aprilia

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ATLANTIC 500

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workshopmanual

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UK

LIST OF SECTIONS

Foreword

This manual provides basic information about ordinary vehicle servicing procedures.
The data and illustrations that make up the manual were up to date at the time of publication.
The manual is intended for **aprilia** dealers and their qualified mechanics. Many concepts have been intentionally omitted as they were considered superfluous.
Since this publication cannot provide exhaustive mechanical knowledge, it is assumed that people who make use of this manual have received a basic training in mechanics and possess a working knowledge of vehicle repairing techniques.
Repairing or checking the vehicle without such knowledge would be ineffective and even dangerous.
As the repairing and checking procedures are not described in full detail, special care should be taken to avoid damage to property and personal injury.
With a view to providing its customers with the best possible riding experience, aprilia is committed to continually improving its products and the accompanying documentation.
aprilia dealers and world branches are informed about all major technical modifications and changes in repairing procedures. Such modifications will be covered in later editions of this manual.
Should any need or doubt arise about repairing and checking procedures, do not hesitate to contact **aprilia**'s Consumer Service (A.C.S.): they will be pleased to provide any information you may require and let you know of any technical modifications and updates.
For further information, please refer to:
SPARE PARTS CATALOGUE 6801;
ROTAX ENGINE WORKSHOP MANUAL 10631-I
10641-E
10651-F
10661-D
10671-UK
10681-USA

The main features described herein remaining unchanged, aprilia reserves the right to change its models at any time.

The mention of third parties' products and services is made for the sole purpose of information and constitutes no engagement.
aprilia assumes no responsibility about the performance and use of such products or services.

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TABLE OF CONTENTS

Chapter 1

Chapter 2

Chapter 3

Chapter 4

Chapter 5

Chapter 6

Chapter 7

1

General Information

SAFETY WARNINGS

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

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

PRECAUTIONS AND GENERAL INFORMATION

When repairing, disassembling and reassembling the vehicle, scrupulously observe the following recommendations.

⚠ WARNING

The use of open flames is forbidden under all circumstances.
Before performing any servicing or checks, switch off the engine, remove the ignition key, allow the engine and the exhaust system to cool down, and if possible lift the vehicle on solid level flooring using specific equipment.
To avoid burns, pay special attention to hot engine and exhaust parts.

The vehicle is made up of inedible parts. On no account must any parts be bitten, sucked, chewed or swallowed.

Unless otherwise specified, the reassembly of parts is carried out by following the disassembling procedures in reverse order.
Any overlapping operations in cross-references to other chapters should be interpreted logically so as to avoid unnecessary removal of components.

Never use fuel as a solvent to clean the vehicle.

Disconnect the battery negative (-) cable, control unit and spark plug lug, before performing any electric welding.

When two or more people are working at the same time, pay attention to the safety of each of them.

BEFORE REMOVING COMPONENTS

Remove any dirt, mud, dust and foreign bodies from the vehicle before removing any components.
Use the tools specially designed for this vehicle whenever necessary.

REMOVING COMPONENTS

Never loosen screws and nuts using tools other than the specific spanners.
Mark the positions on all connecting joints (pipes, cables, etc.) before separating them, and identify them with different marks.
Clearly mark each part so it can be easily identified during reinstallation.
Clean and wash the removed components with a low-flash detergent.
Keep mating parts together, as they have adapted to one another through wear and tear. Some components must be used in combination or replaced as a set.
Keep away from heat sources.

REPLACING COMPONENTS

⚠ CAUTION

Never reuse circlips. Always replace removed circlips with new ones.
When fitting a new circlip, take care not to part its ends more than is required to fit it on the shaft.
After fitting a circlip, ensure that it is fully and firmly inserted in its seat.

Never use compressed air to clean the bearings.

NOTE Bearings should always rotate freely, smoothly and silently, otherwise they must be replaced.

Only use GENUINE **aprilia** spares.
Always use the recommended lubricants and consumables.
If possible, lubricate parts before refitting them.
When tightening screws and nuts, start with the larger or the inner ones, and then proceed diagonally.
Carry out the tightening in successive steps before applying the full tightening torque.
Always replace self-locking nuts, seal rings, circlips, O-rings, cotter pins and screws (if the threads are damaged) with new ones.
Clean all mating surfaces, oil seal rims and gaskets before refitting.
Apply a film of lithium grease to the oil seal rims.
Replace the oil seals and the bearings so that the marks or serial numbers face outwards (side in view).
Generously lubricate the bearings before fitting them.
Check that every component has been fitted properly.
After repairing or servicing any parts, carry out preliminary checks and test the vehicle on private ground or in a low-traffic area.

USING THE MANUAL

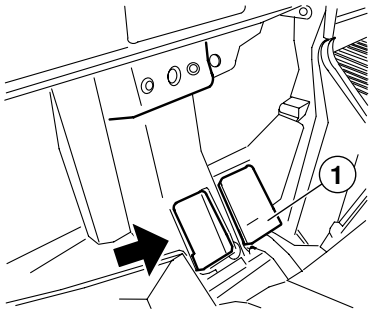
HOW TO CONSULT THE MANUAL

The manual is divided into chapters, each corresponding to a major type of components.
For easy reference, refer to the TABLE OF CONTENTS.
Unless otherwise specified, parts are reassembled by following the disassembling procedures in reverse order.
The terms “left” and “right” refer to the rider sitting on the vehicle in a normal riding position.
Refer to the “OPERATION AND MAINTENANCE MANUAL” for information on how to operate and maintain the vehicle.

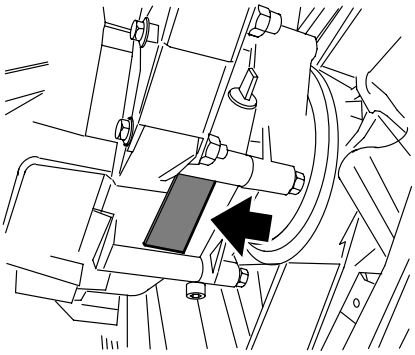
IDENTIFICATION DATA

The frame number may be used to order the spare parts.

NOTE Tampering with serial numbers is subject to severe penalties. In particular, tampering with the frame number immediately voids the warranty.



FRAME NUMBER
The frame number is stamped on the frame central tube. To read it, open the central glove compartment door and remove the cover (1).



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

NOTES ON FUEL, LUBRICANTS, COOLANT AND OTHER ITEMS

FUEL

⚠ WARNING

The fuel used in internal combustion engines is highly flammable and can be explosive under certain conditions.
Refuelling and servicing should be carried out in a well ventilated place after switching off the engine.
Do not smoke while refuelling or in the presence of fuel fumes. Avoid contact with open flames, sparks and any other potential source of ignition or explosion.

Avoid spilling fuel from the tank filler as it may catch fire on contact with the hot engine surfaces.
Should any fuel be inadvertently spilled, be sure to dry up the area before starting the engine.
Since fuel expands when exposed to heat and direct sunlight, avoid filling the tank to the brim.
Carefully close the tank cap after refuelling.
Do not allow fuel to come into contact with the skin and avoid ingesting it or inhaling its fumes. Do not transfer fuel from one vessel into another using a length of tube.

DO NOT DISPOSE OF FUEL IN THE ENVIRONMENT.
KEEP OUT OF REACH OF CHILDREN.
Use only leaded (4 Stars (UK)) or unleaded premium grade petrol, min. O. N. 95 (N. O. R. M.) and 85 (N. O. M. M.).

ENGINE OIL

⚠ WARNING

Engine oil can cause serious damage to the skin if handled every day and for long periods.
Wash your hands carefully after using the oil.
Do not dispose of the oil in the environment.
Put it in a sealed container and take it to the filling station where you usually buy it or to an oil salvage center.

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

Check the engine oil after the first 1,000 km (625 mi) and then every 3,000 km (1,875 mi). Change the oil every 6,000 km (3,750 mi), see CHANGING THE ENGINE OIL AND THE ENGINE OIL FILTER.

Engine oil (recommended):
Synthetic oil SAE 5W/40 of the SELENIA HI Scooter 4Tech type. Alternatively, use brand-name oils with performance complying with or exceeding the A.P.I. SJ specifications.

TRANSMISSION OIL

⚠ WARNING

Transmission oil can cause serious damage to the skin if handled every day and for long periods.
Wash your hands carefully after using the oil.
Do not dispose of the oil in the environment.
Put it in a sealed container and take it to the filling station where you usually buy it or to an oil salvage center.

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

Renew the transmission oil after the first 1,000 km (625 mi) and then every 12,000 km (7,500 mi). Refer to the engine workshop manual.

Transmission oil (recommended):
SAE 80W/90 oil of the TUTELA ZC90 type.
Alternatively, use brand-name oils with performance complying with or exceeding the A.P.I. GL-3 specifications.

BRAKE FLUID

⚠ WARNING

Brake fluid can cause irritation if it comes into contact with the skin or the eyes.
Carefully wash any parts of the body that should happen to come into contact with the fluid. Contact an ophthalmologist or a physician if the fluid comes into contact with the eyes.

DO NOT DISPOSE OF THE FLUID IN THE ENVIRONMENT.

KEEP OUT OF REACH OF CHILDREN.

When handling brake fluid, take care not to spill it on plastic and painted parts as they would be damaged. Check the brake fluid level every 6,000 km (3,750 mi) (CHECKING AND RESTORING THE FRONT BRAKE FLUID LEVEL). Renew the fluid every 2 years (RENEWING THE FRONT BRAKE FLUID).

Brake fluid (recommended):
TUTELA TOP 4.
Alternatively, use brand-name brake fluids with performance complying with or exceeding the specifications.
Synthetic fluid SAE J1703, NHTSA 116 DOT 4, ISO 4925

⚠ CAUTION

Do not use brake fluids other than those prescribed. To avoid damaging the braking system, never mix different types of fluids when topping up.
Never use brake fluid taken from an old container, or from a container that has been open for a long time.
Sudden changes in brake play or a spongy feel of the brake levers are due to problems in the hydraulic circuits.
Take special care in ensuring that the brake discs and the brake linings are not oily or greasy, especially after checking or servicing the brakes.
Ensure that the brake lines are not twisted or worn.
Take care not to let any water or dust into the brake circuit.
Latex gloves are recommended for all maintenance operations involving the hydraulic circuit.

FORK OIL

⚠ WARNING

Fork oil can cause serious damage to the skin if handled every day and for long periods.
Wash your hands carefully after using the oil.
Do not dispose of the oil in the environment.
Put it in a sealed container and take it to the filling station where you usually buy it or to an oil salvage center.

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

The response of the suspension can be partly altered by changing the adjustment of the shock absorbers and/or the viscosity of the oil they contain.

Viscosity grades can be chosen according to the desired vehicle geometry.

COOLANT

⚠ WARNING

**The coolant is harmful if ingested. Contact with the skin or the eyes may cause irritation. Should the liquid come into contact with the skin or the eyes, generously rinse with water and seek medical attention.
If the fluid is ingested, cause vomiting, generously rinse the mouth and throat with water and immediately seek medical attention.**

DO NOT DISPOSE OF THE COOLANT IN THE ENVIRONMENT.

KEEP OUT OF REACH OF 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 maintenance operations are to be performed, it is advisable to use latex gloves.

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

Check the coolant level before starting off and every 2,000 km (1,250 mi) (CHECKING AND RESTORING THE COOLANT LEVEL). Renew the coolant every two years (RENEWING THE COOLANT).

The coolant is made up 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 also in the hot season, since in this way losses due to evaporation are reduced and it is not necessary to top up very frequently.
The mineral salt deposits left in the radiator by evaporated water are thus reduced and the efficiency of the cooling system remains unchanged.

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

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

Engine coolant (recommended):
PARAFLU 11 FE (diluted).
Alternatively, use brand-name coolants with performance complying with or exceeding the specifications.
Antifreeze fluid based on monoethylene glycol, CUNA NC 958-16.

NOTE Different antifreezes have different characteristics. The degree of protection provided by each product is specified on its label.

⚠ CAUTION

Only use nitrite-free antifreeze and anticorrosive providing protection to temperatures of at least -35° C (31° F).

CARBON MONOXIDE
Whenever the engine needs to be run in order to carry out some operation, ensure that this is done in the open air or in a well-ventilated room.
Never run the engine in a closed environment unless the place is equipped with an exhaust system.

⚠ WARNING

Exhaust gases contain carbon monoxide, a poisonous gas that may cause fainting or even death.
Run the engine in an open space or in a closed space equipped with an exhaust system.

HIGH TEMPERATURE COMPONENTS

⚠ WARNING

The engine and the exhaust components reach high temperatures during use and remain hot for some time even after the engine has been switched off.

Before handling these components, put on insulating gloves or wait for the engine and the exhaust system to cool down.

RUNNING-IN RULES

⚠ WARNING

After the first 1,000 km (625 mi), carry out the checking operations indicated in the column "After running-in" of the Regular Service Intervals Chart, see REGULAR SERVICE INTERVALS CHART, in order to avoid hurting your-self or other people and/ or damaging the vehicle.

The running- in of the engine is primary to ensure its working life and its 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.

NOTE Only after the first 1,000 km (625 mi) of running-in it is possible to obtain the best speed and acceleration performance from the vehicle.

Keep to the following indications:
- Do not open the throttle completely if the speed is low, both during and after the running-in.
- **0-100 km (0-62 mi)**
  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.
- **0-500 km (0-312 mi)**
  During the first 500 km (312 mi), do not exceed the 80% of the maximum allowed speed.
- Avoid driving at constant speed for long distances.
- After the first 1,000 km (625 mi), progressively increase the speed until reaching the highest performance levels.

PRECAUTIONS AND GENERAL INFORMATION

When repairing, disassembling and reassembling the vehicle, scrupulously observe the following recommendations.

⚠ WARNING

The use of open flames is forbidden under all circumstances.
Before performing any servicing or checks, switch off the engine, remove the ignition key, allow the engine and the exhaust system to cool down, and if possible lift the vehicle on solid level flooring using specific equipment.
To avoid burns, pay special attention to hot engine and exhaust parts.
The vehicle is made up of inedible parts.
Non mordere, succhiare, masticare o ingerire nessuna parte dello stesso per nessun motivo.
Unless otherwise specified, the reassembly of parts is carried out by following the disassembling procedures in reverse order.

Avoid running the engine in closed or poorly ventilated places.

Petrol is highly flammable and explosive. Handle with the utmost care.

Never use fuel as a solvent to clean the vehicle.

When two or more people are working at the same time, pay attention to the safety of each of them.

– Only use GENUINE **aprilia** spares.
– Only use the recommended lubricants.
– Where provided, use the special tools designed for this type of vehicle.
– Start tightening the screws and nuts with a greater diameter or the inner ones, in a crosswise manner.
– Carefully clean the disassembled components using a detergent with a low degree of flammability.
– Lubricate the parts (when possible) before reassembling.
– Check that every component has been fitted properly.
– Always replace the gaskets, gas rings, piston rings, O rings and split pins with new ones.
– Mark the position on all the junction points (tubes, cables, etc.) before separating them.
Use different and clear identification marks as each part must be easily recognisable during the assembling operations.

⚠ CAUTION

Never reuse circlips.
Always replace removed circlips with new ones.
When fitting a new circlip, take care not to part its ends more than is required to fit it on the shaft.
After fitting a circlip, ensure that it is fully and firmly inserted in its seat.

SPARE PARTS

Only use Genuine **aprilia** Spares.
All Genuine aprilia Spares are high-quality parts specially designed and manufactured for **aprilia** vehicles.

⚠ CAUTION

Using NON-genuine aprilia spares may result in damage and poor performance.

TECHNICAL DATA

DIMENSIONS	
Max. length	2270 mm (89.4 in)
Max. width	720 mm (28.3 in)
Max. height (front part of the fairing included)	1450 mm (57.0 in)
Seat height	780 mm (30.7 in)
Distance between centres	1575 mm (62.0 in)
Min. ground clearance	150 mm (5.9 in)
Weight ready for starting	200 Kg (440.9 lbs)

ENGINE	
Type	4-stroke single-cylinder, 4 valves, single camshaft in cylinder head controlled by chain system on the flywheel side
Number of valves	4
Number of cylinders	1
Total displacement	460 cm^3 (28.0 cu.in)
Bore / stroke	92 mm / 69 mm (3.6 in / 2.7 in)
Compression ratio	10.5 : 1
Starting	electric
Engine idling rpm	1450 ± 50 rpm(rpm)
Clutch	automatic, dry centrifugal clutch
Change	gear automatic
Lubrication system	forced-circulation by means of a trochoidal pump (inside the crankcase), oil filter and bypass for pressure adjustment
Cooling	liquid cooling, forced circulation with centrifugal pump

TRANSMISSION	
Speed change gear	automatic stepless
Primary	V-belt
Secondary	gears
Total engine/wheel ratio	short 1/11.988 long 1/4.86

CAPACITIES	
Fuel (reserve included)	17 ℓ (4.48 gal)
Fuel reserve	4 ℓ (1.05 gal)
Engine oil - engine oil change and engine oil filter replacement only - change for engine overhaul	 1500 cm^3 (91.5 cu.in) 1700 cm^3 (103.7 cu.in)
Transmission oil	~ 250 cm^3 (15.25 cu.in)
Coolant (50% water + 50% antifreeze with ethylene glycol)	1.5 ℓ (0.39 gal)
Front fork oil	220 cm^3 (13.42 cu.in) (for each rod)
Seats	2
Vehicle max. load (driver + luggage)	105 Kg (231.4 lbs)
Vehicle max. load (driver + passenger + luggage)	180 Kg (396.8 lbs)

THROTTLE BODY	
Model	Ø 38 mm (1.5 in) and single injector
Choke tube	diameter 39 mm (1.53 in)

FUEL SUPPLY	
Type	Electronic injection by electric fuel pump
Fuel	Lead free petrol (4 Stars (UK)) with minimum octane number 95 (N.O.R.M.) and 85 (N.O.M.M.)

FRAME	
Type	high resistance steel tubes
Steering inclination angle	28°, 50’
Fore stroke	118 mm (4.6 in)

SUSPENSIONS	
Front	hydraulically operated telescopic fork
Stroke	100 mm (3.93 in) rear
Rear	Two double-acting hydraulic shock absorbers with preload adjustment to five positions
Wheel stroke	100 mm (3.93 in)

BRAKES	
Front	disc brake - Ø 260 mm (10.23 in) - with hydraulic transmission
Rear, combined	disc brake - front 260 mm (10.23 in) combined with the rear brake 220 mm (8.66 in)

WHEEL RIMS	
Type	in light alloy
Front	15 x 3.00
Rear	14 x 3.75

TYRES	
Type	tubeless
Front	120 / 70 - 15 M/C 56R
Rear	140 / 60 - 14 M/C REINF. 64R
STANDARD INFLATION PRESSURE	
Front	210 kPa (2.1 bar/30.4 psi)
Rear	230 kPa (2.3 bar/33.3 psi)
INFLATION PRESSURE WITH PASSENGER	
Front	220 kPa (2.2 bar/31.9 psi)
Rear	260 kPa (2.6 bar/37.7 psi)

IGNITION	
Type	C.D.I. / Inductive
Spark advance	Variable spark advance controlled by the injection power unit

SPARK PLUG	
Standard	CHAMPION RG6YC
- Alternatively	NGK - CR7EKB
Spark plug gap	0.7 - 0.8 mm (0.027 - 0.031 in)

CONTINUED ›

ELECTRIC SYSTEM	
Battery	12 V - 14 Ah
Fuses	30 - 20 - 15 - 3 A
Generator (with permanent magnet)	14 V - 330 W

BULBS	
Low / high beam	12 V - 55 W / 12 V - 35 W
Front parking lights	12 V - 5 W
Direction indicators	rear 16 W - front 10 W
Rear parking light / stoplight	12 V - 5 / 21 W
Helmet compartment light	12 V - 3 W
Number plate	12 V - 5 W
Dashboard light	LED
Third stoplight	12 V - 2.3 W

WARNING LIGHTS	
Direction indicators	LED
Engine oil pressure	LED
Low beam	LED
High beam	LED
Low fuel	LED
Brake pads wear	LED
Coolant high temperature indicator	LED

LUBRICANT CHART

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

Transmission oil (recommended): IP F.C., SAE 75W - 90 or Agip GEAR SYNTH, SAE 75W - 90.
As an alternative to the recommended oil, it is possible to use high- quality oils with characteristics in compliance with or superior to the A.P.I. GL3 specifications.

Fork oil (recommended): IP F.A. 5W or IP F.A. 20W; an alternative Agip FORK 5W or Agip FORK 20W.
If you wish to have an intermediate performance between the products offered, IP F.A.5 W 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.

Bearings and other lubrication points (recommended): IP BIMOL GREASE 481 - Agip GREASE SM2.

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

Protection of the battery poles: neutral grease or Vaseline.

⚠ WARNING

Use new brake fluid only.

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

Alternatively, use brand-name fluids with performance complying with or exceeding the specifications.
Synthetic fluido SAE J1703, NHTSA 116 DOT 4, ISO 4925.

⚠ WARNING

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

Engine coolant (recommended): IP ECOBLU - 40° C - Agip COOL.
Alternatively, use brand-name coolants with performance complying with or exceeding the specifications.
Antifreeze fluid based on monoethylene glycol, CUNA NC 956-16.

TIGHTENING TORQUES TABLE

DESCRIPTION	ftlb	Nm
FRAME ASSEMBLY		
Footrest fixing screw	14.75	20
Steering stop plate screw	8.68	12
Locking ring	36.88	50
Key switch break-off screw	7.23	10
Threaded bushing	0.22	0.3
Key switch fixing screw	7.23	10
WINDSCREEN SUPPORT ASSEMBLY		
Windscreen support fixing screw	7.23	10
Windscreen support stop nut	7.23	10
STEERING DAMPER ASSEMBLY		
Damper to frame fixing screw	7.23	10
Nut	7.23	10
Damper fixing screw, fork side	7.23	10
FOOTBOARDS ASSEMBLY		
Footboard fixing screw	14.75	20
ENGINE MOUNT CONNECTING RODS ASSEMBLY		
Socket hexagonal-head screw	59	80
Frame connecting rod pin	44.25	60
Engine connecting rod pin	44.25	60
STAND ASSEMBLY		
Stand screw	33.19	45
Lower nut	22.12	30
Side stand screw	7.23	10
FRONT SUSPENSION ASSEMBLY		
Nut	11.06	15
Steering series self-locking nut	79.59	110
Flanged screw	18.44	25
REAR SUSPENSIONS ASSEMBLY		
Screw	36.88	50
Screw	18.44	25
FRONT BRAKE ASSEMBLY		
Socket hexagonal-head screw	19.91	27
REAR BRAKE ASSEMBLY		
Socket hexagonal-head screw	19.91	27
HANDLEBAR AND CONTROLS ASSEMBLY		
Screw	29.50	40
Right and left switch	1.47	2
U bolts fixing screws	7.23	10
Hexagonal-head screw	7.23	10
Vibration-damping weights fixing screws	7.23	10
ENGINE ASSEMBLY		
Shock absorber support fixing screw	18.44	25
EXHAUST ASSEMBLY		
Plate to engine fixing screw	36.88	50
Silencer fixing screw	36.88	50
Manifold clamp	7.23	10
Serpress Nut	18.44	25
Heat guard protections fixing screw	0.59	0.8

DESCRIPTION	ftlb	Nm
FRONT WHEEL ASSEMBLY		
Wheel pin	36.88	50
Speedometer sensor screw	0.66	0.9
Hub screw	7.23	10
REAR WHEEL ASSEMBLY		
Nut	110.64	150
PASSENGER HANDLE SUPPORTS ASSEMBLY		
Passenger handles support fixing screw	14.75	20
PASSENGER SEAT BACK SUPPORT ASSEMBLY		
Seat back support fixing screw	7.23	10
HEADLIGHT CARRIER BOW LOWER SUPPORT ASSEMBLY		
Seat back support fixing screw	7.23	10
WINDSCREEN SUPPORT ASSEMBLY		
Windscreen support self-locking nut	7.23	10
PASSENGER HANDLES ASSEMBLY		
Passenger handle fixing screw	18.44	25
BUMPER TUBES ASSEMBLY		
STAINLESS STEEL flanged screw	7.23	10
ELECTRICAL COMPONENTS ASSEMBLY		
Coil fixing screw	1.47	2
Nut	1.47	2
Rotary switch screw	7.23	10
Rotary switch screw	7.23	10
Harness to relay clamp	3.68	5
Reflector nut	1.10	1.5
M5 self-locking nuts fuel pump flange	2.21	3
COOLING SYSTEM ASSEMBLY		
Sleeve clamps	2.21	3
FILTER BOX ASSEMBLY		
Sleeve clamps	2.21	3
SEAT ASSEMBLY		
Seat hinge nut	5.90	8
FUEL TANK ASSEMBLY		
Nut	5.16	7

Periodic Maintenance Operations

2

This section describes the operations to be performed periodically when servicing the main vehicle components.

⚠ CAUTION

Before performing any servicing or checks, switch off the engine, remove the key, allow the engine and the exhaust system to cool down, and if possible lift the vehicle on solid level flooring using specific equipment.
To avoid burns, be sure to keep away from hot engine and exhaust parts.

NOTE to refit the components follow the reverse procedure, unless otherwise specified.

PERIODIC MAINTENANCE PROGRAMME

To maintain the vehicle in perfect running order, **aprilia** recommends observing the scheduled maintenance intervals for the various components.

⚠ CAUTION

ENGINE CODE	BELT REPLACEMENT
8106810	6,000 Km (3,750 mi)
8106983	12,000 Km (7,500 mi)

PERIODIC MAINTENANCE SCHEDULE

TO BE PERFORMED BY aprilia authorized dealer

COMPONENTS	End of running-in 1,000 km (625 mi)	Every 6,000 km (3,750 mi) or 8 months	Every 12,000 km (7,500 mi) or 16 months
Accelerator cable (adjustment)	C	C	
Variator belt		S (code 8106810)	S (code 8106983)
Steering bearings and steering	C	C	
Wheel bearings		C	
Engine oil filter		every 6,000 km (3,750 mi): S	
Clutch shoes - clutch housing		C	C
Valve clearance		R	every 18,000 Km (11,250 mi)
Braking systems	C	C	
Cooling system	C	C	
Stop light switches		C	
Brake fluid	every 6,000 km (3,750 mi): C / every 2 years: S		
Coolant	every 2,000 km (1,250 mi): C / every 2 years: S		
Engine oil	every 3,000 km (1,875 mi): C / every 6,000 km (3,750 mi): S		
Fork oil	every 30,000 km (18,750 mi) or 4 years: S		
Transmission oil	S	C	every 24,000 km (15,000 mi): S
Variator rollers and variator plastic guides			C
Wheels/ tyres and inflation pressure			every 16,000 km (10,000 mi): C
Nut, bolt, screw tightening	C	C	
Brakes fluid bleeding	C		
Fuel pipes	C	C	every 4 years: S
Fuel filter		every 24,000 km (15,000 mi): C	every 48,000 km (30,000 mi):S
Battery/ electrolyte level	C	C	
Spark plug		C	S
Carburation - slow running	C		C
Air cleaner		P	every 18,000 km (11,250 mi):S
Accelerator operation	C	C	
Brake locking operation	C	C	
Light system	C	C	
Light direction - operation		C	
Suspensions	C	C	
Engine oil pressure warning light	on every start: C (*)		
Front and rear brake pad wear	C	every 2,000 km (1,250 mi): C	

(*) to check, see TABLE OF INSTRUMENTS AND INDICATORS

C = check and clean, adjust, lubricate or replace as necessary; **P** = clean; **S** = renew; **R** = adjust.

The above operations must be performed at shorter intervals if the vehicle is used in rainy or dusty areas, or on rough roads.

LUBRICATING POINTS

A proper lubrication is important to ensure the correct operation and duration of the vehicle components.

NOTE Before proceeding with lubrication, thoroughly clean all the components to remove any traces of oxidation, grease, dirt and dust. All exposed parts that are subject to rust must be lubricated with engine oil or grease. Please refer to the TABLE OF LUBRICANTS.

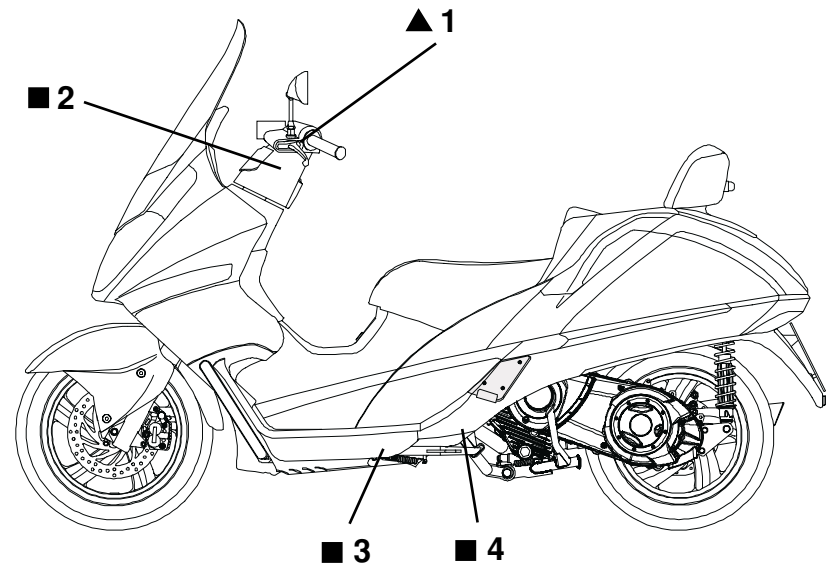
The points to lubricate are shown in the LUBRICATION CHART.

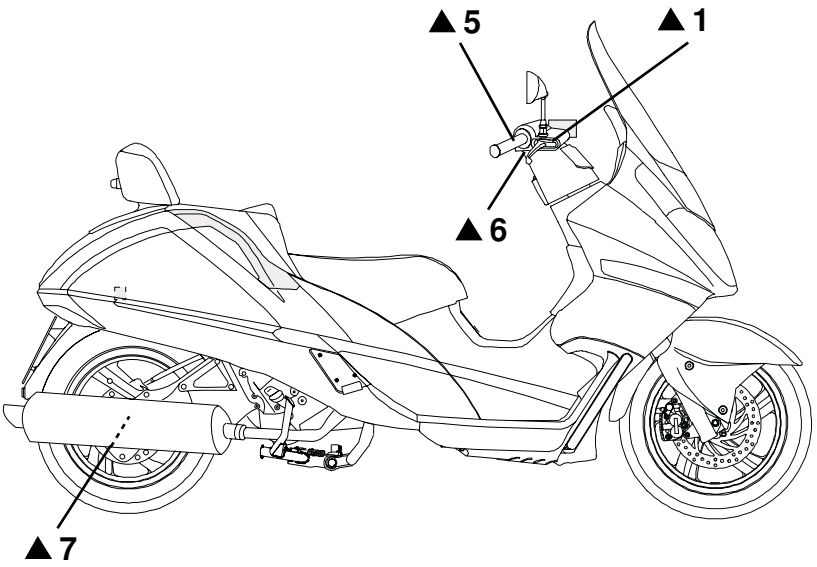
KEY TO LUBRICATION CHART

1) Brake lever pin
2) Steering bearings
3) Sidestand pivot
4) Central stand pivot
5) Throttle control
6) Throttle cable
7) Rear axle

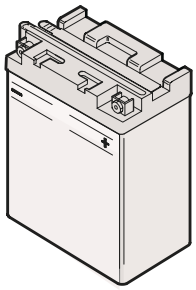
■ = Grease
▲ = Oil

LUBRICATION CHART





BATTERY



Carefully read (PRECAUTIONS AND GENERAL INFORMATION).
Check the electrolyte level and the tightening of the terminals after the first 1,000 km (625 mi) and then every 6,000 km (3,750 mi).

⚠ WARNING

The electrolyte in the battery is toxic and caustic and if it gets in contact with the skin it can cause burns, since it contains sulphuric acid. Wear protection clothes, a face mask and/ or goggles during maintenance operations.

In case of contact with the skin, rinse with plenty of water.

In case of contact with the eyes, rinse with plenty of water for fifteen minutes, then consult an doctor without delay.

If the electrolyte is accidentally swallowed, drink a lot of water or milk, then continue drinking milk of magnesia or vegetable oil and consult a doctor without delay.

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.

⚠ WARNING

Never invert the connection of the battery cables.

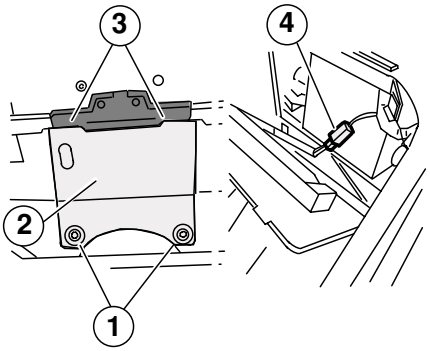
Do not incline the vehicle too much, in order to avoid dangerous leaks of the battery fluid.

KEEP AWAY FROM CHILDREN.

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

The electrolyte is corrosive.
Do not pour or spill it, especially on the plastic parts.

REMOVING THE BATTERY COVER

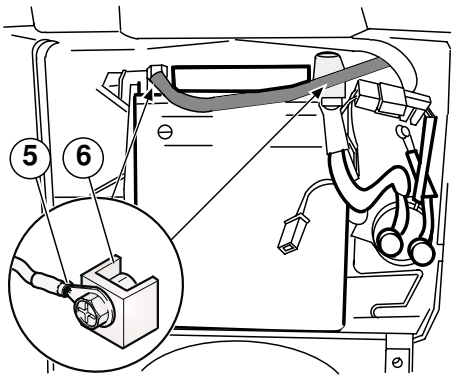


Read through paragraph BATTERY.

NOTE Put the vehicle on a solid and flat surface

- Make sure the ignition lock switch is turned to "⊗".
- Lift the saddle, see (UNLOCKING/ LOCKING THE SEAT).
- Remove the mat from the helmet compartment.
- Unloose and remove the two screws (1).
- Remove the battery cover from the bottom (2) paying attention to the upper tangs (3).
- Disconnect the electrical connector (4) of the helmet compartment light.
- Remove the battery cover (2)

CHECKING AND CLEANING THE TERMINALS



- Remove the battery cover, see (REMOVING THE BATTERY COVER).

- Make sure that the cable terminals (5) and the battery terminals (6) are:

– in good conditions (and not corroded or covered with deposits);
– covered with neutral grease or Vaseline.

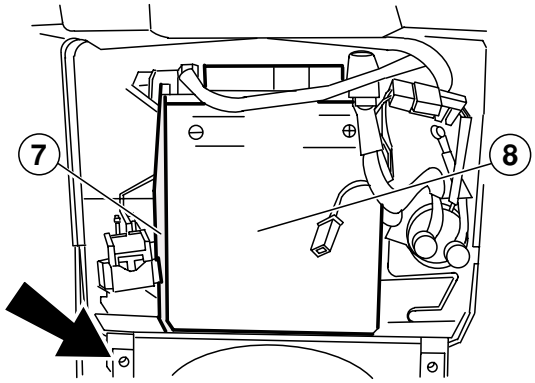
If necessary:

- 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.

⚠ WARNING

Tighten the clamp screws.

REMOVING THE BATTERY



- Remove the battery cover, see (REMOVING THE BATTERY COVER).
- Remove the battery breather pipe (7).
- Remove the battery (8) from its seat by slightly turning it to the right, as shown by the arrow.
- Disconnect first the negative (–) and then the positive cable (+).
- Remove the battery (8) from its compartment and put it on a flat surface, in a cool and dry place.

⚠ WARNING

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

- Refit the battery cover, see (REMOVING THE BATTERY COVER).

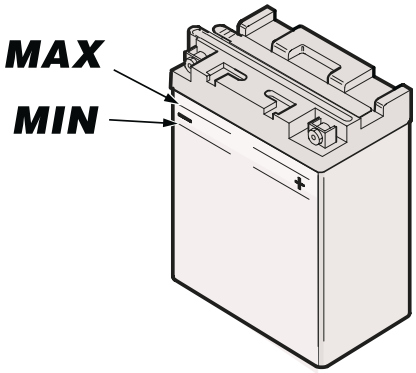
⚠ CAUTION

Handle with care to prevent the electrolyte leakage.

LONG INACTIVATY OF THE BATTERY

Read through the paragraphs BATTERY.
When the vehicle is to remain inactive for a long period, remove the battery and place it in a cool and dry place. Fully charge the battery with a slow recharge.
If the battery is left on the vehicle, disconnect the cables from the terminals.
Check the charge periodically (about once a month) during the winter or when the vehicle is left inactive, to prevent the battery from deteriorating.

CHECKING THE ELECTROLYTE LEVEL



To check the electrolyte level, proceed as follows:
- Remove the battery cover, see (REMOVING THE BATTERY COVER).
- Make sure that the fluid level is included between the two "**MIN**" and "**MAX**" notches stamped on the battery side.

Otherwise:
- Remove the element plugs.

⚠ CAUTION

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

- Top up by adding distilled water.

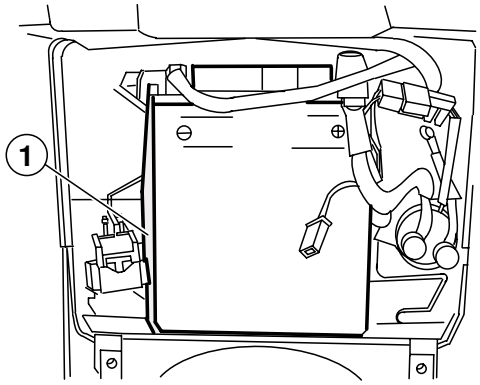
RECHARCING THE BATTERY

- Remove the battery, see (REMOVING THE BATTERY). Remove the element plugs.
- Remove the element plugs.
- Check the electrolyte level, see beside (CHECKING THE ELECTROLYTE LEVEL).
- Connect the battery with a battery charger.
- A recharge with an amperage equal to 1/10th of the battery capacity is recommended.
- After the recharging operation, check the electrolyte level again and if necessary top up with distilled water.
- Put back the element plugs.

⚠ CAUTION

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

INSTALLING THE BATTERY



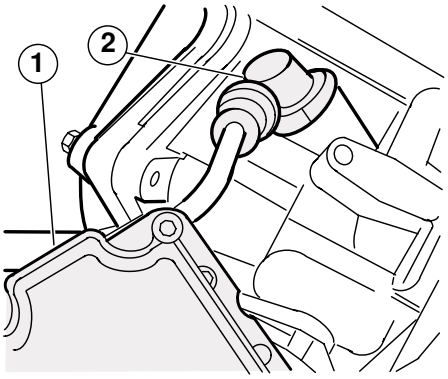
- Remove the battery cover, see (REMOVING THE BATTERY COVER).
- Put the battery in its container.

⚠ CAUTION

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

- Connect, in order, the positive (+) and negative (–) cable.
- Cover the terminals of the cables and of the battery with neutral grease or Vaseline.
- Connect the battery breather pipe (1).
- Refit the battery cover, see (REMOVING THE BATTERY COVER).

SPARK PLUG



Read through the paragraphs MAINTENANCE.

Check the spark plug every 6,000 km (3,750 mi) and replace every 12,000 Km (7,500 mi).
Periodically remove the spark plug, eliminate any carbon deposits and change it if necessary.
To reach the spark plug:

- Remove the left inspection cover, see (REMOVING THE RIGHT AND LEFT INSPECTION COVERS).

To remove and clean the spark plug:

⚠ WARNING

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

- Move the coolant pipe (1) to gain access to the spark plug.
- Disconnect the cap (2) from the spark plug high voltage cable.
- Remove all the dirt from the base of the spark plug, then unscrew it with the spanner you will find in the tool kit and extract it from its seat, taking care that neither dust nor other substances enter the cylinder.
- Make sure that there are neither carbon deposits, nor corrosion marks on the electrode and on the central porcelain part; if necessary, clean them with the special cleaners for spark plugs, with an iron wire and/or a metal brush.

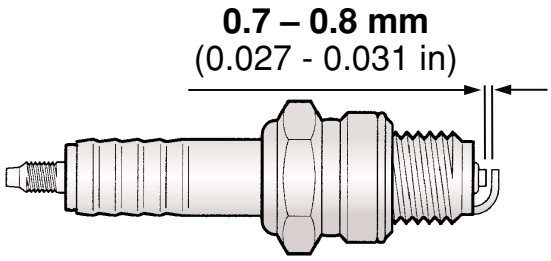
- Energetically blow some air, in order to prevent the removed residues from getting into the engine. If the spark plug has crackings on the insulating material, corroded electrodes or excessive deposits, it must be changed.
- Check the spark plug gap with a thickness gauge. The gap must be **0.7 – 0.8 mm** (0.027 - 0.031 in); if necessary adjust it, carefully bending the earth electrode.
- Make sure that the washer is in good conditions. With the washer on, screw the spark plug by hand in order not to damage the thread.
- Tighten the spark plug by 1/2 turn as to compress the washer, using the spanner found in the tool kit.

Spark plug driving torque:
12 - 14 Nm (1.2 - 1.4 kgm).

⚠ CAUTION

The spark plug must be well tightened, otherwise the engine may overheat and be seriously damaged. Use the recommended type of spark plug only, see TECHNICAL DATA, in order not to compromise the life and performance of the engine.

- Correctly fit the spark plug to prevent it from disconnecting due to the engine vibrations.
- Refit the left inspection cover, see (REMOVING THE RIGHT AND LEFT INSPECTION COVERS).



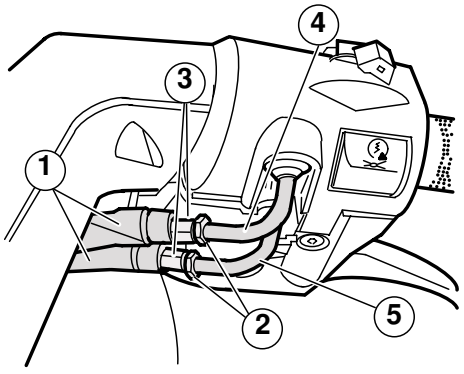
Spark plug	Standard	CHAMPION RG6YC
	- Alternatively	NGK - CR7EKB
	Spark plug gap	0.7 - 0.8 mm (0.027 - 0.031 in)

ADJUSTING THE THROTTLE CONTROL

Read through the paragraphs MAINTENANCE.

The idle stroke of the throttle grip must be **2 - 3 mm (0.078 - 0.118 in),** measured on the edge of the grip itself.
If this is not the case, proceed as follows:

- Position the vehicle on the centre stand.
- Withdraw the protection element (1).
- Loosen the lock nut (2).
- Rotate the adjuster (3) in such a way as to restore the prescribed value.
- After the adjustment, tighten the lock nut (2) and check the idle stroke again.
- Put back the protection element (1).
- Cable (4) opens the throttle
- Cable (5) closes the throttle.



⚠ WARNING

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.

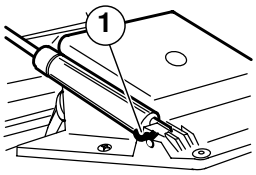
AIR FILTER

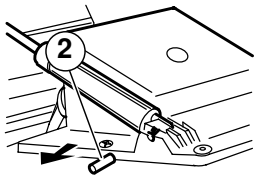
Read through the paragraphs MAINTENANCE.

The air cleaner should be inspected and cleaned every 6,000 km (3,750 mi), depending on the conditions of use.

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

To clean the filtering element it is necessary to remove it from the vehicle.





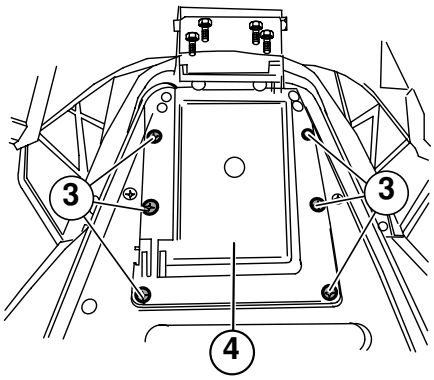
REMOVAL

- Position the vehicle on the centre stand.
- Lift the saddle (SADDLE LOCKING / UNLOCKING).
- Remove the safety clamp (1).
- Pull out the pin (2) fixing the piston to the air filter cover, as shown in the figure.

⚠ CAUTION

When removing the pin, hold the saddle to prevent it from falling.

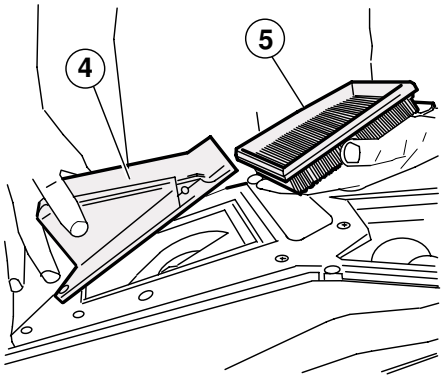
- Hold the saddle, unloose and remove the six screws (3) fixing the air filter cover to the plastic under the saddle.



⚠ CAUTION

When lifting the air filter cover, take care not to detach the intake sleeve from the filter box.

- Carefully lift the air filter cover (4).
- Remove the air filter (5).



CLEANING

⚠ WARNING

Do not use petrol or inflammable solvents to wash the filtering element, in order to avoid fires or explosions.
Do not use any additives or liquids for cleaning as to prevent the forming of moisture inside the filter box. Only use compressed air.

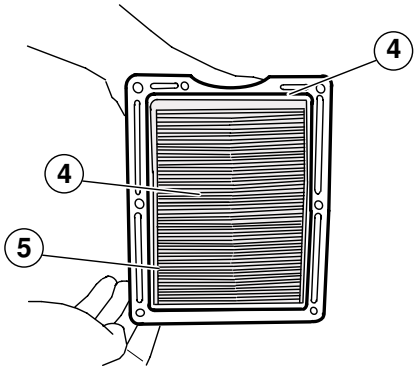
- Clean the filtering element (5) with a jet of air.

⚠ CAUTION

DO NOT OIL THE FILTERING ELEMENT in order not to compromise the filter and engine correct operation.

⚠ CAUTION

Refit the filter (5) in the filter cover (4) (make sure the gasket adheres perfectly to its seat), tighten the cover to the filter box.



ENGINE OIL

Check the engine oil after the first 1,000 km (625 mi) or at the end of the running in period, and then every 3,000 km (1,875 mi). Change the oil every 6000 km (3,750 mi), see RENEWING THE ENGINE OIL AND ENGINE OIL FILTER.

NOTE Use oil with specifications 5/W 40, see (TABLE OF LUBRICANTS).

⚠ CAUTION

When topping up the engine oil, never exceed the "MAX" mark.

CHECKING AND RESTORING THE ENGINE OIL LEVEL

Carefully read LUBRICANTS, MAINTENANCE and LUBRICANT CHART.

CHECK

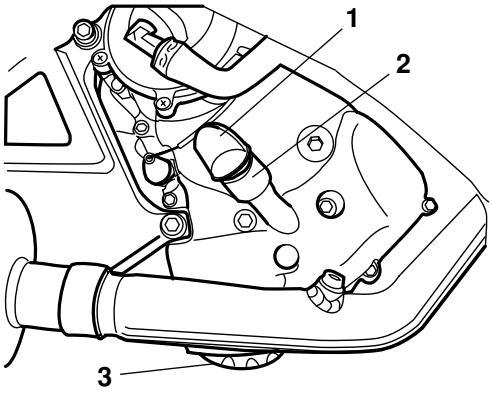
NOTE Position the vehicle on firm and flat ground.

- Position the vehicle on the centre stand.

⚠ WARNING

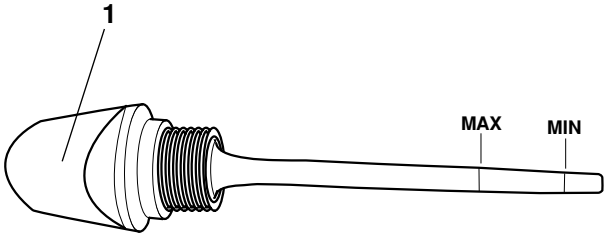
The engine and the components of the exhaust system become very hot and remain hot for some time after the engine has been stopped. Before handling these components, wear insulating gloves or wait until the engine and the exhaust system have cooled down.

- Switch off the engine, let the oil flow into the crankcase and allow the engine and the oil to cool down.



NOTE The non-performance of the operations described above may result in the incorrect measurement of the engine oil level.

- Unscrew and extract the plug/ dipstick (1).
- Clean the part in contact with the oil with a clean cloth.
- Tighten the plug/ dipstick (1) completely, screwing it into the filling hole (2).
- Withdraw the plug/ dipstick (1) again and read the oil level on the dipstick itself:



MAX = maximum level;
MIN = minimum level.

The difference between "**MAX**" and "**MIN**" is about: – 400 cc (24.4 cu.in)

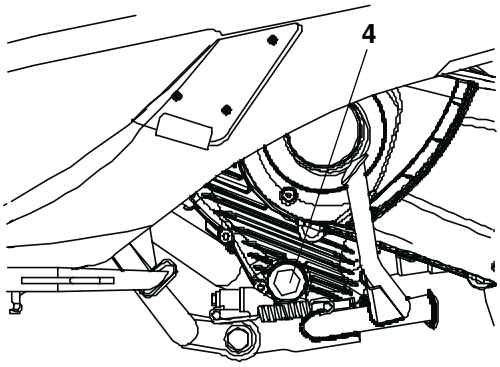
- The level is correct if the oil reaches approx. the "**MAX**" mark on the dipstick.

Never exceed the "MAX" mark, nor leave the oil below the "MIN" mark, in order to avoid serious damage to the engine.

- If necessary, provide for topping up.

TOPPING UP

- Pour a small quantity of oil in the filling hole (2) and wait about one minute, so that the oil flows uniformly into the oil pan.
- Check the oil level and top up if necessary.
- Top up by adding small quantities of oil, until reaching the prescribed level.
- At the end of the operation, screw and tighten the plug/ dipstick (1).



⚠ WARNING

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

RENEWING THE ENGINE OIL AND THE ENGINE OIL FILTER

Check the engine oil level every 3,000 km (1,875 mi), see (CHECKING THE ENGINE OIL LEVEL AND TOPPING UP).

NOTE Use oil with specifications 5/W 40, see (TABLE OF LUBRICANTS).

When topping up the engine oil, never exceed the "MAX" mark.

Check the engine oil after the first 1,000 km (625 mi) and then:

– every 6,000 km (3,750 mi), renew
– every 3,000 km (1,875 mi), check level/top up.

NOTE Put the vehicle on a solid and flat surface

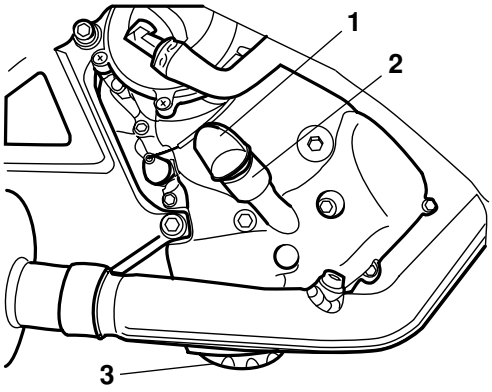
- Put the vehicle on the central stand.

⚠ 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.

- Switch off the engine, let the oil flow into the crankcase and allow the engine and the oil to cool down.

NOTE Make sure the above procedures are carried before the engine oil level is checked



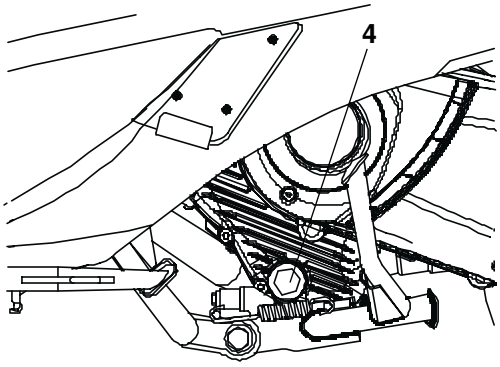
- Unscrew and remove cap/dipstick (1).
- Unloose and remove the engine oil cartridge filter (3).

⚠ WARNING

Do not use the vehicle if lubrication is insufficient. Never use unsuitable or contaminated lubricants as they accelerate the wear and tear of moving parts and can cause irreparable damage.

⚠ WARNING

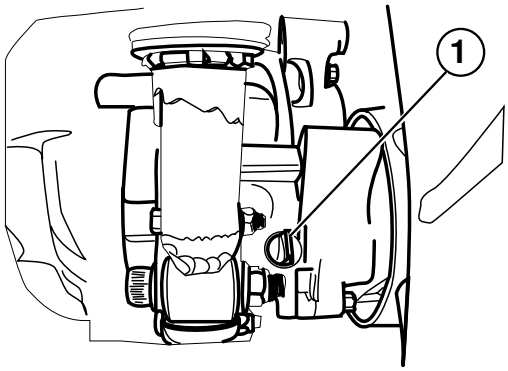
The used oil contains substances that are to the detrimental of the environment. Dispose of the used oils in compliance with the regulations in force.



- Unloose and remove the oil drain plug (4) to allow the engine oil to flow out completely.
- Fit a new oil cartridge filter (3) after having lubricated the relative O rings.
- Screw and tighten the engine oil drain plug (4).
- Pour in about 1700 cm^3 (103.7 cu.in) of engine oil through the filling hole (2).
- Screw and tighten the oil dipstick (1).
- Start the vehicle and let the engine run for a few minutes. Switch it off and allow it cool down. Check the engine oil level again with dipstick (1). If necessary, top up without exceeding the **MAX** mark.

