aprilia

SERVICE STATION MANUAL

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RS 50

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- This manual provides the main information to carry out regular maintenance operations on your vehicle.
- This manual is intended to **aprilia Dealers** and their qualified mechanics; several concepts have been deliberately omitted as they are considered unnecessary. As it is not possible to include complete mechanical notions in this manual, users should have basic mechanical knowledge or minimum knowledge about the procedures involved when repairing scooters. Without this knowledge, repairing or checking the vehicle may be inefficient or even dangerous. As the vehicle repair and check procedures are not described in detail, be extremely cautious so as not to damage components or injure individuals. In order to optimise customer satisfaction when using our vehicles, **aprilia** commits itself to continually improve its products and the relative documentation. The main technical modifications and changes in repair procedures are communicated to all **aprilia Sales Outlets and its International Subsidiaries**. These changes will be introduced in the subsequent editions of the manual. In case of need or further queries on repair and check procedures, consult **aprilia CUSTOMER DEPARTMENT**, which will be prepared to provide any information on the subject and any further communications on updates and technical changes related to the vehicle.

NOTE Provides key information to make the procedure easier to understand and carry out.

CAUTION Refers to specific procedures to carry out for preventing damages to the vehicle.

WARNING Refers to specific procedures to carry out to prevent injuries to the repairer.

Personal safety Failure to completely observe these instructions will result in serious risk of personal injury.

Safeguarding the environment Sections marked with this symbol indicate the correct use of the vehicle to prevent damaging the environment.

Vehicle intactness The incomplete or non-observance of these regulations leads to the risk of serious damage to the vehicle and sometimes even the invalidity of the guarantee.

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INDEX OF TOPICS

Vehicle identification

Chassis prefix

The chassis number is stamped on the right side of the headstock.

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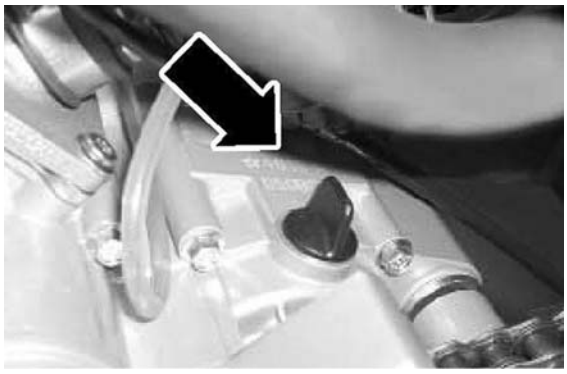

Dimensions and mass

DIMENSIONS

Specification	Desc./Quantity
Max. length	1965 mm (77.36 in)
Max length (with rear mudguard extension)	1985 mm (78.15 in)
Max. width	720 mm (28.35 in)
Max. height (to top fairing)	1100 mm (43.30 in)
Saddle height	848 mm (33.38 in)
Wheelbase	1300 mm (51.18 in)
Minimum ground clearance	170 mm (6.70 in)
Kerb weight	117 kg (257.94 lb)
Vehicle max. load (rider + luggage)	105 kg (231.48 lb)
Vehicle max. load (rider + passenger + luggage)	180 kg (396.83 lb) (in countries where passenger transport is permitted)

Engine

ENGINE

Specification	Desc./Quantity
Type	2-stroke single aluminium cylinder with nickel and silicon carbide coated bore.
Bore	40 mm
Stroke	39,88 mm
Cubic capacity	49 cm³
Compression ratio	11.5 :1
CARBURETTOR	Dell'Orto PHVA-17.5 with manual starter
Engine revs at idle speed	1600 ± 100 rpm
Air filter	with filter oil-impregnated sponge.
Start-up	electric
TRANSMISSION	Chain Ratio: 14/53
Clutch	multiple-disk, oil-bathed clutch with hand control on the left side of the handlebar.
Gear	6-speed transmission with selector fork and drum distributor operated by external control
Gears	I Gear 11/34 II Gear 15/30 III Gear 18/27 VI Gear 20/24 V Gear 22/23 VI Gear 23/22
LUBRICATION	Separated oiling, mixture method.
SUPPLY	Petrol-oil mixture by carburettor, automatic mixer (variable flow according to engine speed and throttle valve opening)
Inlet	Through reed valve on crankcase
COOLING SYSTEM	forced-circulation coolant system

Capacities

CAPACITY

Specification	Desc./Quantity
FUEL TANK	Capacity: 13 l (including reserve) Reserve: 2 l
Oil mixer tank	Capacity: 1.5 l (including reserve) Reserve: 0.5 l
cooling circuit (coolant)	1 l (50% water + 50% ethylene-glycol antifreeze solution)

Specification	Desc./Quantity
Oil for front fork	285 cm³ (for each stem)

Electrical system

ELECTRICAL SYSTEM

	Specification	Desc./Quantity
1	Ignition type	CDI
2	Ignition advance (at TDC)	20° ± 1° before TDC
3	Spark plug	NGK B8 ES
4	Front headlight assembly	High-beam light: 12 V - H8 Low-beam light: 12 V - H8
5	Rear headlight assembly	Stop light bulb: 12 V - 5 / 16 W Tail light: microbulbs
6	Turn indicators	12V - 1.7W
7	WARNING LIGHTS	led
8	Battery	12V-4Ah
9	Fuse	7.5 A
10	Generator	Magneto flywheel, 12 V - 85 W alternating current

Frame and suspensions

CHASSIS AND SUSPENSIONS

Specification	Desc./Quantity
CHASSIS	Delta Box
FRONT SUSPENSION	Hydraulic fork with centred axle.
Front wheel suspension travel	112 mm
REAR SUSPENSION	Swinging arm with hydraulic progressive shock absorber.
Rear wheel suspension travel	112 mm
Steering inclination angle	25.06°
Trail	95.62 mm

Brakes

BRAKES

Specification	Desc./Quantity
Front wheel brakes	Ø 300 mm hydraulic disc brake with hydraulic

Specification	Desc./Quantity
	transmission
Rear wheel brakes	Ø 180 mm hydraulic disc brake with hydraulic transmission

Wheels and tyres

WHEELS AND TYRES

Specification	Desc./Quantity
Wheel rims	made of light alloy
Front tyre	100/80 x 17"
Front wheel rim	2.75 x 17"
Rear tyre	130/70 x 17"
Rear wheel rim	3.50 x 17"
Front tyre pressure	Only driver: 170 kPa (1.7 bar) Driver and passenger: 180 ± 10 kPa (1.8 ± 0.1 bar)
Rear tyre pressure	Only driver: 190 kPa (1.9 bar) Driver and passenger: 210 ± 10 kPa (2.1 ± 0.1 bar)

Tightening Torques

Standard Torques:

TORQUE IN NM BY TYPE OF SCREWED MATERIAL

Name	Torque in Nm
M4 Ø 8.8 steel screw on plastic with metallic spacers	2
M4 Ø 8.8 steel screw on brass, copper, aluminium and their alloys	2
M4 Ø 8.8 steel screw Iron, steel	3
M5 Ø 8.8 steel screw on plastic with metallic spacers	4
M5 Ø 8.8 steel screw on brass, copper, aluminium and their alloys	4
M5 Ø 8.8 steel screw Iron, steel	6
M6 Ø 8.8 steel screw on plastic with metallic spacers	6.5
M6 Ø 8.8 steel screw on brass, copper, aluminium and their alloys	6.5

Name	Torque in Nm
M6 Ø 8.8 steel screw Iron, steel	10.5
M7 Ø 8.8 steel screw on brass, copper, aluminium and their alloys	10.5
M7 Ø 8.8 steel screw Iron, steel	17
M8 Ø 8.8 steel screw on brass, copper, aluminium and their alloys	16
M8 Ø 8.8 steel screw Iron, steel	26
M10 Ø 8.8 steel screw Iron, steel	52
M12 Ø 8.8 steel screw Iron, steel	100
M14 Ø 8.8 steel screw Iron, steel	145

ENGINE-VEHICLE

Name	Torque in Nm
Rear shock absorber upper clamp to the chassis	30-40
Rear shock absorber lower clamp to the chassis	20
SIDE STAND	55-65
Rear fork retainer to the chassis	55-65
Brake calliper arm to rear brake calliper clamp	55-65
Brake calliper arm to rear fork clamp	70-80
Engine to chassis front clamp	35-40
Engine to chassis bottom clamp	25-28
Fork ring nut to steering tube tightening	90-130
Fork ring nut cover on upper plate	17-19
Exhaust manifold to cylinder	9-12
muffler to chassis clamp	17-19
Muffler silencer to chassis	17-19
Screws fixing fork stem to upper and plate	20-24
Half-handlebar to upper plate	20-24
Wheel axle to fork tightening screw	17 - 19
Front wheel axle nut	70-80
Front brake calliper to fork	35 - 40
Rear wheel axle nut	70-80
REAR BRAKE DISC	10 - 12
Front brake disc	10 - 12
Rear wheel crown	17-19

Name	Torque in Nm
Brake/clutch control clamp on half-handlebar	10-12
Spark plug	20
Rear brake pump to chassis	20
Radiator to chassis	8 - 10
Flywheel nut	35 ÷ 45 Nm

Products

LUBRICANT CHART

Product	Description	Specifications
Agip GEAR SYNTH, SAE 75W - 90	Gearbox oil	As an alternative for recommended oils, use top branded oils that meet or exceed the API GL - 4 requirements.
AGIP SPEED 2T	Mixer oil	As an alternative for recommended oils, use top branded fully synthetic oils that meet or exceed the ISO - L - EGD, JASO FC or API TC specifications requirements.
AGIP FORK 7.5W	Fork oil	As an alternative, use AGIP FORK 5W or AGIP FORK 10W fork oil to get a lower or higher stiffness respectively in fork performance.
AGIP GR MU 3	Bearings and other lubrication points	Alternatively to the recommended product, use top branded grease for roller bearings, useful temperature range -30...+140°C, (-22°C...+284) °F, drop point 150...230°C, (302...446°F), high anticorrosive protection, good water and rust resistance.
NEUTRAL GREASE OR PETROLEUM JELLY	Battery poles	Neutral grease or petroleum jelly.
AGIP CHAIN GREASE SPRAY	Chain spray grease	-
AGIP ANTIFREEZE PLUS	Engine coolant	-

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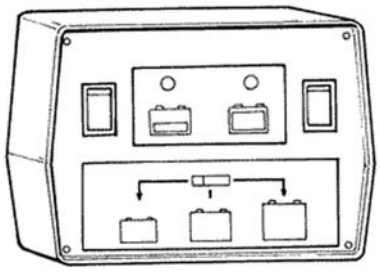
ATTREZZATURA

Stores code	Description	
020376Y	Punch adaptor	
020357Y	32 x 35 mm adaptor	
020441Y	Oil seal punch	
020456Y	Ø 24 mm punch	
020358Y	37 x 40 mm punch	
020426Y	Piston fitting fork	
020455Y	10-mm Oil seal guide in water pump shaft	
020362Y	12-mm Oil seal guide	

Stores code	Description	
020412Y	15-mm Oil seal guide	
020439Y	17-mm Oil seal guide	
020363Y	20-mm Oil seal guide	
0.0H.053.0.004.1	Clutch locking tool	
020565Y	Flywheel lock calliper spanner	
AP8106698	Crankcase separator	
AP8501501	Flywheel extractor	

Stores code	Description	
020330Y	Stroboscopic light for timing checking	
020331Y	Digital multimeter	
020333Y	Single battery charger	
020334Y	Multiple battery charger	

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Maintenance chart

AFTER 1000 KM

Action
Coolant - Check
Air filter - cleaning
Odometer gear - grease
Steering - check up
Brake control levers - Grease
Brake pads - check
Gearing chain - Grease
Gearing chain tension - check
Safety locks - check
Front fork - Check
Electrical system and battery - Check
Wheel - Check
Tyres pressure - Check
Fuel and oil hoses - Check
Vehicle and brake test - test drive
Engine oil - Change
Spark plug / electrode gap - check
Carburettor - Adjustment
Clutch control lever - Adjustment

AFTER 5,000; 25,000; 35,000; 55,000 KM

Action
Coolant level - check
Air filter - cleaning
Brake control levers - Grease
Brake pads - check
Brake fluid level - check
Gearing chain - Grease
Gearing chain tension - check
Front fork - Check
Electrical system and battery - Check
Tyre condition and wear - Check

Action
Tyres pressure - Check
Fuel and oil hoses - Check
Vehicle and brake test - test drive
Engine oil - Check
Spark plug - replacement
Carburettor - Adjustment
Clutch control lever - Adjustment

AFTER 10,000; 20,000; 40,000; 50,000 KM

Action
Coolant - Check
Air filter - cleaning
Radiator - Cleaning
Odometer gear - grease
Steering - check up
Brake control levers - Grease
Brake pads - check
Flexible brake hoses - Check
Gearing chain - Grease
Gearing chain tension - Replacement
Safety locks - check
Front fork - Replacement
Rear shock absorber - Check
Electrical system and battery - Check
Headlight - adjustment
Tyre condition and wear - Check
Wheel - Check
Tyres pressure - Check
Oil filter - Replacement
Fuel and oil hoses - Replacement
Vehicle and brake test - test drive
Engine oil - Change
Spark plug - replacement
Carburettor - Adjustment
Clutch control lever - Adjustment

AFTER 15,000; 30,000; 45,000; 60,000 KM

Action
Coolant level - check
Air filter - cleaning
Brake control levers - Grease
Brake pads - check
Brake fluid level - check
Gearing chain - Grease
Gearing chain tension - check
Front fork - Check
Electrical system and battery - Check
Tyre condition and wear - Check
Tyres pressure - Check
Fuel and oil hoses - Check
Vehicle and brake test - test drive
Engine oil - Check
Spark plug - replacement
Carburettor - Adjustment
Clutch control lever - Adjustment
Cylinder head and cylinder - Cleaning
Complete piston - Replacement

EVERY 2 YEARS

Action
Brake fluid - change

Carburettor

Adjust idle speed each time it is not regular.

To carry out this operation:

- Ride your scooter for some kilometres until it reaches the regular operating temperature.
- Shift the gear lever to neutral.
- Check the engine idle rpm on the rpm indicator.

The engine idle speed should be of about 1600 ± 100 rpm;

If necessary:

- Rest the scooter on its stand.
- Insert a Phillips screwdriver in the hole and operate the set screw «1» on the carburettor. TURN IT CLOCKWISE to increase revs. TURN IT ANTICLOCK-WISE to reduce revs.
- Operate the throttle grip, twist and un-twist it a couple of times to check it works adequately and if the idle speeds is stable.

Carburettor

- Disassemble the carburettor in its parts, wash all of them with solvent, dry all body grooves with compressed air to ensure adequate cleaning.
- Check carefully that the parts are in good condition.
- The throttle valve should slide freely in the mixture chamber. Replace it in case of excess-ive clearance due to wear.
- Replace the carburettor if there are wear marks in the mixture chamber causing inad-equate tightness or free valve slide (even if it is new).
- Replace the gasket at every refit.

WARNING

PETROL IS HIGHLY EXPLOSIVE ALWAYS REPLACE THE GASKETS TO AVOID PETROL LEAKS

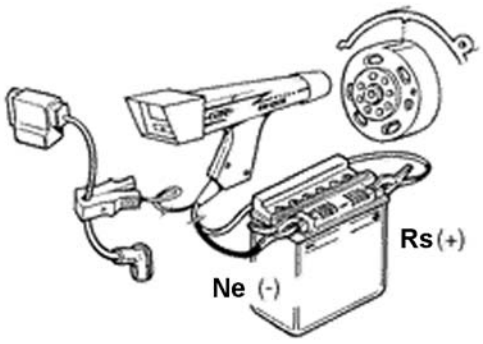
Checking the spark advance

Engine timing control

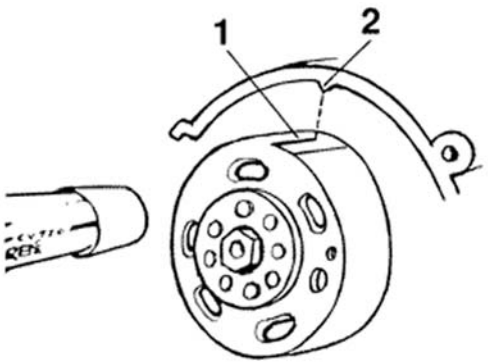
- Remove the crankcase left cover.

- Connect a stroboscopic light, with the red clamp to the positive (+) battery lead and the red clamp to the negative (-) battery lead. Connect the syn-chroniser to the high voltage conductor (the wire

connecting the high voltage coil and the spark plug).



- With the engine at 3000 rpm, check that the reference line (1) on the magneto flywheel is aligned with the notch on the crankcase (2).

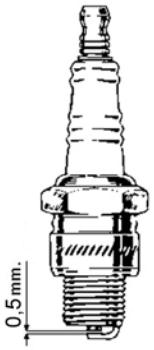


SPECIFICATIONS

Specification	Desc./Quantity
Timing	22° at 3000 rpm
Advance	1.8 mm at 3000 rpm

Spark plug

- Disconnect the cap from the spark plug HV wire.
- Unscrew the spark plug using a box-spanner;.
- Check the conditions of the spark plug, make sure the insulation is intact, and measure the electrode gap with a thickness gauge.
- Adjust the gap if necessary, by carefully bending the side electrode. In case of defects, replace the spark plug with one of the specified type.



- Fit the spark plug with the correct inclination and manually screw it all the way down, then use the special spanner to tighten to the specified torque.
- Push cap fully over the spark plug.

CAUTION

THE SPARK PLUG MUST BE REMOVED WHEN THE MOTOR IS COLD. THE SPARK PLUG MUST BE REPLACED EVERY 5000 KM. USE OF STARTERS NOT CONFORMING OR SPARK PLUGS NOT THOSE DESCRIBED CAN SERIOUSLY DAMAGE THE ENGINE.

Characteristic

electrode gap

0.5 mm

Electric characteristic

Spark plug

NGK BR9ES; or Champion RNC3 alternatively

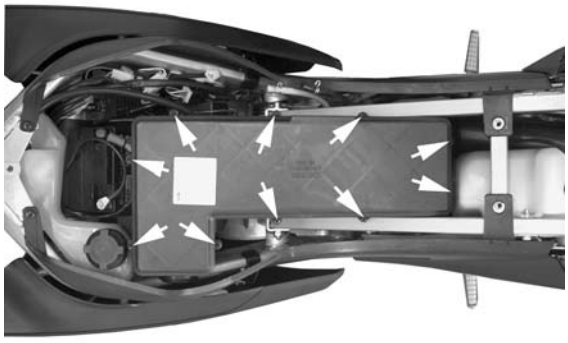
Locking torques (N*m)

Spark plug 20

Air filter

Filtering element

- Remove the fuel tank.
- Remove the ten screws on the filter cover that are indicated in the figure.
- Remove the filtering element.



- Wash the sponge in a container filled with oil for filters, twist gently repeatedly.
- After washing, gently squeeze the filter element with your hand but do not

wring it, let it drip and then refit.

- When refitting, be extremely careful to reposition the sponge in the housing support so that the whole sealing lip perimeter is on contact with the sponge.

IF THE FILTER IS OBSTRUCTED, THE ADMISSION RESISTANCE WILL INCREASE, LEADING TO POWER LOSS AND HIGHER FUEL CONSUMPTION.

Recommended products

AGIP FILTER OIL Oil for air filter sponge

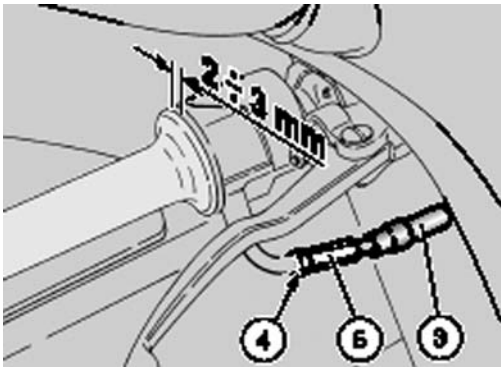
-

Transmissions

Throttle grip transmission adjustment

The empty travel of the throttle grip should be 2 ÷ 3 mm, measured at the trim of the grip.

If this is not so, proceed as follows:



- Rest the scooter on its stand.
- Slide off the protection housing «3».
- Loosen the lock nut «4».
- Turn the set screw «5» so as to obtain the specified value.
- After the adjustment, tighten the lock nut «4» and check again the empty travel.
- Refit the protection housing «3».

CAUTION

AFTER COMPLETING THE ADJUSTMENT, CHECK THAT THE HANDLEBAR ROTATION DOES NOT ALTER THE ENGINE IDLE SPEED AND THAT THE THROTTLE GRIP HOMES SMOOTHLY AND AUTOMATICALLY ONCE RELEASED.

Clutch transmission adjustment

Carry out clutch adjustment when the engine stops or the vehicle tends to move even when clutch lever is operated and the gear engaged, or if the clutch slides resulting in acceleration delay considering the engine revs.

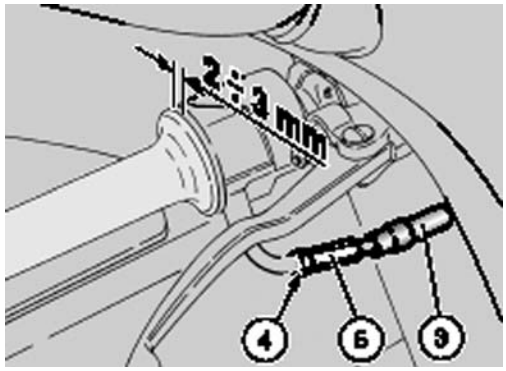
Minor adjustments can be carried out through the set screw on the lever:

- Turn the set screw until the empty travel at the end of the clutch lever is about 10÷15 mm.
- Check the empty travel at the end of the clutch lever.
- Frequently lubricate the clutch wire with an appropriate grease in order to avoid early wear and corrosion.

NOTE

CHECK THE CLUTCH WIRE IS IN GOOD CONDITIONS: THERE SHOULD BE NO SIGNS OF CRUSHING OR WEAR ALL ALONG THE SHEATH.

Mixer Timing



During this stage, the engine must be fed with a 2% mixture (at least 0.5 litres if the tank is empty). Set your scooter into motion and adjust the idle speed operating the set screw «**1**» on the carburettor. Adjust the control cables:

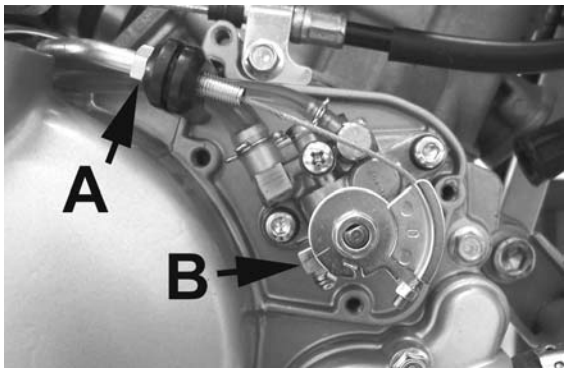
Throttle control: adjust the cable set screw «**5**» so as to obtain an adequate backlash on the throttle.

Carburettor control: remove the rubber cover and regulate the cable set screw so that there is an adequate backlash in the sheath.

Oil mixer control: remove the cap on the engine crankcase and regulate the set screw «**A**» in such

a way that with the throttle released, the reference mark « **B**» on the rotating plate is lined up with the reference mark on the mixer body as indicated in the figure.

Bring the throttle a couple of times to the end of the stroke and check that the adjustments have been made properly, then tighten them all up.



CAUTION

IN THE CASE OF DISMANTLING OR RUNNING OUT OF OIL IN THE TANK BLEED THE MIXER AS FOLLOWS: REFILL THE OIL RESERVOIR WHEN THE MIXER IS FITTED TO THE VEHICLE AND THE ENGINE IS OFF, DISCONNECT THE MIXER TUBE FROM THE CARBURETTOR AND LOOSEN THE BLEED SCREW UNTIL THE OIL BEGINS TO FLOW OUT. TIGHTEN THE SCREWS, START UP THE ENGINE AND WAIT FOR OIL TO FLOW OUT OF THE TUBE. RECONNECT THE DELIVERY TUBE TO THE CARBURETTOR AND FIX IT IN PLACE WITH THE RELEVANT METAL CLIP.

Recommended products

AGIP GREASE 30 Bearings and other lubrication points

As an alternative to the recommended product, use branded grease for rolling bearings, useful temperature range: -30°C...+140°C, drop point: 150°C...230°C, highly resistant to corrosion, good resistance to water and rust.

