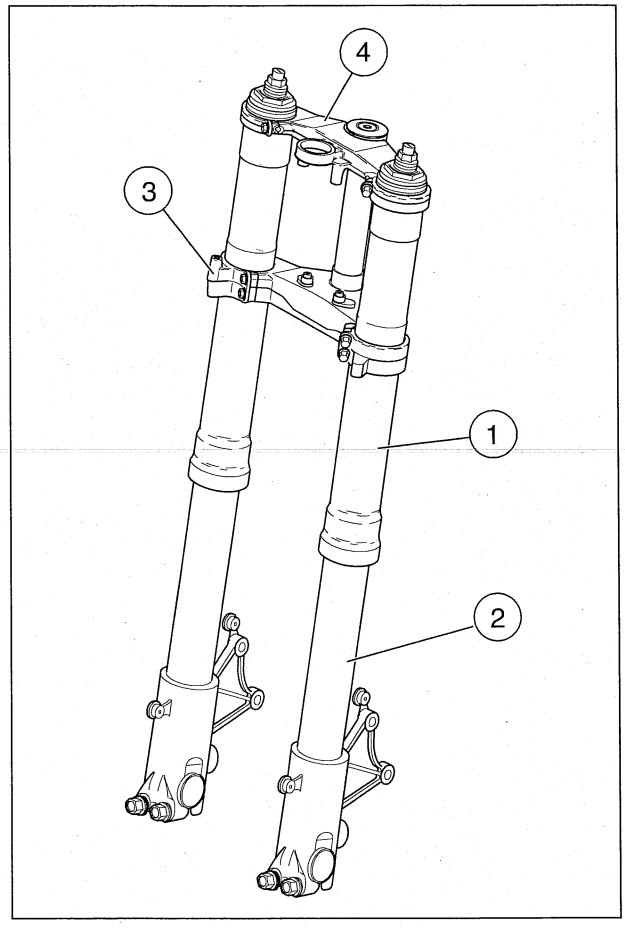
- Tighten the screw (9) that fixes the upper plate (4) to the slider (1).
- Withdraw the wheel pin (5).
- Reassemble the wheel, see 7.2.1 (REMOVING THE WHOLE WHEEL).
- Position the vehicle on the relevant front OPT and rear OPT support stands.
- Remove the vehicle from the centre support stand.

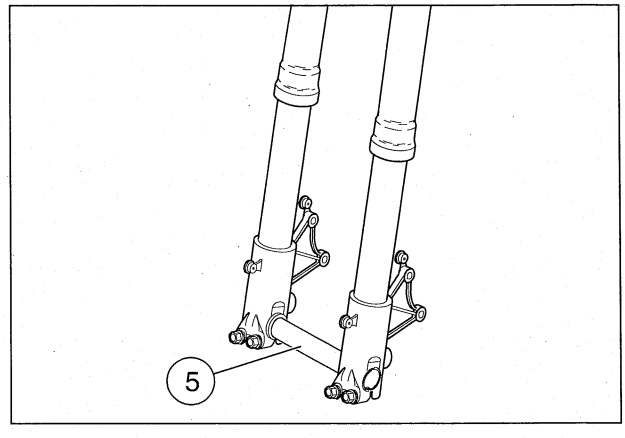
⚠ CAUTION

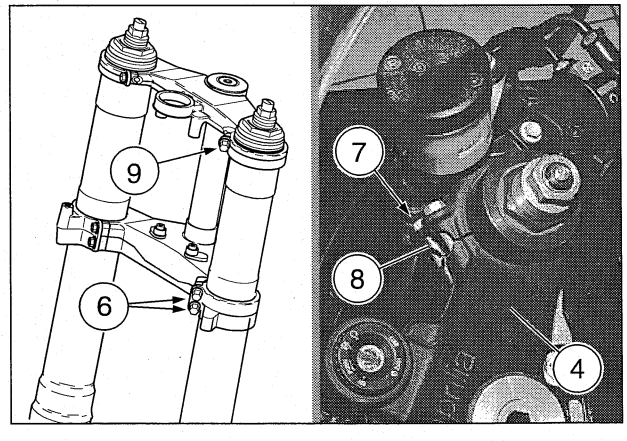
After the reassembly, operate the front brake and thrust the fork repeatedly downwards.
The operation must be smooth and progressive and there must be no trace of oil on the tubes.

⚠ WARNING

Before using the vehicle, check to make sure the riding position is correct, see 2.29.2 (ADJUSTING THE FRONT FORK).





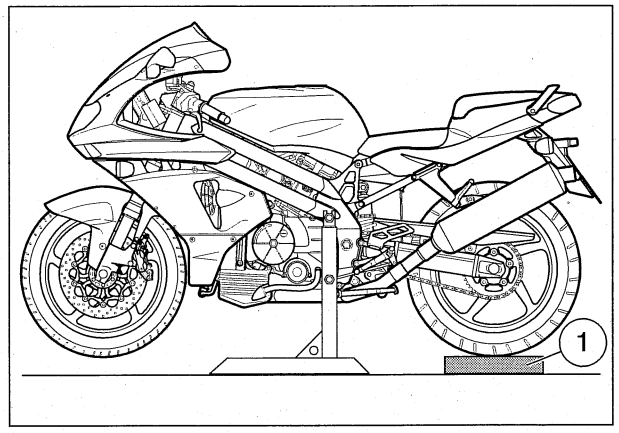


7.9 REAR FORK

7.9.1 REMOVING THE REAR FORK

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 2.30 (REAR FORK).

- Position the vehicle on the special centre stand, see 1.8.4 (POSITIONING THE VEHICLE ON THE CENTRE SUPPORT STAND OPT).
- Place a support (1) under the tyre so that the rear wheel touches lightly on the support and the shock absorber is in the idle position.



Rear brake caliper screws driving torque: 25 Nm (2.5 kgm).

- Unscrew and remove the two screws (2) securing the rear brake caliper (3).

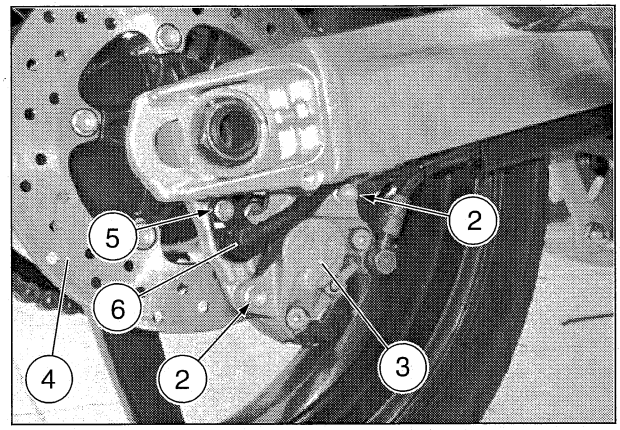
⚠ CAUTION

Upon reassembly of the brake caliper (3), replace the caliper fastening screws (2) with two new screws of the same type.

⚠ CAUTION

When disassembling, be careful not to damage the brake fluid pipes, disc and pads.

- Pull the brake disc (4) off the caliper (3).



⚠ CAUTION

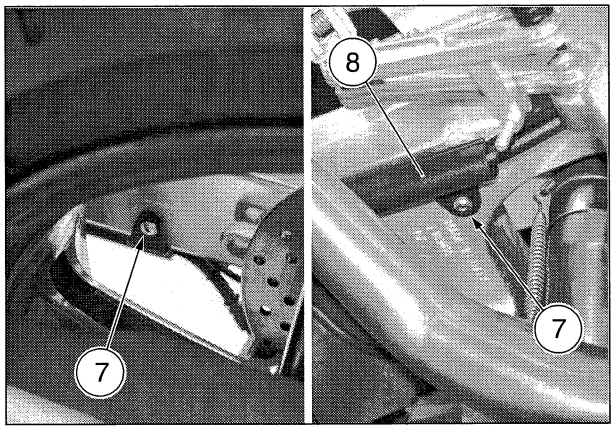
Do not pull the brake lever once the pads have been removed as the caliper pins are liable to come out of their slot, resulting in the spillage of brake fluid.

Speed sensor screw driving torque: 10 Nm (1.0 kgm).

- Unscrew and remove the screw (5) securing the speed sensor (6).

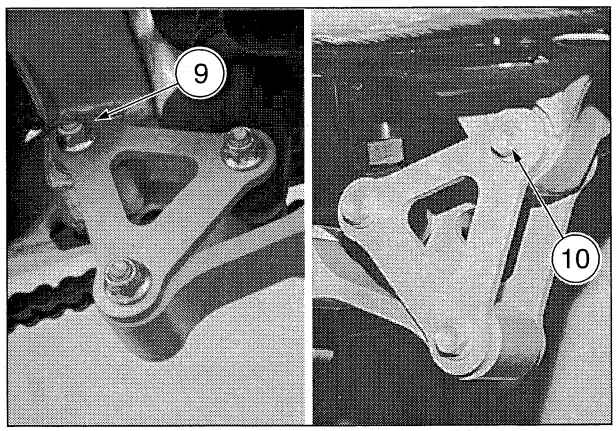
Driving torque of the rear brake pipe guard screws: 2 Nm (0.2 kgm).

- Unscrew and remove the screws (7) securing the profiled guard (8).
- Lower the brake caliper (3) and speed sensor (6) still connected to the pipe and cable respectively gently to the ground.



Driving torque of the pin nut that fastens the double connection element to the rear fork: 50 Nm (5.0 kgm).

- Unscrew and remove the nut (9).
- Slide out the pin (10) fastening the double connecting rod to the fork.



NOTE (X) For the reassembly the rear fork, from this point on follow the specific procedures, see 7.9.4 (REASSEMBLING THE REAR FORK).

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◆ Remove the pinion protection case, see 2.35.5 (INSPECTING THE DRIVING CHAIN GUIDE PLATE).

Drive pinion screw driving torque: 50 Nm (5.0 kgm).

◆ Unscrew and remove the screw (11) and retrieve the two washers (12) (13).
◆ Slide the drive pinion (14), complete with chain, off the shaft.

NOTE In order to make it easier to slide off the drive pinion (14), slacken the chain slightly, see 2.35.3 (ADJUSTING THE DRIVING CHAIN).

◆ Remove the drive pinion (14).

Rear fork pin nut driving torque: 90 Nm (9.0 kgm).

◆ Unscrew and remove the nut (15) and retrieve the washer (16).

NOTE Have the appropriate special tool OPT to hand:
– **aprilia** part# 8140203 (socket spanner for adjusting fork pin - engine mounts).

Rear fork pin metal ring driving torque: 60 Nm (6.0 kgm).

◆ Use the special setscrew spanner to loosen and remove the lock ring (17).

Rear fork adjuster bush driving torque: 12 Nm (1.2 kgm).

◆ Working from the right-hand side of the vehicle, rotate the fork pin (18) anticlockwise, which will cause the adjuster bush (19) to rotate with it, causing it to loosen completely.

⚠ CAUTION

Due to the weight of the rear axle, the following operations require the assistance of another operator. Fix the operating procedure before starting work.
The removal must be carried out with the greatest care.
Support the fork from the front to prevent it accidentally dropping.

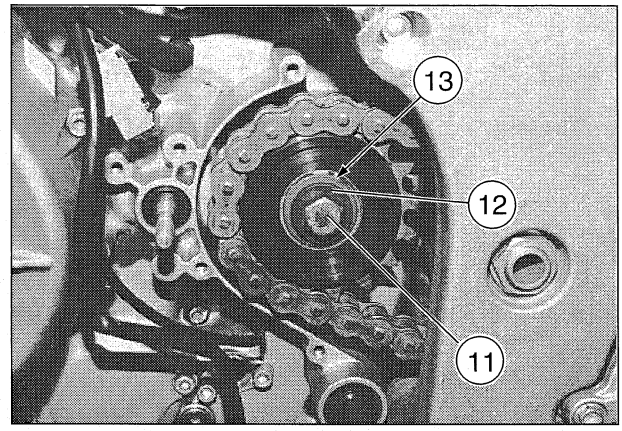
◆ While supporting the fork from the front, slide the fork pin (18) out from the right.

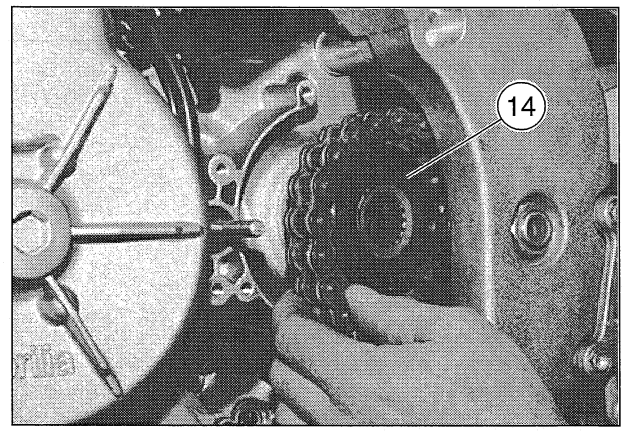
⚠ CAUTION

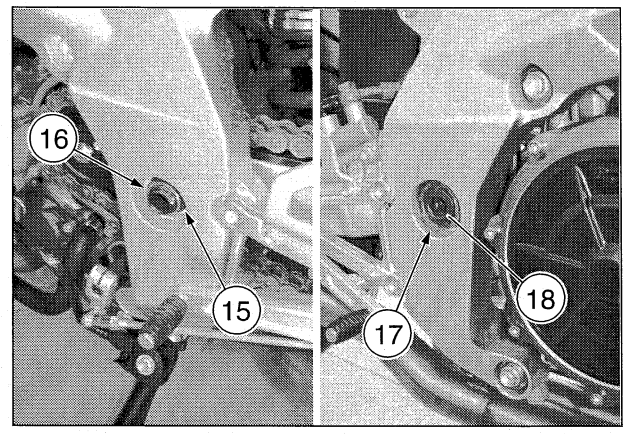
Take care not to let the driving chain get entangled whilst removing the rear axle.

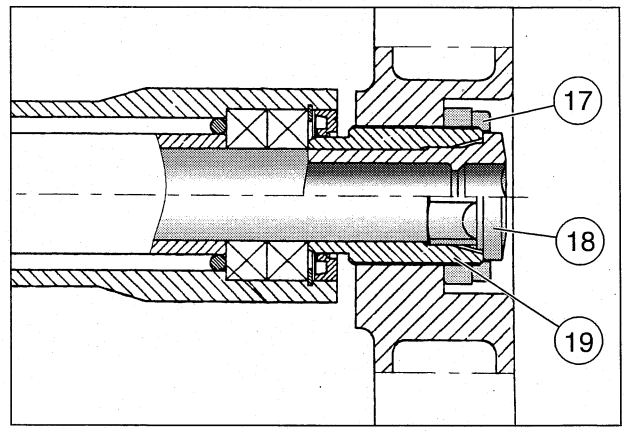
◆ Remove the rear axle complete with rear fork and wheel, sliding it off the back.
◆ Slide the adjuster bush (19) from the pin (18).

NOTE Where necessary, remove the rear wheel, see 7.3.1 (REMOVING THE WHOLE WHEEL).





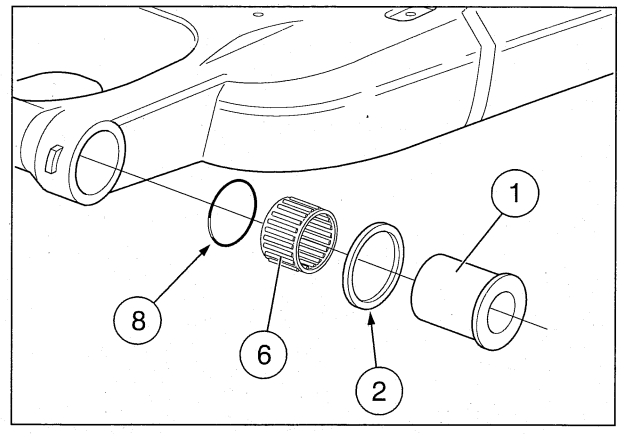




7.9.2 DISASSEMBLING THE REAR FORK

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

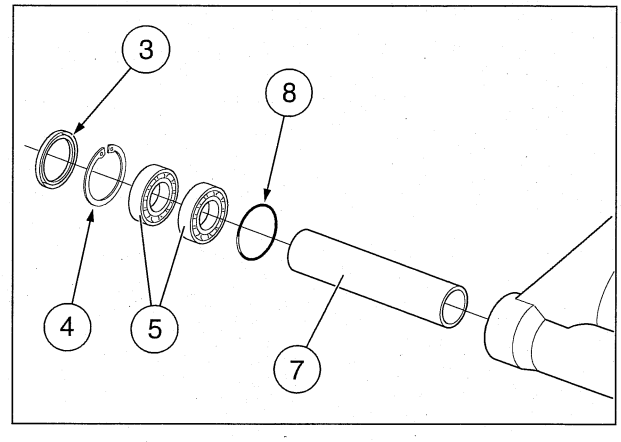
- ◆ Remove the rear fork, see 7.9.1 (REMOVING THE REAR FORK).
- ◆ Use a cloth to clean both sides of the bearing housings.
- ◆ Slide out the bush (1).
- ◆ Remove the seal (2).
- ◆ Remove the seal (3).
- ◆ Remove the snap ring (4).
- ◆ Use a special extractor to extract the two bearings (5) and roller bearing (6).



⚠ CAUTION

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

- ◆ Remove the inner spacer (7) and retrieve the two O-rings (8).
- ◆ Remove the inner spacer (7).
- ◆ Remove the seals (10).
- ◆ Use a special extractor to extract the two roller bearings (11).



⚠ CAUTION

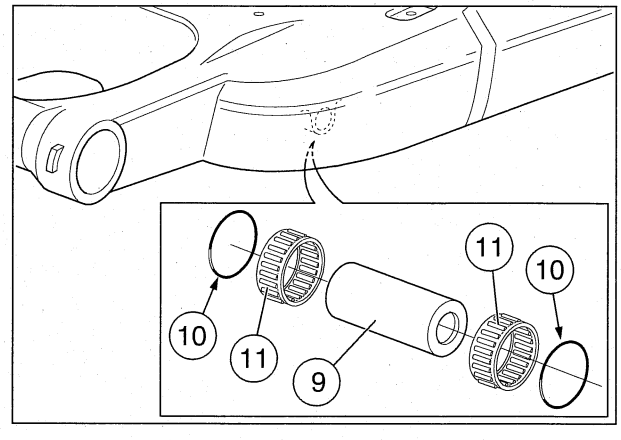
The bearings must be checked and, if necessary, changed every time they are disassembled.

- ◆ Thoroughly clean the inside of the bearing housing.

NOTE Wash all the components with a clean detergent.

⚠ CAUTION

When reassembling, use a drift with the same diameter as the outer race to insert the bearings.
Do not strike the balls and/or the inner race.



7.9.3 CHECKING THE COMPONENTS

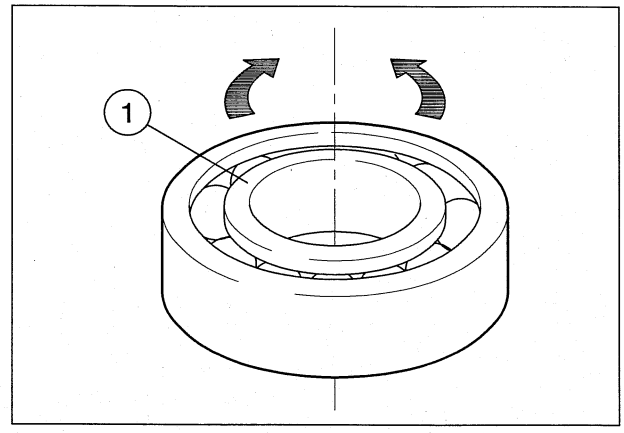
⚠ CAUTION

Make sure that none of the components appear to be visibly distorted, broken, cracked and/or dented.

Replace any damaged components.

BEARINGS

◆ Manually rotate the inner race (1). It should rotate smoothly without jamming and/or noise.
There should be no end play.
Any bearings featuring said defects should be changed.



⚠ CAUTION

Apply grease on the balls (at the sides of each bearing) and rollers, see 1.6 (LUBRICANT CHART).

