

DERBI

**WORKSHOP MANUAL
BOULEVARD 50 2T**



The logo consists of the word "DERBI" in a bold, white, sans-serif font, centered within a dark grey rectangular box.

WORKSHOP MANUAL

Boulevard 50 2T

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

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WORKSHOP MANUAL

Boulevard 50 2T

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

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

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

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



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



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



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



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INDEX OF TOPICS

CHARACTERISTICS

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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 DERBI spare parts and lubricants recommended by the Manufacturer. Non-original or non-conforming spare parts may damage the vehicle.
 - Use only the appropriate tools designed for this vehicle.
 - Always use new gaskets, sealing rings and split pins upon refitting.
 - After removal, clean the components using non-flammable or low flash-point solvents. Lubricate all the work surfaces, except tapered couplings, before refitting these parts.
 - After refitting, make sure that all the components have been installed correctly and work properly.
 - 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 measurement. Using unsuitable coupling members and tools may damage the vehicle.
 - When carrying out maintenance operations on the vehicle that involve the electrical system, make sure the electric connections have been done properly, particularly the ground and battery connections.
-

Vehicle identification

VEHICLE IDENTIFICATION

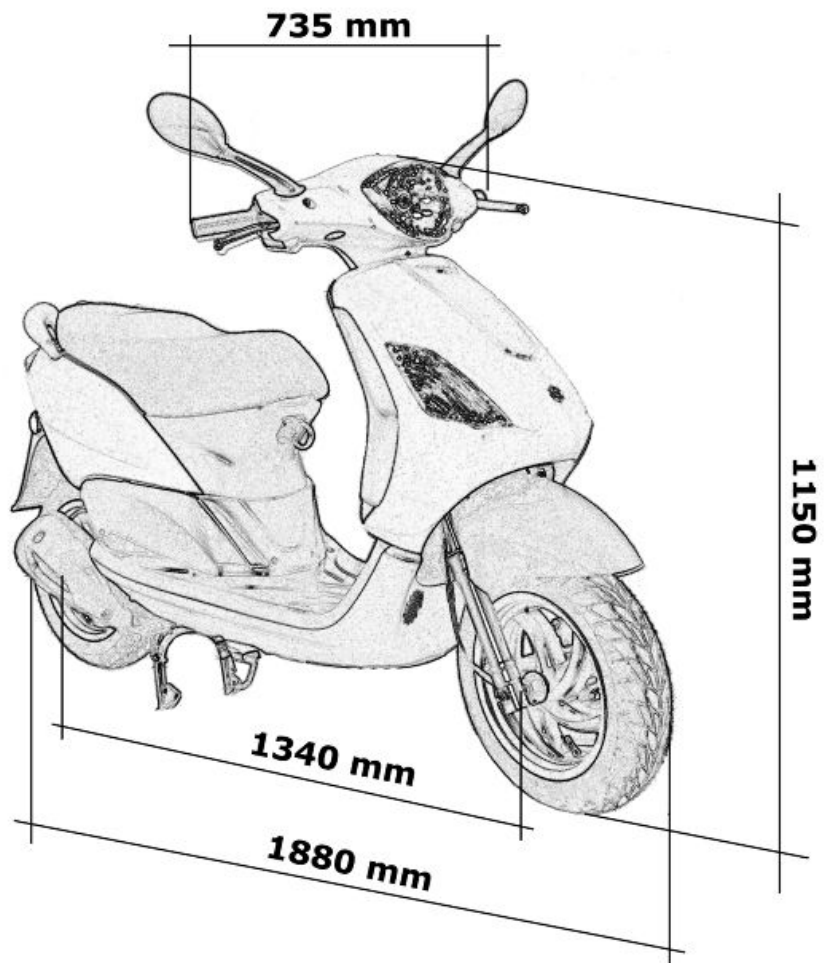
Specification	Desc./Quantity
Frame prefix	ZAPM44100 + 1001
Engine prefix	VTHBR1A1 xxxxxxxxx



Dimensions and mass

DIMENSIONS AND MASS

Specification	Desc./Quantity
Dry weight	97 Kg
Length	1,880
Maximum height	1150 mm
Seat height	785
Width	735
Wheelbase	1,340



Engine

ENGINE

Specification	Desc./Quantity
Engine type	Two-stroke, single cylinder Piaggio Hi-PER2
Bore x stroke	40 X 39.3 mm
Cubic capacity	49.40 cc
Compression ratio	10,3 :1
Carburettor	DELL'ORTO PHVA 17.5
CO adjustment	3.5% ± 0.5
Engine idle speed	1800 to 2000 r.p.m.
Air filter	Sponge, soaked in a mixture (50% SELENIA Air Filter Oil and 50% unleaded petrol).
Starting system	electric starter/kick-starter
Lubrication	With blend and variable oil variable according to the engine revolutions and the throttle valve opening by means of a pump controlled by the driving shaft with toothed belt.
Fuel supply	Gravity feed, with unleaded petrol (with a minimum octane rating of 95) with carburettor.
Cooling system	forced coolant circulation system

Transmission

TRANSMISSION

Specification	Desc./Quantity
Transmission	With automatic expandable pulley variator, torque server, V-belt, automatic clutch, gear reduction unit.

Capacities

CAPACITIES

Specification	Desc./Quantity
Rear hub oil	Quantity: approx. 85 cc
oil mixer tank	Plastic, capacity ~ 1.2 l
Fuel tank capacity	approx. 7.2 litres (of which 1.5 l is reserve)

Electrical system

ELECTRICAL SYSTEM

Specification	Desc./Quantity
Type of ignition	Capacitive discharge type electronic ignition, with incorporated high voltage coil
Ignition advance (before TDC)	Fixed $17^{\circ} \pm 1$
Recommended spark plug	CHAMPION RN2C
Battery	12V-4Ah
Main fuse	7.5 A
Generator	In alternate current with three output sections

Frame and suspensions

FRAME AND SUSPENSIONS

Specification	Desc./Quantity
Type of chassis	Welded tubular steel chassis with stamped sheet reinforcements.
Front suspension	Telescopic mechanical fork, 76mm travel.
Rear suspension	Single hydraulic shock absorber, 72.5-mm travel

Brakes

FRENI

Specification	Desc./Quantity
Front brake	Disc brake (\varnothing 200 mm) with hydraulic control (lever on the right end of the handlebar) and floating calliper.
Rear brake	drum brake (\varnothing 140 mm) with mechanical linkage.(l.h. brake lever).

Wheels and tyres

WHEELS AND TYRES

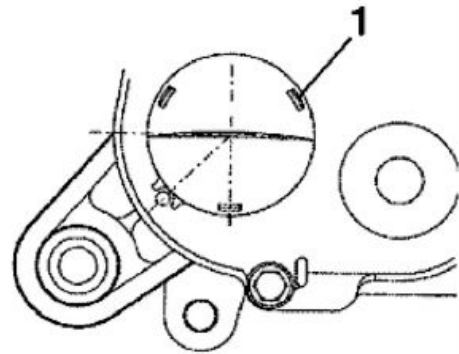
Specification	Desc./Quantity
Front wheel rim	Die-cast aluminium alloy 3.50 x 12"
Front tyre	Tubeless, 120/70-12"

Specification	Desc./Quantity
Rear wheel rim	Die-cast aluminium alloy: 3.00"x12"
Rear tyre	Tubeless, 120/70 - 12"
Front tyre pressure	1.8 bar
Rear tyre pressure	2 bar
Rear wheel pressure (rider and passenger):	2.3 bar

Secondary air

Follow these steps to clean the sponge filters of the secondary air system:

- 1) Remove the snap-on plastic cover (1) on the transmission cover using a small screwdriver as a lever on the retaining tongues in order to insert one of the three slots found on that cap.
- 2) Wash the polyurethane sponge with water and soap, dry all components with compressed air and refit to place. Refit the intake cap respecting the angle reference.
- 3) Undo the two fixing screws (2) on the aluminium cover of the secondary air housing in order to reach the polyurethane sponge inside that housing; clean as indicated in point 2) and refit all elements after checking the steel tab is not deformed and/or does not guarantee correct tightness at its fitting; replace if necessary.



N.B.

UPON REFITTING, MAKE SURE TO CORRECTLY FIT THE TAB IN ITS FITTING ON THE TWO PLASTIC AND ALUMINIUM COVERS.

CAUTION

WHILE CARRYING OUT OPERATION 3), ALWAYS CHECK THE TWO RUBBER COUPLINGS (3) ON ONE END OF THE SECONDARY AIR PIPE FOR CORRECT TIGHTNESS AND CONTINUITY; IF NECESSARY, REPLACE THEM AND USE NEW CLAMPS TO FIX THEM.

Carburettor

50cc Version

Dell'Orto

DELLORTO CARBURETTOR

Specification	Desc./Quantity
Type	PHVA 17.5 RD
Diffuser diameter	Ø 17.5
Regulation reference number	8423
Maximum nozzle:	53
Maximum air nozzle (on the body):	Ø 1.5
Tapered pin stamped code:	A22
Pin position (notches from above):	1
Diffuser:	209 HA
Minimum nozzle:	32
Minimum air nozzle (on the body):	Free
Initial minimum mix screw opening:	1 1/2
Starter jet	50
Starter air nozzle (on the body):	Ø 1.5
Stroke of starter pin:	11 mm
Gasoline inlet hole	Ø 1.5

Tightening Torques

FRONT BRAKE

Name	Torque in Nm
Brake fluid pump - hose fitting	16 ± 20 Nm
Brake fluid pipe-calliper fitting	19 ± 24
Calliper tightening screw	24 ± 27
Disc tightening screw	8 ± 10
Oil bleed screw	7 ± 10

FRONT SUSPENSION

Name	Torque in Nm
Lower fork fixing screw	15 ± 20
Front wheel axle nut	45 - 50

STEERING ASSEMBLY

Name	Torque in Nm
Upper steering ring nut	35 ± 40
Steering lower ring nut	8 ± 10
Handlebar fixing screw	50 ± 55

ENGINE ASSEMBLY

Name	Torque in Nm
Clutch bell nut (**)	40 ± 44
Clutch lock ring nut	55 ± 60
Nut locking driving pulley on crankshaft (**)	40 ± 44 Nm
Start-up lever screw	12 ± 13
Flywheel nut (**)	40 ± 44
Flywheel fan screws	3 ± 4
Half-crank case joint bolts	12 ± 13
Bolts holding exhaust pipe to the crankcase	22 ± 24
Screws holding the filter box to the crank case	4 ± 5
Head nuts	10 ± 11
Starter screws	12 ± 13
Ignition spark plug	25 ± 30
Hub oil drainage cap	3 ± 5
Oil hub level dipstick	Manual
Rear hub cap screws	12 ± 13
Transmission cover screws	12 ± 13
Inlet manifold screws	8 ± 9

Characteristics

Name	Torque in Nm
Flywheel hood fixing screws	1 ÷ 2
Cylinder hood fixing screws	3.5 ÷ 5
Stator clamping screws	3 ÷ 4
Pick-Up clamping screw	4 ÷ 5
Mixer clamping screws	3 ÷ 4
Screw fixing brake lever to the journal on the engine	12 ÷ 13

CHASSIS

Name	Torque in Nm
Swinging arm - engine pin*	33 ÷ 41
Frame/swing-arm bolt (*)	64÷72
Shock absorber - chassis nut (*)	20 to 25 Nm
shock absorber - engine pin (*)	33 to 41 N·m
Rear wheel axle (*)	104÷126 N·m
Centre-stand mounting bracket bolt	25÷30 N·m
Centre-stand mounting bracket screw	20÷25 N·m
Side stand fixing screw	12 ÷ 20
Side stand bracket fixing screw	15 ÷ 20

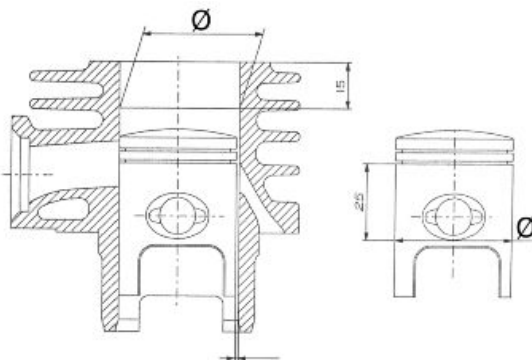
Overhaul data

Assembly clearances

Cylinder - piston assy.

COUPLING BETWEEN PISTON AND CYLINDER

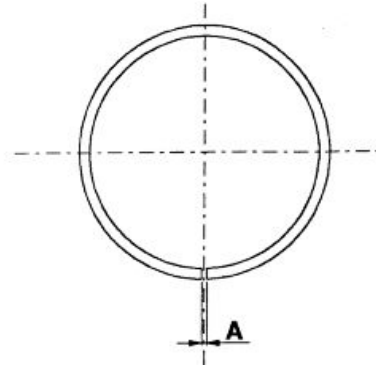
Name	Initials	Cylinder	Piston	Play on fitting
Standard coupling	M	40.005 - 40.012	39.943 - 39.95	0.055 - 0.069
Standard coupling	N	40.012 - 40.019	39.95 - 39.957	0.055 - 0.069
Standard coupling	O	40.019 - 40.026	39.957 - 39.964	0.055 - 0.069
Standard coupling	P	40.026 - 40.033	39.964 - 39.971	0.055 - 0.069
coupling 1st oversize	M1	40.205 - 40.212	40.143 - 40.15	0.055 - 0.069
coupling 1st oversize	N1	40.212 - 40.219	40.15 - 40.157	0.055 - 0.069
coupling 1st oversize	O1	40.219 - 40.226	40.157 - 40.164	0.055 - 0.069
coupling 1st oversize	P1	40.226 - 40.233	40.164 - 40.171	0.055 - 0.069
Coupling 2nd oversize	M2	40.405 - 40.412	40.343 - 40.35	0.055 - 0.069
Coupling 2nd oversize	N2	40.412 - 40.419	40.35 - 40.357	0.055 - 0.069
Coupling 2nd oversize	O2	40.419 - 40.426	40.357 - 40.364	0.055 - 0.069
Coupling 2nd oversize	P2	40.426 - 40.433	40.364 - 40.371	0.055 - 0.069



Piston rings

SEALING RING

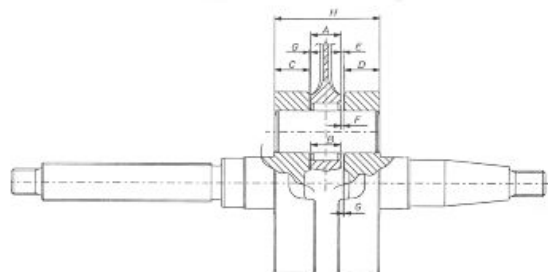
Name	Description	Dimensions	Initials	Quantity
Compression ring		40	A	0.10 to 0.25
Compression ring 1st oversize		40.2	A	0.10 to 0.25
Compression ring 2nd Oversize		40.4	A	0.10 to 0.25



Crankcase - crankshaft - connecting rod

AXIAL CLEARANCE BETWEEN CRANKCASE, CRANKSHAFT AND CONNECTING ROD

Name	Description	Dimensions	Initials	Quantity
Connecting rod		11.750-0.05	A	clearance E = 0.25 to 0.50
shoulder washer		0.5 ± 0.03	G	clearance E = 0.25 to 0.50 - clearance F = 0.20 to 0.75
Half-shaft, transmission side		13.75+0.040	C	clearance E = 0.25 to 0.50 - clearance F = 0.20 to 0.75
Flywheel-side half-shaft		13.75+0.040	D	clearance E = 0.25 to 0.50 - clearance F = 0.20 to 0.75
Lining between the shoulders		40.64	H	clearance E = 0.25 to 0.50 - clearance F = 0.20 to 0.75
Cage		11.800-0.35	B	clearance F = 0.20 to 0.75



Slot packing system

This type of engines foresees the use of one size of basic gaskets.

For 25 km/h engine type versions, use 2 gaskets between cylinder and crankcase.

Products

RECOMMENDED PRODUCTS TABLE

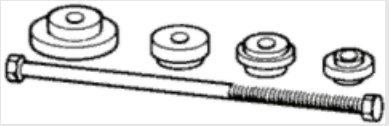
Product	Description	Specifications
AGIP ROTRA 80W-90	Rear hub oil	SAE 80W/90 Oil that exceeds the requirements of API GL3 specifications
AGIP CITY HI TEC 4T	Oil to lubricate flexible transmissions (brake, throttle control and mixer, odometer)	Oil for 2-stroke engines: SAE 5W-40, API SL, ACEA A3, JASO MA
AGIP FILTER OIL	Oil for air filter sponge	Mineral oil with specific additives for increased adhesiveness
AGIP CITY TEC 2T	Mixer oil	synthetic oil for 2-stroke engines: JASO FC, ISO-L-EGD
AGIP BRAKE 4	Brake fluid	FMVSS DOT 4 Synthetic fluid
MONTBLANC MOLYBDENUM GREASE	Grease for driven pulley shaft adjusting ring and movable driven pulley housing	Grease with Molybdenum disulphide
AGIP GREASE PV2	Grease for steering bearings, pin seats and swinging arm	White anhydrous-calcium based grease to protect roller bearings; temperature range between -20 C and +120 C; with NLGI 2; ISO-L-XBCIB2.
AGIP GREASE SM 2	Grease for odometer transmission gear case	Lithium grease with NLGI 2 molybdenum disulphide; ISO-L-XBCHB2, DIN KF2K-20
AGIP GP 330	Grease for brake control levers, throttle, stand	White calcium complex soap-based spray grease with NLGI 2; ISO-L-XBCIB2


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TOOLING


TOOL


TOOLS


Stores code	Description	
001330Y	Tool for fitting steering seats	

001467Y006	Pliers to extract 20 mm bearings	
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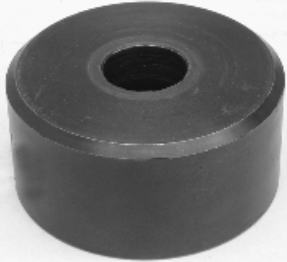




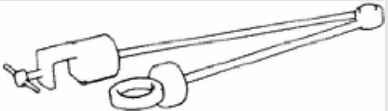
001467Y007	Driver for OD 54 mm bearing	
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001467Y009	Driver for OD 42-mm bearings	
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001467Y013	Pliers to extract ø 15-mm bearings	
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001467Y014	Pliers to extract ø 15-mm bearings	
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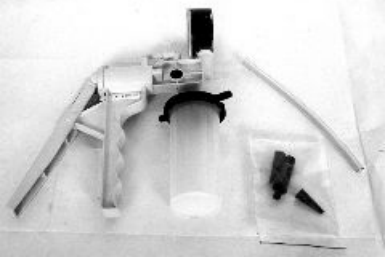

Tooling

Stores code	Description	
001467Y017	Bell for bearings, OD 39 mm	
001467Y021	Extraction pliers for ø 11 mm bearings	
002465Y	Pliers for circlips	
006029Y	Punch for fitting fifth wheel seat on steering tube	
020004Y	Punch for removing fifth wheels from headstock	
020055Y	Wrench for steering tube ring nut	
020150Y	Air heater mounting	

Tooling

Stores code	Description	
020151Y	Air heater	
020162Y	Flywheel extractor	
020163Y	Crankcase splitting plate	
020164Y	Driven pulley assembly sheath	
020165Y	Start-up crown lock	
020166Y	Pin lock fitting tool	

Tooling

Stores code	Description	
020261Y	Starter spring fitting	 A black metal T-shaped tool with a cylindrical handle and a base that fits over a spring.
020262Y	Crankcase splitting plate	 A black metal plate with a central vertical hole and a bolt passing through it, used for splitting a crankcase.
020265Y	Bearing fitting base	 A black metal rectangular base with a central opening, used for bearing fitting.
020325Y	Pliers for brake-shoe springs	 A pair of long-handled pliers with curved jaws, used for adjusting brake shoe springs.
020329Y	Mity-Vac vacuum-operated pump	 A white plastic vacuum-operated pump with various fittings and a hose, used for vacuum operations.
020330Y	Stroboscopic light to check timing	 A handheld stroboscopic light with a black cord, used for timing checks.

Stores code
020331Y

Description
Digital multimeter



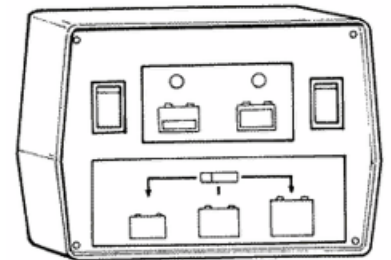
020332Y

Digital rpm indicator



020333Y

Single battery charger



020334Y

Multiple battery charger



Tooling

Stores code

Description

020335Y

Magnetic mounting for dial gauge



020350Y

Electrical system check instrument



020357Y

32x35-mm Adaptor

020359Y

42x47-mm Adaptor



020376Y

Adaptor handle



020412Y

15-mm guide



Tooling

Stores code**Description**

020456Y

Ø 24 mm adaptor



020483Y

30-mm guide



020565Y

Flywheel lock calliper spanner



494929Y

Exhaust fumes analyser



INDEX OF TOPICS

MAINTENANCE

MAIN

Maintenance chart

EVERY 2 YEARS

Action

Brake fluid - change

AFTER 1000 KM

50'

Action

Hub oil - change
 Oil mixer/throttle linkage - adjustment
 Odometer gear - greasing
 Steering - adjustment
 Brake control levers - greasing
 Brake fluid level - check
 Safety locks - check
 Electrical system and battery - check
 Tyre pressure and wear - check
 Vehicle and brake test - road test

AFTER 5000 KM, 25000 KM, 35000 KM AND 55000 KM

40'

Action

Hub oil level - check
 Spark plug/electrode gap - replacement
 Air filter - clean
 Oil mixer/throttle linkage - adjustment
 Brake control levers - greasing
 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

AFTER 10000 KM, 50000 KM

95'

Action

Hub oil - change
 Spark plug/electrode gap - replacement
 Air filter - clean
 Idling speed (*) - adjustment
 Oil mixer/throttle linkage - adjustment
 Variable speed rollers - replacement
 Odometer gear - greasing
 Driving belt - checking
 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 regulations in the «Adjusting the idle speed» section

AFTER 15000 KM AND 45000 KM

65'

Action

Hub oil level - check
Spark plug/electrode gap - replacement
Air filter - cleaning
Oil mixer/throttle linkage - adjustment
Driving belt - replacement
Brake control levers - greasing
Brake pads - check condition and wear
Brake fluid level - check
Electrical system and battery - check
Tyre pressure and wear - check
SAS box (sponge) (**) - cleaning
Vehicle and brake test - road test

(**) See regulations in the «Secondary air system» section

AFTER 20000 KM AND 40000 KM

110'

Action

Hub oil - change
Spark plug/electrode gap - replacement
Air filter - clean
Idling speed (*) - adjustment
Cylinder cooling system - check/cleaning
Oil mixer/throttle linkage - adjustment
Driving belt - checking
Variable speed rollers - replacement
Mixer belt - replacement
Odometer gear - greasing
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 section «Adjusting the idle speed»

AFTER 30000 KM

130'

Action

Hub oil - change
Spark plug/electrode gap - replacement
Air filter - clean
Idling speed (*) - adjustment
Oil mixer/throttle linkage - adjustment
Driving belt - replacement
Variable speed rollers - replacement
Odometer gear - greasing
Steering - adjustment
Brake control levers - greasing
Brake pads - check condition and wear
Flexible brake tubes - replacement
Brake fluid level - check
Transmission elements - lubrication
Safety locks - check
Suspensions - check
Electrical system and battery - check
Headlight - adjustment
Tyre pressure and wear - check
SAS box (sponge) (**) - cleaning
Vehicle and brake test - road test

(*) See regulations in the «Adjusting the idle speed» section
 (**) See regulations in the «Secondary air system» section

AFTER 60000 Km

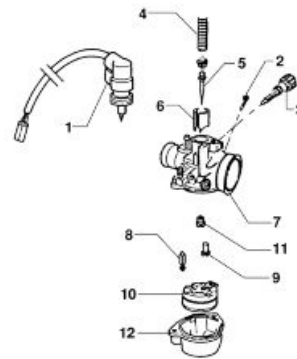
150'

Action
Hub oil - change
Spark plug/electrode gap - replacement
Air filter - clean
Idling speed (*) - adjustment
Cylinder cooling system - check/cleaning
Oil mixer/throttle linkage - adjustment
Driving belt - replacement
Variable speed rollers - replacement
Mixer belt - replacement
Odometer gear - greasing
Steering - adjustment
Brake control levers - greasing
Brake pads - check condition and wear
Flexible brake tubes - replacement
Brake fluid level - check
Transmission elements - lubrication
Safety locks - check
Suspensions - check
Electrical system and battery - check
Headlight - adjustment
Tyre pressure and wear - check
SAS box (sponge) (**) - cleaning
Vehicle and brake test - road test

(*) See regulations in the «Adjusting the idle speed» section
 (**) See regulations in the «Secondary air system» 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 valve in case of wear due to excessive clearance.
- If there are wear marks in the chamber causing inadequate tightness or a free valve slide (even if it is new), replace the carburettor.
- It is advisable to replace the gaskets at every refit.



WARNING

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

1. Automatic starter - 2. Idle air set screw - 3. Idle speed set screw - 4. Throttle valve spring - 5. Throttle valve tapered pin - 6. Throttle valve - 7. Carburettor body - 8. Pin - 9. Min. jet - 10. Float - 11. Max. jet - 12. Float chamber
-

Checking the spark advance

-Check to be made at over 4000 rpm with stroboscopic gun. The advanced ignition measured must be 17° before the TDC.

- This value is correct when the reference mark on the flywheel hood is aligned with the reference mark on the cooling fan and the phase shifter on the stroboscopic gun is set on 17° .

N.B.

IN CASE OF MALFUNCTION, CARRY OUT THE CHECKS PROVIDED FOR IN THE ELECTRICAL SYSTEM CHAPTER.

CAUTION

BEFORE CARRYING OUT THE ABOVE CHECKS, CHECK THE CORRECT KEYING OF THE FLYWHEEL ON THE CRANKSHAFT.

Specific tooling

020330Y Stroboscopic light to check timing

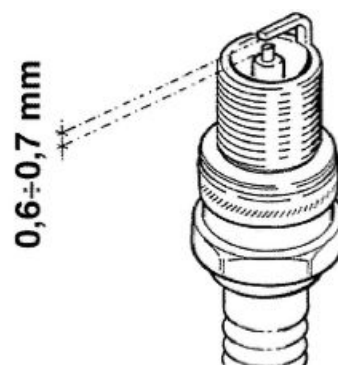


Spark plug

Place the vehicle on its central stand

- Remove the central cover, indicated in the figure, by undoing the 2 fixing screws;
- Disconnect spark plug HV wire hood;
- Undo the spark plug using the socket wrench;
- Examine the condition of the spark plug, check that the insulating material is whole and measure the distance between the electrodes using a thickness gauge.
- Adjust the distance if necessary by bending the side electrode very carefully.

In the case of defects, replace the spark plug with one of the specified type;



- Engage the spark plug with the due inclination and screw it right down by hand, then do it up with the wrench at the prescribed torque;
- Put the hood on the sparking plug as far as it will go;
- Refit the central flap.

CAUTION

THE SPARK PLUG MUST BE REMOVED WHEN THE MOTOR IS COLD. THE SPARK PLUG MUST BE REPLACED EVERY 5000 KM. USE OF STARTERS NOT CONFORMING OR SPARK PLUGS NOT THOSE DESCRIBED CAN SERIOUSLY DAMAGE THE ENGINE.

Characteristic

Recommended spark plug

CHAMPION RN2C

Electric characteristic

Electrode gap

0.6 to 0.7 mm.

Locking torques (N*m)

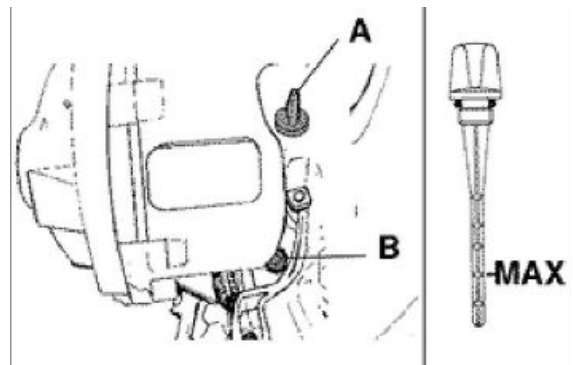
Spark plug 25 - 30 Nm

Hub oil

Check

Do the following to check the correct level:

- 1) Stand the vehicle on the centre-stand on flat ground;
- 2) Remove the dipstick «A», and dry it with a clean cloth. Reinsert it, screwing it in all the way;
- 3) Remove the stick and check that the oil level is slightly over the second notch starting from the lower end;
- 4) Screw the dipstick back in, checking that it is locked in place.



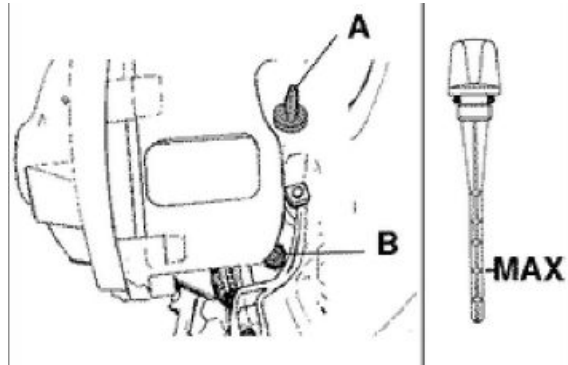
Recommended products

AGIP ROTRA 80W-90 Rear hub oil

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

Replacement

- Remove the oil filler cap «A».
- Loosen the oil draining cap «B» and let the oil completely drain the tank.
- Tighten the draining cap and refill the hub with oil (approx. 75 cc).

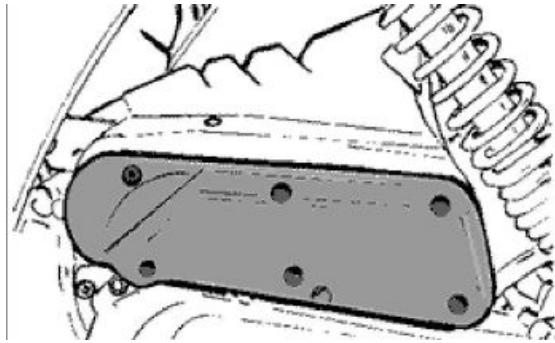


Air filter

- Remove the cap of the purifier, unscrewing the six clamping screws and removing the filter.

Cleaning:

- Wash with water and neutral soap.
- Dry with a clean cloth and short blasts of compressed air.
- Saturate with a 50% mixture of gasoline and oil.
- Drip dry the filter and then squeeze it between the hands without wringing.
- Let it dry and refit it again.



CAUTION

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

Recommended products

AGIP FILTER OIL Oil for air filter sponge

Mineral oil with specific additives for increased adhesiveness

Checking the ignition timing

- Adjust the control cables:

Mix cable: see procedure indicated in "Mixer timing".

Throttle cable: adjust the set screw on the carburettor in such a way that the sheath has no backlash.

Splitter control cable: adjust set screw on the throttle control to the handlebar in such a way that there is no backlash on the throttle control.

Adjust all transmissions in such a way that their sheathings show no sign of backlash.

Mixer Timing

- Using the transmission set screw on the crankcase, with throttle control untwisted, adjust the reference mark on the rotating plate so that it is lined up with the reference mark on the mixer body, as shown in the figure.

While doing this, the engine must be fuelled with a 2 % oil mixture (0.5 litre minimum if the reservoir is empty).

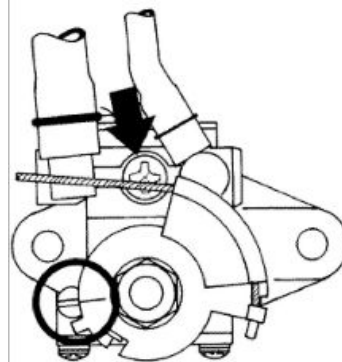
CAUTION

IN CASE OF DISMANTLING OR RUNNING OUT OF OIL IN THE RESERVOIR BLEED THE MIXER AS FOLLOWS: REFILL THE OIL RESERVOIR WHEN THE MIXER IS FITTED TO THE VEHICLE AND THE ENGINE IS OFF, UNDO THE MIXER PIPE FROM THE CARBURETTOR AND LOOSEN THE BLEED SCREWS (SEE THE ARROW IN THE FIGURE) UNTIL THE OIL BEGINS TO FLOW OUT. TIGHTEN THE SCREWS, START UP THE ENGINE AND WAIT FOR OIL TO FLOW OUT OF THE TUBE. RECONNECT THE DELIVERY PIPE TO THE CARBURETTOR AND FIX IT IN PLACE WITH THE RELEVANT METAL CLIP.

Recommended products

AGIP CITY TEC 2T Mixer oil

synthetic oil for 2-stroke engines: JASO FC, ISO-L-EGD



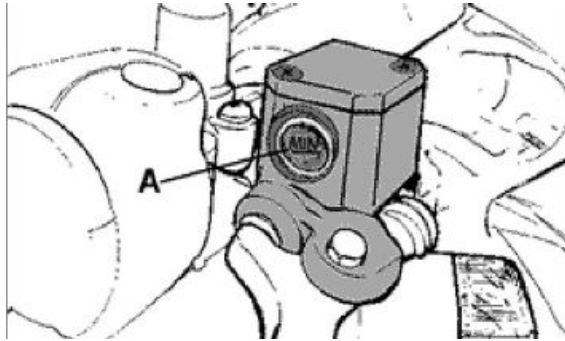
Braking system

Level check

Proceed as follows:

- Rest the vehicle on its centre stand with the handlebars perfectly horizontal;
- Check the level of liquid with the related warning light «A».