Characteristic

Transmission clearance

2 ÷3 mm

Transmission chain adjustment

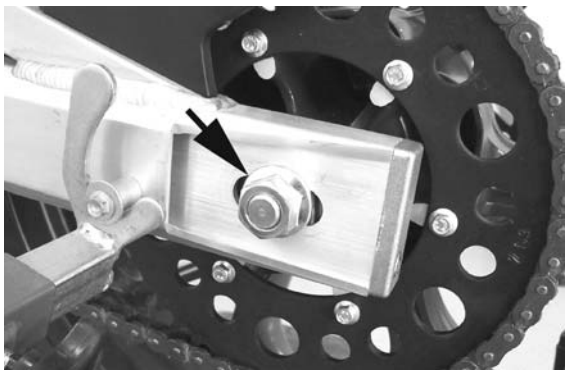
It is convenient to check chain tension, adjust and lubricate the chain if necessary, every 1000 km.

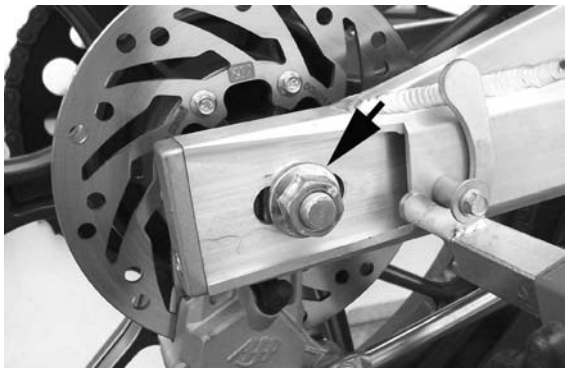
The chain is properly adjusted when, with the scooter upright and without load, it looks as indic-

ated in the figure. The chain backlash should be between 25 and 30 mm.

To restore adequate chain tension, proceed as follows:

- Loosen the wheel pin nut.
- Undo the set screws until the correct chain tension is obtained.
- Check alignment by means of the notches indicated on the chain tightener in the slot on the fork, on both sides.
- Tighten the screws.





Locking torques (N*m)

Rear wheel axle nut 70-80

Braking system

Braking circuit fluid

Front brake oil level check

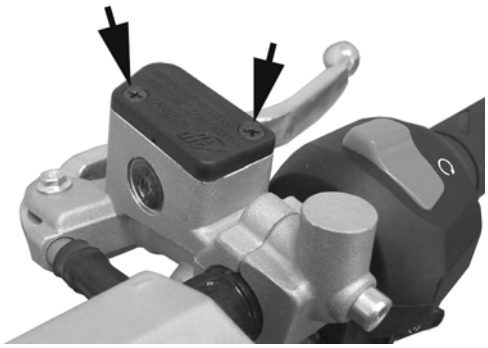
Proceed as follows:

- Rest the scooter on its centre stand with the handlebars perfectly horizontal;
- Check the fluid level through the corresponding sight glass.

Topping up brake fluid

Proceed as follows:

- Remove the tank cap by loosening the two screws, remove the gasket and top up using only the liquid specified without exceeding the maximum level.



AVOID CONTACT OF BRAKE FLUID WITH EYES, SKIN, AND CLOTHING. IN CASE OF ACCIDENTAL CONTACT, RINSE WITH WATER. THE FLUID IN THE BRAKING CIRCUIT IS HYGROSCOPIC, THAT IS, IT ABSORBS MOISTURE FROM THE SURROUNDING AIR. IF MOISTURE CONTAINED IN THE BRAKE FLUID EXCEEDS A CERTAIN VALUE, THIS WILL RESULT IN INEFFICIENT BRAKING. NEVER USE BRAKE LIQUID IN OPEN OR PARTIALLY USED CONTAINERS.

WARNING

BRAKE CIRCUIT FLUID IS VERY CORROSIVE; DO NOT LET IT COME INTO CONTACT WITH THE PAINTED PARTS.

NOTE

SEE THE BRAKING SYSTEM CHAPTER WITH REGARD TO THE CHANGING OF BRAKE FLUID AND THE BLEEDING OF AIR FROM THE CIRCUITS.

CAUTION

ONLY USE DOT 4 CLASSIFIED BRAKE FLUID.

IN ORDINARY CLIMATIC CONDITIONS REPLACE BRAKE FLUID EVERY 2 YEARS.

Rear brake fluid

Rear brake oil level check

Proceed as follows:

- Position the scooter upright.
- Check fluid level through the references on the brake fluid reservoir body.

Topping up brake fluid

Proceed as follows:

- Remove the screw of the reservoir cap, remove the gasket and fill up using only the specified fluid, without exceeding the maximum level.

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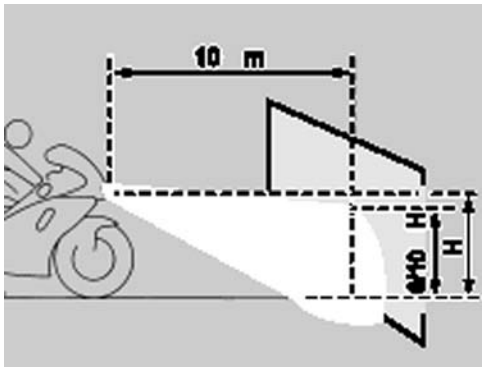
Headlight adjustment

- Position the scooter with rider on flat ground, 10 m away from a half-lit white screen.
- Make sure that the scooter's axle is perpendicular to the screen.
- Measure the distance from the centre of the headlight to the ground and then mark a cross on the wall at the same height measured.
- Start the engine and pull the throttle up to 1/3 of its stroke.
- Turn on the low-beam light, the maximum demarcation limit between the dark and the light area must be at a height not exceeding 8/10 of height from the ground to the centre of the headlight.



Direct the rear headlight by operating the screw indicated in the photograph.

Gearbox Oil

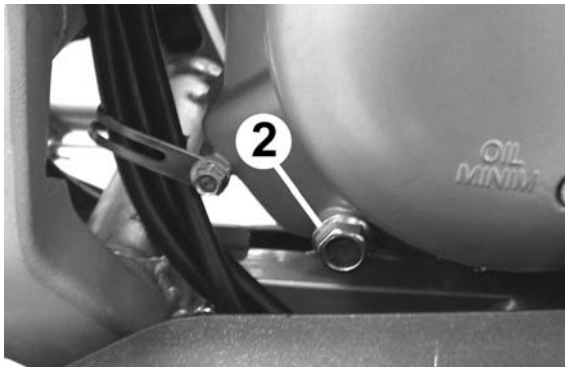
- Warm the engine up to the regular operating temperature
- Remove the oil filler cap «**1**»
- Remove the oil drainage plug from the right crankcase cover «**2**»
- Remove the oil drainage plug from the central section of the crankcase «**3**»
- Clean the drainage plug and its seat, and refit the plug

WARNING

MAKE SURE THAT THE DRAINAGE PLUG GASKET IS IN GOOD CONDITIONS.

Locking torques (N*m)

Oil plug 10 Nm

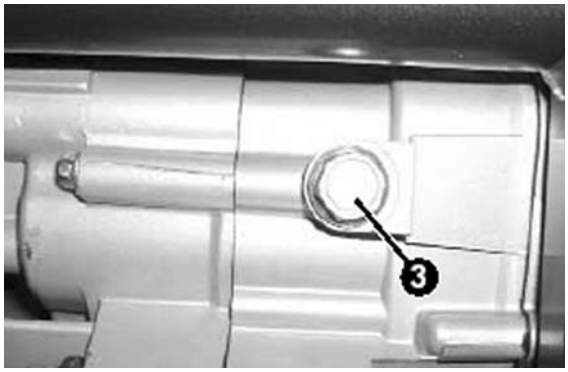


- Pour out the oil in the main transmission gear-case through the filler cap «**1**»

Characteristic

Capacity:

0.65 l



INDEX OF TOPICS

Engine

Poor performance

POOR PERFORMANCE

Possible Cause	Operation
Fuel nozzles or valve clogged or dirty.	Dismantle, wash with solvent and dry with compressed air
Excess of encrustations on the cylinder ports and in the combustion chamber.	Descale the thermal unit.
Muffler obstructed	Replace
Air filter blocked or dirty.	Clean following the procedure.
Inefficient starter (Remains on)	Check the mechanical movement of the Starter control transmission.

Starting difficulties

DIFFICULT STARTING

Possible Cause	Operation
Carburettor nozzles clogged or dirty	Dismantle, wash with solvent and dry with compressed air
Air filter clogged or dirty.	Wash with water and soap and impregnate again with oil for filters.
Inefficient starter	Check the mechanical movement.
Engine is flooded.	Start up keeping the throttle fully open alternating approximately five seconds of turning it with five seconds still. If the engine fails to start, remove the spark plug and make the engine run with open throttle so as to expel excess fuel. Refit a dry spark plug and repeat the procedure. If the fuel tank is empty, refuel and start up.
Spark plug faulty or dirty.	Extract the spark plug, check it is clean and in good conditions. Adjust electrodes at 0.5 mm. Replace spark plug if necessary.
Ignition system faulty.	Check (see ELECTRICAL SYSTEM chapter).
Starter motor will not run	Check battery for adequate charge, check battery leads and tighten, if necessary.

Engine tends to cut-off at full throttle

ENGINE TENDS TO STOP AT TOP SPEED

Possible Cause	Operation
Maximum nozzle dirty- carburetion lean	Wash the nozzle with solvent and dry with compressed air
Dirty carburettor	Wash the carburettor with solvent and dry with compressed air
Spark plug faulty or dirty.	Extract the spark plug, check it is clean and in good conditions. Adjust electrodes at 0.5 mm. Replace spark plug if necessary.
Fuel tank breather obstructed.	With a jet of compressed air, check that the breather pipe is good conditions (without crushings) and that it is not obstructed.
Water in the carburettor.	Empty the tank.

LOSS OF BLOWS

Possible Cause	Operation
Air filter dirty	Clean following the procedure.
Excess of encrustations on the cylinder ports and in the combustion chamber.	Descale the thermal unit.
Spark plug faulty or dirty	Extract the spark plug, check it is clean and in good conditions. Adjust electrodes at 0.5 mm. Replace spark plug if necessary. Bear in mind that many engine problems derive from the use of an inadequate spark plug.

Engine tends to cut-off at idle

ENGINE TENDS TO STOP AT IDLE SPEED

Possible Cause	Operation
Minimum nozzle dirty	Wash the nozzle with solvent and dry with compressed air
Starter that stays open	Check the mechanical movement.
Reed valve does not close	Check/ replace the lamellar pack

High fuel consumption

HIGH FUEL CONSUMPTION

Possible Cause	Operation
Air filter blocked or dirty.	Clean as to procedure
Carburettor nozzles loose and/or float pin faulty	Make sure the nozzles are correctly tightened and that the float needle is correctly tightened and in good conditions.

Possible Cause	Operation
Starter inefficient	Check the mechanical movement.

Engine overheating

ENGINE OVERHEATING

Possible Cause	Operation
No coolant in the cooling circuit	Fill up for correct level
Incorrect air bleeding	Repeat the operation
Thermostat remains closed	Replace
Fluid leaks in the radiator	Replace the radiator
Coolant leaks in the cooling circuit	Inspect the whole circuit to spot the leak.

Transmission and brakes

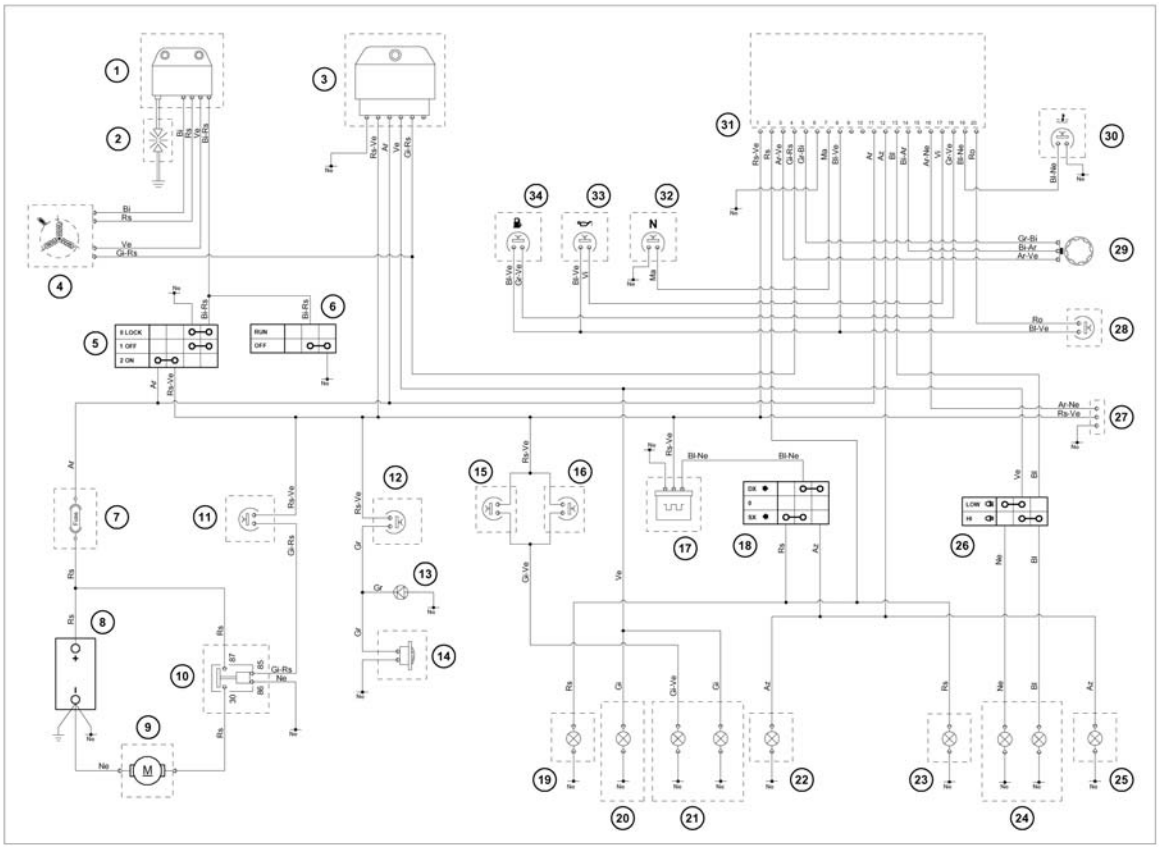
Insufficient braking

BRAKE SYSTEM

Possible Cause	Operation
Inefficient braking	The braking action should begin as soon as the brake controls are operated.
Brake noisiness	Check pads and front brake disc. If you find excessive wear or scoring, make the necessary replacements.
Worn pads	Check the brake pad wear.

Electrical system

INDEX OF TOPICS



KEY:

1. Electronic ignition device

2. Spark plug

3. Voltage regulator

4. Magneto flywheel

5. Key switch

6 Engine stop switch

7. Main fuse

8. Battery

9. Starter motor

10. Electric fan remote control

11. Starter button

12. Horn button

13. Diode

14. Horn

15. STOP button on front brake

16. STOP button on rear brake

17. Turn indicator control

18. Turn indicator switch

19. Left turn rear indicator lamp

20. License plate bulb

21. Rear headlight assembly with tail light and stop light bulbs

22. Right turn rear indicator lamp

23. Left turn front indicator lamp

24. Front headlight assembly with high- and low-beam bulb

25. Right turn front indicator lamp

26. Light switch

27. Diagnostics socket

28. Mode button

29. Tone wheel

30. Engine temperature warning light control

31. Instrument panel

32. Neutral gear engaged sensor

33. Low oil warning light control

34. Fuel level warning light control

O = Orange, **SB** = Sky Blue, **W** = White, **B** = Blue, **Y** = Yellow, **Gr** = Grey, **Br** = Brown, **Bl** = Black, **P** = Pink, **R** = Red, **G** = Green, **Pr** = Purple

Dashboard

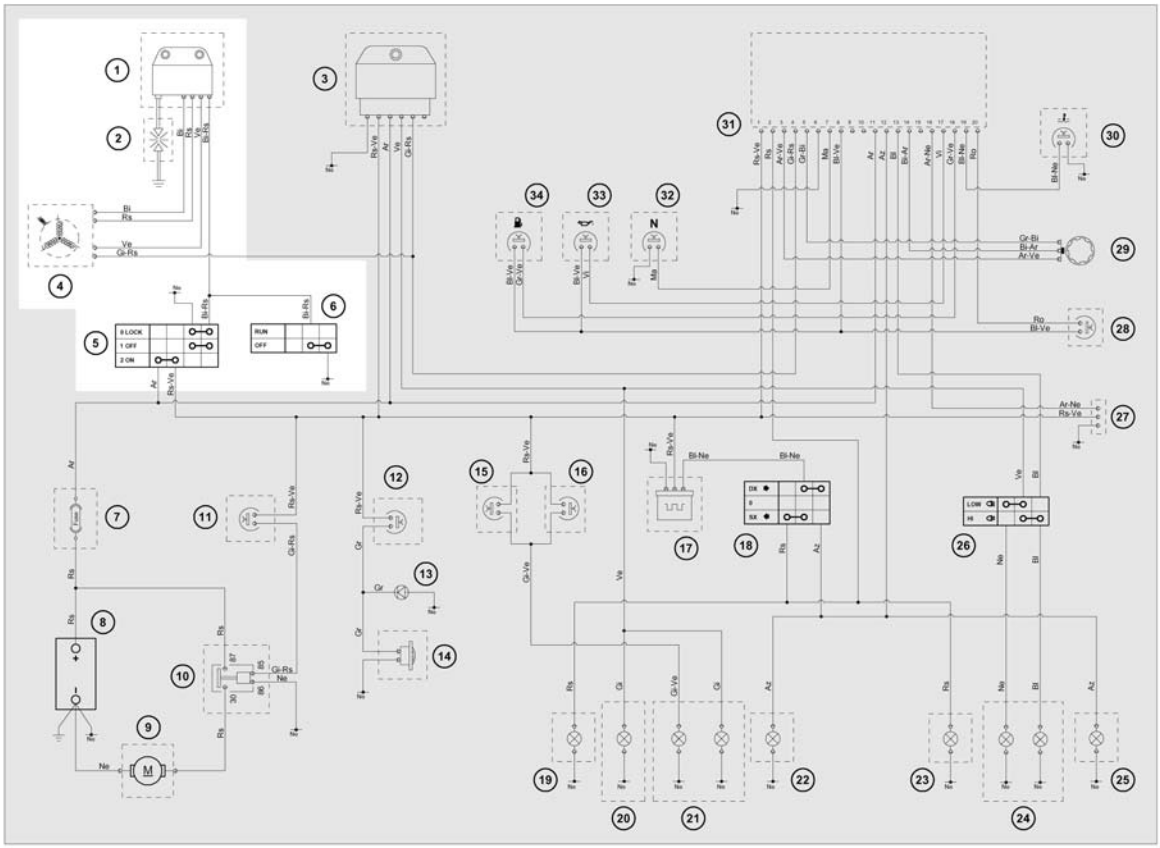
SERVICE WARNING LIGHT RESET

To reset the SERVICE counter:

- Press and hold the MODE button.
- Turn the IGNITION KEY to ON.
- Press and hold the button for 10 sec. During this operation the "service" icon will flash

Conceptual diagrams

Ignition



KEY:

1. Electronic ignition device

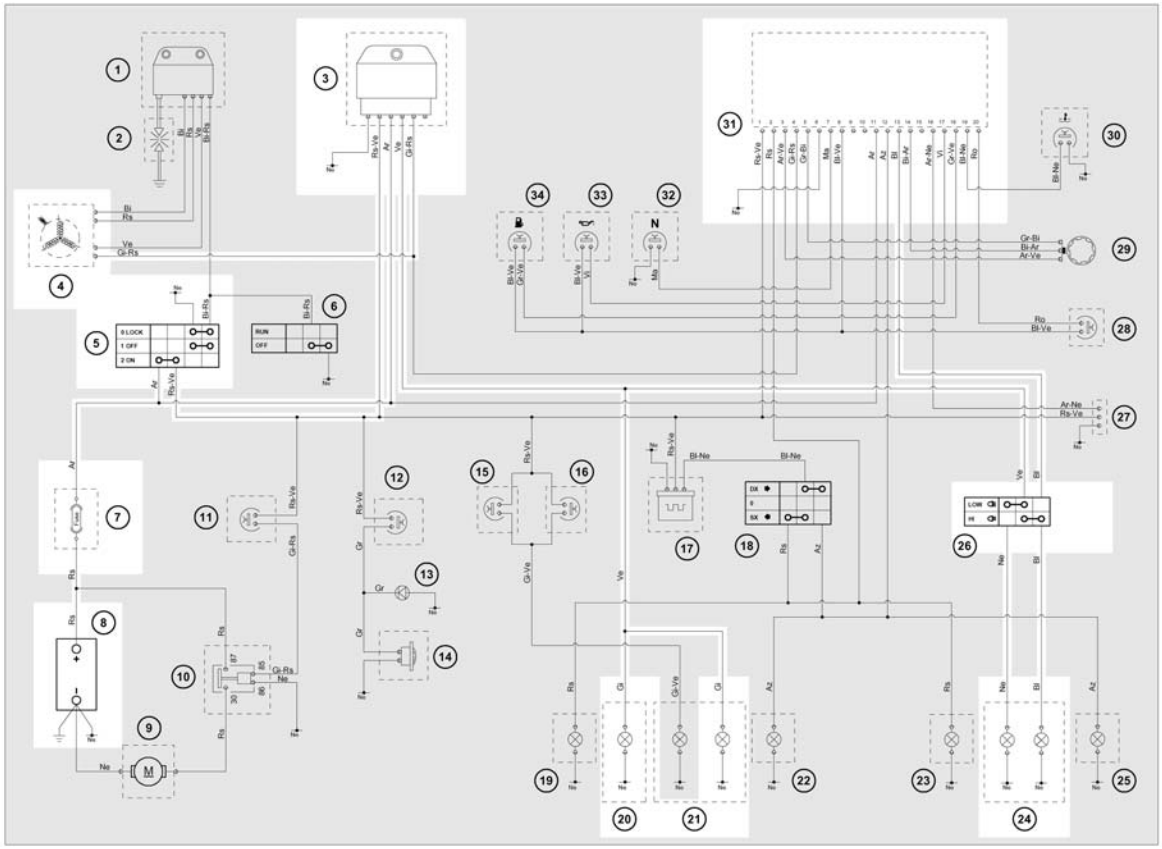
2. Spark plug

4. Magneto flywheel

5. Key switch

6 Engine stop switch

Headlights and automatic starter section



KEY:

3. Voltage regulator

4. Magneto flywheel

5. Key switch

7. Main fuse

8. Battery

20. License plate bulb

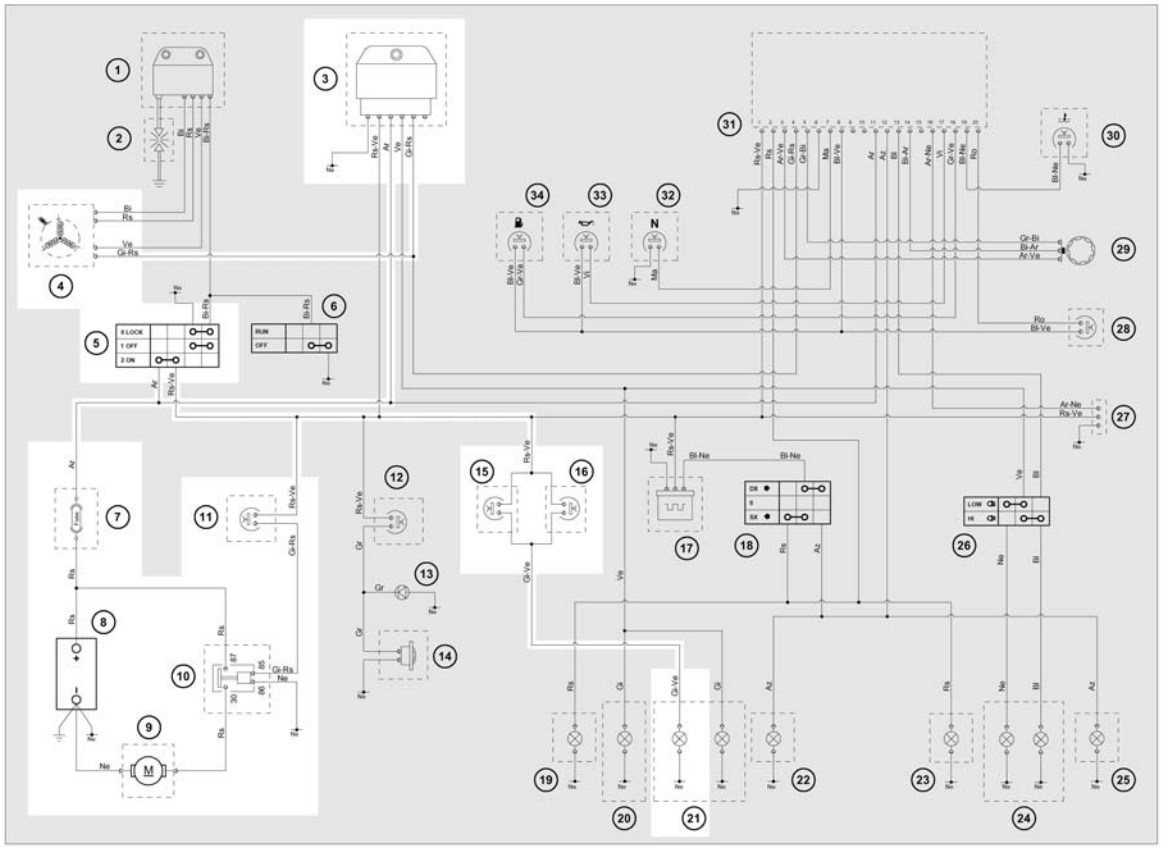
21. Rear headlight assembly with tail light and stop light bulbs

