PIAGGIO

SERVICE STATION MANUAL

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Runner 125 - 200

SERVICE STATION MANUAL

Runner 125 - 200

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

SERVICE STATION MANUAL
Runner 125 - 200

This service station manual has been drawn up by Piaggio & C. Spa to be used by the workshops of Piaggio-Gilera dealers. It is assumed that the user of this manual for maintaining and repairing Piaggio vehicles has a basic knowledge of mechanical principles and vehicle repair technique procedures. Any significant changes to vehicle characteristics or to specific repair operations will be communicated by updates to this manual. Nevertheless, no mounting work can be satisfactory if the necessary equipment and tools are unavailable. It is therefore advisable to read the sections of this manual concerning special tools, along with the special tool catalogue.

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.

INDEX OF TOPICS

PUMP ELECTRICS CHECK	
CONNECTORS	
ENGINE FROM VEHICLE	ENG VE
ENGINE	ENG
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BRAKING SYSTEM	BRAK SYS
COOLING SYSTEM	COOL SYS
CHASSIS	CHAS
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TIME	TIME

INDEX OF TOPICS

This section describes the general specifications of the vehicle.

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. The non original or non-compliant spare parts 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.
- Use only equipment with metric sizes for removal, service and reassembly operations. Metric bolts, nuts and screws are not interchangeable with coupling members using English measurements. Using unsuitable coupling members and tools may damage the vehicle.
- When carrying out maintenance operations on the vehicle that involve the electrical system, make sure the electrical connections have been made properly, particularly the ground and battery connections.

Vehicle identification

Vehicle 125

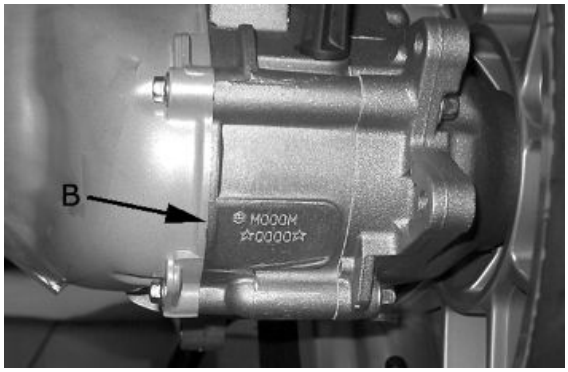
Chassis prefix: ZAPM46300 ÷ 1001

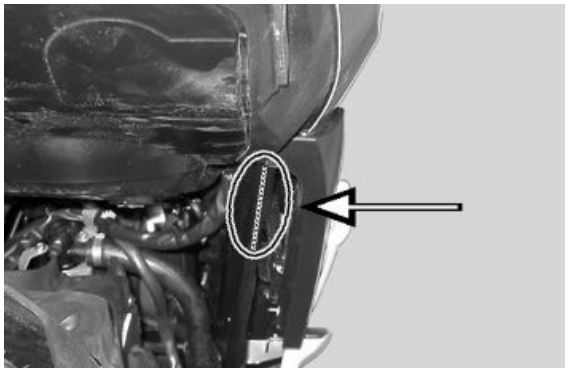
Engine prefix: M463M

Vehicle 200

Chassis prefix: ZAPM46400 ÷ 1001

Engine prefix: M464M

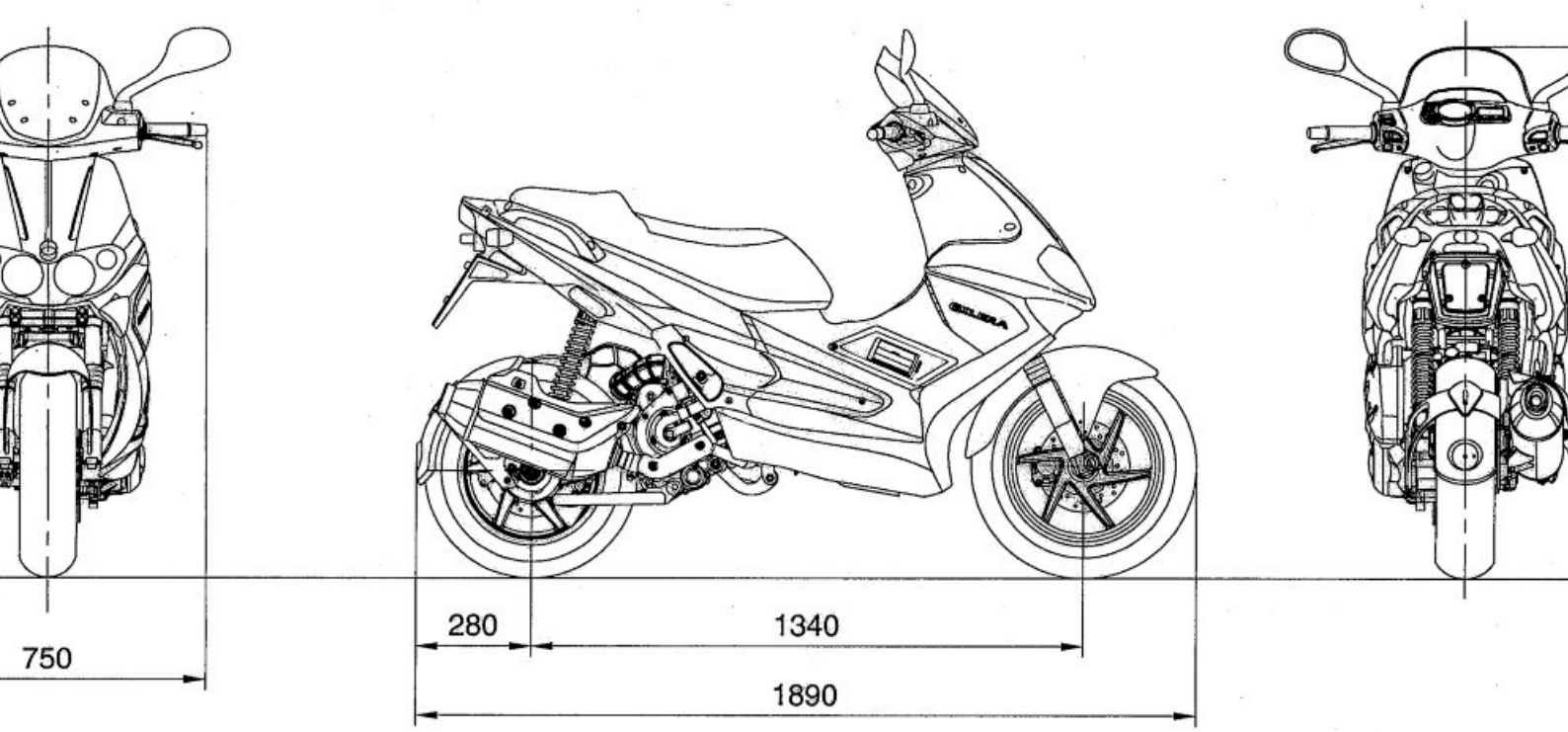




Dimensions and mass

WEIGHT AND DIMENSIONS

Specification	Desc./Quantity
Kerb weight	137 ± 5 kg
Maximum load	Driver + passenger + baggage (180 Kg)
Wheelbase	1340 mm
Saddle height	815 mm
Overall length	1890 mm
Maximum width	750 mm
Overall height	1260 mm



Engine

TECHNICAL DATA 125

Specification	Desc./Quantity
ENGINE	Single-cylinder, four-stroke
Bore x stroke	57 x 48.6 mm
Engine capacity	124 cm³
Compression ratio	11.5 ÷ 12.5 : 1
Ignition advance (before TDC)	From 10° ± 1° at 2000 rpm to 34° ± 1° at 6500 rpm
Kehin Carburettor	CVEK-30
Max. speed	108 km/h
Timing system	single overhead camshaft driven by a chain on the left-hand side, 4 valves, three-arm rocking lever with set screw.
intake valve clearance	0.10 mm
Valve clearance: discharge	0.15 mm
Air filter	sponge, impregnated with mixture (50% oil and 50% unleaded petrol).
Starting system	Electric starter with Bendix gear
Lubrication	With lobe pump (inside crankcase) controlled by a chain with double filter: mesh and paper
Fuel supply	With unloaded petrol, carburettor and electric pump
Engine - wheel ratio	Short: 1/28.02
Engine - wheel ratio	Long: 1/8.41

TECHNICAL DATA 200

Specification	Desc./Quantity
ENGINE	Single-cylinder, four-stroke
Bore x stroke	72 x 48.6 mm
Cubic capacity	198 cm³

Specification	Desc./Quantity
Compression ratio	11 ÷ 12 : 1
Ignition advance (before TDC)	From 10° ± 1° at 2000 rpm to 32° ± 1° at 6500 rpm
Kehin Carburettor	CVEK-30
Max. speed	120 km/h
Timing system	single overhead camshaft driven by a chain on the left-hand side, 4 valves, three-arm rocking lever with set screw.
intake valve clearance	0.10 mm
Valve clearance: discharge	0.15 mm
Air filter	sponge, impregnated with mixture (50% oil and 50% unleaded petrol).
Starting system	Electric starter with Bendix gear
Lubrication	With lobe pump (inside crankcase) controlled by a chain with double filter: mesh and paper
Fuel supply	With unloaded petrol, carburettor and electric pump
Engine - wheel ratio	Short: 1/19.36
Engine - wheel ratio	Long 1/6.54

Transmission

TRANSMISSIONS

Specification	Desc./Quantity
Transmission	With automatic expandable pulley variator, V belt, automatic clutch, gear reduction unit and transmission housing with forced-circulation air cooling.

Capacities

CAPACITY

Specification	Desc./Quantity
Engine oil	1.1 lt. dry; 1.0 lt. at oil change
Fuel tank (including a ~ 1.7 l reserve)	8.5 lt. (approx. value)
Rear hub	approx. 150 cc
Cooling system fluid	~ 2.100 ÷ 2.150 l

Electrical system

ELECTRICAL COMPONENTS 125

Specification	Desc./Quantity
Electronic ignition	Consisting of a capacitor discharge ignition microprocessor with a built-in AT coil and variable advance
Battery	12V -10 Ah
Spark plug	CHAMPION RG 4HC - NGK CR 8 EB
Generator	Three-phase alternating current

ELECTRICAL COMPONENTS 200

Specification	Desc./Quantity
Generator	Three-phase alternating current
Battery	12V -10 Ah
Spark plug	CHAMPION RG 6YC - NGK CR 8 EB
Electronic ignition	Consisting of a capacitor discharge ignition microprocessor with a built-in AT coil and variable advance

Frame and suspensions

FRAME AND SUSPENSIONS

Specification	Desc./Quantity
Chassis	Modular double cradle frame made of welded tubular steel with sheet metal reinforcement.
Front suspension	hydraulic double-acting telescopic fork with 35 mm stems
Rear suspension	With coaxial spring and hydraulic shock absorber. Chassis to engine support with swinging arm.

Brakes

BRAKES

Specification	Desc./Quantity
Front brake	Ø 240 mm disc brake (vehicle LHS), with hydraulic control activated by handlebar right lever.
Rear brake	Ø 220 mm disc brake with twin plunger callipers, with hydraulic control by a handlebar left lever.

Wheels and tyres

WHEELS AND TYRES

Specification	Desc./Quantity
Front wheel	3.00 x 14" light alloy rim
Front tyre	Tubeless, 120/70-14" 55P
Rear wheel	**3.50 x 13" light alloy rims**
Rear tyre	Tubeless, 140/60 - 13" 63P

TYRE PRESSURE

Specification	Desc./Quantity
Front wheel pressure:	1.7 bar
Rear tyre pressure	2 bar
Rear tyre pressure - driver and passenger	2.2 bar

Carburettor

125cc Version

Kehin

KEHIN CVEK-30 CARBURETTOR

Specification	Desc./Quantity
Depression carburettor	CVEK-30
Body stamping	CVK
Stamping	306D
Max. jet	98
Minimum jet	35
Max. air jet	70
Minimum air jet	130
Throttle valve spring	100 ÷ 160 g

Specification	Desc./Quantity
Minimum mixture set screw initial opening	2
Tapered pin stamping	NDYA
Diffuser nozzle	Ø 2.8
Starter air jet	Ø 1.5 (body)
Starter diffuser nozzle	Ø 1.5 (body)
Starter nozzle	42
Starter device resistance	~ 20 Ω (at 24°)
Diffuser	Ø 29

200cc Version

Kehin

KEHIN CVEK-30 CARBURETTOR

Specification	Desc./Quantity
Depression carburettor	CVEK-30
Body stamping	CVK
Stamping	309C
Max. jet	90
Minimum jet	35
Max. air jet	70
Minimum air jet	115
Throttle valve spring	150 ÷ 250 g
Minimum mixture adjustment screw initial opening	2±½
Tapered pin stamping	NDYC
Diffuser nozzle	Ø 2.8
Starter air jet	Ø 1.5 (body)
Starter diffuser jet	Ø 1.2
Starter nozzle	42
Starter device resistance	~ 20 Ω (at 24°)
Diffuser	Ø 29

N.B.

THE IDENTIFICATION LETTER CAN VARY WITH EACH CARBURETTOR UPDATE

Tightening Torques

TORQUE IN NM BY TYPE OF TIGHTENED MATERIAL

Name	Torque in Nm
M4 Ø 8.8 steel screw on plastic with metallic spacers	2
M4 Ø 8.8 steel screw on brass, copper, aluminium and their alloys	2
M4 Ø 8.8 steel screw Iron, steel	3
M5 Ø 8.8 steel screw on plastic with metallic spacers	4
M5 Ø 8.8 steel screw on brass, copper, aluminium and their alloys	4
M5 Ø 8.8 steel screw Iron, steel	6
M6 Ø 8.8 steel screw on plastic with metallic spacers	6.5
M6 Ø 8.8 steel screw on brass, copper, aluminium and their alloys	6.5
M6 Ø 8.8 steel screw Iron, steel	10.5
M7 Ø 8.8 steel screw on brass, copper, aluminium and their alloys	10.5
M7 Ø 8.8 steel screw Iron, steel	17
M8 Ø 8.8 steel screw on brass, copper, aluminium and their alloys	16
M8 Ø 8.8 steel screw Iron, steel	26
M10 Ø 8.8 steel screw Iron, steel	52
M12 Ø 8.8 steel screw Iron, steel	100
M14 Ø 8.8 steel screw Iron, steel	145

REAR BRAKE

Name	Torque in Nm
Rear brake disc screws(°)	5 to 6.5
Rear brake calliper-pipe fitting	20 ÷ 25
Rigid / flexible pipe fitting	13 - 18
Rear brake pump-pipe fitting	16 - 20
Rear brake calliper fixing screws	20 to 25

FRONT BRAKE

Name	Torque in Nm
Oil bleed screw	8 - 12
Disc tightening screw (°)	5 to 6.5
Brake fluid pipe-calliper fitting	20 ÷ 25
Brake fluid pump-hose fitting	16 - 20
Tightening screw for calliper support to the fork	20 ÷ 25
Screw tightening calliper to support	42 ÷ 52

REAR SUSPENSION

Name	Torque in Nm
Shock absorber upper clamp	33 to 41
Shock absorber lower clamping	33 to 41
Shock absorber-crankcase attachment bracket	20 to 25
Rear wheel axle	104 to 126
Silencer arm clamping screws	27 - 30

FRONT SUSPENSION

Name	Torque in Nm
Fork leg screw	6 - 7
Front wheel axle	45 to 50
Fork plate screw	25 ÷ 34

CHASSIS

Name	Torque in Nm
Centre stand bolt	25 ÷ 30
Side stand bolt (°)	35 ÷ 40
Engine arm bolt - frame arm	33 to 41
Swinging arm buffer nut	64 - 72
Frame-swinging arm bolt	64 ÷ 72
Engine-swinging arm bolt	64 - 72

STEERING

Name	Torque in Nm
Steering upper ring nut	30 ÷ 33
Steering lower ring nut	10 ÷ 13 then loosen by 90°
Handlebar fixing screw	50 to 55
Fixing screws for the handlebar control unit U-bolts	7 ÷ 10

ENGINE - COOLING

Product	Description	Specifications
(°) Loctite 243	Medium strength threadlock	Apply LOCTITE 243 medium-strength threadlock

CRANKCASE AND CRANKSHAFT

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

ENGINE - FLYWHEEL

Name	Torque in Nm
Pick-up fixing screws	3 to 4
Stator assembly screws (°)	3 to 4
Flywheel cover fixing screws	5 to 6
Flywheel nut	94 ÷ 102
Screw fixing freewheel to flywheel	13 - 15

ENGINE - TRANSMISSION

Name	Torque in Nm
Rear hub cover screws	24 to 27
Driven pulley shaft nut	54 to 60
Transmission cover screws	11 to 13
Drive pulley nut	75 - 83
Clutch unit nut on driven pulley	55 ÷ 60
Belt support roller screw	11 to 13

ENGINE - CYLINDER HEAD

Name	Torque in Nm
Manifold-silencer retaining bolt	15 ÷ 20
Nut fixing silencer to cylinder head	16 to 18
Camshaft retention plate screw	4 to 6
Timing chain tensioner central screw	5 to 6
Timing chain tensioner support screw	11 to 13
Starter counterweight support screw	11 to 15
Timing chain tensioner slider screw	10 to 14
Intake manifold screws	11 to 13
Tappet adjustment check nut	6 - 8
Starter ground screw	7 to 8.5
Head fixing side screws	11 - 12
Nuts fixing head to cylinder (*)	27 ÷ 29
Tappet cover screws	6 - 7
Spark plug	12 to 14

LUBRICATION

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

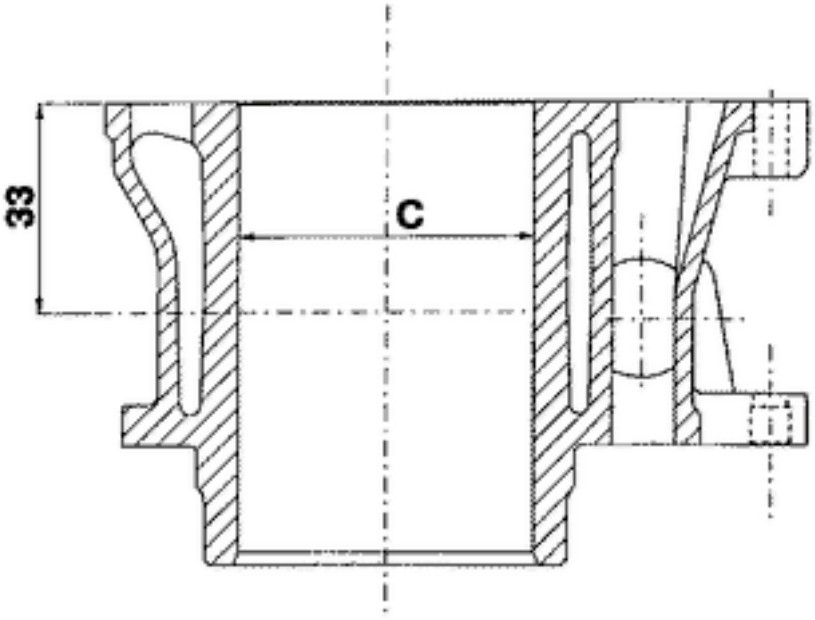
NOTE

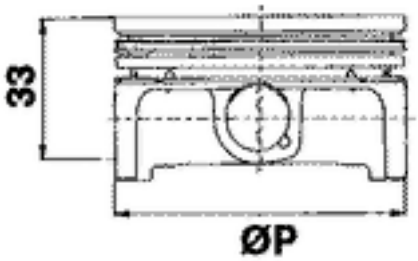
Product	Description	Specifications
(°) Loctite 243	Medium strength threadlock	Apply LOCTITE 243 medium-strength threadlock

Overhaul data

Assembly clearances

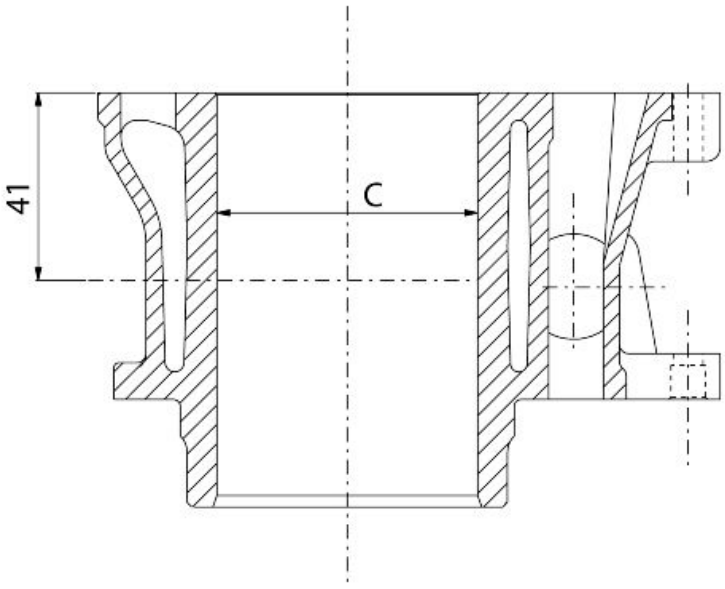
Cylinder - piston assy.

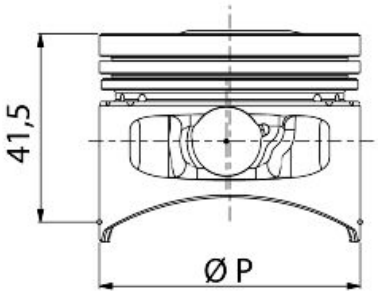




ENGINE 200 COUPLING CATEGORIES

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





ENGINE 125 COUPLING CATEGORIES

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

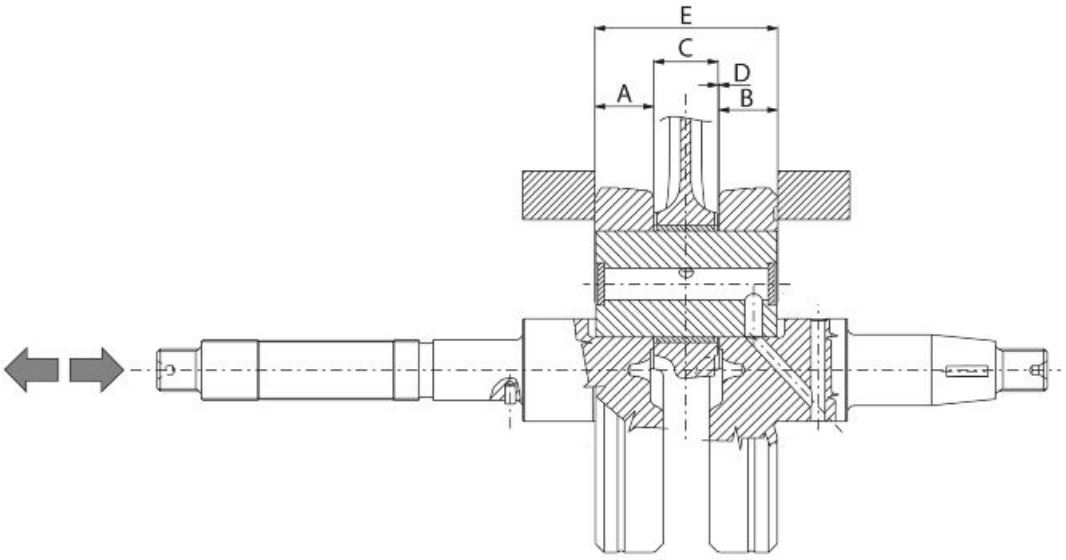
Piston rings

Crankcase - crankshaft - connecting rod

CRANKSHAFT

Titolo	Durata/Valore	Testo Breve (< 4000 car.)	Indirizzo Immagine
Crankshaft		Axial clearance between crankshaft and connecting rod	

Axial clearance between crankshaft and connecting rod



CRANKSHAFT/ CRANKCASE AXIAL CLEARANCE

Name	Description	Dimensions	Initials	Quantity
Transmissionside half-shaft		16.6 +0-0.05	A	D = 0.20 to 0.50
Flywheel-side halfshaft		16.6 +0-0.05	B	D = 0.20 to 0.50
Connecting rod		18 -0.10 -0.15	C	D = 0.20 ÷ 0.50

Name	Description	Dimensions	Initials	Quantity
Spacer tool		51.4 +0.05	E	D = 0.20 ÷ 0.50

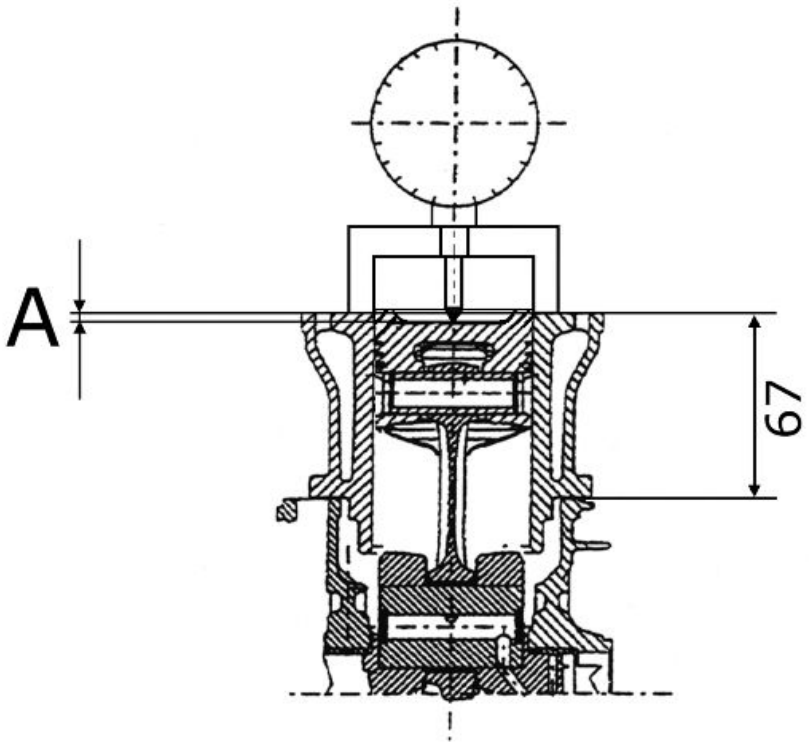
Slot packing system

200 models

Characteristic

Compression ratio, 200 models

11.5 ± 0.5 : 1



Measurement «**A**» to be taken, is a value of piston re-entry. It indicates by how much the plane formed by the piston crown descends below the plane formed by the upper part of the cylinder. The further the piston falls inside the cylinder, the less the base gasket to be applied (to recover 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.

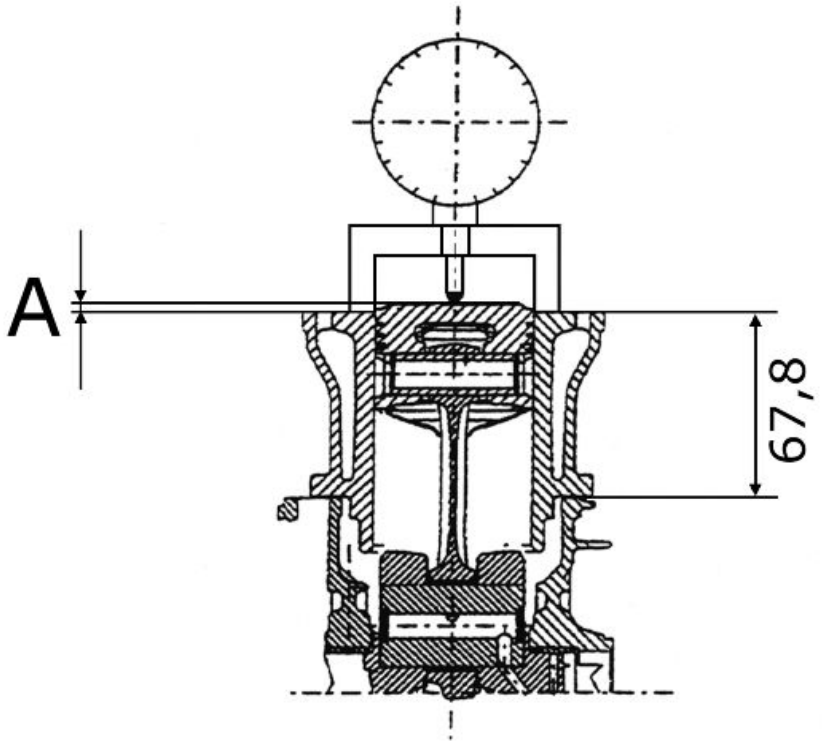
VERSION 200 WITH FIBRE HEAD GASKET (1.1)

Name	Measure A	Thickness
Shimming 200 - Cylinder 67 - Head gasket 1.1 - Base gasket 0.4	1.70 ÷ 1.60	0.4 ± 0.05
Shimming 200 - Cylinder 67 - Head gasket 1.1 - Base gasket 0.6	1.60 ÷ 1.40	0.6 ± 0.05
Shimming 200 - Cylinder 67 - Head gasket 1.1 - Base gasket 0.8	1.40 ÷ 1.30	0.8 ± 0.05

Characteristic

Compression ratio, 125 models

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.

VERSION 125 WITH METAL HEAD GASKET (0.3)

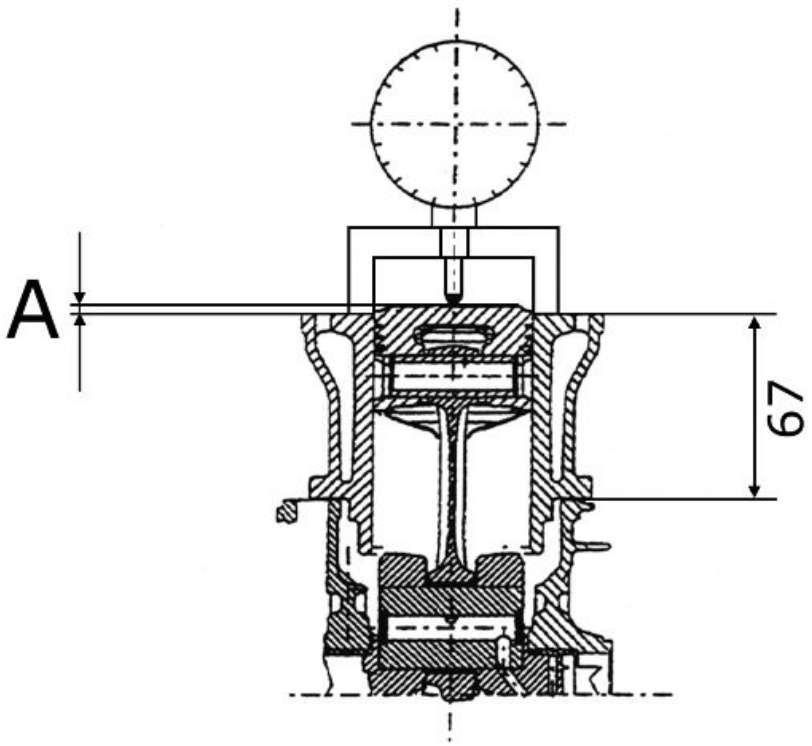
Name	Measure A	Thickness
Shimming 125 - Cylinder 67.8 - Head gasket 0.3 - Base gasket 0.4	1.40 ÷ 1.65	0.4 ± 0.05
Shimming 125 - Cylinder 67.8 - Head gasket 0.3 - Base gasket 0.6	1.65 ÷ 1.90	0.6 ± 0.05

Version 125

Characteristic

Compression ratio, 125 models

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.

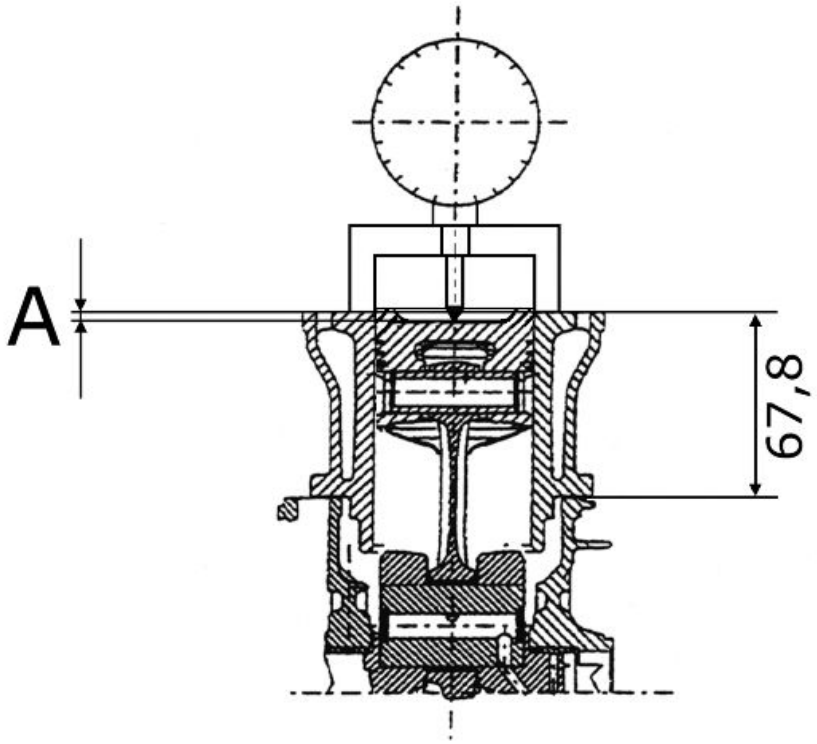
VERSION 125 WITH FIBRE HEAD GASKET (1.1)

Name	Measure A	Thickness
Shimming 125 - Cylinder 67 - Head gasket 1.1 - Base gasket 0.4	2.20 ÷ 2.45	0.4 ± 0.05
Shimming 125 - Cylinder 67 - Head gasket 1.1 - Base gasket 0.6	2.45 ÷ 2.70	0.6 ± 0.05

Characteristic

Compression ratio, 200 models

11.5 ± 0.5 : 1



Measurement «**A**» to be taken, is a value of piston re-entry. It indicates by how much the plane formed by the piston crown descends below the plane formed by the upper part of the cylinder. The further the piston falls inside the cylinder, the less the base gasket to be applied (to recover the compression ratio) and vice versa.

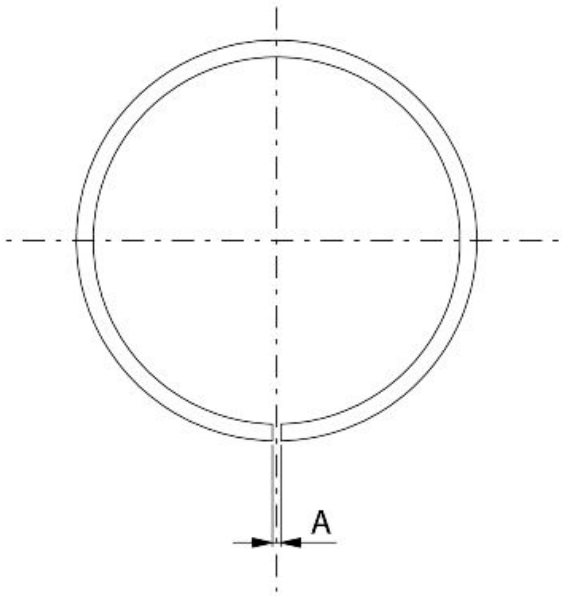
N.B.

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.

VERSION 200 WITH METALLIC HEAD GASKET (0.3)

Name	Measure A	Thickness
Shimming 200 - Cylinder 67.8 - Head gasket 0.3 - Base gasket 0.4	2.50 ÷ 2.40	0.4 ± 0.05
Shimming 200 - Cylinder 67.8 - Head gasket 0.3 - Base gasket 0.6	2.40 ÷ 2.20	0.6 ± 0.05
Shimming 200 - Cylinder 67.8 - Head gasket 0.3 - Base gasket 0.8	2.20 ÷ 2.10	0.8 ± 0.05

Oversizes



ENGINE 125 OVERSIZE

Name	Description	Dimensions	Initials	Quantity
Compression ring		57 x 1	A	0.15 to 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
Compression ring 1st oversize		57.2 x 1	A	0.15 to 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
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
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

ENGINE 200 OVERSIZE

Name	Description	Dimensions	Initials	Quantity
Oil scraper ring		72 x 2.5	A	0.20 ÷ 0.40
Oil scraper ring		72 x 1	A	0.20 ÷ 0.40
Compression ring		72 x 1.5	A	0.15 ÷ 0.30

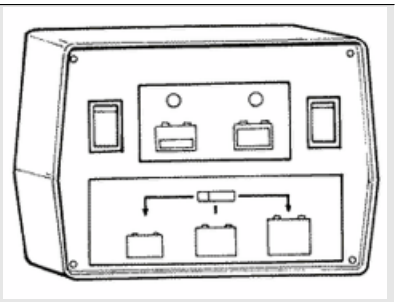
Products

RECOMMENDED PRODUCTS TABLE

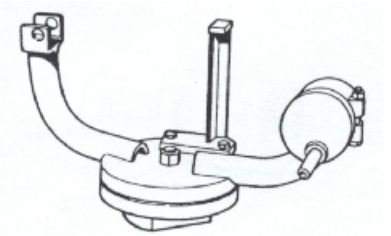
Product	Description	Specifications
AGIP GEAR SAE 80W-90	Lubricant for gearboxes and transmissions.	API GL-4
eni i-Ride PG 5W-40	Synthetic based lubricant for high-performance four-stroke engines.	JASO MA, MA2 - API SL - ACEA A3
AGIP FILTER OIL	Special product for the treatment of foam filters.	-
eni i-Ride PG 5W-40	Synthetic based lubricant for high-performance four-stroke engines.	JASO MA, MA2 - API SL - ACEA A3
AGIP GP 330	Water repellent stringy calcium spray grease.	R.I.D./A.D.R. 2 10°b) 2 R.I.Na. 2.42 - I.A.T.A. 2 - I.M.D.G. class 2 UN 1950 Page 9022 EM 25-89
AGIP GREASE SM 2	Gray black smooth-textured lithium grease, containing molybdenum disulphide.	-
AGIP BRAKE 4	Brake fluid.	Synthetic fluid SAE J 1703 -FMVSS 116 - DOT 3/4 - ISO 4925 - CUNA NC 956 DOT 4
MONTBLANC MOLYBDENUM GREASE	Grease for driven pulley shaft adjusting ring and movable driven pulley housing	Grease with molybdenum disulphide
AGIP GREASE PV2	Ivory smooth-textured, slightly-stringy anhydrous calcium-base grease.	TL 9150 066, symbol NATO G 460

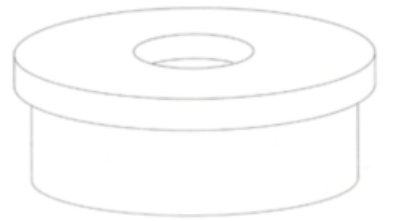
INDEX OF TOPICS

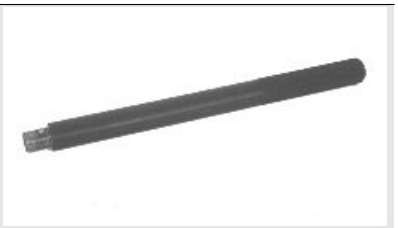
APPROPRIATE TOOL

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

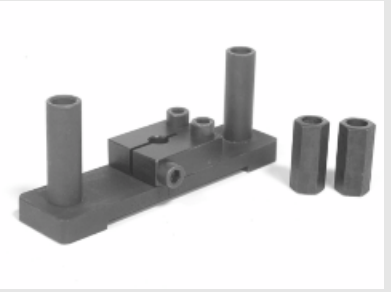
Stores code	Description	
020412Y	15-mm guide	
020335Y	Magnetic support for dial gauge	
020565Y	Flywheel lock calliper spanner	
020439Y	17-mm guide	
020359Y	42x47-mm Adaptor	

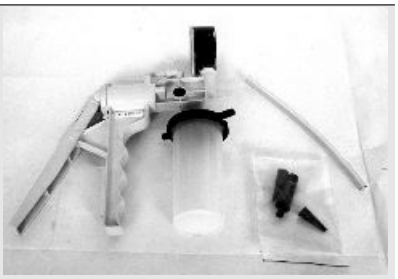
Stores code	Description	
020363Y	20-mm guide	
020459Y	Punch for fitting bearing on steering tube	
020458Y	Puller for lower bearing on steering tube	
005095Y	Engine support	
008564Y	Flywheel extractor	
020434Y	Oil pressure check fitting	

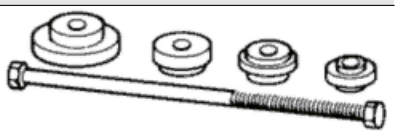
Stores code	Description	
020382Y011	adapter for valve removal tool	
020424Y	Driven pulley roller casing fitting punch	
020431Y	Valve oil seal extractor	
020193Y	Oil pressure check gauge	
020306Y	Punch for assembling valve seal rings	
020360Y	52x55-mm Adaptor	

Stores code	Description	
020364Y	25-mm guide	
020375Y	28 x 30 mm adaptor	
020376Y	Adaptor handle	
020444Y	Tool for fitting/ removing the driven pulley clutch	
020330Y	Stroboscopic light to check timing	
001467Y035	Bearing housing, outside ø 47 mm	

Stores code	Description	
020368Y	driving pulley lock wrench	
020319Y	Immobilizer check tester	
020287Y	Clamp to fit piston on cylinder	
020263Y	Driven pulley assembly sheath	
020262Y	Crankcase splitting plate	
020430Y	Pin lock fitting tool	

Stores code	Description	
020428Y	Piston position check mounting	
020426Y	Piston fitting fork	
020425Y	Punch for flywheel-side oil seal	
020423Y	Driven pulley lock wrench	
020414Y	28-mm guide	
020393Y	Piston assembly 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	Mity-Vac vacuum-operated pump	
020357Y	32x35-mm Adaptor	
020456Y	Ø 24-mm adaptor	

Stores code	Description	
020332Y	Digital rpm indicator	
020074Y	Support base for checking crankshaft alignment	
020055Y	Wrench for steering tube ring nut	
002465Y	Pliers for circlips	
001330Y	Tool for fitting steering seats	
020454Y	Tool for fitting piston pin stops (200 - 250)	

Stores code	Description	
020622Y	Transmission-side oil seal punch	
020444Y011	adapter ring	
020444Y009	wrench 46 x 55	
001467Y	Extractor for bearings for holes	
001467Y013	Pliers to extract ø 15-mm bearings	
020444Y010	adapter ring	

Stores code	Description	
494929Y	Exhaust fumes analyser	

INDEX OF TOPICS

Maintenance chart

MAINTENANCE TABLE

***I**: CHECK AND CLEAN, ADJUST, LUBRICATE OR REPLACE, IF NECESSARY*
***C**. CLEAN, **R**: REPLACE, **A**: ADJUST, **L**: LUBRICATE*
Clean the SAS air filter every 2 years
** Check level every 3,000 km*
*** Replace every 2 years*

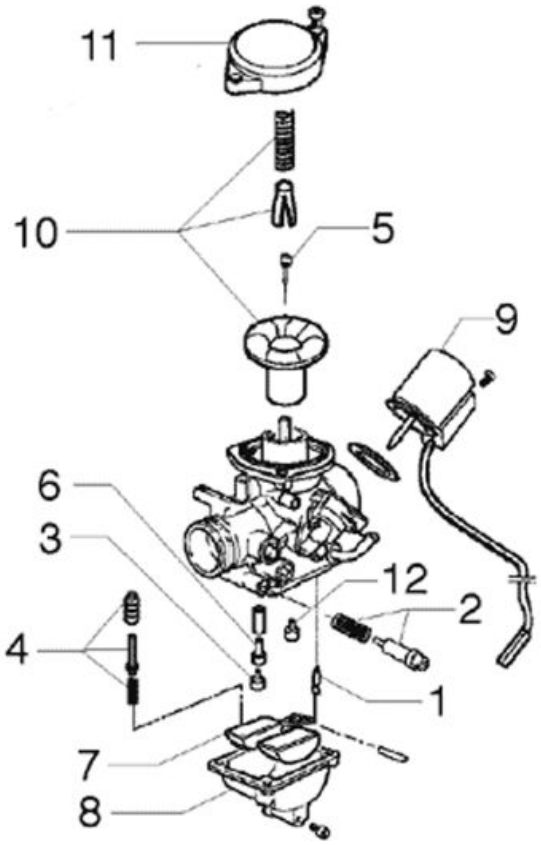
km x 1,000	1	6	12	18	24	30	36	42	48	54	60
Driven pulley roller casing			L		L		L		L		L
Safety fasteners	I		I		I		I		I		I
Spark plug		I	R	I	R	I	R	I	R	I	R
Drive belt		I	R	I	R	I	R	I	R	I	R
Throttle control	A		A		A		A		A		A
Air filter		C	C	C	C	C	C	C	C	C	C
Oil filter		R	R	R	R	R	R	R	R	R	R
Valve clearance		A			A				A		
Electrical system and battery	I	I	I	I	I	I	I	I	I	I	I
Brake levers	L		L		L		L		L		L
Brake fluid **	I	I	I	I	I	I	I	I	I	I	I
Coolant **		I	I	I	I	I	I	I	I	I	I
Engine oil *	R	R	R	R	R	R	R	R	R	R	R
Hub oil	R	I	I	I	R	I	R	I	R	I	I
Headlight direction adjustment			A		A		A		A		A
Brake pads	I	I	I	I	I	I	I	I	I	I	I
Sliding blocks / variable speed rollers		I	I	I	R	I	I	I	R	I	I
Tyre pressure and wear	I	I	I	I	I	I	I	I	I	I	I
Vehicle road test	I	I	I	I	I	I	I	I	I	I	I
Radiator (external cleaning)				I			I			I	
Idle speed	A		A		A		A		A		A
Odometer gear			L								L
Suspension			I		I		I		I		I
Steering	A		A		A		A		A		A
Transmission			L		L		L		L		L

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

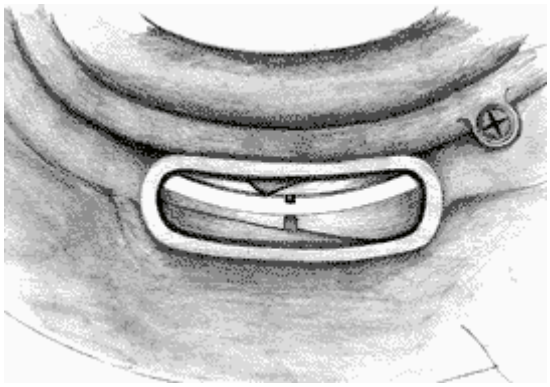
PETROL IS HIGHLY EXPLOSIVE ALWAYS REPLACE THE GASKETS TO AVOID PETROL LEAKS

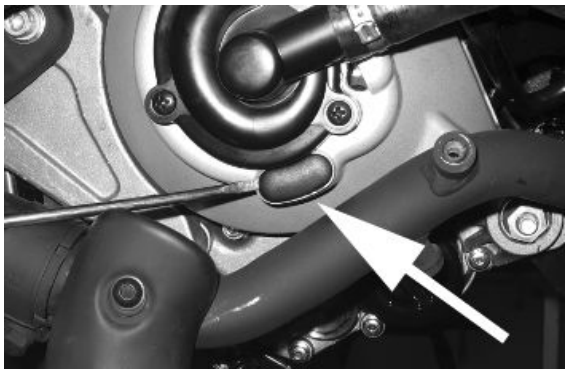


1. Diaphragm cover
2. Gas valve spring
3. Tapered pin support
4. Tapered pin spring
5. Tapered pin
6. Throttle valve diaphragm
7. Automatic starter
8. Idle speed adjustment screw
9. Accelerating pump rocking lever
10. Idle mixture adjustment screw
11. Float pin
12. Acceleration pump unit
13. Float
14. Tank
15. Minimum jet
16. Maximum jet
17. Diffuser
18. Tank drainage screw.

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 revolution 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 AT cable).
- 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.
- Check that the advance degrees corresponds with the rotation rpm as indicated in the table.
- If there are anomalies, 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.





Characteristic

Ignition advance 125 check

10° ± 1° at 2000 rpm

Variable ignition advance (before TDC)

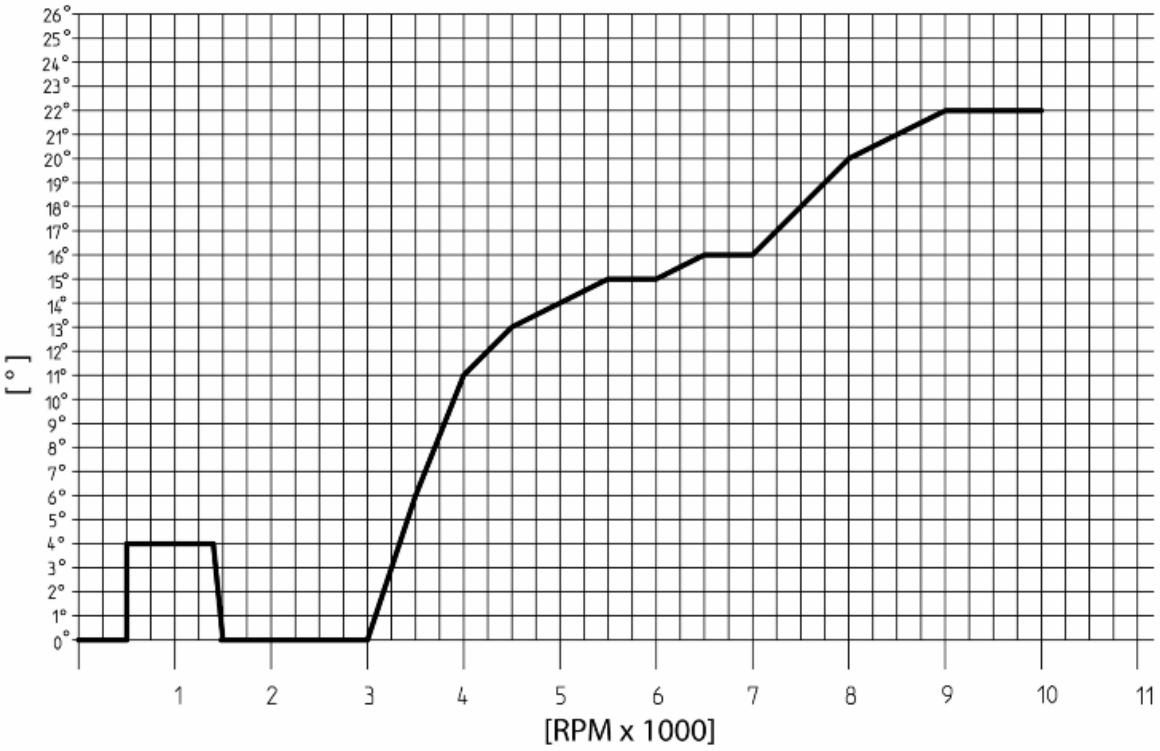
From

10° ± 1° at 2000 rpm

Spark advance variation

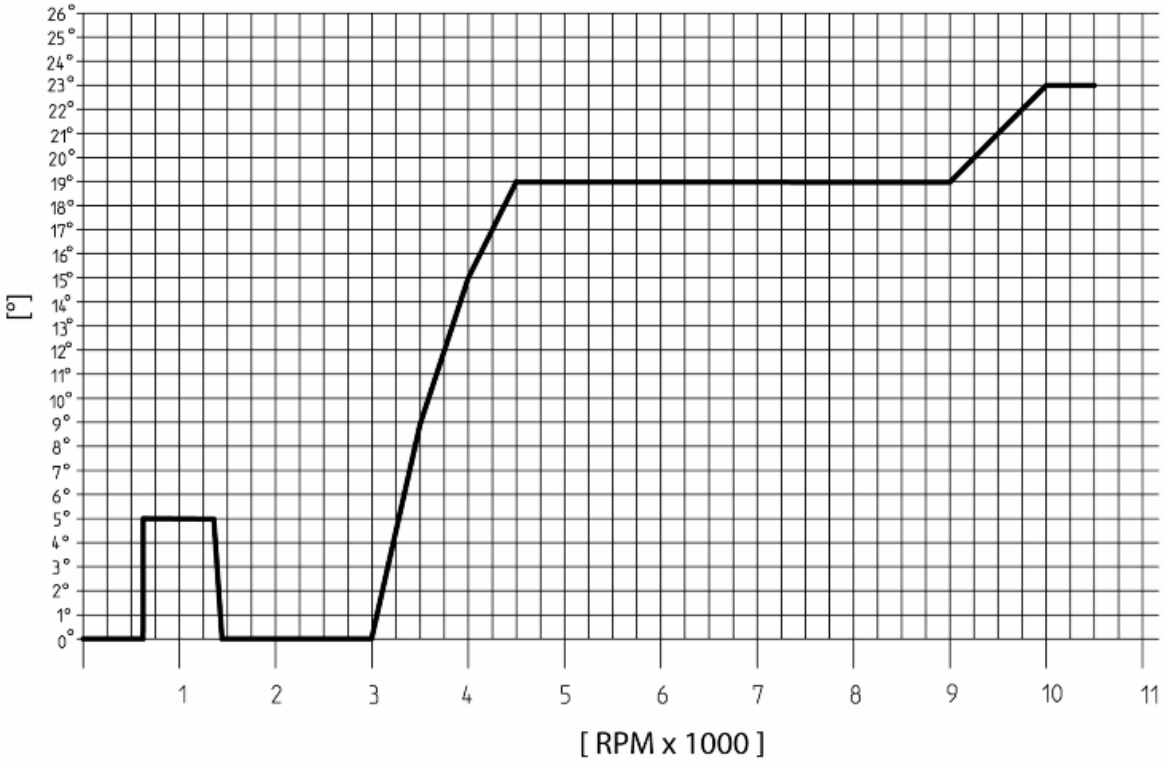
VERSION 200

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
Spark elimination	First threshold : 1 spark on 7 Second threshold : 2 sparks on 3



VERSION 125

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



Spark plug

To service the spark plug the engine must be cold, proceed as follows:

- Remove the right fairing undoing the 4 screws

- Remove the spark plug cap.

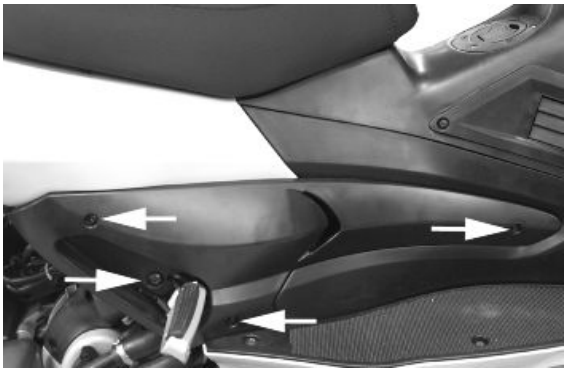
- Use the supplied spanner (with retaining rubber ring) to remove the spark plug.

- Examine it carefully and replace it if the insulator is chipped or cracked.

- Measure electrode gap with a thickness gauge and, if necessary, adjust the gap by carefully bending the outer electrode forward or away.

- Make sure the sealing washer is in good condition.

- Fit the spark plug, screw it manually and lock it to the prescribed torque with a spark plug spanner.



CAUTION

THE SPARK PLUG MUST BE REMOVED WHEN THE MOTOR IS COLD. THE SPARK PLUG MUST BE REPLACED EVERY 12,000 KM. THE USE OF NON CONFORMING IGNITION CONTROL UNITS OR SPARK PLUGS OTHER THAN THOSE PRESCRIBED CAN SERIOUSLY DAMAGE THE ENGINE.

Characteristic

Electrode gap

0.7 to 0.8 mm

Electric characteristic

Recommended spark plug (125)

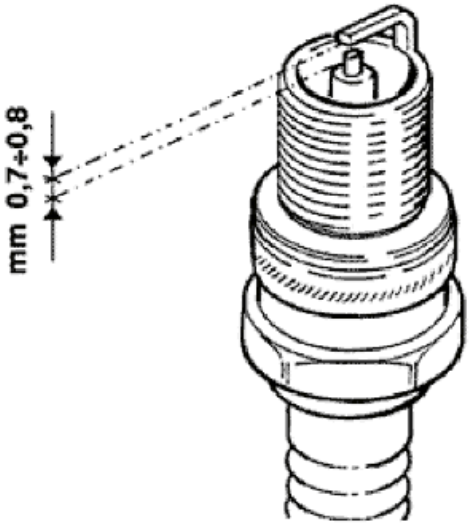
CHAMPION RG4HC - NGK CR8EB

Recommended spark plug (200)

CHAMPION RG6YC - NGK CR8EB

Locking torques (N*m)

Spark plug **12 to 14**



Hub oil

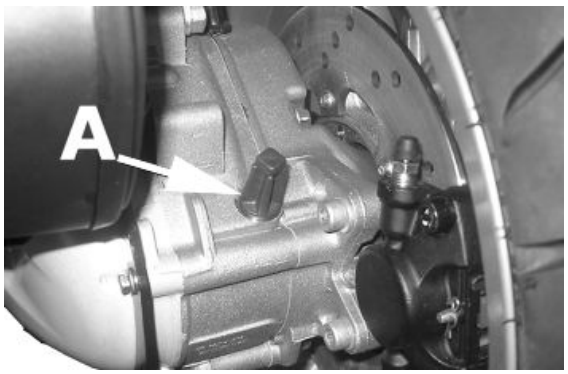
Check

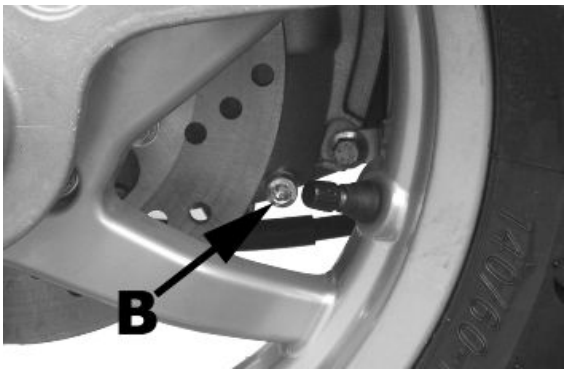
-Stand the vehicle on its centre stand on flat ground;

-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.



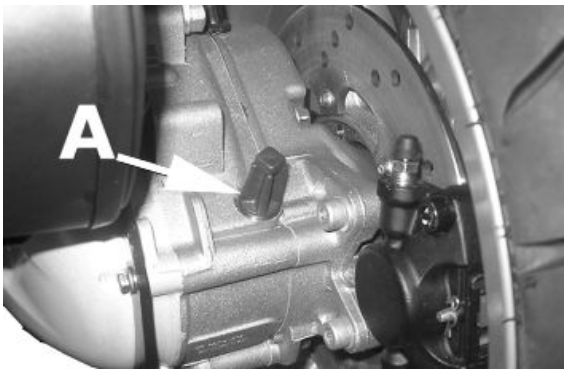


Replacement

-Remove the oil cap «**A**».

- Unscrew the oil drainage cap "**B**" and drain out all the oil.

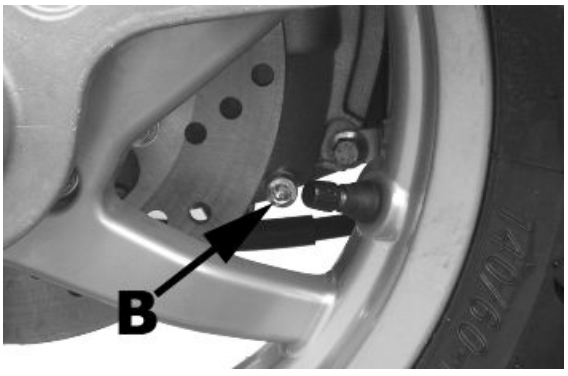
- Screw in the drainage cap again and fill the hub with the prescribed oil.



Recommended products

AGIP GEAR SAE 80W-90 Lubricant for gear-boxes and transmissions.

API GL-4



Characteristic

Rear hub oil

Capacity ~ 150 cm³

Locking torques (N*m)

Hub oil drainage screw 15 to 17 Nm

Air filter

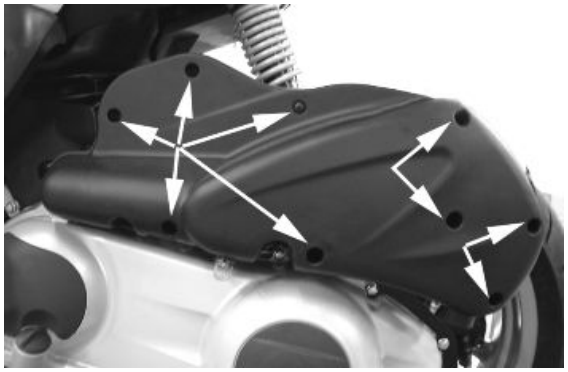
Remove the air cleaner cap after undoing the retainer screws, then extract the filter.

- Wash with water and neutral soap.

-Dry with a clean cloth and short blasts of compressed air.

-Saturate with a 50% mixture of gasoline and oil.

-Drip dry the filter and then squeeze it between the hands without wringing.



CAUTION

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

CAUTION

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

Engine oil

In four stroke engines, the engine oil is used to lubricate the timing elements, the bench bearings and the thermal group. **An insufficient quantity of oil can cause serious damage to the engine.**
In all four stroke engines, the deterioration of the oil characteristics, or a certain consumption should be considered normal, especially if during the run-in period. Consumption levels in particular can be influenced by the conditions of use (e.g.: oil consumption increases when driving at "full throttle".

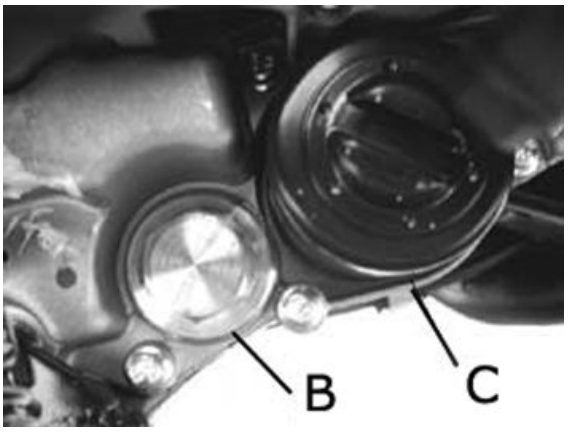
Replacement

Replace oil and filter every 6,000 km. The engine must be drained by running off the oil from drainage cap "**B**" of the flywheel side mesh pre-filter; furthermore to facilitate oil drainage, loosen the cap/dipstick "**A**". Once all the oil has drained through the drainage hole, unscrew the oil cartridge filter "**C**" and remove it.
Make sure the pre-filter and discharge tap O-rings are in good condition.
Lubricate them and refit the gauze filter and oil drainage tap, 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.

Since a certain quantity of oil still remains in the circuit, oil must be filled from cap "**A**". Then start up the scooter, leave it running for a few minutes and switch it off: after five minutes check the level and if necessary top up without exceeding the **MAX** level. 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.



