



PIAGGIO®

WORKSHOP MANUAL

633204



Fly



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www.piaggio.com

V.le R. Piaggio, 23 - 56025 PONTEDERA (Pi)

WORKSHOP MANUAL

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This workshop manual has been drawn up by Piaggio & C. Spa to be used by the workshops of Piaggio-Gilera dealers. This manual is addressed to Piaggio service mechanics who are supposed to have a basic knowledge of mechanics principles and of vehicle 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

CHAR

Rules

This section describes general safety rules for any interventions to be performed on the vehicle.

Safety rules

- Should it be necessary to keep the engine running while servicing, make sure that the area or room is well ventilated, and use special exhaust fans, if required. Never let the engine running in closed rooms. In fact, exhaust gases are toxic.
 - The battery electrolyte contains sulphuric acid. Protect your eyes, cloths and skin. Sulphuric acid is highly corrosive; in the event of contact with your eyes or clothes, rinse thoroughly with water and consult a doctor immediately.
 - The battery produces hydrogen, a gas that can be highly explosive. Do not smoke and avoid sparks and flames when close to the battery, especially during recharge.
 - Fuel is highly flammable, and in some conditions it can be explosive. Do not smoke in the working area, and avoid free flames or sparks.
 - Clean the brake pads in a well ventilated environment, directing the compressed air jet so as to not intake the dust produced by the wear of the friction material. Even though the latter contains no asbestos, dust inhalation is harmful.
-

Safety rules

- Use original PIAGGIO spare parts and lubricants recommended by the Manufacturer. Non-original or non-conforming spares may damage the vehicle.
 - Use only the specific tools designed for this vehicle.
 - Always use new gaskets, sealing rings and split pins upon reassembly.
 - After removal, clean the components using non-flammable or low fire-point solvent. Lubricate all working surfaces before reassembly, except for conical couplings.
 - After reassembly, check that all components have been installed properly and that they are in good working order.
 - For removal, overhaul and reassembly operations use only tools provided with metric measures. Metric bolts, nuts and screws are not interchangeable with coupling members with English measurement. Using improper coupling members and tools may impair the vehicle.
 - Should any interventions to the vehicle electric system be required, check that the electrical connections - especially earth and battery connections - have been implemented properly.
-

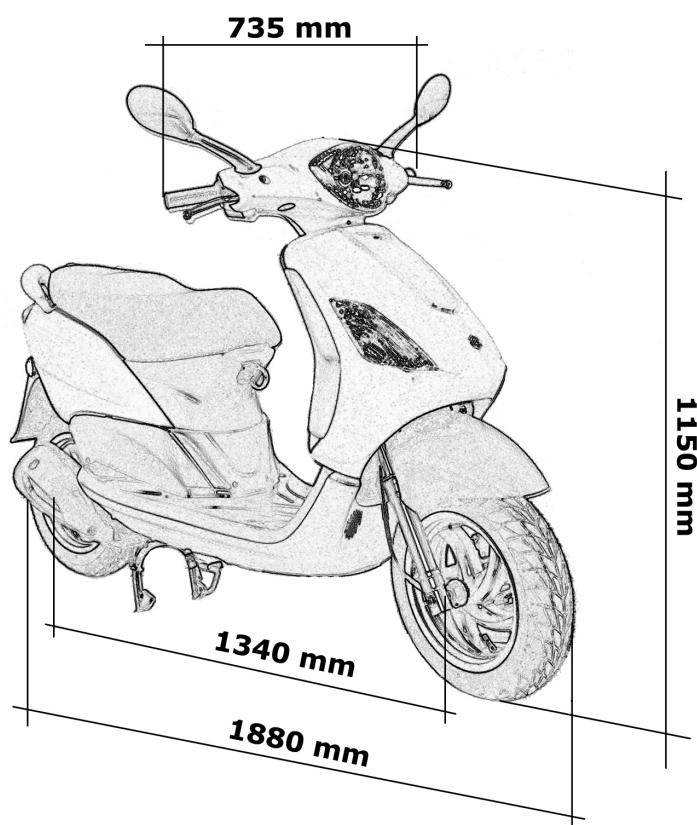
Vehicle identification

VEHICLE IDENTIFICATION

Specification	Desc./Quantity
Frame prefix	ZAPM44100 ÷ 1001
Engine prefix	C441M ÷ 1001

**Dimensions and mass****DIMENSIONS AND MASS**

Specification	Desc./Quantity
Dry weight	97 Kg
Length	1,880
Max height	1,150 mm
Seat height	785
Width	735
Wheelbase	1,340



Engine

ENGINE

Specification	Desc./Quantity
Engine type	Piaggio Hi-PER2, 2-stroke, single-cylinder
Bore x stroke	40 x 39,3 mm
Displacement	49,40 cm ³
Compression ratio	10,3 :1
Carburettor	DELLORTO PHVA 17,5
CO adjustment	3,5% ± 0,5
Engine idle	1800 ÷ 2000 g/min.
Air filter	Sponge, impregnated with mixture (50% Selenia Air Filter Oil and 50% lead-free fuel).
Starter system	starter motor/kick-start.
Lubrication	Guaranteed by oil from fuel-oil mixture and varied with engine speed and throttle opening through a pump driven by the crankshaft via toothed belt.
Fuel system	Gravity, unleaded petrol (minimum octane number 95), through carburettor.
Cooling system	forced air

Transmission

TRASMISSIONS

Specification	Desc./Quantity
Transmission	Expanding pulley type automatic speed variator with vee belt, automatic clutch and gear final drive.

Capacities

CAPACITIES

Specification	Desc./Quantity
Rear hub oil Quantity	Amount: ~ 85 cc
Oil mixer tank	In plastic, of capacity ~ 1.2 lt.
Fuel tank capacity	~ 7.2 litres (of which 1.5 l reserve)

Electrical system

ELECTRICAL COMPONENTS

Specification	Desc./Quantity
Ignition type	capacitive discharge electronic ignition with incorporated high-voltage coil.
Ignition advance variable, with microprocessor (before T.D.C.)	Fixed $17^{\circ} \pm 1$
Reccomended spark plug	CHAMPION RGN2C
Battery	12V-4Ah
Main fuse	7,5 A
Generator	In alternate current with three-second output

Frame and suspensions

FRAME AND SUSPENSIONS

Specification	Desc./Quantity
Type	Welded steel pipes with pressed sheet metal stiffening
Front suspension	Telescopic fork, 76 mm travel
Rear suspension	Single hydraulic shock-absorber 72,5 mm travel

Brakes

FRENI

Specification	Desc./Quantity
Front brake	Ø 200 mm disc hydraulically activated (lever on RHS of handlebars) and floating calliper.
Rear brake	drum brake (Ø 140 mm) with mechanical linkage.(l.h. brake lever).