Top up and change the oil using SAE synthetic oil 5/W 40 exceeding the API ST specifications.

CHECKING THE TRANSMISSION OIL LEVEL AND TOPPING UP



Read through the paragraphs LUBRICANTS, MAINTENANCE AND TABLE OF LUBRICANTS.

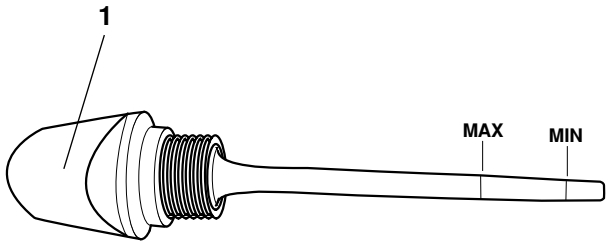
NOTE Put the vehicle on a solid and flat surface

- Put the vehicle on the central stand.

⚠ 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.

- Unscrew and remove cap/dipstick (1).
- Clean dipstick with a clean cloth.
- Completely screw the cap-dipstick (1) into the filling hole (2).
- Remove the cap-dipstick (1) again and check the oil level:



MAX = maximum level
MIN = minimum level

- The oil level is correct when it reaches the “MAX” mark on the dipstick.

⚠ CAUTION

The oil level should never exceed the “MAX” mark or go below the “MIN” mark in order to prevent serious damages to the engine.

- Top up if necessary.

TOPPING UP

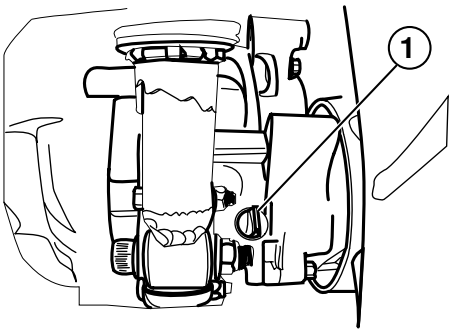
- Pour a small amount of oil in the filling hole (2) and wait until the oil starts flowing into the crank-case.
- Check the oil level, top up if necessary.
- Add small quantities of oil until the prescribed level is reached.
- Afterwards, screw and tighten the cap-dipstick (1).

SAE80W/90 OIL EXCEEDING THE API GL3 SPECIFICATIONS.

⚠ WARNING

Do not use the vehicle if lubrication is insufficient. Never use unsuitable or contaminated lubricants as they accelerate the wear and tear of moving parts and can cause irreparable damage.

RENEWING THE TRANSMISSION OIL



Read through the paragraph LUBRICANTS, MAINTENANCE and TABLE OF LUBRICANTS.

NOTE Put the vehicle on a solid and flat surface.

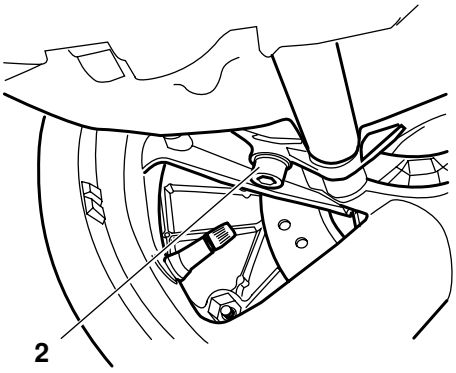
- Put the vehicle on the central stand.

⚠ CAUTION

Do not use the vehicle if lubrication is insufficient. Never use unsuitable or contaminated lubricants as they accelerate the wear and tear of moving parts and can cause irreparable damage.

⚠ CAUTION

The used oil contains substances that are to the detrimental of the environment. Dispose of the used oils in compliance with the regulations in force.



⚠ CAUTION

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.

- Switch off the engine, let the oil flow into the crankcase and allow the engine and the oil to cool down.
- Unscrew and remove the cap-dipstick (1).
- Unscrew and remove the drain nut (2).
- Let the oil flow into a container with capacity of at least 300 cm^3 (18.3 cu.in).
- Screw and tighten the drain nut (2).
- Top up as described under paragraph (CHECKING THE TRANSMISSION OIL LEVEL AND TOPPING UP).

DISC BRAKES

NOTE This vehicle is provided with front and rear disc brakes, with separate hydraulic circuits.

⚠ CAUTION

The following information refers to a single braking system, but is valid for both.
Any sudden play variations or elastic resistance of the brake lever is due to the hydraulic system failure.

⚠ CAUTION

Check that the brake disck and the frictional gaskets are not greasy, in particular after having performed maintenance or check operations.
Check that the brake tube is not twisted or worn.

KEEP OUT OF REACH OF CHILDREN.

DO NOT DISPOSE OF THE LIQUID IN THE ENVIRONMENT.

⚠ CAUTION

The brakes are the parts that most ensure your safety and for this reason they must always be perfectly working; check them before every trip. A dirty disc soils the pads, with consequent reduction of the braking efficiency. Dirty pads must be replaced, while dirty discs must be cleaned with a high-quality degreaser.

Renew the brake fluid every two years.

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.

When the disc pads wear out, the brake fluid level in the reservoir decreases to automatically compensate for their wear.
The brake fluid reservoirs are located under the handlebar cover, next to the brake lever connections.
Periodically check the brake fluid level in the reservoirs, see beside (CHECK) and the wear of the pads, see (CHECKING THE PADS WEAR).

⚠ WARNING

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

CHECK
To check the level:

NOTE Put the vehicle on a solid and flat surface.

- Put the vehicle on the central stand.
- Turn the handlebar so that the fluid in the brake fluid reservoir is at the same level as the “MIN” mark shown on the glass (1).
- Check that the fluid in the resevoir exceeds the “MIN” mark shown on the glass (1).

MIN = minimum level.

if the fluid does not reach at least the “MIN” mark:

⚠ CAUTION

The level of the fluid gradually decreases with pad wear.

- Check the brake pads (CHECKING THE PADS WEAR) and the disc wear.

⚠ CAUTION

Check the braking efficiency.
If the brake lever stroke is excessive or if the braking efficiency becomes poor, it may be necessary to bleed the system.

RESTORING THE BRAKE FLUID LEVEL

Read through the paragraph DISC BRAKES.

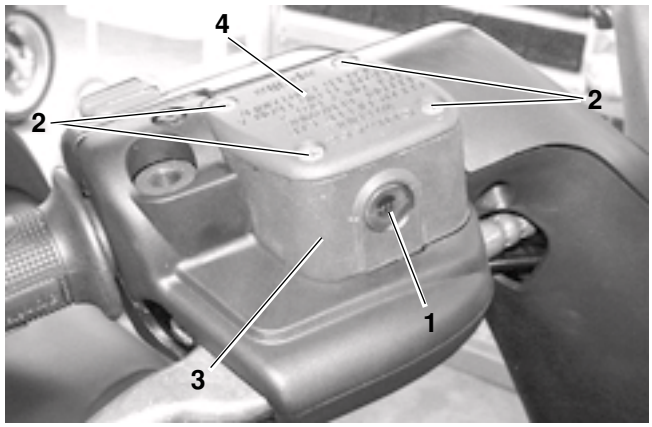
Remove the four screws (2) from brake fluid reservoir (3).

Remove cover (4).

NOTE To avoid spilling the brake fluid when topping up, ensure that the fluid in the reservoir is parallel with the reservoir rim (in a horizontal position).

Remove the gasket under the cover.

NOTE To fill the reservoir to the MAX level, ensure that the rim of the brake fluid reservoir is parallel with the ground and add fluid until sight (5) is completely covered.



⚠ CAUTION

Top up to the MAX level only if the brake pads are new.

The level of the fluid gradually decreases with pad wear.

Topping up to the MAX level when the pads are worn will cause the brake fluid to overflow when the pads are replaced.

Fill reservoir (3) with brake fluid (see LUBRICANT CHART) until sight (1) is completely covered.

To refit the components, follow the reverse procedure to the removal.

CHECKING BRAKE PAD WEAR

Read through the paragraph DISC BRAKES.

The following information are referred to one braking system only, but are valid for both.

Check the brake pad wear after the first 1,000 km (625 mi) and successively every 2,000 km (1,250 mi).

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

The wear is heavier when driving on dirty or wet roads.

FRONT BRAKE CALIPER

– Front side from the bottom for both calipers.

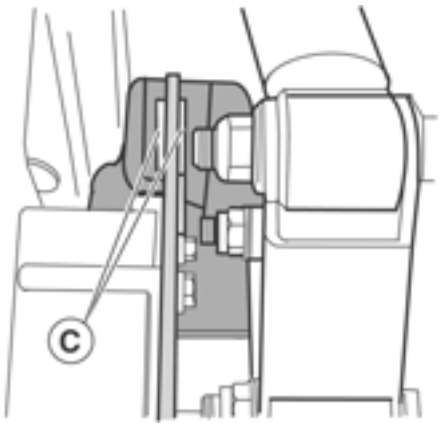
REAR BRAKE CALIPER

– Rear side from the bottom for both pads (C).

⚠ WARNING

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 frictional material (also of one pad only) becomes 1.5 mm (0.059 in), replace both pads (both front and rear pad).



BLEEDING THE BRAKING SYSTEM (FRONT SIDE ONLY)

Read through the paragraph DISC BRAKES.

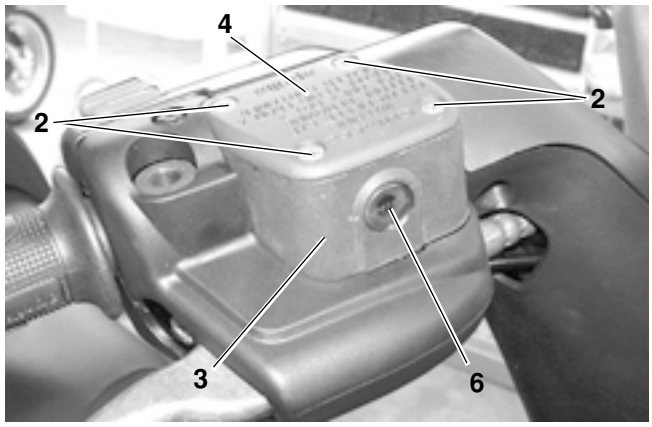
Any air present in the brake circuit acts as a cushion, absorbing much of the pressure applied by the brake pump and reducing the effectiveness of the brake caliper. The presence of air is indicated by a spongy feel of the brake lever and a reduction in the braking action.

⚠ CAUTION

In view of the danger for both the rider and the vehicle, it is essential that the hydraulic circuit should be bled after reinstalling the brakes and restoring the braking system to its normal operating conditions.

Loosen the four screws (2) on brake fluid reservoir (3).
Remove the cap (4).

NOTE To avoid spilling the brake fluid when topping up, be sure to keep the fluid in the reservoir parallel with the ground.



Remove the gasket above the cover.
Check if the brake fluid completely covers sight (6), and if necessary top up.
Remove the cap from breather valve (7).
Connect a transparent pipe (9) to breather valve (8).

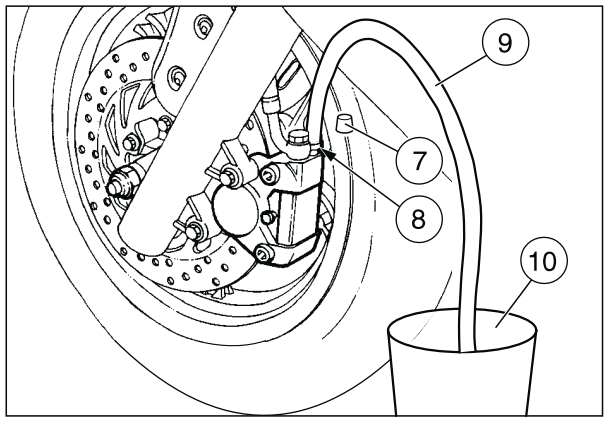
⚠ CAUTION

Take care not to soil the pads or the disc with brake fluid.

Place the free end of the transparent pipe in a container (10).
Slowly pull the brake lever 2-3 times to the end of its travel and then keep it pulled.
Loosen breather valve (8), press the lever and check if any air bubbles come out of the transparent pipe with the brake fluid.

⚠ CAUTION

Before releasing the brake lever, retighten breather valve (8) so as to prevent air from getting into the brake circuit.



When the brake fluid comes out with no air bubbles, tighten breather valve (8) and then release the brake lever.
Tightening torque for breather valve (8): 14 Nm (1.4 kgm).

NOTE Repeat the last three operations until all the air has been purged.

⚠ CAUTION

After refitting the parts, repeatedly operate the brake lever and ensure that the braking system is working properly.

BLEEDING THE INTEGRAL BRAKING SYSTEM

Read through the paragraph DISC BRAKES.

The air present in the hydraulic circuit acts as a cushion, absorbing much of the pressure applied by the brake pump and reducing the effectiveness of the caliper during the braking.

The presence of air can be noticed by a spongy feel of the brake lever and poor braking action.

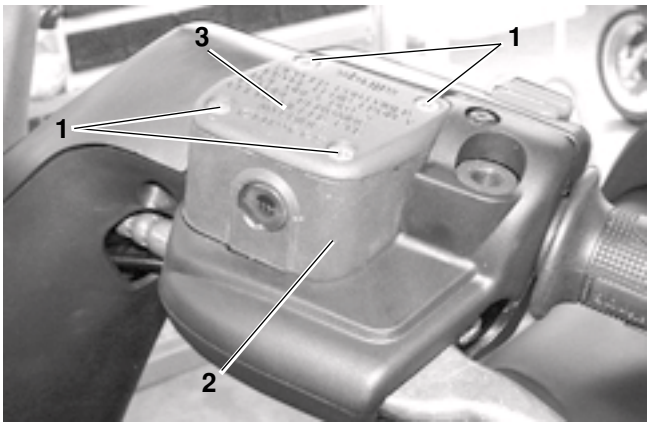
⚠ WARNING

In view of the danger for both the rider and the vehicle, it is essential that the hydraulic circuit should be bled after reinstalling the brakes and restoring the braking system to its normal operating conditions.

NOTE The lever of the l.h. pump acts either on the rear caliper and on the right front caliper.

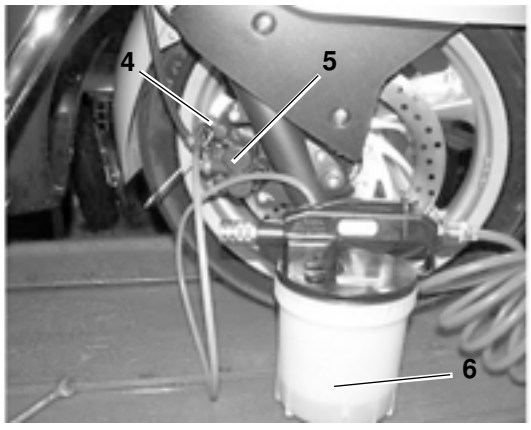
Loosen the four screws (1) on brake fluid reservoir (2). Remove the cap (3).

NOTE To avoid spilling the brake fluid when topping up, be sure to keep the fluid in the reservoir parallel with the ground.

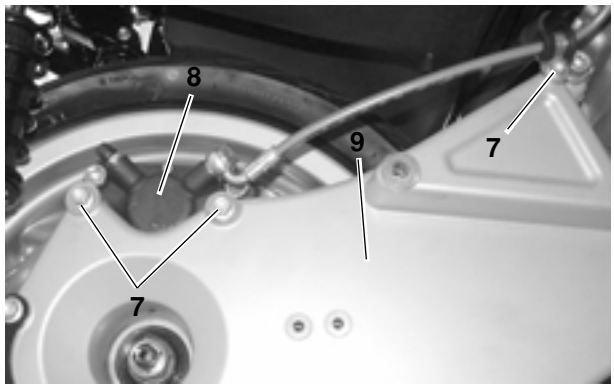


With the specific tool (6), suck the oil through the breather pipe (4) of the right front caliper (5) by unscrewing the breather pipe (4) nut by half turn.

Add oil in the brake fluid reservoir (2) for about 2-3 times.



Unloose and remove the three screws (7).
Remove the rear brake caliper (8) of the plate (9) and the relevant cable lead.
Fit the rear brake caliper (8) so that the breather valve (10) is in the highest position.

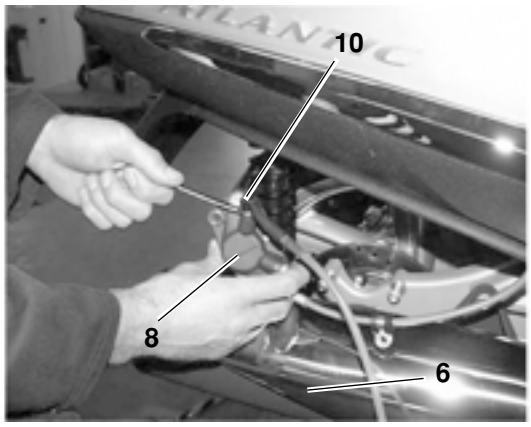


With the specific tool, suck the oil through the breather valve (10) of the rear brake caliper (8) by unscrewing the breather valve (10) nut by half turn.

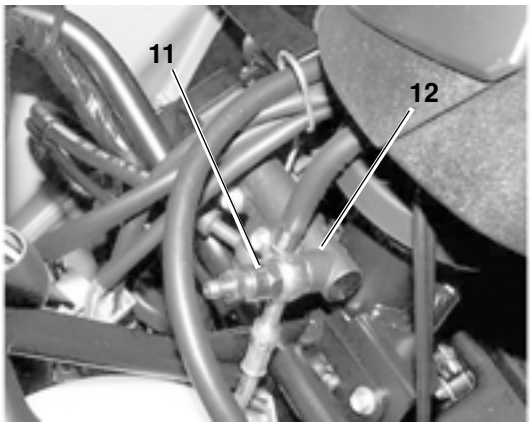
Add oil in the brake fluid reservoir (2) for about 2-3 times.

⚠ CAUTION

Never allow the fluid reservoir (2) to empty completely, to prevent air from entering the circuit.



Refit the rear brake caliper. Remove the front hood, see (REMOVING THE FRONT HOOD).
With the specific tool, suck the oil through the retarder (12) breather (11), by unscrewing the breather (11) nut by half turn.



Operate the brake lever until the reservoir is completely free from air bubbles.
Refit the cover (3) of the brake fluid reservoir (2).
Refit the front hood, see (REMOVING THE FRONT HOOD).

NOTE Perform the bleeding again if the braking action is poor.

CHECKING AND RESTORING THE COOLANT LEVEL

Read through the paragraphs COOLANT and PRECAUTIONS AND GENERAL INFORMATION.

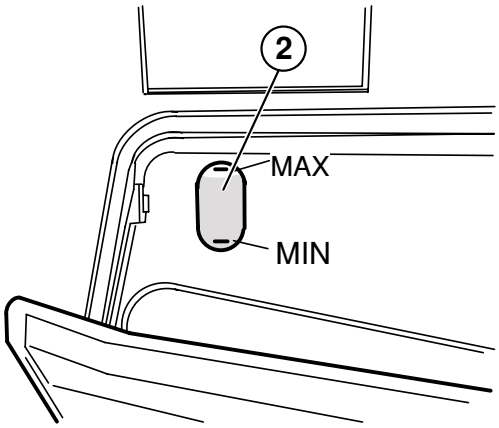
⚠ CAUTION

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

Check the coolant level every 2,000 km (1,250 mi) and after long trips; have the coolant changed every 16 months.

DO NOT DISPOSE OF THE FLUID IN THE ENVIRONMENT

Put the vehicle on the central stand.
Remove the front hood, see (REMOVING THE FRONT HOOD).
Check that the coolant level in the expansion tank (2) is between the "MIN" and "MAX" mark (see figure).



⚠ WARNING

Do not remove the expansion tank plug (1) when the engine is hot, since the coolant is under pressure and its temperature is high.
If it gets in contact with the skin or with clothes it may cause severe burns and/or damage.

Contrariwise, unscrew and the remove the filler cap found under the front hood. Add coolant until it roughly reaches the "MAX" level.
Do not exceed the maximum level as this would cause the coolant to overflow during the engine operation.
Replace the filler cap.
Replace the front hood.

⚠ CAUTION

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

The coolant is harmful: DO NOT INGEST.
KEEP OUT OF REACH OF CHILDREN.

⚠ CAUTION

Only use antifreeze and anticorrosive fluid free from nitrite, ensuring protection at a temperature of at least –35°C (–31°F).

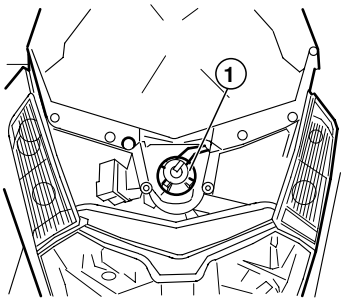
RENEWING THE COOLANT

Read through the paragraphs COOLANT and PRECAUTIONS AND GENERAL INFORMATION.

⚠ CAUTION

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

Check the level of the coolant every 2,000 km (1,250 mi) and after long journeys. Renew the coolant every 16 months.

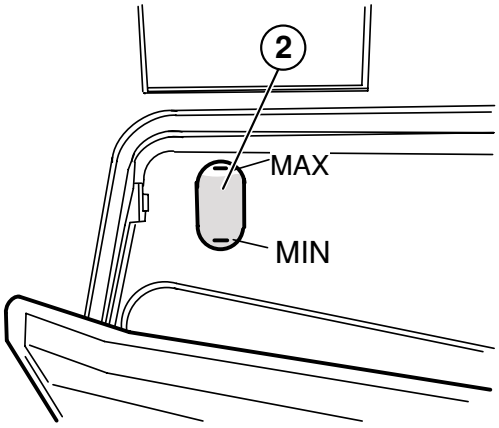


⚠ CAUTION

Switch off the engine and allow the engine and the exhaust system to cool down.

DO NOT DISPOSE OF THE COOLANT IN THE ENVIRONMENT

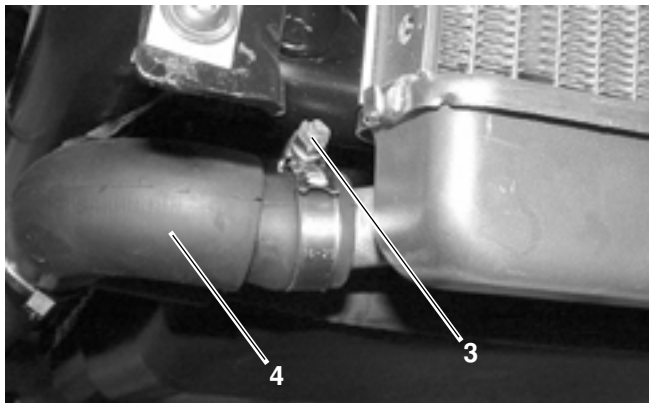
Put the vehicle on the central stand.
Remove the front hood, see (REMOVING THE FRONT HOOD).
Remove the splash guard, see (REMOVING THE SPLASH GUARD).



⚠ CAUTION

Do not remove the expansion tank cap when the engine is hot. The coolant is under pressure at high temperatures and can cause burns and/or damage clothes.

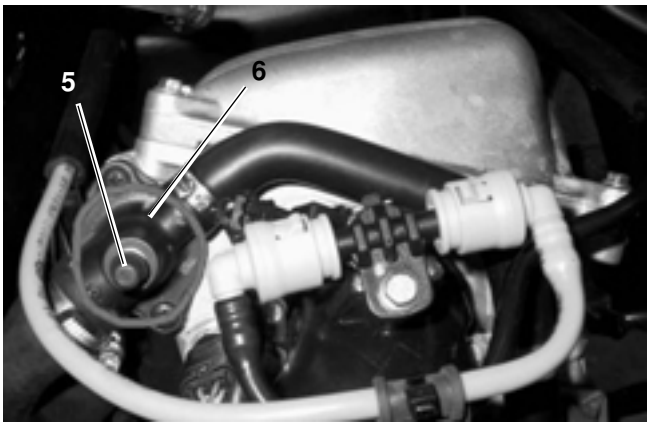
Remove filler cap (1) from expansion tank (2).
Place a container with a capacity of at least 1500 cm^3 (91.5 cu.in) under the crankcase, below drain screw.
Unloose and remove the screw clamp (3), disconnect the union.
Drain all the coolant into the container and then pour it into another container for liquid recovery.
Replace the union and fix with clamp (3).
Pour 1200 cm^3 (73.2 cu.in) of coolant in the expansion tank (2).
Add coolant until it roughly reaches the **"MAX"** level
Do not exceed the maximum level as this would cause the coolant to overflow during engine operation.
Replace filler cap (1).
Remove the right inspection cover, see (REMOVING THE RIGHT AND LEFT INSPECTION COVER).



⚠ CAUTION

Exhaust gases are harmful.
Avoid running the engine in closed or poorly ventilated places.

- Start the engine and let it idle.
- Place a container under the engine to gather any coolant coming out of breather screw (5).



⚠ CAUTION

The coolant in the circuit is under pressure. To avoid dangerous spurts, loosen breather screw (5) slowly and moderately.

- Loosen breather screw (5) on thermostatic valve (6); allow a moderate quantity of coolant to flow out together with any air bubbles and then tighten breather screw (5).
- Check the level of the fluid in expansion tank (2) and then top up to the **MAX** level (see page 2-25 CIRCUIT BLEEDING for the bleeding).
- Ride a few kilometres until the engine reaches the normal operating temperature.

⚠ CAUTION

Switch off the engine and allow the engine and the exhaust system to cool down.

To refit the plastic parts follow the reverse procedure.

⚠ CAUTION

If coolant consumption is excessive, or if the coolant runs out in the tank, check for possible leakage from the circuit.

The coolant is harmful: DO NOT INGEST
KEEP OUT OF REACH OF CHILDREN

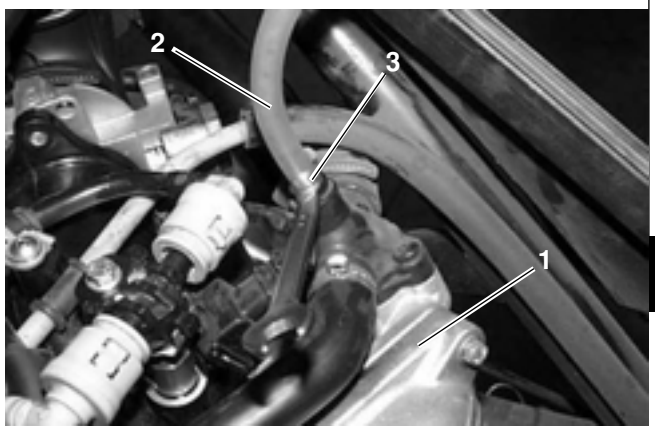
⚠ CAUTION

Only use nitrite-free anticorrosive and antifreeze agents providing a protection at temperatures of -35° C (-31° F) or lower

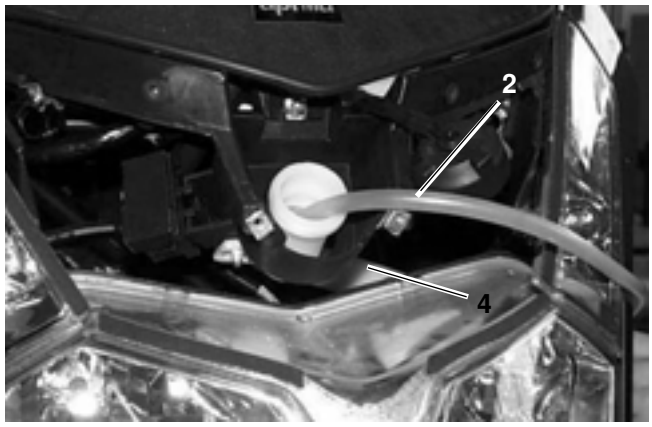
For more information on the cooling system, see (COOLING SYSTEM).

CIRCUIT BLEEDING:

- Remove the front hood, see (REMOVING THE FRONT HOOD).
- Remove the filter box, see (REMOVING THE FILTER BOX).
- Open the expansion tank cap.
- Remove the breather cap located on the cylinder head “T” union (1).



- Connect a transparent rubber pipe (2) between the breather pipe and the expansion tank.
- Screw breather nut (3) by $^1/_2$ turn.
- Add coolant in the expansion tank (4) up to the max level (check level through the glass in the front compartment).



- Switch on the engine.
- The air bubbles will start coming out of the circuit through the transparent pipe (2).
- Check that the pipe between the expansion tank and the radiator starts spraying liquid into the expansion tank (visible from the front side). In this case, it means that the thermostatic valve is open and the circuit is completely full.
- Close the bleeder valve.

NOTE If the heater fan turns on it is unimportant as the sensor that activates the fan is located on the cylinder head and not on the radiator.

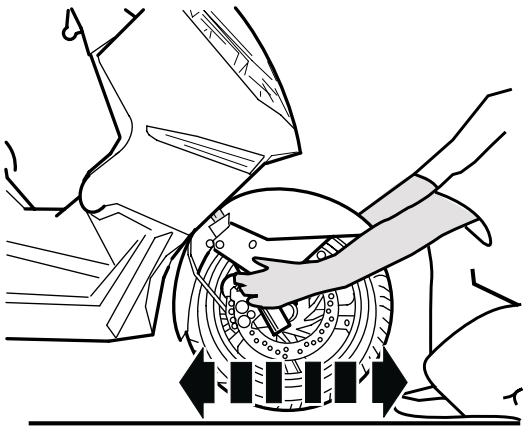
CHECKING AND ADJUSTING THE STEERING

CHECKING THE BEARINGS PLAY
Read through the paragraph PRECAUTIONS AND GENERAL INFORMATION.

Periodically check the play existing on the steering.

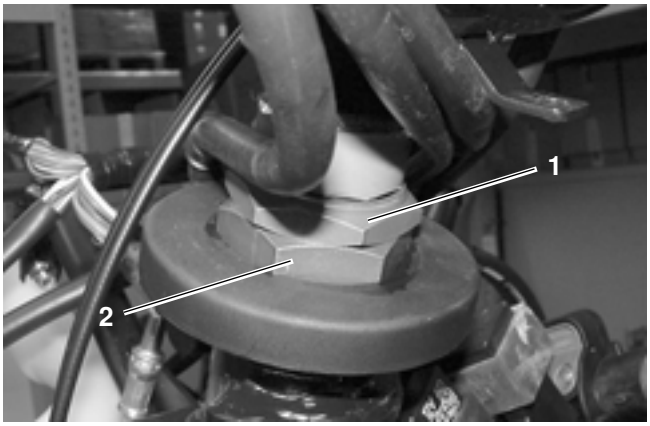
To carry out this operation, proceed as follows:

Position the vehicle on the centre stand.
Shake the fork in the riding direction (see figure).
If any play is found, adjust.



ADJUSTING THE BEARINGS PLAY

Remove the legshield, see (REMOVING THE LEGSHIELD).
Unloose the check nut (1).



⚠ CAUTION

To avoid damaging the steering bearings, take care not to tighten adjusting nut (2) forcefully.

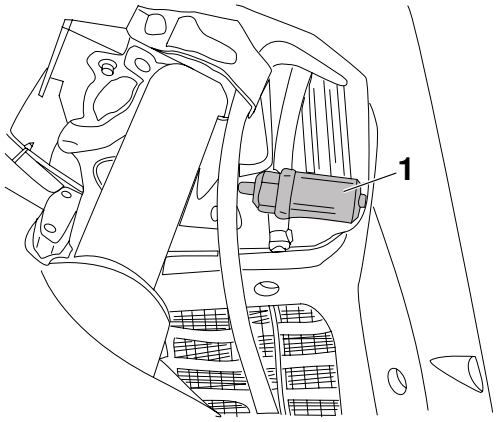
Turn in adjusting nut (2) until the play of the bearings is eliminated.
Check the play by shaking the fork in the direction of motion and ensuring that the steering can rotate freely and smoothly.
While holding adjusting nut (2) in position, tighten counternut (1) with a spanner
Tightening torque for counternut (1):
110 Nm (11 kgm).

Repeat the last but one step.

STEERING DAMPER

It is possible to adjust the steering damper when riding the vehicle at full load (driver + passenger + luggage).

To carry out this operation, proceed as follows:
Turn the ring nut (1) clockwise to increase the damper brake.



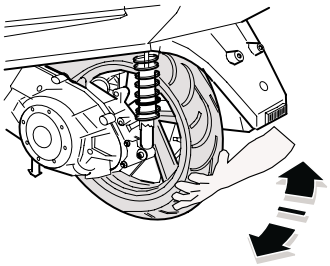
⚠ CAUTION

Tighten the ring nut to increase the damper adjusting brake, thus increasing the effort required for turning the handlebar, which becomes less easy to handle.

CHECK ENGINE PIN BUSHINGS

Read through the paragraph PRECAUTIONS AND GENERAL INFORMATION.

Periodically check the slack existing between the engine pin bushings.



To carry out this operation, proceed as follows:
Position the vehicle on the centre stand.
Shake the wheel transversally with respect to the riding direction.
If any play is found, check that all fulcrum axis fasteners are securely tightened (see REMOVING THE ENGINE LINKAGE).

CHECKING THE FRONT SUSPENSION

Read through the paragraph PRECAUTIONS AND GENERAL INFORMATION.

Inspect the front suspension after the first 1,000 km (625 mi) and then every 6,000 km (3,750 mi) or 8 months.

Renew the oil in the front suspension every 12,000 km (7,500 mi), see FRONT SUSPENSION.

Check that no oil is leaking from the fork, and that the outside surface of the fork rods is not scratched or grooved. Replace any damaged parts.

Also perform the following checks:

While pulling the front brake lever, repeatedly stroke the fork by pushing down on the handlebar. The fork should move smoothly, and there should be no traces of oil on the fork rods.

Check the tightening of all parts and the function of the front suspension joints (see FRONT SUSPENSION).

CHECKING THE REAR SUSPENSION

Read through the paragraph PRECAUTIONS AND GENERAL INFORMATION.

Inspect the rear suspension after the first 1,000 km (625 mi) and subsequently every 6,000 km (3,750 mi) or 8 months.

Check that no oil is leaking from the shock absorbers.

Check the tightening of all parts and the function of the rear suspension joints (see REAR SUSPENSION).

⚠ CAUTION

Check that both shock absorbers are adjusted to the same position. See (ADJUSTMENT).

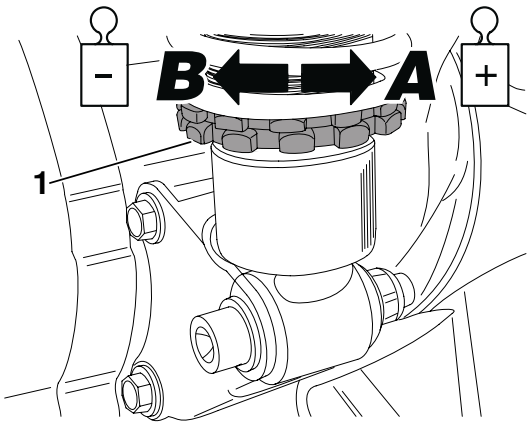
ADJUSTING THE REAR SUSPENSION

Read through the paragraph PRECAUTIONS AND GENERAL INFORMATION.

The rear suspension consists of a doubleeffect shock absorber (braking with compressed/extended shock absorber) fixed to the engine by means of a silent-block.

The standard adjustment, set by the manufacturer, is suitable for a driver weighing about 70 kg (154.3 lbs).

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

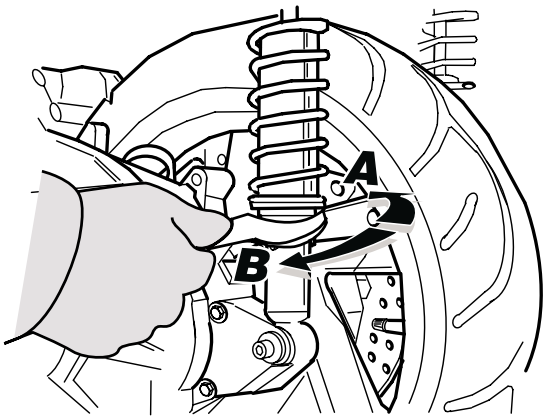


⚠ CAUTION

Adjust both shock absorbers to the same position

ADJUSTMENT OF THE REAR SUSPENSION SPRING PRELOAD

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



WHEELS AND TYRES

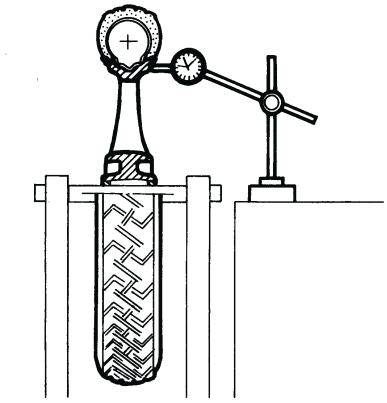
Read through the paragraph PRECAUTIONS AND GENERAL INFORMATION.

WHEELS INSPECTION

Check that the wheel rims are not cracked or distorted. If necessary replace them.
Check the radial runout of the wheel.
If the wheel is distorted beyond the acceptable limit, check the condition of the rim and the bearings.
If necessary replace the wheel.

Runout limits:
Vertical runout: 2 mm (0.078 in)
Lateral runout: 2 mm (0.078 in)

Check the wheel trim.
Slowly turn the wheel several times and observe the point at which it stops.
If the wheel is not statically balanced, it will always stop at the same point. Fit a balancing weight at the lightest point (top).



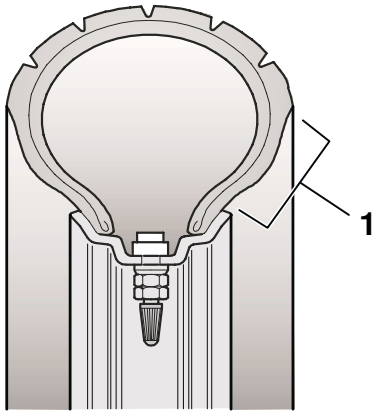
TYRES

Read through the paragraph PRECAUTIONS AND GENERAL INFORMATION.

This vehicle is provided with tubeless tyres.

⚠ WARNING

Periodically check the tyre inflation pressure at room temperature, see (TECHNICAL DATA).
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 road holding during turns.



If, on the contrary, the inflation pressure is too low, the tyre sides (1) 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 get out of the rims.
Further, the vehicle could skid while turning.

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.

Some types of tyres homologated for this vehicle are provided with wear indicators.
There are several kinds of wear indicators.
Visually check if the tyres are worn and in this case have them changed.

If the tyres are old, even if not completely worn out, they may become hard and may not ensure good road holding.In this case, have the tyres changed.

Change the tyre when it is worn out or in case of puncture on the tread side, if the puncture is larger than 5 mm (0.196 in).
After repairing a tyre, have the wheels balanced.

Use only tyres in the size suggested by aprilia, see TECHNICAL DATA.

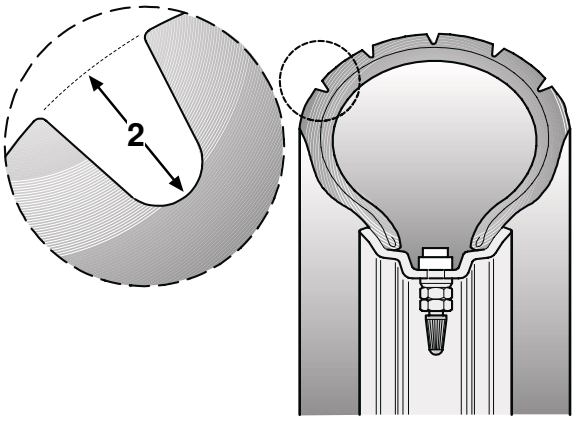
Do not install tyres with air tube on rims for tubeless tyres and viceversa.

Make sure that the tyres always have their valve sealing caps on, to prevent them from suddenly going flat.

Change, repair, maintenance and balancing operations are very important and should be carried out by qualified technicians with appropriate tools.

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.

MINIMUM TREAD DEPTH LIMIT (2)



front:.....2 mm [0.078 in] (USA 3 mm) [0.118 in]

rear:.....2 mm [0.078 in] (USA 3 mm) [0.118 in]

Do not exceed the max transportable weight as this would compromise the vehicle's stability, handiness and may cause damages to the tyres.

MAX LOAD 180 Kg (396.8 lbs)

TYRES PRESSURE

	FRONT	REAR
RIDER ONLY	2.1 bar (30.4 psi)	2.3 bar (33.3 psi)
FULL LOAD (passenger + driver)	2.2 bar (31.9 psi)	2.6 bar (37.7 psi)

According to the tests carried out by **aprilia**, only the tyres listed below have been approved for this model:

	MANUFACTURER	SIZE	MODEL
FONT	MICHELIN	120/70-15' 56S	GOLD STANDARD
REAR		140/60-14' 64S	GOLD STANDARD
FONT	CHENG SHIN MAXXIS	120/70-15'56R	M-6002
REAR		140/60-14' 64R	M-6002

3

Engine

COMPONENTS THAT CAN BE REMOVED WITHOUT REMOVING THE ENGINE

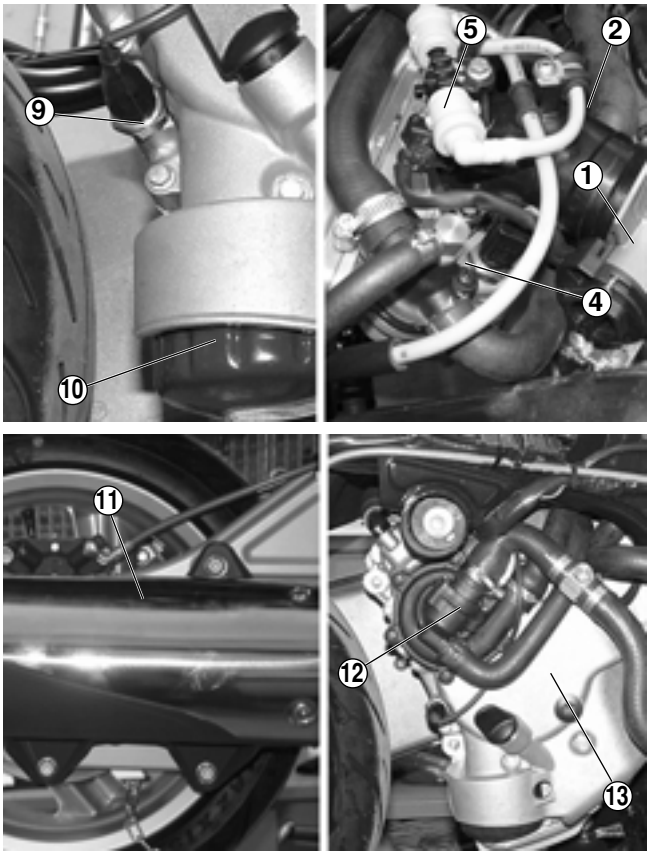
The following parts can be removed and refitted without removing the engine from the frame.

UPPER SIDE
- Throttle body (1) see (THROTTLE BODY)
- Intake manifold sleeve (2)
- Starter motor (3)
- Coolant temperature thermistor (4) (on cylinder head)
- Injector (5)

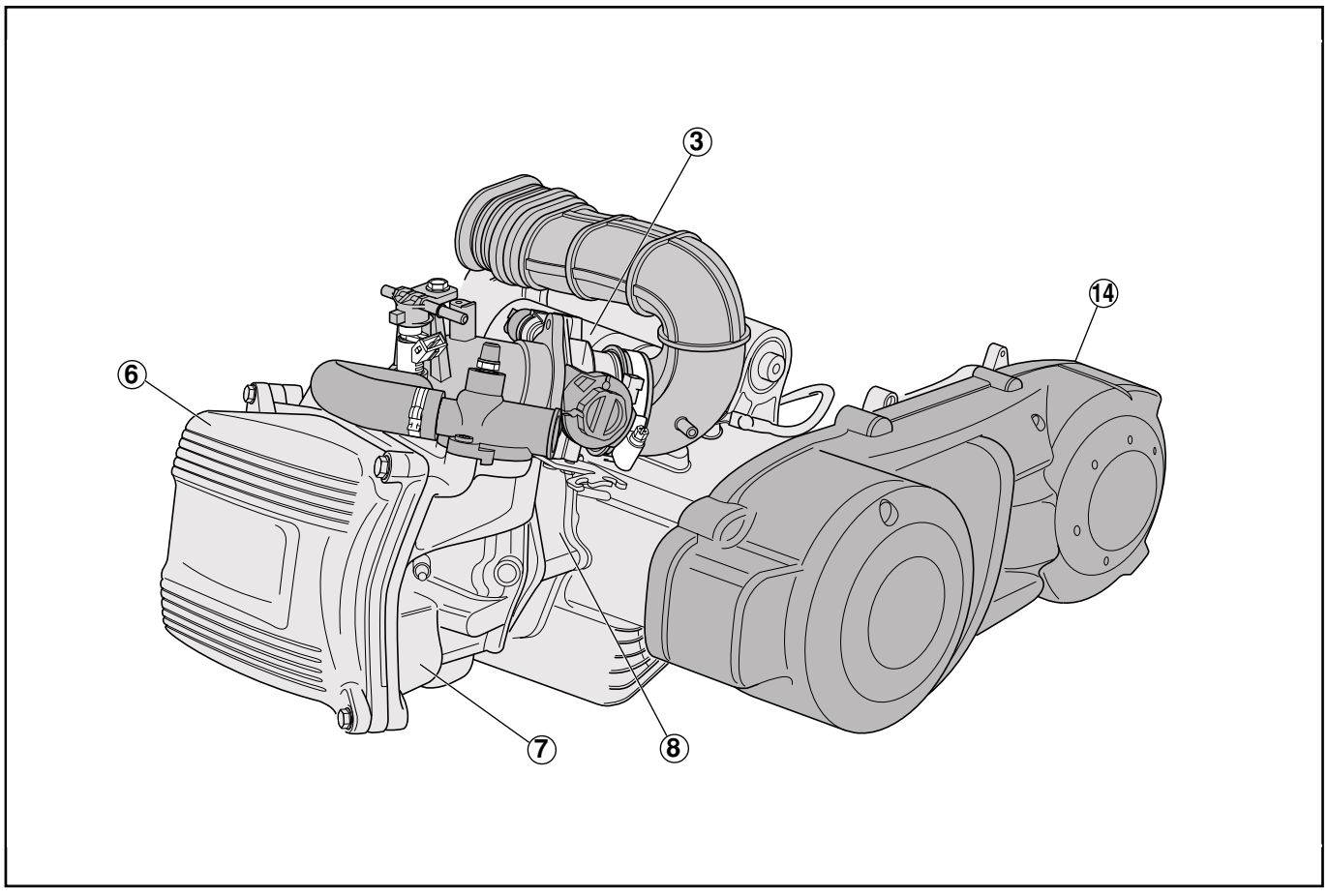
FRONT SIDE
- Tappet cover (6)
- Head (7)
- Cylinder (8)

RIGHT SIDE
- Oil pressure sensor (9)
- Engine oil filter (10)
- Exhaust silencer (11) see (REMOVING THE EXHAUST SILENCER)
- Water pump (12)
- Ignition casing (13)
- Flywheel
- Stator coil
- Pulse generator (pick-up)

LEFT SIDE
- Driving belt box air filter
- Transmission crankcase cover (14)
- Speed variator assembly
- Clutch assembly
- Drive belt



Unless otherwise specified, for information on removing procedures refer to the ENGINE WORKSHOP MANUAL n°1063 (I), n°1064 (E), n°1065 (F), n°1066 (D), n°1067 (UK) and n°1068 (USA).



REMOVING THE ENGINE FROM THE FRAME

Read through the paragraph (PRECAUTIONS AND GENERAL INFORMATION).

⚠ CAUTION

Switch off the engine and allow the engine and the exhaust system to cool down.
Disconnect the battery.

Completely empty out the coolant circuit (RENEWING THE COOLANT).
Remove the right and left inspection covers, see (REMOVING THE RIGHT AND LEFT INSPECTION COVER).

⚠ CAUTION

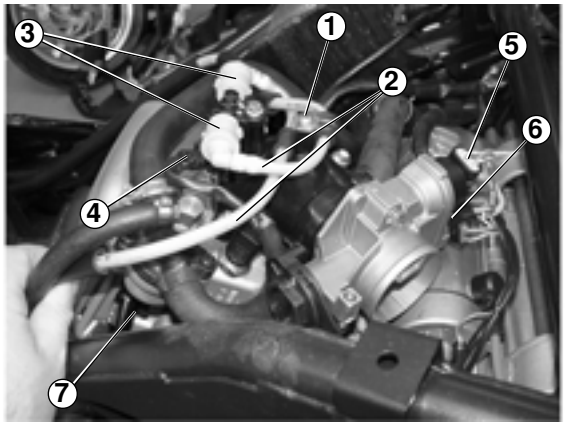
Clean the outside of the engine with a brush, rags and a degreasing detergent.
Take care not to damage rubber and plastic parts with corrosive or penetrating detergents and solvents.

If a steam cleaner is required, take care not to direct any high-pressure water or air jet, or any steam jet towards the following parts: wheel hubs, controls on the left and right sides of the handlebar, brake pump, instruments and indicators, silencer exhaust, document holder, ignition switch/steering lock.

Clean the engine and the related components.

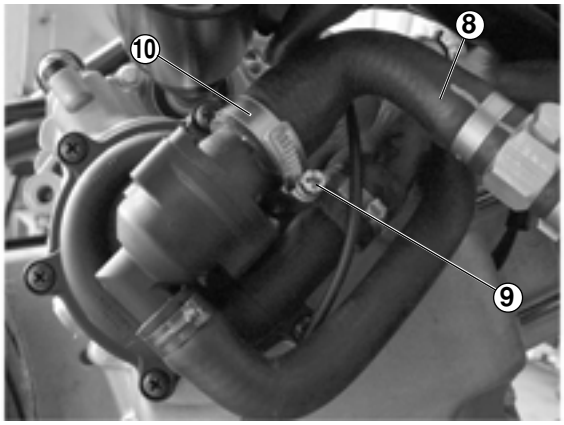
⚠ CAUTION

To ensure proper refitting of the parts, suitably mark the wires, sleeves, pipes, etc.
On reassembly, make sure that all the parts are correctly fitted.



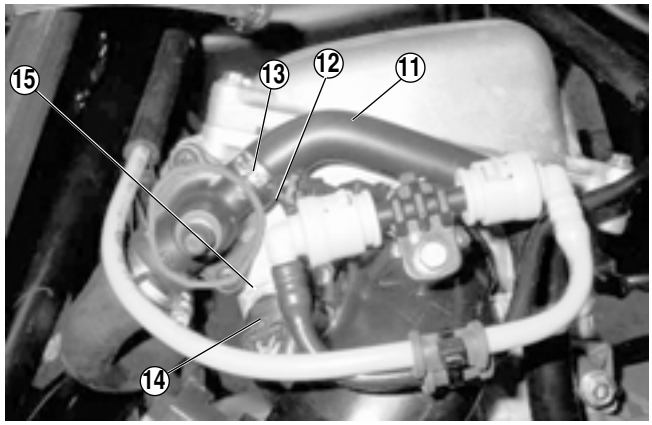
Unloose and remove screw (1) fixing the injector supply pipes support (2).
Detach the two connections (3) supplying fuel to the injector.
Detach the injector electrical connection (4).
Detach the automatic starter electrical connection (5).
Detach the electrical connection (6) from the sensor detecting the position of the throttle body throttle.
Remove the spark plug (7) and release the relative cable.
Disconnect the electrical connection from the air temperature sensor of the throttle body.

Detach the water inlet pipe (8) to the pump by unloosing screw (9) on hose clamp (10).

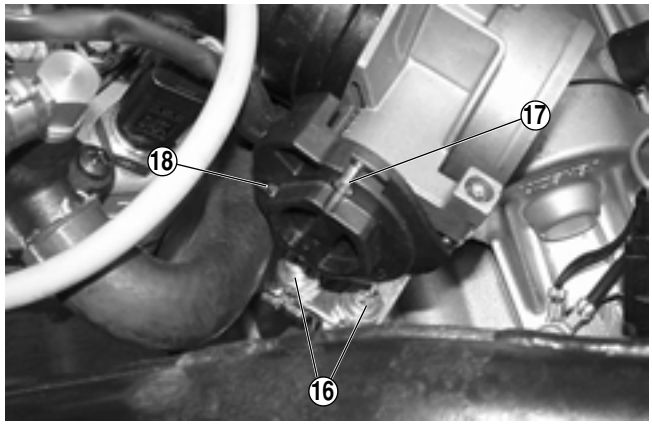


Detach the water outlet pipe (11) from the cylinder by unloosing screw (12) on hose clamp (13) found on the union above the cylinder.

Detach the electrical connection (14) of the coolant temperature sensor (15).

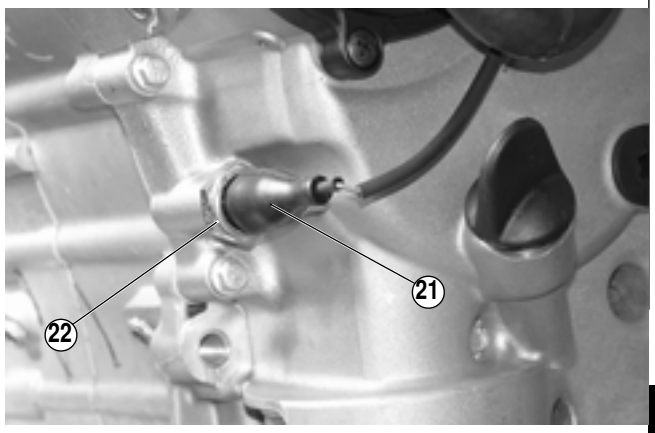


Unloose the two nuts (16) fixing the cable guides to the throttle body support.
Remove the cable guide and relevant control delivery barrel (17) on the throttle body.
Remove the cable guide and the relevant control return barrel (18) on the throttle body.



