DERBI

BALAS ROJAS

# WORKSHOP MANUAL
# GP1 50 cc

# INTRODUCTION

**DERBI - NACIONAL MOTOR, S.A.**, manufacturer of DERBI motorcycles and mopeds, has produced this manual with the aim of documenting and simplifying as much as possible the work you need to do to in dismantling and assembling the GP1 50 c.c.

The intention is to provide as much assistance as possible to mechanics working for our brand's dealers and sub-dealers.

Due to its constant commitment to improving its products, **DERBI - NACIONAL MOTOR, S.A.** Sociedad Unipersonal reserves the right to introduce any modifications it deems fit, without prior warning.

All the information included in this manual is based on the latest data available at the time of its publication. The drawings and photographs in this manual are for reference purposes only, and may therefore not be exactly the same as the corresponding parts of the current model itself.

**NACIONAL MOTOR, S.A.**

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# GENERAL INFORMATION

## REGULATIONS

This section describes the machine's general safety and maintenance work rules.

## SAFETY REGULATIONS

- In the event of having to carry out work on the engine while this is running, ensure that the area is well ventilated, where possible using extractor fans. Never leave engines running in closed spaces. Exhaust gases are poisonous.

Petrol is extremely inflammable and in certain conditions may explode. Smoking must not be allowed in the work area, nor should there be naked flames or sparks.

## MAINTENANCE REGULATIONS

- Use genuine DERBI spare parts and lubricants recommended by the manufacturer. Non-genuine or unauthorised parts may damage the engine.

Always use new gaskets and oil seals during re-assembly.

After dismantling, clean the components with solvents that are non-inflammable or with a high flammability point. Lubricate all working surfaces before assembling, excluding tapered joints.

After assembly, check that all components have been correctly fitted and that they are functioning perfectly.

For dismantling, checking and assembly operations, use only tools with metric measurements. Metric screws, nuts and bolts are not interchangeable with imperial measurement joining devices. Using unsuitable tools and joining devices may damage the engine.

- In the case of work on the engine involving the electrical circuitry, check that electrical connections have been correctly fitted.

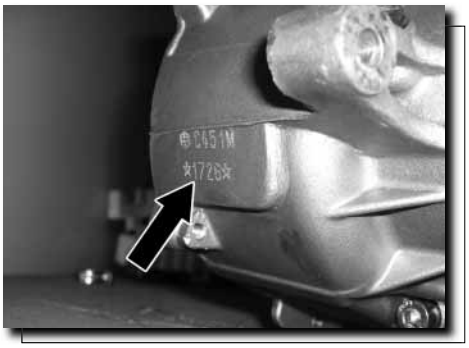
**N.B.**
Indicates a note that gives key information to make the procedure easier and clearer.

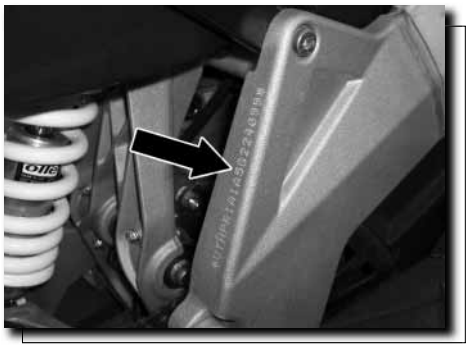
**ATTENTION**
Indicates specific procedures that must be carried out to avoid damage to the machine.

**WARNING**
Indicates specific procedures that must be followed to avoid possible accidents to the person repairing the machine.

# GENERAL TECHNICAL DATA

| MACHINE | ENGINE PREFIX | FRAME PREFIX |
|---|---|---|
| **GP1 50 c.c.** | **C451M** | **VTHPR1A1A** |



## DIMENSIONS AND WEIGHT

| CHARACTERISTIC | DIMENSION/VALUE |
|---|---|
| **Maximum length** | 1875 mm. |
| **Maximum height** | 1212 mm. |
| **Length between axles** | 1338 mm. |
| **Handlebar width** | 705 mm. |
| **Handlebar height** | 1050 mm. |
| **Total weight of machine** | 117 kg. |

## ENGINE

| CHARACTERISTIC | DIMENSION/VALUE |
|---|---|
| **Engine type** | Single cylinder 2-stroke |
| **Diameter per stroke** | 40 x 39.3 mm |
| **Cubic capacity** | 49.40 cm3 |
| **Compression ratio** | 11.3 ÷ 12.8 :1 |
| **Carburettor** | DELL'ORTO PHVA 17,5 ID |
| **CO regulation** | 3.5%±0.5 |
| **Tick over** | 1800 ÷ 2000 rpm |
| **Air filter** | Sponge soaked in oil for filters. |
| **Ignition system** | Electric starter motor. |
| **Lubrication** | Carried out using the mixture oil, and variable depending on the engine revs and the throttle butterfly valve aperture by means of a pump driven by the crankshaft by way of a toothed belt. |

# GENERAL TECHNICAL DATA

## ENGINE

| CHARACTERISTIC | DIMENSION/VALUE |
|---|---|
| **Alimentación** | Depression fuel pump supplying lead free petrol via the carburettor. |
| **Sistema de refrigeración** | By forced circulation of liquid. |
| **Embrague** | Dry automatic centrifugal |
| **Piñón salida cambio** | Z 19 |
| **Plato de arrastre** | Z 45 |

## TRANSMISSION

| CHARACTERISTIC | DIMENSION/VALUE |
|---|---|
| **Transmission** | Automatic speed variator with expandable pulleys, trapezoidal belt, automatic clutch, gear reducer. |

## CAPACITY

| CHARACTERISTIC | DIMENSION/VALUE |
|---|---|
| **Fuel tank capacity** | 7.7 l |
| **Fuel reserve capacity** | 2.7 l |
| **Oil tank capacity** | 1.75 l |
| **Oil reserve capacity** | 0.25 l |
| **Cooling system capacity** | 1.0 l |

## ELECTRICAL SYSTEM

| CHARACTERISTIC | DIMENSION/VALUE |
|---|---|
| **Ignition system** | Electronic 12v 88 W with central intermittence unit + check control |
| **Ignition advance (before T.D.C.)** | 17° a 4000 rpm |
| **Spark plug** | CHAMPION RN1C |
| **Battery** | 12 V 6 Ah |
| **Main fuse** | 7.5 A |

# GENERAL TECHNICAL DATA

## Frame and suspensions

| CHARACTERISTIC | DIMENSION/VALUE |
|---|---|
| **Frame** | Aluminium, Delta Box type |
| **Front suspension** | Telescopic forks with inverted bars |
| **Diameter / Travel** | 35 mm / 80 mm |
| **Oil capacity** | 95 c.c. |
| **Oil type** | SAE 7,5 W |
| **Rear suspension** | Swinging arm with single shock absorber. |
| **Travel** | 80 mm |

## Braking system

| CHARACTERISTIC | DIMENSION/VALUE |
|---|---|
| **Front brake** | Hydraulically operated disk |
| **Front disk diameter** | 245 mm |
| **Rear brake** | Hydraulically operated disk |
| **Rear disk diameter** | 180 mm |
| **Brake fluid type** | DOT 4 |

## Wheels and tyres

| CHARACTERISTIC | DIMENSION/VALUE |
|---|---|
| **Front wheel type** | 120 / 70 x 14in (tubeless) |
| **Front tyre inflated pressure.** | 190 kPa / 200 kPa (with pillion passenger) |
| **Rear wheel type** | 140 / 60 x 14in (tubeless) |
| **Rear tyre inflated pressure** | 200 kPa / 220 kPa (with pillion passenger) |

## Carburettor

| CHARACTERISTIC | DIMENSION/VALUE |
|---|---|
| **Type** | DELL'ORTO PHVA 17.5 ID |
| **Diameter of diffuser** | Ø 17.5 mm |
| **Main jet** | 53 |
| **Minimum air jet** | Ø 1.5 mm |
| **Carburettor needle setting** | A22 |
| **Needle position (slots from above)** | 1 |

# GENERAL TECHNICAL DATA

## CARBURETTOR

| CHARACTERISTIC | DIMENSION/VALUE |
|---|---|
| **Emulsifier** | 209HA |
| **Idle jet** | 32 |
| **Minimum air jet** | Libre |
| **Secondary minimum air orifice** | Ø 2.5 mm |
| **Minimum mixture screw initial opening** | 1 1/2 |
| **Choke jet** | 50 |
| **Choke air jet** | Ø 1.5 mm |
| **Choke needle travel** | 11 mm |
| **Fuel entry orifice** | Ø 1.0 mm |

# GENERAL TECHNICAL DATA

## Chassis tightening torques

| DESCRIPTION | TORQUES (N.M) | TORQUES (M.KG) | SEALER |
|---|---|---|---|
| Top shock absorber - chassis securing device M10x150 8.8 | 30 ÷ 40 | 3 ÷ 4 | |
| Bottom shock absorber – engine securing device M10x150 8.8 | 30 ÷ 40 | 3 ÷ 4 | |
| Engine Silent bloc – chassis securing device M10x150 8.8 | 30 ÷ 40 | 3 ÷ 4 | • |
| Engine support securing bolt M10x150 8.8 | 20 ÷ 30 | 2 ÷ 3 | |
| Engine rear – support securing device M8x125 8.8 | 17 ÷ 19 | 1.7 ÷ 1.9 | |
| Engine rear support - chassis securing device M10x150 8.8 | 30 ÷ 40 | 3 ÷ 4 | |
| Engine rear Silent bloc clamp securing device M6x100 8.8 | 8 ÷ 10 | 0.8 ÷ 1 | |
| Swinging arm securing device M14x200 | 70 ÷ 80 | 7 ÷ 8 | |
| Change output pinion bush securing device M16x125 | 115 ÷ 125 | 11.5 ÷ 12.5 | |
| Change output pinion securing device M35x100 | 115 ÷ 125 | 11.5 ÷ 12.5 | |
| Filter box – engine securing device M6x100 | 8 ÷ 10 | 0.8 ÷ 1 | |
| Horn – chassis securing device M6x100 | 8 ÷ 10 | 0.8 ÷ 1 | |
| Steering forks – chassis securing device M24x100 | 90 ÷ 130 | 9 ÷ 13 | |
| Exhaust pipe –cylinder securing device M6x100 8.8 | 9 ÷ 12 | 0.9 ÷ 1.2 | |
| Exhaust pipe –crankcase securing device M8x125 8.8 | 17 ÷ 19 | 1.7 ÷ 1.9 | • |
| Steering lock – chassis securing device M6x100 8.8 | 8 ÷ 10 | 0.8 ÷ 1 | |
| Handlebars – steering forks securing device M6x100 8.8 | 17 ÷ 19 | 1.7 ÷ 1.9 | |
| Handlebar clamp securing device M8x125 8.8 | 17 ÷ 19 | 1.7 ÷ 1.9 | |
| Counterweight- handlebars securing device M5x80 8.8 | 3.5 ÷ 4.5 | 0.35 ÷ 0.45 | |
| Front wheel – forks securing device M14x200 | 35 ÷ 50 | 3.5 ÷ 5 | |
| Fork arm lock securing device M8x125 | 15 ÷ 19 | 1.5 ÷ 1.9 | |
| Brake disk – front wheel securing device M6x100 | 8 ÷ 10 | 0.8 ÷ 1 | • |
| Brake disk calliper – forks securing device M10x1.5 | 35 ÷ 40 | 3.5 ÷ 4 | • |
| Rear wheel securing device M14x200 | 70 ÷ 80 | 7 ÷ 8 | |
| Drag plate – wheel securing device M6x100 10.9 | 10 ÷ 12 | 1 ÷ 1.2 | • |
| Brake disk – rear wheel securing device M8x125 10.9 | 25 ÷ 29 | 2.5 ÷ 2.9 | • |
| Prop stand – chassis securing device M8x125 | 15 ÷ 19 | 1.5 ÷ 1.9 | |
| Brake puller securing device M10x150 10.9 | 35 ÷ 40 | 3.5 ÷ 4 | |
| Gripper – chassis securing device M8x125 8.8 | 17 ÷ 19 | 1.7 ÷ 1.9 | |
| Radiator - chassis securing device M6x100 | 8 ÷ 10 | 0.8 ÷ 1 | |
| Various metal elements to chassis securing device M5x80 | 3.5 ÷ 4.5 | 0.35 ÷ 0.45 | |
| Various metal elements to chassis securing device M6x100 | 8 ÷ 10 | 0.8 ÷ 1 | |
| Various metal elements to chassis securing device M8x125 | 15 ÷ 19 | 1.5 ÷ 1.9 | |
| Various plastic elements to chassis securing device M6x100 | 1 ÷ 2 | 0.1 ÷ 0.2 | |
| Various plastic elements to chassis securing device M6x100 | 2 ÷ 3.5 | 0.2 ÷ 0.35 | |

# GENERAL TECHNICAL DATA

## ENGINE TIGHTENING TORQUES

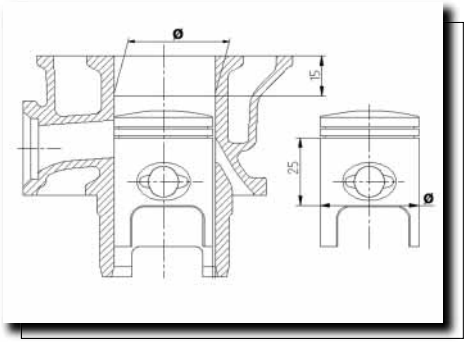
| DESCRIPTION | TORQUES (N.M) | TORQUES (M.KG) |
|---|---|---|
| Clutch bell housing nut | 40 ÷ 44 | 4 ÷ 4.4 |
| Clutch locking nut | 55 ÷ 60 | 5.5 ÷ 6 |
| Nut for locking the driving pulley on the crankshaft | 40 ÷ 44 | 4 ÷ 4.4 |
| Kick start lever bolt | 12 ÷ 13 | 1.2 ÷ 1.3 |
| Magneto nut | 40 ÷ 44 | 4 ÷ 4.4 |
| Magneto fan bolts | 3 ÷ 4 | 0.3 ÷ 0.4 |
| Crankcase halves joining bolts | 12 ÷ 13 | 1.2 ÷ 1.3 |
| Bolts for securing exhaust pipe to the crankcase | 22 ÷ 24 | 2.2 ÷ 2.4 |
| Bolts for securing the filter box to the crankcase | 4 ÷ 5 | 0.4 ÷ 0.5 |
| Cylinder head nuts | 10 ÷ 11 | 1 ÷ 1.1 |
| Starter motor bolts | 12 ÷ 13 | 1.2 ÷ 0.3 |
| Spark plug | 25 ÷ 30 | 2.5 ÷ 3 |
| Oil sump drain plug | 3 ÷ 5 | 0.3 ÷ 0.5 |
| Rear hub cover bolts | 12 ÷ 13 | 1.2 ÷ 1.3 |

| DESCRIPTION | TORQUES (N.M) | TORQUES (M.KG) |
|---|---|---|
| Transmission cover bolts | 12 ÷ 13 | 1.2 ÷ 1.3 |
| Suction collector bolts | 8 ÷ 9 | 0.8 ÷ 0.9 |
| Magneto cover securing bolts | 1 ÷ 2 | 0.1 ÷ 0.2 |
| Cylinder casing securing bolts | 3.5 ÷ 5 | 0.35 ÷ 0.5 |
| Stator securing bolt | 3 ÷ 4 | 0.3 ÷ 0.4 |
| Pick-up securing bolt | 4 ÷ 5 | 0.4 ÷ 0.5 |
| Mixer securing bolt | 3 ÷ 4 | 0.3 ÷ 0.4 |
| Bolt securing brake pedal to shaft in the engine | 12 ÷ 13 | 1.2 ÷ 1.3 |

# GENERAL TECHNICAL DATA

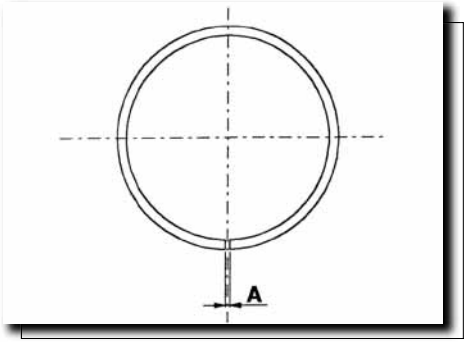
## Conection piston and cylinder

| NAME | PLAY | INITIALS | CYLINDER | PISTON | PLAY ON FITTING |
|---|---|---|---|---|---|
| Standard fitting | </> | M | 39,997-40,004 | 39,943-39,95 | 0,047-0,061 |
| Standard fitting | </> | N | 40,004-40,011 | 39,95-39,957 | 0,047-0,061 |
| Standard fitting | </> | O | 40,011-40,018 | 39,957-39,964 | 0,047-0,061 |
| Standard fitting | </> | P | 40,018-40,025 | 39,964-39,971 | 0,047-0,061 |
| 1st oversize fitting | </> | M1 | 40,197-40,204 | 40,143-40,15 | 0,047-0,061 |
| 1st oversize fitting | </> | N1 | 40,204-40,211 | 40,15-40,157 | 0,047-0,061 |
| 1st oversize fitting | </> | O1 | 4,211-40,218 | 40,157-40,164 | 0,047-0,061 |
| 1st oversize fitting | </> | P1 | 40,218-40,225 | 40,164-40,171 | 0,047-0,061 |
| 2nd oversize fitting | </> | M2 | 40,397-40,404 | 40,343-40,35 | 0,047-0,061 |
| 2nd oversize fitting | </> | N2 | 40-404-40,411 | 40,35-40,357 | 0,047-0,061 |
| 2nd oversize fitting | </> | O2 | 40-411-40,418 | 40,357-40,364 | 0,047-0,061 |
| 2nd oversize fitting | </> | P2 | 40,418-40,425 | 40,364-40,371 | 0,047-0,061 |




## Piston rings

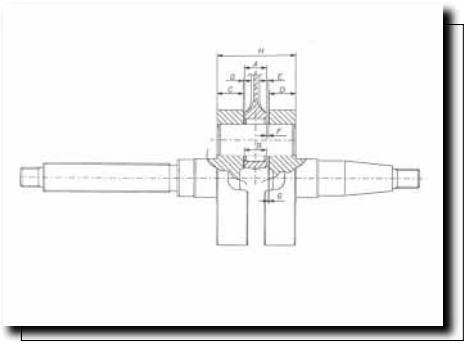
| NAME | DESCRIPTION | DIMENSIONS | INITIALS | QUANTITY |
|---|---|---|---|---|
| Compression lining | | 40 | A | 0,10 ÷ 0,25 |
| Compression lining 1° Greater | | 40,2 | A | 0,10 ÷ 0,25 |
| Compression lining 2° Greater | | 40,4 | A | 0,10 ÷ 0,25 |



# GENERAL TECHNICAL DATA

## END PLAY BETWEEN CRANKCASE, CRANKSHAFT AND CONNECTING ROD

| NAME | DESCRIPTION | DIMENSIONS | INITIAL | QUANTITY |
|---|---|---|---|---|
| **Connecting rod** | | 11,750 ÷ 0,05 | A | Play E=0,25÷0,50<br>Play F= 2,20÷0,75 |
| **Packing washer** | | 0,5 ÷ 0,03 | G | Play E=0,25÷0,50<br>Play F= 2,20÷0,75 |
| **Half shaft transmission side** | | 13,75 ÷ 0,040 | C | Play E=0,25÷0,50<br>Play F= 2,20÷0,75 |
| **Half shaft flywheel side** | | 13,75 ÷ 0,040 | D | Play E=0,25÷0,50<br>Play F= 2,20÷0,75 |
| **Spacing between shoulders** | | 40,64 | H | Play E=0,25÷0,50<br>Play F= 2,20÷0,75 |
| **Cage** | | 11,80 ÷ 0,35 | B | Play F= 2,20÷0,75 |



## SLOT PACKING SYSTEM

- Fit the cylinder without positioningthe base gasket

- Position a dial gauge on the special tool and zeri it on rectified surface.

- Fis the tool on the top of the cylinder using two nuts to fix it to the studs and then bring the piston to T.D.C.

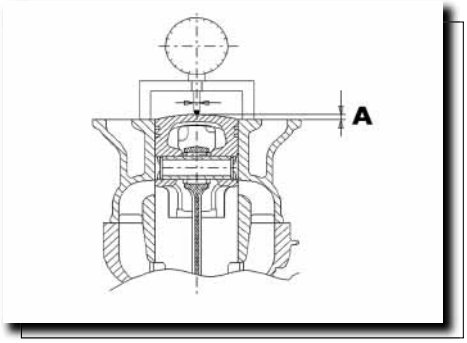
- The gasket thickness to be adopted varies with the measurement. For this reason gaskets with three different thicknesses ara available as spares.

**Specific tooling**
020272Y Tool for checking the piston of the piston.

# GENERAL TECHNICAL DATA

## SISTEMA DE MONTAJE DE ESPESORES

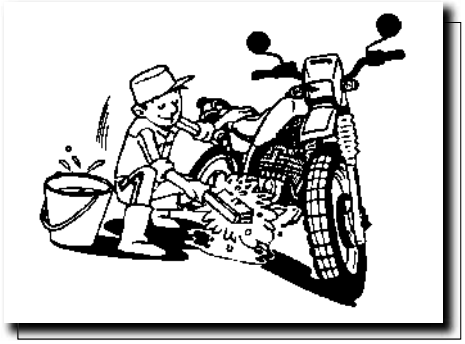
| NAME | MEASURE A | THICKNESS |
|---|---|---|
| **Packing** | 2,80 ÷ 3,04 | 0,4 |
| **Packing** | 3,04 ÷ 3,24 | 0,6 |
| **Spacing** | 3,24 ÷ 3,48 | 0,8 |



# RECOMMENDED TOOLS

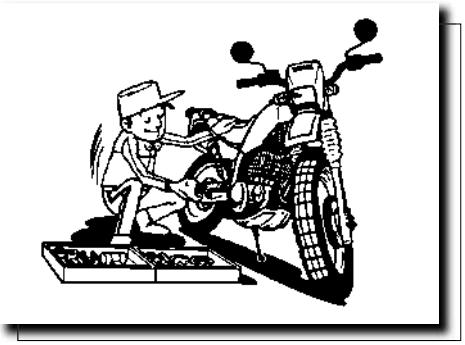
## PREPARATION FOR REMOVAL AND DISMANTLING

**1.** Remove all the dirt, grime, dust and other foreign material before removing and dismantling.



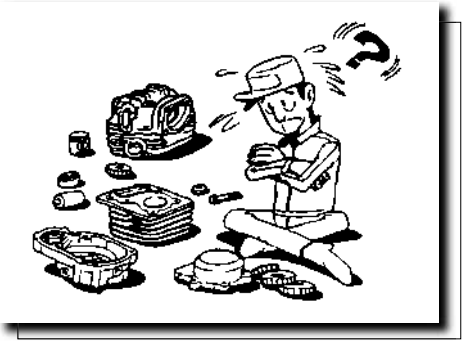
**2.** Use properly cleaned tools and equipment.

See "**SPECIAL TOOLS**".

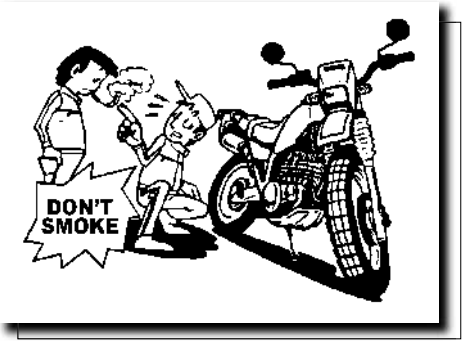


**3.** On dismantling the motorcycle, always keep paired parts together. This includes gears, cylinders, pistons and other parts submitted to natural wear in pairs. Paired parts must always be reassembled or replaced together.

**4.** While dismantling the motorcycle, clean all the parts and lay them out on trays in the order dismantled. This speeds up reassembly and ensures the correct fitting of all the parts.



**5.** Keep all parts away from any contact with fire.



# RECOMMENDED TOOLS

## REPLACEMENT PARTS

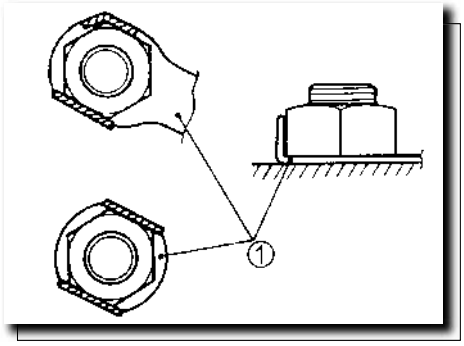
**1.** Use only genuine **DERBI** spare parts. For all lubrication tasks use oils and greases recommended by **DERBI**. Other makes make seem similar in their function and appearance, but are inferior in quality.

## SEALS, RETAINING RINGS AND O-RINGS

**1.** Replace all seals, retaining rings and O-rings when servicing the engine.
All surfaces receiving seals, retaining ring edges and O-rings must be cleaned.

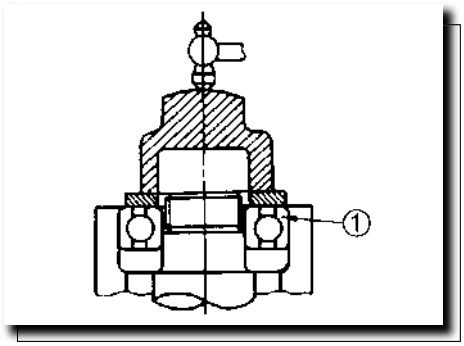
**2.** Apply oil to all paired parts and bearing during reassembly. Apply grease to the retaining ring edges.

## TAB/SPACER WASHERS AND SPLIT PINS



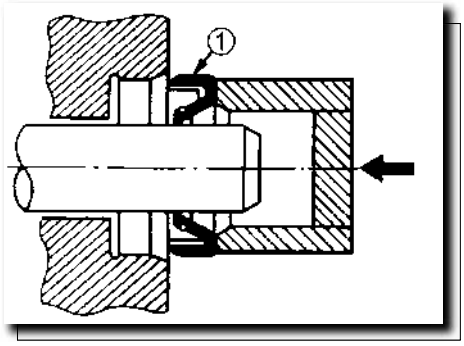

**1.** After removing them, replace all tab/spacer washers (1) and split pins Bend the tabs to fit the flat surfaces of the bolt or nut once they have been tightened to the specified torque.

## BEARINGS AND RETAINING RINGS




**1.** Fit bearings and retaining rings in such a way that the manufacturers marks remain visible. On fitting retaining rings, applying a thin film of light lithium soap based grease to their edges. Where required, apply oil generously when fitting bearings.

**WARNING**
DO NOT USE COMPRESSED AIR TO DRY BEARINGS. THIS DAMAGES THE BEARING SURFACES.

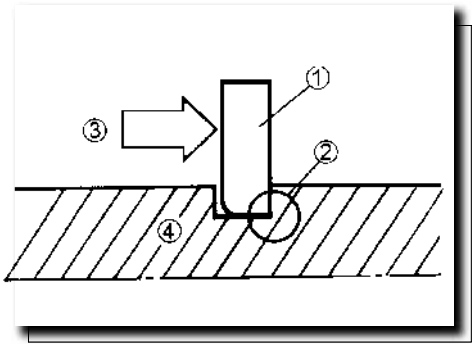


# RECOMMENDED TOOLS

## LOCKING RINGS

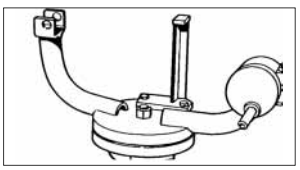
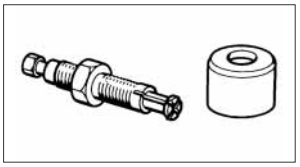
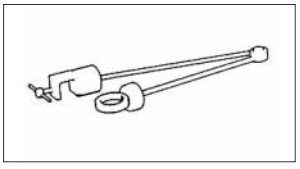
**1.** Examine all the locking rings carefully before fitting. Always replace the gudgeon pin circlips after every use. Replace distorted locking rings. On fitting a locking ring (1), ensure that the sharp edge (2) is on the opposite side to the force to be applied to it.

See the figure on the side, (4) Axle.




## SPECIAL TOOLS

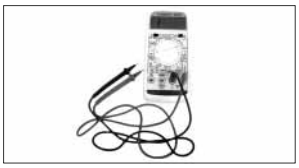
**1.** The following special tools are needed for assembly and for complete and exact adjustments. Only use the proper special tools; thereby avoiding damage caused by the use of unsuitable tools or improvised techniques.

| STORES CODE | DESCRIPTION | IMAGE |
|---|---|---|
| **005095Y** | Engine support |  |
| **001467Y** | Bell |  |
| **002465Y** | Pliers for snap rings |  |
| **020150Y** | Support for air heater |  |

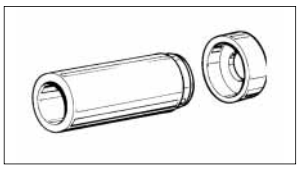
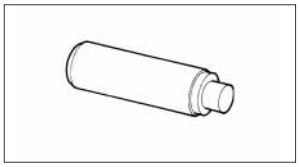
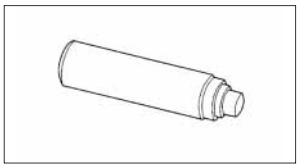
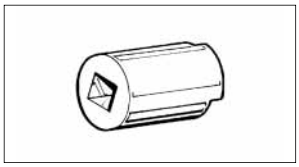
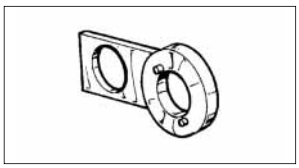
# RECOMMENDED TOOLS

| STORES CODE | DESCRIPTION | IMAGE |
|---|---|---|
| 020151Y | Air heater |  |
| 020162Y | Flywheel extractor |  |
| 020163Y | Crankc splitting plate |  |
| 020164Y | Half-pulleys fixing sheath |  |
| 020451Y | Starter sprocket retainer |  |
| 020166Y | Piston rings fixing tool |  |
| 020163Y | Bearing fitting stand |  |
| 020167Y | Impeller retaining spanner |  |

# RECOMMENDED TOOLS

| REFERENCIA | DESCRIPCIÓN | IMAGEN |
|---|---|---|
| 020168Y | Oil seal fitting drift on half crankcase |  |
| 020169Y | Water pump drive shaft spanner |  |
| 020170Y | Extractor engagement sends mixer |  |
| 020325Y | Pliers for brake-shoe springs |  |
| 020331Y | Digital multimeter |  |
| 020332Y | Digital rpm counter |  |
| 020334Y | Multiple battery charger |  |
| 020335Y | Magnetic stand and comparator |  |

# RECOMMENDED TOOLS

| REFERENCIA | DESCRIPCIÓN | IMAGEN |
|---|---|---|
| 020350Y | Electric system diagnostic device |  |
| 020656Y | Compass flywheel stop spanner |  |
| 020340Y | Crankshaft sela punch |  |
| 020080Y | Needle bearing punch |  |
| 020168Y | Crankcase-half water-seal assembly punch |  |
| 020341Y | Piston ring assembly tool |  |
| 020342Y | Compressor crankshaft pulley retaiting tool |  |
| 00G05300131 | Change output pinion tool |  |

# PERIODIC MAINTENANCE

## MAINTENANCE CHART

| BEFORE EVERY START-UP |
|---|
| ACTION |
| Check the oil level |
| Check the brake fluid level |
| Check the coolant level |
| Check wear on brake pads/shoes |
| Check light mechanism operation |
| Check horn operation |
| Check chain tension |
| Check tyre pressure and wear |
| Check for possible fluid leaks (petrol, oil, coolant, brake fluid) |
| Check for possible cracks in the fuel pipes |
| Check that all the control elements are operating correctly |
| Check that the brakes are operating correctly |

| AFTER EVERY WASHING |
|---|
| ACTION |
| Clean and lubricate the chain |
| Lubricate the clutch and brake levers |
| Check that the brakes are operating correctly |
| Spray locks and light switches with anti-damp spray |

| EVERY 1,000 km |
|---|
| ACTION |
| Clean and lubricate the chain |

| EVERY 2 YEARS |
|---|
| ACTION |
| Brake fluid - Change |
| Cooling fluid - Replacement |

# PERIODIC MAINTENANCE

| AT 1000 KM OR 4 MONTHS |
|---|
| **ACTION** |

| |
|---|
| Hub oil - Replacement |
| Oil mixter / Throttle linkage - Adjust |
| Speedometer cable - Grease |
| Steering - Adjust |
| Brake levers - Grease |
| Brake fluid level - Check |
| Nuts, bolts and fasteners - Check |
| Electrical system and battery - Check |
| Tires-inflation and wear - Check |
| Vehicle and brake test - Road test |

| AT 5000 KM OR 12 MONTHS, 25000 KM, 35000 KM AND 55000 KM |
|---|
| **ACTION** |

| |
|---|
| Hub oil level - Check |
| Spark plug / Electrode gap - Change |
| Air filter - Cleaning |
| Oli mixter / Throttle linkage - Adjust |
| Cooling fluid level - Check |
| Brake levers - Grease |
| Brake pads - Check condition + wear |
| Brake fluid level - Check |
| Electrical system and battery - Check |
| Tires-infaltion and wear - Check |
| Vehicle and brake test - Road test |

