PIAGGIO

SERVICE STATION MANUAL

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Carnaby 125 - 200

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PIAGGIO & C. S.p.A. - After-Sales
V.le Rinaldo Piaggio, 23 - 56025 PONTEDERA (Pi)

SERVICE STATION MANUAL
Carnaby 125 - 200

This service station manual has been drawn up by Piaggio & C. Spa to be used by the workshops of Piaggio-Gilera dealers. This manual is addressed to Piaggio service mechanics who are supposed to have a basic knowledge of mechanics principles and of vehicle repairing techniques and procedures. Any significant changes made to the vehicle characteristics or to specific repair operations will be promptly communicated by updates to this manual. Nevertheless, no work can be satisfactory if the necessary equipment and tools are not available. It is therefore advisable to read the sections of this manual relating to special tools as well as the tool catalogues.

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.

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

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

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

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

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INDEX OF TOPICS

CHARACTERISTICS	CHAR

Rules

This section describes general safety rules for any maintenance operations performed on the vehicle.

Safety rules

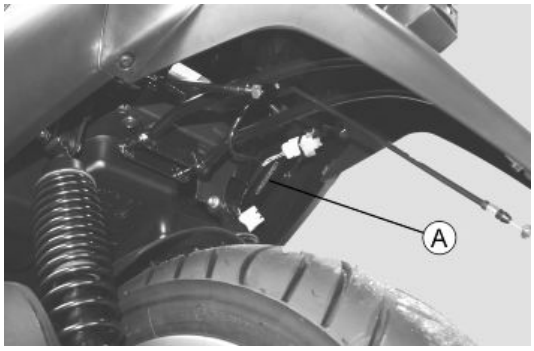
- If work can only be done on the vehicle with the engine running, make sure that the premises are well-ventilated, using special extractors if necessary; never let the engine run in an enclosed area. Exhaust fumes are toxic.
- The battery electrolyte contains sulphuric acid. Protect your eyes, clothes 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.
- Fuel is highly flammable and it can be explosive given some conditions. Do not smoke in the working area, and avoid naked flames or sparks.
- Clean the brake 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 friction material. Even though the latter contains no asbestos, inhaling dust is harmful.

Maintenance rules

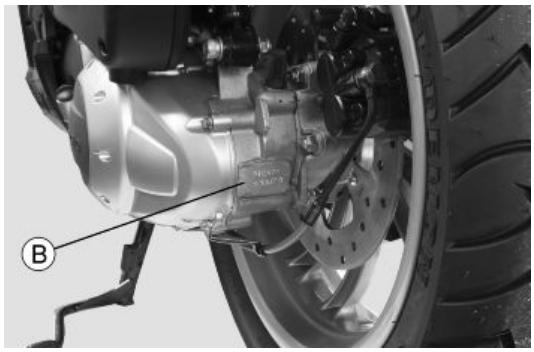
- Use original PIAGGIO spare parts and lubricants recommended by the Manufacturer. Non-original or non-conforming spares may damage the vehicle.
- Use only the appropriate tools designed for this vehicle.
- Always use new gaskets, sealing rings and split pins upon refitting.
- After removal, clean the components using non-flammable or low flash-point solvents. Lubricate all the work surfaces, except tapered couplings, before refitting these parts.
- After refitting, make sure that all the components have been installed correctly and work properly.
- For removal, overhaul and refit operations use only tools with metric measures. Metric bolts, nuts and screws are not interchangeable with coupling members with English sizes. 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 electric connections have been made properly, particularly the ground and battery connections.

Vehicle identification

The chassis prefix «**A**» is located near the right shock absorber connection to the frame.



The engine prefix «**B**» is stamped near the left shock absorber lower support.



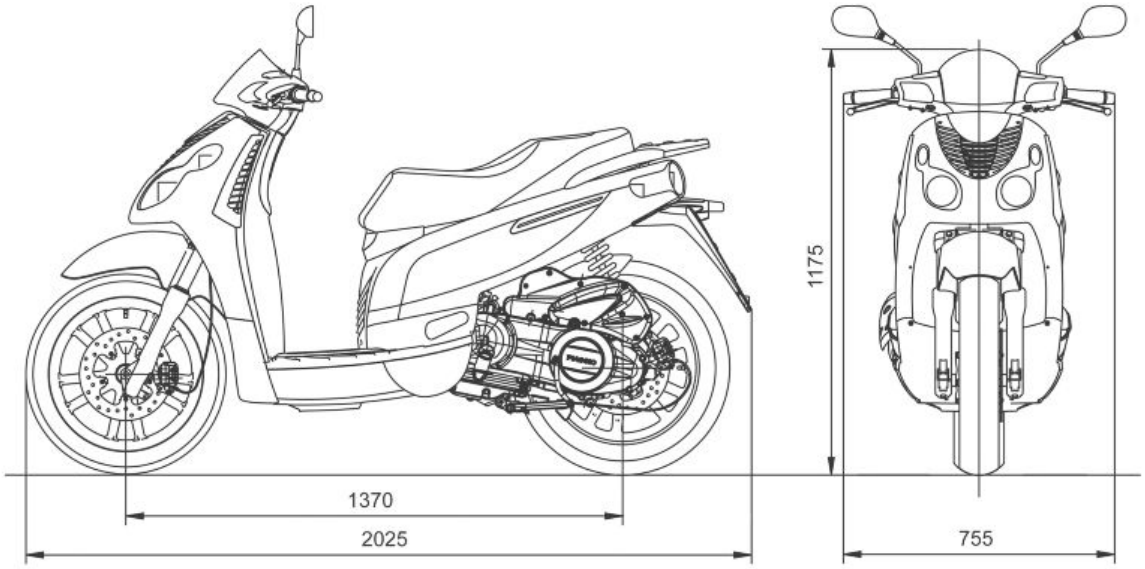
VEHICLE IDENTIFICATION 125

Specification	Desc./Quantity
Frame prefix	ZAPM 60200
Engine prefix	M28FM

VEHICLE IDENTIFICATION 200

Specification	Desc./Quantity
Frame prefix	ZAPM 60100
Engine prefix	M601M

Dimensions and mass



WEIGHTS AND DIMENSIONS 125

Specification	Desc./Quantity
Kerb weight	154 ± 5 kg
Maximum weight allowed	350 kg
Overall height	1.175 mm
Width	755 mm
Wheelbase	1.370 mm
Length	2,025 mm

WEIGHTS AND DIMENSIONS 200

Specification	Desc./Quantity
Kerb weight	154 ± 5 kg
Maximum weight allowed	350 kg
Overall height	1.175 mm
Width	755 mm
Wheelbase	1.370 mm
Length	2,025 mm

Engine

ENGINE 125

Specification	Desc./Quantity
Type	Single-cylinder, 4-stroke
Cubic capacity	124 cm³
Bore x stroke	57.0 x 48.6 mm
Compression ratio	12 ± 0.5: 1
Engine idle speed	1650 ± 100 rpm
Timing system	4 valves, single overhead camshaft, chain-driven.
Valve clearance	Inlet: 0.10 mm Outlet: 0.15 mm
Max. Power	11 kW at 9,750 rpm
MAX. torque	12 Nm at 8,000 rpm

Specification	Desc./Quantity
Lubrication	Engine lubrication with lobe pump (inside crankcase) controlled by a chain with double filter: mesh and paper.
Lubrication pressure	4 bar
Minimum lubrication pressure (100° C)	0.8 bar
Fuel supply	KEIHIN CVEK 30 carburettor and electrical fuel pump.
Cooling	Forced-circulation coolant system.
Fuel	Unleaded petrol (95 RON)
Exhaust muffler	absorption-type exhaust muffler with catalytic converter.
Emission regulations	EURO 3

ENGINE 200

Specification	Desc./Quantity
Type	Single-cylinder, 4-stroke
Cubic capacity	198 cm³
Bore x stroke	72 x 48.6 mm
Compression ratio	11 ± 0.5 : 1
Engine idle speed	1650 ± 100 rpm
Timing system	4 valves, single overhead camshaft, chain-driven.
Valve clearance	Inlet: 0.10 mm Outlet: 0.15 mm
MAX. power	14.5 kW at 9,000 rpm
MAX torque	16.5 Nm at 7.250 rpm
Lubrication	Engine lubrication with lobe pump (inside crankcase) controlled by a chain with double filter: mesh and paper.
Lubrication pressure	4 bar
Minimum lubrication pressure (100° C)	0.8 bar
Fuel supply	KEIHIN CVEK 30 carburettor and electrical fuel pump.
Cooling	Forced-circulation coolant system.
Fuel	Unleaded petrol (95 RON)
Exhaust muffler	absorption-type exhaust muffler with catalytic converter.
Emission regulations	EURO 3

Transmission

TRANSMISSION

Specification	Desc./Quantity
Transmission	Automatic expandable pulley variator with torque server, V-belt, self-ventilating dry automatic centrifugal clutch and transmission housing with forced-circulation air cooling.
Final reduction	Gear reduction unit in oil bath.

Capacities

CAPACITY

Specification	Desc./Quantity
Engine oil	1.10 l
Transmission oil	250 cm³
Cooling system fluid	~ 2 l
Fuel tank (reserve)	~ 10 l (2 l)

Electrical system

ELECTRICAL SYSTEM 125

Specification	Desc./Quantity
Start-up	Electric
Ignition	Capacitive discharge ignition, with variable advance and separate HV coil.
Ignition advance	10° at 2.000 rpm - 29° at 6.750 rpm

Specification	Desc./Quantity
Spark plug	CHAMPION RG4HC
Alternative spark plug	NGK CR8EB
Battery	Sealed, 12 V / 10 Ah

ELECTRICAL SYSTEM 200

Specification	Desc./Quantity
Start-up	Electric
Ignition	Capacitive discharge ignition, with variable advance and separate HV coil.
Ignition advance	10° at 2,000 rpm - 26° at 6,750 rpm
Spark plug	CHAMPION RG4HC
Alternative spark plug	NGK CR8EB
Battery	SEALED 12V / 12Ah BATTERY

Frame and suspensions

CHASSIS AND SUSPENSIONS

Specification	Desc./Quantity
Chassis	Tubular and sheet steel.
Front suspension	Hydraulic telescopic fork with Ø 35-mm stem
Front suspension travel	104 mm
Rear suspension	Two double-acting shock absorbers with preloading adjustment in 4 positions.
Rear suspension travel	- mm

Brakes

BRAKES

Specification	Desc./Quantity
Front brake	Ø 260-mm disc brake with hydraulic control activated by handlebar right lever.
Rear brake	Ø 260-mm disc brake with hydraulic control activated by handlebar left lever.

Wheels and tyres

WHEELS AND TYRES

Specification	Desc./Quantity
Wheel rim type	Light alloy rims.
Front rim	16" x 3.00
Rear rim	16" x 3.00
Front tyre	Tubeless, 110/70 - 16" 52P
Rear tyre	Tubeless, 130/70 - 16" 61P
Front tyre pressure (with passenger)	2 bar (2 bar)
Rear tyre pressure (with passenger)	2.2 bar (2.3 bar)

N.B.

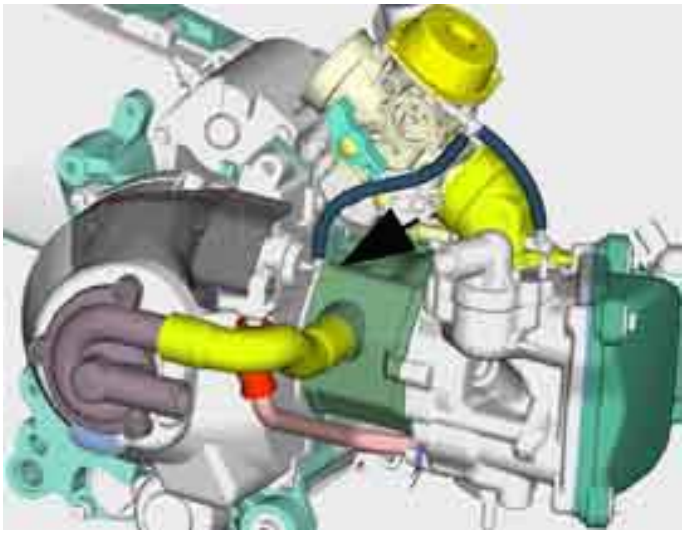
CHECK AND ADJUST TYRE PRESSURE WITH TYRES AT AMBIENT TEMPERATURE. REGULATE PRESSURE ACCORDING TO THE WEIGHT OF THE RIDER AND ACCESSORIES

Secondary air

The SAS for LEADER engines operates in a similar manner to the SAS for 2T engines.

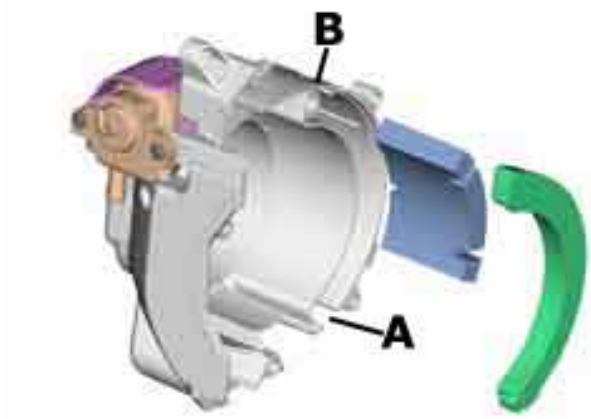
The differences are the following:

instead of entering through the muffler as for 2T engine, the secondary air enters directly in the discharge pipe on the head.



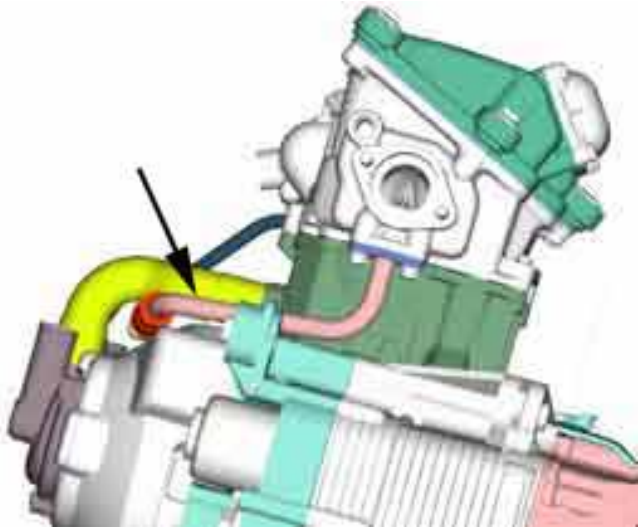
The 2T reed valve has a diaphragm. The unit, indicated by an arrow in the figure, has a cut-off connected to the depression intake on the inlet manifold that cuts the air inlet in deceleration, to avoid explosions in the muffler.

Air is drawn through the opening «**A**», goes through the first filter and is channelled through the opening «**B**».



Air gets to the second filter «**B**» through the opening shown in the figure. Now, the filtered air enters the diaphragm device, and then is channelled to the head.

The air passes through a rigid pipe connected to the head and reaches a discharge joint in order to supply oxygen to the unburned gases before the catalytic converter, thus favouring an improved reaction of the catalytic converter.



Carburettor

125cc Version

Kehin

CARBURETTOR KEIHIN

Specification	Desc./Quantity
Type	Depression carburettor
Model	CVK 30
Body stamping	CVK

Specification	Desc./Quantity
Tapered pin stamping	306D
CUT-OFF device	Not present
Diffuser	Ø 29
Maximum jet	98
Minimum jet	35
Max. air jet	70
Minimum air jet	130
Throttle valve spring	100 ÷ 160 g
Minimum mixture set screw initial opening	2
Tapered pin	Ø 2.45
Diffuser nozzle	Ø 2.8
Starter air jet	Ø 1.5
Starter jet	42
Starter device resistance	~ 20 Ω
Starter pin travel	10

200cc Version

Kehin

CARBURETTOR KEIHIN

Specification	Desc./Quantity
Type	Depression carburettor
Model	CVK 30
Body stamping	CVK
Tapered pin stamping	309D
CUT-OFF device	Present
Diffuser	Ø 29
Maximum jet	90
Minimum jet	35
Max. air jet	70
Minimum air jet	115
Throttle valve spring	150 ÷ 250 g
Minimum mixture set screw initial opening	2 ½
Tapered pin	Ø 2.49
Diffuser nozzle	Ø 2.8
Starter air jet	Ø 1.5
Starter jet	42
Starter device resistance	~ 20 Ω
Starter pin travel	10

Tightening Torques

STEERING

Name	Torque in Nm
Upper steering ring nut	30 ÷ 36
Steering lower ring nut	10 ÷ 13 then loosen by 90°
Handlebar fixing screw (*)	45 ÷ 50
Fixing screws for handlebar control assembly U-bolts	7 ÷ 10

FRAME ASSEMBLY

Name	Torque in Nm
Bolt of the Silent block support plate	54
Frame arm-engine arm coupling pin nut	61
Frame-swinging arm pin nut	60
Engine-swinging arm bolt	40
Centre stand bolt	25 ÷ 30

FRONT SUSPENSION

Name	Torque in Nm
Fixing screw for pumping elements to lower fork plate	20 ÷ 25
Front wheel axle	45 ÷ 50
Fork leg screw	6 ÷ 7
front mudguard to plate fixing screw	4.5 ÷ 7
Fixing screw for mudguard plate to fork	9 ÷ 11

FRONT BRAKE

Name	Torque in Nm
Brake fluid pump-hose fitting	16 ÷ 20
Brake fluid pipe-calliper fitting	16 ÷ 20
Calliper to fork tightening screw	20 ÷ 25
Disc tightening screw (°)	5 - 6
Oil bleed screw	12 - 16
Pad fastening pin	19.6 ÷ 24.5

REAR SUSPENSION

Name	Torque in Nm
Left lower shock absorber support bolt	20 ÷ 25
Upper shock absorber clamp	33 ÷ 41
Lower shock absorber clamp	33 ÷ 41
Rear wheel axle	104 ÷ 126
Fixing screw for wheel rim to hub	34 ÷ 38
Muffler support arm to engine screws (*)	20 ÷ 25

REAR BRAKE

Name	Torque in Nm
Brake fluid pump-hose fitting	16 ÷ 20
Brake fluid pipe-calliper fitting	16 ÷ 20
Flexible/ rigid oil pipe coupling	9 ÷ 11
Rear disc tightening bolt	11 ÷ 13
Oil bleed screw	12 - 16
Screw tightening calliper to the support	20 ÷ 25
Screw fixing rear brake calliper support to engine	20 ÷ 25
Pad fastening pin	20 ÷ 25

MUFFLER

Name	Torque in Nm
Screw fixing manifold to muffler	15.5 ÷ 18.5
Muffler heat guard fixing screw	5 - 6
Exhaust fumes inlet screw	22 ÷ 26
Screw fixing muffler support arm to crankcase	33 ÷ 41
Nuts fixing muffler to support arm	27 ÷ 30
Nut fixing muffler to cylinder head	16 ÷ 18

LUBRICATION

Name	Torque in Nm
Hub oil drainage plug	15 ÷ 17
Oil filter on crankcase fitting	27 ÷ 33
Engine oil drainage plug/mesh filter	24 ÷ 30
Oil filter	4 ÷ 6
Oil pump cover screws	0.7 ÷ 0.9
Screws fixing oil pump to crankcase	5 - 6
Oil pump control crown screw	10 ÷ 14
Oil pump cover plate screws	4 ÷ 6
Oil sump screws	10 ÷ 14
Minimum oil pressure sensor	12 ÷ 14

CYLINDER HEAD

Name	Torque in Nm
Spark plug	12 ÷ 14
Nuts fixing head to cylinder (1) (^)	9 ÷ 11 + 180°
Head fixing side screws	11 ÷ 12
Starter ground screw	7 ÷ 8.5
M5 side screw locking washers on camshaft	7 ÷ 8.5
Tappet set screw lock nut	6 ÷ 8
Timing chain tensioner slider screw	10 ÷ 14
Starter ground support screw	11 ÷ 15
M6 central screw locking washers on camshaft	11 ÷ 15
Timing chain tensioner support screw	11 ÷ 13
Timing chain tensioner central screw	5 - 6
Camshaft retention plate screw	4 ÷ 6

TRANSMISSION

Name	Torque in Nm
Belt support roller screw	11 ÷ 13
Clutch unit nut on driven pulley	45 ÷ 50
Drive pulley nut	75 ÷ 83
Transmission cover screws	11 ÷ 13
Driven pulley shaft nut	54 ÷ 60
Rear hub cover screws	24 ÷ 27

FLYWHEEL

Name	Torque in Nm
Flywheel cover fixing screws	5 - 6
Stator assembly screws (°)	3 ÷ 4
Flywheel nut	52 ÷ 58
Pick-Up clamping screws	3 ÷ 4
Screw fixing freewheel to flywheel	13 ÷ 15

CRANKCASE AND CRANKSHAFT

Name	Torque in Nm
Internal engine crankcase bulkhead (transmission-side half shaft) screws	4 ÷ 6
Engine-crankcase coupling screws	11 ÷ 13
Starter motor screws	11 ÷ 13
Crankcase timing system cover screws (°)	3.5 ÷ 4.5

COOLING

Name	Torque in Nm
Water pump rotor cover	3 ÷ 4
Screws for water pump rotor driving link	3 ÷ 4
Thermostat cover screws	3 ÷ 4
Bleed screw:	3

(°) Apply LOCTITE 242 medium-strength threadlock

(*) The two screws must be tightened to the prescribed torque after having done so with the rear wheel axle nut. Safety locks: see "Pre-delivery operations".

(^) Fasten the nuts in two crossed passes.

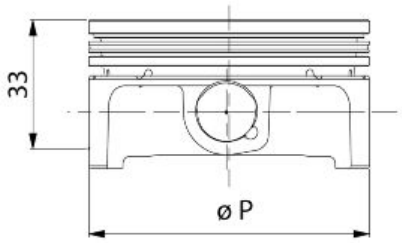
(1) Before fitting the nuts lubricate them with engine oil

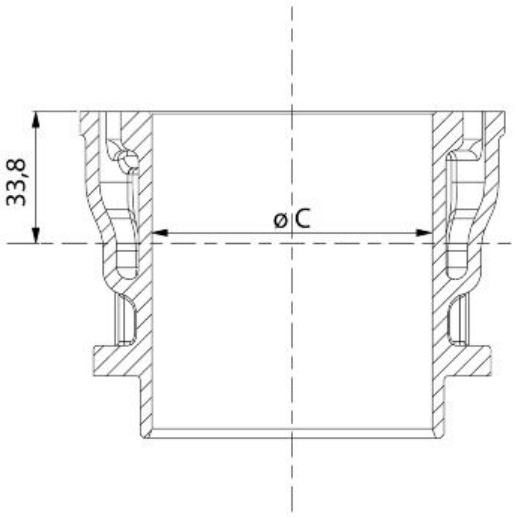
Overhaul data

Assembly clearances

Cylinder - piston assy.

200 cm³ version





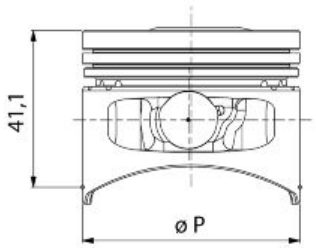
COUPLING CATEGORIES (WITH ALUMINIUM CYLINDER)

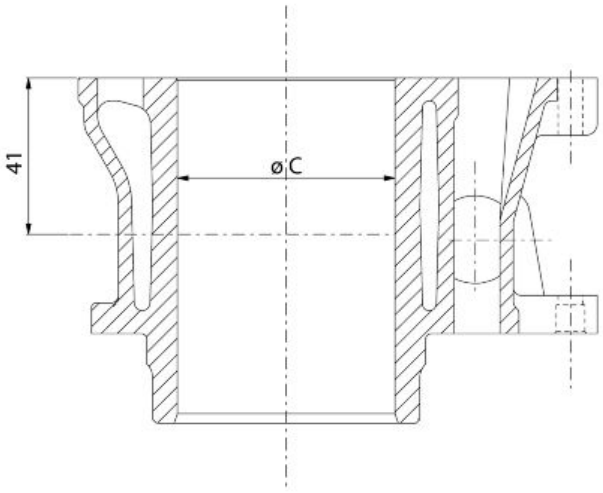
Name	Initials	Cylinder	Piston	Play on fitting
Cylinder / piston	A	71.990 ÷ 71.997	71.953 ÷ 71.960	0.030 - 0.044
Cylinder / piston	B	71.997 ÷ 72.004	71.960 ÷ 71.967	0.030 - 0.044
Cylinder / piston	C	72.004 ÷ 72.011	71.967 ÷ 71.974	0.030 - 0.044
Cylinder / piston	D	72.011 ÷ 72.018	71.974 ÷ 71.981	0.030 - 0.044

COUPLING CATEGORIES (WITH CAST IRON CYLINDER)

Name	Initials	Cylinder	Piston	Play on fitting
Cylinder / piston	M	72 ÷ 72.007	71.953 ÷ 71.960	0.040 - 0.054
Cylinder / piston	N	72.007 ÷ 72.014	71.960 ÷ 71.967	0.040 - 0.054
Cylinder / piston	O	72.014 ÷ 72.021	71.967 ÷ 71.974	0.040 - 0.054
Cylinder / piston	P	72.021 ÷ 72.026	71.974 ÷ 71.981	0.040 - 0.054

125 cm³ version



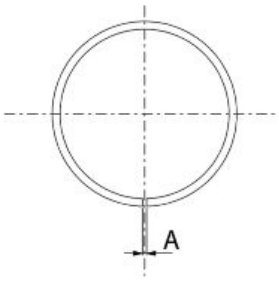


COUPLING CATEGORIES

Name	Initials	Cylinder	Piston	Play on fitting
Cylinder	A	56.997 ÷ 57.004	56.945 ÷ 56.952	0.045 - 0.059
Cylinder	B	57.004 ÷ 57.011	56.952 ÷ 56.959	0.045 - 0.059
Piston	C	57.011 ÷ 57.018	56.959 ÷ 56.966	0.045 - 0.059
Piston	D	57.018 ÷ 57.025	56.966 ÷ 56.973	0.045 - 0.059
Cylinder 1st Oversize	A1	57.197 ÷ 57.204	57.145 ÷ 57.152	0.045 - 0.059
Cylinder 1st Oversize	B 1	57.204 ÷ 57.211	57.152 ÷ 57.159	0.045 - 0.059
Piston 1st Oversize	C 1	57.211 ÷ 57.218	57.159 ÷ 57.166	0.045 - 0.059
Piston 1st Oversize	D 1	57.218 ÷ 57.225	57.166 ÷ 57.173	0.045 - 0.059
Cylinder 2nd Oversize	A2	57.397 ÷ 57.404	57.345 ÷ 57.352	0.045 - 0.059
Cylinder 2nd Oversize	B 2	57.404 ÷ 57.411	57.352 ÷ 57.359	0.045 - 0.059
Piston 2nd Oversize	C 2	57.411 ÷ 57.418	57.359 ÷ 57.366	0.045 - 0.059
Piston 2nd Oversize	D 2	57.418 ÷ 57.425	57.366 ÷ 57.373	0.045 - 0.059
Cylinder 3rd Oversize	A 3	57.597 ÷ 57.604	57.545 ÷ 57.552	0.045 - 0.059
Cylinder 3rd Oversize	B 3	57.604 ÷ 57.611	57.552 ÷ 57.559	0.045 - 0.059
Piston 3rd Oversize	C 3	57.611 ÷ 57.618	57.559 ÷ 57.566	0.045 - 0.059
Piston 3rd Oversize	D 3	57.618 ÷ 57.625	57.566 ÷ 57.573	0.045 - 0.059

Piston rings

125 cm³ version



ENGINE SEALING RINGS

Name	Description	Dimensions	Initials	Quantity
Compression ring		57 x 1	A	0.15 ÷ 0.30
Oil scraper ring		57 x 1	A	0.10 ÷ 0.30
Oil scraper ring		57 x 2.5	A	0.15 ÷ 0.35

ENGINE SEALING RINGS (1ST OVERSIZE)

Name	Description	Dimensions	Initials	Quantity
Compression ring 1st oversize		57.2 x 1	A	0.15 ÷ 0.30
Oil scraper ring 1st Oversize		57.2 x 1	A	0.10 ÷ 0.30
Oil scraper ring 1st Oversize		57.2 x 2.5	A	0.15 ÷ 0.35

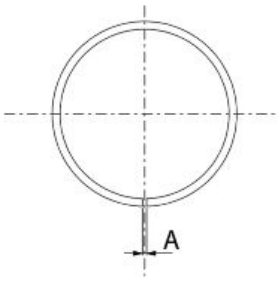
ENGINE SEALING RINGS (2ND OVERSIZE)

Name	Description	Dimensions	Initials	Quantity
Compression ring 2nd Oversize		57.4 x 1	A	0.15 ÷ 0.30
Oil scraper ring 2nd Oversize		57.4 x 1	A	0.10 ÷ 0.30
Oil scraper ring 2nd Oversize		57.4 x 2.5	A	0.15 ÷ 0.35

ENGINE SEALING RINGS (3RD OVERSIZE)

Name	Description	Dimensions	Initials	Quantity
Compression ring 3rd Oversize		57.6 x 1	A	0.15 ÷ 0.30
Oil scraper ring 3rd Oversize		57.6 x 1	A	
Oil scraper ring 3rd Oversize		57.6 x 2.5	A	0.15 ÷ 0.35

200 cm³ version



ENGINE SEALING RINGS

Name	Description	Dimensions	Initials	Quantity
Compression ring		72x1.5	A	0.15 ÷ 0.30
Oil scraper ring		72 x 1	A	0.10 ÷ 0.40
Oil scraper ring		72 x 2.5	A	0.20 ÷ 0.40

Crankcase - crankshaft - connecting rod

CRANKSHAFT HALF-BEARINGS

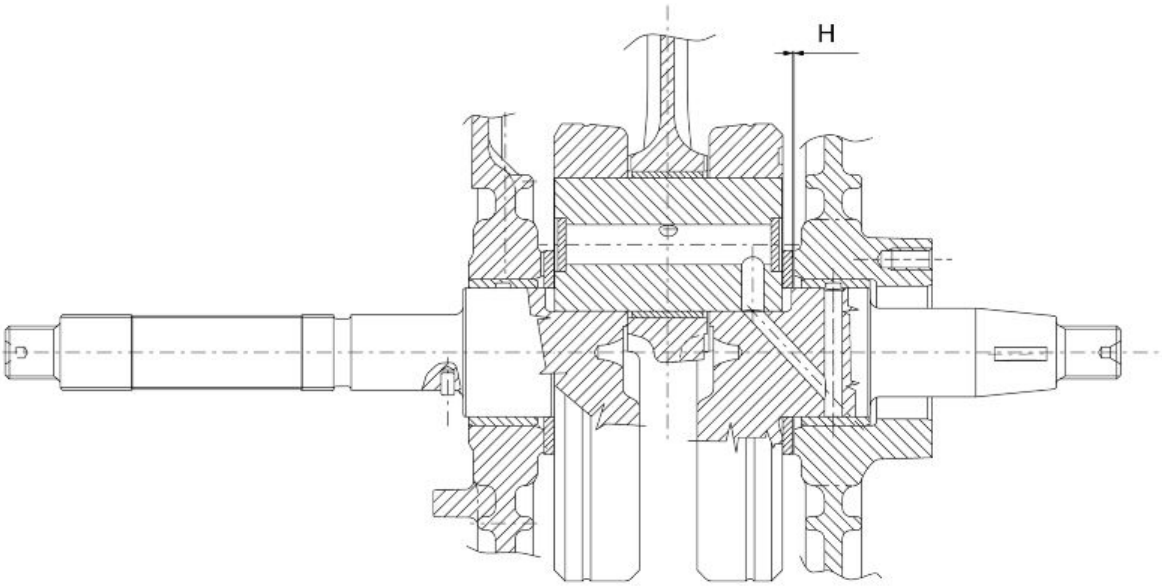
Name	Description	Dimensions	Initials	Quantity
Crankshaft half-bearing			Category B - blue	1.973 ÷ 1.976
Crankshaft half-bearing			Type C - yellow	1.976 ÷ 1.979
Crankshaft half-bearing			Category E - green	1.979 ÷ 1.982

CRANKCASE - CRANKSHAFT COUPLINGS

Name	Description	Dimensions	Initials	Quantity
Crankshaft category 1 - Crankcase category 1			E - E	
Crankshaft category 1 - Crankcase category 2			C - C	
Crankshaft class 2 - Crankcase class 1			C - C	
Crankshaft category 2 - Crankcase category 2			B - B	

CRANKSHAFT - CRANKCASE

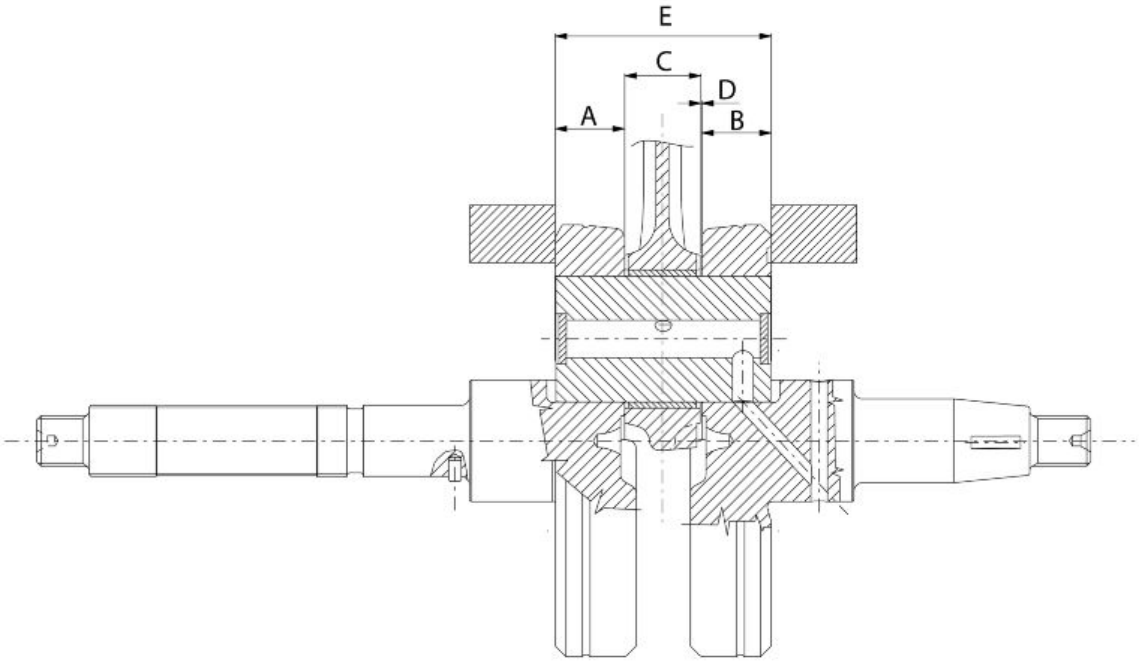
Name	Description	Dimensions	Initials	Quantity
Crankshaft			Category 1	28.998 ÷ 29.004
Crankshaft			Class 2	29.004 ÷ 29.010
Crankcase			Category 1	32.959 ÷ 32.965
Crankcase			Class 2	32.953 ÷ 32.959



Fitting clearances

Crankshaft/crankcase axial clearance (H):

0.15 ÷ 0.40 mm (when cold)



CRANKSHAFT/ CRANKCASE AXIAL CLEARANCE

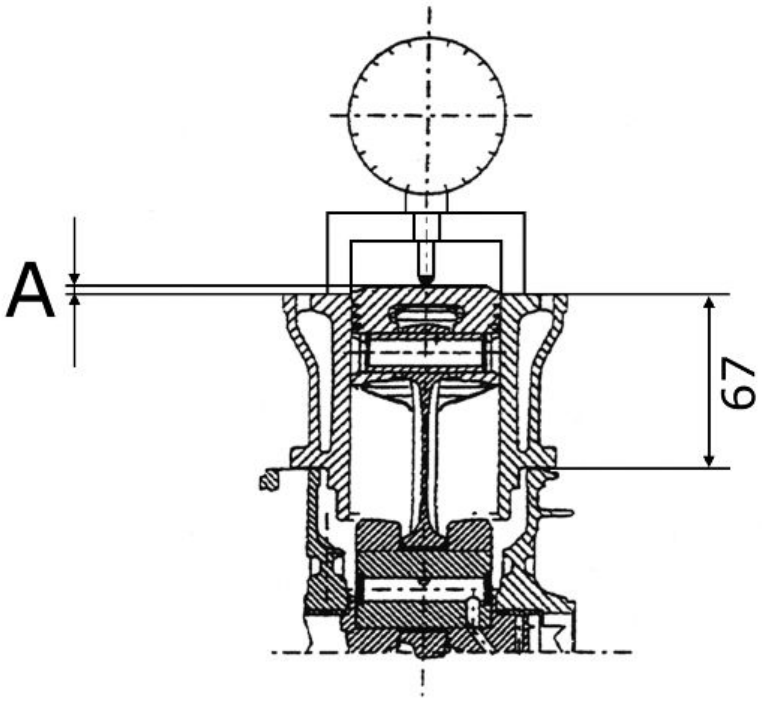
Name	Description	Dimensions	Initials	Quantity
Half-shaft, transmission side		16.6 +0-0.05	A	D = 0.20 - 0.50
Flywheel-side half-shaft		16.6 +0-0.05	B	D = 0.20 - 0.50
Connecting rod		18 -0.10 -0.15	C	D = 0.20 - 0.50
Spacer tool		51.4 +0.05	E	D = 0.20 - 0.50

Slot packing system

Characteristic

Compression ratio

12 ± 0.5: 1



Measurement «**A**» to be taken, is a value of piston protrusion. It indicates by how much the plane formed by the piston crown protrudes from the plane formed by the upper part of the cylinder. The further the piston protrudes from the cylinder, the thicker the base gasket to be used (to restore the compression ratio) and vice versa.

N.B.

NO GASKETS AND SEALS SHOULD BE ASSEMBLED BETWEEN THE CRANKCASE AND CYLINDER AND THE DIAL GAUGE EQUIPPED WITH SUPPORT SHOULD BE SET TO ZERO FOR MEASUREMENT «A» TO BE TAKEN WITH THE PISTON AT TOP DEAD CENTRE POSITION AND ON A RECTIFIED PLANE.

MODELS WITH FIBRE HEAD GASKET (1.1)

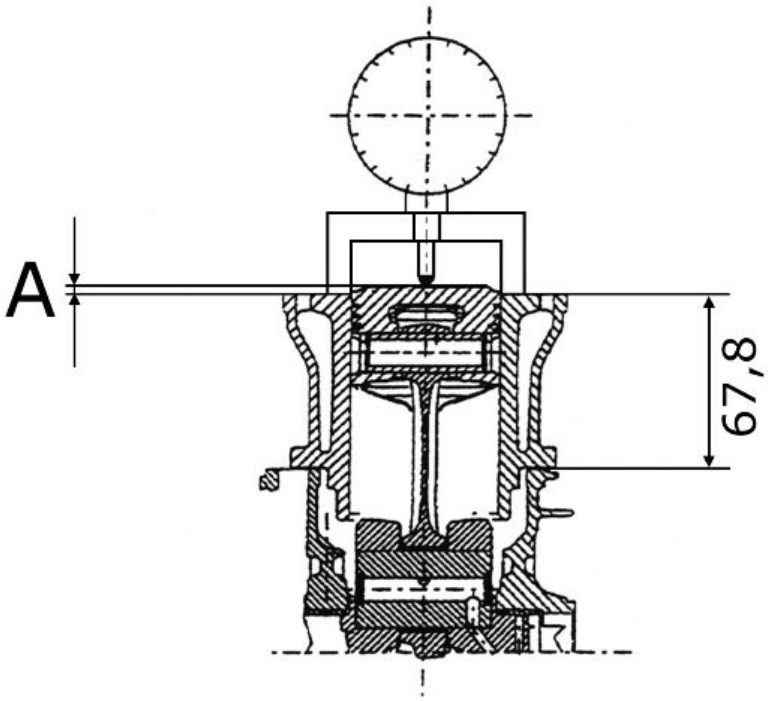
Name	Measure A	Thickness
Shimming - Cylinder 67 - Head gasket 1.1 - Base gasket 0.4	2.20 ÷ 2.45	0.4 ± 0.05

Name	Measure A	Thickness
Shimming - Cylinder 67 - Head gasket 1.1 - Base gasket 0.6	2.45 ÷ 2.70	0.6 ± 0.05

Characteristic

Compression ratio

12 ± 0.5: 1



Measurement «**A**» to be taken, is a value of piston protrusion. It indicates by how much the plane formed by the piston crown protrudes from the plane formed by the upper part of the cylinder. The further the piston protrudes from the cylinder, the thicker the base gasket to be used (to restore the compression ratio) and vice versa.

N.B.

NO GASKETS AND SEALS SHOULD BE ASSEMBLED BETWEEN THE CRANKCASE AND CYLINDER AND THE DIAL GAUGE EQUIPPED WITH SUPPORT SHOULD BE SET TO ZERO FOR MEASUREMENT «A» TO BE TAKEN WITH THE PISTON AT TOP DEAD CENTRE POSITION AND ON A RECTIFIED PLANE.

MODELS WITH METAL HEAD GASKET (0.3)

Name	Measure A	Thickness
Shimming - Cylinder 67.8 - Head gasket 0.3 - Base gasket 0.4	1.40 ÷ 1.65	0.4 ± 0.05
Shimming - Cylinder 67.8 - Head gasket 0.3 - Base gasket 0.6	1.65 ÷ 1.90	0.6 ± 0.05

Products

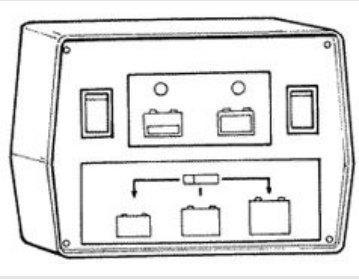
RECOMMENDED PRODUCTS TABLE

Product	Description	Specifications
AGIP ROTRA 80W-90	Rear hub oil	SAE 80W/90 Oil that exceeds the requirements of API GL3 specifications
AGIP CITY HI TEC 4T	Oil to lubricate flexible transmissions (throttle control)	Oil for 4-stroke engines
AGIP FILTER OIL	Oil for air filter sponge	Mineral oil with specific additives for increased adhesiveness
AGIP GP 330	Grease for brake levers, throttle	White calcium complex soap-based spray grease with NLGI 2; ISO-L-XBCIB2
AGIP CITY HI TEC 4T	Engine oil	SAE 5W-40, API SL, ACEA A3, JASO MA Synthetic oil
AGIP BRAKE 4	Brake fluid	FMVSS DOT 4 Synthetic fluid
AGIP PERMANENT SPEZIAL	coolant	Monoethylene glycol-based antifreeze fluid, CUNA NC 956-16

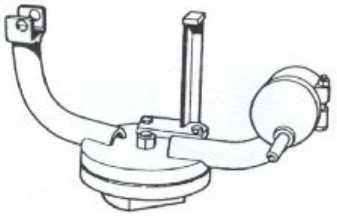
INDEX OF TOPICS

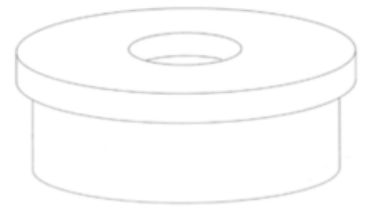
TOOLING	TOOL

APPROPRIATE TOOLS

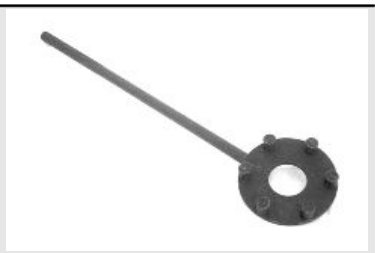
Stores code	Description	
020151Y	Air heater	
020331Y	Digital multimeter	
020333Y	Single battery charger	
020334Y	Multiple battery charger	
001467Y014	Pliers to extract ø 15-mm bearings	

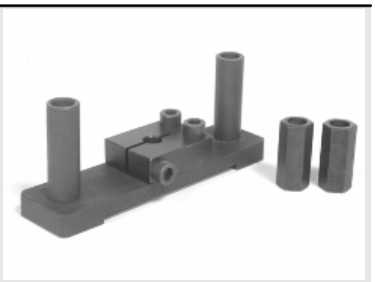
Stores code	Description	
020412Y	15 mm guide	
020335Y	Magnetic support for dial gauge	
020565Y	Flywheel lock calliper spanner	
020439Y	17 mm guide	
020359Y	42x47-mm adaptor	

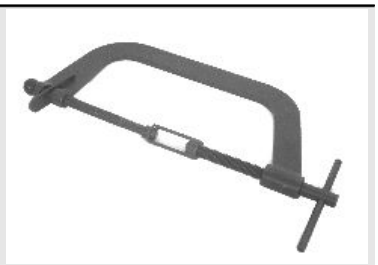
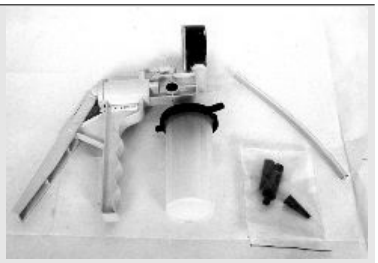
Stores code	Description	
020363Y	20 mm guide	
020459Y	Punch for fitting bearing on steering tube	
020458Y	Puller for lower bearing on steering tube	
005095Y	Engine support	
008564Y	Flywheel extractor	
020434Y	Oil pressure control fitting	

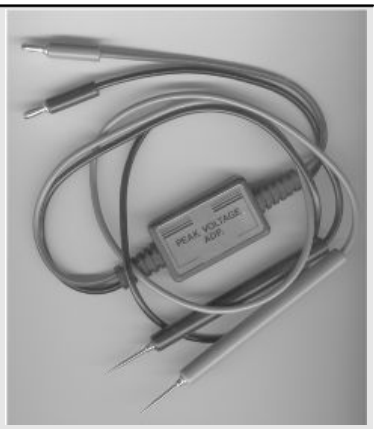
Stores code	Description	
020382Y011	adapter for valve removal tool	
020424Y	Driven pulley roller casing fitting punch	
020431Y	Valve oil seal extractor	
020193Y	Oil pressure gauge	
020306Y	Punch for assembling valve seal rings	
020360Y	Adaptor 52 x 55 mm	

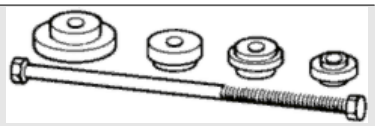
Stores code	Description	
020364Y	25-mm guide	
020375Y	Adaptor 28 x 30 mm	
020376Y	Adaptor handle	
020444Y	Tool for fitting/ removing the driven pulley clutch	
020330Y	Stroboscopic light to check timing	
001467Y035	Belle for OD 47-mm bearings	

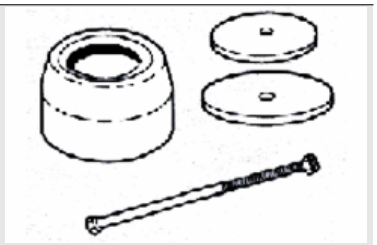
Stores code	Description	
020368Y	driving pulley lock wrench	
020319Y	Immobilizer check tester	
020287Y	Clamp to assemble piston on cylinder	
020263Y	Sheath for driven pulley fitting	
020262Y	Crankcase splitting strip	
020430Y	Pin lock fitting tool	

Stores code	Description	
020428Y	Piston position check support	
020426Y	Piston fitting fork	
020425Y	Punch for flywheel-side oil seal	
020423Y	driven pulley lock wrench	
020414Y	28-mm guide	
020393Y	Piston fitting band	

Stores code	Description	
020382Y	Valve cotters equipped with part 012 removal tool	
020455Y	10-mm guide	
020442Y	Pulley lock wrench	
020440Y	Water pump service tool	
020329Y	MityVac vacuum-operated pump	
020357Y	32 x 35 mm adaptor	

Stores code	Description	
020409Y	Multimeter adaptor - Peak voltage detection	
020456Y	Ø 24 mm adaptor	
020332Y	Digital rev counter	
020074Y	Support base for checking crankshaft alignment	
020055Y	Wrench for steering tube ring nut	

Stores code	Description	
002465Y	Pliers for circlips	
001330Y	Tool for fitting steering seats	
020454Y	Tool for fitting piston pin stops (200 - 250)	
020622Y	Transmission-side oil guard punch	
020444Y011	adapter ring	
020444Y009	46x55 Wrench	
001467Y	Extractor for bearings for holes	

Stores code	Description	
001467Y013	Pliers to extract ø 15-mm bearings	
020444Y010	adapter ring	
020244Y	15 mm diameter punch	
020115Y	Ø 18 punch	
020271Y	Tool for removing-fitting silent bloc	
020627Y	Flywheel lock wrench	

Stores code	Description	
020467Y	Flywheel extractor	
020626Y	Driving pulley lock wrench	

INDEX OF TOPICS

MAINTENANCE	MAIN

Maintenance chart

EVERY 2 YEARS

Action
Coolant - change
Brake fluid - change

EVERY 3,000 KM

Action
Engine oil - level check/ top-up

AFTER 1,000 KM

Action
Engine oil - replacement
Hub oil - change
Engine oil - change
Idle speed (*) - adjustment
Throttle lever - adjustment
Steering - adjustment
Transmissions/Levers - Lubrication
Brake pads - check condition and wear
Brake fluid level - check
Safety locks - check
Electrical system and battery - check
Tyre pressure and wear - check
Vehicle and brake test - road test

(*) See instructions in «Idle speed adjustment» section

AFTER 6,000 KM

Action
Engine oil - change
Hub oil level - check
Spark plug/ electrode gap - check
Air filter - clean
Oil filter -Replacement
Valve clearance - Check
Sliding blocks / variable speed rollers - check
Driving belt - checking
Coolant level - check
Brake pads - check condition and wear
Brake fluid level - check
Electrical system and battery - check
Tyre pressure and wear - check
Vehicle and brake test - road test

AT 12,000 KM AND AT 60,000 KM

Action
Engine oil - replacement
Hub oil level - check
Spark plugs - replacement
Air filter - clean
Engine oil - change
Idle speed (*) - adjustment
Sliding block / variable speed rollers - change
Throttle lever - adjustment
Coolant level - check
Steering - adjustment
Brake pads - check condition and wear
Brake fluid level - check
Transmissions/Levers - Lubrication
Safety locks - check

Action
Suspensions - check
Electrical system and battery - check
Headlight - adjustment
Tyre pressure and wear - check
Vehicle and brake test - road test
Driving belt - replacement

(*) See instructions in «Idle speed adjustment» section

AT 18,000 KM AND AT 54,000 KM

Action
Engine oil - change
Hub oil level - check
Spark plug/ electrode gap - check
Air filter - clean
Oil filter -Replacement
Valve clearance - check
Sliding blocks / variable speed rollers - check
Coolant level - check
Radiator - external cleaning/ check
Brake pads - check condition and wear
Brake fluid level - check
Electrical system and battery - check
Tyre pressure and wear - check
Vehicle and brake test - road test
Driving belt - checking
Fuel filter - replacement
SAS filter - Cleaning

AT 24,000 KM AND AT 48,000 KM

Action
Engine oil - replacement
Hub oil - change
Spark plugs - replacement
Air filter - clean
Engine oil - change
Idle speed (*) - adjustment
Sliding block / variable speed rollers - change
Throttle lever - adjustment
Coolant level - check
Steering - adjustment
Brake pads - check condition and wear
Brake fluid level - check
Transmissions/Levers - Lubrication
Safety locks - check
Suspensions - check
Electrical system and battery - check
Headlight - adjustment
Tyre pressure and wear - check
Vehicle and brake test - road test
Driving Belt - replacement

(*) See instructions in «Idle speed adjustment» section

AT 30,000 KM, AT 42,000 KM AND AT 66,000 KM

Action
Hub oil level - check
Spark plug/ electrode gap - check
Air filter - clean
Variable speed rollers - check or replacement
Driving belt - checking
Coolant level - check
Brake pads - check condition and wear
Brake fluid level - check
Electrical system and battery - check
Tyre pressure and wear - check

Action
Vehicle and brake test - road test
Engine oil - replacement
Oil filter -Replacement

AFTER 36,000 KM

Action
Engine oil - replacement
Hub oil level - check
Spark plugs - replacement
Air filter - clean
Engine oil - change
Valve clearance - Check
Idle speed (*) - adjustment
Sliding block / variable speed rollers - change
Throttle lever - adjustment
Driving belt - replacement
Coolant level - check
Radiator - external cleaning/ check
Steering - adjustment
Brake pads - check condition and wear
Brake fluid level - check
Transmissions/Levers - Lubrication
Safety locks - check
Suspensions - check
Electrical system and battery - check
Headlight - adjustment
Tyre pressure and wear - check
Vehicle and brake test - road test
Fuel filter - replacement
SAS filter - Cleaning

(*) See instructions in «Idle speed adjustment» section

AFTER 72,000 KM

Action
Engine oil - replacement
Hub oil - change
Spark plugs - replacement
Air filter - clean
Valve clearance - Check
Engine oil - change
Idle speed (*) - adjustment
Sliding block / variable speed rollers - change
Throttle lever - adjustment
Driving belt - replacement
Coolant level - check
Radiator - external cleaning/ check
Steering - adjustment
Brake pads - check condition and wear
Brake fluid level - check
Transmissions/Levers - Lubrication
Safety locks - check
Suspensions - check
Electrical system and battery - check
Headlight - adjustment
Tyre pressure and wear - check
Vehicle and brake test - road test
Fuel filter - replacement
SAS filter - Cleaning

(*) See instructions in «Idle speed adjustment» section

Carburettor

- Disassemble the carburettor in its parts, wash all of them with solvent, dry all body grooves with compressed air to ensure adequate cleaning.
- Check carefully that the parts are in good condition.
- The throttle valve should move freely in the chamber. Replace it in case of excessive clearance due to wear.
- If there are wear marks in the chamber causing inadequate tightness or a free valve slide (even if it is new), replace the carburettor.
- It is advisable to replace the gaskets at every refit

WARNING

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

Checking the spark advance

- To check ignition advance, use the stroboscopic light with induction pincers connected to the spark plug power wire.
- Connect the induction pincers being careful to respect the proper polarity (the arrow stamped on the pincers must be pointing at the spark plug).
- Place the light selector in central position (1 spark = 1 crankshaft turn as in 2-T engines).
- Start the engine and check that the light works properly and the rpm indicator can read also the high rpm (e.g. 8000 rpm).
- If flash unsteadiness or revolution reading error is detected (e.g. half values), increase the resistive load on the spark plug power line (10 ÷ 15 KΩ in series to HV wire).
- Remove the plastic cover from the slot on the flywheel cover.
- Operating on the flash corrector displacement of the bulb, make the reference on the flywheel cover coincide with level on the water pump drive. Read the advance degrees indicated by the stroboscopic light.

Characteristic

Ignition advance

10° ± 1° at 2,000 rpm

- Make sure the advance degrees match the rotation rpm.
- If failures are found, check the Pick-Up and the control unit power supply (positive-negative), replace the control unit if necessary.

- The brand new control unit prevents that the engine rotation exceeds 2000 rpm.
- The programmed control unit allows the engine to rotate within the prescribed limits.

Specific tooling

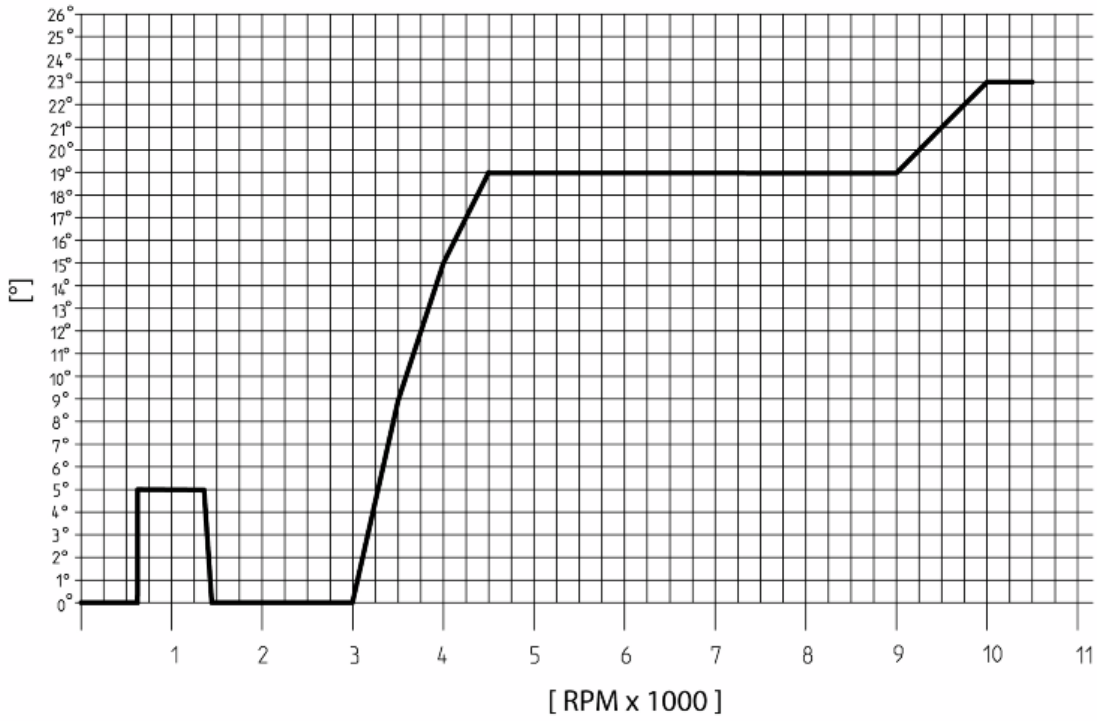
020330Y Stroboscopic light to check timing

Spark advance variation

125 cm³ version

REVOLUTION LIMITER

Specification	Desc./Quantity
Operation threshold	First threshold : 10700 ±50 Second threshold : 11000 ±50
Reactivation threshold	First threshold : 10600±50 Second threshold : 10900±50
Spark elimination	First threshold : 1 spark on 7 Second threshold : 2 sparks on 3

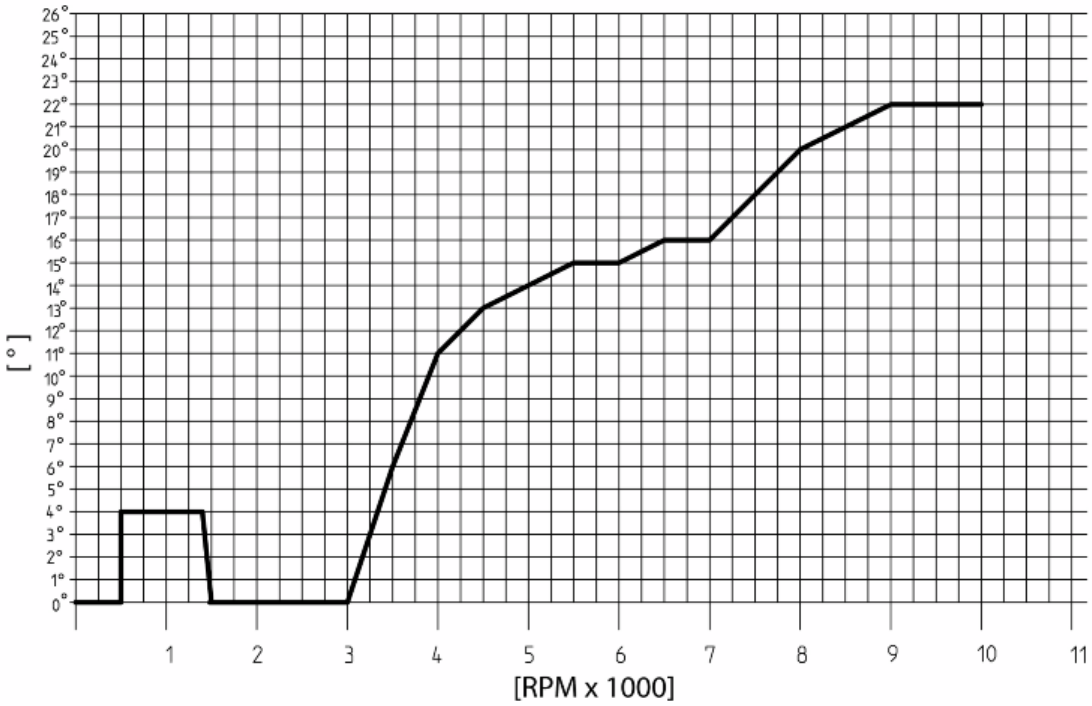


200 cm³ version

REVOLUTION LIMITER

Specification	Desc./Quantity
Version 200 : Operation threshold	First threshold : 9900 ±50 Second threshold : 10100 ±50
Version 200 : Reactivation threshold	First threshold : 9800 ±50 Second threshold: 10000 ±50

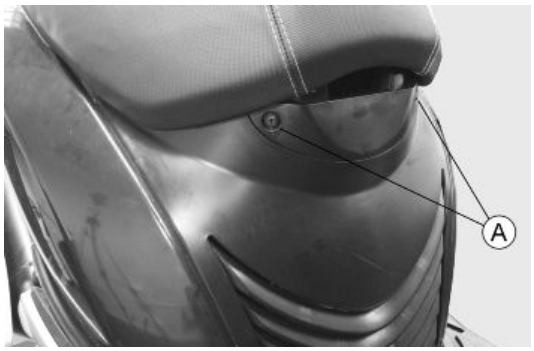
Specification	Desc./Quantity
Spark elimination	First threshold : 1 spark on 7 Second threshold : 2 sparks on 3



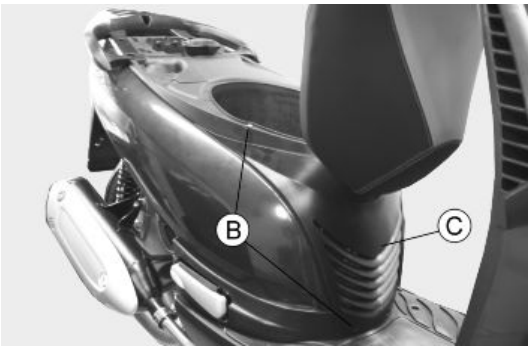
Spark plug

To remove the spark plug, proceed as follows:

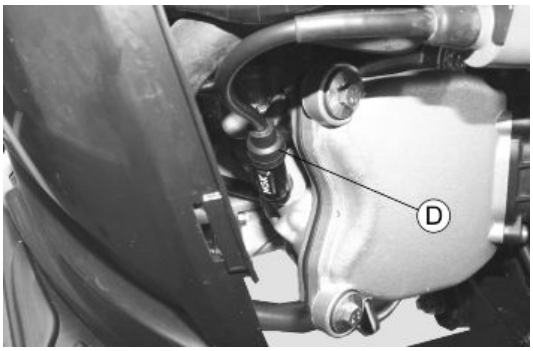
- Undo the two screws « **A**» and remove the cover.



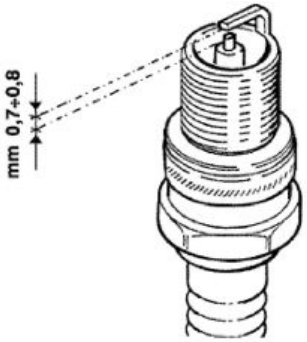
- Operating on both sides of the scooter, undo the screws «**B**».
- Remove the inspection cover «**C**» by pulling it upwards.



- Disconnect the cap «**D**» from the spark plug HV wire.
- Unscrew the spark plug using the wrench supplied.



- Check the conditions of the spark plug, make sure the insulation is intact and the electrodes are not excessively worn or sooty, check the conditions of the sealing washer and measure the electrode gap using the appropriate thickness gauge.
- If necessary, adjust the gap by bending the side electrode very carefully. In case of anomaly (as described before), replace the spark plug with another one of the recommended type.



CAUTION

THE SPARK PLUG MUST BE REMOVED WHEN THE ENGINE IS COLD. CHECK AND REPLACE THE SPARK PLUG AS INDICATED IN THE SCHEDULED MAINTENANCE TABLE. USING NON-COMPLYING IGNITION CONTROL UNITS OR SPARK PLUGS OTHER THAN THOSE PRESCRIBED MAY SERIOUSLY DAMAGE THE ENGINE.

Characteristic

Spark plug

CHAMPION RG4HC

Alternative spark plug

NGK CR8EB

Electrode gap

0.7 ÷ 0.8 mm

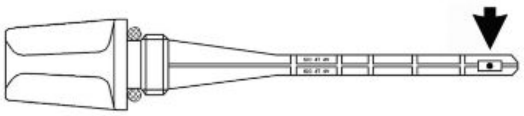
Locking torques (N*m)

Spark plug **12 ÷ 14**

When refitting, place the spark plug into the hole at the due inclination and tighten it manually all the way down. Use the wrench only to tighten it. Once locked, insert the cap «**D**» on the spark plug. Refit the covers.

Hub oil

Check



-Stand the vehicle on its centre stand on flat ground;

- Remove the oil dipstick «**A**», dry it with a clean cloth and put it back into its hole **tightening it completely**;

-Take out the dipstick checking that the oil level reaches the dipstick lower notch; if the level is under the MAX. mark, it needs to be filled with the right amount of hub oil.

-Screw up the oil dipstick again and make sure it is locked properly into place.

The notches on the hub oil level dipstick, except for the notch indicating the MAX level, refer to other manufacturer's models and have no specific function for this model.

Replacement

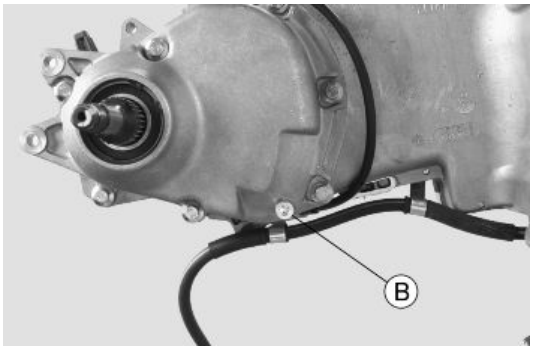
-Remove the oil filler cap «**A**».

- Remove the exhaust silencer.

- Remove the rear wheel.

- Remove the brake calliper and the rear brake disc.

- Unscrew the oil drainage plug "**B**" and drain out all the oil.
- Screw the drainage plug again to the prescribed torque and refill the hub with the recommended oil.



Recommended products

AGIP ROTRA 80W-90 rear oil hub

SAE 80W/90 Oil that exceeds the requirements of API GL3 specifications

Characteristic

Hub Oil Quantity

See the Technical Data Chapter

Locking torques (N*m)

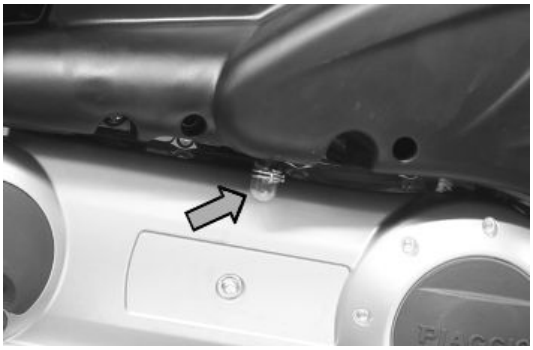
Hub oil drainage screw 15 ÷ 17 Nm

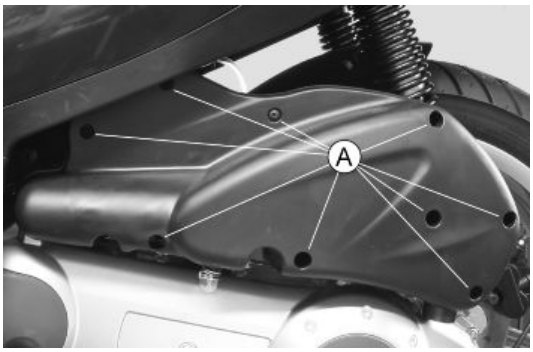
Air filter

- Remove the air cleaner cover after undoing the nine fixing screws «**A**».
- Take out the filtering element.

N.B.

CHECK THE AIR FILTER AND, IF NECESSARY, CLEAN IT AS INDICATED IN THE SCHEDULED MAINTENANCE TABLE. THE AIR JET MUST BE DIRECTED FROM THE INSIDE TO THE OUTSIDE OF THE FILTER (I.E. OPPOSITE TO THE SENSE THE AIR FLOWS AT REGULAR ENGINE RUNNING). UPON SERVICING, REMOVE THE LOCK AND THE RUBBER HOOD UNDER THE FILTER HOUSING AS SHOWN IN THE FIGURE AND DRAIN ALL POSSIBLE OIL DEPOSITS.





Cleaning

- Wash with water and car shampoo.
- Dry with short blasts of compressed air and a clean cloth.
- Soak with a 50% mixture of gasoline and oil.
- Drip dry the filtering element and then squeeze it with your hands without wringing.
- Refit the filtering element.

CAUTION

NEVER RUN THE ENGINE WITHOUT THE AIR FILTER, THIS WILL RESULT IN AN EXCESSIVE CYLINDER AND PISTON WEAR AND ALSO IN CARBURETTOR DAMAGE.

CAUTION

WHEN TRAVELLING ON DUSTY ROADS, THE AIR FILTER MUST BE CLEANED MORE OFTEN THAN SHOWN IN THE SCHEDULED MAINTENANCE CHART.

Recommended products

AGIP FILTER OIL Oil for air filter sponge

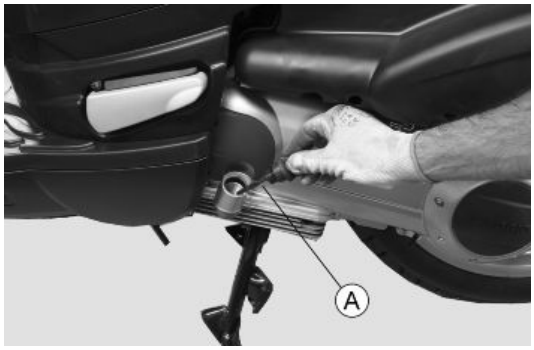
Mineral oil with specific additives for increased adhesiveness

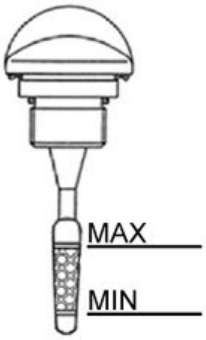
Engine oil

Replacement

Change oil as indicated in the scheduled maintenance table. The engine must be emptied by draining the oil through the drainage plug «**B**» of the mesh pre-filter, flywheel side. Moreover, to facilitate oil drainage, remove the mesh pre-filter and loosen the cap/dipstick «**A**». Once all the oil has drained through the drainage hole, unscrew and remove the oil cartridge filter «**C** ». Before filling, carry out the operations described in the "Engine oil filter" paragraph.

Since a certain quantity of oil still remains in the circuit, fill adding approx. 600 ÷ 650 cm³ of oil through the cap «**A**». Then start up the scooter, leave it running for a few minutes and switch it off: After about five minutes, check the level and, if necessary, top-up but never exceeding the **MAX** level reference mark.





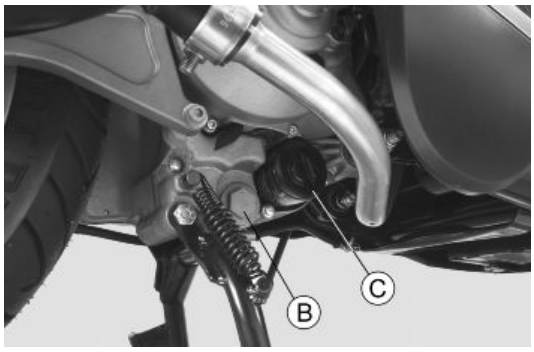
N.B.

THE ENGINE MUST BE HOT WHEN THE OIL IS CHANGED.