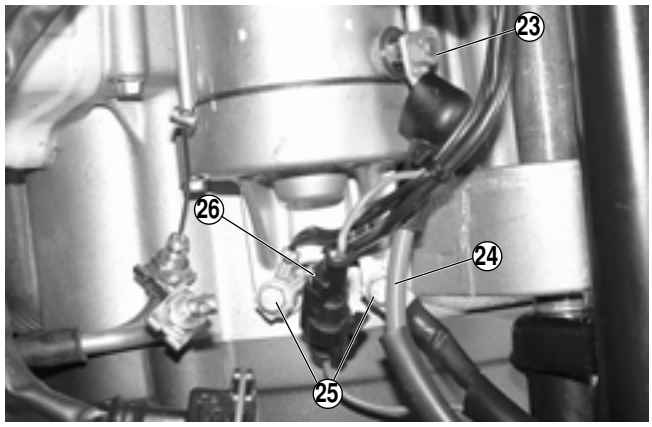
Detach the electrical connection (19) from the phase sensor (20) and release the wires from the clamps fixing them to the frame.

Remove rubber protection (21) and detach the engine oil pressure sensor wire connector (22).



3

Unloose and remove the nut fixing the starter relay cable (23) and remove the cable (24).
Unloose and remove the two screws (25) fixing the starter to the crankcase, and release the cables for the ground.
Detach connector (26) of the injection positive cable.



⚠ WARNING

Owing to the weight and bulk of the components and the vehicle, the following operations are to be performed in cooperation with a second operator. Before starting work, the two operators should agree on their respective roles in the operations to be performed (in the following instructions "A" operations are to be carried out by the 1st operator and "B" operations by the 2nd operator), on the procedures to be followed and on any warning signs to be placed.

EXERCISE EXTREME CAUTION.

⚠ WARNING

The weight and bulk of the vehicle can cause dangerous unbalancing and tipping of the vehicle during the hoisting phase.

PROCEED WITH CAUTION AND MAKE SURE YOU CAN BEAR THE WEIGHT OF THE VEHICLE.

Remove the rear wheel, see (REMOVING THE REAR WHEEL).
"**A**" Lift the vehicle from its rear side, fasten up the wheel with belts if necessary.

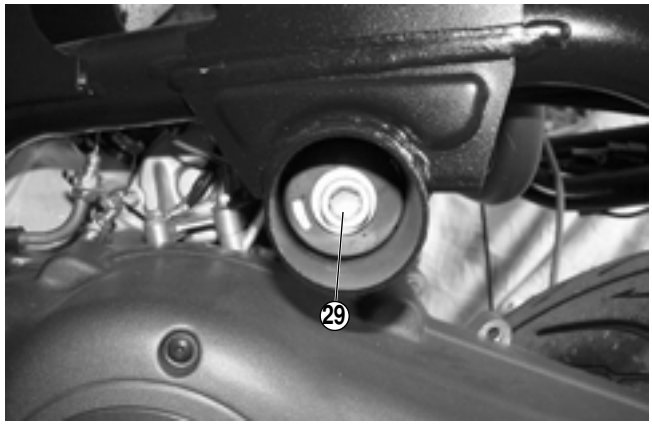
"**A**" arrange for suitable supports to be placed under the engine for the next positioning, after the frame removal.
"**B**" unscrew and remove pin (27) fixing the left rear suspension (28).
Keep the nut and the washer.

⚠ CAUTION

Since the engine is heavy, proceed with caution. In particular, mind the hands.

"**A**" carefully lean the engine on the floor.

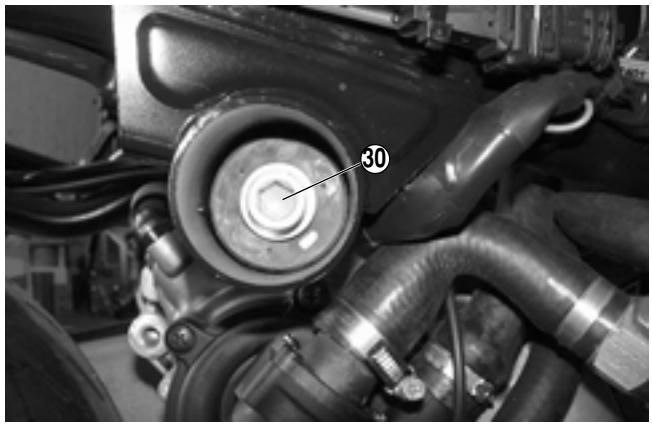
"**B**" unscrew and remove the left pin (29) fixing the engine to the frame. Keep the washer.
"**A**" hold the left side of the engine.



"**B**" unscrew and remove the right pin (30) fixing the engine to the frame. Keep the washer.

⚠ CAUTION

Proceed with caution.
In particular, mind the limbs and fingers.
Proceed with caution when lifting and moving the engine.



"**A**" and "**B**" Lean the engine assembly on the work bench.

⚠ CAUTION

Close the engine intake manifold in order to prevent dirt and foreign bodies from getting in.

4

Fuel System

FUEL TANK AND PUMP

EMS FUEL INJECTION SYSTEM

The fuel injection system used is of the integrated fuel injection and ignition type.
Fuel is injected indirectly into the manifold by means of the electroinjector.
Fuel injection and ignition are timed on a 4-stroke cycle via a phonic wheel keyed to the cam shaft control and a reluctance variation sensor.

Fuel supply and ignition are controlled in relation to the engine revolutions and the opening of the throttle control.
Further corrections are carried out on the basis of the following parameters:
- Coolant temperature
- Air intake temperature
- Environmental pressure

The system carries out a idling supply correction on a cold engine via a stepper motor inserted on to a by-pass circuit of the throttle valve. The control unit controls the stepper motor and the timing of the injector opening, thus guaranteeing idling stability and correct fuel supply.

Under all working conditions, fuel supply is controlled by modifying the injector opening time.
Petrol supply pressure is kept constant on the basis of environmental pressure.

The **supply circuit** is composed of:
- Fuel pump
- Fuel filter
- Injector
- Pressure regulator

The pump, filter and regulator are inserted into the fuel tank via a single support.
The injector is connected by means of two snap-connector tubes. This allows continuous circulation and avoids the risk of fuel overheating. The pressure regulator is situated at the end of the circuit. The fuel pump is controlled by the EMS control unit; thus guaranteeing vehicle safety.

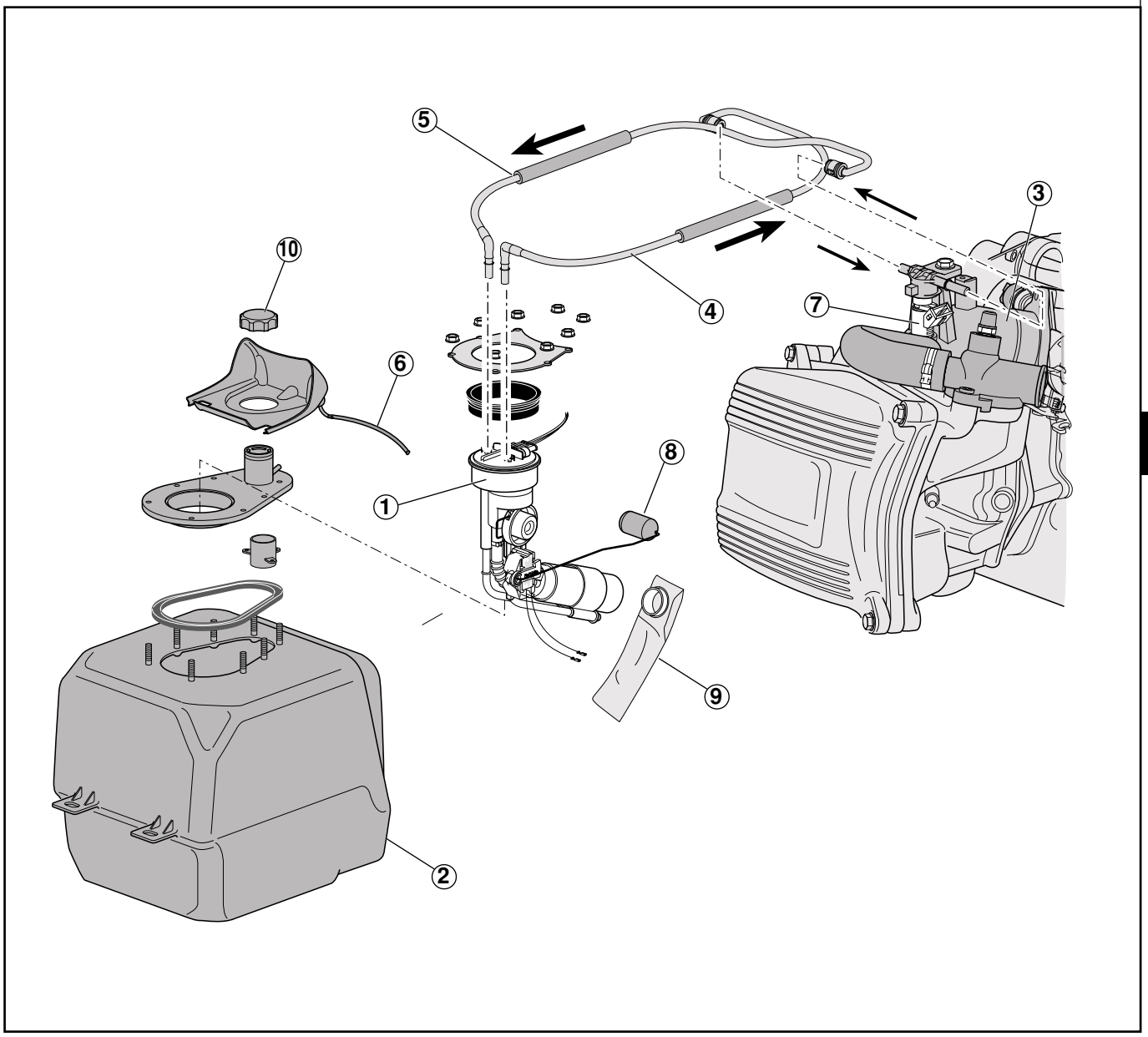
The **ignition circuit** is composed of:
- H.V. coil
- H.V. cable
- Shielded cap
- EMS control unit
- Spark plug

The EMS control unit controls ignition with optimum advance, at the same time guaranteeing 4-stroke cycle timing (ignition only during compression phase).

The EMS fuel injection-ignition system controls the working of the engine by means of a preset programme.
Should certain entry signals fail, an acceptable working of the engine is still guaranteed in order that the user may reach a repairs centre.

Obviously, this will not happen if the revolutions signal fails, nor if there is an anomaly in the control circuit:
- Fuel pump
- H.V. Coil
- Injector

FUEL SUPPLY SYSTEM



KEY TO FUEL SUPPLY SYSTEM

1) Fuel pump
2) Fuel tank
3) Intake manifold
4) Fuel supply pipe (DELIVERY)
5) Fuel supply pipe (RETURN)
6) Excess fuel drain pipe
7) Injector
8) Fuel level float
9) Fuel pump filter
10) Fuel supply cap

MAINTENANCE

Check the condition of the fuel feed pipes every 6,000 km (3,750 mi) or 8 months.
Any pipes showing signs of desiccation, cracks or cuts must be replaced.
Ensure that the pipes are not twisted or choked.

FUEL SUPPLY CHECK

Read through paragraphs (PRECAUTIONS AND GENERAL INFORMATION) and (FUEL).

⚠ CAUTION

Fuel fumes are a health hazard.
Before proceeding, ensure that the working area is suitably aerated. Do not inhale fuel fumes.
Avoid contact of fuel with the skin.
Do not smoke or use open flames.
Do not dispose of fuel in the environment.

Put the vehicle on the central stand.
Ensure that the tank contains fuel.
Remove the central tunnel, see (REMOVAL OF CENTRAL TUNNEL).
To one side of the vehicle, place a container with an approx. 1 ℓ capacity (0.264 gal) to collect the fuel.

⚠ CAUTION

Work with caution. Be ready to collect the fuel that exits from the fuel supply pipe (RETURN) .

Disconnect the fuel supply pipe (RETURN) from the fuel pump (5) (see SUPPLY SYSTEM diagram).
Place the free end of the pipe in the container.
Set the ignition switch to "○" .
Without throttle, allow the starter motor to work for a few seconds and at the same time check that the fuel flows out of the pipe (4).

If the flow is discontinuous or inexistent, verify the integrity and efficiency of the following components:

⚠ CAUTION

DO NOT INVERT THE PIPES DURING REASSEMBLY.
Mark the pipes and their attachments in order to reassemble them correctly.

Check that the pipes ARE NOT twisted and are not choked or obstructed.

To carry out checks follow instructions in WORKSHOP MANUALS n°1063 (I), n°1064 (E), n°1065 (F), n°1066 (D), n°1067 (UK) and n°1068 (USA).

FUEL PUMP REMOVAL/DISMANTLING

Read through the paragraphs (PRECAUTIONS AND GENERAL INFORMATION) and (FUEL).

PUMP ASSEMBLY REMOVAL

⚠ CAUTION

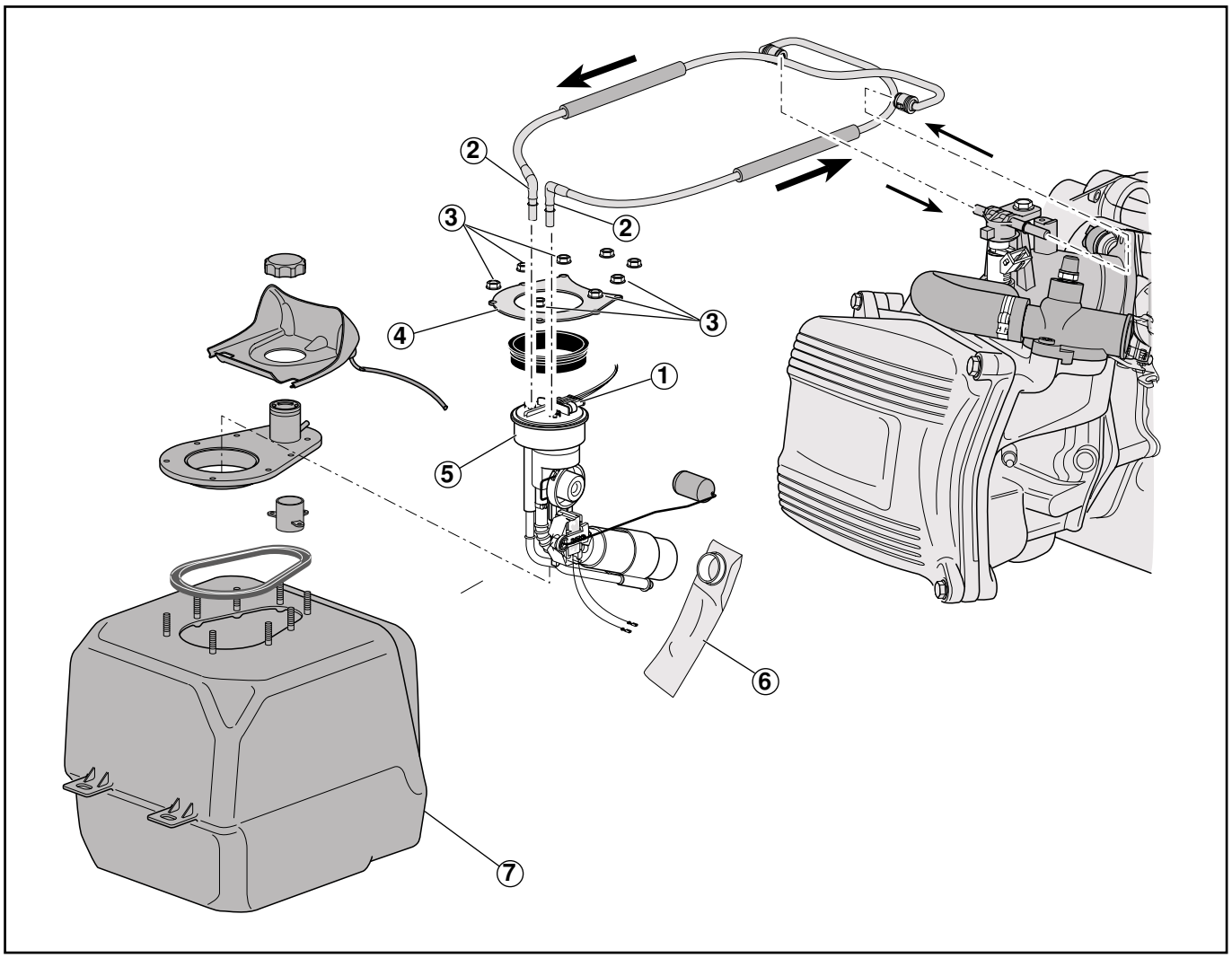
Fuel fumes are a health hazard.
Before proceeding, ensure that the working area is suitably aerated. Do not inhale fuel fumes.
Avoid contact of fuel with the skin.
Do not smoke or use open flames.
Do not dispose of fuel in the environment.

Remove the central tunnel, see (REMOVAL OF CENTRAL TUNNEL).
Disconnect the electrical control connection (1) from the fuel pump.
Disconnect the fuel supply pipes (2) from the pump casing.
Unscrew and remove the six nuts (3).
Remove the fuel pump fixing clamp (4).

⚠ CAUTION

Work with caution during removal of the fuel pump (5) to avoid damage to the fuel pre-filter (6).

Remove the fuel pump (5) from the tank (7).

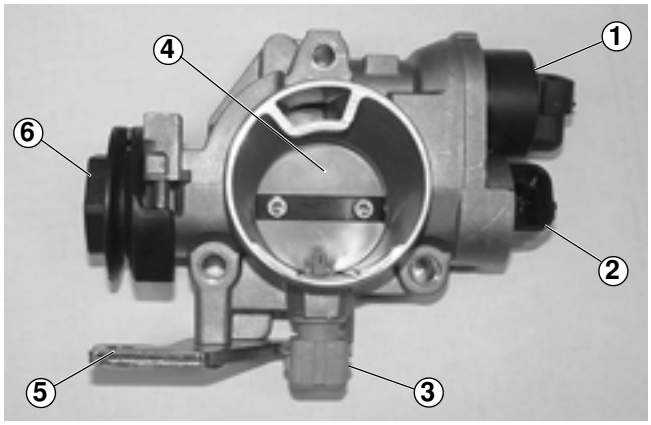


FUEL PUMP AND FUEL LEVEL FEELER DISASSEMBLY AND CHECKING

For dismantling of the components refer to WORKSHOP MANUALS n°1063 (I), n°1064 (E), n°1065 (F), n°1066 (D), n°1067 (UK) and n°1068 (USA).

THROTTLE BODY

1) Stepper motor
2) Valve position sensor
3) Air temperature sensor
4) Valve
5) Valve opening control cables support plate
6) Valve opening/closure wiring control guide

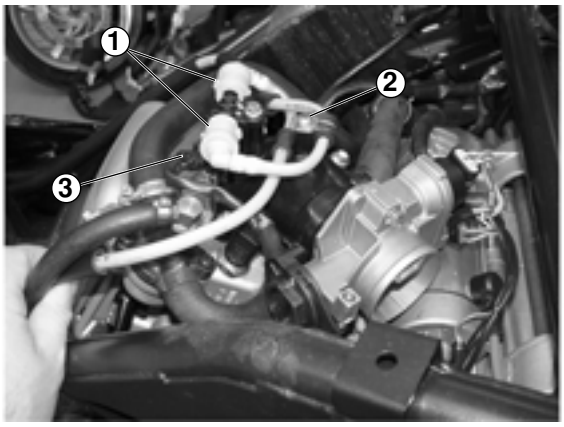


THROTTLE BODY REMOVAL

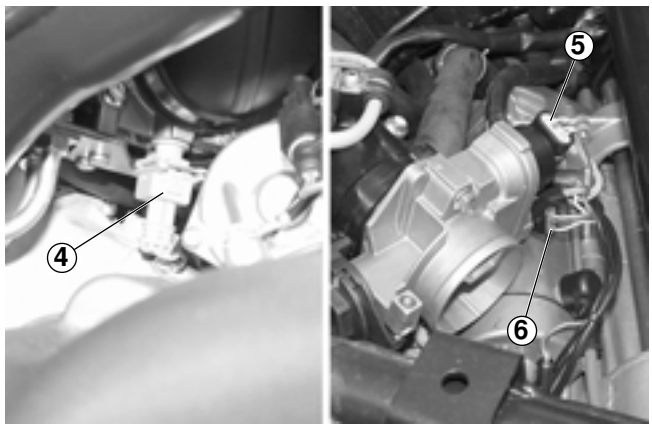
Read through the paragraphs (PRECAUTIONS AND GENERAL INFORMATION) and (FUEL).

Remove the air filter box, see (AIR FILTER).

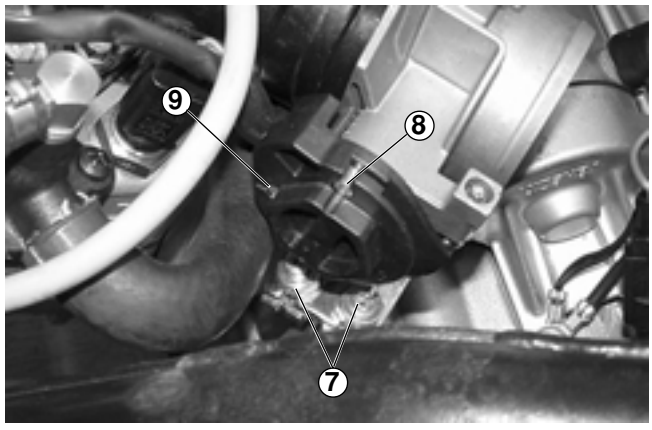
Disconnect the delivery and return fuel supply pipes (1) to the injector.
Unscrew and remove the fixing screw (2) of the fuel pipe clamps.
Disconnect the electrical connection (3) of the injector control.



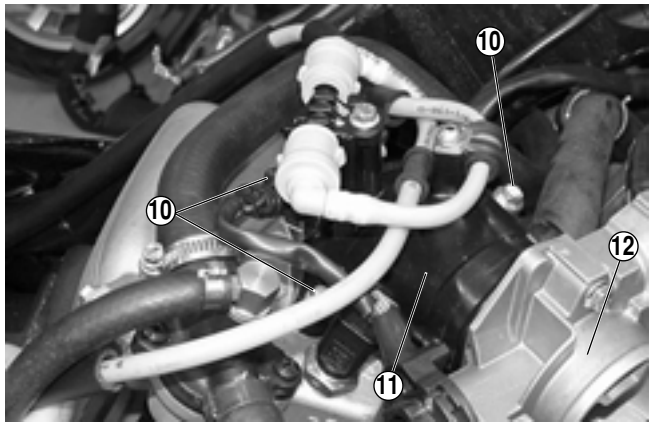
Disconnect the electrical connection (4) of the air temperature sensor.
Disconnect the electrical connection (5) of the stepper motor.
Disconnect the electrical connection (6) of the valve position sensor.



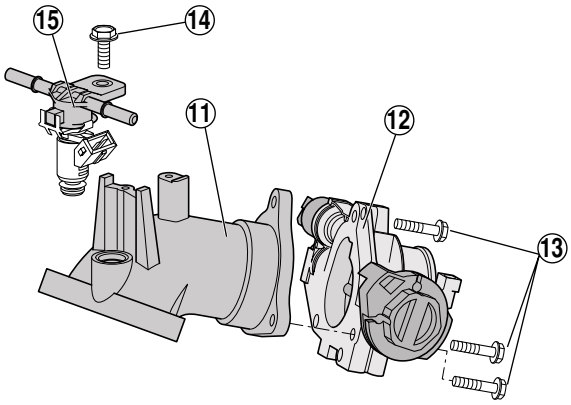
Loosen the two nuts (7) that fix the cable runners to the fuel supply support.
Pull out the cable runner and its related delivery barrel (8) of the carburettor control.
Pull out the cable runner and its related return barrel (9) of the carburettor control.



Unscrew and remove the three screws (10) fixing the intake manifold (11) to the head.
Remove the intake manifold (11) including the throttle body (12).



Unscrew and remove the three screws (13) fixing the throttle body (12) to the intake manifold (11).
Separate the throttle body (12) from the intake manifold (11).
Remove the screw (14) fixing the injector (15) to the Intake manifold.
Remove the injector (15) from the intake manifold (11).



5

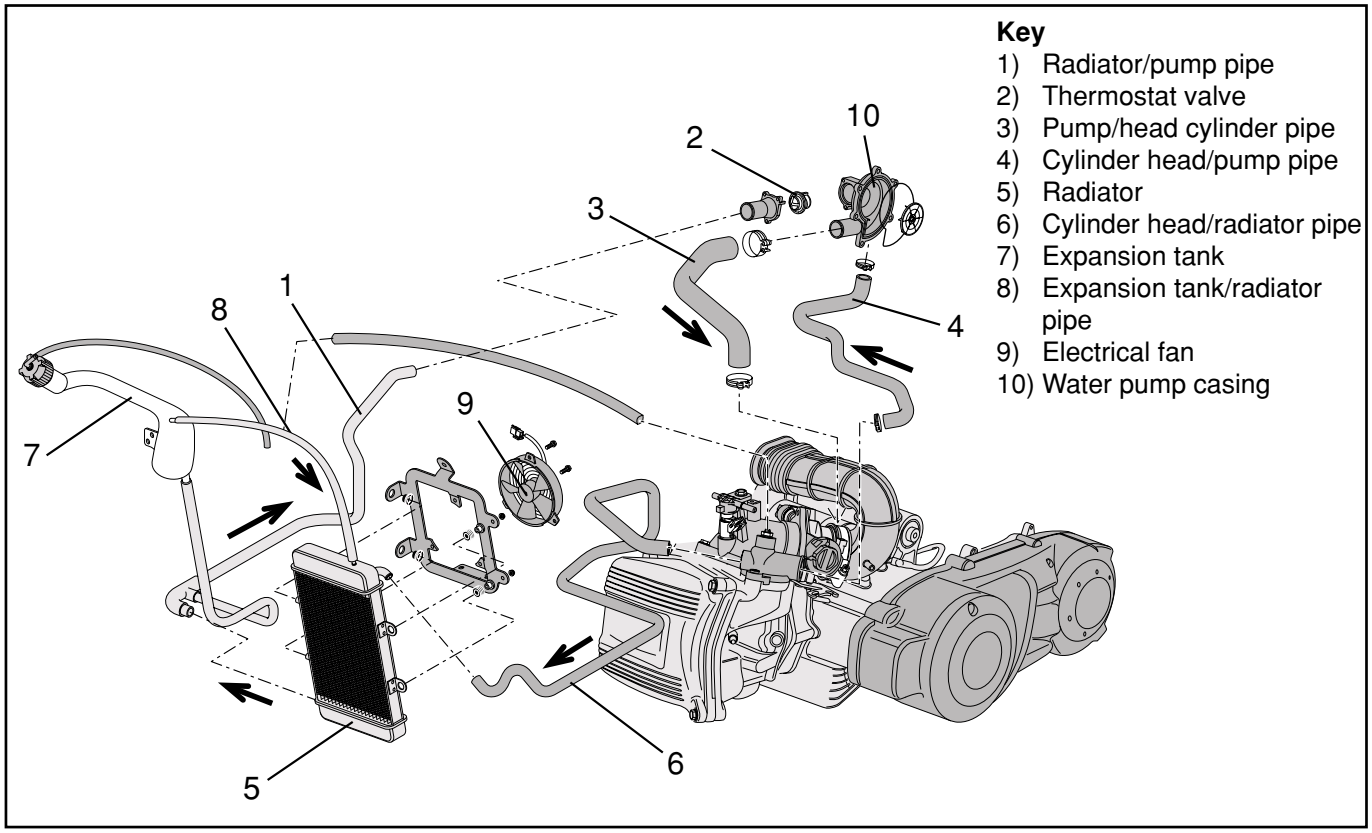
Cooling System

SYSTEM DESCRIPTION

The cooling system is constructed with a centrifugal pump coaxial to the countershaft and as such completes a number of revolutions identical to that of the driving shaft.
The pump has two ducts, one for entry and one for exit.
The exit duct supplies the cylinder and consequently the cylinder head; the entry duct leads from the cylinder head and its entrance to the pump is controlled by the thermostat plate.
The main stabilizer of the thermostat acts instead on the main pump entry duct leading from the radiator.
The radiator is fed from the cylinder head exit; the expansion tank is inserted parallel to the radiator with the ducts on two levels: the delivery high up (in the air) and the fluid return low down (in the fluid).
The system thus composed is 2-way.
The first way is the internal engine circulation and involves the pump, cylinder and cylinder head; this circulation is fully active when the thermostat is fully closed.
The second way is active with the thermostat fully open and is the main circulation which involves the pump, cylinder, cylinder head, radiator and expansion tank; for medium openings of the thermostat, however, the two circuits are both partially inserted, therefore the two ways are superimposed.
This kind of circuit is defined as the type with inlet thermostat. The thermostat is crossed by an inverted flow, that is with cold water which tends to lower the temperature of the wax cell.
This system allows optimization of the engine heating phases.
The expansion tank, parallel to the radiator and inserted on the main circuit, guarantees autodraining when working.
For the filling stages of the system there is a drain exiting from the cylinder head (see filling rules).
The electrical fan is controlled by the fuel injection system with temperature measured on the cylinder head of the engine.

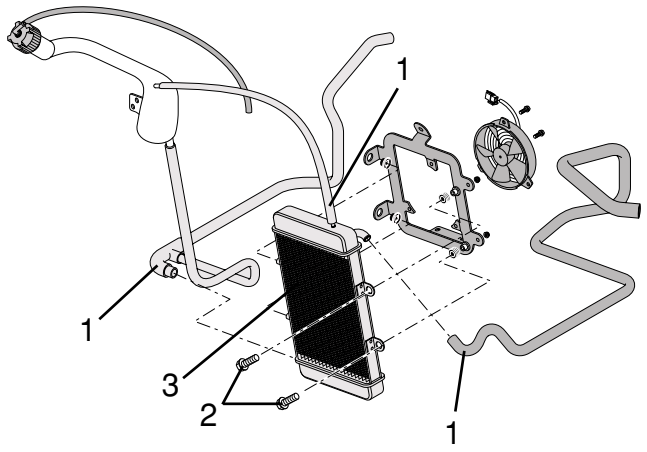
COOLANT

For information concerning the coolant see (COOLANT); (CHECKING AND TOPPING UP OF THE COOLANT) and (REPLACING COOLANT) in the related WORKSHOP MANUALS n°1063 (I), n°1064 (E), n°1065 (F), n°1066 (D), n°1067 (UK) and n°1068 (USA).



Key
1) Radiator/pump pipe
2) Thermostat valve
3) Pump/head cylinder pipe
4) Cylinder head/pump pipe
5) Radiator
6) Cylinder head/radiator pipe
7) Expansion tank
8) Expansion tank/radiator pipe
9) Electrical fan
10) Water pump casing

RADIATOR REMOVAL



Read through the paragraphs (COOLANT) and (PRECAUTIONS AND GENERAL INFORMATION).

Drain the coolant completely, see (REPLACING COOLANT), in the WORKSHOP MANUALS n°1063 (I), n°1064 (E), n°1065 (F), n°1066 (D), n°1067 (UK) and n°1068 (USA).

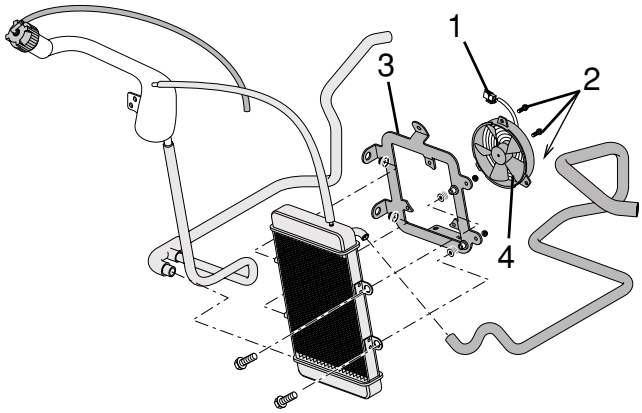
Remove the legshields, see (LEG SHIELDS REMOVAL).
Remove the front splash guard, see (SPLASH GUARDS REMOVAL).
Remove the thermo-reflecting material.
Disconnect the three pipes (1) on the radiator.
Unscrew and remove the two fixing screws (2) of the radiator.

⚠ CAUTION

Work with caution. Do not damage the radiator cooling fins.

Remove the radiator (3) lightly turning it clockwise, and pull towards the left side of the vehicle.

ELECTRICAL COOLING FAN REMOVAL



Read through the paragraph (PRECAUTIONS AND GENERAL INFORMATION).

Remove the radiator, see (RADIATOR REMOVAL).
Disconnect the electrical fan connection (1).
Unscrew and remove the three screws (2) fixing the electrical fan to the support (3).
Remove the electrical fan (4).

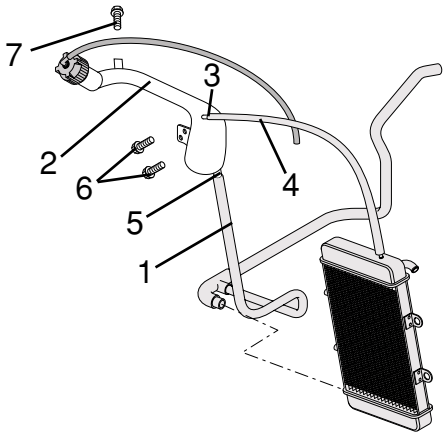
EXPANSION TANK REMOVAL

Read through paragraphs (COOLANT) and (PRECAUTIONS AND GENERAL INFORMATION).

Place the vehicle on its central stand.
Remove the front hood, see (FRONT HOOD REMOVAL).
Remove the legshields, see (LEGSHIELDS REMOVAL).
Remove the dash board, see (DASHBOARD REMOVAL).

⚠ CAUTION

DO NOT DISPOSE OF COOLANT IN THE ENVIRONMENT.
On removing the hose (1) any coolant present will exit from the expansion tank (2).
Be ready with a container with capacity of approx. 1 litre to collect the liquid on exit.
Place an absorbent cloth under the expansion tank to collect any coolant that may be dispersed.



NOTE Keep a supply of hose clamps to replace the originals (of a special kind without screws).

Remove the clamp (3). Replace with a new one during reassembly.
Pull the hose (4) out from the expansion tank attachment.
Remove the clamp (5). Replace with a new one during reassembly.
Pull out the hose (1) from the expansion tank attachment.
Quickly place the container under the expansion tank to collect the coolant.

⚠ CAUTION

Coolant is hazardous to health.
Keep the container in a safe place.
DO NOT LEAVE WITHIN REACH OF CHILDRENI

Unscrew and remove the two screws (6) and screw (7).
Remove the expansion tank.

THERMOSTAT VALVE

For information concerning the thermostat valve, see WORKSHOP MANUALS n°1063 (I), n°1064 (E), n°1065 (F), n°1066 (D), n°1067 (UK) and n°1068 (USA).

COOLANT PUMP

For information concerning the coolant pump, see WORKSHOP MANUALS n°1063 (I), n°1064 (E), n°1065 (F), n°1066 (D), n°1067 (UK) and n°1068 (USA).

COOLANT THERMISTOR

For information concerning the coolant thermistor, see WORKSHOP MANUALS n°1063 (I), n°1064 (E), n°1065 (F), n°1066 (D), n°1067 (UK) and n°1068 (USA).

6

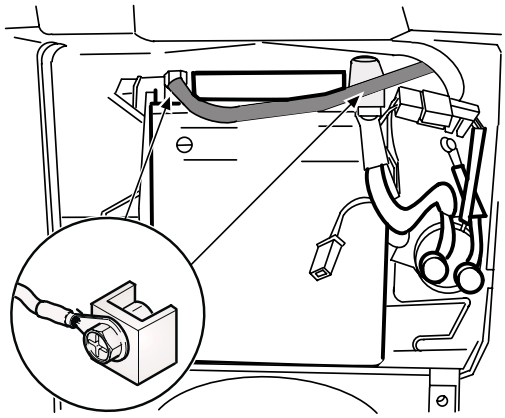
Electrical Equipment

CHECKING THE RECHARGING SYSTEM

The following key will help the reader to consult this section.

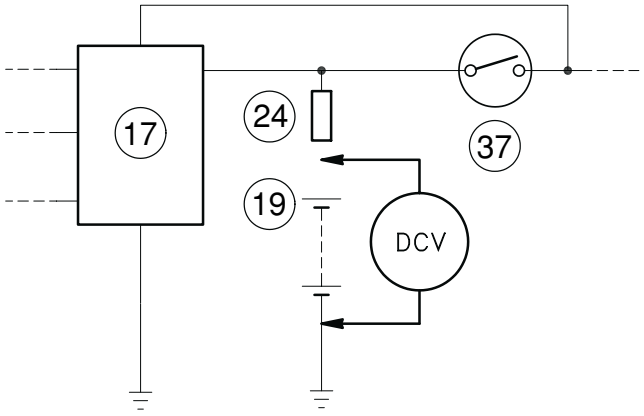
CABLE COLOURS

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



CHECKING THE RECHARGING VOLTAGE

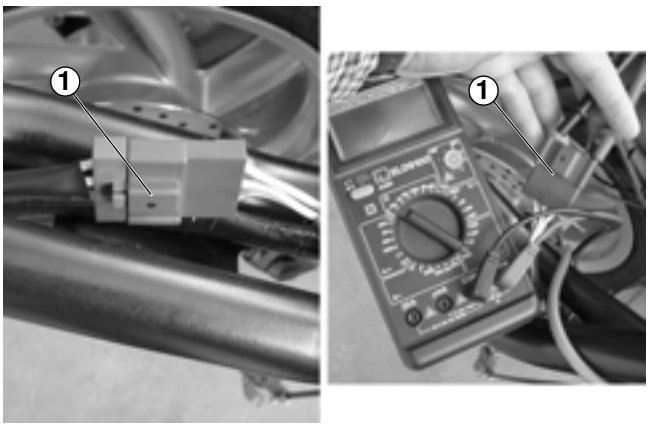
- Check the electrolyte level (CHECKING THE ELECTROLYTE LEVEL).
- Check the battery voltage (RECHARGING THE BATTERY).
- Start the engine and rev it up to 5000 rpm (throttle twist grip rotated by approximately 1/4 of its travel).
- Set the lights switch in the "☼" position and the lights selector switch in the "≡D" position.
- Using a pocket multimeter, measure the direct voltage between the positive (+) and negative (-) terminals of the battery.
- If the multimeter reads voltages of less than 13 V or more than 15 V:
- check the no-load operation and continuity of the alternator (CHECKING THE ALTERNATOR NO-LOAD OPERATION) and (CHECKING THE ALTERNATOR CONTINUITY) and the voltage regulator (VOLTAGE REGULATOR).



Key to second figure

17) Voltage regulator
19) Battery
37) Ignition switch (right switch)
24) Main fuse

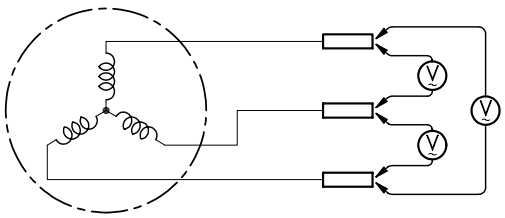
Standard charging voltage: 13 - 15 V (c.c.) at 5000 rpm.



CHECKING THE ALTERNATOR NO-LOAD OPERATION

- Remove the right side panel, see (REMOVAL OF THE SIDE PANELS).
- Detach regulator wiring connector (1).
- Start the engine and rev it up to 5000 rpm (throttle twist grip rotated by approximately 1/4 of its travel).
- Using a pocket multimeter, alternately measure the a.c. voltage between the three yellow wires (G). If the multimeter readings are less than 50 V, the alternator is faulty.

Standard no-load voltage: more than 50 V (a.c.) at 5000 rpm.

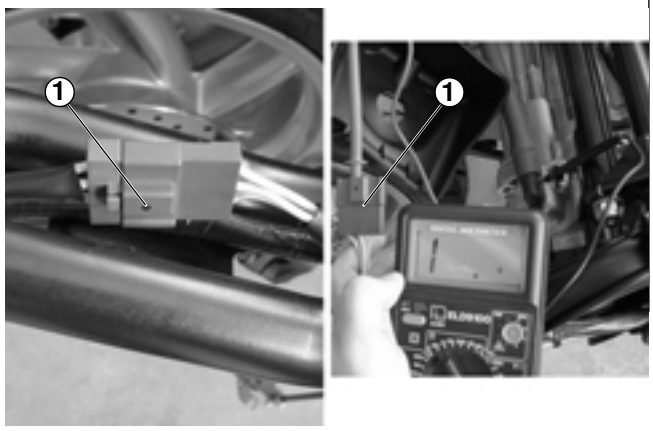


CHECKING THE ALTERNATOR CONTINUITY
With motor off:

- Remove the right side panel, see (SIDE PANELS REMOVAL).
- Detach regulator wiring connector (1).
- Using a pocket multimeter, check continuity between stator yellow wires (G).
- Also check the insulation of the stator support.

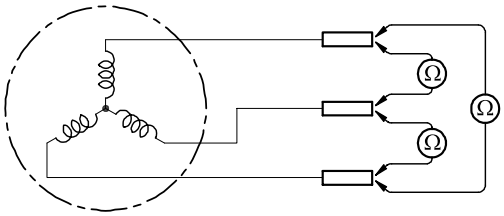
Standard resistance: 0.1 - 1 Ω

Standard resistance between stator support and wiring: ∞ (infinite resistance)

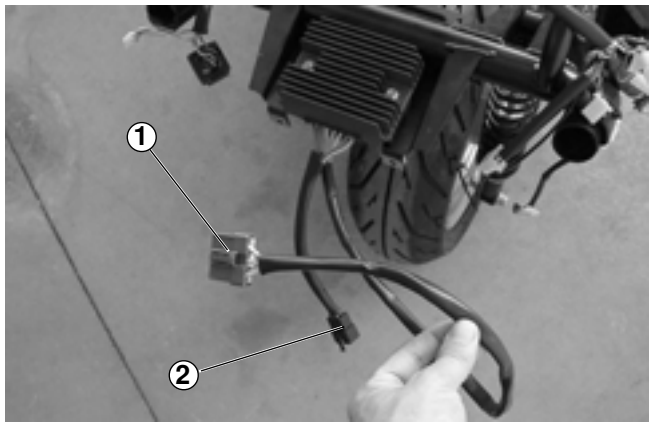


VOLTAGE REGULATOR

- Remove the tail panel, see (TAIL PANEL REMOVAL).
- Remove the right side panel, see (SIDE PANELS REMOVAL).
- Disconnect the connectors (1) and (2).
- Using a pocket multimeter (1 kΩ scale) on the regulator side, measure the resistance between the wires shown in the table below.
- If the measured resistance is not as specified, replace the regulator.

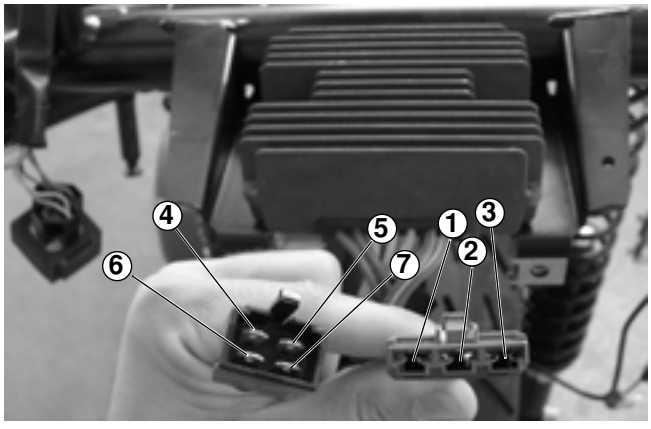


Multimeter negative (-) terminal on:	Multimeter positive (+) terminal on:							
		1	2	3	4	5	6	7
	1		∞	∞	∞	∞	∞	∞
	2	∞		∞	∞	∞	∞	∞
	3	∞	∞		∞	∞	∞	∞
	4	∞	∞	∞		∞	0	∞
	5	∞	∞	∞	∞		∞	0
	6	∞	∞	∞	0	∞		∞
	7	∞	∞	∞	∞	0	∞	

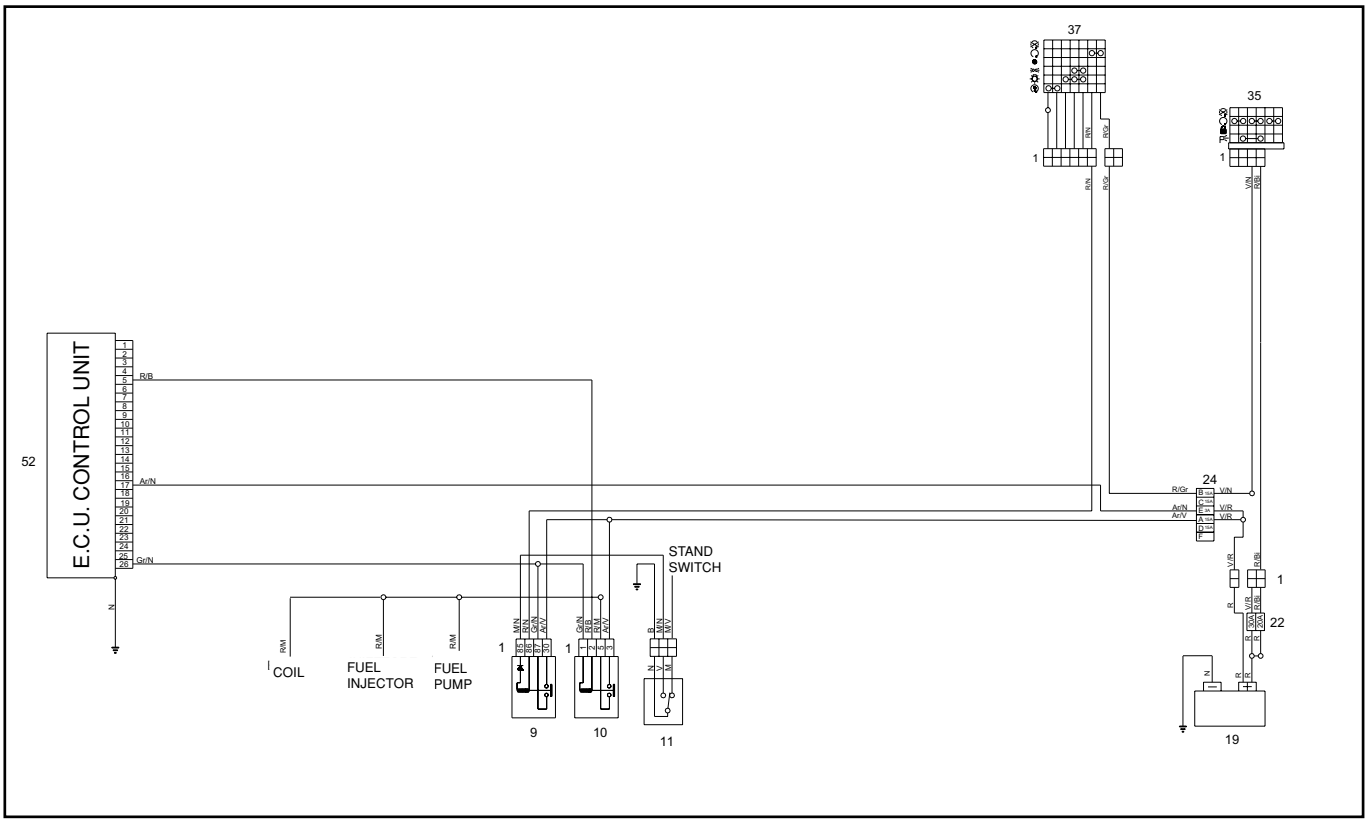


⚠ CAUTION

This is a rough measuring method. If possible, verify the recharging process by using another regulator which has been checked to be in working order

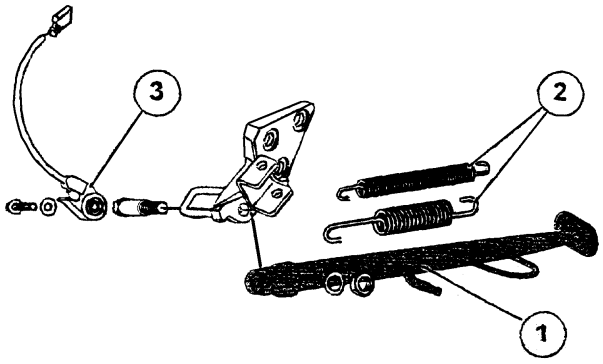


FUEL INJECTION SYSTEM
INJECTION SUPPLY WIRE DIAGRAM



Key to wire diagram
9) Main injection relay
10) Secondary injection relay
11) Side stand switch
19) Battery
35) Key switch
37) Right switch
52) E.C.U. Control unit

STAND SWITCH CONTROL
Rotation of the side stand (1) must be free from obstruction.



Carry out the following checks:

- The springs (2) must not be damaged, worn, rusty or weakened.
- The stand must turn freely, by greasing the joint if necessary, see (TABLE OF LUBRICANTS).

On the side stand (1) there is a safety switch (3) with the role of preventing or interrupting engine running with the side stand (1) lowered.

To check that the safety switch is working (3):

- Sit on the saddle in driving position.
- Raise the side stand (1).
- Start the engine.
- With the throttle twistgrip released and the motor idling, lower the side stand (1) which should activate the safety switch (3).

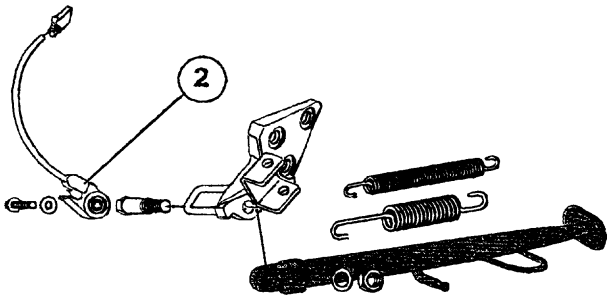
At this point:
- the engine should stop;
- on the dashboard the side stand lowered indicator "(1)" should light up.

If this does not happen, replace the switch (3).

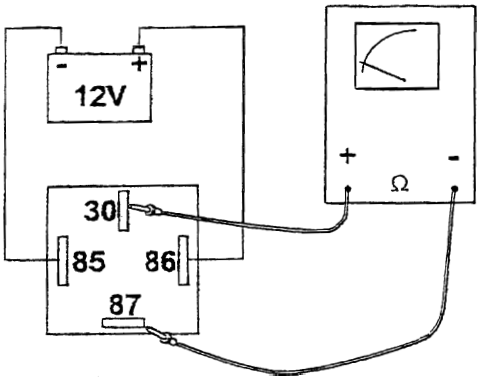
6

STAND SWITCH

Position	Cables		
	N	V	N
Lowered	○		○
Raised		○	○



INJECTION RELAY CONTROLS



To verify that the relay is working:

- Remove the seat, see (REMOVING THE SEAT).
- Supply a 12 V tension to the two male terminals (85-86).
- With a multimeter (in ohm meter mode) verify the continuity between the other two terminals (87-30).

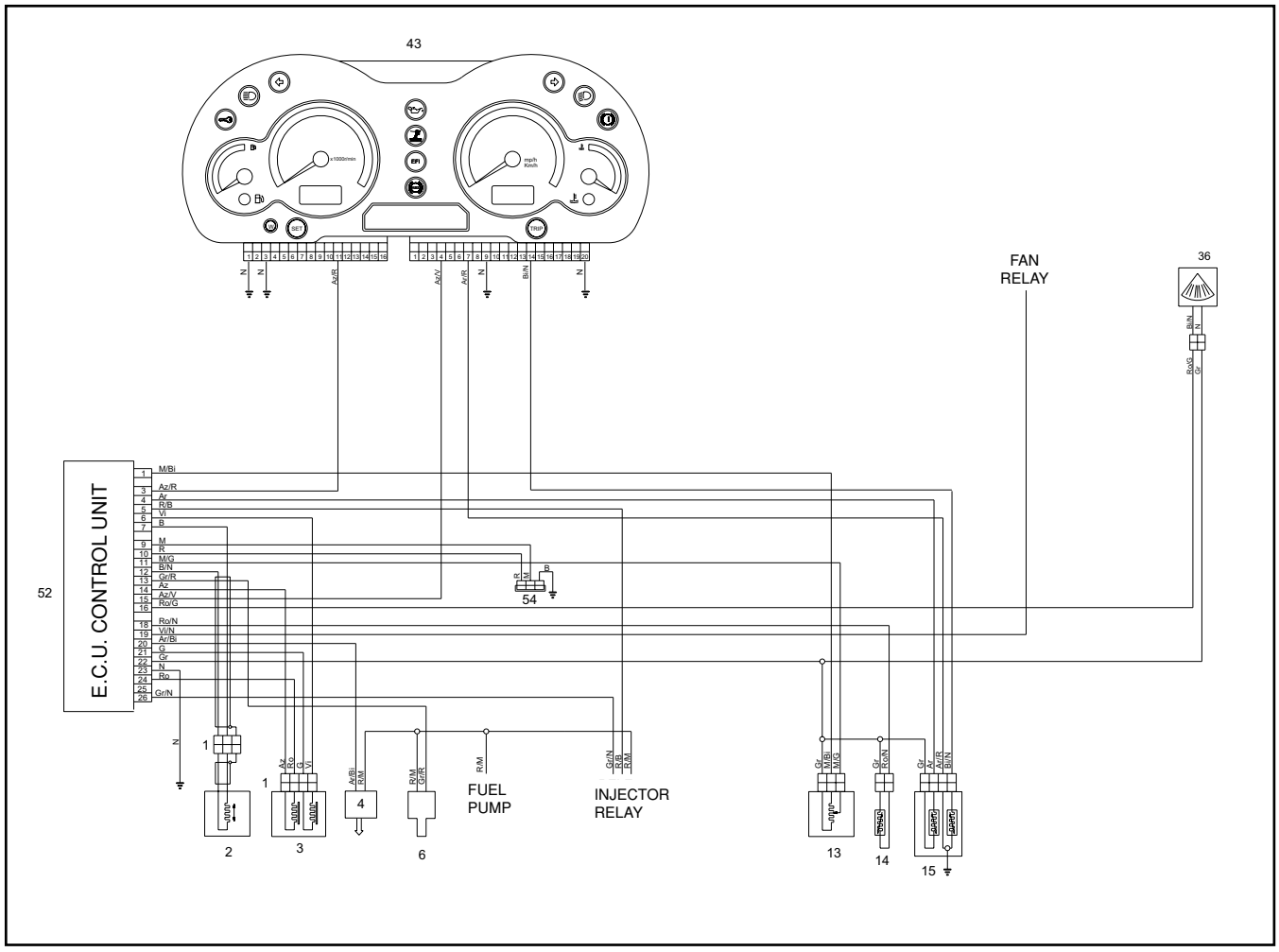
Correct value with supply to the relay: 0 Ω
Correct value without supply to the relay: ∞ Ω

If the resulting values do not correspond to those prescribed, replace the relay concerned.