N.B.

THE ENGINE MUST BE HOT WHEN THE OIL IS CHANGED.

Recommended products

eni i-Ride PG 5W-40 Synthetic based lubricant for high-performance four-stroke engines.

JASO MA, MA2 - API SL - ACEA A3

Characteristic

Engine oil top-up

600 ÷ 650 cc

Check

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

1. Place the vehicle on its centre stand and on flat ground.
2. Undo cap/dipstick "**A**", dry it off with a clean cloth and replace it, **screwing down completely**.
3. Remove the cap/dipstick again and check that the level is between the min and max. marks; top up if necessary.

The MAX level mark indicates a quantity of around 1100 cc 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.

Oil top up

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

The restoration level between the **MIN** and **MAX** levels implies a quantity of oil **of approx. 400 cc**.

Oil pressure warning light

The vehicle is equipped with a telltale light on the dashboard that lights up when the key is turned to the «**ON**» position. However, this light should switch off once the engine has 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.

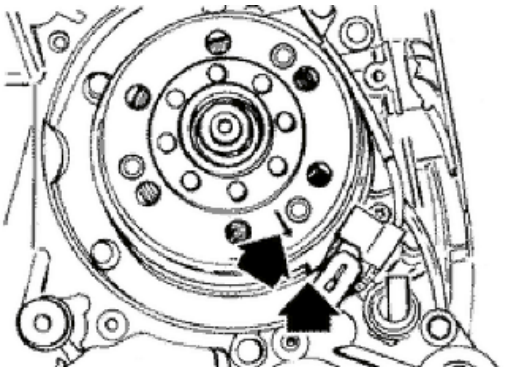
Checking the ignition timing

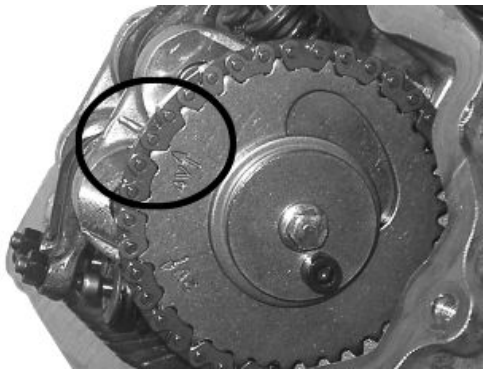
-Remove the 4 fixing screws and move away from the engine the flywheel cover fitted with a water pump and cooling manifolds.

-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 feeler gauge to check that the clearance between the valve and the register 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.

Intake: 0.10 mm (when cold)

Discharge: 0.15 mm (when cold)

Level check

- Remove the front grille

- Check that the coolant level is between the min and max reference marks.

Top up with recommended coolant, if necessary.

Recommended products

AGIP PERMANENT PLUS Amine, Nitrite and phosphate-free antifreeze. Turquoise, biodegradable, ready to use.

ASTM D 3306 - ASTM D 2570 - ASTM D 4340 - CUNA NC 956-10 - CUNA NC 956-16

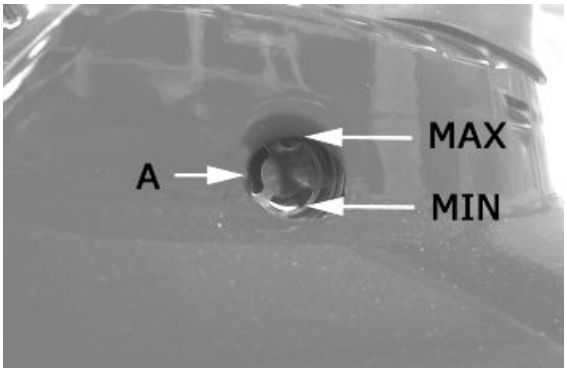
Level check

Proceed as follows:

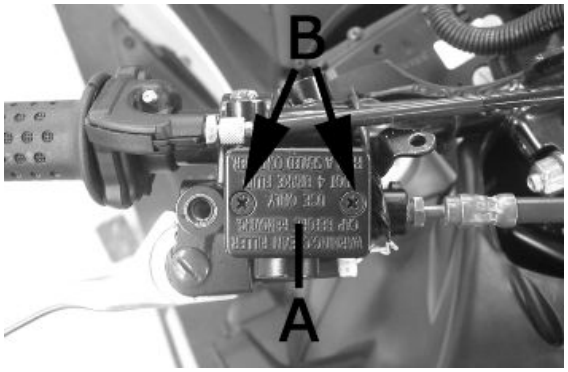
- Rest the vehicle on its centre stand with the handlebars perfectly horizontal;

- Check the level of liquid with the related warning light «**A**».

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



Top-up



Proceed as follows:

1. rest the vehicle on its centre stand with the handlebars perfectly horizontal;

2. remove the rear-view mirrors;

3. remove the front handlebar cover;

4. remove the tank cover «**A**» loosening the two fixing screws «**B**» and restore the level using only the prescribed fluid without exceeding the maximum level.

Under normal climatic conditions, the liquid should be replaced every two years. This operation must be carried out by trained technicians, please contact an **Authorised Piaggio-Gilera Service Centre**

CAUTION

TOP-UPS SHOULD ONLY BE CARRIED OUT WITH DOT4 CLASSIFIED BRAKE FLUID.

CAUTION

THE BRAKING CIRCUIT FLUID IS HIGHLY CORROSIVE. THEREFORE, WHEN TOPPING UP, AVOID LETTING IT COME INTO CONTACT WITH THE PAINTED PARTS OF THE VEHICLE. THE BRAKING CIRCUIT FLUID IS HYGROSCOPIC, THAT IS, IT ABSORBS HUMIDITY FROM THE SURROUNDING AIR. IF MOISTURE CONTAINED IN THE BRAKE FLUID EXCEEDS A CERTAIN VALUE, THIS WILL RESULT IN INEFFICIENT BRAKING.

WARNING

IN NORMAL CLIMATIC CONDITIONS IT IS ADVISABLE TO REPLACE THE ABOVE-MENTIONED FLUID EVERY 2 YEAR. NEVER USE BRAKE FLUID CONTAINED IN CONTAINERS WHICH ARE ALREADY OPEN OR PARTIALLY USED.

Recommended products

AGIP BRAKE 4 Brake fluid.

Synthetic fluid SAE J 1703 -FMVSS 116 - DOT 3/4 - ISO 4925 - CUNA NC 956 DOT 4

Headlight adjustment

Proceed as follows:

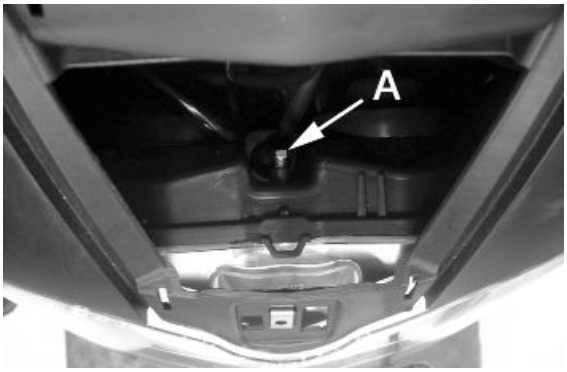
1. Place the vehicle in running order and with the tyres inflated to the prescribed pressure, on a flat surface 10 m away from a white screen situated in a shaded area, making sure that the longitudinal axis of the vehicle is perpendicular to the screen;

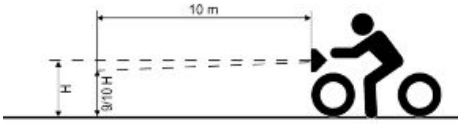
2. Turn on the headlight and check that the borderline of the projected light beam on the screen is not lower than 9/10 of the distance from the ground to the centre of vehicle headlamp and higher than 7/10;

3. Otherwise, regulate the headlight by adjusting the screw «**A**», after removing the front grille.

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.





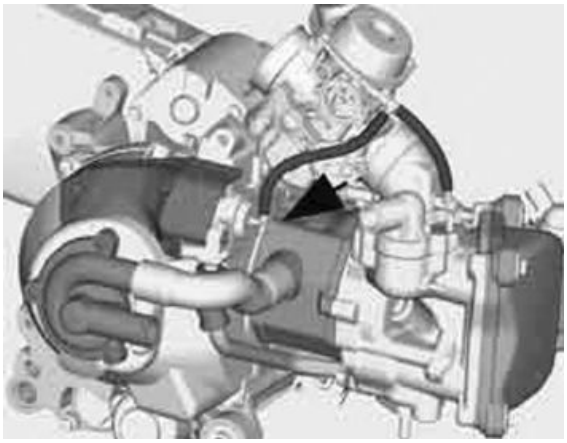
SAS filters inspection and cleaning

the SAS for leader engines 125 cm³ - 200 cm³ Euro 2 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.

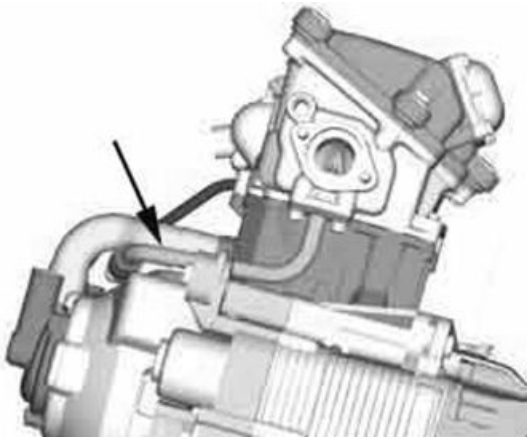


System description:

The air is drawn through a passage behind the secondary air box cover, passes through that cover and flows towards the valve.

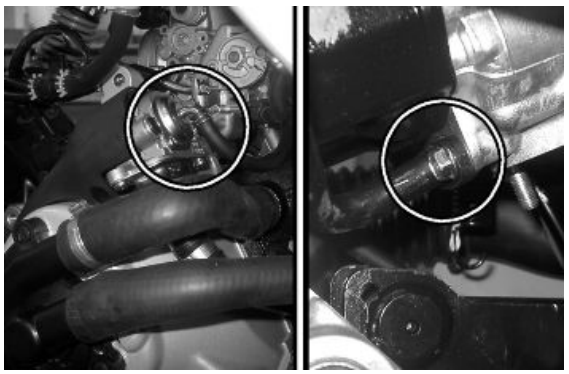
Now the filtered air enters the diaphragm valve to be channelled towards the head.

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.

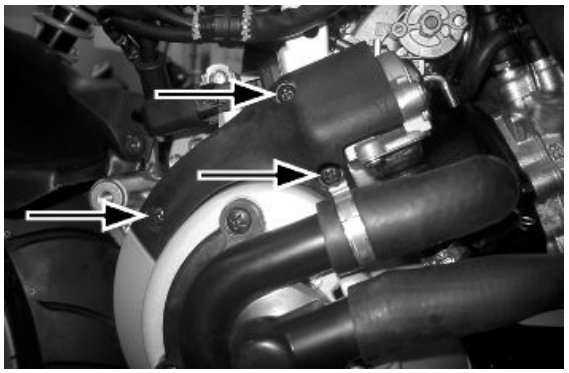


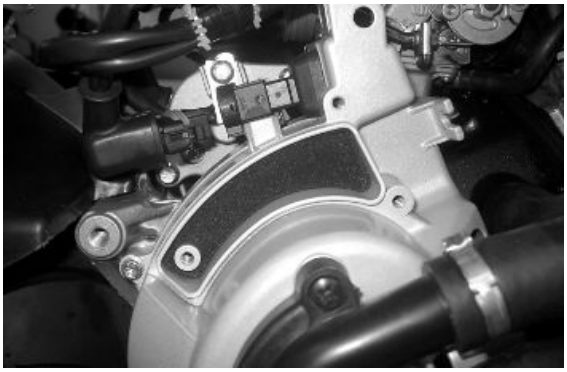
- Detach the vehicle electric cable harness from its attachment fitting on the crankcase.
- Remove the 2 fixing screws, the gasket and the pipe connecting the SAS valve to the head.

- Disconnect the depression pipe from the SAS valve



- Unscrew the 3 fixing screws of the SAS valve cover from the flywheel cover and remove it together with the whole valve.
- Unscrew the 2 fixing screws of the SAS valve and separate all the components.





- Check that the sas valve plastic support is not dented or distorted
- Check the integrity of the rubber gasket between the valve and the sas air filter support.
- Clean the filter thoroughly. Replace the filter if it is damaged or distorted.
- Check that the coupling connecting the secondary air to the metal pipe does not have any dents, overheating or warping. If there is, replace it.
- Check that the metal pipe does not have any dents

CAUTION

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

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

CAUTION

NEVER RUN THE ENGINE WITHOUT THE SECONDARY AIR FILTER

CAUTION

WHEN RIDING ON DUSTY STREETS, THE SECONDARY AIR FILTER MUST BE CLEANED MORE OFTEN THAN WHAT IS INDICATED IN THE SCHEDULED MAINTENANCE CHART.

Insert the filter into its housing.

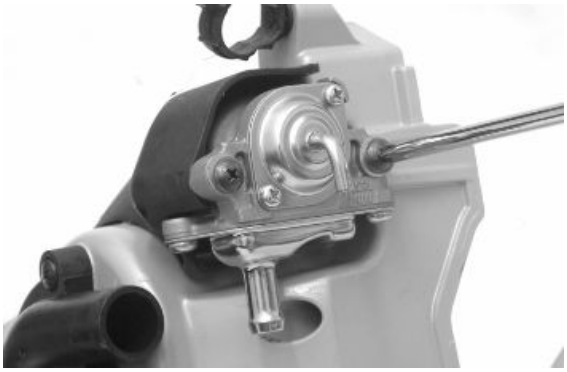
Fit the valve support with the 3 screws

Insert the rubber spacer on the valve and proceed with the assembly on the support.

Fix the valve with 2 screws.

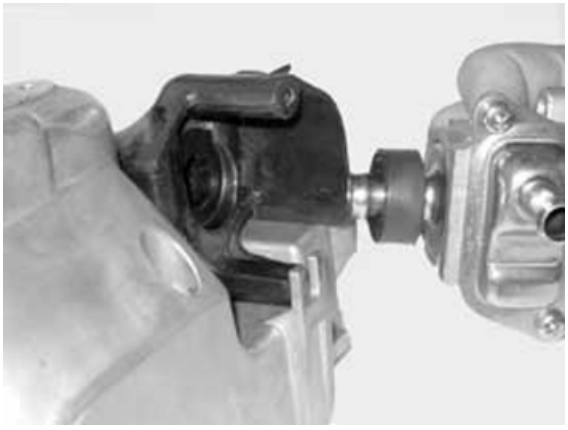
Insert the coupling and the depression pipe into the valve.

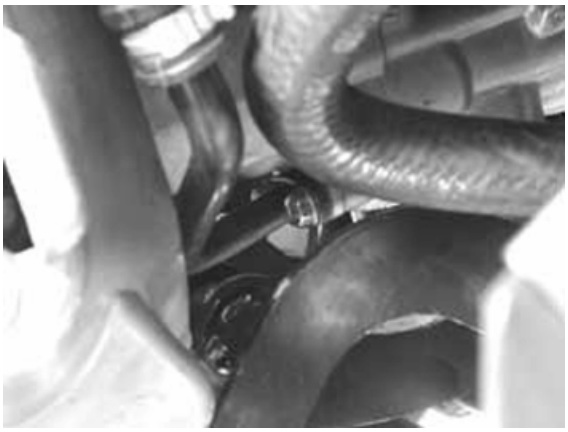
Lock the upper clamp.

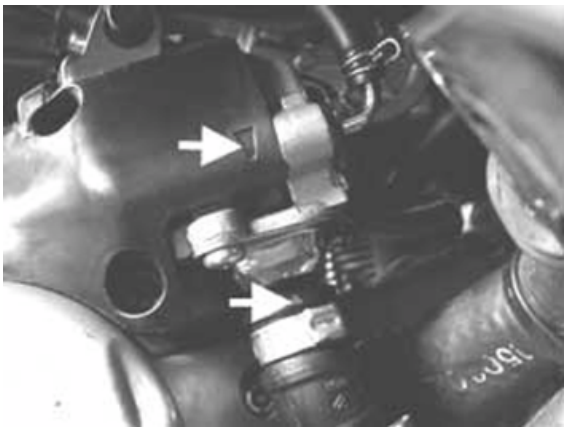


Fix the metal tube to the head using the gasket and the 2 screws.

Lock the lower clamp connecting manifold / pipe.







INDEX OF TOPICS

This section makes it possible to find what solutions to apply when troubleshooting.

For each failure, a list of the possible causes and pertaining operations is given.

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 scales 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
Obstructed muffler	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
Drive belt worn	Replace
Inefficient automatic transmission	Check the rollers and the pulley movement, replace the damaged parts and lubricate the movable guide of the 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 unit
Defective floating valve	Check the proper sliding of the float and the functioning of the valve

Rear wheel spins at idle

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 engine 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
The carburettor is dirty; fuel pump or vacuum valve damaged	Remove, wash with solvent and dry with compressed air or replace

Possible Cause	Operation
Flat battery	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/SMOKY EXHAUST

Possible Cause	Operation
Worn valve guides	Check and replace the head unit if required
Worn valve oil guard	Replace the valve oil seal
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 or replace the pump and the vacuum valve, check the vacuum intake and 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
The starter remains on	Check: electric wiring, circuit not interrupted, mechanical movement and power supply; replace if necessary

Possible Cause	Operation
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
Inefficient Starter	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.

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 faying surface with the bell is mainly in the centre with equivalent characteristics on the three masses. Check that the clutch housing 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.

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 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 INDICATORS NOT WORKING

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

Steering and suspensions

Rear wheel

REAR WHEEL ROTATES WITH ENGINE AT IDLE

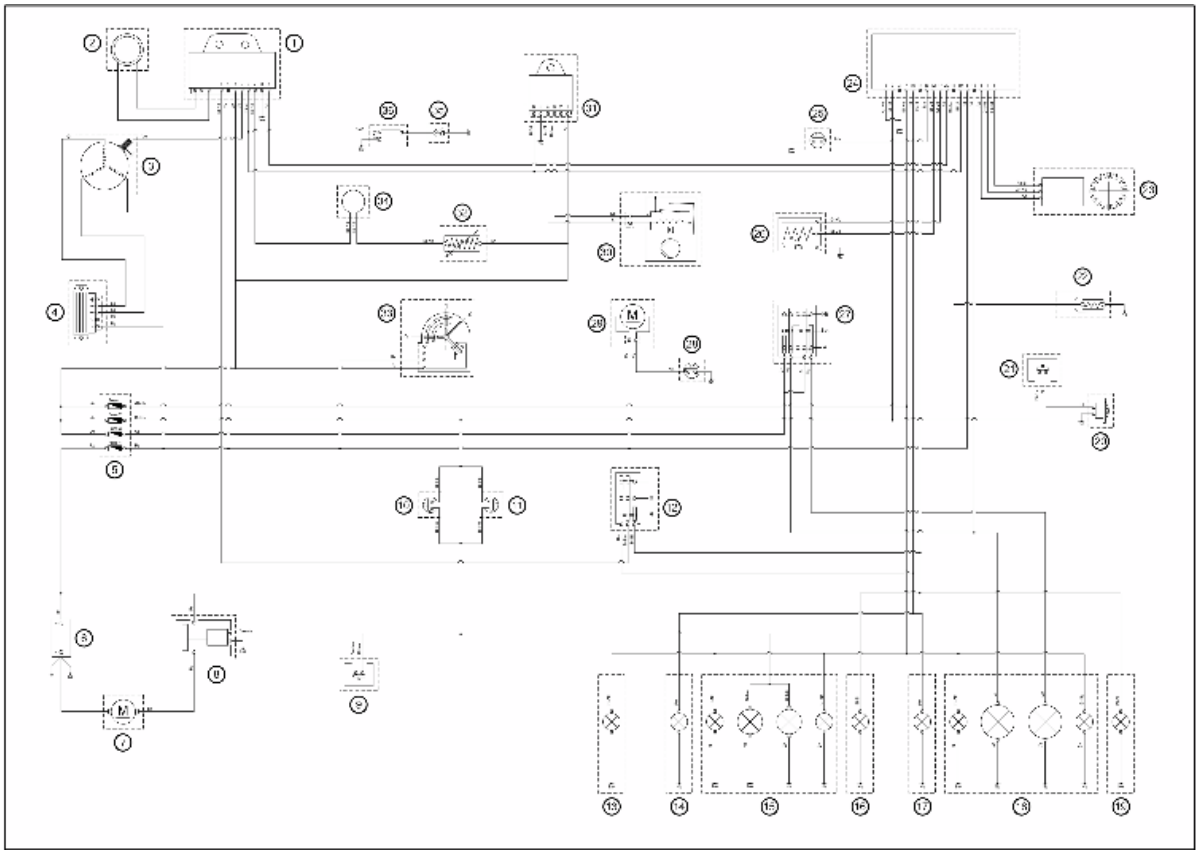
Possible Cause	Operation
Idling rpm too high	Adjust the engine idle speed.
Clutch fault	Check the springs / clutch masses

Controls

STEERING CONTROLS AND SUSPENSIONS

Possible Cause	Operation
Torque not conforming	Check the tightening of the top and bottom ring nuts. If irregularities continue in turning the steering even after making the above adjustments, check the seats in which the ball bearings rotate: replace them if they are recessed or if the balls are flattened.
Steering hardening	Check the tightening of the top and bottom ring nuts. If irregularities continue in turning the steering even after making the above adjustments, check the seats in which the ball bearings rotate: if they are recessed or if the balls are squashed, replace them.
Faults in the suspension system	If the front suspension is noisy, check: the efficiency of the front shock absorber; 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 disc in the attachment to the hub and the steering tube.
Faulty or broken seals	Replace the shock absorber Check the condition of wear of the steering covers and the adjustments.

INDEX OF TOPICS



KEY (With electric pump)

1. Electronic ignition device

2. Immobilizer aerial

3. Magneto flywheel - Pick-up

4. Voltage regulator

5. Fuses

6. Battery

7. Starter motor

8. Start-up remote control switch

9. Start-up button

10. Stop button on rear brake

11. Stop button on front brake

12. Turn indicator switch

13. License plate light

14. Rear left turn indicator

15. Rear light

A. Tail light bulbs

B. Stop light bulbs

16. Rear right turn indicator

17. Left front turn indicator

18. Headlight assembly

A. Tail light bulbs

B. High-beam light bulbs

C. Low-beam light bulb

19. Right front turn indicator

20. Horn

21. Horn button

22. Thermistor

23. Wheel turning sensor

24. Instrument panel

1. +Battery

2. +Key

3. Ground

4. -Hall

5. +Hall

6. Hall

7. Lighting

8. Enable gauge

10. Rev counter

11. Coolant level

12. Fuel level

13. High-beam warning light

14. Right turn indicator

15. Left turn indicator

16. Oil reserve warning light

17. Low fuel warning light

20. Immobilizer LED

25. Engine oil pressure sensor

26. Fuel level transmitter

27. Light switch

28. Thermoswitch

29. Electric fan

30. Fuel pump

31. Electric pump control device

1. +Key

3. Pump ground connection

4. +Pump

5. Ground

6. Engine revs

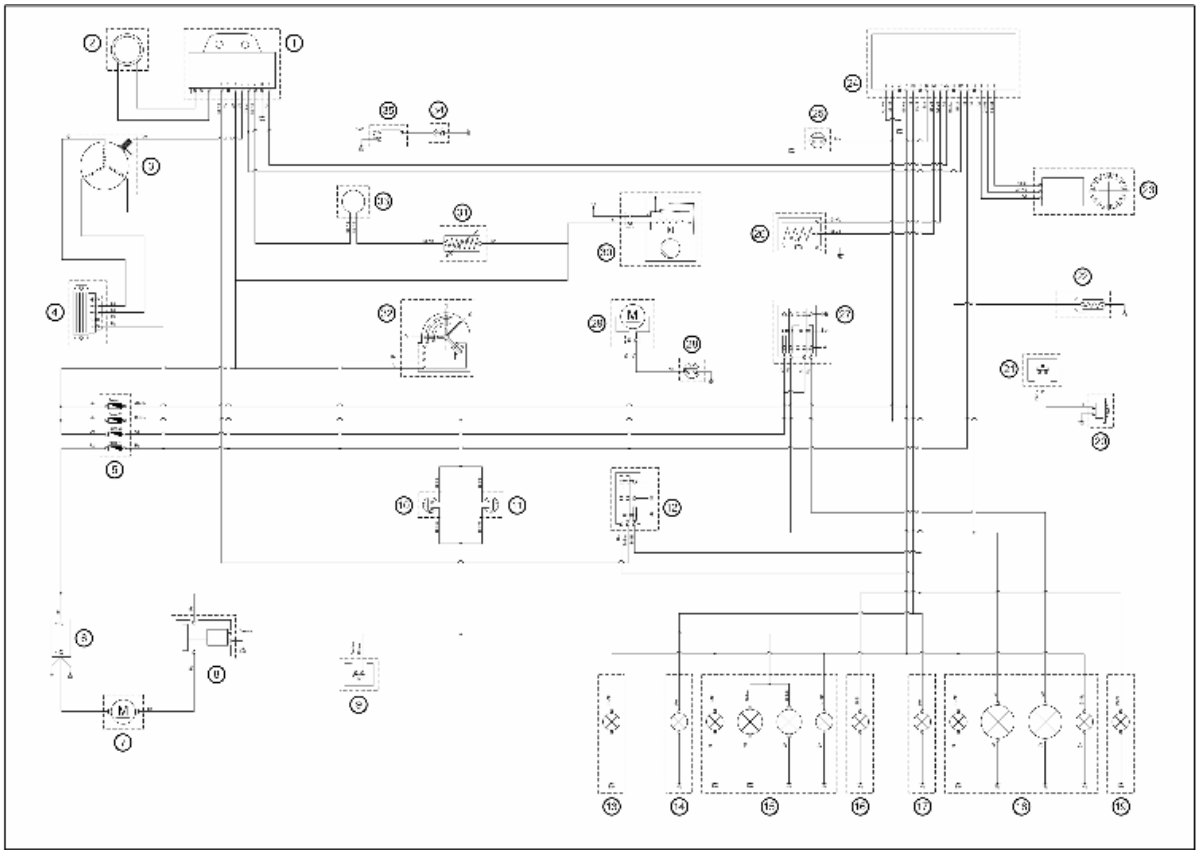
32. Automatic starter

33. Key switch

34. Starter control winding

35. Spark plug

36. HV coil



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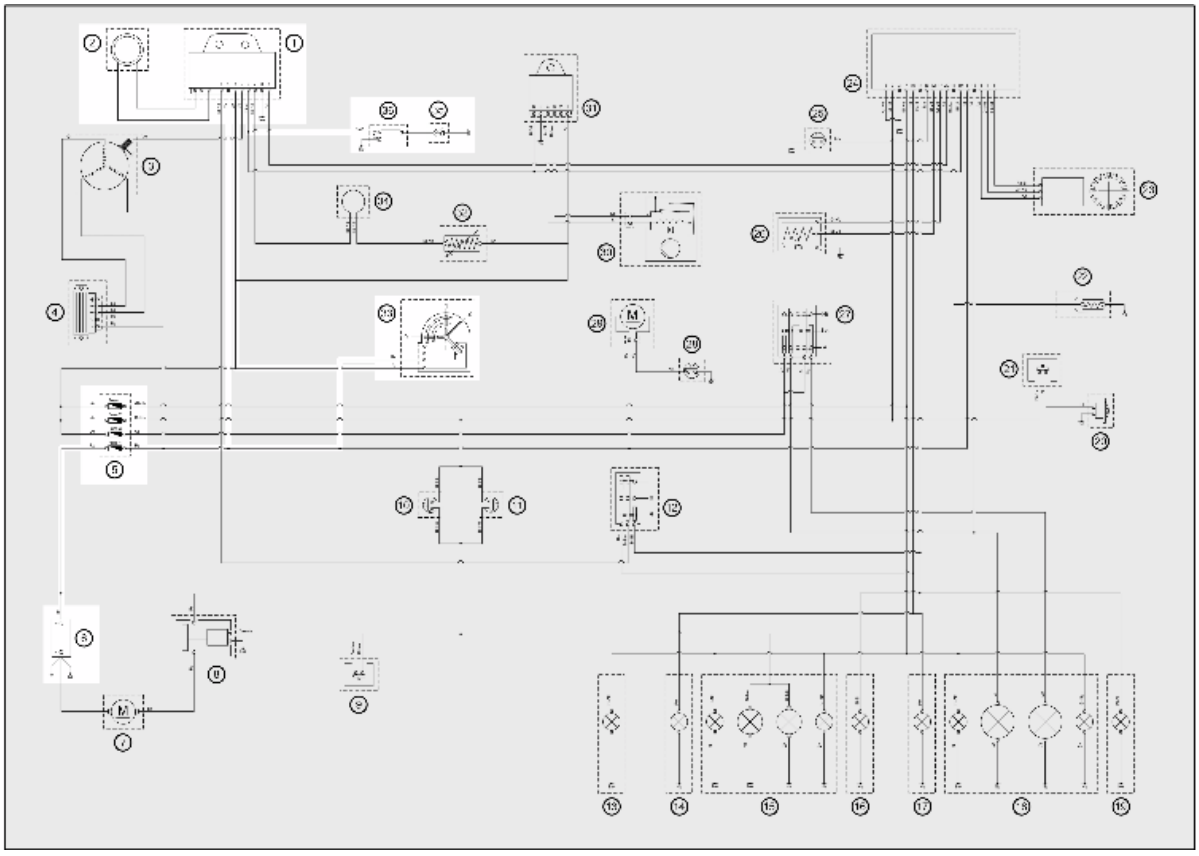
35. HV coil

KEY

Ar: Orange **Az:** Light blue **Bi:** White **Bl:** Blue **Gi:** Yellow **Gr:** Grey **Ma:** Brown **Ne:** Black **Ro:** Pink **Rs:** Red **Ve:** Green **Vi:** Purple

Conceptual diagrams

Ignition



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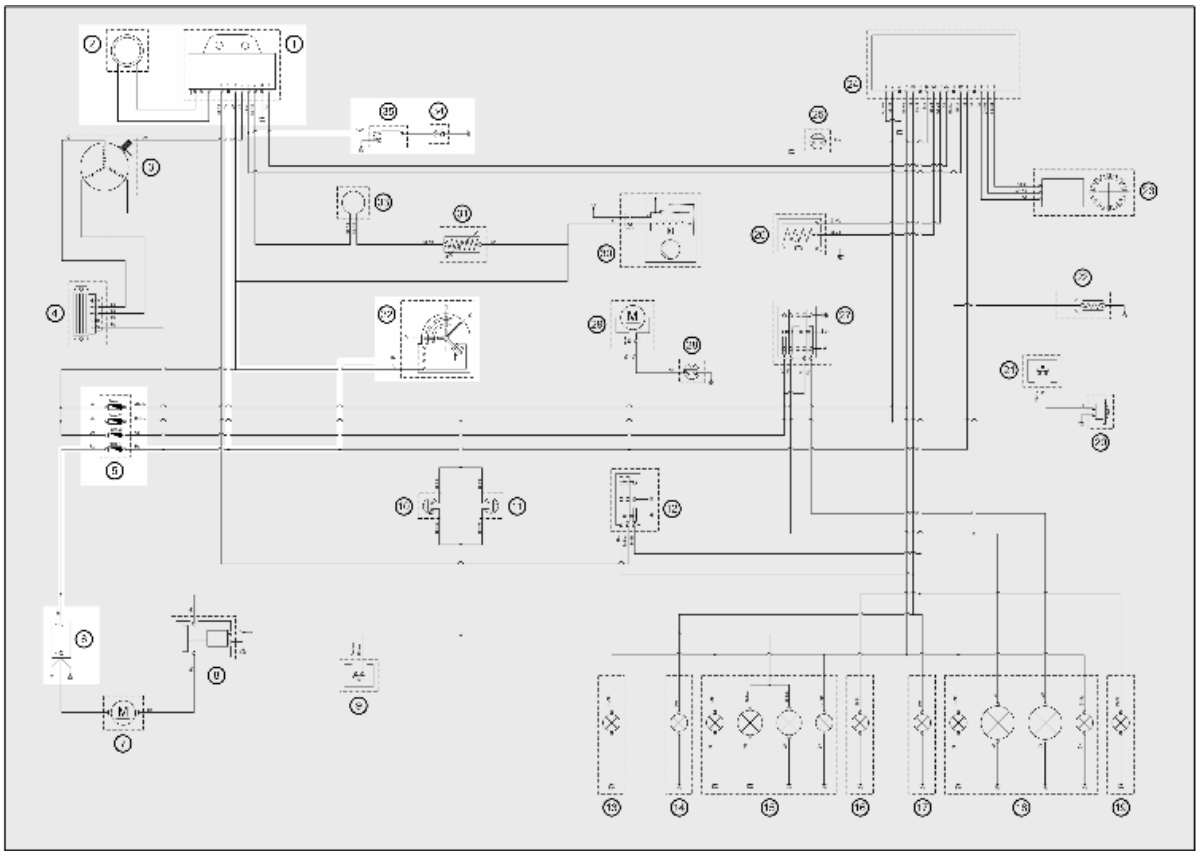

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5. Fuses

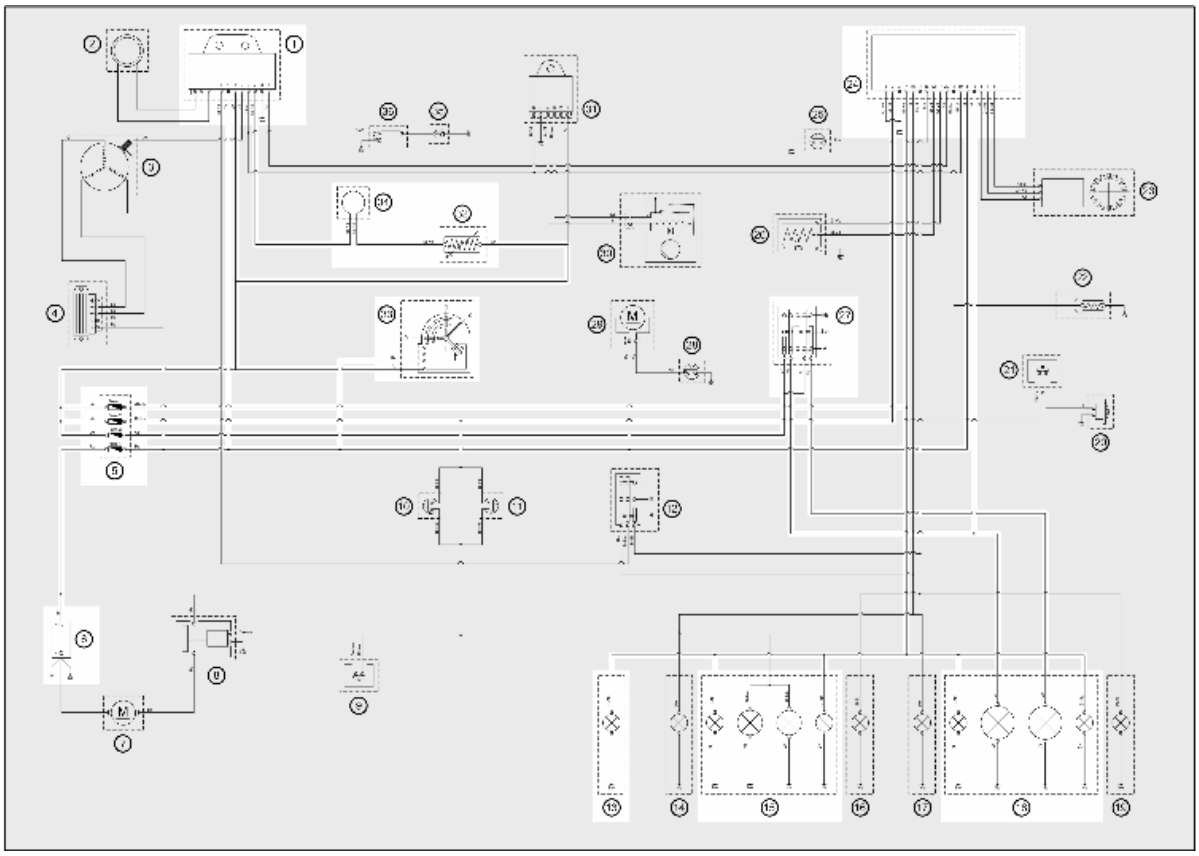
6. Battery

32. Key switch

34. Spark plug

35. HV coil

Headlights and automatic starter section



KEY (With electric pump)

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15. Rear light

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B. Stop light bulbs

18. Headlight assembly

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C. Low-beam light bulb

24. Instrument panel

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2. +Key
3. Ground
4. -Hall
5. +Hall

6. Hall
7. Lighting
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10. Rev counter
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12. Fuel level
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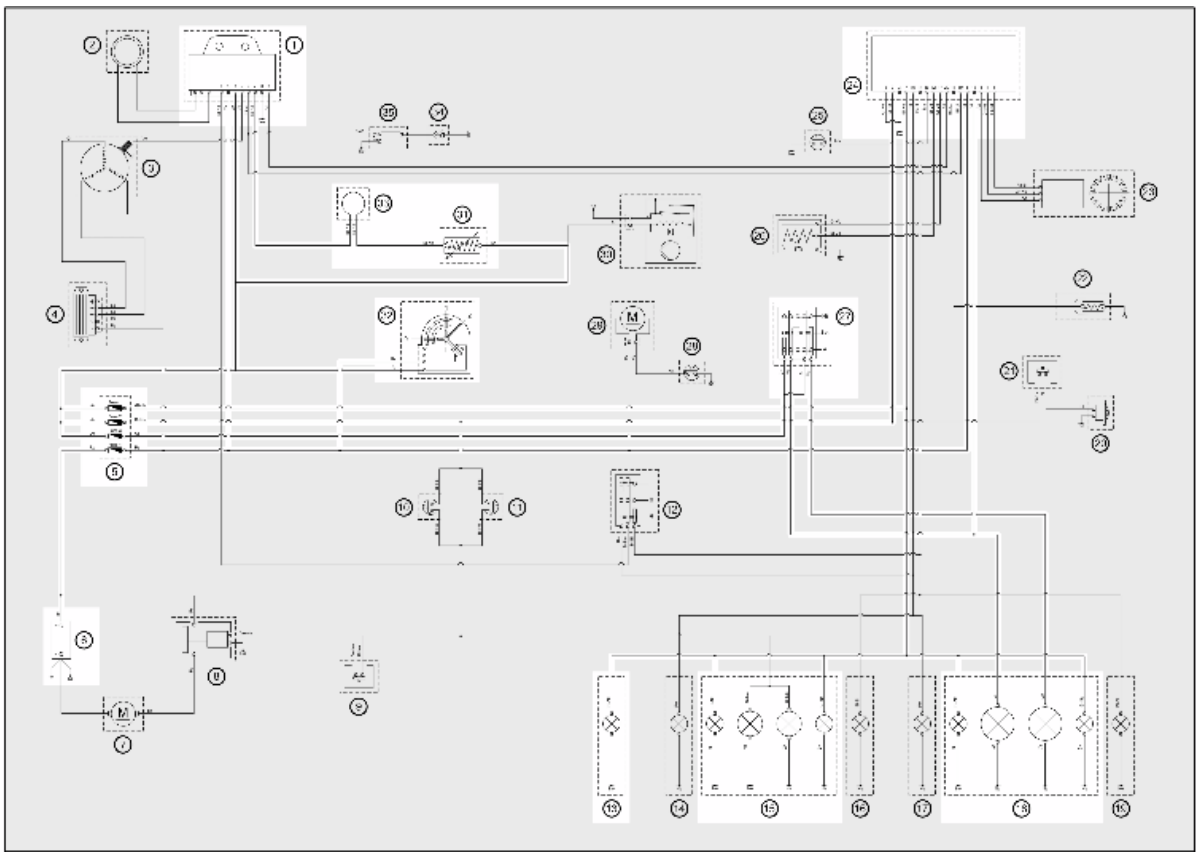
27. Light switch

32. Automatic starter

33. Key switch

34. Starter control winding



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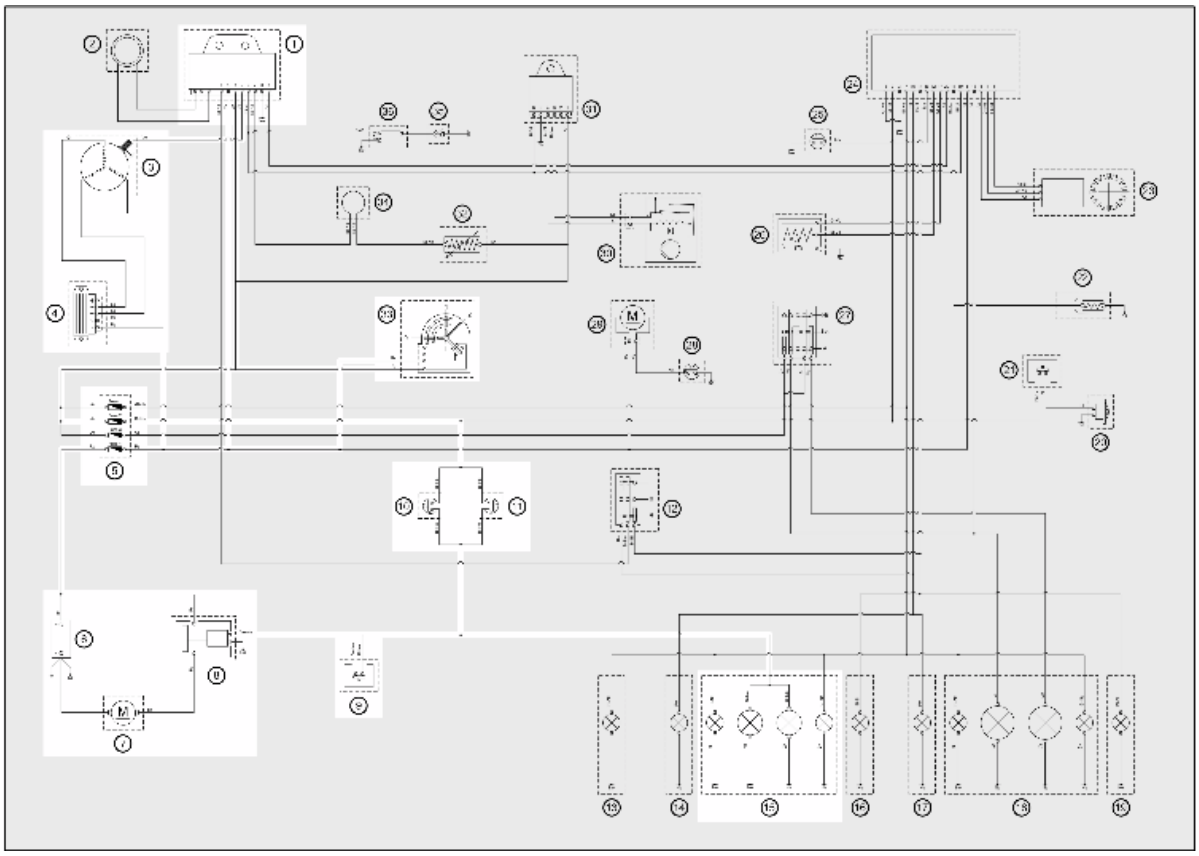
Battery recharge and starting



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1. Electronic ignition device

3. Magneto flywheel - Pick-up

4. Voltage regulator

5. Fuses

6. Battery

7. Starter motor

8. Start-up remote control switch

9. Start-up button

10. Stop button on rear brake

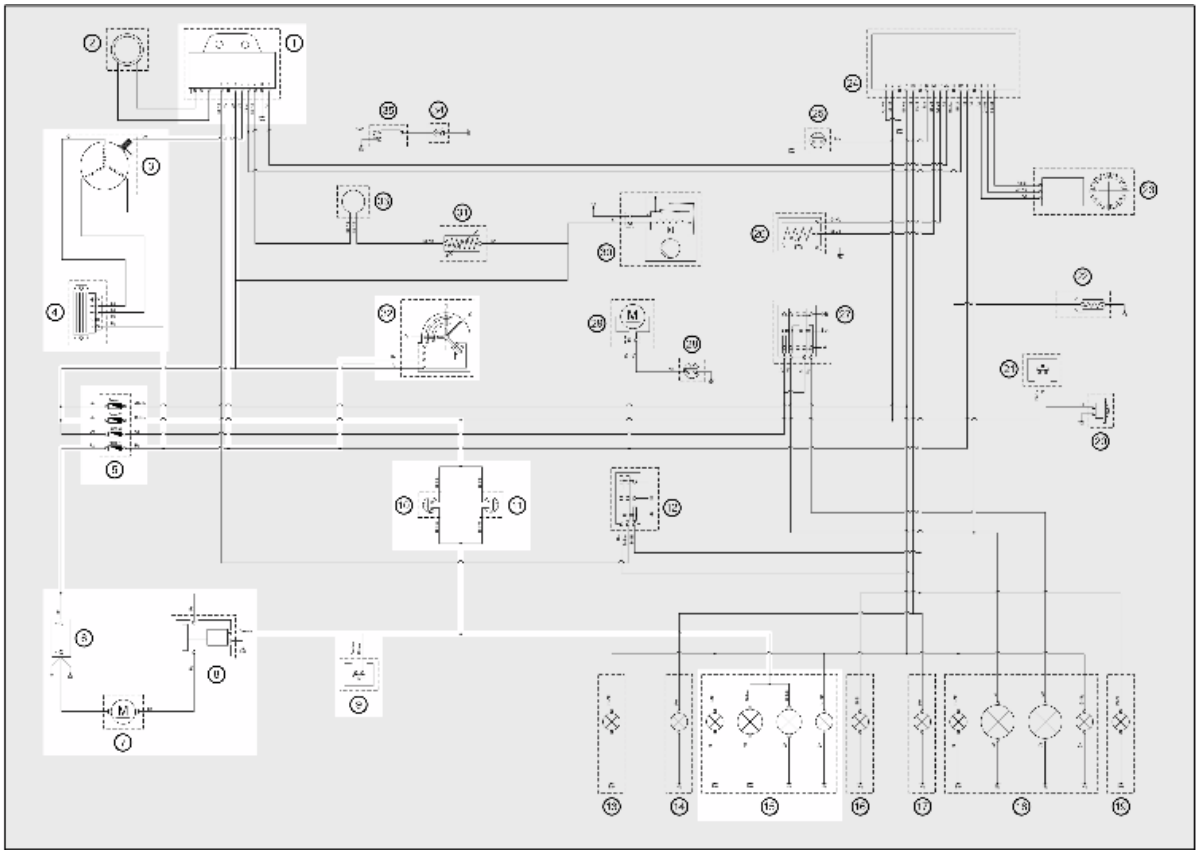
11. Stop button on front brake

15. Rear light

A. Tail light bulbs

B. Stop light bulbs

33. Key switch



KEY (Without electric pump)

1. Electronic ignition device

3. Magneto flywheel - Pick-up

4. Voltage regulator

5. Fuses

6. Battery

7. Starter motor

8. Start-up remote control switch

9. Start-up button

10. Stop button on rear brake

11. Stop button on front brake

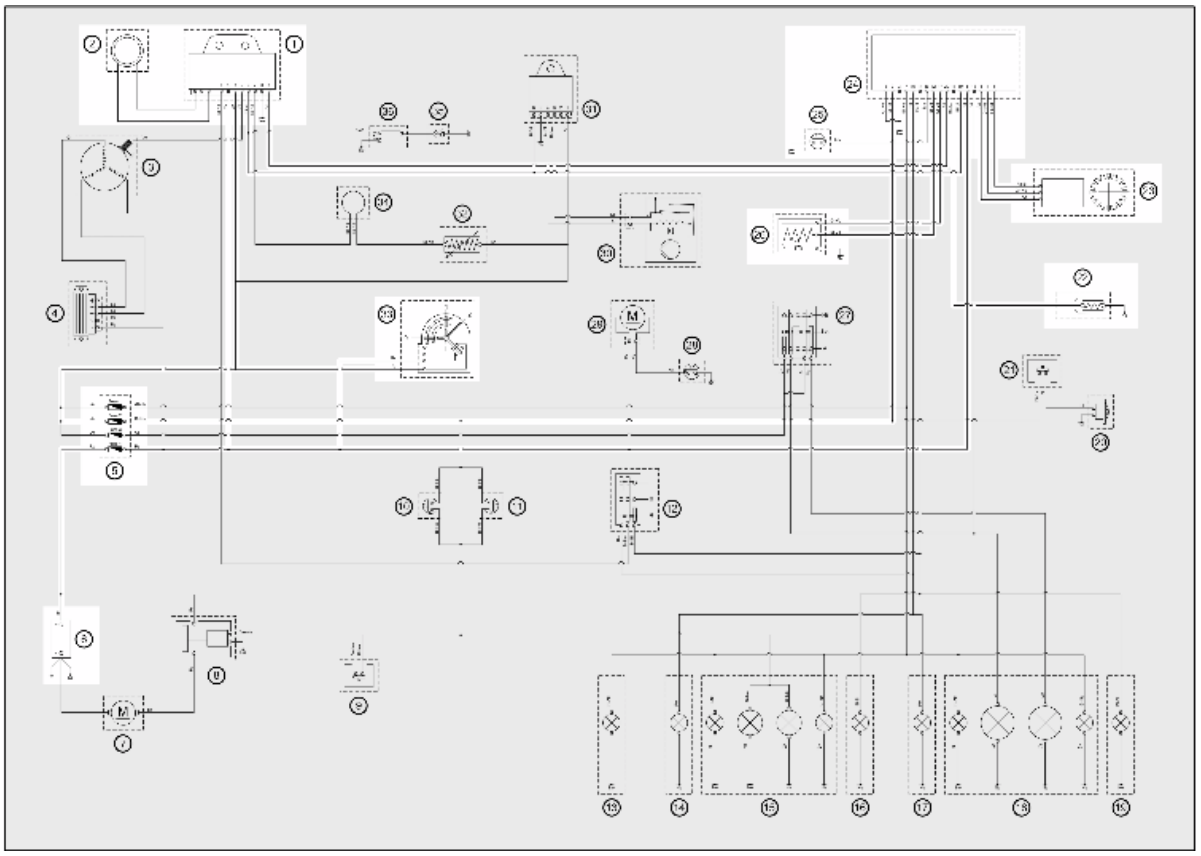
15. Rear light

A. Tail light bulbs

B. Stop light bulbs

32. Key switch

Level indicators and enable signals section



KEY (With electric pump)

1. Electronic ignition device

2. Immobilizer aerial

5. Fuses

6. Battery

22. Thermistor

23. Wheel turning sensor

24. Instrument panel

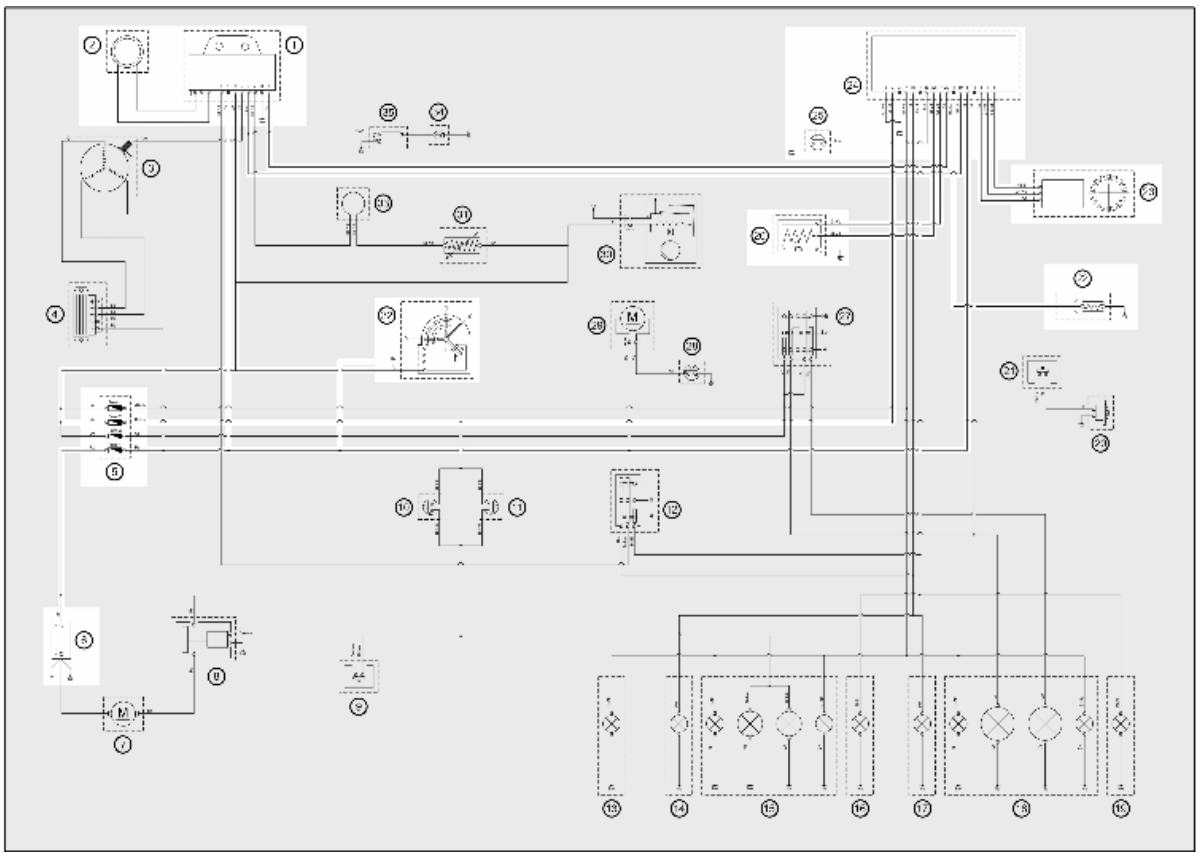
1. +Battery
2. +Key
3. Ground
4. -Hall
5. +Hall
6. Hall
7. Lighting
8. Enable gauge
10. Rev counter
11. Coolant level

12. Fuel level
13. High-beam warning light
14. Right turn indicator
15. Left turn indicator
16. Oil reserve warning light
17. Low fuel warning light
20. Immobilizer LED

25. Engine oil pressure sensor

26. Fuel level transmitter

33. Key switch



KEY (Without electric pump)

1. Electronic ignition device

2. Immobilizer aerial

5. Fuses

6. Battery

22. Thermistor

23. Wheel turning sensor

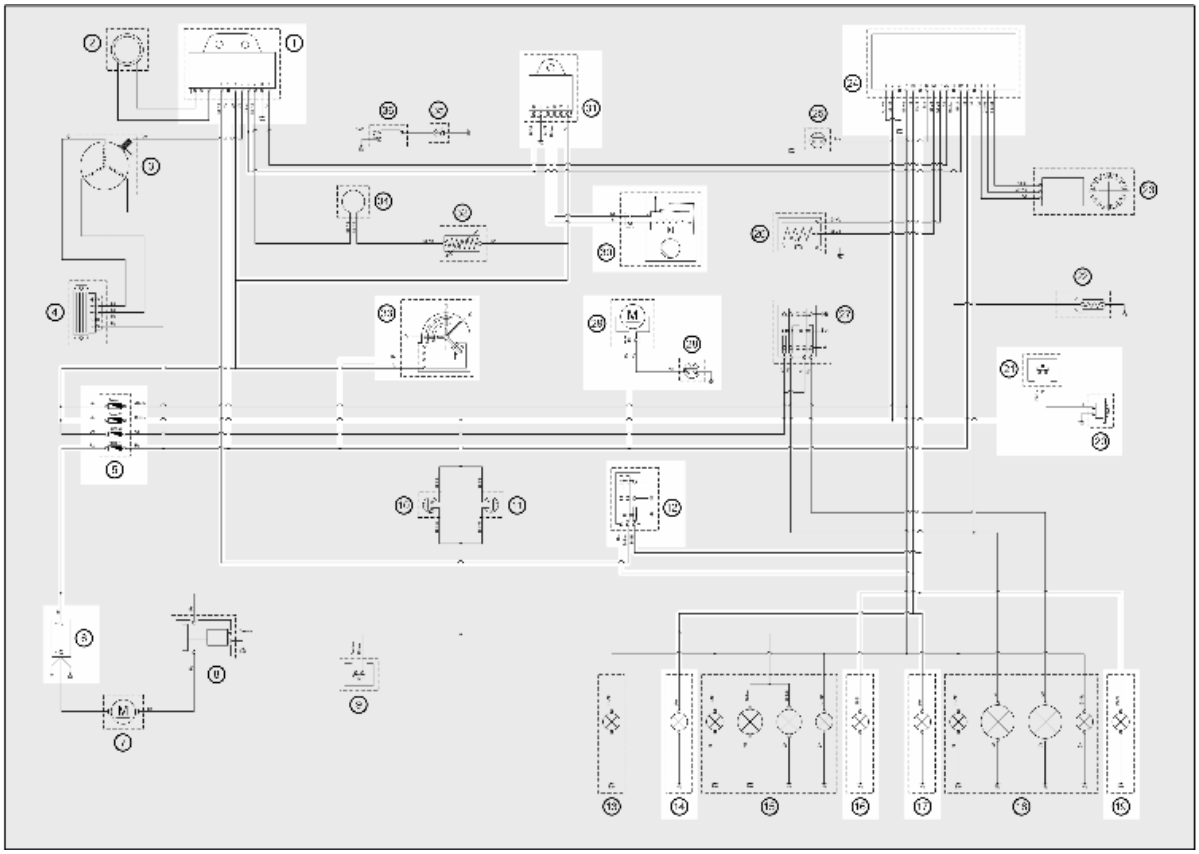
24. Instrument panel

1. +Battery
2. +Key

3. Ground
4. -Hall
5. +Hall
6. Hall
7. Lighting
8. Enable gauge
10. Rev counter
11. Coolant level
12. Fuel level
13. High-beam warning light
14. Right turn indicator
15. Left turn indicator
16. Oil reserve warning light
17. Low fuel warning light
20. Immobilizer LED
25. Engine oil pressure sensor
26. Fuel level transmitter
32. Key switch

Devices and accessories

Devices and accessories



KEY (With electric pump)

1. Electronic ignition device

5. Fuses

6. Battery

12. Turn indicator switch

14. Rear left turn indicator

16. Rear right turn indicator

17. Left front turn indicator

19. Right front turn indicator

20. Horn

21. Horn button

24. Instrument panel

1. +Battery
2. +Key
3. Ground
4. -Hall
5. +Hall
6. Hall
7. Lighting
8. Enable gauge

10. Rev counter
11. Coolant level
12. Fuel level
13. High-beam warning light
14. Right turn indicator
15. Left turn indicator
16. Oil reserve warning light
17. Low fuel warning light
20. Immobilizer LED

28. Thermoswitch

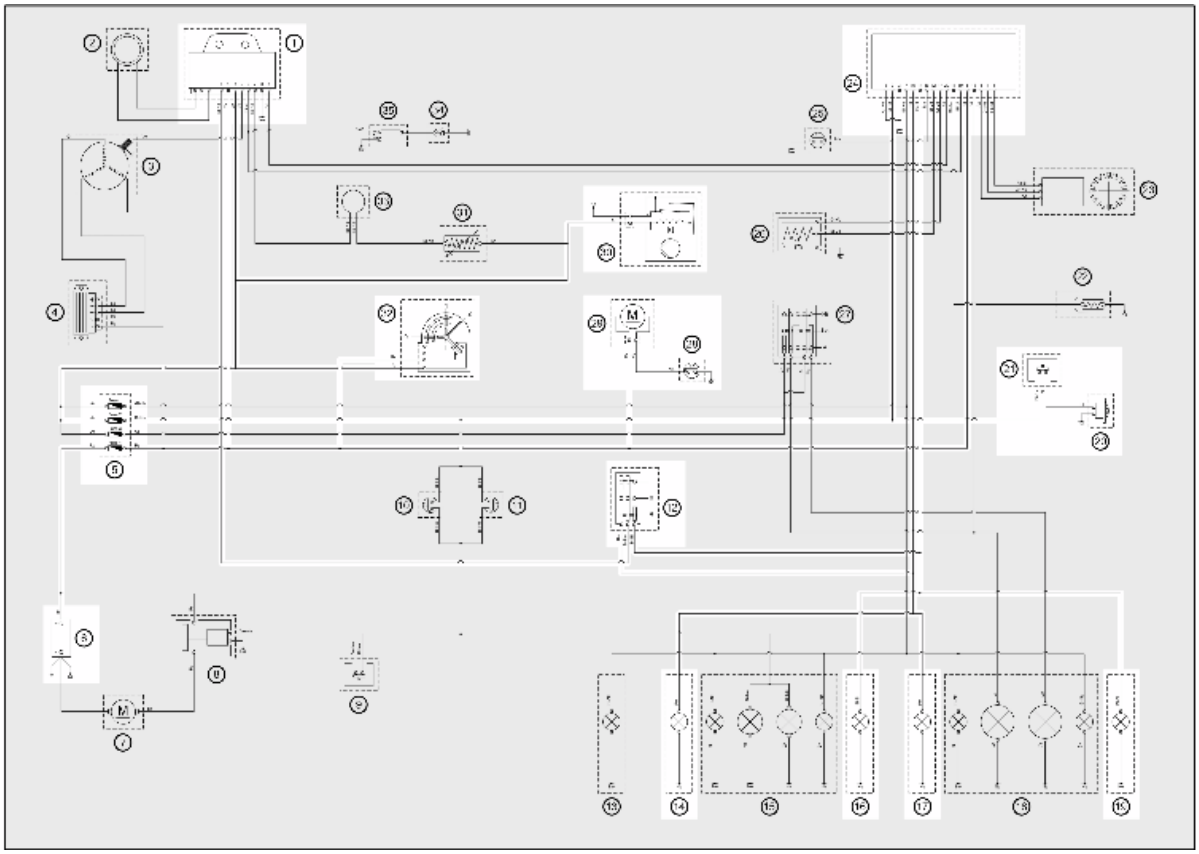
29. Electric fan

30. Fuel pump

31. Electric pump control device

1. +Key
3. Pump ground connection
4. +Pump
5. Ground
6. Engine revs

33. Key switch



KEY (Without electric pump)

1. Electronic ignition device
5. Fuses
6. Battery
12. Turn indicator switch
14. Rear left turn indicator
16. Rear right turn indicator
17. Left front turn indicator
19. Right front turn indicator
20. Horn
21. Horn button
24. Instrument panel
1. +Battery
2. +Key
3. Ground
4. -Hall
5. +Hall
6. Hall
7. Lighting
8. Enable gauge
10. Rev counter
11. Coolant level
12. Fuel level
13. High-beam warning light
14. Right turn indicator
15. Left turn indicator
16. Oil reserve warning light
17. Low fuel warning light
20. Immobilizer LED
28. Thermoswitch
29. Electric fan
30. Fuel pump
32. Key switch

Checks and inspections

This section is dedicated to the checks on the electrical system components.

