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# MANUALE STAZIONE DI SERVIZIO

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**MSS APE 50 (2012)**

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# MANUALE STAZIONE DI SERVIZIO

## MSS APE 50 (2012)

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# MANUALE STAZIONE DI SERVIZIO MSS APE 50 (2012)

## WORKSHOP MANUAL

This workshop manual has been drawn up by PIAGGIO & C. Spa to be used by the workshops of Piaggio dealers. This manual is addressed to Piaggio service mechanics who are supposed to have a basic knowledge of mechanics principles and of vehicle fixing techniques and procedures. Any important changes made to the vehicles or to specific fixing operations will be promptly reported by updates to this manual. Nevertheless, no fixing work can be satisfactory if the necessary equipment and tools are unavailable. It is therefore advisable to read the sections of this manual relating to specific tools, along with the specific tool catalogue.

The descriptions and illustrations given in this publication are not binding. While the basic specifications as described and illustrated in this manual remain unchanged, PIAGGIO reserves the right, at any time and without being required to update this publication beforehand, to make any changes to components, parts or accessories, which it considers necessary to improve the product or which are required for manufacturing or construction reasons.

Not all versions/models shown in this publication are available in all countries. The availability of single versions should be checked at the official Piaggio sales network.

**N.B.** Provides key information to make the procedure easier to understand and carry out.

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

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



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



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

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





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**GENERAL GUIDELINES**

**GEN**

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**Safety guidelines**

- If work can only be done on the vehicle with the engine running, make sure that the premises are well ventilated, using special extractor fans if necessary; never let the engine run in an enclosed area.

Exhaust gasses are toxic.

The battery electrolyte contains sulphuric acid. Protect your eyes, clothes and skin. Sulphuric acid is highly corrosive; in the event of contact with your eyes or skin, rinse thoroughly with abundant water and seek immediate medical attention.

The battery produces hydrogen, a gas that can be highly explosive. Do not smoke and avoid sparks or flames near the battery, especially when charging it.

Petrol is highly flammable and it can be explosive given some conditions. Do not smoke in the working area, and avoid open flames or sparks.

- Clean the blocks, the drums, and pads in a well ventilated area, directing the jet of compressed air in such a way that you do not breathe in the dust produced by the wear of the blocks. Dust caused by shoe wear is toxic since it contains asbestos.

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**Maintenance guidelines**

Use original PIAGGIO spare parts and lubricants recommended by the Manufacturer. Non-original or non-conforming spares may damage the vehicle.

Use only the appropriate tools designed for this vehicle. Always use new gaskets, sealing rings and split pins upon refitting.

After removing these components, clean them using a non-flammable or high flash-point solvent. Lubricate all the work surfaces except the tapered couplings before refitting.

After refitting, make sure that all the components have been installed correctly and work properly.

For disassembly, overhaul and refit operations use only tools with metric measures. Metric bolts, nuts and screws are not interchangeable with coupling members with English measurement. Using unsuitable coupling members and tools may damage the scooter.

When carrying out maintenance operations on the vehicle that involve the electrical system, make sure the electrical connections have been made properly, particularly the ground connections.

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## INDEX OF TOPICS

**C**HARACTERISTICS

**CH**

## Identification

The identification registration numbers are made up of a prefix that identifies the vehicle type and a progressive number punched on the chassis and engine. These numbers must always be quoted in the spare parts requests.

It is advisable to check that the identification registration numbers on the vehicle and on the engine correspond with those indicated in the vehicle registration documents.

Check that the prefix and number punched on the chassis correspond to that shown on the vehicle documents.

The chassis identification number is located on the right side of the cross member under the seat.

### CAUTION



**BE REMINDED THAT ALTERING IDENTIFICATION REGISTRATION NUMBERS MAY LEAD TO SERIOUS PENAL SANCTIONS (IMPOUNDING OF THE VEHICLE. ETC.)**



Check that the prefix and number punched on the engine correspond to that shown on the vehicle documents.

The identification number is punched on the left side of the engine.

### CAUTION



**BE REMINDED THAT ALTERING IDENTIFICATION REGISTRATION NUMBERS MAY LEAD TO SERIOUS PENAL SANCTIONS (IMPOUNDING OF THE VEHICLE. ETC.)**



Located under the right side seat.

### MANUFACTURER'S PLATE KEY:

1. Manufacturer of the vehicle.
2. Type-approval number.
3. Vehicle Identification Number V.I.N.
4. Noise level (dB) under prescribed engine (Rpm)
5. Type of engine.
6. Vehicle code.



7. Country of production.

**COLOUR LABEL:**

This colour label indicates:

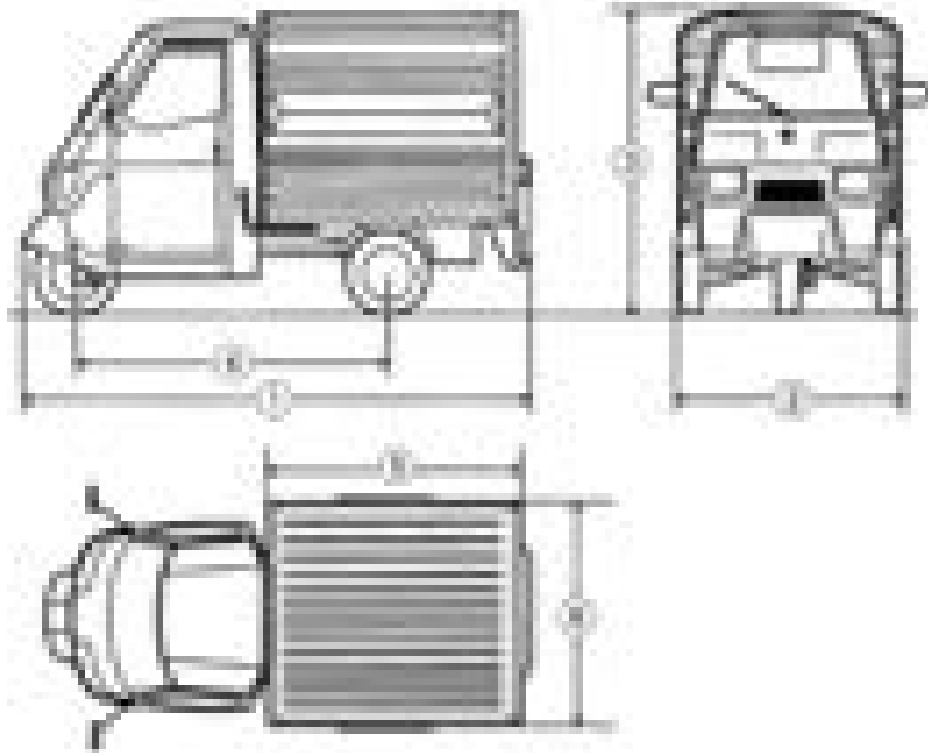
1. Original paintwork manufacturer
2. Paintwork colour
3. Paintwork code



**RANGE OF COLOURS**

COLOUR	PIAGGIO CODE
White	W 10
«River» Blue	PD 1203
Ice Blue	215/A
Ice Green	304/A
Light Yellow	933/A
Black	83
Red	R16
«Sherwood» Green	322
Yellow	937
Orange «RAL 2011»	911/A
«Lime» Yellow	943/A
Orange	953
«Action» Blue	238/A
Rock Sand	741/B
«White Silk» white	576
Lime Green	323/A
Red Sprint	862/A
Sky blue	250/A
Bamboo Green	612
Azure Bay	432
Charming Blue	258/A
White	597
Western Red	876/A

**Characteristics**



**SIZES**

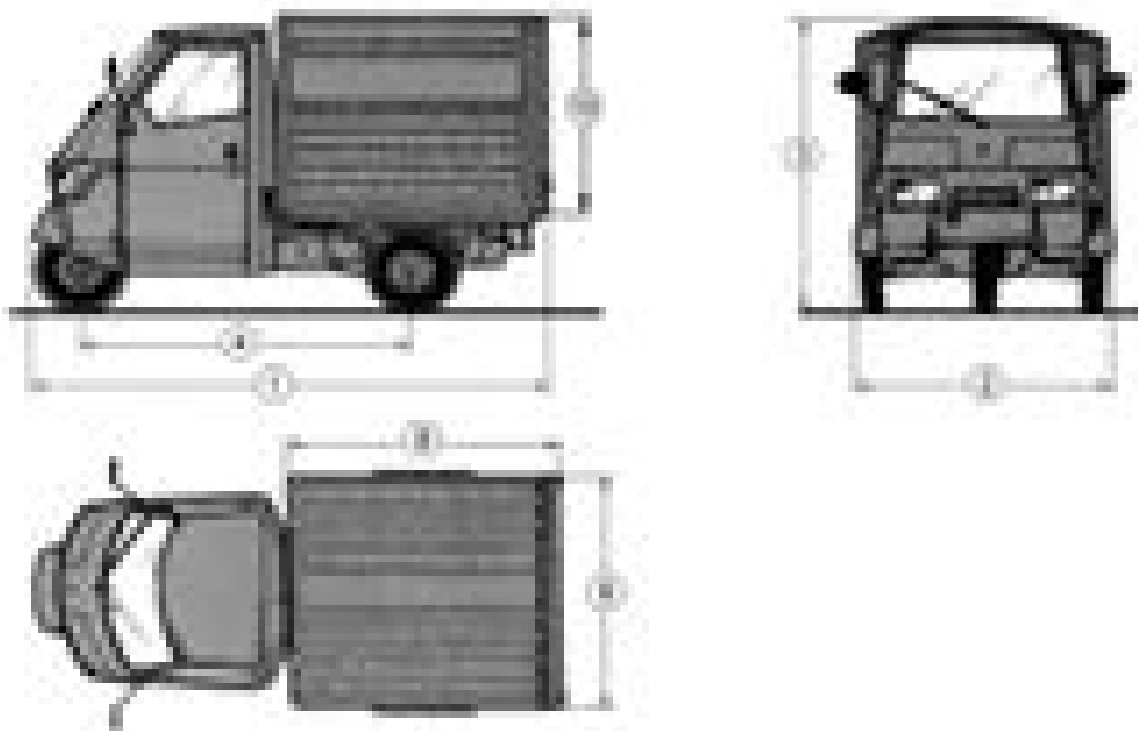
N.	millimetres (mm)	TOP	CROSS	LONG Deck	SHORT deck	VAN
1	Length	2660	2700	2660	2490	2500
2	Width	1260	1260	1260	1260	1260
3	Height	1550	1610	1550	1550	1590
4	Wheelbase	1590	1590	1590	1590	1590
5	Deck length	1422	1427	1427	1257	1257
6	Deck width	1262	---	1211	1211	1211

**WEIGHTS**

Kilograms (kg)	TOP	CROSS	LONG Deck	SHORT deck	VAN
Kerb vehicle weight	230	245	230	230	260
Load capacity besides the driver	205	190	205	205	175

**SIZES - APE 50 EUROPA**

Sizes (mm)	Deck	Short deck	Van	Cross
(1) Length	2660	2520	2560	2580
(2) Width	1250	1250	1250	1270
(3) Height	1530	1530	1560	1580
(4) Wheelbase	1590	1590	1590	1590
(5) Turning spokes	2400	2400	2400	2400



**SIZES - LOAD COMPARTMENT - APE 50 EUROPA**

Sizes (mm)	Deck	Short deck	Van	Cross
(8) Length	1420	1270	1260	1270
(9) Width	1200	1200	1200	1200
(10) Height	-	-	960	-
Top box size	-	-	-	900x460x300

**WEIGHTS - APE 50 EUROPA**

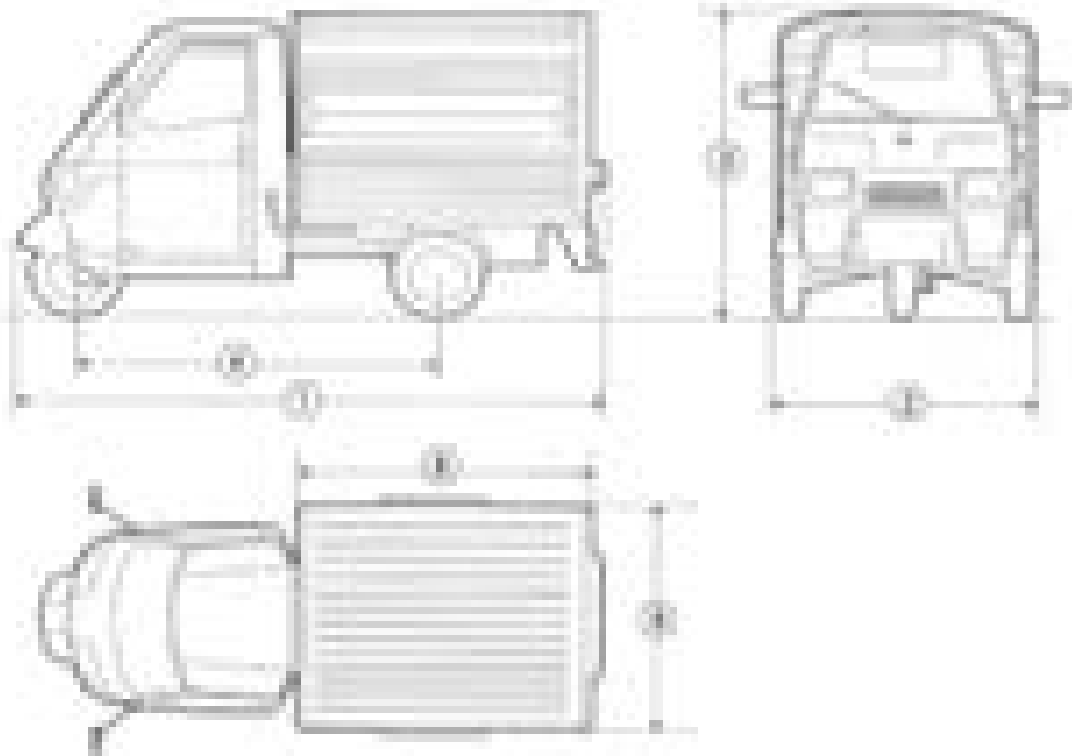
(\*) = besides the driver.

Kilograms (kg)	Deck	Short deck	Van
Total dry weight	220	215	250
Useful load capacity (*)	200	205	170

**SIZES - APE 50 EUROPE 2 - APE 50 MIX**

Sizes (mm)	Long deck base	Short deck base	Van	Cross	Top long deck
(1) Length	2660	2490	2500	2700	2660
(2) Width	1260	1260	1260	1260	1260
(3) Height	1550	1550	1590	1610	1550
(4) Wheelbase	1590	1590	1590	1590	1590





**SIZES - LOAD COMPARTMENT - APE 50 EUROPE 2 - APE 50 MIX**

Sizes (mm)	Long deck base	Short deck base	Van	Cross	Top long deck
(8) Length	1427	1257	1257	1427	1422
(9) Width	1211	1211	1211	1211	1262

**WEIGHTS - APE 50 EUROPE 2 - APE 50 MIX**

(\*) = besides the driver.

Kilograms (kg)	Long Deck	Short deck	Van	Cross	Top
Total dry weight	230	230	260	245	230
Useful load capacity (*)	205	205	175	190	205

**TECHNICAL DATA**

Specification	Desc./Quantity
Fuel system	Mixer petrol - oil through automatic carburettor/mixer (with slave bearing to the engine speed and throttle valve opening) and a gravity system.
Lubrication	Carried out by the oil mixer for: piston, cylinder, crankshaft, bearing of the flywheel side bench.
Water cooling, Heating	Arrangement for in cab heating system. Arrangement for in cab heating system.
Electronic ignition	Consists of a capacitive discharge type device with H.V. coil AT built-in. The system allows you to obtain a spark with a high voltage value, reached in very short time, and with a much reduced discharge duration, so it results in regular operation even with a dirty spark plug, easy cold starting, excellent combustion, limited wear of the electrodes and inalterability of the timing due to the lack of components subject to wear.
Transmission	From the crankshaft to the rear wheels through the clutch, gearbox - differential - axle shaft.
Clutch	Multiple discs in oil bath.
Transmission	With four speeds with always driven gears.

Specification	Desc./Quantity
	<b>N.B.: THERE ARE 3 SPEEDS IN THE VERSION WITH SPEED LIMITED TO 25 km/h.</b>
Differential	Connected to the gearbox shaft by cylinder gears, planetary and satellite gears are bevel. The differential box is connected to the two axle shafts that transmit the motion to the wheels. The differential is equipped with a gear reversing device.
Exhaust silencer	Combined, expansion and absorption type with double Catalytic Converter and secondary air system (SAS box).
Steering and suspensions	Steering tube pivoted on the oscillating arm with helicoidal spring and coaxial hydraulic shock absorber; rear suspension made with two independent oscillating arms with hydraulic shock absorber and helicoidal springs.
Brakes	With expansion on the three wheels: <ul style="list-style-type: none"> <li>• Front: mechanical with control lever on the right side handlebar.</li> <li>• Rear: hydraulically driven by a pedal with direct control brake pump.</li> <li>• Safety: mechanical agent on the rear wheels with control lever on the footrest central longitudinal arm, right side internal cab.</li> </ul>
Wheels	Interchangeable, with printed sheet steel rims. Wheels: rims from 10 - 2.50"; Michelin S83 tyres 100/90 x 10"
Toolkit	Keys: a box-spanner (13/21 mm), a lever for box-spanner, a screwdriver, a jack, a jack drive rod.

### ENGINE

Specification	Desc./Quantity
Engine	2-stroke single-cylinder with rotating timing system
Bore	38.4 mm
Stroke	43 mm
Engine capacity	49.8 cm <sup>3</sup>
Compression ratio	10 ÷ 10.5:1
Ignition advance (before TDC)	15°± 2°
Carburettor	Dell'Orto SHBC 18/16P
Engine-wheel transmission ratio	<b>1st spe.</b> 1/54.17 <b>2nd spe.</b> 1/29.75 <b>3a spe.</b> 1/19.28 <b>4a spe.</b> 1/13.35 RM. 1/76.47
	<b>N.B.: THERE ARE 3 SPEEDS IN THE VERSION WITH SPEED LIMITED TO 25 km/h.</b>
Maximum speed	Following the applicable regulations

### TYRE PRESSURE

Specification	Desc./Quantity
Rear tyre pressure	2.2 bar
Front tyre pressure	1.8 bar

### TYRES - APE 50 - APE 50 EUROPA - APE 50 EUROPE EURO 2 - APE 50 MIX

Specification	Desc./Quantity
Wheel rim	10-2.50"
Tyre	100/90x10"
Front tyre pressure	2 bar.
Rear tyres - inflation pressure	3 bar.

## Tightening torques

### ENGINE - DIFFERENTIAL UNIT

Name	Torque in Nm
Crankcase halves coupling nuts	13 to 15 Nm
Coil support fixing screw	3 to 5 Nm
Spark plug	14 to 18 Nm
Engine gear locking nut	50 to 55 Nm

Name	Torque in Nm
Clutch assembly locking nut	40 ÷ 45 Nm
Fan flywheel locking nut	45 to 50 Nm
Filler joint fixing nuts	5 to 7 Nm
Nuts fixing the exhaust pipe to the cylinder	5 to 7 Nm
Clutch cover fixing bolts	6 to 8 Nm
Big end fixing bolts	13 to 18 Nm
Nuts fixing the cylinder to the crankcase	13 to 15 Nm
Nuts fixing the differential unit to the engine	32 to 35 Nm
Differential crankcase halves coupling nuts	8 to 10 Nm
Engine - chassis anchoring plate fixing nuts	20 to 24 Nm
Differential oil drain plug	20 to 25 Nm
Gear control guide bushing	60 to 65 Nm
Nuts fixing the silencer to the engine support	23 to 25 Nm
Nuts fixing the elastic connection to the engine support	25 to 30 Nm
Engine front fixing bolt	25 to 30 Nm

### **GRUPPO SOSPENSIONE ANTERIORE**

Name	Torque in Nm
Front shock absorber (upper part) - Steering tube	34.3 ± 4.9 Nm
Front shock absorber (lower part) - Steering tube	112.7 ± 14.7 Nm
Brake drum - Steering tube	53.9 ± 5 Nm
Front wheel - Brake drum	23.6 ± 4 Nm

### **GRUPPO SOSPENSIONE POSTERIORE**

Name	Torque in Nm
Brake drum - Semi axle	85.8 ± 7.4 Nm
Rear wheel - Brake drum	23.6 ± 4 Nm
Shoe holder disc - Wheel hub	23.6 ± 4 Nm
Wheel hub - Rear suspension arm	58.8 ± 9.8 Nm
Rear shock absorber (upper part) - Chassis	34.3 ± 4.9 Nm
Rear shock absorber (lower part) - Wheel hub	34.3 ± 4.9 Nm
Rear suspension arm - Frame	44.1 ± 4.9 Nm

### **PARTE GENERALE**

Name	Torque in Nm
Windshield wiper - Chassis (external)	8 ± 0.5 Nm
Rear wheel- Drum	24 ± 4 Nm
Silencer - Engine head	5.9 ± 1 Nm
Silencer - Engine support	23.6 ± 1 Nm
Engine support bracket - Chassis	22 ± 2 Nm
Brake pump - Chassis	15.7 ± 4 Nm
Engine - Chassis	27.5 ± 2.5 Nm

## Vehicle overhaul data

## Assembly clearances

### **FITTING CLEARANCES**

Name	Description	Dimensions	Initials	Quantity
	Distance between the ends of seal rings within the upper and lower cylinder-ring (mm)			0.2 to 0.3
	Gearbox fitting clearance (mm)			0.15 to 0.40

#### **CAUTION**

**THE GEARBOX SHAFT FITTING CLEARANCE MUST BE VERIFIED WITH THE FEELER GAUGE.**

## Specific tooling

## 060824Y Probe

## Cylinder-piston oversizes

**CYLINDER - PISTON**

Specification	Desc./Quantity
Normal cylinder nominal sizes	$\varnothing=38.40 +0.025 - 0.005$
Normal piston nominal sizes	$\varnothing=38.265 \pm 0.015$

**CYLINDER COUPLING - PISTON**

Name	Initials	Cylinder	Piston	Play on fitting
Coupling	1st Oversize	38.600 to 38.620	38.455 to 38.475	0.145
Coupling	2nd Oversize	38.800 to 38.820	38.655 to 38.675	0.145
Coupling	3rd Oversize	39.000 to 39.020	38.855 to 38.875	0.145

## Piston ring oversizes

**SEALING RINGS**

Specification	Desc./Quantity
Upper seal ring (Nominal sizes)	Diameter=38.40 mm
Lower seal ring (Nominal sizes)	Diameter=38.40 mm

**CLEARANCE UPON FITTING**

Name	Description	Dimensions	Initials	Quantity
Upper sealing ring	1st Oversize	38.60		0.20 to 0.60
Lower sealing ring	1st Oversize	38.60		0.20 to 0.60
Upper sealing ring	2nd Oversize	38.80		0.20 to 0.60
Lower sealing ring	2nd Oversize	38.80		0.20 to 0.60
Upper sealing ring	3rd Oversize	39.00		0.20 to 0.60
Lower sealing ring	3rd Oversize	39.00		0.20 to 0.60

## Connecting rod - roller cage fitting

**CONNECTING ROD - ROLLER CAGE**

Connecting rod	Roller cage
1.a category	4.a category
2.a category	3.a category
3.a category	2.a category
4.a category	1.a category

**CAUTION**

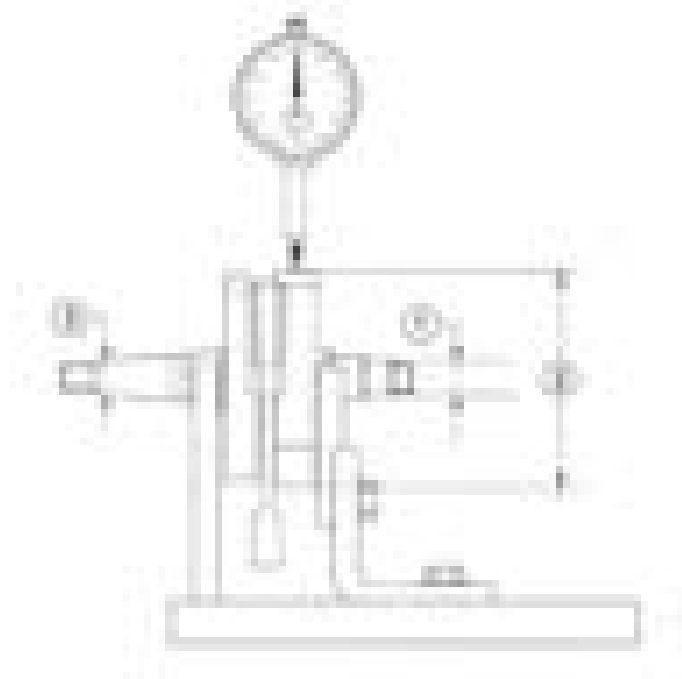
**IN CASE OF NOISE, USE CAGE OF THE CATEGORY IMMEDIATELY BELOW.**

## Crankshaft alignment check

With the proper equipment, check that the eccentricity of the surface of  $\varnothing$  "3" and "1" are contained within 0.003 mm. (the maximum reading limit on the dial gauge clock); Also check the eccentricity of  $\varnothing$  "2", which are allowed for a maximum reading of 0.02 mm. In the case of eccentricities not much greater than that prescribed, perform the straightening of the shaft by means of counterweights with a wedge, or tightening it in a vice (equipped with aluminium bushings) as needed, for much greater eccentricities replace the crankshaft.

**Specific tooling**

**020074Y Crankshaft Alignment Check Tool**



**Piston - Pin**

**PISTON - PIN ASSEMBLY CLEARANCE**

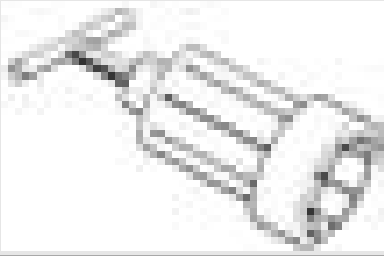

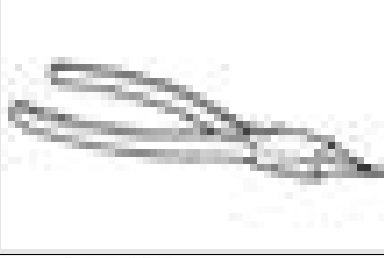


Name	Description	Dimensions	Initials	Quantity
Piston - pin assembly clearance (mm)				0




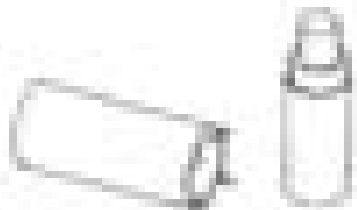

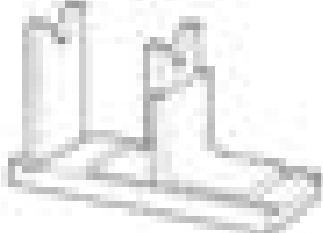

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**SPECIAL TOOLS**




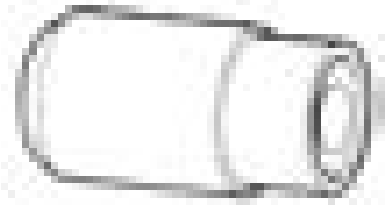
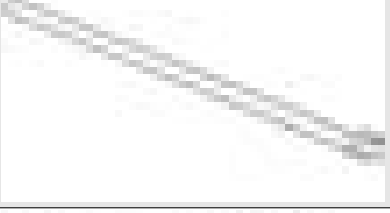
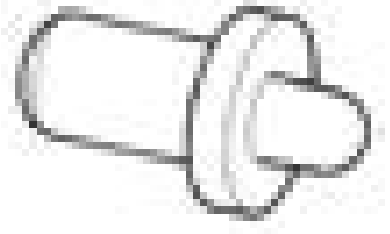

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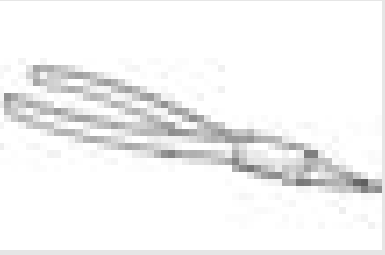
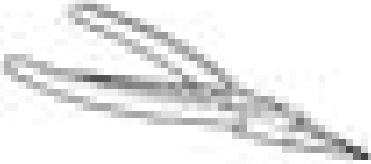
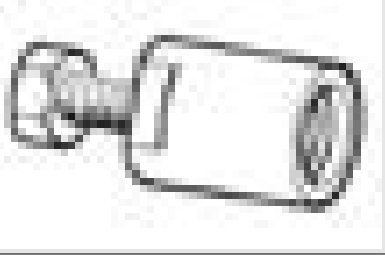
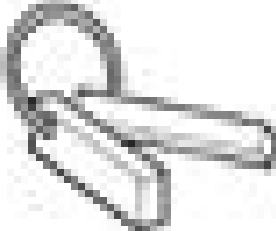
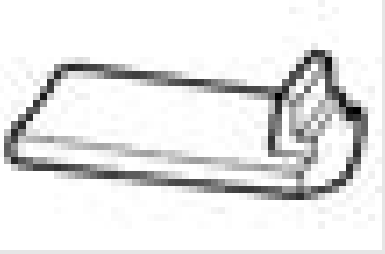
**Tooling**



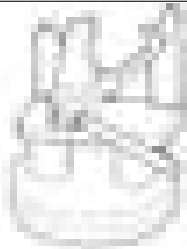


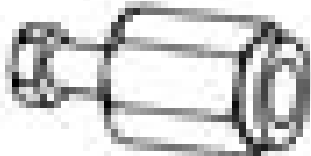
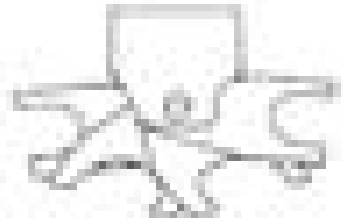
		<b><u>SPECIAL TOOLS</u></b>
<b><u>Stores code</u></b>	<b><u>Description</u></b>	
014499Y	Bearing extractor	
016029Y	Lower Steering Bearing Fitting Tool on the steering tube	
017104Y	Pliers for circlips	
018119Y	Axle Fitting Tool	
018119Y007	Axle fitting	
018119Y009	Axle fitting	
018119Y014	Axle fitting	
018119Y015	Axle fitting	
020004Y	Steering seats extraction punch	

Stores code	Description	
020042Y	Steering tube bearing extractor	
020043Y	Rear Wheel Hub Roller Bearing Fitting Punch	
020044Y	Front Wheel Hub Roller Bearing Fitting Punch	
020055Y	Steering Ring Nut Key	
020057Y	Tool for Starter Motor Bushing Calking	
020074Y	Crankshaft Alignment Check Tool	
020120Y	Punch for Clutch Side Secondary Shaft Roller Bearing	



Stores code	Description	
020150Y	Support	
020151Y	Heat gun	
020322Y	Clutch Removal	
020781Y	Bearings Fitting Punch	
020842Y	Upper Steering Bearing Removal Punch	
021071Y	punch to fit bearings and sealing rings	
021330Y	Steering seats fitting tool	

Stores code	Description	
021467Y	Bearing extractor	
021467Y009	extractor	
021467Y013	extractor	
022465Y	Pliers for circlips	
023638Y	Pliers for circlips	
009551Y	Clutch puller	
029569Y	Gear Engagement Fitting Tool	
030250Y	Clutch Stop Key	

Stores code	Description	
032975Y	Punches for Roller Casings	
033970Y	Punches for Roller Casings	
038077Y	Engine support	
038137Y	Rear Hub Extractor	
038138Y	Roller Casings Punch	
048564Y	Flywheel extractor	
060824Y	Probe	

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<b>Stores code</b>	<b>Description</b>
020095Y	Flywheel Lock
020332Y	Digital rev counter
494929	Exhaust fumes analyser
021330Y003	Steering seats fitting
021330Y004	Steering seats fitting
020114Y	Pane positioning band

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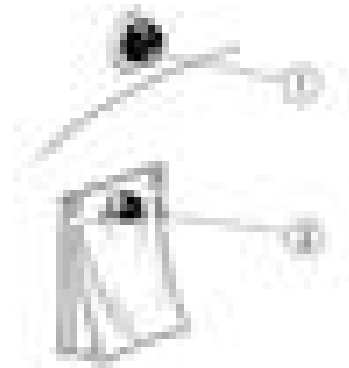
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**MAINTENANCE**

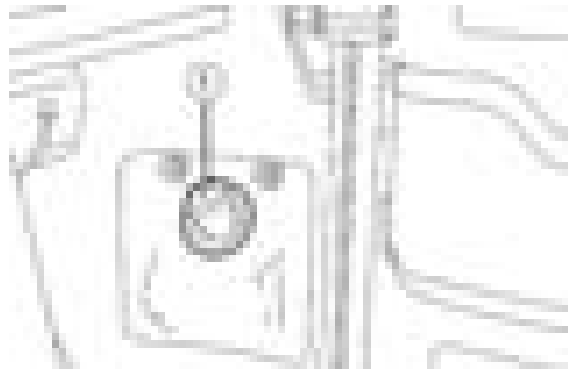
**MA**

**WINDSCREEN WASHER FLUID TOP-UP - APE****50**

Inside the passenger compartment in the front left part, there is a container for windscreen washer fluid. If the fluid does not escape when pressing the button, remove the pipe that goes from the container to the and blow inside with compressed air. Do the same for the pipe that goes from the pump to the external nozzle. Refit everything and try pressing the button several times to recharge the system. If despite the above operations, the fluid does not come out, clean the external nozzle with iron wire of a suitable diameter.

**WINDSCREEN WASHER FLUID TOP-UP- APE****50 EUROPA**

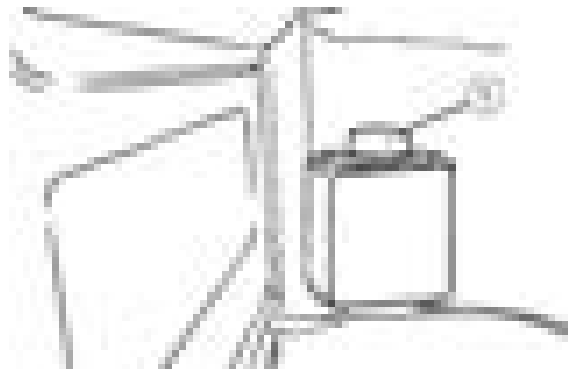
The windscreen washer fluid tank is located inside the passenger compartment, in the front right part. To fill the tank, unscrew the cover (1), restore the fluid level and recharge the system by using the pump on the left side of the passenger compartment several times, until the liquid comes out of the sprayer.

**WINDSCREEN WASHER FLUID TOP-UP APE****50 MIX - APE 50 EUROPE**

The windscreen washer fluid tank is located inside the cab on the front right panel.

To fill the tank, unscrew cover(1), and top up.

Use a specific detergent.



## Manutenzione Batterie

### CHARGE CHECK

Connect the terminals of the specific equipment to the respective poles of the battery.



Check the charge of the battery.  
If necessary replace the battery.



## Scheduled maintenance chart

The following table must be regarded as a general guide for periodic inspections and lubrication interventions. It is necessary to also consider the weather, terrain, geographic location and variety of special use. This interventions table must therefore be changed to reflect the particular needs of the owner. For example, if a vehicle is exposed to sea salt, all parts should be lubricated more frequently than shown in the table to prevent damage caused by corrosion to metal parts.

### SCHEDULED MAINTENANCE TABLE

*I: CHECK AND CLEAN, ADJUST, LUBRICATE OR REPLACE, IF NECESSARY C: CLEAN, R: REPLACE, A: ADJUST, L: LUBRICATE*

*\* Replace every 2 years*

km x 1,000	1	5	10	15	20	25	30	35	40	45	50
Brake fluid level *	I	I	I	I	R	I	I	I	R	I	I
Spark plug		R	R	R	R	R	R	R	R	R	R
Air filter		C	C	C	C	C	C	C	C	C	C
Gearbox oil		I	R	I	R	I	R	I	R	I	R
Differential Oil		I	R	I	R	I	R	I	R	I	R
Carburettor	I		C		C		C		C		C
SAS box			C		C		C		C		C
Clutch and brake lever		L	L	L	L	L	L	L	L	L	L
Flexible brake hoses			I		I		I		I		I
Rear brake pipe							R				
Flexible transmissions			L		L		L		L		L
Acceleration/mixer control	A	A	A	A	A	A	A	A	A	A	A
Steering clearance			I		I		I		I		I
Suspension			I		I		I		I		I

km x 1,000	1	5	10	15	20	25	30	35	40	45	50
Electrical system and battery	I	I	I	I	I	I	I	I	I	I	I
Hinges - Door locking - Transmissions			L		L		L		L		L
Tyre pressure and wear	I	I	I	I	I	I	I	I	I	I	I
Headlights	I		A		A		A		A		A
Safety clamps	I	I	I	I	I	I	I	I	I	I	I
Test drive	I	I	I	I	I	I	I	I	I	I	I
OPERATION TIME	60	60	120	60	120	60	150	60	120	60	120

N.B.

THE TIMES LISTED ON THE SCHEDULED MAINTENANCE TABLE INCLUDE THE TIME DEVOTED TO MANAGEMENT ACTIVITIES.

## Suggested products chart

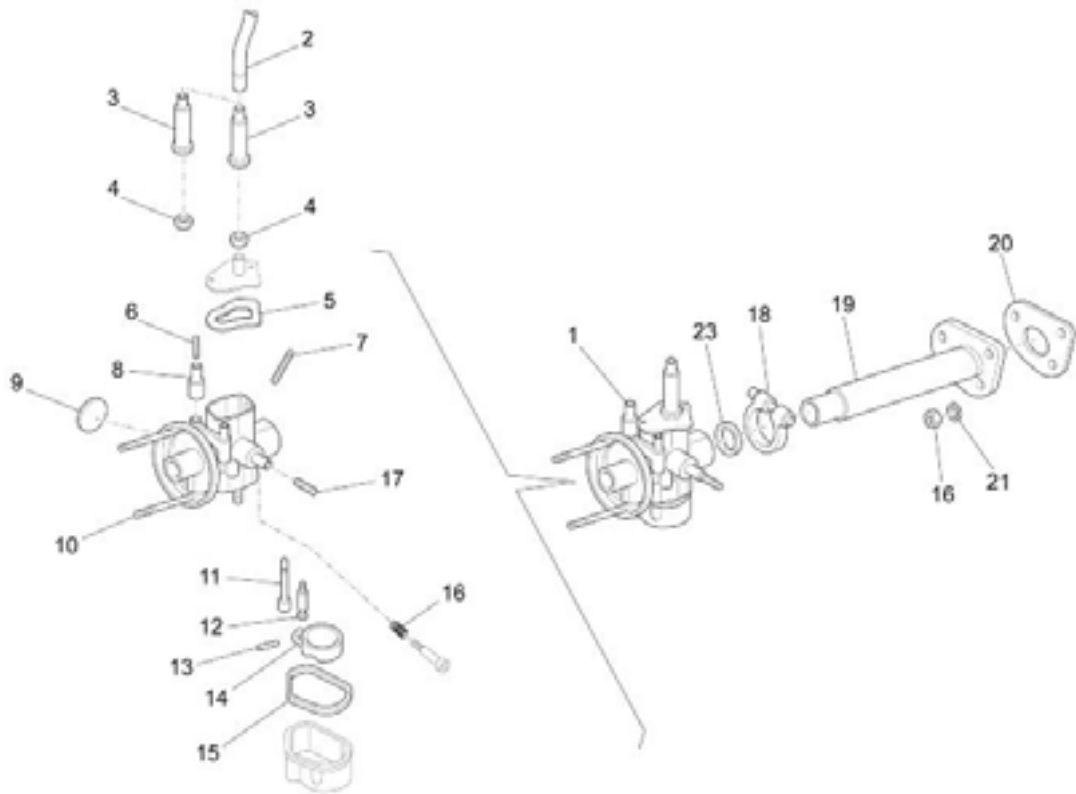
### RECOMMENDED PRODUCTS TABLE

Product	Description	Specifications
eni i-Ride PG 2T	Synthetic based Lubricant for 2 stroke high performance engines.	- API TC - JASO FC - ISO-L-EGD
eni i-Ride PG 5W-40	Synthetic based Lubricant for 4 stroke high performance engines.	- API SL - ACEA A3 - JASO MA, MA2
AGIP ROTRA MP 80W-90	Lubricant for gears, also used for conventional gearbox transmissions and steering boxes.	- API GL-5 - US Department of the Army MIL-L-2105D - Ford M2C 105A - Opel B 0401010
AGIP GREASE PV 2	Anhydrous calcium grease suitable for use with protective functions and lubricants.	- Paste-textured - Ivory colour - Specification TL 9150 066, symbol NATO G 460
AGIP GREASE MU3	Yellow lithium based grease, suitable for various purposes.	- ISO: L-X-BCHA 3 - DIN 51 825: K3K -20
AGIP BRAKE FLUID DOT 4	Synthetic brake fluid.	- SAE J 1703 - FMVSS 116 - DOT 4 - ISO 4925 - CUNA NC 956 DOT 4

## Engine assembly



**Carburettor**



**KEY:**

- 1. Carburettor
- 2. Transmission, splitter
- 3. Cap
- 4. Nut
- 5. Gasket
- 6. Spring
- 7. Minimum jet
- 8. Valve
- 9. Petrol filter
- 10. Stud bolt
- 11. Nozzle
- 12. Needle
- 13. Pin
- 14. Float
- 15. Gasket
- 16. Spring
- 17. Spring
- 18. Ring

19. Admission joint
20. Admission joint gasket
21. Washer
22. M6 nut
23. Gaskets series

---

**ADJUSTMENT**

Perform the idle adjustment.



Perform the mixing adjustment.

**REMOVAL**

Remove the air filter from the carburettor.

**WARNING**

**THE CARBURETTOR IS VERY EXPLOSIVE; BE VERY CAREFUL NOT TO SPILL FUEL DURING THE REMOVAL OF THE CARBURETTOR.**

**WARNING**

**USE EXTREME CAUTION WHEN WORKING ON COMPONENTS CONTAINING PETROL.**

**WARNING**

**PETROL IS HIGHLY EXPLOSIVE.**

**ALWAYS REPLACE THE GASKETS TO AVOID PETROL LEAKS.**

Remove the carburettor from the admission joint,  
loosening the fixing ring.



---

Remove the tank with its gasket.



---

Remove the jet.



---

Remove the needle and the float.



---

Remove the transmissions with their adjustment nuts.



---

Disassemble the carburettor removing the minimum jet, the needle, the gaskets, the petrol filter.



### REVISION

The carburettor is completely decomposed, check all calibrated parts (main jets, idle jets, emulsifiers tubes, etc.).

The value of these calibrated parts must correspond to the adjustment data prescribed for the type of carburettor.

For a thorough cleaning of all components of the carburettor, use a bath of suitable solvent and blow with compressed air.

To clean the calibrated jets, avoid using metallic spikes or wires.

All gaskets, seal rings and springs of the carburettor, should be replaced with each revision.



### FITTING

Refit the carburettor, being careful to replace all gaskets, the sealing rings, and the springs.

Install the carburettor on the engine and fit the air filter.

---

## Air filter

### REMOVAL

Remove the fixing nuts and the air filter cover.



---

Remove the filter and check its state of wear.  
Replace if damaged.  
Clean with high flammability solvent and dry with compressed air.

**CAUTION**

**NEVER RUN THE ENGINE WITHOUT THE AIR FILTER. THIS WOULD RESULT IN AN EXCESSIVE WEAR OF THE PISTON AND CYLINDER.**

**FITTING**

Insert the filter in position and fit the cover.  
Tighten the fixing nuts.

---

**Gear-box oil replacement****REPLACEMENT**

Use a suitable container to collect the gear oil

Undo the gearbox oil filler plug.



Remove the drain plug and drain all the oil in the prepared container.

**REFILL**

Tighten the drain plug and introduce new oil.  
Tighten the filler plug.

---

## Differential oil replacement

### LEVEL CHECK

Start the engine and stop it after having been running for about 1 minute at least.

Remove the control rod and check the oil level.

The oil level should be between the two notches of the maximum and minimum.

Restore oil level if necessary and check for leaks.



### WARNING



**DO NOT REMOVE THE OIL COVER IMMEDIATELY AFTER AN ACTIVITY WITH THE ENGINE AT FULL SPEED AND/OR WITH THE ENGINE RUNNING. THE HEATED OIL MAY LEAK, WITH THE RISK OF BURNING.**

### REPLACEMENT

Use a suitable container to collect the differential oil.

The oil change should be made with the engine warm.

Remove the filler plug with the control rod from the upper part of the differential crankcase.

### WARNING



**DO NOT REMOVE THE OIL COVER IMMEDIATELY AFTER AN ACTIVITY WITH THE ENGINE AT FULL SPEED AND/OR WITH THE ENGINE RUNNING. THE HEATED OIL MAY LEAK, WITH THE RISK OF BURNING.**



Remove the drain plug and drain all the oil in the prepared container.



### REFILL

Tighten the drain plug and introduce new oil.

Requires approximately 0.600 litres for the engine and about 0.300 litres for the differential.

### Locking torques (N\*m)

#### Differential oil drain plug 20 to 25 Nm

Start the engine and stop it after having been running for about 1 minute at least.

Check the oil level and top up if necessary.

Verify that there are no leaks.

Use specific oils.

Tighten the filler plug.

---

## Spark plug

---

### REMOVAL

Remove the rubber cap.



Undo the spark plug and remove it from the cylinder head.



### CHECK

Check the electrode gap and perform the descaling if necessary.

Examine it carefully and if the insulation is chipped or damaged replace it.

Measure the gap between the electrodes with a feeler gauge and adjust if necessary, by carefully bending the outer electrode.

Make sure the sealing washer is in good condition.



### Characteristic

#### Electrode gap

0.6 to 0.7 mm

#### Recommended spark plugs



Piaggio P82M; Champion L82C; Bosch W54C;  
Lodge 2HN; Ac 430Z.

### FITTING

Fit the spark plug, tighten it manually and then lock it to the prescribed torque with the spark plug spanner.

### Locking torques (N\*m)

**Spark plug** 14 to 18 Nm



## Mixer timing

To adjust the timing, operate on the transmission adjuster screw so that the reference stamped on the mobile control coincides with that made on the mixer body.

### N.B.

CHECK FOR THE PROPER TIMING OF THE MIXER, IT IS NECESSARY TO FIRST REMOVE THE METAL COVER FIXED WITH THREE SCREWS ON THE CLUTCH COVER. DUE TO THE PASSAGE OF AN EXHAUST PIPE ON ONE OF THE SCREWS, THE LATTER'S HOUSING HOLE HAS BEEN MADE OPEN TO REMOVE THE LID BY LOOSENING ONLY ONE OF THE SCREWS IN QUESTION.

### N.B.

WHENEVER REMOVING THE MIXER FROM THE CLUTCH COVER, THE SEALING O-RING LOCATED ON THE COLLAR OF THE MIXER MUST BE REPLACED.

### CAUTION

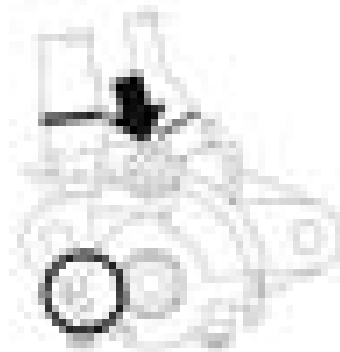
IN THE EVENT OF REMOVAL OR EXHAUSTION OF THE OIL IN THE TANK, PROCEED TO BLEED THE MIXER AS FOLLOWS: WITH THE MIXER FITTED ON THE VEHICLE WITH THE ENGINE TURNED OFF, PULL OFF THE MIXER TUBE FROM THE CARBURETTOR AND LOOSEN THE BLEED SCREW UNTIL OIL STARTS TO FLOW. TIGHTEN THE SCREW, START THE ENGINE AND WAIT UNTIL OIL COMES OUT OF THE DELIVERY LINE TO THE CARBURETTOR (PREVIOUSLY DISCONNECTED). RECONNECT THE PIPE TO THE CARBURETTOR FIXING IT WITH A BAND.

In carrying out this operation, the engine must be fed with a mixture of 2% of appropriate oil (at least 0.5 litres if the tank is empty).

### Recommended products

**eni i-Ride PG 2T Synthetic based Lubricant for 2 stroke high performance engines.**

- API TC
- JASO FC
- ISO-L-EGD





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## Secondary air system

---

### REMOVAL

Undo the fixing screws from the aluminium cover of the air box.



### FILTER CLEANING AND INTEGRITY CHECK

Clean the polyurethane sponge by washing with soap and water then dry fully with compressed air and reposition everything in its seat.

Verify that the blade is not deformed and/or fails to ensure the seal on its contact surface.

Replace if necessary.

### FITTING

Tighten the fixing screws of the cover.

### N.B.

**WHEN REASSEMBLING, TAKE CARE TO PROPERLY REPOSITION THE BLADE IN ITS SEAT ON THE TWO PLASTIC AND ALUMINIUM COVERS.**

### CAUTION

**DURING THE OPERATION 1) ALWAYS CHECK THE INTEGRITY AND THE SEAL OF THE RUBBER SLEEVE LOCATED ON THE END OF THE SECONDARY AIR TUBE; IF NECESSARY, REPLACE THE FIXING CLAMPS.**

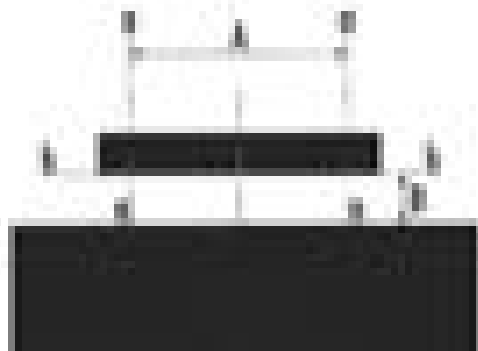
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## Headlight alignment check

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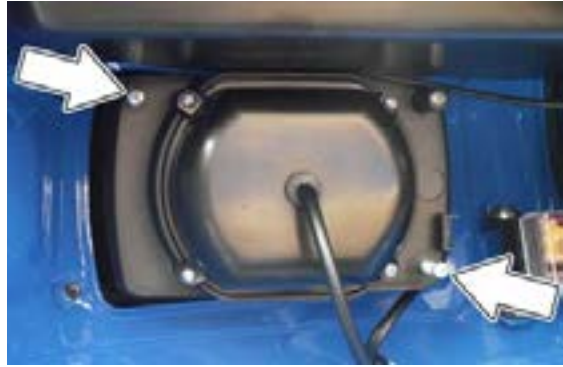
Proceed as follows:

1. Place the vehicle in conditions of use, without load, with the tyres inflated to the prescribed pressure on flat grounds at 10 m from a white screen placed in semidarkness. Make sure the vehicle axis is perpendicular to the screen;
2. Draw two vertical lines "a-a" at a distance «**A**» corresponding to the distance between headlight axes. Draw a horizontal line "b-b" at height «**B**» from ground corresponding to



the headlight centre height from ground multiplied by 0.9;

3. Start the engine and lock the throttle twist grip at approximately 1/3 of its travel. Switch the dipped beam headlight on. Direct the beam so that the horizontal line between the light and the shade falls above the horizontal "b-b" drawn on the screen;
4. if this is not so, adjust the headlight by means of the two screws «A» to correct any beam alterations.



#### CAUTION



BEFORE CARRYING OUT THE OPERATION FOR HEADLIGHTS AIMING, CHECK THAT THE TYRES ARE INFLATED TO THE INDICATED PRESSURES.

## Cables adjustment

### Throttle pedal adjustment

Position yourself near the carburettor.  
Remove the rubber cap from the base.



Adjust by turning the nut.



---

Insert the rubber cap.



---

**Air Adjustment**

Position yourself near the carburettor.  
Remove the rubber cap from the base.



---

Adjust by turning the nut.



---

Insert the rubber cap.



## Clutch

### ADJUSTMENT

Adjust the clutch transmission by acting on the threaded ring nut near the clutch lever.



---

## CAMBIO

### ADJUSTMENT

The adjustment of the gearbox transmission control is performed within the driver's cab.



Adjust the gearbox transmission control by turning the nuts.



# INDEX OF TOPICS

EMISSION CONTROL SYSTEM

CO EM

---

## CO check

The test must be done after a thorough cleaning of all parts of the carburettor, with the air filter clean and spark plug in good condition

Heat the vehicle for the time necessary to activate the catalytic converter. Then turn off the vehicle for the time strictly necessary to carry out the following operations:

Insert an extension pipe of ~ 50 cm at the exhaust fumes socket on the silencer.

With the utmost care, ensure the seal between the silencer and the pipe and insert the probe of the exhaust fumes analyser into the tube.



### Specific tooling

**020332Y Digital rev counter**

**494929 Exhaust fumes analyser**

Start the engine and wait for a minute for the idle to stabilise.

Without ever operating the accelerator and using the appropriate screw, bring the engine speed to  $1350 \pm 100$  rpm.



Record the flow screw in order to have a value of «CO» at least equal to  $2.0 \pm 1.0$ .

Operate the throttle grip by slowly speeding up the engine to a speed of 4000 rpm. and return to the closed position:

check that the idle speed remains at the previously established value, otherwise repeat the procedure.



## INDEX OF TOPICS

TROUBLESHOOTING

TROUBL

**Probable cause and troubleshooting**

**DETONATIONS TO THE EXHAUST**

Possible Cause	Operation
Detonations in the silencer to the gas release	Check the ducts and the membrane of the choke device on the carburettor.

**NOISE - KNOCKS**

Possible Cause	Operation
Worn or leaking shock absorbers	Replace.
Flexible buffers of the swinging arms	Replace.
Insufficient lubrication of the hubs	Remove the hubs and fill the appropriate chamber with special grease.

**RUBBER JOINT FAILURE OF THE SECONDARY PIPE ON THE AIR SILENCER**

Possible Cause	Operation
Secondary air reed locking	Replace.
Secondary air filter clogging	Clean the filter and the box.
Clogging of the secondary air joint on the silencer	Descal the joint taking care to not let the residues fall into the silencer.

**THE VEHICLE PULLS TO ONE SIDE**

Possible Cause	Operation
The pressure of one of the tyres is not right	Check and set to the prescribed pressure
Rear swinging arms	Straighten out if possible, or replace.
Worn rubber buffers	Replace.

**Engine**

**ENGINE STOP**

Possible Cause	Operation
Idle speed too low	Work on the appropriate adjuster screw del of the carburettor.
Dirt or water in the mixture of the ducts	Clean thoroughly.
Inefficient spark plug	Clean and adjust the gap between the electrodes or replace.
Cock obstruction	Clean.
H.V. cable or spark plug hood damaged	Check or replace.
Fuel tank cap breather obstruction (defective fuel system)	Clean properly.

**CRANKSHAFT KNOCKS**

Possible Cause	Operation
Excessive clearance of the main bearings	Replace.
Big end failure	Replace the crankshaft.
Crankshaft unbalanced	Check the alignment
Piston pin worn	Replace.

**RINGING OF THE PISTON**

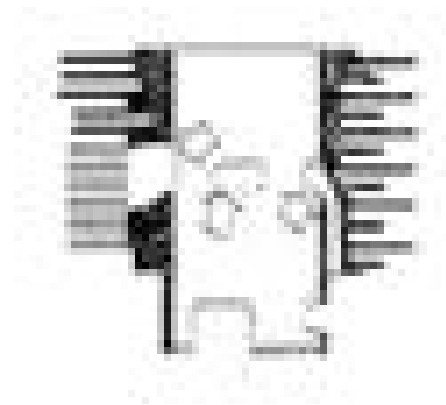
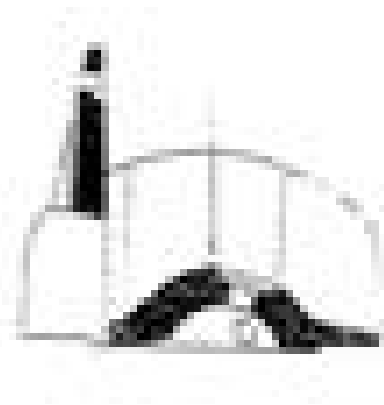
Possible Cause	Operation
Excessive clearance between the piston and cylinder	Replace the piston and correct the cylinder.
Excessive clearance of the roller pin-connecting rod small end or piston pin	Review (for any replacement of the rollers of the connecting rod small end, see the section "Specifications").



Poor performance

**LOW POWER**

Possible Cause	Operation
Timing incorrect	Perform the foreseen checks.
Cylinder head or spark plug not fitted correctly	Correct the locking and the fitting.
Leakage of current of the ignition system	Locate the dispersion and act accordingly.
Excessive incrustation on the lights of the cylinder	Descale.
Silencer blocked	Descale with iron wire bent into a hook or with compressed air introduced into the cylinder nozzle fixed to the cylinder after the external exhaust pipe.



Starting difficulties

**PROBLEMS WITH STARTING**

Possible Cause	Operation
Battery terminals oxidised or not properly locked Discharged battery	Clean, tighten and protect with neutral petroleum jelly The battery is the electrical device in the system that requires the most frequent inspections and thorough maintenance. Frequently check that the fluid level fully covers the plates; if not, restore the level adding distilled water (never use natural water, even if it is drinking water) and check fluid density at the same time. If the vehicle is not used for some time (1 month or longer) the battery needs to be recharged periodically. The battery runs down completely in the course of three months. When the battery is being placed on the vehicle, make sure that the connections are not misplaced, keeping in mind that the black ground cable with the terminal attached to the frame is to be connected to the negative terminal whereas, the other cable, must be connected to the terminal marked +.
Carburettor body nozzles Inefficient spark plug	Remove and clean in petrol; dry with a compressed air jet. Replace.

## Clutch slipping

### CLUTCH SLIPPAGE

Possible Cause	Operation
Insufficient idle stroke	Adjust the stroke.
Weak return spring	Replace.
Worn or burned driven disc gasket	Replace the disc.
Insufficient oil in the differential transmission or unsuitable oil	Restore the oil level or replace.