# PERIODIC MAINTENANCE

| AT 10000 KM OR 24 MONTHS AND 50000 KM |
|---|
| ACTION |
| Hub oil - Replacement |
| Spark plug / spark gap - Replacement |
| Air filter - Cleaning |
| Idle speed / Fuel - Adjust |
| Oil mixer / Throttle linkage - Adjust |
| Variators rollers - Change |
| Speedometer cable - Grease |
| Transmition Belt - Check |
| Cooling fluid level - Check |
| Steering - Adjust |
| Brake levers - Grease |
| Brake pads - Check condition + wear |
| Brake fluid level - Check |
| Transmissions - Lubricate |
| Nuts, bolts and fasteners - Check |
| Suspensions - Check |
| Headlight - Adjust |
| Tires-inflation and wear - Check |
| Vehicle and brake test - Road test |

| AT 15000 KM AND 45000 KM |
|---|
| ACTION |
| Hub oil level - Check |
| Spark plug / spark gap - Replacement |
| Air filter - Cleaning |
| Oil mixer / throttle linkage - Adjust |
| Transmission Belt - Replacement |
| Cooling fluid level - Check |
| Brake levers - Grease |
| Brake pads - Check condition + wear |
| Brake fluid level - Check |
| Electrical system and battery - Check |
| Tires-inflation and wear - Check |
| SAS bos (esponge) - Cleaning |
| Vehicle and brabe test - Road test |

# PERIODIC MAINTENANCE

| AT 20000 KM AND 40000 KM |
|---|
| ACTION |
| Hub oil - Replacement |
| Spark plug / electrode gao - Change |
| Air filter - Cleaning |
| Idle speed / Fuel - Adjust |
| Cylinder cooling system - Check / Clean |
| Oil mixer / throttle linkage- Adjust |
| Transmission Belt - Check |
| Variatos roller - Change |
| Fuel-oil mixer belt - Change |
| Cooling fluid level - Check |
| Radiator - External cleaning / Check |
| Speedometer cable - Grease |
| Steering - Adjust |
| Brake levers - Grease |
| Brake pads - Check condition + wear |
| Brake fluid level - Check |
| Transmisions - Lubricate |
| Nuts, bolts and fasteners - Check |
| Suspensions - Check |
| Electrical system and battery - Check |
| Headlight - Adjust |
| Tires-inflation and wear - Check |
| Vehicle and brake test - Road test |

| AT 30000 KM |
|---|
| ACTION |
| Hub oil - Replacement |
| Spark plug / spark gap - Replacement |
| Air filter - Cleaning |
| Idle speed / Fuel - Adjust |
| Oil mixer / throttle linkage - Adjust |
| Transmission Belt - Replacement |
| Variatos roller - Change |
| Cooling fluid level - Check |
| Speedometer cable - Grease |
| Steering - Adjust |
| Brake levers - Grease |
| Brake pads - Check condition + wear |

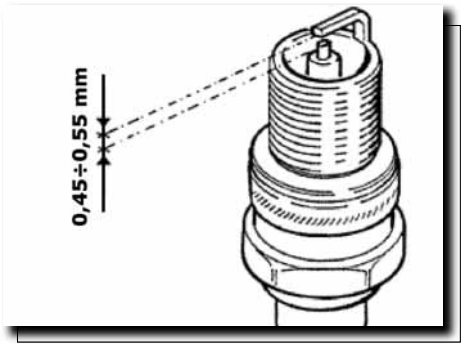
# PERIODIC MAINTENANCE

| AT 30000 KM |
|---|
| ACTION |
| Braking circuit hose - Replacement |
| Brake fluid level - Check |
| Transmisions - Lubricate |
| Buts, bolts and fasteners - Check |
| Suspensions - Check |
| Electrical system and battery - Check |
| Headlight - Adjust |
| Tires-inflation and wear - Check |
| SAS box (esponge) - Clean |
| Vehicle and brake test -Road test |

| AT 60000 KM |
|---|
| ACTION |
| Hub oil - Replacement |
| Spark plug / spark gap - Replacement |
| Air filter - Cleaning |
| Idle speed / Fuel - Adjust |
| Oil mixer / throttle linkage - Adjust |
| Transmission Belt - Replacement |
| Variatos roller - Change |
| Fuel-oil mixter belt - Change |
| Cooling fluid level - Check |
| Radiator - External cleaning / check |
| Speedometer cable - Grease |
| Steering - Adjust |
| Brake levers - Grease |
| Brake pads - Check condition + wear |
| Braking circuit hose - Replacement |
| Brake fluid level - Check |
| Transmissions - Lubricate |
| Nuts, bolts ans fasteners - Check |
| Suspensions - Check |
| Electrical system and battery - Check |
| Headlight - Adjust |
| Tires-inflation and wear - Check |
| SAS box (esponge) - Clean |
| Vehicle and barake test - Road test |

# PERIODIC MAINTENANCE

## SPARK PLUG




- Rest the vehicle on its centre-stand;

- Detach the spark plug flap by removing the two fixing screws;

- Detach the H.T. cable cap from the spark plug;

- Remove the spark plug using the box-spanner provided;

- Examine the conditions of spark plug, the integrity of the insulator, and measure the spark gap with the aid of a feeler gauge.

- If required, adjust the spark gap by carefully bending the outer electrode. In the event of defects, replace the spark plug with one of the recommended type;

- Engage the thread, with the correct inclination, and the screw the spark plug by hand as far as it will go, then tighten it using the box-spanner provided;

- Inserí the spark plug cap;

- Refit the spark plug flap.

**CAUTION**
THE SPARK PLUG REMOVAL MUST BE CARRIED OUT WITH THE ENGINE COLD. THE SPARK PLUG MUST BE REPLACED EVERY 5,000 KM. THE USE OF NON APPROVED ELECTRONIC 1GNITION DEVICES OR SPARK PLUGS OTHER THAN THE PRESCRIBED MODEL MAY SERIOUSLY DAMAGE THE ENGINE.

**CHARACTERISTIC**

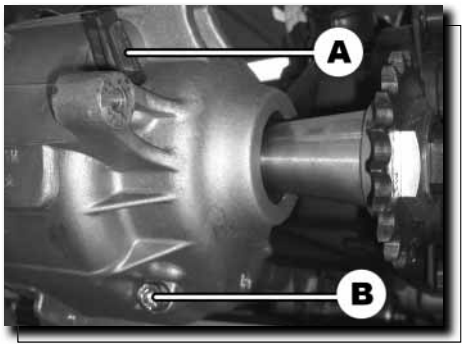
**Spark plug**
*CHAMPION RN1C*

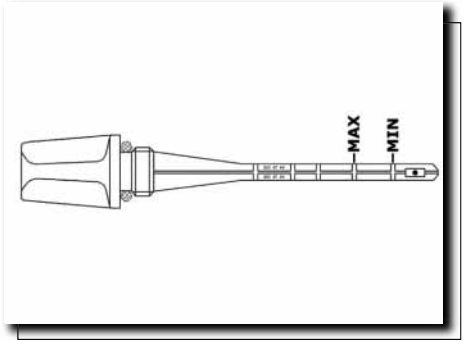
**Electrode gap**
*0.45-0.55 mm*

**Locking torques (N.m)**
*Spark plug 25 - 30 N.m*

# PERIODIC MAINTENANCE

## HUB OIL




**Check**

To check the level, proceed as follows:

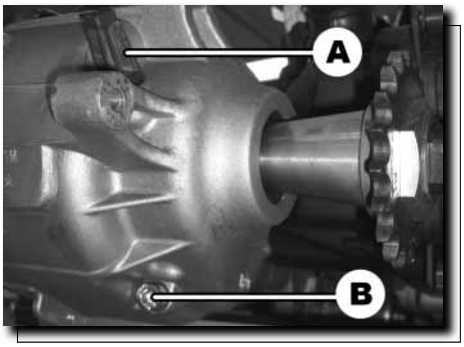
1) Rest the vehicle onto its centre-stand, on flat ground;

2) Remove dipstick «A»; dry it with a clean cloth and reinsert it, using the whole thread;

3) Remove the dipstick and check the oil mark reaches just below the second notch from the bottom;

4) Screw the dipstick back in with the correct torque.

Oil synthetic multidegree SAE 75W/85 API GL4

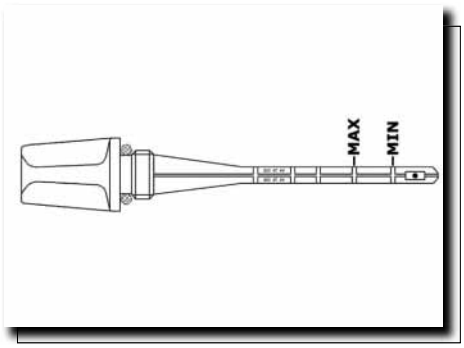



**Replacement**

- Remove oil filler cap «A».

- Loosen oil draining cap «B» and allow for the system to drain completely.

- Refit the draining cap and refill the hub with the prescribed oil.

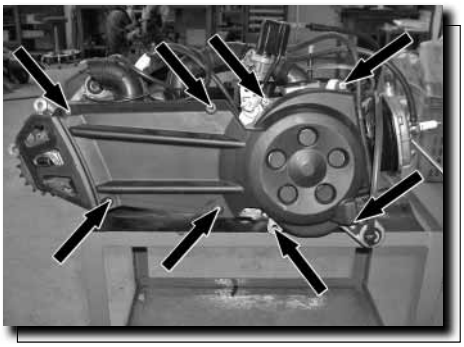



**Characteristic**

Rear hub oil
*85c.c.*

# PERIODIC MAINTENANCE

## AIR FILTER



- Remove the cleaner plug by unloosing the 6 fixing screws. Remove the filtering element.

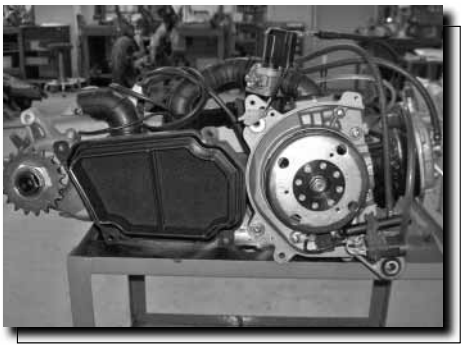
***Cleaning:***
-Wash with water and neutral soap.

-Dry with a clean cloth and small jets of compressed air.

-Soak with a 50 fuel/oil mixture.

-Let the filtering element drain and then squeeze it with your hands without crushing it.

-Let it dry and refit it. Mineral oil with special additives to increase its adhesiveness ISO VG 150



**CAUTION**
NEVER RUN THE ENGINE WITHOUT THE AIR FILTER, THIS WOULD RESULT IN AN EXCESSIVE WEAT OF THE PISTON AND CYLINDER

**Recommended products**
Mineral oil with specific additives to increase adhesion ISO VG 150

# PERIODIC MAINTENANCE

## CHECKING THE IGNITION TIMING

Adjust the control cables:
Mixer cable: see "Mixer timing" procedure, below.

**Throttle cable:**
Adjust the screw on the carburettor so that there is no play on the sheath.

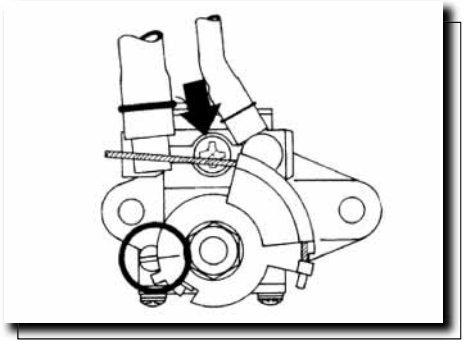
**Splitter control cable:**
Adjust the screw on the throttle grip on the handlebar so that there is no play on the twist grip.

All cables must be adjusted so that there is no play on their sheaths.

**Mixer timing**
- Adjust via the transmission screw on the crankcase, with the throttle cable released, the reference machined on the rotating plate which must be aligned to that shown on the mixer body as indicated in the figure.

While performing this operation the engine must be fed with a 2 oil-fel mixture (at least 0.5 litres if the tank is empty).

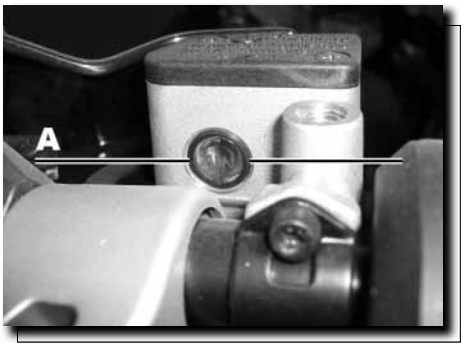
**CAUTION**
WHEN RUNNING OUT OF OIL OR REMOVING THE OIL TANK, FOLLOW THE MIXER BLEEDING OPERATIONS AS FOLLOWS: REFILL THE OIL TANK, WITH THE MIXER FITTED ONTO THE ENGINE, AND THE ENGINE NOT RUNNING, DETACH THE MIXER TUBE FROM THE CARBURETTOR AND LOOSEN THE BLEED SCREW (SEE ARROW IN FIGURE) UNTIL OIL STARTS FLOWING OUTWARDS. RECONNECT THE INLET TUBE TO THE CARBURETTOR, FIXING IT WITH THE APPROPRIATE METALLIC CLAMP.



**Recommended products**
Synthetic oil that passes API TC ++ specifications

# PERIODIC MAINTENANCE

## BRAKING SYSTEM




**Level check**
Proceed as follows:
- Rest the vehicle onto its centre-stand and align the handlebars;

- Check the liquid level through the inspection hole «A».

A certain decrease in the liquid level is due to the wear of the pads.

**Top-up**
Use the following procedure:
Loosen the two screws, remove the reservoir cap, remove the gasket and top up only with the prescribed fluid without exceeding the maximum level.

**CAUTION**
USE ONLY DOT 4 BRAKE FLUID.

**CAUTION**
KEEP THE BRAKE FLUID AWAY FROM THE SKIN, THE EYES AND CLOTHING. IN CASE OF CONTACT, RINSE GENEROUSLY WITH WATER.

**CAUTION**
THE BRAKE FLUID IS HIGHLY CORROSIVE. TAKE CARE NOT TO SPILL IT ON THE PAINTWORK.

**CAUTION**
THE BRAKE FLUID IS HYGROSCOPIC, I.E. IT ABSORBS HUMIDITY FROM THE AIR. IF THE HUMIDITY CONTAINED IN THE FLUID EXCEEDS A GIVEN CONCENTRATION, THE BRAKING ACTION BECOMES INSUFFICIENT.

NEVER DRAW THE FLUID FROM OPEN OR PARTLY EMPTY CONTAINERS.

UNDER NORMAL CLIMATIC CONDITIONS THE FLUID SHOULD BE RENEWED EVERY 20,000 KM, OR IN ANY CASE EVERY TWO YEARS.

**N.B.**
CHANGE THE BRAKE FLUID AND BLEED THE SYSTEM AS DESCRIBED IN CHAPTER BRAKING SYSTEM

**Recommendede products**
Synthetic fluid SAE J 1703 NHTSA 116 DOT 4, ISO 4925

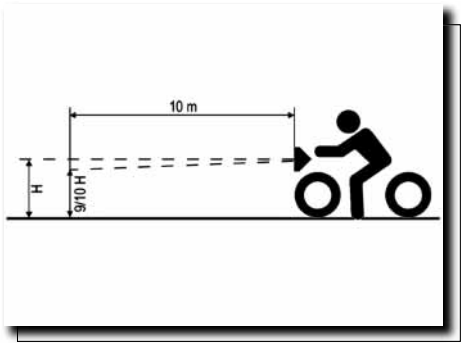
# MANTENIMIENTO PERIÓDICO

## HEADLIGHT ADJUSTMENT


**Proceed as follows:**

1. Position the vehicle in riding conditions, and with the tyres inflated at the prescribed pressure, on a horizontal surface 10m away from a half-lit white screen, ensuring the vertical axis of the vehicle is perpendicular to the screen;

2. Turn on the headlight and check the distance between the ground and the horizontal line which separates the lit area from the dark region, is no more than 9/10 and not less than 7/10 of the height of the headlight, measured from the ground;




3. If this is not the case, adjust the headlight via screw «A», which may be reached by removing the front grid.

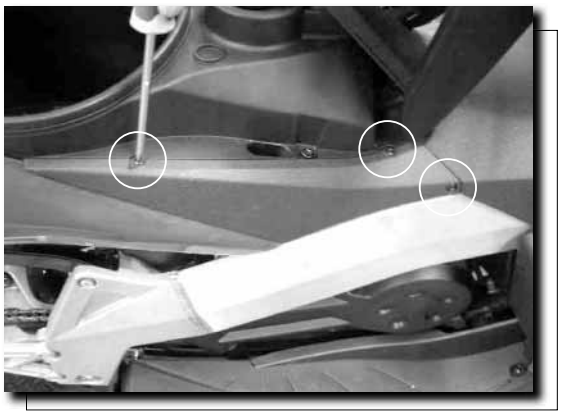
**WARNING**
THE PROCEDURE DESCRIBED ABOVE COMPLIES WITH THE "EURONORM" CONCERNING THE MAX. AND MIN. HEIGHT OF THE LIGHT BEAM OF A ROAD VEHICLE. PLEASE CHECK WITH THE LOCAL AUTHORITIES FOR WHAT REQUIREMENTS MUST BE FULFILLED IN EVERY SINGLE COUNTRY WHERE THE VEHICLE IS TO BE USED.

# DISMANTLING

## 1. SEAT SIDE TRIM

• Extract the 3 securing screws (2 Philips 3.6x14 self-tappers and one 5x16 Allen M3) from each cover.

***Time taken:***
4 Minutes



## 2. COWLING

• Extract the 6 screws (5x12 Allen M3) from under the cowling.

***Time taken:***
15 Minutes

• Extract the 8 top screws (Philips 3.6x14 self-tappers with washer) and the 2 side screws (Philips 6x16 with washer).

• Pull the cowling backwards slightly to access the turn indicator connections and disconnect them.

• Extract the cowling backwards.

**N.B.**
TO REPLACE THE PILOT LIGHTS IT IS ONLY NECESSARY TO EXTRACT THE TWO PILOT LIGHT SCREWS.

# DISMANTLING

## 3. LOWER COWLING COVER

• Extract the 2 securing screws (Philips 6x16 with washer)

***Time taken:***
17 Minutes

**N.B.**
TO CONTINUE WITH THE HELMET HOLDER WE NEED TO CONTINUE DISMANTLING THE FRONT PART, SINCE THE PETROL TANK FRONT BREATHER PIPE PASSES THROUGH THE HELMET HOLDER.

## 4. WATER-OIL TANK COVER

• Extract the 2 top screws (Philips 5x12).

***Time taken:***
19 Minutes

## 5. SIDE COVERS

• Pull them gently backwards.

***Time taken:***
20 Minutes

# DISMANTLING

## 6. SHIELD INNER COVER

• Extract the 2 screws (5x12 Allen M3).

• Extract the 3 top screws (2 Philips 3.6x14 self-tappers and one6x16 Allen screw with washer).

***Time taken:***
23 Minutes

## 7. PETROL TANK COVER

• Extract the bottom covers (left and right), by removing the 6 screws (Philips 5x16 with washer) and the two air inputs, 3 screws (1 Philips 3x10 self-tapper, 1 Philips 3.6x10 self-tapper and 1 Philips 5x16), as there are 2 screws (Philips 6x16 with washer) that are inaccessible without carrying out this step.

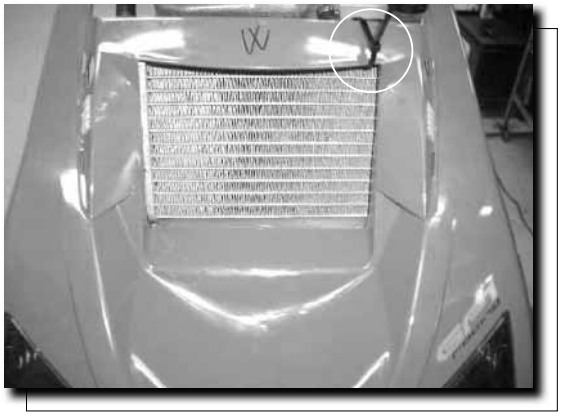
***Time taken:***
27 Minutes

# DISMANTLING

• After extracting the 6 side screws and the central one (Allen M3 5x12) from the tank cover, lift the front of this removing the 2 lugs, and then remove the back part as in the image.

*Time taken:*
35 Minutes

**ATTENTIÓN**
TO PREVENT THE SHIELD FROM DROPPING, THE USE OF A UNEX CLAMP OR SIMILAR IS RECOMMENDED.



## 8. HELMET CARRIER

• Remove the battery and cables.

• Extract the 6 securing screws (2 Philips 8x45, 2 Philips 6x19 with washer and 2 8x25 bolts), the petrol tank cover, the breather pipe and the seat opening cable.

*Time taken:*
47 Minutes

# DISMANTLING

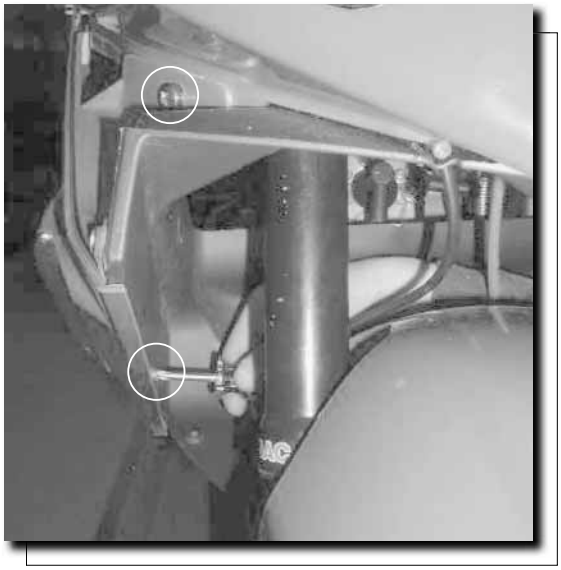
## 9. FOOTRESTS

• Remove the 5 securing screws (2 Philips 6x16 with large washer, 2 Philips 6x16 with small washer and 1 Philips 4.8x25 self-tapper), and the one joining the two fairings.

***Time taken:***
53 Minutes

## 10. SIDE COVERS

• Remove the 2 securing screws (1 Philips 6x16 with l washer and 1 Philips 3.6x10 self-tapper), and the turn indicator wire.



***Time taken:***
60 Minutes

## 11. SHIELD

• Remove the helmet carrier.

• Extract the securing screw (Philips 6x16 with washer).

***Time taken:***
64 Minutes

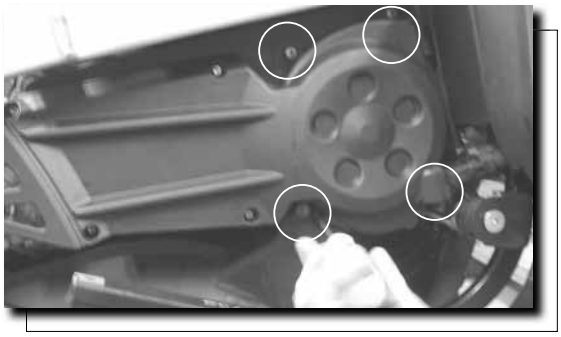
**N.B.**
CUT THE CLAMP USED TO HOLD THE SHIELD.

# DIRECT ACCESS TO THE BOTTOM OF THE CARBURETTOR

## 1. DISMANTLING FOOTRESTS
• See step 9 of the dismantling guide.

## 2. EXTRACTING COMPLETE FILTER BOX
• Extract the 4 (front ) ALLEN Ø 5 screws.

• Extract Ø 6 screw (top rear) with back nut.



## 3. DISCONNECT THE SECONDARY AIR PIPE.

## 4. EXTRACT CARBURETTOR AIR INLET PIPE
• Cut the pipe flange (accessing as in the image).

**N.B.**
TO FIT, IT IS RECOMMENDED LEAVING THE CLAMP UNTIGHTENED IN POSITION ON THE FILTER BOX TO CARBURETTOR AIR PIPE

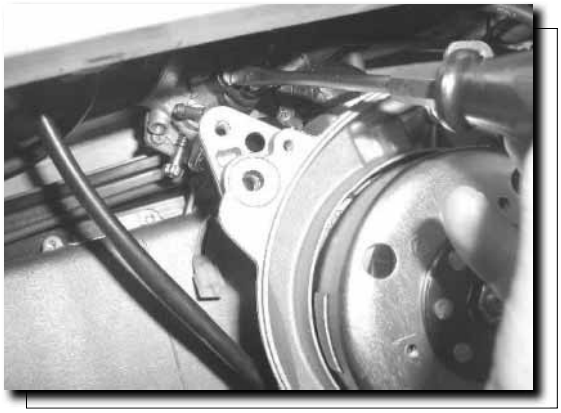
# DIRECT ACCESS TO THE BOTTOM OF THE CARBURETTOR

**5.** Remove the water pipe to the carburettor from the supporting tab and pull out the filter, starting at the rear.

## 6 EXTRACT CARBURETTOR

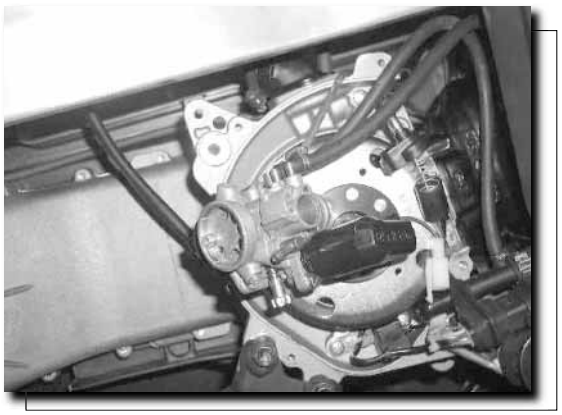
• Loosen the clamp using a ratchet-type tool.

• Disconnect the choke cable, petrol pipe and air inlet pipe from the carburettor. Next, turn it and extract the top cover.



# DIRECT ACCESS TO THE BOTTOM OF THE CARBURETTOR

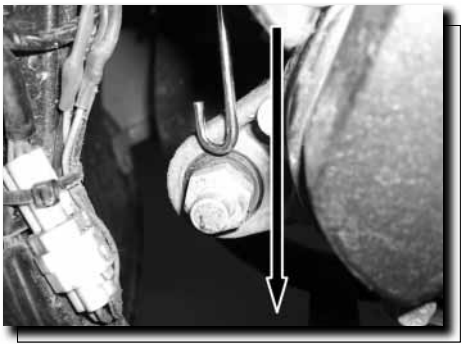
• Extract the carburettor to gain access to all its parts.



**N.B.**
FIT IN REVERSE ORDER, TAKING SPECIAL CARE WITH THE WIRING (PETROL, OIL, WATER).

# ENGINE

## DISMANTLING THE MACHINE'S ENGINE



**1) Disconnect the battery.**

**2) Completely remove the exhaust pipe.**

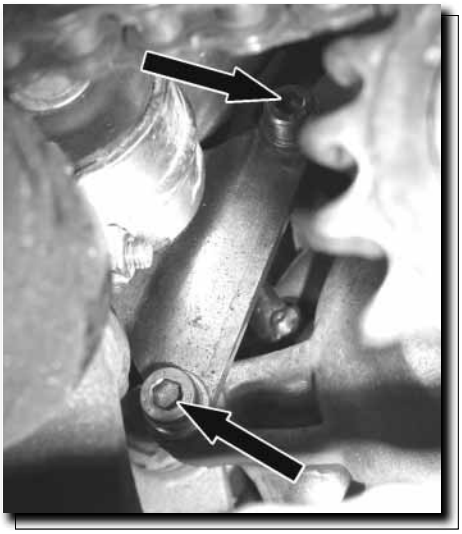
**3) Remove the rear wheel.**

**4) Disconnect the electrical wiring from the magneto.**

**5) Disconnect the throttle and mixer activating transmissions.**

**6) Disconnect the oil pipes from the mixer, the carburettor and the pump depression control on the carburettor.**

**7) Disconnect the H.T. cable from the spark plug.**



**8) Remove the spring from the left hand front part of the Silent bloc.**

**9) Remove the Allen bolt from the right hand front part of the Silent bloc.**

**10) Remove the two bolts and corresponding nuts securing the rear of the engine.**

## AUTOMATIC TRANSMISSION

- Lossen the 15 screws and remove the transmission cover with the aid of a mallet.

**N.B.**
THE CRANKCASE IS RESTRAINED BY THE TIGHT FITTING BETWEEN THE SHAFT OF THE DRIVEN HALF-PULLEY AND THE BEARING HOUSED ONTO THE CRANKCASE.

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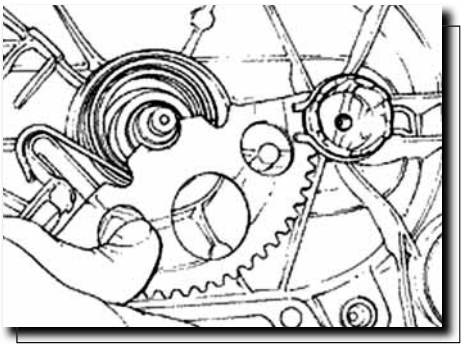
**Meters**
Lithium soap grease, NLGI 33

- Remove the split ring positioned on the external side of the transmission cover.

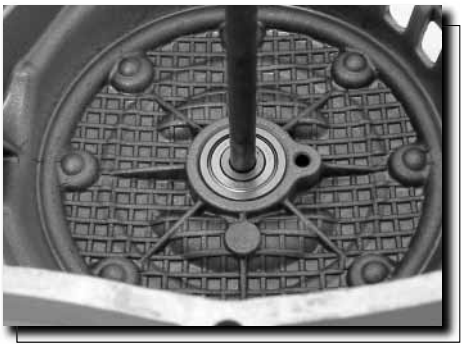
- Remove the drive gear from its housing, de- creasing the tension that the toothed segment applies via the spring; to do so, it is necessary to slightly rotate the toothed segment (see figure).



**CAUTION**
WHEN REMOVING THE GEAR, PAY PARTICULAR ATTENSION TO THE LOADING OF THE SPRING AS THIS MAY BE DANGEROUS FOR THE OPERATOR.

## REMOVING THE DRIVEN PULLEY SHAFT BEARING

- Slightly heat the crankcase on the inside to avoid damaging the painted surface. Remove the bearing using the driven pulley shaft or a pin of the same diameter.



**N.B.**
IF THIS IS DIFFICULT A GENERIC 8 MM EXTRACTOR FOR INNER PARTS CAN BE USED.

## REFITTING THE DRIVEN PULLEY SHAFT BEARING

- After slightly heating the crankcase on the inside, fit the bearing using a bush of the same diameter as the bearing outer race.

**N.B.**
WHEN REFITTING, ALWAYS REPLACE THE BEARING WITH A NEW ONE.

**CAUTION**
WHEN REMOVING/REFITTING THE BEARING, TAKE CARE NOT TO DAMAGE THE PAINTED SURFACE.

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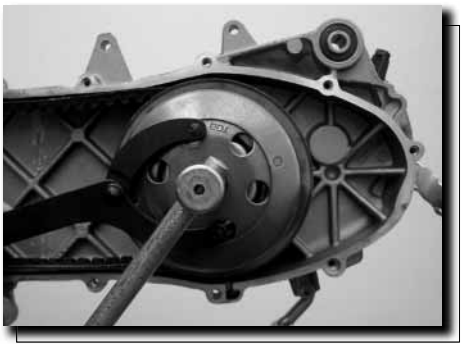
## REMOVING THE DRIVEN PULLEY



- Lock the clutch bell housing with the specific tool.

- Remove the nut, the clutch bell housing and the whole of the driven pulley assembly.

**N.B.**
THE ASSEMBLY CAN ALSO BE REMOVED WITH THE DRIVE PULLEY IN PLACE.

**Specific tooling**
020565Y Compass flywheel stop spanner

## INSPECTING THE CLUTCH DRUM

- To verify that the bell clutch is not usurata or damaged.

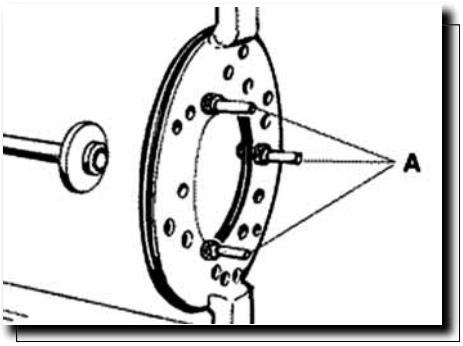
- To measure the inner diameter of the bell clutch.

**Characteristic**
**Clutch bell diameter/standard value**
0107+0,2 +0 mm

**Clutch bell diameter/max, value allowed after use**
0 107,5 mm

**Found eccentricity /max.**
0,20 mm

## REMOVING THE CLUTCH




- Fit the tool with the long pins screwed on from the outside in positions «A». Insert the driven pulley assembly into the tool and tighten the central screw.