24. Front headlight assembly with high- and low-beam bulb

26. Light switch

31. Instrument panel

Battery recharge and starting



KEY:

3. Voltage regulator

4. Magneto flywheel

5. Key switch

7. Main fuse

8. Battery

9. Starter motor

10. Electric fan remote control

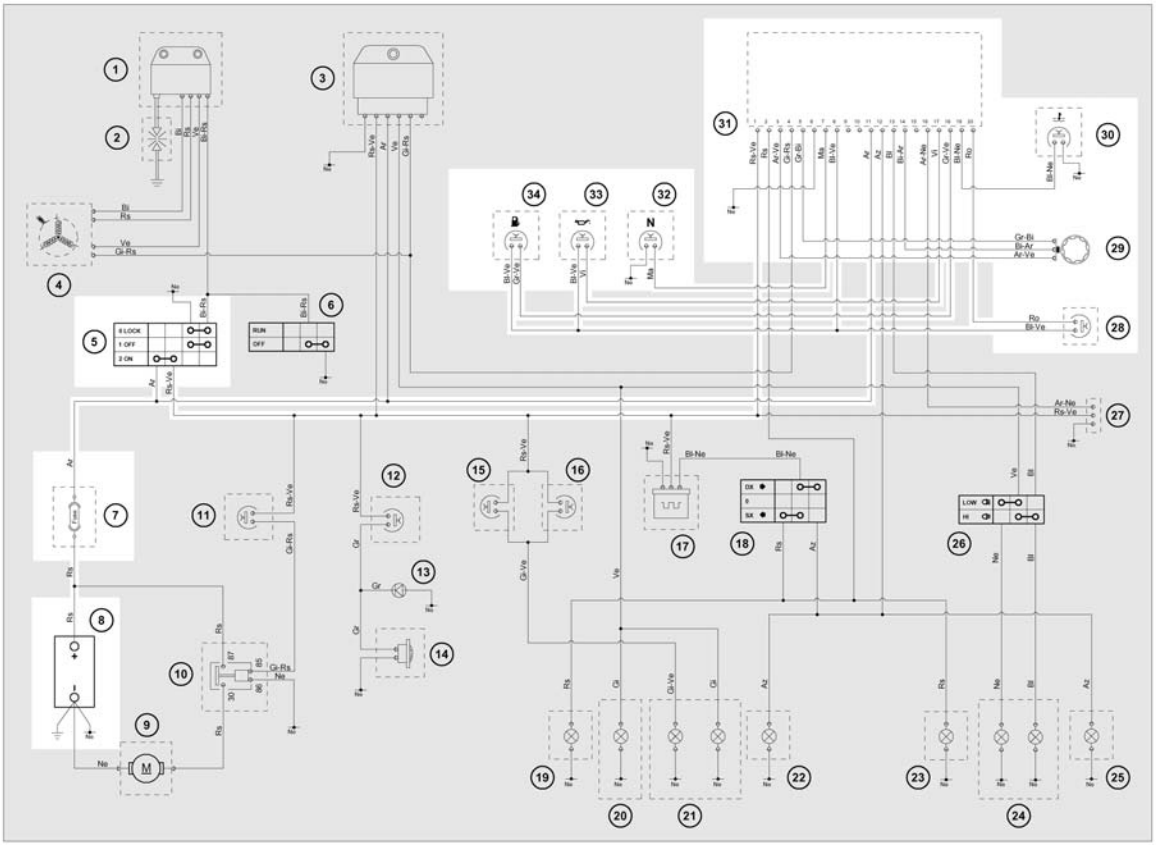
11. Starter button

15. STOP button on front brake

16. STOP button on rear brake

21. Rear headlight assembly with tail light and stop light bulbs

Level indicators and enable signals section



KEY:

5. Key switch

7. Main fuse

8. Battery

28. Mode button

29. Tone wheel

30. Engine temperature warning light control

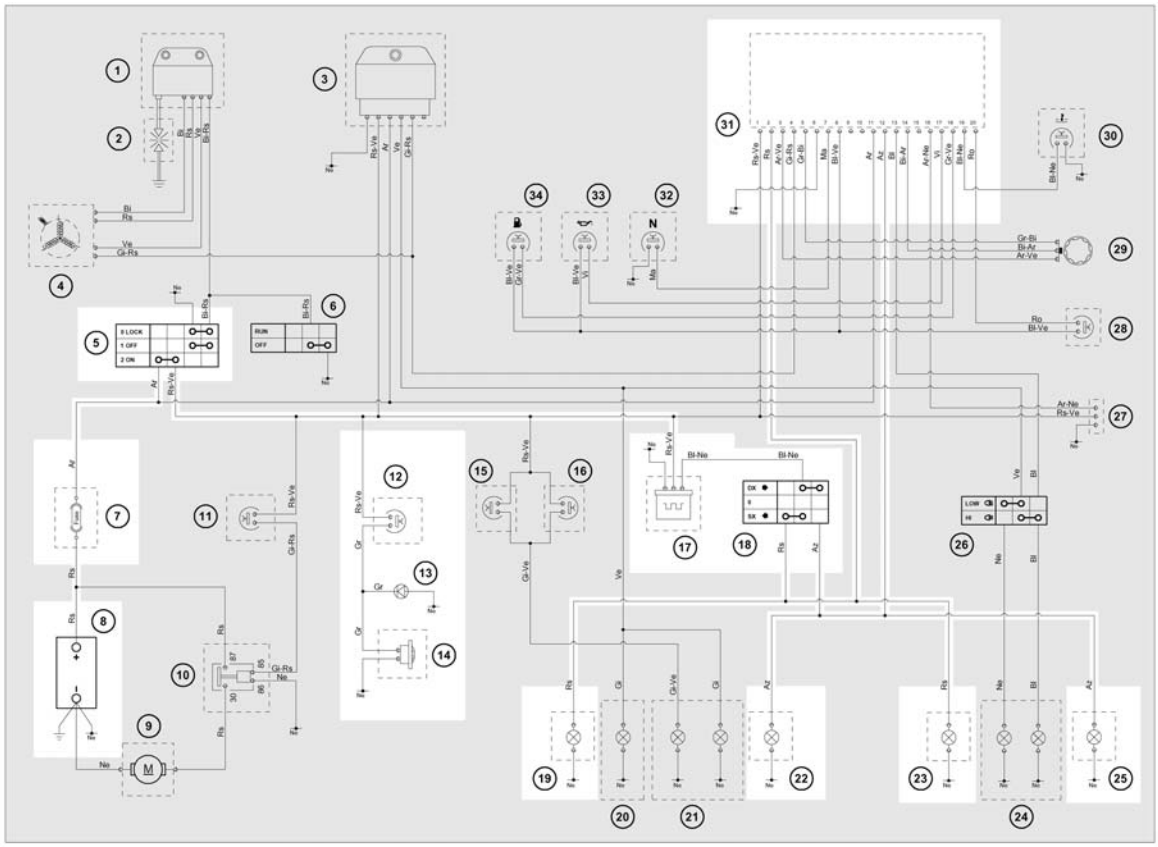
31. Instrument panel

32. Neutral gear engaged sensor

33. Low oil warning light control

34. Fuel level warning light control

Turn indicators and horn



KEY:

5. Key switch

7. Main fuse

8. Battery

12. Horn button

13. Diode

14. Horn

17. Turn indicator control

18. Turn indicator switch

19. Left turn rear indicator lamp

22. Right turn rear indicator lamp

23. Left turn front indicator lamp

25. Right turn front indicator lamp

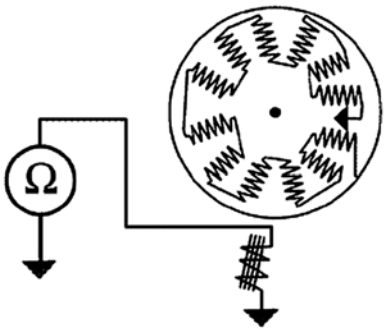
31. Instrument panel

Checks and inspections

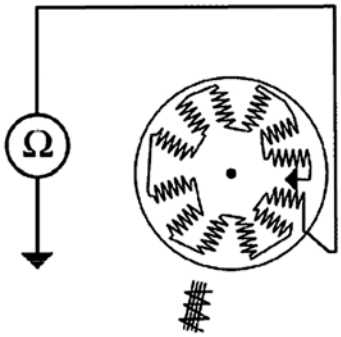
In case the cause of ignition failure or malfunction

cannot be easily identified at sight, first of all re-

place the control unit by another one in operating conditions.
Remember that disconnections due to replacement of the central unit must be done with the engine off.
If after replacement the vehicle starts properly, the control unit is failing and must be replaced.



If the failure persists, check the generator and the stator components as follows:
After a sight control of the electrical connections, use a specific tester to measure the stator winding and the pick-up.
If checks on the loading coil, pick-up detect irregularities, **replace the stator and the failing components**.
Disconnect the connector on the flywheel cover and measure the resistance between either contact and the earth.



Ignition circuit

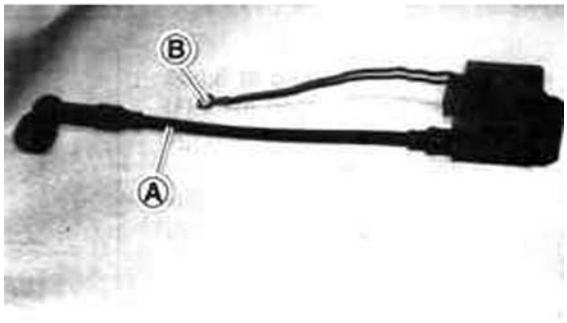
Coil removal

- Remove the front left fairing
- Detach fittings of the magneto flywheel cable
- Remove the two fixing screws of the control unit
- Remove the spark plug pipe
- Remove the control unit

- Check the resistance of the secondary winding of the high voltage coil (resistance between points A and B)

WARNING

IF THE READINGS OF THE SECONDARY WINDING AND THE MAGNETO FLYWHEEL ARE RIGHT, REPLACE THE COIL.



Electric characteristic

Resistance

5 - 6 kOhm

Pipe check

- Check the resistance value in the hole

Electric characteristic

Resistance

4 - 6 kOhm

Stator check

WARNING

IF VALUES NON CONFORMING TO THE TABLE ARE MEASURED, CHECK ALL ELECTRICAL CONNECTIONS BEFORE REPLACING THE MAGNETO FLY-WHEEL

RESISTANCE VALUES

	Specification	Desc./Quantity
1	White - Red	100 (ohm)
2	White - Green	700 (ohm)
3	White - Yellow	0.5 (ohm)
4	Ground - Red	100 (ohm)
5	Ground - Green	820 (ohm)
6	Ground - Yellow	0.7 (ohm)

RESISTANCE VALUES

- Remove the front left fairing
- Disconnect the high voltage coil terminals, the stop lights and the light fittings

- Check that the resistance between terminals and the ground complies with the values indicated in the table.

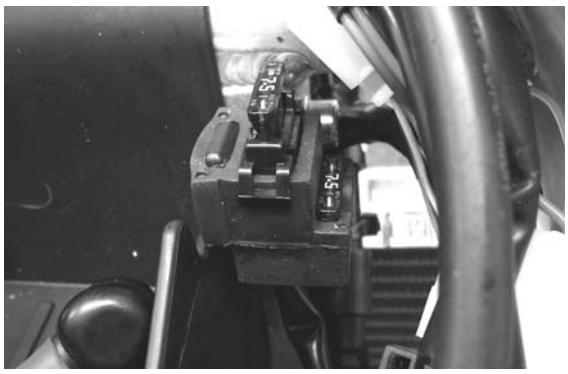
Lights list

BULBS

	Specification	Desc./Quantity
1	Front headlamp bulbs	12V. 35/35 W. **Type:** Double filament
2	Turn indicator bulb	12 V, microbulbs
3	Tail light/stop bulb	Tail: 12 V - microbulbs Stop: 12V - 16W

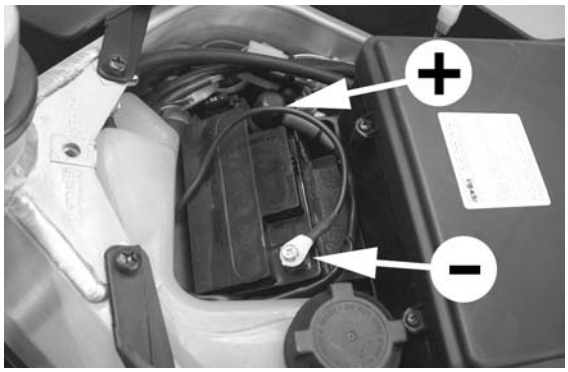
Fuses

The electrical system is protected by one 4 ampere fuse located in the fuse box «**A**» on the battery positive lead under the saddle. Before replacing a blown fuse, find and solve the problem that caused it to blow. Do not substitute the fuse with any alternative form of conductor



Sealed battery

Sealed battery start-up operations



INSTRUCTIONS FOR REFRESHING THE STOCK CHARGE OF AN OPEN CIRCUIT

1) Voltage check

Before installing the battery on the vehicle, check the open circuit voltage with a normal tester.

- If the voltage exceeds 12.60 V, the battery may be installed without any renewal recharge.
- If voltage is below 12.60 V, a renewal recharge is required as explained in 2).

2) Constant voltage battery charge mode

-Constant voltage equal to 14.40 ÷ 14.70V

-Initial charge voltage equal to 0.3 ÷ 0.5 x nominal capacity

-Duration of the charge: 10 to 12 h recommended

Minimum 6 h

Maximum 24 h

3) Constant current battery charge mode

-Charge current equal to 1/10 of the nominal capacity of the battery

-Duration of the charge: 5 h

WARNING

-WHEN THE BATTERY IS REALLY FLAT (WELL BELOW 12.6V) IT MIGHT BE THAT 5 HOURS OF RECHARGING ARE NOT ENOUGH TO ACHIEVE OPTIMAL PERFORMANCE.
IN THESE CONDITIONS IT IS HOWEVER ESSENTIAL NOT TO EXCEED EIGHT HOURS OF CONTINUOUS RECHARGING SO AS NOT TO DAMAGE THE BATTERY ITSELF.

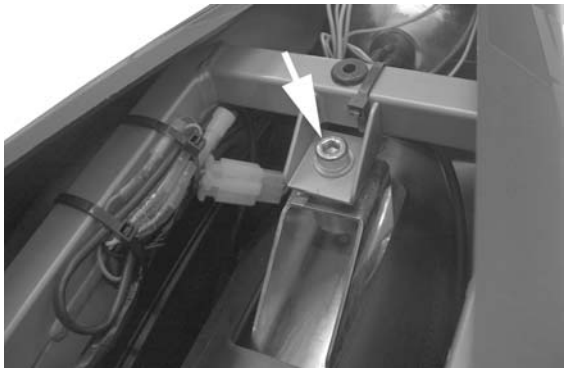
INDEX OF TOPICS

Exhaust assy. Removal

Silencer

Remove the bolt indicated in the figure under the rear saddle and slide the silencer backwards.

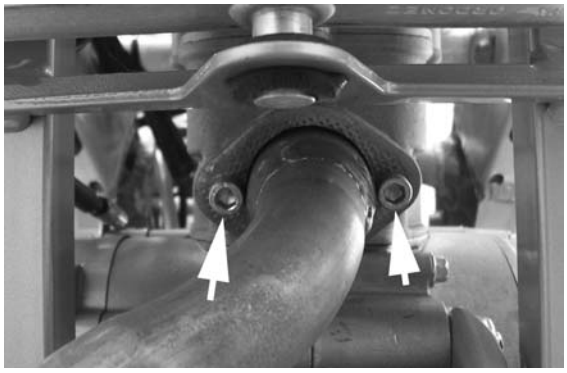
Replace the graphite seal at every removal.

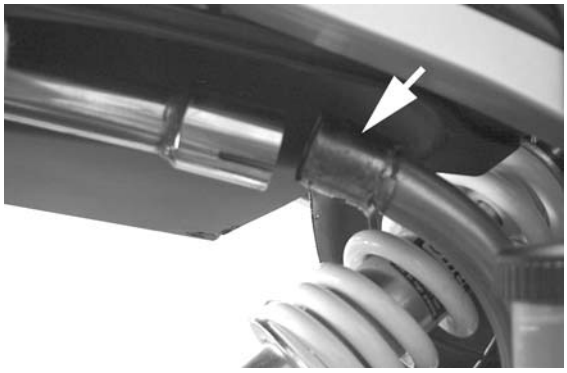


Muffler

- Remove the two fixing screws of the exhaust manifold on the cylinder.
- Remove the bolt fixing the muffler to the chassis and slide the muffler off the silencer.

Replace the graphite seal at every removal.





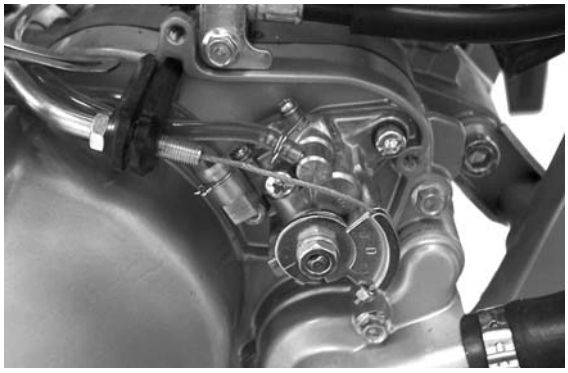
Removal of the engine from the vehicle

- Remove the muffler assembly.
- Remove the transmission chain.

- Remove the spark plug cap.
- Empty the cooling system and then remove the pipes on the cooling system pump and on the engine head.

- Remove the elastic clip fixing the bellows to the carburettor and the clip from the manifold to the engine.
- Disconnect the carburettor from the engine.

- If necessary, remove the clamps in order to disconnect the electrical connections.



- Remove the mixer oil pump transmissions.

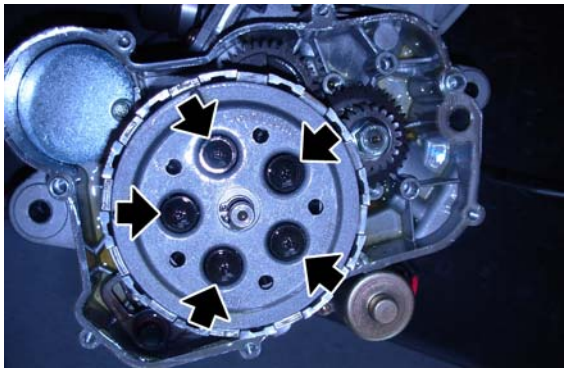
- Remove the clutch control transmission.
- Remove the gear shift lever.

- Remove the rear engine to chassis bolt.
- Hold the engine and remove the three bolts fixing the engine to the cradle.
- Tilt the engine until it is off its position in the chassis.

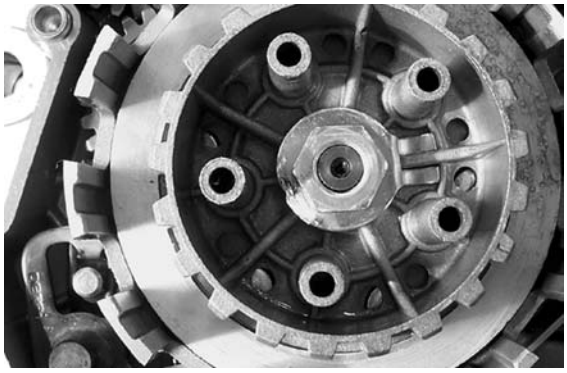
INDEX OF TOPICS

Removing the clutch

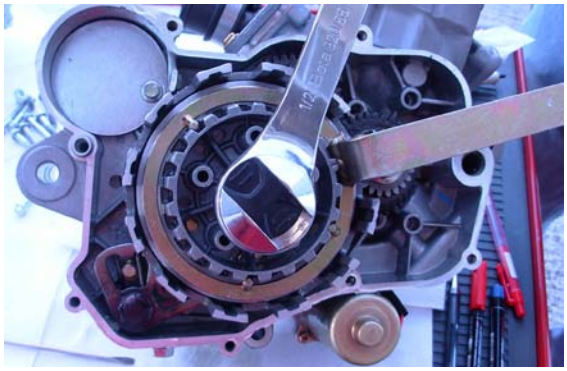
- Remove the crankcase right cover
- Undo the 5 screws fixing the clutch springs and lift the internal clutch cover



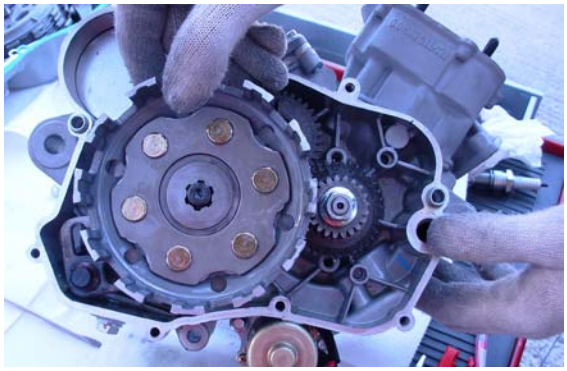
- Remove the 4 clutch plates and the three steel discs
- Straighten the bevelled washer

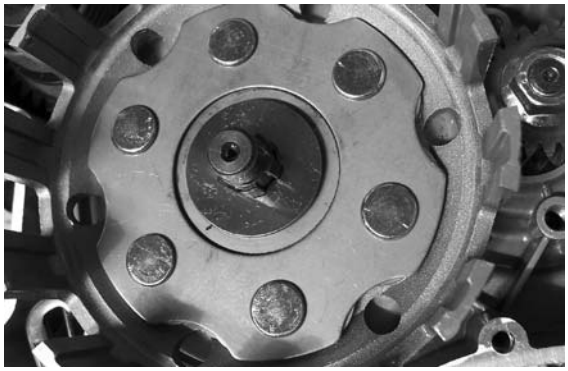


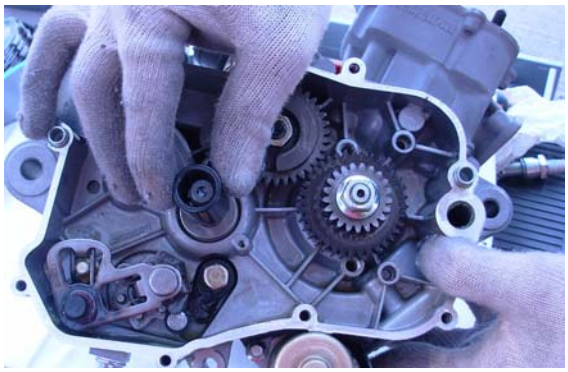
- Lock the disc thrust plate with the specific tool and unscrew the nut
- Detach the locking washer and the star washer



- Slide off the clutch bell as well as the bushing and the shim washer







- Check the clutch spring
- Measure the length of each spring when extended

Characteristic

Spring serviceability limit :

31 mm

- Check the clutch plate
- Measure each plate thickness

Characteristic

Serviceability limit :

3.8 mm

- Check the steel discs
- Use thickness gauges to check that the plates are not deformed

Characteristic

Serviceability limit :

0.15 mm

Carry out a visual inspection of the clutch jaws. Replace the component if there are signs of thermal fatigue, reduced surface hardness or irregular jaw wear.

Check the components of the clutch bell are in good conditions:

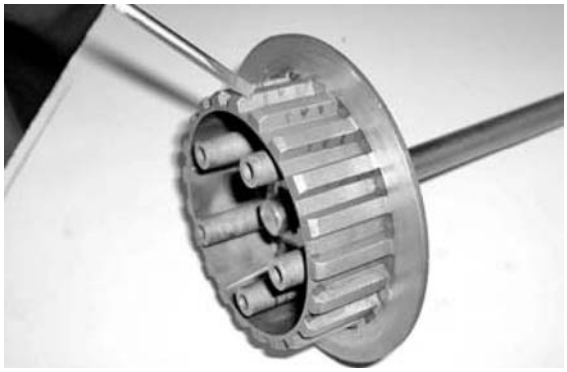
- Clutch plate seats
- Rivets and connecting plugs to crown gears
- Main shaft lever coupling

CAUTION

REPLACE THE PART IN CASE OF UNDUE DAMAGE.