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



Top-up

Proceed as follows:

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

CAUTION

ONLY USE DOT 4-CLASSIFIED BRAKE FLUID.

CAUTION



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

CAUTION

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

CAUTION

THE BRAKE FLUID IS HYGROSCOPIC, IN OTHER WORDS, IT ABSORBS MOISTURE FROM THE SURROUNDING AIR. IF THE CONTENT OF MOISTURE IN THE BRAKING FLUID EXCEEDS A CERTAIN VALUE, BRAKING WILL BE INEFFICIENT.

NEVER USE BRAKE LIQUID IN OPEN OR PARTIALLY USED CONTAINERS.

UNDER NORMAL CLIMATIC CONDITIONS, THE FLUID MUST BE CHANGED EVERY 20,000 KM OR ANYWAY EVERY TWO YEARS.

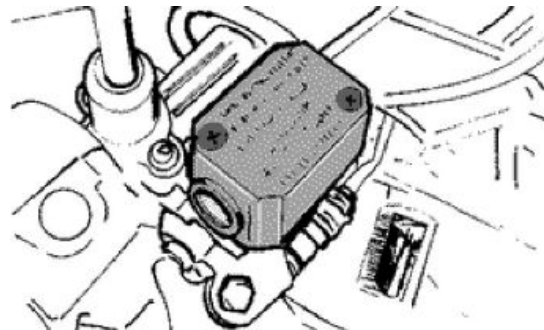
N.B.

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

Recommended products

AGIP BRAKE 4 Brake fluid

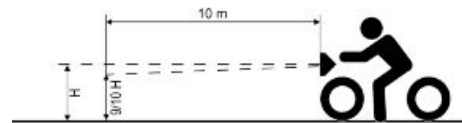
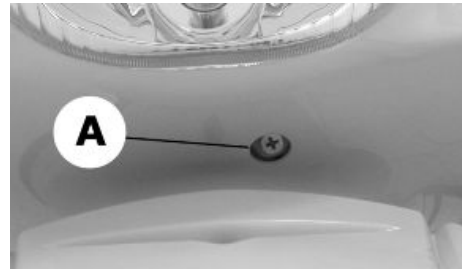
FMVSS DOT 4 Synthetic fluid



Headlight adjustment

Proceed as follows:

1. Place the vehicle, in running order and with the tyres inflated to the prescribed pressure, on a flat surface 10-m away from a white screen situated in a shaded area, making sure that the longitudinal axis of the scooter is perpendicular to the screen;
2. Turn on the headlight and check that the borderline of the projected light beam on the screen is not higher than 9/10 or lower than 7/10 of the distance from the ground to the centre of vehicle headlamp;
3. If otherwise, adjust the right headlight with screw «A».



N.B.

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

CO check

In the event that the exhaust on the vehicle being tested does not have an exhaust gases collection port, proceed as follows:

- Remove the R.H. side fairing
- Remove the secondary air box cover with the aluminium cap by acting upon the clamp shown in the figure.



Attach the exhaust gas collection tube to the secondary air rubber manifold. Such joint must be sealed in order to guarantee accurate CO readings.



- Start the engine, adjust the idle speed to $1,700 \pm 100$ rpm and check the CO value is equal $3.5 \pm 1\%$

- If the parameters found do not agree with the above figures, act upon the idle adjusting screw. Otherwise, check the automatic choke device

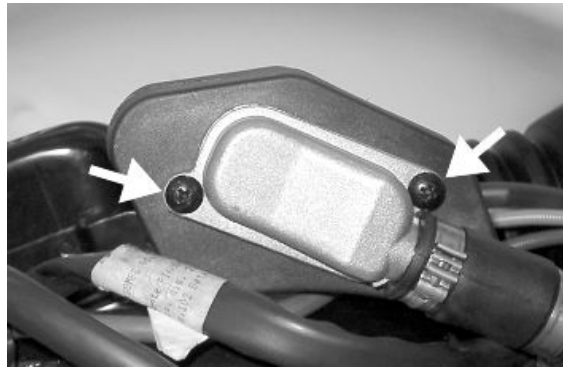
Specific tooling

020320Y Exhaust gases analyser

020332Y Digital rpm indicator

The check must be carried out after having carefully cleaned all carburettor components, with the air filter clean, and the spark plug in good conditions.

- Remove the R.H. side fairing
- Warm-up the engine by riding the vehicle on the road for at least 10 minutes
- Shut down the engine
- Remove the 2 secondary air box screws shown in the figure



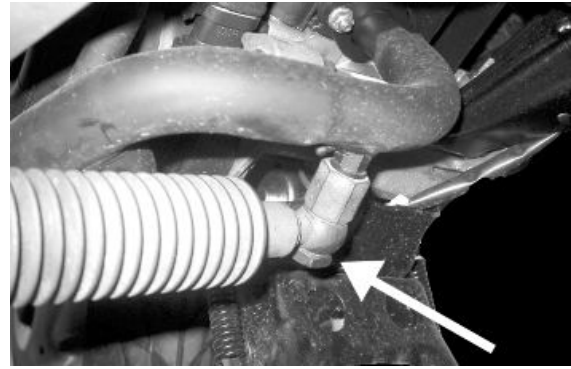
- Place a plastic sheet between the one-way valve and the aluminium outlet as shown in the figure



- Ensure the one-way valve packing properly seals the aluminium outlet fitting.
- Refit the aluminium outlet onto the SAS box as shown in the picture.



- Attach the special tool and move the joints as shown in the figure.
- Start the engine, adjust the idle speed to $1,700 \pm 100$ rpm and check the CO value is equal $3.5 \pm 1\%$
- If the parameters found do not agree with the above figures, act upon the idle adjusting screw. Otherwise, check the automatic choke device.



Specific tooling

020320Y Exhaust gases analyser

020332Y Digital rpm indicator

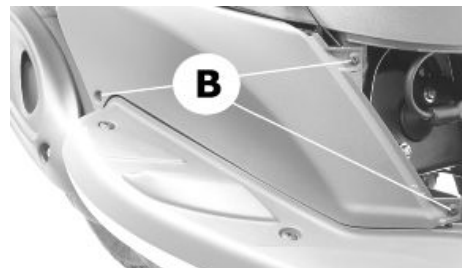
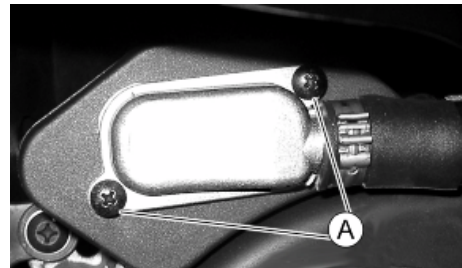
020625Y Kit for sampling gas from the exhaust manifold

SAS filters inspection and cleaning

After removing the spark plug cap, remove the RHS fairing, by loosening the three fixing screws «**B**» shown in the figure.

Remove the SAS aluminium cover fixing screws «**A**». Detach the metal hose from its rubber housing on the cover, without detaching it from the cover/bellow. Hence remove plate and plastic cover, extract the sponge and wash it with soap. Dry with compressed air before refitting, ensuring to correctly positioning the plate in the housing machined on the plastic and aluminium covers.

Whenever removing the part, always replace the O-ring located on the special housing on the cover.



INDEX OF TOPICS

TROUBLESHOOTING

TROUBL

This section makes it possible to find the solutions to use in troubleshooting.

For each breakdown, a list of the possible causes and respective interventions is given.

Engine

Poor performance

POOR PERFORMANCE

Possible Cause	Operation
Fuel nozzles or cock clogged or dirty	Dismantle, wash with solvent and dry with compressed air
Excess of encrustations in the combustion chamber	Remove the encrustations
Lack of compression wear of the piston rings or cylinder	Check the worn parts and replace them
Exhaust pipe clogged due to excessive encrustations	Replace the exhaust pipe and check the carburation and mixer timer
Air filter blocked or dirty	Clean according to the procedure
Starter inefficient (stays on)	Check the mechanical sliding, continuity of the circuit, the presence of power and electrical wiring
Clutch slipping	Check the centrifugal brake shoe assembly and /or clutch bell and replace if necessary
Defective mobile pulley sliding	Check the parts, change the faulty parts and lubricate the driven pulley using only Montblanc-Molibdenum Grease (dis. 498345) grease
Driving belt worn	Replace
Carburettor nozzles clogged	Dismantle, wash with solvent and dry with compressed air
Fuel filter on vacuum operated cock blocked	Clean the cock filter
Roller wear; Presence of oil; Dirt	Check the cap with filter is fitted to the transmission cover; clean the speed variator, replace the rollers if worn out

Rear wheel spins at idle

REAR WHEEL

Possible Cause	Operation
Idling rpm too high	Check the idling speed and, if necessary, adjust the C.O.
Clutch fault	Check the spring/friction mass and the clutch bell
Air filter housing not sealed	Correctly refit the filter housing and replace it if it is damaged

Starting difficulties

DIFFICULTY STARTING

Possible Cause	Operation
Carburettor nozzles clogged or dirty	Dismantle, wash with solvent and dry with compressed air
Faulty fuel cock	Check that, at ignition and with throttle untwisted, no petrol flows out the delivery pipe; otherwise, replace the vacuum-operated cock
Starter inefficient	Check: electric wiring, circuit continuity, mechanical sliding and power supply
Defective spark plug or with incorrect electrode gap	Check and if necessary replace the spark plug and the electrode gap
Battery flat	Check the state of the battery. If it shows signs of sulphation replace it and bring the new battery into service charging it for eight hours at a current of 1/10 of the capacity of the battery itself
- Engine flooded.	Start the vehicle keeping the throttle fully open alternately making the engine run for approx. five seconds and stopping for other five seconds. If however it does not start, remove the spark plug, the engine over with the throttle open being careful

Possible Cause	Operation
	to keep the cap in contact with the spark plug and the spark plug grounded but away from its hole. Refit a dry spark plug and start the vehicle.
Altered fuel characteristics	Drain off the fuel no longer up to standard; then, refill
Faulty spark plug	Remove the encrustation, restore the plug gap or replace being sure to use the types of spark plug recommended at all times. Bear in mind that many problems engines have, derive from the use of the wrong spark plug
Intake joint cracked or with a bad seal	Replace intake joint and check for correct sealing on the head
Purifier-carburettor fitting damaged	Replace

Excessive oil consumption/Exhaust smoke

EXCESSIVE OIL CONSUMPTION/SMOKEY EXHAUST

Possible Cause	Operation
Excess of encrustations in the combustion chamber	Remove the encrustations

Engine tends to cut-off at full throttle

ENGINE STOP FULL THROTTLE

Possible Cause	Operation
Maximum nozzle dirty - lean mixture	Wash the nozzle with solvent and dry with compressed air
Dirty carburettor	Wash the carburettor with solvent and dry with compressed air
Water in the carburettor	Empty the tank through the appropriate bleed nipple.
Air filter dirty	Clean or replace
Defective floating valve	Check the proper sliding of the float and the functioning of the valve
Tank breather hole obstructed	Restore the proper reservoir aeration

Engine tends to cut-off at idle

ENGINE STOP IDLING

Possible Cause	Operation
Minimum nozzle dirty	Wash the nozzle with solvent and dry with compressed air
Starter that stays open	Check: electric wiring, circuit continuity, mechanical sliding and power supply
Reed valve does not close	Check / replace the reed pack
Wrong idling adjustment	Correctly adjust the engine idling and check the level of the C.O.
Spark plug defective or faulty	Replace the spark plug with one with the specified degree and check the plug gap

Excessive exhaust noise

INCREASED NOISINESS

Possible Cause	Operation
Secondary metal air pipe deteriorated	Check there are no leaks on the hoses on the crankcase and the housing, check that there is a cap with filter and it is correctly fitted to the transmission cover
Good condition of the missing secondary air circuit components	Check the individual components and the piping, check the precision of the fitting. Replace the damaged components

High fuel consumption

HIGH FUEL CONSUMPTION

Possible Cause	Operation
Air filter blocked or dirty.	Clean according to the procedure
Starter inefficient	Check: electric wiring, circuit continuity, mechanical sliding and power supply

SAS malfunctions

SLACKENING OF THE RUBBER JOINT OF THE SECONDARY AIR PIPE ON THE MUFFLER

Possible Cause	Operation
Secondary air reed blocking	Replace
Secondary air filter clogging	Clean the filter and the housing
Blockage of the secondary air fitting on the muffler	Remove the encrustations from the joint being careful not to let the debris fall into the muffler

Transmission and brakes

Clutch grabbing or performing inadequately

CLUTCH BRAKES

Possible Cause	Operation
Slippage or irregular functioning	<p>Check that the masses open and return normally</p> <p>Check that there is no grease on the masses</p> <p>Check that the clutch masses' contact surface with the clutch bell is mainly in the middle with characteristics equivalent on the three masses</p> <p>Check that the clutch bell is not scored or worn abnormally</p> <p>Never operate the engine without the clutch bell</p> <p>Check the cap with filter is fitted to the transmission cover</p>

Insufficient braking

BRAKING SYSTEM MALFUNCTION

Possible Cause	Operation
Poor braking	<p>The rear (drum type) brake is adjusted by regulating the special adjustment (on the wheel) bearing in mind that, with the control levers in the rest position, the wheels must turn freely.</p> <p>The braking action should begin when the brake levers are pressed by about a third.</p> <p>Check the brake pad wear.</p> <p>If it is not possible to remove any problems by simply adjusting the transmissions, check the brake pads and front brake disc, the brake shoes and the rear drum. If you encounter excessive wear or scoring, make the necessary replacements.</p>
Air bubbles inside the hydraulic braking system	Carefully bleed the hydraulic braking system, (there must be no flexible movement of the brake lever).
Fluid leakage in hydraulic braking system The brake fluid has lost its properties	Elastic fittings, piston seals or brake pump breakdown, replace Replace the front brake fluid and top up to the correct level in the pump
Defective sliding of the cables in their sheathes	Lubricate or substitute
Brake noise	Check the wear of the brake pads and/or shoes

Brakes overheating

BRAKES OVERHEATING

Possible Cause	Operation
Defective piston sliding	Check calliper and replace any damaged part.
Brake disc or drum deformed	Using a dial gauge, check the planarity of the disk with the wheel correctly fitted or the concentricity of the rear drum.

Electrical system

Battery

BATTERY

Possible Cause	Operation
Battery	The battery is the electrical device in the system that requires the most frequent inspections and 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 5 ÷ 6 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+. Follow the instructions in the ELECTRICAL SYSTEM chapter for the recharging of the batteries.

Steering and suspensions

Rear wheel

REAR WHEEL

Possible Cause	Operation
Idle speed set too high	Adjust idle speed. Adjust C.O. if necessary
Faulty clutch	Check springs / frictional weights and clutch housing.

Heavy steering

STEERING HARDENING

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

Excessive steering play

EXCESSIVE STEERING CLEARANCE

Possible Cause	Operation
EXCESSIVE STEERING CLEARANCE	Check the tightening of the top and bottom ring nuts. If irregularities continue in turning the steering even after making the above adjustments, check the seats in which the ball bearings rotate: replace if they are recessed.

Noisy suspension

NOISY SUSPENSION

Possible Cause	Operation
NOISY SUSPENSION	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.

Suspension oil leakage

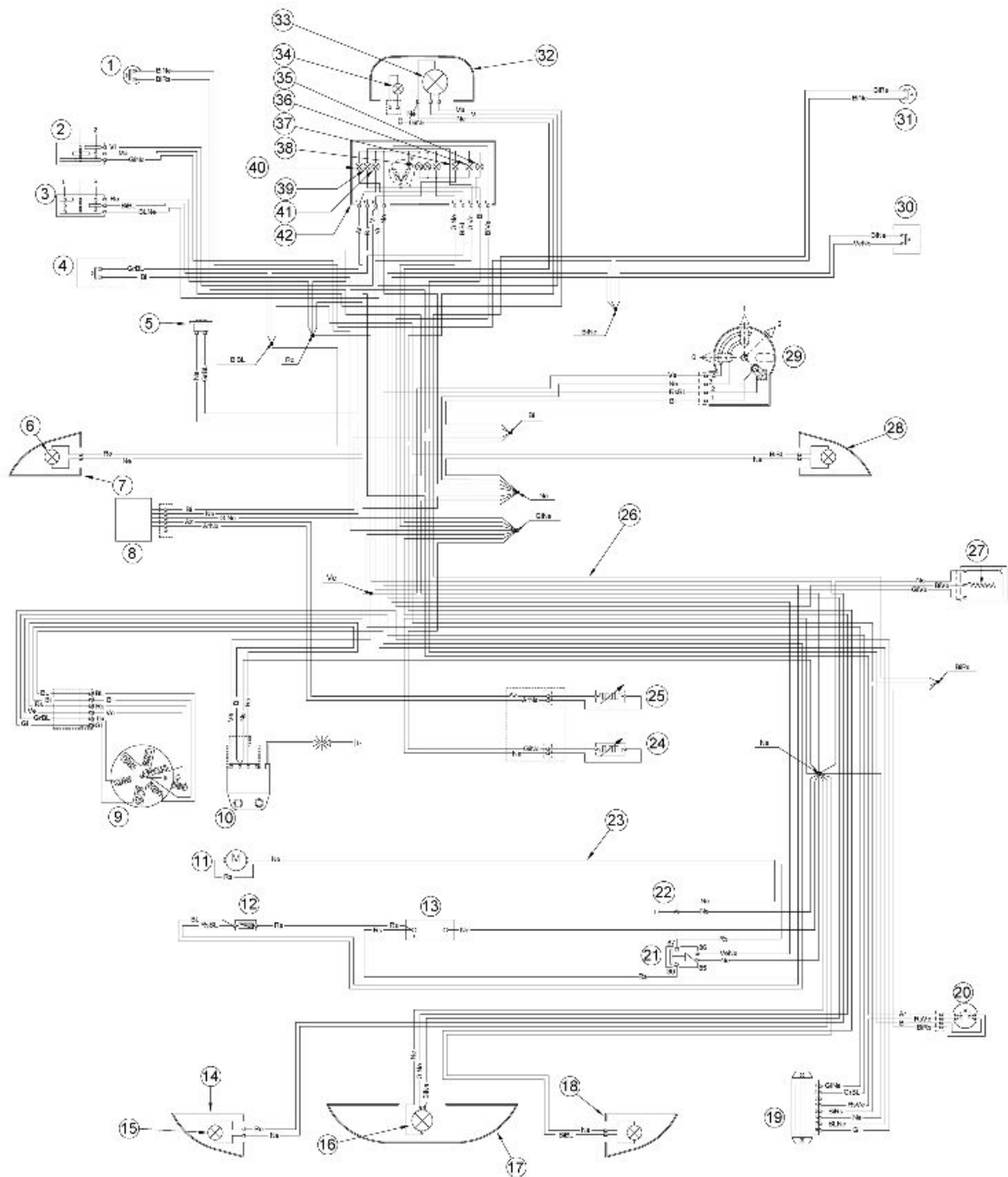
OIL LEAKAGE FROM SUSPENSION

Possible Cause	Operation
Oil leakage from suspension	Service the pumping members and check the sleeves and sealing rings are in good conditions. Replace the damaged parts

INDEX OF TOPICS

ELECTRICAL SYSTEM

ELE SYS



ELECTRICAL SYSTEM DIAGRAM

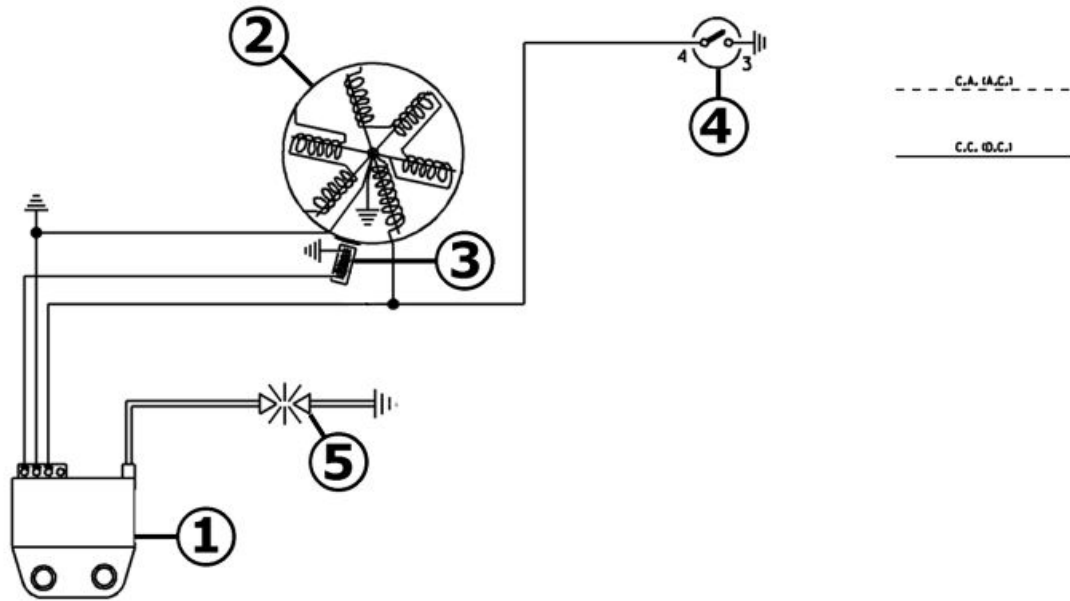
Specification	Desc./Quantity	
1	Stop button on rear brake	
2	Light switch	
3	Turn indicator switch	
4	Horn button	
5	Horn	
6	Front turn indicator bulbs	Front turn indicator bulbs 12V-10W x 2
7	Front left turn indicator	
8	Heater control device	
9	Magneto flywheel	
10	Electronic ignition device	
11	Starter motor	

	Specification	Desc./Quantity
12	Fuse box	
13	Battery	12V - 4Ah
14	rear left turn indicator	
15	Rear turn indicator bulbs	Two, 12V-10W, spherical
16	Stop and tail light bulb	Type: Spherical Power: 12V 21/5W Quantity: 1
17	Rear light assembly	
18	rear right turn indicator	
19	Voltage regulator	
20	Mixer oil warning light control	
21	Start-up remote control switch	
22	Ground lead (-)	
23	starter motor wire unit	
24	Automatic starter	
25	Carburettor heater	
26	Chassis wire unit	
27	Fuel level transmitter	
28	front right turn indicator	
29	Key switch	
30	Starter button	
31	Front brake stop button	
32	Headlight	
33	Headlight bulb	12V-35/35W
34	Front tail light bulb	Type: All glass Power: 12V 5W Quantity: 1
35	Left turn indicator warning light	12V - 2W
36	Headlight warning light	12V 1.2W
37	High-beam warning light	12V - 1.2W
38	Instrument panel light bulbs	Type: All glass Power: 12V 1.2W Quantity: 3
39	Low fuel warning light	
40	Right turn indicator warning light	12V - 2W
41	Low oil warning light	12V - 1.2W
42	Odometer with warning lights and level indicator	

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

Conceptual diagrams

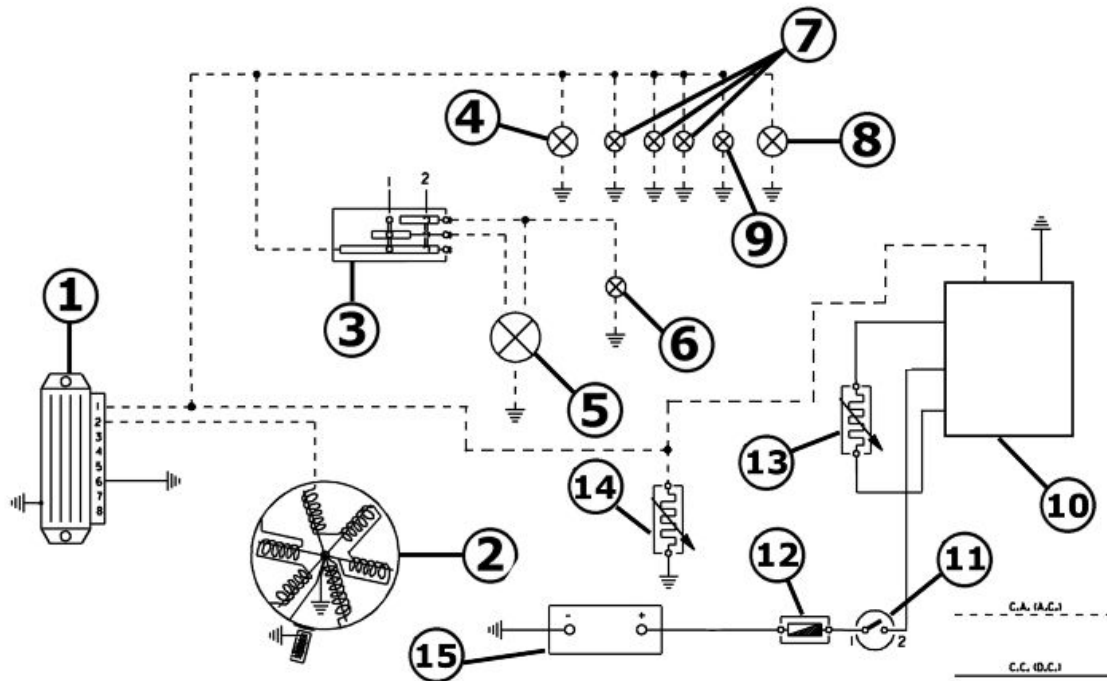
Ignition



IGNITION

	Specification	Desc./Quantity
1	Electronic control unit	
2	Magneto flywheel	
3	Pick - up	
4	Key switch	
5	Spark plug	

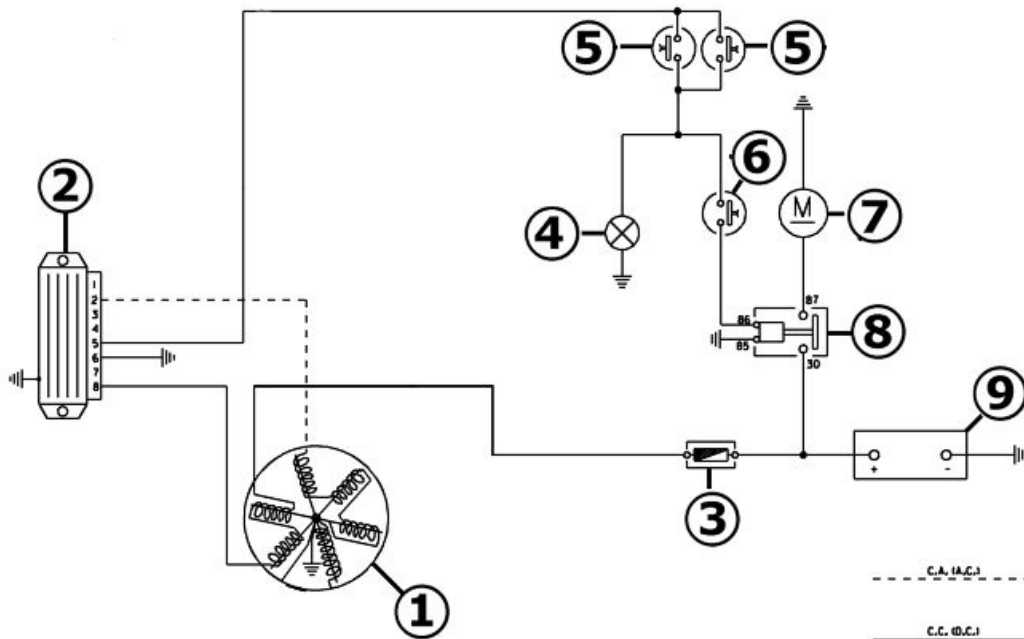
Headlights and automatic starter section



LIGHTS

	Specification	Desc./Quantity
1	Voltage regulator	
2	Magneto flywheel	
3	Light switch	
4	Rear light bulb	12V - 5W
5	Headlight bulb	12V-35/35W
6	High-beam warning light	12V - 1.2W
7	N°3 instrument lighting bulbs	12V - 1.2W
8	Taillight bulb	12V - 5W
9	Headlight warning light	12V - 1.2W
10	Heater control device	
11	Key switch contacts	
12	Fuse 7,5A	
13	Carburettor heater	
14	Automatic starter	
15	Battery	12V - 4Ah

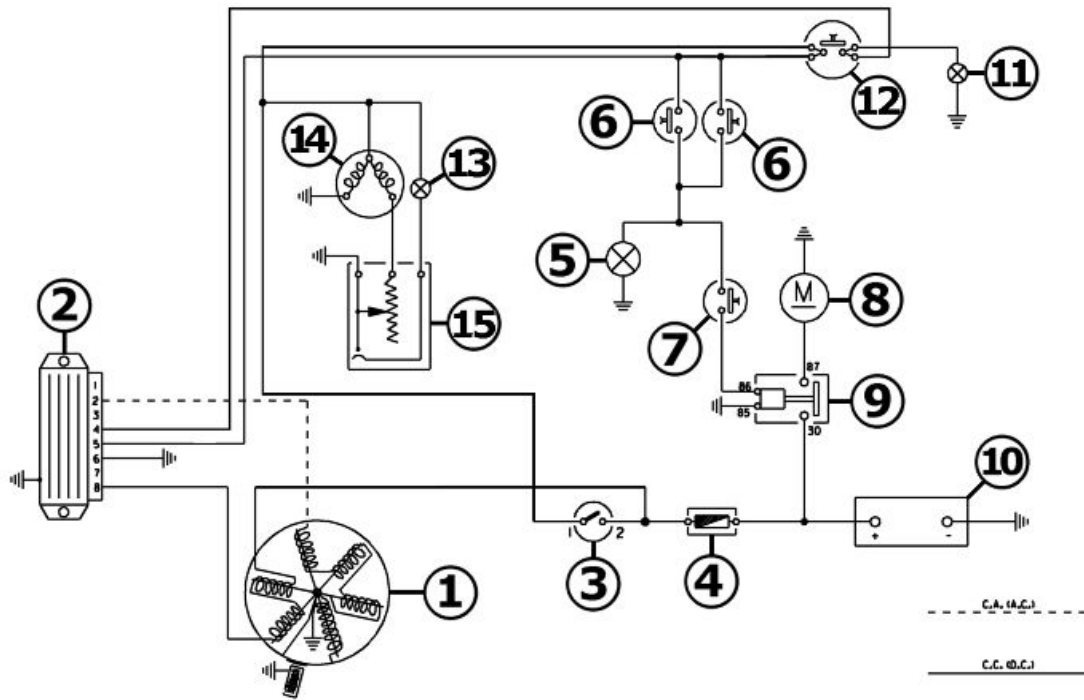
Battery recharge and starting



BATTERY RECHARGE AND STARTING

	Specification	Desc./Quantity
1	Magneto flywheel	
2	Voltage regulator	
3	Main fuse	7,5A
4	Brake light filament	12V - 21W
5	Front and rear brake light button	
6	Start up button	
7	Starter motor	
8	Remote starter switch	
9	Battery	12V - 4Ah

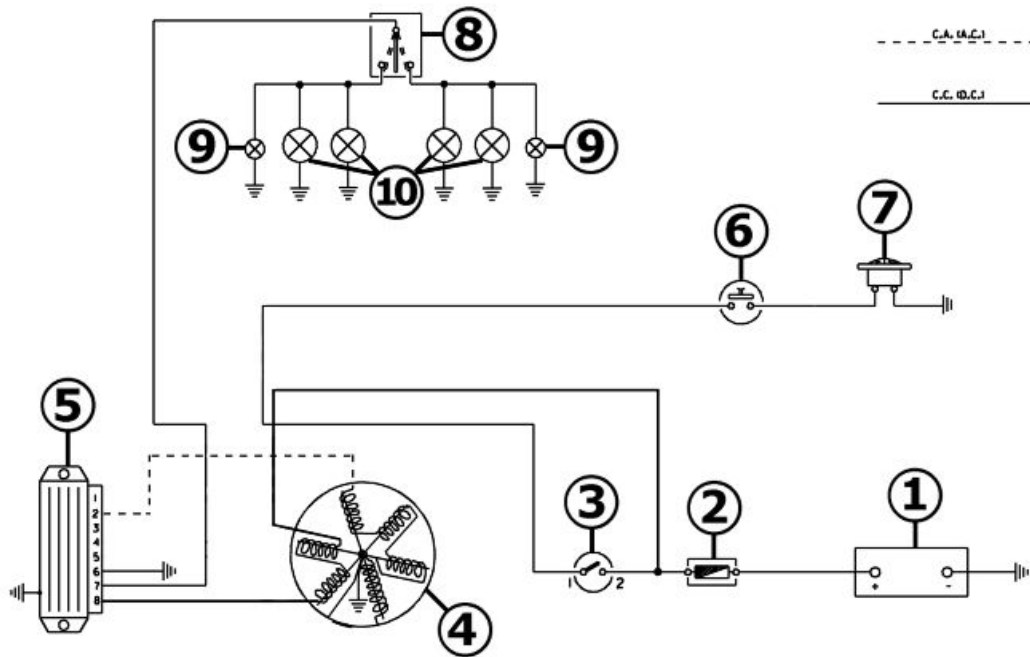
Level indicators and enable signals section



START PERMISSIVE BUTTONS AND LEVEL INDICATORS

	Specification	Desc./Quantity
1	Magneto flywheel	
2	Voltage regulator	
3	Key switch	
4	Main fuse	7,5A
5	Brake light filament	12V - 21W
6	Front and rear brake light button	
7	Start up button	
8	Starter motor	
9	Remote starter switch	
10	Battery	12V - 4Ah
11	Low oil warning light	12V - 1.2W
12	Oil level sender	
13	Low fuel warning light	12V - 1.2W
14	Fuel gauge	
15	Fuel level sender	

Turn signal lights

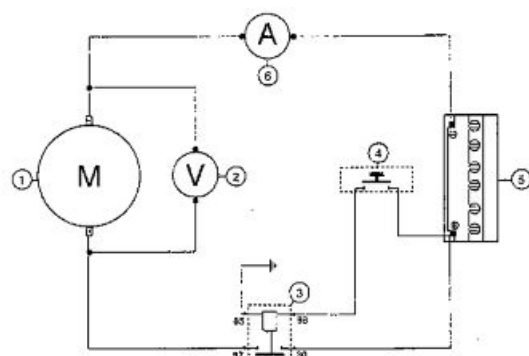


TURN INDICATORS AND HORN

	Specification	Desc./Quantity
1	Battery	12V - 4Ah
2	Main fuse	7,5A
3	Key switch	
4	Magneto flywheel	
5	Voltage regulator	
6	Horn button	
7	Horn	
8	Indicators switch	
9	Two (2) turn signal warning light bulbs	12V - 2W
10	4 Turn indicator bulbs	12V-10W

Checks and inspections

- 1) No-load test: the starter motor, when unloaded, must absorb no more than 10A with a supply voltage $\geq 12V$ and must rotate at $\geq 15,000$ rpm.
- 2) Load test: when the starter motor is so braked that it absorbs 47A with supply voltage $\geq 10V$, torque of $\geq 0.2 N\cdot m$ must be obtained at 10,000 rpm.
- 3) Static torque test: when the rotor is locked and the supply voltage is $< 7V$, the absorbed current must not exceed 130A and the torque must be at least $0.55 N\cdot m$



Specifications

- Rated voltage 12V.
- Rated power 0.25 kW.
- Left-hand rotation view from pinion side.
- Connected to the engine by pinion and crown wheel on crankshaft, transmission side.
- Push-button control.
- Battery used for the test: 12V-3,6Ah.