## Gearbox

### OIL LOSS FROM THE TRANSMISSION - DIFFERENTIAL UNIT

Possible Cause	Operation
Excessive filling	Bring back to level.
Loosening of the crankcase halves locking nuts and the differential cover	Check the locks, replace the gaskets if necessary.
Axle shaft oil seal hood worn or broken	Replace.
Cracked crankcase	Replace.
Loose oil drain plug	Lock and replace if damaged

## Gears disengage abruptly or are difficult to engage

### SPONTANEOUS GEARS DISENGAGEMENT

Possible Cause	Operation
Gearbox housing worn or damaged	Verify and replace if necessary
Badly adjusted control cable	Adjust.
Transmission gears or spiders not properly assembled or worn	Review.

## Noisy gears

### NOISY TRANSMISSION

Possible Cause	Operation
Excessive clearance between the gears of the transmission	Review and replace the worn components.
Insufficient oil in the differential transmission	Restore the oil level or replace.
Bearings of the gear shaft are noisy	Replace.

## Locked brakes

### BRAKES LOCKED EVEN WHEN YOU CEASE TO PRESS THE PEDAL

Possible Cause	Operation
Return springs stretched	Replace.
Compensation hole on the pump clogged	Clean and bleed the air out of the system.
Rubber gasket swollen or sized	Check the system, replace all the rubber parts and the fluid, bleed air from the system: use the recommended oil

## Noisy suspension

### NOISY FRONT SUSPENSION

Possible Cause	Operation
Hub bearings worn or with excessive clearance	Replace.
The wheel hub chamber needs to be greased	Disassemble and apply grease.

---

Possible Cause	Operation
Hydraulic absorber inefficient or discharged	Replace.
Roller casings of swinging arm worn	Replace.

---

## Difficult riding

### GUIDE IRREGULARITIES

Possible Cause	Operation
The vehicle "pulls" to one side due to deformation of the steering tube	Check the steering unit and replace if necessary.
Steering is hard or knocks	Check the steering fifth wheels: if they are loose they must be properly tightened; if marked with pricks, they must be replaced.

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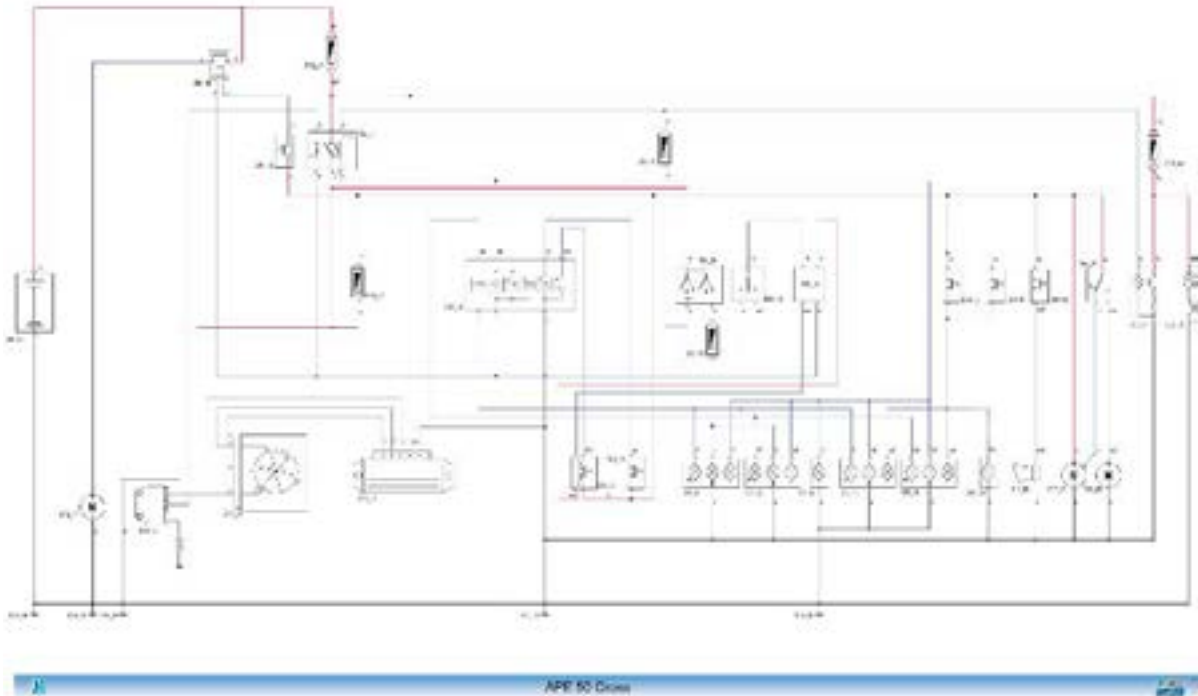
# INDEX OF TOPICS

**ELECTRICAL SYSTEM**

**ES**

**Devices and accessories**

Base electrical circuit diagram

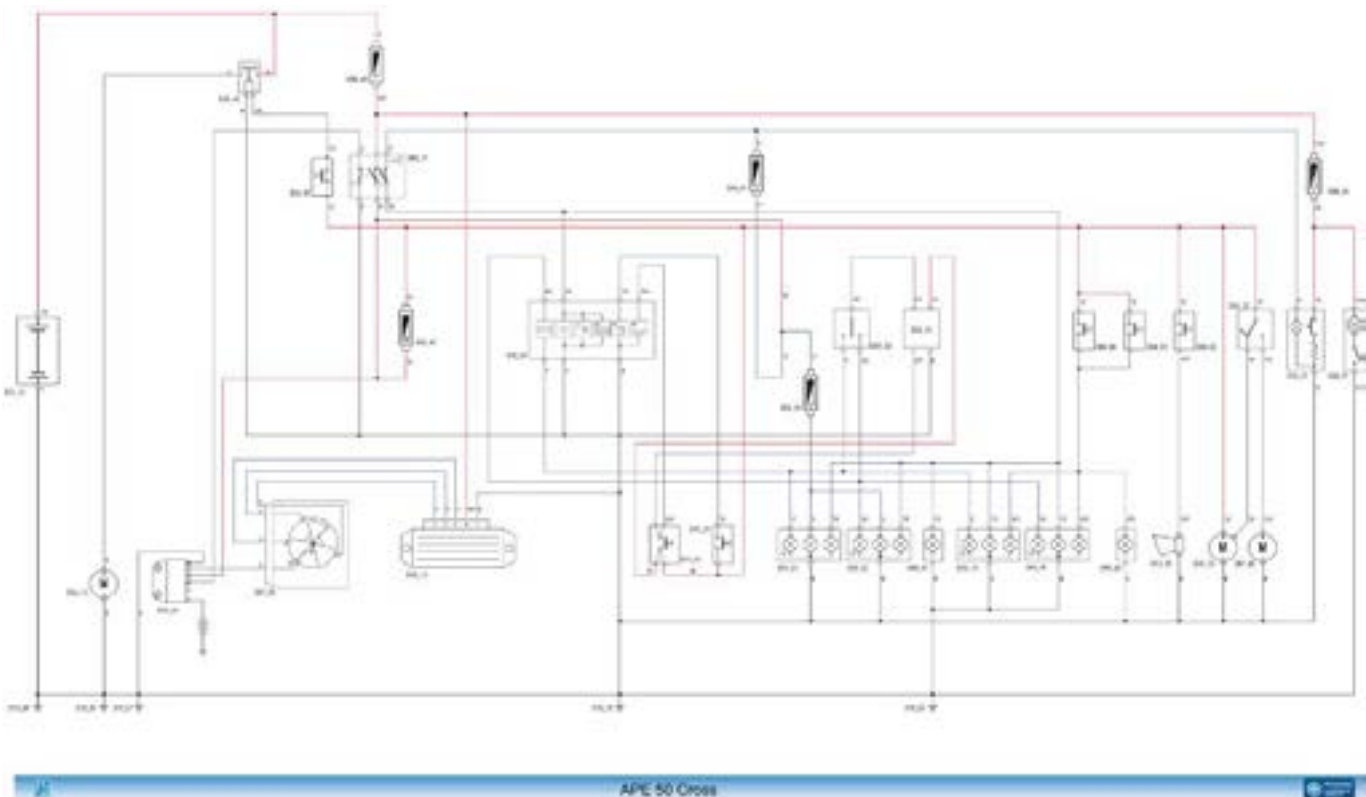


**COMPONENTS DESCRIPTION**

Component	Description
D01_01	Starter battery
D02_13	Voltage regulator
D04_10	Starter motor
D04_11	Ignition switch
D04_34	External lights switch
D04_37	Windscreen control switch
D04_53	Ignition device
D04_59	Starter button
D04_60	Stop button on front brake
D04_61	Stop button on rear brake
D04_62	Audible warning device control button
D04_63	Turn signal control deviator
D05_01	Left headlight
D05_02	Right headlight
D05_07	Licence plate light
D05_18	Right taillight
D05_19	Left taillight
D05_20	Stop third light
D06_01	Passenger compartment light unit
D07_03	Windscreen wiper motor
D07_05	Electric screen washer pump
D07_23	Magneto flywheel
D08_10	Turn signal flasher relay
D08_42	Start-up relay
D08_43	Main fuse

Component	Description
D08_44	Cigarette lighter supply fuse
D08_45	Ancillary supply fuse
D08_46	Headlight supply fuse
D08_47	External lighting supply fuse
D10_02	Engine ground
D10_03	Rear right hand chassis ground
D10_06	Battery ground
D10_07	Chassis/engine ground
D10_10	Ground point services cable harness
D11_15	Fuel level sensor
D11_30	Oil level sensor
D12_01	Instrument panel
D12_03	Digital clock
D13_01	12V accessory socket- Cigarette lighter
D13_05	Horn

For version with lights always on.



**DESCRIPTION OF COMPONENTS - VERSION WITH LIGHTS ALWAYS ON**

Component	Description
D01_01	Starter battery
D02_13	Voltage regulator
D04_10	Starter motor
D04_11	Ignition switch
D04_37	Windscreen control switch
D04_53	Ignition device
D04_59	Starter button
D04_60	Stop button on front brake
D04_61	Stop button on rear brake
D04_62	Audible warning device control button
D04_63	Turn signal control deviator
D05_01	Left headlight
D05_02	Right headlight
D05_07	Licence plate light
D05_18	Right taillight

Component	Description
D05_19	Left taillight
D05_20	Stop third light
D06_01	Passenger compartment light unit
D07_03	Windscreen wiper motor
D07_05	Electric screen washer pump
D07_23	Magneto flywheel
D08_10	Turn signal flasher relay
D08_42	Start-up relay
D08_43	Main fuse
D08_44	Cigarette lighter supply fuse
D08_45	Ancillary supply fuse
D08_46	Headlight supply fuse
D08_47	External lighting supply fuse
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D10_03	Rear right hand chassis ground
D10_06	Battery ground
D10_07	Chassis/engine ground
D10_10	Ground point services cable harness
D11_15	Fuel level sensor
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D13_05	Horn

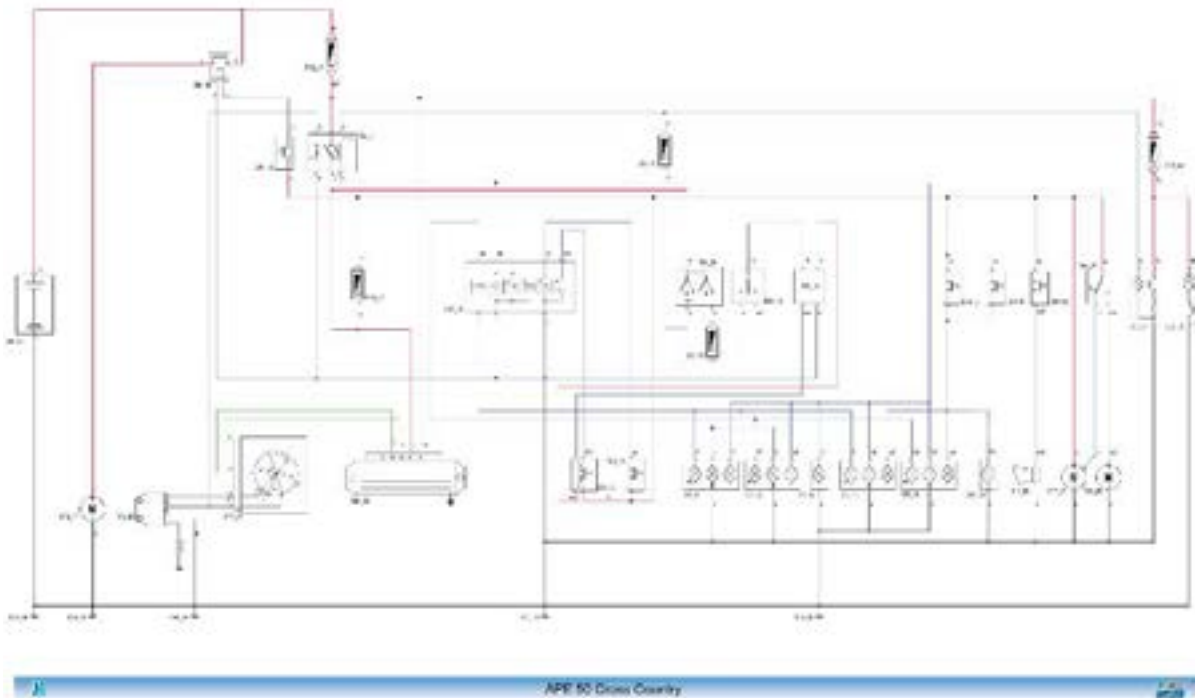
#### CABLES COLOUR DESCRIPTION

Colour	Description
B	Black
Br	Brown
G	Green
Gr	Grey
L	Blue
O	Orange
P	Rosa
R	Red
V	Purple
Y	Yellow
W	White
GB	Green-Black
GrL	Grey-Blue
LB	Blue-Black
RB	Red-Black
RL	Red-Blue
RGr	Red-Grey
RW	Red-White
YB	Yellow-Black
YG	Yellow-Green
WB	White-Black
WG	White-Green
WL	White-Blue
WV	White-Purple

#### ELECTRICAL SIGNALS IDENTIFICATION IN THE DIAGRAM

Colour	Description
RED	Supply
BLACK	Ground lead
BLUE	Controls to sensors/electrical devices
GREEN	Signals from sensors/electrical devices

**It differs from the Cross version by the type of magneto flywheel and voltage regulator**



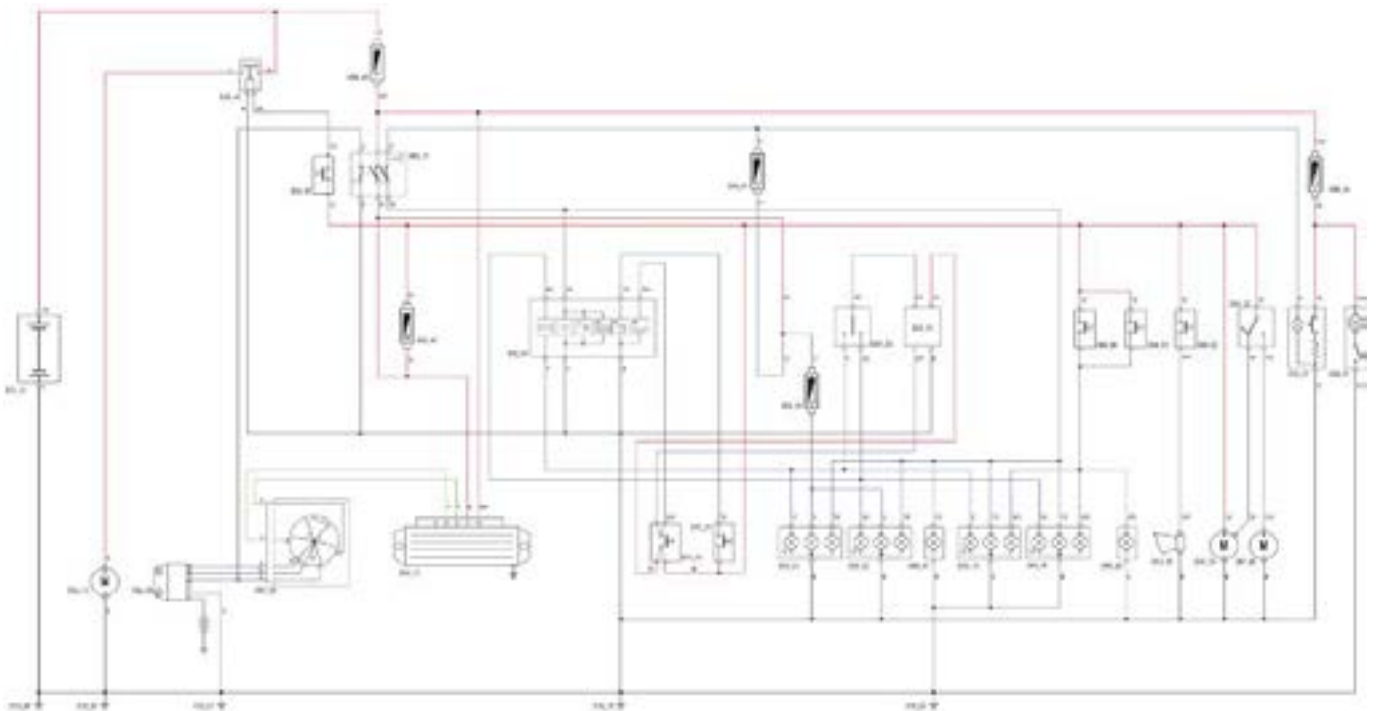
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D04_59	Starter button
D04_60	Stop button on front brake
D04_61	Stop button on rear brake
D04_62	Audible warning device control button
D04_63	Turn signal control deviator
D05_01	Left headlight
D05_02	Right headlight
D05_07	Licence plate light
D05_18	Right taillight
D05_19	Left taillight
D05_20	Stop third light
D06_01	Passenger compartment light unit
D07_03	Windscreen wiper motor
D07_05	Electric screen washer pump
D07_23	Magneto flywheel
D08_10	Turn signal flasher relay
D08_42	Start-up relay
D08_43	Main fuse
D08_44	Cigarette lighter supply fuse
D08_45	Ancillary supply fuse
D08_46	Headlight supply fuse
D08_47	External lighting supply fuse
D10_02	Engine ground
D10_03	Rear right hand chassis ground



Component	Description
D10_06	Battery ground
D10_07	Chassis/engine ground
D10_10	Ground point services cable harness
D11_15	Fuel level sensor
D11_30	Oil level sensor
D12_01	Instrument panel
D12_03	Digital clock
D13_01	12V accessory socket- Cigarette lighter
D13_05	Horn

For version with lights always on.



APE 50 Cross Country

**DESCRIPTION OF COMPONENTS - VERSION WITH LIGHTS ALWAYS ON**

Component	Description
D01_01	Starter battery
D02_13	Voltage regulator
D04_10	Starter motor
D04_11	Ignition switch
D04_37	Windscreen control switch
D04_53	Ignition device
D04_59	Starter button
D04_60	Stop button on front brake
D04_61	Stop button on rear brake
D04_62	Audible warning device control button
D04_63	Turn signal control deviator
D05_01	Left headlight
D05_02	Right headlight
D05_07	Licence plate light
D05_18	Right taillight
D05_19	Left taillight
D05_20	Stop third light
D06_01	Passenger compartment light unit
D07_03	Windscreen wiper motor
D07_05	Electric screen washer pump
D07_23	Magneto flywheel

Component	Description
D08_10	Turn signal flasher relay
D08_42	Start-up relay
D08_43	Main fuse
D08_44	Cigarette lighter supply fuse
D08_45	Ancillary supply fuse
D08_46	Headlight supply fuse
D08_47	External lighting supply fuse
D10_02	Engine ground
D10_03	Rear right hand chassis ground
D10_06	Battery ground
D10_07	Chassis/engine ground
D10_10	Ground point services cable harness
D11_15	Fuel level sensor
D11_30	Oil level sensor
D12_01	Instrument panel
D12_03	Digital clock
D13_01	12V accessory socket- Cigarette lighter
D13_05	Horn

### CABLES COLOUR DESCRIPTION

Colour	Description
B	Black
Br	Brown
G	Green
Gr	Grey
L	Blue
O	Orange
P	Rosa
R	Red
V	Purple
Y	Yellow
W	White
GB	Green-Black
GrL	Grey-Blue
LB	Blue-Black
RB	Red-Black
RL	Red-Blue
RGr	Red-Grey
RW	Red-White
YB	Yellow-Black
YG	Yellow-Green
WB	White-Black
WG	White-Green
WL	White-Blue
WV	White-Purple

### ELECTRICAL SIGNALS IDENTIFICATION IN THE DIAGRAM

Colour	Description
RED	Supply
BLACK	Ground lead
BLUE	Controls to sensors/electrical devices
GREEN	Signals from sensors/electrical devices

## Key-switch

**LOCK Position:** contacts 7-8, ground ignition, extractable key, locked steering.

**OFF:** contacts 7-8, ground ignition. Key may be removed.

**ON Position:** contacts 1 -3 (c.c. to the services) and 5-6 (Provision to the ignition of the daylight running light in c.a.). Key may not be removed.

**Position 1:** contacts 7-8 (ground ignition) and 3-5 (c.c. to the daylight running light). Parking extractable key.



## Turn signal switch

Position **0**: no contact.

Position **1**: contact between the Blue and White - Blue cables.

Position **2**: contact between the Blue and Brown cables.



## Horn button

Button in working position, contact between the White and Grey Black cables.



## Headlight switch

For versions with light switch:

Position **0**: no contact.

Position **1**: contact between the Pink and Grey cables.

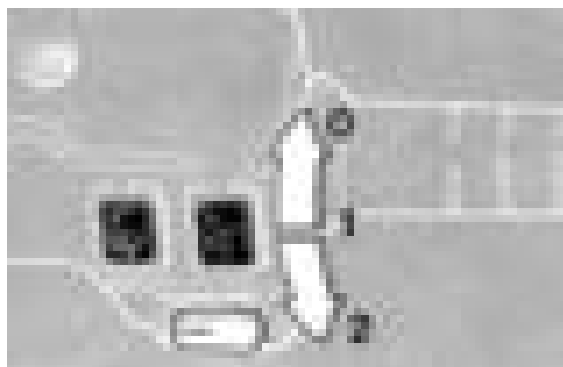
Position **2**: contact between the Pink and Grey and Purple cables.



Position **0**: no contact.

Position **1**: contact between the Pink and Grey cables.

Position **2**: contact between the Pink and Grey and Purple cables.



## Wiper switch

In working position, contact between the White and White Black cables.

### POSITIONS OF THE WINDSCREEN WIPER SWITCH - APE 50 MIX - APE 50 EUROPE

**0** = Windscreen wiper turned off

**1** = Windscreen wiper turned on

**2** = Windscreen washer enabling



## Pulsante avviamento

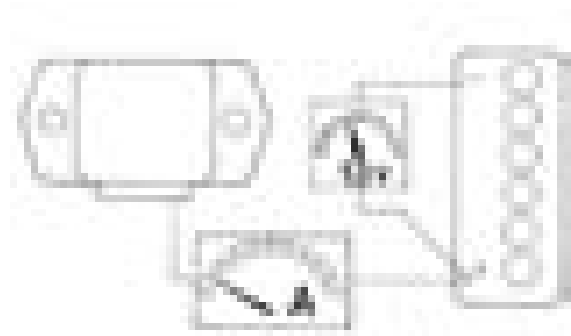
In working position, contact between the White and Green Black cables.



## Interventions

The failure of the alternate current section of the voltage regulator can cause, depending on the type of fault, the following problems:

- 1) Burning of the bulbs (regulator stopped).
- 2) Operation failure of the lighting (short circuit in the regulator).

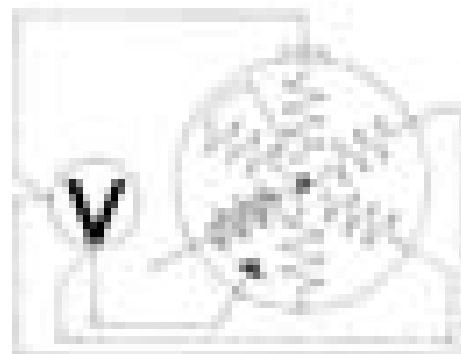


### FAILURE 1

Replace the regulator because it is securely inefficient.

### FAILURE 2

- a) Check the correct current output of the alternator: disconnect the grey regulator cable, place a voltmeter between the cable and ground to detect the alternate current voltages and to check that the output voltage at 3000 rpm is greater than or equal to 20V.
- b) If the checks carried out disclose no failures, replace the regulator.
- c) If replacing the regulator does not restore proper operation, proceed to the checks of the electrical system connections.



## interventions

The failure of the direct current section of the voltage regulator can cause, depending on the type of fault, the following problems:

- 3) Burning of the protective fuse (short circuit in the regulator) and subsequent battery recharge failure.  
 4) Battery recharge failure(regulator stopped).

**FAILURE 3**

Replace the regulator, because it is securely inefficient and replace the protective fuse.

**FAILURE 4**

- a) Insert an ammeter between the regulator and the battery and verify that the current output at 3000 rpm is greater than 1 amp, with the battery maintained at 13V. If the values are lower than required, replace the regulator.
- b) If replacing the regulator does not restore proper operation, check the voltage output from the alternator, as in point 2a. Checking the output voltage at 3000 rpm on the c.c. section is greater than or equal to 25V.

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**Characteristics**

**STARTER MOTOR**

Specification	Desc./Quantity
Rated voltage	12V.
rated power	0.25 Kw.
Rotation	Left.

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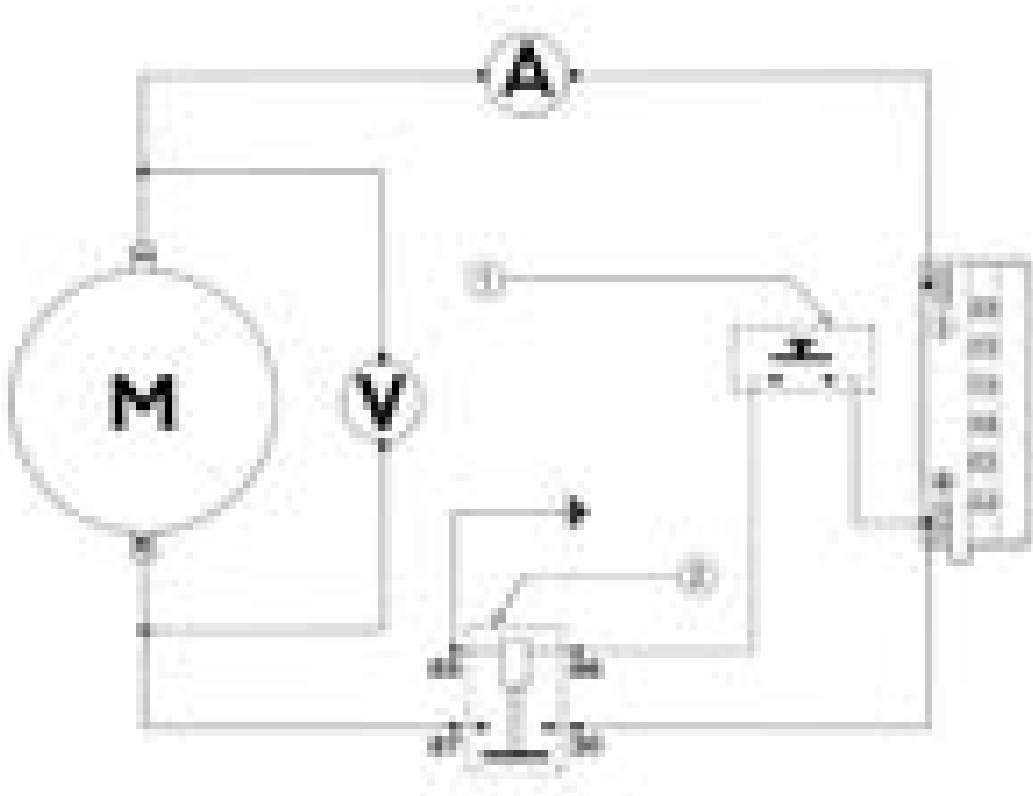
**Bench tests**

**TESTS TO BE PERFORMED AT THE BENCH WHEN THE STARTER MOTOR HAS TO BE OVERHAULED.**

- 1) No-load test: the starter motor, under no-load, must draw a maximum of 30 Amp. with a supply voltage of 11.5 to 12V and must rotate at rpm 11,000.
- 2) Load test: braking the starter motor so that it draws 60 Amp, and with a supply voltage of 10 to 10.5 V a torque 0.06 kgm must be obtained, for no lower than 4,600 rpm.
- 3) Pickup test: with rotor locked and a supply voltage 8 to 8.5V the current drawn must not be higher than 160 Amp and the torque must be no lower than 0.3 kgm.

**N.B.**

**THE VALUES SHOWN ABOVE MUST BE TAKEN WITH A CHARGED BATTERY AND AFTER THE STARTER MOTOR HAS BEEN ROTATING FOR 30" UNDER CONDITIONS OF POINT 1.**



**KEY:**

1 = Starter button

2 = Remote control

**Starter motor removal**



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## Safety cap removal



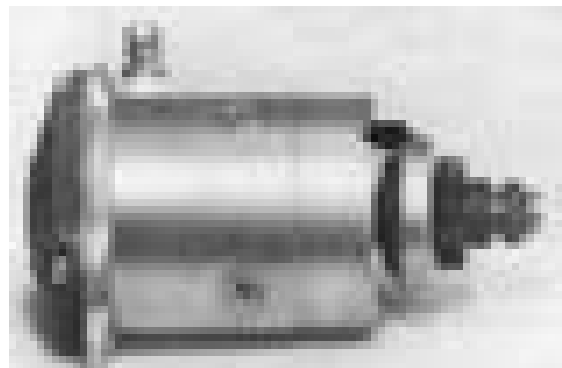
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## Coupling pin removal

Remove the retainer ring and remove the pinion.

**CAUTION**

ALWAYS REPLACE THE INDICATED GASKET GIVEN TOGETHER WITH THE SPECIFIC RECOMMENDED PRODUCT.



---

## Safety cap calkin

- Position the hood.
- Chamfer, as shown, the hood with the appropriate tool.

**CAUTION**

REPLACING THE BRUSHES, AND REMOVE THE REAR LID AND REPLACE.

### Specific tooling

020057Y Tool for Starter Motor Bushing Calking

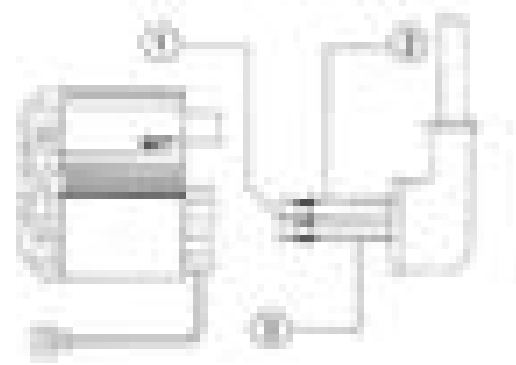




## Controllo impianto di accensione

All system check operations involving disconnection of the cables (inspections of connections and devices that are part of the ignition circuit) must be made with the engine turned off: otherwise the control unit could be irreparably damaged.

It is therefore important and necessary that in case of removal of the cables, when refitting attention is paid to correctly reconnecting each cable to the corresponding coupling respecting the distinct colour codings.



### KEY:

1 = Red

2 = White

3 = Green

### INSPECTIONS TO BE PERFORMED IN THE EVENT OF IGNITION IRREGULARITIES

In the event of failure and abnormal operation of the ignition, whose causes are not detectable by a visual inspection, it is necessary first to replace the control unit with a corresponding, safely functional replacement.

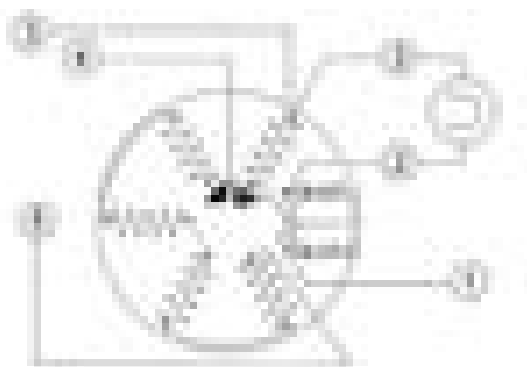
Remember that the disconnections and connections to replace the control unit must be performed when the engine stopped.

If replacing it restores the ignition operation, the fault lies in the control unit, which obviously needs to be replaced.

In the event that the failure persists, it is necessary to carry out checks on the alternator and on the stator parts as follows:

After a visual inspection of the electrical connections, measurements are carried out on the loading coil and on the pick-up using an Ohm meter, capable of detecting the resistance from 1 to 1000 ohms.

Connect the instrument between the green cable and the white one, there must be continuity and an ohmic value of  $500 \pm 20$  ohm.

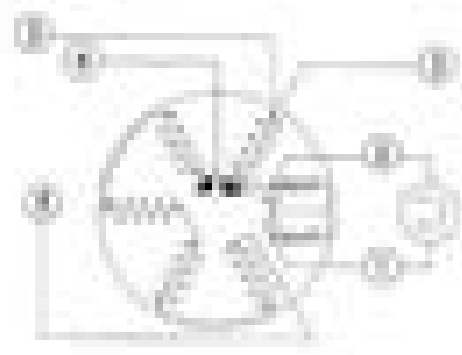


### KEY:

1 = Red

- 2 = White
- 3 = Green
- 4 = Black
- 5 = Blue

Connect the instrument between the red and white cables, there must be continuity and an ohmic value of  $110 \pm 5$  ohm.



**KEY:**

- 1 = Red
- 2 = White
- 3 = Green
- 4 = Black
- 5 = Blue

If there are failures on the checks on the loading coil and on the pick-up, proceed to the replacement.

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## ELECTRIC FUNCTIONS

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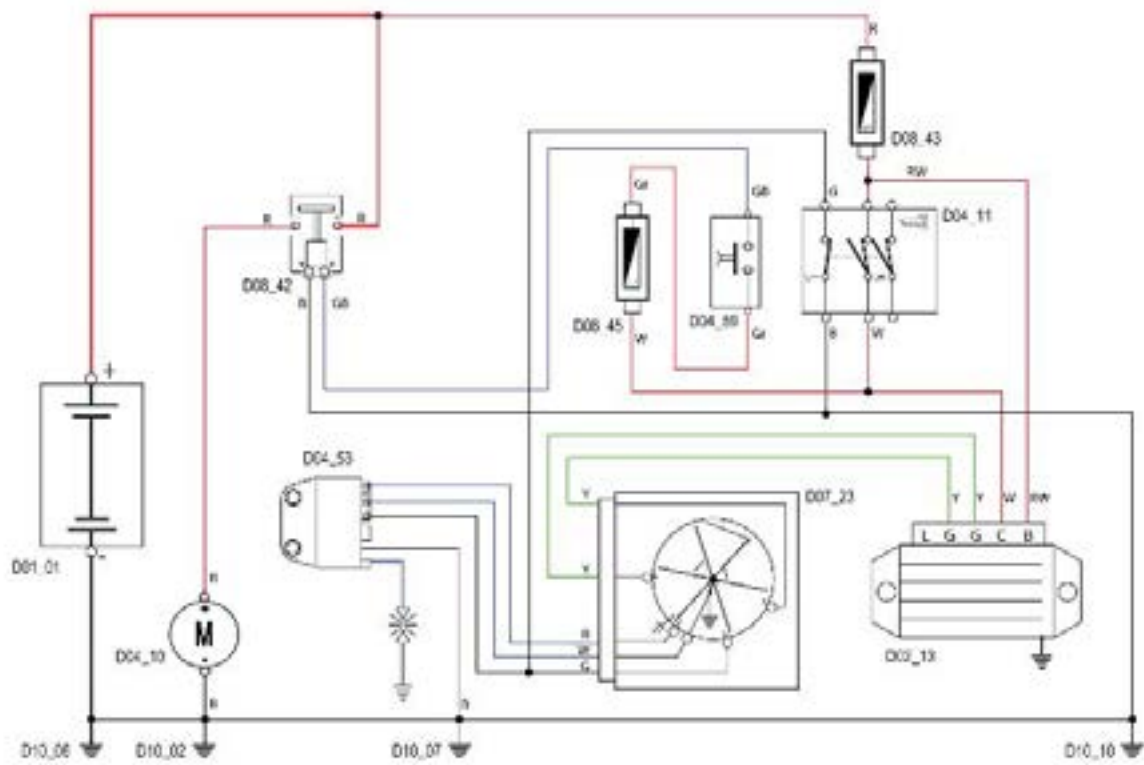
### F01 POWER

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#### Starting/Charging

F01\_02 Electrical functions, Starting/ Voltage regulator (it differs from the Cross version by the type of magneto flywheel and voltage regulator)

Functional Diagram



**F01\_02 - DESCRIPTION OF COMPONENTS**

Component	Description
D01_01	Starter battery
D02_13	Voltage regulator
D04_10	Starter motor
D04_11	Ignition switch
D04_53	Ignition device
D04_59	Starter button
D07_23	Magneto flywheel
D08_42	Start-up relay
D08_43	Main fuse
D08_45	Ancillary supply fuse
D10_02	Engine ground
D10_06	Battery ground
D10_07	Chassis/engine ground
D10_10	Ground point services cable harness

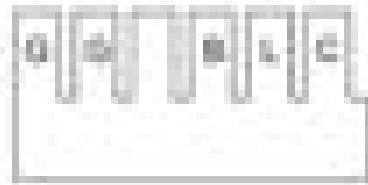
**CABLES COLOUR DESCRIPTION**

Colour	Description
B	Black
Br	Brown
G	Green
Gr	Grey
L	Blue
O	Orange
P	Rosa
R	Red
V	Purple
Y	Yellow
W	White
GB	Green-Black
GrL	Grey-Blue
LB	Blue-Black

Colour	Description
RB	Red-Black
RL	Red-Blue
RGr	Red-Grey
RW	Red-White
YB	Yellow-Black
YG	Yellow-Green
WB	White-Black
WG	White-Green
WL	White-Blue
WV	White-Purple

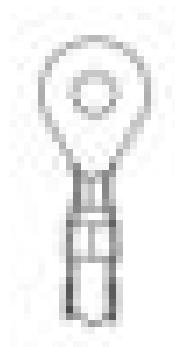
**ELECTRICAL SIGNALS IDENTIFICATION IN THE DIAGRAM**

Colour	Description
RED	Supply
BLACK	Ground lead
BLUE	Controls to sensors/electrical devices
GREEN	Signals from sensors/electrical devices



**D02 13 - VOLTAGE REGULATOR CONNECTOR (CROSS COUNTRY)**

Pin	Colour	Description
C	W	Ignition switched live
L	-	-
B	RW	Power supply from main fuse D08_43 (20A)
G	Y	Signal from the magneto flywheel
G	Y	Signal from the magneto flywheel



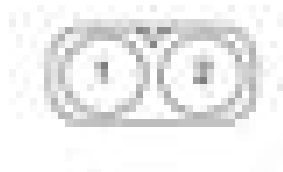
**D04 10 - STARTER MOTOR CONNECTOR**

Pin	Colour	Description
	R	Starter motor command



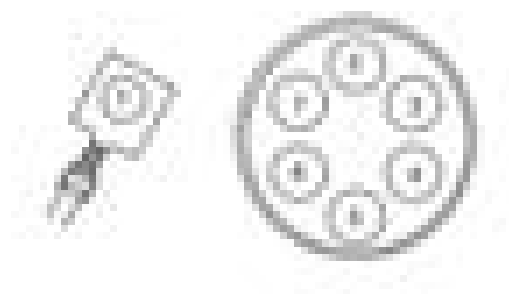
**D04\_11 - IGNITION SWITCH CONNECTOR**

Pin	Colour	Description
1	B	Ground D10_10
2	YB	External lighting enable
3	RW	Battery positive from main fuse D08_43 (20A)
4	W	To fuse D08_45 (7.5A) for ancillary supply
5	O	External lights and cigarette lighter lighting power supply enable
6	G	Ground signal for ignition device



**D04\_59 - START-UP BUTTON CONNECTOR**

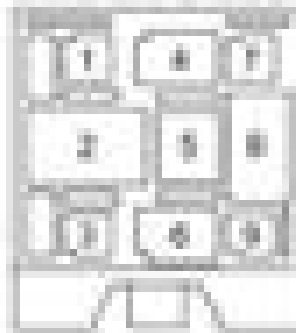
Pin	Colour	Description
1	GB	Starter relay command
2	Gr	Positive from fuse D08_45 (7.5A)



**D07\_23 - MAGNETO FLYWHEEL CONNECTOR (CROSS COUNTRY)**

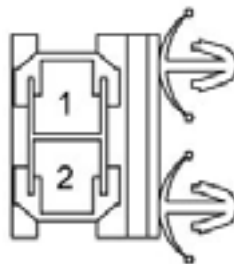
Pin	Colour	Description
1	B	Ground lead
2	-	-
3	Y	Signal to the voltage regulator
4	-	-

Pin	Colour	Description
5	Y	Signal to the voltage regulator
6	-	-
7	Y	Signal to the voltage regulator



#### **D08\_42 - START-UP RELAY CONNECTOR**

Pin	Colour	Description
1	-	-
2	R	Direct battery positive
3	-	-
4	B	Ground D10_10
5	-	-
6	GB	Positive from start-up button
7	-	-
8	R	Starter motor command
9	-	-

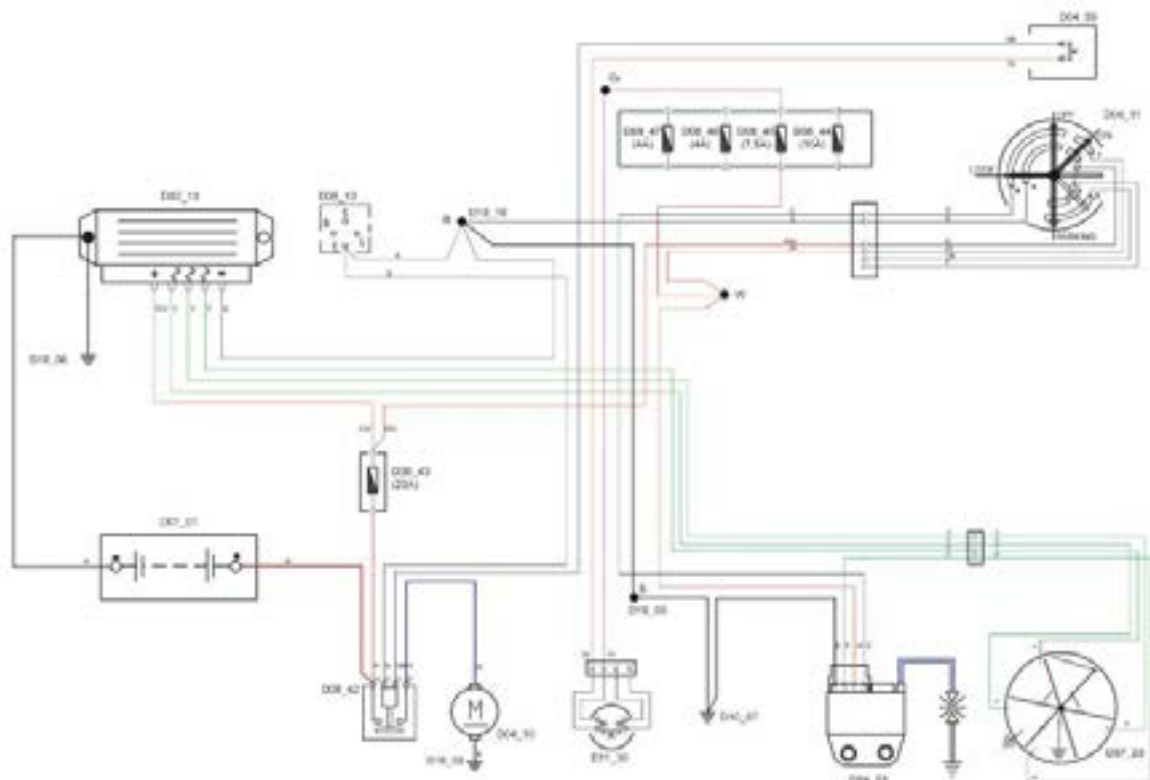


#### **D08\_43 - MAIN FUSE CONNECTOR**

Pin	Colour	Description
1	R	Direct battery positive
2	RW	Ignition switch and voltage regulator power supply

### **F01\_02 Electrical functions Starting / Voltage regulator**

#### **Functional Diagram**



**F01\_02 - DESCRIPTION OF COMPONENTS**

Component	Description
D01_01	Starter battery
D02_13	Voltage regulator
D04_10	Starter motor
D04_11	Ignition switch
D04_53	Ignition device
D04_59	Starter button
D07_23	Magneto flywheel
D08_10	Turn signal flasher relay
D08_42	Start-up relay
D08_43	Main fuse
D08_45	Ancillary supply fuse
D10_02	Engine ground
D10_03	Rear right hand chassis ground
D10_06	Battery ground
D10_07	Chassis/engine ground
D10_10	Ground point services cable harness
D11_30	Oil level sensor

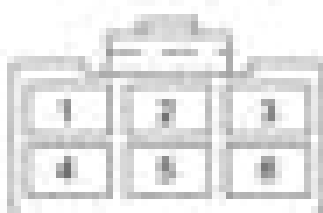
**CABLES COLOUR DESCRIPTION**

Colour	Description
B	Black
Br	Brown
G	Green
Gr	Grey
L	Blue
O	Orange
P	Rosa
R	Red
V	Purple
Y	Yellow
W	White
GB	Green-Black

Colour	Description
GrL	Grey-Blue
LB	Blue-Black
RB	Red-Black
RL	Red-Blue
RGr	Red-Grey
RW	Red-White
YB	Yellow-Black
YG	Yellow-Green
WB	White-Black
WG	White-Green
WL	White-Blue
WV	White-Purple

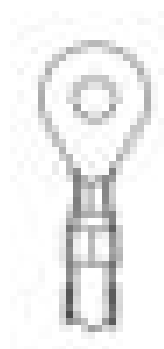
**ELECTRICAL SIGNALS IDENTIFICATION IN THE DIAGRAM**

Colour	Description
RED	Supply
BLACK	Ground lead
BLUE	Controls to sensors/electrical devices
GREEN	Signals from sensors/electrical devices



**D02 13 - VOLTAGE REGULATOR CONNECTOR**

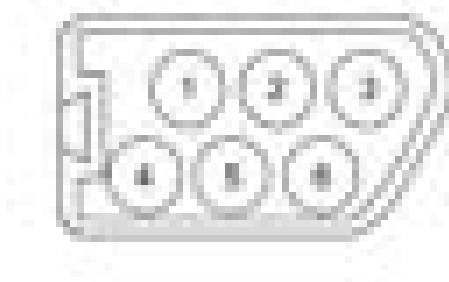
Pin	Colour	Description
1	RW	Power supply from main fuse D08_43 (20A)
2	-	-
3	B	Ground D10_10
4	Y	Signal from the magneto flywheel
5	Y	Signal from the magneto flywheel
6	Y	Signal from the magneto flywheel



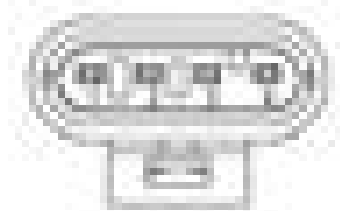
**D04 10 - STARTER MOTOR CONNECTOR**

Pin	Colour	Description
	R	Starter motor command

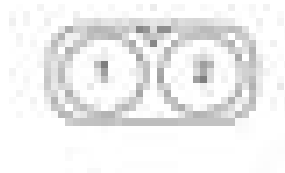


**D04\_11 - IGNITION SWITCH CONNECTOR**

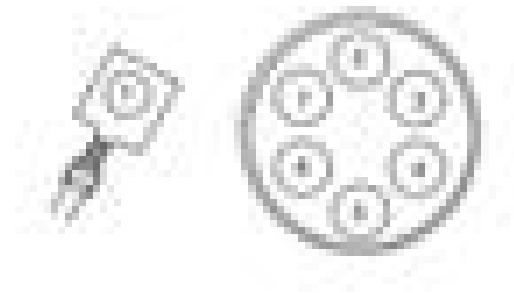
Pin	Colour	Description
1	B	Ground D10_10
2	YB	External lighting enable
3	RW	Battery positive from main fuse D08_43 (20A)
4	W	To fuse D08_45 (7.5A) for ancillary supply
5	O	External lights and cigarette lighter lighting power supply enable
6	G	Ground signal for ignition device

**D04\_53 - IGNITION DEVICE CONNECTOR**

Pin	Colour	Description
1	B	Ground D10_07
2	P	Signal from the magneto flywheel
3	G	Ground signal of ignition switch
4	W	Positive from ignition switch

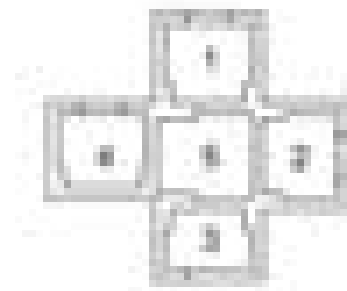
**D04\_59 - START-UP BUTTON CONNECTOR**

Pin	Colour	Description
1	GB	Starter relay command
2	Gr	Positive from fuse D08_45 (7.5A)



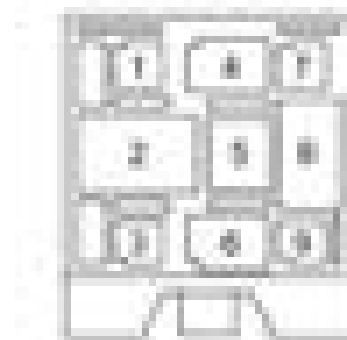
**D07 23 - MAGNETO FLYWHEEL CONNECTOR**

Pin	Colour	Description
1	B	Ground lead
2	P	Signal to the ignition device
3	Y	Signal to the voltage regulator
4	-	-
5	Y	Signal to the voltage regulator
6	-	-
7	Y	Signal to the voltage regulator



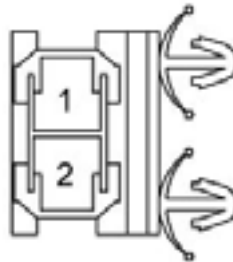
**D08 10 - INTERMITTENT RELAY CONNECTOR**

Pin	Colour	Description
1	B	Ground D10_10
2	Gr	Power supply from fuse D08_45 (7.5A)
3	LB	To the turn signal control deviator
4	-	-
5	WV	Intermittent signal for oil level warning light

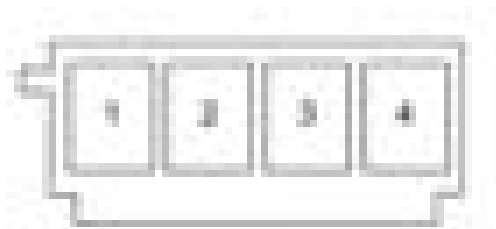


**D08 42 - START-UP RELAY CONNECTOR**

Pin	Colour	Description
1	-	-
2	R	Direct battery positive
3	-	-
4	B	Ground D10_10
5	-	-
6	GB	Positive from start-up button
7	-	-
8	R	Starter motor command
9	-	-

**D08 43 - MAIN FUSE CONNECTOR**

Pin	Colour	Description
1	R	Direct battery positive
2	RW	Ignition switch and voltage regulator power supply

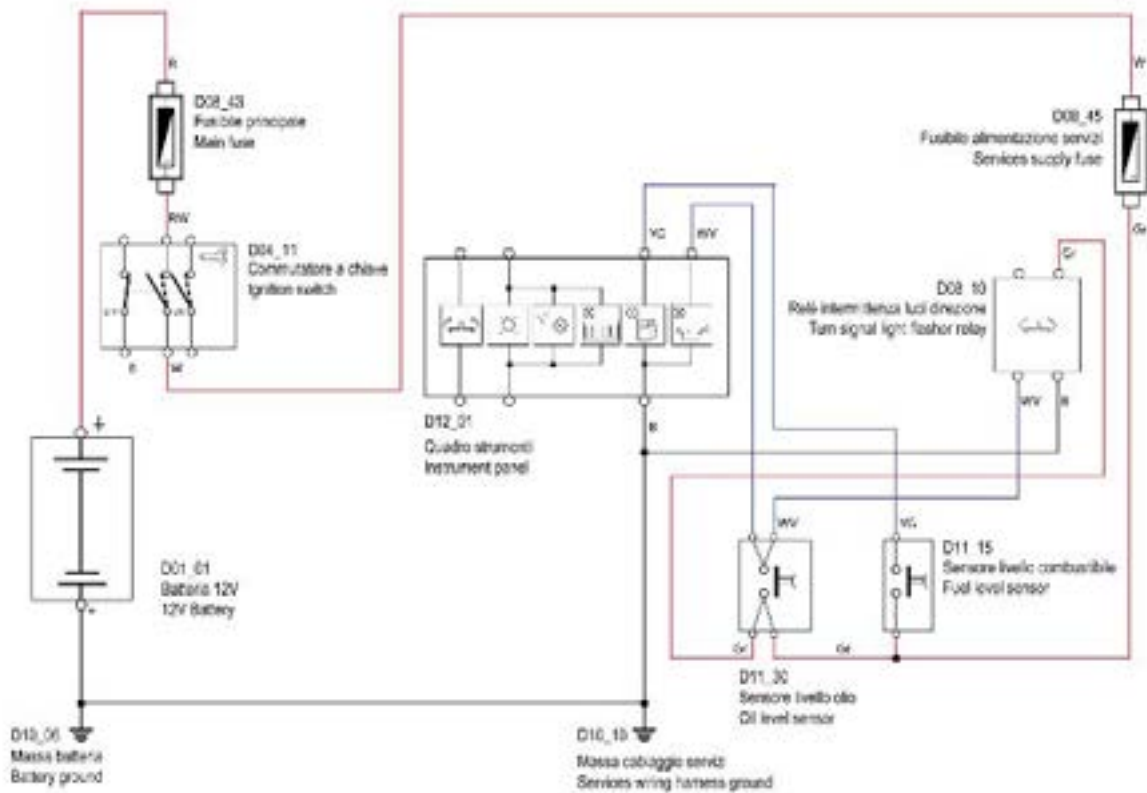
**D11 30 - OIL LEVEL SENSOR CONNECTOR**

Pin	Colour	Description
1	WV	Oil level warning light control
2	WV	Signal of intermittent relay D08_10
3	Gr	Positive from fuse D08_45 (7.5A)
4	Gr	Positive from fuse D08_45 (7.5A)

**F02 ON BOARD INSTRUMENTS****Instrument panel/Warning and indicator lights**

F02\_01 - Electrical functions, instrument panel/warning and indicator lights

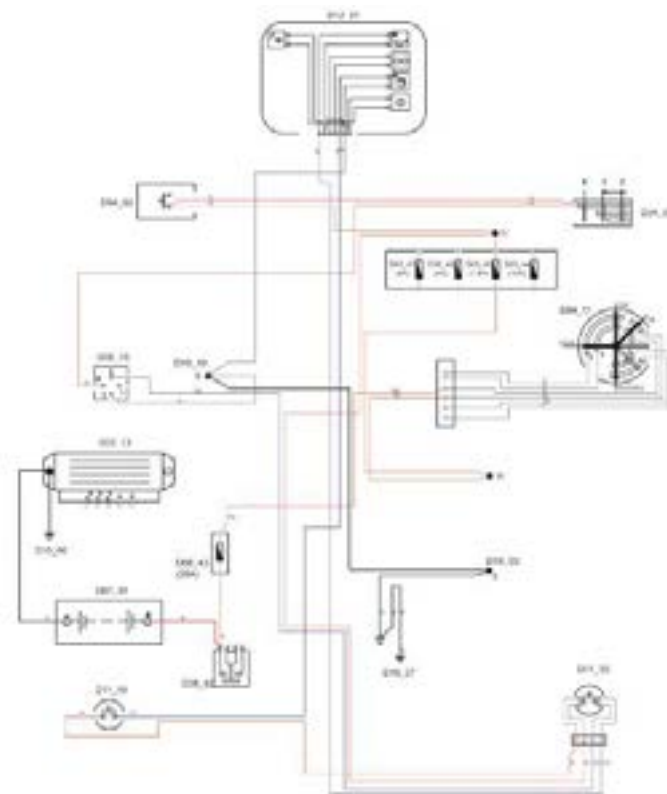
Functional Diagram



**F02\_01 - DESCRIPTION OF COMPONENTS**

Component	Description
D01_01	Starter battery
D04_11	Ignition switch
D08_10	Turn signal flasher relay
D08_43	Main fuse
D08_45	Ancillary supply fuse
D10_06	Battery ground
D10_10	Ground point services cable harness
D11_15	Fuel level sensor
D11_30	Oil level sensor
D12_01	Instrument panel

For version with lights always on.