Immobiliser

The electronic ignition system is controlled by the control unit with the integrated Immobilizer system. The immobilizer is an anti-theft system that allows the vehicle to be operated only when it is started with coded keys recognised by the control unit. The code is integrated in a transponder in the key block. This allows the driver clear operation without having to do anything other than just turning the key. The Immobiliser system consists of the following components:

- electronic control unit
- immobilizer aerial
- master key with built-in transponder (red key) with big handgrip
- service key with built-in transponder (red key with small handgrip)
- H.V. coil
- Diagnostic LED

The diagnosis led also works as a blinking light to deter theft. This function is activated every time the ignition switch is turned to the "OFF" position, or the emergency stop switch is turned to the "OFF" position. It remains activated for 48 hours in order not to affect the battery charge. When the ignition switch is turned to the "ON" position, the deterring blinker function is deactivated. Subsequently, a flash confirms the switching to the "ON" status. The duration of the flash depends on the programming of the electronic control unit If the LED is off regardless of the position of the ignition-key switch and/or the instrument panel is not initiated, check if:

- there is battery voltage
- fuses 2 and 4 are working properly
- there is power to the control unit as specified below:

Remove the front shield to access the control unit. Disconnect the two connectors and check the following conditions:

With the key switch in the OFF position:

- there is battery voltage between terminals 4-8 and terminal 6- large chassis earth connector (fixed power supply). If there is no voltage check that fuse 4 and its cable are in working order.

<DIV class=cnt_summary title="Short test (<4000 car.)">

With the key switch in the OFF position:

- there is battery voltage between terminals 5-8 and terminals 5-large chassis earth connector (power supply under panel). If there is no voltage, check the key switch contacts, that fuse no. 4 and its cable are working order.

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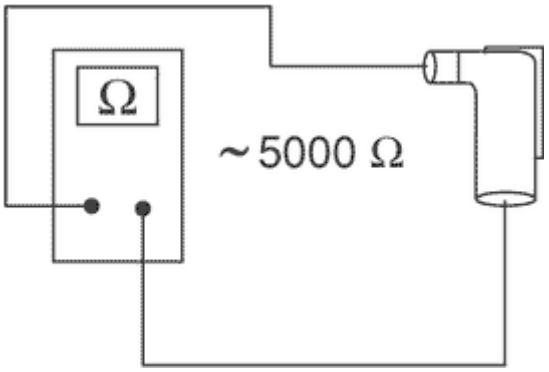

When the ignition system is not encrypted, any key will start the engine but limited to 2000 rpm. The keys can only be recognised if the control unit has been programmed properly. The data storage procedure for a previously unprogrammed control unit provides for the recognition of the master as the first key to be stored to memory: this becomes particularly important because it is the only key that enables the control unit to be wiped clean and reprogrammed for the memorisation of the service keys. The master and service keys must be used to code the system as follows:

- Insert the Master key, turn it to «ON» and keep this position for two seconds (lower and upper limits 1 to 3 seconds).
- Insert the service key and turn it to "ON" for 2 seconds.
- If you have copies of the key, repeat the operation with each key.
- Insert the MASTER key again and turn it to "ON" for 2 seconds.

The maximum time to change keys is 10 seconds. During a single data storage sequence a maximum of 7 service keys are allowed.

It is essential to adhere to the times and the procedure. If you do not, start again from the beginning. Once the system has been programmed, master key transponder, decoder and control unit are strictly matched. With this link established, it is now possible to encode new service keys, in the event of losses, replacements, etc. Each new programming deletes the previous one so, in order to add or eliminate keys, you must repeat the procedure using all the keys you intend to keep using. If a service key should become un-coded, the efficiency of the high voltage circuit shielding must be

thoroughly inspected: In any case it is advisable to use resistive spark plugs.

Characteristic

MASTER key:

RED KEY WITH BIG HANDGRIP

SERVICE key.

RED KEY WITH SMALL HANDGRIP

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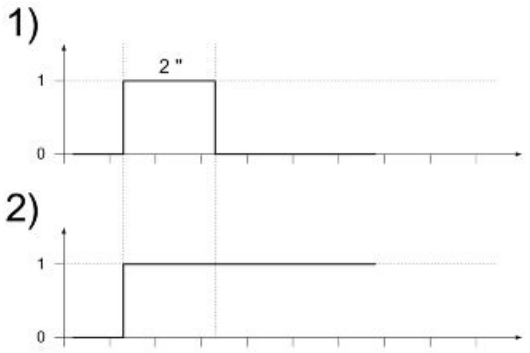
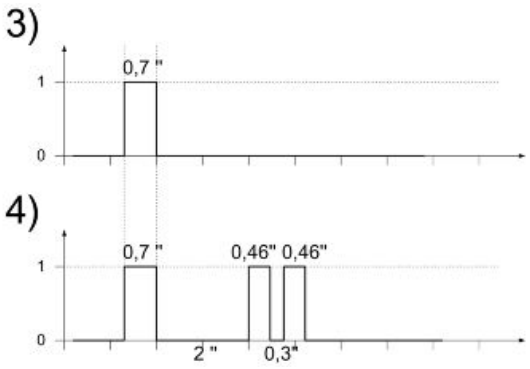
The Immobilizer system is tested each time the ignition key is turned from «OFF» to «ON». During this diagnosis phase a number of control unit statuses can be identified and various light codes displayed. Regardless of the code transmitted, if at the end of the diagnosis the LED remains off permanently, the ignition is enabled. If, however, the LED remains on permanently, it means the ignition is inhibited:



1. Previously unused control unit - key inserted: a single 2 second flash is displayed, after which the LED remains off permanently. The keys can be stored to memory, the vehicle can be started but with a limitation imposed on the number of revs.

2. Previously unused control unit - transponder absent or cannot be used: The LED is permanently ON; in this condition, no operations are possible, not even starting the vehicle.

3. **Programmed control unit - service key inserted (normal conditions of use)**: a single 0.7 second flash is displayed, after which the LED remains off permanently. The engine can be started.



4. **Programmed control unit - Master key inserted**: a 0.7-sec flash is displayed followed by the LED remaining off for 2 sec and then by short 0.46-sec flashes, the same number of times as there are keys stored in the memory including the Master key. When the diagnosis has been completed, the LED remains permanently OFF. The engine can be started.

5. Programmed control unit - fault detected: a light code is displayed according to the fault detected, after which the LED remains on permanently. The engine cannot be started. The codes that can be transmitted are:

- 1-flash code
- 2-flash code
- 3-flash code

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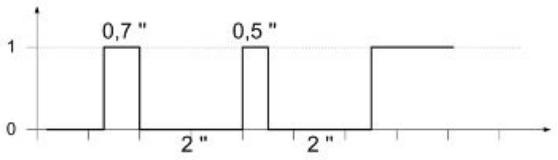
A one-flash code indicates a system where the serial line is not present or is not detected. Check the Immobilizer aerial wiring and change it if necessary.



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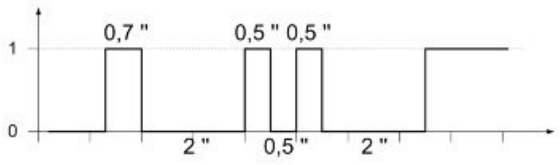
A two-flash code shows a system where the control unit does not show the transponder signal. This might depend on the inefficiency of the Immobilizer antenna or the transponder.

Turn the switch to ON using several keys: if the code is repeated even with the Master key, check the aerial wiring and change it if necessary. If this is not the case, replace the defective key and/or reprogram the control unit. Replace the control unit if the problem continues.



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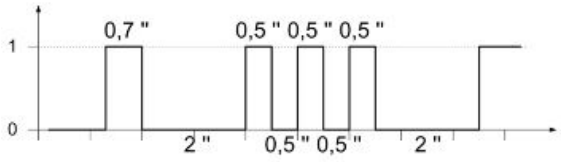
A three-flash code indicates a system where the control unit does not recognise the key. Turn the switch to ON using several keys: if the error code is repeated even with the Master key, replace the control unit. If this is not the case, reprogram the decoder.



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Once the immobilizer system is enabled, the HV coil and the signals from the Pick-Up will produce a spark in the spark plug.
The battery provides the basic power supply. The system is adjusted so that the start-up system immediately detects an eventual battery voltage drop, but this is practically irrelevant for the ignition system.
The Pick-Up is connected to the control unit by a single cable; then, for the ground circuit, the control unit is connected to the Pick-Up by the chassis and the engine ground lead.
To avoid disturbances in the ignition system during start-up, it is very important that the engine-chassis ground connection bonding is efficient.

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The recharge system is provided with a three phase alternator with permanent flywheel.
The alternator is directly connected to the voltage regulator.
This, in its turn, is connected directly to the ground and the battery's positive terminal passing through the 20A protective fuse.
The three-phase generator provides good recharge power and at low revs a good compromise is achieved between the generated power and idle speed stability.

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- With a tester, check the circuit between connections 5-3 and 5-1 is not interrupted.
- Check the earth isolation on the three phases of stators 5-earth, 3-earth, 1-earth.

Stage indicative resistance: 0.7 - 0.9 Ω

Minimum oil pressure switch check

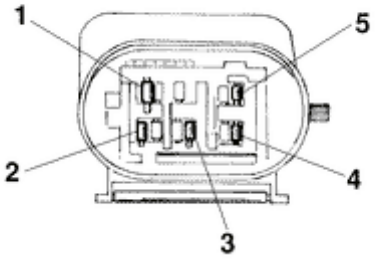
- With a tester, check the circuit between connections 4 and ground (with engine off) is not interrupted.

Pick-Up check

- Check that there is a resistance of about 105 ÷ 124 Ω at 20° C between connection 2 and ground.
- In case of values different from the ones stated, replace the defective parts.

N.B.

VALUES ARE STATED AT AMBIENT TEMPERATURE. A CHECK WITH THE STATOR AT OPERATING TEMPERATURE MAY RESULT IN VALUES HIGHER THAN THOSE STATED.



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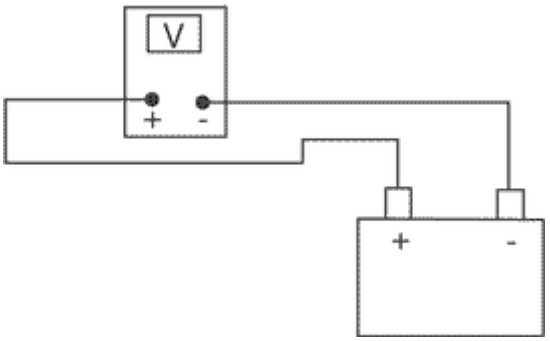
With a perfectly charged battery and lights off, measure voltage at the battery poles with a high running engine.
The voltage should not exceed 15.2 Volt.
In case higher voltages are detected, replace the regulator.
In case of voltage values lower than 14 Volt, check the stator and the corresponding cable harness.



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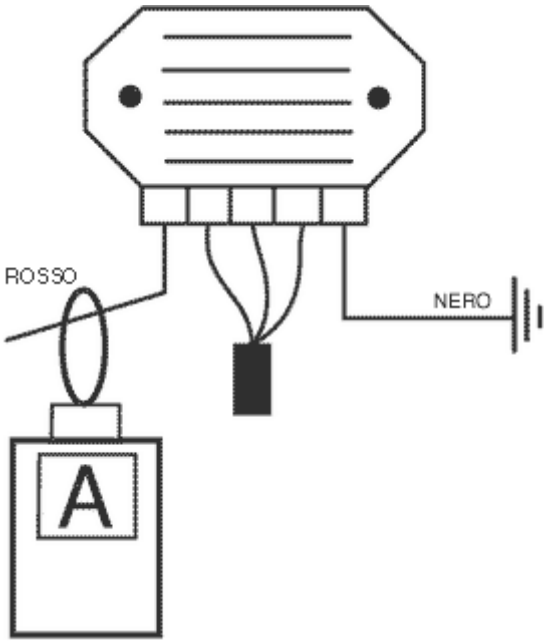
Connect an ammeter induction clamp to the voltage regulator positive terminal, measure the battery voltage and turning on the vehicles lights with engine off, wait for the voltage to set at about 12 V. Start the engine and measure the current generated by the system with lights on and a high running engine.
In case the generated current value is lower than 10A, repeat the test using a new regulator and/ stator alternatively.



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The turn indicator circuit is powered by the electronic control unit. In the case it does not work, it is necessary to:

- Check light bulbs efficiency.
- With the key switch set to ON, check there is voltage on the black blue wire for the turn indicator control device. if this is powered, check the continuity of the wiring, with the turn indicator switch on, between the black-blue indicator control output cable and the pink and white-blue cables of the turn indicator bulbs. If there is no continuity, check the wiring and the efficiency of the turn indicator switch, otherwise replace the turn indicator control device because it is certainly defective.

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The electrical system has 4 fuses located inside the battery compartment to protect the different circuits of the system.

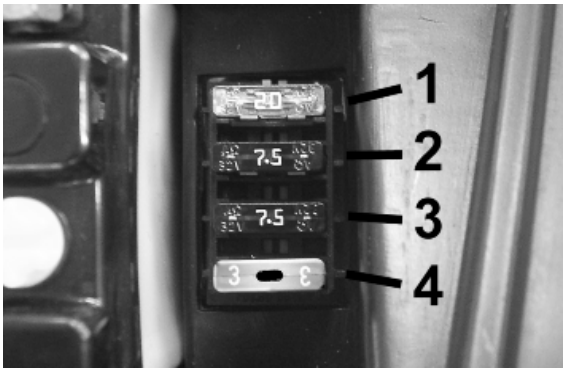
The chart shows the position and characteristics of the fuses in the vehicle.

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
1	Fuse No. 1	**Position on fuse box:** 4 **Capacity**: 3A **Protected circuits:** Front and rear tail light bulbs and license plate light **Location**: battery compartment
2	Fuse No. 2	**Position on fuse box:** 3 **Capacity**: 7.5 A **Protected circuits:** Stop light bulbs, engine start-up control, horn, instrument panel **Location**: battery compartment
3	Fuse No. 3	**Position on fuse box:** 2 **Capacity**: 7.5 A **Protected circuits:** High- and low-beam light bulbs. **Location**: battery compartment
4	Fuse No. 4	**Position on fuse box:** 1 **Capacity**: 20A **Protected circuits:** System protection main fuse **Location**: battery compartment



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A= High-beam warning light;

B= Engine oil pressure warning light;

C= Turn indicator warning light;

D= Low fuel warning light;

E= Headlight warning lights;

F= Rpm indicator;

G= "**Mode**" Button;

H= "**Clock**" Button;

L= "**Set**" Button;

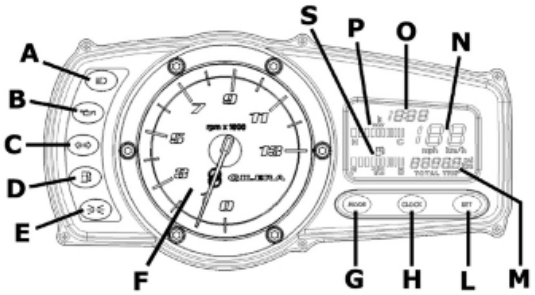
M= Total/Trip Odometer;

N= Speedometer;

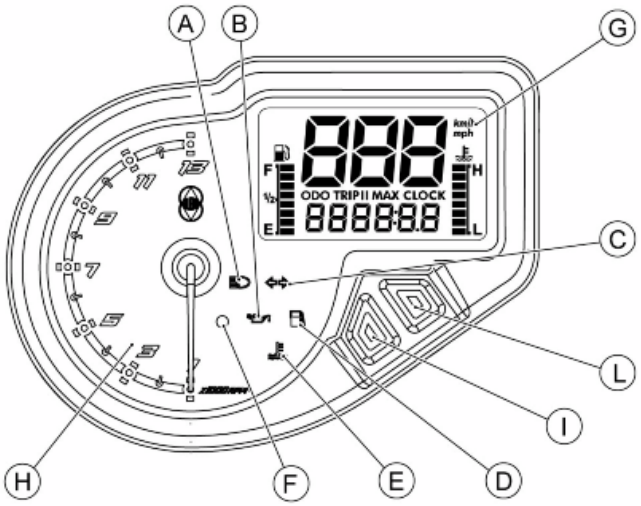
O= Clock;

P= Coolant temperature gauge

S= Fuel gauge;



THE FOLLOWING INSTRUCTIONS REFER TO THE MY2012 VERSION.



A= High beam warning light;

B= Engine oil pressure warning light;

C= Turn indicator warning light;

D= Low fuel warning light;

E= Coolant temperature too hot warning light;

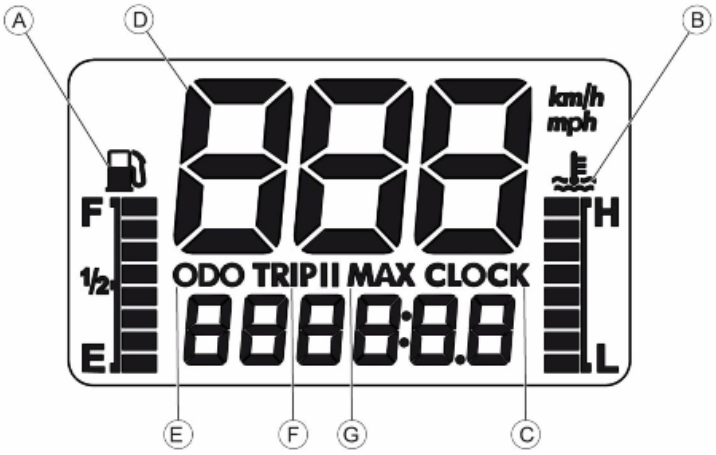
F= Immobiliser warning light;

G= Digital display;

H= Rpm indicator;

I= "**MODE**" key;

L= "**Set**" Button;



A= Fuel level gauge;

B= Coolant temperature gauge;

C= Digital clock;

D= Speedometer;

E= Odometer;

F= Partial odometer gauge;

G= Maximum speed indicator;

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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 standard 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 to 14.70V
- Initial charge voltage equal to 0.3 to 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 THAT RECOMMENDED. THE USE OF A FUSE OF UNSUITABLE CAPACITY MAY RESULT IN SERIOUS DAMAGES TO THE WHOLE 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, WHEREAS 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.

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COMMISSIONING A NEW DRY-CHARGED BATTERY

- Remove the battery air pipe stop cap and each single cell cap.
- Fill the battery with electrolyte of 1.270+/-0.01 kg/l density (corresponding to 31+/-1 Bé) with an ambient temperature not below 15°C, until it reaches the upper level indicated on the block.
- Tilt the battery slightly to remove any air bubbles formed during filling.
- Place the caps on each single cell filling hole without screwing them and leave the battery to rest. During this stage, the battery is subject to a gasification phenomenon and temperature increases.
- Let it rest until it reaches ambient temperature (this stage can take up to 60 minutes).
- Tilt the battery slightly to facilitate the elimination of any gas bubbles present inside; restore the level using the same filling electrolyte

Note: This is the last time that electrolyte can be added. Future top-ups should be done only with distilled water;

- Before 24 hours elapse, recharge the battery following these steps:
- Connect the battery charger terminals observing the correct polarity;
- Wit the battery charger drw. 020333Y and/or drw. 020334Y operate the battery charger control by selecting the position corresponding to that capacity;
- Otherwise, charge the battery with direct current equal to 1/10 of rated capacity (e.g. for a battery with a 9Ah rated capacity, the charging current should be 0.9-1.0A) for approximately a 4-6 hour charge.

Note: Batteries that have been stored for a long time may take a longer charging time. The battery chargers drw. 020333Y and drw. 020334Y have an automatic protection which interrupts the recharge after 12 hours to avoid battery harmful heating. In this case, a green LED turns on to indicate the activation of the safety system and not the end of the charge.

- Let the open circuit battery rest for approximately 4-6 hours; then check the off-load voltage using a standard tester.
- If the open-circuit voltage is higher or equal to **12.6V**, the battery is charged adequately. Slightly shake or tilt the battery to eliminate any air bubbles formed during recharging.
- Check the electrolyte levels again, fill them with distilled water up to the upper level line if necessary, clean battery properly, close each single cell cap tightly and install it on the vehicle.
- If the voltage indicated is low, charge the battery another 4-6 hours in the way described above.

Note: With the battery charger drw. 020334Y, it is possible to check the battery charge level with the **Check** function. The value indicated on the display must be higher than the value indicated on the chart; otherwise, recharge the battery again in the same way indicated above.

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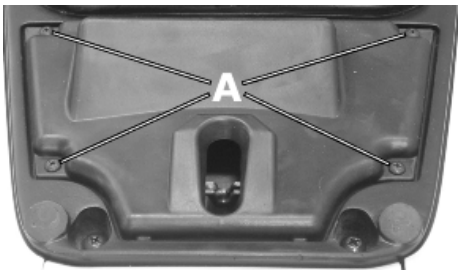
• Remove the battery cover after undoing the 4 screws shown in the photograph.



- Insert the battery connecting the bleeding tube.

- Using the screwdriver, tighten up the battery terminal cables as far as they will go, placing the special Grover washer between the screw head and the cable terminal.

N.B.

DO NOT USE WRENCHES TO TIGHTEN UP THE SCREWS FOR FIXING THE TERMINALS TO THE BATTERY TERMINALS

- Refit the battery cover

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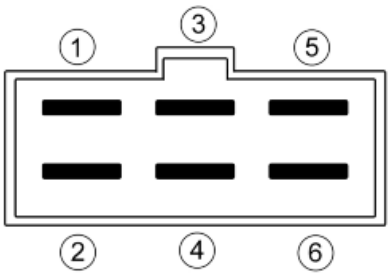
PUMP ELECTRICS CHECK

Connect the tester positive probe to pin 4 of the connector of the fuel pump control device, and the negative probe to pin 3, making sure there is battery voltage as indicated in 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 r.p.m.	Always «ON»

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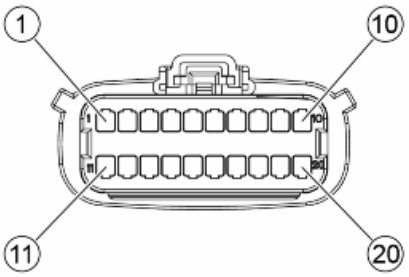
CONNECTORS

THE FOLLOWING INSTRUCTIONS REFER TO THE MY2012 VERSION.

INSTRUMENT PANEL CONNECTOR



1= Ground;

2= Live power supply;

3= Not connected;

4= Speed sensor negative;

5= Right turn indicator signal;

6= Not connected;

7= Low beam lights signal;

8= Left turn indicator signal;

9= Immobilizer;

10= Not connected;

11= Engine temperature sensor signal;

12= Oil pressure sensor signal;

13= Speedometer signal;

14= Not connected;

15= Not connected;

16= Not connected;

17= Not connected;

18= Speed sensor positive;

19 Fuel level sender signal

20= Battery power;

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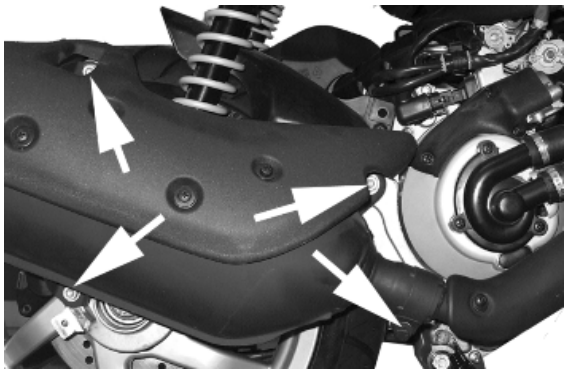
ENGINE FROM VEHICLE

ENG VE

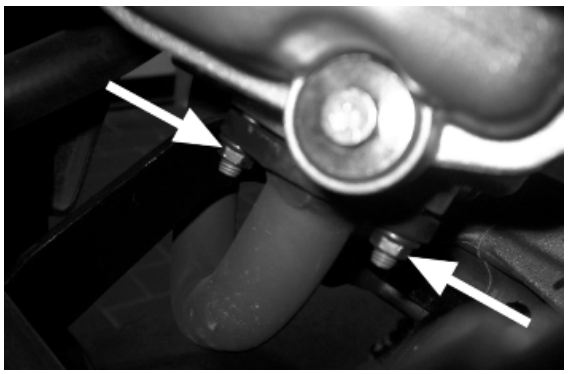
Questa sezione descrive le operazioni da effettuare per lo smontaggio del motore dal veicolo.

Exhaust assy. Removal

- Unscrew the 3 screws fixing the muffler to the engine crankcase and the supporting arm;
- Loosen the bolt holding the muffler to the exhaust manifold; after that, remove the muffler backwards.

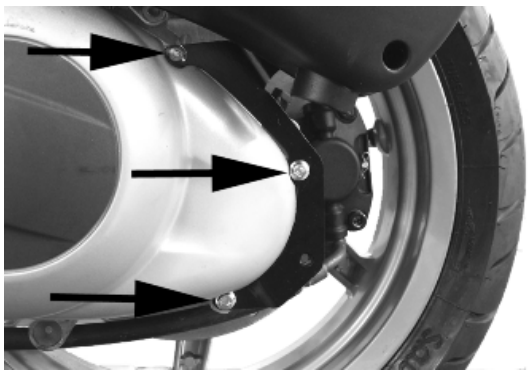


- Unscrew the 2 nuts that fix the exhaust manifold to the head and remove it.

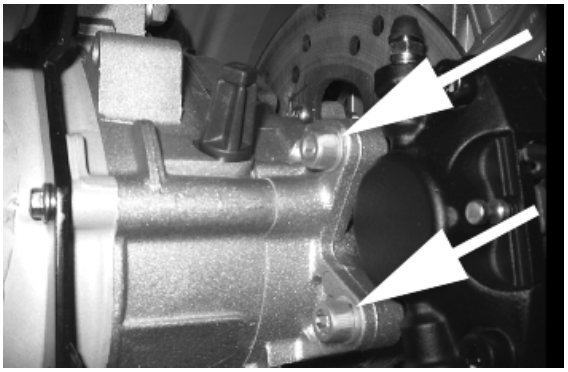


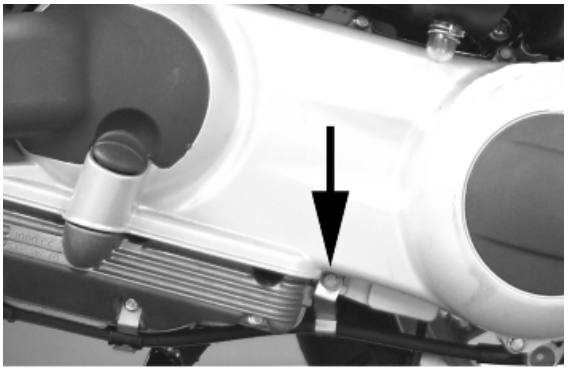
Removal of the engine from the vehicle

- Remove the rear mudguard supporting bracket undoing the 3 screws.
- Remove the whole muffler, the shock absorber/ wheel supporting bracket and the rear wheel.

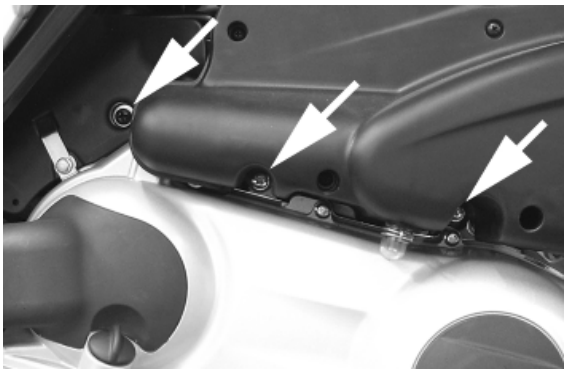


- Remove the 2 fixing screws of the brake pump.
- Remove the screw fixing the brake calliper oil pipe support and move the tubes aside towards the vehicle front door so as not hinder the next removal operations.

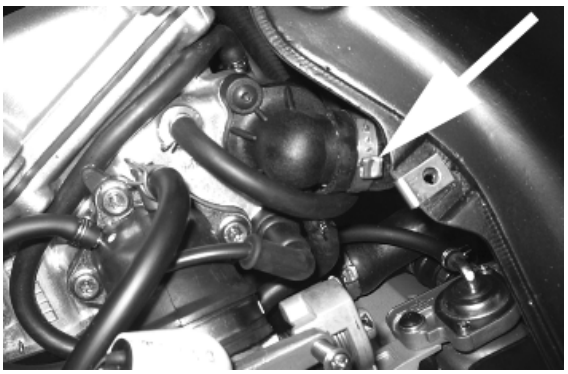


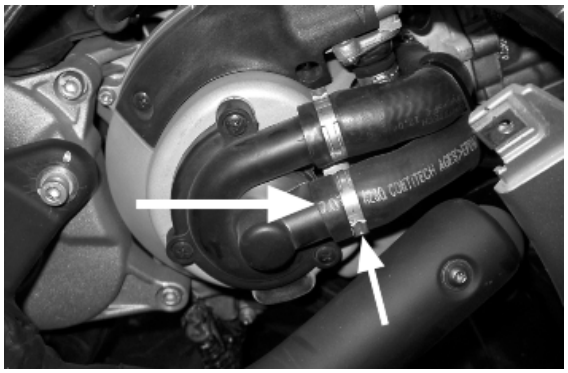


To remove the air filter proceed as follows:
- undo the 3 fixing screws to the engine crankcase;
- remove the blow-by pipe operating on the clamp;
- disconnect the connecting hood to the carburettor by loosening the clamp.

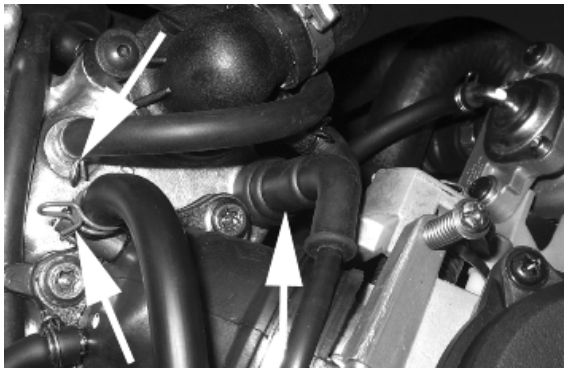


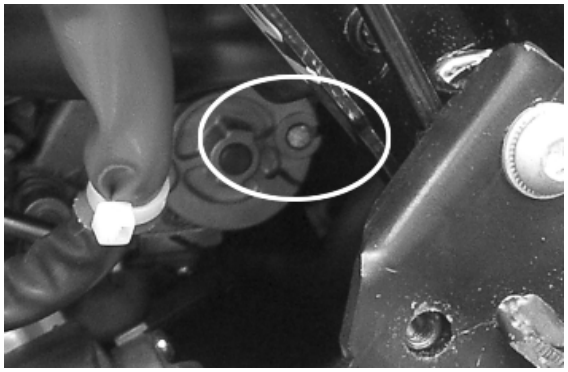
- Empty the cooling system.
- Remove the clamps and disconnect the coolant feeding (engine compartment) and return (water pump) pipes.



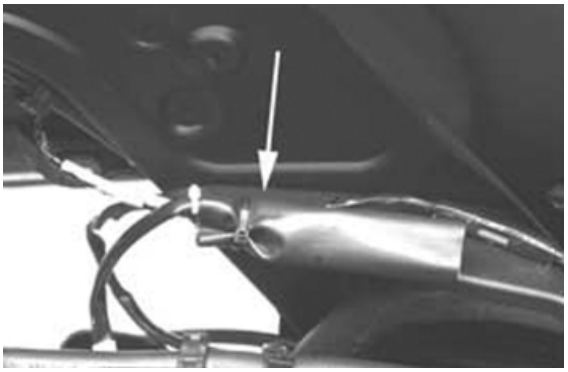


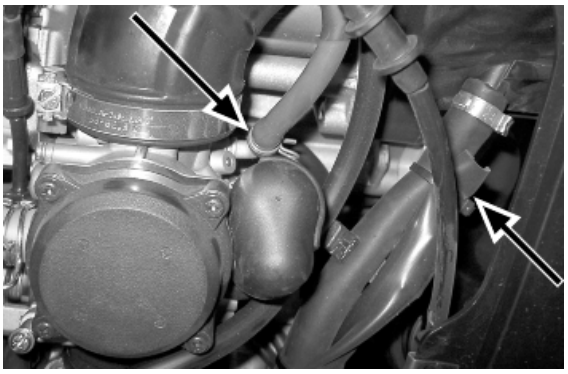
- Remove the holding springs and remove the coolant out pipes;
- Remove the holding springs and remove the petrol pump low-pressure tube from the inlet manifold;
- Move the accelerator wire from the throttle control rocking lever; unscrew the adjuster and disconnect the transmission from the carburettor.
- Disconnect the HV wire from the spark plug;
- Disconnect the thermistor electrical connection after removing the rubber cap.



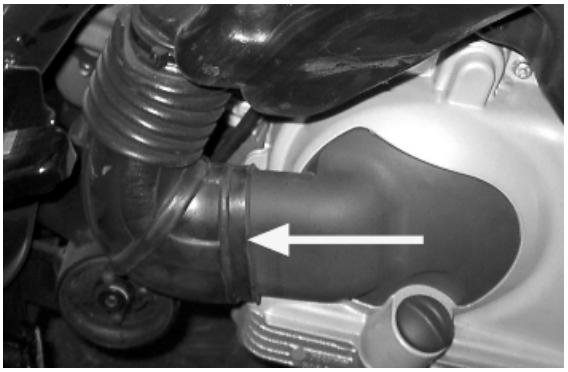


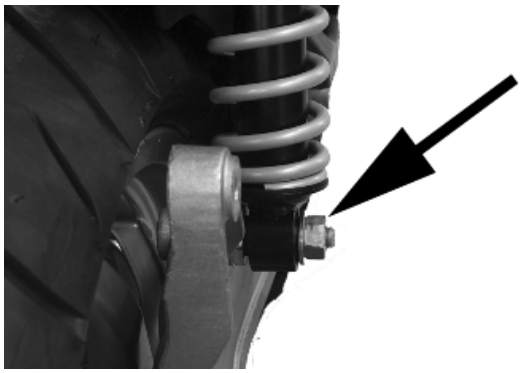
- Remove the holding spring and move the petrol feed pipe to carburettor;
- Remove the starter cover, undo the carburettor fastening screw and remove the pipe.

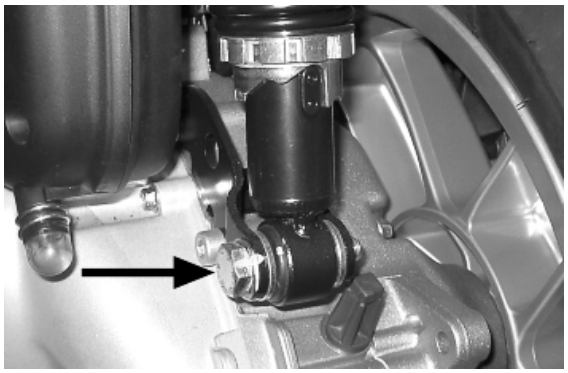


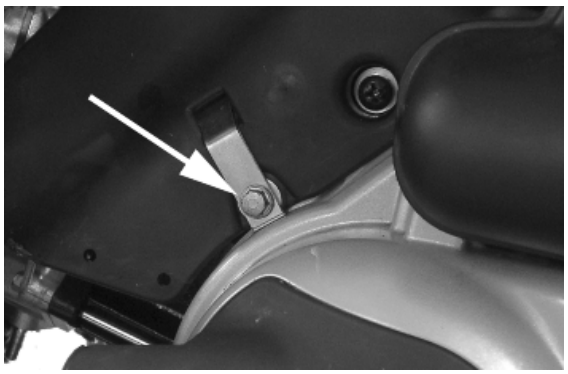


- Remove the lower screws fastening the rear shock absorbers to the engine crankcase and the supporting arm;
- Cut the clamp on the transmission crankcase duct; after that, disconnect the pipe connected to the air intake on the chassis.
- Remove the screw supporting the accelerator cable.

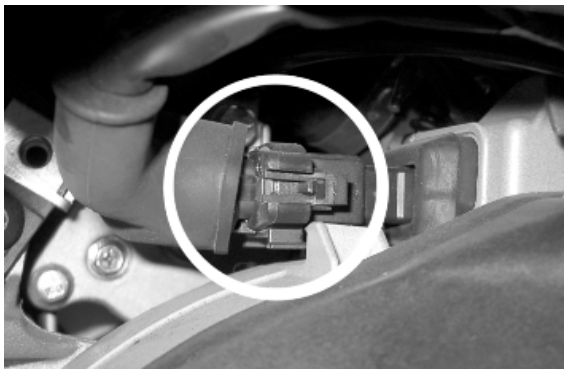






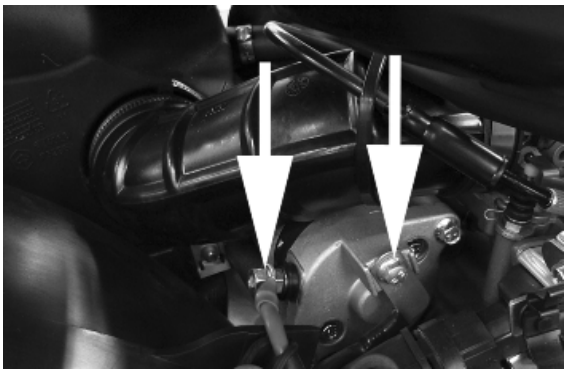


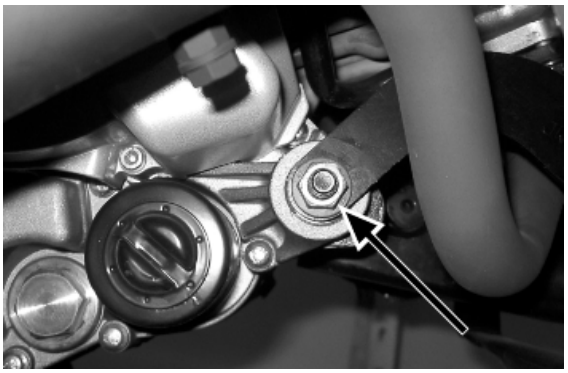
- Disconnect the electric connector linking the magneto flywheel to the vehicle cable harness.
- Remove the starter motor electrical connections operating on the two screws.
- Remove the footrest and the left side fairing; move the lower central cover slightly to the outside; after that, remove the three supporting plate fixing screws from the swinging arm buffer. Remove the buffer seal seeger ring

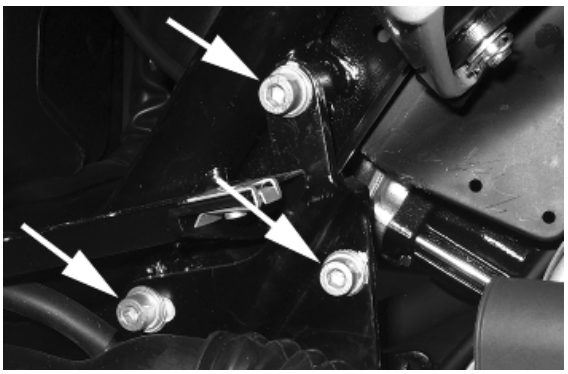


and remove the supporting plate from the swinging arm buffer.

- Support the vehicle adequately with the jack. Remove the engine - swinging arm fixing pin operating on the nut and the pin head.
- The engine is now free.







Locking torques (N*m)

Engine swinging arm pin nut 33 to 41 **Shock absorber lower clamping** 33 to 41 **Rear brake caliper tightening screws** 20 to 25

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ENGINE

ENG

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

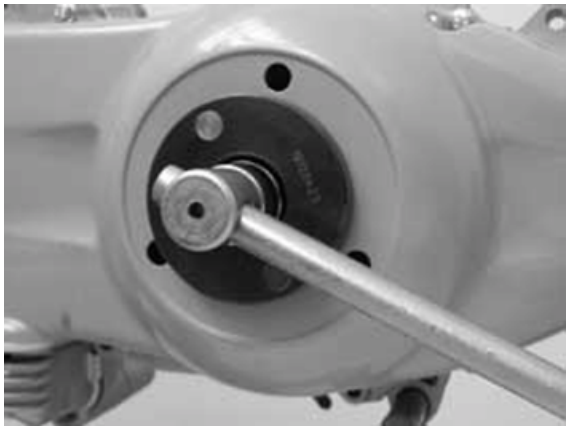
Automatic transmission

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 housing lock wrench shown in the figure, remove the driven pulley shaft locking nut and washer.

Specific tooling

020423Y Driven pulley lock wrench

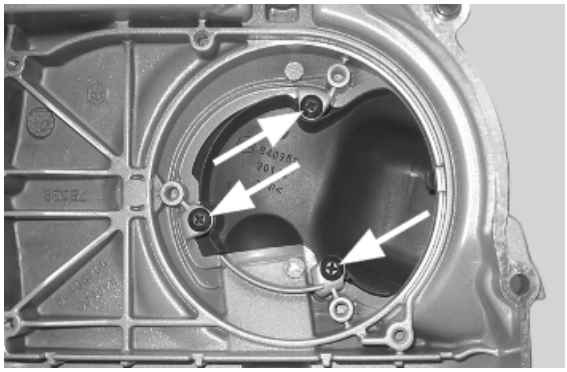


- Remove the cap/dipstick from the engine oil filling hole.
- Remove the 2 retainers of the air filter housing.
- Remove the screw of the engine compartment cover case.
- Remove the 10 transmission cover screws.
- Remove the transmission cover operating on the front and rear tabs.

Air duct

- Remove the 4 screws and the housing.

- To remove the intake throat on the transmission cover, just remove the 3 fixing screws on the transmission cover.



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 28 x 30 mm adaptor

020412Y 15-mm guide

Refitting the driven pulley shaft bearing

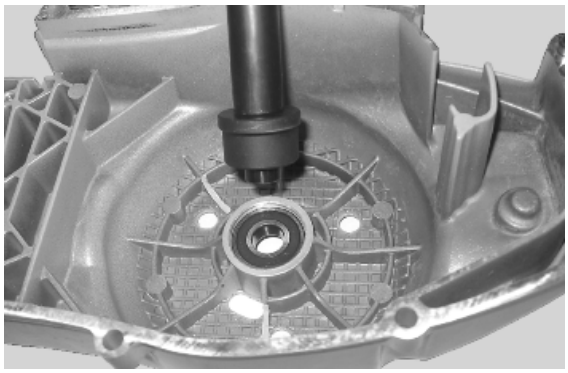
- Slightly heat the crankcase from the inside so as not to damage the painted surface.
- Insert the bearing in its seat.
- Refit the Seeger ring.

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 32x35-mm Adaptor

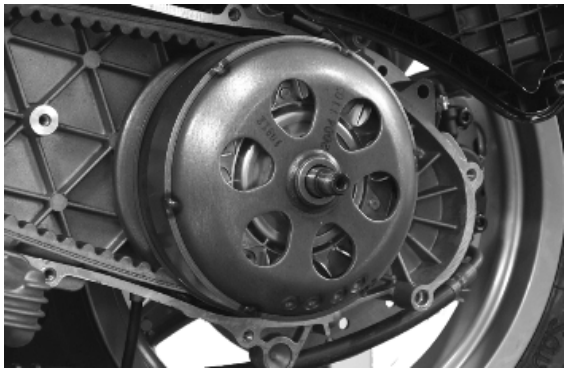
020412Y 15-mm guide

Removing the driven pulley

- Remove the clutch bell housing and the driven pulley assembly.

N.B.

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



Inspecting the clutch drum

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

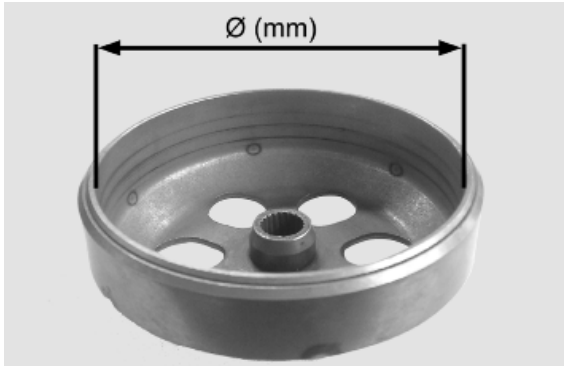
Characteristic

Max. value clutch housing

Max. value: Ø 134.5 mm

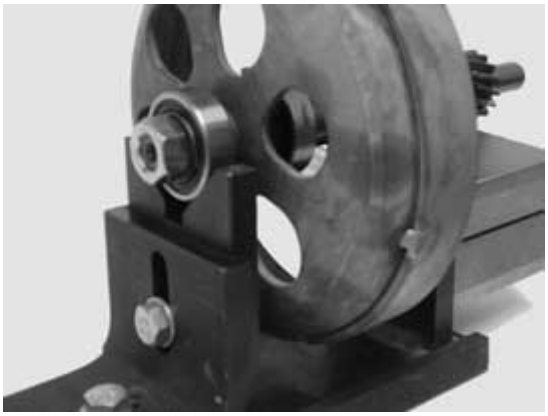
clutch housing standard value

Standard value: Ø 134 - 134.2 mm

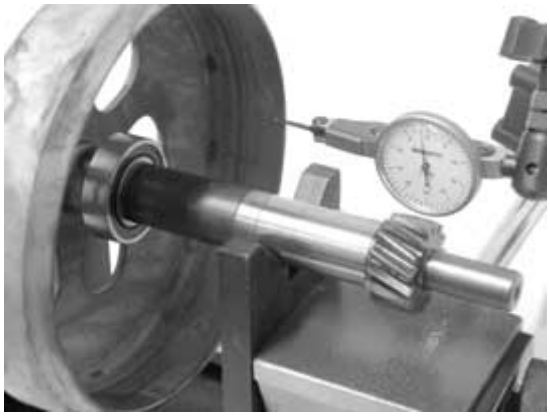


Checking the bell working surface eccentricity

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



- Using a feeler dial gauge and the magnetic base, measure the bell eccentricity.
- Repeat the measurement in 3 positions (Central, internal, external).
- If faults are found, replace the bell.



Specific tooling

020074Y Support base for checking crankshaft alignment

020335Y Magnetic support for dial gauge

Characteristic

clutch housing inspection: Limit eccentricity.

Admissible limit eccentricity: 0.15 mm

Removing the clutch

Removing the clutch

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 No 8 in the pins.
- Assemble the driven pulley assembly 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 wrench 46 x 55

020444Y010 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 FAYING 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 ANY DIFFICULTY.

N.B.

BE CAREFUL NOT TO PUSH THE SCREWDRIVERS IN TOO FAR TO AVOID DAMAGE THAT COULD COMPROMISE THE O-RING SEAL.

- Remove the 4 torque server pins and pull the pulley halves apart.

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 retainer 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 Bearing housing, outside ø 47 mm

- 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

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

Characteristic

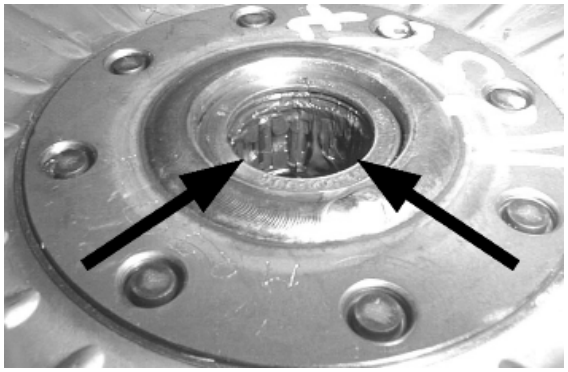
Half-pulley standard diameter

Standard diameter: Ø 40.985 mm

Half-pulley minimum diameter

Minimum admissible diameter: Ø 40.96 mm

- Every 12,000 km, when the vehicle should be serviced according to scheduled maintenance, it is necessary to check the correct lubrication of the driven pulley roller casing.
- In case the lubrication is not enough, the specific grease should be applied manually on the roller surface.



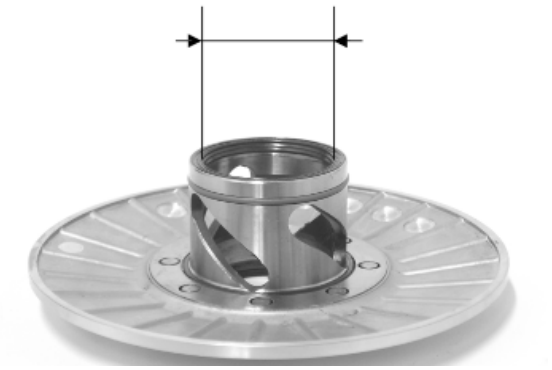
Recommended products

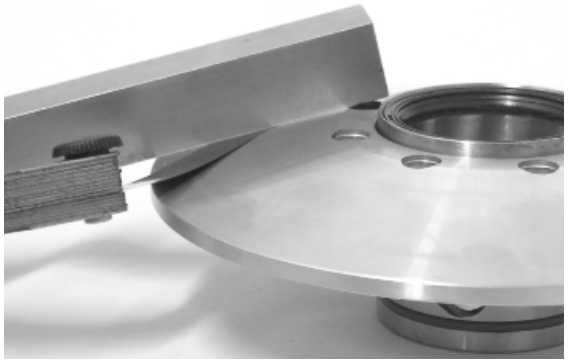
AGIP GREASE SM 2 Gray black smooth-textured lithium grease, containing molybdenum disulphide.

-

Inspecting the driven sliding half-pulley

- Remove the two internal grommets and the two O-rings.
- Measure the movable half-pulley bushing inside diameter.
- Check that the faying surface with the belt is not abnormally worn.
- Check the riveted joints are functional.
- Check the evenness of the belt faying surface.





MOVABLE DRIVEN HALF-PULLEY DIMENSIONS

Specification	Desc./Quantity
Wear limit	0.3 mm
standard diameter	Ø 41.000 - 41.035 mm
maximum allowable diameter	Ø 41.08 mm

Refitting the driven half-pulley bearing

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

Fit the retainer ring

WARNING

N.B.

FIT THE BALL BEARING WITH THE VISIBLE SHIELDING

Specific tooling

020376Y Adaptor handle

020375Y 28 x 30 mm adaptor

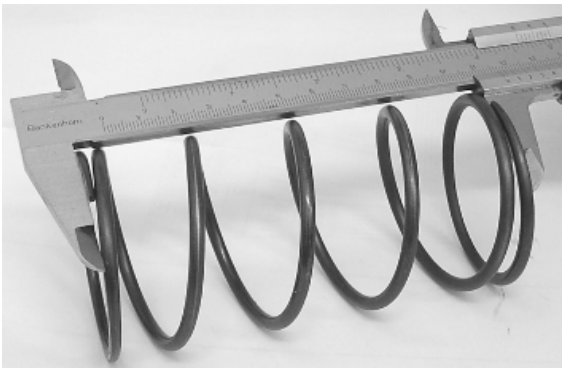
020424Y Driven pulley roller casing fitting punch

Refitting the driven pulley

- 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

- Measure the length of the spring, while it is relaxed.



Characteristic

Standard length

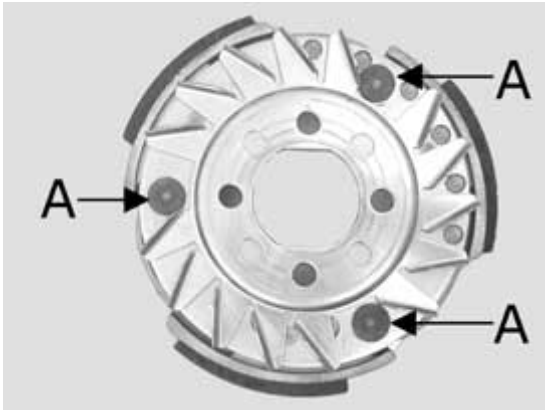
106 mm

Acceptable limit after use:

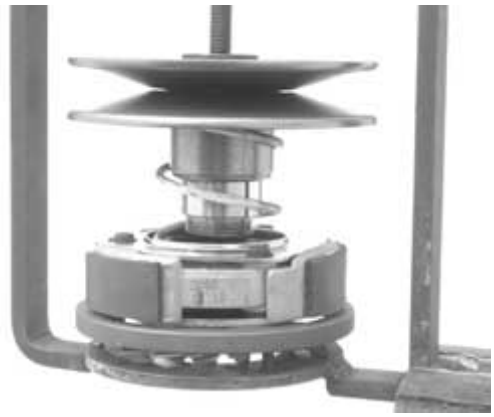
101 mm

Refitting the clutch

- 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 No 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.

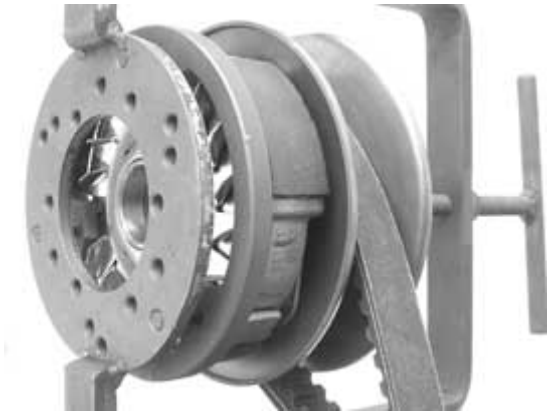


- Insert the clutch on the adapter ring.
- Lubricate the end of the spring that abuts against the servo-system closing collar.
- Insert the spring with relevant plastic holder in contact with the clutch.
- Insert the driving belt into the pulley unit according to their direction of rotation.
- Insert 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 appropriate tool.
- Preload the clutch contrast 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 assembly 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 wrench 46 x 55

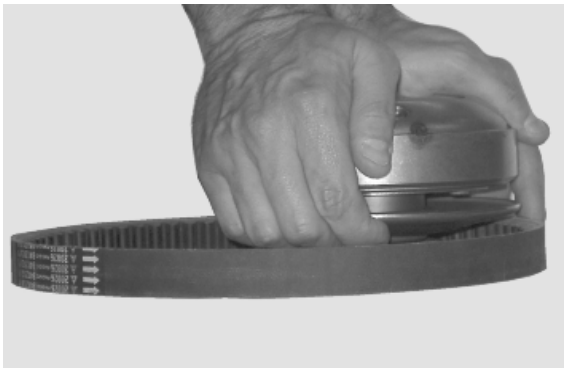
Locking torques (N*m)

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

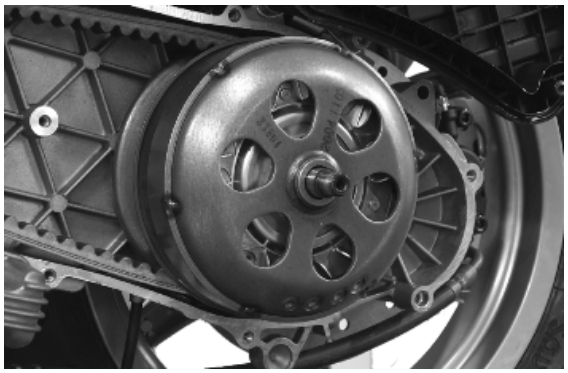
Refitting the driven pulley

- Place the driven pulley with clutch bell on the work table.
- With your hands compress the mobile pulley while introducing the driving belt fully between the pulleys.

This operation is necessary so that the belt does not interfere with the correct assembly of the moving driving pulley and loosen the nut on the crankshaft.

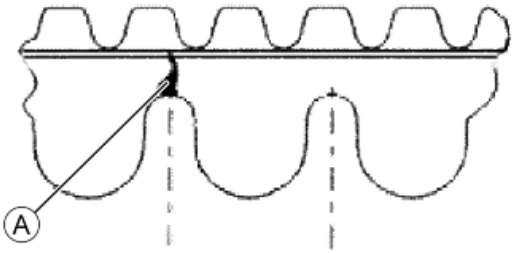


- Refit the whole driven pulley on its shaft.

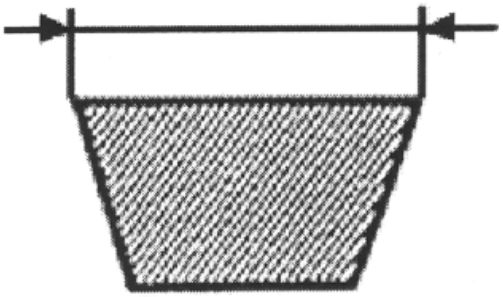


Drive-belt

During the wear checks foreseen in the scheduled maintenance services at 6000 km, 18000 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.



- Check that the driving belt is not damaged.
- Check the width of the belt is adequate.



Characteristic

Driving belt - minimum width:

21.5 mm

Driving belt - standard width:

22.5 ± 0.2 mm

Removing the driving pulley

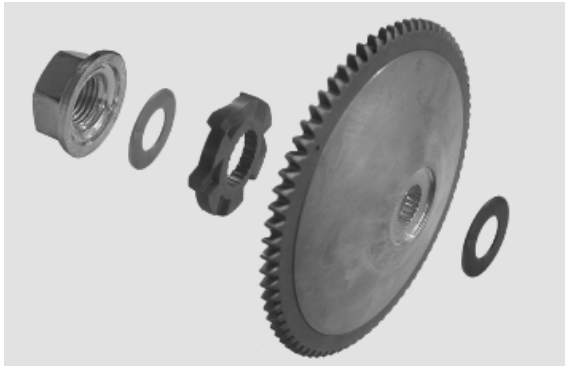
Driving pulley removal

- Remove the plate operating on the 3 screws.
- 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:

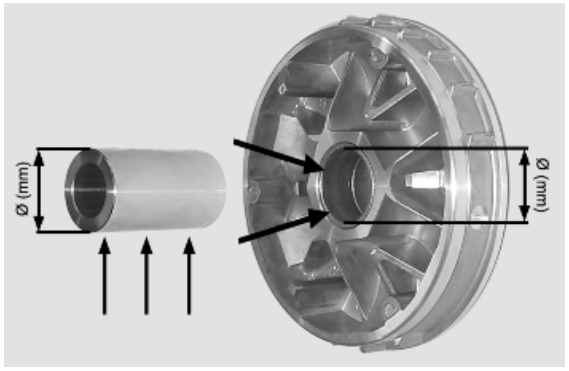
Specific tooling

020368Y driving pulley lock wrench



Inspecting the rollers case

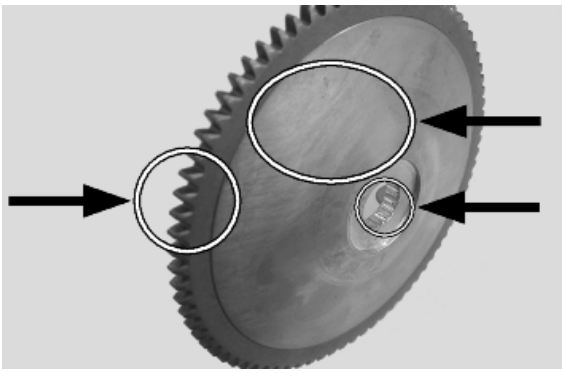
- Check that the internal bushing shown in the figure is not abnormally worn and measure inner diameter A.
- Measure the pulley sliding bushing outside diameter shown in the figure.
- Check that the rollers are not damaged or worn.
- Check the guide shoes for the variator back-plate are not worn.



- 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: Minimum diameter permitted

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: Standard Diameter

Ø 18.9 ÷ 19.1 mm

Sliding bushing: Standard Diameter

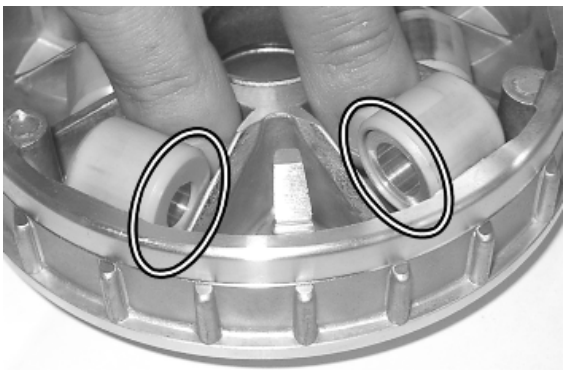
Ø 25.959 ÷ 25.98 mm

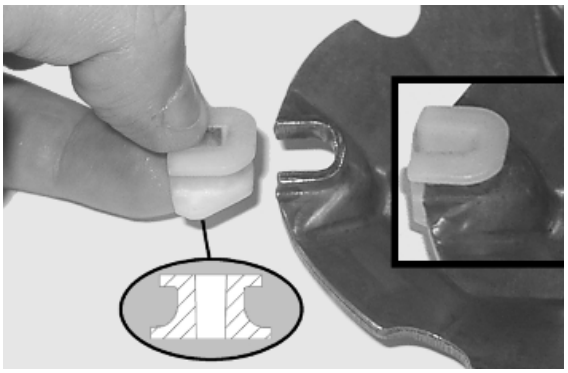
movable driving half-pulley bushing: Standard Diameter

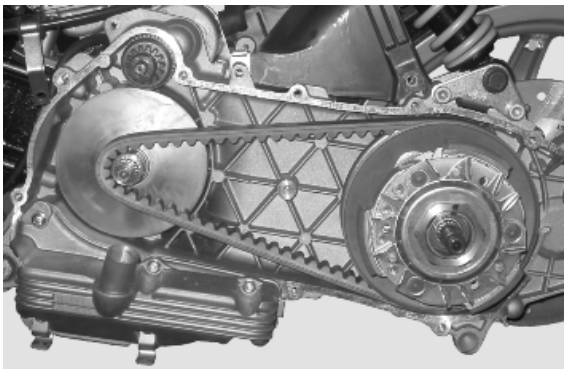
26.000 - 26.021 mm

Refitting 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.
- 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 crankshaft.
- Fit the driven pulley/Clutch/belt unit on the engine.







- 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

Refitting the transmission cover

- Check that there are 2 alignment dowels and that the sealing gasket for the oil sump on the transmission cover is adequately fitted.
- Replace the cover and tighten the 10 screws to 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.
- Refit the plastic cover.

Specific tooling

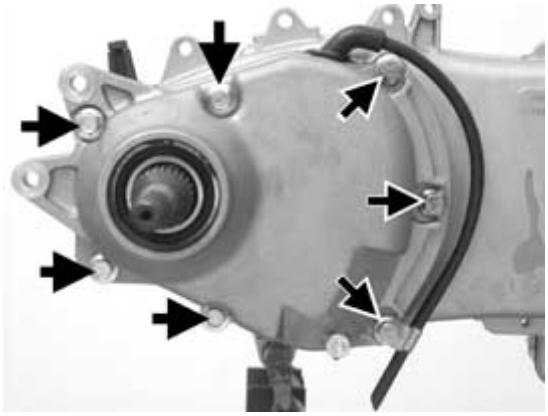
020423Y Driven pulley lock wrench

Locking torques (N*m)

Transmission cover screws 11 to 13 Driven pulley shaft nut 54 to 60

End gear

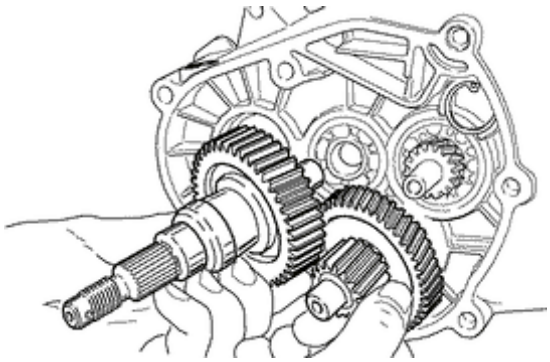
Removing the hub cover



- 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.

