



SERVICE STATION MANUAL

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Nexus 125 EURO 3



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SERVICE STATION MANUAL

Nexus 125 EURO 3

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 relating to 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.



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CHARACTERISTICS

CHAR

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

Vehicle identification

To read the chassis prefix, remove the lid «A» in the helmet compartment.

Chassis prefix: ZAPM35500

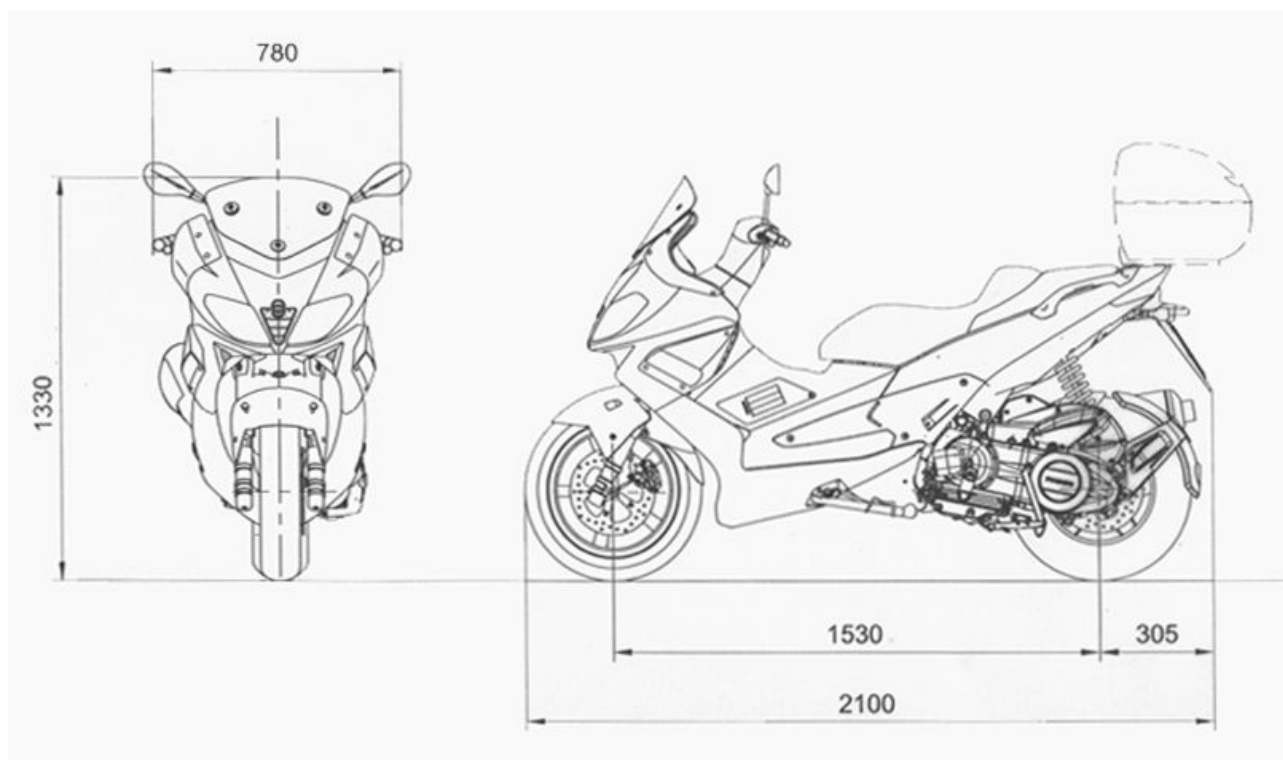


The engine prefix «B» is stamped near the left shock absorber lower support.

Engine prefix: M355M



Dimensions and mass



WEIGHTS AND DIMENSIONS

Specification	Desc./Quantity
Kerb weight	169±5 Kg
Maximum weight allowed	370 Kg
Maximum height	1.330 mm
Width	780 mm
Wheelbase	1530 mm
Length	2100 mm

Engine**ENGINE**

Specification	Desc./Quantity
Type	Single-cylinder, 4-stroke with double spark plug
Cubic capacity	124 cm ³
Bore x stroke	57.0 x 48.6 mm
Compression ratio	12 ± 0.5: 1
Engine idle speed	1650 ± 100 rpm
Valve clearance	Inlet: 0.10 mm Outlet: 0.15 mm
Max. Power	11 kW at 9,750 rpm
Max. torque	12 Nm at 8000 rpm
Lubrication	With lobe pump (inside crankcase) controlled by a chain with double filter: mesh and paper
Lubrication pressure	3 ÷ 4 bar
Minimum lubrication pressure (90° C)	0.6 ÷ 1.2 bar
Fuel supply	KEIHIN CVEK 30 carburettor and electrical fuel pump.
Cooling	Forced-circulation coolant system.
Fuel	Unleaded petrol (95 RON)

Transmission**TRANSMISSION**

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

Capacities**CAPACITY**

Specification	Desc./Quantity
Engine oil	1.1 l
Transmission oil	150 cm ³
Cooling system fluid	1.75 l
Fuel tank (reserve)	approx.15.00 l (approx. 2.80 l)

Electrical system**ELECTRIC SYSTEM**

Specification	Desc./Quantity
Start-up	Electric
Ignition	Capacitive discharge ignition, with variable advance and separate HV coil.

Specification	Desc./Quantity
Ignition advance	$10^{\circ} \pm 1^{\circ}$ at 2,000 rpm ÷ $29^{\circ} \pm 1^{\circ}$ at 6,500 rpm
Spark plug	CHAMPION RG4HC
Alternative spark plug	NGK CR8EB
Battery	Sealed, 12 V / 10 Ah
Generator	Alternating current

Frame and suspensions

CHASSIS AND SUSPENSIONS

Specification	Desc./Quantity
Chassis	Tubular and sheet steel.
Front suspension	Hydraulic telescopic fork with Ø 35 mm stem
Front suspension travel	104 mm
Rear suspension	Two double-acting shock absorbers with preloading adjustment in 4 positions.
Rear suspension travel	95.5 mm

Brakes

BRAKES

Specification	Desc./Quantity
Front brake	Ø 260-mm disc brake with hydraulic control activated by handlebar right lever.
Rear brake	Ø 240 mm disc brake with hydraulic control activated by handlebar left lever.

Wheels and tyres

WHEELS AND TYRES

Specification	Desc./Quantity
Wheel rim type	Light alloy rims.
Front rim	14" x 3.50
Rear rim	14" x 3.50
Front tyre	Tubeless 120/70-14" 55P
Rear tyre	Tubeless 140/70 - 14" 64P
Front tyre pressure (with passenger)	2.0 bar (-)
Rear tyre pressure (with passenger)	2.4 bar (-)

N.B.

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

Tightening Torques

STEERING

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

STEERING (VERSION WITH FIFTH WHEEL)

Name	Torque in Nm
Upper steering ring nut	40 ÷ 45

Name	Torque in Nm
Steering lower ring nut	10 ÷ 12

CHASSIS

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

CHASSIS

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

FRONT SUSPENSION

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

REAR SUSPENSION

Name	Torque in Nm
Upper shock absorber clamp	33 ÷ 41
Lower shock absorber clamp	33 ÷ 41
Rear wheel axle	104 ÷ 126
Shock absorber-crankcase attachment bracket	20 ÷ 25
Muffler arm clamping screws	27 ÷ 30

FRONT BRAKE

Name	Torque in Nm
Oil bleed screw	8÷12
Disc tightening screw (°)	5 - 6
Brake fluid pipe-calliper fitting	16 ÷ 20
Brake fluid pump-hose fitting	16 ÷ 20
Tightening screw for calliper support to the fork	45 ÷ 55

REAR BRAKE

Name	Torque in Nm
Rear brake disc screws(°)	5 ÷ 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 ÷ 25

REAR BRAKE

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

MUFFLER

Name	Torque in Nm
Muffler heat guard fixing screw	4 ÷ 5
Screw for fixing muffler to the support arm	20 ÷ 25
Lambda probe clamp on exhaust manifold	40 ÷ 50
Exhaust manifold-muffler joint clamp	12 ÷ 13
Manifold - muffler diaphragm tightening clamp	16 ÷ 18

LUBRICATION

Name	Torque in Nm
Hub oil drainage plug	15 ÷ 17
Oil filter on crankcase fitting	27 ÷ 33
Engine oil drainage plug/mesh filter	24 ÷ 30
Oil filter	4 ÷ 6
Oil pump cover screws	7 ÷ 9
Screws fixing oil pump to crankcase	5 - 6
Oil pump control crown screw	10 ÷ 14
Oil pump cover plate screws	4 ÷ 6
Oil sump screws	10 ÷ 14
Minimum oil pressure sensor	12 ÷ 14

CYLINDER HEAD

Name	Torque in Nm
Spark plug	12 ÷ 14
Head cover screws	6 ÷ 7
Nuts fixing head to cylinder	7±1 + 10±1 + 270°
Head fixing side screws	11 ÷ 12
Starter ground screw	7 ÷ 8.5
Tappet set screw lock nut	6 ÷ 8
Inlet manifold screws	11 ÷ 13
Timing chain tensioner slider screw	10 ÷ 14
Starter ground support screw	11 ÷ 15
Timing chain tensioner support screw	11 ÷ 13
Timing chain tensioner central screw	5 - 6
Camshaft retention plate screw	4 ÷ 6

TRANSMISSION

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

FLYWHEEL

Name	Torque in Nm
Flywheel cover screw	11 ÷ 13
Stator assembly screws	3 - 4 (Apply LOCTITE 242 medium-strength threadlock)
Flywheel nut	94 ÷ 102
Pick-Up clamping screws	3 ÷ 4
Screw fixing freewheel to flywheel	13 ÷ 15

CRANKCASE AND CRANKSHAFT

Name	Torque in Nm
Internal engine crankcase bulkhead (transmission-side half shaft) screws	4 ÷ 6
Engine-crankcase coupling screws	11 ÷ 13
Starter motor screws	11 ÷ 13
Crankcase timing cover screws	3.5 - 4.5 (Apply LOCTITE 242 medium-strength threadlock)

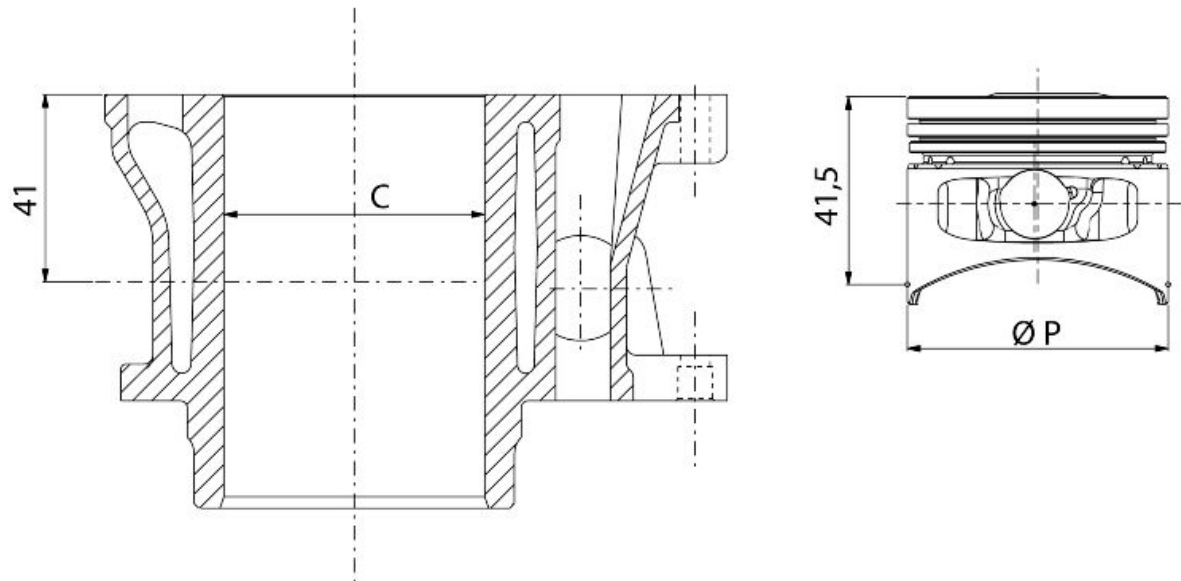
COOLING

Name	Torque in Nm
Water pump rotor cover	3 ÷ 4
Thermostat cover screws	3 ÷ 4
Bleed screw	3

Overhaul data

Assembly clearances

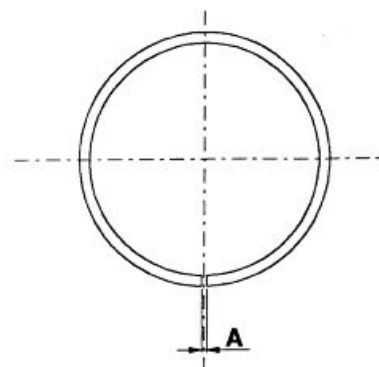
Cylinder - piston assy.



ENGINE COUPLING CATEGORIES

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

Piston rings



ENGINE SEALING RINGS

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

Crankcase - crankshaft - connecting rod

CRANKSHAFT HALF-BEARINGS

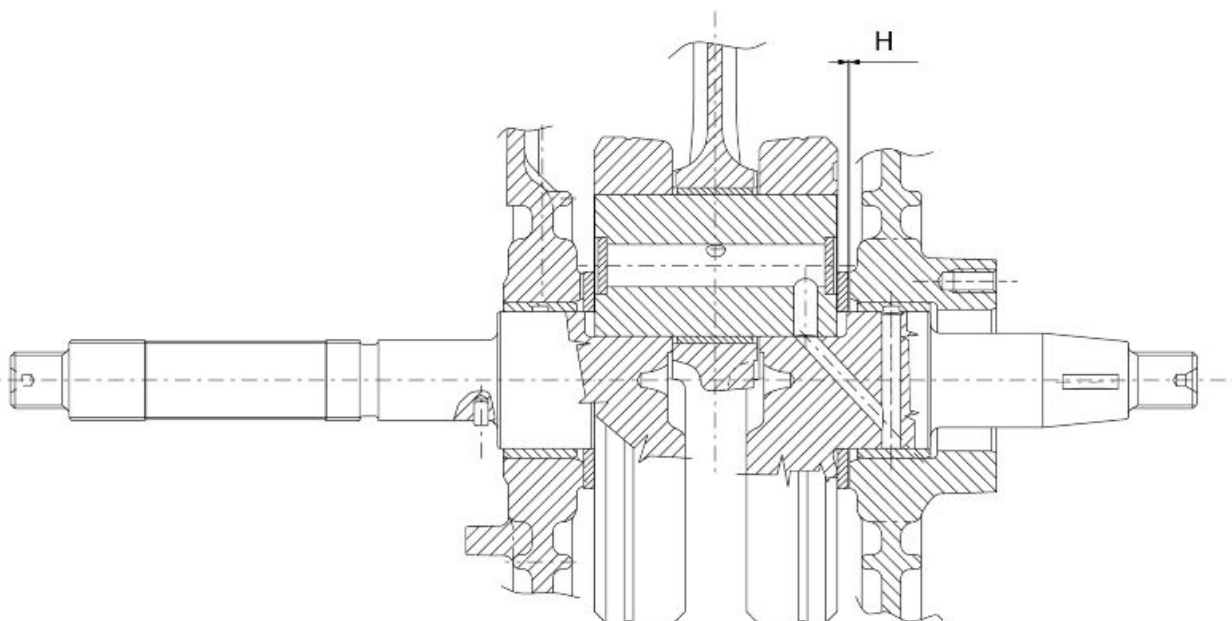
Name	Description	Dimensions	Initials	Quantity
Crankshaft half-bearing			Category B - blue	1.973 ÷ 1.976
Crankshaft half-bearing			Type C - yellow	1.976 ÷ 1.979
Crankshaft half-bearing			Category E - green	1.979 ÷ 1.982

CRANKCASE - CRANKSHAFT COUPLINGS

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

CRANKSHAFT - CRANKCASE

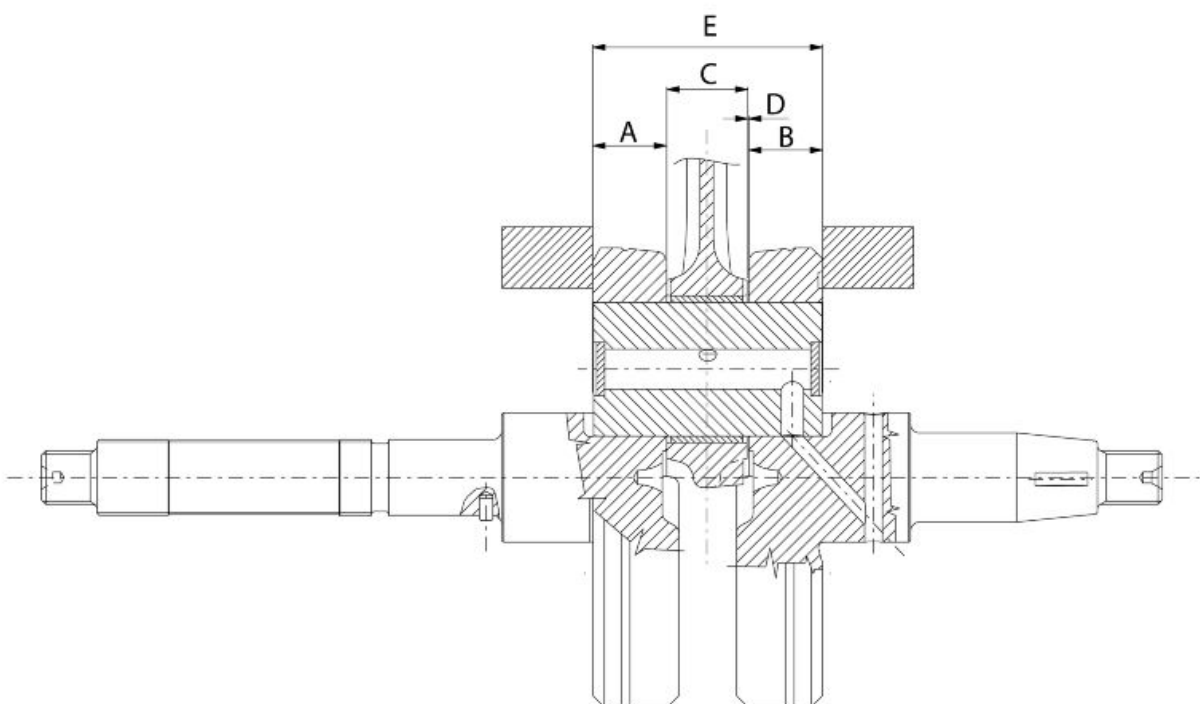
Name	Description	Dimensions	Initials	Quantity
Crankshaft			Category 1	28.998 ÷ 29.004
Crankshaft			Class 2	29.004 ÷ 29.010
Crankcase			Category 1	32.959 ÷ 32.965
Crankcase			Class 2	32.953 ÷ 32.959



Fitting clearances

Crankshaft/crankcase axial clearance (H):

0.15 ÷ 0.40 mm (when cold)

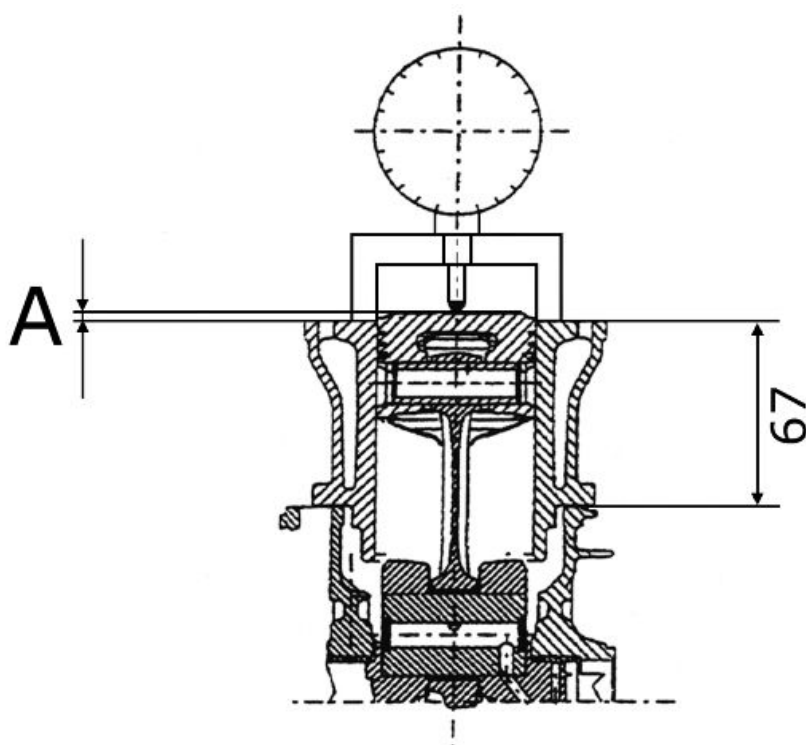


CRANKSHAFT/ CRANKCASE AXIAL CLEARANCE

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

Slot packing system**Characteristic****Compression ratio**

12 ± 0.5: 1



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

N.B.

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

MODELS WITH FIBRE HEAD GASKET (1.1)

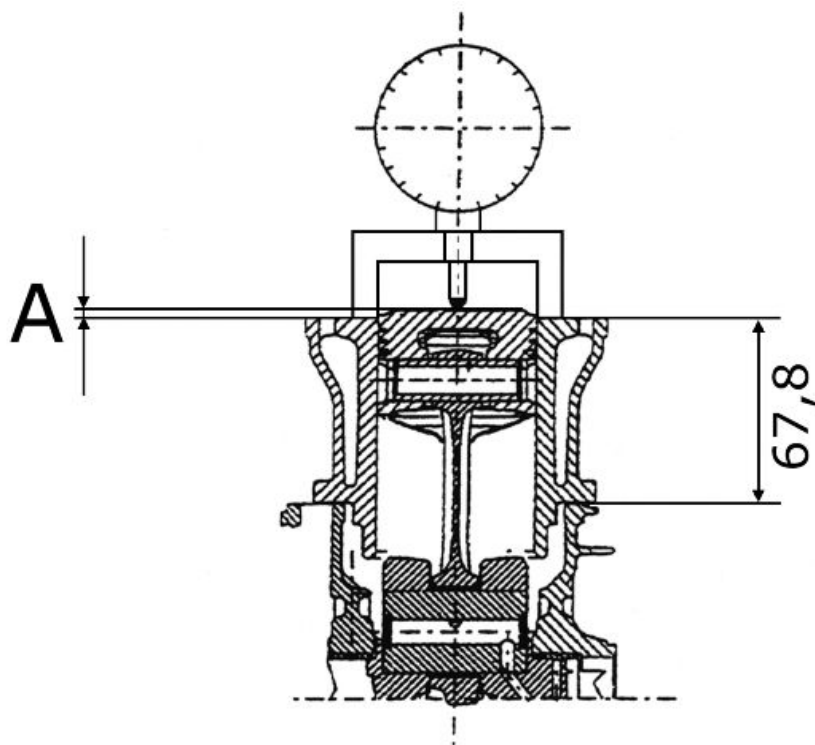
Name	Measure A	Thickness
Shimming - Cylinder 67 - Head gasket 1.1 - Base gasket 0.4	2.20 ÷ 2.45	0.4 ± 0.05

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

Characteristic

Compression ratio

12 ± 0.5: 1



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

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

MODELS WITH METAL HEAD GASKET (0.3)

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

Products

RECOMMENDED PRODUCTS TABLE

Product	Description	Specifications
AGIP GEAR 80W-90	Oil for speed gearbox	SAE 80W-90, API GL-4 mineral multi-grade oil
AGIP CITY HI TEC 4T	Oil to lubricate flexible transmissions (throttle control)	Oil for 4-stroke engines
AGIP GP 330	Grease for brake levers, throttle	White calcium complex soap-based spray grease with NLGI 2; ISO-L-XBCIB2
AGIP CITY HI TEC 4T	Engine oil	SAE 5W-40, API SL, ACEA A3, JASO MA Synthetic oil
AGIP BRAKE 4	Brake fluid	FMVSS DOT 4 Synthetic fluid
AGIP PERMANENT SPEZIAL	coolant	Monoethylene glycol-based antifreeze fluid, CUNA NC 956-16
AUTOSOL METAL POLISH	Muffler cleaning paste	special product for cleaning and polishing stainless steel muffler
AGIP GREASE PV2	Grease for the steering bearings, pin seats and swinging arm	Soap-based lithium and zinc oxide grease containing NLGI 2; ISO-L-XBCIB2 of the swinging arm
AGIP GREASE SM 2	Grease for the tone wheel revolving ring	Soap-based lithium grease containing NLGI 2 Molybdenum disulphide; ISO-L-XBCHB2, DIN KF2K-20

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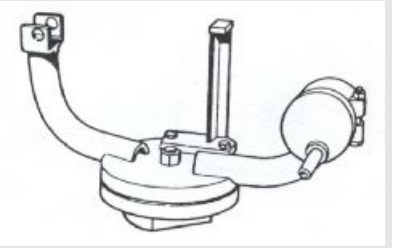
TOOLING

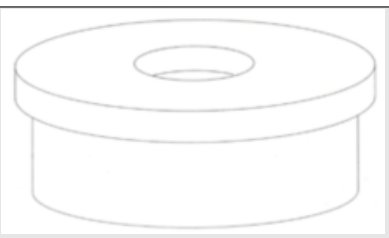
TOOL

APPROPRIATE TOOLS

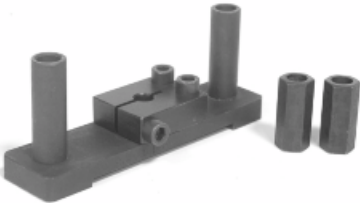
Stores code	Description	
020151Y	Air heater	
020331Y	Digital multimeter	
020648Y	Single battery charger	
001467Y014	Pliers to extract ø 15-mm bearings	
020412Y	15 mm guide	

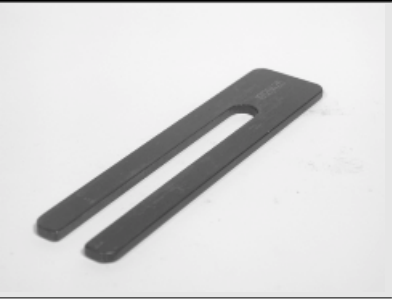
Stores code	Description	
020335Y	Magnetic support for dial gauge	
020565Y	Flywheel lock calliper spanner	
020439Y	17 mm guide	
020359Y	42x47-mm adaptor	
020363Y	20 mm guide	

Stores code	Description	
020459Y	Punch for fitting bearing on steering tube	
020458Y	Puller for lower bearing on steering tube	
005095Y	Engine support	
008564Y	Flywheel extractor	
020434Y	Oil pressure control fitting	
020382Y011	adapter for valve removal tool	

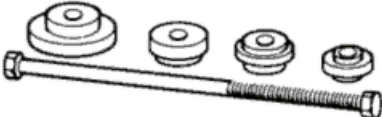
Stores code	Description	
020424Y	Driven pulley roller casing fitting punch	
020431Y	Valve oil seal extractor	
020193Y	Oil pressure gauge	
020306Y	Punch for assembling valve seal rings	
020360Y	Adaptor 52 x 55 mm	
020364Y	25-mm guide	

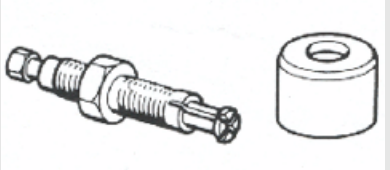
Stores code	Description	
020375Y	Adaptor 28 x 30 mm	
020376Y	Adaptor handle	
020444Y	Tool for fitting/ removing the driven pulley clutch	
020330Y	Stroboscopic light to check timing	
001467Y035	Belle for OD 47-mm bearings	
020368Y	driving pulley lock wrench	

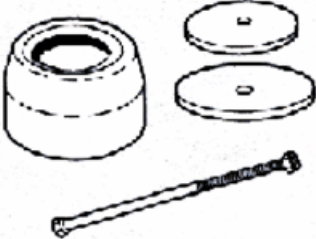
Stores code	Description	
020319Y	Immobilizer check tester	
020287Y	Clamp to assemble piston on cylinder	
020263Y	Sheath for driven pulley fitting	
020262Y	Crankcase splitting strip	
020430Y	Pin lock fitting tool	
020428Y	Piston position check support	

Stores code	Description	
020426Y	Piston fitting fork	
020425Y	Punch for flywheel-side oil seal	
020423Y	driven pulley lock wrench	
020414Y	28-mm guide	
020393Y	Piston fitting band	
020382Y	Valve cotters equipped with part 012 re- moval tool	

Stores code	Description	
020455Y	10-mm guide	
020442Y	Pulley lock wrench	
020440Y	Water pump service tool	
020329Y	MityVac vacuum-operated pump	
020357Y	32 x 35 mm adaptor	
020409Y	Multimeter adaptor - Peak voltage detection	

Stores code	Description	
020456Y	Ø 24 mm adaptor	
020332Y	Digital rev counter	
020074Y	Support base for checking crankshaft alignment	
020055Y	Wrench for steering tube ring nut	
002465Y	Pliers for circlips	
001330Y	Tool for fitting steering seats	

Stores code	Description	
020454Y	Tool for fitting piston pin stops (200 - 250)	
020622Y	Transmission-side oil guard punch	
020444Y011	adapter ring	
020444Y009	46x55 Wrench	
001467Y	Extractor for bearings for holes	
001467Y013	Pliers to extract ø 15-mm bearings	

Stores code	Description	
020444Y010	adapter ring	
020244Y	15 mm diameter punch	
020115Y	Ø 18 punch	
020271Y	Tool for removing-fitting silent bloc	
020627Y	Flywheel lock wrench	
020467Y	Flywheel extractor	

Stores code	Description	
020626Y	Driving pulley lock wrench	
020628Y	Water pump service kit	

INDEX OF TOPICS

MAINTENANCE

MAIN

Maintenance chart

EVERY 2 YEARS

Action

Coolant - change
Brake fluid - change
Secondary air filter (external / internal) - Clean

AFTER 1,000 KM

Action

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

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

EVERY 3,000 KM

Action

Engine oil - level check/ top-up

AFTER 6,000 KM

Action

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

At 12,000 KM AND AT 60,000 KM

Action

Engine oil - replacement
Hub oil level - check
Spark plug - replacement
Air filter - clean
Engine oil - change
Idle speed (*) - adjustment
Sliding block / variable speed rollers - change
Throttle lever - adjustment
Coolant level - check
Steering - adjustment
Brake control levers - greasing
Brake pads - check condition and wear
Brake fluid level - check

Action

Transmission elements - lubrication
Safety locks - check
Suspensions - check
Electrical system and battery - check
Headlight - adjustment
Tyre pressure and wear - check
Vehicle and brake test - road test
Driving belt - replacement

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

At 18,000 KM AND AT 54,000 KM**Action**

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

At 24,000 KM AND AT 48,000 KM**Action**

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

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

At 30,000 KM, AT 42,000 KM AND AT 66,000 KM**Action**

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

Action

Tyre pressure and wear - check
Vehicle and brake test - road test
Engine oil - replacement
Oil filter -Replacement

AFTER 36,000 KM**Action**

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

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

AFTER 72,000 KM**Action**

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

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

Carburettor

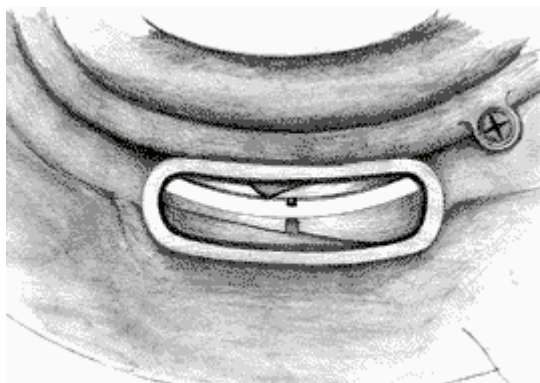
- Disassemble the carburettor in its parts, wash all of them with solvent, dry all body grooves with compressed air to ensure adequate cleaning.
- Check carefully that the parts are in good condition.
- The throttle valve should move freely in the chamber. Replace it in case of excessive clearance due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

WARNING

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

Checking the spark advance

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



Characteristic

Ignition advance

$10^\circ \pm 1^\circ$ at 2,000 rpm $\div$ $29^\circ \pm 1^\circ$ at 6,500 rpm

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

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

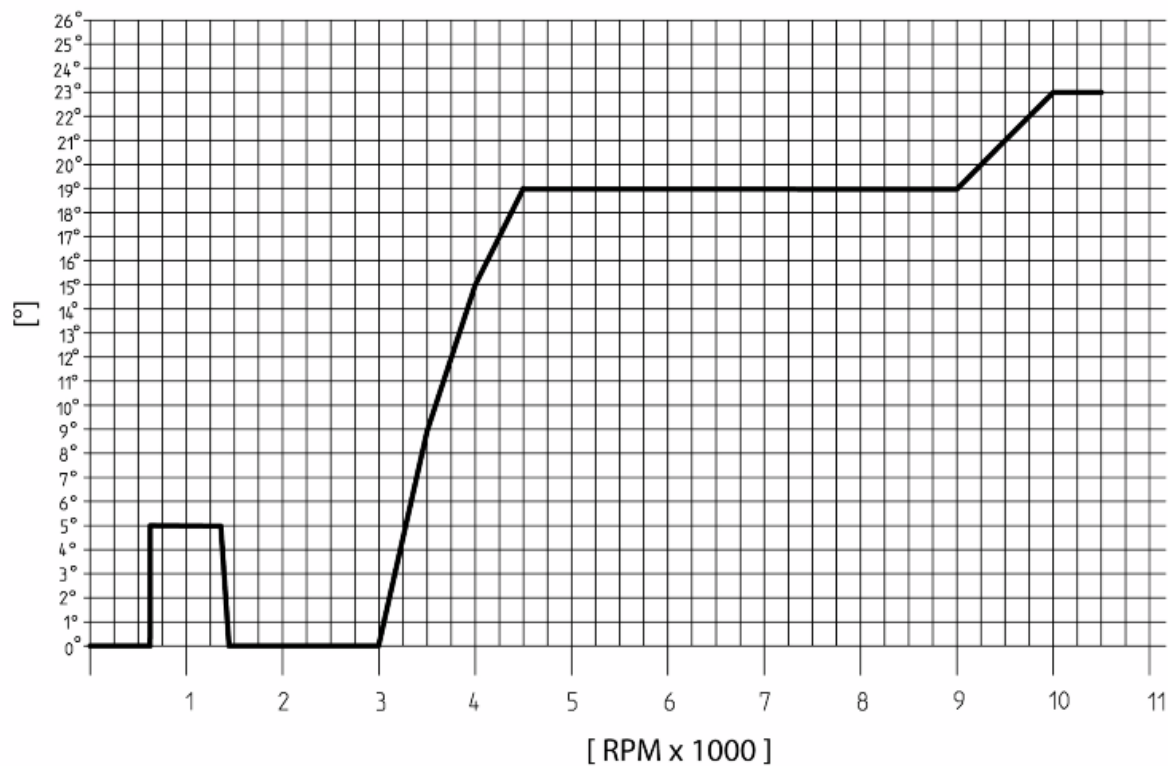
Specific tooling

020330Y Stroboscopic light to check timing

Spark advance variation

REVOLUTION LIMITER

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



Spark plug

Proceed as follows:

1. Lift the rubber mat;
2. Remove the right side cover by unscrewing the 3 screws «A»;
3. Disconnect the spark plug HV wire cap «B» ;
4. Unscrew the spark plug using the wrench supplied. ;
5. When refitting, place the spark plug in the hole at the due inclination and tighten it by hand until it is finger tight;
6. Only use the wrench to lock it in place;
7. Push cap «B» fully over the spark plug.

WARNING

THE USE OF SPARK PLUGS OTHER THAN THOSE RECOMMENDED OR A SHIELDLESS SPARK PLUG CAP COULD CAUSE DISTURBANCES TO THE SYSTEM.

CAUTION



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

Characteristic

Spark plug

CHAMPION RG4HC

Alternative spark plug

NGK CR8EB

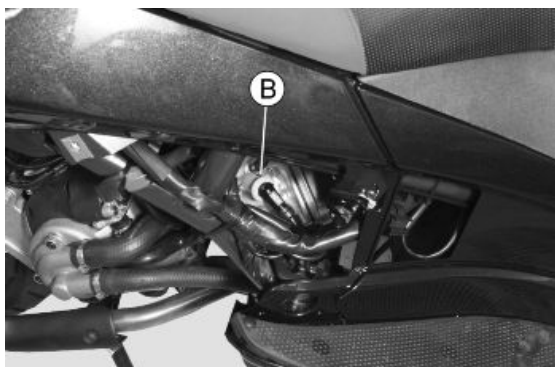
Electric characteristic

Electrode gap

0.7 ÷ 0.8 mm

Locking torques (N*m)

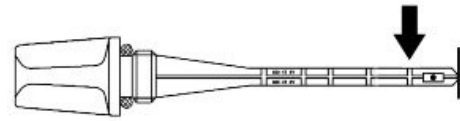
Spark plug 12 ÷ 14



Hub oil

Check

- Stand the vehicle on its centre stand on flat ground;
- Remove the oil dipstick «A», dry it with a clean cloth. Reinsert it **tightening it fully**;
- Remove the dipstick and check that the oil level is slightly over the second notch starting from the lower end; 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 ROTRA 80W-90 Rear hub oil

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

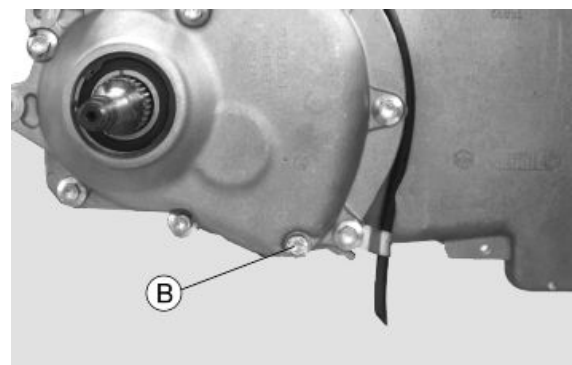
Characteristic

Transmission oil

150 cm³

Locking torques (N*m)

Hub oil drainage screw 15 ÷ 17 Nm



Air filter

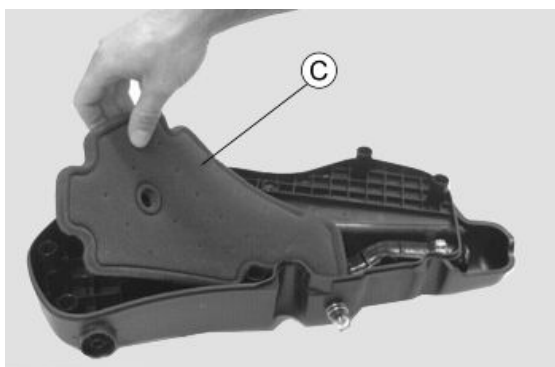
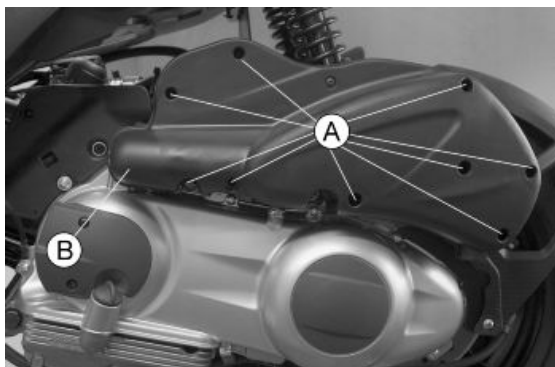
To remove them, proceed as follows:

1. Unscrew the 9 fixing screws «A»;
2. Remove the air filter«B»

CAUTION



IF THE VEHICLE IS USED ON DUSTY ROADS, IT IS NECESSARY TO SERVICE THE AIR FILTER MORE OFTEN TO AVOID DAMAGING THE ENGINE.



Cleaning:

- Wash the sponge «C» with water and mild soap.
- Dry it with a clean cloth and short blasts of compressed air.
- Soak it in a mixture of 50% petrol and 50% specified oil.
- Gently squeeze the filtering element, let it drip and then refit it.

CAUTION



IF THE VEHICLE IS USED ON DUSTY ROADS, IT IS NECESSARY TO SERVICE THE AIR FILTER MORE OFTEN TO AVOID DAMAGING THE ENGINE.

Recommended products

AGIP FILTER OIL Oil for air filter sponge

Mineral oil with specific additives for increased adhesiveness

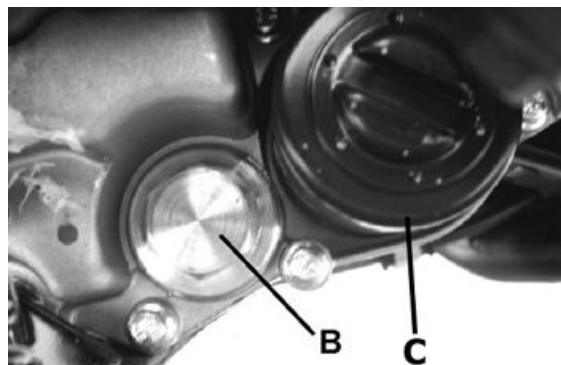
Engine oil

In 4T engines, the engine oil is used to lubricate the distribution elements, the bench bearings and the thermal group. **An insufficient quantity of oil can cause serious damage to the engine.**

In all 4T engines, the deterioration of the oil characteristics, or a certain consumption should be considered normal, especially if during the run-in period. Consumption levels in particular can be influenced by the conditions of use (e.g.: oil consumption increases when driving at "full throttle").

Replacement

Change oil as indicated in the scheduled maintenance table. The engine must be emptied by draining the oil through the drainage plug «B» of the mesh pre-filter, flywheel side; furthermore, to facilitate oil drainage, loosen the cap/dipstick «A». Once all the oil has drained through the drainage opening, unscrew and remove the oil cartridge filter «C».



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



N.B.

THE ENGINE MUST BE HOT WHEN THE OIL IS CHANGED.

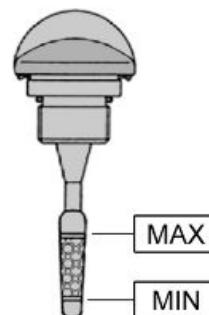
Recommended products

AGIP CITY HI TEC 4T Engine oil

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

Locking torques (N*m)

Engine oil drainage plug 24 ÷ 30



Check

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

- 1) Rest the vehicle on the central stand and on a flat ground.
- 2) Unscrew the cap/dipstick "A", dry it with a clean cloth and reinsert it, **screwing it thoroughly**.
- 3) Remove the cap/dipstick again and check that the level is between the max. and min levels; top up, if required.



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

Characteristic

Engine oil

1.10 l

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

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

Engine oil filter

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

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

Recommended products

AGIP CITY HI TEC 4T Engine oil

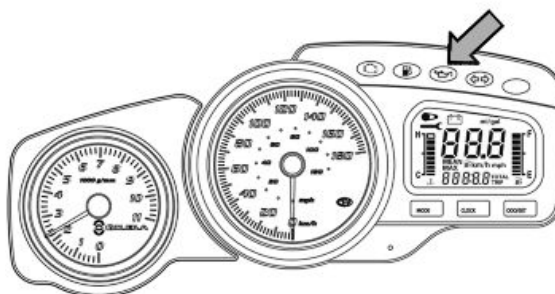
SAE 5W-40 Synthetic oil that exceed the requirements of API SL, ACEA A3, JASO MA specifications

Oil pressure warning light

Warning light (low oil pressure)

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

If the light comes on during braking, at idling speed or while turning, it is necessary to first switch off the engine and then to check the oil level and the lubrication system



Checking the ignition timing

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

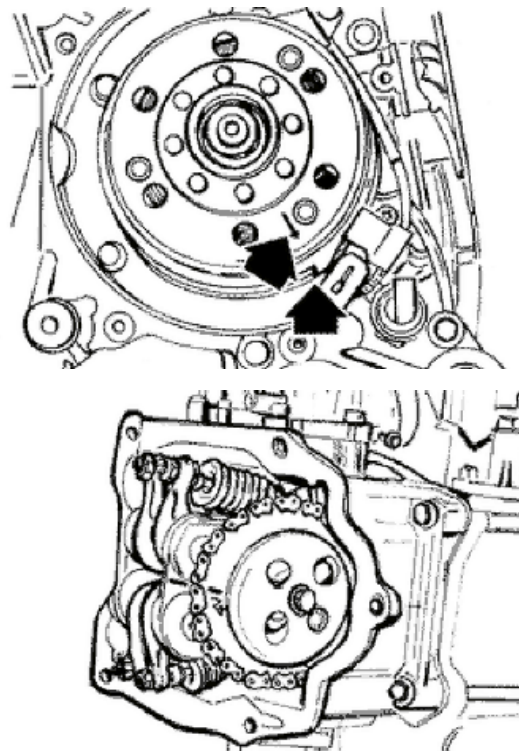
-Rotate the flywheel until the reference matches the crankcase operation end as shown in the figure (TDC). Make sure that the 4V reference point on the camshaft control pulley is aligned with the reference point on the head as shown in the second figure. If the reference mark is opposite the indicator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

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

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

N.B.

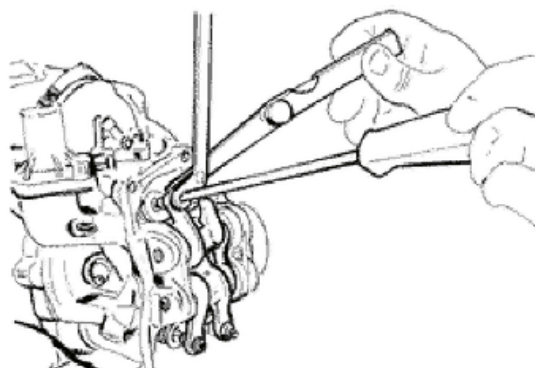
TIME THE TIMING SYSTEM UNIT IF IT IS NOT IN PHASE.



Checking the valve clearance

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

- Use a thickness gauge to check that the clearance between the valve and the 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.



Characteristic

Valve clearance

Inlet: 0.10 mm (when cold)

Outlet: 0.15 mm (when cold)

Cooling system

If noise or loss of liquid at the drain bore of the water pump is discovered, it will be necessary to overhaul the pump as described in the "Flywheel cover" Chapter.

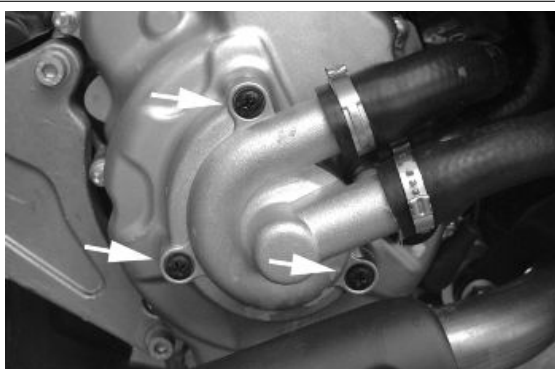
Proceed to carry out a few preliminary operations as described below:

- Place the vehicle on its centre stand and on flat ground.
- Empty the cooling system by removing the couplings on the pump cover and the filler plug on the expansion tank.

CAUTION

THIS OPERATION MUST BE CARRIED OUT WHEN THE ENGINE IS COLD.

- Remove the water pump cover as indicated in the figure by loosening the 3 fixing screws.
- Proceeding as described in chapter «Engine», partially drain the system and overhaul the pump.
- Refill and drain the system again once after having repaired the damaged and reinstalled all the components.



N.B.

FOR CHANGING THE COOLANT AND BLEEDING THE SYSTEM, SEE CHAPTER "COOLING SYSTEM".

Characteristic

Cooling system

approx. 1.8 litres

Level check

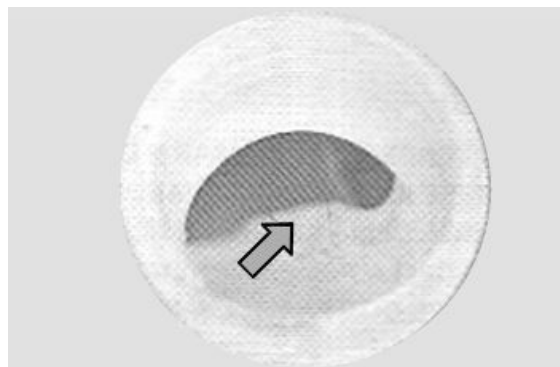
The fluid level inspection should be carried out when the engine is cold following the methods indicated below:

- Place the vehicle on its centre stand and on flat ground.
- Remove the cap of the expansion tank.



- To check the level, it is necessary to look inside the expansion tank:

The reference mark in the figure shows the correct coolant level.



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

CAUTION

DO NOT EXCEED THE MAX. LEVEL WHEN FILLING SO AS TO AVOID THE COOLANT ESCAPING FROM THE EXPANSION TANK WHEN THE vehicle IS IN USE.

N.B.

THE COOLANT CONSISTS OF A MIXTURE OF DE-IONISED WATER AND FLUID FOR SEALED CIRCUITS. THE MIXTURE THUS OBTAINED LOWERS THE FREEZING POINT OF THE COOLANT TO - 40°C. THE MIXTURE IN COMBINATION WITH THE PRESSURE OF 0.9 BAR RAISES THE BOILING POINT TO APPROX. 125°C. THE RECOMMENDED LIQUID ALSO PROVIDES PROTECTIVE FUNCTIONS FOR THE ALUMINIUM ALLOYS. THIS CHARACTERISTIC MAY DECREASE OVER THE COURSE OF TIME; THIS IS WHY A PERIODIC REPLACEMENT OF THE COOLANT IS INDISPENSABLE.

N.B.

FOR THE REPLACEMENT OF THE COOLANT AND THE FLUSHING OF THE SYSTEM, SEE CHAPTER COOLING SYSTEM.

Braking system

Level check

- Position the vehicle on a flat surface and on the centre stand.
- Check the brake fluid level via the special indicator located on the pump.



N.B.

THE LEVEL TENDS TO DROP AS THE BRAKE PADS GET WORN, A MINIMUM LEVEL SHOULD NOT BE REACHED. IF THE LEVEL IS TOO LOW, CHECK AND FIX THE SYSTEM SEALS, IF REQUIRED. TOP UP THE PUMP TANK, IF REQUIRED, CONSIDERING THAT THE "MAX." LEVEL MUST ONLY BE OBTAINED WITH NEW PADS.

Top-up

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

Proceed as follows:

- Position the vehicle on a flat surface and on the centre stand.
- Remove the tank cap by removing the two screws, remove the gasket and top up using only the liquid specified without exceeding the maximum level.

**CAUTION**

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

WARNING

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

WARNING

THE BRAKE FLUID IS HYGROSCOPIC, THAT IS, IT ABSORBS MOISTURE FROM THE SURROUNDING AIR. IF THE HUMIDITY IN THE BRAKING FLUID EXCEEDS A CERTAIN VALUE, IT WILL LEAD TO INEFFICIENT BRAKING; FOR THIS REASON, NEVER USE BRAKING FLUID FROM CONTAINERS THAT HAVE ALREADY BEEN OPENED, OR PARTIALLY USED.

Characteristic

prescribed fluid:

AGIP BRAKE FLUID DOT 4

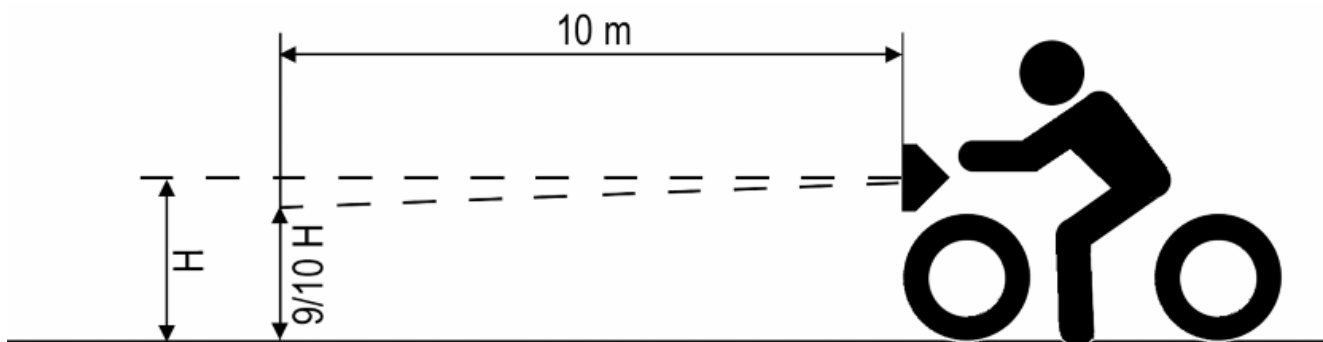
Under normal climatic conditions, the brake fluid should be replaced following the given instructions.

N.B.

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

Headlight adjustment

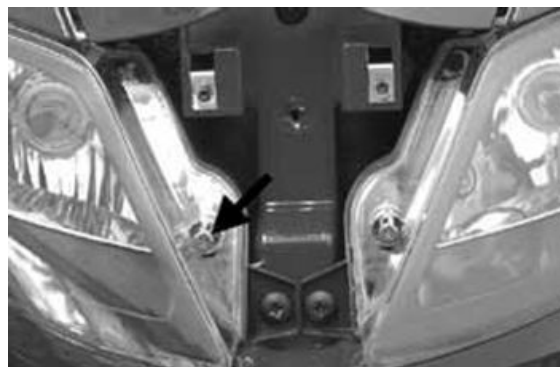
- Place the scooter in use conditions, with tyres inflated to the prescribed pressure on flat ground at 10 m from a white screen placed in dim light.
- Make sure that the scooter's axle is perpendicular to the screen.
- Turn the headlight on and check that the limit of the light beam projected onto the screen does not exceed 9/10 of the headlight centre height from the ground and that it is not less than 7/10.



- Otherwise, adjust the right headlight by the screw shown in the figure, which can be accessed by removing the front shield connecting member.

N.B.

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



SAS filters inspection and cleaning

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

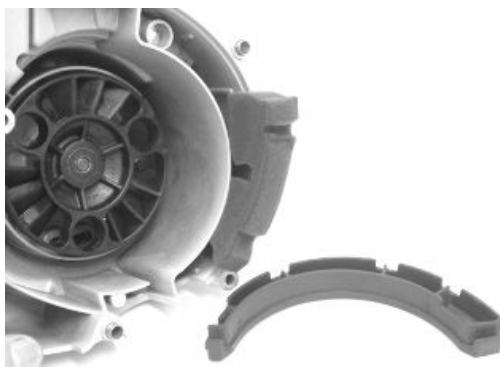


- Remove the plastic support and the gasket as shown in the photograph



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

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

**CAUTION**

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

CAUTION

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

CAUTION

NEVER RUN THE ENGINE WITHOUT THE SECONDARY AIR FILTER

INDEX OF TOPICS

TROUBLESHOOTING

TROUBL

Engine

Poor performance

POOR PERFORMANCE

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

Rear wheel spins at idle

REAR WHEEL ROTATES WITH ENGINE AT IDLE

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

Starting difficulties

DIFFICULT STARTING

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

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

Excessive oil consumption/Exhaust smoke

EXCESSIVE OIL CONSUMPTION/SMOKEY EXHAUST

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

Insufficient lubrication pressure

LOW LUBRICATION PRESSURE

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

Engine tends to cut-off at full throttle

ENGINE STOP FULL THROTTLE

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

Engine tends to cut-off at idle

ENGINE STOP IDLING

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

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

Excessive exhaust noise

EXCESSIVE EXHAUST NOISE

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

High fuel consumption

HIGH FUEL CONSUMPTION

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

SAS malfunctions

ANOMALIES IN THE SECONDARY AIR DEVICE

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

Transmission and brakes

Clutch grabbing or performing inadequately

IRREGULAR CLUTCH PERFORMANCE OR SLIPPAGE

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

Insufficient braking

INSUFFICIENT BRAKING

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

Brakes overheating

BRAKES OVERHEATING

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

Braking vibrations or noise

VIBRATIONS OR NOISE WHEN BRAKING

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

Electrical system

Battery

BATTERY

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

Turn signal lights malfunction

TURN INDICATOR NOT WORKING

Possible Cause	Operation
Electronic ignition device failure	With the key switch set to "ON", jump the contacts 1 (Blue-Black) and 5 (Green/Red) on the control unit connector.

Possible Cause	Operation
	If by operating the turn indicator control the lights are not steadily on, replace the control unit; otherwise, check the cable harness and the switch.