Check that the disc holding plate is in good conditions.

Check that the coupling between the surface and the plate is not eroded or grooved. Replace the part if any defect is found.



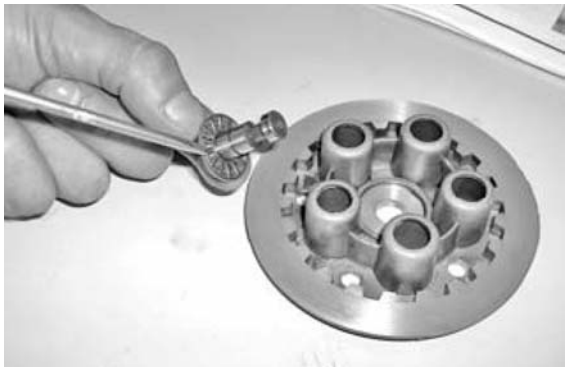
CAUTION

REPLACE THE PART IN CASE OF UNDUE DAMAGE.

Check the disc thrust plate and its axial bearing.

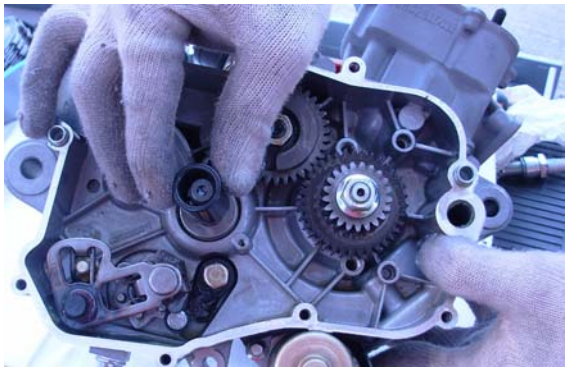
CAUTION

REPLACE THE PART IN CASE OF UNDUE DAMAGE.

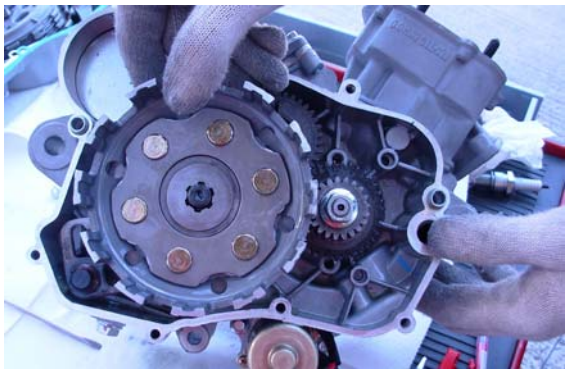


Refitting the clutch

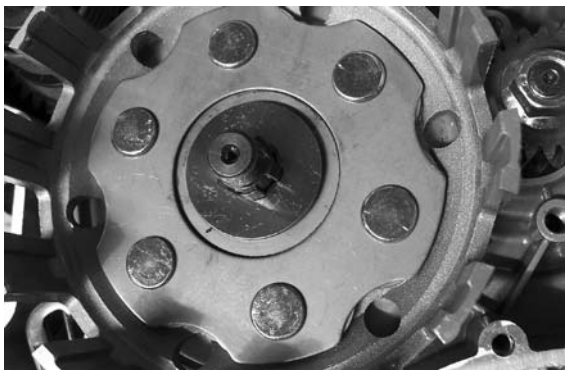
- Fit the shim washer and the clutch bushing



- Inserire la campana frizione

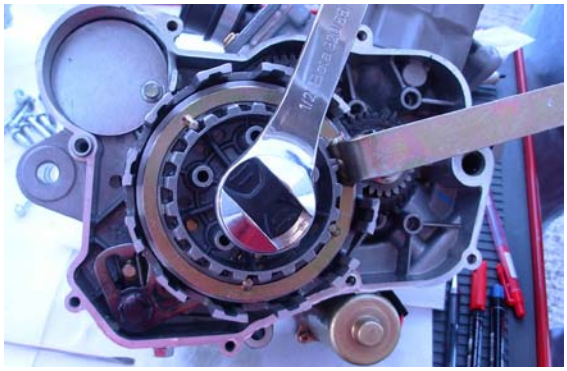


- Fit the star washer
- Fit the disc thrust plate, the bevelled washer and the fixing nut
- Lock the plate with the specific tool and tighten the fixing nut
- Fold the locking washer to secure the nut



Specific tooling

00H0530004.1 Clutch locking tool

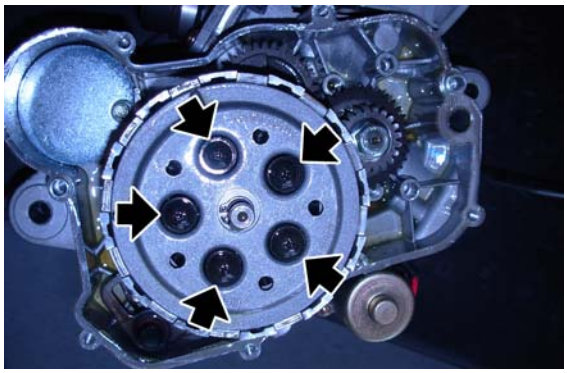


- Lubricate the clutch plates with new oil
- Fit the plates with the visible mark on one of the friction surfaces facing out

- Fit the clutch springs and their fixing screws
- Tighten to the specified torque

Locking torques (N*m)

Clutch cover screws 8 -10 Nm



Flywheel and starting

Removing the starter motor

- Remove the flywheel cover.
- Undo the two screws to remove the bendix supporting plate

- Slide the bendix form its seat and take the shim washers

- Remove the electrical connections to the starter motor
- Undo the two screws to remove the starter motor

Removing the flywheel magneto

- Remove the gear pedal
- Undo the three fixings screws and remove the left crankcase cover

- Lock the magneto flywheel with the aid of a spe-

cific calliper spanner. Unscrew the flywheel fixing screw and collect the spacer

Specific tooling

020565Y Flywheel lock calliper spanner

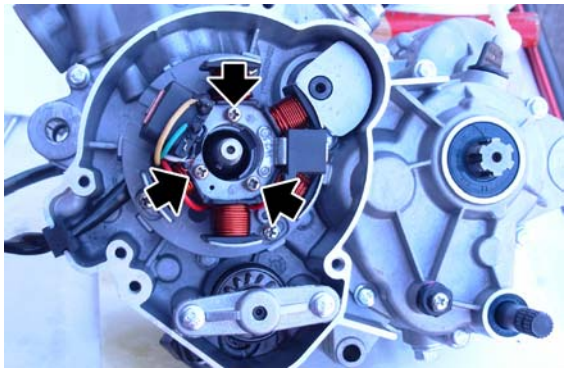
- Remove the flywheel with the specific extractor

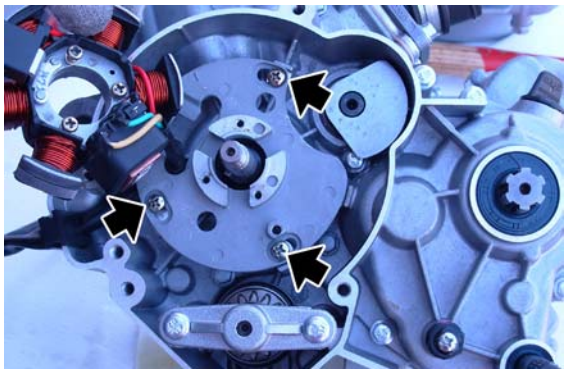
Specific tooling

AP8501501 Flywheel extractor

- Detach the connector between stator and the clamps fixing the wire to the chassis

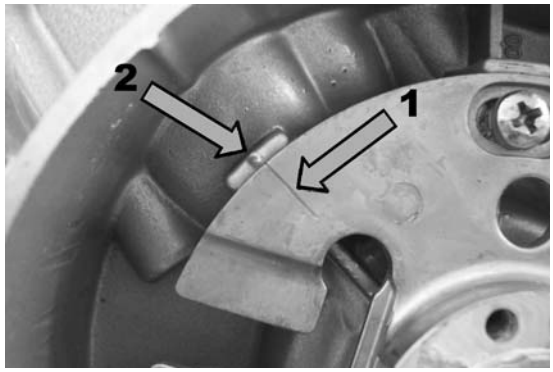
- Undo the three fixings screws and remove the stator from stator plate
- Undo the three fixing screws of the plate in order to detach the stator electrical cable

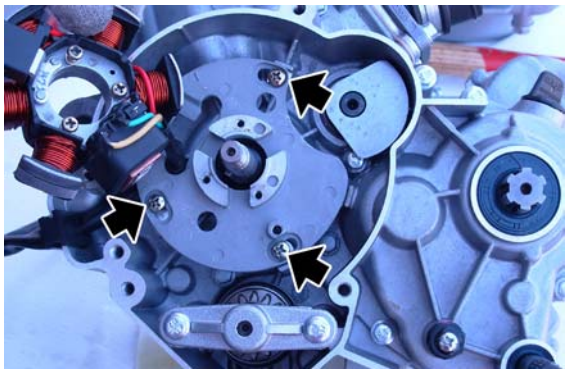




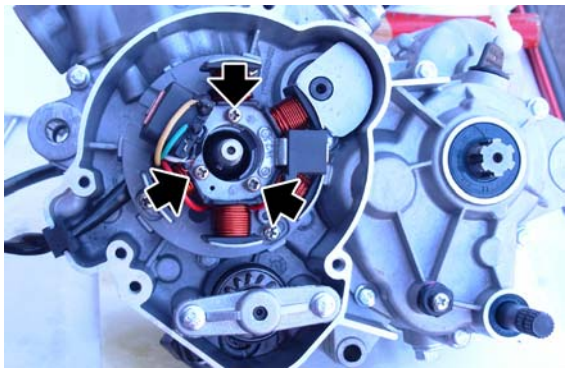
Refitting the flywheel magneto

- Make the electrical cable go from the seat to the stator plate
- Make the notch «**1**» of the stator plate coincide with the reference point on the engine crankcase
- Fix the plate with the three screws
- Fit the stator on the stator plate

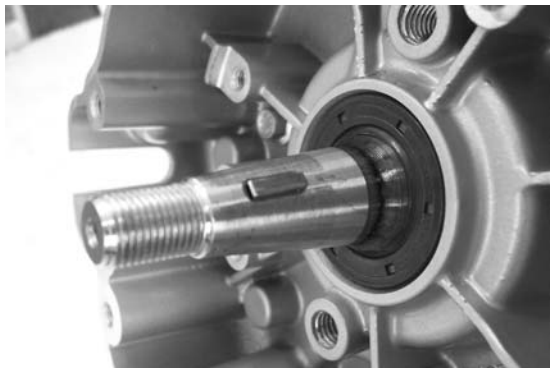




- Connect the stator connector and fix the wire to the chassis by means of the clamps
- Make sure the cable support inside the crankcase is correctly positioned so that the cables do not get into contact with the flywheel rotor



- Mount the flywheel checking the proper insertion of the key in the slot on the crankshaft
- Lock the flywheel with the aid of a specific calliper spanner and tighten the flywheel fixing screw
- Mount the rest of the components following the removal procedure but in reverse order



Specific tooling

020565Y Flywheel lock calliper spanner

Locking torques (N*m)

FLYWHEEL 35 ÷ 45 Nm

Refitting the starter motor

Follow the removal procedure but in reverse order being careful to replace and grease the sealing O-ring on the starter motor coupling

- Check that the lower and upper shim washers are fitted

Cylinder assy. and timing system

Removing the cylinder head

- Remove the coolant rubber pipes connecting the pump and the radiator and collect the coolant
- Remove the rubber pipes connecting the head and the radiator
- Disconnect the electrical connector of the temperature sensor
- Remove the spark plug
- Undo the five fixing screws to remove the head cover
- Undo the four stud bolt nuts to remove the head and its gasket

- Remove any carbon deposits present on the head being careful not to scratch the coupling surfaces
- Use a trued bar to check the head coupling surface is not distorted.

Characteristic

Maximum allowable run-out

0.05 mm

Fitting the head

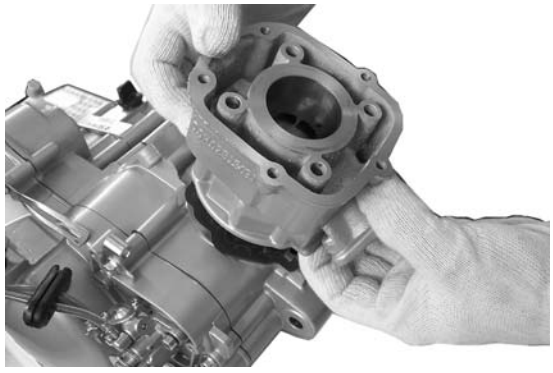
- To refit, carry out the removal operations but in reverse order.
- Fit a new gasket between the head and the cylinder
- Check that the coupling surfaces are perfectly clean
- Place the head on the cylinder and tighten the four stud bolts in two or three stages, tightening one stud bolt and afterwards the one that is diametrically opposite
- Refit the thermal switch and fit an adhesive gasket on the thread
- Mount the thermostat and the two fixing nuts
- Connect the thermal switch connector and the spark plug tube - Connect the radiator hose to the cylinder head
- Connect the radiator hose to the hydraulic pump
- Fill up the cooling system reservoir with coolant
- Bleed the system through the cap on the coolant pump

Locking torques (N*m)

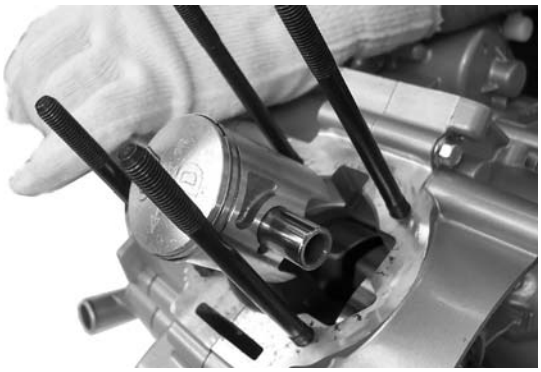
Nuts: 19 Nm Screws 6 Nm Thermal switch 10 Nm

Removing the cylinder - piston assy.

- Empty the coolant out the system
- Remove the cylinder head
- Remove the cylinder by slowly sliding it upwards
- Remove the base gasket
- Put a piece of old cloth in the cylinder housing hole on the crankcase so that no object can fall in
- Remove the seeger ring retaining the pin
- Remove the pin. Be careful to support the connecting rod properly to avoid deformations



- Remove the piston
- Remove the gasket rings from the piston (piston rings)
- Remove the ball retainer of the rod small end
- Check and clean the components
- Clean the piston crown carefully to remove any carbon deposits
- Visually check the piston sealing circlips. Replace them if damaged or distorted



Inspecting the piston

- Check the piston outside diameter following the perpendicular axis to the pin seat. Measure at 15 mm from the lowest seat of a circlip

Characteristic

Serviceability limit:

0.01 mm

Inspecting the cylinder

- Measure the openings of the piston elastic sealing rings by placing a thickness gauge in the cylinder

Characteristic

Maximum allowable piston ring opening:

0.35 mm

- Check cylinder for wear with a bore meter.
- Carry out measurements following the perpendicular axis and at three different heights of the cylinder.
- To select the piston to be coupled to the cylinder, refer to the TYPES tables, keeping in mind that the piston-cylinder clearance should be always between 0.035 and 0.045 mm.

Characteristic

Serviceability limit:

0.05 mm

TYPE A

Specification	Desc./Quantity
Piston	39,850 +/- 0,0025 mm
Cylinder	39,890 +/- 0,0025 mm

TYPE B

Specification	Desc./Quantity
Piston	39,855 +/- 0,0025 mm
Cylinder	39,895 +/- 0,0025 mm

TYPE C

Specification	Desc./Quantity
Piston	39,860 +/- 0,0025 mm
Cylinder	39,900 +/- 0,0025 mm

TYPE D

Specification	Desc./Quantity
Piston	39,865 +/- 0,0025 mm
Cylinder	39,905 +/- 0,0025 mm

Removing the piston

- Refit the piston sealing circlips
- Fit a new cylinder base gasket
- Refit the ball retainer at the rod small end and

make sure to lubricate the components with recommended oil

- Refit the piston paying attention to the direction of the arrow indicated at the piston crown. This arrow should be facing the outlet
- Fully fit the previously lubricated pin and mount two new pin retaining seeger rings being careful to fit them in their correct positions
- Lubricate both the cylinder and the piston faying surfaces and the sealing circlips
- Carefully fit the piston in the cylinder being careful to press the sealing circlips in their positions
- Fit a new head gasket and refit the cylinder head
- Mount the head cover
- Fit a new spark plug
- Connect again the temperature sensor connectors and the spark plug cap
- Fill up the cooling system being careful to purge it

Splitting the crankcase halves

Main transmission pinion and countershaft gear

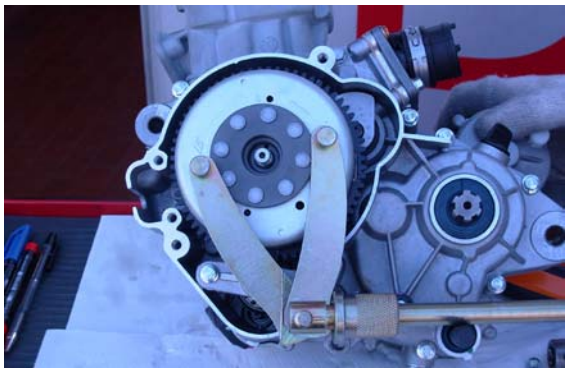
- Rimuovere il coperchio destro del carter
- Rimuovere la frizione

- Remove the crankcase left cover
- Lock the magneto flywheel with the specific tool.

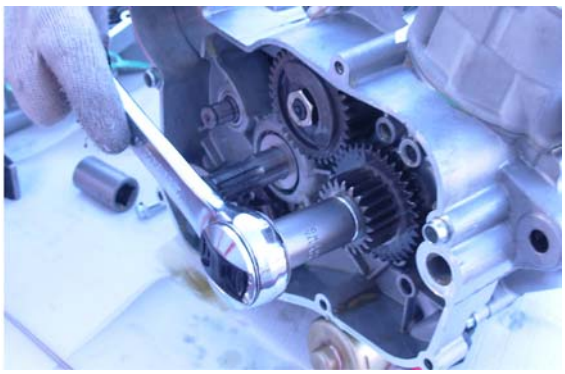
If the flywheel has been already removed, reposition it on the shaft only for this operation

Specific tooling

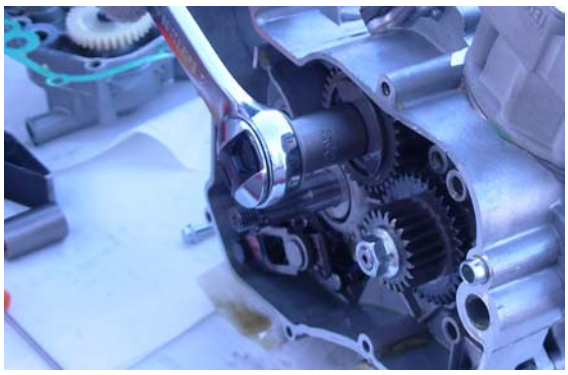
020565Y Flywheel lock calliper spanner



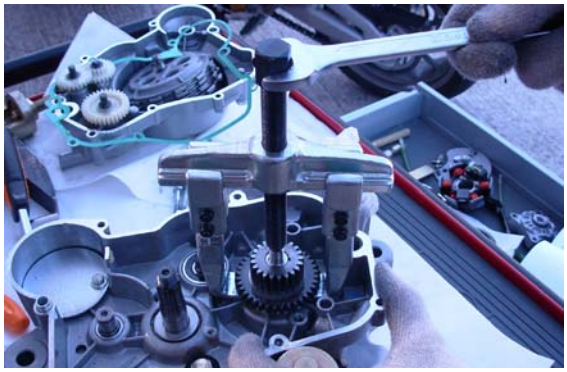
- Unscrew and remove the nut fixing the crank-shaft pinion



- Svitare e togliere il dado dell'ingranaggio del contralbero
- Rimuovere l'ingranaggio completo di rasamento

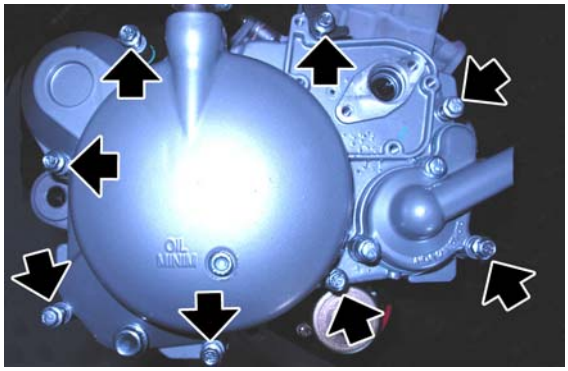


- Remove the main transmission gear with an extractor available in the market

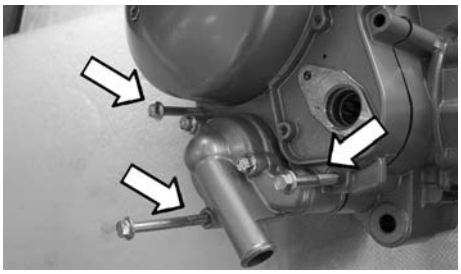


RIGHT side crankcase removal

- Detach the hose connecting the radiator to the hydraulic pump and flow out the coolant of the cooling system
- Disconnect the clutch lever wire and remove the clutch wire clamp
- Flow out the oil in the gearbox and in the clutch
- Remove the oil pump cover
- Turn the pump valve control anticlockwise and detach the oil pump wire
- Undo the two fixing screws of the oil pump
- Move the whole oil pump assembly and its choses upwards but do not detach them
- Remove the clutch cover undoing the eight screws indicated in the figure
- Remove the clutch cover bolts



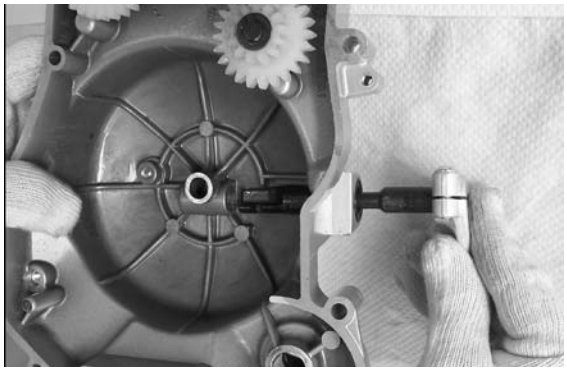
- The longer screws are highlighted in the figure
- Remove the crankcase cover gasket and clean off any rests of old gaskets that may remain on the crankcase or the cover