**F02\_01 - DESCRIPTION OF COMPONENTS**

Component	Description
D01_01	Starter battery
D02_13	Voltage regulator
D04_11	Ignition switch
D04_37	Windscreen control switch
D04_62	Audible warning device control button
D08_10	Turn signal flasher relay
D08_42	Start-up relay
D08_43	Main fuse
D08_45	Ancillary supply fuse
D10_06	Battery ground
D10_03	Rear right hand chassis ground
D10_07	Chassis/engine ground
D10_10	Ground point services cable harness
D11_15	Fuel level sensor
D11_30	Oil level sensor
D12_01	Instrument panel

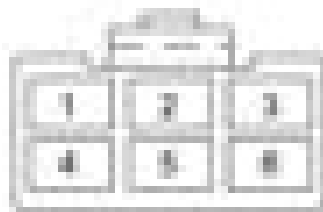
**CABLES COLOUR DESCRIPTION**

Colour	Description
B	Black
Br	Brown
G	Green
Gr	Grey
L	Blue
O	Orange
P	Rosa
R	Red
V	Purple
Y	Yellow
W	White
GB	Green-Black
GrL	Grey-Blue

Colour	Description
LB	Blue-Black
RB	Red-Black
RL	Red-Blue
RGr	Red-Grey
RW	Red-White
YB	Yellow-Black
YG	Yellow-Green
WB	White-Black
WG	White-Green
WL	White-Blue
WV	White-Purple

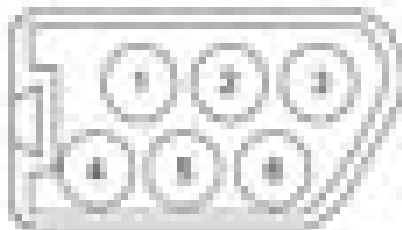
**ELECTRICAL SIGNALS IDENTIFICATION IN THE DIAGRAM**

Colour	Description
RED	Supply
BLACK	Ground lead
BLUE	Controls to sensors/electrical devices
GREEN	Signals from sensors/electrical devices



**D02 13 - VOLTAGE REGULATOR CONNECTOR**

Pin	Colour	Description
1	RW	Power supply from main fuse D08_43 (20A)
2	-	-
3	B	Ground D10_10
4	Y	Signal from the magneto flywheel
5	Y	Signal from the magneto flywheel
6	Y	Signal from the magneto flywheel



**D04 11 - IGNITION SWITCH CONNECTOR**

Pin	Colour	Description
1	B	Ground D10_10
2	YB	External lighting enable
3	RW	Battery positive from main fuse D08_43 (20A)
4	W	To fuse D08_45 (7.5A) for ancillary supply
5	O	External lights and cigarette lighter lighting power supply enable

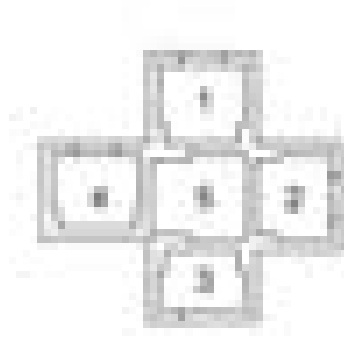
Pin	Colour	Description
6	G	Ground signal for ignition device

**D04 37 - WINDSCREEN WIPER WASHER CONTROL SWITCH CONNECTOR**

Pin	Colour	Description
1	Gr	power supply from fuse D08_45 (7.5A)
2	Br	Windscreen wiper control
3	GrL	Electric screen washer pump control

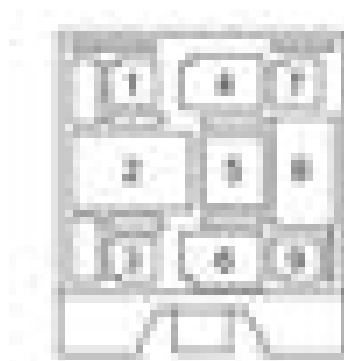
**D04 62 - AUDIBLE WARNING DEVICE CONTROL SWITCH CONNECTOR**

Pin	Colour	Description
1	GrB	Audible warning device control
2	Gr	Positive from fuse D08_45 (7.5A)



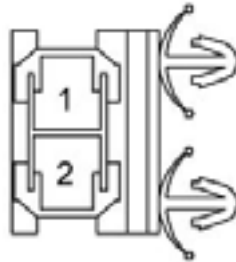
**D08 10 - INTERMITTENT RELAY CONNECTOR**

Pin	Colour	Description
1	B	Ground D10_10
2	Gr	Power supply from fuse D08_45 (7.5A)
3	LB	To the turn signal control deviator
4	-	-
5	WV	Intermittent signal for oil level warning light



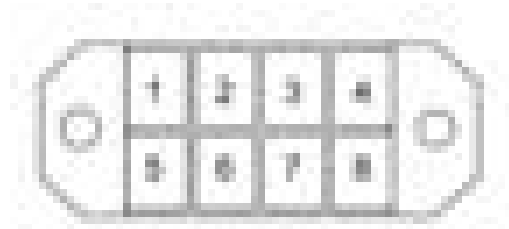
**D08 42 - START-UP RELAY CONNECTOR**

Pin	Colour	Description
1	-	-
2	R	Direct battery positive
3	-	-
4	B	Ground D10_10
5	-	-
6	GB	Positive from start-up button
7	-	-
8	R	Starter motor command
9	-	-



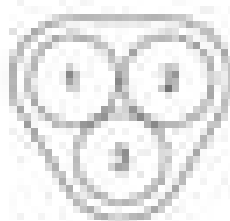
**D08\_43 - MAIN FUSE CONNECTOR**

Pin	Colour	Description
1	R	Direct battery positive
2	RW	Ignition switch and voltage regulator power supply



**FUSES TERMINAL BLOCK CONNECTOR**

Pin	Colour	Description
1	O	To the external lights switch for activation of daylight running light
2	VB	Headlight power supply from fuse D08_46 (4A)
3	Gr	Ancillary power supply from fuse D08_45 (7.5A)
4	RL	Cigarette lighter power supply from fuse D08_44 (10A)
5	O	External lights power supply from fuse D08_47 (4A)
6	V	Headlights control of external lights switch
7	W	Positive after ignition switch from main fuse D08_43 (20A)
8	RW	Battery positive after main fuse D08_43 (20A)

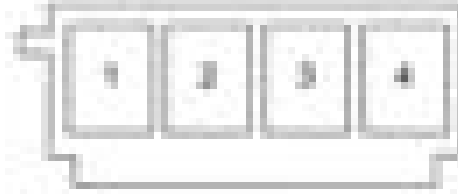


**D11\_15 - FUEL LEVEL SENSOR CONNECTOR**

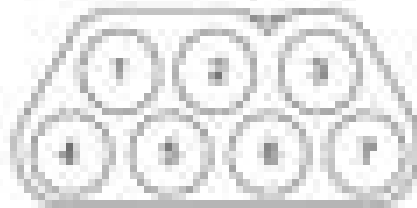
Pin	Colour	Description
1	Gr	Positive from fuse D08_45 (7.5A)
2	YG	Fuel reserve warning light control



Pin	Colour	Description
3	-	-

**D11 30 - OIL LEVEL SENSOR CONNECTOR**

Pin	Colour	Description
1	WV	Oil level warning light control
2	WV	Signal of intermittent relay D08_10
3	Gr	Positive from fuse D08_45 (7.5A)
4	Gr	Positive from fuse D08_45 (7.5A)

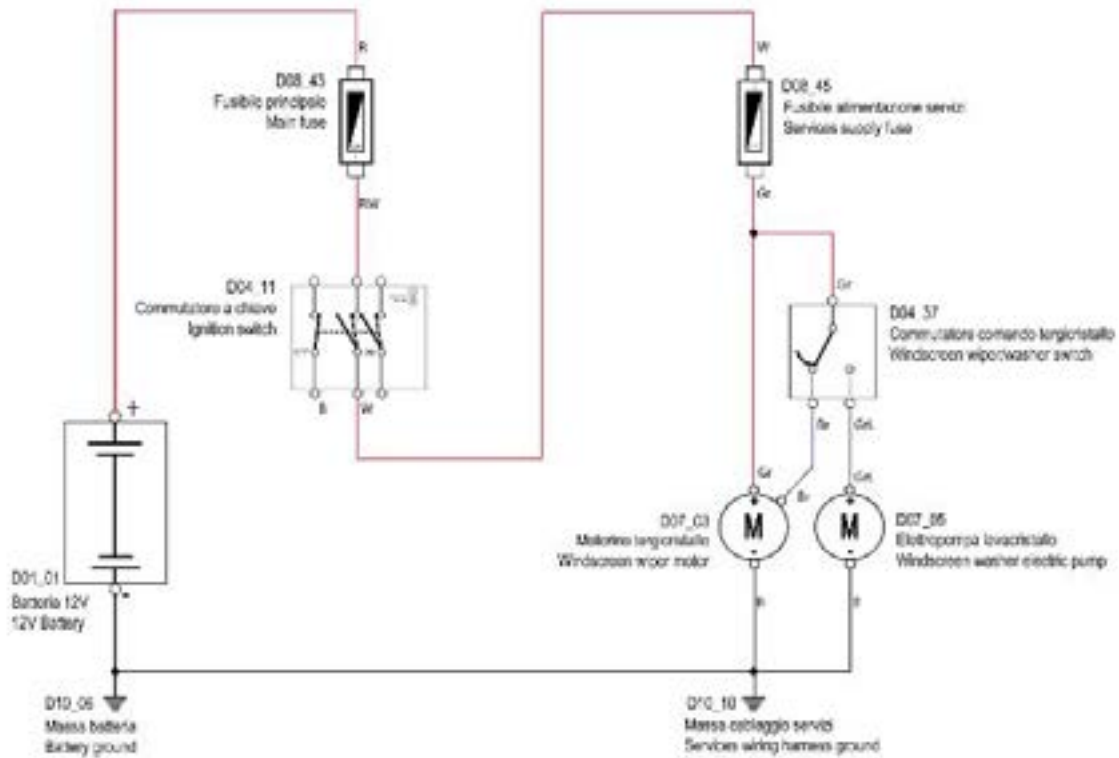
**D12 01 - INSTRUMENT PANEL CONNECTOR**

Pin	Colour	Description
1	YB	Panel lighting and daylight running light warning light power supply activated
2	B	Ground D10_10
3	WL	Turn signal lights activation
4	P	Turn signal lights activation
5	YG	fuel reserve indication
6	B	Ground D10_10
7	WV	Oil level indication

**F04 ELECTRICALLY OPERATED DEVICES****Windscreen washer-wiper/Rear screen washer-wiper**

F04\_01 - Electrical functions. Windscreen wiper-washer/Rear screen wiper-washer

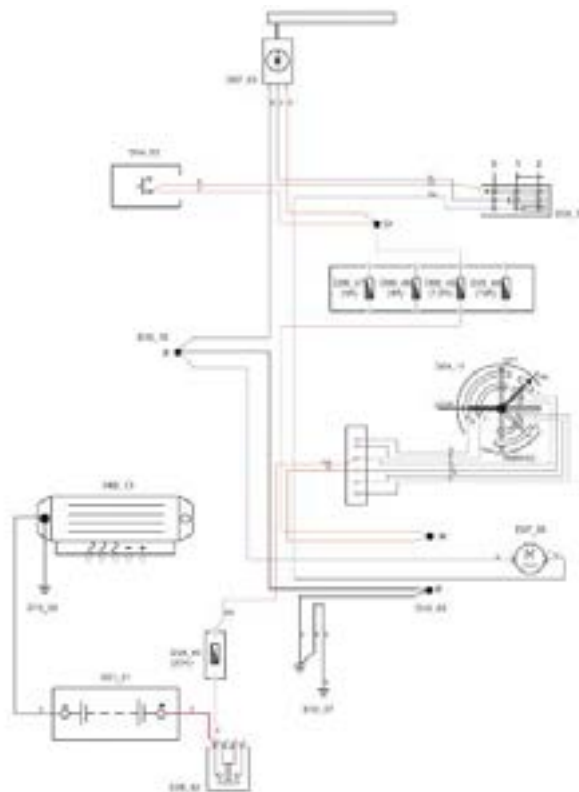
Functional Diagram



**F04 01 - DESCRIPTION OF COMPONENTS**

Component	Description
D01_01	Starter battery
D04_11	Ignition switch
D04_37	Windscreen control switch
D07_03	Windscreen wiper motor
D07_05	Electric screen washer pump
D08_43	Main fuse
D08_45	Ancillary supply fuse
D10_06	Battery ground
D10_10	Ground point services cable harness

For version with lights always on.



**F04 01 - DESCRIPTION OF COMPONENTS**

Component	Description
D01_01	Starter battery
D02_13	Voltage regulator
D04_11	Ignition switch
D04_37	Windscreen control switch
D04_62	Audible warning device control button
D07_03	Windscreen wiper motor
D07_05	Electric screen washer pump
D08_42	Start-up relay
D08_43	Main fuse
D08_45	Ancillary supply fuse
D10_03	Rear right hand chassis ground
D10_06	Battery ground
D10_07	Chassis/engine ground
D10_10	Ground point services cable harness

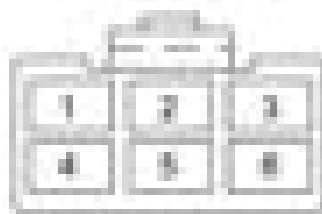
**CABLES COLOUR DESCRIPTION**

Colour	Description
B	Black
Br	Brown
G	Green
Gr	Grey
L	Blue
O	Orange
P	Rosa
R	Red
V	Purple
Y	Yellow
W	White
GB	Green-Black
GrL	Grey-Blue
LB	Blue-Black
RB	Red-Black

Colour	Description
RL	Red-Blue
RGr	Red-Grey
RW	Red-White
YB	Yellow-Black
YG	Yellow-Green
WB	White-Black
WG	White-Green
WL	White-Blue
WV	White-Purple

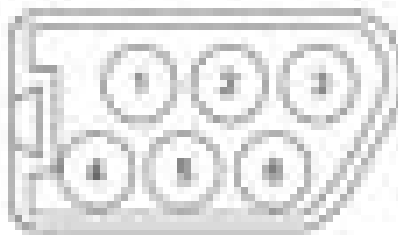
**ELECTRICAL SIGNALS IDENTIFICATION IN THE DIAGRAM**

Colour	Description
RED	Supply
BLACK	Ground lead
BLUE	Controls to sensors/electrical devices
GREEN	Signals from sensors/electrical devices



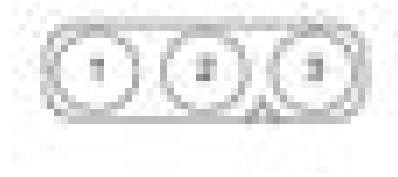
**D02 13 - VOLTAGE REGULATOR CONNECTOR**

Pin	Colour	Description
1	RW	Power supply from main fuse D08_43 (20A)
2	-	-
3	B	Ground D10_10
4	Y	Signal from the magneto flywheel
5	Y	Signal from the magneto flywheel
6	Y	Signal from the magneto flywheel



**D04 11 - IGNITION SWITCH CONNECTOR**

Pin	Colour	Description
1	B	Ground D10_10
2	YB	External lighting enable
3	RW	Battery positive from main fuse D08_43 (20A)
4	W	To fuse D08_45 (7.5A) for ancillary supply
5	O	External lights and cigarette lighter lighting power supply enable
6	G	Ground signal for ignition device

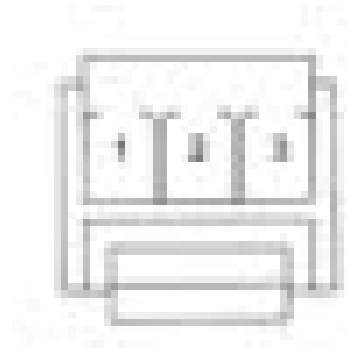


**D04 37 - WINDSCREEN WIPER WASHER CONTROL SWITCH CONNECTOR**

Pin	Colour	Description
1	Gr	power supply from fuse D08_45 (7.5A)
2	Br	Windscreen wiper control
3	GrL	Electric screen washer pump control

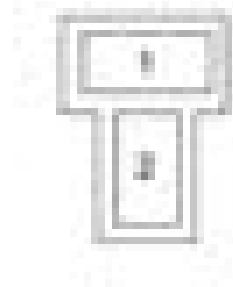
**D04 62 - AUDIBLE WARNING DEVICE CONTROL SWITCH CONNECTOR**

Pin	Colour	Description
1	GrB	Audible warning device control
2	Gr	Positive from fuse D08_45 (7.5A)



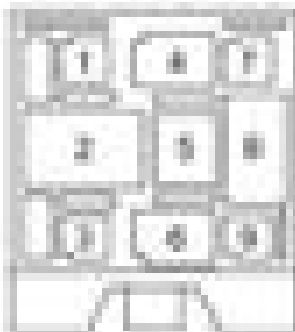
**D07 03 - WINDSCREEN WIPER MOTOR CONNECTOR**

Pin	Colour	Description
1	Gr	Power supply from fuse D08_45 (7.5A)
2	B	Ground D10_10
3	Br	Windscreen switch control

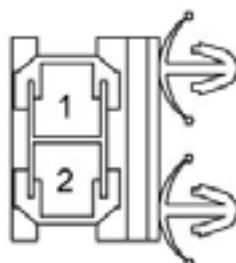


**D07\_05 - ELECTRIC WINDSCREEN WASHER PUMP CONNECTOR**

Pin	Colour	Description
1	B	Ground D10_10
2	GrL	Control of windscreen wiper washer switch

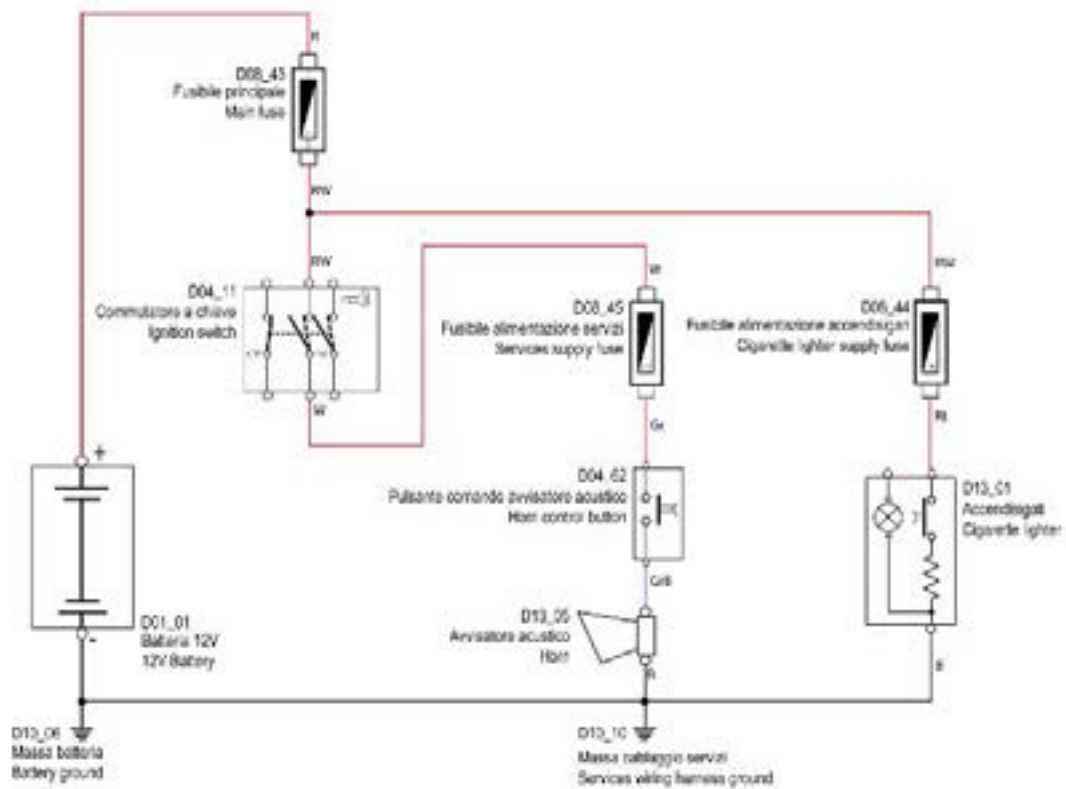
**D08\_42 - START-UP RELAY CONNECTOR**

Pin	Colour	Description
1	-	-
2	R	Direct battery positive
3	-	-
4	B	Ground D10_10
5	-	-
6	GB	Positive from start-up button
7	-	-
8	R	Starter motor command
9	-	-

**D08\_43 - MAIN FUSE CONNECTOR**

Pin	Colour	Description
1	R	Direct battery positive
2	RW	Ignition switch and voltage regulator power supply

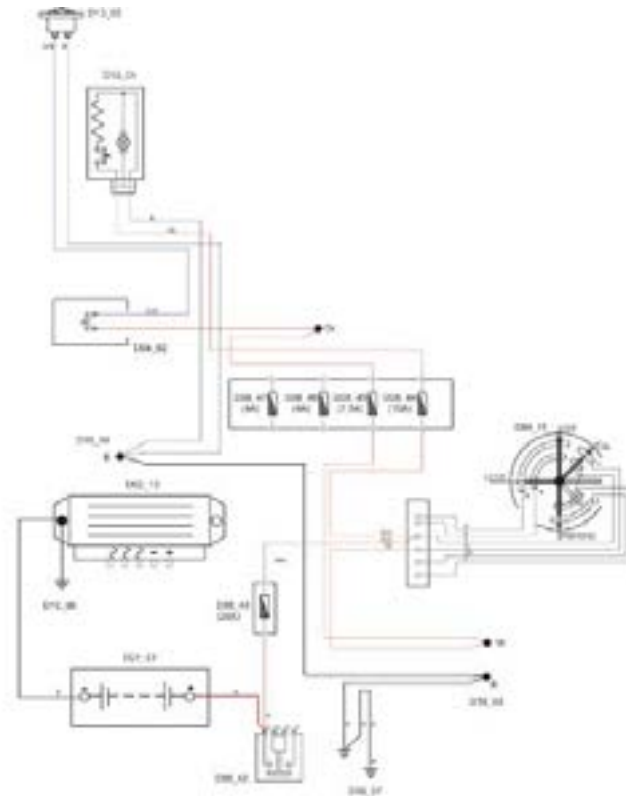
**Horn/Cigarette lighter****F04\_03 - Electrical functions, Horn/Cigarette lighter****Functional Diagram**



**F04\_03 - DESCRIPTION OF COMPONENTS**

Component	Description
D01_01	Starter battery
D04_11	Ignition switch
D04_62	Audible warning device control button
D08_43	Main fuse
D08_44	Cigarette lighter supply fuse
D08_45	Ancillary supply fuse
D10_06	Battery ground
D10_10	Ground point services cable harness
D13_01	12V accessory socket- Cigarette lighter
D13_05	Horn

For version with lights always on.



**F04 03 - DESCRIPTION OF COMPONENTS**

Component	Description
D01_01	Starter battery
D02_13	Voltage regulator
D04_11	Ignition switch
D04_62	Audible warning device control button
D08_42	Start-up relay
D08_43	Main fuse
D08_44	Cigarette lighter supply fuse
D08_45	Ancillary supply fuse
D10_03	Rear right hand chassis ground
D10_06	Battery ground
D10_07	Chassis/engine ground
D10_10	Ground point services cable harness
D13_01	12V accessory socket- Cigarette lighter
D13_05	Horn

**CABLES COLOUR DESCRIPTION**

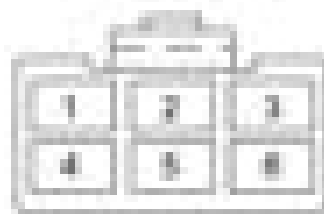
Colour	Description
B	Black
Br	Brown
G	Green
Gr	Grey
L	Blue
O	Orange
P	Rosa
R	Red
V	Purple
Y	Yellow
W	White
GB	Green-Black
GrL	Grey-Blue
LB	Blue-Black
RB	Red-Black



Colour	Description
RL	Red-Blue
RGr	Red-Grey
RW	Red-White
YB	Yellow-Black
YG	Yellow-Green
WB	White-Black
WG	White-Green
WL	White-Blue
WV	White-Purple

**ELECTRICAL SIGNALS IDENTIFICATION IN THE DIAGRAM**

Colour	Description
RED	Supply
BLACK	Ground lead
BLUE	Controls to sensors/electrical devices
GREEN	Signals from sensors/electrical devices



**D02\_13 - VOLTAGE REGULATOR CONNECTOR**

Pin	Colour	Description
1	RW	Power supply from main fuse D08_43 (20A)
2	-	-
3	B	Ground D10_10
4	Y	Signal from the magneto flywheel
5	Y	Signal from the magneto flywheel
6	Y	Signal from the magneto flywheel



**D04\_11 - IGNITION SWITCH CONNECTOR**

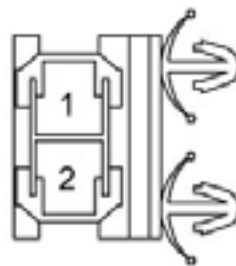
Pin	Colour	Description
1	B	Ground D10_10
2	YB	External lighting enable
3	RW	Battery positive from main fuse D08_43 (20A)
4	W	To fuse D08_45 (7.5A) for ancillary supply
5	O	External lights and cigarette lighter lighting power supply enable
6	G	Ground signal for ignition device

**D04\_62 - AUDIBLE WARNING DEVICE CONTROL SWITCH CONNECTOR**

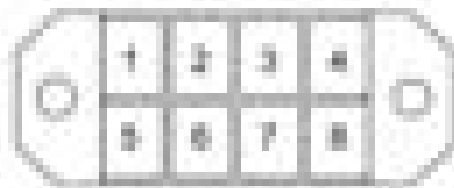
Pin	Colour	Description
1	GrB	Audible warning device control
2	Gr	Positive from fuse D08_45 (7.5A)

**D08\_42 - START-UP RELAY CONNECTOR**

Pin	Colour	Description
1	-	-
2	R	Direct battery positive
3	-	-
4	B	Ground D10_10
5	-	-
6	GB	Positive from start-up button
7	-	-
8	R	Starter motor command
9	-	-

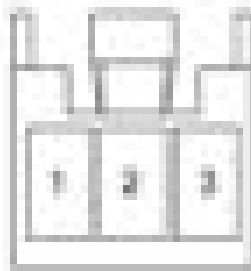
**D08\_43 - MAIN FUSE CONNECTOR**

Pin	Colour	Description
1	R	Direct battery positive
2	RW	Ignition switch and voltage regulator power supply

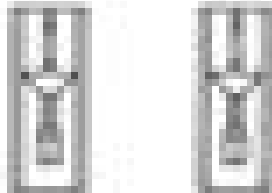


**FUSES TERMINAL BLOCK CONNECTOR**

Pin	Colour	Description
1	O	To the external lights switch for activation of daylight running light
2	VB	Headlight power supply from fuse D08_46 (4A)
3	Gr	Ancillary power supply from fuse D08_45 (7.5A)
4	RL	Cigarette lighter power supply from fuse D08_44 (10A)
5	O	External lights power supply from fuse D08_47 (4A)
6	V	Headlights control of external lights switch
7	W	Positive after ignition switch from main fuse D08_43 (20A)
8	RW	Battery positive after main fuse D08_43 (20A)

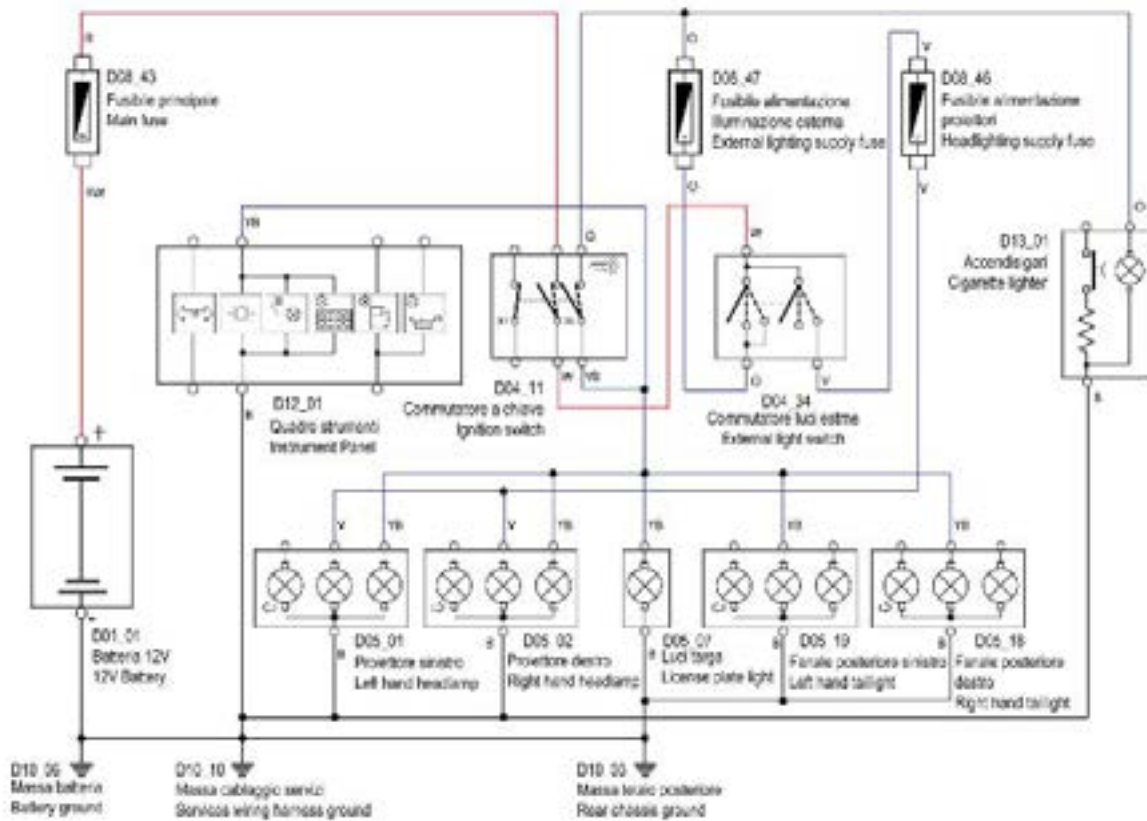
**D13 01 - CIGARETTE LIGHTER CONNECTOR**

Pin	Colour	Description
1	Gr	Positive for cigarette lighter lighting
2	RL	Power supply from fuse D08_44 (10A)
3	B	Ground D10_10

**D13 05 - HORN CONNECTOR**

Pin	Colour	Description
	GrB	Audible warning device control
	B	Ground lead

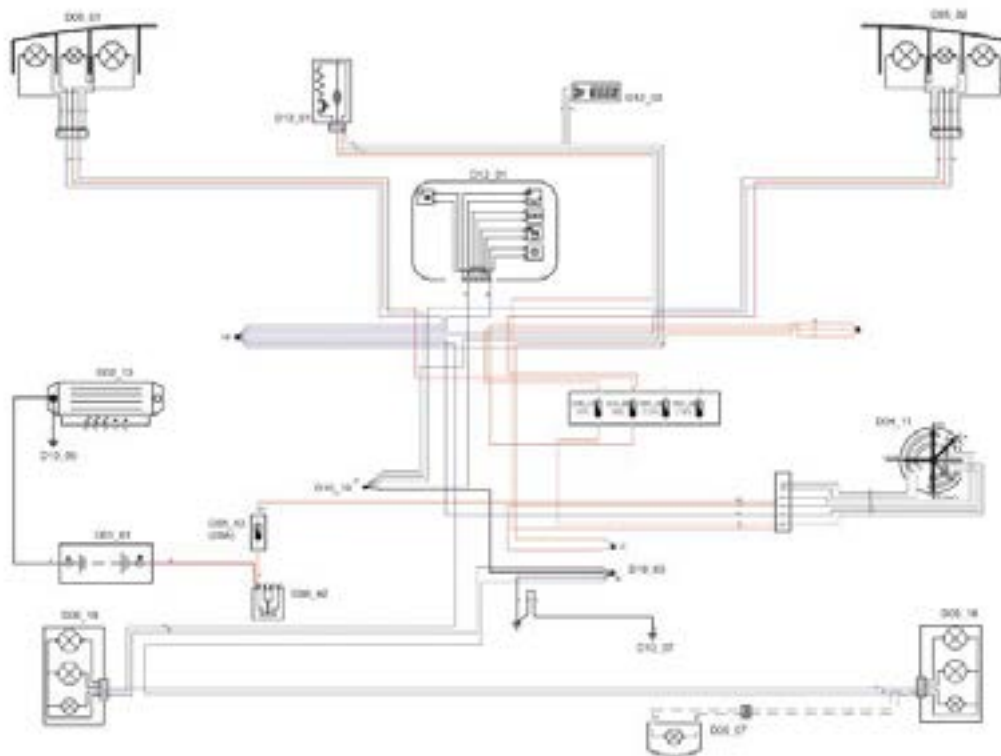
**F05 EXTERNAL LIGHTING****High beam/Low beam/Daylight running lights****F05\_01 - Electrical function external lighting****Functional Diagram**



**F05 01 - DESCRIPTION OF COMPONENTS**

Component	Description
D01_01	Starter battery
D04_11	Ignition switch
D04_34	External lights switch
D05_01	Left headlight
D05_02	Right headlight
D05_07	License plate light
D05_18	Right taillight
D05_19	Left taillight
D08_43	Main fuse
D08_46	Headlight supply fuse
D08_47	External lighting supply fuse
D10_03	Rear right hand chassis ground
D10_06	Battery ground
D10_10	Ground point services cable harness
D12_01	Instrument panel
D13_01	12V accessory socket- Cigarette lighter

For version with lights always on.



**F05\_01 - DESCRIPTION OF COMPONENTS**

Component	Description
D01_01	Starter battery
D02_13	Voltage regulator
D04_11	Ignition switch
D05_01	Left headlight
D05_02	Right headlight
D05_07	Licence plate light
D05_18	Right taillight
D05_19	Left taillight
D08_42	Start-up relay
D08_43	Main fuse
D08_46	Headlight supply fuse
D08_47	External lighting supply fuse
D10_03	Rear right hand chassis ground
D10_06	Battery ground
D10_07	Chassis/engine ground
D10_10	Ground point services cable harness
D12_01	Instrument panel
D12_03	Digital clock
D13_01	12V accessory socket- Cigarette lighter

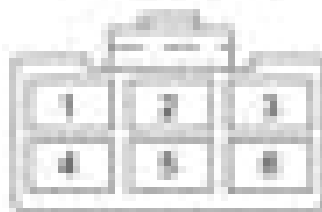
**CABLES COLOUR DESCRIPTION**

Colour	Description
B	Black
Br	Brown
G	Green
Gr	Grey
L	Blue
O	Orange
P	Rosa
R	Red
V	Purple
Y	Yellow

Colour	Description
W	White
GB	Green-Black
GrL	Grey-Blue
LB	Blue-Black
RB	Red-Black
RL	Red-Blue
RGr	Red-Grey
RW	Red-White
YB	Yellow-Black
YG	Yellow-Green
WB	White-Black
WG	White-Green
WL	White-Blue
WV	White-Purple

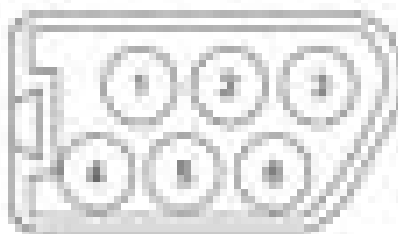
#### ELECTRICAL SIGNALS IDENTIFICATION IN THE DIAGRAM

Colour	Description
RED	Supply
BLACK	Ground lead
BLUE	Controls to sensors/electrical devices
GREEN	Signals from sensors/electrical devices



#### D02 13 - VOLTAGE REGULATOR CONNECTOR

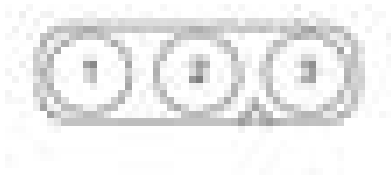
Pin	Colour	Description
1	RW	Power supply from main fuse D08_43 (20A)
2	-	-
3	B	Ground D10_10
4	Y	Signal from the magneto flywheel
5	Y	Signal from the magneto flywheel
6	Y	Signal from the magneto flywheel



#### D04 11 - IGNITION SWITCH CONNECTOR

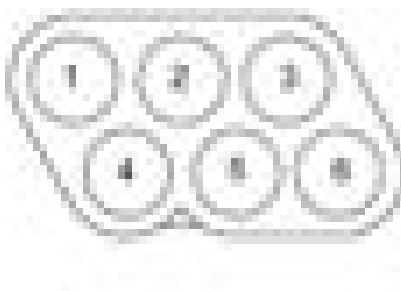
Pin	Colour	Description
1	B	Ground D10_10
2	YB	External lighting enable

Pin	Colour	Description
3	RW	Battery positive from main fuse D08_43 (20A)
4	W	To fuse D08_45 (7.5A) for ancillary supply
5	O	External lights and cigarette lighter lighting power supply enable
6	G	Ground signal for ignition device



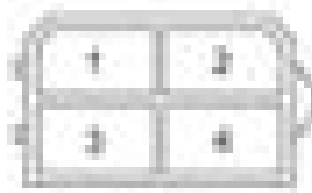
**D04 34 - EXTERNAL LIGHTS SWITCH CONNECTOR**

Pin	Colour	Description
1	W	Positive from ignition switch
2	O	External lights control
3	V	Headlight control



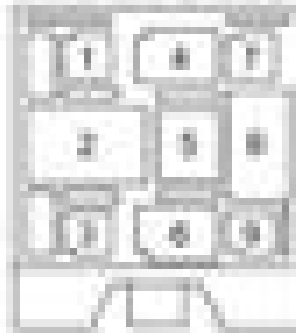
**D05 01/02 - HEADLIGHT CONNECTOR**

Pin	Colour	Description
1	-	-
2	P/WL	Turn signal control
3	VB	Headlight control
4	-	-
5	YB	Daylight running lights control
6	B	Headlight ground

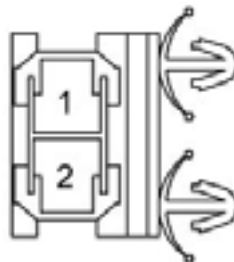


**D05 18/19 - TAILLIGHT CONNECTOR**

Pin	Colour	Description
1	WB	Stop light control
2	YB	Daylight running lights control
3	B	Ground D10_03
4	WL	Turn signal control

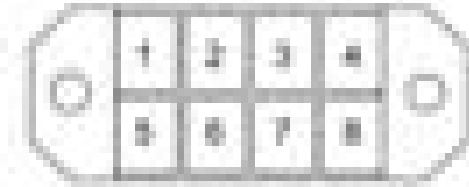
**D08 42 - START-UP RELAY CONNECTOR**

Pin	Colour	Description
1	-	-
2	R	Direct battery positive
3	-	-
4	B	Ground D10_10
5	-	-
6	GB	Positive from start-up button
7	-	-
8	R	Starter motor command
9	-	-

**D08 43 - MAIN FUSE CONNECTOR**

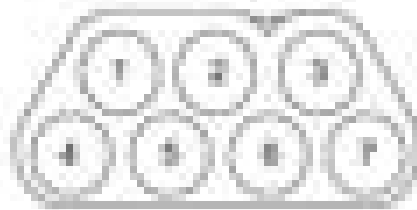
Pin	Colour	Description
1	R	Direct battery positive
2	RW	Ignition switch and voltage regulator power supply





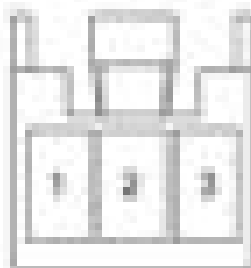
**FUSES TERMINAL BLOCK CONNECTOR**

Pin	Colour	Description
1	O	To the external lights switch for activation of daylight running light
2	VB	Headlight power supply from fuse D08_46 (4A)
3	Gr	Ancillary power supply from fuse D08_45 (7.5A)
4	RL	Cigarette lighter power supply from fuse D08_44 (10A)
5	O	External lights power supply from fuse D08_47 (4A)
6	V	Headlights control of external lights switch
7	W	Positive after ignition switch from main fuse D08_43 (20A)
8	RW	Battery positive after main fuse D08_43 (20A)



**D12 01 - INSTRUMENT PANEL CONNECTOR**

Pin	Colour	Description
1	YB	Panel lighting and daylight running light warning light power supply activated
2	B	Ground D10_10
3	WL	Turn signal lights activation
4	P	Turn signal lights activation
5	YG	fuel reserve indication
6	B	Ground D10_10
7	WV	Oil level indication



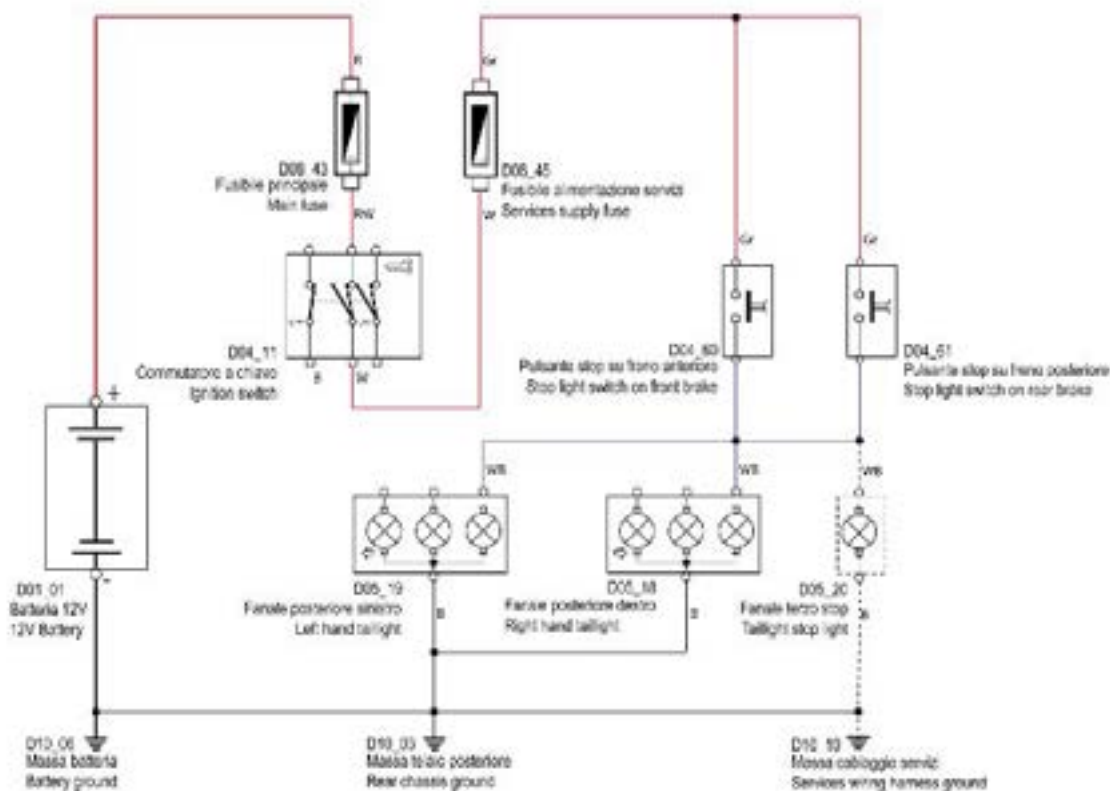
**D13\_01 - CIGARETTE LIGHTER CONNECTOR**

Pin	Colour	Description
1	Gr	Positive for cigarette lighter lighting
2	RL	Power supply from fuse D08_44 (10A)
3	B	Ground D10_10

**Fog light/Rear fog light/Stop lights/Reverse light**

**F05\_03 - Stop lights**

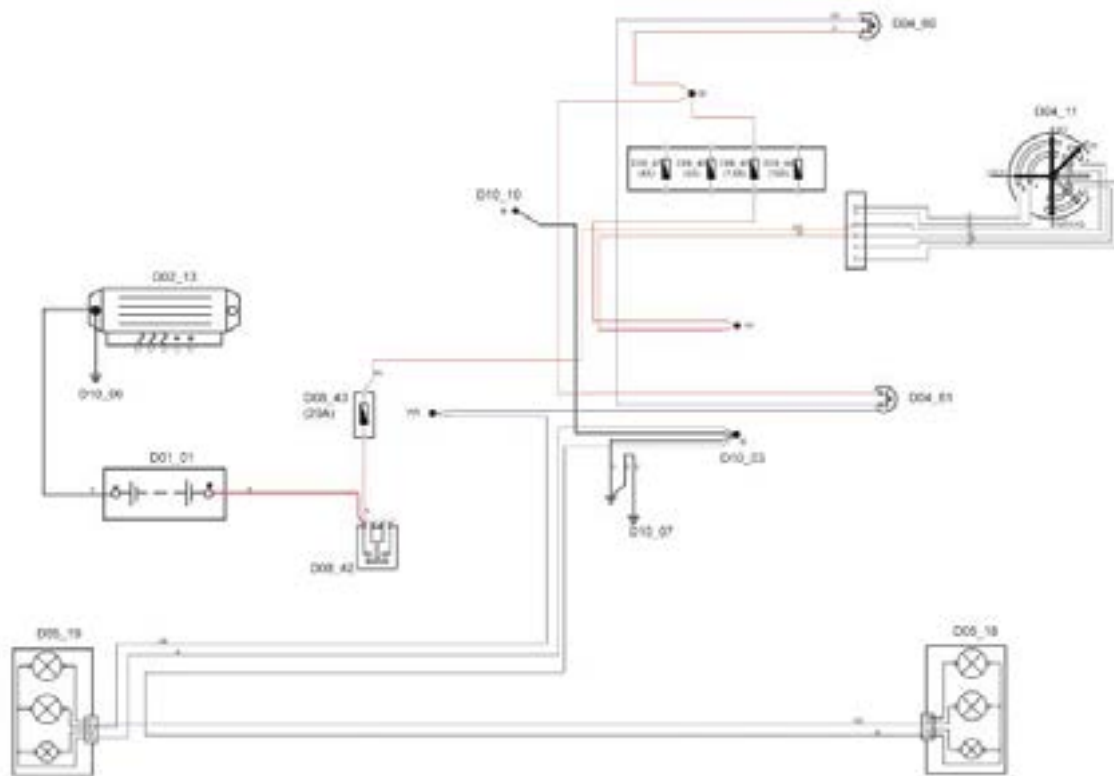
**Functional Diagram**



**F05\_03 - DESCRIPTION OF COMPONENTS**

Component	Description
D01_01	Starter battery
D04_11	Ignition switch
D04_60	Stop button on front brake
D04_61	Stop button on rear brake
D05_18	Right taillight
D05_19	Left taillight
D05_20	Stop third light
D08_43	Main fuse
D08_45	Ancillary supply fuse
D10_03	Rear right hand chassis ground
D10_06	Battery ground
D10_10	Ground point services cable harness

For version with lights always on.



**F05\_03 - DESCRIPTION OF COMPONENTS**

Component	Description
D01_01	Starter battery
D02_13	Voltage regulator
D04_11	Ignition switch
D04_60	Stop button on front brake
D04_61	Stop button on rear brake
D05_18	Right taillight
D05_19	Left taillight
D05_20	Stop third light
D08_42	Start-up relay
D08_43	Main fuse
D08_45	Ancillary supply fuse
D10_03	Rear right hand chassis ground
D10_06	Battery ground
D10_07	Chassis/engine ground
D10_10	Ground point services cable harness

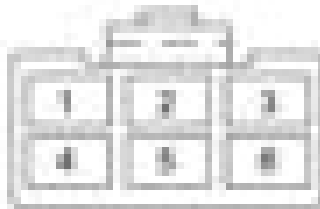
**CABLES COLOUR DESCRIPTION**

Colour	Description
B	Black
Br	Brown
G	Green
Gr	Grey
L	Blue
O	Orange
P	Rosa
R	Red
V	Purple
Y	Yellow
W	White
GB	Green-Black
GrL	Grey-Blue
LB	Blue-Black

Colour	Description
RB	Red-Black
RL	Red-Blue
RGr	Red-Grey
RW	Red-White
YB	Yellow-Black
YG	Yellow-Green
WB	White-Black
WG	White-Green
WL	White-Blue
WV	White-Purple

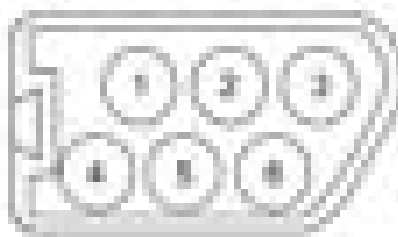
**ELECTRICAL SIGNALS IDENTIFICATION IN THE DIAGRAM**

Colour	Description
RED	Supply
BLACK	Ground lead
BLUE	Controls to sensors/electrical devices
GREEN	Signals from sensors/electrical devices



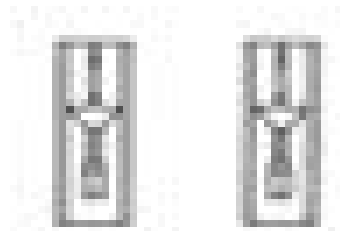
**D02 13 - VOLTAGE REGULATOR CONNECTOR**

Pin	Colour	Description
1	RW	Power supply from main fuse D08_43 (20A)
2	-	-
3	B	Ground D10_10
4	Y	Signal from the magneto flywheel
5	Y	Signal from the magneto flywheel
6	Y	Signal from the magneto flywheel



**D04 11 - IGNITION SWITCH CONNECTOR**

Pin	Colour	Description
1	B	Ground D10_10
2	YB	External lighting enable
3	RW	Battery positive from main fuse D08_43 (20A)
4	W	To fuse D08_45 (7.5A) for ancillary supply
5	O	External lights and cigarette lighter lighting power supply enable
6	G	Ground signal for ignition device

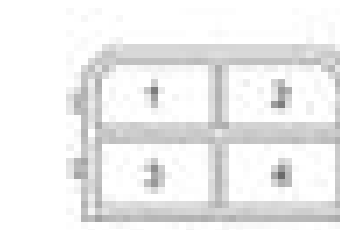


**D04 60 - STOP BUTTON CONNECTOR ON FRONT BRAKE**

Pin	Colour	Description
	Gr	Power supply from ancillary fuse D08_45 (7.5A)
	WB	Stop light control

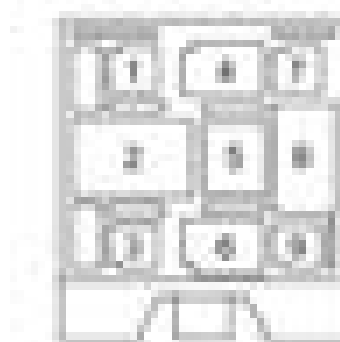
**D04 61 - STOP BUTTON CONNECTOR ON REAR BRAKE**

Pin	Colour	Description
	Gr	Power supply from ancillary fuse D08_45 (7.5A)
	WB	Stop light control



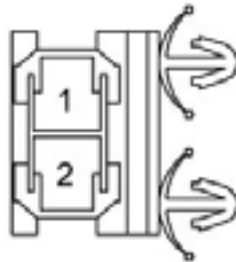
**D05 18/19 - TAILLIGHT CONNECTOR**

Pin	Colour	Description
1	WB	Stop light control
2	YB	Daylight running lights control
3	B	Ground D10_03
4	WL	Turn signal control



**D08\_42 - START-UP RELAY CONNECTOR**

Pin	Colour	Description
1	-	-
2	R	Direct battery positive
3	-	-
4	B	Ground D10_10
5	-	-
6	GB	Positive from start-up button
7	-	-
8	R	Starter motor command
9	-	-

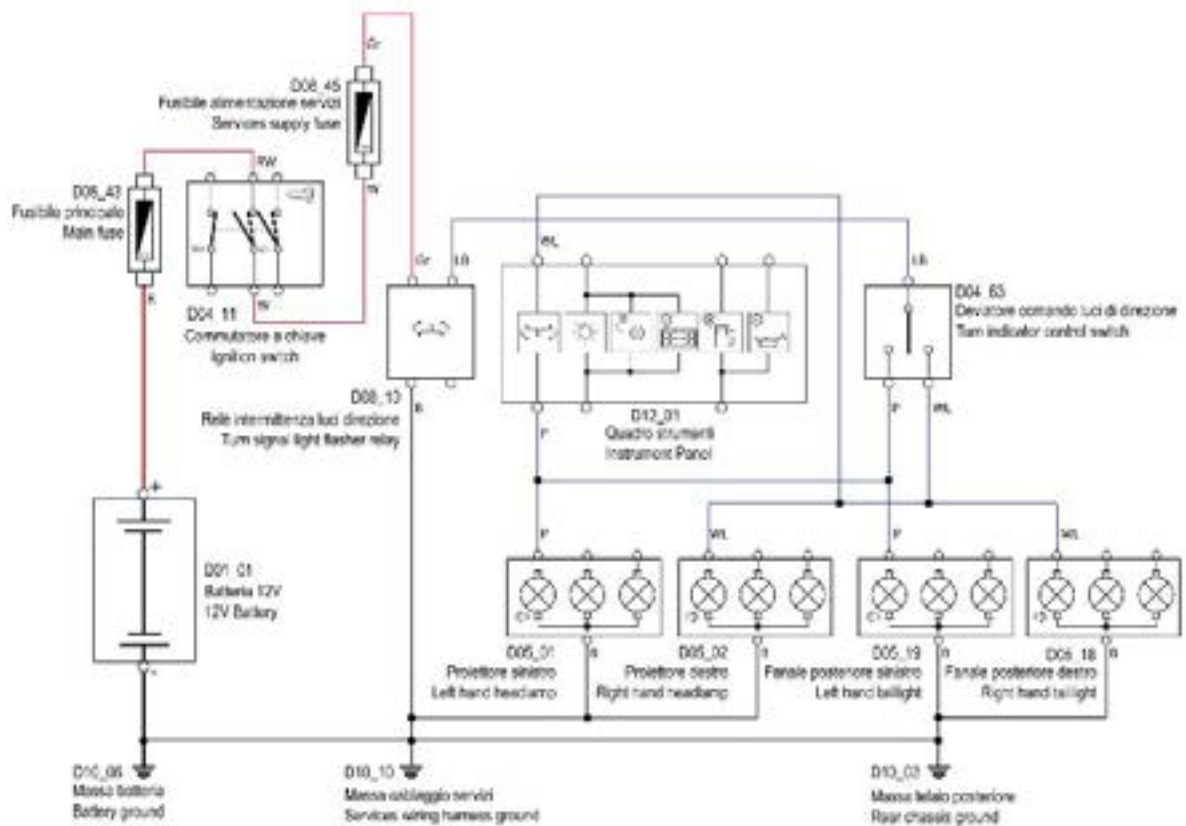
**D08\_43 - MAIN FUSE CONNECTOR**

Pin	Colour	Description
1	R	Direct battery positive
2	RW	Ignition switch and voltage regulator power supply

**Turn indicators/Hazard warning lights**

F05\_04 - Electrical functions, turn signals lights

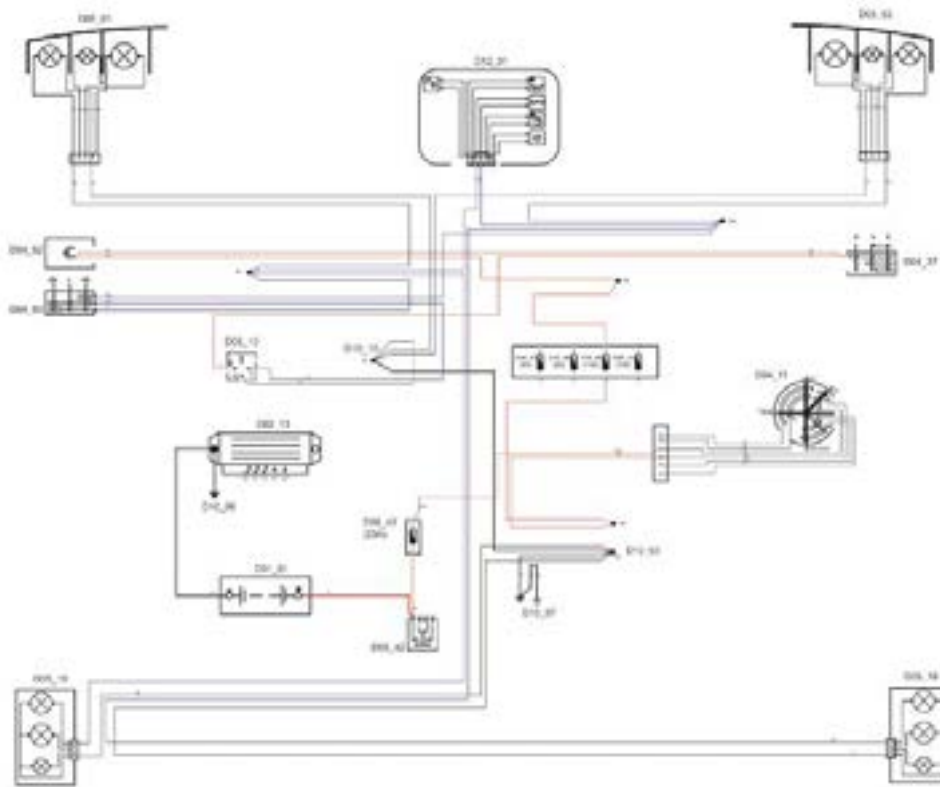
Functional Diagram



**F05\_04 - DESCRIPTION OF COMPONENTS**

Component	Description
D01_01	Starter battery
D04_11	Ignition switch
D04_63	Turn signal control deviator
D05_01	Left headlight
D05_02	Right headlight
D05_18	Right taillight
D05_19	Left taillight
D08_10	Turn signal flasher relay
D08_43	Main fuse
D08_45	Ancillary supply fuse
D10_03	Rear right hand chassis ground
D10_06	Battery ground
D10_10	Ground point services cable harness
D12_01	Instrument panel

For version with lights always on.