⚠ CAUTION

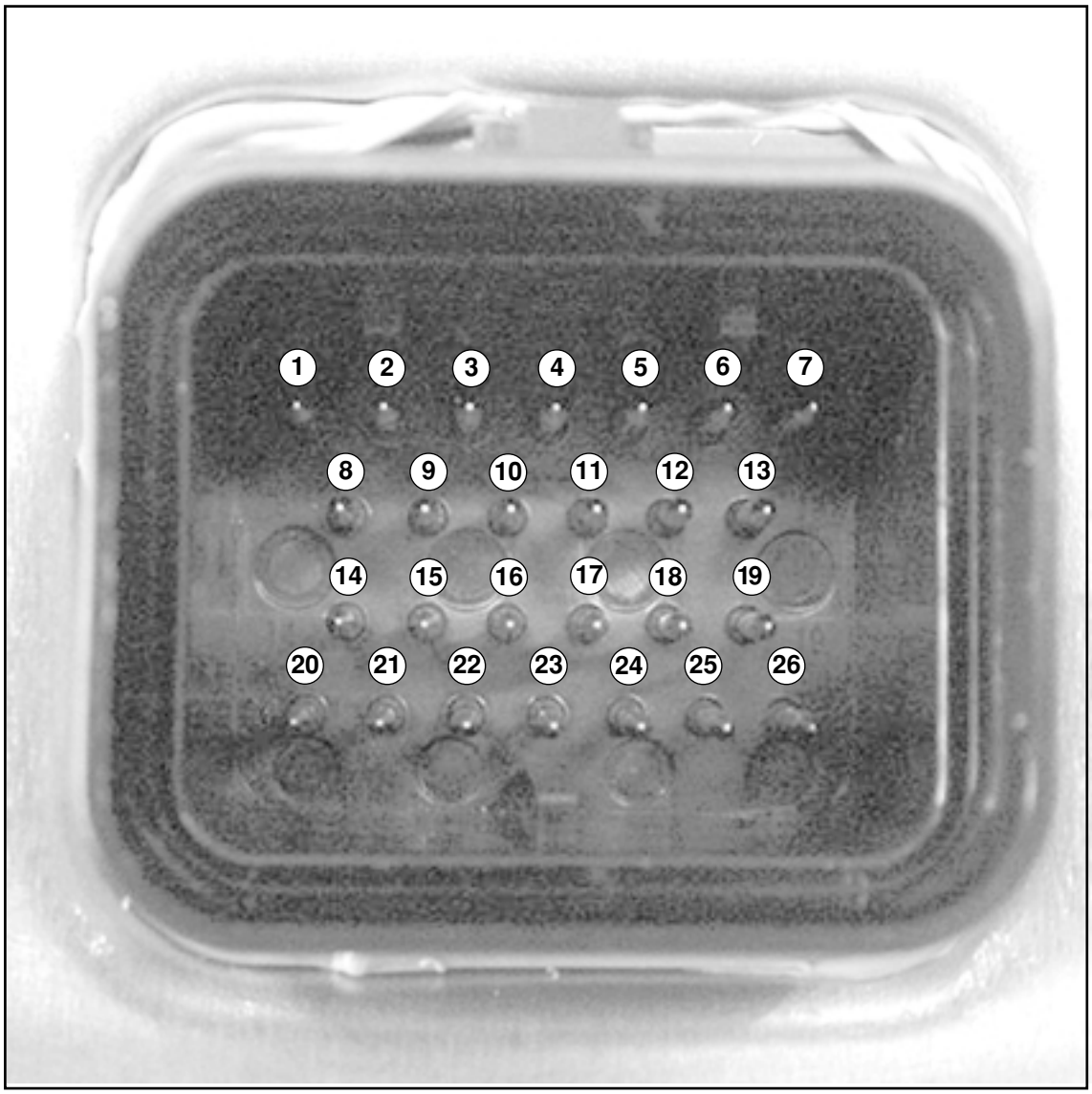
For the main injection relay only:
Observe the polarity supplying terminal (86) with the "+" and terminal (85) with the "-", as in the interior there is a diode.

IGNITION/INJECTION SYSTEM
E.C.U. CONNECTIONS



Key to wire diagram

2) Revolutions sensor
3) Stepper motor
4) Coil
6) Fuel injector
13) Accelerator sensor
14) Engine air thermistor
15) Dashboard/engine water thermistor
36) Drop sensor
43) Dashboard
52) E.C.U.Control unit



⚠ CAUTION

Since inside the C.D.I. control unit there are diodes, condensers and other electrical components, the measuring method described is approximate.
Further checking is recommended by replacing the control unit with another pre-checked to ensure it is in working order, or carry out the checks described in the chapter (ELECTRICAL SYSTEM CONTROL USING A C.D.I. CONTROL UNIT CONNECTOR).

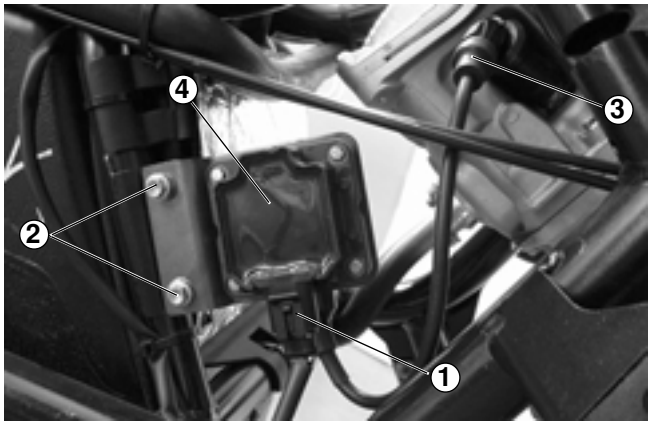
CONNECTIONS TO THE E.C.U. CONTROL UNIT

COMPONENT	TERMINALS	NOMINAL VALUE	CABLE COLOUR
RPM sensor	7 - 12	680 Ω	B - B/N
Stepper Motor	14 - 24	52 Ω	Az - Ro
Stepper Motor	6 - 21	52 Ω	Vi - G
Accelerator sensor	1 - 22	5 kΩ	M/Bi - Gr
Accelerator sensor	1 - 11	1 - 6 kΩ	M/Bi - M/G
Air injection terminals	18 - 22	see tab.	Ro/N - Gr
Water injection terminals	4 - 22	see tab.	Ar - Gr
Drop sensor	16 -22	62 kΩ *	Ro/G - Gr
Coil	20	0.6 Ω	Ar/Bi - R/M
Injector	13	14.5 Ω	Gr/R - R/M

* With drop sensor in upright position.

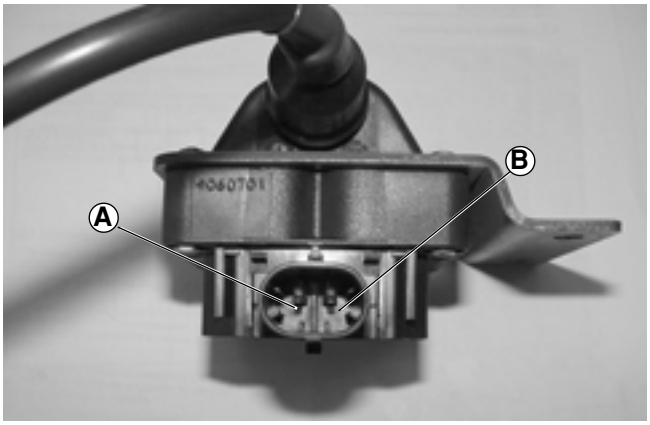
CHECKING THE HV COIL

- Remove the left inspection cover, see (REMOVING THE RIGHT AND LEFT INSPECTION COVERS).
- Disconnect terminal (1).
- Unscrew and remove the two screws (2).
- Disconnect the spark plug (3).
- Remove the coil (4).



- With a pocket multimeter (scale 200 Ω), measure the resistance (from the coil side) between the terminals (A e B) indicated in the diagram.
- If the resistance measured is not correct, replace the coil.

Standard value: 0.6 Ω ± 0.1 Ω



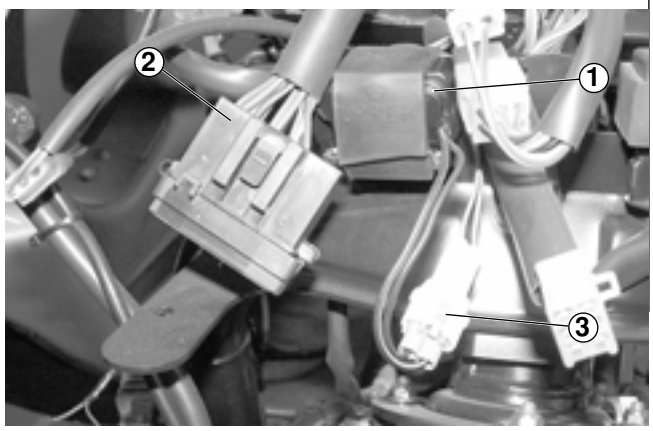
- Also verify the resistance between the high voltage terminal and the casing of the coil.

Standard value: 7.4 kΩ

⚠ CAUTION

Before measuring, remove the H.V. cable complete with the spark plug cap.

DROP SENSOR CHECK



With motor off:

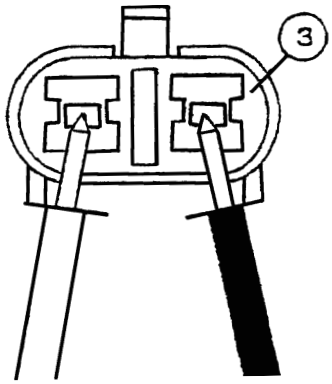
- Remove the front hood, see (REMOVING THE FRONT HOOD).

Check that the sensor (1) is mounted correctly (with the arrow imprinted on the rubber pointing upwards).

- Partially remove the fuse carriers (2).
- Disconnect the two-way connector (3)(white/grey) and take measurements (on terminals sensor side).

⚠ CAUTION

During reassembly ensure correct coupling of the electrical connector (3).



- With a multimeter (scale x 100 kΩ), measure the resistance between the black and white/black cable terminals (N -Bi/N).

Standard value: resistance 62 kΩ ± 15%

- Remove the sensor (1) with the rubber washer in its housing, and lean it sideways to an angle of more than 45° (simulating the parking position).

Standard value: 0 - 1 Ω

If the resistance is different from that prescribed, the sensor (1) must be replaced.

- Repeat the operations leaning the sensor towards the opposite side.

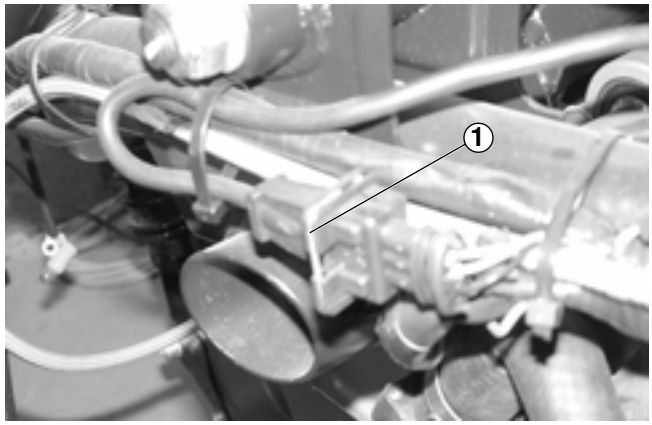
RPM SENSOR CHECK

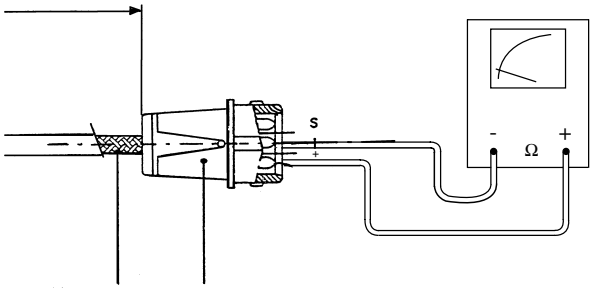
With motor off:

- Disconnect the three-way connector (1) and take measurements.
- With a multimeter (scale x 100 Ω) measure the resistance between the sensor terminals, observing polarity (see diagram).

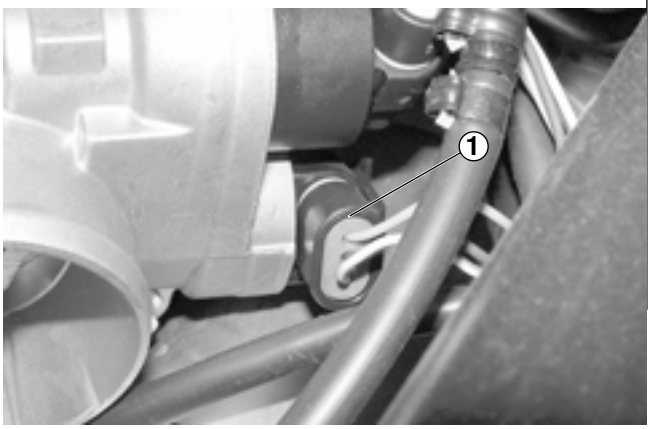
Standard value: 680 Ω ± 10%

- If the resistance is infinite or different from the prescribed value, the sensor must be replaced.





THROTTLE VALVE POTENTIOMETER (ACCELERATOR SENSOR) CHECK



With motor off:

- Disconnect the three-way connector (black) (1).

⚠ CAUTION

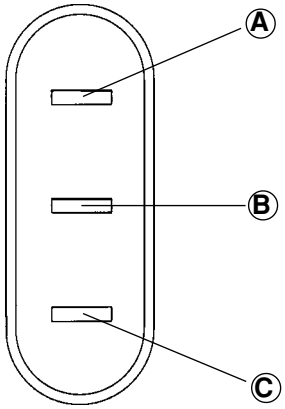
During reassembly ensure correct coupling of the electrical connector (1).

- Set the ignition switch to "⊗".
- With a multimeter (scale kΩ), measure the resistance between the potentiometer terminals.

MEASUREMENT (A)

Resistance between the two terminals A and B, in any position of the throttle valves:

Standard value: 5 kΩ ± 10%



MEASUREMENT (B)

Resistance between the terminals A and C:

From the value of the throttle completely closed, accelerating progressively up to completely open, the resistance will vary as follows:

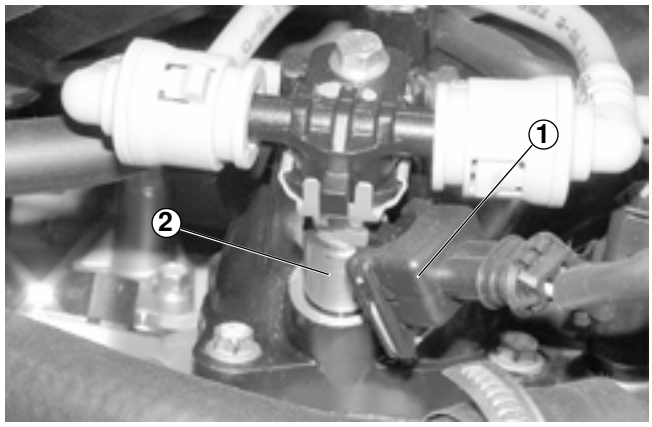
Standard value: from 1 kΩ to 6 kΩ ± 10%

NOTE To unscrew the two screws more easily, block with LOCTITE®243, preheat with a blow of hot air.

- Unscrew and remove the screws.
- Remove the potentiometer.

If the resistance values are different from those prescribed, replace the potentiometer.

INJECTOR CHECK



With motor off:

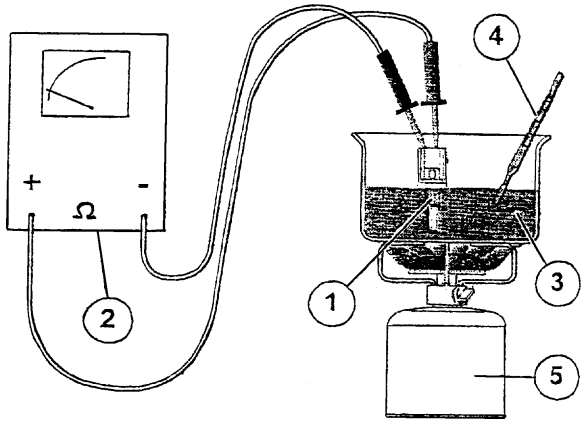
- Disconnect the two-way connector (1) (black) and take measurements (on the terminals on the injector side).
- With a multimeter (scale x 100 Ω), measure the resistance between the injector terminals.

Standard value: 14.5 ± 10% Ω to 25°C

If the resistance is infinite (∞) or less than the prescribed value, the injector (2) must be replaced.

COOLANT THERMISTOR FUNCTION CHECK

- Remove the thermistor (1), see (COOLANT THERMISTOR REMOVAL).
- Connect a multimeter (2) (set in ohm metre mode) as illustrated in the diagram, to the thermistor (1).
- Immerse the thermistor (1) in a container (3) containing coolant.
- In the same container immerse a thermometer (4) with 0 -150 °C gauge (32 -302 °F).
- Place the container on a hotplate (5) and slowly heat the liquid.
- Check the temperature indicated on the thermometer (4) and the value of the thermistor (1) indicated on the multimeter.

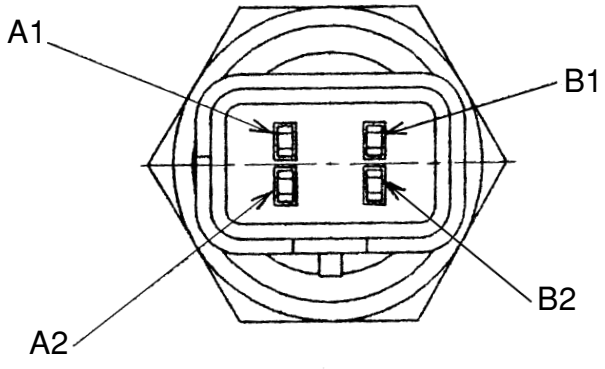


Verify that the values vary in relation to the temperature as indicated.

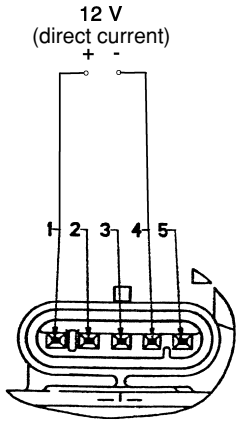
NOTE If the standard values do not change as the temperature changes**,** or change too much from those given in the table, replace the thermistor (1).

- Repeat these operations also for the other thermistor.

Temperature °C	A1 - A2 (Ω)	B1 - B2 (Ω)
60	557 ±10%	576 ±10%
90	196 ±10%	231 ±10%
120	80.6 ±10%	105 ±10%



FUEL PUMP CHECK

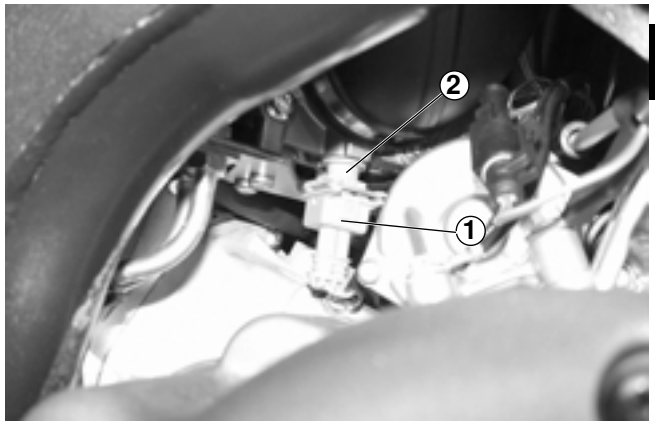


- Supply terminals 1 and 4 of the pump connector with a 12V tension (c.c.).
- Verify that the pump works, emitting the characteristic hum, and check on the manometer that the supply pressure reaches at least i 150 KPa (1.5 bar).

⚠ CAUTION

Observe the pump polarity.

AIR THERMISTOR FUNCTION CHECK



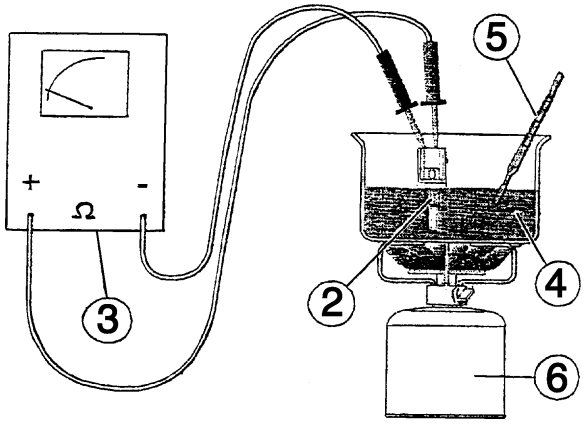
⚠ CAUTION

During reassembly ensure the correct coupling of the electrical connector (1).

- Remove the thermistor (2).
- Connect a multimeter (3) (set to ohm meter mode) al thermistor (2), as illustrated in the diagram.
- Immerse the thermistor in a container (4) containing water.
- In the same container immerse a thermometer (5) with 0 -150 °C gauge (32 -302 °F).
- Place the container on a hotplate (6) and slowly heat the liquid.
- Check the temperature indicated on the thermometer (5)and the value of the thermistor indicated on the multimeter.

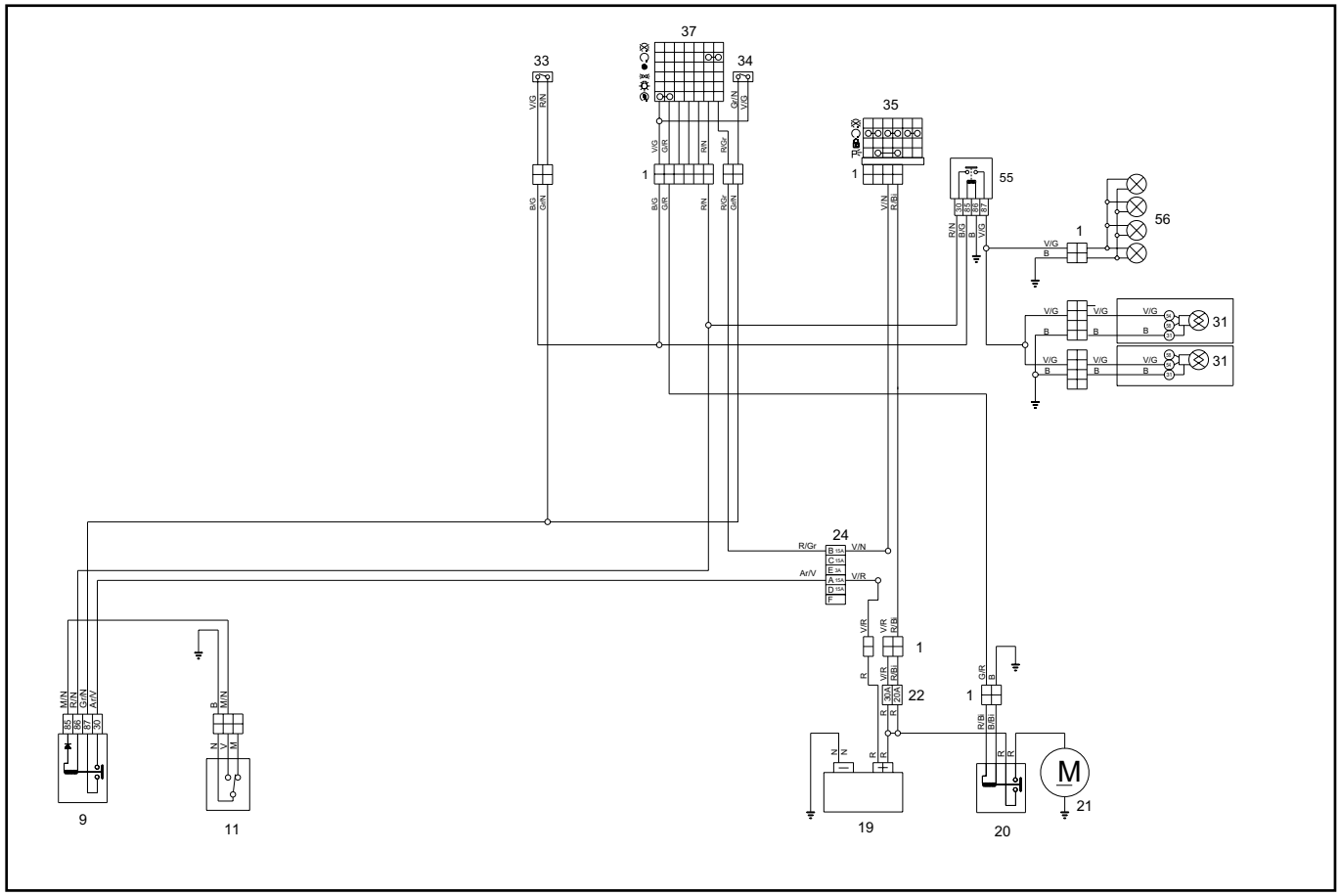
Verify that the values vary in relation to the temperature as indicated.

Temperature °C	Resistance Ω
0	9750
10	5970
20	3740
30	2410



NOTE If the values do not change as the temperature changes, or change too much from those given in the table, replace the thermistor (2).

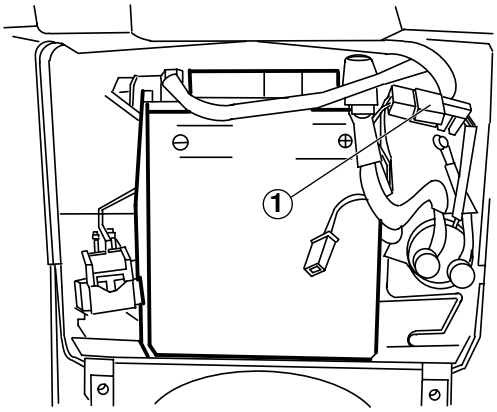
STARTING AND STOP LIGHTS SYSTEM



Key to wire diagram

9) Main injection relay
11) Side stand switch
19) Battery
20) Starting relay
21) Starting motor
24) Secondary fuses
33) Rear stop light switch
34) Front stop light switch
35) Key switch
37) Right switch
55) Stop lights relay
56) Third stop light bulbs

STARTING RELAY CHECK

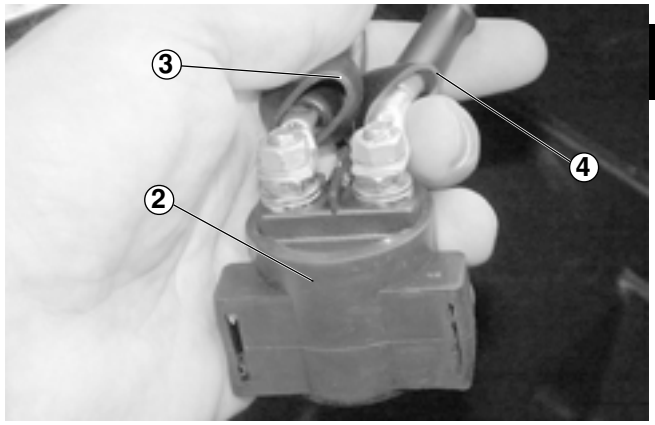


- Disconnect the two-way connector (1)(white).

⚠ CAUTION

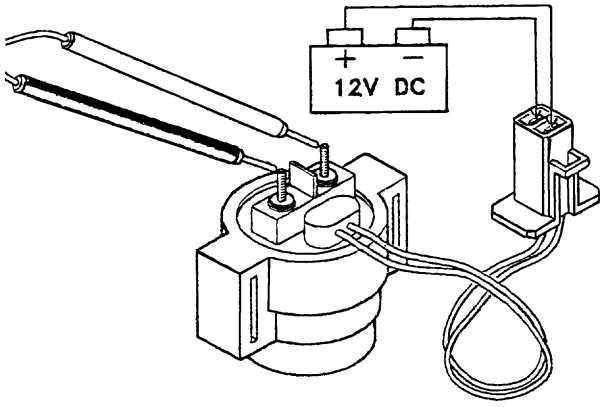
During reassembly ensure correct coupling of the electrical connector (1).

- Pull the relay out from the special hooks (2).
- Pull out the two rubber protectors (3-4).
- Disconnect the cables from their respective terminals on the relay (2).
- Supply the two internal terminals to the connector (1) with a 12V tension from the relay side.
- With a multimeter (set to Ohm meter mode) verify the continuity between the two screw contacts on the relay (2).



Correct value with supply to the relay: 0 Ω
Correct value without supply to the relay: ∞ Ω

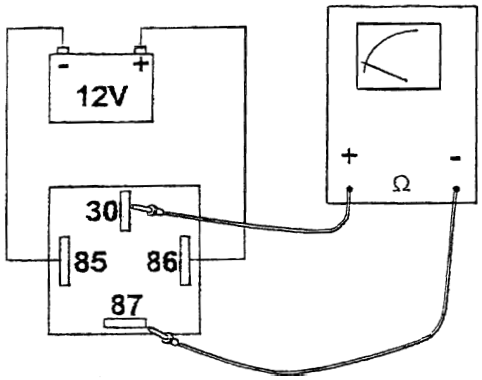
If the resulting values do not correspond to those prescribed, replace the relay (2).



STOP LIGHTS RELAY CHECK

To verify that the relay is working:

- To access the relay raise the saddle and remove the left tail lamp, see (TAIL LAMP BULBS REPLACEMENT).
- Supply the two male terminals (85-86) with a 12V tension;
- With a multimeter (set to ohm meter mode) verify the continuity between the other two terminals (87-30).



Correct value with supply to the relay: 0 Ω
Correct value without supply to the relay: ∞ Ω

If the resulting values do not correspond to those prescribed, replace the relay concerned.

7) ENGINE OFF BUTTON (○ - ⊗)

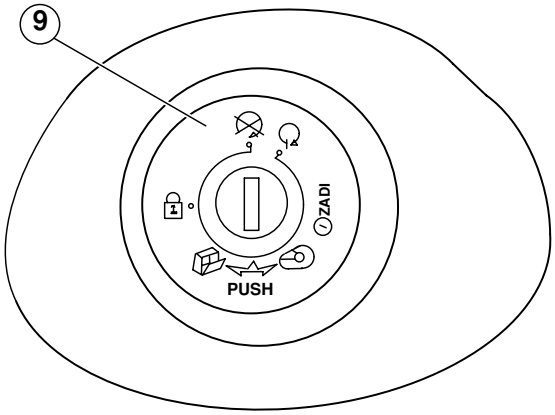
Cable / Rs	R/N	R/Gr
⊗		
○	○——	——○

8) START BUTTON (⏀)

Cable / Rs	V/G	G/R
⏀	○——	——○

9) IGNITION BUTTON

Cable / Rs	G/Gr	G	V/N	R/Bi
⊗				
○	○——	——○	○——	——○
🔓				

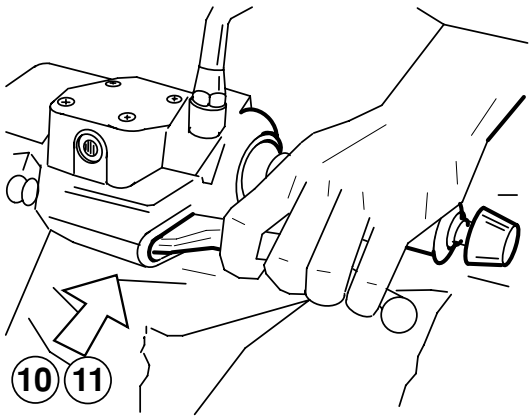


10) FRONT BRAKE LIGHT SWITCH

Cable / Rs	Gr/N	V/G
ON	○——	——○

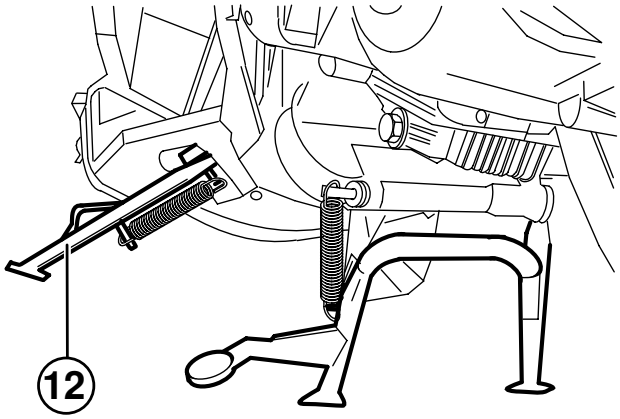
11) REAR BRAKE LIGHT SWITCH

Cable / Rs	V/G	R/N
ON	○——	——○



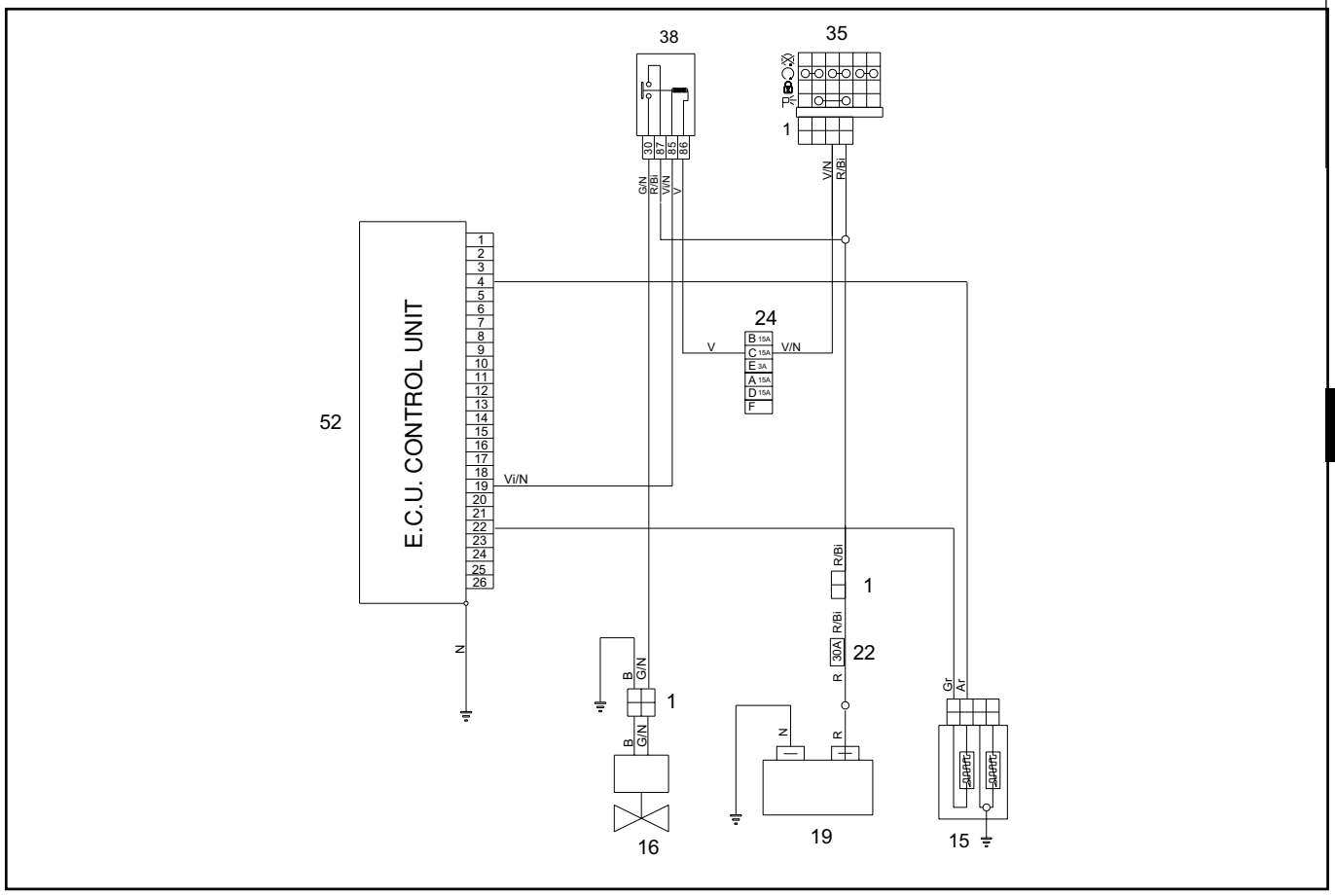
12) SIDE STAND SWITCH

Cable / Rs	N (⏚)	V	M
OPEN	○——	——○	
CLOSED	○——		——○



ELECTRIC COOLING FAN

WIRING DIAGRAM

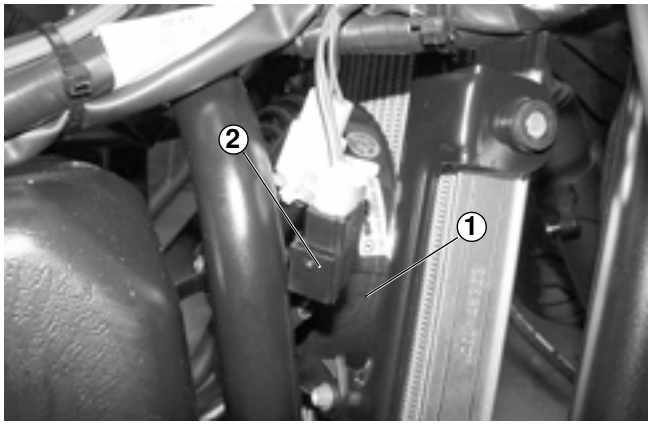


Key to wiring diagram

15) Water thermistor
16) Fan
19) Battery
24) Secondary fuses
35) Key switch
38) Fan relay
52) E.C.U. control unit

CHECKING THE ELECTRIC FAN

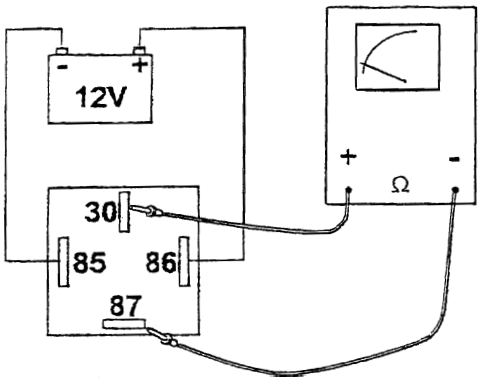
- To check the operation of electric fan (1):
- Remove the leg shields,see (LEG SHIELDS REMOVAL).
- Disconnect the electrical connection (2) operating the electrical fan (1).
- Directly supply the electrical fan with a 12 volt direct current.



WATER THERMISTOR CHECK

See (COOLANT THERMISTOR FUNCTION CHECK) on page 6-14.

FAN RELAY CHECK



To verify that the relay is working:

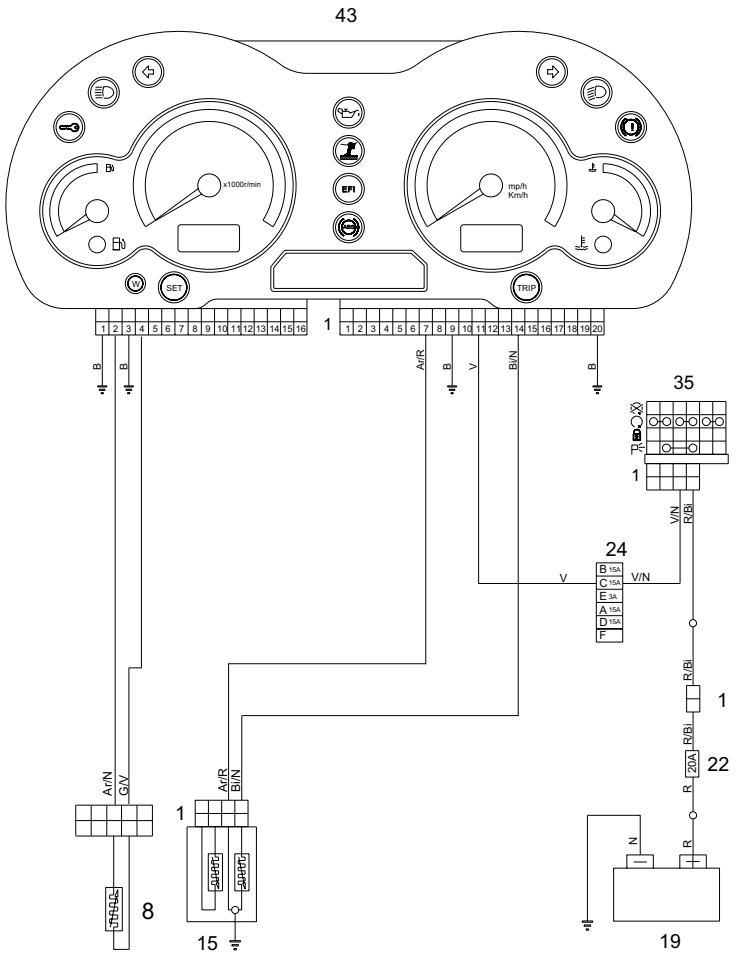
- Remove the seat, see (SEAT REMOVAL).
- Supply the two male terminals (85-86) with a 12V tension.
- With a multimeter (set to ohm meter mode) verify the continuity between the other two terminals (87-30).

Correct value with supply to the relay: 0 Ω
Correct value without supply to the relay: ∞ Ω

If the resulting values do not correspond to those prescribed, replace the relay concerned.

COOLANT TEMPERATURE AND FUEL LEVEL INDICATORS

WIRING DIAGRAM



Key to wiring diagram

8) Fuel level sensor
15) Water thermistor
19) Battery
22) Main fuses
24) Secondary fuses
35) Key switch
43) Dashboard

WATER TEMPERATURE

DASHBOARD CHECK

- Disconnect the water thermistor connector and connect an electrical resistance (from the connector side) between the orange/red and white/black cables.
- Turn the key to ON and verify the indication on the dashboard.

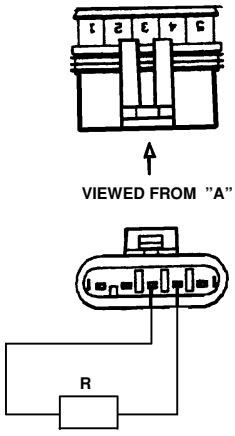
Connector values:

resistance	<60 Ω	bottom scale indication
resistance	80 Ω	start of red zone indication ±5°
resistance	>1090 Ω	start of scale indication

WATER THERMISTOR CHECK

See (COOLANT THERMISTOR FUNCTION CHECK) pages 6-14.

FUEL LEVEL

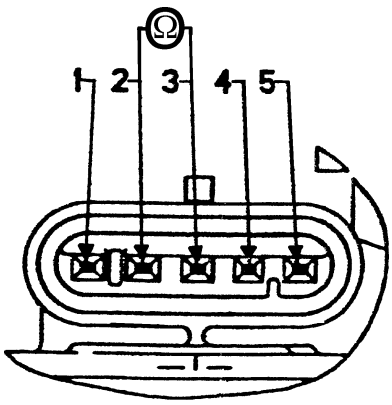


DASHBOARD CHECK

- Disconnect the pump assembly connector and connect an electrical resistance (from the connector side) between the yellow-green and orange-black cables.
- Turn the key to ON and verify the indication on the dashboard.

Connector values:

resistance	250 Ω	1/2 scale indication ±5°
resistance	3 Ω	full indication
resistance	820 Ω	empty indication and indicator lit



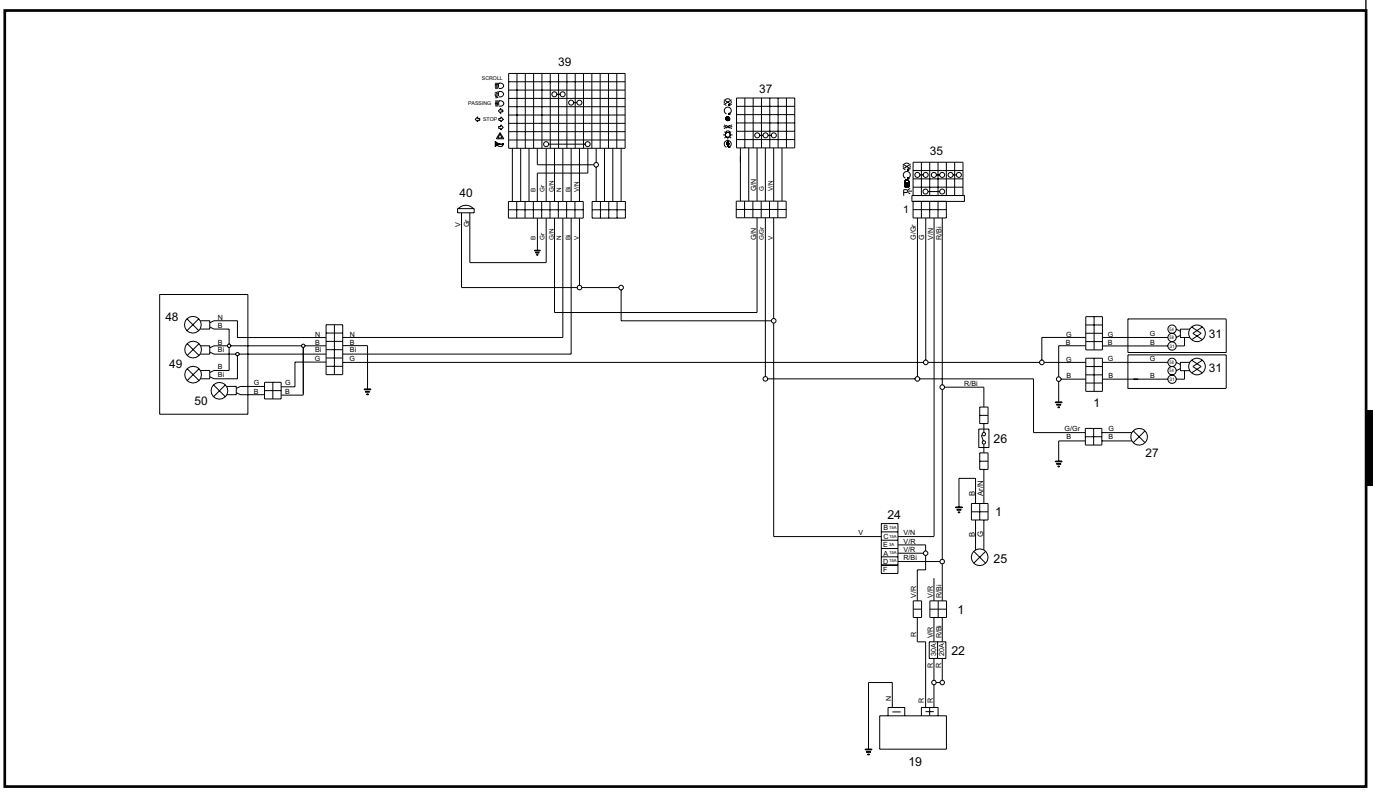
FUEL LEVEL SENSOR CHECK

- Disconnect the pump assembly/sensor connector.
- Connect an ohm meter to terminals 2 and 3 and verify the indication at different fuel levels.

Correct value with full tank - less than 16 Ω
Correct value with 8 litres of fuel - 300-400 Ω
Correct value with Ø litres - more than 800 Ω

LIGHTS AND ACOUSTIC SIGNALS SYSTEM

WIRING DIAGRAM



Key to wiring diagram

19) Battery
22) Main fuses
24) Secondary fuses
25) Top case light
26) Top case switch
27) Number plate light
31) Parking/stop lights bulbs
35) Key switch
37) Right switch
39) Left switch
40) Horn
48) Dipped beam bulbs
49) Full beam bulbs
50) Parking lights bulb

HORN CHECK

Directly supply the horn with 12 V to the two terminal endings.
If it does not work, activate the special adjuster.
If necessary replace it with a new one.

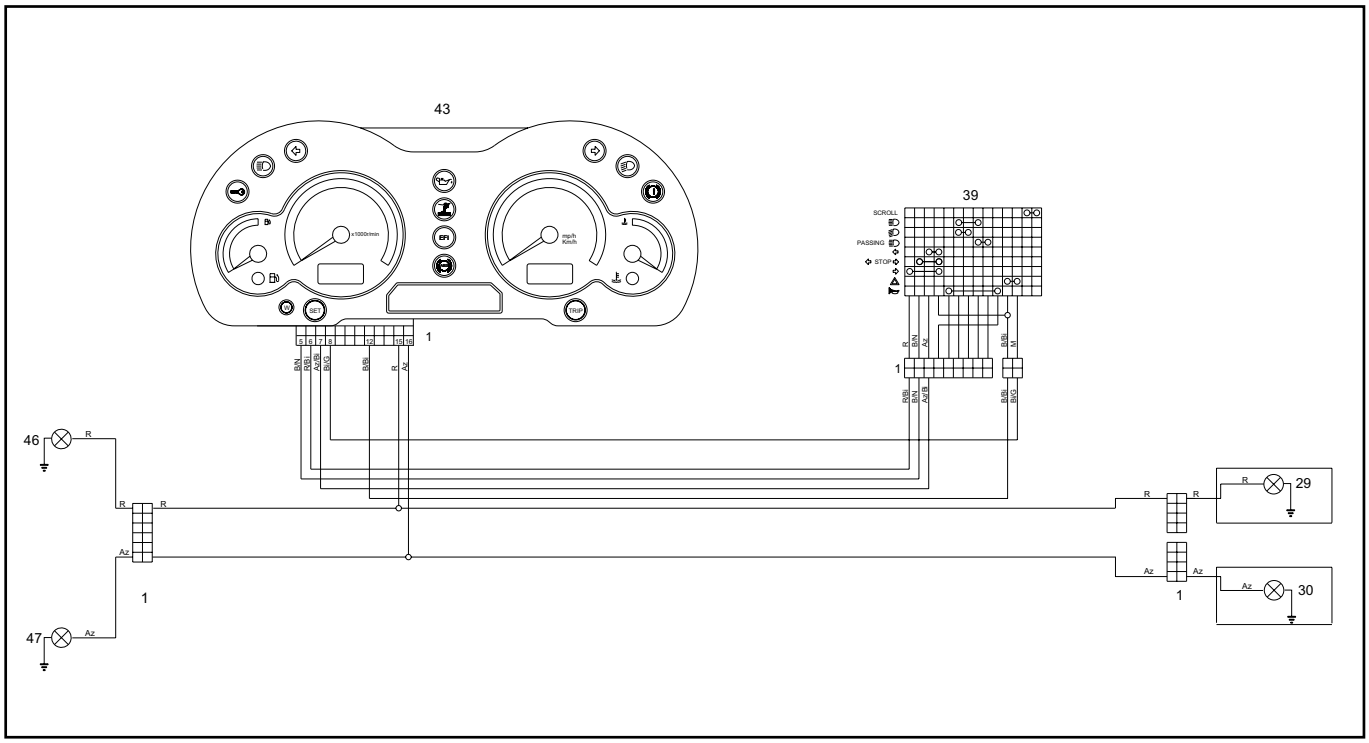
TOP CASE SWITCH CHECK

With a multimeter in ohm meter mode, verify the continuity between the two terminals.