Wheels and tyres

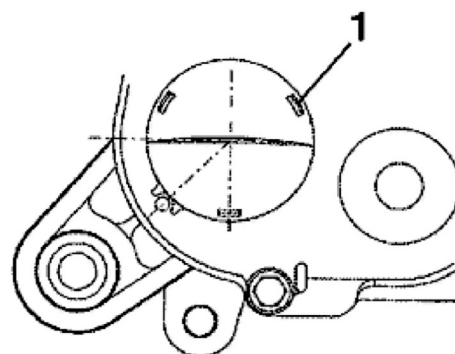
WHEELS AND TYRES

Specification	Desc./Quantity
Front wheel rim	Die cast aluminium alloy 3.50 x 12"
Front tyre	Tubeless 120/70-12"
Rear wheel rim	Die cast aluminium alloy: 3.00 x 12"
Rear tyre	Tubeless 120/70 - 12"
Tyre pressure (front wheel)	1,8 bar
Tyre pressure (rear wheel)	2 bar
Tyre pressure (rear wheel driver and passenger)	2,3 bar

Secondary air

In order to clean the sponge filters of the secondary air system, please proceed as follows:

- 1) Remove the plastic cap (1) from the transmission cover by inserting a small screwdriver through one of the three slits and pressing against the retaining spline, to release it.
- 2) Wash the polyurethane sponge filter with soap and water, then dry it with compressed air and re-locate it in its housing. Refit the intake cover minding the angle reference.
- 3) Loosen the two screws (2) fixing the SAS aluminium cover in order to reach the polyurethane sponge located inside the box; clean the sponge as indicated in 2) and refit each component, after having in the meantime ensured that the steel plate is not deformed or unable to guarantee a



perfect sealing when shut; replace if necessary.

N.B.

WHEN REFITTING THE VALVE COMPONENTS, ENSURE TO CORRECTLY PLACE THE STEEL LATH IN THE HOUSING MACHINED ON THE PLASTIC AND ALUMINIUM COVERS.

CAUTION

DURING THE OPERATION 3) ALWAYS CHECK THE LEAK TIGHTNESS OF THE TWO RUBBER SLEEVES (3) LOCATED AT THE END OF THE SECONDARY AIR DUCT; REPLACE IF NECESSARY; USE NEW ZIP TIES.

Carburettor

50cc Version

Dell'Orto

DELLORTO CARBURETTOR

Specification	Desc./Quantity
Type	PHVA 17,5 RD
Choke diameter	Ø 17,5
Adjustments reference number	8423
Maximum thrust:	53
Maximum air thrust (on body):	Ø1,5
Tapered pin stamping:	A22
Needle position (notches from top):	1
Jet mixer:	209 HA
Minimum thrust:	32
Minimum air thrust (on body):	Free
Initial minimum mixture screw opening:	1 1/2
Starter jet	50
Starter air thrust (on body)	Ø 1,5
Starter pin stroke	11 mm
Choke maximum cone	Ø 1,5

Tightening Torques

FRONT BRAKE

Name	Torque in Nm
Oil pump-hose joint	16÷20 N·m
Oil pump-caliper joint	19 ÷ 24
Calliper set screw	24 ÷ 27
Screw tightening disc	8 ÷ 10
Oil bleed screw	7 ÷ 10

FRONT SUSPENSION

Name	Torque in Nm
Lower fork fixing screw	15 ÷ 20
Front wheel spindle nut	45 ÷ 50

STEERING

Name	Torque in Nm
Steering upper ring nut	35 ÷ 40
Steering lower ring nut	8 ÷ 10
Handlebar fastening screw	50 ÷ 55

ENGINE ASSEMBLY

Name	Torque in Nm
Clutch securing ring-nut	55÷60 N·m
Starter lever screw	12÷13 N·m
Flywheel fan screws	3 ÷4 N.m
Half-crankcase coupling screw	12÷13 N·m
Exhaust/crankcase fixing bolts	22÷24 N·m
Air-box/crankcase fixing screw	4÷5 N·m
Cylinder head nuts	10÷11 N·m
Starter motor screws	12÷13 N·m
Spark plug	25÷30 N·m
Hub oil drain cap	3÷5 N·m
Hub oil dipstick	Manual
Rear hub cover screws	12÷13 N·m
Transmission cover screws	12÷13 N·m
Intake manifold screws	8÷9 N·m
Flywheel volute fixing screws	1÷2 N·m
Cylinder shroud fixing screws	3,5÷5 N·m
Stator fixing screw	3÷4 N·m

Name	Torque in Nm
Pick-up fixing screw	4÷5 N·m
Mixer fixing screw	3÷4 N·m
Brake lever-engine screw	12÷13 N·m

CHASSIS

Name	Torque in Nm
Engine swing-arm bolt*	33 ÷ 41
Frame/swing-arm bolt (*)	64÷72
Shock-absorber/frame nut (*)	20 ÷25 N·m
Shock-absorber/engine bolt (*)	33÷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 N·m
Side-stand mounting bracket fixing screw	15÷20 N·m

Overhaul data

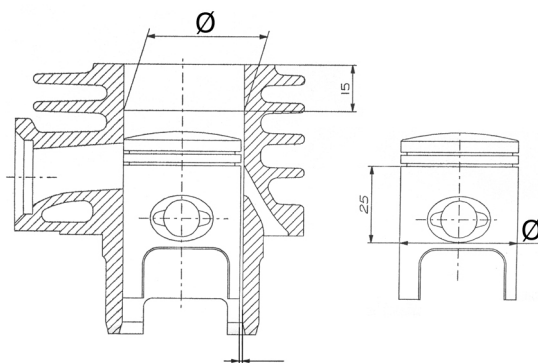
Assembly clearances

Cylinder - piston assy.

CONNECTION PISTON AND CYLINDER

Name	Play	Initials	Cylinder	Piston	Play on fitting
Cylinder	∅ 40+0,033+0,00 5	M	40,005 - 40,012	39,943 - 39,95	0,055 - 0,069
Cylinder	∅ 40+0,033+0,00 5	N	40,012 - 40,019	39,95 - 39,957	0,055 - 0,069
Piston	∅ 40-0,029-0,057	O	40,019 - 40,026	39,957 - 39,964	0,055 - 0,069
Piston	∅ 40-0,029-0,057	P	40,026 - 40,033	39,964 - 39,971	0,055 - 0,069
Cylinder first uprat	∅ 40+0,033+0,00 5	M1	40,205 - 40,212	40,143 - 40,15	0,055 - 0,069
Cylinder first uprat	∅ 40+0,033+0,00	N1	40,212 - 40,219	40,15 - 40,157	0,055 - 0,069

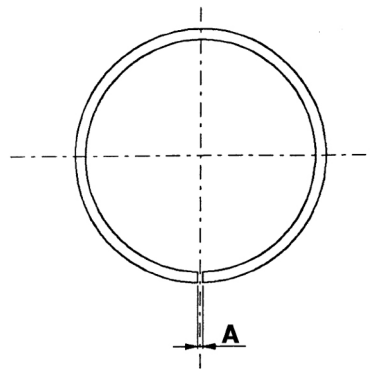
Name	Play	Initials	Cylinder	Piston	Play on fitting
	5				
Piston first up- rat.	\emptyset 40-0,029-0,057	O1	40,219 - 40,226	40,157 - 40,164	0,055 - 0,069
Piston first up- rat.	\emptyset 40-0,029-0,057	P1	40,226 - 40,233	40,164 - 40,171	0,055 - 0,069
Cylinder second uprat.	\emptyset 40+0,033+0,00 5	M2	40,405 - 40,412	40,343 - 40,35	0,055 - 0,069
Cylinder second uprat.	\emptyset 40+0,033+0,00 5	N2	40,412 - 40,419	40,35 - 40,357	0,055 - 0,069
Piston second uprat.	\emptyset 40-0,029-0,057	O2	40,419 - 40,426	40,357 - 40,364	0,055 - 0,069
Piston second uprat.	\emptyset 40-0,029-0,057	P2	40,426 - 40,433	40,364 - 40,371	0,055 - 0,069