**CAUTION**
OVERTIGHTENING OF THE CENTRAL SCREW CAUSES THE DISTORTION OF THE TOOL.

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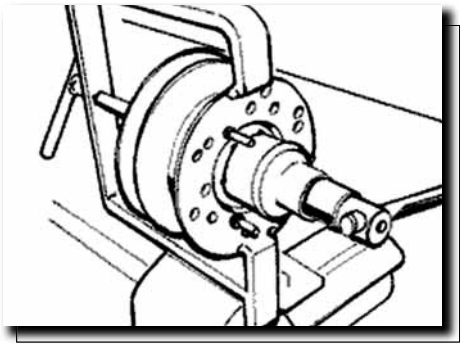
- Using a 34 mm socket wrench, remove the clutch locknut.

- Loosen the central screw, unloading the spring of the driven pulley assembly.

- Separate the components.



**Specific tooling**
020444Y Driven half pulley spring compressor tool

## INSPECTING THE CLUTCH

- Check the thickness of the clutch mass friction material.

- The masses must exhibit no traces of lubricants; in that case, check the driven pulley unit seals.

**N.B.**
UPON RUNNING-IN, THE MASSES MUST EXHIBIT A CENTRAL CONTACT SURFACE AND MUST NOT BE DIFFERENT FROM ONE ANOTHER.
DIFFERENT CONDITIONS MAY CAUSE THE CLUTCH TEARING.

**CAUTION**
DO NOT OPEN THE MASSES USING TOOLS TO PREVENT A VARIATION IN THE RETURN SPRING LOAD.

**Characteristic**
Check. Minimum thickness 1mm

## PIN RETAINING COLLAR

- Remove the collar with the aid of two screw drivers.

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- Remove the three guide pins and the movable half pulley.

## REMOVING THE DRIVEN HALF-PULLEY BEARING

- Remove the roller bearing using the specific extractor inserted from the lower side of the stationary half pulley

**CAUTION**
POSITION THE SEALING EDGE OF THE EXTRACTION PLIERS BETWEEN THE END OF THE BEARING AND THE BUILT-IN SEAL RING.

**Specific tooling**
001467y029 Bell

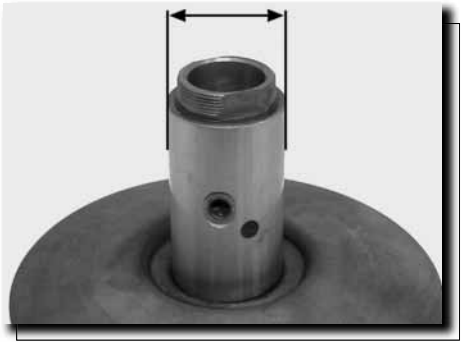
- Remove the snap ring from the roller bearing.

- Remove the roller bearing from the side of the clutch using the specific device.

**N.B.**
ADEQUATELY SUPPORT THE HALF PULLEY TO PREVENT THE DRIVE BELT SLIDING SURFACE FROM BEING DISTORTED.

**Specific tooling**
020376Y Handle for punches
020363Y 20mm guide

## INSPECTING THE DRIVEN FIXED HALF-PULLEY



- Make sure there are no signs of wear on the work surface of the belts, if there are replace the half pulley.

- Make sure the bearing do not show signs of unusual wear.

- Measure the external diameter of the pulley bushing.

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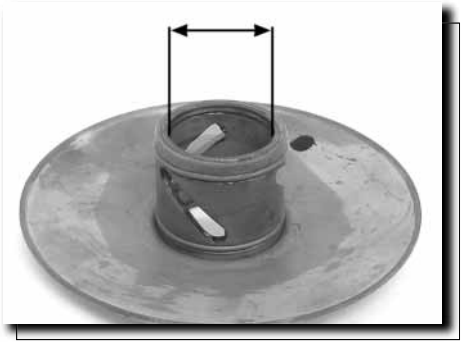
**Characteristic**
**Standard diameter**
0 33,965 ÷ 33,985 mm

**Stationary driven half pulley/ Minimum diameter allowed after use**
0 33,96 mm

## INSPECTING THE DRIVEN SLIDING HALF-PULLEY



- Remove the two inner seal rings and the two 0-rings.

- Measure the inside diameter of the movable half pulley bushing.

**Characteristic**
**Maximum allowable diameter**
0 34,08 mm

- Check the belt contact surfaces.

- Insert the new oil guards and 0-rings on the mobile half pulley.

- Assemble the half pulley on the bushing.

**Recommended products**
Molybdenum disulphide grease and lithium soap

- Make sure the pins and collar are not worn, reassemble the pins and collar.

- Use a.greaser with a curved spout to lubricate the driven pulley unit with around 6 gr. of grease, this operation must be carried out through one of the holes inside the bushing until grease comes out of the opposite hole. This operation is necessary to avoid the presence of grease beyond the 0-rings.

**Recommended products**
Molybdenum disulphide grease and lithium soap

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## REFITTING THE DRIVEN HALF-PULLEY BEARING

- Fit a new ball bearing with the specific tools.

- Fit the ball bearing circlip.

- Fit the new roller bearing so that the lettering is visible from the outside.

**CAUTION**
ADEQUATELY SUPPORT THE HALF PULLEY TO AVOID DAMAGING THE THREADED END WHILE FITTING THE BEARINGS.

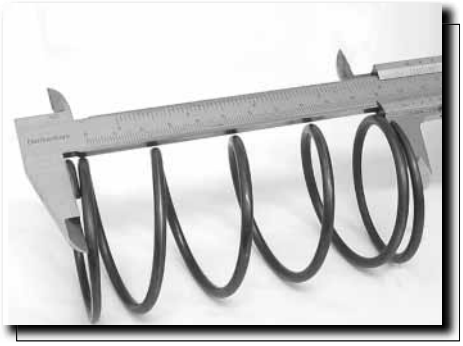
**Specific tooling**

020376Y Handle for punches
020456Y 24 mm adaptor
020362Y 12 mm guide
020171Y Roller bearing drift

## INSPECTING THE CLUTCH SPRING

- Make sure that the driven pulley contrast spring is not deformed.

- Minimum length allowed after use



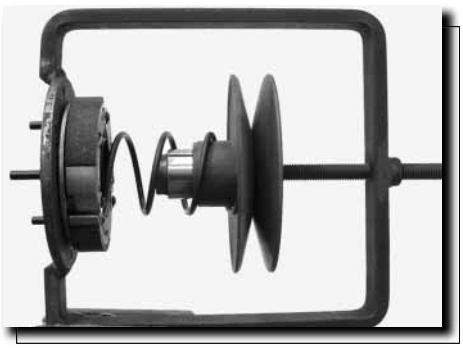
**Characteristic**
**Standard length**
118 mm

## REFITTING THE CLUTCH

- Preassemble the driven pulley unit with spring, sheathing and clutch.

- Position the spring with the plastic shielding supporting the clutch

- Insert the parts in the device and preload the spring, being careful not to damage the plastic sheathing and the end of the threaded shank.



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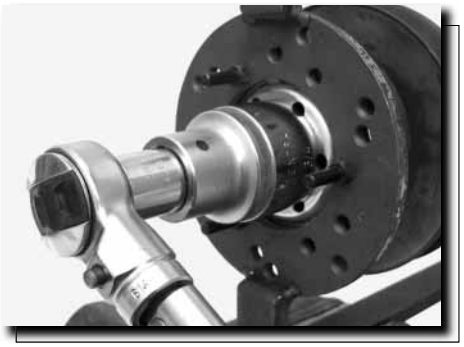
- Reassemble the nut securing the clutch and tighten to the prescribed torque.



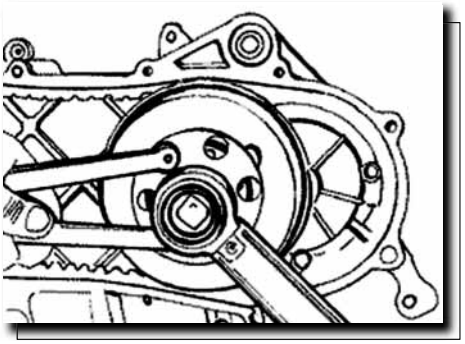
**CAUTION**
TO AVOID DAMAGING THE CLUTCH NUT, USE A SOCKET WRENCH WITH A SMALL BEVEL.

**CAUTION**
POSITION THE UNBEVELLED SURFACE OF THE NUT IN CONTACT WITH THE CLUTCH.

**Locking torques (N*m)**
Nut locking clutch assembly on pulley 55 - 60 Nm

## REFITTING THE DRIVEN PULLEY

- Fit the driven pulley assembly, the clutch bell housing and the nut using the specific tool.



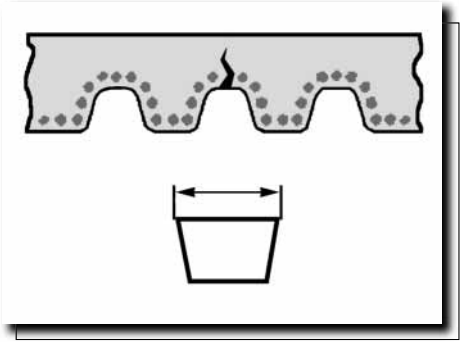
**Specific tooling**
020565Y Compass flywheel stop spanner

**Locking torques (N*m)**
Driven pulley shaft nut 40 — 44 Nm

## DRIVE-BELT

- Make sure the transmission belt is not damaged and does not have cracks in the toothed grooves.

- Check the width of the belt.



**Characteristic**
transmission bell/Minimum width
17,5mm

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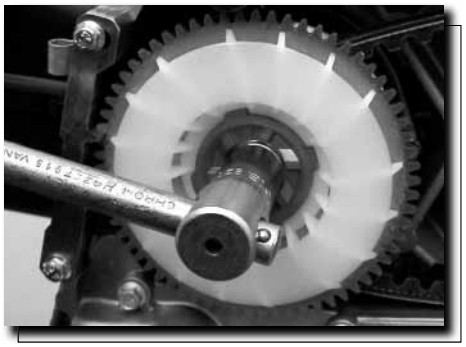
## REMOVING THE DRIVING PULLEY



- Lock the pulley with the specific tool.

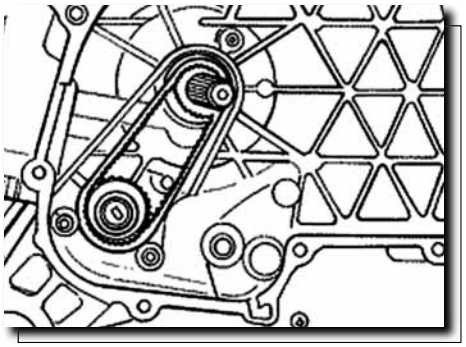
- Remove the central nut with the related washer, then remove the drive and the plastic fan.

- Remove the fixed half pulley.

- Remove the belt, washer and remove the mobile half pulley with its bushing, being careful of the rollers and contrast plate fitted loosely on it.

**Specific tooling**
020451y Drive pulley stop spanner

## MIXER GEARS AND BELT



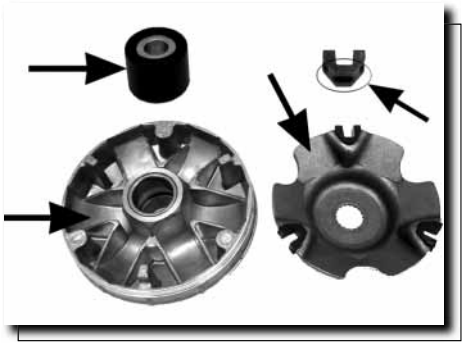
- Remove belt and gear

**CAUTION**
DO NOT TWIST OR BEND THE BELT WHEN REFITTING IT

**CAUTION**
BEFORE REFITTING THE BELT, CAREFULLY LUBRICATE THE PIN AND THE MIXER DRIVE GEAR BUSHING WITH OIL, MAKING SURE THIS IS FREE FROM ANY LOAD.

**N.B.**
REPLACE THE BELT EVERY 20,000 KM.

## INSPECTING THE ROLLERS CASE



**1)** Make sure that the bushing and sliding rings on the mobile pulley are not lined or deformed.

**2)** Check the track where the rollers slide on the contact pulley, there should not be any signs of wear and check the conditions of the belt contact surfaces on the half pulleys (mobile and stationary).

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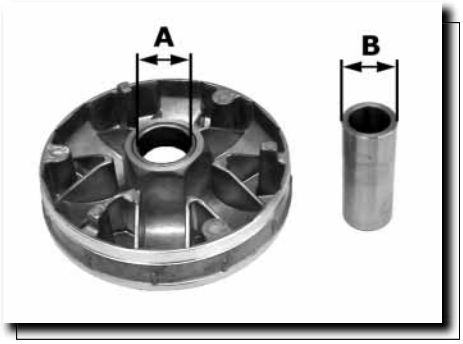
**3)** Make sure that the rollers do not have marked facing on the sliding surfaces and that the metal insert does not protrude from the edges of the plastic cover.

**4)** Make sure that the contact plate sliding blocks are intact.




- Check that the internal bronze bushing shown in the figure is not abnormally worn and measure inside diameter «A».

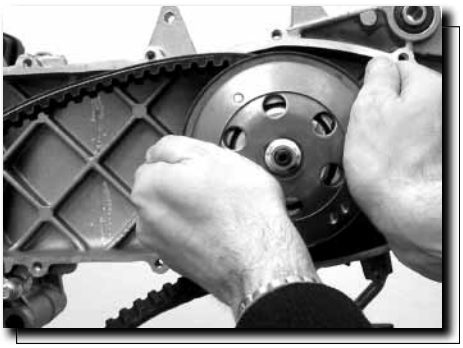
- Measure outside diameter «B» of the pulley sliding bushing shown in the figure.

**CAUTION**
DO NOT LUBRICATE OR CLEAN THE BRONZE BUSHING.

**Characteristic**
Maximum allowable diameter:
20,12 mm

Standard diameter:
20,021 mm

## REFITTING THE DRIVING PULLEY



- Manually move the mobile driven pulley by pulling it towards the clutch unit and insert the belt keeping the rotation direction of the first assembly.

**N.B.**
IT IS ALWAYS A GOOD IDEA TO FIT THE BELT SO THAT THE WORDS ARE LEGIBLE IN CASE THE BELT DOES NOT SHOW AN ASSEMBLY DIRECTION.

- Reassemble the unit parts (roller housing unit with bushing, washer, stationary half pulley, belt cooling fan with intake, washer and nut).

Tighten the nut to a torque of 20 Nm and then finally tighten 90° with the specific tool preventing rotation of the drive pulley.

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**N.B.**
REPLACE THE NUT WITH A NEW ONE EVERY TIME THE PARTS ARE REASSEMBLED

**ATENCIÓN**
IT IS VERY IMPORTANT THAT WHEN THE DRIVE PULLEY IS SECURED THAT THE BELT IS FREE INSIDE IT, TO AVOID INCORRECTLY TIGHTENING IT WITH LATER DAMAGE TO THE ENGINE SHAFT MM SCALE.

**Specific tooling**
020451 y Drive pulley stop spanner

**Locking torques (N*m)**
Tightening torque plus angle 18÷20 + 90° N.m

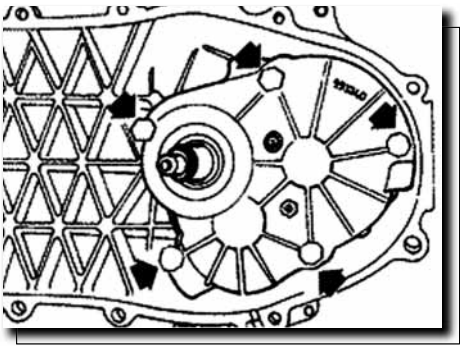
## DISMANTLING ENGINE PINION

- Loosen: Change output engine pinion bush M16x125.

**Specific tool**
00G05300131

**Tightening torques (N.m)**
Change output pinion bush securing device 115 ÷ 125 N.m

## REMOVING THE HUB COVER



- Remove the transmission cover.
- Remove the Driven pulley removal
- Discharge the rear hub oil.
- Remove the 5 screws indicated in the figure.
- Remve the hub cover with pulley shaft.

**See also**
Refitting the clutch

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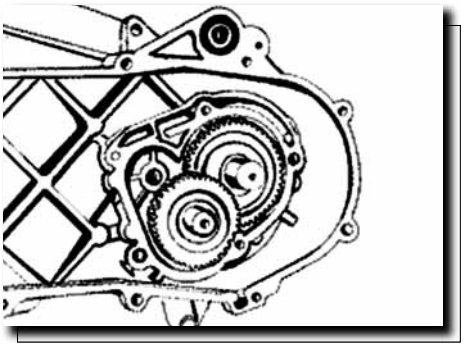
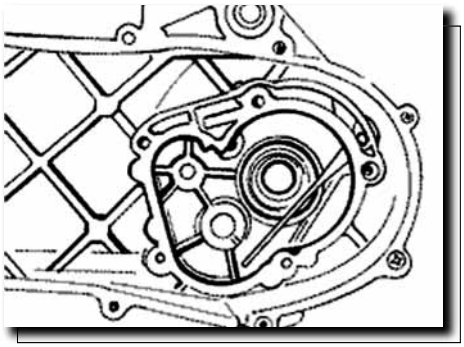
## DISMANTLING OUTPUT PINION SHAFT



- Remove the intermediate gearing and the output pinion shaft.

- While removing the idler gear, pay attention to the related shoulders.

## DISMANTLING OUTPUT PINION SHAFT BEARING



- Remove the oil seal and the seeger ring.

- Remove the bearing by pushing it with the specially designed drift from the outside towards the inside of the gear compartment.

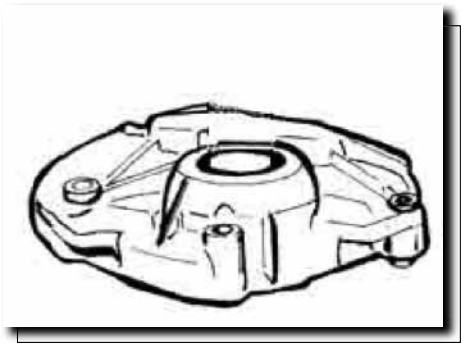
**Specific tooling**

020363Y 20mm guide

020376Y Handle for punches

020358y 37x40 adaptor

## REMOVING THE DRIVEN PULLEY SHAFT BEARING



- Remove the seeger ring from inside the cover.

- Remove the oil seal from the outside.

- Remove the two dowel bolts and place the cover on a horizontal surface.

- Position the specific tool on the inner race of the bearing and expel the bearing with the aid of a press.

**Specific tooling**

020452y Driven pulley shaft fitting/removing tube

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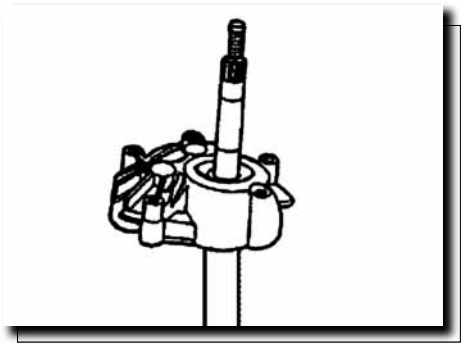
- Position the specific tube on the inner race of the bearing and on the pulley shaft teeth side as shown in the figure. Expel the driven pulley shaft with the aid of a press.

**Specific tooling**
020452y Driven pulley shaft fitting/removing tube



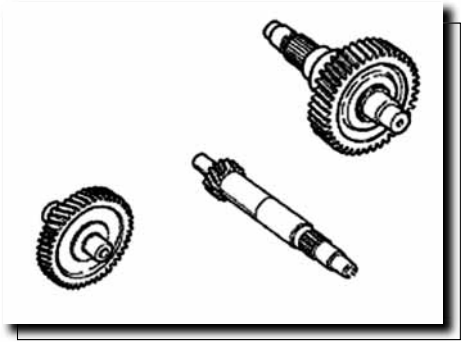
## INSPECTING THE HUB SHAFT

- Check the three shafts for wear or distortion of the toothed surfaces, the bearing housings and the oil seal housings.

- Replace any damaged parts.

- Check that the mating surface is not dented or distorted.

- If any anomalies are found, replace the hub cover.



## INSPECTING THE HUB COVER

- Make sure the coupling surface is not dented or deformed.

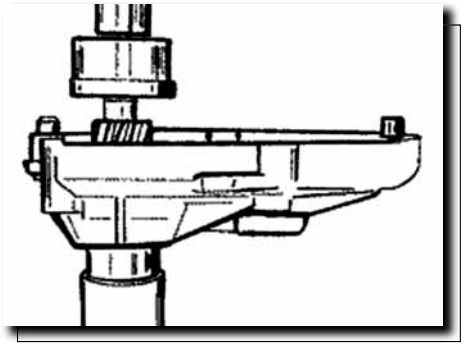
- If faults are discovered replace the hub cover.

## REFITTING THE DRIVEN PULLEY SHAFT BEARING

- Using the specific tool under the press, support the inner race of the bearing on the outside of the hub cover. Fit the driven pulley shaft.

- Fit the oil seal so it is flush with the cover,

**Specific tooling**
020452y Driven pulley shaft fitting/removing tube



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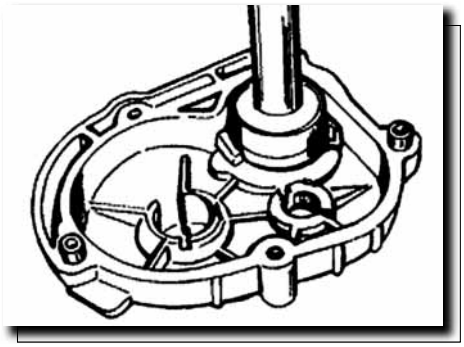
- Heat the hub cover and insert the bearing using the specific punch.

- Fit the elastic ring with the concave part on then bearing side.



**N.B.**
FIT THE BALL BEARING WITH THE SHIELD FACING THE OIL SEAL.

**Specific tooling**

020151Y Air heater

020376Y Handle for punches

020439Y 17mmguide

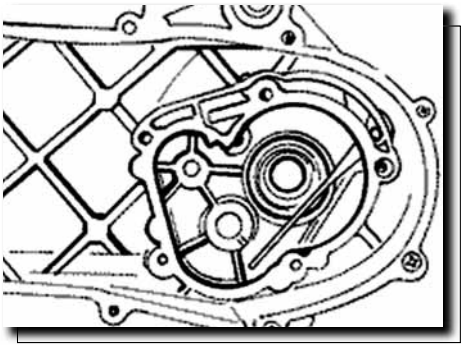
020358y 37 x40 adaptor

## REFITTING THE WHEEL AXLE BEARING

- Heat the crankcase on the clutch side with the thermal gun

- After lubricating the bearing outer plate, fit the bearing using the specially designed adaptor with the aid of a hammer.

- Fit the seeger ring and the oil ring using the 42x47 adaptor and the handle.



**Specific tooling**

020151Y Air heater

020376Y Handle for punches

020363Y 20mm guide

020359Y 42 x 47 mm hub bearing fitting adaptor

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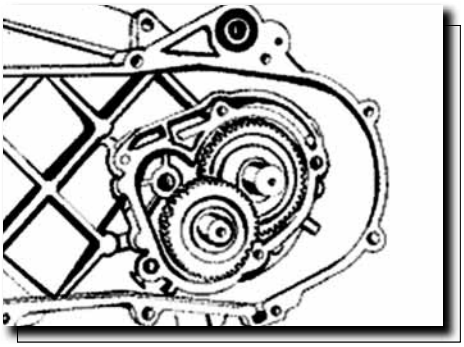
### REFITTING THE UB COVER

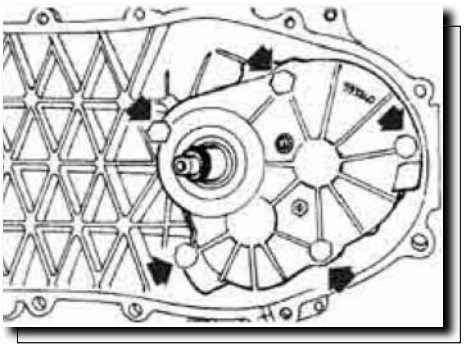
- Refit the wheel, axle assembly.

- Refit the intermediate gear paying attention to the two shim washers.

- Apply LOCTITE 510 on the hub cover and refit it with driven pulley shaft.

- Refit the 5 screws arid tighten to the, prescribed





**N.B.**
BEFORE FITTING A NEW GASKET, REMOVE ANY RESIDUES OF THE OLD GASKET FROM THE MATING SURFACE OF THE HUB COVER AND THE CRANKCASE HALF.

**Locking torques (N*m)**
Tightening torque: 11÷13 N-m

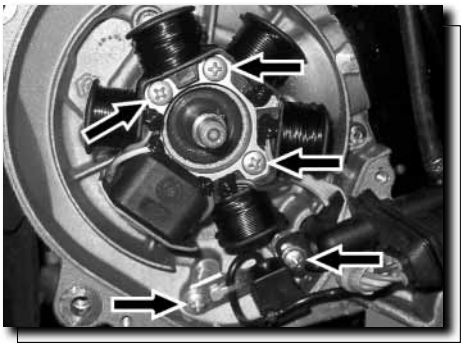
## FLYWHEEL COVER

### REMOVING THE STATOR

- Remove the stator 3 implantations indicated in photo

- Remove the pick-up 2 implantations indicates in photo

- Remove the stator complete with wiring



### REFITTING THE STATOR

- Refit stator and flywheel following the removal operations in reverse and tightening all fasteners to the prescribed torque.

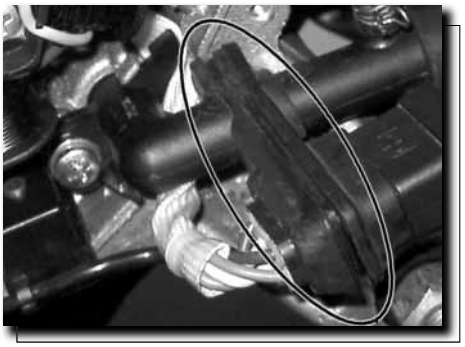
**CAUTION**
RUN THE STATOR WIRING THROUGH THE SPECIAL FAIRLEAD ON THE CRANKCASE AND ENSURE IT REMAINS CONSTRAINED TO THE COOLANT INLET HOSE.

**Locking torques (N*m)**
Pick-up screws 3÷4 Stator screws 3÷4

# ENGINE

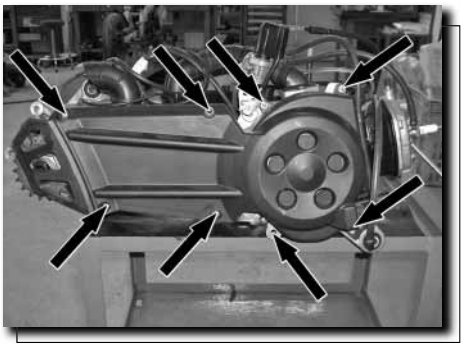
### REFITTING THE FLYWHEEL COVER

- Fit the rubber seal on the flywheel connector and around the inlet coolant hose.



- Keeping the flywheel connector rubber clamp on the coolant inlet hose, refit the flywheel cover paying attention in inserting the strap in the groove.

- Tighten the 8 fixing screws.



## FLYWHEEL AND STARTING

### REMOVING THE STARTER MOTOR

- Remove the fixings shown in the picture.

### REMOVING THE FLYWHEEL MAGNETO

- Lock the flywheel using the compass spanner.

- Remove the nut.

**CAUTION**
USING A COMPASS SPANNER OTHER THAN THE ONE PROVIDED CAN DAMAGE THE STATOR COILS.

# ENGINE

- Extract the flywheel with the specially designed extractor.

**Specific tooling**
020565Y Compass flywheel stop spanner

020162y Flywheel extractor

## INSPECTING THE FLYWHEEL COMPONENTS

- Check the flywheel for any distortion that might cause rubbing on the stator and the pick-up.

## REFITTING THE FLYWHEEL MAGNETO

- Fit the flywheel taking care to properly insert the key.

- Tighten the flywheel locknut with the prescribed torque.

- Check that the pick-up air gap is 0.5 - 0.6 mm No adjustment of the air gap is necessary when fitting the pick-up.

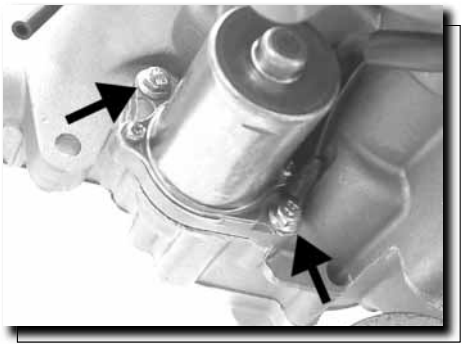
- A different air gap denotes distortion of the pickup support.

**N.B.**
A CHANGE IN THE AIR GAP MAY ALTER THE SPARK ADVANCE AND CAUSE KNOCKING, ETC.

**Locking torques (N*m)**
Flywheel nut 40-44 N.m

# ENGINE

## REFITTING THE STARTER MOTOR



- Fit a new 0-ring on the starter motor and lubricate it.

- Install the starter motor on the crankcase and tighten the two screws with the prescribed torque.

**N.B.**
FIT THE REMAINING PARTS AS DESCRIBED IN THE CHAPTERS CYLINDER, CYLINDER HEAD, VALVE GEAR, LUBRICATION, FLYWHEEL AND TRANSMISSION.

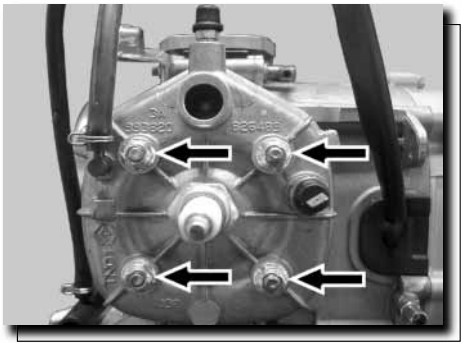
**Locking torques (N*m)**
Starter motor screws 11÷13

## CYLINDER ASSY. AND TIMING SYSTEM

## REMOVING THE INTAKE MANIFOLD

Using the TORX spanner, remove the 2 intake manifold fixing screws

## REMOVING THE CYLINDER HEAD

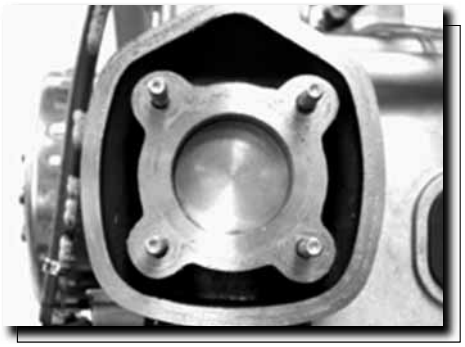


Remove the four nuts shown in the picture.

# ENGINE

## REMOVING THE CYLINDER - PISTON ASSY

- Carefully remove the cylinder.

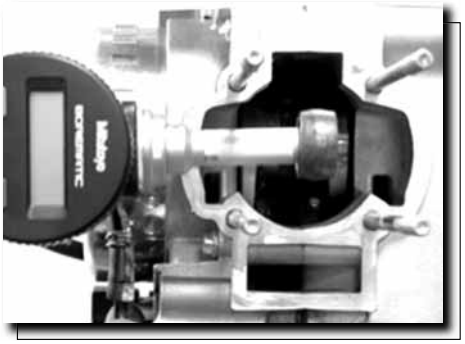


- Remove the split rings and the wrist pin.

**CAUTION**
ALWAYS REPLACE THE WRIST PIN SPLIT RINGS WITH NEW ONES

## INSPECTING THE SMALL END

- Using an inside micrometer, measure the small end diameter



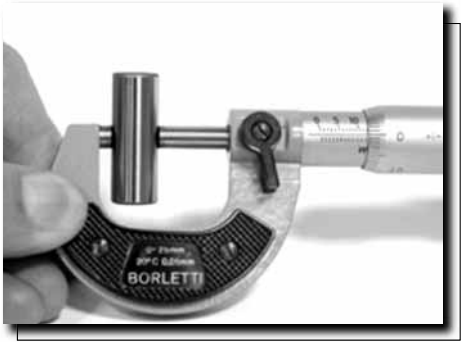
**N.B.**
IF THE SMALL END DIAMETER EXCEEDS THE MAXIMUM ALLOWABLE VALUE, OR IF IT SHOWS SIGNS OF WEAR OR OVERHEATING, PROCEED TO REPLACE THE CRANKSHAFT AS DESCRIBED IN THE CHAPTER "CRANKCASE AND CRANKSHAFT".

**Characteristic**
Standard diameter
17+0,011-0,001

Max. allowable diameter
17,060

## INSPECTING THE WRIST PIN

- Check the wrist pin external diameter using a micrometer.




**Characteristic**
Wrist pin: standard diameter
12 +0,005+0,001 mm

# ENGINE

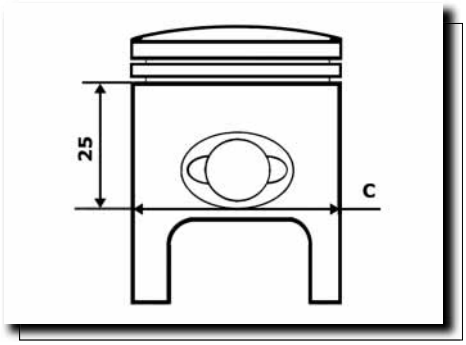
## INSPECTING THE PISTON

- Using a suitable instrument measure the piston diameter.

- Evaluate the piston-wrist pin fitting clearance.