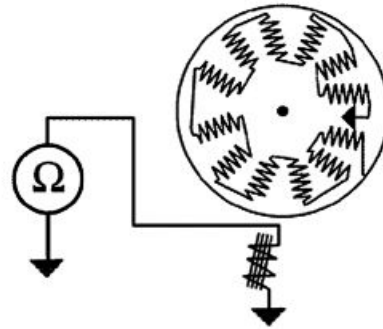
N.B.

THESE VALUES MUST BE MEASURED WITH A CHARGED BATTERY AND AFTER THE STARTER HAS BEEN ROTATING FOR 30" UNDER CONDITIONS OF POINT 1

In case the cause of ignition failure or malfunction cannot be easily identified at sight, first of all replace the control unit by another one in operating conditions.

Remember that the engine must be off to disconnect and replace the control unit.

If after replacement the vehicle starts properly, the control unit is failing and must be replaced.

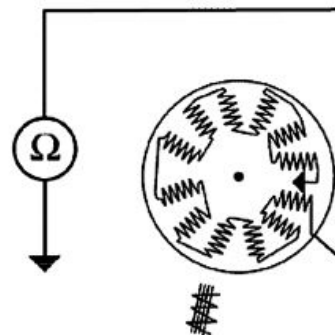


If the failure persists, check the generator and the stator components as follows:

After visually checking the electrical connections, use a specific tester to measurement the stator winding and the pickup (see table).

If any failure is found after checking the loading coil and the pick-up, **replace the stator and the damaged parts.**

Disconnect the connector on the flywheel cover and measure the resistance between either contact and the earthing.



Specific tooling

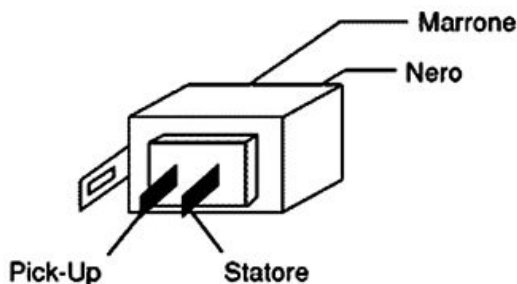
020331Y Digital multimeter

PICK-UP CHECK

	Specification	Desc./Quantity
1	1) Brown cable and earth	~ 170 Ω

STATOR WINDING CHECK

	Specification	Desc./Quantity
1	1) Black cable and earth	~ 1 Ω



Ignition circuit

1) Check the state of the spark plug (clean it with a metallic brush, remove all incrustations, blow it with compressed air, and replace it if necessary).

2) Without removing the stator, perform the checks described below:

After a visual inspection of the electrical connections, carry out the measurements on the charging coil and pick-up (see table), and check for continuity using the special tester, 020331Y.

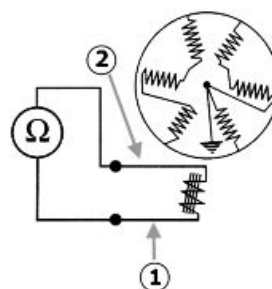
If the continuity checks or the inspections on the coil and pick-up are incorrect, proceed by replacing the stator, otherwise replace the ECU.

Remember to detach the ECU wirings when the engine is not running.

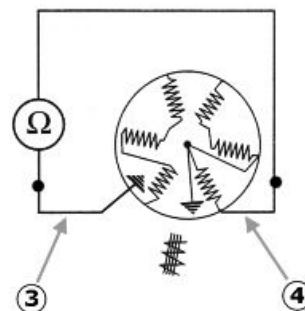
Specific tooling

020331Y Digital multimeter

A



B



PICK - UP CHECK (FIGURE A)

	Specification	Desc./Quantity
1	Red cable (1) and White cable (2)	90 ÷ 140 Ohm

RECHARGING COIL CHECK (FIGURE B)

	Specification	Desc./Quantity
1	Red cable (3) and Green cable (4)	800 ÷ 1100 Ohm

CONTINUITY CHECK

	Specification	Desc./Quantity
1	White cable - Engine	Continuity
2	White cable - Frame	Continuity

Stator check

- Using a tester, check the resistance between the stator wiring.

N.B.

VALUES ARE STATED AT AMBIENT TEMPERATURE. A CHECK WITH THE STATOR AT OPERATING TEMPERATURE LEADS TO VALUES HIGHER THAN THOSE STATED.

Electric characteristic

Stator : Grey ÷ Ground

~ 1 ohm

Stator : White ÷ Ground

~ 1 ohm

Stator : Green - Ground

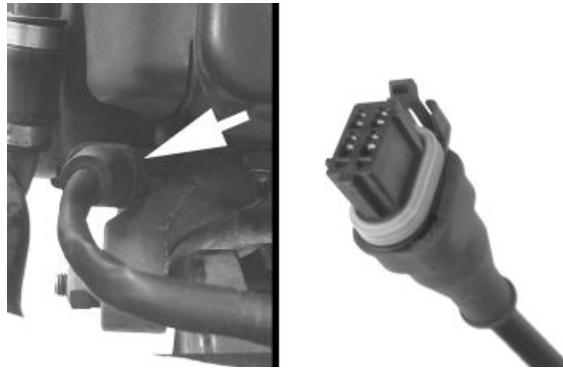
~ 1Kohm

Stator : Blue ÷ Yellow

~ 1 ohm

Pick-Up: Red - ground

~ 170 Ω (Pick-Up)



Voltage regulator check

Voltage regulator

A fault in the voltage regulator can cause the following problems depending on the type of fault:

- 1) Blow out of the lighting system bulbs.
- 2) Failure of the lighting system.
- 3) Excessive battery charging (blowing of main fuse).
- 4) Battery recharging failure.
- 5) Failure of the turn indicators.
- 6) Failure of the oil and petrol check lamp.

Operations

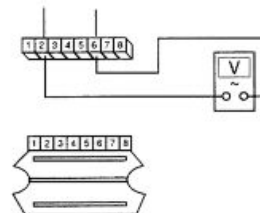
FAULT 1:

Make sure that at 5000 rpm with the lights on that the regulation voltage is between 13V and 14.5V.

Make sure that at 5000 rpm with the lights off the regulation voltage is \approx 16V.

If the regulation voltage is greater than >16V replace the regulator.

A



FAULT 2:

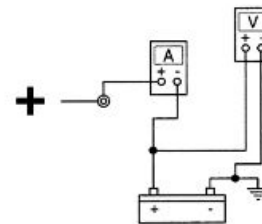
- a) Make sure the stator is supplying voltage correctly: disconnect the regulator connector and place tester 020331 y between the grey-blue wire (2) and the black wire (6) to measure the alternating voltage and make sure that the voltage supplied at 3000 rpm, is between 25 and 30V (FIG> A). If there are any anomalies, replace the stator.
- b) If the tests do not reveal any anomalies, replace the regulator.
- c) If replacement of the regulator does not restore correct operation, check the connections of the electrical system.

FAULT 3

After checking that there are no short circuits in the system towards earthing with the engine off and the regulator connector detached, replace the regulator because it is certainly inefficient, and replace the protection fuse.

Following the replacement, measure the current and the recharging voltage on the battery ends (FIG. B). The values detected must be $1.5 \div 2$ A and 13 V at 3000 rpm.

B

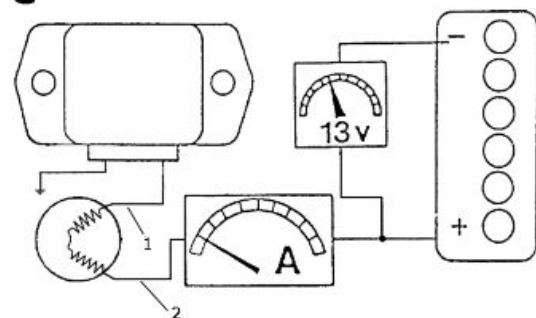


FAULT 4

a) By positioning tester 020331Y between the yellow wire terminal (8) on the regulator and the black wire (6) (FIG. D), check the generator output voltage is within 26 and 30 V at 3,000 rpm (this measurement must be carried out with the battery detached). In the event of anomalies, replace the stator; otherwise proceed to point b).

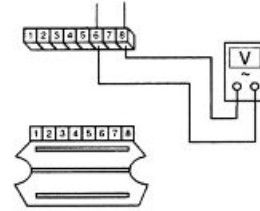
b) Yellow wire (1) attached to the regulator. Insert an ammeter between the stator's blue wire (2) and the battery, and check, using tester 020331Y, that the current output, at 3,000 rpm and with the battery kept between 12 and 13V, is approx. 1.5 - 2 A (FIG. C).

C



If the values thus obtained are lower than prescribed, proceed by replacing the regulator. Before carrying out inspections on the regulator and its electrical system, it is always advisable to check for continuity between the black wire and earth.

D

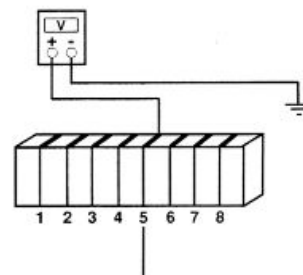


FAULT 5

(FIG. E) If the turn indicators do not work, proceed as follows:

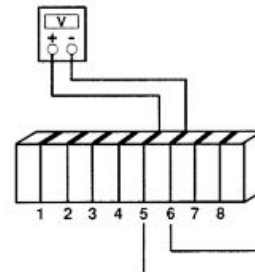
- Remove the regulator connector, and insert the tester probes between the contact 5 (yellow-red) and the ground lead.
- Turn the key switch to ON and check that the battery is getting voltage. If no voltage is detected, check the wiring and the contacts on the key switch and on the battery.

E



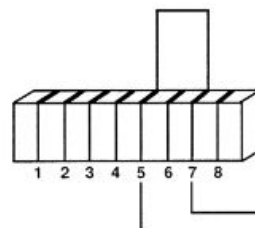
(FIG. F) Repeat the procedure now placing the tester probes between contacts 5 (yellow/ red) and 6 (black), and check the presence of the battery voltage with the key switch set to ON. If there is no voltage, check the regulator ground wiring.

F



(FIG. G) If the above tests have positive results, jump the contacts 5 (yellow/red) and 7 (blue/black) on the connector, set the key switch to ON and shift the turn indicator switch to the right and left to see when the lights are steadily on (as they are powered directly from the battery). If even after this operation the turn indicators fail to turn on, check that the wiring is not damaged and the switch works properly. If these last two tests have a positive result, replace the regulator because it is certainly not functioning properly.

G

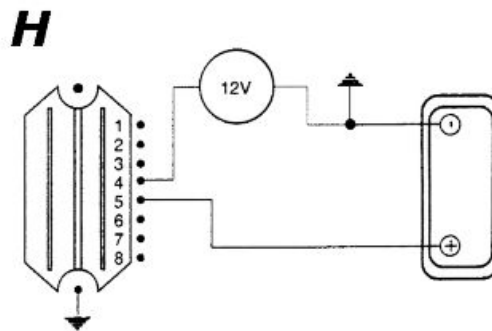


FAULT 6

Oil reserve check warning light not working

(FIG H) - Disconnect the voltage regulator connector.

- Supply 12V to the terminal marked with number 5; with a digital tester check that the terminal number 4 has a similar output (12V) for about 5 seconds.
- If no voltage is detected for terminal number 4, replace the regulator.
- If there is voltage for terminal number 4, check both the installation and the bulb of the oil warning light.



Specific tooling

020331Y Digital multimeter

Sealed battery

INSTRUCTIONS FOR REFRESHING THE STOCK CHARGE OF AN OPEN CIRCUIT

1) Voltage check

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

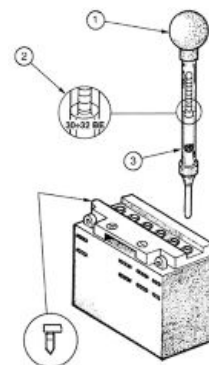
- If the voltage exceeds 12.60 V, the battery may be installed without any renewal recharge.
- If voltage is below 12.60 V, a renewal recharge is required as explained in 2).

2) Constant voltage battery charge mode

- Constant voltage equal to 14.40÷14.70V
- Initial charge voltage equal to 0.3÷0.5 for nominal capacity
- Duration of the charge: 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
- Duration of the charge: 5 h



WARNING

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

- 1 Hold the vertical tube
- 2 Look at the level
- 3 The float must be freed

Dry-charge battery

The battery is an electrical device which requires careful monitoring and diligent maintenance. The maintenance rules are:

1) Check the level of the electrolyte

The electrolyte level must be checked frequently and must reach the upper level. Only use distilled water, to restore this level.

If it is necessary to add water too frequently, check the vehicle's electrical system: the battery works overcharged and is subject to quick wear.

2) Load status check

After restoring the electrolyte level, check its density using an appropriate densitometer (see the figure). When the battery is charged, you should detect a density of 30 to 32 Bé corresponding to a specific weight of 1.26 to 1.28 at a temperature of no lower than 15° C.

A density reading of less than 20° Bé indicates that the battery is completely flat and it must therefore be recharged.

After charging the battery, check each element electrolyte level and density. If the scooter is not used for a given time (1 month or more) it will be necessary to periodically recharge the battery.

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, remembering that the earth 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.

Regular bench charging must be carried out with the specific battery charger, (single) or (multiple), setting the battery charger selector to the type of battery to be recharged. Connections to the power supply source must be implemented by connecting the corresponding poles (+ to+ and - to -).

4) Cleaning the battery

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

WARNING

- Before recharging the battery, remove the plugs of each cell. Keep the battery away from naked flames or sparks when charging.

Remove the battery from the vehicle removing the negative clamp first.

CAUTION

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

CAUTION

DRINKING WATER CONTAINS MINERALS THAT CAN BE EXTREMELY HARMFUL TO THE BATTERY: USE DISTILLED WATER ONLY.

CAUTION

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

Specific tooling

020333Y Single battery charger

020334Y Multiple battery charger

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, flush abundantly with water for about 15 minutes and seek immediate medical attention.

In the event of accidental ingestion of the fluid, immediately drink large quantities of water or milk. Follow with milk of magnesia, beaten egg or vegetable oil. Seek immediate medical attention

Batteries produce explosive gases; keep clear of free flames, sparks or cigarettes; ventilate the area when recharging the battery indoors.

Always protect your eyes when working close to batteries.

Keep out of the reach of children.

1)- Remove the short closed tube and the caps, then pour sulphuric acid into the cells using the type specified for batteries, with a specific gravity of 1.26, corresponding to 30° Bé, at a minimum temperature of 15°C until the upper level is reached.

2) - Leave to rest for at least 2 hours; then, restore the level with sulphuric acid.

3)- Within the following 24 hours, recharge with the specific battery charger (single) or (multiple) at a density of about 1/10 of the battery nominal capacity and until the acid density is about 1.27, corresponding to 31° Bé, and these values are stabilised.

4) - Once the charge is over, level the acid (by adding **distilled water**). Close and clean carefully.

5)- Once the above operations have been performed, install the battery in the vehicle ensuring the connections between the wiring and the battery terminals are correct.

WARNING

- ONCE THE BATTERY HAS BEEN INSTALLED IN THE VEHICLE IT IS NECESSARY TO REPLACE THE SHORT TUBE (WITH CLOSED END) NEAR THE + POSITIVE TERMINAL WITH THE CORRESPONDING LONG TUBE (WITH OPEN END), THAT YOU FIND FITTED TO THE VEHICLE, TO ENSURE THAT THE GASES THAT FORM CAN ESCAPE PROPERLY.

Specific tooling

020333Y Single battery charger

020334Y Multiple battery charger

INDEX OF TOPICS

ENGINE FROM VEHICLE

ENG VE

Removal of the engine from the vehicle

Remove the engine from the frame

- Disconnect the battery.
- Remove the muffler assembly.
- Remove the rear wheel.
- Remove the mechanical transmission of the rear brake.
- Disconnect the electric terminals.
- Remove the throttle grip and mixer transmissions.
- Disconnect the hoses (petrol-oil-vacuum-operated cock control).

WARNING

Be very careful when handling fuel.

CAUTION

When installing the battery, first attach the positive cable and then the negative cable.

WARNING

Wear safety goggles when using hitting tools.

INDEX OF TOPICS

ENGINE

ENG

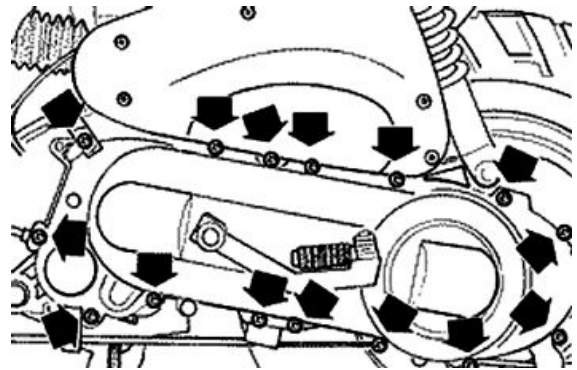
Automatic transmission

Transmission cover

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

N.B.

THE CRANKCASE IS SLIGHTLY BLOCKED BY THE TIGHT FIT BETWEEN THE SHAFT OF THE DRIVEN HALF-PULLEY AND THE BEARING HOUSED ON THE CRANKCASE.

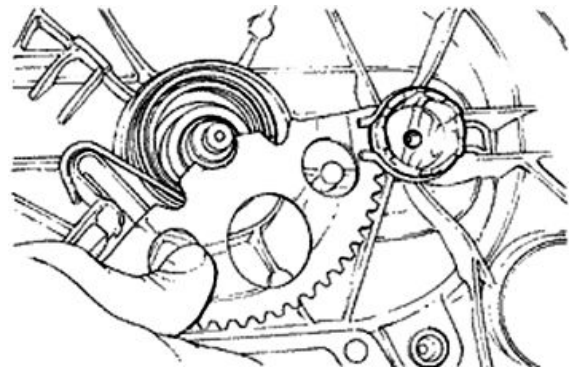


Kickstart

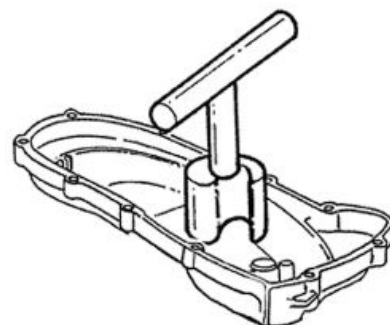
- Remove the seeger ring located on the exterior of the crankshaft.
- Dismantle the dog gear from its seat, slackening the tension that the toothed sector applies to it by means of the spring; to do this, it is necessary to rotate the toothed sector slightly (see the figure).

CAUTION

WHILE REMOVING THE TOOTHED SECTOR, BE VERY CAREFUL OF THE SPRING TENSION: IT COULD CONSTITUTE A HAZARD FOR THE OPERATOR.



- Upon refitting, apply the recommended grease to the bushing, to the spring and along the toothed sector.
- Use the special tool for the charging of the spring, as shown in the figure.
- Refit the seeger ring after checking that it is in good condition.



Specific tooling

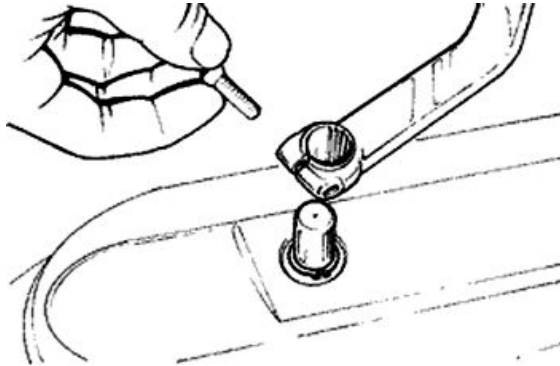
020261Y Starter spring fitting

Recommended products

AGIP GREASE MU3 Grease for odometer transmission gear case

Soap-based lithium grease with NLGI 3; ISO-L-XBCHA3, DIN K3K-20

- Remove the screws shown in the figure and remove the engine starting lever.
- For the assembly, work in reverse and tighten the screws to the prescribed torque..

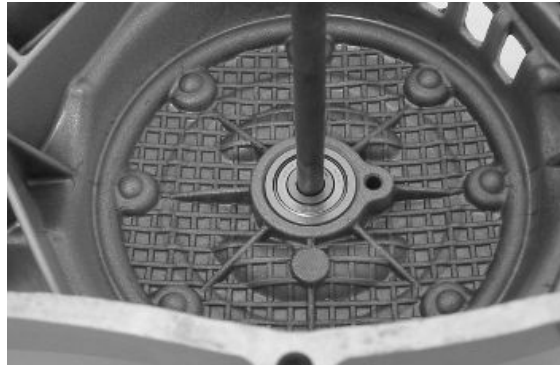


Locking torques (N*m)

Starter lever replacement 12 to 13 Nm

Removing the driven pulley shaft bearing

- Slightly heat the crankshaft from the inside side to avoid damaging the coated surface and use the driven pulley shaft or a pin of the same diameter to remove the bearing.



N.B.
IN CASE OF DIFFICULTY A STANDARD 8MM-INSIDE DIAMETER EXTRACTOR CAN BE USED.

Refitting the driven pulley shaft bearing

- Refit the bearing with the aid of a bushing with the same diameter as the external plate of the bearing after slightly heating the crankcase from the inside.

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

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

Removing the driven pulley

- Lock the clutch bell housing with the specific tool.
- Remove the nut, the clutch bell housing and the whole of the driven pulley assembly.

N.B.

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

Specific tooling

020565Y Flywheel lock calliper spanner



Inspecting the clutch drum

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

Characteristic

Clutch bell diameter/standard value

Ø 107+0.2 +0 mm

Clutch bell diameter/max. value allowed after use

Ø 107.5 mm

Eccentricity measured /max.

0.20 mm

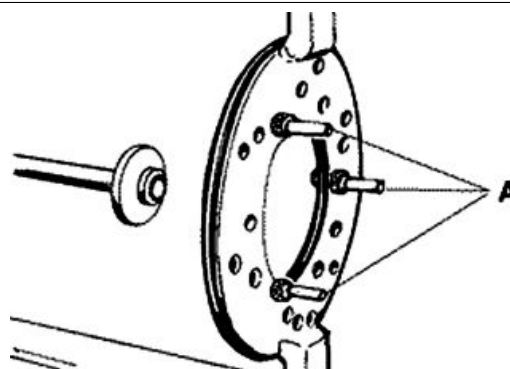


Removing the clutch

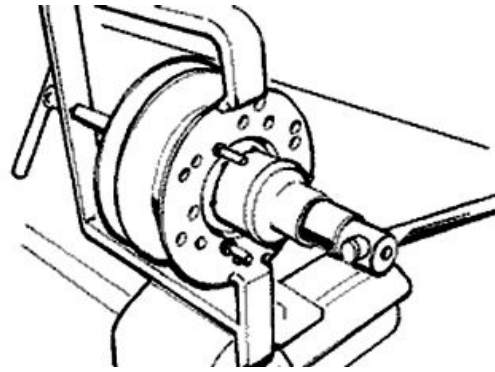
- Equip the tool with long pins screwed into position «A» from the outside, insert the entire driven pulley in the tool and put the central screw under stress.

CAUTION

THE TOOL WILL BE DEFORMED IF THE CENTRAL SCREW IS TIGHTENED UP TOO FAR.



- Using a 34 mm socket wrench remove the clutch locking nut.
- Loosen the central screw thereby undoing the driven pulley unit
- Separate the components.



Specific tooling

020444Y Tool for fitting/ removing the driven pulley clutch

Inspecting the clutch

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

N.B.

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

CAUTION

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



Characteristic

Check minimum thickness

1 mm

Pin retaining collar

- Remove the collar with the aid of 2 screwdrivers.



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



Removing the driven half-pulley bearing

- Remove the roller bearing with the special extractor inserted from the bottom of the fixed half-pulley.

CAUTION

POSITION THE HOLDING EDGE OF THE EXTRACTION PLIERS BETWEEN THE END OF THE BEARING AND THE BUILT IN SEALING RING.

Specific tooling

001467Y029 Bell for bearings, O.D. 38 mm



- Remove the ball bearing retention snap ring.
- Expel the ball bearing from the side of the clutch housing by means of the special tool.

N.B.

PROPERLY SUPPORT THE HALF-PULLEY SO AS NOT TO DEFORM THE SLIDING SURFACE OF THE DRIVING BELT

Specific tooling

020376Y Adaptor handle

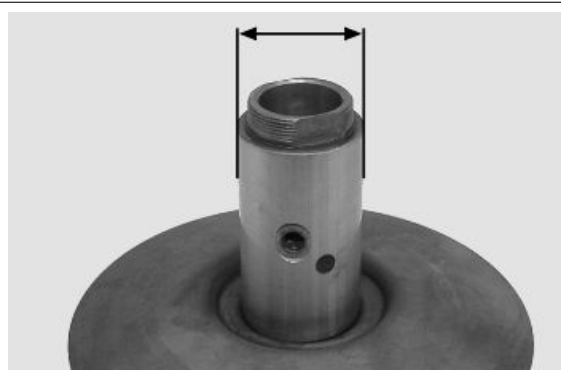
020363Y 20-mm guide



Inspecting the driven fixed half-pulley

- Check that there are no signs of wear on the work surface of the belt. If there are, replace the half-pulley..
- Make sure the bearings do not show signs of unusual wear.
- Measure the external diameter of the pulley bushing.

Characteristic



Stationary driven half-pulley/Standard diameter

Ø 33.965 to 33.985 mm

Stationary driven half-pulley / Minimum diameter admitted after use

Ø 33.96 mm

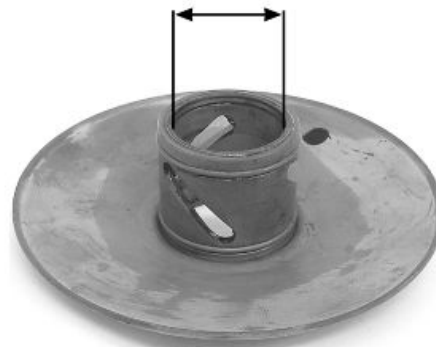
Inspecting the driven sliding half-pulley

- Remove the 2 inner sealing rings and the two O-rings.
- Measure the inside diameter of the mobile half-pulley bushing.

Characteristic

Mobile driven half-pulley/ Maximum diameter allowed

Ø 34.08 mm



- Check the belt contact surfaces.
- Insert the new oil seal and O-rings on the mobile half-pulley.
- Fitting the half-pulley on the bushing.

Recommended products

AGIP GREASE SM 2 Grease for the C-ring of the tone wheel

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



- Make sure the pins and collar are not worn, reassemble the pins and collar.
- Use a greaser with a curved spout to lubricate the driven pulley unit with around 6 g of grease. This operation must be done through one of the holes inside the bushing until grease comes out of the opposite hole. This procedure is necessary to prevent the presence of grease beyond the O-ring.

Recommended products

AGIP GREASE SM 2 Grease for the C-ring of the tone wheel

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

Refitting the driven half-pulley bearing

- Fit a new ball bearing with the specific tool.
- Fit the ball bearing retention snap ring.
- Fit the new roller bearing with the wording visible from the outside.

CAUTION

PROPERLY SUPPORT THE HALF-PULLEY TO PREVENT DAMAGE TO THE THREADED END WHILE THE BEARINGS ARE BEING FITTED.

Specific tooling

020376Y Adaptor handle

020456Y Ø 24 mm adaptor

020362Y 12 mm guide

020171Y Punch for Ø 17 mm roller case



Inspecting the clutch spring

- Check that the contrast spring of the driven pulley does not show signs of deformation
- Measure the free length of the spring

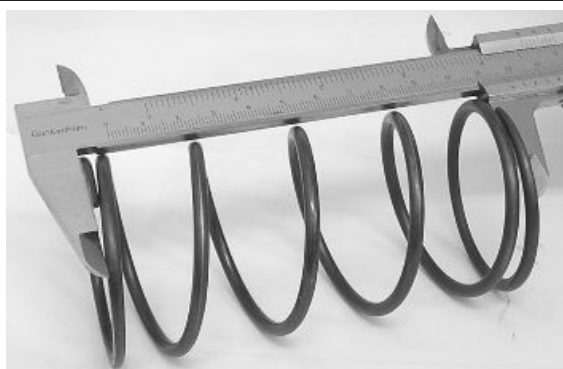
Characteristic

Standard length

118 mm

Minimum length allowed after use

XXXX



Refitting the clutch

- Preassemble the driven pulley group with spring, sheath and clutch.
- Position the spring with the sheath
- Insert the components in the tool and preload the spring being careful not to damage the plastic sheath and the end of the threaded bar.



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

CAUTION

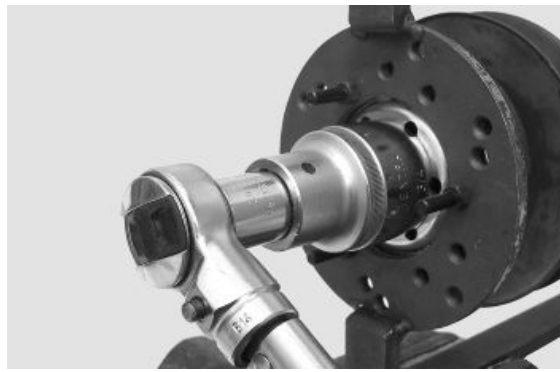
SO AS NOT TO DAMAGE THE CLUTCH NUT USE A SOCKET WRENCH WITH SMALL CHAMFER.

CAUTION

POSITION THE NON-CHAMFERED SURFACES OF THE NUT IN CONTACT WITH THE CLUTCH

Locking torques (N*m)

Nut locking clutch unit on pulley $55 \div 60$ Nm



Refitting the driven pulley

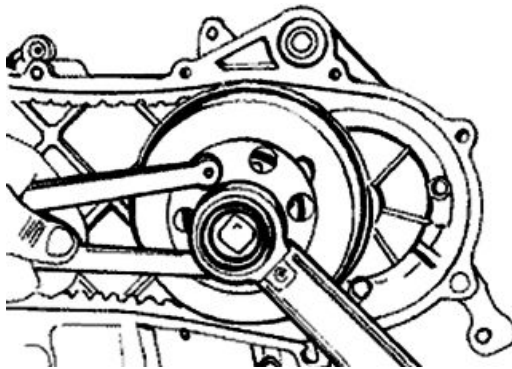
-Refit the driven pulley assembly, the clutch bell and the nut, using the specific tool.

Specific tooling

020565Y Flywheel lock calliper spanner

Locking torques (N*m)

Driven pulley shaft nut 40 to 44 Nm



Drive-belt

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

- Check the width of the belt.