**F05 04 - DESCRIPTION OF COMPONENTS**

Component	Description
D01_01	Starter battery
D02_13	Voltage regulator
D04_11	Ignition switch
D04_37	Windscreen control switch
D04_62	Audible warning device control button
D04_63	Turn signal control deviator
D05_01	Left headlight
D05_02	Right headlight
D05_18	Right taillight
D05_19	Left taillight
D08_10	Turn signal flasher relay
D08_42	Start-up relay
D08_43	Main fuse
D08_45	Ancillary supply fuse
D10_03	Rear right hand chassis ground
D10_06	Battery ground
D10_07	Chassis/engine ground
D10_10	Ground point services cable harness
D12_01	Instrument panel

**CABLES COLOUR DESCRIPTION**

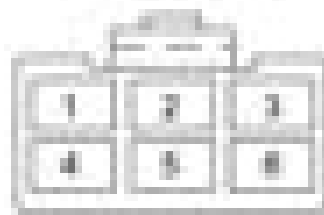
Colour	Description
B	Black
Br	Brown
G	Green
Gr	Grey
L	Blue
O	Orange
P	Rosa
R	Red
V	Purple
Y	Yellow



Colour	Description
W	White
GB	Green-Black
GrL	Grey-Blue
LB	Blue-Black
RB	Red-Black
RL	Red-Blue
RGr	Red-Grey
RW	Red-White
YB	Yellow-Black
YG	Yellow-Green
WB	White-Black
WG	White-Green
WL	White-Blue
WV	White-Purple

**ELECTRICAL SIGNALS IDENTIFICATION IN THE DIAGRAM**

Colour	Description
RED	Supply
BLACK	Ground lead
BLUE	Controls to sensors/electrical devices
GREEN	Signals from sensors/electrical devices



**D02 13 - VOLTAGE REGULATOR CONNECTOR**

Pin	Colour	Description
1	RW	Power supply from main fuse D08_43 (20A)
2	-	-
3	B	Ground D10_10
4	Y	Signal from the magneto flywheel
5	Y	Signal from the magneto flywheel
6	Y	Signal from the magneto flywheel



**D04 11 - IGNITION SWITCH CONNECTOR**

Pin	Colour	Description
1	B	Ground D10_10
2	YB	External lighting enable

Pin	Colour	Description
3	RW	Battery positive from main fuse D08_43 (20A)
4	W	To fuse D08_45 (7.5A) for ancillary supply
5	O	External lights and cigarette lighter lighting power supply enable
6	G	Ground signal for ignition device



#### **D04\_63 - TURN SIGNAL CONTROL DEVIATOR CONNECTOR**

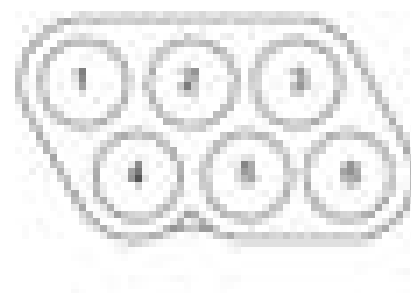
Pin	Colour	Description
1	WL	Right hand turn signal control
2	LB	Intermittent relay enable
3	P	Left hand turn signal control

#### **D04\_37 - WINDSCREEN WIPER WASHER CONTROL SWITCH CONNECTOR**

Pin	Colour	Description
1	Gr	power supply from fuse D08_45 (7.5A)
2	Br	Windscreen wiper control
3	GrL	Electric screen washer pump control

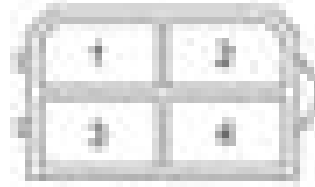
#### **D04\_62 - AUDIBLE WARNING DEVICE CONTROL SWITCH CONNECTOR**

Pin	Colour	Description
1	GrB	Audible warning device control
2	Gr	Positive from fuse D08_45 (7.5A)



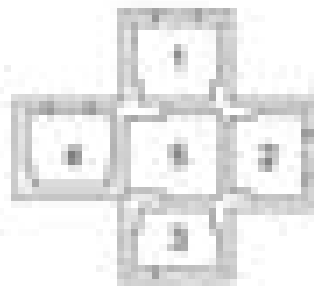
#### **D05\_01/02 - HEADLIGHT CONNECTOR**

Pin	Colour	Description
1	-	-
2	P/WL	Turn signal control
3	VB	Headlight control
4	-	-
5	YB	Daylight running lights control
6	B	Headlight ground



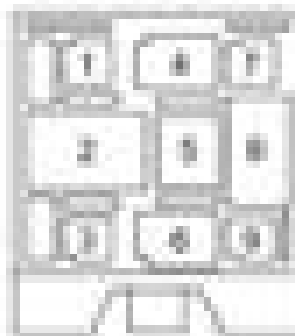
**D05 18/19 - TAILLIGHT CONNECTOR**

Pin	Colour	Description
1	WB	Stop light control
2	YB	Daylight running lights control
3	B	Ground D10_03
4	WL	Turn signal control



**D08 10 - INTERMITTENT RELAY CONNECTOR**

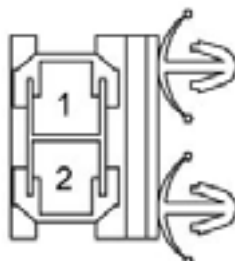
Pin	Colour	Description
1	B	Ground D10_10
2	Gr	Power supply from fuse D08_45 (7.5A)
3	LB	To the turn signal control deviator
4	-	-
5	WV	Intermittent signal for oil level warning light



**D08 42 - START-UP RELAY CONNECTOR**

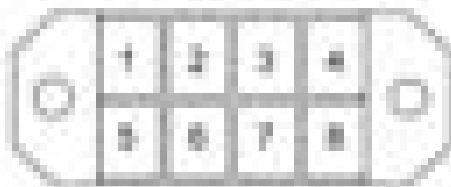
Pin	Colour	Description
1	-	-
2	R	Direct battery positive
3	-	-

Pin	Colour	Description
4	B	Ground D10_10
5	-	-
6	GB	Positive from start-up button
7	-	-
8	R	Starter motor command
9	-	-



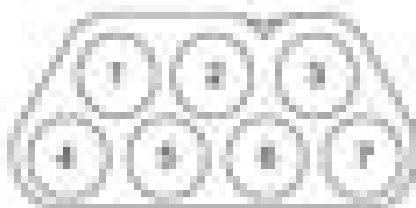
**D08 43 - MAIN FUSE CONNECTOR**

Pin	Colour	Description
1	R	Direct battery positive
2	RW	Ignition switch and voltage regulator power supply



**FUSES TERMINAL BLOCK CONNECTOR**

Pin	Colour	Description
1	O	To the external lights switch for activation of daylight running light
2	VB	Headlight power supply from fuse D08_46 (4A)
3	Gr	Ancillary power supply from fuse D08_45 (7.5A)
4	RL	Cigarette lighter power supply from fuse D08_44 (10A)
5	O	External lights power supply from fuse D08_47 (4A)
6	V	Headlights control of external lights switch
7	W	Positive after ignition switch from main fuse D08_43 (20A)
8	RW	Battery positive after main fuse D08_43 (20A)

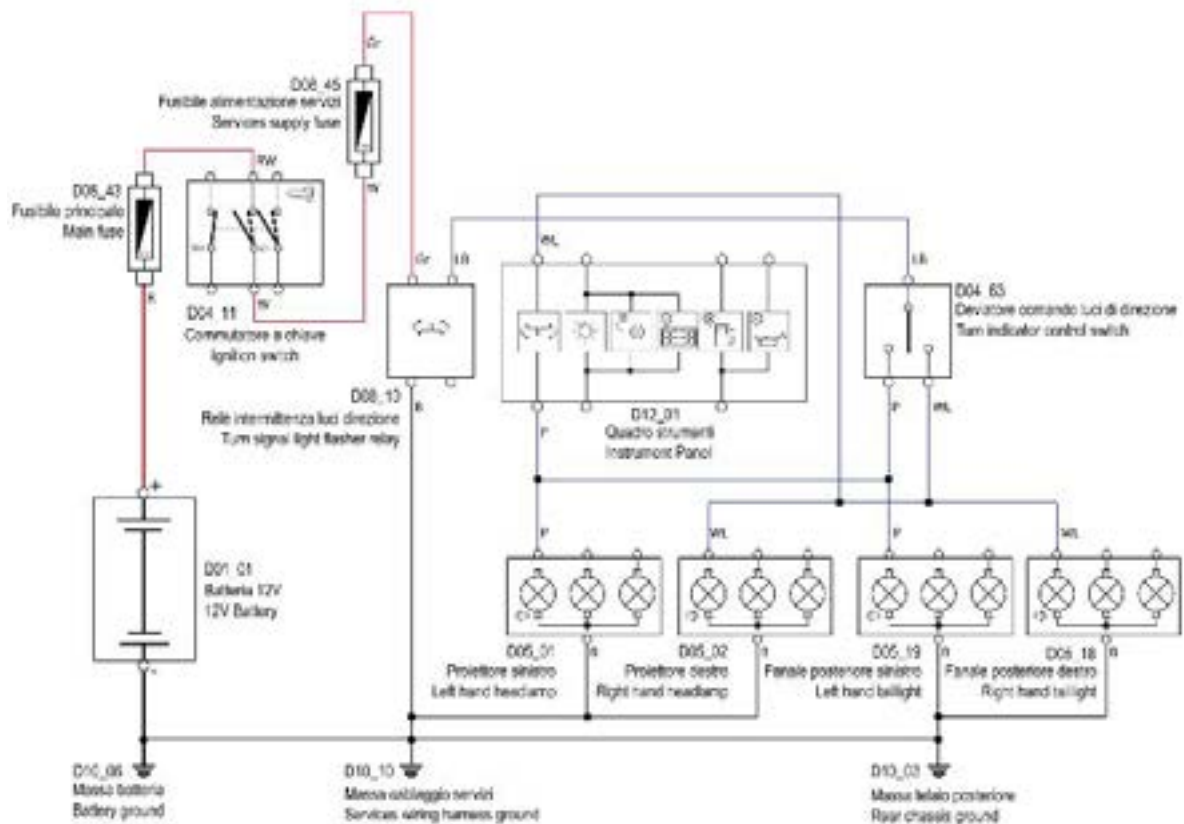


**D12\_01 - INSTRUMENT PANEL CONNECTOR**

Pin	Colour	Description
1	YB	Panel lighting and daylight running light warning light power supply activated
2	B	Ground D10_10
3	WL	Turn signal lights activation
4	P	Turn signal lights activation
5	YG	fuel reserve indication
6	B	Ground D10_10
7	WV	Oil level indication

**F05\_04 - Electrical functions, turn signals lights**

**Functional Diagram**



**F05\_04 - DESCRIPTION OF COMPONENTS**

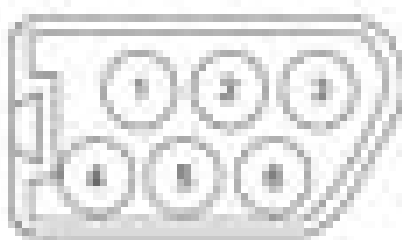
Component	Description
D01_01	Starter battery
D04_11	Ignition switch
D04_63	Turn signal control deviator
D05_01	Left headlight
D05_02	Right headlight
D05_18	Right taillight
D05_19	Left taillight
D08_10	Turn signal flasher relay
D08_43	Main fuse
D08_45	Ancillary supply fuse
D10_03	Rear right hand chassis ground
D10_06	Battery ground
D10_10	Ground point services cable harness
D12_01	Instrument panel

**CABLES COLOUR DESCRIPTION**

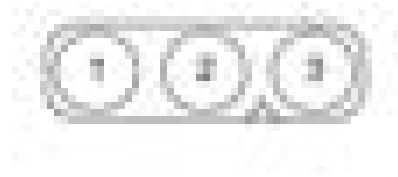
Colour	Description
B	Black
Br	Brown
G	Green
Gr	Grey
L	Blue
O	Orange
P	Rosa
R	Red
V	Purple
Y	Yellow
W	White
GB	Green-Black
GrL	Grey-Blue
LB	Blue-Black
RB	Red-Black
RL	Red-Blue
RGr	Red-Grey
RW	Red-White
YB	Yellow-Black
YG	Yellow-Green
WB	White-Black
WG	White-Green
WL	White-Blue
WV	White-Purple

**ELECTRICAL SIGNALS IDENTIFICATION IN THE DIAGRAM**

Colour	Description
RED	Supply
BLACK	Ground lead
BLUE	Controls to sensors/electrical devices
GREEN	Signals from sensors/electrical devices

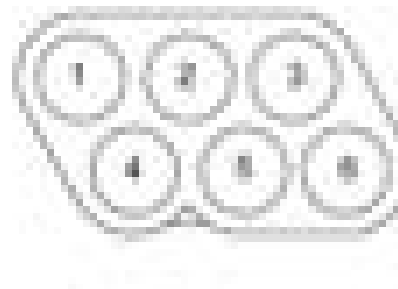
**D04 11 - IGNITION SWITCH CONNECTOR**

Pin	Colour	Description
1	B	Ground D10_10
2	YB	External lighting enable
3	RW	Battery positive from main fuse D08_43 (20A)
4	W	To fuse D08_45 (7.5A) for ancillary supply
5	O	External lights and cigarette lighter lighting power supply enable
6	G	Ground signal for ignition device



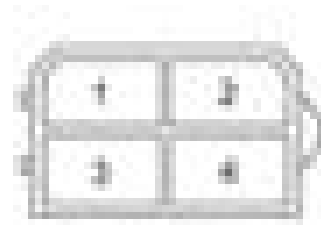
**D04 63 - TURN SIGNAL CONTROL DEVIATOR CONNECTOR**

Pin	Colour	Description
1	WL	Right hand turn signal control
2	LB	Intermittent relay enable
3	P	Left hand turn signal control



**D05 01/02 - HEADLIGHT CONNECTOR**

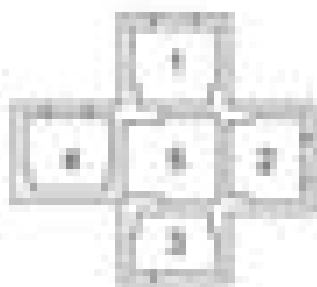
Pin	Colour	Description
1	-	-
2	P/WL	Turn signal control
3	VB	Headlight control
4	-	-
5	YB	Daylight running lights control
6	B	Headlight ground



**D05 18/19 - TAILLIGHT CONNECTOR**

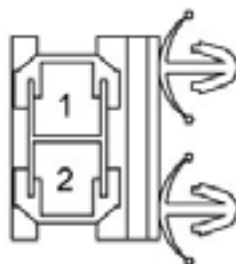
Pin	Colour	Description
1	WB	Stop light control
2	YB	Daylight running lights control
3	B	Ground D10_03

Pin	Colour	Description
4	WL	Turn signal control



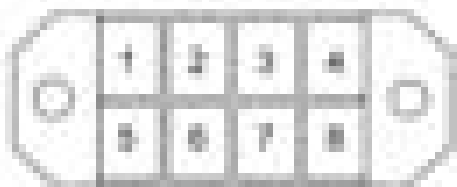
**D08 10 - INTERMITTENT RELAY CONNECTOR**

Pin	Colour	Description
1	B	Ground D10_10
2	Gr	Power supply from fuse D08_45 (7.5A)
3	LB	To the turn signal control deviator
4	-	-
5	WV	Intermittent signal for oil level warning light



**D08 43 - MAIN FUSE CONNECTOR**

Pin	Colour	Description
1	R	Direct battery positive
2	RW	Ignition switch and voltage regulator power supply

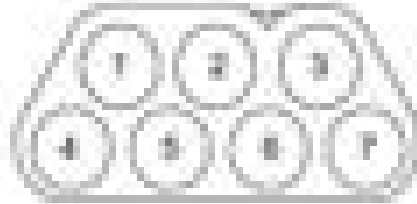


**FUSES TERMINAL BLOCK CONNECTOR**

Pin	Colour	Description
1	O	To the external lights switch for activation of daylight running light
2	VB	Headlight power supply from fuse D08_46 (4A)
3	Gr	Ancillary power supply from fuse D08_45 (7.5A)



Pin	Colour	Description
4	RL	Cigarette lighter power supply from fuse D08_44 (10A)
5	O	External lights power supply from fuse D08_47 (4A)
6	V	Headlights control of external lights switch
7	W	Positive after ignition switch from main fuse D08_43 (20A)
8	RW	Battery positive after main fuse D08_43 (20A)



### **D12\_01 - INSTRUMENT PANEL CONNECTOR**

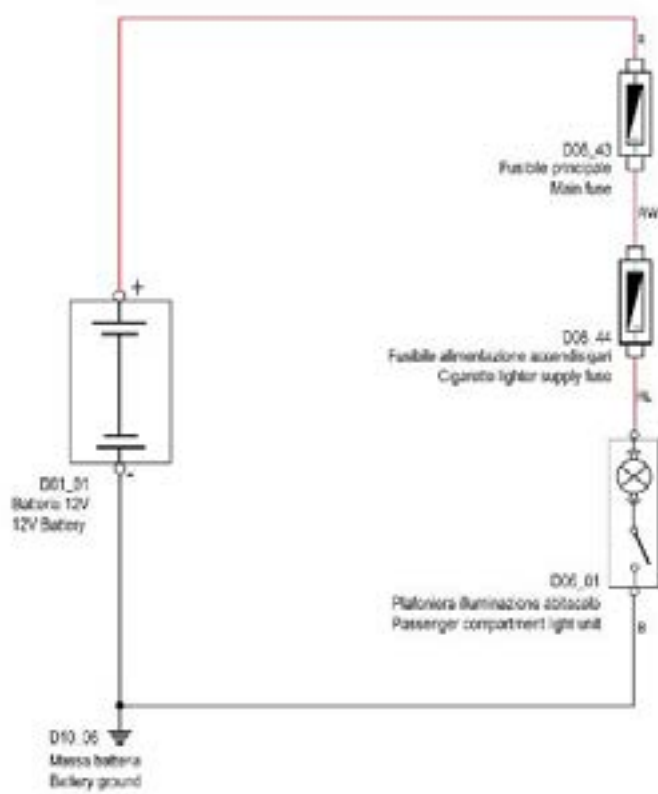
Pin	Colour	Description
1	YB	Panel lighting and daylight running light warning light power supply activated
2	B	Ground D10_10
3	WL	Turn signal lights activation
4	P	Turn signal lights activation
5	YG	fuel reserve indication
6	B	Ground D10_10
7	WV	Oil level indication

## **F06 INTERNAL LIGHTING**

### **Passenger compartment light**

**F06\_01 - Electrical functions. Passenger compartment interior lighting**

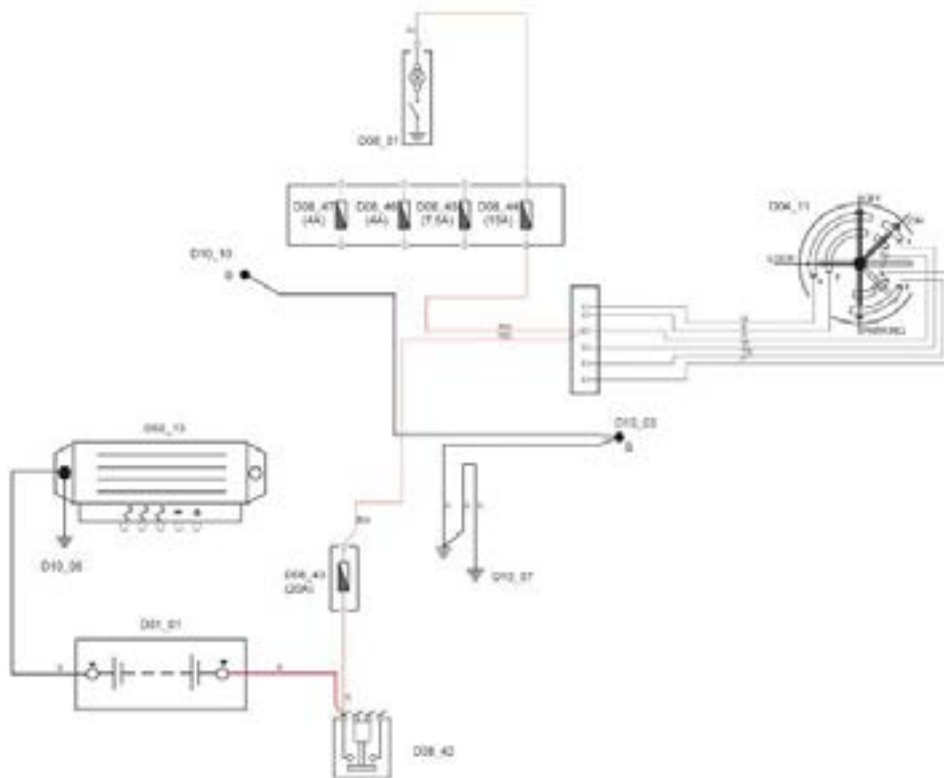
Functional Diagram



**F06\_01 - DESCRIPTION OF COMPONENTS**

Component	Description
D01_01	Starter battery
D06_01	Passenger compartment light unit
D08_43	Main fuse
D08_44	Cigarette lighter supply fuse
D10_06	Battery ground

For version with lights always on.



**F06\_01 - DESCRIPTION OF COMPONENTS**

Component	Description
D01_01	Starter battery
D02_13	Voltage regulator
D04_11	Ignition switch
D06_01	Passenger compartment light unit
D08_42	Start-up relay
D08_43	Main fuse
D08_44	Cigarette lighter supply fuse
D10_03	Rear right hand chassis ground
D10_06	Battery ground
D10_07	Chassis/engine ground
D10_10	Ground point services cable harness

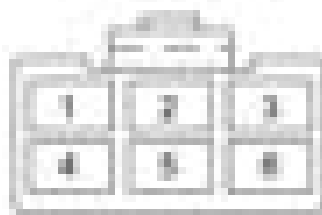
**CABLES COLOUR DESCRIPTION**

Colour	Description
B	Black
Br	Brown
G	Green
Gr	Grey
L	Blue
O	Orange
P	Rosa
R	Red
V	Purple
Y	Yellow
W	White
GB	Green-Black
GrL	Grey-Blue
LB	Blue-Black
RB	Red-Black
RL	Red-Blue
RGr	Red-Grey
RW	Red-White

Colour	Description
YB	Yellow-Black
YG	Yellow-Green
WB	White-Black
WG	White-Green
WL	White-Blue
WV	White-Purple

**ELECTRICAL SIGNALS IDENTIFICATION IN THE DIAGRAM**

Colour	Description
RED	Supply
BLACK	Ground lead
BLUE	Controls to sensors/electrical devices
GREEN	Signals from sensors/electrical devices



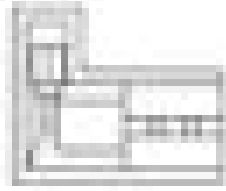
**D02 13 - VOLTAGE REGULATOR CONNECTOR**

Pin	Colour	Description
1	RW	Power supply from main fuse D08_43 (20A)
2	-	-
3	B	Ground D10_10
4	Y	Signal from the magneto flywheel
5	Y	Signal from the magneto flywheel
6	Y	Signal from the magneto flywheel



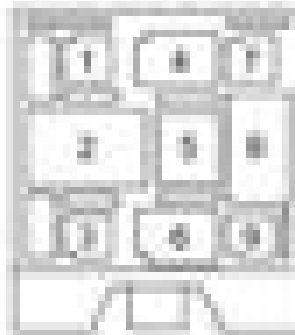
**D04 11 - IGNITION SWITCH CONNECTOR**

Pin	Colour	Description
1	B	Ground D10_10
2	YB	External lighting enable
3	RW	Battery positive from main fuse D08_43 (20A)
4	W	To fuse D08_45 (7.5A) for ancillary supply
5	O	External lights and cigarette lighter lighting power supply enable
6	G	Ground signal for ignition device



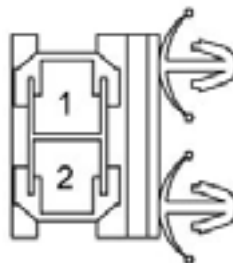
**D06\_01 - INTERNAL COMPARTMENT LIGHT UNIT CONNECTOR**

Pin	Colour	Description
	RL	Power supply from fuse D08_44 (10A)



**D08\_42 - START-UP RELAY CONNECTOR**

Pin	Colour	Description
1	-	-
2	R	Direct battery positive
3	-	-
4	B	Ground D10_10
5	-	-
6	GB	Positive from start-up button
7	-	-
8	R	Starter motor command
9	-	-

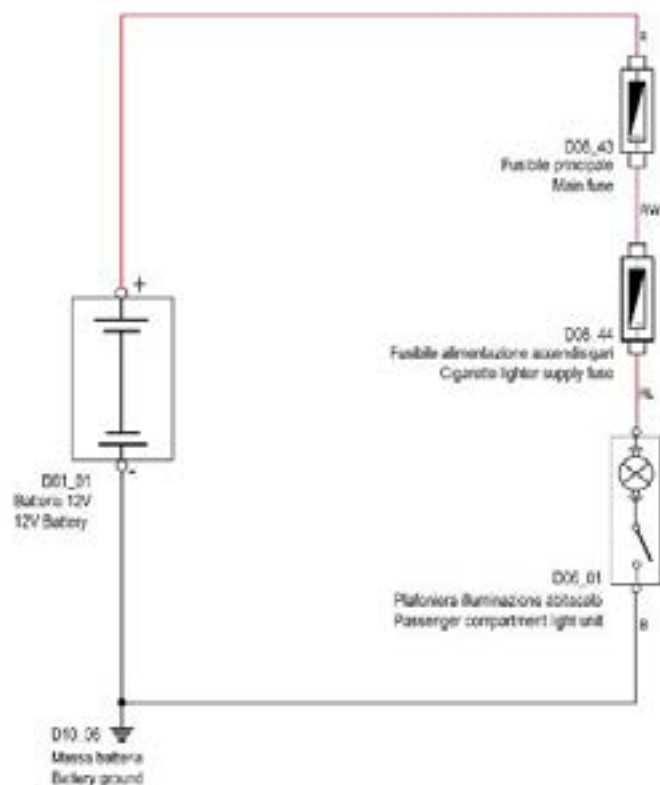


**D08\_43 - MAIN FUSE CONNECTOR**

Pin	Colour	Description
1	R	Direct battery positive
2	RW	Ignition switch and voltage regulator power supply

**F06\_01 - Electrical functions. Passenger compartment interior lighting**

**Functional Diagram**



**F06\_01 - DESCRIPTION OF COMPONENTS**

Component	Description
D01_01	Starter battery
D06_01	Passenger compartment light unit
D08_43	Main fuse
D08_44	Cigarette lighter supply fuse
D10_06	Battery ground

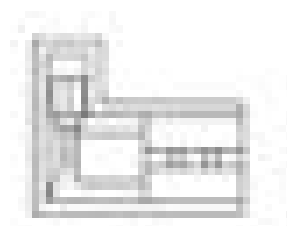
**CABLES COLOUR DESCRIPTION**

Colour	Description
B	Black
Br	Brown
G	Green
Gr	Grey
L	Blue
O	Orange
P	Rosa
R	Red
V	Purple
Y	Yellow
W	White
GB	Green-Black
GrL	Grey-Blue
LB	Blue-Black
RB	Red-Black
RL	Red-Blue
RGr	Red-Grey

Colour	Description
RW	Red-White
YB	Yellow-Black
YG	Yellow-Green
WB	White-Black
WG	White-Green
WL	White-Blue
WV	White-Purple

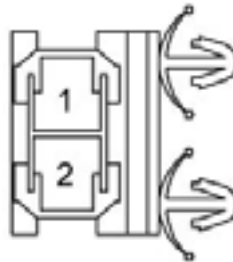
**ELECTRICAL SIGNALS IDENTIFICATION IN THE DIAGRAM**

Colour	Description
RED	Supply
BLACK	Ground lead
BLUE	Controls to sensors/electrical devices
GREEN	Signals from sensors/electrical devices



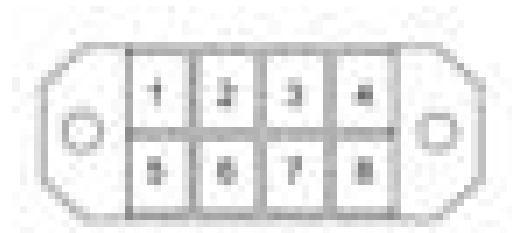
**D06\_01 - INTERNAL COMPARTMENT LIGHT UNIT CONNECTOR**

Pin	Colour	Description
	RL	Power supply from fuse D08_44 (10A)



**D08\_43 - MAIN FUSE CONNECTOR**

Pin	Colour	Description
1	R	Direct battery positive
2	RW	Ignition switch and voltage regulator power supply



#### **FUSES TERMINAL BLOCK CONNECTOR**

<b>Pin</b>	<b>Colour</b>	<b>Description</b>
1	O	To the external lights switch for activation of daylight running light
2	VB	Headlight power supply from fuse D08_46 (4A)
3	Gr	Ancillary power supply from fuse D08_45 (7.5A)
4	RL	Cigarette lighter power supply from fuse D08_44 (10A)
5	O	External lights power supply from fuse D08_47 (4A)
6	V	Headlights control of external lights switch
7	W	Positive after ignition switch from main fuse D08_43 (20A)
8	RW	Battery positive after main fuse D08_43 (20A)



# INDEX OF TOPICS

ENGINE FROM VEHICLE

EV

**REMOVAL:**

Lift the vehicle using the lift.

Disconnect the positive (+) and negative (-) poles of the battery.

**CAUTION**

**MAKE SURE THAT THE SIDE ARMS OF THE LIFT ARE CORRECTLY WELDED AND POSITIONED IN CORRESPONDENCE WITH THE LIFTING POINTS.**



Undo the differential oil drain plug.

**CAUTION**

**PREPARE A CONTAINER SUITABLE FOR COLLECTING BRAKE FLUID.**

**CAUTION**

**PAY THE UTMOST ATTENTION NOT TO COME IN CONTACT WITH THE OIL.**

**CAUTION**

**MAKE SURE THAT THE SIDE ARMS OF THE LIFT ARE CORRECTLY WELDED AND POSITIONED IN CORRESPONDENCE WITH THE LIFTING POINTS.**



Remove the plug and drain the differential oil in a suitable container.



Retighten the plug, using a new gasket.

**CAUTION**

**WHEN REASSEMBLING ALWAYS USE A NEW GASKET.**



---

Undo the gearbox oil drain plug.



Remove the plug and drain the gearbox oil in a suitable container.



Retighten the gearbox oil drain plug.



Undo the screws fastening the flange hood of the semi axle to the differential crankcase.



Remove the flange with the hood and using special pliers remove the retainer ring of the semi axle.



Undo the fixing bolt of the suspension arm to the frame.

**CAUTION**  
DURING THIS OPERATION, SUPPORT THE REAR SUSPENSION ARM.



Remove the bolt.



Remove the rear suspension arm from the frame.



---

Press on the wheel so as to move it toward the outside so as to push the semi axle out of its seat. Also proceed from the other side of the engine.

**CAUTION****DURING THIS OPERATION, ACT WITH CAUTION.**

---

Undo the retaining cylinder of the clutch transmission.



---

Remove the clutch cable from the engine.



---

Remove the odometer.





Remove the odometer from the engine.



Undo the fixing screws of the mixer cover.

**CAUTION**

IT IS NOT ESSENTIAL TO REMOVE THE SCREW LOCATED BEHIND THE SILENCER BUT JUST LOOSEN IT TO ENSURE THE REMOVAL OF THE COVER.



Remove the mixer cover.



Remove from the mixer the transmission of the accelerator coming from the splitter.



---

Undo the fixing screw and remove the mixer oil line retaining plate from the engine.



Using a suitable tool, close the oil inlet pipe to the mixer.



Remove the oil inlet pipe from the mixer.

**CAUTION**

**PREPARE A SUITABLE CONTAINER TO COLLECT ANY OIL LEAKS.**



Disconnect the gearbox transmissions.

**CAUTION**

**BEFORE PROCEEDING WITH THIS OPERATION, NOTE DOWN THE POSITION OF BOTH TRANSMISSIONS.**



Undo the screw fixing the plate and remove the electrical connection from the starter motor.



Close the fuel cock under the appropriate tank.



Remove the fuel pipe from the carburettor.

**CAUTION**

**PREPARE A SUITABLE CONTAINER TO COLLECT ANY OIL LEAKS.**



Undo the nut of the locking ring of the carburettor to the admission joint.





---

Remove the carburettor with cleaner from the admission joint.

**CAUTION**

**BE CAREFUL NOT TO OVERTURN THE CARBURETTOR IN ORDER TO PREVENT LEAKAGE.**



---

Remove the mixer output pipe from the carburettor.



---

Remove the pipe for pressure loss from the carburettor.



---

Undo the screw fixing the engine support of the retaining plate of the connection between the magnet flywheel and the voltage regulator.



Remove the retaining plate of the magnet flywheel connection.



Disconnect the connection between the magnet flywheel and the voltage regulator.



Disconnect the engine ground.



Remove the spark plug cap.



---

Disconnect the transmission of the gear inverter.



---

Hold the engine with a workshop jack.



---

Undo the fixing bolt of the engine to the frame.



---

Remove the fixing bolt of the engine to the frame.



Undo the fixing screw of the engine support bracket to the frame.



Remove the bracket from the frame.  
Repeat these operations to also release the other side of the engine support from the frame.



Remove the engine by lowering the workshop jack.

**CAUTION**  
**ACT WITH EXTREME CAUTION ON THE WORKSHOP JACK.**



**REFITTING:**

Acting on the workshop jack, reposition the engine under the vehicle.

**CAUTION**  
**PAY SPECIAL ATTENTION DURING THIS OPERATION.**





Tighten the fixing screw and lock the bracket to the frame.

Also repeat these operations for the other side of the engine support.

**Locking torques (N\*m)**

**Engine support bracket - Chassis  $22 \pm 2$  Nm**



Insert and tighten the bolt fixing the engine to the frame.

**Locking torques (N\*m)**

**Engine - Chassis  $27.5 \pm 2.5$  Nm**



Insert the semi axle in its seat.

Also proceed from the other side of the engine.

**CAUTION**

**DURING THIS OPERATION, ACT WITH CAUTION.**



Refit the rear suspension arm on the frame.



Refit and tighten the fixing bolt of the suspension arm to the frame.

### Locking torques (N\*m)

Rear suspension arm - Frame  $44.1 \pm 4.9$  Nm



With suitable pliers, refit the retainer ring of the semi axle and correctly position the flange with the hood.



Tighten the screws fastening the hood of the semi axle to the differential crankcase.

Also repeat these operations from the other side of the engine.

Restore the oil in the differential.

#### CAUTION

CHECK THAT THE DIFFERENTIAL BOX DOES NOT LEAK OIL.

### Recommended products

**AGIP GEAR 80W-90 Oil for gears and transmissions.**

- API GL-4



Reconnect the spark plug cap.



---

Tighten the engine ground.



Connect the connection between the magnet flywheel and the voltage regulator.



Refit the retainer plate of the magnet flywheel connection and tighten the fixing screw to the engine support.



Refit the carburettor with cleaner on the admission joint.

**CAUTION**

**BE CAREFUL NOT TO OVERTURN THE CARBURETTOR IN ORDER TO PREVENT LEAKAGE.**



Tighten the nut of the locking ring of the carburettor to the admission joint.



Refit on the carburettor the output pipe from the mixer and the vacuum one.



Refit the fuel pipe on the carburettor.



Connect the transmission of the gear inverter.





---

Refit the electrical connection from the starter motor, tightening the screw fixing the plate.



---

Connect the gearbox transmissions.

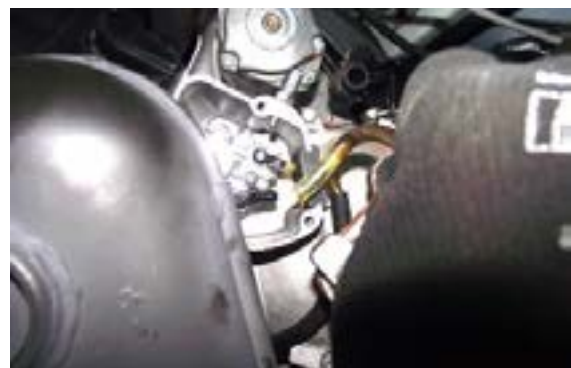
**CAUTION**

**FOR THE CORRECT REFITTING, REFER TO THE POSITION OF BOTH TRANSMISSIONS, PREVIOUSLY NOTED.**



---

Refit the oil inlet pipe on the mixer.



---

Tighten the screw on the plate fixing the mixer oil line to the engine.



Connect to the mixer the transmission of the accelerator coming from the splitter.



Refit the mixer cover.



Tighten the fixing screws of the mixer cover.

**CAUTION**

THE SCREW LOCATED BEHIND THE SILENCER HAS NOT BEEN REMOVED; THEREFORE IT IS SUFFICIENT TO RESTORE THE PROPER FITTING.



Tighten the odometer to the engine.



---

Position the clutch cable on the engine.



---

Refit the cylinder on the clutch cable



---

Tighten the retaining cylinder of the clutch transmission.



---

Open the fuel cock under the appropriate tank.



Remove the tool and reopen the oil inlet pipe to the mixer.



Reconnect the positive (+) and negative (-) pole of the battery.

Restore the oil in the gearbox.

Check the proper adjustment of all transmissions (clutch, gearbox, accelerator, gear inverter).

**Recommended products**

**AGIP GEAR 80W-90 Oil for gears and transmissions.**

- API GL-4



## INDEX OF TOPICS

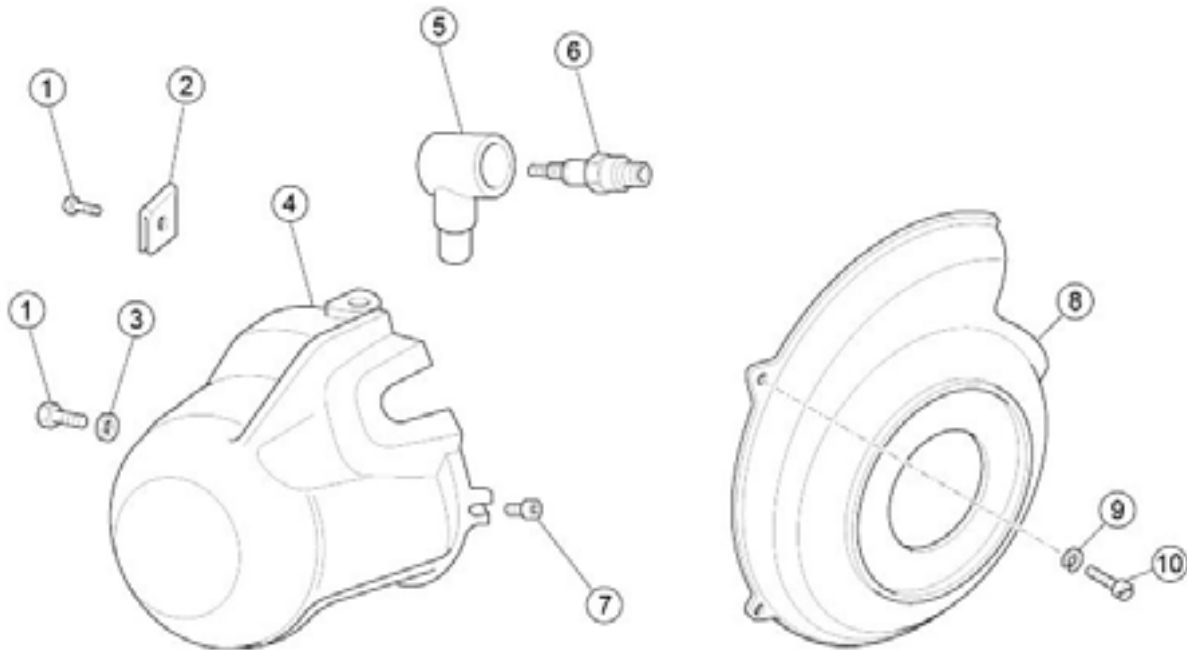
ENGINE

EN

---

**Engine type 1**

---

**Air deflector - cooling fan****KEY**

1. Screw
2. Plate
3. Washer
4. Cooling hood
5. Cap
6. Spark plug
7. Screw
8. Scroll cover
9. Washer
10. Screw

---

**REMOVAL**

Undo the spark plug.



Remove the spark plug from its seat.



Undo the screws fastening the cooling hood.



Remove the cooling hood.





Undo the lock screw of the scroll cover and remove it.



### **FITTING**

Position the scroll cover on its seat and tighten the lock screws of the scroll cover.



Position the cooling hood in its seat, on the cylinder head.



Tighten the fixing screws.





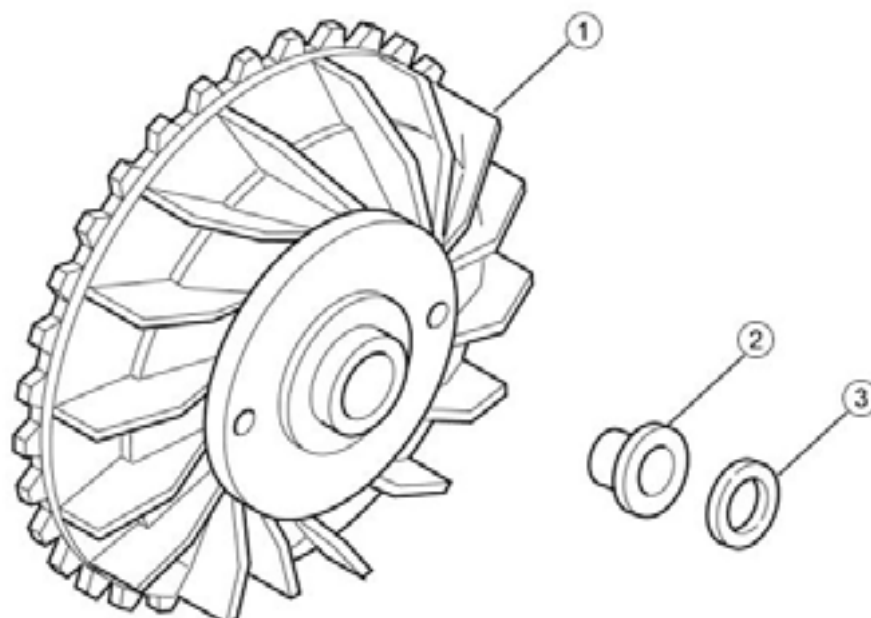
Install the spark plug on the cylinder head.



Tighten the spark plug.



## Flywheel



### KEY

- 1. Magneto flywheel
- 2. Nut

### 3. Washer

#### REMOVAL

Remove the scroll cover.

Using the specific equipment lock the flywheel fan.

#### Specific tooling

020095Y Flywheel Lock



Using the specific equipment remove the fixing nut of the flywheel fan and the washer.

#### Specific tooling

048564Y Flywheel extractor



Remove the flywheel fan.



#### FITTING

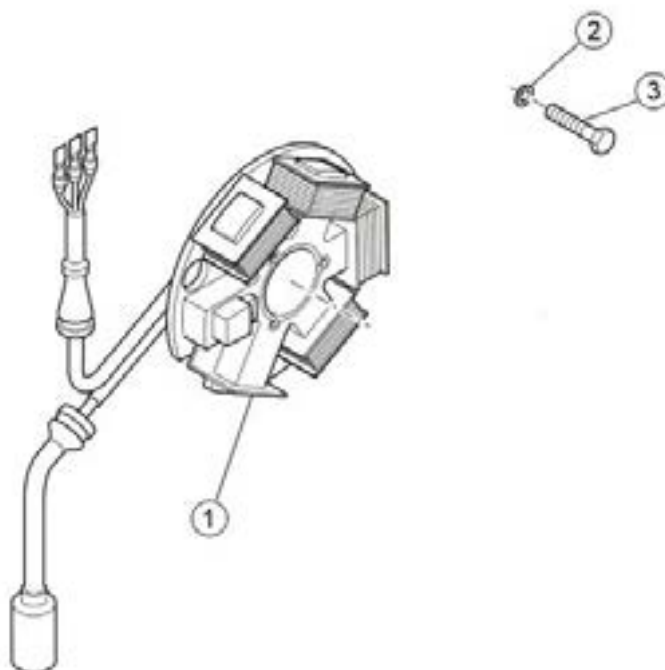
Install the flywheel fan.



Using the specific equipment tighten the fixing nut of the flywheel.

**Locking torques (N\*m)**

Flywheel fan - Crankshaft  $47.5 \pm 2.5$  Nm

**Stator****KEY**

1. Complete stator.
2. Washer.
3. Screw.

**REMOVAL**

Remove the flywheel fan.

---

Check correspondence of the reference mark of the stator with respect to the crankcase.



---

Remove the fixing screws and washers.



---

Remove the complete stator.

---

When removing the stator, remove the sheath from inside.



---

### **FITTING**

Insert the cable in the appropriate passage hole.



Install the complete stator taking care to match the reference marks as shown at disassembly.



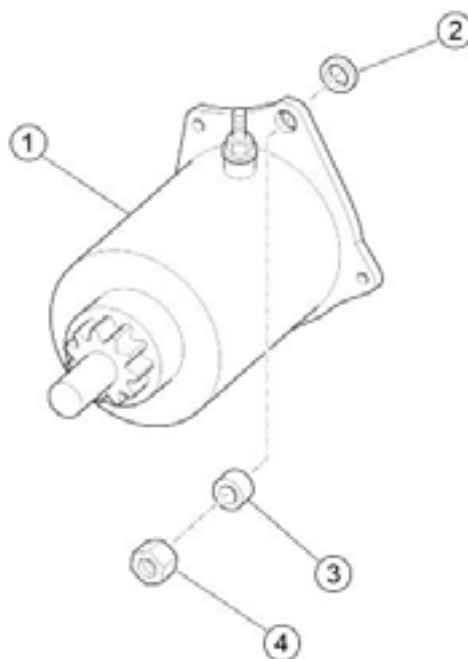
Tighten the fixing screws of the complete stator.

### Locking torques (N\*m)

Coils support - Crankcase half  $4 \pm 1$  Nm



## Starter motor



### KEY

1. Starter motor.
2. Flat washer.

3.Elastic washer.

4.Nut.

---

## Removal

Undo the fixing nuts of the starter motor.



Remove the starter motor from its seat.



---

## Assembly

Install the motor.





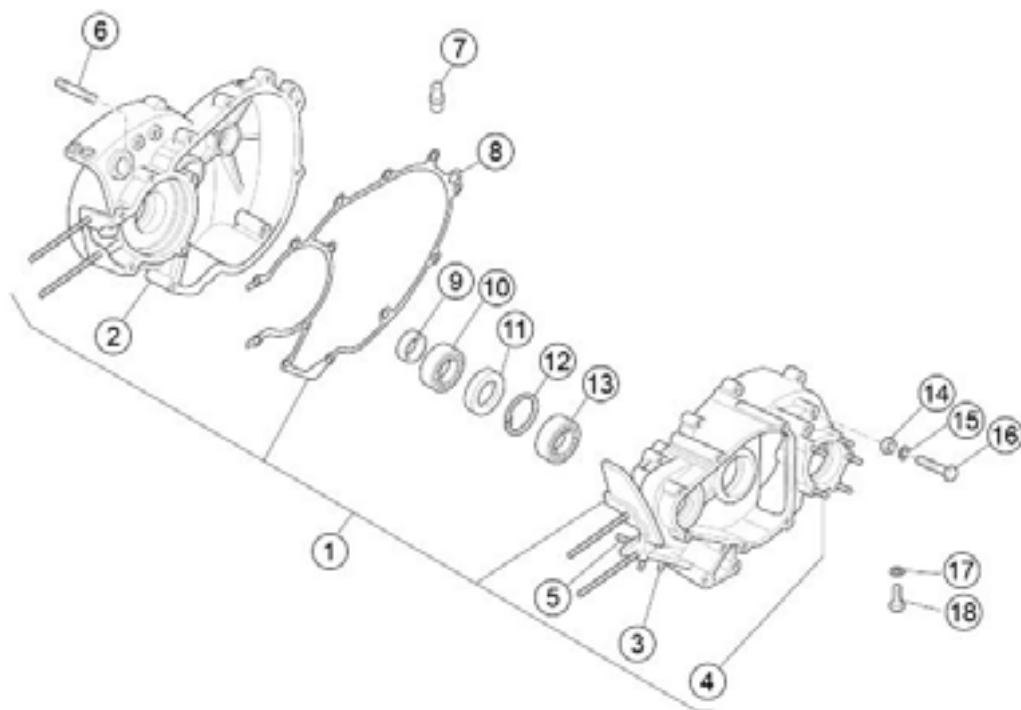
Tighten the fixing nuts of the starter motor

### Locking torques (N\*m)

Starter motor - Crankcase half  $8 \pm 1$  Nm



## Crankcase splitting



### KEY

1. Complete crankcase.
2. Stud bolt.
3. Stud bolt.
4. Screw.
5. Stud bolt.
6. Stud bolt.
7. Breather.
8. Gasket.
9. Ring.
10. Bearing.

11. Ring.
12. Seeger ring.
13. Bearing.
14. Nut.
15. Washer.
16. Bolt.
17. Gasket.
18. Oil plug.

---

## Half-crankcase splitting

### REMOVAL

Remove the flywheel fan.

Remove the stator.

Remove the head and the cylinder.

Remove the differential unit.

Remove the clutch assembly and the engine gear.

Remove the sealing ring from the flywheel side.

Remove the fixing screws of the crankcase.



Disassemble the crankcase.





**FITTING**

Thoroughly clean the coupling surfaces and position a new gasket on the flywheel side crankcase half.



Couple the crankcase halves.



Install the clutch assembly and the engine gear.

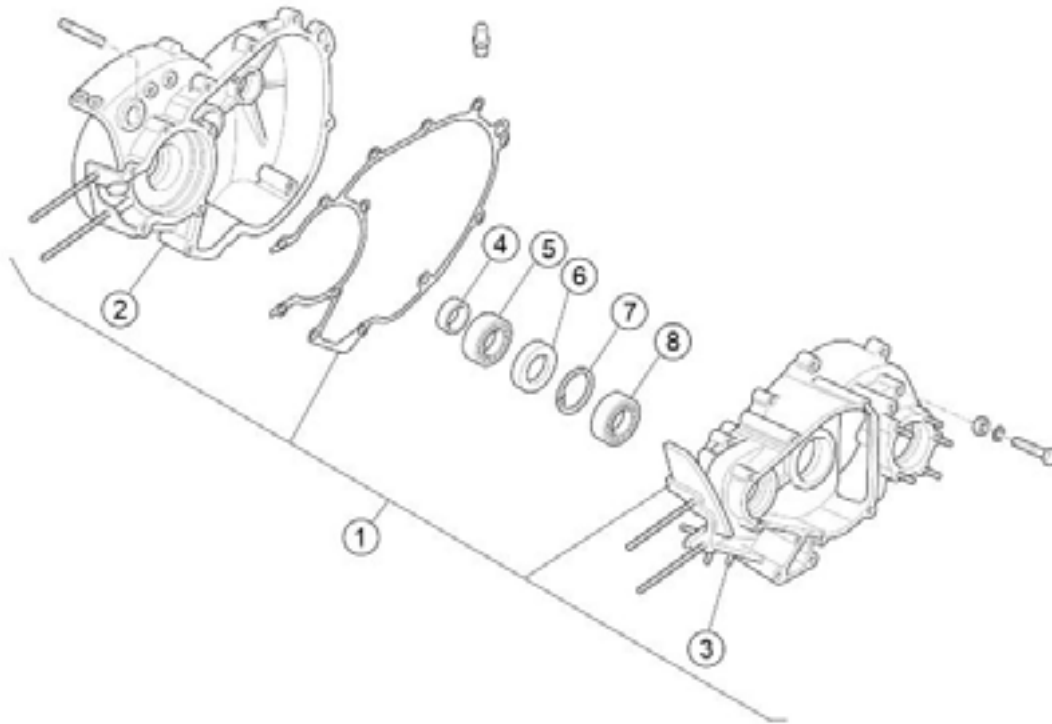
Install the head and the cylinder.

Install the differential unit.

Install the stator.

Install the flywheel fan.

## Crankcase bearings



### KEY

1. Complete crankcase
2. Flywheel-side crankcase half
3. Clutch-side crankcase half
4. Ring
5. Bearing
6. Ring
7. Seeger ring
8. Bearing

### REMOVAL

Separate the crankcase.

Remove the crankshaft from the flywheel side crankcase half.



---

Heat the crankcase bearing coupling to a temperature of about 80°C to facilitate removal.

**Specific tooling**

**020151Y Heat gun**



---

Remove the sealing ring and by means of a punch of suitable diameter eject the bearing.



---

Remove the bearing from the flywheel side crankcase half.



---

Remove the sealing ring from the clutch side crankcase half.



Remove the bench bearing sealing ring from the flywheel side crankcase half.



Using the appropriate pliers, remove the snap ring.

**Specific tooling**

**022465Y Pliers for circlips**



Heat the crankcase to about 80°C to facilitate the expulsion of the bearing. Eject the bearing from its housing using a punch of suitable diameter.

**Specific tooling**

**020150Y Support**

**020151Y Heat gun**



Remove the bearing.



**FITTING**

Heat the coupling seat to about 80°C to facilitate installation.

Place the bearing on its seat on the flywheel side crankcase half and insert it using a punch of an adequate size.

**Specific tooling**

**020150Y Support**

**020151Y Heat gun**

Heat the coupling seat on the clutch side crankcase half to about 80°C to facilitate installation.

Place the bearing on its seat and insert it using a punch of an adequate size.

**Specific tooling**

**020150Y Support**

**020151Y Heat gun**

Place the snap ring by means of special pliers.

**Specific tooling**

**022465Y Pliers for circlips**



Position the sealing ring on the crankcase halves.

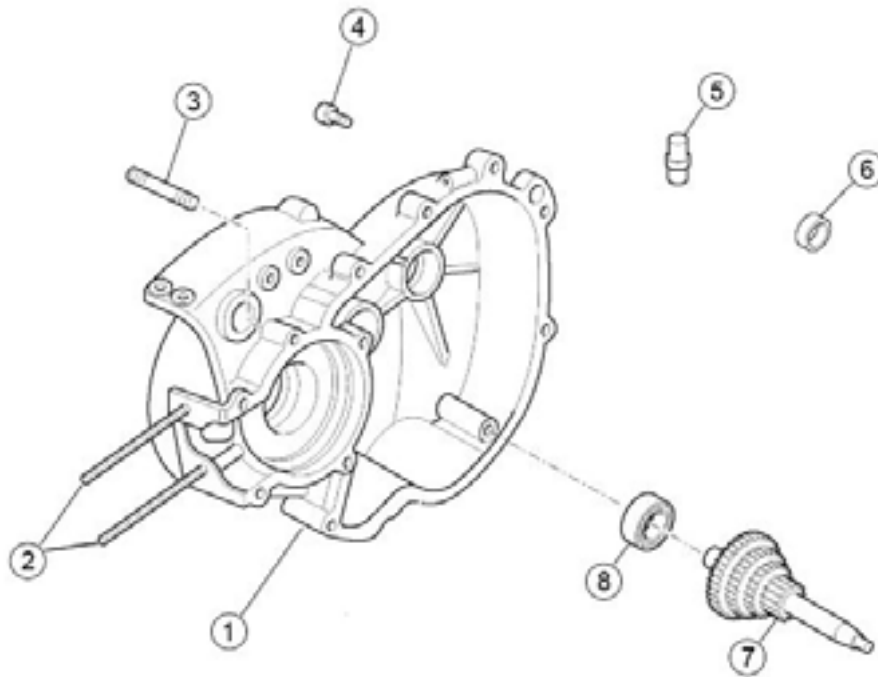
**Specific tooling**

**022465Y Pliers for circlips**



Couple the crankcase.

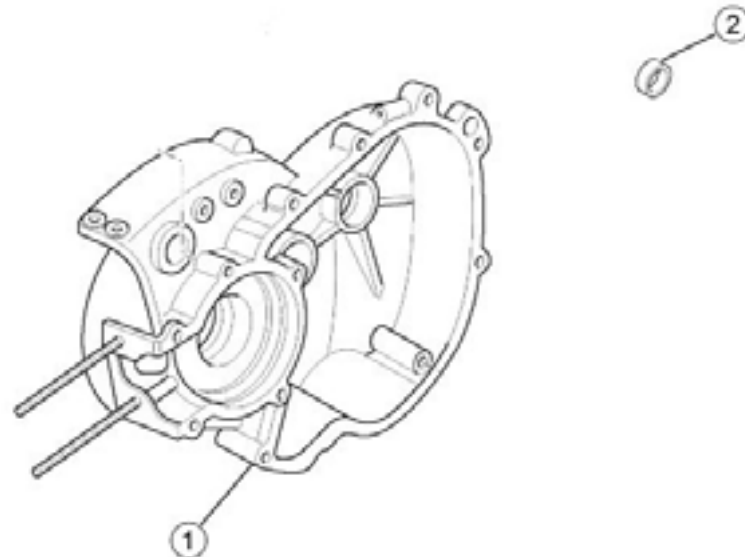
## Fly-wheel side half-crankcase



### KEY

1. Crankcase halves
2. Stud bolt
3. Stud bolt
4. Plug
5. Breather
6. Roller bearing
7. Gear
8. Bearing

## Roller cage



### KEY

1. Flywheel-side crankcase half
2. Roller bearing

### REMOVAL

Carry out the separation of the crankcase.

Heat the crankcase to about 80°C to facilitate the removal of the roller bearing.

Remove the roller bearing using the specific equipment.

### Specific tooling

020150Y Support

020151Y Heat gun

021467Y Bearing extractor

021467Y013 extractor

021467Y009 extractor





**FITTING**

Let the crankcase cool down.

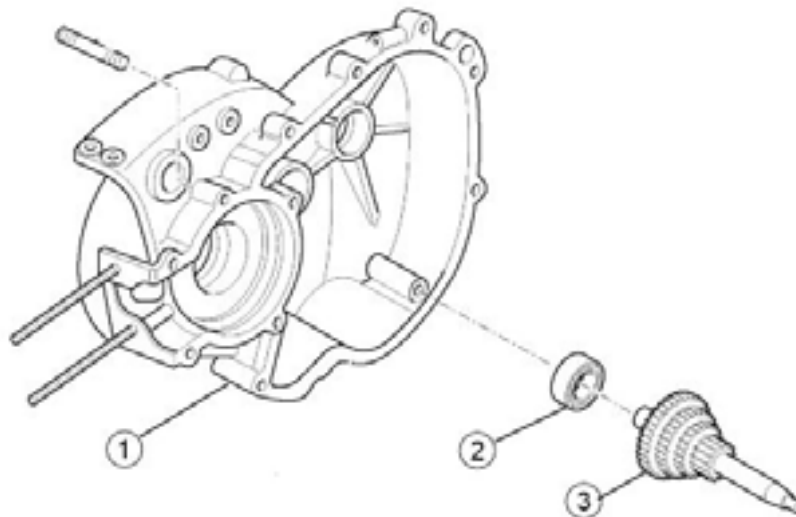
Fit the roller bearing using the specific equipment.

**Specific tooling**

**032975Y Punches for Roller Casings**



Perform the coupling of the crankcase.

**Primary gear-shaft****KEY**

1. Flywheel-side crankcase half

2. Bearing

3. Gear

**REMOVAL**

Carry out the separation of the crankcase.



---

Remove the gear box primary shaft from the crankcase.



Heat the flywheel side crankcase half to about 80° C to facilitate the removal of the bearing.

Remove the gear box primary shaft bearing using a punch of suitable diameter and a rubber hammer.

**Specific tooling**

**020150Y Support**

**020151Y Heat gun**



**FITTING**

Heat the crankcase to about 80°C to facilitate the insertion of the bearing.

Install the gear box primary shaft bearing using a punch of suitable diameter and a rubber hammer.