**Characteristic**
**Wrist pin housing: standard diameter**
12+0,007+0,012

**Wrist pin housing: standard tolerance**
0,002-0,011 mm



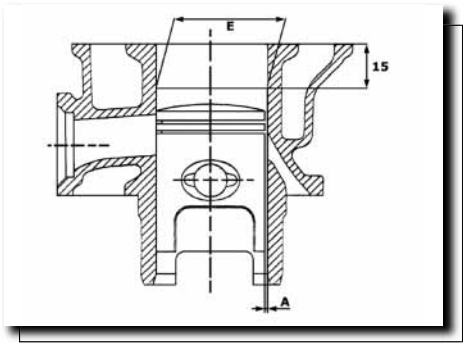

- Measure the external diameter of the piston according to a direction orthogonal to the pin axis.

- Carry out the measurement at the location shown in the figure.

- To classify the cylinder-piston mating, check the appropriate table.

**See also**
Cylinder - piston assy.

## INSPECTING THE CYLINDER




- Check the cylinder does not show signs of seizures. If it does proceed by replacing it or performing a grinding operation befitting the available oversize pistons.

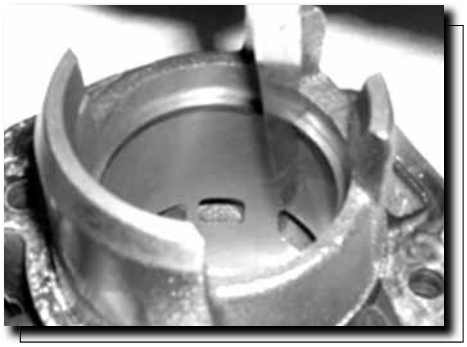
- Using an appropriate device, measure the internal cylinder diameter in the directions shown in the figure.

- Check the mating surface with the head is free from wear or deformations To classify the cylinder-piston mating, check the appropriate table.

**See also**
Cylinder - piston assy.

# ENGINE

## Inspecting the piston rings



- Alternatively insert the two piston rings inside the cylinder.

- Insert the piston rings in the direction orthogonal to the cylinder axis, using the piston to push them through.

- Measure the rings gap using a feeler gauge as shown in the picture.

- If the measured values exceed those shown inthe table, proceed by replacing the rings.

## Removing the piston

- Position the piston ring inside part 1 with its opening coinciding with the arrow shown on the tool.

- Push part 2 through part 1 as far as it will go and hence extract part 2.

- Insert part 3 inside part 1, position the assembly in the piston ring housing and push part 3 home.

**N.B.**
REFIT THE REMAINING COMPONENTS FOLLOWING THE OPERATIONS FOR THEIR REMOVAL IN THE REVERSE ORDER.

**Specific tooling**
020166y Piston rings fixing tool

**Locking torques (N*m)**
Cylinder head lock nuts 10-11 N-m

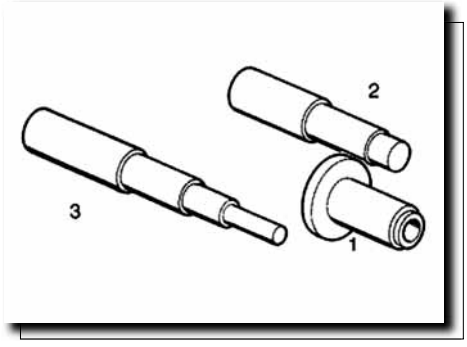
- Use new split rings for the wrist pin.

- Replace the cylinder base gasket with a new one.

- Before proceeding with the reassembly carefully clean all surfaces.

- Lubricate components with two-stroke oil when refitting piston and cylinder.

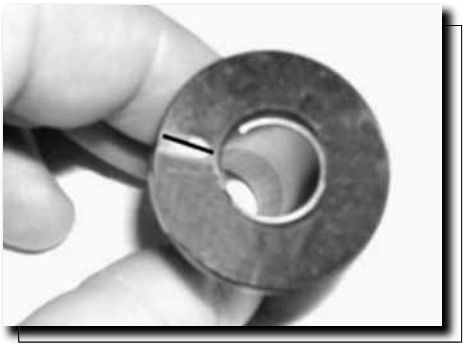
**CAUTION**
POSITION THE ARROW STAMPED ON THE TOP OF THE PISTON TOWARDS THE EXHAUST PORT. THE WRIST PIN SPLIT RINGS MUST BE POSITIONED ON THE PISTON USING THE SPECIAL TOOL.

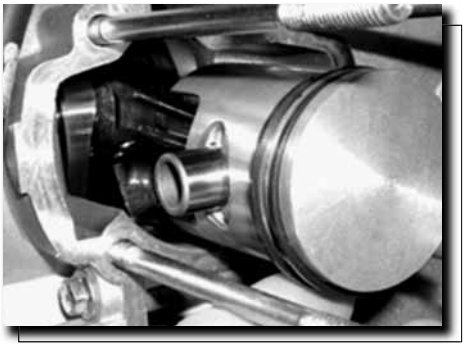


# ENGINE

**Recommended products**
Selenia Hi Scooter 2 Tech Oil

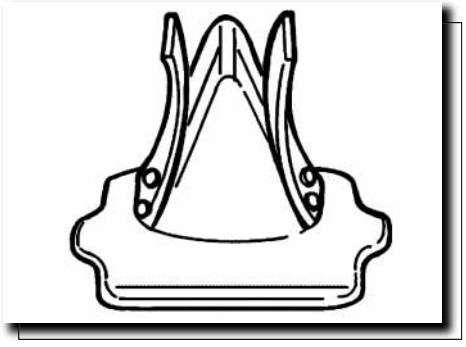
Recommended oil





## INSPECTING THE TIMING SYSTEM COMPONENTS

**CAUTION**
CHECK THE LEAK TIGHTNESS OF THE REED VALVE ASSY.; NO LIGHT BE VISIBLE BETWEEN VALVE AND HOUSING.

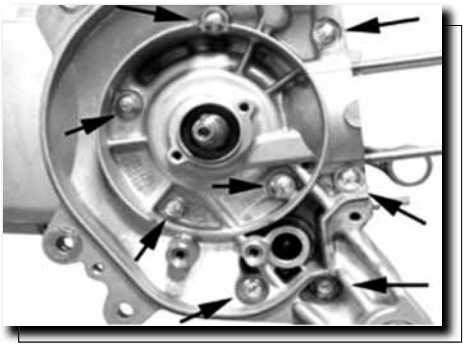


# ENGINE

## CRANKCASE - CRANKSHAFT

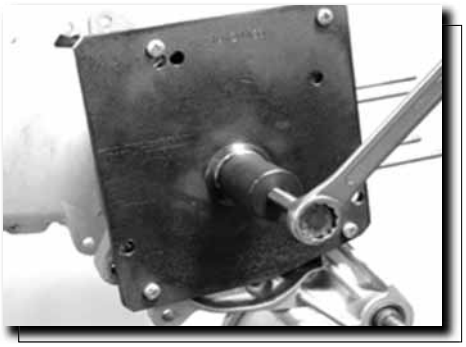
### Splitting the crankcase halves

Remove the eight crankcase fasteners.



Install the special plate on the flywheel-side half crankcase and proceed by splitting the two halves.

**Specific tooling**
020163y Crankcase splitting plate

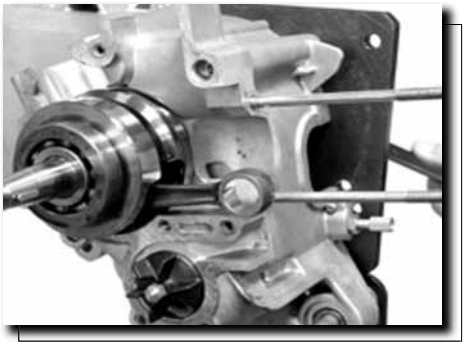


### Removing the crankshaft

- Install the special tool onto the transmission-side half-crankcase using four M6 screws of adequate length.

- Remove the crankshaft from the transmission side half-crankcase.

**Specific tooling**
020163y Crankcase splitting plate

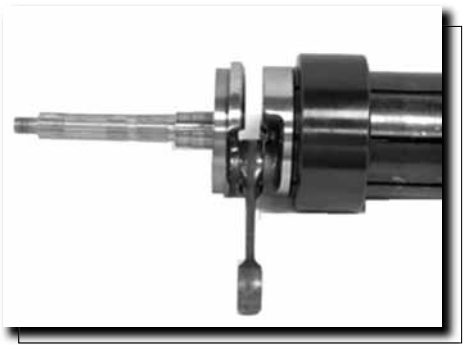


### Removing the crankshaft bearings

The bearings may remain attached either to half- crankcase or crankshaft, indifferently.

- Using the special tool provided, remove only the bearings attached to the engine.

**N.B.**
THE HALF RINGS MUST BE FITTED ONTO THE BEARINGS WITH THE AID OF A MALLET.



# ENGINE

**Specific tooling**

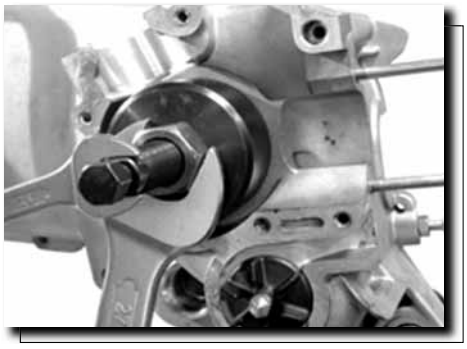
004499y001 Bearing extractor fitted with parts

004499y006 Bearing extractor fitted with parts

004499y002 Bearing extractor fitted with parts

004499y007 Half rings

Using the special tool, remove any bearing which remained on the crankcase.



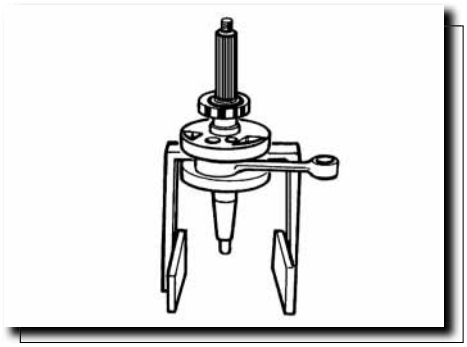
**Specific tooling**

001467Y007 Bell for bearings external 0 54 mm

001467Y006 20-mm pliers

## REFITTING THE CRANKSHAFT BEARINGS

Heat the bearings in oil at approx. 100°C and fit them onto the crankshaft with the aid, if necessary of tube section acting directly on the internal ring of the bearing.



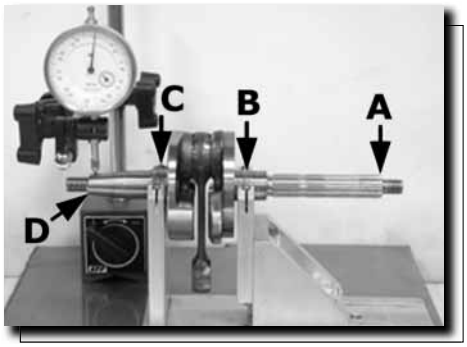
**Specific tooling**

020265y Bearing fitting stand

# ENGINE

## INSPECTING THE CRANKSHAFT ALIGNMENT

Using the appropriate specific tools, check the eccentricities of the surfaces of diameters «A»-«B»-« C» are within 0.03 mm (top reading limit for the dial gauge clock); check also the eccentricity of diameter «D», for which a maximum misalignment of 0.02 mm is allowed. In the event that the eccentricities are not too far off the prescribed values, straighten the crankshaft by acting with a wedge in between the counterweights or by using vice (with aluminium mouth guards) according to your needs.



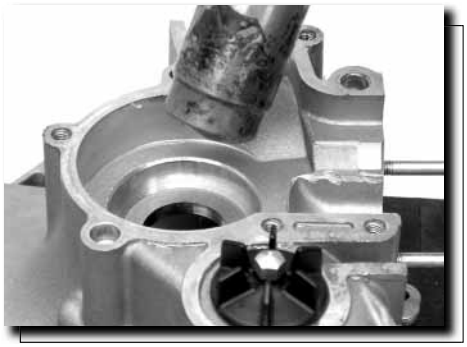

**Specific tooling**

020335Y Magnetic stand and comparator

020074Y Crankshaft aligning tool

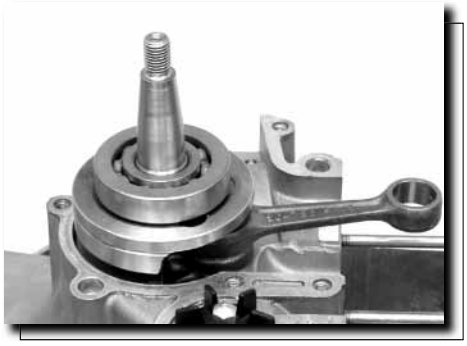
## REFITTING THE CRANKSHAFT

- Rest the transmission-side half-crankcase on two wooden supports.



- Using a heat gun, heat the bearing housing up to approx. 120°.

- Insert the crankshaft and push it in as far as the bearing will go.



# ENGINE

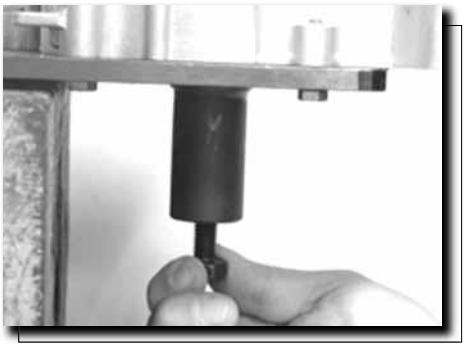
- Let the half-crankcase temperature settle with that of the crankshaft.

- Reinstall the crankcase splitting plate WITHOUT installing the crankshaft protection.

- During the reassembly process keep the centre thrust screw loose.

- Tighten the four fixing screws and then loosen them with the same angle (e.g. 90°)

- When the temperature has settled manually preload the tool's thrusting screw until the ball bearing play disappears.



**Specific tooling**

020163y Crankcase splitting plate

## REFITTING THE CRANKCASE HALVES

- Prepare the mating plane by applying a thin layer of LOCTITE 510, after cleaning the surface with and adequate solvent (e.g. acetylene trichloride).

- Heat the flywheel-side half-crankcase using a heat gun.

**Recommended products**

Loct'rte 510 Packing fluid
Packing

- Keeping the transmission-side half-crankcase in horizontal position, vigorously and accurately insert the flywheel-side half-crankcase.

- Insert at least 3 fixing screws and tighten them quickly.

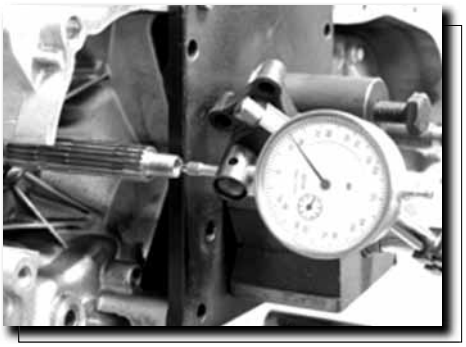
- Insert the other 5 screws and tighten them at the prescribed torque.

**Locking torques (N*m)**

Crankcase fixing screws 11-13

# ENGINE

- Move the crankcase splitting plate backwards as shown in the figure.



- Install the special magnetic mounting with its dial gauge, at the end of the crankshaft.

- Check the crankshaft axial play.

- If the measurements do not match those prescribed, repeat the crankshaft reassembly operation.

**Specific tooling**
020335Y Magnetic stand and comparator

**Characteristic**
**Axial play with warm crankcase**
0,10 ÷ 0,12 mm

**Axial play with cold crankcase**
0,06 ÷ 0,08 mm

**Limit value with cold crankcase**
0,02 ÷ 0,03 mm

## LUBRICATION

### CRANKSHAFT OIL SEALS

**Refitting**
- Install a new flywheel-side oil seal using the puncher from the special tool.

- The flywheel-side oil seal may be recognised for having a smaller diameter.

**N.B.**
THE SPECIAL TOOL MAY NOT BE USED WHEN THE WOODRUFF KEY IS FITTED

**Specific tooling**
020340Y Punch for fitting oil guard magneto and transmission

# ENGINE

- Install a new transmission-side oil seal using the special tool fitted with adapter ring.

- The transmission-side oil seal may be recognised by its larger diameter.

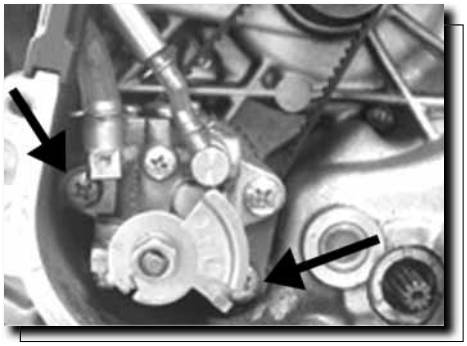
**Specific tooling**

020340Y Punch for fitting oil guard magneto and transmission

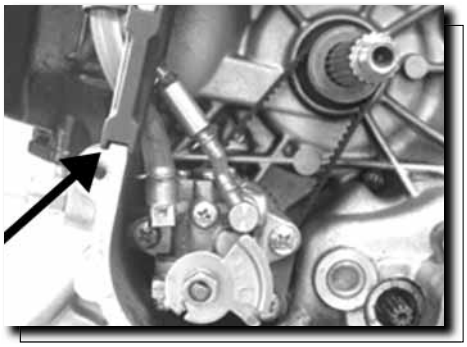
## OIL PUMP

### REMOVAL

Remove the two screws shown in the figure.



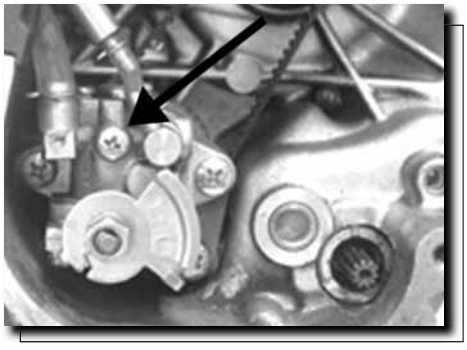
Remove the fairlead from the crankcase, as indicated in the figure.



### REFITTING

- For the reassembly follow the removal operations in the reverse order.

- After the reassembly, it is recommended to bleed the system by acting upon the screw shown in the picture.



# ENGINE

## FUEL SUPPLY

The vehicle is fitted with a membrane pump controlled via the vacuum generated in the intake duct. The tank is therefore fitted with a hole located at its lowest point, which allows fuel to flow to the pump and then to the carburettor.

To check the pump performance, the following mass flow measurement may be carried out:

**1)** Start the engine, warm it up to the standard operating temperature, and shut it down.

**2)** Detach the fuel inlet tube on the carburettor and insert it inside a scaled recipient.

**3)** Start the engine without twisting the throttle, and let it run at idle.

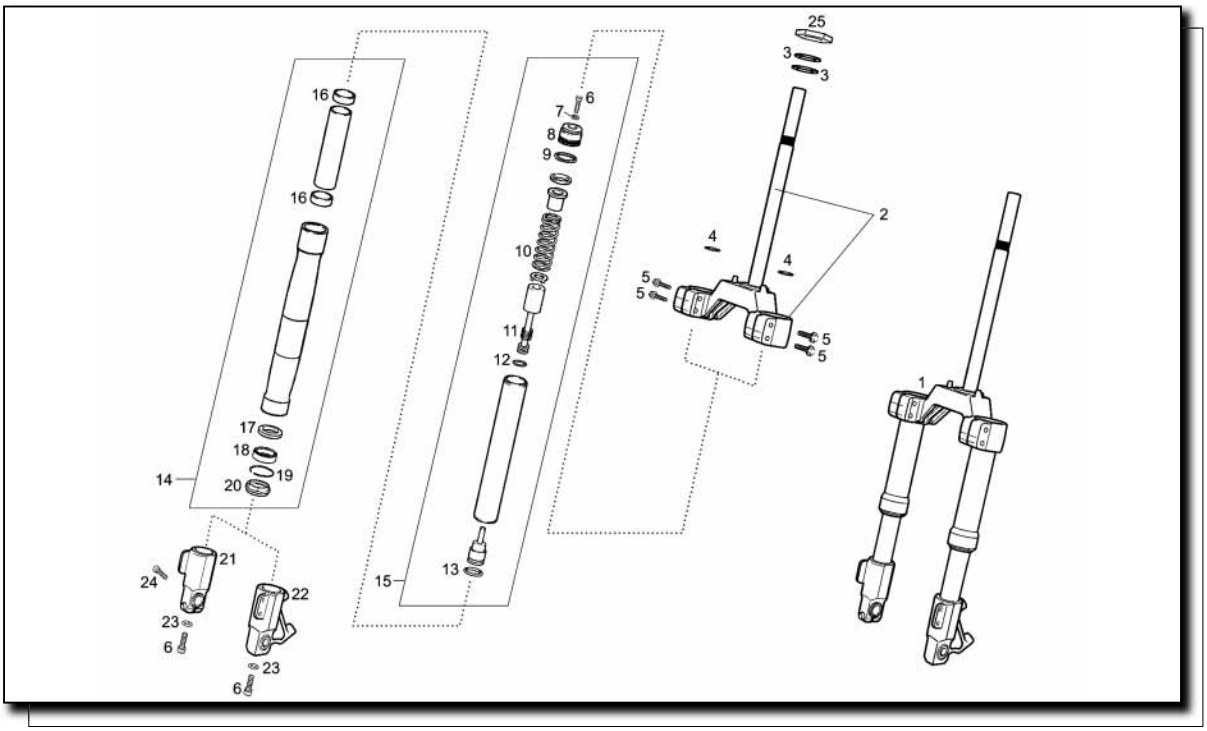
**4)** Let the engine run for a total of 10 seconds, from start-up and shut it down.

**5)** Check the quantity of fuel is not less than prescribed.

**Characteristic**
**Fuel supplied**
~100ccX10"

# FORKS

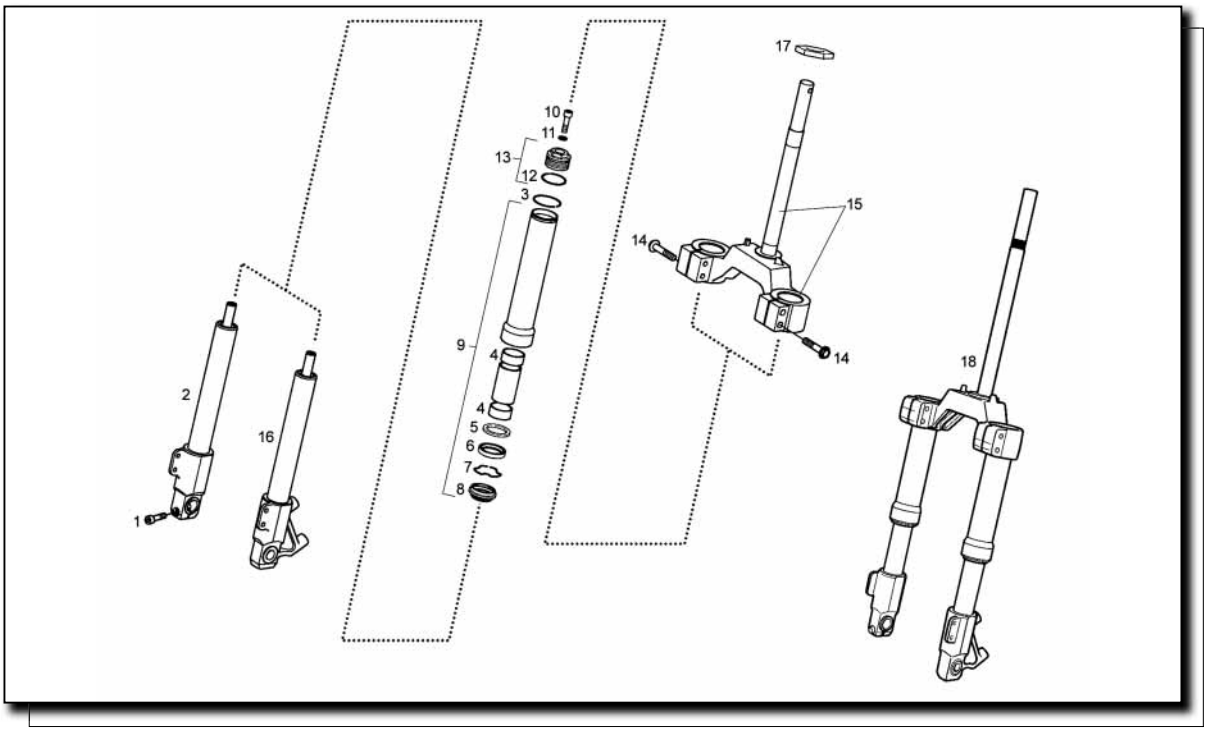
## SEBAC FORKS




| | |
|---|---|
| 1 | Forks assembly |
| 2 | Stem-plate subassembly |
| 3 | Fork stem securing washer |
| 4 | Fork arm securing safety ring |
| 5 | 10M150x50 hexagonal bolt |
| 6 | 8M125x35 ZnB Allen bolt |
| 7 | Arm securing bolt washer |
| 8 | Fork arm plug |
| 9 | Fork pipe plug ring |
| 10 | Fork spring |
| 11 | Hydraulic piston spring |
| 12 | Hydraulic piston ring |
| 13 | Fork arm retainer washer |
| 14 | Fork arm pipe |
| 15 | Hydraulic pipe |
| 16 | Fork arm guide bush |
| 17 | Arm bush washer |
| 18 | Fork arm retainer |
| 19 | Fork arm ring |
| 20 | Fork dust guard |
| 21 | Right hand end point |
| 22 | Left hand end point |
| 23 | D10 Int. star washer |
| 24 | 8M125x30 Allen bolt |
| 25 | Stem securing nut |

# FORKS

## MARZOCCHI Forks




| | |
|---|---|
| 1 | 8M125x30 Allen bolt |
| 2 | Right hand end point hydraulic assembly |
| 3 | Fork arm securing ring |
| 4 | Fork arm guide bush |
| 5 | Arm guide bush washer |
| 6 | Fork arm retainer |
| 7 | Oil seal ring |
| 8 | Fork arm dust guard |
| 9 | Fork arm assembly |
| 10 | 8M125x30 Allen bolt |
| 11 | Arm securing bolt washer |
| 12 | Fork plug ring |
| 13 | Fork plug assembly |
| 14 | 10M150x50 Hexagonal bolt |
| 15 | Plate stem assembly |
| 16 | Left hand end point hydraulic assembly |
| 17 | Stem securing nut |
| 18 | Forks assembly |

# FORKS

## DISMANTLING FRONT SUSPENSION

**ATTENTION**
TO CARRY OUT THE PROCESS OF DISMANTLING THE FORKS WITHOUT REMOVING THEM FROM THE BOTTOM PLATE. TO DO SO, HOLD THE FORKS IN A BENCH VICE BY THE STEERING COLUMN, THEREBY PREVENTING THEM FROM BEING SCRATCHED.

- Extract the top closing bolt.

- Remove the top bolt.

**ATENCIÓN**
THE BOTTOM BAR OF THE FORKS WILL COME FREE. HOLD IT TO PREVENT IT FROM FALLING.

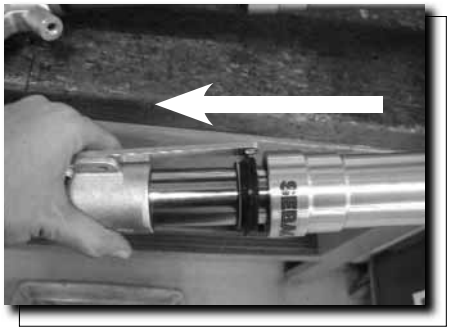
Have ready a suitable sized container in which to drain off the hydraulic fluid from each bar (pump the fork stem assembly in order to ensure it is completely drained).

# FORKS

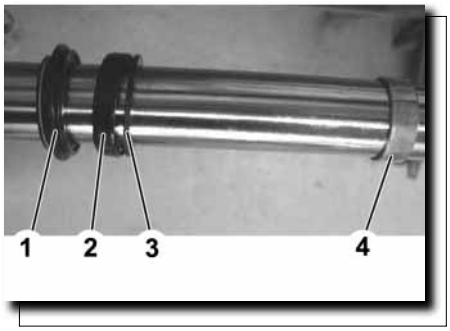
Extract the spring and the preload spacer.

- Extract the oil seal dust guard together with its security circlip.

- Firmly separate the bar from the fork stem.



**Extract the elements:**
- Dust guard (1).
- Oil seal (2).
- Washer (3).
- Scraper (4).



# FORKS

- Proceed with cleaning and degreasing all the front suspension components, so that they can be subsequently checked.

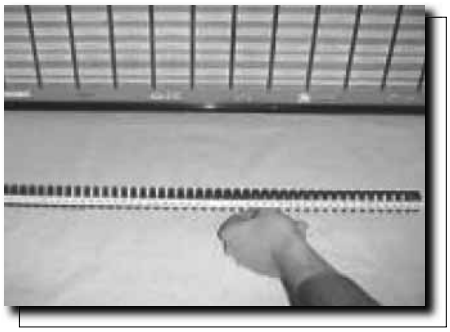
## INSPECTING THE FRONT FORKS

- Check the degree of wear on the suspension bar guide bush. Replace it in the event of it being damaged on over 30% of its total surface.

- With the aid of some X-shaped chocks and a comparison meter fitted on a fixed support, determine the degree of non-alignment of the bar.

**Service limit:**
**0,4 mm.**

- Check the length of the suspension spring, as well as its distortion and/or lack of parallelism.



- Check the state of the rebound spring and the airtight O-ring. Replace them in the event of evident distortion or damage.

Clean and degrease all the elements making up the assembly, ready for reassembly.

# FORKS

Reassemble the assembly, paying special attention to the tightening of the fork stem, as well as the fitting of the oil seal, putting a little oil on its edges and inserting it with the aid of the special tool. Refill the hydraulic fluid and do not forget to insert the preload bush between the spring and the closing plug.

| SUSPENSION | FREE LENGTH OF SPRING (MM) | $cm^3$ OIL / BAR | TYPE OF OIL |
|---|---|---|---|
| SEBAC / MARZOCCHI | 193.8 | 145 ± 2 | SAE 7,5 W |

**Fork elements tightening torques:**

**- Guide fork to the chassis**
90 ÷ 130 N.m (9 ÷ 13 m.kg)

**- Fork stem closing**
15 ÷ 19 N.m (1.5 ÷ 1.9 m.kg)

**1. Refit all the components:**
- Readjust forks to the chassis.
- Refit the front fairing.
- Connect the headlight cables, the turn indicators and the dashboard.

**NOTA**
TIGHTEN ALL BOLTS TO THEIR NOMINAL TORQUE.

**- Top forks to the chassis**:
90 ÷ 130 N.m (9 ÷ 13 kg.m)

**2. Dismantle:**
Front fairing
- Disconnect lighting connections.
- Disconnect dashboard connections.

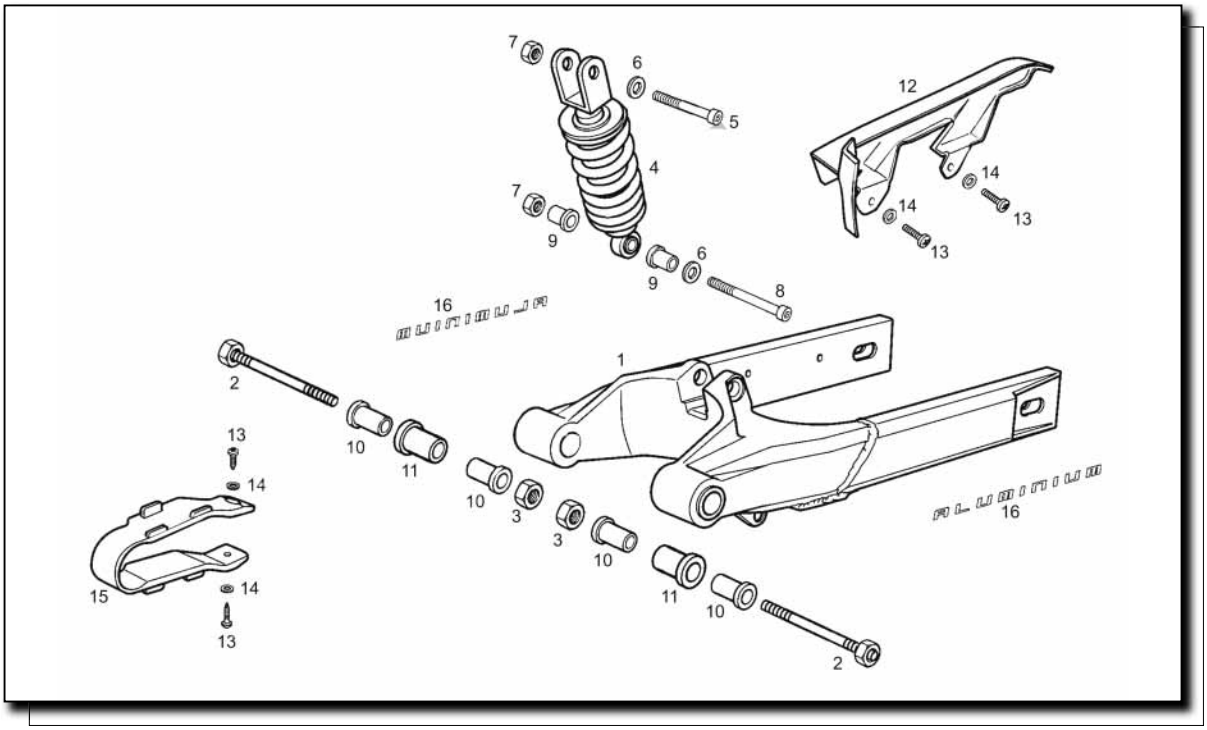
**4. Separate:**
Forks wheel assembly (downwards).