Characteristic

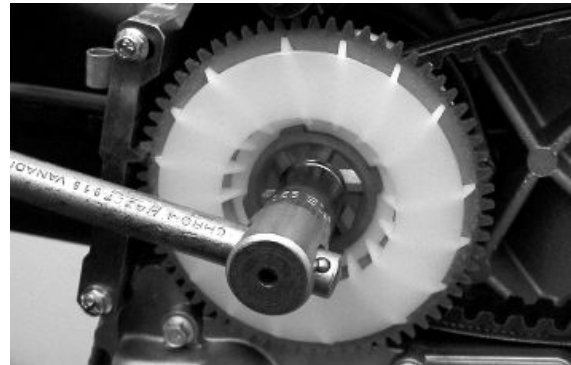
Transmission belt/Minimum width

17.5 mm



Removing the driving pulley

- Lock the driving pulley using the appropriate tool.
- Remove the central nut with the related washer, then remove the drive and the plastic fan.
- Remove the stationary half-pulley.



- Remove the belt, washer and remove the mobile half-pulley with its bushing, being careful that the rollers and contrast plate fitted loosely on it do not come off.

Specific tooling

020451Y Starting ring gear lock

Mixer gears and belt

- Remove gear and belt.

CAUTION

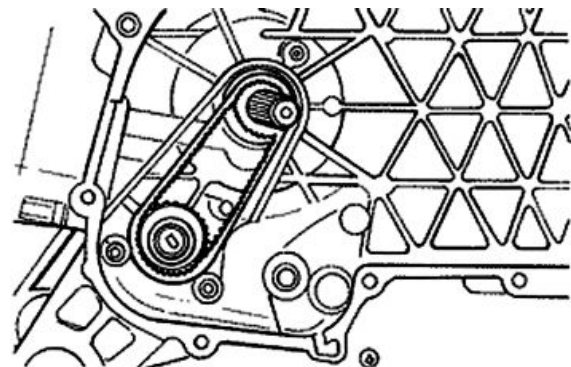
PAY PARTICULAR ATTENTION TO NOT TOUCHING OR BENDING THE BELT BECAUSE THIS COULD BREAK SUDDENLY DURING OPERATION.

CAUTION

ON REFITTING, MAKE SURE THAT DIRT DOES NOT GET INTO THE INNER BUSHING OF THE MIXER CONTROL GEAR AND THAT IT DOES NOT EXERT ANY STRESS ON THE CRANKCASE PIN.

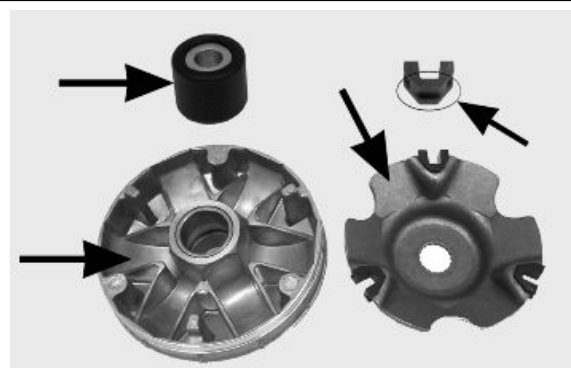
N.B.

REPLACE THE BELT EVERY 20000 KM.



Inspecting the rollers case

- 1) Check that the bushing and the sliding rings of the mobile pulley do not show signs of scoring or deformation.
- 2) Check the roller running tracks on the contact pulley; there must not be signs of wear and check the condition of the contact surface of the belt on the half-pulleys (mobile and stationary).
- 3) Check that the rollers do not show signs of marked facetting on the sliding surface and that the metallic insert does not come out of the plastic shell borders.



4) Check the integrity of the sliding blocks of the contact plate.

- Check that the internal bushing shown in the figure is not abnormally worn and measure inside diameter «A».
- Measure outside diameter «B» of the pulley sliding bushing shown in the figure.

CAUTION
DO NOT LUBRICATE OR CLEAN THE BUSHING.

Characteristic

Driving pulley / Maximum diameter:

20.12 mm

Driving pulley/ Standard diameter:

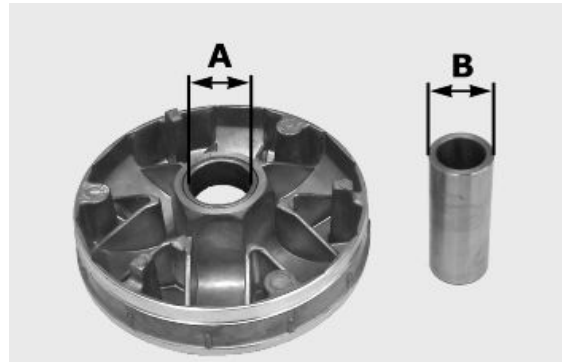
20.021 mm

Driving pulley bushing/ Diameter maximum:

XXX mm

Driving pulley bushing/ Standard diameter:

20 -0.020/-0.041mm



Refitting the driving pulley

- Manually move the movable driven half-pulley away by pulling it towards the clutch unit and insert the belt observing the direction of rotation of the first fitting.

N.B.
IT IS GOOD PRACTICE ALWAYS TO FIT THE BELT SO THAT THE WORDS CAN BE READ IN CASE IT DOES NOT SHOW A FITTING SIDE.



- Refit the components of the assembly (roller container assembly with bushing, limiting washer, stationary half-pulley, cooling fan belt with drive, washer and nut).
- With the specific tool, tighten the lock nut to 20 Nm and then perform a final 90° locking in order to prevent the rotation of the driving pulley.

N.B.
REPLACE THE NUT WITH A NEW ONE AT EVERY REFIT
CAUTION
UPON FITTING THE DRIVING PULLEY UNIT IT IS OF UTMOST IMPORTANCE THAT THE BELT IS FREE INSIDE IN



ORDER TO AVOID WRONG TIGHTENING AND CONSEQUENTLY DAMAGING THE CRANKSHAFT KNURLING.

Specific tooling

020451Y Starting ring gear lock

Locking torques (N*m)

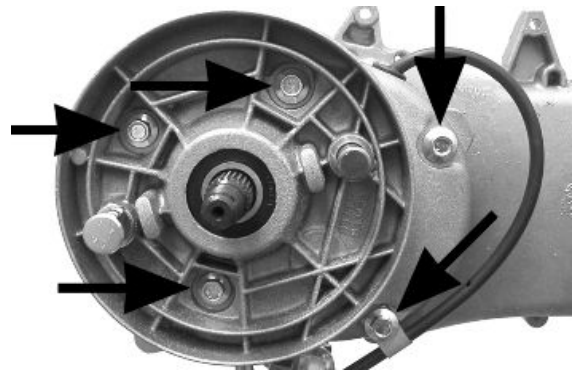
Crankshaft pulley nut 18 to 20 + 90° Nm

For 25 km/h engine type versions, the limit washer is 5.5 mm thick

End gear

Removing the hub cover

- Drain the rear hub oil
- Remove driven pulley
- Remove the rear brake shoes
- Remove the 5 screws fixing the cover to the crankcase
- Remove the cover with the wheel axle and pull it out
- Remove the intermediate gear with the appropriate shim washers



Removing the wheel axle bearings

- Remove the oil seal and the seeger ring.
- Fix the hub cover properly to avoid damaging the sealing surface with the housing
- Remove the wheel axle bearing using the specific tool

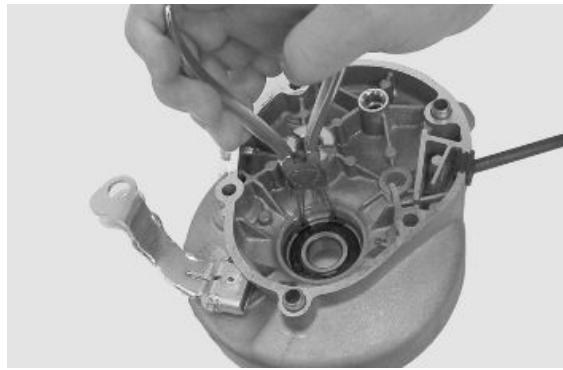
Specific tooling

020363Y 20-mm guide

020376Y Adaptor handle



020477Y 37 mm adaptor



Removing the driven pulley shaft bearing

- Remove the seeger ring
- Heat the engine crankcase but do not direct the hot air towards the bearing
- Extract the driven pulley shaft together with the bearing with a few mallet blows



- Remove the bearing off the driven pulley shaft using the specific tool and a press

N.B.

USE THE SPECIFIC TOOL ON THE SIDE WITH THE SMALLER INTERNAL DIAMETER

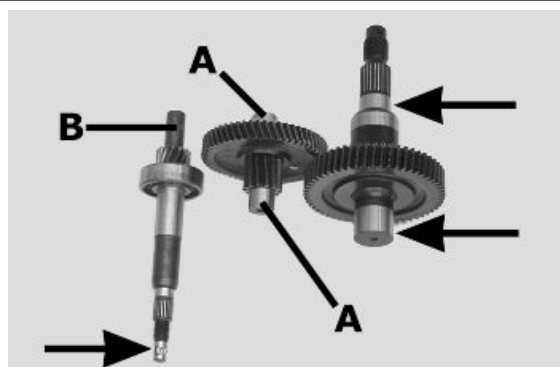
Specific tooling

020452Y Tube for removing and refitting the driven pulley shaft



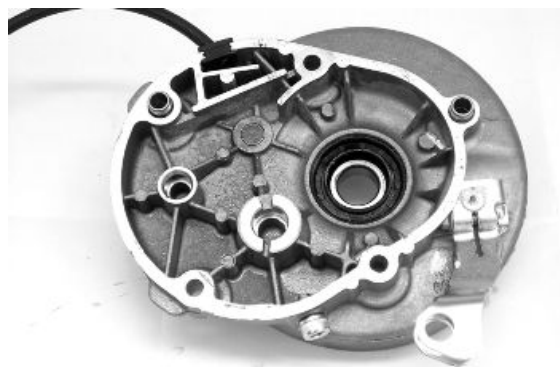
Inspecting the hub shaft

- 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.
- Check capacity (A) of the transmission gear (wear, deformations, etc.)
- Check the pulley shaft seating: Superficial wear (B) may indicate irregularities in the crankcase seatings or in the pulley shaft capacities



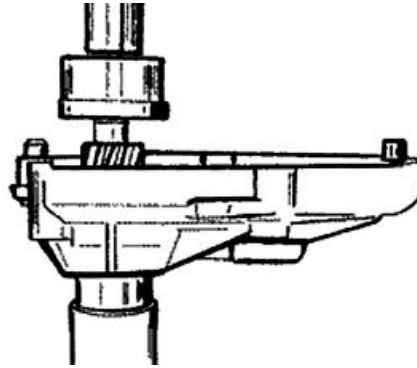
Inspecting the hub cover

- Check that the fitting surface is not dented or distorted.
- If faults are found, replace the hub cover.



Refitting the driven pulley shaft bearing

- Support the inner track of the bearing from the outside of the hub cover with the specific tool positioned under the press and insert the driven pulley axle.
- Refit the oil seal flush with the cover.



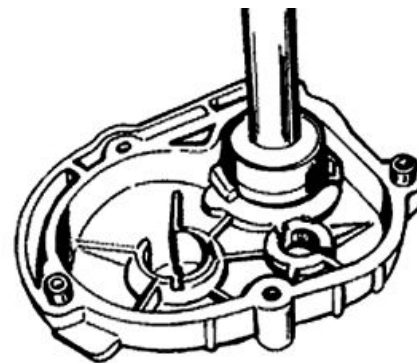
Specific tooling

020452Y Tube for removing and refitting the driven pulley shaft

- Slightly heat the hub cover and then fit the bearing with the specific drift.
- Fit the circlip with the concave or radial part facing the bearing.

N.B.

FIT THE BALL BEARING WITH THE SHIELD FACING THE OIL SEAL.



Specific tooling

020151Y Air heater

020376Y Adaptor handle

020439Y 17-mm guide

020358Y 37x40-mm Adaptor

Refitting the wheel axle bearing

- Support the hub cover on a wooden surface
- Heat up the hub cover using the thermal gun.
- Preassemble the bearing on the specific punch using grease and then insert the bearing in its seating
- Refit the seeger ring and the oil seal using the 42 x 47 mm adaptor

N.B.

POSITION THE OIL SEAL WITH THE SEALING LIP FACING THE HUB INTERNAL SIDE



Specific tooling

020150Y Air heater mounting

020151Y Air heater

020376Y Adaptor handle

020363Y 20-mm guide

020359Y 42x47-mm Adaptor



Refitting the hub bearings

- Remove the wheel axle on the cover and pay attention not to damage the sealing lip of the oil seal
- Apply a thin layer of grease on the two shim washers of the intermediate gear and fit one on the cap so that it does not interfere with the wheel axle gear when placing the transmission shaft



Refitting the hub cover

- Apply product recommended for surfaces on the hub cap and refit cap on the crankcase
- Fit the 5 screws and tighten them to the specified torque.

N.B.

CLEAN THE CONTACT SURFACES OF THE HUB COVER AND THE HALF CRANKCASE OF RESIDUE FROM PREVIOUS GASKETS BEFORE APPLYING A NEW ONE.

Recommended products

Loctite 510 Liquid sealant



Gasket

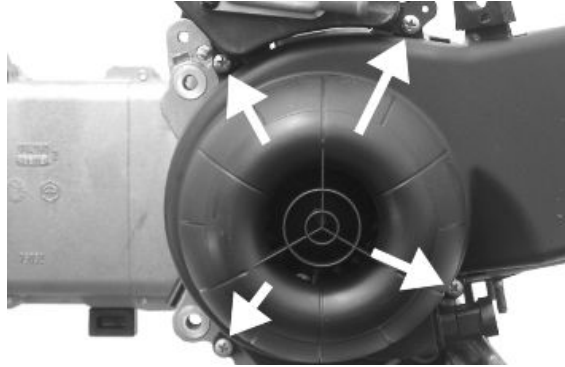
Locking torques (N*m)

hub cap screws 24 - 26

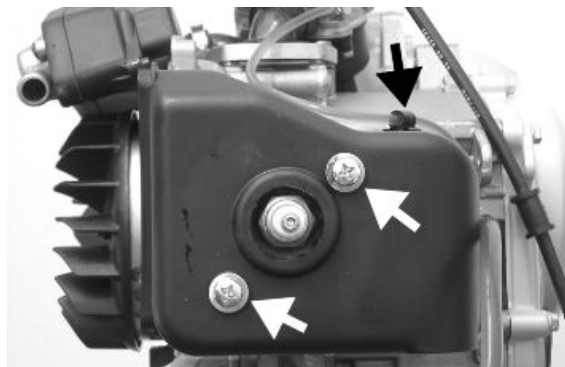
Flywheel cover

Cooling hood

- Remove the four fixings shown in the figure.
- Remove the fan cover

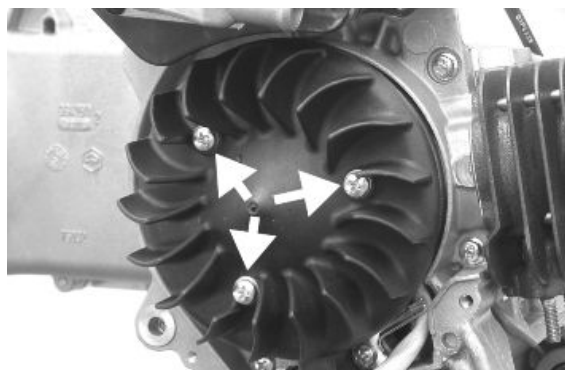


- Remove the oil piping retention band from the hood
- Remove the 2 screws shown in the figure



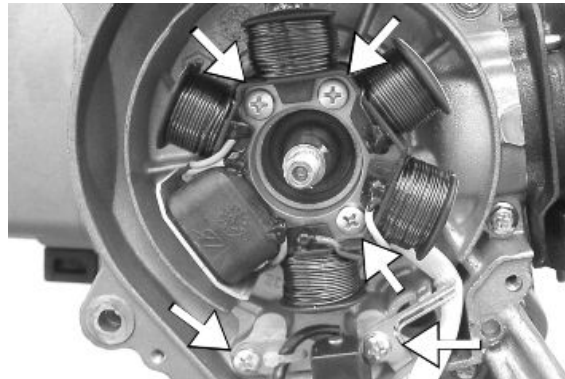
Cooling fan

- Remove the cooling fan by acting on the three fixings indicated in the figure.



Removing the stator

- Remove the three stator fixings shown in the photo
- Remove the two pick-up fixings shown in the photo
- Remove the stator with the wiring



Refitting the stator

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

N.B.

THE PICK-UP CABLE MUST BE POSITIONED ADHERING TO THE FUSION TONGUE ON THE CRANKSHAFT IN SUCH A WAY AS TO AVOID BEING CRUSHED BY THE FAN COVER ASSEMBLY.

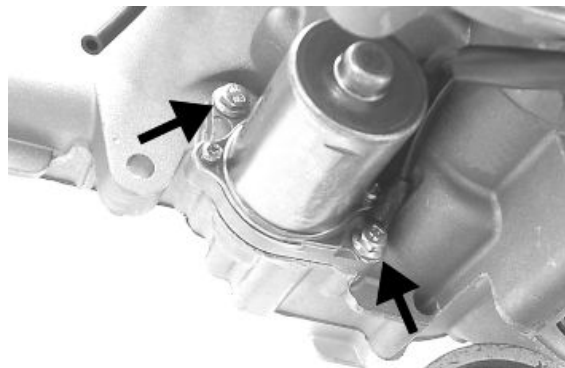
Locking torques (N*m)

Pick-up screws 3 ÷ 4 Stator screws 3 ÷ 4

Flywheel and starting

Removing the starter motor

Remove the two clamps shown in the figure

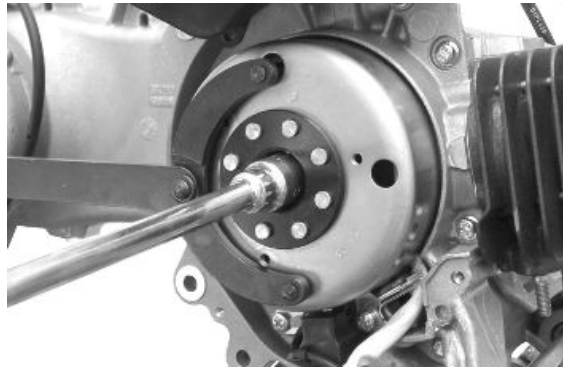


Removing the flywheel magneto

- Lock the rotation of the flywheel using the calliper spanner.
- Remove the nut.

CAUTION

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



- Extract the flywheel with the extractor.

Specific tooling

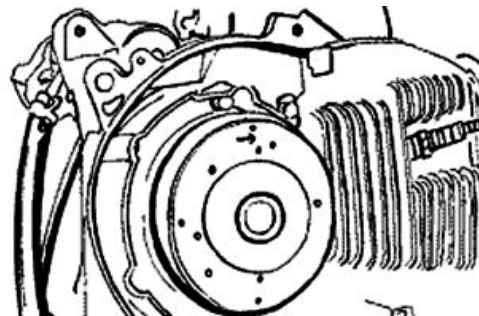
020565Y Flywheel lock calliper spanner

020162Y Flywheel extractor



Inspecting the flywheel components

- Check the condition of the flywheel and any distortions that might cause rubbing on the stator and on the Pick-Up.



Refitting the flywheel magneto

- Fit the flywheel being careful to insert the key properly.
- Lock the flywheel nut at the prescribed torque
- Check the Pick-Up air gap.
- The air gap may not be modified in the fitting of the Pick-Up.
- Other values derive from deformations visible on the Pick-Up support.



N.B.

A VARIATION OF THE AIR GAP DISTANCE CAN LEAD TO A VARIATION IN THE IGNITION ADVANCE SUCH AS TO CAUSE PINGING, KNOCKING ETC.

Locking torques (N*m)

Flywheel nut 40 to 44 N.m

Refitting the starter motor

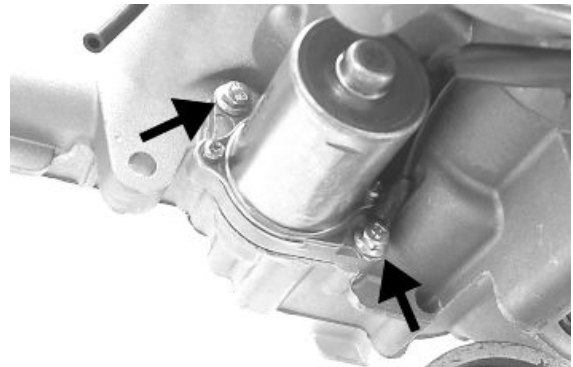
- Fit a new O-ring on the starter and lubricate it.
- Fit the starter on the crankcase, locking the two screws to the prescribed torque.

N.B.

REFIT THE REMAINING PARTS AS DESCRIBED IN THE CYLINDER HEAD, TIMING, LUBRICATION, FLYWHEEL AND TRANSMISSION CHAPTERS.

Locking torques (N*m)

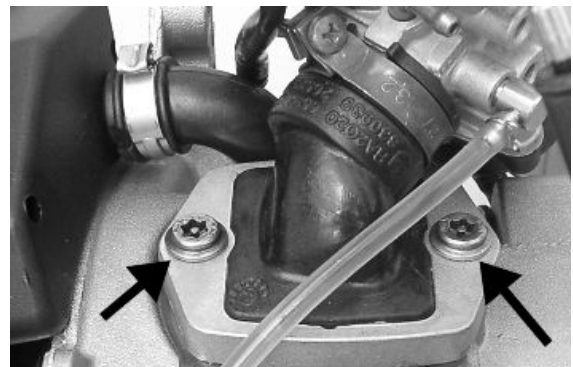
Starter screws 11 ÷ 13



Cylinder assy. and timing system

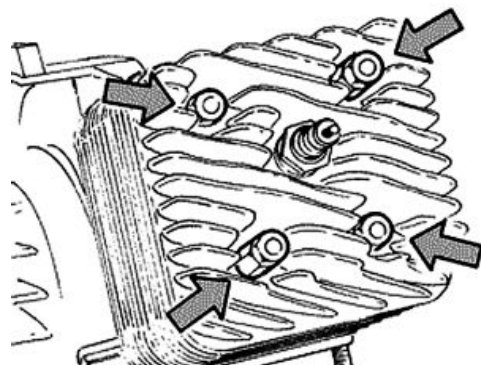
Removing the intake manifold

Use an anti-tampering TORX spanner to remove the two clamping screws of the intake manifold



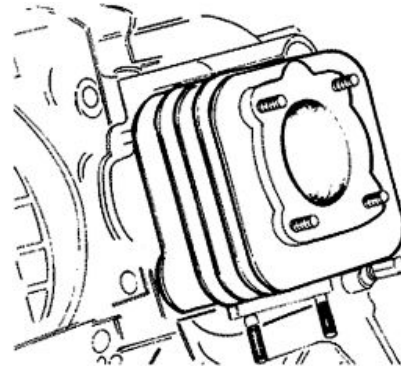
Removing the cylinder head

Remove the 4 screws shown in the figure



Removing the cylinder - piston assy.

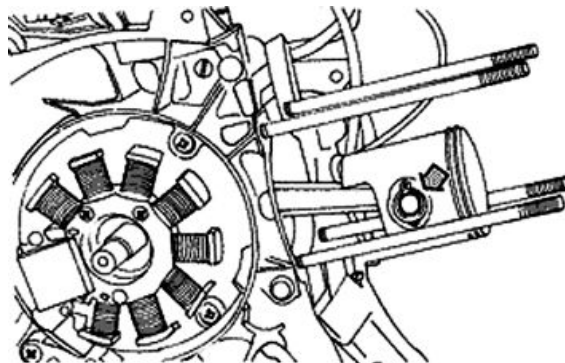
Remove the cylinder very carefully



Remove the snap rings and remove the pin

CAUTION

AFTER EACH REMOVAL OPERATION REPLACE THE PIN RETENTION SNAP RINGS



Inspecting the small end

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

N.B.

IF THE DIAMETER OF THE ROD SMALL END EXCEEDS THE MAXIMUM DIAMETER ALLOWED, SHOWS SIGNS OF WEAR OR OVERHEATING REPLACE THE CRANKSHAFT AS DESCRIBED IN THE "CRANKCASE AND CRANKSHAFT" CHAPTER".

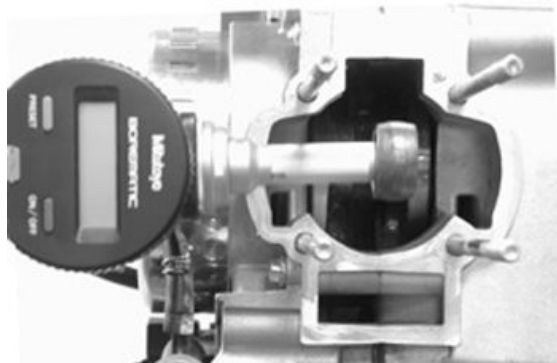
Characteristic

Rod small end: standard diameter

17 +0.011-0.001

Rod small end: maximum allowable diameter

17,060 mm



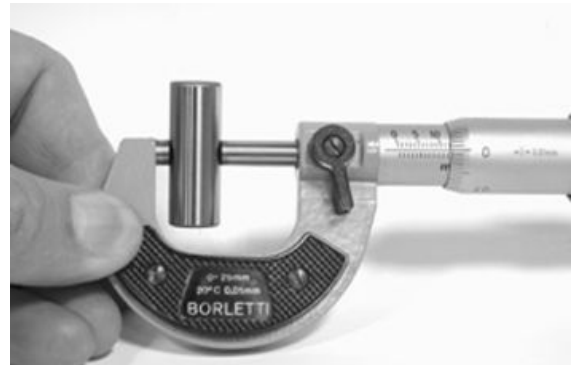
Inspecting the wrist pin

- Check the wrist pin external diameter using a micrometer

Characteristic

Wrist pin: standard diameter

12 +0.005 +0.001 mm



Inspecting the piston

- Measure the bearings on the piston using a bore meter
- Calculate the piston-pin coupling clearance.

Characteristic

Wrist pin housing: standard diameter

12 +0.007 +0.012

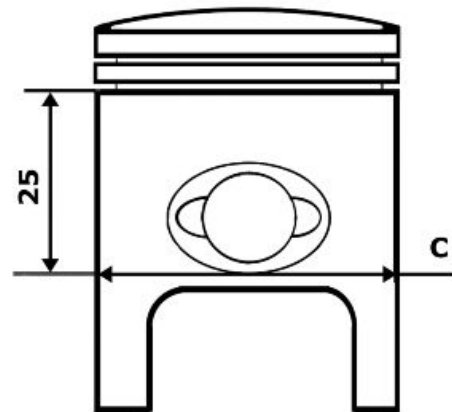
Wrist pin housing: standard clearance

0.002 ÷ 0.011 mm



- Measure the outer diameter of the piston, perpendicular to the pin axis.
- Take the measurement in the position shown in the figure

To classify the cylinder-piston fitting, check the appropriate table

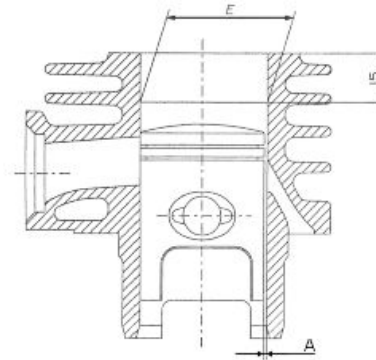


See also

[Cylinder - piston assy.](#)

Inspecting the cylinder

- Check that the cylinder does not show seizures. Otherwise, replace it or adjust it respecting the allowable increases
- Measure the internal diameter of the cylinder with a bore meter, according to the directions given in the figure
- Check that the fitting surface with the head is not dented or distorted.



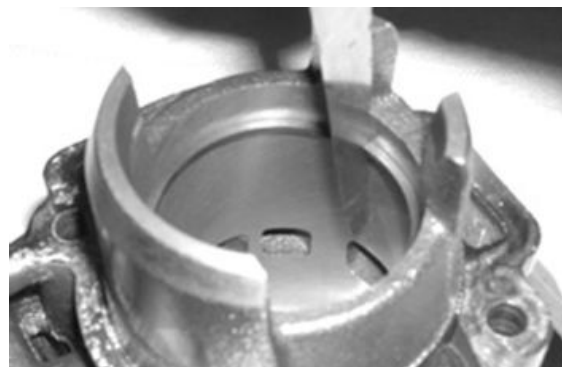
To classify the cylinder-piston fitting, check the appropriate table

See also

[Cylinder - piston assy.](#)

Inspecting the piston rings

- Alternatively insert the two sealing rings in the cylinder
- Using the piston, insert the seals perpendicularly to the cylinder axis.
- Measure the opening of the sealing rings using a thickness gauge as shown in the photograph
 - If the values are higher than the values prescribed in the chart, substitute the rings



Removing the piston

- Position the snap ring in detail 1 with the opening straddling the arrow printed on the tool.
- Push detail 2 into detail 1 until the stop and extract detail 2.
- Insert detail 3 into detail 1, position the assembly in the snap ring assembly area, and push detail 3 all the way in.

N.B.

REFIT THE REMAINING PARTS FOLLOWING THE OPERATIONS IN REVERSE ORDER FROM THE REMOVAL OPERATIONS

Specific tooling

020166Y Pin lock fitting tool

Locking torques (N*m)

Locking head nuts: 10 to 11 N.m

- Use new wrist pin snap rings.
- Use new cylinder base gasket.
- Before refitting carefully clean all the surfaces.
- Use oil to be mixed during the fitting of the piston and the cylinder.

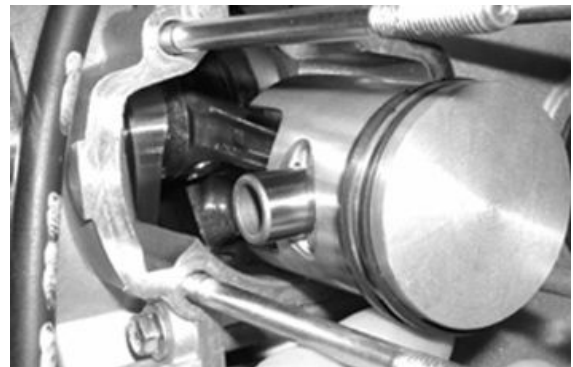
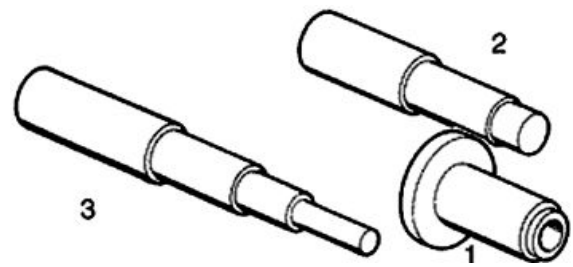
CAUTION

POSITION THE ARROW PRINTED ON THE PISTON CROWN TOWARDS THE EXHAUST OPENING. THE WRIST PIN SNAP RINGS MUST BE POSITIONED ON THE PISTON WITH THE SPECIFIC TOOL

Recommended products

AGIP CITY TEC 2T Oil

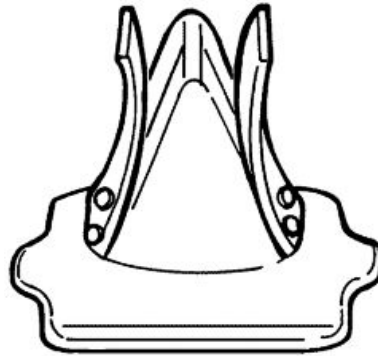
Recommended oil



Inspecting the timing system components

CAUTION

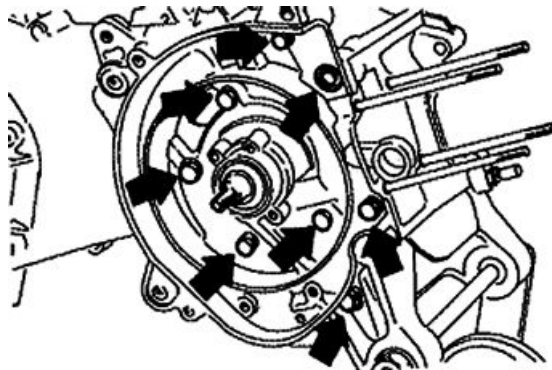
CHECK THE CORRECT REED UNIT SEAL; NO LIGHT MUST PASS BETWEEN THE SUPPORT AND LAMELLA.



Crankcase - crankshaft

Splitting the crankcase halves

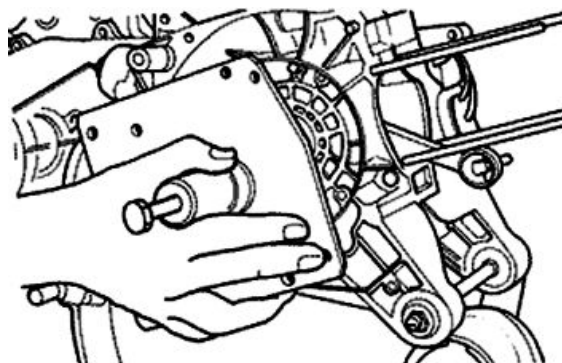
Remove the eight crankcase union fasteners.