**Specific tooling**

**020150Y Support**

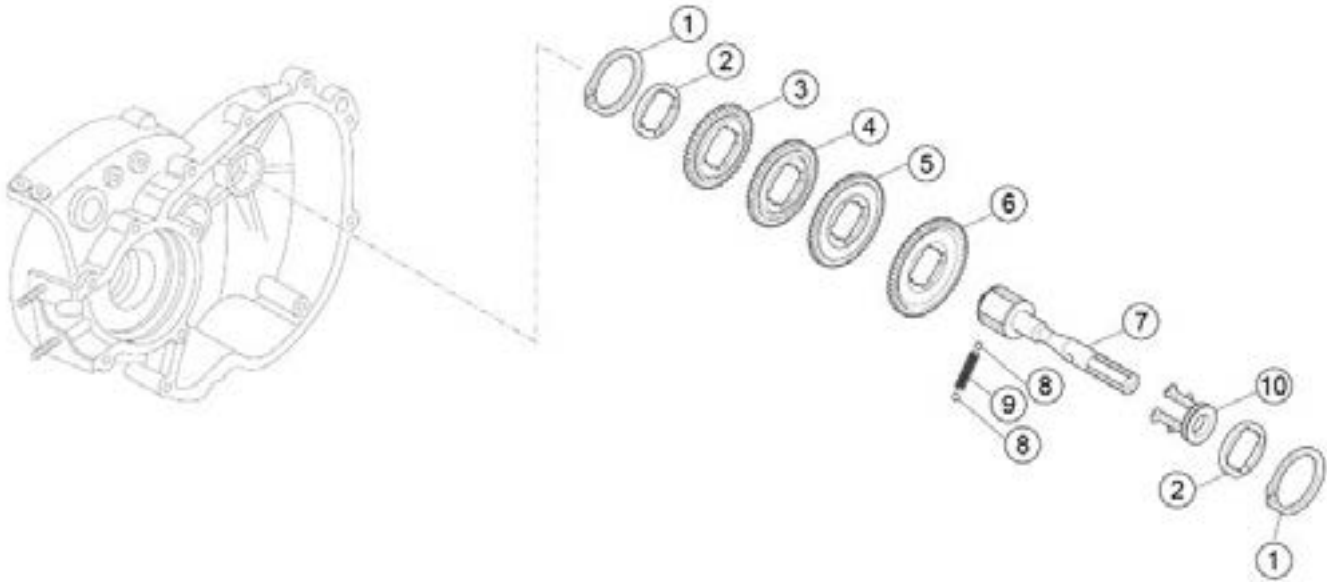
**020151Y Heat gun**



Perform the coupling of the crankcase.

---

## Gear-box coupling replacement

**KEY:**

1. Ring
2. Ring
3. 4th speed gear
4. Gear
5. Gear
6. Gear
7. Change gear shaft
8. Ball
9. Spring
10. Fitting

---

## Overhaul

**REMOVAL**

Carry out the separation of the crankcase and remove the gearbox secondary shaft.

Remove the speed gears from the gearbox secondary shaft.

Remove the snap ring and disassemble the gearbox engagement.

**Specific tooling****023638Y Pliers for circlips**

Check the condition of wear and replace damaged components.

**FITTING**

Using the special tool reassemble the gearbox engagement.

**Specific tooling****029569Y Gear Engagement Fitting Tool**

Install the speed gears.

Install the gearbox secondary shaft

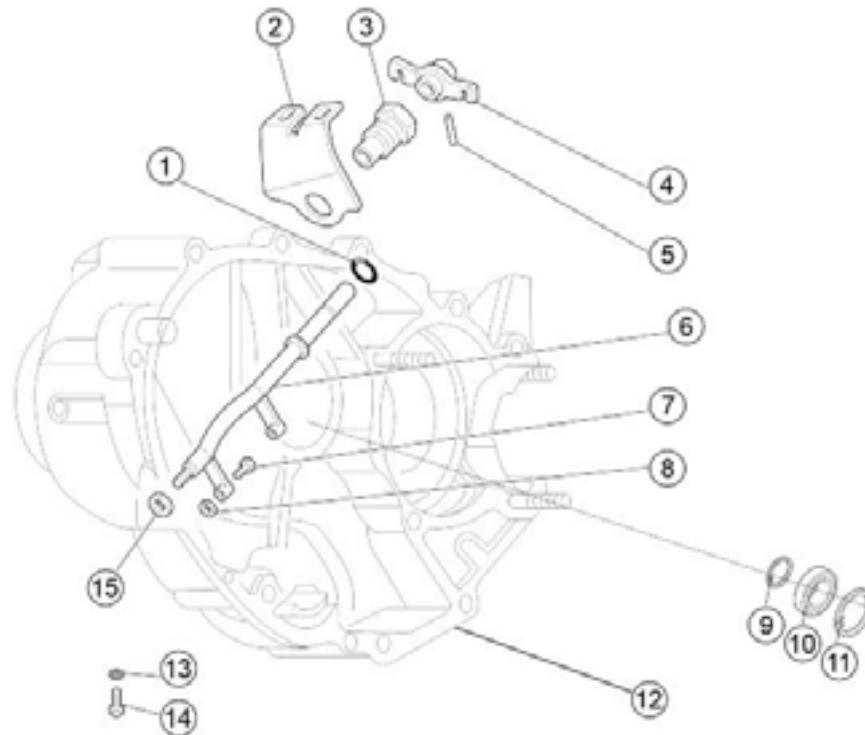
Perform the assembly of the crankcase.

---

**Coupling refitting**

---

## Bearings on half-crankcase clutch-side



### KEY

1. Gasket
2. Stop
3. Bushing
4. Tie rod
5. Pin
6. Fork
7. Slider
8. Snap ring
9. Ring
10. Bearing
11. Seeger ring
12. Clutch-side crankcase half
13. Gasket
14. Oil plug
15. Elastic washer

### REMOVAL

Carry out the separation of the crankcase.

Remove the gearbox secondary shaft.

---

Remove the snap ring.

**Specific tooling**

**023638Y Pliers for circlips**



---

Remove the helical gear.



---

Heat the crankcase to about 80°C to facilitate removal.

Eject the bearing using a punch of appropriate diameter.

**Specific tooling**

**020150Y Support**

**020151Y Heat gun**



---

Remove the bearing from the clutch side crankcase half.



## Refitting

Heat the crankcase to about 80°C to facilitate removal.

Position the bearing in its housing on the clutch side crankcase half using a punch of appropriate diameter.



### Specific tooling

020150Y Support

020151Y Heat gun

Fit the snap ring by means of special pliers.

### Specific tooling

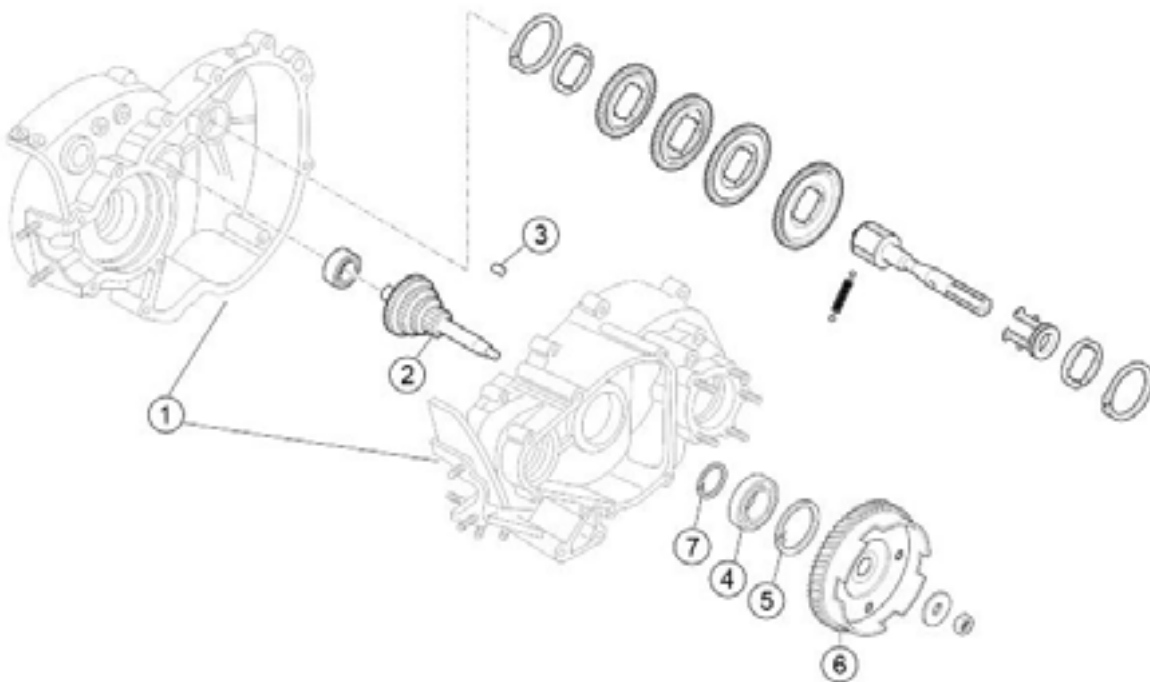
022465Y Pliers for circlips



Install the clutch housing.

Perform the coupling of the crankcase.

## Clutch drum



**KEY**

1. Crankcase
2. Gear.
3. Key.
4. Bearing.
5. Seeger ring.
6. Helical gear.
7. Ring.

**REMOVAL**

Remove the clutch assembly.

Carry out the separation of the crankcase.

Heat the crankcase to about 80°C to facilitate removal.

Remove the helical gear using a rubber hammer if necessary.

**Specific tooling**

**020150Y Support**

**020151Y Heat gun**

**FITTING**

Heat the crankcase to about 80°C to facilitate removal.

Install the helical gear using a rubber hammer if necessary.

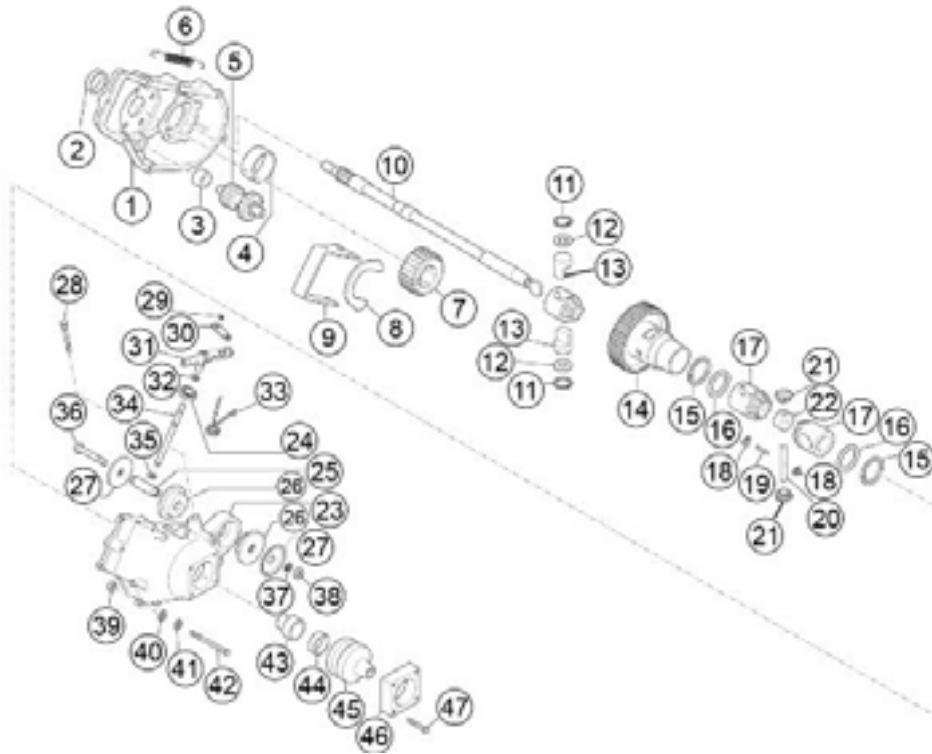
**Specific tooling**

**020150Y Support**

**020151Y Heat gun**



**Differential assembly**



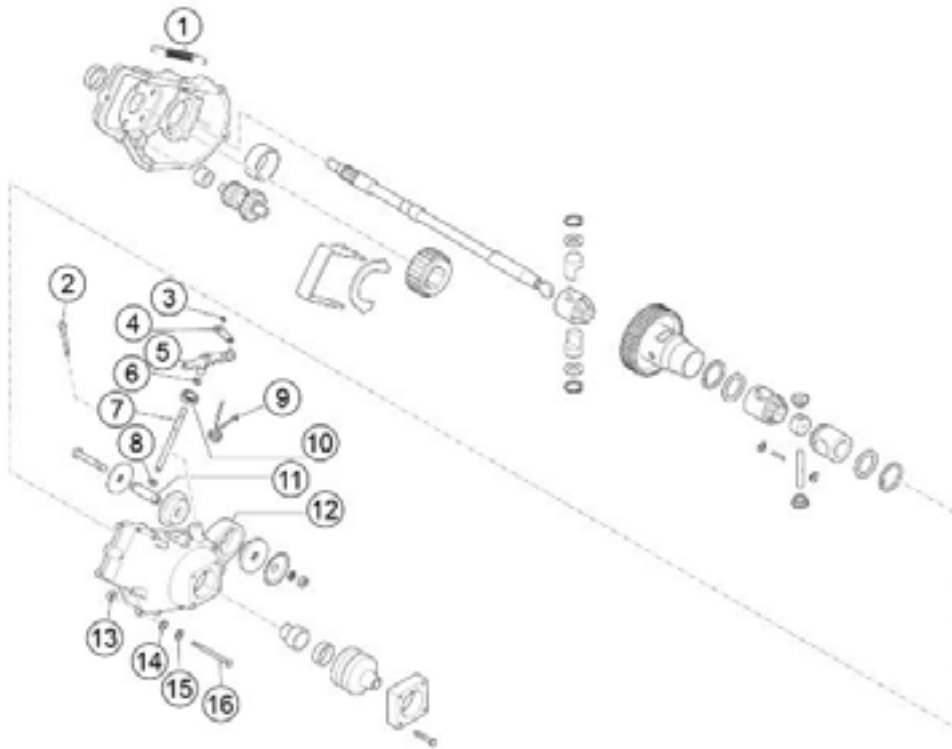
**KEY**

- 1. Differential crankcase
- 2. Ring
- 3. Roller cage
- 4. Bushing
- 5. Whole gear
- 6. Spring
- 7. Sliding gear
- 8. Slider
- 9. Fork
- 10. Axle shaft
- 11. Helical ring
- 12. Washer
- 13. Pin
- 14. Differential case
- 15. Ring
- 16. Washer
- 17. Planetary gear
- 18. Helical ring
- 19. Pin



- 20.Pin
  - 21.Gear
  - 22. Spacer
  - 23. Differential crankcase
  - 24.Sealing ring
  - 25. Bushing
  - 26.Ring
  - 27. Washer
  - 28.Plug
  - 29.Ring
  - 30. Lever
  - 31. Lever
  - 32. Gasket
  - 33. Spring
  - 34.Pin
  - 35.Ring
  - 36.Screw
  - 37.Washer
  - 38. Nut
  - 39.M6 nut
  - 40. Flat washer
  - 41. Elastic washer
  - 42.Screw
  - 43.Bushing
  - 44. Ring
  - 45.Hood
  - 46. Cover
  - 47. Screw TE M6x20
-

## Cover removal



### KEY

1. Spring
2. Plug
3. Ring
4. Lever
5. Lever
6. Gasket
7. Pin
8. Ring
9. Spring
10. Sealing ring
11. Bushing
12. Differential crankcase
13. Nut
14. Flat washer
15. Elastic washer
16. Screw

---

**REMOVAL**

Remove the fixing screws.



---

Remove the cover of the gear.



---

Remove the spring.



---

Remove the nuts and the fixing screws.



---

Remove the cover of the differential crankcase.



---

### FITTING

Thoroughly clean the contact surface and apply new paste.



---

Install the cover of the differential crankcase.



---

Tighten the nuts and the screws.

### Locking torques (N\*m)

Crankcase half - Differential crankcase cover 9  
 $\pm 1$  Nm



Position the spring.



## Differential box and transmission gears

### REMOVAL

Remove the cover of the differential crankcase.



Remove the whole gear.



Remove the sliding gear.



Remove the differential box.



**FITTING**

Install the differential box.



Install the sliding gear



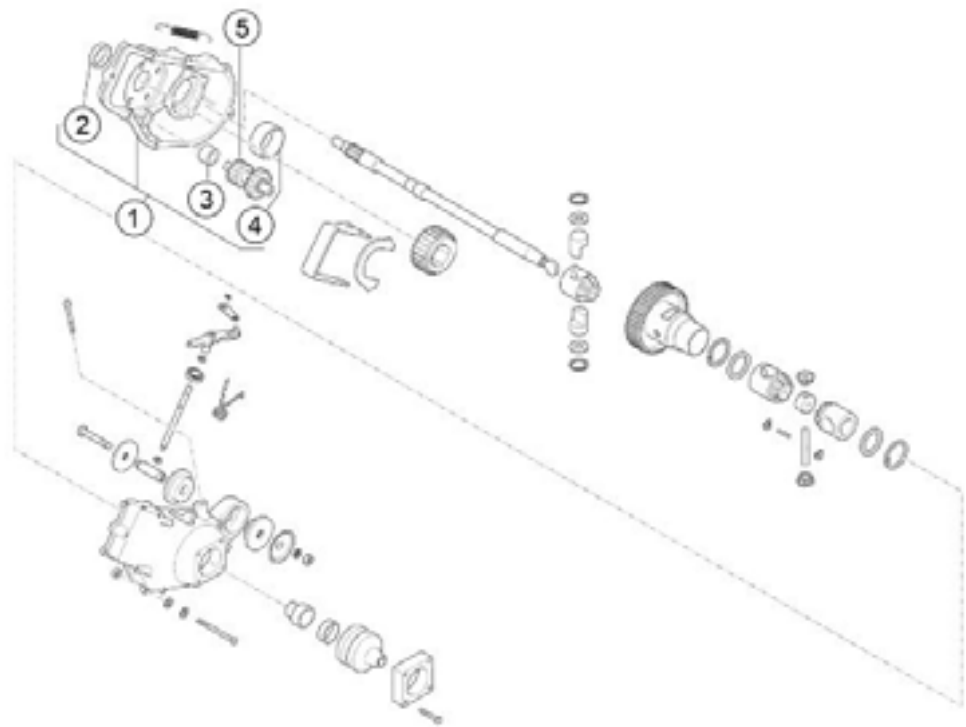
Install the whole gear



Install the cover of the differential crankcase.

---

## Differential case



### KEY

1. Differential crankcase
2. Ring
3. Roller cage
4. Bushing
5. Whole gear

### REMOVAL

Remove the cover of the differential crankcase.

Remove differential box.

Remove the fixing nuts.





---

Remove the differential crankcase.



---

### FITTING

Thoroughly clean the contact surface of paste residues.



---

Apply the new paste on the contact surface of the differential crankcase.



---

Install the differential crankcase.





Tighten the fixing nuts

### Locking torques (N\*m)

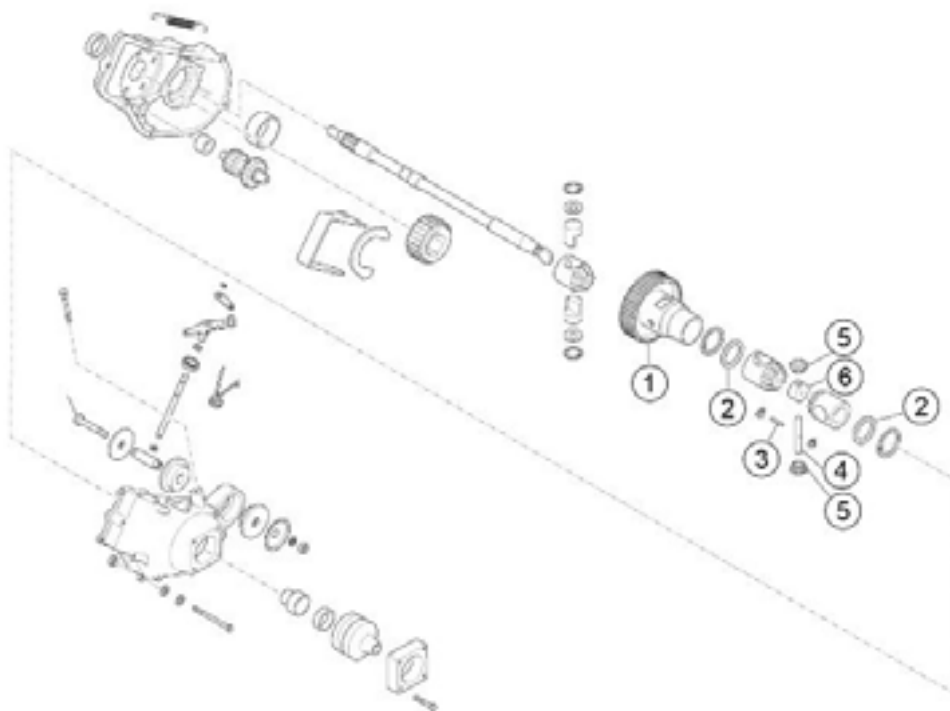
**Differential crankcase - Crankcase half**  $33.5 \pm 1.5$   
Nm



Install the differential box.

Install the cover of the differential crankcase.

## Differential box overhaul



### KEY

1. Differential box
2. Washer
3. Pin
4. Pin
5. Gear
6. Spacer

### REMOVAL

Remove the differential box.

Remove the pin.



Remove the pivot.



Remove the gears, the washers and the spacer.



**REVISION**

Check the condition of the components.



---

**FITTING**

Install the washers in position inside the differential box.



---

Position the gears and the spacer.  
Partially insert the pin.



---

Completely insert the pin.



---

Position the pin.



---

Install the differential box.

---



---

Remove the fixing screws of the cover.



---

Remove the clutch cover.



---

Remove the ring.



---

Remove the clutch cap.



---

**CLUTCH LEVER REMOVAL**

Release the end of the spring from the lever.



Remove the bearing from the clutch cover.



Remove the lever from its seat on the clutch cover and remove the second bearing and the clutch actuating pad.



---

**CLUTCH LEVER INSTALLATION**

Position the spring on the clutch lever.





---

Insert the lever.



Attach the end of spring into the hole of the lever.



Position the clutch actuating pad in its housing being careful to lubricate.



In order to properly position thrust plate actuating pad, keep the clutch lever at the end of its travel, insert the pad in its housing and holding the pad pressed, slowly release the clutch lever; check that the reference marks on the clutch lever and the cover are the same.

---

### **CLUTCH COVER INSTALLATION**

Position the clutch cap.



---

Install the ring



Position the gasket and the clutch cover.



Tighten the fixing screws of the clutch cover.

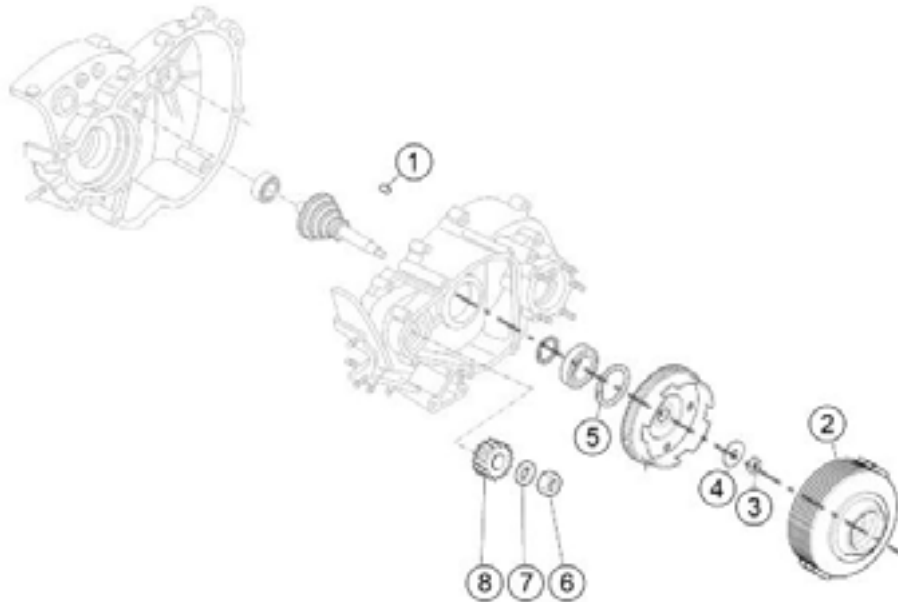
**Locking torques (N\*m)**

**Clutch cover - Crankcase half  $7 \pm 1$  Nm**





## Clutch and engine gear



### KEY

1. Key
2. Complete clutch
3. Nut
4. Washer
5. Seeger ring
6. Nut
7. Washer
8. Engine gear

### REMOVAL

Remove the clutch cover.

Straighten the safety tabs of the washer.



---

Lock the clutch assembly using the specific equipment and remove the fixing nut.

**Specific tooling**

**030250Y Clutch Stop Key**



---

Remove the washer.



---

Install the clutch extractor tool.

**Specific tooling**

**009551Y Clutch puller**



---

Remove the complete clutch and the key positioned on the shaft.



---

Straighten the safety tabs of the washer.



---

Loosen the lock nut of the engine gear.



---

Remove the nut and the washer.



---

Remove the engine gear and the key.



---

Remove the clutch housing.

**FITTING**

Fit the clutch housing.

**CAUTION**

**REFIT THE PARTICULAR COMPONENTS OF THE ASSEMBLY IN THE CORRECT ORDER.**

Position the key.



Insert the key of the engine gear on the shaft.

**CAUTION**

**CORRECTLY POSITION THE KEY ON THE SHAFT**



Position the engine gear.



Install the washer and the nut.

Tighten the nut.

**Locking torques (N\*m)**

**Engine gear - Crankshaft  $52.5 \pm 2.5$  Nm**





Fold the safety tab.



Position the complete clutch.



Position the washer.



Tighten the nut.

**Specific tooling**

**030250Y Clutch Stop Key**

**Locking torques (N\*m)**

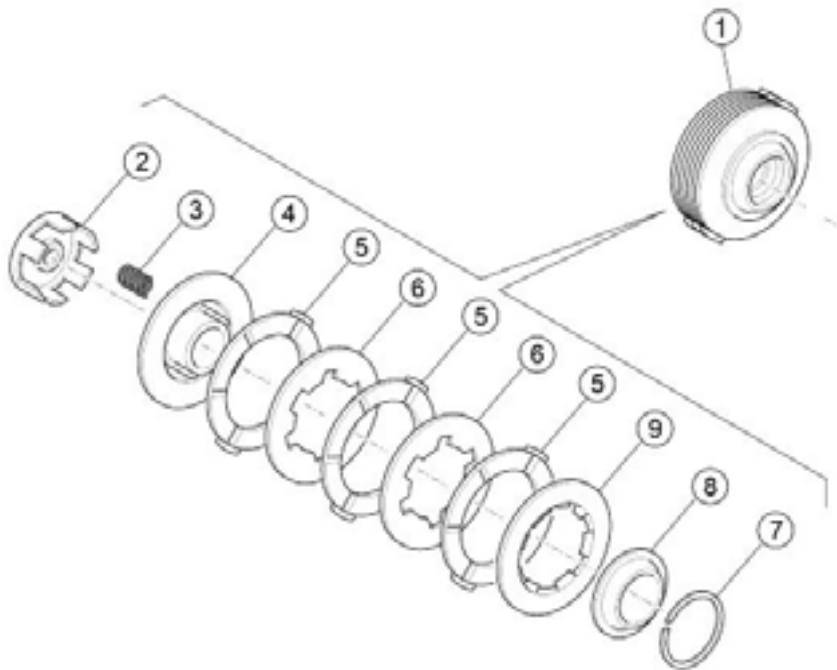
**Clutch assembly - Gear  $42.5 \pm 2.5$  Nm**



Fold the safety tab on the washer.



## Clutch overhaul



### KEY

- 1. Complete clutch
- 2. Bell
- 3. Spring
- 4. Retaining plate
- 5. Drive disc
- 6. Pressure plate
- 7. Helical ring
- 8. Tray
- 9. External cap

### REMOVAL

---

Remove the complete clutch and position it on the bench.

Remove the snap ring and the tray.



---

Remove the external cap, the driving and driven discs and the retainer cap.



---

Remove the springs and the housing.



---

**REVISION**

Check the wear status of the components and replace damaged components.



**FITTING**

Place in order: housing, springs, retaining plate, driving and driven discs alternately, outer plate, tray.

**CAUTION**

REFIT THE PARTICULAR COMPONENTS OF THE ASSEMBLY IN THE CORRECT ORDER.



Using the specific equipment assemble the components and position the snap ring by completing the installation of complete clutch.

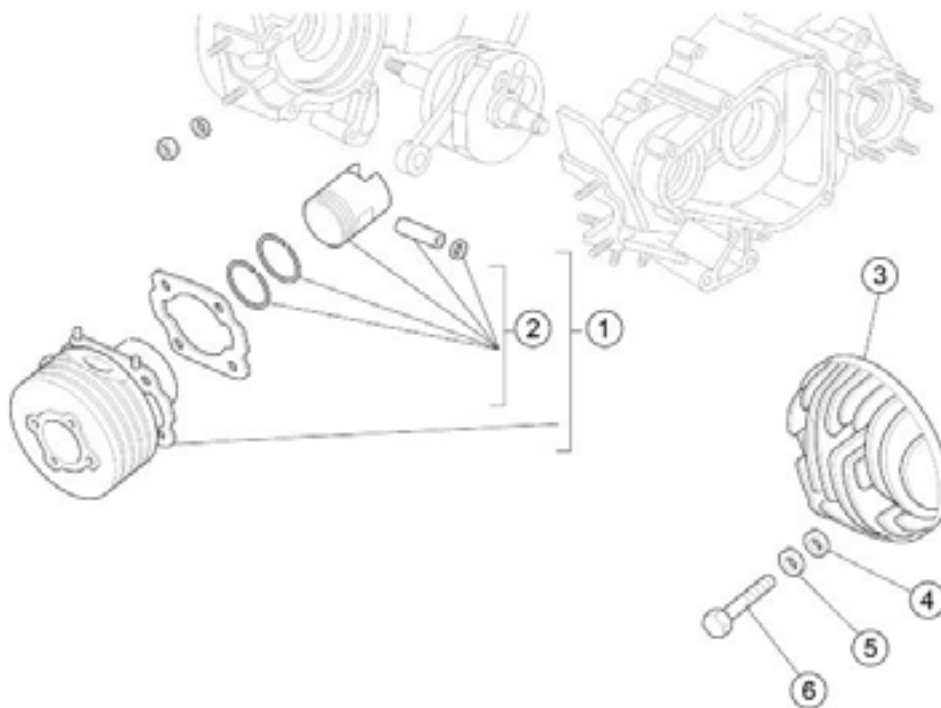
**Specific tooling**

020322Y Clutch Removal



Install complete clutch on the engine.

**Cylinder/piston assy - carburettor**



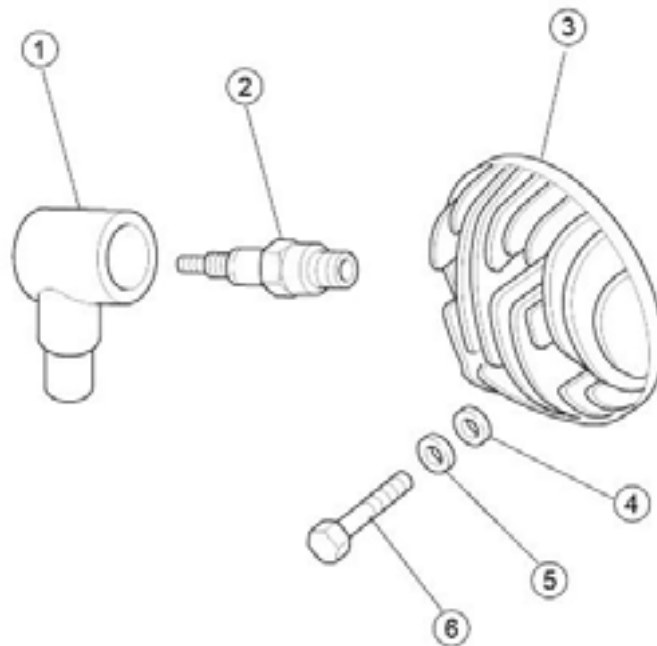
**KEY**

1. Pin cylinder unit



2. Piston
3. Cylinder head
4. Washer
5. Washer
6. Bolt

---

**Cylinder head****KEY**

1. Cap
2. Spark plug
3. Cylinder head
4. Washer
5. Washer
6. Bolt

**REMOVAL**

Remove the cooling hood.

---

Remove the fixing pins of the head.



Remove the head from the cylinder.



Undo the fixing nuts of the cylinder.



Remove the cylinder removing it from the stud bolts.



**FITTING**

Position the gasket on the crankcase.



Insert the piston, paying attention to lubricate during installation.



Put the cylinder in position.



Tighten the fixing nuts.

**Locking torques (N\*m)**

Cylinder - Crankcase  $14 \pm 1$  Nm



Position the head on the cylinder.



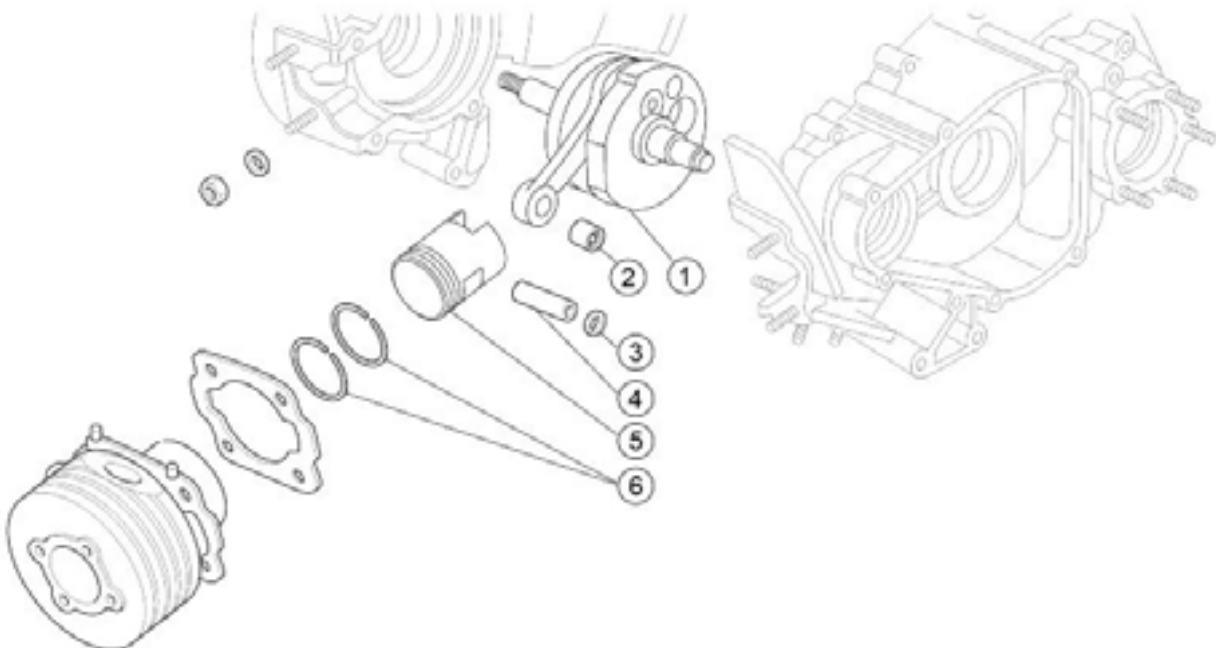
Tighten the fixing screws of the head.

**Locking torques (N\*m)**

**Head - Cylinder  $15.5 \pm 2.5$  Nm**



## Piston



### LEGENDA

1. Albero motore
2. Gabbia spinotto

3. Anello elastico
4. Spinotto
5. Pistone
6. Anello di tenuta

**SMONTAGGIO**

Rimuovere il cilindro.

Rimuovere l'anello elastico dalle estremità dello spinotto.



Rimuovere lo spinotto per mezzo dell'apposito punzone.



Rimuovere il pistone.



Rimuovere gli anelli di tenuta.



Rimuovere la gabbia spinotto.



### **MONTAGGIO**

Inserire la gabbia spinotto avendo cura di lubrificare al montaggio.



Lubrificare il vano dell'albero motore.





---

Installare gli anelli di tenuta sul pistone.



Posizionare il pistone.

**CAUTION**

**POSIZIONARE IL PISTONE CON LA FRECCIA STAMPATA SUL CIELO DELLO STESSO IN DIREZIONE DELLO SCARICO.**



Posizionare l'anello elastico.

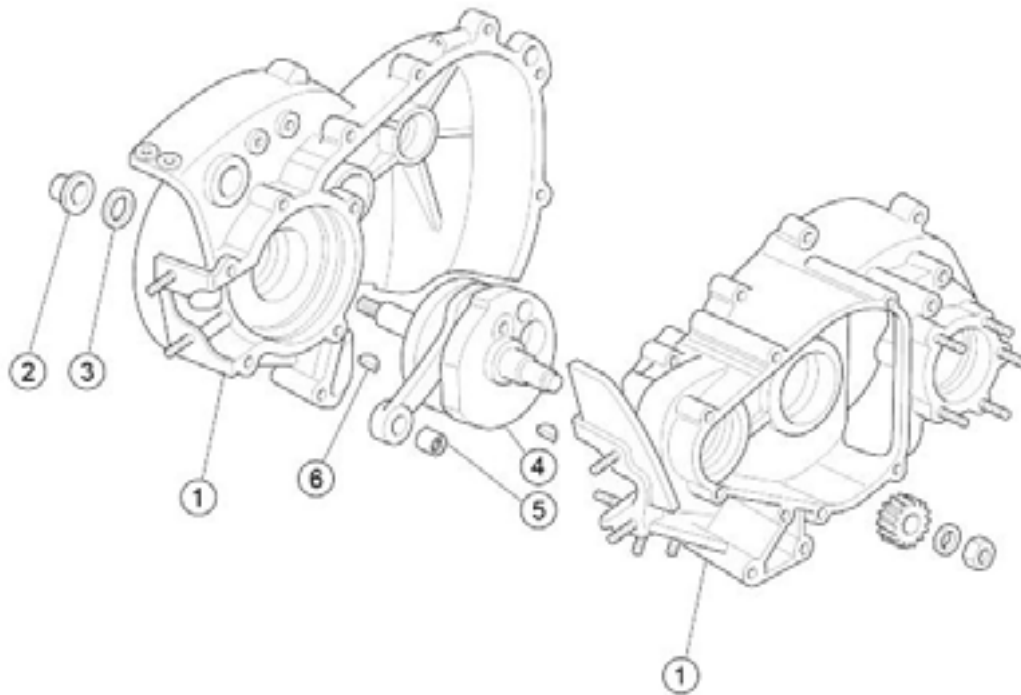


Inserire lo spinotto e posizionare l'anello elastico sul cilindro.



Installare il cilindro.

## Crankshaft



### KEY

1. Crankcase halves
2. Nut
3. Washer
4. COMPL. CRANKSHAFT
5. Pin cage
6. Key

### REMOVAL

Remove the piston.

Carry out the separation of the crankcase.

Heat the housing of the crankshaft bearing to facilitate its removal.





---

Make light blows with a rubber hammer.

**CAUTION**



**SUPPORT THE CRANKSHAFT TO PREVENT DAMAGE BY FALLING.**



---

Remove the complete crankshaft.



---

**FITTING**

If necessary heat the coupling seat between the crankshaft and bearing to facilitate its positioning.



---

Position the shaft in its seat.

Use specific equipment required.

**Specific tooling**

**018119Y Axle Fitting Tool**

**018119Y009 Axle fitting**

**018119Y007 Axle fitting**

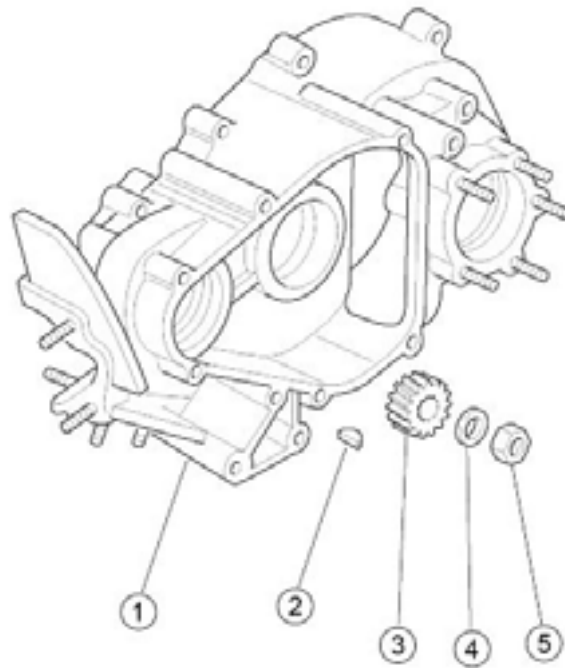


Check the correct positioning of the complete crankshaft respect to the crankcase half.



Perform the coupling of the crankcase.

## Crankshaft gear



### KEY

1. Crankcase
2. Key
3. Engine gear
4. Washer
5. Nut

---

**REMOVAL**

Straighten the safety tabs of the washer.



---

Loosen the lock nut of the engine gear.



---

Remove the nut and the washer.



---

Remove the engine gear and the key.



**FITTING**

Insert the key in its seat on the shaft.



Position the engine gear.



Install the washer and the nut.

Tighten the nut.

**Locking torques (N\*m)**

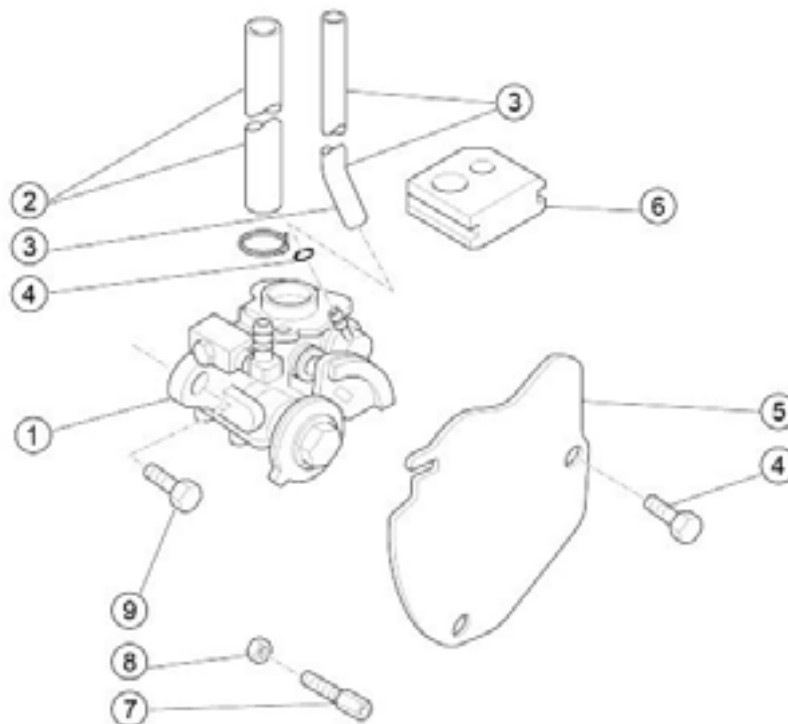
**Engine gear - Crankshaft  $52.5 \pm 2.5$  Nm**



Fold the safety tab.



## Oil pump - Pressure adjustment valve



### KEY

1. Oil pump
2. Oil output pipe
3. Oil inlet pipe
4. Gasket
5. Cover
6. Cable grommet
7. Adjustment screw
8. M6 nut
9. M5x16 screw

---

## Removal

Remove the oil pump cover.



Remove the snap ring.



Remove the oil input and output pipes.



Remove the fixing screws.



Remove the oil pump.



---

## Fitting

Position the oil pump.



Tighten the fixing screws.



Position the oil input and output pipes and the cable grommet.



Fit the oil pump cover.

---

## Engine timing

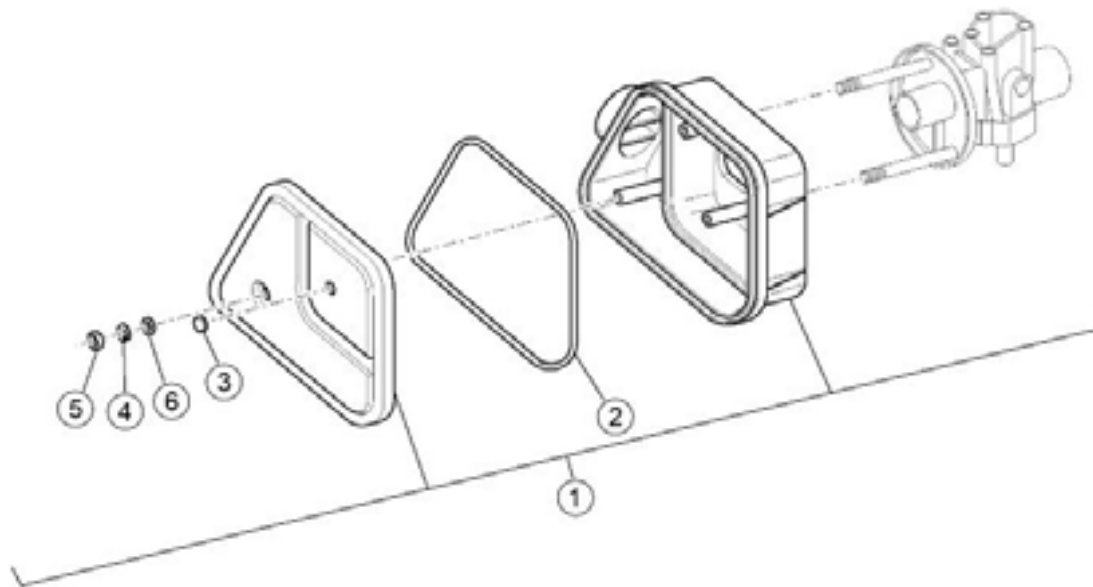
Check correspondence of the reference mark of the stator with respect to the crankcase



Check to be carried with the Tecno- test 130/P strobe gun (or a similar one that is able to function properly up to at least 11,000 times per minute).

**CAUTION**

**BEFORE PERFORMING THE TESTS ABOVE, CHECK THE CORRECT JOINING OF THE FLYWHEEL ON THE CRANK-SHAFT.**

**Oil filter - Air filter****KEY**

1. Cleaner
2. Gasket
3. Plug
4. Washer
5. Nut
6. Flat washer



---

**AIR FILTER REMOVAL**

Remove the fixing nuts.



Remove the air filter.



---

**AIR FILTER OPENING**

Remove the fixing screw.



Remove the gasket from its seat.



**AIR FILTER FITTING**

Remove the air filter.



Tighten the fixing nuts of the air filter

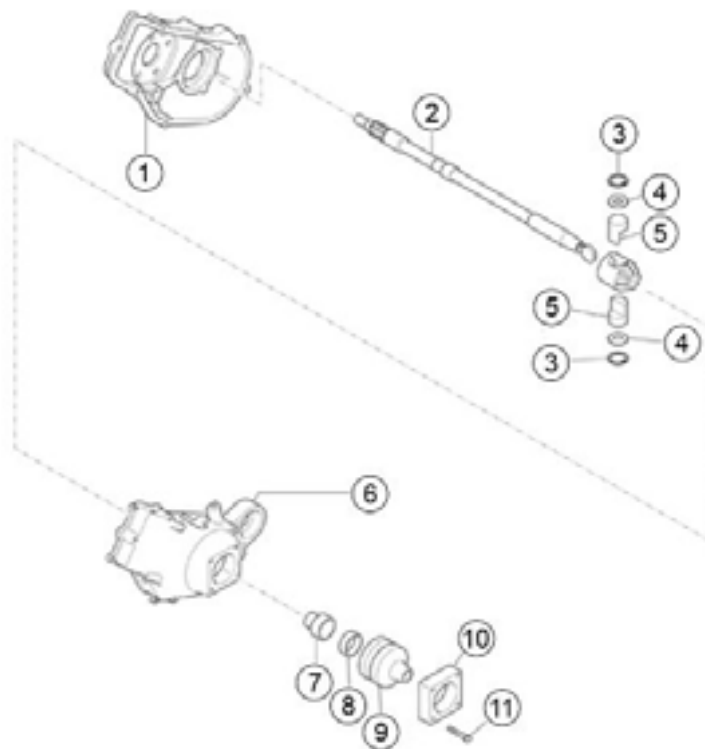


## INDEX OF TOPICS

DIFFERENTIAL

DI

---

**Half-axle****KEY:**

1. Differential crankcase
2. Axle shaft
3. Helical ring
4. Washer
5. Pin
6. Differential crankcase
7. Bushing
8. Ring
9. Hood
10. Cover
11. Screw TE M6x20

**REMOVAL:**

Lift the vehicle using the lift.

Remove the wheel hub.

Undo the oil drain plug.

**CAUTION**

PREPARE A CONTAINER SUITABLE FOR COLLECTING BRAKE FLUID.

**CAUTION**

PAY THE UTMOST ATTENTION NOT TO COME IN CONTACT WITH THE OIL.

**CAUTION**

MAKE SURE THAT THE SIDE ARMS OF THE LIFT ARE CORRECTLY WELDED AND POSITIONED IN CORRESPONDENCE WITH THE LIFTING POINTS.



Remove the plug and drain the differential oil in a suitable container.

Retighten the plug, using a new gasket.



Undo the screws fastening the hood flange to the differential crankcase.



Remove the flange along the semi-axle with the hood.



Using suitable pliers, remove the retainer ring of the semi-axle.



Remove the semi axle.  
Remove semi pins and sprocket.



**REFITTING:**

Position the semi axle in the appropriate housing on the differential crankcase.



Using suitable pliers, lock the retainer ring of the semi-axle.



---

Tighten the screws fastening the hood to the differential crankcase.

Refit the wheel hub.

Top up the oil in the differential, by removing the appropriate oil filler cap.

**CAUTION**

**CHECK THAT THE DIFFERENTIAL BOX DOES NOT LEAK OIL.**

**Recommended products**

**AGIP GEAR 80W-90 Oil for gears and transmissions.**

- API GL-4



## INDEX OF TOPICS

**B**RAKING SYSTEM

**BS**

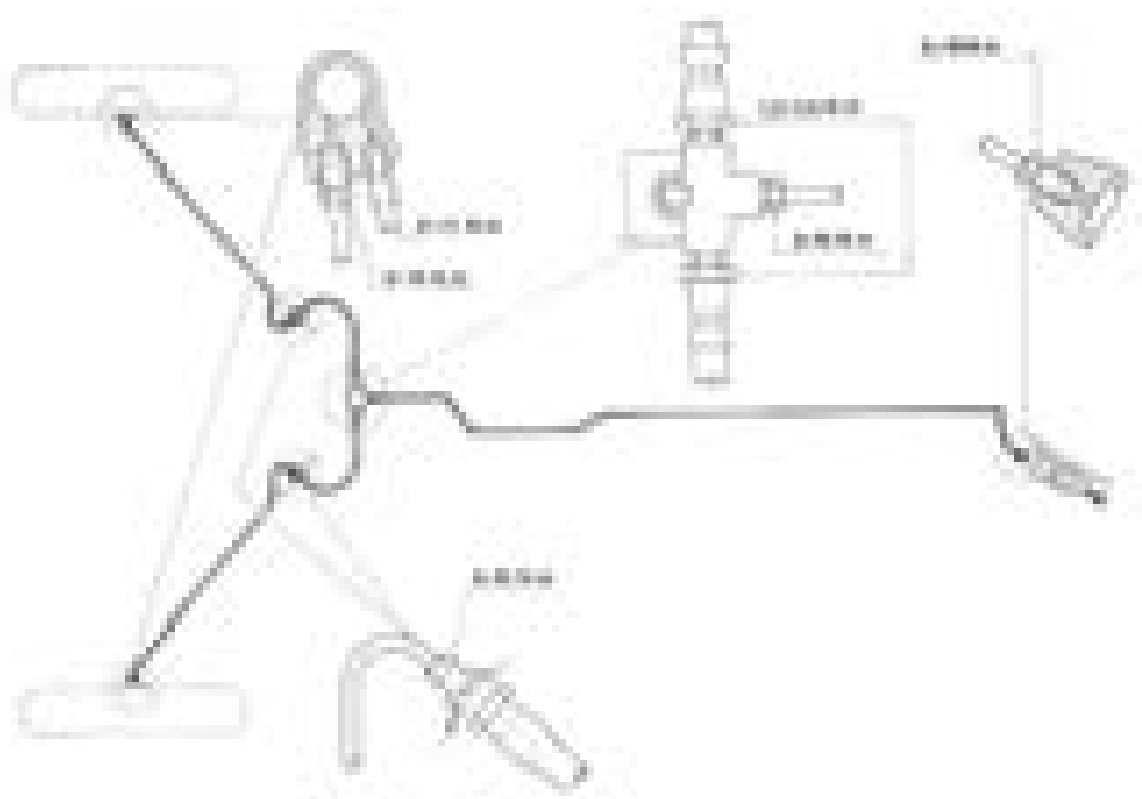


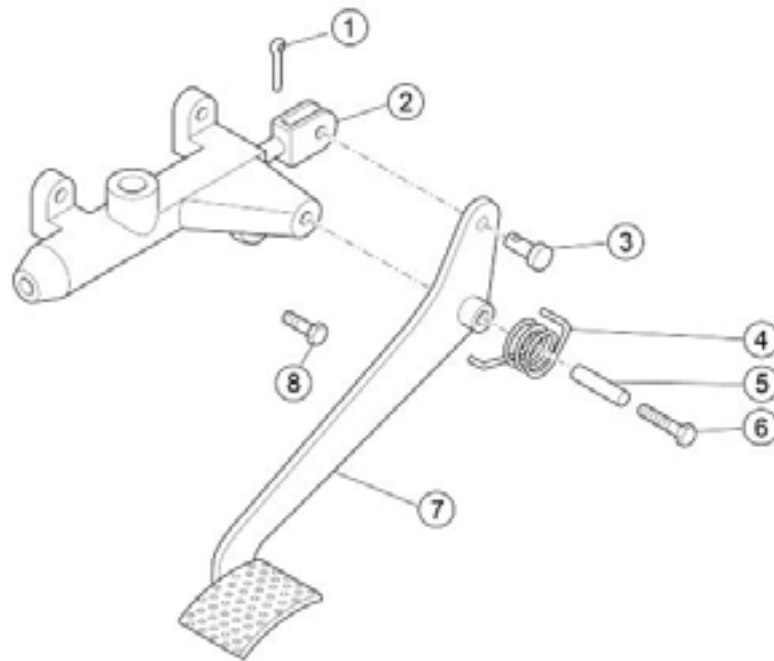
## Brakes

### RULES TO CHECK THE HYDRAULIC BRAKE:

If the braking system is malfunctioning and this requires a general inspection, make sure that:

1. The metal pipes are in perfect working conditions and are adequately fitted so that they do not interfere with the chassis and may get damaged or flattened.
2. All pipe clamps are adequately secured to the supporting brackets and plates: inadequate fixing would lead to pipe vibration and oscillation, and in turn, to pipe breaking.
3. There are no fluid leaking from the different couplings; if there are, tighten being careful not to damage the pipes.



**Brake pedal****KEY:**

1. Cotter pin
2. Brake pump
3. Pin
4. Spring
5. Spacer
6. Bolt
7. Brake pedal
8. Screw

## Removal

Remove the rear brake pump.



Remove the cotter pin fixing the pedal.



Release the spring from the pedal.



Remove the bolt locking the pedal to the pump.



---

Remove the pivot.



---

Separate the brake pedal from the pump.



---

Remove the spring.



---

## Inspection and repair

Check all parts for distortion or irregularities.  
Make sure of the proper functioning of the spring;  
otherwise proceed with the replacement.



## Installation

Position the spring on the pedal pin as shown in the figure.



Insert the pedal on the pump by attaching the spring appropriately.



Insert the bolt locking the pedal to the pump.



Insert the pin that secures the pedal to the lug of the pump.



Lock the pin by inserting the cotter pin.  
Refit the rear brake pump.

**CAUTION**

WHEN REFITTING USE A NEW COTTER PIN.

**CAUTION**

PERFORM THE BRAKE PEDAL ADJUSTMENT.



## Adjustment

### REAR BRAKE PEDAL

During use you may notice a slight lengthening of the rear brake pedal stroke due to normal wear of the brake shoe.



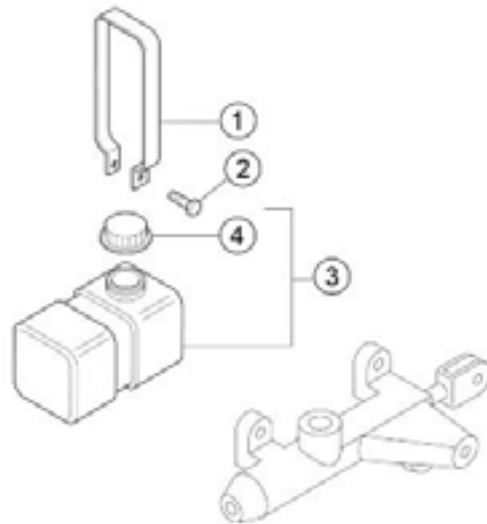
To recover the clearance, proceed as follows:

- Loosen lock-nut "1".
- Screw in set screw "2" to shorten the pedal stroke.
- Tighten the lock-nut "1".

For the correct operation of the rear brake system, check that the pedal always has a slight clearance on the brake pump. Make sure that the wheels turn freely with the pedal in the rest position.



## Brake fluid reservoir

**KEY:**

1. Clamp
2. Screw d3.5x9.5
3. Brake fluid tank
4. Plug

## Removal

Remove the plug from the tank.

**CAUTION**

**CHECK THAT THE VEHICLE DOES NOT HAVE THE ENGINE RUNNING.**



Using a suitable pump, suck the brake fluid inside the tank.

Reposition the plug on the tank.

**CAUTION**

**BRAKING SYSTEM LIQUID IS HAZARDOUS: WASH WITH WATER IN THE EVENT OF ACCIDENTAL CONTACT.**

**CAUTION**

**BRAKING CIRCUIT FLUID IS VERY CORROSIVE;. AVOID CONTACT WITH PAINTED PARTS.**



Disconnect the electrical connection of the rear brake switch.



Undo the fixing screw of the retainer clamp of the tank.