Steering and suspensions

Heavy steering

STEERING HARDENING

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

Excessive steering play

EXCESSIVE STEERING BACKLASH

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

Noisy suspension

NOISY SUSPENSION

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

Suspension oil leakage

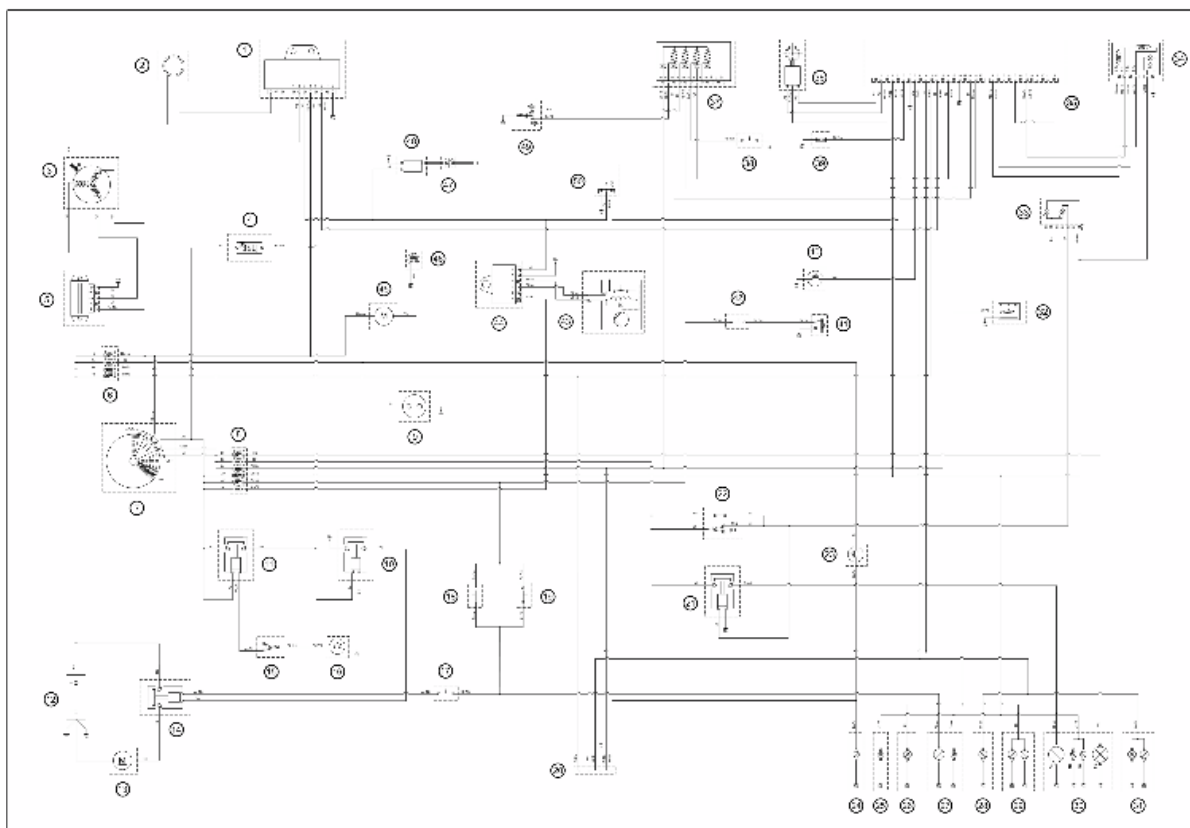
OIL LEAKAGE FROM SUSPENSION

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

INDEX OF TOPICS

ELECTRICAL SYSTEM

ELE SYS

**KEY**

1. Electronic ignition device
2. Immobilizer aerial
3. Magneto flywheel Pick-up
4. Automatic starter
5. Voltage regulator
6. Main fuse unit
7. Key switch
8. Secondary fuse unit
9. 12V socket
10. Start-up enabling remote control
11. Engine stop remote control
12. Battery
13. Starter motor
14. Start-up remote control
15. Engine stop switch
16. Side stand button
17. Starter button
18. Stop button on rear brake
19. Stop button on front brake

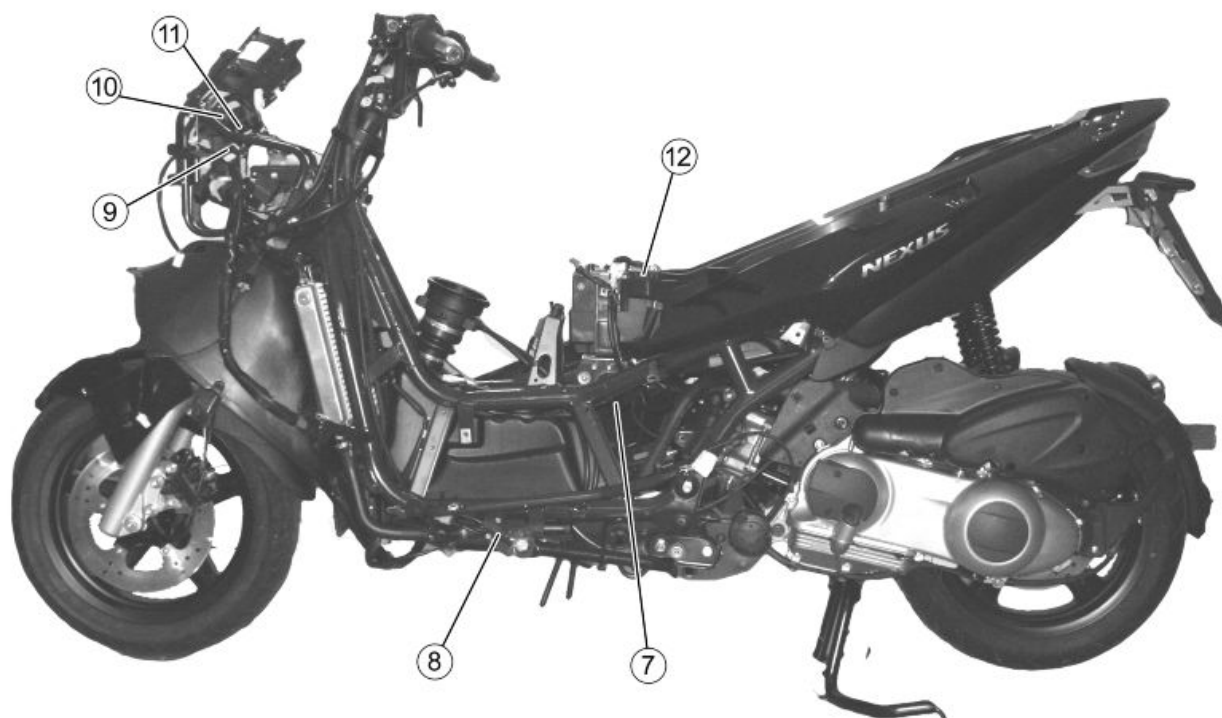
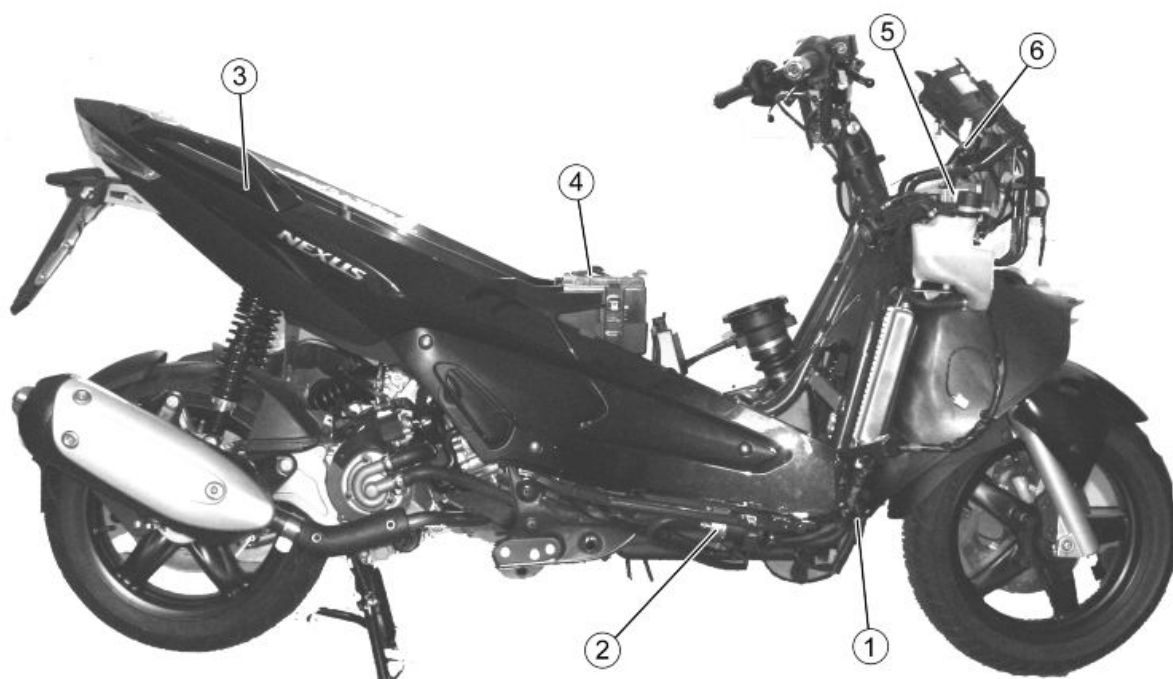
- 20.** Wiring for antitheft device
- 21.** High-beam light remote control
- 22.** Light switch
- 23.** Helmet compartment light switch
- 24.** Helmet compartment internal light
- 25.** License plate lamp
- 26.** Rear left turn indicator
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- 28.** Rear right turn indicator
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 - B. Tail light bulbs
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- 33.** Warning light unit
 - A. Tail light warning light
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 - 1/20. + Wheel turning sensor
 - 2/20. Wheel turning sensor signal
 - 3/20. Wheel turning sensor ground
 - 4/20. + Lighting
 - 5/20. Rpm indicator signal
 - 6/20. Water temperature sensor
 - 7/20. Water temperature sensor ground
 - 8/20. Oil pressure
 - 9/20. Right turn indicator warning light
 - 10/20. Left turn indicator warning light
 - 11/20. +Battery
 - 12/20. Immobilizer LED
 - 13/20. +Key
 - 14/20. Remote MODE switch
 - 15/20. Fuel gauge
 - 16/20. Ground
 - 18/20. Right turn indicator switch

- 19/20. Left turn indicator switch
- 1/12. Stepper Motor D
- 2/12. Stepper Motor B
- 5/12. ICP/ID (Engine identification pin "Nexus 500/125")
- 6/12. ICP/ID (Engine identification pin "Nexus 250/125")
- 7/12. Stepper Motor C
- 8/12. Stepper Motor A
- 12/12. ICP (Engine identification common pin "Common ID")
- 36.** Wheel turning sensor
- 37.** Electric control management device
- 38.** Remote MODE switch
- 39.** Thermistor
- 40.** Oil pressure sensor
- 41.** Horn
- 42.** Horn button
- 43.** Fuel pump
- 44.** Pump control device
- 45.** Electric fan
- 46.** Thermoswitch
- 47.** Spark plug
- 48.** HV coil
- 49.** Turn indicator switch
- 50.** Rpm indicator signal filter

KEY

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

Components arrangement

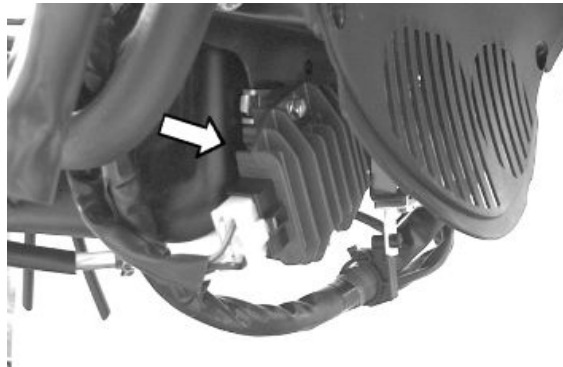


KEY:

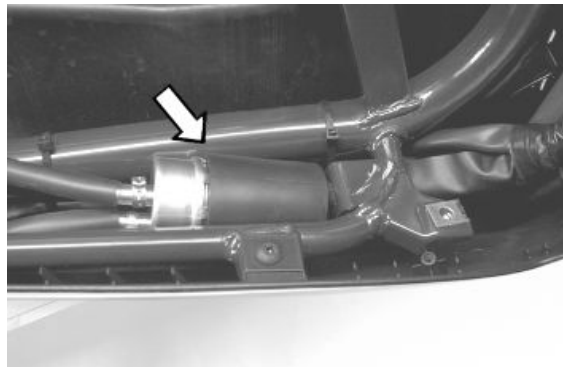
- 1. Voltage regulator

2. Electric pump
3. Fuses
4. Battery
5. Remote controls
6. Instrument panel connectors
7. HV coil
8. Side stand switch
9. Antitheft pre-installation connector
10. Electric pump control unit
11. Electronic control unit
12. Fuses

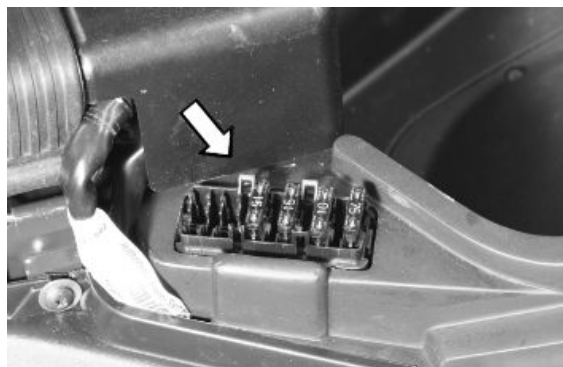
1. Voltage regulator: to reach the regulator, remove the spoiler.



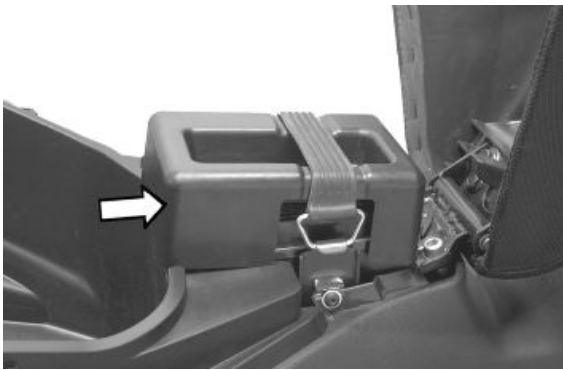
2. Electric pump: to reach it, remove the right footrest.



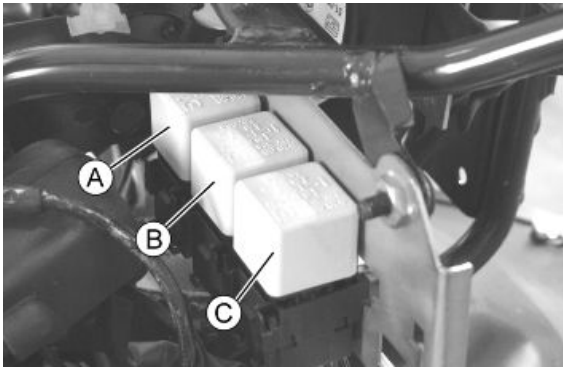
3. Fuses: placed under the saddle near the battery.



4. **Battery:** Placed under the saddle.



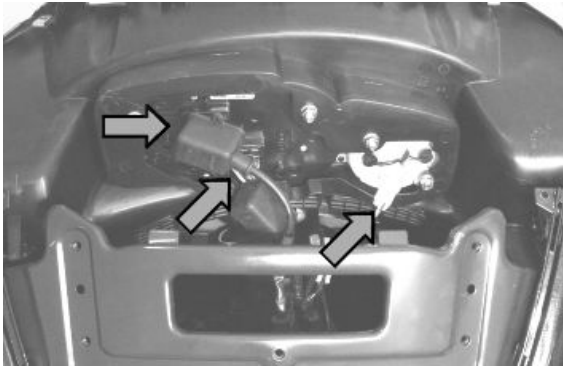
5. **Remote controls:** to reach them, remove the instrument panel.



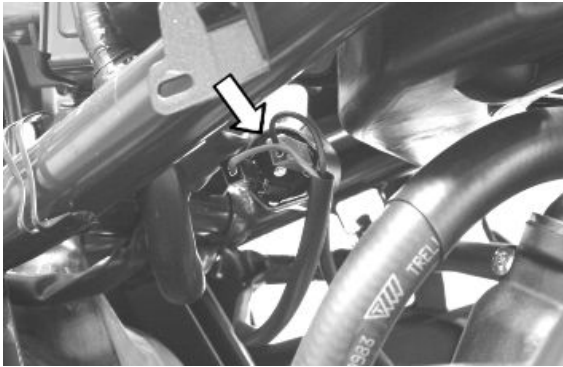
REMOTE CONTROL DESCRIPTION

	Specification	Desc./Quantity
1	Remote control (A) :	Start-up enabling
2	Remote control (B) :	High-beam lights
3	Remote control (C) :	Engine stop

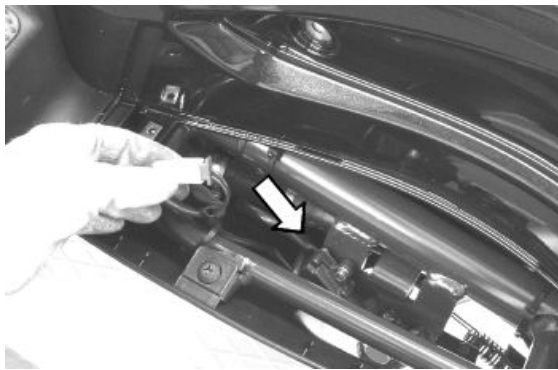
6. **Instrument panel connectors:** to reach them, remove the instrument panel.



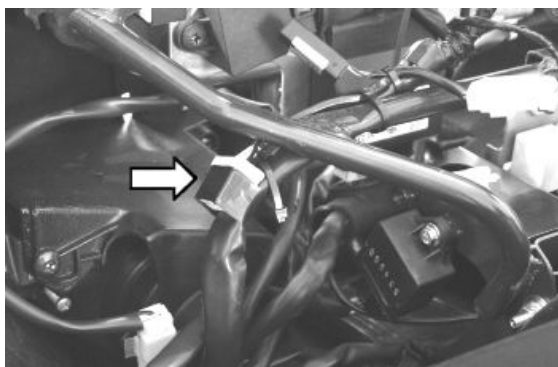
7. **HV coil:** under the battery. To reach it, remove the left side fairing.



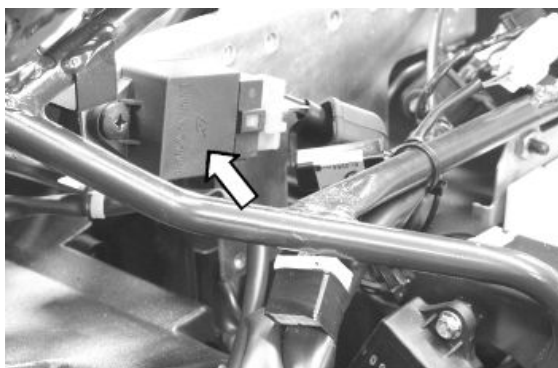
8. Side stand switch: under the left footrest.



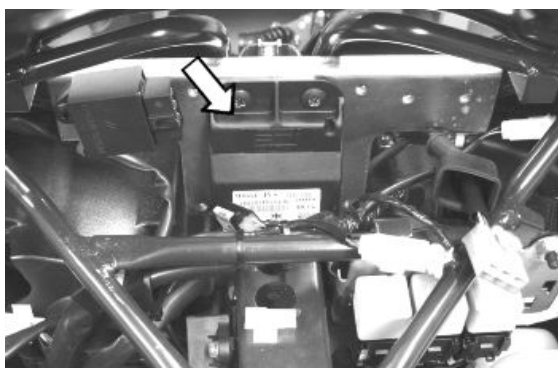
9. Antitheft device pre-installation connector: to reach the antitheft device pre-installation connector, remove the instrument panel.



10. Electric pump control unit: to reach them, remove the instrument panel.



11. Electronic control unit: to reach them, remove the instrument panel.

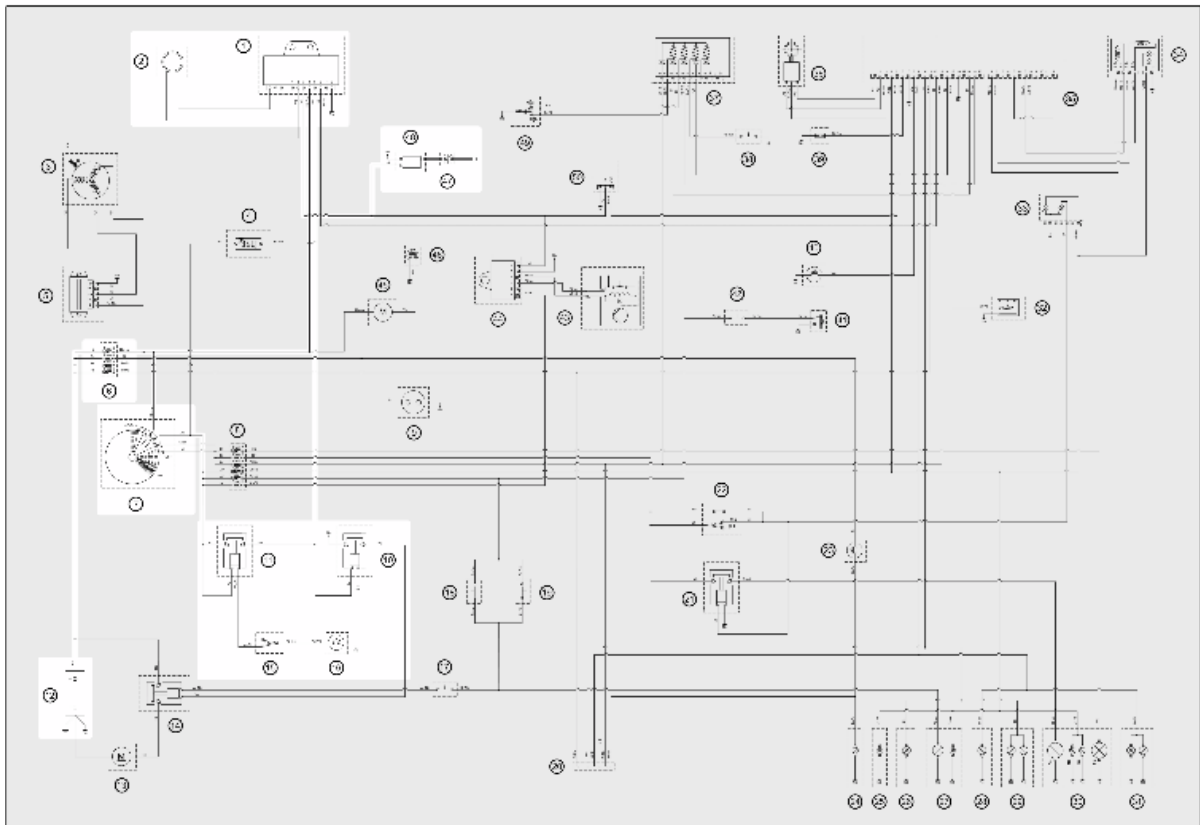


12. Fuses: placed in the helmet compartment.



Conceptual diagrams

Ignition



KEY

- 1. Electronic ignition device
- 2. Immobilizer aerial
- 6. Main fuse unit
- 7. Key switch
- 10. Start-up enabling remote control
- 11. Engine stop remote control
- 12. Battery

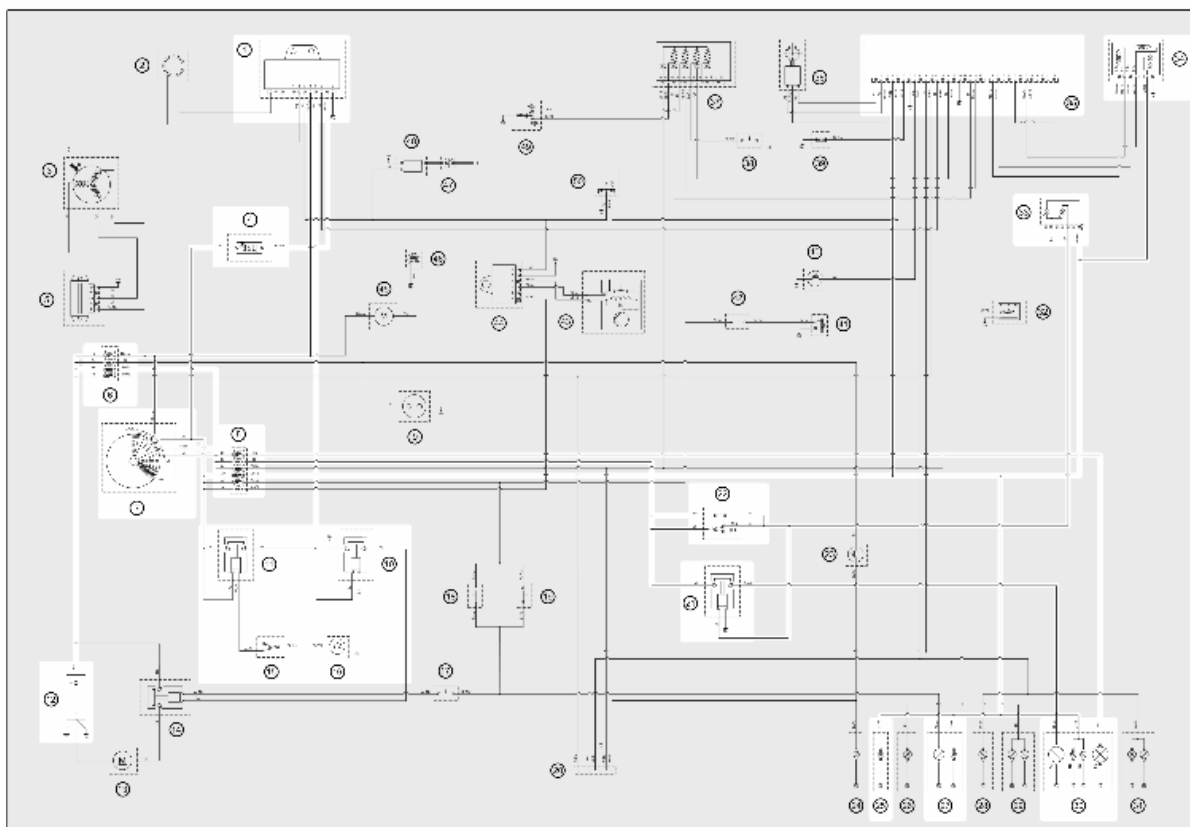
15. Engine stop switch

16. Side stand button

47. Spark plug

48. HV coil

Headlights and automatic starter section



KEY

1. Electronic ignition device

4. Automatic starter

6. Main fuse unit

7. Key switch

8. Secondary fuse unit

10. Start-up enabling remote control

11. Engine stop remote control

12. Battery

15. Engine stop switch

16. Side stand button

21. High-beam light remote control

22. Light switch

25. License plate lamp

27. Tail light/stop twin filament bulb

30. Headlight

C. High-beam light bulb

B. Tail light bulbs

C. Low-beam bulb

33. Warning light unit

A. Tail light warning light

B. High-beam warning light

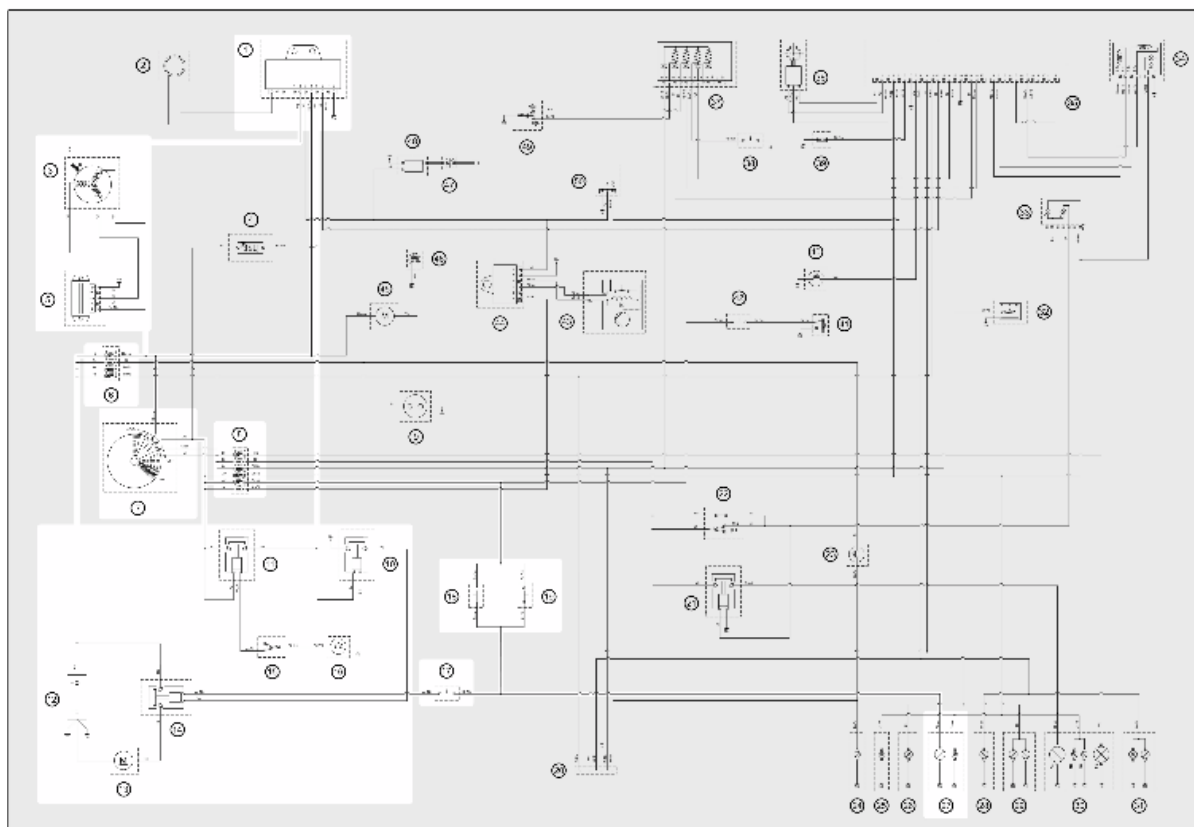
34. Analogue rpm indicator

35. Instrument panel

4/20. + Lighting

16/20. Ground

Battery recharge and starting



KEY

1. Electronic ignition device

3. Magneto flywheel Pick-up

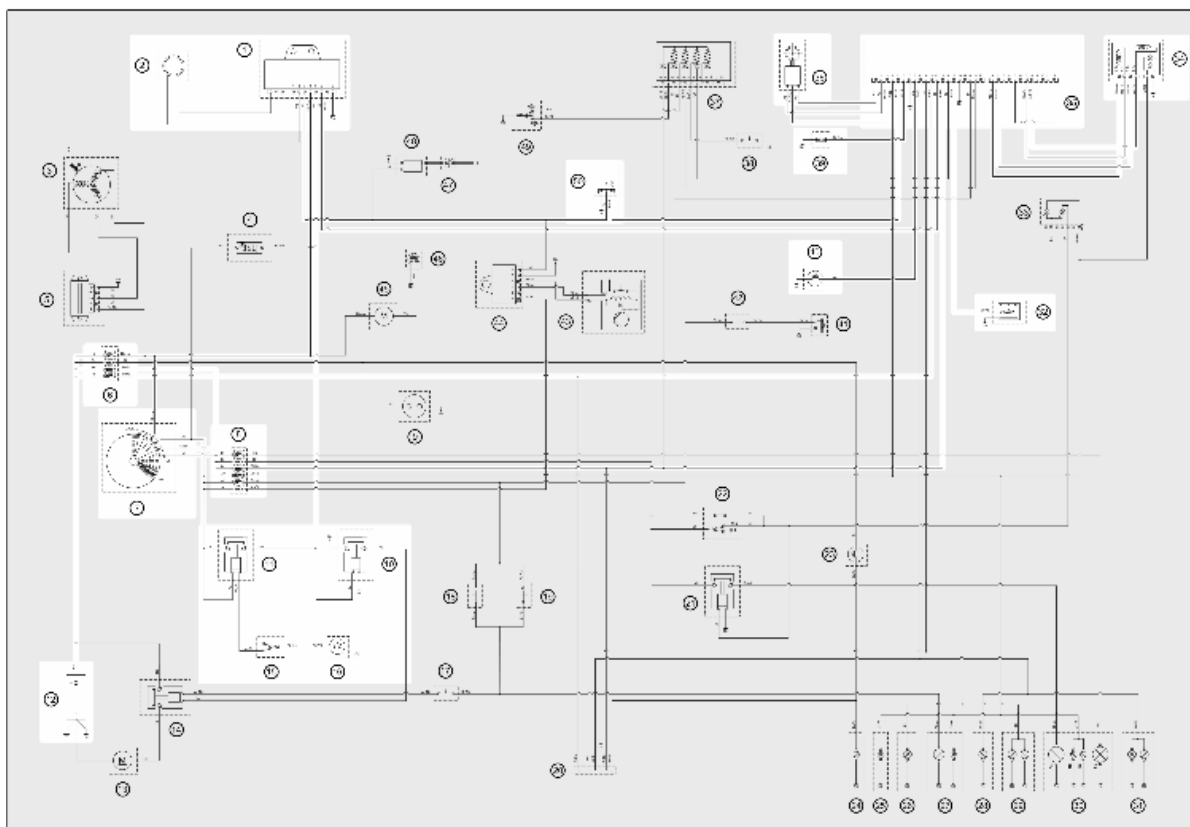
5. Voltage regulator

6. Main fuse unit

7. Key switch

- 8. Secondary fuse unit
- 10. Start-up enabling remote control
- 11. Engine stop remote control
- 12. Battery
- 13. Starter motor
- 14. Start-up remote control
- 15. Engine stop switch
- 16. Side stand button
- 17. Starter button
- 18. Stop button on rear brake
- 19. Stop button on front brake
- 27. Tail light/stop twin filament bulb

Level indicators and enable signals section

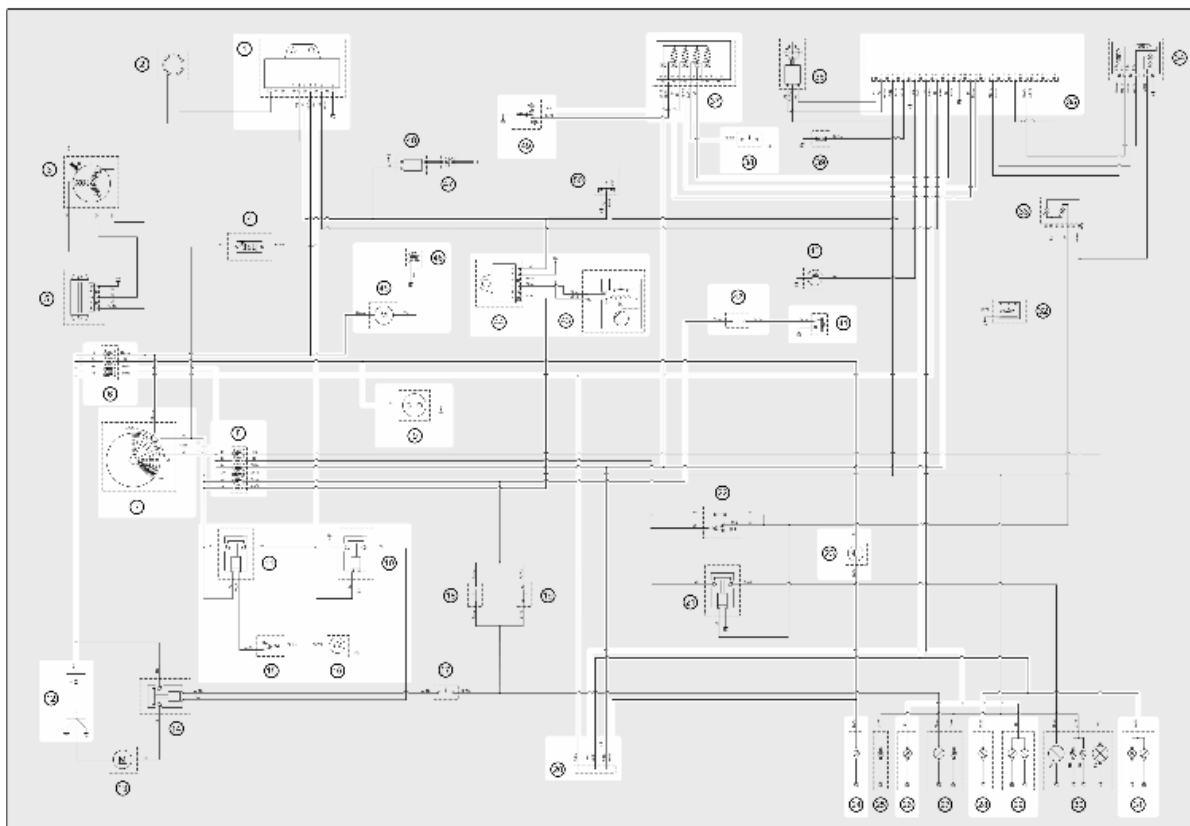


KEY

- 1. Electronic ignition device
- 2. Immobilizer aerial
- 6. Main fuse unit
- 7. Key switch
- 8. Secondary fuse unit

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 - 3/20. Wheel turning sensor ground
 - 5/20. Rpm indicator signal
 - 6/20. Water temperature sensor
 - 7/20. Water temperature sensor ground
 - 8/20. Oil pressure
 - 11/20. +Battery
 - 12/20. Immobilizer LED
 - 13/20. + Key
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 - 2/12. Stepper Motor B
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 - 8/12. Stepper Motor A
 - 12/12. ICP "Common ID"
 - 36.** Wheel turning sensor
 - 39.** Thermistor
 - 40.** Oil pressure sensor
 - 50.** Rpm indicator signal filter
-

Devices and accessories



KEY

- 1. Electronic ignition device
- 6. Main fuse unit
- 7. Key switch
- 8. Secondary fuse unit
- 9. 12V socket
- 10. Start-up enabling remote control
- 11. Engine stop remote control
- 12. Battery
- 15. Engine stop switch
- 16. Side stand button
- 20. Wiring for antitheft device
- 23. Helmet compartment light switch
- 24. Helmet compartment internal light
- 26. Rear left turn indicator
- 28. Rear right turn indicator
- 29. Front left turn indicator
- 31. Front right turn indicator

35. Instrument panel

9/20. Right turn indicator warning light

10/20. Left turn indicator warning light

11/20. +Battery

13/20. + Key

14/20. Remote MODE switch

16/20. Ground

18/20. Right turn indicator switch

19/20. Left turn indicator switch

37. Electric control management device

38. Remote MODE switch

41. Horn

42. Horn button

43. Fuel pump

44. Pump control device

45. Electric fan

46. Thermoswitch

49. Turn indicator switch

Checks and inspections

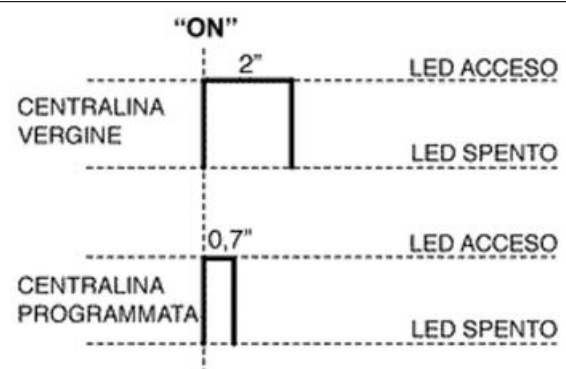
Immobiliser

The electric ignition system is fed with direct current and is protected by an antitheft immobilizer integrated to the control unit.

The ignition system consists of:

- electronic control unit
- immobilizer aerial
- master and service keys with built-in transponder
- H.V. coil
- diagnosis LED

The diagnosis LED also works as a blinking light to deter theft. This function is activated every time the key switch is set to «OFF», when the side stand is lowered or the engine emergency cut-off switch is set to «OFF». It remains activated for 48 hours in order not to affect the battery charge.



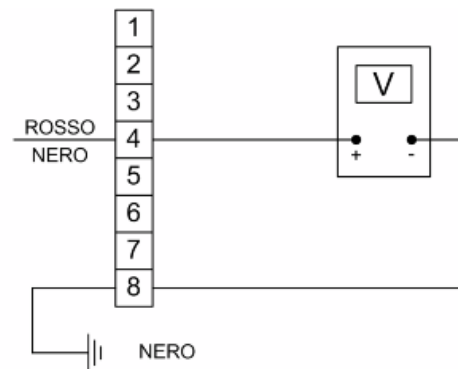
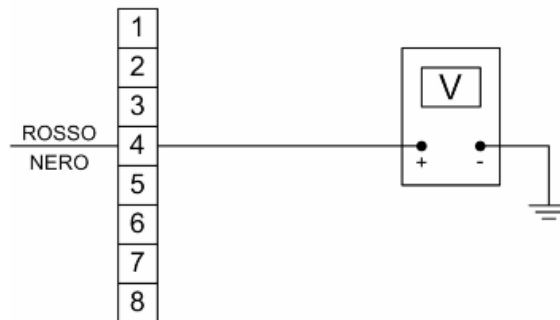
When the ignition switch is turned to «ON», the deterring blinker function is deactivated. Subsequently, a flash confirms the switching to «ON». The duration of the flash depends on the electronic control unit program (see figure).

In case the LED turns off and remains so even when switching over to «ON», check if:

- the battery is charged
- 15A main fuse (No. 3) is in working order.

If the deterring LED remains off, check the control unit power supply as follows:

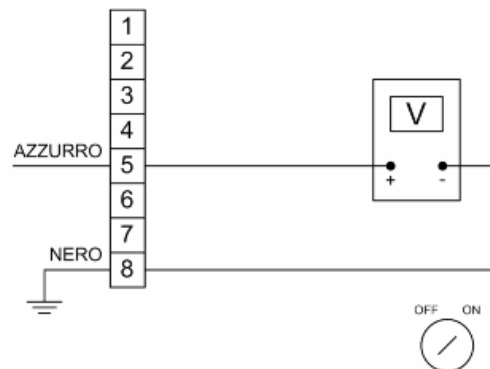
- Disconnect the control unit connector and check if:
 - There is battery voltage between terminal No. 4 (Red/Black) and the ground lead
 - There is battery voltage between the terminal No. 4 (Red/Black) and terminal No. 8 (Negative) as shown in the figure.



- There is battery voltage between the terminals No. 5 and No. 8 with the key switch set to «ON», the side stand folded up and the emergency cut-off switch set to «RUN».

If no faults are found, replace the control unit; otherwise check the wiring and the following components:

- Engine stop remote control;
- Emergency cut-off switch;
- Side stand contacts;
- Key switch contacts.



Virgin circuit

If the ignition system has not been programmed, the engine can be started but it will run limited to 2000 rpm. When trying to accelerate, some evident loss of power may be felt.

Program the system with the MASTER (Brown) and SERVICE (Black) keys as follows:

- Insert the MASTER key, turn it to "ON" and keep it in that position for 2 seconds (limit values: 1 ÷ 3 seconds).
- Alternately insert all the available black keys and turn each one of them to "ON" for 2 seconds.
- Insert the MASTER key again and turn it to "ON" for 2 seconds.

The maximum time to change keys is 10 seconds. A maximum of 7 (Black) service keys can be programmed at one time.

Sequence and times must be strictly observed or it will be necessary to repeat the procedure from the start.

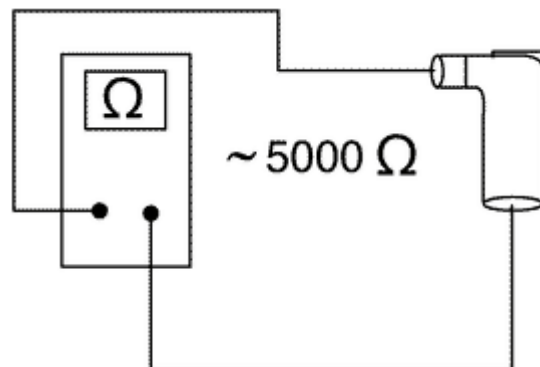
Once the control unit has been programmed, the control unit is inseparably matched with the MASTER key transponder.

This matching allows programming further service keys in case of loss, replacement, etc. Each new time new data is programmed the previously stored one is deleted.

If a service key setting is lost, it is essential to carefully check the efficiency of the high voltage system:

Shielded cap resistance ~ 5000 Ω .

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



Diagnostic codes

The flash indicating the switching to "ON" can be followed by a phase of programmed failure warnings. That is, the led is off for 2 seconds, and then diagnosis codes are transmitted with 0.5-second flashes.

After the failure code indication, the LED remains on permanently to indicate that ignition is not possible.

Diagnostic code - 2 flashes

When the 2-flash code is detected, carry out the following checks:

- Check if the failure continues after changing key (MASTER key included). If the failure persists with any key, disconnect the aerial connector from the control unit and check the aerial for continuity with the recommended tool.

If non-conforming values are measured, replace the aerial.

If no failures are found in the aerial, replace the control unit.

CAUTION

BEFORE PROGRAMMING THE NEW ELECTRONIC CONTROL UNIT CHECK THAT NO FAILURE CODE IS INDICATED. THIS IS NECESSARY TO AVOID SPOILING A NEW CONTROL UNIT

Specific tooling

020331Y Digital multimeter

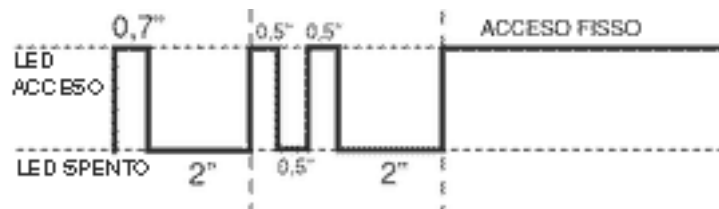
Electric characteristic

immobilizer aerial

~ 7 ÷ 9 Ohm

2-FLASH CODE - Example with programmed control unit, no transponder and/or malfunctioning aerial.

Ignition disabled-Vehicle immobilised



Diagnostic code - 3 flashes

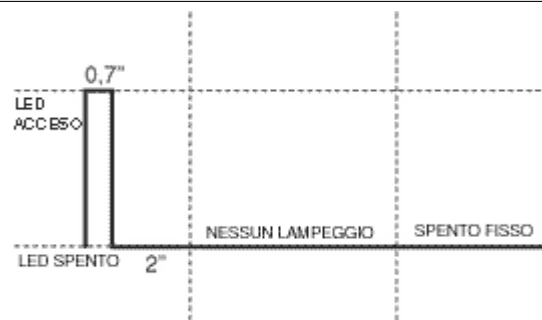
If the 3-flash code is detected, check if the failure occurs when the MASTER key is inserted into the key switch.

- If the failure disappears when the MASTER key is used, proceed with coding a new service key (Blue).
- If the failure persists, it means that the MASTER key and the control unit are not linked; in this case, replace the control unit and then encode the keys.

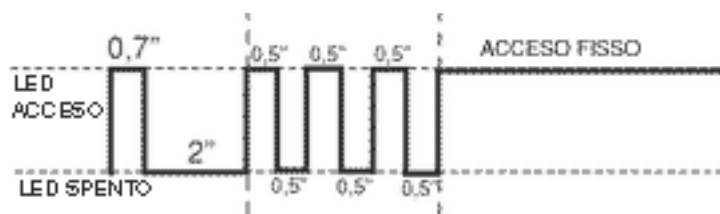
The immobilizer system is efficient when, after switching over to «ON», only a 0.7-sec flash is detected (see diagram).

In this case, the engine can be started.

Example with programmed control unit, transponder, programmed key and working aerial. **The ignition is enabled (regular use conditions)**



3-FLASH CODE - Example with programmed control unit, aerial working properly and unknown transponder code. **Ignition disabled-Vehicle immobilised**



Ignition circuit

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.

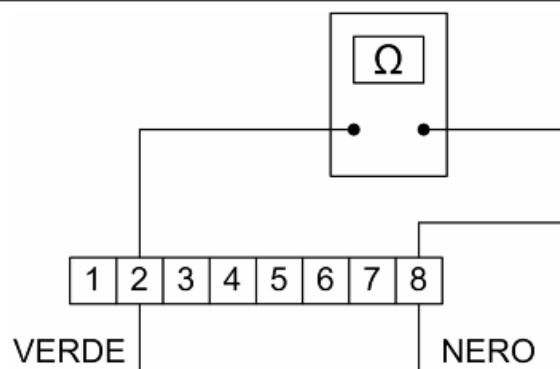
To avoid disturbances in the ignition system during start-up, it is very important that the engine-chassis ground connection bonding is efficient.

No spark plug

Once the lack of power to the spark plug has been detected and the LED indicates it can be ignited, follow this procedure:

- Pick-Up check.

Disconnect the control unit connector and check the resistance value between terminal No. 2 (Green) and terminal No. 8 (Black). Check the Pick-Up and its power line:



Electric characteristic

Pick-up resistance value

105 ÷ 124 Ohm

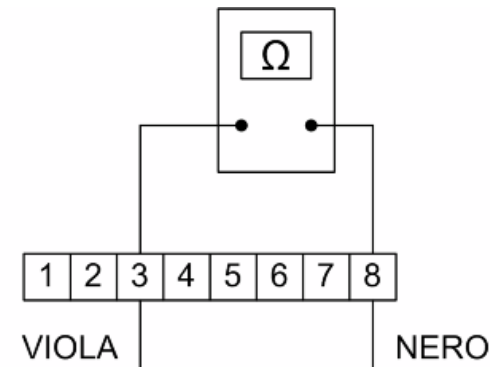
If a break in the circuit is found, check again the flywheel and the engine ground connectors (see engine manual). If non-conforming values are measured, replace the Pick-Up; otherwise, repair the cable harness.

In case conforming values are measured, try replacing the control unit (without programming) and make sure the failure has been solved by checking sparks are produced in the spark plug; only then program the control unit.

- HV primary coil check

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

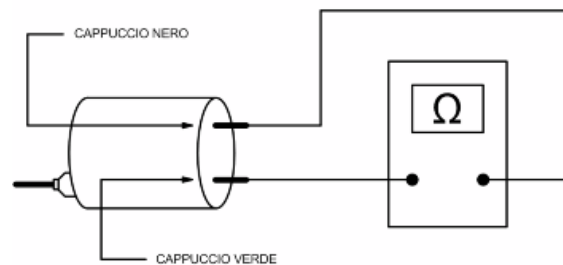
If non-conforming values are measured, check again the HV primary coil directly on the positive and negative terminals. If non-conforming values are measured, repair the cable harness or else replace the HV coil.



Electric characteristic

High voltage coil primary resistance value

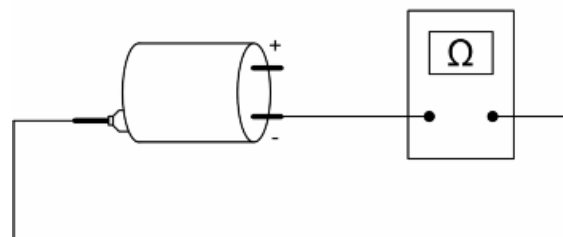
~ 1 ohm



HV coil secondary check

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

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



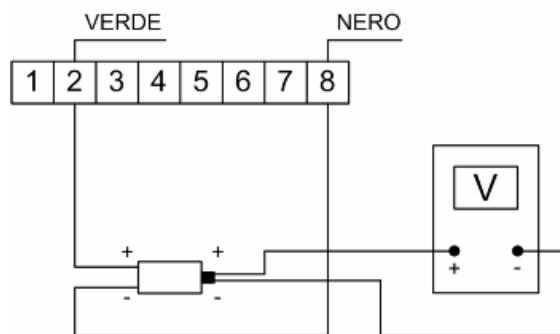
Electric characteristic

High voltage coil secondary resistance value

~ 8,000 ± 300 ohm

Pick-Up.

- Disconnect the control unit connector and connect the positive wire to connector No. 2 and the negative wire to connector No. 8 (see figure).
 - The multimeter end of a scale should be 200V.
- Use the start-up system to run the engine and measure the voltage produced by the Pick-Up.
- Replace the Pick-Up if non-conforming values are measured.



N.B.

THE MULTIMETER MUST BE SELECTED TO DETECT CONTINUOUS VOLTAGE.

Specific tooling

020409Y Multimeter adaptor - Peak voltage detection

Electric characteristic

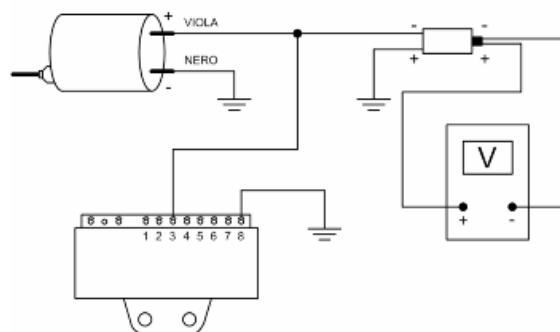
Voltage value

> 5 Volt

- HV coil

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

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



N.B.

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

Electric characteristic

High voltage coil voltage value

High voltage coil voltage value: > 100 Volt

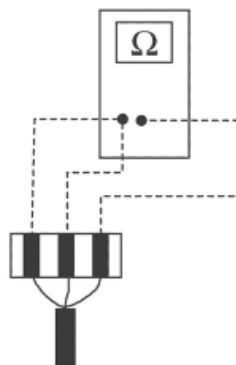
Stator check

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

Electric characteristic

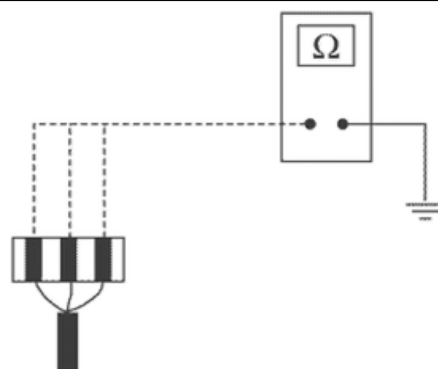
Ohm value:

0.7 ÷ 0.9 Ohm



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

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



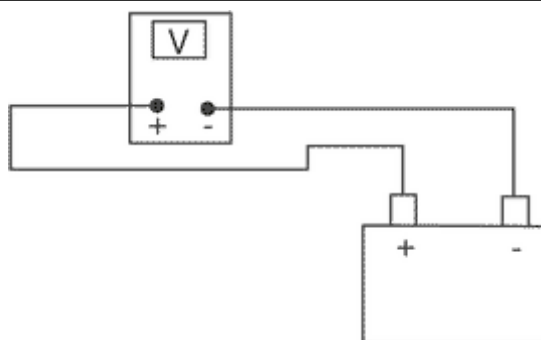
Voltage regulator check

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

The voltage should not exceed 15.2 Volt.

In case higher voltages are detected, replace the regulator.

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



Recharge system voltage check

The recharge system is provided with a three phase alternator with permanent flywheel.

The alternator is directly connected to the voltage regulator.

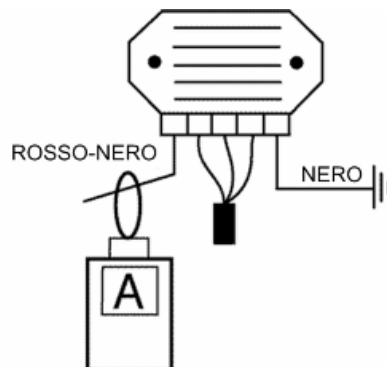
In turn, the voltage regulator is directly connected to ground and to the battery positive terminal passing through the 15A protection fuse (No. 3).

This system therefore requires no connection to the key switch.

The three- phase generator provides good re-charge power and at low revs a good compromise is achieved between generated power and idle stability. For this reason, it is very important that the idle speed is adjusted as prescribed.

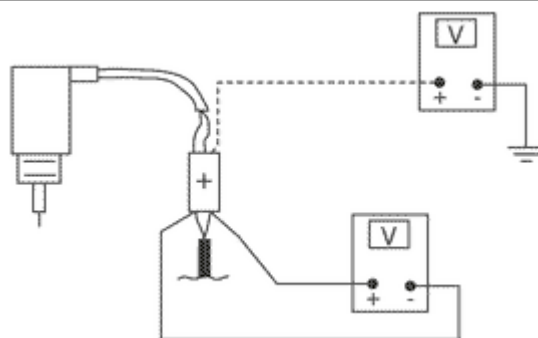
Connect an ammeter induction clamp to the voltage regulator positive terminal, measure the battery voltage and turning on the vehicles lights with engine off, wait for the voltage to set at about 12 V. Start the engine and measure the current generated by the system with lights on and a high running engine.