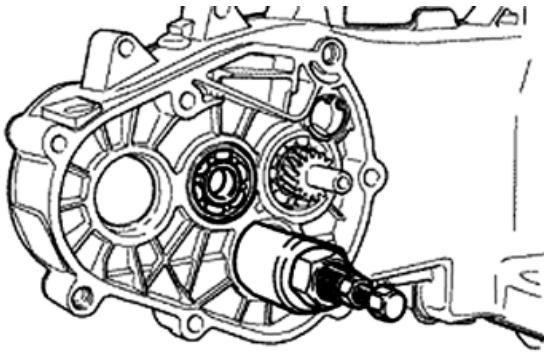


Removing the hub bearings

- 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

Hold up the hub cover and take out the bearing.

Specific tooling

020376Y Adaptor handle

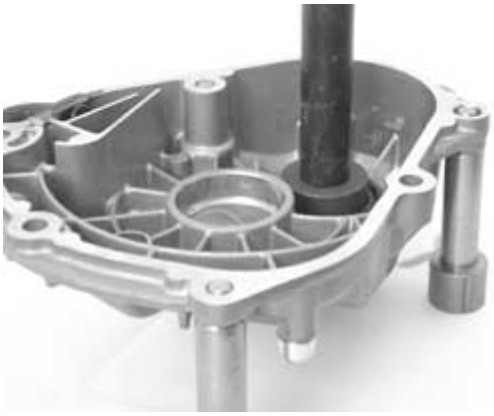
020477Y 37 mm adaptor

020483Y 30-mm guide

With the appropriate tools, remove the oil seal as shown in the figure.

Specific tooling

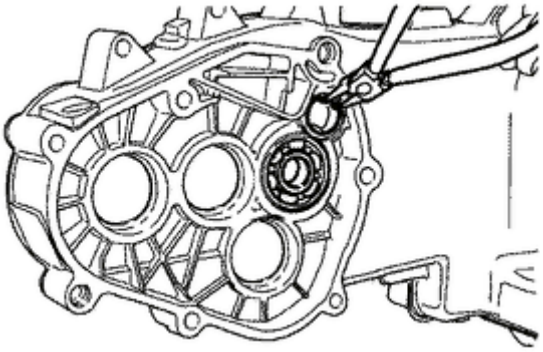
020359Y 42x47-mm Adaptor



Removing the driven pulley shaft bearing

When removing the driven pulley shaft, the corresponding bearing and oil seal, remove the transmission cover and the clutch group as explained 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



With the sectional punch, remove the driven pulley shaft bearing.

Specific tooling

020376Y Adaptor handle

020375Y 28 x 30 mm adaptor

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.
- If faults are found, 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 faults, replace the damaged components.

Refitting the wheel axle bearing

Support the hub cover on a wooden surface.

- Heat the cover crankcase with special heat gun.
- Fit the wheel shaft bearing with a modular punch as shown in the figure.

Specific tooling

020150Y Air heater support

020151Y Air heater

020376Y Adaptor handle

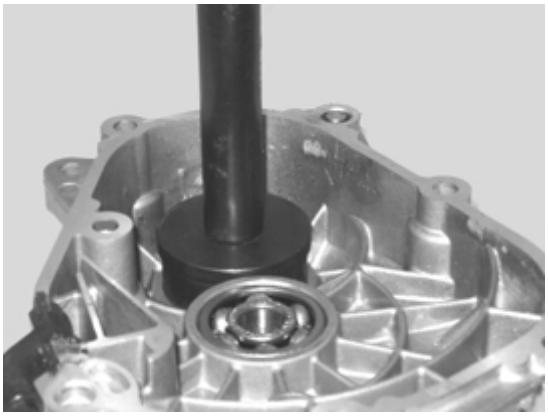
020360Y 52x55-mm Adaptor

020483Y 30-mm guide

Assemble 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**.**

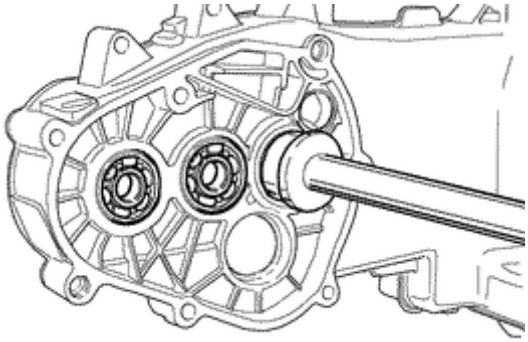
The 52 mm side of the adapter must be turned towards the bearing.



Refitting the hub cover bearings

In order to fit the hub box 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.



Specific tooling

020150Y Air heater support

020151Y Air heater

020376Y Adaptor handle

020359Y 42x47-mm Adaptor

020412Y 15-mm guide

N.B.

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

- Refit the driven pulley shaft bearing with a modular punch as shown in the figure.

N.B.

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

Specific tooling

020376Y Adaptor handle

020359Y 42x47-mm Adaptor

020363Y 20-mm guide

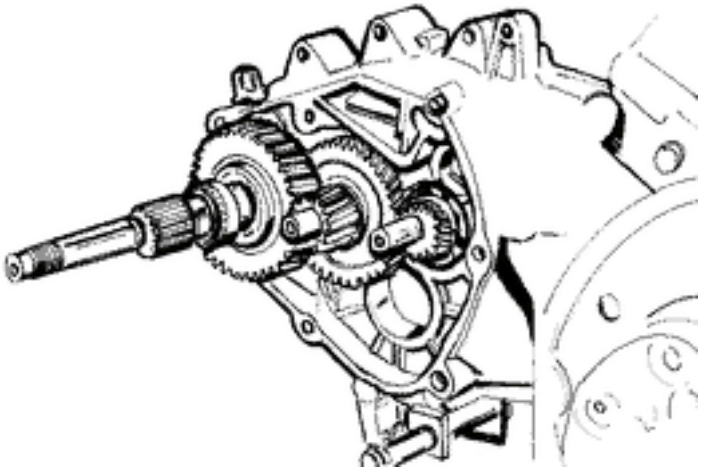
N.B.

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

- Refit the Seeger ring with the opening facing the bearing and fit a new oil seal flush with the crankcase from the pulley side.

Refitting the hub bearings

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

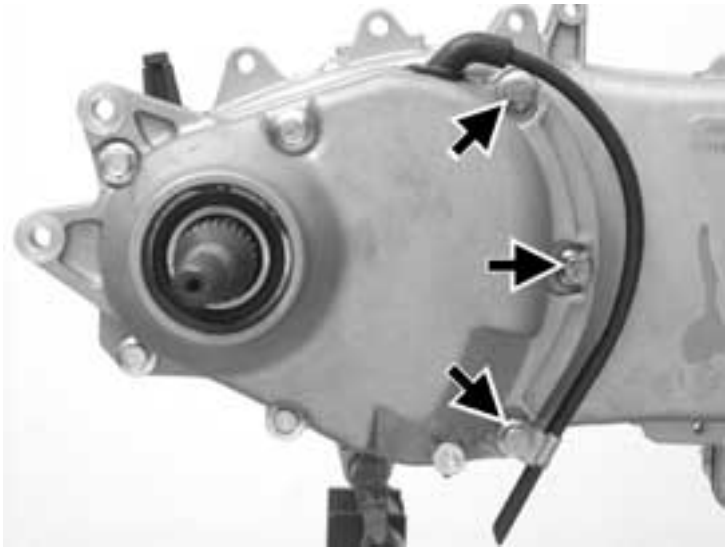


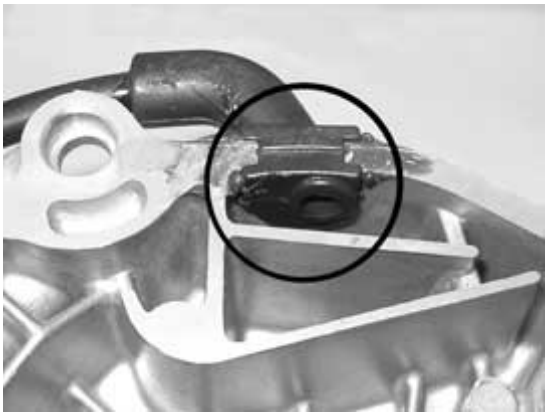
Refitting the ub cover

- 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 to 27

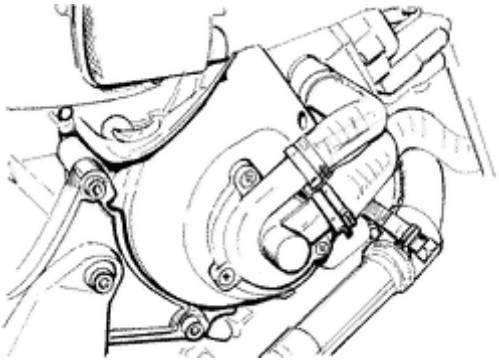




Flywheel cover

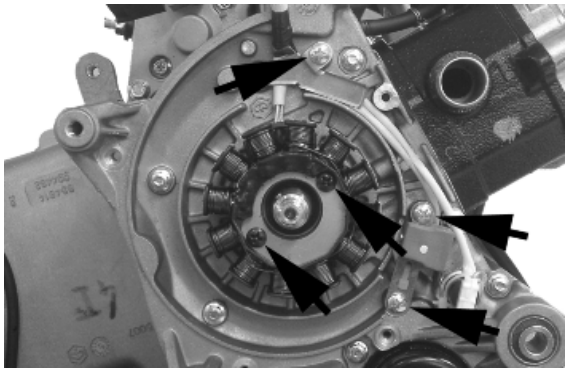
Removing the hub cover

- 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.

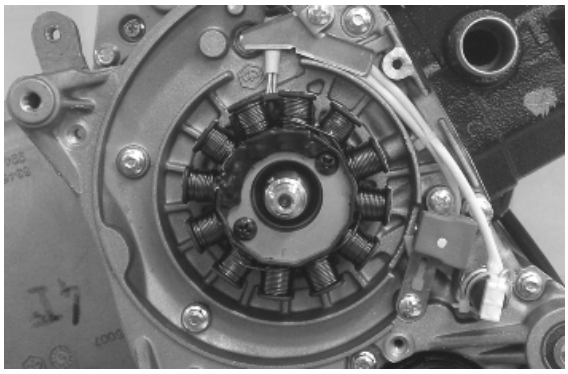


Refitting the stator

- 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 DOWEL AS SHOWN IN THE DETAIL DRAWING.



Locking torques (N*m)

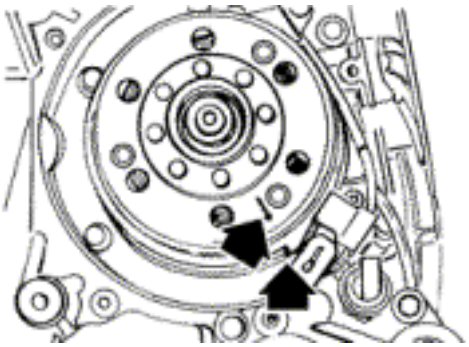
Stator assembly screws (°) **3 to 4**

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.



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 using a calliper spanner.
- Remove the flanged nut M10X1.25
- Extract the flywheel with the extractor.

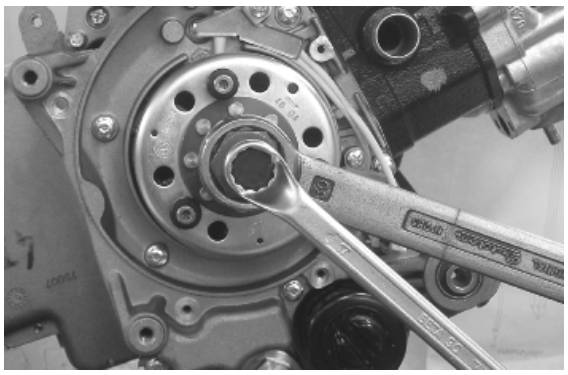
Specific tooling

020565Y Flywheel lock calliper spanner

020162Y Flywheel extractor

Locking torques (N*m)

Electric start-up flywheel nut: 40 ÷ 44 Nm



Inspecting the flywheel components

- Check the integrity of the internal plastic parts of the flywheel and the Pickup 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.

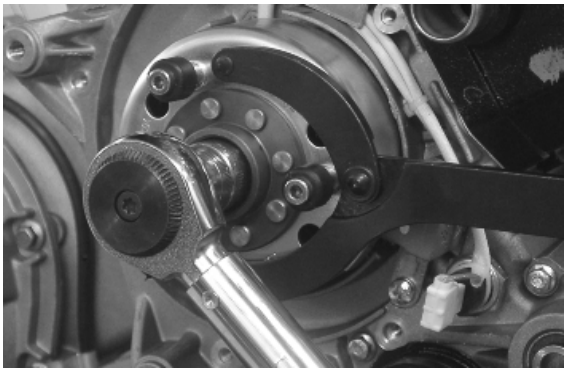
A VARIATION IN THE AIR GAP DISTANCE MODIFIES THE IGNITION SYSTEM IDLE SPEED

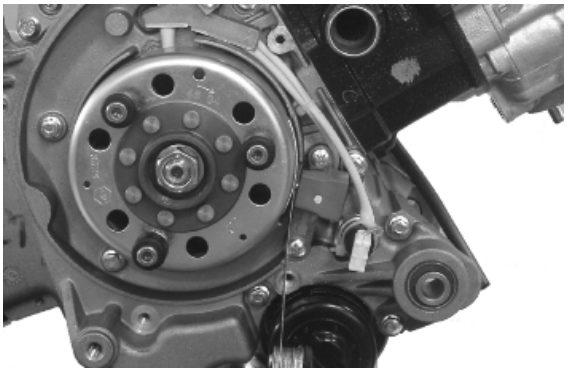
Specific tooling

020565Y Flywheel lock calliper spanner

Locking torques (N*m)

Flywheel nut 54 ÷ 60



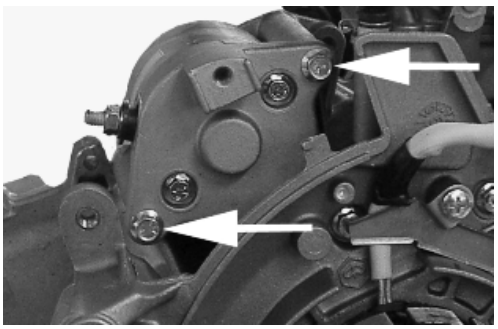


Refitting the starter motor

- Fit a new O-ring on the starter motor and lubricate it.
- Fit the starter motor on the crankcase and lock the 2 screws to the prescribed torque.

Locking torques (N*m)

Starter screws 11 to 13



Cylinder assy. and timing system

Removing the intake manifold

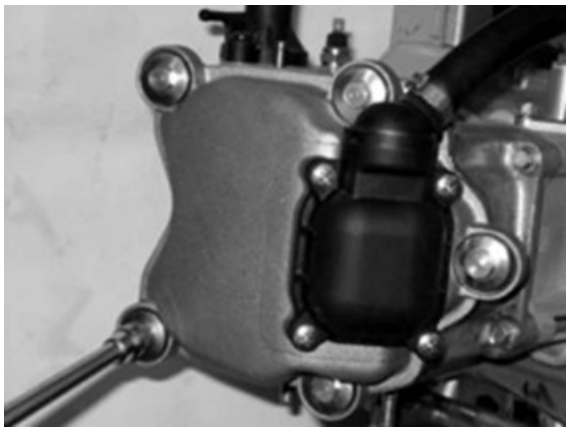
- Remove the flywheel cover completely as described in the flywheel cover section.
- Loosen the 3 crews and remove the intake manifold.

N.B.

SCREWS AGAINST ACCIDENTAL OPERATION ARE PROVIDED

Removing the rocker-arms cover

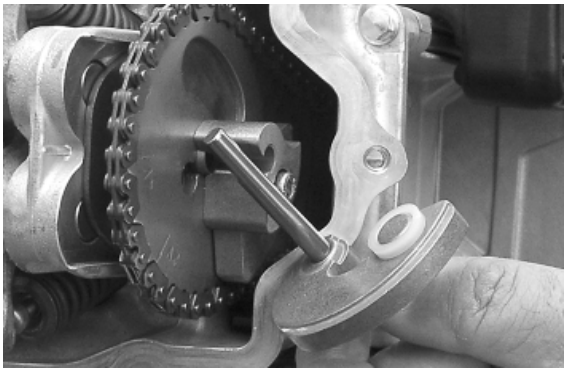
- Remove the 5 screws indicated in the figure



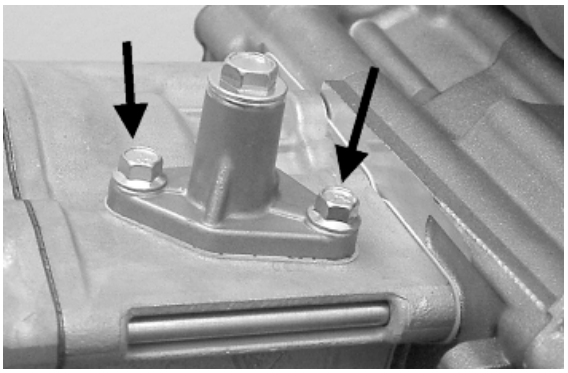
Removing the timing system drive

- First remove the parts listed below: transmission cover, drive pulley with belt, oil sump with spring and by-pass piston, oil pump pulley cover, O-ring on the crankshaft and the sprocket wheel separation washer.
- Remove the tappet cover.
- Remove the central screw fastener and the automatic valve-lifter retaining cover, as shown in the figure.

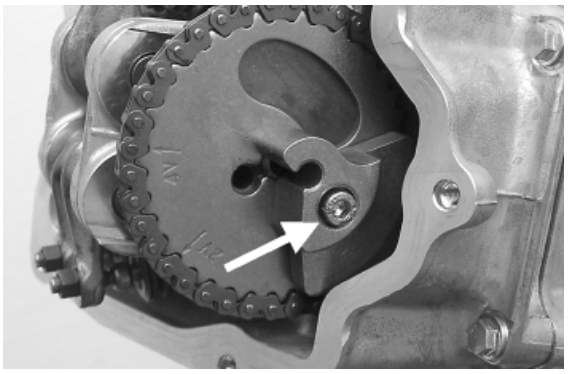
- Remove the return spring of the automatic valve lifter unit and the automatic valve lifter unit and its end of stroke washer.



- Loosen the central screw on the tensioner first.
- Remove the two fixings shown in the figure.
- Remove the tensioner with its gasket.



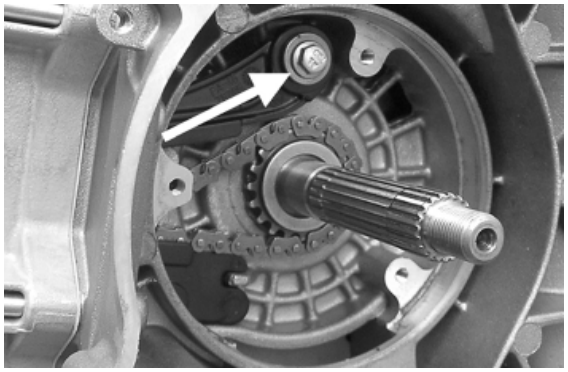
- Remove the internal hex screw and the counter-weight shown in the figure.



- Remove the camshaft control pulley with its washer.

- Remove the control sprocket wheel and the timing chain.
- Remove the screws indicated in the figure, the spacer bar and the tensioner slider.

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

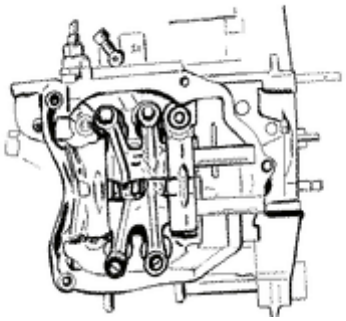


N.B.

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

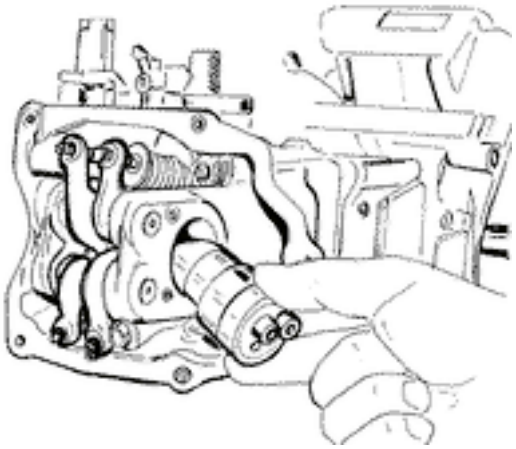
Removing the cam shaft

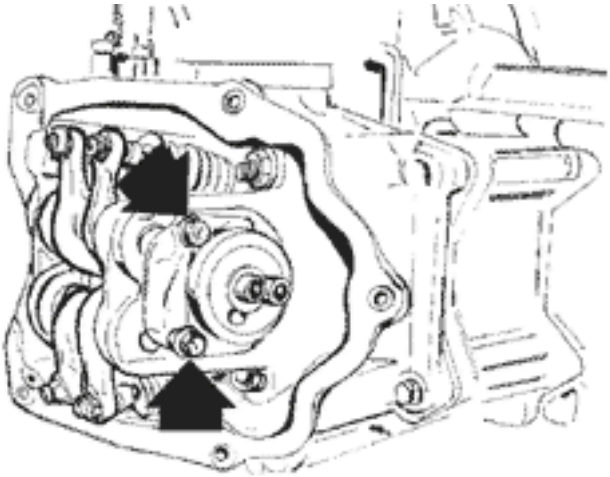
- Remove the 2 screws and the camshaft retainer shown in the diagram.
- Remove the camshaft.
- Remove the pins and the rocking levers from the flywheel side holes.



N.B.

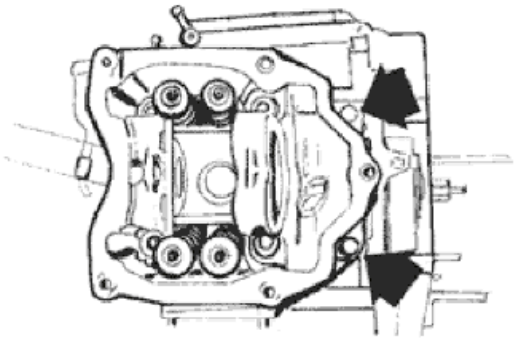
IF NEEDED, THE HEAD MAY BE REMOVED WITH THE CAMSHAFT, ROCKER PINS AND FIXING BRACKET. THE HEAD CAN ALSO BE REMOVED WITHOUT REMOVING THE CHAIN AND THE CRANKSHAFT CHAIN TENSIONER.





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 alignment dowels and the gasket.



N.B.

IF NEEDED, THE HEAD MAY BE REMOVED WITH THE CAMSHAFT, ROCKER PINS AND FIXING BRACKET. THE HEAD CAN ALSO BE REMOVED WITHOUT REMOVING THE CHAIN AND THE CRANKSHAFT CHAIN TENSIONER.

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

Removing the cylinder - piston assy.

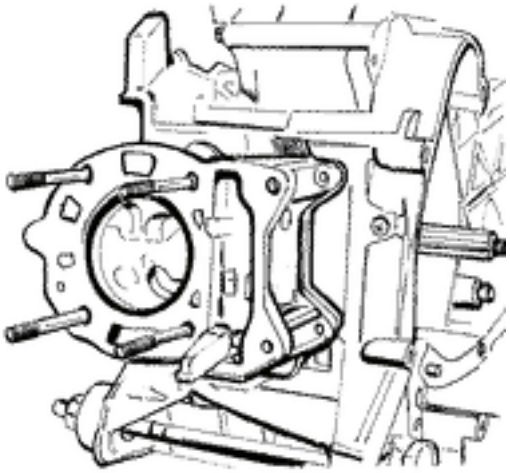
- Remove the chain guide pad.
- Pull out the cylinder.
- Remove the cylinder base gasket.
- Remove the two stop rings, the wrist pin and the piston.
- Remove the piston seals.

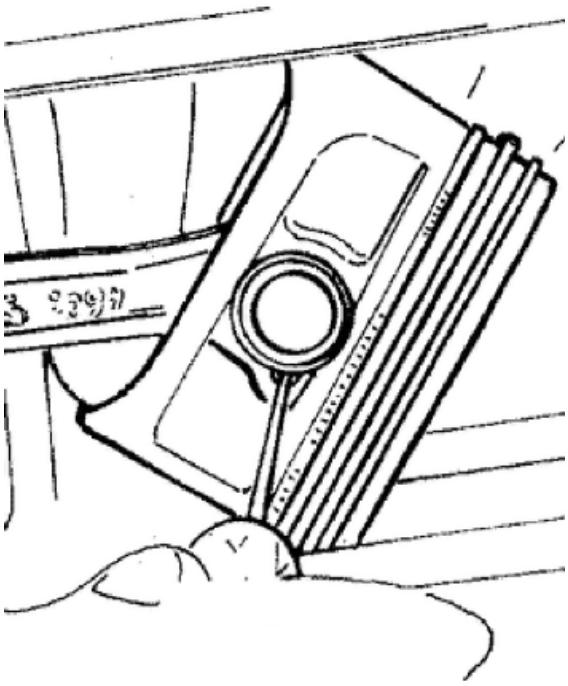
CAUTION

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

N.B.

BE CAREFUL NOT TO DAMAGE THE SEALING RINGS DURING REMOVAL.



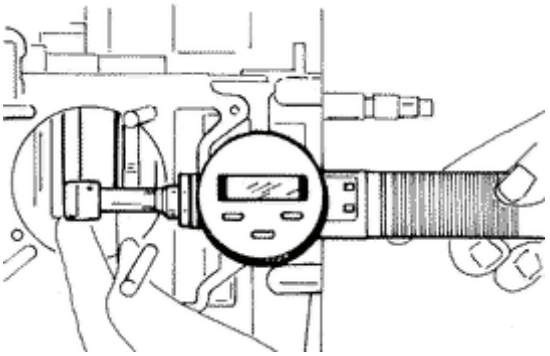


Inspecting the small end

- Measure the internal diameter of the connecting rod 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

Connecting rod small end check-up: Maximum diameter

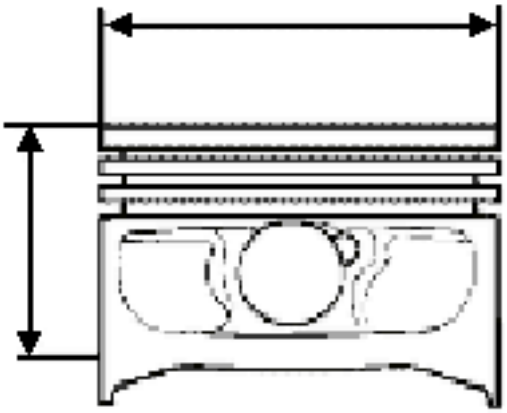
15.030 mm

Connecting rod small end check-up: Standard diameter

15+0.015+0.025 mm

Inspecting the wrist pin

- Measure the outer diameter of the gudgeon pin.
- Calculate the coupling clearance between pin and connecting rod end.
- Measure the capacity diameter on the piston.
- Calculate the piston pin coupling clearance.
- Measure the outside diameter of the piston, perpendicular to the gudgeon pin axis.
- Carry out the measurement as shown in the figure.



125 cc: 41.1 mm (from crown)200 cc: 5 mm (from bottom)

- Using a bore meter, measure the inner cylinder diameter at three different points according to the directions shown in the figure.
- Check that the head matching surface exhibits no deformations or wear.

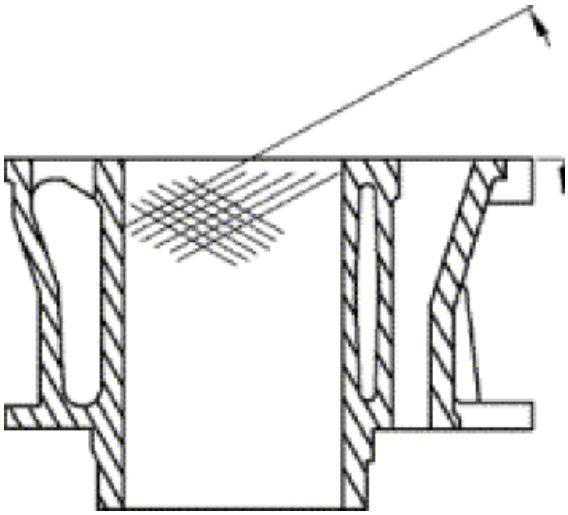
Maximum admissible displacement: 0.05 mm

- Pistons and cylinders are classified into categories based on their diameter. The coupling is carried out in pairs (A-A, B-B, C-C, D-D).
- The cylinder rectifying operation should be carried out with a surfacing that respects the original angle.

- The cylinder surface roughness should be 0.9 micron.
- This is indispensable for a good seating of the sealing rings, which in turn minimises oil consumption and guarantees optimum performance.

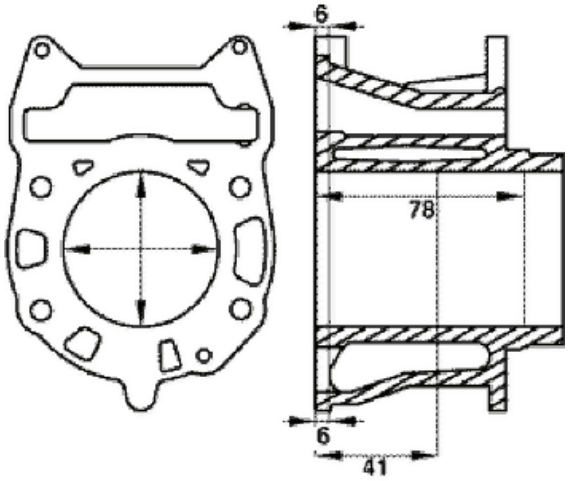
For 125 engines

- The pistons are oversized due to cylinder rectification and are subdivided into three categories 1st, 2nd, 3rd with 0.2-0.4-0.6 mm oversize. They are also classified into 4 categories 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.



Characteristic

Pin diameter Standard diameter: 200 cc

68.990 ÷ 69.018

Pin diameter Standard diameter: 125 cc

56.997 ÷ 57.025

Pin diameter : Piston 200 cc

68.933 - 68.961 mm

piston diameter

56.945 ÷ 56.973 mm

Pin diameter: Standard clearance

0.015 ÷ 0.029 mm

Pin diameter Standard diameter

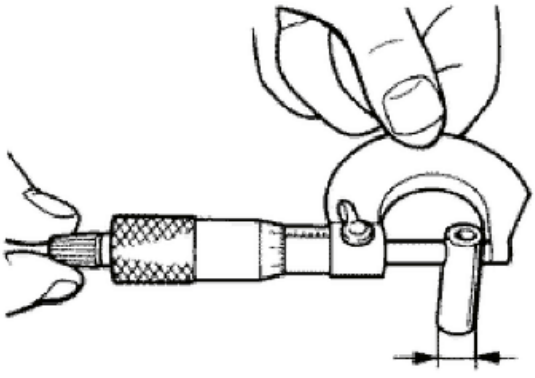
14.996 - 15.000 mm

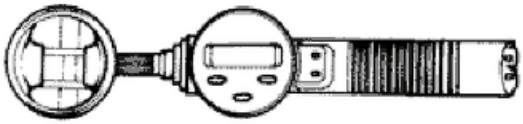
Wrist pin seat on the piston: Standard diameter

15.001 ÷ 15.006 mm

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

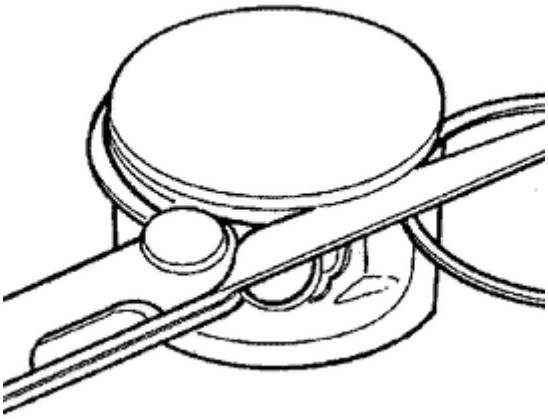
0.001 - 0.010 mm





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.



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.

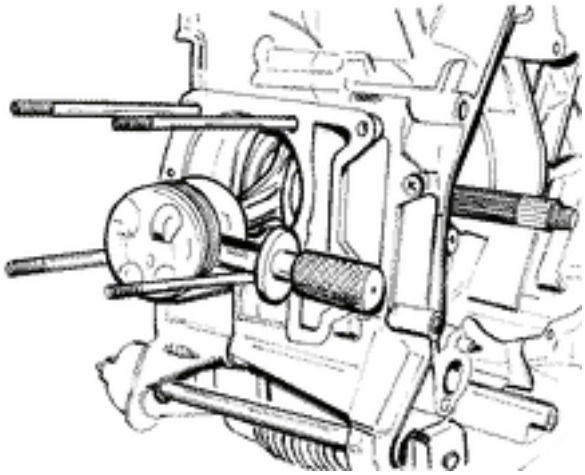
N.B.

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

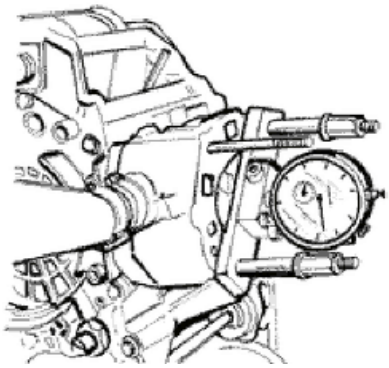
Specific tooling

020430Y Tool for fitting pin stops (125)

020454Y Tool for fitting pin stops (200)



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.

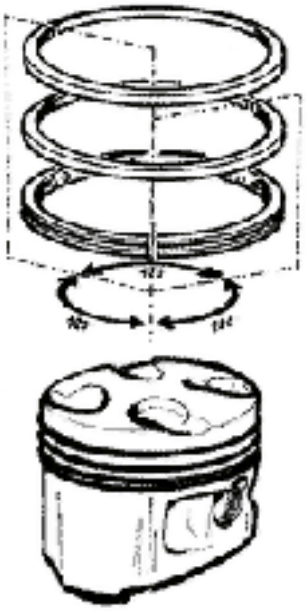
PISTON PROTRUSION IS MEASURED IN 125 ENGINES WHILE INTRODUCTION IS MEASURED IN 200 ENGINES.

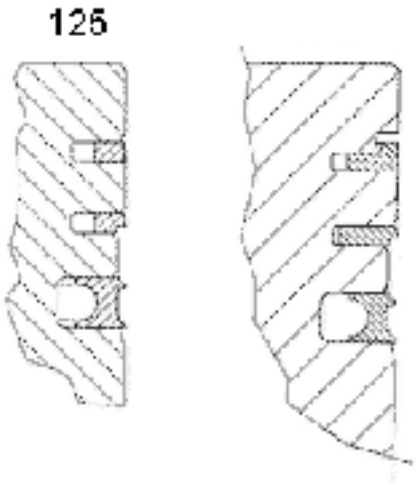
Refitting the piston rings

- 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 LINER.

Specific tooling

020393Y Piston assembly band

020287Y Clamp to fit piston on cylinder

Inspecting the cylinder head

- Using a trued bar and a 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 rocking lever 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»

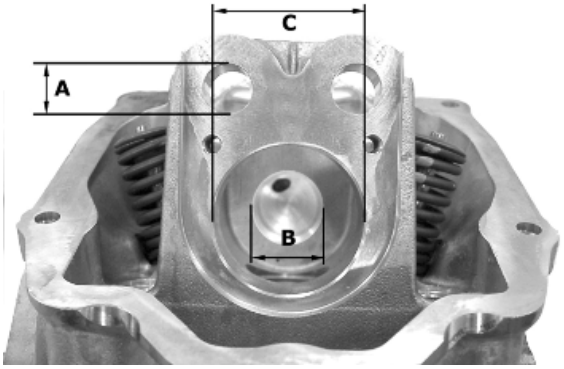
Ø 12.000 - 12.018 mm

bearing «B»

Ø 20.000 ÷ 20.021 mm

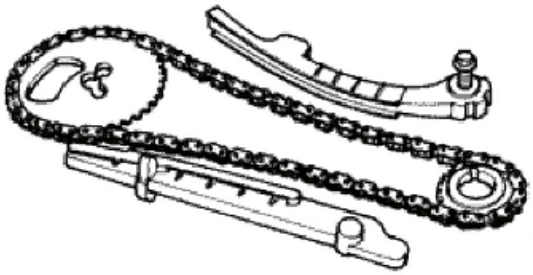
bearing «C»

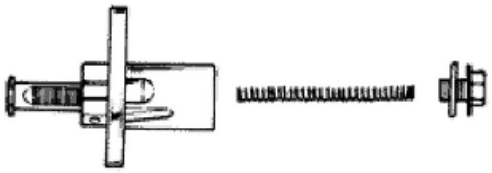
Ø 37.000 - 37.025 mm



Inspecting the timing system components

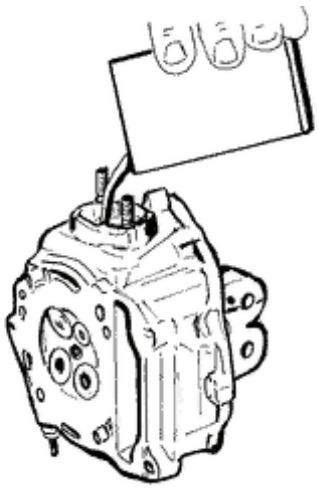
- Check that the guide slider and the tensioner slider are not worn out.
- Ensure that the camshaft control pulley chain assembly and the sprocket wheel are not worn.
- If you detect wear, replace the parts or, if the chain, sprocket wheel and pulley are worn, replace the whole unit.
- Remove the centre 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 unit.



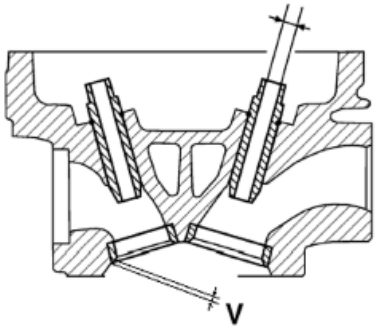


Inspecting the valve sealings

- 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

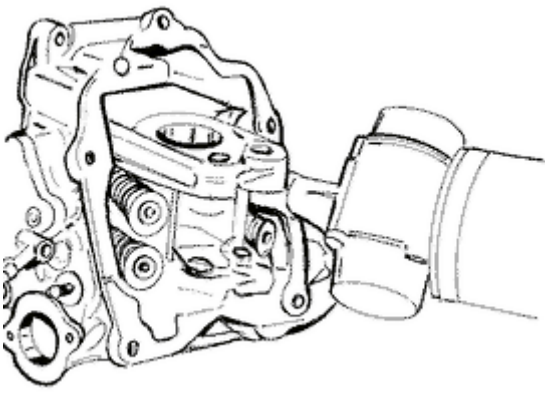
Valve seat wear Exhaust guide

Accepted limit 5.022

Valve seat wear Exhaust guide

Standard diameter: 5.000 ÷ 5.012 mm

Inspecting the valves



- Measure the 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 faying surface with the articulated set screw terminal.
- If no anomalies are found during the above checks, 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

Exhaust: 94.4 mm

Valve check Standard length

Intake: 94.6 mm

Valve check Maximum admissible clearance

Exhaust: 0.072 mm

Valve check Maximum admissible clearance

Intake: 0.062 mm

Valve check standard clearance

Exhaust: 0.025 to 0.052 mm

Valve check standard clearance

Intake: 0.013 ÷ 0.040 mm

Valve check Minimum admissible diameter:

Exhaust: 4.95 mm

Valve check Minimum admissible diameter:

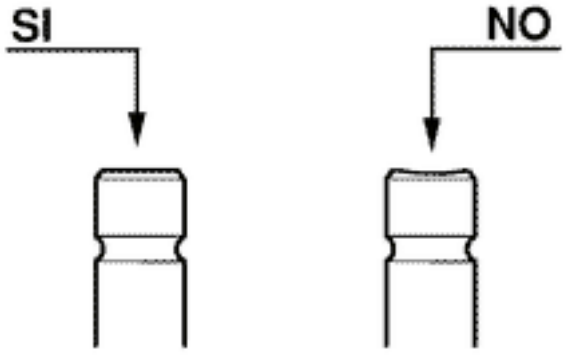
Intake: 4.96 mm

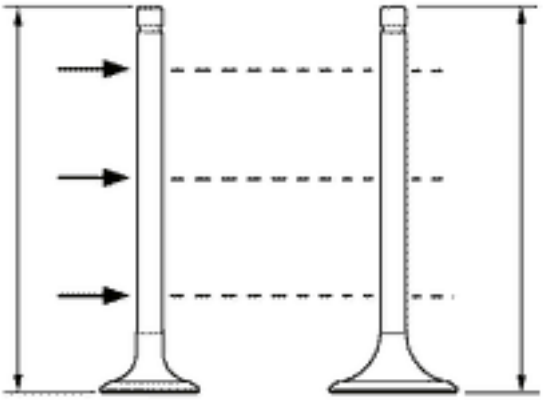
Valve check Standard diameter:

Intake: 4.972 ÷ 4.987 mm

Valve check Standard diameter:

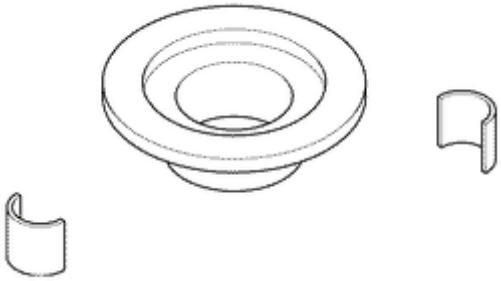
Exhaust: 4.96 ÷ 4.975 mm





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 seal rings.
- 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 POSITIONS THE VALVES ARE FITTED IN FIT THE VALVE SPONGES WITH THE REFERENCE COLOUR ON COTTER SIDE (TURNS WITH GREATER PITCH).

Specific tooling

020306Y Punch for assembling valve seal rings

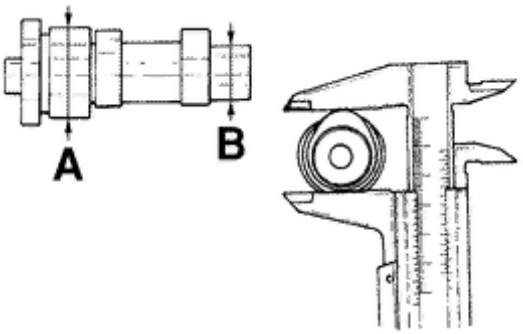
020382Y Valve cotters equipped with part 012 removal tool

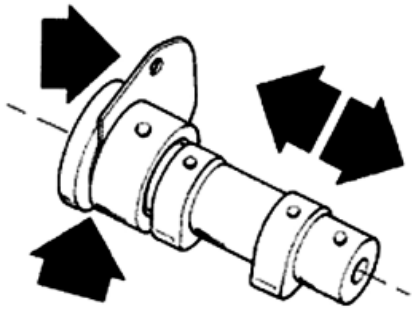
020382Y011 adapter for valve removal tool

Inspecting the cam shaft

- Inspect the camshaft 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 lifter spring has not yielded.
- Replace any defective or worn components.
- Check the rocking lever pins do not show signs of wear or scoring.
- Measure the internal diameter of each rocking lever.

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





Characteristic

Rocking lever inside diameter: Standard diameter

Diameter 12.000 - 12.011 mm

Rocking lever pin diameter: Standard diameter

Diameter 11.977 - 11.985 mm

Camshaft check: Maximum admissible axial clearance

0.42 mm

Camshaft check: Standard axial clearance:

0.11 - 0.41 mm

Camshaft check: Standard height

Exhaust: 29.209 mm

Camshaft check: Standard height

Intake: 30.285 mm

Camshaft check: Minimum admissible diameter

Bearing B diameter: 19.950 mm

Camshaft check: Minimum admissible diameter

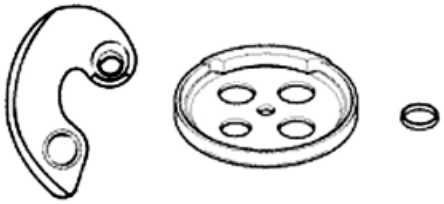
Bearing A Ø: 36.94 mm

Camshaft check: Standard diameter

Bearing B diameter: 19.959 ÷ 19.98 mm

Camshaft check: Standard diameter

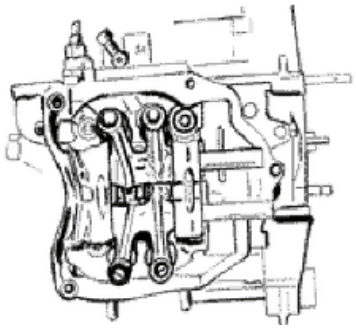
Bearing A Ø: 36.95 ÷ 36.975 mm



Refitting the head and timing system components

Assemble 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.

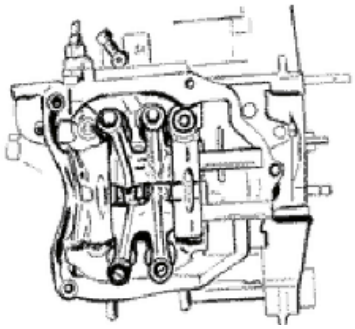


Locking torques (N*m)

Slider screw 10 - 14 Nm

Fit the pins and rocking levers.

- Lubricate the two rocking levers through the holes at the top.
- Lubricate the 2 bearings and insert the camshaft in the cylinder head with the cams corresponding to the rocking levers.
- Insert the retention plate and tighten the two screws shown in the figure to the prescribed torque.

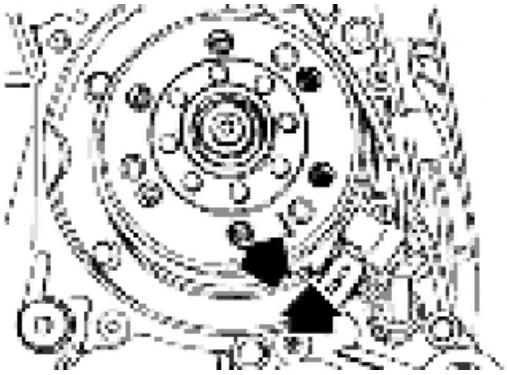


Locking torques (N*m)

Plate screws **4 - 6 Nm**

Insert 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.
- Assemble the counterweight with the corresponding fixing screw and tighten to the prescribed torque.



Locking torques (N*m)

Counterweight screw **7 to 8.5**

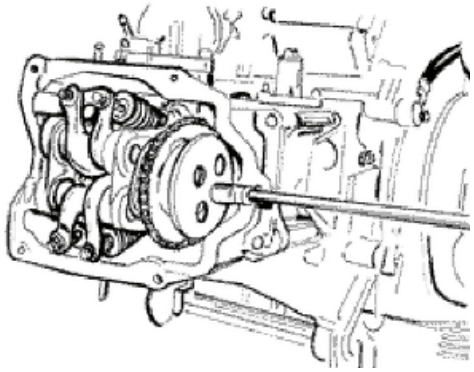
Fit the end-of stroke ring on the valve-lifting mass and fit the automatic valve-lifting cam to the camshaft.

N.B.

LUBRICATE WITH GREASE THE END-OF-STROKE RING IN ORDER TO AVOID ACCIDENTAL LEAKS THAT MAY FALL INTO THE ENGINE. ASSEMBLE THE AUTOMATIC VALVE-LIFTER RETURN SPRING. DURING THIS OPERATION THE SPRING MUST BE LOADED AT APPROXIMATELY 180°.

Assemble the limiting bell using the counterweight fixing screw as a reference.

- Tighten the clamping screw to the prescribed torque.



Locking torques (N*m)

Limiting bell screw 11 ÷ 15 Nm

Set the tensioner cursor to 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.

Locking torques (N*m)

Tensioner screws 11 to 13 Tensioner cover 5 - 6 Nm

Adjust valve clearance

- Fit the spark plug.

Electrode distance 0.8 mm

Locking torques (N*m)

Spark plug 12 ÷ 14

Refit the cylinder head cover, tightening the 5 screws to the prescribed torque. Make sure the gasket is positioned properly.

Remove the flywheel cover completely as already described in the flywheel chapter.

- Reassemble the oil pump control, the chain compartment cover, the by-pass and the oil sump as described in the lubrication chapter.

- Reassemble the driving pulley, the belt and the transmission cover as described in the transmission chapter.

Locking torques (N*m)

Tappet cover screws 6 - 7 Nm

TIMING SYSTEM COMPONENTS ASSEMBLY

Name	Torque in Nm
Tappet cover screws	6 - 7 Nm
Spark plug	12 ÷ 14
Tensioner cover	5 - 6 Nm
Tensioner screws	11 to 13
Limiting bell screw	11 ÷ 15 Nm
Counterweight screw	7 to 8.5
Plate screws	4 - 6 Nm

Name	Torque in Nm
Slider screw	10 - 14 Nm

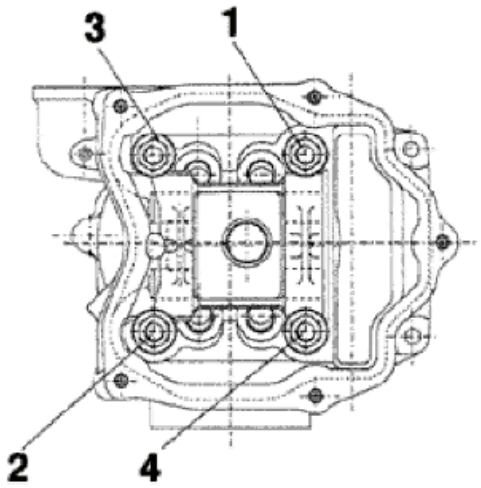
- Fit the timing chain guide pad.
- Insert the centring dowel between the cylinder head to the cylinder, fit the cylinder head gasket and the cylinder head.
- Lubricate the stud bolt threading.
- Tighten up the nuts to a pre-torque of 7±1 N·m
- Rotate by a 180° angle (2 rotations of 90° each)
- To carry 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.

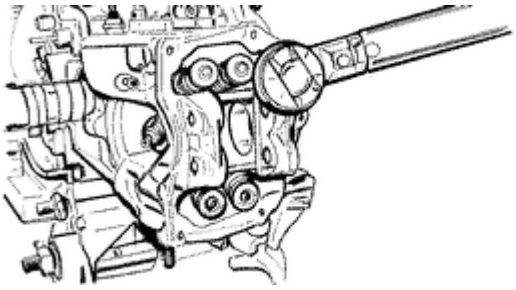
N.B.

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 to 13**



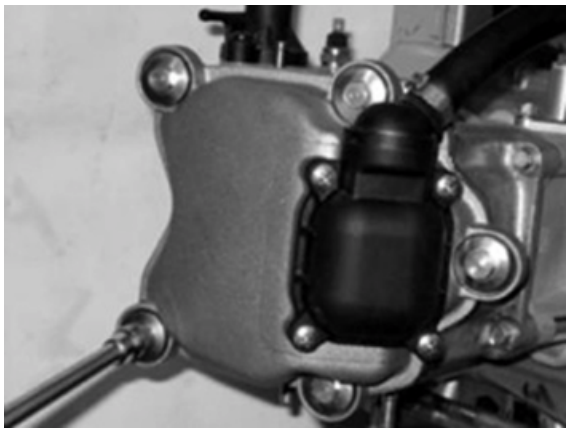


Refitting the rocker-arms cover

- Refit the cylinder head cover and tighten the 5 clamping screws to the prescribed torque.
- Make sure the gasket is positioned properly.

Locking torques (N*m)

Tappet cover screws 6 - 7 Nm

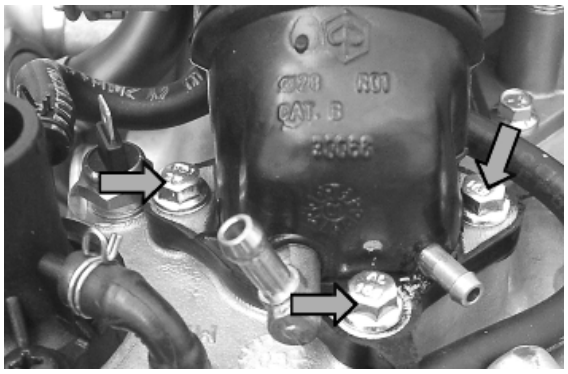


Refitting the intake manifold

Fit the intake manifold and do up the three screws.

N.B.

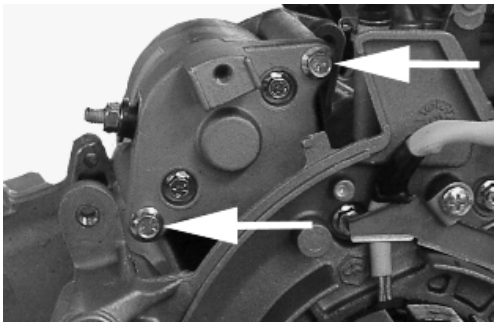
FOR SPECIAL SCREWS USE COMMERCIALLY AVAILABLE INSERTS AND INSERT HOLDERS.



Crankcase - crankshaft

Splitting the crankcase halves

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.

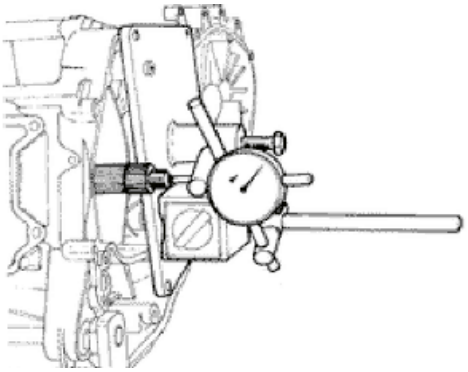


- Remove the flywheel cover together with the water pump, the flywheel and the stator as described in the **magneto flywheel** chapter.
- Remove the oil filter and the oil pressure switch.
- Remove the cylinder/piston/head unit as described in the **cylinder head timing system** chapter.
- Remove the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

Before opening the engine crankcase, it is advisable to check axial clearance of the crankshaft. To do this, use a plate and a support with appropriate tool dial gauge.

Higher clearances are signs of wear on the supporting surfaces of the crankshaft casing.

Standard clearance: 0.15 ÷ 0.40 mm



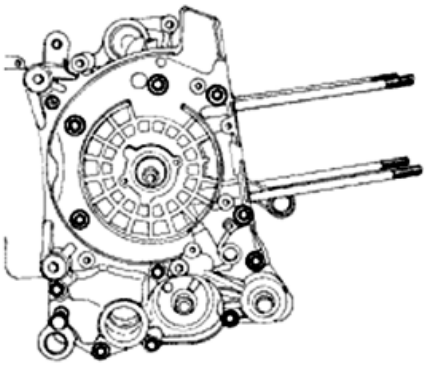
Remove the 11 coupling screws to the crankcase.

- Separate the crankcase while keeping the crankshaft in one of the two halves of the crankcase.

Remove the crankshaft.

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.

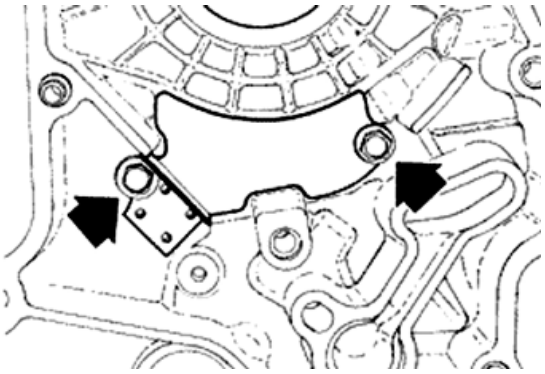


- Remove the coupling gasket of the crankcase halves.

- Remove the two screws and the internal shield shown in the diagram.

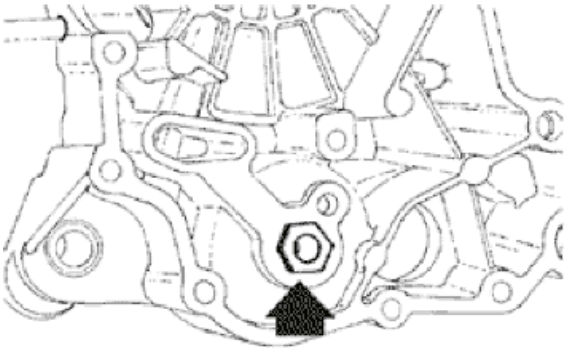
CAUTION

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



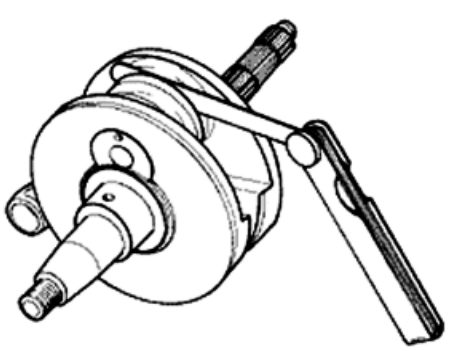
- Remove the oil seal on the flywheel side.

- Remove the oil filter fitting shown in the diagram



Fitting clearance

Connecting rod axial clearance **0.20 - 0.50**



Check the radial clearance on the connecting rod.

Standard clearance: 0.036 ÷ 0.054 mm

-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.

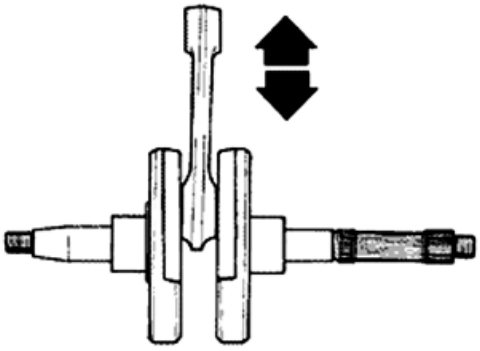
Standard dimensions:

55.75 ÷ 55.90 mm (125 cc)

51.40 ÷ 51.45 mm (200 cc)

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.



The crankshaft can be reused when the width is within the standard values and the surfaces show no signs of scoring.

Shim washers (only 200 cc)

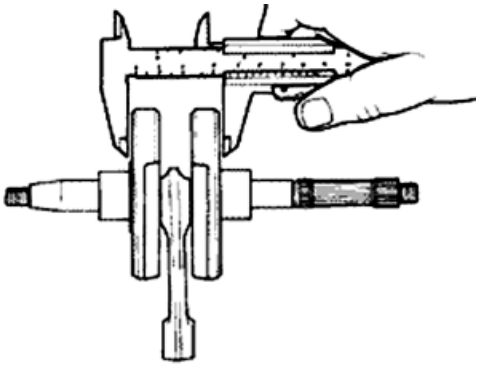
- Check the thickness of the shim washers.

Standard thickness: 2.175 ÷ 2.225 mm

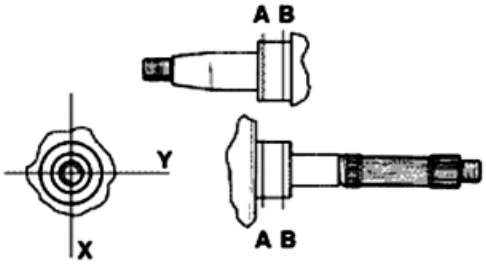
- Check that the shim washers are not stripped.

N.B.

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



Check the diameters of both bearings of the crankshaft according to 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.



Characteristic

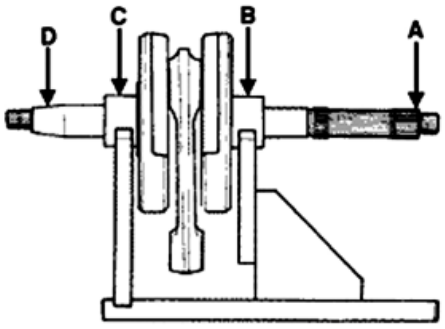
Standard diameter - Category 2

29.004 ÷ 29.010

Standard diameter - Category 1

28.994 ÷ 29.000

Inspecting the crankshaft alignment



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

- Check that the crankshaft 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 big end 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

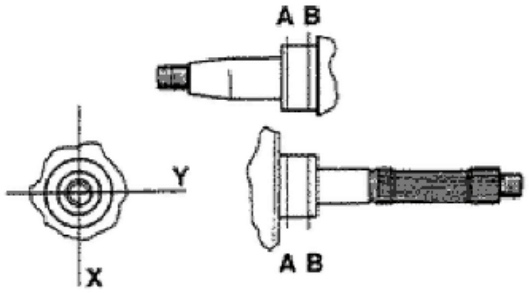
Measure the capacity of both axes X-Y

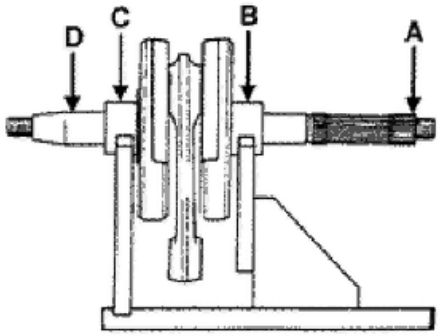
Specific tooling

020074Y Support base for checking crankshaft alignment

CRANKSHAFT ALIGNMENT

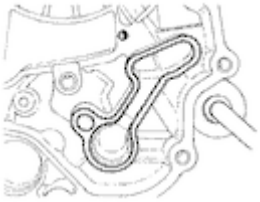
Titolo	Durata/Valore	Testo Breve (< 4000 car.)	Indirizzo Immagine
Crankshaft alignment			

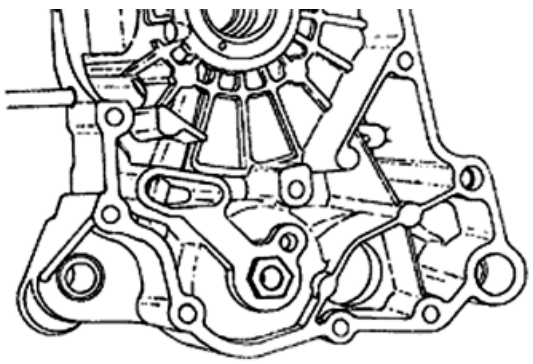


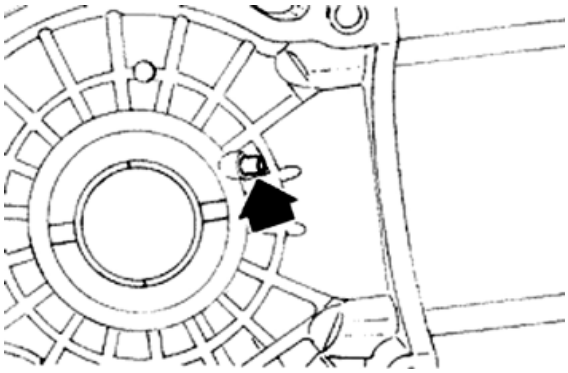


Inspecting the crankcase halves

- 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 piston, 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 particular 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 bushings and connecting 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.