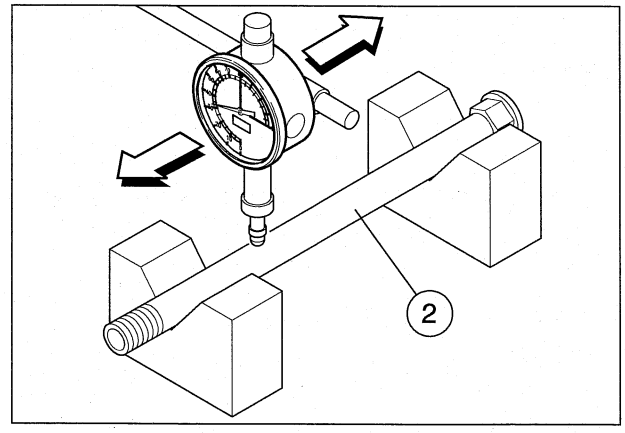
SEALS

◆ Make sure the seals are intact; should they prove damaged or feature signs of excessive wear, change them.

REAR FORK PIN

◆ Check the eccentricity of the pin (2) by means of a comparator.
If the eccentricity exceeds the limit value, change the pin (2).

Maximum eccentricity: 0.3 mm.



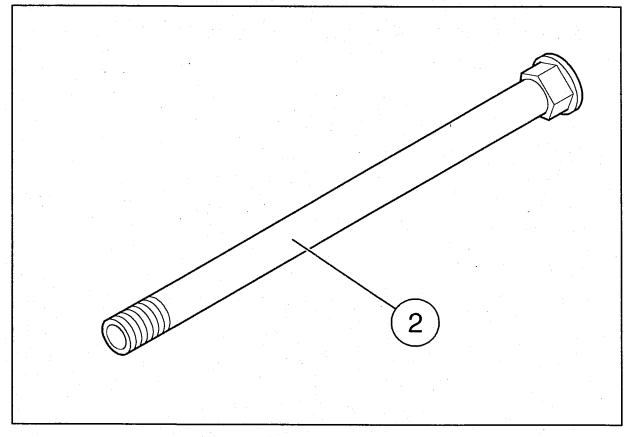
7.9.4 REASSEMBLING THE REAR FORK

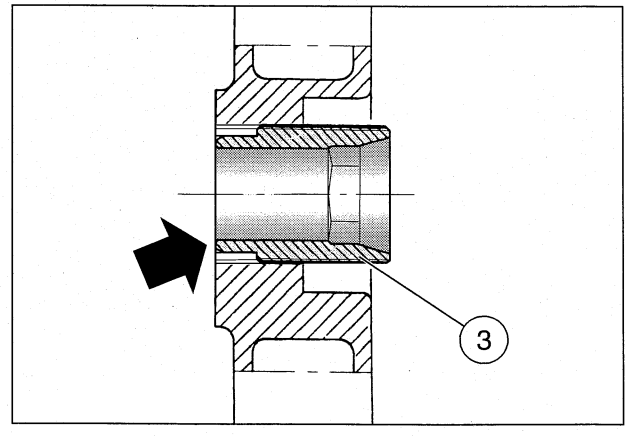
Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 2.30.1 (ADJUSTING THE REAR FORK).

◆ Smear a film of grease over the entire length of the fork pin (2), see 1.6 (LUBRICANT CHART).
◆ Insert the adjuster ring (3) in its slot and screw it on by hand.

NOTE The adjuster ring (3) must not stick out from the inside edge of the frame.

Follow ▶





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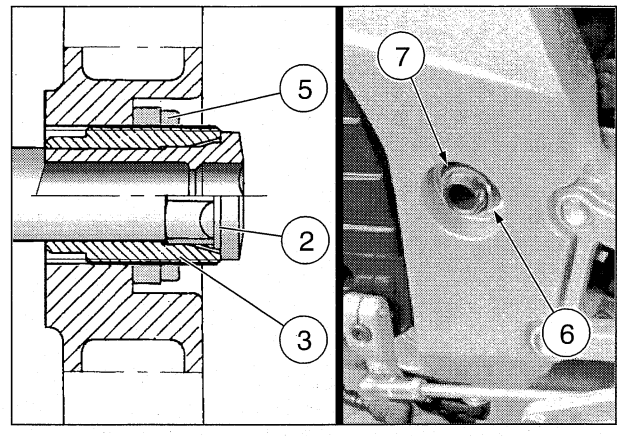
◆ Place the driving chain (4) on the front (left) part of the fork and fasten it in place with adhesive tape.

⚠ CAUTION

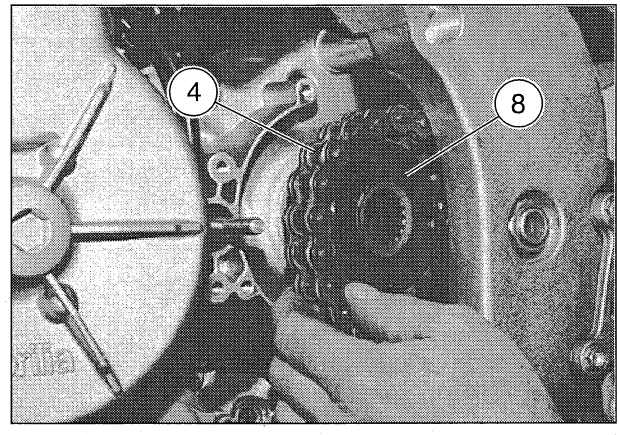
Due to the weight of the rear axle, the following operations require the assistance of another operator. Fix the operating procedure before starting work.

◆ Support the fork from the front. Adjust its position so that the holes are aligned, at the same time pushing the pin (2) all the way in.

NOTE Make sure that the hex head of the pin (2) is correctly inserted in the hexagonal slot on the adjuster bush (3).



◆ Fit the lock ring (5) and screw it on by hand a few turns.
◆ Place the washer (6) and nut (7) on the pin, tightening them by hand.
◆ Now go ahead and adjust the rear fork, see 2.30.1 (ADJUSTING THE REAR FORK).
◆ Remove the adhesive tape, releasing the chain.
◆ Refit the chain (4) on the drive pinion (8).



NOTE Apply Anti-Seize LOCTITE® on the inner toothing of the drive pinion (8).

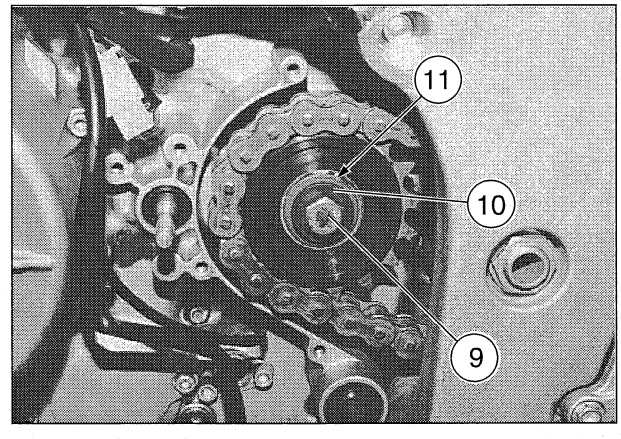
◆ Insert the pinion (8), complete with chain, on the shaft.

NOTE Apply LOCTITE® 243 on the thread of the screw (9).

◆ Insert the washer (10) and washer (11) on the screw (9).

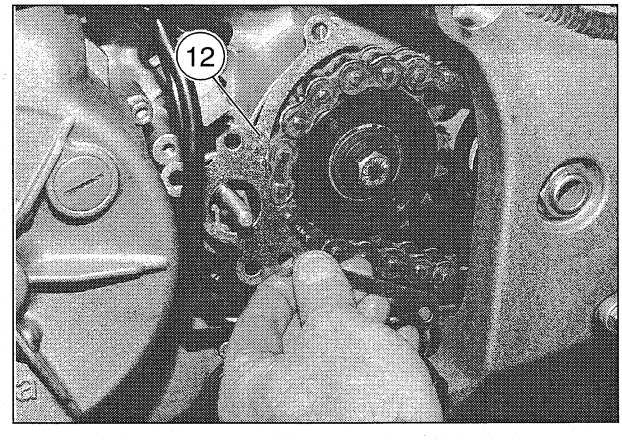
Drive pinion screw driving torque: 50 Nm (5.0 kgm).

◆ Screw and tighten the screw (9).
◆ Fit the guide plate (12).
◆ Refit the clutch control cylinder, see 3.2.4 (REMOVING THE CLUTCH CONTROL CYLINDER).
◆ Refit the pinion cover, see 3.2.3 (REMOVE THE PINION COVER).
◆ Go ahead with the adjustment of the driving chain tension, see 2.35.3 (ADJUSTING THE DRIVING CHAIN).



⚠ CAUTION

From this point on, reassemble the fork following the removal procedure in the reverse order, starting from NOTE (X), see 7.9.1 (REMOVING THE REAR FORK).



7.10 REAR SUSPENSION

7.10.1 REMOVING THE SHOCK ABSORBER

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 2.31.1 (REAR SUSPENSION).

- Position the vehicle on the special centre stand, see 1.8.4 (POSITIONING THE VEHICLE ON THE CENTRE SUPPORT STAND OPT).
- Place a support under the rear wheel so that the rear wheel touches lightly on the support and the shock absorber is in the idle position.

Rear shock absorber upper nut driving torque: 50 Nm (5.0 kgm).

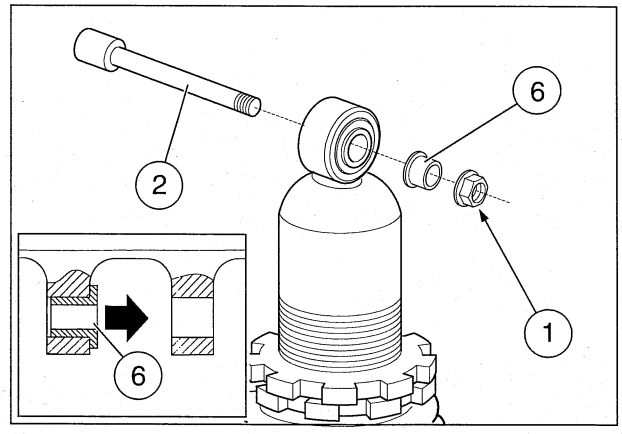
- Working from the left-hand side of the vehicle, loosen and remove the nut (1) and push the screw (2) out partially.
- Pull the screw (2) out from the opposite side.

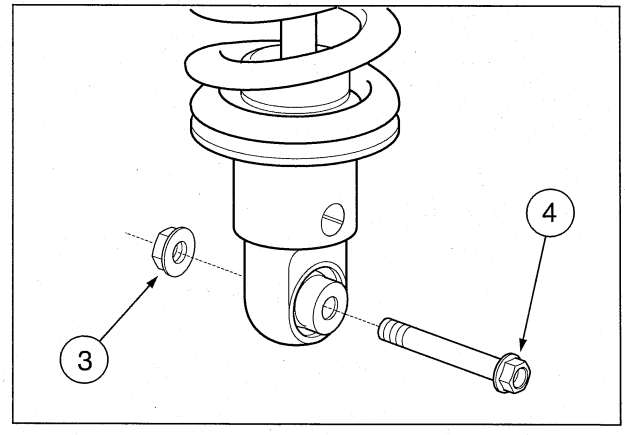
Rear shock absorber lower nut driving torque: 50 Nm (5.0 kgm).

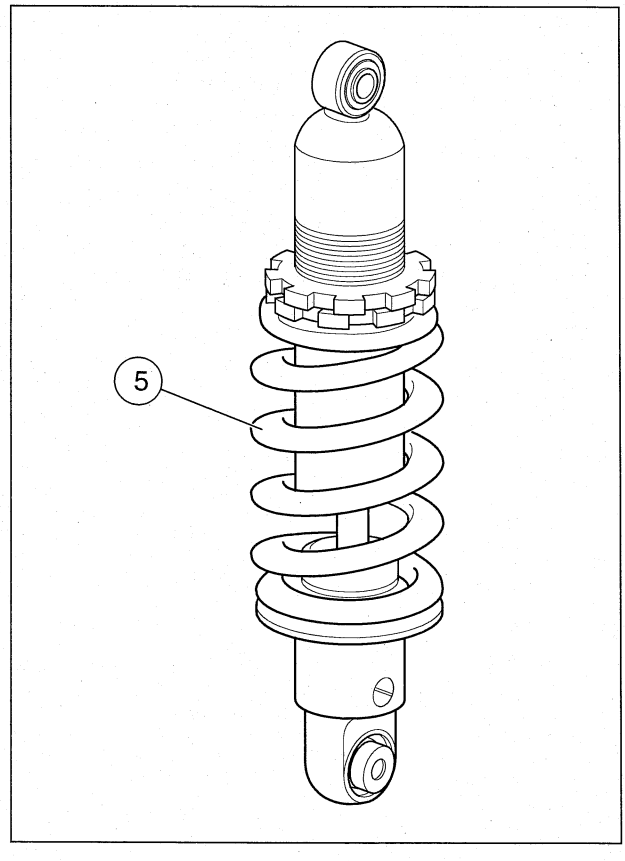
- Working from the right-hand side of the vehicle, loosen and remove the nut (3).
- Pull the screw (4) out from the opposite side.
- Grip the shock absorber (5) and remove it.
- Slide the spacer (6), to be found on the shock absorber's upper attachment fork, inwards.

NOTE Wash all the components with a clean detergent.

- Check the components, see 7.10.4 (CHECKING THE COMPONENTS).







7.10.2 DISASSEMBLING THE REAR SUSPENSION LINKAGE

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 2.31.1 (REAR SUSPENSION).

Driving torque of the nut that fastens the double connection element to the rear fork: 50 Nm (5.0 kgm).

- ◆ Working from the right-hand side of the vehicle, loosen and remove the nut (1).
- ◆ Pull the screw (2) out from the opposite side.

Rear shock absorber lower nut driving torque: 50 Nm (5.0 kgm).

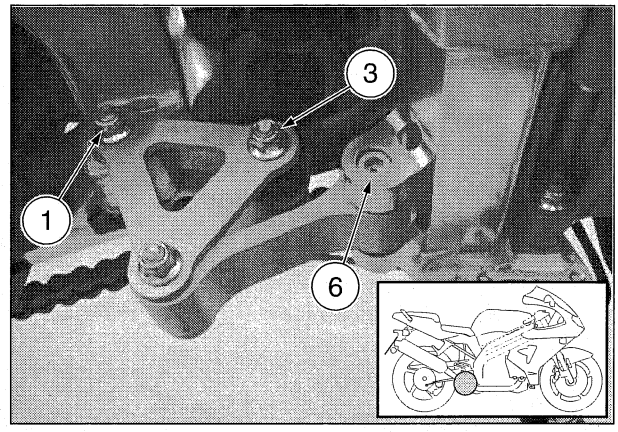
- ◆ Loosen and remove the nut (3).
- ◆ Pull the screw (4) out from the opposite side.

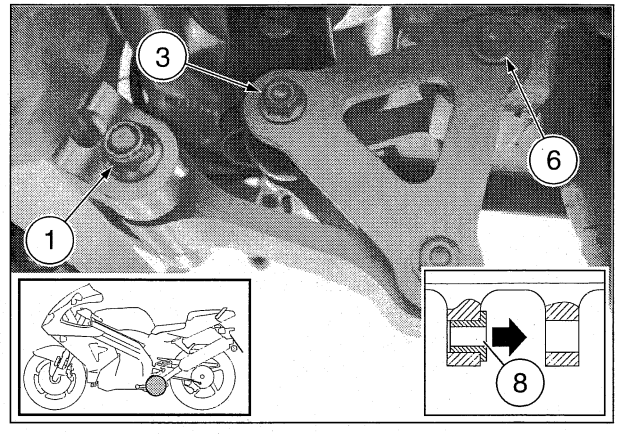
Driving torque of the nut that fastens the single connection element to the frame: 50 Nm (5.0 kgm).

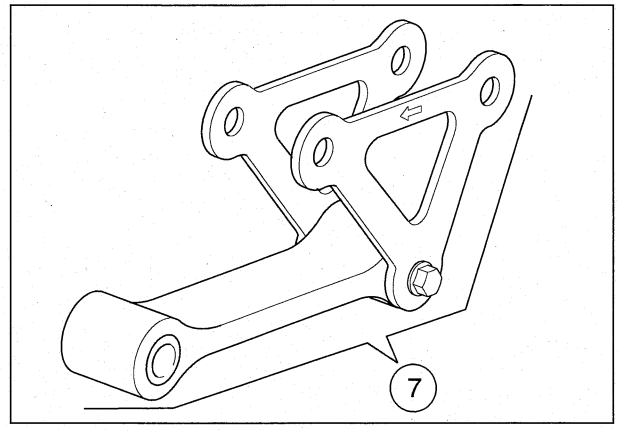
- ◆ Working from the left-hand side of the vehicle, loosen and remove the nut (5).
- ◆ Pull the screw (6) out from the opposite side.
- ◆ Remove the whole suspension linkage unit (7).
- ◆ Withdraw towards the inside the spacer (8) positioned on the connection element unit lower coupling fork.

NOTE When reassembling, grease the linkage fulcrum points, see 1.6 (LUBRICANT CHART), and be extremely careful to refit the components correctly, making sure that the joints move smoothly.

- ◆ Once reassembly is complete, check the assembly, see 2.31.3 (CHECKING THE REAR SUSPENSION LINKAGE).







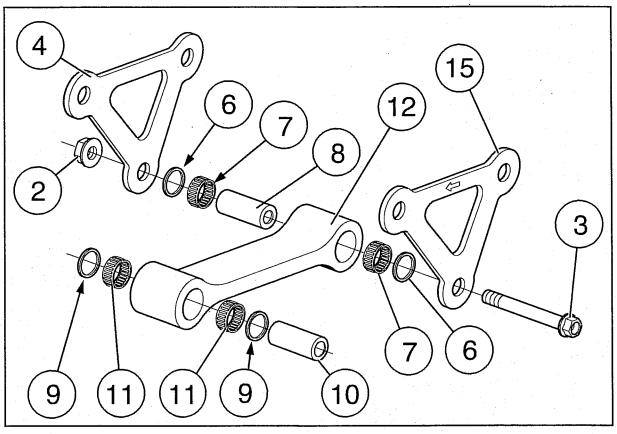
7.10.3 DISASSEMBLING THE SUSPENSION LINKAGE

Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS).

- Remove the entire connection element unit of the suspension (1), see 7.10.2 (DISASSEMBLING THE REAR SUSPENSION LINKAGE).
- Loosen and remove the nut (2).

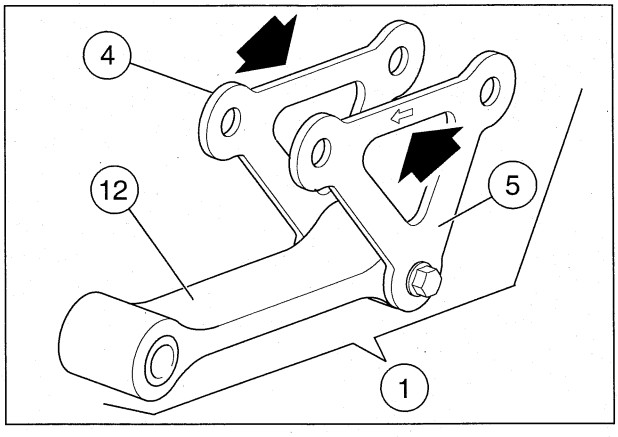
Driving torque of the nut that fastens the double connection element to the single connection element: 50 Nm (5.0 kgm).

- Slide out the screw (3).
- Remove the two double connecting rods (4) (5).
- Remove the two seals (6).
- Use a special extractor to extract the two roller bearings (7).
- Remove the inner spacer (8).
- Remove the two seals (9).
- Remove the inner spacer (10).
- Use a special extractor to extract the two roller bearings (11).



NOTE Wash all the components with a clean detergent.

NOTE When reassembling, connect the single connecting rod (12) to the double connecting rods (4) (5) as illustrated in the figure; the arrow inscribed on the top side must face in the direction of travel.