Recommended products

AGIP CITY HI TEC 4T Engine oil

SAE 5W-40 Synthetic oil that exceed the requirements of API SL, ACEA A3, JASO MA specifications



Locking torques (N*m)

Engine oil drainage plug 24 ÷ 30

See also

Engine

oil filter

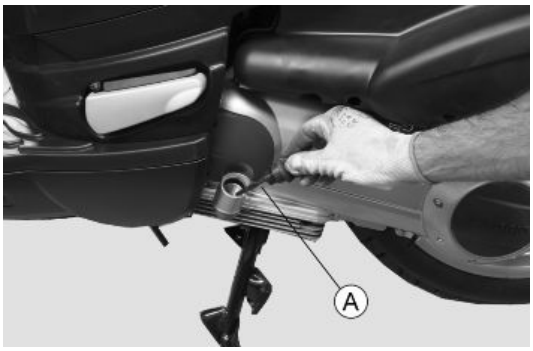
Check

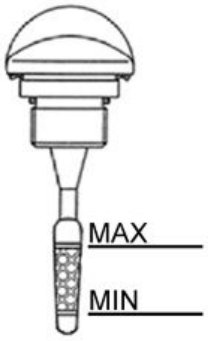
In 4T engines, the engine oil is used to lubricate the distribution elements, the bench bearings and the thermal group. **An insufficient quantity of oil can cause serious damage to the engine.** In all 4T engines, the deterioration of the oil characteristics, or a certain consumption should be considered normal, especially if during the run-in period. Consumption can particularly reflect the conditions of use (i.e. when driving at 'full acceleration' all the time, oil consumption increases).

This operation must be carried out with the engine cold and following the procedure below:

- Place the scooter on its centre stand and on flat ground.
- Unscrew the cap/dipstick "**A**", dry it with a clean cloth and reinsert it, **screwing it all the way down**.
- Remove the cap/dipstick again and check that the level is between the min and max reference marks; top up, if required.

The MAX level reference mark indicates the amount of oil in the engine. If the check is carried out after the vehicle has been used, and therefore with a hot engine, the level line will be lower; in order to carry out a correct check it is necessary to wait at least 10 minutes after the engine has been stopped, so as to get the correct level.





Characteristic

Engine oil

1.10 l

The oil should be topped up after having checked the level and in any case by adding oil **without ever exceeding the MAX. level**.

Restoring the level between the **MIN** and **MAX** reference marks requires ~ 400 cm³ of oil.

Engine oil filter

The cartridge filter must be replaced every time the oil is changed. Use new oil of the recommended type for topping up and changing purposes.

Make sure the pre-filter and drainage plug O-rings are in good conditions. Lubricate them and refit the mesh filter and oil drainage plug, screwing them up to the specified torque. Refit the new cartridge filter being careful to lubricate the O-ring before fitting it. Change the engine oil.

Recommended products

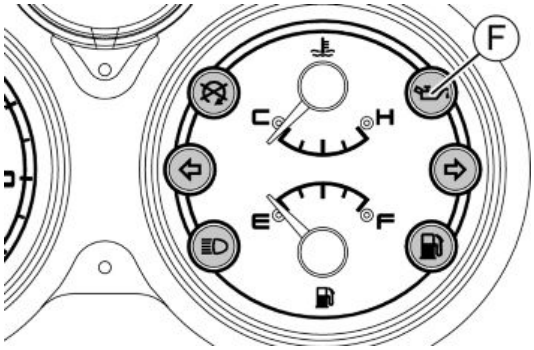
AGIP CITY HI TEC 4T Engine oil

SAE 5W-40 Synthetic oil that exceed the requirements of API SL, ACEA A3, JASO MA specifications

Oil pressure warning light

The vehicle is equipped with a warning light «**F**» on the instrument panel that lights up when the key is turned to «**ON**». However, this light should switch off once the engine has been started.

If the light turns on during braking, at idling speed or while turning a corner, it is necessary to check the oil level and the lubrication system.



Checking the ignition timing

-Remove the 4 fixing screws and move away from the engine the flywheel cover fitted with a water pump and cooling manifolds.

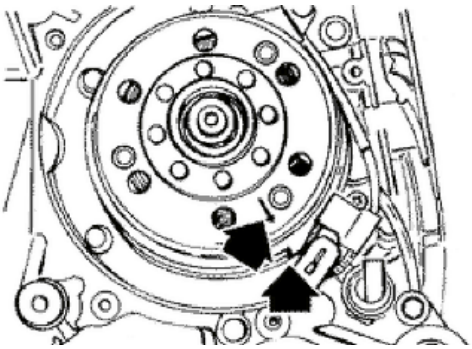
-Rotate the flywheel until the reference matches the crankcase operation end as shown in the figure (TDC). Make sure that the 4V reference point on the camshaft control pulley is aligned with the reference point on the head as shown in the second figure. If the reference mark is opposite the indicator on the head, make the crankshaft turn once more.

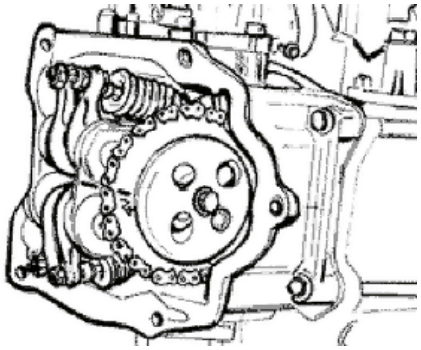
-The TDC reference mark is repeated also between the flywheel cooling fan and the flywheel cover.

To use this reference mark, remove the spark plug and turn the engine in the opposite direction to the normal direction using a calliper spanner applied to the camshaft command pulley casing.

N.B.

TIME THE TIMING SYSTEM UNIT IF IT IS NOT IN PHASE.

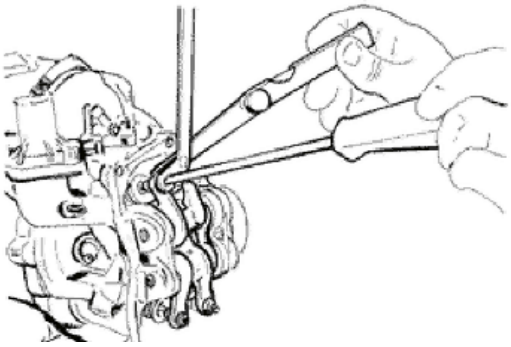




Checking the valve clearance

-To check valve clearance, centre the reference marks of the timing system.

- Use a thickness gauge to check that the clearance between the valve and the set screw corresponds with the indicated values. When the valve clearance values, intake and drainage respectively, are different from the ones indicated below, adjust them by loosening the lock nut and operate on the register with a screwdriver as shown in the figure.



Characteristic

Valve clearance

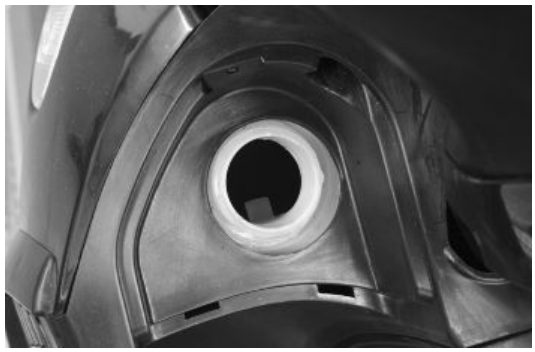
Inlet: 0.10 mm (when cold)

Outlet: 0.15 mm (when cold)

Cooling system

Level check

- To check the level, it is necessary to look inside the expansion tank: a mark on the side of the filler indicates the level required.



Top-up

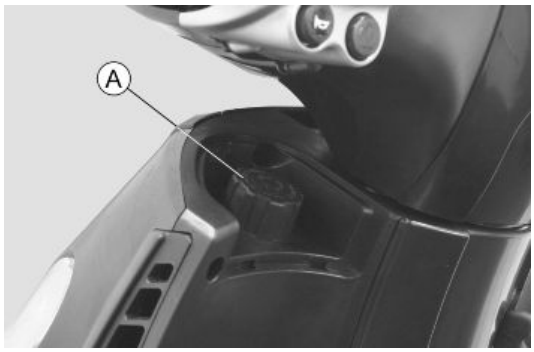
Check coolant level when the engine is cold as indicated in the scheduled maintenance table, following the steps below.

Place the scooter on its centre stand and on flat ground.

- Undo the screw and remove the expansion tank cap located on the scooter left side.

- Remove the expansion tank cap «**A** » and, if necessary, top-up if the coolant level is near or below the mark in the expansion tank. Coolant level must always reach the mark.

-The coolant consists of an ethylene glycol and corrosion inhibitor based 50% de-ionised water-antifreeze solution mix.



CAUTION

TO PREVENT THE COOLANT FROM LEAKING OUT OF THE EXPANSION TANK WHEN THE SCOOTER IS IN USE, DO NOT EXCEED THE LEVEL INDICATED BY THE INTERNAL MARK.

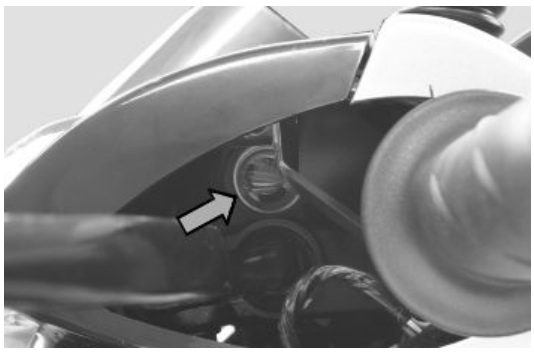
Braking system

Level check

The brake fluid tanks for the front and rear brakes are located on the pumps under the handlebar cover. Proceed as follows:

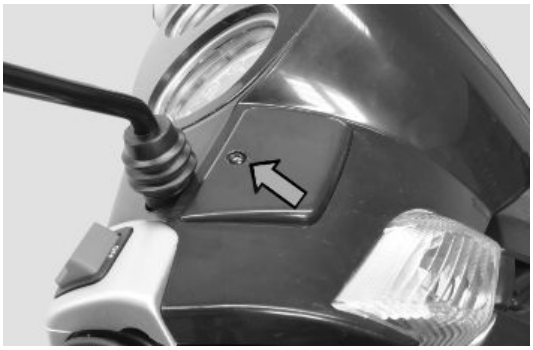
- Bring the scooter onto the centre stand and with the handlebar centred;
- check the fluid level at the sight glass as shown in the figure.

A certain lowering of the level is caused by wear on the pads.



Top-up

- Remove the cover on the handlebar shown in the photograph by undoing the screw.



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

CAUTION

ONLY USE DOT 4-CLASSIFIED BRAKE FLUID.

CAUTION

AVOID CONTACT OF THE BRAKE FLUID WITH YOUR EYES, SKIN, AND CLOTHING. IN CASE OF ACCIDENTAL CONTACT, WASH WITH WATER.

CAUTION

BRAKING CIRCUIT FLUID IS HIGHLY CORROSIVE; MAKE SURE THAT IT DOES NOT COME INTO CONTACT WITH THE PAINTWORK.

CAUTION

THE BRAKE FLUID IS HYGROSCOPIC, IN OTHER WORDS, IT ABSORBS MOISTURE FROM THE SURROUNDING AIR. IF THE CONTENT OF MOISTURE IN THE BRAKING FLUID EXCEEDS A CERTAIN VALUE, BRAKING WILL BE INEFFICIENT.
NEVER USE BRAKE LIQUID IN OPEN OR PARTIALLY USED CONTAINERS.
UNDER NORMAL CLIMATIC CONDITIONS, THE FLUID MUST BE CHANGED EVERY 20,000 KM OR ANYWAY EVERY TWO YEARS.

Recommended products

AGIP BRAKE 4 Brake fluid

FMVSS DOT 4 Synthetic fluid

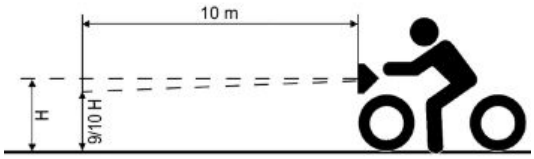
Headlight adjustment

Proceed as follows:

- Position the unloaded scooter, in running order and with the tyres inflated to the prescribed pressure, onto a flat surface 10 m away from a half-lit white screen; make sure the scooter axis is perpendicular to the screen;

- Turn on the headlight and check that the border of the projected light beam on the screen is not higher than 9/10 or lower than 7/10 f the height from the ground to the centre of vehicle headlamp;

- If this is not the case, adjust the headlight by operating the screw «**A**».



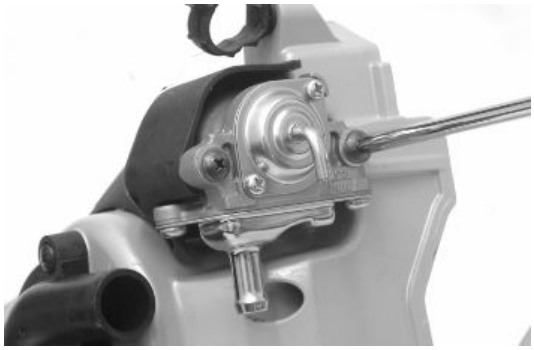
N.B.

THE ABOVE PROCEDURE COMPLIES WITH THE EUROPEAN STANDARDS REGARDING MAXIMUM AND MINIMUM HEIGHT OF LIGHT BEAMS. REFER TO THE STATUTORY REGULATIONS IN FORCE IN EVERY COUNTRY WHERE THE vehicle IS USED.

SAS filters inspection and cleaning

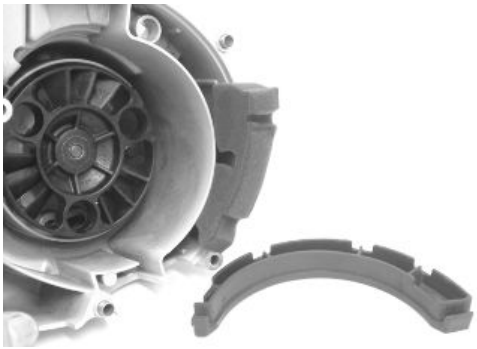
- Remove the flywheel cover.

- Remove the two screws fixing the SAS valve as shown in the figure and remove the SAS valve and the O-ring from the support



- Remove the plastic support and the gasket as shown in the photograph

- Check that the SAS valve plastic support is not dented or distorted
- Check that the gasket is in good conditions
- Carefully clean the inside and outside filters. Replace them if damaged or abnormally distorted.
- Make sure the coupling connecting the secondary air to the head is not dented, overheated or distorted. If there is, replace it.
- Check that the metal pipe does not have any dents



To refit, follow the removal procedure but in reverse order, being careful to respect the direction of the rubber coupling connecting the SAS valve to the discharge system

CAUTION

INADEQUATE TIGHTNESS BETWEEN THE SAS VALVE AND ITS SUPPORT INCREASES NOISE IN THE SAS SYSTEM.

CAUTION

WHEN TRAVELLING ON DUSTY ROADS, THE AIR FILTER MUST BE CLEANED MORE OFTEN THAN SHOWN IN THE SCHEDULED MAINTENANCE CHART.

CAUTION

NEVER RUN THE ENGINE WITHOUT THE SECONDARY AIR FILTER

INDEX OF TOPICS

TROUBLESHOOTING	TROUBL

Engine

Poor performance

POOR PERFORMANCE

Possible Cause	Operation
The carburettor is dirty; fuel pump or vacuum valve damaged	Remove, wash with solvent and dry with compressed air or replace
Excess of encrustations in the combustion chamber	Descale the cylinder, the piston, the head and the valves
Incorrect timing or worn timing system elements	Time the system again or replace the worn parts
Muffler obstructed	Replace
Air filter blocked or dirty.	Remove the sponge, wash with water and car shampoo, then soak it in a mixture of 50% petrol and 50% specific oil. Press with your hand without squeezing, allow it to drip dry and refit.
Automatic starter failure	Check: mechanical movement, electric connection and fuel supply, replace if required.
Oil level exceeds maximum	Check for causes and fill to reach the correct level
Lack of compression: parts, cylinder and valves worn	Replace the worn parts
Transmission belt worn	Replace
Inefficient automatic transmission	Check the rollers, the pulley movement and make sure the drive belt is in good conditions; replace the damaged parts and lubricate the moveable driven pulley with specific grease.
Clutch slipping	Check the clutch system and/or the bell and replace if necessary
Overheated valves	Remove the head and the valves, grind or replace the valves
Wrong valve adjustment	Adjust the valve clearance properly
Valve seat distorted	Replace the head assembly
Defective floating valve	Check the proper sliding of the float and the functioning of the valve

Rear wheel spins at idle

REAR WHEEL ROTATES WITH ENGINE AT IDLE

Possible Cause	Operation
Idling rpm too high	Adjust the engine idle speed.
Clutch fault	Check the springs / clutch masses

Starting difficulties

DIFFICULT STARTING

Possible Cause	Operation
Altered fuel characteristics	Drain off the fuel no longer up to standard; then, refill
Rpm too low at start-up or engine and start-up system damaged	Check the starter motor, the system and the torque limiter
Incorrect valve sealing or valve adjustment	Inspect the head and/or restore the correct clearance
- Engine flooded.	Try starting-up with the throttle fully open. If the engine fails to start, remove the spark plug, dry it and before refitting, make the motor turn so as to expel the fuel excess taking care to connect the cap to the spark plug, and this in turn to the ground. If the fuel tank is empty, refuel and start up.
Automatic starter failure	Check: mechanical movement, electric connection and fuel supply, replace if required.
Air filter blocked or dirty.	Remove the sponge, wash with water and car shampoo, then soak it in a mixture of 50% petrol and 50% specific oil. Press with your hand without squeezing, allow it to drip dry and refit.
Faulty spark plug or incorrect ignition advance	Replace the spark plug or check the ignition circuit components

Possible Cause	Operation
The carburettor is dirty; fuel pump damaged	Remove, wash with solvent and dry with compressed air or replace
Battery flat	Check the charge of the battery, if there are any sulphur marks, replace and use the new battery following the instructions shown in the chapter
Intake coupling cracked or clamps incorrectly tightened	Replace the intake coupling and check the clamps are tightened
Defective floating valve	Check the proper sliding of the float and the functioning of the valve
Carburettor nozzles clogged	Dismantle, wash with solvent and dry with compressed air
Fuel pump fault	Check the pump control device

Excessive oil consumption/Exhaust smoke

EXCESSIVE OIL CONSUMPTION/SMOKEY EXHAUST

Possible Cause	Operation
Worn valve guides	Check and replace the head unit if required
Worn valve oil guard	Replace the valve oil guard
Oil leaks from the couplings or from the gaskets	Check and replace the gaskets or restore the coupling seal
Worn or broken piston rings or piston rings that have not been fitted properly	Replace the piston cylinder unit or just the piston rings

Insufficient lubrication pressure

LOW LUBRICATION PRESSURE

Possible Cause	Operation
By-Pass remains open	Check the By-Pass and replace if required. Carefully clean the By-Pass area.
Oil pump with excessive clearance	Perform the dimensional checks on the oil pump components
Oil filter too dirty	Replace the cartridge filter
Oil level too low	Restore the level adding the recommended oil type

Engine tends to cut-off at full throttle

ENGINE STOP FULL THROTTLE

Possible Cause	Operation
Faulty fuel supply	Check and replace the pump, if necessary, and check the pipe sealing
Incorrect float level	Restore the level in the tank by bending on the float the thrusting reed of the petrol inlet rod so as to have the float parallel to the tank level with the carburettor inverted.
Water in the carburettor	Empty the tank through the appropriate bleed nipple.
Maximum nozzle dirty - lean mixture	Wash the nozzle with solvent and dry with compressed air

Engine tends to cut-off at idle

ENGINE STOP IDLING

Possible Cause	Operation
Incorrect timing	Time the system and check the timing system components
Cut off device failure	Check that the following parts work properly: valve; diaphragm; spring; and that the air calibration elements are clean; check if the sponge filter is clean too
Incorrect idle adjustment	Adjust using the rpm indicator
Pressure too low at the end of compression	Check the thermal group seals and replace worn components
Faulty spark plug or incorrect ignition advance	Replace the spark plug or check the ignition circuit components

Possible Cause	Operation
The starter remains on	Check: electric wiring, circuit not interrupted, mechanical movement and power supply; replace if necessary
Minimum nozzle dirty	Wash the nozzle with solvent and dry with compressed air

Excessive exhaust noise

EXCESSIVE EXHAUST NOISE

Possible Cause	Operation
Secondary air device cut-off valve not working	Replace the secondary air device
Depression intake pipe of the secondary air device disconnected or dented	Replace the pipe
Reed valve of the secondary air device does not close correctly and wears out the rubber coupling between the device and the head pipe	Replace the device and the coupling

High fuel consumption

HIGH FUEL CONSUMPTION

Possible Cause	Operation
Float level	Restore the level in the tank by bending on the float the thrusting reed of the petrol inlet rod so as to have the float parallel to the tank level with the carburettor inverted.
Loose nozzles	Check the maximum and minimum nozzles are adequately fixed in their fittings
Fuel pump failure	Check that there is no fuel in the low-pressure duct
Starter inefficient	Check: electric wiring, circuit continuity, mechanical sliding and power supply
Air filter blocked or dirty.	Remove the sponge, wash with water and car shampoo, then soak it in a mixture of 50% petrol and 50% specific oil. Press with your hand without squeezing, allow it to drip dry and refit.

Engine overheating

ENGINE OVERHEAT

Possible Cause	Operation
No coolant in the cooling circuit	Restore the level
Incorrect air bleeding	Repeat the operation
Thermostat remains closed	Replace
Fluid leak in the radiator	Replace the radiator
Coolant leaking from the cooling system	Inspect the whole circuit to spot the leak.
Coolant leakage through the crankcase drainage hole	Replace the pump

SAS malfunctions

ANOMALIES IN THE SECONDARY AIR DEVICE

Possible Cause	Operation
Secondary air device cut-off valve not working	Replace the secondary air device
Depression intake pipe of the secondary air device disconnected or dented	Replace the pipe
Reed valve of the secondary air device does not close correctly and wears out the rubber coupling between the device and the head pipe	Replace the device and the coupling

Transmission and brakes

Clutch grabbing or performing inadequately

IRREGULAR CLUTCH PERFORMANCE OR SLIPPAGE

Possible Cause	Operation
Faulty clutch	Check that there is no grease on the masses. Check that the clutch mass contact surface with the casing is mainly in the centre with equivalent characteristics on the three masses. Check that the clutch casing is not scored or worn in an anomalous way

Insufficient braking

INSUFFICIENT BRAKING

Possible Cause	Operation
Inefficient braking system	Check the pad wear (1.5 min). Check that the brake discs are not worn, scored or warped. Check the correct level of fluid in the pumps and change brake fluid if necessary. Check there is no air in the circuits; if necessary, bleed the air. Check that the front brake calliper moves in axis with the disc.
Fluid leakage in hydraulic braking system	Failing elastic fittings, plunger or brake pump seals, replace

Brakes overheating

BRAKES OVERHEATING

Possible Cause	Operation
Rubber gaskets swollen or stuck	Replace gaskets.
Compensation holes on the pump clogged	Clean carefully and blast with compressed air
Brake disc slack or distorted	Check the brake disc screws are locked; use a dial gauge and a wheel mounted on the vehicle to measure the axial shift of the disc.
Defective piston sliding	Check calliper and replace any damaged part.

Braking vibrations or noise

VIBRATIONS OR NOISE WHEN BRAKING

Possible Cause	Operation
Brake disc slack or distorted	Check the brake disc screws are locked; use a dial gauge and a wheel mounted on the vehicle to measure the axial shift of the disc.

Electrical system

Battery

BATTERY

Possible Cause	Operation
Battery	This is the device in the system that requires the most frequent attention and the most thorough maintenance. If the vehicle is

Possible Cause	Operation
	not used for some time (1 month or more) the battery needs to be recharged periodically. The battery runs down completely in the course of 3 months. If the battery is fitted on a motorcycle, be careful not to invert the connections, keeping in mind that the black ground wire is connected to the negative terminal while the red wire is connected to the terminal marked+.

Turn signal lights malfunction

TURN INDICATOR NOT WORKING

Possible Cause	Operation
Electronic ignition device failure	With the key switch set to "ON", jump the contacts 1 (Blue-Black) and 5 (Green/Red) on the control unit connector. If by operating the turn indicator control the lights are not steadily on, replace the control unit; otherwise, check the cable harness and the switch.

Steering and suspensions

Heavy steering

STEERING HARDENING

Possible Cause	Operation
Steering hardening	Check the tightening of the top and bottom ring nuts. If irregularities in turning the steering continue even after making the above adjustments, check the seats on which the ball bearings rotate: replace them if they are recessed or if the balls are flattened.

Excessive steering play

EXCESSIVE STEERING BACKLASH

Possible Cause	Operation
Torque not conforming	Check the tightening of the top and bottom ring nuts. If irregularities in turning the steering continue even after making the above adjustments, check the seats on which the ball bearings rotate: replace them if they are recessed or if the balls are flattened.

Noisy suspension

NOISY SUSPENSION

Possible Cause	Operation
Malfunctions in the suspension system	If the front suspension is noisy, check: the efficiency of the front shock absorbers; the condition of the ball bearings and relevant lock-nuts, the limit switch rubber buffers and the movement bushings. In conclusion, check the tightening torque of the wheel hub, the brake calliper, the shock absorber disk in the attachment to the hub and the steering tube.

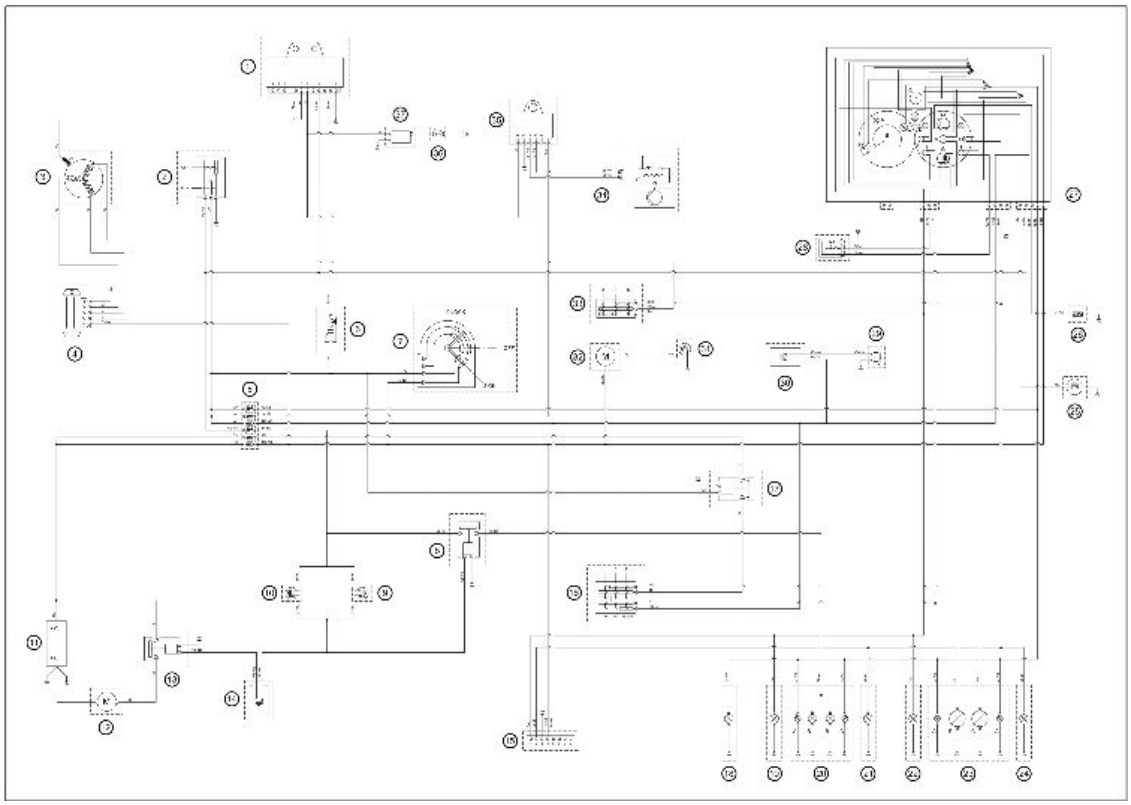
Suspension oil leakage

OIL LEAKAGE FROM SUSPENSION

Possible Cause	Operation
Seal fault or breakage	Check the sealing conditions of the oil seals.

INDEX OF TOPICS

ELECTRICAL SYSTEM	ELE SYS



KEY

1. Electronic ignition device

2. Engine stop switch

3. Magneto flywheel - Pick-up

4. Voltage regulator

5. Fuse unit

6. Automatic starter

7. Key switch

8. Stop light remote control

9. Stop button on front brake

10. Stop button on rear brake

11. Battery

12. Starter motor

13. Start-up remote control

14. Starter button

15. Wiring for antitheft device

16. Light switch

17. Headlight remote control

18. Licence plate lamp

19. Rear left turn indicator light

20. Rear light

A. Tail light bulbs

B. Stop light bulbs

21. Rear right turn indicator light

22. Front left turn indicator light

23. Headlight

A. Tail light bulbs

B. High-beam light bulb

C. Low-beam light bulb

24. Front right turn indicator light

25. Engine oil pressure sensor

26. Thermistor

27. Instrument panel

A. Instrument panel lighting bulbs

B. Speedometer

C. Clock

D. Engine disabled warning light

E. Right turn indicator warning light

F. High-beam warning light

G. Fuel gauge

H. Low fuel warning light

I. Left turn indicator warning light

L. Oil warning light

M. Water temperature gauge

28. Fuel level transmitter

29. Horn

30. Horn button

31. Thermoswitch

32. Electric fan

33. Turn signal switch

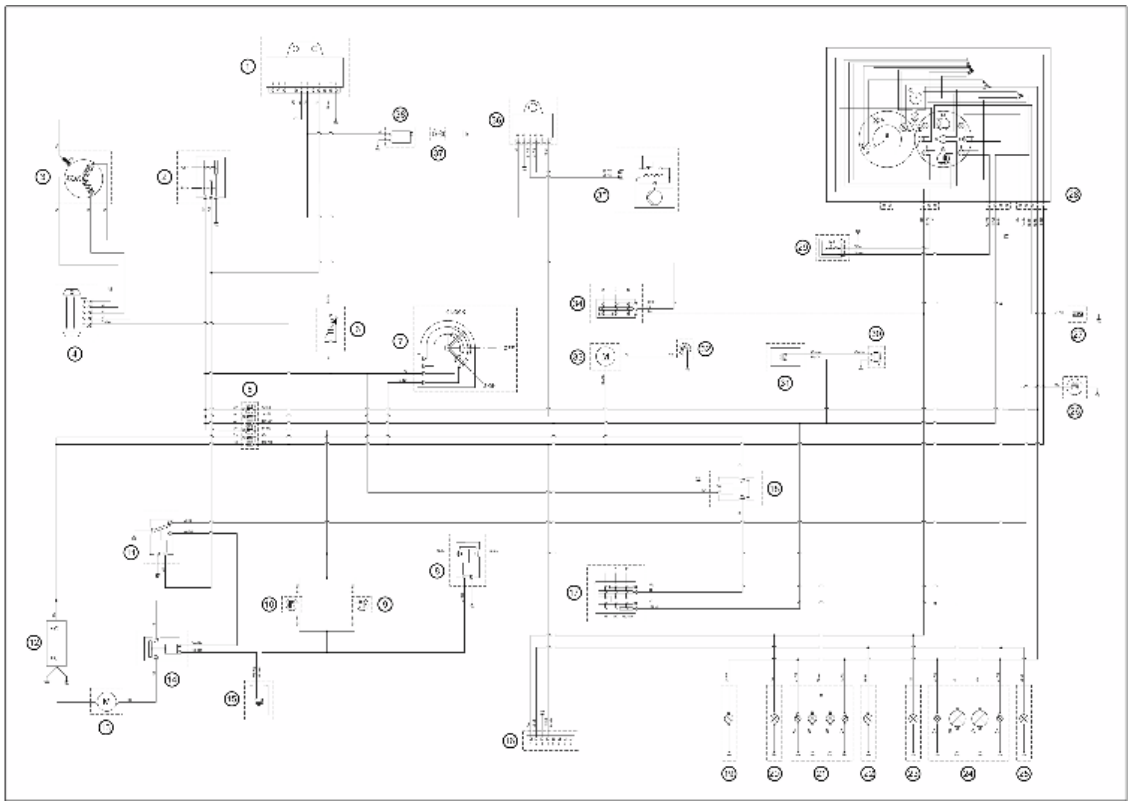
34. Electric fuel pump

35. Electric pump control device

36. Spark plug

37. HV coil

VERSIONE CON TELERUTTORE DI INIBIZIONE AVVIAMENTO



LEGENDA

1. Dispositivo di accensione elettronica

2. Deviatore arresto motore

3. Volano magnete - Pick-up

4. Regolatore di tensione

5. Gruppo fusibili

6. Starter automatico

7. Commutatore a chiave

8. Teleruttore luci stop

9. Pulsante di stop sul freno anteriore

10. Pulsante di stop sul freno posteriore

11. Teleruttore inibizione avviamento

12. Batteria

13. Motorino di avviamento

14. Teleruttore di avviamento

15. Pulsante di avviamento

16. Predisposizione antifurto

17. Deviatore luci

18. Teleruttore proiettore

19. Fanalino illuminazione targa

20. Lampeggiatore posteriore sinistro

21. Fanale posteriore

A. Lampade luce di posizione

B. Lampade luce di stop

22. Lampeggiatore posteriore destro

23. Lampeggiatore anteriore sinistro

24. Proiettore

A. Lampade luce di posizione

B. Lampada luce abbagliante

C. Lampada luce anabbagliante

25. Lampeggiatore anteriore destro

26. Sensore pressione olio motore

27. Termistore

28. Gruppo strumenti

A. Lampade illuminazione strumento

B. Tachimetro

C. Orologio

D. Spia motore non abilitato

E. Spia freccia destra

F. Spia luce abbagliante

G. Indicatore livello carburante

H. Spia riserva

I. Spia freccia sinistra

L. Spia olio

M. Indicatore temperatura acqua

29. Trasmettitore livello carburante

30. Clacson

31. Pulsante clacson

32. Termointerruttore

33. Elettroventola

34. Commutatore lampeggiatori

35. Pompa elettrica carburante

36. Dispositivo comando pompa elettrica

37. Candela

38. Bobina A.T.

Components arrangement

KEY

1. Battery

2. Fuses

3. Spark plug

4. Coil

5. Pick-up

6. Voltage regulator

7. Control unit

8. Electric fan

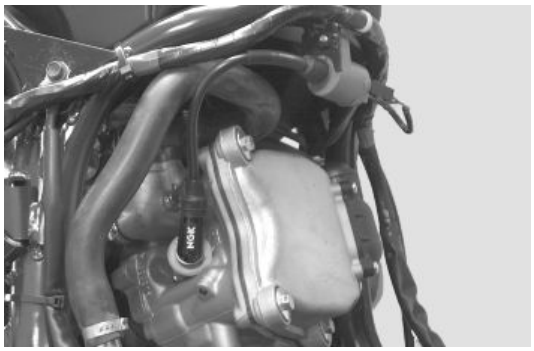
9. Thermoswitch

10. Thermistor

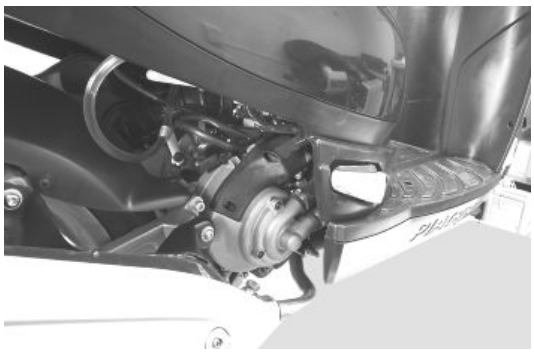
11. Starter

1.Battery - 2. Fuse terminal block: To get access to these components, unscrew the flap on the foot-rest and reach the battery compartment.

3. Spark plug - 4. Coil: Remove the inspection cover to reach the spark plug and the coil.



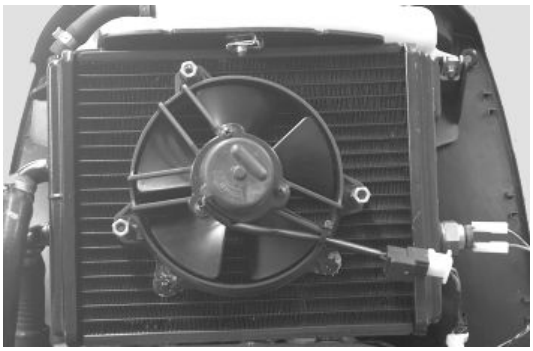
5. Pick-up: To get access to the pick-up, operate from the right side.



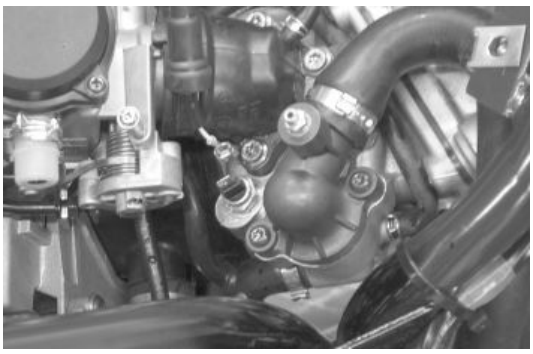
6. Voltage regulator: To get access to the voltage regulator, remove the lower part of the wheel housing.

7. Control unit: To get access to the control unit, remove the shield back plate.

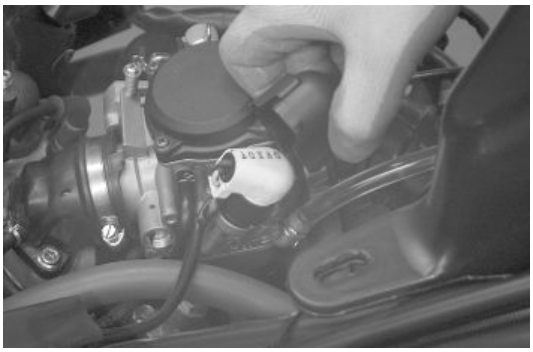
8. Electric fan - 9. Thermoswitch: To get access to the electric fan, remove the front shield.



10. Thermistor: To get access to the thermistor, remove the helmet compartment.

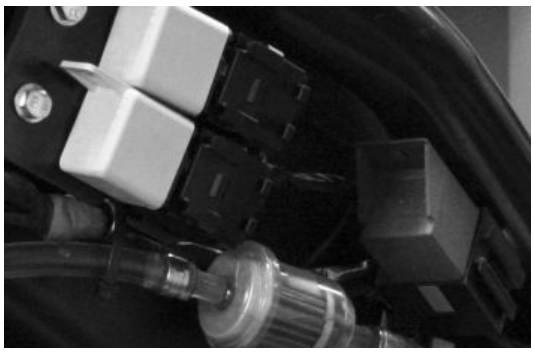


11. Starter: To get access to the starter, remove the helmet compartment.



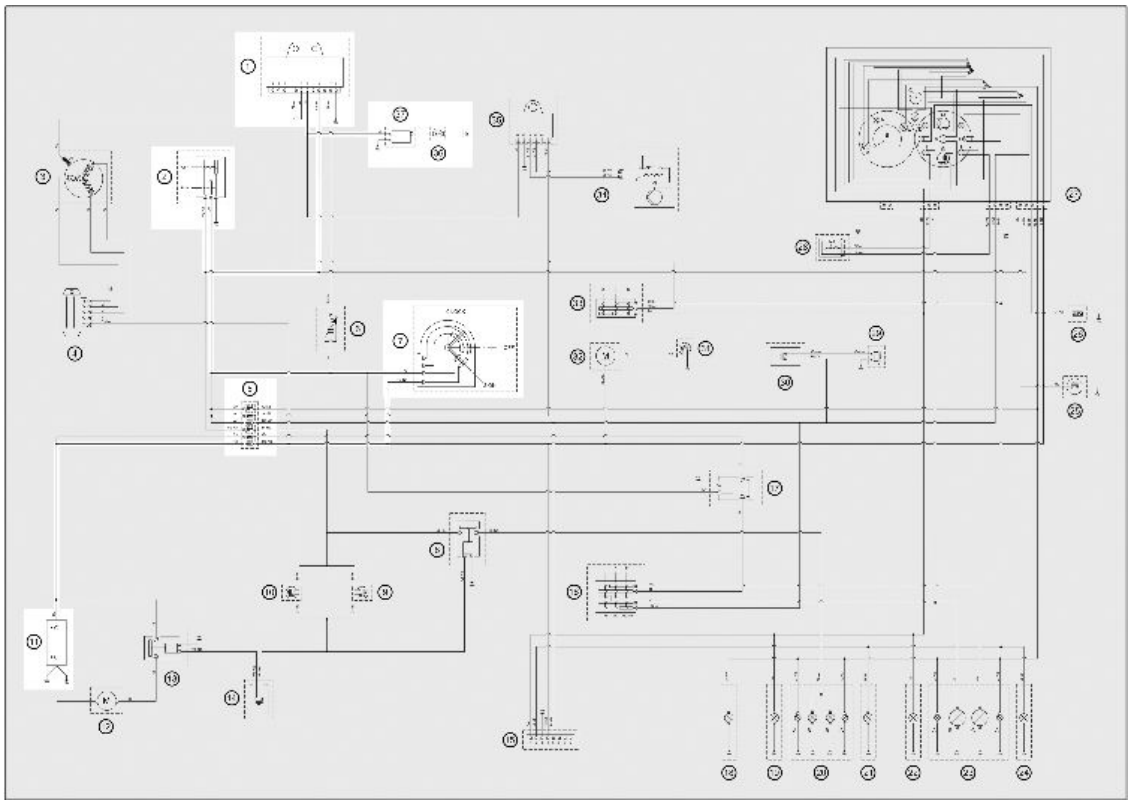
12. Clacson - 13. Dispositivo di comando pompa elettrica carburante: Per accedervi rimuovere il controscudo. I componenti sono situati nella parte bassa del veicolo.

14. Teleruttori - 15. Pompa carburante: Per accedere a questi componenti rimuovere la fiancata laterale destra.



Conceptual diagrams

Ignition



KEY

1. Electronic ignition device

2. Engine stop switch

5. Fuse unit

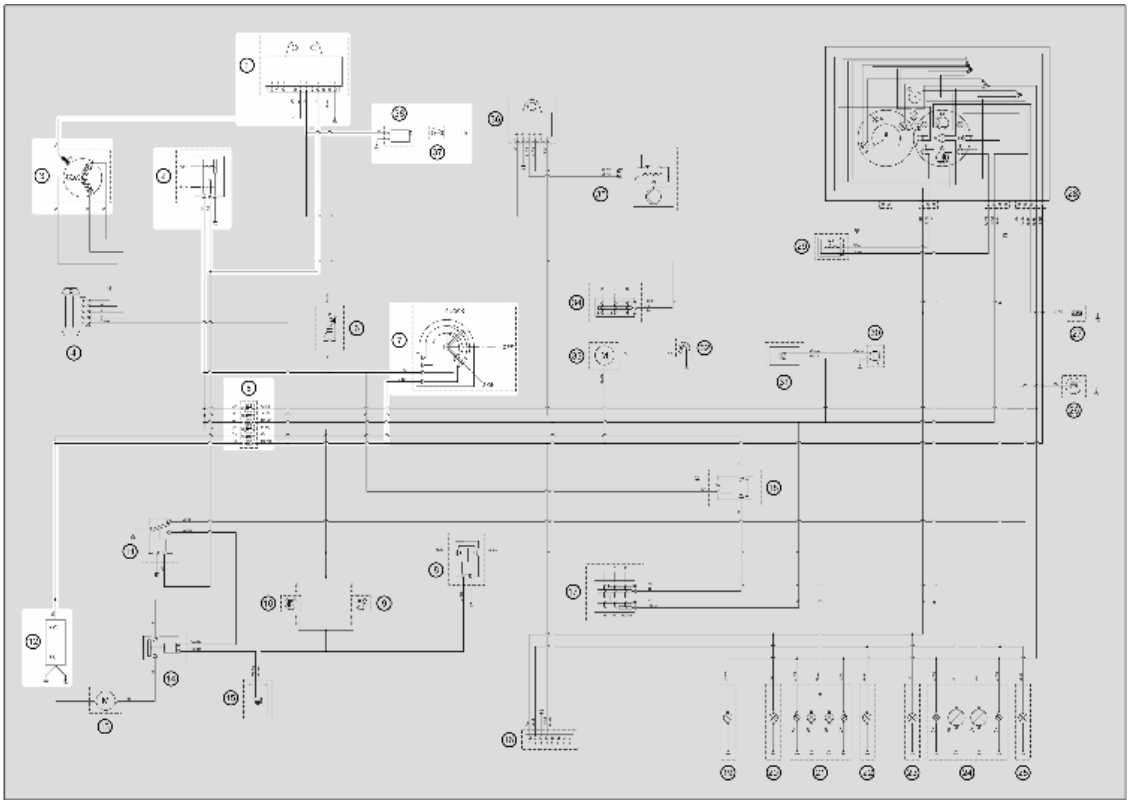
7. Key switch

11. Battery

36. Spark plug

37. HV coil

VERSIONE CON TELERUTTORE DI INIBIZIONE AVVIAMENTO



LEGENDA

1. Dispositivo di accensione elettronica

2. Deviatore arresto motore

3. Volano magnete - Pick-up

5. Gruppo fusibili

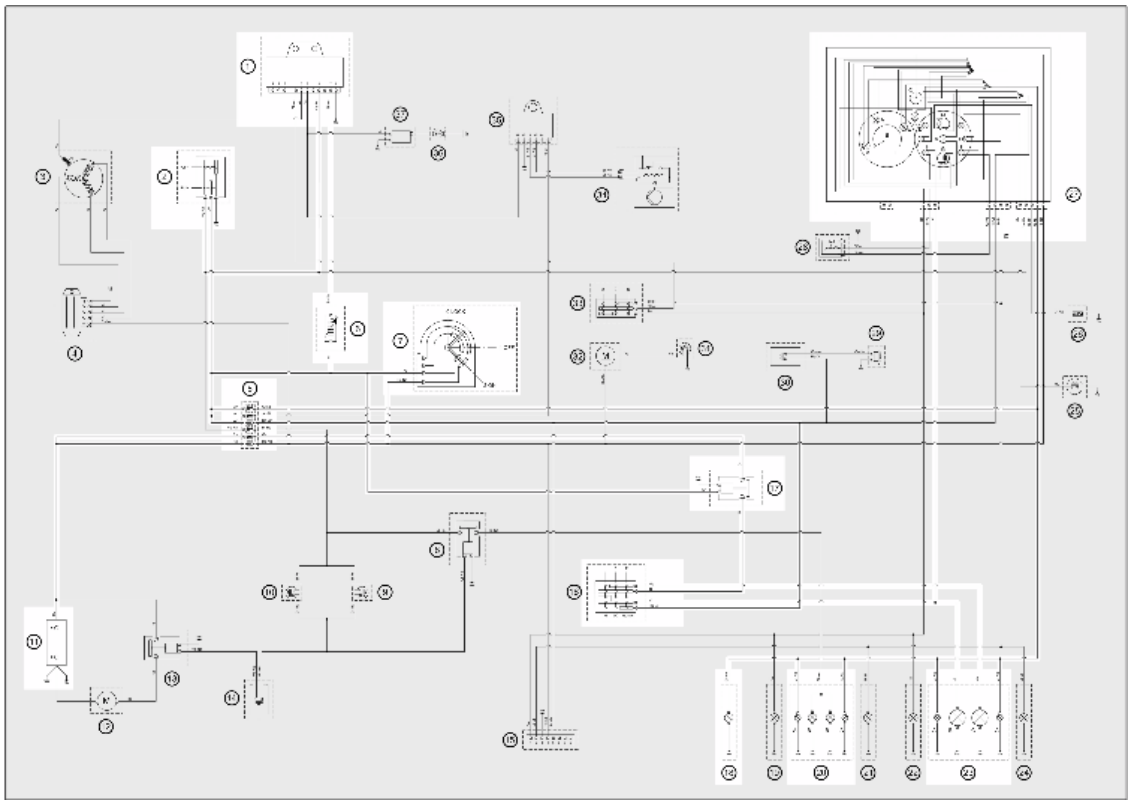
7. Commutatore a chiave

12. Batteria

37. Candela

38. Bobina A.T.

Headlights and automatic starter section



KEY

1. Electronic ignition device

2. Engine stop switch

5. Fuse unit

6. Automatic starter

7. Key switch

11. Battery

16. Light switch

17. Headlight remote control

18. Licence plate lamp

20. Rear light

A. Tail light bulbs

23. Headlight

A. Tail light bulbs

B. High-beam light bulb

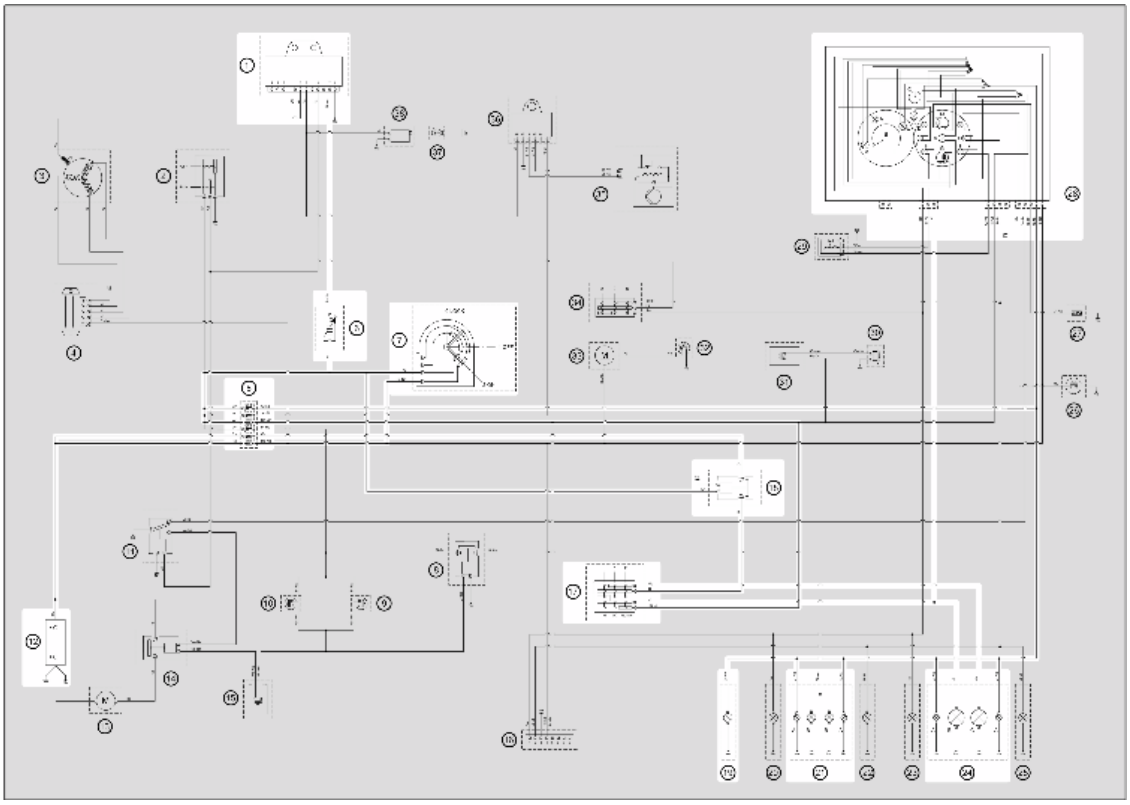
C. Low-beam light bulb

27. Instrument panel

A. Instrument panel bulbs

F. High-beam warning light

VERSIONE CON TELERUTTORE DI INIBIZIONE AVVIAMENTO



LEGENDA

1. Dispositivo di accensione elettronica

5. Gruppo fusibili

6. Starter automatico

7. Commutatore a chiave

12. Batteria

17. Deviatore luci

18. Teleruttore proiettore

19. Fanalino illuminazione targa

21. Fanale posteriore

A. Lampade luce di posizione

24. Proiettore

A. Lampade luce di posizione

B. Lampada luce abbagliante

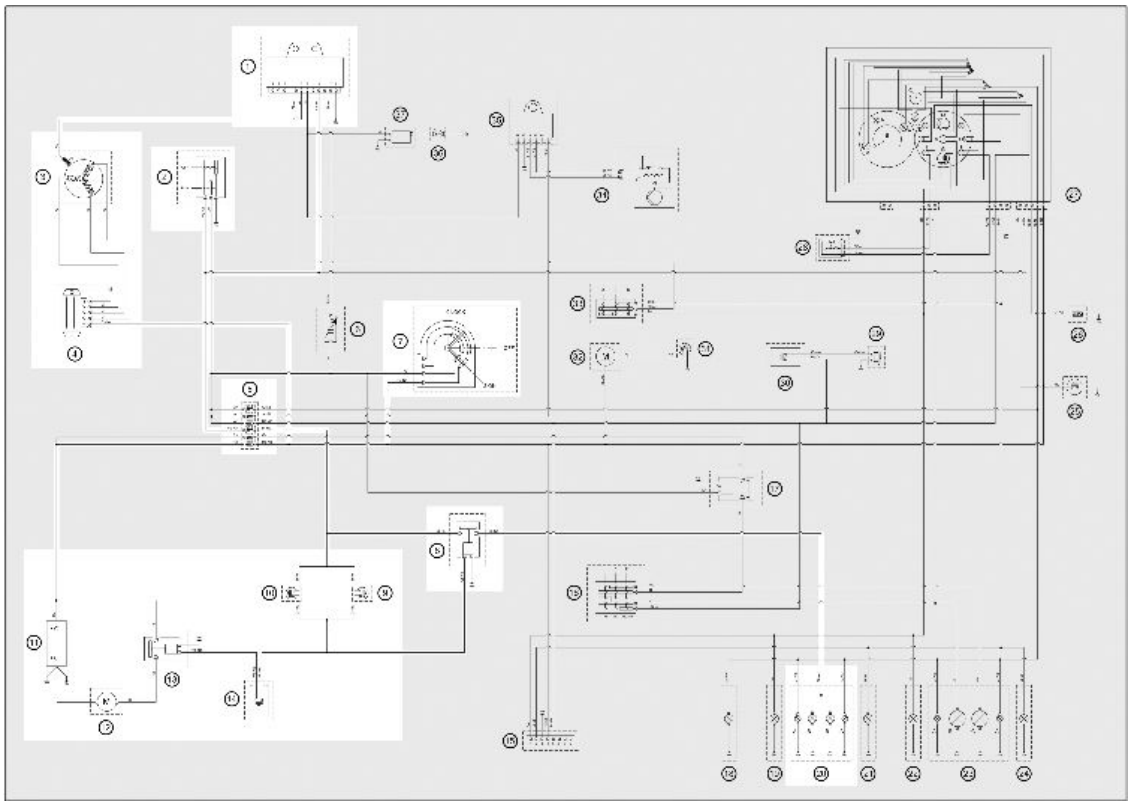
C. Lampada luce anabbagliante

28. Gruppo strumenti

A. Lampade illuminazione strumento

F. Spia luce abbagliante

Battery recharge and starting



KEY

1. Electronic ignition device

2. Engine stop switch

3. Magneto flywheel - Pick-up

4. Voltage regulator

5. Fuse unit

7. Key switch

8. Stop light remote control

9. Stop button on front brake

10. Stop button on rear brake

11. Battery

12. Starter motor

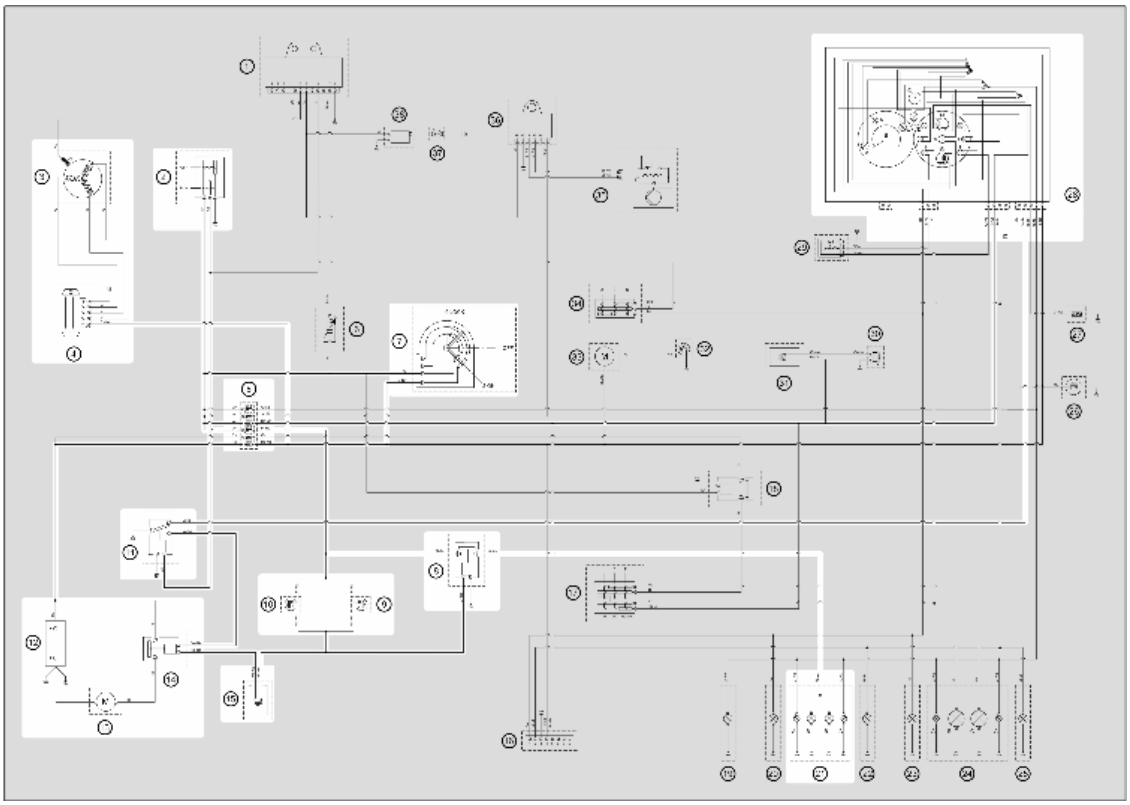
13. Start-up remote control

14. Starter button

20. Rear light

B. Stop light bulbs

VERSIONE CON TELERUTTORE DI INIBIZIONE AVVIAMENTO



LEGENDA

2. Deviatore arresto motore

3. Volano magnete - Pick-up

4. Regolatore di tensione

5. Gruppo fusibili

7. Commutatore a chiave

8. Teleruttore luci stop

9. Pulsante di stop sul freno anteriore

10. Pulsante di stop sul freno posteriore

11. Teleruttore inibizione avviamento

12. Batteria

13. Motorino di avviamento

14. Teleruttore di avviamento

15. Pulsante di avviamento

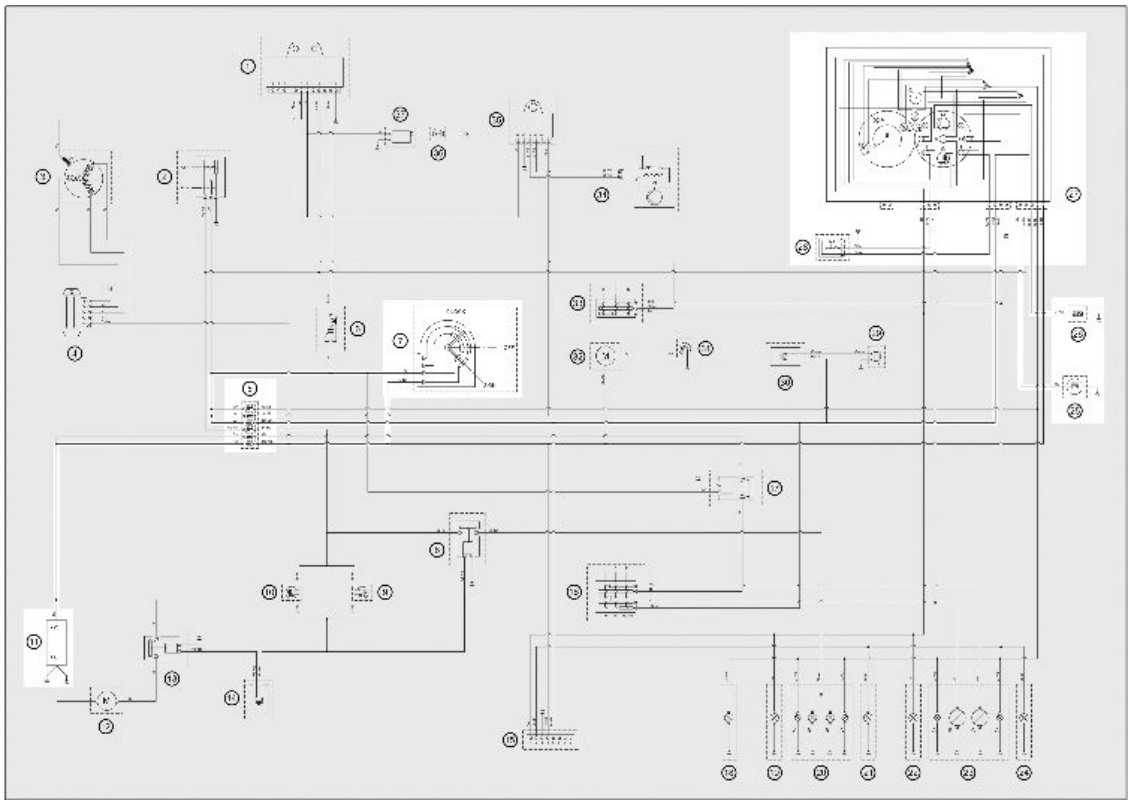
21. Fanale posteriore

B. Lampade luce di stop

28. Gruppo strumenti

D. Spia motore non abilitato

Level indicators and enable signals section



KEY

5. Fuse unit

7. Key switch

11. Battery

25. Engine oil pressure sensor

26. Thermistor

27. Instrument panel

G. Fuel level indicator

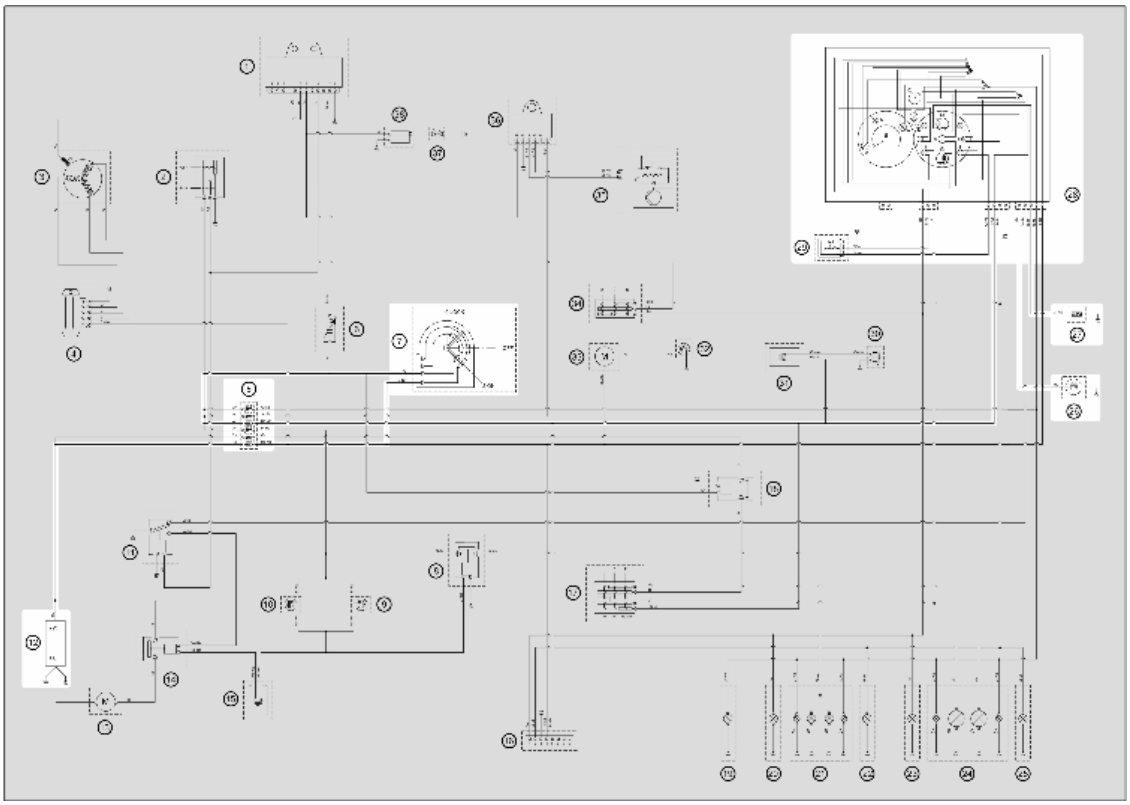
H. Low fuel warning light

L. Oil warning light

M. Water temperature gauge

28. Fuel level transmitter

VERSIONE CON TELERUTTORE DI INIBIZIONE AVVIAMENTO



LEGENDA

5. Gruppo fusibili

7. Commutatore a chiave

12. Batteria

26. Sensore pressione olio motore

27. Termistore

28. Gruppo strumenti

G. Indicatore livello carburante

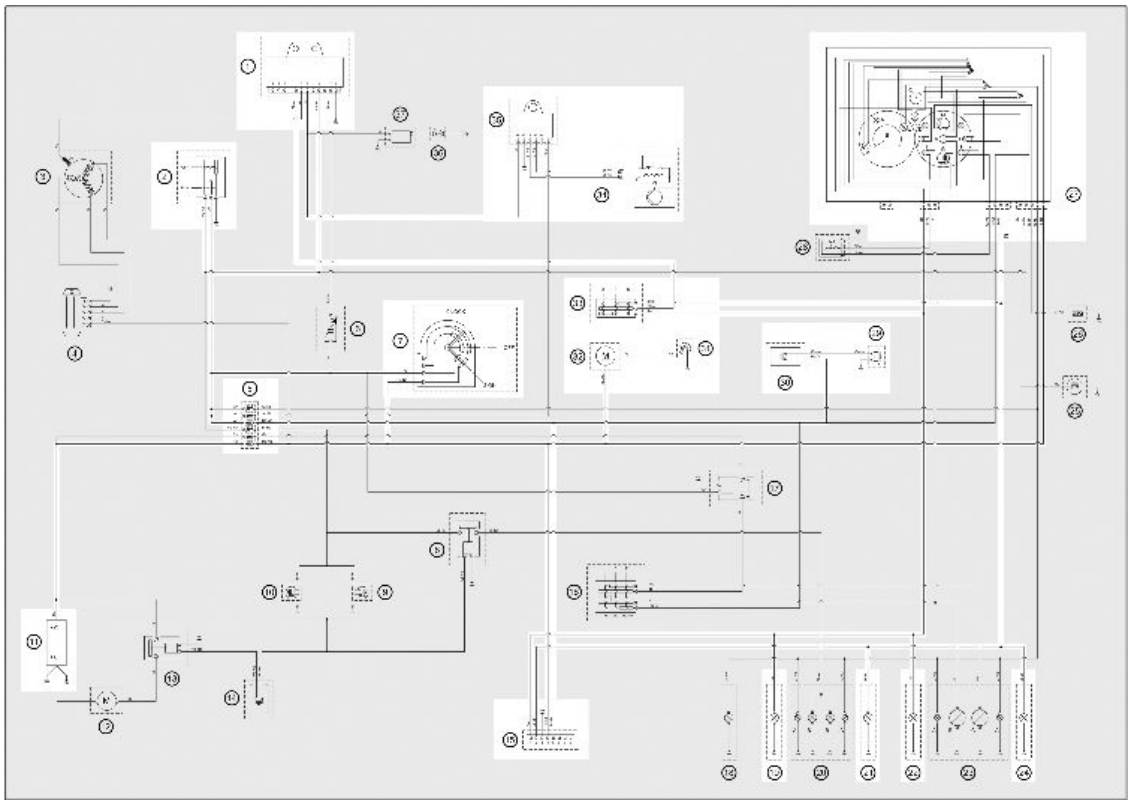
H. Spia riserva

L. Spia olio

M. Indicatore temperatura acqua

29. Trasmettitore livello carburante

Devices and accessories



KEY

1. Electronic ignition device

2. Engine stop switch

5. Fuse unit

7. Key switch

11. Battery

15. Wiring for antitheft device

19. Rear left turn indicator light

21. Rear right turn indicator light

22. Front left turn indicator light

24. Front right turn indicator light

27. Instrument panel

C. Clock

E. Right arrow warning light

I. Left arrow warning light

29. Horn

30. Horn button

31. Thermoswitch

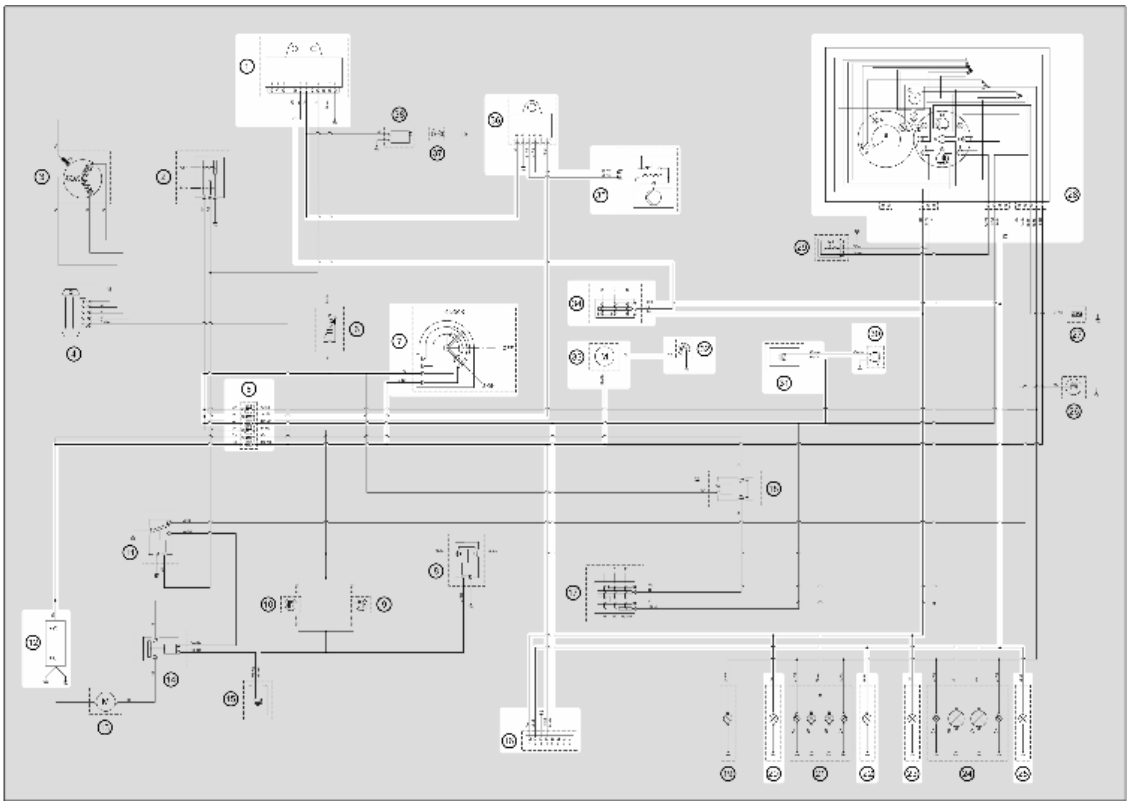
32. Electric fan

33. Turn signal switch

34. Electric fuel pump

35. Electric pump control device

VERSIONE CON TELERUTTORE DI INIBIZIONE AVVIAMENTO



LEGENDA

1. Dispositivo di accensione elettronica

5. Gruppo fusibili

7. Commutatore a chiave

12. Batteria

16. Predisposizione antifurto

20. Lampeggiatore posteriore sinistro

22. Lampeggiatore posteriore destro

23. Lampeggiatore anteriore sinistro

25. Lampeggiatore anteriore destro

28. Gruppo strumenti

C. Orologio

E. Spia freccia destra

I. Spia freccia sinistra

30. Clacson

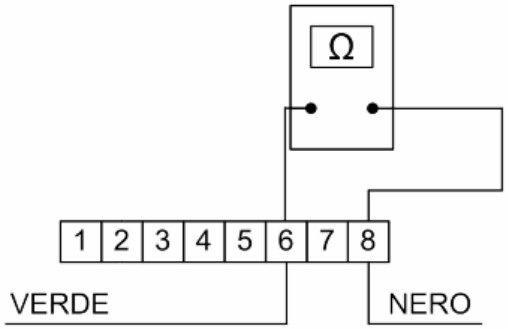
31. Pulsante clacson
32. Termointerruttore
33. Elettroventola
34. Commutatore lampeggiatori
35. Pompa elettrica carburante
36. Dispositivo comando pompa elettrica

Checks and inspections

Ignition circuit

No spark plug

Once the lack of power to the spark plug has been detected and the LED indicates it can be ignited, follow this procedure:
- Pick-Up check.
Disconnect the control unit connector and check the resistance value between terminal No. 6 (Green) and terminal No. 8 (Black). Check the Pick-Up and its power line:



Electric characteristic

Pick-up resistance value

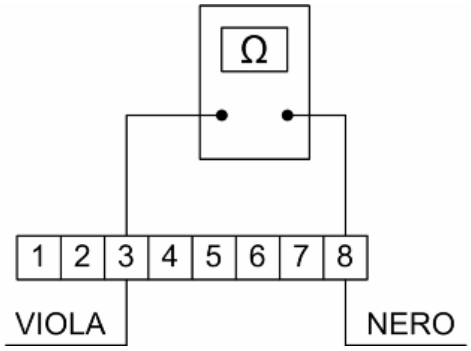
Pick-up resistance value: 105 ÷ 124 Ohm

If a break in the circuit is found, check again the flywheel and the engine ground connectors (see engine manual). If non-conforming values are measured, replace the Pick-Up; otherwise, repair the cable harness.
In case conforming values are measured, try replacing the control unit (without programming) and make sure the failure has been solved by checking sparks are produced in the spark plug; only then program the control unit.