In case the generated current value is lower than 10A, repeat the test using a new regulator and/ stator alternatively.



Choke Inspection

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

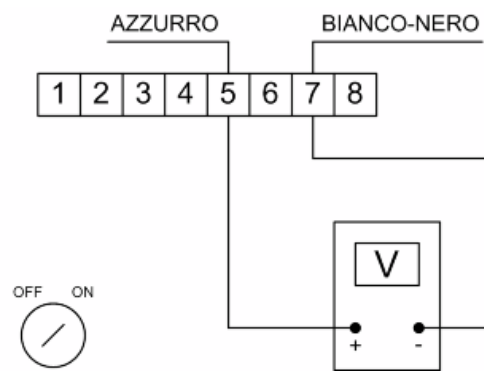


If no voltage is detected, connect the multimeter negative lead to the ground connection and the positive lead to the automatic starter White-Black cable; with the key switch set to «ON» check whether there is battery voltage; if there is no voltage, check the cable harness connections to the key switch and that the 15A fuse (No. 3) works properly.

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

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

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



Turn signals system check

Instrument panel power supply check:

- Disconnect the instrument panel connector and check that there is battery voltage between terminal No. 11/20 (White-Red) and the ground connection.
- Check that the same happens between terminal No. 11/20 and terminal No. 16/20 (Black).
- Repeat the check between terminal No. 13/20 (White-Black) and terminal No. 16/20 with the key switch set to «ON», the side stand should be raised and the emergency switch set to «RUN».

If there is no voltage, check cable harness, and that 7.5A fuses (No 6 and 9) are connected and in good conditions. Otherwise, proceed as follows:

- Connect the instrument panel terminal No 18/20 to ground and check that the right turn indicators turn on.
- Repeat the check with terminal No 19/20 making sure that the left turn indicators turn on.

If no lights turn on, replace the instrument panel because it is faulty. If they turn on, carry out the following checks:

- Check for the continuity between terminals No. 3 and No. 2 of the electric control management device with the turn indicator switch activated to the right.

- Repeat the test between terminals No 5 and No 4 with the turn indicator switch activated to the left. If there is no continuity, check the connection cable harness between the instrument panel, the electric control management device and the turn indicator switch, then repeat the test.

If there is still no continuity between the terminals, replace the electric control management device because it is faulty. If there is continuity, replace the turn indicator switch because it is certainly damaged.

Lights list

BULBS

	Specification	Desc./Quantity
1	High/low beam light bulb	Type: HALOGEN (H7) Power: 12V - 55W Quantity: 2
2	Front headlights bulb	Type: ALL GLASS Power: 12V - 5W Quantity: 2
3	Rear turn indicator bulbs	Type: SPHERICAL Colour: Amber Power: 12V-10W Quantity: 2
4	Front turn indicator bulbs	Type: ALL GLASS Colour: Amber Power: 12V - 5W Quantity: 4
5	Tail light and stop light bulb	Type: SPHERICAL, DOUBLE FILAMENT Power: 12V - 21/5W Quantity: 1
6	License plate lighting bulb	Type: ALL GLASS Quantity: 1 Power: 12V - 5W
7	Helmet compartment lighting bulb	Type: CYLINDRIC Quantity: 1 Power: 12V - 5W

Fuses

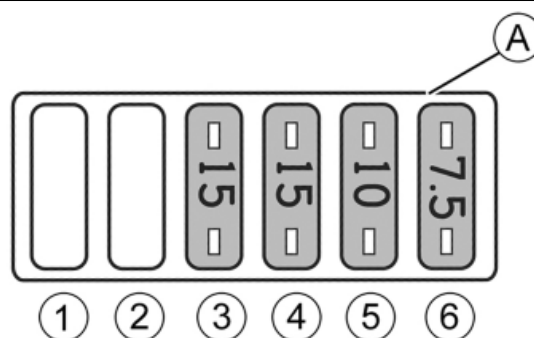
The electric system is fitted with 2 fuse boxes:

Fuse box «A» 4 fuses located in the helmet compartment near the battery.

Fuse box«B» 6 fuses located in the helmet compartment near the plug socket.

Replace fuses using adequate pliers supplied in the tool kit.

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



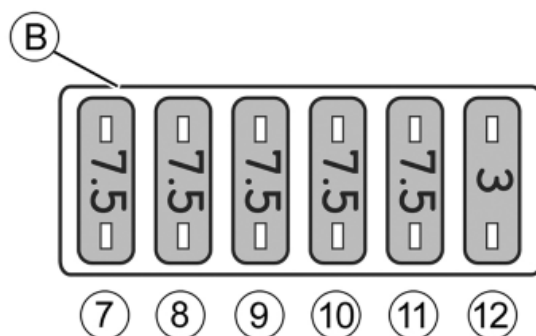
CAUTION



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).

FUSES A

	Specification	Desc./Quantity
1	Fuse No. 1	Pre-installation not used.
2	Fuse No. 2	Pre-installation not used.
3	Fuse No. 3	Capacity:15A Protected circuits: Radiator electric fan, Re-charge circuit, Ignition device, Circuits protected by fuses 10, 11 and 12 .
4	Fuse No. 4	Capacity:15A Protected circuits: Helmet compartment light bulb, 12V Accessory socket.
5	Fuse No. 5	Capacity:10 A Protected circuits: Key switch and circuits protected by fuses 7, 8 and 9 .
6	Fuse No. 6	Capacity:7.5 A Protected circuits: Digital display, Warning lights, Turn indicators, Immobilizer, Antitheft device pre-installation.

FUSES B

	Specification	Desc./Quantity
1	Fuse No. 7	Capacity:7.5 A Protected circuits: Low-beam bulb
2	Fuse No. 8	Capacity:7.5 A Protected circuits: High-beam light, High-beam warning lights.
3	Fuse No. 9	Capacity:7.5 A Protected circuits: Turn indicators, Antitheft device pre-installation, Digital display.
4	Fuse No. 10	Capacity:7.5 A Protected circuits: Front tail light, Rear tail light, License plate light, Instrument panel lighting.
5	Fuse No. 11	Capacity:7.5 A Protected circuits: Stop lights, Horn.
6	Fuse No. 12	Capacity:3A

Specification	Desc./Quantity
	Protected circuits: Fuel pump controlling device.

Dashboard

The digital display has two service symbols:

SERVICE:

The lamp should come on after reaching 1,000 km, then every 6,000 km or 1 year after the last activation.



BELT:

This lamp should turn on and flash every 6,000 km.

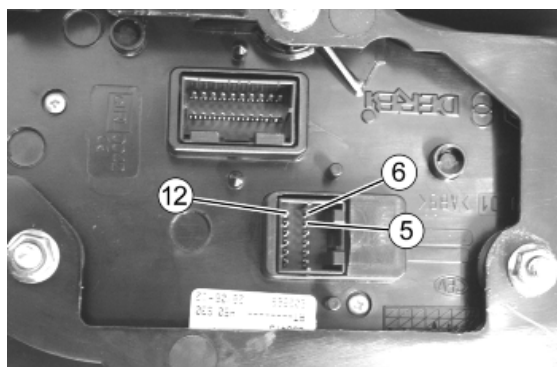
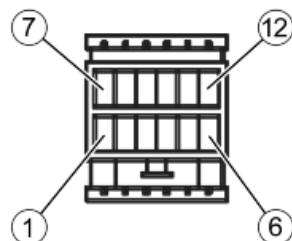


- Press buttons "MODE" and "ODO/SET" simultaneously at the moment you turn the key to "ON" for more than 3 seconds: The "BELT" symbol starts to flash.
- Pressing the button "MODE" for less than 1 second displays the symbols in turn. The selected symbol remains lit.
- Pressing button "MODE" for longer than 3 seconds resets the kilometre reading for the symbol selected, in "SERVICE" mode the date is also reset.

N.B.

- AT THE MOMENT THE DATE IS RESET, THE "SERVICE" SYMBOL IS ACTIVATED AGAIN.
- PERFORM THE RESET PROCEDURE ONLY AT THE MOMENT OF DELIVERY OF THE SCOOTER TO THE CUSTOMER IN ORDER THAT THIS SYMBOL SIGNALS THE NEED FOR THE FIRST SERVICE IN RELATION TO THE DISTANCE TRAVELLED AND THE TIME SINCE THE ACTIVATION.

The instrument Panel recognises the vehicle engine type (125 cm³, 250 cm³, 500 cm³); according to the 12-way connector configuration of the connecting clamp between the electric system Cable harness and the Instrument Panel.



INSTRUMENT PANEL COMMON TERMINAL DESCRIPTION

Specification	Desc./Quantity
Pins No 5 and No 12 jumped	Nexus 500
Pins No 6 and No 12 jumped	Nexus 250
Pins No 5, No. 6 and No. 12 jumped	Nexus 125

Sealed battery

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

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

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

INSTRUCTIONS FOR THE BATTERY REFRESH AFTER OPEN-CIRCUIT STORAGE

1) Voltage check

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

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

2) Constant voltage battery charge mode

- Constant voltage charge equal to 14.40 ÷ 14.70V
- Initial charge voltage equal to 0.3 ÷ 0.5 for Nominal capacity
- Charge time:

10 to 12 h recommended

Minimum 6 h

Maximum 24 h

3) Constant current battery charge mode

- Charge current equal to 1/10 of the nominal capacity of the battery
- Charge time: 5 h

CAUTION

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

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

IF THE VEHICLE IS NOT USED FOR SOME TIME (1 MONTH OR MORE) THE BATTERY NEEDS TO BE RECHARGED PERIODICALLY. THE BATTERY RUNS DOWN COMPLETELY IN THE COURSE OF THREE MONTHS. IF IT IS NECESSARY TO REFIT THE BATTERY IN THE VEHICLE, BE CAREFUL NOT TO REVERSE THE CONNECTIONS TAKING INTO ACCOUNT THAT THE GROUND WIRE (BLACK) MARKED (-) MUST BE CONNECTED TO THE - NEGATIVE TERMINAL WHILE THE OTHER TWO RED WIRES MARKED (+) MUST BE CONNECTED TO THE TERMINAL MARKED WITH THE +POSITIVE SIGN

WARNING

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

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

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

Pump electrics check

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

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



PUMP SUPPLY

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

If the pump does not work:

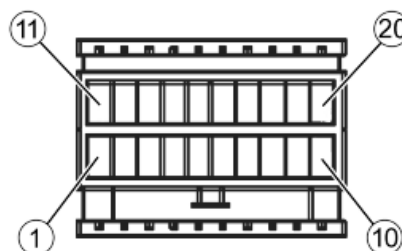
- Disconnect the fuel supply connector from the pump.
- Make sure there is battery voltage at the connector ends.
- If there is no voltage, check the continuity of the cable harness and replace it if damaged.
- If the cable harness is intact, check that the fuel pump works properly by applying a 12 V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

Replace the pump if damaged.

- If the pump works properly, replace the control unit.

Connectors**INSTRUMENT PANEL CONNECTOR**

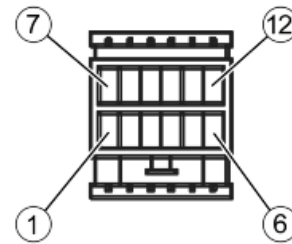
1. To the wheel turning sensor (Red)
2. To the wheel turning sensor (Blue)
3. To the wheel turning sensor (Grey-Black)
4. Panel lighting and headlight warning light (Yellow-Black)
5. Rpm indicator signal (White-Purple)
6. Thermistor signal (Yellow-Pink)
7. Ground (Black)
8. Oil pressure signal (Brown)
9. Right turn indicator warning light (White-Blue)
10. Left turn indicator warning light (Pink)
11. +Battery (White-Red)
12. Immobilizer LED (Yellow)
13. +Live (White-Black)
14. To electric control management device (Grey)
15. Fuel level signal (White-Green)
16. Ground (Black)
17. Free
18. To electric control management device (Blue)
19. To electric control management device (Pink-Black)



20. Free

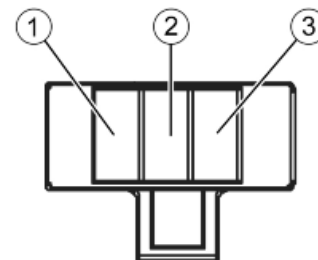
RPM INDICATOR CONNECTOR

1. To the analogue rpm indicator (Brown-Black)
2. To the analogue rpm indicator (Blue-Black)
3. Free
4. Free
5. Engine identification pin "Nexus 500/125"
6. Engine identification pin "Nexus 250/125"
7. To the analogue rpm indicator (Brown-Red)
8. To the analogue rpm indicator (Blue-Red)
9. Free
10. Free
11. Free
12. Engine identification common pin "Common ID"



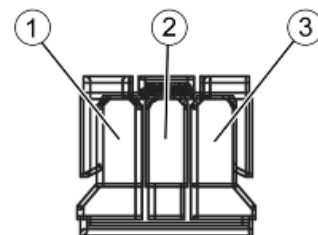
TONE WHEEL CONNECTOR

1. To the instrument panel (Blue)
2. To the instrument panel (Grey-Black)
3. To the instrument panel (Red)



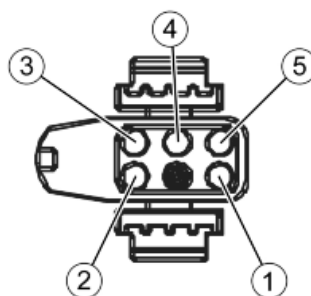
RPM INDICATOR SIGNAL FILTER CONNECTOR

1. Rpm indicator signal output (White-Purple)
2. Ground (Black)
3. Rpm indicator signal inlet (Purple)

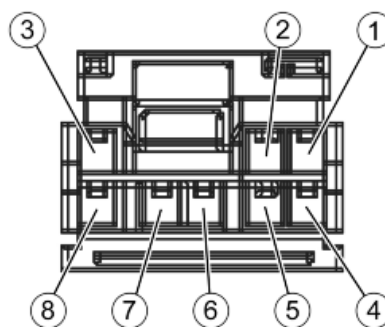


FLYWHEEL CONNECTOR

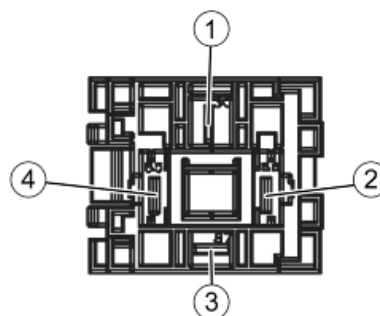
1. To the voltage regulator (Yellow)
2. To the voltage regulator (Yellow)
3. To the engine oil pressure sensor (Brown)
4. To the voltage regulator (Yellow)
5. Pick-up (Green)

**CONTROL UNIT CONNECTOR**

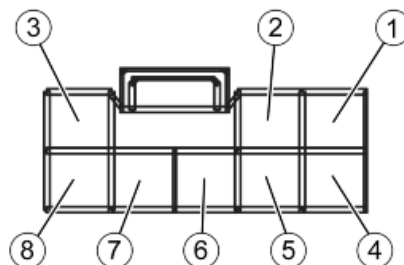
1. Not connected
2. Pick-up (Green)
3. HV coil (Purple)
4. +Battery (Red-Black)
5. +Live (Blue)
6. Immobilizer (Yellow)
7. To the automatic starter (White-Black)
8. Ground (Black)

**START-UP ENABLING RELAY CONNECTOR**

1. To the start-up relay (Green)
2. Ground (Black)
3. +Live (Blue)
4. Ground (Black)

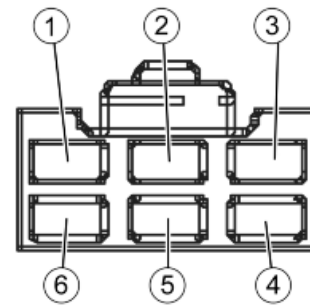
**ANTITHEFT CONNECTOR**

1. Left turn indicators (Pink)
2. Right turn indicators (White-Blue)
3. Ground (Black)
4. +Battery (White-Red)
5. +Live (White-Black)
6. Helmet compartment lighting (Blue-Yellow)
7. Not connected
8. Not connected



VOLTAGE REGULATOR CONNECTOR

- 1. +Battery (Red-Black)
- 2. Not connected
- 3. Ground (Black)
- 4. To the magneto flywheel (Yellow)
- 5. To the magneto flywheel (Yellow)
- 6. To the magneto flywheel (Yellow)



INDEX OF TOPICS

ENGINE FROM VEHICLE

ENG VE

This section describes the operations to carry out when removing the engine from the vehicle.

Exhaust assy. Removal

- Undo the two exhaust manifold fixings on the head.



- Undo the muffler fixing screw pair to the support arm.

Remove the full muffler assembly.

CAUTION

SHOULD IT BE NECESSARY TO REMOVE ONLY THE MUFFLER TIP, ALWAYS REPLACE THE GRAPHITE GASKET BETWEEN STUB AND TIP.



Removal of the engine from the vehicle

To remove the chassis engine, proceed as follows:

- Disconnect the battery.
 - Remove the side fairings.
 - Remove the handgrips and top side fairings.
 - Remove carburettor inspection cover.
 - Remove the air filter.
- Remove the full muffler assembly.
- Remove the rear wheel.
 - Remove the rear break calliper and release the clamp pipes on the lower side of the engine.
 - Drain the cooling system.

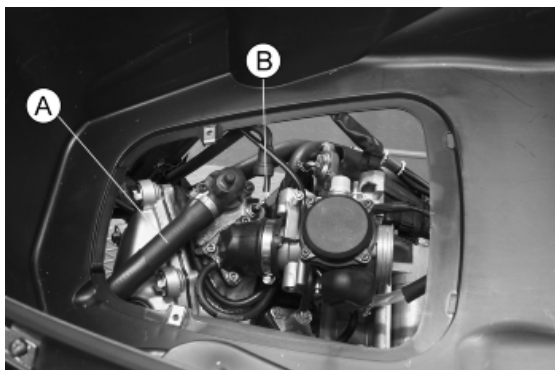
WARNING

OVERLAPPING OPERATIONS IN DIFFERENT CHAPTERS MUST BE LOGICALLY INTERPRETED SO AS TO AVOID REMOVING UNNECESSARY COMPONENTS.

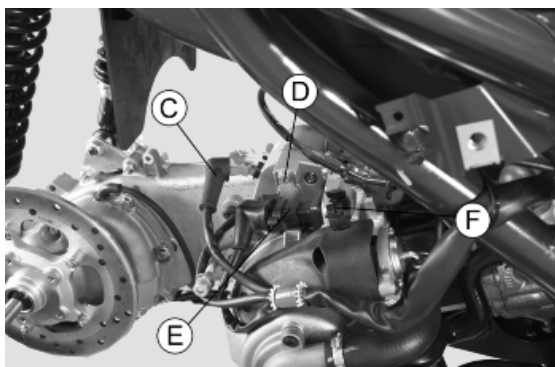
WARNING

CARRY OUT THESE OPERATIONS WHEN THE ENGINE IS COLD.

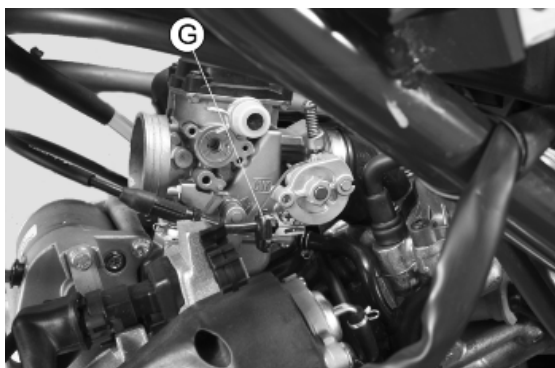
- From the helmet compartment, disconnect the coolant return pipe «A» from the water temperature thermostat. Disconnect the water temperature sensor «B».



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



- Undo the nut «G» and release the carburettor throttle control transmission.



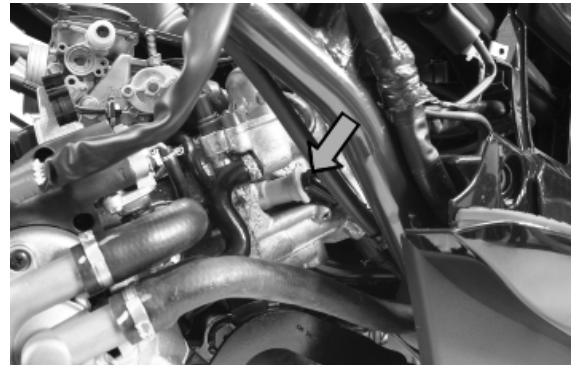
- Disconnect the fuel delivery pipe «H» from the carburettor.



- From the right side of the vehicle, disconnect the carburettor starter connector and pull to release it from the clamp.



- From the right side of the vehicle, disconnect the spark plug.



- From the left side of the vehicle, undo and remove the engine ground screw «I».

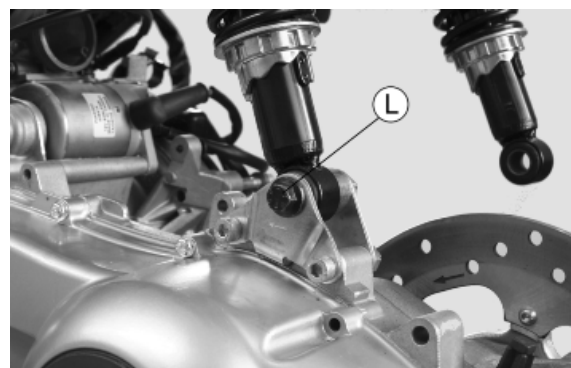
WARNING

GET A HOIST AND BELTS TO LIFT IT.

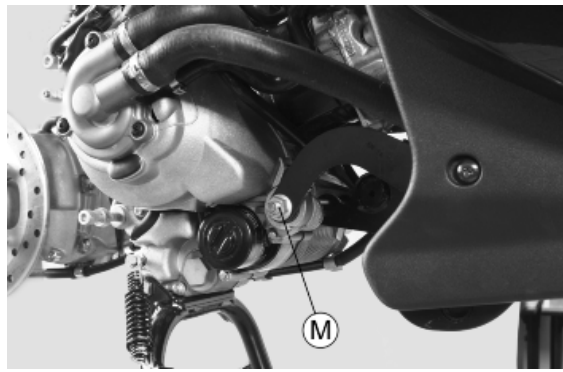


- Connect the belts to the rear part of the chassis. Lift the hoist arm until the belts are tight.

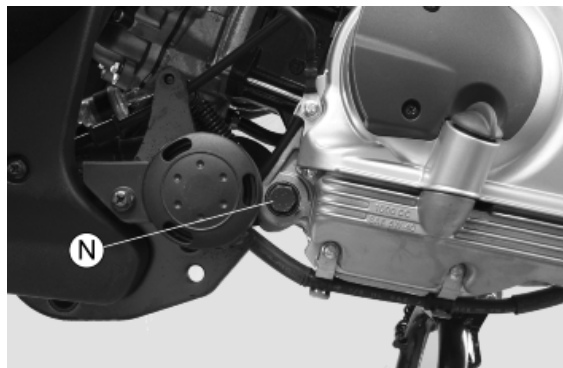
- Undo and remove the left shock absorber fixing screw «L».



- Undo and remove the engine retainer nut on the swinging arm «M».



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



To refit the engine on the chassis follow the removal procedure but in reverse order, checking:

- Locking torques (see table "TORQUE" , chapter "SPECIFICATIONS").
 - Fasten the pipes and cables with the appropriate clamps.
 - Fill and bleed the cooling system.
 - Check the throttle control transmission functioning.
 - Check the electric device functioning.
-

INDEX OF TOPICS

ENGINE

ENG

Automatic transmission

Air duct

- Remove the 4 screws and the housing.



Removing the driven pulley shaft bearing

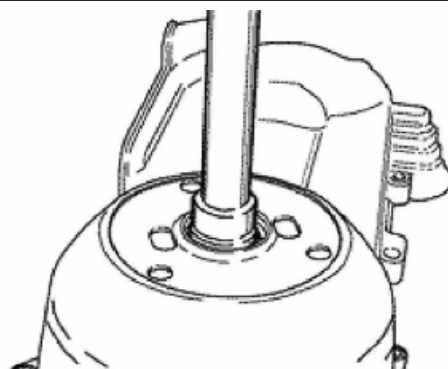
- Remove the clip from the inside of the cover.
- Remove the bearing from the crankcase by means of:

Specific tooling

020376Y Adaptor handle

020375Y Adaptor 28 x 30 mm

020412Y 15 mm guide



Refitting the driven pulley shaft bearing

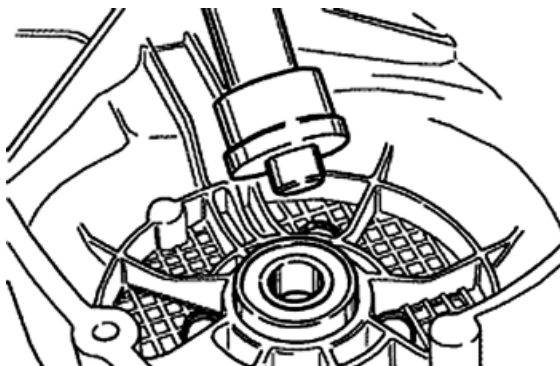
- Slightly heat the crankcase from the inside so as not to damage the painted surface.
- Insert the bearing in its seat.
- Refit the seeger ring.

CAUTION

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

N.B.

ALWAYS REPLACE THE BEARING WITH A NEW ONE UPON REFITTING.



Specific tooling

020376Y Adaptor handle

020357Y 32 x 35 mm adaptor

020412Y 15 mm guide

Baffle roller

Removal

Belt support roller (200 cm³ models only)

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



Refitting

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

Specific tools:

Specific tooling

020455Y 10-mm guide



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



Locking torques (N*m)

Anti-flapping roller 12 - 16

Plastic roller

- Check that the roller does not show signs of wear and that it turns freely.
- Remove the special clamping screws as indicated in the photograph



- Check the outside diameter of the roller does not have defects that could jeopardise belt functioning
- For refitting, place the roller with the belt containment edge on the engine crankcase side
- Tighten the wrench to the prescribed torque.

Locking torques (N*m)

Anti-flapping roller 12 - 16

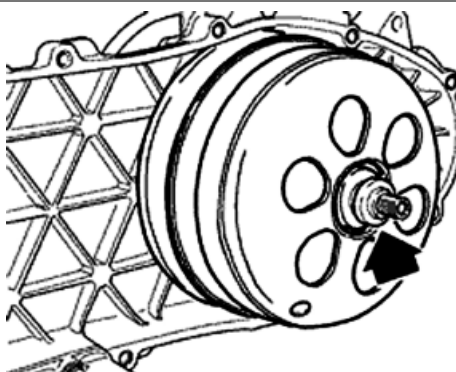


Removing the driven pulley

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

N.B.

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



Inspecting the clutch drum

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

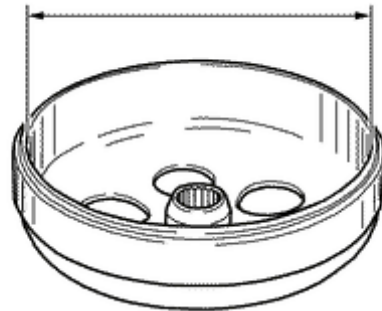
Characteristic

Max. value clutch bell

Max. value: Ø 134.5 mm

Clutch bell standard value

Standard value: Ø 134 - 134.2 mm



Checking the bell working surface eccentricity

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



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



CAUTION

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

Specific tooling

020444Y009 46x55 Wrench

020444Y010 adapter ring

Inspecting the clutch

- Check the thickness of the clutch mass friction material.
- The masses must not show traces of lubricants; otherwise, check the driven pulley unit seals.

N.B.

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

CAUTION

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

Characteristic

Check minimum thickness

1 mm



Pin retaining collar

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

N.B.

USE TWO SCREWDRIVERS IF YOU HAVE DIFFICULTY.

N.B.

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



- Remove the four 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 retaining ring using two flat blade screwdrivers.
- Support the pulley bushing adequately from the threaded side using a wooden surface.
- Using a hammer and pin, knock the ball bearing out as shown in the figure.



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

Specific tooling

001467Y035 Belle for OD 47-mm bearings



- Remove the roller bearing using the modular punch.

Specific tooling

020376Y Adaptor handle

020456Y Ø 24 mm adaptor

020363Y 20 mm guide

Inspecting the driven fixed half-pulley

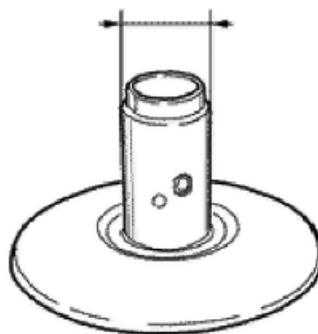
- Measure the outer diameter of the pulley bushing.
- Check the contact surface with the belt to make sure there are no flaws.

Characteristic**Half-pulley standard diameter**

Standard diameter: Ø 40.985 mm

Half-pulley minimum diameter

Minimum admissible diameter Ø 40.96 mm



Inspecting the driven sliding half-pulley

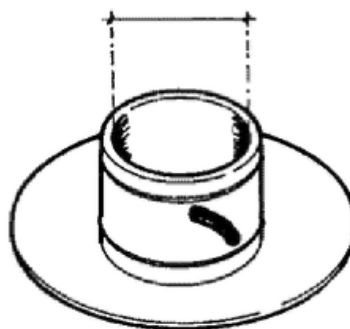
- Remove the two internal grommets and the two O-rings.
- Measure the movable half-pulley bushing inside diameter.

Characteristic**Movable driven half-pulley max. diameter**

Max. diameter admitted: Ø 41.08 mm

Movable driven half-pulley standard diameter

Standard diameter: Ø 41.000 ÷ 41.035 mm



Refitting the driven half-pulley bearing

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

Fit the snap ring

WARNING

N.B.

FIT THE BALL BEARING WITH THE VISIBLE SHIELD

Specific tooling

020376Y Adaptor handle

020375Y Adaptor 28 x 30 mm

020424Y Driven pulley roller casing fitting punch



Refitting the driven pulley

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



- Fit the half-pulley over the bushing using the appropriate tool
- Check that the pins are not worn and proceed to refitting them in their slots.
- Refit the torque server closure collar.



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

N.B.

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



Specific tooling

020263Y Sheath for driven pulley fitting

Recommended products

AGIP GREASE SM 2 Grease for the tone wheel revolving ring

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

Inspecting the clutch spring

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

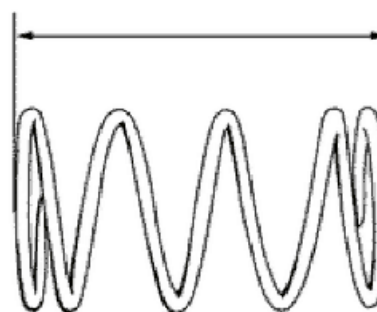
Characteristic

Standard length

106 mm

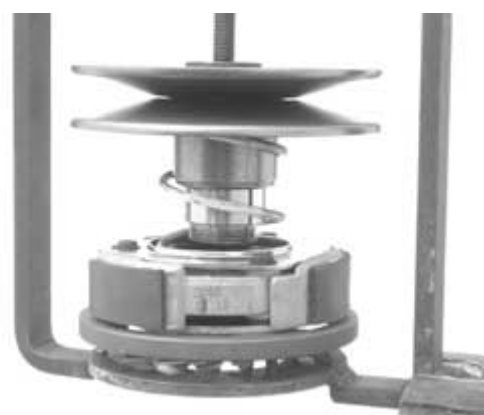
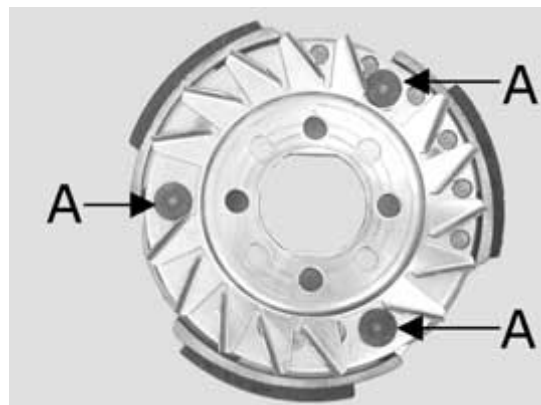
acceptable limit after use:

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



N.B.

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

N.B.

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

N.B.

AN EXCESSIVE QUANTITY CAN DAMAGE THE CLUTCH OPERATION.

Specific tooling

020444Y011 adapter ring

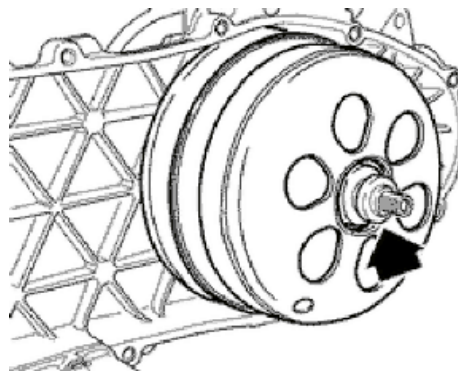
020444Y009 46x55 Wrench

Locking torques (N*m)

Clutch unit nut on driven pulley 55 ÷ 60

Refitting the driven pulley

- Reassemble the clutch bell and spacer.



Drive-belt

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

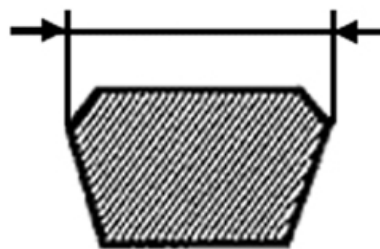
Characteristic

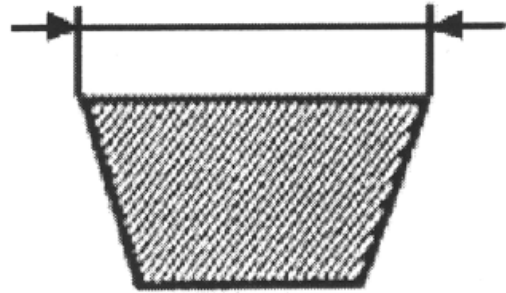
Driving belt - minimum width:

21.5 mm

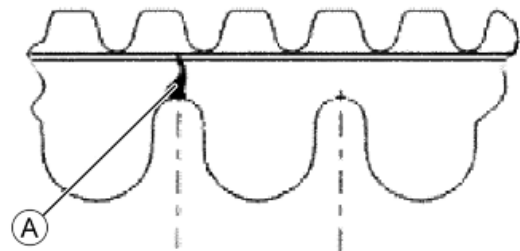
Driving belt - standard width:

22.5 ± 0.2 mm





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



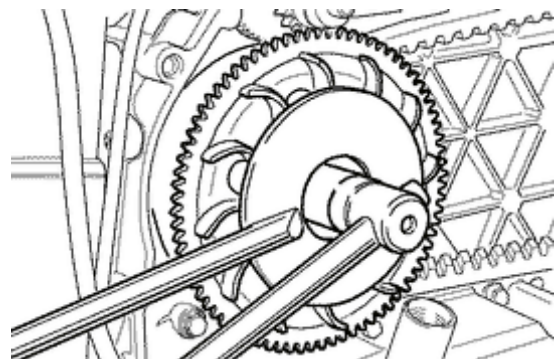
Removing the driving pulley

- 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.

Specific tools:

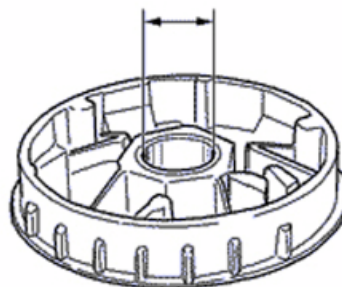
Specific tooling

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 outer diameter B of the pulley sliding bushing 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

Movable driving half-pulley bushing: Standard Diameter

26.000 - 26.021 mm

Movable driving half-pulley bushing: Maximum allowable diameter

Ø 26.12 mm

Sliding bushing: Standard Diameter

Ø 25.959 ÷ 25.98 mm

Sliding bushing: Minimum admissible diameter

Ø 25.95 mm

Roller: Standard Diameter

Ø 18.9 ÷ 19.1 mm

Roller: Minimum diameter permitted

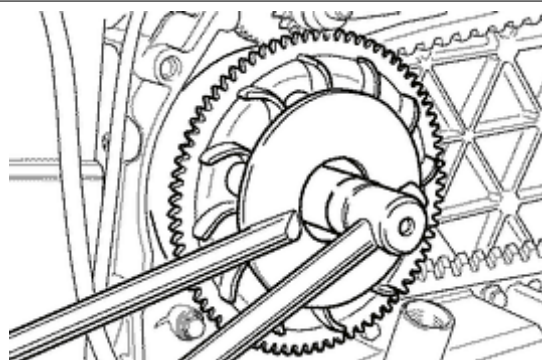
Ø 18.5 mm





Refitting the driving pulley

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



CAUTION

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

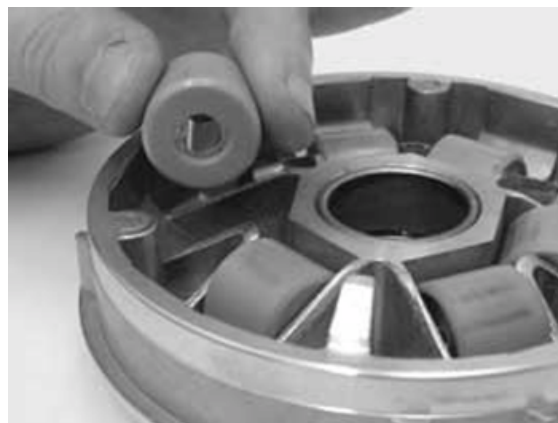
Specific tooling

020368Y driving pulley lock wrench

Locking torques (N*m)

Drive pulley nut 75 ÷ 83

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

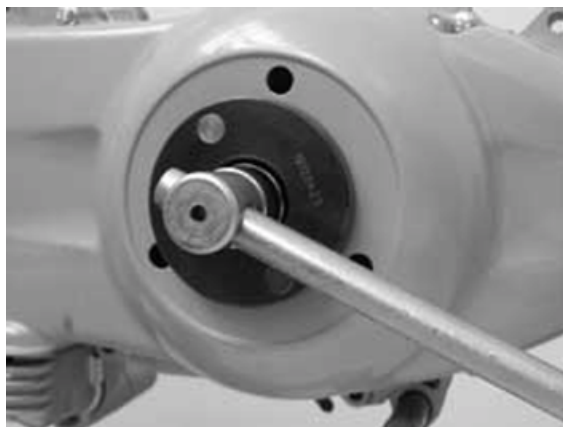


- Fit the driven pulley/Clutch/belt unit on the engine.



Refitting the transmission cover

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



Specific tooling

020423Y driven pulley lock wrench

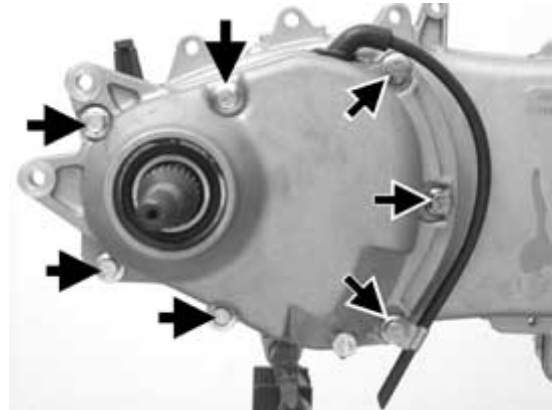
Locking torques (N*m)

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

End gear

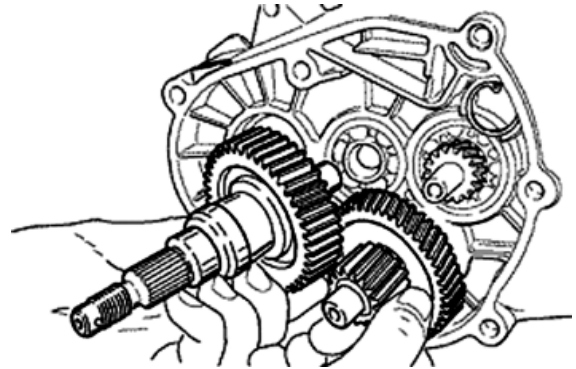
Removing the hub cover

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



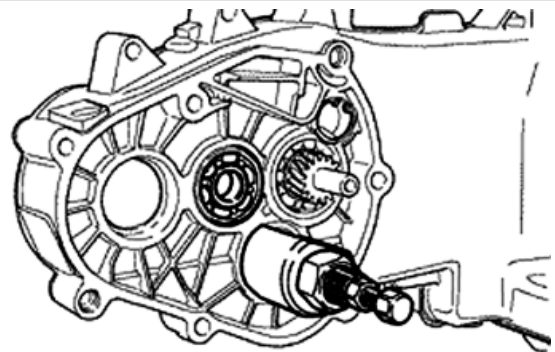
Removing the wheel axle

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



Removing the hub bearings

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



Specific tooling

001467Y013 Pliers to extract ø 15-mm bearings



Removing the wheel axle bearings

- Take out the clip on the outside of the gearbox cover.
 - Support the hub cover and expel the bearing.
- By means of the appropriate tools, remove the oil guard as in the figure.

Specific tooling

020376Y Adaptor handle

020477Y Adaptor 37 mm

020483Y 30 mm guide

020359Y 42x47-mm adaptor

020489Y Hub cover support stud bolt set



Removing the driven pulley shaft bearing

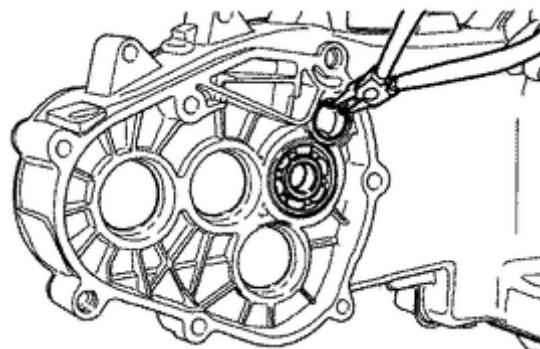
- As you need to remove the driven pulley shaft, its bearing and oil guard, remove the transmission cover as described above.
 - Extract the driven pulley shaft from its bearing.
 - Remove the oil guard using a screwdriver, working from inside the bearing and being careful not to damage the housing,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

Specific tooling

020376Y Adaptor handle

020375Y Adaptor 28 x 30 mm

020363Y 20 mm guide



Inspecting the hub shaft

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



Inspecting the hub cover

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

Refitting the wheel axle bearing

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

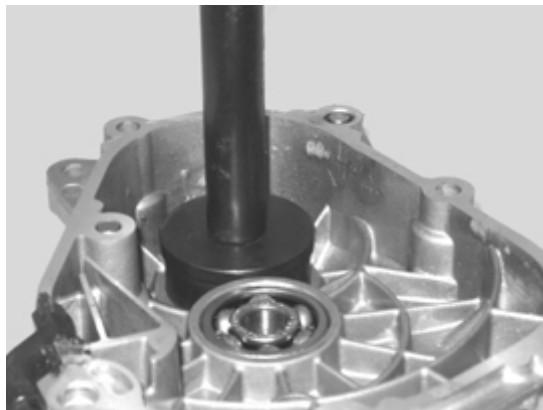
The 52 mm side of the adapter must be turned towards the bearing.

Specific tooling

020376Y Adaptor handle

020360Y Adaptor 52 x 55 mm

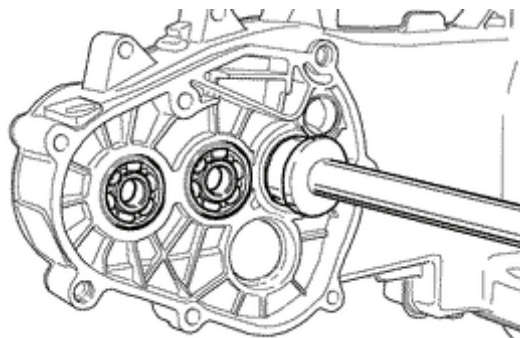
020483Y 30 mm guide



Refitting the hub cover bearings

For the fitting of 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 adaptor 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, SUPPORT THE COVER WITH THE STUD BOLT SET.

- 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



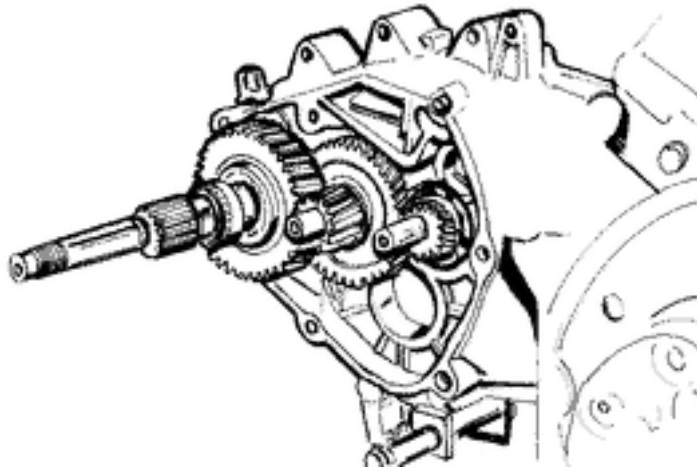
N.B.

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 guard flush with the crankcase from the pulley side.

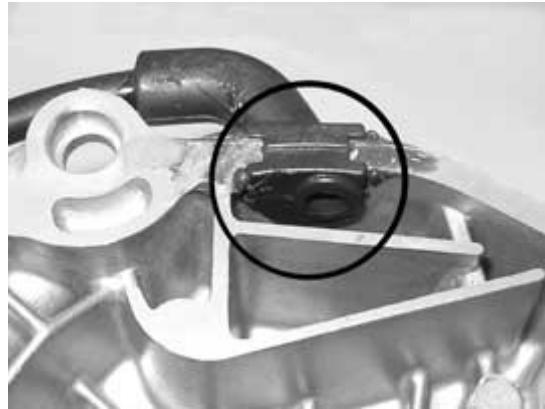
Refitting the hub bearings

- 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)

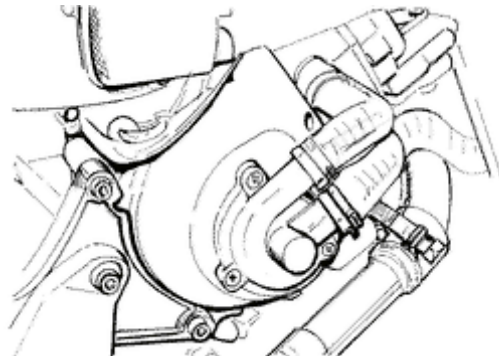
Rear hub cover screws 24 ÷ 27



Flywheel cover

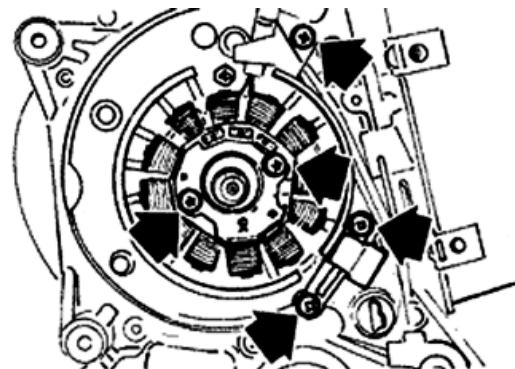
Removing the hub cover

- 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

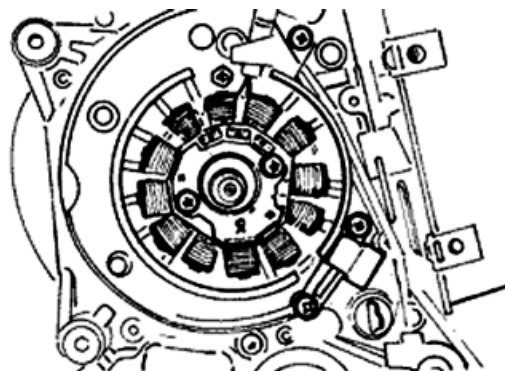
- Refit the stator and flywheel carrying out the removal procedure in reverse, tightening the retainers to the specified torque.
- Place the cable harness as shown in the figure.
- Stator screws and Pick-Up

N.B.

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

Locking torques (N*m)

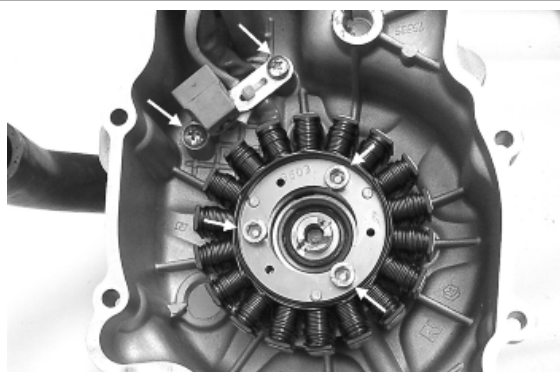
Stator assembly screws (°) 3 ÷ 4



- Refit the stator and flywheel carrying out the removal procedure in reverse, tightening the retainers to the specified torque.

Locking torques (N*m)

Stator assembly screws (°) 3 ÷ 4

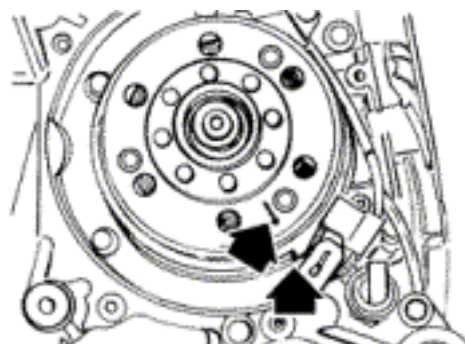


Refitting the flywheel cover

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

CAUTION

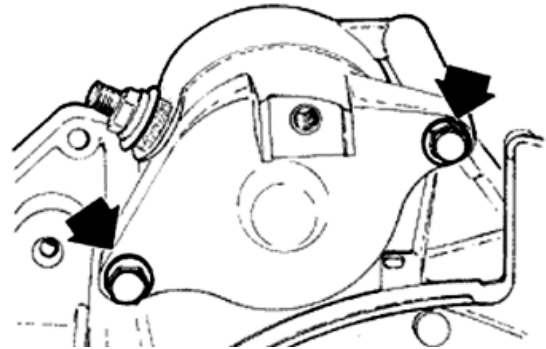
TAKE CARE TO CORRECTLY POSITION THE FLYWHEEL CONNECTOR. MAKE SURE THE CENTRING DOWELS ARE PRESENT.



Flywheel and starting

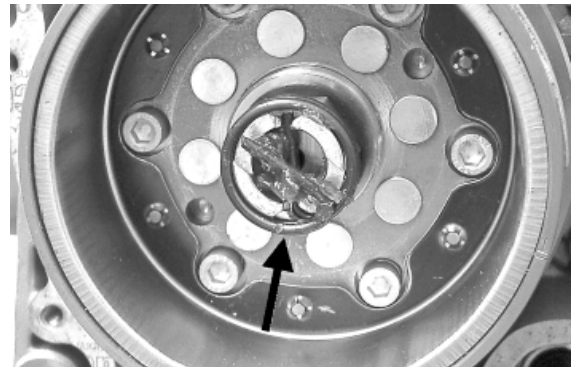
Removing the starter motor

- Remove the two screws indicated in the figure.
- Take the starter motor out of its seat



Removing the flywheel magneto

- Remove the water pump shaft and crankshaft spline clip



- Line up the two holes in the flywheel as shown in the photo



- Screw in the guide bushing that is part of the special flywheel stop tool on the flywheel as shown in the photo.



- Insert the special flywheel stop tool on the flywheel as shown in the photo

Specific tooling

020627Y Flywheel lock wrench



- Remove the flywheel nut with its washer
- Do up the flywheel nut by three or four threads so that the flywheel does not fall accidentally on extraction
- Screw the extractor onto the flywheel and extract it as shown in the photograph



Specific tooling

020467Y Flywheel extractor

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

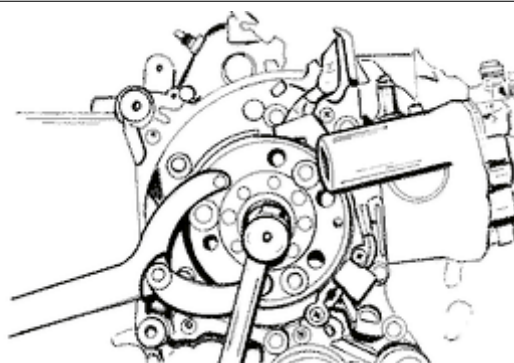
CAUTION

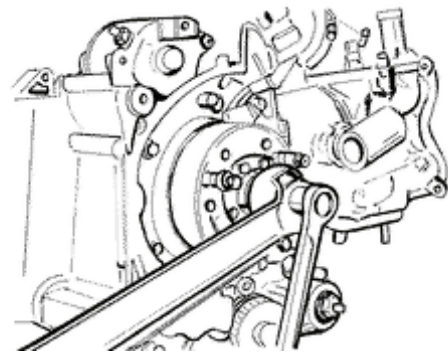
THE USE OF A CALLIPER SPANNER OTHER THAN THE ONE SUPPLIED COULD DAMAGE THE STATOR COILS

Specific tooling

020565Y Flywheel lock calliper spanner

008564Y Flywheel extractor





Inspecting the flywheel components

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

Refitting the free wheel

- Make sure the freewheel faying surfaces are in good condition.
- Thoroughly clean the free wheel to remove LOCTITE residue.
- Degrease the threading of the holes in the free wheel and the clamping screws.
- Apply the recommended product to the end of the screws.

Recommended products

Loctite 243 Medium strength threadlock

Loctite 243 medium-strength threadlock

- Fit the freewheel on the magneto flywheel making sure that the ground side is in contact with the flywheel itself, i.e. with wheel seeger ring visible.
- Lock the six clamping screws in criss-cross fashion to the prescribed torque.



Locking torques (N*m)

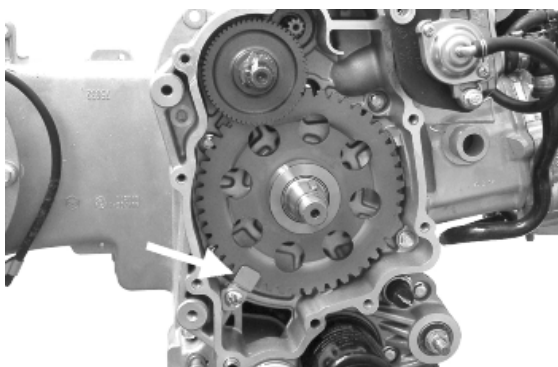
Screw fixing freewheel to flywheel 13 ÷ 15

- Oil the free wheel "rollers".



Refitting the flywheel magneto

- Remove the freewheel retaining plate indicated in the photograph
- Remove the transmission gear and the freewheel



- Insert the free wheel on the flywheel as shown in the photo
- Then refit the flywheel with free wheel and transmission gear



- Using the special flywheel stop tool, tighten up the flywheel fixing nut to the prescribed torque
- Refit the retention plate



Specific tooling

020627Y Flywheel lock wrench

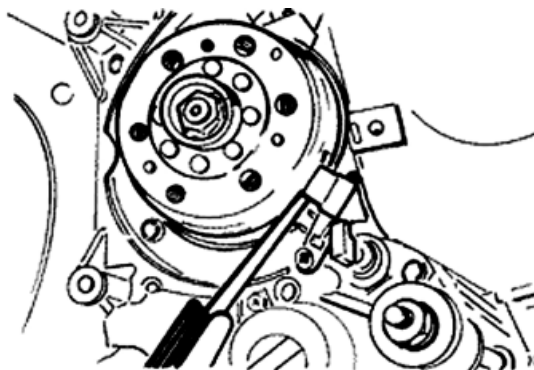
Locking torques (N*m)

Flywheel nut 94 ÷ 102

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

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

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



N.B.