Piston rings

UPRATING TABLE

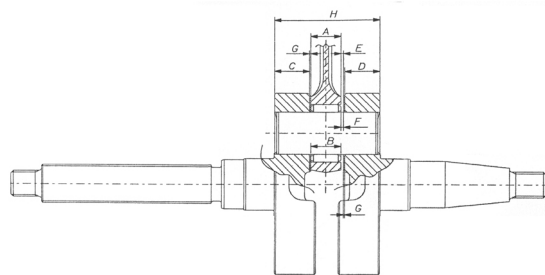
Name	Description	Dimensions	Initials	Quantity
Compression lining		40	A	0,10 ÷ 0,25
Compression lining 1° greater		40,2	A	0,10 ÷ 0,25
Compression lining 2° greater		40,4	A	0,10 ÷ 0,25



Crankcase - crankshaft - connecting rod

END PLAY BETWEEN DRIVING SHAFT AND CONNECTING ROD

Name	Description	Dimensions	Initials	Quantity
Connecting rod		11,750-0,05	A	E = 0,25 ÷ 0,50
Packing washer		0,5 ± 0,03	G	E = 0,25 ÷ 0,50
Half shaft transmission side		13,75+0,040	C	E = 0,25 ÷ 0,50
Half shaft flywheel side		13,75+0,040	D	E = 0,25 ÷ 0,50
Spacing tool		40,64	H	E = 0,25 ÷ 0,50
Cage		11,80-0,35	B	F = 0,20 ÷ 0,75

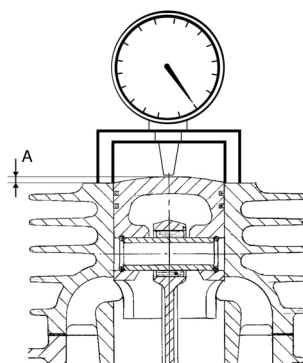


Slot packing system

- Fit the cylinder without positioning the base gasket
- Position a dial gauge on the special tool and zero it on rectified surface.
- Fix the tool on the top of the cylinder using two nuts to fix it to the studs and then bring the piston

to T.D.C.

- The gasket thickness to be adopted varies with the measurement. For this reason gaskets with three different thicknesses are available as spares.



Specific tooling

020272Y Tool for checking the position of the piston

PACKING SYSTEM

Name	Measure A	Thickness
Packing	2,80 ÷ 3,04	0,4
Packing	3,04 ÷ 3,24	0,6
Packing	3,25 ÷ 3,48	0,8

Products

TABLE OF RECOMMENDED PRODUCTS

Product	Description	Specifications
TUTELA ZC 90	Rear hub oil	SAE 80W/90 Oil that passes API GL3 specifications
SELENIA HI Scooter 2 Tech	Oil for flexible transmission lubrication (acceleration control, mixer and km counter)	Oil for two-stroke motors
SELENIA Air Filter Oil	Oil for air filter sponge	Mineral oil with specific additive for increasing the ISO VG 150
SYSTEM TW 249 AREXONS	Grease (brake/acceleration command levers)	Compound calcium soap grease NGLI 1-2
SELENIA HI Scooter 2 Tech	Mixer Oil	Synthetic oil that passes API TC ++ specifications
TUTELA TOP 4	Brake fluid	Synthetic fluid SAE J1703, NHTSA 116 DOT 4, ISO 4925
MONTBLANC MOLYBDENUM GREASE	Grease for driven pulley shaft compensating ring and mobile driven pulley sliding seat	Molybdenum bisulphide grease
TUTELA ZETA 2	Grease for steering, seats of pin and swing arm	Lithium soap and zinc oxide grease NLG12
TUTELA MRM2	Grease for driven pulley bushing and mobile driven pulley seat	Bisulphide soap grease with Molybdenum NLGI2




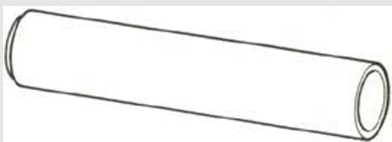


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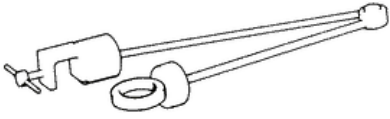


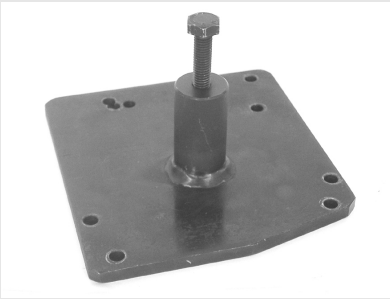
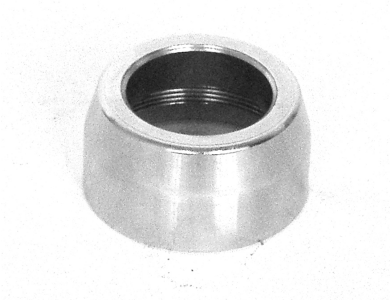
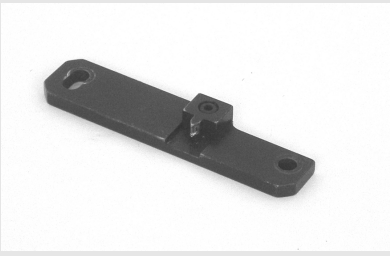
TOOLING



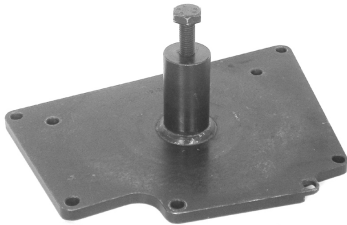


TOOL

TOOLS

Stores code	Description	
001330Y	Steering seat installer, to be fitted with parts: 001330Y009-For lower seat, 001330Y013-For upper seat	
001467Y006	20-mm pliers	
001467Y007	Bell for bearings external Ø 54 mm	
001467Y009	Bell for bearings external Ø 50 mm	
001467Y013	15-mm pliers	
001467Y014	15 mm pliers	

Stores code	Description	
001467Y017	Bell for bearings external Ø 39 mm	
001467y021	11 mm bearing clip	
002465Y	Pliers for snap rings	
006029y	Drift for fitting thrust ring seats on steering tube	
020004Y	Drift for removing thrust rings from steering head tube	
020055Y	Steering tube ring nut spanner	

Stores code	Description	
020150Y	Support for air heater "METABO HG 1500/2"	
020151Y	Air heater "METABO HG 1500/2"	
020162y	Flywheel extractor	
020163y	Crankcase splitting plate	
020164y	Half-pulleys fixing sheath	
020165y	Starter sprocket retainer	

Stores code	Description	
020166y	Piston rings fixing tool	 A set of three black metal tools used for piston rings. It includes a small cylindrical cap, a longer cylindrical rod with a threaded end, and a handle with a tapered end.
020261Y	Kick-starter spring assembler	 A black metal tool with a T-shaped handle and a circular base with a central hole and a smaller hole on the side.
020262Y	Crankcase detachment plate	 A black metal plate with a central vertical hole and a smaller hole on the side, used for crankcase detachment.
020265y	Bearing fitting stand	 A black metal stand with a rectangular frame and a central vertical hole, used for bearing fitting.
020325y	Pliers for brake-shoe springs	 A pair of black metal pliers with long handles and pointed jaws, used for brake-shoe springs.