- HV primary coil check

Disconnect the control unit connector and check that the cable between terminal No. 3 and terminal No. 8 is not interrupted (see figure).

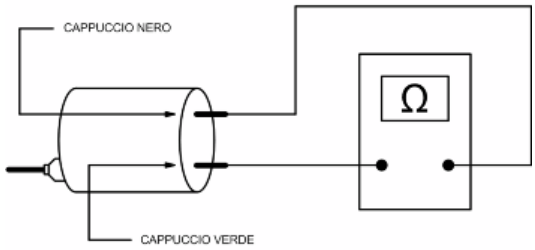
If non-conforming values are measured, check again the HV primary coil directly on the positive and negative terminals. If non-conforming values are measured, repair the cable harness or else replace the HV coil.



Electric characteristic

High voltage coil primary check

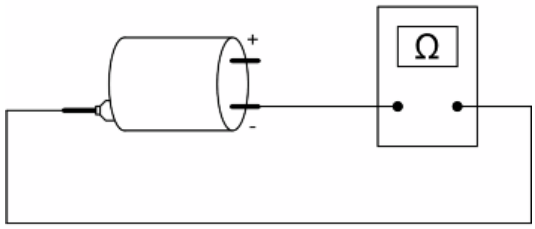
0.21 ± 0.025 Ohm



HV coil secondary check

Disconnect the spark plug cap from the HV cable and measure the resistance between the HV cable terminal and the HV coil negative terminal (see figure).

If non-conforming values are measured, replace the HV coil. To carry out a more complete diagnosis, check the peak voltage with the multimeter adaptor.



Specific tooling

020409Y Multimeter adaptor - Peak voltage detection

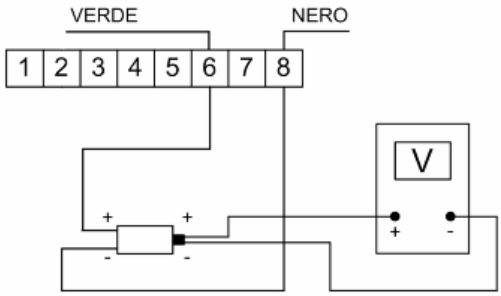
Electric characteristic

High voltage coil secondary resistance value

3100±310 Ohm

Pick-Up.

- Disconnect the control unit connector and connect the positive terminal to connector No. 6 and the negative terminal to connector No. 8 (see figure).
- The multimeter end of a scale should be 200V. Use the start-up system to run the engine and measure the voltage produced by the Pick-Up.
- Replace the Pick-Up if non-conforming values are measured.



N.B.

THE MULTIMETER MUST BE SELECTED TO DETECT CONTINUOUS VOLTAGE.

Electric characteristic

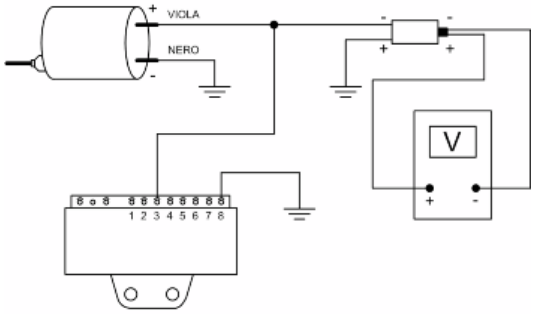
Voltage value

> 5 Volt

H.V. coil

With the control unit and HV coil connected, measure the voltage of the coil primary during the start-up test with the voltage peak adaptor and connecting the positive terminal to the ground one and the negative to the coil positive connector.

If non-conforming values are measured, replace the control unit.



N.B.

THE PLASTIC CAP OF THE POSITIVE TERMINAL ON THE HV COIL PRIMARY IS BLACK AND THE NEGATIVE TERMINAL ONE IS GREEN.

Specific tooling

020409Y Multimeter adaptor - Peak voltage detection

Electric characteristic

High voltage coil voltage value

>200V

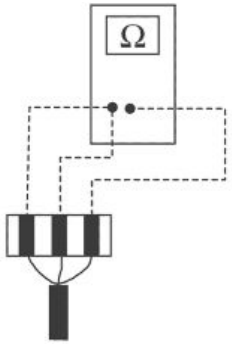
Stator check

Disconnect the connector from the voltage regulator and check there is continuity between any yellow cable and the other two cables.

Electric characteristic

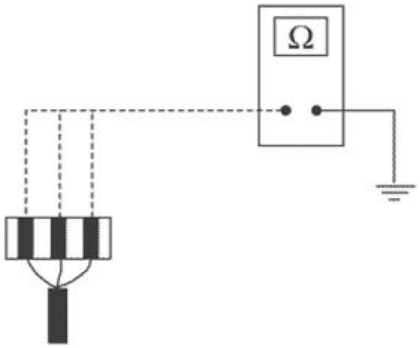
Ohm value:

0.7 ÷ 0.9 Ohm



Also check that all yellow cables are insulated from the ground connection.

If non-conforming values are detected, repeat the checks directly to the stator. In case of further repetitions of incorrect values replace the stator or repair the wiring.



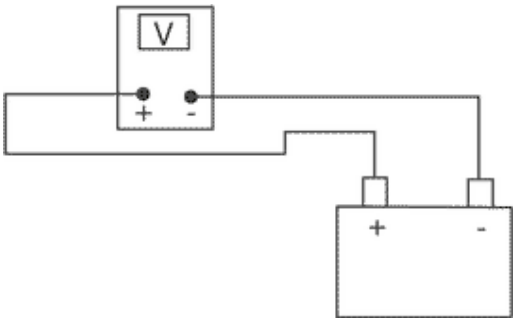
Voltage regulator check

With a perfectly charged battery and lights off, measure voltage at the battery poles with a high running engine.

The voltage should not exceed 15.2 Volt.

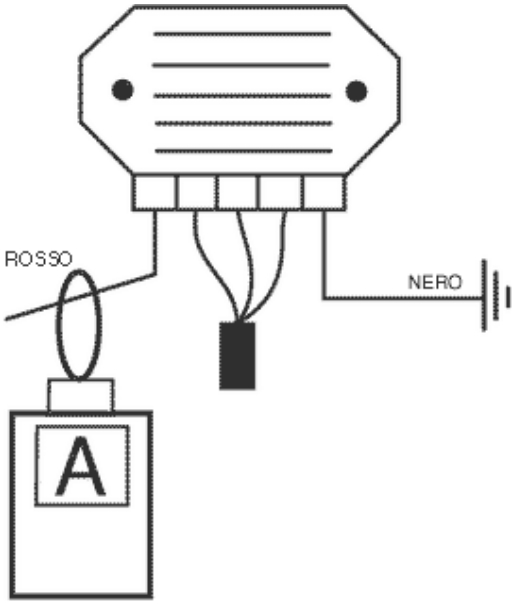
In case higher voltages are detected, replace the regulator.

In case of voltage values lower than 14 Volt, check the stator and the corresponding cable harness.



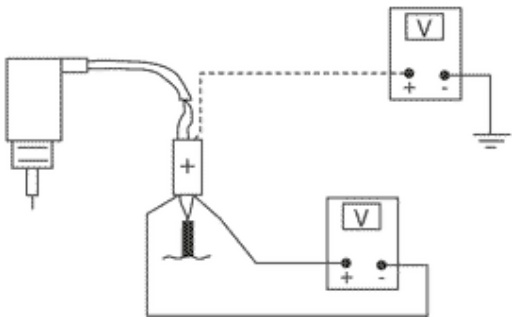
Recharge system voltage check

The recharge system is provided with a three phase alternator with permanent flywheel.
The alternator is directly connected to the voltage regulator.
In turn, the latter is directly connected to earth and to the battery positive terminal passing through the 15A protection fuse (No. 1).
This system therefore requires no connection to the key switch.
The three- phase generator provides good recharge power and at low revs a good compromise is achieved between generated power and idle stability. For this reason, it is very important that the idle speed is adjusted as prescribed.
Connect an ammeter induction clamp to the voltage regulator positive terminal, measure the battery voltage and turning on the vehicles lights with engine off, wait for the voltage to set at about 12 V. Start the engine and measure the current generated by the system with lights on and a high running engine.
In case the generated current value is lower than 10A, repeat the test using a new regulator and/ stator alternatively.



Choke Inspection

Refer to the engine section to check the resistance and operating conditions of the component. As regards voltage supply, keep the connector connected to the system and check that the two terminals receive battery voltage **with the engine on** (see figure).

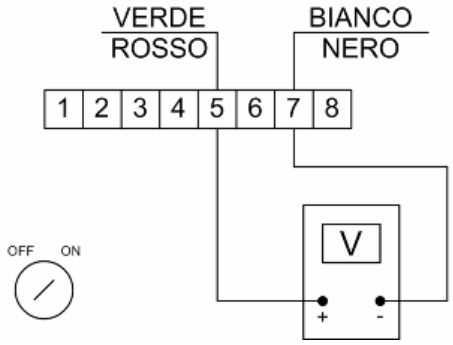


If no voltage is detected, connect the multimeter negative lead to the ground connection and the positive lead to the automatic starter White-Black cable; with the key switch set to «ON» check whether there is battery voltage; if there is no voltage, check the cable harness connections to the key switch and make sure the 15A fuse (No. 1) is in working order.

If there is voltage, check again the ignition control unit connector.

After disconnecting the starter, start up the engine and keep it at idle speed; then check whether there is voltage connecting the multimeter positive lead to terminal No. 5 (Green-Red), and the negative one to terminal No. 7 (White-Black) (see figure).

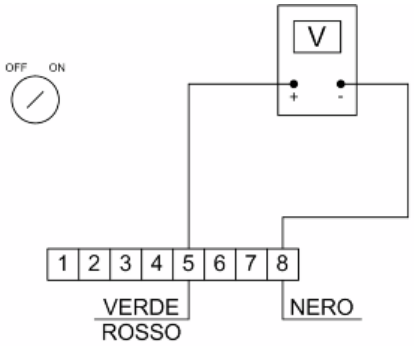
If there is no voltage, replace the control unit after making sure that the fuses are not blown; otherwise, check the cable harness between the starter and the control unit and, as a last resource, replace the starter.



Turn signals system check

- If the turn indicators do not work, proceed as follows:

- Repeat the check between terminal No. 5 (Green-Red) and terminal No. 8 (Black) with the key switch set to «ON», the side stand up and the emergency switch set to «RUN».

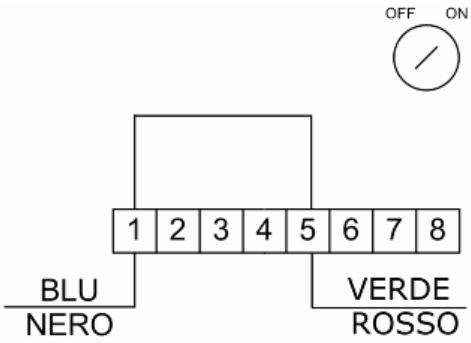


If no voltage is detected, check the cable harness, the connections and make sure the 15A main fuse (No. 1) is in working order; otherwise, proceed as follows:

- Jump terminals No. 1 (Blue-Black) and No. 5 (Green-Red) (see figure) and activate the turn indicator switch alternately to the right and left. Make sure the lights turn on.

If they do, replace the control unit because it is faulty. If they do not turn on, check the control unit-turn indicator switch connection cable harness; then, repeat the test.

If the cable harness is in good conditions and the turn indicators still do not turn on, replace the turn indicator switch because it is faulty.

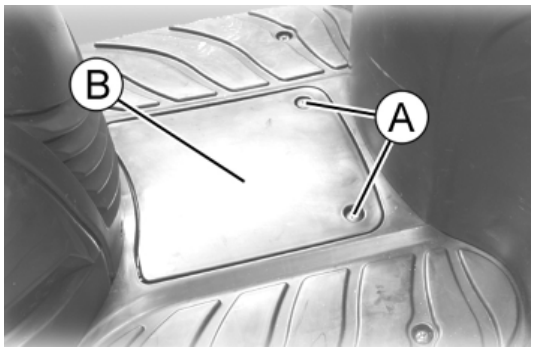


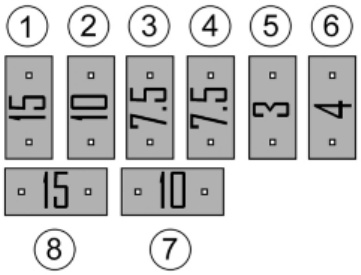
Lights list

LIGHT BULB TABLE

	Specification	Desc./Quantity
1	High-beam light bulb	**Type:** HALOGEN (H11) **Power:** 12V - 55W **Quantity:** 1
2	Low-beam bulb	**Type:** HALOGEN (H11) **Power:** 12V - 55W **Quantity:** 1
3	Front tail light bulb	**Type:** ALL GLASS **Power:** 12V - 5W **Quantity:** 2
4	Instrument panel bulb	**Type:** ALL GLASS **Power:** 12V - 1.2W **Quantity:** 5
5	Front turn indicator bulb	**Type:** SPHERICAL **Power:** 12V - 10W **Quantity:** 1 RHS + 1 LHS
6	Rear turn indicator bulb	**Type:** SPHERICAL **Power:** 12V - 10W **Quantity:** 1 RHS + 1 LHS
7	Twin-filament stop/tail light bulb	**Type:** SPHERICAL **Power:** 12V - 5/21W **Quantity:**1
8	License plate light bulb	**Type:** ALL GLASS **Power:** 12V - 5W **Quantity:** 1

Fuses





The electrical system has six protection fuses. To reach the board of fuses, unscrew the two screws «**A**» and remove the battery cover «**B**».

CAUTION

BEFORE REPLACING A BLOWN FUSE, FIND AND SOLVE THE FAILURE THAT CAUSED IT TO BLOW. NEVER TRY TO REPLACE THE FUSE WITH ANY OTHER MATERIAL (E.G., A PIECE OF ELECTRIC WIRE).

FUSE TABLE

Specification	Desc./Quantity
Fuse No. 1	**Capacity:**15A **Protected circuits:**Electric fan, Battery recharge circuit, Electronic ignition device, Clock, Electronic ignition device, Wiring for antitheft device, Lines protected by fuses 4.5 and 6.
Fuse No. 2	**Capacity:**15A **Protected circuits:**Headlight Remote control.
Fuse No. 3	**Capacity:**7.5 A

Specification	Desc./Quantity
	Protected circuits: Start-up circuit, Stop light remote control.
Fuse No. 4	**Capacity:**7.5 A **Protected circuits:**Instrument panel gauges and warning lights, Horn, Light switch, Headlight remote control, Wiring for anti-theft device.
Fuse No. 5	**Capacity:**3A **Protected circuits:**Electric pump control device.
Fuse No. 6	**Capacity: 5**A **Protected circuits:**Front tail light, Rear tail light, Instrument panel lighting, License plate light.
Fuse No. 7	**Capacity:**7.5 A **Protected circuits:**Free.
Fuse No. 8	**Capacity:**15A **Protected circuits:**Free.

Sealed battery

If the vehicle is provided with a sealed battery, the only maintenance required is the check of its charge and recharging, if necessary.

These operations should be carried out before delivering the vehicle, and on a six-month basis while the vehicle is stored in open circuit.

Besides, upon pre-delivery it is therefore necessary to check the battery charge and recharge it, if required, before storing the vehicle and, afterwards, every six months.

INSTRUCTIONS FOR THE BATTERY REFRESH AFTER OPEN-CIRCUIT STORAGE

1) Voltage check

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

- If voltage exceeds 12.60 V, the battery can be installed without any renewal recharge.

- If voltage is below 12.60 V, a renewal recharge is required as explained in 2).

2) Constant voltage battery charge mode

- Constant voltage charge equal to 14.40 ÷ 14.70V

- Initial charge voltage equal to 0.3 ÷ 0.5 for Nominal capacity

- Charge time:

10 to 12 h recommended

Minimum 6 h

Maximum 24 h

3) Constant current battery charge mode

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

- Charge time: 5 h

CAUTION

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

CHARGE THE BATTERY BEFORE USE TO ENSURE OPTIMUM PERFORMANCE. INADEQUATE CHARGING OF THE BATTERY WITH A LOW ELECTROLYTE LEVEL BEFORE IT IS FIRST USED SHORTENS THE LIFE OF THE BATTERY.

IF THE VEHICLE IS NOT USED FOR SOME TIME (1 MONTH OR MORE) THE BATTERY NEEDS TO BE RECHARGED PERIODICALLY. THE BATTERY RUNS DOWN COMPLETELY IN THE COURSE OF THREE MONTHS. IF IT IS NECESSARY TO REFIT THE BATTERY IN THE VEHICLE,

BE CAREFUL NOT TO REVERSE THE CONNECTIONS TAKING INTO ACCOUNT THAT THE GROUND WIRE (BLACK) MARKED(-) MUST BE CONNECTED TO THE - NEGATIVE TERMINAL WHILE THE OTHER TWO RED WIRES MARKED (+) MUST BE CONNECTED TO THE TERMINAL MARKED WITH THE +POSITIVE SIGN

WARNING

WHEN THE BATTERY IS REALLY FLAT (WELL BELOW 12.6V) IT MIGHT OCCUR THAT 5 HOURS OF RECHARGING ARE NOT ENOUGH TO ACHIEVE OPTIMAL PERFORMANCE.
GIVEN THESE CONDITIONS IT IS HOWEVER ESSENTIAL NOT TO EXCEED 8 HOURS OF CONTINUOUS RECHARGING SO AS NOT TO DAMAGE THE BATTERY ITSELF.

The battery should always be kept clean, especially on its top side, and the terminals should be coated with Vaseline.

Normal bench charging must be carried out using the specific battery charger 020333Y (single) or 020334 (multiple), setting the battery charge selector to the type of battery that needs recharging (i.e., at a current equal to 1/10 of the battery rated capacity). Connections to the power supply source must be implemented by connecting corresponding poles (+ to + and - to -).

Pump electrics check

If the engine does not work properly, the electric pump control unit may not work properly either. In this case:

- Remove the footrest in order to reach the electric fuel pump.
- Disconnect the fuel supply connector from the pump.
- Check that the fuel supply to the pump is adequate according to the data on the table.

PUMP SUPPLY

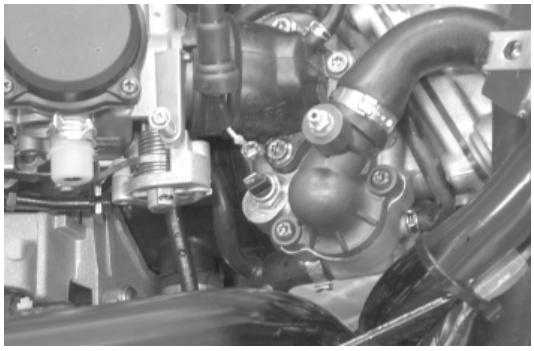
Specification	Desc./Quantity
Key set to «KEY ON»	Supply to the pump for 13 seconds
Engine revs from 0 to 200 rpm	Always «OFF»
Engine revs from 200 to 1200 rpm	Always «ON»
Engine revs from 1200 to 2000 rpm	0.2 seconds «ON» 9 seconds «OFF»
Engine rpm] 2000 rpm	Always «ON»

If the pump does not work:

- Disconnect the fuel supply connector from the pump.
- Make sure there is battery voltage at the connector ends.
- If there is no voltage, check the continuity of the cable harness and replace it if damaged.
- If the cable harness is intact, check that the fuel pump works properly by applying a 12 V voltage. Replace the pump if damaged.
- If the pump works properly, replace the control unit.

Smontaggio

- Remove the helmet compartment.
- Remove the side spoiler.
- Empty the cooling circuit.
- Remove the cover, disconnect the electrical terminal and unscrew the thermistor.



Verifica

LEGEND:

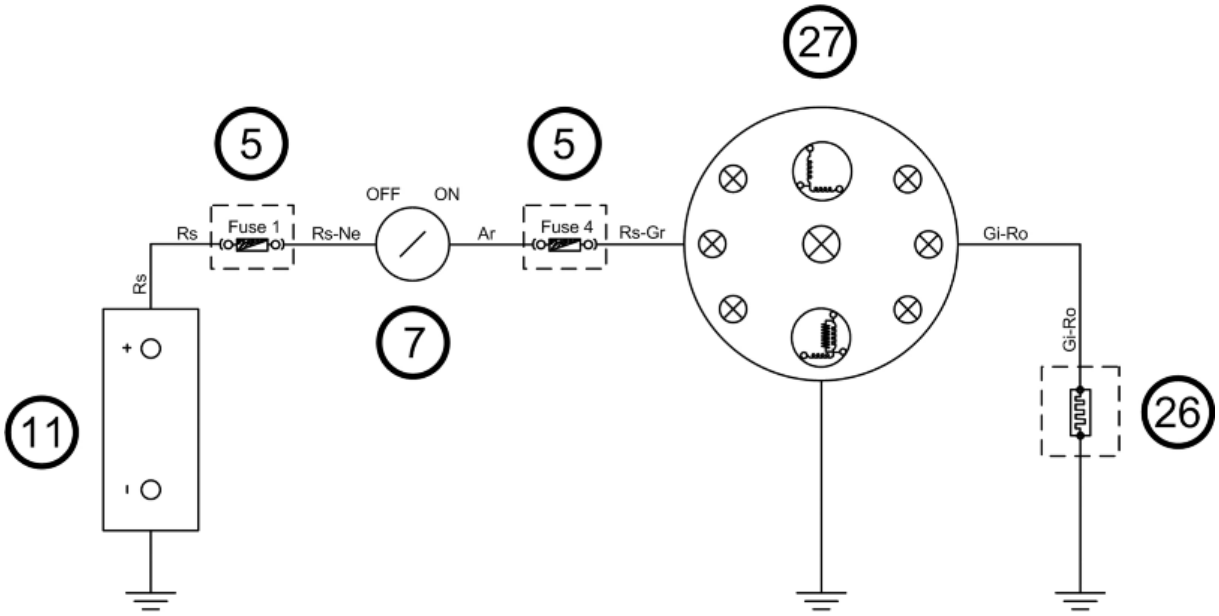
5. Fuse unit

7. Key switch

11. Battery

26. Thermistor

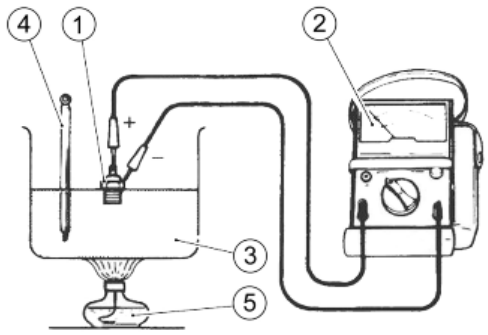
27. Instrument panel



- Connect a tester **«10»** (set as ohmmeter) to the thermistor **«2»** as shown in the figure.
- Immerse the thermistor in a container **«11»** with coolant.

In the same container, immerse a thermometer **«12»** with a temperature range of 0°÷150° (32° ÷302°F).

- Place the container on a stove **«13»** and warm up the coolant slowly.
- Check the temperature indicated on the thermometer and the thermistor value indicated on the tester.
- Make sure the thermistor varies according to temperature as indicated.



COOLANT TEMPERATURE °C (°F) / RESISTANCE VALUES (OHM)

Specification	Desc./Quantity
115° (239°)	Approx. 26 ÷ 10
50° (122°)	Approx. 205 ÷ 50

CAUTION

IF THE VALUES DO NOT VARY OR DIFFER TOO MUCH FROM THOSE INDICATED IN THE TABLE, REPLACE THE THERMISTOR.

Montaggio

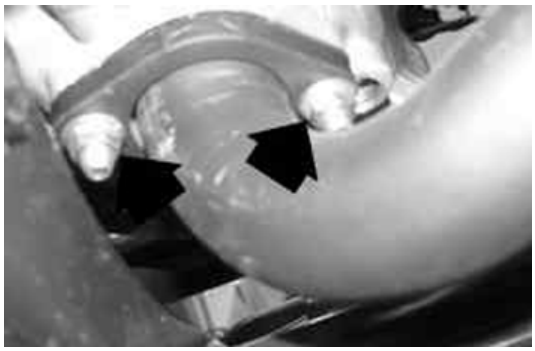
- Carry out removal operations in reverse order.
- Fill and bleed the cooling system.

INDEX OF TOPICS

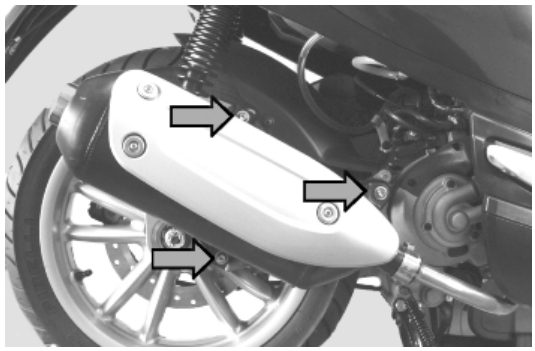
ENGINE FROM VEHICLE	ENG VE

Exhaust assy. Removal

- Undo the two exhaust manifold fixings on the head.



- Undo the three screws fixing the muffler to the support arm.
- Remove the full muffler unit.



To refit, carry out the removal operations in reverse order, observing the prescribed tightening torques.

Locking torques (N*m)

Nuts fixing muffler to support arm 27 ÷ 30 Nut fixing muffler to cylinder head 16 ÷ 18

Removal of the engine from the vehicle

WARNING

IN CASE OF OPERATIONS OVERLAPPING IN THE CROSS-REFERENCES TO OTHER CHAPTERS, INTERPRET THESE OPERATIONS LOGICALLY, THUS AVOIDING THE UNNECESSARY REMOVAL OF COMPONENTS.

WARNING

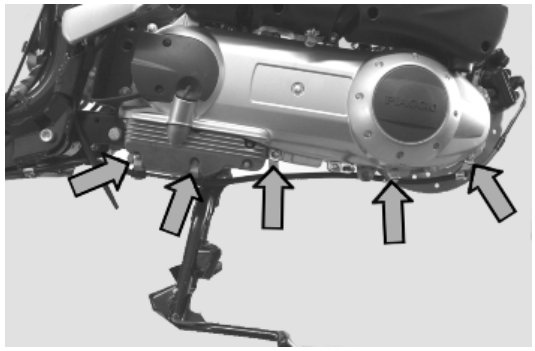
CARRY OUT THESE OPERATIONS WHEN THE ENGINE IS COLD.

To remove the engine from the frame, proceed as follows:

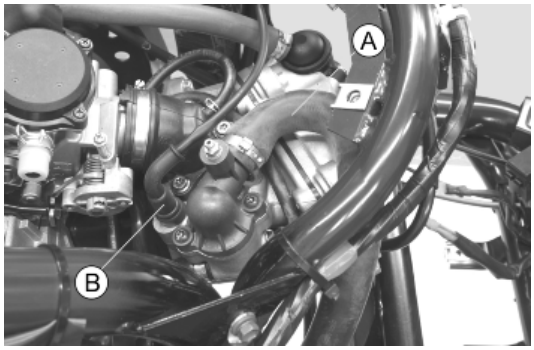
- Disconnect the battery.
- Remove the helmet compartment.
- Remove the lower spoiler.

Remove the full muffler unit.

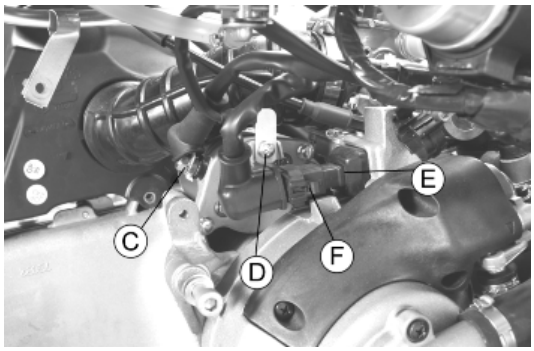
- Remove the rear wheel.
- Remove the rear brake calliper and release the pipe from the clamps in the engine lower section.



- Empty the cooling system.
- From the helmet compartment, disconnect the coolant return pipe «**A**» from the water temperature thermostat. Disconnect the water temperature sensor «**B**».

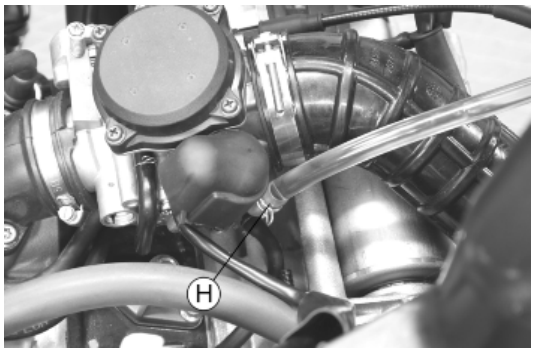


- Disconnect the cable «**C**» and the ground lead «**D**» from the starter motor, disconnect the pick-up «**E**» and release the cables from the clamp «**F**».

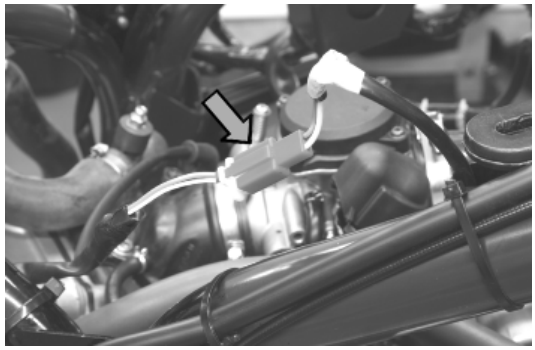


- Loosen the nut «**G**», release the throttle control transmission from the carburettor and release the cable harness.

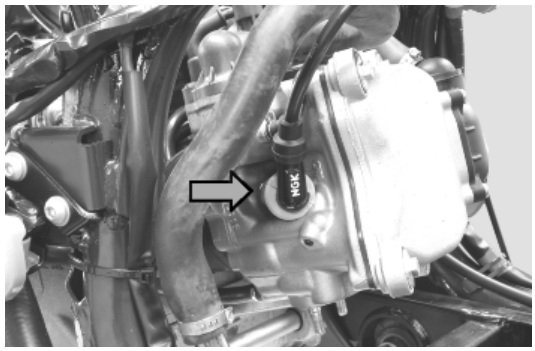
- Disconnect the fuel delivery pipe «**H**» from the carburettor.



- From the scooter left side, disconnect the connector from the carburettor starter.



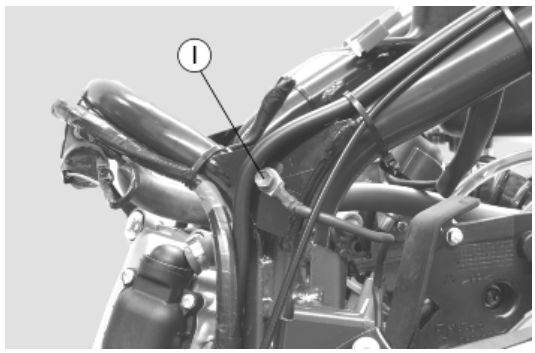
- From the scooter right side, disconnect the spark plug.



- From the scooter left side, undo and remove the engine ground screw «**I**»

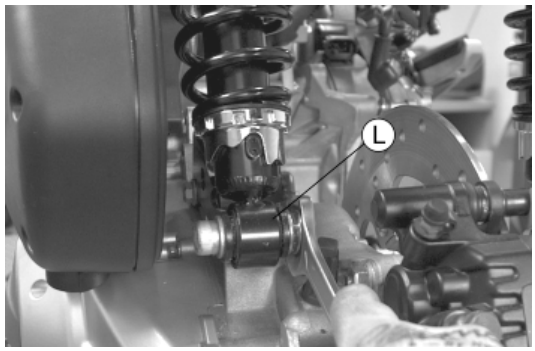
WARNING

GET A HOIST AND BELTS TO LIFT IT.

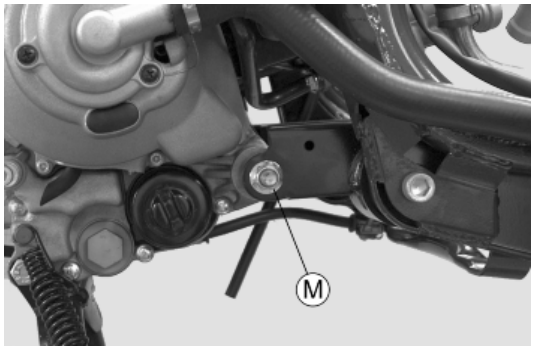


- Place the belts on the rear part of the frame. Lift the hoist arm until the belts are tightened.

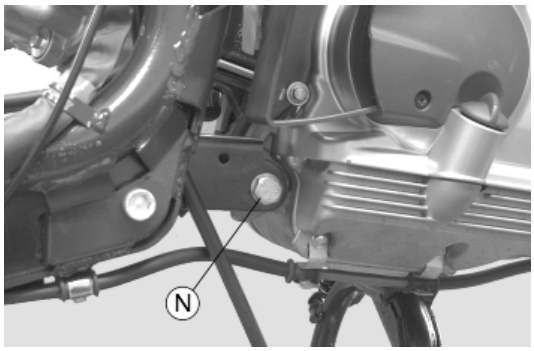
- Undo and remove the left shock absorber fixing screw «**L**»



- Undo and remove the nut fixing the engine on the swinging arm «**M**»



- Slide off the engine pin on the swinging arm «**N**». Remove the engine together with the centre stand.



To refit the engine on the frame, carry out removal operations in reverse order, checking:

- Tightening torques (see the TORQUES table in the CHARACTERISTICS chapter).
- Secure the pipes and the cables with the corresponding clamps.
- Fill and bleed the cooling system.
- Make sure the throttle control transmission is in working order.
- Make sure the electrical devices are in working order.

INDEX OF TOPICS

ENGINE	ENG

This section describes the operations to be carried out on the engine and the tools to be used.

Automatic transmission

Transmission cover

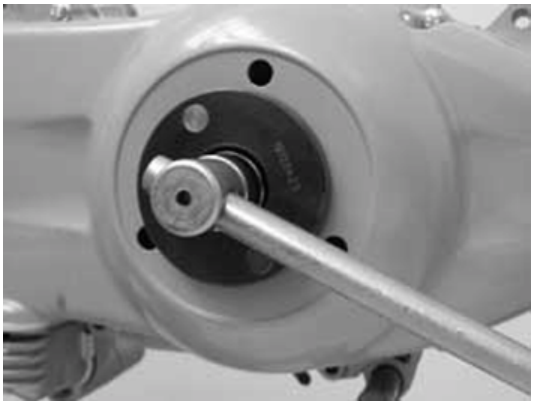
- To remove the transmission cover it is necessary to remove the plastic cover first, by inserting a screwdriver in the slotted holes. Using the clutch bell lock wrench shown in the figure, remove the driven pulley shaft locking nut and washer.

Specific tooling

020423Y driven pulley lock wrench

- Remove the cap/dipstick from the engine oil filling hole.
- Remove the ten screws.
- Remove the transmission cover.

If this operation is carried out directly on the vehicle, remove the cooling air supply coupling of the transmission housing.



Air duct

- Remove the five screws on two different levels as well as the small casing.

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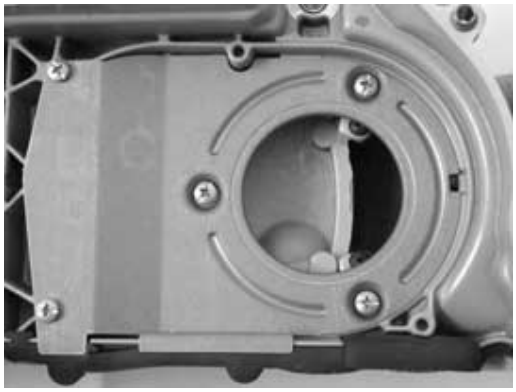
- Remove the 4 screws and the housing.



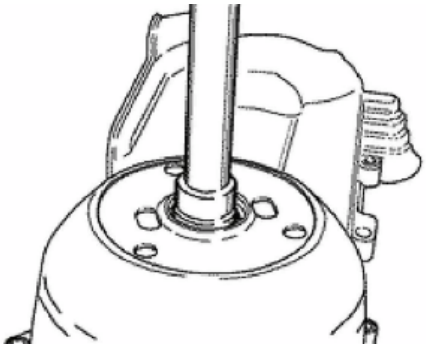
- To remove the intake throat on the transmission cover, just remove the 2 fixing screws indicated in the figure.

Air duct filter

To remove the intake throat on the transmission cover, remove the 2 fixing screws indicated in the figure.

Removing the driven pulley shaft bearing

- Remove the clip from the inside of the cover.
- Remove the bearing from the crankcase by means of:



Specific tooling

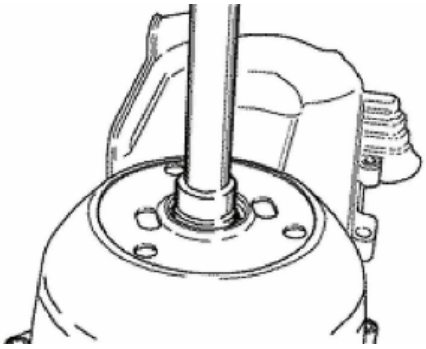
020376Y Adaptor handle

020375Y Adaptor 28 x 30 mm

020412Y 15 mm guide

Refitting the driven pulley shaft bearing

- Slightly heat the crankcase from the inside so as not to damage the painted surface.
- Insert the bearing in its seat.
- Refit the seeger ring.



CAUTION

USE AN APPROPRIATE REST SURFACE TO AVOID DAMAGING THE COVER PAINT.

N.B.

ALWAYS REPLACE THE BEARING WITH A NEW ONE UPON REFITTING.

Specific tooling

020376Y Adaptor handle

020357Y 32 x 35 mm adaptor

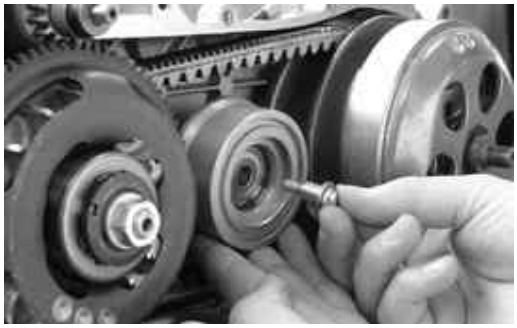
020412Y 15 mm guide

Baffle roller

Removal

Belt support roller (200 cm³ models only)

- Check that the roller does not show signs of wear and that it turns freely.
- Remove the special fixing screw and the roller together with the bearing.



Refitting

- Heat the roller and insert the bearing using the specific punch:

Specific tools:

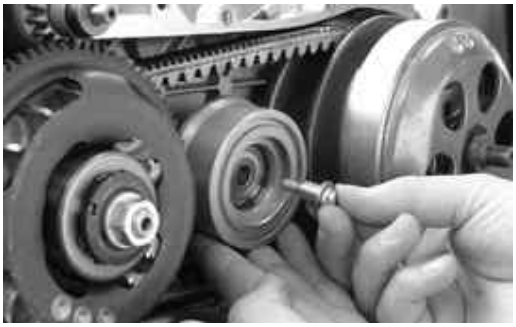
Specific tooling

020455Y 10-mm guide

- Refit the roller with the special screw.
- Tighten to the specified torque.
- Refit the intake throat with the O-ring, the sump sealing gasket and a the fan housing.

Locking torques (N*m)

Anti-flapping roller 12 - 16

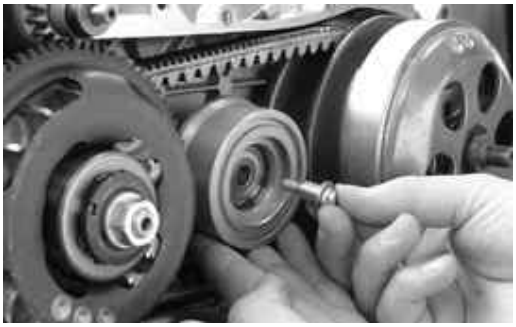


- Heat the roller and insert the bearing using the specific punch:

Specific tools:

Specific tooling

020455Y 10-mm guide



- Refit the roller with the special screw.
- Tighten to the specified torque.
- Refit the intake throat with the O-ring, the sump sealing gasket and a the fan housing.

Locking torques (N*m)

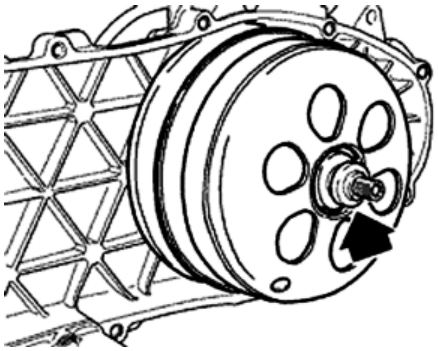
Anti-flapping roller 12 - 16

Removing the driven pulley

- Remove the spacer, the clutch bell and the whole driven pulley unit.

N.B.

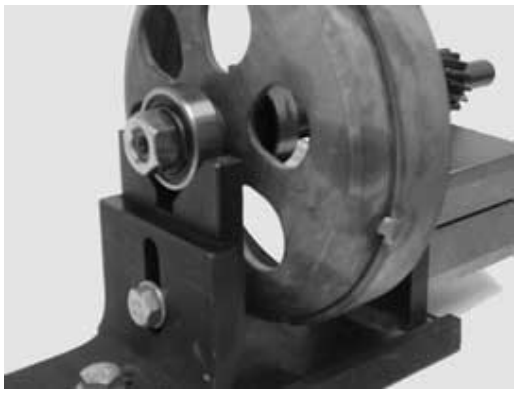
THE UNIT CAN ALSO BE REMOVED WITH THE DRIVING PULLEY MOUNTED.



Inspecting the clutch drum

Checking the bell working surface eccentricity

- Install the bell on a driven pulley shaft using 2 bearings (inner diameter 15 and 17 mm).
- Lock with the original spacer and nut.
- Place the bell/shaft assembly on the support to check the crankshaft alignment.



- Check that the clutch bell is not worn or damaged.
- Measure the clutch bell inside diameter.

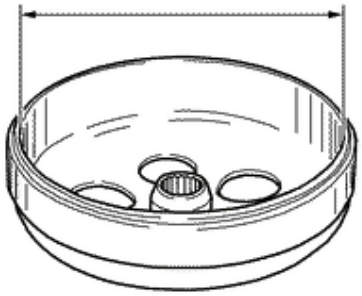
Characteristic

Max. value clutch bell

Max. value: Ø 134.5 mm

Clutch bell standard value

Standard value: Ø 134 - 134.2 mm



Removing the clutch

Clutch removal (125 cm³ H2O)

Fit the driven pulley spring compressor specific tool with medium length pins screwed in position **F** from the tool internal side.

- Insert the adapter ring 8 in the pins.
- Assemble the driven pulley unit on the tool introducing the rivets heads in the adapter ring.
- Make sure that the clutch is perfectly inserted into the adapter ring before proceeding to loosen/tighten the clutch nut.
- Use the special 46x55 wrench component n°9 to remove the nut fixing the clutch in place.
- Separate the driven pulley components (Clutch, fan and spring with plastic fitting).

CAUTION

THE TOOL MUST BE FIRMLY FIXED IN THE CLAMP AND THE CENTRAL SCREW MUST BE BROUGHT INTO CONTACT WITH THE TOOL. EXCESSIVE TORQUE CAN CAUSE THE SPECIFIC TOOL TO BUCKLE.

Specific tooling

020444Y009 46x55 Wrench

020444Y010 adapter ring

- Fit the special driven pulley spring compressor tool with the medium-length pins in position **"C"** screwed up from the inner side of the tool.
- Introduce the adapter ring 11 with the chamfering facing the inside of the tool.
- Fit the driven pulley unit on the tool with the insertion of the 3 pins in the ventilation holes in the mass holder support.
- Make sure that the clutch is perfectly inserted into the adapter ring before proceeding to loosen/tighten the clutch nut.
- Use the special 46x55 wrench component 9 to remove the nut fixing the clutch in place.
- Separate the driven pulley into its components (Clutch and spring with its plastic holder)

CAUTION

THE TOOL MUST BE FIRMLY FIXED IN THE CLAMP AND THE CENTRAL SCREW MUST BE BROUGHT INTO CONTACT WITH THE TOOL. EXCESSIVE TORQUE CAN CAUSE THE SPECIFIC TOOL TO BUCKLE.

Specific tooling

020444Y009 46x55 Wrench

020444Y011 adapter ring

Inspecting the clutch

- Check the thickness of the clutch mass friction material.

- The masses must not show traces of lubricants; otherwise, check the driven pulley unit seals.

N.B.

UPON RUNNING-IN, THE MASSES MUST EXHIBIT A CENTRAL CONTACT SURFACE AND MUST NOT BE DIFFERENT FROM ONE ANOTHER.
VARIOUS CONDITIONS CAN CAUSE THE CLUTCH TO TEAR.

CAUTION

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

Characteristic

Check minimum thickness

1 mm

Pin retaining collar

- Simultaneously turn and pull the collar manually to remove it.

N.B.

USE TWO SCREWDRIVERS IF YOU HAVE DIFFICULTY.

N.B.

BE CAREFUL NOT TO PUSH THE SCREW DRIVERS IN TOO FAR TO AVOID DAMAGE THAT COULD ENDANGER THE O-RING SEAL.

Removing the driven half-pulley bearing

- Check there are no signs of wear and/or noisiness; - Replace with a new one if there are.
- Remove the retaining ring using two flat blade screwdrivers.
- Support the pulley bushing adequately from the threaded side using a wooden surface.
- Using a hammer and pin, knock the ball bearing out as shown in the figure.

- Support the pulley properly using the bell as shown in the figure.

Specific tooling

001467Y035 Belle for OD 47-mm bearings

- Remove the roller bearing using the modular punch.

Specific tooling

020376Y Adaptor handle

020456Y Ø 24 mm adaptor

020363Y 20 mm guide

Inspecting the driven fixed half-pulley

- Remove the spacer, the clutch bell and the whole driven pulley unit.

N.B.

THE UNIT CAN ALSO BE REMOVED WITH THE DRIVING PULLEY MOUNTED.

- Measure the outer diameter of the pulley bushing.
- Check the contact surface with the belt to make sure there are no flaws.
- Check the riveted joints are functional.
- Check the evenness of the belt contact surface.

Characteristic

Half-pulley minimum diameter

Minimum admissible diameter Ø 40.96 mm

Half-pulley standard diameter

Standard diameter: Ø 40.985 mm

Wear limit

0.3 mm

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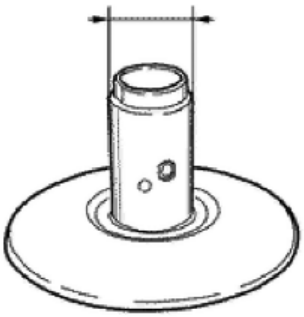
- Measure the outer diameter of the pulley bushing.
- Check the contact surface with the belt to make sure there are no flaws.



Characteristic

Half-pulley standard diameter

Standard diameter: Ø 40.985 mm

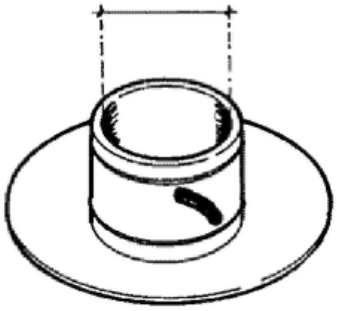
Half-pulley minimum diameter

Minimum admissible diameter Ø 40.96 mm

Inspecting the driven sliding half-pulley

125 - 200 version

- Remove the two internal grommets and the two O-rings.
- Measure the movable half-pulley bushing inside diameter.



Characteristic

Movable driven half-pulley max. diameter

Max. diameter admitted: Ø 41.08 mm

Movable driven half-pulley standard diameter

Standard diameter: Ø 41.000 ÷ 41.035 mm

- Remove the belt and slide the movable half-pulley with the relevant bush, taking care of the falling free assembled rollers.
- Remove the return rollers plate with the relative guide pads.

Refitting the driven half-pulley bearing

- Support the pulley bushing adequately from the threaded side using a wooden surface.
- Fit a new roller sleeve as in the figure.
- For the fitting of the new ball bearing, follow the example in the figure using a modular punch.

Fit the snap ring

WARNING

N.B.

FIT THE BALL BEARING WITH THE VISIBLE SHIELD

Specific tooling

020376Y Adaptor handle

020375Y Adaptor 28 x 30 mm

020424Y Driven pulley roller casing fitting punch

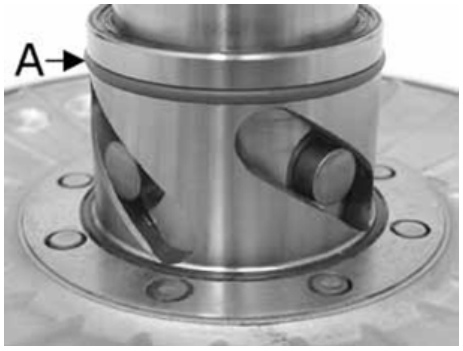
Refitting the driven pulley

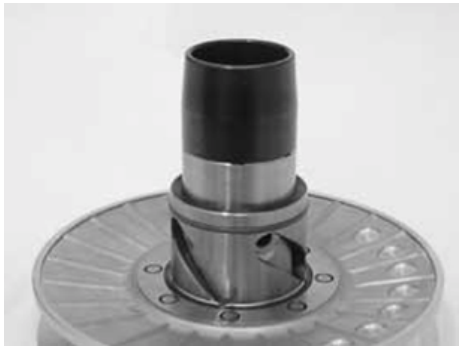
Driven pulley fitting

- Insert the new oil guards and O-rings on the movable half-pulley.
- Lightly grease the O-rings (A) shown in the figure.
- Fit the half-pulley over the bushing using the appropriate tool

Check that the pins are not worn and proceed with the refitting in the relative hollows.-

- Refit the torque server closure collar.
- Using a curved-spout grease gun, lubricate the driven pulley unit with approximately 6 gr. of grease. Apply the grease through one of the holes in the bushing until it comes out through the hole on the opposite side. This operation is necessary to avoid the presence of grease beyond the O-rings.





N.B.

THE TORQUE SERVER CAN BE GREASED WHETHER WITH BEARINGS FITTED OR WHEN THEY ARE BEING REPLACED; UNDERTAKING THE OPERATION WHEN THE BEARINGS ARE BEING SERVICED MIGHT BE EASIER.

Specific tooling

020263Y Sheath for driven pulley fitting

Recommended products

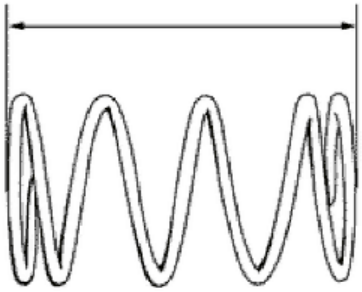
AGIP GREASE SM 2 Grease for the tone wheel revolving ring

Soap-based lithium grease containing NLGI 2 Molybdenum disulphide; ISO-L-XBCHB2, DIN KF2K-20

- Insert the new oil guards and O-rings on the movable half-pulley.
- Lightly grease the O-rings «**A**» shown in the figure.

Inspecting the clutch spring

- Misurare la lunghezza libera della molla della semipuleggia condotta mobile.



Characteristic

Standard length (125)

106 mm

limit after use (125)

101 mm

Lunghezza standard (200)

123 mm

Limite dopo l'uso (200)

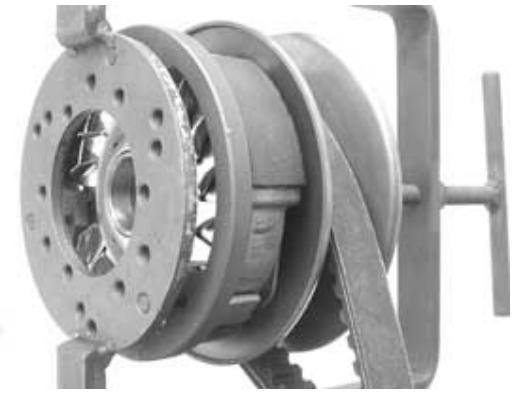
118 mm

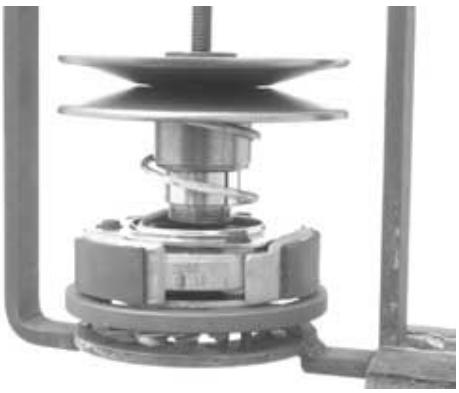
Refitting the clutch

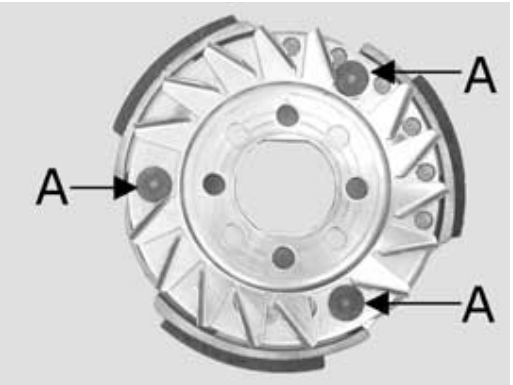
Version 125

- Support the driven pulley spring compressor appropriate tool with the control screw in vertical axis.
- Arrange the tool with the medium length pins screwed in position «**F**» on the inside.
- Insert the adapter ring 8 in the pins.
- Preassemble the cooling fan to the clutch in such a way that the keying facets are aligned and the 3 pin heads (A) of the mass axis can be seen in full.
- Insert the clutch on the adapter ring.
- Lubricate the end of the spring that abuts against the servo-system closing collar.

- Insert the spring with its plastic holder in contact with the clutch.
- Insert the driving belt into the pulley unit according to their direction of rotation.
- Insert the pulley unit with the belt into the tool.
- Slightly preload the spring.
- Make sure that the clutch is perfectly inserted into the adapter ring before proceeding to tighten the clutch nut.
- Place the tool in the clamp with the control screw on the horizontal axis.
- Fully preload the spring.
- Apply the clutch lock nut and tighten it to the specified torque using the specific 46x55 spanner.
- Loosen the tool clamp and insert the belt according to its direction of rotation.
- Lock the driven pulley again using the specific tool.
- Preload the clutch return spring with a traction/rotation combined action until it reaches the pulleys maximum opening and place the belt on the minimum rolling diameter.
- Remove the driven pulley /belt unit from the tool.







N.B.

FOR DESIGN REASONS, THE NUT IS SLIGHTLY ASYMMETRIC; THE FLATTEST SURFACE SHOULD BE MOUNTED IN CONTACT WITH THE CLUTCH.

N.B.

DURING THE SPRING PRELOADING PHASE, BE CAREFUL NOT TO DAMAGE THE PLASTIC SPRING STOP AND THE BUSHING THREADING.

N.B.

AN EXCESSIVE QUANTITY CAN DAMAGE THE CLUTCH OPERATION.

Specific tooling

020444Y011 adapter ring

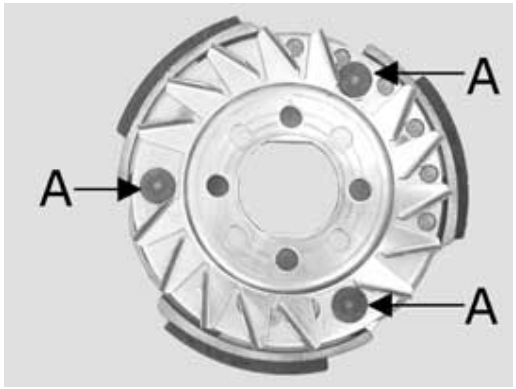
020444Y009 46x55 Wrench

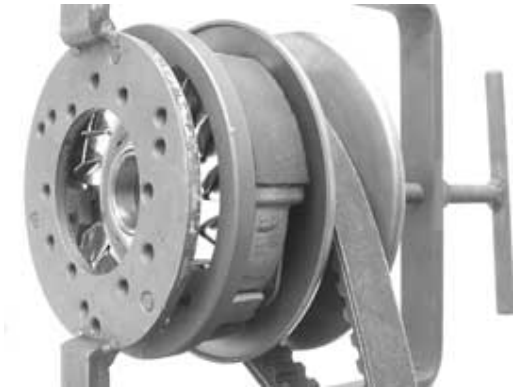
Locking torques (N*m)

Clutch unit nut on driven pulley 55 ÷ 60

Version 125

- Support the driven pulley spring compressor appropriate tool with the control screw in vertical axis.
- Arrange the tool with the medium length pins screwed in position «**F**» on the inside.
- Insert the adapter ring 8 in the pins.
- Preassemble the cooling fan to the clutch in such a way that the keying facets are aligned and the 3 pin heads (A) of the mass axis can be seen in full.
- Insert the clutch on the adapter ring.
- Lubricate the end of the spring that abuts against the servo-system closing collar.
- Insert the spring with its plastic holder in contact with the clutch.
- Insert the driving belt into the pulley unit according to their direction of rotation.
- Insert the pulley unit with the belt into the tool.
- Slightly preload the spring.
- Make sure that the clutch is perfectly inserted into the adapter ring before proceeding to tighten the clutch nut.
- Place the tool in the clamp with the control screw on the horizontal axis.
- Fully preload the spring.
- Apply the clutch lock nut and tighten it to the specified torque using the specific 46x55 spanner.
- Loosen the tool clamp and insert the belt according to its direction of rotation.
- Lock the driven pulley again using the specific tool.
- Preload the clutch return spring with a traction/rotation combined action until it reaches the pulleys maximum opening and place the belt on the minimum rolling diameter.
- Remove the driven pulley /belt unit from the tool.





N.B.

FOR DESIGN REASONS, THE NUT IS SLIGHTLY ASYMMETRIC; THE FLATTEST SURFACE SHOULD BE MOUNTED IN CONTACT WITH THE CLUTCH.

N.B.

DURING THE SPRING PRELOADING PHASE, BE CAREFUL NOT TO DAMAGE THE PLASTIC SPRING STOP AND THE BUSHING THREADING.

N.B.

AN EXCESSIVE QUANTITY CAN DAMAGE THE CLUTCH OPERATION.

Specific tooling

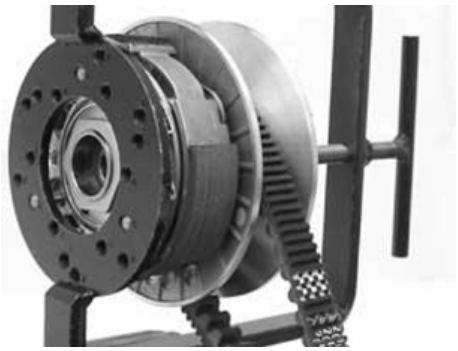
020444Y011 adapter ring

020444Y009 46x55 Wrench

Locking torques (N*m)

Clutch unit nut on driven pulley **55 ÷ 60**

- Support the driven pulley spring compressor appropriate tool with the control screw in vertical axis.
- Arrange the tool with the medium length pins screwed in position "**C**" on the inside.
- Introduce the adapter ring 11 with the chamfering facing upwards.
- Insert the clutch on the adapter ring.
- Lubricate the end of the spring that abuts against the servo-system closing collar.
- Insert the spring with its plastic holder in contact with the clutch.
- Insert the driving belt into the pulley unit according to their direction of rotation.
- Insert the pulley unit with the belt into the tool.
- Slightly preload the spring.
- Make sure that the clutch is perfectly inserted into the adapter ring before proceeding to tighten the clutch nut.
- Place the tool in the clamp with the control screw on the horizontal axis.
- Fully preload the spring.
- Apply the clutch fixing nut and tighten it to the prescribed torque using the special 46x55 wrench.
- Loosen the tool clamp and insert the belt according to its direction of rotation.
- Lock the driven pulley again using the specific tool.



- Preload the clutch return spring with a traction/ rotation combined action and place the belt in the smaller diameter rolling position.
- Remove the driven pulley /belt unit from the tool.

N.B.

DURING THE SPRING PRELOADING PHASE, BE CAREFUL NOT TO DAMAGE THE PLASTIC SPRING STOP AND THE BUSHING THREADING.

N.B.

FOR DESIGN REASONS, THE NUT IS SLIGHTLY ASYMMETRIC; THE FLATTEST SURFACE SHOULD BE MOUNTED IN CONTACT WITH THE CLUTCH.

Specific tooling

020444Y Tool for fitting/ removing the driven pulley clutch

020444Y011 adapter ring

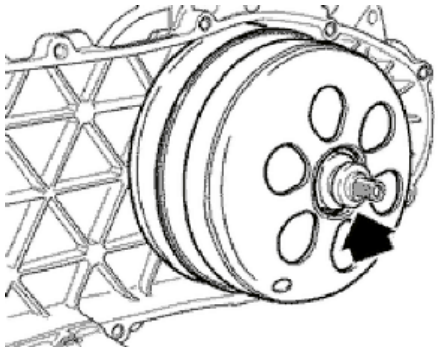
020444Y009 46x55 Wrench

Locking torques (N*m)

Nut locking clutch unit on pulley 55 ÷ 60 Nm

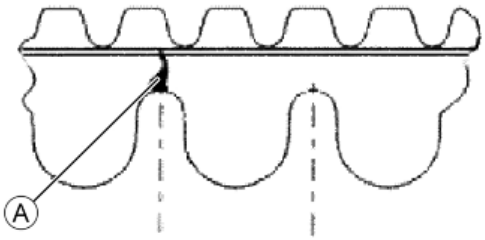
Refitting the driven pulley

- Reassemble the clutch bell and spacer.



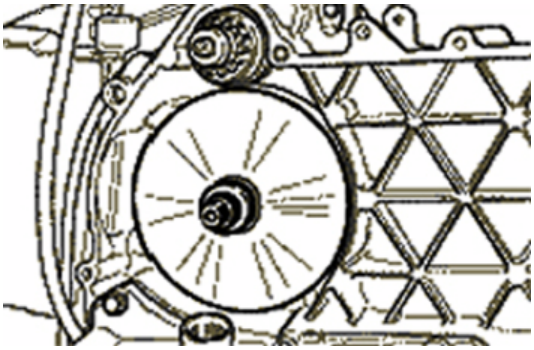
Drive-belt

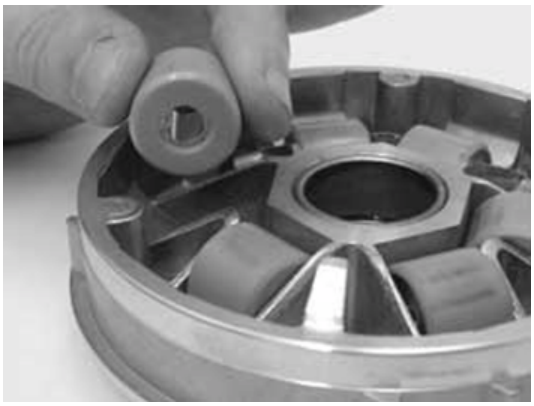
During the wear checks foreseen in the scheduled maintenance services at 6,000 km; 18,000 km; etc., check that the rim bottom of the toothing does not show signs of incisions or cracking (see figure): The rim bottom of the tooth must not have incisions or cracking; if it does, change the belt.



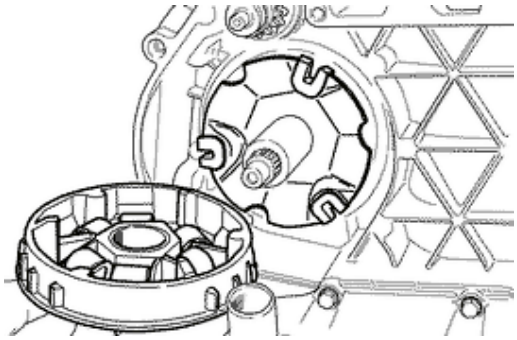
Removing the driving pulley

- Preassemble the movable half-pulley with the roller contrast plate by putting the rollers in their housings with the larger support surface touching the pulley according to the direction of rotation. - Make sure the roller contact plate is not flawed or damaged on the grooved edge. - Fit the unit together with the bushing on the crankshaft - Fit the driven pulley/Clutch/belt unit on the engine.

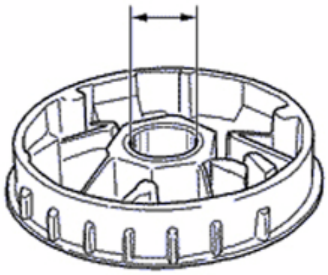




- Remove the belt and slide the movable half-pulley with the relevant bush, taking care of the falling free assembled rollers.
- Remove the return rollers plate with the relative guide pads.



- Check that the internal bushing shown in the figure is not abnormally worn and measure inner diameter A.
- Measure the pulley sliding bushing outside diameter shown in the figure.
- Check that the rollers are not damaged or worn.
- Check the guide shoes for the variator back-plate are not worn.
- Check the wear of the roller housings and of the belt contact surfaces on both pulley halves.
- Check that stationary driving pulley does not show signs of abnormal wear on the grooved edge and on the surface in contact with the belt.
- Check that the O-ring is not pushed out of shape.



CAUTION

DO NOT LUBRICATE OR CLEAN SINTERED BUSHINGS

Characteristic

roller (200): Minimum diameter allowed

Ø 20 mm

roller (125): Minimum diameter allowed

Ø 18.5 mm

Sliding bushing: Minimum admissible diameter

Ø 25.95 mm

Movable driving half-pulley bushing: Maximum allowable diameter

Ø 26.12 mm

roller (200): Standard Diameter

Diameter 20.5 - 20.7 mm

roller (125): Standard Diameter

Ø 18.9 ÷ 19.1 mm

Sliding bushing: Standard Diameter

Ø 25.959 ÷ 25.98 mm

Movable driving half-pulley bushing: Standard Diameter

26.000 - 26.021 mm

Driving pulley removal

- With the appropriate tool placed into the internal slots, remove the nut with the built-in Belleville washer.

Appropriate tools:

Specific tooling

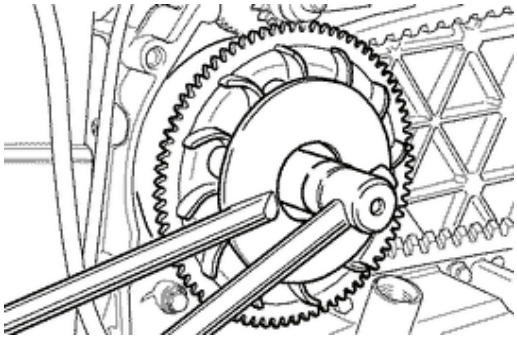
020442Y Pulley lock wrench

- Remove the entire start-up crown unit with the torque limiter.
- Remove the fixed driving half-pulley together with the O-ring and the steel washer touching the bushing.

Driving pulley removal (125)

- With the appropriate tool, remove the nut with the built-in Belleville washer, the drive common to the kick-starter version, and the steel washer.
- Remove the fixed driving half-pulley.
- Remove the steel washer separating from the bushing.

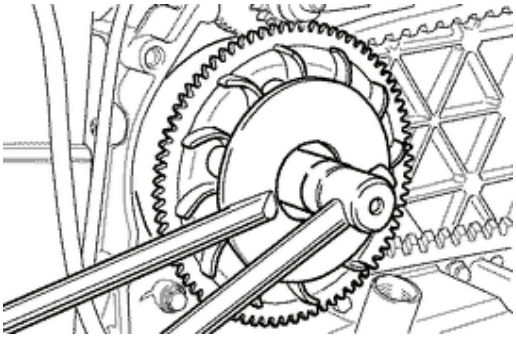
Appropriate tools:



Specific tooling

020368Y driving pulley lock wrench

Refitting the driving pulley



- Correctly refit the previously removed Bendix back to its position.
- Reassemble the parts of the unit (internal lining, fixed half-pulley, external lining, drive and nut), spread Loctite 243 Quick Set threadlock on the thread and tighten the nut to the prescribed torque.
- Avoid the half-pulley rotation with the appropriate stop key tool..
- Rotate the engine manually until the belt is slightly taut.

CAUTION

IT IS EXTREMELY IMPORTANT THAT THE BELT IS PERFECTLY FREE WHEN THE FIXED DRIVING HALF-PULLEY IS ASSEMBLED. THIS IS TO AVOID CARRYING OUT A WRONG TIGHTENING OF THE DRIVING HALF-PULLEY.

Specific tooling

020368Y driving pulley lock wrench

Locking torques (N*m)

Drive pulley nut 75 ÷ 83

- Preassemble the movable half-pulley with the roller contrast plate by putting the rollers in their housings with the larger support surface touching the pulley according to the direction of rotation.
- Check that the roller contact plate does not have flaws and is not damaged on the grooved edge.
- Mount the complete bushing unit on the driving shaft.
- Fit the driven pulley/Clutch/belt unit on the engine.

Refitting the transmission cover

- Check the presence of the 2 centring dowels and the correct installation of the sealing gasket for the oil sump on the transmission cover.
- Replace the cover tightening the 10 screws at the specified torque.
- Refit the oil loading cap/bar.
- refit the steel washer and the driven pulley nut.
- Tighten the nut to the prescribed torque using the lock wrench and the torque wrench tools.
- Replace the plastic cover.

Specific tooling

020423Y driven pulley lock wrench

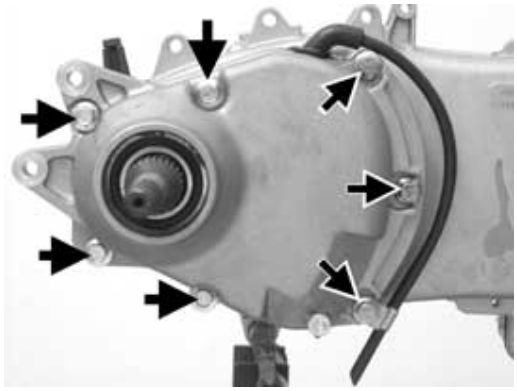
Locking torques (N*m)

Transmission cover screws 11 ÷ 13 **Driven pulley shaft nut** 54 ÷ 60

End gear

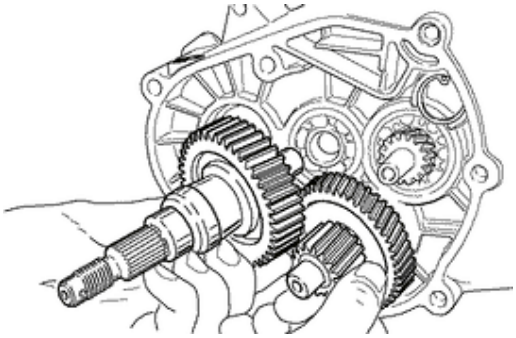
Removing the hub cover

- Empty the rear hub through the oil drainage plug.
- Remove the 7 flanged screws indicated in the figure.
- Remove the hub cover and its gasket.