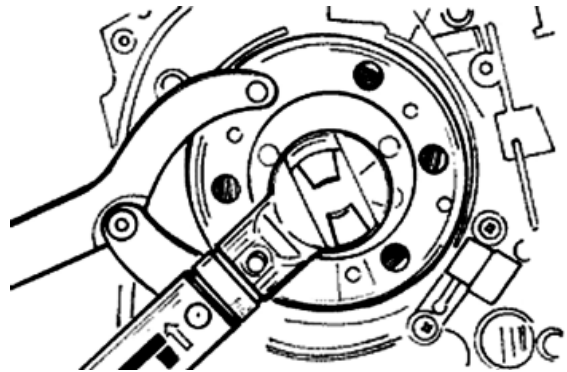
A VARIATION IN THE AIR GAP DISTANCE MODIFIES THE IGNITION SYSTEM IDLE SPEED

Specific tooling

020565Y Flywheel lock calliper spanner

Locking torques (N*m)

Flywheel nut 54 ÷ 60



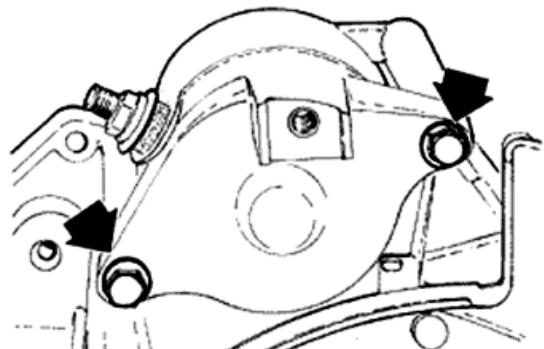
Refitting the starter motor

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

- Fit the starter on the crankcase, locking the two screws to the prescribed torque.

Locking torques (N*m)

Starter motor screws 11 ÷ 13



Cylinder assy. and timing system

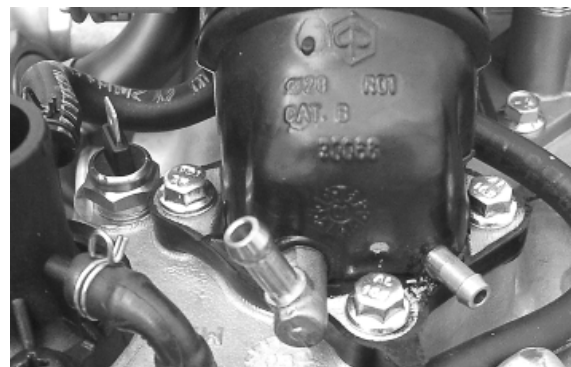
Removing the intake manifold

- Remove the flywheel cover completely as described in the flywheel cover section.

- Loosen the 3 screws and remove the intake manifold.

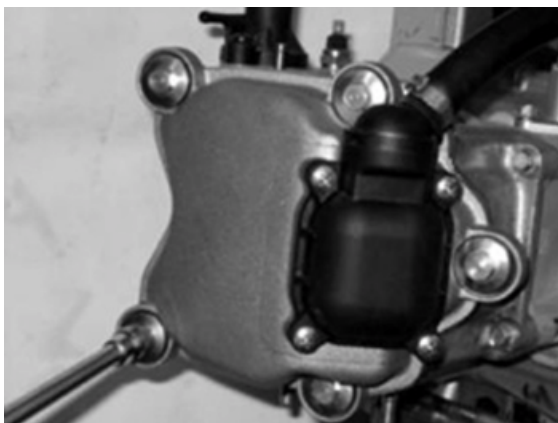
N.B.

TAMPERPROOF SCREWS ARE SUPPLIED WITH 125 CC MODELS.



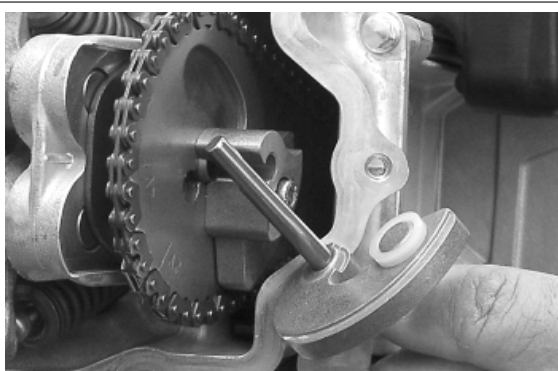
Removing the rocker-arms cover

- Remove the 5 screws indicated in the figure

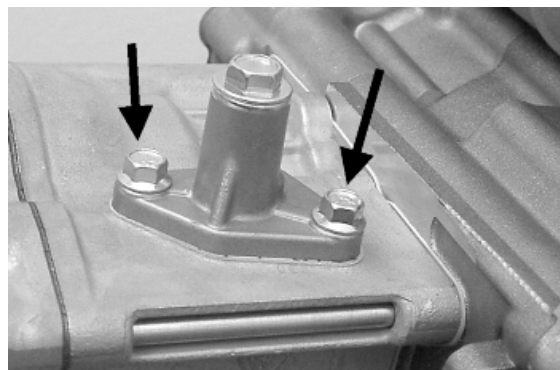


Removing the timing system drive

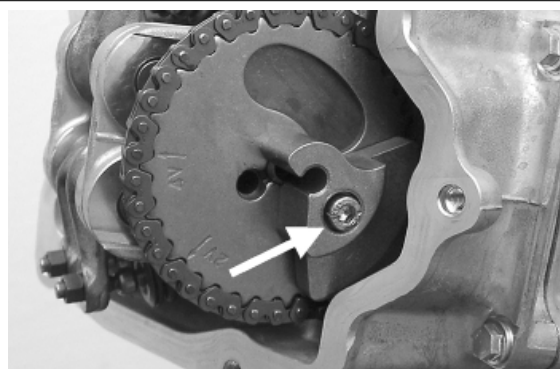
- Remove the parts listed below first: transmission cover, drive pulley with belt, oil sump with spring and by-pass piston, oil pump pulley cover, O-ring on the crankshaft and the sprocket wheel separation washer.
- Remove the tappet cover.
- Remove the central screw fastener and the automatic valve-lifter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



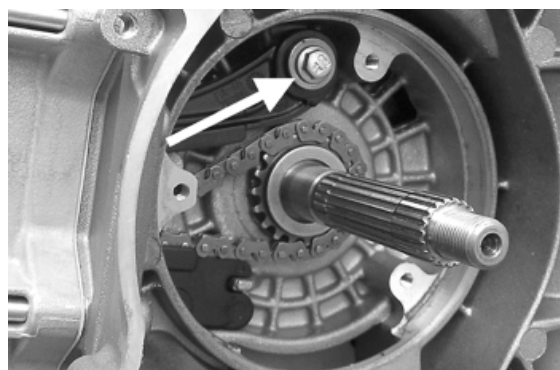
- Remove the camshaft control pulley with its washer.



- Remove the command sprocket wheel and the timing chain.

- Remove the screws indicated in the figure, the spacer bar and the tensioner slider.

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

**N.B.**

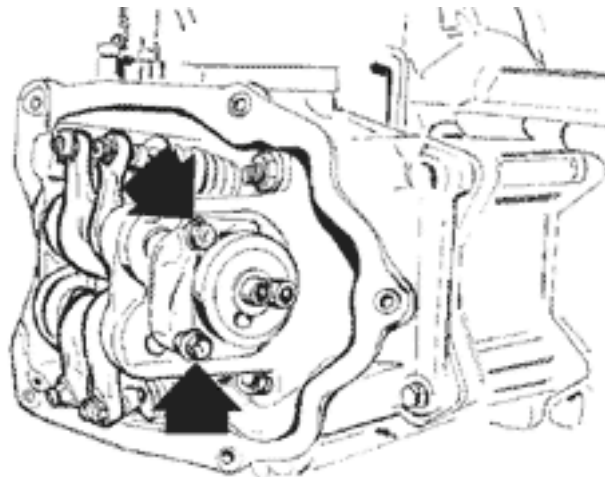
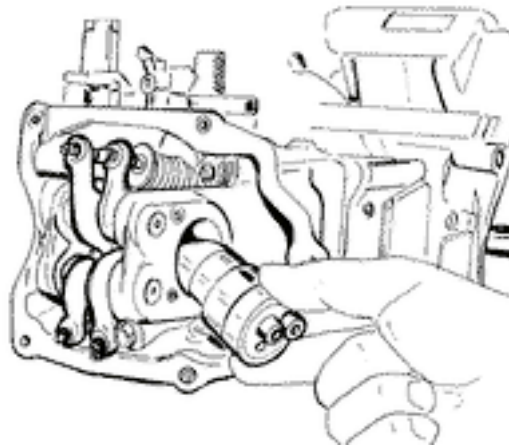
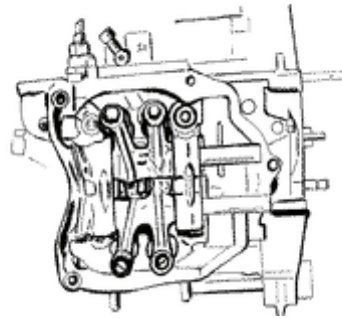
IT IS ADVISABLE TO MARK THE CHAIN IN ORDER TO ENSURE THAT THE INITIAL DIRECTION OF ROTATION IS MAINTAINED.

Removing the cam shaft

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

N.B.

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

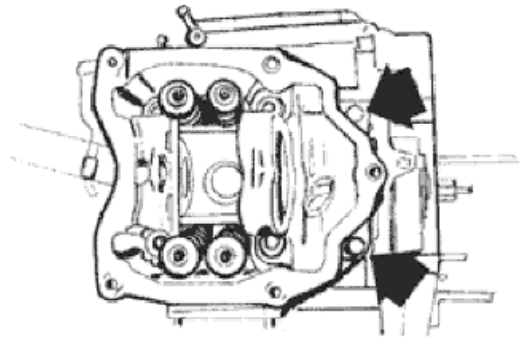


Removing the cylinder head

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

N.B.

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



Removing the valves

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

CAUTION

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

Specific tooling

020382Y011 adapter for valve removal tool

020382Y Valve cotters equipped with part 012 removal tool

020306Y Punch for assembling valve seal rings



Removing the cylinder - piston assy.

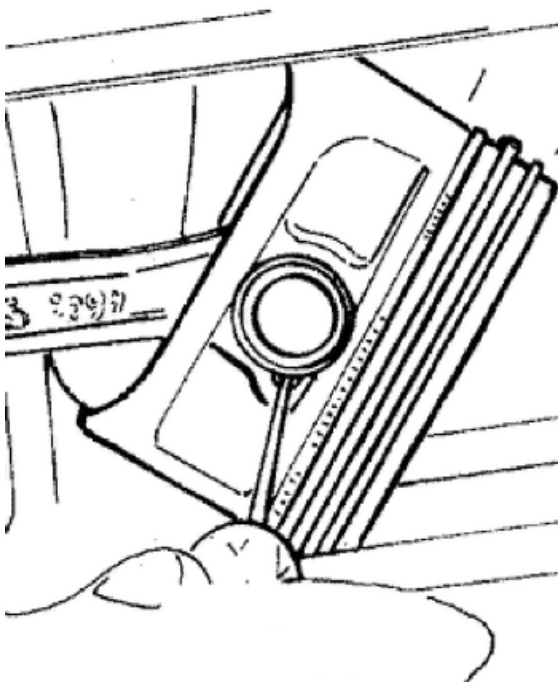
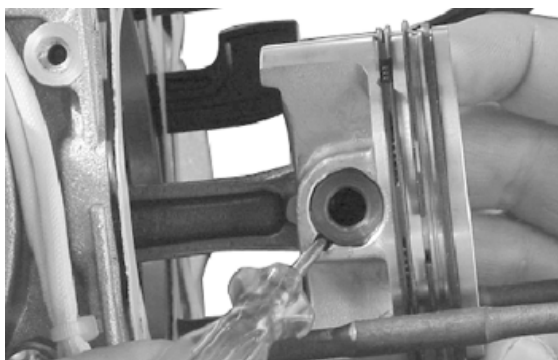
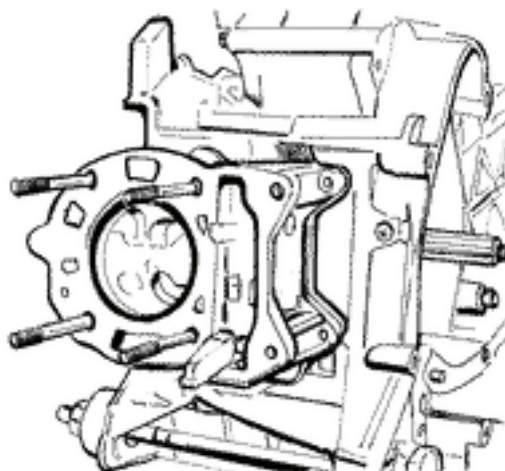
- Remove the chain guide pad.
- Pull out the cylinder.
- Remove the cylinder base gasket.
- Remove the two stop rings, the wrist pin and the piston.
- Remove the piston seals.

CAUTION

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

N.B.

BE CAREFUL NOT TO DAMAGE THE SEALING RINGS DURING REMOVAL.



Inspecting the small end

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

N.B.

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

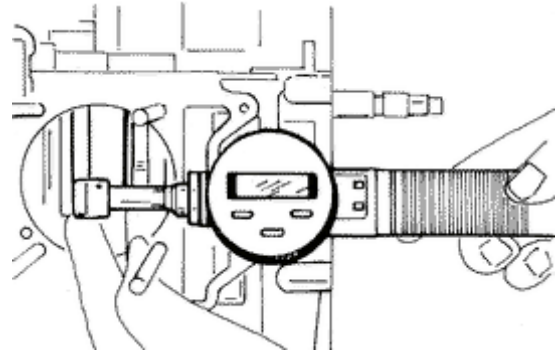
Characteristic

Rod small end check-up: Maximum diameter

15.030 mm

Rod small end check-up: Standard diameter

15 +0.015+0.025 mm



Inspecting the wrist pin

- Measure the outside diameter of the gudgeon pin.
- Calculate the coupling clearance between pin and connecting rod end.

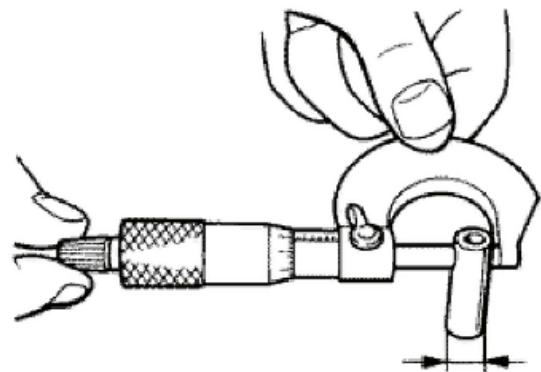
Characteristic

Pin diameter: Standard clearance

0.015 ÷ 0.029 mm

Pin diameter Standard diameter

14.996 - 15.000 mm



Inspecting the piston

- Measure the diameter of the wrist pin seat on the piston.
- Calculate the piston pin coupling clearance.
- Measure the outside diameter of the piston, perpendicular to the gudgeon pin axis.
- Measure at 41.1 mm from the piston crown in the position shown in the figure.
- 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.

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

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

piston diameter

56.945 ÷ 56.973 mm

Fitting clearance

Top piston ring - standard coupling clearance

0.025 ÷ 0.07 mm **Top piston ring - maximum clearance allowed after use** 0.08 mm

Middle piston ring - standard coupling clearance 0.015 - 0.06 mm

Middle piston ring - maximum clearance allowed after use 0.07 mm

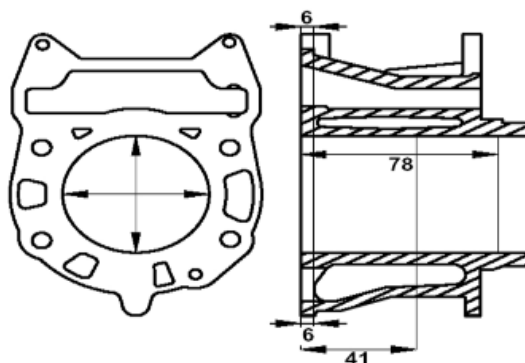
oil scraper ring - standard coupling clearance 0.015 - 0.06 mm

oil scraper ring - maximum clearance allowed after use 0.07 mm



Inspecting the cylinder

- 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 coupling surface is not worn or misshapen.
- Pistons and cylinders are classified according to 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.
- The pistons are oversized due to cylinder grinding and are subdivided into three categories- 1st, 2nd, 3rd corresponding to 0.2-0.4-0.6 mm oversizes. They are also classified into 4 categories A-A, B-B, C-C, D-D.

Characteristic**cylinder: standard diameter**

56.997 - 57.025 mm (at 41 mm)

Maximum allowable run-out:

0.05 mm

Inspecting the piston rings**Sealing 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.

Characteristic**Top piston ring**

Standard opening: 0.15 ÷ 0.30 mm

Middle piston ring

Standard opening: 0.10 ÷ 0.30 mm

scraper ring

Standard opening: 0.15 ÷ 0.35 mm



Removing the piston

- Install piston and wrist pin onto the connecting rod, aligning the piston arrow the arrow facing towards the exhaust.
 - Fit the wrist 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



N.B.

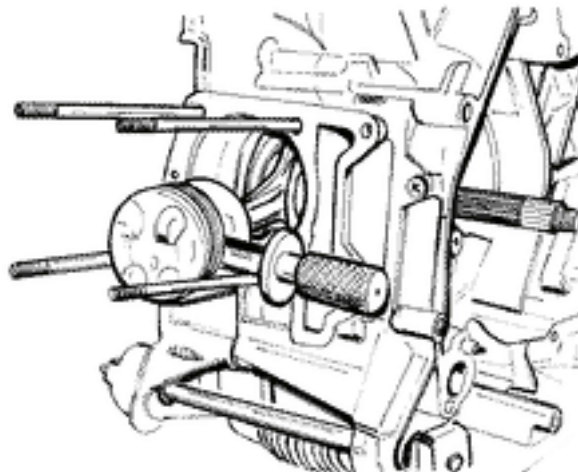
THE TOOL FOR INSTALLING THE STOP RINGS MUST BE USED MANUALLY.

CAUTION

USING A HAMMER MIGHT DAMAGE THE STOPS' HOUSING.

Specific tooling

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

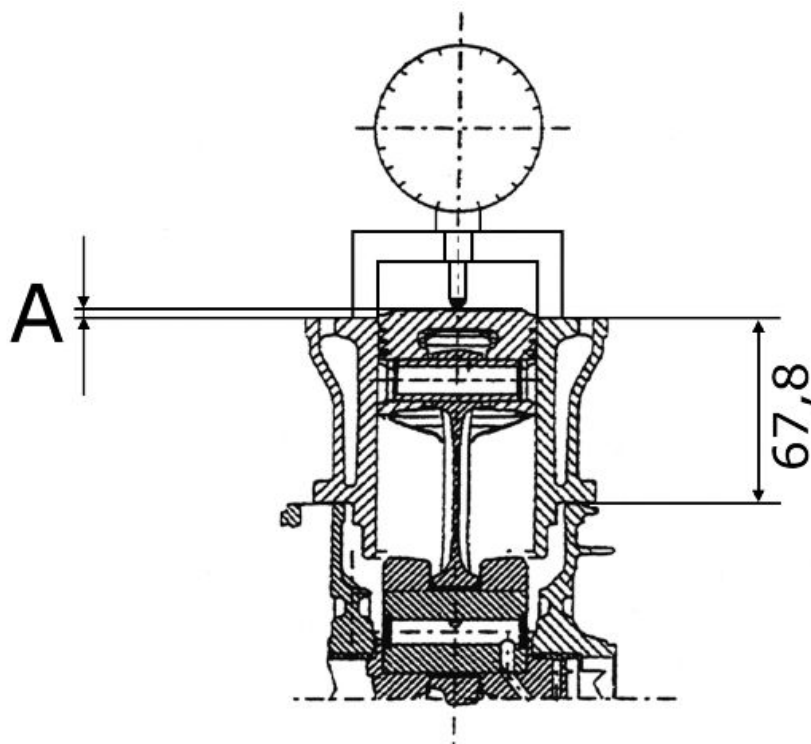


Choosing the gasket

Characteristic

Compression ratio

$12 \pm 0.5: 1$



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

N.B.

NO GASKETS AND SEALS SHOULD BE ASSEMBLED BETWEEN THE CRANKCASE AND CYLINDER AND THE DIAL GAUGE EQUIPPED WITH SUPPORT SHOULD BE SET TO ZERO FOR

MEASUREMENT «A» TO BE TAKEN WITH THE PISTON AT TOP DEAD CENTRE POSITION AND ON A RECTIFIED PLANE.

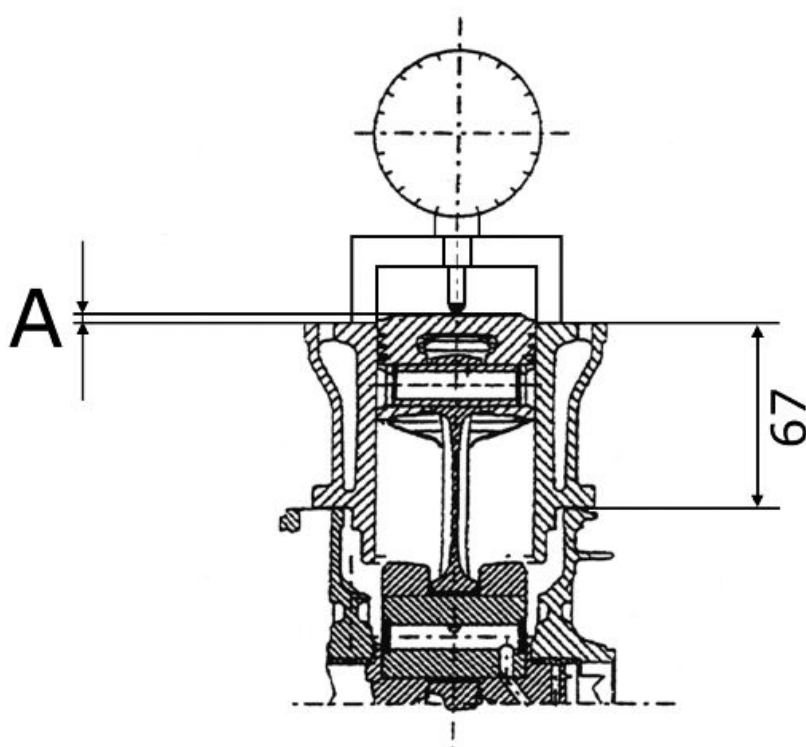
MODELS WITH METAL HEAD GASKET (0.3)

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

Characteristic

Compression ratio

12 ± 0.5: 1



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

N.B.

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

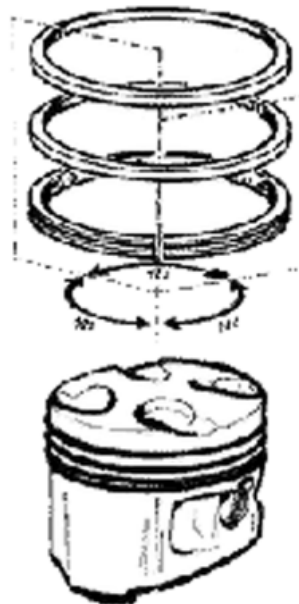
MODELS WITH FIBRE HEAD GASKET (1.1)

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

Refitting the piston rings

Fitting the sealing 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.



N.B.

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



Refitting the cylinder

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

N.B.

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

Specific tooling

020426Y Piston fitting fork

020393Y Piston fitting band

020287Y Clamp to assemble piston on cylinder



Inspecting the cylinder head

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

Maximum allowable run-out: 0.05 mm

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



Characteristic

bearing «A»

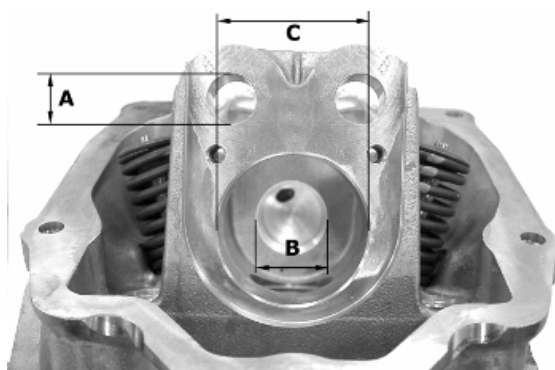
Ø 12.000 - 12.018 mm

bearing «B»

Ø 20.000 ÷ 20.021 mm

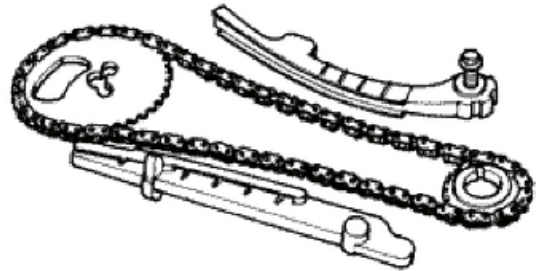
bearing «C»

Ø 37.000 - 37.025 mm



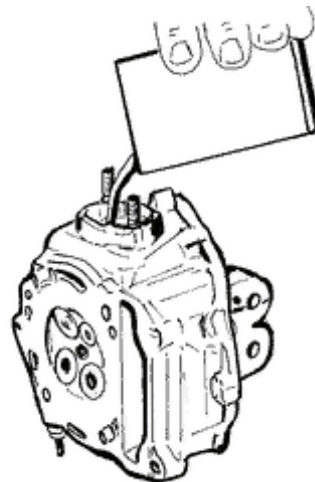
Inspecting the timing system components

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



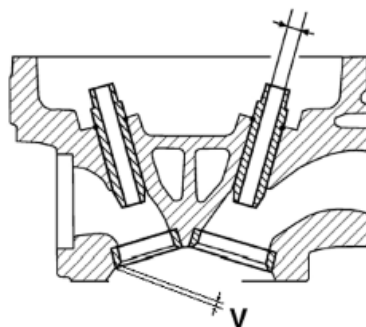
Inspecting the valve sealings

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



Inspecting the valve housings

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



Characteristic

Valve seat wear Intake guide

limit accepted: 5.022

Valve seat wear Intake guide

Standard diameter: 5.000 ÷ 5.012 mm

Valve seat wear Exhaust guide

Accepted limit 5.022

Valve seat wear Exhaust guide

Standard diameter: 5.000 ÷ 5.012 mm

Inspecting the valves

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

CAUTION

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

N.B.

DO NOT CHANGE THE POSITIONS THE VALVES ARE FITTED IN

Characteristic

Valve check standard length

Outlet: 94.4 mm

Valve check standard length

Inlet: 94.6 mm

Valve check Maximum admissible clearance

Outlet: 0.072 mm

Valve check Maximum admissible clearance

Inlet: 0.062 mm

Valve check standard clearance

Outlet: 0.025 ÷ 0.052 mm

Valve check standard clearance

Inlet: 0.013 ÷ 0.040 mm

Valve check Minimum admissible diameter

Outlet: 4.95 mm

Valve check Minimum admissible diameter

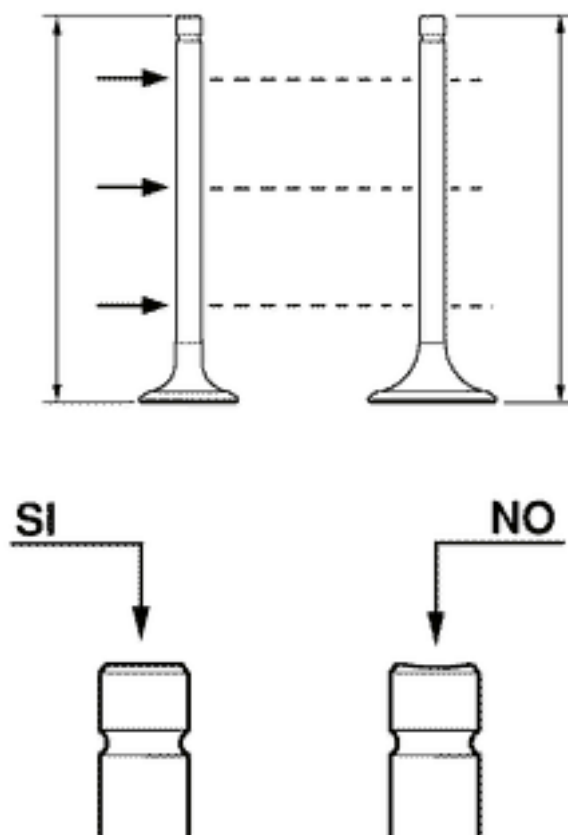
Inlet: 4.96 mm

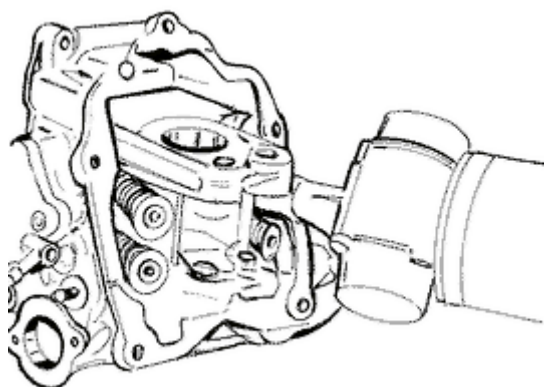
Valve check Standard diameter:

Inlet: 4.972 ÷ 4.987 mm

Valve check Standard diameter:

Outlet: 4.96 ÷ 4.975 mm

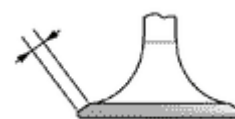
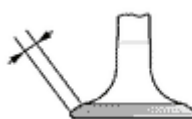




- Measure the width of the sealing surface on the valve seats and on the valves.

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

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



CAUTION

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

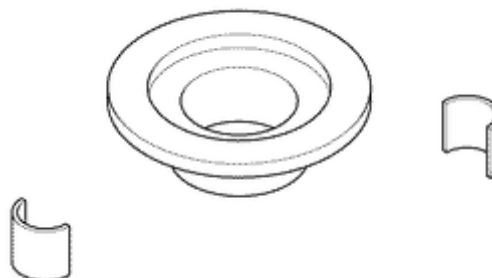
Characteristic

Valve wear check Standard: Intake and exhaust:

0.99 - 1.27 mm

Inspecting the springs and half-cones

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



Refitting the valves

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

N.B.

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

Specific tooling

020306Y Punch for assembling valve seal rings

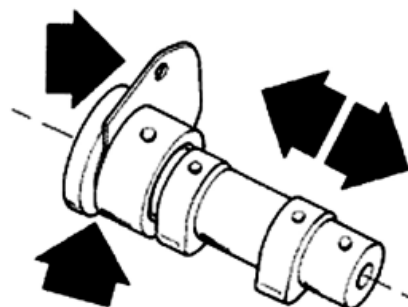
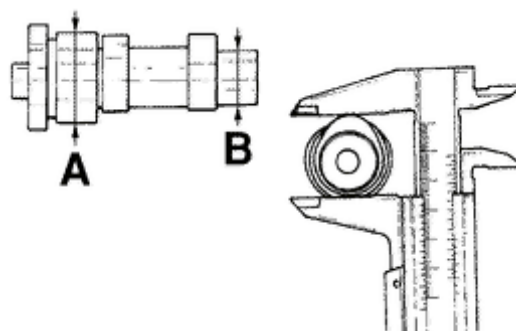
020382Y Valve cotters equipped with part 012 removal tool

020382Y011 adapter for valve removal tool



Inspecting the cam shaft

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



- Measure the internal diameter of each rocker arm.

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

Characteristic

Internal rocker arm diameter: Standard diameter

Diameter 12.000 - 12.011 mm

Rocking lever pin diameter: Standard diameter

Diameter 11.977 - 11.985 mm

Cam shaft check: Maximum admissible axial clearance

0.42 mm

Cam shaft check: Standard axial clearance:

0.11 - 0.41 mm

Cam shaft check: Standard height

Outlet: 29.209 mm

Cam shaft check: Standard height

Inlet: 30.285 mm

Cam shaft check: Minimum admissible diameter

Bearing B diameter: 19.950 mm

Cam shaft check: Minimum admissible diameter

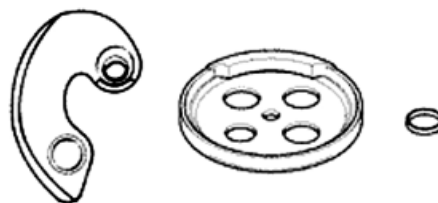
Bearing A Ø: 36.94 mm

Cam shaft check: Standard diameter

Bearing B diameter: 19.959 ÷ 19.98 mm

Cam shaft check: Standard diameter

Bearing A Ø: 36.95 ÷ 36.975 mm



Refitting the head and timing system components

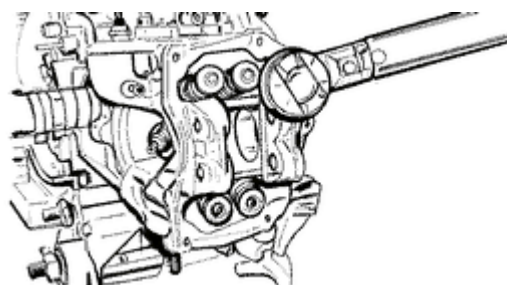
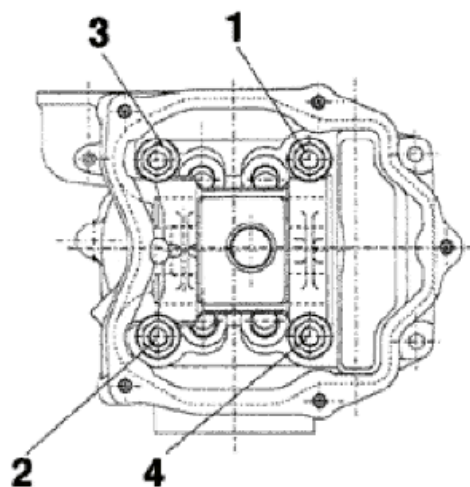
- Fit the timing chain guide pad.
- Insert the centring dowel between the cylinder head to the cylinder, fit the cylinder head gasket and the cylinder head.
- Lubricate the stud bolt threading.
- Tighten up the nuts to a pre-torque of 7 ± 1 N·m
- Rotate by a 180° angle (2 rotations of 90° each)
- To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

N.B.

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

Locking torques (N*m)

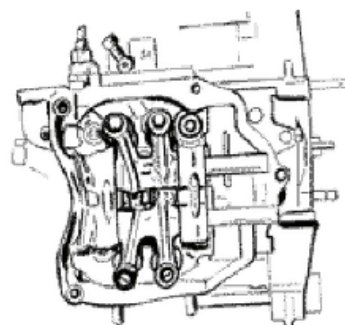
Timing chain tensioner support screw 11 ÷ 13



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.

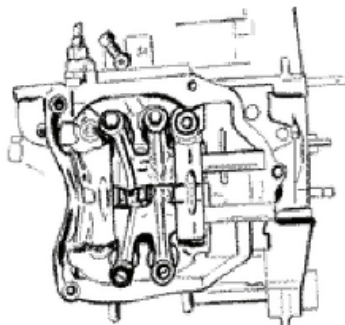
Locking torques (N*m)



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 cam shaft in the cylinder head with the cams corresponding to the rockers.
- Insert the retention plate and tighten the two screws shown in the figure to the prescribed torque.

**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 ÷ 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°.

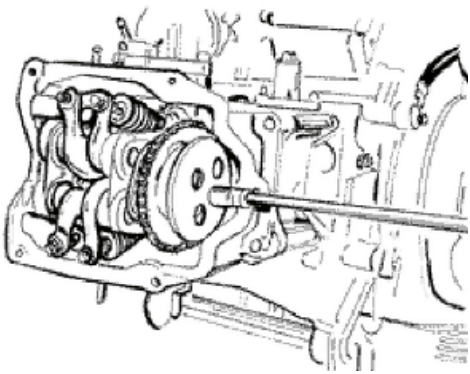


Assemble the limiting bell using the counterweight fixing screw as a reference.

- 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 ÷ 13 Nm
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 ÷ 13
Limiting bell screw	11 ÷ 15 Nm
Counterweight screw	7 ÷ 8.5
Plate screws	4 ÷ 6 Nm

Name	Torque in Nm
Slider screw	10 ÷ 14 Nm

Refitting the rocker-arms cover

- Refit the cylinder head cover, tightening 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

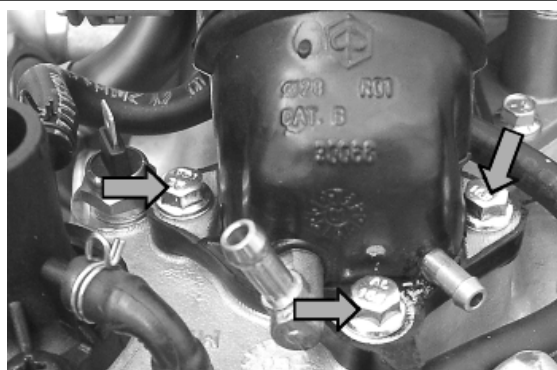


Refitting the intake manifold

Fit the intake manifold and do up the three screws.

N.B.

FOR SPECIAL SCREWS USE COMMERCIALY AVAILABLE INSERTS AND INSERT HOLDERS.



Crankcase - crankshaft

Splitting the crankcase halves

First remove the following units:

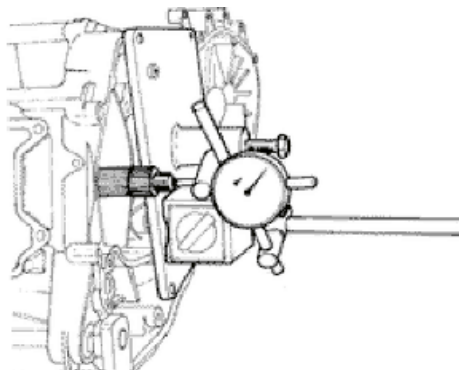
transmission cover, driving pulley, driven pulley and belt, rear hub cover, gears, bearings and oil seals as described in the **transmission** chapter.

- 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: $0.15 \div 0.40$ mm



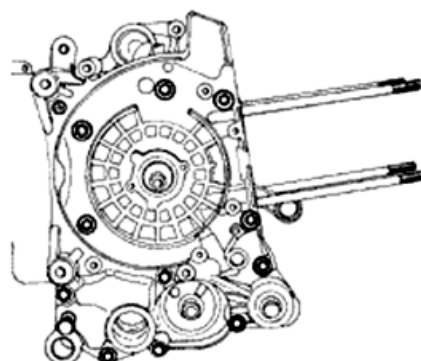
Remove the 11 coupling screws to the crankcase.

- 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.

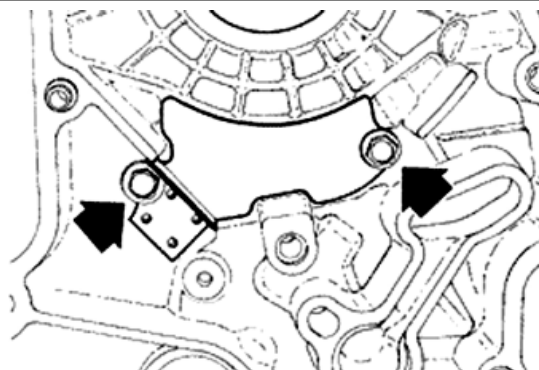


- Remove the coupling gasket of the crankcase halves.

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

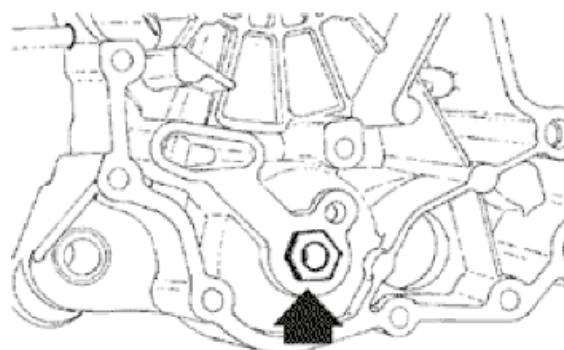
CAUTION

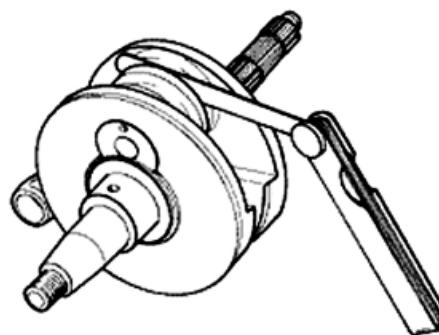
WHILE OPENING THE CRANKCASES AND REMOVING THE DRIVING SHAFT, CHECK THAT THE THREADED SHAFT ENDS DO NOT INTERFERE WITH THE MAIN BUSHINGS. FAILURE TO OBSERVE THIS PRECAUTION CAN DAMAGE THE MAIN BUSHINGS.



- Remove the oil guard 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: $0.036 \div 0.054$ mm

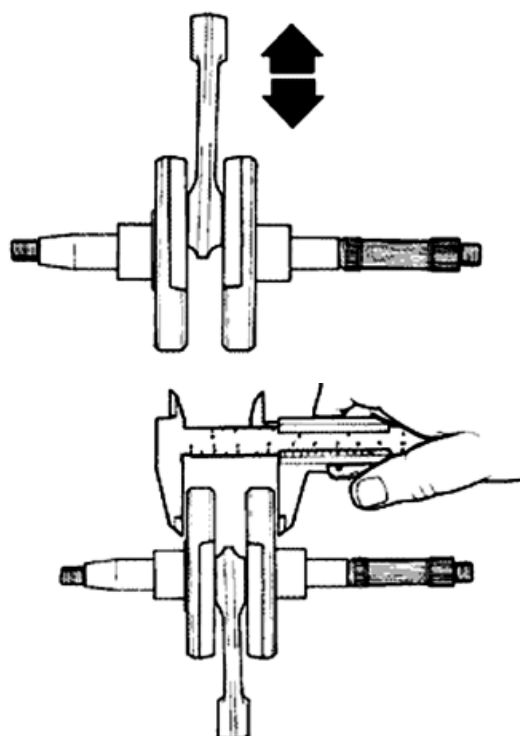
-Check the surfaces that limit the axial free-play are not scored and measure the width of the crankshaft between these surfaces, as shown in the diagram.

Standard dimensions:

$55.75 \div 55.90$ mm

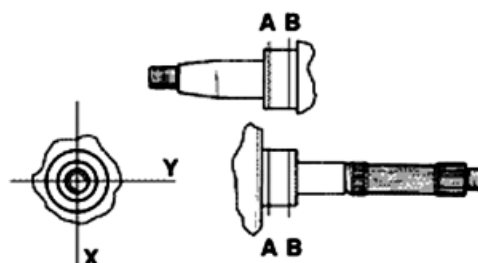
N.B.

WHEN MEASURING THE WIDTH OF THE CRANKSHAFT, MAKE SURE THAT THE MEASUREMENTS ARE NOT MODIFIED BY THE RADIUS OF FITTINGS WITH THE CRANKSHAFT BEARINGS.



If the axial clearance between crankshaft and crankcase exceeds the standard and the crankshaft does not have any defect, the problem must be due to either excessive wear or wrong machining on the engine crankcase.

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

$29.004 \div 29.010$

Standard diameter - Category 1

$28.994 \div 29.000$

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

Inspecting the crankshaft alignment

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

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

The connecting rod head bushings cannot be replaced. For the same reason, the connecting rod may not be replaced and, when cleaning the crankshaft, be very careful that no impurities get in through the shaft's lubrication holes.

In order to prevent damaging the connecting rod bushings, do not attempt cleaning the lubrication duct with compressed air.

- Make sure that the 2 caps on the crankpin are properly fitted.
- A wrong installation of a cap can seriously affect the bushing lubrication pressure.

N.B.

THE MAIN BEARINGS ARE NOT GRINDABLE

Specific tooling

020074Y Support base for checking crankshaft alignment

Characteristic

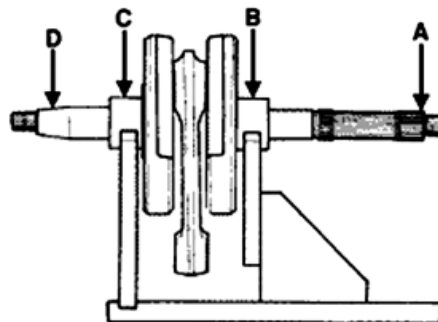
Off-line maximum admitted

A = 0.15 mm

B = 0.01 mm

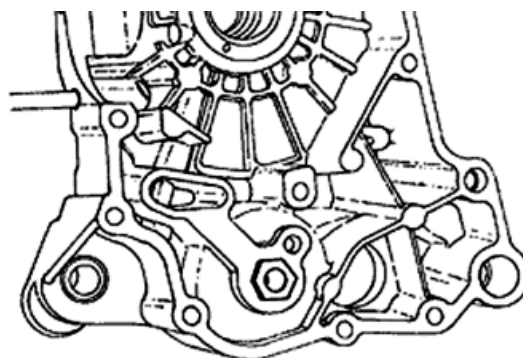
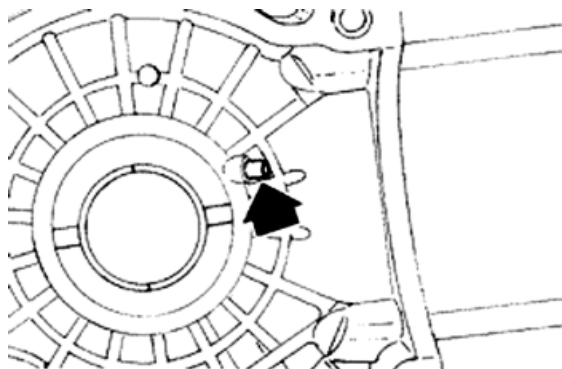
C = 0.01 mm

D = 0.10 mm



Inspecting the crankcase halves

- Before proceeding to check the crankcase halves, thoroughly clean all surfaces and oil ducts.
- On the transmission-side crankcase half, take particular care when handling the oil pump compartment and the oil ducts, the by-pass duct, the main bushings and the cooling jet on the transmission side (see diagram).
- Take particular care, also, that there are no signs wear in the oil by-pass valve housing (see Chapter Lubrication), as this could prevent a good seal in the valve, which regulates the oil pressure.
- On the flywheel side crankcase half, take particular care cleaning the oil ducts for the main bushings, the oil duct for the jet that lubricates the cylinder head and the oil drainage duct at the flywheel side oil seal.
- Inspect the coupling surfaces on the crankcase halves for scratches or deformation, taking 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 bearings and connection rod.
- Check the main bearing seats that limit axial clearance in the crankshaft show no signs of wear. The dimension between these seats is measured by way of the procedure described previously for measuring the crankshaft axial clearance and dimensions.



N.B.

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

N.B.

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

Inspecting the crankshaft plain bearings

- I

In order for the main bushings to be lubricated properly it is necessary to have both an outstanding lubricating pressure (3.2 bar) and a good oil flow rate, therefore it is essential for the main bushings to be positioned properly so that the oil feed channels are not choked.

- The main bushings are comprised of two half-bearings, one containing holes and channels for lubrication and the other solid.

- The solid half bearing must withstand the thrusts due to combustion and is therefore positioned opposite the cylinder.

- So as not to choke the oil feed channels it is essential for the coupling surfaces of the two half bearings to be perfectly at right-angles to the cylinder axis as shown in the figure.

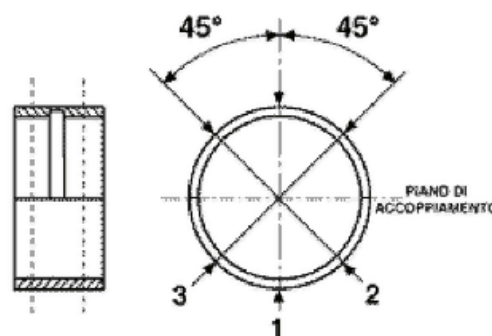
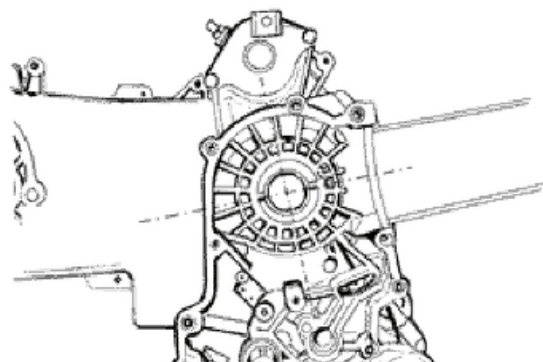
- The oil feed channels cross-section is also influenced by the depth to which the bushings are driven compared with the crankshaft axial clearance containment surface.

- Check the inside diameter of the main bushings in the three directions indicated in the diagram.

- Repeat the measurement for the other half of the main bushing. see diagram.

- There are three crankcase versions: with BLUE bushings, with YELLOW bushings and with GREEN bushings.

- There just one type of main bushing housing hole in the crankcase



The standard diameter of the main bushings after fitting is variable depending on 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		
B		BLUE		
C		YELLOW		
E		GREEN		
		Type "B" - BLUE	Type "C" - YEL-	Type "E" - GREEN
		LOW		
Main half-bearing		1.9703	1.976	1.979 ÷
		1.976	1.979	1.982
Bush- ing category	Crank- case halves category	Internal bush- ing diameter after fitting		Possible fitting
B	1	29.025	29.040	Original
C	1	29.019	29.034	Original
	2	29.028	29.043	and spare
D	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 replacement crankcase cannot be matched with a crankshaft with mixed categories. The replacement crankshaft has half shafts of the same category.

Crankcase halves	Engine half shaft	Bushing
Cat. 1	Cat. 1	E
Cat. 2	Cat. 2	B

Cat. 1	Cat. 2	C
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

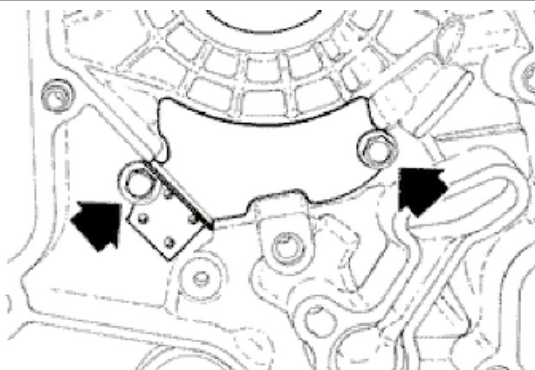
1.35 ÷ 1.6

Diameter of crankcase without bushing

32.953 ÷ 32.963

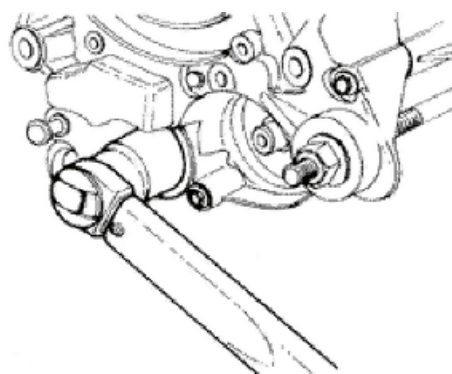
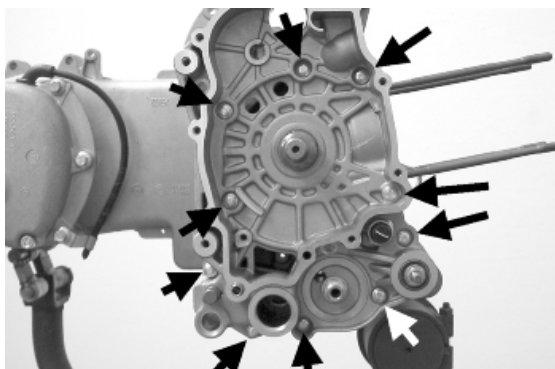
Refitting the crankcase halves

- Fit the internal bulkhead by locking the two screws to the prescribed torque.
- Fit the oil filter fitting and tighten it to the specified torque.
- Place a new gasket on one of the crankcase halves, preferably on the transmission side, together with the locating dowels.
- Lubricate the main bushings and insert the crankshaft in the transmission side crankcase half.
- Reassemble the two crankcase halves.
- Fit the 10 screws and tighten them to the prescribed torque.
- Fit a new O-ring on the pre-filter and lubricate it.
- Insert the filter on the engine with the relative cap. Tighten to the prescribed torque.



Locking torques (N*m)

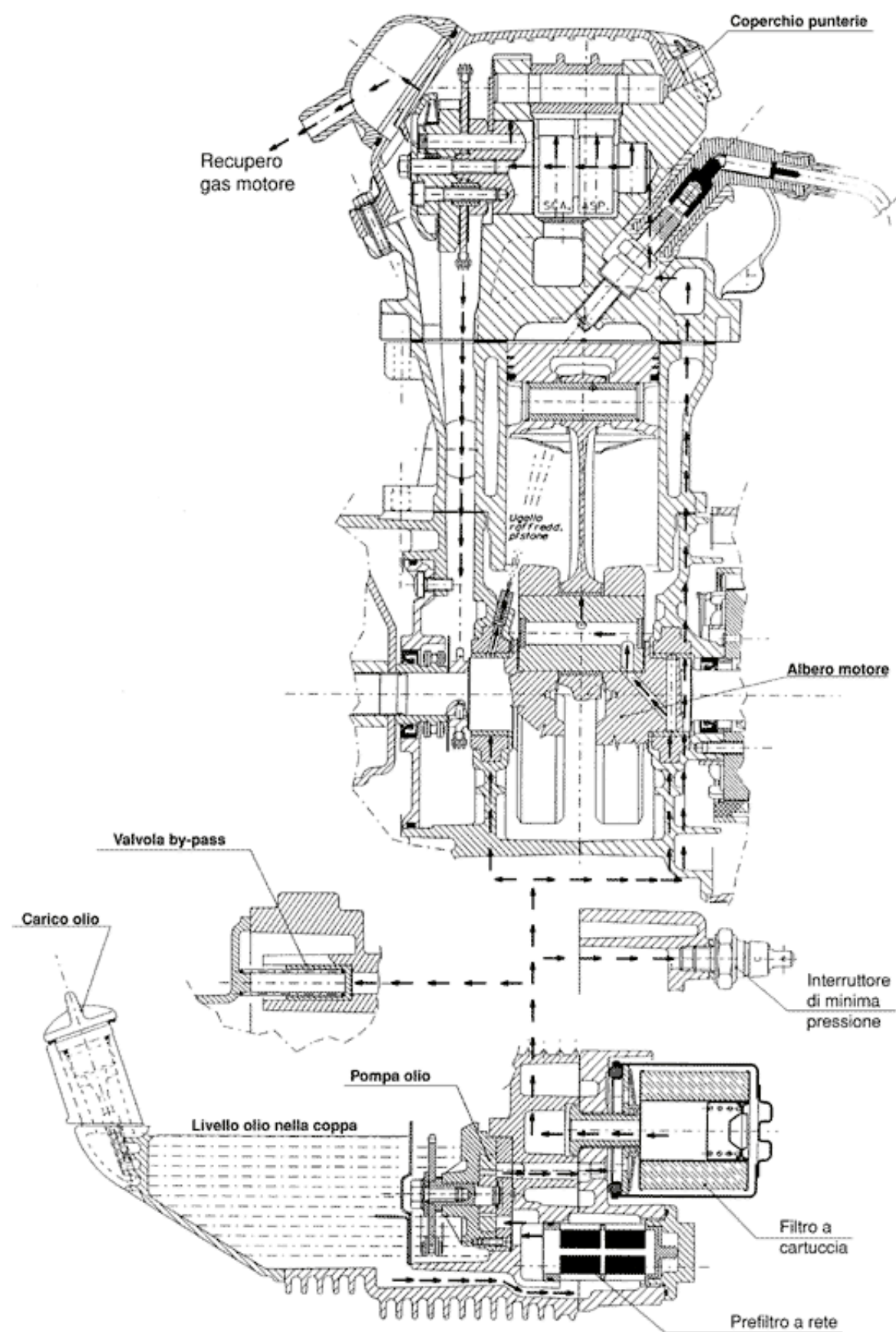
Internal engine crankcase bulkhead (transmission-side half shaft) screws 4 ÷ 6
Engine-crankcase coupling screws 11 ÷ 13
Oil filter on crankcase fitting 27 ÷ 33
Engine oil drainage plug/mesh filter 24 ÷ 30



Lubrication

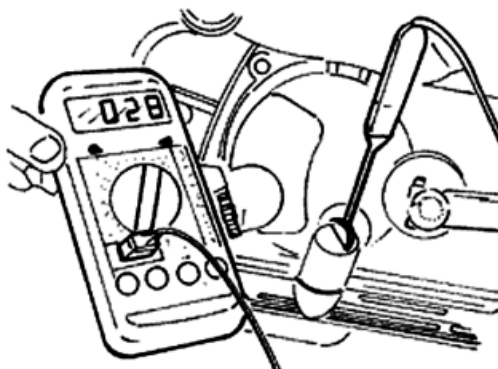
Conceptual diagrams

LUBRICATION CIRCUIT



Oil pressure check

- After removing the flywheel cover as described in the "Flywheel" chapter, remove the electric connexion of the minimum oil pressure switch and then remove the switch.
- With the engine idling at 1650 rpm and the oil temperature at $\sim 90^{\circ}\text{C}$, check that the oil pressure is between $0.5 \div 1.2$ bar.
- With the engine at 6000 rpm and the oil temperature at $\sim 90^{\circ}\text{C}$, check that the oil pressure is between $3.2 \div 4.2$ bar.
- 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 outside the specified limits, in the following order, check: the oil filter, the oil by-pass valve, the oil pump and the crankshaft seals.