**5. Check:**
- Functioning (top and bottom bearings).
Push the handlebars down several times.

Irregular functioning => **Repair.**

See **"FRONT FORKS"** in **CHAPTER 6.**

# SHOCK ABSORBER AND SWINGING ARM




| | |
|---|---|
| 1 | Swinging arm assembly |
| 2 | Swinging arm assembly |
| 3 | 14M200 ZnB Hexagonal nut |
| 4 | Shock absorber assembly |
| 5 | 10M150x60 ZnB Allen bolt |
| 6 | D10D125 ZnB Washer |
| 7 | 10M150 ZnB Hexagonal nut |
| 8 | 10M150x60 ZnB Allen bolt |
| 9 | Shock absorber bottom separator bush |
| 10 | Swinging arm outer stop bush |
| 11 | Swinging arm shaft bush |
| 12 | Chain cover |
| 13 | Bolt 4.8 x 13 |
| 14 | Flat washer |
| 15 | Chain rubbing plate |
| 16 | Aluminium plate |

# SHOCK ABSORBER AND SWINGING ARM

## DISMANTLING

**1. Place the motorcycle on a flat surface.**

**WARNING**
ENSURE THAT THE MOTORCYCLE IS SUPPORTED FIRMLY AND THERE IS NO RISK OF IT FALLING.

**2. Extract:**
- Rear wheel.
- Wheel sprocket.
- Brake disk.
- Rear calliper.

**3. Extract:**
- Nut (top and bottom).
- Shock absorber.

**4. Extract:**
- Swinging arm shaft nut.
- Wheel axle nut.
- Washers (swinging arm).
- Shafts.
- Swnging arm.

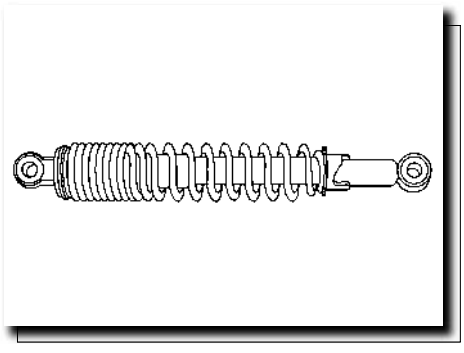
## INSPECCIÓN

**1. Inspect:**
**- Swinging arm play**
Play => **Tighten the joint shaft nut or replace the bushes.**

**- Swinging arm vertical movement**
Irregular movement/warping/stains => **Replace the bushes.**

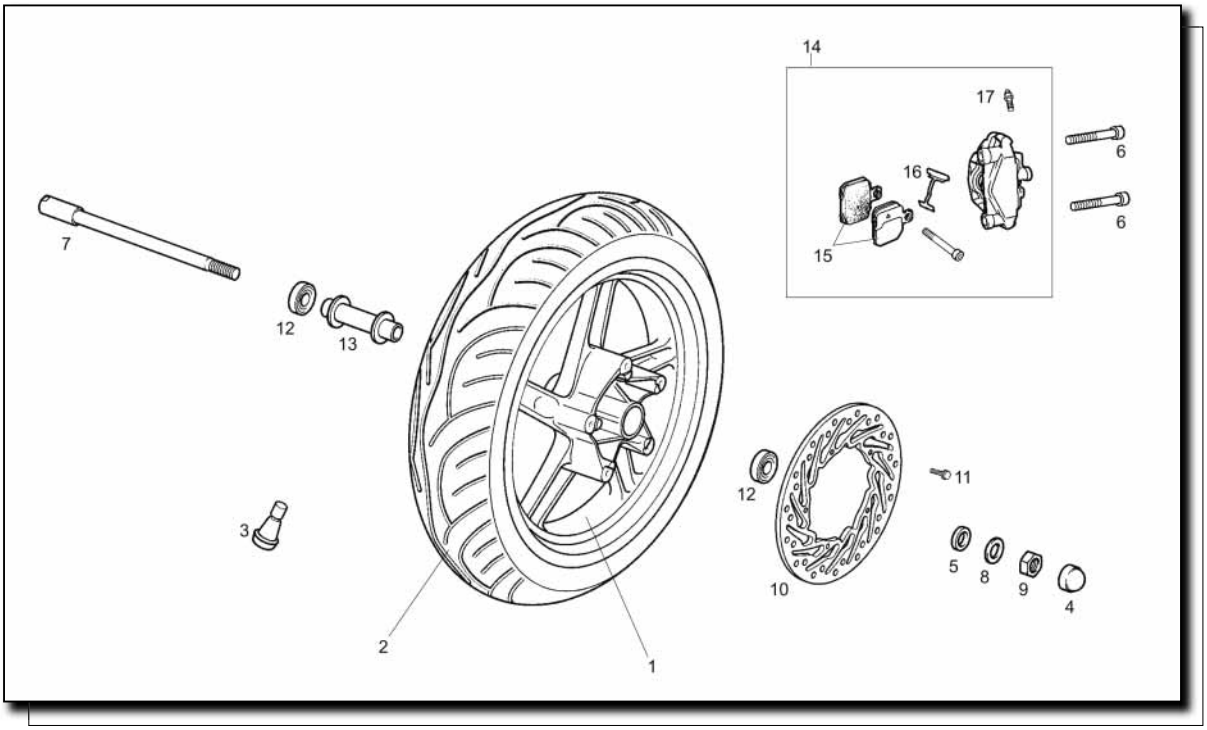
**- Swinging arm vertical movement**
Irregular movement/warping/stains => **Replace the bushes.**

**2. Inspect:**
- Shock absorber Fluid leaks/damage => **Replace the shock absorber.**



# FRONT WHEEL AND BRAKE

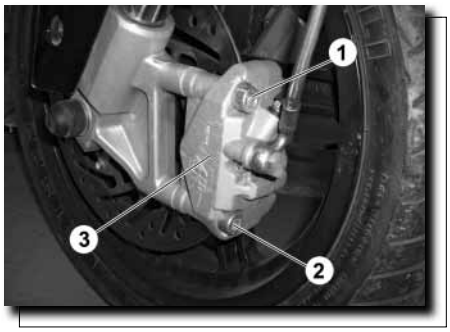
## FRONT WHEEL DIAGRAM




| | |
|---|---|
| 1 | Front wheel rim |
| 2 | 120/70-14in front tyre |
| 3 | Wheel air valve assembly |
| 4 | M14x150 wheel axle nut protector |
| 5 | Wheel separator bush |
| 6 | C/ALL 10M 150x60 D912 8ZnB bolt |
| 7 | DIN 125-A-ST front wheel axle. |
| 8 | D15 DIN 125-A-ST flat washer |
| 9 | D-934 wheel axle head nut |
| 10 | D.245 front brake disk |
| 11 | FR.(6x20) Zn.B10.9 disk securing bolt |
| 12 | Bearing |
| 13 | R- Bearing separator assembly |
| 14 | R-brake calliper assembly |
| 15 | R-brake pad assembly |
| 16 | R-Pad securing spring |
| 17 | R-Front brake calliper bleeding assembly |

# FRONT WHEEL AND BRAKE

## DISMANTLING

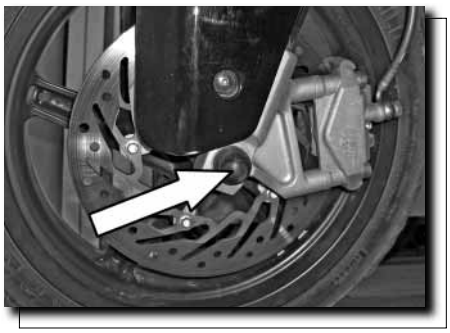



**WARNING**
- ENSURE THAT THE MOTORCYCLE IS SUPPORTED FIRMLY AND THERE IS NO RISK OF IT FALLING.

- PLACE THE MOTORCYCLE ON A FLAT SURFACE.

**1. Extract:**
- Front brake calliper (Bolts 1 and 2).

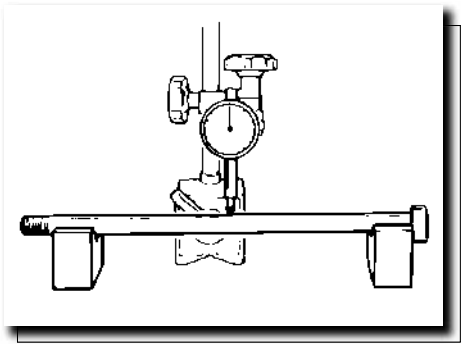
**2. Extract:**
- Nut protecting cover.
- Nut (left side).



**3. Raise:**
- Front wheel
(Put a suitable support under the engine).

**4. Extract:**
- Front wheel axle.
- Front brake disk assembly.
- Dustguard/spacer.
- Front wheel.

## INSPECTING THE FRONT WHEEL



**1. Inspect:**
- Front wheel axle. (By rolling it on a flat surface).

Warping => **Replace.**

**WARNING**
DO NOT TRY STRAIGHTENING A WARPED AXLE.

**Wheel axle warp limit:**
0,25 mm

**2. Inspect:**
- Neumático delantero.

Damage/wear => **Replace.**

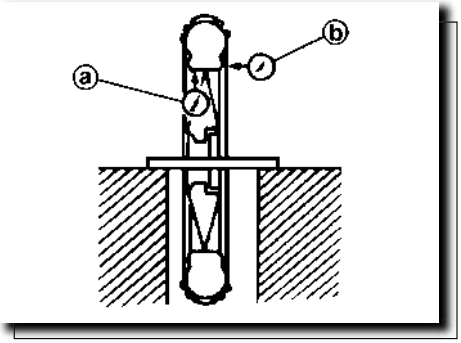
# FRONT WHEEL AND BRAKE

**3. Check:**
- Spokes.

Warps/damage => **Replace.**

**4. Measure:**
- Distortion of the front wheel

Above that specified => **Replace**.



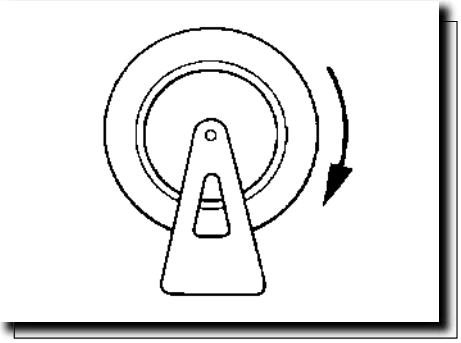

**Distortion limits for the front wheel:**
**Radial (a):**
0,5 mm
**Lateral (b):**
0,8 mm

**5. Check:**
- Front wheel bearings.

Bearings allow play in the wheel hub or the wheel does not turn freely => **Replace.**

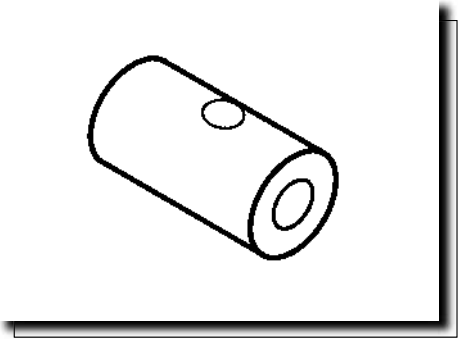
- Retaining rings.

Damage/wear => **Replace.**



**6. Inspect:**
- Spacer.

With scratches/worn => **Replace the spacer and the retaining ring.**



# FRONT WHEEL AND BRAKE

## DISMANTLING THE FRONT DISK CALLIPER

- Loosen the banjo bolt (1) from the bottom end of the brake pipe and tighten it slightly.

- Unscrew the calliper mounting bolts (2) and separate the calliper (3) backwards from the disk.

**PRECAUTION**
CLEAN OFF ANY SPILT BRAKE FLUID REMAINS IMMEDIATELY.

**Fitting the front calliper:**
- Fit the bottom end of the brake pipe and the calliper.
- Tighten to nominal torque.

- Tighten the brake banjo bolt.

- Check brake fluid level.

- Bleed the brake system pipe (consult “Bleeding the brake system pipe” in this chapter).

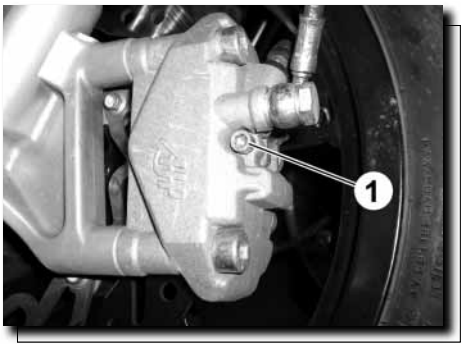
- Check the condition of the braking force to see if any resistance is noted or any loss of fluid.


**WARNING**
DO NOT ATTEMPT TO RIDE THE MOTORCYCLE UNTIL THE BRAKE LEVER IS OPERATING PROPERLY. PUMP THE LEVER UNTIL THE PADS ARE AGAINST THE DISK. IF NOT, THE BRAKES WILL NOT WORK THE FIRST TIME THE LEVER IS USED.

# FRONT WHEEL AND BRAKE

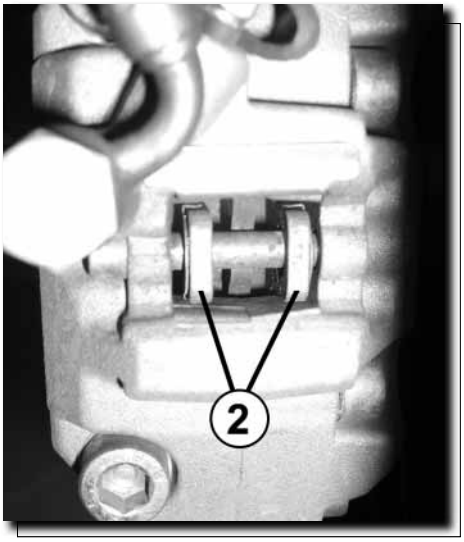
**Extracting the front brake pads.**
- Remove the front brake calliper (see "Dismantling the front brake calliper" in this chapter).

**Extract:**
- Pad springs (1).
- Pin.
- Brake pads (2).



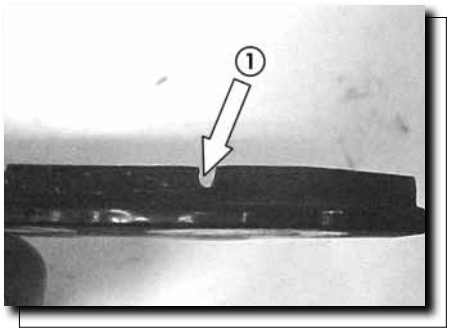

**Fitting the front brake pads**
- Press the calliper pistons in manually.
- Fit the pads inside the calliper.
- Adjust the pad springs.

**WARNING**
DO NOT ATTEMPT TO RIDE THE MOTORCYCLE UNTIL THE BRAKE LEVER IS OPERATING FULLY. THIS IS ACHIEVED BY PUMPING THE LEVER UNTIL THE PADS ARE AGAINST THE DISK. IF NOT, THE BRAKES WILL NOT WORK THE FIRST TIME THE LEVER IS USED.

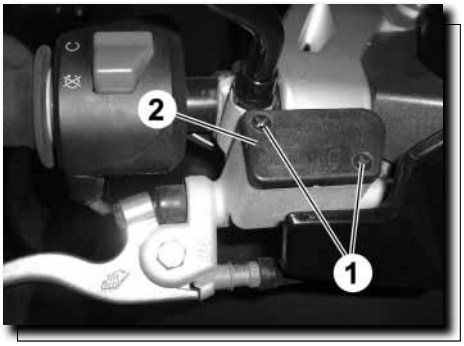



**Inspecting the pads for wear**
- Remove the front brake pads.

- Examine both brake pads.
If the wear has caused the wear indicating groove (1) to disappear, both pads must be renewed.



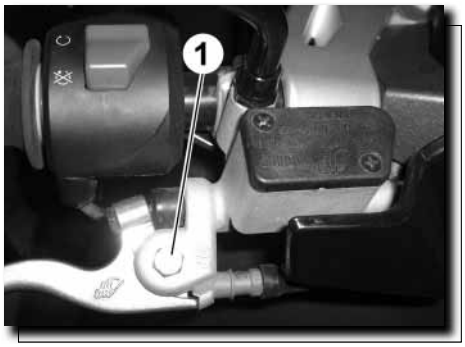

**Extracting the front brake cylinder.**
- Extract the bolt (1) and remove the flexible pipe from the brake cylinder reservoir.



# FRONT WHEEL AND BRAKE

**N.B.**
THE MASTER CYLINDER (1) IS INCORPORATED INTO THE FRONT BRAKE LEVER ASSEMBLY.

- EXTRACT THE SCREWS (2) AND THE FRONT BRAKE LEVER ASSEMBLY.

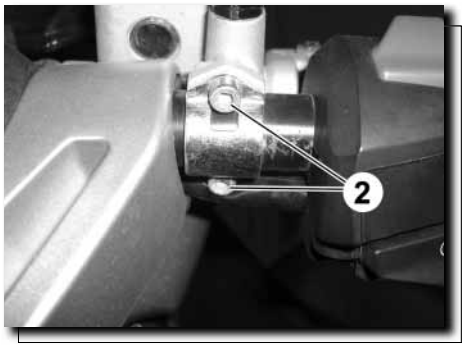



**PRECAUTION**
CLEAN OFF ANY SPILT BRAKE FLUID REMAINS IMMEDIATELY.

**Extract:**
- Brake lever mounting bolt and nut.
- Brake lever.

**Fitting the front master cylinder:**
- Fit the brake lever assembly and tighten the securing screw.

- Tighten the flexible brake pipe bolt.




- Bleed the brake system pipe (consult "Bleeding the brake system pipe" in this chapter).

- Check the condition of the braking force to see if any resistance is noted or any loss of fluid.
Checking the brake lever master cylinder (visual check):

- Extract the master cylinder (consult "Extracting the front master cylinder" in this section).

- Dismantle the front master cylinder:

- Check that there are no scratches, corrosion or holes on the inner walls of the master cylinders and on the outer part of each piston.

- If any damage is discovered on the master cylinder or on the pistons, change them.

- Examine the primary seal and secondary seal.

- If the seal is worn, soft (perished) or swollen, change the piston assembly to renew the seals.

- If fluid loss is noticed at the brake lever, change the seals.

# FRONT WHEEL AND BRAKE

**Checking the brake calliper main cylinder:**
**- Check that the anti-dust boots are not damaged. If they are, change them.**

**- Check that the piston return is not damaged. If it is, renew it.**

**- Check that the relief port and feed port are not blocked. if the relief port is blocked, the brake pads will bind on the disk. Inject compressed air to clean the ports.**

**Extracting the brake disk:**
- Remove the front wheel.

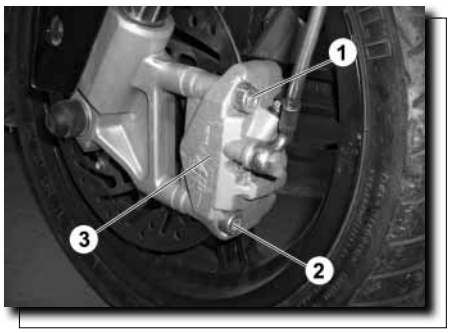
- Unscrew the mounting bolts and extract the disk.

**Fitting the brake disk**
- Fit the brake disk onto the front wheel so that side (2) faces outwards.

- Apply a temporary blocking device to the threads of the brake disk mounting bolts(1).

- Tighten the front brake disk mounting bolts(1).

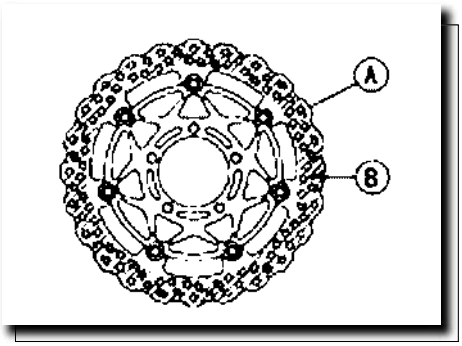
**Nominal tightening torque:**
0.8 ÷ 1 m.kg (8 ÷ 10 N.m)




**Wear to the brake disk:**
- Measure the thickness of the disks (A) at the point where they are most worn.

- If the disk is more worn than specified in the service limit, renew it.

Measurement area (B).




**Standard thickness of the front brake disk.**
3.3 ÷ 3.6 mm.

**Service limit:**
3.1 mm

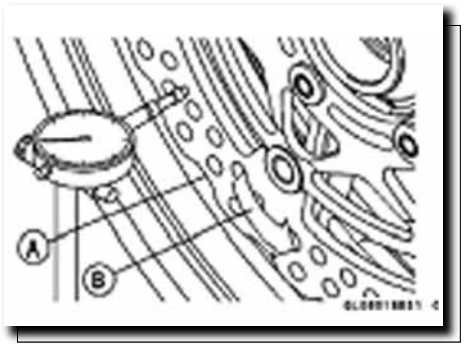
# FRONT WHEEL AND BRAKE

**Brake disk distortion:**
- Raise the motorcycle on the jack so that the tyre is clear of the ground.

- To check the front disk, turn the handlebars completely to one side.

- Place a dial calibrator against the disk (A) as shown, and measure the disk's deviation from centre as the tyre is turned by hand (B).

- If the deviation from centre exceeds the service limit, renew the disk.




**Disk deviation from centre:**
**Standard:**
less than 0.15mm

**Service limit:**
0,3 mm

**Bleeding the brake system pipe**
The brake fluid has a very low compression coefficient, with the result that almost all the movements of the brake lever are transmitted directly to the calliper for braking. Air however compresses easily. When air enters the brake system pipes, the movement of the brake lever is partially used up in compressing the air. This causes the lever to feel spongy and leads to a loss of braking power.

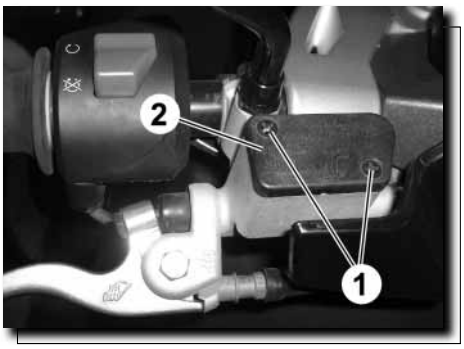
**WARNING**
BE SURE TO BLEED AIR OUT OF THE BRAKE SYSTEM WHEN THE BRAKE LEVER FEELS SPONGY AFTER CHANGING THE BRAKE FLUID OR WHEN THE BRAKE SYSTEM PIPE HAS BEEN LOOSENED FOR ANY REASON.

**Extract:**
- Bolts (1).

- Reservoir cap (2).

- Fill the reservoir with brake fluid up to the top reservoir line.

- With the cap removed, pump the brake lever slowly several times until no bubbles can be seen rising through the liquid.



# FRONT WHEEL AND BRAKE

Purge the air completely from the master cylinder using this procedure.
- Remove the transparent plastic cap from the bleed nipple and place the other end of the pipe in a container.

- Repeat the following procedure until there is no air left emerging from the plastic pipe:

- Pump the brake lever until it becomes hard and holds the brakes down.

- Open and close the purge valve quickly while keeping the brake on.

- Release the brake.

**N.B.**
CHECK THE FLUID LEVEL FREQUENTLY DURING THE BLEEDIING OPERATION AND REPLENISH THE RESERVOIR WITH BRAKE FLUID WHEN NECESSARY. IF THE RESERVOIR EMPTIES COMPLETELY OF BRAKE FLUID AT ANY TIME THE DURING BLEEDING PROCEDURE, PERFORM THE BLEEDING PROCEDURE ALL OVER AGAIN FROM THE BEGINNING, SINCE AIR WILL HAVE ENTERED THE PIPE. TAP THE BRAKE PIPE LIGHTLY FROM THE CALLIPER TO THE RESERVOIR TO ACHIEVE A MORE COMPLETE BLEEDING.

- Extract the transparent plastic pipe.

**Fit:**
- Reservoir cap.

- Cap securing screws.

-Tighten the bleed valve and fit the rubber hood.

- Check brake fluid level.

- Once the bleeding process has been carried out, check the efficiency of the brake to see if there is any resistance or any fluid loss.

**WARNING**
WHEN WORKING WITH THE DISK BRAKE, TAKE THE FOLLOWING PRECAUTIONS:

1) NEVER RE-USE BRAKE FLUID.

2) DO NOT USE FLUID FROM A CONTAINER THAT HAS BEEN LEFT OPEN OR HAS BEEN LEFT UNUSED FOR A PROLONGED PERIOD OF TIME.

# FRONT WHEEL AND BRAKE

**3) DO NOT MIX TWO TYPES OR BRANDS OF FLUID FOR USE IN THE BRAKE. THIS LOWERS THE BRAKE FLUID EVAPORATION POINT AND MAY RESULT IN THE BRAKES NOT WORKING EFFICIENTLY. IN ADDITION, IT MAY CAUSE DETERIORATION OF THE BRAKE PARTS.**

**4) DO NOT LEAVE THE RESERVOIR CAP OFF AT ANY TIME, TO PREVENT CONTAMINATION OF THE FLUID.**

**5) DO NOT CHANGE THE FLUID IN RAINY OR VERY WINDY CONDITIONS.**

**6) EXCEPT ON THE BRAKE LININGS AND THE DISK, USE ONLY BRAKE FLUID, ISOPROPILIC ALCOHOL OR ETHYL ALCOHOL FOR CLEANING BRAKE PARTS. DO NOT USE ANY OTHER TYPE OF LIQUID FOR CLEANING THESE PARTS.**

**PETROL, ENGINE OIL OR ANY OTHER PETROLEUM DISTILLATE WILL CAUSE RUBBER PARTS TO DETERIORATE. IF OIL IS SPILT ON ANY PART, IT WILL BE DIFFICULT TO CLEAN COMPLETELY AND MAY DETERIORATE THE RUBBER USED IN THE DISK BRAKE.**

**7) ON HANDLING THE DISK BRAKE LININGS OR THE DISK, TAKE CARE TO ENSURE THAT NO BRAKE FLUID COMES INTO CONTACT WITH THEM. CLEAN ANY REMAINS OF BRAKE FLUID THAT ACCIDENTALLY COMES INTO CONTACT WITH THE LININGS OR WITH THE DISK WITH A SOLVENT WITH A HIGH INFLAMMATION POINT. DO NOT USE ONE THAT LEAVES GREASY RESIDUES. IF LININGS CANNOT BE CLEANED SATISFACTORILY, CHANGE THEM FOR NEW ONES.**

**8) BRAKE FLUID DESTROYS PAINTED SURFACES RAPIDLY. CLEAN OFF ANY SPILT REMAINS IMMEDIATELY.**

**9) IF ANY OF THE BRAKE SYSTEM PIPE SECURING SYSTEMS OR THE BLEED VALVE OPENS AT ANY TIME, THE AIR CAN BE BLED FROM THE BRAKE SYSTEM PIPE.**

## ASSEMBLING THE FRONT WHEEL

**1. Fit:**

- Speedometer assembly

# FRONT WHEEL AND BRAKE

## ASSEMBLING THE FRONT WHEEL

Reverse the "**DISMANTLING**" procedures. Take care

**with the following points:**

**1. Lubricate:**
- Front wheel axle.
- Bearing.
- Retaining rings.

**Recommended lubricant:**
Lithium soap based grease

**2. Fit:**
- Front wheel

**3. Tighten:**
- Front wheel axle.
- Axle nut (front wheel).

**ATTENTION**
BEFORE TIGHTENING THE WHEEL AXLE, PUSH THE FRONT FORKS DOWN SEVERAL TIMES, HOLDING THE HANDLEBARS, TO CHECK THEIR OPERATION.

**Axle nut:**
70-80 N.m (7-8 kgf.m)

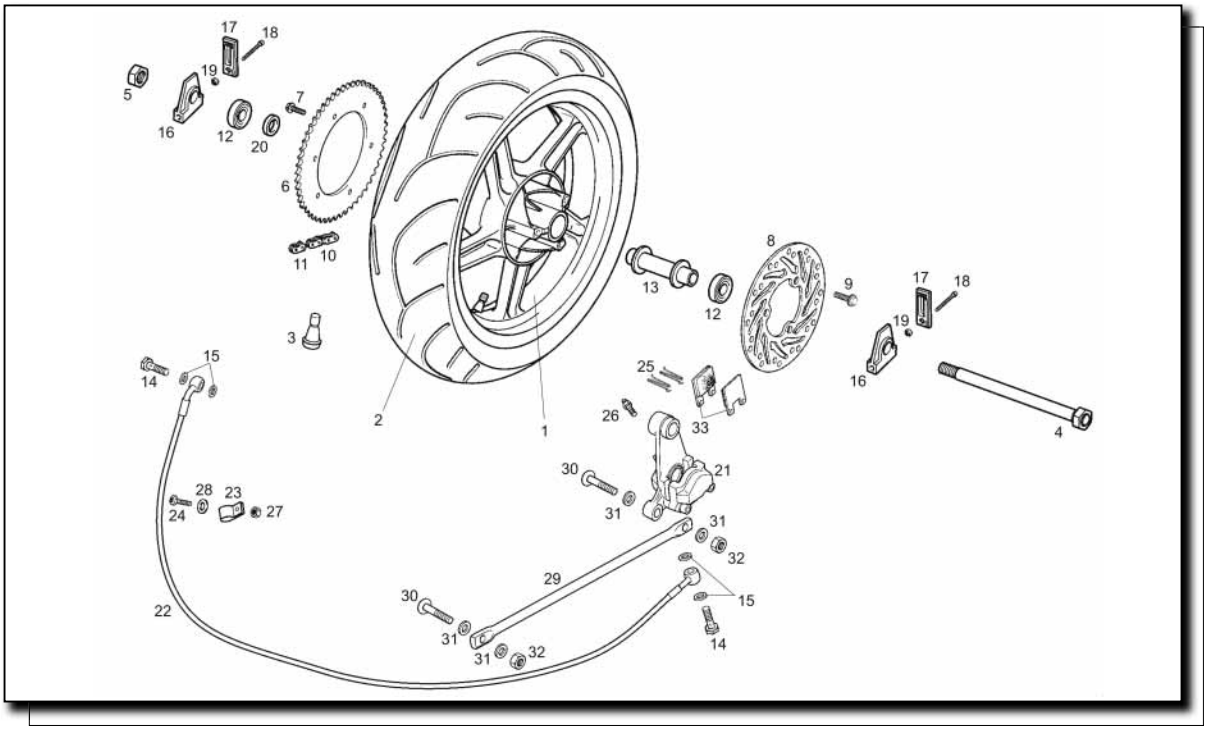
**WARNING**
ENSURE THAT THE SPEEDOMETER CABLE GUIDE IS CORRECT.

**4. Check:**
Front brake functioning
Irregular functioning => **Dismantle or check again**.

- Brake lever play

# REAR WHEEL AND BRAKES

## WHEEL DIAGRAM




| | |
|---|---|
| 1 | GP1 front wheel |
| 2 | 120/70-14in rear tyre |
| 3 | Air valve assembly |
| 4 | Rear wheel axle assembly |
| 5 | 14M200 ZnB nuts |
| 6 | GP1 drag plate |
| 7 | (6x20) Zn.B10.9 brake disk securing bolt |
| 8 | D.180 rear brake disk |
| 9 | ZnB rear brake disk securing bolt |
| 10 | GP1 secondary chain |
| 11 | Secondary chain coupling |
| 12 | Bearing |
| 13 | Bearing separator |
| 14 | Connector |
| 15 | Washer |
| 16 | Wheel tensioner |
| 17 | Wheel tensioner cap |
| 18 | 6M100x60 chain tensioner bolt |
| 19 | Aut.6M100 DIN-985.8 ZnB nut |
| 20 | Plate side bush |
| 21 | GP1 rear calliper assembly |
| 22 | Rear brake liquid cable |
| 23 | Rear brake cable securing clamp |
| 24 | c/Red Cross 5M8Ox16D7985NG bolt |

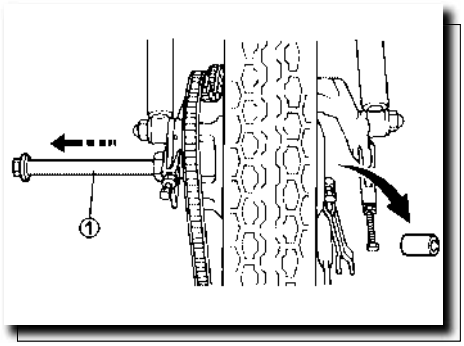
| | |
|---|---|
| 25 | Brake pad securing spring |
| 26 | Rear brake calliper bleed nipple |
| 27 | 5M80 DIN-982 self-locking nut |
| 28 | D5 ZnB flat washer |
| 29 | Rear brake puller |
| 30 | Main connecting rod securing bolt |
| 31 | Washer |
| 32 | 10M150 DIN985 ZnB nut |
| 33 | Brake pad set |

# REAR WHEEL AND BRAKES

## DISMANTLING

**WARNING**
- ENSURE THAT THE MOTORCYCLE IS SUPPORTED FIRMLY AND THERE IS NO RISK OF IT FALLING.
- PLACE THE MOTORCYCLE ON A FLAT SURFACE.