Stores code

Description

020329Y

Pump MITYVAC



020330Y

Stroboscopic gun for two- and four-stroke engines



020331Y

Digital multimeter



020332Y

Digital rpm counter

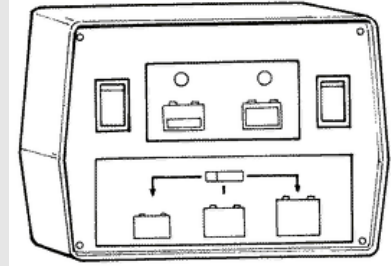


Stores code

Description

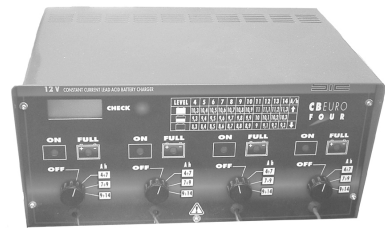
020333Y

Single battery charger



020334Y

Multiple battery charger



020335Y

Magnetic stand and comparator



020350y

Electric system diagnostic device

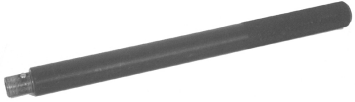






020357Y

32 x 35 mm adaptor

020359Y

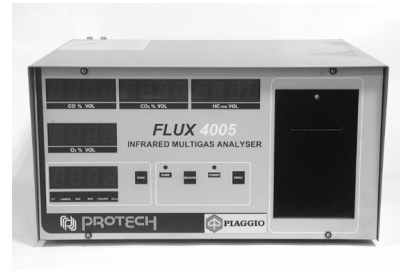
42 x 47 mm hub bearing fitting

Stores code	Description	
020376Y	adaptor Handle for punches	
020412Y	15 mm guide	
020456Y	Ø 24 mm adaptor	
020483Y	30 mm guide	
020565Y	Compass flywheel stop spanner	

Stores code**Description**

494929

Exhaust gas analyser



INDEX OF TOPICS

MAINTENANCE

MAIN

Maintenance chart
EVERY 2 YEARS
Action

 Brake fluid - Change

AT 1000 KM OR 4 MONTHS
Action

 Hub Oil - Replacement

 Oil mixer/throttle linkage - Adjust

 Speedometer cable - Grease

 Steering - Adjust

 Brake levers - Grease

 Brake fluid level - Check

 Nuts, bolts and fasteners - Check

 Electrical system and battery - Check

 Tires-inflation and wear - Check

 Vehicle and brake test - Road test

AT 5000 KM OR 12 MONTHS, 25000 KM, 35000 KM AND 55000 KM
Action

 Hub oil level - Check

 Spark plug/Electrode gap - Change

 Air filter - cleaning

 Oil mixer/throttle linkage - Adjust

 Brake levers - Grease

 Brake pads - Check condition + wear

 Brake fluid level - Check

 Electrical system and battery - Check

 Tires-inflation and wear - Check

 Vehicle and brake test - Road test

AT 10000 KM OR 24 MONTHS AND 50000 KM
Action

 Hub Oil - Replacement

 Spark plug/spark gap - replacement

 Air filter - cleaning

 Idle speed/Fuel (*) - Adjust

Action

Oil mixer/throttle linkage - Adjust

Variator rollers - Change

Speedometer cable - Grease

Transmission Belt - Check

Steering - Adjust

Brake levers - Grease

Brake pads - Check condition + wear

Brake fluid level - Check

Transmissions - Lubricate

Nuts, bolts and fasteners - Check

Suspensions - Check

Electrical system and battery - Check

Headlight - Adjust

Tires-inflation and wear - Check

Vehicle and brake test - Road test

(*) See CO regulation in the «Adjusting the engine idle» section

AT 15000 KM AND 45000 KM

Action

Hub oil level - Check

Spark plug/spark gap - replacement

Air Filter - Cleaning

Oil mixer/throttle linkage - Adjust

Transmission Belt - Replacemen

Brake levers - Grease

Brake pads - Check condition + wear

Brake fluid level - Check

Electrical system and battery - Check

Tires-inflation and wear - Check

Vehicle and brake test - Road test

SAS box (sponge) (**) - Clean

SAS suction cap (sponge) (**) - Clean

(**) See rules in the «Secondary Air System» section

AT 20000 KM AND 40000 KM

Action

Hub Oil - Replacement

Spark plug/Electrode gap - Change

Air filter - cleaning

Idle speed/Fuel (*) - Adjust

Cylinder cooling system - Check/Clean

Oil mixer/throttle linkage - Adjust

Transmission Belt - Check

Variator rollers - Change

Fuel-oil mixer belt - Change

Speedometer cable - Grease

Steering - Adjust

Brake levers - Grease

Brake pads - Check condition + wear

Brake fluid level - Check

Transmissions - Lubricate

Nuts, bolts and fasteners - Check

Suspensions - Check

Electrical system and battery - Check

Headlight - Adjust

Tires-inflation and wear - Check

Vehicle and brake test - Road test

(*) See CO regulation in the «Adjusting the engine idle» section

AT 30000 KM

Action

Hub Oil - Replacement

Spark plug/spark gap - replacement

Air filter - cleaning

Idle speed/Fuel (*) - Adjust

Oil mixer/throttle linkage - Adjust

Transmission Belt - Check

Transmission Belt - Replacemen

Variator rollers - Change

Speedometer cable - Grease

Steering - Adjust

Action

Brake levers - Grease

Brake pads - Check condition + wear

Braking circuit hose - Replacement

Brake fluid level - Check

Transmissions - Lubricate

Nuts, bolts and fasteners - Check

Suspensions - Check

Electrical system and battery - Check

Headlight - Adjust

Tires-inflation and wear - Check

Vehicle and brake test - Road test

SAS box (sponge) (**) - Clean

SAS suction cap (sponge) (**) - Clean

(*) See CO regulation in the «Adjusting the engine idle» section (**) See rules in the «Secondary Air System» section

AT 60000 KM

Action

Hub Oil - Replacement

Spark plug/spark gap - replacement

Air filter - cleaning

Idle speed/Fuel (*) - Adjust

Cylinder cooling system - Check/Clean

Oil mixer/throttle linkage - Adjust

Transmission Belt - Replacemen

Variator rollers - Change

Fule-oil mixer belt - Change

Speedometer cable - Grease

Steering - Adjust

Brake levers - Grease

Brake pads - Check condition + wear

Braking circuit hose - Replacement

Brake fluid level - Check

Transmissions - Lubricate

Nuts, bolts and fasteners - Check

Suspensions - Check

Action

Electrical system and battery - Check

Headlight - Adjust

Tires-inflation and wear - Check

Vehicle and brake test - Road test

SAS box (sponge) (**) - Clean

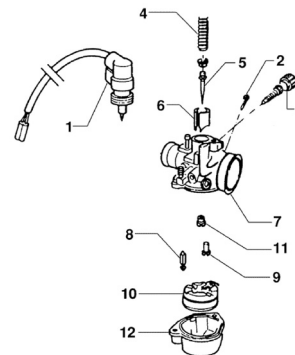
SAS suction cap (sponge) (**) - Clean

(*) See CO regulation in the «Adjusting the engine idle» section (**) See rules in the «Secondary Air System» section

Carburettor

Disassemble all carburettor components, accurately wash them in solvent, then dry them with compressed air. To ensure thorough cleaning, pay special attention to the passages in the carburettor body.

- Carefully check the condition of all components.
- The **throttle** must slide freely in the chamber, if the play is excessive because of wear, replace the throttle.
- Replace the carburettor if the chamber shows signs of wear as to prejudice the valve's regular seal or free sliding (though it is new).
- When reassembling the carburettor, it is a good rule to replace the gaskets.


WARNING

PETROL IS HIGHLY EXPLOSIVE. ALWAYS FIT NEW SEALS AND GASKETS TO PREVENT LEAKAGE.

1. Automatic choke device - 2. Idle air adjusting screw - 3. Idle adjusting screw - 4. Throttle valve spring - 5. Conical needle - 6. Throttle valve - 7. Carburettor body - 8. Needle - 9. Idle jet - 10. Float - 11. Main jet - 12. Float bowl.