Value with the switch free (saddle raised) Ø Ω
Value with the switch pressed (saddle closed) ∞

DIRECTION INDICATORS AND DISPLAY DATA

WIRING DIAGRAM



Key to wiring diagram
29) Rear right indicator
30) Rear left indicator
39) Left lights switch
43) Dashboard
46) Front right indicator
47) Front left indicator

CONTROLS ON THE LEFT SIDE OF THE HANDLEBAR

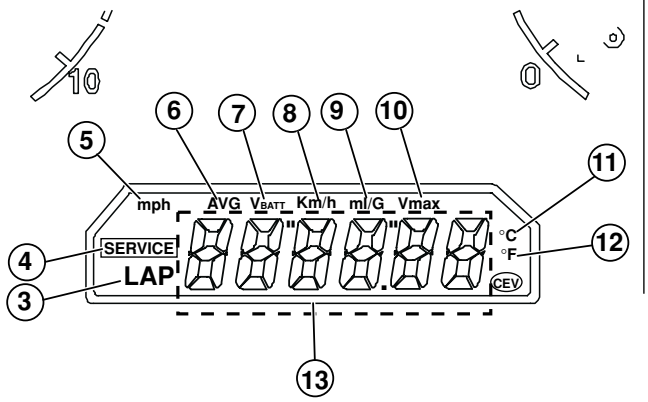
NOTE The electrical components work only with the ignition switch in position "◯".

MODE BUTTON (MODE)
Press repeatedly to select the various data visualized on the Multifuncion LCD display.

HAZARD BUTTON (⚠)
ACTIVATION
Press to activate the four indicators, at this point it is possible to turn the ignition switch to position "⊗" and remove the key.
DEACTIVATION
Insert the key in the ignition lock switch and turn to position "◯", press the HAZARD button again to deactivate the system.
NOTE The flashing frequency of the hazard remains unvaried even with a burnt out bulb.

MULTIFUNCTION LCD DISPLAY

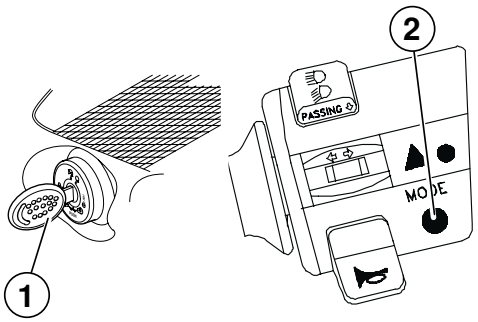
Turning the ignition key (1) to position "○", all the segments on the Multifuncion LCD display are activated for a few seconds (in this way working checks are carried out on the components) and the last function imposed after the vehicle was stopped is visualized.



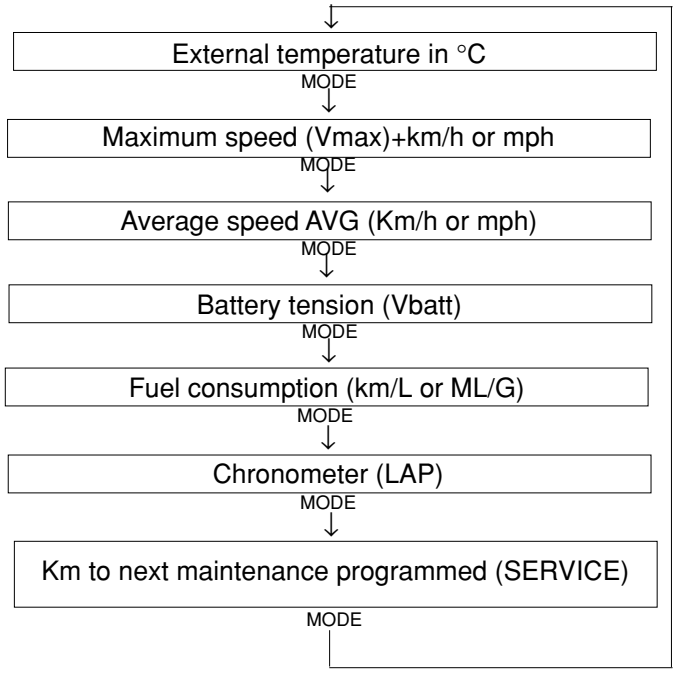
⚠ CAUTION

After the first 1,000 Km (625 mi) and then every 6,000 Km (3,750 mi), SERVICE will appear on the display.
In this case carry out the operations prescribed in the periodical maintenance programme, see pages 2-3 (PERIODICAL MAINTENANCE PROGRAMME).

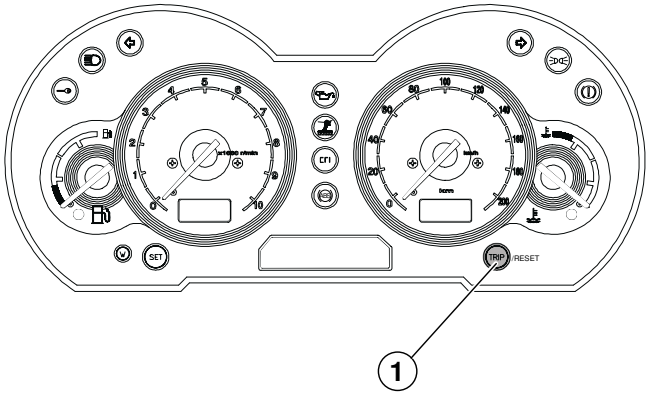
The various functions are selected then visualized on the display by pressing the MODE button (2) on the controls to the left side of the handlebars.
The segments forming the multifunction LCD display are as follows:
Chronometer indicator (3), programmed maintenance due icon (4), average speed icon expressed in mph (5), average speed (6), battery tension icon (7), average speed icon expressed in Km/h (8).
(The same icon is used for the consumption function expressed with the symbol Km//l, consumption expressed in ml/G (used only for USA UK versions) (9), maximum speed icon (10), external temperature icon expressed in degrees Celsius (°C)(11), external temperature icon expressed in degrees Fahrenheit (°F) (12), six-figure displays of the values relating to the functions set and identified by the respective icons (13).



By pressing the MODE button, the functions are obtained in the following sequence:



RESETTING OF AVERAGE SPEED, MAXIMUM SPEED, FUEL CONSUMPTION AND CHRONOMETER VALUES



NOTE Cancellation of this information is only possible if the odometer is visualized to the right of the digital display.

Keep the TRIP/RESET button (1) pressed for more than three seconds.

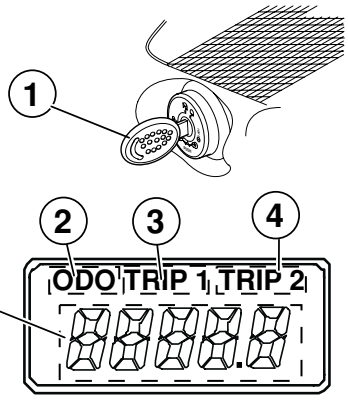
NOTE The function visualized will be cancelled.

START/STOP AND CHRONOMETER RESETTING

NOTE Cancellation of this information is only possible if the odometer is visualized to the right of the digital display.

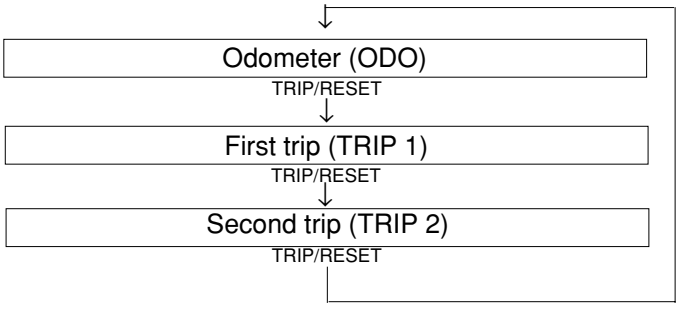
START/STOP:
Keep the MODE button (2) pressed for more than three seconds.
RESETTING:
Keep the TRIP/RESET button (1) pressed for more than three seconds, only when the chronometer is stopped.

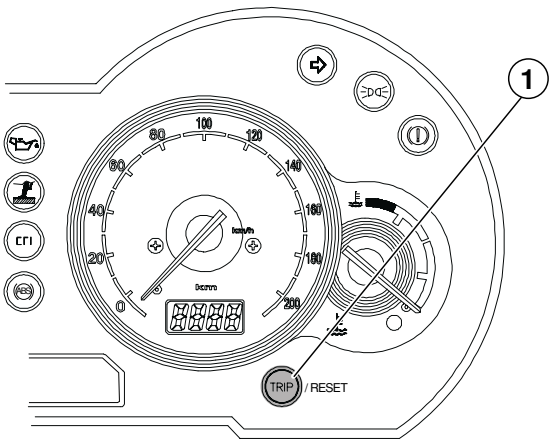
DIGITAL ODOMETER



NOTE The LCD displays only work with the ignition switch in position "○".
Turning the ignition key (1) to position "○", all the segments are activated on the LCD display for a few seconds and in this way working checks of the components can be carried out, after the odometer is always visible.
The segments forming the LCD display are as follows: Odometer visualized icon (2), first trip visualized icon (3), second trip visualized icon (4), 5-figure visualization of values relating to the selected functions (5).

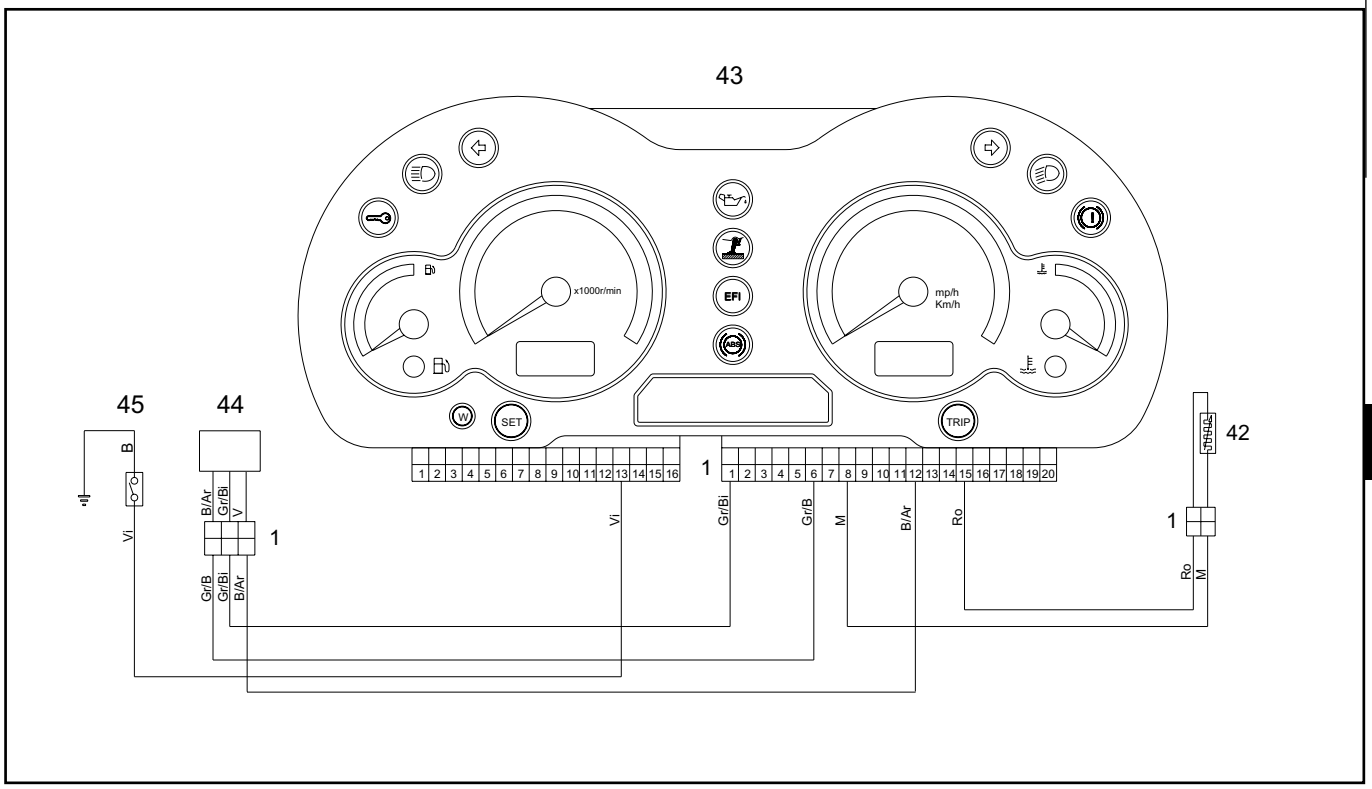
By pressing the TRIP/RESET button in sequence the following functions are activated:





DIRECTION INDICATOR AND SPEEDOMETER

WIRING DIAGRAM



Key to wiring diagram

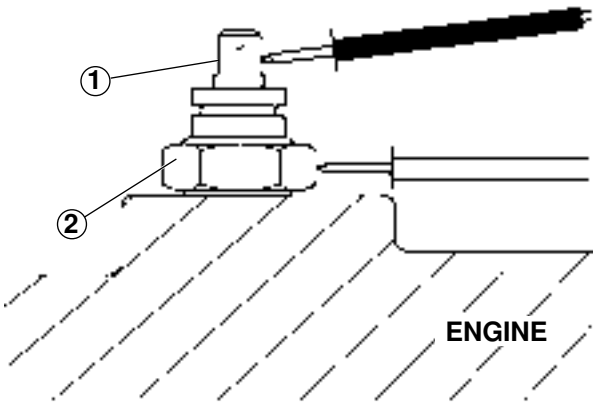
42) Air temperature thermistor
43) Dashboard
44) Speed sensor
45) Pressure oil sensor

DASHBOSRD CHECK

- If the dashboard is in good working order, the red LED "🛢" of the oil pressure should go on with the ignition switch to the "◯" position.

SENSOR CHECK

- With the ignition switch in position "◯" the red LED indicator "🛢", relating to engine oil pressure, must light up.
- If the red LED indicator "🛢", does not regularly light up, verify that the sensor is working.
- With a multimeter (scale 100 Ω) verify the continuity between the pin terminal (1) and the sensor casing (2)(see diagram).



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

If the resulting values do not correspond to those prescribed, check that the engine oil level is correct, see (ENGINE OIL LEVEL CHECK AND TOPPING UP) and if necessary replace the sensor.

SPEEDOMETER

- Check the correct coupling of the speed sensor connector (1).
- Check the correct coupling of the dashboard connectors (2).
- Check the distance between the speed sensor (3) and the front brake disc fixing screws (4).

Distance between sensor (3) and screws (4): 1.5 ± 1 mm.

- Check that all the screws (4) are present.

With engine off and the ignition switch in position "○" carry out the following tests:

1st Test
- Without disconnecting the speed sensor connector (1) connect a multimeter and measure the tension between the grey/blue (Gr/B) and blue/orange (B/Ar) cables.

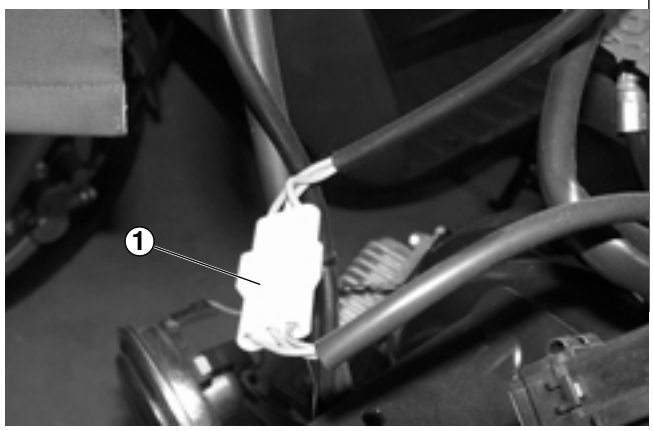
Correct value: > 9 V (c.c.).

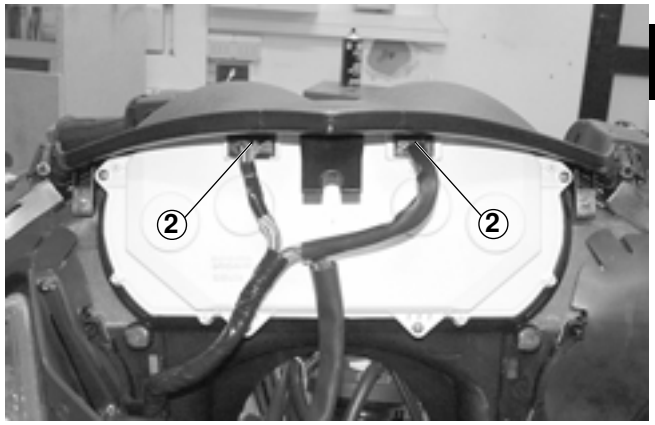
2nd Test
- Without disconnecting the speed sensor connector (1), connect a multimeter and measure the tension between the grey/white (Gr/Bi) and blue/orange (B/Ar) cables.

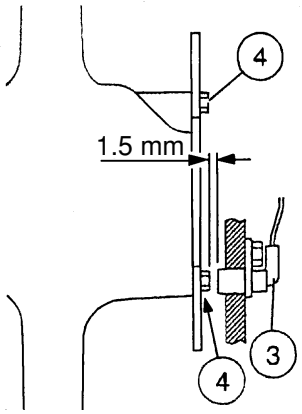
Correct value: > 6 V (c.c.).

3rd Test
- Place the vehicle on the special rear stand OPT
- Carry out the 2nd test.
- Manually turn the front wheel bringing one of the screws (4) in line with the sensors (3). The multimeter indication will give **zero V** for approx. two seconds, then return to >**6 V** .

- If the 1st test results in an incorrect value, disconnect the sensor (3) and repeat the 1st test; if the incorrect value persists, the dashboard is defective and must be replaced with one that is known to work.
- If the 1st test results in a correct value and the 2nd with an incorrect value, the sensor (3) is defective and must be replaced.
- If the 1st and 2nd tests result in a correct value and the 3rd test with an incorrect value, the sensor (3) is defective and must be replaced.
- If all three tests result in a correct value but the speed does not appear to the left of the dashboard, the dasboard is defective and must be replaced with one that is known to work.

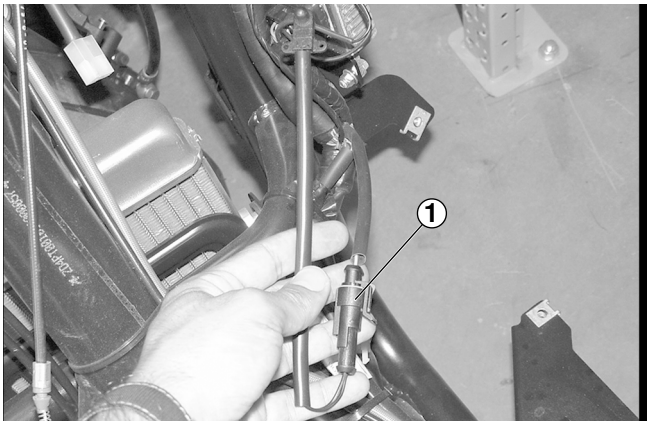






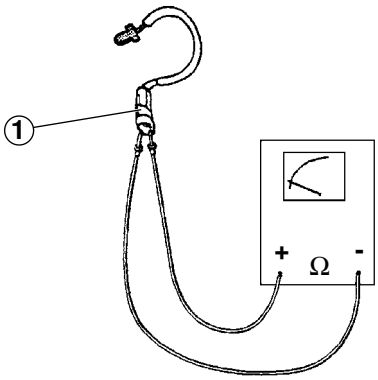
AIR TEMPERATURE SENSOR

To verify that the air temperature sensor works:



- Disconnect the two-way connector (1).
- Carry out the sensor check in an environment with controlled temperature of 20 °C (68 °F).

- Measure the electrical resistance with an ohm meter (scale 0-20 kΩ) between the connector terminals (1).

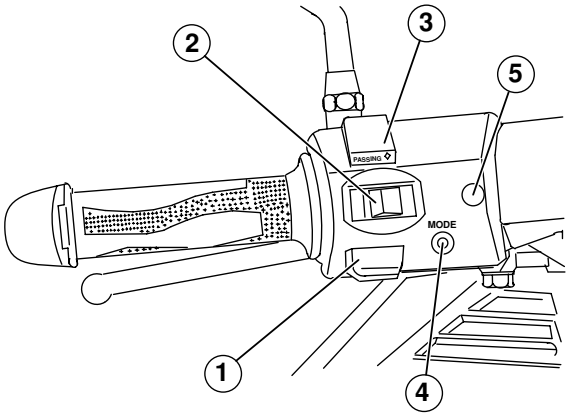


Correct value: 12.200 kΩ - 12.700 kΩ

If the air temperature sensor works correctly check the dashboard:

- Apply a resistance equal to 12.4 kΩ between the sensor terminals (cabling side).
- If the dashboard works correctly it should indicate a temperature of 20 ± 1 °C (68 ± 3 °F).

SWITCHES
Using a pocket multimeter, check the continuity of the switches by referring to the tables below.
Replace any faulty components.



1) HORN BUTTON ( )

Cable / Rs	Gr	B
	○	○

2) TURN INDICATOR SWITCH ( )

Cable / Rs	B/Bi	Az	R	B/N
	○	○		
	○		○	
STOP	○			○

3) LIGHTS SWITCH (-) / FLASHING FULL BEAM BUTTON (PASSING)

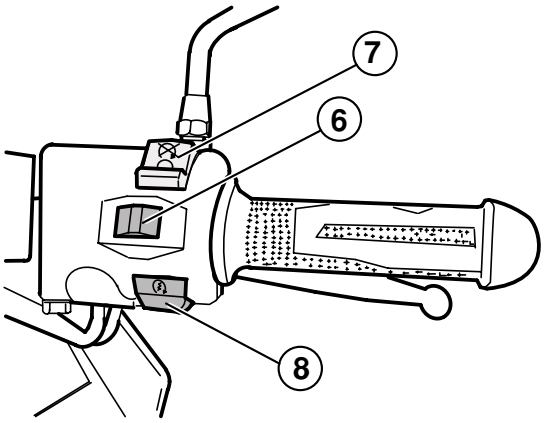
Cable / Rs	G/N	N	Bi	V/N
	○		○	
	○	○		
PASSING			○	○

4) MODE BUTTON (MODE)

Cable / Rs	Ro	V
SCROLL	○	○

5) HAZARD BUTTON ( )

Cable / Rs	B/Bi	M
	○	○



6) LIGHTS SWITCH (- - •)

Cable / Rs	V/N	G	G/N
•			
	○	○	
	○	○	○

BULB REPLACEMENT

⚠ WARNING

Before changing a bulb, move the ignition switch to position "⊗" and wait a few minutes, so that the bulb cools down. Change the bulb wearing clean gloves or using a clean and dry cloth. Do not leave fingerprints on the bulb, since these may cause its overheating and consequent breakage. If you touch the bulb with bare hands, remove any fingerprint with alcohol, in order to avoid any damage.

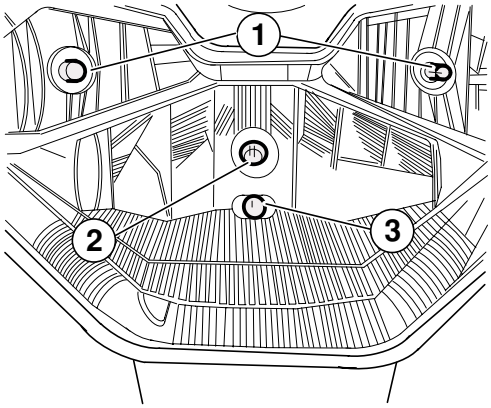
DO NOT FORCE THE ELECTRIC CABLES.

HEADLIGHT BULB REPLACEMENT

Carefully read BULBS.

The headlight contains:
– Two bulbs for full beam (1).
– One bulb for dipped beam (2).
– One parking light bulb (3).

To change the bulbs, proceed as follows:
• Remove the front hood, see (REMOVAL OF THE FRONT HOOD).



LOW/HIGH BEAM BULB

⚠ CAUTION

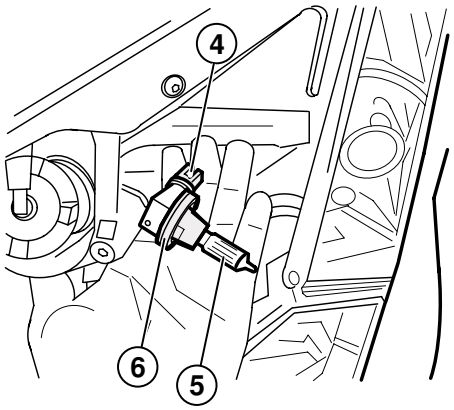
To extract the bulb electric connector, do not pull its electric wires.

• Grasp the bulb electric connector (4), pull it and disconnect it from the bulb (5).
• Rotate the bulb socket (6) anticlockwise and extract it from the reflector.
• Extract the bulb (5).

For the reassembly:

NOTE Insert the bulb (5) in the reflector, ensuring that the three pins on the bulb coincide with the respective slots in the bulb casing.

• Position the bulb socket (6) in the reflector and rotate it clockwise.
• Connect the bulb electric connector (4).



BATTERY

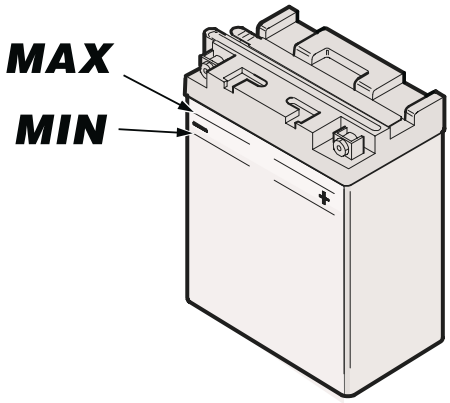
For safety regulations and general information concerning the battery, see (BATTERY).

For other information, see (ELECTROLYTE LEVEL CHECK),(BATTERY RECHARGE) and (BATTERY PROLONGED INACTIVITY).

ACTIVATING THE BATTERY

Read through paragraph (BATTERY).

- Remove the battery cover, see (BATTERY COVER REMOVAL).
- Remove the battery, see (BATTERY REMOVAL).
- Check the battery electrolyte level, see (BATTERY ELECTROLYTE LEVEL CHECK).
- Recharge the battery, see (BATTERY RE-CHARGE).



RETURN UNDER GUARANTEE

Read through paragraph (BATTERY).

The guarantee is considered no longer valid if the battery shows signs of:
- Damage (casing dented, poles bent, etc.).
- Diffuse formation of sulphate (incorrect activation and/or use of the battery).
- Insufficient level of electrolytic liquid (to avoid leakage during transportation it is sufficient to close the vent with the special cap).
- Missing elements (caps, etc.).

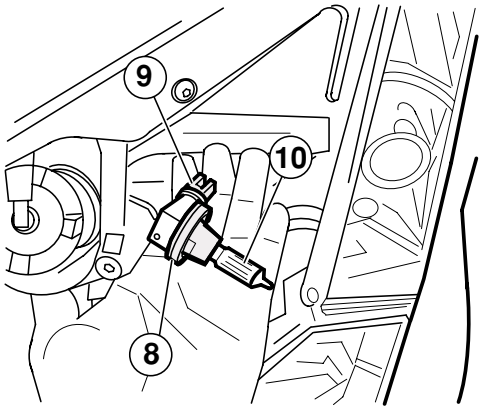
FULL BEAM BULBS

- Turn the bulb socket/bulb (8) anticlockwise and extract it from the parabolic setting.

⚠ CAUTION

To remove the bulb socket/bulb from its connection, take special care not to damage the two housings (9).

- Remove the bulb (10).
- Correctly fit a bulb of the same kind.
- For reassembly, repeat the operations in reverse order.

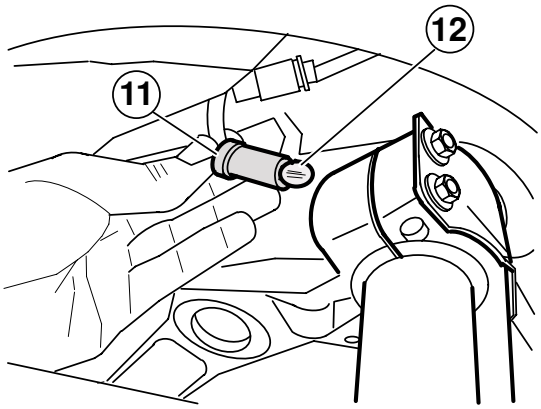


PARKING LIGHT BULBS

⚠ CAUTION

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

- Working from the front of the vehicle, grasp the bulb socket (11), pull it and take it out of its seat.
- Extract the parking light bulb (12) and replace it with a new one of the same type.



REPLACING THE REAR LIGHT BULBS

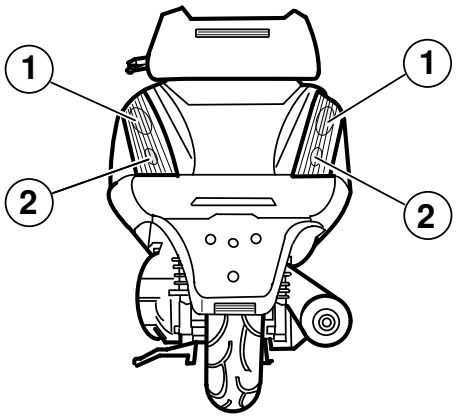
Carefully read BULBS.

The rear light contains:
– Two bulbs for parking/stop lights (1).
– Two bulbs for rear indicator lights (2).

To change them:
- Raise the saddle,see (SADDLE UNBLOCKING AND BLOCKING).

NOTE The following information is only for one indicator but is valid for both operations.

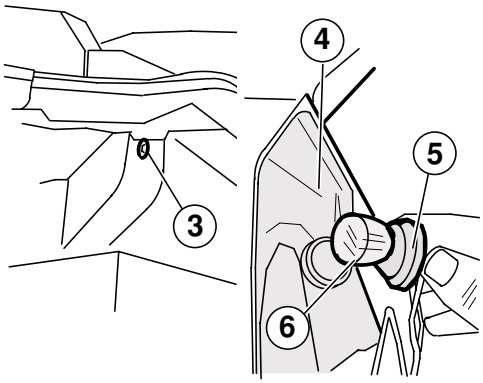
- Remove the fixing pommel (3) of the rear lights assembly of the vehicle.



⚠ CAUTION

During the following operations do not pull or force the electrical cables.

- Pull out the rear lights assembly (4) first pulling out the upper part and then distancing it from its housing.



⚠ CAUTION

Work with caution.
Do not damage the pins and/or their housings.

- Holding the rear lights assembly by hand, turn it anticlockwise and remove the bulb socket (5) with the bulb (6) from the parabolic housing (4).
- Remove the bulb from the housing.

NOTE Set the bulb in the bulb socket, ensuring that the two guiding pins are in line with their respective slots on the bulb socket.

- Correctly fit a bulb of the same kind.

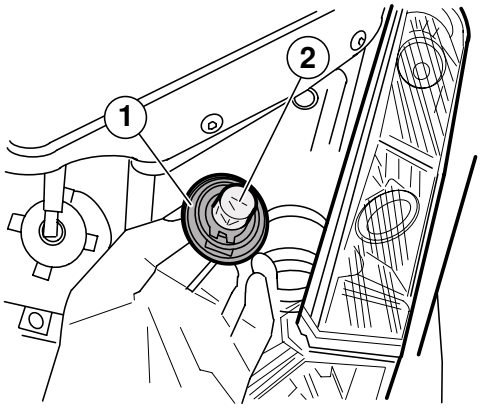
NOTE During reassembly, correctly place the protective screen in its housing.

⚠ CAUTION

Carefully and gently tighten the pommel (3) in order to avoid damage to the protective screen.

FRONT INDICATOR LIGHTS BULB REPLACEMENT
Carefully read BULBS.
To change the bulbs:

- Remove the front hood, see (FRONT HOOD REMOVAL). As an alternative, it is also possible to remove the box covers to gain access to the bulbs (see DASHBOARD REMOVAL).



⚠ CAUTION

Proceed with care.
Do not damage the tangs and/or their seatsstro.

For the LEFT indicator:

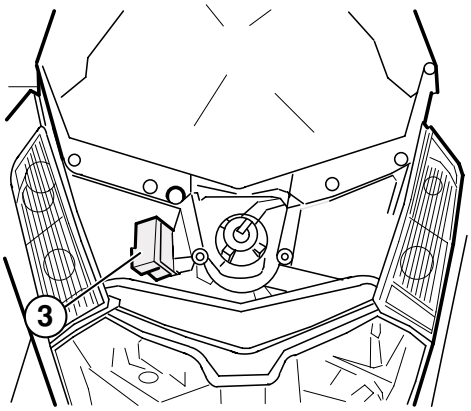
- Working from the front of the vehicle, turn the support (1) clockwise with the bulb (2) and remove both from the housing.
- Gently press the bulb (2) and turn it anticlockwise.
- Extract the bulb from its seat.

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

- Correctly fit a bulb of the same kind.
- For reassembly repeat the operations in reverse order.

For the RIGHT indicator:

- Pull the secondary fuse box (3) from its housing in order to have sufficient space for dismantling operations.
- Continue as described for the LEFT indicator.



NUMBER PLATE LIGHT REPLACEMENT

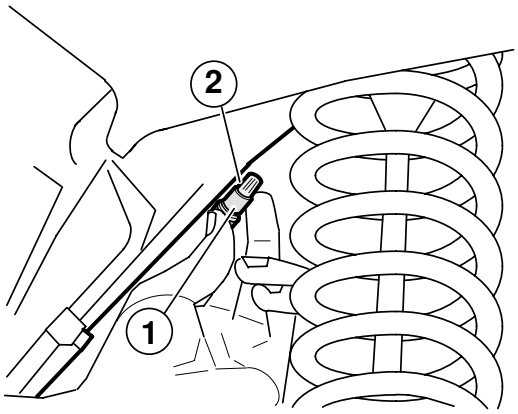
Carefully read BULBS.

To change the bulbs:

⚠ CAUTION

Do not pull the electrical cables when removing the bulb socket.

- Grasp the bulb socket (1), pull and remove it from its housing.
- Pull out and replace the bulb (2) with one of the same kind.



HELMET COMPARTMENT LIGHT REPLACEMENT

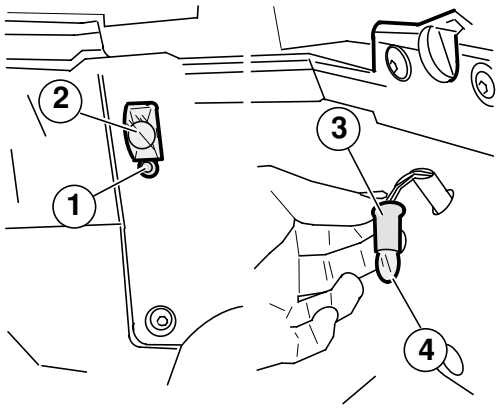
Carefully read BULBS.

To change the bulbs:
- Lift the saddle, see (SADDLE UNBLOCKING/ BLOCKING).
- Loosen and remove the screw (1) fixing the glass to the battery cover.
- Remove the glass (2) by pulling downwards.

⚠ CAUTION

Do not pull the electrical cables when removing the bulb socket.

- Grasp the bulb socket (3), pull and remove it from its housing.
- Pull out and replace the bulb (4) with one of the same kind.



THIRD STOP LIGHTS REPLACEMENT

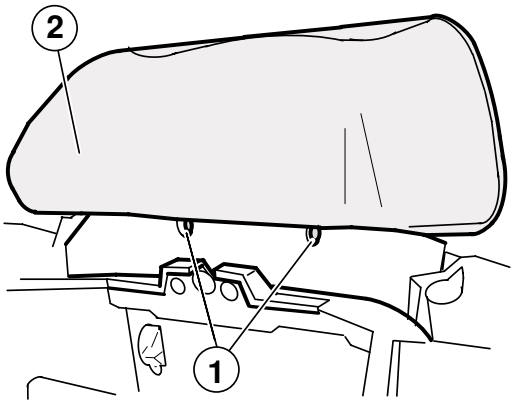
Carefully read BULBS.

To change the bulbs:
- Lift the saddle, see (UNBLOCKING/BLOCKING THE SADDLE).
- Loosen and remove the two fixing screws (1) of the backrest.

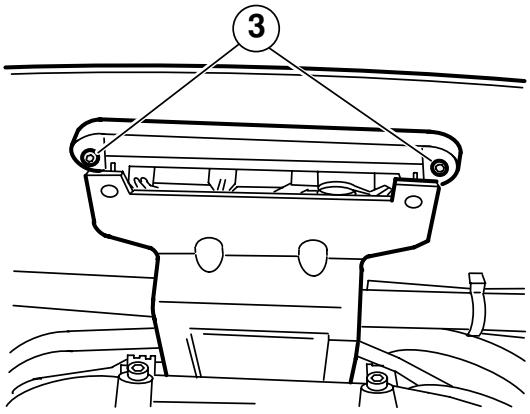
⚠ CAUTION

When removing the backrest, proceed with caution in order to avoid breaking the coupling prongs.

- Remove the backrest (2) by pulling upwards.



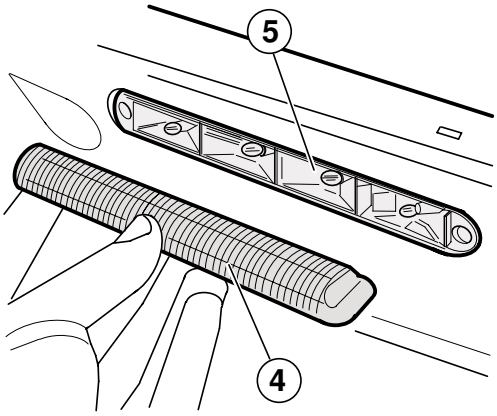
- Loosen and remove the two fixing screws (3) of the protective screen (4) of the third stop light.
- Pull out the all-glass bulbs (5) from their housing.
- Correctly fit a bulb of the same kind.



NOTE During reassembly, correctly set the protective screen in its housing.

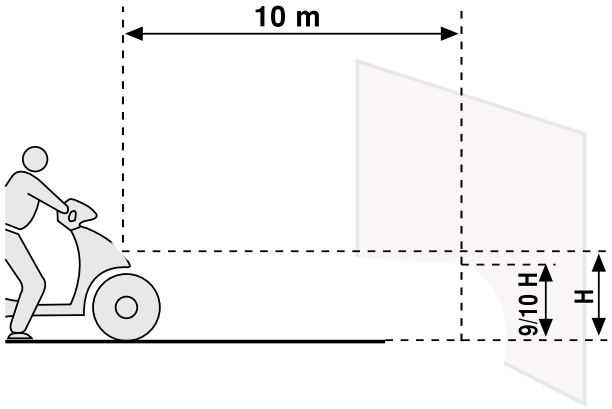
⚠ CAUTION

Carefully and gently tighten the screw (3) in order to avoid damaging the protective screen.



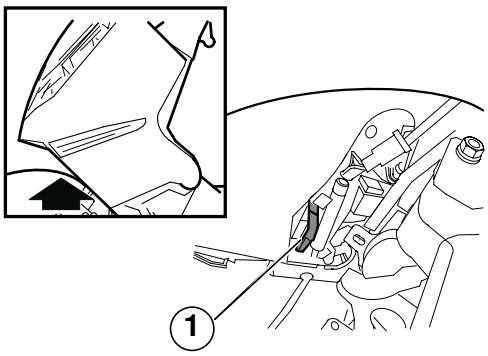
VERTICAL BEAM ADJUSTMENT

- To quickly check the alignment of the headlight beam, place the vehicle on level ground, 10 metres from a vertical wall.
- Turn on the low beam, sit on the vehicle and check that the top of the lighted area on the wall is slightly lower than the projection of the headlight axis (approximately 9/10 of the overall height).

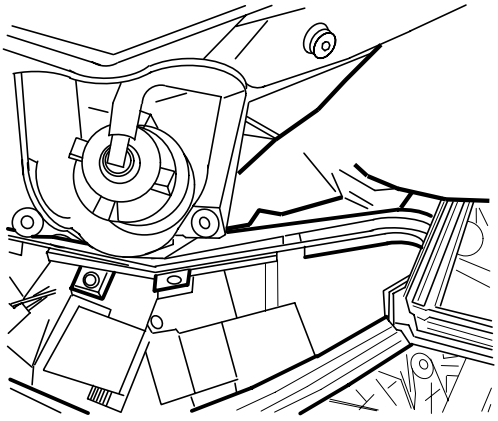


To adjust the headlight beam:

- Use the special handle (1) from the front of the vehicle.
- Turning it CLOCKWISE, the beam is raised.
- Turning it ANTICLOCKWISE, the beam is lowered.



HORIZONTAL BEAM ADJUSTMENT

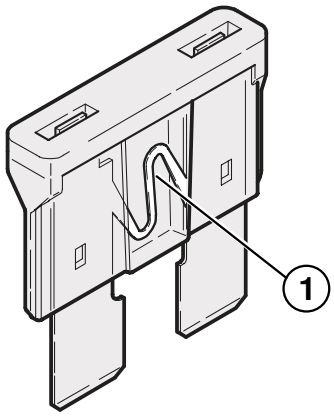


- Remove the internal front shield, see (INTERNAL FRONT SHIELD REMOVAL).

To carry out the beam adjustment:

- Use the special handle (as indicated on the diagram) from the front of the vehicle.
- Turn CLOCKWISE and the beam will move to the RIGHT (with respect to the direction faced).
- Turn ANTICLOCKWISE and the beam will move to the LEFT (with respect to the direction faced).

REPLACING THE FUSES



Carefully read (MAINTENANCE).

⚠ CAUTION

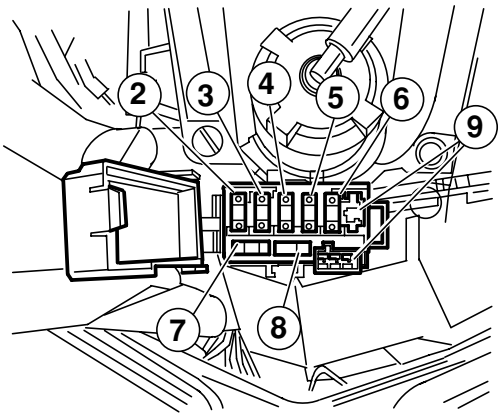
Do not repair faulty fuses.
Never use fuses different from the recommended ones.
The use of unsuitable fuses may damage the electric system or, in case of short circuit, may even cause a fire.

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 engine fails to start, it is necessary to check the fuses.
- Check the 3 A and the 15 A fuses first and then the 20-30 A fuse.

To carry out the checking:

- Remove the battery cover, see (BATTERY COVER REMOVAL) or remove the front hood, see (FRONT HOOD REMOVAL).
- Extract the fuses one by one and check if the filament (1) is broken.
- Before replacing a fuse, try to find out the cause of the trouble, if possible.
- Then replace the damaged fuse with a new one having the same amperage.

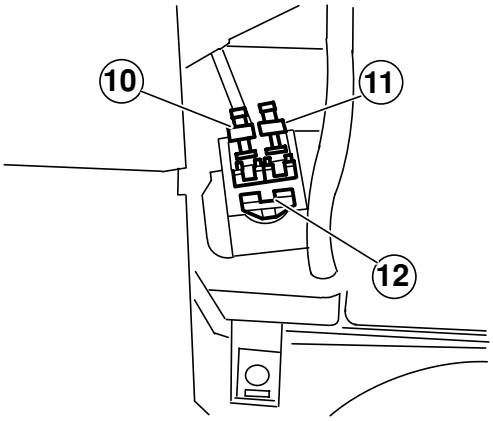


NOTE If you use one of the spare fuses, put a new fuse in the appropriate seat.

- Replace the battery cover, see (BATTERY COVER REMOVAL) or replace the front hood, see (FRONT HOOD REMOVAL).

SECONDARY FUSE LAYOUT
(FRONT HOOD)

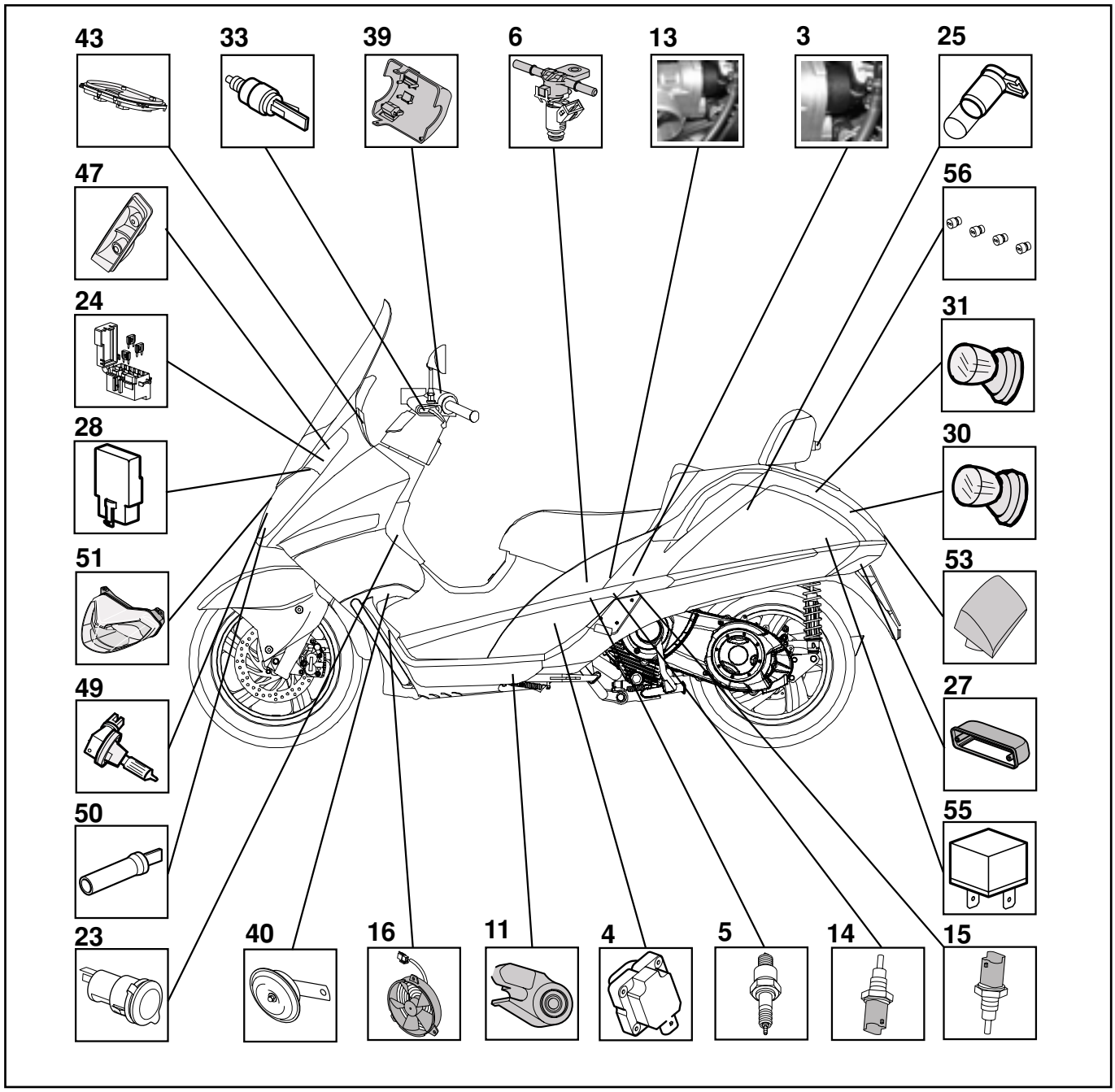
- **15 A (2) fuse**
  From voltage regulator to: injection, stop/starting lights logistics (Housing A on the wire diagram).
- **15 A (3) fuse**
  From the ignition switch to: engine kill logistics, stop lights (Housing B on the wire diagram).
- **15 A (4) fuse**
  From the ignition switch to: lights, horn, dashboard, fan relay, radio power supply (Housing C on the wire diagram).
- **15 A (5) fuse**
  From the main fuse to the power socket in the glove compartment .
- **3 A (6) fuse**
  From the voltage regulator to permanent supply of the ECU control unit (Housing E on the wire diagram).
- **15 A (7) fuse**
  Spare.
- **3 A (8) fuse**
  Spare.
- **Free (9)**



MAIN FUSE LAYOUT
(BATTERY COMPARTMENT)

- **20 A (10) fuse**
  From the battery to: ignition switch, fuse (2), helmet compartment light, cooling fan, permanent supply to the dashboard.
- **30 A (11) fuse**
  From the battery to: voltage regulator, fuse (3), fuse (5).
- **30 A (12) fuse**
  Spare.