Install the special strip on the half crankcase on the flywheel side and separate the half crankcase on the flywheel side from the transmission side

Specific tooling

020163Y Crankcase splitting plate

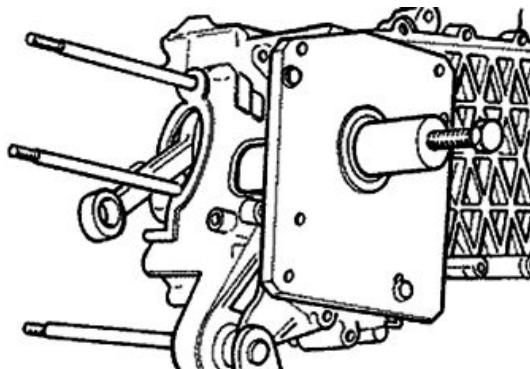


Removing the crankshaft

- Install the specific tool on the half crankcase on the transmission side using four M6 screws of an adequate length.
- Remove the crankshaft from the transmission side half crankcase

Specific tooling

020163Y Crankcase splitting plate



Removing the crankshaft bearings

The bearings can stay on either the half crankcase or the crankshaft indifferently

- Using the special tool, remove any bearings that have been left on the crankshaft

N.B.

The half rings must be inserted on the bearings with a few mallet blows.

Specific tooling

004499Y001 Bearing extractor bell

004499Y006 Bearing extractor ring

004499Y002 Bearing extractor screw

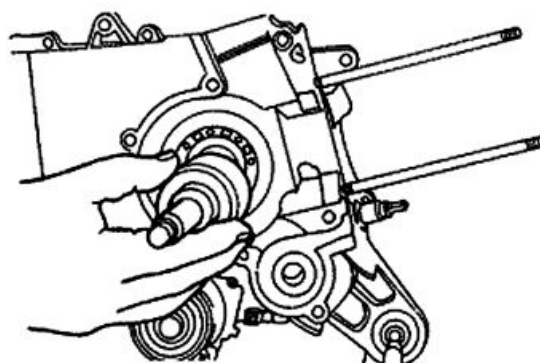
004499Y007 Half rings

- Using the specific tool remove any bearings left on the half crankcase

Specific tooling

001467Y007 Driver for OD 54 mm bearing

001467Y006 Pliers to extract 20 mm bearings

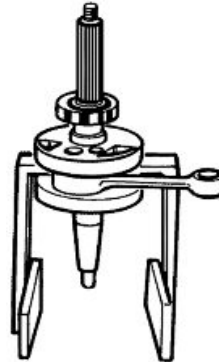


Refitting the crankshaft bearings

Heat the bearings in an oil bath at around 150°C and fit them on the crankshaft, if necessary using a section of tube that acts on the bearing's inner track

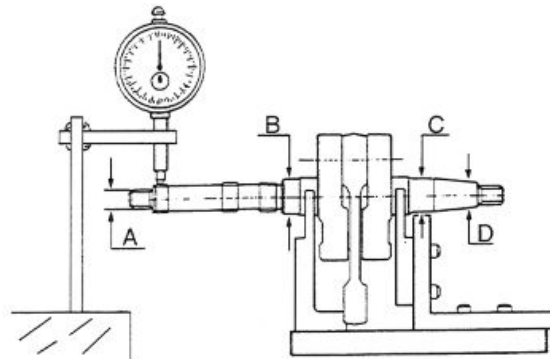
Specific tooling

020265Y Bearing fitting base



Inspecting the crankshaft alignment

With the specific tool shown check that the eccentricity of the surfaces of diam. «A»-«B»-«C» are within 0.03 mm. (reading limit on the dial gauge); in addition, check the eccentricity of diam. «D», for which a maximum reading of 0.02 mm is permitted. In the case where eccentricity is not much above prescribed levels, **straighten** the shaft by acting on the counterweights with a shim or tighten them in a clamp (with an aluminium bushing) as required..



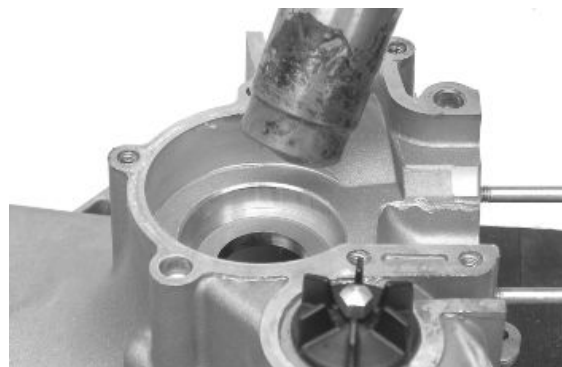
Specific tooling

020335Y Magnetic mounting for dial gauge

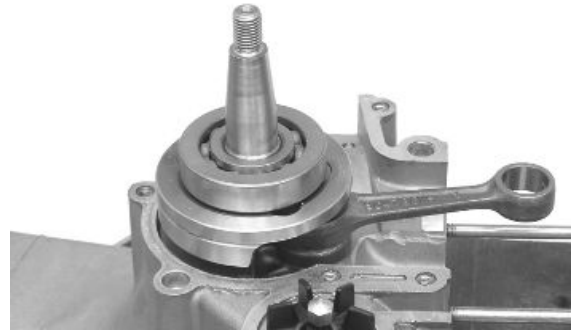
020074Y Mounting base for checking crankshaft alignment

Refitting the crankshaft

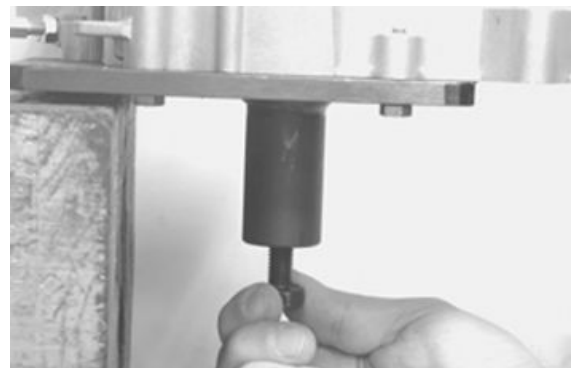
- Position the transmission side half crankcase on two wooden supports
- Using a thermal gun, heat the bearing seat to about 120°



- Firmly insert the crankshaft until the bearing reaches the end-of-stroke stop



- Let the temperature of the half crankcase settle at the temperature of the crankshaft.
- Again install the special crankcase separation plate **NOT** installing the crankshaft protection
- During the assembly phase keep the central thrust screw loose.
- Take the four clamping screws to the end of the stroke and loosen them again with the same angle (e.g. 90°)
- When the temperature has settled, preload the thrust screw of the tool manually until the ball bearing clearance is cancelled out.



Specific tooling

020163Y Crankcase splitting plate

Refitting the crankcase halves

- Prepare the coupling surface with LOCTITE 510 applying a thin layer of it after degreasing the surface using a suitable solvent (e.g. trichloroethylene)
- Heat the flywheel-side half crankcase with a thermal gun.

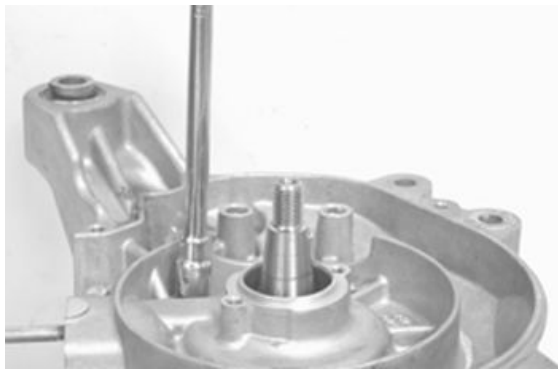


Recommended products

Loctite 510 Liquid sealant

Gasket

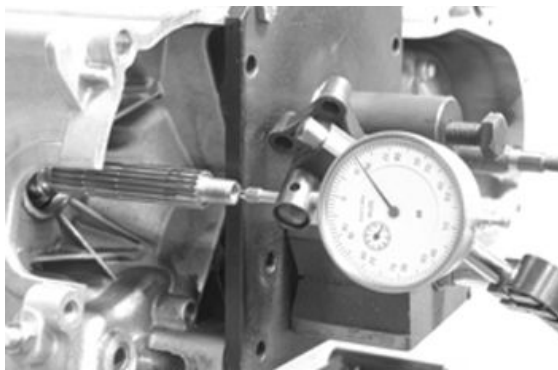
- Keeping the half crankcase on the transmission side, insert the flywheel side half crankcase with a clean precise movement
- Insert at least three clamping screws and tighten up rapidly
- Insert the other 5 screws and tighten them to the specified torque.



Locking torques (N*m)

crankcase coupling screws 11 - 13

- Move the crankcase separation plate in a position back from the one indicated in the figure
 - Install the special magnetic support with dial gauge at the end of the crankshaft
 - Check the axial clearance of the crankcase
- If this is not within the maximum limit allowed, repeat the crankcase coupling procedure



Specific tooling

020335Y Magnetic mounting for dial gauge

Characteristic

Axial clearance with warm crankcase

0.10 ÷ 0.12 mm

Axial clearance with cold crankcase

0.06 to 0.08 mm

Limit value with cold crankcase

0.02 ÷ 0.03 mm

Lubrication

Crankshaft oil seals

Refitting

- Install a new flywheel-side oil seal only with the special tool's punch

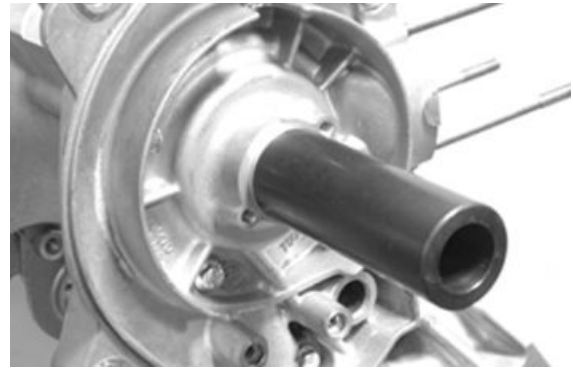
The flywheel-side oil seal is recognised by its smaller diameter

N.B.

THE USE OF THE SPECIFIC TOOL IS NOT COMPATIBLE WITH THE FITTED WRENCH

Specific tooling

020340Y Flywheel and transmission oil seals fitting punch



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

The transmission-side oil seal is recognised by the larger diameter

Specific tooling

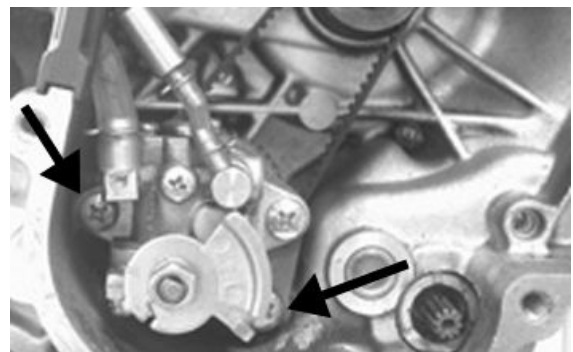
020340Y Flywheel and transmission oil seals fitting punch



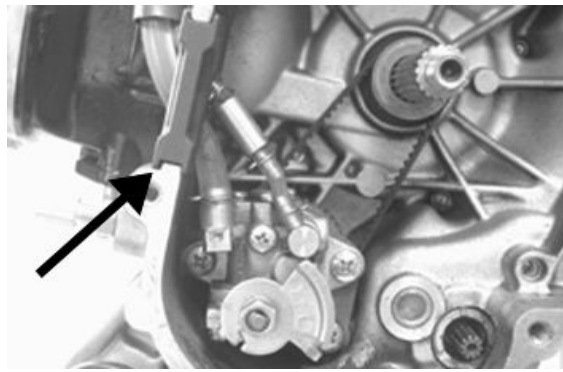
Oil pump

Removal

- Remove the 2 screws shown in the figure



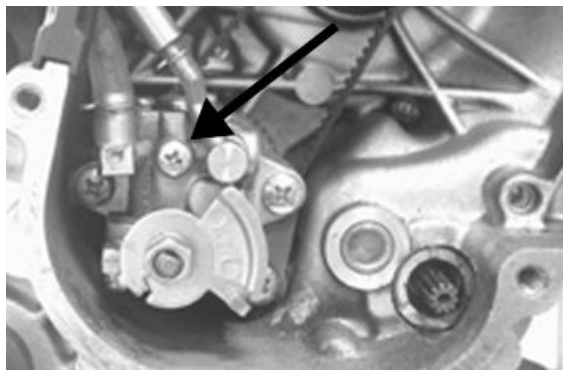
Remove the tube passage seal from the crankcase shown in the figure



Refitting

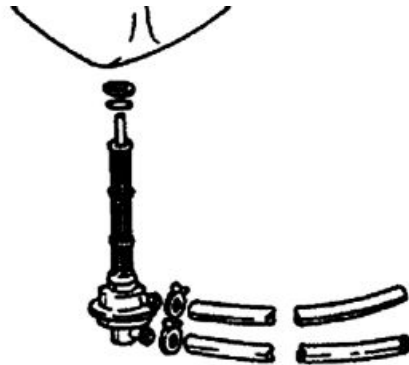
To refit, perform the steps in the reverse direction to disassembly

Remember to drain after refitting using the screw shown in the figure



Fuel supply

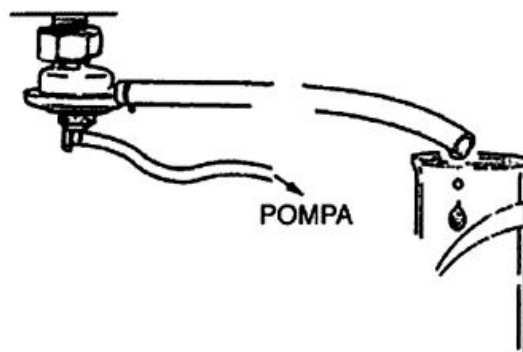
- Completely empty the fuel tank.
- Remove the petrol delivery pipe and the low-pressure pipe.
- Loosen the clip and remove the cock.
- Clean the tank and the filter of the cock with a specific solvent.
- Refit the cock making sure that there is an O-Ring.
- Turn the cock to the direction it had before it was removed and block the clip.



N.B.

THE FILTER CAN BE UNSCREWED FROM THE COCK TO FACILITATE CLEANING.

- Disconnect the fuel supply and the suction taking pipe from the carburettor.
- Check that there are no fuel leaks between the two tubes.
- Close the fuel outlet pipe.
- By means of the MITYVAC pump apply 0.1 bar of suction to the tap.
- Make sure that the suction is kept stable and that and that there are no fuel leaks.
- Reconnect the suction pipe to the manifold.
- Position the fuel pipe with the outlet at the point of the tap.
- Turn the engine by using the starter for five seconds with the carburettor at minimum.
- Take up the fuel by means of a graded burette.



N.B.

THE MEASUREMENT MAY BE FALSIFIED BY THE INCORRECT NUMBER OF REVS OR BY THE WRONG POSITION OF THE TUBE. IN THIS CASE, THE TENDENCY IS TO OBTAIN A REDUCED FUEL FLOW RATE. THE SUCTION OUTLET ON THE MANIFOLD HAS A SECTION INTENTIONALLY REDUCED FOR THE PURPOSE OF ENHANCING THE SUCTION PULSATION AND THEREBY GUARANTEE A CONSTANT TAP FLOW RATE.

Specific tooling

020329Y Mity-Vac vacuum-operated pump

Characteristic

Minimum flow rate

20 cc

INDEX OF TOPICS

SSUSPENSIONS

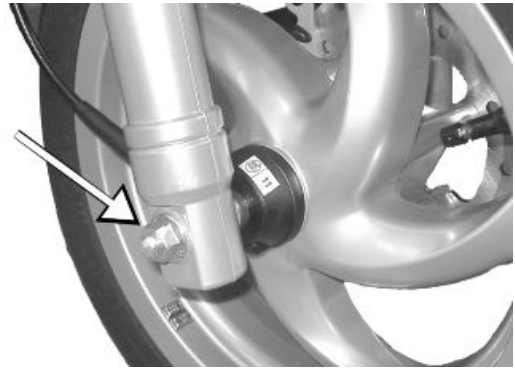
SUSP

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

Front

Removing the front wheel

- Remove the wheel axle lock nut.
- Remove the wheel axle and the wheel.
- Upon removal take care not to damage the sensor that detects movement in the odometer.



Front wheel hub overhaul

Ball bearings on wheel hub

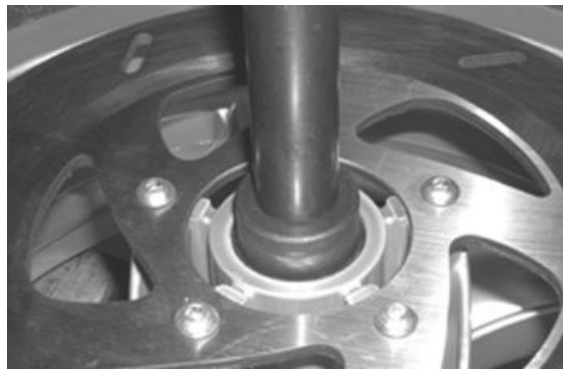
- Remove the front wheel
- Keep the wheel level by means of two wooden wedges
- With the appropriate pliers and tool remove the wheel bearing on the side the rpm indicator detects movement, as shown in the photograph



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



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



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



Specific tooling

001467Y009 Driver for OD 42-mm bearings

001467Y014 Pliers to extract \varnothing 15-mm bearings

020357Y 32x35-mm Adaptor

020376Y Adaptor handle

020412Y 15-mm guide

020456Y \varnothing 24 mm adaptor

Refitting the front wheel

- Follow the same procedure as per removal but in reverse order, tighten to the specified torque, remember to offset the odometer movement sensor by 90° compared with its own seating on the wheel so as to avoid damages.

Locking torques (N*m)

Front wheel axle nut 45 - 50

Handlebar

Removal

Handlebars removal

Remove the handlebar cover before carrying out this operation,.

- After removing the transmissions and disconnecting the electrical terminals, remove the terminal fixing the handlebar to the steering.
- Check all components and replace faulty parts.



N.B.

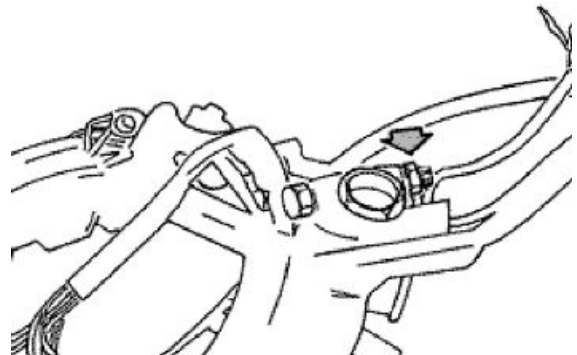
IF THE HANDLEBAR IS BEING REMOVED TO REMOVE THE STEERING, TILT THE HANDLEBAR FORWARD TO AVOIDING DAMAGING THE TRANSMISSIONS.

Refitting

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

Locking torques (N*m)

Handlebar fixing screw 50 ÷ 55

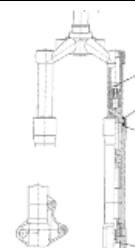


Front fork

Overhaul

Seal replacement and stanchion removal

- Remove the wheel axle.
- Remove the lower screw (1).
- Discharge the oil in the suspension.
- Remove the stem.
- Replace the sealing rings (3-4) with new ones.
- Insert the new sealing rings only after lubricating their seatings.
- Refit the stem and the lower screw (1).



- Remove the upper screw (2).
- Add 30 cc \pm 1 "Fork PG" oil (SAE 20W oil for forks).
- Refit all components.

Locking torques (N*m)

Upper screw tightening torque 20 to 25 Nm Lower screw tightening torque: 20 to 25 Nm

Steering column

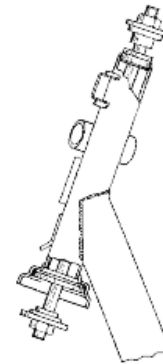
Refitting

Lower and upper bearing races to frame

Lower and upper seating on the chassis

LOWER AND UPPER SEATING ON THE CHASSIS

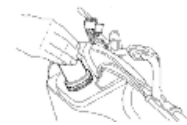
Titolo	Durata/ Valore	Testo Breve (< 4000 car.)	Indirizzo Immagine
Lower and upper seating on the chassis			



Steering bearing

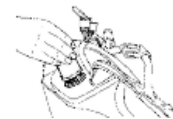
Steering locking ring nut

Steering lock ring nut



Top washer and upper bearing housing

- Lubricate race and balls with **Z2** grease.
- Tighten to the specified torque and then rotate the tool through 80° - 90° in an anticlockwise direction.



Removal

Lower and upper races from frame

To remove the bearing seats from the chassis, use the appropriate tool as shown in the figure.

N.B.

To remove the lower seating of the lower bearing just use a screwdriver as a lever between the seating and the shell.

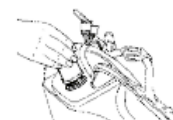


LOWER AND UPPER SEATING FROM THE CHASSIS

Titolo	Durata/Valore	Testo Breve (< 4000 car.)	Indirizzo Immagine
Lower and upper seating from the chassis			

Top washer and upper bearing housing

After removing the upper seating, tilt the vehicle to a side and take out the steering tube making sure mudflaps have been removed and the calliper disconnected.



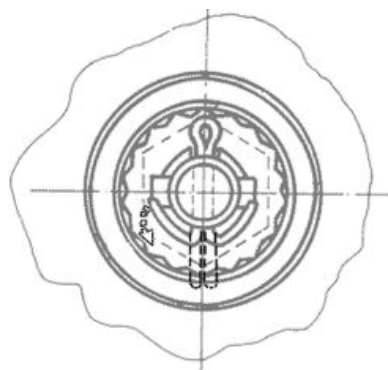
Rear

Removing the rear wheel

- Use a screwdriver as a lever between the drum and the cover.
- Straighten the split pin and remove the cap.
- Remove the wheel acting on the central fixing point.

WARNING

-ALWAYS USE NEW SPLIT PINS FOR REFITTING.



Refitting the rear wheel

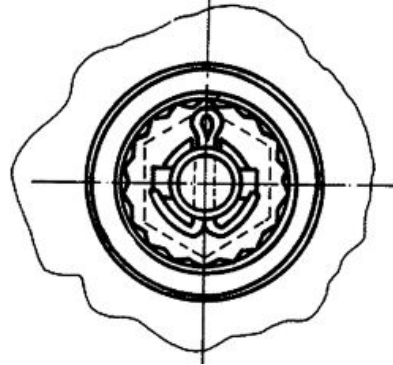
- Refit the parts in the reverse order as for removal, lock the wheel nut to the specified torque.

WARNING

- FOLD THE EDGES OF THE SPLIT PIN AS SHOWN IN ORDER TO AVOID BACKSLASH BETWEEN THE CAP AND THE WHEEL AXLE.

Locking torques (N*m)

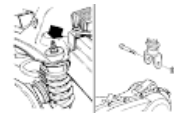
Rear wheel axle 104 ÷ 126



Shock absorbers

Removal

- To replace the shock absorber remove the rear cover and battery access flap to get and remove the shock absorber/ chassis anchoring nut. Then remove the shock absorber/engine anchorage nut.



- When refitting, tighten the shock absorber/chassis anchoring nut and the shock absorber/engine pin to the prescribed torque.

Locking torques (N*m)

Shock absorber/engine pin torque 33 to 41 N·m

Shock absorber/frame nut torque 20 to 25 Nm

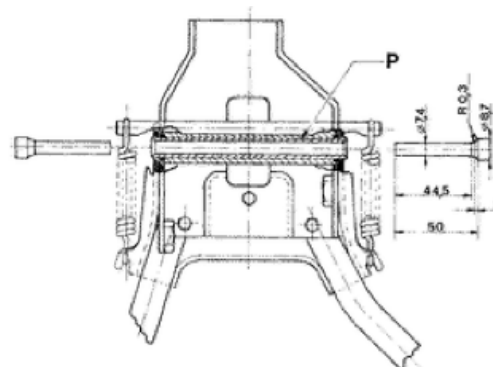
Centre-stand

Centre-stand bolt refitting and caulking to mounting bracket

- Caulk the end of the pin «P» between the two punches shown in the figure.
- After caulking it must be possible for the stand to turn freely.

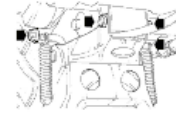
N.B.

UPON REFITTING USE NEW O-RING AND PIN, GREASE THE SPRING ATTACHMENTS AND THE PIN.



Centre-stand assy. removal

- Work on the screws shown in the figure.
- When refitting, secure to the prescribed torque.

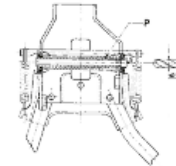


Locking torques (N*m)

Stand screw torque 18.5 to 19 Nm

Centre-stand bolt removal from mounting bracket

- Remove the stand support bracket from the engine.
- Drill a 5 mm hole in the bracket so that the pin «P» can come out.



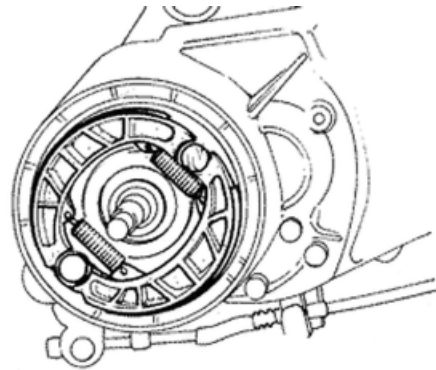
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BRAKING SYSTEM

BRAK SYS

Once the muffler and the wheel have been removed, follow these steps:

1. Remove the shoe spring using the specific spanner.
2. Remove the shoe with the aid of a lever.
3. Refit the new shoes giving a few taps with the mallet.
4. Attach the spring using the specific pliers.



Specific tooling

020325Y Pliers for brake-shoe springs

Front brake calliper

Overhaul

- Remove the calliper assembling bolts and take out the internal bodies and components. If necessary, in order to make it easier to take out the plungers, inject (shorts blasts of) compressed air through the brake fluid pipe.
- Check that the cylinders of the internal and external body of the calliper do not show scratches or signs of erosion; otherwise, replace the entire calliper.

CAUTION

ALL THE INTERNAL COMPONENTS MUST BE REPLACED EVERY TIME THE CALLIPER IS SERVICED.

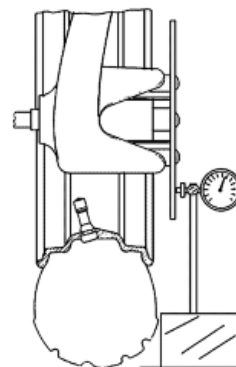
Front brake disc

Disc Inspection

- Remove the wheel and check for unevenness of the disc.

Maximum permissible out of true is 0.1 mm. If the value measured is greater, fit a new disc and repeat the check.

- If the problem persists, check and replace the wheel rim if necessary.



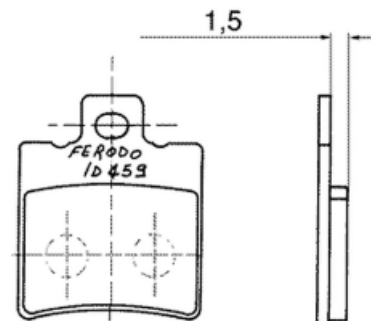
Specific tooling

020335Y Magnetic mounting for dial gauge

Front brake pads

Removal

- To facilitate this operation remove the two calliper fixings. With the calliper detached from its support but still connected to the brake fluid line, remove the plastic cover by prising it with a screwdriver.
- Remove the outside circlip from the brake pad pin, the leaf spring and the pads.
- Renew the pads when friction facing thickness is less than 1.5 mm.



Fill

Front

- Once the bleed valve is closed, fill the system with brake liquid to the maximum level.
- Undo the bleed screw.
- Apply the tube of the special tool to the bleed screws.

When bleeding it is necessary to fill the oil tank in continuation while working with a MITYVAC pump on the bleed screws until no more air comes out of the system.

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

- Do up the bleed screw.
- When the operation is over, tighten up the oil bleed screw to the prescribed torque.

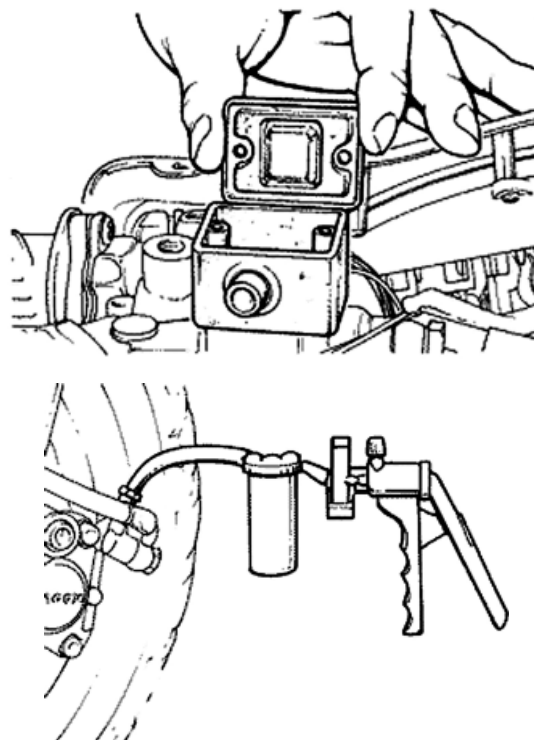
N.B.

**IF AIR CONTINUES TO COME OUT DURING PURGING, EXAMINE ALL THE FITTINGS:
IF SAID FITTINGS DO NOT SHOW SIGNS OF BEING FAULTY, LOOK FOR THE AIR INPUT AMONG THE VARIOUS SEALS ON THE PUMP AND CALLIPER PISTONS.**

CAUTION

- DURING THE OPERATIONS, THE VEHICLE MUST BE ON THE STAND AND LEVEL.

N.B.



DURING PURGING FREQUENTLY CHECK THE LEVEL TO PREVENT AIR GETTING INTO THE SYSTEM THROUGH THE PUMP.

WARNING

- BRAKING CIRCUIT FLUID IS HYGROSCOPIC. IT ABSORBS HUMIDITY FROM THE SURROUNDING AIR. IF THE LEVEL OF HUMIDITY IN THE BRAKING FLUID EXCEEDS A GIVEN VALUE, BRAKING EFFICIENCY WILL BE REDUCED.

THEREFORE, ALWAYS USE FLUID FROM SEALED CONTAINERS.

UNDER NORMAL DRIVING AND CLIMATIC CONDITIONS YOU SHOULD CHANGE THIS LIQUID EVERY TWO YEARS. IF THE BRAKES ARE USED INTENSELY AND/OR IN HARSH CONDITIONS, CHANGE THE FLUID MORE FREQUENTLY.

CAUTION

WHEN CARRYING OUT THE OPERATION, BRAKE FLUID MAY LEAK FROM BETWEEN THE BLEED SCREW AND ITS SEAT ON THE CALLIPER.

CAREFULLY DRY THE CALLIPER AND DEGREASE THE DISC SHOULD THERE BE OIL ON IT.

Specific tooling

020329Y Mity-Vac vacuum-operated pump

Recommended products

AGIP BRAKE 4 Brake fluid

FMVSS DOT 4 Synthetic fluid

Locking torques (N*m)

Oil bleed screw 8 ÷ 12

Front brake pump

-After removing the front and rear handlebar covers, act on the two stand fixing points (see the figure).

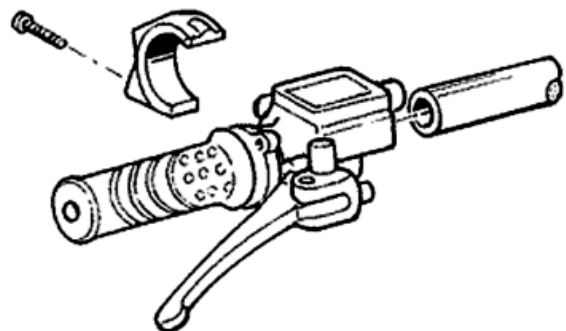
- Disconnect the tube, collecting the brake oil in a container.

- On refitting, perform the operation in reverse.

- Tighten the hydraulic line to the prescribed torque and bleed the system.

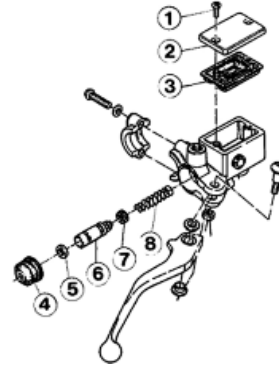
Locking torques (N*m)

Brake fluid pump - hose fitting 20 ÷ 25 Nm



Removal

- Bleed the circuit and drain the brake fluid through the bleeding screw located on the calliper and actuate the brake lever until no more fluid flows out.
- Remove the oil pump from the handlebar; remove the brake lever and then remove the wheel cylinder.



- 1 - Tank cap screw.
- 2. Tank cover.
- 3. Diaphragm.
- 4. Bellows.
- 5. Sealing ring.
- 6. Piston.
- 7. Gasket.
- 8 - Spring

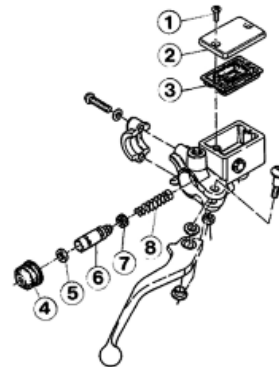
CAUTION

- THE PRESENCE OF BRAKE FLUID ON THE DISC OR BRAKE PADS REDUCES THE BRAKING EFFICIENCY. IN THIS CASE, REPLACE THE PADS AND CLEAN THE DISC WITH A HIGH-QUALITY SOLVENT. CONTACT WITH BRAKE FLUID WILL DAMAGE PAINTED SURFACES. RUBBER PARTS SHOULD NEVER BE LEFT IN ALCOHOL FOR LONGER THAN 20 SECONDS. AFTER WASHING, THE PIECES MUST BE DRIED WITH A BLAST OF COMPRESSED AIR AND A CLEAN CLOTH. THE SEALING RINGS MUST BE IMMERSSED IN THE OPERATING LIQUID.