7.10.4 CHECKING THE COMPONENTS

⚠ CAUTION

Make sure that none of the components appear to be visibly distorted, broken, cracked and/or dented.

Replace any damaged components.

BEARINGS

- Manually rotate the rollers. It should rotate smoothly without jamming and/or noise.
  There should be no end play.
  Any bearings featuring said defects should be changed.

⚠ CAUTION

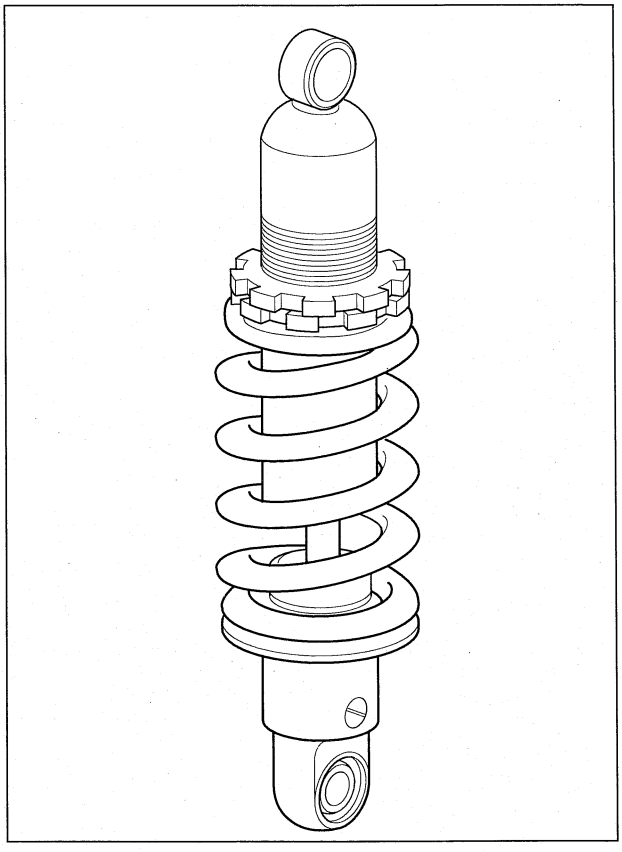
Apply grease on the rollers, see 1.6 (LUBRICANT CHART).

SEALS

- Make sure the seals are intact; should they prove damaged or feature signs of excessive wear, change them.

SHOCK ABSORBER

- Make sure that there are no oil leaks from the shock absorber and that its travel is smooth and gradual.
  If this is not the case, change the shock absorber.



7.11 DISASSEMBLING THE DRIVING CHAIN

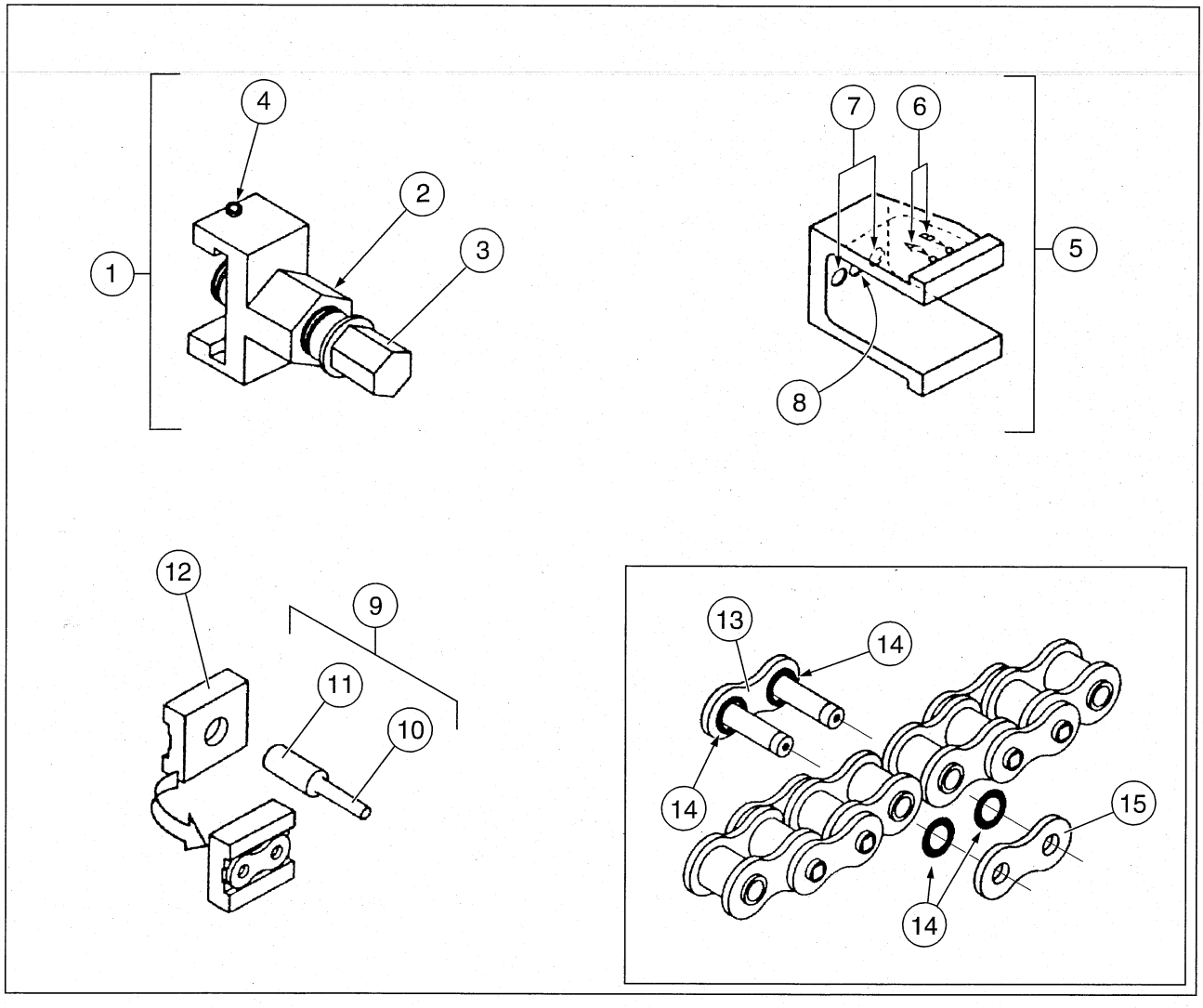
7.11.1 CHAIN BREAKER/RIVET TOOL OPT

NOTE Have the appropriate special tool OPT to hand:
– **aprilia** part# 8140192 (chain disassembly/reassembly tool).

NOTE This tool is designed for breaking/rejoining chains with rivet-type connecting links.

⚠ CAUTION

Only rivet-type connecting link chains should be fitted on this vehicle.

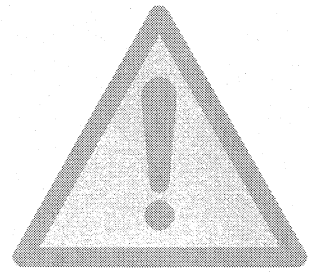


KEY

1) Main body
2) Fixed hexagonal seat (for 27 mm spanner)
3) Hex-head screw (for 19 mm spanner)
4) Locating dowel
5) Rivet tool
6) "A" and "B" reference marks
7) Positioning holes for joining pins
8) Pin exit hole
9) Pusher
10) Breaking side
11) Joining side
12) Support plate
13) Joining plate
14) O-rings
15) Rivet plate

7.11.2 BREAKING THE CHAIN

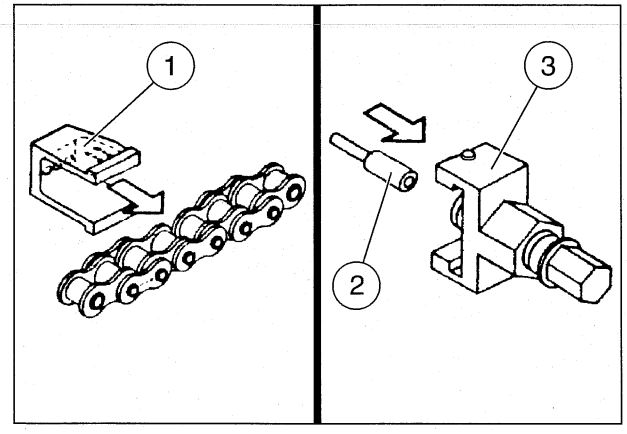
Carefully read 0.4.1 (PRECAUTIONS AND GENERAL INFORMATIONS) and 2.35 (DRIVE CHAIN).



- Remove the chain guide plate, see 3.2.5 (REMOVAL THE DRIVING CHAIN GUIDE PLATE).
- Slacken the chain, see 2.35.3 (ADJUSTING THE DRIVING CHAIN).
- Position the vehicle on the special rear support stand OPT.

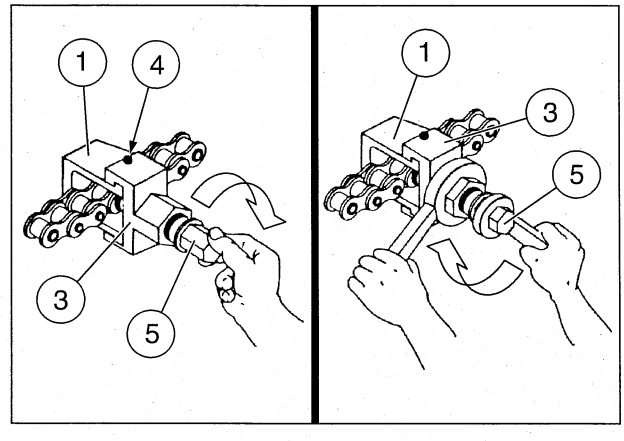
NOTE Make sure the tool is suitable for the chain type fitted on the vehicle and for the size of the chain's links.

- Place the rivet tool (1) on the chain at a point between the sprocket and pinion, on the chain's lower course.
- Move the rivet tool (1) so that its pin exit hole (the one in the centre) is lined up with the pin on the chain to be pushed out.
- Insert the pusher (2) on the main body (3), with the part featuring the greatest diameter first.
- Fit the main body (3) on the rivet tool (1).
- Move the main body (3) so that the locating dowel (4) is in line with mark "A" on the rivet tool (1).
- Turn the screw (5) by hand until the pusher (2) touches the pin to be pushed out.



NOTE Make sure the pusher (2) is perfectly in line with the pin to be pushed out.

- Use a 27 mm spanner, inserted on the fixed hexagonal seat of the central body (3), to hold the body still.
- Use a 19 mm spanner to turn the screw (5) until the pin on the chain is pushed out completely.
- Loosen the screw (5).
- Repeat the procedure, moving on to the adjacent pin on the same link.
- Remove the components of the disconnected link and the four O-rings.
- Remove the chain.



⚠ CAUTION

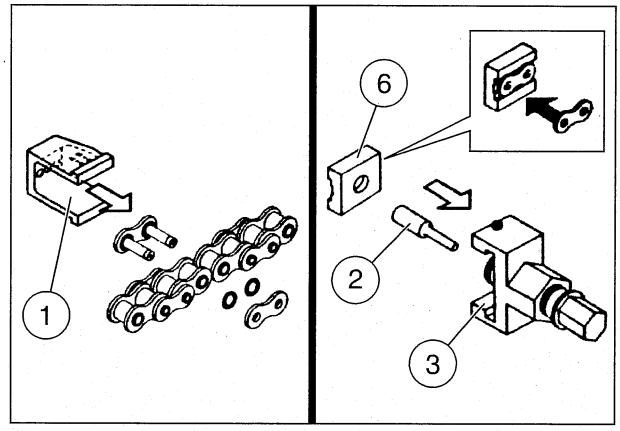
If the chain appears particularly worn, replace the whole unit (pinion, sprocket and chain), see 7.3.2 (DISASSEMBLING THE FINAL DRIVE UNIT).

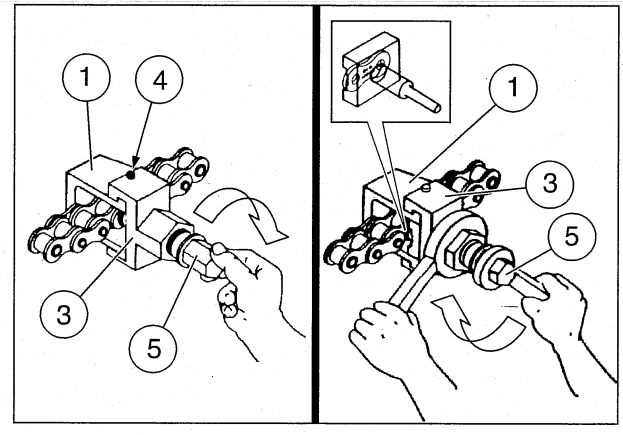
7.11.3 POSITIONING THE JOINING LINK

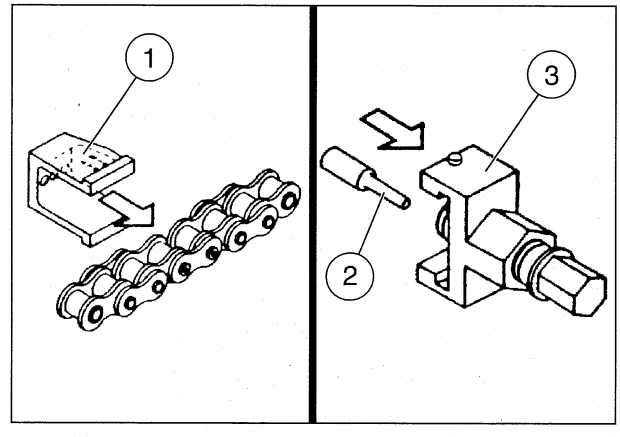
⚠ CAUTION

Make sure the joining link is of the same type as the chain to be joined up.

- ◆ Position the chain on the vehicle with the two ends to be joined up at a point between the sprocket and pinion on the chain's lower course.
- ◆ Insert the two O-rings on the pins of the joining plate.
- ◆ Grease the two pins on the joining plate, see 1.6 (LUBRICANT CHART).
- ◆ Join together the two ends of the chain and insert the joining plate pins.
- ◆ Insert the two O-rings on the ends of the pins.
- ◆ Insert the rivet plate on the pins.
- ◆ Fit the support plate (6) on the rivet plate.
- ◆ Fit the rivet tool (1) on the chain.
- ◆ Move the rivet tool (1) so its holes (the ones at the side) are lined up with the heads of the pins on the joining plate.
- ◆ Insert the pusher (2) on the main body (3), with the area featuring the smallest diameter first.
- ◆ Fit the main body (3) on the rivet tool (1).
- ◆ Move the main body (3) so that the locating dowel (4) is in line with mark "A".
- ◆ Turn the screw (5) by hand until the pusher (2) touches the support plate (6).
- ◆ Use a 27 mm spanner, inserted on the fixed hexagonal seat of the central body (3), to hold the body still.
- ◆ Use a 19 mm spanner to turn the screw (5) as far as it will go.





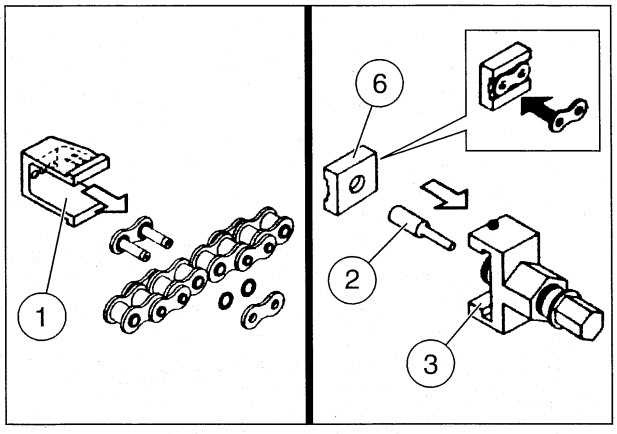


7.11.4 RIVETTING THE PINS

With the tool already in place on the chain:

- Loosen the screw (5).
- Remove the main body (3) from the rivet tool (1).
- Remove the support plate (6).
- Refit the main body (3) on the rivet tool (1).
- Move the main body (3) so that the locating dowel (4) is lined up with mark "B" on the rivet tool (1).
- Turn the screw (5) by hand until the pusher (2) touches the pin to be rivetted.

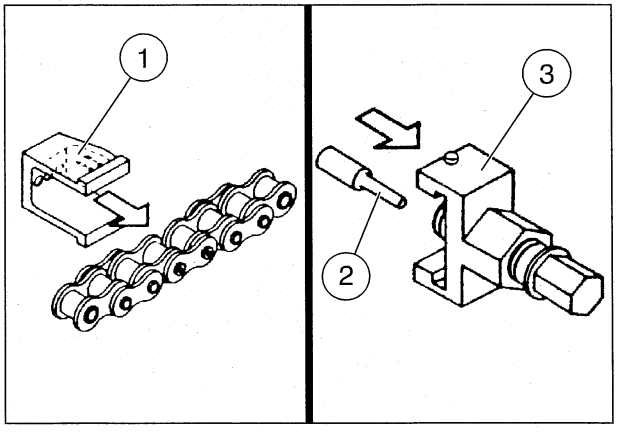
NOTE Make sure the pusher (2) is perfectly in line with the pin to be rivetted.



⚠ CAUTION

To have on goggles or glow screen for the eyes.

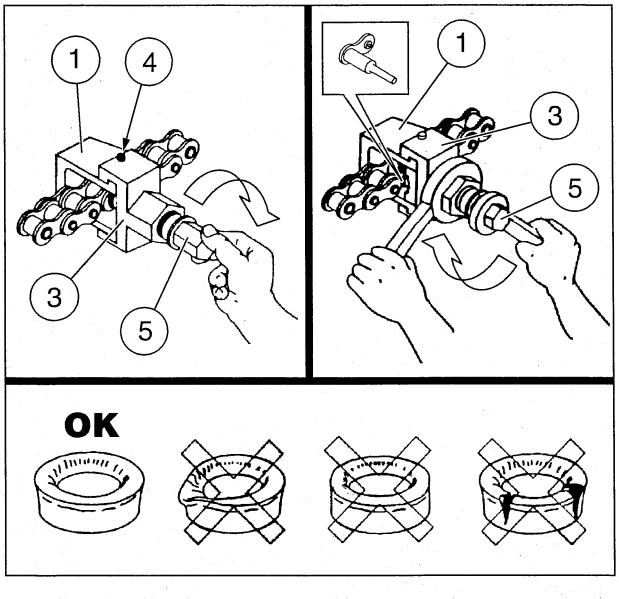
- Use a 27 mm spanner, inserted on the fixed hexagonal seat of the central body (3), to hold the body still.
- Use a 19 mm spanner to turn the screw (5) until the edge of the pin is rivetted.



⚠ CAUTION

Make sure that the rivetting on the pin has been performed correctly; the rivetted edge of the pin must touch the rivet plate evenly. The rivetted edge diameter must be 5.65 ± 0.15 mm max.

- Loosen the screw (5).
- Repeat the procedure, moving on to the adjacent pin on the same link.



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REPAIR INFORMATION

8

REPAIR INFORMATION

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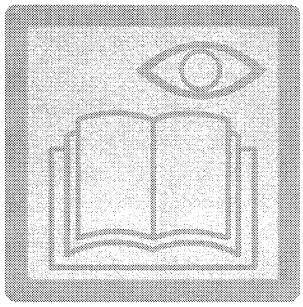
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8.1 TROUBLESHOOTING

⚠ CAUTION

Any faults with the ignition coils, driving shaft position sensor, camshaft sensor, pressure sensors and thermistors are automatically detected by the engine control unit and reported on the multifunction display with the flashing message "EFI".

For this reason, the malfunctions of these components are not repeated in the troubleshooting table; see relevant chapters in sect. 4 (FUEL SUPPLY SYSTEM) and sect. 6 (ELECTRIC SYSTEM).



NOTE In the following table, the operations marked with (*) must be carried out consulting the **aprilia** part# 8140582 (Engine service and repair manual V990 1051-1).