Remove the clamp.





---

Pull the tank upwards.

**CAUTION**

PAY ATTENTION TO ANY DROPS OF OIL RELEASED.



---

## Installation

Insert, pressing it down, the tank into place on the pump.

**CAUTION**

CHECK THAT THE VEHICLE DOES NOT HAVE THE ENGINE RUNNING.



Insert the retainer clamp in its grooves on the tank.



Tighten the fixing screw of the clamp.



---

Attach the electrical connection of the rear brake switch.



Fill the tank with the right amount of brake fluid: the level must be between 1 cm below the surface of the cap (MAX level) and 1 cm above the bottom of the tank (MIN level).

Close the tank with the cap.

**CAUTION**

**BLEED THE AIR FROM THE BRAKING SYSTEM.**

**CAUTION**

**BRAKING SYSTEM LIQUID IS HAZARDOUS: WASH WITH WATER IN THE EVENT OF ACCIDENTAL CONTACT.**

**CAUTION**

**BRAKING CIRCUIT FLUID IS VERY CORROSIVE;. AVOID CONTACT WITH PAINTED PARTS.**

**CAUTION**

**BRAKING SYSTEM LIQUID IS HYGROSCOPIC, I.E., IT ABSORBS HUMIDITY FROM THE SURROUNDING AIR. IF THE HUMIDITY IN THE BRAKE FLUID EXCEEDS A CERTAIN VALUE, IT WILL LEAD TO INEFFICIENT BRAKING. NEVER USE BRAKE FLUID FROM PREVIOUSLY OPENED OR PARTLY-EMPTY CONTAINERS.**

**Recommended products**

**AGIP BRAKE FLUID DOT 4 Synthetic brake fluid.**

- SAE J 1703
- FMVSS 116 - DOT 4
- ISO 4925
- CUNA NC 956 DOT 4



## Brake system

Fill the brake liquid tank.

Press the brake pedal up to the end of the stroke and release it quickly several times until the pedal feels a back pressure.

**CAUTION**

THIS PROCEDURE SHOULD BE CARRIED OUT WITH TWO PEOPLE.

**Recommended products**

**AGIP BRAKE FLUID DOT 4 Synthetic brake fluid.**

- SAE J 1703
- FMVSS 116 - DOT 4
- ISO 4925
- CUNA NC 956 DOT 4



While holding down the pedal, undo the bleed screw on one of the two rear wheels in order to squeeze out the air.

**CAUTION**

PLACE A SMALL PIPE ON THE BLEED SCREW AND AN APPROPRIATE CONTAINER FOR THE COLLECTION OF BRAKE FLUID.



Repeat the operations until the air bubbles leakage has ceased.

Retighten the bleed screw.

Repeat the operations for the other wheel.

**CAUTION**

IT MAY OCCUR THAT DURING THE BLEEDING OPERATION, AIR CONTINUES TO ESCAPE FROM THE TUBES; IN SUCH A CASE INSPECT ALL FITTINGS AND THE CORRECT TIGHTENING OF THE PUMP AND OF THE CYLINDERS OF THE WHEEL.

**CAUTION**

WHILE FILLING THE CIRCUIT MAKE SURE THAT THE LEVEL OF THE FLUID LIQUID IN THE RESERVOIR DOES NOT DROP BELOW THE MINIMUM, CONTINUOUSLY TOPPING UP WITH THE RECOMMENDED PRODUCT.

**CAUTION**

BRAKE FLUID IS HYGROSCOPIC; IT TENDS TO ABSORB MOISTURE FROM THE SURROUNDING AIR. IF THE HUMIDITY IN THE BRAKE FLUID IS ABOVE A GIVEN VALUE, BRAKING IS POOR. UNDER NORMAL DRIVING AND CLIMATIC CONDITIONS YOU SHOULD CHANGE THE FLUID EVERY TWO YEARS.

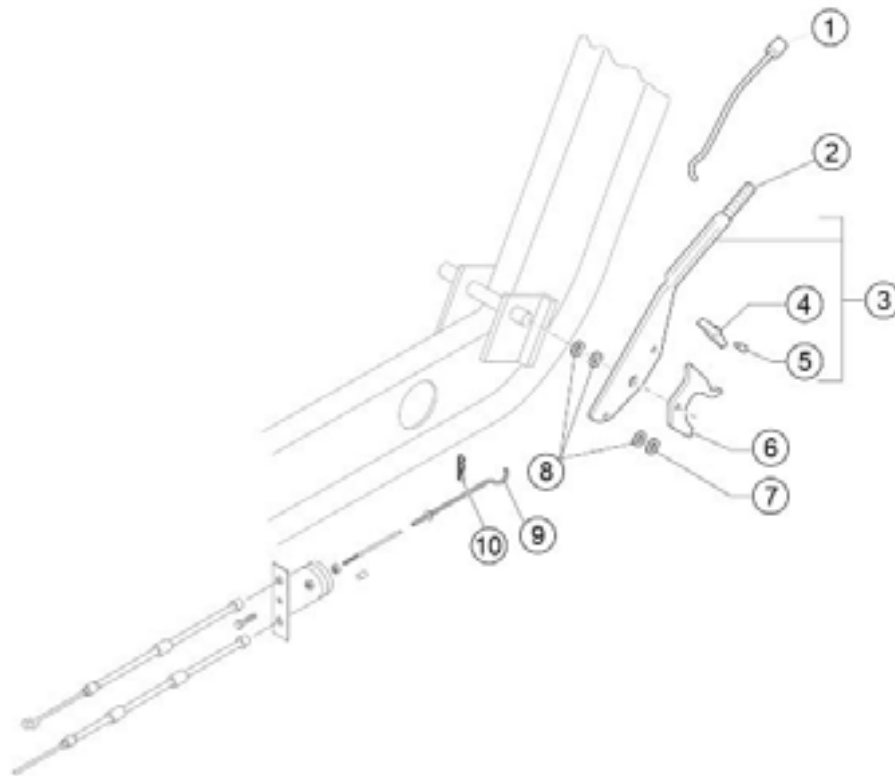


IF THE BRAKES UNDERGO SEVERE OPERATING CONDITIONS THE LIQUID SHOULD BE REPLACED MORE FREQUENTLY.

**CAUTION**

**BRAKING SYSTEM LIQUID IS HAZARDOUS: WASH WITH WATER IN THE EVENT OF ACCIDENTAL CONTACT.**

## Parking brake lever



**KEY:**

1. Rod
2. Spring
3. Clutch control lever
4. Detent
5. Pin
6. Sector
7. Ring
8. Washer
9. Tie rod
10. Cotter pin

## Removal

Using a screwdriver remove the retainer ring.



Remove the washer.



Remove the tie rod fixing screw cotter pin.



Release the tie rod from the parking brake command lever.



---

Remove the parking brake command lever from the pin on the chassis.



---

## Check

Remove the rod with the spring from the lever.



Remove the sector.



Check all parts for distortion or irregularities.  
Make sure of the proper functioning of the spring;  
otherwise proceed with the replacement.





Reposition the rod with the spring inside the lever.



Make sure that the final part of the rod, inside the lever, positions itself at the end of the detent as shown in the figure.



Position the sector so that the teeth engage with the detent.



---

## Installation

Position the parking brake command lever on the pin on the chassis.



Insert the tie rod on the parking brake command lever.



Lock the tie rod by inserting the cotter pin.

**CAUTION**

**WHEN REFITTING USE A NEW COTTER PIN.**



Insert the washer on the pin on the chassis.



Position the retaining ring so as to lock the lever.

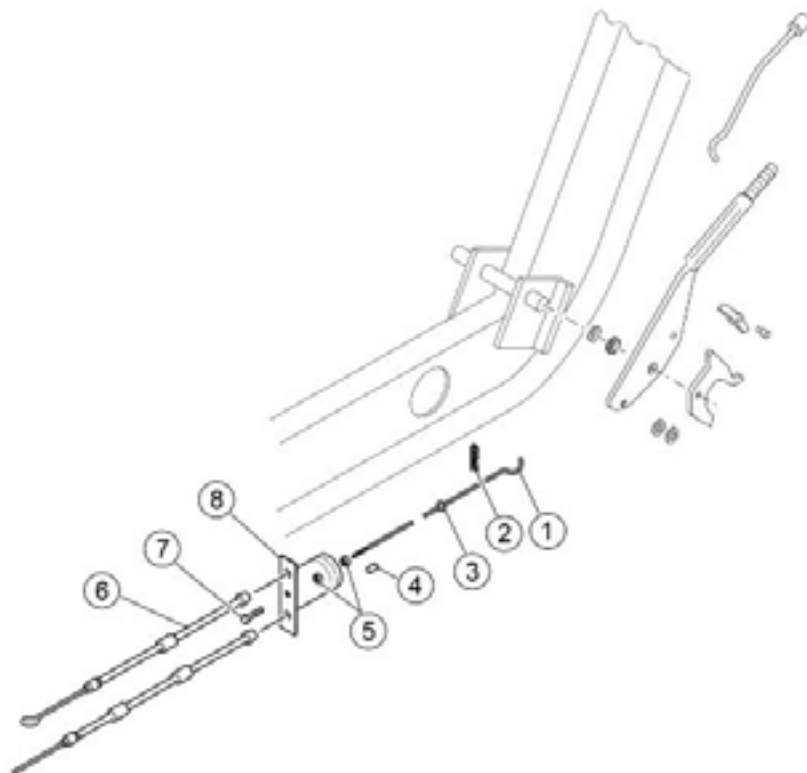
**CAUTION**

**ADJUST THE PARKING BRAKE.**





## Parking brake cable



**KEY:**

- 1. Tie rod

2. Cotter pin
3. Cable grommet
4. Spacer
5. M6 nut
6. Transmission
7. Screw d3.5x9.5
8. Plate

---

## Removal

Remove the tie rod fixing screw cotter pin.



Release the tie rod from the parking brake command lever.



Undo the nut securing the tie rod to the transmission support.



---

Remove the tie rod and the spacer.



---

Remove the transmission support.



---

At the rear of the cab, undo the fixing screw of the transmission retaining plate.



---

Remove the plate.



Remove the two ends of the parking brake cable from the backing plates on both wheels.  
Release the parking brake cables from both suspension arms.



From inside the cab, remove the parking brake cable.



## Installation

Pass the parking brake cable through the holes provided inside cab.



Refit the two ends of the cable in the two backing plates on the rear wheels.  
Secure the cable on the two suspension arms by applying the relative springs.



---

Attach the cable to the back cab by applying the relative plate.



Tighten the fixing screw of the plate to the chassis.



From inside the cab, apply the relative support on the cable.



Insert the tie rod with its spacer on the support.



---

Tighten the nut securing the tie rod to the transmission support.



Insert the tie rod on the parking brake command lever.



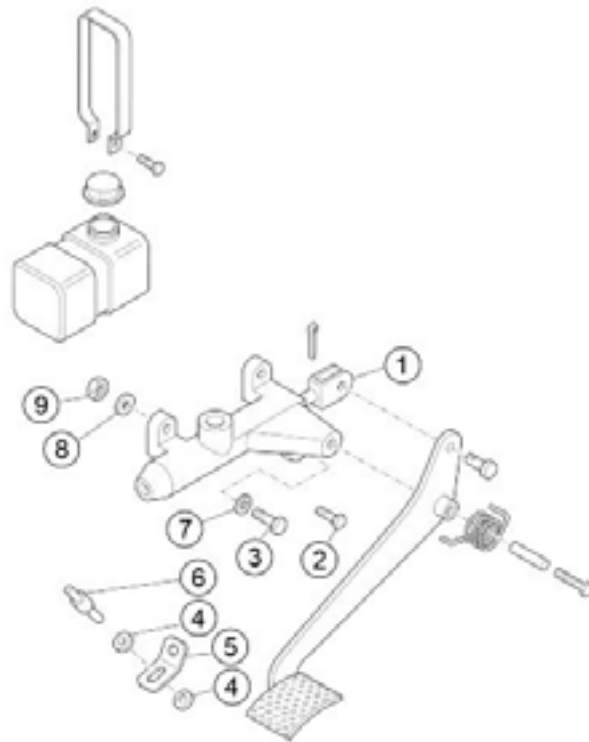
Lock the tie rod by inserting the cotter pin.

**CAUTION**

**WHEN REFITTING USE A NEW COTTER PIN.**



## Brake pump



### KEY:

1. Brake pump
2. Screw
3. Screw
4. m12x1.5 h=7 Hexagonal nut
5. Bracket
6. Switch
7. M6 nut
8. Washer
9. M8 nut

### REMOVAL:

Remove the brake liquid tank.

Unscrew the rear brake pipe from the pump.

#### CAUTION

IF YOU DECIDE TO REMOVE THE PUMP WITHOUT REMOVING THE TANK, PLACE A CONTAINER FOR THE COLLECTION OF BRAKE FLUID WHEN THE PIPE IS REMOVED.

#### CAUTION

BRAKE FLUID IS HARMFUL TO THE EYES. IF IT COMES INTO CONTACT WITH THE EYES WASH THE AFFECTED PART CAREFULLY AND CONSULT A DOCTOR.





---

Remove the rear brakes pipe from the pump.



---

From under the vehicle, in the front wheel, loosen the bolts securing the pump.



---

Remove the brake pump.



---

Remove the rear brake switch.

Remove the brake pedal.





Remove the lug from the pump.



Undo the screw fixing switch support bracket.



Remove the bracket.



**CHECK:**

Check all parts for distortion or irregularities.  
Check the proper operation; otherwise proceed  
with the replacement.



**REFITTING:**

Refit the brake pedal.

Insert the lug in the pump.



Refit the switch support bracket by tightening the fixing screw.



Tighten the rear brake switch.

**CAUTION**  
PERFORM THE BRAKE COMMAND PEDAL ADJUSTMENT.



Position the brake pump in its seat inside the cab.



---

Tighten the bolts securing the pump to the chassis.

**Locking torques (N\*m)**

**Brake pump - Chassis  $15.7 \pm 4$  Nm**



---

Insert and tighten the rear brake pipe in the pump.

Remove the brake liquid tank.

**CAUTION**

**BLEED THE AIR FROM THE BRAKING SYSTEM.**



---

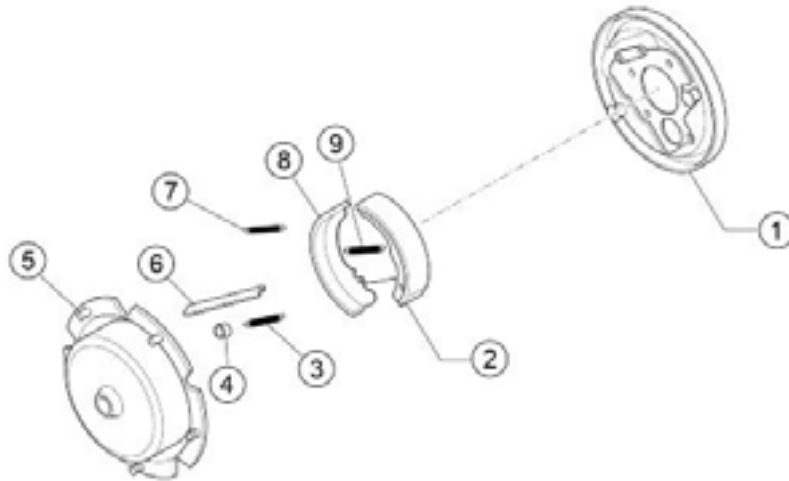
## Brake pump overhaul specifications

Verificare che il corpo della pompa non presenti sia internamente che esternamente rigature o corrosioni, in quanto da queste potrebbero derivare avarie agli anelli di tenuta ed al pistone.

Assicurarsi inoltre che i passaggi che pongono in comunicazione il serbatoio della pompa con il corpo, non siano otturati o sporchi.



## Shoes and drums

**KEY:**

1. Shoe holder disc
2. Shoe
3. Spring
4. Buffer
5. Drum
6. Strut
7. Spring
8. Shoe
9. Spring

Lift the vehicle using the lift.

Remove the rear brake drum.

Using appropriate pliers, loosen a shoe so as to release it from the spring.

**CAUTION**

**MAKE SURE THAT THE SIDE ARMS OF THE LIFT ARE CORRECTLY WELDED AND POSITIONED IN CORRESPONDENCE WITH THE LIFTING POINTS.**



Remove the strut.



Remove the spring.



Remove the side spring from a shoe.



Remove the parking brake cable from its seat.





---

Remove the first shoe after releasing it from the upper spring.



Remove the other shoe after detaching it from the side spring.



Remove the side spring.



**CHECK:**

Check that there are no irregularities on the surface of the shoes and that the springs are not deteriorated or stretched.



**REAR SHOES REFITTING:**

Attach the shoe to the plate using the special side clamp.

**CAUTION**

**BEFORE PROCEEDING WITH THE REPLACEMENT OF THE SHOES, THE REGISTERS MUST BE CLEARED.**



Position the parking brake cable in its seat.



Also insert the side spring in the other shoe.



Using the spring, lock the shoe to the plate.



Insert the strut in its seats on the shoes.



Attach the lower spring to the two shoes.



Fit the upper spring.

**N.B.**

**TO FACILITATE THE OPERATION, SLIGHTLY OFFSET THE UPPER PART OF THE SHOE FROM ITS SEAT.**



With the help of a screwdriver, if necessary bring the shoe back into place.

Refit the rear brake drum.

**CAUTION**

**ADJUST THE REAR BRAKES.**





## Shoe and drum clearance adjustment

Before performing the adjustment between the shoe and the drums, it is necessary to set the brakes in motion, in a way that ensures the centring of said shoe.

Then act as follows for each wheel:

Lift the wheel from the ground, fully lower the brake pedal until bringing the shoes against the drum.

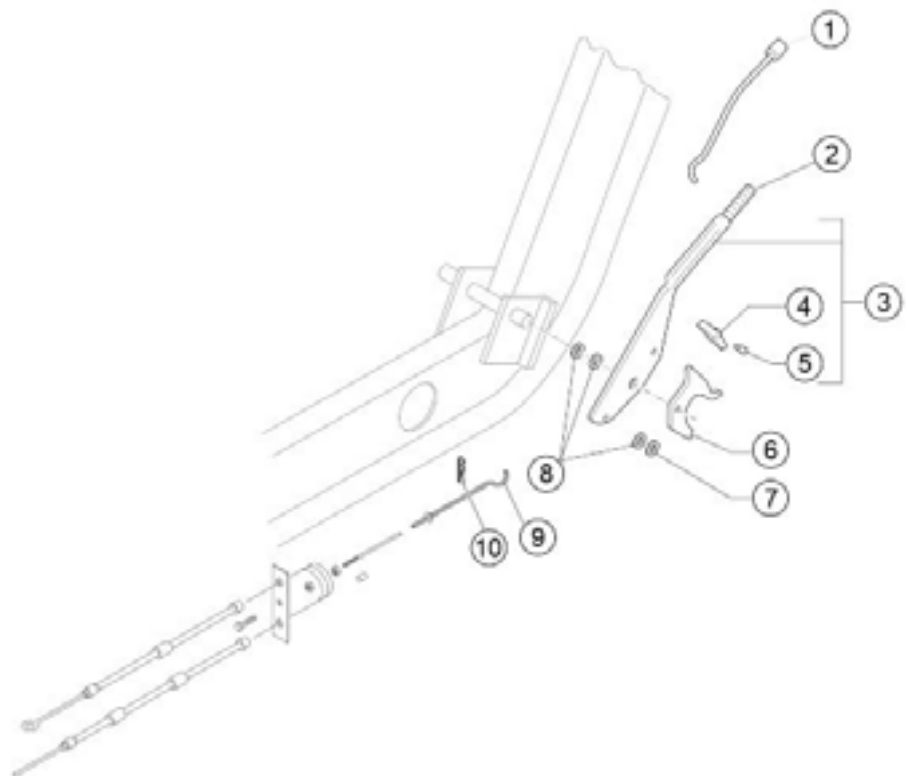


Holding down the pedal, rotate the nuts of the adjustment eccentricities outwards until they stop, then rotate them in the opposite direction by about 45°.

Then release the pedal and check that the wheel turns freely.



## Parking brake



**KEY:**

1. Rod
2. Spring
3. Clutch control lever
4. Detent
5. Pin
6. Sector
7. Ring
8. Washer
9. Tie rod
10. Cotter pin

---

## Parking brake adjustment

### HAND BRAKE

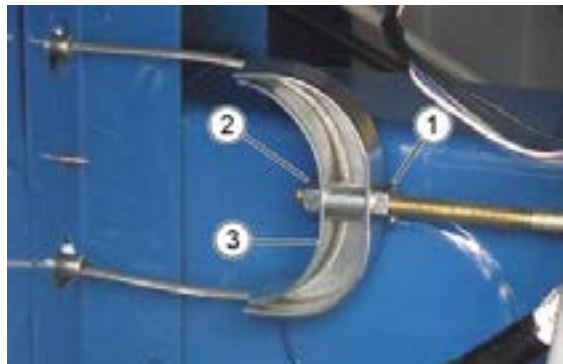
During the use of the vehicle, you may notice a slight lengthening of the hand brake stroke due to normal wear.

The normal stroke should be 3-4 clicks.



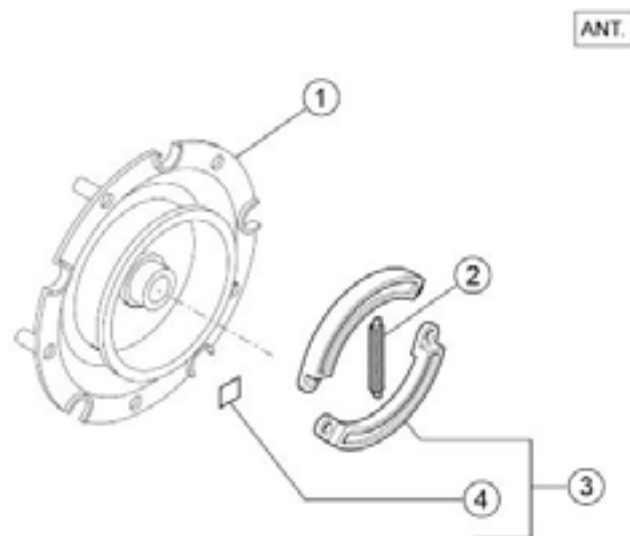
To recover the clearance, proceed as follows:

- Pull the hand brake lever for four clicks.
- Loosen fixing nut "1".
- Screw in hand brake adjuster screw "2" until you feel the proper tension of the bracket "3".
- Tighten the fixing nut "1".



Make sure that with the hand brake lever in the rest position, the rear wheels turn freely.

## Front drum brake

**KEY:**

1. Brake drum
2. Spring
3. Shoe
4. Plate

**FRONT SHOES REMOVAL:**

Lift the vehicle using the lift.

Remove the front brake drum.

**CAUTION**

**MAKE SURE THAT THE SIDE ARMS OF THE LIFT ARE CORRECTLY WELDED AND POSITIONED IN CORRESPONDENCE WITH THE LIFTING POINTS.**



---

Using a screwdriver remove the retaining ring of the shoe.



Remove the shoe from the upper pin.



In the lower part of the shoe, remove the plate.



Remove the first shoe after releasing it from the spring.



---

Remove the other shoe.



---

Release the spring.



---

Remove the spacer.



---

**CHECK:**

Check that there are no irregularities on the surface of the shoes and that the spring is not deteriorated or stretched.



**FRONT SHOES REFITTING:**

Position the spacer into its seat on the steering arm pin.



Attach the spring to the shoe and insert the latter on the upper pin.



Also attach the other shoe of the spring and insert the plate in the lower part.



Use leverage on the shoe and insert its upper hole on the pin.





---

Lock the shoe by applying the retaining ring on the pin.

Refit the front brake drum.

**CAUTION**

**ADJUST THE FRONT BRAKE.**

**FRONT DRUM BRAKE**

Turn the adjuster screw on the front wheel clockwise to recover any excessive clearance of the front brake lever due to wear. Check that, with the lever at rest, the wheel turns freely.



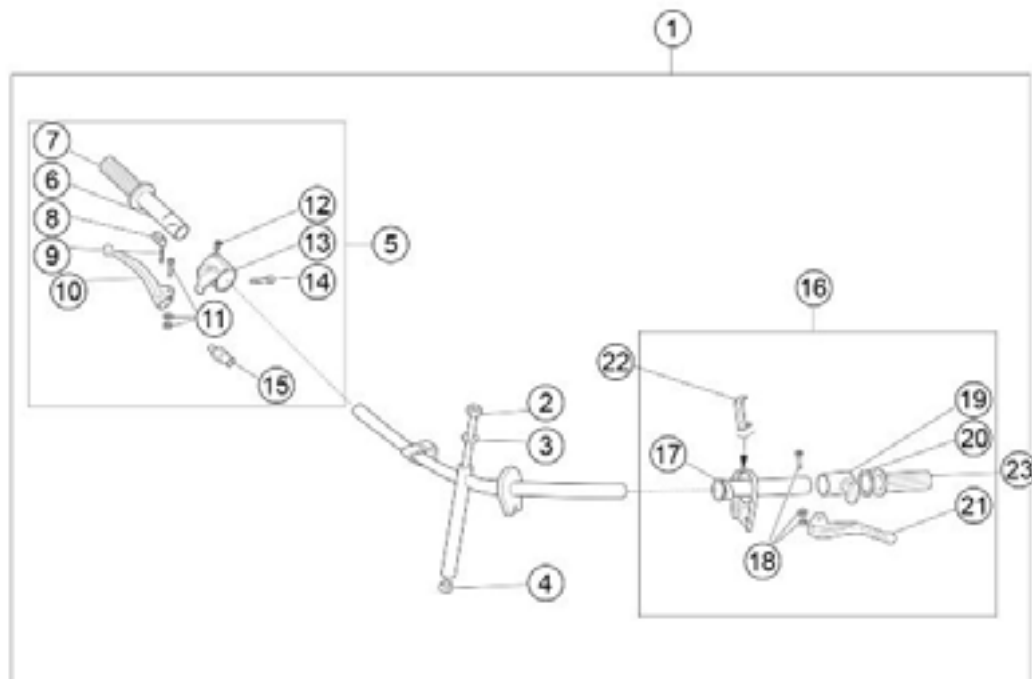
## INDEX OF TOPICS

**S**TEERING COLUMN

**SC**



---

**Handlebar**
**KEY**

- 1. Complete handlebar
- 2. Bolt
- 3. Washer
- 4. Cone
- 5. Throttle grip
- 6. Pipe
- 7. Hand grip
- 8. Slider
- 9. Fix. screw
- 10. Clutch control lever
- 11. Screw
- 12. Screw
- 13. Sleeve
- 14. Screw with bushing
- 15. Stop button
- 16. Pipe
- 17. Pipe
- 18. Screw

19. Sleeve
20. Washer
21. Clutch control lever
22. Sector
23. Hand grip

Lift the vehicle using the lift. Remove the handlebar cover.

**CAUTION**

**MAKE SURE THAT THE SIDE ARMS OF THE LIFT ARE CORRECTLY WELDED AND POSITIONED IN CORRESPONDENCE WITH THE LIFTING POINTS.**



Use the common lubricant under the knob, using a screwdriver to lift it, to facilitate its removal.



Remove the rubber hand grip.



Remove the washer.



---

Remove the fixing screw of the sleeve to the handlebar.



---

Release the clutch cable from the engine side.



---

Remove the retainer knob of the clutch cable on the handlebar.



---

Remove the clutch cable from the handlebar and its bushing.



Undo the fixing screw of the clutch control lever to the sleeve.



Remove the clutch control lever.



Remove the sleeve.



Remove the fixing screw of the sector cover.



---

Remove the cover of the sector.



**N.B.**

**FOR THE CORRECT REFITTING, NOTE DOWN THE POSITION OF THE GEAR CONTROL TRANSMISSIONS ON THE SECTOR.**



---

Remove the gear transmissions.



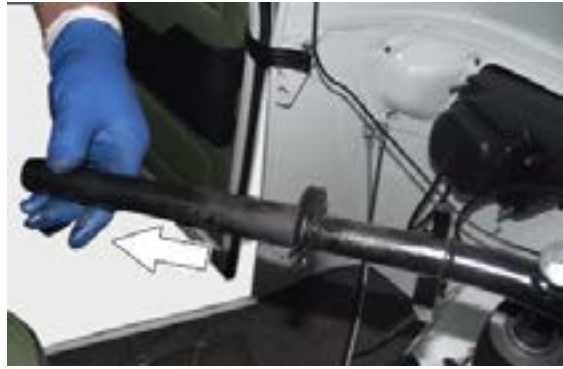
---

Remove the sector from the handlebar.



---

Remove the pipe from the handlebar.



Remove the knob on the right side of the handlebar, after having been placed common lubricant underneath to facilitate the extraction.



Unscrew the retaining screw of the accelerator transmission.



Remove the accelerator transmission.





On the rear wheel, loosen the adjusting nut of the brake transmission.



From the brake lever on the handlebar, remove the transmission of the front brake.

**CAUTION**

**PAY ATTENTION TO THE RELEASE OF THE BUSHING ON THE BRAKE.**



Unscrew the fixing screw of the sleeve with the throttle grip and lever.



Remove the complete sleeve.



Remove the stop button.



Remove the fixing screw of the front brake lever.



Remove the front brake lever.



Undo the fixing screw of the sleeve to the accelerator pipe.





---

Remove the accelerator pipe from the sleeve, paying attention to the escape of the slider.

**N.B.**

**FOR THE CORRECT REFITTING, TAKE NOTE OF THE POSITION OF THE SLIDER.**



---

Remove the fixing bolt of the handlebar.



---

Remove the handlebar.



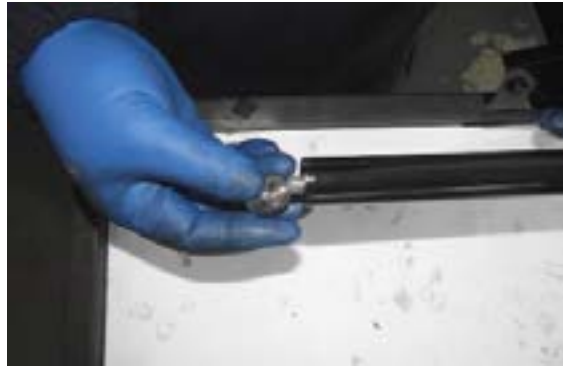
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Remove the plastic guard from the handlebar.

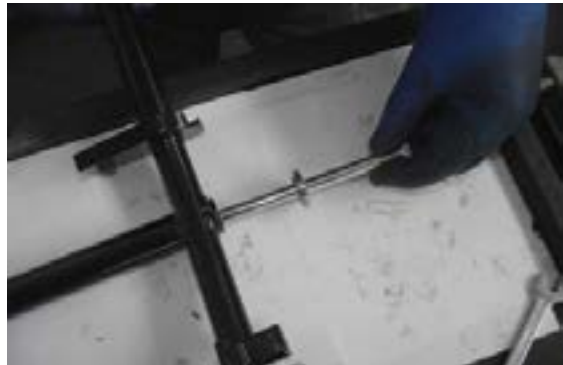


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Undo and remove the cone from the bottom end of the handlebar.



Remove the bolt with the washer from inside the handlebar.

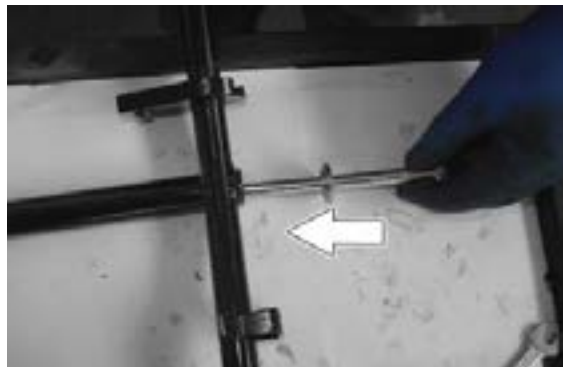


**CHECK:**

Check that all the components are free of deformities or failures so as not to compromise functioning. Replace in case of irregularities.

**REFITTING:**

Position the bolt inside the handlebar.



At the lower end of the bolt protruding from the handlebar, screw in the cone.



---

Insert the plastic guard on the handlebar.



---

Insert the handlebar in its appropriate seat on the steering.



---

Tighten the fixing bolt of the handlebar.

**Locking torques (N\*m)**

**Handlebar - Steering seat  $47.5 \pm 12.5$  Nm**



---

Fit the slider on the accelerator tube, matching the locations indicated above.

**CAUTION**

**LUBRICATE THE SLIDING SURFACE OF THE SLIDER.**



Insert the accelerator pipe with the slider on the sleeve.



Tighten the fixing screw of the sleeve to the accelerator pipe.



Insert the front brake lever in its seat on the sleeve and tighten the fixing screw.



**Locking torques (N\*m)**

**Front brake lever - Sleeve  $4 \pm 1$  Nm**

Refit the stop button.



Insert the complete sleeve on the handlebar, right side, and lock it by tightening the fixing screw.

**Locking torques (N\*m)**

**Accelerator sleeve - Handlebar  $8.3 \pm 0.5$  Nm**



Refit the lever of the transmission of the front brake.

**CAUTION**

**PROCEED WITH THE ADJUSTMENT OF THE FRONT BRAKE TRANSMISSION.**



Insert the throttle transmission in its seat and tighten the retaining screw.



Insert the hand grip on the handlebar.





Insert the pipe on the left part of the handlebar.



Insert the sector in the suitable seat on the pipe.

**N.B.**

**WE RECOMMEND GREASING THE HOUSING OF THE SECTOR.**



Fit the gear transmissions.

**CAUTION**

**PAY ATTENTION TO PROPERLY INSTALLING THE GEAR TRANSMISSIONS. REFER TO THE NOTES TAKEN ABOVE DURING THE DISASSEMBLY.**



Fit the cover of the sector.



Tighten the fixing screw of the sector cover.



Fit the sleeve.



Mount the clutch command lever on the sleeve and lock it by tightening the fixing screw.

**Locking torques (N\*m)**

**Clutch control lever - Sleeve  $4 \pm 1$  Nm**



Insert the clutch cable and its bushing on the lever.



Tighten the retainer knob of the clutch cable on the lever.



Refit the clutch cable from the engine side.

**CAUTION**

**ADJUST THE CLUTCH CABLE.**



Tighten the fixing screw of the sleeve to the handlebar.

**Locking torques (N\*m)**

**Clutch sleeve - Handlebar  $8.3 \pm 0.5$  Nm**



Insert the washer.

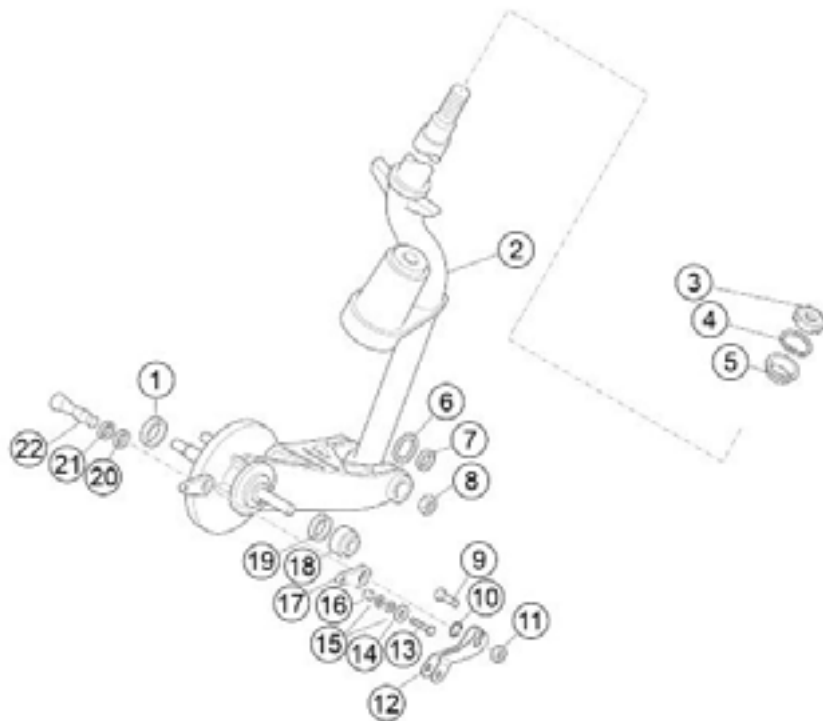




Insert the rubber hand grip.  
Refit the handlebar cover.



## Steering wheel from chassis



### KEY

1. Ring
2. Steering tube
3. Steering tube ring nut
4. Steering washer
5. Ring nut
6. Gasket
7. Sealing ring
8. Bearing
9. Screw
10. O-ring

11. Nut
12. Brake lever axis
13. Screw
14. Washer
15. Cup spring
16. Spacer
17. Plate
18. Sealing ring
19. Cap
20. Flat washer
21. Sealing ring
22. Brake command lever

---

**REMOVAL:**

Remove the handlebar.

Remove the front shock absorber.

Remove the front wheel, the drum and the brake shoe.

With the appropriate tool, undo the steering tube ring nut.

**Specific tooling****020055Y Steering Ring Nut Key**

Remove the steering tube ring nut.



Remove the steering washer.



---

Remove the front brake transmission from its clamp on the steering tube.



---

Undo the adjusting nut of the brake transmission.



---

Remove the adjusting nut of the brake transmission.



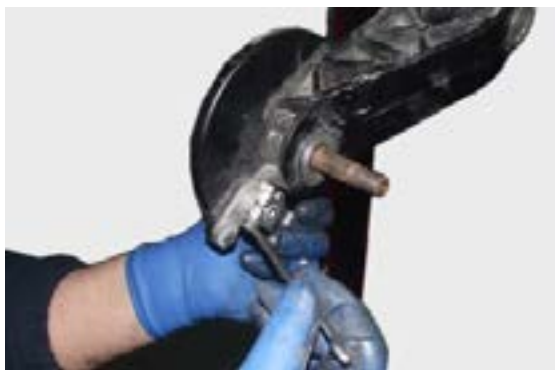
---

Pull the front brake transmission from the brake lever axle.



---

Undo the fixing bolt of the brake lever axle.



Remove the brake lever axle from the steering tube.



Press on the opposite side to remove the brake command lever.



Undo the brake command lever with the sealing ring and the washer.



---

Undo the fixing screw of the plate to the steering tube.



Remove the plate.



Remove the o-ring from the plate.



With the appropriate tool, undo the second steering tube ring nut.

**CAUTION**

**DURING THIS OPERATION SUPPORT THE STEERING TUBE FROM THE OUTSIDE.**

**Specific tooling**

**020055Y Steering Ring Nut Key**



Remove the second ring nut from the steering tube.

**CAUTION**

PAY SPECIAL ATTENTION TO AVOID THE FALL OF THE BALLS UNDERNEATH.



Remove the steering tube.

**CAUTION**

PAY SPECIAL ATTENTION TO AVOID THE FALL OF THE BALLS ON THE STEERING TUBE.

**CHECK**

Check that all the components are free of deformities or failures so as not to compromise functioning. Replace in case of irregularities.

**REFITTING:**

Reinsert the steering tube in the suitable seat on the chassis.





Position the ring nut on the steering tube.



With the appropriate tool, tighten the ring nut.

**Specific tooling**

**020055Y Steering Ring Nut Key**

**Locking torques (N\*m)**

**Ring nut- Steering tube  $34.3 \pm 4.9$  Nm**



Insert the steering washer.



Insert the steering tube ring nut



With the appropriate tool, tighten the steering tube ring nut.

**Specific tooling****020055Y Steering Ring Nut Key****Locking torques (N\*m)****Steering tube ring nut- Steering tube  $53.9 \pm 5$  Nm**

Reinsert the o-ring on the plate.



Refit the plate on the steering tube.



Tighten the fixing screw of the plate to the steering tube.

**Locking torques (N\*m)****Plate - Steering tube  $8.9 \pm 1$  Nm**



---

Refit the sealing ring and the washer on the brake command lever.



---

Reinsert the brake command lever on the steering tube.



---

Refit the brake lever axle on the brake command lever on the steering tube.



---

The refitting of the brake lever axle on the brake command lever can be done in one way only, lining up the smooth sides with no notches.



Tighten the fixing bolt of the brake lever axle.

### Locking torques (N\*m)

**Brake lever axle - Brake command lever  $12.2 \pm 0.5$  Nm**



Insert the front brake transmission on the brake lever axle.



Tighten the adjusting nut of the brake transmission. For the mechanical adjustment of the front brake, turn the adjuster so that, with the control lever in its rest position, the wheel rotates freely.

#### CAUTION

**PROCEED WITH THE ADJUSTMENT OF THE FRONT BRAKE TRANSMISSION.**



Remove the front brake transmission from its clamp on the steering tube.

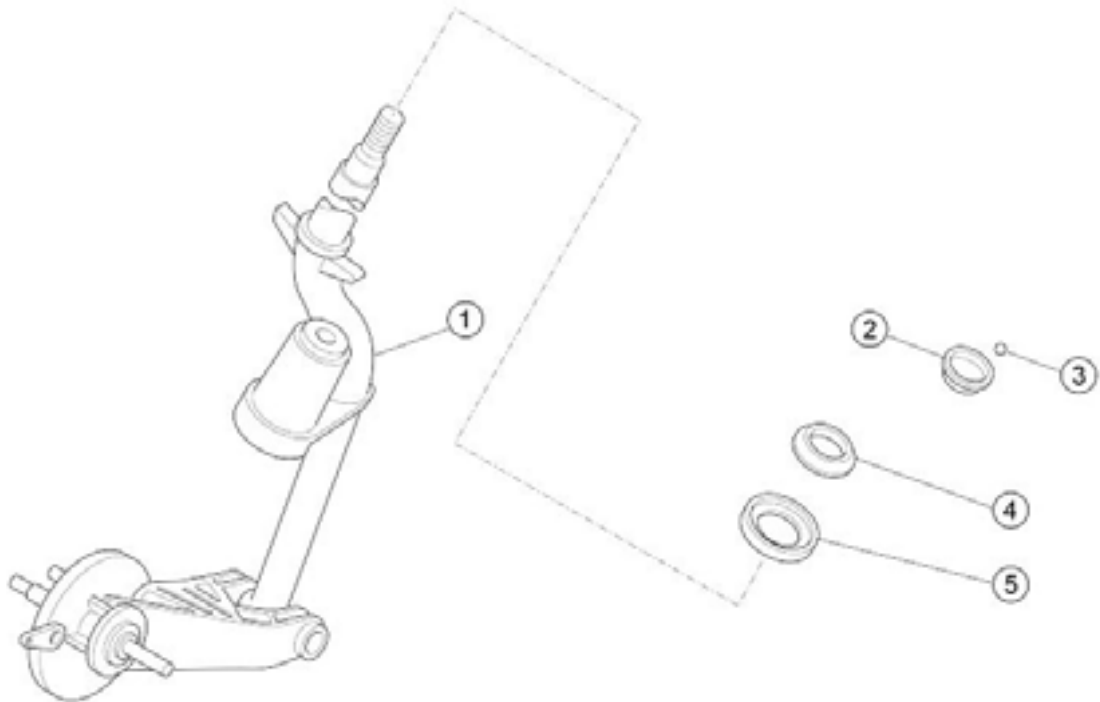
Refit the front wheel, the drum and the brake shoe.

Refit the front shock absorber.

Refit the handlebar.



## Steering bearing housing from chassis



### KEY

1. Steering tube
2. Bearing seat
3. Ball
4. Bearing seat
5. Washer

## Upper housing

### REMOVAL:

Remove the steering from the chassis.

Remove the balls from the upper seat.

Using the specific tool and with the aid of a hammer, release the upper seat from the chassis.

### CAUTION

SUPPORT THE UPPER SEAT FROM INSIDE THE CAB IN ORDER TO AVOID DANGEROUS LEAKS.

### Specific tooling

020842Y Upper Steering Bearing Removal Punch



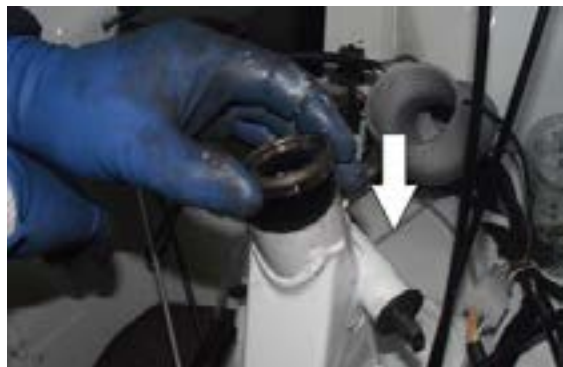
Remove the upper seat.  
Disassemble the lower seat.

**CHECK:**

Check the good state of all components.

**REFITTING:**

Thoroughly clean the housings of the upper and lower seats on the frame.  
Position the upper seat in its housing on the steering tube.  
Also refit the lower seat.



Insert the threaded pin and the lower spacer, forming part of the specific tool, in the steering tube from the lower seat part.

**Specific tooling**

**021330Y Steering seats fitting tool**



Check the positioning of the threaded pin also on the side of the upper seat.



---

Also fit the upper spacer on the threaded pin.



Insert the upper nut on the threaded pin.



Tighten the nut until the simultaneous complete insertion of the upper and lower seat.

Refit the balls on the upper seat, after having properly applied grease to the housing.

**CAUTION**

TO PERFORM THIS OPERATION, THE INTERVENTION OF A SECOND PERSON TO HOLD THE NUT LOCKED DURING THE LOCKING IS NEEDED.

**Recommended products**

**AGIP GREASE MU3 Yellow lithium based grease, suitable for various purposes.**

- ISO: L-X-BCHA 3

- DIN 51 825: K3K -20





## Lower housing

### REMOVAL:

Remove the steering from the chassis.

Remove the upper seat.

Using the specific tool and with the aid of a hammer, release the lower seat from the chassis.

### CAUTION

**SUPPORT THE LOWER SEAT FROM THE OUTSIDE IN ORDER TO AVOID DANGEROUS LEAKS.**

### Specific tooling

#### 020004Y Steering seats extraction punch

Remove the lower seat with the washer.



### CHECK:

Check the good state of all components.

### REFITTING:

Thoroughly clean the housings of the upper and lower seats on the frame.

Position the lower seat with the washer in its housing on the steering tube.

Also refit the lower seat.



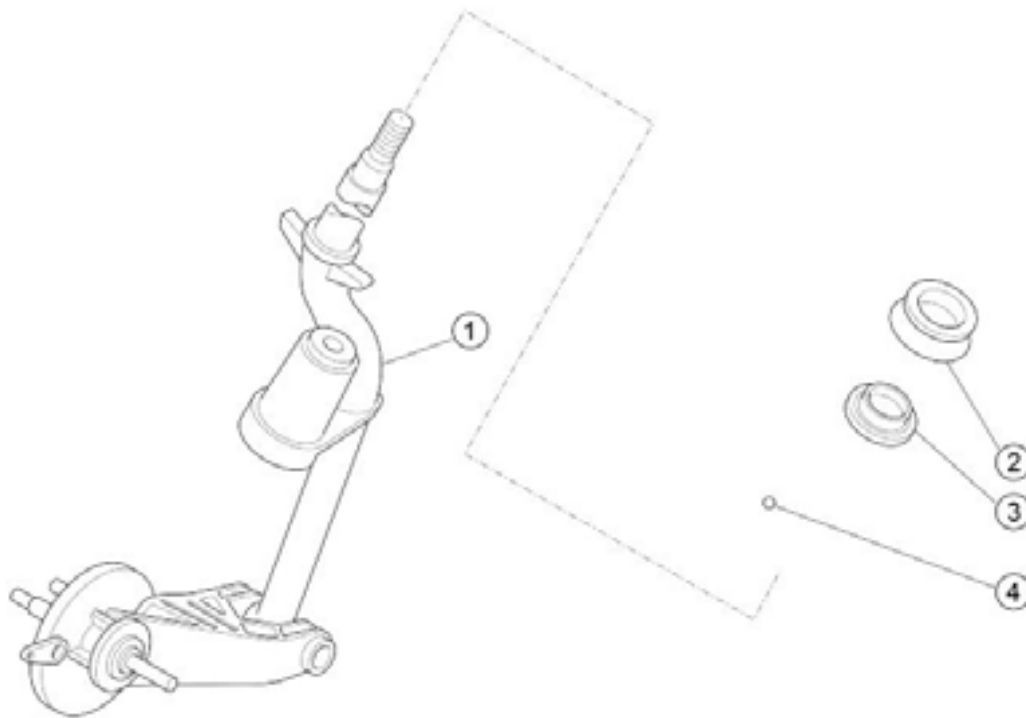
Use the specific tool to simultaneously lock the upper and lower seat, as described in the refitting of the upper seat.

### Specific tooling

#### 021330Y Steering seats fitting tool



---

**Lower housing from steering column****KEY**

1. Steering tube
2. Dust gaiter
3. External steering bearing
4. Ball

**REMOVAL:**

- Remove the steering from the chassis.  
Remove the balls.



Using a punch and a hammer, release the lower seat and the dust gaiter from the tube.



Remove the lower seat and the dust gaiter from the steering tube.



### CHECK

Check that the lower seat is free of deformities or failures so as not to compromise functioning. Replace in case of irregularities.

### REFITTING

Position the steering tube in a clamp.

Using the specific tool insert a new oil seal and the lower seat on the steering tube.

#### CAUTION

USE A NEW OIL SEAL.

#### Specific tooling

**016029Y Lower Steering Bearing Fitting Tool on the steering tube**



Apply grease on the lower seat.

#### Recommended products

**AGIP GREASE MU3 Yellow lithium based grease, suitable for various purposes.**

- ISO: L-X-BCHA 3

- DIN 51 825: K3K -20





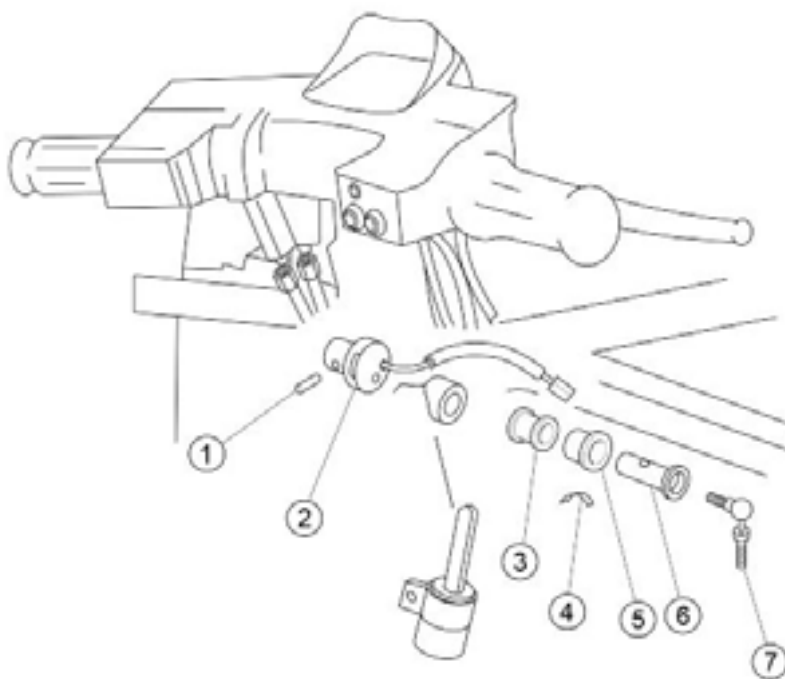
Clean any grease leaks with a rag.



Reposition the balls in their seat.



### Smontaggio cilindretto commutatore a chiave



#### KEY

1. Dowel
2. Switch

- 3.Lock block
- 4.Plate
- 5.Lock body
- 6.Cylinder
- 7.Keys

**REMOVAL:**

Disconnect the switch electric connection.



Using an Allen wrench undo the fixing dowel of the switch.



Remove the switch from its seat on the steering tube.



Remove the cylinder.



---

Press down with a pin on the internal latch to remove the lock.

**CAUTION****TURN THE KEY TO THE "OFF" POSITION.**

---

At the same time remove the lock.

**CAUTION****PAY ATTENTION TO THE RELEASE OF THE PLATE.**

---

Remove the plate from the lock.



---

With a pin simultaneously press the tab and remove the cylinder from the lock body.



---

Remove the cylinder from the lock body.



**CHECK:**

Check that the components of the lock are free of deformities or failures so as not to compromise functioning. Replace if necessary.

**REFITTING:**

Insert the cylinder in the lock body until it clicks into its locked position.



Reposition the plate on the lock.



With a pin reposition the latch behind the lock.



---

Position the lock inside its seat on the steering tube and press it until it clicks into its locked position.

**CAUTION**

BE CAREFUL NOT TO DROP THE PLATE.



---

Refit the cylinder in its seat.



---

Refit the switch in its seat on the steering tube.



---

Using an Allen wrench tighten the fixing dowel of the switch.



Connect the switch electric connection.

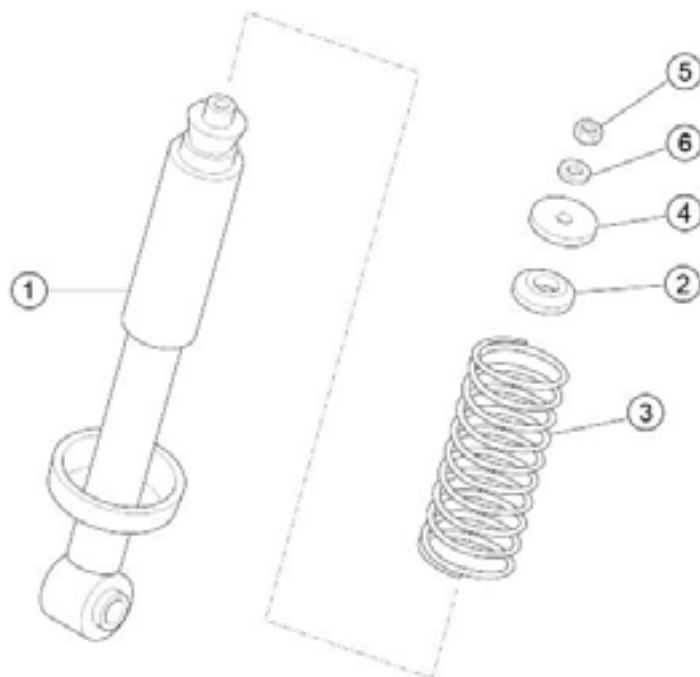


## INDEX OF TOPICS

**SUSPENSIONS**

**SS**

---

**Front****KEY:**

1. Front shock absorber
2. Buffer
3. Spring
4. Washer
5. Nut
6. Washer 17.6x11x2.5

---

**Shock-absorbers removal****REMOVAL:**

Lift the vehicle using the lift.

Undo the top locking nut of the shock absorber to the steering tube.

**CAUTION**

**MAKE SURE THAT THE SIDE ARMS OF THE LIFT ARE CORRECTLY WELDED AND POSITIONED IN CORRESPONDENCE WITH THE LIFTING POINTS.**





Also remove the washers and the buffer.



Undo the lower fixing nut of the shock absorber.



Remove the washer underneath.



Remove the complete front shock absorber.

**CAUTION**  
DURING THIS OPERATION, SUPPORT THE FRONT WHEEL.



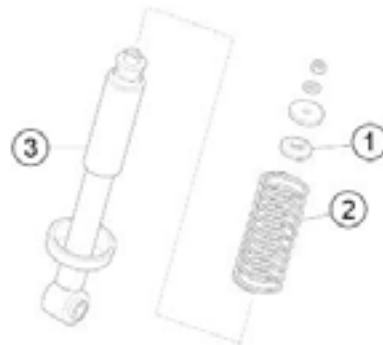
Remove the spring from the shock absorber.



### CHECK:

Check the following parts:

1. Spring buffer = wear
2. Spring = flattened condition
3. Shock absorber = oil loss



### SHOCK ABSORBER FUNCTIONING CHECK:

Position the shock absorber in a vice.

Press the shock absorber and check that the compression is uniform throughout the stroke, and that there is no abnormal resistance or noise.

Check the same conditions with the shock absorber extended.

Check that it returns to a constant speed at the beginning to the end.

Also check that there is no oil leakage, and ensure the integrity of the lower silent block.

If the shock absorber is defective, replace it.



### SPRING CHECK:

Check the integrity of the spring and the absence of signs of wear due to rubbing on the shock absorber.



**REFITTING:**

Apply the spring to the shock absorber.



Fit the complete shock absorber on the steering tube.



Insert the washer on the lower pin of the steering tube.



Tighten the lower fixing nut of the shock absorber.

**Locking torques (N\*m)**

**Front shock absorber (upper part) - Steering tube**  $34.3 \pm 4.9$  Nm



Insert the washers and the buffer and tighten the upper nut locking the shock absorber to the steering tube.

Make the vehicle without load shake up and down, in order to settle the suspension.

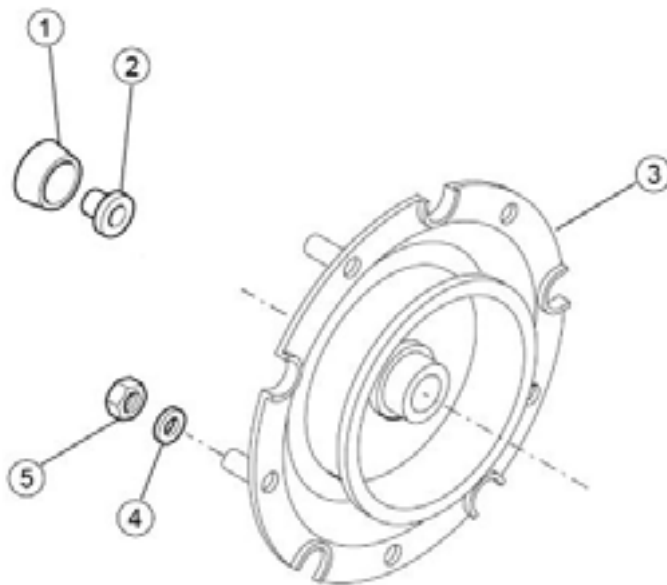
Check again the locking torque of the fixing nuts to the steering tube.



### Locking torques (N\*m)

**Front shock absorber (lower part) - Steering tube**  $112.7 \pm 14.7$  Nm

## Brake drum



ANT.