Refitting

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

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



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

- 5. Sealing ring.
 - 6. Piston.
 - 7. Gasket.
 - 8. Spring.
-

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CHASSIS

CHAS

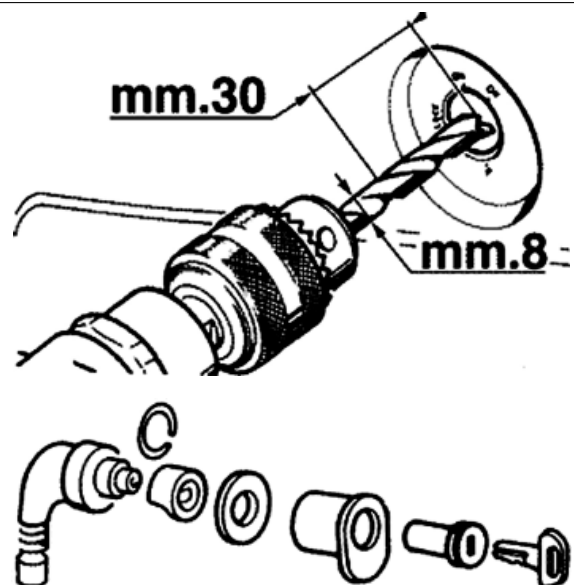
Removing the ignition key-switch when on *off*

- Remove the shield back plate
- Push the lock body until the stop spring does not show grooves.
- Keep the lock body blocked with a screwdriver and remove the spring with a pair of pliers.
- Take out the lock block.



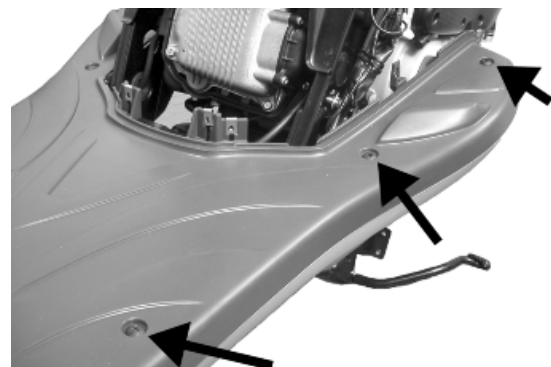
Removing the ignition key-switch when on *lock*

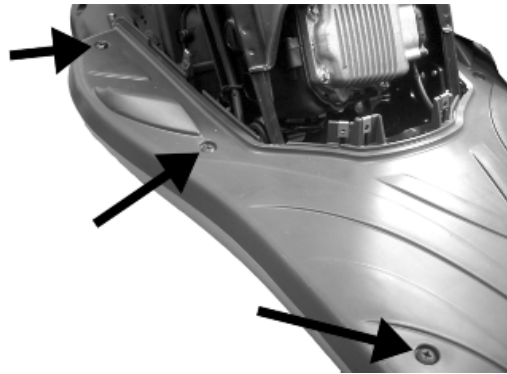
- Remove the shield.
- Remove the switch of the key switch.
 - Make a hole on the block using a drill as shown in the figure.
 - Insert the wheel cylinder with the key and with the anchoring tab facing down halfway on the lock body taking care that the insertion phase of the key is oriented matching "ON" (the only position that enables the cylinder to get into the lock body); now turn the key leftwards to "OFF" and at the same time press until the cylinder is completely in.



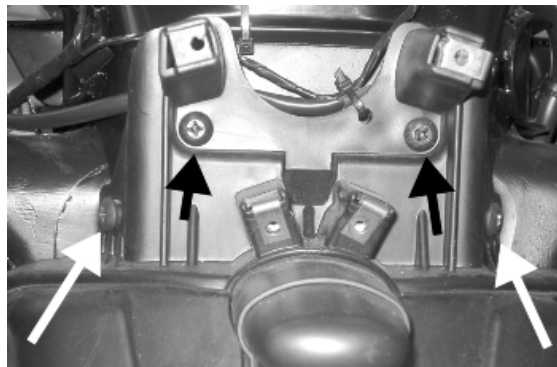
Footrest

- Remove the side fairings
- Remove the shield back plate
- Remove the 6 screws shown in the photograph





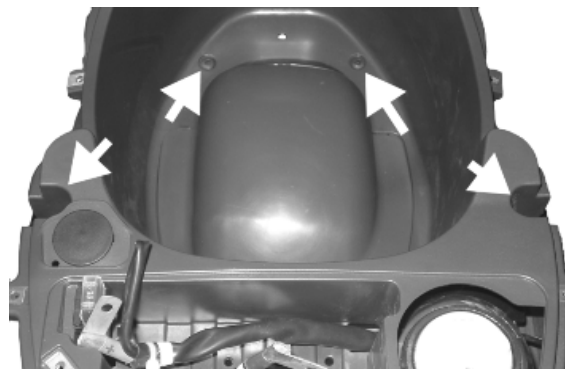
Rear mudguard



- Remove the side fairings
- Remove the 4 screws shown in the photograph

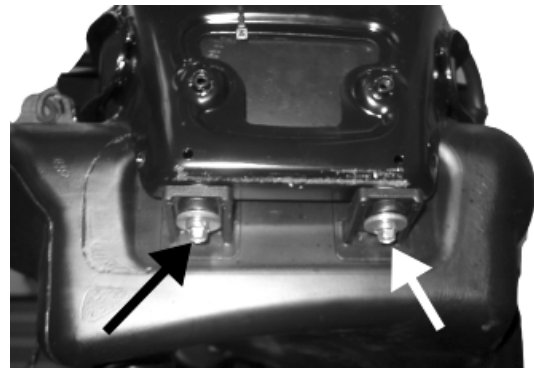
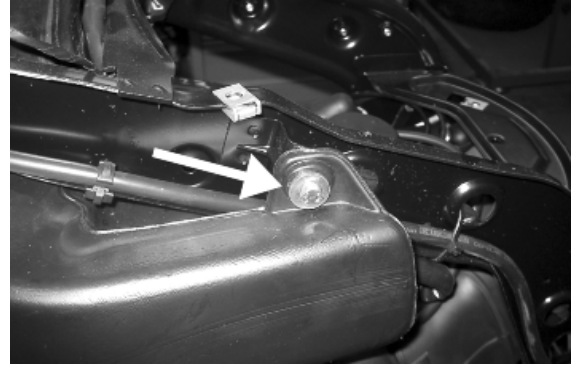
Helmet bay

- Remove the side fairings
- Remove the helmet compartment by undoing the 4 screws indicated in the figure



Fuel tank

- Remove the side fairings
- Remove the rear mudguard
- Remove the crews shown in the photograph
- Remove the shock absorber upper clamping in order to create the necessary space to take out the tank.



INDEX OF TOPICS

PRE-DELIVERY

PRE DE

Aesthetic inspection

Appearance check:

- Paintwork
- Fitting of plastics
- Scratches
- Dirt

Tightening torques inspection

Lock check

- Safety locks
- clamping screws

Safety locks

Rear shock absorber upper fixing

Rear shock absorber lower fixing

Front wheel axle nut

Wheel hub nut

Frame - swinging arm bolt *

Swinging arm bolt - Engine

Engine arm pin - Frame arm

Handlebar lock nut

Steering lower ring nut

Upper steering ring nut

Electrical system

Electrical system:

- Main switch
- Headlamps: high-beam lights, low-beam lights, tail and parking lights and their warning lights
- Adjusting the headlights according to the regulations currently in force
- Rear light, parking light, stop light
- Front and rear stop light switches
- Turn indicators and their warning lights
- Instrument panel lights
- Instrument panel: fuel gauge
- Instrument panel warning lights
- Horn
- Starter

CAUTION

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

WARNING

BEFORE RECHARGING THE BATTERY, REMOVE THE CAPS OF EACH CELL. KEEP THE BATTERY AWAY FROM NAKED FLAMES OR SPARKS WHILE IT IS CHARGED. REMOVE THE BATTERY FROM THE SCOOTER, DISCONNECTING THE NEGATIVE TERMINAL FIRST.

CAUTION

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

WARNING

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

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

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

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

KEEP OUT OF THE REACH OF CHILDREN

CAUTION

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

Levels check

Level check:

- Hydraulic braking system fluid level.
 - Rear hub oil level
 - Engine coolant level.
-

Road test

Test ride

- Cold start
 - Instrument operations
 - Response to the throttle control
 - Stability on acceleration and braking
 - Rear and front brake efficiency
 - Rear and front suspension efficiency
 - Abnormal noise
-

Static test

Static control after the test ride:

- Starting when warm
- Starter operation
- Minimum hold (turning the handlebar)
- Uniform turning of the steering
- Possible leaks

CAUTION

CHECK AND ADJUST TYRE PRESSURE WITH TYRES AT AMBIENT TEMPERATURE.

CAUTION

NEVER EXCEED THE RECOMMENDED INFLATION PRESSURES OR TYRES MAY BURST.

Functional inspection

Functional check up:

Braking system (hydraulic)

- Lever travel

Braking system (mechanical)

- Lever travel

Clutch

- Proper functioning check

Engine

- Throttle travel check

Others

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

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TIME

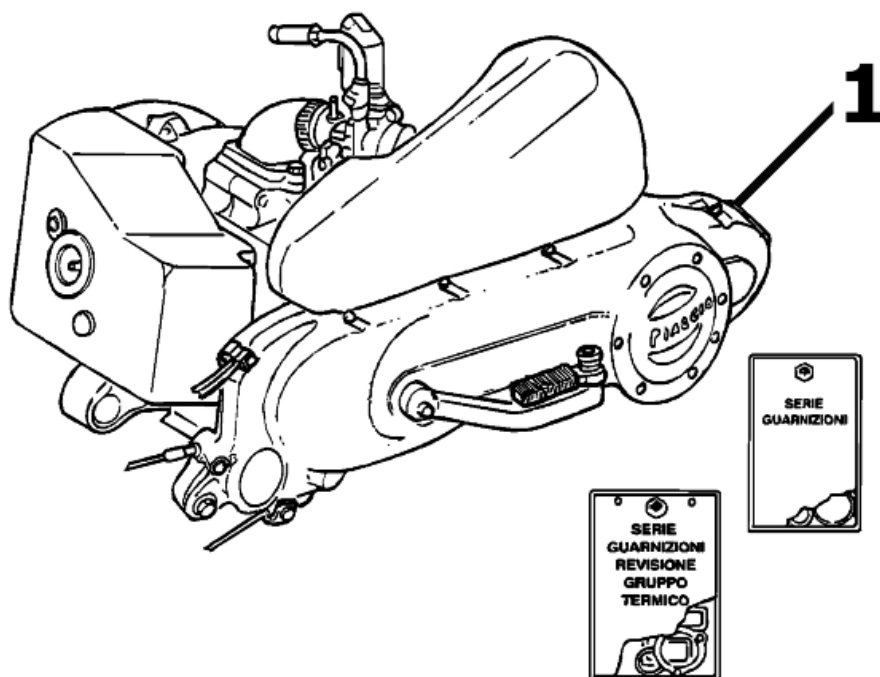
TIME

This section is devoted to the time necessary to carry out repairs.



The description and code for each operation is indicated.

Engine

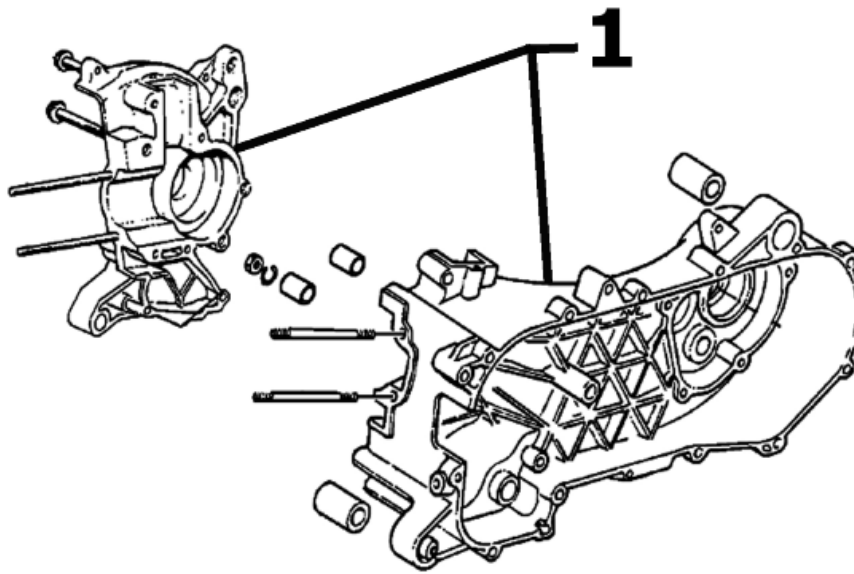


ENGINE

	Code	Action	Duration
1	001001	engine from frame - removal and re-fitting	

Time

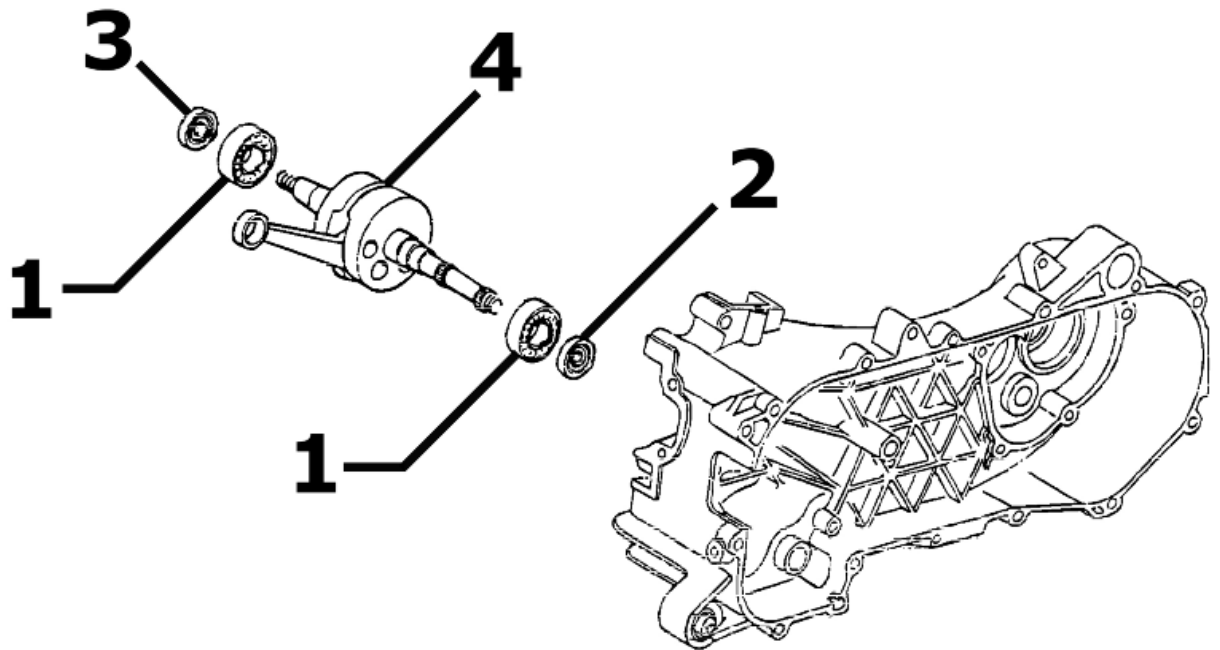
Crankcase



CRANKCASE

	Code	Action	Duration
1	001133	Engine crankcase - Replacement	

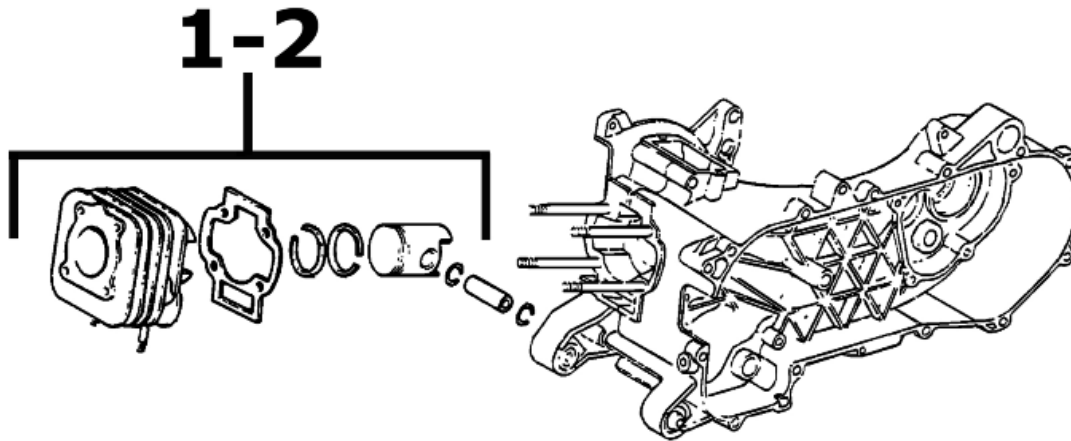
Crankshaft



CRANKSHAFT

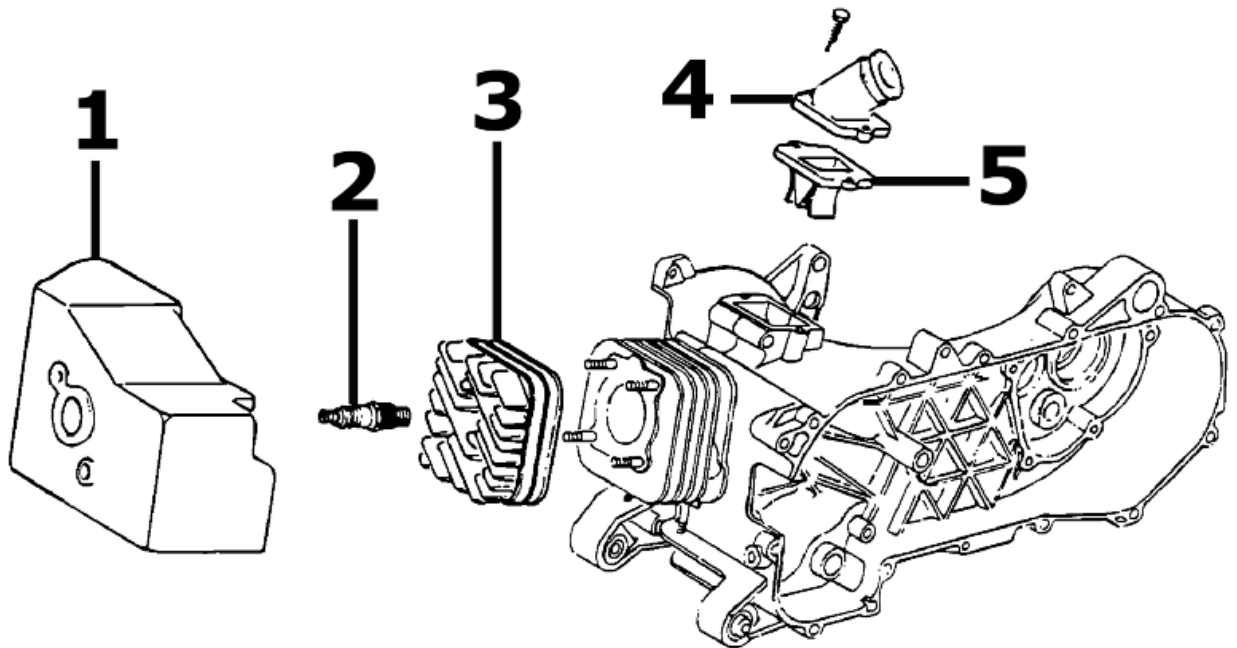
	Code	Action	Duration
1	001118	Main bearings - Replacement	
2	001100	Clutch-side oil seal - Replacement	
3	001099	Oil seal, flywheel side - Replacement	
4	001117	Crankshaft - Replacement	

Cylinder assy.



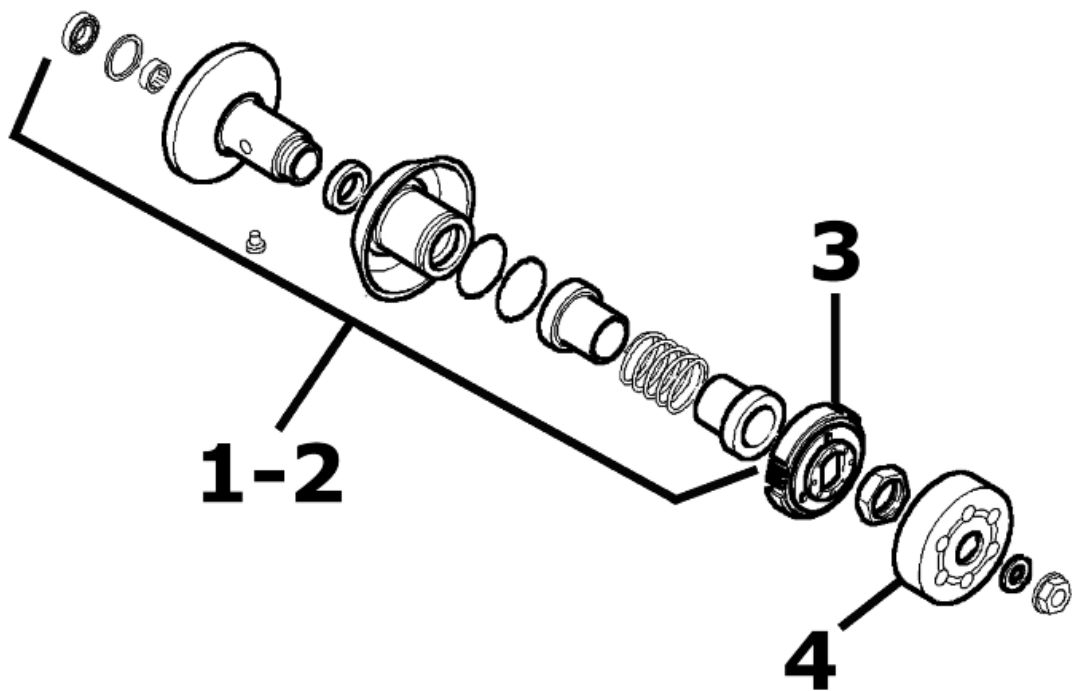
CYLINDER- PISTON

	Code	Action	Duration
1	001002	Cylinder-Piston - Replacement	
2	001107	Cylinder / piston - Inspection / cleaning	

Cylinder head assy.**HEAD**

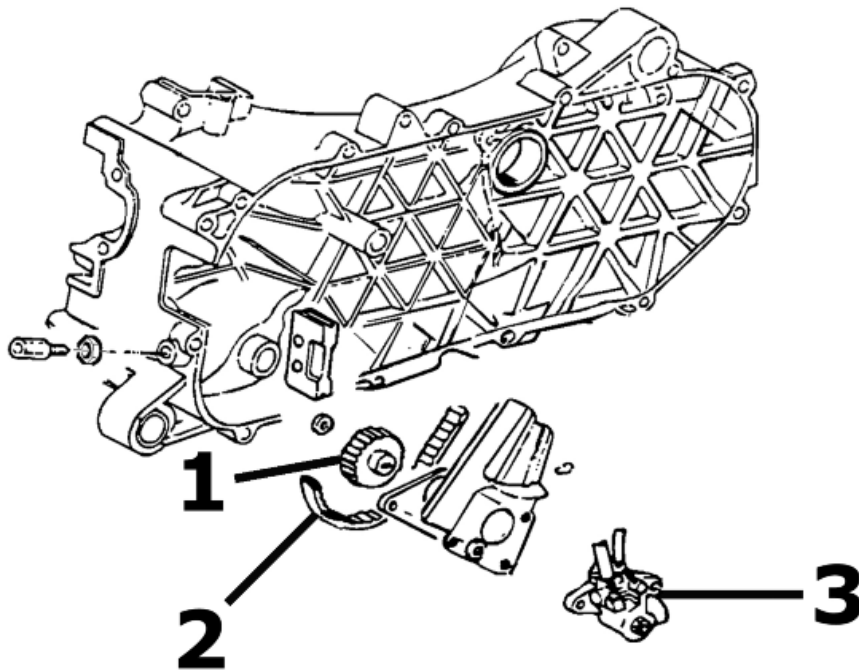
	Code	Action	Duration
1	001097	Cooling hood - Replacement	
2	001093	Spark plug - Replacement	
3	001126	Head - Replacement	
4	001013	Intake manifold - Replacement	
5	001178	Disc pack - Replacement	

Driven pulley



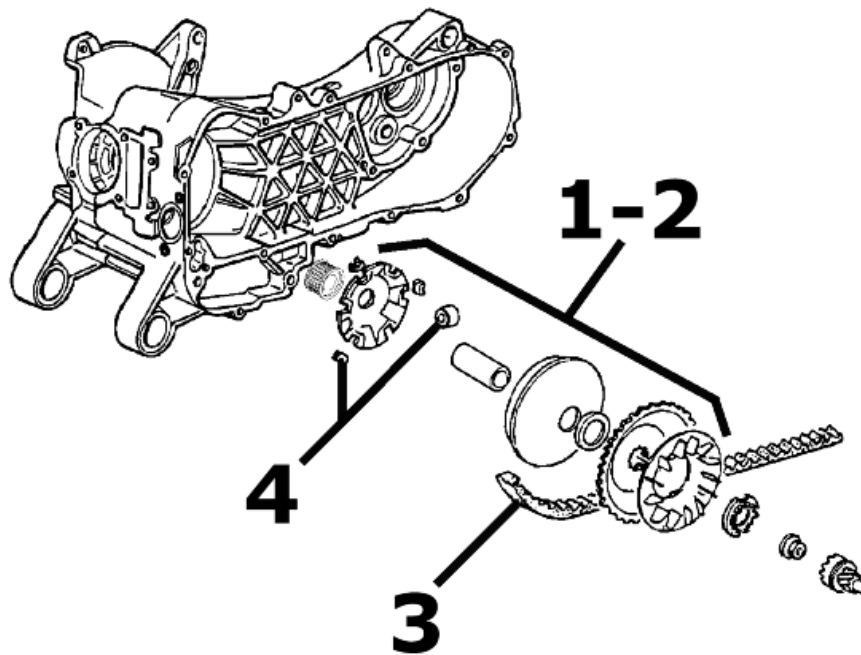
DRIVEN PULLEY - CLUTCH

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

Oil pump**OIL PUMP**

	Code	Action	Duration
1	001028	Mix movement gear socket - Replacement	
2	001019	Mixer belt - replacement	
3	001018	Mixer - Replacement	

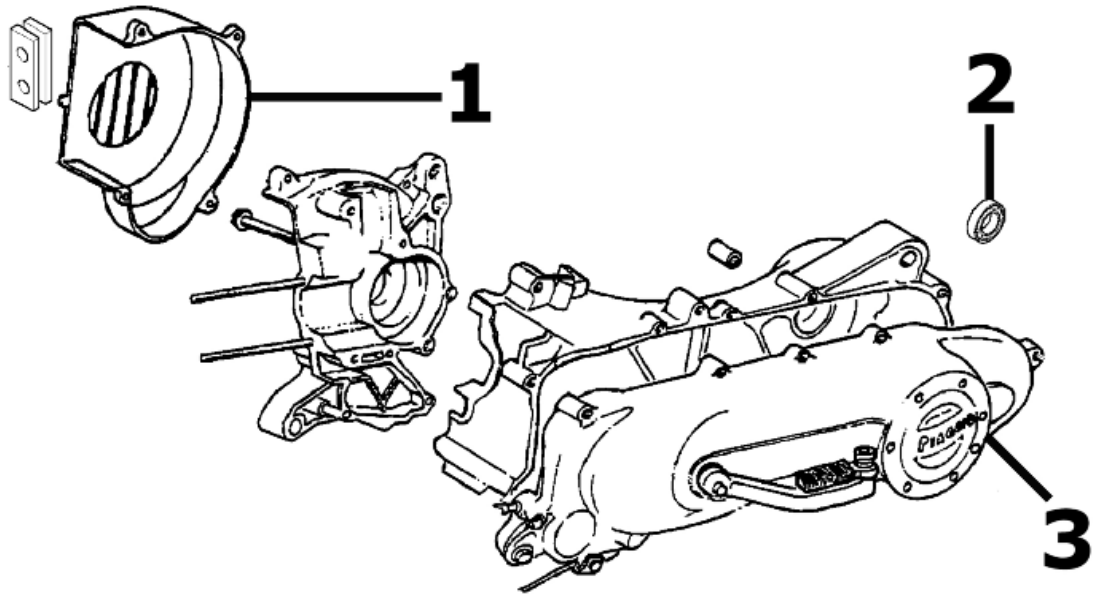
Driving pulley



DRIVING PULLEY

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

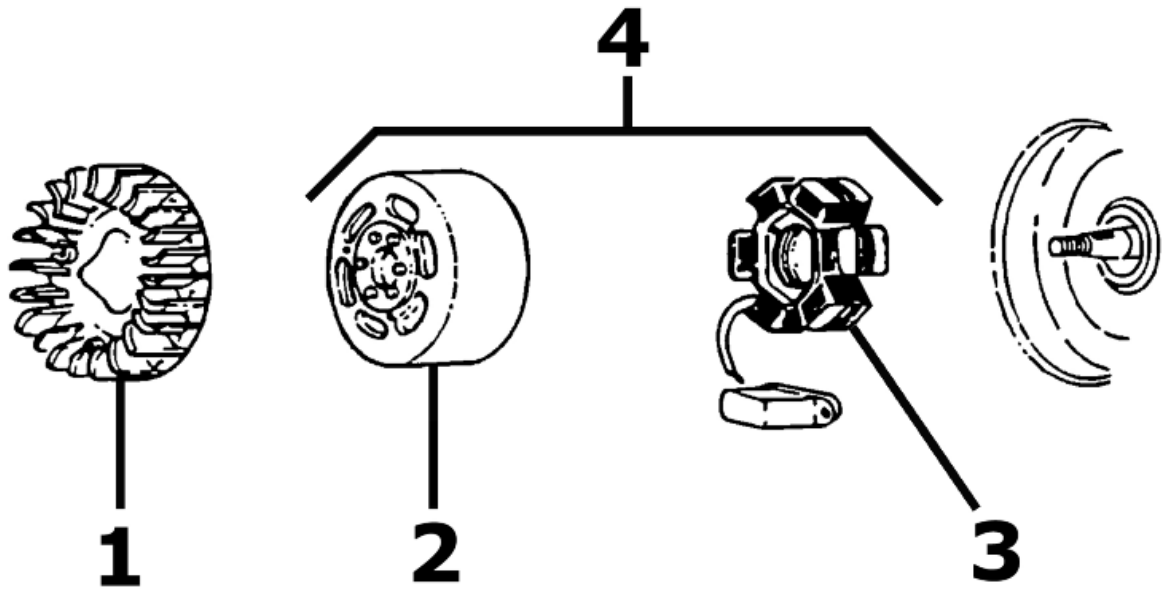
Transmission cover



TRANSMISSION COVER

	Code	Action	Duration
1	001087	Flywheel cover - Replacement	
2	001135	Transmission cover bearing - Replacement	
3	001096	Transmission crankcase cover - Replacement	

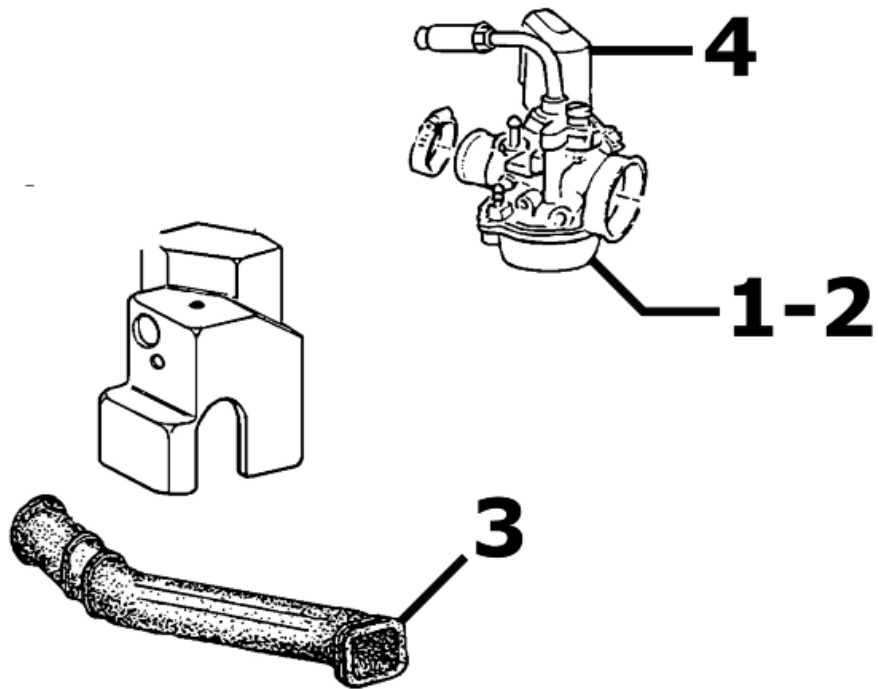
Flywheel magneto



FLYWHEEL - FAN

	Code	Action	Duration
1	001109	Cooling fan - Replacement	
2	001173	Rotor - Replacement	
3	001067	Stator - Fitting and Refitting	
4	001058	Flywheel - Replacement	