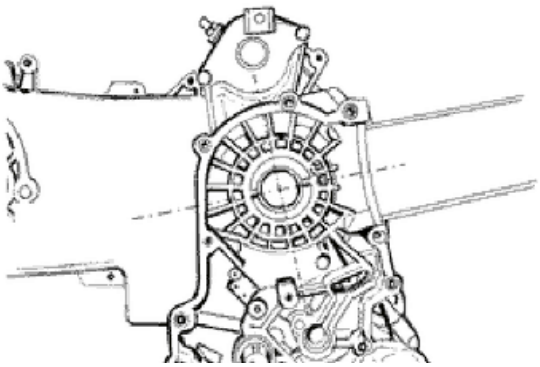
N.B.

THE JET IS FED THROUGH THE MAIN BUSHINGS. PROPER OPERATION OF THIS COMPONENT IMPROVES PISTON CROWN COOLING. CLOGGING HAS EFFECTS THAT ARE DIFFICULT TO DETECT (PISTON TEMPERATURE INCREASE). FAILURE OR LEAKS CAN CAUSE A CONSIDERABLE DROP IN THE LUBRICATION PRESSURE FOR MAIN BUSHINGS AND CONNECTING ROD.

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



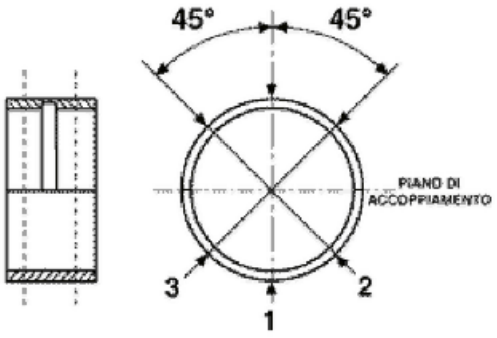
- T

o obtain a good bushing lubrication it is necessary to have both an optimal lubricating pressure (3,2 bar) and a good oil flow rate; the bushings must be correctly positioned so as not to obstruct the oil supply channels.
- The main bushings are comprised of two half-bearings, one with holes and channels for lubrication whereas the other is solid.

- The solid half-bearing is intended to stand the thrusts caused by combustion, and for this reason it is arranged opposite the cylinder.
- To prevent obstructions in the oil feeding channels, the matching surface of the two half-bearings must be perfectly perpendicular to the cylinder axis, as shown in the figure.
- The oil feeding channel section is also affected by the bushings driving depth compared with the crankshaft axial clearance of the limiting surface.
- Check the inside diameter of the main bushings in the three directions indicated in the diagram.
- Repeat the measurements for the other bushing half. see diagram.
- There are three crankcase versions: with RED main bushings, with BLUE main bushings and with YELLOW main bushings.
- There is only one type of main bushing housing hole in the crankcase

The standard bushing diameter after driving is variable on the basis of a coupling selection.

- The bushing housings in the crankcase are available in two categories, Cat. 1 and Cat. 2, as are the crankshafts.
- The main bushings are available in three thickness categories, identified by colour markings, as shown in the table below.



TYPE	IDENTIFICATION
A	RED
B	BLUE
C	YELLOW

	Type "A" - RED	Type "B" - BLUE	Type "C" - YELLOW
Crankshaft half-bearing	1.970 ÷ 1.973	1.9703 ÷ 1.976	1.976 ÷ 1.979

Bushing category	Crankcase halves category	Internal bushing diameter after fitting	Possible fitting
A	1	29.025 ÷ 29.040	Original
B	1	29.019 ÷ 29.034	Original and
	2	29.028 ÷ 29.043	spare
C	2	29.022 ÷ 29.037	Original

Match the shaft with two category 1 crank webs with the category 1 crankcase (or cat. 2 with cat. 2) Furthermore a spare crankcase cannot be matched with a crankshaft with mixed categories. The spare crankshaft has half shafts of the same category.

Crankcase halves	Engine half shaft	Bushing
Cat. 1	Cat. 1	B
Cat. 2	Cat. 2	B
Cat. 1	Cat. 2	A
Cat. 2	Cat. 1	C

N.B.

TO KEEP THIS POSITION OF THE BUSHINGS ON THE CRANKCASE, FITTING IS FORCED ON STEEL RINGS INSERTED IN THE CASTING OF BOTH CRANKCASE HALVES.

N.B.

DO NOT TAKE THE MEASUREMENT ON THE TWO HALF-SHELL COUPLING SURFACE SINCE THE ENDS ARE RELIEVED TO ALLOW BENDING DURING THE DRIVING OPERATION.

N.B.

CRANKCASES FOR REPLACEMENTS ARE SELECTED WITH CRANKCASE HALVES OF THE SAME CATEGORY AND ARE FITTED WITH CATEGORY B BUSHINGS (BLUE)

Characteristic

Standard driving depth

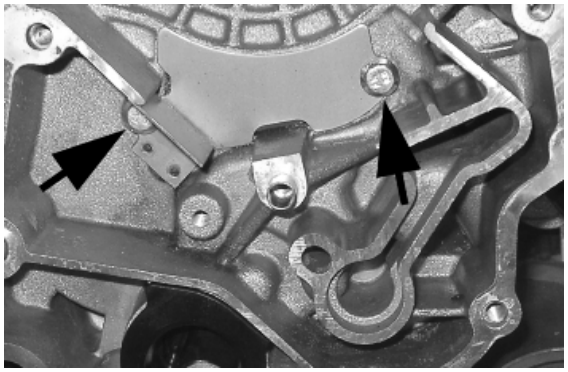
1.35 to 1.6

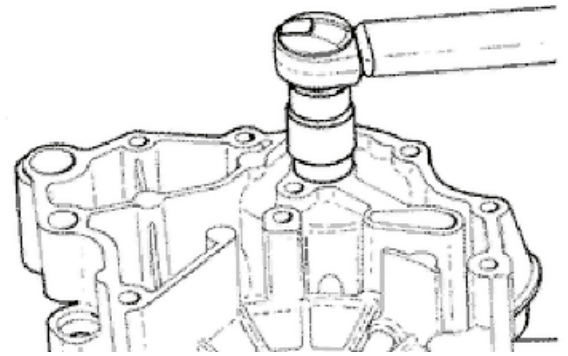
Diameter of crankcase without bushing

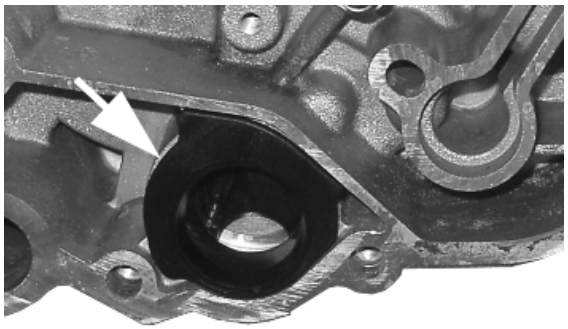
32.953 ÷ 32.963

Refitting the crankcase halves

- Fit the internal bulkhead by locking the two screws to the prescribed torque.
- Fit the oil filter joint and tighten it to the prescribed torque.
- Fit the oil pre-filter insert into the half crankcase on the transmission side as shown in the figure.
- 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.
- Fit the 11 screws and tighten them to the prescribed torque.
- Lubricate the flywheel oil seal.
- Using the appropriate tool, assemble the oil seal.
- Assemble a new O-Ring on the pre-filter and lubricate with engine oil.
- Insert the filter on the engine with the relative cap. Tighten to the specified torque.







N.B.

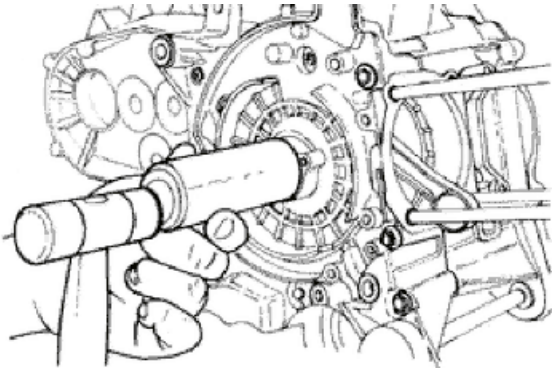
FAILURE TO USE THE SPECIFIC TOOL CAN RESULT IN AN INCORRECT DEPTH POSITION AND AS A CONSEQUENCE IN INADEQUATE OIL SEALING.

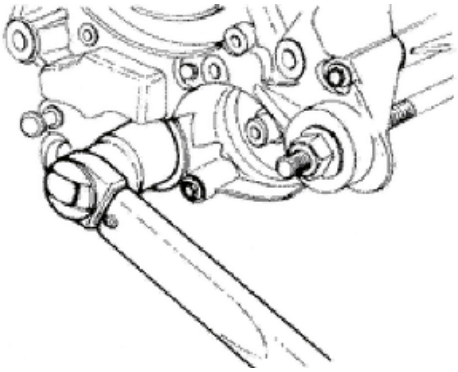
Specific tooling

020425Y Punch for flywheel-side oil seal

Locking torques (N*m)

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

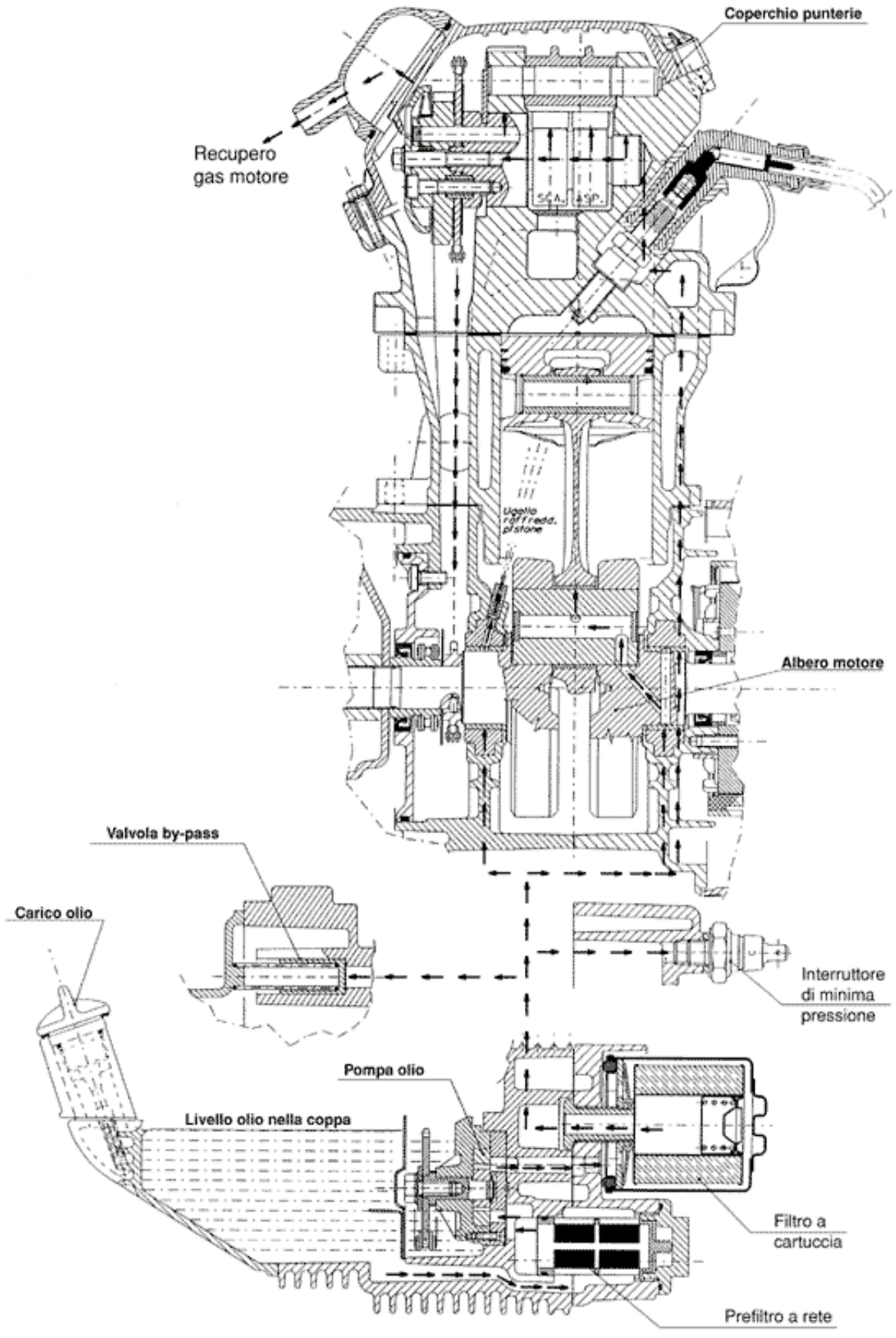




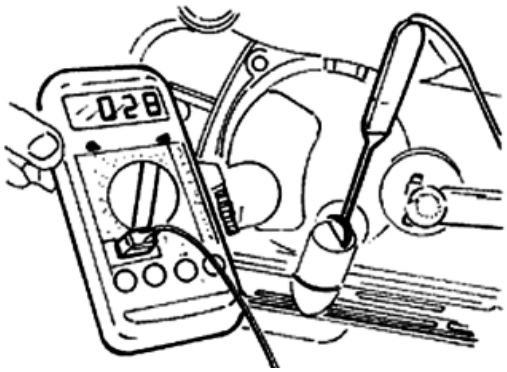
Lubrication

Conceptual diagrams

LUBRICATION CIRCUIT


Coperchio punterie
Recupero
gas motore
Albero motore
Valvola by-pass
Carico olio
Interruttore
di minima
pressione
Pompa olio
Livello olio nella coppa
Filtro a
cartuccia
Prefiltro a rete

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 PROPER CONDITION.

Characteristic

Oil pressure

Minimum pressure admitted at 6000 rpm: 3.2 atm.

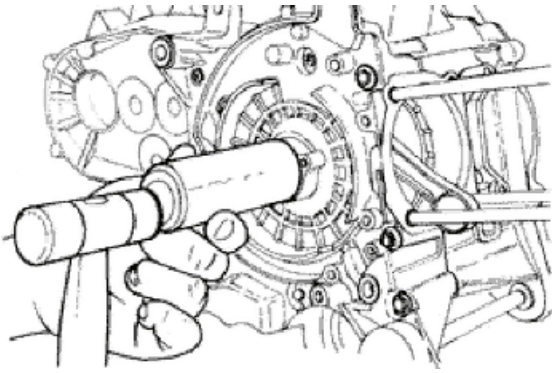
Locking torques (N*m)

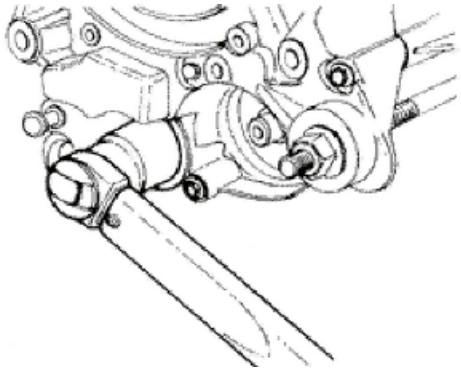
Minimum oil pressure sensor **12 to 14**

Crankshaft oil seals

Refitting

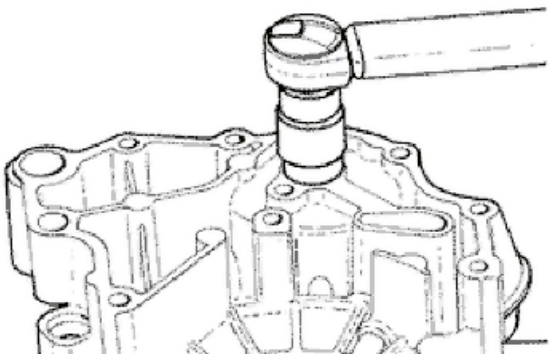
- Fit the internal bulkhead by locking the two screws to the prescribed torque.
- Fit the oil filter joint and tighten it to the prescribed torque.
- Fit the oil pre-filter insert into the half crankcase on the transmission side as shown in the figure.
- Place a new gasket on one of the crankcase halves, 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.
- Fit the 11 screws and tighten them to the prescribed torque.
- Lubricate the flywheel oil seal.
- Using the appropriate tool, assemble the oil seal.
- Assemble a new O-Ring on the pre-filter and lubricate with engine oil.
- Insert the filter on the engine with the relative cap. Tighten to the specified torque.





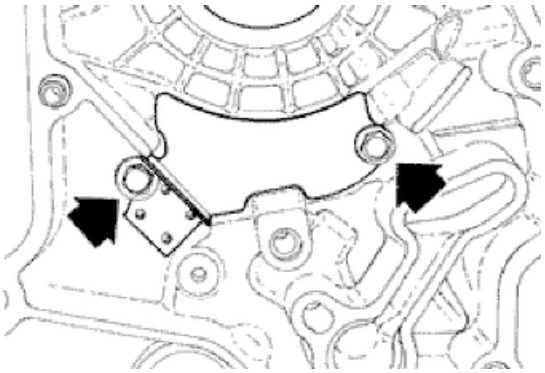
N.B.

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



Specific tooling

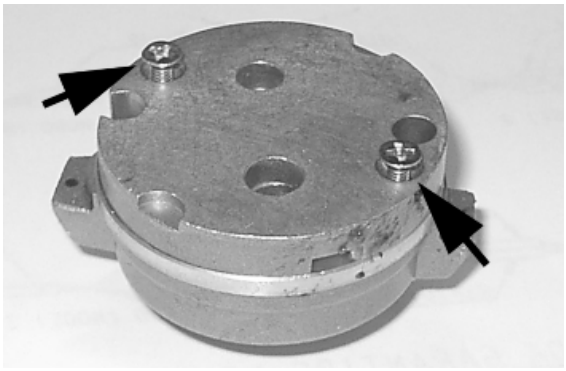
020425Y Punch for flywheel-side oil seal



Locking torques (N*m)

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

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 clamping 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 cup washer. Tighten to the prescribed torque.
-Fit the oil pump cover, by tightening the two screws to the prescribed torque.

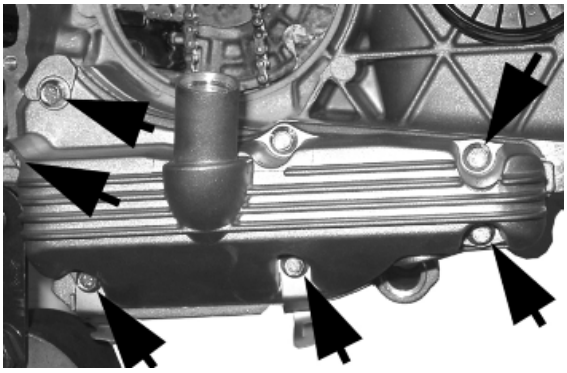
N.B.

FIT THE CUP 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 the crankcase 5 to 6
Oil pump command sprocket screw 10 to 14 **Oil pump cover screws** 0.7 - 0.9

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 above.
- Remove the 7 screws, shown in the diagram, and the 2 rear brake fluid pipe fixing brackets.
- Remove the screw, the by-pass piston, the gasket and the centring dowels shown in the figure.

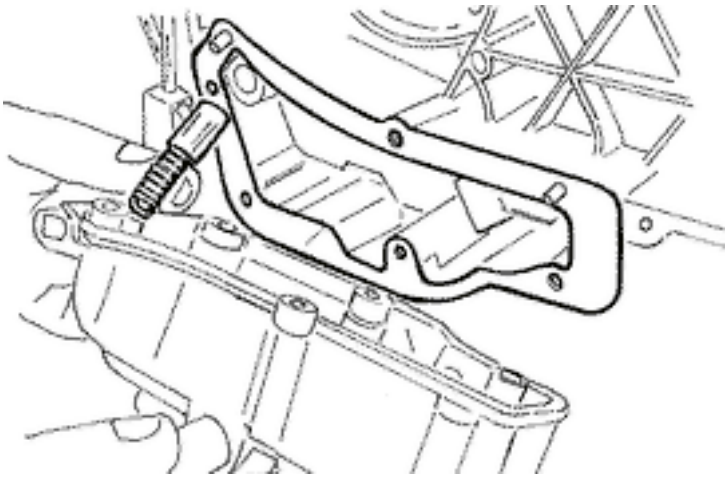
Inspecting the by-pass valve

- 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.

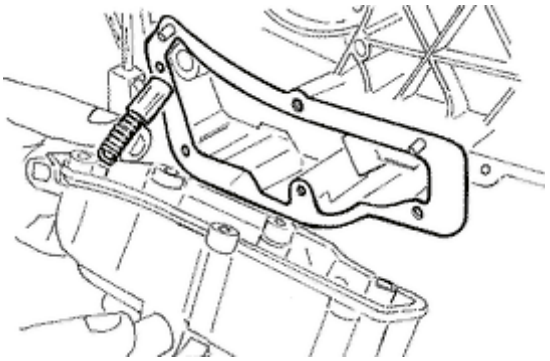
Characteristic

By-pass check up: Standard length

54.2 mm



Refitting the oil sump



- Refit the by-pass piston 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 driving pulley assembly, the drive belt, the sprocket wheel and the transmission cover, as described in the "Transmission" chapter.

- When testing the lubrication system, refer to chapter "Crankcase and Crankshaft", regard-

ing lubrication of the crankshaft and connecting rod

Locking torques (N*m)

Oil sump screws **10 to 14**

SAS valve

Inspecting the one-way valve

- Remove the SAS valve.
- Provisionally assemble the rubber sleeve of the SAS valve outlet to ensure tightness.
- Connect the MITYVAC vacuum pump to the rubber sleeve 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 (PRESSURE).
- Operate the pump slowly and check if there is an increase of pressure. A small leakage is considered to be normal.

If anomalies are detected, replace the pump.

N.B.

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

N.B.

ABSENCE OF VIBRATION INDICATES INEFFICIENT SEALING

Specific tooling

020329Y Mity-Vac 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 sleeve 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 reacts. - Under normal functioning conditions the vacuum undergoes a slight fall and then readjusts. Then there is a stage of gradual and slow loss of vacuum up to a value of approx. 0.4 BAR. At this point the valve opening and the sudden vacuum resetting is detected.

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 SILENCER). 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 Mity-Vac vacuum-operated pump

Removing the carburettor

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.

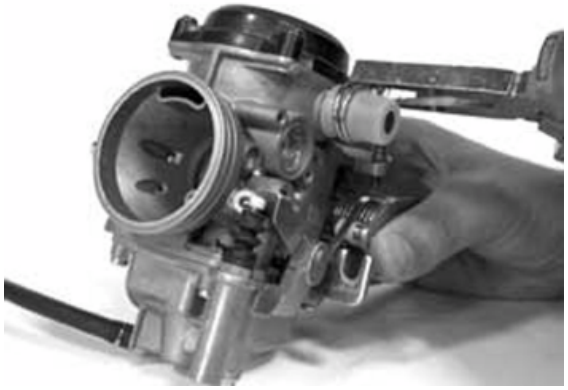
N.B.

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.



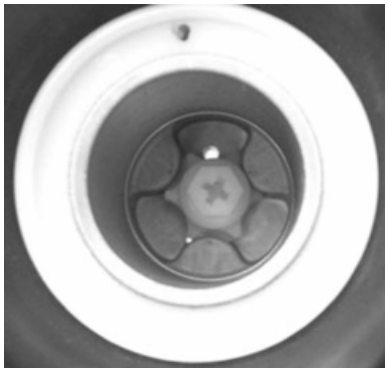
- Remove the 4 fixing screws shown in the figure and the vacuum chamber cover.

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 exhaust valves of the intake pump from the tank

N.B.

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

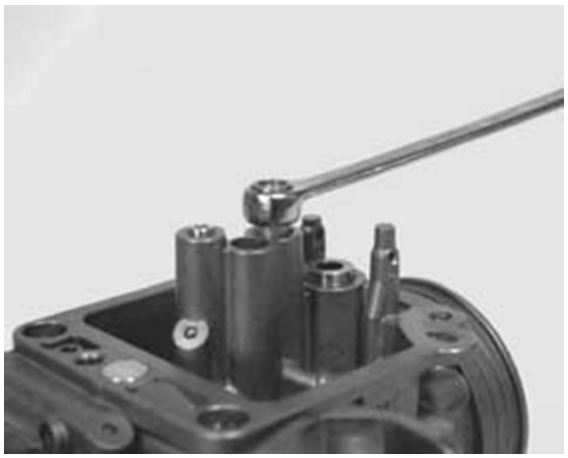
N.B.

AVOID REMOVING THE PISTON OF THE PUMP AND ITS CONTROL.

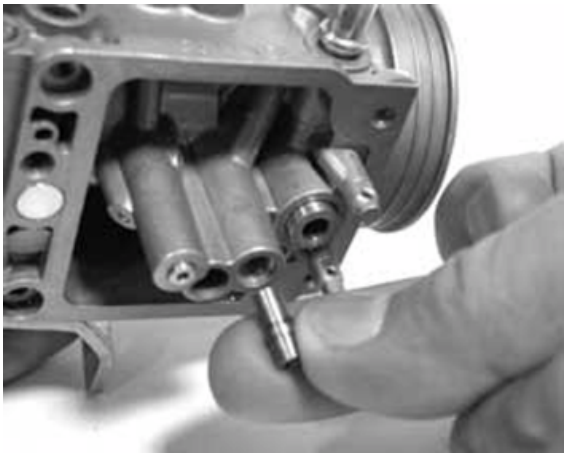
Adequately support the carburettor and using a rod and hammer remove the float pin acting from the throttle control side.

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

-Remove the maximum nozzle.



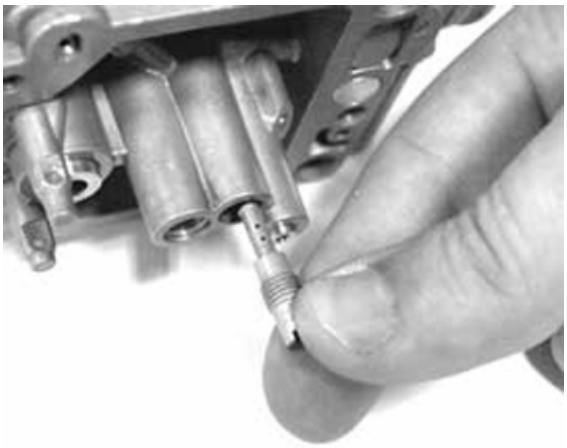
-Remove diffuser.



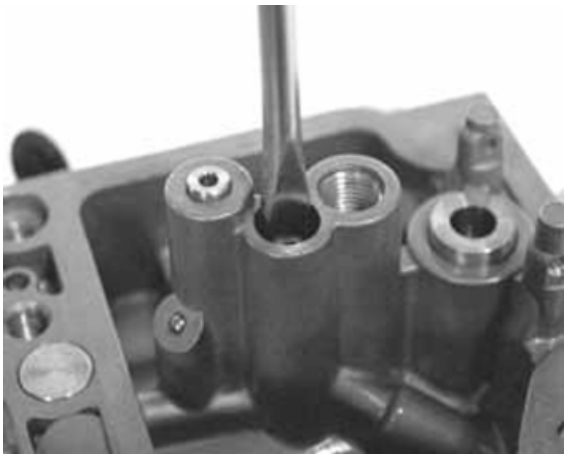
- Remove the sprayer.

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.



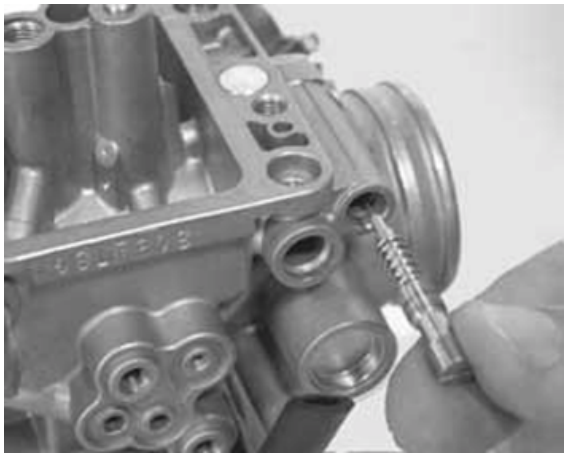
-Remove the minimum nozzle.



- 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 INTAKE NOZZLE, MINIMUM AND MAXIMUM AIR GAUGE, THROTTLE VALVE CONTROL SHAFT. DO NOT REMOVE THROTTLE-SHAFT CONNECTION SCREWS. THE FIXING SCREWS ARE CAULKED AFTER FITTING AND THEIR REMOVAL DAMAGES THE SHAFT.



Walbro

To detach the carburettor from the engine, it is necessary to move the air filter and remove the transmission throttle control, the automatic starter connexion, 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 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.

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

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

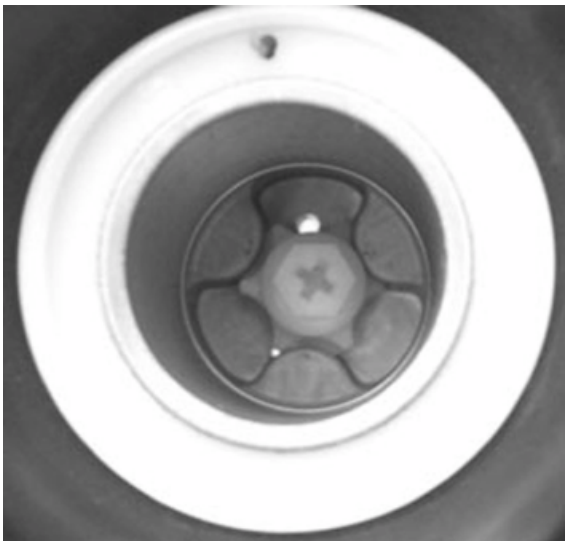
Remove the 4 fixing screws indicated in the figure and the vacuum chamber cover.

N.B.

DURING THE REMOVAL OF THE 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, remove it, take out the spring and vacuum valve plunger



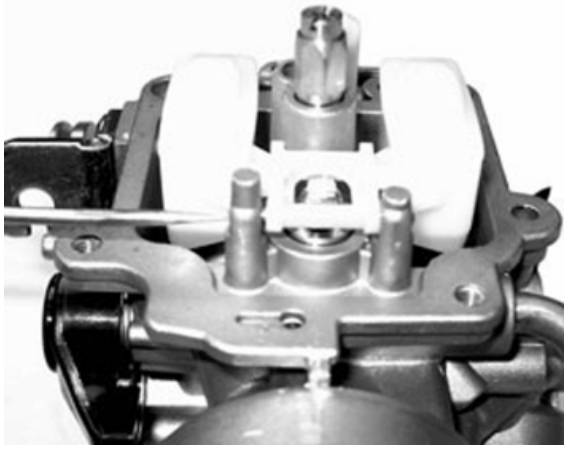
Remove the 4 screws shown in the figure.

Remove the tank with the intake pump, its control and gasket.

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

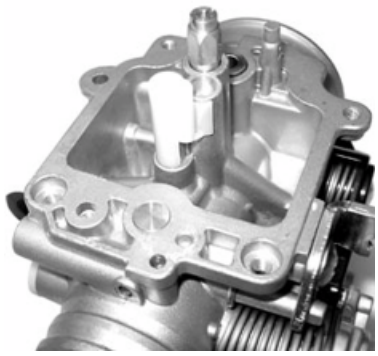
Adequately support the carburettor and using a rod and hammer remove the float pin acting from the throttle control side.
Remove the float and the plunger.

Remove the cover of the duct from the carburettor to the starter nozzle as shown in the figure.



-Remove the maximum nozzle.

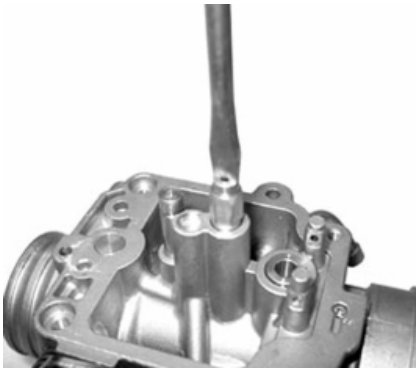
-Remove diffuser.



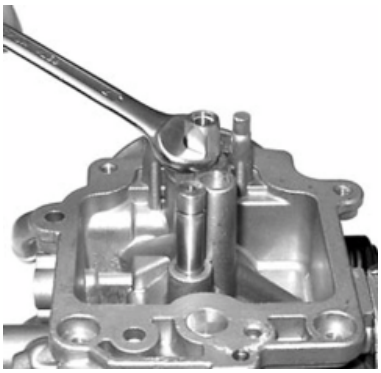
Remove the sprayer.

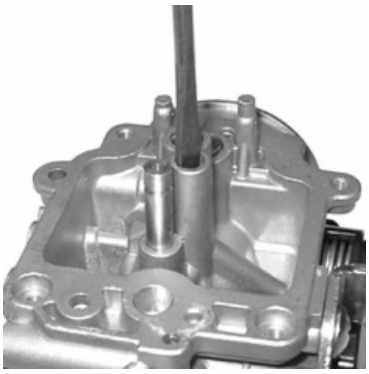
N.B.

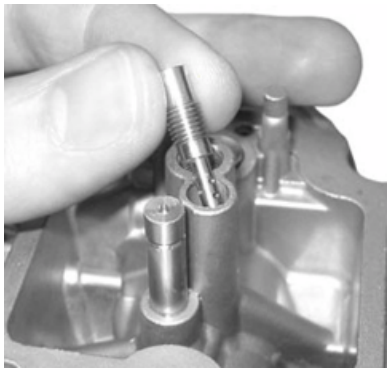
THIS OPERATION IS NECESSARY TO AVOID LOSING SPRAYER PARTS WHEN CLEANING THE CARBURETTOR BODY. IF THE SPRAYER IS FORCED IN ITS HOUSING DO NOT ATTEMPT TO REMOVE IT AS THIS WILL ONLY DAMAGE IT.



-Remove the minimum nozzle.





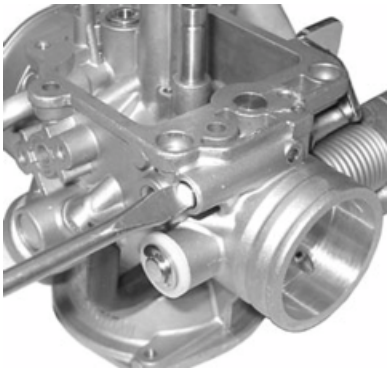


Remove the minimum flow screw with the O-ring, the washer and the spring.

-Remove the 2 fixing screws, the cover, the spring, and the cut-off device diaphragm.

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 THE ASSEMBLY AND THEIR REMOVAL DAMAGES THE SHAFT.



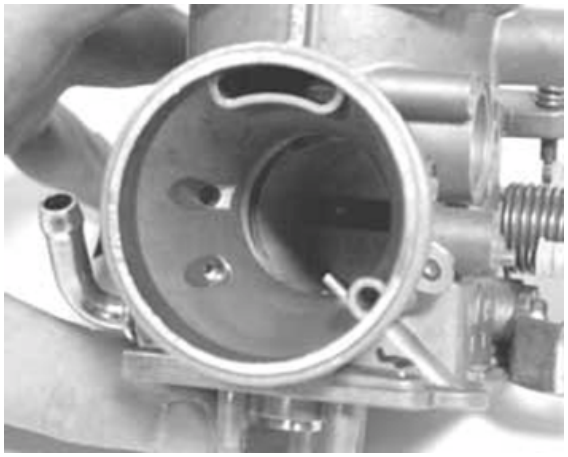
Refitting the carburettor

Kehin

- Before refitting, wash the carburettor body accurately with petrol and compressed air.

- Pay special attention to the fuel supply pipe and the plunger seat.

- For maximum circuit, check the air adjustment is correct as shown in the figure.



- For the minimum circuit, make sure the following points are properly cleaned: air gauging, exhaust section controlled by flow screw, progression holes near the throttle valve.

- For the starter circuit, blow the connection pipe properly with the jet. This is necessary because the nozzle support hides other inaccessible internal calibrations.

- Blow the intake nozzle properly.

N.B.

THE ACCELERATION NOZZLE EXHAUST IS EXTREMELY SMALL AND IS ORIENTED TO THE THROTTLE VALVE. NOZZLE INCORRECT ORIENTATION RESULTS IN INADEQUATE SPRAY-ING.

- Check that there are 5 closing ball joints for the operating pipes on the carburettor body.

- Check that the coupling surfaces, the chamber and the diaphragm are not dented.

-Check that the depression valve housing pipe is not scratched.

- Check that the throttle valve and the shaft do not show abnormal wear.

- Check that the plunger seat does not show abnormal wear.

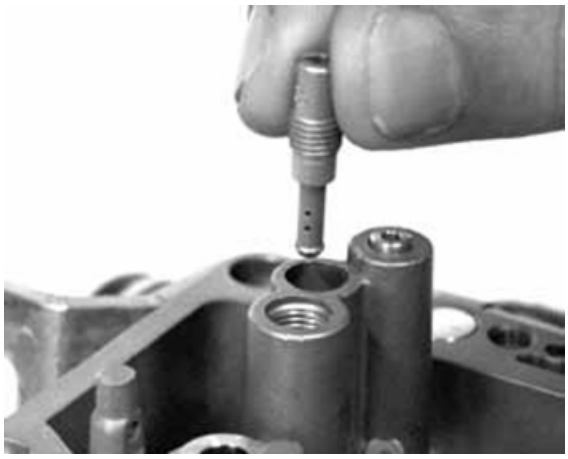
- Replace the carburettor in case of irregularities.

- Check that the return spring of the accelerating pump rocking lever is not deformed by over-stretching.

N.B.

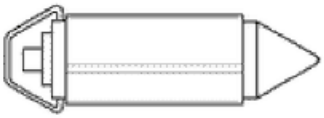
TO AVOID DAMAGES, DO NOT INTRODUCE METAL OBJECTS IN THE ADJUSTED SECTIONS.

- Wash and blow the minimum nozzle properly and reassemble it.



- Properly wash and blow the components of the sprayer maximum circuit, the diffuser and the nozzle.
- Introduce the sprayer in the carburettor body with the shortest cylindrical part directed to the diffuser.
- Assemble the diffuser making sure the sprayer is being adequately inserted and lock it.
-Assemble the maximum nozzle.

- Check that the tapered pin does not show signs of wear on the sealing surfaces of the shock absorber pin and the return clamp.
- Replace the rod if worn out.



- Check that the float is not worn on the pin housing or on the contact plate with the plunger and that there are no fuel infiltration.
- Replace it in case of failures.
- Introduce the float with the rod on the fuel feeding tube side.

N.B.

INTRODUCE THE RETURN SPRING ON THE FLOAT PLATE ADEQUATELY

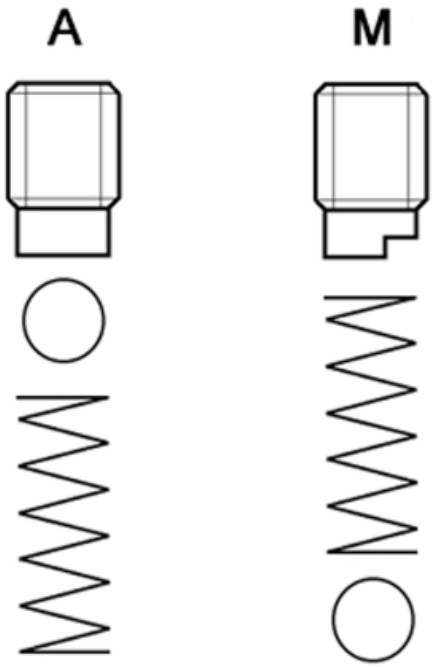
- Remove the drainage screw from the tank, wash and blow it properly and make sure the acceleration pump pipes are clean.
- Operate the acceleration pump piston repeatedly and blow with compressed air.
- Reassemble the acceleration pump valves following this order:

INTAKE VALVE (A)

- Spring
- Ball
- Nozzle

IN VALVE (M)

- Ball
- Spring
- Nozzle

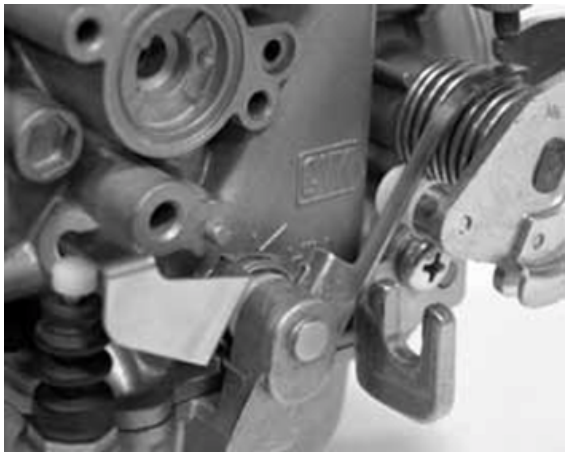


N.B.

THE IN VALVE NOZZLE, CORRESPONDING TO THE ACCELERATION PUMP, IS MILLED.

-Check the screw tightness introducing a small amount of fuel in the tank.

- Assemble a new gasket on the tank.
- Assemble the tank on the carburettor body fastening the 4 screws.
- Check that the control roller is free to rotate in its own seat.



N.B.

MAKE SURE THE TANK GASKET IS CORRECTLY INTRODUCED

N.B.

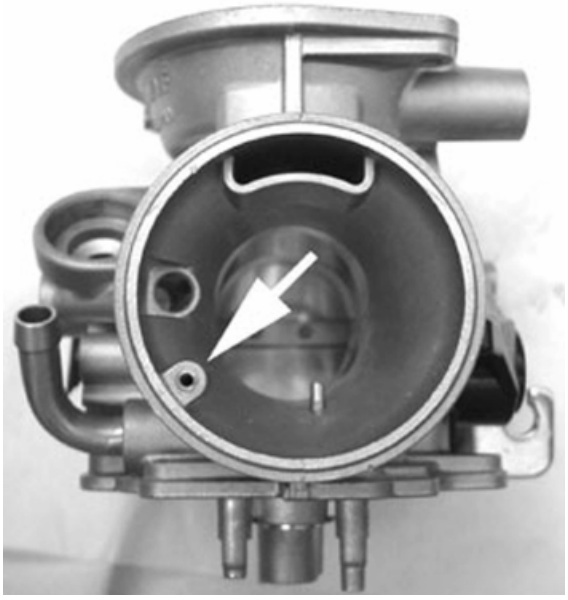
AVOID DEFORMING THE ACCELERATION PUMP CONTROL ROCKER.

- Wash and blow the flow screw properly.
- Check that screw is not deformed and/or rusty.
- Assemble the spring on the screw.
- Screw the flow screw on the carburettor body.

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

Walbro

- Before refitting, wash the carburettor body accurately with petrol and compressed air.
- Pay special attention to the fuel supply pipe and the plunger seat.



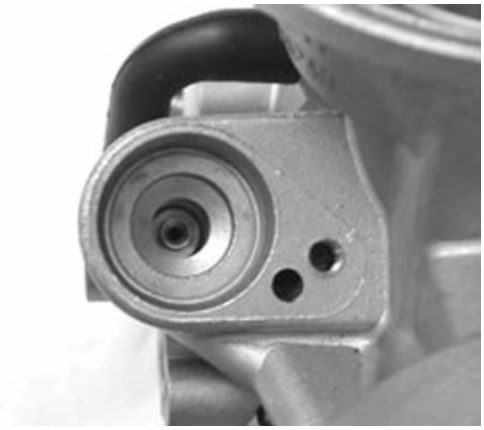
- For maximum circuit, check the air adjustment is correct as shown in the figure.
- Carefully clean the air holes indicated in the figure.

- For the minimum circuit, make sure the following points are properly cleaned: air gauging, outlet section controlled by flow screw, progression holes near the throttle valve.

N.B.

THE MINIMUM AIR IS CONTROLLED BY TWO ADJUSTMENTS. THE CUT-OFF ONE IS INDICATED DIRECTLY IN THE CARBURETTOR BODY.

- For the starter circuit, blow the connection pipe properly with the jet.This is necessary because the nozzle support hides other inaccessible internal calibrations.
- Blow the intake nozzle properly.



N.B.

THE ACCELERATION NOZZLE OUTLET IS EXTREMELY SMALL AND IS ORIENTED TO THE THROTTLE VALVE. NOZZLE INCORRECT ORIENTATION RESULTS IN INADEQUATE SPRAYING.

- Check that there are 5 closing ball joints for the operating pipes on the carburettor body.
- Check that the coupling surfaces, the tank and the diaphragm are not dented.
-Check that the depression valve housing pipe is not scratched.
- Check that the throttle valve and the shaft do not show abnormal wear.
- Check that the plunger seat does not show abnormal wear.
- Replace the carburettor in case of irregularities.

N.B.

TO AVOID DAMAGES, DO NOT INTRODUCE METAL OBJECTS IN THE ADJUSTED SECTIONS.

- Wash and blow the minimum nozzle properly and reassemble it.
- Properly wash and blow the components of the sprayer maximum circuit, the diffuser and the nozzle.

- Introduce the sprayer in the carburettor body with the shortest cylindric part directed to the diffuser.
- Assemble the diffuser making sure the sprayer is being adequately inserted and lock it.
-Assemble the maximum nozzle.
- Check that the tapered pin does not show signs of wear on the sealing surfaces of the shock absorber pin and the return clamp.
- Replace the rod if worn out.
- Check that the float is not worn on the pin housing or on the contact plate with the plunger and that there are no fuel infiltration.
- Replace it in case of anomalies.
- Assemble the float with the plunger introducing the pin on the carburettor feeding tube side.

N.B.

INTRODUCE THE RETURN SPRING ON THE FLOAT PLATE ADEQUATELY

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.

Walbro

- Make sure the float coupling surface is parallel to the tank surface with the carburettor in inverted position.
- If different positions are detected, change the plunger control metal plate direction to obtain the position described above.
- If the plate gets deformed, make sure it remains parallel to the float pin.

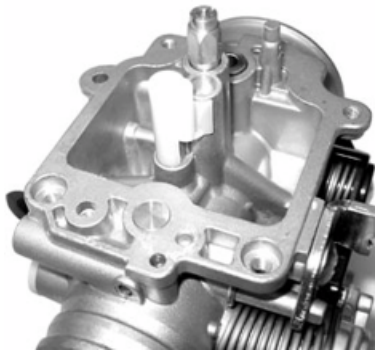
N.B.

WITH INVERTED CARBURETTOR, THE FLOAT WEIGHT SHOULD NOT EXCEED THE TAPERED PIN SPRING THRUST. OTHERWISE, CHECK THAT THE FLOAT IS NOT HEAVY DUE TO FUEL INFILTRATION. REPLACE THE FLOAT AND THE TAPERED PIN, IF NECESSARY.

- Wash and blow the carburettor duct cover properly and introduce it in the starter nozzle.

N.B.

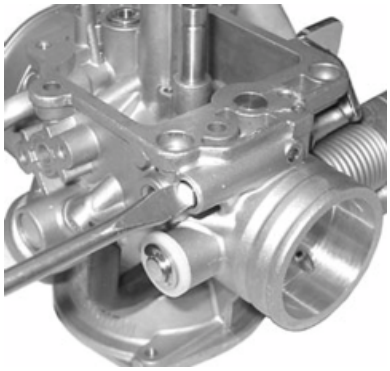
INCORRECT ASSEMBLY OF CARBURETTOR DUCT COVER ON THE STARTER NOZZLE CAUSES A NEGATIVE COLD START-UP SITUATION: THE STARTER NOZZLE TAKES UP THE OLD FUEL FROM THE BOTTOM OF THE TANK.



- Remove the drainage screw from the tank, wash and blow the tank properly and make sure the acceleration pump intake and supply valve are clean.
- Being the valves unidirectional, blow them carefully with compressed air, at the inner side of the tank for the intake valve and at the pump piston housing for the supply valve.
- Check that there are no signs of wear in the acceleration pump piston and its corresponding seat in the tank.
- In case of wear, replace the defective parts.
- Check that the acceleration pump piston contrast spring is not worn.
- Assemble a new O-Ring and a new bellows gasket. Reassemble the piston unit on the tank.
- Assemble a new O-Ring on the tank drainage screw and lock it.

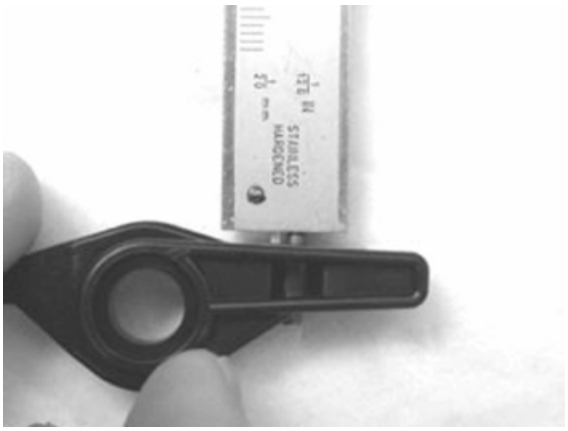
-Check the screw tightness introducing a small amount of fuel in the tank.
- Assemble a new gasket on the tank.
- Assemble the tank on the carburettor body fastening the 4 screws.

- Wash and blow the flow screw properly and assemble a new O-Ring.
- Preassemble the components on the screw as follows: spring, washer and O-ring.
- Screw the flow screw on the carburettor body.
- The screw final position should be determined by an exhaust fumes analysis.



- Prepare the carburettor for adjustment by rotating the screw 3 turns from the close position.

- Check that the rocking lever control of the accelerating pump does not show abnormal wear.
- Check that the end of stroke screw of the rocking lever protrudes 3.2 mm.



Check that the return spring of the rocking lever is not loaded.
- Preassemble the spring and rocking lever as shown in the figure.
- Assemble the rocking lever on the carburettor keeping the throttle valve open.
- Lock the fixing screw of the rocking lever.
- Make sure that the mechanism works correctly.

Inspecting the valve and needle

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.

N.B.

THE VALVE CAN BE INSERTED IN ONLY ONE POSSIBLE POSITION.

- 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.

- 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.

Walbro

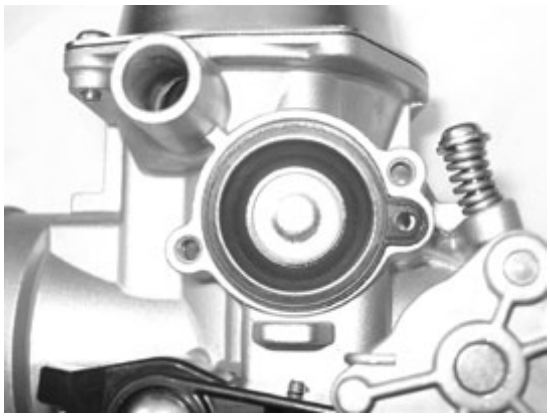
- Check that the pin does not show signs of wear and that the lock is in the 3rd of the 3 notches.
- Check that the valve does not show threads around its external diameter.
- Check that the 2 vacuum supply holes are not clogged.

N.B.

THE 2 VACUUM SUPPLY HOLES ARE OF DIFFERENT DIAMETERS.

- Check that the diaphragm is not worn or has hardened.
If it does, replace it.
- Refit the tapered pin on the vacuum valve.
- Make sure the spring is in the correct position on the plunger and inserted in its housing.
- Assemble the coupling by rotating it 1/8 of a turn.

- Reassemble the vacuum gas valve on the carburettor body being careful that the tapered pin is inserted into the sprayer.
- Time the vacuum valve rotation inserting the diaphragm tab in its place.
When the diaphragm is correctly assembled to the valve, the main vacuum supply hole is positioned axially with the diffuser, on the throttle valve side.
- Refit the spring on the valve.
- Refit the vacuum chamber cover matching the reference mark with the orientation of the diaphragm.
- Tighten the screws to the prescribed torque.
- Check the cut-off valve correct functioning. - Check that the diaphragm is not worn or has hardened. Check the free length of the spring.



Characteristic

Walbro: Standard length of cut-off spring

24 mm

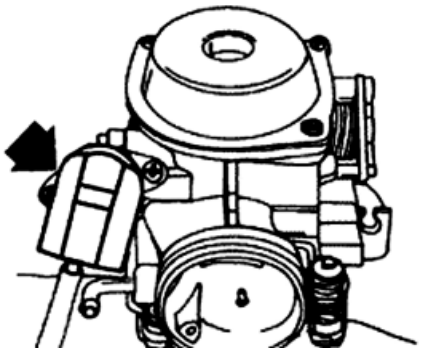
- Reassemble the diaphragm and the metal pin placed on the valve.
- Reassemble the spring and the cover. The vacuum intake should be facing upwards.

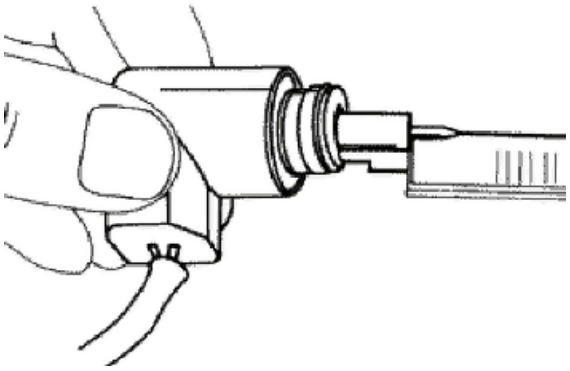
Inspecting the automatic choke device

- 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

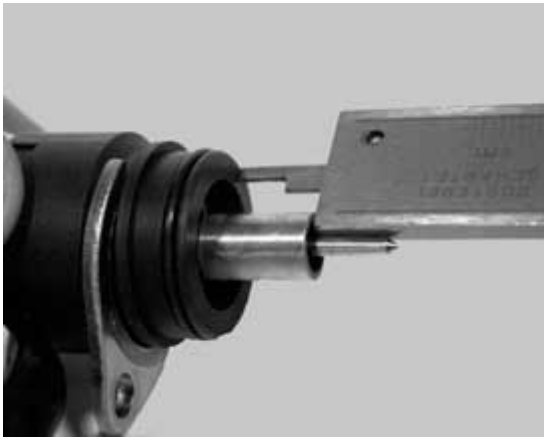
Kehin

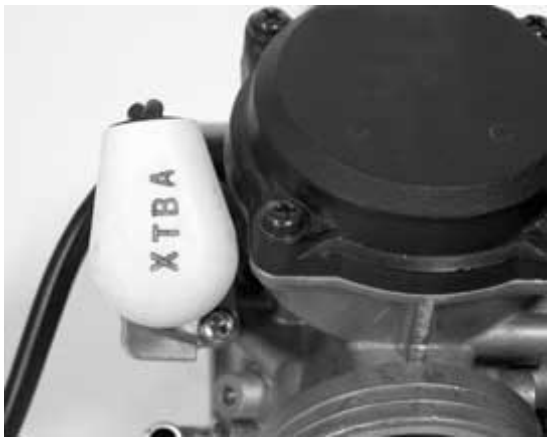
- Check that the automatic starter piston is not deformed or rusty.
- Check that the piston slides freely from the seat to the support.
- Check that the piston sealing gasket is not deformed.
- The starter must be more or less functional depending on the ambient temperature.
- Measure the protrusion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

With a 12V battery power the automatic starter and check that the 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 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 Kehin automatic starter: Protrusion value

XX ÷ XX mm at approx. 20°C

Check max. protrusion of Kehin aut. starter

XXX ÷ XXX mm

Check aut. Kehin max. time starter

5 min

Walbro

- 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.
- Measure the protrusion of the piston as shown in the figure and check its 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 (20 - 25° C).

With a 12V battery power the automatic starter and check that the 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.

Characteristic

Check the auto starter: Protrusion Value for Walbro

12.5 ÷ 13 mm at approx. 20°C

Check the automatic starter: Walbro maximum protrusion

18.5 ÷ 19 mm

Check the automatic starter: Walbro max. time

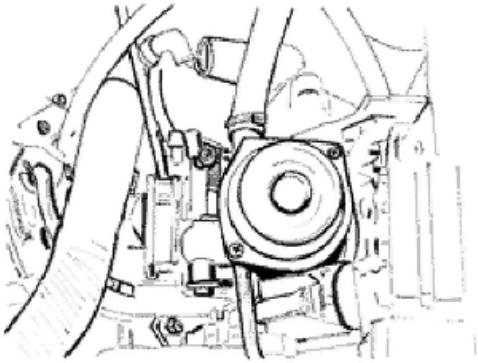
5 min

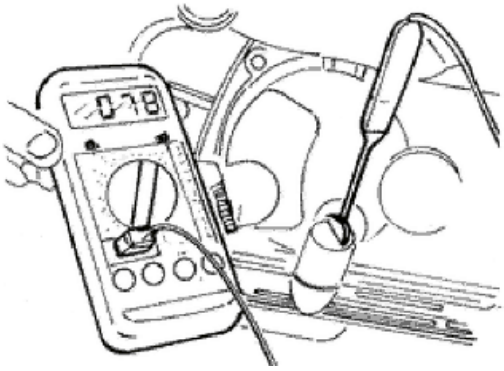
Electric characteristic

Walbro Resistance

approx. 40 Ω

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

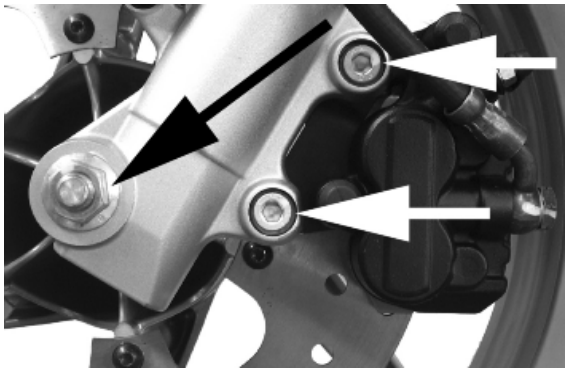
SUSP

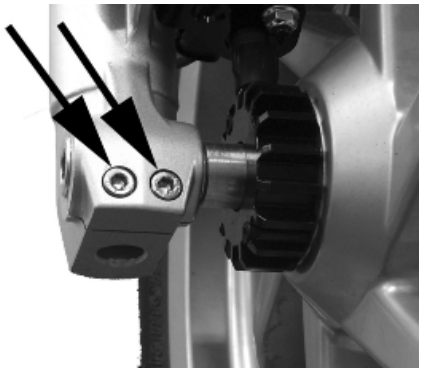
This section is dedicated to operations that can be carried out on the suspensions.

Front

Removing the front wheel

- Remove the front brake calliper after undoing the screws fixing it to the leg.
- Loosen the wheel axle locking nut.
- Loosen the two wheel axis safety screws on the leg on the RHS.
- Remove the wheel axle.





Front wheel hub overhaul

- Remove the front wheel

- Keep the wheel level by means of two wooden wedges

- With the appropriate pliers and tool remove the wheel bearing on the side the rpm indicator detects movement, as shown in the photograph

Specific tooling

001467Y014 Calliper to extract ø 15-mm bearings

001467Y009 Bell for OD 42-mm bearings

- Remove the internal spacer
- Use appropriate handle, adaptor and guide and hit with a mallet to extract the bearing and the spacer bushing on the brake disk side; insert handle on the side the rpm indicator detects movement, as shown in the photo

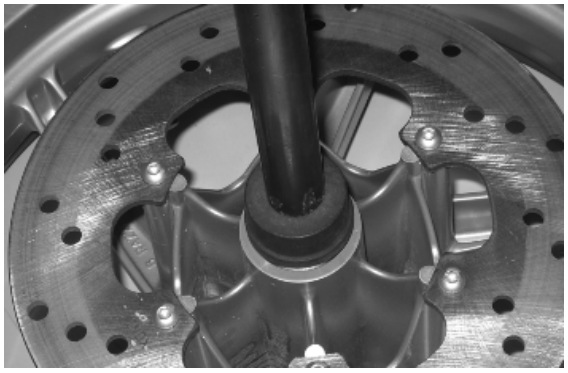
Specific tooling

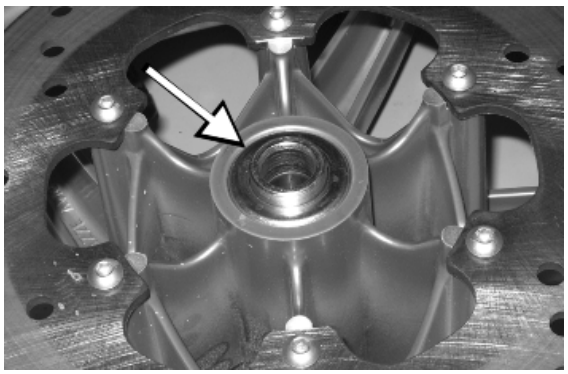
020376Y Adaptor handle

020456Y Ø 24-mm adaptor

020412Y 15-mm guide

- Check that the bearings do not show flaws or jamming. If there is, replace it.
- Check that the internal spacer does not show abnormal wear. If there is, replace it.
- With a hot air gun heat the seat of the bearing on the brake calliper side
- With an appropriate tool remove the bearing on the brake disk side
- Insert the spacer bushing on the brake disk side





Specific tooling

020376Y Adaptor handle

020357Y 32x35-mm Adaptor

020412Y 15-mm guide

- With a hot air gun heat the seat of the bearing on the side the rpm indicator detects movement
- Insert the internal spacer with the centring ring facing to the brake disk side, as shown in the photo
- Use an appropriate tool to insert the bearing on the rpm indicator movement detector side

Specific tooling

020376Y Adaptor handle

020357Y 32x35-mm Adaptor

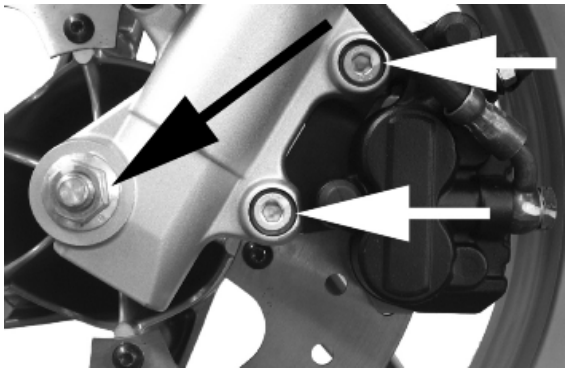
020412Y 15-mm guide

See also

Removing the front wheel

Refitting the front wheel

- Check that the seal of the relative contact track on the wheel of the odometer transmission is in good condition.
- Insert the wheel axle, after greasing it, from the side of the clamp on the fork leg and also insert the transmission itself.
- -Tighten the wheel axle nut to the prescribed torque.
- Tighten the safety screws of the protection.