**1. Extract:**
- Wheel axle (1).
- Spacer.




**N.B.**
ON WITHDRAWING THE WHEEL AXLE, THE SPACER WILL DROP DOWN. TAKE CARE NOT TO LOSE IT.

**2. Extract:**
- Rear wheel.

**N.B.**
ON EXTRACTING THE WHEEL, PUSH THE WHEEL FORWARDS TO REMOVE THE DRIVE CHAIN, THEN EXTRACT THE WHEEL BACKWARDS TO AVOID THE BRAKE CALLIPER.

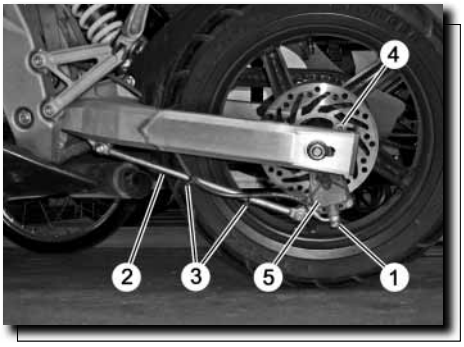
## DISMANTLING THE REAR DISK CALLIPER

- Loosen the bolt at the bottom end of the flexible brake hose and tighten it slightly (1)

- Unscrew the bolt securing the brake puller (2) and remove the clips (3) joining the flexible hose to the puller.

- Extract the wheel axle (4).

- Remove the brake calliper (5).




**PRECAUTION**
CLEAN OFF ANY SPILT BRAKE FLUID REMAINS IMMEDIATELY.

# REAR WHEEL AND BRAKES

**Fitting the rear calliper**
- Fit the bottom end of the flexible brake pipe and the calliper.

Fit the wheel axle, the brake puller and the flexible hose securing clips.

**Nominal torque (wheel axle):**
110-130 N.m (11-13 kgf.m)

Tighten to nominal torque (brake puller):
35-40 N.m (3,5 – 4 kgf.m)

- Tighten the brake banjo bolt.

- Check brake fluid level.

- Bleed the braking system pipe (consult "Bleeding the brake system pipe", in the chapter corresponding to the front brakes).

- Check the condition of the braking force to see if any resistance is noted or any loss of fluid.

**WARNING**
DO NOT ATTEMPT TO RIDE THE MOTORCYCLE UNTIL THE BRAKE LEVER IS OPERATING PROPERLY. PUMP THE LEVER UNTIL THE PADS ARE AGAINST THE DISK. IF NOT, THE BRAKES WILL NOT WORK THE FIRST TIME THE LEVER IS USED.

**Extracting the rear brake pads**
- Remove the rear brake calliper (see "Dismantling the rear brake calliper", in this chapter).

**Extract:**
- Pad springs (1).

- Brake pads.


**Fitting the rear brake pads.**
- Press the calliper pistons in manually.

- Fit the pads inside the calliper.

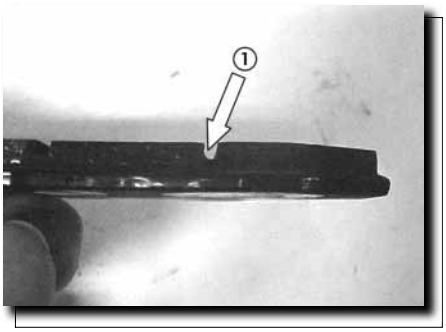
- Adjust the pad springs.

# REAR WHEEL AND BRAKES

**WARNING**
DO NOT ATTEMPT TO RIDE THE MOTORCYCLE UNTIL THE BRAKE PEDAL IS OPERATING FULLY. PUMP THE LEVER UNTIL THE PADS ARE AGAINST THE DISK. IF NOT, THE BRAKE WILL NOT WORK THE FIRST TIME THE PEDAL IS USED.

**Inspecting the pads for wear**
**- Removing the rear brake pads.**
**- Examine both brake pads.**

**If the wear has caused the wear indicating groove (1) to disappear, both pads must be renewed.**




**Extracting the rear main cylinder**
**- Remove the cover protecting the main cylinder. (The bolts securing the cover also support the cylinder)**

**- Extract the bolt and remove the flexible hose from the brake cylinder reservoir.**

**PRECAUTION**
CLEAN OFF ANY SPILT BRAKE FLUID REMAINS IMMEDIATELY.

**Fitting the rear main cylinder.**
**- Fit the rear main cylinder and its protective cover.**

**- Tighten the brake flexible hose bolt.**

**- Bleed the brake system pipe (consult "Bleeding the brake system pipe" in this chapter).**

**- Check the condition of the braking force to see if any resistance is noted or any loss of fluid.**

# REAR WHEEL AND BRAKES

**Checking the rear main cylinder (visual check)**
**- Extract the main cylinder (consult "Extracting the rear main cylinder" in this section).**

**- Dismantle the rear main cylinder.**

**- Check that there are no scratches, corrosion or holes in the inner walls of the main cylinder and on the outer part of each piston.**

**If any damage is discovered on the master cylinder or on the pistons, change them.**
**- Examine the primary and secondary seals.**

**- If a seal is worn, soft (perished) or swollen, change the piston assembly to renew the seals.**

**- If you notice loss of fluid in the brake cylinder, change the seals.**

**Checking the rear calliper main cylinder**

- Check that the anti-dust boots are not damaged.
If they are, change them.

- Check that the piston return is not damaged. If it is, renew it.

- Check that the relief port and feed port are not blocked.
if the relief port is blocked, the brake pads will bind on the disk. Inject compressed air to clean the ports.

**Extracting the brake disk**
- Extract the rear wheel.

- Unscrew the mounting bolts and extract the disk.

**Fitting the brake disk**
**- Fit the brake disk to the rear wheel in such a way that the engraved side faces outwards.**

**- Apply a temporary blocking device to the threads of the brake disk mounting bolts.**

**- Tighten the rear brake disk securing bolts.**

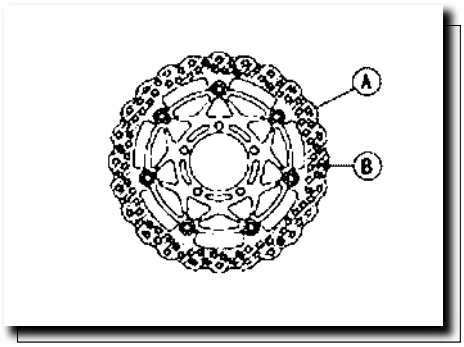
**Nominal tightening torque:**
2.5 ÷ 2.9 m-kg (25 ÷ 29 N.m)

# REAR WHEEL AND BRAKES

**Brake disk wear**
- Measure the thickness of the disks (A) at the point where they are most worn.

- If the disk is more worn than specified in the service limit, renew it.

Measurement area (B).

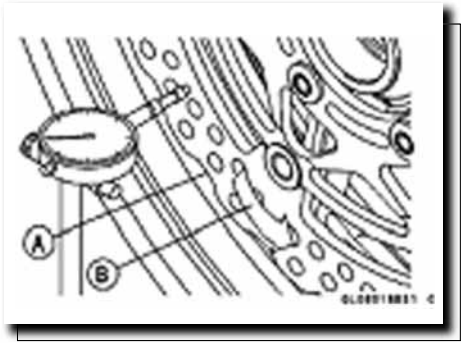



**Standard brake disk thickness:**
3.3 ÷ 3.6 mm.

**Service limit:**
3.1 mm.

**Brake disk distortion**
- Raise the motorcycle on the jack so that the tyre is clear of the ground.

- Place a dial calibrator against the disk (A) as shown, and measure the disk's deviation from centre as the tyre is turned (B) by hand.




- If the deviation from centre exceeds the service limit, renew the disk.

**Disk deviation from centre:**
**Standard:**
Inferior a 0,15 mm

**Service limit:**
0,3 mm

**Bleeding the brake system pipe**
The brake fluid has a very low compression coefficient, with the result that almost all the movements of the brake lever are transmitted directly to the calliper for braking. Air however compresses easily. When air enters the brake system pipes, the movement of the brake lever is partially used up in compressing the air. This causes the pedal to feel spongy and leads to a loss of braking power.

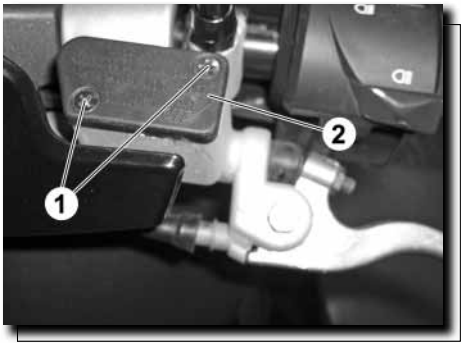
**WARNING**
BE SURE TO BLEED AIR OUT OF THE BRAKE SYSTEM WHEN THE BRAKE LEVER FEELS SPONGY AFTER CHANGING THE BRAKE FLUID OR WHEN THE BRAKE SYSTEM PIPE HAS BEEN LOOSENED FOR ANY REASON.

**Remove:**
Reservoir cap (threaded)

- Fill the reservoir with new brake fluid up to the top reservoir line.

- With the cap removed, pump the brake slowly several times until no more bubbles rise up through the fluid.

# REAR WHEEL AND BRAKES




**Extract:**
- Bolts (1).
- Reservoir cap (2).

- Fill the reservoir with brake fluid up to the top reservoir line.

- With the cap removed, pump the brake lever slowly several times until no bubbles can be seen rising through the liquid.

Purge the air completely from the master cylinder using this procedure.
- Remove the transparent plastic cap from the bleed nipple and place the other end of the pipe in a container.

- Repeat the following procedure until there is no air left emerging from the plastic pipe:

- Pump the brake lever until it becomes hard and holds the brakes down.

- Open and close the purge valve quickly while keeping the brake on.

- Release the brake.

**NOTA**
CHECK THE FLUID LEVEL FREQUENTLY DURING THE BLEEDIING OPERATION AND REPLENISH THE RESERVOIR WITH BRAKE FLUID WHEN NECESSARY. IF THE RESERVOIR EMPTIES COMPLETELY OF BRAKE FLUID AT ANY TIME THE DURING BLEEDING PROCEDURE, PERFORM THE BLEEDING PROCEDURE ALL OVER AGAIN FROM THE BEGINNING, SINCE AIR WILL HAVE ENTERED THE PIPE. TAP THE BRAKE PIPE LIGHTLY FROM THE CALLIPER TO THE RESERVOIR TO ACHIEVE A MORE COMPLETE BLEEDING.

- Extract the transparent plastic pipe.

**Fit:**
- Reservoir cap.

- Cap securing screws.

-Tighten the bleed valve and fit the rubber hood.

- Check brake fluid level.

- Once the bleeding process has been carried out, check the efficiency of the brake to see if there is any resistance or any fluid loss.

# REAR WHEEL AND BRAKES

**WARNING**
WHEN WORKING WITH THE DISK BRAKE, TAKE THE FOLLOWING PRECAUTIONS:

1) NEVER RE-USE BRAKE FLUID.

2) DO NOT USE FLUID FROM A CONTAINER THAT HAS BEEN LEFT OPEN OR HAS BEEN LEFT UNUSED FOR A PROLONGED PERIOD OF TIME.

3) DO NOT MIX TWO TYPES OR BRANDS OF FLUID FOR USE IN THE BRAKE. THIS REDUCES THE BRAKE FLUID EVAPORATING POINT AND MAY RESULT IN THE BRAKES NOT WORKING EFFICIENTLY. IN ADDITION, IT MAY CAUSE DETERIORATION OF THE BRAKE PARTS.

4) DO NOT LEAVE THE RESERVOIR CAP OFF AT ANY TIME, TO PREVENT CONTAMINATION OF THE FLUID.

5) DO NOT CHANGE THE FLUID IN RAINY OR VERY WINDY CONDITIONS.

6) EXCEPT ON THE BRAKE LININGS AND THE DISK, USE ONLY BRAKE FLUID, ISOPROPILIC ALCOHOL OR ETHYL ALCOHOL FOR CLEANING BRAKE PARTS. DO NOT USE ANY OTHER TYPE OF LIQUID FOR CLEANING THESE PARTS.
PETROL, ENGINE OIL OR ANY OTHER PETROLEUM DISTILLATE WILL CAUSE RUBBER PARTS TO DETERIORATE. IF OIL IS SPILT ON ANY PART, IT WILL BE DIFFICULT TO CLEAN COMPLETELY AND MAY DETERIORATE THE RUBBER USED IN THE DISK BRAKE.

7) ON HANDLING THE DISK BRAKE LININGS OR THE DISK, TAKE CARE TO ENSURE THAT NO BRAKE FLUID COMES INTO CONTACT WITH THEM. CLEAN ANY REMAINS OF BRAKE FLUID THAT ACCIDENTALLY COMES INTO CONTACT WITH THE LININGS OR WITH THE DISK WITH A SOLVENT WITH A HIGH INFLAMMATION POINT. DO NOT USE ONE THAT LEAVES GREASY RESIDUES. IF LININGS CANNOT BE CLEANED SATISFACTORILY, CHANGE THEM FOR NEW ONES.

8) BRAKE FLUID DESTROYS PAINTED SURFACES RAPIDLY. CLEAN OFF ANY SPILT REMAINS IMMEDIATELY.

9) IF ANY OF THE BRAKE SYSTEM PIPE SECURING SYSTEMS OR THE BLEED VALVE OPENS AT ANY TIME, THE AIR CAN BE BLED FROM THE BRAKE SYSTEM PIPE.

# REAR WHEEL AND BRAKES

## INSPECTING THE REAR WHEEL

**1. Inspect:**
- Rear wheel axle
- Rear wheel
- Rear wheel bearings
- Retaining rings

See the "**WHEEL AND REAR BRAKE**" section

**2. Measure:**
- Distortion of the rear wheel

See the **"WHEEL AND REAR BRAKE"** section

## FITTING THE REAR WHEEL

Reverse the "**DISMANTLING**" procedures.

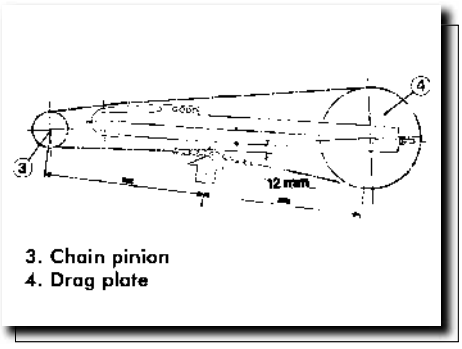
Take care with the following points:

**1. Fit:**
- Rear wheel.

**2. Adjust:**
- Drive chain tension

**Transmision chain**
- Check the drive chain tension. When pressed with a finger, there should be a play of 12÷18mm. If adjustment is needed, proceed as follows: loosen the wheel nut and adjust the tensor by turning thern dockwise, giving the same number of turns of the right and left tensor. In this way the wheel will be correctly aligend. Thighten the wheel nut.

- Due to the geometrical features of the vehicle the tightness of the chain must be checked regularly with the rider sitting on the vehicle always.




3. Chain pinion
4. Drag plate

**3. Tighten:**
- Rear wheel axle.
- Axle nut (rear wheel) (1).

**Nut (rear wheel axle):**
70 ÷ 80 N.m (7 ÷ 8 m.kg)

**4. Check:**
- Brake pedal play

# TRANSMISSION

## DISMANTLING

**1. Place the motorcycle on a flat surface.**

**WARNING**
ENSURE THAT THE MOTORCYCLE IS SUPPORTED FIRMLY AND THERE IS NO RISK OF IT FALLING.

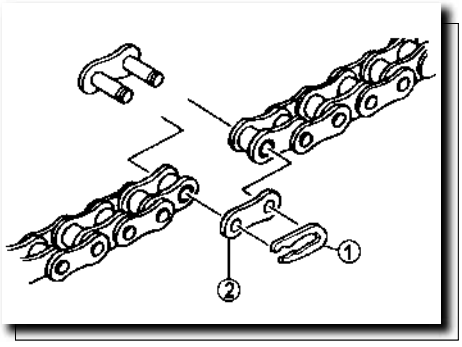
**2. Extract:**
- Pinion

See the "**DISMANTLING THE ENGINE**" section in **CHAPTER 5.**

**3. Extract:**
- Rear wheel

See the **"WHEEL AND REAR BRAKE"** section.

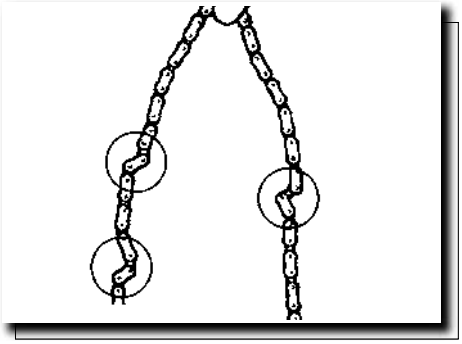
**4. Extract:**
- Coupling circlip(1).
- Coupling plate (2).
- Coupling link.
- Drive chain




**5. Extract:**
- Chain sprocket, by removing the bolts.

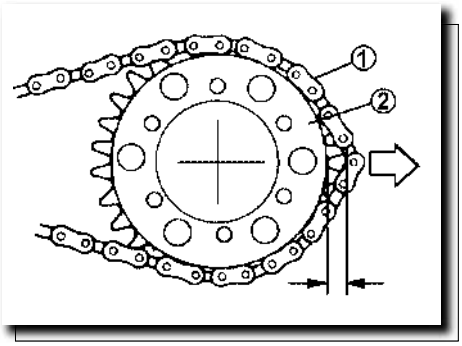
# TRANSMISSION

## INSPECTING THE DRIVE CHAIN



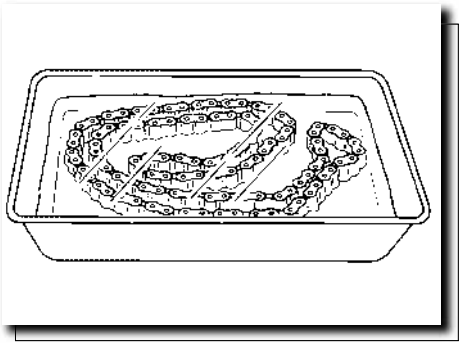
**1. Inspect:**
- Chain stiffness

Stiffness => **Clean and lubricate, or replace**.




**2. Inspect:**
- Drive chain (1).
- Chain sprocket (2).

More than ½ tooth of wear => **Replace the whole chain.**



**3. Clean:**
- Drive chain

Place the chain in a container with petrol and brush it to remove as much of the dirt as possible. Then remove the chain from the petrol, dry and lubricate it.

**Lubricant for the drive chain:**
Engine oil

## CHAIN SPROCKET

**1. Fit:**
- Chain sprocket.
- Nut.

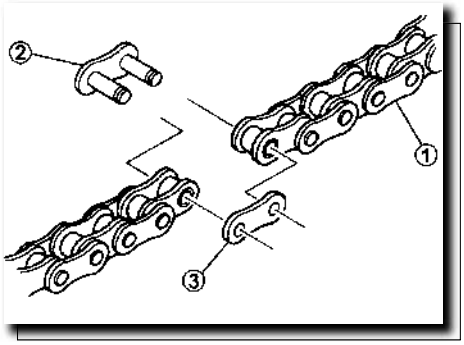
**Chain sprocket nuts:**
10 ÷ 12 N.m (1.0 ÷ 1.2 m.kg)

# TRANSMISSION

## FITTING THE CHAIN SPROCKET AND THE DRIVE CHAIN

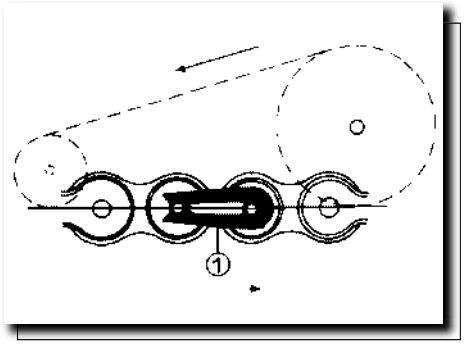
**1. Fit:**
- Chain sprocket assembly

**2. Fit:**
- Drive chain (1).
- Coupling link (2).
- Coupling plate (3).




**3. Fit:**
- Circlip (1).

**ATTENTION**
FIT THE CHAIN COUPLING CIRCLIP FACING IN THE DIRECTION INDICATED IN THE FIGURE

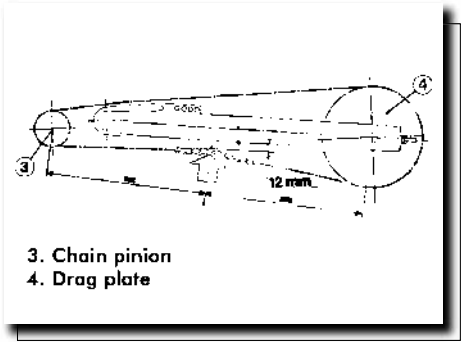



**4. Fit:**
- Pinion
- Gear change pedal

See the **"DISMANTLING THE ENGINE"** section in **CHAPTER 5.**

**5. Adjust:**
- Drive chain tension

**Transmision chain**
- Check the drive chain tension. When pressed with a finger, there should be a play of 12÷18mm. If adjustment is needed, proceed as follows: loosen the wheel nut and adjust the tensor by turning thern dockwise, giving the same number of turns of the right and left tensor. In this way the wheel will be correctly aligend. Thighten the wheel nut.




3. Chain pinion
4. Drag plate

- Due to the geometrical features of the vehicle the tightness of the chain must be checked regularly with the rider sitting on the vehicle always.

**6. Tighten:**
- Wheel axle.

# COOLING SYSTEM

## SYSTEM BLEED

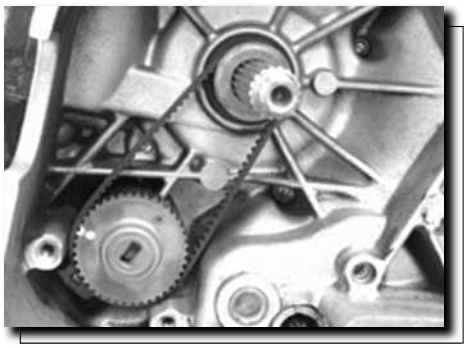
Fill up the circuit through the expansion tank up to the max level mark. Secure a rubber hose to the bleed joint on the head and insert it inside the expansion tank filler hole. Loosen the joint and, if necessary, top-up with fresh coolant. Start up the engine and wait until only coolant exits the hose, hence tighten the joint on the cylinder head. Shut the engine down, top-up with coolant and hence replace the expansion tank filler cap. Warm the engine up to its operational temperature so to eliminate any air bubble within the main circuit. Shut the engine off, let it cool down and hence check the coolant level in the expansion tank reaches the max mark; top-up as necessary.

## WATER PUMP - OVERHAUL

- Remove the pick-up/coolant inlet hose clamp
- Remove the transmission cover
- Remove the mixer
- Setup the special as shown in the picture

**N.B.**
WHEN SECURING THE TOOL PAY ATTENTION NOT TO OVERLOAD THE PLASTIC IMPELLER.

**Specific tooling**
020167y Impeller retaining spanner



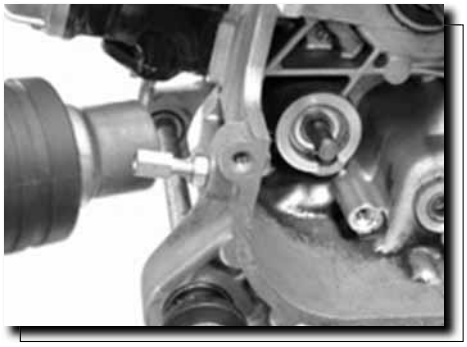
- Remove the mixer/water pump drive-belt with the two sprockets

# COOLING SYSTEM

- Remove the split ring from the shaft together with the bearings.

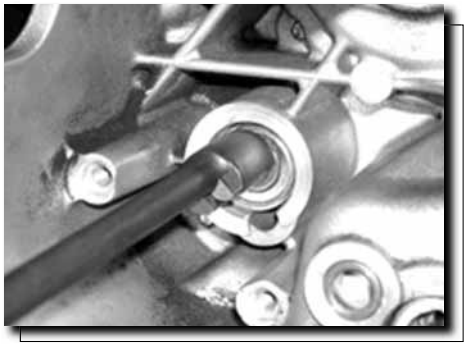
- Remove the steel washer.

- Using the air heater, warm up the crankcase in the area around the water pump bearings as shown in the picture.



-With the aid of the special tool, loosen the impeller shaft turning the spanner clockwise (left-handed thread).

- As the thread is fully disengaged, extract the shaft with the aid of pliers.



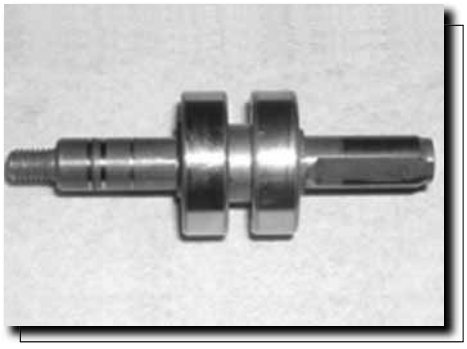
**Specific tooling**
020169Y Water pump drive shaft spanner

- Using the special hook, remove the split ring from its housing as shown in the picture.

**Specific tooling**
020209Y Spring hook

- Ensure the shaft is not abnormally worn and the bearings not noisy. Otherwise, replace shaft and bearings.

- Carefully clean oil seal and bearing housings.

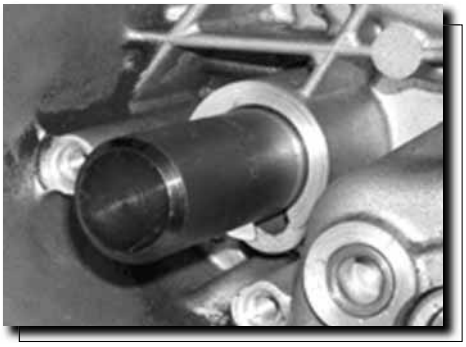


# COOLING SYSTEM

- For refitting use a new oil seal.

- Position the new oil seal on the special tool with the main lip facing the bearings as shown in the picture.

- Lubricate the oil seal and push it home using the special tool as shown in the picture



**Specific tooling**

020168y Oil seal fitting drift on half-crankcase.

- Insert the shaft, with bearings, in its housing by pushing and turning it at the same (turn anticlockwise for tightening).

- Turn it rapidly until the thread reaches the end.

- Should this operation prove difficult, do not carry on; instead, start over by reheating the crankcase.

**N.B.**

THE NON OBSERVATION OF THIS RULE MAY RESULT IN DAMAGE TO THE THREAD OF THE COPPER INSERT ON THE IMPELLER, OR THE SEPARATION OF THIS FROM THE IMPELLER ITSELF.

**Specific tooling**

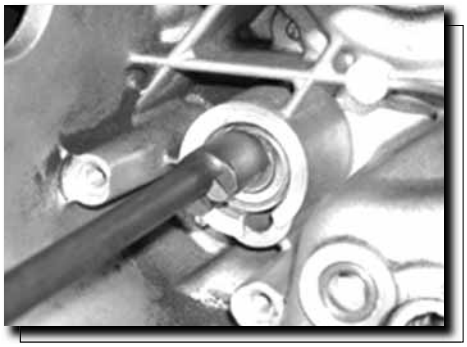
020169Y Water pump drive shaft spanner

# COOLING SYSTEM

Using the air heater, warm up the water pump bearing housing, without directing the air flux directly aginst the oil seal.

- Lubricate the end of the water pump shaft on the oil seal side, using the recommended product.

**Recommended products**
Lithium soap grease NLGI 33



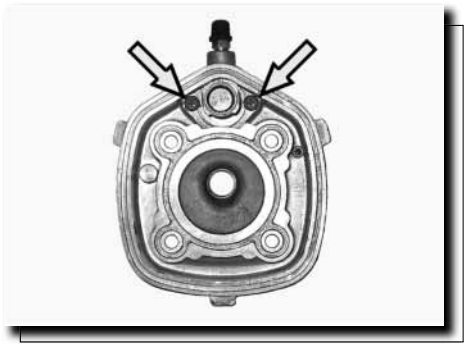
## THERMOSTAT

### Removal

- Detach the coolant hose from the head, partially draining the system.

- Remove the cylinder head.

- Remove the two fixing screws and hence the thermostat.



### Check

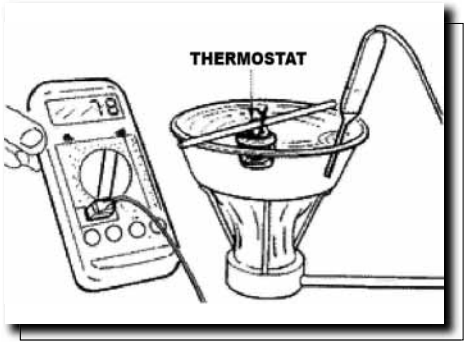
**1)** Visually ensure the thermostat is not damaged.

**2)** Fill a metallic container with approx. 1 litre of water.

Immerge the thermostat, and keep it in the centre of the bowl.

Immerge the multimeter temperature probe, and keep it close to the thermostat.

Heat up the bowl using the air heater.




Check the thermostat opening start temperature:
**Heat up until the thermostat is completely open.**

**3)** Replace the thermostat if not working properly.

# COOLING SYSTEM

**CAUTION**
AVOID CONTACT BETWEEN THERMOSTAT AND CONTAINER AND BETWEEN THERMOMETER AND CONTAINER FOR A CORRECT TEST PERFORMANCE.

**Specific tooling**
020331 Y Digital multimeter

020151Y Air heater

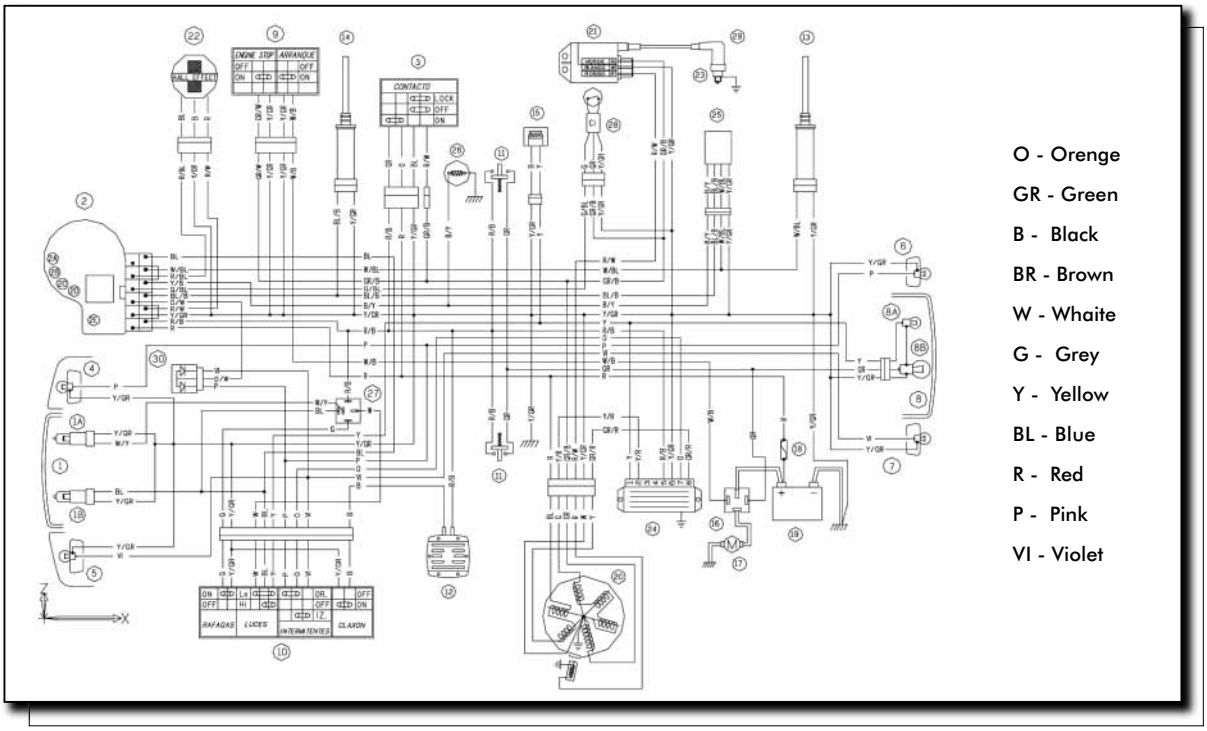
**Characteristic**
Thermostat check: Opening start temperature
60±2°C

## REFITTING

- Refit the thermostat onto the head, following the removal operations in the reverse order, and paying attention in inserting the groove on the thermostat on the reference on the head.