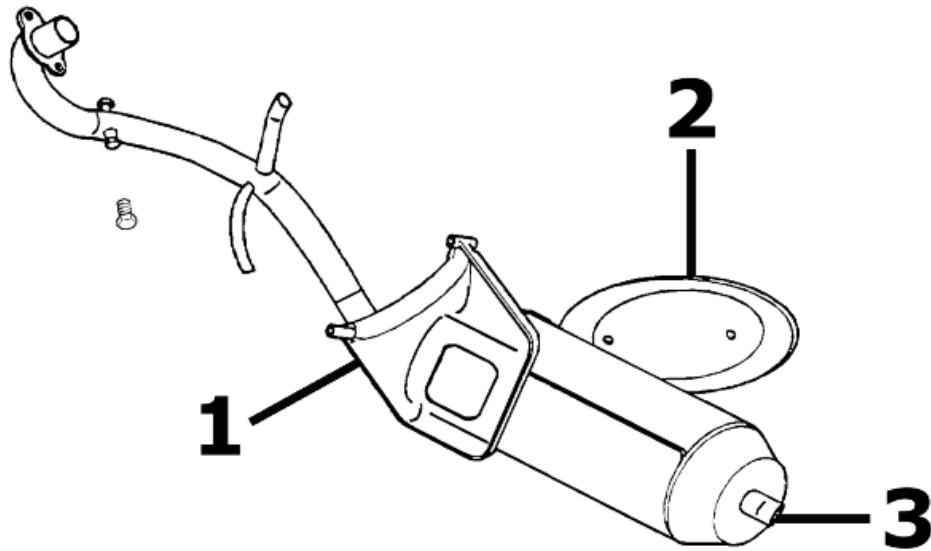
Carburettor



CARBURATOR

	Code	Action	Duration
1	001008	Carburettor - Inspection	
2	001063	Carburettor - Replacement	
3	007020	Carburettor heating tubing - replacement	
4	001081	Automatic choke - Replacement	

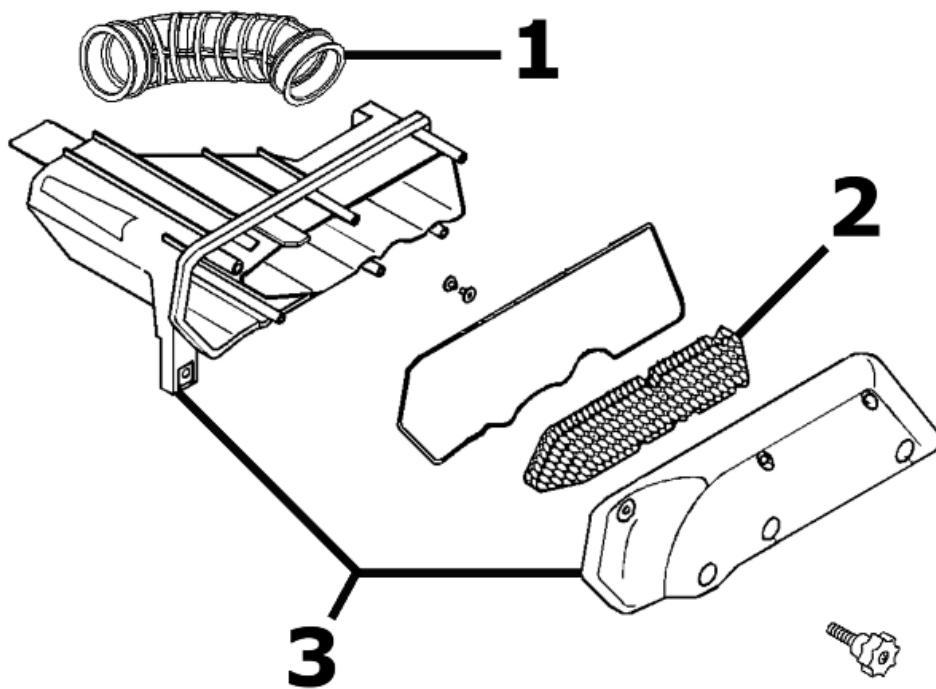
Exhaust pipe



MUFFLER

	Code	Action	Duration
1	001009	Muffler - Replacement	
2	001095	Muffler guard - Replacement	
3	001136	Exhaust emissions - Adjustment	

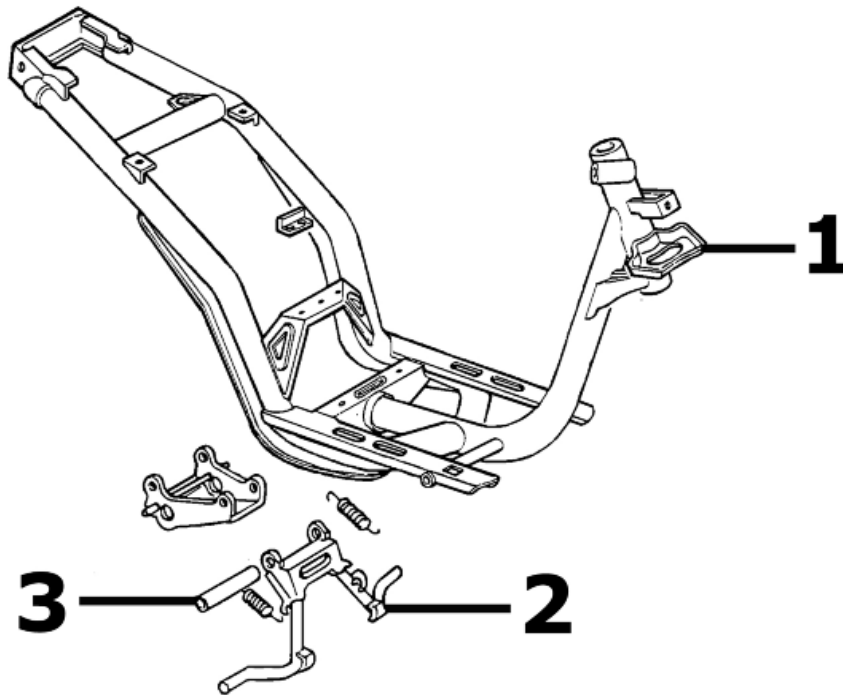
Air cleaner



AIR CLEANER

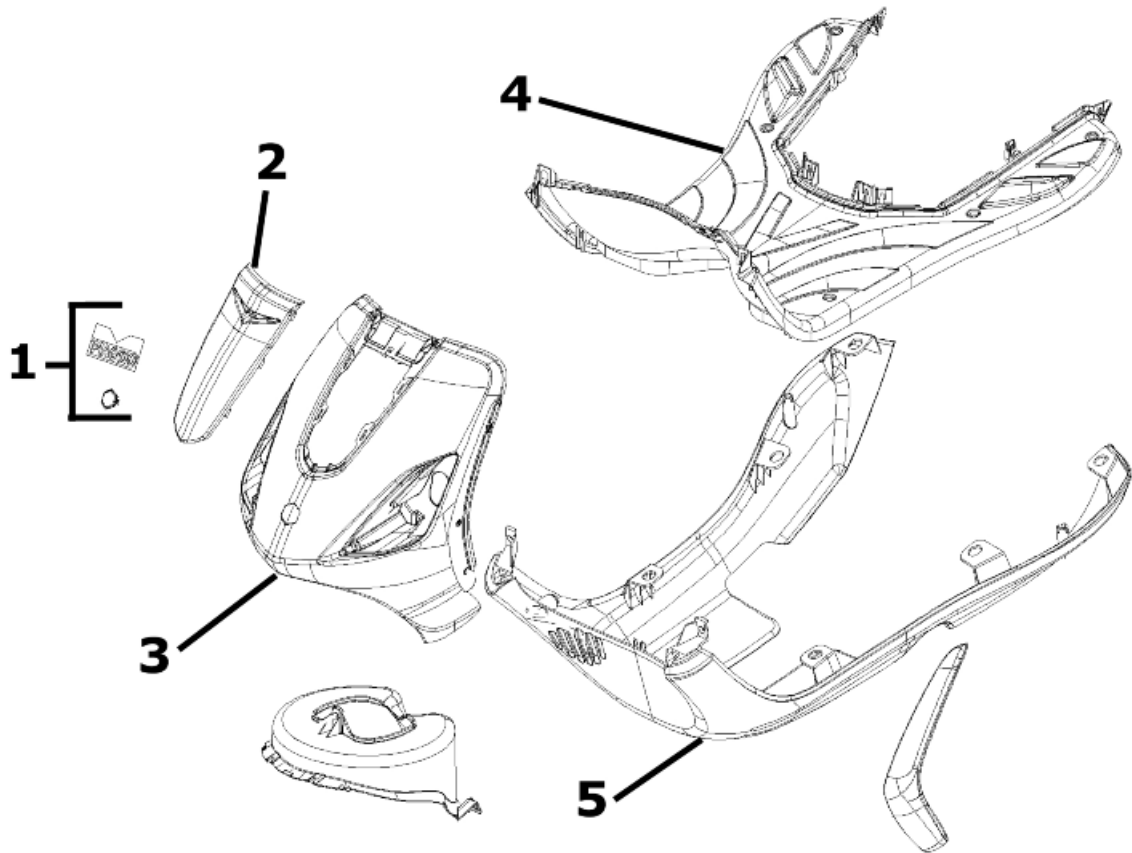
	Code	Action	Duration
1	004122	Air cleaner carburettor fitting - Replacement	
2	001014	Air filter - Replacement / cleaning	
3	001015	Air filter box - Replacement	

Frame

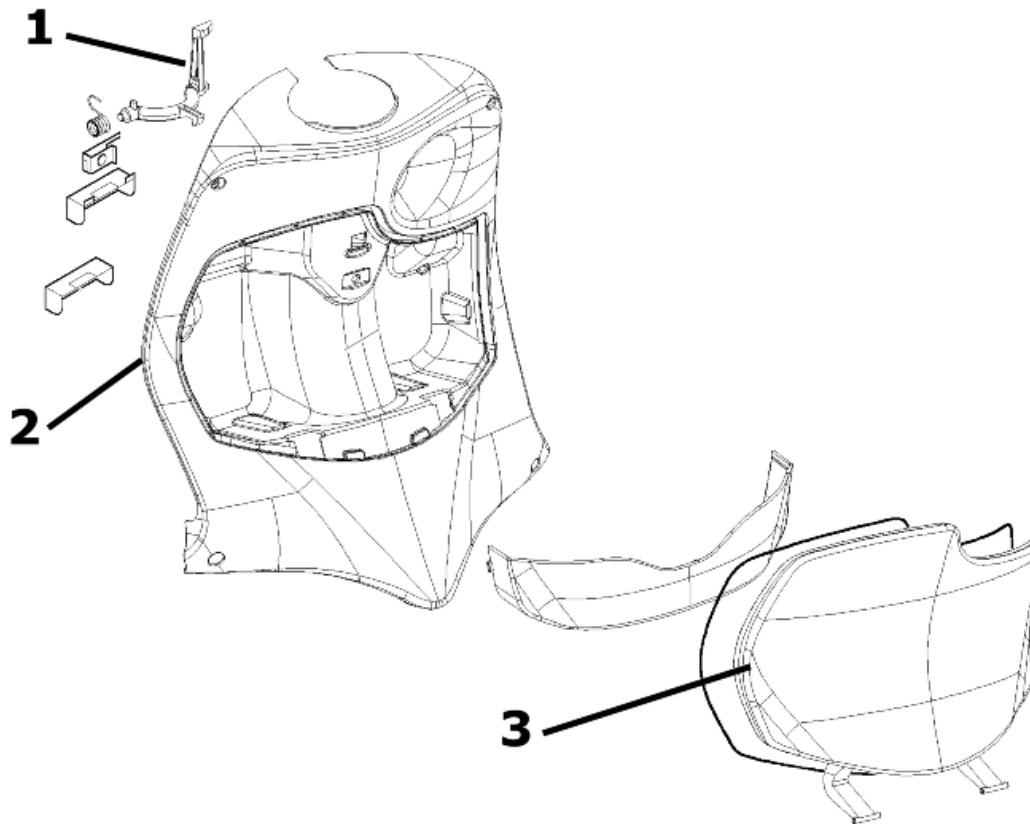


STAND

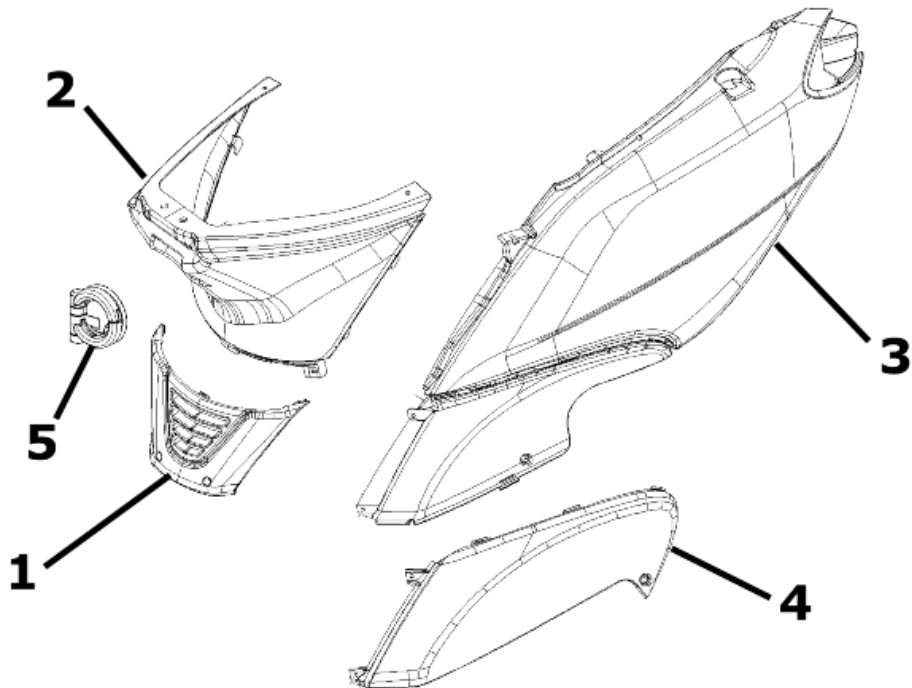
	Code	Action	Duration
1	004001	Frame - replace	
2	004004	Stand - Replacement	
3	001053	Stand bolt - Replacement	

Legshield spoiler**FRONT SHIELD SPOILER**

	Code	Action	Duration
1	004159	Plates / Stickers - Replacement	
2	004149	Shield central cover - Replacement	
3	004064	Front shield, front part - Removal and refitting	
4	004015	Footrest - Removal and Refitting	
5	004053	Spoiler - Replacement	

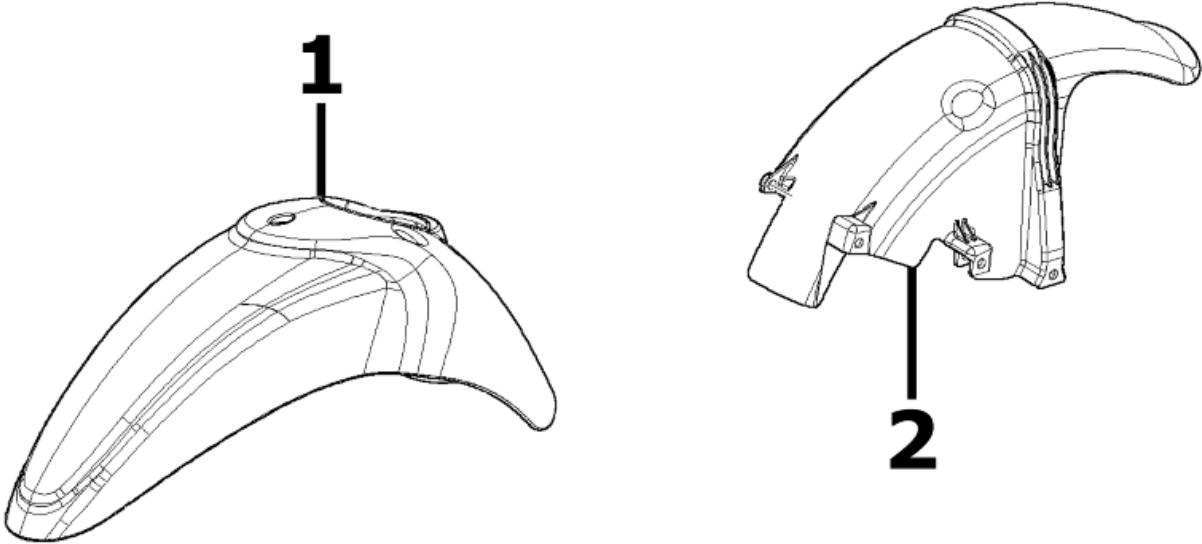
Rear cover**REAR SHIELD**

	Code	Action	Duration
1	004174	Trunk levers - Replacement	
2	004065	Legshield, rear part - Removal and refitting	
3	004081	Top box lid - Replacement	

Central cover**CENTRAL COVER**

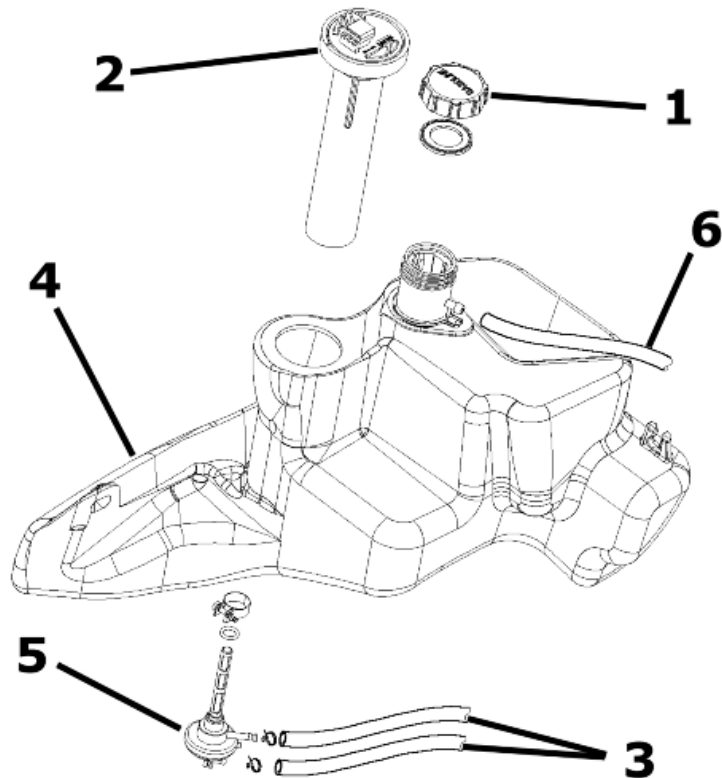
	Code	Action	Duration
1	004059	Spark plug inspection flap - Replacement	
2	004106	Under-saddle band - Replacement	
3	004085	Fairing (1) - Replacement	
4	004105	Right side clamp - Replacement	
5	004131	Luggage rack support - Replacement	

Mudguard



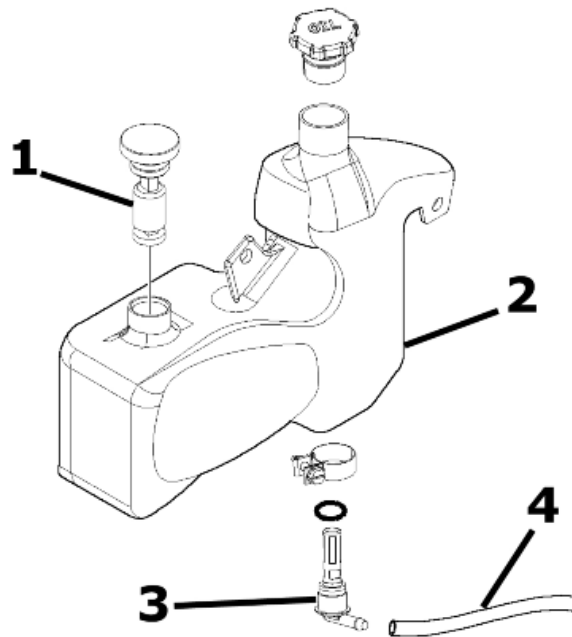
MUDGUARDS

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

Fuel tank**FUEL TANK**

	Code	Action	Duration
1	004168	Fuel tank cap - Replacement	
2	005010	Tank float - Replacement	
3	004112	Cock-carburettor hose - Replacement	
4	004005	Fuel tank - Replacement	
5	004007	Fuel valve - Replacement	
6	004109	Fuel tank breather - change	

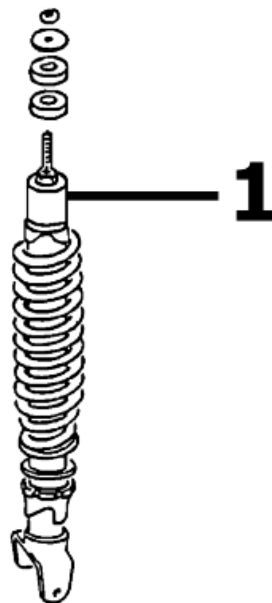
Tank oil



OIL RESERVOIR

	Code	Action	Duration
1	005018	Oil reservoir float - Replacement	
2	004017	Oil reservoir - Replacement	
3	004095	Oil reservoir cock - Replacement	
4	004091	Oil reservoir hose - Replacement	

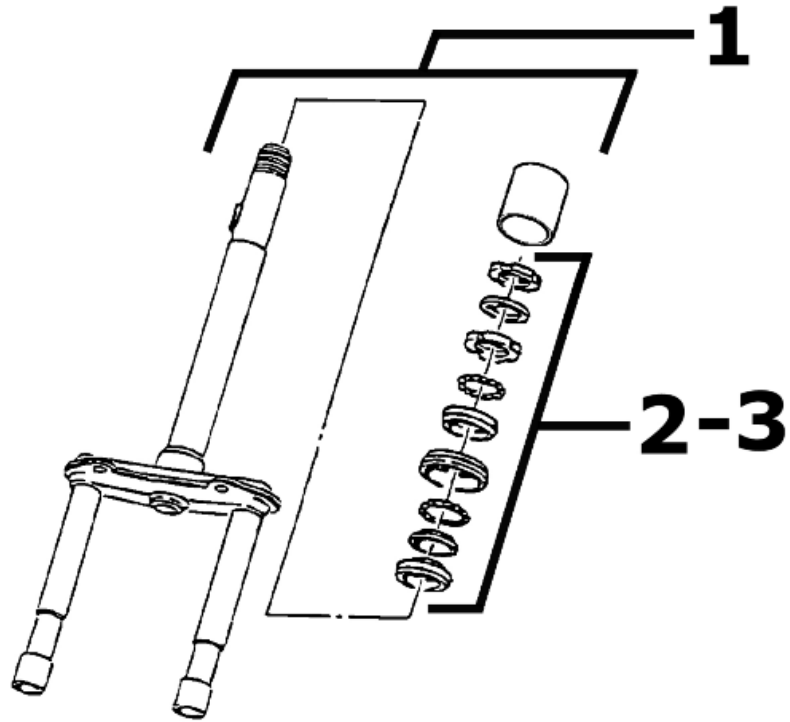
Rear shock-absorber



REAR SHOCK ABSORBER

	Code	Action	Duration
1	003007	Rear shock absorber - Removal and Refitting	

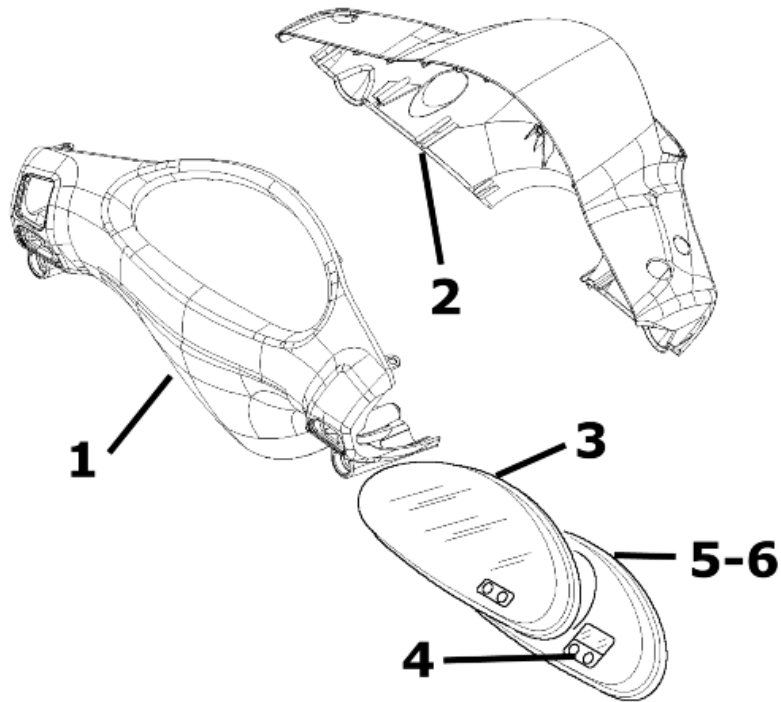
Steering column bearings



STEERING FIFTH WHEELS

	Code	Action	Duration
1	003051	Complete fork - Replacement	
2	003002	Steering fifth wheels - Replacement	
3	003073	Steering clearance - Adjustment	

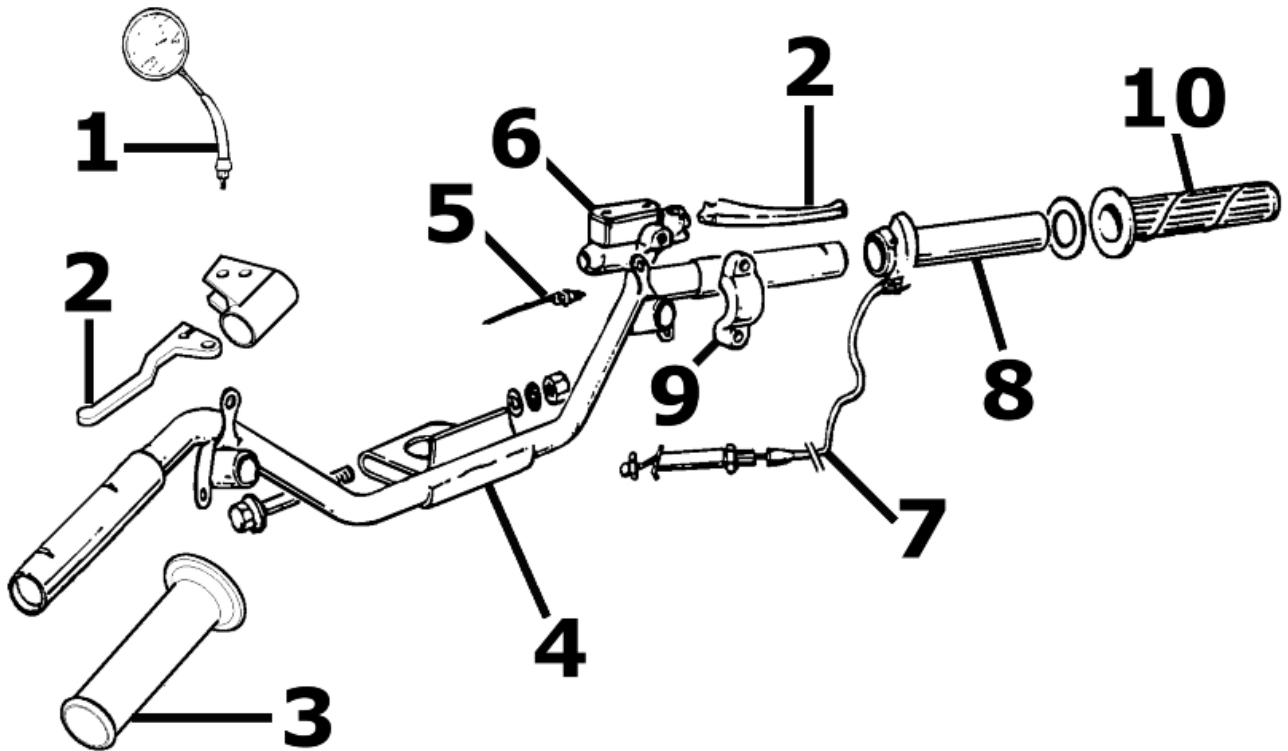
Handlebar covers



HANDLEBAR COVERS

	Code	Action	Duration
1	004019	Handlebar rear section - Replacement	
2	004018	Handlebar front section - Replacement	
3	005078	Odometer glass - Replacement	
4	005076	Clock / Cell - Replacement	
5	005014	Odometer - Replacement	
6	005038	Instrument panel warning light bulbs - Replacement	

Handlebar components

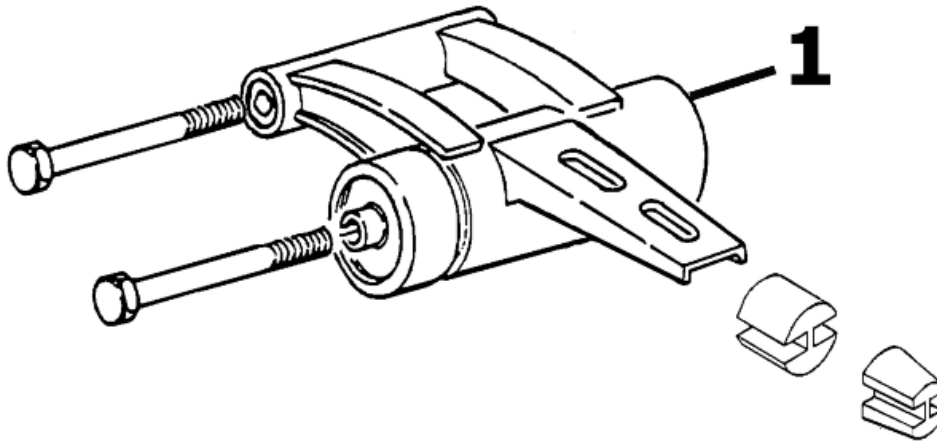


HANDLEBAR COMPONENTS

	Code	Action	Duration
1	004066	Driving mirror - Replacement	
2	002037	Brake or clutch lever - Replacement	
3	002071	Left hand grip - Replacement	
4	003001	Handlebar - Replacement	
5	005017	Stop switch - Replacement	
6	002024	Front brake pump - Removal and Re-fitting	
7	002054	Throttle or splitter transmission complete - Replacement	
8	002060	Complete throttle control - Replacement	
9	004162	Mirror support and/or brake pump fitting U-bolt - Replacement	
10	002059	Right hand grip - Replacement	

Time

Swing-arm

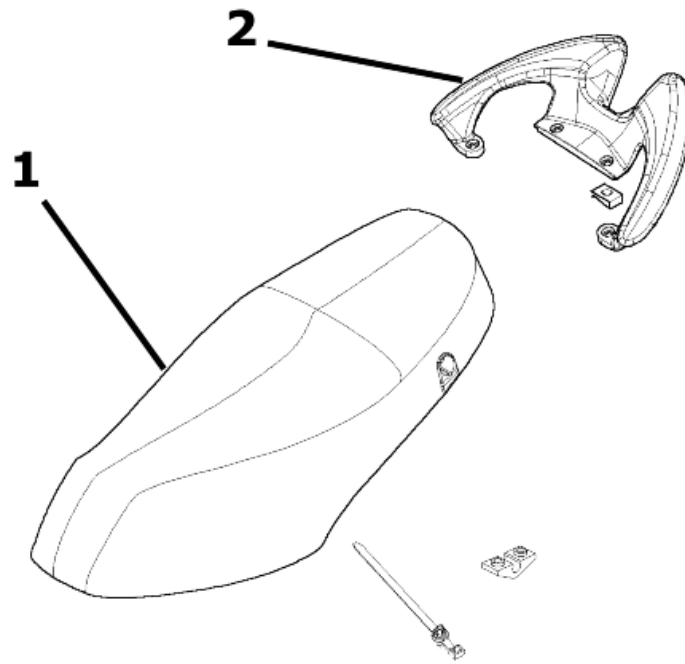


SWINGING ARM

	Code	Action	Duration
1	001072	Engine-frame connection swinging arm - Replacement	

Time

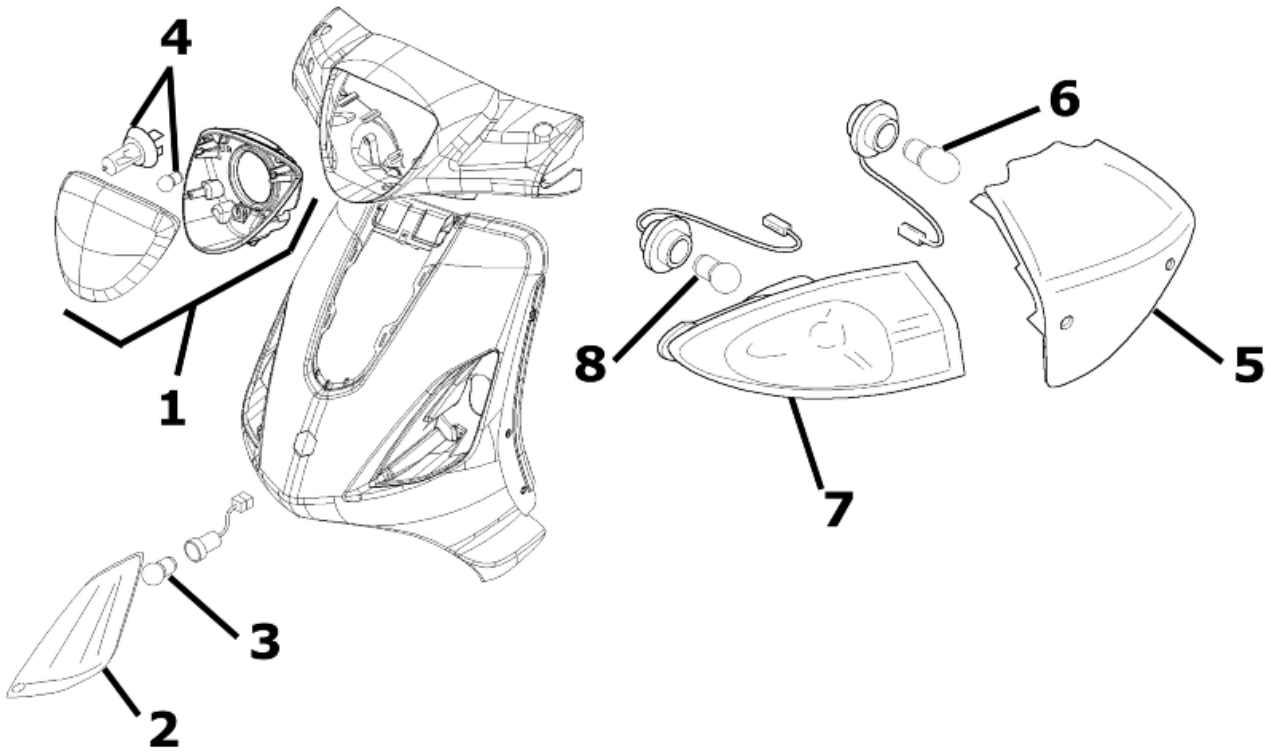
Seat



SADDLE

	Code	Action	Duration
1	004003	Saddle - Replacement	
2	004068	Passenger handgrip - Replacement	