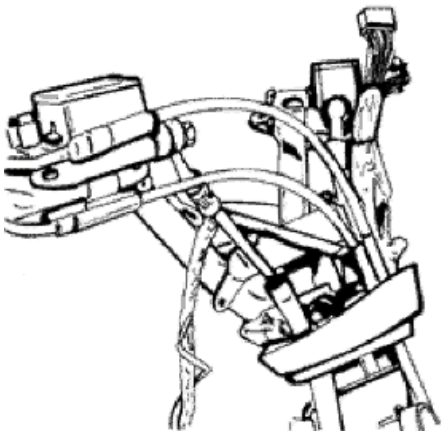
Locking torques (N*m)

Wheel axle nut 45 to 50 **Safety screw on fork leg** 6 to 7

Handlebar

Removal

- Remove the three handlebar covers as explained in the Bodywork Chapter.
- Remove the handlebar wiring fixing clips and disconnect the electric connectors from the brake levers.
- Unscrew the fittings, then remove the front and rear brake pump piping.
- Remove the flexible transmission of the accelerator and remove the throttle.
- Loosen the clamp fixing the handlebar to the steering tube operating on the blot, and remove the handlebar pulling



upwards, then remove the lower plastic cover.

N.B.

IF THE HANDLEBAR IS BEING REMOVED TO REMOVE THE STEERING, IT IS ONLY NECESSARY TO TILT THE HANDLEBAR FORWARD ONTO THE FRONT PART OF THE VEHICLE WITHOUT REMOVING THE PARTS FITTED SO AS TO AVOID DAMAGING THE SHAFTS.

Refitting

Carry out the above operations by working in the reverse order from that used for removal.

Locking torques (N*m)

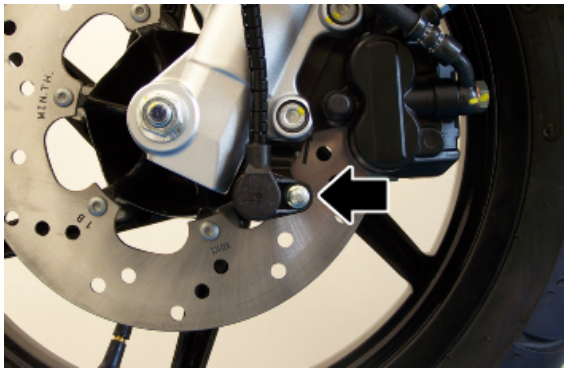
Handlebar fixing screw (*) 43 ÷ 47

Front fork

Removal

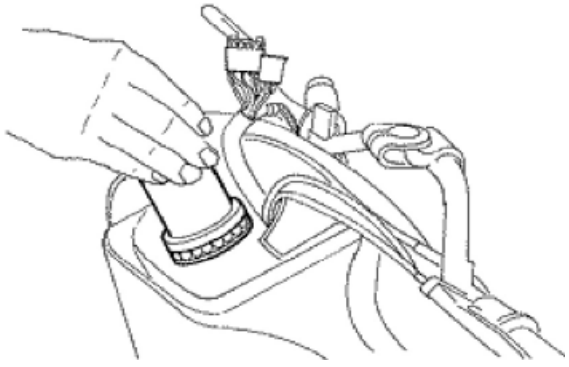
- Remove the front brake calliper.
- Remove the speed sensor.
- Remove the front mudguard
- Remove the handlebar.

After removing the steering ring-nut using the special tool, lean the vehicle on one side and extract the steering tube.



Specific tooling

020055Y Wrench for steering tube ring nut



See also

Handlebar
Front mudguard
Front
brake calliper

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 gaiter ring using a screwdriver as shown in the figure.

- Remove the oil seal 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 seal.
- 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 seal

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

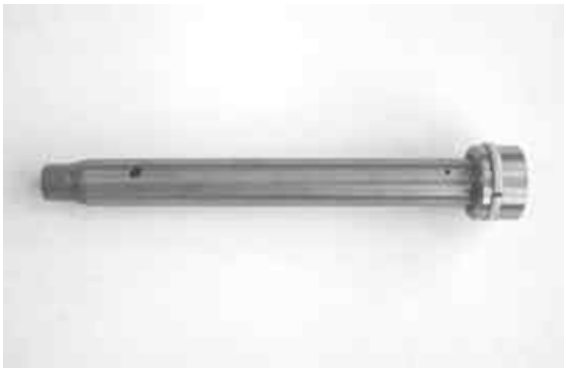
Maximum fork leg diameter

35.10 mm

Minimum stem diameter

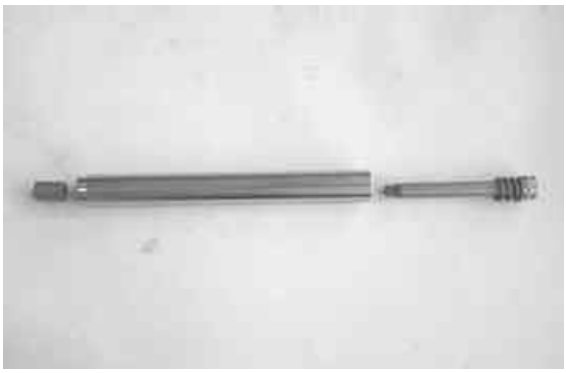
34.90 mm

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



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

- 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 avoid the rotation of the pumping element insert a 12 mm hexagonal wrench on the stem for internals. - Put 125 ± 1 cc of oil in the stem.

Recommended products

AGIP FORK 7.5 W Oil for fork.

-

- 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 seal 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 to 25 **Stem upper cap** 15 ÷ 30 **Lower screw with copper washer** 25 - 35

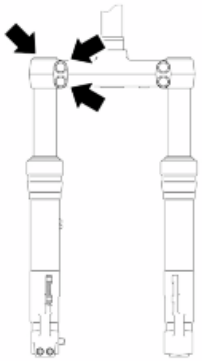
Smontaggio stelo

THE FOLLOWING INSTRUCTIONS REFER TO THE MY2012 VERSION.

The 2012 Model Year version is equipped with a conventional fork.

The following instructions are applicable for both fork stanchions.

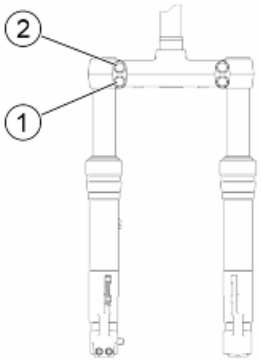
- Remove the upper stanchion cap.
- Remove the two fastener screws on the steering yoke.
- Remove the stem.



CAUTION

THE STEM CLOSING CAP KEEPS THE MAIN SPRING PRE-LOADED. KEEP THE CAP PROPERLY FITTED DURING THE REMOVAL FINAL STAGE TO AVOID ACCIDENTS.

Refit in reverse order to removal, lubricating the stanchion cap O-ring and tightening the cap to the specified torque.



Recommended products

AGIP GREASE MU3 Yellow-brown, lithium-base, medium-fibre multipurpose grease.

ISO L-X-BCHA 3 - DIN 51 825 K3K -20

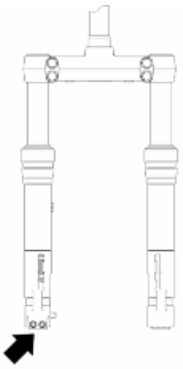
Locking torques (N*m)

Stem support clamp tightening screws **Apply a torque of 25-34 Nm to lower screw «1» Lock upper screw «2» a torque of 25-34 Nm Lock lower screw «1» a torque of 25-34 Nm** **Fork locking screws cap** **35 - 55**

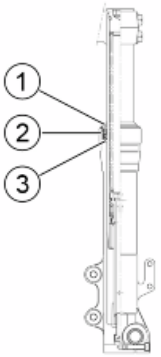
Smontaggio smorzatore

THE FOLLOWING INSTRUCTIONS REFER TO THE MY2012 VERSION.

- Remove the main spring and drain the oil from the fork leg.
- Undo the lower screw and collect the washer.
- Collect any residual oil not drained previously.



- Remove the dust gaiter «**1**» from the stanchion.
- Remove the circlip retaining the oil seal «**2**».
- Separate the stanchion from the fork leg.
- Use the specific tool to remove the oil seal «**3**» from the fork leg.



Refit in inverse order to removal, fitting a new oil seal, dust gaiter and washer (grease before installation).

Locking torques (N*m)

Fork bottom screw 25 - 35

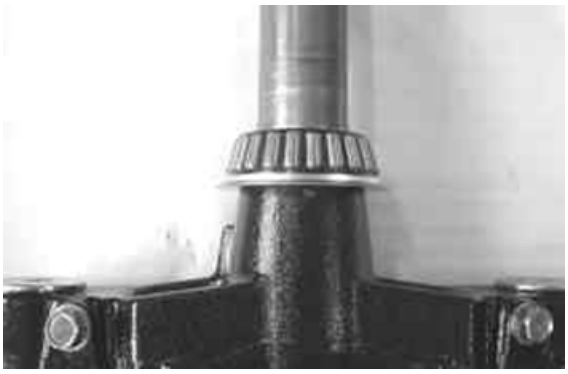
Refitting

- Grease using lithium soap grease on the roller bearings.

Recommended products

AGIP GREASE PV2 Ivory smooth-textured, slightly-stringy anhydrous calcium-base grease.

TL 9150 066, symbol NATO G 460



- 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). Lock with a torque of 10 ÷ 13 Nm and rotate the wrench anticlockwise by 90°.
- Install the space washer.
- Using the appropriate tool tighten the second locking ring in the steering tube to a torque of 30 ÷ 36 Nm.

- 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.

- Refit the three handlebar covers as described in the «Bodywork» Chapter.
- Install the front wheel.
- Refit the brake calliper on the fork leg.

Specific tooling

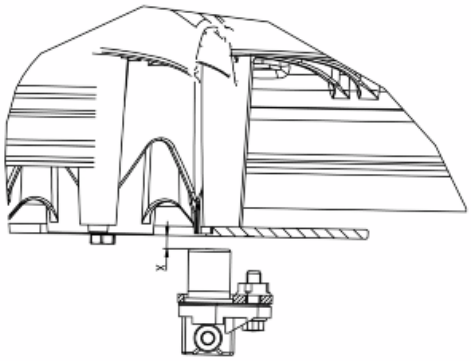
020055Y Wrench for steering tube ring nut

Locking torques (N*m)

screw fixing handlebar to the steering tube 45 ÷ 50 **Upper steering ring nut** 30 ÷ 36 **Steering lower ring nut** 10 ÷ 13 **then loosen by 90° Tightening screw for calliper support to the fork** 45 ÷ 55 **Front wheel axle** 45 to 50

THE SPEED SENSOR MUST BE INSTALLED CORRECTLY; PROCEED AS FOLLOWS:

- Install the speed sensor without the relative washer.
- Measure the distance «**X**» between the brake disc and the sensor with a feeler gauge.
- Fit the correct number of washers indicated in the table in relation to the distance measured:



INSTALLING THE SPEED SENSOR

Distance «X» (mm)	Number of washers
X < 3.65	4
X = 3.65 to 3.95	3
X = 3.95 to 4.2	2
X = 4.2 to 4.45	1
X = 4.45 to 4.95	None

See also

Refitting the front wheel

Steering bearing

Removal

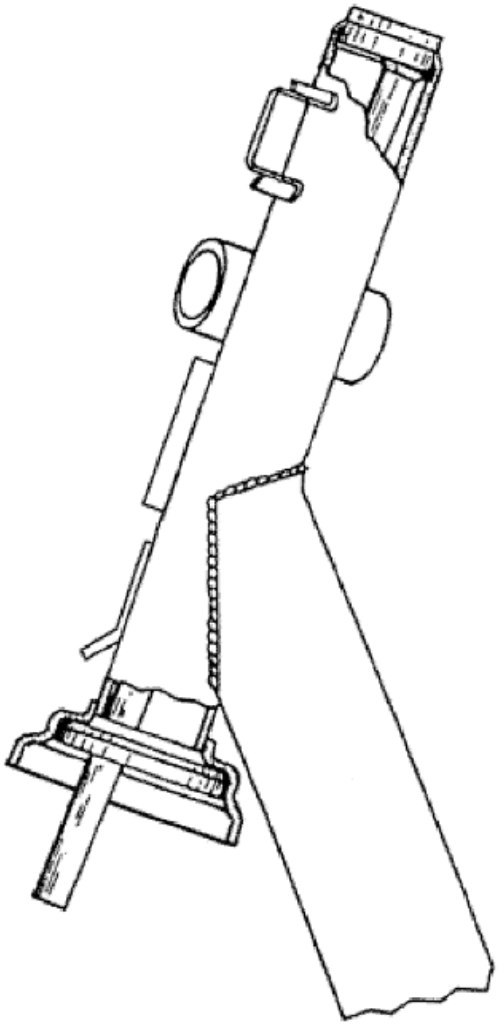
Remove upper bearing with an appropriate tool.

N.B.

USE THE APPROPRIATE TOOL AGAIN TO REMOVE THE LOWER HOUSING OF THE STEERING LOWER BEARING

Specific tooling

020004Y Punch for removing fifth wheels from headstock



Refitting

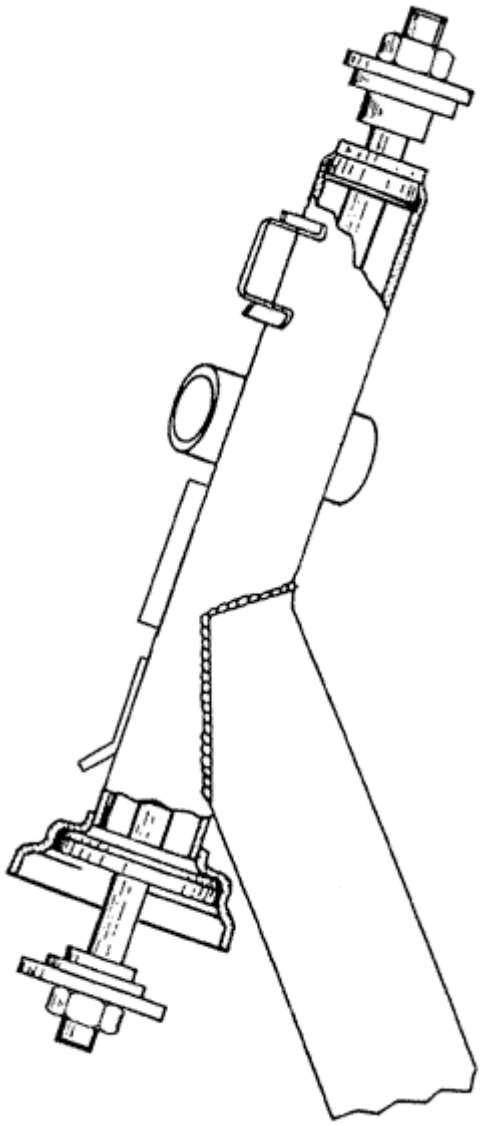
Insert the lower and upper bearing on the chassis using an appropriate tool.

N.B.

ASSEMBLE THE LOWER HOUSING ON HE STEERING TUBE WITH A TUBE SECTION OF AN ADEQUATE DIAMETER.

Specific tooling

001330Y Tool for fitting steering seats



Rear

Removing the rear wheel

Removal

- Remove the whole muffler;
- Remove the shock absorber - wheel supporting bracket;
- Remove the 5 screws fixing the wheel and remove it;

Reassembly

Carry out the previous operations in reverse order.

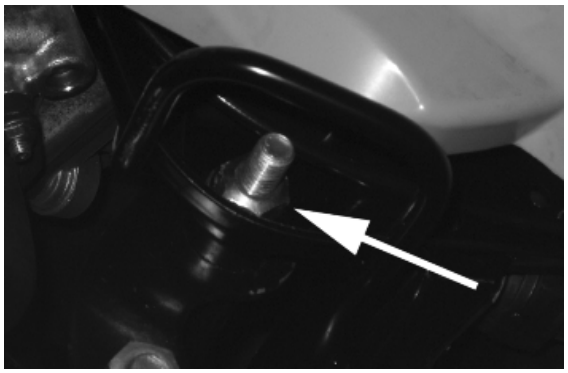
Locking torques (N*m)

Rear wheel axle 104 to 126 **Rear wheel fixing screws** 33÷37

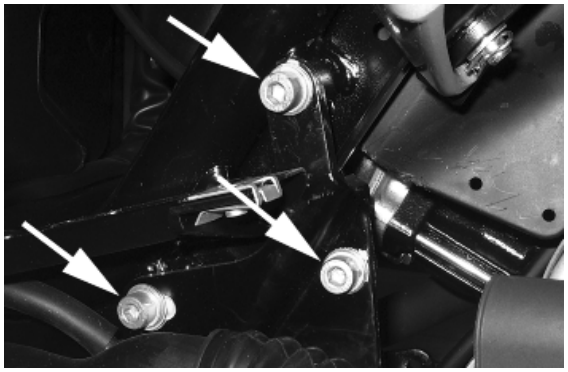
Swing-arm

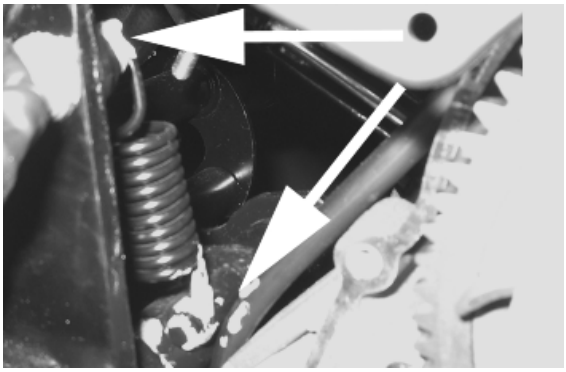
Removal

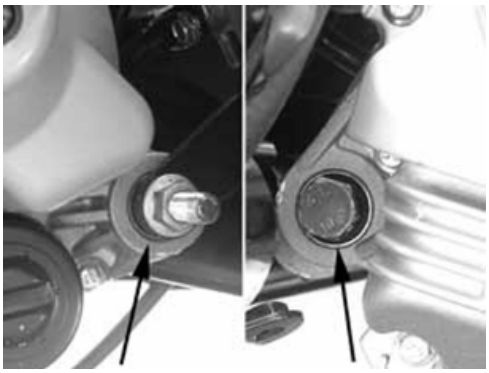
- Place the vehicle on its centre stand;
- Keep the vehicle firm;
- Remove the bolt fixing the swinging arm to the chassis;



- Remove the central lower cover;
- Remove the three fixing screws of the bracket supporting the buffer to the chassis, remove the Seeger ring and then the bracket;
- Remove the spring fixing the swinging arm to the chassis shown in the photo;
- Remove the bolt retaining the swinging arm to the engine, and then remove the swinging arm;







- Check the entire swinging arm assembly.
- Check all the centring bushing components and silent block rubber buffers.
- Replace the work components that cause excessive clearance on the rear suspension.

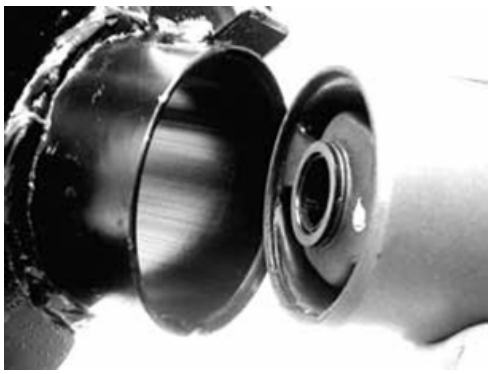
Overhaul

- Make sure the silent bloc is not broken. If it is, replace the coupling.
- Remove the Seeger ring shown in the picture

- Remove the full silent bloc bracket
- Undo the silent bloc ring shown in the picture

- Hold the full silent bloc bracket in the clamp
- Using the appropriate tool, remove the silent bloc from the bracket from the side corresponding to the inside of the vehicle. This is to guarantee the tool is centred properly on the support

- Install a new silent bloc, making sure it aligns properly with the reference tooth.
- Fit the silent blocs, making sure the chamfered part of the silent bloc matches the chamfered part of the bracket



- Using the appropriate tool, fit the silent bloc as shown in the picture

- Check there is no sticking in the movement of the connection of the swinging arm on the engine side to the swinging arm on the chassis side.
- Check the axial clearance between the two swinging arms using a feeler gauge

Characteristic

Standard clearance

0.40 - 0.60 mm

Allowable limit after use:

1.5 mm

- In order to check the clearance of the swinging arm on the frame side, prepare a retainer using the fixing pin of the swinging arm on the frame and two rings from the special tool 020229Y. Alternatively, use two washers with 12-mm inside diameter for pins, minimum 30-mm outside diameter and 4-mm thick at least.

- Check there is no sticking in the rotation.
- Check the axial clearance of the swinging arm on the chassis side

Characteristic

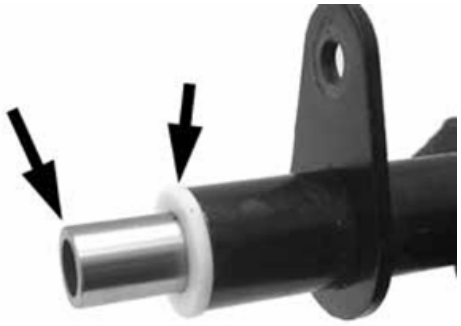
Standard clearance

0.40 - 0.60 mm

Allowable limit after use:

1.5 mm

- Separate the swinging arm on the engine side from the vehicle side arm.
- Remove the plastic bushings and the internal spacer shown in the picture.



- Using a suitable pin remove the roller casings as shown in the pictures

- Using an appropriate tool plant new roller casings, being careful to position the bearings with the seal rings facing outwards

Specific tooling

020244Y 15-mm diameter punch

020115Y Ø 18 punch

Characteristic

Length of the swinging arm tube on the engine side:

L 175.3 + 0.3 0

Length of the internal swinging arm spacer on the engine side:

L 183 + 0.3 0

Engine side swinging arm plastic bushing shim:

3.5 ± 0.05 mm

Chassis side swinging arm plastic bushing shim:

3.5 ± 0.05 mm

Length of the internal swinging arm spacer on the frame side:

290 ± 0.1 mm

Length of the swinging arm tube on the chassis side:

283 ± 0.1 mm

- Lubricate roller casings and the plastic bushings with grease
- Insert the spacers
- Assemble the two arms with the relative bolt in the position shown in the picture
- Adjust the bolt as shown in the picture
- Position the chassis side swinging arm with the most protruding part pointing towards the silent block side as shown in the picture

Recommended products

AGIP GREASE PV2 Ivory smooth-textured, slightly-stringy anhydrous calcium-base grease.

TL 9150 066, symbol NATO G 460

Refitting

- To refit, perform the removal operations in reverse.
- Grease the bearings and the rolling parts with the recommended grease.
-Complete the fitting by tightening the nuts on the relative bolts to the proper tightening torque.

Locking torques (N*m)

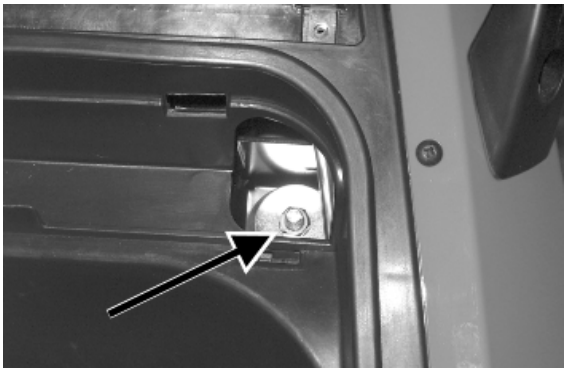
Engine and vehicle side swinging arm junction bolt 33 ÷ 41 Nm Swinging arm pin - Engine 64 ÷ 72 Body shell - Swinging arm pin 76 ÷ 83 Screw fixing the silent-block support plate to the body 42 ÷ 52

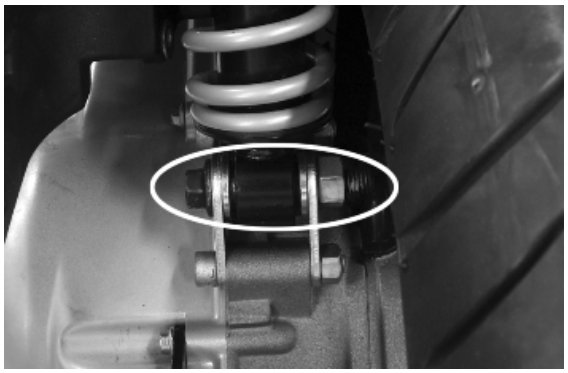
Shock absorbers

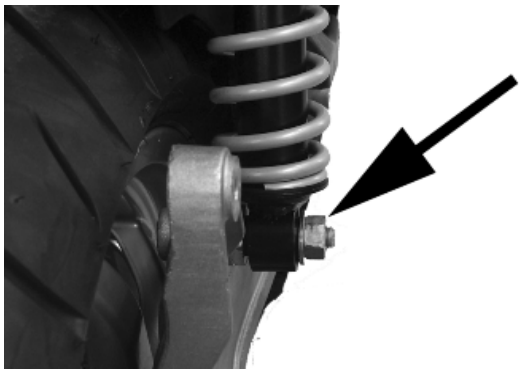
Removal

Remove the full muffler assembly.

- Remove the air filter
- Remove the upper fixing nuts to the chassis, that can be reached from the tool compartment
- Remove the fixing bolts to the crankcase and then the shock absorber
- Remove the fixing nut on the right and then remove the shock absorber







Refitting

Carry out the previous operations but in reverse order.

Locking torques (N*m)

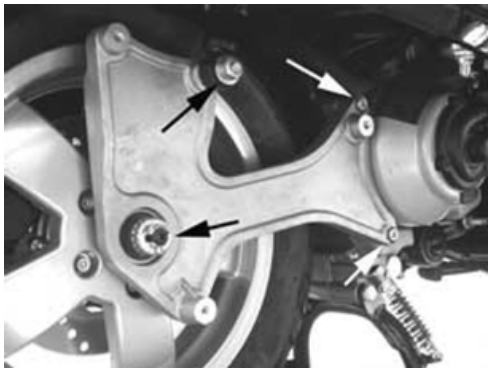
Shock absorber lower clamping 33 to 41 Shock absorber upper clamp 33 to 41

Exhaust bracket

Removal

Remove the full muffler unit.

- Remove the two fixing screws of the bracket to the engine crankcase
- Remove the split pin, the cover and the fixing nut of the rear wheel axle and its spacer
- Remove the shock absorber lower clamp



Refitting

- The refitting procedure is in the reverse order of the removal operation being careful to respect the torques indicated and the spacer assembly layout as shown in the photo.

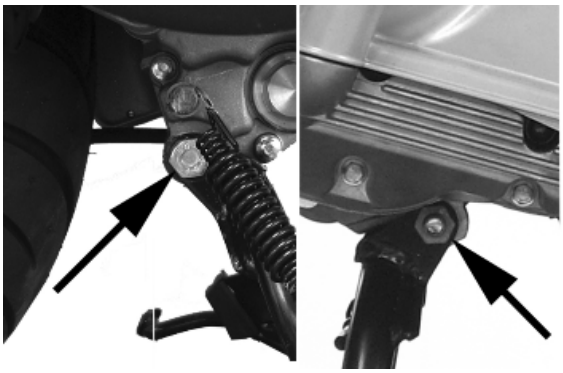
Locking torques (N*m)

Bracket fixing screws to the engine crank-case: 20 ÷ 25 Shock absorber lower clamping 33 to 41 Wheel axle clamping 104 ÷ 126

Centre-stand

REMOVAL

- Use a jack to support the vehicle properly.
- Remove the two return springs from the centre stand.
- Undo the nut shown in the figure.
- Remove the bolt from the right side.
- Remove the centre stand.



FITTING

- On refitting tighten the nut to the specified torque.

Locking torques (N*m)

Centre stand fixing bolt 25 ÷ 30 Nm

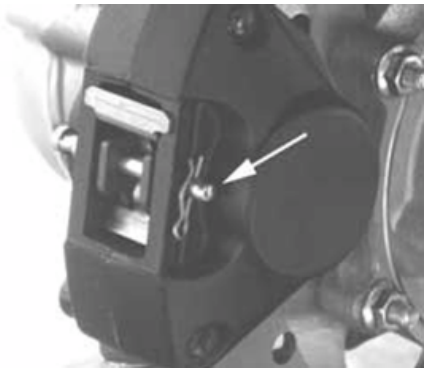
INDEX OF TOPICS

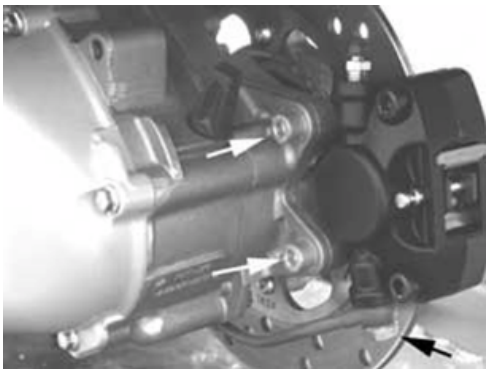
This section è is dedicated to the description of the brake system components.

Rear brake calliper

Removal

- Remove the rear wheel.
- Remove the pad retention pin snap ring.
- Using a pin partially remove the brake pad retention pin.
- Remove the screws fixing the brake calliper to the crankcase then remove the brake calliper complete with pipe.
- Complete the extraction of the pad retention pin, the spring and the pads.





N.B.

IF IT IS NECESSARY TO REPLACE OR SERVICE THE BRAKE CALLIPER, BEFORE REMOVING THE FITTINGS FIXING THE CALLIPER TO THE SUPPORT BRACKET, FIRST LOOSEN THE OIL HOSE FITTING AFTER HAVING EMPTIED THE SYSTEM OF THE CIRCUIT BEING EXAMINED.

Overhaul

- Remove the rear brake calliper.
- Suitably hold the brake calliper in a clamp
- Remove the two calliper coupling screws as shown in the photo
- Remove the two pistons from the calliper body with the aid of short blasts of compressed air through the brake fluid holes
- Remove the dust ring and the O-ring of each half calliper.
- Remove the O-rings in the half calliper.

N.B.

WHEN REMOVING THE O-RINGS, BE CAREFUL NOT TO SCRATCH THE HALF CALLIPER SEATS

- Check that the pistons and their seats show no scratches.
- Wash and blow all the components carefully
- Fit the O-rings and new dust guards
- Refit the pistons in their seats being careful to lubricate with brake fluid
- Re-couple the half callipers and lock the two screws at the specified torque

Locking torques (N*m)

Calliper coupling screw **22 ÷ 27**

Refitting

- Insert the brake pads in the calliper.
- Insert the pad fixing pin and the retention screw being careful to position the terminals of it pointing towards the bleed screw as shown in the photo.
- Insert the clip on the pad fixing pin

N.B.

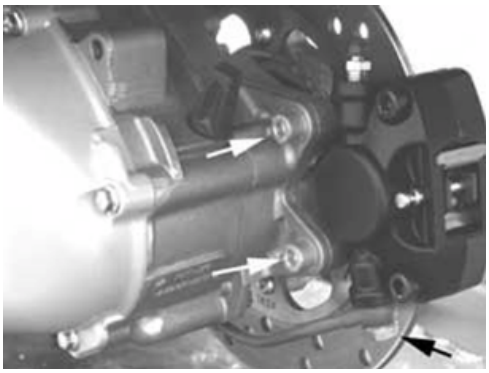
FAILURE TO RESPECT THE PAD POSITIONING REQUIREMENTS WITH RESPECT TO THE DIRECTION OF ROTATION COULD COMPROMISE PROPER BRAKE FUNCTIONING AND NOISELESSNESS.

- Keep the brake pads in contact with the pistons and insert the calliper in the brake disc.
- Fix the calliper to the crankcase with the two screws with elastic washer at the prescribed torque as shown in the photograph

- Fix the brake pipe joint to the calliper and tighten at the prescribed torque
- Bleed the system and refit the rear wheel

Locking torques (N*m)

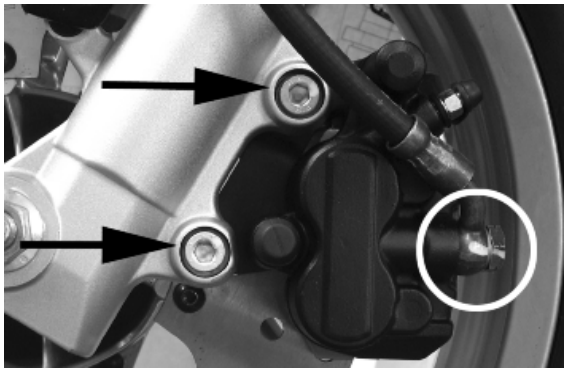
Brake calliper mounting clamping **20 to 25 Nm**
Brake pipe connection **20 to 25 N•m**



Front brake calliper

Removal

- Place a suitable container to collect the oil and disconnect the oil pipe from the calliper operating the joint.
- Remove the two screws (shown in picture) fixing the calliper to the fork and remove the fork.



Overhaul

Proceed as follows:

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

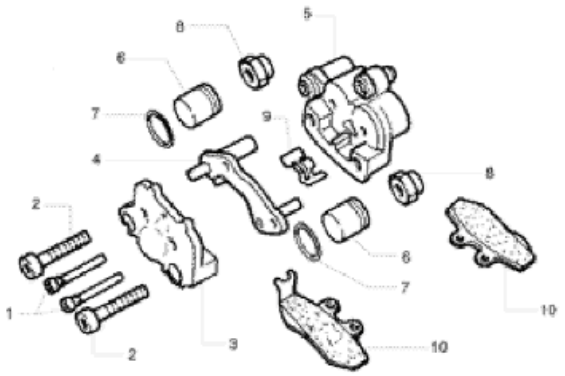
2) remove the two male hexagonal screws (2) and remove the reaction plate (3);

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 disc, 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. Brake 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 to 24.5

Refitting

Insert the following on the front brake body:

-The sealing rings and the pistons (1).

-Refit the plate (2).

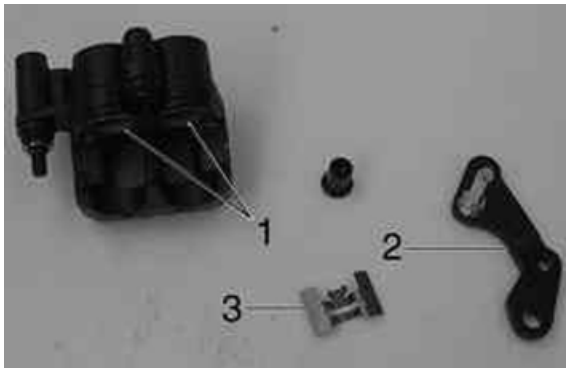
- Arrange the pad holding clamp (3).

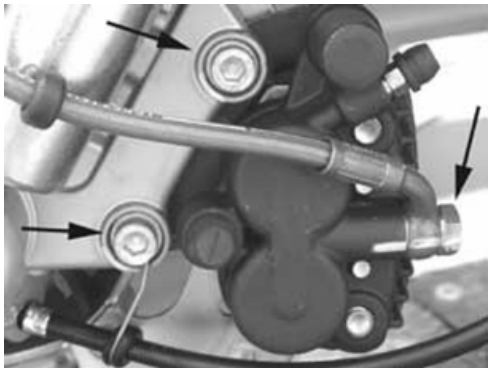
-Refit the pads and bleed air.

-Place the calliper on the disk and lock it to the support by tightening the bolts at the prescribed torque.

-Lock the pipe joint to the calliper at the prescribed torque.

-Follow the same procedure for the rear brake calliper.





Locking torques (N*m)

Screws fixing the front calliper to the support: 20 ÷ 25 Nm Screw fixing the oil connection to the calliper: 20 ÷ 25 Nm

Rear brake disc

Removal

- Remove the rear wheel.
- Remove the rear brake calliper.
- Remove the brake disk and the hub from the wheel axle.
- To remove the brake disk from the hub, hold the unit firmly with a vice and operate on the 5 fixing screws indicated in the photograph.

Refitting

- Carry out the operations to reassemble the brake disk to the hub in the reverse order from the removal, being careful to position the brake disk on the hub on the side opposite to the wheel keying
- Respect the direction of rotation indicated by the arrow and tighten at the prescribed torque.
- Insert the brake hub unit in the wheel axle

Locking torques (N*m)

Disk to the hub 11 ÷ 13

Disc Inspection

- Remove the rear brake calliper.
- Check the disc thickness with a micrometer

Characteristic

Minimum thickness allowed after use:

3.5 mm

Standard thickness:

4 +0.2-0.2 mm

- Repeat the measurement at no fewer than six points on the disc.
- Check the regular nature of the rotation of the brake disc assembly using the appropriate tool fixed onto the brake calliper as shown in the photo.
- In order to be able to anchor the appropriate tool properly use a metal plate with M8 threaded hole and fix it to one of the two rear brake calliper attachment points.
- Suitably fix the flange to the wheel axle with the original nut and spacer and a Æ 17 mm bearing.

N.B.

SO AS NOT TO GET A DISTORTED READING, CAUSE THE DRIVEN PULLEY SHAFT TO TURN IN ORDER TO ROTATE THE DISC.

Specific tooling

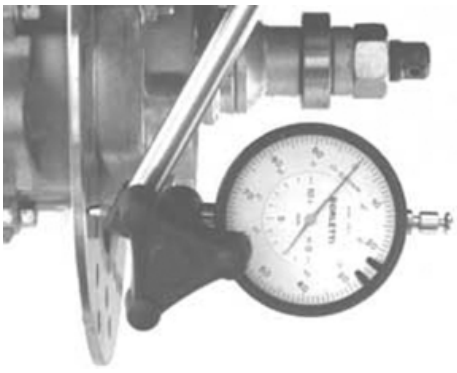
020335Y Magnetic support for dial gauge

Characteristic

Max. deviation allowed:

0.1 mm

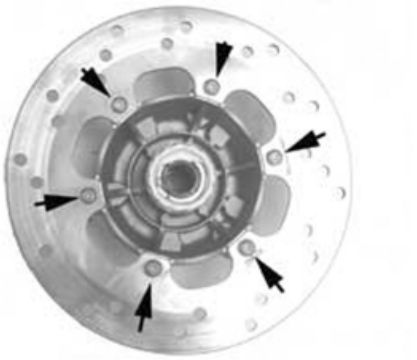
- If you detect incorrect values, replace the disc. If the anomaly persists, replace the hub.



Front brake disc

Removal

- Remove the front wheel
- Remove the disk from the front wheel operating the 6 screws.

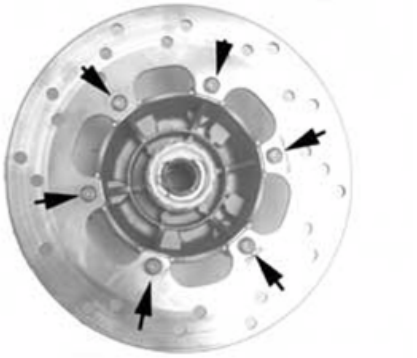


Refitting

- Carry out the operations in the reverse order from the removal being careful to respect the direction of disc rotation shown by the arrow printed on it
- Tighten the six screws to the specified torque.

Locking torques (N*m)

Brake disc screws: 6 +0.5 -1 Nm



Disc Inspection

- Remove the front wheel
- Use a micrometer to check the disc thickness as shown in the photograph
- Repeat the measurement in at least 6 points on the disk
- Remove the front brake calliper
- In order to secure the appropriate tool adequately use a metal plate with M8 threaded hole and fix it to one of the two front brake calliper attachment points
- Place the dial gauge on the disk outer edge
- Make the wheel hub turn and check the disk deviation

Specific tooling

020335Y Magnetic support for dial gauge

Characteristic

Standard thickness:

4 +0.2-0.2 mm

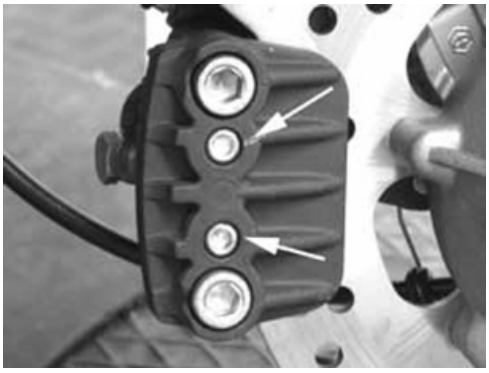
Max. deviation allowed:

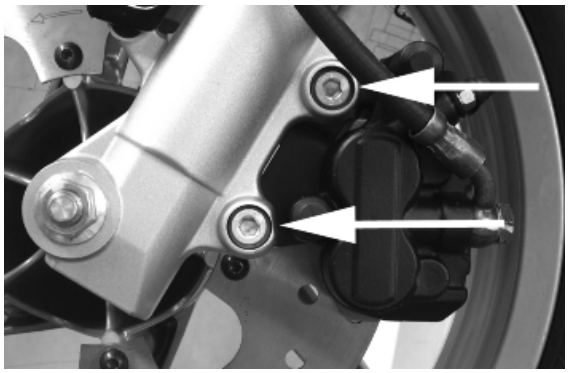
0.1 mm

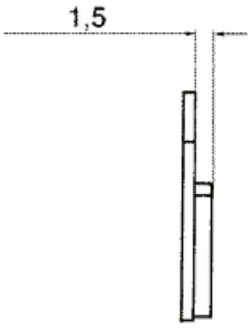
Front brake pads

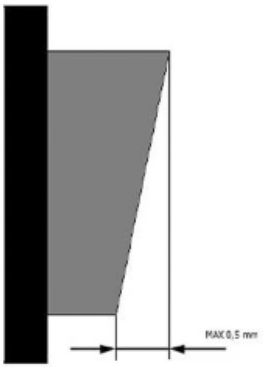
Removal

- Preloosen the two fixing pins of the brake pads
- Remove the brake calliper
- Remove permanently the two pad fixing screws
- Check that there are no flaws or warping. If there is, replace it.
- Check the thickness of the friction material is more than 1.5 mm. If it is not, replace it
- The replacement must be made with greater residual thickness if the pad has not worn evenly. A 0.5 mm thickness difference in the residual friction material is permitted









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

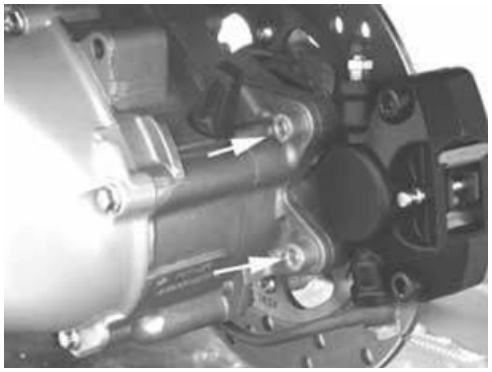
Medium Loctite 243 threadlock

Locking torques (N*m)

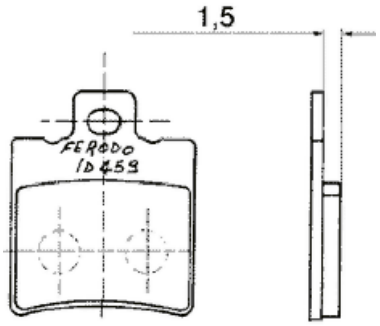
Screw tightening calliper to support 20 ÷ 25 Pad fastening pin 19.6 to 24.5

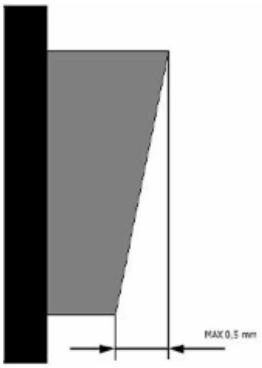
Rear brake pads

Removal



- Remove the rear wheel.
- Remove the rear brake calliper.
- Remove the check spring and the fixing pin.
- Remove the brake pads and check that they show no flaws or warping. If it is, replace it.
- Check that the thickness of the friction material is over 1.5 mm. Otherwise, replace it.
- The replacement must be made with greater residual thickness if the pad has not worn evenly. A 0.5 mm thickness difference in the residual friction material is permitted.





See also

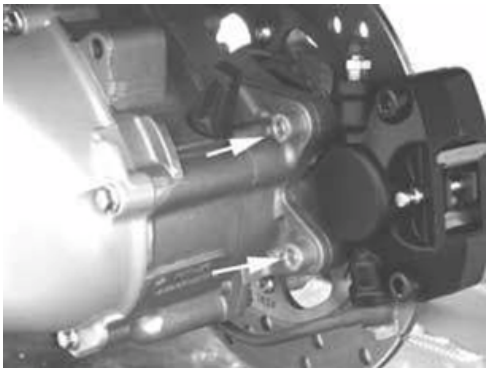
Removal

Refitting

- Insert the brake pads
- Insert the fixing pin being careful to position the clip with the ends towards the bleed screw as in the photo.
- Insert the clip on the pin
- Fix the rear brake calliper to the bracket and tighten the two screws to the specified torque.

Locking torques (N*m)

Rear brake calliper tightening screw **20 to 25 Nm**



Fill

Front

- Rest the scooter on its stand on level ground.
- Remove the front handlebar cover.
- Remove the brake pump cover unscrewing the two screws.
- Refill the brake system tank up to the maximum level with the prescribed fluid.
- Connect the bleeding fitting to the appropriate tool tube (Mityvac manual pump).
- Actuate the tool at the bleed fitting, at the same time constantly top up the brake reservoir to prevent air being drawn into the system, until no more air escapes at the bleed fitting:

The operation is finished when just oil comes out of the bleed screws.

- Close the bleed screw and tighten to the prescribed torque.

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 Mity-Vac vacuum-operated pump

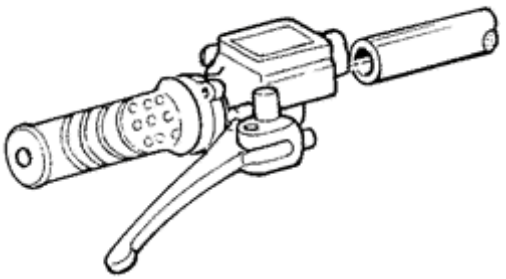
Locking torques (N*m)

Oil bleed screw 8 - 12

Front brake pump

Removal

1) remove the front and rear handlebar covers;
2) placing a suitable container to catch the oil, disconnect the oil pipe from the calliper and work the brake lever until no more oil comes out;
3) disconnect the oil pipe from the pump then unscrew the two u-bolt clamping screws and remove the pump.



- On refitting, tighten up the fitting to the specified torque and bleed the system.

Locking torques (N*m)

Brake fluid pump-hose fitting 16 - 20

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

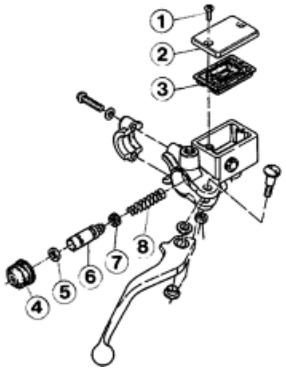
CAUTION

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

Refitting

Before fitting, the parts must be perfectly clean and free of traces of oil, diesel fuel, grease, etc.. They should be washed thoroughly in denatured alcohol before proceeding.

- 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.



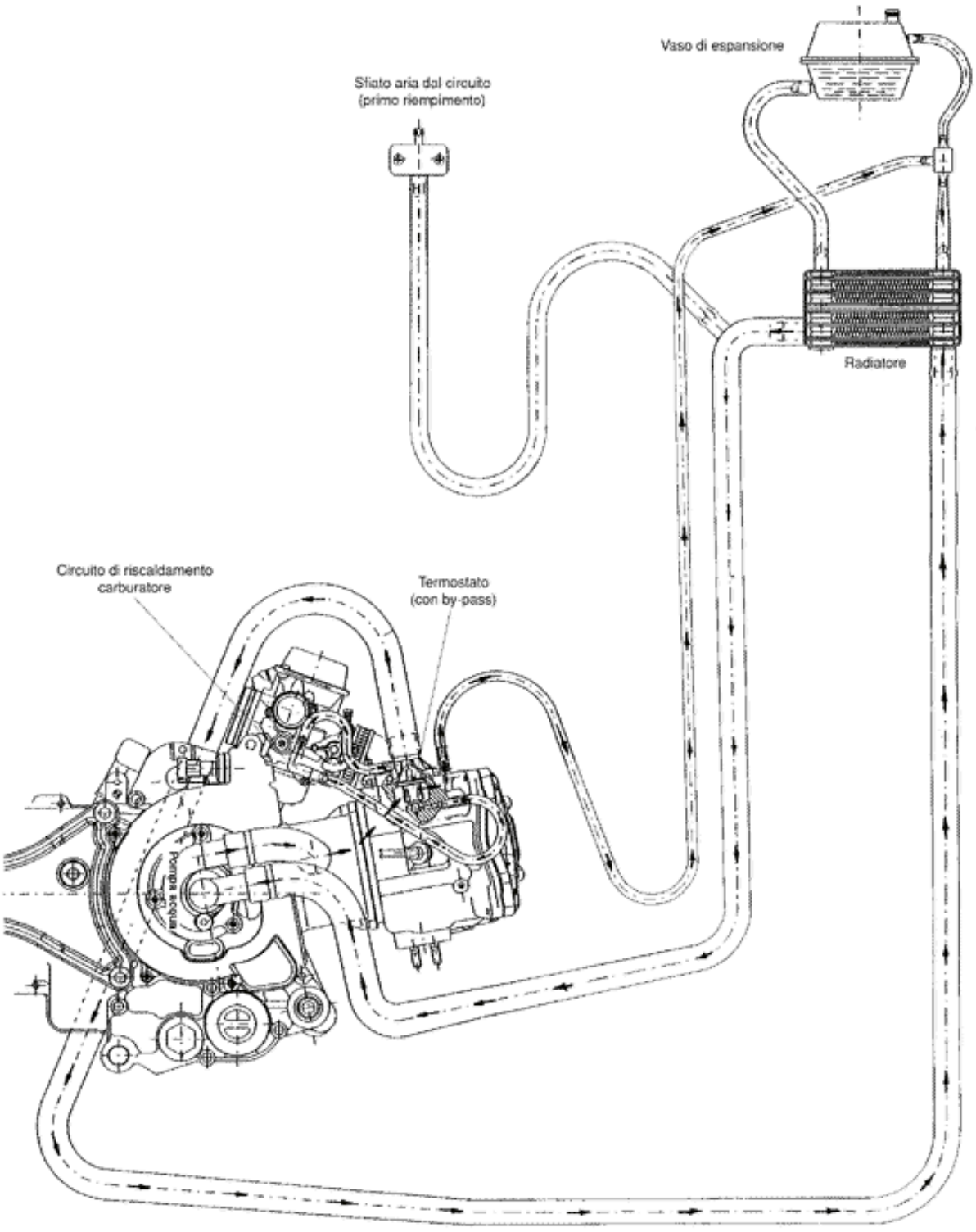
1 - Tank cap screw.
2. Tank cover.
3. Diaphragm.
4. Bellows.
5. Sealing ring.

6. Piston.
7. Gasket.
8. Spring.

INDEX OF TOPICS

Questa sezione è in lavorazione.

Circuit diagram



Water pump - overhaul

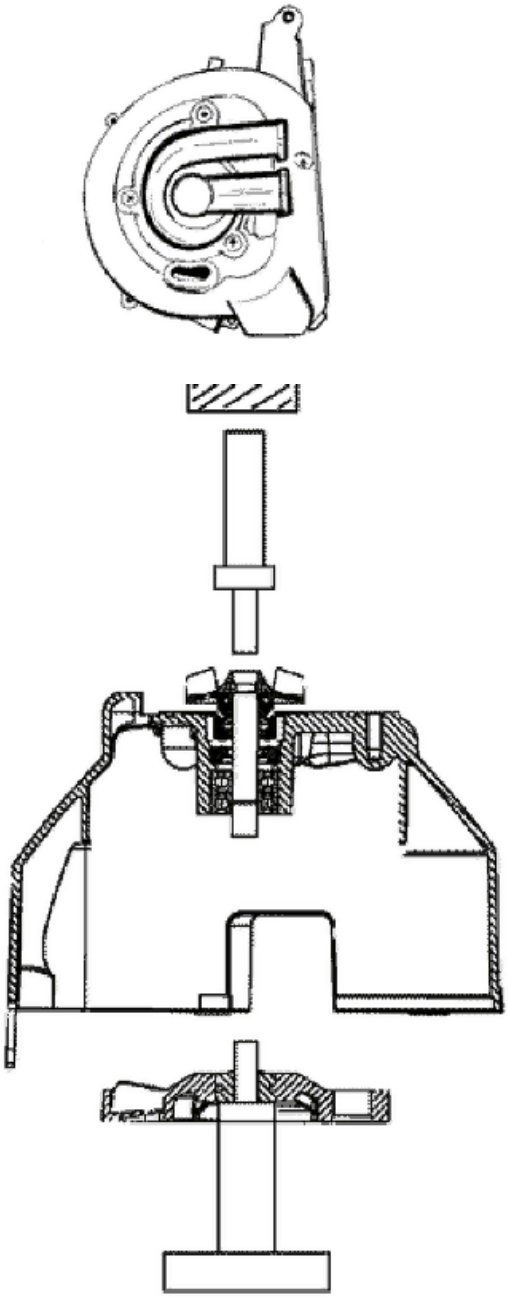
With a hot air gun heat the flywheel cover on the inner side.

- Place the flywheel cover on the ring base following the same procedure as for removal.
- Place the two bearings on the specific punch.
- Use grease to keep the bearings on the appropriate tool.
- Use a plastic mallet to insert the bearings on the housing up to the stop.
- Assembly the ceramic ring and the corresponding rubber gasket. The ceramic ring chamfering should always face towards the gasket.
- Lubricate the rubber gasket and insert the unit on the flywheel cover.

Use the punch of the appropriate tool manually if necessary.

Insert the drive on the guide on the support base facing part of the appropriate tool, being careful to check that the convex part faces upwards.

- Insert the flywheel cover with bearings on the appropriate tool.
- Insert the shaft together with the mechanical gaskets on the bearings.
- With the appropriate punch and socket, insert the shaft in the bearings and the drive until the end of stroke of the appropriate tool cannot be seen.
- Reassemble the rotor cover with a new O-Ring.
- Tighten the 3 fixing screws to the torque below.



N.B.

AVOID OVERHEATING AS THIS MAY ALTER THE PAINTED SURFACE.

N.B.

ALWAYS USE NEW BEARINGS.

N.B.

ALWAYS USE NEW CERAMIC RING AND GASKETS. ASSEMBLING THE CERAMIC SEALING RING IN A MANNER OTHER THAN MANUALLY MAY DAMAGE THE RING.

N.B.

Centre the punch well on the rotor. Push the shaft in and check that the wheel flywheel cover is level. Failure to respect this procedure damages the drive.

N.B.

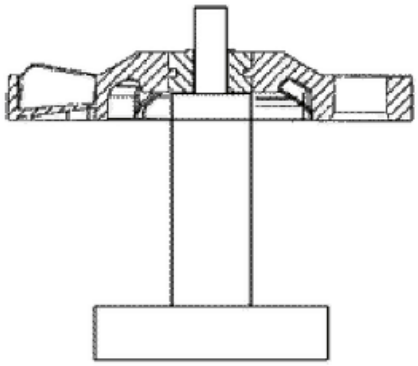
DO NOT LUBRICATE THE O-RING. FAILURE TO RESPECT THIS RULE RESULTS IN RING DISTORTION.

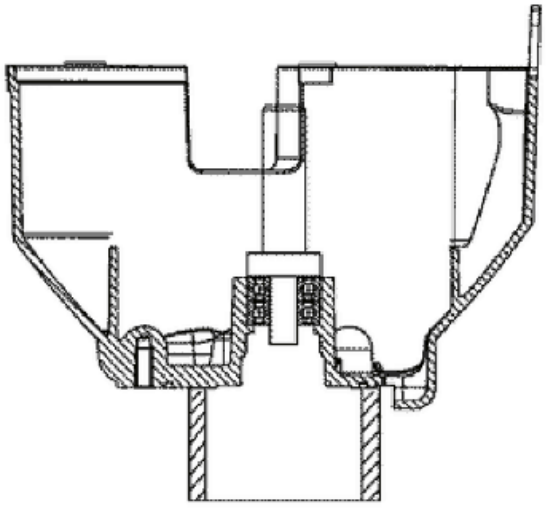
Specific tooling

020440Y Water pump service tool

Locking torques (N*m)

Water pump rotor cover 3 to 4





Water pump ceramic seal

Our Leader, Quasar, and Master liquid cooled engines are equipped with water pumps fitted with the ceramic seal in the subject. This component is intended to guarantee the leak tightness of the coolant in relation to the pump shaft. The seal achieved via two special ceramics, a static one and a spinning one, kept in contact by the thrust of a spring, coaxially mounted onto the pump shaft. The efficiency of this system is guaranteed by the accurate machining and cleaning of the components as they are fitted; in any case, ceramic seals are subjected to a running in period. During this period (1,000 ± 1,500 km), there may be small leaks through draining holes, which remain visible on the aluminium crankcase. This phenomenon is particularly visible there where the hole is more exposed (Quasar and Master). In

such cases we recommend cleaning the casing in order to be able to check again for leaks after a distance of more than 1500 km. If leaks continue or in the event of real losses, the ceramic seal should be replaced. For these operations, observe the tools and instructions given in the relevant service station manuals.

Note: The ceramic seal may be overhauled according to the following couplings:

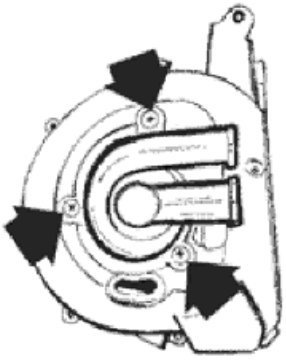
- Coupling "A": seal ring no. 485084 with ceramic seal no. 486216
- Coupling "B": seal ring no. 841329 with ceramic seal no. 841330

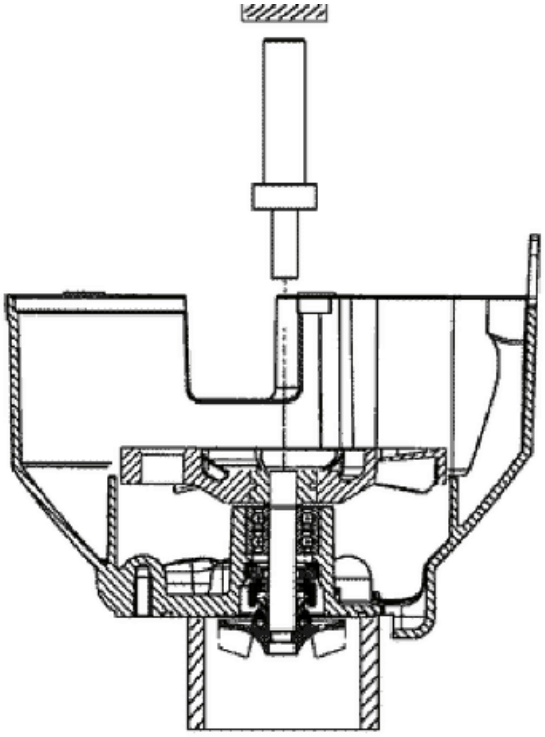
The couplings above may be selected according to their availability, as they are interchangeable.

- Check the water pump if noise in the bearings or liquid leaking from the drainage hole inside the cover is detected.
- Remove the flywheel cover together with the water pump from the engine (see chapter 4).
- Remove the rotor cover by unscrewing the 3 retainers indicated in the figure.
- Place the flywheel cover on the ring base forming part of the tool drawing No 020440Y

With an appropriate socket and punch, forming part of the specific tool 020440y, extract the shaft together with the rotor from the drive and the bearings.

- Use a screwdriver to remove the static part of the ceramic seal from the flywheel cover.
- Place the flywheel cover below the socket making sure it is perfectly levelled.
- Use the punch in the inverted position to extract the two ball bearings.



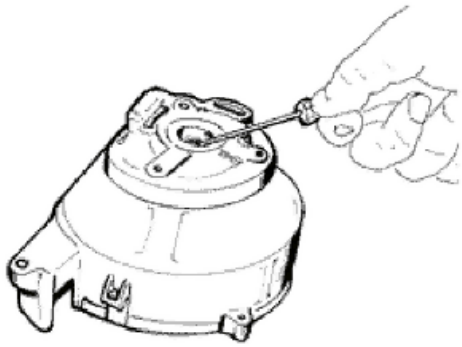


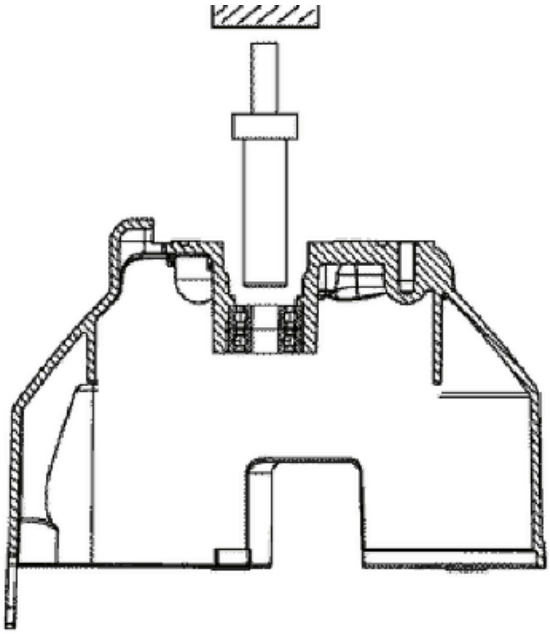
N.B.

To avoid damaging the cover surface that retains the coolant, use de ring base with the accurately machined surface facing the flywheel cover.

Specific tooling

020440Y Water pump service tool





Check components

- Check that the rotor does not show abnormal wear or dents;
- Check that the rotor shaft is not rusty;
- Check that there is no rust on the bearing seats or the ceramic seal;
- Check that the drive does not show dents and that it is perfectly integral with the steel hub.

Thermostat

Removal

- Loosen the two screws indicated in the figure and remove the thermostat cover.
- Remove the thermostat with its gasket.

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:
- Heat up until the thermostat is completely open
- 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

Thermostat check: opening travel

3.5 mm at 80°C

Thermostat check: Opening start temperature

69.5 ÷ 72.5°C

1) Look to see that the thermostat is not damaged.

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

Immerse the thermostat, and keep it in the centre of the container.

Immerse the multimeter temperature probe drawing No° 020331Y closeà to the thermostat.