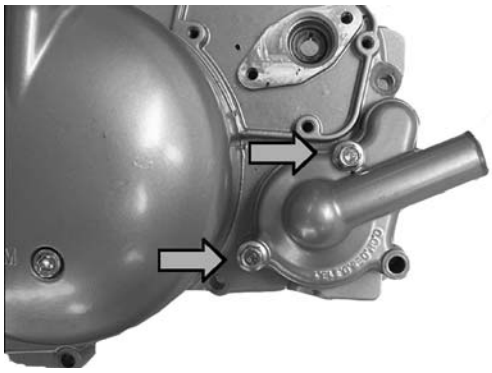


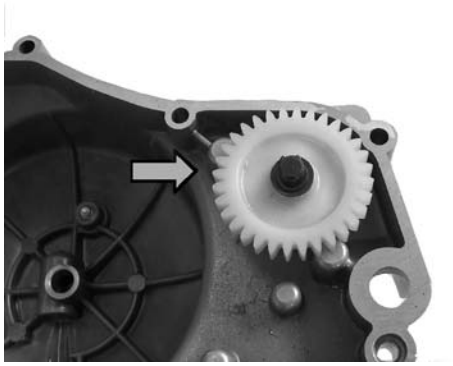
- Slide off and remove the clutch lever from the clutch cover
- Undo the two fixing screws of the hydraulic pump and remove the pump
- Detach the gasket and clean off any rests of old gaskets that may be left on the coupling surfaces

of the hydraulic pump

- Lock the driving gear

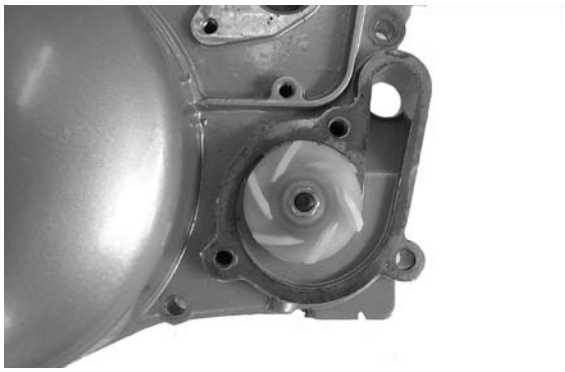


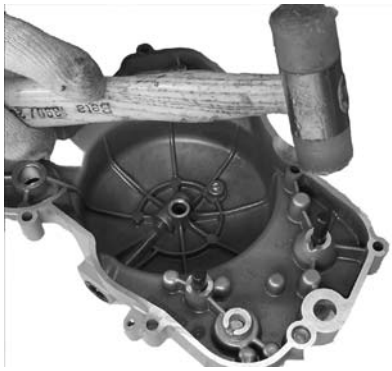




- First unscrew the fixing nut and then the rotor. Remove the driving gear

- Slide out the hydraulic pump shaft and its oil seals



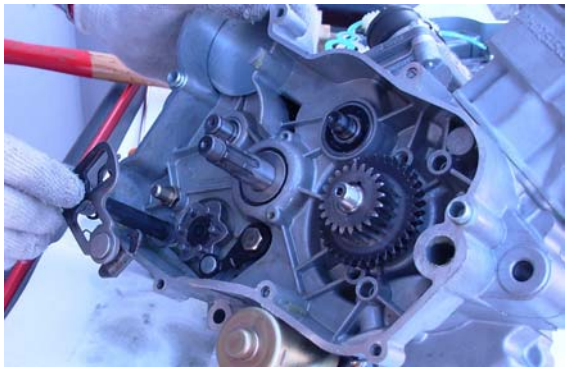


- Remove the transmission gear
- Remove the driving gear and the oil pump shaft

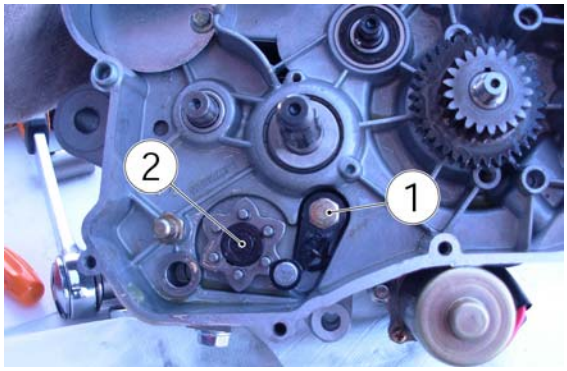
Gear selector unit removal

- Take out the clutch assembly
- Remove the gear pedal

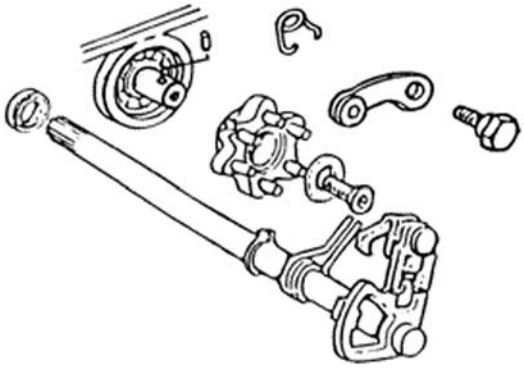
- Pull and extract the shaft/selector unit together with its shimming



- Svitare la vite **1** della leva del selettore del cambio
- Svitare la vite **2** della testa del comando a tamburo



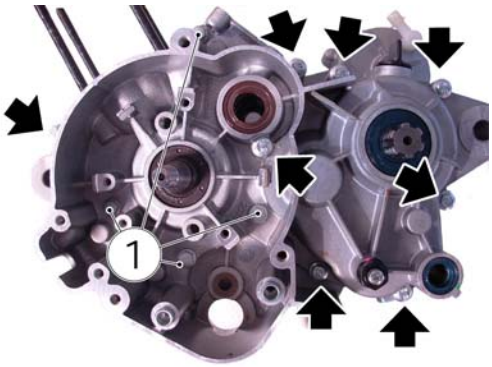
- Check that the selector shaft is not worn or damaged
- Mount the components following the removal procedure but in reverse order
- Apply one drop of Loctite 270 on the thread of the screw of the drum control head
- Make sure that the selector shaft springs and the gear selector lever spring have been correctly fitted



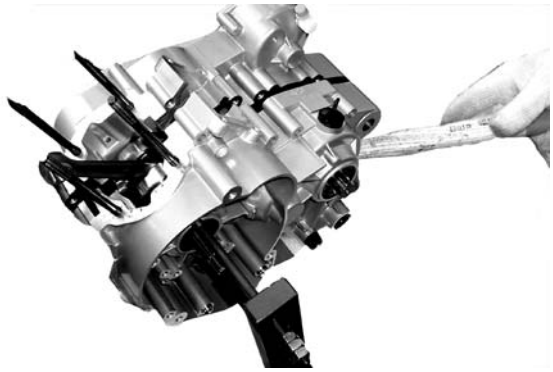
Removing the crankshaft

and gear unit

- Remove the engine from the chassis
- Remove the thermal group (cylinder head and piston)
- Remove the lamellar pack
- Remove the magneto flywheel
- Remove the complete clutch
- Remove the primary gear
- Remove the countershaft gear
- Remove the pin
- Remove the gear selector lever
- Remove the fixings screws of both crankcase halves located at the left of the engine. Screws **1** are too short.



- Mediante l'attrezzo specifico scoppiare i due semicarter



CAUTION

NEVER USE A LEVER OR A SCREWDRIVER TO SEPARATE THE CRANKCASE HALVES. REPLACE THE CRANKCASE HALVES IF THE COUPLING SURFACES GET DAMAGED.

Specific tooling

AP8106698 Crankcase separator

- Take out the selector guiding fork and the selector after removing the relative bolts

- Remove the selector

- Take out the two gear shafts simultaneously

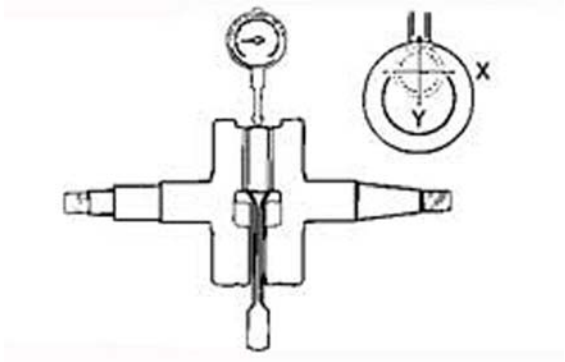
- Warm the crankshaft seat on the clutch side at about 60° and take out the crankshaft

- Thoroughly clean and degrease the crankshaft and then check it
- Use a thickness gauge to check the clearance between the rod head and the half shaft

Characteristic
Serviceability limit:
0.8 mm

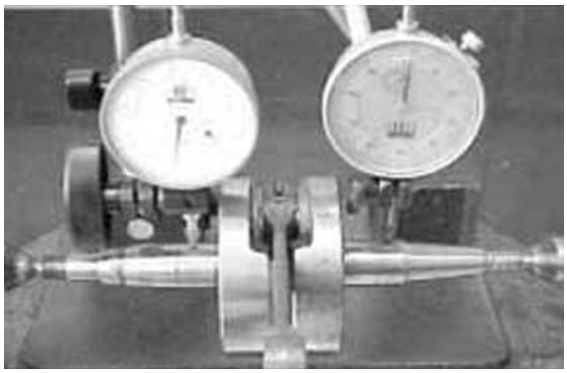
- Use a comparator to check the clearance between the connecting rod and the crankpin on X and Y axis as indicated in the photograph

Characteristic
Serviceability limit:
0,04 mm



- Make sure that both half shafts are not scratched or unduly worn
- Use two comparators and a support as indicated in the photograph to check the run out for both half shafts

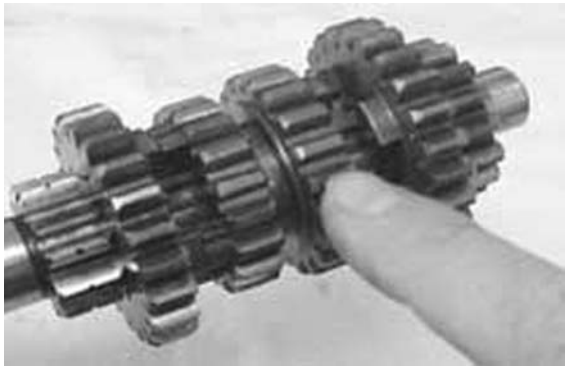
Characteristic
Serviceability limit:
0.05 mm



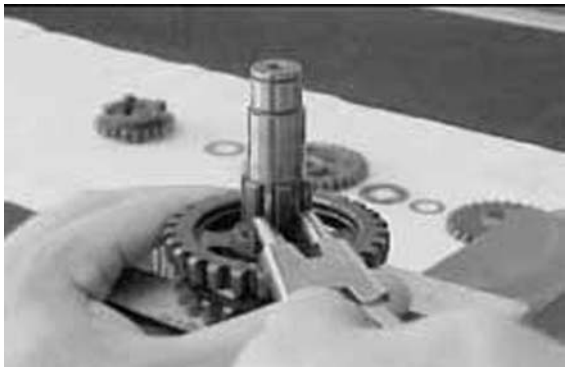
Refitting the crankshaft

and gear unit

- Clean and degrease the gear shaft, then check it
- Carry out a visual inspection of the gears. Replace the gears if they show signs of overheating or surface softening or abnormal wear of teeth
- Replace the whole shaft if it is damaged or abnormally worn



- Take out the gears and the shim washers of the secondary shaft once the locks have been removed

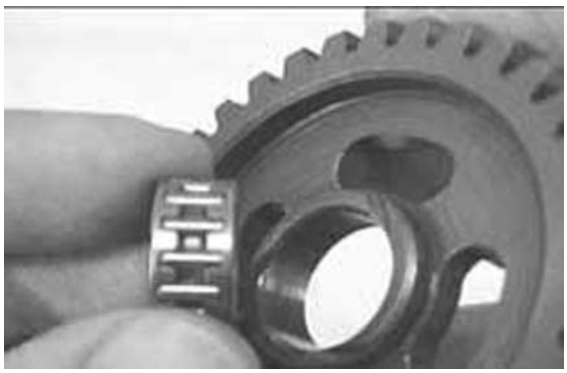


- Check there gear studs and clefts are not rounded or show signs of abnormal wear

- Check the secondary shaft rings for wear
- Replace them if 25% of their surface is worn

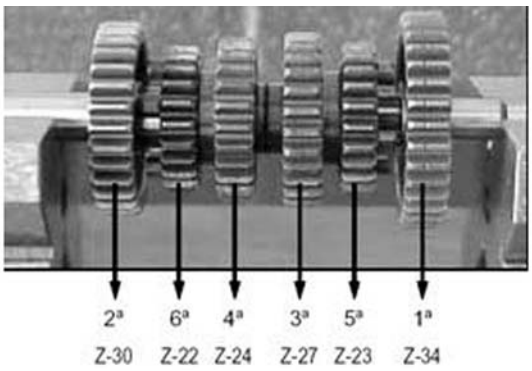
- Make sure that the secondary shaft roller bear-

ings show no signs of wear. Otherwise, replace it.



- Clean and lubricate the main bearings
- Replace them if there are signs of abnormal wear, deformations or jams.

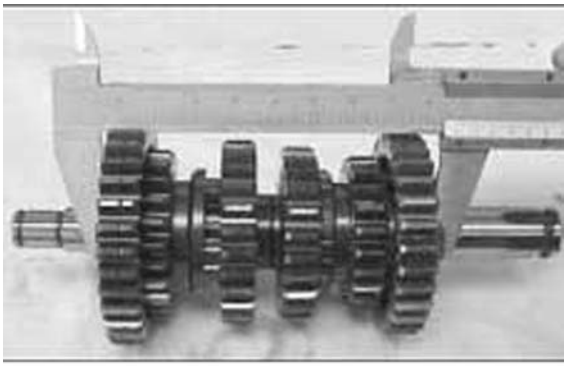
- Thoroughly clean and degrease all the components of the gear housing, the selector and the shaft
- Reassemble the secondary shaft making sure all components are fitted correctly
- Refit the gear unit in the crankcase (the main and the secondary shafts must be mounted at the same time)
- First check the overall volume of the secondary shaft including shimmings



Characteristic

Secondary shaft overall height

Max 87.700 mm Min 87.350 mm



- Fit the selector. Lubricate the surfaces with specific oil
- Make sure that the gear housing works properly by selecting different speeds and turning the drum to both sides
- Select neutral gear and check that the system rotates freely
- Reassemble the crankcase by warming up the shaft seats at about 60°
- Tighten the screws to the prescribed torque
- Make sure the crankshaft and the gear work freely after having refitting the crankcase

Recommended products

AGIP SPEED 2T Oil mixer

Synthetic oil that passes API TC ++ specifications

Locking torques (N*m)

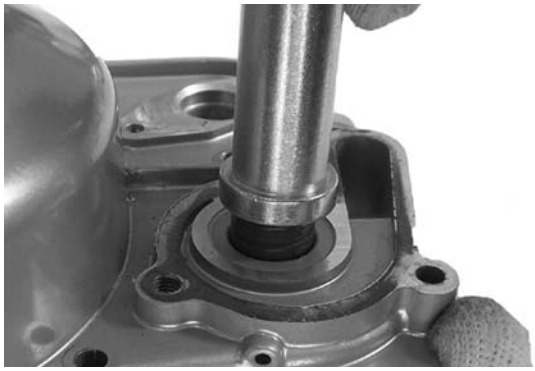
Crankcase half screws 6 Nm

Refitting the crankcase halves

RIGHT side crankcase fitting

- On the cover, install the hydraulic pump shaft together with the outer seeger ring, fitting it from the rotor side
- Mount the driving gear

- Fit new oil seals on the hydraulic pump shaft with the aid of the specific tool
- Fit the first oil seal with its rim facing inside, and the second with the rim facing outside

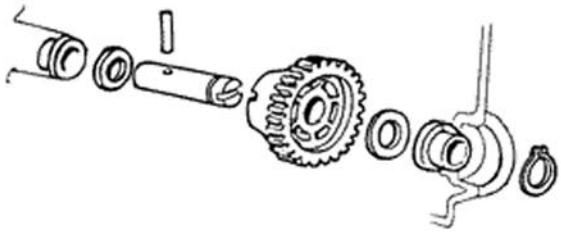


Specific tooling

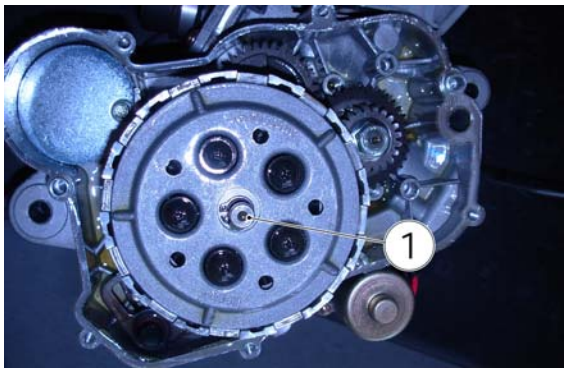
020441Y Oil seal punch

- Mount the pump rotor and fixed it by tightening its nut manually
- Fit the pump cover with a new gasket and then mount the pump cover

- Mount the oil pump shaft following the same procedure as for removal but in reverse order
- It is crucial to check that the shim washers are correctly mounted
- Mount the transmission and the driving gear
- Fit a new oil seal in the clutch lever seat on the cover
- Fit the clutch lever



- Insert the bolts on the clutch cover
- Fit a new gasket on the crankcase right cover
- Make sure the faying surfaces of the crankcase and cover are clean and not damaged
- Align the tappet (1) with the clutch lever on the cover



- Place the clutch cover, turn the clutch control until it coincides with the tappet
- Turn the water pump rotor so as to engage the driving gear with the pin of the crankshaft
- Repeat this procedure also with the oil pump transmission gear, use a screwdriver to turn the oil pump shaft

- Push the clutch cover until it stops on the engine crankcase
- Tighten the screws on the crankcase cover in two or three stages, first screw in on screw and then the one that is diametrically opposite

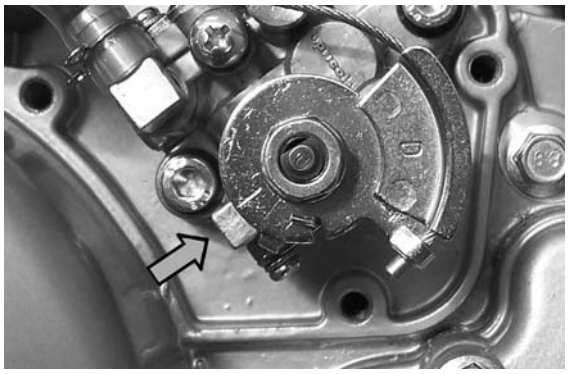
Locking torques (N*m)

Right crankcase cover 8 ÷ 10 Nm

- Mount the oil pump and the pipe support
- Mount the oil pump wire. Operate the nut to align the symbols stamped cage on the oil pump with the throttle control in neutral
- Mount the oil pump cover.

Specific tooling

020441Y Oil seal punch



- Fit the clutch wire, the clamp and the lever
- Turn the clutch control clockwise with a screwdriver and then fit the clutch lever and its screws
- Adjust the clutch lever backlash at a value ranging from 2 to 4 mm (handlebar left-hand side)

- Mount the hose connecting the hydraulic pump to the radiator and that connecting the hydraulic pump to the cylinder
- Pour recommended oil in the crankcase
- Fill up the cooling system with the recommended coolant

Lubrication

Oil pump

Removal

Oil pump removal

- Remove the oil pump cover located on the engine crankcase
- Remove the oil inlet and delivery hoses to the pump by operating the flexible clamps
- Be careful to close the oil pipe going to the pump so that the reservoir does not get empty

- Remove the pump opening control cable by operating the set screw first and then the pump cam retainer

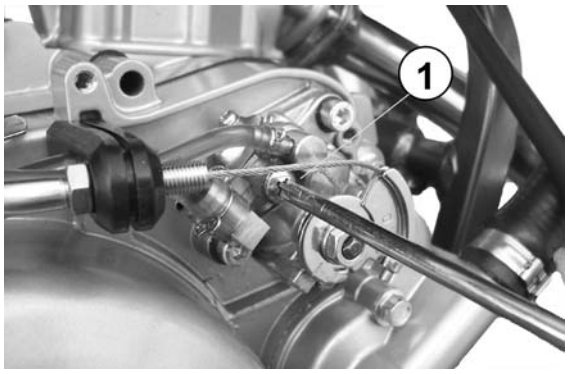
- Remove the two screws fixing the pump to the crankcase
- Remove the pump
- Make sure that the pump drive rotates freely
- Check the sealing rings are in good conditions. Replace them if they are damaged or deformed
- The oil pump is an essential safety element for proper engine operation. Replace, not repair, them in case of faults

Refitting

- Mount the oil pump following the same procedure as for removal but in reverse order
- Operate the set screw to align the reference notches on the pump control lever with those on the pump body, without accelerating with the throttle control
- Purge the oil system after fitting the oil pump

Oil pump purging

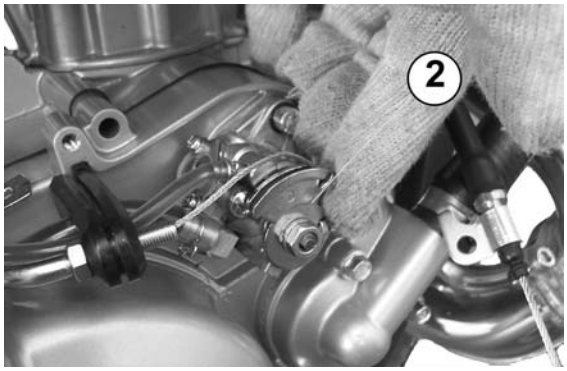
- Check oil in the reservoir for correct level; top up with recommended oil if necessary
- Place a suitable container under the pump to collect the oil purged from the pump
- Loosen the oil pump bleed screw (1), located at the front of the pump between the inlet and the delivery pipes, to facilitate drainage until the oil flow is constant and no air bubbles are formed.



Tighten the bleed screw (1)

Pipe purging

- Fill up the fuel tank with a mixture of oil and petrol at 2.5%, use the recommended oil specific for this type of engine
- Start the engine and let it run for about 10 minutes with the oil pump control lever (2) fully open in order to send out all the air in the pipes together with the oil
- NEVER fully rev up the engine while purging
- Carry out this operation in a well-ventilated area



Fuel supply

WARNING

IF THE SCOOTER IS NOT USED FOR OVER 1 MONTH, DRAIN ALL THE FUEL IN THE CARBURETTOR CHAMBER. OTHERWISE, THE NOZZLES CAN GET PARTIALLY OR FULLY CLOGGED

WARNING

THE CARBURETTOR CAN BE REMOVED OR REPLACED WITH THE ENGINE FITTED ON THE SCOOTER.

Removing the carburettor

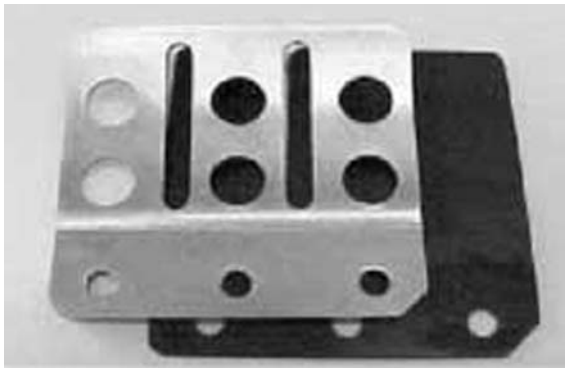
Reed valve

- Remove the carburettor from the engine
- Remove the reed valve and its gaskets from the crankcase

- Check that the valve petals are not damaged or deformed. Otherwise, replace it.

- Remove the plate limiting the reed valve opening by undoing the three screws fixing the reeds

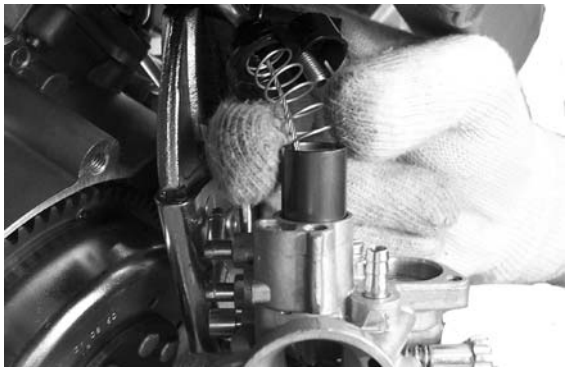
- Mount the valve following the removal procedure but in reverse order, make sure the plate limiting the reed valve opening has been correctly positioned
- Absence of the plate limiting the reed valve opening compromises the engine performance and reliability
- Check the O-ring of the reed support. Replace it if damaged or deformed



(PHVA 14 TYPE)

- Remove the carburettor by releasing the clamps on the inlet manifold and the bellows connected to the air cleaner housing
- Remove the fuel pipe of the carburettor, the mixer oil intake pipe and the fuel cock vacuum pipe and the two carburettor heating pipes

- Undo the two screws to remove the throttle valve and the tapered pin as well



- Compress the throttle valve return spring
- Remove the safety cap of the throttle valve and remove the throttle control cable from the throttle

- Remove the fixing plate of the starter control by undoing the screws indicated in the photograph
- Remove the starter control

- Remove the air flow set screw as indicated in the photograph

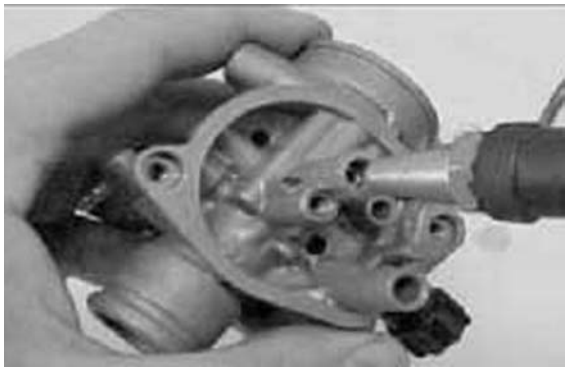
- Remove the carburettor float chamber
- Remove the float by operating the stem that fixes it to the carburettor with a very thin pin

- Remove the maximum nozzle, the idle nozzle and the starter nozzle

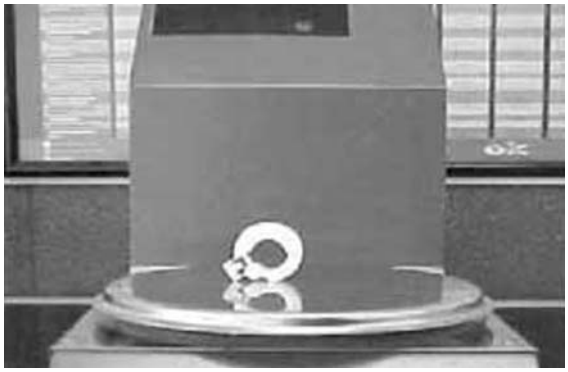
Refitting the carburettor

- Clean thoroughly all the carburettor components with solvent
- Be careful not to damage the carburettor gaskets and the starter control O-ring

- Blow short blasts of compressed air through all the nozzles of the carburettor, including the oil and petrol intake ones



- Use scales to check the float weight. Weight: 3.5 gr
- Replace the float if higher weight values are found



- Check that the tapered pin is in good conditions. Replace it if worn or deformed

- Check the starter control pistons are in good conditions
- Replace them if they show signs of abnormal wear

- Check that the calibration of the nozzles is adequate (see the carburettor calibration table)
- Failure to respect these values compromises

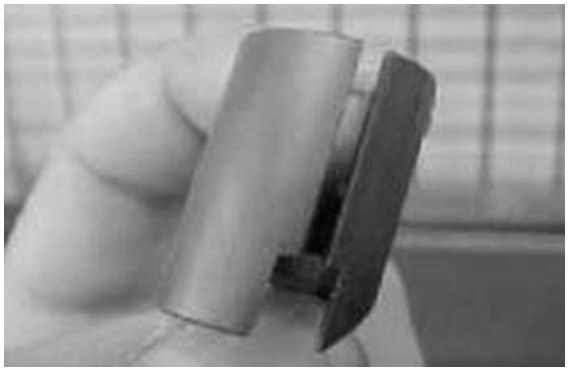
engine performance

- Check that the stop is correctly positioned on the tapered pin notch
- The stop must be on the third notch from the top
- Move up the stop to obtain a leaner mixture
- Move it down to obtain a richer mixture Thus, carburetion can adapt to different climatic conditions

- Replace the tapered pin if it shows signs on early wear as shown in the photograph

- Check that idle set screw shows no signs of abnormal wear. This is detrimental to a correct idle speed adjustment

- Check that the throttle valve shows scratches comprising 25% of its overall surface. Otherwise, replace it.