### KEY:

1. Cap
2. Nut
3. Brake drum
4. 13.75x8.15x4.5 flexible washer
5. Nut

**REMOVAL:**

Lift the vehicle using the lift.

Undo the fixing nuts of the front wheel.

**CAUTION**

**MAKE SURE THAT THE SIDE ARMS OF THE LIFT ARE CORRECTLY WELDED AND POSITIONED IN CORRESPONDENCE WITH THE LIFTING POINTS.**



Remove the front wheel.



Using a lever and a rubber hammer make light blows and remove the cap.

**CAUTION**

**BE CAREFUL NOT TO DAMAGE THE CAP AND THE DRUM.**



Remove the cap.



Undo the drum fixing nut.



Remove the brake drum.



#### **BRAKE DRUM CHECK:**

Check the internal surface of the brake drum.

Replace if there are any irregularities or cracks that may damage the brake shoes.

#### **REFITTING:**

Insert the brake drum in its seat on the steering tube.



Tighten the fixing nut and lock the brake drum.

#### **CAUTION**

ALWAYS USE A NEW NUT, CHAMFERING CAREFULLY WITH A PUNCH.

#### **Locking torques (N\*m)**

Brake drum - Steering tube  $53.9 \pm 5$  Nm





Refit the cap by pressing it, if necessary hitting it with light blows with a rubber hammer.



Refit the front wheel and attach to the drum by tightening the fixing nuts.

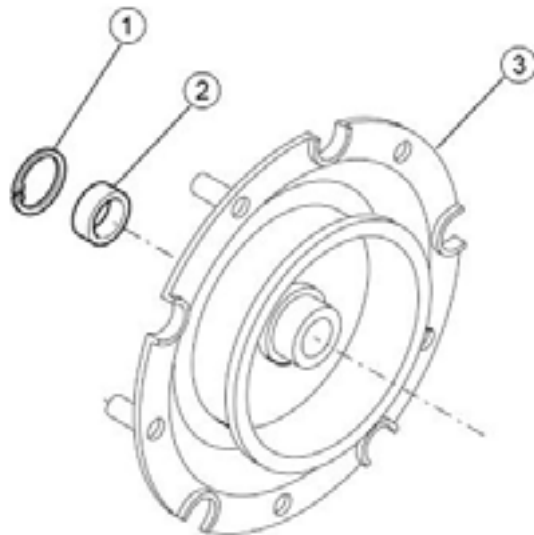
### Locking torques (N\*m)

Front wheel - Brake drum  $23.6 \pm 4$  Nm



## Drum bearings

ANT.



### KEY:

1. Snap ring

2. Bearing

3. Brake drum

---

**REMOVAL:**

Remove the front wheel and the brake drum.  
Position the drum on a flat and stable surface.  
Using the appropriate equipment, remove the sealing ring.

**Specific tooling**

**Pliers\_snap\_rings\_suspensions\_ape502012**  
**Pliers for circlips**



Position the drum in a clamp.

Using a hammer hit a few blows on an appropriate punch to remove the ball bearing.

**CAUTION**

**SUPPORT THE BEARING FROM THE OTHER SIDE OF THE DRUM.**



Remove the bearing from the other side.

**REFITTING:**

Reposition the bearing in its seat on the drum.





Using a hammer hit a few blows on an appropriate punch to insert the ball bearing.

**CAUTION**

APPLY GREASE TO THE BEARING

**Specific tooling**

**Punch\_installation\_bearings\_suspensions\_ape502012** Punch for mounting bearings

**Recommended products**

**AGIP GREASE MU3** Yellow lithium based grease, suitable for various purposes.

- ISO: L-X-BCHA 3

- DIN 51 825: K3K -20



Using the appropriate equipment, apply the sealing ring.

Refit the brake drum and the front wheel.

**CAUTION**

BEFORE REFITTING THE DRUM, FILL THE INTERNAL CHAMBER WITH GREASE.

**Specific tooling**

**Pliers\_snap\_rings\_suspensions\_ape502012**  
Pliers for circlips

**Recommended products**

**AGIP GREASE MU3** Yellow lithium based grease, suitable for various purposes.

- ISO: L-X-BCHA 3

- DIN 51 825: K3K -20



## Roller cage and split ring on brake drum

**REMOVAL:**

Remove the front wheel and the brake drum.

Remove the ball bearing.

Using a hammer hit a few blows on an appropriate punch to remove the roller bearing.

**Specific tooling**

**Punches for front suspension roller casings**  
**Punches for front suspension roller casings**



Remove the roller bearing from the other side.



### REFITTING:

Reposition the roller bearing in its seat on the drum.

Using a hammer hit a few blows on an appropriate punch to insert the roller bearing.

Refit the ball bearing.

Refit the brake drum and the front wheel.

#### CAUTION

APPLY GREASE TO THE ROLLER BEARING.

#### CAUTION

BEFORE REFITTING THE DRUM, FILL THE INTERNAL CHAMBER WITH GREASE.



### Specific tooling

033970Y Punches for roller casings

### Recommended products

**AGIP GREASE MU3 Yellow lithium based grease, suitable for various purposes.**

- ISO: L-X-BCHA 3

- DIN 51 825: K3K -20

## Verifiche e regolazioni

### CHECKS:

1. Check the wear of the tyre.
2. Check the correct pressure.
3. Make sure of the lack of abnormal noise when the wheel is turned.
4. Check the tightness of bolts of the parts concerned.
5. Check wheel clearance:
  - Lift the vehicle using the lift.



Alternately push and pull the top and bottom of the tyre, making sure that does not have an excessive clearance.

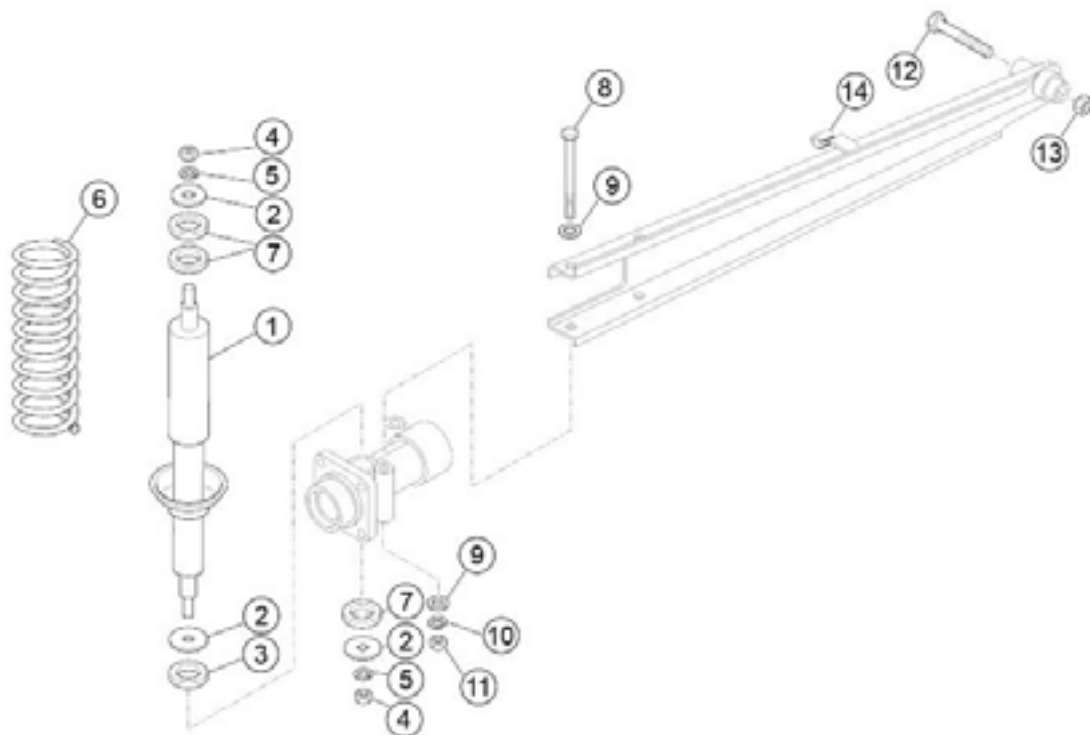
- If the clearance is excessive, repeat the control with the front brake lever engaged.
- If there is excessive clearance then the front wheel bearing is loose.
- If there is still excessive clearance, then the steering joint or suspension section is loose.

**SHOCK ABSORBER FUNCTIONING CHECK:**

Visually inspect the shock absorber and check that there are no signs of deterioration and fluid leaks. Firmly push down on the front of the vehicle to verify that there is no abnormal resistance or noise.



**Rear**

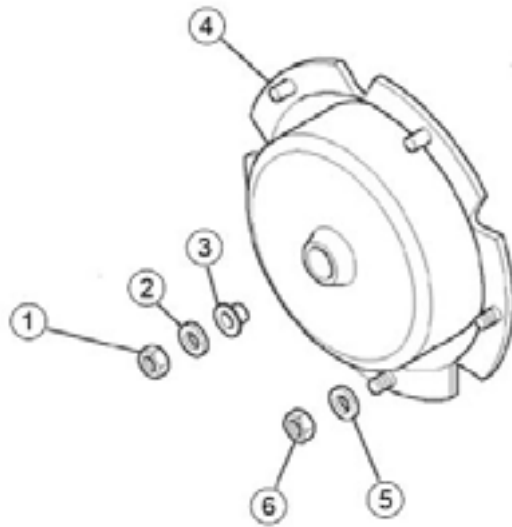


**KEY:**

1. Spring
2. Nut
3. Flexible washer
4. Washer
5. Buffer
6. Rear shock absorber
7. Buffer
8. Screw
9. Washer
10. Flexible washer
11. Nut
12. Screw
13. M10 self-locking nut
14. Arm

---

## Drum and rear wheel



### KEY:

1. Nut
2. Washer
3. Cone
4. Drum

5. 13.75x8.15x4.5 flexible washer

6. Nut

**REMOVAL:**

Lift the vehicle using the lift.

Undo the fixing nuts of the rear wheel.

**CAUTION**

**MAKE SURE THAT THE SIDE ARMS OF THE LIFT ARE CORRECTLY WELDED AND POSITIONED IN CORRESPONDENCE WITH THE LIFTING POINTS.**



Remove the rear wheel.



Undo the fixing nut of the brake drum.



Remove the ring and the washer.



---

Remove the brake drum.

**BRAKE DRUM CHECK:**

Check the internal surface of the brake drum.

Replace if there are any irregularities or cracks that may damage the brake shoes.

**REFITTING:**

Reposition the brake drum in its seat.



Insert the ring and the washer on the pin.



Tighten the fixing nut of the brake drum.

**CAUTION**

ALWAYS USE A NEW NUT, CHAMFERING CAREFULLY WITH A PUNCH.

**Locking torques (N\*m)**

Brake drum - Semi axle  $85.8 \pm 7.4$  Nm



Chamfer the nut with a punch.



Fit the rear wheel.



Tighten the fixing nuts of the rear wheel.

#### Locking torques (N\*m)

Rear wheel - Brake drum  $23.6 \pm 4$  Nm



## Parking brake control and brake shoes

### REMOVAL:

Lift the vehicle using the lift.

Remove the rear wheel, the brake drum and the shoe.

Lightly pull the parking brake control transmission to release the locking ring to the shoe holder disc.

### CAUTION

MAKE SURE THAT THE SIDE ARMS OF THE LIFT ARE CORRECTLY WELDED AND POSITIONED IN CORRESPONDENCE WITH THE LIFTING POINTS.





---

Remove the ring.



Remove the parking brake control transmission from the shoe holder disc.



**REFITTING:**

Insert the parking brake cable in its seat on the shoe holder disc.



Apply the ring on the parking brake control transmission so as to lock it to the shoe holder disc, pulling the cable slightly.  
Remove the shoes, the brake drum and the rear wheel.





## Brake cylinder and shoe disc

### REMOVAL:

Lift the vehicle using the lift.

Remove the rear wheel, the brake drum and the shoe.

Undo the bleed screw and drain the oil in the braking system, if necessary applying a rubber tube to facilitate the operations.

### CAUTION

PREPARE A CONTAINER SUITABLE FOR COLLECTING BRAKE FLUID.

### CAUTION

PAY THE UTMOST ATTENTION NOT TO COME IN CONTACT WITH THE OIL.

### CAUTION

MAKE SURE THAT THE SIDE ARMS OF THE LIFT ARE CORRECTLY WELDED AND POSITIONED IN CORRESPONDENCE WITH THE LIFTING POINTS.

Undo the nut fixing the brake line to the cylinder.



Undo the screw fixing the brake cylinder on the shoe holder disc.



Remove the brake cylinder.



Supporting the nuts from the inside part with a wrench, undo the fixing bolts of the shoe holder disc.



Remove the shoe holder disc.



**REFITTING:**

Insert the shoe holder disc in the semi axle in its seat.



Tighten the shoe holder disc fixing bolts to the hub.

**Locking torques (N\*m)**

**Shoe holder disc - Wheel hub  $23.6 \pm 4$  Nm**



Apply the brake cylinder in the appropriate slot on the shoe holder disc.



Tighten the screw fixing the brake cylinder on the shoe holder disc.



Tighten the nut fixing the brake line to the cylinder.  
Remove the shoes, the brake drum and the rear wheel.

**CAUTION**

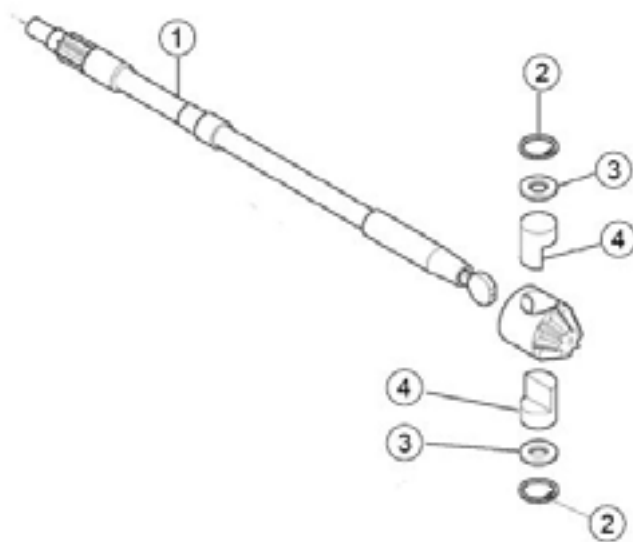
**INSERT NEW OIL IN THE BRAKING SYSTEM.  
DO NOT RECOVER THE PREVIOUS ONE.**

**CAUTION**

**CARRY OUT THE BLEEDING OF THE BRAKING SYSTEM.**



## Planetary and half-pins

**KEY:**

1. Axle shaft
2. Helical ring
3. Washer
4. Pin

**REMOVAL:**

Remove the semi axle.

Position the semi axle in an appropriate clamp.



---

Remove the protection hood.



---

Remove the sealing ring with the appropriate equipment.

**Specific tooling**

**Pliers\_snap\_rings\_suspensions\_ape502012**

**Pliers for circlips**



---

Remove the washer.



---

Remove the pivot.

**CAUTION**

**TAKE NOTE OF THE CORRECT POSITIONING OF THE TWO SEMI PINS INSIDE THE JOINT.**



---

Remove the joint from the semi axle.



Remove, from the joint, the other pin with the washer and the sealing ring.



Remove the washer from the semi axle.



Remove the sealing ring of the semi-axle to the differential crankcase.





---

Remove the flange with the hood.



---

**CHECK:**

Check that all the components are free of deformities or failures so as not to compromise the semi-axle joint.

Replace in case of irregularities.



---

**REFITTING:**

Refit the flange with the hood on the semi axle.



Refit the sealing ring on the semi-axle to the differential crankcase.



Insert the washer on the semi axle.



Refit the joint on the semi axle.



Insert the pin in the joint.



Rotate the joint, and, based on what was previously noted, correctly insert the other pin as well.





---

Refit the washer.



---

Refit the sealing ring using the appropriate equipment.

**Specific tooling**

**Pliers\_snap\_rings\_suspensions\_ape502012**

**Pliers for circlips**



---

Refit the washer and the sealing ring also for the other pin in the joint.



---

## Ball bearing and split ring on hub

**REMOVAL:**

Remove the wheel hub on the semi-axle.

Position the hub in a vice.

Remove the roller bearing. Using an appropriate lever remove the oil seal.



---

Remove the spacer.



Clean the residual grease from the inside of the hub.

Remove the sealing ring with the appropriate equipment.

**Specific tooling**

**Pliers\_snap\_rings\_suspensions\_ape502012**  
**Pliers for circlips**



Turn over the hub and, using a hammer and suitable punch, eject the bearing.

**CAUTION**

**PAY ATTENTION TO ESCAPE OF THE BEARING FROM THE OTHER SIDE OF THE HUB.**



Remove the bearing.



Remove the spacer.



**CHECK:**

Check that all the components are free of deformities or failures so as not to compromise functioning.

Replace in case of irregularities.



**REFITTING:**

Apply grease in the internal chamber of the hub.

**Recommended products**

**AGIP GREASE MU3 Yellow lithium based grease, suitable for various purposes.**

- ISO: L-X-BCHA 3

- DIN 51 825: K3K -20



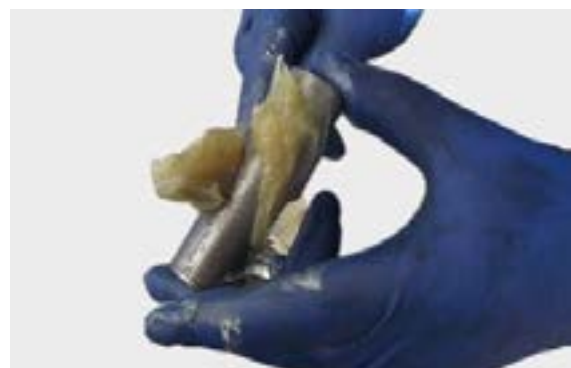
Apply grease to the spacer.

**Recommended products**

**AGIP GREASE MU3 Yellow lithium based grease, suitable for various purposes.**

- ISO: L-X-BCHA 3

- DIN 51 825: K3K -20



---

Insert the spacer inside the hub.



---

Insert the bearing in its seat.



---

Using a hammer hit a few blows on an appropriate punch to insert the bearing at the end.

#### **Specific tooling**

**Punch\_installation\_bearings\_suspensions\_ape502012** Punch for mounting bearings



---

Apply grease on the surface of the bearing.

#### **Recommended products**

**AGIP GREASE MU3** Yellow lithium based grease, suitable for various purposes.

- ISO: L-X-BCHA 3
- DIN 51 825: K3K -20





Insert the sealing ring with the appropriate equipment.

### Specific tooling

Pliers\_snap\_rings\_suspensions\_ape502012  
Pliers for circlips



Insert the spacer.

### CAUTION

THE SPACER MUST BE PLACED WITH THE FLARING FACING UP.



Fit the oil seal.

Refit the roller bearing.

Refit the wheel hub on the semi-axle.

### CAUTION

WHEN REFITTING ALWAYS USE NEW OIL SEALS.



## Spacer, roller cage and split ring

### REMOVAL:

Remove the wheel hub on the semi-axle.

Position the hub in a vice.

Remove the ball bearing.

Using an appropriate lever remove the oil seal.



Remove the spacer.



Turn over the hub and, using a hammer and suitable punch, eject the roller bearing.

**CAUTION**  
**PAY ATTENTION TO ESCAPE OF THE ROLLER BEARING FROM THE OTHER SIDE OF THE HUB.**

**Specific tooling**

- Punches for rear suspension roller casings**
- Punches for roller casings**



Remove the roller bearing.



**CHECK:**

Check that all the components are free of deformities or failures so as not to compromise functioning.

Replace in case of irregularities.



**REFITTING:**

Position the roller bearing in its seat.



Using a hammer hit a few blows on an appropriate punch to insert the roller bearing.

**Specific tooling**

**038138Y Punches for roller casings**



Insert the roller bearing by aligning the edge to the seat.



Apply grease on the surface of the roller bearing.

**Recommended products**

**AGIP GREASE MU3 Yellow lithium based grease, suitable for various purposes.**

- ISO: L-X-BCHA 3

- DIN 51 825: K3K -20



---

Fit the oil seal.

Refit the ball bearing.

Refit the wheel hub on the semi-axle.

**CAUTION**

WHEN REFITTING ALWAYS USE NEW OIL SEALS.



---

## Wheel hub on half-shaft

**REMOVAL:**

Remove the shoe holder disc.

Remove the rear shock absorber.

Undo the bolts that secure the hub to the rear suspension arm.



Remove the bolts and their bolts.



Separate the hub from the suspension arm.





---

Use the appropriate extractor to remove the hub.

**Specific tooling**

**038137Y Rear hub extractor**



---

Remove the wheel hub from the semi-axle.



---

**REFITTING:**

Mount the wheel hub on the semi-axle, also tapping it lightly with a rubber mallet so as to lock it permanently on the semi-axle.

**CAUTION**

**PAY ATTENTION TO THE CORRECT POSITIONING OF THE OIL SEAL ON THE AXLE SHAFT.**



---

Couple the hub with the suspension arm.



Insert the bolts and their fixing nuts.



Tighten the bolts that secure the hub to the rear suspension arm.

Refit the rear shock absorber.

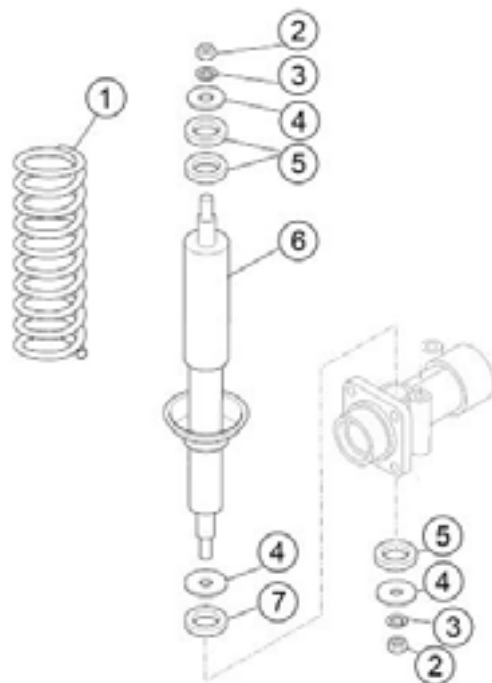
Refit the shoe holder disc.

**Locking torques (N\*m)**

**Wheel hub - Rear suspension arm  $58.8 \pm 9.8$  Nm**



**Shock-absorbers removal**



**KEY:**

- 1. Spring

2. Nut
3. Flexible washer
4. Washer
5. Buffer
6. Rear shock absorber
7. Buffer

**REMOVAL:**

Remove the rear wheel.

Undo the lower nut fixing the shock absorber to the wheel hub.

Remove the washer.



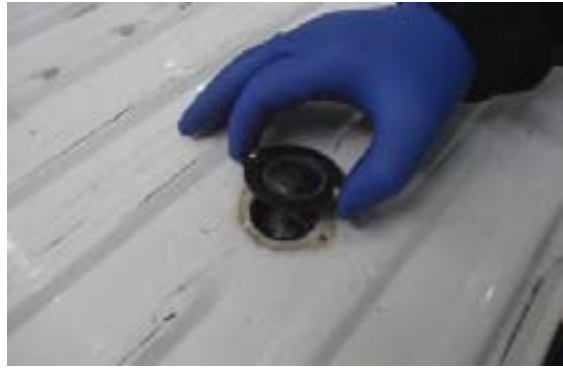
Slightly lower the hub and remove the buffers with the washers and the bolt.



From the inside of the rear deck, undo the fixing screws of the upper cover.



Remove the upper cover.



Remove the washer underneath.



Remove the buffer.



Undo the upper nut fixing the shock absorber to the chassis.

**CAUTION**  
DURING THIS OPERATION, SUPPORT THE SHOCK ABSORBER FROM THE LOWER SIDE.



---

Remove the rear shock absorber from below.



---

Remove the spring of the shock absorber.



---

Remove the buffer from the upper seat of the shock absorber.



---

**CHECK:**

Check that the buffers are not worn and that the washers are in good condition.

In case of damage, replace them.



**SHOCK ABSORBER FUNCTIONING CHECK:**

Position the shock absorber in a vice.

Press the shock absorber and check that the compression is uniform throughout the stroke, and that there is no abnormal resistance or noise.

Check the same conditions with the shock absorber extended.

Check that it returns to a constant speed at the beginning to the end.

Also check that it does not leak oil.

If the shock absorber is defective, replace it.

**SPRING CHECK:**

Check the integrity of the spring and the absence of signs of wear due to rubbing on the shock absorber.

**REFITTING:**

Reinsert the buffer and the spring in the shock absorber.



Insert the rear shock absorber in its seat from below.





Mount the buffer with the washer inside the upper seat on the wheel hub.



Mount the buffer with the washer inside the lower seat on the wheel hub.



Insert the shock absorber pin and tighten the nut with the washer so as to fix it to the wheel hub. Refit the rear wheel.

### Locking torques (N\*m)

**Rear shock absorber (lower part) - Wheel hub**  
 $34.3 \pm 4.9$  Nm



With the aid of a workshop jack, compress the shock absorber to facilitate insertion into the upper seat.

### CAUTION

**DURING COMPRESSION, MAKE SURE THAT THE SPRING IS PERFECTLY IN ITS SEAT ON THE STANCHION.**



---

Tighten the upper nut fixing the shock absorber to the chassis.

**Locking torques (N\*m)**

**Rear shock absorber (upper part) - Chassis 34.3**  
 $\pm 4.9$  Nm



---

Insert the buffer.



---

Insert the washer.



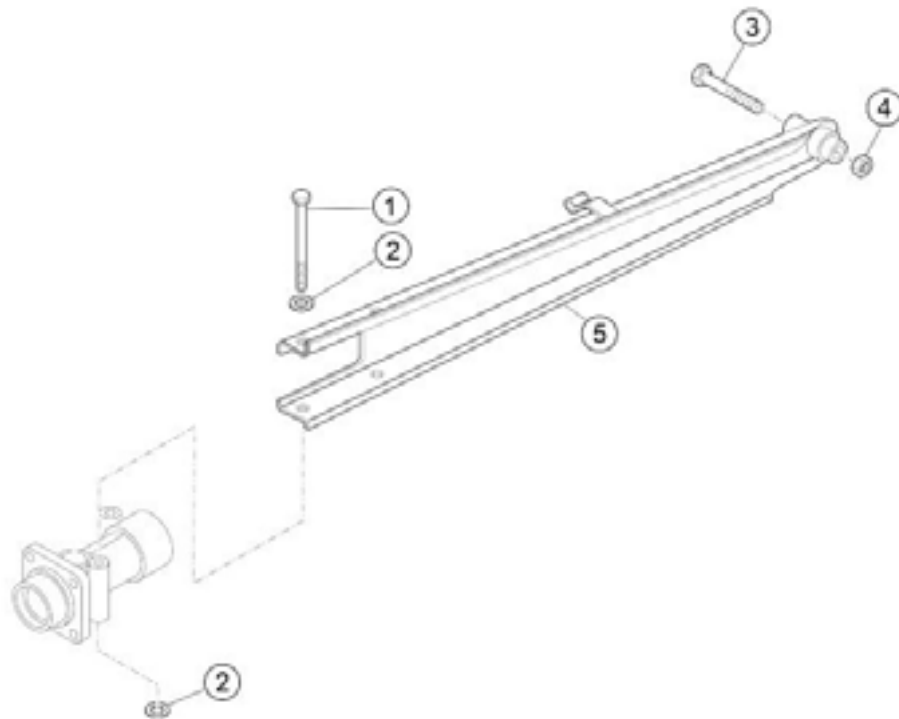
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Apply the cover and tighten the screws to fix it to the deck.





## Suspension arm replacement

**KEY:**

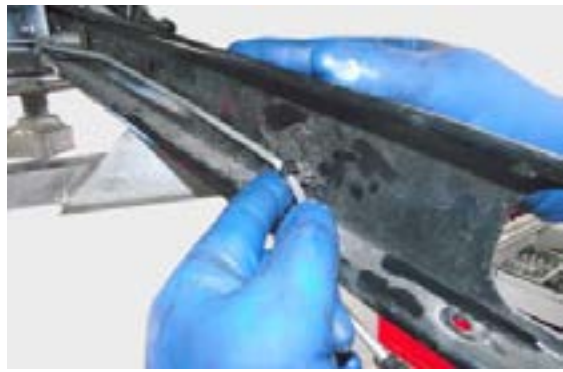
1. Screw
2. Washer
3. Screw
4. M10 self-locking nut
5. Arm

**REMOVAL:**

Remove the wheel hub from the semi-axle.  
Release the parking brake transmission from the suspension arm.



Release the rear brake pipe from the suspension arm.



Undo the joint of the rear brake pipe from the suspension arm.

Remove the pipe.

**CAUTION**

**PREPARE A CONTAINER SUITABLE FOR COLLECTING BRAKE FLUID.**



Remove the retainer spring.



Remove, from the suspension arm, the brake line from the brake distributor.

**CAUTION**

**DRAIN THE OUTLET BRAKE FLUID FROM THE PIPE IN THE APPROPRIATE CONTAINER.**

**CAUTION**

**PAY THE UTMOST ATTENTION NOT TO COME IN CONTACT WITH THE OIL.**



Undo the fixing bolt of the suspension arm to the frame.

**CAUTION**

**DURING THIS OPERATION, SUPPORT THE REAR SUSPENSION ARM.**



Remove the bolt and its nut.



Remove the rear suspension arm from the frame.

**REFITTING:**

Position the suspension arm in its housing on the frame.

Apply the bolt and its fixing nut.

**CAUTION**

**DURING THIS OPERATION, SUPPORT THE REAR SUSPENSION ARM.**



Tighten the fixing bolt of the suspension arm to the frame.

**Locking torques (N\*m)**

**Rear suspension arm - Frame  $44.1 \pm 4.9$  Nm**



Insert, in the appropriate hole on the suspension arm, the brake line from the brake distributor.



Apply the retainer spring.



Tighten the joint of the rear brake pipe to the suspension arm.



Snap the rear brake pipe into place on the suspension arm.



Snap the parking brake transmission into place on the suspension arm.

Refit the wheel hub from the semi-axle.

**CAUTION**

**INSERT NEW OIL IN THE BRAKING SYSTEM.  
DO NOT RECOVER THE PREVIOUS ONE.**

**CAUTION**

**CARRY OUT THE BLEEDING OF THE BRAKING SYSTEM.**



## Verifiche

**NOISE:**

1. Check the wear of the rear tyres.
2. Check the correct pressure.
3. Check that there is no abnormal noise when the wheels are rotated.
4. Check the tightness of bolts of the parts concerned.

5. Check wheel clearance:

- Lift the vehicle using the lift.

Alternately push and pull the top and bottom of the tyre, making sure that does not have an excessive clearance.



**REAR SUSPENSION INSPECTION:**

Visually inspect the suspension making sure that there are no signs of wear or damage.

Check that the retainers produce no abnormal sounds by rocking the suspension manually.

**INSPECTION AND CHECKS ON THE REAR  
SHOCK ABSORBERS:**

Visually inspect the shock absorbers and check that there are no signs of deterioration and fluid leaks.

Firmly push down on the rear of the vehicle to verify that there is no abnormal resistance or noise.



# INDEX OF TOPICS

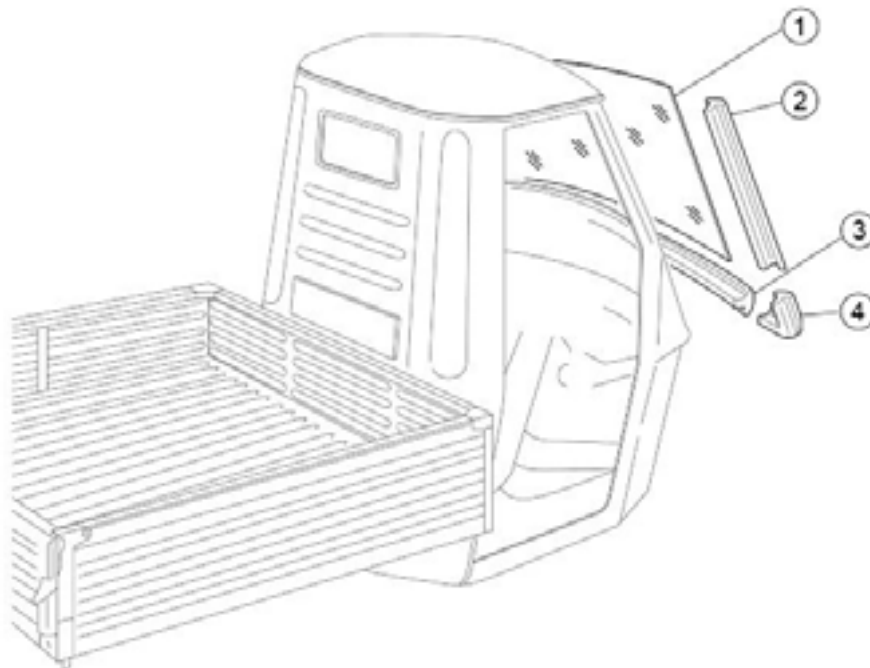
CHASSIS

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**RANGE OF COLOURS**

COLOUR	PIAGGIO CODE
White	W 10
«River» Blue	PD 1203
Ice Blue	215/A
Ice Green	304/A
Light Yellow	933/A
Black	83
Red	R16
«Sherwood» Green	322
Yellow	937
Orange «RAL 2011»	911/A
«Lime» Yellow	943/A
Orange	953
«Action» Blue	238/A
Rock Sand	741/B
«White Silk» white	576
Lime Green	323/A
Red Sprint	862/A
Sky blue	250/A
Bamboo Green	612
Azure Bay	432
Charming Blue	258/A
White	597
Western Red	876/A

**Windscreen****LEGENDA:**

1. Vetro parabrezza
2. Bordo laterale



3. Bordo inferiore
4. Angolare

---

**Removal****PREPARATION:**

Before removing the windscreen, it is necessary to make provisions for the following equipment:

- Cutter;
- Adhesive tape;
- Steel wire with handle for removing glass.



Remove the upper central dashboard.

Remove the edge.

Remove the wiper blade by undoing the relative fixing nut.



In order to avoid damaging the paintwork, apply the adhesive tape along the entire perimeter of the windscreen.



Using a cutter from outside the cab, remove the gaskets, all along the perimeter of the windscreen, glued to the chassis.



Repeat the above operation from inside the passenger compartment.



Remove the gasket residues.



Position the steel wire between the windscreen and the chassis.



Slide the steel wire all along the windscreen so as to remove it permanently.

**CAUTION**

IT IS NECESSARY TO PERFORM THIS OPERATION WITH TWO PEOPLE, ONE FROM INSIDE THE CAB AND THE OTHER FROM THE OUTSIDE.

**CAUTION**

PROCEED WITH EXTREME CAUTION IN ORDER TO AVOID DAMAGING THE GLASS.

**CAUTION**

SUPPORT THE GLASS FROM THE OUTSIDE.



---

Remove the windscreen.



---

## Refitting

### PREPARATION:

Before refitting the windscreen, it is necessary to make provisions for the following equipment:

- Cutter;
- Recommended product for fixing the windscreen.

### CAUTION

**WHEN REFITTING ALWAYS USE NEW GASKETS.**

### Recommended products

#### THIO BOSTIK 80

Adhesive sealing compound

---

Remove the residues of the adhesive and the pre-existing window using mechanical tools, blades or abrasive elements. Thoroughly clean the entire area housing the pane.



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Check that the frame profile is not deformed, straighten it if required. Readjust the housing area if necessary with original paint to ensure perfect adhesion of the sealant.



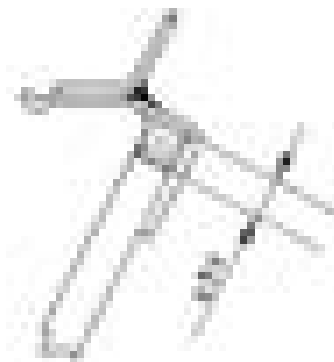
Protect the external and internal edge of the frame using a special tape for bodywork; use a brush to apply a thin coat of primer on the whole adherence surface involved when the specific adhesive sealant is applied.



Degrease the edge of the new pane with ethyl alcohol.



Position the glass and centre it with respect to the edge, upper and lower, of the frame that houses the pane, observing proper distances.



Check that the distance of the pane from the edge of the housing frame is the same on both sides.



The adhesive sealing compound cartridge has two components that should be come into contact inside that cartridge; they should be carefully mixed before being used. For that operation, use of the appropriate whisk that must be fixed to a (slow rotation) drill and inserted inside the cartridge, proceed at this point to the mixing operation for a period of 3', by slowly rotating the drill.

**CAUTION**

**IN ORDER TO ENSURE THE EFFECTIVENESS OF THE BONDING, AND THEN THE RESULTING GLASS SEAL, ALWAYS MAKE SURE THAT THE PRIMER AND THE ADHESIVE SEALING COM-**

**POUND, BEFORE THEY ARE USED, HAVE NOT LOST THE REQUIRED PROPERTIES FOR THE FUTURE EXCEEDING OF THE STORAGE LIMITS, PRESCRIBED BELOW BY THE BOSTON COMPANY.**

### Specific tooling

#### AC/UNI Whisk Whisk for "Thio Bostik 80" cartridge

Make sure that a period of 30' minimum and 4h maximum has elapsed from the moment the primer was applied, to insert the cartridge in the appropriate gun, which should be connected to a compressed air unit. Be careful to apply the adhesive sealing compound as a uniform string between the frame and the pane.



### Specific tooling

#### AC/UNI Gun Gun for "Thio Bostik 80" cartridge

After completing application of the adhesive sealant, proceed to fit, on the sides of the frame, the three finishing strips (trimmings) and the two angles until making them adhere to the glass and the edge of the frame.



#### CAUTION

**FIT THE THREE STRIPS WITH THE TOP EDGE FACING THE PANE. THEN APPLY THE BAND ON THE LOWER TRIM, AND THE TAPE FROM THE BODYWORK ON THE SIDE STRIPS TO ENSURE A PERFECT ADHERENCE, IN THE DRYING PHASE. ONCE DRIED (NEEDED TIME AT 20°: 4 TO 5 HOURS «DUST OUT» - THAT IS FOR THE INITIAL STAGE; 6 HOURS FOR TOTAL HARDENING), REMOVE THE TOOL, BEING CAREFUL TO REMOVE WITH A SPATULA ANY ADHESIVE SEALING COMPOUND THAT MAY HAVE Oozed WHEN THE TRIMS WERE PRESSED.**

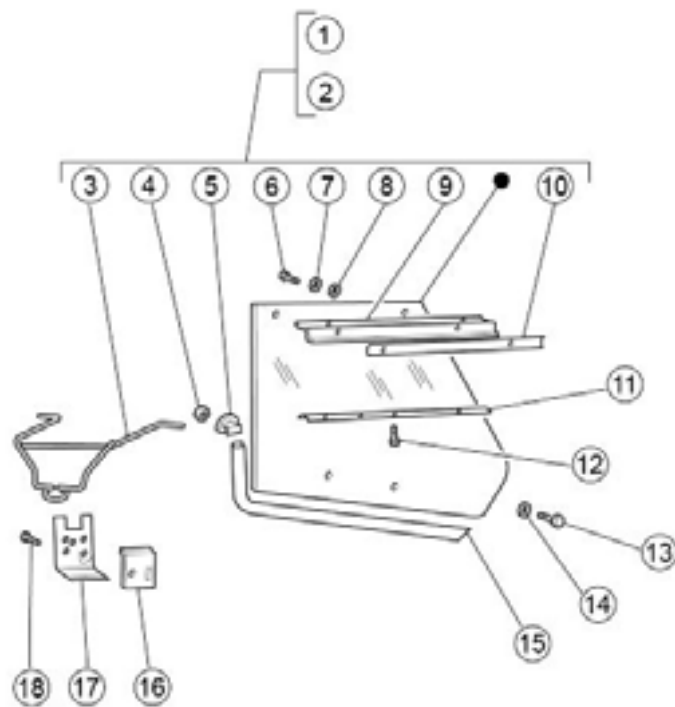
Install the windshield wiper.

### Locking torques (N\*m)

**Windshield wiper - Chassis (external)  $8 \pm 0.5$  Nm**



## Side windows



### KEY:

1. Right complete window
2. Left complete window
3. Arm
4. M5 nut
5. Hinge
6. Rivet
7. Washer
8. Washer
9. Profile
10. Spring line
11. Strip
12. Screw
13. Bolt
14. Washer
15. Gasket
16. Plate
17. Spring
18. Screw

---

## Removal

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Undo the fixing nuts of the arm to the glass.



Remove the arm and its bolts.



Offset the upper part of the gasket.



Undo the fixing screws of the glass to the door.

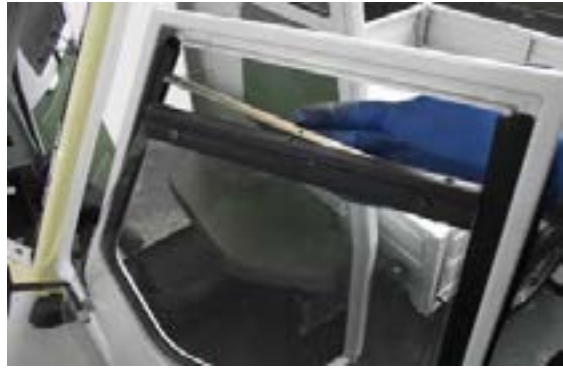
**CAUTION**  
**SUPPORT THE GLASS FROM THE OUTSIDE.**





---

Remove the glass and the strip underneath.



Undo the fixing screws and remove the spring and the plate locking the glass to the door.



---

## Refitting

Position the strip as shown in the figure.



From the outside, place the upper part of the glass in its seat.





---

Tighten the fixing screws of the glass to the door.

**CAUTION**

**SUPPORT THE GLASS FROM THE OUTSIDE.**



---

Reposition the gasket in its seat.



---

Fit the arm on the glass using the relative bolts.



---

Tighten the fixing nuts of the arm to the glass.



---

Lightly tighten the screws and fix the spring and the plate locking the glass to the door.



Position the arm under the spring so that the glass closes tightly.



Fully tighten the fixing screws of the spring to the door.



## Rear window

**KEY:**

1. Glass
2. Gasket

---

## Removal

**PREPARATION:**

Before removing the rear screen, it is necessary to make provisions for the following equipment:

- Metal levers for removing windows;
- Stiff rope for installing windows.

Working from inside the cab, insert the small metal levers between the gasket and the seat of rear screen, so as to push the latter towards the outside.



Proceed along the width of the rear screen until the lower part is fully released.

**CAUTION**

SUPPORT THE REAR SCREEN FROM THE OUTSIDE.



Remove the rear screen.

**Refitting**

Apply the gasket on the rear screen.

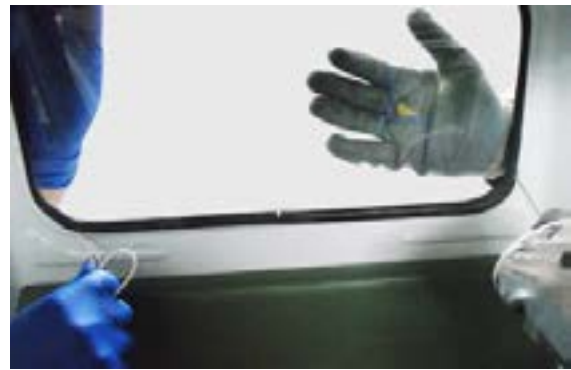
Insert the stiff rope in the sealing gasket groove.



The stiff rope ends must be positioned as shown in figure.



Insert the rear screen in its seat, making sure that the two ends of the stiff rope are positioned inside the cab.



Pull the stiff rope and simultaneously press the rear screen evenly from the outside so that it is positioned properly in its seat.



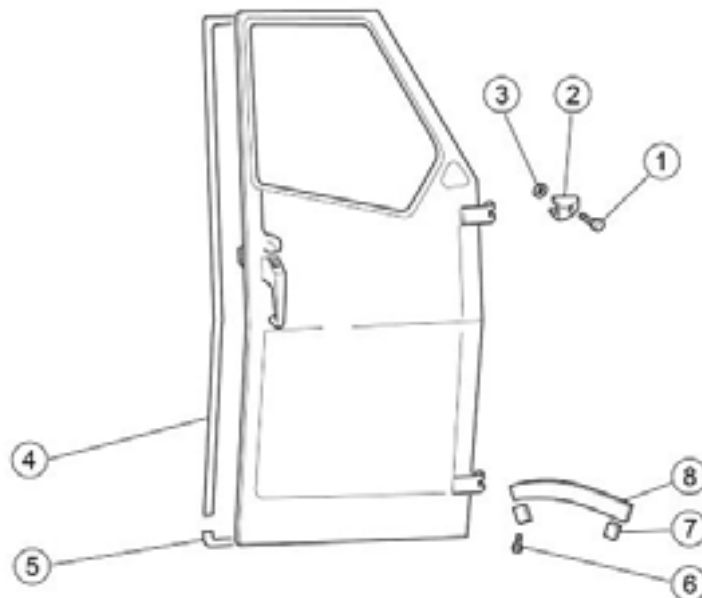
**CAUTION**

**PAY ATTENTION TO THE CORRECT POSITIONING OF THE GASKET.**

**N.B.**

**DO NOT USE GASKETS WITH SIGNS OF WEAR AS WATER LEAKS MAY OCCUR. TO FACILITATE THE REAR SCREEN INSTALLATION USE A RUBBER HAMMER.**

## Doors



**KEY:**

- 1. Self-tapping screw 4.2x16

2. Cowl
3. Elastic plate
4. Upper gasket
5. Lower gasket
6. Screw
7. Plate
8. Belt

**REMOVAL:**

Remove the rear view mirror by undoing the fixing nut.



Undo the fixing screw and remove the upper cowl.



Remove the plate underneath.





---

From inside the cab, undo the fixing screw of the bumper.



Offset the bumper in order to release the fixing of the door to the frame.



Undo the fixing screws of the belt to the cab.



Remove the belt and its plate.



---

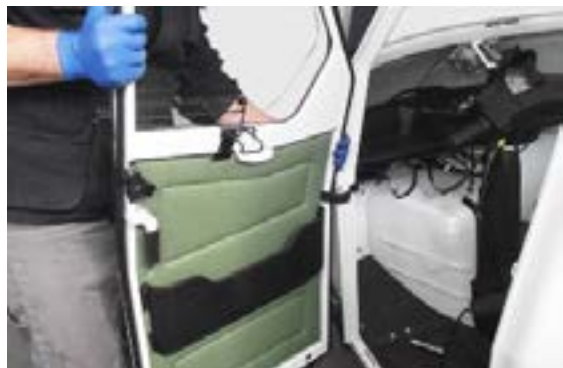
Undo the fixing bolts of the door to the cab.

**CAUTION**

**DURING THIS OPERATION, SUPPORT THE DOOR.**



Remove the complete door.



**REFITTING:**

Support the door and tighten the fixing bolts of the door to the cab.



Refit the plate on the chassis.





---

Tighten the fixing screw and refit the upper cowl.



Tighten the fixing screw inside the cab and lock the bumper.



Tighten the fixing screws and refit the belt with its plate.



---

## Pannelli

### REMOVAL:

Remove the plate locking the glass to the door.  
Undo the fixing screws of the storage pouch.



Remove the storage pouch.



Using a lever, detach the panel, along its entire perimeter, from the door.

**CAUTION**  
BE CAREFUL NOT TO DAMAGE THE PANEL AND THE DOOR.



Remove the door panel.



**REFITTING:**

Replace the double-sided tape placed in the lower end of the panel.

**N.B.**  
IN CASE OF NEW PANEL, THE DOUBLE-SIDED TAPE WILL ALREADY BE PRESENT.



Apply the panel in its seat, by pressing lightly on the bottom so that the double-sided tape is stably fixed to the door.

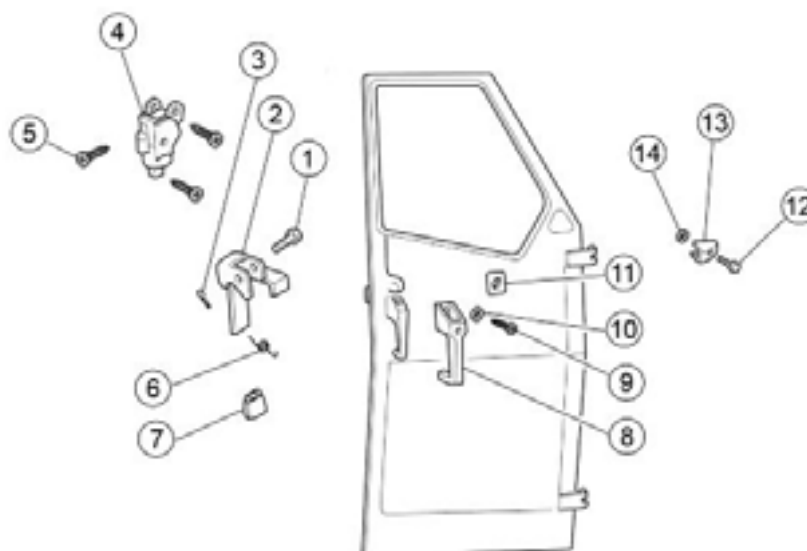


Tighten the fixing screws and lock the storage pouch.

Refit the plate locking the glass to the door.



## Serratura e maniglie



### KEY:

1. Pin

2. Handle
3. Cotter pin
4. Left safety lock box
5. Screw d3.5x9.5
6. Spring
7. Protection
8. Handle
9. TCB screw 3.5x19
10. Washer 4.5x12x1
11. Button covering
12. Self-tapping screw 4.2x16
13. Cowl
14. Elastic plate

---

**HANDLE REMOVAL:**

Remove the door panel.

Undo the fixing screws of the handle.



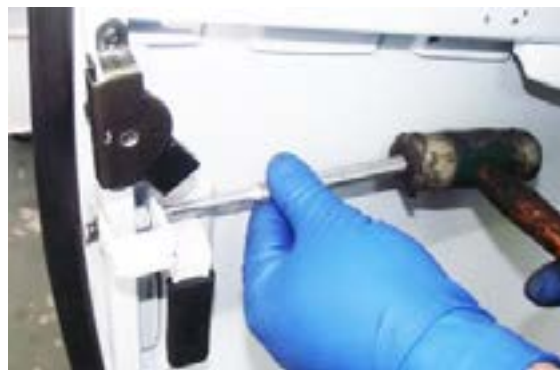
Remove the handle from the external side.



Remove the cotter pin.



With the aid of a hammer and a punch, remove the pin.



Remove the handle and the spring.



**LEFT SAFETY LOCK REMOVAL:**

Undo the fixing screws of the left safety lock.



Remove the left safety lock.

**N.B.**

**TO REMOVE THE LEFT SAFETY LOCK IT IS NOT NECESSARY TO REMOVE THE DOOR PANEL.**



**RIGHT DOOR CLOSING CYLINDER REMOVAL:**

Undo the locking nut of the cylinder.



Remove the locking nut and the washer.



From the outside remove the right door closing cylinder.

**RIGHT DOOR CLOSING CYLINDER REFITTING:**

Insert the cylinder in the appropriate slot on the right door.

**CAUTION**

**INSERT THE CYLINDER WITH THE LEVER FACING UPWARDS.**





---

Insert the washer and tighten the locking nut.



---

**LEFT SAFETY LOCK REFITTING:**

Tighten the fixing screws and lock the safety lock to the left door.



---

**HANDLE REFITTING:**

Insert the handle with its spring in the appropriate slot on the door.



Position the spring as shown in the figure.



Using a rubber hammer, insert the pin.



Insert the cotter pin.

**CAUTION**

**USE A NEW COTTER PIN.**



Position the external handle, supporting it, of the door in its seat.

**CAUTION**

**BEFORE FULLY TIGHTENING THE SCREWS, PERFECTLY CENTRE THE HANDLE.**

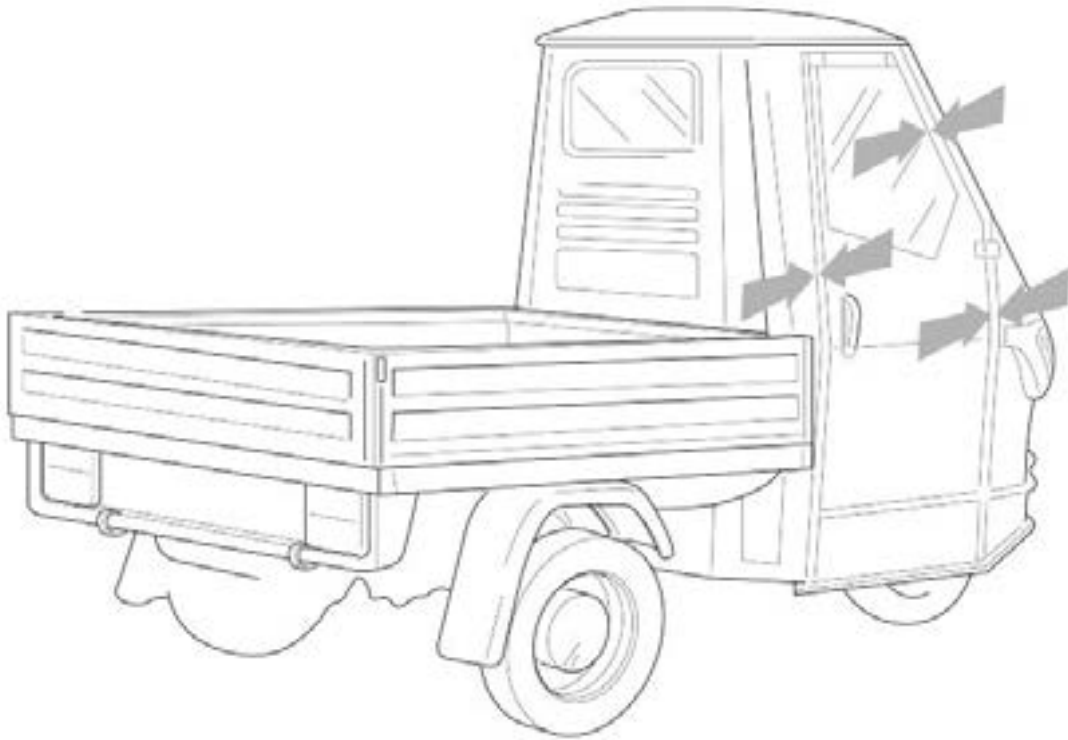


Tighten the fixing screws and lock the handle.  
Refit the door panel.





## Longitudinal adjustments



Act on the bolts fixing the door to make the vertical adjustment.



## Rain seal

### SEAL GASKET REMOVAL:

Lift the glass and remove the external glass gasket along the entire perimeter.



---

Remove the upper and lower gaskets of the door.



---

**SEAL GASKET INSTALLATION:**

Remove the film of the double-sided tape to the door gaskets, both lower and upper.



Position the gaskets properly along the entire perimeter of the door.

Press lightly making sure they are set uniformly.

**CAUTION**

**BE SURE TO POSITION THE DOOR GASKETS ALONG THE ENTIRE INTERIOR PERIMETER.**



Remove the film of the double-sided tape to the glass gasket.



Position the glass seal properly along the entire perimeter of its housing.

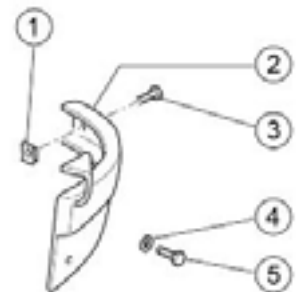
Press lightly making sure it is set uniformly.

**CAUTION**

**BE SURE TO POSITION THE GLASS GASKET ALONG THE OUTER PERIMETER.**

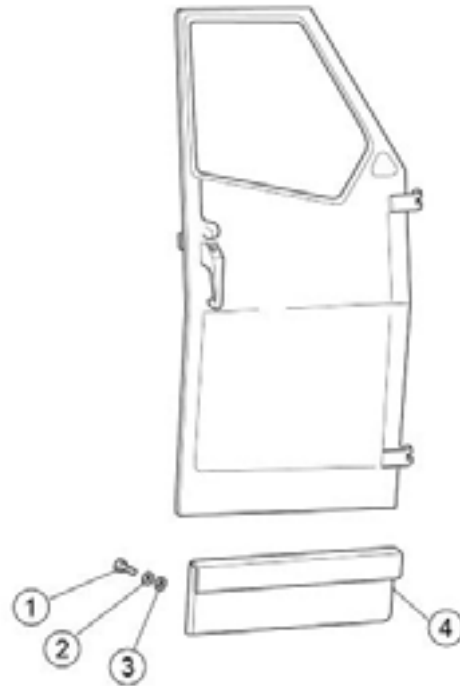


## Front bumper



**KEY:**

1. Elastic plate
2. Bumper
3. Screw
4. Washer
5. Self-tapping screw M3.5x13

**KEY:**

1. Flat washer 4.2x12x1
2. Gasket
3. Self-tapping screw M3.5x13
4. Panel

**REMOVAL:**

Undo the fixing screws of the bumper at the base of the door.



---

Remove the bumper from the base of the door.



Undo the fixing screw, located inside the cab, from the bumper.



Undo the external screw.



Remove the side bumper.

Also repeat the operations from the other side of the vehicle.



**REFITTING:**

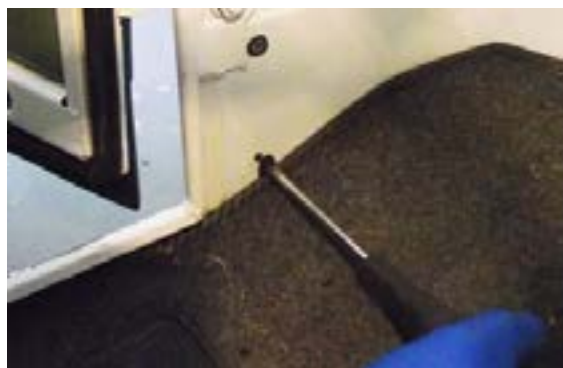
Position the side bumper into place, taking care that it completely covers the fixing bolt of the door to the frame.



Tighten the fixing screw.