Removing the wheel axle

- Remove the wheel axis complete with gear.
- Remove the intermediate gear.

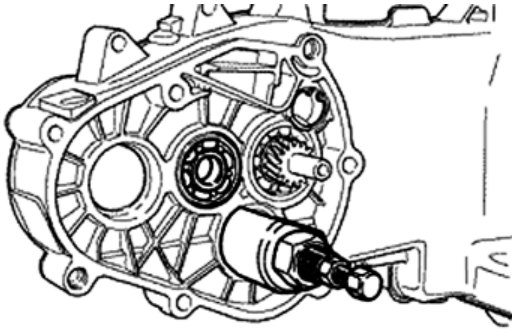


Removing the hub bearings

- Check the state of the bearings being examined (wear, clearance and noisiness). If faults are detected, do the following.
- Use the specific bearing extractor to remove the three 15 mm bearings (2 in the crankcase and 1 in the hub cover).

Specific tooling

001467Y013 Pliers to extract ø 15-mm bearings



Removing the wheel axle bearings

- Take out the clip on the outside of the gearbox cover.
- Support the hub cover and expel the bearing.

By means of the appropriate tools, remove the oil guard as in the figure.

Specific tooling

020376Y Adaptor handle

020477Y Adaptor 37 mm

020483Y 30 mm guide

020359Y 42x47-mm adaptor

020489Y Hub cover support stud bolt set

Removing the driven pulley shaft bearing

- As you need to remove the driven pulley shaft, its bearing and oil guard, remove the transmission cover as described above.
- Extract the driven pulley shaft from its bearing.
- Remove the oil guard using a screwdriver, working from inside the bearing and being careful not to damage the housing, make it come out of the belt transmission side.
- Remove the seeger ring shown in the figure

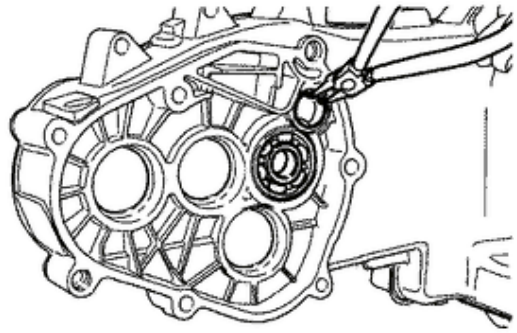
Remove the driven pulley shaft bearing using the modular punch.

Specific tooling

020376Y Adaptor handle

020375Y Adaptor 28 x 30 mm

020363Y 20 mm guide



Inspecting the hub shaft

- Check the three shafts for wear or distortion of the toothed surfaces, the bearing housings, and the oil seal housings.
- In case of anomalies, replace the damaged components.

Inspecting the hub cover

- Check that the fitting surface is not dented or distorted.
- Check the bearing bearings.
- In case of anomalies, replace the damaged components.

Refitting the wheel axle bearing

- Support the hub cover on a wooden surface.
- Heat the crankcase cover with the specific heat gun.
- Fit the wheel shaft bearing with a modular punch as shown in the figure.
- Fit the seeger ring.
- Fit the oil guard with seal lip towards the inside of the hub and place it flush with the internal surface by means of the appropriate tool used from the 52 mm side**.**

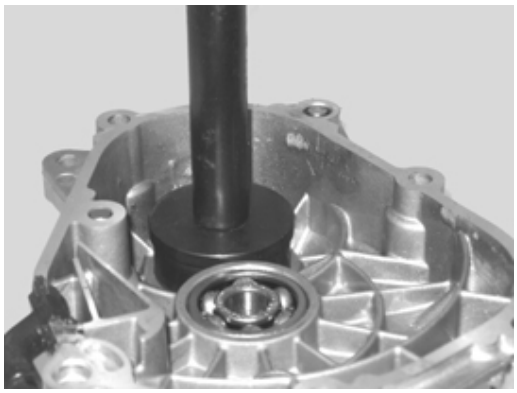
The 52 mm side of the adapter must be turned towards the bearing.

Specific tooling

020376Y Adaptor handle

020360Y Adaptor 52 x 55 mm

020483Y 30 mm guide

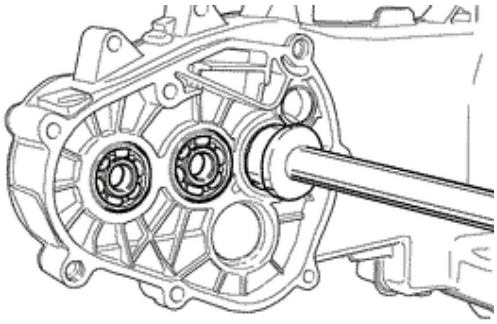


Refitting the hub cover bearings

- To fit the hub housing bearings, the engine crankcase and the cover must be heated with the special heat gun.
- The three 15 mm bearings must be fitted using the appropriate tools.

The 42 mm side of the adapter must be turned towards the bearing.

- Refit the driven pulley shaft bearing with a modular punch as shown in the figure.
- Refit the Seeger ring with the opening facing the bearing and the new oil guard flush with the crankcase on the pulley side.



N.B.

TO FIT THE BEARING ON THE COVER, SUPPORT THE COVER WITH THE STUD BOLT SET.

N.B.

IF THE BEARING HAS AN ASYMMETRICAL BALL RETAINER, PLACE IT SO THAT THE BALLS ARE VISIBLE FROM THE HUB INNER SIDE.

N.B.

WHEN FITTING THE BEARINGS ON THE ENGINE CRANKCASE, SUPPORT THE CRANKCASE PREFERABLY ON A SURFACE TO ALLOW THE BEARINGS TO BE DRIVEN VERTICALLY.

Specific tooling

020150Y Air heater support

020151Y Air heater

020412Y 15 mm guide

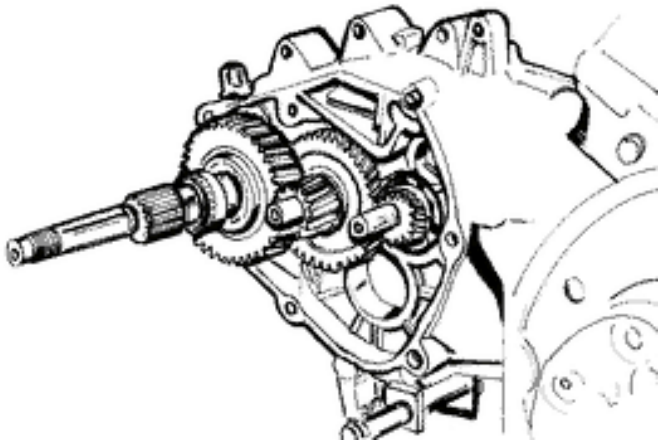
020376Y Adaptor handle

020359Y 42x47-mm adaptor

020363Y 20 mm guide

Refitting the hub bearings

- Install the three shafts in the engine crankcase as shown in the figure.

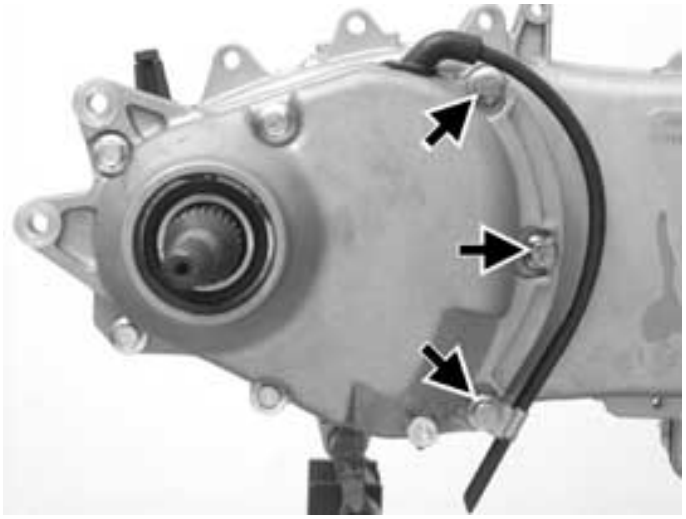


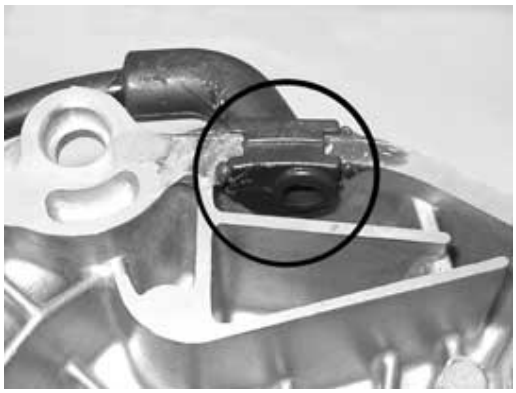
Refitting the ub cover

- Fit a new gasket together with the centring dowels.
- Seal the gasket of the breather pipe using black silicone sealant.
- Fit the gearbox cover, making sure the breather pipe is in the correct position.
- Place the 3 shortest screws, identifiable by their different colour, as shown in the figure.
- Fasten the breather pipe support bracket with the lower short screw.
- Assemble the remaining 4 screws and tighten the 7 screws to the prescribed torque.

Locking torques (N*m)

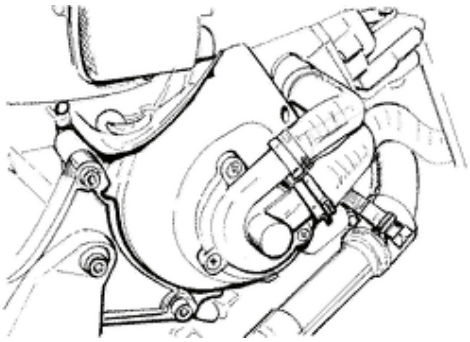
Rear hub cover screws 24 ÷ 27





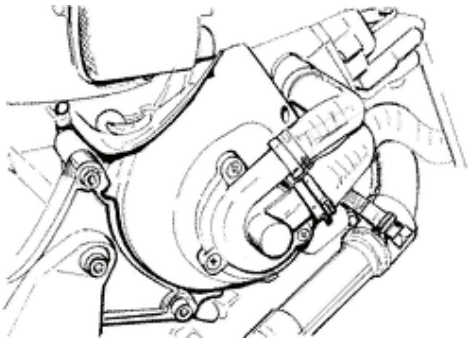
Flywheel cover

- Remove the two clamps, the two couplings and empty the cooling system.
- Remove the 4 retainers and the flywheel cover.



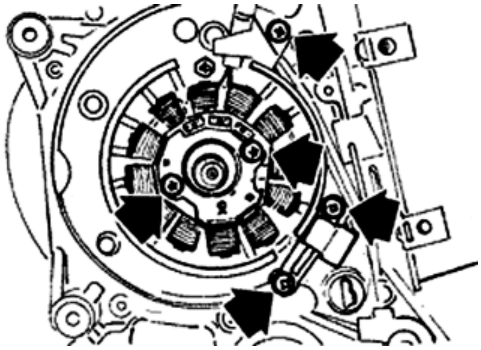
Removing the hub cover

- Remove the two clamps, the two couplings and empty the cooling system.
- Remove the 4 retainers and the flywheel cover



Removing the stator

- Remove the electric terminal of the minimum oil pressure switch.
- Remove the two Pick-Up screws and the one for the wiring harness bracket as well as the two stator fixing screws shown in the figure.
- Remove the stator and its wiring.

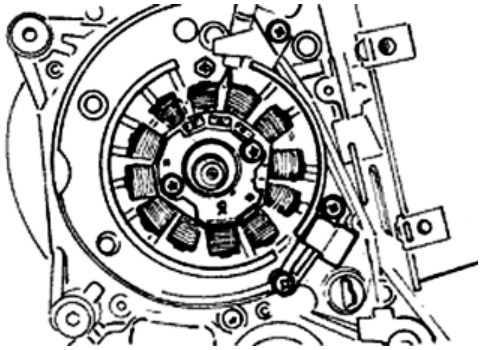


Refitting the stator

- Refit the stator and flywheel carrying out the removal procedure in reverse, tightening the retainers to the specified torque.
- Place the cable harness as shown in the figure.
- Stator screws and Pick-Up

N.B.

THE PICK-UP WIRE SHOULD BE POSITIONED BETWEEN THE UPPER SCREW AND THE REFERENCE PIN AS SHOWN IN THE DETAIL DRAWING.



Locking torques (N*m)

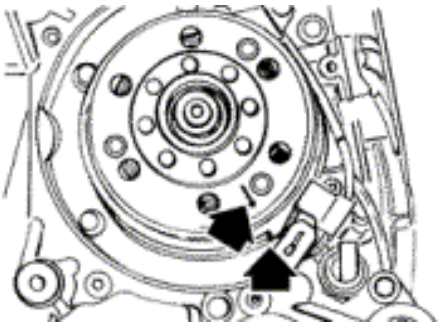
Stator assembly screws (°) 3 ÷ 4

Refitting the flywheel cover

- Place the flywheel with the top dead centre mark aligned with the crankcase.
- Place the flywheel cover by aligning the reference marks of the drive and the crankcase cover.
- Reassemble the cover on the engine, placing the three connectors in the drive for the water pump.
- Carry out the steps in the reverse order from the dismantling procedure.

CAUTION

TAKE CARE TO CORRECTLY POSITION THE FLYWHEEL CONNECTOR. MAKE SURE THE CENTRING DOWELS ARE PRESENT.



- Place the flywheel with the top dead centre mark aligned with the crankcase.
- Place the flywheel cover by aligning the reference marks of the drive and the crankcase cover.
- Reassemble the cover on the engine, placing the three connectors in the drive for the water pump.
- Carry out the steps in the reverse order from the dismantling procedure.

CAUTION

TAKE CARE TO CORRECTLY POSITION THE FLYWHEEL CONNECTOR. MAKE SURE THE CENTRING DOWELS ARE PRESENT.

Flywheel and starting

- Check the integrity of the internal plastic parts of the flywheel and the Pick-Up control plate.

Removing the flywheel magneto

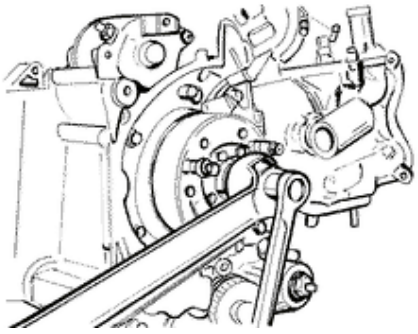
- Lock the rotation of the Flywheel with the calliper spanner tool.
- Remove the nut.
- Take out the flywheel.

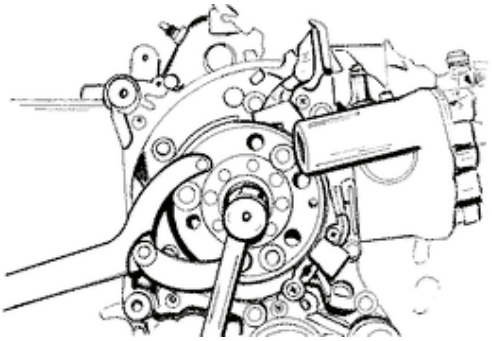
CAUTION

THE USE OF A CALLIPER SPANNER OTHER THAN THE ONE SUPPLIED COULD DAMAGE THE STATOR COILS

N.B.

THE FLYWHEEL OF THE 200 CM³ MODELS FEATURES ENHANCED INERTIAL MASS.





Inspecting the flywheel components

- Check the integrity of the internal plastic parts of the flywheel and the Pick-Up control plate.

Refitting the flywheel magneto

- Fit the flywheel being careful to insert the key properly.
- Lock the flywheel nut to the prescribed torque
- Check that the Pick-Up air gap is between 0.34 ÷ 0.76 mm.

The air gap cannot be modified when assembling the Pick-Up.

Different values result from deformations visible on the Pick-Up support.

N.B.

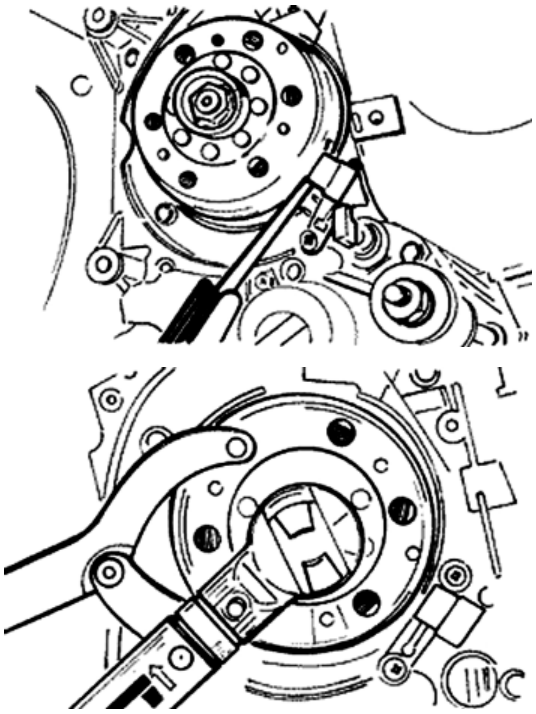
A VARIATION IN THE AIR GAP DISTANCE MODIFIES THE IGNITION SYSTEM IDLE SPEED

Specific tooling

020565Y Flywheel lock calliper spanner

Locking torques (N*m)

Flywheel nut 54 ÷ 60

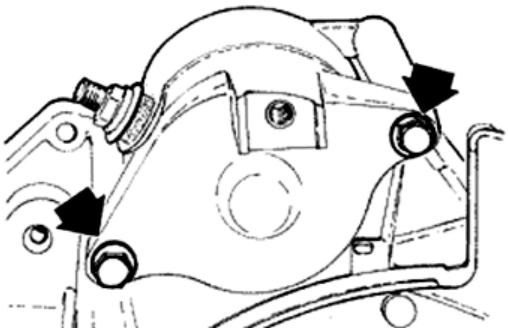


Refitting the starter motor

- Fit a new O-ring on the starter motor and lubricate it.
- Fit the starter on the crankcase, locking the two screws to the prescribed torque.

Locking torques (N*m)

Starter motor screws 11 ÷ 13



Cylinder assy. and timing system

Removing the intake manifold

- Remove the flywheel cover completely as described in the flywheel cover section.
- Loosen the 3 crews and remove the intake manifold.

N.B.

TAMPERPROOF SCREWS ARE SUPPLIED WITH 125 CC MODELS.

- Remove the flywheel cover completely as described in the flywheel cover section.
- Loosen the 3 crews and remove the intake manifold.

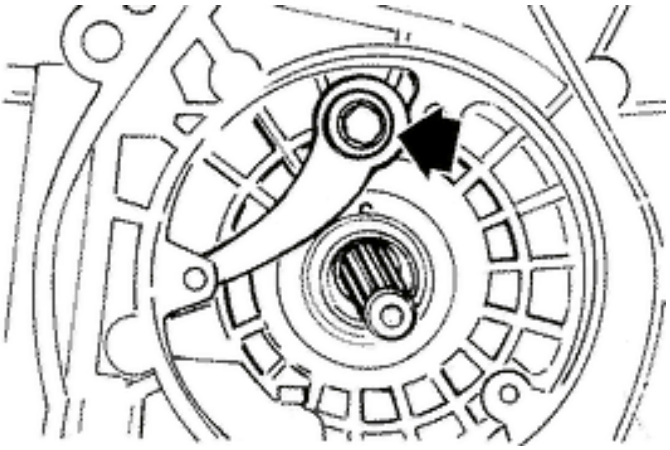
Removing the timing system drive

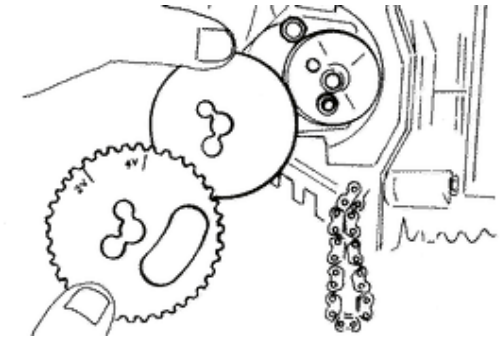
- Remove the parts listed below first: transmission cover, driving pulley with belt, start-up piston, oil sump with spring and by-pass piston, oil pump pulley cover, the O-ring on the crankshaft and the pinion separation washer.
- Remove the tappet cover.
- Remove the central screw fastener and the automatic valve-lifter retaining cover, as shown in the figure.
- Remove the return spring of the automatic valve lifter unit and the automatic valve lifter unit and its end of stroke washer.
- Loosen the central screw on the tensioner first.
- Remove the two fixings shown in the figure.
- Remove the tensioner with its gasket.
- Remove the internal hex screw and the counterweight shown in the figure.
- Remove the camshaft command pulley and its washer.
- Remove the command sprocket wheel and the timing chain.
- Remove the screw indicated in the figure, the spacer and the tensioner slider.

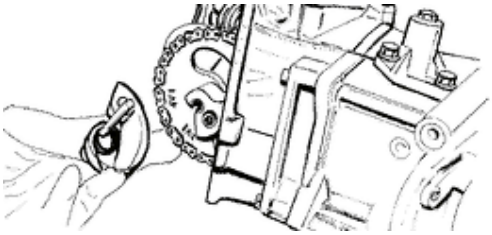
The chain tensioning pad must be removed from the transmission side. As regards the lower chain guide pad, it may only be removed after the head has been removed.

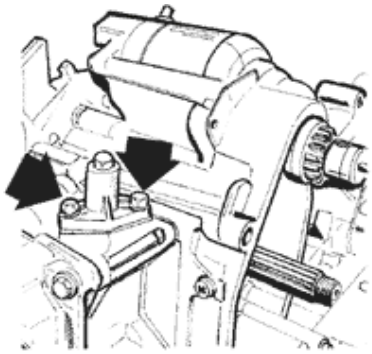
N.B.

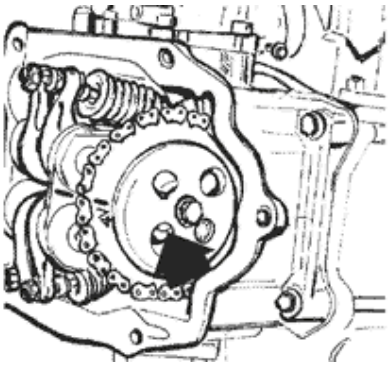
It is advisable to mark the chain in order to guarantee that the initial direction of rotation is maintained.





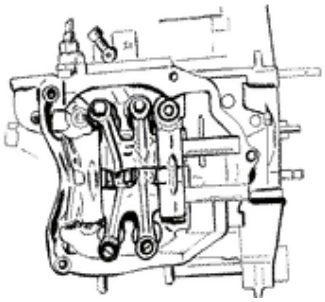






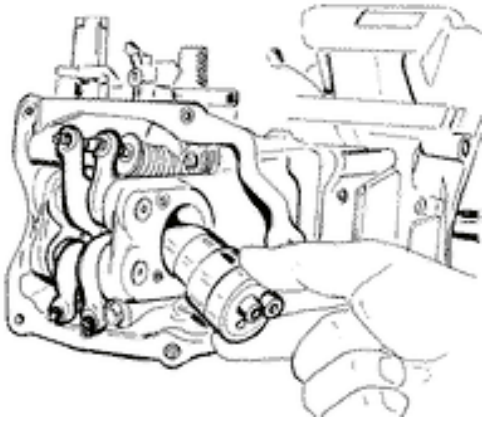
Removing the cam shaft

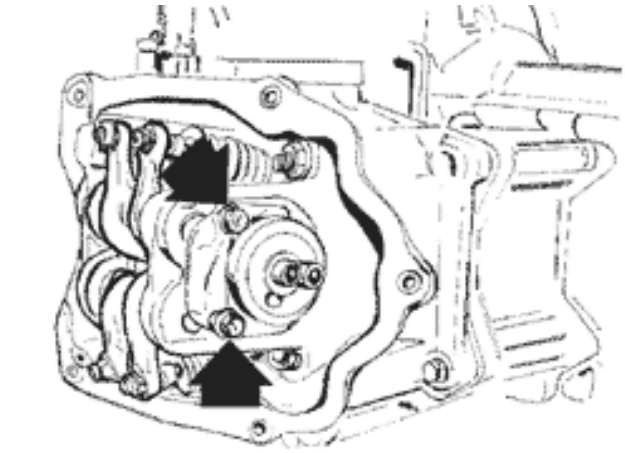
- Remove the two screws and the cam shaft retainer shown in the diagram.
- Remove the cam shaft.
- Remove the pins and the rocker arms from the flywheel side holes.



N.B.

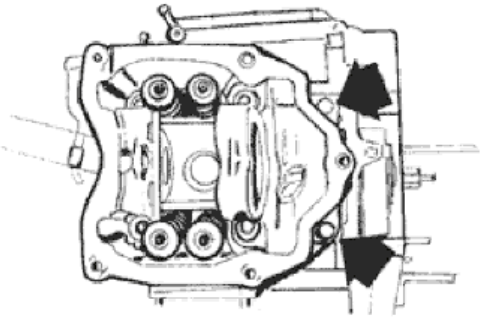
IN CASE OF NEED, THE HEAD MAY BE REMOVED WITH THE CAMSHAFT, PINS, ROCKING LEVERS AND FIXING BRACKET. THE HEAD CAN ALSO BE REMOVED WITHOUT REMOVING THE CHAIN AND THE DRIVING SHAFT CHAIN TIGHTENER.





Removing the cylinder head

- Remove the spark plug.
- Remove the 2 side fixings shown in the figure.
- Loosen the 4 head-cylinder fastening nuts in two or three stages and in criss-cross fashion.
- Remove the head, the two centring dowels and the gasket.



N.B.

IN CASE OF NEED, THE HEAD MAY BE REMOVED WITH THE CAMSHAFT, PINS, ROCKING LEVERS AND FIXING BRACKET. THE HEAD CAN ALSO BE REMOVED WITHOUT REMOVING THE CHAIN AND THE DRIVING SHAFT CHAIN TIGHTENER.

Removing the valves

- Using the appropriate tool fitted with an adaptor, remove the cotters, caps, springs and valves.
- Remove the oil guards with the appropriate tool.
- Remove the lower spring supports.

CAUTION

REPLACE THE VALVES IN SUCH A WAY AS TO RECOGNISE THEIR ORIGINAL POSITION ON THE HEAD.

Specific tooling

020382Y011 adapter for valve removal tool

020382Y Valve cotters equipped with part 012 removal tool

020306Y Punch for assembling valve seal rings

- Using the appropriate tool fitted with an adaptor, remove the cotters, caps, springs and valves.
- Remove the oil guards with the appropriate tool.
- Remove the lower spring supports.

CAUTION

REPLACE THE VALVES IN SUCH A WAY AS TO RECOGNISE THEIR ORIGINAL POSITION ON THE HEAD.

Specific tooling

020382Y011 adapter for valve removal tool

020382Y Valve cotters equipped with part 012 removal tool

020306Y Punch for assembling valve seal rings

Removing the cylinder - piston assy.

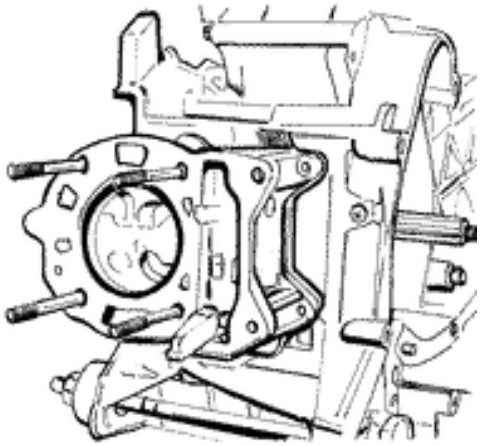
- Remove the chain guide pad.
- Pull out the cylinder.
- Remove the cylinder base gasket.
- Remove the two stop rings, the wrist pin and the piston.
- Remove the piston seals.

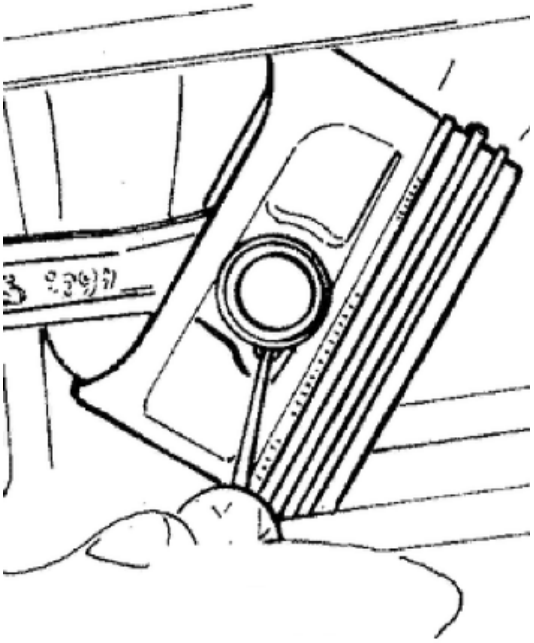
CAUTION

TO AVOID DAMAGING THE PISTON, SUPPORT IT WHILE REMOVING THE CYLINDER.

N.B.

BE CAREFUL NOT TO DAMAGE THE SEALING RINGS DURING REMOVAL.



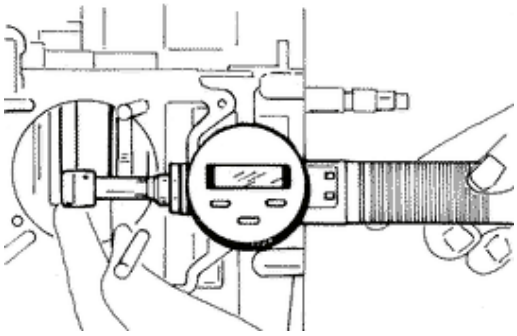


Inspecting the small end

- Measure the internal diameter of the small end using an internal micrometer.

N.B.

REPLACE THE CRANKSHAFT IF THE DIAMETER OF THE ROD SMALL END EXCEEDS THE STANDARD DIAMETER OR IT SHOWS SIGNS OF WEAR OR OVERHEATING.



Characteristic

Rod small end check-up: Maximum diameter

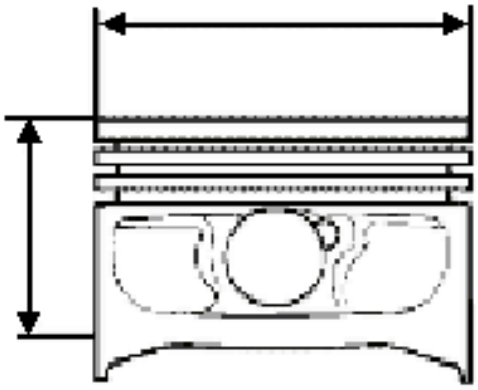
15.030 mm

Rod small end check-up: Standard diameter

15 +0.015+0.025 mm

Inspecting the wrist pin

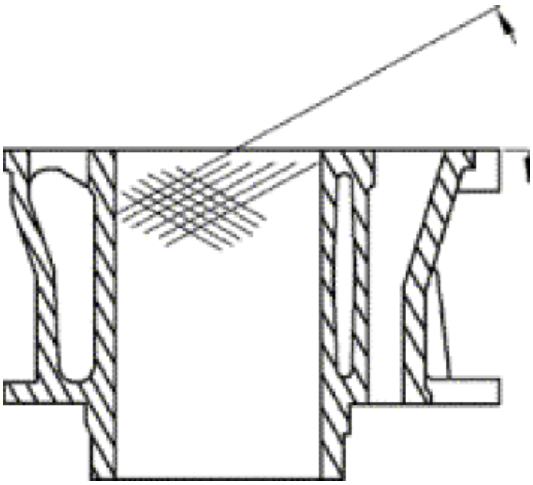
- Verificare il diametro esterno dello spinotto.
- Calcolare il gioco di accoppiamento piede di biella spinotto.
- Misurare il diametro delle portate sul pistone.
- Calcolare il gioco di accoppiamento spinotto pistone.
- Misurare il diametro esterno del pistone secondo una direzione ortogonale all'asse dello spinotto.
- Effettuare la misurazione nella posizione mostrata in figura.



125 cc: 41,1 mm (dal cielo)200 cc: 5 mm (dalla base)

- Mediante un alesametro misurare il diametro interno del cilindro secondo le direzioni indicate in figura e a tre altezze diverse.
- Verificare che il piano di accoppiamento con la testa non presenti usure o deformazioni.

Massimo fuoripiano ammesso: 0,05 mm



- I pistoni ed i cilindri sono classificati con categorie in funzione del diametro. L'accoppiamento viene effettuato alla pari (A-A, B-B, C-C, D-D).
- L'operazione di rettifica del cilindro deve essere effettuato con una finitura che rispetta l'angolazione originale.
- La superficie del cilindro deve presentare una rugosità di 0,9 micron.
- Ciò è indispensabile al fine di garantire un buon assestamento degli anelli di tenuta, garantendo così un consumo d'olio ridotto e ottime prestazioni.

Per il motore 125

- Sono previsti pistoni maggiorati per rettifica del cilindro, suddivisi in tre categorie 1°, 2°, 3° pari a 0,2-0,4-0,6 mm di maggiorazione. Anche questi sono classificati nelle 4 categorie A-A, B-B, C-C, D-D.

N.B.

THE PIN HOUSINGS HAVE 2 LUBRICATION CHANNELS. FOR THIS REASON MEASUREMENT OF THE DIAMETER MUST BE CARRIED OUT ACCORDING TO THE AXIS OF THE PISTON.

Caratteristiche tecniche

Diametro spinotto: Diametro standard : 200

68,990 ÷ 69,018

Pin diameter Standard diameter: 125 cc

56.997 ÷ 57.025

Diametro spinotto: Pistone : 200

68,933 ÷ 68,961

piston diameter

56.945 ÷ 56.973 mm

Pin diameter: Standard clearance

0.015 ÷ 0.029 mm

Pin diameter Standard diameter

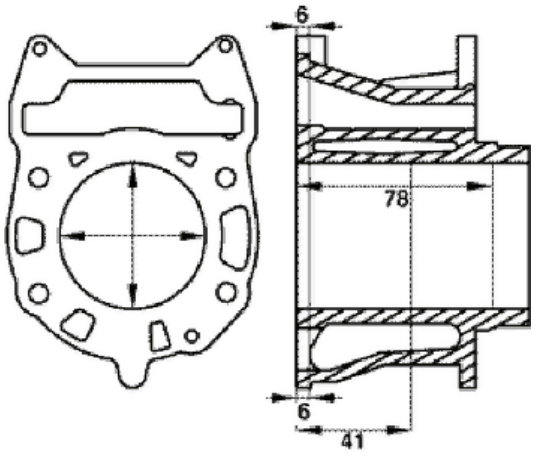
14.996 - 15.000 mm

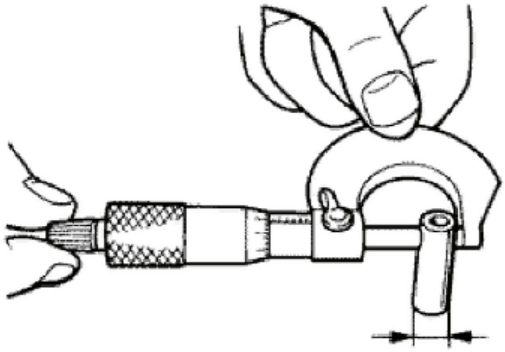
Wrist pin seat on the piston: Standard diameter

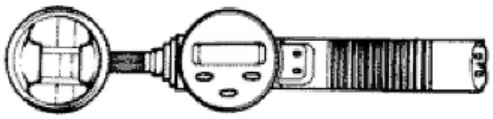
15.001 ÷ 15.006 mm

Diameter of the wrist pin seat on the piston: Standard clearance

0.001 ÷ 0.010 mm

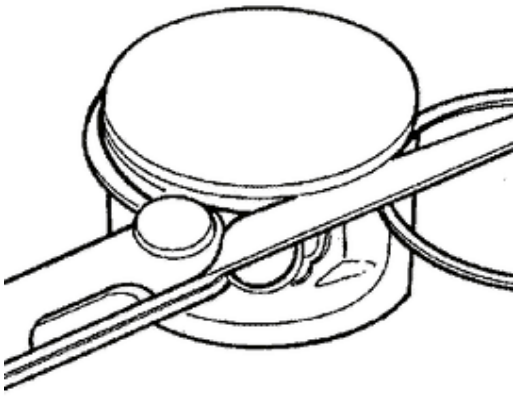






Inspecting the piston

- Carefully clean the seal housings.
- Measure the coupling clearance between the seal rings and the grooves using suitable sensors, as shown in the diagram.
- If the clearance is greater than that indicated in the table, replace the piston.



125 cc

Inspecting the piston rings

- Alternately insert the three sealing rings into the cylinder, in the area where it retains its original diameter. Using the piston, insert the rings perpendicularly to the cylinder axis.
- Measure the opening (see figure) of the sealing rings using a feeler gauge.
- If any measurements are greater than specified, replace the piston rings.

N.B.

BEFORE REPLACING ONLY THE PISTON RINGS, ENSURE THAT THE CLEARANCE BETWEEN THE PISTON RINGS AND THE PISTON RING GROOVES, AND BETWEEN THE PISTON AND THE CYLINDER, IS AS SPECIFIED. IN ANY CASE, NEW PISTON RINGS USED IN COMBINATION WITH A USED CYLINDER MAY HAVE DIFFERENT BEDDING CONDITIONS THAN THE STANDARD.

Removing the piston

- Install piston and wrist pin onto the connecting rod, aligning the piston arrow the arrow facing towards the exhaust.
- Fit the pin stop ring onto the appropriate tool.
- With opening in the position indicated on the tool

S = left

D = right

- Place the wrist pin stop ring into position using a punch
- Fit the wrist pin stop using the plug as shown in the figure

CAUTION

USING A HAMMER MIGHT DAMAGE THE STOPS' HOUSING.

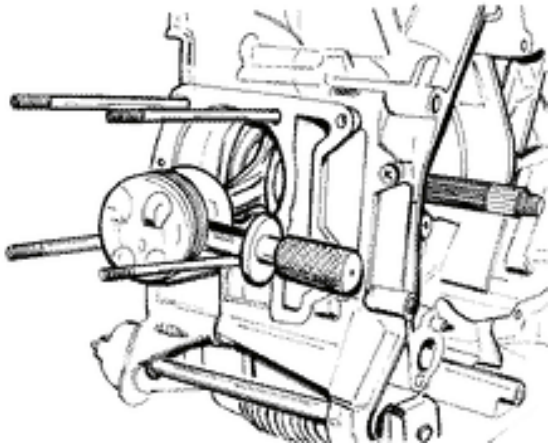
N.B.

THE TOOL FOR INSTALLING THE STOP RINGS MUST BE USED MANUALLY.

Specific tooling

020430Y Pin lock fitting tool

020454Y Tool for fitting piston pin stops (200 - 250)



Choosing the gasket

- Provisionally fit the piston into the cylinder, without any base gasket.
- Assemble a dial gauge on the specific tool

Support to check piston position 020428Y

- Set the dial gauge to zero placing the tool on a contrasting surface. Keeping the zero position, assemble the tool on the cylinder and lock it with 2 supplied nuts as shown in the figure.
- Rotate the crankshaft until TDC (the inverted point of the dial gauge rotation)
- Position the dial gauge on the piston as shown in the figure and measure how much the piston protrudes.
- By means of the table shown in the specifications chapter identify the cylinder base gasket thickness to be used for refitting. Correctly identify the cylinder base gasket thickness to keep the correct compression ratio.
- Remove the specific tool and the cylinder.

N.B.

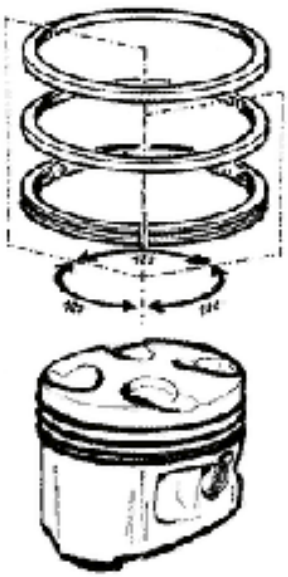
PISTON PROTRUSION IS MEASURED IN 125 ENGINES WHILE INTRODUCTION IS MEASURED IN 200 ENGINES.

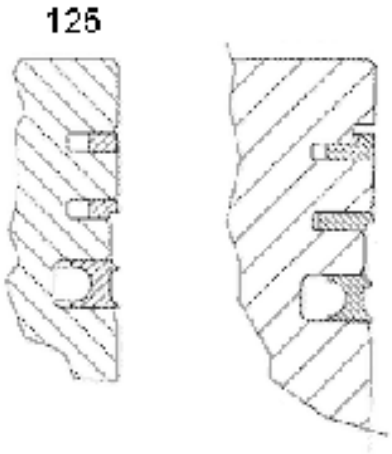
Refitting the piston rings

- Place the oil scraper spring on the piston.
- Refit the oil scraper ring with the join of spring ends on the opposite side from the ring gap and the word 'TOP' towards the crown of the piston. The chamfered side of the oil scraper ring should always be facing the piston crown.
- Fit the middle piston ring with the identification letter facing the crown of the piston. In any case, the step must be facing opposite the piston top.
- Fit the top piston ring with the word 'TOP' or the reference mark facing the crown of the piston.
- Offset the piston ring gaps on the three rings by 120° to each other as shown in the figure.
- Lubricate the components with engine oil.
- The 200 engine takes the 1st segment with L section.

N.B.

THE TWO PISTON RINGS ARE MADE WITH A TAPERED CYLINDRICAL CONTACT CROSS-SECTION. THIS IS TO ACHIEVE A BETTER BEDDING.





Refitting the cylinder

- Insert the cylinder base gasket with the thickness determined above.
- Using the fork support and the piston ring retaining band, refit the cylinder as shown in the figure.

N.B.

BEFORE FITTING THE CYLINDER, CAREFULLY BLOW OUT THE LUBRICATION DUCT AND OIL THE CYLINDER BARREL.

Specific tooling

020393Y Piston fitting band

020287Y Clamp to assemble piston on cylinder

Inspecting the cylinder head

Head check

- Using a trued bar and feeler gauge check that the cylinder head surface is not worn or distorted.

Maximum allowable run-out: 0.05 mm

- Check that the camshaft and the rocker pin capacities exhibit no wear.
- Check that the cylinder head cover surface, the intake manifold and the exhaust manifold are not worn.

Standard diameter

A Ø 12.000 ÷ 12.018 mm

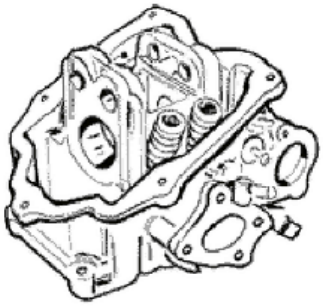
B Ø 20.000 ÷ 20.021 mm

C Ø 37.000 ÷ 37.025 mm

- Using a trued bar and feeler gauge check that the cylinder head surface is not worn or distorted.

Maximum allowable run-out: 0.05 mm

- Check that the camshaft and the rocker pin capacities exhibit no wear.
- Check that the cylinder head cover surface, the intake manifold and the exhaust manifold are not worn.



Characteristic

bearing «A»

Ø 12.000 - 12.018 mm

bearing «B»

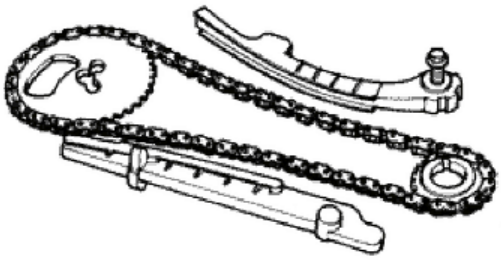
Ø 20.000 ÷ 20.021 mm

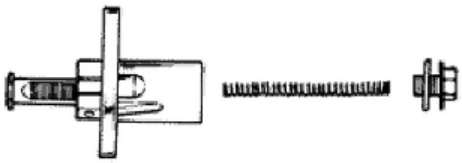
bearing «C»

Ø 37.000 - 37.025 mm

Inspecting the timing system components

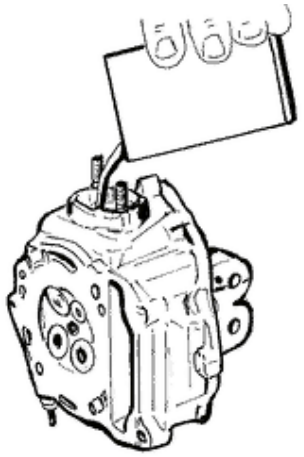
- Check that the guide shoe and the tensioner shoe are not worn out.
- Ensure that the camshaft control pulley chain assembly and the sprocket wheel are not worn.
- If you encounter wear, replace the parts or, if the chain, sprocket wheel and pulley are worn replace the whole assembly.
- Remove the centre screw with the washer and the tensioner spring. Check that the one-way mechanism is not worn.
- Check the condition of the tensioner spring.
- If examples of wear are found, replace the whole assembly.





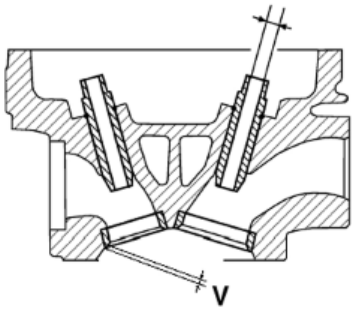
Inspecting the valve sealings

- Insert the valves into the cylinder head.
- Alternatively check the intake and exhaust valves.
- The test is carried out by filling the manifold with petrol and checking that the head does not ooze through the valves when these are just pressed with the fingers.



Inspecting the valve housings

- Check the width of the imprint on the valve seat«**V**» wear limit max. 1.6 mm.
- Remove any carbon formation from the valve guides.
- Measure the inside diameter of each valve guide.
- Take the measurement at three different heights in the rocker arm push direction.
- If the width of the impression on the valve seat or the diameter of the valve guide exceed the specified limits, replace the cylinder head.



Characteristic

Valve seat wear Intake guide

limit accepted: 5.022

Valve seat wear Intake guide

Standard diameter: 5.000 ÷ 5.012 mm

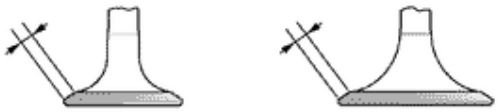
Valve seat wear Exhaust guide

Accepted limit 5.022

Valve seat wear Exhaust guide

Standard diameter: 5.000 ÷ 5.012 mm

Inspecting the valves



- Measure the width of the sealing surface on the valve seats and on the valves.

Sealing surface width: After use: Intake and exhaust: 1.6 mm

- If any of the sealing surfaces on the valves is wider than the specified limit or is damaged in one or more points, or curved, replace the valve with a new one.

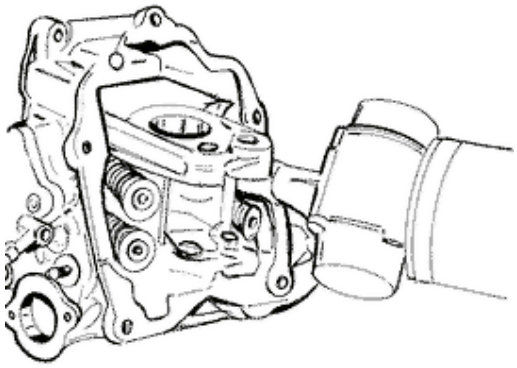
CAUTION

DO NOT REVERSE THE FITTING POSITIONS OF THE VALVES (RIGHT - LEFT).

Characteristic

Valve wear check Standard: Intake and exhaust:

0.99 - 1.27 mm



- Measure the diameter of the valve stems in the three positions indicated in the diagram.
- Calculate the clearance between valve and valve guide.
- Check that there are no signs of wear on the surface of contact with the articulated register terminal.
- If the checks above give no failures, you can use the same valves. For best sealing results, it is advisable to grind the valves. Grind the valves gently with a fine-grained lapping compound. During the grinding, keep the cylinder head with the valve axes in a horizontal position. This will prevent the lapping compound residues from penetrating between the valve stem and the guide (see figure).

CAUTION

TO AVOID SCORING THE FAYING SURFACE, DO NOT KEEP ROTATING THE VALVE WHEN NO LAPPING COMPOUND IS LEFT. CAREFULLY WASH THE CYLINDER HEAD AND THE VALVES WITH A SUITABLE PRODUCT FOR THE TYPE OF LAPPING COMPOUND BEING USED.

N.B.

DO NOT CHANGE THE POSITIONS THE VALVES ARE FITTED IN

Characteristic

Valve check standard length

Outlet: 94.4 mm

Valve check standard length

Inlet: 94.6 mm

Valve check Maximum admissible clearance

Outlet: 0.072 mm

Valve check Maximum admissible clearance

Inlet: 0.062 mm

Valve check standard clearance

Outlet: 0.025 ÷ 0.052 mm

Valve check standard clearance

Inlet: 0.013 ÷ 0.040 mm

Valve check Minimum admissible diameter

Outlet: 4.95 mm

Valve check Minimum admissible diameter

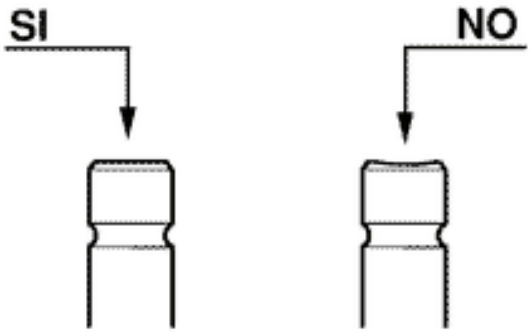
Inlet: 4.96 mm

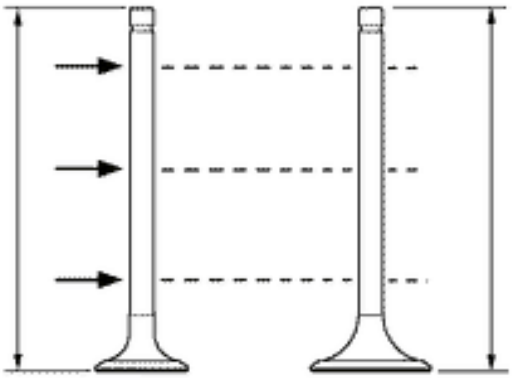
Valve check Standard diameter:

Inlet: 4.972 ÷ 4.987 mm

Valve check Standard diameter:

Outlet: 4.96 ÷ 4.975 mm





- Measure the diameter of the valve stems in the three positions indicated in the diagram.
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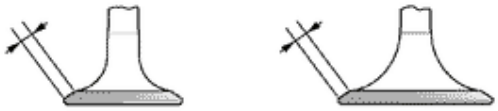

CAUTION

TO AVOID SCORING THE FAYING SURFACE, DO NOT KEEP ROTATING THE VALVE WHEN NO LAPPING COMPOUND IS LEFT. CAREFULLY WASH THE CYLINDER HEAD AND THE VALVES WITH A SUITABLE PRODUCT FOR THE TYPE OF LAPPING COMPOUND BEING USED.

N.B.

DO NOT CHANGE THE POSITIONS THE VALVES ARE FITTED IN

Characteristic

Valve check standard length

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Inlet: 94.6 mm

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Inlet: 0.062 mm

Valve check standard clearance

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Valve check standard clearance

Inlet: 0.013 ÷ 0.040 mm

Valve check Minimum admissible diameter

Outlet: 4.95 mm

Valve check Minimum admissible diameter

Inlet: 4.96 mm

Valve check Standard diameter:

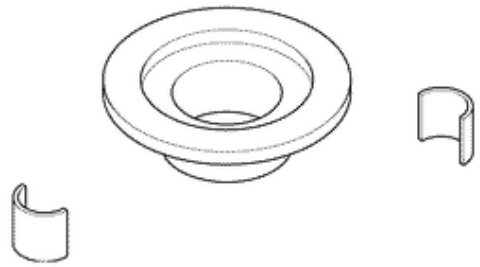
Inlet: 4.972 ÷ 4.987 mm

Valve check Standard diameter:

Outlet: 4.96 ÷ 4.975 mm

Inspecting the springs and half-cones

- Check that the upper spring caps and the cotter halves show no signs of abnormal wear.



Refitting the valves

- Lubricate the valve guides with engine oil.
- Place the valve spring supports on the head.
- Using the special punch, fit the four valve seals.
- Fit the valves, the springs and the caps. Using the appropriate tool with adapter, compress the springs and insert the cotters in their seats.

N.B.

DO NOT CHANGE THE VALVE FITTING POSITION. FIT THE VALVE SPRINGS WITH THE REFERENCE COLOUR ON COTTER SIDE (TURNS WITH GREATER PITCH).

Specific tooling

020306Y Punch for assembling valve seal rings

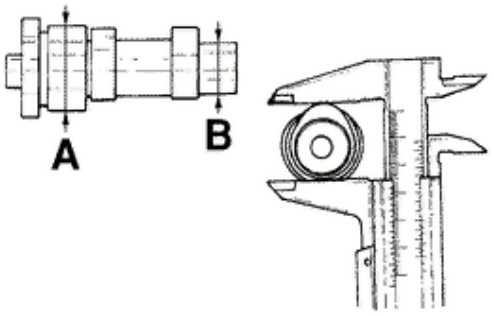
020382Y Valve cotters equipped with part 012 removal tool

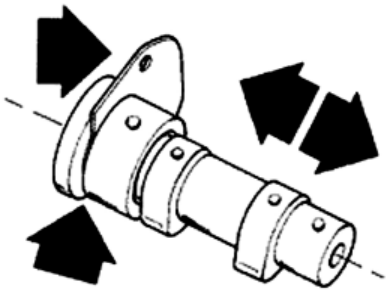
020382Y011 adapter for valve removal tool

Inspecting the cam shaft

- Inspect the cam shaft for signs of abnormal wear on the cams.
- Check the cam height.
- Check there is no wear on the cam shaft retaining plate and its associated groove on the cam shaft.
- If any of the above dimensions are outside the specified limits, or there are signs of excessive wear, replace the defective components with new ones.
- Check there are no signs of wear on the automatic valve-lifter cam, or the end-of stroke roller, or the rubber buffer on the automatic valve-lifter retaining cover.
- Check that the valve lifting spring has not yielded.
- Replace any defective or worn components.
- Check the rocker pins do not show signs of wear or scoring.
- Measure the internal diameter of each rocker arm.

Check there are no signs of wear on the pad from contact with the cam and on the jointed adjustment plate.





Characteristic

Internal rocker arm diameter: Standard diameter

Diameter 12.000 - 12.011 mm

Rocking lever pin diameter: Standard diameter

Diameter 11.977 - 11.985 mm

Cam shaft check: Maximum admissible axial clearance

0.42 mm

Cam shaft check: Standard axial clearance:

0.11 - 0.41 mm

Cam shaft check: Standard height

Outlet: 29.209 mm

Cam shaft check: Standard height

Inlet: 30.285 mm

Cam shaft check: Minimum admissible diameter

Bearing B diameter: 19.950 mm

Cam shaft check: Minimum admissible diameter

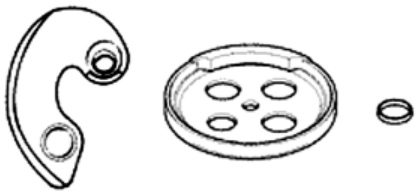
Bearing A Ø: 36.94 mm

Cam shaft check: Standard diameter

Bearing B diameter: 19.959 ÷ 19.98 mm

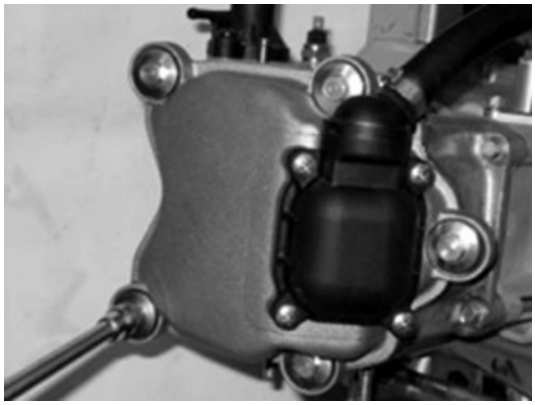
Cam shaft check: Standard diameter

Bearing A Ø: 36.95 ÷ 36.975 mm



Refitting the head and timing system components

- Refit the lower timing chain sprocket wheel on the crankshaft, with the chamfer facing the insertion side.
- Loop the timing chain around the sprocket on the crankshaft.
- Fit the chain tensioner slider from the cylinder head side.
- Fit the spacer and the screw fastener.
- Tighten the screws to the prescribed torque.
- Fit the pins and rocker arms.
- Lubricate the two rocking levers through the holes at the top.
- Lubricate the 2 bearings and insert the cam shaft in the cylinder head with the cams corresponding to the rockers.
- Insert the retention plate and tighten the two screws shown in the figure to the prescribed torque.

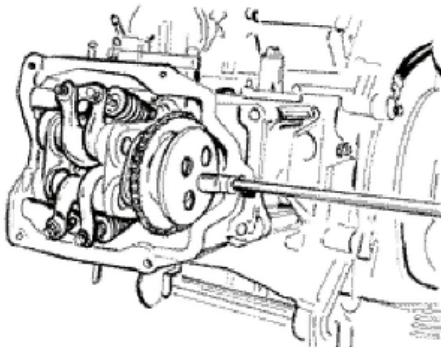


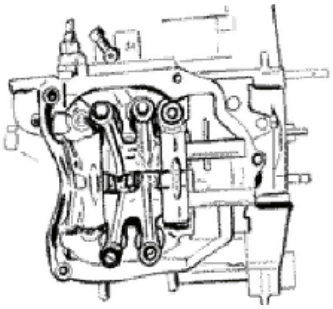
- Refit the spacer on the cam shaft.
- Rotate the engine so that the piston is at top dead centre, using the reference marks on the flywheel and the crankcase.
- Holding this position insert the chain on the camshaft control pulley.
- Insert the pulley on the cam shaft while keeping the reference **4V** in correspondence with the reference mark on the head.
- Fit the counterweight and tighten the fixing screw to the prescribed torque.
-Fit the end-stop ring on the automatic valve-lifter cam and fit the automatic valve-lifter cam to the cam shaft.
- Fit the automatic valve-lifter return spring.
- During this operation the spring must be loaded by approximately 180°.
- Fit the automatic valve-lifter retaining dish, using the counterweight screw fastener as a reference.
- Tighten the clamping screw to the prescribed torque.
- Set the tensioner cursor in the rest position.
- Fit the chain tensioner on the cylinder, using a new gasket, and tight the two screws to the prescribed torque.
- Insert the chain tensioning screw, together with the spring and washer, tightening it to the prescribed torque.
- Adjust the valve clearance.
- Fit the spark plug.

Electrode distance 0.8 mm

N.B.

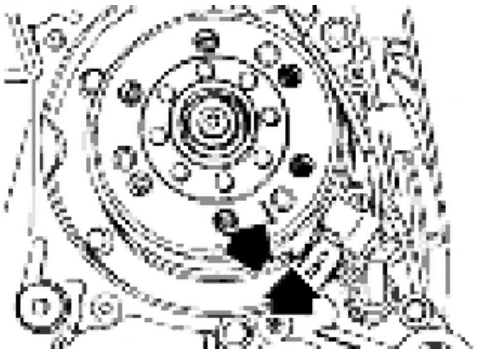
GREASE THE END STOP RING TO PREVENT IT COMING OUT AND FALLING INTO THE ENGINE.

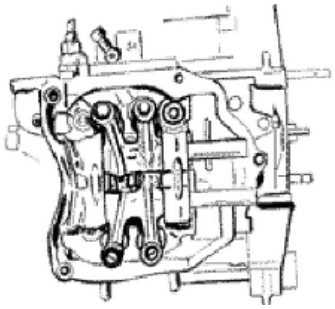




Locking torques (N*m)

Timing chain tensioner support screw 11 ÷ 13 **Spark plug** 12 ÷ 14 **Starter ground screw** 7 ÷ 8.5 **Timing chain tensioner slider screw** 10 ÷ 14 **Starter ground support screw** 11 ÷ 15 **Timing chain tensioner central screw** 5 - 6 **Camshaft retention plate screw** 4 ÷ 6

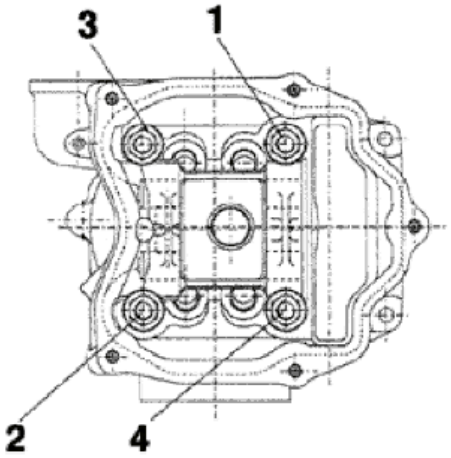




- Fit the timing chain guide pad.
- Insert the centring dowel between the cylinder head to the cylinder, fit the cylinder head gasket and the cylinder head.
- Lubricate the stud bolt threading.
- Tighten up the nuts to a pre-torque of 7±1 N·m
- Rotate by a 180° angle (2 rotations of 90° each)
- To carry out the operations described above, follow the tightening sequence in the figure.
- Fit the two screws on the outside of the timing chain side and tighten them to the specified torque.

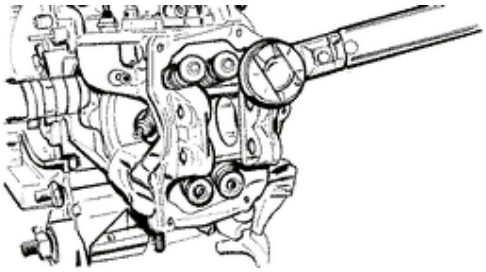
N.B.

BEFORE INSTALLING THE HEAD, MAKE SURE THAT THE LUBRICATION CHANNEL IS CLEAN USING A COMPRESSED AIR JET.



Locking torques (N*m)

Timing chain tensioner support screw 11 ÷ 13

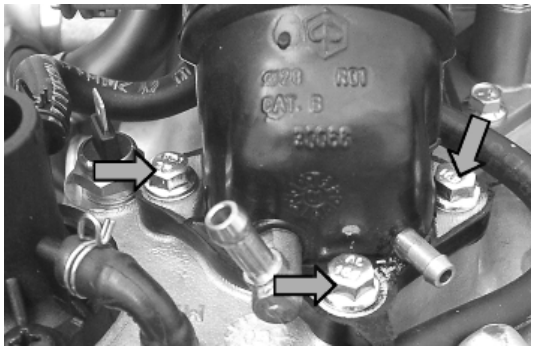


Refitting the intake manifold

Fit the intake manifold and do up the three screws.

N.B.

USE COMMERCIALLY AVAILABLE INSERTS AND INSERT HOLDERS FOR THE SPECIAL SCREWS FOR 125 CM³ MODELS.



Crankcase - crankshaft

Splitting the crankcase halves

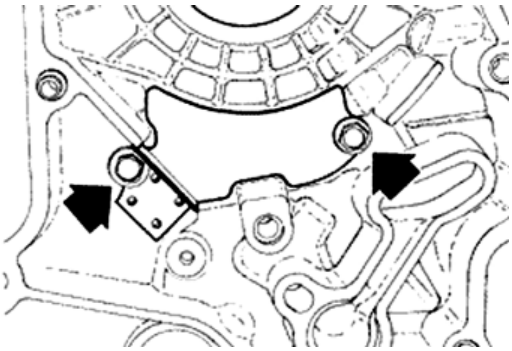
engine crankcase opening

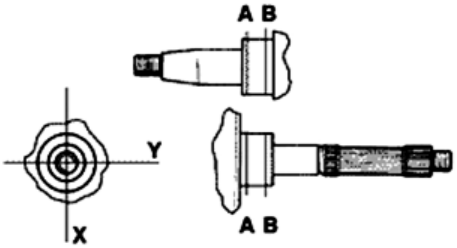
ble>

- First remove the following units:

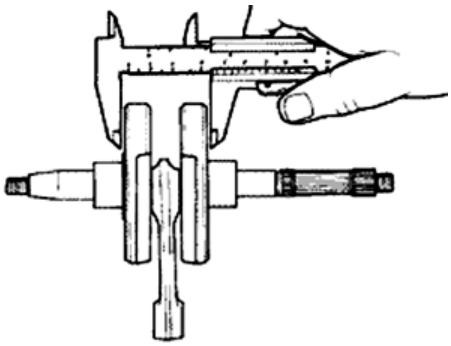
transmission cover, driving pulley, driven pulley and belt, rear hub cover, gears, bearings and oil seals as described in the **transmission** chapter.

-Remove the oil sump, the by-pass, the chain compartment cover and the oil pump as in the **lubrication** chapter.

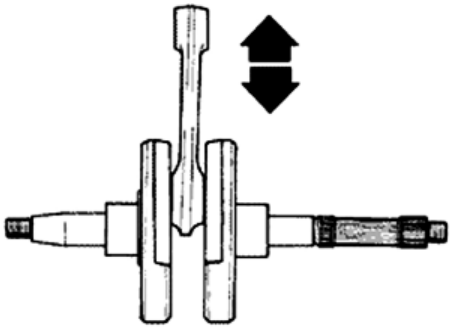




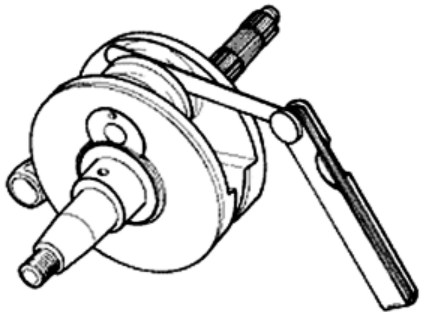
- Remove the flywheel cover together with the water pump, the flywheel and the stator as described in the **magneto flywheel** chapter.
- Remove the oil filter and the oil pressure switch.
- Remove the cylinder-piston-head unit as described in the **cylinder head timing system** chapter.
- Remove the 2 retainers indicated in the figure and the starter motor.



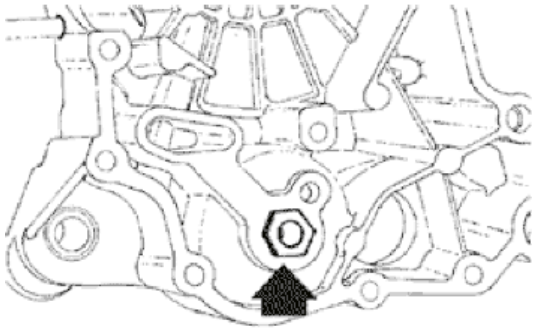
- Before opening the crankshaft, it is advisable to check the axial clearance of the crankshaft. To do this, use a plate and a support with appropriate tool dial gauge.
- Upper clearances are an indication of wear on the surfaces of the crankshaft casing support.



- Remove the 11 crankcase coupling screws.
- Separate the crankcase while keeping the crankshaft in one of the two halves of the crankcase.
- Remove the crankshaft.

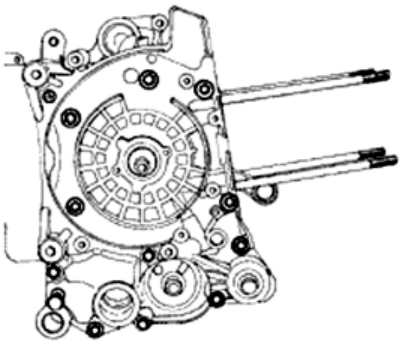


- Remove the half crankcase coupling gasket.
- Remove the two screws and the internal cover shown in the diagram.

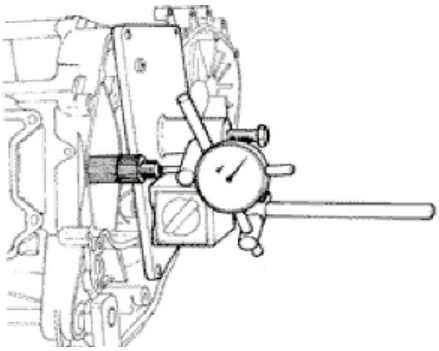


- Remove the oil guard on the flywheel side.
- Remove the oil filter fitting shown in the diagram.
- Check the axial clearance on the connecting rod.

- Check the radial clearance on the connecting rod.
-Check the surfaces that limit the axial free-play are not scored and measure the width of the crankshaft between these surfaces, as shown in the diagram.

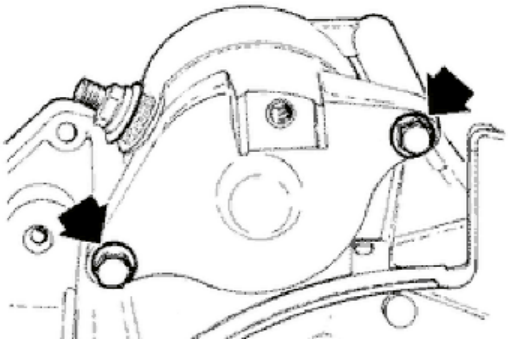


Shim washers (only 200 cc)
- Check the thickness of the shim washers.
- Check that the shim washers are not stripped.



- If the axial clearance between the crankshaft and the crankcase exceeds the established value and the crankshaft does not present any anomalies, the problem must be due to either excessive wear or wrong machining on the engine crankcase.

- Check the diameters of both the bearings of the crankshaft in accordance with the axes and surfaces shown in the figure. The half-shafts are classified in two categories Cat. 1 and Cat. 2 as shown the chart below.



CAUTION

THE CRANKSHAFT CAN BE REUSED WHEN THE WIDTH IS WITHIN THE STANDARD VALUES AND THE SURFACES SHOW NO SIGNS OF SCORING.

CAUTION

WHILE OPENING THE CRANKCASES AND REMOVING THE DRIVING SHAFT, CHECK THAT THE THREADED SHAFT ENDS DO NOT INTERFERE WITH THE MAIN BUSHINGS. FAILURE TO OBSERVE THIS PRECAUTION CAN DAMAGE THE MAIN BUSHINGS.

CAUTION

KEEP THE CRANKSHAFT IN ONE OF THE TWO HALVES OF THE CRANKCASE WHEN SEPARATING IT. IF YOU FAIL TO DO THIS, THE CRANKSHAFT MIGHT ACCIDENTALLY FALL.

N.B.

IN CASE OF NEW UTILISATION, MAINTAIN THE FIRST FITTING POSITION.

N.B.

WHEN MEASURING THE WIDTH OF THE CRANKSHAFT, MAKE SURE THAT THE MEASUREMENTS ARE NOT

MODIFIED BY THE RADIUSES OF FITTINGS WITH THE CRANKSHAFT BEARINGS.

N.B.

The crankshaft of the 200 cm³ version has two steel shim washers. Take note of their fitting position.

Specific tooling

020262Y Crankcase splitting strip

Characteristic

Crankshaft bearings: Standard diameter: Cat. 2

29.000 ÷ 29.006

Crankshaft bearings: Standard diameter: Cat. 1

28.994 ÷ 29.000

Engine crankcase opening: Standard thickness:

2.175 ÷ 2.225 mm

Width of the crankshaft with shim washers: standard measurements

51.40 ÷ 51.45 mm

Engine crankcase opening: standard measurements

55.75 ÷ 55.90 mm (125)

Radial connecting rod - crankshaft clearance Standard clearance

0.036 ÷ 0.054 mm

Axial connecting rod - crankshaft clearance Standard clearance

0.20 ÷ 0.50 mm

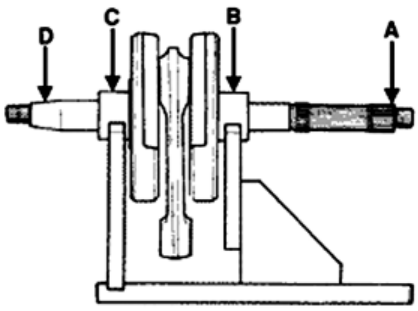
Axial crankshaft/crankcase clearance: Standard clearance

0.15 - 0.40 mm (when cold)

Inspecting the crankshaft alignment

To install the drive shaft on the support and to measure the misalignment in the 4 points indicated in figure.

- Check that the driving shaft cone, the tab seat, the oil seal capacity, the toothed gear and the threaded tangs are in good working order.
- In case of failures, replace the crankshaft.