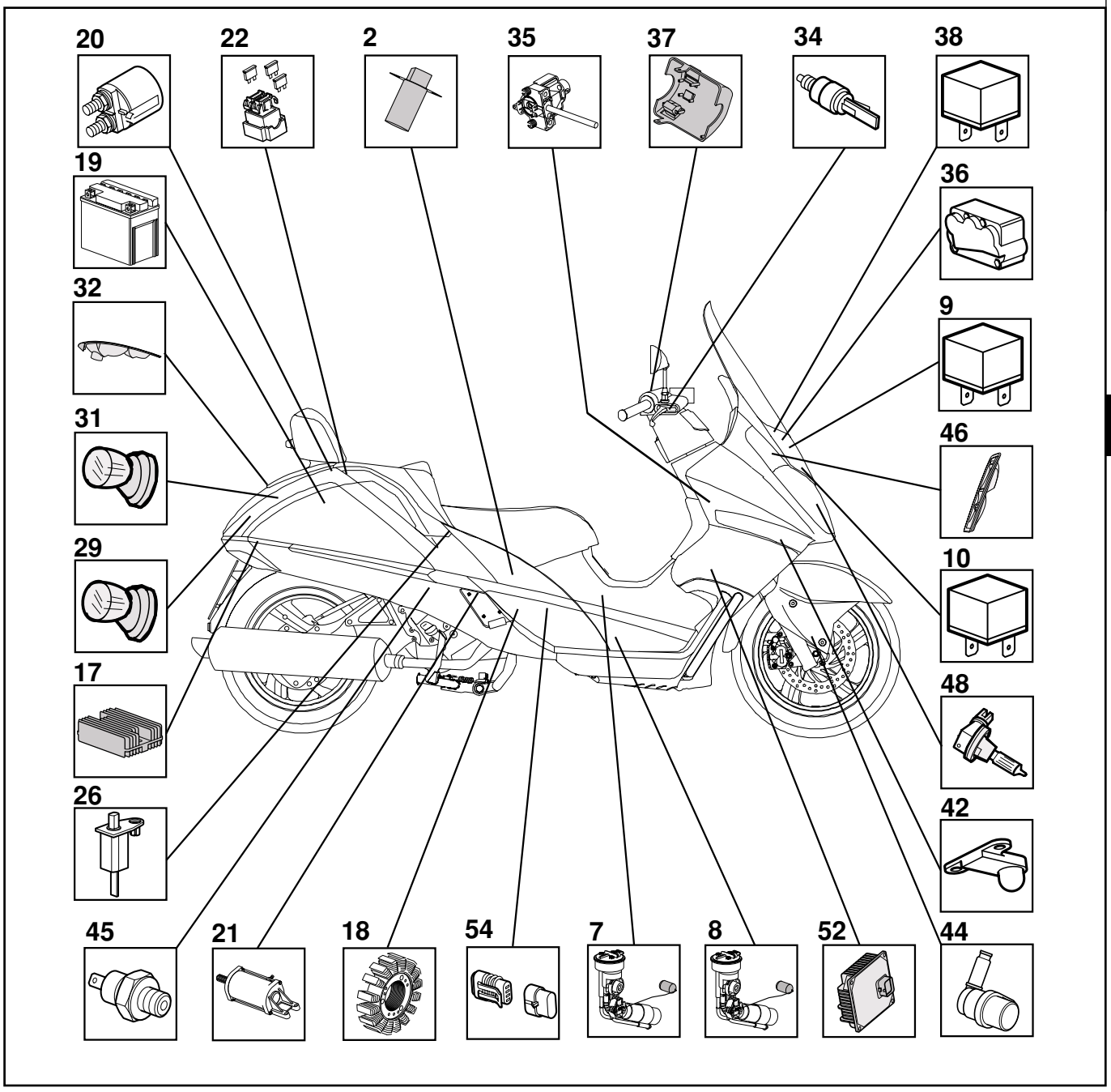
ELECTRICAL COMPONENTS LAYOUT



KEY

3) Stepper motor
4) Coil
5) Spark plug
6) Fuel injector
11) Side stand switch
13) Accelerator sensor
14) Engine air thermistor
15) Dashboard / engine water thermistor
16) Fan
23) Power socket
24) Secondary fuses
25) Top case light
27) Number plate light
28) Radio power supply
30) Rear left indicator
31) Parking/stop lights
33) Rear stop light switch
39) Left indicator lights
40) Horn
43) Dashboard
47) Front left indicator
49) Full beam bulbs
50) Parking lights bulb
51) Headlight
53) Left tail lamp
55) Stop lights relay
56) 3 stop light bulbs

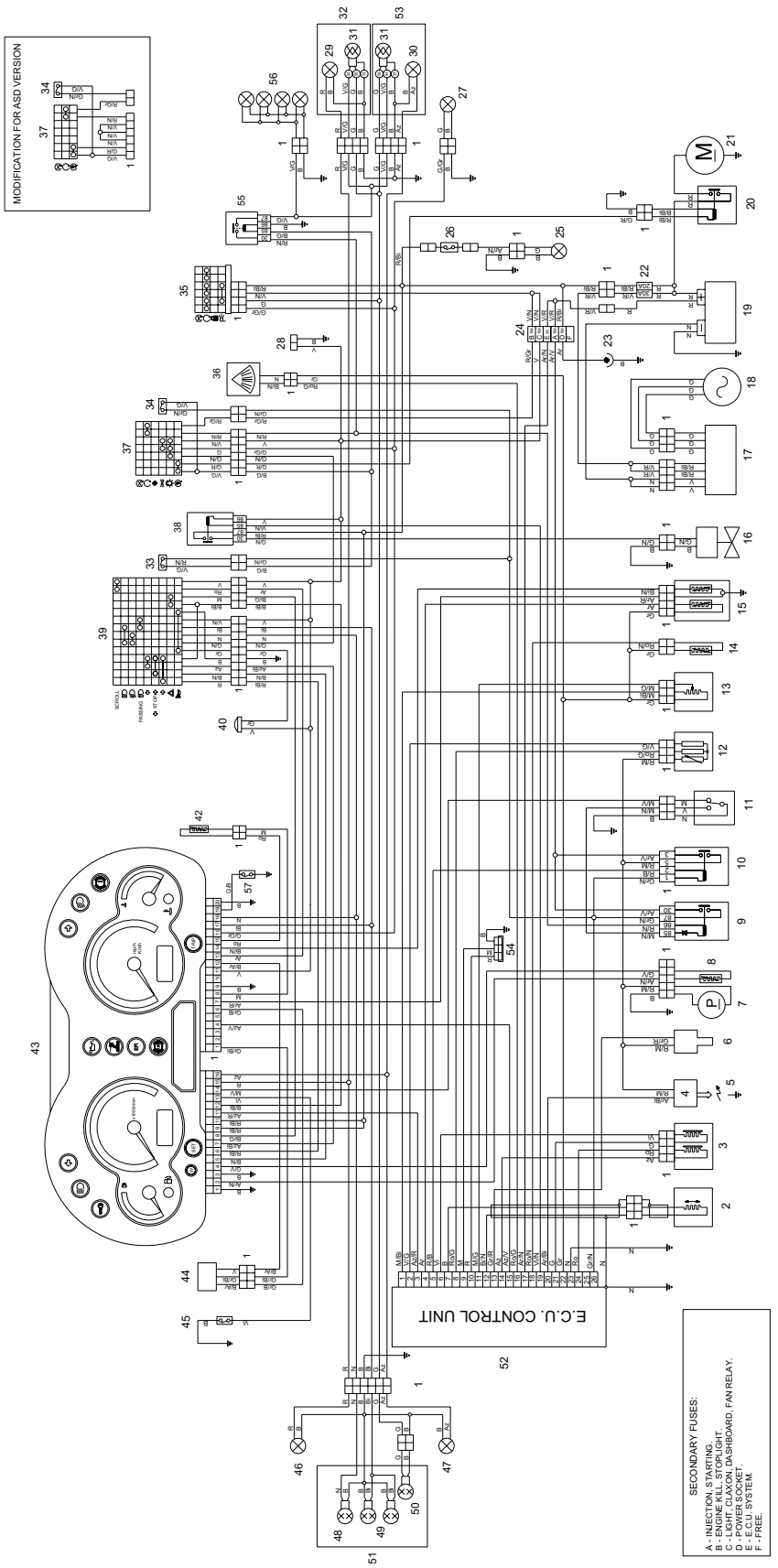
ELECTRICAL COMPONENTS LAYOUT



KEY

2) Revolutions sensor
7) Fuel pump
8) Fuel level feeler
9) Main injection relay (with diode)
10) Secondary injection relay
17) Voltage regulator
18) Flywheel
19) Battery
20) Starting relay
21) Starting motor
22) Main fuses
26) Compartment switch
29) Rear right indicator
31) Parking/stop lights
32) Right tail lamp
34) Front stop light switch
35) Key switch
36) Drop sensor
37) Right switch
38) Fan relay
42) Dashboard air temperature thermistor
44) Speed sensor
45) Oil pressure sensor
46) Front right indicator
48) Dipped beam bulb
52) E.C.U. control unit
54) Diagnostics socket

WIRING DIAGRAM 500 C.C. ATLANTIC SCOOTER



WIRING DIAGRAM KEY

1) Multiple connectors
2) Revolutions sensor
3) Stepper motor
4) Coil
5) Spark plug
6) Fuel injector
7) Fuel pump
8) Fuel level feeler
9) Main injection relay (with diode)
10) Secondary injection relay
11) Side stand switch
12) Lambda feeler (optional)
13) Accelerator sensor
14) Engine air thermistor
15) Dashboard/engine water thermistor
16) Fan
17) Voltage regulator
18) Flywheel
19) Battery
20) Starting relay
21) Starting motor
22) Main fuses
23) Power socket
24) Secondary fuses
25) Top case light
26) Compartment light switch
27) Number plate light
28) Radio power supply
29) Rear right indicator
30) Rear left indicator
31) Parking/stop lights
32) Right tail lamp
33) Rear stop light switch
34) Front stop light switch
35) Key switch
36) Drop sensor
37) Right switch
38) Fan relay
39) Left switch
40) Horn
42) Dashboard air T thermistor
43) Dashboard
44) Speed sensor
45) Oil pressure sensor
46) Front right indicator
47) Front left indicator
48) Dipped beam bulb
49) Full beam bulbs
50) Parking lights bulb
51) Headlight
52) E.C.U. control unit
53) Left tail lamp
54) Diagnostics power socket
55) Stop lights relay
56) Third stop light bulbs
57) Handbrake switch (optional)

CABLE COLOURS

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

7

Cycle parts

BODYWORK

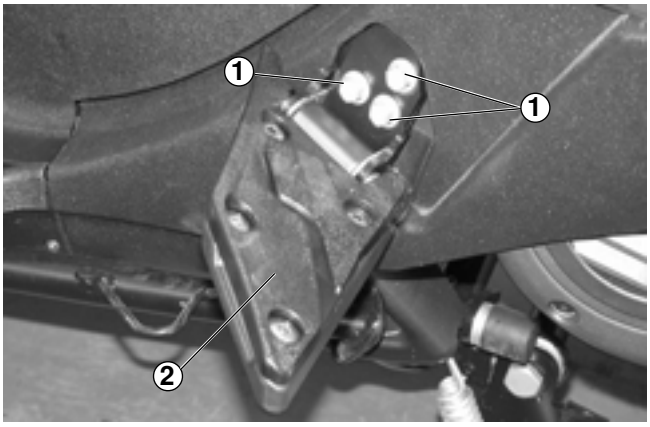
PASSENGER FOOTREST REMOVAL

Place the vehicle on the central stand.

⚠ CAUTION

Work with care.

Unscrew and remove the three screws (1).
Remove the passenger footrest (2).



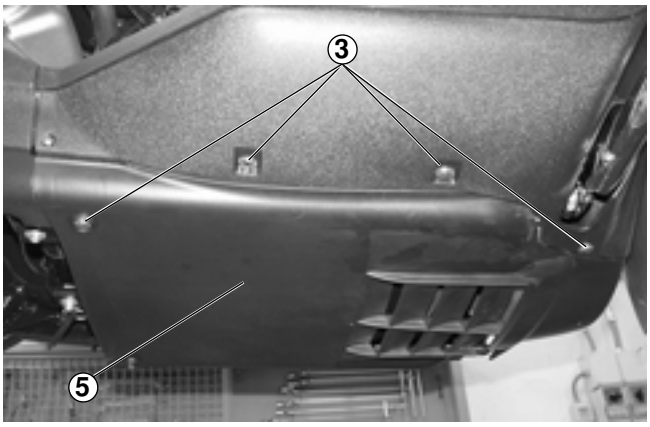
LOWER PROTECTION COVER REMOVAL

Place the vehicle on the central stand.

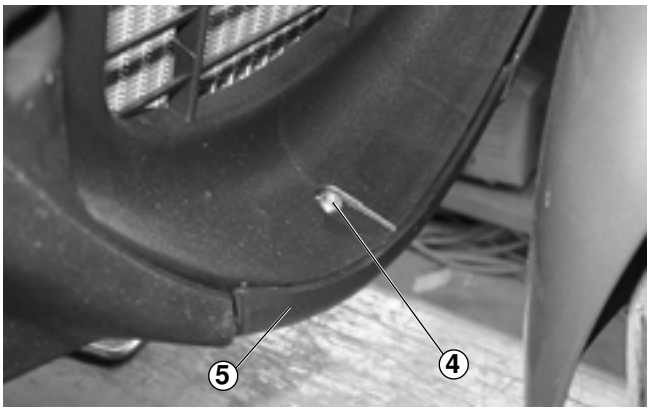
⚠ CAUTION

Work with care. Do not damage the tongue and/or the relative seats. Handle the painted components with care. Do not drag them or ruin them.

Unscrew and remove the four screws (3) on the r.h. side, and the four screws on the l.h. side.
Remove the breather pipe from the expansion tank.

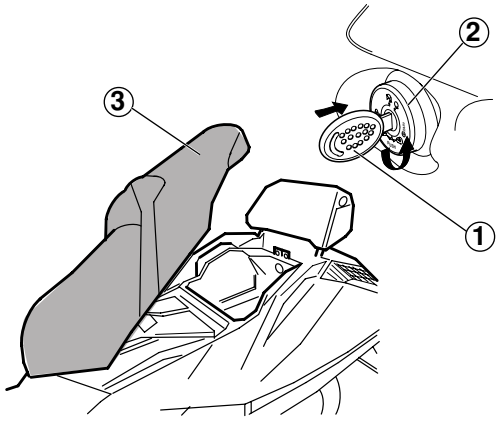


Unscrew and remove the screw (4) placed on the leading edge, behind the front wheel.
Remove the lower protection cover (5), supporting it to prevent it from dropping.



UNLOCKING/LOCKING THE SEAT

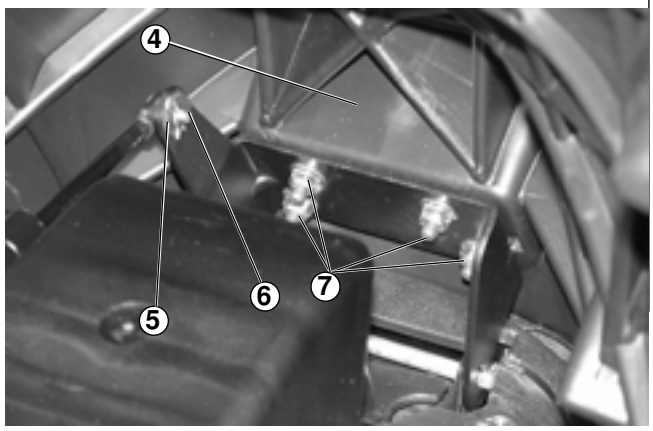
Position the vehicle on the central stand.
Insert the key (1) into the ignition switch (2).
Press and rotate the ignition key (1) in an anti-clockwise direction.
Via the pneumatic piston, the seat (3) remains in a raised position and the under-seat compartment is illuminated.
To lock the seat, lower it and press it (without forcing it), making the lock click.



⚠ WARNING

Before riding again, make sure that the seat is correctly locked.

SEAT REMOVAL



Place the vehicle on the central stand.
Lift up the seat (4) (see UNLOCKING/LOCKING THE SEAT).

⚠ CAUTION

Work with care.

Utilising a suitable pincer, unclip the clip (5).

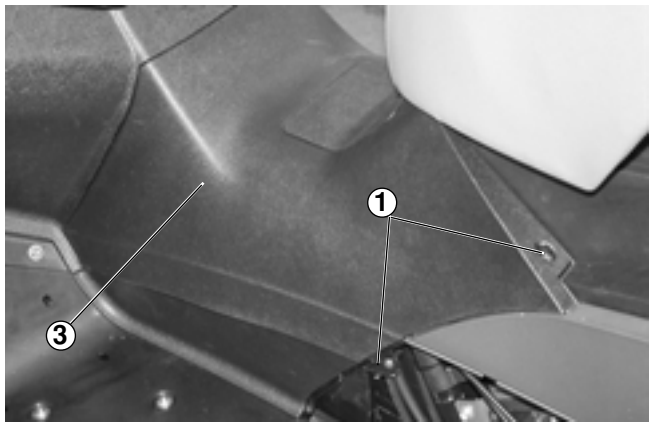
⚠ CAUTION

Prop up the seat do make sure it does not fall unexpectedly.

Remove the pin (6).
Unscrew and remove the four nuts (7).
Remove the seat (4).

7

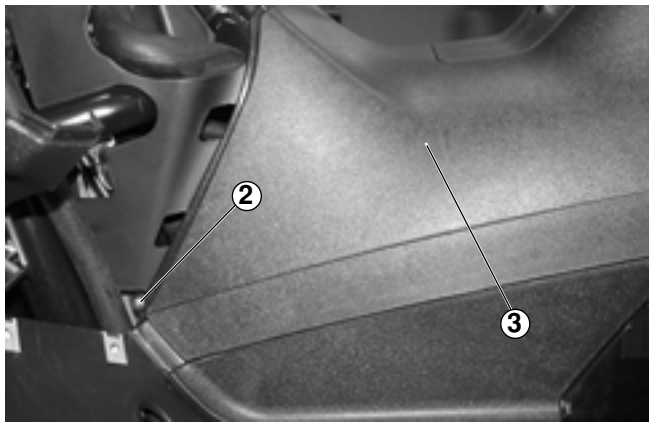
CENTRAL TUNNEL REMOVAL



Place the vehicle on the central stand.
Remove the seat (see SEAT REMOVAL).
Remove the right and left inspection covers (see RIGHT AND LEFT INSPECTION COVER REMOVAL).
Remove the legshield (see LEGSHIELD REMOVAL).

⚠ CAUTION

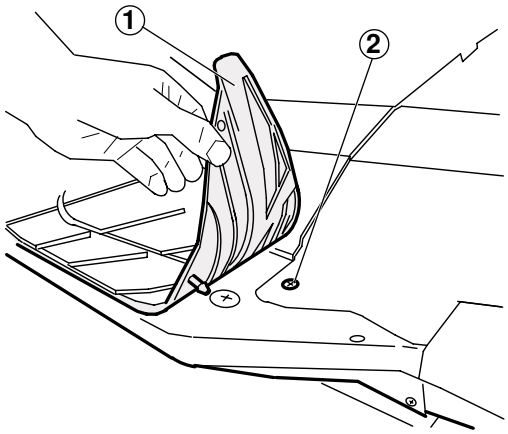
Work with care. Do not damage the tongue and/or the relative seats. Handle the painted components with care. Do not drag them or ruin them.



Unscrew and remove the two screws (1) on the right and left side.
Unscrew and remove the screw (2) on the right and left side.
Remove the central tunnel (3).

LEFT AND RIGHT HAND INSPECTION COVER REMOVAL

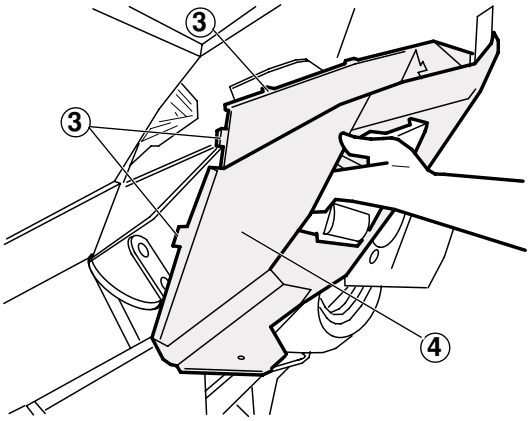
Place the vehicle on the central stand.
Remove the left and right hand rubber mats (1) by lifting them up with the hands.
Unscrew and remove the screw (2).



⚠ CAUTION

Work with care.
Do not damage the tabs (3) and/or the relative seats. Handle the painted and plastic components with care. Do not drag them or ruin them.

Utilising a screwdriver, pull up the lower part of the inspection cover (4) until it slips out from its seat.

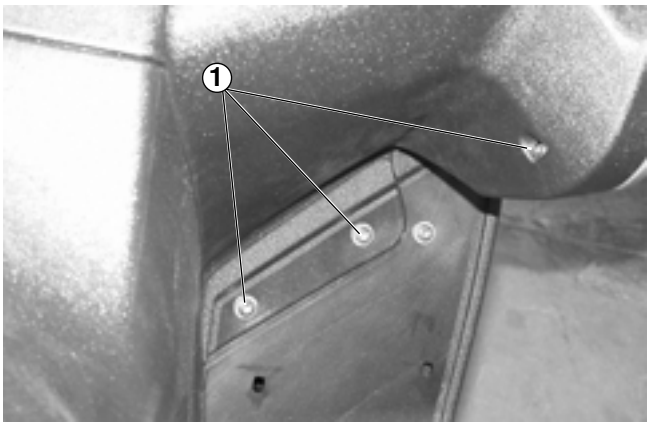


⚠ CAUTION

When reassembling, correctly insert the tabs into their relative seats

LEGSHIELD REMOVAL

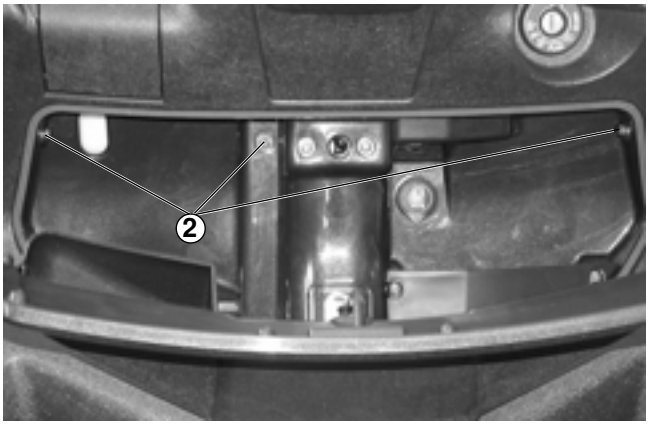
Place the vehicle in the central stand.



⚠ CAUTION

Work with care.
Do not damage the tongue and/or the relative seats. Handle the painted components with care. Do not drag them or ruin them.

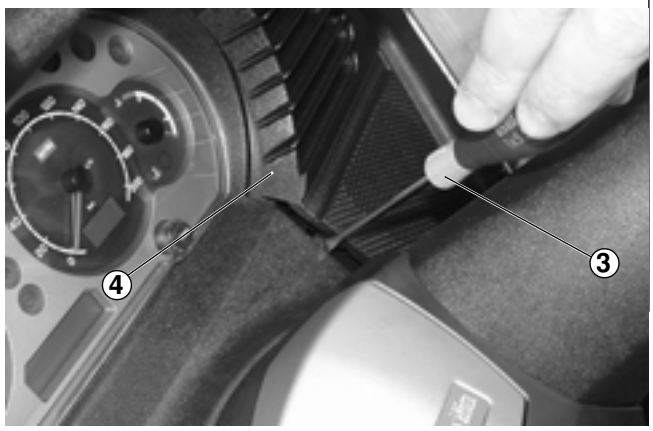
Remove the rubber foot mat by lifting it with the hands.
Unscrew and remove the three screws (1).
Open the door of the document compartment (see DOCUMENT COMPARTMENT).
Unscrew and remove the three screws (2).



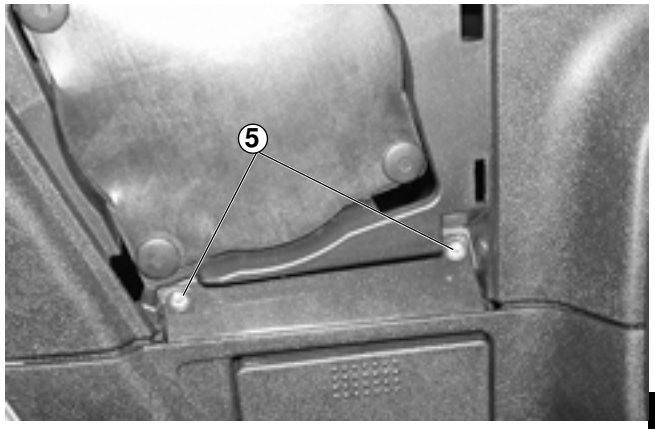
⚠ CAUTION

Work with care.
Do not damage the plastic finish.

Utilising a flat-bladed screwdriver (3), lever up the speaker cover (4) to free it from its seat, as indicated in the figure.
Remove the speaker cover (4).



Unscrew and remove the two screws (5).

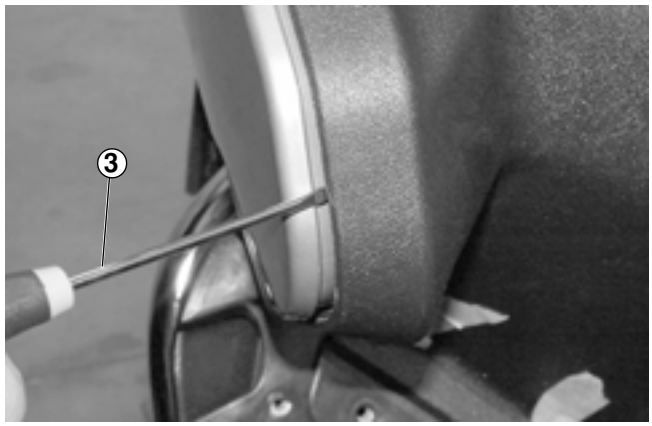


7

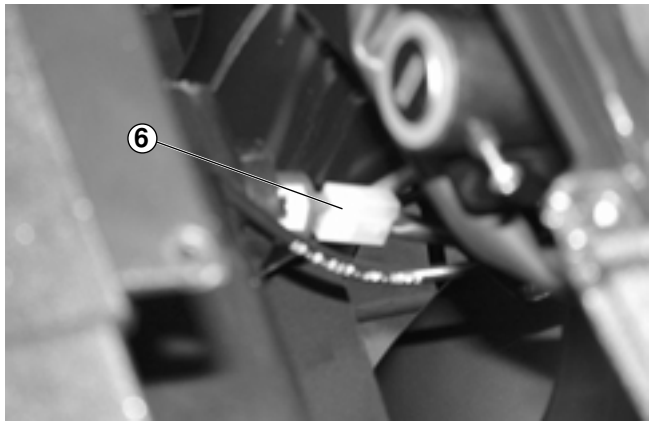
⚠ CAUTION

Work with care. Do not damage the tongue and/or the relative seats. Handle the painted components with care. Do not drag them or ruin them.

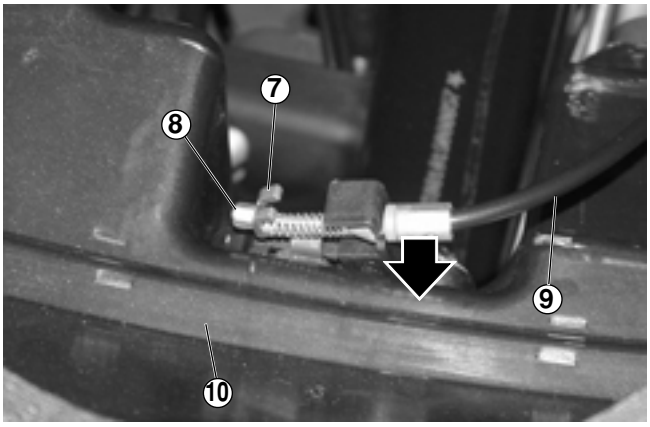
Utilising a flat-bladed screwdriver (3), lever up the edge of the legshield in such a way that it frees itself from its seat.



Once the legshield is freed from its seat, remove it slightly to disconnect the electrical connection (6) from the 180W electrical socket situated inside the document compartment.

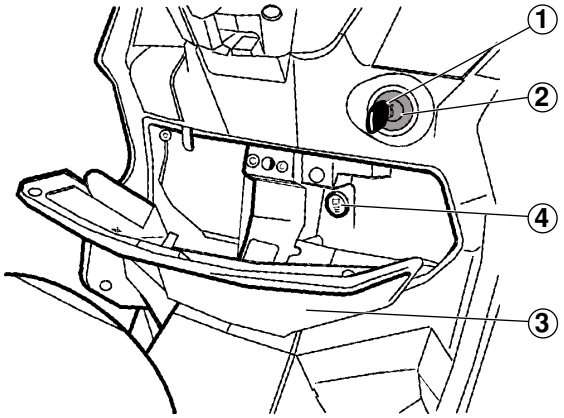


Pull the tabs (7) towards the cable (9), in such a way that the cable head (8) is freed by lifting it up. Pull the cable (9) in the direction indicated by the arrow to free the legshield from the document compartment closure.
Remove the legshield (10).



DOCUMENT COMPARTMENT

Thanks to the utilisation of the document compartment it is not necessary to carry cumbersome objects around with you every time you park the vehicle.
Insert the key (1) into the ignition switch (2).
Press and rotate the key in an anti-clockwise direction.
The door of the document compartment (3) opens automatically.
Inside the document compartment there is a 12V socket (4).
The socket can be utilised for as an electrical feed for items with an output of not more than 180W (mobile phones, inspection lamp, etc.).



⚠ CAUTION

The prolonged use of the electrical socket without the engine switched on can cause a partial discharge of the battery.

FRONT MUDGUARD REMOVAL

Place the vehicle on the central stand.

⚠ CAUTION

Work with care. Do not damage the tongue and/or the relative seats. Handle the painted components with care. Do not drag them or ruin them.

Unscrew and remove the screw (7).
Unscrew and remove the two screws (5).
Remove the front mudguard (6) by releasing it from the front part of the vehicle.

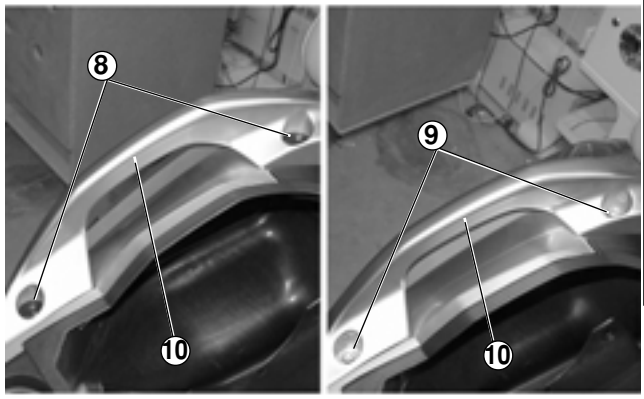
PASSENGER HANDLE-GRIP REMOVAL

Place the machine on the central stand.

⚠ CAUTION

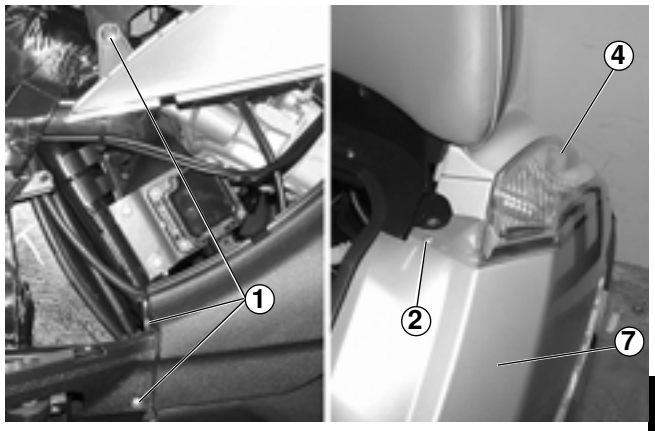
Work with care. Do not damage the tongue and/or the relative seats. Handle the painted components with care. Do not drag them or ruin them.

Lift up the seat (see UNLOCKING/LOCKING THE SEAT).
Utilising a small flat head screwdriver, lever up the two rubber plugs (8).
Unscrew and remove the two screws (9).
Remove the passenger handle-grip (10) by rotating it towards the vehicle.



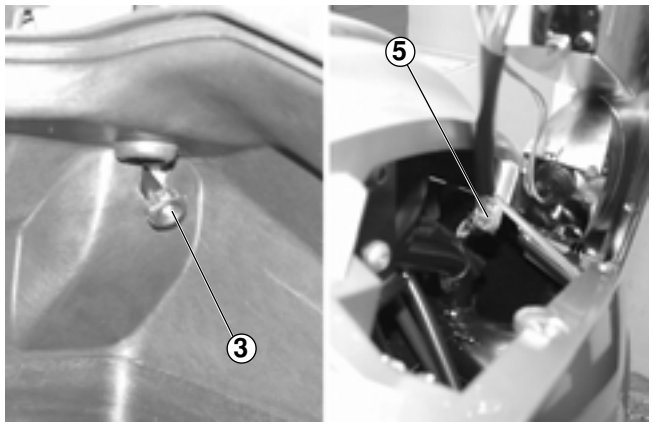
COMPLETE SIDE PANEL REMOVAL

Remove the inspection covers (see RIGHT AND LEFT HAND INSPECTION COVER REMOVAL).
Remove the passenger footrests (see PASSENGER FOOTREST REMOVAL).
Lift up the seat (see UNLOCKING/LOCKING OF THE SEAT).
Place the vehicle on the central stand.
Unscrew and remove the three screws (1).
Unscrew and remove the screw (2).

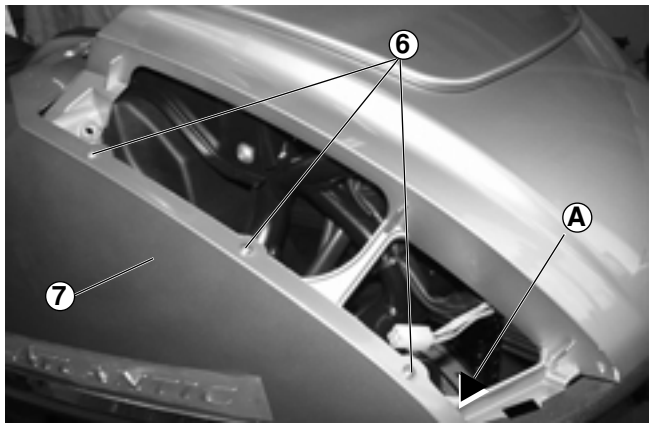


7

From inside the crash helmet compartment, slacken and remove the fixing knob (3) of the light assembly (4).
Slightly lift up the rear light assembly (4) from the side panel and disconnect the electrical connection (5).
Remove the rear light assembly (4).



Unscrew and remove the three screws (6).
Lower the side stand (only for the left side).
Remove screw (A) from the number plate holder .
Rotating away from the vehicle, remove the cover (7) complete with the chromed strip.



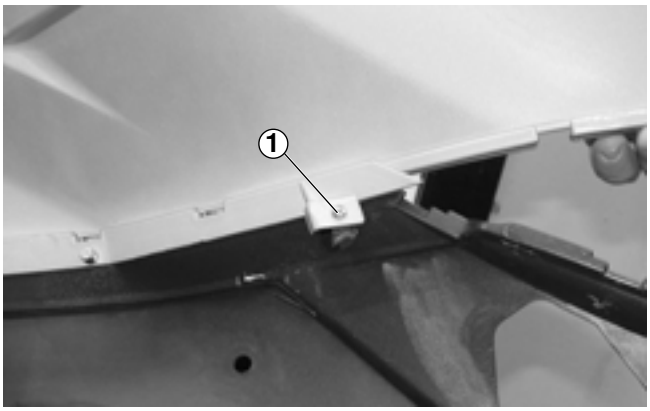
REMOVAL OF THE CHROMED STRIP FROM THE SIDE PANELS

Remove the complete side panel (see COMPLETE SIDE PANEL REMOVAL).

⚠ CAUTION

Work with care. Do not damage the tongue and/or the relative seats. Handle the painted components with care. Do not drag them or ruin them.

Unscrew and remove the screw (1) situated inside the side panel.
Remove the chromed strip by slightly arcing it in the central part.



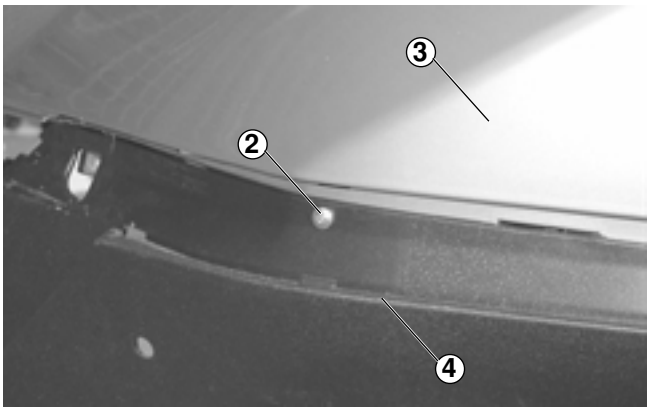
SIDE PANEL SEPARATION

Remove the complete side panels (see COMPLETE SIDE PANEL REMOVAL).
Remove the chromed strip on the side panels (see REMOVAL OF THE CHROMED STRIP FROM THE SIDE PANELS).

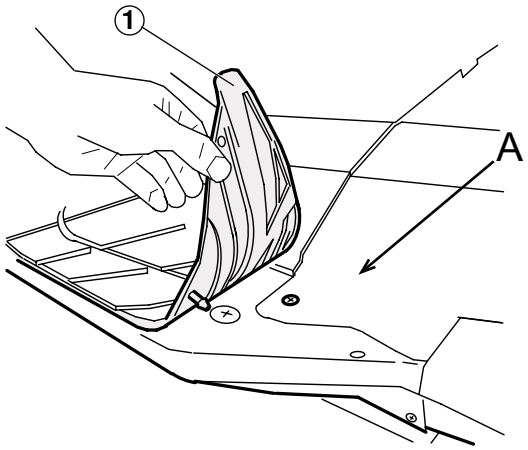
⚠ CAUTION

Work with care. Do not damage the tongue and/or the relative seats. Handle the painted components with care. Do not drag them or ruin them.

Unscrew and remove the screw (2) situated under the chromed strip.
Separate the two screws of the side panels (3) and (4), sliding them against one another but also paying attention to not damage the tabs.



FOOT PLATFORM REMOVAL

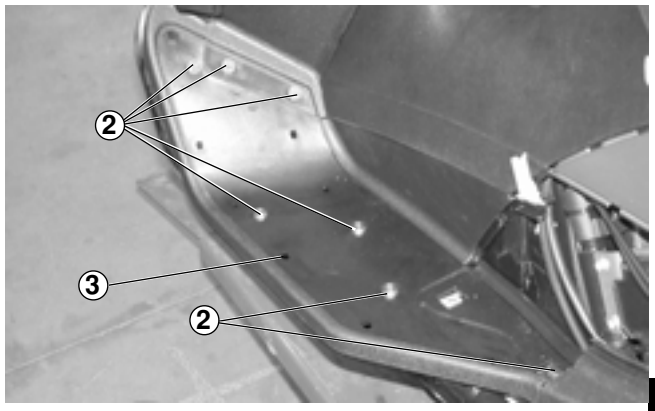


Place the vehicle on the central stand.
Remove the rubber mats (1) by lifting them by hand.
Remove the cover to gain access to the spark plug (A).

⚠ CAUTION

Work with care. Do not damage the tongue and/or the relative seats. Handle the painted components with care. Do not drag them or ruin them.

Unscrew and remove the seven screws (2).
Remove the foot platform (3).



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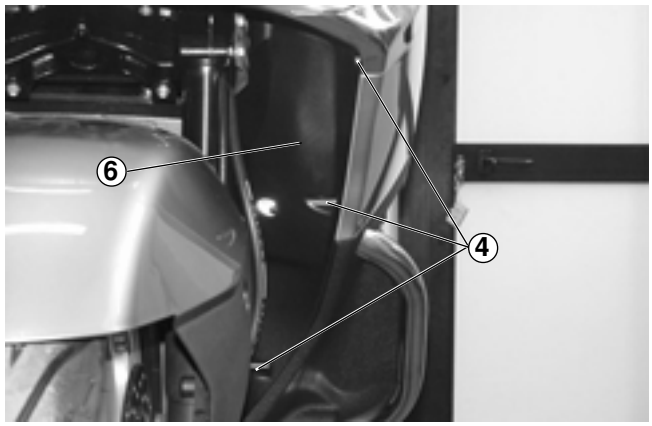
SPRAY GUARD REMOVAL

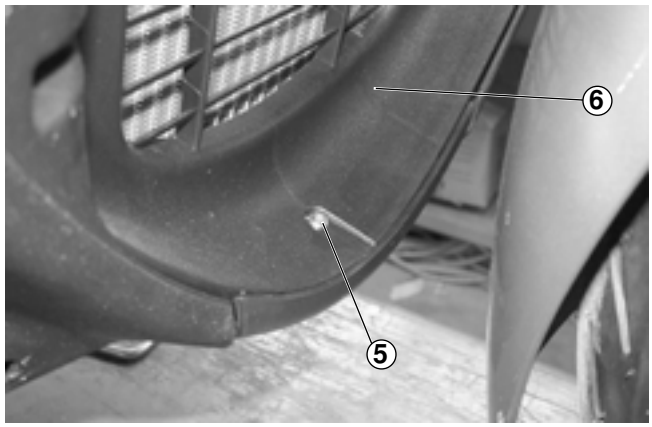


Place the vehicle on the central stand.

⚠ CAUTION

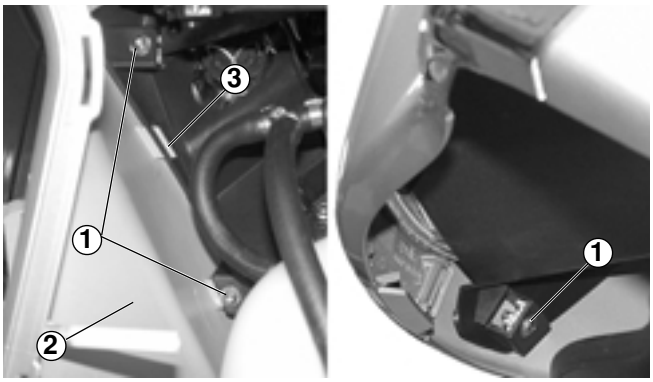
Work with care. Do not damage the tongue and/or the relative seats. Handle the painted components with care. Do not drag them or ruin them.

Remove the front mudguard (see FRONT MUDGUARD REMOVAL).
Remove the front wheel (see FRONT WHEEL REMOVAL).
Unscrew and remove the three screws (4) (on the right and left side of the vehicle).



Unscrew and remove the screw (5).
Remove the spray guard (6) by sliding it out from underneath.

FRONT SHIELD REMOVAL



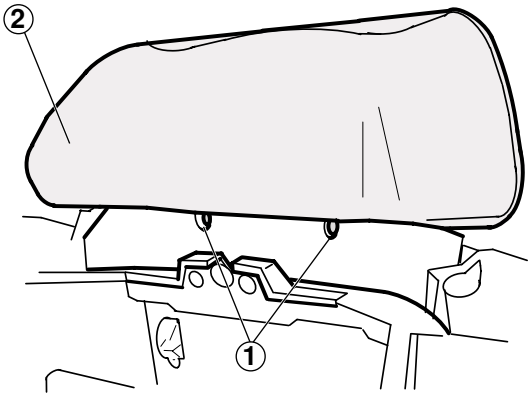
Remove the spray guard (see SPRAY GUARD REMOVAL).
Remove the legshield (see LEGSHIELD REMOVAL).

⚠ CAUTION

Work with care. Do not damage the tongue and/or the relative seats. Handle the painted components with care. Do not drag them or ruin them.

Unscrew and remove the three screws (1) (three on the right and three on the left).
Free the front shield (2) from its supports by acting on the tabs (3) via the utilisation of a flat head screwdriver.
Remove the front shield (2), sliding it out from the front part of the vehicle.

PASSENGER BACKREST REMOVAL



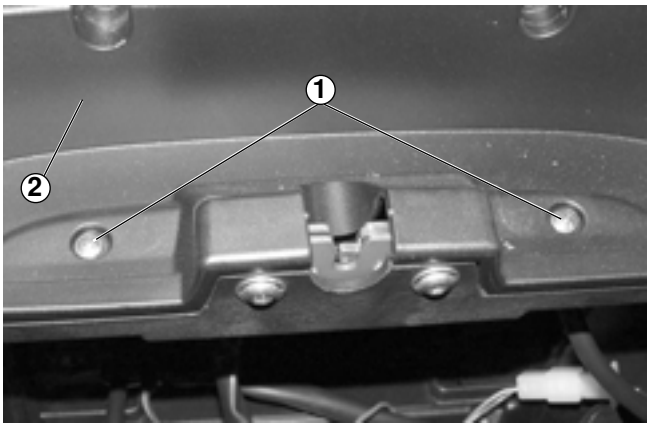
Lift up the seat (see UNLOCKING/LOCKING OF THE SEAT).
Slacken and remove the two fixing screws (1) of the backrest.

⚠ CAUTION

During the backrest removal, proceed with care so as not to break the engagement teeth.

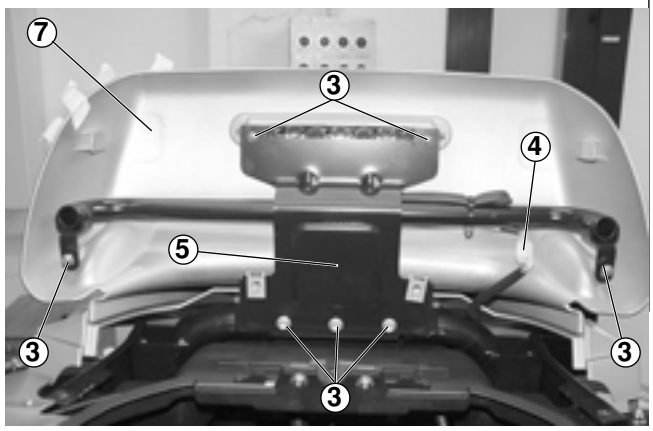
Remove the backrest (2) by pulling it upwards.

PLASTIC BACKREST REMOVAL

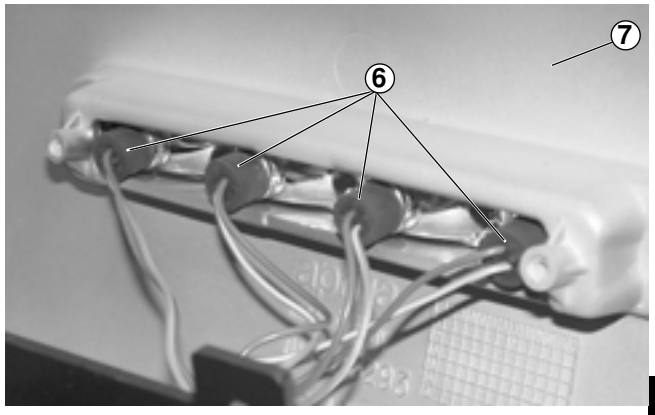


Remove the passenger backrest (see PASSENGER BACKREST REMOVAL).
Unscrew and remove the two screws (1).
Remove the cover (2) of the seat closure.

Unscrew and remove the seven screws (3).
Disconnect the electrical connection (4).
Remove the support arc (5).



Disconnec the electrical connection from the bulbs (6) and the third stoplight.
Lift up and remove the plastic part (7) of the backrest.



7

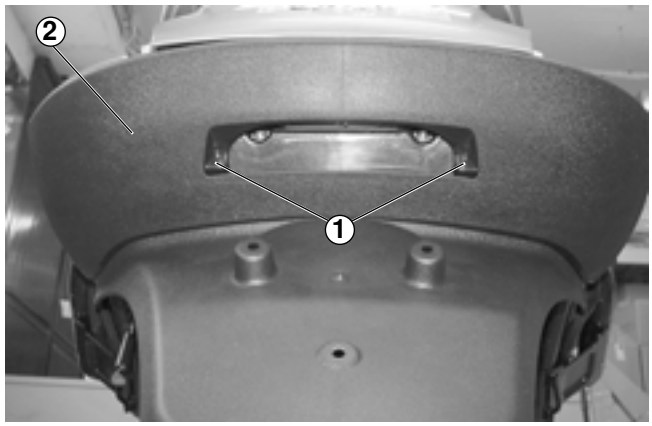
REAR MUDGUARD REMOVAL

Place the vehicle on the central stand.

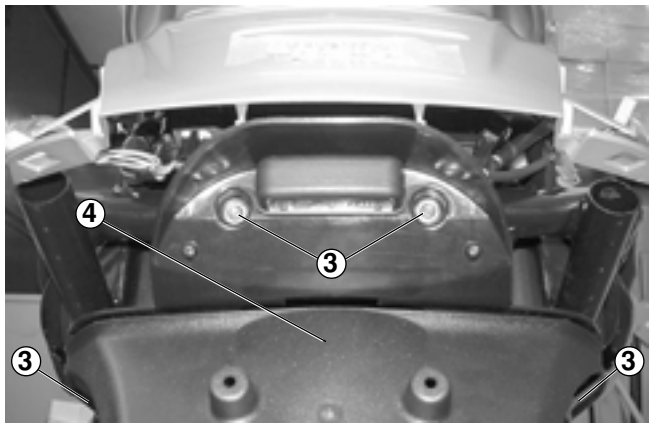
⚠ CAUTION

Work with care. Do not damage the tongue and/or the relative seats. Handle the painted components with care. Do not drag them or ruin them.

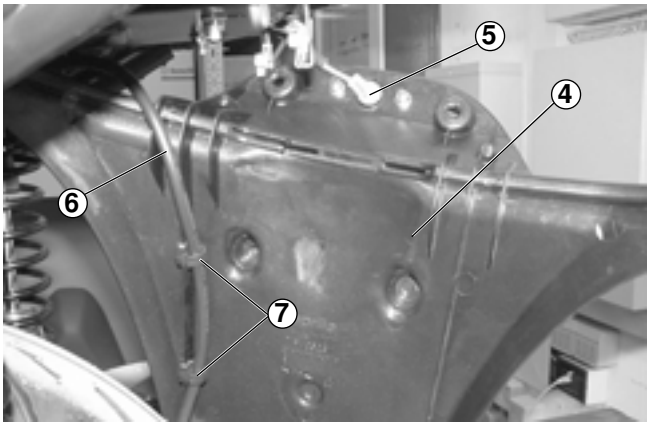
Unscrew and remove the two screws (1).
Remove the number plate light cover.
Remove the plastic cover by pulling it (2).



Unscrew and remove the four screws (3).
Support and slightly remove the rear mudguard (4).

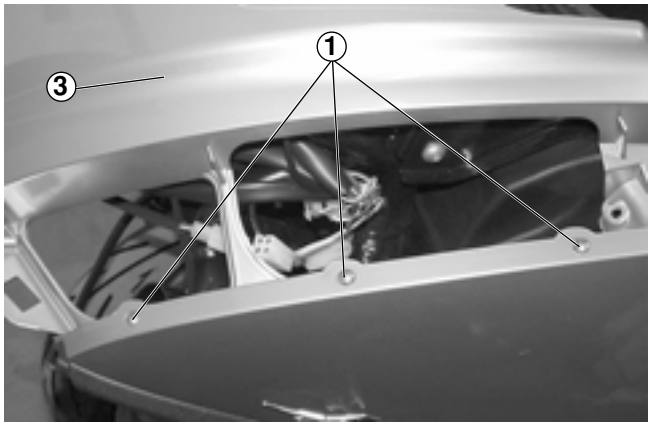


Holding the rear mudguard in the hand, disconnect the number plate light bulb (5), slide out the battery overflow tube (6) from the guide clip (7).
Remove the rear mudguard (4).

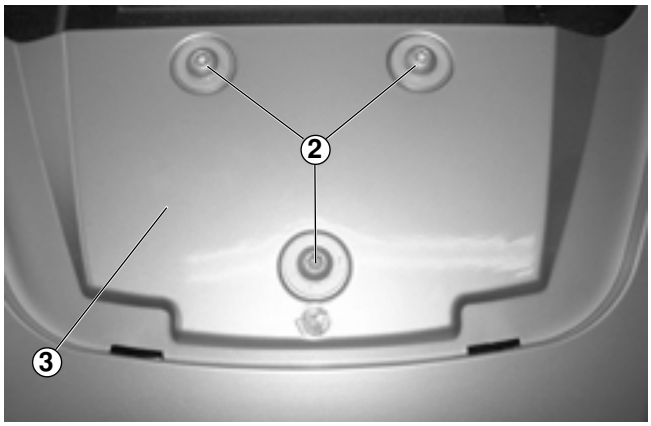


TAIL UNIT REMOVAL

Remove the plastic backrest (see PLASTIC BACKREST REMOVAL).
Remove the rear mudguard (see REAR MUDGUARD REMOVAL).
Remove the rear light assembly (see COMPLETE SIDE PANEL REMOVAL).
Unscrew and remove the three screws (1).



Unscrew and remove the three screws (2), taking care to recover the washers and ferrules.
Remove the tail unit by sliding out from the rear of the vehicle (3).



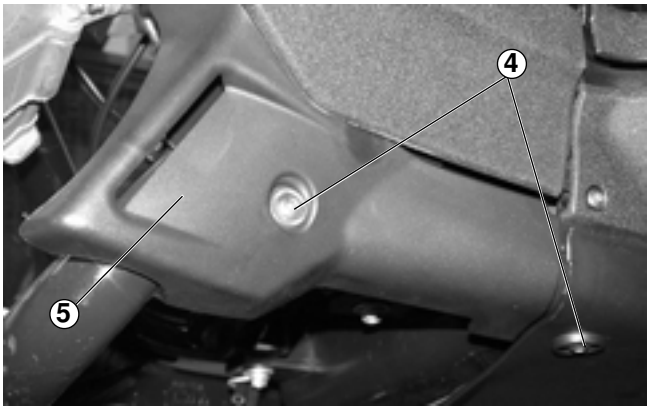
LOWER COVER REMOVAL

Place the vehicle on the central stand.

⚠ CAUTION

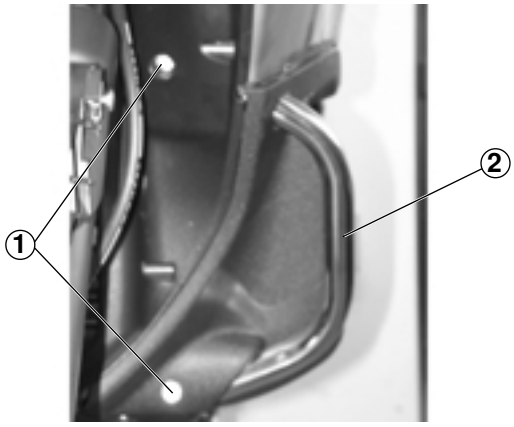
Work with care. Do not damage the tongue and/or the relative seats. Handle the painted components with care. Do not drag them or ruin them.

Unscrew and remove the two screws (4).
Remove the lower cover (5).

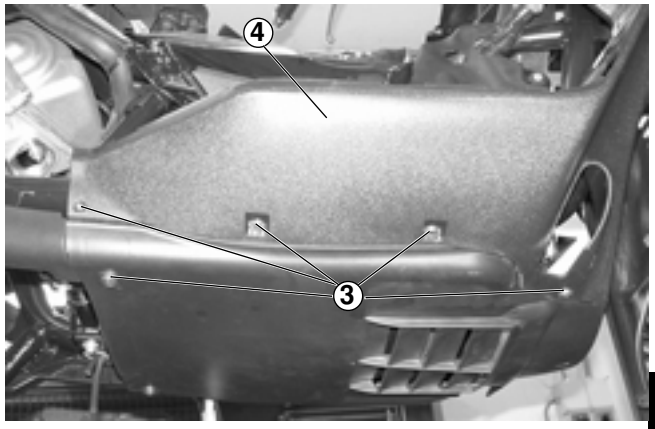


FOOTREST SUPPORT AND LOWER SPRAY GUARD REMOVAL

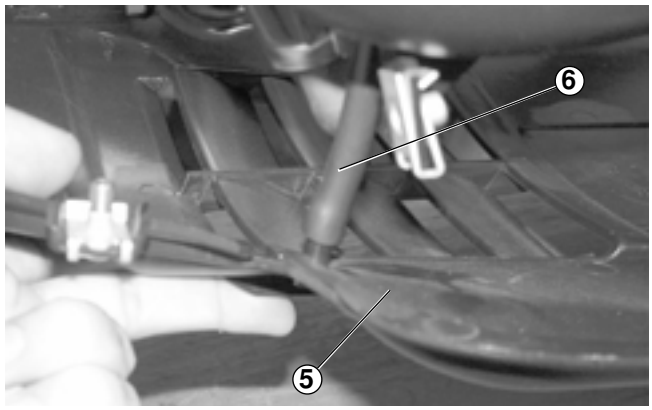
Remove the legshield (see LEGSHIELD REMOVAL).
Remove the central tunnel (see CENTRAL TUNNEL REMOVAL).
Unscrew and remove the two screws (1).
Remove the chromed protection tube (2).



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

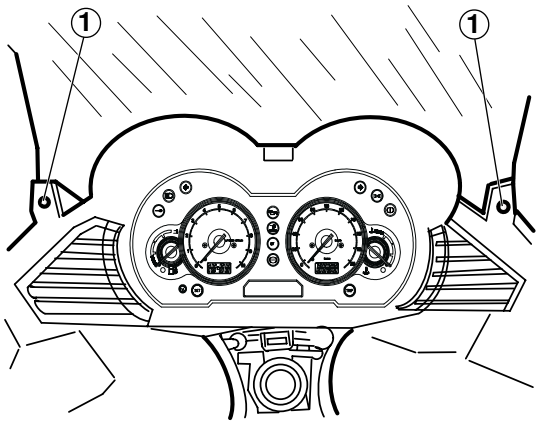


Support the lower spray guard (5).
Disconnect the overflow tube (6) of the coolant tank.
Remove the lower spray guard (5).



FRONT PANEL REMOVAL

Place the vehicle on the central stand.
Unscrew and remove the two screws (1).