- If the throttle valve is replaced, fit another with the standard settings indicated on the top surface as shown in the photograph
- Re-assemble the whole carburettor
- Refit the carburettor to the engine, connect the fuel pipes again, the mixer oil intake pipes and the vacuum pipe for the fuel cock control

Adjusting the idle

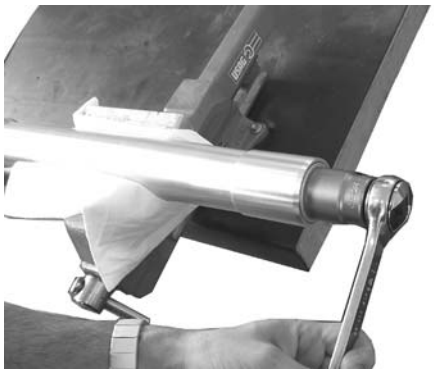
- Tighten the flow set screw slowly until it stops and then unscrew it as many turns as specified for this type of engine (1+1/4)
- Remember this is the first adjustment
- Warm the engine up to the regular operating temperature
- Adjust the idle speed at 1600 ± 200 rpm by operating the idle speed set screw
- Turn the flow set screw (1) to both sides until the maximum rpm possible is obtained

INDEX OF TOPICS

Front

Front suspension removal

- Remove the stem and the fork leg from the fork plate.
- Secure the stem in the vice upright with aluminium clamps to avoid scratching the sleeve.
- Loosen the upper screw.



Slowly pull up the stem high enough to detach the end of stroke plate and both half rings indicated in the figure.

- Get a container to collect the oil in each stem.

- Remove the dust guard with the aid of a screwdriver.

- Remove the stop ring from the oil seal.

- Take out the oil seal ring.

- Remove the stop washer.
- Remove the upper guiding bushing, the spacer and the lower guiding bushing.

- Clean and degrease all the components of the front suspension.
- Check all the parts concerning suspension.
- Check the guiding bushings for wear. Replace them if there are signs of wear on the surface.

- Check the guiding bushings on the fork leg for wear. Replace them if they show signs of abnormal wear.

- Prepare a support with two gauging blocks in X.
- Position the stem as shown in the photograph and use a comparator to check alignment.

Characteristic

Serviceability limit:

0.2 mm

Reassembly

Follow the procedure in the reverse order, replace the oil seal and dust guard and restore the correct

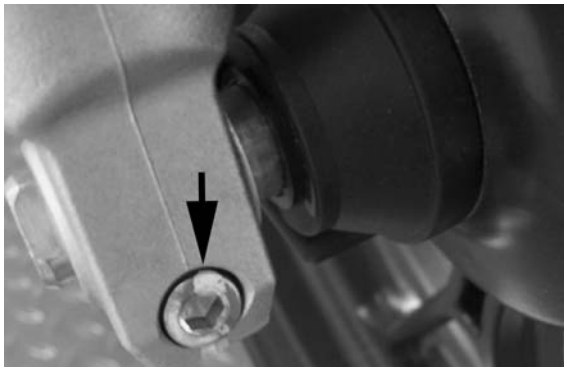
oil level. Respect the following tightening torques:

REASSEMBLY

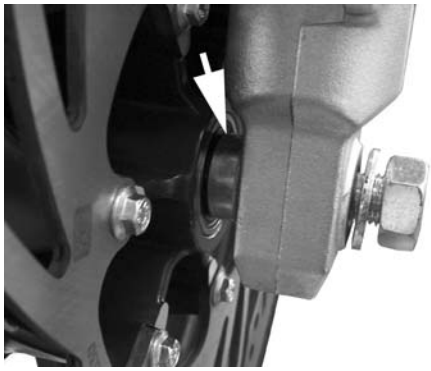
Name	Torque in Nm
Fork stem cap	17 ÷ 19 Nm
Fork plate upper clamp	20 ÷ 24 Nm
Fork plate lower clamp	20 ÷ 24 Nm
Wheel axle to fork tightening screw	17 - 19
Front brake calliper clamps	35 ÷ 40 Nm

Removing the front wheel

- Adequately support the scooter fore-carriage so that the front wheel does not touch the ground.
- Remove the plastic protection of the wheel axle nut.
- Remove the wheel axle nut.
- Loosen the stop screw and, holding the wheel, slide off the axle.
- Slide off the wheel from its seating.



Refitting the front wheel



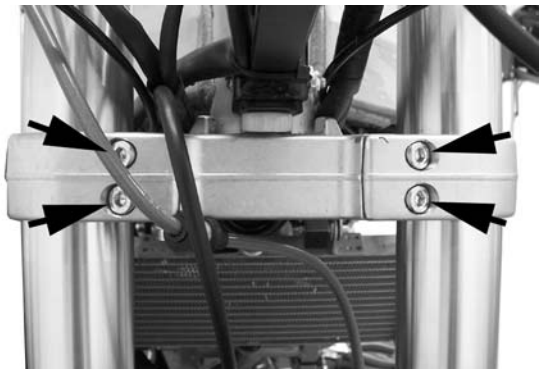
Follow the removal steps but in reverse order, be careful to adequately position the drive and the spacers.
Tighten all the components to the prescribed torque.

Locking torques (N*m)

Front wheel axle nut 70-80 Wheel axle to fork tightening screw 17 - 19

Front fork

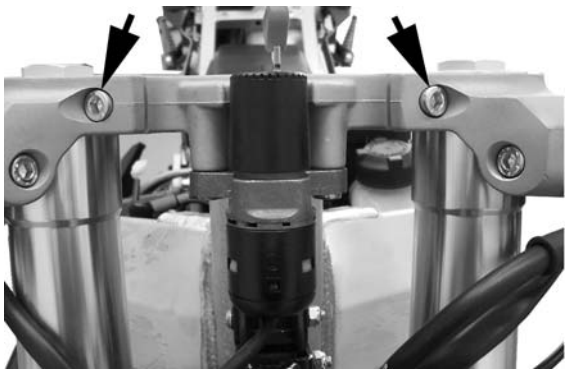
Removal



- Remove the front mudguard.
- Remove the front wheel.
- Remove the front brake calliper from the fork without disconnecting the brake fluid hose.
- Undo the six screws (three per stem) fixing the stem to the plate and slide off the stems from their seats.

NOTE

THE RIGHT STEM HAS A DAMPENING FUNCTION, THE LEFT ONE THAT OF A SPRING.



Steering bearing

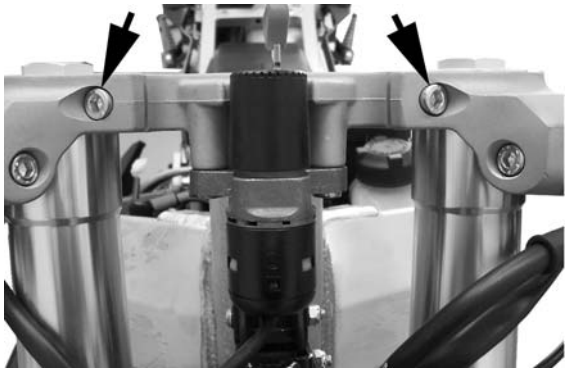
Removal

The steering is articulated on two ball bearings, interference-fit mounted on the steering and do not need special maintenance operations.

To replace the bearings, proceed as follows:

Removal

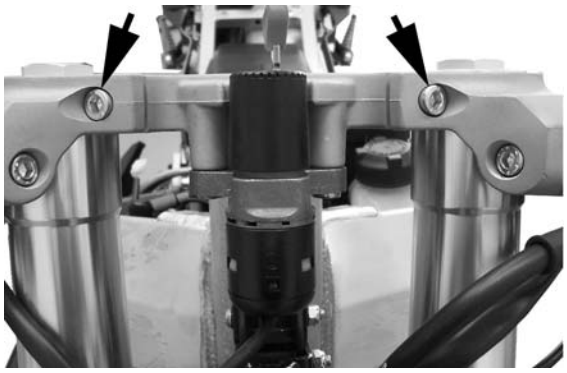
- Support the forecarriage adequately.
- Remove the front wheel.
- Support the whole fork, then remove the upper plate.
- Remove the fixing ring nut and its washer.
- Undo the two screws on the upper plate fixing the stems.
- Remove the upper plate.
- Remove the lower plate with the stems.
- If necessary, use a specific extractor to remove the bearings from the head-stock and replace them.



Refitting

Follow the removal procedure but in reverse order being careful to correctly position the shim washers following the sequence below:

- Lower plate
- Washer
- Headstock
- Washer
- Upper rubber caps
- Upper plate
- Washer
- Fixing ring nut



Tighten the components to the prescribed torque.

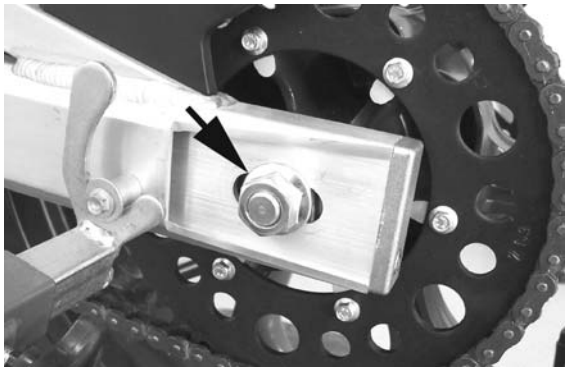
Locking torques (N*m)

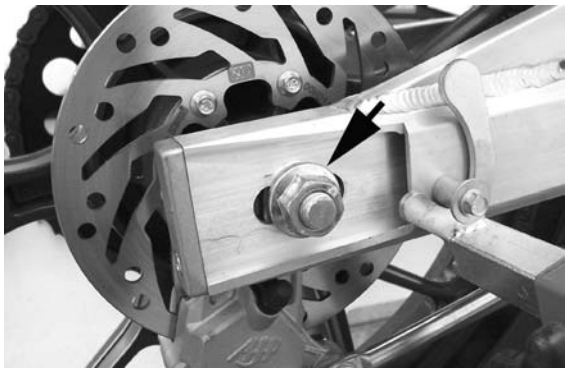
Screws fixing fork stem to upper and plate 20-24 Half-handlebar to upper plate 20-24 Fork ring nut to steering tube tightening 90-130 Fork ring nut cover on upper plate 17-19

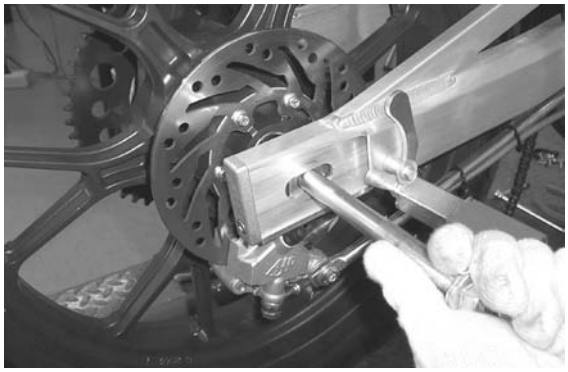
Rear

Removing the rear wheel

- Remove the transmission chain.
- Holding the wheel remove the wheel axle using two spanners on opposed nuts.
- Slide off the wheel from its housing.







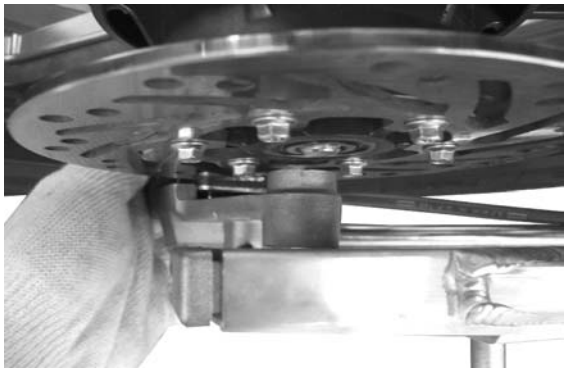
Refitting the rear wheel

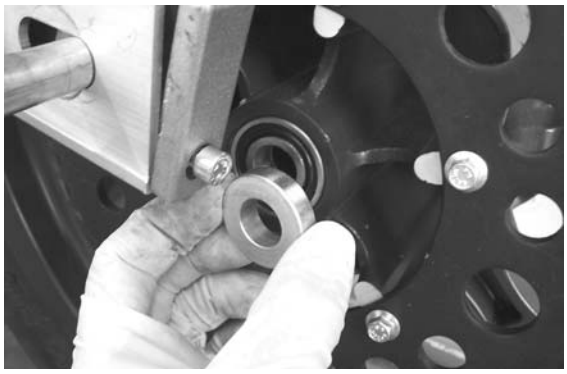
Follow the removal steps but in reverse order, be careful to adequately position the spacers on the left side as indicated in the figure.

Tighten the nuts to the prescribed torque.

Locking torques (N*m)

Rear wheel axle nut 70-80 Rear brake disc 17-19

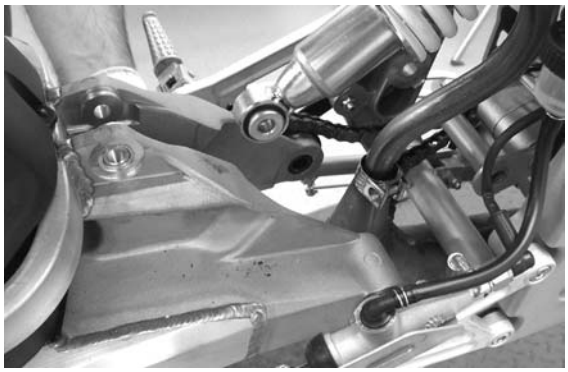




Swing-arm

Removal

- Support the scooter adequately.
- Remove the rear wheel.
- Remove the bolt from the brake caliper bracket indicated in the figure.
- Remove the bolt fixing the shock absorber to the swinging arm.
- Remove the swinging arm shaft.
- Slide the arm off the chassis.



Refitting

Follow the steps but in reverse order, be careful to position the spacers as indicated in the figure.

Tighten the nuts to the prescribed torque.

Locking torques (N*m)

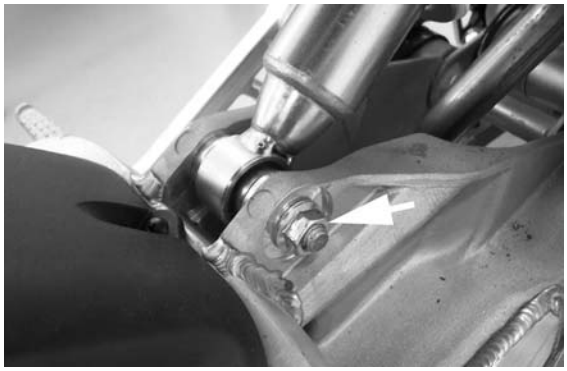
Rear shock absorber lower clamp to the chassis 20 Rear fork retainer to the chassis 55-65 Brake calliper arm to rear brake calliper clamp 55-65 Brake calliper arm to rear fork clamp 70-80

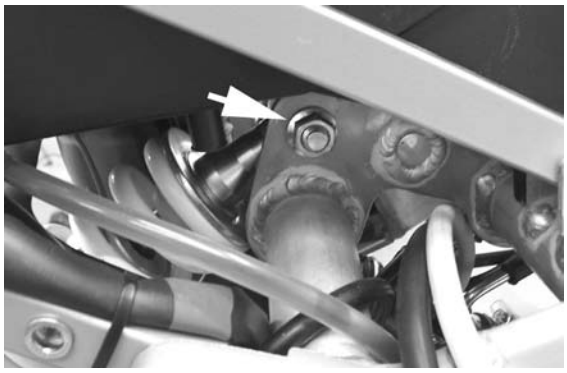
Shock absorbers

- The rear shock absorber assembly does not require maintenance. Replace it if there are any signs of malfunctioning

Removal

- Support the scooter adequately.
- Remove the rear wheel.
- Support the swinging arm and remove the bolt fixing the shock absorber to the swinging arm.
- Remove the bolt fixing the shock absorber to the chassis, and then slide the shock absorber off the wheel housing.





Refitting

- Follow the removal steps but in reverse order, be careful to adequately position the spacers as indicated in

the figure.

- Tighten the nuts to the prescribed torque.

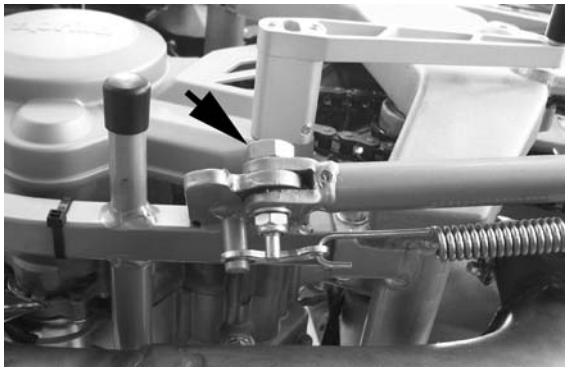
Locking torques (N*m)

Rear shock absorber upper clamp to the chassis 30-40 Rear shock absorber lower clamp to the chassis 20

Side stand

Removal

- Release the stop spring.
- Remove the bolt.



Fitting

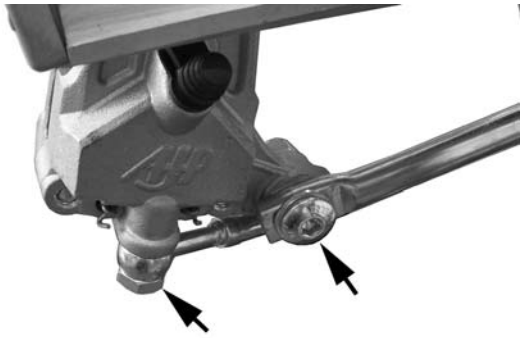
Follow the removal steps but in reverse order, be careful to adequately fit the spring and the metal tongue that should be at the back of the extension of the bolt.

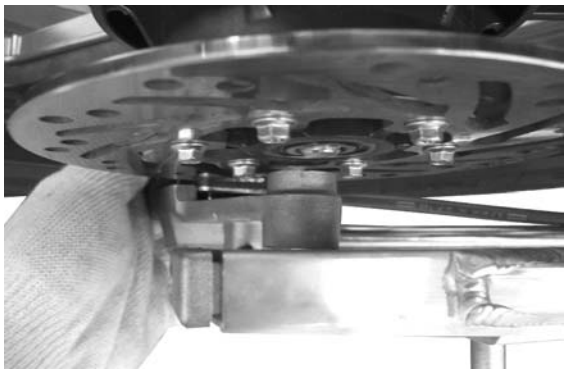
Locking torques (N*m)

SIDE STAND 55-65

INDEX OF TOPICS

Rear brake calliper





Rear brake calliper replacement

- Support the scooter rearcarriage adequately so that the rear wheel does not touch the ground.
- Detach the oil brake hose from calliper, pouring the fluid inside a container.
- Remove the lower retaining bolts of the rear brake calliper.
- Remove the right nut of the wheel axle and partially take out the axle as much as to the detach the brake calliper from the wheel.
- Slide the calliper off its seat.

Upon refitting tighten the wheel axle nut to the specified torque.

Purge the system.

Locking torques (N*m)

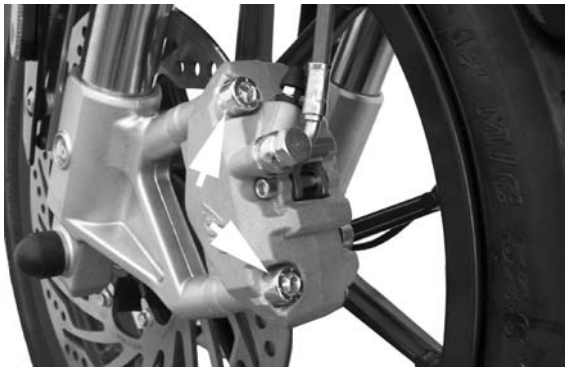
Brake calliper arm to rear brake calliper clamp 55-65 Rear wheel axle nut 70-80

Front brake calliper

- Detach the oil brake hose from calliper, pouring the fluid inside a container.
- Remove the mountings indicated in the figure.
- When refitting, tighten the nuts to the prescribed torque.
- Bleed the system.

Locking torques (N*m)

fixing screws 35 - 40 Nm



Rear brake disc

Rear brake disc replacement

- Remove the rear wheel
- Undo the six disc clamps.
- Upon refitting, position the disc adequately so that the inscriptions are on the external side.
- Tighten to the specified torque.

Locking torques (N*m)

REAR BRAKE DISC 10 - 12

Front brake disc

Brake disc replacement

- Remove the front wheel.
- Undo the six disc clamps.
- Upon refitting, position the disc adequately so that the inscriptions are on the external side.
- Tighten to the specified torque.

Locking torques (N*m)

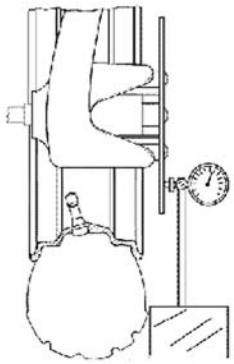
Front brake disc 10 - 12

Disc Inspection

- Remove the wheel and check for unevenness of the disc. Maximum permissible out of true is 0.1 mm. If the value measured is greater, fit a new

disc and repeat the check.

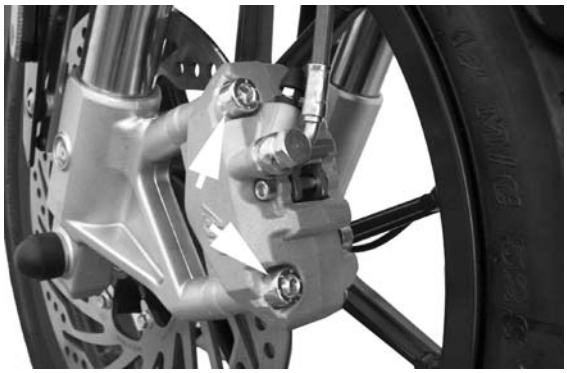
- If the problem persists, check and replace the wheel rim if necessary.

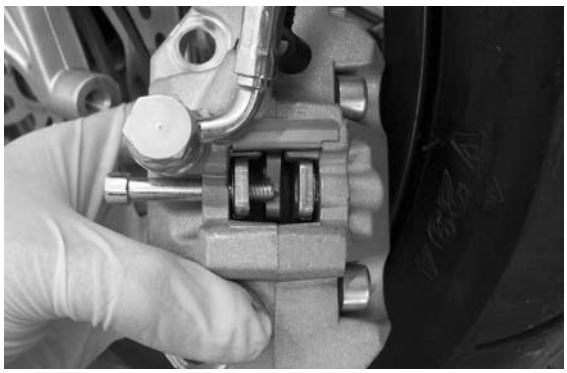


Front brake pads

- Undo the screws fixing the pads to the brake calliper.