Checking the spark advance

- The check must be carried out at over 4,000
-

rpm with a strobe light. The spark advance must be 17° before the T.D.C.

- This value is correct when the reference mark shown on the flywheel cover is aligned with that machined on the cooling fan and the phase-shifter on the strobe light is set onto 17° .

N.B.

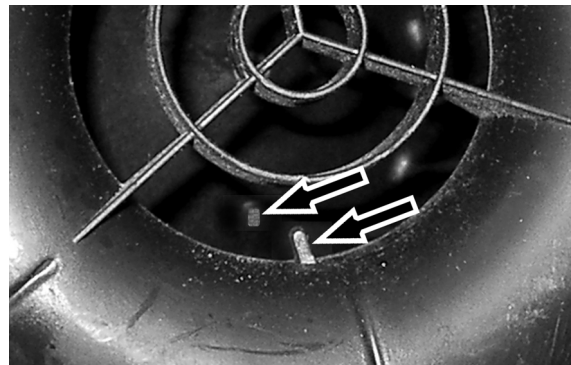
IN THE EVENT OF IRREGULAR OPERATION, PERFORM THE CHECKS LISTED IN THE ELECTRICAL CIRCUIT CHAPTER.

CAUTION

BEFORE PERFORMING THE ABOVE MENTIONED INSPECTIONS, CHECK THE FLYWHEEL IS CORRECTLY KEYPED ONTO THE CRANKSHAFT

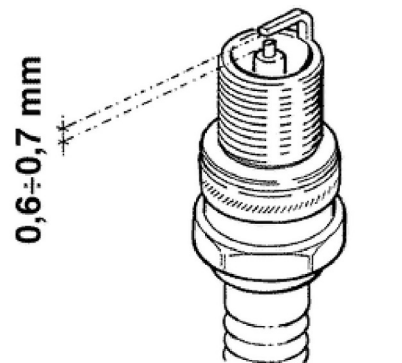
Specific tooling

020330Y Stroboscopic gun for two- and four-stroke engines



Spark plug

- Rest the vehicle on its centre-stand;
 - Remove the central flap, shown in the figure, by loosening the two fixing screws;
 - Detach the H.T. cable cap from the spark plug;
 - Remove the spark plug using the supplied box spanner;
 - Examine the spark plug conditions, the insulator integrity, and measure the spark gap using a suitable feeler gauge;
 - Proceed by adjusting the spark gap by carefully bending the outer electrode.
- If defective, replace the spark plug with new of the prescribed model;
- Insert the spark plug in with the correct inclination, screwing it in by hand, hence tighten it using the supplied box



-spanner at the prescribed torque; -Reattach the spark plug cap; -Refit the central flap.

CAUTION

THE SPARK PLUG REMOVAL MUST BE CARRIED OUT WITH THE ENGINE COLD. THE SPARK PLUG MUST BE REPLACED EVERY 5,000 KM. THE USE OF NON APPROVED ELECTRONIC IGNITION DEVICES OR SPARK PLUGS OTHER THAN THE PRESCRIBED MODEL MAY SERIOUSLY DAMAGE THE ENGINE.

Characteristic

Reccomended spark plug

CHAMPION RGN2C

Electric characteristic

Electrode gap

0,6 ÷ 0,7 mm.

Locking torques (N*m)

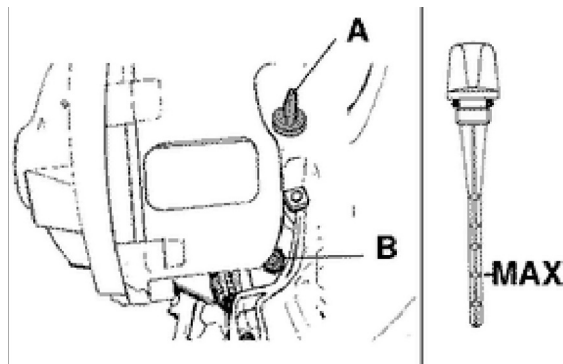
Spark plung 25 - 30 Nm

Hub oil

Check

To check the correct oil level, proceed as follows:

- 1) Place the vehicle on the stand on level ground.
- 2) Unscrew oil dipstick «A», wipe it with a clean rag, reinsert it and screw it in fully.
- 3) Pull out the dipstick and check that the oil level is in the middle (two-notch dipstick) or reaches the middle notch (three-notch dipstick).
- 4) Reinsert the dipstick and screw it in fully.



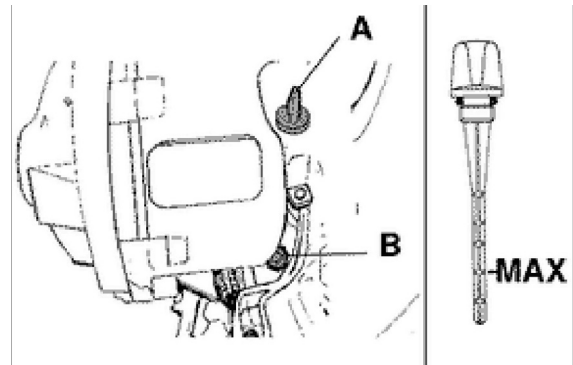
Recommended products

TUTELA ZC 90 Rear hub oil

SAE 80W/90 Oil that passes 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).

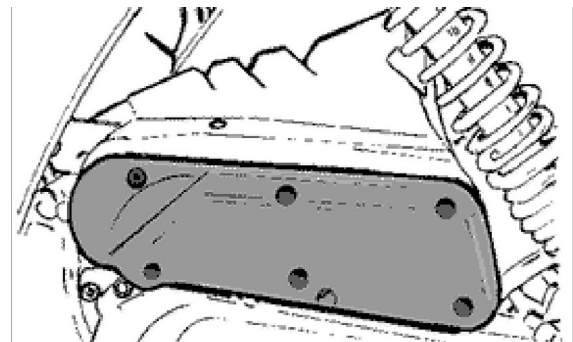


Air filter

- Remove the cleaner plug by unloosing the 6 fixing screws. Remove the filtering element.

Cleaning:

- Wash with water and neutral soap.
- Dry with a clean cloth and small jets of compressed air.
- Soak with a 50% fuel/oil mixture.
- Let the filtering element drain and then squeeze it with your hands without crushing it.
- Let it dry and refit it. Mineral oil with special additives to increase its adhesiveness ISO VG 150



CAUTION

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

Recommended products

Selenia Air Filter Oil Air filter sponge oil

Mineral oil with specific additives to increase adhesion ISO VG 150

Checking the ignition timing

- Adjust the control cables:
- Mixer cable: see "Mixer timing" procedure, below.

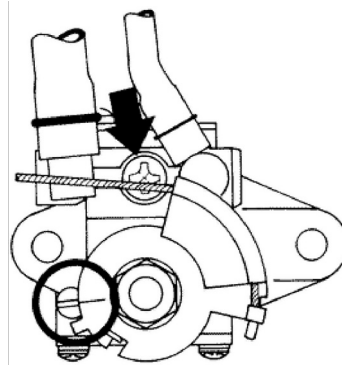
Throttle cable: adjust the screw on the carburettor so that there is no play on the sheath.

Splitter control cable: adjust the screw on the throttle grip on the handlebar so that there is no play on the twist grip.

All cables must be adjusted so that there is no play on their sheaths.

Mixer timing

- Adjust via the transmission screw on the crank-case, with the throttle cable released, the reference machined on the rotating plate which must be aligned to that shown on the mixer body as indicated in the figure. While performing this operation the engine must be fed with a 2% oil-fuel mixture (at least 0.5 litres if the tank is empty).