8.1.1 ENGINE

DEFECT	SYMPTOM AND POSSIBLE CAUSES	REMEDY
The engine does not start or has trouble starting	Engine shutoff switch set to "⊗"	Set to "○"
	Starting safety logic not satisfied	Check and restore the necessary conditions
	Fall sensor faulty	Replace
	Vent hole on tank cap clogged	Clean
	Battery charge insufficient	Recharge
	Battery damaged	Replace
	Free-wheel, gear free-wheel worn or faulty	Replace (*)
	Double gear or intermediate gear of the starter motor worn or faulty	Replace (*)
	Starter motor toothing broken	Replace (*)
	Spark plugs dirty	Replace
	Spark plugs wet	Clean or replace
	Spark plugs loose	Tighten
	Spark plugs are not to spec.	Replace
	Cold start cable not working	Check
	Fuel filters dirty or fuel supply pipes clogged	Clean or replace
	Fuel pump, relay or wiring faulty	Replace
	Fuel pressure regulator faulty	Replace
	Injectors faulty	Replace
	Valve clearance incorrect	Adjust (*)
The engine has trouble idling	Idling rpm too low	Adjust
	Air cleaner dirty	Clean
	Intake coupling leaking	Replace
	Poor synchronization of both cylinders	Synchronize the cylinders
	Throttle body connection hoses damaged or cracked	Replace
	Throttle valve shaft/housing worn	Replace
	See the subsection entitled (The engine does not start or has trouble starting) for other possible causes	
The engine runs irregularly at higher speeds	The dirty fuel output connection causes less fuel to reach the injector	Clean and resupply the fuel system
	Intake conveyors and pipes clogged	Check
	Air penetrating through the throttle body or intake coupling	Replace
	Fuel pressure too low	Clean fuel system or change pump.
	Fuel supply pump faulty	Replace
	Camshafts worn	Replace (*)
	See the subsection entitled (The engine does not start or has trouble starting) for other possible causes	

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DEFECT	SYMPTOM AND POSSIBLE CAUSES	REMEDY
Engine lacks power	Spark plugs dirty	Clean or replace
	Spark plugs are not to spec.	Replace
	Insufficient valve clearance	Adjust (*)
	Exhaust system faulty	Replace
	Valve timing incorrect	Adjust (*)
	Faulty valve springs	Replace (*)
	Valve seats leaking	Reface seat (*)
	Intake coupling or intake system leaking	Replace
	Clutch slipping	Replace the clutch discs or springs (*)
	Motor oil not to spec.	Use motor oil conforming to spec.
	Air cleaner dirty	Replace
	Fuel pump faulty	Replace
	Fuel pressure too low	Replace the fuel pressure regulator or check the pump
	Injector dirty	Replace
	Piston rings worn	Replace (*)
	See the subsections entitled [The engine produces an excessive amount of exhaust fumes (blue smoke)] and (The clutch slips) for other possible causes	
The engine overheats	Insufficient coolant in the cooling system, system leaking	Top up with coolant, subject the system to a pressure test
	Coolant not to specification	Use coolant conforming to specification
	Radiator dirty or coolant pipe clogged	Clean
	Air in the cooling system	Bleed
	Cooling fan motor faulty	Repair or replace
	Coolant thermal switch faulty	Replace
	Thermal expansion valve faulty	Replace
	Coolant pump or coolant pump control drive faulty	Replace (*)
	Insufficient oil in the system	Top up with motor oil
	Oil pump or oil pump control faulty, or oil circuit clogged	Replace or clean (*)
	Motor oil not to spec.	Use motor oil conforming to spec.
	Intake coupling or intake system leaking	Replace
	Injector faulty	Replace
	Head gasket faulty	Replace (*)
The engine temperature stays too low	Thermal expansion valve faulty	Replace
The engine produces excessive exhaust fumes (blue smoke)	Clutch diaphragm leaking	Replace (*)
	Valve stem gaskets worn	Replace (*)
	Valve stems or valve guides worn	Replace (*)
	Signs of scratches or scoring on the cylinder walls	Replace (*)
	Piston rings or cylinder worn	Replace (*)
	Head gasket leaking	Replace (*)
The engine vibrates	Engine fastening loose	Tighten
	Bearing or bearing housing worn	Replace
	Countershaft timing incorrect	Adjust (*)
Engine oil pressure too low ("" LED comes on)	Insufficient oil in the system	Top up with motor oil
	Oil not to spec.	Replace
	Oil pressure sensor faulty	Replace (*)
	Oil pressure adjusting valve clogged or faulty (the adjusting valve remains open)	Clean or replace (*)
	Oil pump control faulty	Replace (*)
	Oil pump worn	Replace (*)

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DEFECT	SYMPTOM AND POSSIBLE CAUSES	REMEDY
The engine runs too noisily	**The noise seems to be coming from the timing system**	
	Chain tightener shoe worn	Replace (*)
	Excessive valve clearance	Adjust (*)
	Valve springs exhausted or broken	Replace (*)
	Bucket-type tappets or camshaft worn	Replace (*)
	Timing chain worn	Replace (*)
	Timing gears worn	Replace (*)
	Timing chain tightener faulty	Replace (*)
	The noise seems to be coming from the piston	
	Piston or cylinder worn	Replace (*)
	Gudgeon pin, bore or connecting rod worn	Replace (*)
	Piston rings or grooves worn or broken	Replace (*)
	The noise seems to be coming from the clutch or clutch casing	
	Clutch discs worn	Replace (*)
	Clutch housing worn	Replace (*)
	Flexible couplings on clutch housing have excessive play	Replace (*)
	Noise with the clutch engaged – grooved ball bearings in the support plate faulty	Replace (*)
	Primary transmission worn or broken	Replace (*)
	The noise seems to be coming from the flywheel casing	
	Timing gears worn or broken	Replace (*)
	The noise seems to be coming from the crank gear	
	Connecting rod bearings worn	Replace (*)
	Driving shaft bushes or countershaft bearings worn	Replace (*)
	The noise seems to be coming from the gearshift	
	Gears or propeller shafts worn or broken	Replace (*)
	Primary gear unit worn	Replace (*)
	Gearshift bearings worn	Replace (*)
	The noise is heard when the engine is started	
	Freewheel gear, gear or housing worn or faulty	Replace (*)
	Double gear or intermediate gear of the starter motor worn	Replace (*)
	Starter motor toothing broken	Replace (*)
The clutch "slips"	Clutch discs worn or distorted	Replace (*)
	Clutch springs exhausted	Replace (*)
	Support plate worn or distorted	Replace (*)
	Motor oil not to spec.	Use motor oil conforming to spec.
	Clutch control hydraulic system faulty	Replace
The clutch does not "disengage"	Control fluid tank level	Check
	Motor oil not to spec.	Use motor oil conforming to spec.
	Clutch discs stuck together	Clean or replace (*)
	Clutch discs or support plate distorted	Replace (*)
	Clutch control hydraulic system faulty	Replace
	Clutch housing worn	Replace (*)
The clutch sticks during engagement	Clutch discs worn or distorted	Replace (*)
	Clutch disc guide grooves inside clutch housing worn	Replace the housing clutch (*)
	Smooth disc guide grooves in clutch disc hub worn	Replace the disc hub (*)
	Thrust-bearing surfaces of the clutch housing or support plate worn	Replace (*)
The gearshift does not engage or has trouble engaging	Engagement teeth of speed gears worn	Replace (*)
	Propeller shafts worn	Replace (*)
	Selector shaft gearshift mechanism faulty	Repair or replace (*)
	The gearshift forks are worn or distorted	Replace (*)
	See the subsection entitled (The clutch does not "disengage") for other possible causes	

Follow ▶

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DEFECT	SYMPTOM AND POSSIBLE CAUSES	REMEDY
The gears disengage when the vehicle is started or whilst accelerating hard	Gearshift gears worn	Replace (*)
	The gearshift forks are worn or distorted	Replace (*)
	The positioning springs are exhausted or broken	Replace (*)
	Gearchanging lacks coordination or is incomplete; the gearshift lever is distorted or adjusted incorrectly	When shifting up or down, always press the gearshift lever pedal down all the way; replace the gearshift lever (*)
Spark plugs overheated, burnt out or dirty	Spark plugs not to spec	Replace
	Spark plugs loose	Tighten
	Intake coupling or intake system leaking	Replace
	Fuel supply system faulty	Repair or replace
The battery alternator is not charged or is charged incorrectly	Battery faulty	Change the battery
	Voltage regulator faulty	Replace
	Break in current, short-circuit or earthing of alternator windings	Replace
	Break in cables or cables short-circuited, connections loose	Repair, change or tighten

8.1.2 ELECTRIC SYSTEM

DEFECT	SYMPTOM AND POSSIBLE CAUSES	REMEDY
Spark plugs becomes dirty immediately with carbon deposits	Motor oil level incorrect	Check
	Unsuitable fuel	Use the prescribed fuel
	Air cleaner dirty	Clean
Spark plugs gets dirty too quickly	Motor oil level incorrect	Check
	Piston segments worn	Replace (*)
	Piston or cylinder worn	Replace (*)
Spark plugs electrodes overheated or burnts	The engine overheats	Adjust
	Spark plug loose	Tighten
Alternator does not charge	Connection terminals interrupted, in short circuit or loose	Repair, change or tighten
	Alternator coils in short circuit, earthed or interrupted	Replace
	Regulator/rectifier in short circuit or defective	Replace
The alternator does charge but the current intensity is lower than the prescribed value	The terminals are subject to short circuit, interruption or excessive separation	Repair or tighten
	Alternator stator coils earthed or interrupted	Replace
	Regulator/rectifier defective	Replace
	Battery faulty	Replace
Alternator charges too much	Short circuit inside battery	Repair or replace
	Regulator/rectifier damaged or defective	Replace
	Unstable earth of regulator/rectifier	Replace
Charge not constant	Terminal insulation worn due to vibrations, with consequent temporary short circuits	Repair or replace
	Internal generator short circuits	Replace (*)
	Regulator/rectifier defective	Replace

8.1.3 BATTERY

DEFECT	SYMPTOM AND POSSIBLE CAUSES	REMEDY
Battery runs down too quickly	Recharging system defective	Check the alternator, the regulator/rectifier, the circuit connections and carry out operations necessary to restore correct recharge
	Battery elements have lost much active material consequent on excessive charge	Change the battery and repair charging system
	Presence of short circuits inside battery owing to excessive accumulation of sediments	Change the battery
	Old battery	Change the battery
Battery polarity inverted	Battery has been incorrectly connected to the system	Change the battery and make sure new one is connected properly

8.1.4 BRAKES

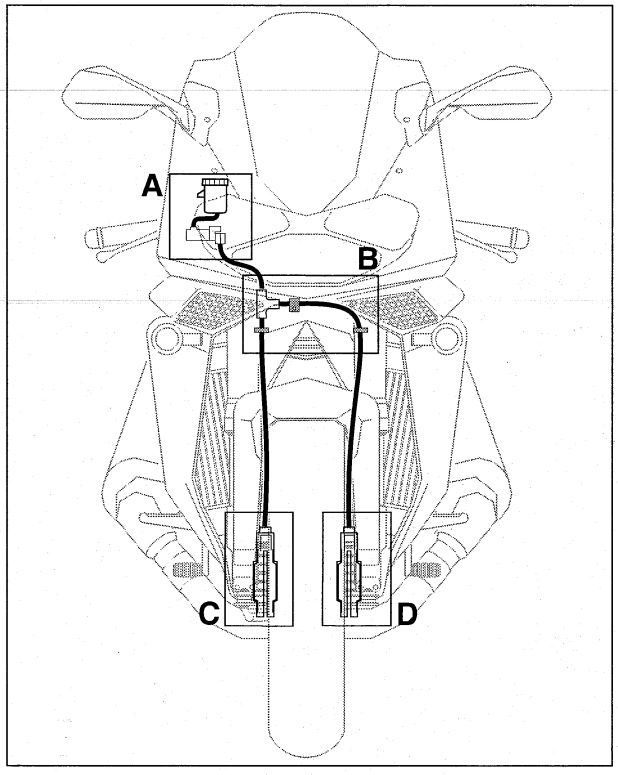
DEFECT	SYMPTOM AND POSSIBLE CAUSES	REMEDY
Poor braking power	Brake fluid leakage from hydraulic system	Repair or replace
	Brake pads worn	Change pads
	Contact surfaces of pads soiled by oil, grease or brake fluid	Change pads
	Brake discs worn	Change disc
	Air in hydraulic circuit	Bleed the circuit
	Brake discs dirty with oil, grease or brake fluid	Clean
	Foreign matter in brake fluid	Change brake fluid
	Brake pump return hole clogged	Disassemble and clean brake pump
Brakes squeak	Pad contact surfaces hardened	Restore surfaces with sandpaper
	Pads installed backwards	Install correctly
	Wheel bearing damaged	Replace
	Front or rear wheel pin loose	Tighten to prescribed driving torque
	Brake pads worn	Replace
Excessive stroke of brake lever	Air in hydraulic circuit	Bleed the circuit
	Insufficient brake fluid	Replace
	Unsuitable brake fluid	Replace
	Brake caliper pins locked	Disassemble and clean
Brake fluid leakage	Insufficient tightening of connection fittings	Tighten to prescribed driving torque
	Cracked pipes	Replace
	Pumping element and/or body worn	Change the pumping element and/or body

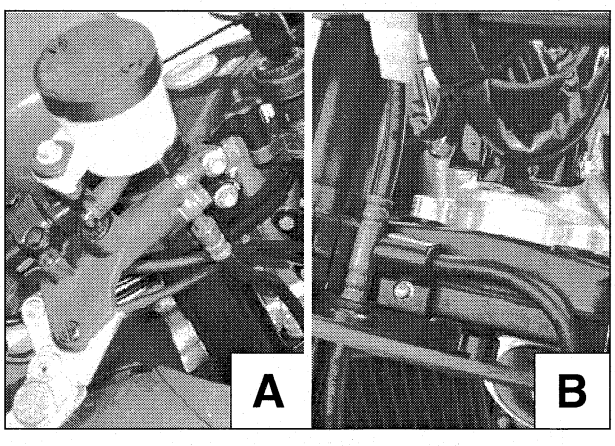
8.1.5 CHASSIS

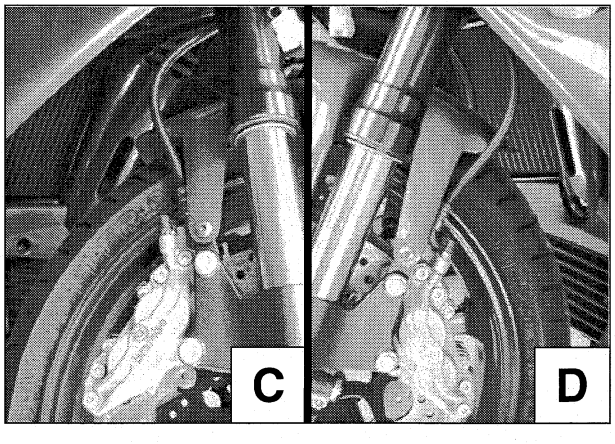
DEFECT	SYMPTOM AND POSSIBLE CAUSES	REMEDY
Hard steering	Steering adjustment ring nut too tight	Adjust
	Steering bearings broken	Replace
	Steering axis deformed	Replace
	Insufficient front tyre pressure	Adjust
	Steering shock absorber stiff	Replace
Steering not fluid	Steering bearings damaged	Replace
Handlebar oscillates	Unbalanced adjustment of fork tubes	Adjust
	Fork deformed	Replace
	Front wheel pin deformed or tyre deformed	Replace
	Front/rear wheel not balanced	Balance
Rear wheel oscillates	Wheel rim deformed	Replace
	Wheel bearings worn	Replace
	Tyre defective or unsuitable type	Replace
	Wheel pin nut loose	Tighten
	Fork oil unsuitable	Replace
Fork too soft	Adjustments incorrect	Adjust
	Springs weakened	Replace
	Fork oil insufficient	Top up
	Fork oil exhausted	Replace
Fork too rigid	Adjustments incorrect	Adjust
	Fork oil too viscous	Replace
	Too much oil in fork	Remove excess oil
Noisy fork	Fork oil insufficient	Top up
	Suspension coupling screws and nuts loose	Tighten
Rear wheel oscillates	Wheel rim deformed	Replace
	Wheel bearings worn	Replace
	Tyre defective or unsuitable type	Replace
	Fork bearings worn	Replace
	Suspension screws and nuts loose	Replace
	Rear brake fastening nut loose	Tighten
	Rear fork pin fastening ring loose	Tighten
Rear suspension too soft	Shock absorber spring weakened	Replace
	Adjusting devices incorrectly adjusted	Adjust
	Oil leakage from shock absorber	Replace
	Shock absorber leaking nitrogen	Replace
Rear suspension too rigid	Adjusting devices incorrectly adjusted	Adjust
	Shock absorber pin deformed	Replace
	Fork deformed	Replace
	Fork bearings worn	Replace
	Suspension roller bearings worn	Replace
Rear suspension noisy	Suspension screws and nuts loose	Tighten
	Fork bearings worn	Replace
	Suspension roller bearings worn	Replace