⚠ CAUTION

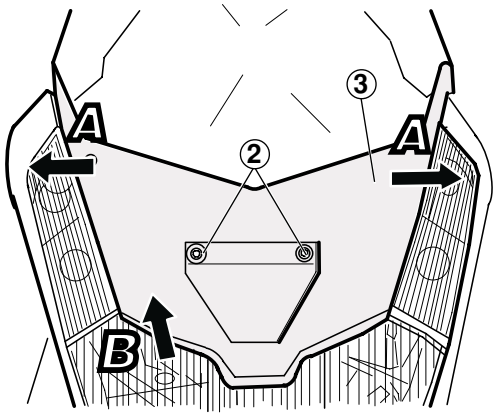
Work with care. Do not damage the tongue and/or the relative seats. Handle the painted components with care. Do not drag them or ruin them.

Unscrew and remove the two screws (2).

⚠ CAUTION

During the removal, take care to not drop the clips attached to the engagement tabs.

Slightly widen the tabs of the front panel as indicated by the arrow “A” in such a way that the engagement tabs are freed from the windshield.
Slightly lift up the lower part of the front panel, as indicated by arrow “B”.
Remove the front panel (3) by pulling it with caution.

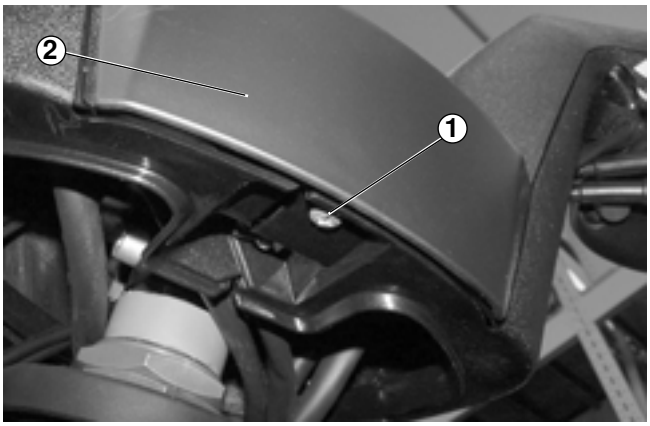


⚠ CAUTION

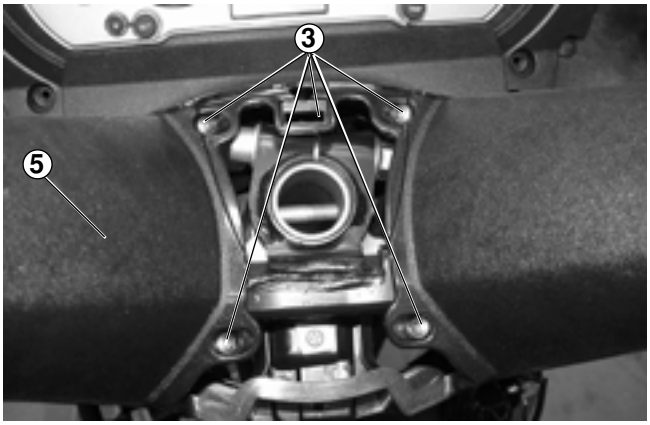
When reassembling, correctly insert the engagement tabs into their appropriate seats with their relative clips.

UPPER HANDLEBAR COVER REMOVAL

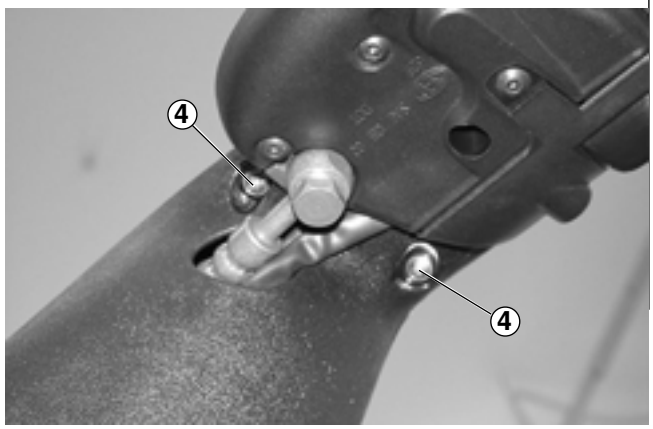
Remove the legshield (see LEGSHIELD REMOVAL).
Unscrew and remove the screw (1).
Lift up and remove the cover (2).



Unscrew and remove the five screws (3).

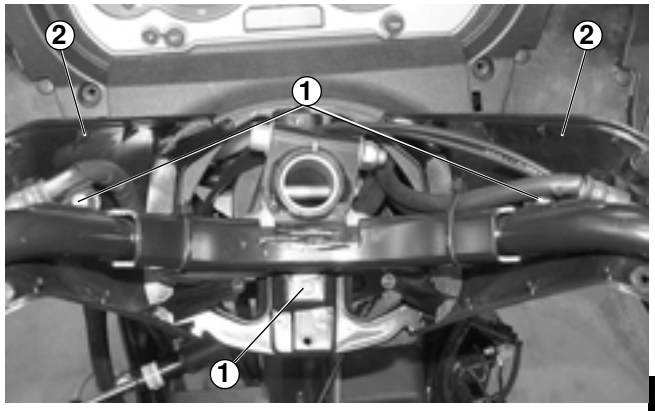


Unscrew and remove the two screws (4) on the right and left side of the vehicle.
Remove the upper handlebar cover (5).



LOWER HANDLEBAR COVER REMOVAL

Remove the upper handlebar cover (see UPPER HANDLEBAR REMOVAL).
Unscrew and remove the three screws (1).
Separate the plastic parts (2) by pulling them outwards.



7

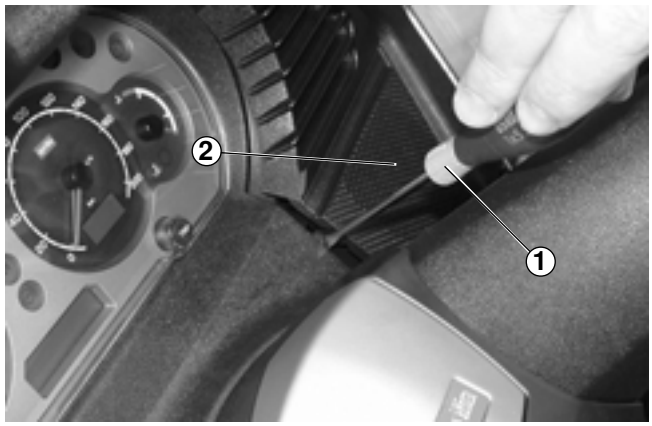
COMPLETE INSTRUMENT PANEL REMOVAL

Place the vehicle on the central stand.

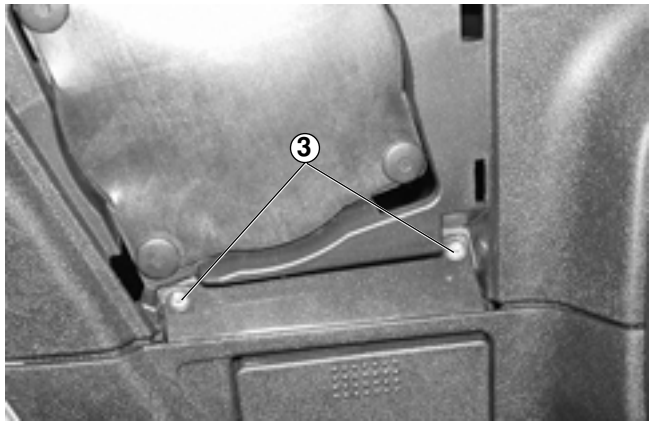
⚠ CAUTION

Work with care. Do not damage the tongue and/or the relative seats. Handle the painted components with care. Do not drag them or ruin them.

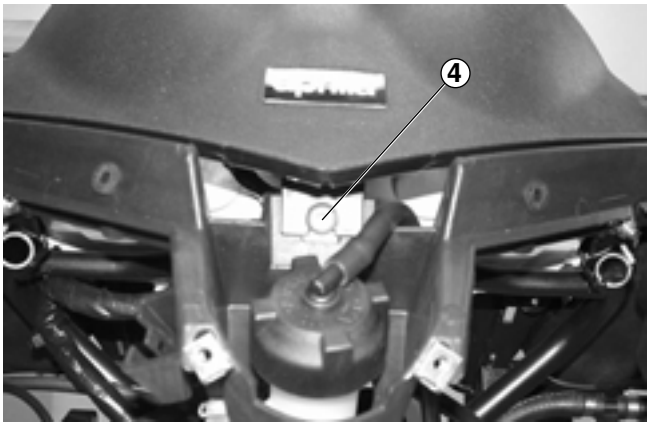
Utilising a flat head screwdriver (1), lever up the speaker cover (2) to free it from its seat (as indicated in the figure).
Remove the speaker cover (2).



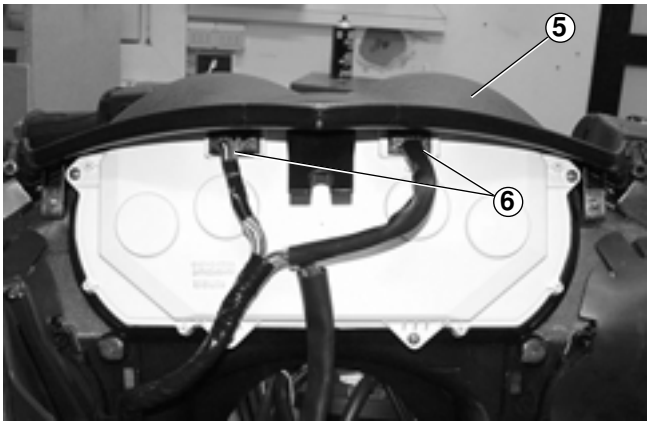
Unscrew and remove the two screws (3).



Remove the front panel (see FRONT PANEL REMOVAL).
Remove the windshield (see WINDSHIELD REMOVAL).
Unscrew and remove the screw (4).

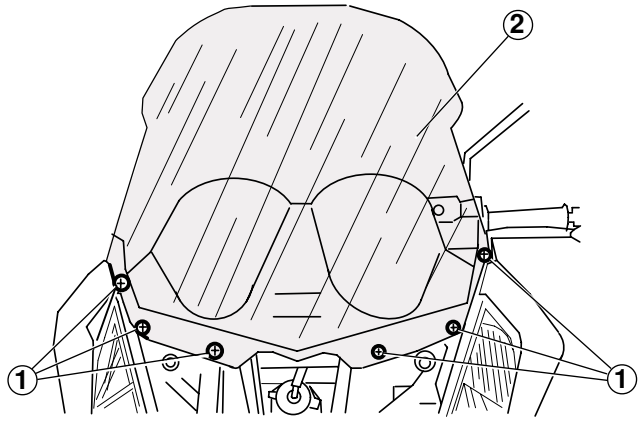


Lift up the complete instrument panel (5) and disconnect the electrical connections (6) directly from the instrument panel.
Remove the complete instrument panel (5).



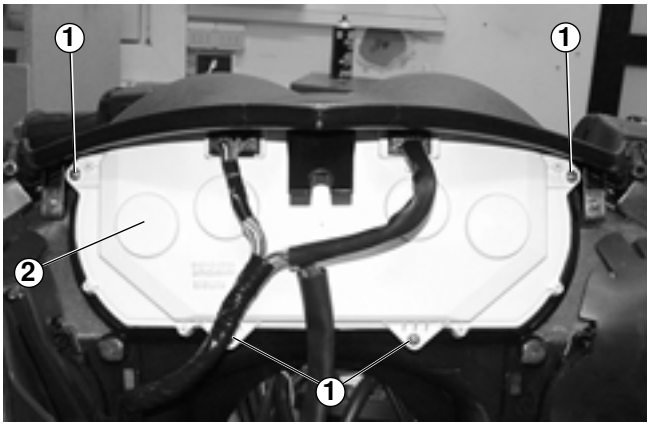
WINDSHIELD REMOVAL

Carefully read (MAINTENANCE).
Place the vehicle on the central stand.
Remove the front panel (see FRONT PANEL REMOVAL).
Slacken and remove the six fixing screws (1) of the front panel.
Remove the front panel (2).



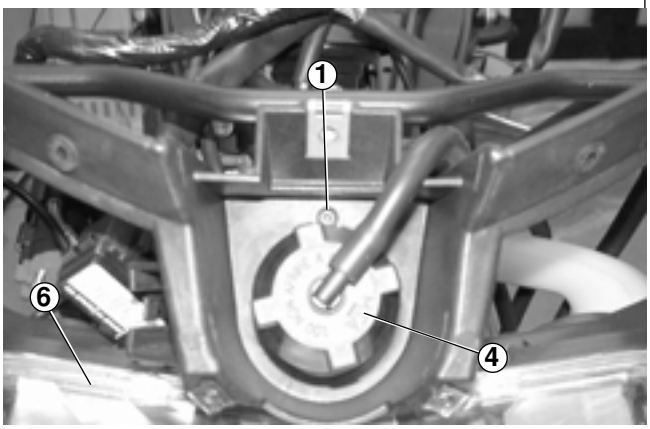
INSTRUMENT PANEL REMOVAL

Remove the complete instrument panel (see INSTRUMENT PANEL REMOVAL).
Unscrew and remove the four screws (1).
Remove the instrument panel (2).

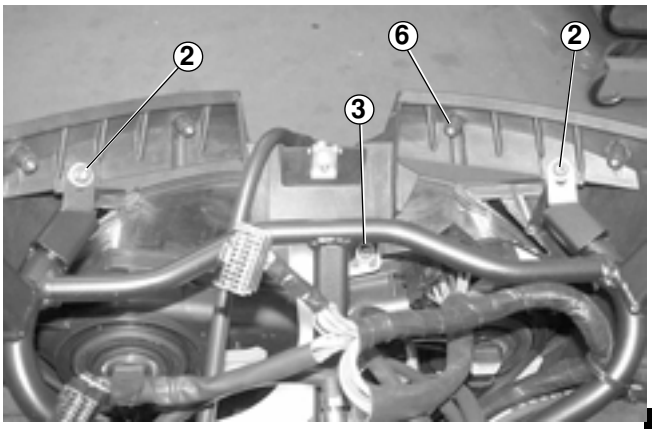


COMPLETE LIGHTING ASSEMBLY REMOVAL

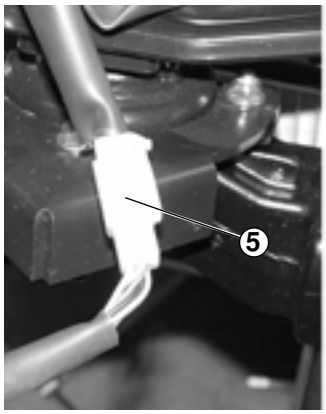
Remove the hood, (see WINDSHIELD REMOVAL).
Remove the front spray guard (see FRONT SPRAY GUARD REMOVAL).
Remove the front panel (see FRONT PANEL REMOVAL).
Remove the complete instrument panel (see INSTRUMENT PANEL REMOVAL).
Unscrew and remove the screw (1).



Unscrew and remove the two screws (2) and recover the relative self-locking nut.
Unscrew and remove the screw (3).
Unscrew the cap of the coolant tank (4).
Unloose the two screws of the lower bow (above the fork).

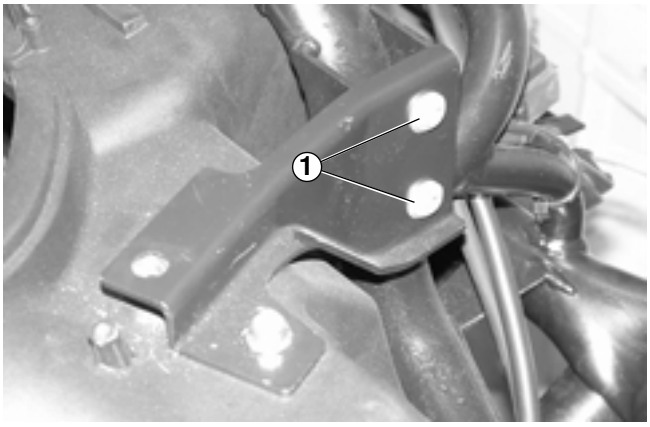


Disconnect the electrical connection (5).
Remove the complete lighting assembly (6).

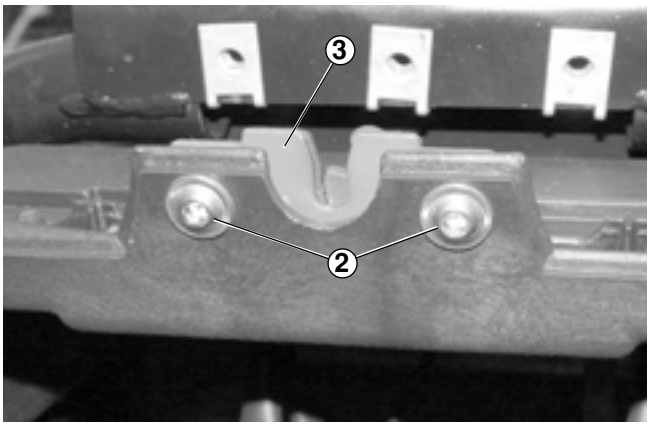


CRASH HELMET COMPARTMENT REMOVAL

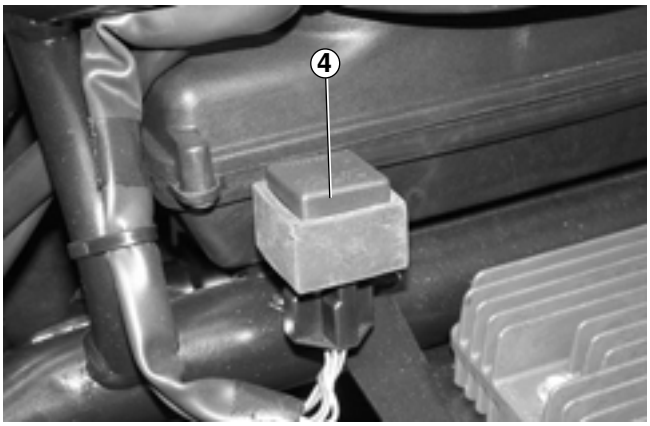
Remove the seat (see SEAT REMOVAL).
Remove the central tunnel (see CENTRAL TUNNEL REMOVAL).
Remove the left and right hand side panels (see COMPLETE SIDE PANEL REMOVAL).
Unscrew and remove the two screws (1) and recover the relative washers.
(Carry out this operation also on the right hand side)



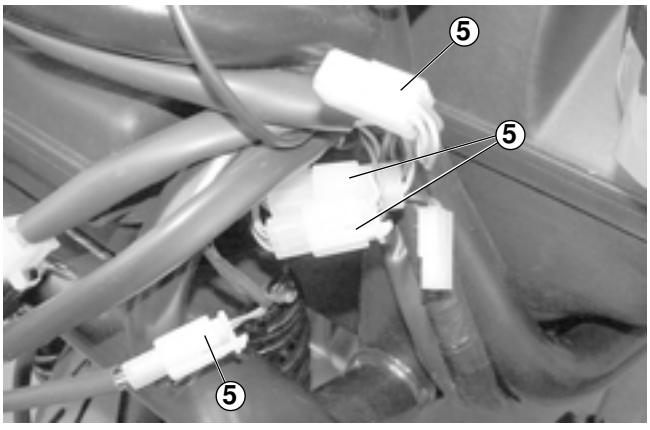
Unscrew and remove the two fixing screws (2) of the seat lock (3) from the crash helmet compartment and free the lock from the crash helmet compartment.



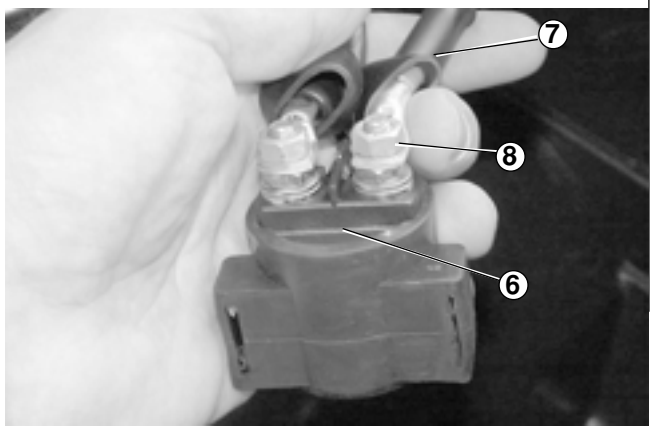
Slide out the relay (4) by pulling it upwards.



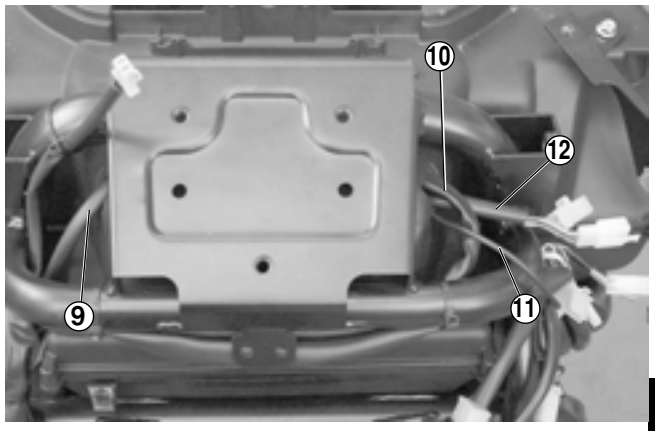
Remove the battery cover (see BATTERY COVER REMOVAL).
Disconnect the electrical connections (5) of the battery.
Remove the battery (see BATTERY REMOVAL).



Slide the starter relay (6) out of its seat inside the battery compartment.
Support it by hand and slide off the rubber protection cover (7).
Unscrew and remove the nut (8).

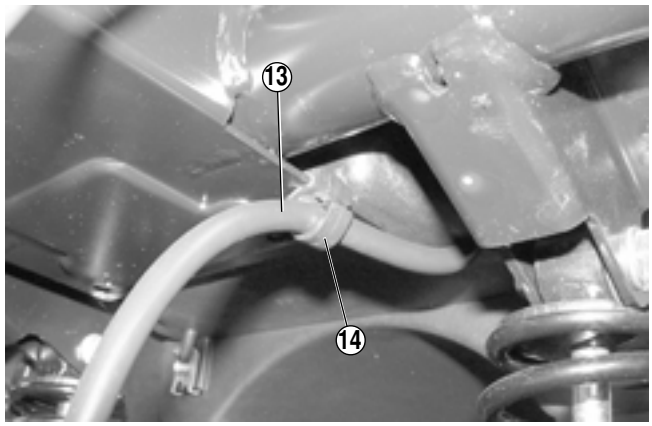


Slide out from the rear, the wiring that comes out of the crash helmet compartment.
Slide out the starter relay lead (9).
Slide out the battery lead (10).
Slide out the earth lead (11).
Slide out the fuse lead (12).

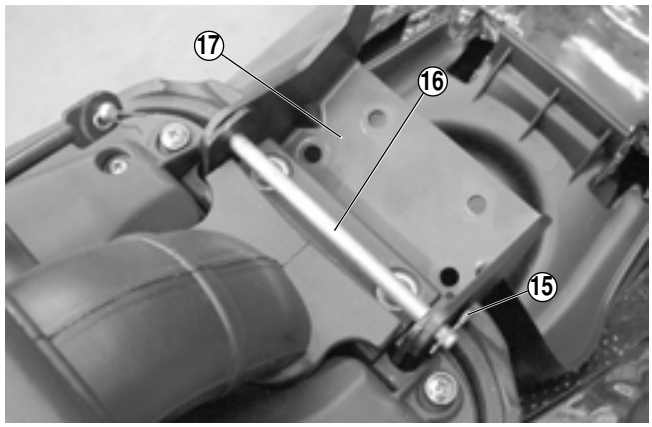


7

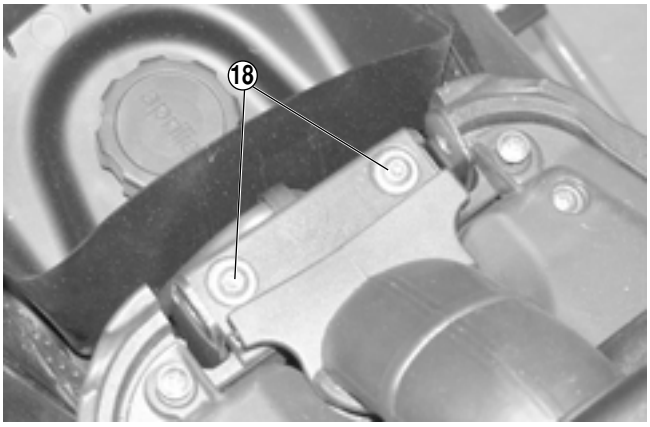
Disconnect the battery breather tube (13) from the clip (14).



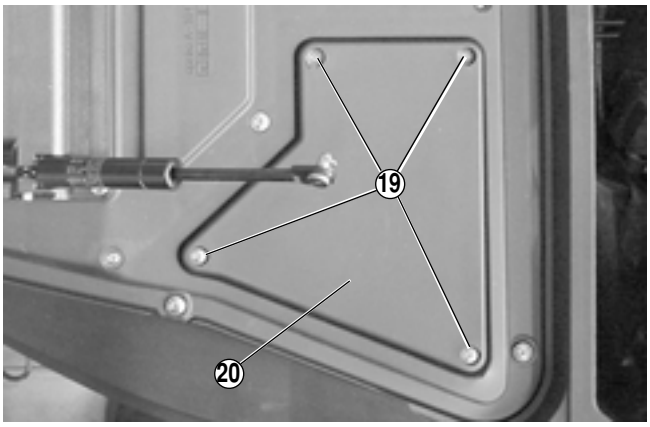
Remove the clip (15) and slide out the pin (16).
Remove the seat hinge (17).



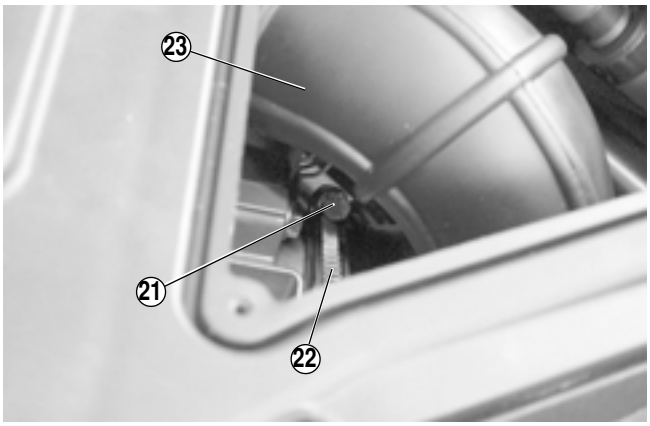
Unscrew and remove the two screws (18).



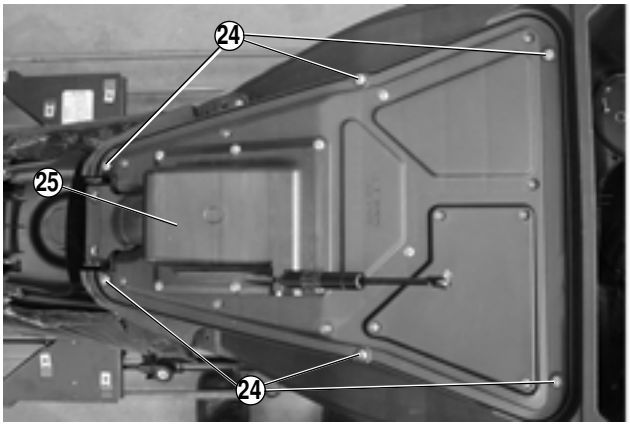
Unscrew and remove the four screws (19) of the carburettor cover (20).
Remove the carburettor cover (20).



Slacken the bands (22) via the screw (21) and slide out the fuel breather tube (23) by pulling it outwards.

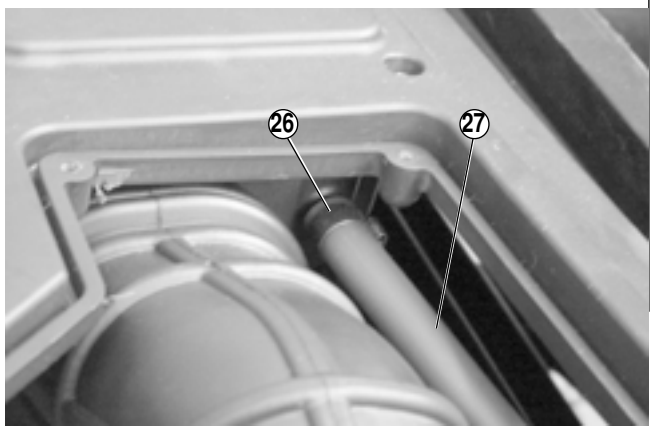


Unscrew and remove the six screws (24) from the filter box (25).



NOTE Make sure that you have a new band before substituting the old one.

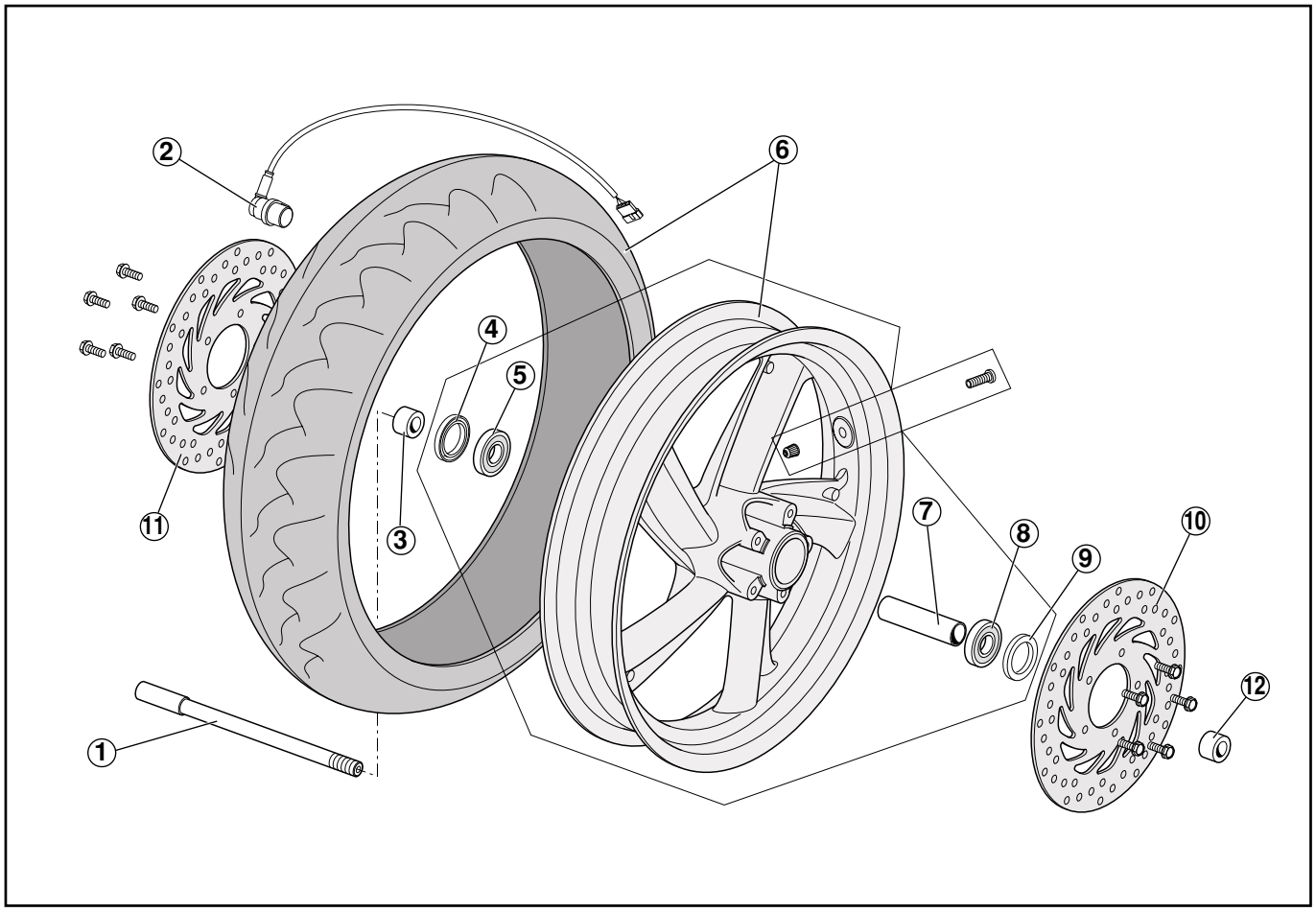
Remove the plastic band (26) and slide out the tube (27).
Remove the engine cover (25) by lifting it upwards.



Disconnect the electrical connections (28) of the crash helmet compartment light switch.
Remove the crash helmet compartment (29) by lifting up the front part and moving the complete unit forwards.

7

FRONT WHEEL



KEY

1) Axle
2) Odometer sensor
3) r.h. outer spacer
4) r.h. oil seal
5) r.h. bearing
6) Wheel
7) Inner spacer
8) l.h. bearing
9) l.h. oil seal
10) l.h. brake disc
11) r.h. brake disc
12) l.h. outer spacer

REMOVING THE FRONT WHEEL

Read through the paragraph (PRECAUTIONS AND GENERAL INFORMATION).

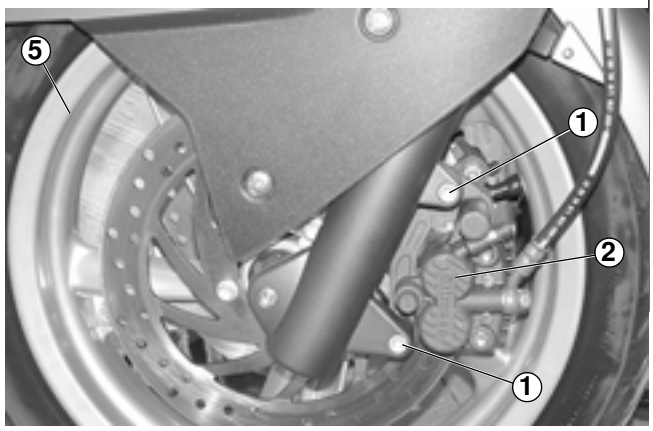
⚠ CAUTION

When removing/refitting the parts, take care not to damage the brake line, the disc and the pads.

Put the vehicle on the central stand.

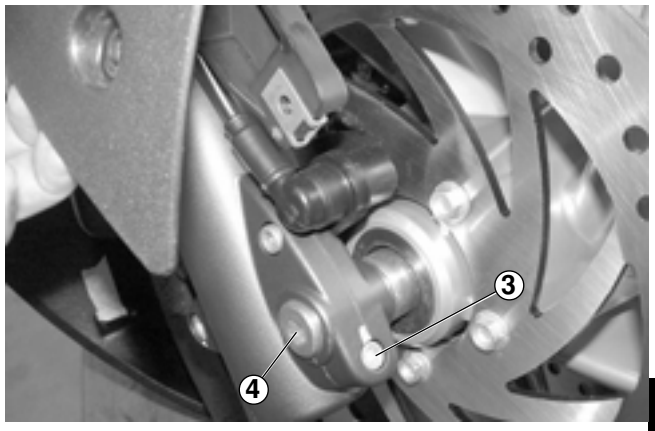
⚠ WARNING

Place a suitable support under the vehicle so that there is room for the front wheel to move and the vehicle does not topple over.



NOTE Perform the following operation also on the r.h. side of the vehicle.

Remove the two screws (1).
Carefully release the brake caliper (2).
Unloose screw (3).



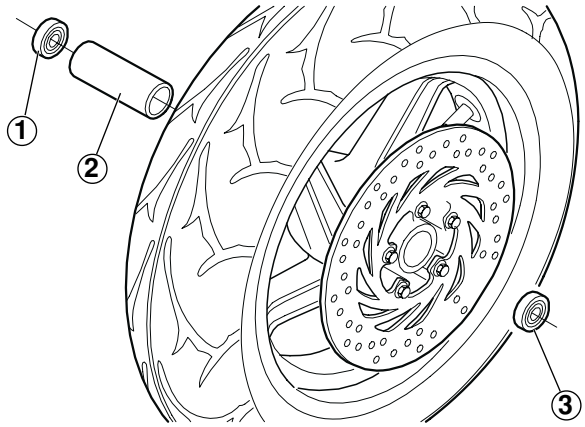
NOTE To ensure proper refitting, carefully check the positions of the parts, the washers and the spacer.

Unscrew the wheel pin (4).
Support the front wheel (5) and manually pull out axle (4).
Remove wheel (5).
Keep the right and left spacers.

⚠ WARNING

Do not pull the front brake lever after removing the wheel as the caliper piston may come out of its seat and cause a leakage of brake fluid.

For instructions on how to refit the wheel, (see REFITTING).



REPLACING THE BEARINGS

Read through the paragraph (PRECAUTIONS AND GENERAL INFORMATION).

⚠ CAUTION

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

Clean both sides of the hub with a rag.

Removal

Working on the left side of the vehicle:

Insert a drift (with no point) into the wheel hub and act on the inner race of right-hand bearing (1), taking care to shift the strike points (by 90°) so as not to offset the bearing.
Extract right-hand bearing (1).
Extract spacer (2).

Working on the right side of the vehicle:

⚠ CAUTION

Maintain the drift perpendicular to the bearing (on the same axis as the axle) to avoid offsetting and damaging the latter.

Insert a bumper with diameter of 15 mm (0.59 in) into the wheel hub and lean it against the ring inside the left bearing (3).
Drive out the bearing by repeatedly hitting the drift with moderate force with a plastic mallet.

Refitting

Working on the right side of the vehicle:

Rest the bearing on the wheel hub.

⚠ CAUTION

Maintain the drift perpendicular to the bearing (on the same axis as the axle) to avoid offsetting and damaging the bearing.

Lean a bumper with diameter of 31 mm (1.22 in) against the bearing outer diameter.
Fully insert right-hand bearing (1) by repeatedly hitting the drift with moderate force with a plastic mallet.
Fit spacer (2).

Working on the left side of the vehicle:

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

⚠ WARNING

Check the bearings centering to the wheel hub.

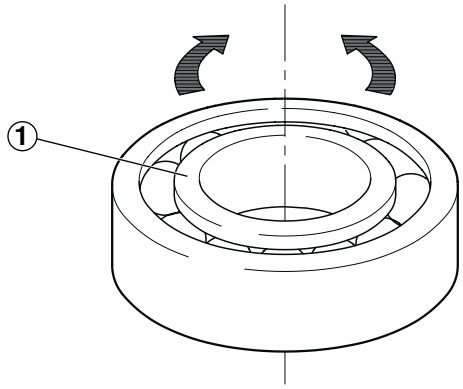
CHECK

⚠ CAUTION

Check the condition of all components, and in particular of those listed below.

Bearings

Manually rotate inner race (1), making sure it turns smoothly without any sticking and/or noise.
Also check that there is no axial play.
Replace any bearings showing the above defects.



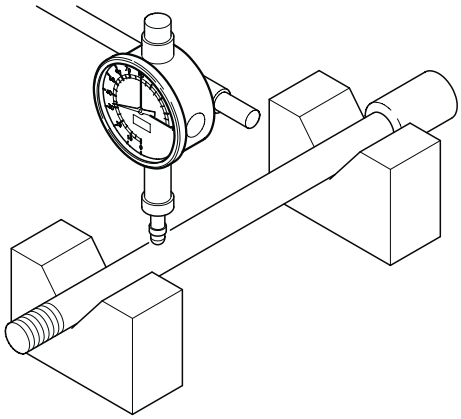
⚠ CAUTION

Grease the balls (or rollers) at the sides of each bearing (see LUBRICANT CHART).
The operation is unnecessary if the bearings are of the self-lubricating type.

Axle

Check the pin runout using a dial gauge.
If the runout exceeds the maximum allowed limit, replace the pin.

Maximum runout: 0.25 mm (0.0098 in)



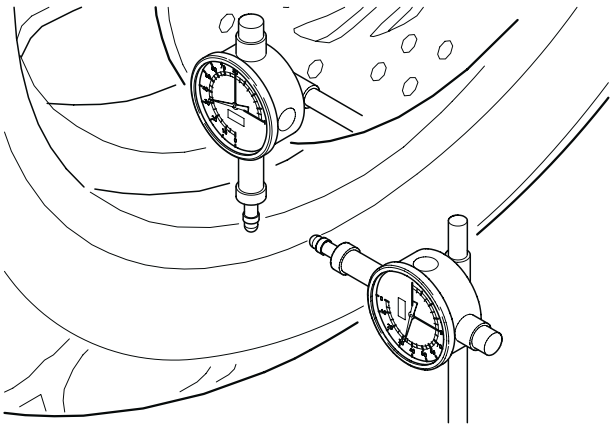
⚠ CAUTION

Lubricate the pin (only the area in contact with the bearings) see (TABLE OF LUBRICANTS).

Wheel rim

Using a dial gauge, check that the radial and axial runout of the wheel rim does not exceed the specified limit.
Excessive runout is usually caused by worn or damaged bearings. If, after replacing the bearings, the runout still exceeds the prescribed limit, replace the wheel rim.

Maximum radial and axial runout: 2 mm (0.078 in)



Speedometer drive

Check that it shows no signs of damage and/or excessive wear.

Tyre

Check the condition of the tyre (TYRES).

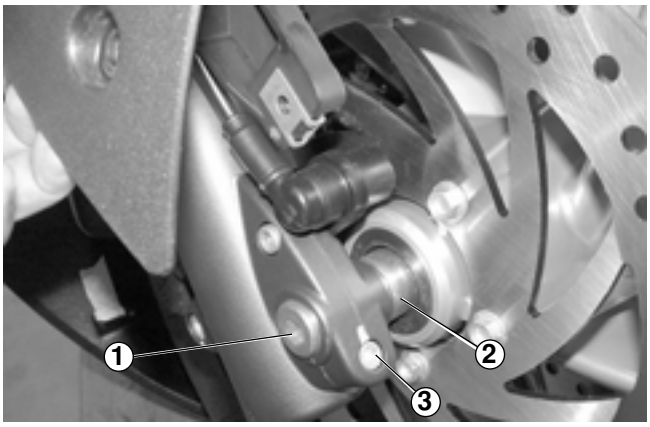
7

REFITTING THE FRONT WHEEL

⚠ CAUTION

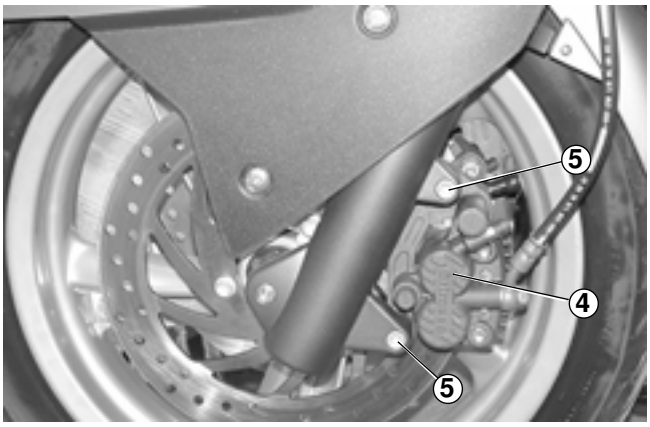
When refitting the front wheel, take care not to damage the brake line, the disc and the pads.

Position the wheel between the fork rods.
Insert axle (1) from the right side of the vehicle.
Insert the spacer (2) between the hub and the left fork rod.
Insert the spacer between the hub and the left fork rod.
Screw and tighten the wheel pin (1).



NOTE Perform these operations also on the vehicle r.h. side.

Carefully refit the brake caliper to brake disc (4).
Tighten the two screws (5).
While pulling the front brake lever, repeatedly stroke the fork by pressing down on the handlebar.
This will allow the fork rods (1) to settle appropriately .
Tighten axle clamp screw (3).

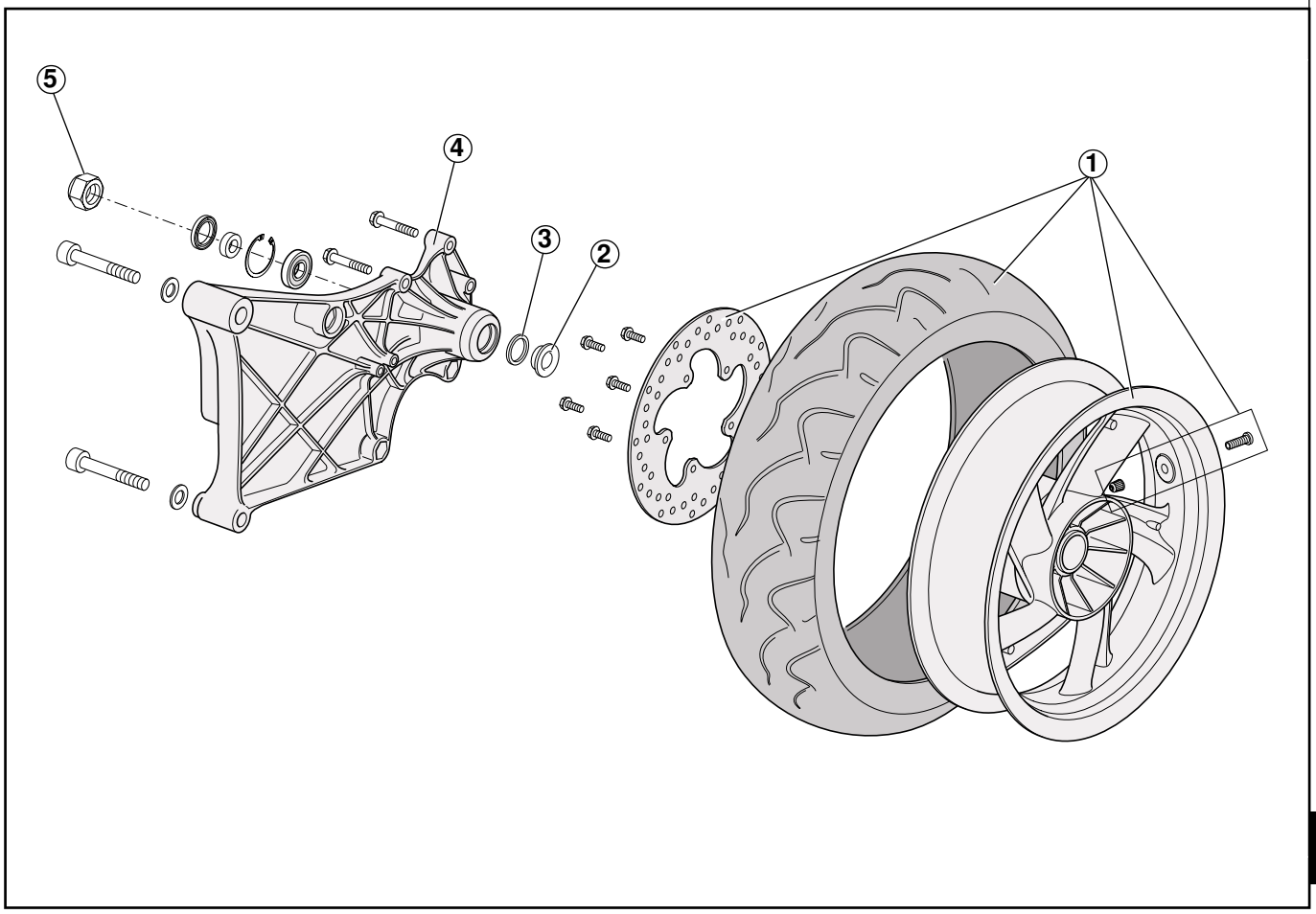


⚠ CAUTION

After refitting the parts, repeatedly pull the front brake lever and check the operation of the braking system

Check the wheel centering and balancing, see (WHEELS/TYRES).

REAR WHEEL



7

KEY

1) Wheel assembly
2) Spacer
3) Oil seal
4) Brake caliper and silencer supporting plate
5) Nut

REMOVING THE REAR WHEEL

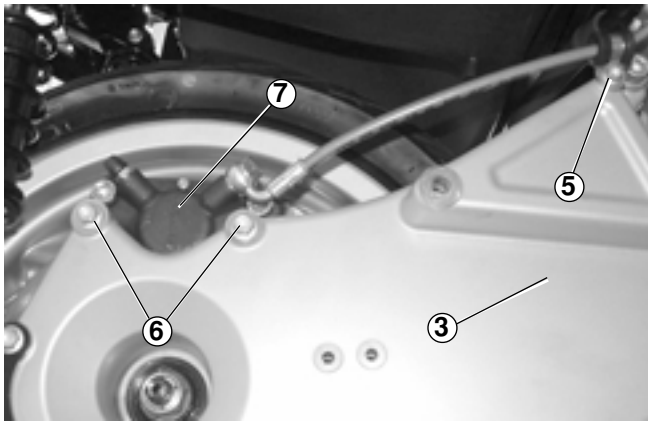
Read through the paragraph (PRECAUTIONS AND GENERAL INFORMATION).

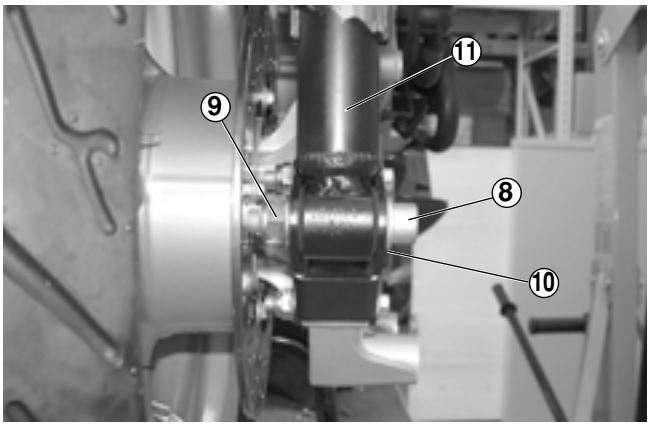
Put the vehicle on the central stand.

⚠ WARNING

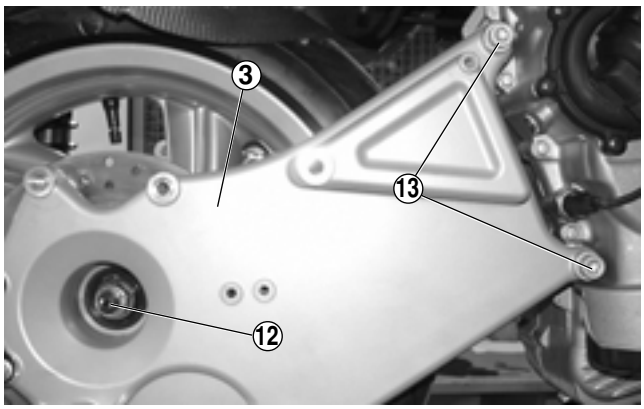
Allow the engine and the exhaust terminal to cool down completely.

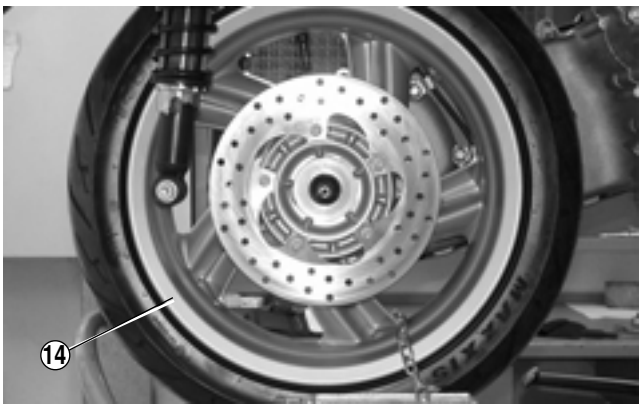
Remove the exhaust terminal, see (REMOVING THE EXHAUST TERMINAL).
Unloose and remove screw (5) fixing the pipe guide clamp.
Unloose and remove the two screws (6) fixing the rear brake caliper (7).
Release the rear brake caliper (7) from the support (3).
Unscrew and remove pin (8) fixing the suspension (11).





Keep nut (9) and washer (10).
Release the right suspension (11) of support (3).
Unscrew and remove the wheel pin nut (12) using a pneumatic gun.
Unloose and remove the two screws (13) fixing the support (3) to the engine. Keep the washers.
Remove support (3) by pulling it outwards.
Remove wheel (14) by pulling it outwards, including the rear brake disc.





REMOVING THE EXHAUST TERMINAL

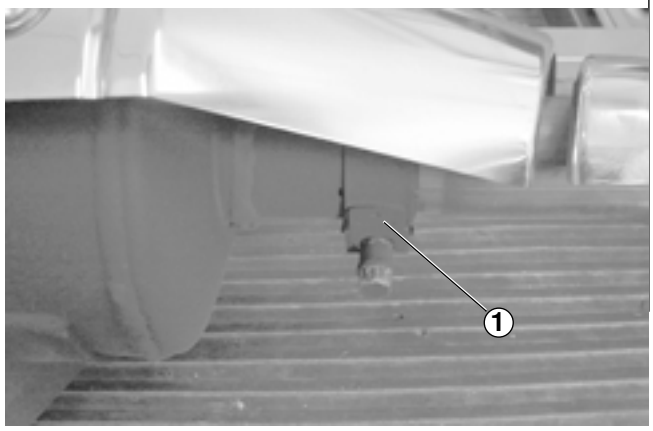
Read through the paragraph (PRECAUTIONS AND GENERAL INFORMATION).

Put the vehicle on the central stand.