The connecting rod head bushings cannot be replaced. For the same reason, the connecting rod may not be replaced and, when cleaning the crankshaft, be very careful that no impurities get in through the shaft's lubrication holes.
In order to prevent damaging the connecting rod bushings, do not attempt cleaning the lubrication duct with compressed air.
- Make sure that the 2 caps on the crankpin are properly fitted.
- A wrong installation of a cap can seriously affect the bushing lubrication pressure.

N.B.

THE MAIN BEARINGS ARE NOT GRINDABLE

Specific tooling

020074Y Support base for checking crankshaft alignment

Characteristic

Off-line maximum admitted

A = 0.15 mm

B = 0.01 mm
C = 0.01 mm
D = 0.10 mm

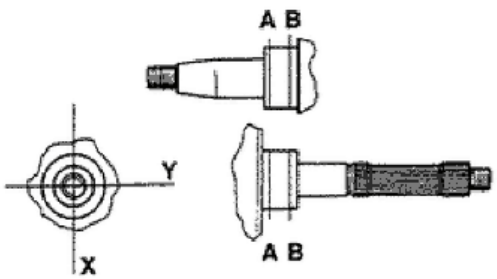
CRANKSHAFT ALIGNMENT

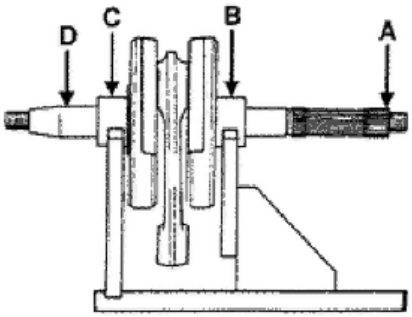
Titolo	Durata/Valore	Testo Breve (< 4000 car.)	Indirizzo Immagine
Crankshaft alignment			

Measure the capacity of both axes X-Y

STANDARD DIAMETER (125 - 200 CM³)

Name	Description	Dimensions	Initials	Quantity
Cat. 1		28.998 ÷ 29.004		
Cat. 2		29.004 ÷ 29.010		





Off-line maximum allowed:

A = 0.15 mm

B = 0.01 mm

C = 0.01 mm

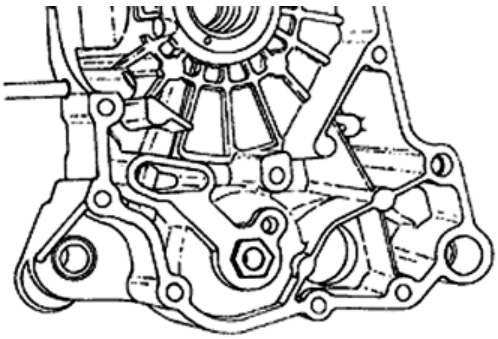
D = 0.10 mm

Specific tooling

020335Y Magnetic support for dial gauge

020074Y Support base for checking crankshaft alignment

Inspecting the crankcase halves

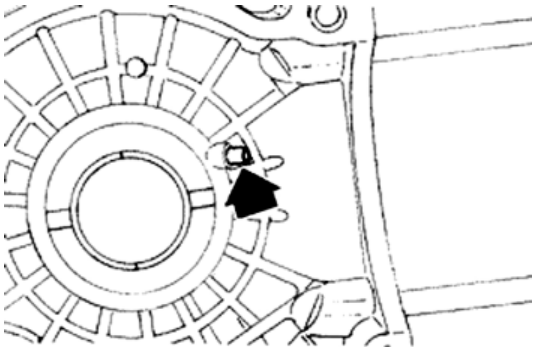


- Before proceeding to check the crankcase halves, thoroughly clean all surfaces and oil ducts.
- On the transmission-side crankcase half, take particular care when handling the oil pump compartment and the oil ducts, the by-pass duct, the main bushings and the cooling jet on the transmission side (see diagram).
- Take particular care, also, that there are no signs wear in the oil by-pass valve housing (see Chapter Lubrication), as this could prevent a good seal in the valve, which regulates the oil pressure.
- On the flywheel side crankcase half, take particular care cleaning the oil ducts for the main bushings, the oil duct for the jet that lubricates the cylinder head and the oil drainage duct at the flywheel side oil seal.
- Inspect the coupling surfaces on the crankcase halves for scratches or deformation, taking partic-

ular care with the cylinder/crankcase surfaces and the crankcase halves surfaces.

- Defects in the crankcase coupling gasket between the crankcase halves or the mating surfaces shown in the diagram, could cause a drop in the oil pressure lubricating the main bearings and connection rod.

- Check the main bearing seats that limit axial clearance in the crankshaft show no signs of wear. The dimension between these seats is measured by way of the procedure described previously for measuring the crankshaft axial clearance and dimensions.



N.B.

THE JET IS FED THROUGH THE MAIN BUSHINGS. PROPER OPERATION OF THIS COMPONENT IMPROVES THE PISTON TOP COOLING. CLOGGING HAS EFFECTS THAT ARE DIFFICULT TO DETECT (PISTON TEMPERATURE INCREASE). FAILURE OR LEAK CAN CONSIDERABLY DECREASE THE MAIN BUSHING AND CONNECTING ROD LUBRICATION PRESSURE.

N.B.

THE HEAD LUBRICATION CHANNEL IS PROVIDED WITH A SHUTTER JET; THIS GIVES A "LOW PRESSURE" HEAD LUBRICATION; THIS CHOICE WAS MADE TO REDUCE THE OIL TEMPERATURE IN THE SUMP. THE JET CLOGGING IMPAIRS THE HEAD LUBRICATION AND THE TIMING MECHANISMS. A JET FAILURE CAUSES A DECREASE OF THE MAIN BUSHING AND CONNECTING ROD LUBRICATION PRESSURE.

Inspecting the crankshaft plain bearings

Refitting the crankcase halves

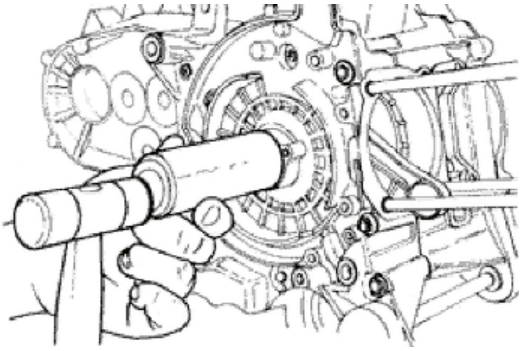
- Fit the internal bulkhead by locking the two screws to the prescribed torque.

- Fit the oil filter fitting and tighten it to the specified torque.

- Place a new gasket on one of the crankcase halves, preferably on the transmission side, together with the locating dowels.

- Lubricate the main bushings and insert the crankshaft in the transmission side crankcase half.

- Reassemble the two crankcase halves.



For the 200 models reposition the shim washers as in the original fitting.

- Fit the 11 screws and tighten them to the prescribed torque.
- Lubricate the flywheel oil seal.
- Using the appropriate tool, assemble the oil seal.
- Fit a new O-ring on the pre-filter and lubricate it.
- Insert the filter on the engine with the relative cap. Tighten to the specified torque.

N.B.

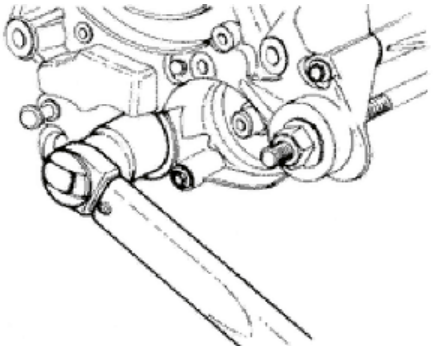
FAILURE TO USE THE SPECIFIC TOOL CAN RESULT IN AN INCORRECT DEPTH POSITION AND AS A CONSEQUENCE IN INADEQUATE OIL SEALING.

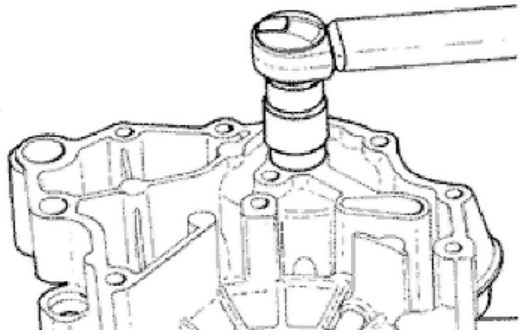
Specific tooling

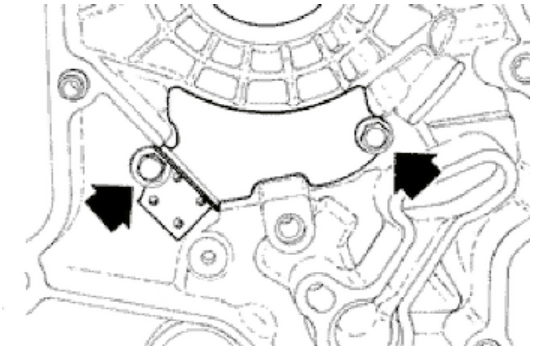
020425Y Punch for flywheel-side oil seal

Locking torques (N*m)

Internal engine crankcase bulkhead (transmission-side half shaft) screws 4 ÷ 6 **Oil filter on crankcase fitting** 27 ÷ 33 **Engine-crankcase coupling screws** 11 ÷ 13 **Engine oil drainage plug/ mesh filter** 24 ÷ 30



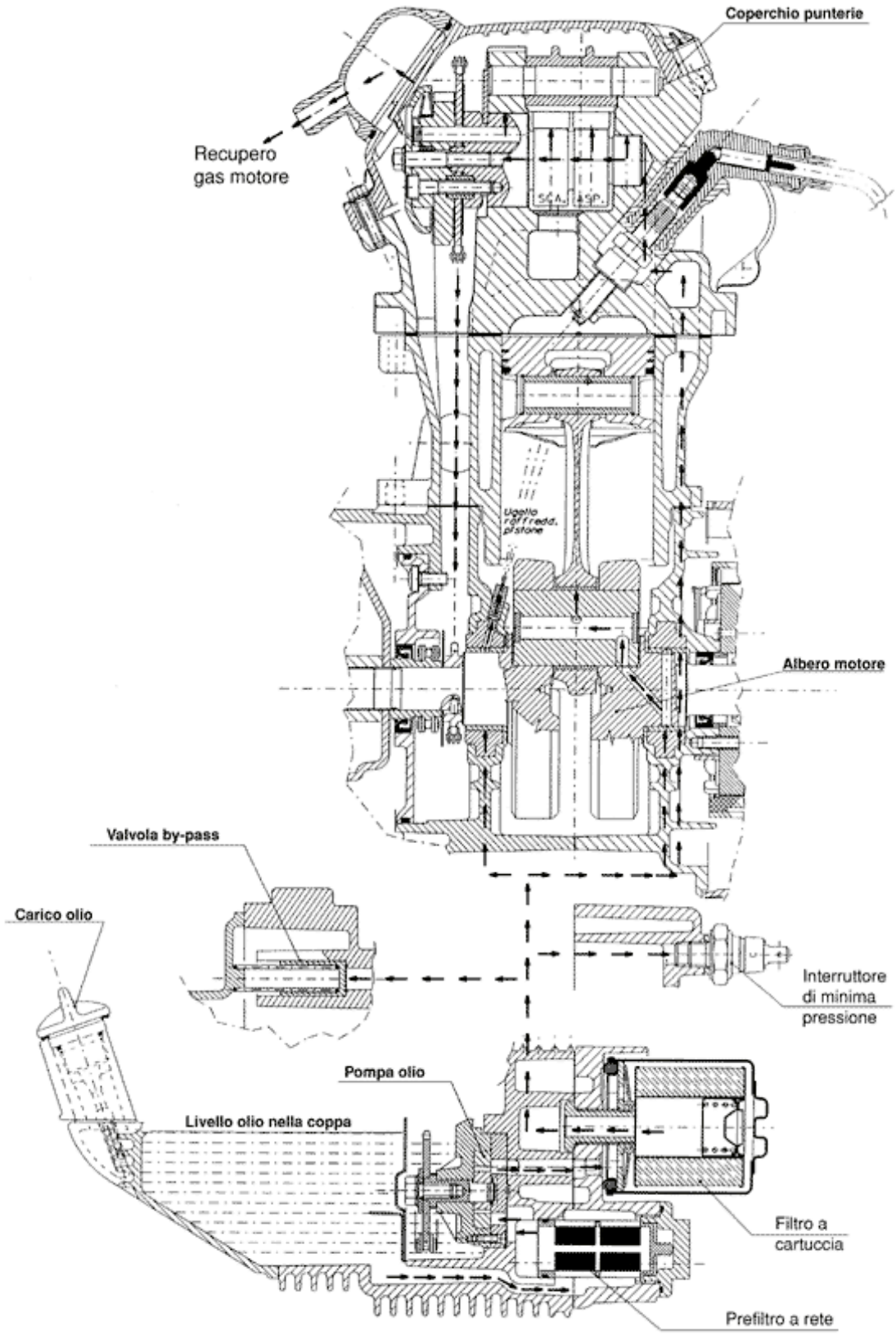




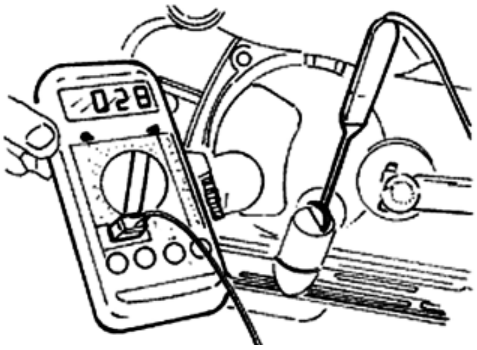
Lubrication

Conceptual diagrams

LUBRICATION CIRCUIT



Oil pressure check



- After removing the flywheel cover as described in the "Flywheel" chapter, remove the electric connexion of the minimum oil pressure switch and then remove the switch.
- With the engine idling at 1650 rpm and the oil temperature at ~90°C, check that the oil pressure is between 0.5 ÷ 1.2 atm.
- With the engine idling at 6000 rpm and the oil temperature at ~90°C, check that the oil pressure is between 3.2 ÷ 4.2 atm.
- Remove the appropriate tools once the measurement is complete, refit the oil pressure switch and washer, tightening it to the specified torque and fit the fan cover.
- If the oil pressure is not within the specified limits, in the following order, check: the oil filter, the oil by-pass valve, the oil pump and the crankshaft seals.

N.B.

THE CHECK MUST BE CARRIED OUT WITH OIL AT THE CORRECT LEVEL AND WITH AN OIL FILTER IN GOOD CONDITION.

Characteristic

Oil pressure

Minimum pressure admitted at 6000 rpm: 3.2 atm.

Locking torques (N*m)

Minimum oil pressure sensor 12 ÷ 14

- After removing the flywheel cover as described in the "Flywheel" chapter, remove the electrical connexion of the minimum oil pressure switch and then remove the switch.
- With the engine idling at 1650 rpm and the oil temperature at ~90°C, check that the oil pressure is between 0.5 ÷ 1.2 atm.
- With the engine idling at 6000 rpm and the oil temperature at ~90°C, check that the oil pressure is between 3.2 ÷ 4.2 atm.
- Remove the appropriate tools once the measurement is complete, refit the oil pressure switch and washer, tightening it to the prescribed torque and fit the fan cover.
- If the oil pressure is outside the specified limits, in the following order, check: the oil filter, the oil by-pass valve, the oil pump and the crankshaft seals.

N.B.

THE CHECK MUST BE CARRIED OUT WITH OIL AT THE CORRECT LEVEL AND WITH AN OIL FILTER IN GOOD CONDITION.

Specific tooling

020193Y Oil pressure gauge

020434Y Oil pressure control fitting

020331Y Digital multimeter

Characteristic

Oil pressure check: minimum allowed at 6000 rpm

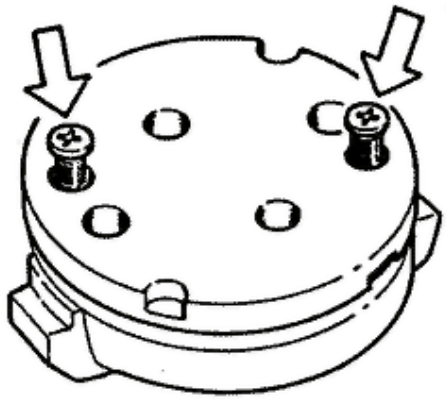
3.2 atm.

Locking torques (N*m)

Minimum oil pressure sensor **12 ÷ 14**

Oil pump

- Check there are no signs of wear on the oil pump shaft or body.
- Check there are no signs of scoring or wear on the oil pump cover.
- If you detect non-conforming measurements or scoring, replace the faulty parts or the unit.
- Fit the pump cover in the position that permits the crankcase fixing screws to be aligned.
- Make sure the gasket is positioned properly and refit the pump on the engine crankcase. The pump can only be fitted in one position. - Tighten the screws to the prescribed torque.
- Fit the sprocket wheel with a new O-ring.
- Fit the chain.
- Fit the central screw and the belleville washer. Tighten to the prescribed torque.
- Fit the oil pump cover by tightening the two screws to the prescribed torque.



N.B.

FIT THE BELLEVILLE WASHER SO THAT ITS OUTER RIM TOUCHES THE PULLEY. MAKE SURE THAT THE PUMP TURNS FREELY.

Locking torques (N*m)

Screws fixing oil pump to crankcase 5 - 6 **Oil pump control crown screw** 10 ÷ 14 **Oil pump cover screws** 0.7 ÷ 0.9

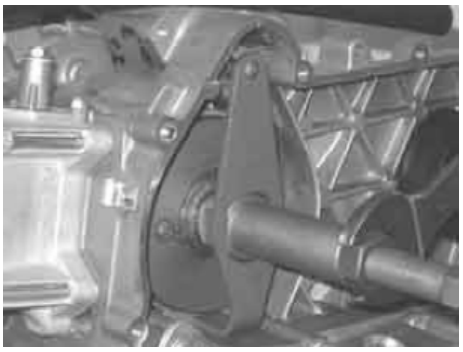
Removal

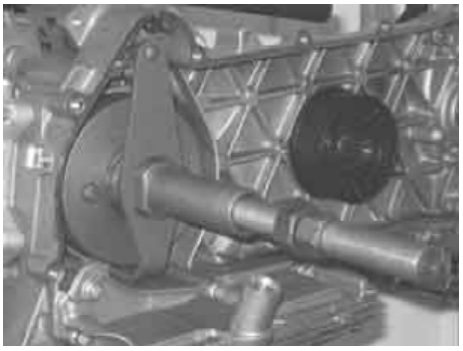
- Remove the cover of the pump control pulley using the two retainers, as shown in the figure.
- Block the rotation of the oil pump control pulley inserting a screwdriver through one of its two holes.
- Remove the central screw with Belleville washer, as shown in the diagram.
- Remove the chain.
- Remove the control sprocket with relative O-ring.
- Remove the oil pump by unscrewing the two screws in the figure.
- Remove the oil pump seal.

N.B.

IT IS ADVISABLE TO MARK THE CHAIN IN ORDER TO ENSURE THAT THE INITIAL DIRECTION OF ROTATION IS MAINTAINED.

- Use a new oil seal upon refitting.
- Prepare the new oil seal, lubricating the sealing lip.
- Preassemble the oil seal with the specific tool, positioning the screws.
- Place the sheath over the crankshaft.
- Insert the tool with the oil seal on the crankshaft until it comes into contact with the crankcase.
- Orientate the oil seal by inserting the bracket which is part of the specific tool.
- Tighten the threaded bar onto the crankshaft as far as it will go.
- Use the nut to move the base of the tool until you can feel the end of the oil seal driving stroke.
- Remove all of the tool components following the inverse procedure





CAUTION

DO NOT LUBRICATE THE SURFACE FOR KEYING ONTO THE ENGINE CRANKCASE.

CAUTION

ORIENT THE OIL GUARD BY POSITIONING THE CHAIN HOUSING CHANNEL FACING DOWNWARDS. WHEN THE POSITION IS REACHED, DO NOT RETRACT THE OIL GUARD. FAILURE TO COMPLY WITH THIS RULE CAN CAUSE A WRONG POSITIONING OF THE OIL GUARD SHEATH.

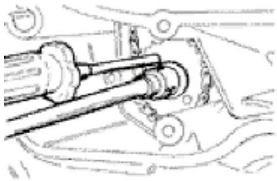
CAUTION

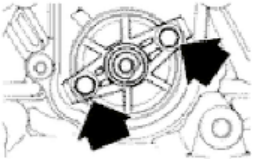
FAILURE TO COMPLY WITH THIS ASSEMBLY PROCEDURE CAN SERIOUSLY DAMAGE THE ENGINE DUE TO THE WRONG TENSIONING OF THE OIL PUMP CONTROL CHAIN.

Specific tooling

020622Y Transmission-side oil guard punch

- Remove the cover of the pump control pulley using the two retainers, as shown in the figure.
- Block the rotation of the oil pump control pulley inserting a screwdriver through one of its two holes.
- Remove the central screw with Belleville washer, as shown in the diagram.
- Remove the chain.
- Remove the control sprocket with relative O-ring.
- Remove the oil pump by unscrewing the two screws in the figure.
- Remove the oil pump seal.





N.B.

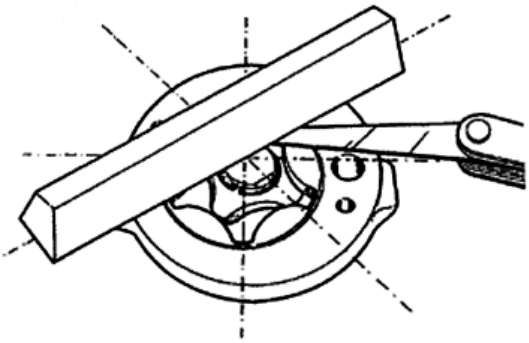
IT IS ADVISABLE TO MARK THE CHAIN IN ORDER TO ENSURE THAT THE INITIAL DIRECTION OF ROTATION IS MAINTAINED.

Inspection

- Remove the two screws and the oil pump cover.
- Remove the clip retaining the innermost rotor.
- Remove and wash the rotors thoroughly with petrol and compressed air.
- Reassemble the rotors in the pump body, keeping the two reference marks visible Replace the snap ring.
- Check the clearance between the rotors in the position shown in the diagram using a thickness gauge.

Measure the distance between the outer rotor and the pump body (see figure).

- Check the axial clearance of the rotors using a trued bar as shown in the figure.



Characteristic

Axial rotor clearance

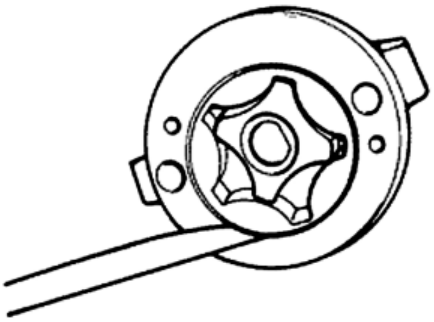
Limit values admitted: 0.09 mm

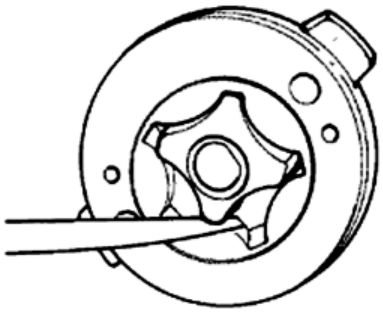
Distance between the outer rotor and the pump body

Admissible limit clearance: 0.20 mm

Distance between the rotors

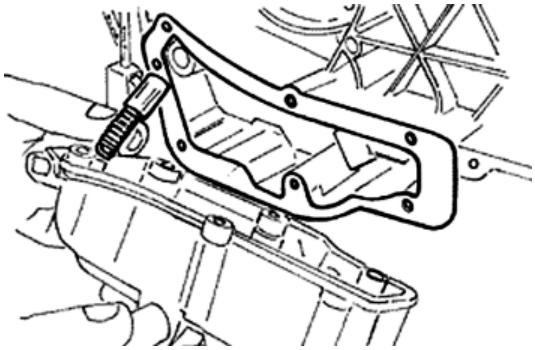
Admissible limit clearance: 0.12 mm

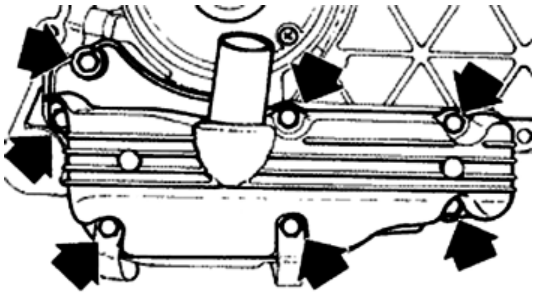




Removing the oil sump

- Remove the oil filler plug, the transmission cover, the complete driving pulley assembly with belt and the sprocket wheel, as described in the "Transmission" chapter.
- Drain the oil as described previously.
- Remove the seven screws, shown in the diagram, and the two rear brake fluid pipe fixing brackets.
- Remove the screw, the by-pass piston, the gasket and centring dowels shown in the figure.





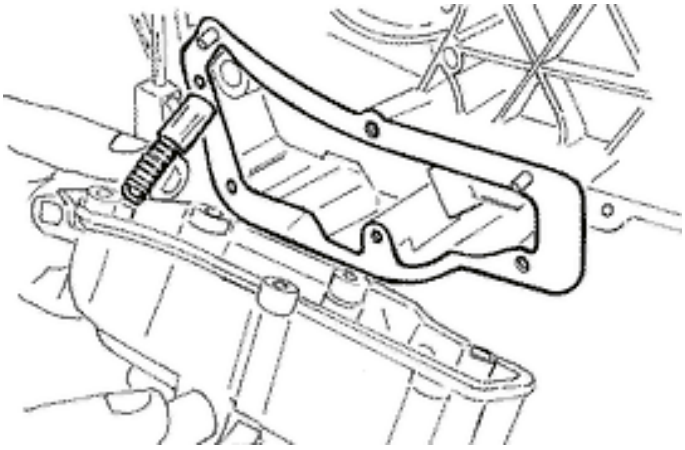
Inspecting the by-pass valve

- Check the unloaded spring length.
- Check that the small piston is not scored.
- Ensure that it slides freely on the crankcase and that it guarantees a good seal.
- If not, eliminate any impurities or replace defective parts.

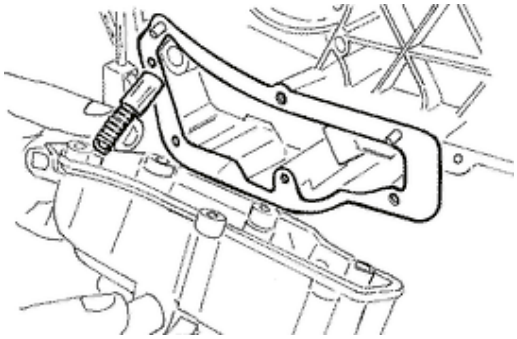
Characteristic

By-pass check up: Standard length

54.2 mm



Refitting the oil sump



- Refit the by-pass valve plunger in its housing.
- Insert the pressure-regulating spring.
- Fit a new sump seal.
- Refit the two centring dowels.
- Refit the sump, taking care to locate the spring in the appropriate recess machined into the inside of the sump.
- Refit the rear brake cable brackets and the screws in the reverse order from which they were removed.
- Tighten the screws to the prescribed torque.
- Refit the drive pulley assembly, the drive belt, the sprocket wheel and the transmission cover, as described in the "Transmissions" chapter.
- **When testing the lubrication system, refer to chapter "Crankcase and Crankshaft", regarding lubrication of the crankshaft and connecting rod**

Locking torques (N*m)

Oil sump screws 10 ÷ 14

SAS valve

Inspecting the one-way valve

- Remove the SAS valve.
- Provisionally assemble the rubber coupling of the SAS valve outlet to ensure tightness.
- Connect the MITYVAC vacuum pump to the rubber coupling as shown in the photograph.
- Set the pump to the low-pressure position (VACUUM).
- Operate the pump slowly.
- Check that the one way valve allows the air to pass through causing a slight vibration.

- Switch the pump to pressure mode (PRES-SURE).
- Operate the pump slowly and check if there is an increase of pressure. A small leakage is consid-ered to be normal.

If anomalies are detected, replace the pump.

N.B.

A MALFUNCTIONING ONE-WAY VALVE CAN RESULT IN RUBBER COUPLING AND FILTER OVERHEATING

N.B.

ABSENCE OF VIBRATION INDICATES INEFFICIENT SEAL-ING

Specific tooling

020329Y MityVac vacuum-operated pump

Inspecting the cut-off

- Remove the SAS valve.
- Connect the MITYVAC pump in low-pressure mode (VACUUM) to the CUT-OFF valve vacuum intake.
- Apply a vacuum value higher than 0.5 BAR.
- Check that this value is kept all the time.
- If a worn seal is detected, replace it.
- With a "T" bypass and flexible rubber hoses make a parallel connection between the rubber coupling and the vacuum intake of the CUT-OFF valve.
- Connect the bypass to the MITYVAC pump.
- Set the pump set to the low-pressure mode (VACUUM).
- Using a pair of long flat pliers, choke the rubber hose next to the valve.
- Operate the pump until vacuum is higher than 0.5 BAR.
- Release the hose and check how the vacuum re-acts. - Under normal functioning conditions the vacuum undergoes a slight fall and then readjusts. There follows a slow and continuous loss of de-pression up to approximately 0.4 BAR. At this point

the valve opens and the depression is suddenly set to zero.

Lack of tightness or the fact that the valve opens at different vacuum values should be regarded as anomalies. In this case, replace it.

N.B.

LACK OF TIGHTNESS IN THE CUT-OFF VALVE RESULTS IN EXHAUST NOISE (EXPLOSIONS IN THE MUFFLER). INCORRECT CUT-OFF VALVE CALIBRATION CAN RESULT IN CATALYTIC CONVERTER MALFUNCTIONING

N.B.

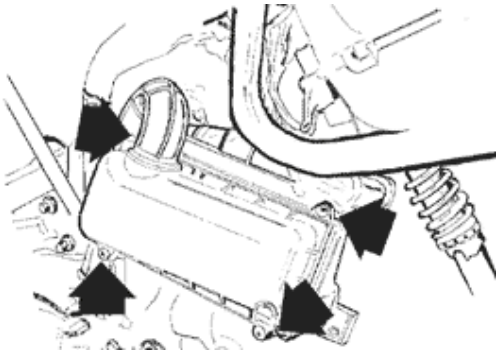
A FAULTY CUT-OFF VALVE DIAPHRAGM, BESIDES JEOPARDISING THE CORRECT OPERATION OF THE CUT-OFF VALVE, ALSO DAMAGES IDLE FUNCTIONING

Specific tooling

020329Y MityVac vacuum-operated pump

Fuel supply

- To clean the filtering element proceed as follows: remove the 4 filter cover fixing screws indicated in the figure; remove the cover and take out the paper filtering element, clean with compressed air and refit.
- Make sure the filtering element is in the correct position.
- Check that the air passage sections are not damaged or deformed.
- Check the correct sealing of the coupling between the filter housing and the cover.



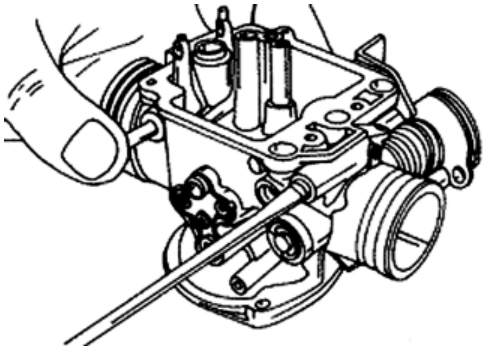
N.B.

FAILURE TO OBSERVE THESE INSTRUCTIONS MAY RESULT IN WRONG VACUUM INSIDE THE FILTER HOUSING, WHICH IN TURN MAY PRODUCE VARIATIONS IN CARBURETION.

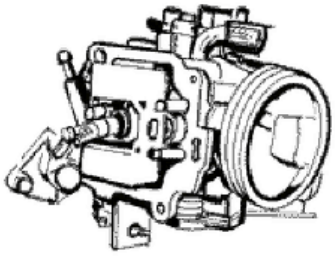
Removing the carburettor

carburettor removal

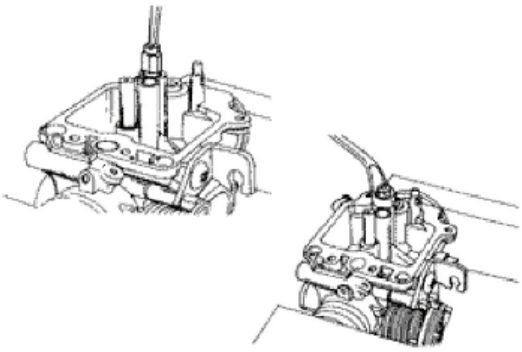
ble>



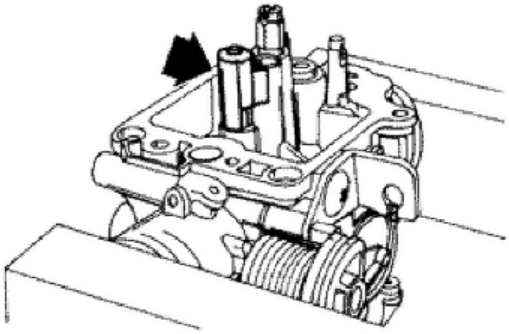
- To detach the carburettor from the engine, move the air filter and remove the throttle control transmission, the automatic starter connection, the clamps anchoring the carburettor to the filter housing and to the inlet manifold, the air delivery pipe to the diaphragm, and the intake fitting.
- Take out the carburettor and rotate it so as to remove the screw with the water joint and the pipes.



- Remove the protection, the bracket and the starter operating on the 2 screws shown in the figure.

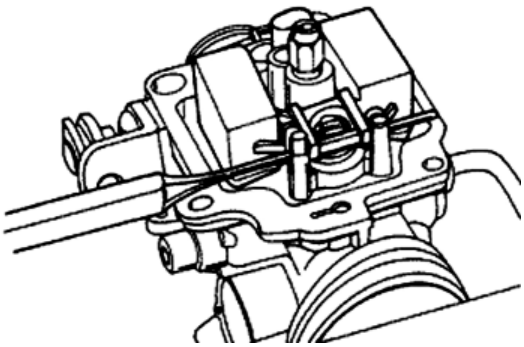


- Remove the 2 screws and the starter support with the gasket.
- Remove the fixing screw shown in the figure, the rocking lever and the accelerating pump control spring.

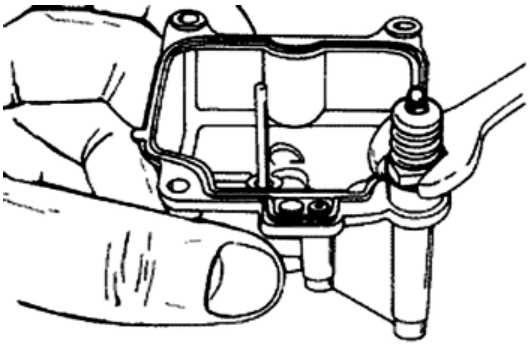


- Remove the 2 fixing screws indicated in the figure, the vacuum chamber cover and the spring.
- Remove the vacuum valve together with the diaphragm.
- Remove the 4 screws shown in the figure and the chamber with the gasket.

- Remove the accelerating pump piston with the ring nut, the hood, the O-Ring and the spring from the chamber as shown in the figure.



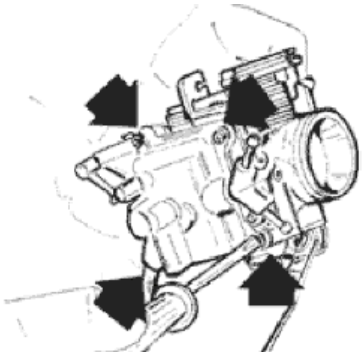
- Adequately support the carburettor and using a pin and hammer; remove the float pin operating from the throttle control side.
- Remove the float and the plunger.



- Remove the cover of the air deflector from the carburettor to the starter nozzle as shown in the figure.

-Remove the maximum nozzle.

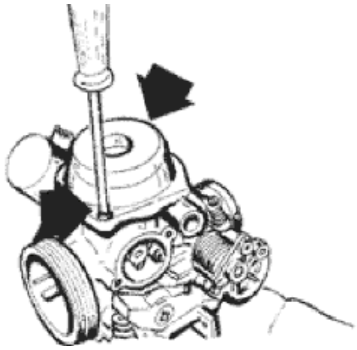
-Remove diffuser.



- Remove the sprayer.

-Remove the minimum nozzle.

- Remove the minimum flow screw with the O-ring, the washer and the spring.
- For the 200 cm³ version only, remove the two fixing screws, the cover, the spring and the diaphragm of the cut-off device.



N.B.

This last operation is necessary so as no to empty the cooling system. For the 200 cm³ version only, disconnect the low-pressure supply pipe to the cut-off device.

WARNING

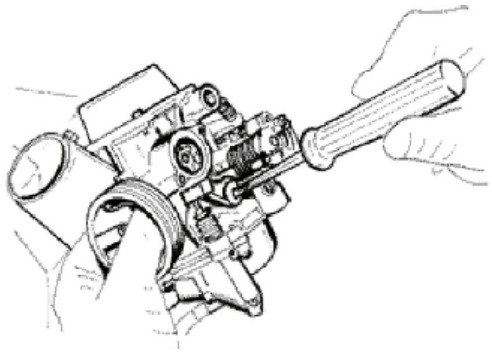
- While removing the cover, pay attention not to release the spring accidentally.

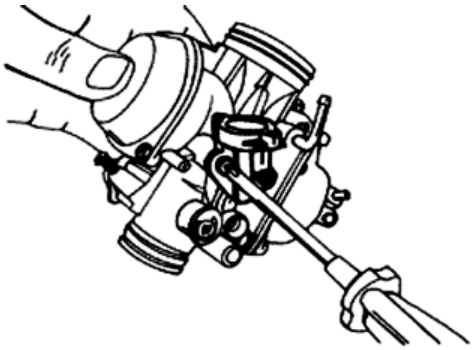
N.B.

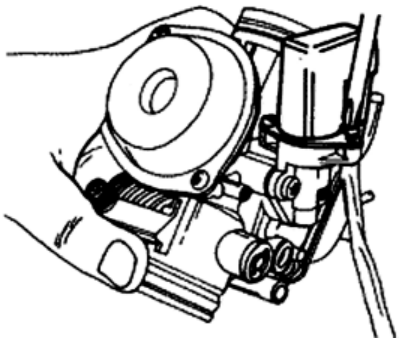
This operation is necessary to avoid losing sprayer parts when cleaning the carburettor body. If the sprayer is forced in its housing, do not attempt to remove it as this will only damage it.

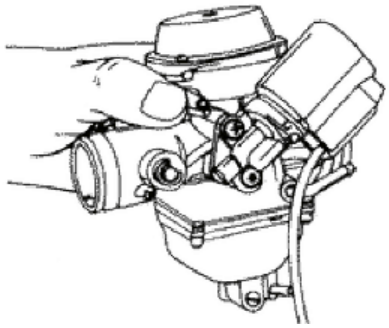
CAUTION

- Do not attempt to remove parts embedded in the carburettor body, such as: fuel supply pipe, plunger housing, starter nozzle, pit cover for progressions and inlet nozzle, minimum and maximum air gauge, throttle valve control shaft. Do not remove throttle-shaft connecting screws. The fixing screws are caulked after fitting and removing them damages the shaft.









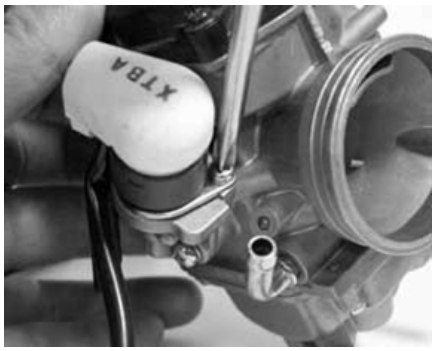
Kehin

- To detach the carburettor from the engine, it is necessary to move the air filter and remove the transmission throttle control, the automatic starter connection, the clamps anchoring the carburettor to the filter housing and to the inlet manifold, the air delivery pipe to the diaphragm, and the intake fitting.
- Take out the carburettor and rotate it so as to remove the screw with the water joint and the pipes.

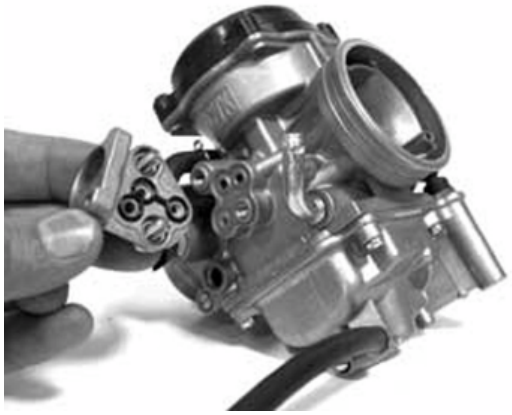
N.B.

THIS LAST OPERATION IS NECESSARY SO AS NO TO EMPTY THE COOLING SYSTEM.

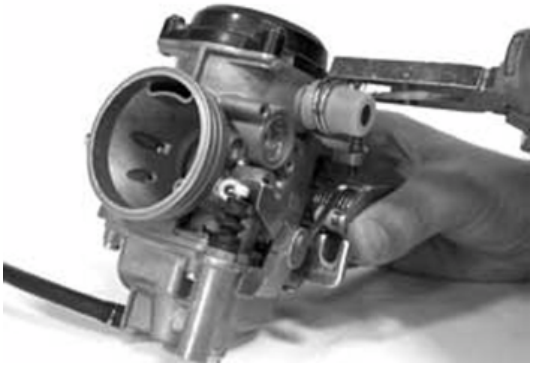
- Remove the protection, the bracket and the starter acting on the screw shown in the figure.



- Remove the 2 screws and the starter support with the gasket.



- Remove the clamp and cover with the airing filter of the diaphragm chamber.



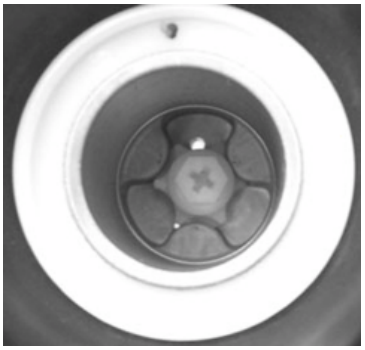
- Remove the 4 fixing screws shown in the figure and the vacuum chamber cover.

WARNING

DURING THE REMOVAL OF THE CARBURETTOR COVER TAKE SPECIAL CARE NOT TO RELEASE THE SPRING ACCIDENTALLY.

- Remove the vacuum valve together with the diaphragm.

- Unscrew the bayonet joint 1/8 of a turn and remove, take out the spring and vacuum valve needle



- Remove the 4 screws indicated in the figure.

- Remove the chamber with the accelerating pump, its control and gasket.

- Remove the oil pump seal.

- Remove the intake and outlet valves of the intake pump from the tank

N.B.

CAUTION, THE ACCELERATION PUMP VALVES ARE MADE UP OF NOZZLES, SPRING AND BALL.

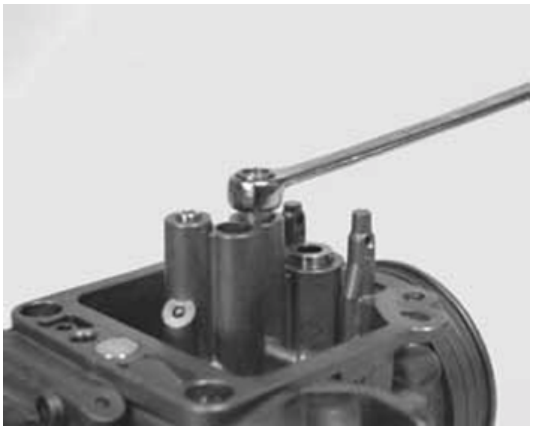
N.B.

AVOID REMOVING THE PISTON OF THE PUMP AND ITS CONTROL.

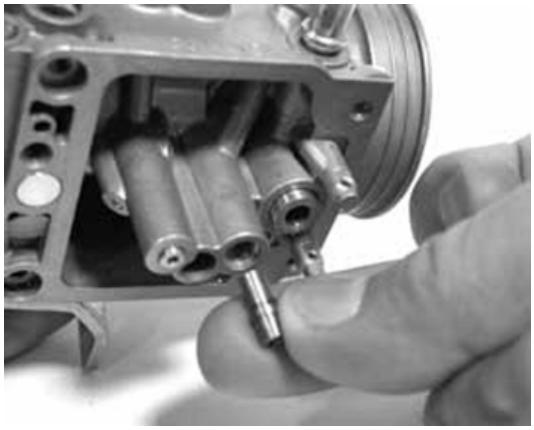
Adequately support the carburettor and using a rod and hammer remove the float pin acting from the throttle control side.

- Remove the float and the plunger.
- Remove the maximum nozzle

-Remove the maximum nozzle.



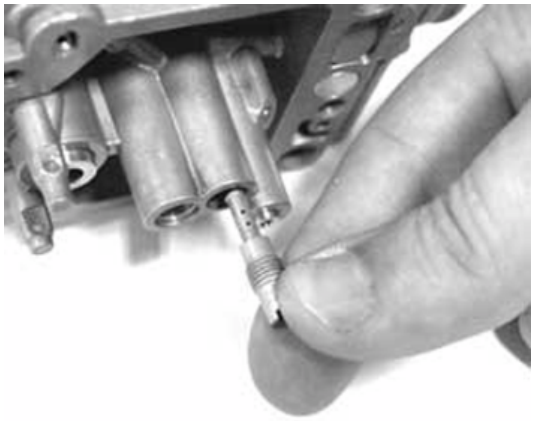
-Remove diffuser.



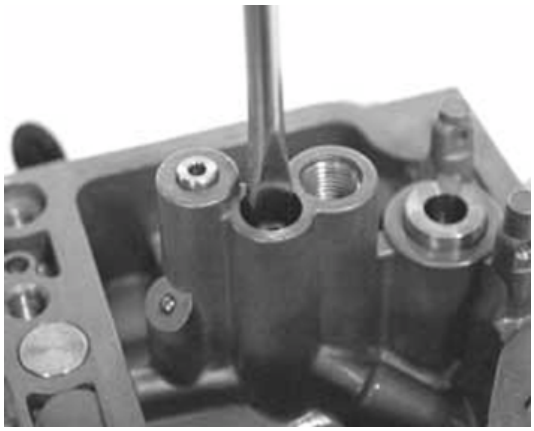
- Remove the sprayer.

N.B.

WHEN CLEANING THE CARBURETTOR BODY REMOVE THE SPRAYER TO AVOID LOSING PARTS. IF THE SPRAYER IS FORCED IN ITS HOUSING DO NOT ATTEMPT TO REMOVE IT AS THIS WILL ONLY DAMAGE IT.



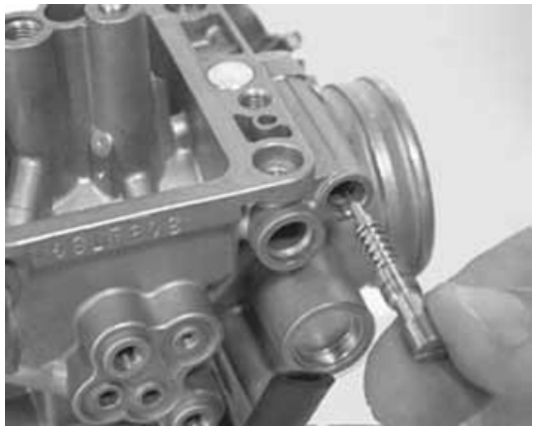
-Remove the minimum nozzle.



- Remove the minimum flow set screw and the spring.

CAUTION

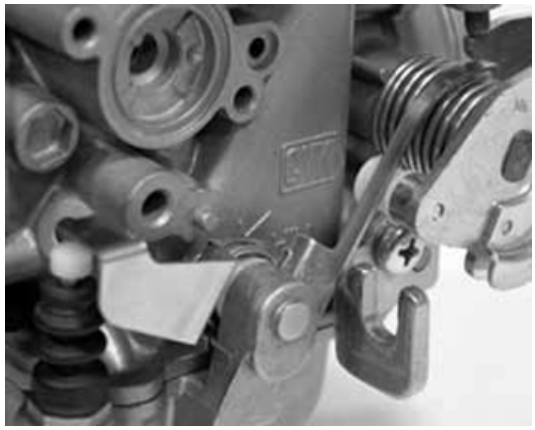
DO NOT ATTEMPT REMOVING PARTS EMBEDDED IN THE CARBURETTOR BODY SUCH AS: FUEL SUPPLY PIPE, PLUNGER HOUSING, STARTER NOZZLE, PIT COVER FOR PROGRESSIONS AND INLET NOZZLE, MINIMUM AND MAXIMUM AIR GAUGE, THROTTLE VALVE CONTROL SHAFT. DO NOT REMOVE THROTTLE-SHAFT CONNECTION SCREWS. THE FIXING SCREWS ARE CAULKED AFTER ASSEMBLY AND THEIR REMOVAL DAMAGES THE SHAFT.

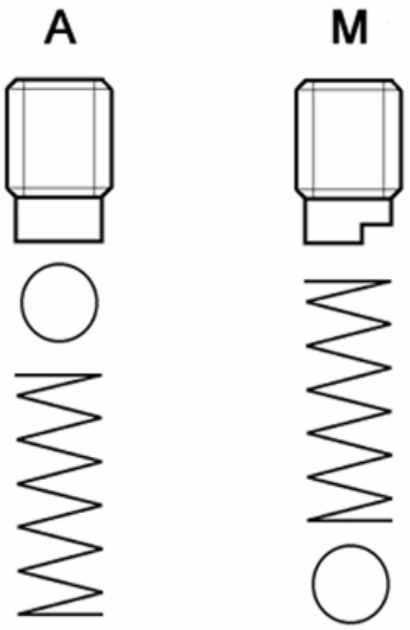


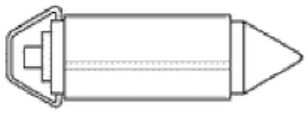
Refitting the carburettor

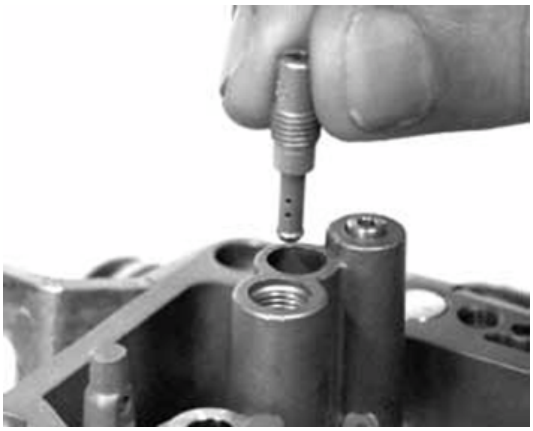
Kehin

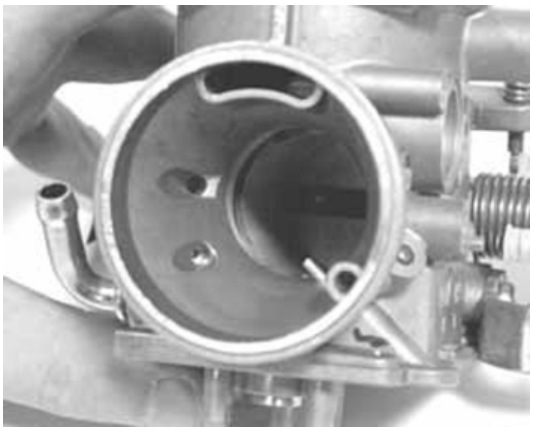
- The screw final position should be determined by an exhaust fume analysis.
- Adjust the carburettor by turning the screw twice from the close position.











Level check

Kehin

- Place the carburettor inclined as shown in the figure.
- Check that the float reference is parallel to the tank coupling surface
- If different positions are detected, change the plunger control metal plate direction to obtain the position described above.

Kehin

- Check that the tapered pin of the vacuum valve does not show wear.
- Check that the depression valve does not show threads on the external surfaces.
- Check that the vacuum intake hole is not clogged.
- Check that the diaphragm is not damaged or has hardened, otherwise replacement the whole valve.
- Insert the tapered pin into the vacuum valve housing.

- Reassemble the vacuum valve on the carburettor body taking care that the tapered pin is inserted into the sprayer.
- Reassemble the spring with the pin lock.
- Remove the cover of the vacuum chamber being careful to correctly insert the spring in its place on the cover.
- Tighten the screws to the prescribed torque
- Wash and blow dry the filter sponge of the ambient pressure intake.
- Reassemble the filter with its clamp.
- Wash and blow dry the starter support.

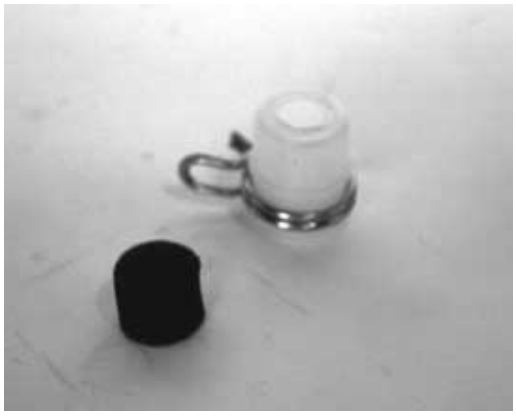
Assemble a new gasket on the carburettor body and tighten the 2 fixing screws.

N.B.

THE VALVE CAN BE INSERTED IN ONLY ONE POSSIBLE POSITION.

Locking torques (N*m)

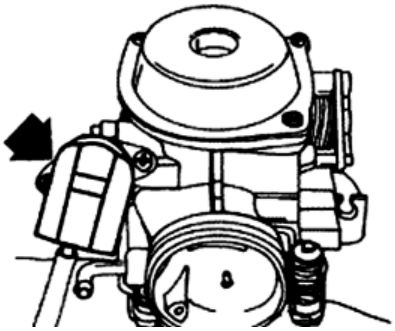
Vacuum chamber cover screws: XX Nm



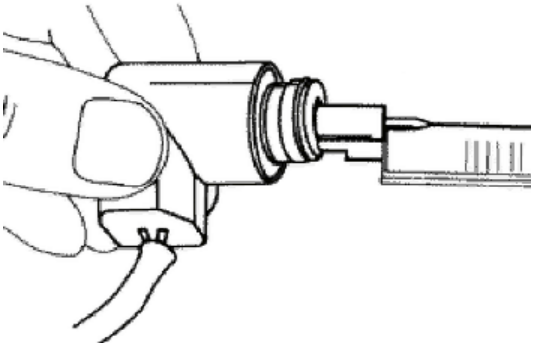
Inspecting the automatic choke device

- Check that the piston of the automatic starter is not deformed or rusty.
- Check that the piston slides freely from the seat to the support.
- Check that the sealing gasket of the piston is not deformed.
- The starter must be more or less functional depending on the ambient temperature.
- Measure the protrusion of the piston as shown in the figure and check the corresponding value.
- Make sure that the starter is adjusted for the ambient temperature.
- The starter should disconnect progressively by means of electrical heating.
- Check the starter resistance when adjusted to the ambient temperature.

With a 12V battery power the automatic starter and check that piston protrudes as much as possible.



- The correct warm up time depends on the ambient temperature.
- If protrusion, resistance or timing values are different from the ones prescribed, replace the starter.



- Assemble the starter to the carburettor being careful to position the O-Ring correctly, insert the

plate with the machined side contacting the starter, tighten the 2 fixing screws.

- Position the starter as shown in the figure.
- Assemble the protection casing.

Characteristic

Check the auto starter: Protrusion Value for Walbro

12.5 ÷ 13 mm at approx. 20°C

Check the automatic starter: maximum protrusion

18.5 ÷ 19 mm

Check the automatic starter: Max. time:

5 min

Electric characteristic

Check the automatic starter: Resistance

around 30 Ω

Kehin

- Check that the automatic starter piston is not deformed or rusty.
- Check that the piston slides freely from the seat to the support.
- Check that the piston sealing gasket is not deformed.
- The starter must be more or less functional depending on the ambient temperature.
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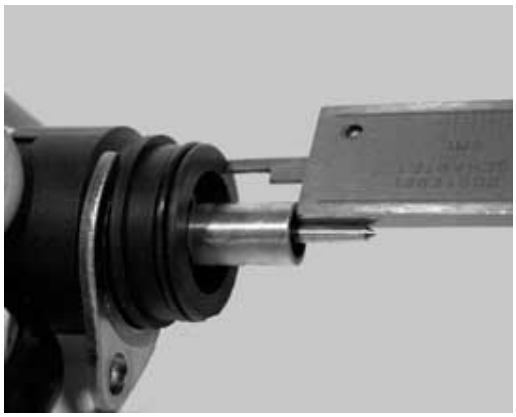
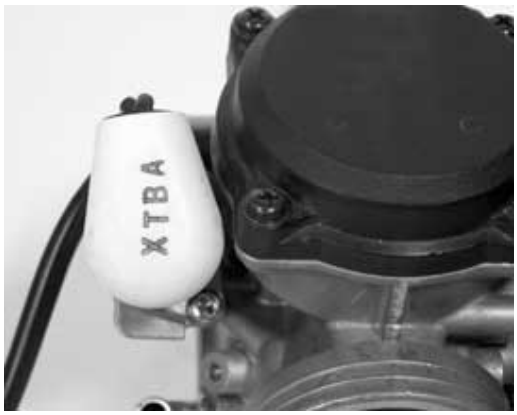


- The correct warm up time depends on the ambient temperature.
- If protrusion, resistance or timing values are different from the ones prescribed, replace the starter.
- Assemble the starter to the carburettor being careful to position the O-Ring correctly, insert the plate with the machined side contacting the starter, tighten the fixing screws.
- Position the starter as shown in the figure.
- Assemble the protection casing.



N.B.

TO CARRY OUT THIS CHECK PAY SPECIAL ATTENTION NOT TO GENERATE SHORT CIRCUITS USE A CABLE SECTION WITH A TERMINAL SUITABLE TO BE CONNECTED TO THE STARTER.

Characteristic

Check the automatic starter: Kehin: Protrusion value

XX ÷ XX mm at approx. 20°C

Check the automatic starter: Kehin maximum protrusion

XXX ÷ XXX mm

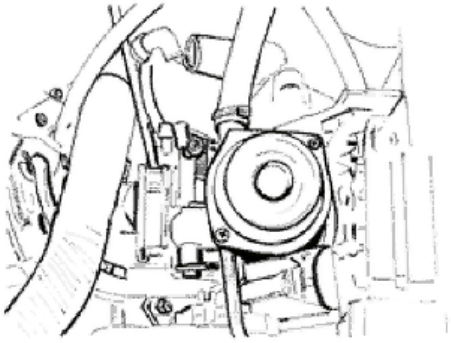
Check the automatic starter: Keihin maximum time

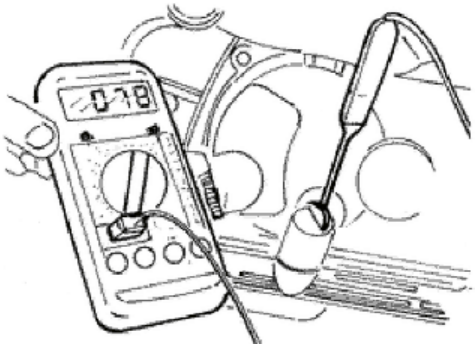
5 min

Adjusting the idle

- The engine does not need frequent idle adjustments, however it is very important to make any adjustments fully respecting some standards.
- Before adjusting the carburettor make sure to respect the lubrication requirements, valve clearance, and complying timing, spark plug should be in optimum conditions, air filter clean and sealed, and the exhaust system tight.
- Warm up the engine by running it at least 5 minutes at approximately 50 kph.

- Connect the vehicle to the exhaust fumes analyser inserting the probe into a sealed extension pipe placed at the muffler exit end.
- Connect a millimetre thermometer (020331y) on the sump, using a cover with oil expressly prepared for probes.
- Start the motor and before adjusting the idle speed make sure that the oil temperature is between 70 ÷ 80°C.
- Using the rpm indicator or any other instrument (020332y), adjust the idle screw to obtain 1600 rpm ÷ 1700 rpm
- Adjust the flow screw until the carbon monoxide (CO) percentage is 3.1 ÷ 4.5%, when the screw is loosened the CO value rises (rich mix). Tightening the screw decreases the CO (lean mix).
- If the adjustment of the flow screw causes a rpm increase readjust the revs again and if necessary, the flow screw to reach stable values.
- When the oil temperature, the numbers of revs and the percentage of carbon monoxide are respected the idle carburetion is considered correct. From the analyser we can draw further information:
- carbon dioxide percentages (CO2), the percentage of carbon dioxide has an inverted course compared to the percentage of(CO), values over 12.5% are considered correct. Non complying values indicate lack of tightness in the exhaust system.
- Unburned hydrocarbons (HC) are measured in parts per million (PPM). The HC value decreases while the rpm increases; with the engine at idle it is normal to detect 200 ÷ 400 PPM, these emission values are deemed normal for an engine with a diagram of distribution for motorcycles. Higher values can cause loss of engine blows as the mixture





is too lean (low CO), ignition failure or, incorrect timing or a clogged or unsealed exhaust valve.

- If it were difficult to ???? adjustment CO check accurately:

- That the carburettor is clean

- That the automatic starter is efficient

- Tapered pin housing efficiency

- Tank level adjustments

N.B.

THE EXTENSION TUBE IS INDISPENSABLE SO AS NOT TO SEND POLLUTED EXHAUST FUMES TO THE AMBIENT OXYGEN. IT IS INDISPENSABLE TO USE AN EXHAUST FUMES ANALYSER PREVIOUSLY HEATED AND PREPARED TO GUARANTEE THE RESET OF THE READING OF GASES AND THE CORRECT GAS CAPACITY. FAILURE TO RESPECT THESE REGULATIONS RESULTS IN INACCURATE READINGS.

N.B.

THE WASTED SPARK IGNITION SYSTEM OFFERS REMARKABLE POWER. READINGS MAY NOT BE ACCURATE IF INADEQUATE RPM INDICATORS ARE USED. CORRECT COUPLING OF THE RPM INDICATOR WILL BE INDICATED WHEN IT CAN READ RPM OVER 6000 ÷ 8000

Characteristic

Idle adjustment: Pipe sizes

Ø 40 mm

Idle adjustment: length

500 ÷- 600 mm

INDEX OF TOPICS

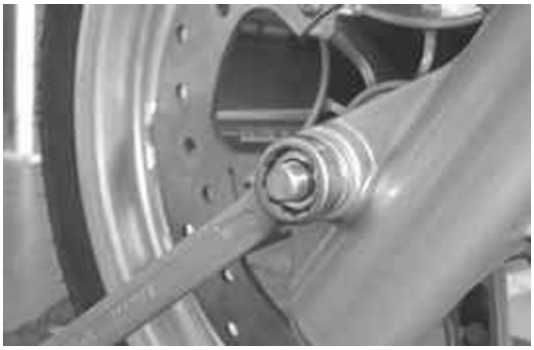
SUSPENSIONS	SUSP

Front

Removing the front wheel

- Remove the front calliper.

- Loosen the wheel axle lock-nut.



- Loosen the two wheel axle safety screws on the fork leg, on the brake calliper side.

- Pull out the wheel axle.

Front wheel hub overhaul

Check that the wheel bearings do not show signs of wear.

If you have to replace the wheel bearings, proceed as follows:

- Remove the plastic cover on the tone wheel side to avoid damage by loosening the 5 fixing screws.
- Remove the two bearings on the odometer drive side using the pliers 14 or 34 and the bell detail 9.
- Remove the internal spacer.

*** Either tool can be used.**

- Support the front wheel with two wooden shims that make it possible to avoid scratching in the case of contact with the rim.
- Insert the punch (consisting of adaptor handle, 15 mm adaptor and guide) from the odometer drive side to permit the removal of the brake disc side bearing and the spacer bushing.

Specific tooling

020376Y Adaptor handle

020456Y Ø 24 mm adaptor

020412Y 15 mm guide

- Heat the bearing seat on the side the brake disc with the heat gun.

- Insert the bearing using the punch consisting of adaptor handle, 42x47 mm adaptor and 15 mm guide, and drive it up to the stop.

- Reinsert the spacer bushing on the brake disc side using the appropriate tool and take it to the stop.

Specific tooling

020376Y Adaptor handle

020359Y 42x47-mm adaptor

020412Y 15 mm guide

020201Y Spacer bushing driving tube

- Turn over the wheel and insert the internal spacer with the part fitted with the Seeger ring facing the bearing on the brake disc side installed previously.

- Heat the bearing seat on the odometer drive side with the heat gun.

- Insert the two bearings using the punch consisting of adaptor handle, 32x35 mm adaptor and 15 mm guide, and drive it up to the stop.

Specific tooling

020376Y Adaptor handle

020357Y 32 x 35 mm adaptor

020412Y 15 mm guide

- Refit the cap and tighten the five fixing screws.

Refitting the front wheel

- Grease the wheel axle, then install it from the tone wheel side and install the tone wheel properly.
- Tighten the wheel axle nut to the prescribed torque.

N.B.

TAKE CARE NOT TO DAMAGE THE ODOMETER DRIVE. FOR THE SAKE OF SAFETY, OFFSET THE INTERNAL STOP FROM THE STOP OF THE TONE WHEEL BY 90°.

- Tighten the two safety screw on the leg to the prescribed torque.

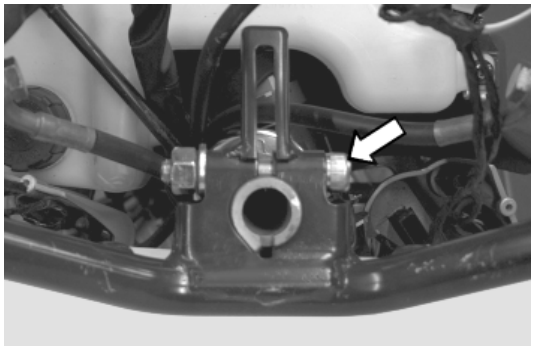
Locking torques (N*m)

Front wheel axle nut 45 - 50 **Safety screw on fork leg** 6 ÷ 7

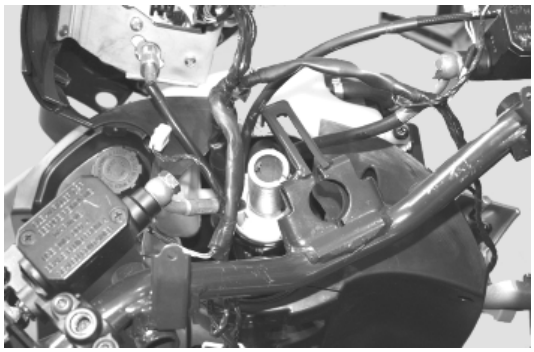
Handlebar

Removal

- Remove the front handlebar cover.
- Remove the rear handlebar cover.
- Remove the fixing pin.
- Remove the handlebar resting it on the shield back plate.

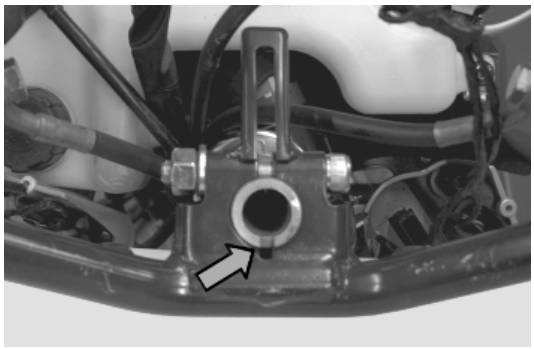


If you want to remove the fork, proceed as follows:
- Remove the front handlebar cover.
- Remove the rear handlebar cover by disconnecting the odometer cable and the instrument panel connectors.
- Remove the brake pumps.
- Release the throttle control.
- Remove the fixing pin.
- Remove the handlebar.



Refitting

- Install the handlebars on the steering tube, paying attention to the centring, aligning the recess on the handlebar with that on the steering tube as shown in the figure.
- Tighten the handlebar fixing screw on the steering tube to the prescribed torque.



Locking torques (N*m)

Handlebar fixing screw (*) **45 ÷ 50**

(*) Lubricate the nuts with engine oil before installation

Front fork

Removal

- Remove the front wheel.
- Remove the handlebar.
- Using the appropriate tool, loosen and remove the upper ring nut, the distancing washer, the counter ring nut and the spacer ring.
- Extract the fork.

N.B.

TAKE CARE TO SUPPORT THE FORK SO AS TO PREVENT IT FROM COMING OFF ABRUPTLY

Specific tooling

020055Y Wrench for steering tube ring nut

See also

Removal
Removing the front wheel

Overhaul

- With the 10 mm hexagonal wrench for internal parts loosen the upper stem closing cap.

- Loosen the stem support clamp and remove fork leg and stem.

- Remove the first spring featuring 15 turns.
- Remove the spring support plate.
- Remove the second spring featuring 21 turns.
- Drain the oil.
- Separate the stem from the leg by removing the screws with copper washer shown in the figure. To prevent the rotation of the pumping insert a 12 mm hexagonal wrench for internal parts in the stem.

- Remove the dust guard ring using a screwdriver as shown in the figure.

- Remove the oil guard safety lock using a screw-driver.
- Using the appropriate special tool, remove the oil seal.
- Insert the tie rod complete with cable into the oil guard.
- Insert in sequence the two half-rings per Ø 35-mm stems.

- Keeping the tie rod in vertical position, insert the bell for the Ø 35 mm stems.
- Insert the nut in the thread and take out the oil guard

Specific tooling

020487Y Fork oil seal extractor

SPRING LENGTH CHECK

Specification	Desc./Quantity
Standard length	15-turn spring: 116.3 + 2-1 mm
Standard length	21-turn spring: 175.7 + 2-1 mm
Allowable limit after use:	15-turn spring: 114.3 mm
Allowable limit after use:	21-turn spring: 173.7 mm

Check there are no signs of wear or seizing up between the stem and the leg. Otherwise, replace the damaged parts.

Characteristic

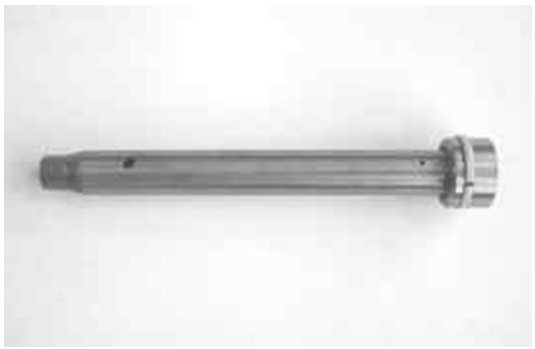
Maximum leg diameter

35.10 mm

Minimum stem diameter

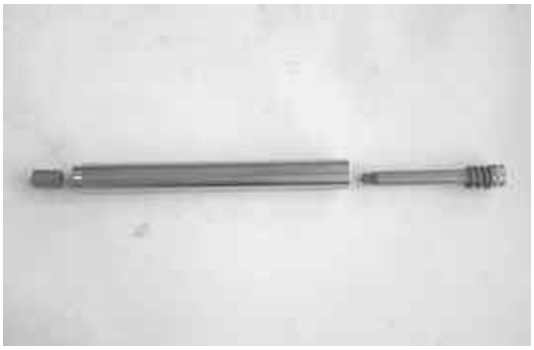
34.90 mm

Check that the oil holes on the pumping element are not clogged. - Check that the O-ring shows no sign of damage.



- Insert a new oil guard with the special adaptor handle and take it to the stop.
- Insert the safety clip.
- Insert a new dust guard.

- Insert the contrast spring into the pumping member.
- Insert the pumping element inside the stem.
- Insert the pumping element guide bushing at the lower stem end.
- Insert the stem in the leg being careful not to let the stem guide bushing come out.



- Inset and screw up the copper washer to the prescribed torque. To prevent the pumping member from rotating, insert a 12 mm Allen key into the stem.
- Pour 102 ± 1 cm^3 of oil into the stem.

Recommended products

AGIP FORK 7.5 W Fork oil

Grade 7.5 W

- Insert the 21 winding springs, the support plate with the chamfer facing downwards and then the 15 winding spring.

- Insert the stem into the fork clamp.
- Do up the clamp once to allow the stem closure upper cap to be tightened.
- Check that the sealing ring on the cap is in good working order, then tighten the cap on the stem to the prescribed torque.