N.B.

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

Characteristic

Oil pressure

Minimum pressure admitted at 6,000 rpm: 3 bar

Locking torques (N*m)

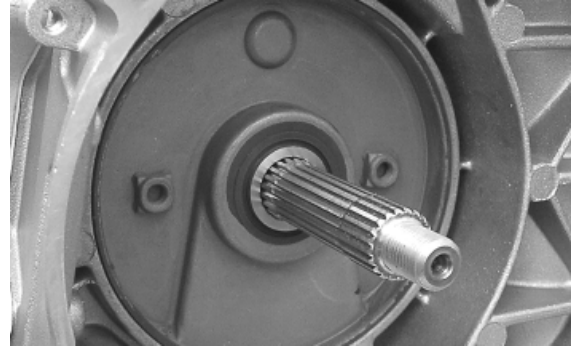
Minimum oil pressure sensor $12 \div 14$



Crankshaft oil seals

Removal

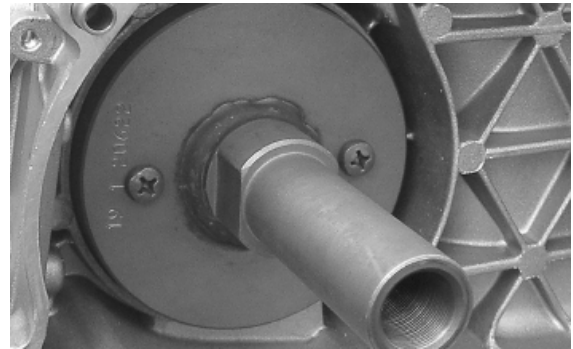
- First remove the transmission cover and the complete driving pulley



- Install the base of the appropriate tool on the oil guard using the screws provided.

Specific tooling

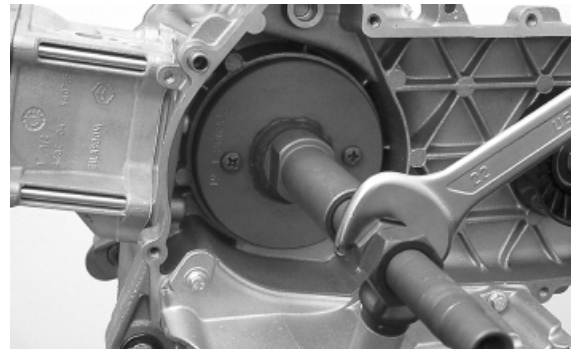
020622Y Transmission-side oil guard punch



- Screw the threaded bar onto the base of the tool and extract the oil guard.

Specific tooling

020622Y Transmission-side oil guard punch



Refitting

- Use a new oil seal upon refitting.
- Prepare the new oil seal, lubricating the sealing lip.
- Preassemble the oil seal with the specific tool, positioning the screws.
- Place the sheath over the crankshaft.
- Insert the tool with the oil seal on the crankshaft until it comes into contact with the crankcase.



- Orientate the oil seal by inserting the bracket which is part of the specific tool.
- Tighten the threaded bar onto the crankshaft as far as it will go.
- Use the nut to move the base of the tool until you can feel the end of the oil seal driving stroke.
- Remove all of the tool components following the inverse procedure

CAUTION

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

CAUTION

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

CAUTION

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

Specific tooling

020622Y Transmission-side oil guard punch





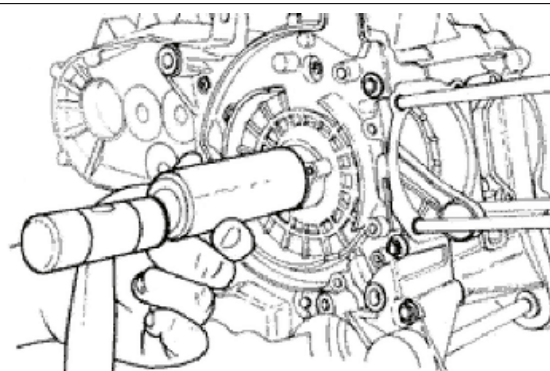
For 125 models, fit a new oil seal on the flywheel side using the specific tool as shown in the photograph

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

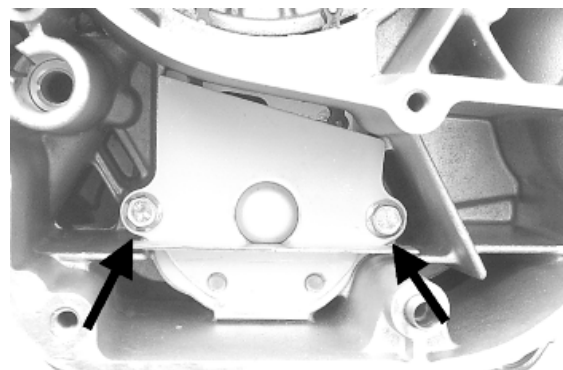
020425Y Punch for flywheel-side oil seal



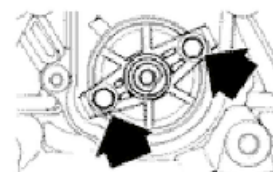
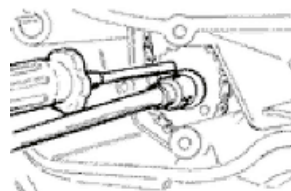
Oil pump

Removal

- Undo the two clamping screws in the figure and remove the cover over the pump control crown.



- Block the rotation of the oil pump control pulley with a screwdriver inserted through one of its two holes.
- Remove the central screw with Belleville washer, as shown in the diagram.
- Remove the chain with the crown.
- Remove the control sprocket with relative O-ring.



- Remove the oil pump by undoing the two screws in the figure.
- Remove the oil pump seal.

N.B.

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

Inspection

- Remove the two screws and the oil pump cover.
- Remove the clip retaining the innermost rotor.
- Remove and wash the rotors thoroughly with petrol and compressed air.
- Reassemble the rotors in the pump body, keeping the two reference marks visible. Replace the snap ring.

- Check the clearance between the rotors in the position shown in the diagram using a thickness gauge.

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

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

Characteristic**Axial rotor clearance**

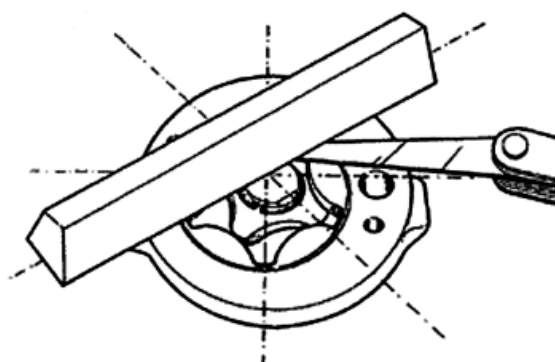
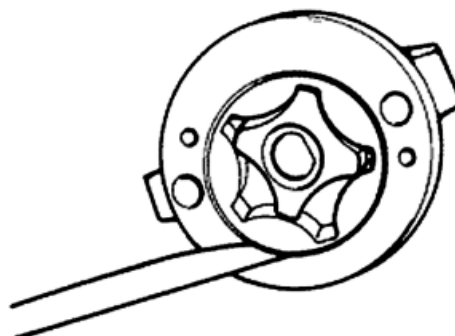
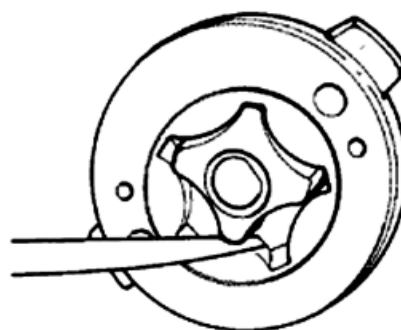
Limit values admitted: 0.09 mm

Distance between the outer rotor and the pump body

Admissible limit clearance: 0.20 mm

Distance between the rotors

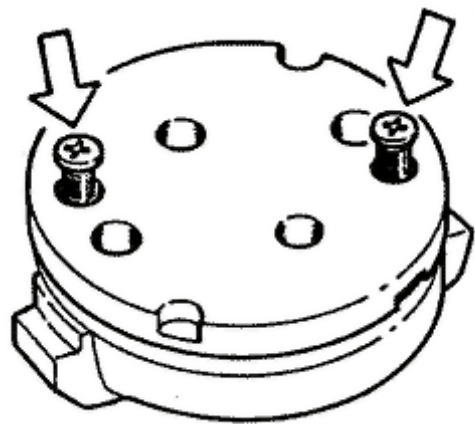
Admissible limit clearance: 0.12 mm





Refitting

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



N.B.

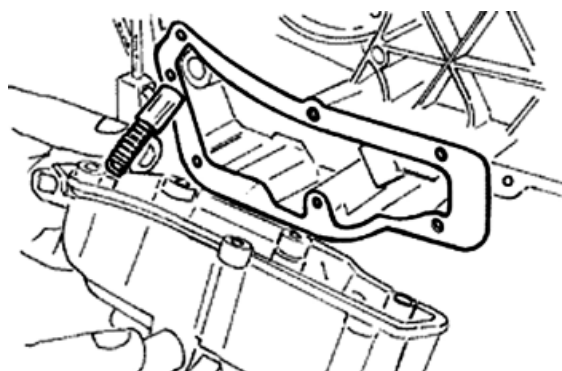
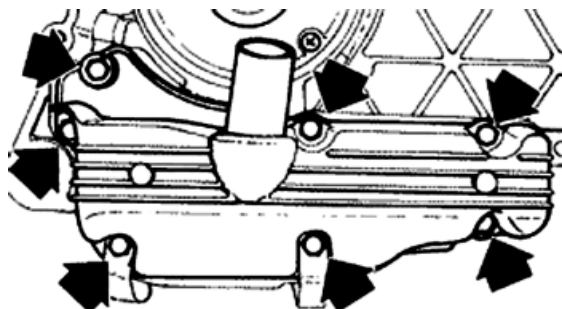
FIT THE BELLEVILLE WASHER SO THAT ITS OUTER RIM TOUCHES THE PULLEY. MAKE SURE THAT THE PUMP TURNS FREELY.

Locking torques (N*m)

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

Removing the oil sump

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



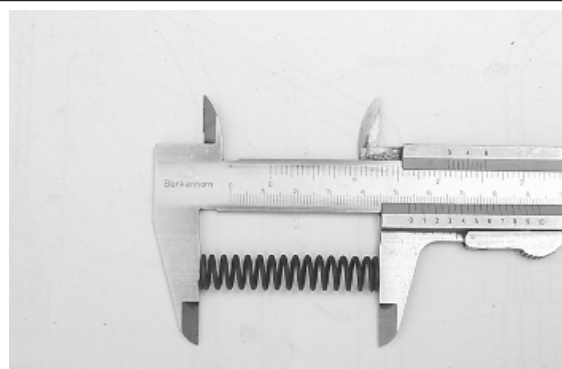
Inspecting the by-pass valve

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

Characteristic

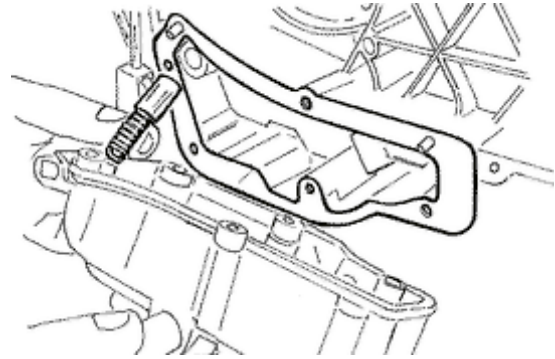
By-pass check up: Standard length

54.2 mm



Refitting the oil sump

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



Locking torques (N*m)

Oil sump screws 10 ÷ 14

SAS valve

Inspecting the one-way valve

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



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

If anomalies are detected, replace the pump.

N.B.

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

N.B.

ABSENCE OF VIBRATION INDICATES INEFFICIENT SEALING

Specific tooling

020329Y MityVac vacuum-operated pump

Inspecting the cut-off

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



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

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

N.B.

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

N.B.

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

Specific tooling

020329Y MityVac vacuum-operated pump



Fuel supply

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.

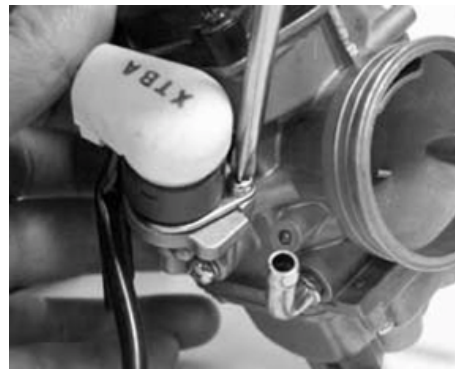
- Take out the carburettor and rotate it so as to remove the screw with the water joint and the pipes.

N.B.

THIS LAST OPERATION IS NECESSARY SO AS NOT TO EMPTY THE COOLING SYSTEM.



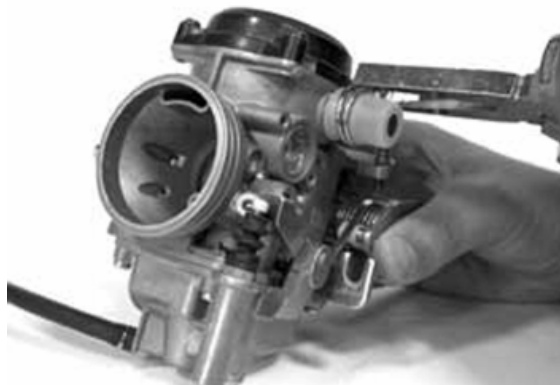
-
- Remove the protection, the bracket and the starter acting on the screw shown in the figure.



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



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



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

WARNING

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

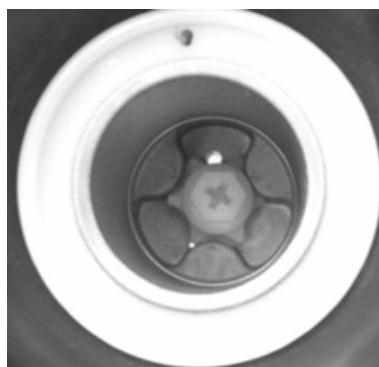




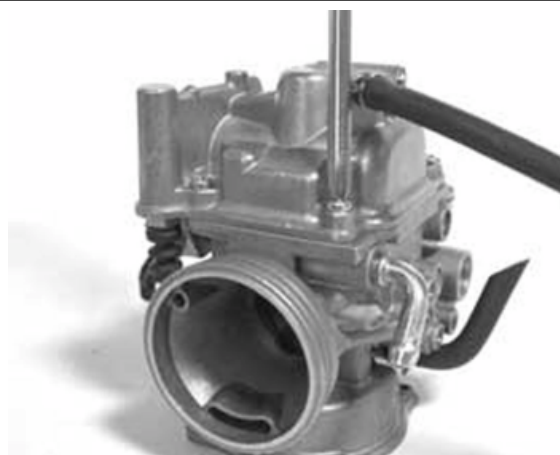
- Remove the vacuum valve together with the diaphragm.



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



- Remove the 4 screws indicated in the figure.



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



- Remove the oil pump seal.
- Remove the intake and outlet valves of the intake pump from the tank

N.B.

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

N.B.

AVOID REMOVING THE PISTON OF THE PUMP AND ITS CONTROL.

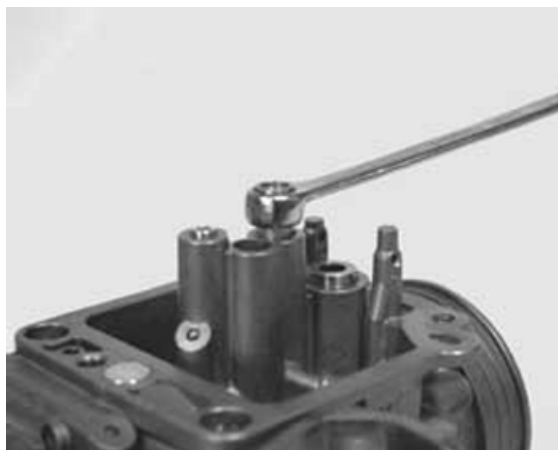


Adequately support the carburettor and using a rod and hammer remove the float pin acting from the throttle control side.

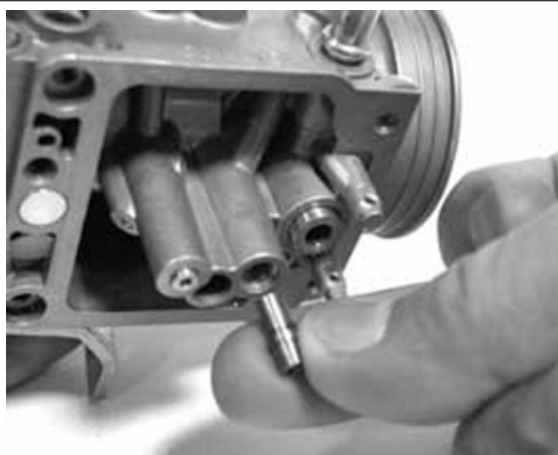
- Remove the float and the plunger.
- Remove the maximum nozzle



-Remove the maximum nozzle.



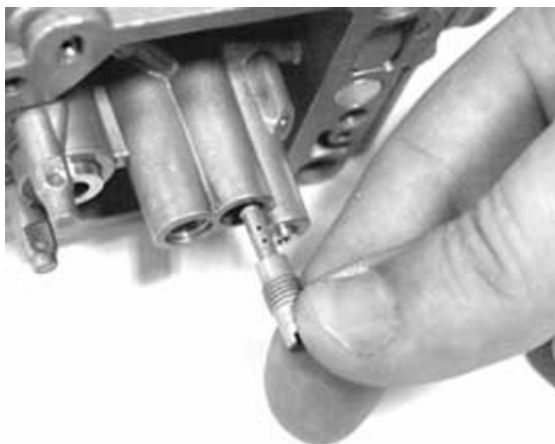
-Remove diffuser.



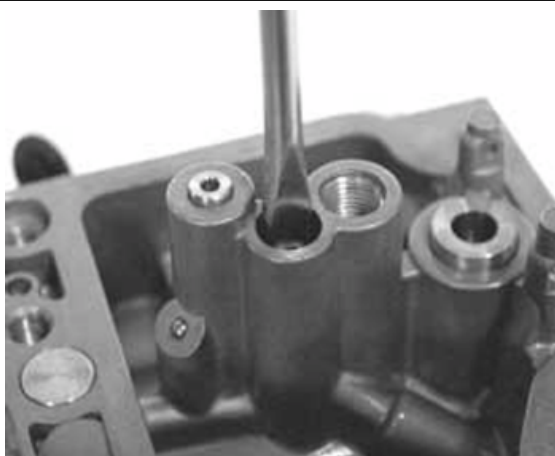
- Remove the sprayer.

N.B.

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



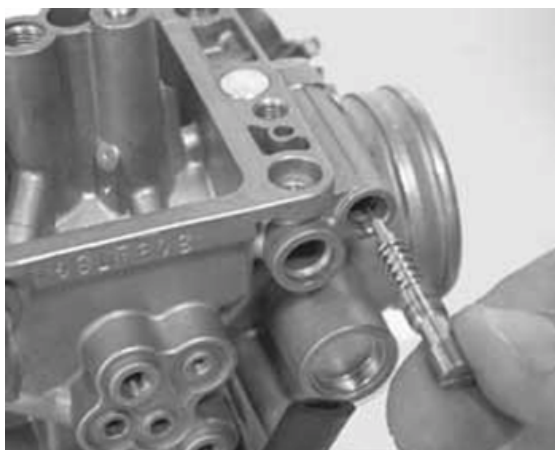
- Remove the minimum nozzle.



- Remove the minimum flow set screw and the spring.

CAUTION

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



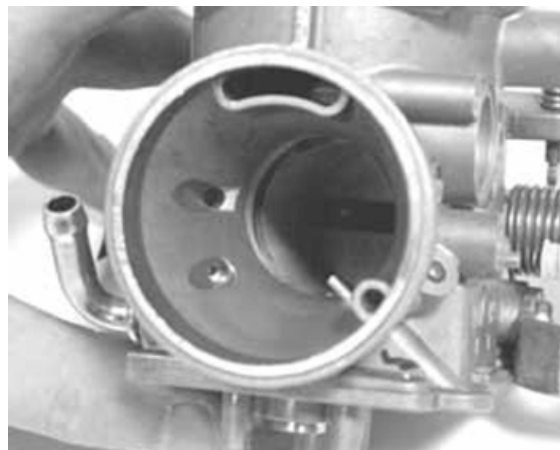
Refitting the carburettor

Kehin

- 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, outlet 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 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.
- 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 anomalies.

- Introduce the float with the rod on the fuel feeding tube side.

N.B.

INTRODUCE THE RETURN SPRING ON THE FLOAT PLATE ADEQUATELY

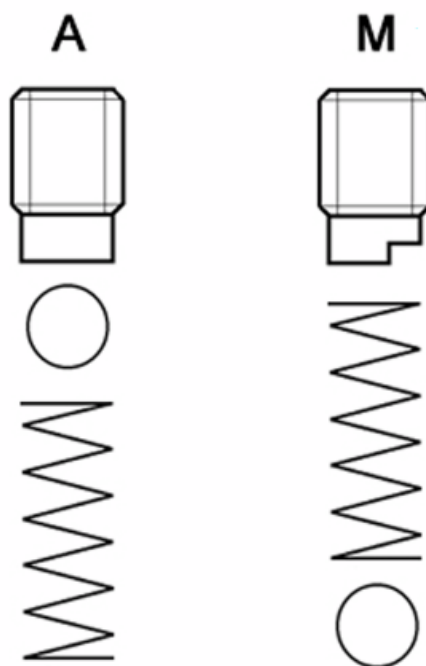
- Remove the drainage screw from the tank, wash and blow it properly and make sure the acceleration pump pipes are clean.
- Operate the acceleration pump piston repeatedly and blow with compressed air.
- Reassemble the acceleration pump valves following this order:

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.

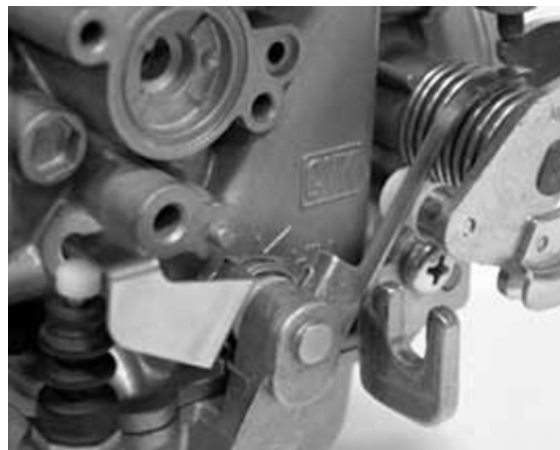
- Check the screw tightness introducing a small amount of fuel in the tank.
- Assemble a new gasket on the tank.
- Assemble the tank on the carburettor body fastening the 4 screws.
- Check that the control roller is free to rotate in its own seat.

N.B.

MAKE SURE THE TANK GASKET IS CORRECTLY INTRODUCED

N.B.

AVOID DEFORMING THE ACCELERATION PUMP CONTROL ROCKING LEVER.



- 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.

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.

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.



Inspecting the automatic choke device

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

Protrusion value

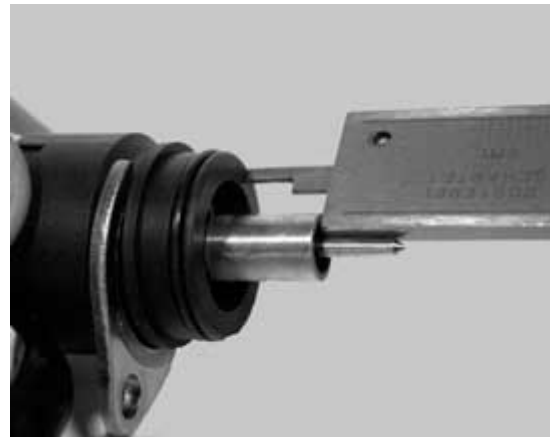
10 mm at about 24°

Starter resistance

20 Ω

Check the automatic starter: Keihin maximum time

5 min



INDEX OF TOPICS

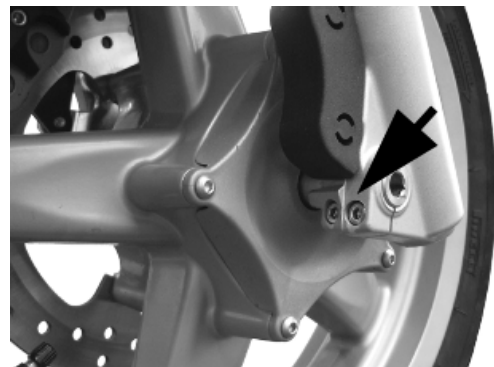
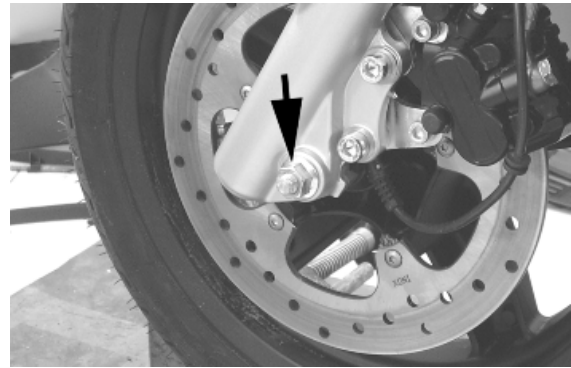
SUSPENSIONS	SUSP
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This section is devoted to operations that can be carried out on the suspension.

Front

Removing the front wheel

- Remove the fixing nut from the wheel axle on the left side of the vehicle.
- Loosen the two screws fixing the wheel axle clamp and remove the clamp.



Front wheel hub overhaul

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

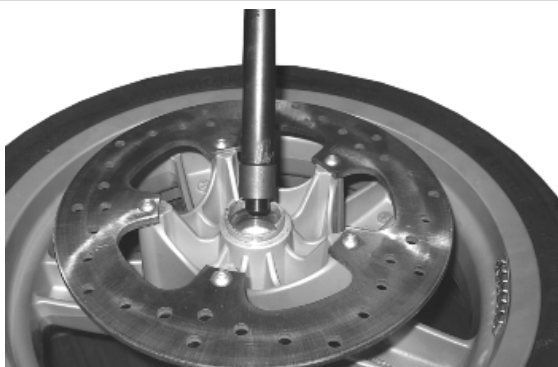
If you have to replace the wheel bearings, proceed as follows:

- Remove the two bearings on the brake disc side using pliers 14 and the special bell 9.
- Remove the internal spacer.





- Support the front wheel with two wooden shims that make it possible to avoid scratching in the case of contact with the rim.
- Insert the punch (consisting of adaptor handle, 24 mm adaptor and 15 mm guide) from the brake disc side to permit the removal of the opposite side bearing and the spacer bushing.



Specific tooling

020376Y Adaptor handle

020456Y Ø 24 mm adaptor

020412Y 15 mm guide

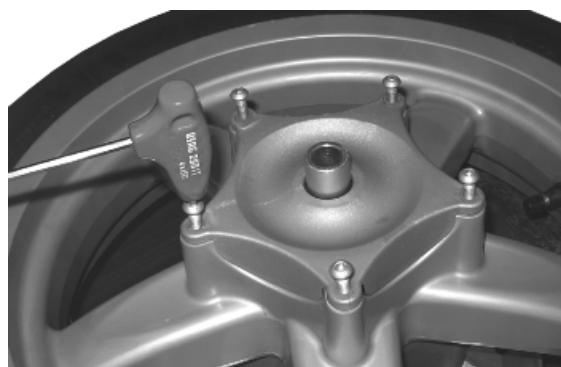
- Heat the bearing seat on the side opposite the brake disc with the heat gun.



- Insert the bearing using the punch consisting of adaptor handle, 40x37 mm adaptor and 15 mm guide, and take it to the stop.



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

Specific tooling**020376Y Adaptor handle****020359Y 42x47-mm adaptor****020412Y 15 mm guide****020201Y Spacer bushing driving tube**

- Refit the cap and tighten the five fixing screws.



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



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



2 - Insert the two bearings one at a time using the punch consisting of adaptor handle, 32x35 mm adaptor and 15 mm guide, and take it to the stop.

Specific tooling

020376Y Adaptor handle

020357Y 32 x 35 mm adaptor

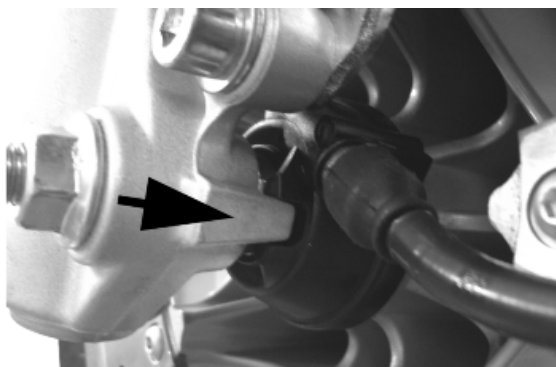
020412Y 15 mm guide

Refitting the front wheel

- When refitting, pay attention in repositioning the odometer drive correctly.

Locking torques (N*m)

Wheel axle nut $45 \div 50$ Wheel axle clamp
screws 6 - 7 Nm



Handlebar

Removal

- Remove the two 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 and pulling upwards, remove the handlebar, 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 those of the removal.

Locking torques (N*m)

Handlebar fixing screw (*) 43 ÷ 47

Front fork

Removal

- Remove the front wheel.
- Remove the handlebar and tip it onto the shield back plate being careful not to damage the plate.

- Using the appropriate tool, loosen and remove the upper ring nut, the spacer washer, the counter ring nut and the spacer ring.
- Remove the fork.

N.B.

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

Specific tooling

020055Y Wrench for steering tube ring nut

See also

[Removal](#)

[Removing the front wheel](#)



Overhaul

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



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



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



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



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



- Keep the tie rod vertical and insert the Ø 35 mm stem bell.
- Insert the nut in the thread and extract the oil seal

Specific tooling

020487Y Fork oil seal extractor



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



- Insert the contrast spring into the pumping member.
- Insert the pumping member into the stem.
- Insert the pumping member guiding bushing at the bottom end of the stem.
- Insert the stem in the leg being careful not to let the stem guide bushing come out.



- Inset and screw up the copper washer to the prescribed torque. To prevent the pumping member from rotating, insert a 12 mm Allen key into the stem.
- Pour $133 \pm 2.5 \text{ cm}^3$ of oil into the stem.



Recommended products

AGIP FORK 7.5 W Fork oil

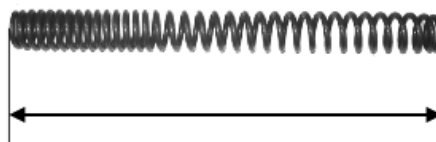
Grade 7.5 W

- Insert the spring inside the stem
- Insert the stem into the fork clamp.
- Tighten the clamp to screw the top stem closing cap.
- Check that the sealing ring on the cap is in good working order, then tighten the cap on the stem to the prescribed torque.



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

**Specific tooling****020376Y Adaptor handle****020359Y 42x47-mm adaptor****Locking torques (N*m)****Fork clamp screws** 20 ÷ 25 **Stem upper cap** 15 ÷ 30 **Lower screw with copper washer** 25 - 35



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

Characteristic**Maximum leg diameter**

35.10 mm

Minimum stem diameter

34.90 mm

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



Refitting

- Grease using lithium soap grease on the roller bearings.

Recommended products

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

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



- Insert the fork into the headstock.
- Insert the spacer ring.
- Using an appropriate tool do up the first ring nut in the steering tube (upper steering ball bearing). Lock with a torque of $10 \div 13$ 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 $30 \div 36$ 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 3 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 $45 \div 50$ Upper steering ring nut $30 \div 36$ Steering lower ring nut $10 \div 13$ then loosen by 90° Tightening screw for calliper support to the fork $45 \div 55$ Front wheel axle $45 \div 50$



See also

[Refitting the front wheel](#)

Steering bearing

Removal

For the version with steering fifth wheel remove the seat on the steering tube by means of the special punch as indicated in the photograph

Specific tooling

020004Y Punch for removing fifth wheels from headstock



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

In case of replacement, proceed as follows:

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

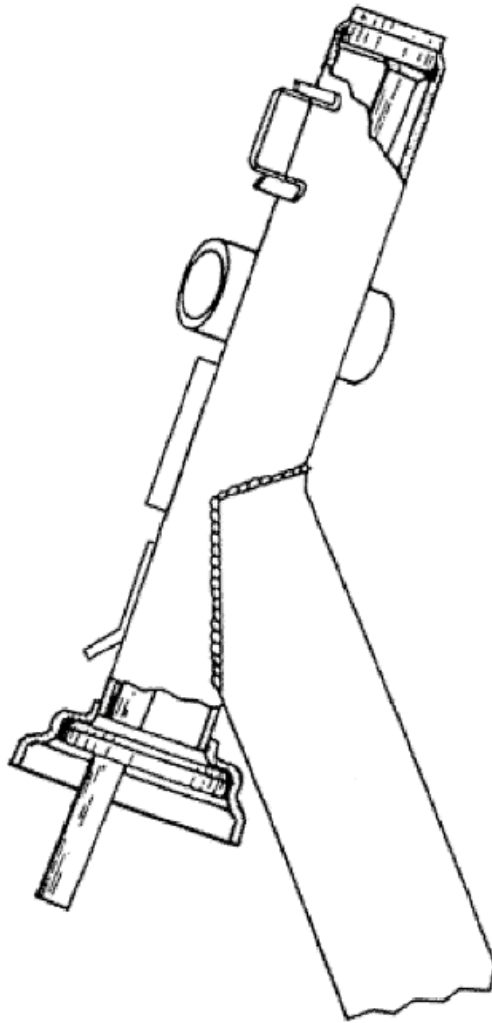


N.B.

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

Specific tooling

020004Y Punch for removing fifth wheels from headstock



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

In case of replacement, proceed as follows: - Support the fork in a clamp.

- Insert the contrast plate in the upper end of the steering tube

N.B.

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



- Insert the special tool as shown in the figure.



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



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

Specific tooling

020458Y Puller for lower bearing on steering tube



Refitting

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

- Place a new ball bearing on the headstock and a roller bearing seat on the lower part.
- Insert the screw of the special tool set-up with the adapters for inserting bearing and seat, into the steering head, as shown in the figure.
- Using two 24 mm wrenches, do the seat and the bearing right up.

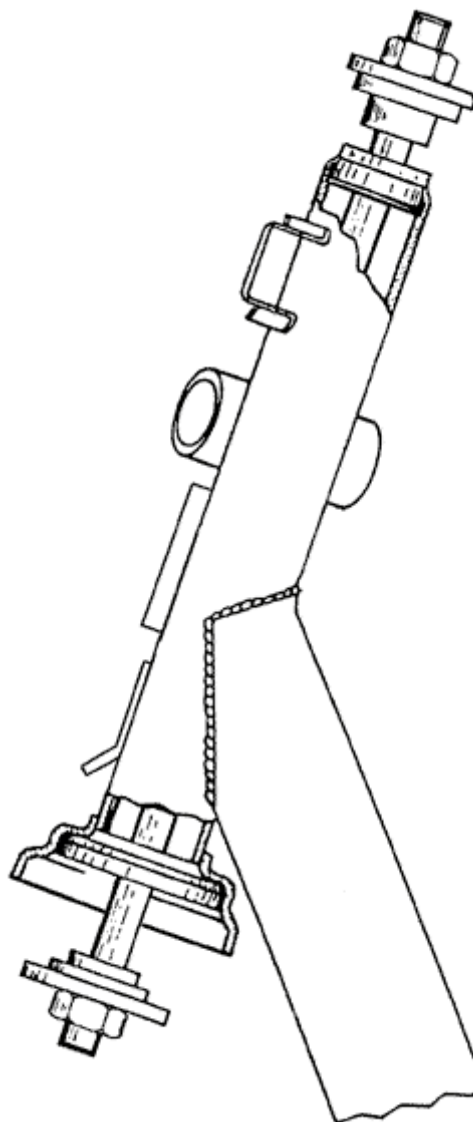


N.B.

ALWAYS USE A NEW BEARING AND A NEW SEAT.

Specific tooling

001330Y Tool for fitting steering seats



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

Specific tooling

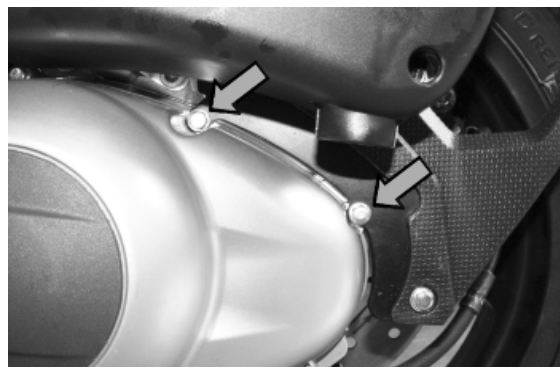
006029Y Punch for fitting fifth wheel seat on steering tube



Rear

Removing the rear wheel

- Remove the mudflap undoing the four screws.



- Remove the exhaust silencer.



- Remove the cotter pin.



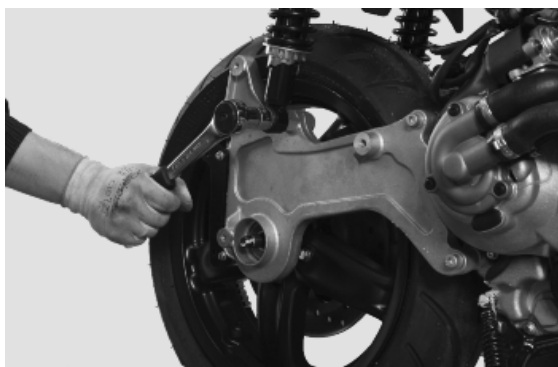
- Remove the cap.



- Unscrew the wheel fixing nut and collect the spacer.



- Unscrew the shock absorber fixing nut on the right of the bracket.



- Undo the two screws fixing the bracket to the engine and remove the bracket.
- Collect the spacer.



- Undo the five wheel fixing screws and collect the wheel.



Refitting the rear wheel

To fit, follow the removal procedure but in reverse order.

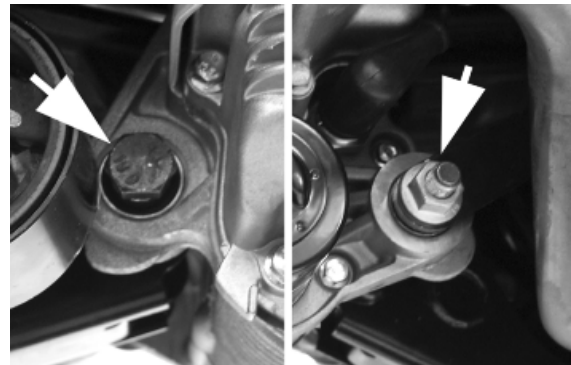
Locking torques (N*m)

Muffler arm clamping screws 27 ÷ 30 Nm Rear wheel axle nut 104 ÷ 126 Nm Shock absorber-crankcase attachment bracket 20 ÷ 25 Nm Lower shock absorber clamping screw 33 ÷ 41 Nm Rear brake calliper fixing screws 25 ÷ 30 Nm

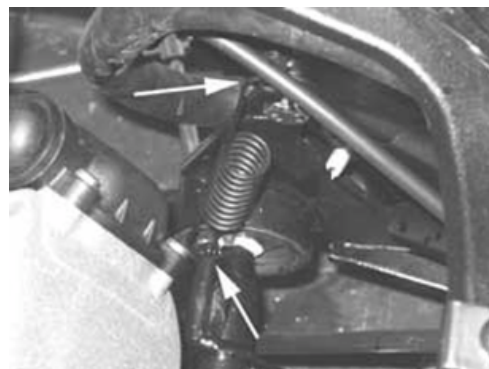
Swing-arm

Removal

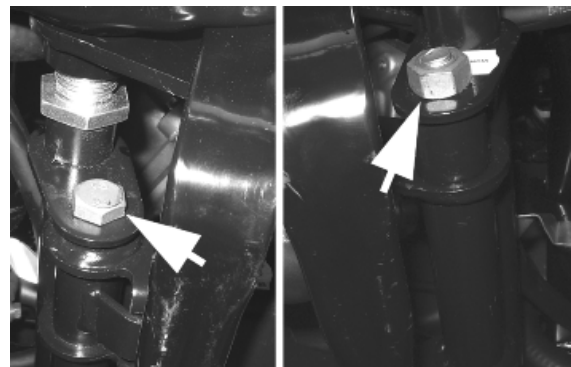
- Place the scooter on its centre stand;
- Remove the swinging arm/engine fitting shown in the photo
- Move the engine back



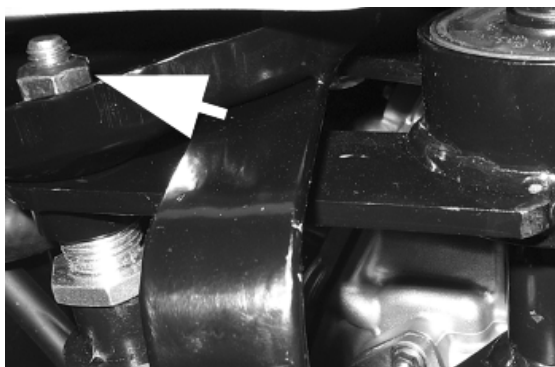
- remove the spring anchoring the swinging arm to the frame as shown in the photo



- Remove the two screws fixing the buffer support bracket to the frame



- Undo the nut on the LHS shown in the figure and remove the corresponding bolt from the opposite side.
- Remove the swinging arm.

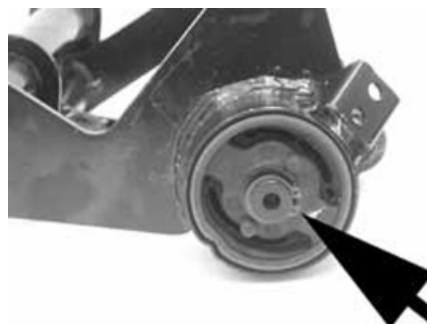


- Check the entire swinging arm assembly.
- Check all the centring bushing components and silent block rubber buffers.
- Replace the work components that cause excessive clearance on the rear suspension.



Overhaul

- Make sure the silent bloc is not broken. If there is, replace it.
- Remove the seeger ring shown in the photograph



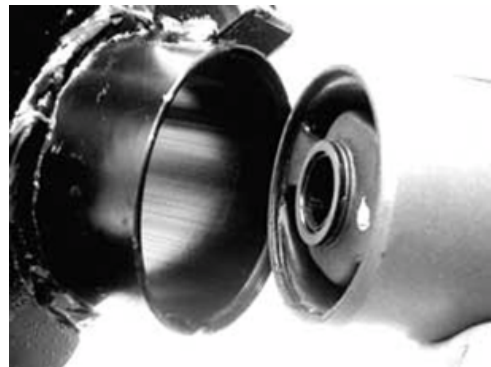
- Remove the full silent bloc bracket
- Undo the silent bloc ring shown in the photograph



- 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 photo



- 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 frame side.
- Check the axial clearance between the two swinging arms using a feeler thickness gauge

Characteristic**Standard clearance**

0.40 ÷ 0.60 mm

Allowable limit after use:

1.5 mm



- To check the clearance on the frame-side arm, mount the retainer using the pin fixing the swinging arm to the frame and two adaptor rings of the appropriate tool 020229Y. Alternatively use two washers with inner diameter for 12-mm pins, min. outer diameter: 30 mm: min. thickness: 4 mm.



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

Characteristic**Standard clearance**

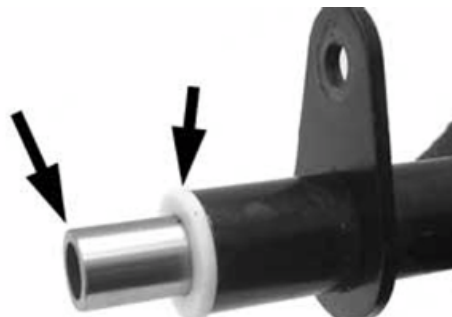
0.40 ÷ 0.60 mm

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 photo.



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



- Using an appropriate tool plant new roller casings, being careful to position the bearings with the O-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:

$L 175.3 \pm 0.3 \text{ mm}$

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

$L 183 \pm 0.3 \text{ mm}$

Engine side swinging arm plastic bushing shim:

$3.5 \pm 0.05 \text{ mm}$

Frame-side swinging arm plastic bushing shim:

$3.5 \pm 0.05 \text{ mm}$

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

$290 \pm 0.1 \text{ mm}$

Length of the swinging arm tube on the frame side:

$283 \pm 0.1 \text{ mm}$



- 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 photograph
- Adjust the bolt as shown in the photograph
- Position the frame side swinging arm with the most protruding part pointing towards the silent block side as shown in the photograph



Recommended products

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

Soap-based lithium and zinc oxide grease containing NLGI 2; ISO-L-XBCIB2 of the swinging arm

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)

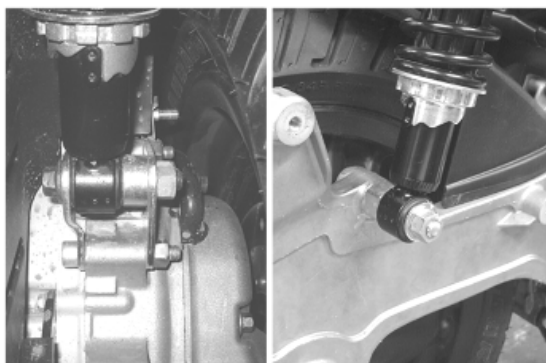
Engine and vehicle side swinging arm junction bolt $33 \div 41$ Nm Swinging arm pin - Engine 64 - 72 Body shell - Swinging arm pin $76 \div 83$ Screw fixing the silent-block support plate to the body $42 \div 52$

Shock absorbers

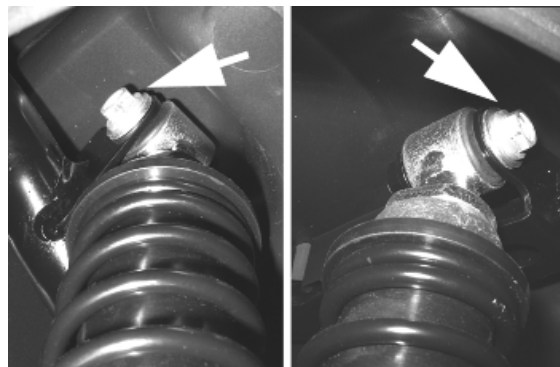
Removal

Proceed as follows:

- place the scooter on its centre stand;
- lift the engine a little with a jack so as to free the two shock absorbers;
- remove the muffler
- undo the shock absorber spring assembly clamping screw from the support fixed to the engine on the one side and from that fixed to the muffler on the other;



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



Refitting

Carry out the previous operations but in reverse order.

Locking torques (N*m)

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

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 bolt 32 ÷ 40

Side stand

REMOVAL

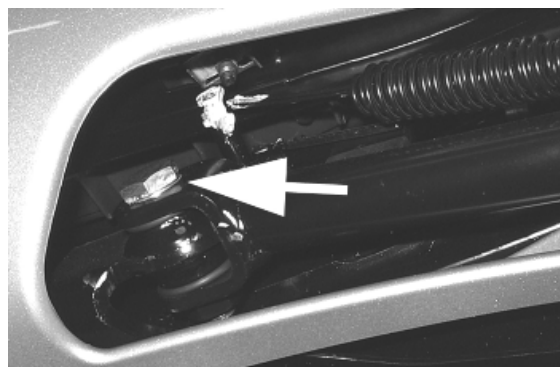
- Uncouple the centre stand return spring;
- Remove the screw shown in the photograph

FITTING

To refit, carry out the removal operations in reverse order and comply with the specified torque.

Locking torques (N*m)

Side stand fixing bolt 35 ÷ 40



INDEX OF TOPICS

BRAKING SYSTEM

BRAK SYS

This section è is devoted to the description of the braking system components.

Rear brake calliper

Removal

- Remove the rear wheel.
- Remove the two rear brake calliper devices fastening them to the support as shown in the photograph.

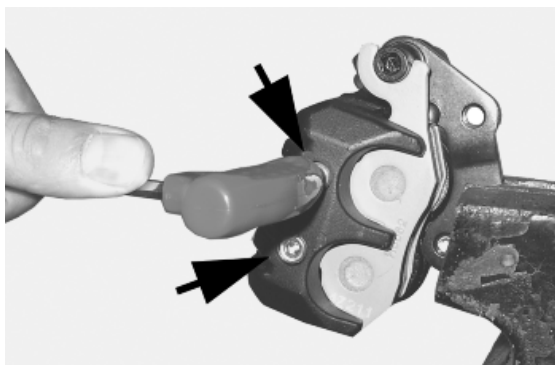
N.B.

SHOULD THE BRAKE CALLIPER BE REPLACED OR SERVICED, BEFORE REMOVING THE FITTINGS FIXING THE CALLIPER TO THE SUPPORT BRACKET, LOOSEN THE OIL HOSE FITTING AFTER HAVING EMPTIED THE SYSTEM OF THE CIRCUIT BEING EXAMINED.



Overhaul

- Remove the brake calliper.
- Suitably support the brake calliper in a vice
- Remove the two pad fixing screws.
- Remove the pads being careful with the stop spring.



- Remove the fixed plate by undoing the screw shown in the photograph.



- Remove the internal parts from the floating body with short blasts of compressed air through the brake liquid pipe to facilitate expelling the plungers.

- Check:

- that the plates and the body are whole and in good condition;
- that the cylinders of the calliper floating body 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



CAUTION

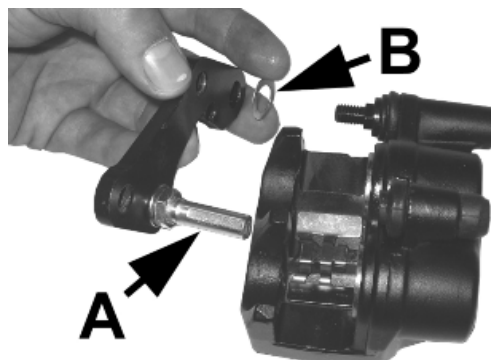
ALL THE SEALS AND GASKETS MUST BE REPLACED EVERY TIME THE PUMP IS SERVICED.

Refitting

- Insert the O-rings and small pistons the floating body, lubricating all the components with brake fluid.



- Fit the fixed plate being careful to grease the guide «A» and to insert washer «B» correctly as indicated in the photo.



- Fit the pad retention spring

- Fit the pads and screw up the relative clamping screws to the specified torque

- Hold the pads in the correct position and insert the calliper in the brake disc.
- Fix the support calliper by means of the two screws at the specified torque
- Secure the pipe fitting to the calliper at the specified torque.
- Bleed the air from the system.

Front brake calliper

Removal

- Remove the two front brake calliper devices fastening them to the support as shown in the photograph.

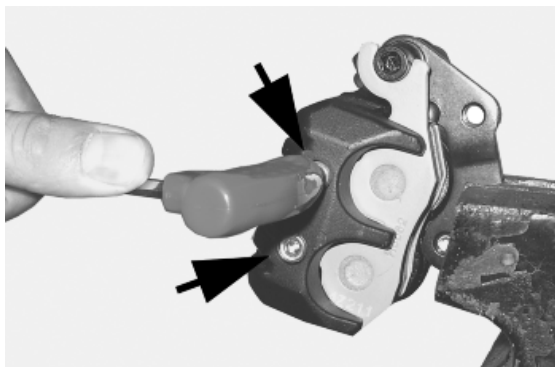
N.B.

WHEN A PROCEDURE IS PLANNED INCLUDING THE SERVICE OR REPLACEMENT OF THE CALLIPER, FIRST LOOSEN THE FITTING CONNECTING THE PIPE TO THE BRAKE CALLIPER



Overhaul

- Remove the brake calliper.
- Suitably support the brake calliper in a vice
- Remove the two pad fixing screws.
- Remove the pads being careful with the stop spring.



- Remove the fixed plate by undoing the screw shown in the photograph.



- Remove the internal parts from the floating body with short blasts of compressed air through the brake liquid pipe to facilitate expelling the plungers.

- Check:

- that the plates and the body are whole and in good condition;
- that the cylinders of the calliper floating body 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



CAUTION

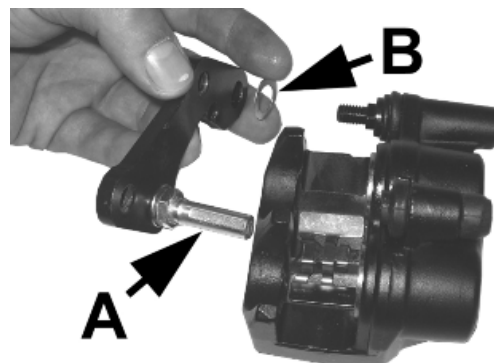
ALL THE SEALS AND GASKETS MUST BE REPLACED EVERY TIME THE PUMP IS SERVICED.

Refitting

- Insert the O-rings and small pistons the floating body, lubricating all the components with brake fluid.



- Fit the fixed plate being careful to grease the guide «A» and to insert washer «B» correctly as indicated in the photo.



- Fit the pad retention spring

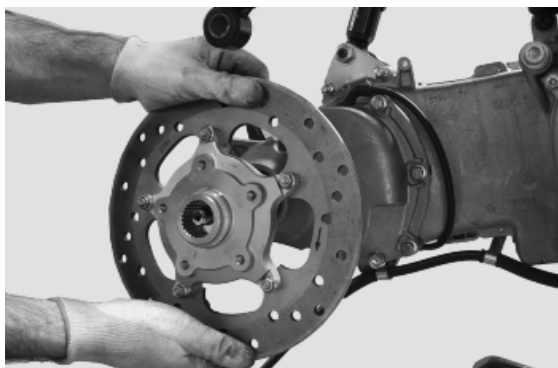
- Fit the pads and screw up the relative clamping screws to the specified torque

- Hold the pads in the correct position and insert the calliper in the brake disc.
- Fix the support calliper by means of the two screws at the specified torque
- Secure the pipe fitting to the calliper at the specified torque.
- Bleed the air from the system.

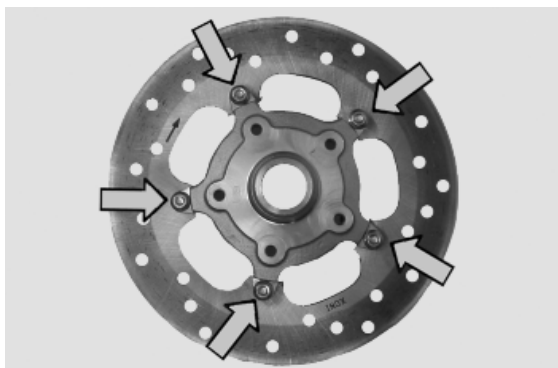
Rear brake disc

Removal

- Remove the rear wheel.
- Remove the brake calliper.
- Remove the disc from the wheel axle.



- Undo the five screws and remove the disc from the wheel hub.



Refitting

Follow the removal operations but in reverse order.

N.B.

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

Recommended products

Loctite 243 Medium strength threadlock

Loctite 243 medium-strength threadlock

Locking torques (N*m)

Brake disc fixing screw 5 ÷ 6.5

Disc Inspection

- Remove the rear brake calliper.

- Check the disc thickness with a micrometer

Characteristic**Standard thickness:**

5 +0.2-0.1 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 $\varnothing$ 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.

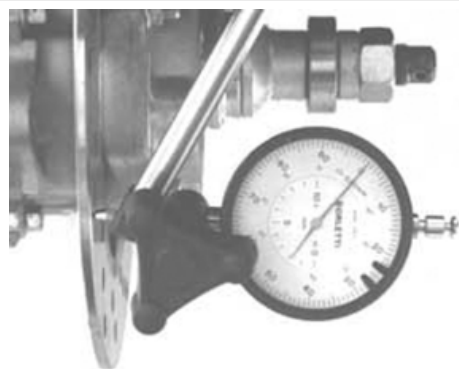
Specific tooling

020335Y Magnetic support for dial gauge

Characteristic**Max. deviation allowed:**

0.1 mm

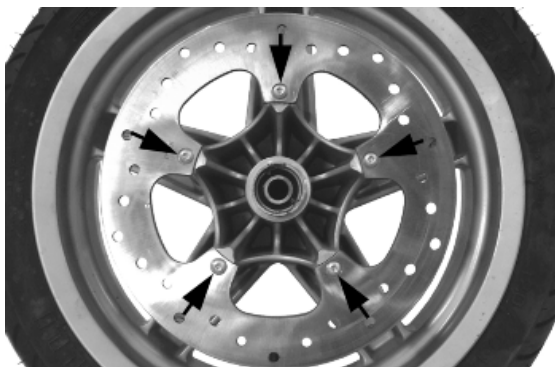
- If you detect incorrect values, replace the disc. If the anomaly persists, replace the hub.