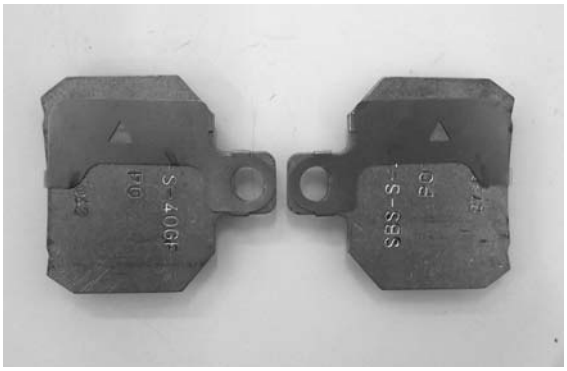
- Remove the two screws fixing the calliper to the fork, then slide the calliper off the disc.
- Remove the pad fixing screws that have been previously loosened.
- Slide the pads off their seat.





- Replace the pads if the friction material thick-

ness is less than 1.5 mm.



- Upon refitting operate in the reverse sequence bearing in mind that the arrow on the plate indicates the disc rotation sense.

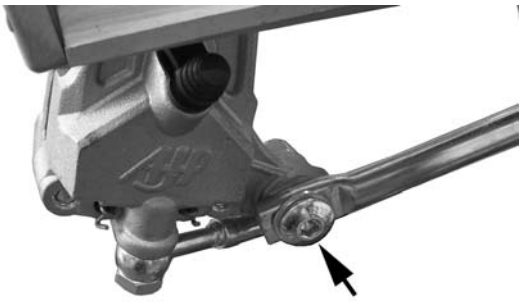
Locking torques (N*m)

Front brake calliper to fork 35 - 40

Rear brake pads

Brake pad replacement

- Support the scooter rearcarriage adequately so that the rear wheel does not touch the ground.
- Partially remove the rear wheel axle, just enough to free the rear brake calliper.
- Remove the bolts fixing the brake calliper to the bracket and slide off the brake calliper.



- Remove the two pad locks once the calliper has been removed though still connected to the oil pipe.
- Remover the 2 pads and the two metal plates.

- Replace the pads if the friction material thick-

ness is less than 1.5 mm.

- Upon refitting operate in the reverse sequence bearing in mind that the arrow on the plate indicates the disc rotation sense.

Fill - Bleeding the braking system

Rear - combined

Oil refill and purging

- Once the bleed valve is closed, fill the system with recommended brake fluid to the maximum level.
- Fit a transparent pipe when purging.
- Operate the brake lever.
- Open the bleed screw and let oil and air flow out.
- Close again the bleed screw before the brake lever end of stroke.
- Repeat the operation until only oil flows out the calliper.

NOTE

IF AIR CONTINUES TO COME OUT DURING THE BLEED OPERATION EXAMINE ALL THE FITTINGS:

IF SAID FITTINGS DO NOT SHOW SIGNS OF BEING FAULTY, LOOK FOR THE AIR INPUT AMONG THE VARIOUS SEALS ON THE PUMP AND CALLIPER PISTONS.

NOTE

DURING THE BLEEDING OPERATIONS FREQUENTLY CHECK THE LEVEL TO PREVENT AIR GETTING INTO THE SYSTEM THROUGH THE PUMP.

CAUTION

DURING THESE OPERATIONS, THE VEHICLE MUST BE UPRIGHT.

WARNING

BRAKE FLUID IS HYGROSCOPIC; IT TENDS TO ABSORB MOISTURE FROM THE SURROUNDING AIR.
IF THE LEVEL OF MOISTURE IN THE FLUID EXCEEDS A GIVEN VALUE, BRAKING EFFICIENCY WILL BE REDUCED.
THEREFORE, ALWAYS USE FLUID FROM SEALED CONTAINERS.
UNDER NORMAL DRIVING AND CLIMATIC CONDITIONS YOU SHOULD CHANGE THIS LIQUID EVERY TWO YEARS.
IF THE BRAKES ARE USED INTENSELY AND/OR IN HARSH CONDITIONS, CHANGE THE FLUID MORE FREQUENTLY.

CAUTION

WHEN CARRYING OUT THE OPERATION, BRAKE FLUID MAY LEAK FROM BETWEEN THE BLEED SCREW AND ITS SEAT ON THE CALLIPER. CAREFULLY DRY THE CALLIPER AND DEGREASE THE DISC SHOULD THERE BE OIL ON IT. WHEN THE OPERATION IS OVER, TIGHTEN THE OIL BLEED SCREW TO THE PRESCRIBED TORQUE.

CAUTION

MAKE SURE THE BRAKE FLUID DOES NOT GET INTO YOUR EYES OR ON YOUR SKIN OR CLOTHES. IF THIS HAPPENS ACCIDENTALLY, WASH WITH WATER.

WARNING

BRAKE CIRCUIT FLUID IS VERY CORROSIVE; DO NOT LET IT COME INTO CONTACT WITH THE PAINTED PARTS.

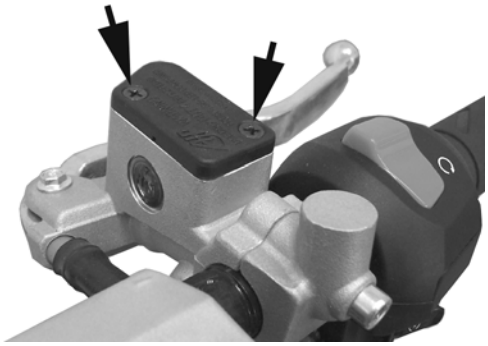
CAUTION

THE BRAKING CIRCUIT FLUID IS HYGROSCOPIC, IN OTHER WORDS, IT ABSORBS HUMIDITY FROM THE SURROUNDING AIR. IF THE CONTENT OF MOISTURE IN THE BRAKING FLUID EXCEEDS A CERTAIN VALUE, BRAKING WILL BE INEFFICIENT.

Front

-Once the bleed valve is closed, fill the system

with brake liquid to the maximum level.



Recommended products

AGIP BRAKE 4 Brake fluid

As an alternative to the recommended fluid, other fluids that meet or exceed the required specifications may be used. SAE J1703, NHTSA 116 DOT 4, ISO 4925 Synthetic fluid

- Fit a transparent pipe when purging.
- Operate the brake lever.
- Open the bleed screw and let oil and air flow out.
- Close again the bleed screw before the brake lever end of stroke.
- Repeat the operation until only oil flows out the calliper.

NOTE

IF AIR CONTINUES TO COME OUT DURING THE BLEED OPERATION EXAMINE ALL THE FITTINGS:
IF SAID FITTINGS DO NOT SHOW SIGNS OF BEING FAULTY, LOOK FOR THE AIR INPUT AMONG THE VARIOUS SEALS ON THE PUMP AND CALLIPER PISTONS.

NOTE

DURING THE BLEEDING OPERATIONS FREQUENTLY CHECK THE LEVEL TO PREVENT AIR GETTING INTO THE SYSTEM THROUGH THE PUMP.

CAUTION

DURING THESE OPERATIONS, THE VEHICLE MUST BE UPRIGHT.

WARNING

BRAKE FLUID IS HYGROSCOPIC; IT TENDS TO ABSORB MOISTURE FROM THE SURROUNDING AIR.
IF THE LEVEL OF MOISTURE IN THE FLUID EXCEEDS A GIVEN VALUE, BRAKING EFFICIENCY WILL BE REDUCED.
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CAUTION

WHEN CARRYING OUT THE OPERATION, BRAKE FLUID MAY LEAK FROM BETWEEN THE BLEED SCREW AND ITS SEAT ON THE CALLIPER. CAREFULLY DRY THE CALLIPER AND DEGREASE THE DISC SHOULD THERE BE

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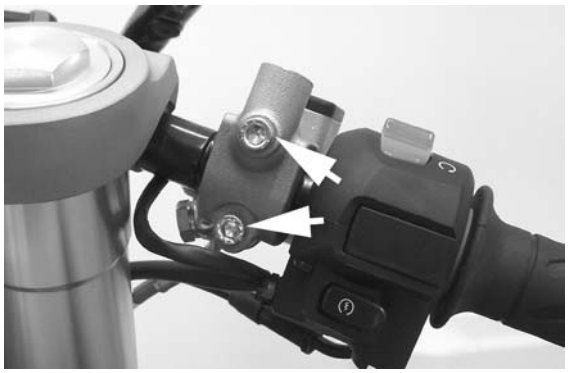
Front brake pump



- Disconnect the tube, collecting the brake oil in a container.
- Undo the two retainers of the U bolt indicated in the figure.

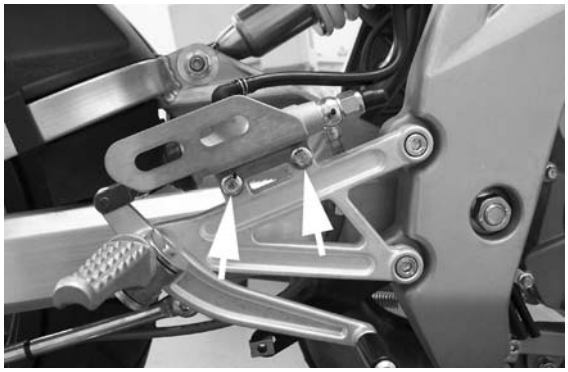
Upon refitting, carry out the operation in reverse order.

Lock the hydraulic pipes to the prescribed torque and purge the system.

Locking torques (N*m)

Brake/clutch control clamp on half-handlebar
10-12

Rear brake pump - combined



Rear pump replacement

- Disconnect the hose, collecting the brake fluid in a container.

Remove the pump by undoing the tow retainers indicated in the figure.

Upon refitting, carry out the operation in reverse order and respecting the prescribed torque.

CAUTION

MAKE SURE THE BRAKE FLUID DOES NOT GET INTO YOUR EYES OR ON YOUR SKIN OR CLOTHES. IF THIS HAPPENS ACCIDENTALLY, WASH WITH WATER.

WARNING

BRAKE CIRCUIT FLUID IS VERY CORROSIVE; DO NOT LET IT COME INTO CONTACT WITH THE PAINTED PARTS.

CAUTION

THE BRAKING CIRCUIT FLUID IS HYGROSCOPIC, IN OTHER WORDS, IT ABSORBS HUMIDITY FROM THE SURROUNDING AIR. IF THE CONTENT OF MOISTURE IN THE BRAKING FLUID EXCEEDS A CERTAIN VALUE, BRAKING WILL BE INEFFICIENT.

Locking torques (N*m)

Rear brake pump to chassis 20 Nm

INDEX OF TOPICS

Coolant replacement

- Remove the right side fairing.
- Remove the metal clamp on the pump intake pipe.
- Slide off the pipe and empty the system, collect the fluid in a suitable container.
- To facilitate draining the fluid, remove the expansion tank cap.

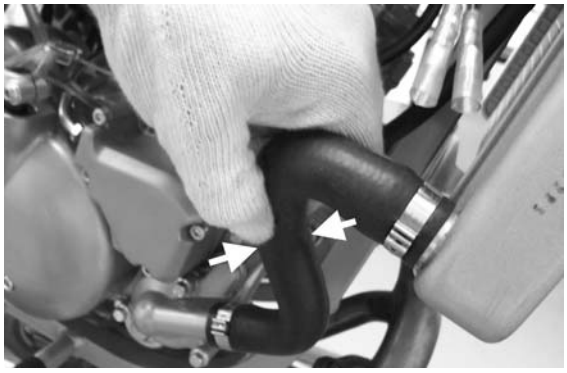
CAUTION

MAKE SURE THE SYSTEM DOES NOT LEAK.

System bleed

The circuit is not fitted with a bleed valve. To adequately refill the cooling circuit, proceed as follows:

- Fill up the circuit through the expansion tank filler up to the correct level.
- Tighten the expansion tank cap and slightly press the delivery and return pipes of the radiator so as to eliminate



any air bubble in the circuit.

- Check the fluid level on the expansion tank and top up if necessary.
- Set the vehicle into motion and warm up (to open the thermostat pump).
- Once the adequate temperature is obtained, shut off the engine and pump again the delivery and return pipes of the radiator.
- Let the engine cool down.
- Once the engine is cold, check the fluid level in the expansion tank for the last time, and top up if necessary.

WARNING

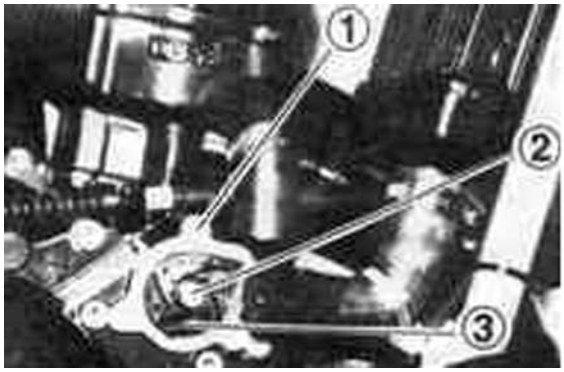
CARRY OUT THESE OPERATIONS WHEN THE ENGINE IS COLD, SCALDING FLUID OR ITS VAPOURS CAN CAUSE SERIOUS BURNS. COLLECT THE FLUID IN A SUITABLE CONTAINER. THE COOLANT IS HARMFUL. AVOID CONTACT WITH THE SKIN AND EYES.

Water pump - overhaul

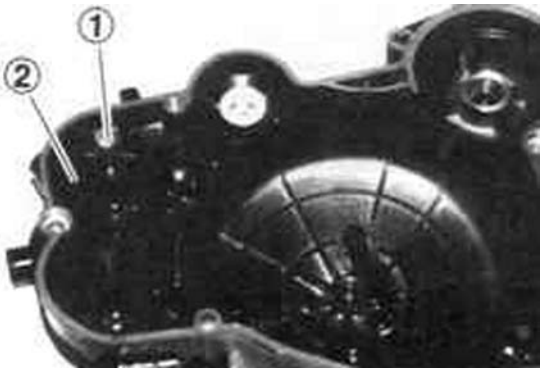
Hydraulic pump removal

- Empty the cooling system
- Remove the water pump cover and the wire guiding support
- Remove the hydraulic pump cover

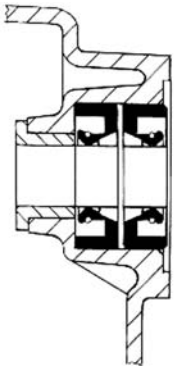
- Detach the gasket (1)
- Undo the rotor screw (2)
- Undo the hydraulic pump rotor (3)
- Drain out all the oil from the engine
- Remove the crankcase right cover



- Remove the shaft of the hydraulic pump (1) and the transmission pinion (2)



- As soon as there is the slightest indication of coolant or oil leaking from the breather, replace the gaskets of the hydraulic pump shaft
- Fit new gaskets as shown in the next layout



Installing the hydraulic pump

- Install the hydraulic pump shaft and the transmission pinion
- Fit the washer (3)
- Fit the crankcase cover
- Fit the rotor of the pump (1) and its screw

Locking torques (N*m)

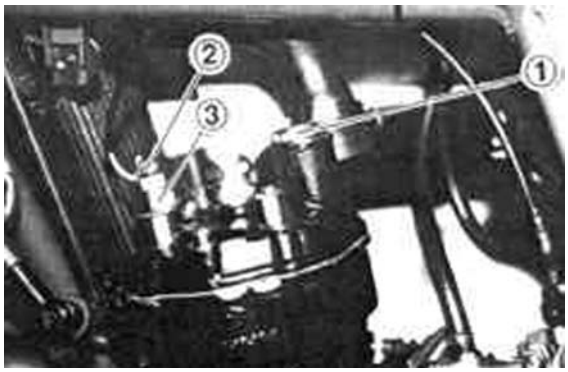
Pump rotor: Tighten manually

- Fit the gasket on the pump cover, the cover and the two couplings
- Pour recommended oil in the transmission
- Fill up the cooling system
- Mount the rest of the components following the removal procedure but in reverse order

Thermostat

Removal

- Empty the cooling system
- Detach the coupling from the cylinder head
- Undo the thermostat screw (1) and the thermostat itself
- Take out the fitting (2) of the thermal switch
- Detach the thermal switch (3)



Check

Thermostat check

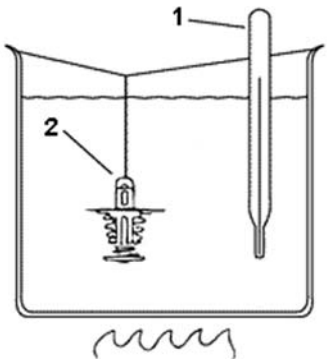
Measuring the valve opening temperature:

- Immerse the thermostat and the thermal switch in hot water.

Neither of them should get into contact with the container walls or bottom, otherwise the reading will not be accurate

1 - Thermometer

2 - Thermostat (it should be fully immersed into



water)

- Replace the thermostat if the results do not coincide with the specified values

Characteristic

Valve opens at 67±3 °C :

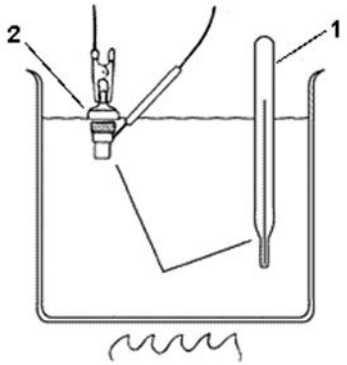
0.1 mm

Valve opens at 75°C :

3 mm

Thermostat check

- Immerse the thermal switch in hot water to check its resistance
- The thermostat should not get into contact with the container walls or bottom, otherwise the reading will not be accurate



1 - Thermometer

2 - Thermal switch

- Replace the thermal switch if the results do not coincide with the specified values

Characteristic

Activation

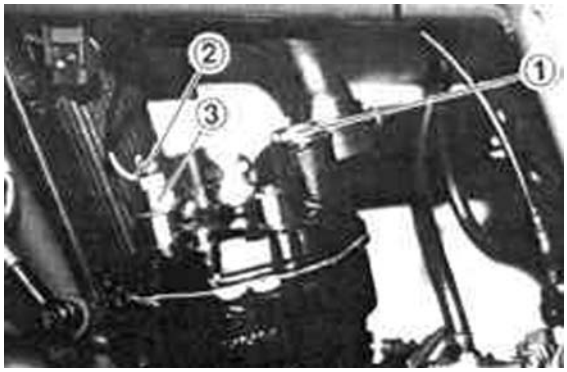
124 ± 3°C

Deactivation

114 ± 3°C

Refitting

- Fit the thermal switch (3)
- Connect the connector (2) to the thermal switch
- Fit the thermostat and its fixing screw (1)
- Connect the coupling to the cylinder head
- Fill up the cooling system with the recommended coolant



INDEX OF TOPICS

Seat

Removal

To remove the front saddle insert the starter key in the relative lock and turn clockwise, lift the saddle from its front and slide it off.

To remove the rear saddle, operate the knob located below that saddle once the front saddle has been removed

Fitting

Follow the removal steps but in reverse order, be careful to adequately position the rear fixing tabs in their slots on the chassis.

Driving mirrors

Removal

- Remove the two nuts (one per side) fixing the mirrors.
- Remove the brackets supporting the mirrors by undoing the four screws (two per side) indicated in the figure.

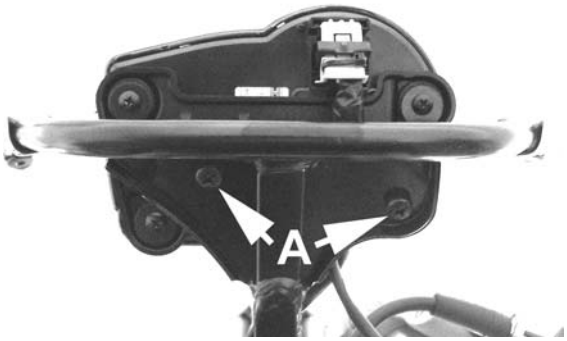
Fitting

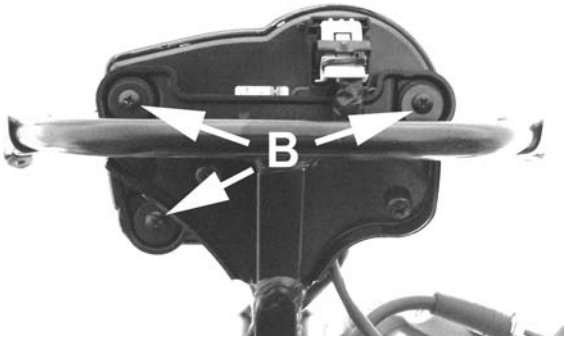
Follow the removal steps but in reverse order, be careful to adequately position the components as shown in the figure.

Instrument panel

Instrument panel

- Remove the front top fairing.
- Remove the connector to the digital display.
- Undo the two screws A to remove the instrument panel and its brackets, or the three screws B to remove the instrument panel only.





Headlight assy.

Removal

- Remove the front windscreen.
- Remove the front headlight assembly by undoing the four screws.

Fitting

Follow the removal steps but in reverse order.

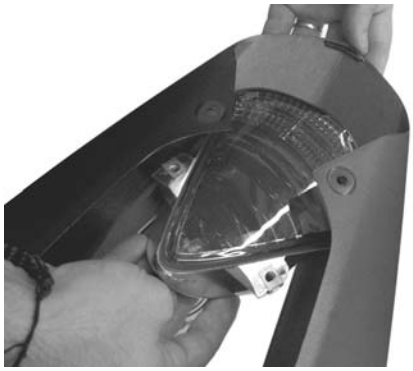
Bulb replacement

To replace a bulb disconnect the electric connector and turn the bulb anticlockwise.

Taillight assy.

Removal

- Remove the rear tail.
- Remove the rear headlight assembly from its seating.



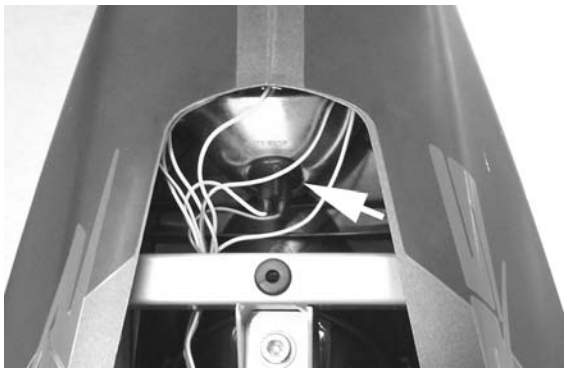
Fitting

Follow the removal steps but in reverse order.

Bulb replacement

To remove stop light bulb just remove the rear saddle and turn the rubber bulb holder anticlockwise and slide it off.

To replace the turn indicator microbulbs jut remove the rear headlamp, then extract the rubber bulb holder



Footrest

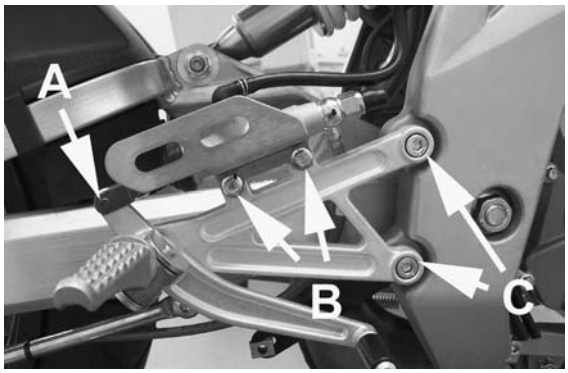
Passenger footrest replacement

- Remove the screws indicated in the figure and remove the passenger footrests.

Driver footrests

Removal

- Remove the A pin of the rear brake pedal on the right footrest.
- Remove the rear brake pump from the footrest by undoing the two screws B
- Remove the passenger footrest by undoing the 4 screws (2 per side).
- Remove the rear brake pedal from the bracket.



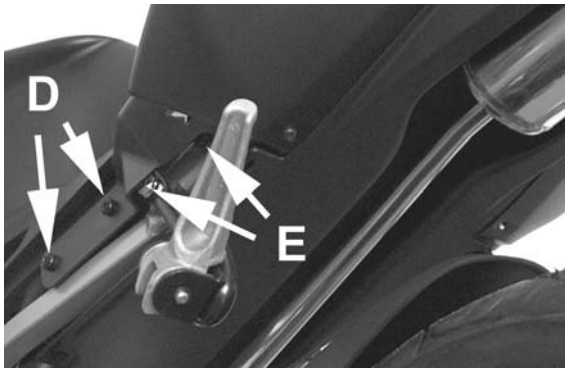
Fitting

Follow the removal steps but in reverse order.

Passenger footrests

Removal

- Remove the rear side fairings.
- Remove the 4 screws (2 per side) and undo the 4 screws E to remove the tail.