# ELECTRICAL SYSTEM

## GP1 50c.c. WIRING DIAGRAM

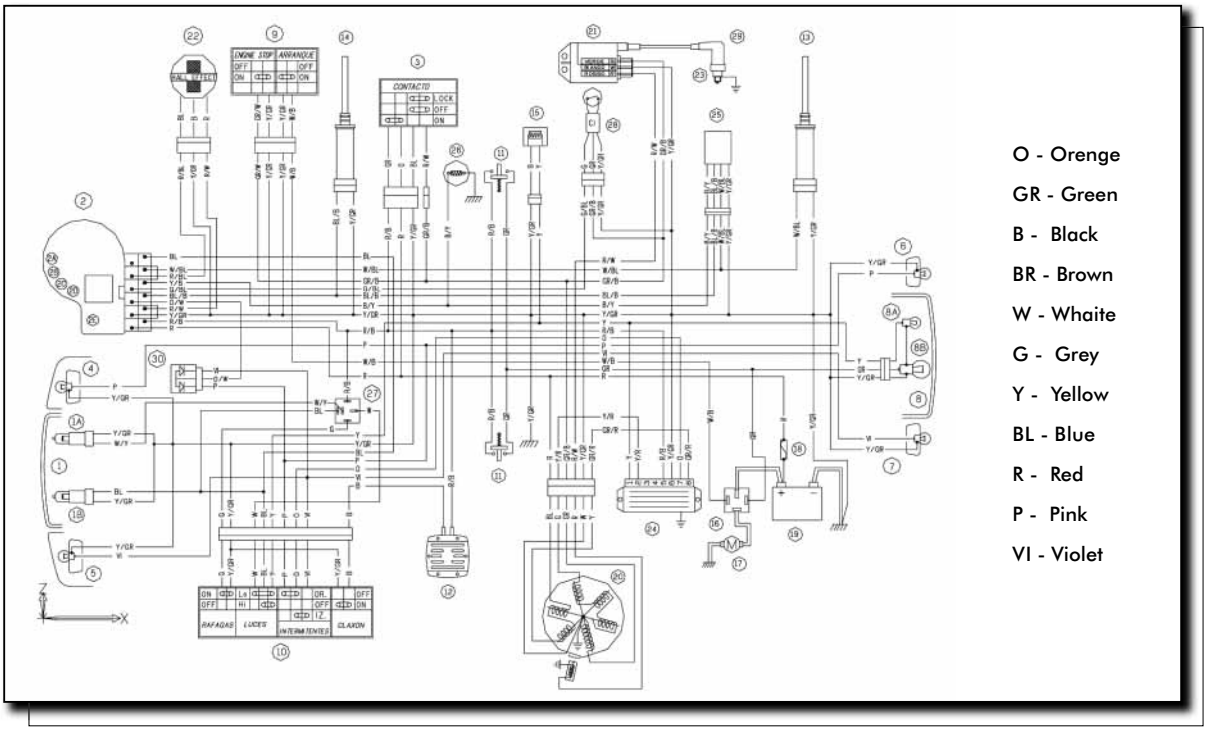



| | |
|---|---|
| 1 | Front headlight |
| 1A | 12v 35W/H8 front right hand dipped headlight |
| 1B | 12v 35W/H8 front left hand main beam headlight |
| 2 | Instrument panel |
| 2A | Water temperature LED indicator |
| 2B | Oil LED indicator |
| 2C | Fuel LED indicator |
| 2D | Main beam LED indicator |
| 2E | Turn indicators LED indicator |
| 3 | Ignition key switch |
| 4 | Right hand front turn indic. (12v 10W amber bulb) |
| 5 | Left hand front turn indic. (12v 10W amber bulb) |
| 6 | Right hand rear turn indic. (12v 10W amber bulb) |
| 7 | Left hand rear turn indic. (12v 10W amber bulb) |
| 8 | Side/Brake light assembly |
| 8A | 12v 2.3W sidelight bulb |
| 8B | 12v 16W brake light bulb |
| 9 | Engine stop and elec. start button switch assembly |
| 10 | Turn/horn/hazard flash light switch |
| 11 | Stop switch |
| 12 | Horn |
| 13 | Fuel reserve sensor |
| 14 | Oil reserve sensor |
| 15 | Choke resistance |

| | |
|---|---|
| 16 | Starter relay |
| 17 | Starter motor |
| 18 | 4 amp fuse |
| 19 | 12v 6 amp battery (maintenance free) |
| 20 | Magneto |
| 21 | Electronic converter coil |
| 22 | Electronic sensor (Hall Effect) |
| 23 | Spark plug |
| 24 | Turn indicator unit + regulator |
| 25 | Control check timer |
| 26 | Temperature thermoresistance |
| 27 | Lights relay |
| 28 | Prop stand switch |
| 29 | Spark plug cap |
| 30 | Diode box |

# ELECTRICAL SYSTEM

## GP1 50c.c. WIRING DIAGRAM SWITZERLAND




| | |
|---|---|
| 1 | Front headlight |
| 1A | 12v 35W/H8 front right hand dipped headlight |
| 1B | 12v 35W/H8 front left hand main beam headlight |
| 1C | 12v 5W sidelight |
| 2 | Instrument panel |
| 2A | Water temperature LED indicator |
| 2B | Oil LED indicator |
| 2C | Fuel LED indicator |
| 2D | Main beam LED indicator |
| 2E | Turn indicators LED indicator |
| 3 | Ignition key switch |
| 4 | Right hand front turn indic. (12v 10W amber bulb) |
| 5 | Left hand rear turn indicator (12v 10W amber bulb) |
| 6 | Right hand rear turn indicator (12v 10W amber bulb) |
| 7 | Left hand rear turn indicator (12v 10W amber bulb) |
| 8 | Side/Brake light assembly |
| 8A | 12v 2.3W sidelight bulb |
| 8B | 12v 16W brake light bulb |
| 8C | 12v 5W number plate light assembly |
| 9 | Engine stop and A/E button switch assembly |
| 10 | Turn/horn/hazard flash light switch |
| 11 | Stop switch |
| 12 | Horn |
| 13 | Fuel reserve sensor |

| | |
|---|---|
| 14 | Oil reserve sensor |
| 15 | Choke resistance |
| 16 | Starter relay |
| 17 | Starter motor |
| 18 | 4 amp fuse |
| 19 | 12v 6 amp battery (maintenance free) |
| 20 | Magneto |
| 21 | Electronic converter coil |
| 22 | Electronic sensor (Hall Effect) |
| 23 | Spark plug |
| 24 | Turn indicator unit + regulator |
| 25 | Control check timer |
| 26 | Temperature thermoresistance |
| 27 | Lights relay |
| 28 | Prop stand switch |
| 29 | Spark plug cap |
| 30 | Diode box |

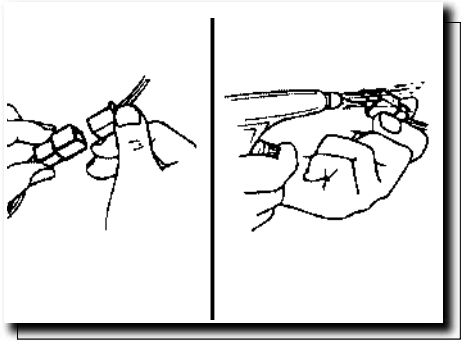
# ELECTRICAL SYSTEM

## CHECKING CONNECTORS

Check for corrosion, damp etc. in the connectors.

**1. Disconnect:**
- Connectors

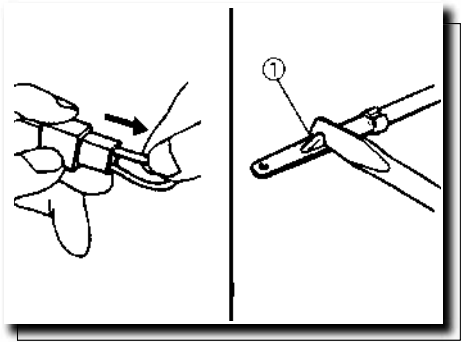
**2. Dry each of the terminals with compressed air.**



**3. Connect and disconnect two or three times.**

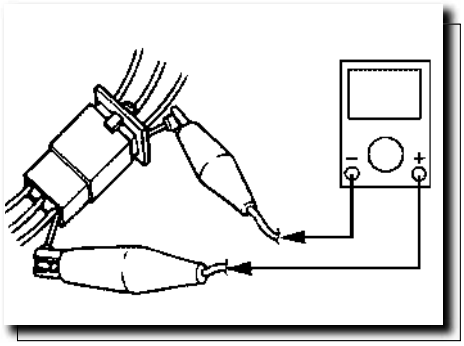
**4. Pull the conductor to check if it is loose.**

**5. If the terminal comes loose, bend the pin (1) and refit the terminal in the connector.**




**6. Connect:**
- Connector

**N.B.**
THE TWO PARTS OF THE CONNECTOR MAKE A SOUND WHEN THEY FIT TOGETHER.



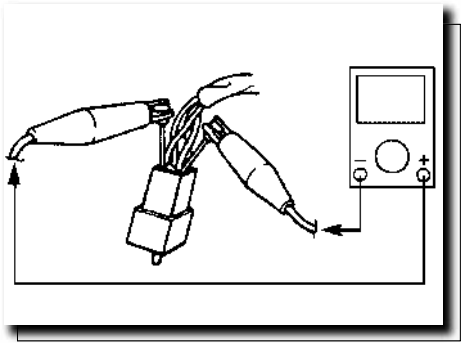
**7. Check the circuit with a Multimeter.**

**N.B.**
- IF THERE IS NO CIRCUIT, CLEAN THE TERMINALS.

- FOLLOW THE STEPS FROM (1) TO (7) ABOVE ON INSPECTING THE ELECTRICAL SYSTEM.

- AS A PROVISIONAL SOLUTION, USE A CONTACT CLEANER.

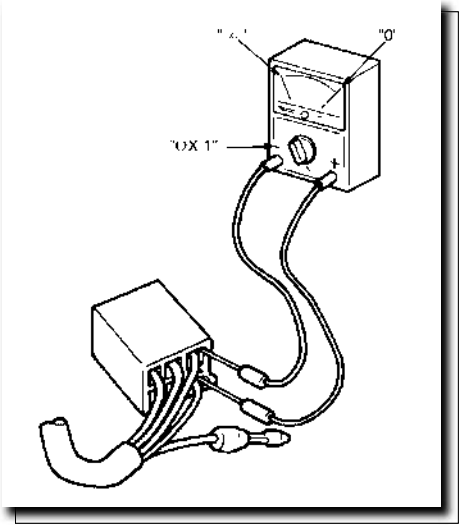
- USE THE MULTIMETER IN ACCORDANCE WITH THAT INDICATED IN THE FIGURE.



# ELECTRICAL SYSTEM

## INSPECTION STEPS

Using a multimeter, check the circuit between the terminals to make sure that they are correctly connected. Replace the component if any of the combinations gives an incorrect reading.

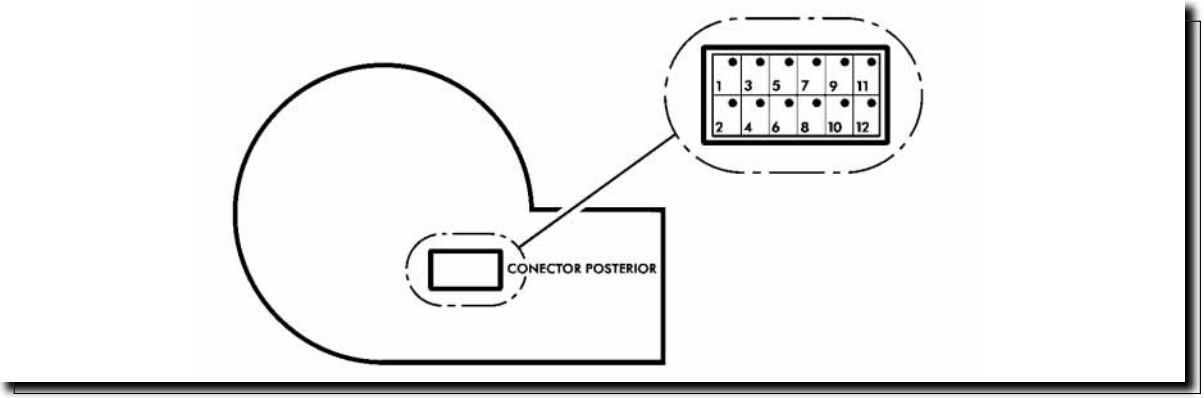



**N.B.**
- SWITCH THE "**ON**" AND "**OFF**" SWITCH ON AND OFF SEVERAL TIMES.

- ADJUST THE METER SELECTOR TO THE "**X1**" POSITION.

- ADJUST THE GAUGE TO "**ZERO**".

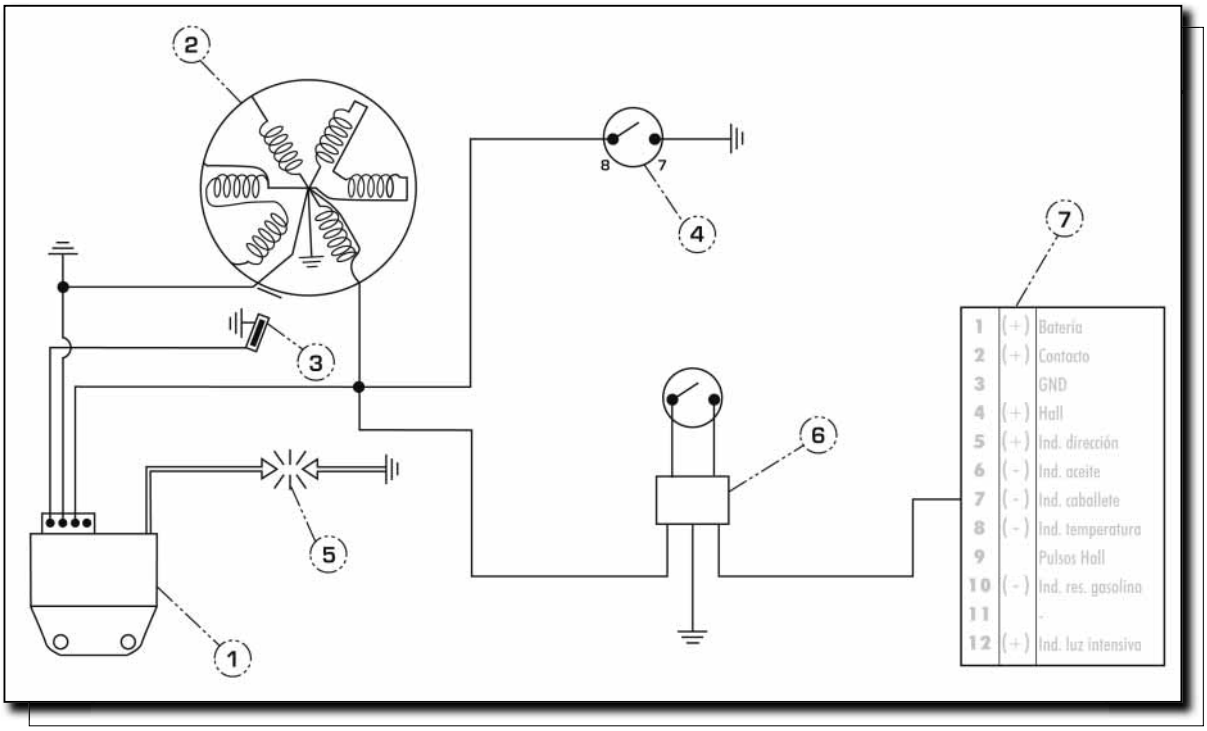
## DIGITAL INSTRUMENTS UNIT




| NUMBER CONNECTION | POLARITY | DESCRIPTION |
|---|---|---|
| 1 | (+) | Battery |
| 2 | (+) | Contact |
| 3 | (+) | GND |
| 4 | (+) | Hall Effect (without intensity 1=0).<br>**Check:** Battery voltage, at the terminals with a digital multi-meter. |
| 5 | (+) | Turn indicator. |
| 6 | (-) | Oil indicator. |
| 7 | (-) | Centre stand indicator. |
| 8 | (-) | Temperature indicator. |
| 9 | | Hall pulses. |
| 10 | (-) | Fuel reserve indicator. |
| 11 | | No connection. |
| 12 | (+) | Main beam indicator. |

# ELECTRICAL SYSTEM

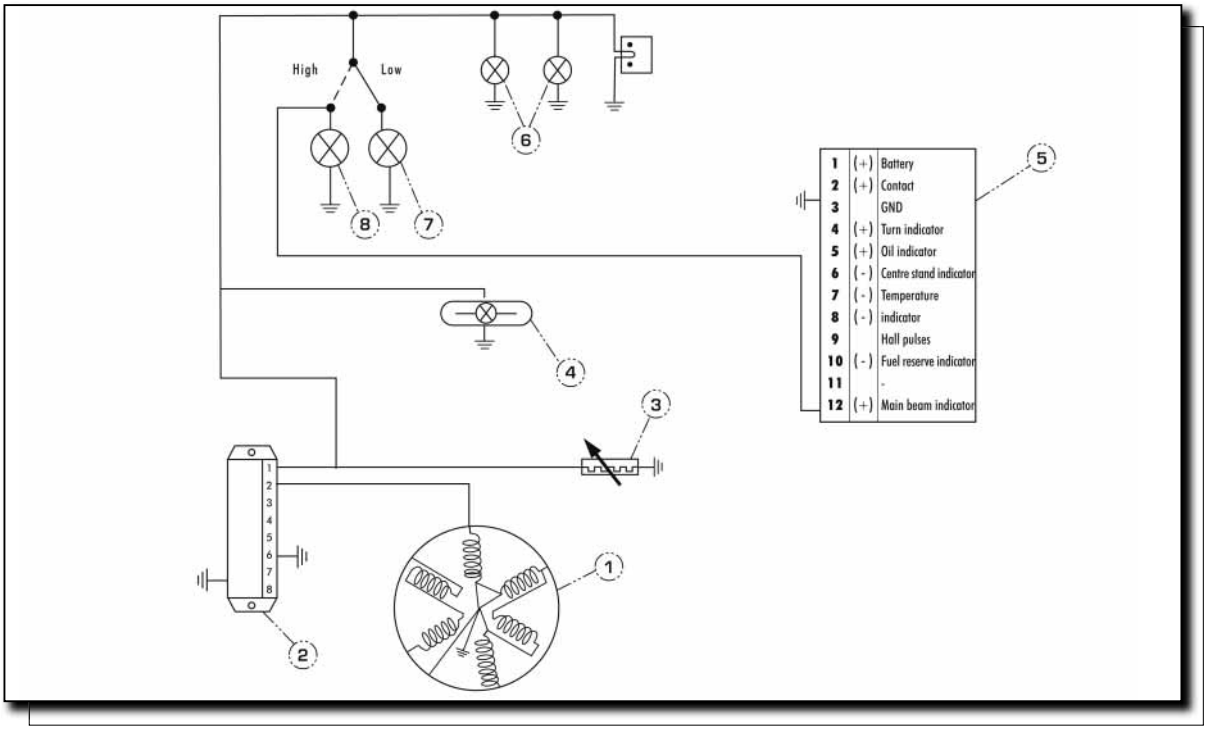
## IGNITION




| | |
|---|---|
| 1 | Electronic central unit |
| 2 | Magneto |
| 3 | Pick-Up |
| 4 | Ignition key switch |
| 5 | Spark plug |
| 6 | Control circuit |
| 7 | Digital instruments unit |

# ELECTRICAL SYSTEM

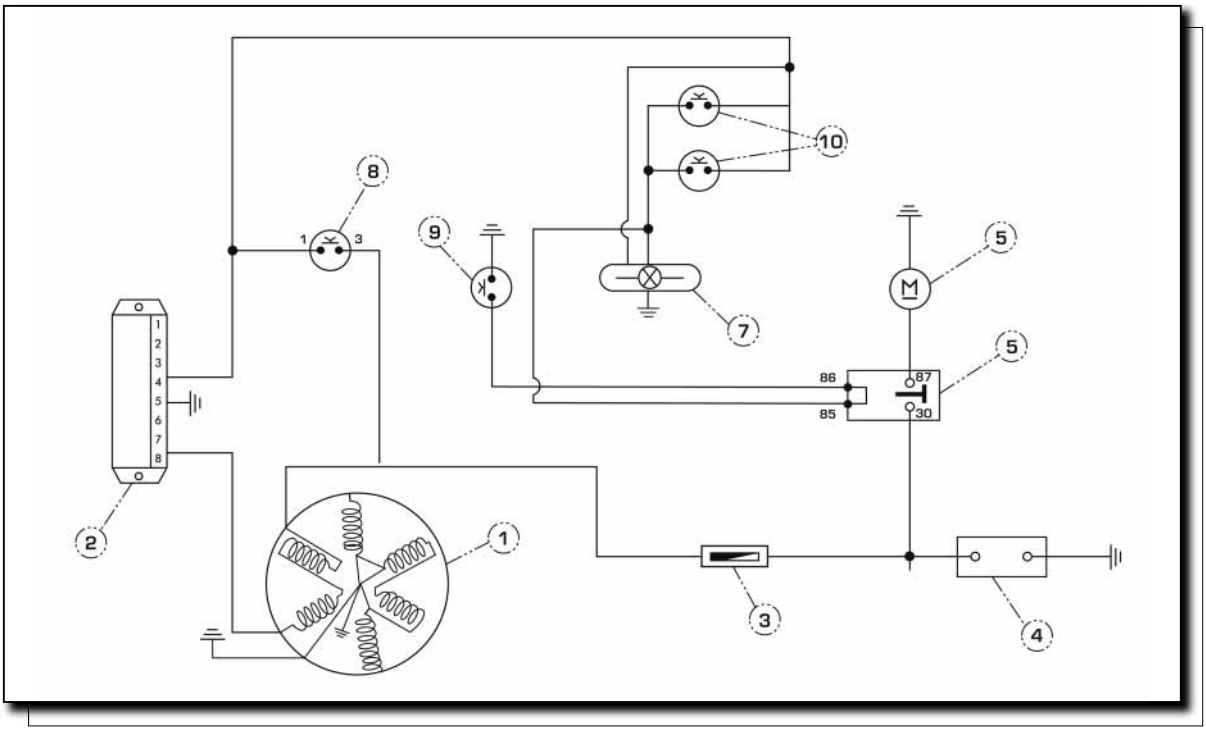
## AUTOMATIC CHOKE AND LIGHTS




| | |
|---|---|
| 1 | Magneto |
| 2 | Voltage regulator |
| 3 | Automatic choke |
| 4 | Rear light |
| 5 | Digital instruments unit |
| 6 | Front sidelight bulbs |
| 7 | Dipped headlight bulbs |
| 8 | Main beam headlight bulbs |

# ELECTRICAL SYSTEM

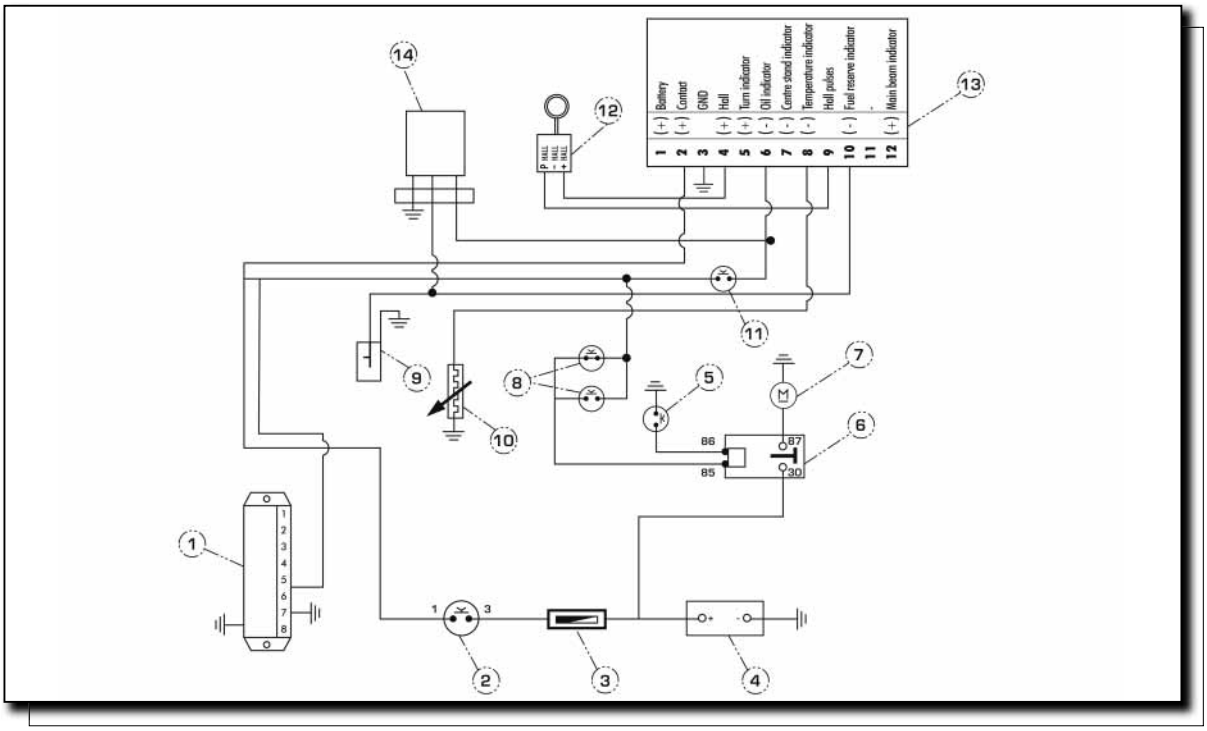
## BATTERY RECHARGE AND STARTING




| | |
|---|---|
| 1 | Magneto |
| 2 | Voltage regulator |
| 3 | 7.5 amp fuse |
| 4 | 12v 6AH battery |
| 5 | Starter relay |
| 6 | Starter motor |
| 7 | Rear light with LED |
| 8 | Ignition key switch |
| 9 | Starter button |
| 10 | Stop buttons |

# ELECTRICAL SYSTEM

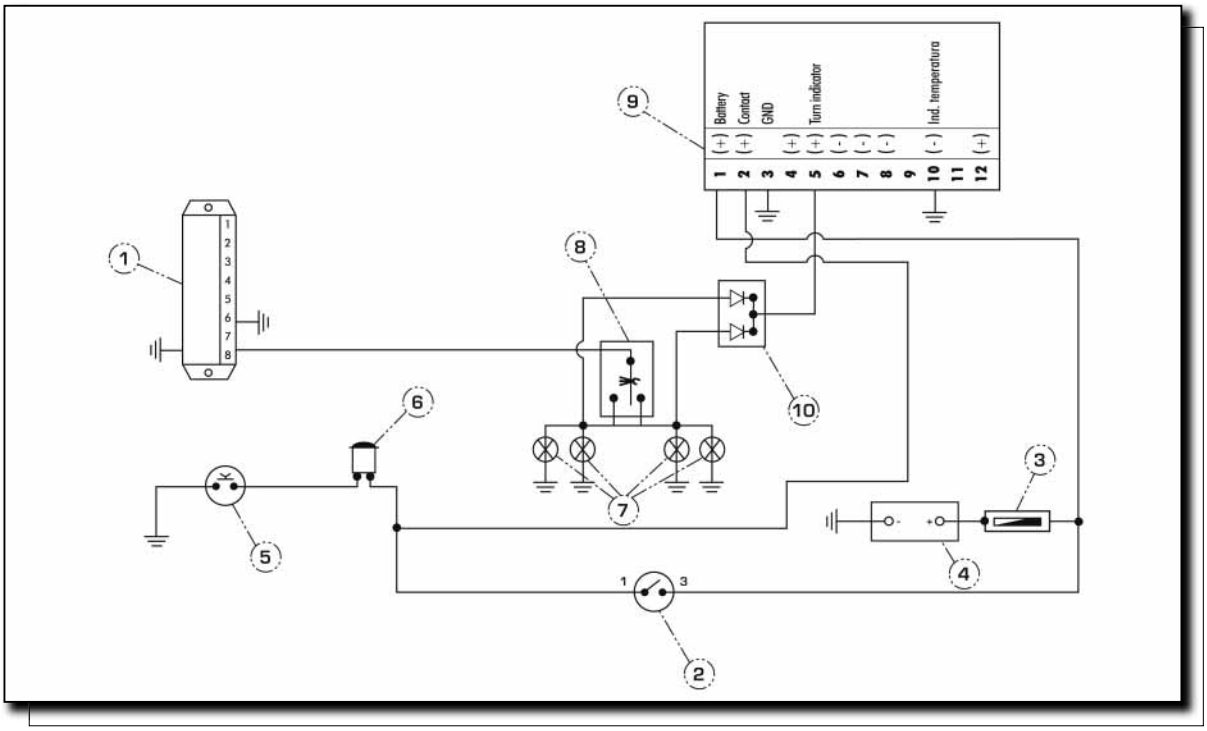
## LEVEL INDICATORS




| | |
|---|---|
| 1 | Voltage regulator |
| 2 | Ignition key switch |
| 3 | 7.5 amp fuse |
| 4 | 12v 6AH battery |
| 5 | Starter button |
| 6 | Starter relay |
| 7 | Starter motor |
| 8 | Stop buttons |
| 9 | Fuel level sensor |
| 10 | Coolant temperature sensor |
| 11 | Mixer oil level sensor |
| 12 | Phonic wheel |
| 13 | Digital instruments unit |
| 14 | Check Control |

# ELECTRICAL SYSTEM

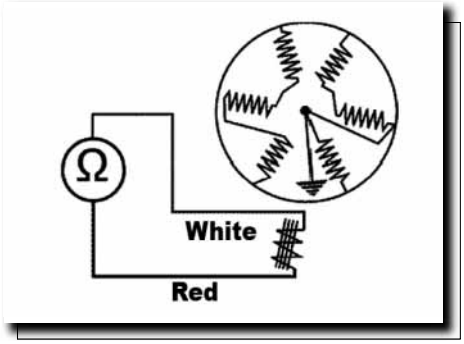
## TURN INDICATORS AND HORN




| | |
|---|---|
| 1 | Voltage regulator |
| 2 | Ignition key switch |
| 3 | 7.5 amp fuse |
| 4 | 12v 6AH battery |
| 5 | Horn button |
| 6 | Horn |
| 7 | Turn indicator bulbs |
| 8 | Turn indicator switch |
| 9 | Digital instruments unit |
| 10 | Diode box |

# ELECTRICAL SYSTEM

## CHECKS AND INSPECTIONS




**Checks to be carried out in the event of ignition faults and/or missed sparking.**

Check the spark plug (clean with a metal brush. Remove all incrustations. Blow with an air jet and replace if necessary). Without removing the stator, perform the inspections given below.

## CHECKING THE PICK-UP

| **Specification** | **Desc./Quantity** |
|---|---|
| 1 Red/white cable | 90±140ohm |

After a visual inspection of the electrical connections, carry out measurements on the recharge coil, on the pick-up (see table), and continuity measurements using the special tester.

If faults are identified through the above inspections, proceed by replacing the stator, otherwise replace the ECU. Bear in mind that the ECU connections must only be detached when the engine is not running.

**Specific tooling**
020331Y Digital multimeter

## Checking the recharge coil

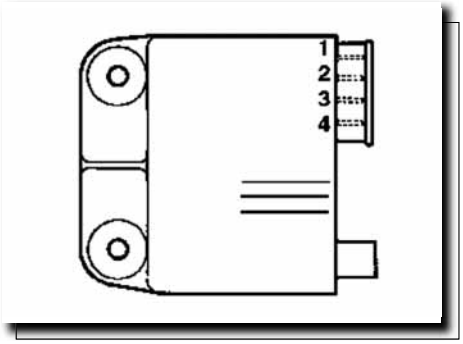
| **Specification** | **Desc./Quantity** |
|---|---|
| 1 White/green cable | 800±1100 ohm |

## Comprobación continuidad

| **Specification** | **Desc./Quantity** |
|---|---|
| 1 White cable-frame | Continuity |
| 2 White cable - engine | Continuity |

# ELECTRICAL SYSTEM

## IGNITION CIRCUIT




All checks on the electrical equipment involving the disconnection of cables (checks on ignition circuit connections and devices) are to be carried out while the engine is switched off. Should the engine be running, the C.D.I, module could suffer irreparable damage.

## STATOR CHECK

- Using a tester check the resistance between the brown-ground and black-ground terminal.

**NOTA**
THE VALUES ARE STATED FOR AMBIENT TEMPERATURE. CHECKING THE STATOR AT OPERATING TEMPERATURE WILL BRING THE VALUES ABOVE THE STATED ONES.

**Electric characteristic**
Stator : brown - ground
~ 170 Ω (pick-Up)

Stator: black-ground
~ 1 Ω (stator)

## VOLTAGE REGULATOR CHECK

The fault to the voltage regulator may cause, according to the type of fault, the following inconvenients:

Bursting of head and taillight bulbs. Head and taillight not operational. Excessive battery recharge (bursting of main fuse). Battery not recharging. Turn signals not operational. Dashboard check not operational.