- Loosen the fork clamp screws and ensure the stem closure cap is fitted properly on the clamp.
- Tighten the clamp screws to the prescribed torque.

Specific tooling

020376Y Adaptor handle

020359Y 42x47-mm adaptor

Locking torques (N*m)

Fork clamp screws 20 ÷ 25 **Stem upper cap** 15 ÷ 30 **Lower screw with copper washer** 25 - 35

- Check that the roller bearing does not show signs of wear or pricking.

In case of replacement, proceed as follows:

- Support the fork in a vice.
- Insert the contrast plate in the upper end of the steering tube

N.B.

ONLY REMOVE THE UPPER BALL BEARING IF YOU REALLY NEED TO.

- Insert the special tool as shown in the figure.

- Insert the retaining band of the two half-rings.

- Using a 19 mm hexagonal spanner, extract the roller bearing.

Specific tooling

020458Y Puller for lower bearing on steering tube

- Insert the a new plate and a new dust guard in the steering tube
- Insert a new roller bearing in the roller tube.
- Using the special tool and a mallet to move the dust guard and the bearing in abutment.

Specific tooling

006029Y Punch for fitting fifth wheel seat on steering tube

- With the 10 mm hexagonal wrench for internal parts loosen the upper stem closing cap.

- Loosen the stem support clamp and remove fork leg and stem.

- Remove the first spring featuring 15 turns.
- Remove the spring support plate.
- Remove the second spring featuring 21 turns.
- Drain the oil.
- Separate the stem from the leg by removing the screws with copper washer shown in the figure. To prevent the rotation of the pumping insert a 12 mm hexagonal wrench for internal parts in the stem.

- Remove the dust guard ring using a screwdriver as shown in the figure.

- Remove the oil guard safety lock using a screwdriver.
- Using the appropriate special tool, remove the oil seal.
- Insert the tie rod complete with cable into the oil guard.
- Insert in sequence the two half-rings per Ø 35-mm stems.

- Keeping the tie rod in vertical position, insert the bell for the Ø 35 mm stems.
- Insert the nut in the thread and take out the oil guard

Specific tooling

020487Y Fork oil seal extractor

- Check the length of the springs.

SPRING LENGTH CHECK

Specification	Desc./Quantity
Standard length	15-turn spring: 116.3 + 2-1 mm
Standard length	21-turn spring: 175.7 + 2-1 mm
Allowable limit after use:	15-turn spring: 114.3 mm

Specification	Desc./Quantity
Allowable limit after use:	21-turn spring: 173.7 mm

Check there are no signs of wear or seizing up between the stem and the leg. Otherwise, replace the damaged parts.

Characteristic

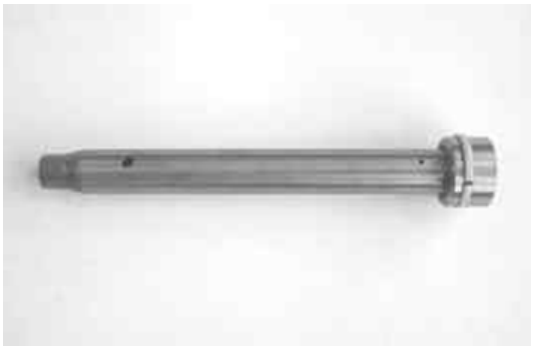
Maximum leg diameter

35.10 mm

Minimum stem diameter

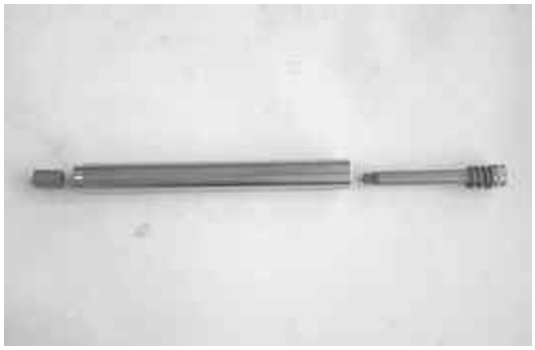
34.90 mm

Check that the oil holes on the pumping element are not clogged. - Check that the O-ring shows no sign of damage.



- Insert a new oil guard with the special adaptor handle and take it to the stop.
- Insert the safety clip.
- Insert a new dust guard.

- Insert the contrast spring into the pumping member.
- Insert the pumping element inside the stem.
- Insert the pumping element guide bushing at the lower stem end.
- Insert the stem in the leg being careful not to let the stem guide bushing come out.



- Inset and screw up the copper washer to the prescribed torque. To prevent the pumping member from rotating, insert a 12 mm Allen key into the stem.
- Pour 102 ± 1 cm^3 of oil into the stem.

Recommended products

AGIP FORK 7.5 W Fork oil

Grade 7.5 W

- Insert the 21 winding springs, the support plate with the chamfer facing downwards and then the 15 winding spring.

- Insert the stem into the fork clamp.
- Do up the clamp once to allow the stem closure upper cap to be tightened.
- Check that the sealing ring on the cap is in good working order, then tighten the cap on the stem to the prescribed torque.

- Loosen the fork clamp screws and ensure the stem closure cap is fitted properly on the clamp.
- Tighten the clamp screws to the prescribed torque.

Specific tooling

020376Y Adaptor handle

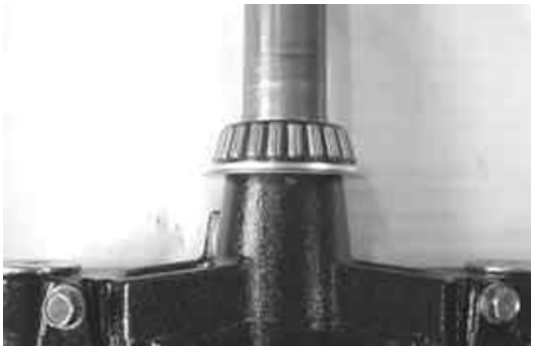
020359Y 42x47-mm adaptor

Locking torques (N*m)

Fork clamp screws 20 ÷ 25 **Stem upper cap** 15 ÷ 30 **Lower screw with copper washer** 25 - 35

Refitting

- Grease using lithium soap grease on the roller bearings.



Recommended products

AGIP GREASE PV2 Grease for the steering bearings, pin seats and swinging arm

White anhydrous-calcium based grease to protect roller bearings; temperature range between -20 C and +120 C; NLGI 2; ISO-L-XBCIB2.

- Insert the fork into the headstock.
- Insert the spacer ring.
- Using an appropriate tool do up the first ring nut in the steering tube (upper steering ball bearing). Tighten to the prescribed torque.
- Install the space washer.
- Using the special tool, tighten the second locking ring nut in the steering tube to the prescribed torque.

Specific tooling

020055Y Wrench for steering tube ring nut

Locking torques (N*m)

Steering lower ring nut 10 ÷ 13 then loosen by 90°
Upper steering ring nut 30 ÷ 36

Steering bearing

Removal

- Remove the fork
- Check that the upper ball bearing and the seat of the lower roller bearings do not show signs of wear or pricking.

In case of replacement, proceed as follows:

- Using a punch to remove the bearings, insert it from the bottom and remove the ball bearing above the headstock. Then remove the lower seat of the roller bearing by inserting the punch from the top of the headstock.

N.B.

ONLY REMOVE THE UPPER BALL BEARING IF YOU REALLY NEED TO.

Specific tooling

020004Y Punch for removing fifth wheels from headstock

See also

Removal

Refitting

Using the appropriate tool, refit the upper ball bearing and the seat of the lower roller bearings on the headstock as described below:

- Place a new ball bearing on the headstock and a roller bearing seat on the lower part.
- Insert the tie rod screw of the appropriate tool fitted out with the adaptors for planting the bearing and seat it in the headstock as in the photograph.
- Using two 24 mm wrenches, tighten the screw until the seat and the bearing are fully set in place.

N.B.

ALWAYS USE A NEW BEARING AND A NEW SEAT.

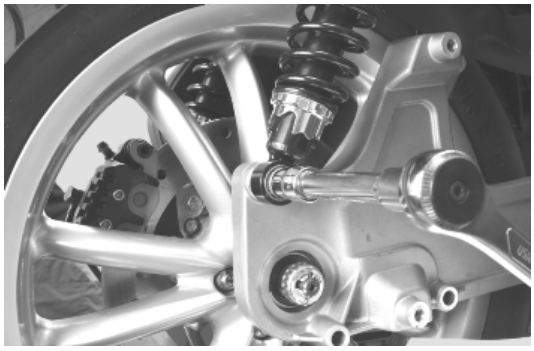
Specific tooling

001330Y Tool for fitting steering seats

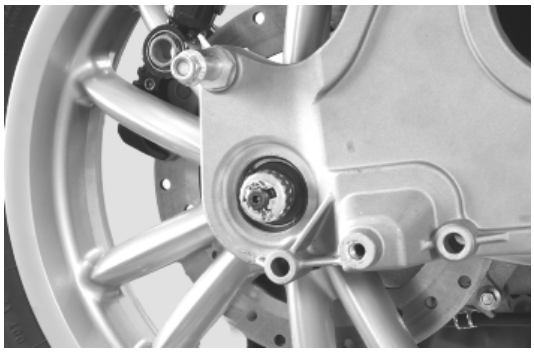
Rear

Removing the rear wheel

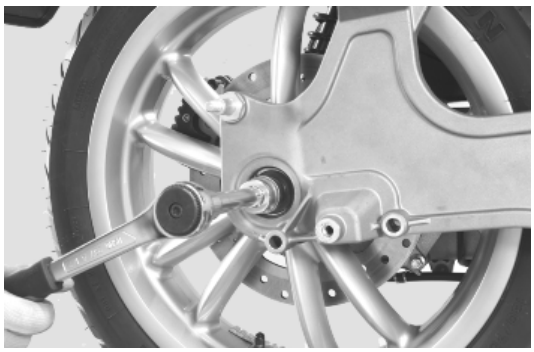
- Remove the exhaust silencer.
- Unscrew the shock absorber lower clamp and rotate the shock absorber towards the scooter rear part.



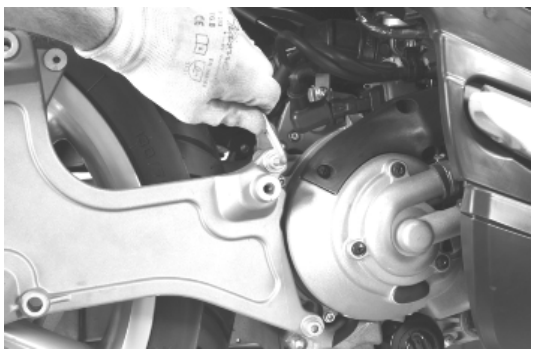
- Remove the cotter pin and the cap.



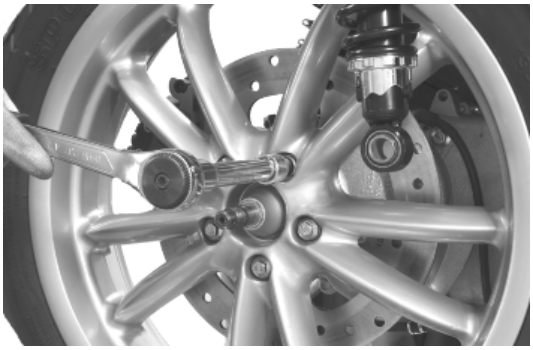
- Loosen the nut and collect the spacer.



- Remove the two screws fixing the right shock absorber support bracket and remove the bracket.



- Remove the five screws fixing the wheel to the hub.
- Remove the wheel and collect the conical spacer.



Refitting the rear wheel

- Carry out the removal operations but in reverse order, observing the prescribed tightening torques.

Locking torques (N*m)

Fixing screw for wheel rim to hub 34 ÷ 38

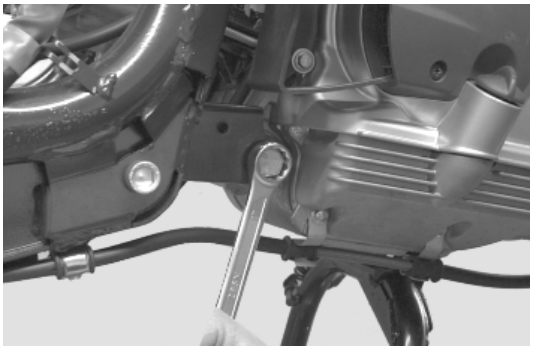
Swing-arm

Removal

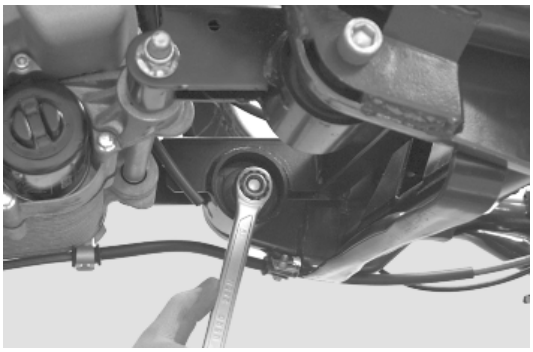
WARNING

IT IS NOT NECESSARY TO REMOVE THE SWINGING ARM TO SERVICE IT.

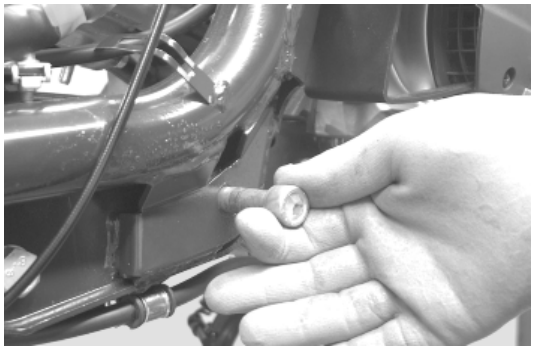
- Rest the scooter on its centre stand.
- Remove the side spoilers.
- Remove the footrest.
- Support the engine adequately.
- Unscrew the pin connecting the swinging arm to the engine and collect the spacer.



- Operating from both sides of the scooter, loosen the nut from the inside and collect the washer.



- Remove the pin from the silent bloc.



- Once the swinging arm on the engine side is released, release the swinging arm on the frame side, operating on both sides.
- Loosen the nut and collect the washer.

- Remove the pin connecting the swinging arm to the frame.

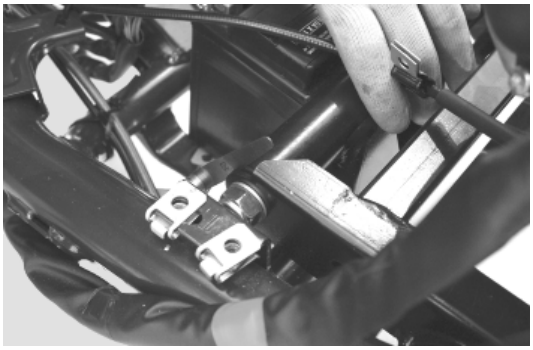
- Remove the swinging arm by pulling it forwards.

Overhaul

WARNING

THE SWINGING ARM CLEARANCE MUST BE CHECKED WITH THE ARM MOUNTED IN RIDING CONDITIONS.

- Remove the side spoilers.
- Remove the footrest.
- Check the axial clearance between the two swinging arms using a thickness gauge.
- If non-conforming values are detected, remove the swinging arm and replace the Teflon spacer bushings.



Characteristic

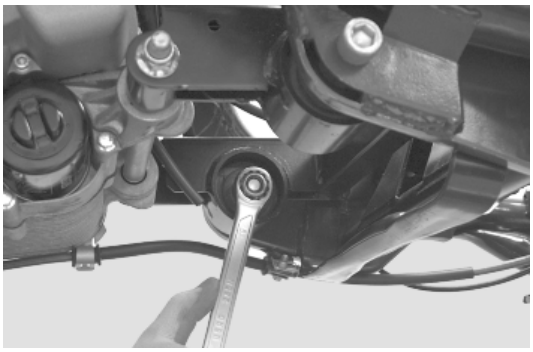
Axial clearance between the two swinging arms
Min 0.6 Max 1.2 mm

- Check clearances between the arm on the frame side and the frame using a thickness gauge.
- If non-conforming values are detected, remove the swinging arm and replace the Teflon spacer bushings.

Characteristic

Clearance between the bushing and the plates
Min 0.6 Max 1.2 mm

- To check the silent bloc, loosen the nut from the inside, undo the screw and remove the silent bloc.
- Make sure it is not broken. If it does, replace it.



- To remove the roller casings, take out the Teflon spacer bushing and the internal spacer **«A»**.
- Using an appropriate pin, remove the roller casings **«B»**.
- Using an appropriate tool, set new roller casings, being careful to place the bearings with the O-rings facing outwards.
- Once fitted, lubricate the ball cages with the recommended product.

Specific tooling

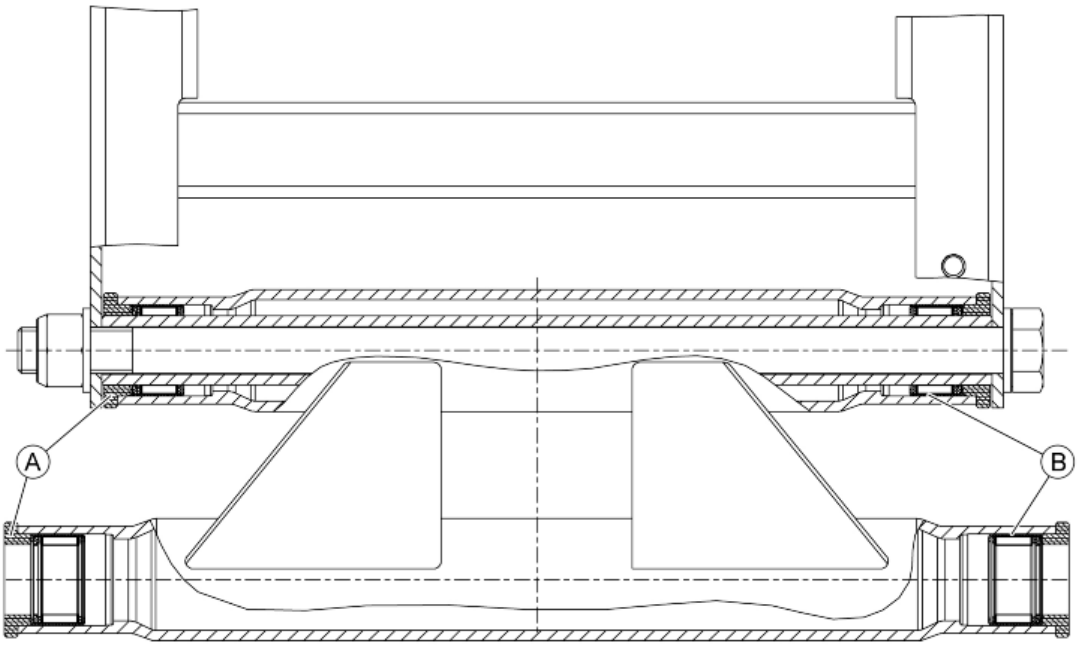
020115Y Ø 18 punch

020244Y 15 mm diameter punch

Recommended products

AGIP GREASE PV2 Grease for control levers on the engine

White anhydrous-calcium based grease to protect roller bearings; temperature range between -20 °C and +120 °C; NLGI 2; ISO-L-XBCIB2



Refitting

- Carry out removal operations in reverse order.
- Tighten to the prescribed torques.

SWINGING ARM FITTING

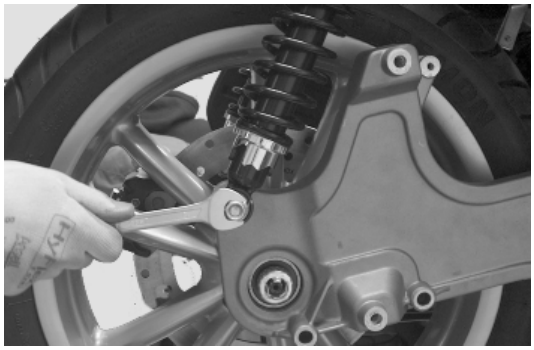
Name	Torque in Nm
Swinging arm on engine side - Engine	40
Silent bloc - Frame	54
Swinging arm on frame side - Frame	60
Swinging arm on engine side - Swinging arm on frame side	61

Shock absorbers

Removal

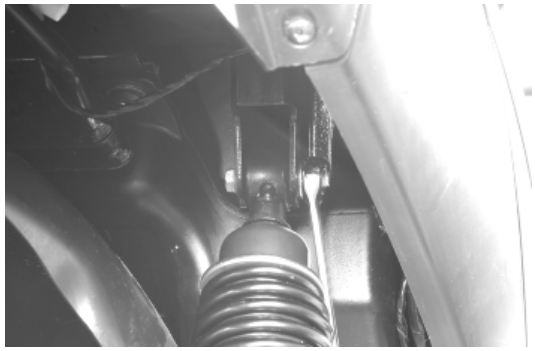
Proceed as follows:

- Place the scooter on its centre stand;
- Lift the engine using a jack so as to free both shock absorbers.
- Remove the muffler.
- Undo the screws fixing the shock absorber spring unit from the support fixed to the engine on one side.



- Loosen the nut fixed to the muffler support on the other side.

- Undo the two upper nuts (one on each side) fixing the shock absorber spring unit to the frame and remove the shock absorbers themselves.



Refitting

Carry out the previous operations but in reverse order.

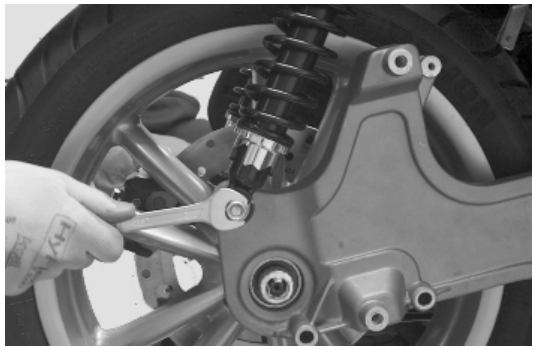
Locking torques (N*m)

Lower shock absorber clamp 33 ÷ 41 Upper shock absorber clamp 33 ÷ 41

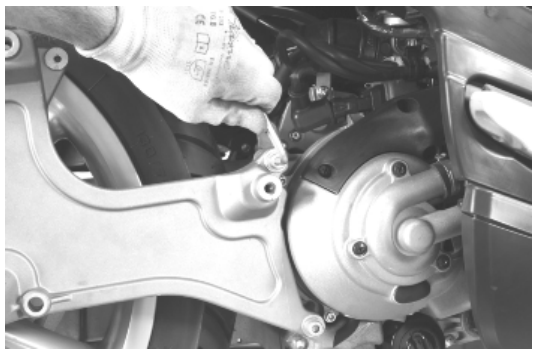
Exhaust bracket

Removal

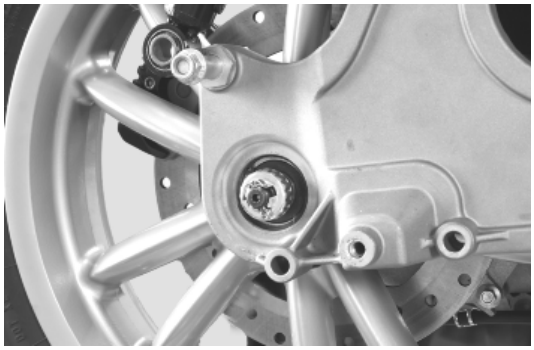
- Remove the muffler.
- Loosen and remove the lower retaining bolt of the right-hand shock absorber at the support arm.



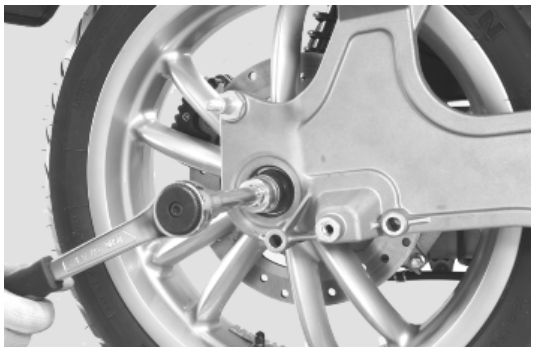
- Undo the two screws fixing the arm to the engine.



- Remove the split pin and safety cover;



- Unscrew the wheel axle nut; to prevent the wheel from rotating, use the rear brake and collect the spacer.



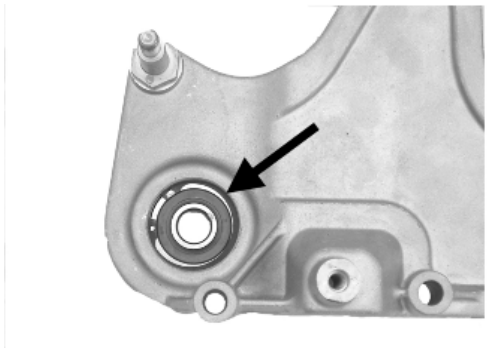
- Remove the support arm.

See also

Exhaust assy. Removal

Overhaul

- Remove the circlip shown in the photograph



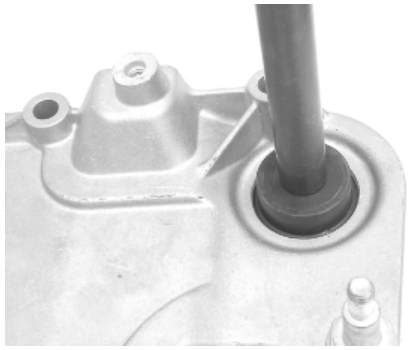
- Support the muffler support bracket sufficiently
- Using the special punch, remove the bearing from its seat as shown in the photograph

Specific tooling

020376Y Adaptor handle

020456Y Ø 24 mm adaptor

- Heat the bearing seat using the heat gun
- Using the special punch, install a new bearing in the seat as shown in the photograph



Specific tooling

020376Y Adaptor handle

020151Y Air heater

Refitting

To refit, carry out the removal operations in reverse order, observing the prescribed tightening torques.

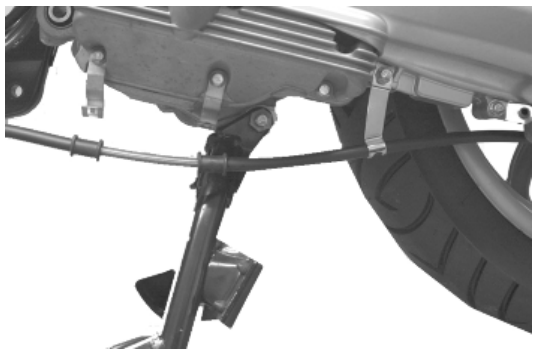
Locking torques (N*m)

Rear wheel axle nut 104 ÷ 126 Muffler support arm to engine screws (*) 20 ÷ 25 Lower shock absorber clamp 33 ÷ 41

Centre-stand

- Remove the muffler
- Remove the two stand return springs.

- Detach the rear brake pipe from the clamps, unscrew the fixing nut and collect the washer.



- Slide off the pin and remove the stand.
- To refit, carry out these operations in reverse order.
- Tighten the nut to the prescribed tightening torque.

CAUTION

LUBRICATE THE FOLLOWING PARTS WITH GREASE: SPRING COUPLING PINS, BUSHINGS ON STAND FIXING BRACKETS.

Recommended products

AGIP GREASE PV2 Grease for control levers on the engine

White anhydrous-calcium based grease to protect roller bearings; temperature range between -20 °C and +120 °C; NLGI 2; ISO-L-XBCIB2

Locking torques (N*m)

Bolt fixing the centre stand to the frame 25 ÷ 30

INDEX OF TOPICS

BRAKING SYSTEM	BRAK SYS

Interventions rules

WARNING

BRAKING SYSTEM FLUID IS CORROSIVE: ALWAYS WEAR PROTECTIVE GLOVES. IN THE EVENT OF ACCIDENTAL CONTACT WITH YOUR EYES, RINSE THE CONTACT AREA WELL WITH ABUNDANT WATER.
THE BRAKE FLUID DRAINED FROM THE SYSTEM IS HARMFUL TO THE ENVIRONMENT. COLLECTION AND DISPOSAL MUST BE CARRIED OUT IN COMPLIANCE WITH THE REGULATIONS IN FORCE. UNDER NORMAL DRIVING AND CLIMATIC CONDITIONS YOU SHOULD CHANGE THE FLUID EVERY TWO YEARS. IF BRAKES ARE USED INTENSELY AND/OR IN HARSH CONDITIONS, CHANGE THE FLUID MORE FREQUENTLY.
DURING INSTALLATION, THE PARTS TO BE REUSED MUST BE ABSOLUTELY CLEAN AND FREE FROM ANY TRACES OF OIL, FUEL AND GREASE: IT IS THEREFORE NECESSARY TO CLEAN THEM THOROUGH WITH DENATURED ALCOHOL.

N.B.

FOR TOPPING UP AND CHANGE, USE ONLY BRAKE FLUID DOT4 - NHTSA 116.
OBSERVE THE MAXIMUM DEGREE OF CLEANLINESS. HYDRAULIC FLUID IS EXTREMELY CORROSIVE FOR PAINTED SURFACES.
BRAKE FLUID IS HYGROSCOPIC; THAT IS, IT ABSORBS MOISTURE FROM THE SURROUNDING AIR.
IF THE MOISTURE CONTENT IN THE BRAKE FLUID EXCEEDS A CERTAIN VALUE, IT WILL RESULT IN POOR BRAKING EFFICIENCY DUE TO A LOW BOILING POINT OF THE FLUID.

N.B.

ALWAYS USE FLUID FROM SEALED CONTAINERS.

N.B.

RUBBER PARTS SHOULD NEVER BE LEFT IN ALCOHOL LONGER THAN 20 SECONDS. AFTER WASHING, THE PIECES MUST BE DRIED WITH A BLAST OF COMPRESSED AIR AND A CLEAN CLOTH.
THE SEAL RINGS MUST BE IMMERSED IN THE OPERATING FLUID; THE USE OF PRF1 PROTECTIVE DEVICE IS ALLOWED.

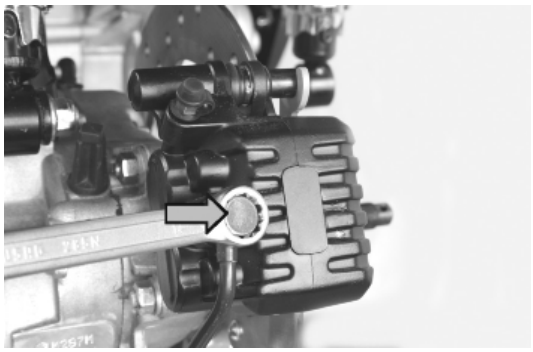
WARNING

THE PRESENCE OF BRAKE FLUID ON THE DISC OR BRAKE PADS REDUCES BRAKING EFFICIENCY. IN THIS CASE, REPLACE THE PADS AND CLEAN THE DISC WITH A HIGH-QUALITY SOLVENT.

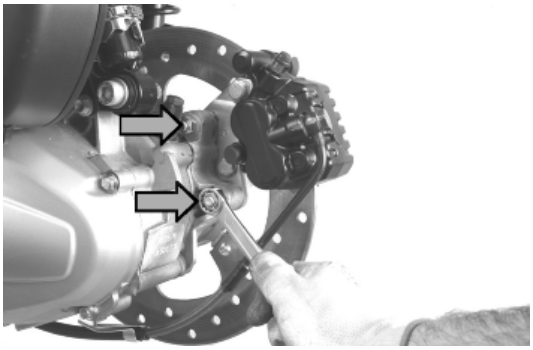
Rear brake calliper

Removal

- Make sure the brake pipes and the joint are in good conditions. Remove and repair the calliper in the event of fluid leaks.
- Disconnect the brake fluid pipe from the calliper, pouring the fluid inside a container.



- Undo the screws fixing the calliper support to the engine.

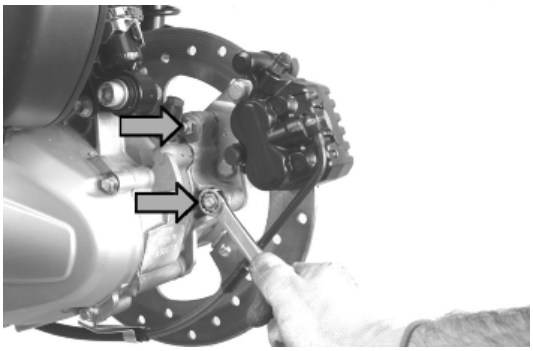


Refitting

- Fix the brake calliper support plate to the crank-case and the brake calliper to the bracket, tightening the screws to the prescribed torque.
- Apply the recommended product to the fixing screws of the brake calliper to the bracket.
- Purge the system.

N.B.

WHILE REFITTING, REPLACE THE COPPER GASKETS ON THEIR FITTINGS.



Recommended products

Loctite 243 Medium strength threadlock

Loctite 243 medium-strength threadlock

Locking torques (N*m)

Oil bleed screw 12 - 16 **Screw tightening calliper to the support** 23 ÷ 25 **Screw fixing rear brake calliper support to engine** 20 ÷ 25 **Brake fluid pipe-calliper fitting** 16 ÷ 20

See also

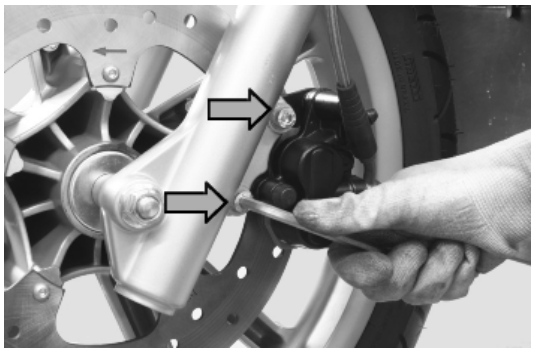
Rear - combined

Front brake calliper

Removal

- Make sure the brake pipes and the joint are in good conditions. Remove and repair the calliper in the event of fluid leaks.
- Disconnect the brake fluid pipe from the calliper, pouring the fluid inside a container.

- Undo the screws fixing the brake calliper support to the fork.



Overhaul

Proceed as follows:

1) remove the two male hexagonal screws (1) and take out the two pads (10);

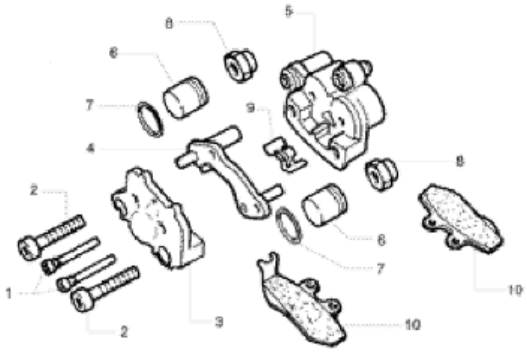
2) remove the two male hexagonal screws (2) and remove the reaction plate (3);

3) take out the fixed plate (4) from the guide;

4) remove the internal elements from the floating body (5) with the help of short blows of compressed air through the brake fluid pipe in order to facilitate the expulsion of pistons (6).

5) Check:

- that the plates and the body are whole and in good condition;
- that the cylinder and the floating body of the calliper do not show signs of scratches or erosion, otherwise replace the entire calliper;



- that the guides of the fixed plate are not scratched or eroded, otherwise replace the entire plate;
- that the brake pad check spring works properly.

Refitting

1) insert the pistons (6) and the sealing rings (7) in the body;
2) place the guide rubbers (8) and refit the fixed plate (4);
3) assemble the reaction plate (3) tightening the screws (2), insert the brake pad check spring (9) and then the pads, fixing them with the corresponding screws (1);
5) place the calliper on the disc and lock it to the strut by tightening the fixing screws;
6) fix the pipe joint on the calliper at the prescribed torque.

Functioning

This is a floating type calliper.
It takes advantage of the action and reaction principle to obtain the thrust for both pads.
The body and the reaction plate body work integrally and can move axially with respect of the fixed plate that is integral to the strut.
The pistons, forced by pressure to push the pad to the disk, cause the reaction plate to push in turn the other pad towards the disc.

The brake pad lock spring

1. Pad fixing screws
2. Reaction plate fixing screws
3. Reaction plate
4. Fixed plate
5. Floating body
6. Piston
7. Piston sealing rings
8. Guide protection rubbers
9. Brake pad check spring
10. Pads

CAUTION

ALL THE SEALS AND GASKETS MUST BE REPLACED EVERY TIME THE CALLIPER IS SERVICED.

Locking torques (N*m)

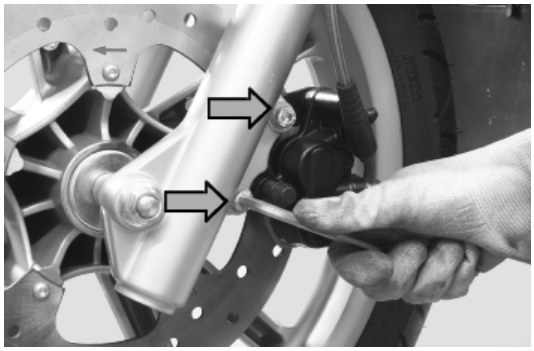
Brake fluid pipe-calliper fitting 20 ÷ 25 **Pad fastening pin** 19.6 ÷ 24.5

Refitting

- When refitting, tighten the nuts to the prescribed torque.
- Reconnect the brake pipe.
- Purge the system.

N.B.

WHILE REFITTING, REPLACE THE COPPER GASKETS ON THEIR FITTINGS.



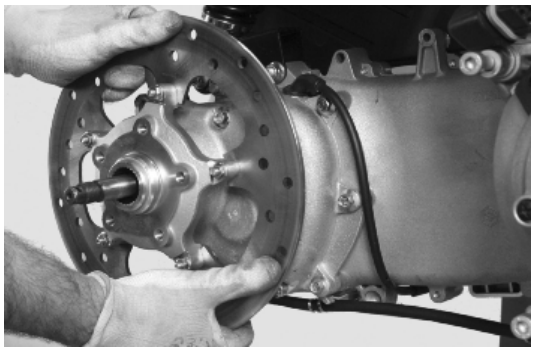
Locking torques (N*m)

Oil bleed screw 12 - 16 **Screw tightening calliper to the support** 20 ÷ 25 **Brake fluid pipe-calliper fitting** 16 ÷ 20

Rear brake disc

Removal

- Remove the rear wheel.
- Remove the brake calliper.
- Remove the hub and the brake disc.



- Carry out the same procedure with the front brake disc.

See also

Removing the rear wheel

Refitting

- For the installation, position the disc correctly using the arrow stamped on it as reference.
- Tighten the screws to the prescribed torque and apply the recommended product.

N.B.

THE SURFACE OF THE DISC WITH THE STAMPED ARROW FOR THE DIRECTION OF ROTATION MUST FACE TOWARDS THE OUTSIDE OF THE SCOOTER.

Recommended products

Loctite 243 Medium strength threadlock

Loctite 243 medium-strength threadlock

Locking torques (N*m)

Brake disc fixing screws 11 ÷ 13

Disc Inspection

Checking the disc is important; it must be perfectly clean, with no sign of rust, oil or grease or any other dirt, and must show no signs of deep scoring.

Characteristic

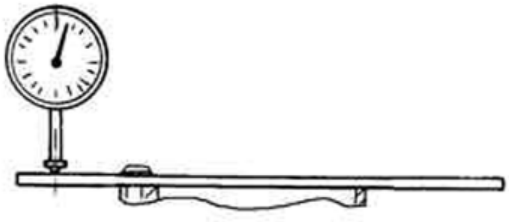
New rear disc thickness

4.0 mm

Disc thickness at wear limit (rear)

3.5 mm

- Remove the wheel and check using the appropriate tools that the axial run-out of the brake surface is within the prescribed limits.
- If this is not the case, replace the disc and repeat the test.



WHEN INSTALLING, THOROUGHLY CLEAN THE DISC AND ITS SEAT ON THE HUB.

Characteristic

Max. axial run-out

0.1 mm

Front brake disc

Removal

Proceed as follows:

- Remove the front wheel.
- Loosen the five disc fixing screws.
- Thoroughly clean the seats on the front wheel hub and on the disc.

See also

Removing the front wheel

Refitting

For fitting, position the disc correctly using the arrow stamped on it as reference.

- Do up the screws to the prescribed torque and apply the recommended product

N.B.

THE ARROW STAMPED ON THE DISC INDICATING THE RUNNING DIRECTION MUST BE FITTED TOWARDS THE OUTSIDE OF THE VEHICLE.

Recommended products

Loctite 243 Medium strength threadlock

Loctite 243 medium-strength threadlock

Locking torques (N*m)

Brake disc fixing screw 5 ÷ 6.5

Disc Inspection

Checking the disc is important; it must be perfectly clean, with no sign of rust, oil or grease or any other dirt, and must show no signs of deep scoring.

Characteristic

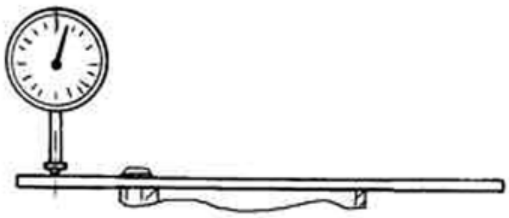
Thickness of a new front disc

4.0 mm

Disc thickness at wear limit (front)

3.5 mm

- Remove the wheel and check using the appropriate tools that the axial run-out of the brake surface is within the prescribed limits.
- If this is not the case, replace the disc and repeat the test.



WHEN INSTALLING, THOROUGHLY CLEAN THE DISC AND ITS SEAT ON THE HUB.

Characteristic

Max. axial run-out

0.1 mm

Front brake pads

Removal

Proceed as follows:

- Remove the front calliper.
- Loosen the two pins shown in the figure that lock the two pads.
- Remove the pads, being careful with the pad spring clamp.
- Check the thickness of the pads.

Characteristic

Minimum value

1.5 mm

See also

Front brake calliper

Refitting

To fit, proceed as follows:

- Insert the two pads in the callipers.
- Screw the two pad lock pins to the correct torque, and apply the recommended product.
- Fit the calliper on its support, tightening the two screws to the prescribed torque.

N.B.

IF IT IS NOT POSSIBLE TO CORRECTLY POSITION THE CALLIPER ON THE DISC DURING FITTING, GENTLY EXPAND THE PADS.

Recommended products

Loctite 243 Medium strength threadlock

Loctite 243 medium-strength threadlock

Locking torques (N*m)

Screw tightening calliper to the support 20 ÷ 25 Pad fastening pin 19.6 ÷ 24.5

Rear brake pads

Removal

Proceed as follows:

- Remove the rear brake calliper
- Remove the two pins holding the brake pads.
- Remove the pads, paying attention to the pad retaining spring.
- Check the thickness of the pads.

If the thickness is less than the minimum value, replace the pads with new pads.

Characteristic

Minimum value

1.5 mm

See also

Removal

Refitting

Carry out the installation by analogy with the procedure described for the installation of the rear brake calliper.

- Tighten the two calliper fixing screws to the prescribed tightening torque.

Locking torques (N*m)

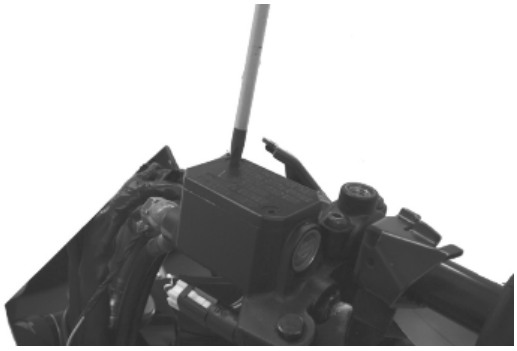
Pad fastening pin 19.6 ÷ 24.5 Screw tightening calliper to the support 20 ÷ 25 Fixing screws for the calliper support on the engine 20 ÷ 25

Fill

Rear - combined

Proceed as follows:

- Position the vehicle on a flat surface and on the stand
- Loosen the two screws shown in the figure and open the front brake fluid reservoir.



- Through the bleed screw on the brake calliper, bleed the system using a hose of adequate diameter.
- Collect the used fluid in a container.

- Pump on the brake lever to completely drain the system of all used fluid.
- Tighten the bleed valve.
- Refill the brake system tank up to the maximum level with the prescribed fluid.
- Attach the tube of the special tool to the bleed fitting.
- Actuate the tool at the bleed fitting, at the same time constantly topping up the brake system tank to prevent air being drawn into the system, until no more air escapes at the bleed fitting. The operation is finished when only brake fluid comes out of the bleed screw.
- Close the bleed screw and tighten to the prescribed torque.
- Close the brake system tank.

N.B.

IF AIR CONTINUES TO COME OUT DURING THE BLEED OPERATION, EXAMINE ALL THE FITTINGS. IF SAID FITTINGS DO NOT SHOW SIGNS OF BEING FAULTY, LOOK FOR THE AIR INPUT AMONG THE VARIOUS SEALS ON THE PUMP AND CALLIPER PISTONS. WHEN CARRYING OUT THE OPERATION, BRAKE FLUID MAY LEAK FROM THE BLEED SCREW ON THE CALLIPER AND ON THE DISC. IN THIS CASE; CAREFULLY CLEAN THE CALLIPER AND DEGREASE THE BRAKE DISC.

Specific tooling

020329Y MityVac vacuum-operated pump

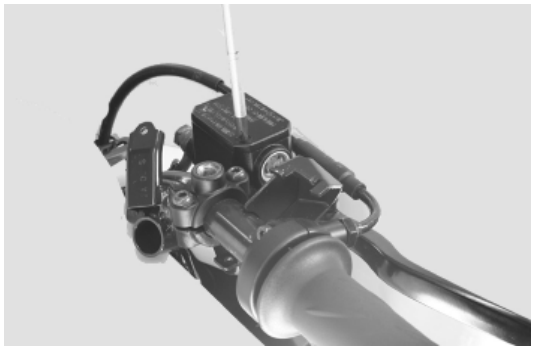
Locking torques (N*m)

Oil bleed screw 12 - 16

Front

Proceed as follows:

- Position the vehicle on a flat surface and on the stand
- Loosen the two screws shown in the figure and open the front brake fluid reservoir.



- Through the bleed screw on the brake calliper, bleed the system using a hose of adequate diameter.
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- Close the bleed screw and tighten to the prescribed torque.
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IF AIR CONTINUES TO COME OUT DURING THE BLEED OPERATION, EXAMINE ALL THE FITTINGS. IF SAID FITTINGS DO NOT SHOW SIGNS OF BEING FAULTY, LOOK FOR THE AIR INPUT AMONG THE VARIOUS SEALS ON THE PUMP AND CALLIPER PISTONS. WHEN CARRYING OUT THE OPERATION, BRAKE FLUID MAY LEAK FROM THE BLEED SCREW ON THE CALLIPER AND ON THE DISC. IN THIS CASE; CAREFULLY CLEAN THE CALLIPER AND DEGREASE THE BRAKE DISC.

Specific tooling

020329Y MityVac vacuum-operated pump

Locking torques (N*m)

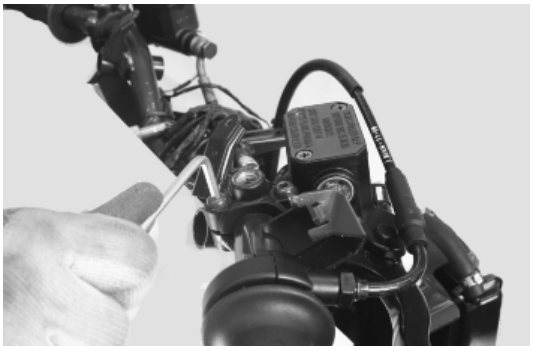
Oil bleed screw 12 - 16

Front brake pump

Removal

- Remove the front handlebar cover.
- Remove the rear handlebar cover.
- Drain the braking system.
- Disconnect the brake fluid pipe from the pump, paying attention to a possible escape of remaining brake fluid.
- Remove the front brake stop button from the lever.

- Loosen the two fixing screws of the stand and remove together with the rear view mirror.
- Remove the front brake pump together with the lever.



See also

Rear handlebar cover
Front

Overhaul

1) Remove the brake lever by loosening the fixing screw;
open the cover (2) and take out the diaphragm (3);
2) Remove the cap and unscrew the internal parts in the specified order;
3) Check that:
- The body of the pump shows no signs of internal damage or corrosion;
- The piston shows no sign of damage or abnormal wear;
- The piston return spring is in good condition.

Refitting

Reinstall the individual parts in the reverse order to the removal, paying attention to the correct positioning of the rubber parts in order to ensure leak tightness.

1. Tank cover screw
2. Tank cover
3. Diaphragm
4. Bellows

5. Seal ring
6. Piston
7. Gasket
8. Spring
9. Tank

CAUTION

ALL THE SEALS AND GASKETS MUST BE REPLACED EVERY TIME THE PUMP IS SERVICED.

Refitting

- Upon refitting, perform the operation but in reverse order.
- Tighten the hydraulic line to the prescribed torque and purge the system.
- When the operation is over, tighten the brake fluid bleed screw to the prescribed torque.

WARNING

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

CAUTION

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

Locking torques (N*m)

Oil bleed screw 12 - 16 Hydraulic line fixing screw: 16 ÷ 20 Fixing screws for handlebar control assembly U-bolts 7 ÷ 10

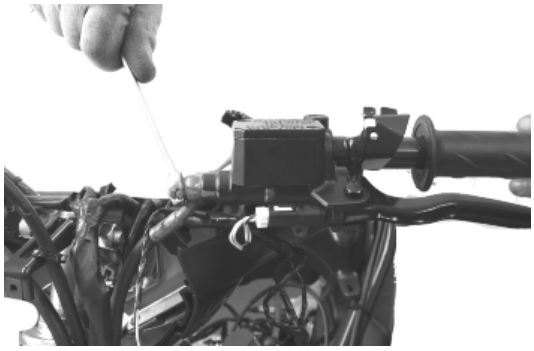
See also

Front

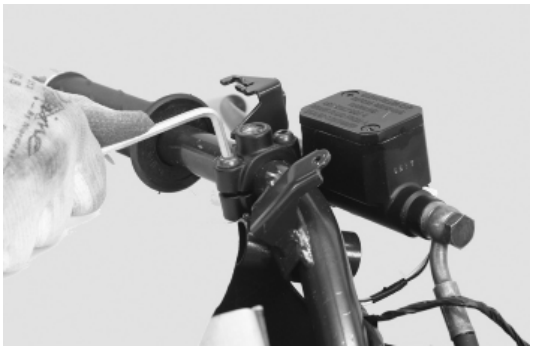
Rear brake pump - combined

Removal

- Remove the front handlebar cover.
- Remove the rear handlebar cover.
- Drain the braking system.
- Disconnect the brake oil pipe from the pump, paying attention to a possible escape of remaining oil.
- Remove the rear brake stop button from the lever.



- Loosen the two fixing screws of the stand and remove together with the rear view mirror.
- Remove the front brake pump together with the lever.



See also

Rear - combined
Rear handlebar cover

Refitting

- Upon refitting, perform the operation but in reverse order.
- Tighten the hydraulic line to the prescribed torque and purge the system.
- When the operation is over, tighten the brake fluid bleed screw to the prescribed torque.

WARNING

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

CAUTION

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

Locking torques (N*m)

Oil bleed screw 12 - 16 Hydraulic line fixing screw: 16 ÷ 20 Fixing screws for handlebar control assembly U-bolts 7 ÷ 10

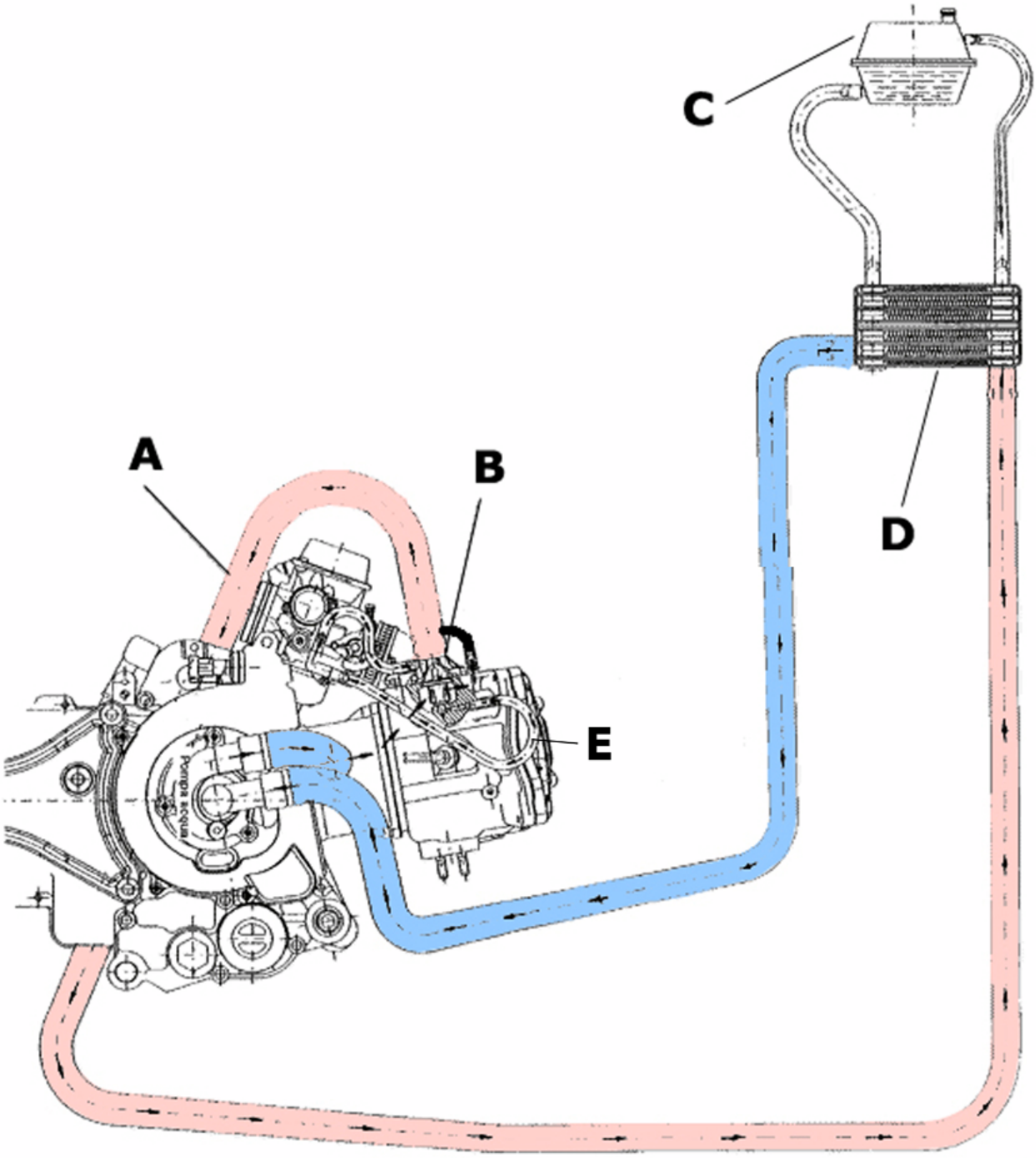
See also

Front

INDEX OF TOPICS

COOLING SYSTEM	COOL SYS

Circuit diagram

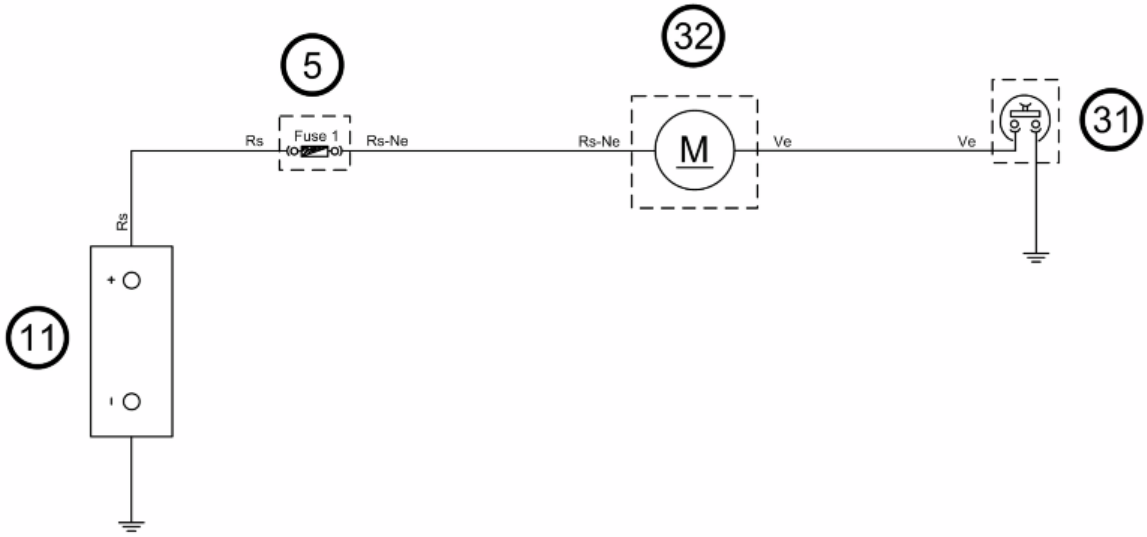


COOLING CIRCUIT

Specification	Desc./Quantity
A	Fluid cooling circuit
B	Thermostat with By-Pass

Specification	Desc./Quantity
C	Expansion tank
D	Radiator
E	Carburettor heating circuit

Electric fan check



KEY:

5. Fuse unit

11. Battery

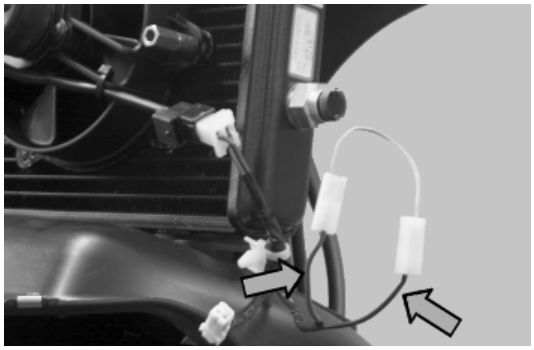
31. Thermoswitch

32. Electric fan

Electric fan operation check

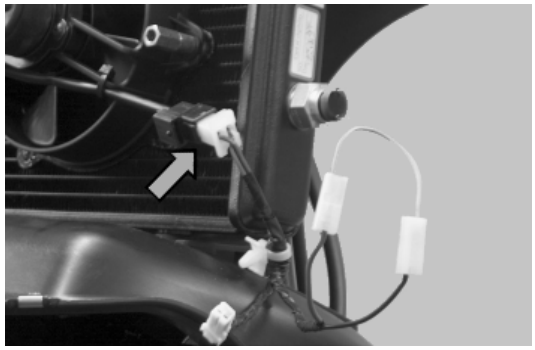
To carry out the electric fan operation check, proceed as follows:

- Remove the front shield.
- Disconnect the two electric terminals from the thermoswitch and connect them together.



If it does not work:

- Make sure the connector is properly inserted.



- Rotate the fan manually and check that the blades do not touch the support.

If the fan rotates freely:

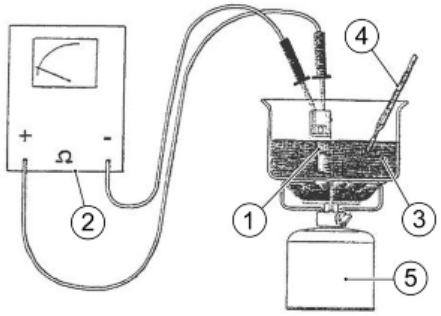
- Check the battery recharge system and the main fuse.

Thermoswitch operation check:

- Remove the front shield.
- Remove the thermoswitch «**1**».
- Connect a tester «**2**» (set as ohmmeter) to the thermoswitch «**1**» as shown in the figure.
- Immerse the thermoswitch in a container «**3**» with coolant.

In the same container, immerse a thermometer «**4**» with a temperature range of 0°÷150° (32° ÷302°F).

- Place the container on a stove «**5**» and warm up the coolant slowly.
- Check that the temperature indicated on the thermometer and the thermoswitch value indicated on the tester correspond to the data on the table.



COOLANT TEMPERATURE °C (°F) / RESISTANCE VALUES (OHM)

Specification	Desc./Quantity
Less than 90° (194°)	Unlimited
More than 90° (194°)	0

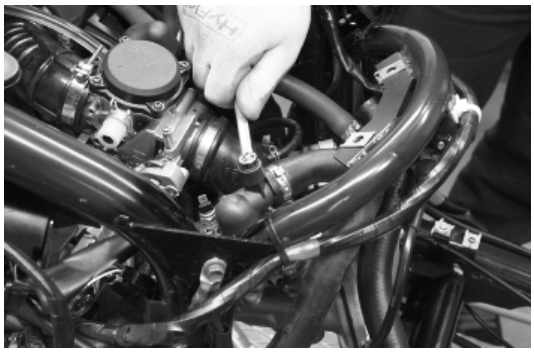
Coolant replacement

Emptying

- Remove the right side fairing.
- Remove the right lower spoiler.
- Unscrew and remove the expansion tank cap.
- Slide off the sleeve after loosening the clamp.
- Let the coolant drain into a container of adequate capacity.

Filling

- Connect the sleeve and fix it with the clamp.
- Open the bleed valve.
- Fill the coolant from the expansion tank.
- Once the coolant drains out of the bleed valve without air bubbles, close the screw, close the expansion tank, start the scooter and warm it up.



- Wait for the engine to cool down.
- Carry out the bleed operation again, inside the expansion tank, if the coolant has not reached the level indicated.
- Restore the level in the expansion tank.

Thermostat

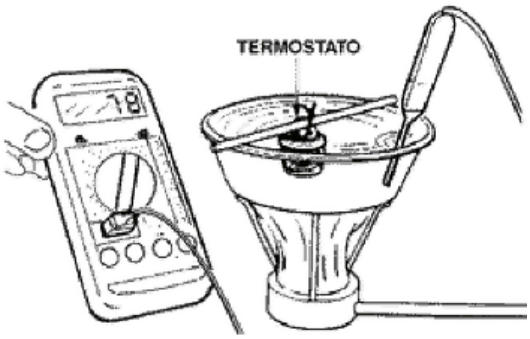
Removal

- Remove the helmet compartment.
- Remove the side spoiler.
- Empty the cooling circuit.
- Remove the thermostat cover.

- Slide the thermostat off the cover.

Check

- Visually check that the thermostat is not damaged.
- Prepare a metal container with approx. 1 litre of water.
- Immerse the thermostat, keeping it in the centre of the container.
- Immerse the multimeter temperature probe, near the thermostat.
- Warm up the container using the heat gun.
- Check the temperature when the thermostat starts to open:
- Warm up until the thermostat opens completely.
- Replace the thermostat if it does not work properly.



CAUTION

TO EXECUTE THE TEST CORRECTLY, MAKE SURE NEITHER THE THERMOSTAT NOR THE THERMOMETER TOUCHES THE CONTAINER.

Specific tooling

020331Y Digital multimeter

020151Y Air heater

Characteristic

Opening start temperature

85° ± 1.5°

Refitting

- Carry out removal operations in reverse order.
- Fill and bleed the cooling system.

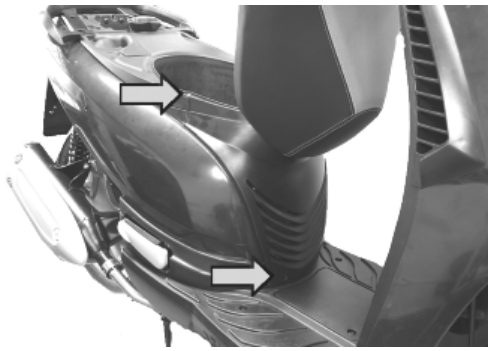
INDEX OF TOPICS

CHASSIS	CHAS

Seat

- Remove the cover by undoing the two screws.

- Operating on both sides, undo the four screws and remove the spark plug inspection cover pulling it upwards.

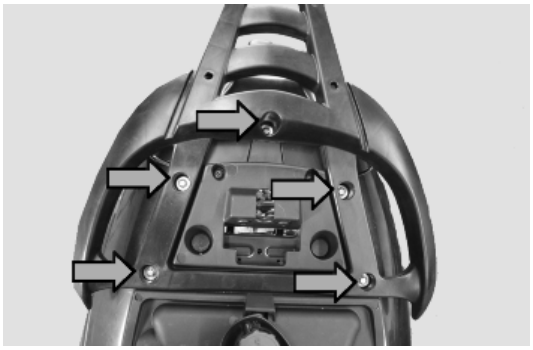


- With the saddle opened, remove the cotter pin.

- Take out the pin with a punch.

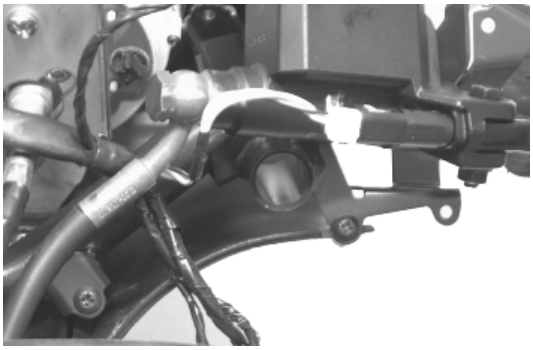
Rear rack

- Undo the five fixing screws.



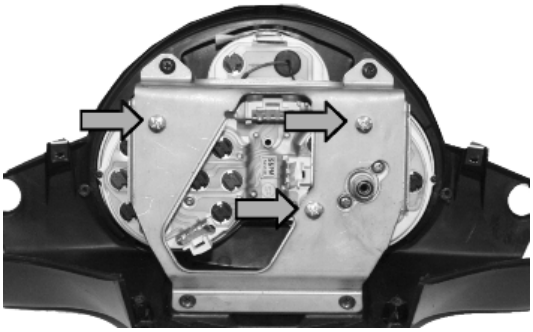
Rear handlebar cover

- Remove the front handlebar cover.
- Remove the rear-view mirrors.
- Remove the four frame fixing screws from both sides, as shown in the figure.



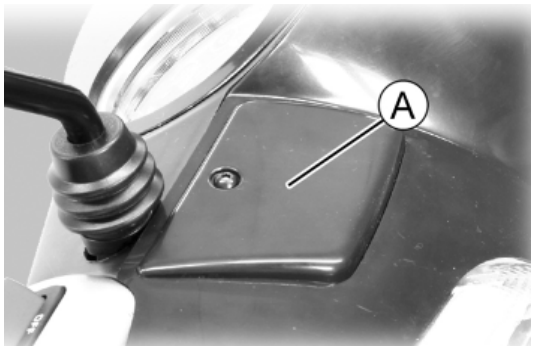
Instrument panel

- Remove the front handlebar cover.
- Disconnect the connectors.
- Remove the odometer cable.
- Remove the three screws shown in the figure.
- Remove the instrument panel

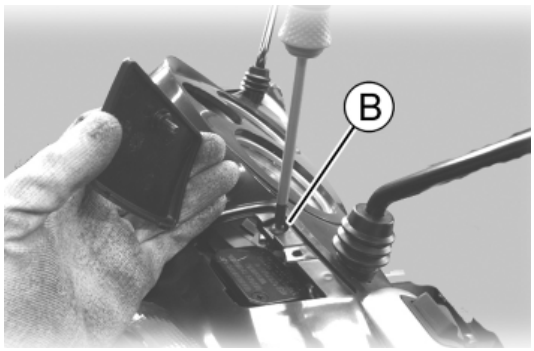


Front handlebar cover

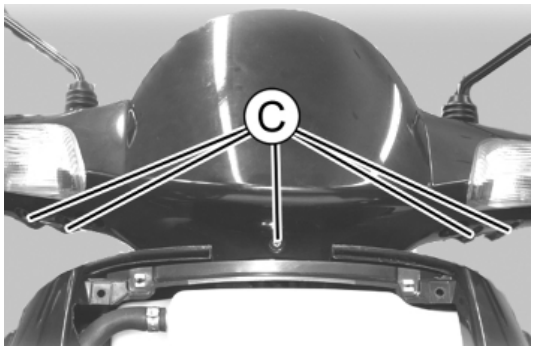
- Operating on both sides of the scooter, remove the two inspection covers of the brake calliper reservoir «**A**».



- Undo the two screws «**B**».



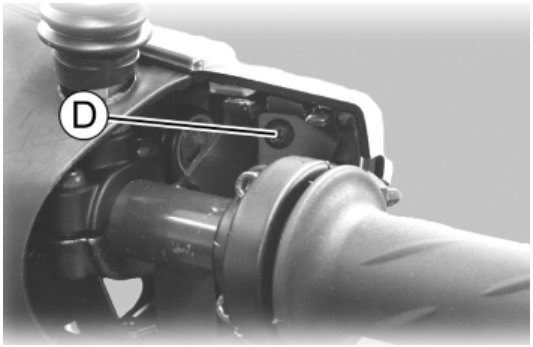
- Remove the five screws «**C**».



- Remove the right and left controls assembly.
- Undo the two screws «**D**» and remove the front handlebar cover.

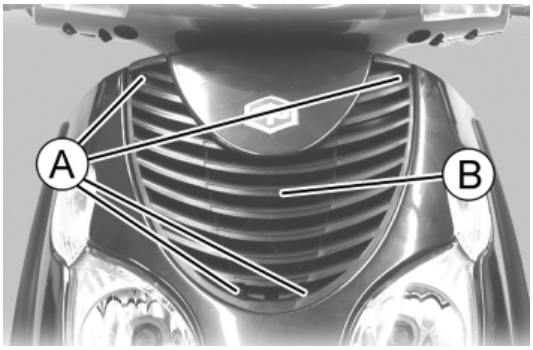
CAUTION

OPERATE VERY CAREFULLY TO AVOID DAMAGING THE PLASTIC PARTS

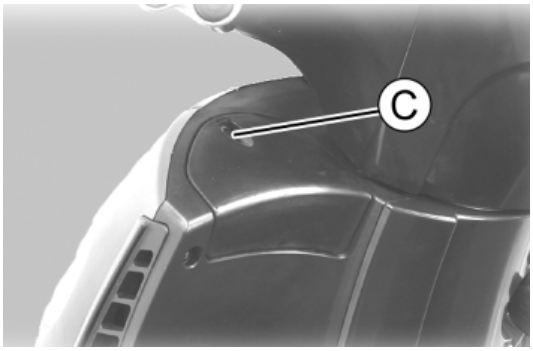


Headlight assy.

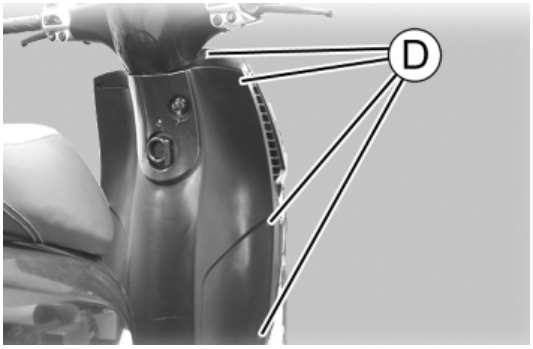
- Undo the four screws «**A**» and remove the front case «**B**».



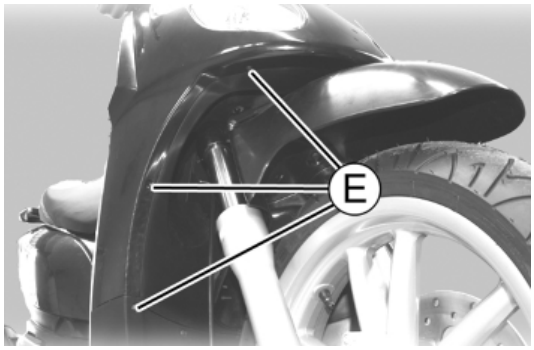
- Undo the screw «**C**» and remove the cover to reach the expansion tank cap.



- Operating on both sides of the scooter, undo the eight screws «**D**».



- Operating on both sides of the scooter, undo the six screws «**E**».



- Undo the two screws «**F**» connecting the headlight assembly to the turn indicators.

- Undo the six screws «**G**» connecting the headlight assembly to the legshield and remove the headlight assembly.