8.2 RUN, FASTENING, WIRING, CABLES AND PIPES

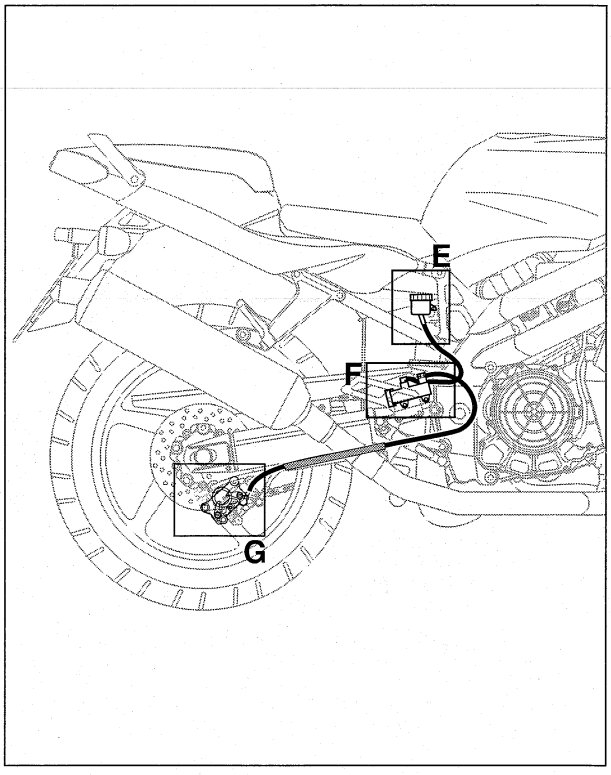
8.2.1 FRONT BRAKE PIPES

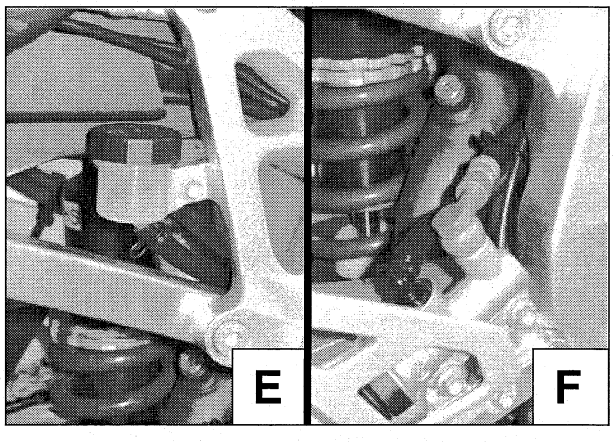


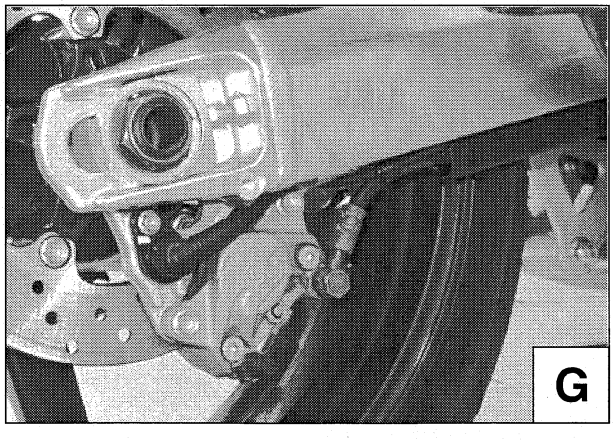




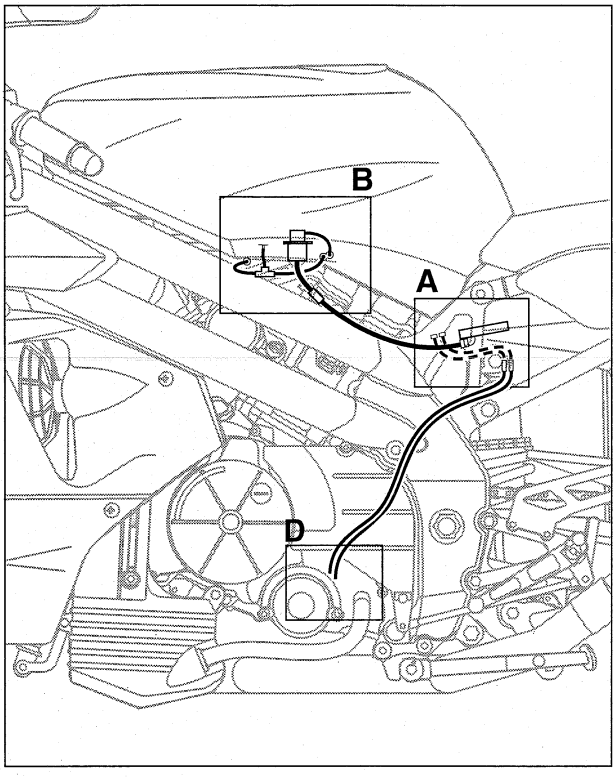
8.2.2 REAR BRAKE PIPES

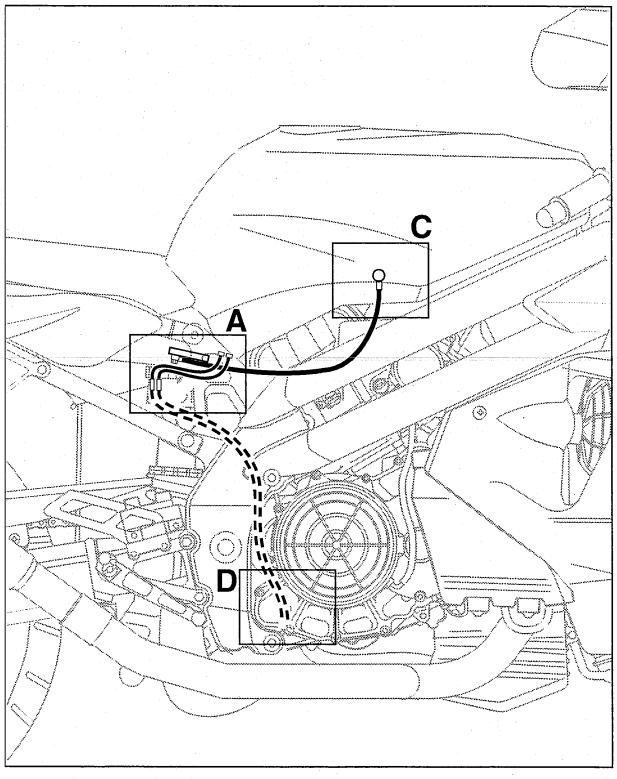


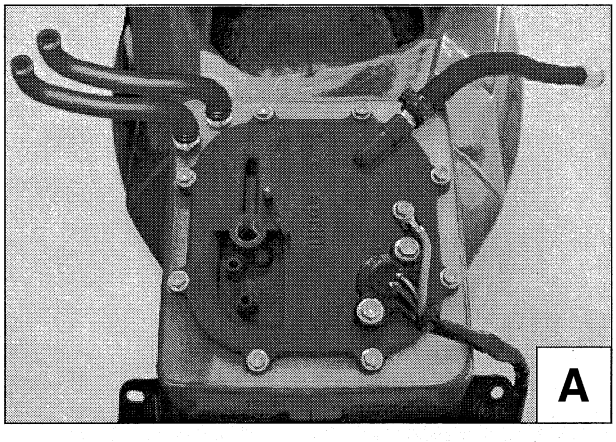


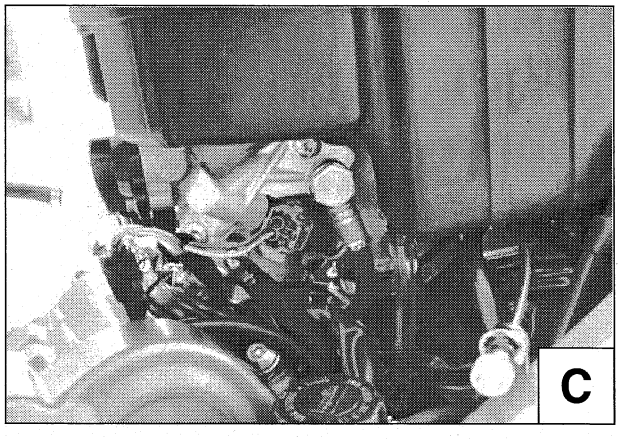


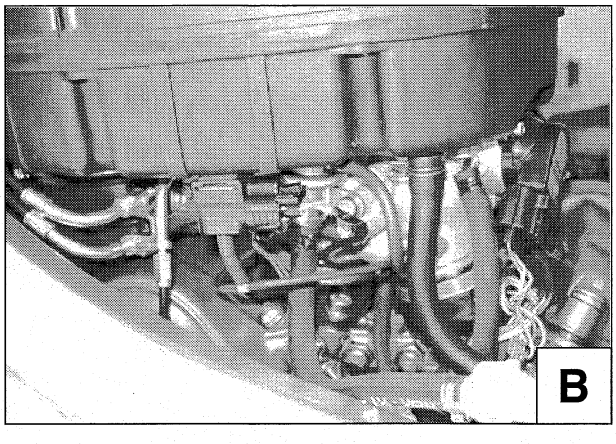
8.2.3 FUEL SYSTEM PIPES

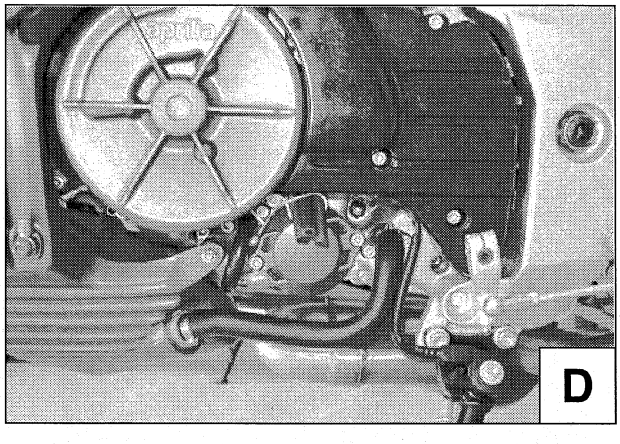




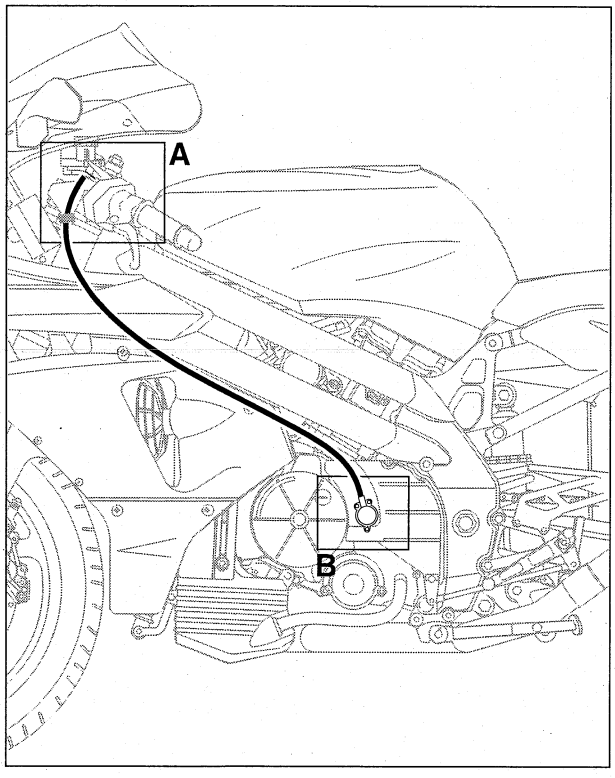


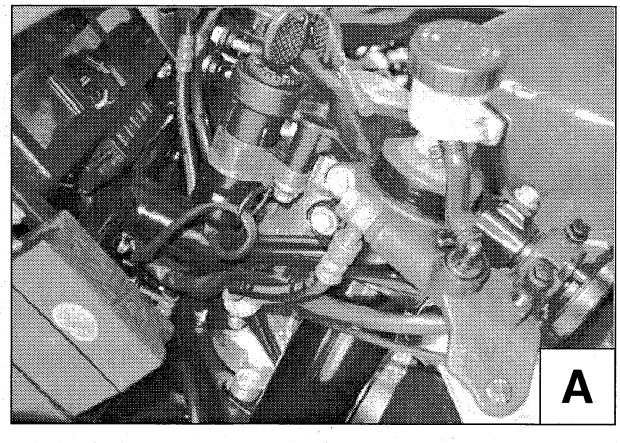


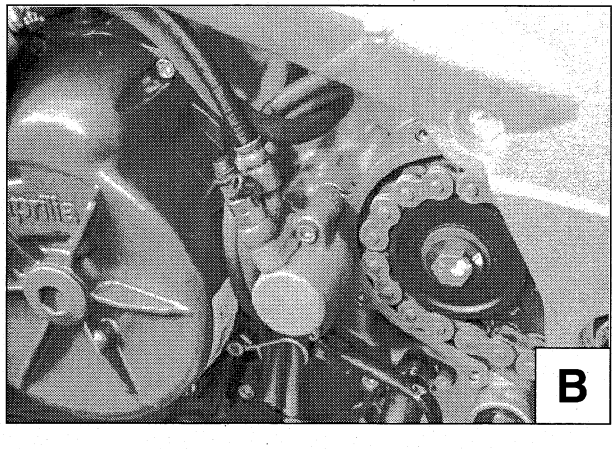




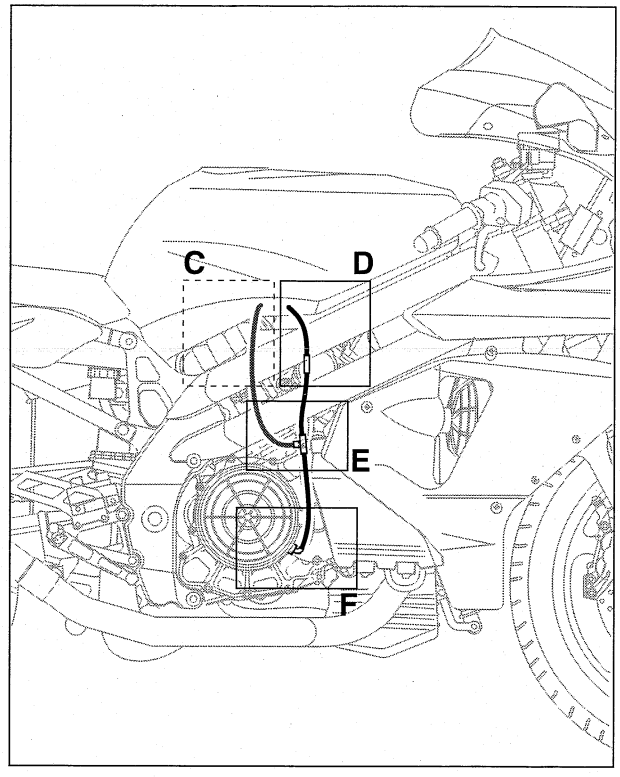
8.2.4 CLUTCH CONTROL PIPE

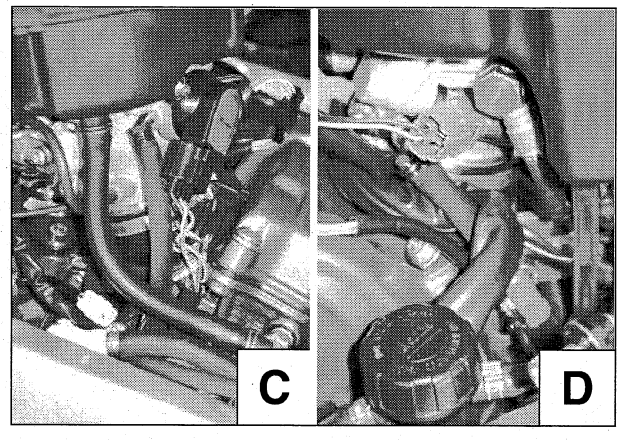


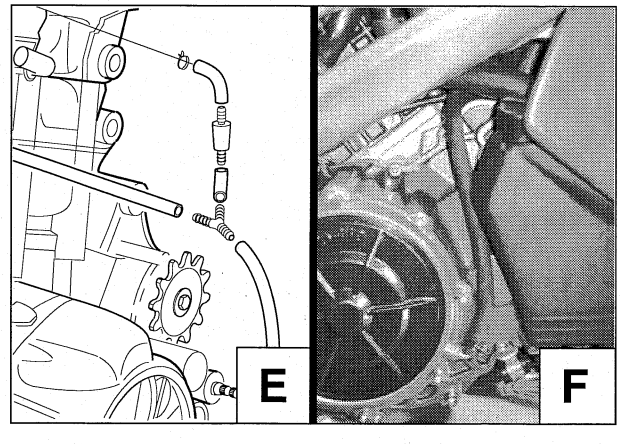




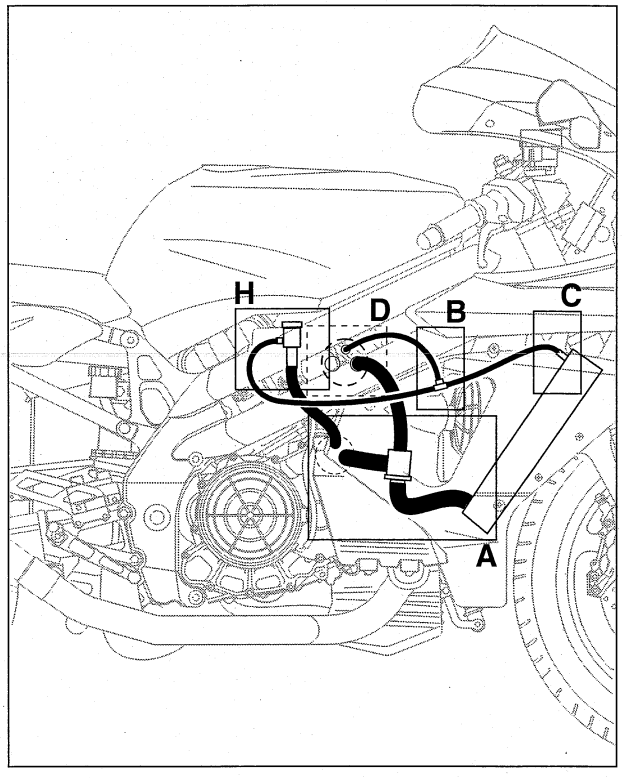
8.2.5 PPC DEVICE PRESSURE PIPES

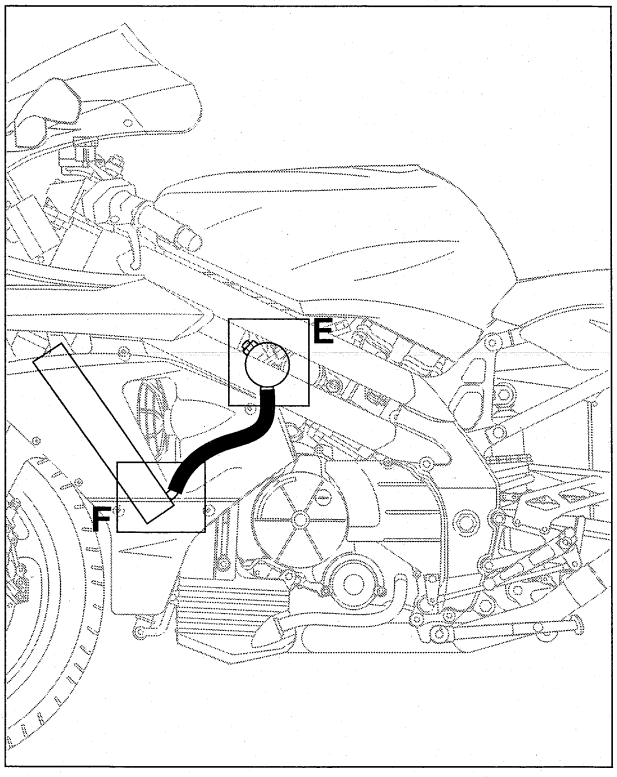


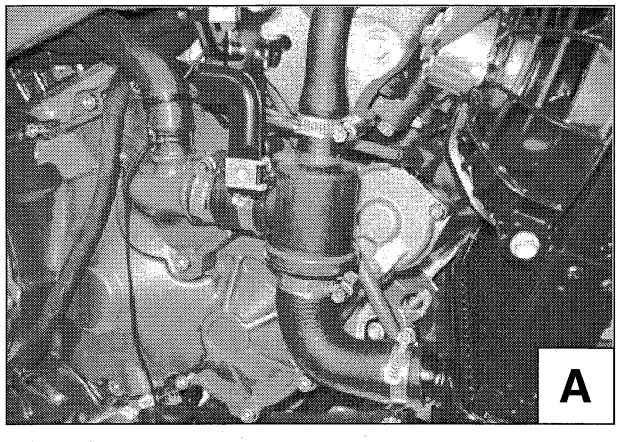


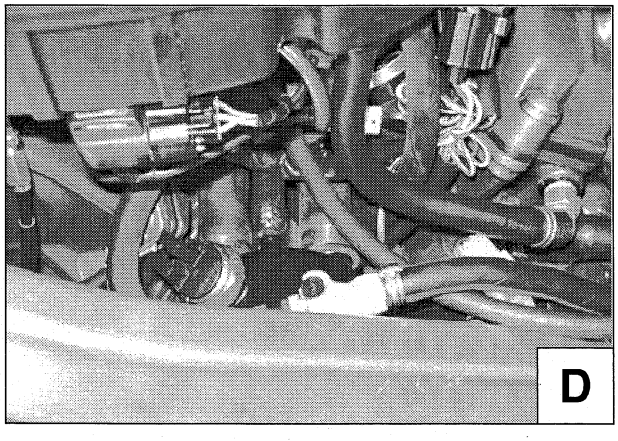


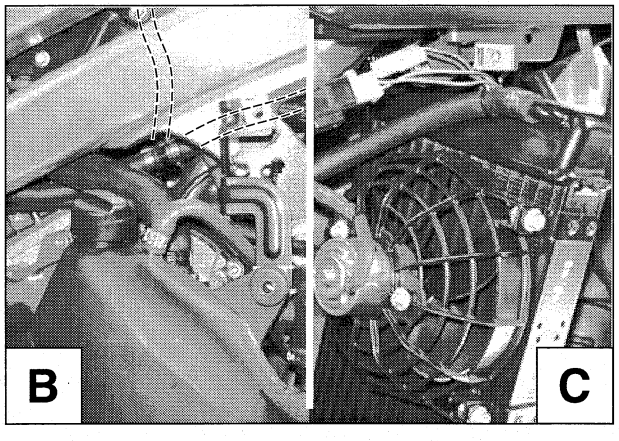
8.2.6 COOLING SYSTEM PIPES

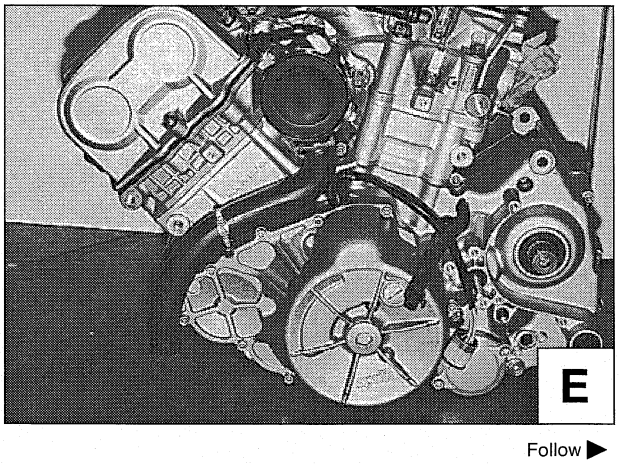






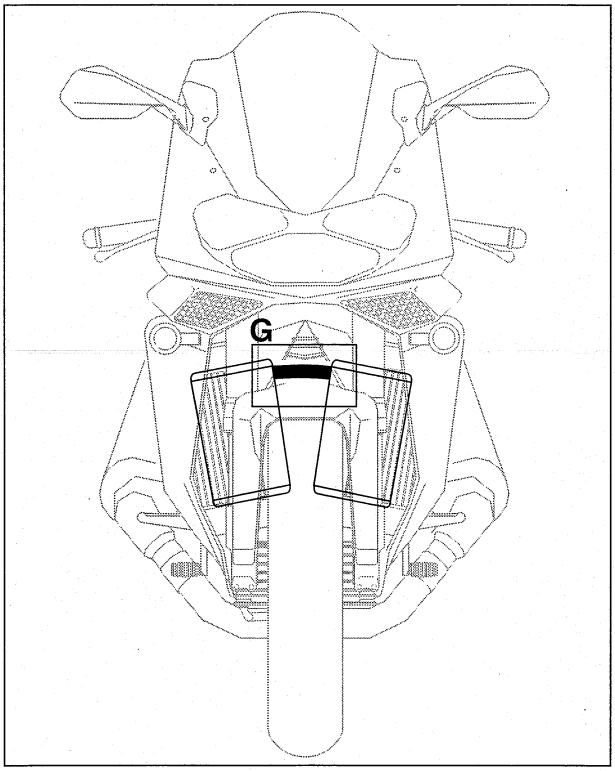


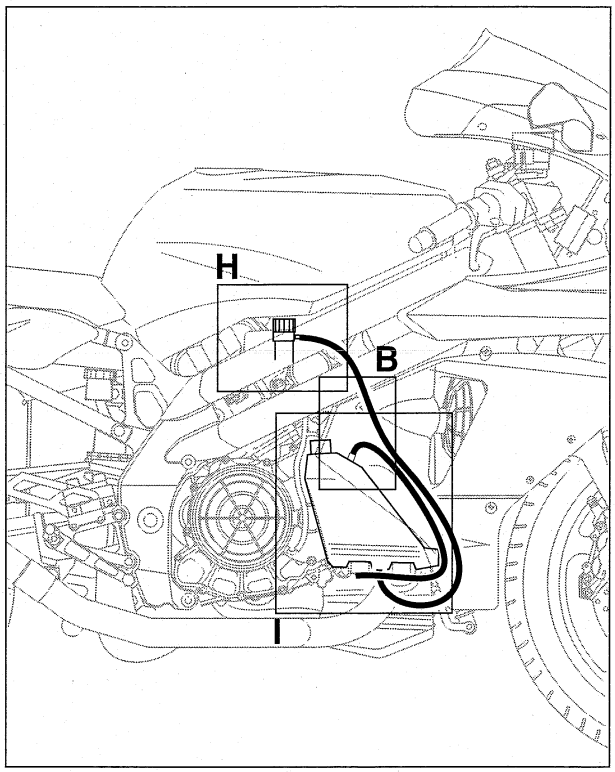


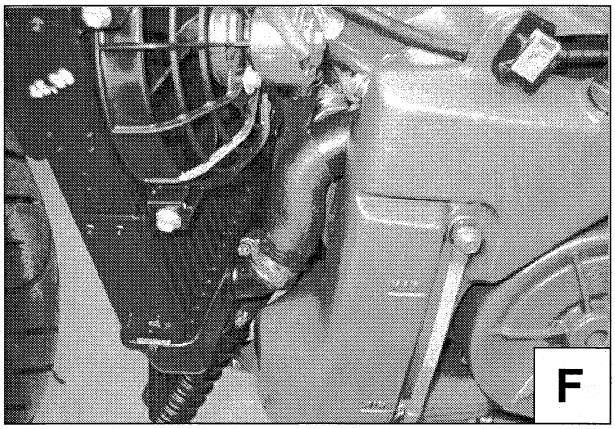


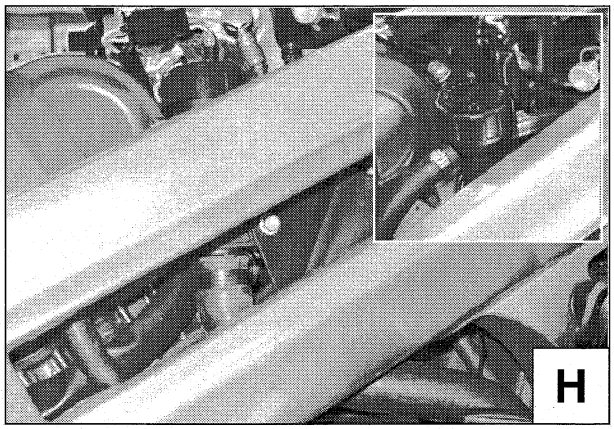
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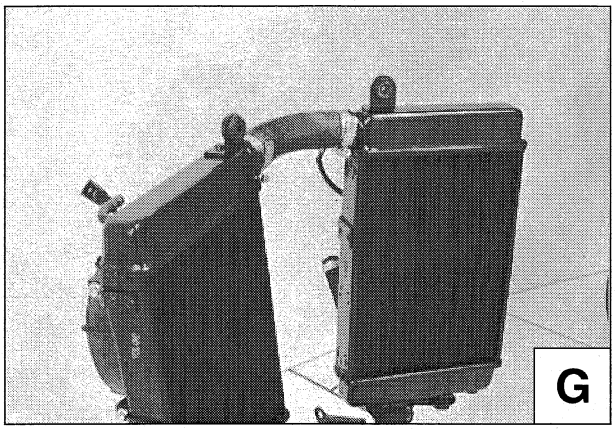
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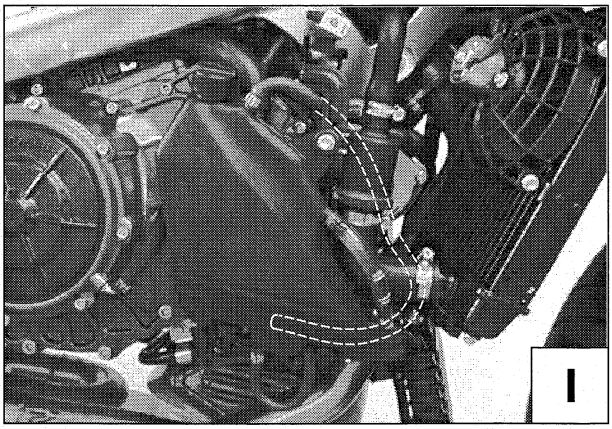