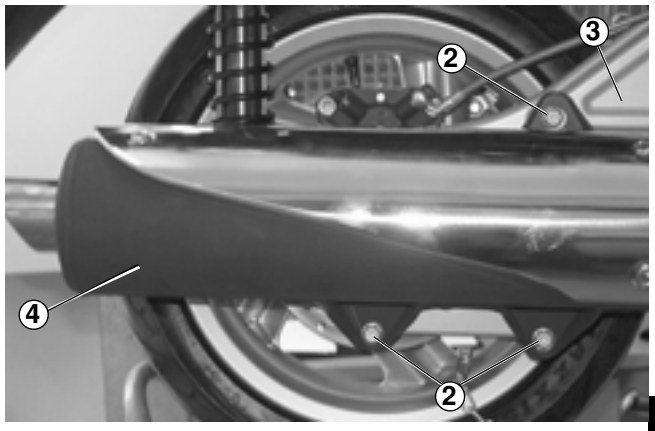
⚠ WARNING

Allow the engine and the exhaust terminal to cool down completely.

Unloose clamp (1) by unscrewing the nut fixing the exhaust terminal to the manifold.



Unscrew and remove the three bolts (2) fixing the terminal to support (3), keep the relevant nuts. Remove the exhaust terminal (4).



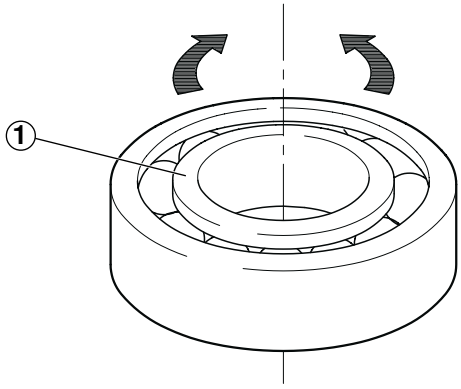
CHECK

⚠ CAUTION

Check the condition of all components and in particular of those listed below.

Bearings

Manually rotate inner race (1), making sure it turns smoothly without any sticking and/or noise.
Check that there is no axial play.
Replace any bearings showing the above defects.



⚠ CAUTION

Lubricate the balls (or rollers) on the side of each bearing, see (TABLE OF LUBRICANTS). Lubrication is not necessary if the bearing is of the self-lubricating type.

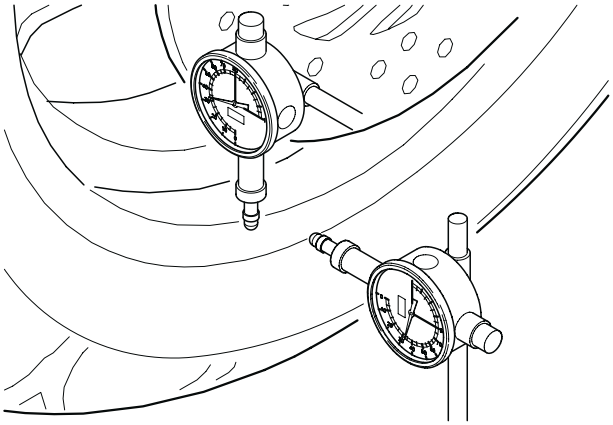
Axle

Refer to the ENGINE WORKSHOP MANUAL no.1063 (I), no.1064 (E), no.1065 (F), no.1066 (D), no.1067 (UK) and no.1068 (USA).

Wheel rim

Using a dial gauge, check that the radial and axial runout of the wheel rim does not exceed the specified limit.
Excessive runout is usually caused by worn or damaged bearings. If, after replacing the bearings, the runout still exceeds the prescribed limit, replace the wheel rim.

Maximum radial and axial runout: 2 mm (0.078 in)



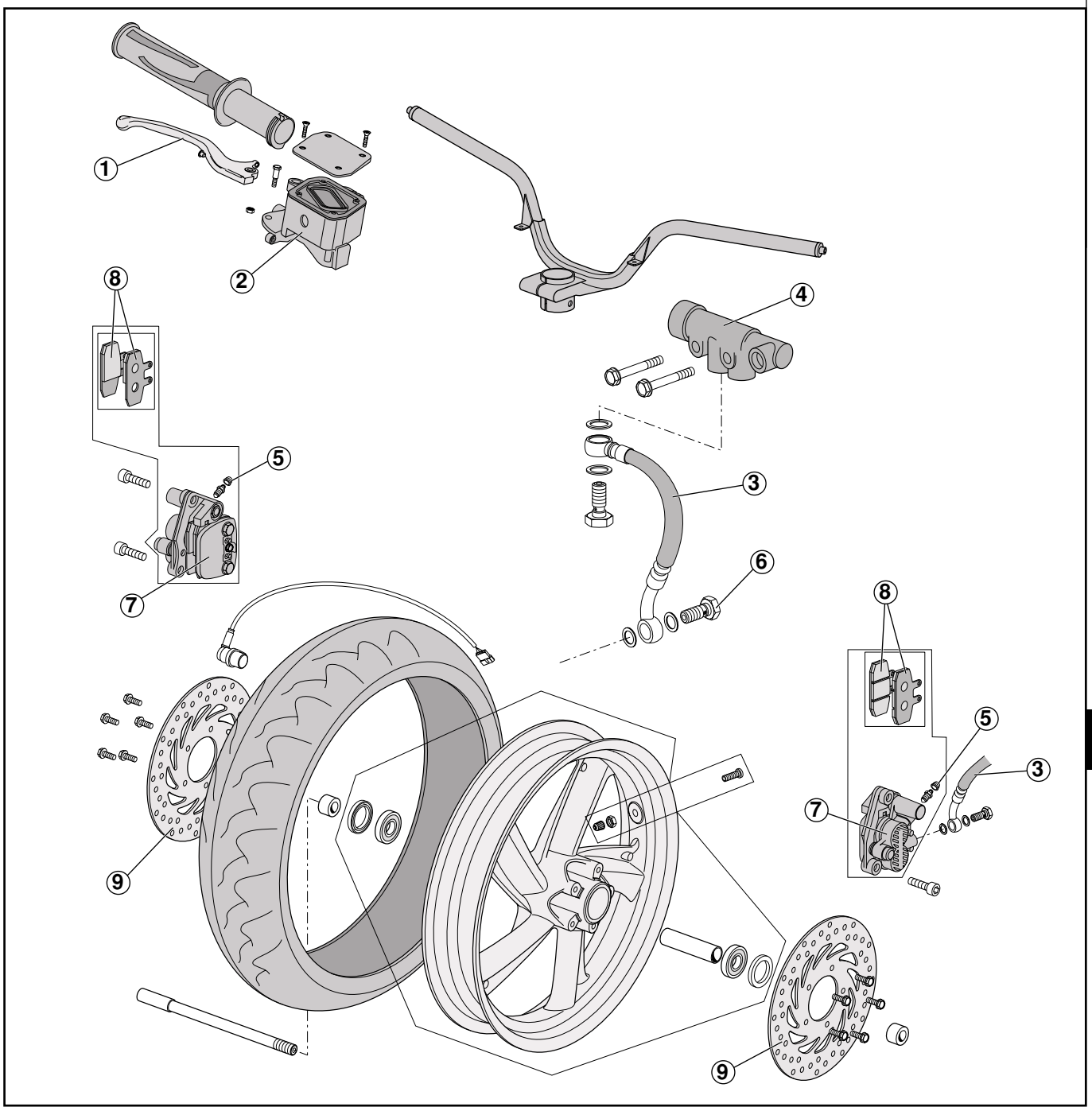
Tyre

Check the condition of the tyre (TYRES).

FRONT BRAKE

For general information, refer to the paragraph (BRAKES FLUID).

For more information on:
Braking system parts, see (BRAKING SYSTEM).
Pads wear checking, see (CHECKING PADS WEAR).
Braking system bleeding, see (BRAKING SYSTEM BLEEDING).



KEY

1) Brake control lever
2) Brake fluid pump/tank
3) Brake fluid pipe
4) Braking retarder
5) Brake caliper breather valve
6) Pipe fitting screw
7) Brake caliper
8) Brake pads
9) Brake disc

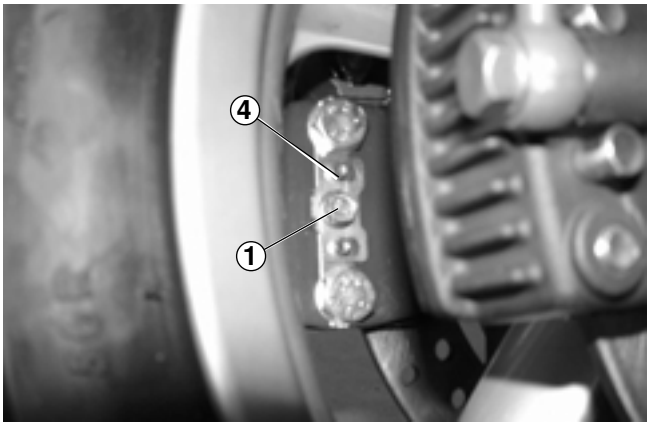
REPLACING THE BRAKE PADS

Read through the paragraph (PRECAUTIONS AND GENERAL INFORMATION).

Put the vehicle on the central stand.

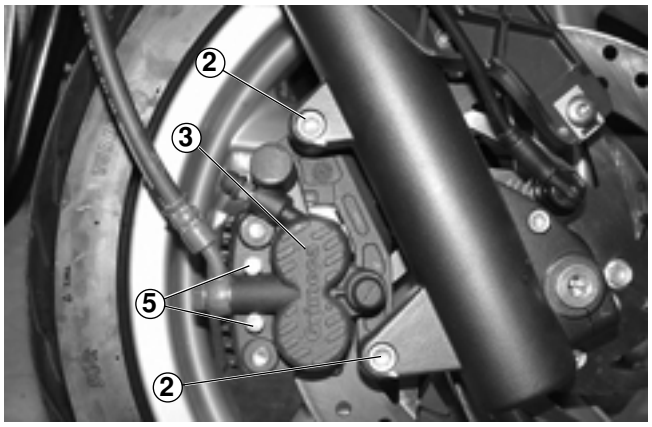
NOTE Perform the following operations on both sides.

Unloose and remove screw (1).
Unloose and remove the two screws (2) and release the brake caliper (3).
Hold the brake caliper in one hand and remove plate (4).
Remove the two pins (5).
Remove the two pads.



⚠ CAUTION

Do not pull the brake lever after removing the brake pads as the caliper pistons may come out of their seats and cause a leakage of brake fluid.

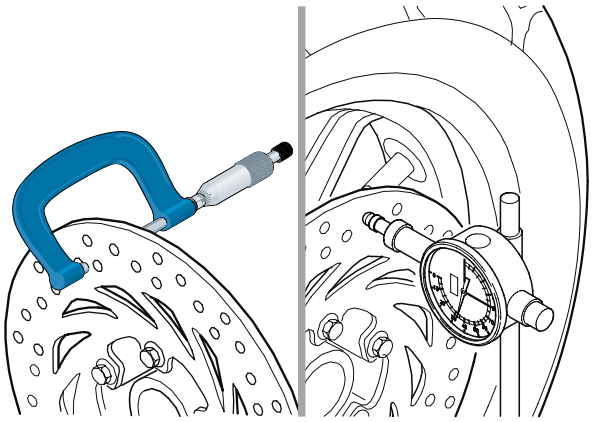


⚠ CAUTION

Always replace both pads and make sure to properly position them inside the caliper.

Fit two new pads.
Insert the two pins (5).
Correctly position plate (4).
Screw on screw (1), without tightening it.
Correctly position the brake calipers.
Screw and tighten the two screws (2).
Screw and tighten screw (1).

CHECKING THE BRAKE DISC



⚠ CAUTION

The following operations must be performed when the brake disc is installed on the wheel.

Visually check the surface of the brake disc. If it shows any signs of scoring or damage, replace the disc (REMOVING THE BRAKE DISC).
Check the wear of the brake disc by measuring its minimum thickness with a micrometer at several points.
If the minimum thickness of the disc, even at one point, is less than the prescribed limit, replace the disc.

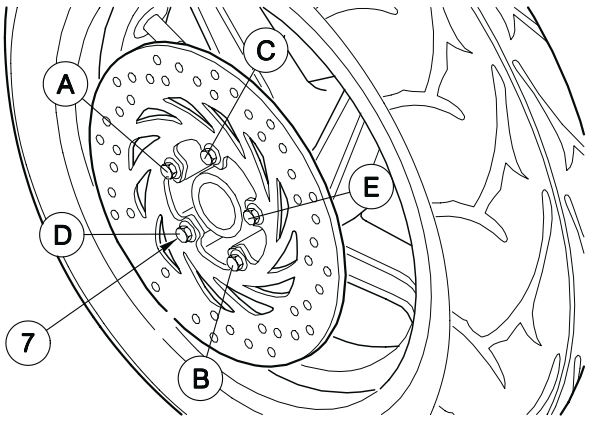
Minimum thickness of the brake disc: 3.5 mm (0.137 in)

With a dial gauge, check that the disc oscillation does not exceed the allowed tolerance. Replace if necessary.

Brake disc oscillation tolerance: **0.1 mm (0.004 in)**

7

REMOVING THE BRAKE DISC



Read through the paragraph (PRECAUTIONS AND GENERAL INFORMATION).
Take down the front wheel (REMOVING THE FRONT WHEEL).
Remove the five brake disc screws (7).
NOTE Turn in all screws manually, and then tighten them diagonally in the following order: A-B-C-D-E.
Check the disc direction of rotation.

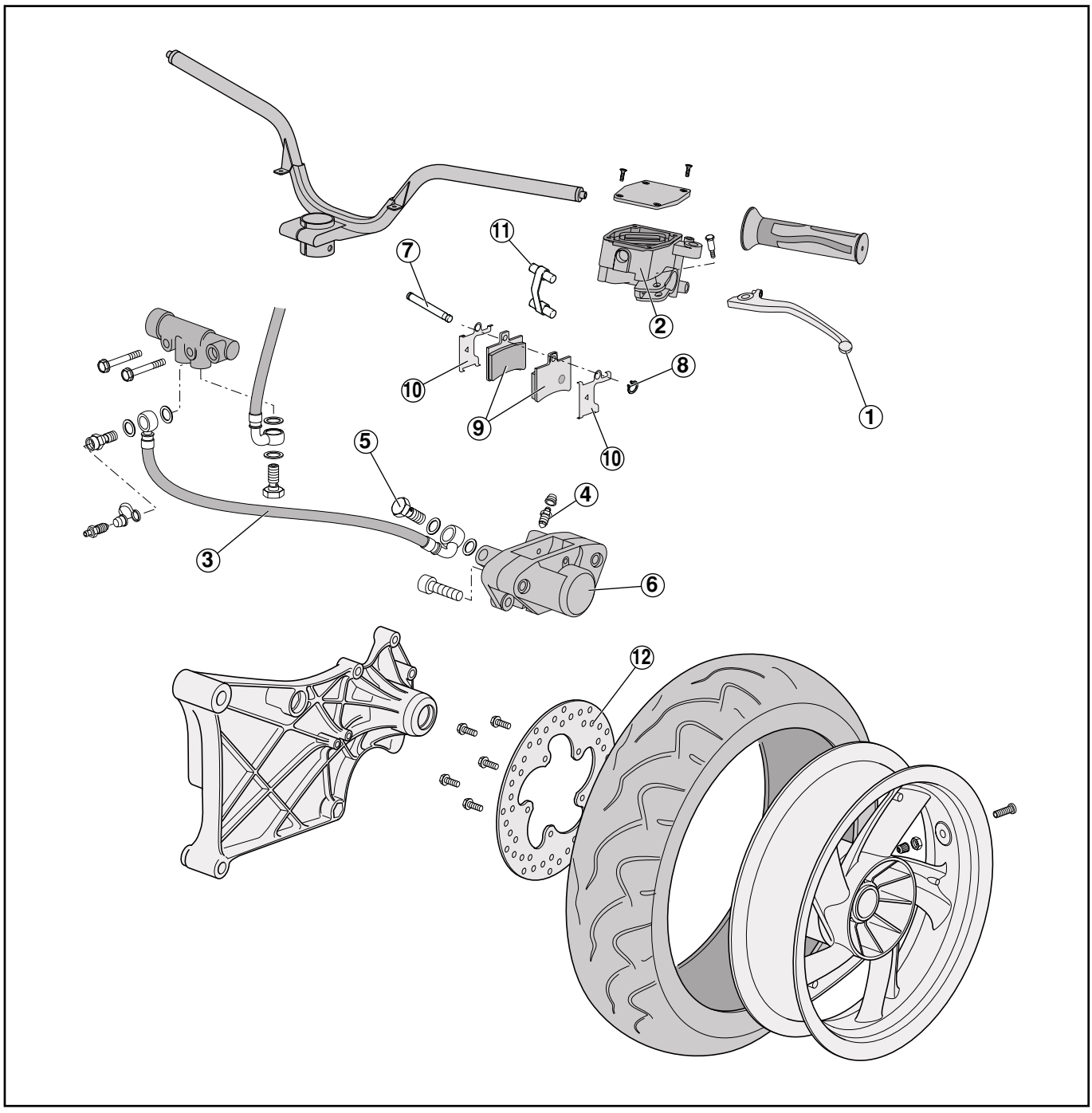
⚠ CAUTION

When refitting, apply LOCTITE ® 270 over the threads of the brake disc screws.
Remove the brake disc.

REAR BRAKE

For general information, refer to the paragraph (BRAKES FLUID).

For more information on:
Braking system parts, see (BRAKING SYSTEM).
Pads wear checking, see (CHECKING PADS WEAR).
Braking system bleeding, see (BRAKING SYSTEM BLEEDING).



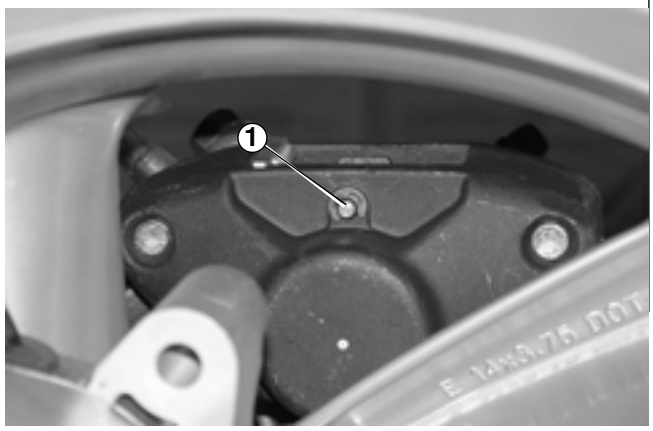
KEY

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

REPLACING THE BRAKE PADS

Read through the paragraph (PRECAUTIONS AND GENERAL INFORMATION).

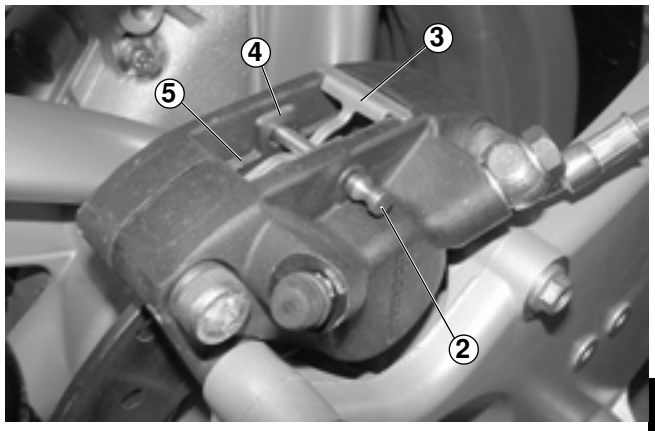
Remove the rear brake caliper, see (REMOVING THE REAR BRAKE CALIPER).
Remove stop ring (1).
Remove pin (2).
Remove spring (3).



⚠ CAUTION

The vibration-damping plates are removed together with the pads.

Remove the pads (4) (complete with the vibration-damping plates (5)) by withdrawing them one by one.



⚠ CAUTION

Do not pull the brake lever after removing the brake pads as the caliper piston may come out of its seat and cause a leakage of brake fluid.

Replace the pads (4).
Replace the vibration-damping plates (5) if they show signs of wear.

⚠ WARNING

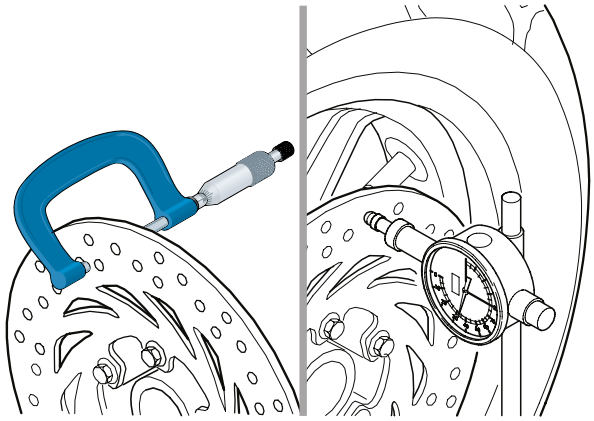
Always replace both pads and make sure to properly position them inside the caliper.

Fit two new pads and vibration-damping plates paying attention to the assembly direction (direction of rotation of the wheel).
Correctly install the spring (3), see Turn Indicator.
Fit the pin (2).
Fit the stop ring (1).
Check the brake fluid level, see (CHECKING THE BRAKE FLUID LEVEL).

CHECKING THE BRAKE DISC

⚠ CAUTION

The following operations must be performed when the brake disc is installed on the wheel.



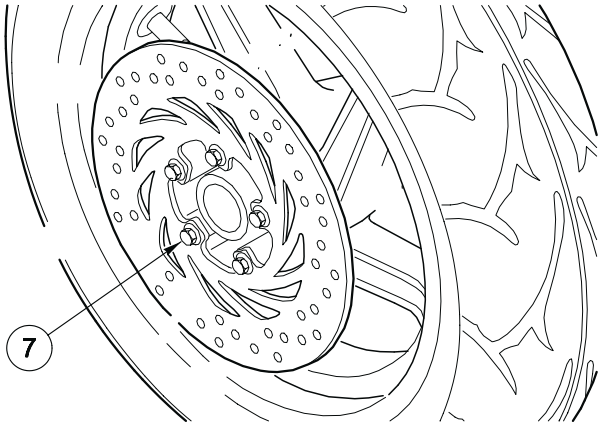
Visually check the surface of the brake disc. If it shows any signs of scoring or damage, replace the disc (REMOVING THE BRAKE DISC).
Check the wear of the brake disc by measuring its minimum thickness with a micrometer at several points.
If the minimum thickness of the disc, even at one point, is less than the prescribed limit, replace the disc.

Minimum thickness of the brake disc: 3.5 mm (0.137 in)

With a dial gauge, check that the disc oscillation does not exceed the allowed tolerance. Replace if necessary.

Brake disc oscillation tolerance: **0.1 mm (0.004 in)**

REMOVING THE BRAKE DISC



Read through the paragraph (PRECAUTIONS AND GENERAL INFORMATION).

Take down the front wheel (REMOVING THE FRONT WHEEL).
Remove the five brake disc screws (7).

⚠ CAUTION

When refitting, apply LOCTITE ® 270 over the threads of the brake disc screws.

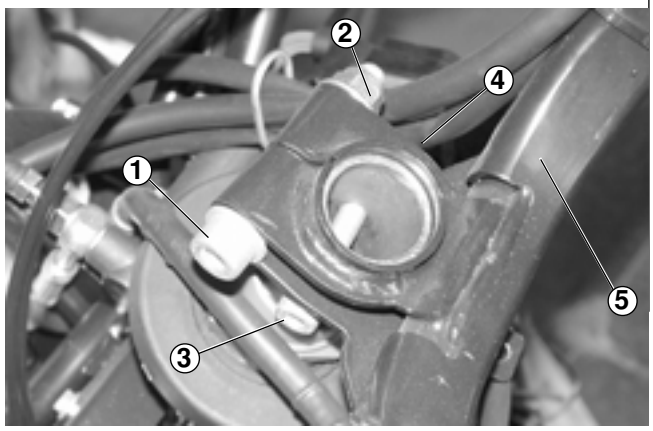
Remove the brake disc.

STEERING

For information on how to check and adjust the steering, refer to the paragraph (CHECKING AND ADJUSTING THE STEERING).

Disassembly

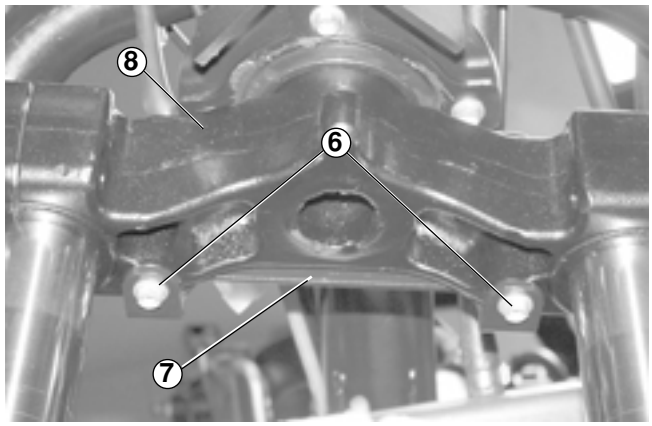
Read through the paragraph (PRECAUTIONS AND GENERAL INFORMATION).
Remove the handlebar cover, see (REMOVING THE UPPER HANDLEBAR COVER) and (REMOVING THE LOWER HANDLEBAR COVER).
Put the vehicle onto an elevator, leaving the front wheel out, and lower central stand.



⚠ CAUTION

Place a suitable support under the vehicle so as to prevent it from falling.
The vehicle should rest on the frame and not, on any account, on the fuel tank.
Ensure that the vehicle is stable.

Unloose and remove screw (1).
Keep nut (2) and the washers.
Unloose and remove screw (3).
Keep nut (4) and the washers.
Remove the front mudguard, see (REMOVING THE FRONT MUDGUARD).

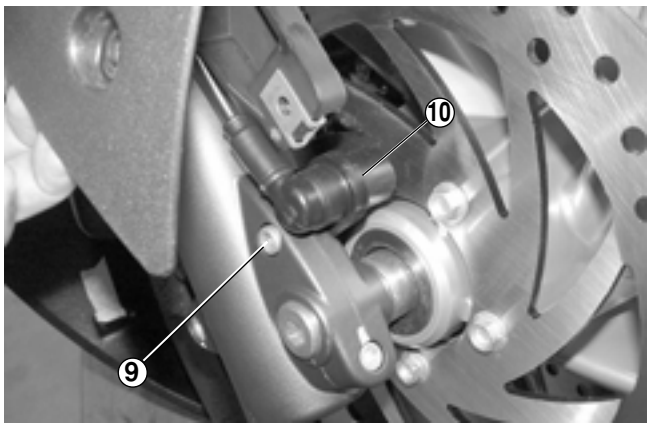


⚠ CAUTION

Arrange for a suitable support to hold the handlebar that remains connected to the vehicle by means of the electrical cables and the brake pipes. Proceed with care. Do not force the electrical cables.

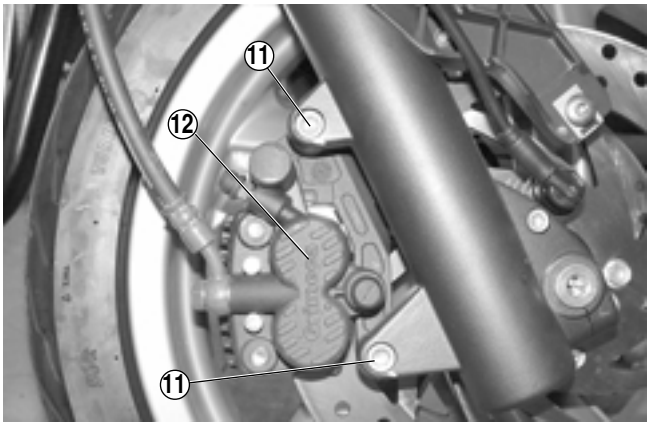
Completely pull upwards the handlebar (5) (complete with switches).
Unloose and remove the two screws (6).
Release the plate (7) of the steering trapezoid (8) of the steering suspension.

Unloose and remove screw (9) and release the odometer sensor (10).



NOTE Perform the following operation also on the vehicle l.h.side.

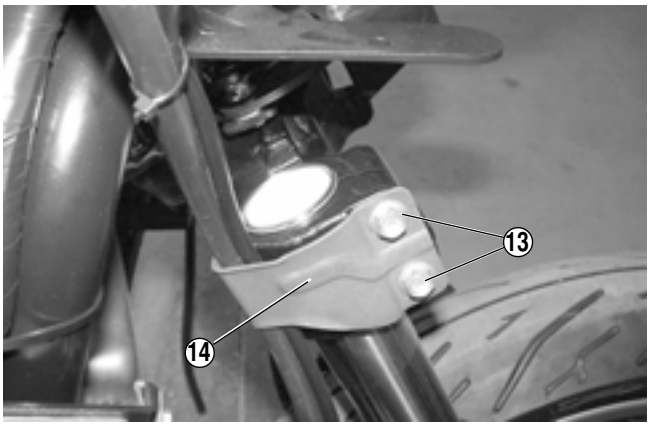
Unloose and remove the two screws (11).
Release the brake caliper (12) from the fork.



⚠ CAUTION

Do not pull the front brake lever after removing the brake caliper as the caliper piston may come out of its seat and cause a leakage of brake fluid.

Unloose and remove the two screws (13)
Remove the brake oil pipes stop plate (14).
Release the pipes and the brake caliper from the fork.



Remove counternut (15).

⚠ CAUTION

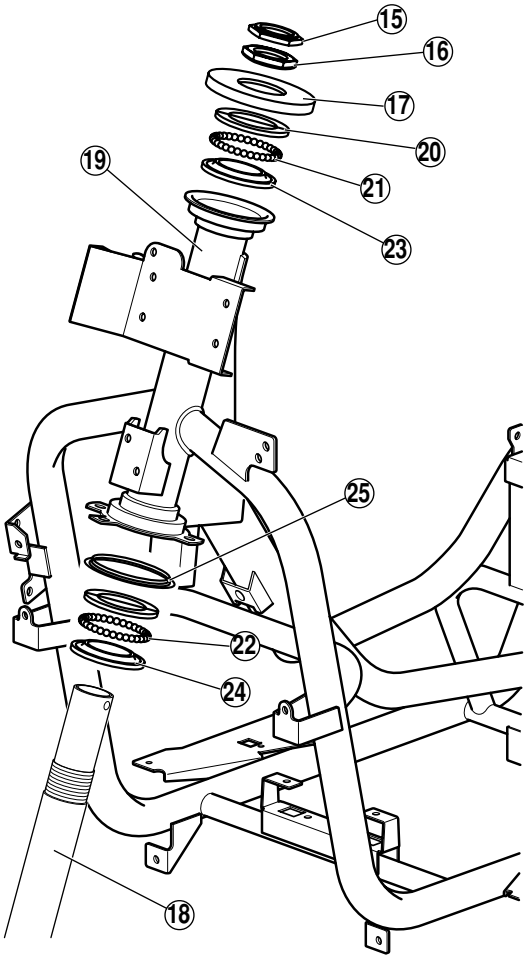
Support the fork to prevent it from falling.

NOTE When removing the fork, pay attention to the balls coming out of the lower bearing.

Remove adjusting nut (16).
Remove the plastic gasket (17).
Remove the fork (18) from the steering tube (19).
Remove revolving ring (20) and upper bearing balls (21).
Remove lower bearing balls (22).
Remove the grease from all bearing components, fixed rings (23) and (24) included.
Remove the dust cover gasket (25).
Check the components for any signs of wear and replace as necessary.

NOTE For the grease type to be used with the bearings, refer to the (LUBRICANT CHART).

Grease and proceed with the reassembly.

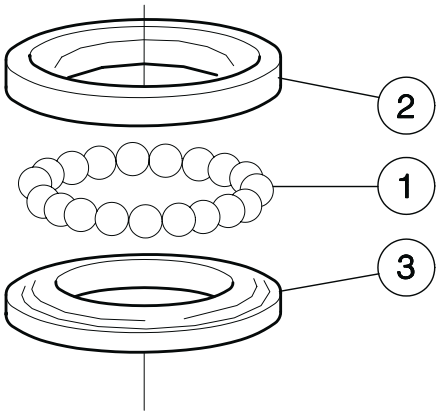


CHECKING THE BEARINGS

⚠ CAUTION

Check the condition of all components.

Check that the areas that come into contact with balls (1) on both revolving ring (2) and fixed ring (3) are not damaged or worn out. If they are, replace the bearing assembly.



⚠ CAUTION

Grease the two rings (2) and (3) in the areas where they are in contact with the balls (see LUBRICANT CHART).

Reassembly

To reassemble, follow the disassembling procedure in reverse order, taking care to interpose the steps given below.

⚠ CAUTION

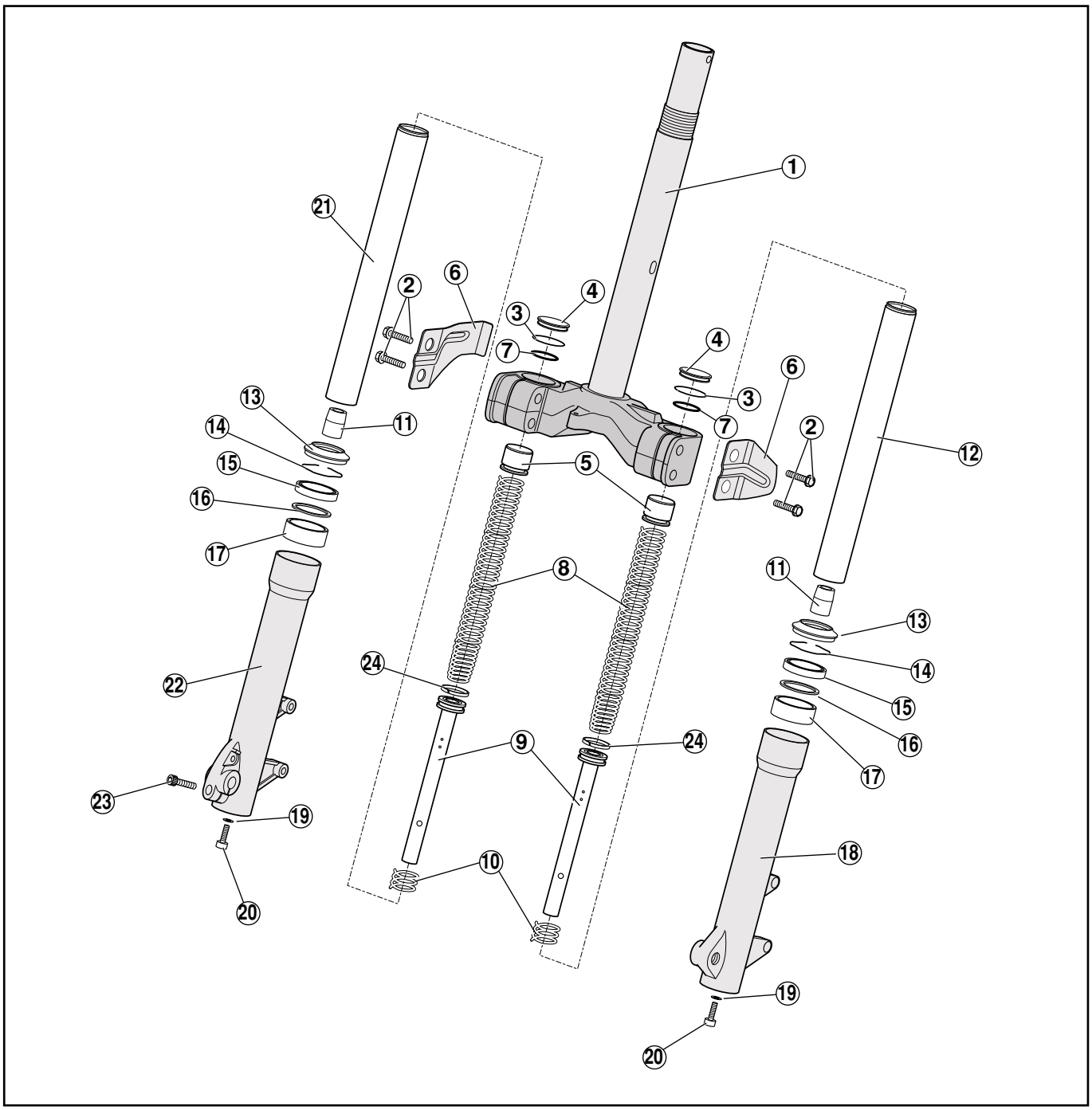
Ensure that the pipes and the cables are not twisted

NOTE The hole for the fixing to the handlebar clamp must be aligned with the slot on the fork pin.

⚠ CAUTION

To avoid damaging the steering bearings, take care not to screw adjusting nut (4) tight.

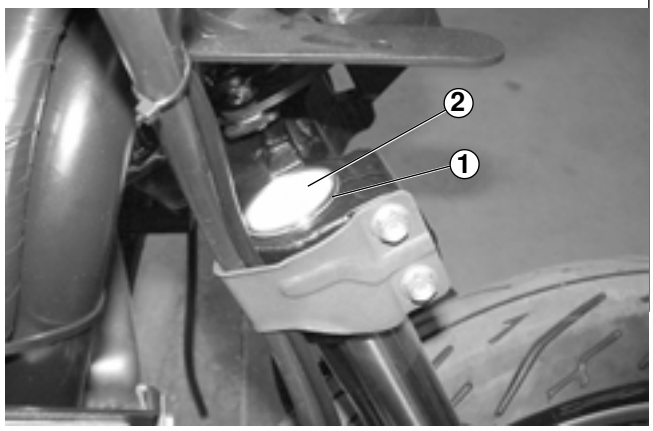
Screw in adjusting nut (4) until the play of the bearings is eliminated.
Check the play by stroking the fork in the direction of motion and checking that the steering can rotate smoothly and freely.
Lock adjusting nut (4) in position and tighten counternut (5) with a spanner.
Repeat the second operation.



KEY

1) Fork base
2) Fork clamp screws
3) Spring stop ring
4) Rubber cap
5) Seal cap
6) Brake pipe cable lead
7) “GACO” ring OR type
8) Spring
9) Pumping element
10) Return spring
11) Bottom bumper
12) Left rod
13) Dust cover gasket
14) Lock spring ring
15) Seal gasket
16) Cup
17) Bush
18) Left wheel carrier
19) Seal washer
20) Lower screw
21) Right rod
22) Right wheel carrier
23) Locking screw
24) Bush

CHECKING THE OIL LEVEL



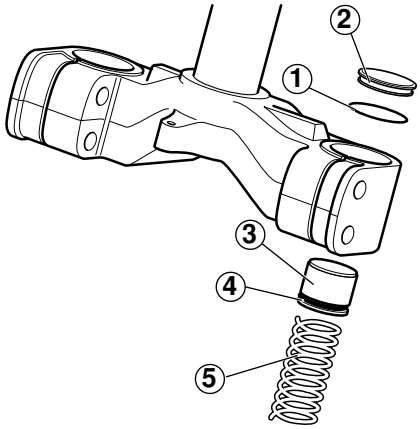
If " bottom strokes" are noticed in the fork, check the oil level in the rods.
Remove the front shield, see (REMOVING THE INNER SHIELD).

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

Remove the spring stop ring (1).
Remove the plastic cap (2).
Slowly pump the fork until the two seal caps (3) complete with O rings (4) have come out.

NOTE Check the O rings conditions. Replace if necessary.

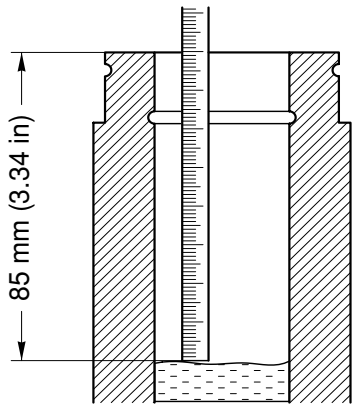
NOTE Check the spring position (5) (the turns with a smaller diameter and closer to each other must be facing upwards).



⚠ CAUTION

The spring is immersed in oil.
Avoid dripping the oil when removing the spring.

Pull out the spring (5).
Move the fork to its full bump position, insert a gauged rod (meter) in one of the two rods and check that there is a distance of 85 mm (3.34 in) between the rod upper edge and the oil level.
Top up the fork oil if necessary. See (TABLE OF LUBRICANTS).
Repeat these two operations also for the second rod.



REMOVING THE FORK ASSEMBLY

To remove the fork assembly (in case it is to be replaced), follow the instructions described in paragraph (DISASSEMBLY).

REMOVING THE ROD-WHEEL CARRIER ASSEMBLY (with installed fork)

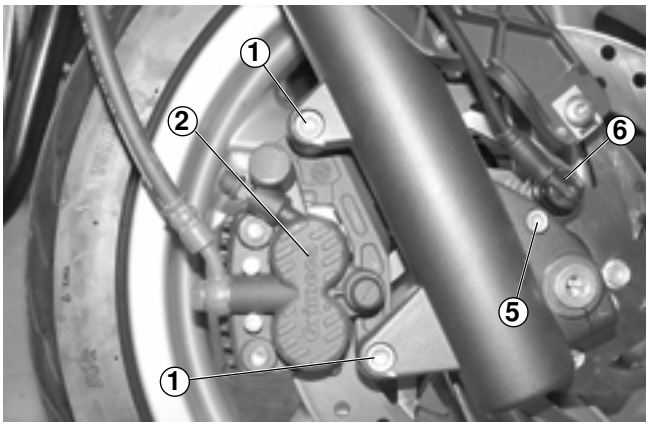
Put the vehicle on the stand.

⚠ CAUTION

Place a suitable stand under the vehicle to prevent it from falling.

Remove the front mudguard, see (REMOVING THE FRONT MUDGUARD).
Remove the front wheel, see (REMOVING THE FRONT WHEEL).
Remove the front shield, see (REMOVING THE INNER SHIELD).

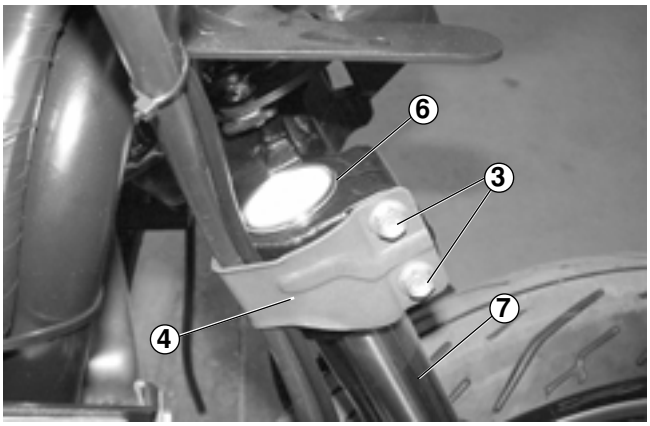
NOTE Perform the following operation also on the vehicle left side.
Unloose and remove the two screws (1).
Release the brake caliper (2) from the fork.



⚠ CAUTION

Do not pull the front brake lever after removing the brake caliper as the caliper piston may come out of its seat and cause a leakage of brake fluid.

Unloose and remove the two screws (3).
Remove the brake oil pipes stop plate (4) and the lock (6).
Release the pipes and the brake caliper from the fork.
Unloose and remove screw (5).
Remove the odometer sensor (6) from the fork rod (7).
Completely remove, by lowering it, the fork rod complete with the wheel carrier.
Repeat the last three operations also for the second rod.



WHEEL CARRIER ROD DISASSEMBLY

Read through the paragraph (PRECAUTIONS AND GENERAL INFORMATION).

To disassemble the rubber cap (1), lock spring ring (snap ring) (2), seal cap (3) complete with O ring (4), and spring (5), perform the (CHECKING THE OIL LEVEL) operations on the wheel carrier rod that is to be disassembled, leaving out the last two oil check operations.

⚠ CAUTION

Pay attention to possible oil leakages as the rod-wheel carrier assembly is full with oil.
Do not overturn or incline the unit excessively when removing it.

Remove the rod-wheel carrier assembly, see (REMOVING THE ROD-WHEEL CARRIER ASSEMBLY) (with installed fork).
Prepare a container with capacity of at least 200 cm^3 (12.2 cu.in).
Let the rod retract completely in the wheel carrier, turn the rod – wheel carrier assembly and drain the oil into the container.

⚠ CAUTION

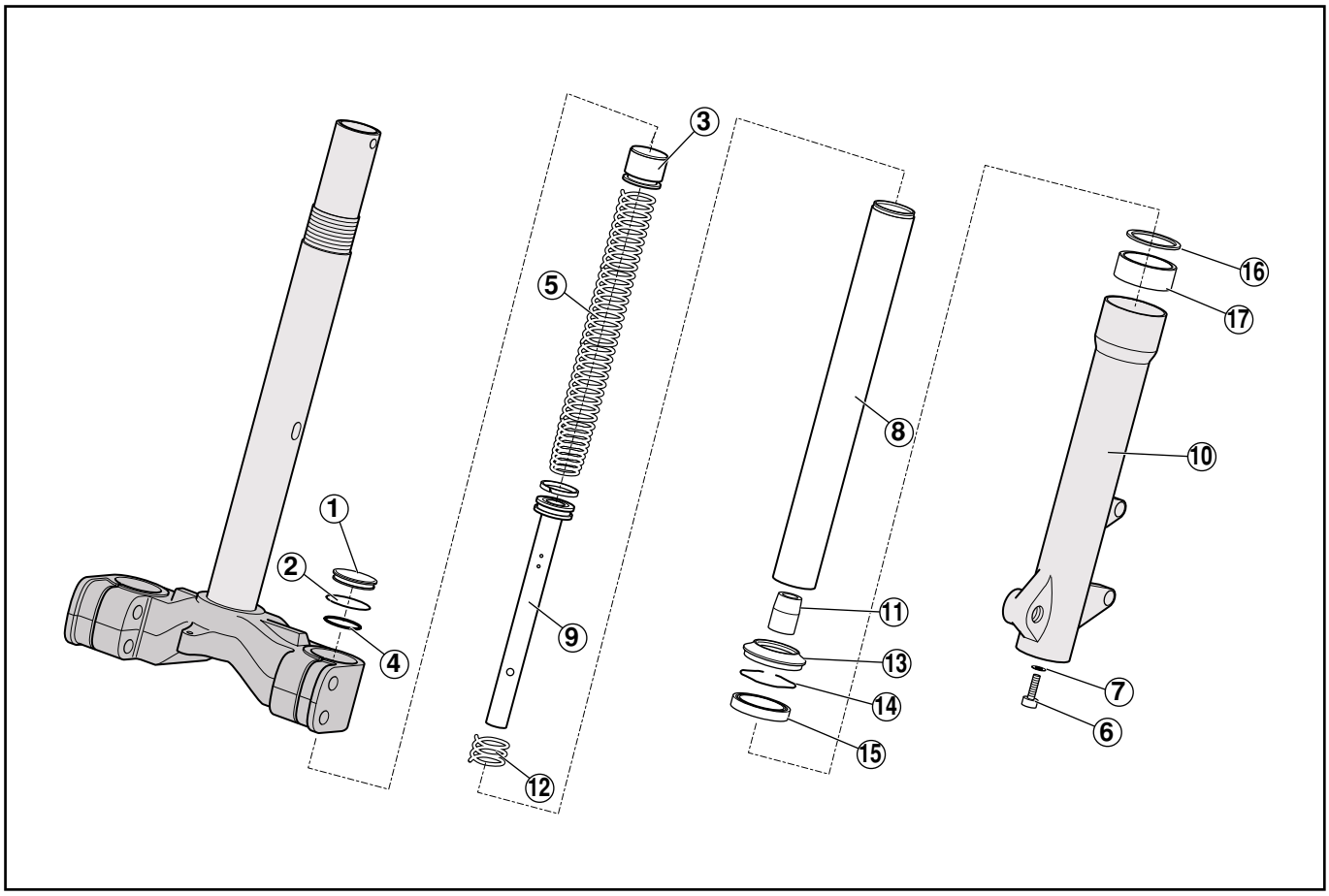
Check the oil quantity.
If less than 225 cm^3 (13.72 cu.in), top up or renew.

Unloose and remove screw (6) (wheel carrier bottom) and keep the copper washer (7).
Remove the rod (8) complete with pumping element (9).
Turn the wheel carrier (10) to take out the bottom bumper (11) and the counter spring (12).
Remove the dust cover gasket (13).
Remove the lock spring ring (snap ring) (14).

⚠ CAUTION

To reassemble, make sure the sharp edge of the lock spring ring (snap ring) (14) is in the same position as shown in the figure.

Remove the seal gasket (15).
Remove the cup (16).
Remove the bush (17).



CHECKING THE COMPONENTS

Rod

The sliding surface must show no signs of scoring and/or damage.
If the rod is damaged, replace it.
With a dial gauge, check that the rod bending is lower than the limit value.
If necessary, replace the rod.

Bending limit: 0.2 mm (0.007 in).

⚠ WARNING

A bent rod must NEVER be straightened as its structure would become weak, thus compromising the vehicle safety.

Wheel carrier

Check that it shows no signs of damage and/or flaws.
Replace if necessary.

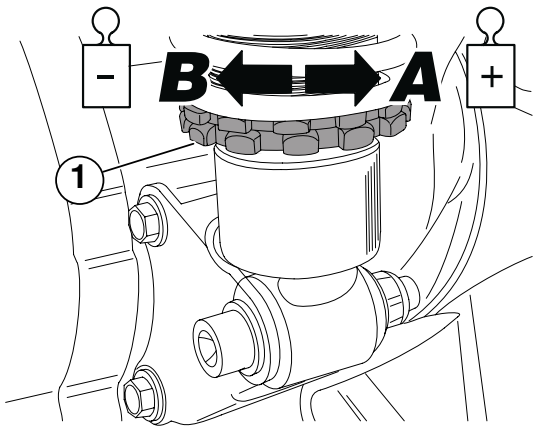
Spring

Check the spring condition.

Pumping element

Check the pumping element condition.
Replace if it shows signs of damage.

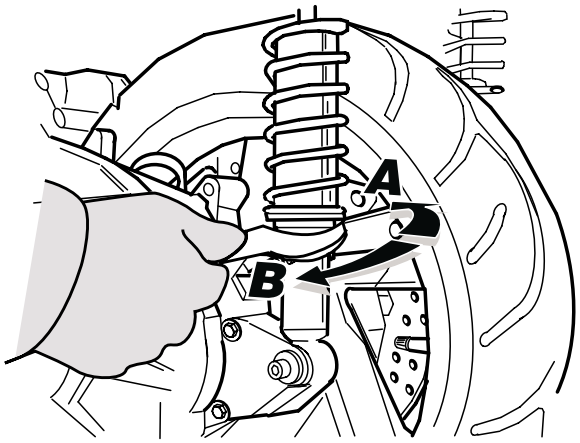
ADJUSTING THE REAR SUSPENSION



The rear suspension consists of a doubleeffect shock absorber (braking with compressed/extended shock absorber) fixed to the engine by means of a silent-block.
The standard adjustment, set by the manufacturer, is suitable for a driver weighing about 70 kg (154.3 lbs).
If your weight and needs are different, adjust the ring nut (1) with the appropriate spanner provided in the tool kit, thus setting the ideal travelling conditions (see table).
Adjust both shock absorbers to the same position.

ADJUSTMENT OF THE REAR SUSPENSION SPRING PRELOAD

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



REMOVING THE SHOCK ABSORBER

Read through the paragraph (PRECAUTIONS AND GENERAL INFORMATION).
Put the vehicle on the central stand.

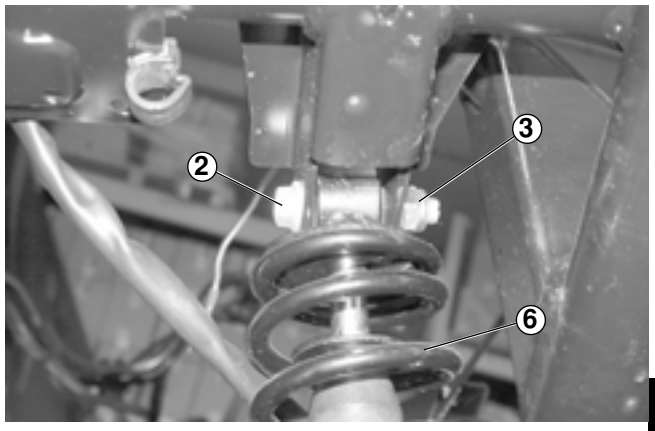
⚠ WARNING

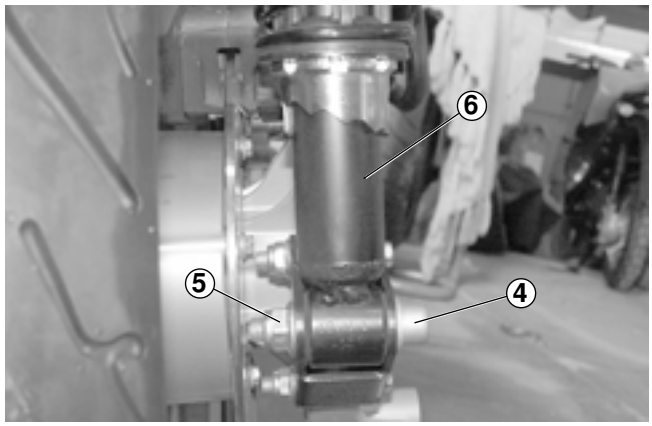
Wait for the engine and the exhaust terminal to cool down completely.

⚠ CAUTION

Remove one shock absorber per time.
To maintain the vehicle in the upright position, always leave one shock absorber assembled to the vehicle.

NOTE Perform the following operations for both shock absorbers.
Unloose and remove the lower screw (4) and keep nut (5).
Unloose and remove screw (2) and keep the nut (3).
Remove the shock absorber (6).





7

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