Legshield

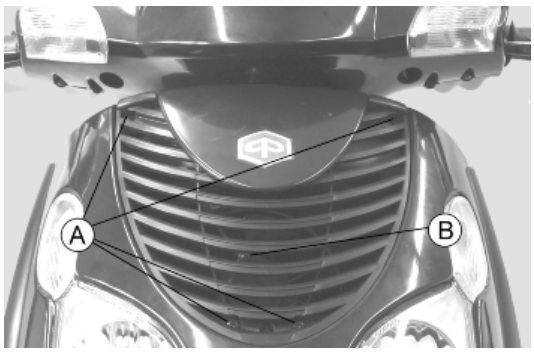
WARNING

CARRY OUT THESE OPERATIONS WHEN THE ENGINE IS COLD.

WARNING

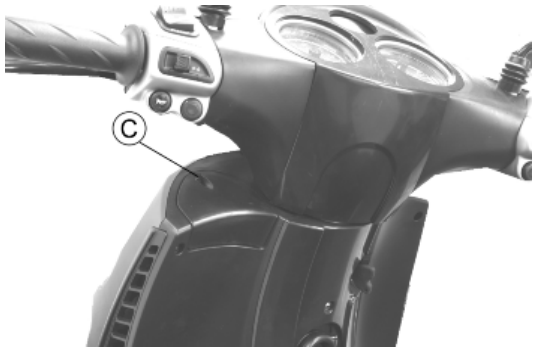
DETACH THE BATTERY POLES.

- Undo the four screws «**A**» and remove the radiator cover «**B**».

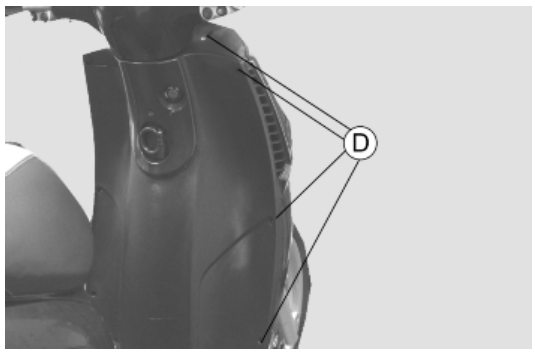


- Undo the screws fixing the legshield to the frame above the bag hook.

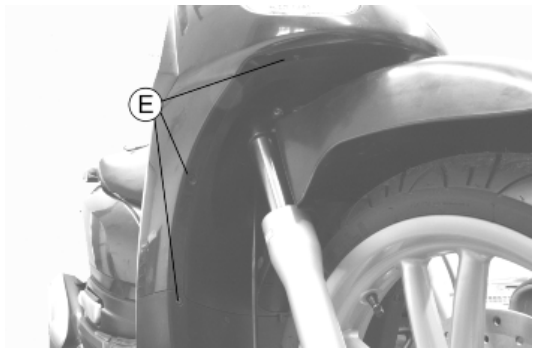
- Undo the screw «**C**» and remove the cover to reach the expansion tank cap.
- Unscrew the expansion tank cap.



- Operating on both sides of the scooter, undo the eight screws «**D**».



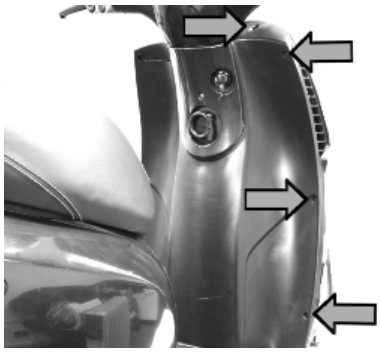
- Operating on both sides of the scooter, undo the six screws «**E**» and remove the legshield.



Knee-guard

- Remove the front handlebar cover.
- Remove the rear handlebar cover.
- Undo the screws of the cover of the expansion tank compartment and remove the cap.
- Undo the screw of the bag hook.

- Operating from both sides, undo the eight fixing screws.
- Slide off the shield back plate from the bottom.



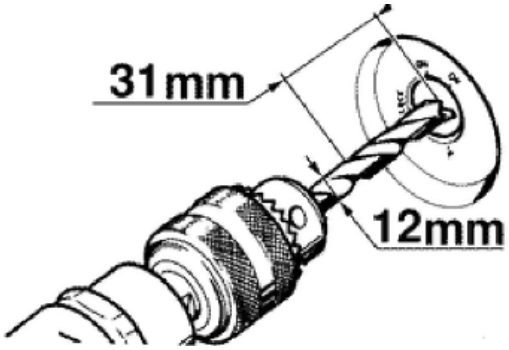
Removing the ignition key-switch when on *off*

- Remove the shield back plate.
- Detach the electrical wiring.
- Remove the ignition key switch, by removing the retaining spring as shown in the figure.

- Lightly push the master-cylinder and extract the lock from the notch shown in the figure.
- Hence extract the master-cylinder complete with the key-switch.
- To refit, proceed in the reverse order.

Removing the ignition key-switch when on *lock*

In position "Lock", it is not possible to access the cylinder retaining spring. The spring must then be removed as shown in the figure, allowing the lock spring to be pressed out.



N.B.

TO REFIT THIS ITEM, THE SCOOTER STEERING LOCK MUST BE RELEASED WITH THE LOCK BODY (INTERNAL AND EXTERNAL PART) IN POSITION "OFF". PROCEED AS DESCRIBED IN THE PREVIOUS PARAGRAPH.

See also

Removing the ignition key-switch when on *off*

Front wheel housing

- The front wheel housing is divided in two parts. Two different procedures must be carried out to remove it.

- Lower part:

- Remove the footrest.
- Remove the lower spoilers.
- Remove the four screws connecting the lower part to the legshield.

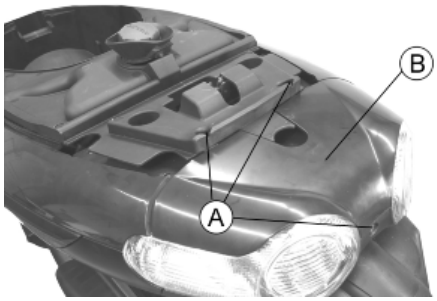
- Upper part:

- Remove the lower part.
- Remove the legshield.
- Remove the fork
- Remove the two screws fixing the upper part to the frame.

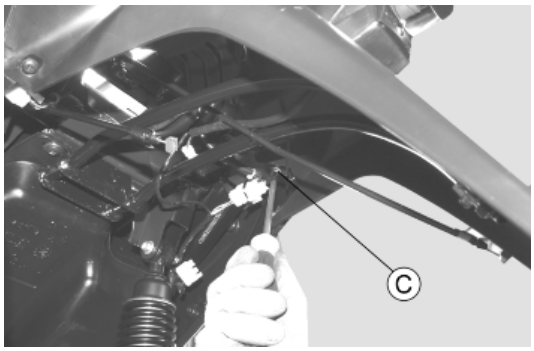
Taillight assy.

The rear light unit has two parts that can be removed separately. The operations described refer to one part but apply to both.

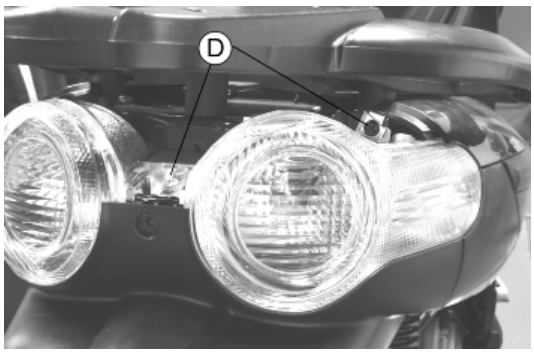
- Lift the saddle and remove the three screws «**A**» fixing the tail light fairing **B**».



- Operating on both sides, undo the screw inside the rear wheel housing «**C**» and disconnect the connector.

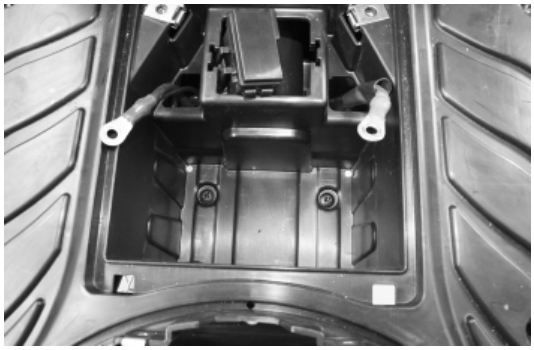


- Undo the two screws «**D**».



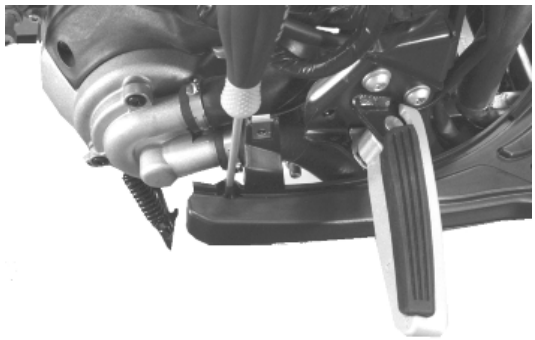
Footrest

- Remove the side fairings.
- Remove the shield back plate.
- Remove the cover and take out the battery.
- Remove the fuse box by pulling it upwards.
- Remove the battery lower support.
- Undo the two screws connecting the battery to the frame.



- Undo the four centre screws.

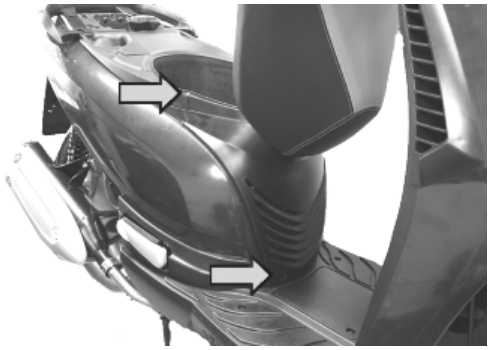
- Operating on both sides, undo the two screws on the lower part.
- Remove the footrest.



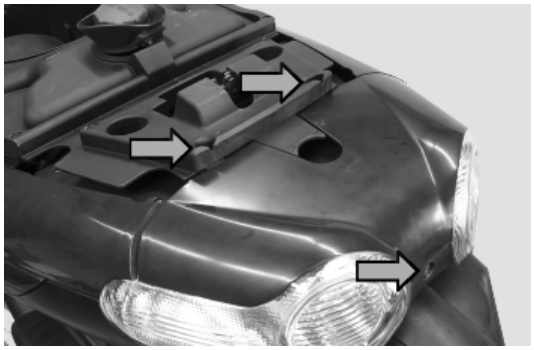
Side fairings

- Remove the cover by undoing the two screws.

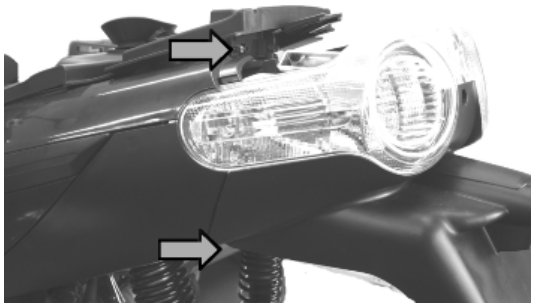
- Operating on both sides, undo the four screws and remove the spark plug inspection cover pulling it upwards.



- Remove the luggage rack.
- Remove the upper fairing of the rear light unit by undoing the three screws indicated.

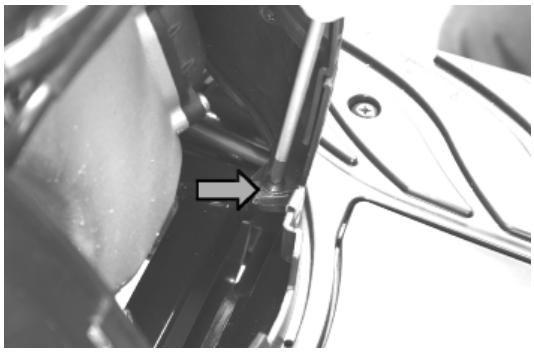


- Undo the two screws indicated.



- Unfold the passenger footrest and undo the two screws.

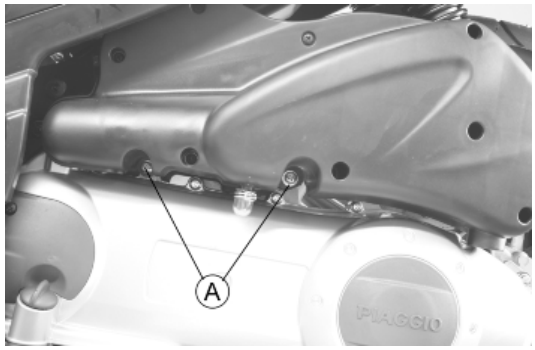
- Undo the screw indicated, inside the spark plug inspection compartment.



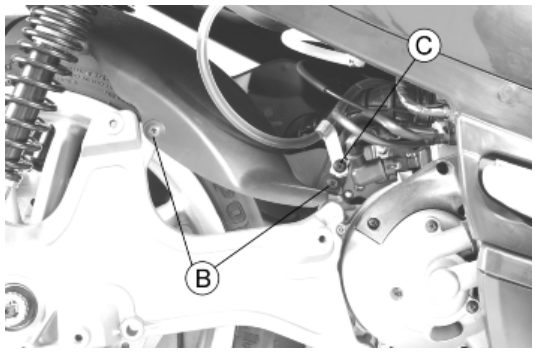
- Remove the side fairing.

Rear mudguard

- Undo the two screws « **A**» under the air filter.



- Undo the two screws «**B**» and the screw «**C**» supporting the fuel supply bracket.



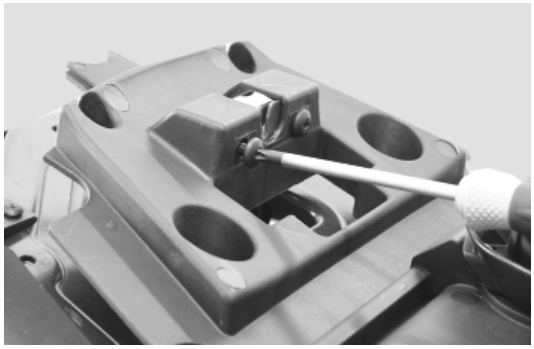
- Unscrew the shock absorber lower clamp and rotate the shock absorber towards the scooter rear part.
- Remove the mudguard.

Helmet bay

- Remove the side fairings.
- Remove the luggage rack.
- Remove the upper fairing of the rear light assembly.
- Operating on both sides, undo the screws indicated connecting the helmet compartment to the tank.

- Undo the screws fixing the helmet compartment to the frame.

- Undo the screws fixing the saddle lock.



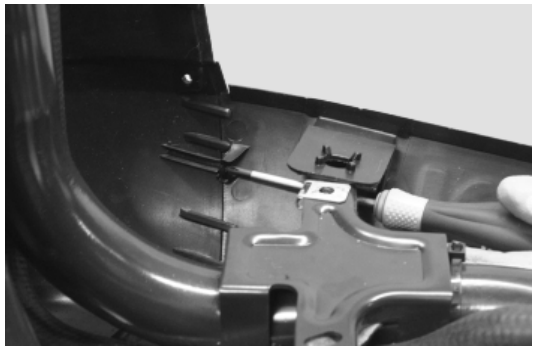
- Undo the fuel tank cap, remove the rubber fuel recovery tank and disconnect the bleed pipe.

- Remove the helmet compartment by pulling it upwards.

spoiler

- The lower spoiler is divided into two parts that can be removed separately. The operations described refer to one part but apply to both.
- Remove the footrest.
- Remove the lower centre screw and the external screw.

- Remove the external screw and the spoiler.



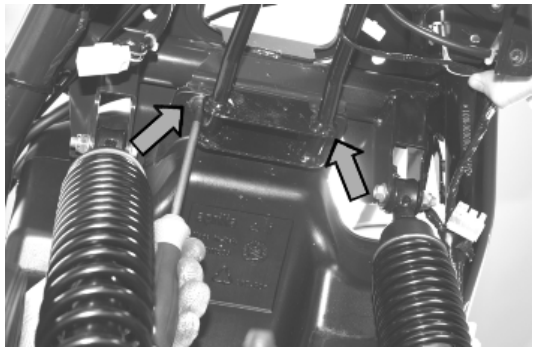
Fuel tank

- Remove the helmet compartment.

N.B.

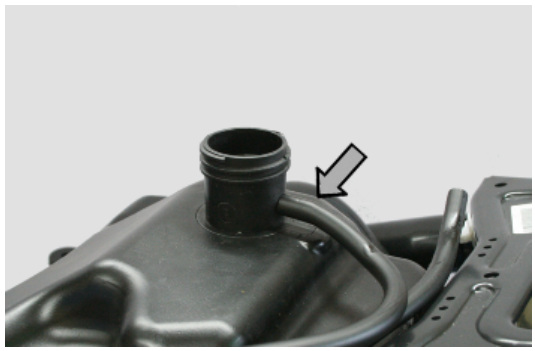
THIS OPERATION SHOULD PREFERABLY BE PERFORMED WITH THE TANK EMPTY.

- Undo the two screws, on the rear wheel housing, connecting the tank to the frame and collect the washer.



- Disconnect the connector of the probe checking fuel level.

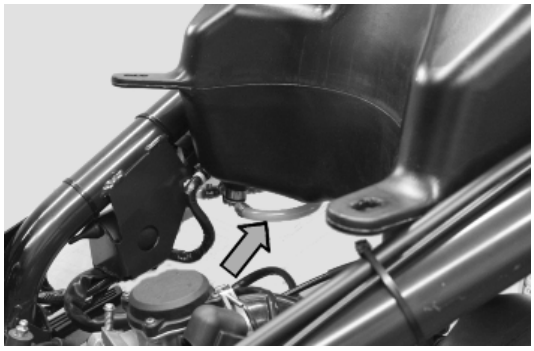
- Disconnect the overflow pipe.



- Disconnect the fuel hose.

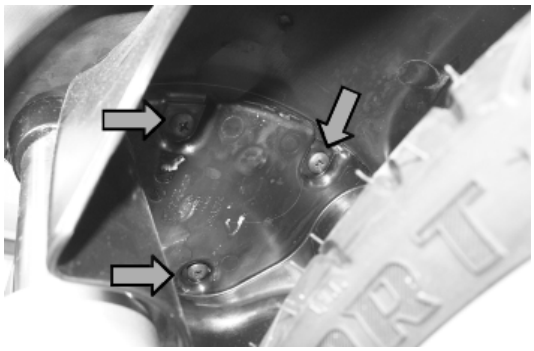
N.B.

THIS OPERATION SHOULD PREFERABLY BE PERFORMED WITH THE TANK EMPTY.



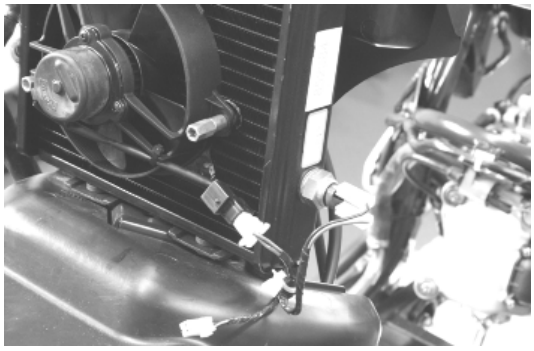
Front mudguard

- Undo the three screws fixing the front mudguard to the fork plate inside the mudguard.
- Remove the mudguard.

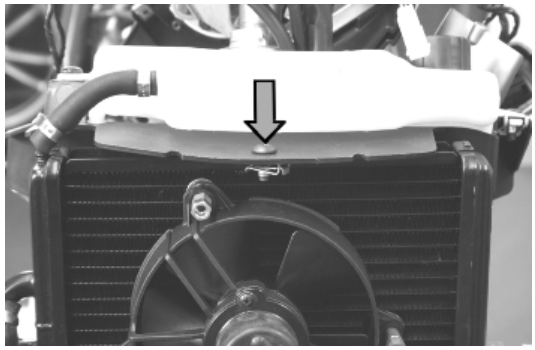


Radiator fan

- Remove the shield back plate.
- Remove the radiator cover and disconnect the headlight assembly connectors.
- Remove the legshield.
- Prepare a container to collect the coolant.
- Disconnect the delivery and return hoses of the expansion tank.
- Disconnect the delivery and return hoses from the radiator.
- Disconnect the connectors of the water temperature sensor and the electric fan.



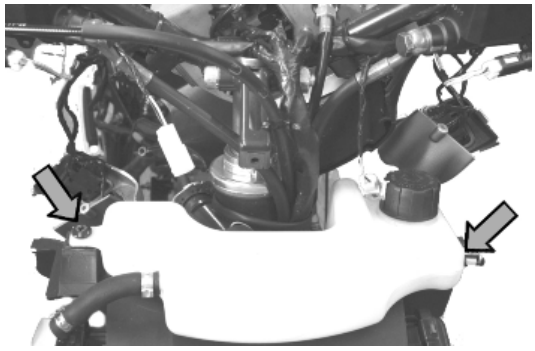
- Undo the screw fixing the radiator to the frame.



- Detach the radiator and the electric fan.
- Once refitted, bleed the cooling system.

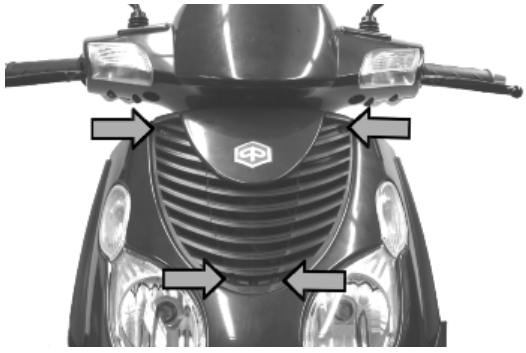
Expansion tank

- Remove the shield back plate.
- Remove the radiator cover and disconnect the headlight assembly connectors.
- Remove the legshield.
- Prepare a container to collect the coolant.
- Disconnect the delivery and return hoses of the expansion tank.
- Undo the two screws and remove the expansion tank.



Radiator cover

- Undo the four screws indicated.



INDEX OF TOPICS

PRE-DELIVERY	PRE DE

Carry out the listed tests before delivering the vehicle.

Warning- be very careful when handling fuel.

Aesthetic inspection

Appearance check:

- Paintwork
- Fitting of plastics
- Scratches
- Dirt

Tightening torques inspection

Lock check

- Safety locks
- clamping screws

Safety locks

Rear shock absorber upper fixing
Rear shock absorber lower fixing
Front wheel axle nut
Wheel hub nut
Frame - swinging arm bolt *
Swinging arm bolt - Engine
Engine arm pin - Frame arm
Handlebar lock nut
Steering lower ring nut
Upper steering ring nut

Electrical system

Electrical system:

- Main switch
- Headlamps: high beam, low beam, position and parking lights and the respective warning lights
- Adjusting the headlights according to the regulations currently in force
- Rear light, parking light, stop light
- Front and rear stop light switches
- Turn indicators and their warning lights
- Instrument panel lights
- Instrument panel: fuel and temperature indicator
- Instrument panel warning lights

- Horn
- Starter

CAUTION

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

WARNING

BEFORE RECHARGING THE BATTERY, REMOVE THE CAPS OF EACH CELL.
KEEP THE BATTERY AWAY FROM NAKED FLAMES OR SPARKS WHILE IT IS CHARGED.
REMOVE THE BATTERY FROM THE SCOOTER, DISCONNECTING THE NEGATIVE TERMINAL FIRST.

CAUTION

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 VEGETABLE OIL. SEEK IMMEDIATE MEDICAL ATTENTION.
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.
KEEP OUT OF THE REACH OF CHILDREN

CAUTION

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

Levels check

Level check:

- Hydraulic braking system fluid level.
- Rear hub oil level
- Engine coolant level.

Road test

Test ride

- Cold start
- Instrument operations
- Response to the throttle control
- Stability on acceleration and braking
- Rear and front brake efficiency
- Rear and front suspension efficiency

- Abnormal noise

Static test

Static control after the test ride:

- Starting when warm
- Starter operation
- Minimum hold (turning the handlebar)
- Uniform turning of the steering
- Possible leaks

CAUTION

CHECK AND ADJUST TYRE PRESSURE WITH TYRES AT AMBIENT TEMPERATURE.

CAUTION

NEVER EXCEED THE RECOMMENDED INFLATION PRESSURES OR TYRES MAY BURST.

Functional inspection

Functional check up:

Braking system (hydraulic)

- Lever travel

Braking system (mechanical)

- Lever travel

Clutch

- Proper functioning check

Engine

- Throttle travel check

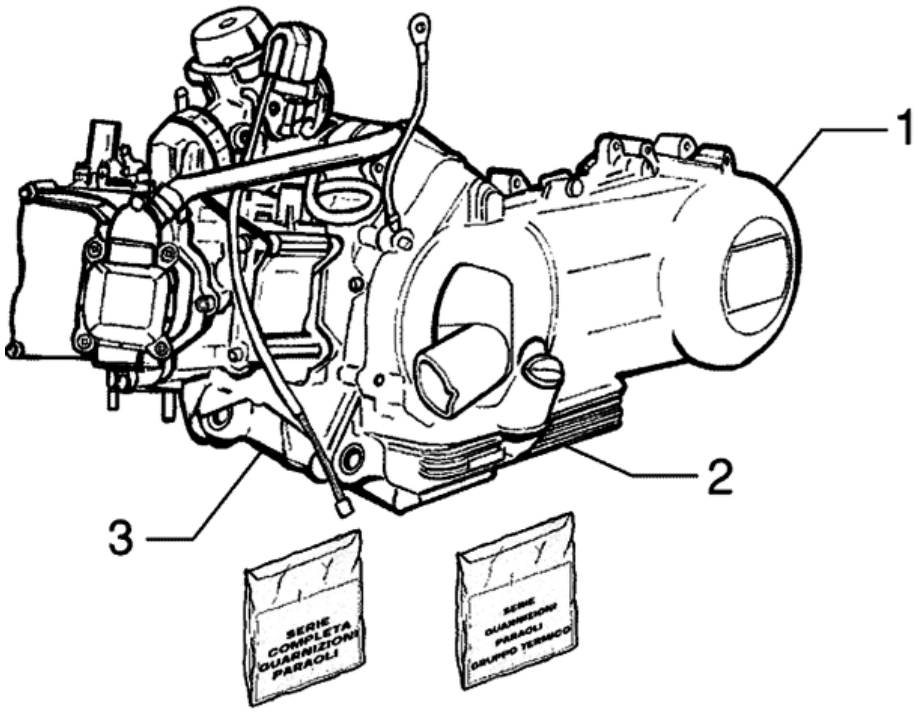
Others

- Check documentation
- Check the frame and engine numbers
- Tool kit
- License plate fitting
- Check locks
- Check tyre pressures
- Installation of mirrors and any accessories

INDEX OF TOPICS

TIME TIME

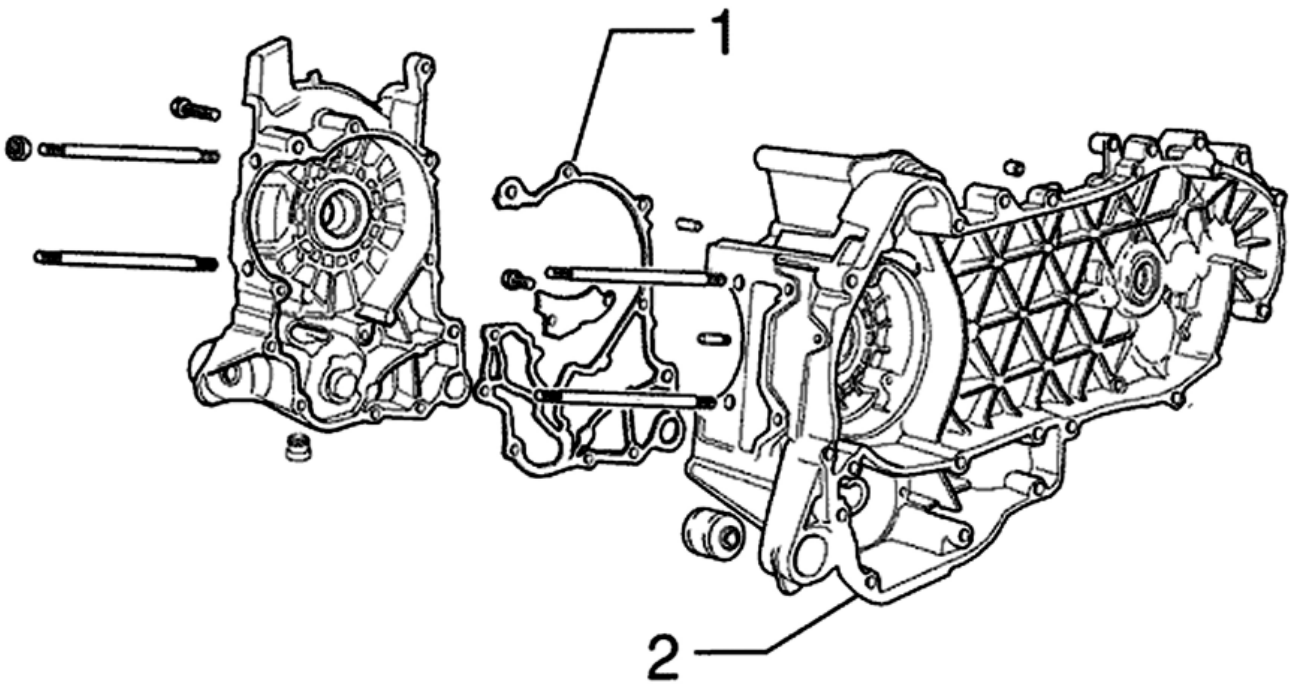
Engine



ENGINE

	Code	Action	Duration
1	001001	Engine from frame - Removal and re-fit.	
2	003064	Engine oil - Change	
3	003057	Engine retainer - Tighten nuts	

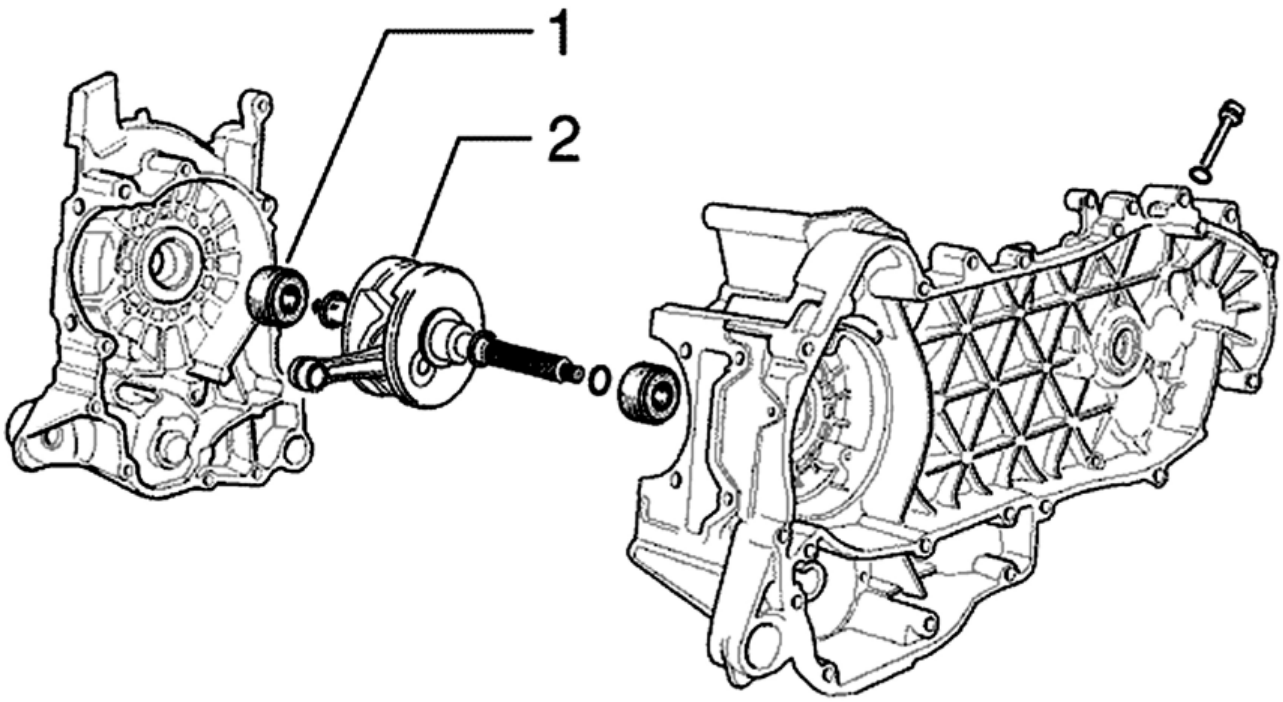
Crankcase



CRANKCASE

	Code	Action	Duration
1	001153	Crankcase halves gasket - Replacement	
2	001133	Engine crankcase - Replacement	

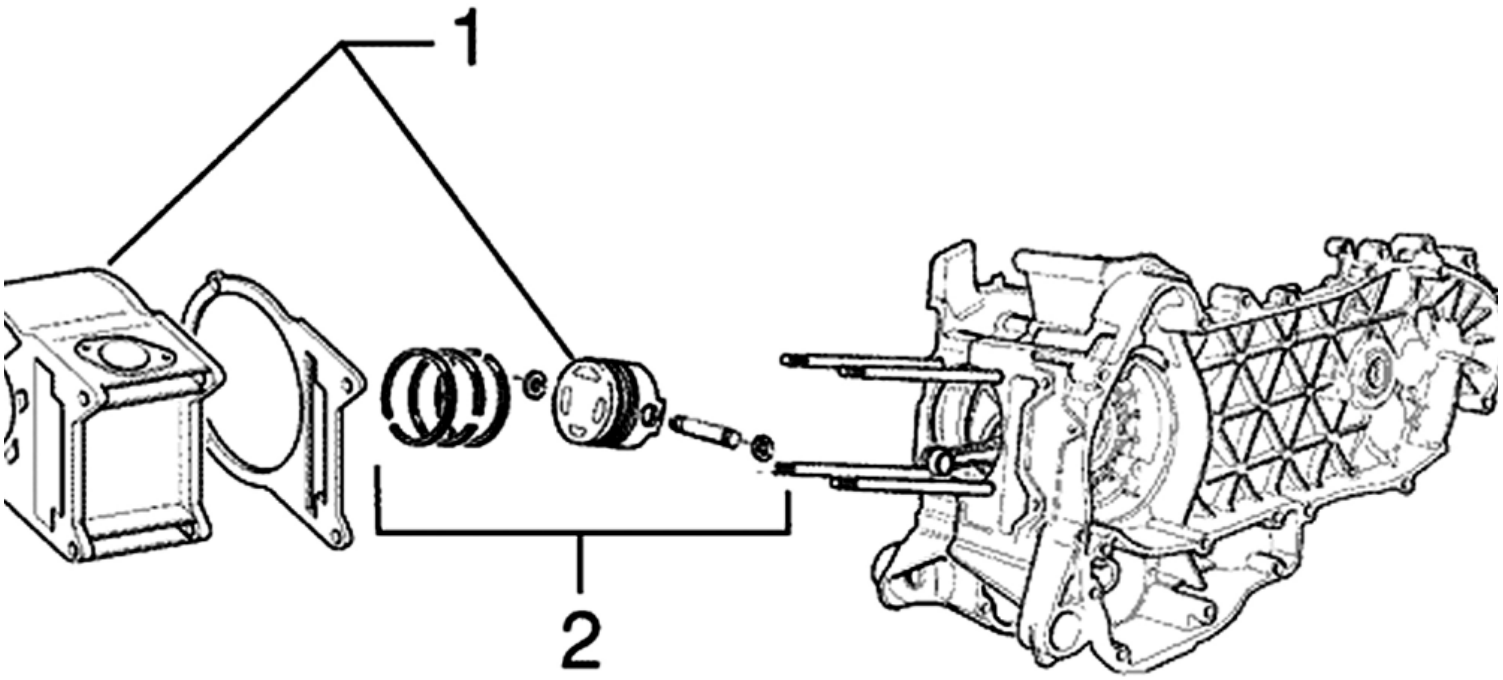
Crankshaft



CRANKSHAFT

	Code	Action	Duration
1	001099	Oil seal, flywheel side - Replacement	
2	001117	Crankshaft - Replacement	

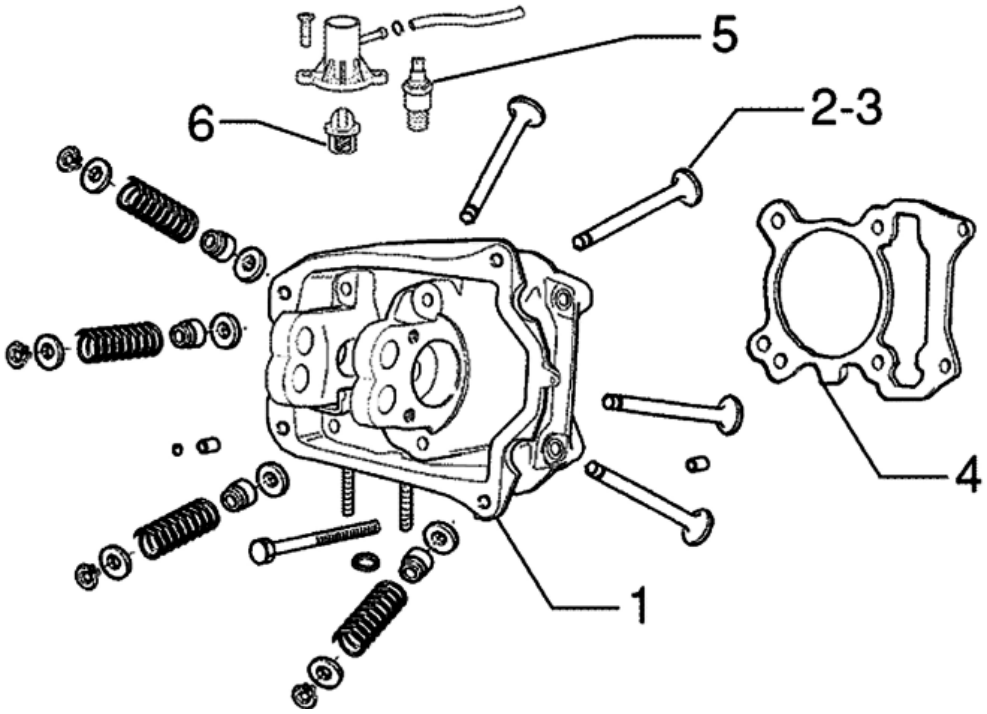
Cylinder assy.



CYLINDER- PISTON

	Code	Action	Duration
1	001002	Cylinder-Piston - Replacement	
2	001154	Pin ring piston unit - Service	

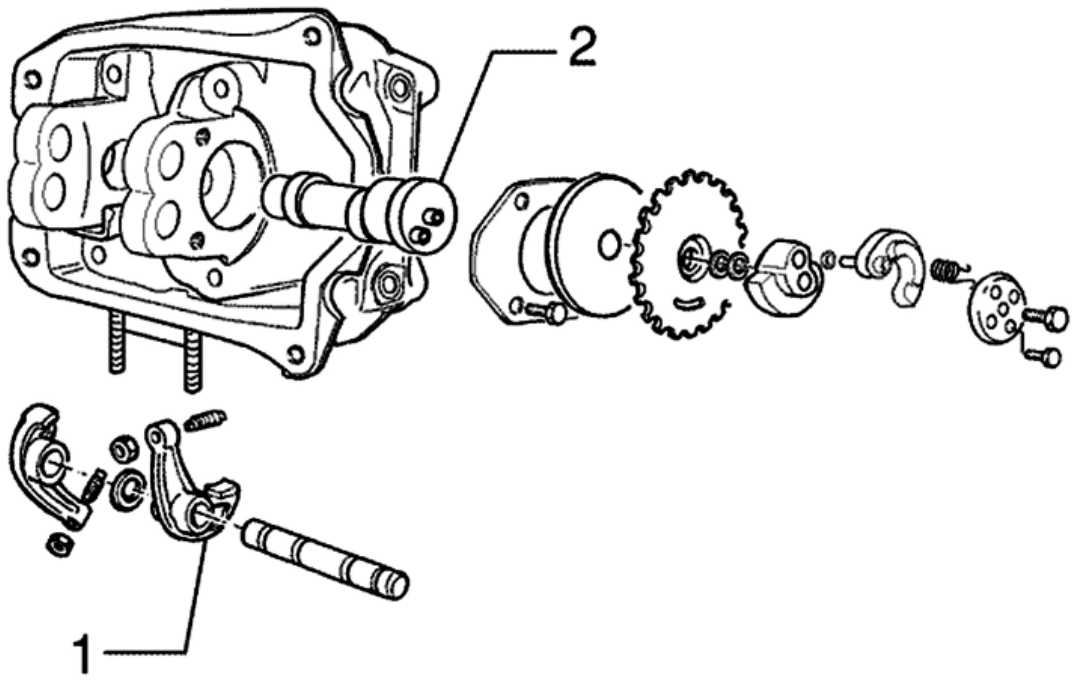
Cylinder head assy.



VALVE HEAD

	Code	Action	Duration
1	001126	Head - Replacement	
2	001045	Valves - Replacement	
3	001049	Valves - Adjustment	
4	001056	Head gasket - Replacement	
5	001083	Thermistor - Replacement	
6	001057	Thermostat - Replacement	

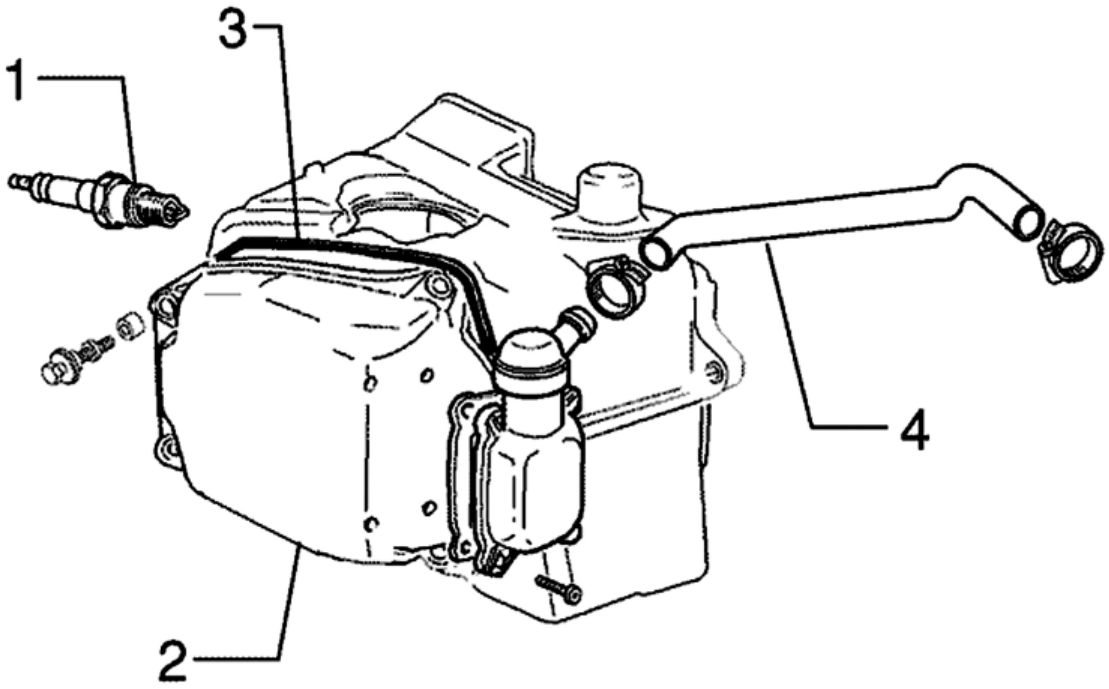
Rocker arms support assy.



CAMSHAFT - ROCKING LEVERS

	Code	Action	Duration
1	001148	Valve rocking levers - Replacement	
2	001044	Camshaft - Replacement	

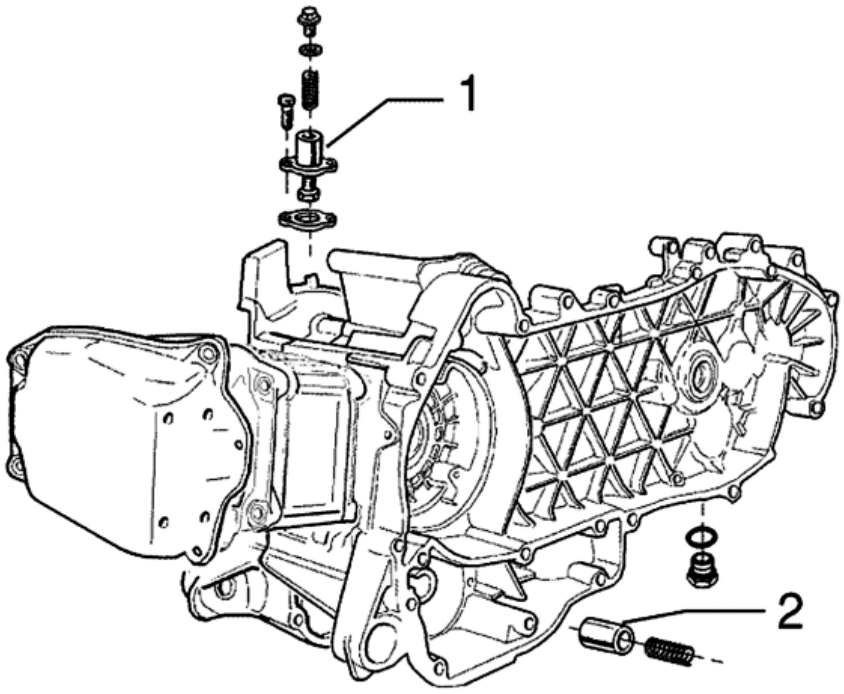
Cylinder head cover



HEAD COVER

	Code	Action	Duration
1	001093	Spark plug - Replacement	
2	001089	Head cover - Replacement	
3	001088	Head cover gasket - Replacement	
4	001074	Oil vapour recovery pipe - Replacement	

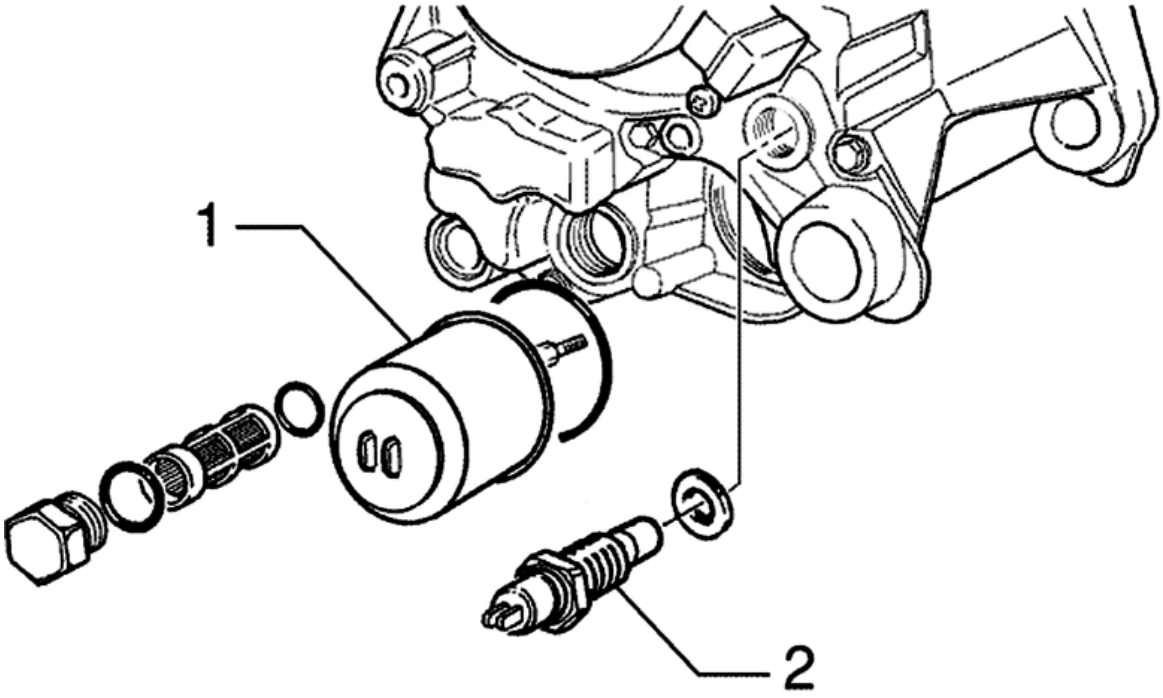
Chain tensioner



CHAIN TIGHTENER

	Code	Action	Duration
1	001129	Chain tensioner - Service and Replacement	
2	001124	By pass lubrication - Replacement	

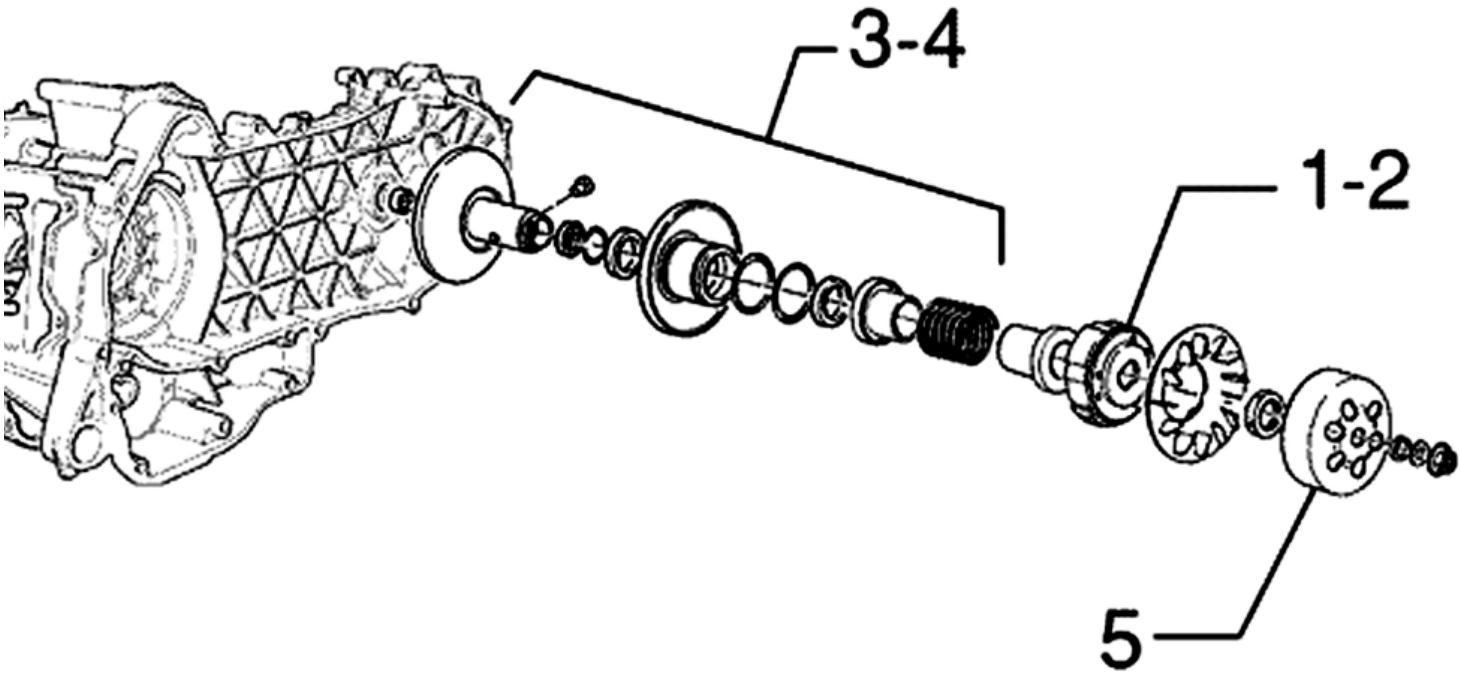
Oil filter



OIL FILTER

	Code	Action	Duration
1	001123	Oil filter - Replacement	
2	001160	Oil pressure sensor - Replacement	

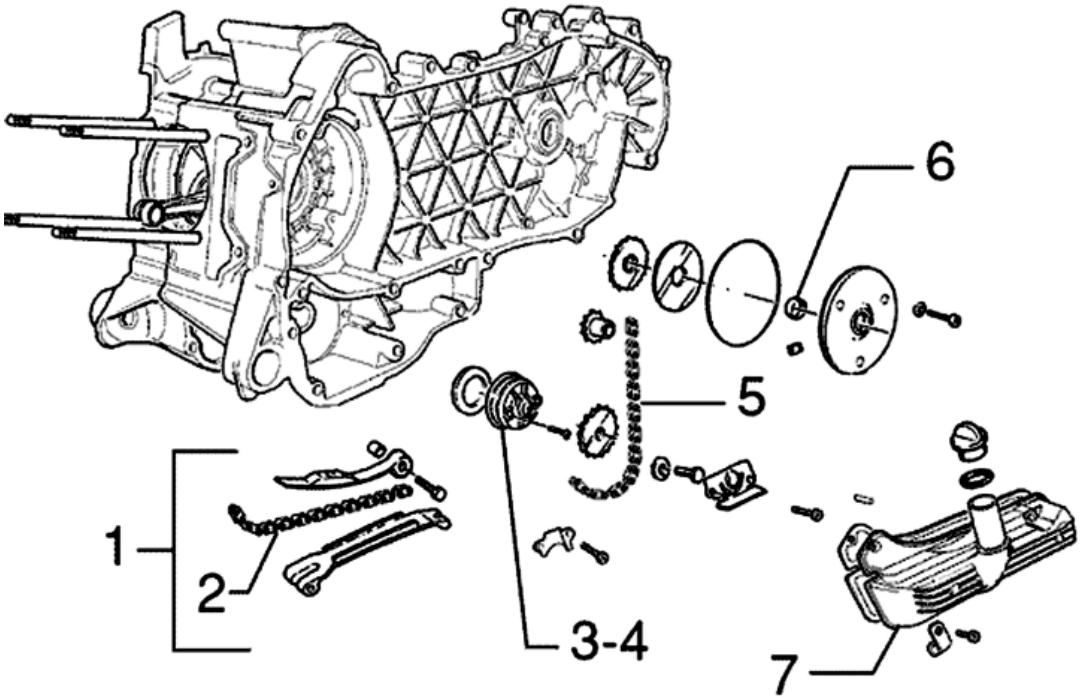
Driven pulley



DRIVEN PULLEY

	Code	Action	Duration
1	001022	Clutch - Replacement	
2	003072	Clutch unit - Wear check	
3	001012	Driven pulley - Service	
4	001110	Driven pulley - Replacement	
5	001155	Clutch bell housing - Replacement	

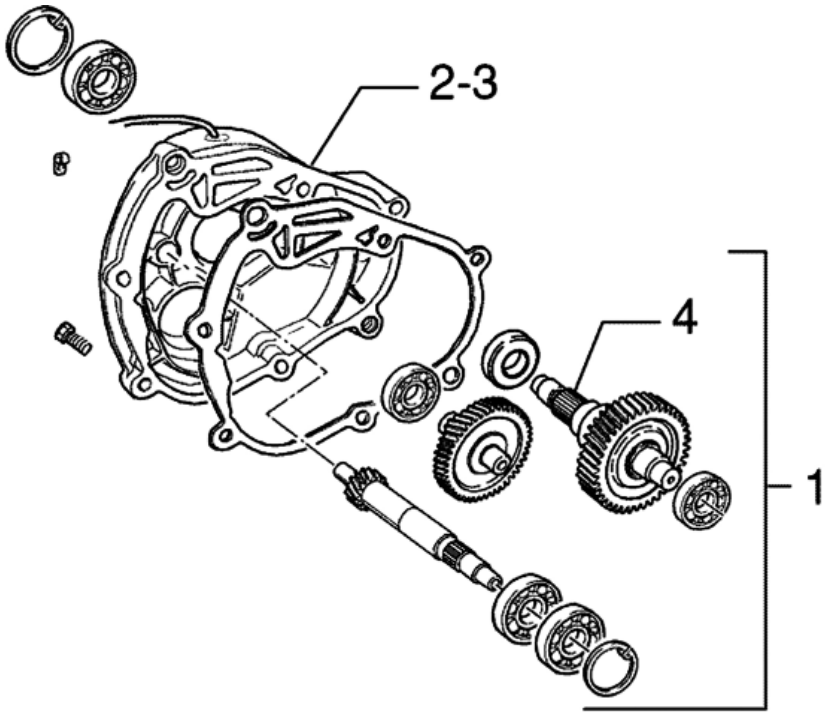
Oil pump



PUMP - OIL SUMP UNIT

	Code	Action	Duration
1	001125	Chain guide pads - Replacement	
2	001051	Belt/ Timing chain - Replacement	
3	001042	Oil pump - Service	
4	001112	Oil pump - Replacement	
5	001122	Oil pump chain - Replacement	
6	001121	Chain cover oil seal - Replacement	
7	001130	Oil sump - Replacement	

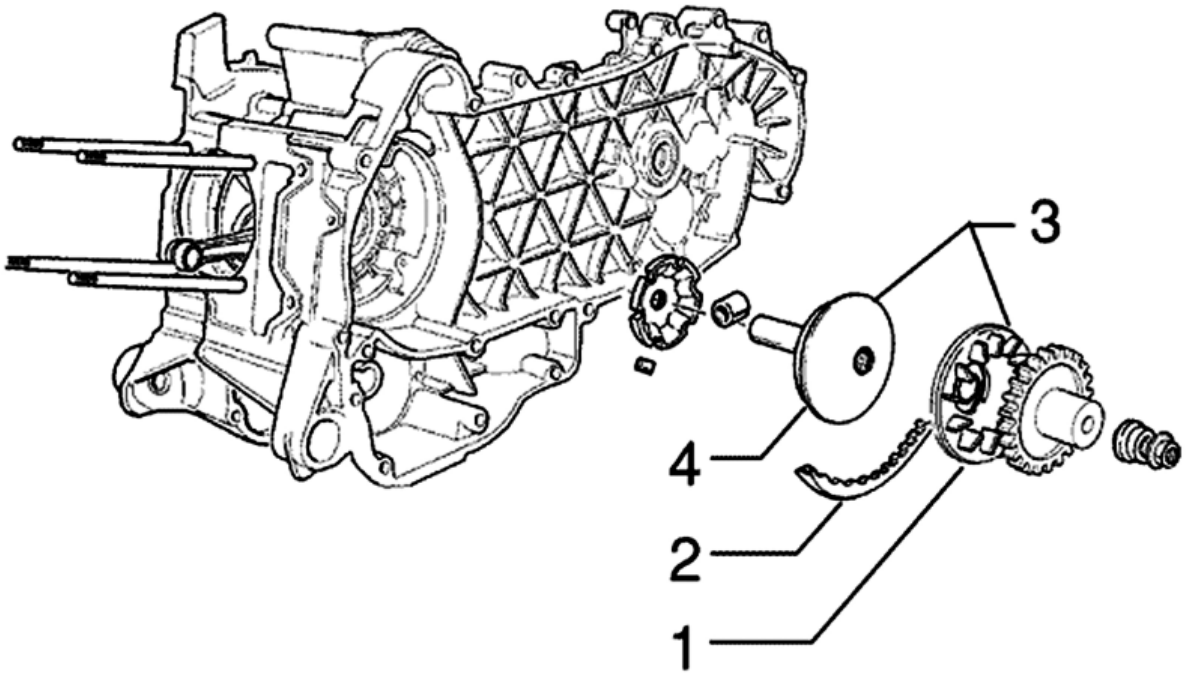
Final gear assy.



FINAL DRIVE

	Code	Action	Duration
1	001010	Gear reduction unit - Inspection	
2	001156	Gear reduction unit cover - Replacement	
3	003065	Gear box oil - Replacement	
4	004125	Rear wheel axle - Replacement	

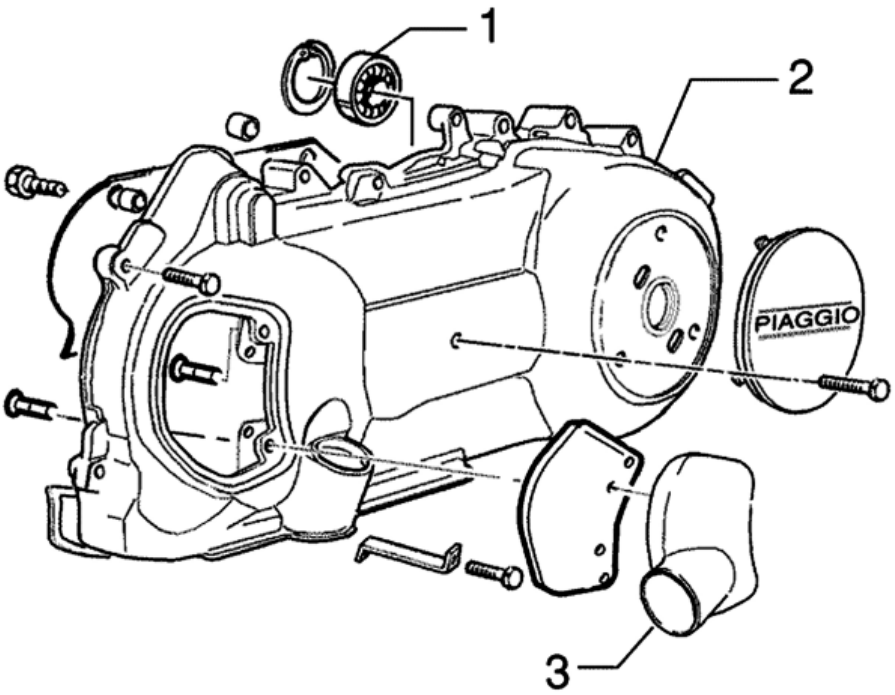
Driving pulley



REAR-VIEW **PULLEY**

	Code	Action	Duration
1	001086	rear-view half-pulley - Replacement	
2	001011	Driving belt - Replacement	
3	001066	Driving pulley - Removal and Refitting	
4	001006	driving pulley - Service	

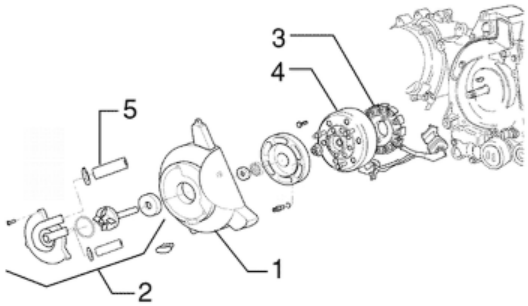
Transmission cover



TRANSMISSION COVER

	Code	Action	Duration
1	001135	Transmission cover bearing - Replacement	
2	001096	Transmission crankcase cover - replace	
3	001131	Transmission air intake - Replacement	

Flywheel magneto

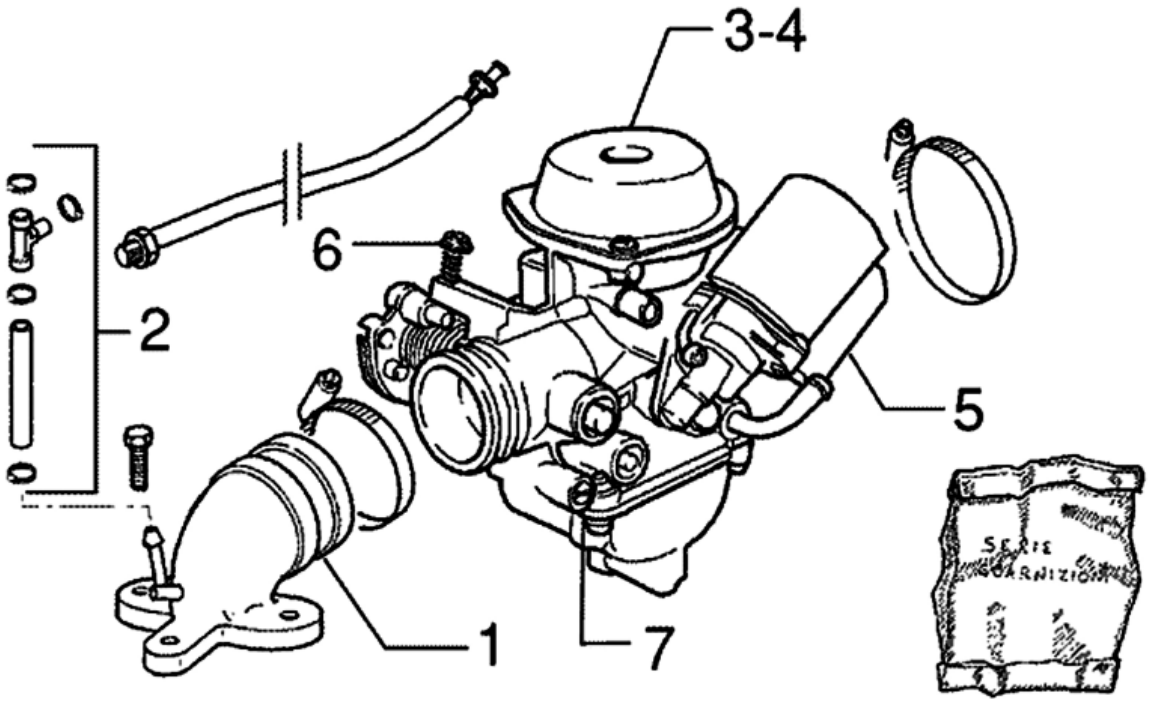


MAGNETO FLYWHEEL AND SECONDARY AIR

	Code	Action	Duration
1	001087	Flywheel cover - Replacement	
2	001113	Water pump - Replacement	
3	001058	Flywheel - Replacement	
4	001173	Rotor - Replacement	
5	001067	Stator - Replacement	

	Code	Action	Duration
6	001161	Secondary air filters - Replacement / Cleaning	
7	001162	Secondary air housing - Replacement	
8	001174	SAS valve - Replacement	
9	001163	SAS valve / Head connection - Replacement	

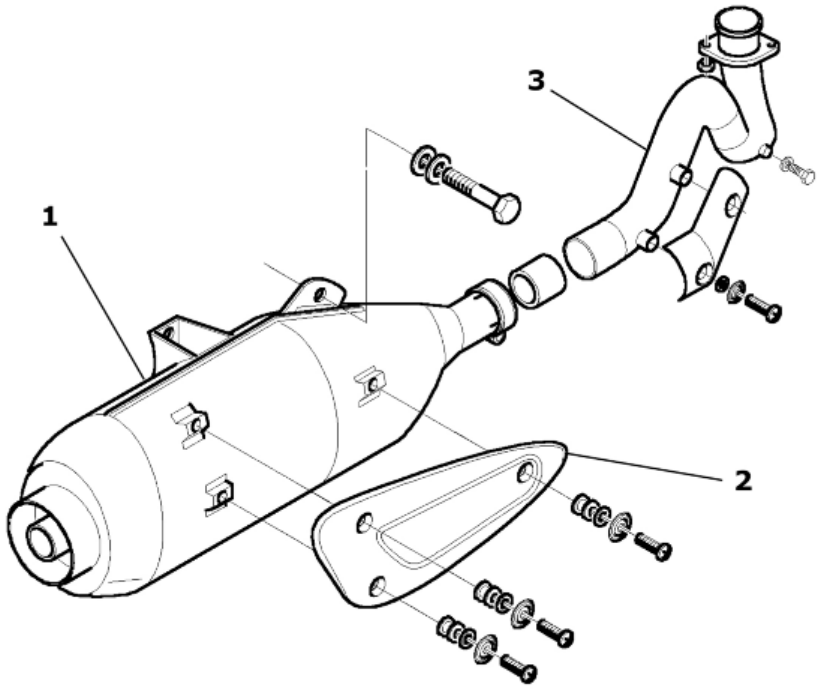
Carburettor



CARBURETTOR

	Code	Action	Duration
1	001013	Intake manifold - Replacement	
2	007020	Carburettor heat. pipes - Replacement	
3	001008	Carburettor - Inspection	
4	001063	Carburettor - Replacement	
5	001081	Automatic choke - Replacement	
6	003058	Carburettor - Adjustment	
7	001136	Exhaust emissions - Adjustment	

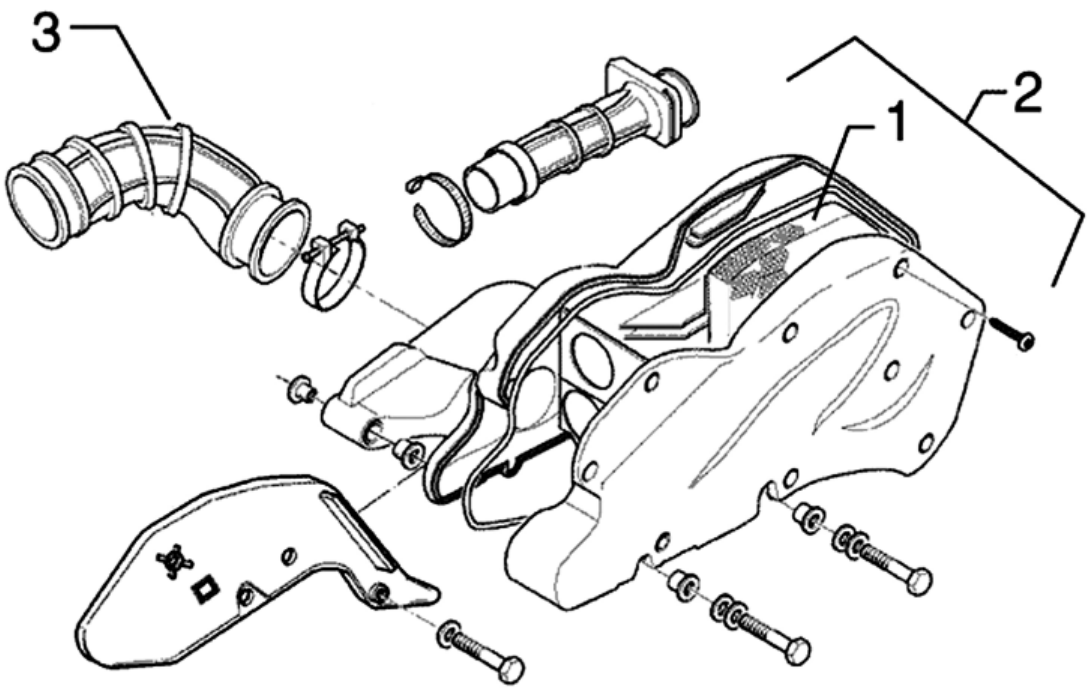
Exhaust pipe



MUFFLER

	Code	Action	Duration
1	001009	Muffler - Replacement	
2	001095	Muffler guard - Replacement	
3	001092	Exhaust manifold - Replacement	

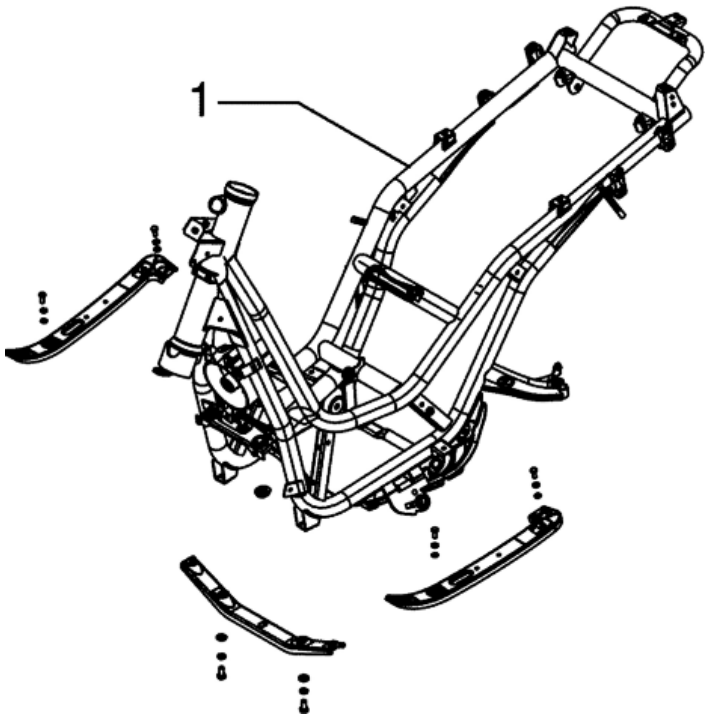
Air cleaner



AIR CLEANER

	Code	Action	Duration
1	001014	Air filter - Replacement/Cleaning	
2	001015	Air filter box - Replacement	
3	004122	Carburettor air cleaner attachment - Replacement	

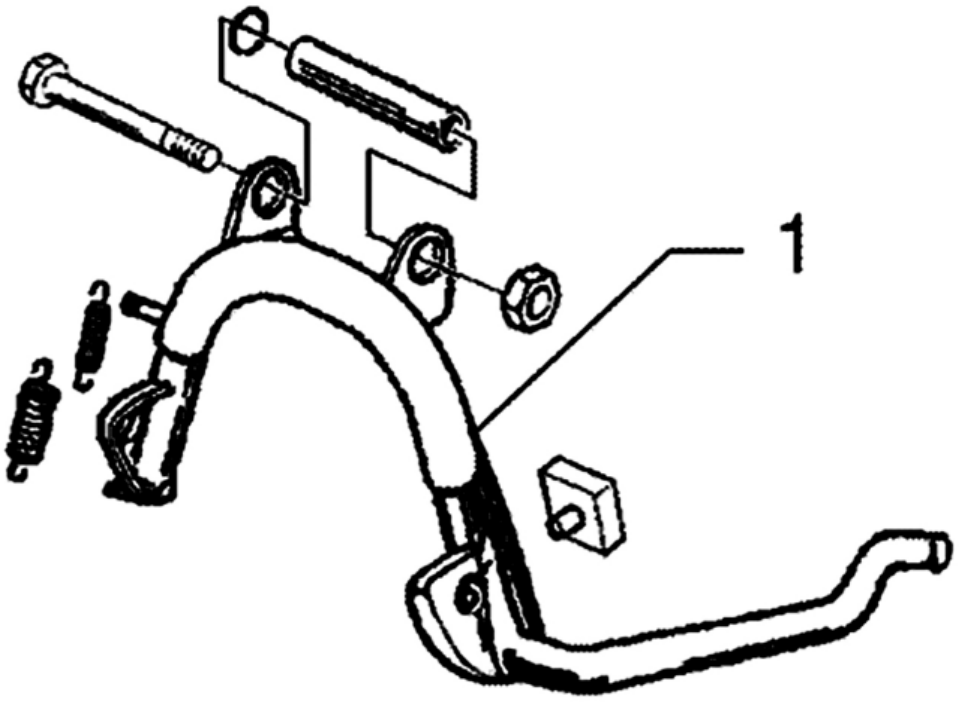
Frame



CHASSIS

	Code	Action	Duration
1	004001	Chassis - Replacement	

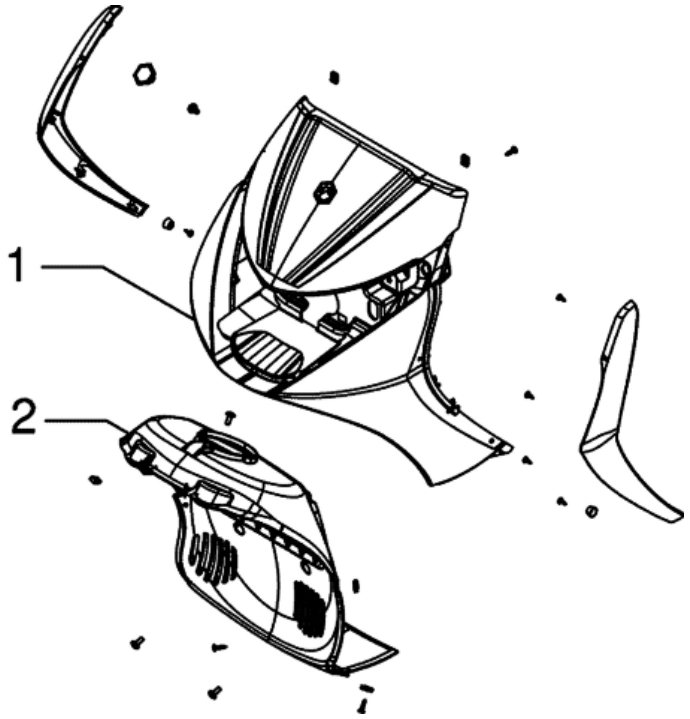
Centre-stand



CENTRE AND SIDE STANDS

	Code	Action	Duration
1	004004	Stand - Replacement	

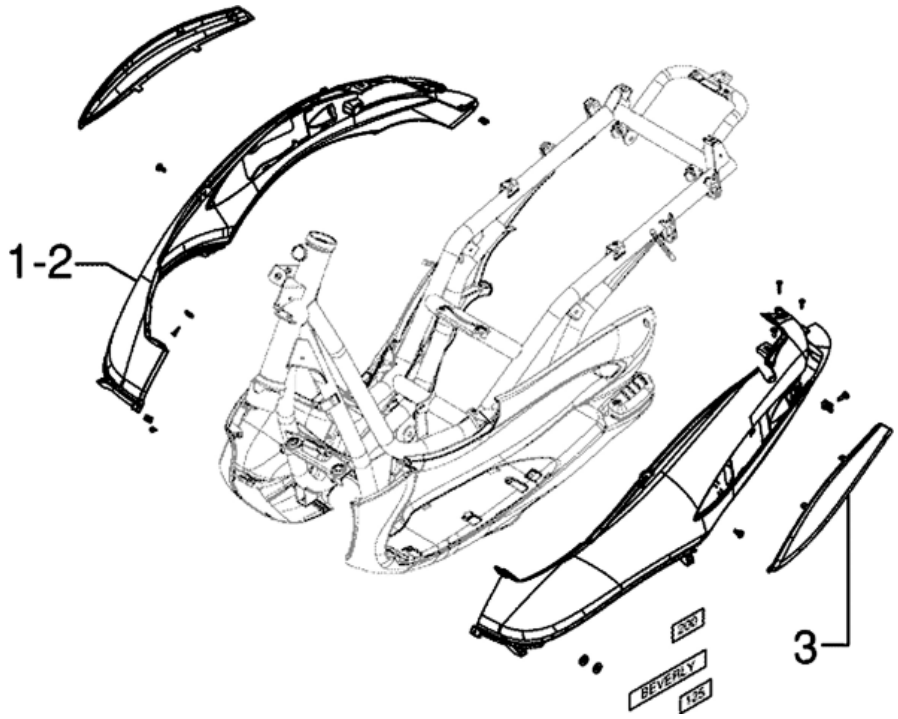
Legshield spoiler



LEGSHIELD - SPOILER

	Code	Action	Duration
1	004064	Legshield - Replacement	
2	004053	Spoiler - Replacement	

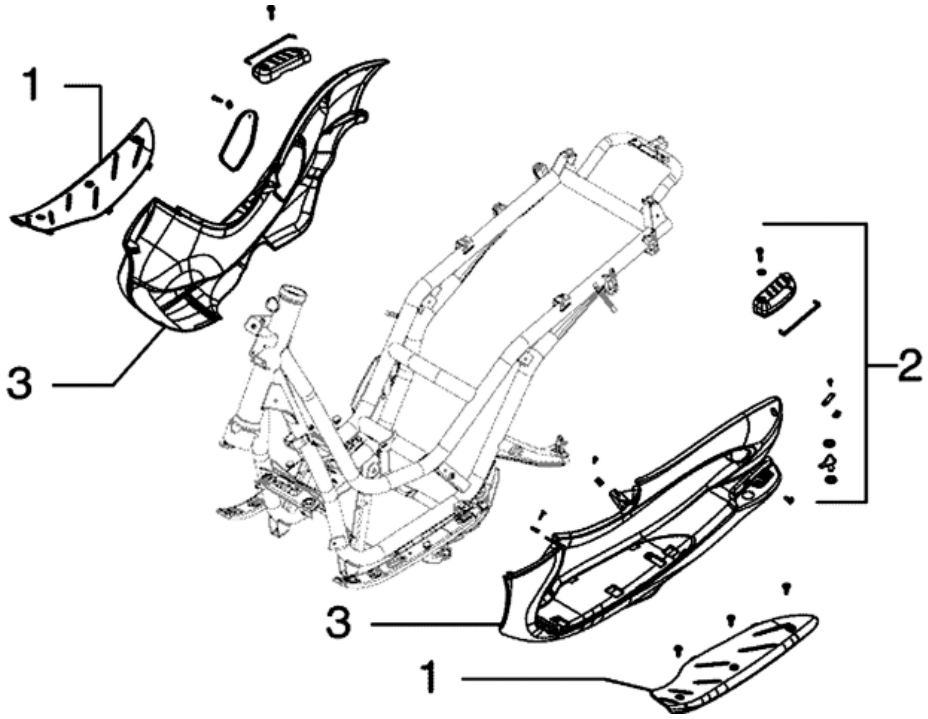
Side fairings



SIDE COVERS

	Code	Action	Duration
1	004085	Fairing (1) - Replacement	
2	004012	Rear side panels - Replacement	
3	004052	Bumper - Replacement	

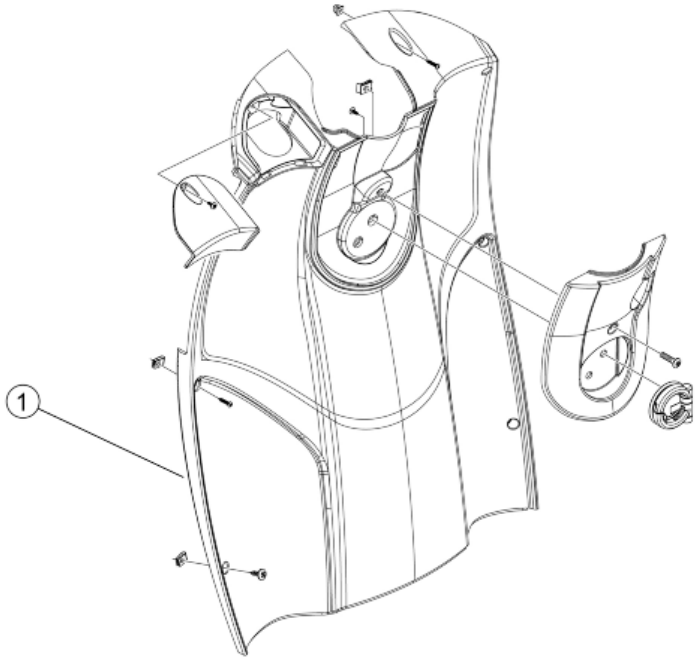
Footrests



MATS AND COVERS

	Code	Action	Duration
1	004075	Front mat - Replacement	
2	004079	Passenger footrest (1) - Replacement	
3	004015	Footrests - Remov. and Refit.	