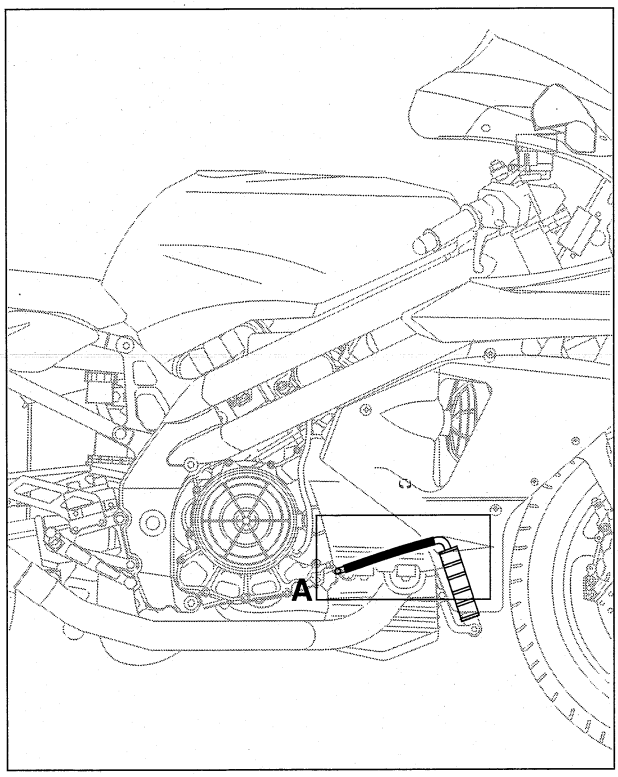


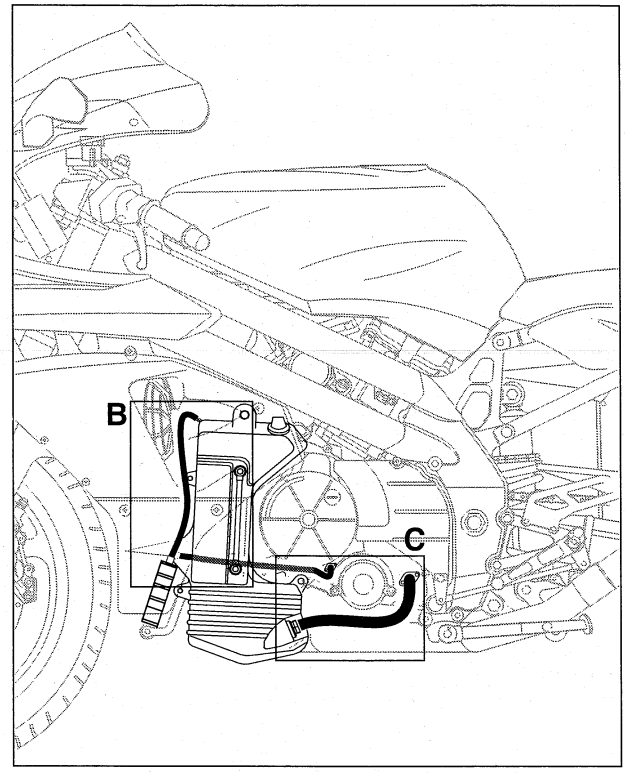


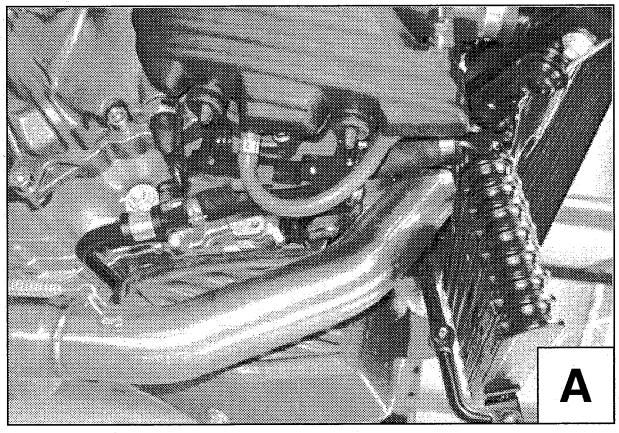


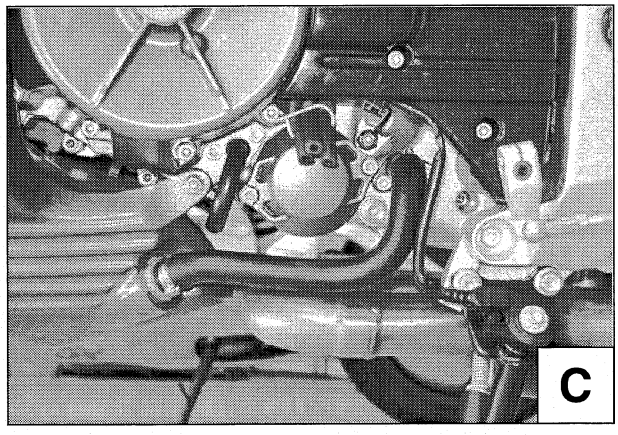


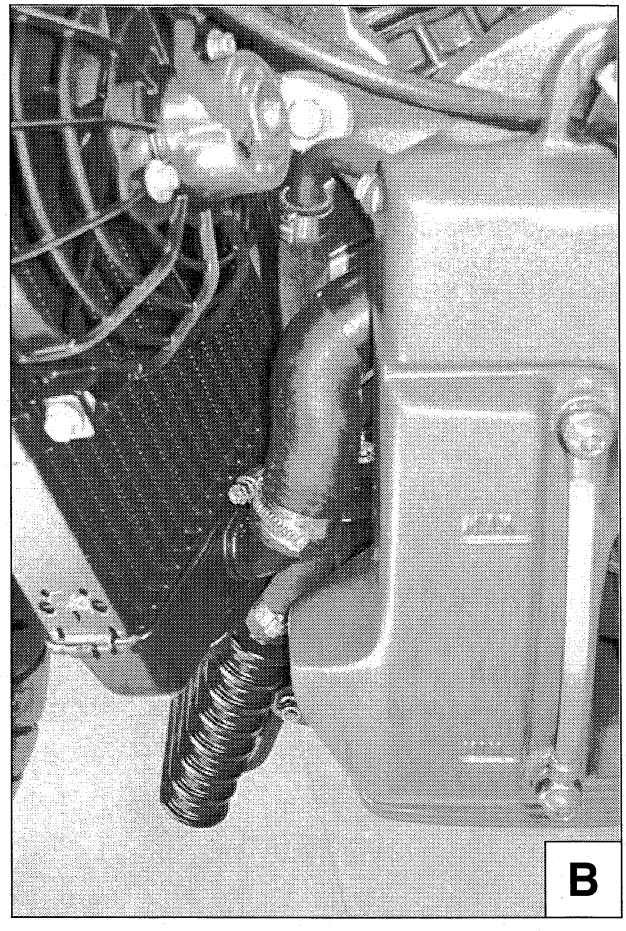
8.2.7 ENGINE OIL PIPES



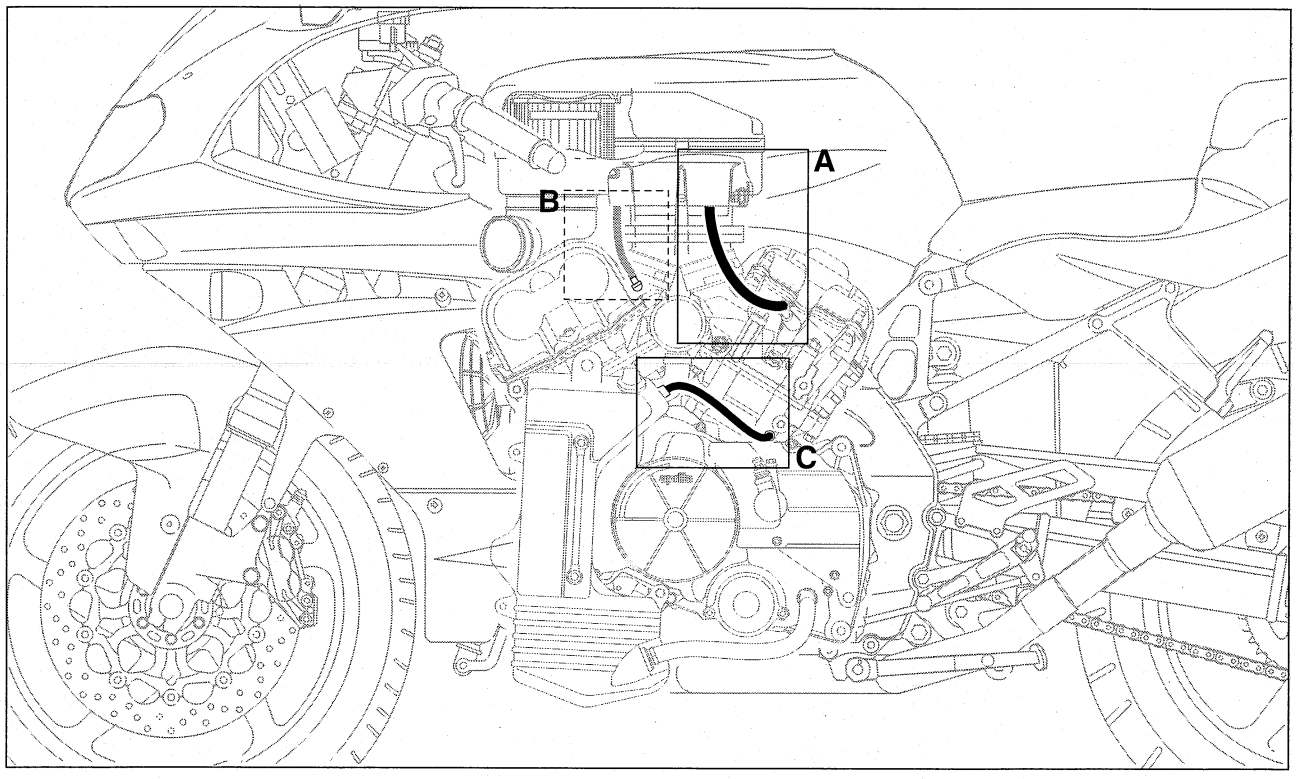




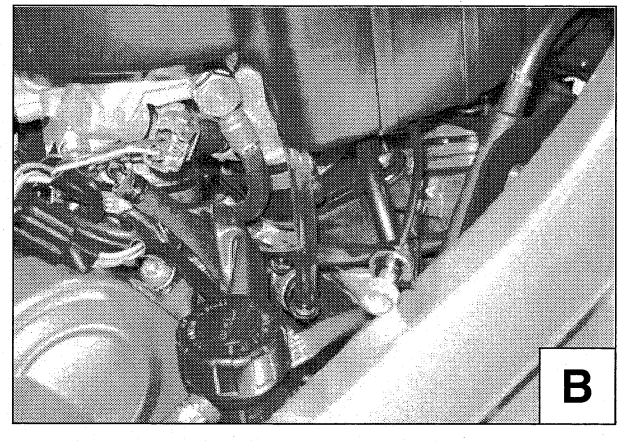


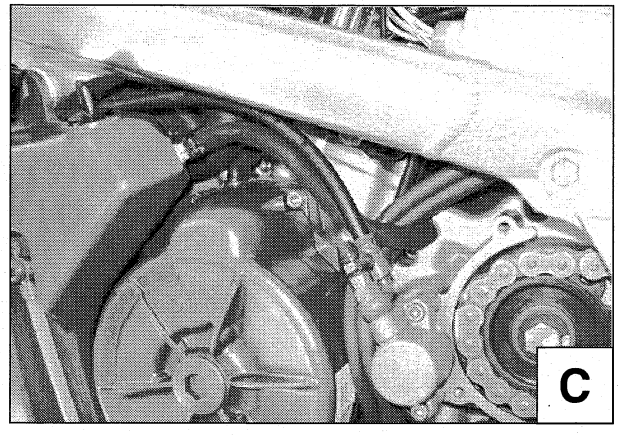


8.2.8 BREATHER AND IMPURITY DRAINAGE PIPES

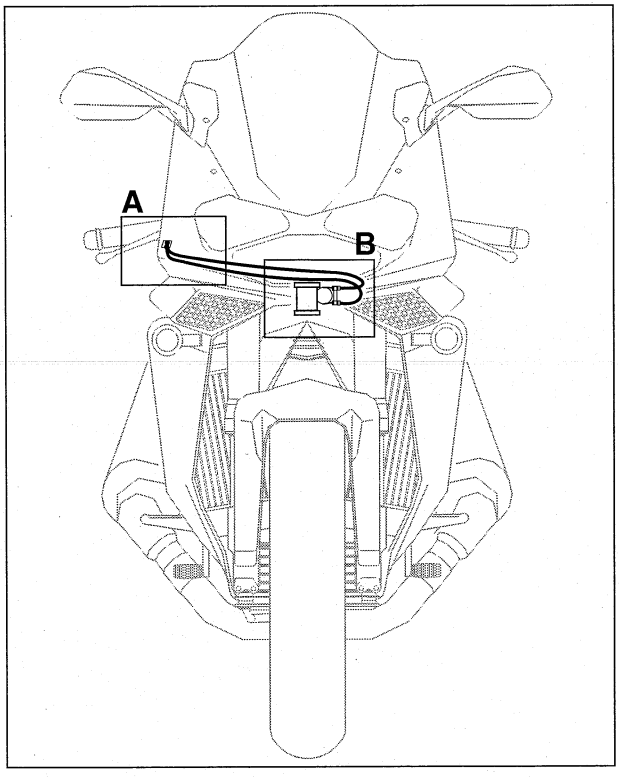


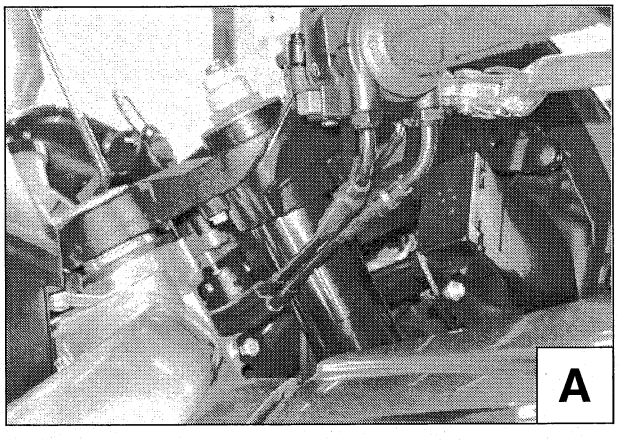


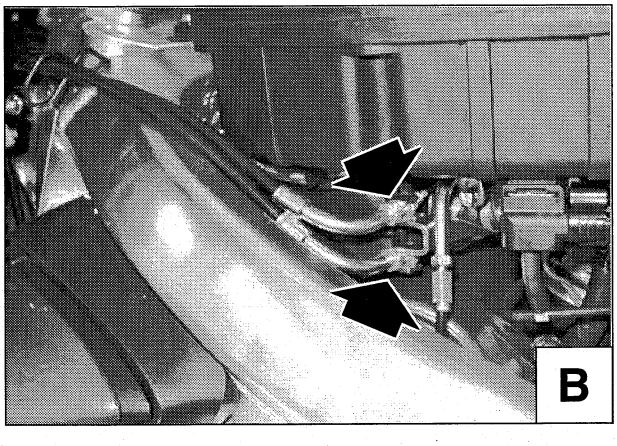




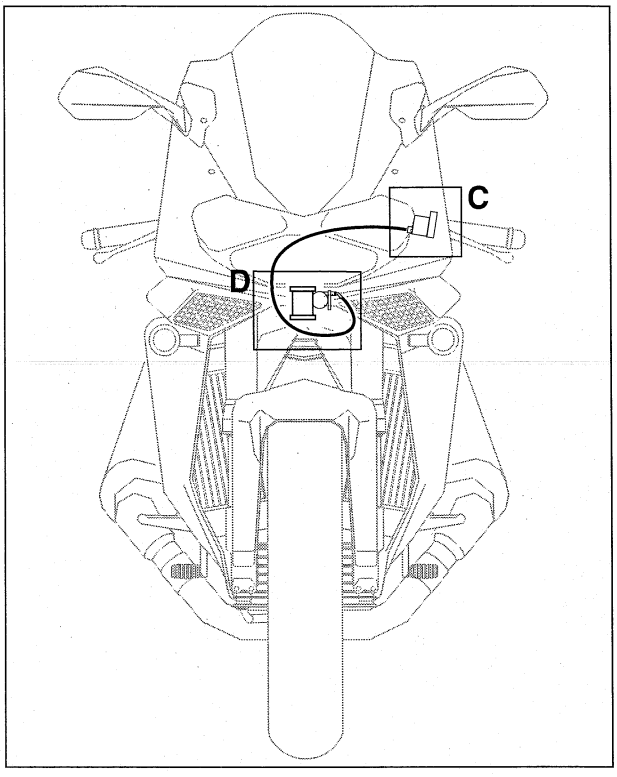
8.2.9 ACCELERATOR CONTROL CABLES

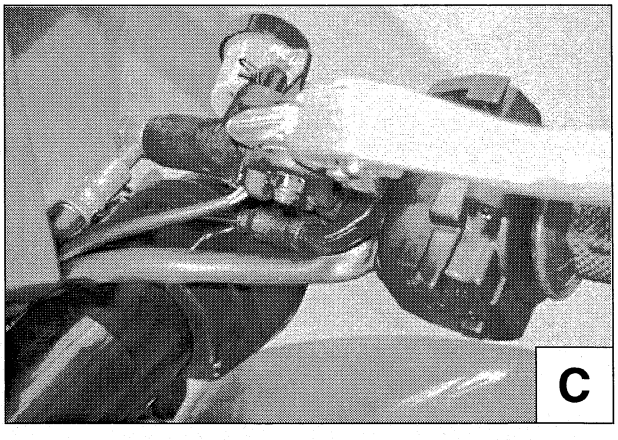


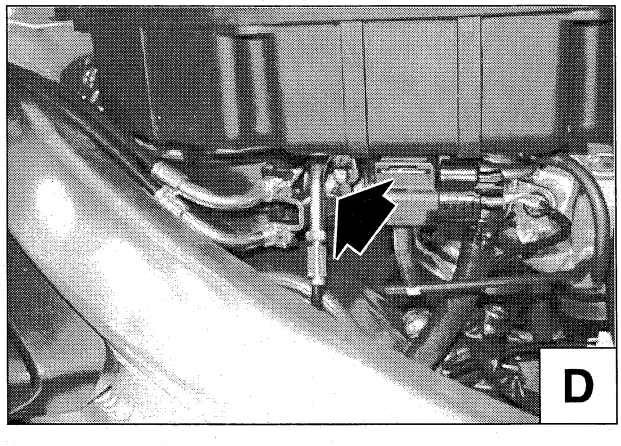




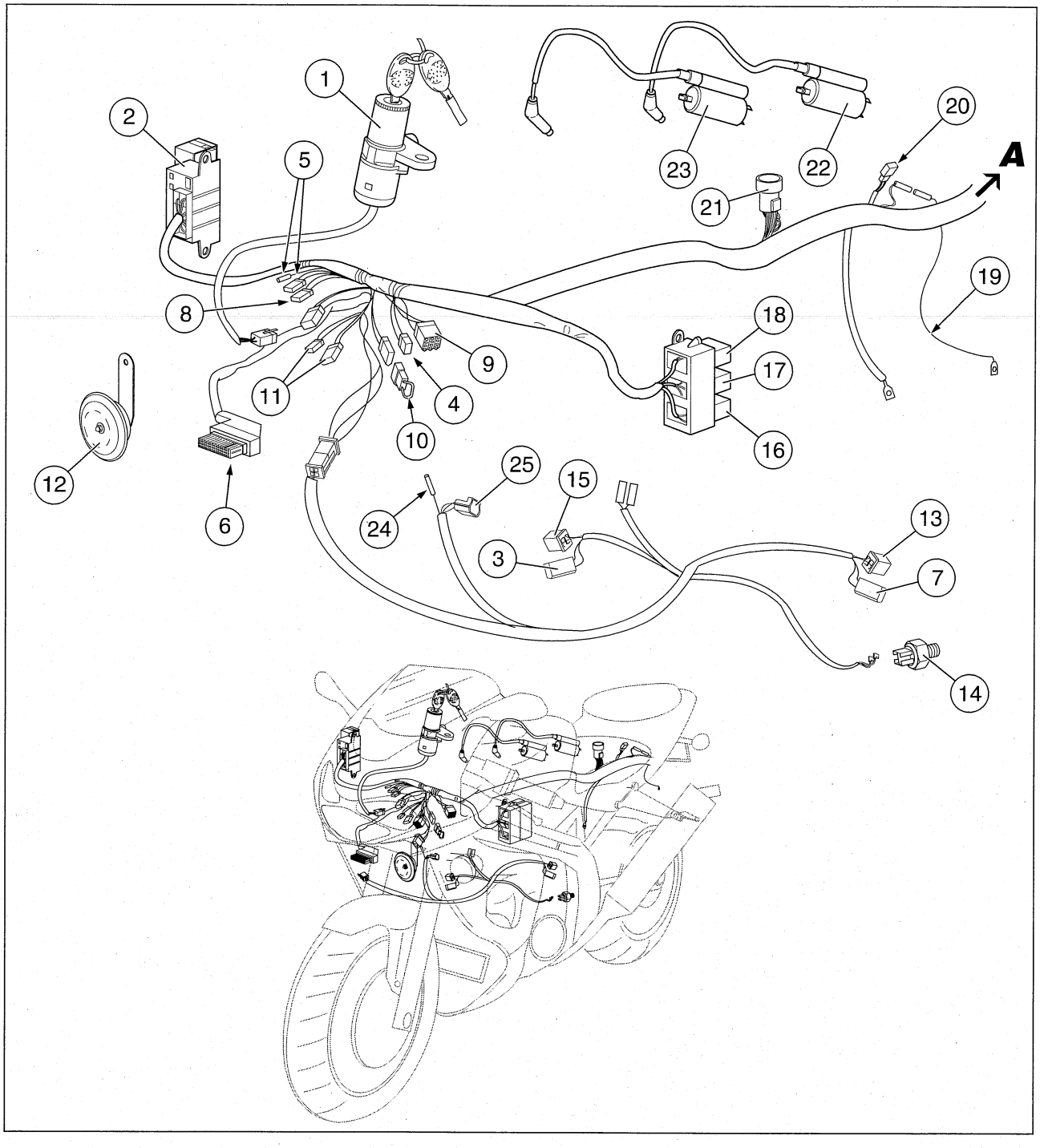
8.2.10 COLD START CABLE







8.2.11 ELECTRIC CABLES

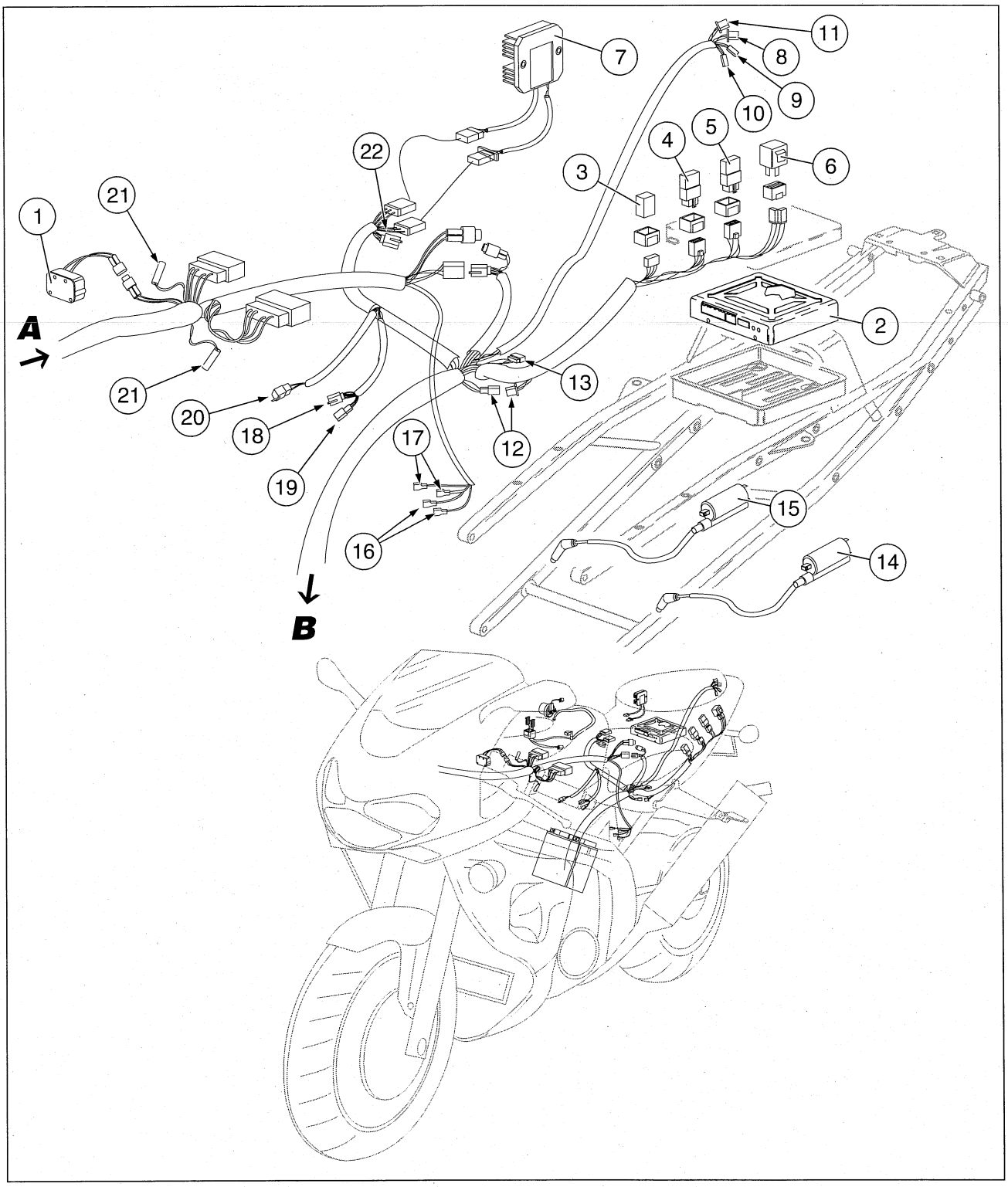


KEY

1) Ignition switch
2) Secondary fuse box
3) Front right indicator connector
4) Brake light switch connector
5) Right dip switch connector
6) Dashboard connector
7) Front left indicator connector
8) Clutch control lever switch connector
9) Left dip switch connector
10) Lights diode/LAP
11) Headlight connector
12) Horn