Fitting

Follow the removal steps but in reverse order.

Side fairings

Rear fairing removal

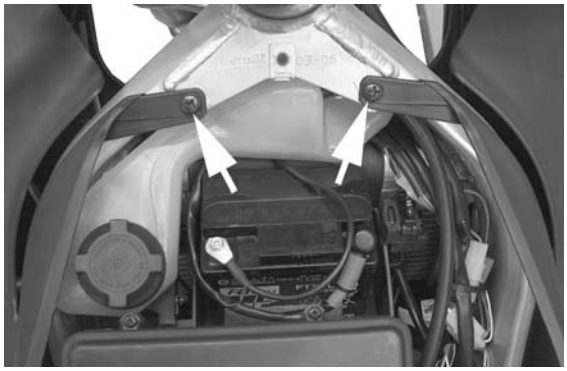
Remove the two screws (one per side) indicated in the figure, then remove the fairing.

Front fairing removal

- Remove the rear fairings.
- Remove the fuel tank.
- Remove the two screws indicated in the figure, then remove the fairing.

Fitting

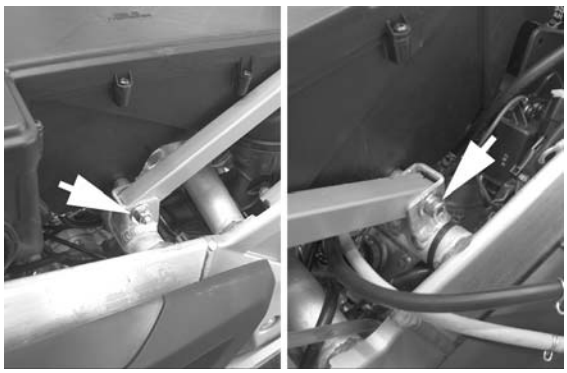
Follow the removal steps but in reverse order.



Air filter

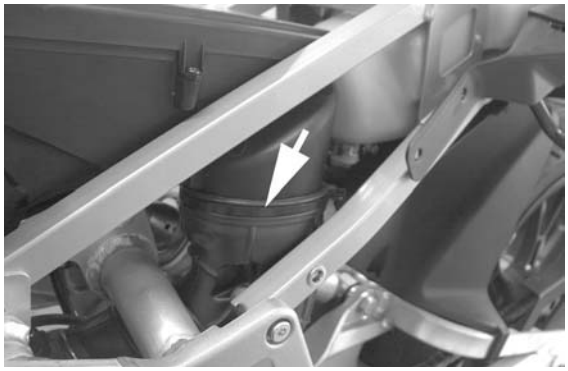
Filter housing removal

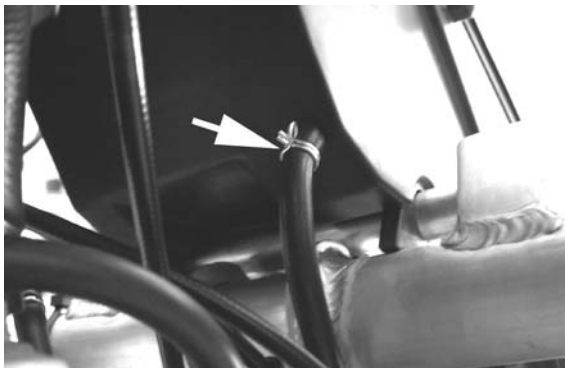
- Remove the fuel tank.
- Remove the side fairings.
- Remove the expansion tank fixing screw located under the front central cover.
- Levering the expansion tank, remove the screw next to the tank and the crescent like bracket fixing the air filter to the chassis.
- Remove the bolt of the rear frame trapeze upper attachment.
- Remove the retainer clamp and disconnect the air filter bellows.
- Remove the retainer clamp and slide off the breather pipe.
- Remove the air filter housing.



Fitting

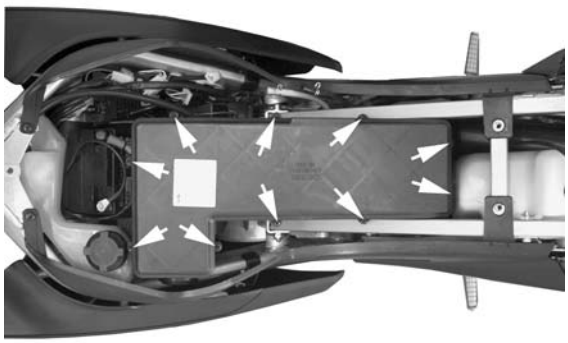
Follow the removal steps but in reverse order, be careful to adequately thread the breather pipe through its guide so that it is far from the transmission chain and the muffler.





Filtering element

- Remove the fuel tank.
- Remove the ten screws on the filter cover that are indicated in the figure.
- Remove the filtering element.



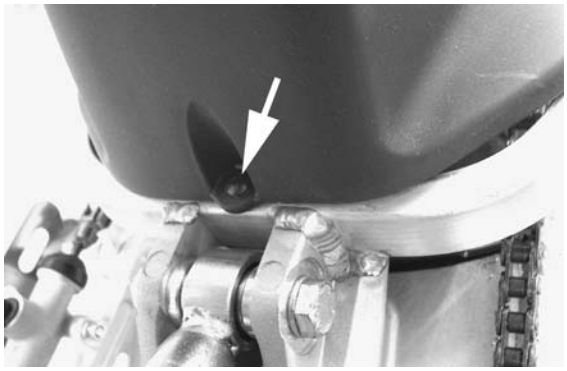
Rear mudguard

Removal

Remove the two screws indicated in the figure and slide the mudguard off the rear fork

Fitting

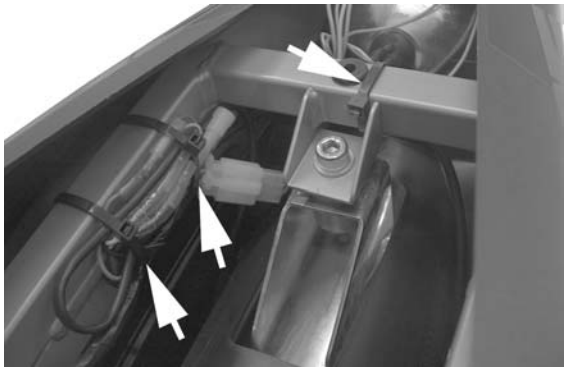
Follow the removal steps but in reverse order.



spoiler

Removal

- Remove the front and rear saddles.
- Remove the brackets fixing the wiring to the chassis indicated in the figure and disconnect the connector of the rear headlight assembly.
- Remove the rear side fairings.



- Remove the four screws (two per side) located under the side fairings.
- Remove the six screws (three per side) located on the tail in the rear wheel housing.
- Slide the tail off the chassis.

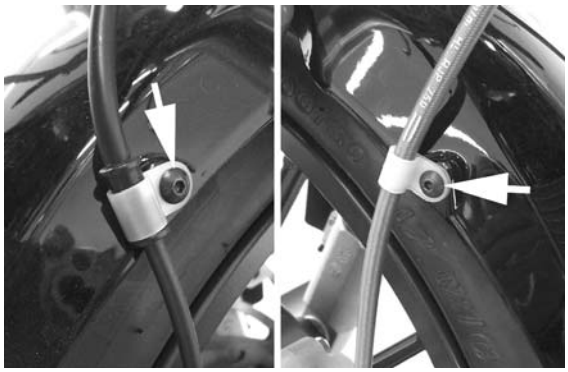
Fitting

Follow the removal steps but in reverse order and fit new brackets.

Front mudguard

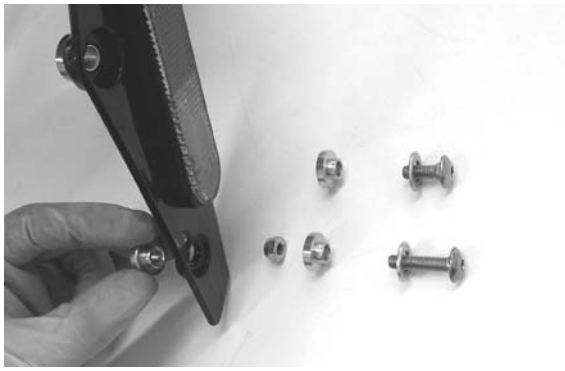
Removal

- Detach the hose guide from the mudguard by undoing the relative screws.
- Remover the four fixing screws (two per side) and slide off the mudguard.



Fitting

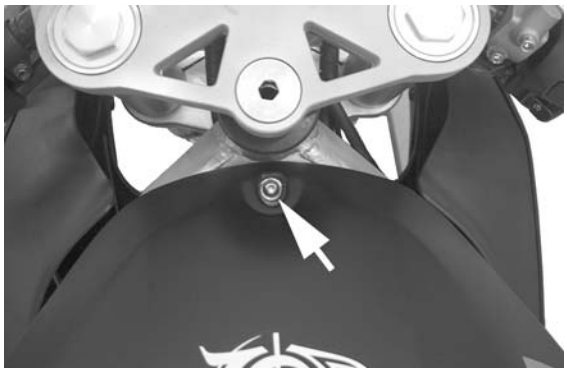
Follow the removal steps but in reverse order.



Fuel tank

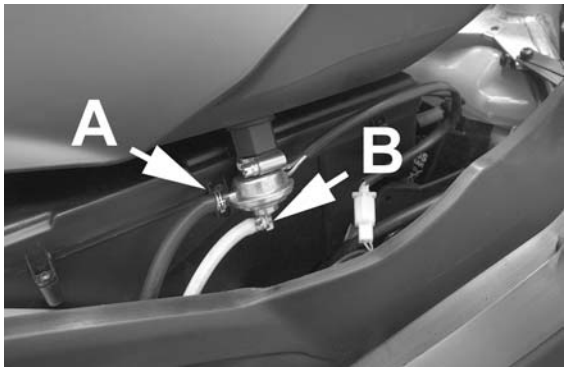
Removal

- Remove the front saddle
- Remove the three fixing screws of the tank indicated in the figure.
- Slightly lift the tank, disconnect the connector of the fuel level transducer and the fuel intake pipes A and the vacuum valve B located to the right.
- Slide off the tank breather pipe and remove the tank.



Fitting

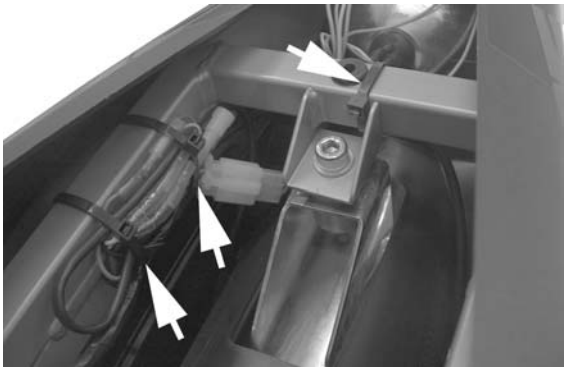
Follow the removal steps but in reverse order, be careful to adequately thread the breather pipe through its guide so that it does not interfere with the muffler or the transmission chain.



Rear central cover

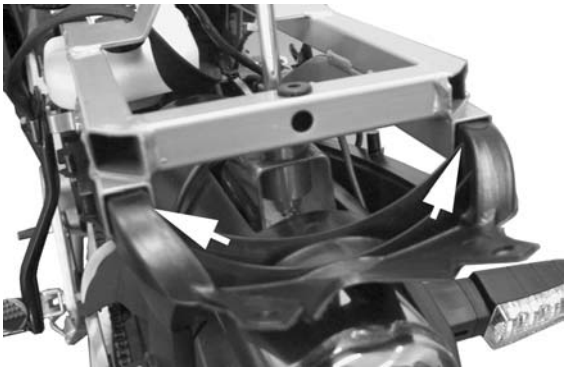
Removal

- Remove the straps fixing the wiring to the chassis indicated in the figure and disconnect the two connectors of rear turn indicators.
- Remove the tail.
- Remove the silencer, then slide off the cover.



Fitting

Follow the removal steps but in reverse order, be careful to adequately insert the tongues of the cover in the chassis.



Radiator fan

Removal

- Remove the cases.
- Remove the front central cover.
- Empty the cooling system by operating on the coolant pump coupling.
- Disconnect the radiator hoses.
- Remove the bolts fixing the radiator to the chassis.
- Slide the radiator off its lower seat on the chassis.

Fitting

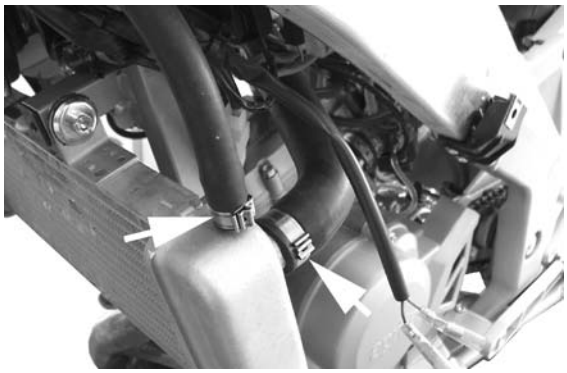
Follow the removal steps but in reverse order, be careful to adequately insert the lower pin in its position before fitting the bolts. Fill up and then purge the system.

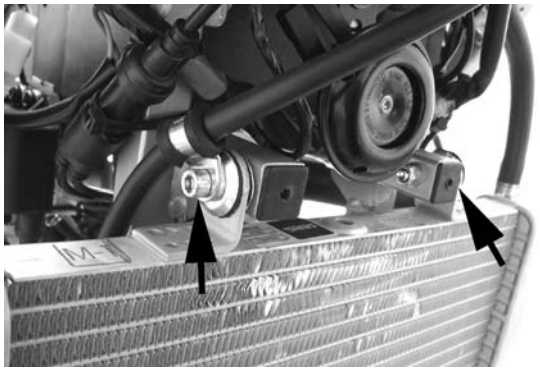
WARNING

CARRY OUT THESE OPERATIONS WHEN THE ENGINE IS COLD, SCALDING FLUID OR ITS VAPOURS CAN CAUSE SERIOUS BURNS. COLLECT THE FLUID IN A SUITABLE CONTAINER. THE COOLANT IS HARMFUL. AVOID CONTACT WITH THE SKIN AND EYES.

Locking torques (N*m)

Radiator to chassis 15 Nm





Expansion tank

Removal

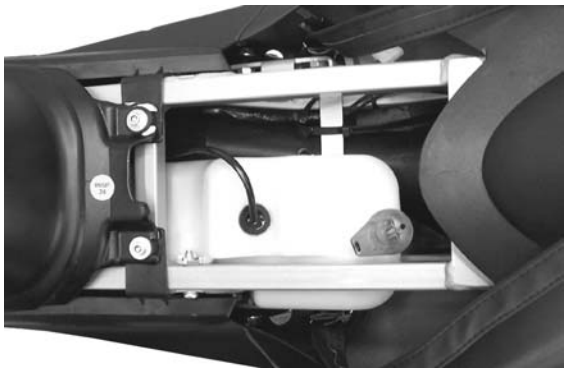
- Remove the air filter housing.
- Empty the cooling system by operating the pump coupling and collecting the fluid in a suitable container.
- Remove the two couplings on the expansion tank, then slide this tank off and upwards.

Fitting

- Follow the removal steps but in reverse order, be careful to adequately replace the metal brackets with new ones.
- Fill up the cooling circuit and then purge it.

Mixture oil tank

- Remove the saddle
- Remove the rear side fairings
- Remove the tail
- Remove the oil intake pipes and empty the mixer oil reservoir
- Remove the electric connections from the oil level indicator
- Remove the screws fixing the reservoir to the chassis
- Slide the reservoir off its seat.



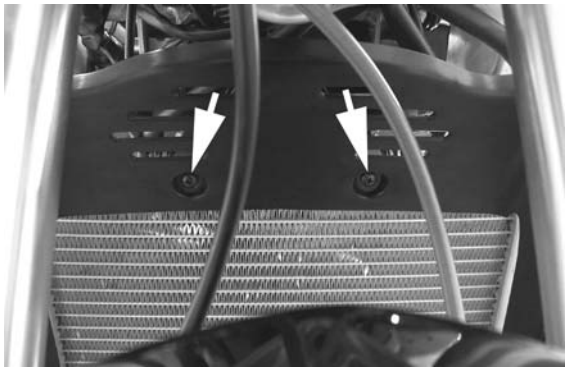
Front central cover

Removal

- Remove the side fairings.
- Remove the two screws indicated in the figure, then remove the cover.

Fitting

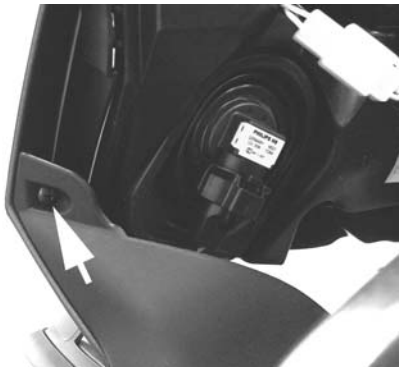
Follow the removal steps but in reverse order.



Flyscreen

Removal

- Remove the front deflectors.
- Remove the rear view mirrors.
- Remove the six fixings screws (three per side) to the side cases.
- Disconnect the electric connector of the front headlight assembly.
- Slightly press to detach the wind-screen lower part from the side cases and slide the whole windscreen off the headlight assembly

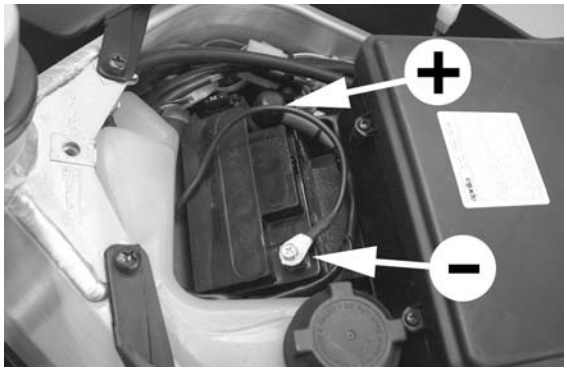


Fitting

Follow the removal steps but in reverse order.

Battery

To reach the battery, just remove the fuel tank.



Lower cover

Removal

Remove the eight screws (four per side) indicated in the figure, then remove the cover.

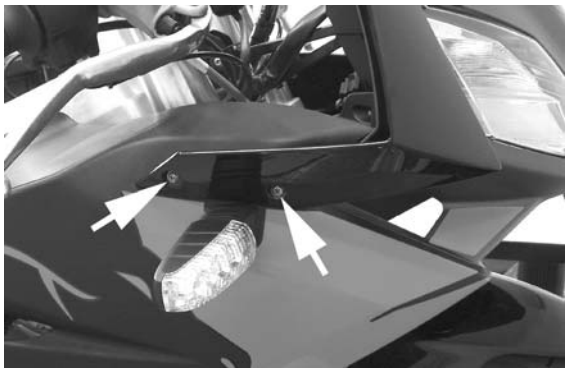
Fitting

Follow the removal steps but in reverse order.

Side Cowlings

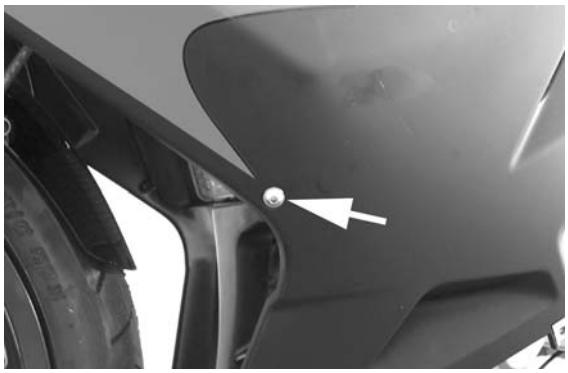
Front deflector removal

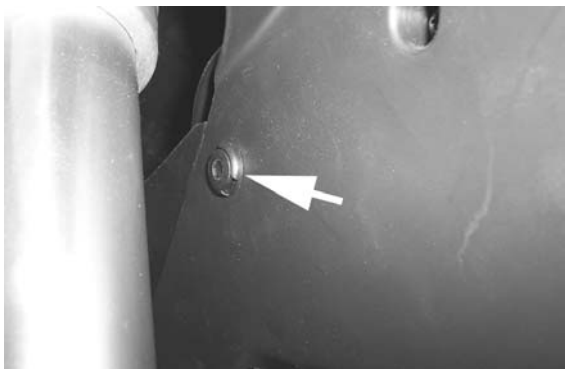
Remove the four screws (two per side) indicated in the figure, then remove the two deflectors.



Side case removal

- Remove the lower cover.
- Remove the two front deflectors.
- Remove the four screws (two per side) on the external part of the case.
- Remove the two clips (one per side) inside the wheel housing.





- Remove the six fixings screws (three

per side) to the front windscreen.

- Disconnect the turn indicator wiring.

Fitting

Follow the removal steps but in reverse order.

INDEX OF TOPICS

Aesthetic inspection

Scooter check

- Paintwork
- Fitting of plastic parts
- Damages
- Dirt

Tightening torques inspection

Locking check

- All tightening torques
- External screws of covers

Electrical system

Electrical system

- Fill up the battery with acid for batteries, charge using a suitable battery charger.
- Key switch
- Low-beam light, high-beam light, warning lights, tail lights
- Headlight adjustment
- Rear light
- Stop light (possibly front and rear brakes)
- Turn indicators and the respective warning lights
- Speedometer and instrument panel lighting
- Horn
- Starter button

CAUTION

TO ENSURE MAXIMUM PERFORMANCE, THE BATTERY MUST BE CHARGED BEFORE USE. INADEQUATE CHARGING OF THE BATTERY WITH A LOW LEVEL OF ELECTROLYTE BEFORE IT IS FIRST USED SHORTENS THE LIFE OF THE BATTERY.

WARNING

BEFORE RECHARGING THE BATTERY, REMOVE THE PLUGS OF EACH ELEMENT.
KEEP OPEN FLAMES OR SPARKS AWAY FROM THE BATTERY DURING CHARGING.
FIRST DETACH THE NEGATIVE TERMINAL BEFORE REMOVING THE BATTERY FROM THE VEHICLE.

CAUTION

WHEN INSTALLING THE BATTERY, FIRST ATTACH THE POSITIVE LEAD AND

THEN THE NEGATIVE LEAD.

WARNING

THE BATTERY ELECTROLYTE IS POISONOUS AS IT MAY CAUSE SERIOUS BURNS. IT CONTAINS SULPHURIC ACID. AVOID CONTACT WITH THE EYES, THE SKIN AND CLOTHING. IF COMING INTO CONTACT WITH EYES OR SKIN, WASH ABUNDANTLY WITH WATER FOR APPROX. 15 MIN. AND SEEK IMMEDIATE MEDICAL ATTENTION.
IN THE EVENT OF ACCIDENTAL INGESTION OF THE LIQUID, IMMEDIATELY DRINK LARGE QUANTITIES OF WATER OR MILK, MAGNESIUM MILK, BATTERED EGG OR VEGETABLE OIL. SEEK IMMEDIATE MEDICAL ATTENTION.
THE BATTERIES PRODUCE EXPLOSIVE GAS; KEEP CLEAR OF NAKED FLAMES, SPARKS OR CIGARETTES; VENTILATE THE AREA WHEN RECHARGING INDOORS.
ALWAYS WEAR EYE PROTECTION WHEN WORKING IN THE PROXIMITY OF BATTERIES.

KEEP OUT OF REACH OF CHILDREN

CAUTION

NEVER USE FUSES WITH A CAPACITY HIGHER THAN THE RECOMMENDED CAPACITY. USING A FUSE OF UNSUITABLE RATING MAY SERIOUSLY DAMAGE THE VEHICLE OR EVEN CAUSE A FIRE.

Levels check

Level check

- Brake fluid level
- Gearbox oil level
- Mixer oil level
- Coolant level

Road test

Test drive

- Cold start
- Speedometer operation check
- Throttle control operation check
- Riding stability
- Front and rear brake efficiency
- Front and rear wheel shock absorbers
- Abnormal noise
- Restarting when warmed up
- Fluid leakage (after the test drive)

Static test

Static check

- Tyre pressure
- Correct operation of all locks
- Installation of mirrors and accessories
- Tools supplied, user's manual, warranty certificate and customer services documents

NOTE

CHECK AND ADJUST TYRE PRESSURE WITH TYRES AT AMBIENT TEMPERATURE. REGULATE PRESSURE ACCORDING TO THE WEIGHT OF THE RIDER AND ACCESSORIES.

CAUTION

NEVER EXCEED THE RECOMMENDED INFLATION PRESSURES AS THE TYRES MAY BURST.

WARNING

Be extremely cautious when handling fuel.

Functional inspection

Functional check

- Brake lever travel
- Throttle control adjustment and free travel
- Uniform turning of the steering