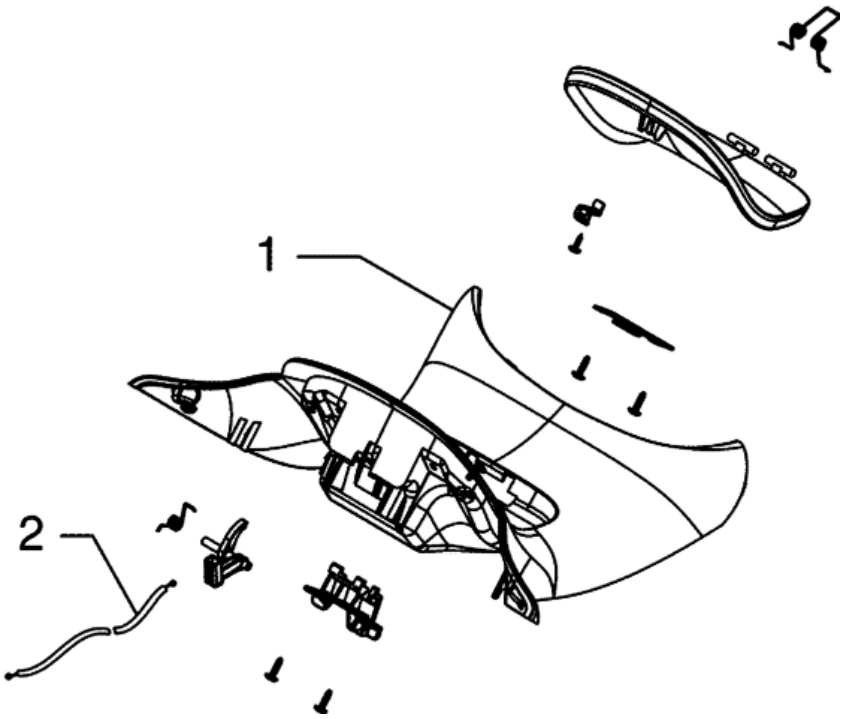
Rear cover



REAR SHIELD

	Code	Action	Duration
1	004065	Legshield rear section - Remov. and Refit.	

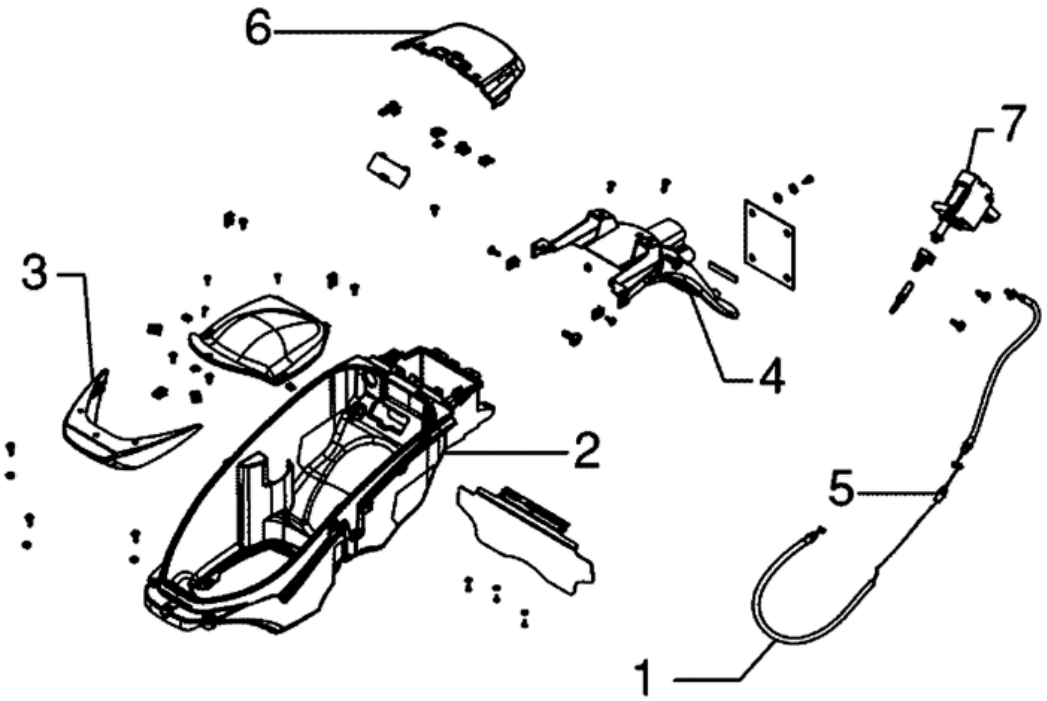
Central cover



CENTRAL COVER

	Code	Action	Duration
1	004011	Frame central cover - Replacement	
2	002082	Fuel tank cap opening drive - Replacement	

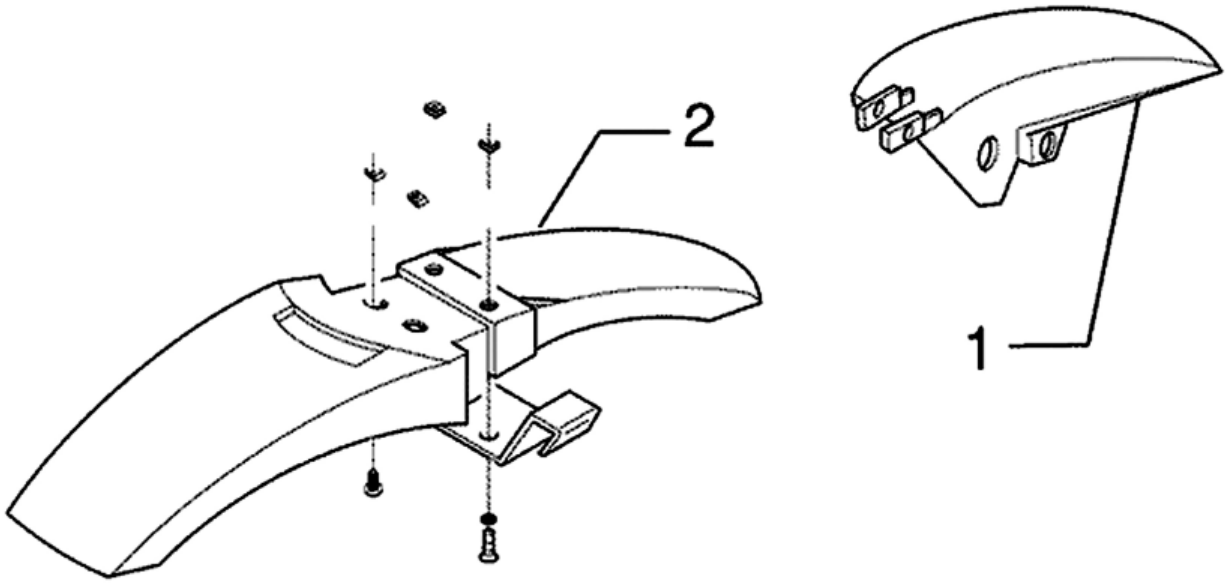
Underseat compartment



HELMET COMPARTMENT- SEAT ELECTRIC OPENING-LICENCE PLATE HOLDER

	Code	Action	Duration
1	002083	Saddle opening transmission - Replacement Saddle opening transmission - Replacement	
2	004016	Helmet compartment - Remov. and Refit.	
3	004106	Underseat band - Replacement	
4	004136	License plate holder support - Replacement	
5	004158	Saddle opening splitter - Replacement	
6	005046	Battery cover - Replacement	
7	005099	Electric saddle opening activator - Replacement	

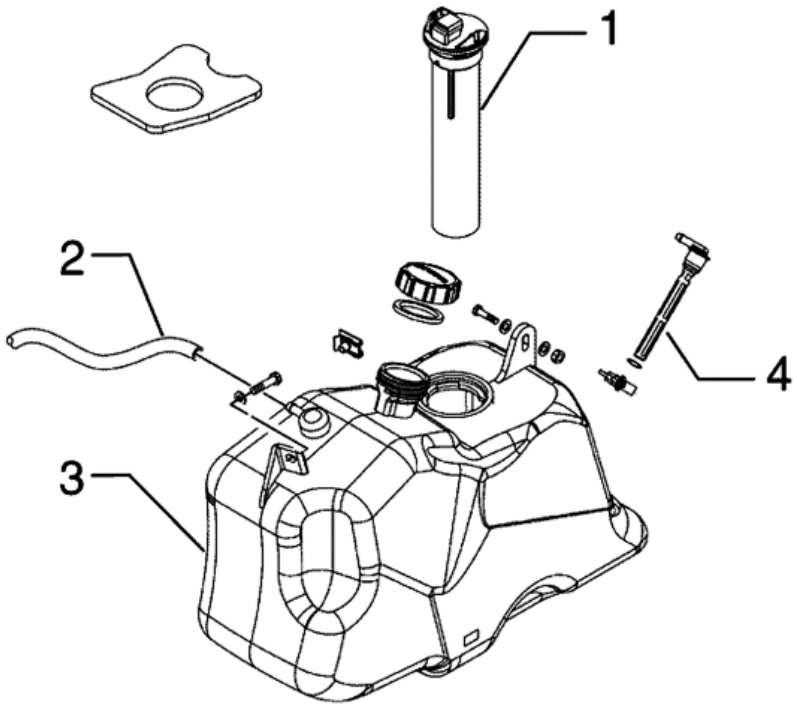
Mudguard



FRONT AND REAR MUDGUARDS

	Code	Action	Duration
1	004009	Rear mudguard - Replacement	
2	004002	Front mudguard - Replacement	

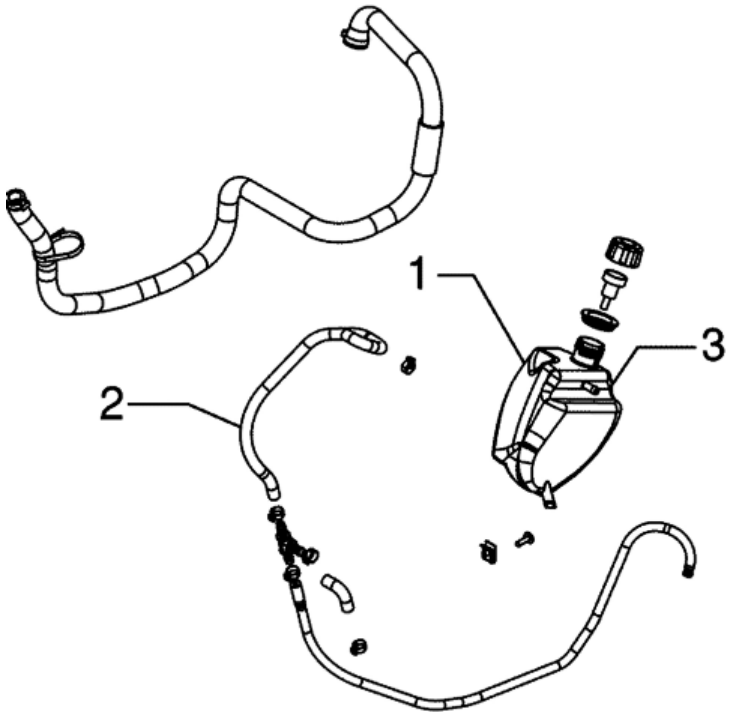
Fuel tank



FUEL TANK

	Code	Action	Duration
1	005010	Tank float - Replacement	
2	004109	Fuel tank breather - Replacement	
3	004005	Fuel tank - Replacement	
4	004007	Fuel valve - Replacement	

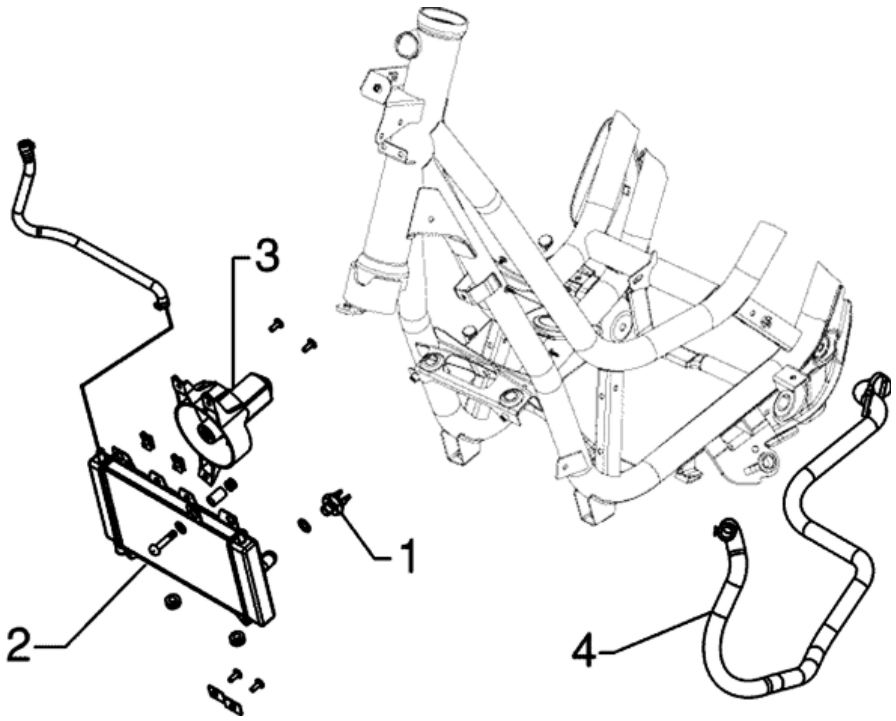
Expansion tank



EXPANSION TANK

	Code	Action	Duration
1	007001	Expansion tank - Replacement	
2	007013	Expansion tank - radiator connection pipe - Replacement	
3	001052	Coolant and air bleeding - Replacement	

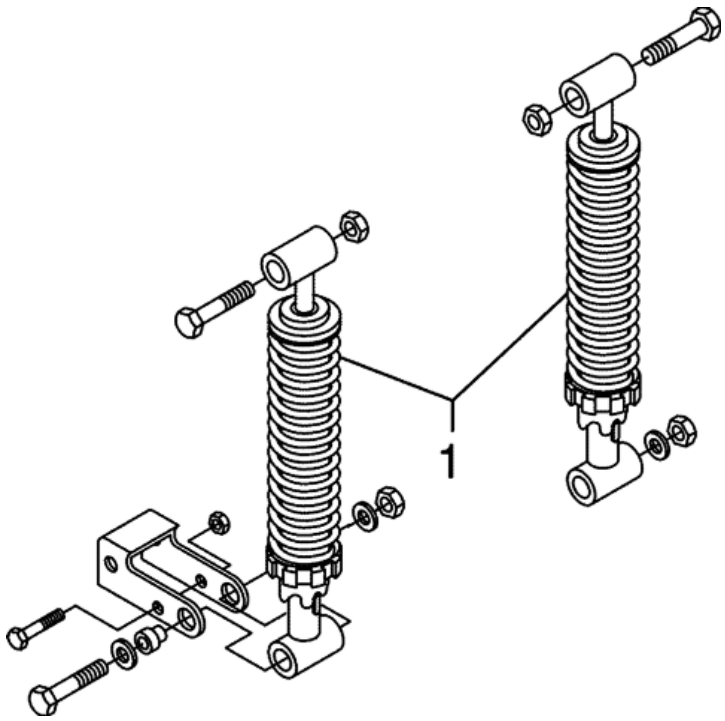
Radiator



RADIATOR

	Code	Action	Duration
1	007014	Radiator thermal switch - Replacement	
2	007002	Radiator water - Replacement	
3	007016	Complete fan with support - Replacement	
4	007003	Coolant delivery and return pipe - Replacement	

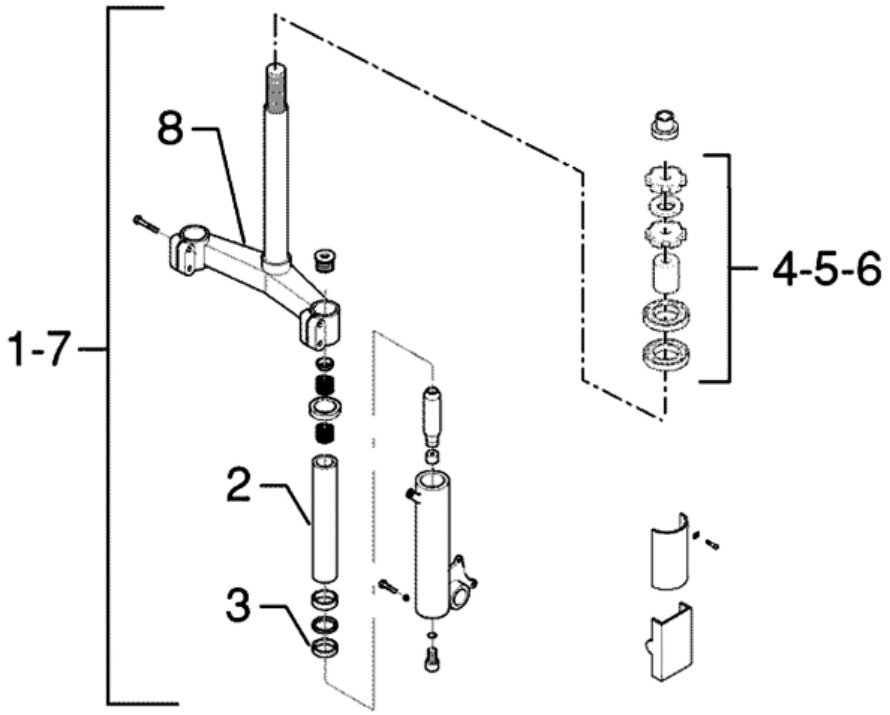
Rear shock-absorber



REAR SHOCK ABSORBER

	Code	Action	Duration
1	003007	Rear shock absorber - Remov. and Refit.	

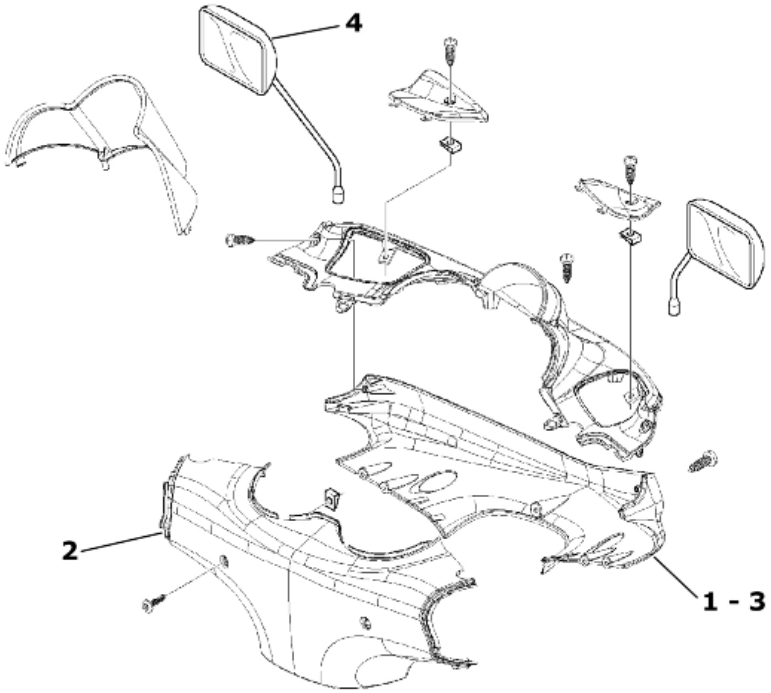
Steering column bearings



STEERING FIFTH WHEELS

	Code	Action	Duration
1	003051	Fork unit - Replacement	
2	003079	Fork stem - Replacement	
3	003048	Fork oil seal - Replacement	
4	004119	Bearing/upper steering fifth wheel - Replacement	
5	003002	Steering fifth wheel - Replacement	
6	003073	Steering clearance - Adjustment	
7	003010	Front suspension - Service	
8	003050	Fork lower plate - Replacement	
9	003076	Fork sheath - Replacement	

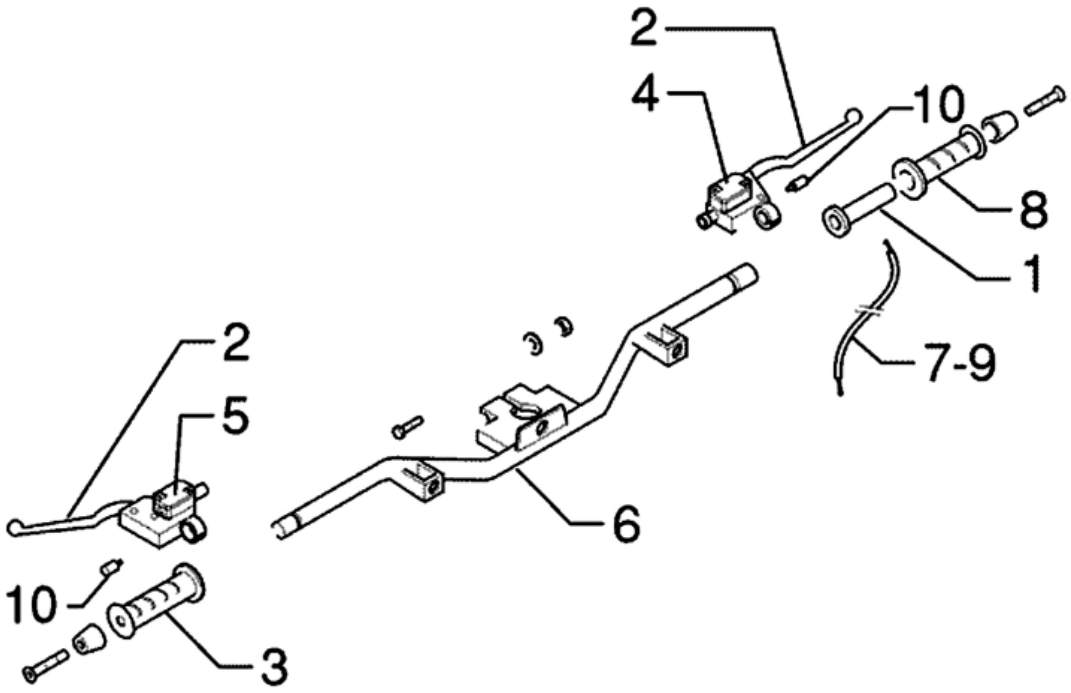
Handlebar covers



HANDLEBAR COVER

	Code	Action	Duration
1	004018	Handlebar front section - Replacement	
2	004019	Handlebar rear section - Replacement	

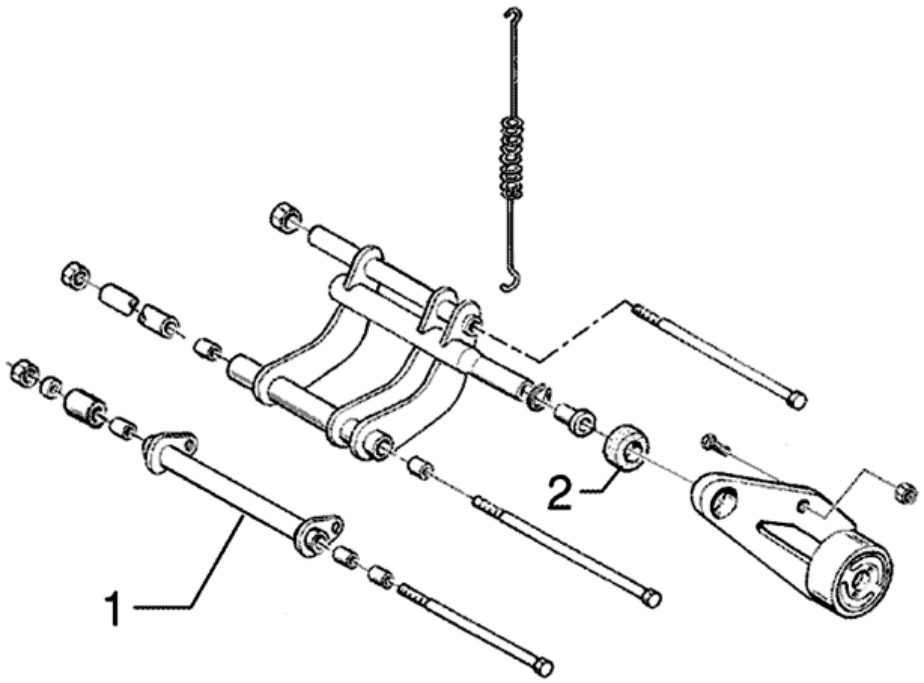
Handlebar components



HANDLEBAR COMPONENTS

	Code	Action	Duration
1	002060	Throttle grip - Replacement	
2	002037	Brake or clutch lever - Replacement	
3	002071	Left knob - Replacement	
4	002024	Front brake pump - Removal and Re-fitting	
5	002067	Rear brake pump - Replacement	
6	003001	Handlebar - Replacement	
7	002063	Complete throttle grip transmission - Replacement	
8	002059	Right-hand knob - Replacement	
9	003061	Accelerator transmission - Adjust-ment	
10	005017	Stop switch - Replacement	

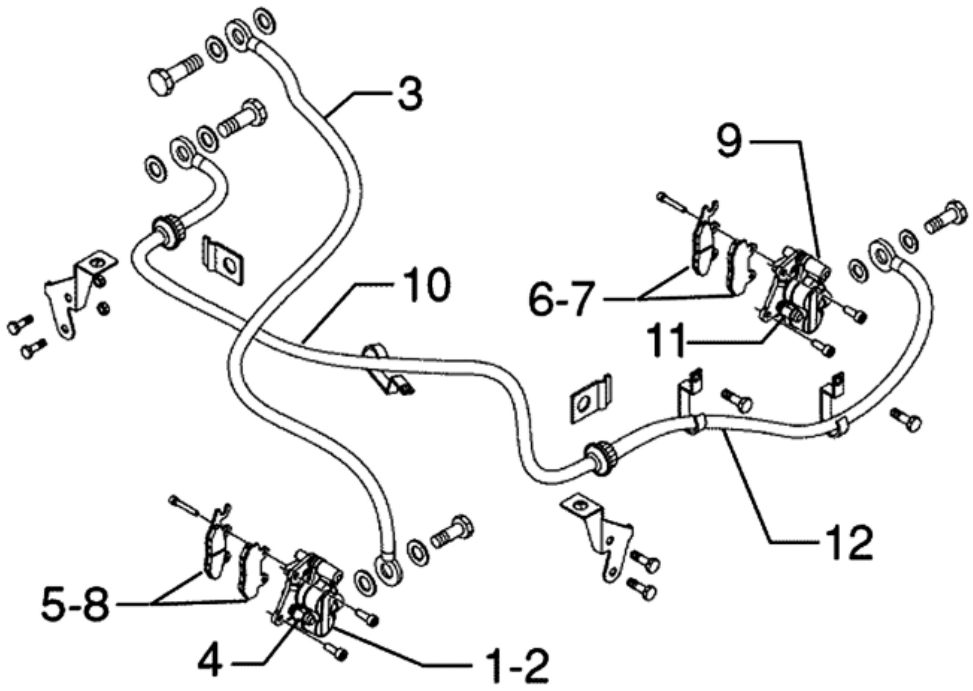
Swing-arm



SWINGING ARM

	Code	Action	Duration
1	001072	Swinging arm - Engine-chassis connection - Replacement	
2	004058	Silent block - Replacement	

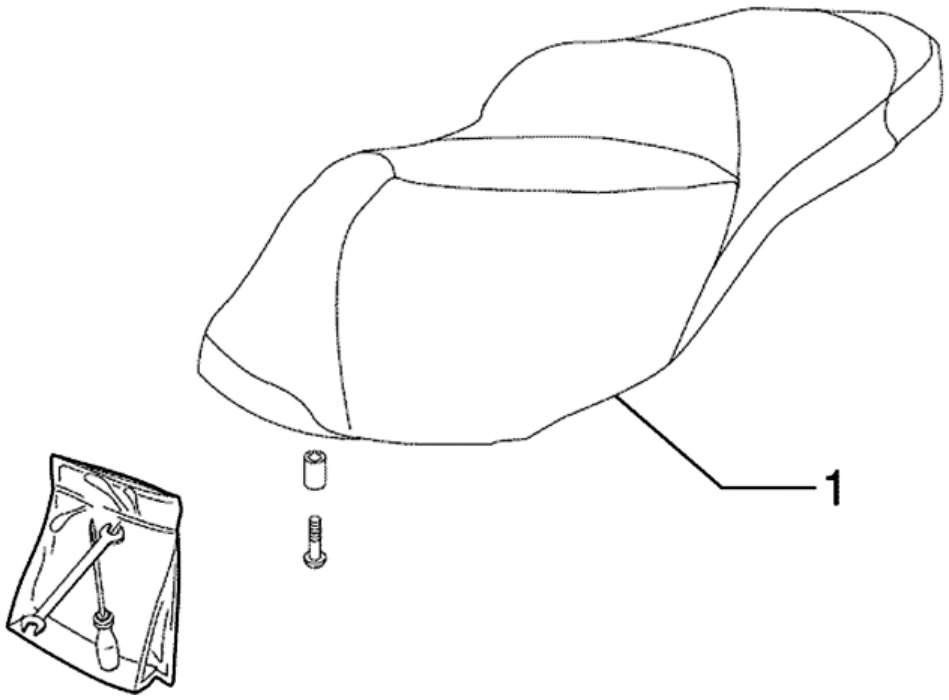
Brake hoses



BRAKE PIPING

	Code	Action	Duration
1	002039	Front brake calliper - Replacement	
2	002040	Front brake calliper - Service	
3	002021	Front brake piping - Replacement	
4	002047	Front brake fluid and system bleeding plug - Repl.	
5	003070	Front brake pads/shoes - Check for wear	
6	003071	Rear brake pads/shoes - Check for wear	
7	002002	Rear brake pads/shoes - Repl.	
8	002007	Front brake pads/shoes - Remov. and Refit.	
9	002048	Rear brake calliper - Replacement	
10	002020	Rear brake hose - Remov. and Refit.	
11	002080	Rear brake oil bleeding system - Replacement	
12	002081	Rear brake rigid pipes - Replacement	

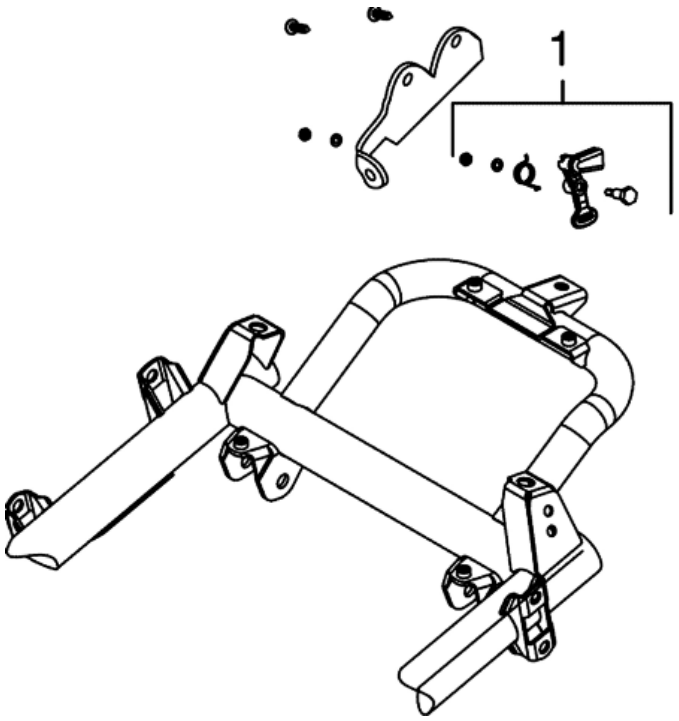
Seat



SADDLE

	Code	Action	Duration
1	004003	Saddle - Replacement	

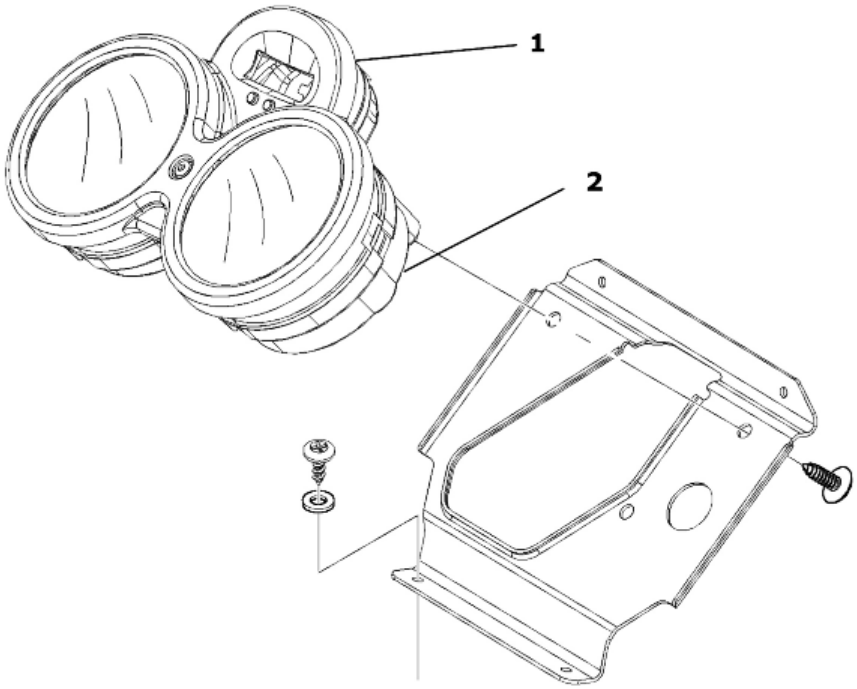
Seat lock



SADDLE LOCK MECHANISM

	Code	Action	Duration
1	004054	Saddle lock catch - Replacement	

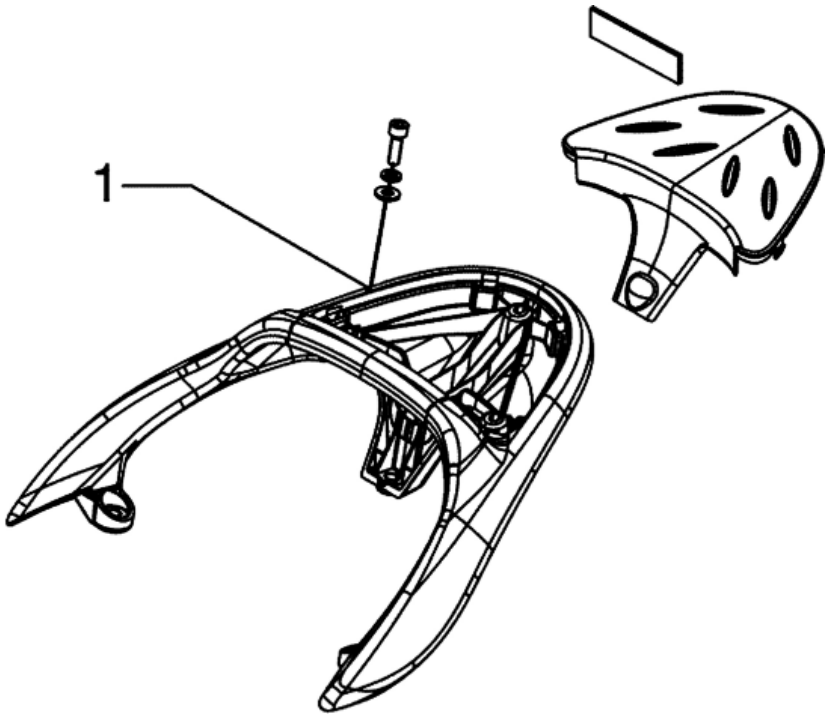
Instrument panel



INSTRUMENT PANEL

	Code	Action	Duration
1	005014	Odometer - Replacement	
2	005038	Instrument panel warning light bulbs - Replacement	

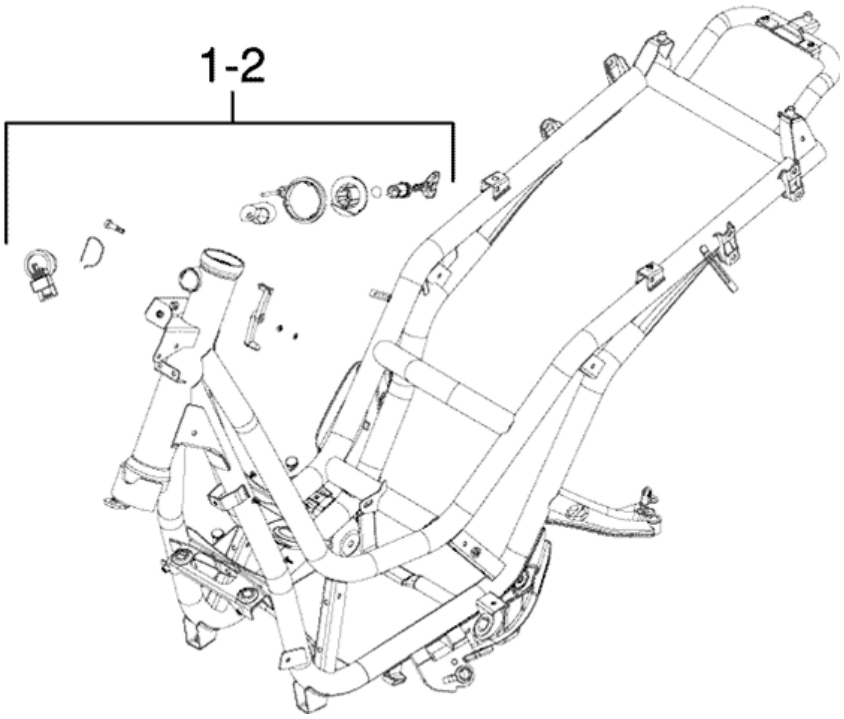
Rear rack



LUGGAGE RACK

	Code	Action	Duration
1	004008	Luggage rack - Replacement	

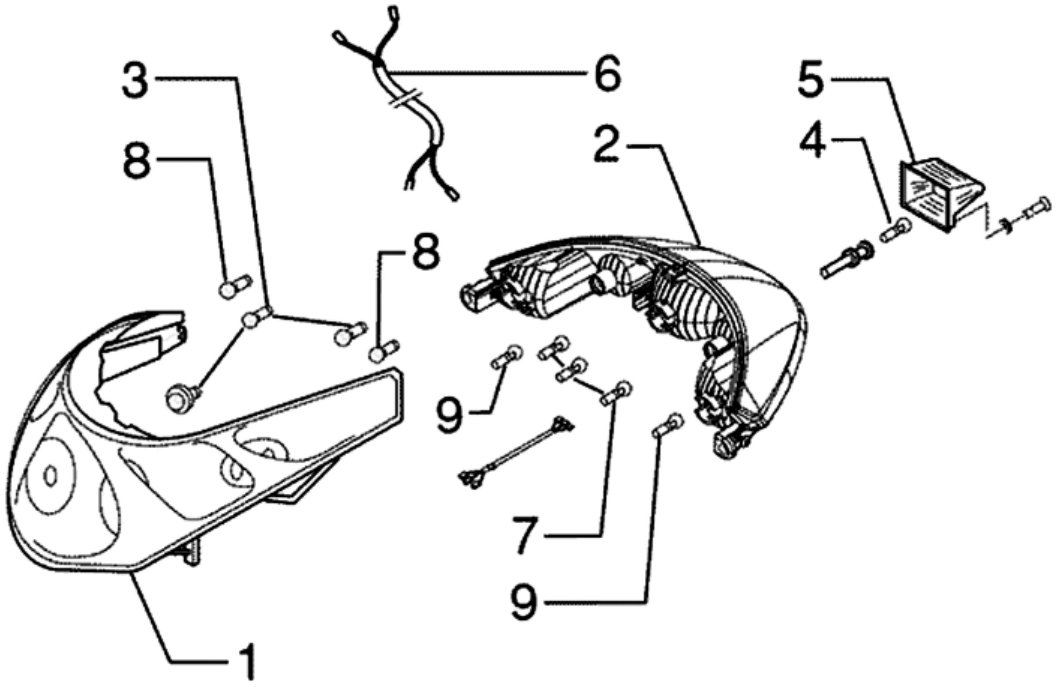
Locks



LOCKS

	Code	Action	Duration
1	005016	Key switch - Replacement	
2	004010	Anti-theft lock - Replacement	

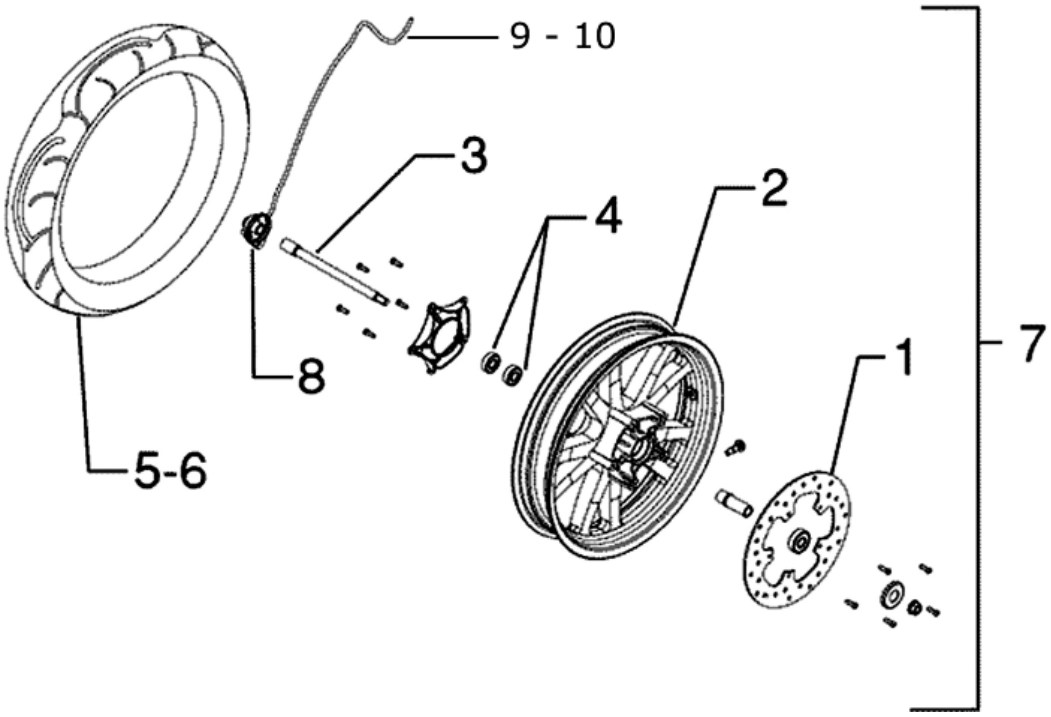
Turn signal lights



TURN INDICATOR LIGHTS

	Code	Action	Duration
1	005002	Front headlamp - Replacement	
2	005005	Taillight - Replacement	
3	005008	Headlight bulbs - Replacement	
4	005031	Licence plate light bulb - Replacement	
5	005032	Licence plate light glass - Replacement	
6	005044	Front lights cable unit - replace	
7	005066	Rear light bulbs - Replacement	
8	005067	Front turn indicator light - Replacement	
9	005068	Rear turn indicator bulb - Replacement	

Front wheel



FRONT WHEEL

	Code	Action	Duration
1	002041	Brake disc - Replacement	
2	003037	Front wheel rim - Remov. and Refit.	
3	003038	Front wheel axle - Remov. and Refit.	
4	003040	Front wheel bearings - Replacement	
5	003047	Front tyre - Replacement	
6	003063	Tyre pressure - Check	
7	004123	Front wheel - Replacement	
8	002011	Odometer drive - Replacement	
9	002049	Odometer cable - Replacement	
10	002051	Odometer transmission assembly - Replacement	

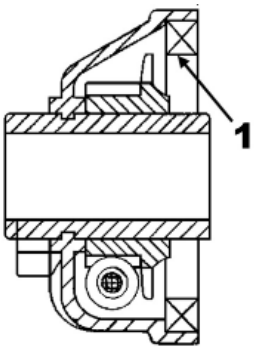
Grease tone wheel or drive

Please take note that the code has been introduced:

900001 - Tone wheel / drive greasing - 15'.

Never mistake the codes 002011 (movement sensor replacement) and 005089 (tone wheel replacement) in the event of noise of the indicated components.

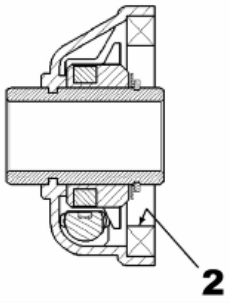
In the following points we indicate with an arrow the area to be greased (1 - Drive, 2 - Tone wheel)



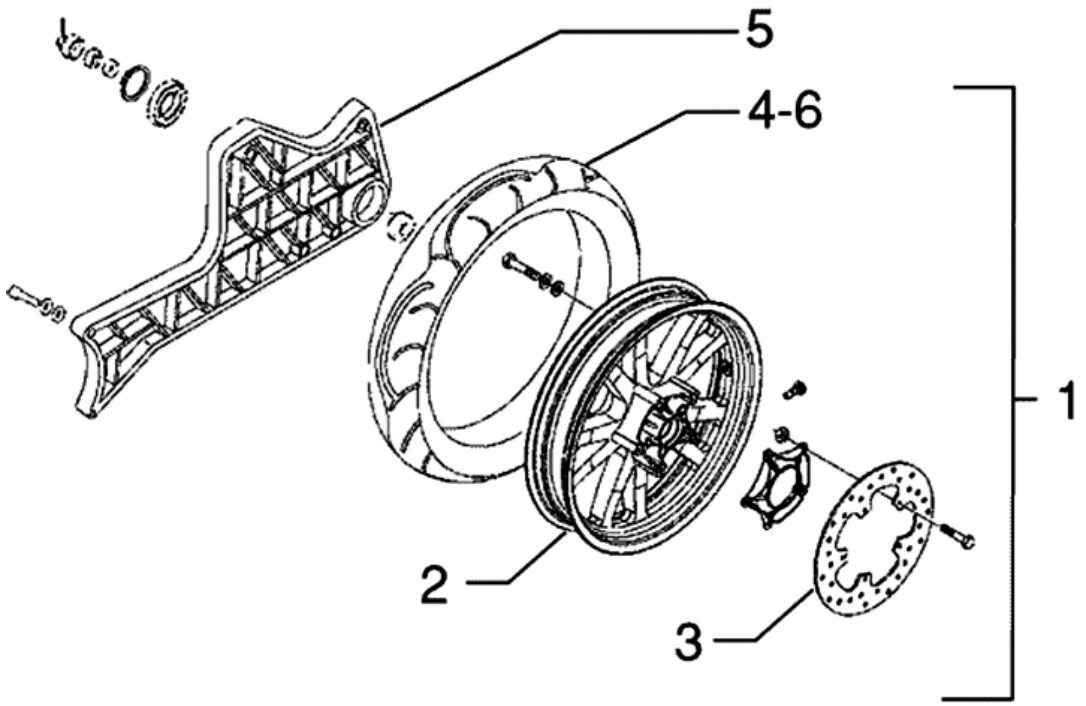
Recommended products

AGIP GREASE SM 2 Grease for the tone wheel revolving ring

Soap-based lithium grease containing NLGI 2 Molybdenum disulphide; ISO-L-XBCHB2, DIN KF2K-20



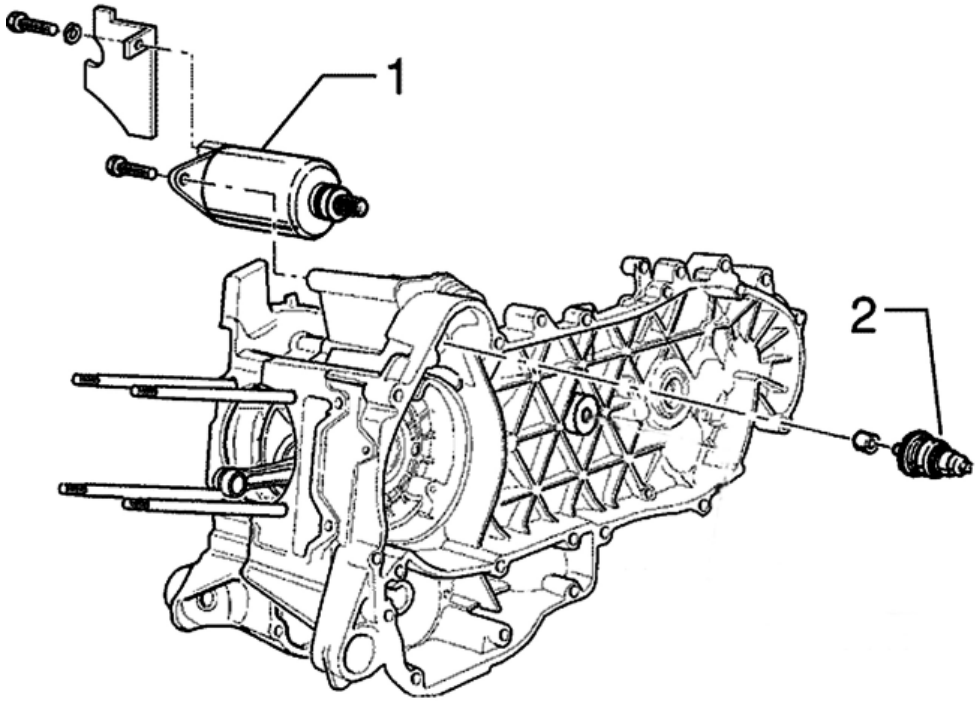
Rear wheel



REAR WHEEL

	Code	Action	Duration
1	001016	Rear wheel - Replacement	
2	001071	Rear wheel rim - Removal and Refitting	
3	002070	Rear brake disc - Replacement	
4	003063	Tyre pressure - Check	
5	003077	muffler/rear shock absorber support arm - Service	
6	004126	Rear wheel tyre - Replacement	

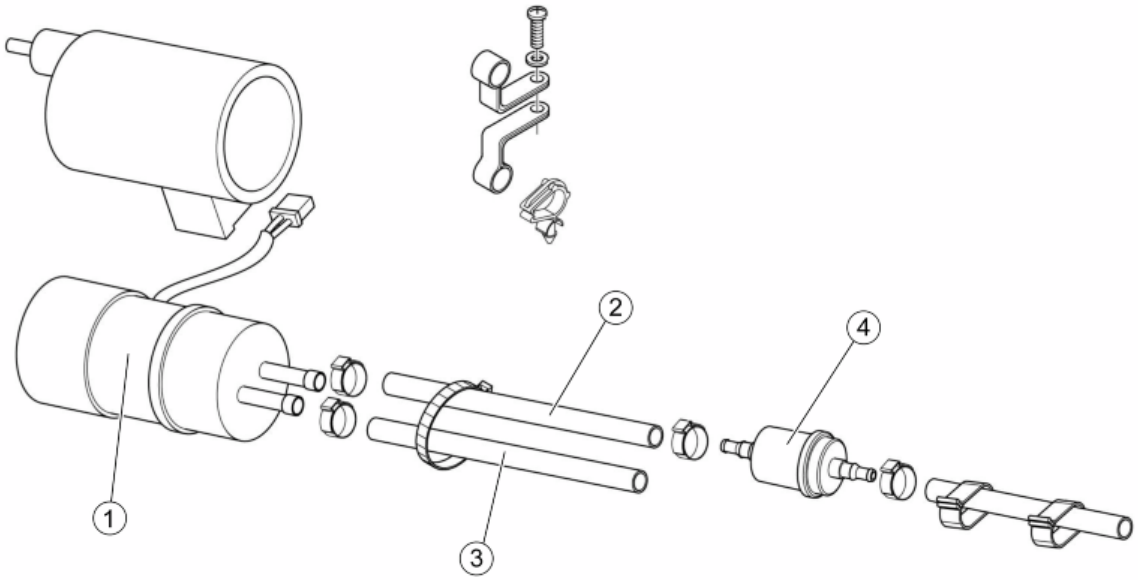
Electric start



ELECTRICAL START-UP

	Code	Action	Duration
1	001020	Starter motor - Replacement	
2	001017	Start-up pinion - Replacement	

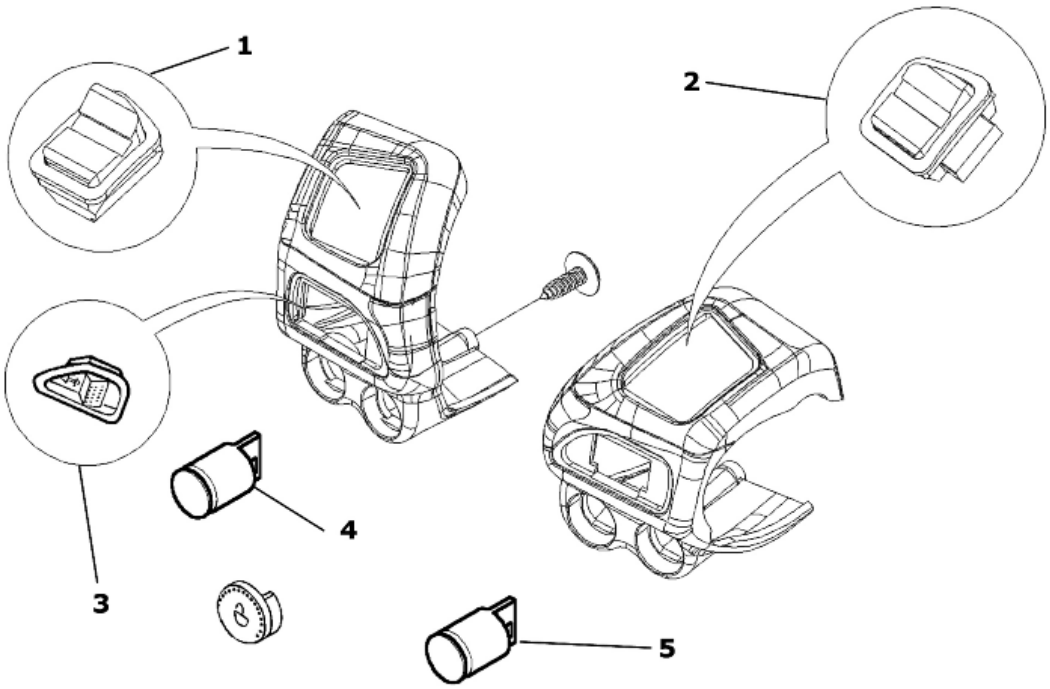
Fuel pump

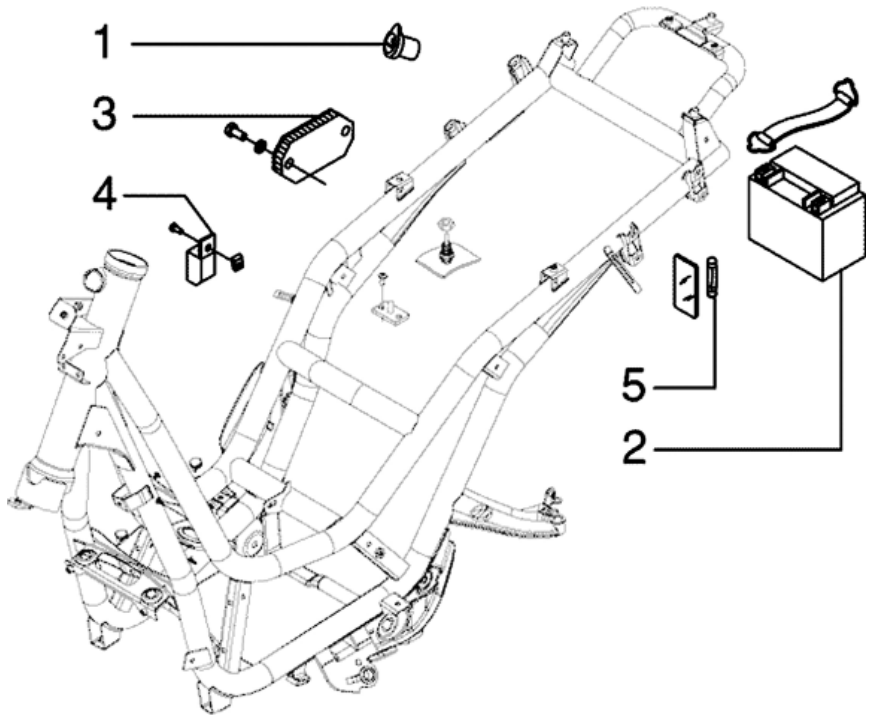


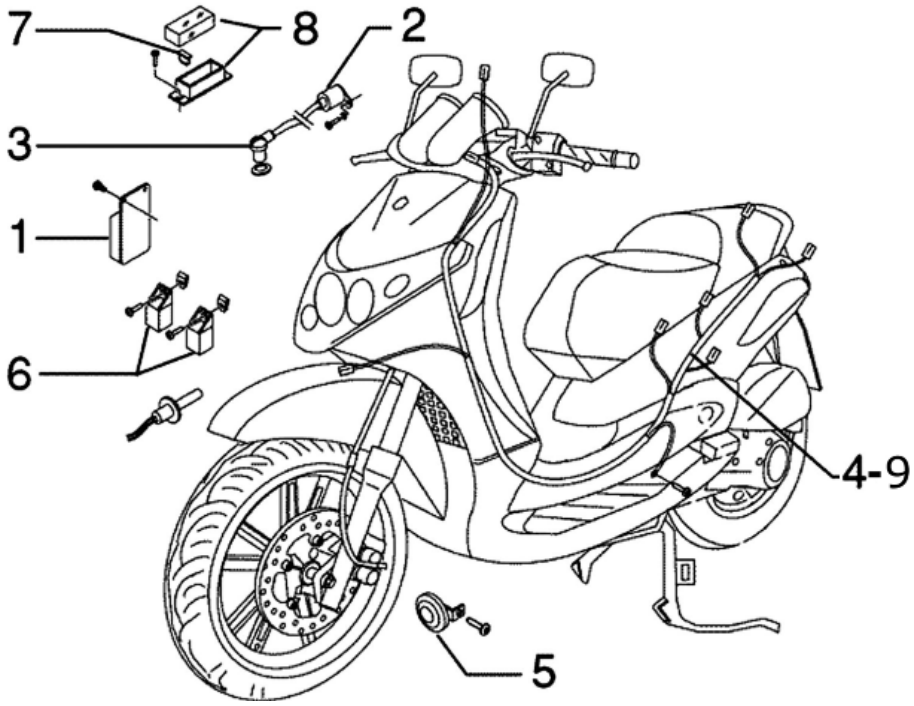
FUEL PUMP

	Code	Action	Duration
1	004073	Fuel pump - Replacement	
2	004137	Carburettor pump hose - Replace-ment	
3	004089	Tank-pump hose - Replacement	
4	004072	Fuel filter - Replacement	

Electric devices



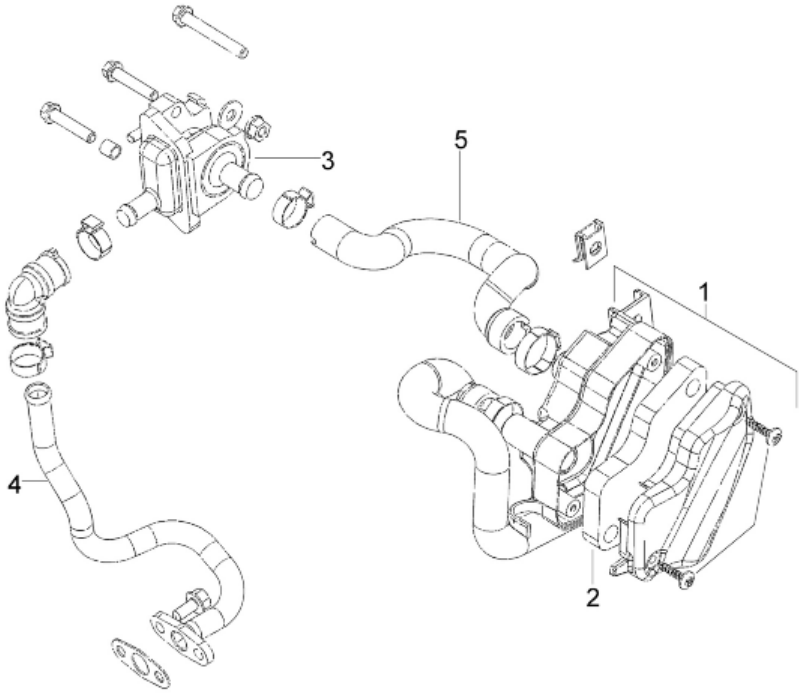




ELECTRIC DEVICES

	Code	Action	Duration
1	001023	Control unit - Replacement	
2	001069	HV coil - Replacement	
3	001094	Spark plug hood - Replacement	
4	005001	Electrical system - Replacement	
5	005003	Horn - Replacement	
6	005035	Headlight remote control - Replacement	
7	005052	Fuse (1) - Replacement	
8	005054	Fuse block (1) - Replacement	
9	005114	Electrical system - Service	

Secondary air box



SECONDARY AIR HOUSING

	Code	Action	Duration
1	001162	Secondary air housing - Replacement	
2	001161	Secondary air filter - Replacement / Cleaning	
3	001174	SAS valve - Replacement	
4	001163	SAS valve / Head connection - Replacement	
5	001164	Crankcase secondary air connection - Replacement	

A
Air filter: *47*

B
Battery: *60*, *76*, *90*
Brake: *218*, *219*, *222*, *223*, *225*, *226*, *229*, *230*, *295*

C
Carburettor: *13*, *42*, *173*, *181*, *275*
Coolant: *236*

E
Engine oil: *48*
Engine stop:

F
Fuel: *59*, *172*, *253*, *287*, *305*
Fuses: *89*

H
Headlight: *54*, *243*
Hub oil: *46*

I
Identification: *8*
Instrument panel: *241*, *298*

L
Luggage rack:

M
Maintenance: *7*, *39*

O
Oil filter: *49*, *269*

S
Saddle:
Shock absorbers: *212*
Spark plug: *44*, *82*
Start-up:

T
Tank: *253*, *255*, *287*, *288*
Transmission: *10*, *60*, *100*, *120*, *274*

Tyres: *11*