13) Left electrofan connector
14) Thermal switch
15) Right electrofan connector
16) Electric fan relay
17) High beam relay
18) Dipped beam relay
19) "Neutral" gearbox switch
20) Side stand switch connector
21) Generator/pick-up connector
22) Rear cylinder coil "1"
23) Rear cylinder coil "2"
24) Engine oil pressure sensor connector
25) Coolant temperature thermistor connector

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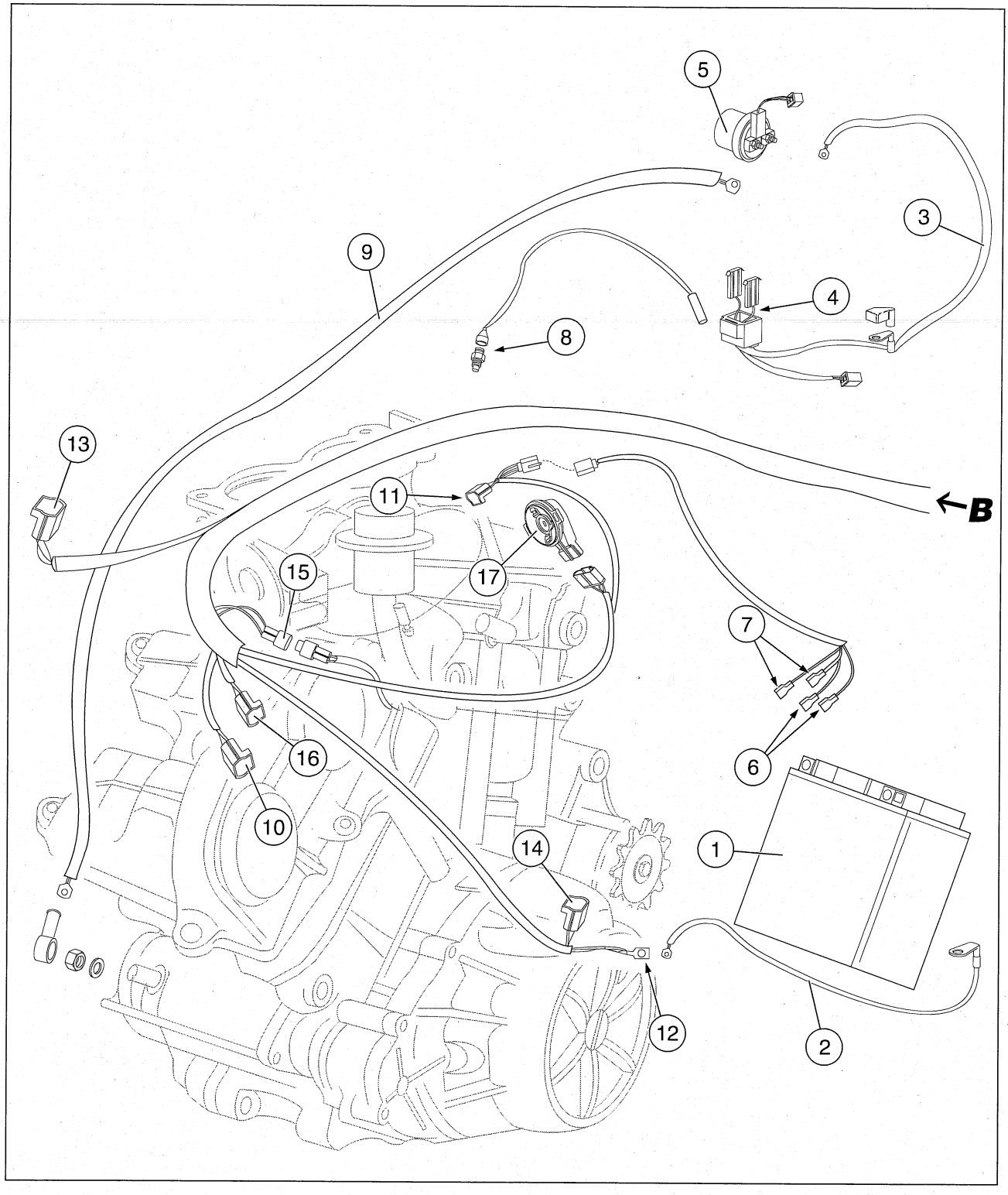


KEY

1) Fall sensor
2) Electronic unit
3) Diode module
4) Fuel pump relay
5) Engine stop relay
6) Blinking
7) Voltage regulator
8) Rear light connector
9) Rear right indicator connector
10) Rear left indicator connector
11) Number plate light connector
12) Arrangement for the installation of the anti-theft device
13) Fuel pump connector
14) Front cylinder coil "1"
15) Front cylinder coil "2"
16) Front cylinder "1" coil connector
17) Front cylinder "2" coil connector
18) Speed sensor connector
19) Side stand switch connector
20) Main fuses connector
21) TEST connectors
22) Start relay connector

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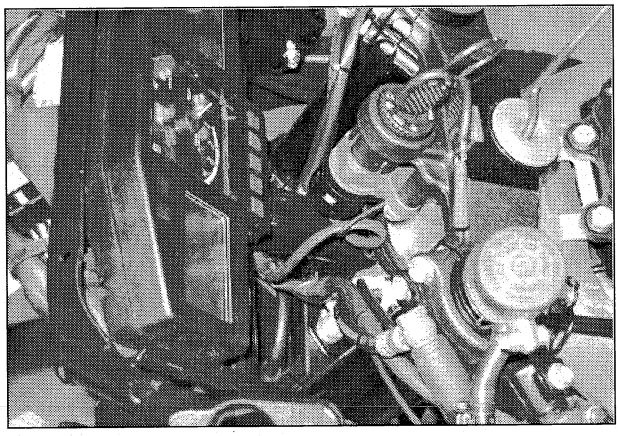