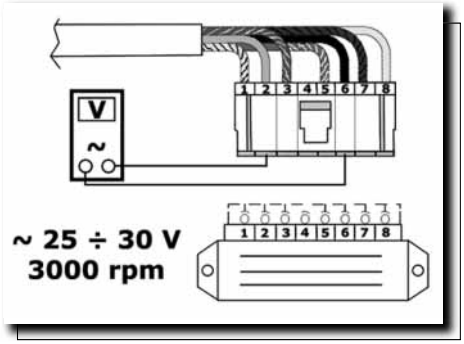
# ELECTRICAL SYSTEM

## Interventions

**FAULT 1**

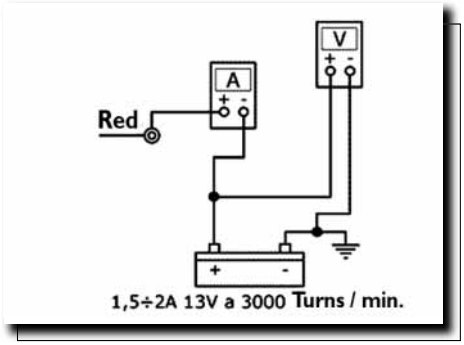
Replace the regulator as definitely faulty.

**FAULT 2**




**a)** Check the output from the stator gives the correct voltage: detach the stator connector, interpose an AC tester between the grey-blue and black cables, and check the output voltage is within the prescribed limits. If anomalies are found, replace the stator.

**b)** If no anomalies are identified, replace the regulator.

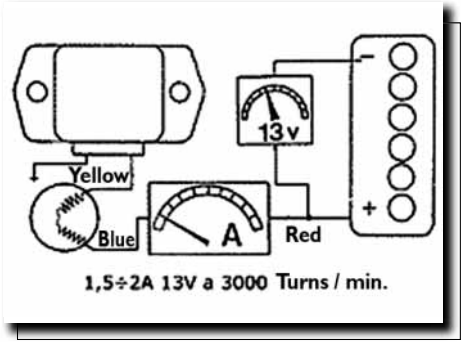



**c)** If the replacement of the regulator does not solve the fault, check the electric connections.

**Specific tooling**
020331Y Digital multimeter

**Characteristic**
Voltage output at 3000 r.p.m.
25÷30V

**FAULT 3**

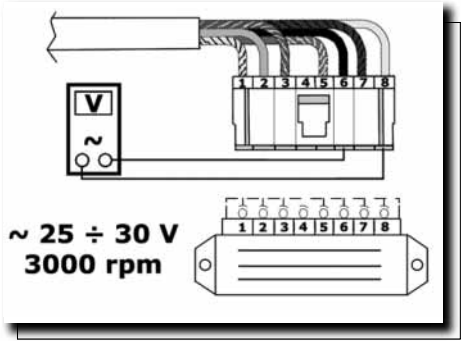



With the engine off and the regulator connector detached, check there are no short-circuits in the system, with reference to ground. Then replace the regulator (with fuse) as this is definitely faulty.

After replacing the regulator, measure the charge voltage and current at the battery terminals.

# ELECTRICAL SYSTEM

**FAULT 4**




**a)** Interposing the AC tester between the black and yellow cables on the regulator, check the generator output voltage is within the prescribed values (this measurement must be carried out with the battery detached). In the event of anomalies, replace the stator; otherwise proceed to point b).

**b)** Insert an ammeter between the stator (blue cable) and the battery and check with the tester that the current output, at 3,000 rpm and with the battery kept between 12 and 13V, is as shown. If the values thus obtained are lower than prescribed, proceed by replacing the regulator.

**N.B.**
BEFORE CARRYING OUT INSPECTIONS ON THE REGULATOR AND ITS ELECTRICAL SYSTEMS, IT IS ALWAYS ADVISABLE TO CHECK FOR CONTINUITY BETWEEN THE BLACK CABLE AND GROUND.

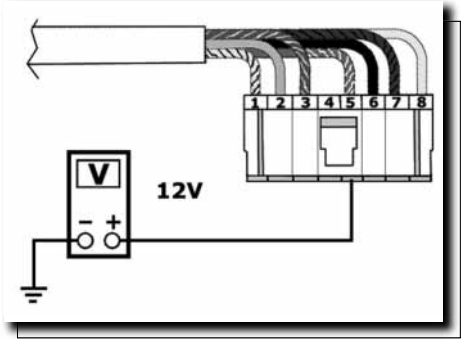
**N.B.**
TO MAINTAIN THE BATTERY BETWEEN 12 AND 13V, RESULTING IN CURRENT BEING ABSORBED FROM THE CIRCUIT, IT IS POSSIBLE TO USE A 12V-35W LIGHT BULB LOCATED BETWEEN BATTERY + AND GROUND.

**Specific tooling**
020331Y Digital multimeter

**Characteristic**
Voltage output at 300 rpm
25÷30V

**Current output**
1,5÷2V

**FAULT 5**

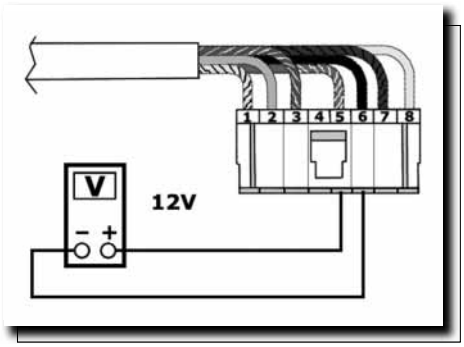



In the event that the turn signal lights are not operational, proceed as follows:
- Remove the regulator connector and insert the tester terminals between pin 5 and ground.

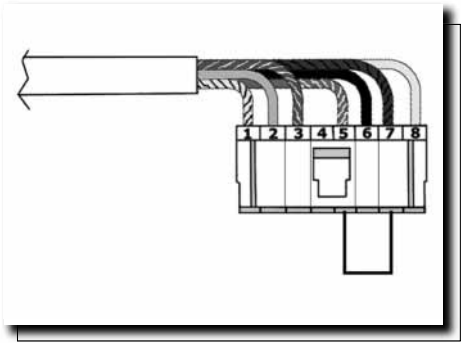
- Turn the ignition switch onto ON and check for battery voltage. If no voltage is found, check wiring and terminals on key-switch and battery.

# ELECTRICAL SYSTEM

- Repeat the same operation with the terminals inserted between pins 5 (+) and 6 (-) and check for the presence of battery voltage with the ignition switch onto ON. If unsuccessful, check the ground cable on the regulator.




- If the checks given above are unsuccessful, jump pins 5 and 7 on the connector, turn the key-switch onto ON and turn the turn signal switch alternately from left to right to visualize the continuous operation of the lights (as powered directly by the battery). If the lights do not go on, check the switch and its cable, if these are not damaged or faulty; replace the regulator as definitely faulty.



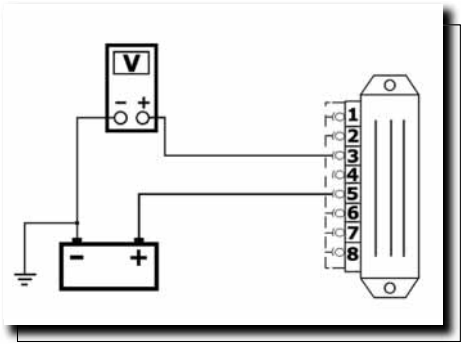

**Specific tooling**
020331Y Digital multimeter

**FAULT 6**

Dashboard check light does not go on. Detach the connector to the voltage regulator.
- Apply a tension of 12V to the pin marked with the number 5, check, using the digital tester; there is an equivalent output (12V) from pin 3 for at least 5 seconds.

- If pins no. 4 and/or no. 3 give no output voltage, replace the regulator.

- If pin no. 3 gives output voltage, check the system and the low-oil or low-fuel warning lights.




**Specific tooling**
020331Y Digital multimeter

# ELECTRICAL SYSTEM

## FUSES

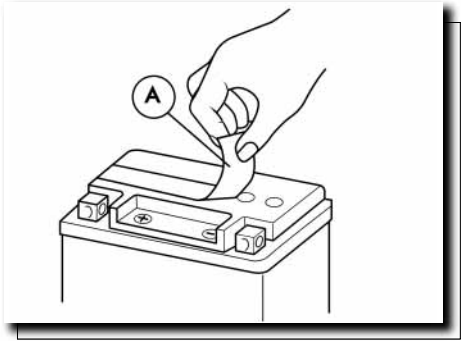
The electrical system is protected by a fuse located on the r.h.s. of the battery bay. To replace it, lift the seat, remove the battery access door and then the transparent fuse cover. Ignition system, headlight, and taillight are not protected by the fuses.

**CAUTION**
BEFORE REPLACING THE BLOWN FUSE, TRY TO ELIMINATE THE FAULT THAT HAS CAUSED IT TO BLOW.

NEVER TRY TO REPLACE A FUSE USING DIFFERENT MATERIAL (FOR EXAMPLE A PIECE OF ELECTRIC WIRE) OR A FUSE WITH HIGHER AMPERAGE.

**Characteristic**
Fuse

## DISMANTLING THE BATTERY




**WARNING**
ENSURE THAT YOU DISCONNECT THE CABLE FROM THE NEGATIVE TERMINAL FIRST.

FILLING WITH ELECTROLYTE

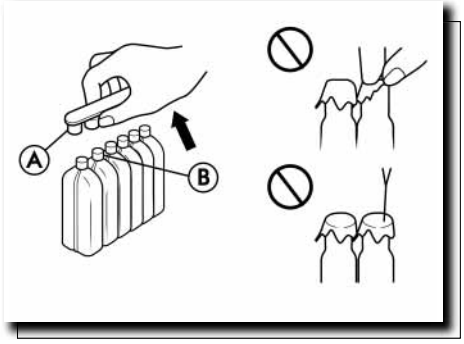
**WARNING**
DO NOT REMOVE THE ALUMINIUM SEALING STRIP THAT SEALS THE FILLING HOLES UNTIL JUST BEFORE USING IT. THE ELECTROLYTE CONTAINER SUPPLIED WITH THE BATTERY MUST BE USED.

- Place the battery on a level surface.

- Remove the closing strip (A).

- Remove the electrolyte container from the bag.

- Detach the plug strip (A) from the container.

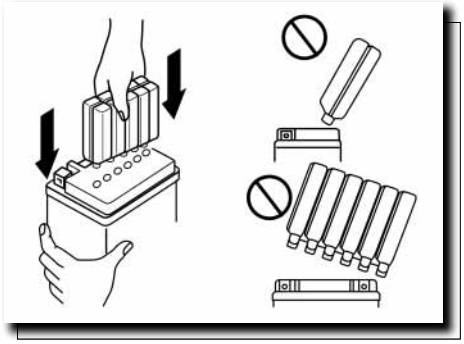



**NOTA**
- DO NOT THROW AWAY THE PLUG STRIP AS IT WILL BE SUBSEQUENTLY USED AS BATTERY PLUGS.

- DO NOT DETACH OR PERFORATE THE HERMETIC CLOSING SURFACES (B).

# ELECTRICAL SYSTEM

- Upturn the electrolyte container with the six closing surfaces aligned with the six battery filling holes.

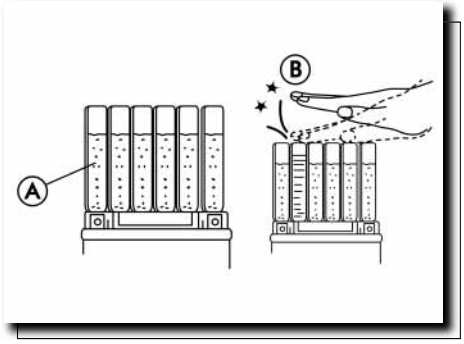


- Push the container down with enough force to break the seals. The electrolyte should then begin to flow into the battery.

**N.B.**
- DO NOT TILT THE CONTAINER, AS THIS MAY INTERRUPT THE FLOW OF THE ELECTROLYTE.

- MAKE SURE THAT AIR BUBBLES (A) EMERGE FROM THE SIX FILLING HOLES.

- LEAVE THE CONTAINER IN THIS POSITION FOR 30 MINUTES OR MORE.

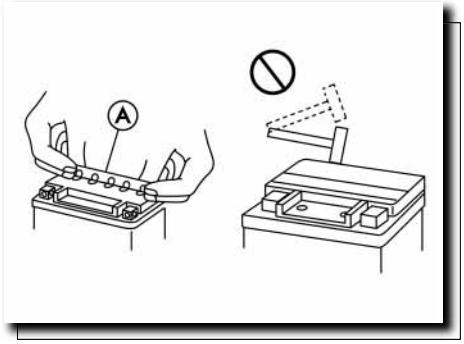



**N.B.**
- IF BUBBLES DO NOT EMERGE FROM THE FILLING HOLES, TAP THE BOTTOM OF THE BOTTLE (A) LIGHTLY TWO OR THREE TIMES. NEVER REMOVE THE CONTAINER FROM THE BATTERY.

**WARNING**
REFILL THE BATTERY WITH ELECTROLYTE UNTIL THE CONTAINER HAS COMPLETELY EMPTIED.

- Make sure all the electrolyte has emptied out.

- Tap the bottom lightly as indicated above if any electrolyte has remained in the container.




- Now withdraw the container gently from the battery.

- Leave the battery standing for 30 minutes. During this period the electrolyte penetrates into the special separators and the gas generated by the chemical reaction is given off.

- Push the plug strip (A) firmly into place in the filling holes until the strip lies flush with the top of the battery.

**N.B.**
- DO NOT HIT WITH A HAMMER. PRESS DOWN EVENLY WITH BOTH HANDS.

**WARNING**
ONCE THE PLUG STRIP HAS BEEN FITTED FOLLOWING THE BATTERY FILLING, NEVER REMOVE IT OR ADD WATER TO THE ELECTROLYTE.

# ELECTRICAL SYSTEM

## BATTERY-INITIAL CHARGE

Accepting that a battery requiring no maintenance can be used only once it has been filled with electrolyte, the battery may be incapable of starting the engine in the cases indicated in the following table, where it is necessary firstly to give it an initial charge. However, if a battery shows a voltage at the terminals of over 12.5v 10 minutes after filling (Note 1), the initial charge is not necessary.

## CAPACITY

| STATE THAT REQUIRES AN INITIAL CHARGE | CHARGING METHOD |
|---|---|
| **At low temperatures (below 0ºC)** | 0,4A x 2-3 hours |
| **The battery has been stored at high temperature and humidity** | 0,4A x 15-20 hours |
| **The closing strip has been removed or is broken – peeled, torn or punctured** | |
| **2 or more years have transpired since the battery was manufactured** | |

NOTE 1: Terminal voltage – To measure the battery terminal voltage, use a digital voltmeter.

**PRECAUTION**
**1).** DOES NOT REQUIRE REFILLING.
WHEN USED IN A NORMAL WAY, THIS BATTERY DOES NOT REQUIRE REFILLING UNTIL THE END OF ITS LIFE. LEVERING OFF THE CLOSING STRIP TO ADD WATER IS VERY DANGEROUS. NEVER DO THIS.

**WARNING**
THIS BATTERY IS DESIGNED IN SUCH A WAY THAT IT SHOULD NOT SUFFER EXCESSIVE DETERIORATION IF RECHARGED ACORDING TO THE METHOD SPECIFIED ABOVE. TAKE CARE HOWEVER, SINCE THE BATTERY'S PERFORMANCE MAY BE NOTABLY REDUCED IF CHARGED IN CONDITIONS OTHER THAN THE ABOVE.
NEVER REMOVE THE CLOSING STRIP DURING RECHARGING.

**2).** WHEN THE MOTORCYCLE IS NOT TO BE USED FOR A PERIOD OF MONTHS:
RECHARGE IT BEFORE STORING THE MOTORCYCLE, AND STORE IT WITH THE NEGATIVE CABLE DISCONNECTED. RECHARGE IT ON A MONTHLY BASIS DURING THE STORAGE PERIOD.

**3).** BATTERY LIFE:
IF THE BATTERY FAILS TO START THE ENGINE EVEN AFTER VARIOUS RECHARGES, THIS MEANS THAT THE BATTERY HAS REACHED THE END OF ITS LIFE. REPLACE IT WITH A NEW ONE. (ALWAYS ASSUMING HOWEVER THAT THERE ARE NO PROBLEMS IN THE MACHINE'S STARTER SYSTEM)

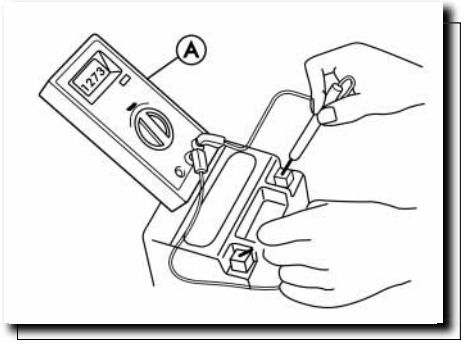
# ELECTRICAL SYSTEM

**TAKE CARE**
KEEP THE BATTERY AWAY FROM SPARKS OR NAKED FLAMES DURING THE CHARGING PROCESS, SINCE THE BATTERY GIVES OFF AN EXPLOSIVE MIXTURE OF HYDROGEN AND OXYGEN GASES. WHEN USING A BATTERY CHARGER, CONNECT THE CHARGER TO THE BATTERY BEFORE PLUGGING IT IN. THIS PROCEDURE PREVENTS SPARKS FROM BEING PRODUCED AT THE BATTERY TERMINALS THAT MAY IGNITE THE GASES COMING FROM THE BATTERY.
NEVER LIGHT A FIRE NEAR THE BATTERY. THE TERMINALS MUST NOT BE LOOSE.
THE ELECTROLYTE CONTAINS SULPHURIC ACID. TAKE GREAT CARE THAT THIS DOES NOT COME INTO CONTACT WITH THE SKIN OR EYES.
IF IT DOES COME INTO CONTACT WITH THESE, WASH THE AFFECTED AREA IMMEDIATELY WITH AN ABUNDANT AMOUNT OF WATER. IF THE CONDITION IS SERIOUS, GET MEDICAL ATTENTION.

INTERCHANGEABILITY
A BATTERY THAT DOES NOT REQUIRE MAINTENANCE CAN ONLY GIVE ITS BEST PERFORMANCE IN COMBINATION WITH THE ELECTRICAL SYSTEM OF THE CORRECT MACHINE. THEREFORE ONLY FIT A MAINTENANCE-FREE BATTERY ON A MOTORCYCLE THAT WAS ORIGINALLY FITTED WITH A MAINTENANCE-FREE BATTERY.

TAKE CARE, SINCE FITTING A MAINTENANCE-FREE BATTERY ON A MOTORCYCLE WITH A NORMAL BATTERY AS ORIGINAL EQUIPMENT WILL RESULT IN THE LIFE OF THE MAINTENANCE-FREE BATTERY BEING SHORTENED.

## INSPECTING THE CHARGING CONDITIONS




Battery charging conditions can be checked by measuring the voltage at the battery terminals.

- Remove the seats (see Chassis chapter).

- Disconnect the cables from the battery.

**WARNING**
ENSURE THAT YOU DISCONNECT THE CABLE FROM THE NEGATIVE TERMINAL FIRST.

ENSURE THAT YOU DISCONNECT THE CABLE FROM THE NEGATIVE TERMINAL FIRST.

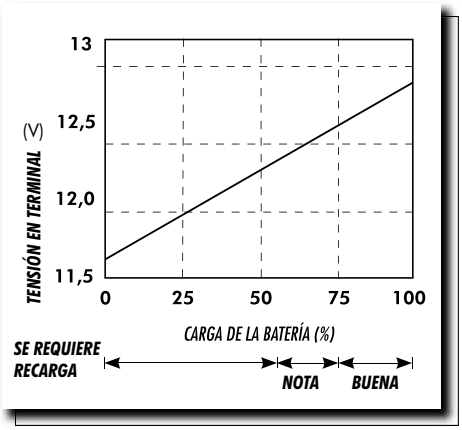
# ELECTRICAL SYSTEM

**N.B.**
CARRY OUT THE MEASUREMENT WITH A DIGITAL VOLTMETER (A) THAT CAN READ VOLTAGES WITH DECIMAL FIGURES.

* IF THE READING IS BELOW THAT SPECIFIED, THE BATTERY NEEDS TO BE RECHARGED.

**Battery terminal voltage**
**Standard:** 12.5v or higher

- Measure the voltage at the battery terminals.

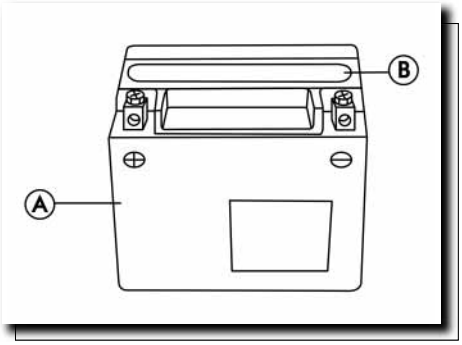



## RECHARGING

- Disconnect the cables from the battery terminals (see inspecting the charging conditions).

- Remove the battery (A).

- Carry out the recharging by following the method, and according to the voltage at the battery terminals.




**WARNING**
THIS BATTERY IS THE HERMETIC (AIRTIGHT) TYPE. NEVER REMOVE THE CLOSING PLUGS (B), NOT EVEN WHEN CHARGING. NEVER ADD WATER.

CARRY OUT THE CHARGING WITH THE CURRENT AND FOR THE PERIOD INDICATED BELOW.

**Battery terminal voltage:** 11.5 – Less than 12.5V
**Standard charge:**
0.4A x 5 - 10h (see the graph on the following page)

# ELECTRICAL SYSTEM

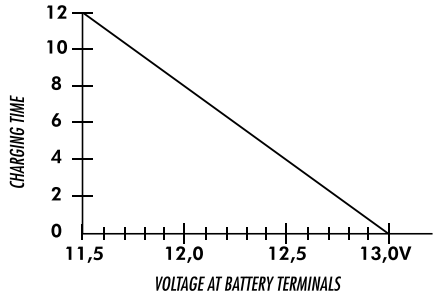
## CHARGING SYSTEM

**- A charger with a constant intensity and voltage needs to be used.**

**STANDARD CHARGE: 0.38AH FOR 10 HOURS IF THE VOLTAGE IS BELOW 12.5V.**

**- Carry out charging using the enclosed table.**

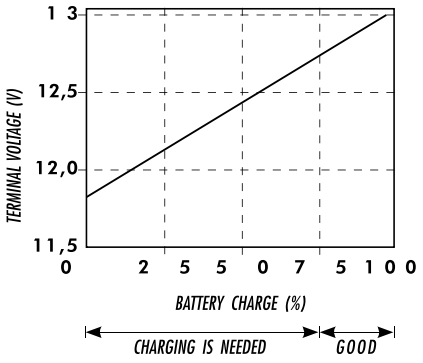
**STANDARD BATTERY CHARGING TIME.**




**STANDARD VALUES TO DETERMINE THE STATE OF THE BATTERY.**

| | |
|---|---|
| Voltage of 12.5v or higher | Correct |
| Voltage from 12.0 to 12.4 | Insufficient charge. Charge up. |
| Voltage of 11.9 or less | Unusable (Replace) |

**MONITORING GRAPH TO DETERMINE BATTERY CONDITION**



# TROUBLESHOOTING

This section is for solutions to solve problems.

A list of possible causes is provided for each problem and reated operations.

## ENGINE

### POOR PERFORMANCE

| CAUSES POSSIBLE | WORK |
|---|---|
| Fuel pump defective or vacuum tube damaged | Replaced pump or tubing |
| Carbirettor jets colgged or dirty | Remove. wash in solvent and dry with compressed air |
| Fuel filter on tank oulet joint dirty or obstructed | Clean the joint filter |
| Excessivge carbon deposits on cylinder ports and in combustion chamber | Decoke |
| Poor compression> worn compression rings or cylinder | Check parts and replace if necessary |
| Silencer clogged by excessive carnob deposits | Replace silencer and check carburation and mixer timing |
| Air filter colgged or dirty | Clean |
| Choke failure (it remains inserted) | Check mechanical sliding, circuit continuity, power supply, and electrical connections |
| Clutchs slippage | Check and if necessary replace the centrifugal weights and/or clutch housing |
| Defective sliding of movable pulleys | Check parts and replace if cenessary. Lubricate the driven pulley with Montblanc-Molibdenum Grease (drg. 498345). |
| Worn driving belt | Replace |
| Rollers worn, presence of oil dirt | Clean the variator; replace rollers if worn |

# TROUBLESHOOTING

## REAR WHEEL SPINS AT IDLE

### REAR WHEEL

| CAUSES POSSIBLE | WORK |
|---|---|
| Idle speed set too high | Adjust slow running speed and C.O. if necessary |
| Faulty clutch | Check springs/weight of friction and clutch housing pan |
| Air filter box not sealed | Refit filter box. Replace if it is damaged |

### STARTING DIFFICULTY

| CAUSES POSSIBLE | WORK |
|---|---|
| Carburettor jets clogged or dirty | Remove, wash in solvent and dry with compressed air |
| Fuel pump defective or vacuum tube damaged | Replace pump or tubing |
| Choke failure | Check: electrical connections, circuit continuity, mechanical sliding and power supply |
| Battery is down | Check the battery charge condition. If the battery shows signs of sulfation, replace it. Before installing the new battery, charge it for eight hours with a current corresponding to 1/10 of the capacity of the battery. |
| Engine flooding | Open the throttle wide and try to start the engine. If the engine does not start, remove the spark plug, run the engine with throttle open making sure the cap is connected to the spark plug and the spark plug is earthed, far from the hole. Fit a dry spark plug and start the engine. |
| Wrong fuel specifications | Drain the fuel and then refuel |
| Spark plug defective, or electrode gap incorrect | Clean; adjust electrode gap or replace, always using recommended spark plugs. Please keep in mind that most engine problems result from the use of inappropriate spark plugs |
| Intake duct cracked or not sealing | Replace intake duct and check its sealing with crankcase and carburettor |
| Cleaner-carburettor union damaged | Replace |

# TROUBLESHOOTING

## EXCESSIVE OIL CONSUMPTION/EXHAUST SMOKE

| CAUSES POSSIBLE | WORK |
|---|---|
| Excessive carbon deposits on cylinder ports and in combustion chamber | Decoke |

## ENGINE TENDS TO CUT-OFF AT FULL THROTTLE

### ENGINE STOPS AT FULL THROTTLE

| CAUSES POSSIBLE | WORK |
|---|---|
| Maximum jet dirty - lean carburetion | Wash with solvent and dry with compressed air. |
| Fuel cock failure | Check that the fuel comes through the feed pipe when the engine is started, with the throttle closed; if not, replace the vacuum cock. |
| Water in the carburettor | Empty the basin by the special drain. |
| Float valve faulty | Check float sliding and needle valve operation. |
| Float valve defective | Check float and needle sliding. |
| Fuel vent pipe colgged | Resorte the proper tank aeration. |

## ENGINE TENDS TO CUT-OFF AT IDLE

### ENGINE STOPS AT IDLE

| CAUSES POSSIBLE | WORK |
|---|---|
| Idle nozzle dirty | Wash with solvent and dry with compressed air |
| The choke stays open | Check: electrical connections, circuit continuity, mechanical sliding and power supply |
| The reed valve does not close | Check / replace the reed pack |
| Slow running incorrectly tuned up | Tune up slow running and check C.O. level |
| Spark plug faulty | Replace spark plug with an equivalent part having the prescribed heat grade. Check electrodes gap |

# TROUBLESHOOTING

## HIGH FUEL CONSUMPTION

### EXCESSIVE CONSUMPTION

| CAUSES POSSIBLE | WORK |
|---|---|
| Air filter clogged or dirty | Clean |
| Inefficient starter | Check: electric connections, circuit continuity, mechanical sliding, and presence of power |

## EXCESSIVE EXHAUST NOISE

### NOISE INCREASE

| CAUSES POSSIBLE | WORK |
|---|---|
| Secondary air metallic tube deteriorated | Check the seal of the tubing against crankcase and secondary air box. Check tubing between box and exhaust. |
| Secondary air circuit components faulty | Check components and tubing. Check correct assembly. Replace components if damaged. |

## SURRISCALDAMENTO MOTORE

### ENGINE OVERHEATING

| CAUSES POSSIBLE | WORK |
|---|---|
| No coolant within the cooling circuit | Top up the level and ensure there are no leaks within the circuit. |
| Air-bleed badly performed | Repeat the operation |
| Thermostat remains shut | Replace |
| Coolant leaks from radiator | Replace the radiator |
| Coolant leaks from system | Overhaul the system |
| Coolant leaks from crankcase draining hole | Replace coolant sealing ring on half-crankcase from transmission-side |
| Coolant pump impeller bearing seized | Replace bearings and, if necessary, shaft and impeller |
| Mixer drive-belt snapped | Replace belt and check the cylinder assembly is not damaged |

# TROUBLESHOOTING

## SAS MALFUNCTIONS

### Looseness of rubber union of secondary air tube to silencer

| CAUSES POSSIBLE | WORK |
|---|---|
| Secondary air reed blocking | Replace |
| Secondary air filter clogged | Clean filter and box |
| Secondary air union to silencer clogged | Decoke the union taking care not to let the carbon deposits fall inside the silencer |

## TRANSMISSION AND BRAKES - CLUTCH GRABBING OR PERFORMING INADEQUATELY

### Brakes

| CAUSES POSSIBLE | WORK |
|---|---|
| Clutch slippage or irregular operation | Ensure shoes open and close freely.<br><br>Check no grease is present on the shoes.<br><br>Check the shoes' contact surface against the drum is thicker in the centre and equivalent on all three shoes.<br><br>Check the drum is not abnormally scratched or worn.<br><br>Never let the engine run without clutch drum. |

# TROUBLESHOOTING

## INSUFFICIENT BRAKING

### BRAKING SYSTEM FAILURE

| CAUSES POSSIBLE | WORK |
|---|---|
| Insufficient braking force | The rear brake (drum brake) is adjusted by setting the relative registers (on the wheel), remembering that the wheels must turn freely when the brake levers are fully released.<br><br>The braking action should start when brake levers are pulled at 1/3 of their travel.<br><br>Check wear of brake pads. If there are problems that cannot be overcome simply by normal adjustment of the control linkages, proceed to inspect the pads and front brake disc, the shoes and the rear drum.<br><br>If surfaces are excessively worn or scored, replace the affected parts as necessary. |
| Air bubbles in the braking hydraulic system | Carefully bleed the hydraulic system (spring action of the brake lever should not be felt) |
| Fluid leakage | Spring connections, piston gaskets or brake pump failure. Replace |
| Worn fluid | Change the front brake fluid and restore correct level in the pump |
| Cables not sliding properly in sheaths | Lubricate or replace |
| Noisy brake | Check pads and/or shoes wear |

### BRAKES OVERHEATING

| CAUSES POSSIBLE | WORK |
|---|---|
| Defective piston sliding | Check the caliper and replace any damaged parts |
| Brake disc or drum deformed | Check by means of a dial gauge the disc levelness with the wheel correctly mounted, or concentricity of the rear drum |

# TROUBLESHOOTING

## ELECTRICAL SYSTEM

### BATTERY

| CAUSES POSSIBLE | WORK |
|---|---|
| Battery | This one component of the system needs checking more frequently and servicing more carefully than any other. If the vehicle is to stand idle for any length of time (one month or longer), the battery will need recharging periodically. The battery discharges completely over a period of around 5 - 6 months. When fitting the battery to the vehicle, take care not to switch the connections: the black earth lead is connected to the negative terminal and the red lead to the positive terminal marked +. To charge the battery, follow the instructions described in Chapter ELECTRICAL EQUIPMENT. |

## STEERING AND SUSPENSIONS - REAR WHEEL

### POOR ROAD HANDLING

| CAUSES POSSIBLE | WORK |
|---|---|
| Suspensions faulty | Check integrity and operation of rear shockabsorber and/or front fork. Replace or overhaul front fork and/or replace rear shock absorber if faulty |
| Tyres damaged or low inflating pressure | Check tyre inflation pressure and tread. Inflate at correct pressure or replace |
| Front and/or rear suspension fixings loosen | Check tightening torques between frame, swingarm, and engine, and those between wheels, hubs, and/or axle. Check the torque on the steering lock-nuts. |

# TROUBLESHOOTING

## HEAVY STEERING

| CAUSES POSSIBLE | WORK |
|---|---|
| Unacceptable tightening | Check the tightening torque of the upper and lower collar. If the steering fails to turn smoothly even when correctly tightened, inspect the bearing races and replace if they show signs of uneven wear. |

## EXCESSIVE STEERING PLAY

| CAUSES POSSIBLE | WORK |
|---|---|
| Excessive steering play | Check the tightening torque of the upper and lower collar. If the steering fails to turn smoothly even when correctly tightened, inspect the bearing races and replace if they show signs of uneven wear. |

## NOISY SUSPENSION

| CAUSES POSSIBLE | WORK |
|---|---|
| Front suspension components damaged | Check for the absence of noise coming from the fork during compression and rebound. If necessary, overhaul the fork. Ensure the wheel spins freely and without any noise; otherwise replace the wheel bearings. |
| Rear-suspension components damaged | Check for the absence of noise coming from the fork during compression and rebound. If necessary, check the tightening torques on the swingarm and the absence of oxidations, or replace the shock-absorber. Ensure the wheel spins freely and without any noise; otherwise replace the final gearing train. |

# TROUBLESHOOTING

## SUSPENSION OIL LEAKAGE

| CAUSES POSSIBLE | WORK |
|---|---|
| Rear shock-absorber faulty | Replace the shock-absorber assembly |
| Inner fork hydraulic damper damaged | Replace the hydraulic damper |

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