Front brake disc

Removal

- Remove the front wheel.
- Undo the five clamping screws shown in the photograph



Refitting

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

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

N.B.

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

Recommended products

Loctite 243 Medium strength threadlock

Loctite 243 medium-strength threadlock

Locking torques (N*m)

Brake disc fixing screw 5 ÷ 6.5

Disc Inspection

Checking the disc is important; it must be perfectly clean, with no sign of rust, oil or grease or other dirt and must not show signs of deep scoring.

Characteristic

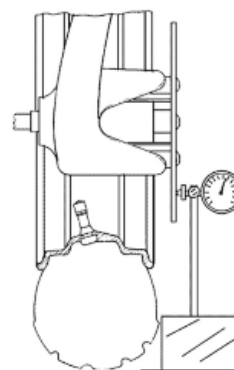
New rear disc thickness

4.0 mm

Disc thickness at wear limit (front)

3.5 mm

- Using the appropriate tool, measure how much the disc protrudes when the wheel is fitted properly. The protrusion, measured near the external edge of the disc, must be less than 0.1 mm.
- If a value is measured other than the specified value, remove the front wheel (Front/Rear Suspension chapter) and check the protrusion of the disc. Maximum permissible out of true is 0.1 mm. If the value measured is greater, replace the disc and repeat the check.
- If the problem persists, check and replace the wheel hub if necessary.



Specific tooling

020335Y Magnetic support for dial gauge

Front brake pads

Removal

Proceed as follows:

- Remove the front brake calliper.



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



Characteristic

Minimum value

1.5 mm

See also

Front brake calliper

Refitting

To fit, proceed as follows:

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

N.B.

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

Recommended products

Loctite 243 Medium strength threadlock

Loctite 243 medium-strength threadlock

Locking torques (N*m)

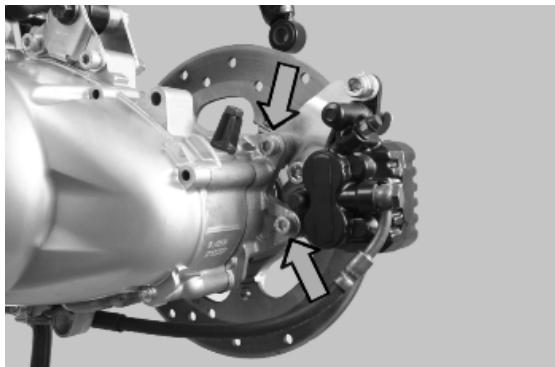
Screw tightening calliper to the support 24 ÷ 27 Pad fastening pin 19.6 ÷ 24.5

Rear brake pads

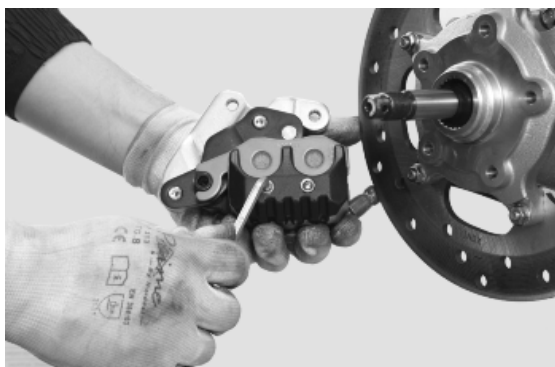
Removal

Proceed as follows:

- Remove the rear brake calliper.



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



Characteristic

Minimum value

1.5 mm

See also

[Removal](#)

Refitting

To fit, proceed as follows:

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

N.B.

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

Recommended products

Loctite 243 Medium strength threadlock

Loctite 243 medium-strength threadlock

Locking torques (N*m)

Screw tightening calliper to the support 24 ÷ 27 Pad fastening pin 19.6 ÷ 24.5

Fill

Rear - combined

- Remove the rubber hood from the bleed screw.
- Insert a rubber pipe in the bleed screw to permit the brake fluid to be recovered.
- With the left-hand brake lever, load the system and bring it up to the required pressure.
- Keeping the left-hand brake lever pulled, loosen the bleed screw to permit the air in the system to escape. Then tighten the bleed screw



- Repeat the operation until only brake fluid comes out of the rubber pipe.
- Remove the fluid recovery pipe and refit the rubber cap over the bleed screw.
- Top up the brake fluid to the right level in the reservoir.

If necessary, bleeding can be done using a special vacuum pump

N.B.

DURING THE BLEEDING OPERATIONS, MAKE SURE THE BRAKE FLUID DOES NOT COME INTO CONTACT WITH THE BODYWORK SO AS NOT TO DAMAGE IT. FURTHERMORE, DURING THE BLEEDING OPERATIONS REGARDING THE BRAKE CALLIPERS, MAKE SURE THE BRAKE FLUID DOES NOT COME INTO CONTACT WITH THE DISC BRAKES AND WITH THE BRAKE PADS. FAILURE TO COMPLY WITH THIS NORM WILL ENDANGER THE PROPER WORKING AND EFFICIENCY OF THE BRAKING SYSTEM

Specific tooling

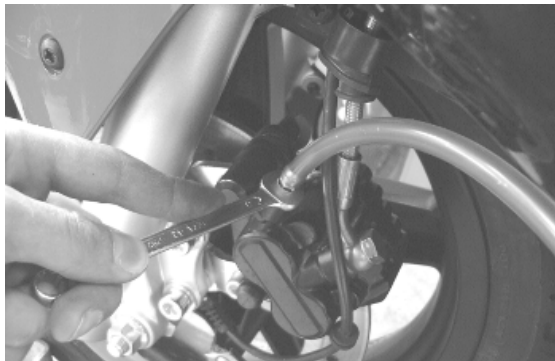
020329Y MityVac vacuum-operated pump

Locking torques (N*m)

System bleed calliper fitting: 12 ÷ 16 Nm

Front

- Remove the rubber hood from the bleed screw.
- Insert a rubber pipe in the bleed screw to permit the brake fluid to be recovered.
- With the right-hand brake lever, load the system and bring it up to the required pressure.
- Keeping the right-hand brake lever pulled, loosen the bleed screw to permit the air in the system to escape. Then do up the bleed screw



- Repeat the operation until only brake fluid comes out of the rubber pipe.
- Remove the fluid recovery pipe and refit the rubber cap over the bleed screw.
- Top up the brake fluid to the right level in the reservoir.

If necessary, bleeding can be done using a special vacuum pump

N.B.

DURING THE BLEEDING OPERATIONS, MAKE SURE THE BRAKE FLUID DOES NOT COME INTO CONTACT WITH THE BODYWORK SO AS NOT TO DAMAGE IT. FURTHERMORE, DURING THE BLEEDING OPERATIONS REGARDING THE BRAKE CALLIPERS, MAKE SURE THE BRAKE FLUID DOES NOT COME INTO CONTACT WITH THE DISC BRAKES AND WITH THE BRAKE PADS. FAILURE TO COMPLY WITH THIS NORM WILL ENDANGER THE PROPER WORKING AND EFFICIENCY OF THE BRAKING SYSTEM

Specific tooling

020329Y MityVac vacuum-operated pump

Locking torques (N*m)

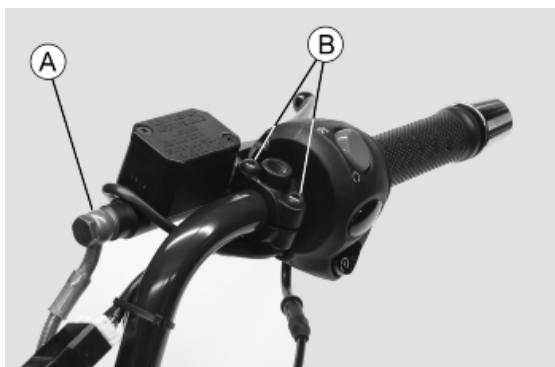
System bleed calliper fitting: 12 ÷ 16 Nm

Front brake pump

Removal

The procedure is valid for both brake pumps.

- Remove the front and rear handlebar cover.
- Place a suitable container to collect the oil, disconnect the oil pipe from the calliper and operate the brake lever until no more oil comes out.
- Disconnect the oil pipe «A» from the pump, then unscrew the two retainers «B» from the U bolt 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**

INDEX OF TOPICS

COOLING SYSTEM

COOL SYS

Coolant replacement

To drain the cooling system proceed as follows:

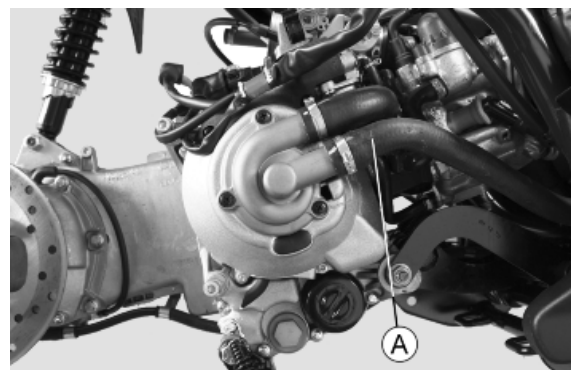
- Unscrew the expansion tank cap to help the coolant drain.



- Remove the clamp.
- Slide off the coolant delivery pipe «A» and drain the system.

WARNING

BEFORE ANY OPERATIONS, GET A SUITABLE COLLECTING CONTAINER .

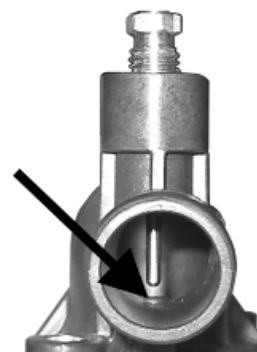


To fill the cooling system proceed as follows:

- Refit the coolant delivery pipe «A» and tighten it with the clamp.
- Top up the expansion tank with coolant until reaching the reference mark «MAX».
- Bleed the system.

System bleed

- Start up the engine until the operating temperature is reached.
- From the helmet compartment, remove the carburettor inspection cover.
- Remove the rubber hood from the thermostat bleed screw «B» and insert a transparent pipe long enough to connect the valve to the expansion tank.
- Loosen the bleeding valve by two turns until the communication hole is revealed with the head as shown in the photo.



- Wait until only coolant comes out of the rubber pipe so as to eliminate any air bubbles inside the circuit.
- Close the valve respecting the maximum torque and restore the level until reaching the reference mark «**MAX**».
- Turn off the vehicle, bleed again and top up.
- Screw the expansion tank cap.
- Refit the carburettor inspection cover.

Check

- 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, and keep it close to the thermostat.

Heat up the container using the thermal gun.

Check the temperature when the thermostat starts to open:

Heat up until the thermostat is completely open.

- 3) Replace the thermostat if it is not working 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 start temperature

69.5 ÷ 72.5°C



INDEX OF TOPICS

CHASSIS

CHAS

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

Seat

Lift the saddle to remove it:

- Push and turn the ignition lock key anticlockwise until it clicks.
- Lift the saddle.
- Remove the control button of the under seat light.
- Remove the two fixing screws to the chassis.



Rear handlebar cover

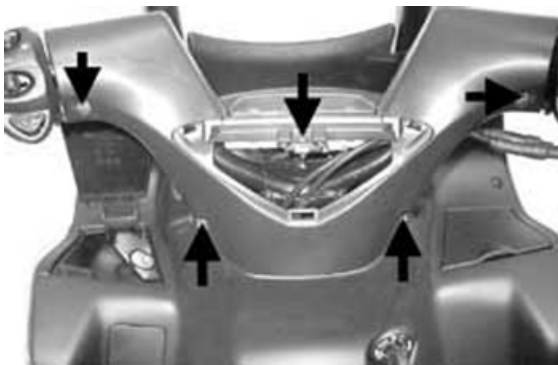
- Release the three retaining tabs of the rear handlebar cover shown in the figure using a screwdriver and paying attention not to damage the paintwork.



- Remove the five fixing screws from the rear handlebar cover.
- Remove the rear cover.

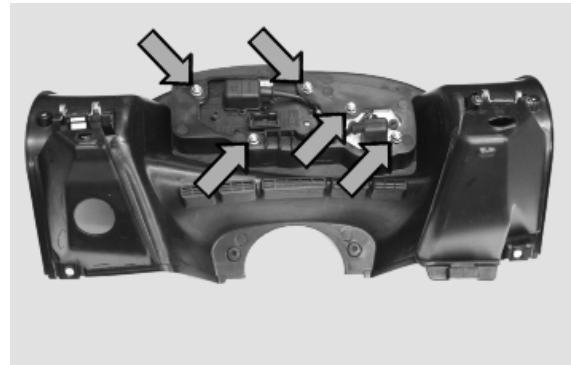
N.B.

WHEN INSTALLING, THE CENTRE SCREW IS A METAL SCREW, THE OTHER 4 ARE PLASTIC.



Instrument panel

- Remove the instrument panel.
- Loosen the five fixing nuts of the instrument panel.



Front handlebar cover

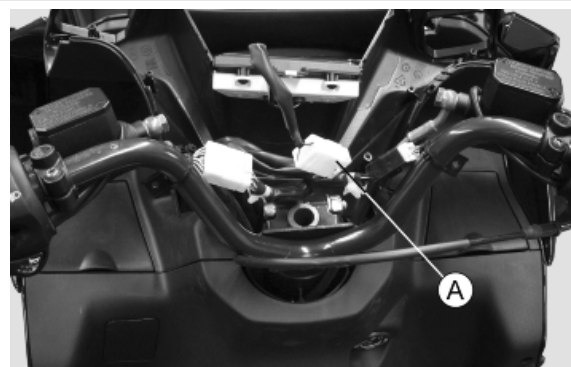
- Remove the rear handlebar cover.
- Remove the left and right frames of the brake pump secured with two retaining fins.



- Loosen the four fixing screws of the front handlebar cover with the handlebar itself.



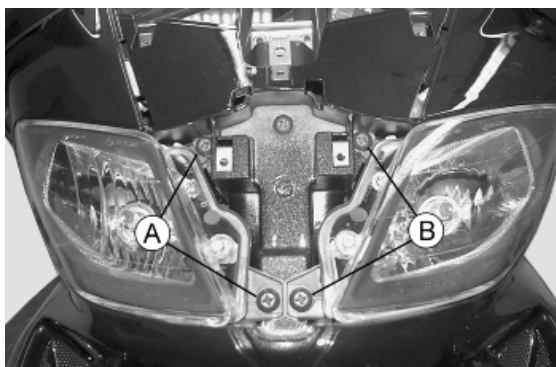
- Disconnect the warning light unit connector «A».



Headlight assy.

The front headlight assembly has two units, the procedure for both is the following:

- Remove the front lower frame (see FRONT SHIELD).
- To remove the right headlight assembly undo the two screws «A».
- To remove the left headlight assembly undo the two screws «B».
- To remove the right assembly, remove the screw located in the coolant loading compartment.



- To remove the left-hand light assembly, remove the screw located in the left-hand storage compartment.



Remove the light, disconnecting the electric connector from the light and the complete lamp holder of the position light.

N.B.

THE TWO REAR ADJUSTMENT SCREWS SHOWN IN THE FIGURE ARE ADJUSTED DURING ASSEMBLY OF THE LIGHT AND MUST NOT BE ALTERED.

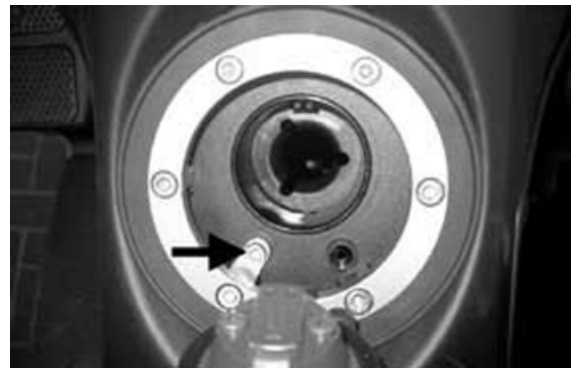


Frame central cover

The chassis central cover has a central tunnel and two side fairings, the procedure is the following:

CENTRAL TUNNEL:

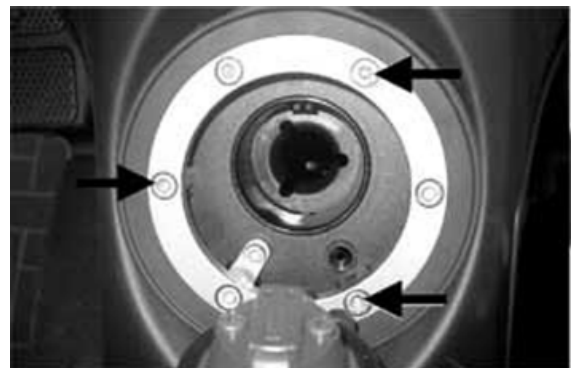
- Remove the saddle together with the hinge.
- Open the fuel tank flap.
- Undo the screw indicated in the figure.



- Undo the three screws indicated in the figure.

N.B.

THE OTHER 3 SCREWS HAVE ONLY AN AESTHETIC FUNCTION



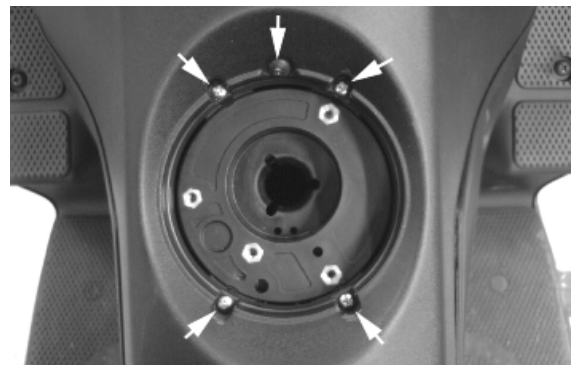
- Undo and remove from both vehicle sides the screw indicated in the figure.



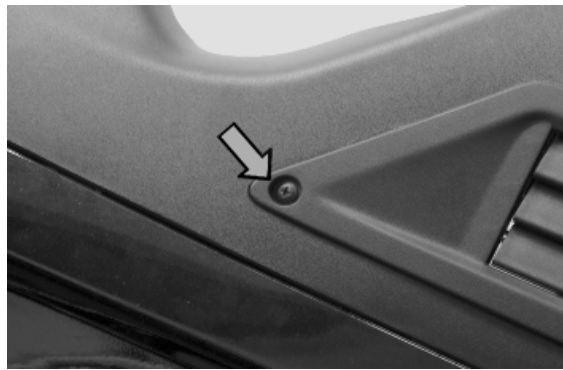
- Undo the five screws indicated in the figure.

CAUTION

PROVISIONALLY PROTECT THE NECK OF THE FUEL TANK USING A CLEAN CLOTH TO PREVENT ANY DIRT OR OBJECTS ACCIDENTALLY FALLING INTO THE TANK.



- Working from both sides, undo the screw indicated and release the retaining tongues to remove the side air deflectors.



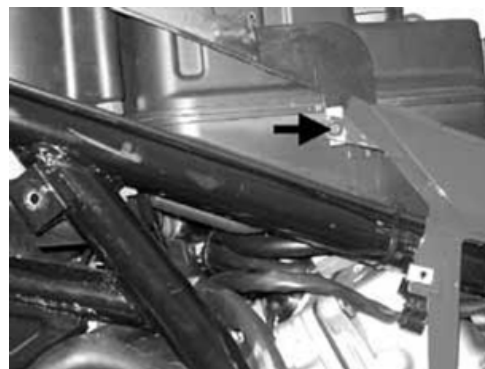
- Undo from both sides the screw indicated in the figure.
- Remove the central tunnel sliding it from the tongues.



SIDE FAIRING:

- Remove the central tunnel.
- Remove the side fairings.
- Remove the handgrips and top side fairings.
- Remove the right and left footrests (see FOOTREST).

- Working from both sides, undo the screw indicated in the figure.
- Remove the side fairing sliding it from the tongues.



Legshield

The front shield has a lot of sections. The removal procedure is described below:

FRONT LOWER FRAME:

- Using a screwdriver, remove the «GILERA» clip-on badge.



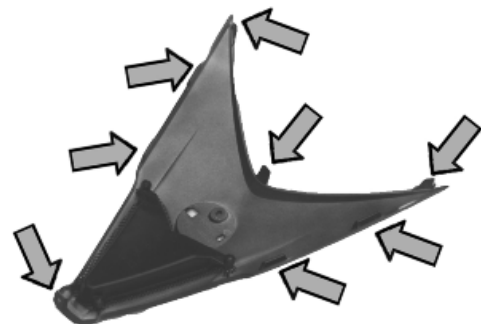
- Undo and remove the screw under the badge.



- Undo and remove the screw «A».



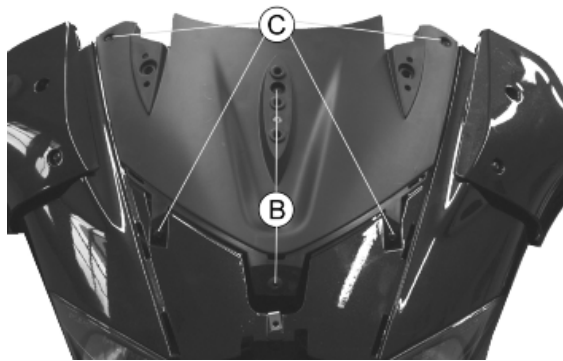
- Taking care not to damage the plastic tongues, remove the front lower frame sliding it upwards from bottom to top.



FRONT UPPER FRAME:

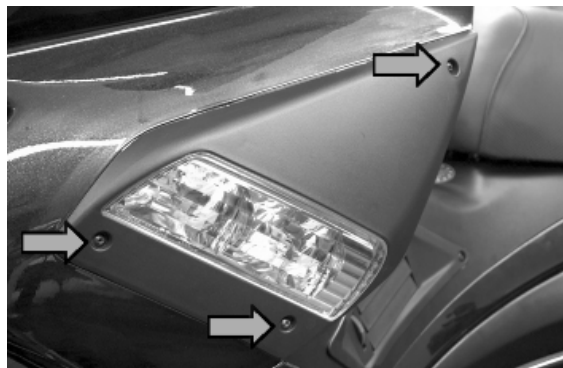
- Remove the FRONT LOWER FRAME.
- Remove the windshield together with the supports.

- Undo and remove the two screws «B» and the four screws «C».
- Remove the frame sliding it from the tongues.

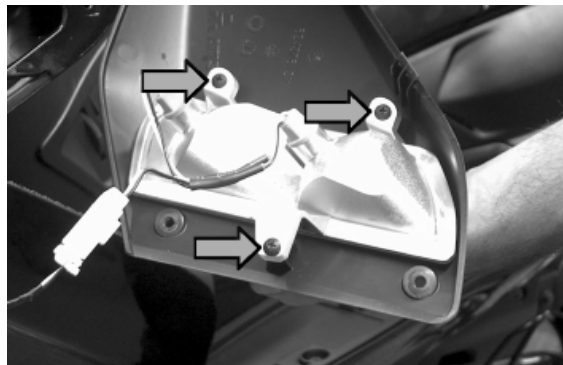


FRONT TURN INDICATORS:

- Undo and remove the three screws indicated.



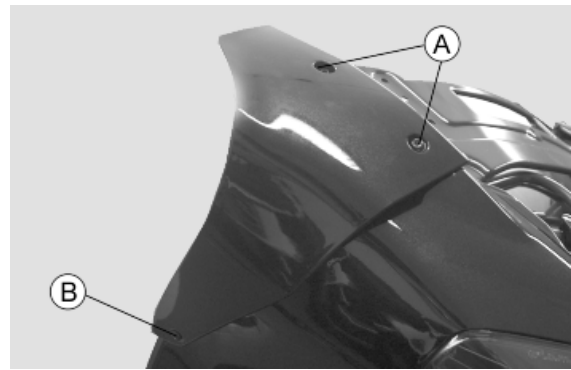
- Disconnect the front turn indicator connector.
- Undo and remove the three screws to remove the bulb holder from the support.



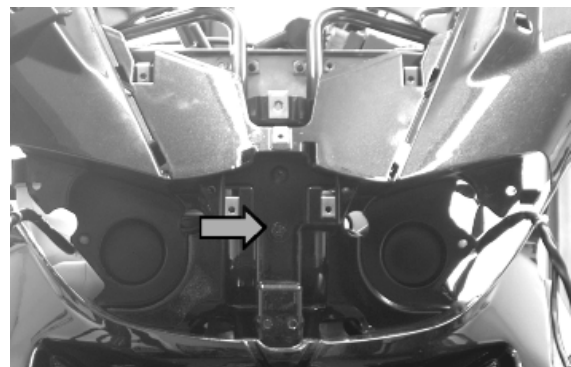
FRONT SHIELD:

- Remove the front lower frame.
- Remove the front upper frame.
- Remove the front headlight assemblies.
- Remove the instrument panel (see SHIELD BACK PLATE).
- Remove the lower shield back plate (see SHIELD BACK PLATE).

- Remove the hand guards unscrewing, from both sides, the two screws «A» collecting the washers and the screw «B».



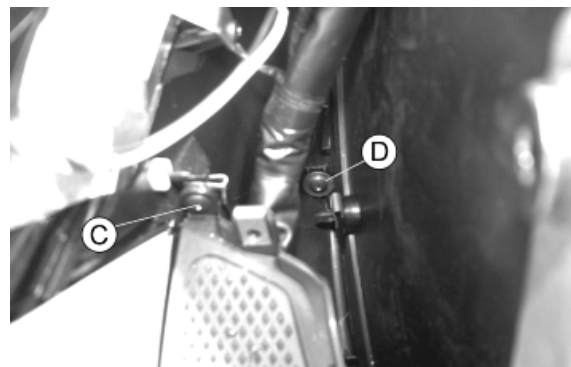
- Undo the central screw.



- Undo the two screws indicated.



- Undo the rider footrest fixing screw «C» and the spoiler fixing screw «D».
- Remove the front shield releasing the different cable harness from the clamps.



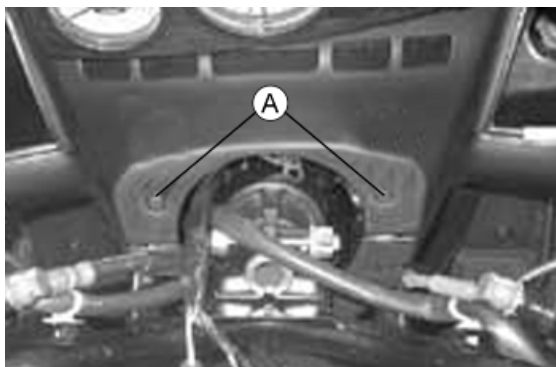
To refit follow the reverse order paying attention to fasten the cable harness with the relative clamps.

Knee-guard

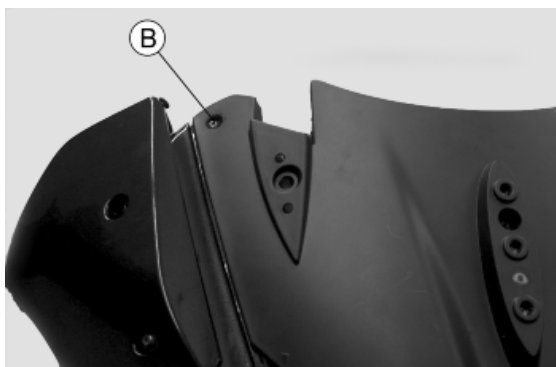
The shield back plate is made by two sections. The instrument panel, with instrument unit and lower shield back plate. The procedure for both is described below:

INSTRUMENT PANEL:

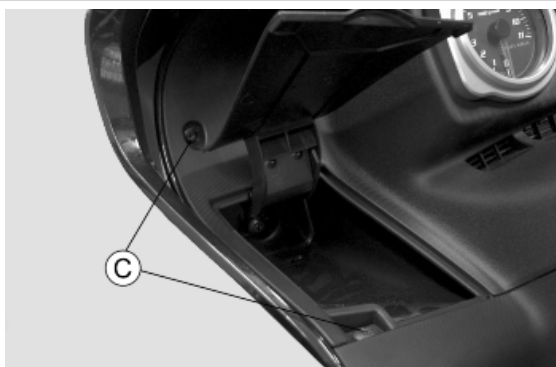
- Remove the windshield.
 - Remove the rear handlebar cover.
 - Remove the front handlebar cover
 - Remove the handlebar.
-
- Undo and remove the two screws «A».



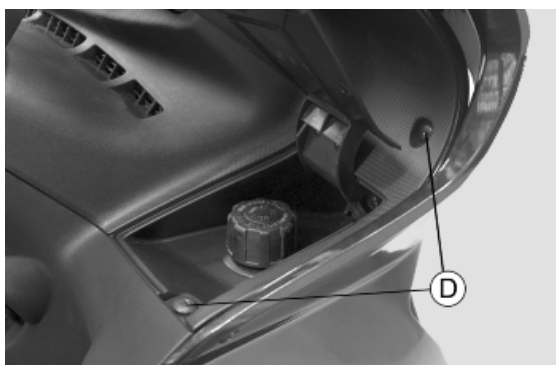
-
- Working from both vehicle sides, undo and remove the screw «B».



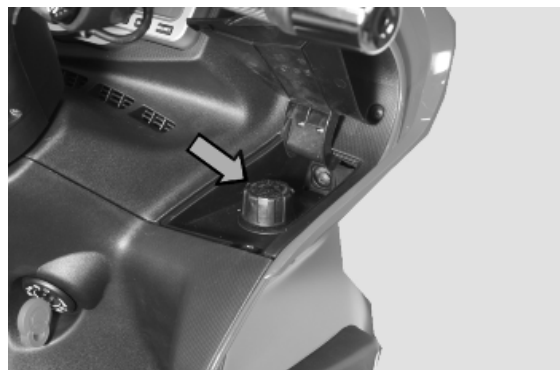
-
- Undo and remove the two screws «C» placed on and inside the glove compartment.



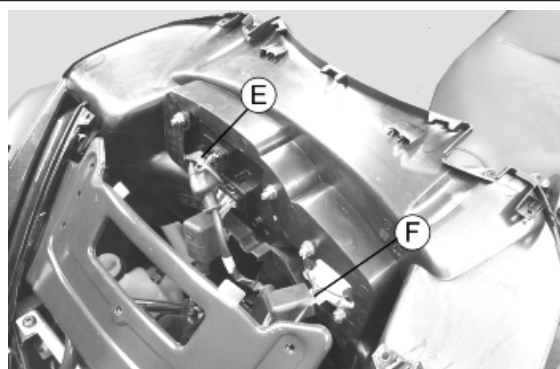
-
- Undo and remove the two screws «D» placed on and inside the coolant loading compartment.



- Undo and remove the expansion tank cap and the gasket below.

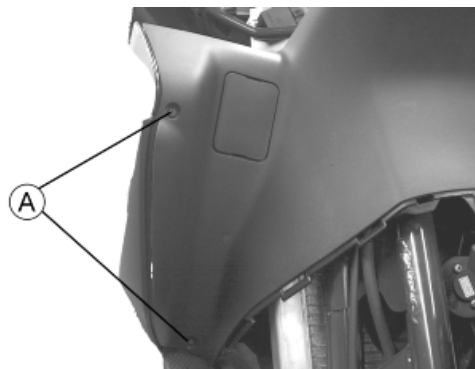


- Remove the instrument panel and release the instrument panel connector «E» and the instrument panel lighting connector «F». Remove the instrument panel.



LOWER SHIELD BACK PLATE:

- Remove the central tunnel (see CENTRAL CHASSIS COVER).
- Remove the instrument panel (see SHIELD BACK PLATE).
- Working from both vehicle sides, undo and remove the two screws «A».



- Turn the key switch frame anticlockwise (it may be necessary to use pliers), releasing the catch.



Removing the ignition key-switch when on *off*

- Remove the lower shield back plate.
- Unscrew the seat opening transmission from the side.
- Remove in advance the ring of the immobiliser antenna.
- Undo the two hexagonal male screws and remove the complete switch.



-
- From the bottom, it is possible to remove the three fixing screws and to release the two hook teeth to raise the retaining plate of the steering lock strut.
 - The latter has a retaining tab with cylindrical teeth that cannot be replaced.



Front wheel housing

To remove the front wheel housing, proceed as follows:

- Remove the spoiler.
- Remove the front fork.
- Remove the plate supporting bracket for the horn and voltage regulator by loosening the two fixing screws shown in the figure in order to release the two lower retainers of the wheel housing.
- Remove the upper fixing screw of the wheel housing to permit movement.



- In order to remove the wheel housing it is necessary to remove the front brake hose to the tank and combination with the splitter.
-

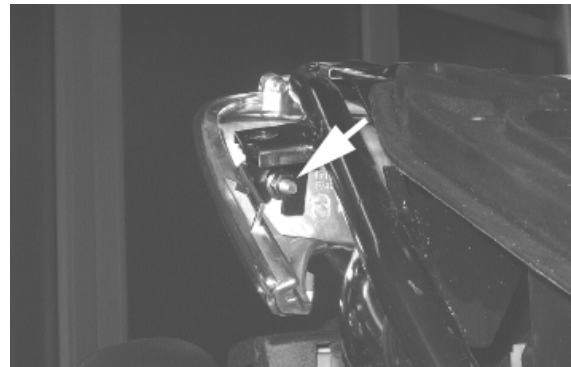
Taillight assy.

To remove the rear light assembly, proceed as follows:

- Remove the rear upper central cover.
- Remove the handgrips and the upper side fairings.
- Undo and remove the central screw.



- Using a jointed wrench between the helmet compartment and the chassis pipes, loosen the two rear fixing nuts and then disconnect the light stud bolts from the support extensions.
- Remove the light and disconnect the bulb holder by turning it through 30° in anticlockwise direction.



Footrest

The footrest comprises a right and left footrest, a passenger footrest and a rider footrest. The whole procedure is described below:

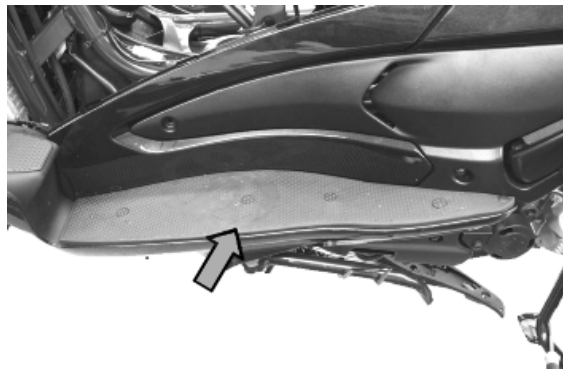
PASSENGER FOOTREST:

- Remove the side fairings.
- Unscrew the nut «A» from both vehicle sides and release the footrests.

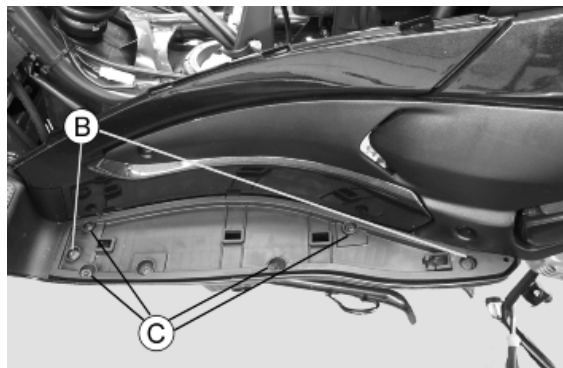


RIGHT AND LEFT FOOTREST:

- Working from both vehicle sides, remove the mat.



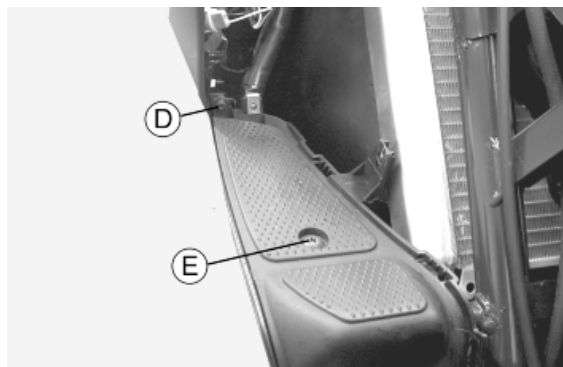
- Undo and remove the two screws «B» and the four screws «C».
- Remove the footrest

**RIDER FOOTREST:**

To remove the rider footrest, proceed as follows:

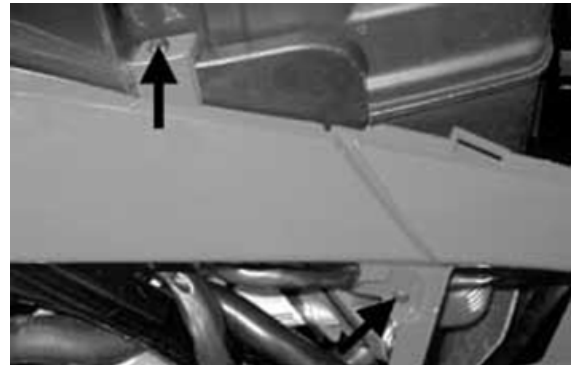
- Remove the central cover.
- Remove the shield back plate.
- Remove the right and left footrest (see FOOTREST).

- Undo the screw «D» and the screw «E» and remove the rider footrest.

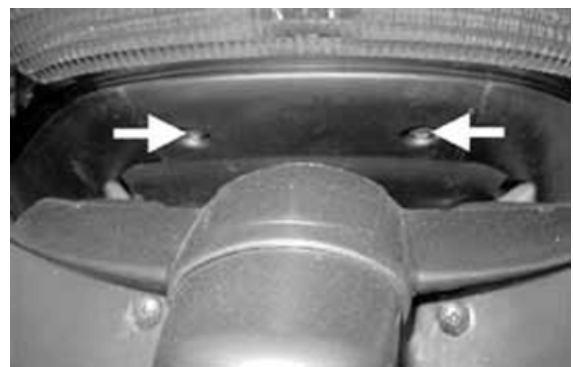


Side fairings

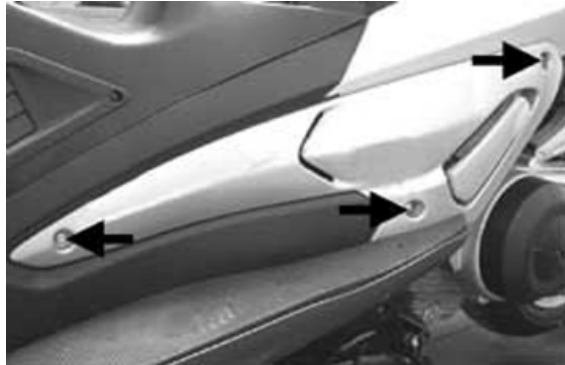
- Remove the rear central cover.
- Remove the passenger handles.
- Remove the lower cover.



- Remove the lower side cover.
- Remove the eight screws shown in the figure (four on each side).
- Pull out the fairing.

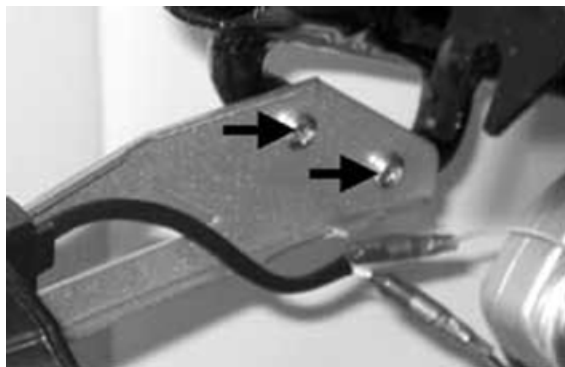


- Remove the three screws indicated in the figure.

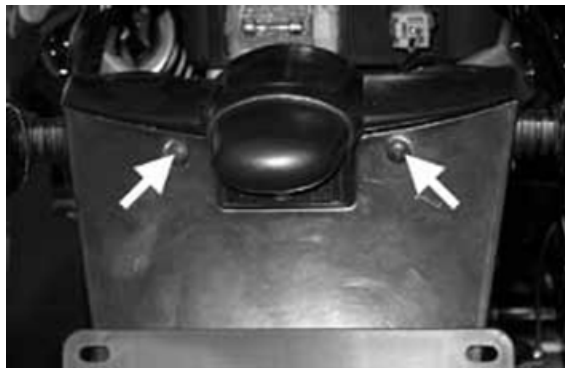


License plate holder

- Remove the rear lower central cover.
- Remove the four fixing screws (two per side) and disconnect the electric connectors.



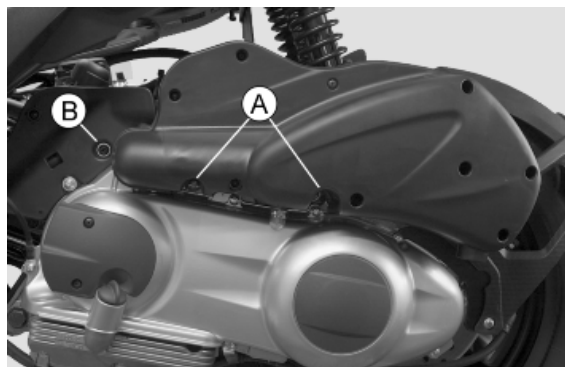
- To access the license plate light bulb, remove the two fixing screws of the support rear cover and extract the complete bulb holder.



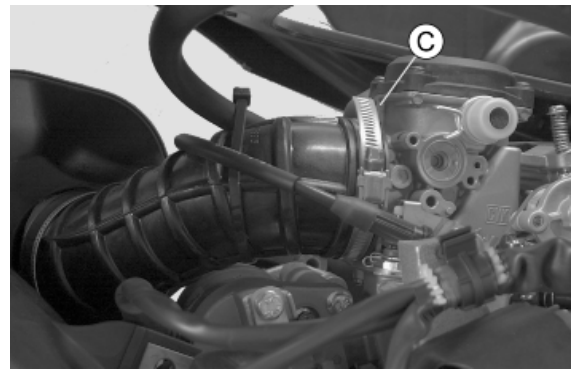
Air filter

To remove the complete air filter from the engine, proceed as follows:

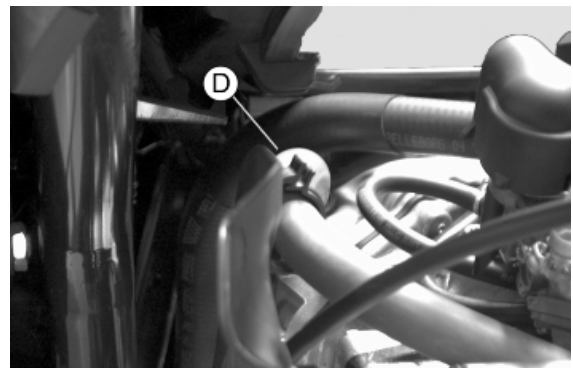
- Undo the two screws «A» and the screw «B» collecting the washers.



- Unscrew the clamp «C» and remove the clamp by pulling.



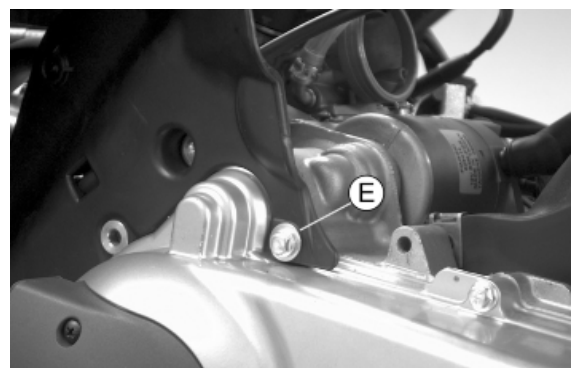
- Release the oil recovery pipe releasing the clamp «D» and remove it from the air filter.
- Remove the complete air filter.



- To remove the crankcase mudflap:
- Release the throttle control cable.



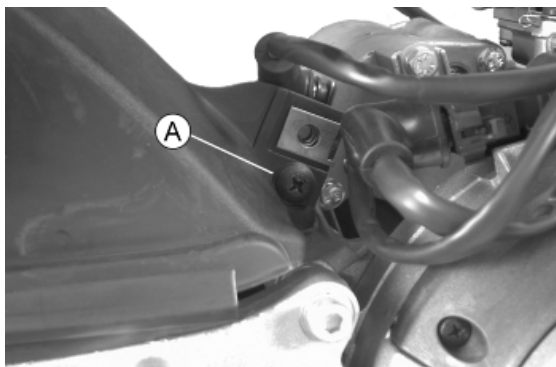
- Undo and remove the screw «E».
- Remove the mudflap.



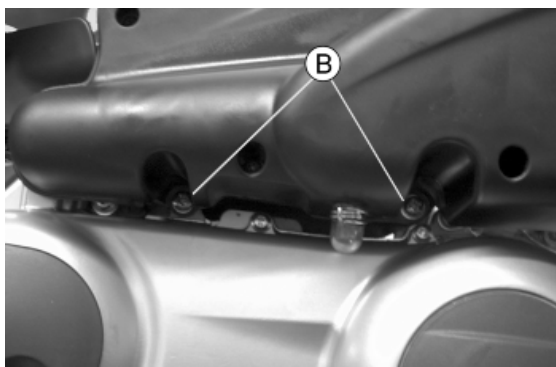
Rear mudguard

To remove the rear mudguard, proceed as follows:

- From the right side of the vehicle, undo the screw «**A**».



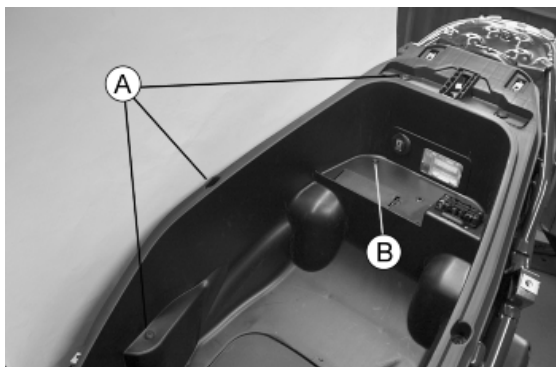
- From the left side of the vehicle, undo the two screws «**B**».
- Remove the rear mudguard.



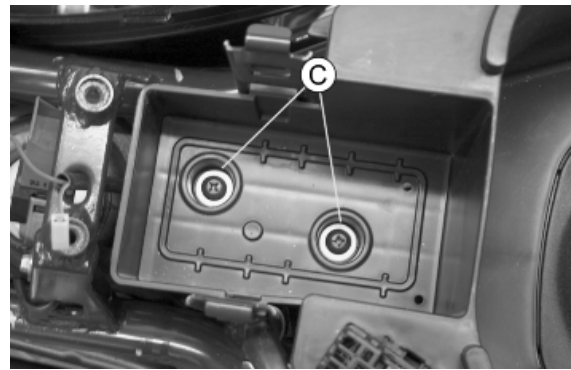
Helmet bay

To remove the helmet compartment, proceed as follows:

- Remove the saddle.
- Remove the battery.
- Remove the rear upper central cover.
- Remove the handgrips and top side fairings.
- Working from both vehicle sides, undo the three screws «**A**» and the screw «**B**».



- Undo and remove the two screws «C» from the battery compartment.
- Lift the helmet compartment from the rear side and remove the saddle lock.

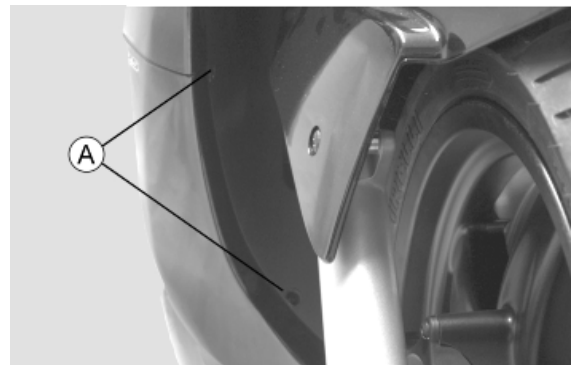


- Disconnect the connectors of the power socket and the under seat light.
- Remove the plug socket due to the interference with the chassis.
- Remove the fuse box releasing the side hook teeth.
- Remove the complete helmet compartment.

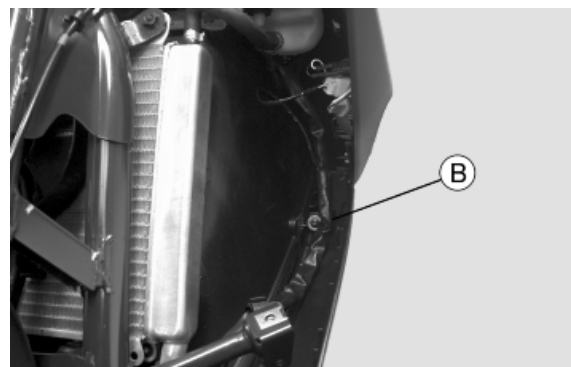
spoiler

To remove the spoiler, proceed as follows:

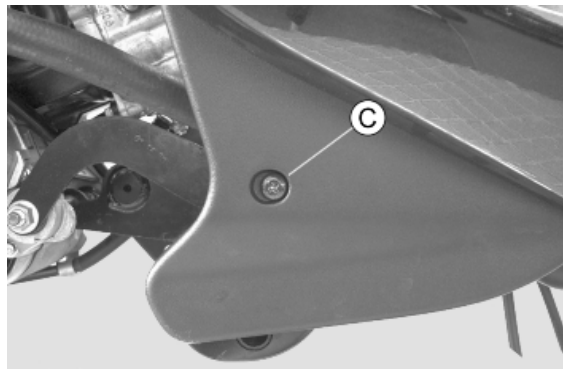
- Remove the footrest.
- Working from both vehicle sides, undo the two fixing screws «A» with the front wheel housing.



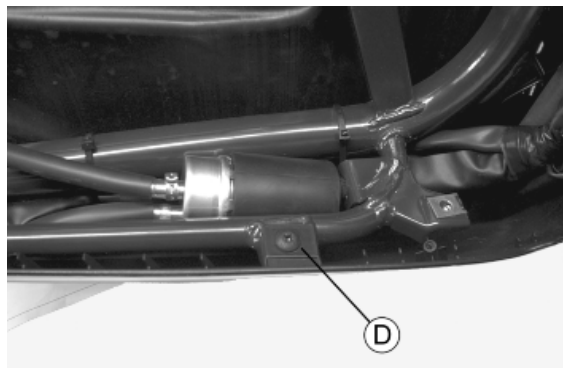
- Working from both vehicle sides, undo the fixing screw «B» with the front shield.



- Working from both vehicle sides, undo the fixing screw «C» with the chassis.



- Working from both vehicle sides, undo the fixing screw «D» with footrest chassis support.
- Slide off the spoiler from the bottom trying not to touch the side stand.



Fuel tank

To remove the fuel tank, proceed as follows:

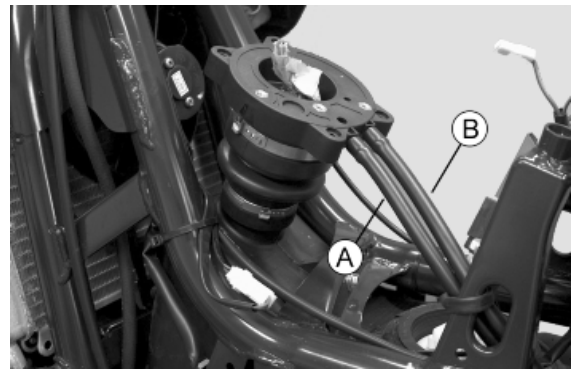
N.B.

THIS OPERATION SHOULD PREFERABLY BE PERFORMED WITH THE TANK EMPTY.

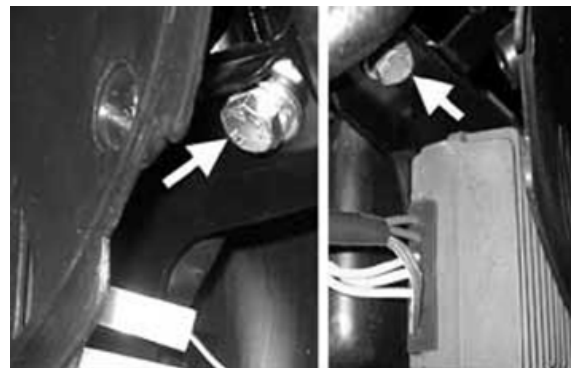
- Remove the shield back plate.
- Remove the central chassis cover.
- Remove the footrest.
- Remove the spoiler.
- Remove the filler unscrewing the two tank retaining straps.



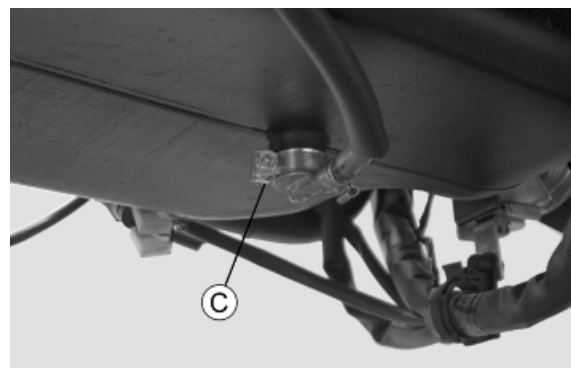
- Remove the "too full" pipe «A» and the tank ventilation pipe «B».



- Remove the horn plate support bracket and the voltage regulator unscrewing the two nuts shown in the figure.



- Release the fuel pipe removing the clamp «C».



- Disconnect the fuel probe connector.

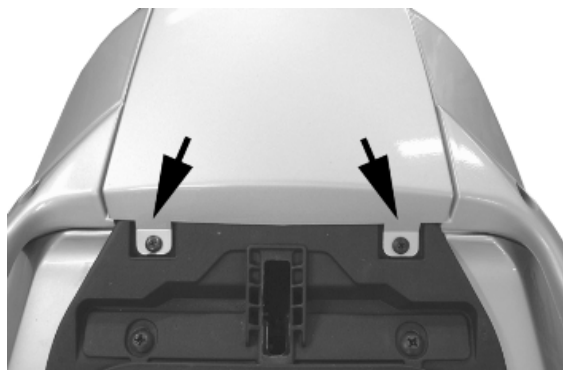


- Undo the two tank fixing screws.
- Remove the tank through the front lower part of the vehicle.

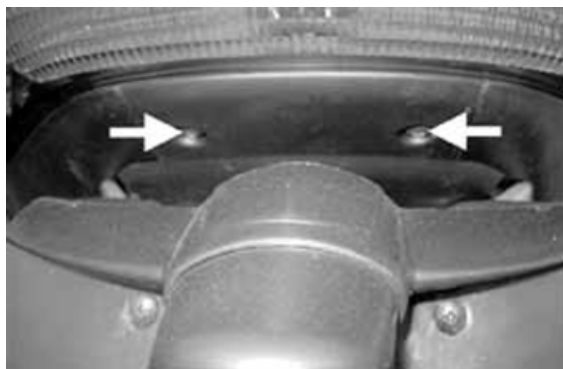


Rear central cover

- Raise the saddle.
- Remove the two fixing screws shown in the figure.



- Remove the two screws indicated in the figure.



- Remove the seven screws indicated in the figure.
- Remove the central cover from its retainers.



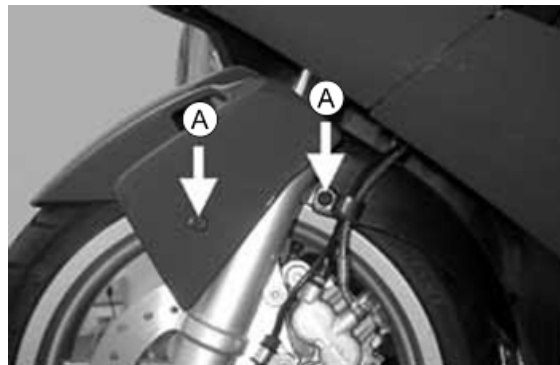
Front mudguard

- Working from both vehicle sides, undo and remove the two screws «A».

Slide the mudguard to the front part of the vehicle.

CAUTION

WHEN REFITTING PAY ATTENTION TO THE CORRECT POSITION OF THE PIPE RETAINING STRAPS.