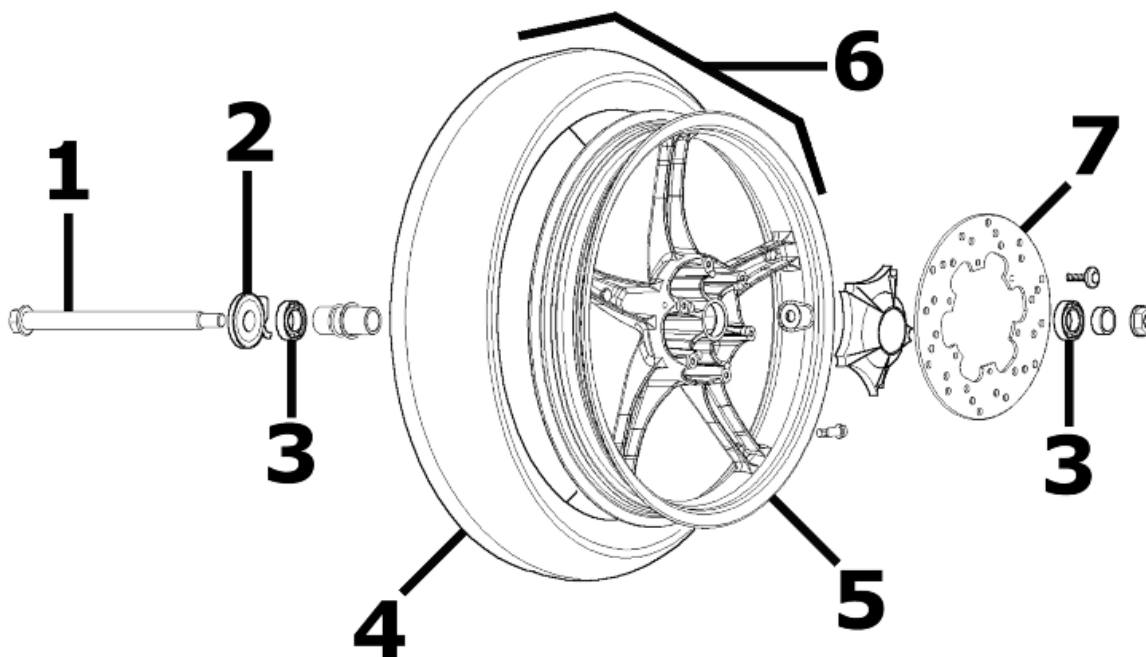
Turn signal lights



TURN INDICATOR LIGHTS

	Code	Action	Duration
1	005002	Front headlamp - Replacement	
2	005012	Front turn indicator - Replacement	
3	005067	Front turn indicator bulb - Replacement	
4	005008	Headlight bulbs - Replacement	
5	005005	Taillight - change	
6	005066	Rear light bulbs - Replacement	
7	005022	Rear turning indicators - Replacement	
8	005068	Rear turning indicator bulb - Replacement	

Front wheel



FRONT WHEEL

	Code	Action	Duration
1	003038	Front wheel axle - Remov. and refitt.	
2	002011	Odometer movement sensor - Replacement	
3	003040	Front wheel bearings - Replacement	
4	003047	Front tyre - Replacement	
5	003037	Front wheel rim - Removal and Refitting	
6	004123	Front wheel - Replacement	
7	002041	Front brake disc - Replacement	

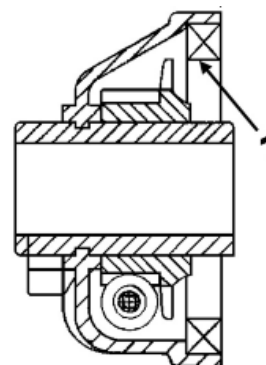
Grease tone wheel or drive

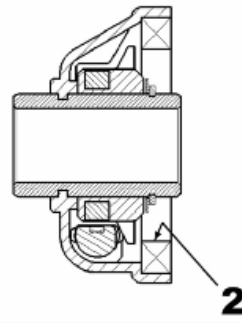
Please take note that the code has been introduced:

900001 - Tone wheel / drive greasing - 15'.

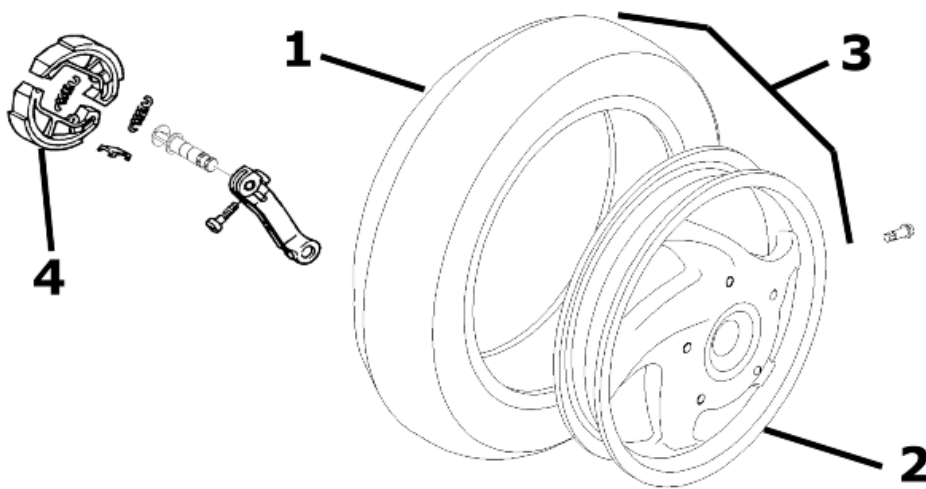
Never mistake the codes 002011 (movement sensor replacement) and 005089 (tone wheel replacement) in the event of noise of the indicated components. The grease recommended is TUTELA MRM 2 (soap-based lithium grease with Molybdenum disulphide).

In the following points we indicate with an arrow the area to be greased (1 - Drive, 2 - Tone wheel)





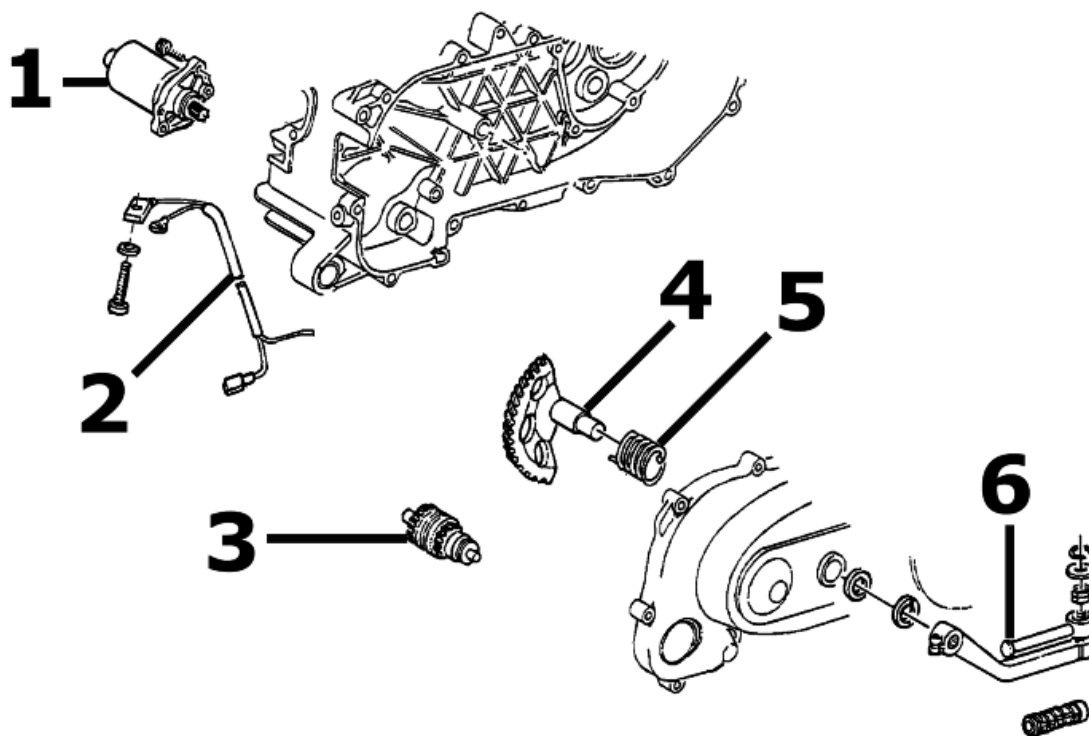
Rear wheel



REAR WHEEL

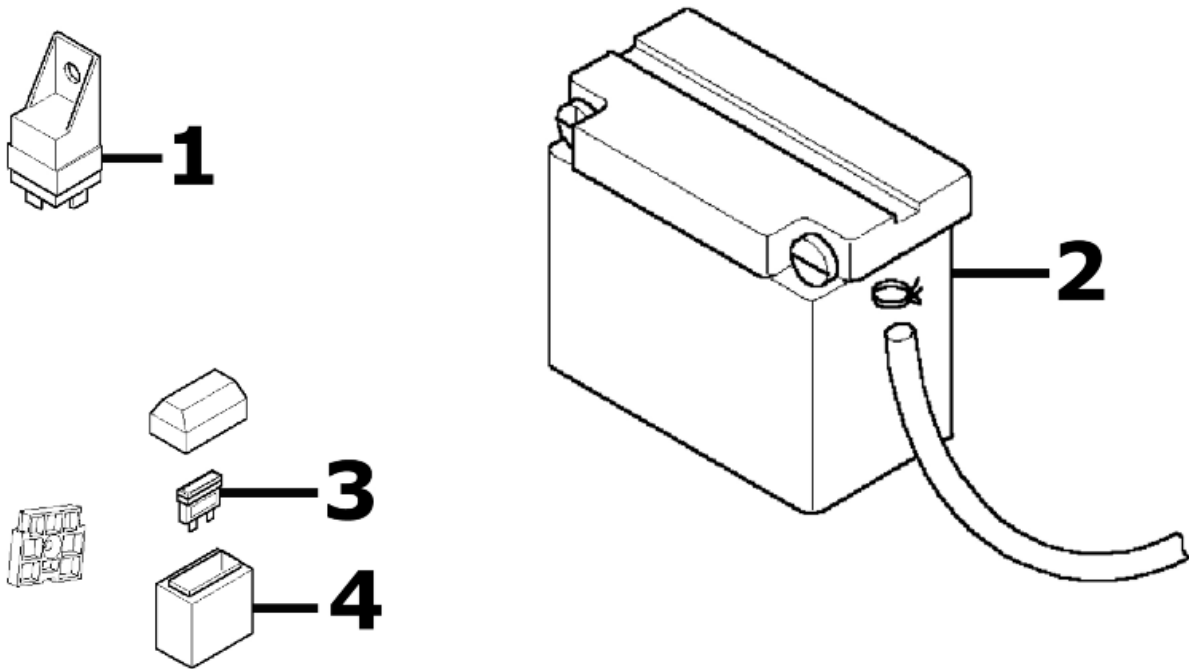
	Code	Action	Duration
1	004126	Rear wheel tyre - Replacement	
2	001071	Rear wheel rim - Removal and Refitting	
3	001016	Rear wheel - Replacement	
4	002002	Rear brake pads/shoes - Repl.	

Electric start

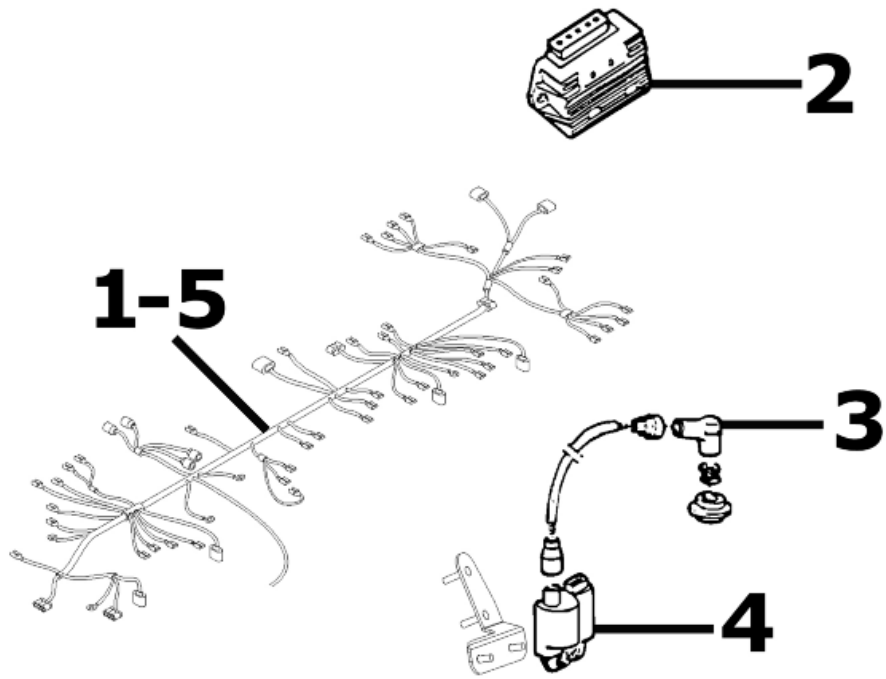


ELECTRICAL START-UP

	Code	Action	Duration
1	001020	Starter motor - Replacement	
2	005045	Starter motor cable harness - Replacement	
3	001017	Starter sprocket wheel - Replacement	
4	001021	Kick starter - Inspection	
5	008008	Starter spring pack - Replacement	
6	001084	Starter lever - Replacement	

Electric devices**ELECTRICAL DEVICES**

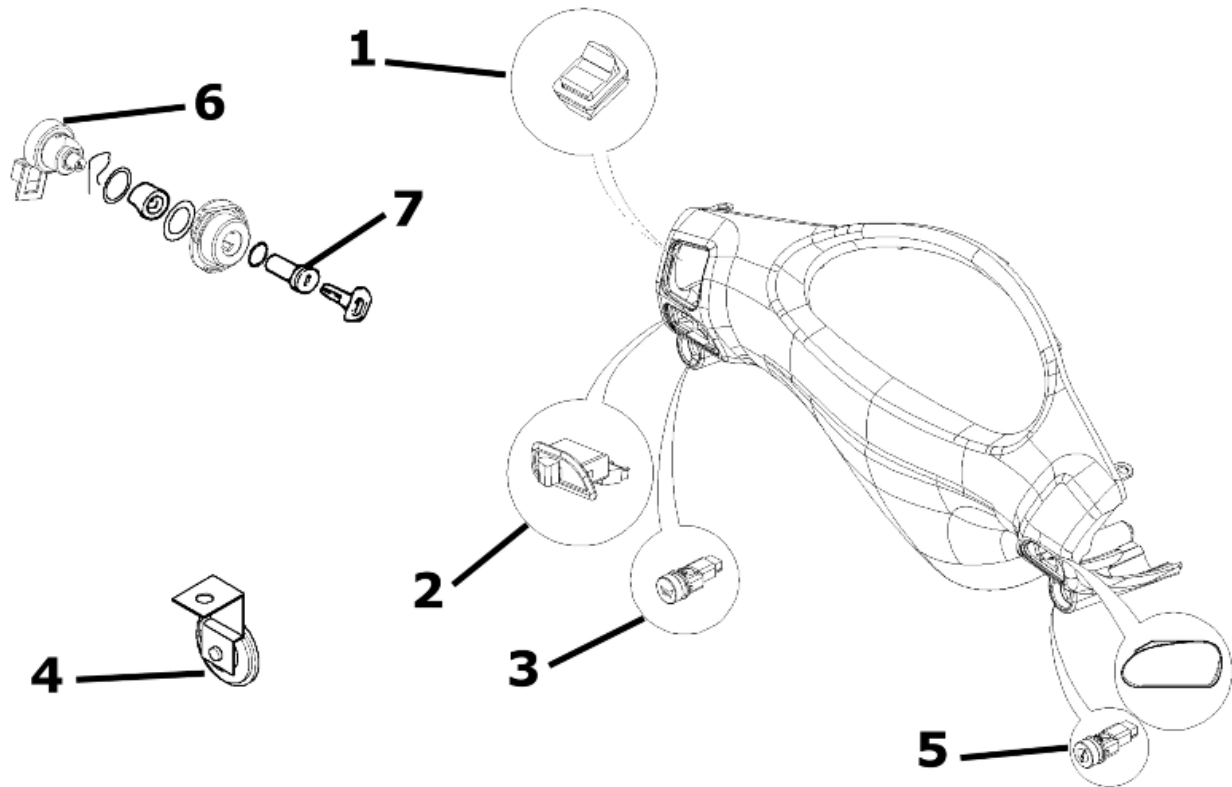
	Code	Action	Duration
1	005007	Battery - change	
2	005011	Start-up contactor - Replacement	
3	005052	Fuse (1) - Replacement	
4	005054	Fuse block (1) - Replacement	



ELECTRICAL DEVICES

	Code	Action	Duration
1	005001	Electrical system - Replacement	
2	005009	Voltage regulator - Replacement	
3	001094	Spark plug cap - Replacement	
4	001023	Control unit - Replacement	
5	005114	Electrical system - Service	

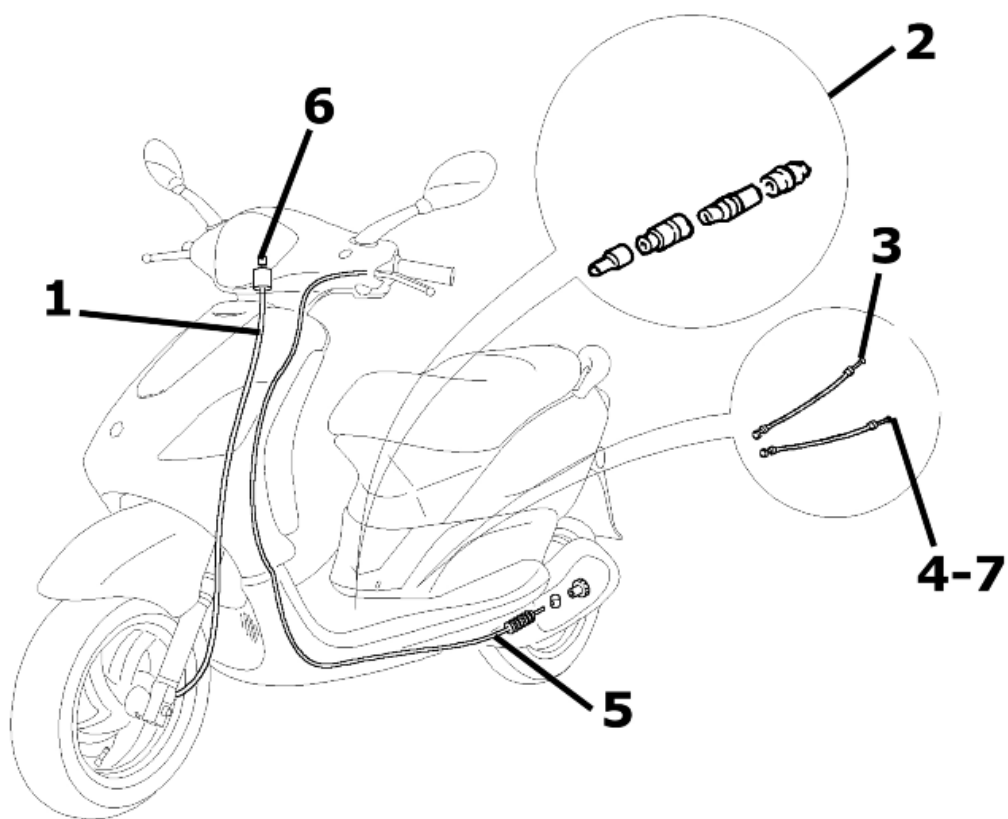
Electronic controls



ELECTRIC CONTROLS

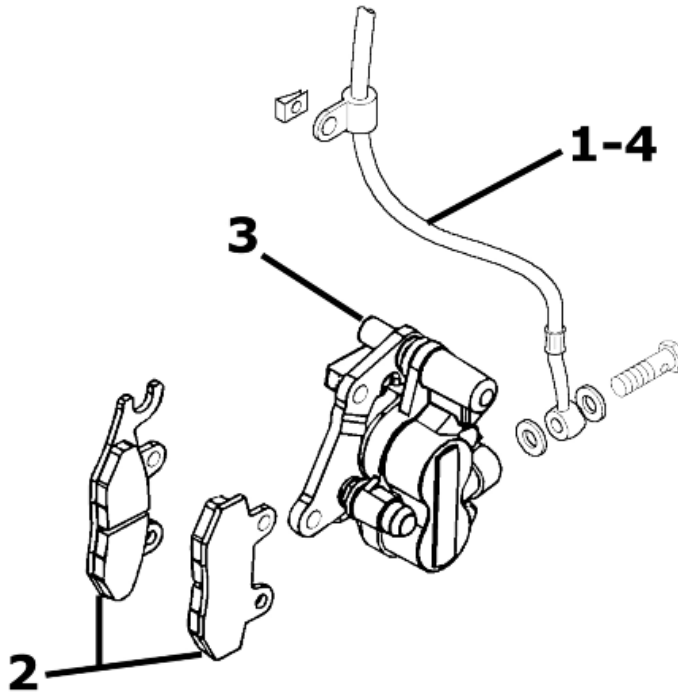
	Code	Action	Duration
1	005039	Lights switch - Replacement	
2	005006	Light or turning indicator switch - Replacement	
3	005040	Horn button - Replacement	
4	005003	Horn - Replacement	
5	005041	Starter button - Replacement	
6	005016	Key switch - Replacement	
7	004096	Lock series - Replacement	

Transmissions



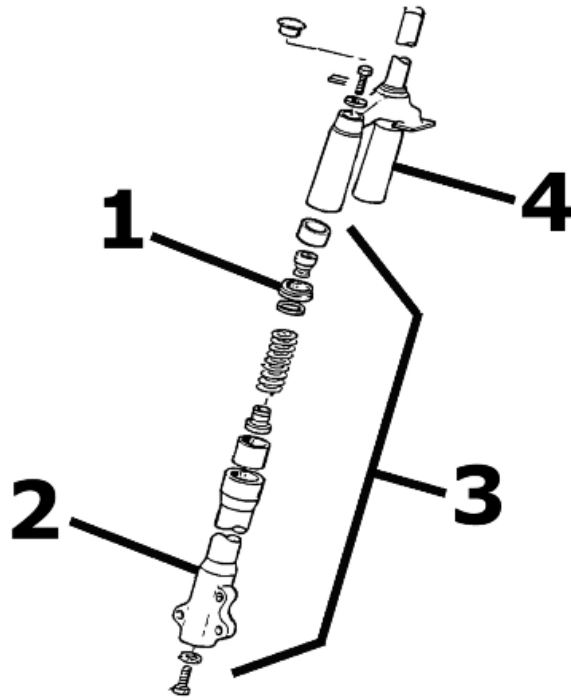
TRANSMISSION

	Code	Action	Duration
1	002051	Odometer transmission assembly - Replacement	
2	002012	Splitter - Replacement	
3	002057	Carburettor / splitter transmission complete - Replacement	
4	002058	Mix / splitter transmission complete - Replacement	
5	002053	Rear brake transmission complete - Replacement	
6	002049	Odometer cable - Replacement	
7	003061	Accelerator transmission - adjust	

Brake callipers**CALLIPER**

	Code	Action	Duration
1	002021	Front brake hose - Remov. and Refitt.	
2	002007	Front brake shoes/pads - Remov. and Refitt.	
3	002039	Front brake calliper - Removal and Refitting	
4	002047	Front brake fluid and air bleed system - Replacement	

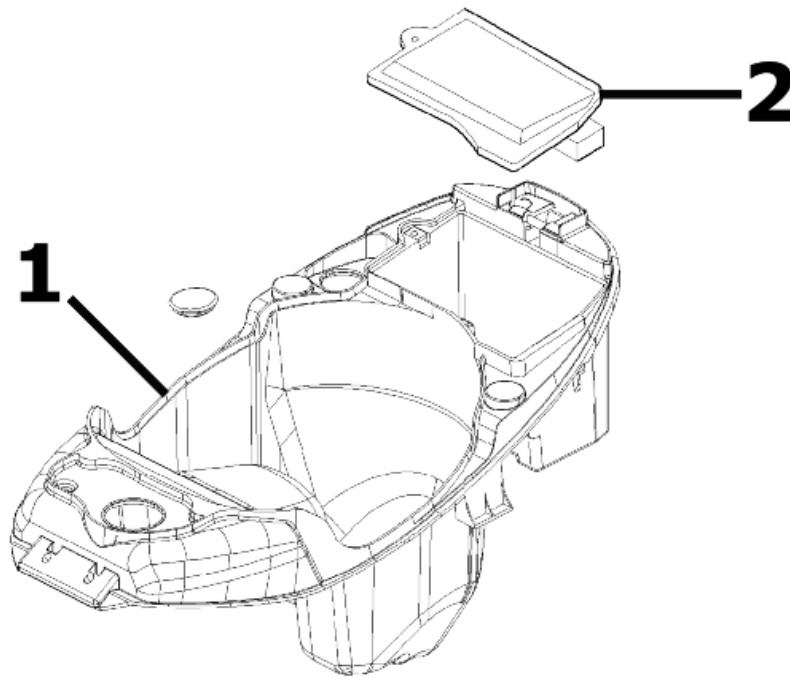
Steering column



STEERING

	Code	Action	Duration
1	003048	Fork oil seal - Replacement	
2	003076	Fork sheath - Replacement	
3	003079	Fork stem - Replacement	
4	003010	Front suspension - Service	

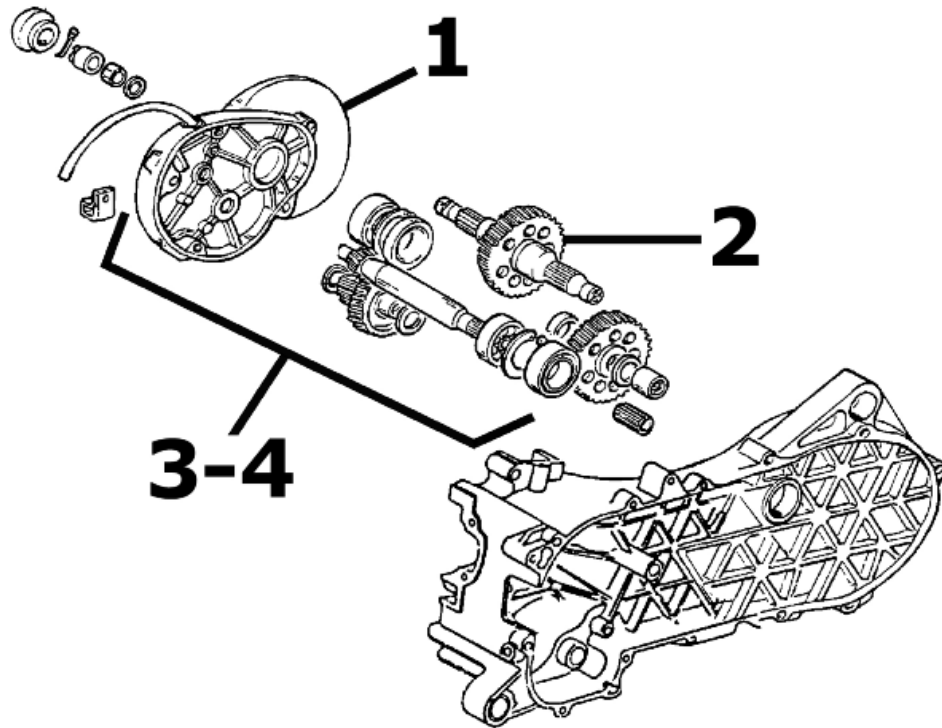
Helmet bay



HELMET COMPARTMENT

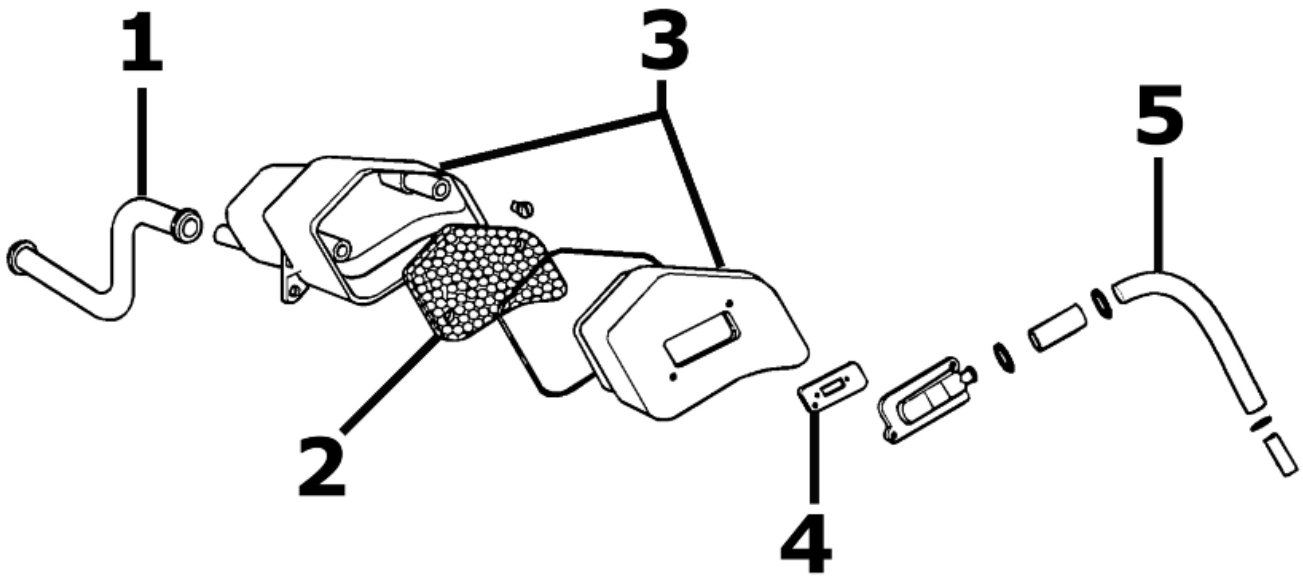
	Code	Action	Duration
1	004016	Helmet compartment - Removal and Refitting	
2	005046	Battery cover - change	

Rear wheel axle



REAR WHEEL AXLE

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

Secondary air box**SECONDARY AIR HOUSING**

	Code	Action	Duration
1	001164	Crankcase secondary air connection - Replacement	
2	001161	Secondary air filter - Replacement / Cleaning	
3	001162	Secondary air housing - Replacement	
4	001163	Muffler secondary air connection - Replacement	
5	001165	Secondary air reed - Replacement	

A

Air filter: 30

B

Battery: 40, 47, 55, 56

Brake: 101–103, 148

C

Carburettor: 11, 27, 125

E

Engine stop:

F

Fuel: 39, 90, 109, 133

H

Headlight: 33

Horn:

Hub oil: 29

I

Identification: 8

M

Maintenance: 7, 25

S

Saddle:

Shock absorbers: 98

Spark plug: 28

Stand:

Start-up:

T

Tank: 109, 133, 134

Transmission: 10, 39, 61, 123

Turn indicators:

Tyres: 10