Heat the container with a hot air gun drawing No° 020151Y.

Check the temperature when the thermostat starts to open:

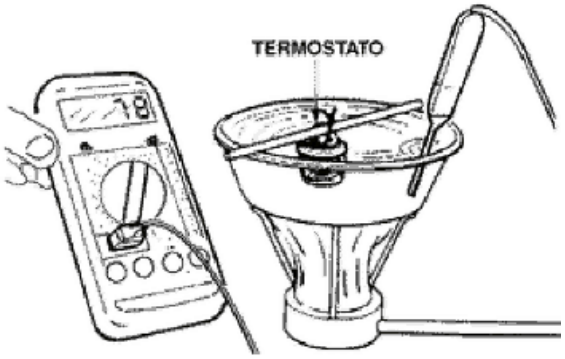
Opening start temperature: 69.5 ÷72.5°C

Heat up until the thermostat is completely open.

Opening travel: 3.5 mm at 80°C

CAUTION - To execute the test correctly, make sure neither the thermostat nor the thermometer touches the container.

3) Replace the thermostat if it is not working properly.



Refitting

- Place the thermostat with the bleeding hole at the highest point.
- Make sure that the rubber gasket is positioned properly.
- Fit the thermostat cover with the connection for the carburettor heating pipe facing the flywheel.
- Tighten the two screw to the torque indicated below.

Locking torques (N*m)

Thermostat cover screws **3 - 4**

INDEX OF TOPICS

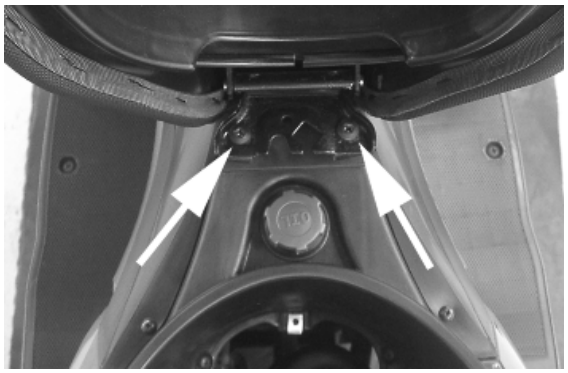
CHASSIS

CHAS

This section è is dedicated to the operations that can be carried out on the vehicle's bodywork.

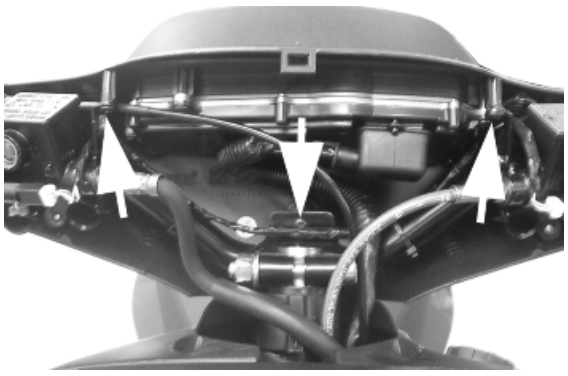
Seat

Lift the saddle and remove the screws indicated in the photograph



Rear handlebar cover

- Remove the front handlebar cover
- Remove the 3 screws indicated in the figure
-After disconnecting the wiring remove the rear handlebar.



See also

Front handlebar cover

Front handlebar cover

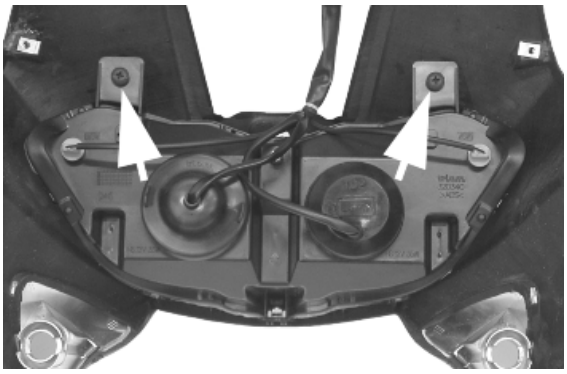
-Remove the rear-view mirrors.

-Remove the two screws shown in the figure, and at the same time disconnect the fitting in the upper part of the handlebar cover. Pull the front part upwards so as not to damage the fittings made of plastic.

Headlight assy.

- Remove the front shield

- Remove the 2 screws indicated in the photograph at the back of the shield, then disconnect the wiring and remove the headlight assembly.



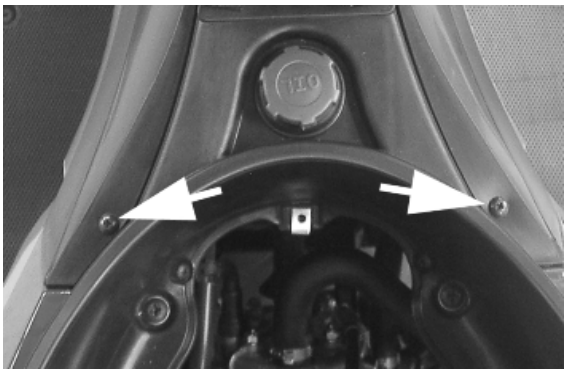
See also

Legshield

Frame central cover

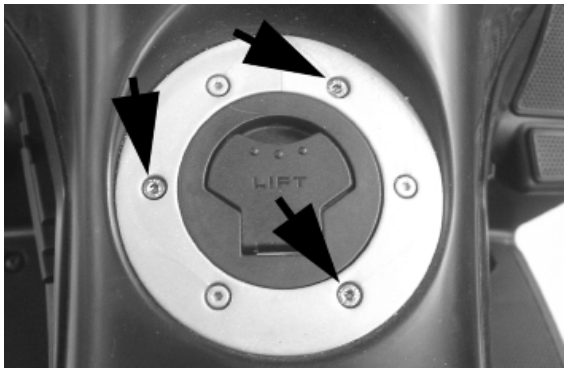
Remove the saddle and the two screws indicated in the photograph.

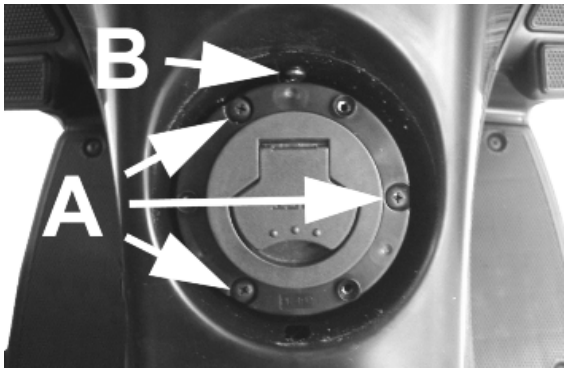
- Remove the air ducts, then operate the screw indicated in photograph.



- Remove the ring nut of the fuel tank cap by unscrewing the 3 screws indicated in the photograph.
- Remove the filling hole unit of the fuel tank by loosening the 3 screws <**A**> indicated in the photograph and the metal clamp.
- Remove the screw <**B>** indicated in the photograph, then remove the chassis central cover by pulling it upwards.

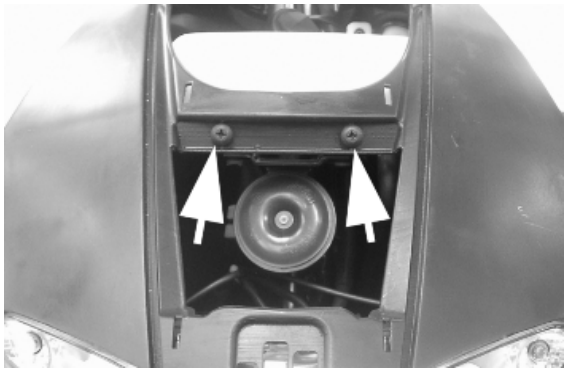
To fit, repeat the procedure in reverse order being careful to replace the metal clamp of the fuel tank filling hole.



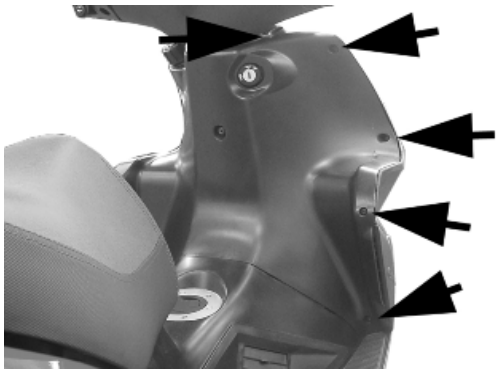


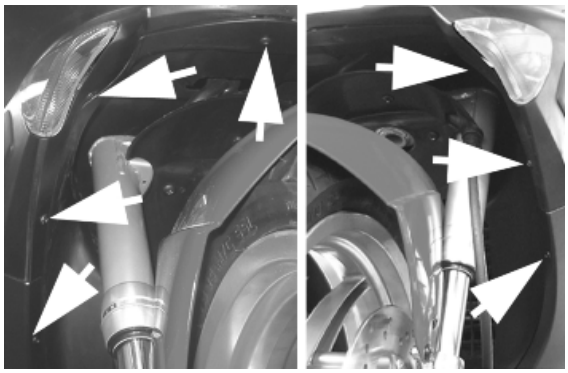
Legshield

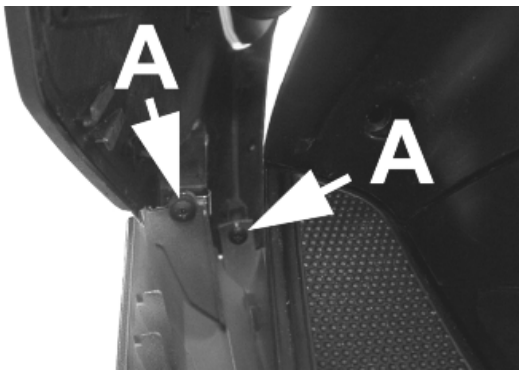
- Remove the shield central cover.
- Remove the 2 screws shown in the photograph.
- Remove the 10 screws (5 per side) indicated in the photograph.
- Remove the 7 screws indicated in the photograph from the front wheel compartment.
- Lever on the plastic parts creating enough space to remove the 4 screws (2 per side) <**A>** indicated in the photograph.



- Remove the front shield after disconnecting the wiring of the front headlight assembly and of the taillights.
Assembly following the procedure in reverse order.



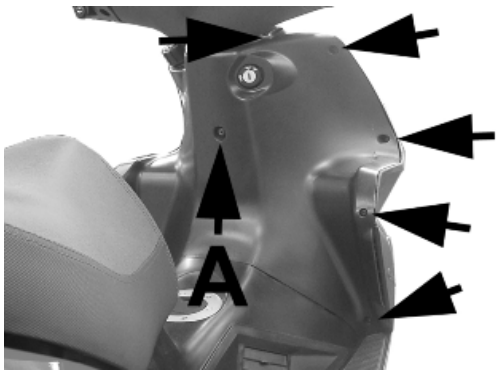




See also
Front central cover

Knee-guard

- Remove the central chassis cover.
- Remove the shield central cover and remove the supporting screws for the expansion tank.
- Remove the 10 screws (5 per side) of the shield back plate indicated in the photograph.
- Remove the central screw <**A**> indicated in the photo, then remove the shield back plate.
Follow the procedure in reverse order to refit.



See also
Frame central cover

Front central cover

Removing the ignition key-switch when on *off*

- Remove the shield back plate.
- Remove the immobilizer aerial as shown in the figure.

- Detach the electrical wiring.
- Remove the ignition key-switch, by removing the spring retainer shown in the figure.

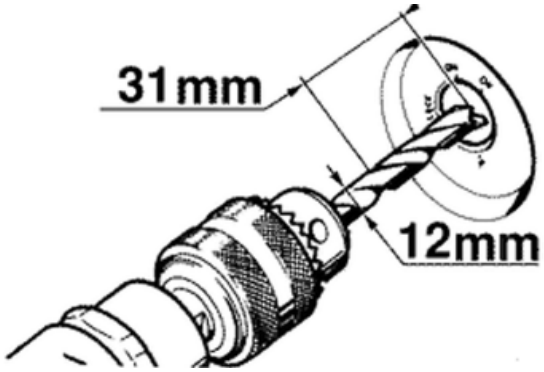
- Lightly push the master-cylinder and extract the lock from the notch shown in the figure.
- Hence extract the master-cylinder complete with the key-switch.
- For the reassembly proceed in the reverse order.

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.

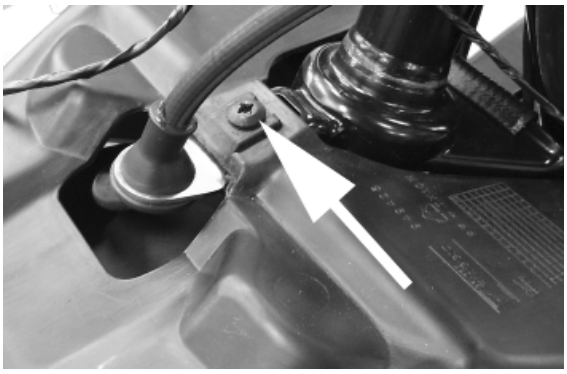
N.B.

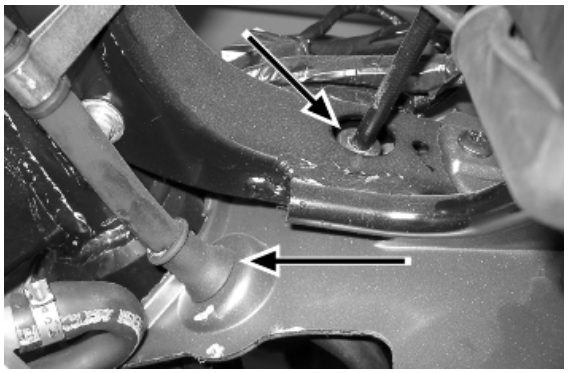
FOR REASSEMBLY FROM THIS POSITION, RELEASE THE STEERING WHEEL AND SET THE LOCK BODY (INSIDE AND OUTSIDE PART) TO "OFF". THEN, PROCEED AS DESCRIBED IN PARAGRAPH REMOVAL, LOCK IN OFF POSITION.



Front wheel housing

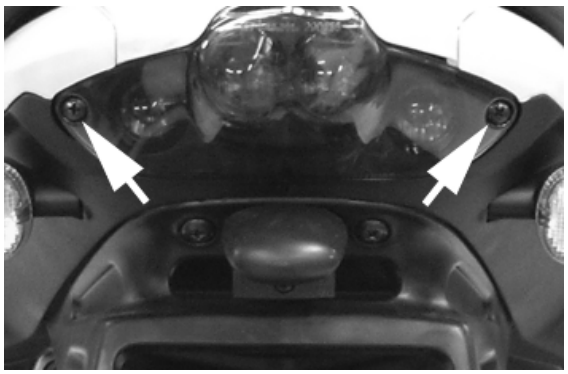
- Remove the front fork;
- Unscrew the central stud of the wheel well at the frame;
- Disconnect the brake pipe to the pump and pull it out;;
- Remove the odometer transmission..





Taillight assy.

Remove the two screws and take out the whole unit.

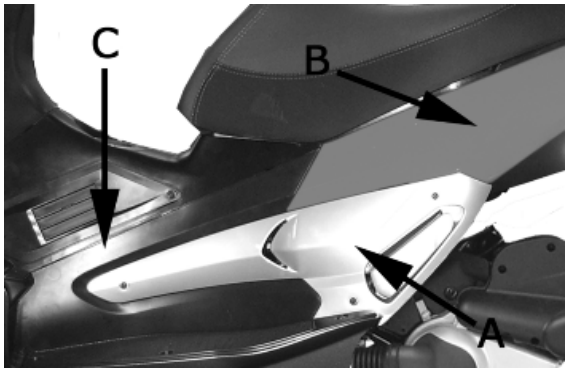


Footrest

Remove the 3 screws indicated in the figure and remove the footrest.

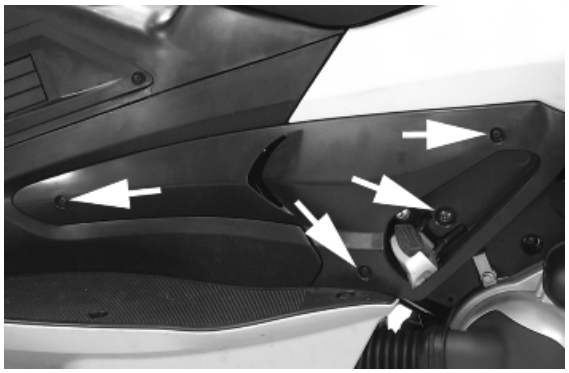
Side fairings

The side fairing consists of 3 parts as described in the figure.



Fairing A

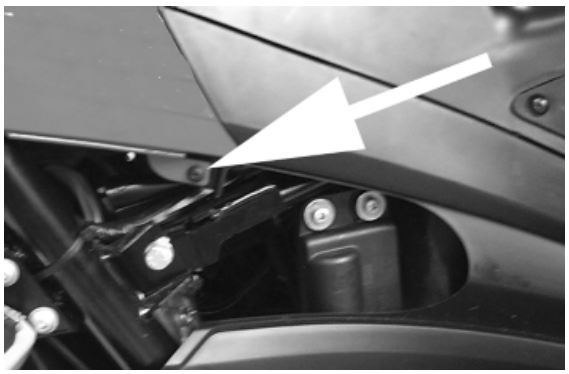
- Remove the 4 screws indicated in the figure and take out the casing.

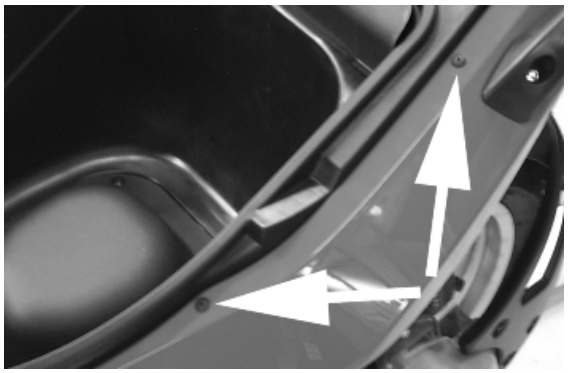


Fairing B

- Remove fairing **A**

- Remove the passenger handles.
- Remove the rear light assembly.
- Remove the license plate holder undoing the 4 screws indicated in the figure.
- Remove the screw of the rear wheel compartment.
- Remove the 2 screws indicated in the figure.
- Remove the screw located below the fairing **A**
- Pull out the fairing.



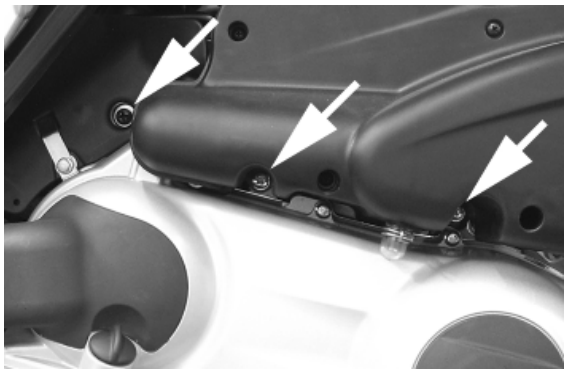


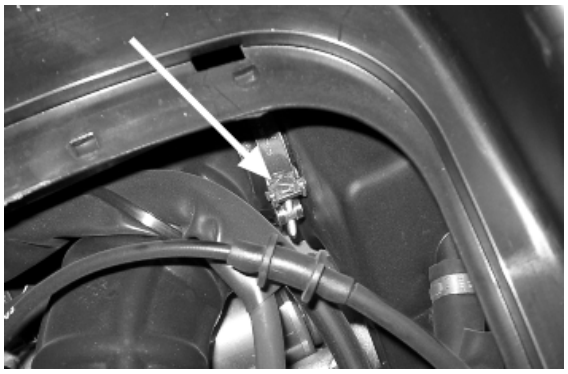
Fairing C

- Remove the central chassis cover.
- Remove the lateral fairings **A** and **B**.
- Remove the fairing by pulling it upwards.

Air filter

- Undo the three screws fixing the housing to the engine crankcase;
- Loosen the hood clamp connected to the carburettor and disconnect it from the filter housing.
- Remove the clamp of the blow-by tube and take it out.
- Push the housing upwards to free it from the appendages on the crankcase and remove it.



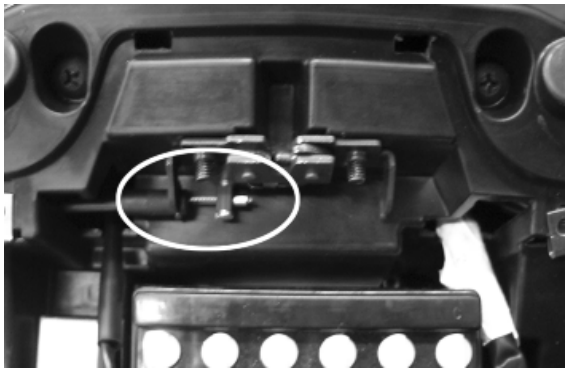


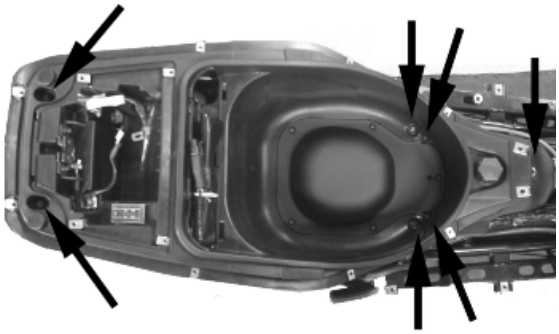
See also

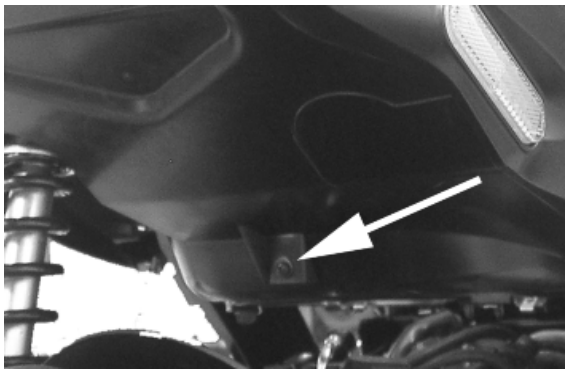
Side fairings

Helmet bay

- Remove the battery after disconnecting the wiring.
- Remove the saddle.
- Remove the rear central cover.
- Remove the side panels
- Remove the wiring found in the battery compartment.
-Disconnect the cable of the saddle opening device.
- Remove the 5 screws indicated in the figure located on the front part of the helmet compartment.
- Remove the 2 screws indicated in the figure located on the rear part of the helmet compartment.
- Remove the screw indicated in the figure located on the rear wheel compartment, and then remove the helmet compartment.







See also

Side fairings
Seat

Fuel tank

- Remove the central chassis cover.

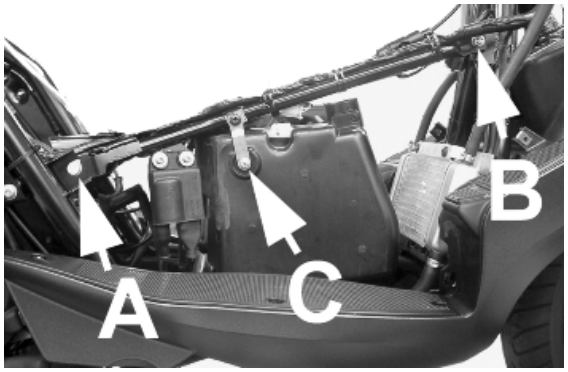
Remove the side fairings and the helmet compartment.

- Remove the screw <**C**> indicated in the figure at both sides.

- Remove the bolt <**A**> and loosen the nut <**B**>indicated in the figure.

- Lift the chassis very gently, being careful with the cables affixed to it.

- Disconnect the electrical connections and the fuel tank pipes when extracting the chassis.



N.B.

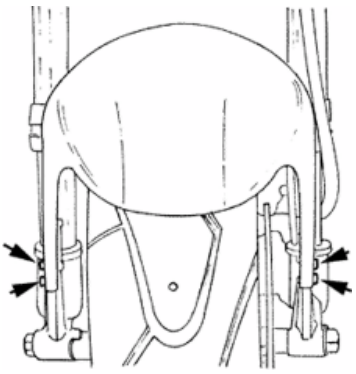
this operation should be preferably be carried out with the tank empty.

See also

Helmet bay
Frame central cover
Side fairings

Front mudguard

Loosen the four screws fixing the fender to the fork.



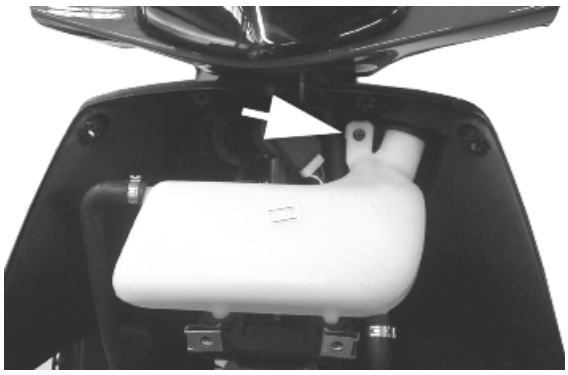
Expansion tank

- Remove the front shield.

Remove the screw indicated in the photograph.

- Remove the cap momentarily to disconnect it from the shield back plate by pulling it downwards.
- Disconnect the expansion tank from the support anchored to the chassis.
- Prepare a container to collect the coolant.
- Remove the coolant in (top) and return (bottom) pipes.

Assembly following the procedure in reverse order.

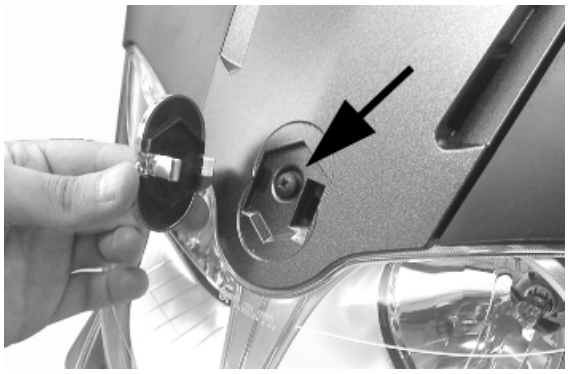


See also

Legshield

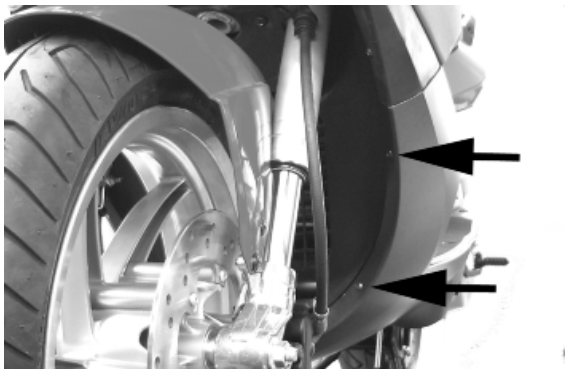
Front central cover

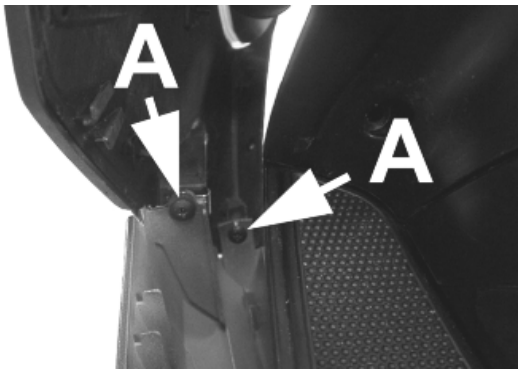
- Remove the Gilera emblem placing a screwdriver in the emblem right groove.
- Remove the screw indicated in the photograph and remove the cover by pulling it upwards.



Lower cover

- Remove the footrests.
- Remove the 4 screws (2 per side) indicated in the photograph of the front wheel compartment.
- Remove the two bottom screws (1 per side) of the shield back plate, then lever the plastic parts to reach the screws <**A>** indicated in the photograph.
- Remove the lower cover.




A
A

INDEX OF TOPICS

Carry out the listed tests before delivering the vehicle.

Warning - Handle fuel with care.

Aesthetic inspection

Appearance check:

- Paintwork
- Fitting of plastics
- Scratches
- Dirt

Tightening torques inspection

Lock check

- Safety fasteners
- Fixing screws

Safety fasteners:

Rear shock absorber upper fixing
Rear shock absorber lower fixing
Front wheel axle nut
Wheel hub nut
Swinging arm - chassis pin
Engine-swinging arm pin
Engine arm pin - Chassis arm
Handlebar lock nut
Lower steering ring nut
Upper steering ring nut

Electrical system

Electrical system:

- Main switch
- Headlamps: high beam lights, low beam lights, tail and parking lights and their 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 THE LIFE OF THE BATTERY.

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 VEHICLE, DISCONNECTING THE NEGATIVE TERMINAL FIRST.

CAUTION

WHEN INSTALLING THE BATTERY, ATTACH THE POSITIVE LEAD FIRST AND THEN THE NEGATIVE ONE.

WARNING

BATTERY ELECTROLYTE IS TOXIC AND IT MAY CAUSE SERIOUS BURNS. IT CONTAINS SULPHURIC ACID. AVOID CONTACT WITH YOUR EYES, SKIN AND CLOTHING.
IN CASE OF CONTACT WITH YOUR EYES OR SKIN, RINSE WITH ABUNDANT WATER FOR ABOUT 15 MINUTES AND SEEK IMMEDIATE MEDICAL ATTENTION.
IF IT ACCIDENTALLY SWALLOWED, IMMEDIATELY DRINK LARGE QUANTITIES OF WATER OR VEGETABLE OIL. SEEK IMMEDIATE MEDICAL ATTENTION.
BATTERIES PRODUCE EXPLOSIVE GASES; 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 Checks:

Braking system (hydraulic)

- Lever travel

Braking system (mechanical)

- Lever travel

Clutch

- Proper functioning check

Engine

- Throttle travel check

Others

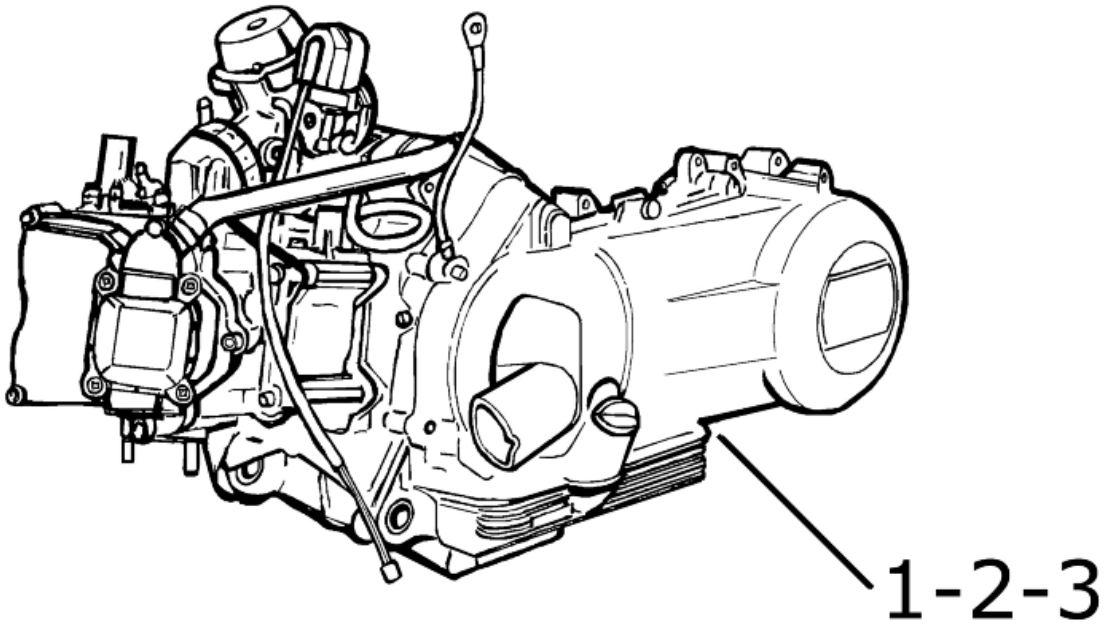
- Check documentation
- Check the chassis and engine numbers
- Tool kit
- License plate fitting
- Check locks
- Check tyre pressures
- Installation of mirrors and any accessories

INDEX OF TOPICS

TIME

TIME

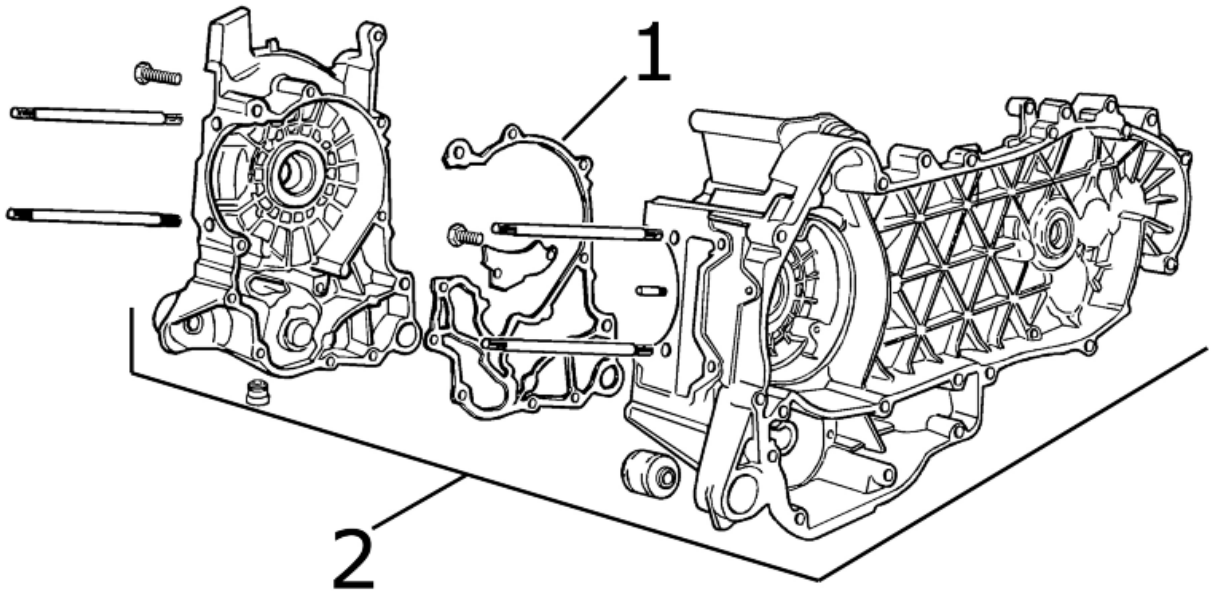
Engine



ENGINE

	Code	Action	Duration
1	001001	Engine - Replacement	
2	001136	Exhaust emissions - Adjustment	
3	003064	Engine oil - Change	

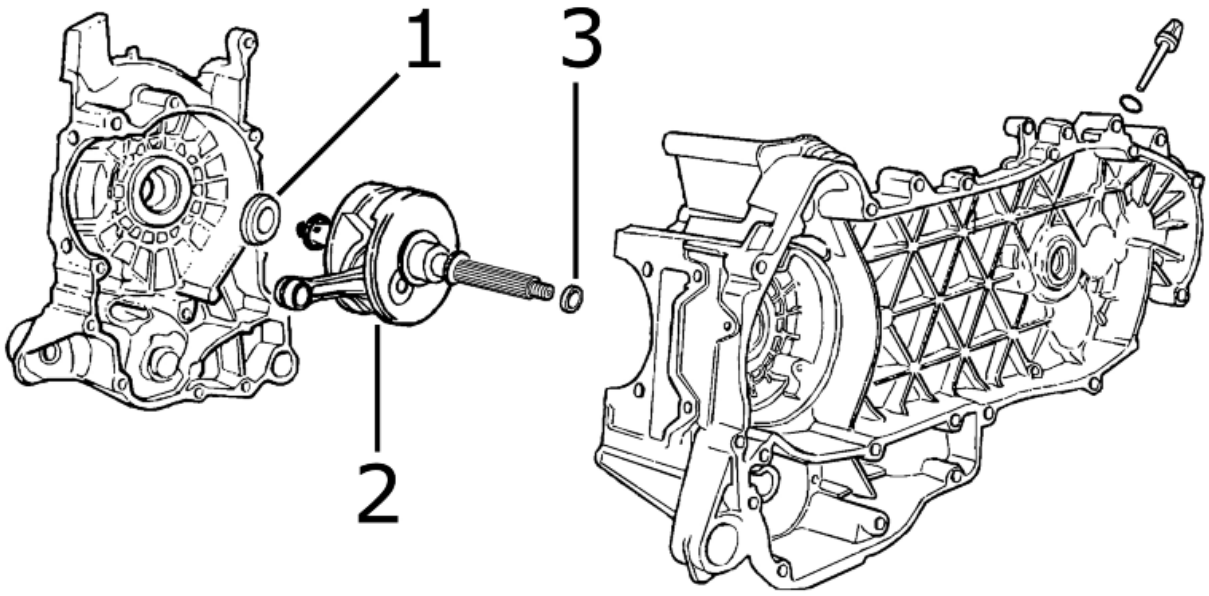
Crankcase



CRANKCASE

	Code	Action	Duration
1	001153	Crankcase gasket - Replacement	
2	001133	Engine crankcase - Replacement	

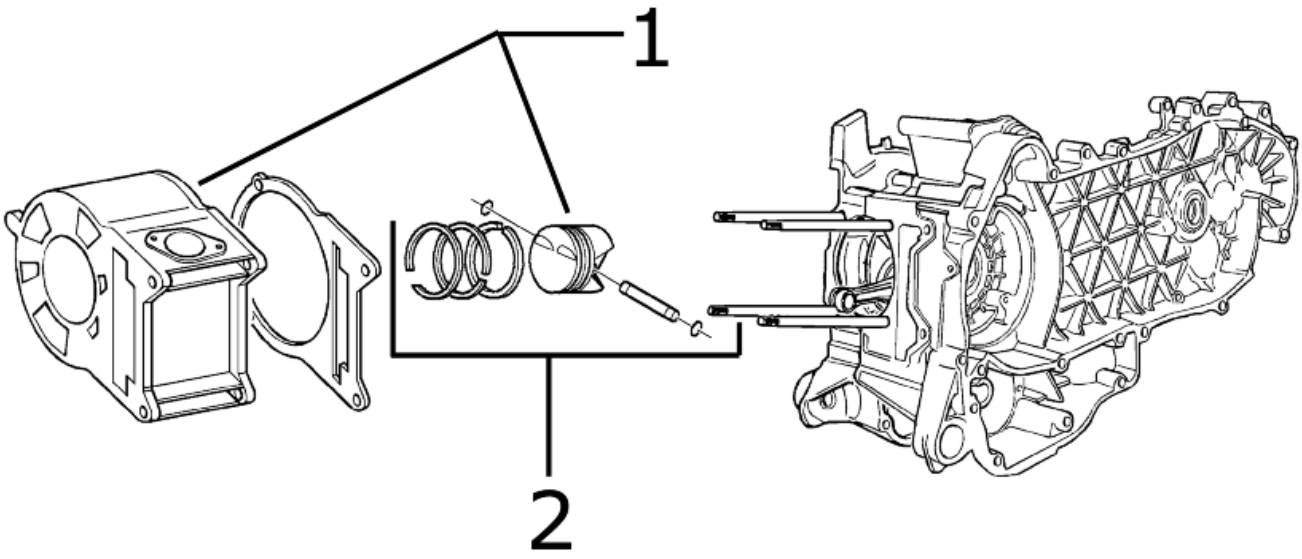
Crankshaft



CRANKSHAFT

	Code	Action	Duration
1	001099	Flywheel-side oil seal - Replacement	
2	001117	Crankshaft - Replacement	
3	001100	Oil seal, clutch side - Replacement	

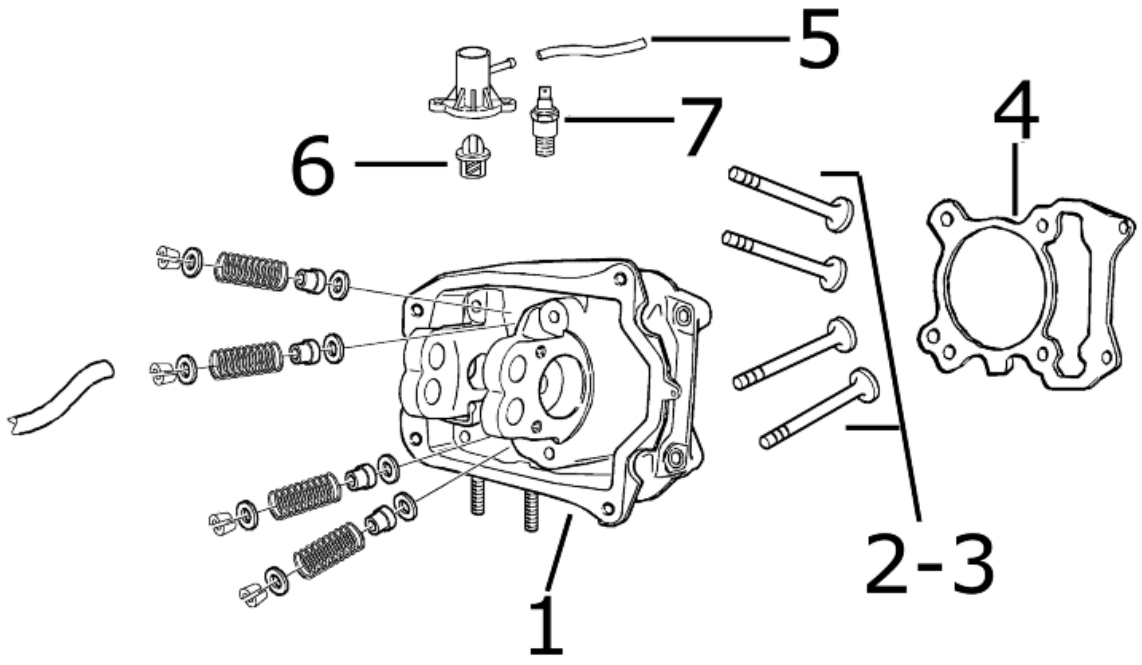
Cylinder assy.



CYLINDER UNIT - PISTON

	Code	Action	Duration
1	001002	Cylinder / Piston - Replacement	
2	001176	Rings / Pin - Replacement	

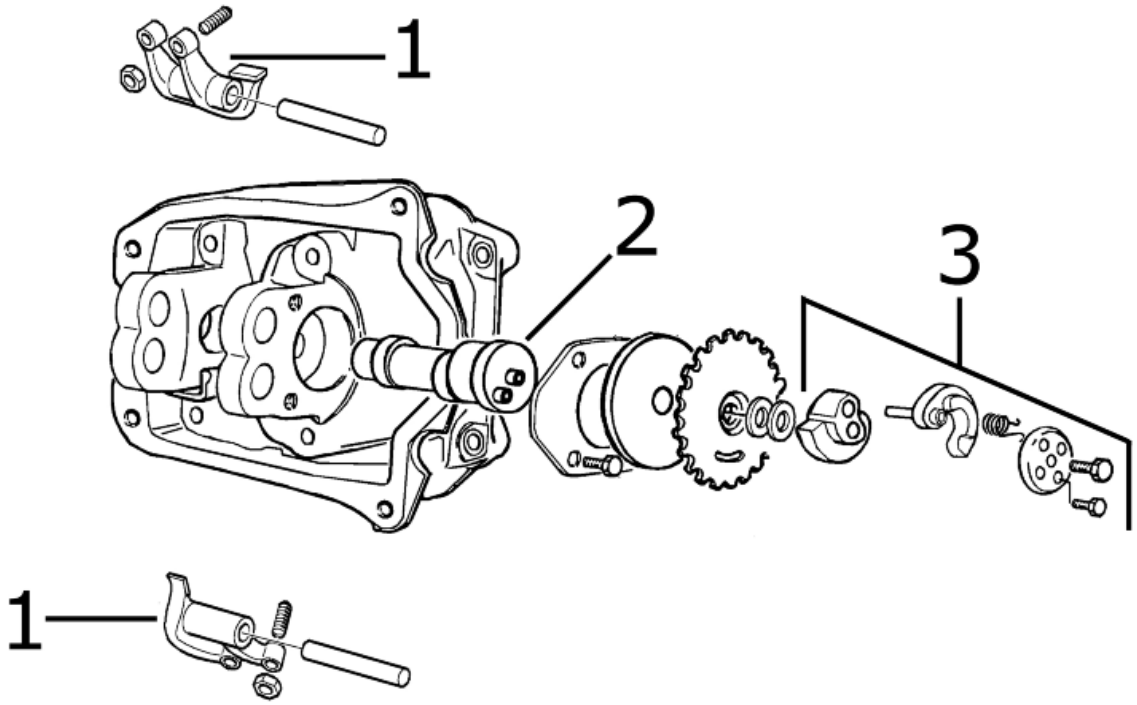
Cylinder head assy.



CYLINDER HEAD ASSEMBLY

	Code	Action	Duration
1	001126	Head - Replacement	
2	001045	Valves - Replacement	
3	001049	Valves - adjust	
4	001056	Head gasket - change	
5	007009	Cylinder / pump rubber coupling - Replacement	
6	001057	Thermostat - Replacement	
7	001083	Thermistor - Replacement	

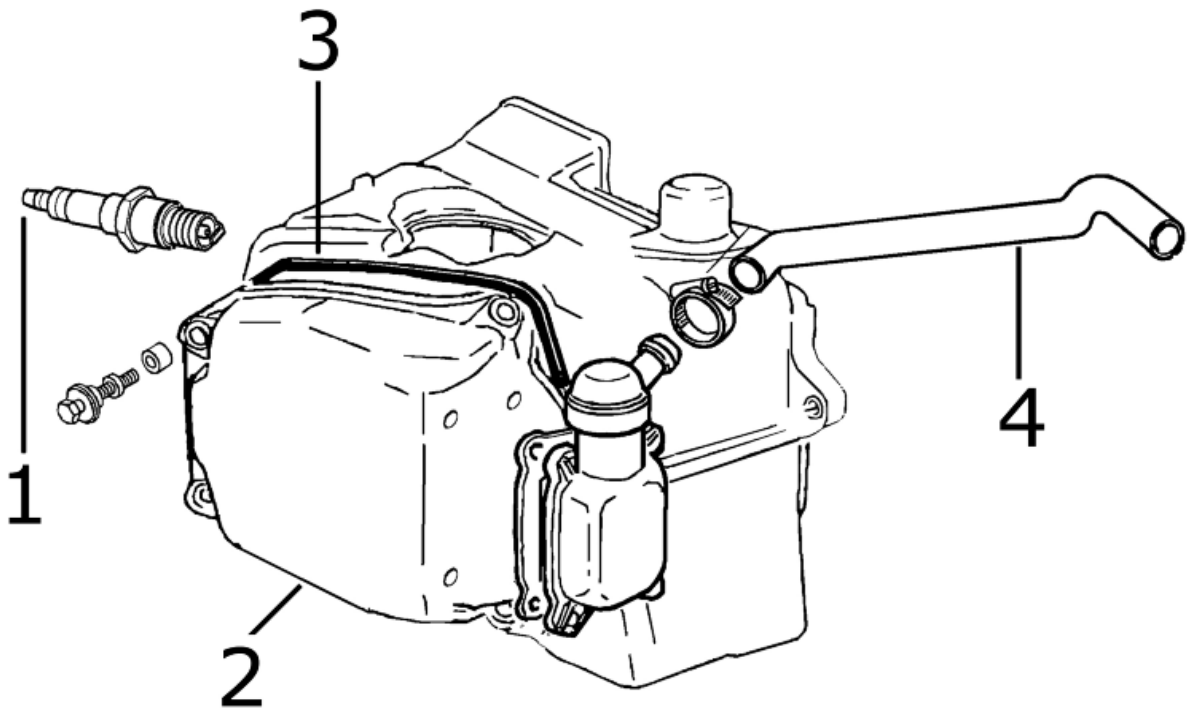
Rocker arms support assy.



ROCKING LEVER UNIT

	Code	Action	Duration
1	001148	Rockers valves - Replacement	
2	001044	Camshaft - Replacement	
3	001169	Pressure reducer - Replacement	

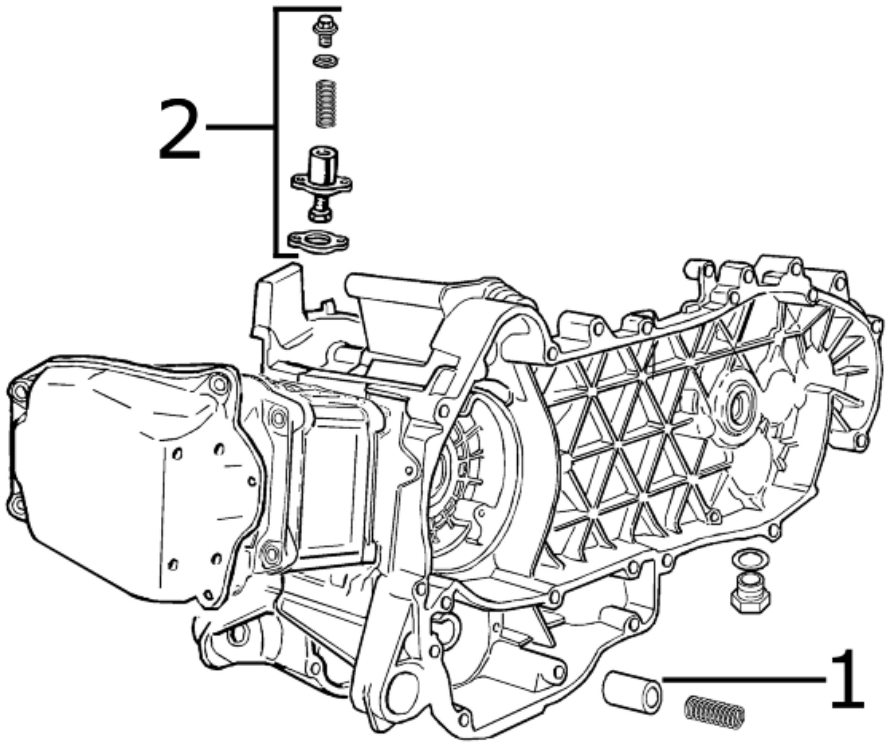
Cylinder head cover



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	

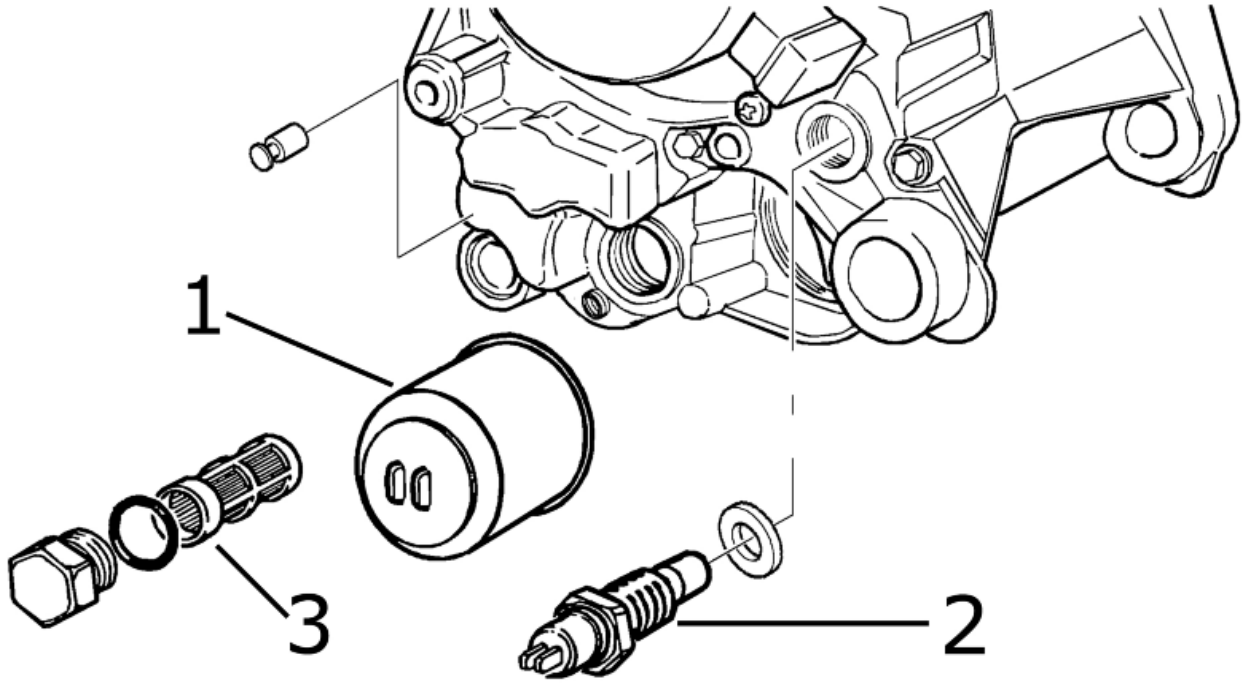
Chain tensioner



CHAIN TIGHTENER

	Code	Action	Duration
1	001124	Lubrication by pass - Replacement	
2	001129	Chain tightener - Replacement	

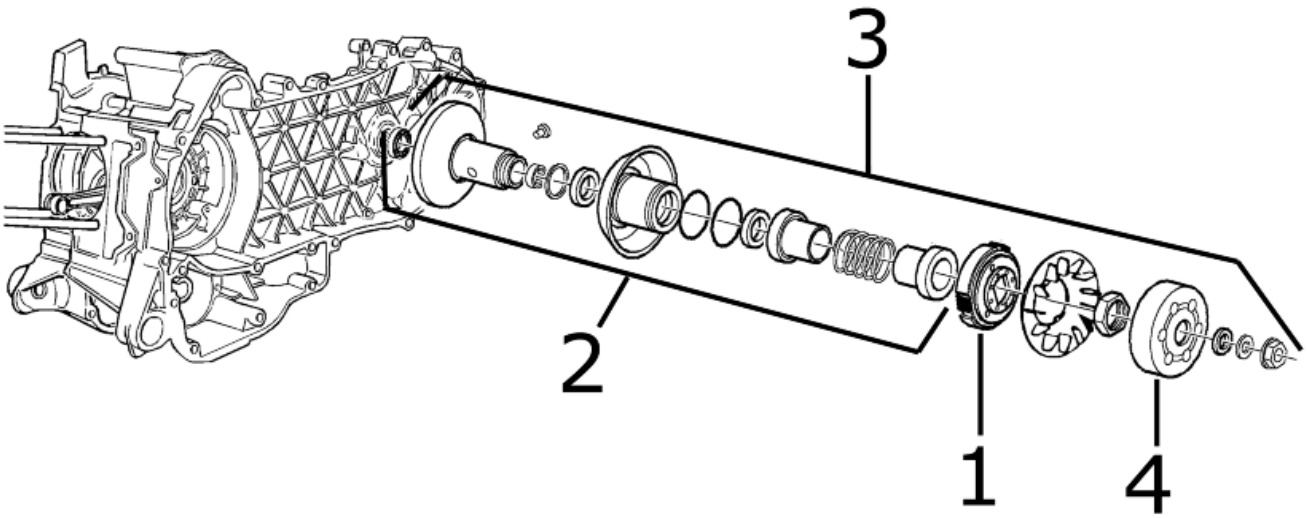
Oil filter



OIL FILTER

	Code	Action	Duration
1	001123	Oil filter -Replacement	
2	001160	Oil pressure sensor - change	
3	001102	Oil mesh filter - Change / Cleaning	

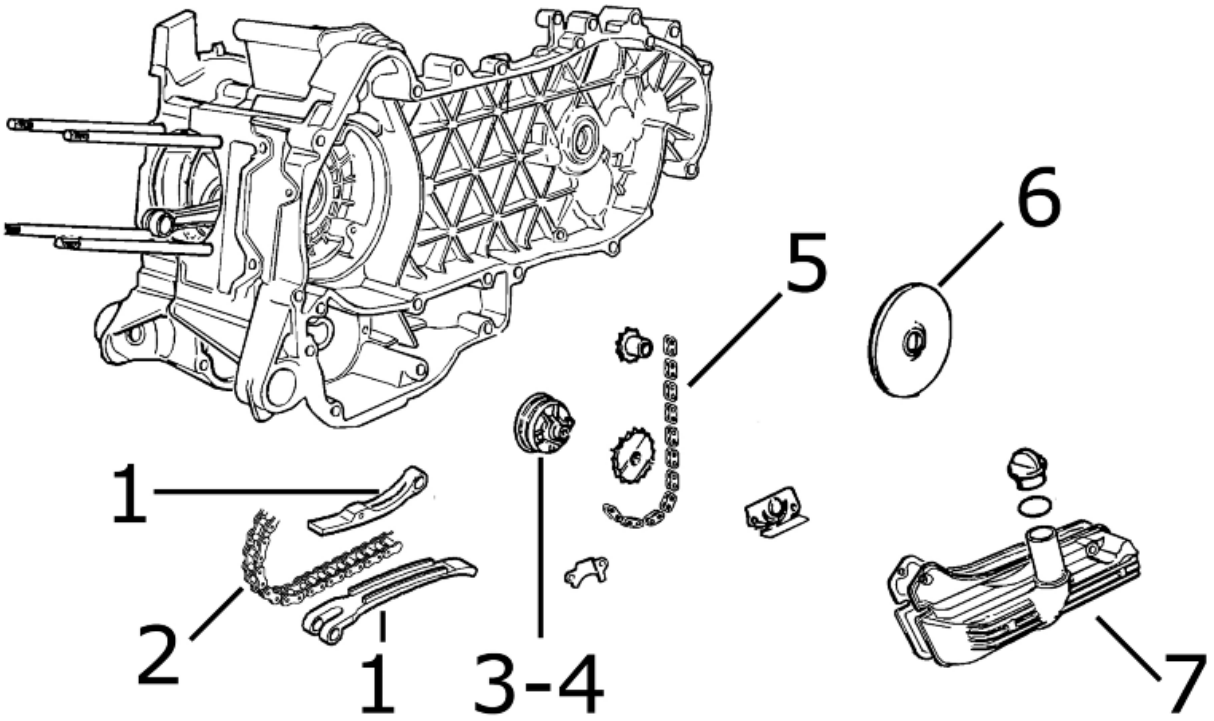
Driven pulley



DRIVEN PULLEY

	Code	Action	Duration
1	001022	Clutch - Replacement	
2	001012	Driven pulley - overhaul	
3	001110	Driven pulley- Replacement	
4	001155	Clutch housing - Replacement	

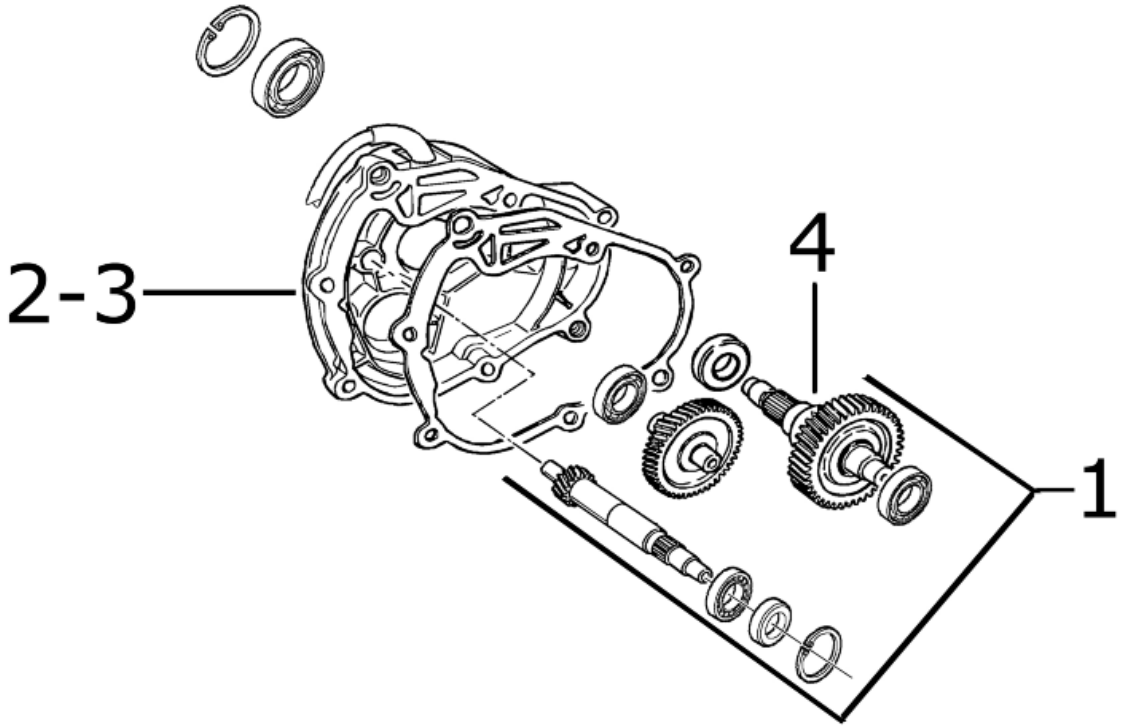
Oil pump



OIL PUMP

	Code	Action	Duration
1	001125	Chain guide pads - Replacement	
2	001051	Distribution belt - Timing chain - Replacement	
3	001042	Oil pump - overhaul	
4	001112	Oil pump - change	
5	001122	Oil pump chain	
6	001172	Chain cover flap - change	
7	001130	Oil sump - change	

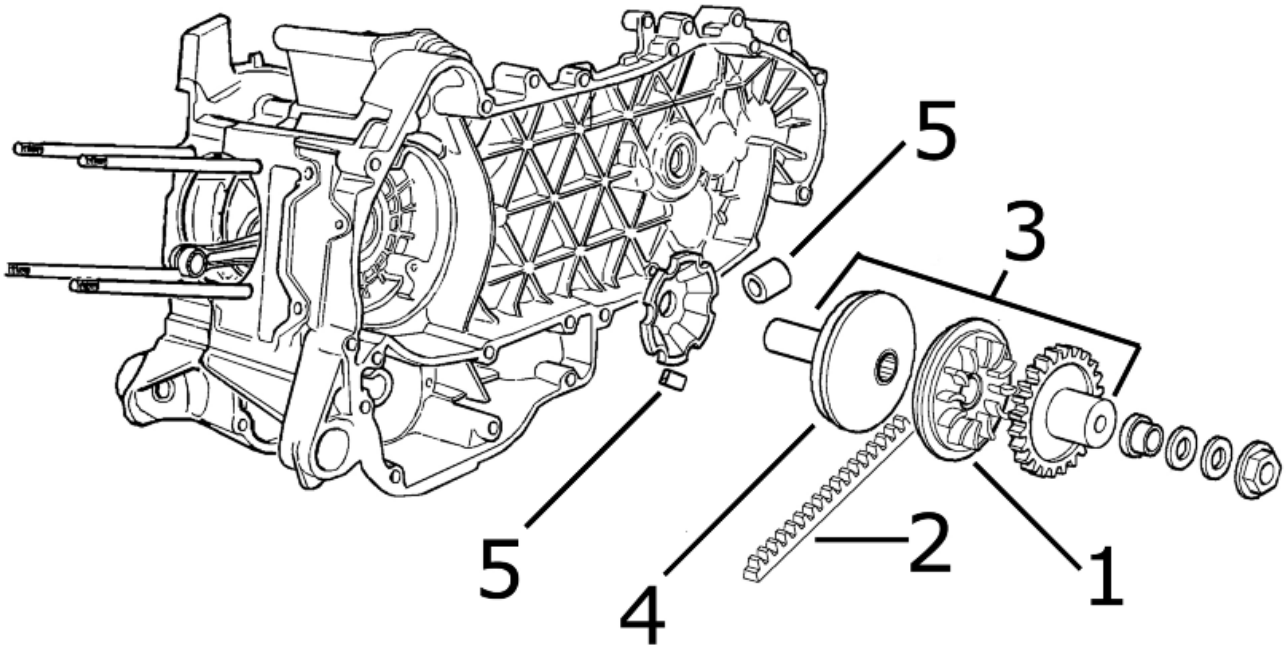
Final gear assy.