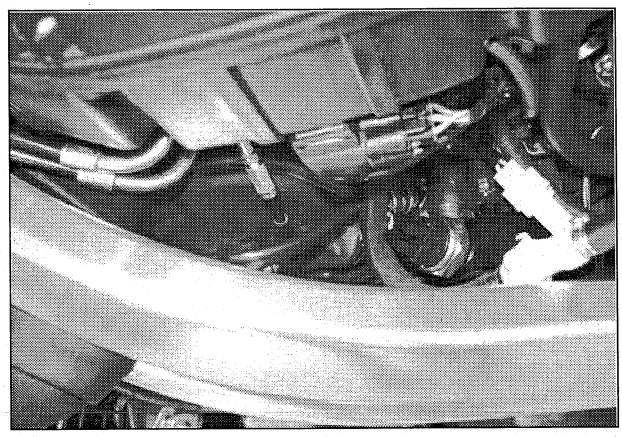
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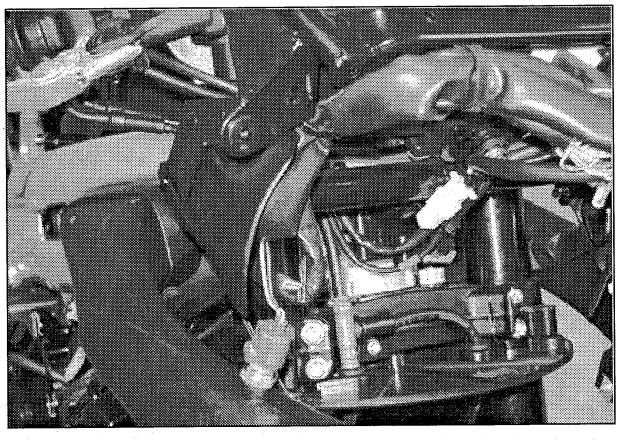
1) Battery
2) Battery earth cable
3) Supply cable
4) Main fuses
5) Start relay
6) Rear cylinder "1" coil connectors
7) Rear cylinder "2" coil connectors
8) Engine oil pressure sensor
9) Starter cable
10) Intake pressure sensor connector
11) Right injector connector
12) Engine earth cable
13) Air thermistor connector
14) Coolant thermistor connector
15) Camshaft position sensor connector
16) Left injector connector
17) Throttle valve potentiometer

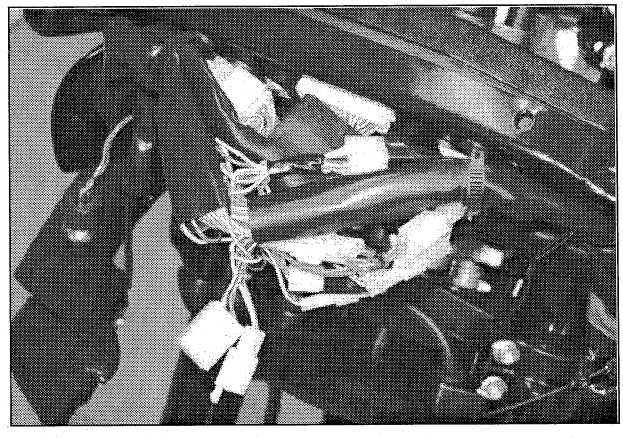
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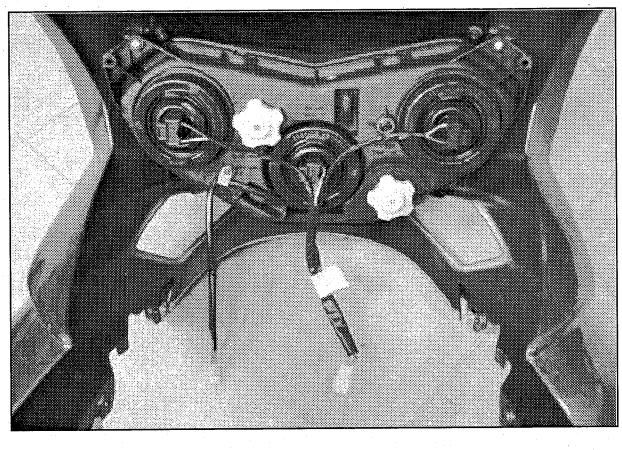
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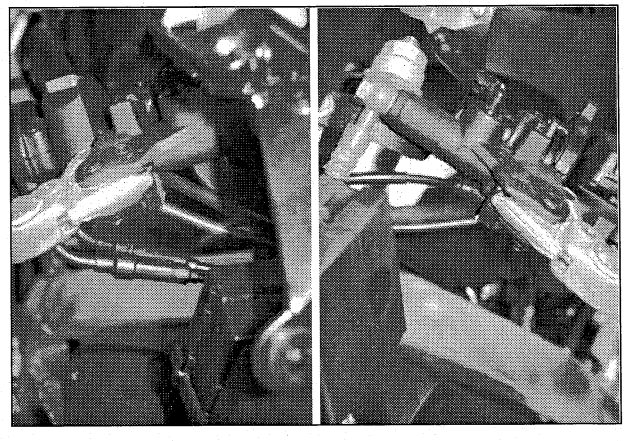


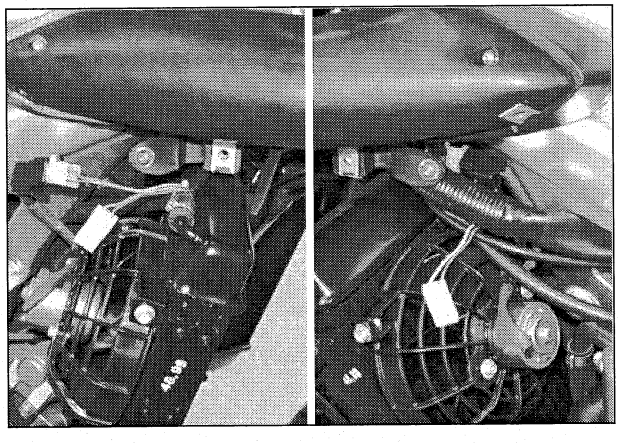


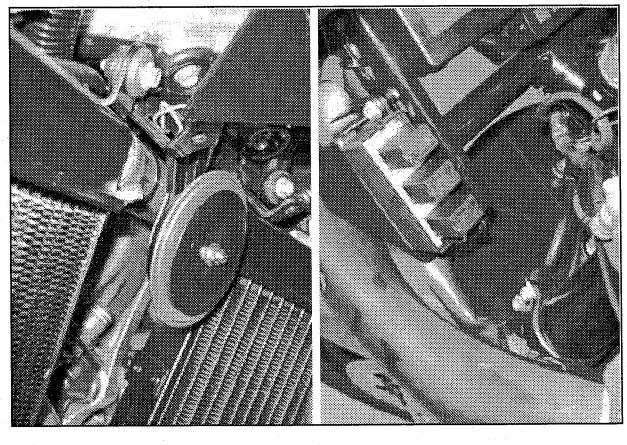






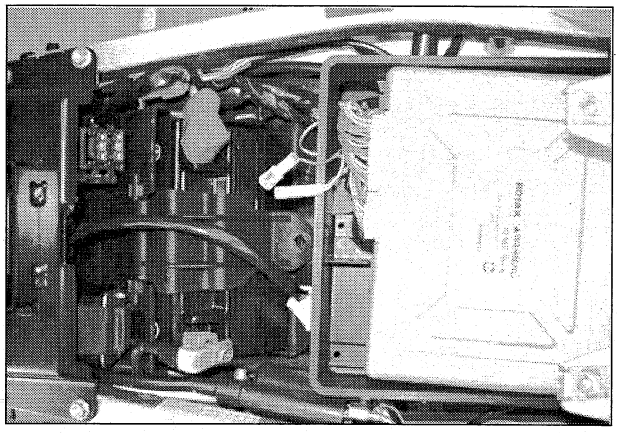


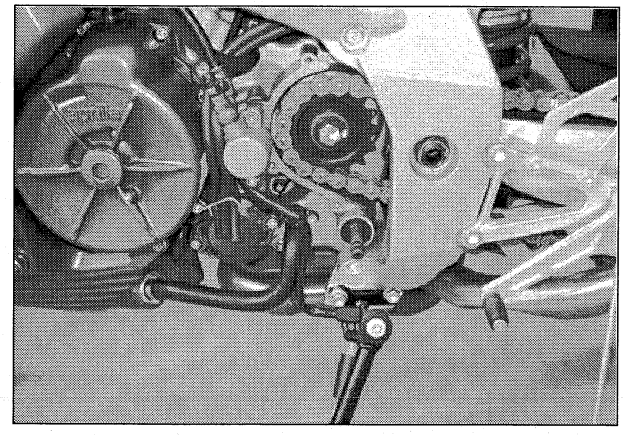


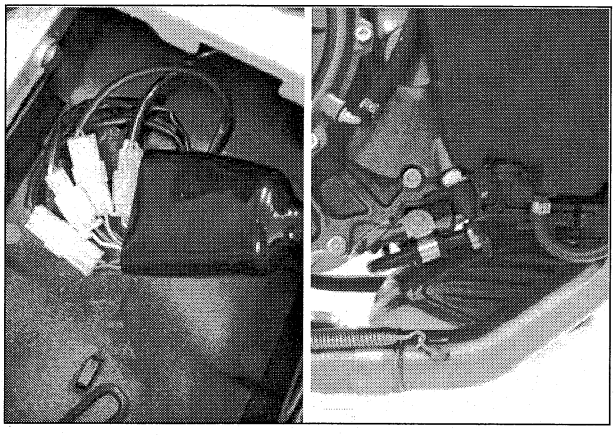


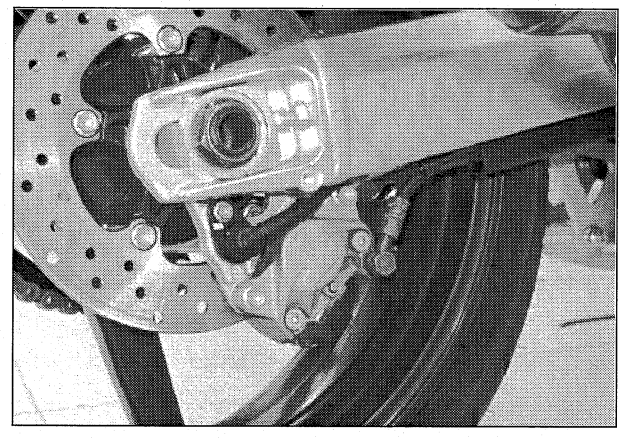
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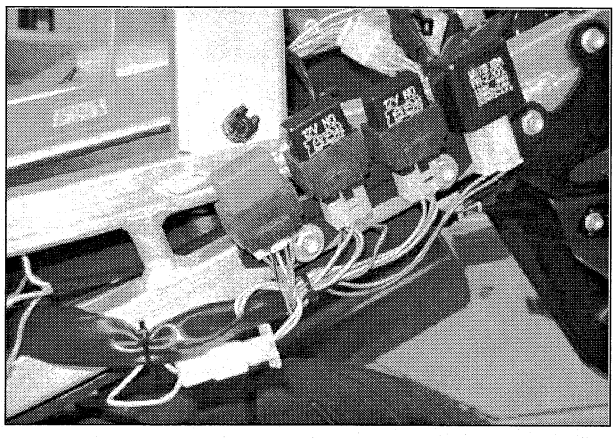
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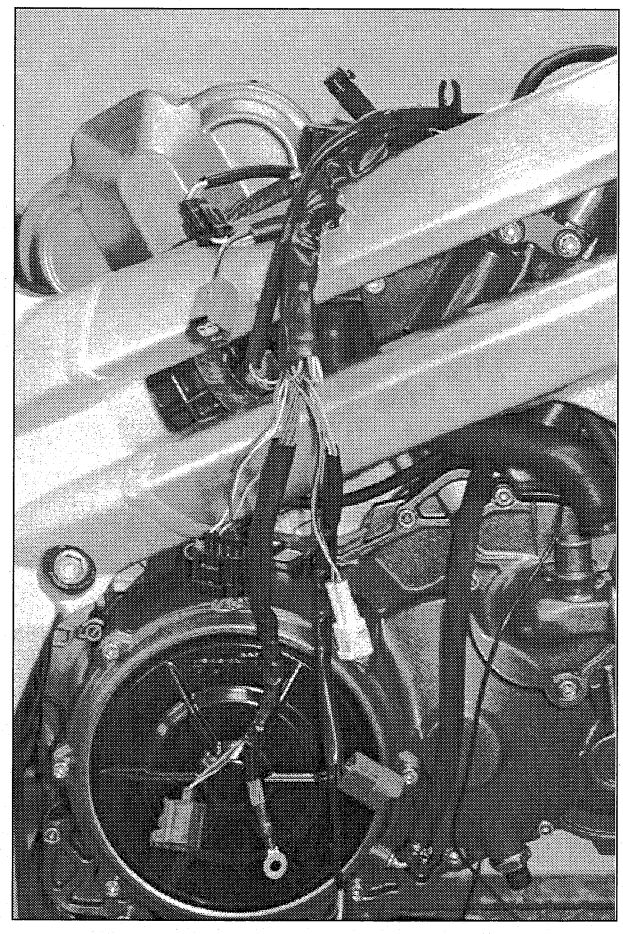


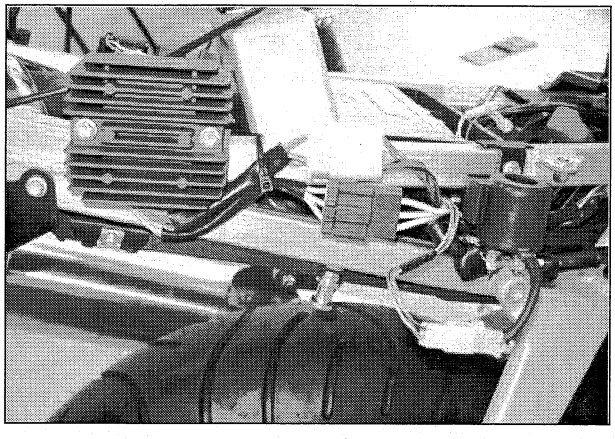












8.3 CHECKING THE ELECTRICAL SYSTEM

See 6.2 (ELECTRIC COMPONENTS LAYOUT) and 8.2.11 (ELECTRIC CABLES) for the location of the electric components.

8.3.1 SPARK PLUGS (no spark)

First check:

- Check the 15 A secondary fuses.
- Check the spark plugs.

Second check:

- Check the main 30 A fuses.
- See 6.4.4 (CHECKING THE IGNITION COILS).

Third check:

- See 6.4.5 (CHECKING THE PICK-UP).

8.3.2 BATTERY RECHARGING PROBLEMS

- See:

6.3.1 (CHECKING THE RECHARGING VOLTAGE).
6.3.2 (CHECKING THE ALTERNATOR LOADLESS OPERATION).
6.3.3 (CHECKING THE ALTERNATOR CONTINUITY).
6.3.4 (CHECKING THE VOLTAGE REGULATOR).
6.11.3 (BATTERY - CHECK).

8.3.3 IGNITION AND/OR STARTING PROBLEMS

Check the diagnostics system to be found in the vehicle, see 6.4.2 [TROUBLESHOOTING (IF THE ENGINE DOES NOT START)].

- Also see:

6.4.4 (CHECKING THE IGNITION COILS).
6.4.5 (CHECKING THE PICK-UP).
6.4.6 (CHECKING THE CAMSHAFT POSITION SENSOR).
6.4.7 (CHECKING THE FALL SENSOR).
6.4.8 (CHECKING THE COOLANT THERMISTOR OPERATION).
6.4.9 (CHECKING THE AIR THERMISTOR OPERATION).
6.4.10 (CHECKING THE THROTTLE VALVE POTENTIOMETER).
6.4.11 (CHECKING THE INTAKE PRESSURE SENSOR).
6.4.12 (CHECKING THE INJECTORS).
6.5.2 (CHECKING THE FUEL PUMP).
6.5.3 (CHECKING THE FUEL PUMP RELAY).
6.6.2 (STARTING SAFETY OPERATING LOGIC).
6.6.3 (CHECKING THE STARTING RELAY).
6.6.4 (CHECKING THE SIDE STAND AND THE SAFETY SWITCH).
6.6.5 (CHECKING THE DIODE MODULE).
6.7 (SWITCHES - RIGHT SIDE SWITCH SET).
6.11.3 (BATTERY - CHECK).

8.3.4 AUXILIARY SYSTEM PROBLEMS

- See:

6.7 (SWITCHES - RIGHT SIDE SWITCH SET).
6.8.2 (CHECKING THE LIGHTS RELAY).
6.8.3 [CHECKING THE LIGHTS / LAP DIODE (multifunction)].
6.9.2 (CHECKING THE ELECTROFAN OPERATION).
6.9.3 (CHECKING THE THERMAL SWITCH OPERATION).
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6.10.2 (LOW FUEL WARNING LIGHT).
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6.10.5 (SPEEDOMETER).
6.10.6 (REVOLUTION COUNTER).
6.11.3 (BATTERY - CHECK).

8.4 TECHNICAL DATA AND SPECIFICATIONS

8.4.1 ENGINE

See **aprilia** part# 8140582 (Engine service and repair manual V990 1051-1) for the technical data and specifications.

8.4.2 THROTTLE BODY COMPONENTS

See 4.8 (THROTTLE BODY) for the technical data and specifications.

8.4.3 SUPPLY SYSTEM

- Material of pipes entering/leaving the delivery filter (internal Ø= 7.5 mm - external Ø = 14.5 mm) = NBR-SF-NBR DIN 73379.
- Material of high-pressure delivery pipe = TEFLON incorporating metal plait and ends featuring eyelet connections.
- Material of low-pressure return pipe (internal Ø = 6 mm - external Ø = 12 mm) = NBR-SF-NEOPRENE DIN 73379.

8.4.4 ELECTRIC SYSTEM

See 1.5 (TECHNICAL SPECIFICATIONS) and sect. 6 (ELECTRIC SYSTEM).

8.4.5 FRONT BRAKING SYSTEM

- Disc material = steel.
- Disc thickness = 5 mm (minimum 4.5 mm).
- Disc diameter = 320 mm.
- Number of caliper pins = 4 facing each other.
- Diameter of caliper pins = 30 mm (lower) + 34 mm (upper).
- Pad type = sintered.
- Pad friction material (standard) = TOSHIBA TT 2802.
- Pad friction material (alternative) = FERIT/FERODO ID 450.
- Pad surface area = 23.68 cm^2.
- Diameter rubber pipes (standard) = external Ø 10 mm - internal Ø 3.2 mm.
- Diameter metal plait pipes (alternative) = external Ø 7 mm - internal Ø 3.2 mm.
- Pump diameter = 16 mm.

8.4.6 REAR BRAKING SYSTEM

- Disc material = steel.
- Disc thickness = 5 mm (minimum 4.5 mm).
- Disc diameter = 220 mm.
- Number of caliper pins = 2 facing each other.
- Diameter of caliper pins = 32 mm.
- Diameter rubber pipes (standard) = FERIT/FERODO ID 450.
- Pad friction material (standard) = TOSHIBA TTH38GF FERIT/FERODO ID 450/452/459.
- Pad surface area = 16 cm^2.
- Diameter rubber pipes (standard) = external Ø 10 mm - internal Ø 3.2 mm.
- Diameter metal plait pipes (alternative) = external Ø 7 mm - internal Ø 3.2 mm.
- Pump diameter = 11 mm.

8.4.7 COOLING SYSTEM

See sect. 5 (COOLING SYSTEM)

- Working pressure 90-120 kPa (0.9-1.2 bar).

8.4.8 WHEELS

Rims:
See 1.5 (TECHNICAL SPECIFICATIONS).

Rim eccentricity:
See 7.2.3 (CHECKING THE COMPONENTS).

Wheel pin eccentricity:
See 7.2.3 (CHECKING THE COMPONENTS).

Tyres:
See 1.5 (TECHNICAL SPECIFICATIONS) and 7.4 (TYRES).

8.4.9 FRONT SUSPENSION

See 1.5 (TECHNICAL SPECIFICATIONS), 2.29 (INSPECTING THE FRONT AND REAR SUSPENSION) and 7.8 (FRONT FORK).

8.4.10 REAR SUSPENSION

See 1.5 (TECHNICAL SPECIFICATIONS), 2.31 (INSPECTING THE REAR SUSPENSION), 7.9 (REAR FORK) and 7.10 (REAR SUSPENSION).

8.4.11 STEERING

See 2.28 (STEERING) and 7.7 (STEERING).

8.4.12 CAPACITIES - FLUID PROPERTIES

See 1.5 (TECHNICAL SPECIFICATIONS) and 1.6 (LUBRICANT CHART).

8.4.13 STRUCTURE (FRAME / SADDLE SUPPORT / DASHBOARD MOUNT)

- Frame / Saddle support / Dashboard mount material = light alloy.
- Frame weight = kg 10.5.
- Frame torsional stiffness (engine included) = 6900 Nm/° (690 kgm/°).
- Steering rake = 24.5°.
- Trail = 97 mm.
- Saddle support weight = kg 2.3.
- Dashboard mount weight = kg 0.750.

NOTE

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ANALYTICAL INDEX

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