Radiator fan

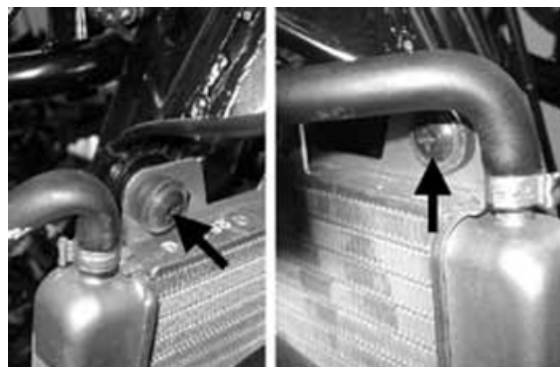
- Remove the spoiler.
- Remove the front fork.
- Remove the plate supporting bracket for the horn and voltage regulator by loosening the two fixing screws shown in the figure in order to release the two lower retainers of the wheel housing.



- Remove the upper fixing screw of the wheel housing to permit movement.



- Drain the cooling system.
- Remove the feed and return hoses from the expansion tank.
- Remove the coolant feed and return hoses from the radiator.
- Remove the fixing screws of the radiator to the frame shown in the figure.
- Disengage the complete radiator and the electric fan.



Expansion tank

To remove the expansion tank, proceed as follows:

- Drain the cooling system.
- Remove the shield back plate.
- Disconnect the expansion tank pipes.
- Remove it from the retaining seat.

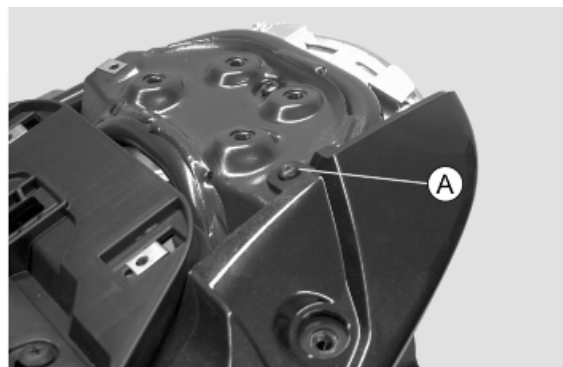


Handles and top side fairings

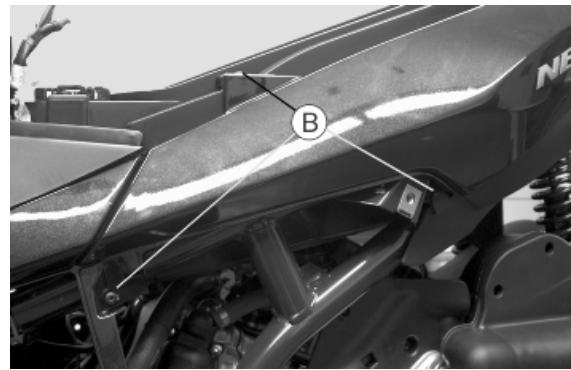
- Remove the side fairings.
- Remove the rear central cover.
- Undo the two screws indicated.



- Working from both sides, undo the screw «A».

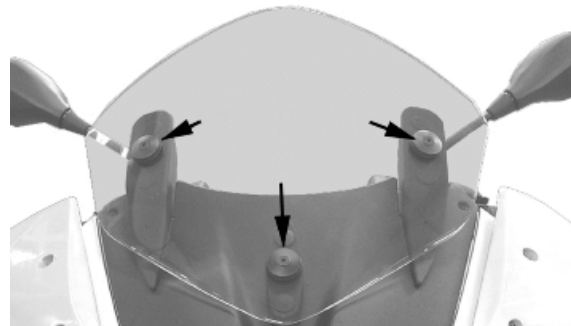


- Working from both sides, undo the three screws «B».
- Remove the upper side fairings.



Flyscreen

- Remove the three hex. socket head screws, then remove the windshield together with the rubber rings.

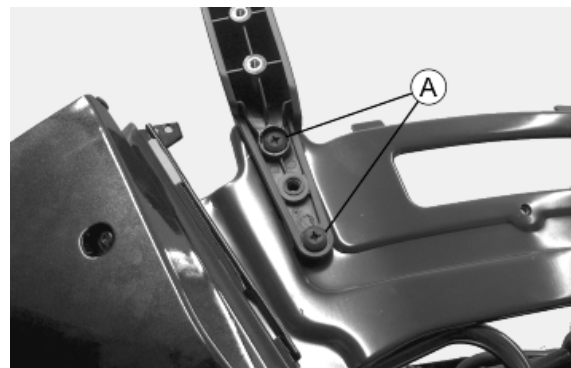


To remove the windshield supports, proceed as follows:

- Remove the caps and the gaskets on the two windshield supports.
- Remove the FRONT UPPER FRAME.

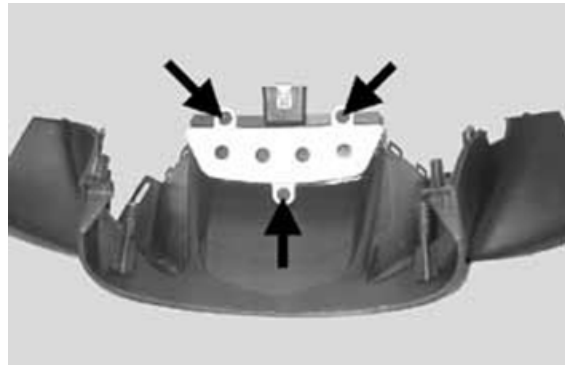


- Working from both vehicle sides, undo and remove the two screws «A».
- Remove the supports.



Pilot lights kit

- Remove the front handlebar cover.
- Remove the three screws shown in the figure, then slide off the complete unit from the front handlebar cover.

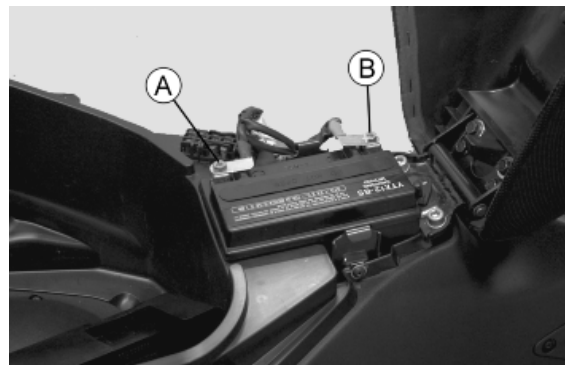


Battery

- Remove the elastic strap and the battery cover.



- First disconnect the negative terminal «A», then the positive terminal «B».



- Remove the battery.
-

INDEX OF TOPICS

PRE-DELIVERY

PRE DE

Carry out the listed tests before delivering the vehicle.

Warning- be very careful when handling fuel.

Aesthetic inspection

Appearance check:

- Paintwork
- Fitting of plastics
- Scratches
- Dirt

Tightening torques inspection

Lock check

- Safety locks
- clamping screws

Safety locks

Rear shock absorber upper fixing

Rear shock absorber lower fixing

Lower front shock absorber fitting

Front wheel axle nut

Front wheel screws

Rear wheel screws

Front and rear wheel hub nut

Front and rear brake calliper clamping screws

Frame - swinging arm bolt *

Swinging arm bolt - Engine

Engine arm pin - Frame arm

Handlebar lock nut

Steering lower ring nut

Upper steering ring nut

Electrical system

- Main switch
- Lights: high beams, low beams, side/taillights (front and rear) and relevant warning lights
- Regulating the headlights according to the regulations currently in force
- Front and rear stop light buttons and relative light •Turn indicators and relative telltales
- Instrument lighting
- instruments: fuel and temperature indicator

- Instrument panel lights
- Horn
- electric start up
- Engine stopping with emergency stop switch
- electric saddle opening button

CAUTION

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

CAUTION

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

WARNING

BATTERY ELECTROLYTE IS TOXIC AND IT MAY CAUSE SERIOUS BURNS. IT CONTAINS SULPHURIC ACID. AVOID CONTACT WITH EYES, SKIN AND CLOTHING.

IN CASE OF CONTACT WITH EYES OR SKIN, RINSE WITH ABUNDANT WATER FOR ABOUT 15 MINUTES AND SEEK MEDICAL ATTENTION AT ONCE.

IF IT IS SWALLOWED, IMMEDIATELY DRINK LARGE QUANTITIES OF WATER OR VEGETABLE OIL. SEEK IMMEDIATE MEDICAL ATTENTION.

BATTERIES PRODUCE EXPLOSIVE GAS; KEEP THEM AWAY FROM NAKED FLAMES, SPARKS AND CIGARETTES. IF THE BATTERY IS CHARGED IN A CLOSED PLACE, TAKE CARE TO ENSURE ADEQUATE VENTILATION. ALWAYS PROTECT YOUR EYES WHEN WORKING CLOSE TO BATTERIES.

KEEP OUT OF THE REACH OF CHILDREN

CAUTION

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

Levels check

Level check:

- Hydraulic brake system liquid level.
 - Rear hub oil level
 - Engine coolant level
 - Engine oil 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:

- Hot engine restart
- Minimum seal (turning the handlebar)
- Uniform steering rotation
- Possible losses
- electric radiator fan operation

CAUTION

CHECK AND ADJUST TYRE PRESSURE WITH TYRES AT AMBIENT TEMPERATURE.

CAUTION

NEVER EXCEED THE RECOMMENDED INFLATION PRESSURES OR TYRES MAY BURST.

Functional inspection

Functional check up:

- Hydraulic braking system: lever travel
 - Clutch: proper functioning check
 - Engine: proper general functioning and no abnormal noise check
 - Other: papers check, frame and engine number check, tools and equipment, licence plate fitting, lock check, tyre pressure check, rear-view mirror and any accessory fitting
-

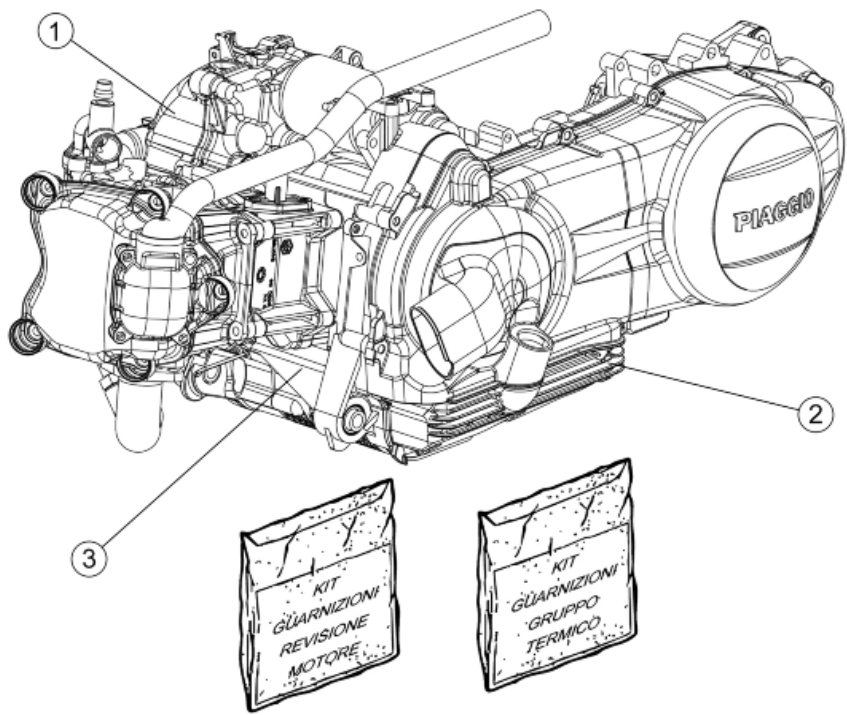
INDEX OF TOPICS

TIME

TIME

This section is devoted to the time necessary to carry out repairs.
For each operation, the description, code and time envisages are specified.

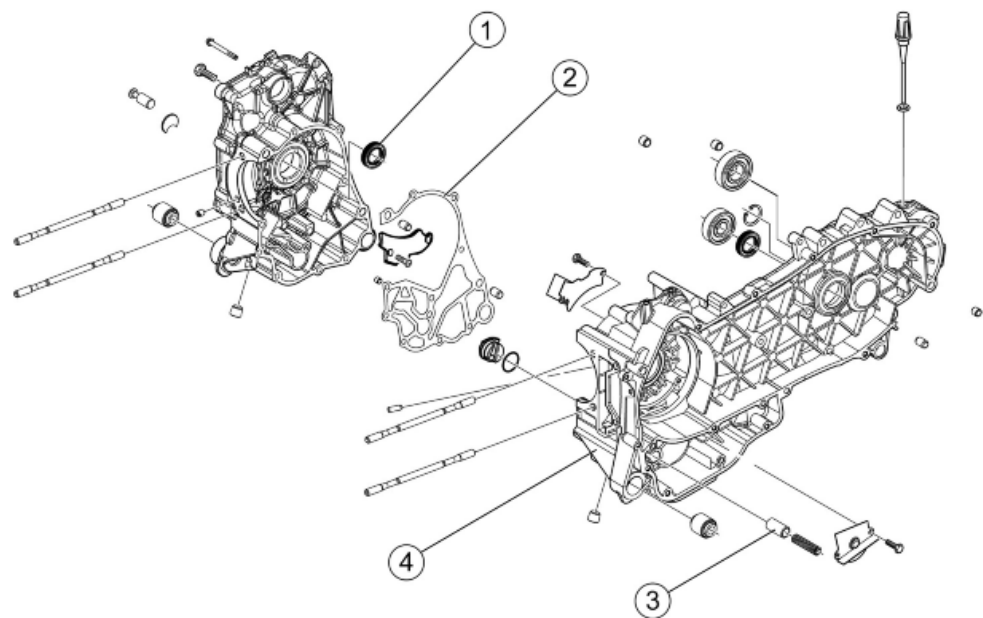
Engine



ENGINE

	Code	Action	Duration
1	001001	Engine - Replacement	
2	003064	Engine oil - Change	
3	001127	Engine - Complete service	

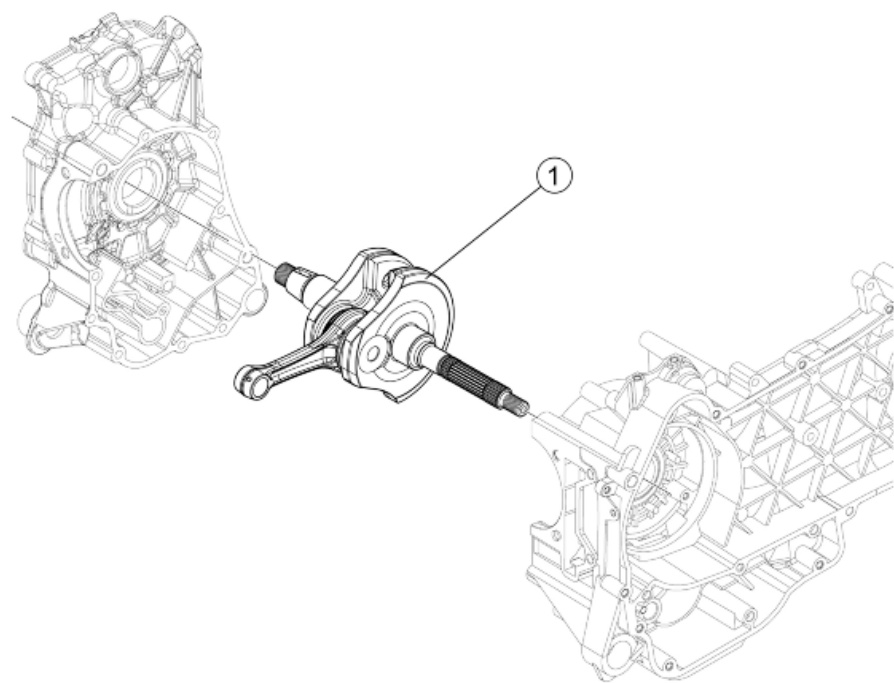
Crankcase



CRANKCASE

	Code	Action	Duration
1	001099	Oil seal, flywheel side - Replacement	
2	001153	Crankcase halves gasket - Replacement	
3	001124	Lubrication by-pass - Replacement	
4	001133	Engine crankcase- Replacement	

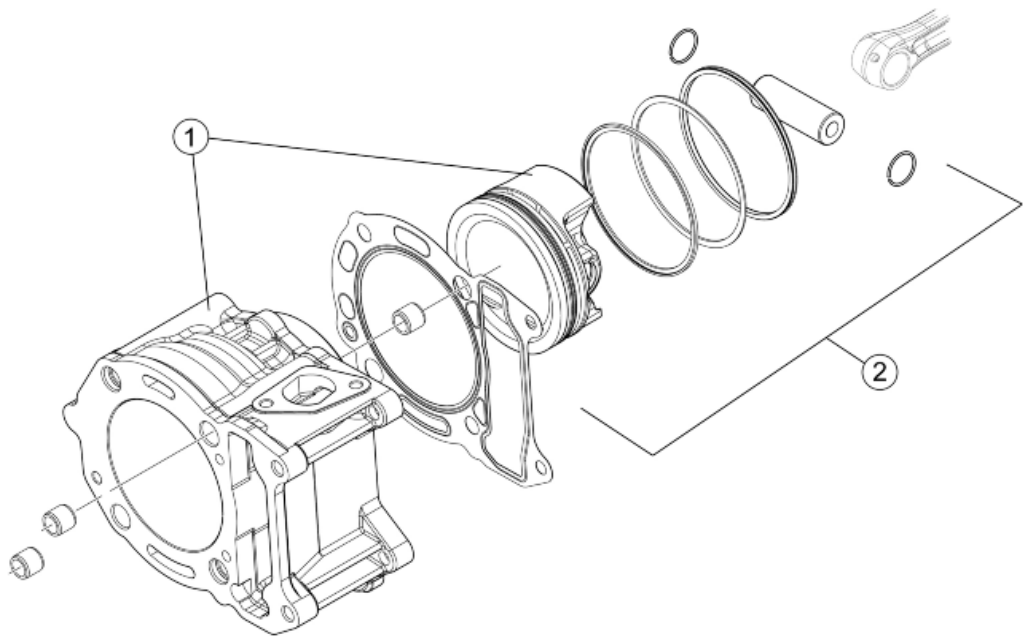
Crankshaft



CRANKSHAFT

	Code	Action	Duration
1	001117	Crankshaft - Replacement	

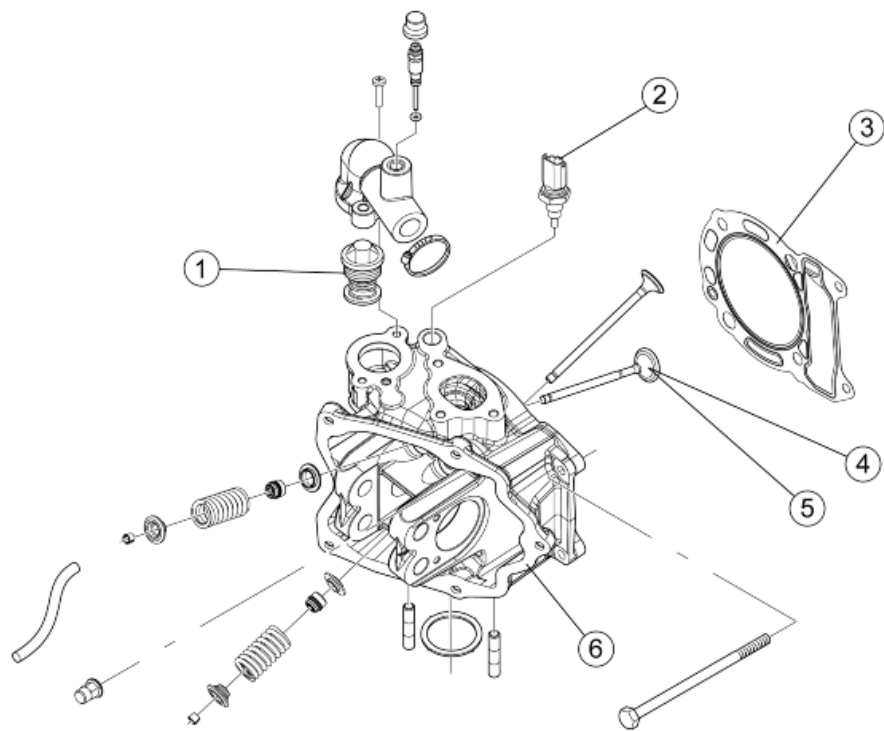
Cylinder assy.



CYLINDER GROUP

	Code	Action	Duration
1	001002	Cylinder-Piston - Replacement	
2	001154	Pin-ring-piston assembly - Service	

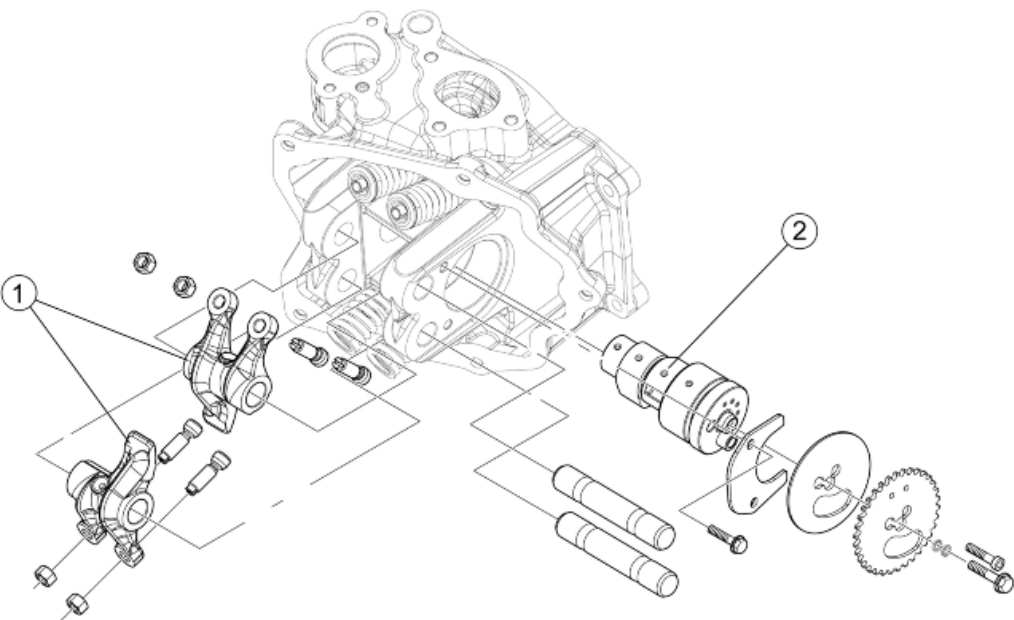
Cylinder head assy.



HEAD UNIT

	Code	Action	Duration
1	001057	Thermostat - Replacement	
2	001083	Thermistor - Replacement	
3	001056	Head gasket - Replacement	
4	001045	Valves - Replacement	
5	001049	Valves - Adjustment	
6	001126	Head - Replacement	

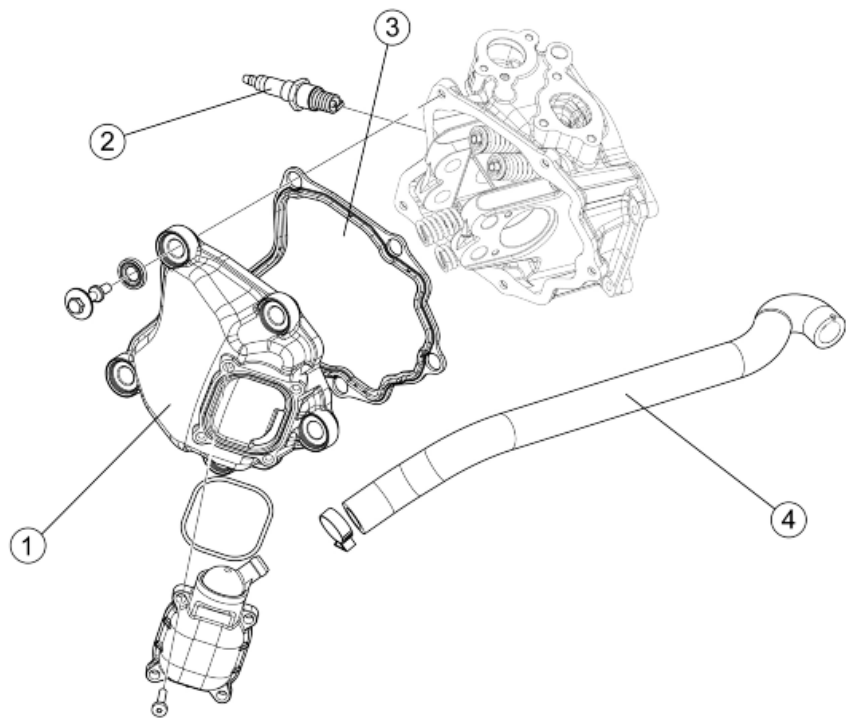
Rocker arms support assy.



GRUPPO SUPPORTO BILANCIERI

	Code	Action	Duration
1	001148	Rocking lever valve - Replacement	
2	001044	Camshaft - Replacement	

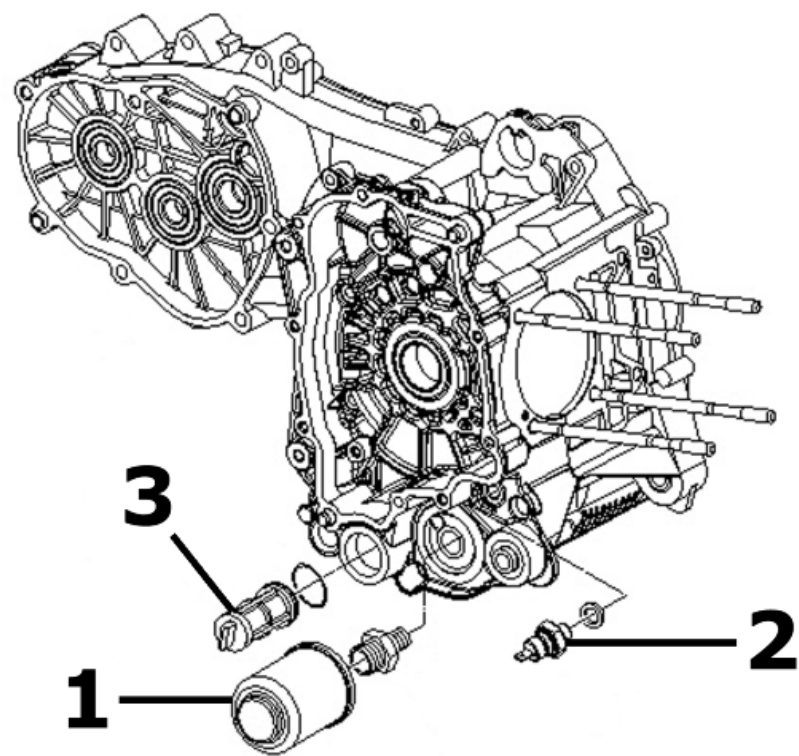
Cylinder head cover



HEAD COVER

	Code	Action	Duration
1	001089	Head cover - Replacement	
2	001093	Spark plug - Replacement	
3	001088	Head cover gasket - Replacement	
4	001074	Oil vapour recovery pipe - Replacement	

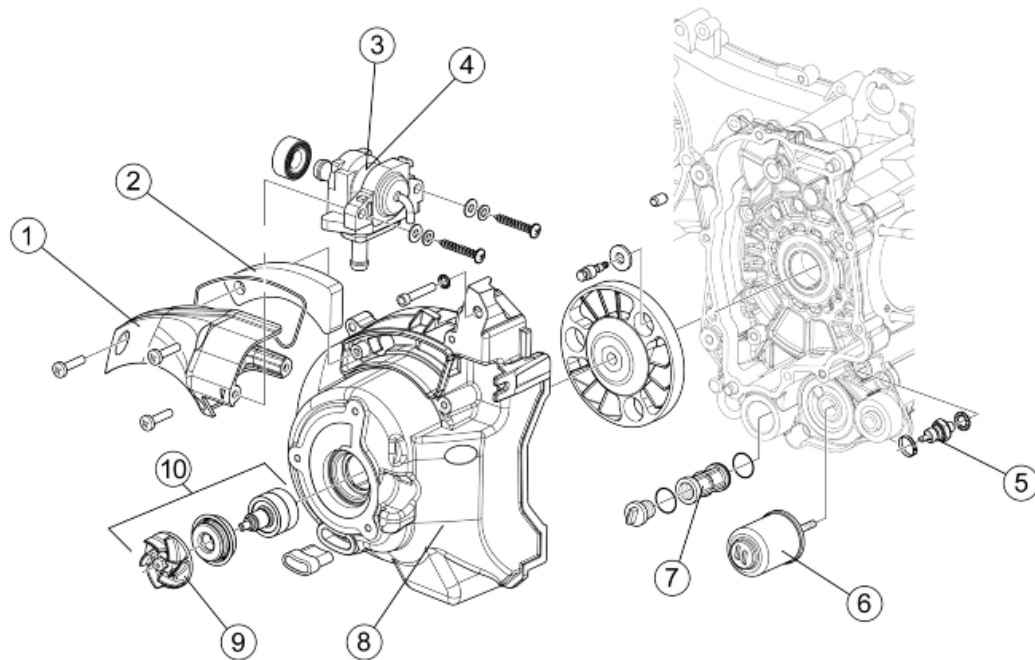
Oil filter



OIL FILTER

	Code	Action	Duration
1	001123	Oil filter -Replacement	
2	001160	Oil pressure sensor - Replacement	
3	001102	Net oil filter - Replacement / Cleaning	

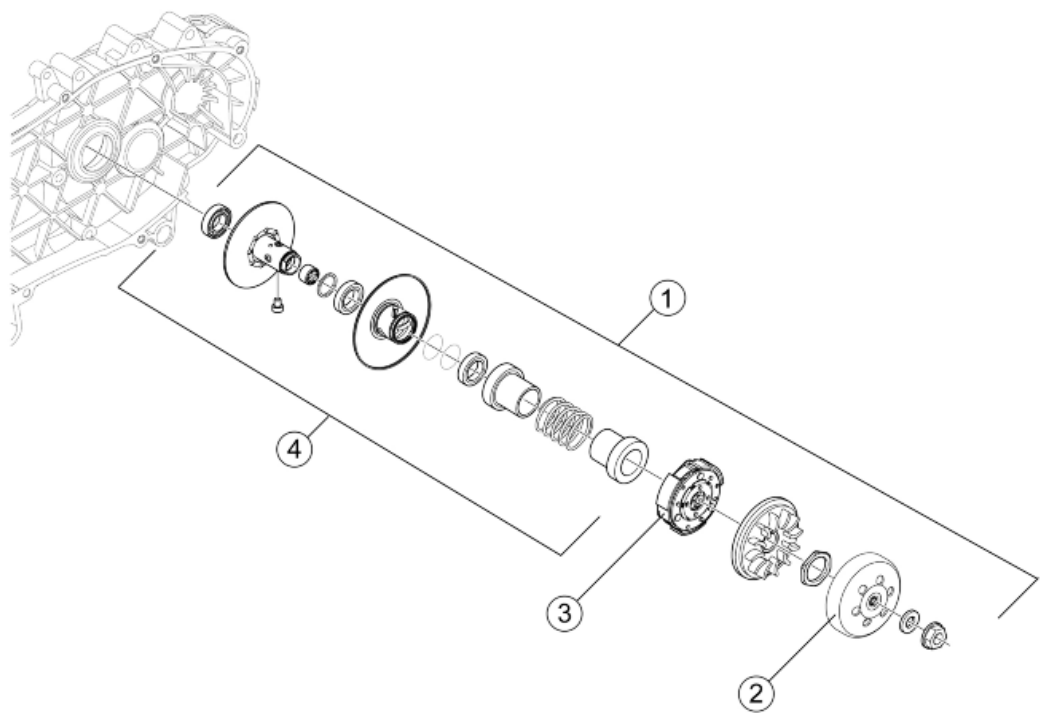
Flywheel cover



FLYWHEEL COVER

	Code	Action	Duration
1	001162	Secondary air filter box - Replacement	
2	001161	Secondary air filter - Replacement	
3	001174	SAS valve - Replacement	
4	001163	Muffler secondary air connection - Replacement	
5	001160	Oil pressure sensor - Replacement	
6	001123	Oil filter -Replacement	
7	001102	Net oil filter - Replacement / Cleaning	
8	001087	Flywheel cover - Replacement	
9	007007	Water pump rotor - Replacement	
10	001113	Water pump / Pump rotor - Replacement	

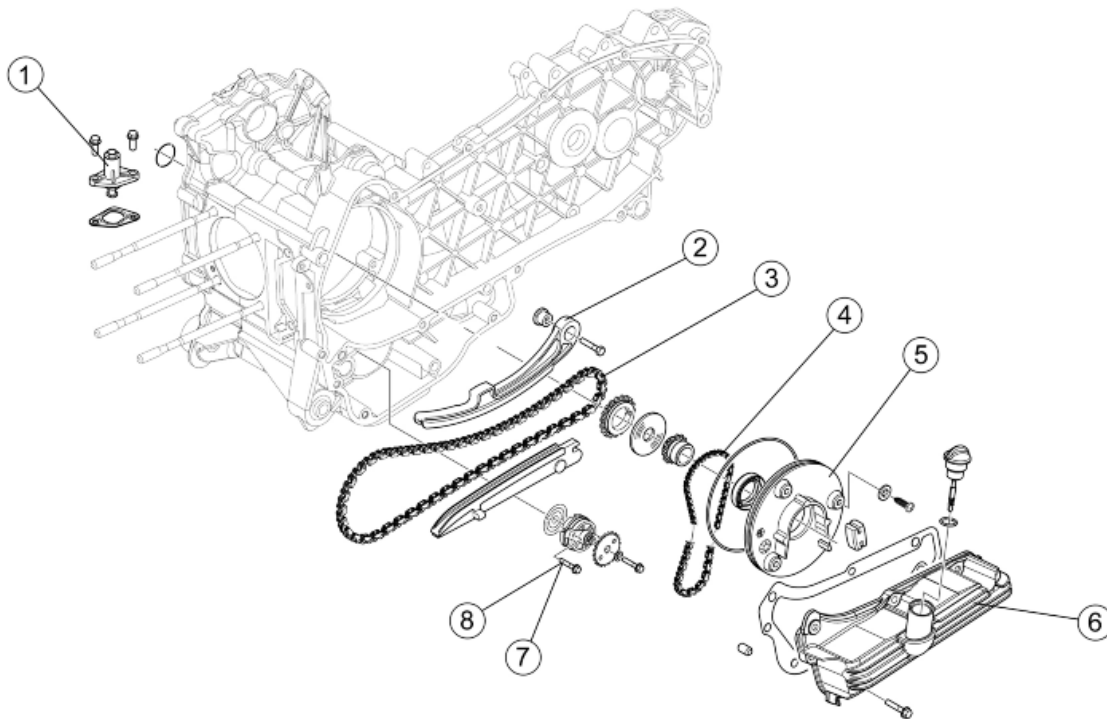
Driven pulley



DRIVEN PULLEY

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

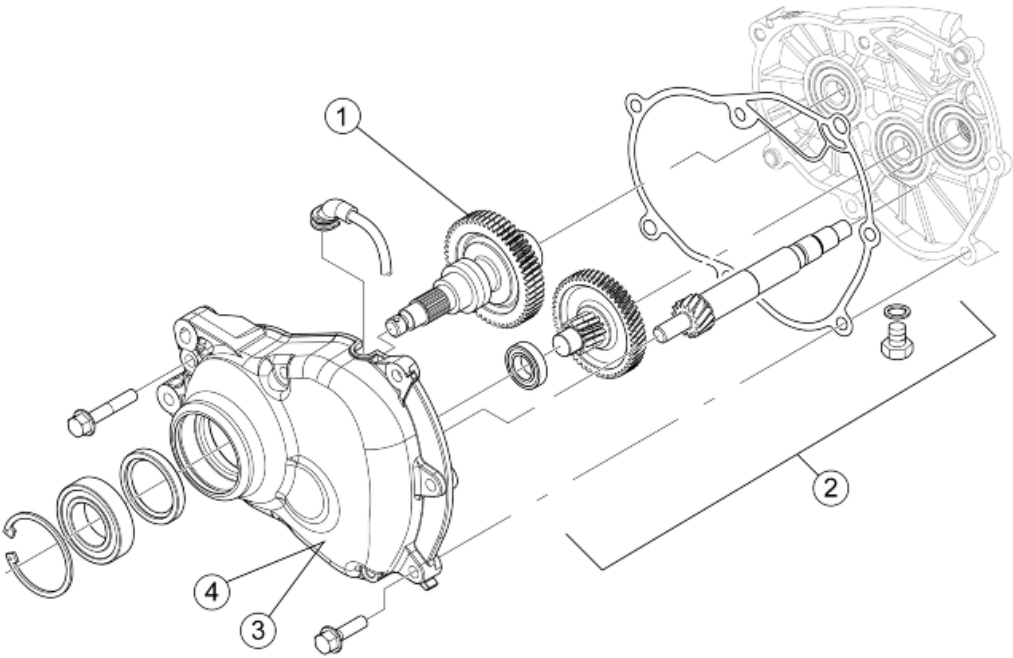
Oil pump



OIL PUMP

	Code	Action	Duration
1	001129	Chain tightener - Overhaul and replacement	
2	001125	Chain guide pads - Replacement	
3	001051	Belt/Timing chain - Change	
4	001122	Oil pump chain - Replacement	
5	001172	Chain cover flap - change	
6	001130	Oil sump - Replacement	
7	001042	Oil pump - Service	
8	001112	Oil pump - change	

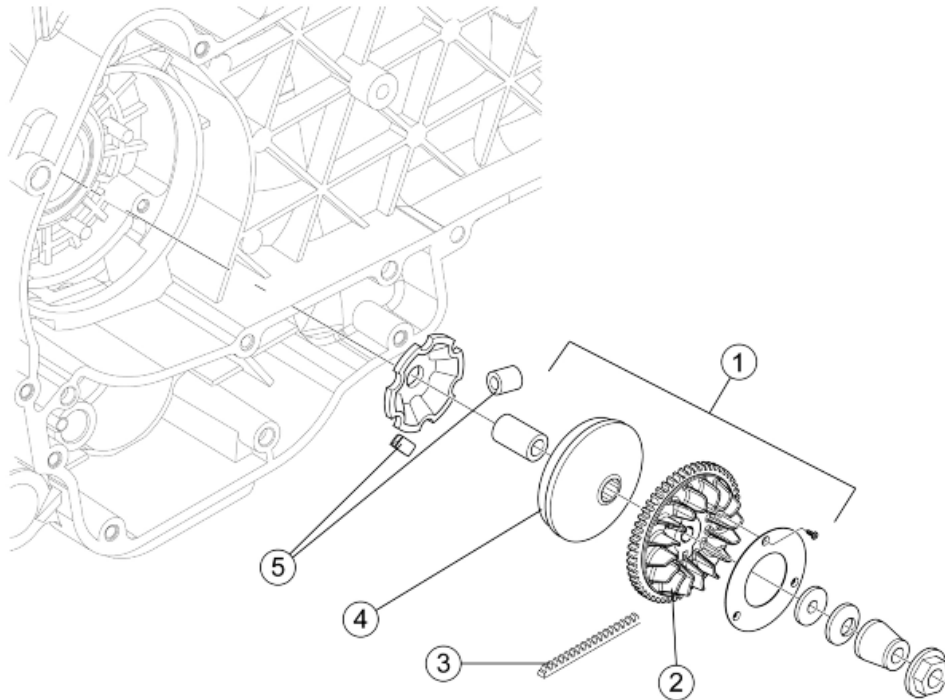
Final gear assy.



FINAL REDUCTION GEAR ASSEMBLY

	Code	Action	Duration
1	004125	Rear wheel axle - Replacement	
2	001010	Geared reduction unit - Service	
3	001156	Gear reduction unit cover - Replacement	
4	003065	Gear box oil - Replacement	

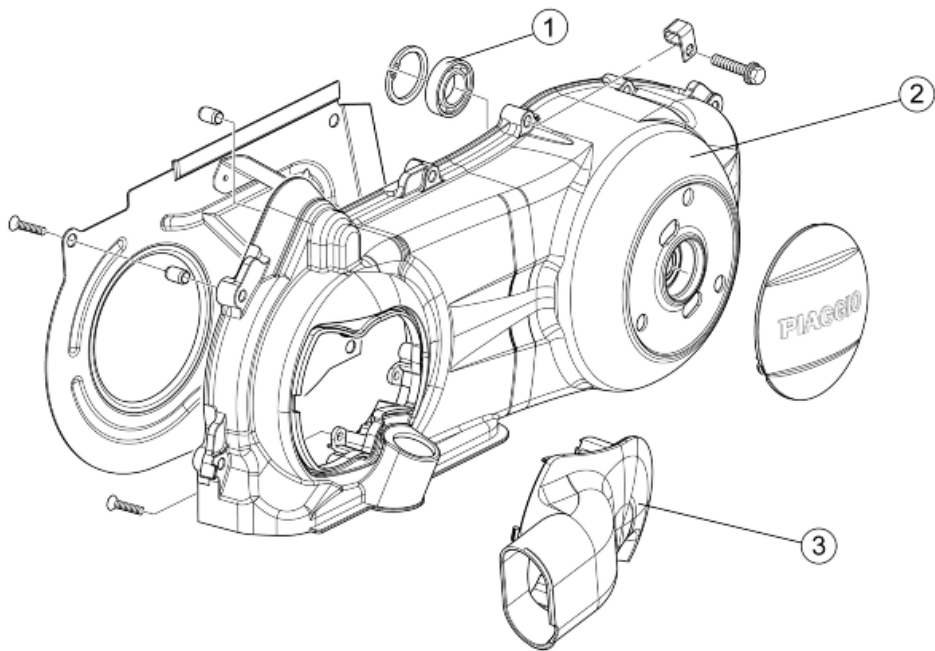
Driving pulley



DRIVING PULLEY

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

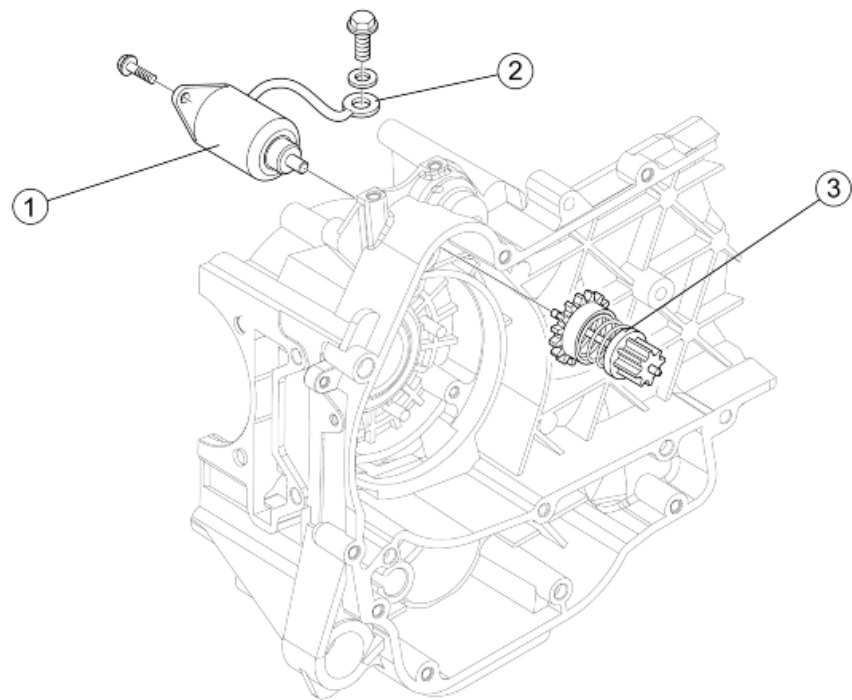
Transmission cover



TRANSMISSION COVER

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

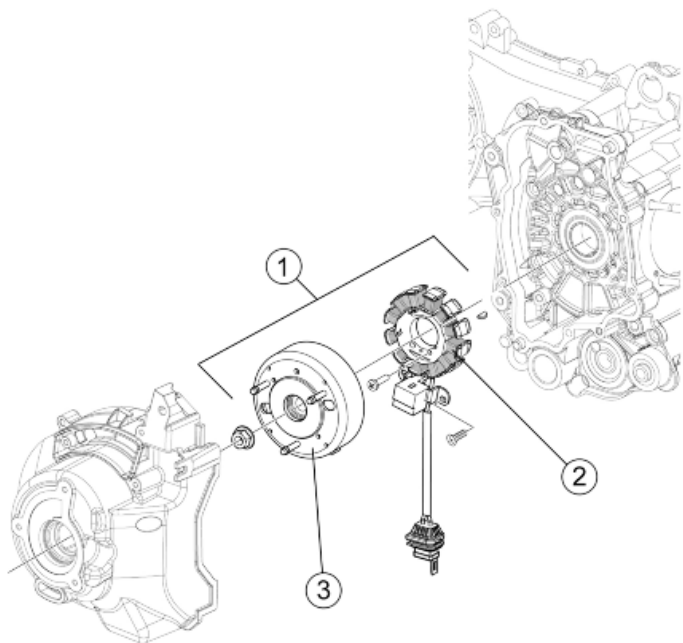
Starter motor



STARTER MOTOR

	Code	Action	Duration
1	001020	Starter motor - Replacement	
2	005045	Starter motor cable harness - Re- placement	
3	001017	Start-up pinion - Replacement	

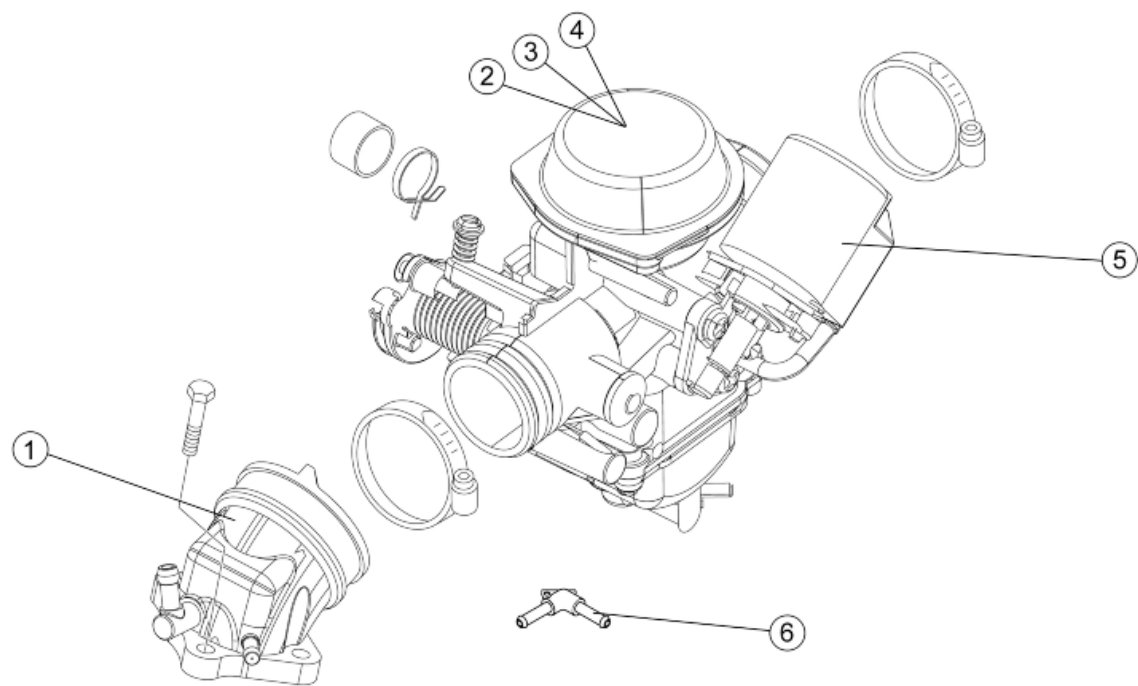
Flywheel magneto



MAGNETO FLYWHEEL

	Code	Action	Duration
1	001058	Complete flywheel - Replacement	
2	001067	Stator - Removal and Refitting	
3	001173	Rotor - Replacement	

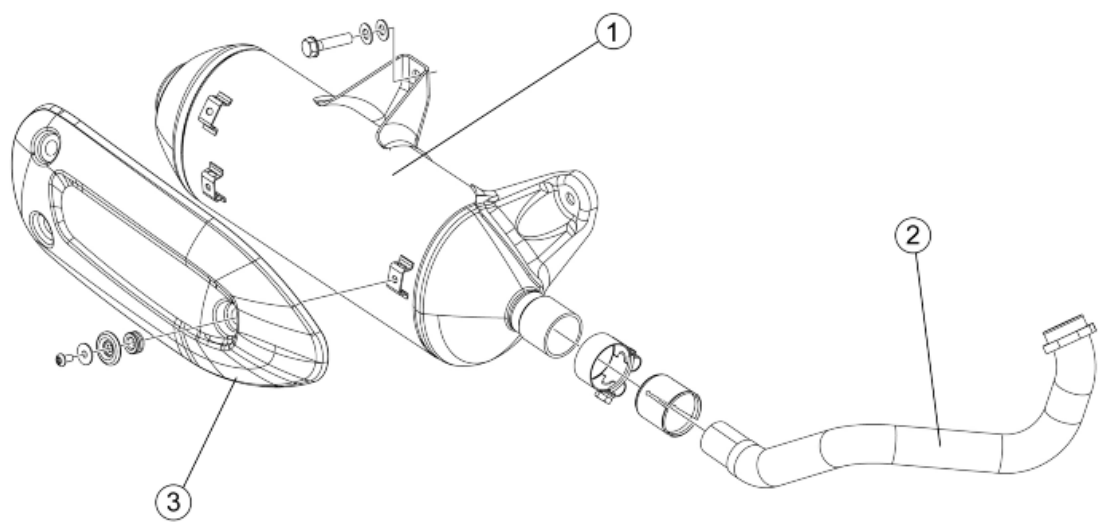
Carburettor



CARBURETTOR

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

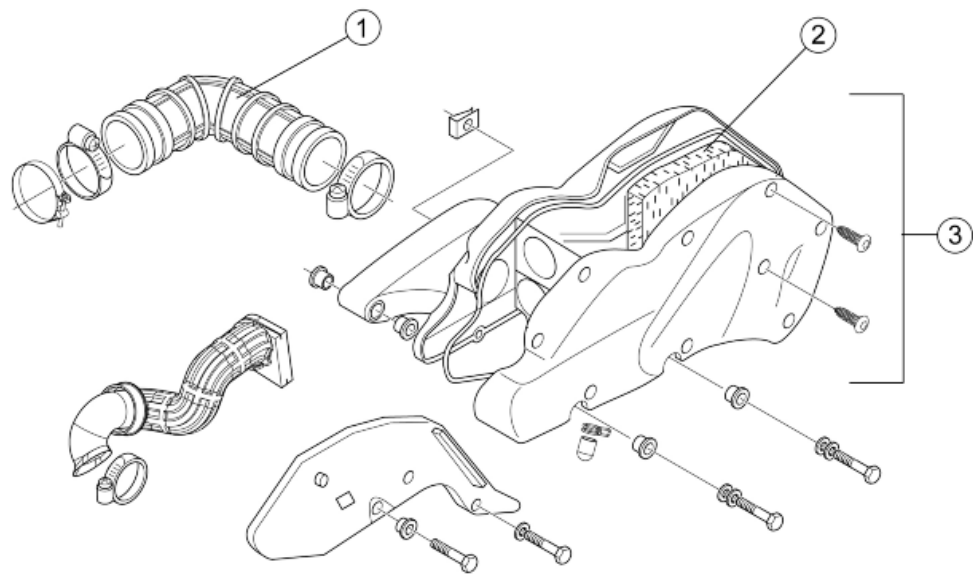
Exhaust pipe



MUFFLER

	Code	Action	Duration
1	001009	Muffler - Replacement	
2	001092	Exhaust manifold - Replacement	
3	001095	Muffler guard - Replacement	

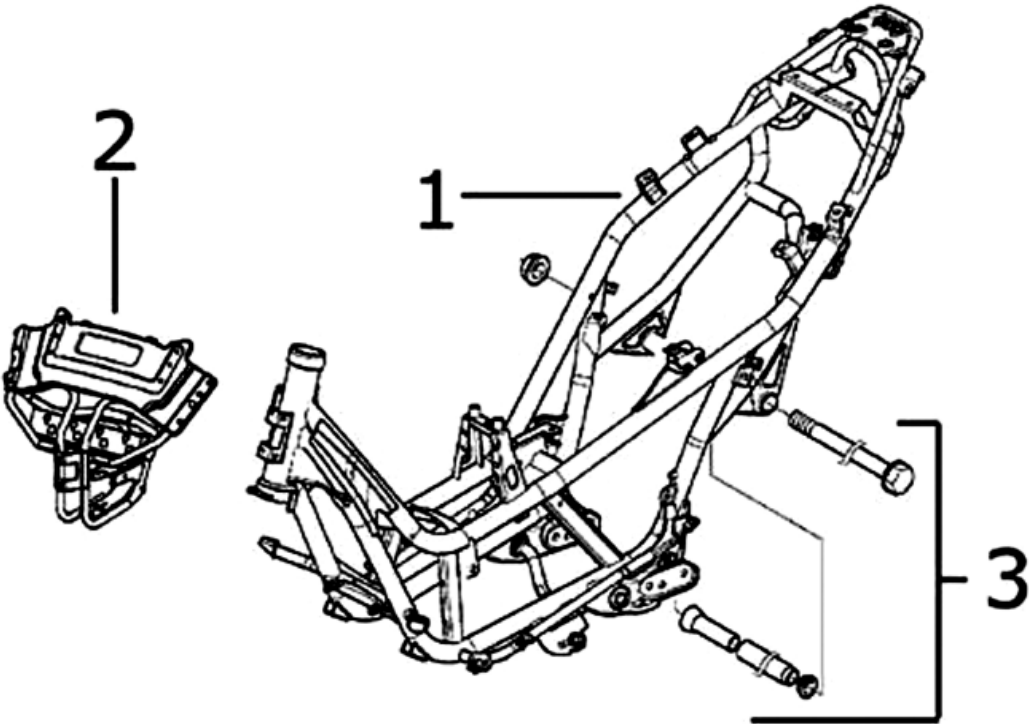
Air cleaner



AIR CLEANER

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

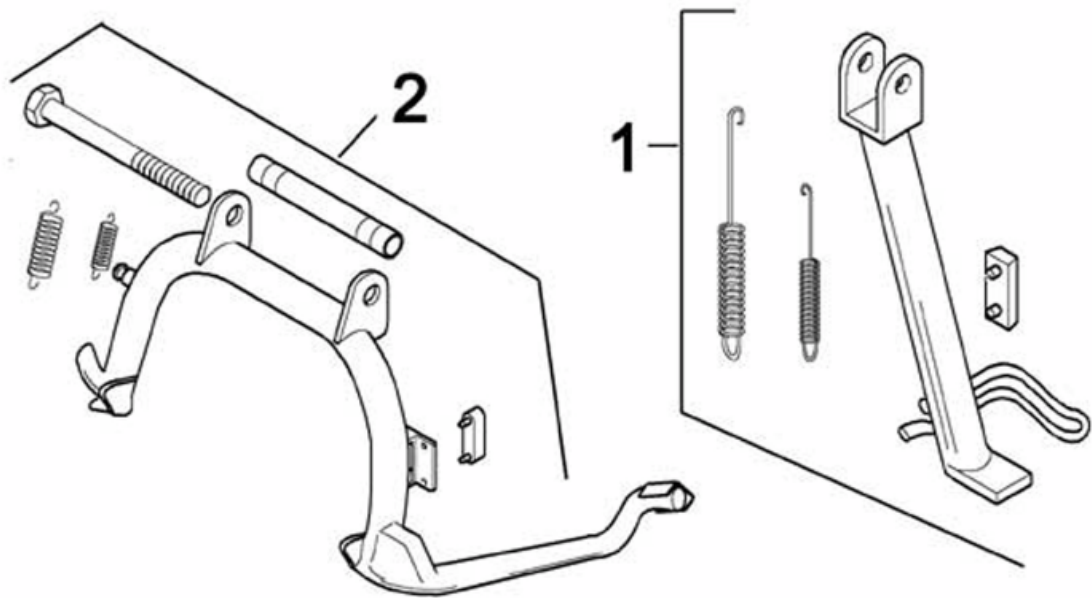
Frame



FRAME

	Code	Action	Duration
1	004001	Frame - replace	
2	004146	Front frame - Replacement	
3	001032	Engine support pin - Replacement	