FINAL REDUCTION GEAR

	Code	Action	Duration
1	001010	Reduction gear - Replacement	
2	003065	Gear box oil - Replacement	
3	001156	Reduction gear cover - Replacement	
4	004125	Rear wheel axle - Replacement	

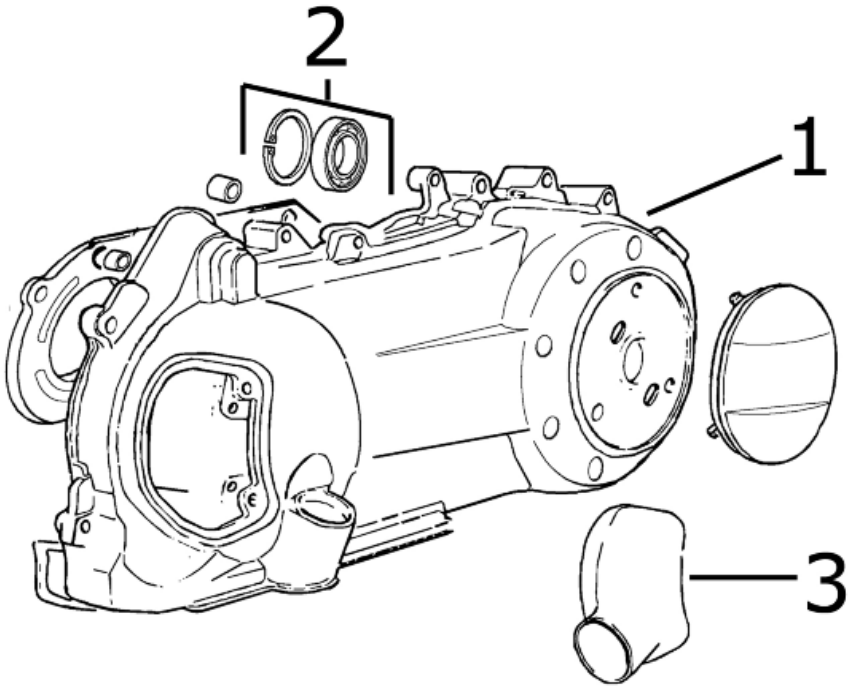
Driving pulley



DRIVING PULLEY REPAIR TIME

	Code	Action	Duration
1	001086	Driving half-pulley - Replacement	
2	001011	Drive belt - Replacement	
3	001006	Driving pulley - Service	
4	001066	rear-view pulley - Replacement	
5	001177	Variator rollers / shoes - Replacement	

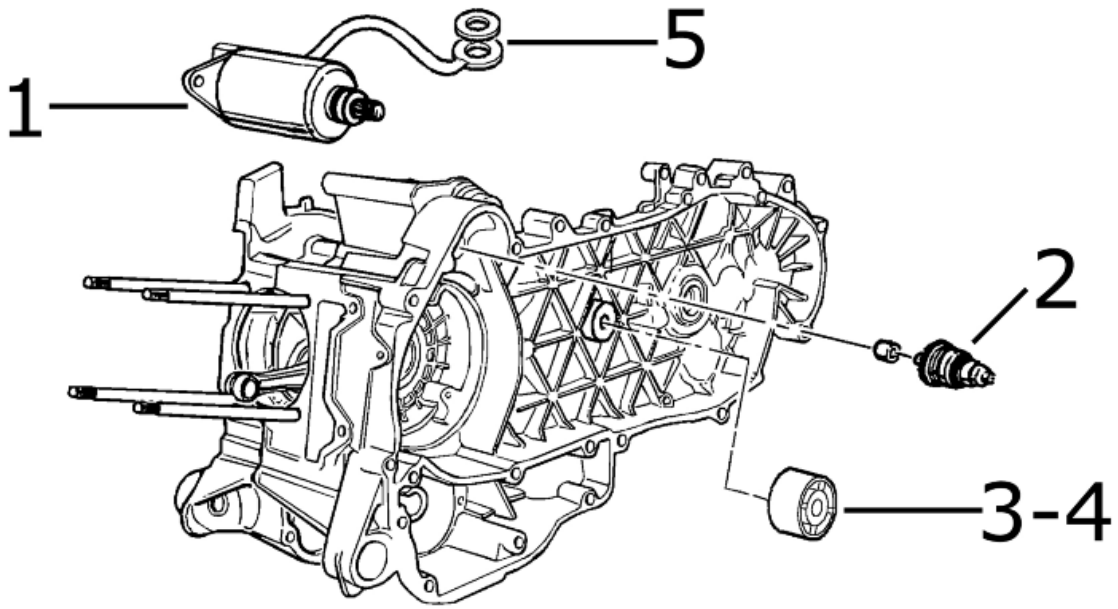
Transmission cover



TRANSMISSION COVER

	Code	Action	Duration
1	001096	Transmission crankcase cover - Replacement	
2	001135	Transmission cover bearing - Replacement	
3	001170	Air deflector - Replacement	

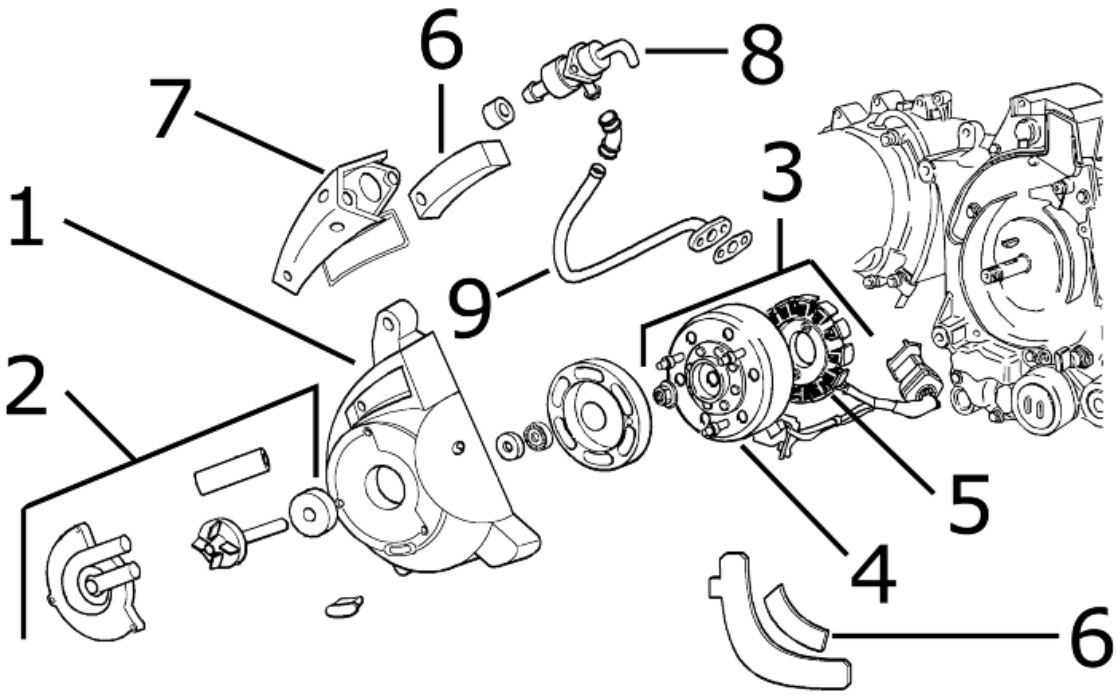
Starter motor



STARTER MOTOR

	Code	Action	Duration
1	001020	Starter motor - Replacement	
2	001017	Start-up pinion - Replacement	
3	001141	Belt anti-flapping roller - Replacement	
4	001175	Anti-vibration roller - Service	
5	005045	Starter motor cable assembly - Replacement	

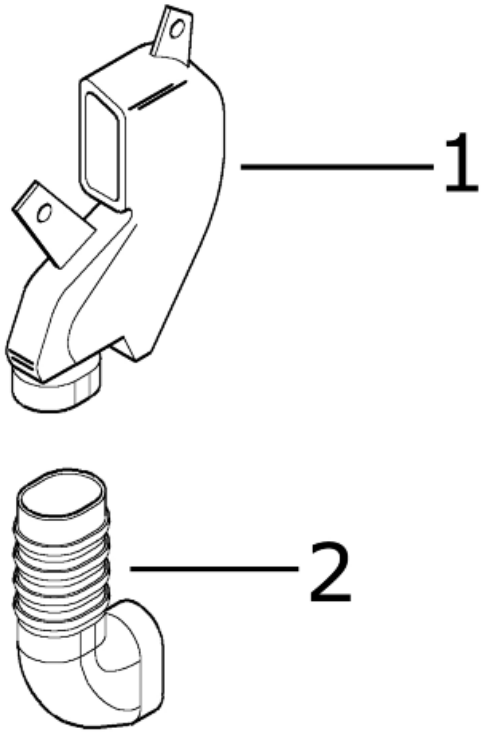
Flywheel magneto



MAGNETO FLYWHEEL AND SECONDARY AIR

	Code	Action	Duration
1	001087	Flywheel cover - Replacement	
2	001113	Water pump / Pump rotor - Replacement	
3	001058	Flywheel - Replacement	
4	001173	Rotor - Replacement	
5	001067	Stator - Replacement	
6	001161	Secondary air filter - Replacement / Cleaning	
7	001162	Secondary air housing - Replacement	
8	001174	SAS valve - Replacement	
9	001163	SAS valve / Head connection - Replacement	

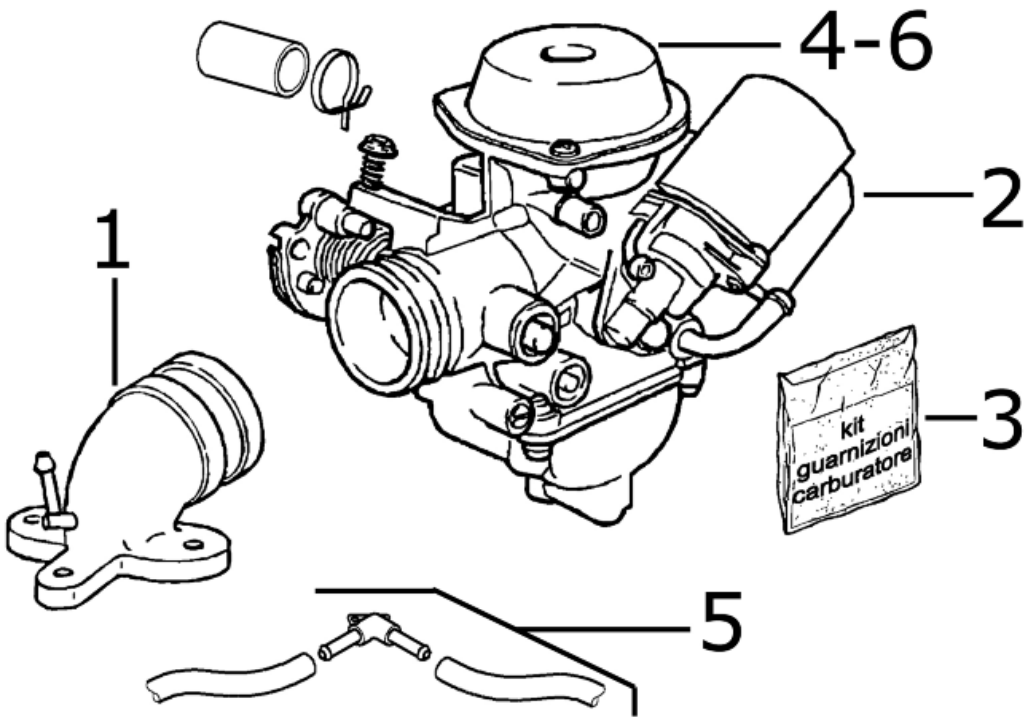
Belt cooling duct



BELT COOLING TUBE

	Code	Action	Duration
1	001131	Transmission air inlet - Replacement	
2	001132	Transmission air inlet tube - Replacement	

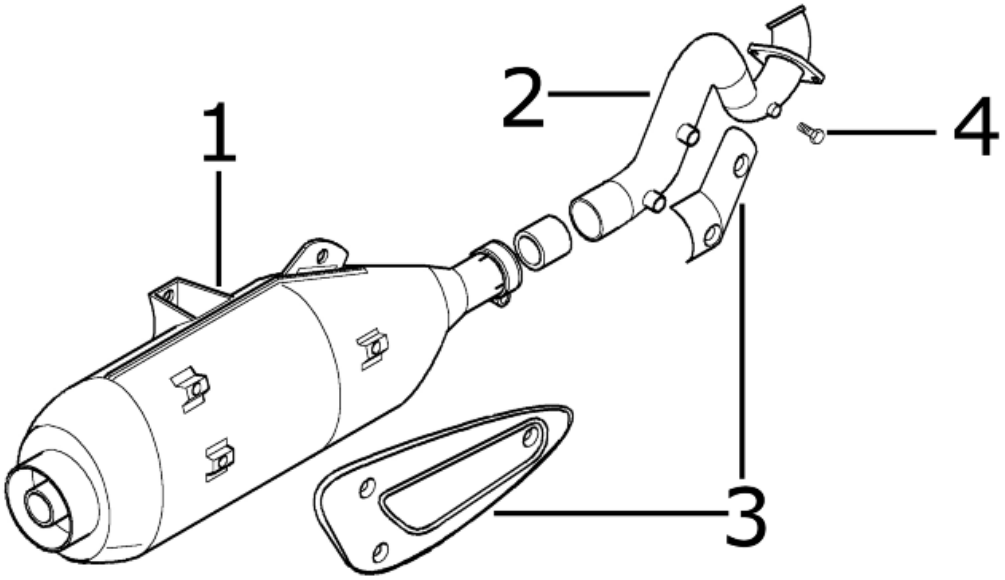
Carburettor



CARBURETTOR

	Code	Action	Duration
1	001013	Intake manifold - change	
2	001081	Automatic choke - Replacement	
3	001008	Carburettor - Inspection	
4	001063	Carburettor - Replacement	
5	007020	Carburettor heating tubing - replacement	
6	003058	Carburettor - Adjustment	

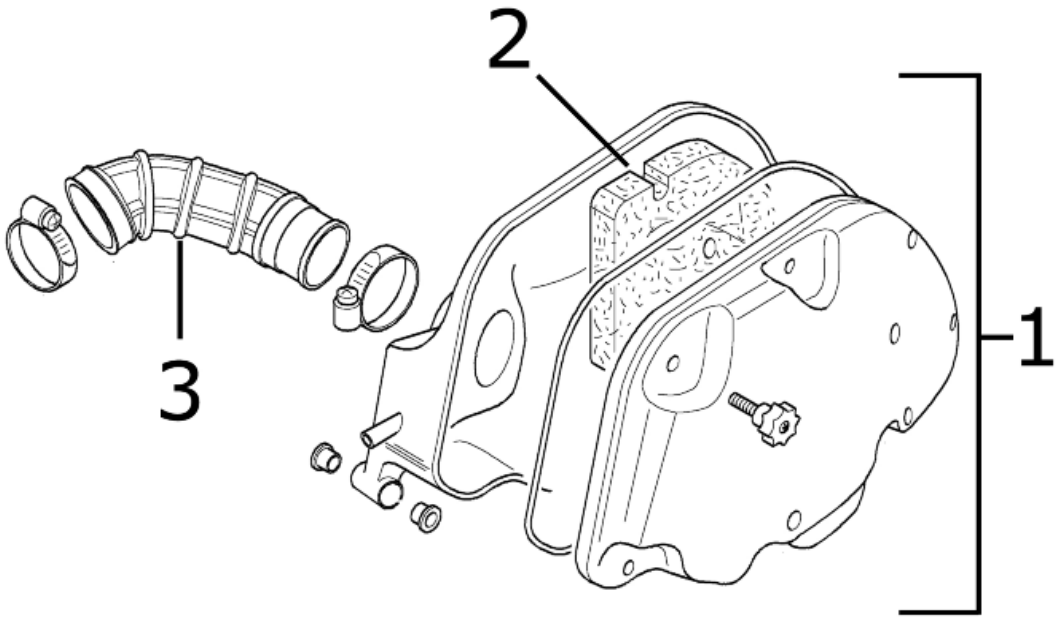
Exhaust pipe



MUFFLER

	Code	Action	Duration
1	001009	Silencer - Replacement	
2	001092	Exhaust manifold - Replacement	
3	001095	Silencer heatshield - Replacement	
4	001136	Exhaust emissions - Adjustment	

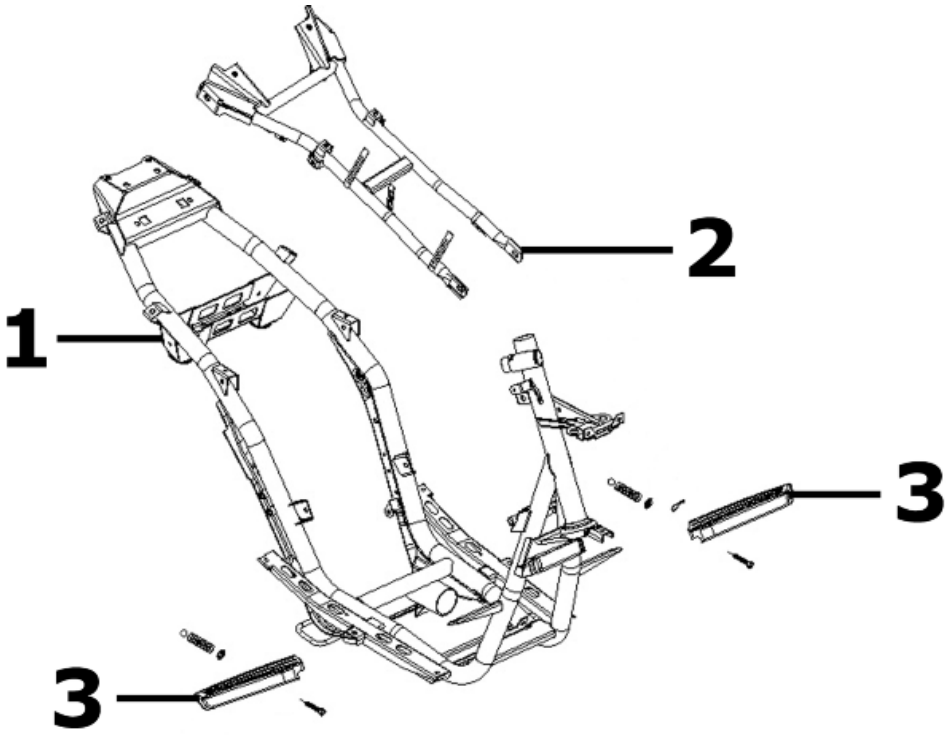
Air cleaner



AIR CLEANER

	Code	Action	Duration
1	001015	Air filter box - Replacement	
2	001014	Air filter - Replacement / cleaning	
3	004122	Air cleaner/ carburettor union - Replacement	

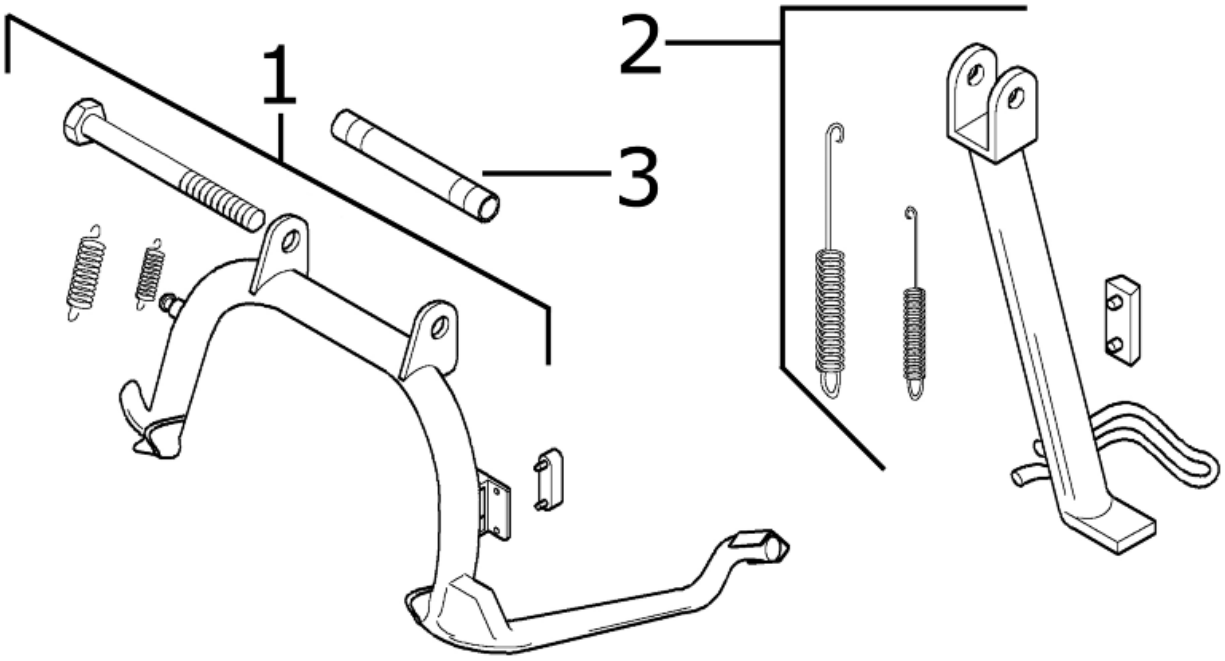
Frame



CHASSIS

	Code	Action	Duration
1	004001	Chassis - Replacement	
2	004116	Rear frame - Replacement	
3	004015	Footrest - Replacement	

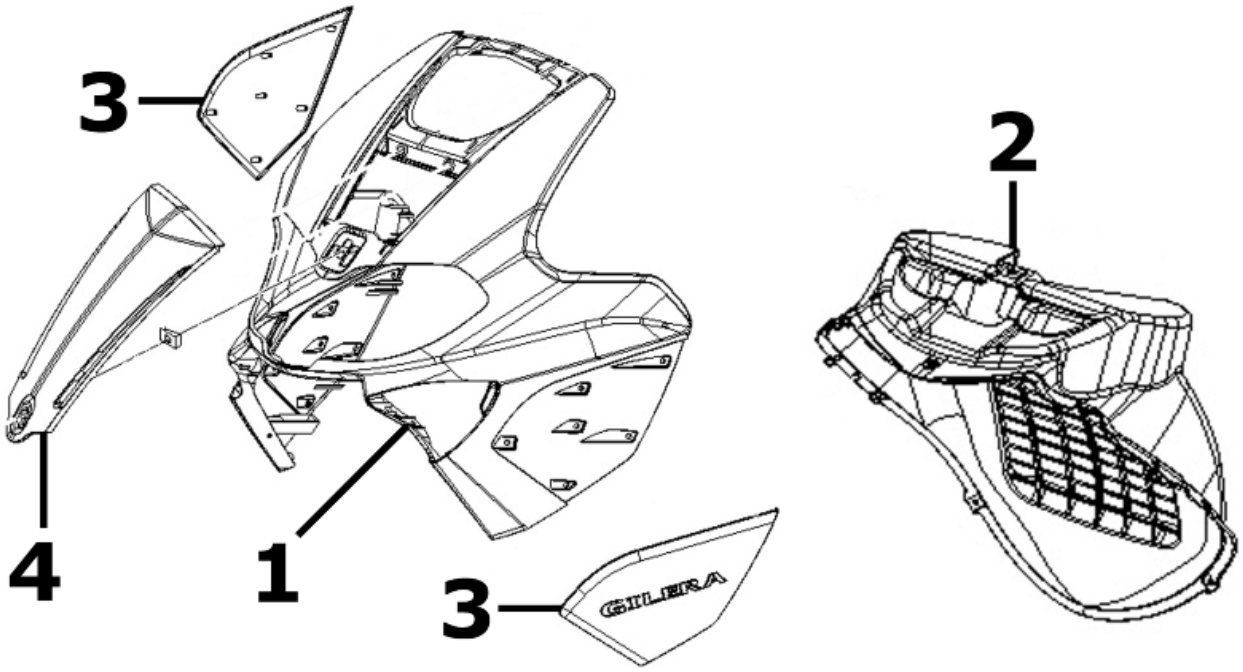
Centre-stand



STAND REPAIR TIME

	Code	Action	Duration
1	004004	Stand - Replacement	
2	004102	Side stand - Replacement	
3	001053	Stand pin - Replacement	

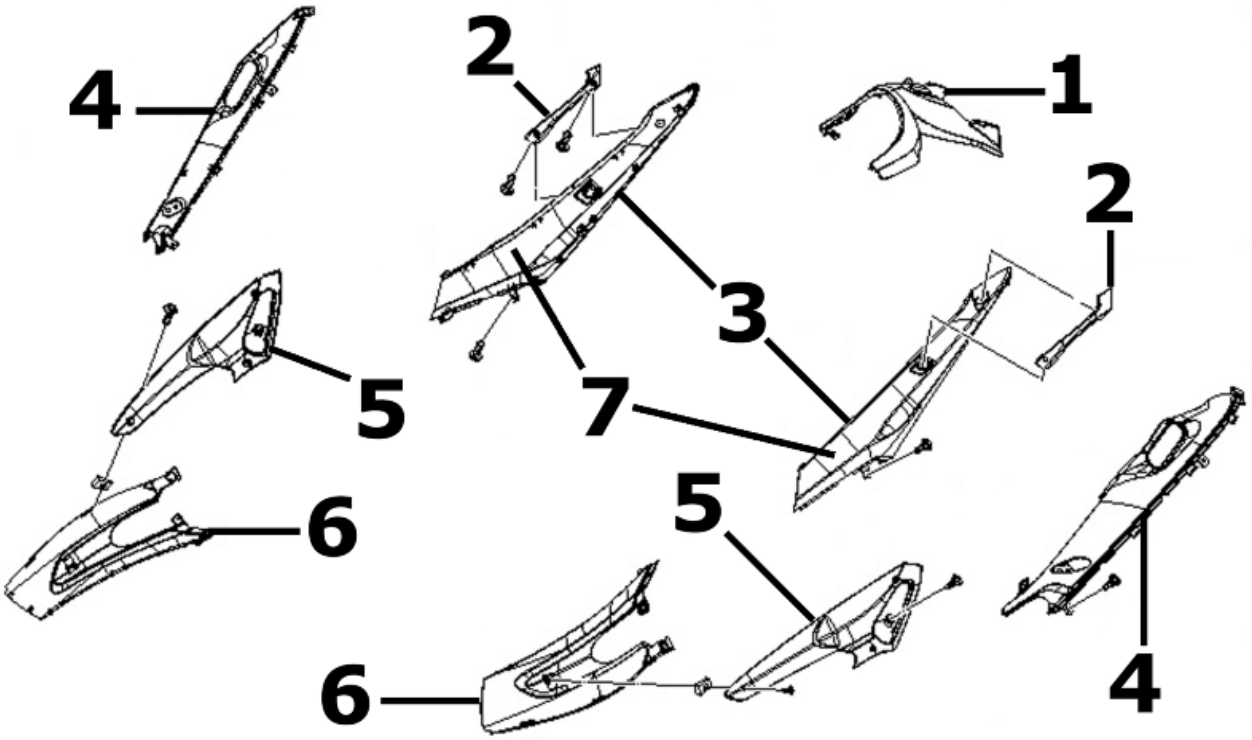
Legshield spoiler



FRONT SHIELD

	Code	Action	Duration
1	004064	Legshield - Replacement	
2	004053	Spoiler - Replacement	
3	004182	Side cover - Replacement	
4	004149	Shield central cover - Replacement	

Side fairings



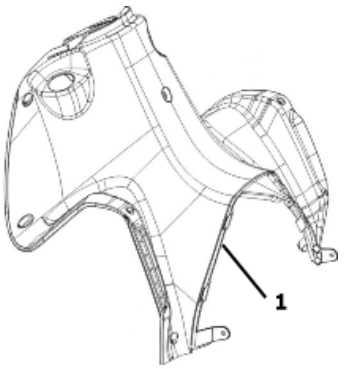
SIDE COVERS

	Code	Action	Duration
1	004057	Taillight lower cover - Replacement	
2	004068	Passenger handgrip - Replacement	
3	004012	Rear fairings - Removal and refitting	
4	004129	Rear fairing - Replacement	
5	004085	Fairing (1) - Replacement	
6	004036	Lower chassis cover - Replacement	
7	004159	Plates / Stickers - Replacement	

Rear cover

SHIELD BACK PLATE

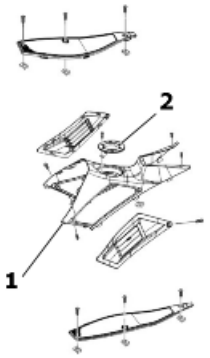
	Code	Action	Duration
1	004065	Leg shield rear section - Replacement	



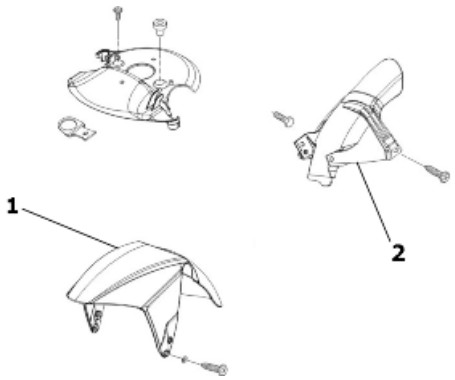
Central cover

CENTRAL COVER

	Code	Action	Duration
1	004011	Central chassis cover - Replacement	
2	004135	Fuel tank lid - Replacement	



Mudguard



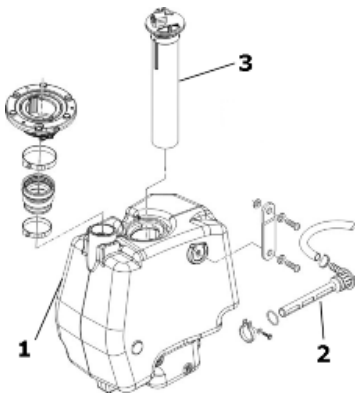
MUDGUARD

	Code	Action	Duration
1	004002	Front mudguard - change	
2	004009	Rear mudguard - Replacement	

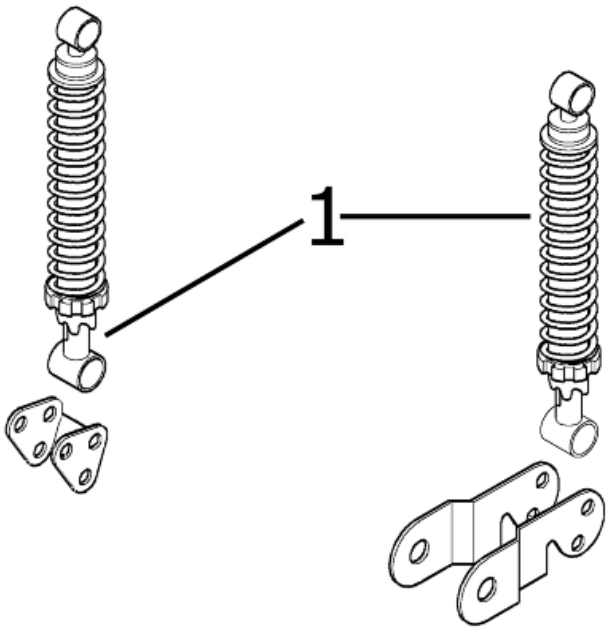
Fuel tank

FUEL TANK

	Code	Action	Duration
1	004005	Fuel tank - Replacement	
2	004007	Fuel valve - Replacement	
3	005010	Tank float - Replacement	



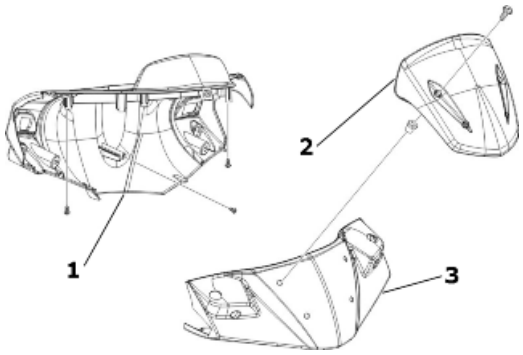
Rear shock-absorber



REAR SHOCK ABSORBER

	Code	Action	Duration
1	003007	Rear shock absorber - Replacement	

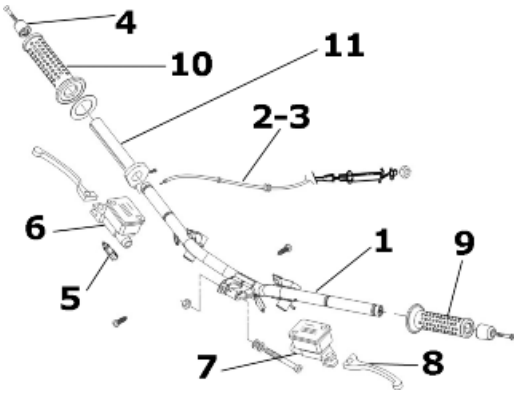
Handlebar covers



HANDLEBAR COVERS

	Code	Action	Duration
1	004019	Handlebar rear section - Replacement	
2	004028	Windshield glass - Replacement	
3	004018	Handlebar front section - Replacement	

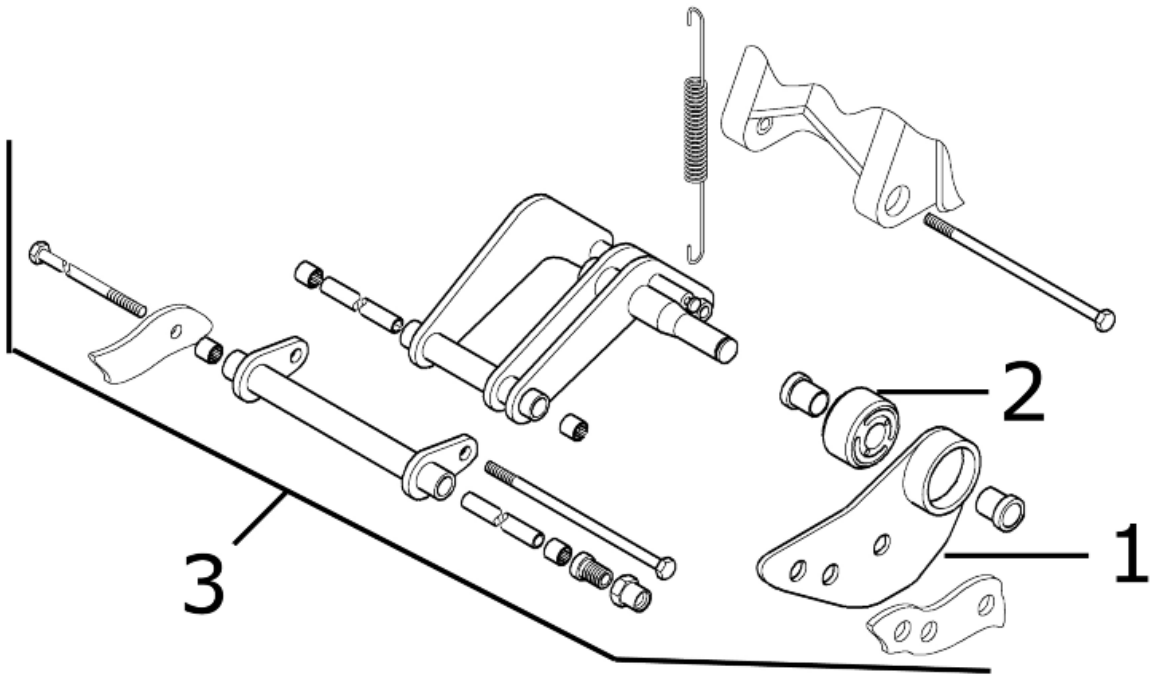
Handlebar components



HANDLEBAR COMPONENTS

	Code	Action	Duration
1	003001	Handlebar - Replacement	
2	002063	Complete throttle transmission - Replacement	
3	003061	Accelerator transmission - adjust	
4	003059	Counterweight - Replacement	
5	005017	Stop switch - Replacement	
6	002024	Front brake pump - Replacement	
7	002067	Rear brake pump - Replacement	
8	002037	Brake lever - Replacement	
9	002071	Left knob - Replacement	
10	002059	Right-hand knob - Replacement	
11	002060	Complete throttle control - Replacement	

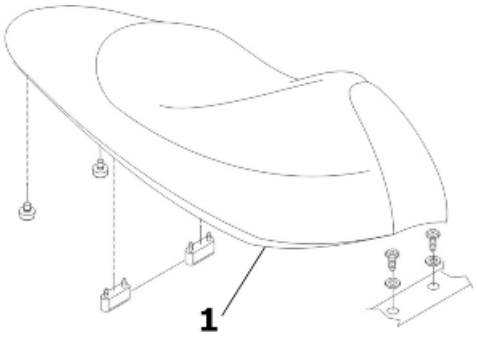
Swing-arm



SWINGING ARM

	Code	Action	Duration
1	003081	Swinging arm support flange - Replacement	
2	004058	Silent block - Replacement	
3	001072	Engine/chassis swinging arm attachment - Replacement	

Seat



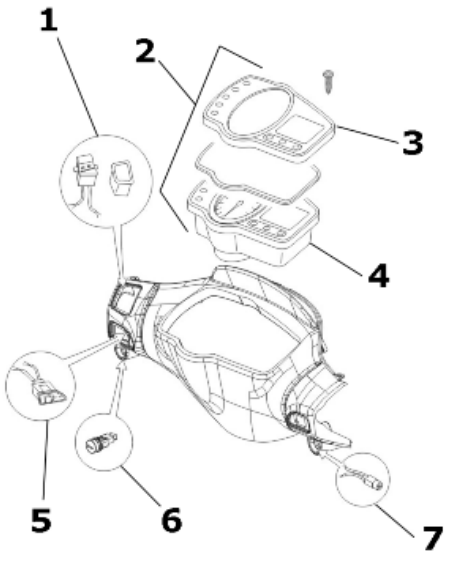
SADDLE

	Code	Action	Duration
1	004003	Saddle - Replacement	

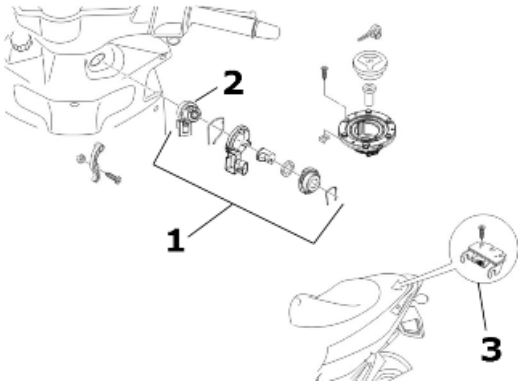
Instrument panel

INSTRUMENT PANEL

	Code	Action	Duration
1	005039	Lights switch - Replacement	
2	005014	Instrument panel - Replacement	
3	005078	Odometer glass - Replacement	
4	005038	Instrument panel warning light bulbs - Replacement	
5	005006	Light or turning indicator switch - Replacement	
6	005040	Horn button - Replacement	
7	005041	Starter button - Replacement	



Locks



LOCKS

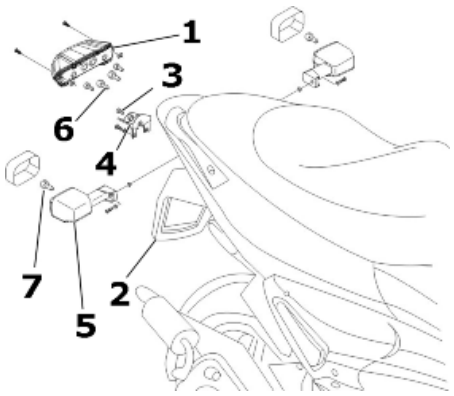
	Code	Action	Duration
1	004010	Anti-theft lock - Replacement	
2	005016	Key switch - Replacement	
3	004054	Saddle lock catch - Replacement	

Turn signal lights

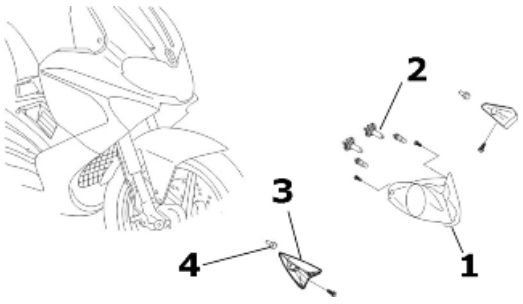
Fanaleria posteriore

REAR LIGHTS

	Code	Action	Duration
1	005005	Taillight - change	
2	005048	number plate holder - Replacement	
3	005031	number plate light bulb - Replacement	
4	005032	number plate light glass - Replacement	
5	005022	Rear turning indicators - Replacement	
6	005066	Rear light bulbs - Replacement	
7	005068	Rear turning indicator bulb - Replacement	



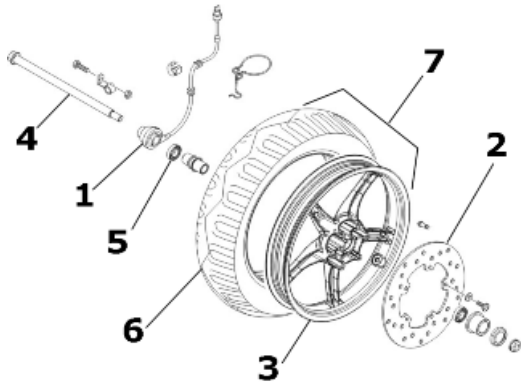
Fanaleria anteriore



INDICATOR LIGHTS

	Code	Action	Duration
1	005002	Front light - replacement	
2	005008	Headlight bulbs - Replacement	
3	005012	Front turning indicators - Replacement	
4	005067	Front turning indicator bulb - replacement	

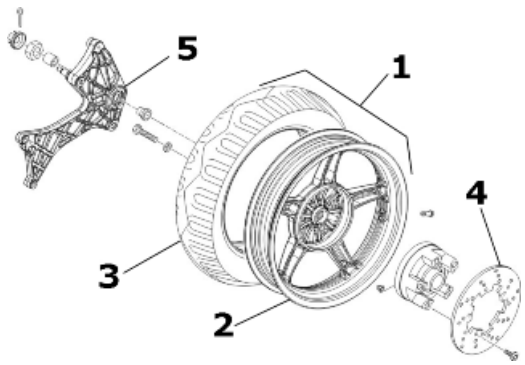
Front wheel



FRONT WHEEL

	Code	Action	Duration
1	002011	Odometer movement sensor - Replacement	
2	002041	Front brake disc - Replacement	
3	003037	Front wheel rim - Replacement	
4	003038	Front wheel axle - Replacement	
5	003040	Front wheel bearings - Replacement	
6	003047	Front tyre - Replacement	
7	004123	Front wheel - Replacement	
8	003063	Tyre pressure - Check	

Rear wheel

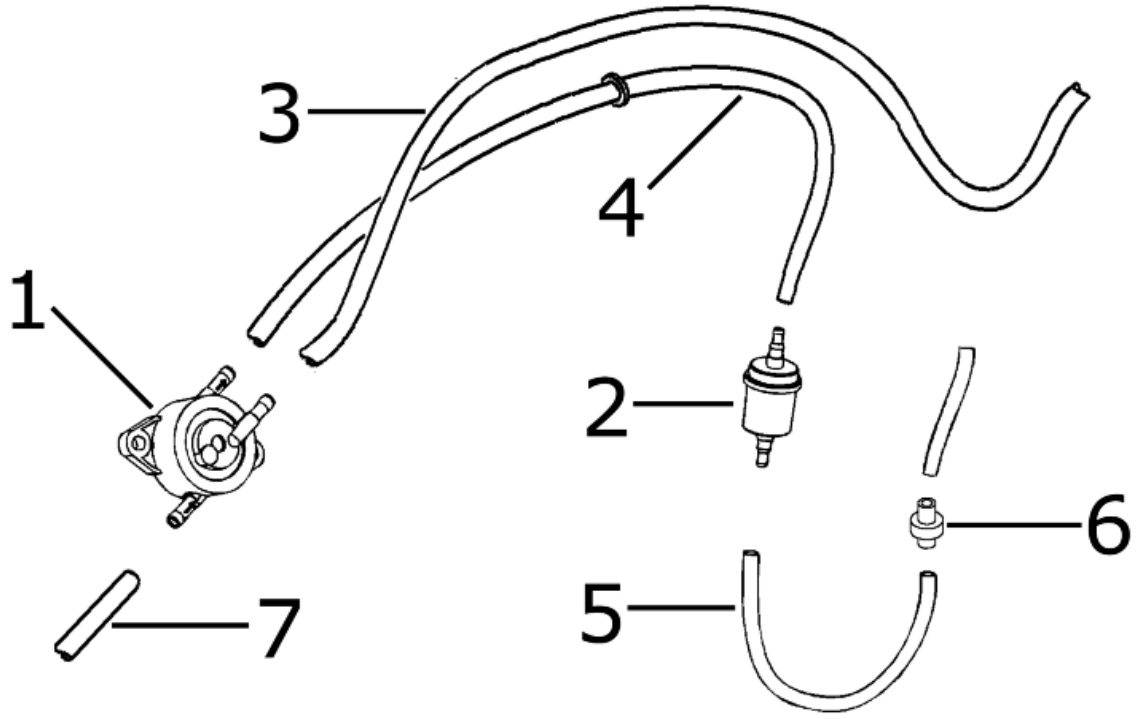


REAR WHEEL

	Code	Action	Duration
1	001016	Rear wheel - Replacement	

	Code	Action	Duration
2	001071	Rear wheel rim - Replacement	
3	004126	Rear wheel tyre - Replacement	
4	002070	Rear brake disc - Replacement	
5	003077	muffler/rear shock absorber support arm - Service	

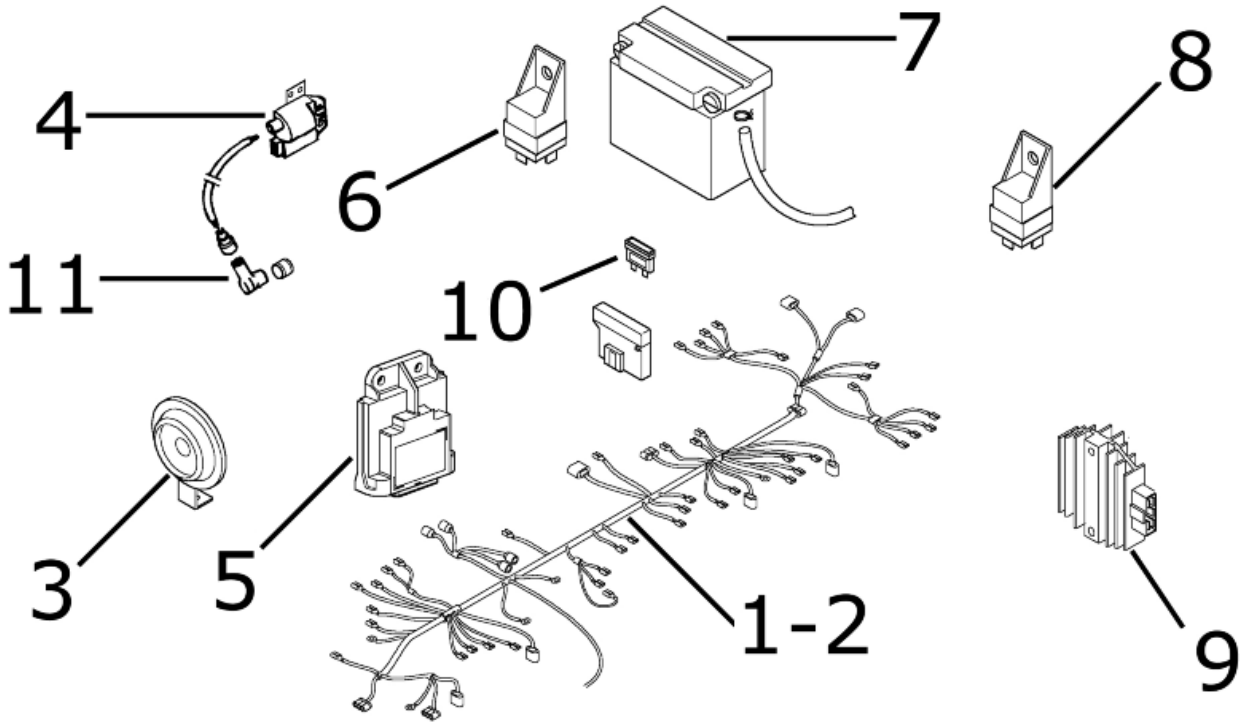
Fuel pump



FUEL PUMP

	Code	Action	Duration
1	004073	Fuel pump - Replacement	
2	004072	Fuel filter - Replacement	
3	004086	Petrol pump depression tube - Replacement	
4	004087	Filter / petrol pump pipe - Replacement	
5	004137	Pump / carburettor hose - Replacement	
6	004139	Fuel no return valve - Replacement	
7	004089	Tank / petrol pump pipe - Replacement	

Electric devices



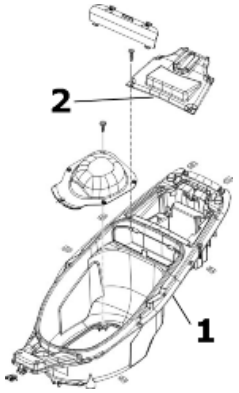
ELECTRICAL DEVICES

	Code	Action	Duration
1	005001	Electrical system - Replacement	
2	005114	Electrical system - Service	
3	005003	Horn - Replacement	
4	001069	HV coil - replace	
5	001023	Control unit - Replacement	
6	005035	Headlight remote control - Replacement	
7	005007	Battery - change	
8	005011	Start-up remote control switch - change	
9	005009	Voltage regulator - Replacement	
10	005052	Fuse (1) - Replacement	
11	001094	Spark plug cap - Replacement	

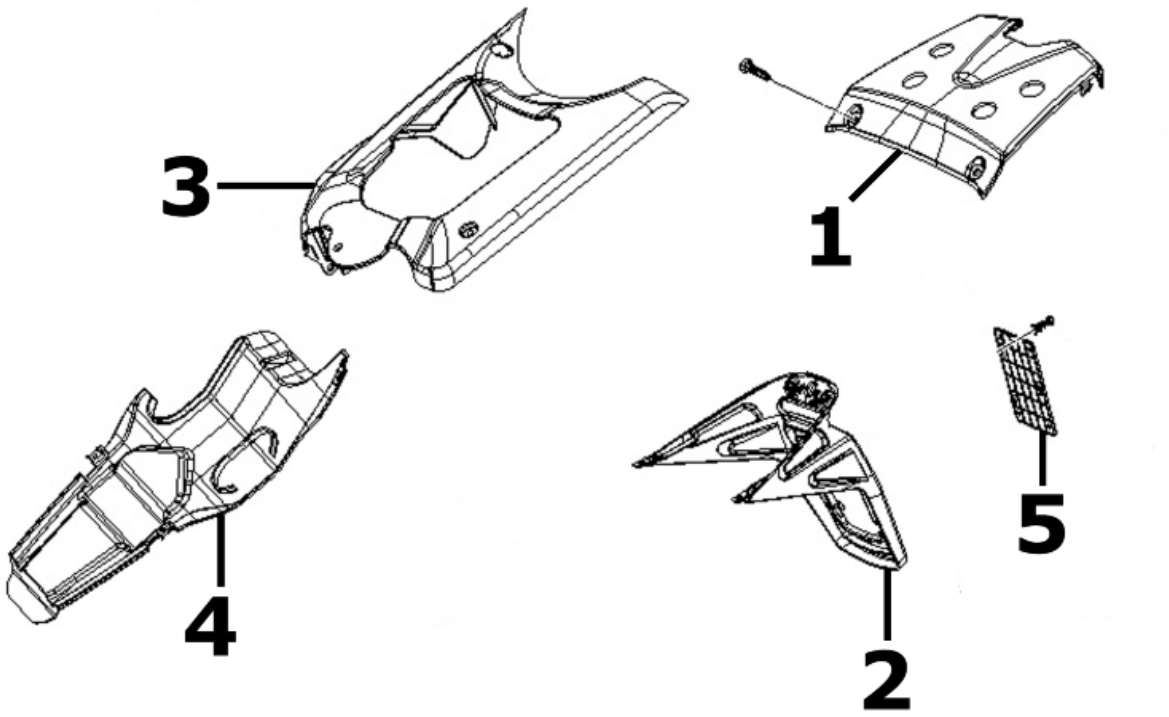
Helmet bay

HELMET COMPARTMENT

	Code	Action	Duration
1	004016	Helmet compartment - Replacement	
2	005046	Battery cover - change	



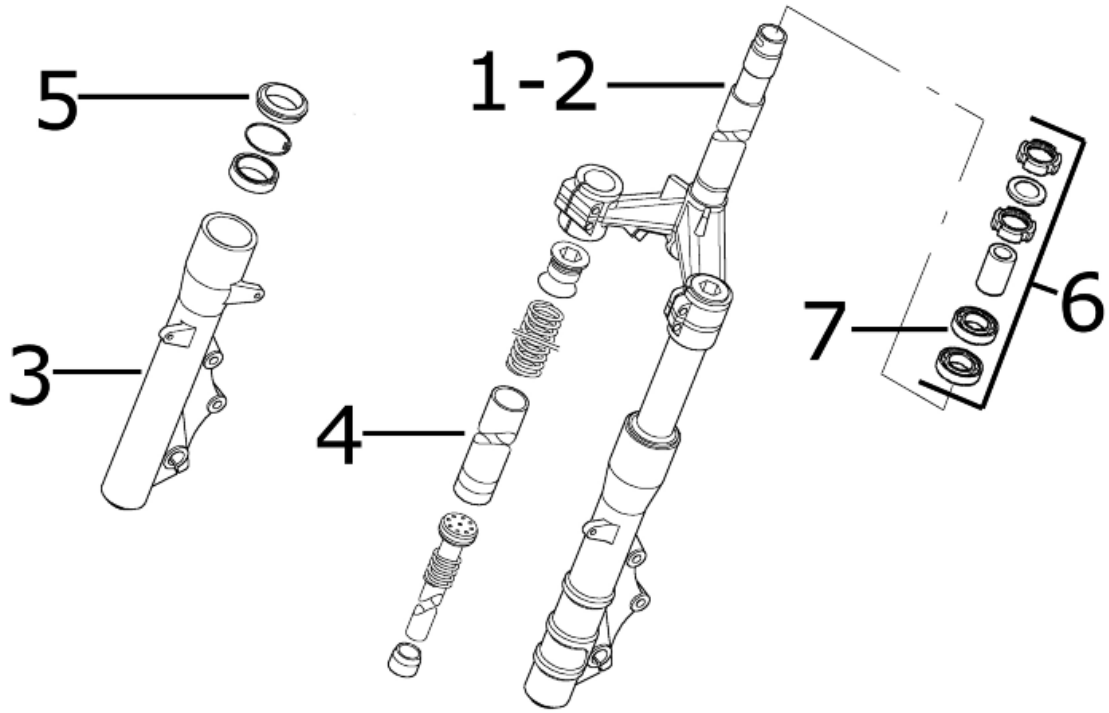
Rear side fairings



REAR COVERS

	Code	Action	Duration
1	004056	Upper rear light cover - Replacement	
2	004136	License plate holder mounting - Replacement	
3	004183	Cover for engine components - Replacement	
4	004181	Lower cover - Replacement	
5	005048	number plate holder - Replacement	

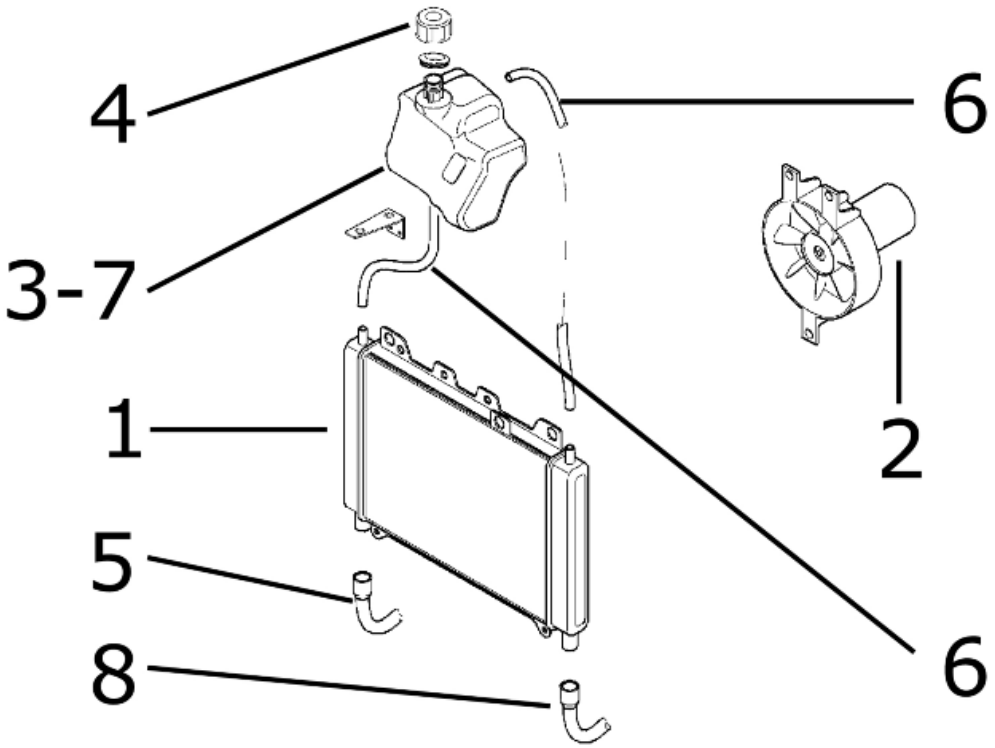
Front suspension



FRONT SUSPENSION

	Code	Action	Duration
1	003051	Complete fork - Replacement	
2	003010	Front suspension - Service	
3	003076	Fork sleeve - Replacement	
4	003079	Fork stem - Replacement	
5	003048	Fork oil seal - Replacement	
6	003002	Steering fifth wheels - Replacement	
7	004119	Upper steering bearing - Housing	

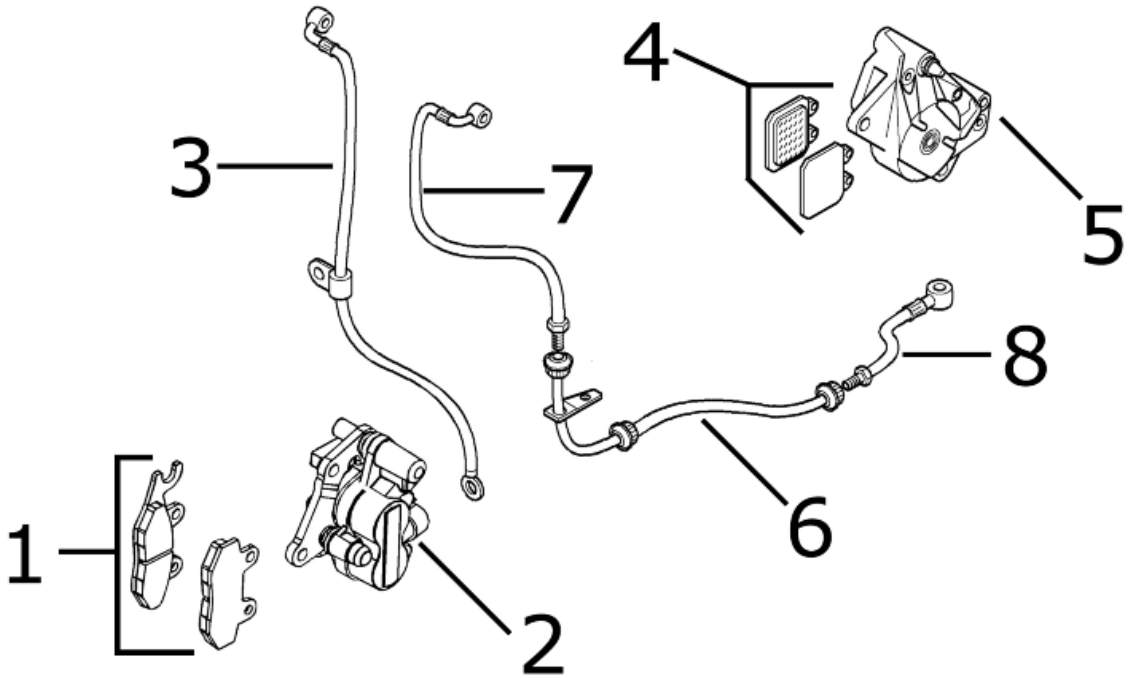
Cooling system



COOLING SYSTEM

	Code	Action	Duration
1	007002	Water radiator - replacement	
2	007016	Fan with support - Replacement	
3	007001	Expansion tank - Replacement	
4	007024	Expansion tank cap - Replacement	
5	007019	Connection water pump pipe / return pipe - Replacement	
6	007013	Radiator expansion tank connection pipe - change	
7	001052	Coolant and air bleed - Replacement	
8	007022	Coolant delivery pipe - Replacement	

Braking system



BRAKE SYSTEM

	Code	Action	Duration
1	002007	Front brake pads - Replacement	
2	002039	Front brake calliper - Replacement	
3	002021	Front brake piping - Replacement	
4	002002	Rear brake pads - Replacement	
5	002048	Rear brake calliper - Replacement	
6	002081	Rear brake rigid pipes - Replacement	
7	002025	Brake piping - Replacement	
8	002020	Rear brake disc piping - Replacement	

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