CAUTION

WHEN RUNNING OUT OF OIL OR REMOVING THE OIL TANK, FOLLOW THE MIXER BLEEDING OPERATIONS AS FOLLOWS: REFILL THE OIL TANK, WITH THE MIXER FITTED ONTO THE ENGINE, AND THE ENGINE NOT RUNNING, DETACH THE MIXER TUBE FROM THE CARBURETTOR AND LOOSEN THE BLEED SCREW (SEE ARROW IN FIGURE) UNTIL OIL STARTS FLOWING OUTWARDS. RECONNECT THE INLET TUBE TO THE CARBURETTOR, FIXING IT WITH THE APPROPRIATE METALLIC CLAMP.

Recommended products

SELENIA HI Scooter 2 Tech Mixer Oil

Synthetic oil that passes API TC ++ specifications

Braking system

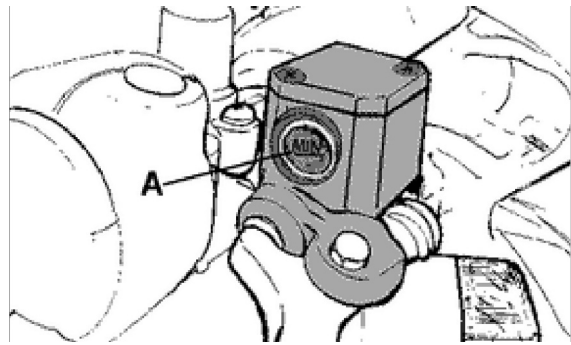
Level check

Proceed as follows:

- Rest the vehicle onto its centre-stand and align the handlebars;

- Check the liquid level through the inspection hole «A».

A certain decrease in the liquid level is due to the wear of the pads.



Top-up

Use the following procedure:

Loosen the two screws, remove the reservoir cap, remove the gasket and top up only with the prescribed fluid without exceeding the maximum level.

CAUTION

BRAKE FLUID TYPE TUTELA TOP 4

CAUTION

KEEP THE BRAKE FLUID AWAY FROM THE SKIN, THE EYES AND CLOTHING. IN CASE OF CONTACT, RINSE GENEROUSLY WITH WATER.

CAUTION

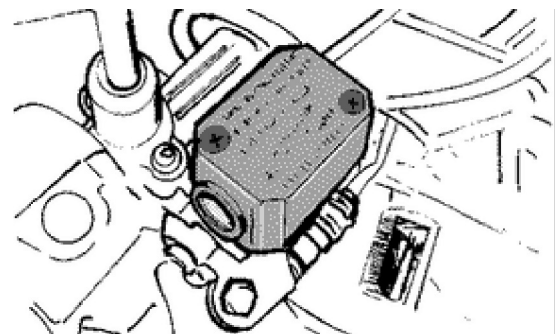
THE BRAKE FLUID IS HIGHLY CORROSIVE. TAKE CARE NOT TO SPILL IT ON THE PAINTWORK.

CAUTION

THE BRAKE FLUID IS HYGROSCOPIC, I.E. IT ABSORBS HUMIDITY FROM THE AIR. IF THE HUMIDITY CONTAINED IN THE FLUID EXCEEDS A GIVEN CONCENTRATION, THE BRAKING ACTION BECOMES INSUFFICIENT. NEVER DRAW THE FLUID FROM OPEN OR PARTLY EMPTY CONTAINERS. UNDER NORMAL CLIMATIC CONDITIONS THE FLUID SHOULD BE RENEWED EVERY 20,000 KM, OR IN ANY CASE EVERY TWO YEARS.

N.B.

CHANGE THE BRAKE FLUID AND BLEED THE SYSTEM AS DESCRIBED IN CHAPTER BRAKING SYSTEM



Recommended products

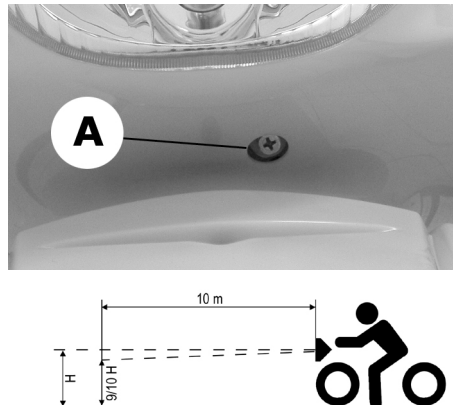
TUTELA TOP 4 Brake fluid

Synthetic fluid SAE J1703, NHTSA 116 DOT 4,
ISO 4925

Headlight adjustment

Proceed as follows:

1. Place the vehicle, in riding order and with the tyres inflated to the prescribed pressure, on flat ground, 10 m away from a half-lit white screen. Ensure the vehicle axis is perpendicular to the screen;
2. Turn the headlight on and check the projection of the light beam is between $7/10$ and $9/10$ of the distance measured from the ground to the centre of the headlight;
3. Adjust the headlight as necessary, via screw «A».



WARNING

THE PROCEDURE DESCRIBED ABOVE COMPLIES WITH THE "EURONORM" CONCERNING THE MAX. AND MIN. HEIGHT OF THE LIGHT BEAM OF A ROAD VEHICLE. PLEASE CHECK WITH THE LOCAL AUTHORITIES FOR WHAT REQUIREMENTS MUST BE FULFILLED IN EVERY SINGLE COUNTRY WHERE THE VEHICLE IS TO BE 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

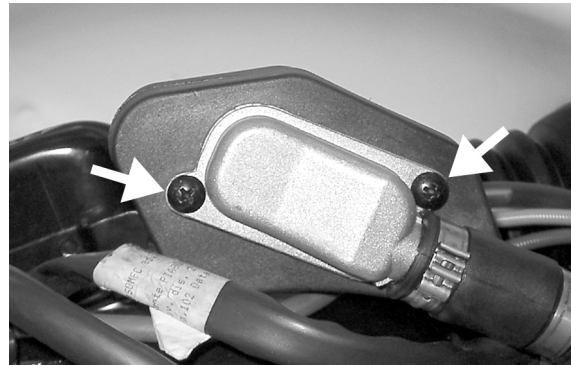
Specific tooling

020320Y Exhaust gases analyser

020332Y Digital rpm counter

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



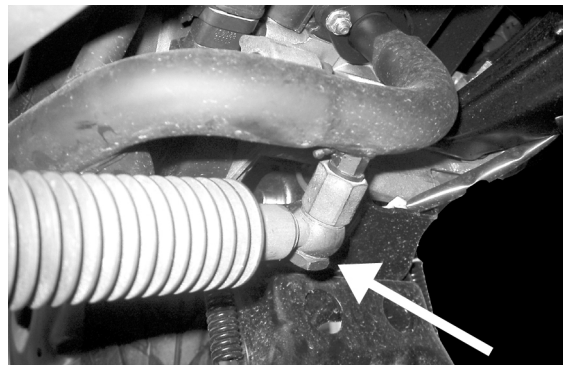
- Place a plastic sheet between the one-way valve and the aluminium outlet as shown in the figure



- 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

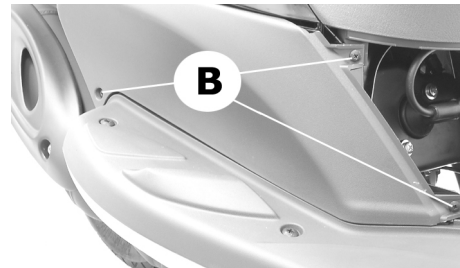
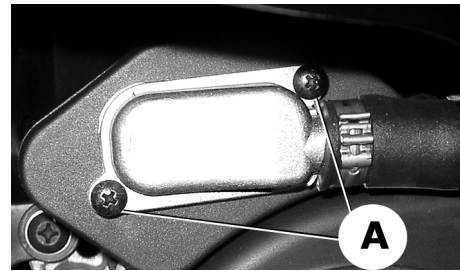
020332Y Digital rpm counter

020625Y Exhaust gases collecting kit

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 is for finding solutions to solve problems.