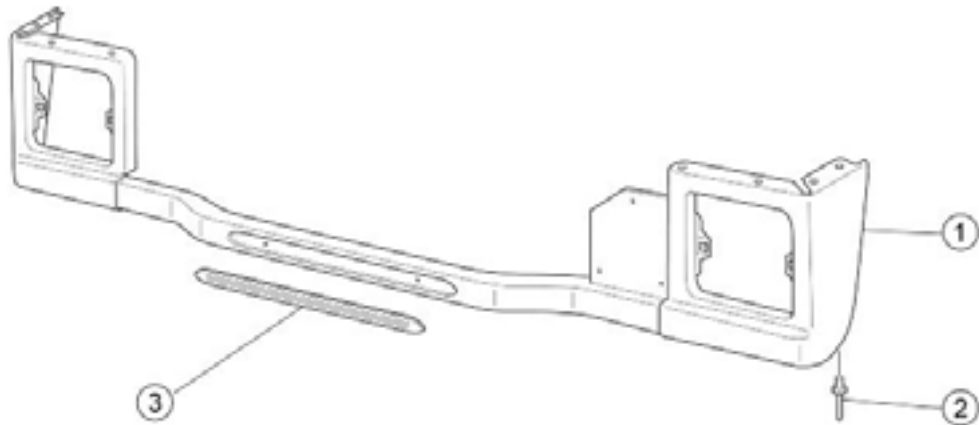
Tighten the fixing screw inside the cab and lock the side bumper.



Tighten the fixing screws and fix the bumper located at the base of the door.



## Rear bumper

**KEY:**

1. Rear bumper
2. Rivet
3. Strip

**REMOVAL:**

Remove the rear lights.

Undo the bolts that secure the bumper to the frame.





Remove the rear bumper.



**REFITTING:**

Approach the bumper to the chassis and lock it by screwing the fixing bolts.

Refit the rear lights.



## Mudguards



**KEY:**

1. Mudguard



2. Flat washer 16x6.5x1.5
3. Screw TE M6x18
4. Mudguard
5. Screw
6. Rivet
7. Rivet
8. Bracket
9. Splash guard
- 10.Flat washer 4.2x12x1
- 11.Plate
- 12.Protective cover
- 13.Protective cover

**FRONT MUDGUARD REMOVAL:**

Remove the side bumper from both sides of the vehicle.

Loosen the fixing screws located in the front inside the cab.



Disconnect the mudguard from the cab.



Disconnect the electrical connection of the horn and remove the mudguard.



---

Undo the fixing screws and remove the horn.



---

**FRONT MUDGUARD REFITTING:**

Tighten the fixing screws and refit the horn.



---

Approach the mudguard to the chassis and attach the electrical connection of the horn.



---

From inside the cab tighten the fixing screws and lock the mudguard.

Refit the side bumper from both sides of the vehicle.



**REAR MUDGUARD REMOVAL:**

Lift the vehicle using the lift.

Undo the fixing nuts of the rear wheel.

**CAUTION**

MAKE SURE THAT THE SIDE ARMS OF THE LIFT ARE CORRECTLY WELDED AND POSITIONED IN CORRESPONDENCE WITH THE LIFTING POINTS.



Remove the rear wheel.



Undo the rivets and remove the rear mudguard with splash guard.

**REAR MUDGUARD REFITTING:**

Tighten the rivets and lock the rear mudguard to the chassis.



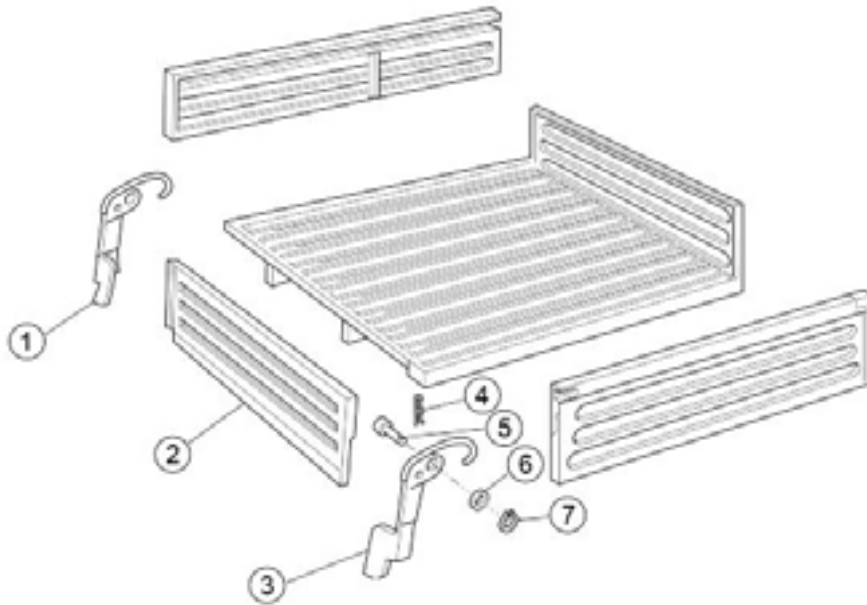
Refit the rear wheel and tighten its nuts.

**Locking torques (N\*m)**

**Rear wheel- Drum  $24 \pm 4$  Nm**



**Rear body**



**KEY:**

1. Handle
2. Rear hatch
3. Handle
4. Cotter pin
5. Pin
6. Washer
7. Ring

**REAR HATCH REMOVAL:**

Remove the fixing bolt of the cable to the dropside.



Remove the fixing bolt to the rear hatch and remove the cable.

Repeat these operations also for the cable located on the other side of the hatch.



With the aid of a screwdriver, remove the locking ring of the pin of the handle.



Remove the washer underneath.



Remove the handle and its washer underneath.  
Also repeat the operations for the handle located  
on the other side.



Remove the lower cotter pin locking the hinge.



With the aid of a hammer and a punch, remove the  
pin.



Also repeat the operations for the fixing located on  
the other side and remove the rear hatch.





---

**REAR HATCH REFITTING:**

Position the rear hatch in its seat correctly in order to align the holes for the insertion of the locking pins to the hinges.

Using a rubber hammer insert the pins.



---

Insert the cotter pins locking the pins.

**N.B.**

**USE NEW COTTER PINS.**



---

Insert the washer on the side pin of the hatch.



---

Insert the handle on the pin.



---

Insert the fixing ring and the washer.  
Also repeat the operations for the handle located  
on the other side of the deck.



Fit the cable to the dropside tightening the fixing  
bolt with its washer.

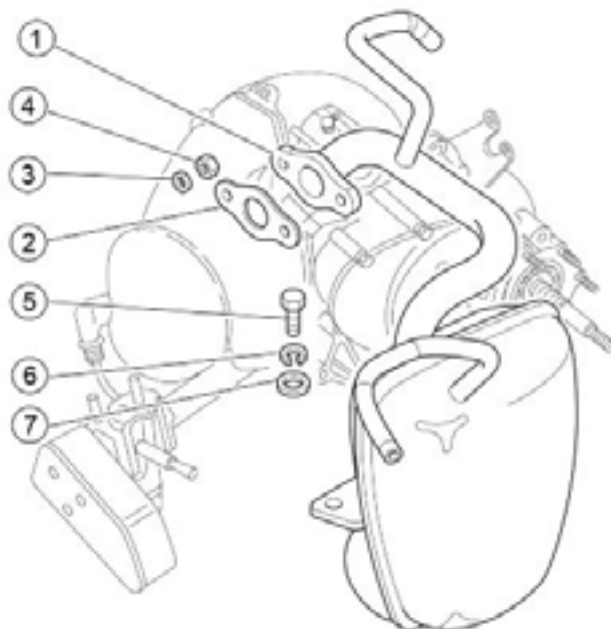


Lock the cable to the rear hatch by tightening the  
fixing bolt with its washer.  
Repeat these operations also for the cable located  
on the other side of the hatch.





## Replacing the exhaust



### KEY:

1. Kat silencer
2. Gasket
3. Toothed washer 6.6x11x0
4. M6 nut
5. Hexagonal screw
6. 13.75x8.15x4.5 flexible washer
7. Flat washer 8.2x20x2.5

### REMOVAL:

Lift the vehicle using the lift.

Disconnect the cap from the spark plug.

### CAUTION

**MAKE SURE THAT THE SIDE ARMS OF THE LIFT ARE CORRECTLY WELDED AND POSITIONED IN CORRESPONDENCE WITH THE LIFTING POINTS.**



Remove the retainer clamp of the pipe to the cleaner.



Disconnect the rubber hose from the cleaner.



Undo the nut of the locking ring of the carburettor to the admission joint.



Partially eject the carburettor with cleaner from the admission joint in order to facilitate the removal of the cooling hood.

**CAUTION**

**BE CAREFUL NOT TO OVERTURN THE CARBURETTOR IN ORDER TO PREVENT LEAKAGE.**



---

Undo the screws fastening the cooling hood to the engine.



Remove the cooling hood.



Undo the fixing screws of the silencer to the engine support.



Undo the fixing nuts of the silencer to the engine head.



---

Remove the left rear wheel.

To access the remaining fixtures of the silencer, it is necessary to offset the fitting of the cleaner; for this, unscrew the fixing screws of the support bridge of the joint.



---

Remove the bridge.



---

Remove the retainer clamps of the rubber sleeve to the secondary air system box cover.



---

Remove the silencer with a sleeve from the secondary air system box cover.



---

Remove the rubber sleeve from the silencer.



For the extraction of the silencer it is necessary to lower the engine.

Hold the engine with a workshop jack.



Undo the fixing screw of the engine support bracket to the frame.



Remove the bracket from the frame.

Repeat these operations to also release the other side of the engine support from the frame.





Lower the engine by operating on the workshop jack.

**CAUTION**

ACT WITH EXTREME CAUTION ON THE WORKSHOP JACK.



Remove the silencer.

**REFITTING:**

Reposition the silencer in its seat.

**CAUTION**

BEFORE PROCEEDING WITH THE REPLACEMENT OF PARTS, MAKE SURE YOU HAVE CORRECTLY PLACED THE SILENCER MATCHING THE FIXING HOLES.



Insert a new gasket on the engine head.



---

Tighten the fixing nuts of the silencer to the engine head.

**Locking torques (N\*m)**

**Silencer - Engine head  $5.9 \pm 1$  Nm**



---

Tighten the fixing screws of the silencer to the engine support.

**Locking torques (N\*m)**

**Silencer - Engine support  $23.6 \pm 1$  Nm**



---

Tighten the fixing screws and remove the secondary air system box cover.



---

Insert the rubber sleeve on the pipe of the silencer.



Insert the sleeve on the secondary air system box cover.



Tighten the cover with the silencer on the secondary air system box cover.



Insert and lock the new retaining clips on the rubber sleeve, silencer side and secondary air system box cover side.

**CAUTION**  
WHEN REFITTING ALWAYS USE NEW CLAMPS.



Refit the cooling hood on the engine, making sure to insert the spark plug in the appropriate hole.





Tighten the fixing screws and lock the cooling hood to the engine.



Lift the engine by operating on the workshop jack.  
Insert the bracket to the chassis.  
Repeat these operations to also release the other side of the engine support from the frame.

**CAUTION**

**ACT WITH EXTREME CAUTION ON THE WORKSHOP JACK.**



Tighten the fixing screw and lock the bracket to the frame.

**Locking torques (N\*m)**

**Engine support bracket - Chassis  $22 \pm 2$  Nm**



Lower and remove the workshop jack.



Refit the cap on the spark plug.



Refit the carburettor on the admission joint.



Tighten the nut of the ring and lock the carburettor to the admission joint.



Refit the rubber hose on the cleaner and secure it using a new clamp.

**CAUTION**  
**WHEN REFITTING ALWAYS USE NEW CLAMPS.**

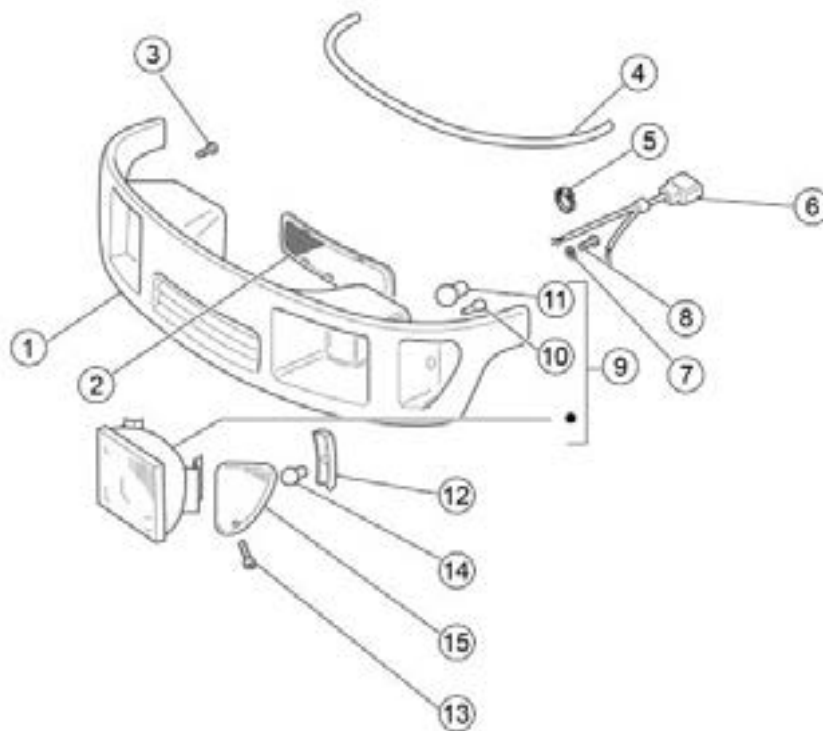


Correctly reposition the fitting of the cleaner and tighten the fixing screws of the supporting bridge of the fitting to the frame.

Refit the left rear wheel.



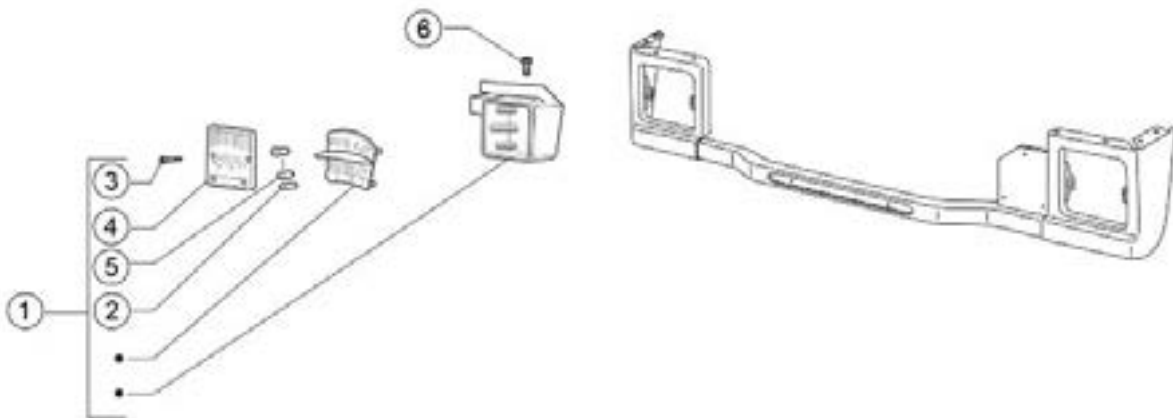
## Light unit



### KEY:

1. Front mask
2. Front mask grille
3. D4x20 screw
4. Gasket
5. Cable tie
6. Cables Gr.
7. Washer
8. Screw
9. Headlight

10. 12V-3W bulb
11. Bulb
12. Bulb holder
13. Self-tapping screw 4.2x16
14. R10W 12v bulb
15. Transparent

**KEY:**

1. Rear headlight.
2. Bulb
3. Self-locking screw
4. Transparent
5. R10W 12v bulb
6. Dowel

---

**FRONT LIGHT UNIT REMOVAL:**

Disconnect the electrical wiring of the front headlight.



Undo the fixing screws of the headlamp internal cover.



Remove the internal cover of the headlamp.



Remove the electrical connections from the headlamp.



Remove the bulb.



Press the headlamp towards the outside to release it.

**CAUTION**

**WHEN CARRYING OUT THIS OPERATION, ANOTHER PERSON SUPPORTING THE HEADLAMP FROM THE OUTSIDE IS NEEDED.**



Remove the headlamp from the outside.



Undo the fixing screws of the transparent of the turn indicator.





---

Remove the transparent of the turn indicator.



---

Remove the bulb holder.



---

Remove the electrical connections from the bulb holder.



---

**FRONT LIGHT UNIT REFITTING:**

Reconnect the electrical connections on the bulb holder.





Insert the bulb holder in its seat.

**CAUTION**

PAY ATTENTION THAT THE PIN ON THE INSIDE OF THE BULB HOLDER FITS PERFECTLY INTO THE HOLE IN THE HOUSING ON THE MASK.



Fit the transparent of the turn indicator and lock it with the fixing screws.



Insert the headlamp from the outside by snap locking it into the mask.



Insert the bulb.



Reconnect the electrical connections to the headlamp present on the cover.



Tighten the fixing screws of the headlamp internal cover.



Reconnect the electrical wiring of the front headlight.  
Adjust the light beam of the headlights.



#### **FRONT MASK REMOVAL**

Unscrew the locking screws of the belt of the door in order to access the fixing of the mask.



Undo the fixing screw located on the upright of the door side frame.



From inside the cab, undo the fixing screws of the mask.



Disconnect all electrical cables of the front light unit.

Remove the mask with the front light unit.

Remove the headlights and the turn indicators.



#### **FRONT MASK REFITTING:**

Refit the headlights and the turn indicators.

Insert the mask in its seat in front of the cab.

From inside the cab, tighten the fixing screws of the mask.

#### **CAUTION**

**PAY ATTENTION NOT TO PRESS WITH THE MASK ON THE ELECTRICAL WIRING; PASS THEM THROUGH THE HOUSING OF THE HEADLAMPS AND TURN INDICATORS.**



Tighten the fixing screw located on the upright of the door side frame.



Tighten the fixing screws of the belt of the door.



**REAR LIGHT UNIT REMOVAL:**

Undo the fixing screws of the rear light transparent.



Remove the transparent.



From the rear, remove the protective cap of the electrical wiring.



Disconnect the electrical wiring of the light.



Remove the rear light.



**REAR LIGHT UNIT REFITTING:**

Reinsert the rear light in its housing on the bumper.



---

Reconnect the electrical wiring of the rear light.



---

Refit the rubber cap on the connector.



---

Refit the transparent of the light and lock it by tightening the fixing screws.





**KEY:**

1. Internal light
2. Screw

From inside the cab, disconnect the transparent.



Disconnect the electrical connections and remove the bulb.





---

Undo the fixing screws and remove the internal light.



**INTERNAL COURTESY LIGHT REFITTING:**

Refit the internal light in its seat and lock it by tightening its fixing screws.



Refit the bulb and reconnect the electrical connections.



Snap in the transparent.



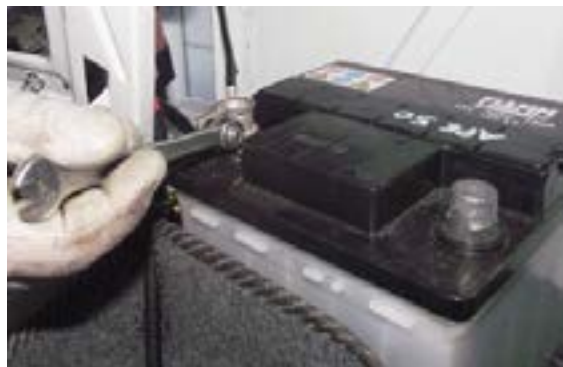
## Instrument panel

### REMOVAL:

The following steps describe how to properly remove the dashboard and various components.



Remove the negative battery terminal clamp (-).



Disconnect the electric connection for the cigarette lighter.



Undo the two side fixing screws of the upper central dashboard.



Remove the ash tray.



Undo the central fixing screw and remove the upper central instrument panel.



Undo the fixing screws of the edge.



Remove the edge.



From under the instrument panel, unscrew and remove the connection of the odometer.



On the rear wheel, loosen the adjusting nut of the brake transmission.



From the brake lever on the handlebar, remove the transmission of the front brake.

**CAUTION**

**PAY ATTENTION TO THE RELEASE OF THE BUSHING ON THE BRAKE.**



Undo the fixing screws and lift the handlebar cover.





---

Disconnect the electrical connections of all the switches.



---

Press from inside the handlebar coverage, remove all the switches.



---

Remove the central bulb from the instrument panel.



---

Remove all remaining side lamps from the instrument panel.



Remove the handlebar cover and undo the fixing nut of the instrument panel.



Remove the instrument panel.



**N.B.**

**TO REMOVE THE INSTRUMENT PANEL ONLY, IT IS NOT NECESSARY TO REMOVE THE HANDLE COVER; IT IS POSSIBLE TO REMOVE THE FIXING NUT BY ACTING UNDER THE HANDLEBAR.**



Pass the electrical wiring inside the hole present on the dashboard, so as to facilitate the removal of the latter.



---

Remove the rubber tube of the window washer.



---

Undo the fixing screw of the dashboard.



---

Using a suitable lever release the dashboard from the cab, removing the rubber plugs.



---

Remove the dashboard from the cab.

**N.B.**  
**AT THE MOMENT OF EXTRACTION OF THE DASHBOARD,**  
**THE TUBE WILL ALSO BE DETACHED FROM THE LAT-**  
**TER.**





---

Undo the fixing screws of the upper central cover.



Remove the upper central cover.



Offset the carpet on the floor and undo the screws holding the lower central cover.



Remove the lower central cover.



Undo the fixing screws and remove the sun screens.



**REFITTING:**

Tighten the fixing screws and refit the sun screens.



Reposition the lower central cover in its seat covering all transmissions and lock it by tightening the fixing screws.



Reposition the upper central cover in its seat, taking care that it goes down to cover the lower cover. Tighten the fixing screws and lock the upper central cover.



---

Reposition the dashboard in its seat inside the cab, inserting the air tube in its lower part.



Press the rubber plugs in their seats to fix the dashboard.



Tighten the fixing screw and lock the dashboard.



Pass the rubber hose through the appropriate hole on the dashboard to the and reconnect it properly to the window washer.



Pass the electrical cables inside the hole on the dashboard.



Refit the instrument panel on the cover of the handlebar and lock it by screwing the relative nut.



Reposition all the bulbs in the instrument panel.

**CAUTION**

**MATCH THE NUMERICAL INSTRUCTIONS ON THE WIRING OF THE BULBS WITH THOSE ON THE INSTRUMENT PANEL.**



By lightly pressing from the outside, refit all the switches.



---

Reconnect the electrical connections of all the switches.



Correctly reposition the cover in its seat above the handlebar and lock it by tightening the fixing screws.



Refit on the appropriate lever on the handlebar the transmission of the front brake.  
Adjust the transmission.



From under the instrument panel, connect the connection of the odometer, after having passed it correctly through the hole in the dashboard.





---

Reposition the internal edge of the cab.



Tighten the fixing screws and lock the edge.



Tighten the central screw of the upper dashboard.



Tighten the side fixing screws of the upper dashboard to the edge.



Refit the ash tray.

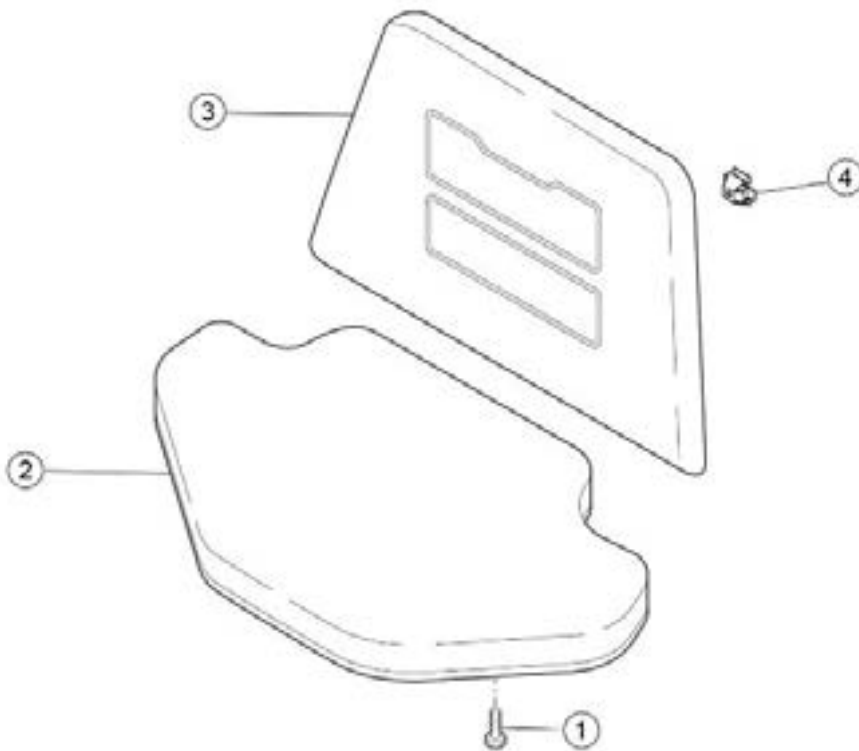


Connect the electric connection for the cigarette lighter.

Connect the negative battery terminal clamp (-).



## Sedili - Cinture di sicurezza



### KEY:

1. Bolt



2. Cushion
3. Seat back
4. Clip

**REMOVAL:**

Undo the fixing bolts of the seat.



Remove the seat.



Lever with your hands, disconnect the seat back from the cab and remove the clips underneath.



**REFITTING:**

Apply the clips and the seat back in its seat inside the cab.



Lock the seat back by pushing it until it clicks.



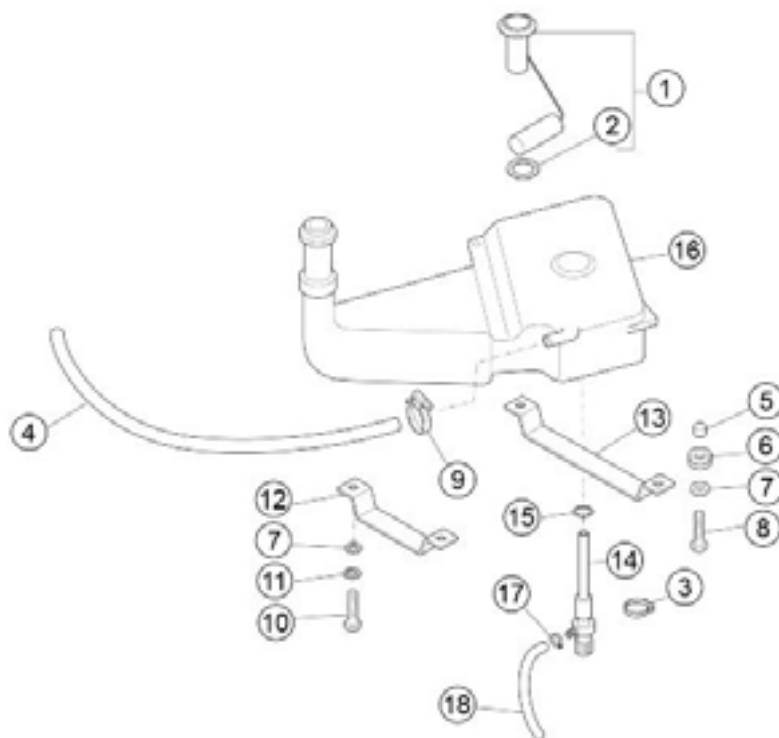
Place the seat in place.



Tighten the fixing bolts and lock the seat.



## Serbatoio carburante

**KEY:**

1. Reserve indic.
2. Gasket
3. Clamp
4. Pipe
5. Spacer
6. Buffer
7. Elastic washer 6.4x11.8x1
8. Screw TE M6x18
9. TCEI M6x20 Screw Clamp
10. Elastic washer 6.4x11.8x1
11. Clamp
12. Clamp
13. Cock
14. Gasket
15. Fuel tank
16. Clamp
17. Pipe
18. Pipe

**REMOVAL:**

Lift the vehicle using the lift.

Close the valve underneath the tank.

**CAUTION**

**MAKE SURE THAT THE SIDE ARMS OF THE LIFT ARE CORRECTLY WELDED AND POSITIONED IN CORRESPONDENCE WITH THE LIFTING POINTS.**



Remove the retainer clamp of the fuel pipe.



Prepare a suitable container for the collection of the fuel and remove the rubber hose.

**CAUTION**

**ALWAYS WEAR GLOVES IN ORDER TO AVOID CONTACT WITH THE FUEL.**

**CAUTION**

**PREVENT THE FUEL COMING INTO CONTACT WITH FLAMES OR SIMILAR.**



Hold the tank with a workshop jack.

**CAUTION**

**ACT WITH EXTREME CAUTION ON THE WORKSHOP JACK.**



Tighten the fixing screws and remove the front clamp.



Unscrew the fixing screws and remove the rear clamp.



Carefully lower the workshop jack and remove the fuel tank.  
Empty the tank.



#### **REFITTING:**

Position the tank in its seat supporting it with a workshop jack.

Tighten the fixing screws and lock the rear support clamp of the tank.



Tighten the fixing screws and lock the front clamp.



Replace the rubber hose on the tap and secure it using a new clamp.

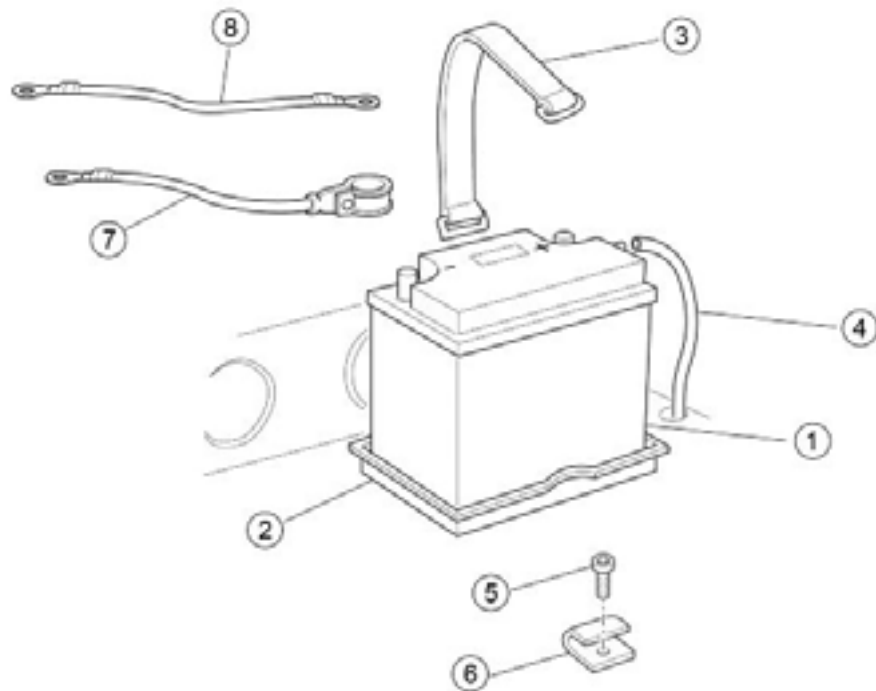
**N.B.**  
**ALWAYS USE NEW CLAMPS.**



Open the fuel cock.



## Batterie

**KEY:**

1. Battery
2. Tray
3. Belt
4. Breather tube
5. Rivet
6. Plate
7. Battery cable
8. Battery cable

**REMOVAL:**

Disconnect the strap to release the battery.





Undo the nut and disconnect the positive battery cable (+).



Undo the nut and disconnect the negative battery cable (-).

Remove the battery, lifting it upwards.



**REFITTING:**

Reposition the battery in its seat.

Connect the negative battery cable (-).



Connect the positive battery cable (+).



Attach the belt to the appropriate hook to lock the battery.



# INDEX OF TOPICS

**P**RE-DELIVERY

**PD**

**CAUTION**

**(FOR VEHICLES EQUIPPED WITH "MARELLI" ALTERNATOR): AT THE TIME OF INSTALLING THE BATTERY ON THE VEHICLE OR IN THE EVENT OF STARTING WITH AN AUXILIARY BATTERY AND STEERING WHEEL CABLES, TAKE GREAT CARE TO NOT INVERT THE POLARITY': THIS RESULTS IN A FAST BURNING OF THE BATTERY-ALTERNATOR CONNECTING CABLE WITH RISK OF FIRE.**

**CAUTION**

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

**WARNING**

**BEFORE RECHARGING THE BATTERY, REMOVE THE COVERS OF EACH CELL. KEEP OPEN FLAMES OR SPARKS AWAY FROM THE BATTERY DURING CHARGING. REMOVE THE VEHICLE BATTERY, DISCONNECTING THE NEGATIVE CABLE FIRST.**

**WARNING**

**WHEN INSTALLING THE BATTERY, ATTACH THE POSITIVE LEAD FIRST AND THEN THE NEGATIVE LEAD.**

**WARNING**

**BATTERY ELECTROLYTE IS TOXIC AND IT MAY CAUSE SERIOUS BURNS. IT CONTAINS SULPHURIC ACID. AVOID CONTACT WITH EYES, SKIN AND CLOTHING.**

In case of contact with eyes or skin, rinse with abundant water for about 15 minutes and seek medical attention at once.

If it is swallowed, immediately drink large quantities of water or milk. Following milk of magnesia, beaten egg or vegetable oil. Seek immediate medical attention.

The batteries produce explosive gas; Keep them away from naked flames, sparks and cigarettes. If the battery is charged in a closed place, take care to ensure adequate ventilation. Always protect your eyes when working close to batteries.

**WARNING**

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

**WARNING**

**DO NOT REMOVE THE OIL COVER IMMEDIATELY AFTER AN ACTIVITY WITH THE ENGINE AT FULL SPEED AND/OR WITH THE ENGINE RUNNING. THE HEATED OIL MAY LEAK, WITH THE RISK OF BURNING**

**WARNING**

**CHECK AND ADJUST TYRE PRESSURE WITH TYRES AT AMBIENT TEMPERATURE.**

**WARNING**

**NEVER EXCEED THE RECOMMENDED INFLATION PRESSURES OR TYRES MAY BURST. DO NOT BE ABOVE THE TYRE DURING INFLATION.**

**WARNING**

**BE VERY CAREFUL WHEN HANDLING FUEL.**

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## General inspection

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### Vehicle external appearance

Check for any damage to the exterior of the vehicle.

- Body Painting
- Mouldings
- Glass windows
- Exterior mirrors
- Headlamp glass
- Bumper



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### External bodywork

Open and close the door with key.

Open and close each door with the internal lock.



Release, for a double check, the tailboard locking levers.

Open, for a double check, the tailboard.

Check correct operation and, if necessary, lubricate.



### External vehicle cleaning

Carry out the following operations:

1. With a low-pressure water jet, soften and rinse caked dirt.
2. Wash the vehicle with a soft sponge and a mix of water and car shampoo.
3. Rinse the car shampoo with a low-pressure water jet.
4. Use a specific compound for any grease or tar marks.
5. Thoroughly rinse the vehicle with water.
6. Dry the vehicle wiping from the top to the bottom using a clean shammy cloth or a soft absorbing cloth.
7. Check that water does not leak in.
8. Remove all the check labels from the vehicle window glasses or mirrors

**9. Adjust mirrors aiming.****Internal vehicle cleaning**

Carry out the following operations:

1. Remove any trace of grease or dirt off the internal surfaces.
2. Completely remove all plastic covers from seats, sun screens, instruments panel.
3. Clean the upholstery with a vacuum cleaner.
4. Clean the carpets with a vacuum cleaner.
5. Remove all the shipping information labels.
6. Clean all glasses and mirrors with a specific compound.
7. Check that all the optional parts are correctly fitted and that they work properly.

**User manual****Use and Maintenance Booklet - Warranty booklet**

Ensure that the following are placed in the glove box or on the oddment storage shelf:

- Use and maintenance booklet
- Warranty booklet

**Tools**

Check that the vehicle is equipped with the following:

Toolkit bag, wheel spanner, spark plug wrench, screwdriver and jack.



## Tyre pressure

### Tyre pressure

Check inflation pressure.

Adjust inflation pressure of each tyre to the prescribed value.

Tyre pressure is also indicated on the specific adhesive label affixed to the vehicle.



### TYRE PRESSURE

Specification	Desc./Quantity
Rear tyre pressure	2.2 bar
Front tyre pressure	1.8 bar

## Nut tightening

### Loosening wheel fittings

With a specific key, check that the hub nuts of the wheels are not loose.



With a specific key, check that the fixings of the wheels are not loose.





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## Horn operation

Check if the horn sounds every time you press the button.



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## Wipers operation

### Operation of windscreen wiper and washer

Check that:

- The windshield wipers work smoothly.
- The washer fluid is sprayed in the centre of the windscreen.



### Adjusting windscreen washer orientation

Check the position of the spray nozzles of the windscreen washer.

Insert a straight pin in the spray nozzle, then adjust its position.



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## Turn signals operation

Check the operation of the external turn indicators (left and right).



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## External lights

Check the operation of the following external lights:

- Headlamps, high and low beams.
- Rear lights and stop lights.
- License plate lights.
- Reverse gear light.



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## Headlight adjustment

### Headlamp aiming

To control the orientation of the headlamps:

1. Park the vehicle on a level surface.
2. Act several times on the front suspension.
3. Shake the vehicle sideways repeatedly, then allow the vehicle to return to its normal position.
4. Clean the headlight lenses, then place the specific testing tool in front of the lights and check that the headlights are aimed correctly.



---

## Warning lights

### Warning lights (instrument panel)

Check the operation of warning lights. (The ignition switch must be set to "ON").

**Oil pressure warning light**

**Low fuel warning light**

**Turn indicator flashing**

**Light warning lights**



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## Chassis inspection

Perform an integrity check of the lower part of the body.

### Points of support for security support with double post lift.

The points of support are arranged in four positions, two on the right side and two on the left side. Position the supports of the front under the upright of the body.



Position the supports of the rear part on the central part of the frame.



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## Leakages

Check for any fluid leaks from the following components:

- Engine
- Transmission
- Differential
- Fuel pipe
- Fuel tank and filler plug



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## Engine housing inspection

### Battery connections

Check the following:

- Corroded or loose connections.
- Battery terminals unthreaded due to loosening.

If necessary, tighten the connections or the terminal.



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## Window cleaning liquid

### Washer fluid in the storage reservoir

The container of the washer fluid is positioned internally to the driver's cab, in the lower right in the rear part.

Check the level:

If necessary, add washer fluid.



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## Engine idle

### IDLE ADJUSTMENT

Heat the vehicle for the time necessary to activate the catalytic converter.

Wait for a minute for the idle to stabilise.  
Without ever operating the accelerator and using the appropriate flow screw, bring the engine speed to  $1350 \pm 100$  rpm.



Operate the throttle grip by slowly speeding up the engine to a speed of 4000 rpm. and return to the closed position:

Check that the idle speed remains at the previously established value, otherwise repeat the procedure.



## Engine oil

### LEVEL CHECK

Start the engine and stop it after having been running for about 1 minute at least.

Remove the control rod and check the oil level.

The oil level should be between the two notches of the maximum and minimum.

Restore oil level if necessary and check for leaks.

#### WARNING



**DO NOT REMOVE THE OIL COVER IMMEDIATELY AFTER AN ACTIVITY WITH THE ENGINE AT FULL SPEED AND/OR WITH THE ENGINE RUNNING. THE HEATED OIL MAY LEAK, WITH THE RISK OF BURNING.**

### REPLACEMENT

Use a suitable container to collect the differential oil.

The oil change should be made with the engine warm.



Remove the filler plug with the control rod from the upper part of the differential crankcase.

**WARNING**

**DO NOT REMOVE THE OIL COVER IMMEDIATELY AFTER AN ACTIVITY WITH THE ENGINE AT FULL SPEED AND/OR WITH THE ENGINE RUNNING. THE HEATED OIL MAY LEAK, WITH THE RISK OF BURNING.**



Remove the drain plug and drain all the oil in the prepared container.

**REFILL**

Tighten the drain plug and introduce new oil.

Requires approximately 0.600 litres for the engine and about 0.300 litres for the differential.

**Locking torques (N\*m)****Differential oil drain plug 20 to 25 Nm**

Start the engine and stop it after having been running for about 1 minute at least.

Check the oil level and top up if necessary.

Verify that there are no leaks.

Use specific oils.

Tighten the filler plug.

**Livello liquido freni**

Check the level.

If necessary reset the level by adding the specified brake fluid.



---

## Brake pedal adjustment

### Operation of the service and parking brake

- The vehicle must brake in a straight line.
- Park the vehicle on a slope and operate the parking brake. The vehicle must remain in position.
- The lever of the parking brake must rise from 6 to 10 notches when a force of 20 kg is applied.



### Adjustment of service and parking brake

Make adjustments by turning the adjustment nuts of the parking brake control transmission positioned below the driver's seat.



### Brake Pedal

Check the free travel of the brake pedal.



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## Aesthetic inspection

Check for any damage to the exterior of the vehicle and the vehicle body.





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## Road test

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### Operation of the engine at minimum and accelerator partial opening

#### At idle

Note the idle with engine fully warmed up.

#### For partially open throttle

The performance must be regular and free of breaks. The speed must be kept constant at 40 to 50 km/h.

### Operation of the engine with vehicle load and at cruising speed

Functioning Checking:

#### With vehicle load

Accelerate up to 3/4 of gas. The vehicle must accelerate smoothly without hesitation or fatigue.

#### At cruising speed

The vehicle must operate smoothly without any hesitation or oscillation.

#### Vibration and noise

Check for any vibration or noise. The vehicle must operate without any vibration or abnormal noise whether in the frame or from the bodywork.



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## STEERING CONTROL

Rotate the handle alternately right and left to check that the movement is fluid and smooth and without interference.



## INDEX OF TOPICS

TIME-SHEET

TEMP

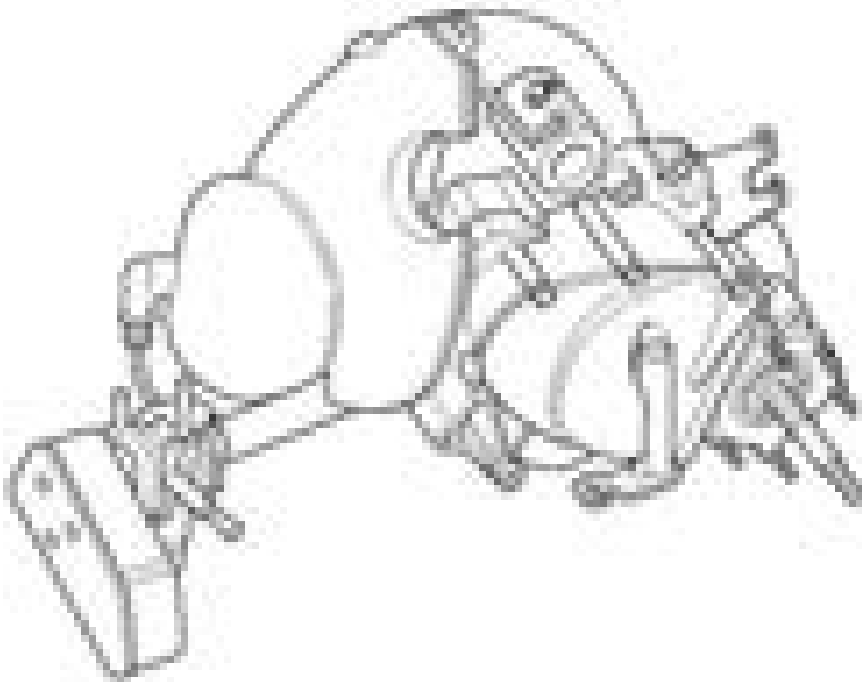
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**Engine**


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**Engine, assembly**

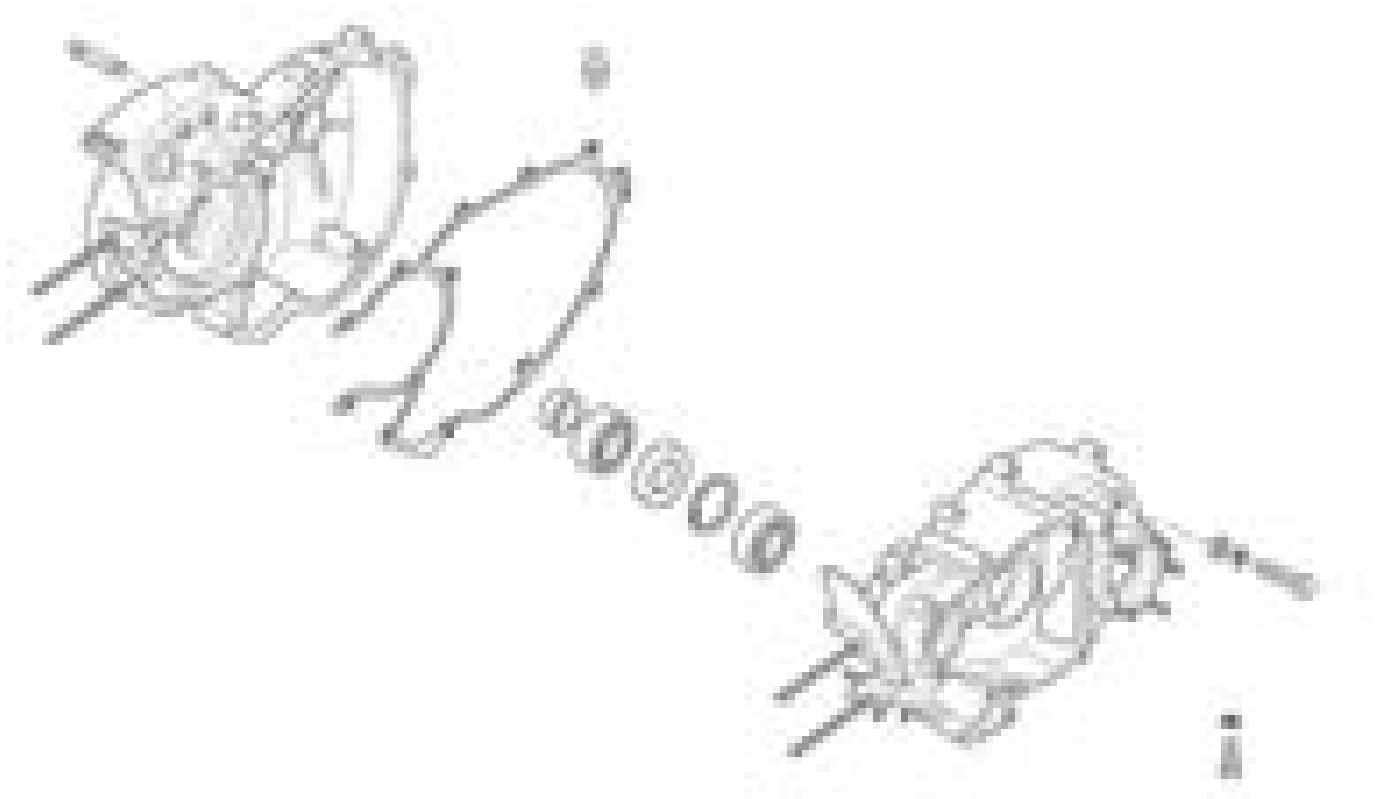

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**COMPLETE ENGINE**

	<b>Code</b>	<b>Action</b>	<b>Duration</b>
1	001001	ENGINE FROM THE FRAME - REPLACEMENT	
2	001032	ENGINE SUPPORT - REPLACEMENT	
3	003016	ENGINE SUPPORT FRONT BUFFERS - REPLACEMENT	
4	003017	ENGINE SUPPORT REAR BUFFER - REPLACEMENT	
5	003052	IGNITION TIMING	
6	003057	ENGINE ANCHORING - NUTS TIGHTENING	
7	003064	Engine oil - Replacement	

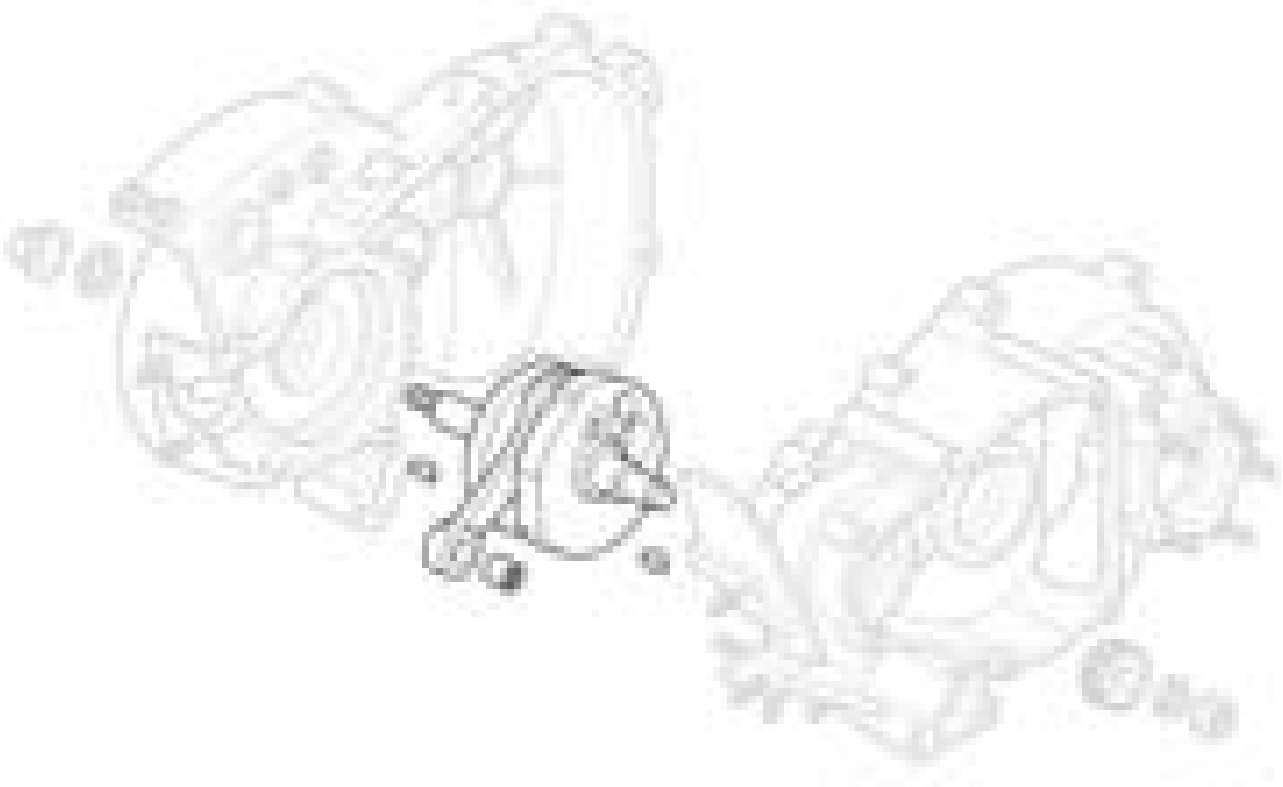
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**Crankcase**



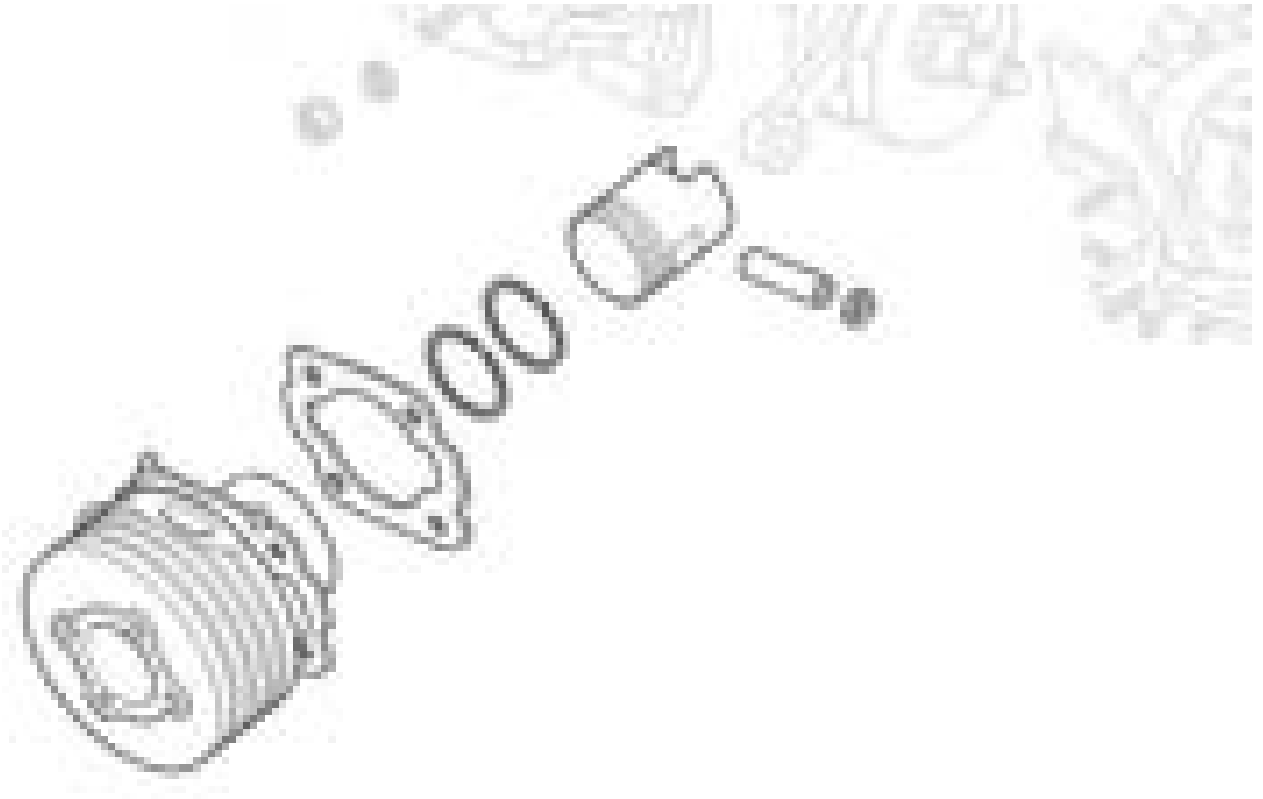
**CRANKCASE**

	<b>Code</b>	<b>Action</b>	<b>Duration</b>
1	001118	Main bearings - Replacement	
2	001120	ENGINE CRANKCASE BEARINGS - REPLACEMENT	

**Crankshaft****CRANKSHAFT**

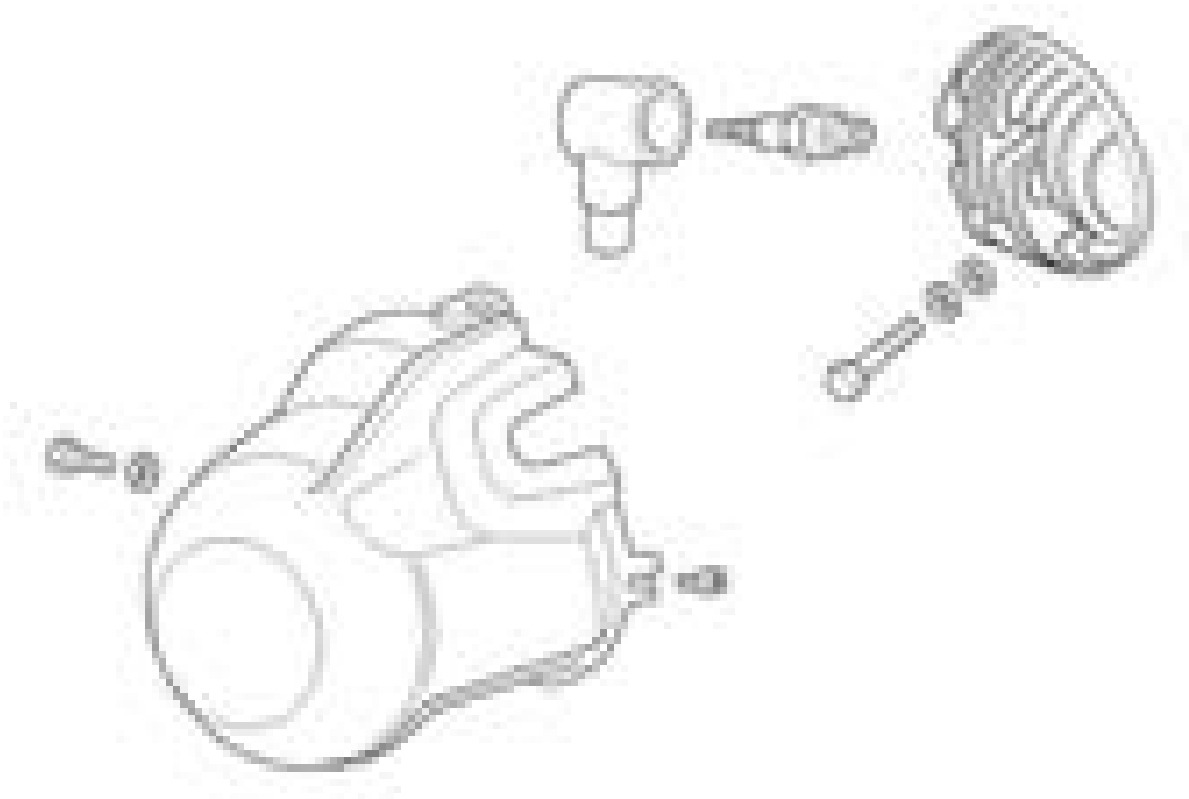
	<b>Code</b>	<b>Action</b>	<b>Duration</b>
1	001101	CRANKSHAFT - OVERHAUL	
2	001117	CRANKSHAFT - REPLACEMENT	

### Cylinder-piston-wrist pin unit



#### CYLINDER - PISTON - PIN

	<b>Code</b>	<b>Action</b>	<b>Duration</b>
1	001002	CYLINDER PISTON - REPLACEMENT	
2	001107	CYLINDER / PISTON - INSPECTION / CLEANING	

**Cylinder head cover****HEAD COVER**

	<b>Code</b>	<b>Action</b>	<b>Duration</b>
1	001093	Spark plug - Replacement	
2	001094	Spark plug hood - Replacement	
3	001097	COOLING HOOD - REPLACEMENT	
4	003056	HEAD/CYLINDER - TIGHTENING	



**Oil pump****OIL PUMP**

<b>Titolo</b>	<b>Durata/Valore</b>	<b>Testo Breve (&lt; 4000 car.)</b>	<b>Indirizzo Immagine</b>
OIL PUMP			

---

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