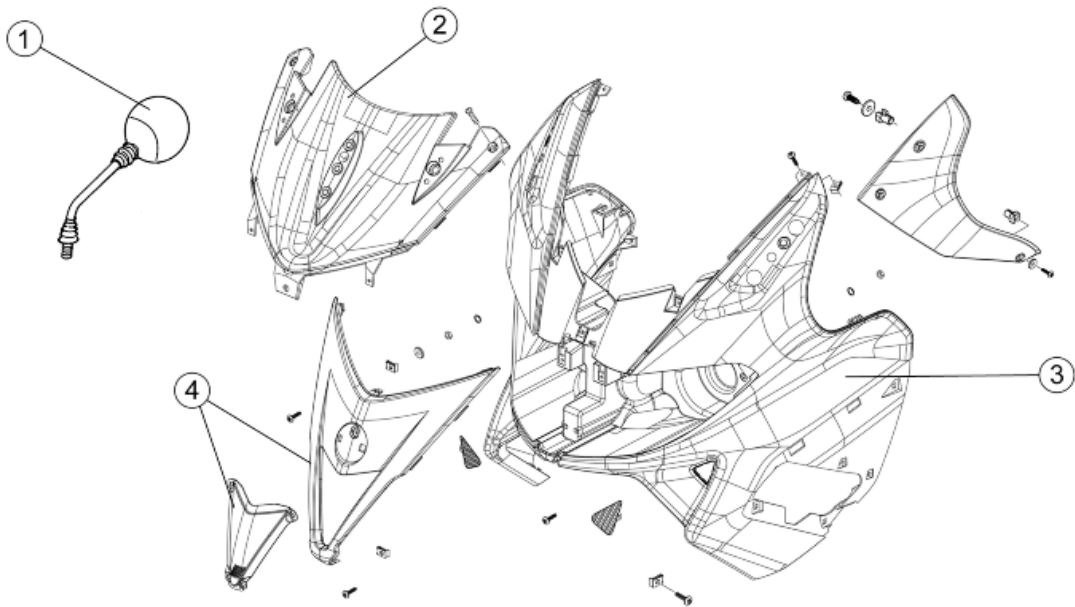
Centre-stand



STAND

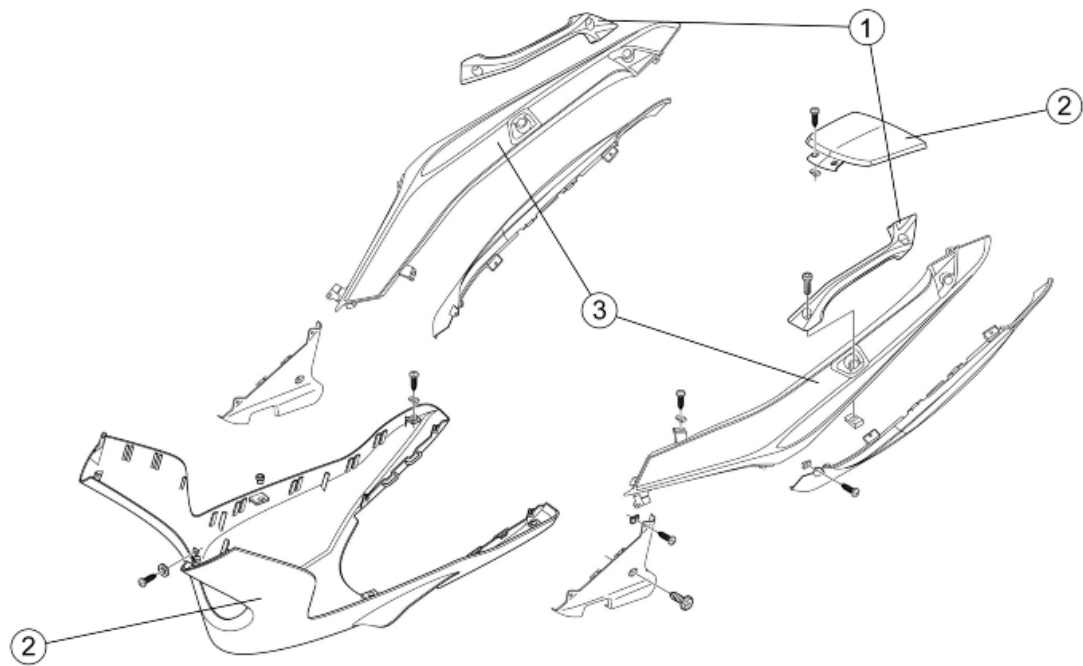
	Code	Action	Duration
1	004102	Side stand - Replacement	
2	004004	Stand - Replacement	
3	001053	Stand bolt - Replacement	

Legshield spoiler



FRONT SHIELD SPOILER

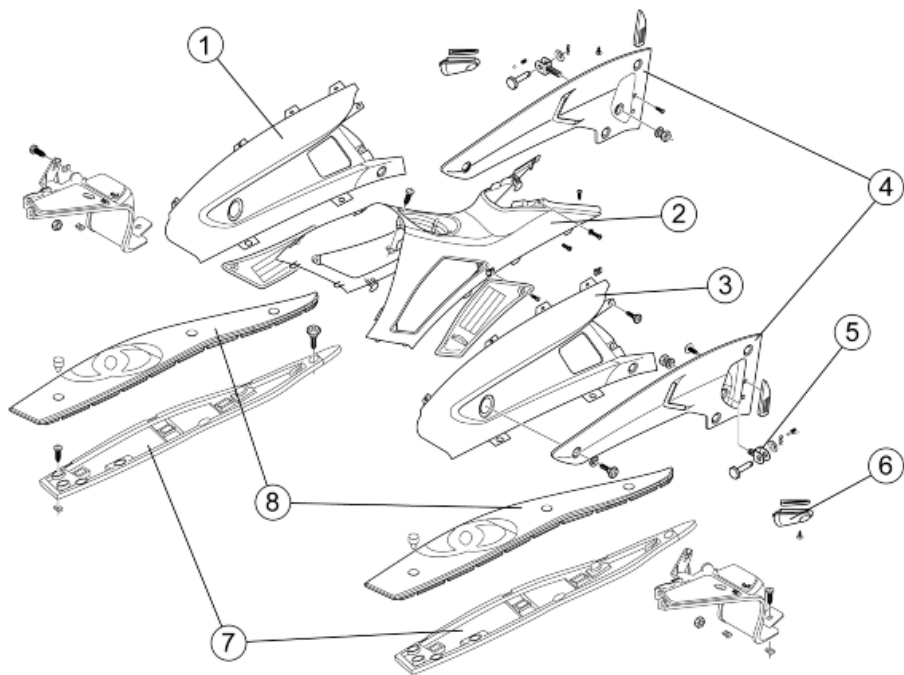
	Code	Action	Duration
1	004066	Driving mirror - Replacement	
2	004028	Windshield glass - Replacement	
3	004064	Front shield - Replacement	
4	004149	Shield central cover - Replacement	



FRONT SHIELD SPOILER

	Code	Action	Duration
1	004068	Passenger handgrip - Replacement	
2	004053	Spoiler - Replacement	
3	004012	Rear fairings - Removal and refitting	

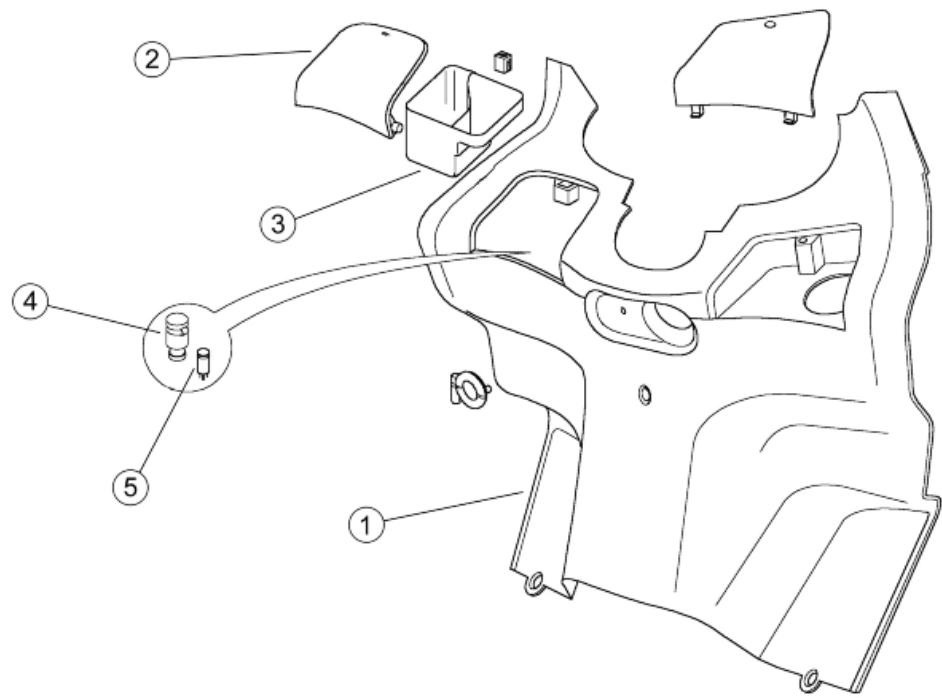
Side fairings



SIDE COVERS

	Code	Action	Duration
1	004105	Right side clamp - Replacement	
2	004011	Central chassis cover - Replacement	
3	004104	Left side cover - Replacement	
4	004013	Side/rear bumper pipes - Replacement	
5	004143	Footrest support - replace	
6	004079	Footrest - replacement	
7	004015	Footrest - Removal and Refitting	
8	004075	Front mat - Replacement	

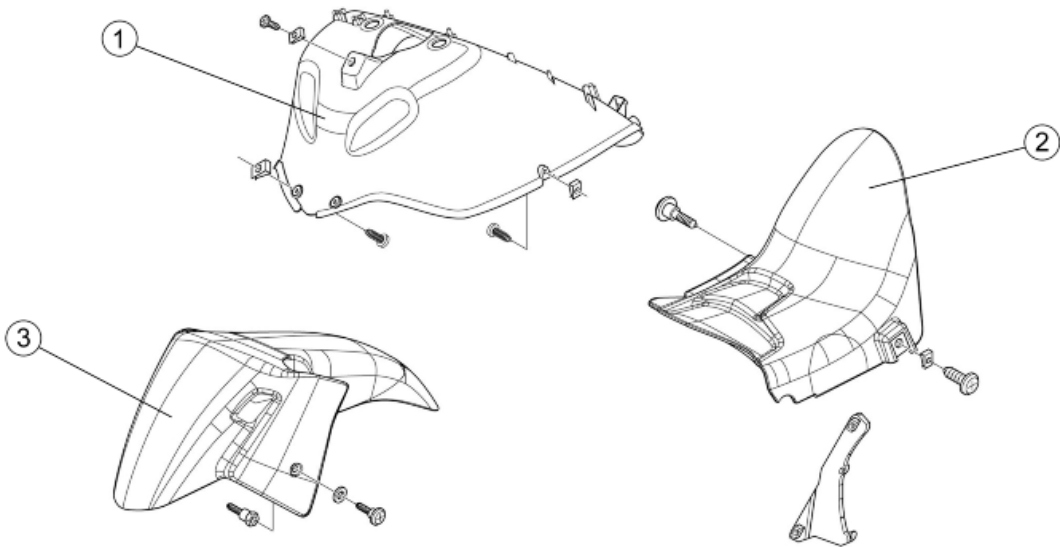
Rear cover



SHIELD BACK PLATE

	Code	Action	Duration
1	004065	Shield back plate - Replacement	
2	004156	Glove box flap and/or support - Re- placement	
3	004145	Glove box - Replacement	
4	004142	electric socket - Replacement	
5	005085	Reset button - Replacement	

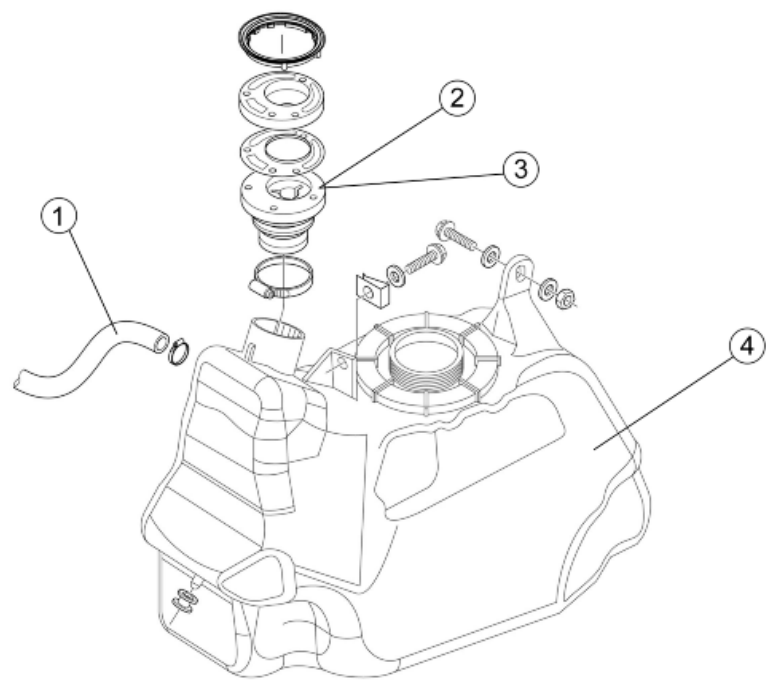
Mudguard



MUDGUARDS

	Code	Action	Duration
1	003087	Wheel housing - Replacement	
2	004009	Rear mudguard - Replacement	
3	004002	Front mudguard - Replacement	

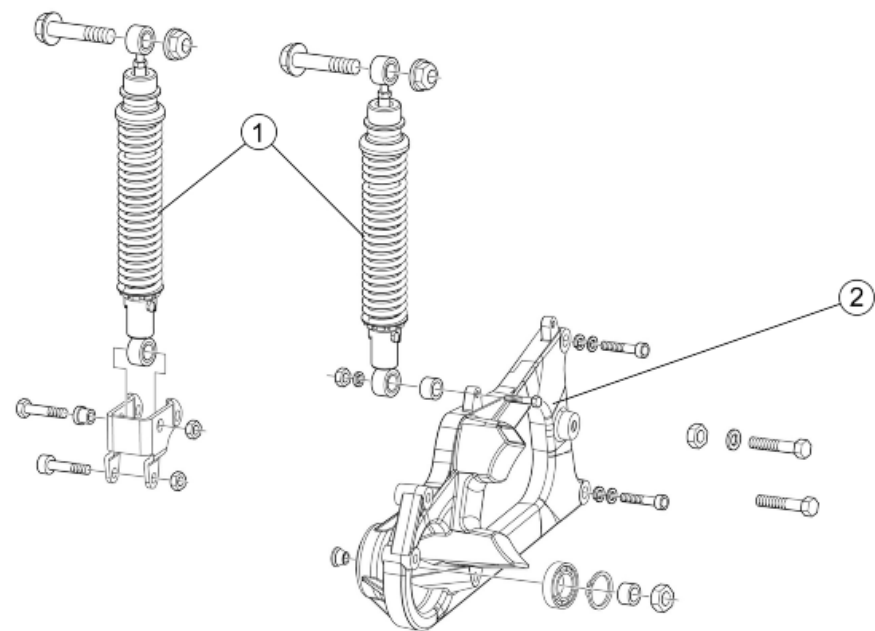
Fuel tank



FUEL TANK

	Code	Action	Duration
1	004109	Fuel tank breather - Replacement	
2	004170	Tank filler neck - Replacement	
3	004168	Fuel tank cap - Replacement	
4	004005	Fuel tank - Replacement	

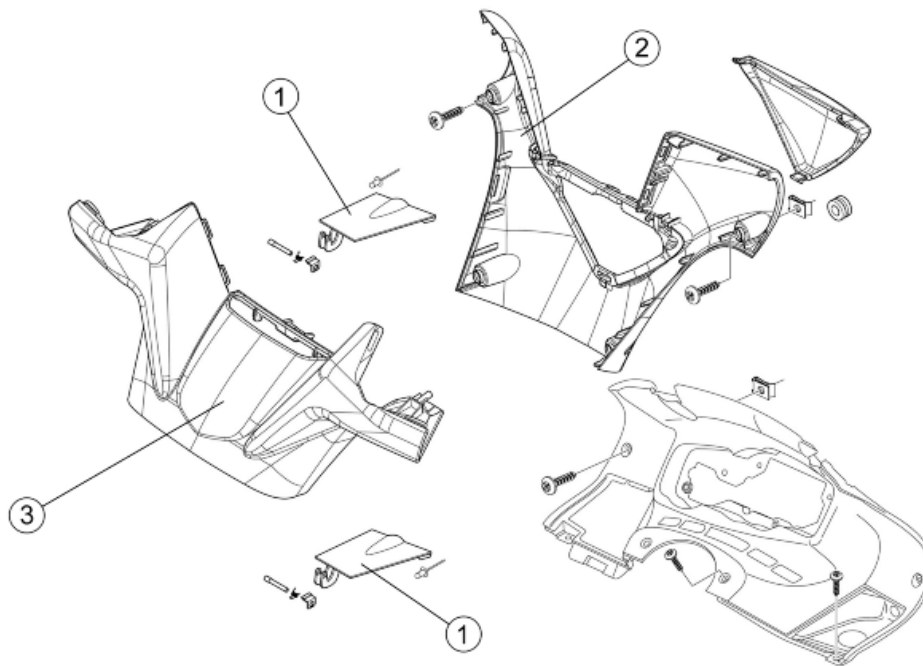
Rear shock-absorber



REAR SHOCK ABSORBERS

	Code	Action	Duration
1	003007	Rear shock absorbers - Replacement	
2	003077	muffler/rear shock absorber support arm - Service	

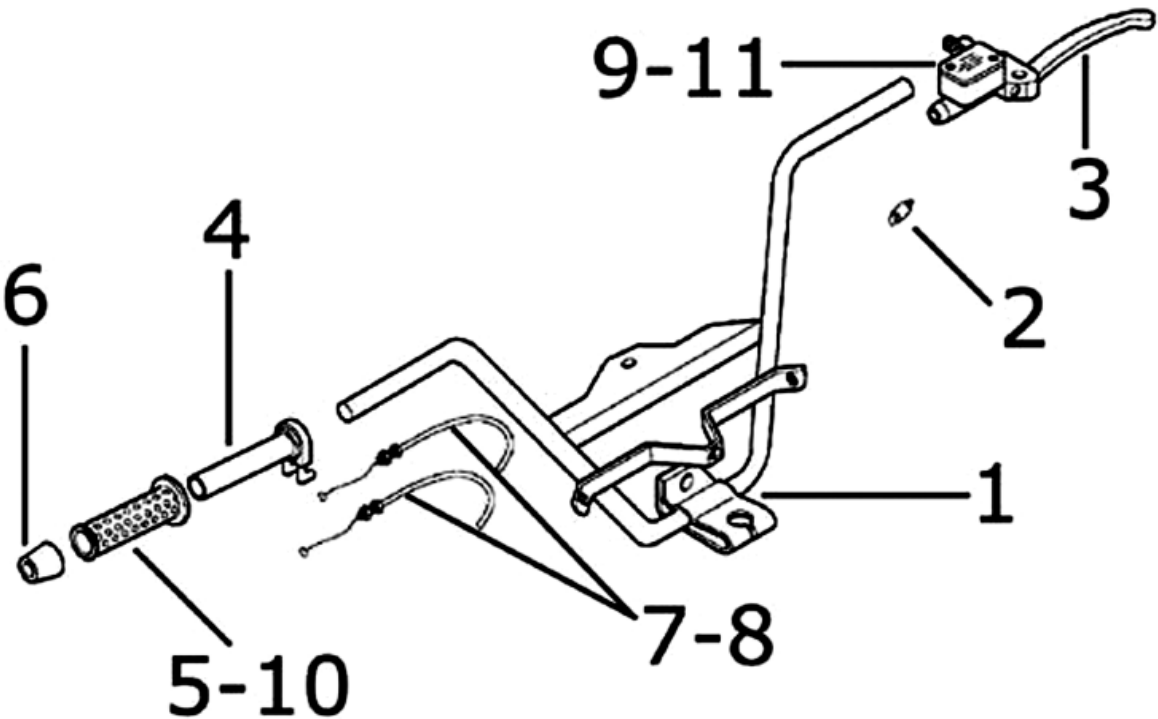
Handlebar covers



HANDLEBAR COVERS

	Code	Action	Duration
1	004156	Glove box flap and/or support - Replacement	
2	004019	Handlebar rear section - Replacement	
3	004018	Handlebar front section - Replacement	

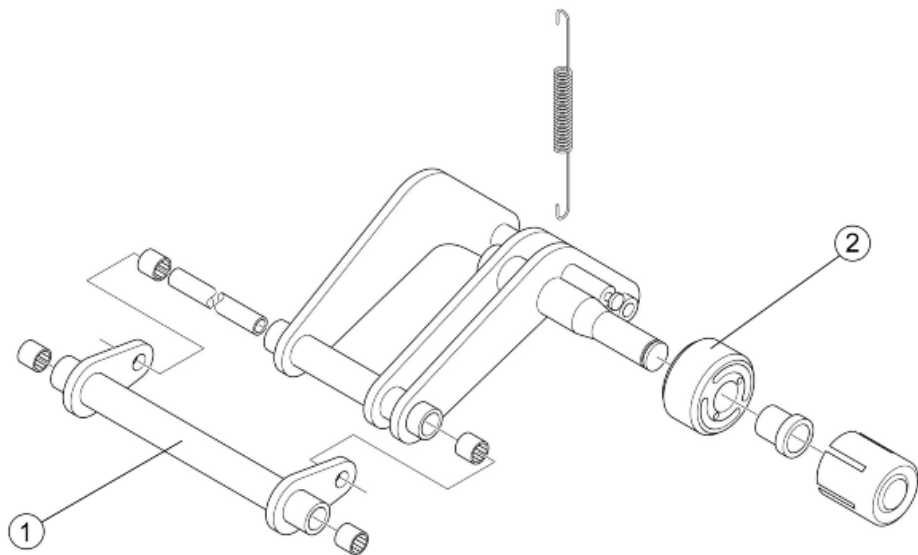
Handlebar components



HANDLEBAR COMPONENTS

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

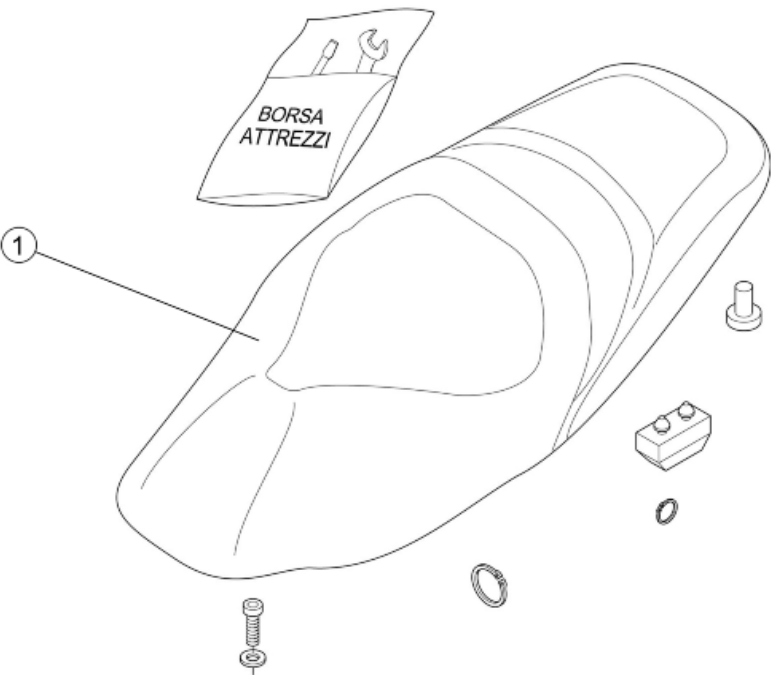
Swing-arm



SWINGING ARM

	Code	Action	Duration
1	004058	Silent block - Replacement	
2	001072	Swinging arm - Engine-chassis connection - Replacement	

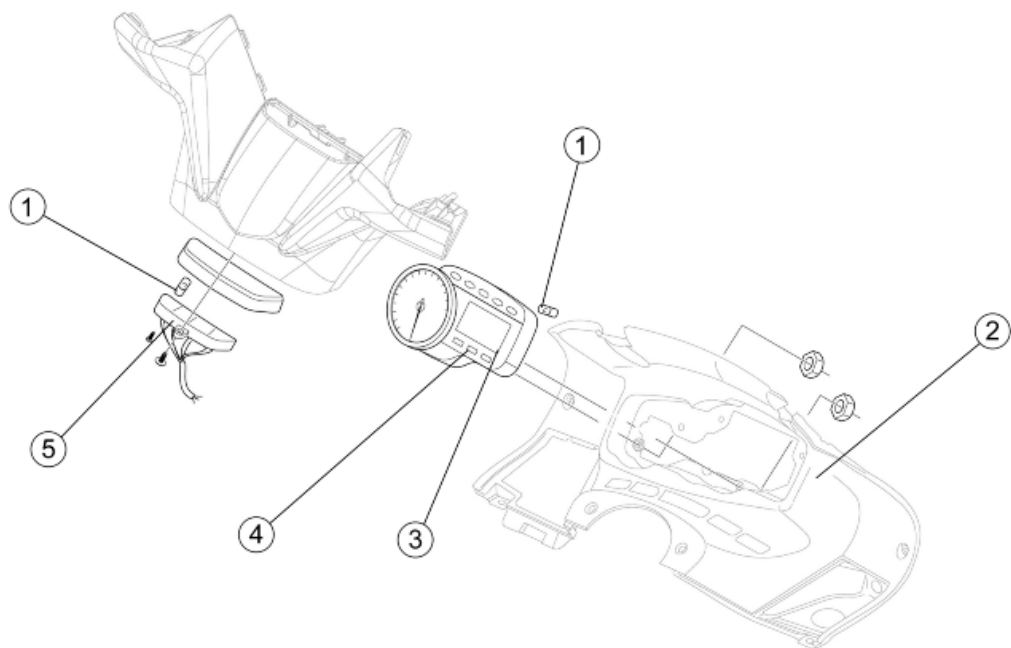
Seat



SADDLE

	Code	Action	Duration
1	004003	Saddle - Replacement	

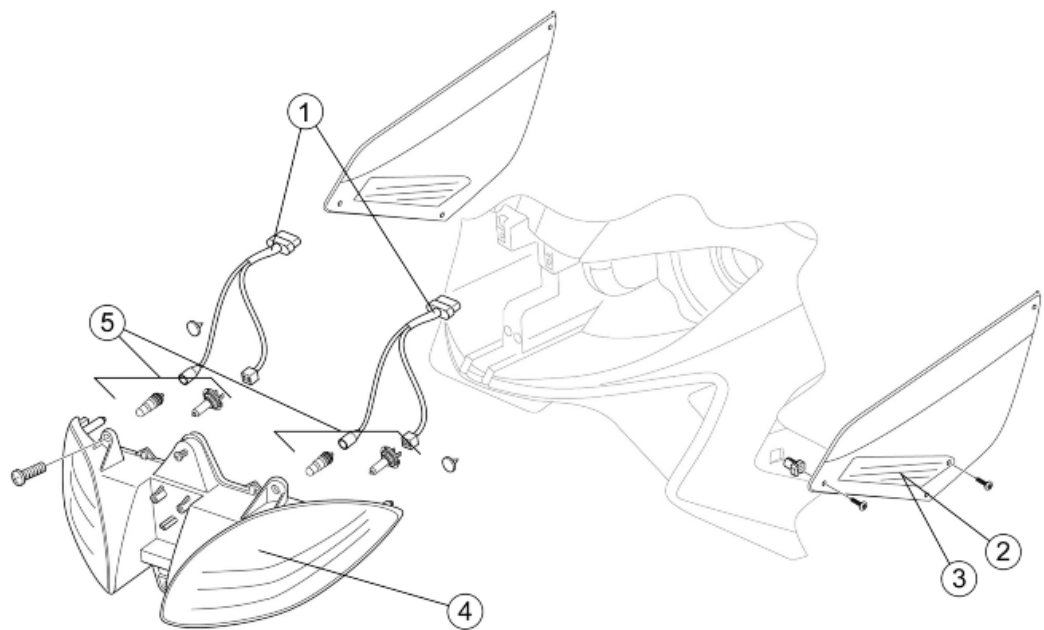
Instrument panel



INSTRUMENT PANEL AND HANDLEBAR CONTROLS

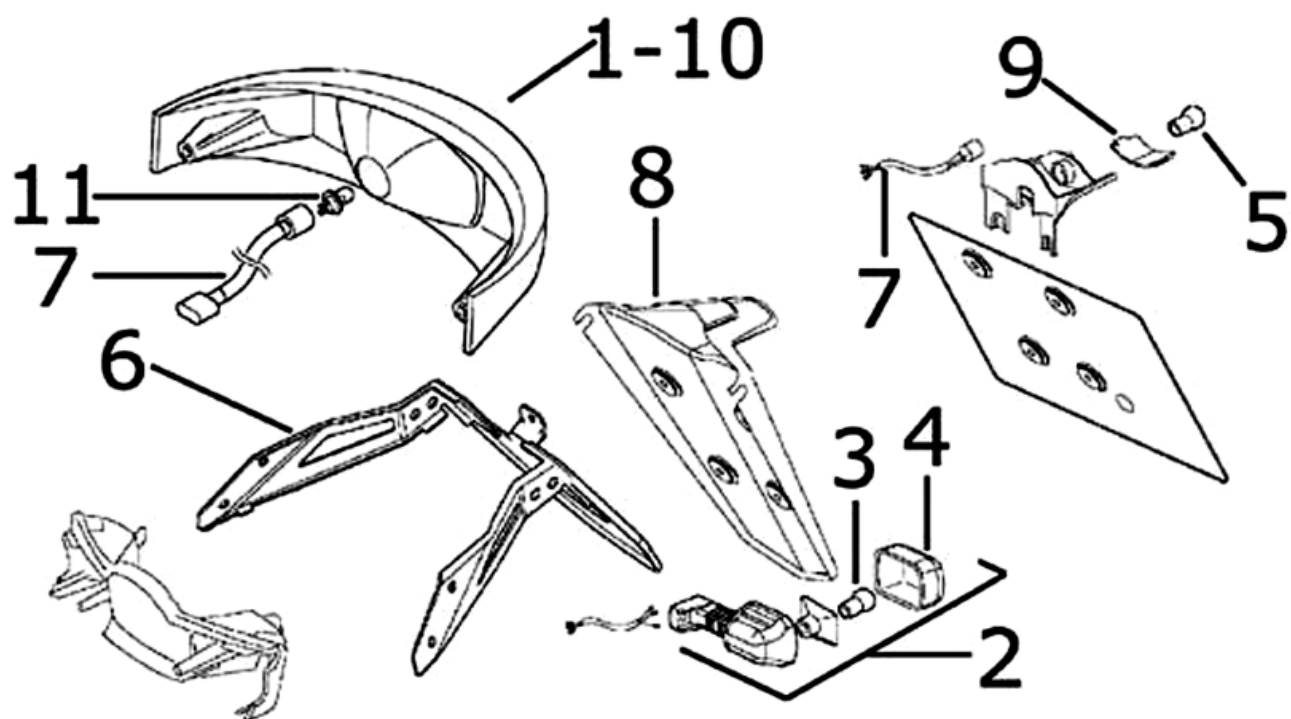
	Code	Action	Duration
1	005038	Instrument panel warning light bulbs - Replacement	
2	004035	Instrument panel - Replacement	
3	005014	Odometer - Replacement	
4	005082	Instrument panel cable harness - Re- placement	
5	005129	Warning light group - Replacement	

Turn signal lights



FRONT LIGHTS

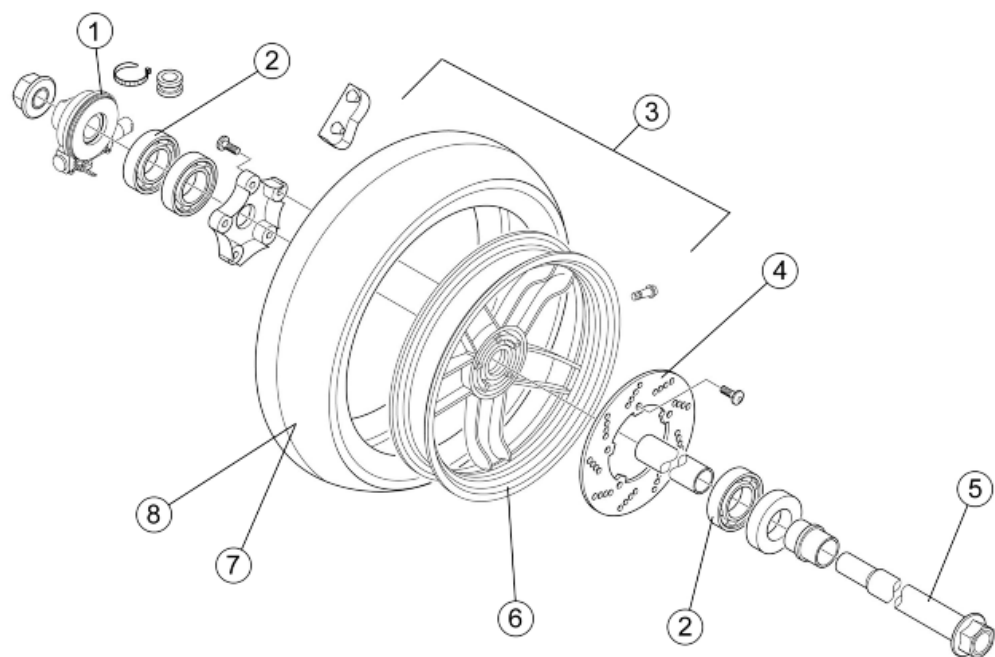
	Code	Action	Duration
1	005044	Front lights cable unit- Replacement	
2	005067	Front turn indicator bulb - Replacement	
3	005012	Front turn indicator - Replacement	
4	002002	Shoes - Rear brake pads - Replacement	
5	005008	Front headlamp bulbs - Replacement	



REAR LIGHTS

	Code	Action	Duration
1	005005	Taillight - change	
2	005022	Rear turn indicators - Replacement	
3	005068	Rear turn indicator bulb- Replacement	
4	005091	Turn indicator glass - Replacement	
5	005031	Licence plate light bulb - Replacement	
6	004136	License plate holder support - Replacement	
7	005030	Rear headlight cable unit- Replacement	
8	005048	Licence plate holder - Replacement	
9	005032	Transparent licence plate cover - replace	
10	005028	Rear light assembly glass - Replacement	
11	005066	Rear light bulbs - Replacement	

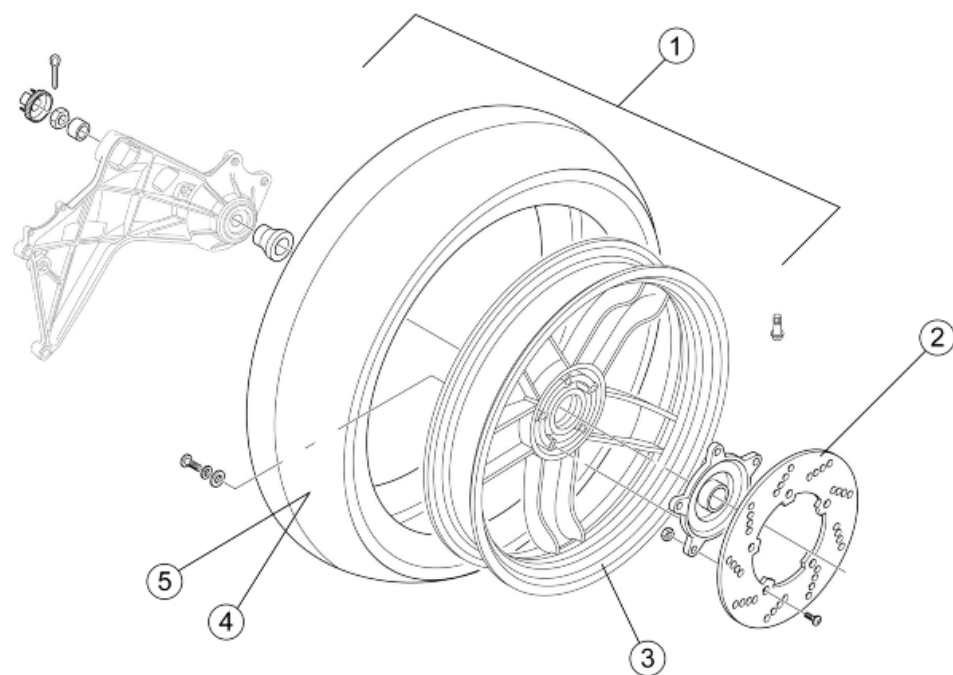
Front wheel



FRONT WHEEL

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

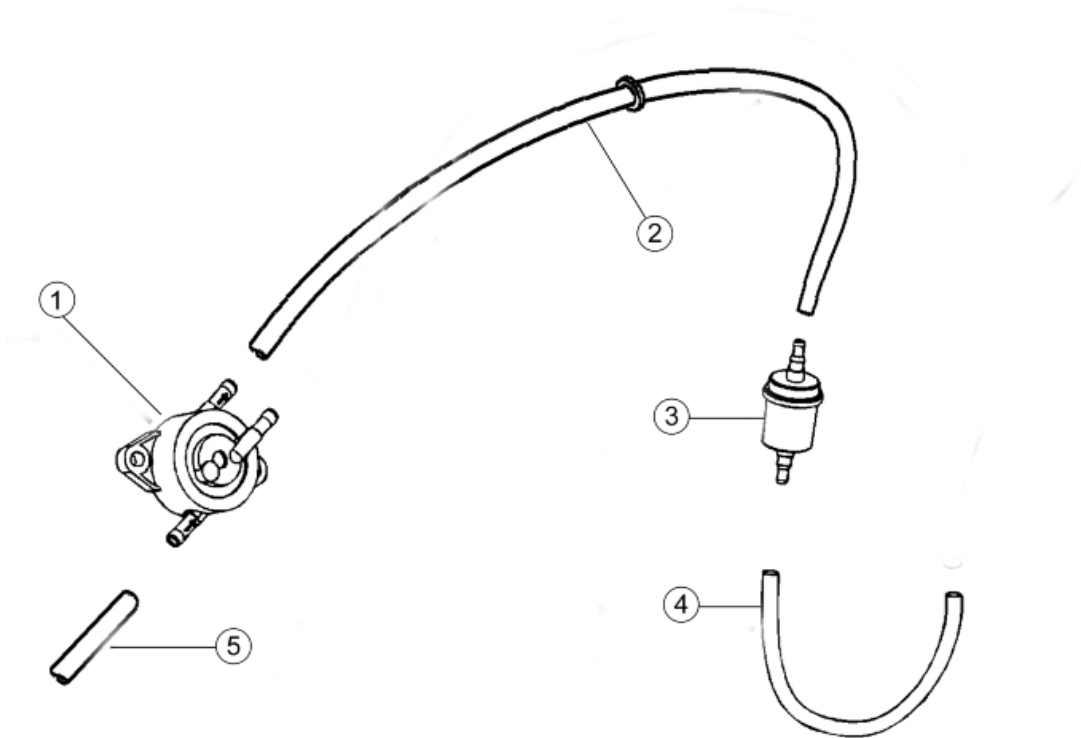
Rear wheel



REAR WHEEL

	Code	Action	Duration
1	001016	Rear wheel - Replacement	
2	002070	Rear brake disc - Replacement	
3	001071	Rear wheel rim - Replacement	
4	004126	Rear wheel tyre - Replacement	
5	003063	Tyre pressure - Check	

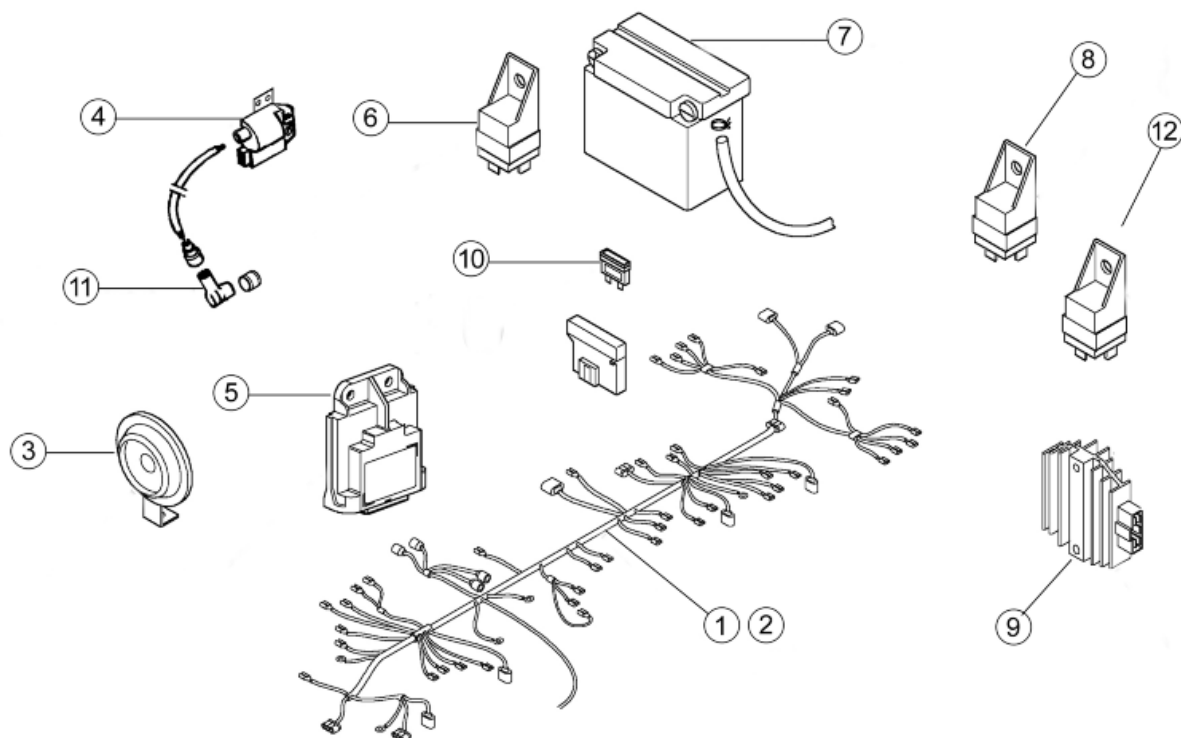
Fuel pump



FUEL PUMP

	Code	Action	Duration
1	004073	Fuel pump - Replacement	
2	004087	Filter / petrol pump pipe - Replacement	
3	004072	Fuel filter - Replacement	
4	004137	Pump / carburettor hose - Replacement	
5	004089	Tank / petrol pump pipe - Replacement	

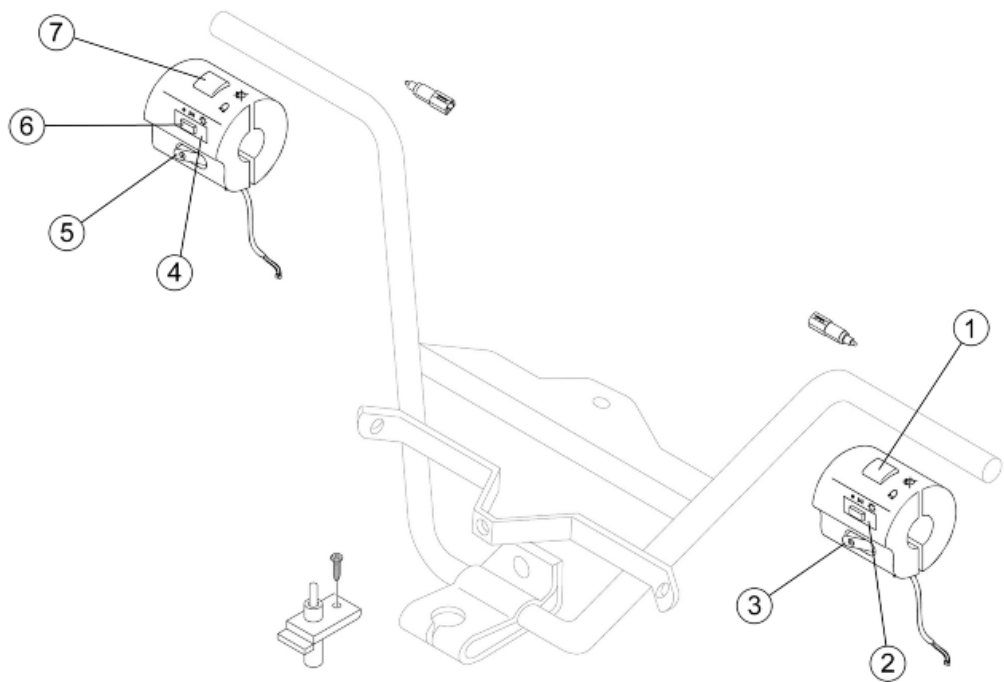
Electric devices



ELECTRIC 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 - Replacement	
8	005011	Start-up remote control switch - change	
9	005009	Voltage regulator - Replacement	
10	005052	Fuse (1) - Replacement	
11	001094	Spark plug cap - Replacement	
12	005052	Fuse (1) - Replacement	
13	001094	Spark plug cap - Replacement	
14	005088	Emergency stop remote control - Replacement	

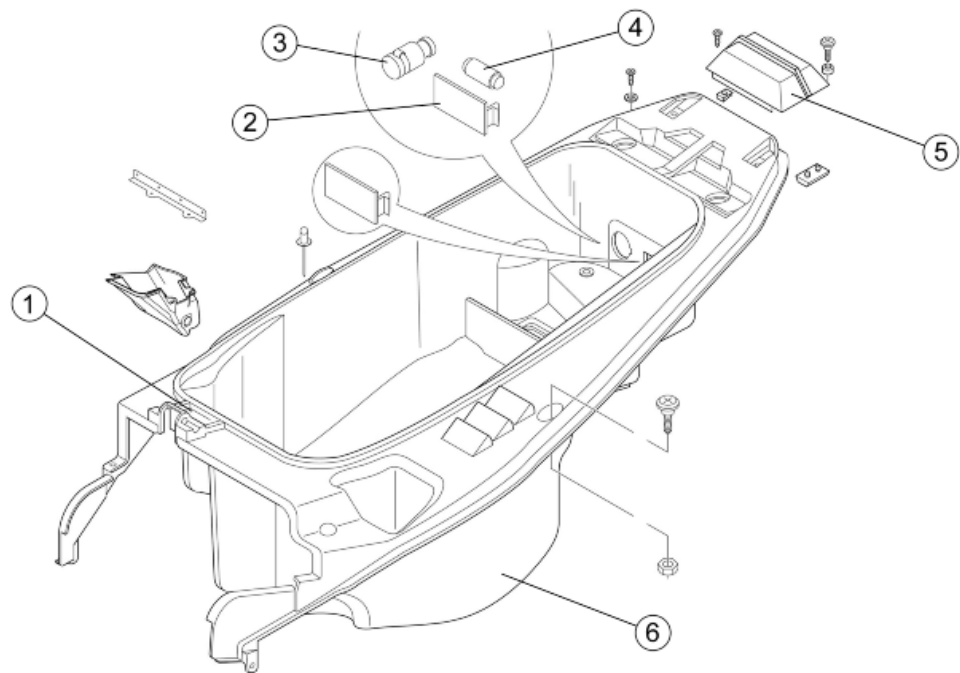
Electronic controls



ELECTRIC CONTROLS

	Code	Action	Duration
1	005077	Emergency stop switch - Replacement	
2	003075	Handlebar left control - Replacement	
3	005041	Starter button - Replacement	
4	003074	Handlebar right control - Replacement	
5	005040	Horn button - Replacement	
6	005006	Light switch or turn indicators - Replacement	
7	005039	Headlight switch - Replacement	

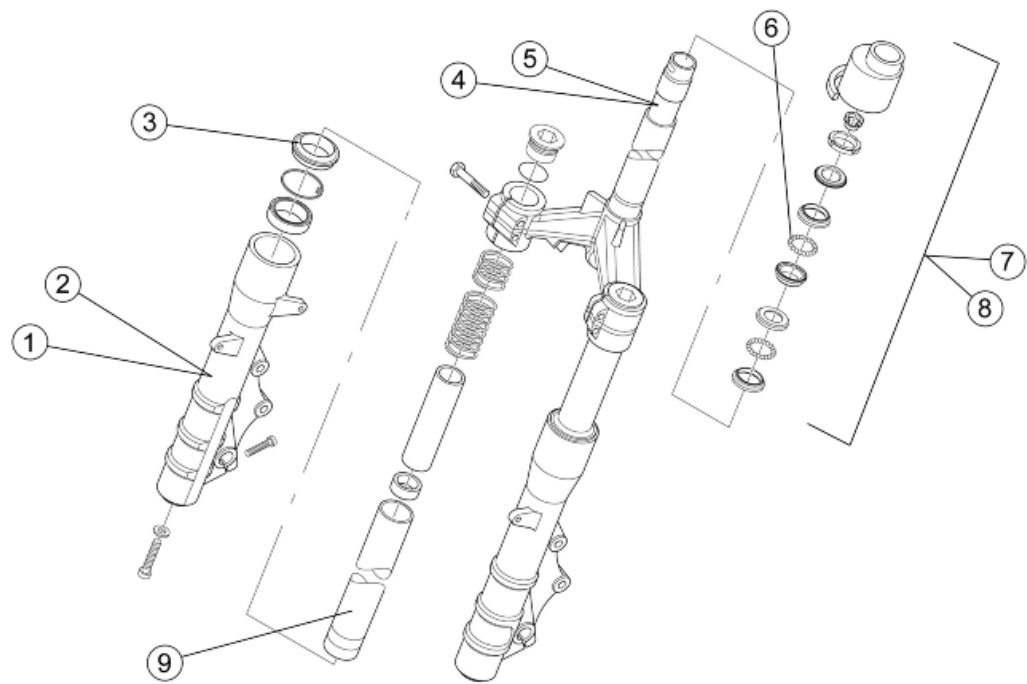
Helmet bay



HELMET COMPARTMENT

	Code	Action	Duration
1	005033	Under seat light switch - Replacement	
2	005027	Helmet compartment bulb - Replacement	
3	004142	Plug socket - Replacement	
4	005026	Helmet compartment light - Replacement	
5	005046	Battery cover - change	
6	004016	Helmet compartment - Replacement	

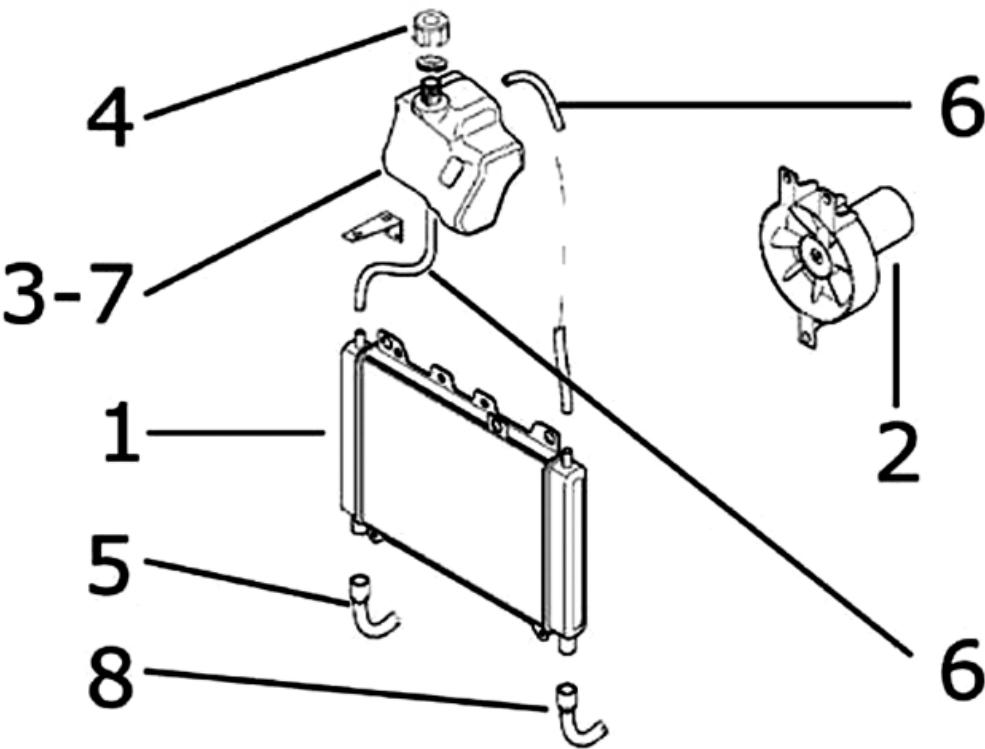
Front suspension



FRONT SUSPENSION

	Code	Action	Duration
1	003076	Fork sheath - Replacement	
2	003069	Front fork oil - Replacement	
3	003048	Fork oil seal - Replacement	
4	003010	Front suspension - Service	
5	003051	Complete fork - replace	
6	004119	Bearing / upper steering fifth wheel - Replacement	
7	003002	Steering fifth wheel - Replacement	
8	003073	Steering clearance - Adjustment	
9	003079	Fork stem - Replacement	

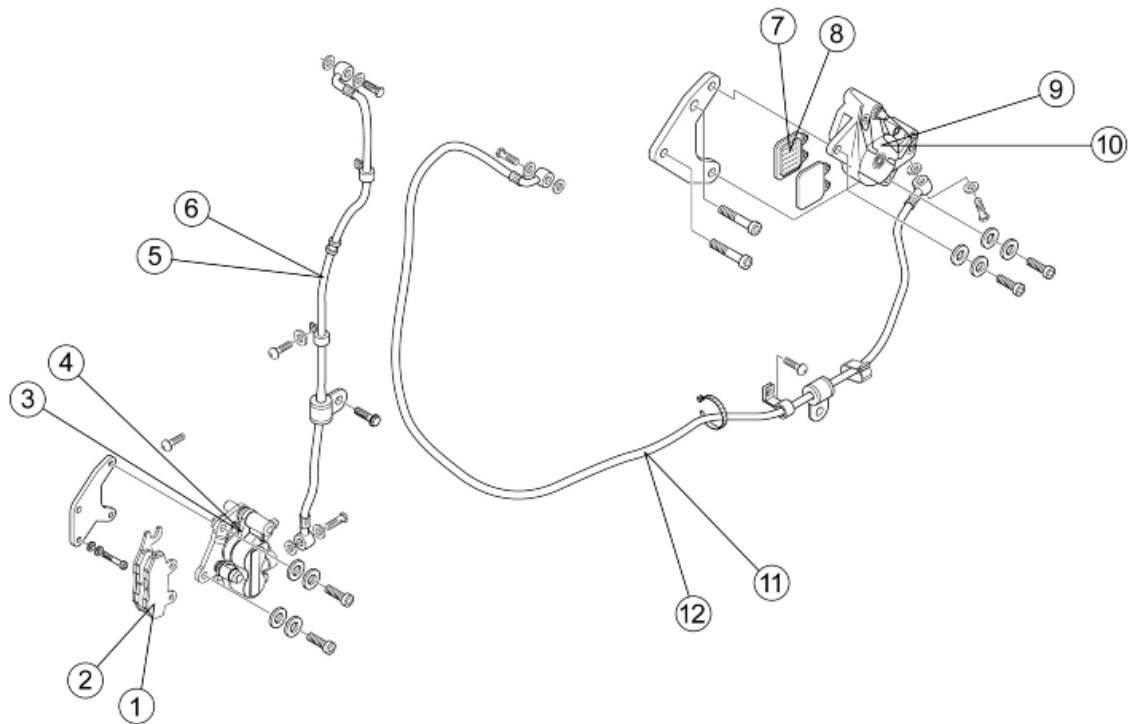
Cooling system



COOLING SYSTEM

	Code	Action	Duration
1	007002	Water cooling radiator - Replacement	
2	007016	Fan with support - Replacement	
3	007001	Expansion tank - Replacement	
4	007024	Expansion tank cap - Replacement	
5	007019	Coolant return pipe - replacement	
6	007013	Expansion tank / radiator connecting hose - Replacement	
7	001052	Coolant and air bleed - replacement	
8	007022	Coolant delivery pipe - Replacement	

Braking system



BRAKING SYSTEM

	Code	Action	Duration
1	003070	Front brake pads / Shoes - Check wear	
2	002007	Front brake pads - Replacement	
3	002039	Front brake calliper - Replacement	
4	002040	Front brake calliper - Check	
5	002047	Front brake fluid and air bleeding system - Replacement	
6	002021	Front brake piping - Replacement	
7	002002	Shoes - Rear brake pads - Replacement	
8	003071	Rear brake pads - Wear check	
9	002048	Rear brake calliper - Replacement	
10	002068	Rear brake calliper - Check	
11	002020	Rear brake pipes - Removal and re-fitting	
12	002080	Rear brake oil bleeding system - Replacement	

A

Air filter: 40, 232

B

Battery: 53, 65, 82, 242

Brake: 202, 204, 206, 207, 209, 210, 212

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