A list of possible causes is provided for each problem and related operations.

Engine

Poor performance

POOR PERFORMANCE

Possible Cause	Work
Carburettor jets or fuel cock clogged or dirty	Remove, wash in solvent and dry with compressed air
Excessive carbon deposits on cylinder ports and in combustion chamber	Decoke
Poor compression: worn compression rings or cylinder	Check parts and replace if necessary
Silencer clogged by excessive carbon deposits	Replace silencer and check carburation and mixer timing
Air filter clogged or dirty	Clean
Choke failure (it remains inserted)	Check mechanical sliding, circuit continuity, power supply, and electrical connections
Clutch slippage	Check and if necessary replace the centrifugal weights and/or clutch housing
Defective sliding of movable pulleys	Check parts and replace if necessary. Lubricate the driven pulley with Montblanc-Molibdenum Grease (drg. 498345).
Worn driving belt	Replace
Carburettor jets clogged or dirty	Remove, wash in solvent and dry with compressed air
Fuel filter on vacuum cock obstructed	Replace cock filter
Worn rollers; presence of oil; dirt	Check presence of the plug with filter on the transmission cover; clean the speed variator; replace worn rollers

Rear wheel spins at idle

REAR WHEEL

Possible Cause	Work
Idle speed set too high	Adjust slow running speed and C.O, if necessary.
Faulty clutch	Check springs/weight of friction and clutch housing pan
Air filter box not sealed	Refit filter box. Replace if it is damaged

Starting difficulties
STARTING DIFFICULTIES

Possible Cause	Work
Carburettor jets clogged or dirty	Remove, wash in solvent and dry with compressed air
Fuel cock failure	Check that the fuel comes through the feed pipe when the engine is started, with the throttle closed; if not, replace the vacuum cock
Choke failure	Check: electrical connections, circuit continuity, mechanical sliding and power supply
Spark plug faulty or electrodes gap incorrect	Check spark plug and electrodes gap. Replace if necessary
Battery is down	Check the battery charge condition. If the battery shows signs of sulfation, replace it. Before installing the new battery, charge it for eight hours with a current corresponding to 1/10 of the capacity of the battery
Engine flooding	Open the throttle wide and try to start the engine. If the engine does not start, remove the spark plug, run the engine with throttle open making sure the cap is connected to the spark plug and the spark plug is earthed, far from the hole. Fit a dry spark plug and start the engine.
Wrong fuel specifications	Drain the fuel and then refuel
Spark plug defective	Brush clean and restore the correct gap between electrodes, or replace with a plug of recommended type. Remember that many engine problems are attributable to the use of an unsuitable spark plug
Intake manifold cracked or clips not tightened	Renew intake manifold and check sealing on head
Cleaner-carburettor union damaged	Replace

Excessive oil consumption/Exhaust smoke
EXCESSIVE CONSUMPTION

Possible Cause	Work
Excessive carbon deposits on cylinder ports and in combustion chamber	Decoke

Engine tends to cut-off at full throttle

ENGINE TENDS TO CUT OUT AT FULL THROTTLE

Possible Cause	Work
Maximum jet dirty - lean carburetion	Wash with solvent and dry with compressed air
Fuel cock failure	Check that the fuel comes through the feed pipe when the engine is started, with the throttle closed; if not, replace the vacuum cock
Water in the carburettor	Empty the basin by the special drain
Float valve faulty	Check float sliding and needle valve operation
Float valve defective	Check float and needle sliding
Fuel vent pipe clogged	Restore the proper tank aeration

Engine tends to cut-off at idle

ENGINE TENDS TO STOP WHEN IDLING

Possible Cause	Work
Idle nozzle dirty	Wash with solvent and dry with compressed air
The choke stays open	Check: electrical connections, circuit continuity, mechanical sliding and power supply
The reed valve does not close	Check / replace the reed pack
Slow running incorrectly tuned up	Tune up slow running and check C.O. level
Spark plug faulty	Replace spark plug with an equivalent part having the prescribed heat grade. Check electrodes gap

High fuel consumption

EXCESSIVE CONSUMPTION

Possible Cause	Work
Air filter clogged or dirty	Clean
Inefficient starter	Check: electric connections, circuit continuity, mechanical sliding, and presence of power

Excessive exhaust noise

INCREASED EXHAUST NOISE

Possible Cause	Work
Secondary air metal pipeline is worn	Check pipeline sealing on crankcase and box, check presence and correct assembly of plug with filter on transmission cover.
Secondary air circuit components faulty	Check components and pipeline, check correct assembly. Replace components if they are damaged

SAS malfunctions

LOOSENESS OF RUBBER UNION OF SECONDARY AIR TUBE TO SILENCER

Possible Cause	Work
Secondary air reed blocking	Replace
Secondary air filter clogged	Clean filter and box
Secondary air union to silencer clogged	Decoke the union taking care not to let the carbon deposits fall inside the silencer

Transmission and brakes

Clutch grabbing or performing inadequately

CLUTCH DEFECTIVE

Possible Cause	Work
Jerky or irregular operation	<p>Check that the weights shift and return smoothly.</p> <p>Check that there is no grease on the weights.</p> <p>Check that the contact surface of the clutch weights with the housing is at the centre, and that the 3 weights have the same specifications.</p> <p>Check that the clutch housing is not scored or does not show anomalous signs of wear. Never run the engine without the clutch housing.</p> <p>Check that the plug with filter on the transmission cover is there</p>

Insufficient braking

BRAKING SYSTEM FAILURE

Possible Cause	Work
Insufficient braking force	<p>The rear brake (drum brake) is adjusted by setting the relative registers (on the wheel), remembering that the wheels must turn freely when the brake levers are fully released.</p> <p>The braking action should start when brake levers are pulled at 1/3 of their travel.</p> <p>Check wear of brake pads. If there are problems that cannot be overcome simply by normal adjustment of the control linkages, proceed to inspect the pads and front brake disc, the shoes and the rear drum.</p> <p>If surfaces are excessively worn or scored, replace the affected parts as necessary</p>
Air bubbles in the braking hydraulic system	Carefully bleed the hydraulic system (spring ac-

Possible Cause

Work

	tion of the brake lever should not be felt)
Fluid leakage	Spring connections, piston gaskets or brake pump failure. Replace
Worn fluid	Change the front brake fluid and restore correct level in the pump
Cables not sliding properly in sheaths	Lubricate or replace
Noisy brake	Check pads and/or shoes wear

Brakes overheating

BRAKES OVERHEATING

Possible Cause

Work

Defective piston sliding	Check the caliper and replace any damaged parts
Brake disc or drum deformed	Check by means of a dial gauge the disc levelness with the wheel correctly mounted, or concentricity of the rear drum

Electrical system

Battery

BATTERY

Possible Cause

Work

Battery	This one component of the system needs checking more frequently and servicing more carefully than any other. If the vehicle is to stand idle for any length of time (one month or longer), the battery will need recharging periodically. The battery discharges completely over a period of around 5 - 6 months. When fitting the battery to the vehicle, take care not to switch the connections: the black earth lead is connected to the negative terminal and the red lead to the positive terminal marked +. To charge the battery, follow the instructions described in Chapter ELECTRICAL EQUIPMENT.
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Steering and suspensions

Rear wheel

REAR WHEEL

Possible Cause	Work
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 STIFF

Possible Cause	Work
Unacceptable tightening	Check the tightening torque of the upper and lower collar. If the steering fails to turn smoothly even when correctly tightened, inspect the bearing races and replace if they show signs of uneven wear

Excessive steering play

EXCESSIVE STEERING PLAY

Possible Cause	Work
Excessive steering play	Check the tightening torque of the upper and lower collar. If the steering fails to turn smoothly even when correctly tightened, inspect the bearing races and replace if they show signs of uneven wear

Noisy suspension

NOISY SUSPENSION

Possible Cause	Work
Noisy suspension	If the front suspension is noisy, check: efficiency of front suspension; condition of the ball bearings and relative locking nuts; rubber stroke end bumpers; sliding bushes

Suspension oil leakage

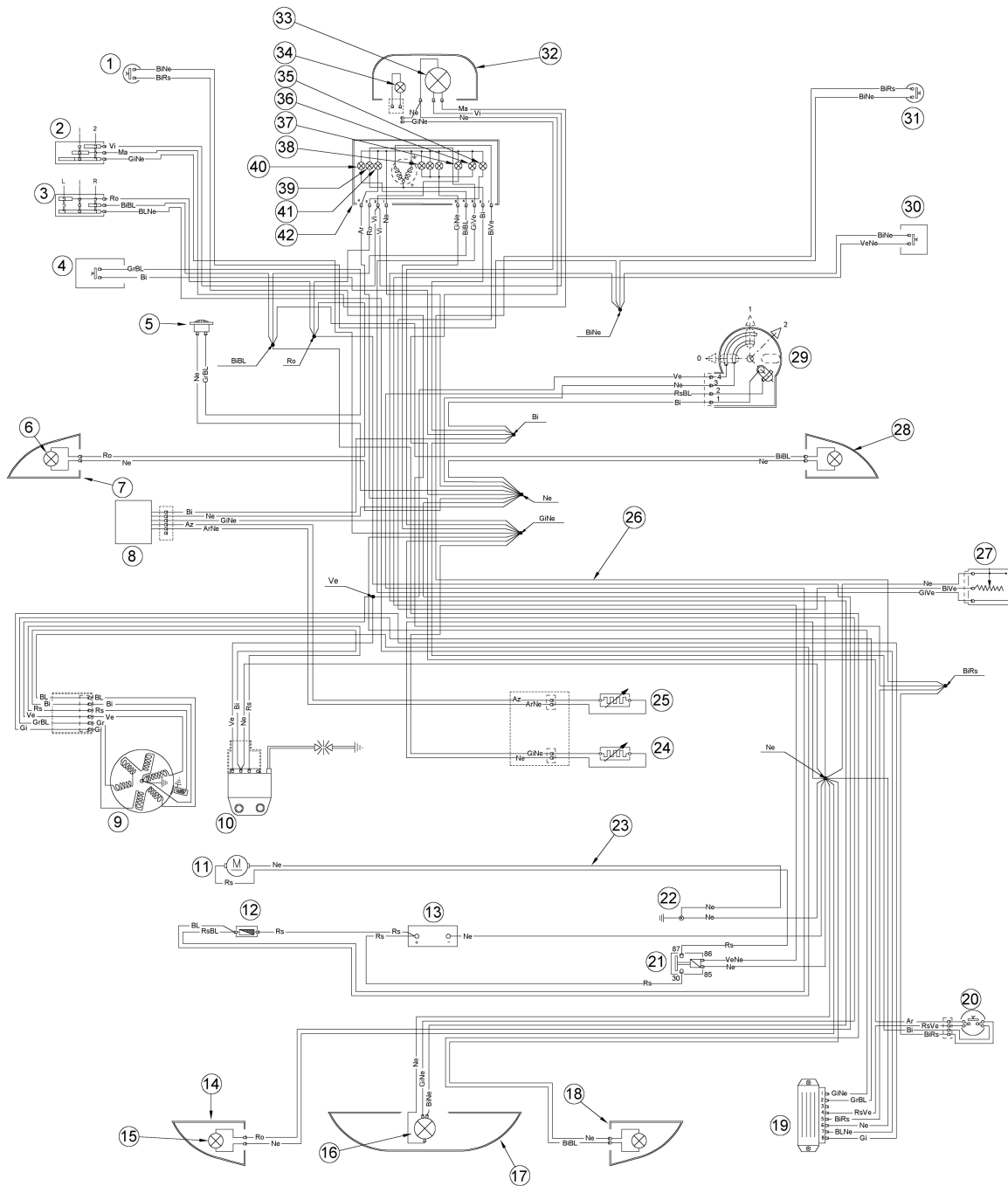
OIL LEAKING FROM SUSPENSION

Possible Cause	Work
Oil leaking from suspension	Check pumping elements and condition of sleeves and sealing rings. Replace if damaged.

INDEX OF TOPICS

ELECTRICAL SYSTEM

ELE SYS



SCHEMA IMPIANTO ELETTRICO

Specification

Desc./Quantity

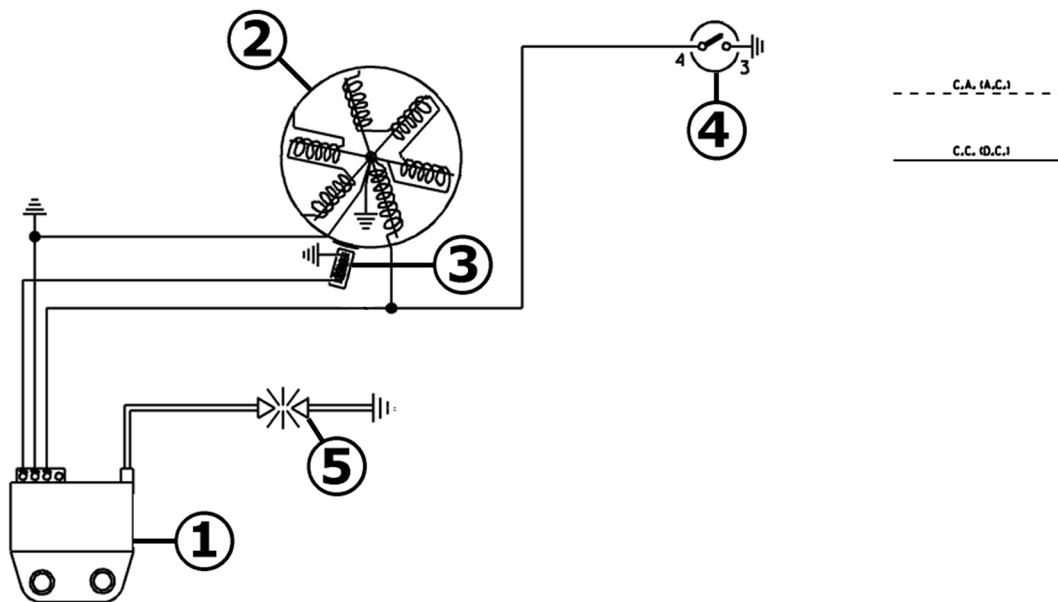
Specification	Desc./Quantity
1 Stop switch on rear brake	
2 Light switch with flash	
3 Commutatore lampeggiatori	
4 Horn button	
5 Horn	
6 Front direction indicator lights	12V-10W x 2

	Specification	Desc./Quantity
7	Front L.H. turn signal light	
8	Dispositivo comando riscaldatore	
9	Volano magnete	
10	Control device ignition	
11	Motorino avviamento	
12	Fuse holder	
13	Battery	12V - 4Ah
14	Rear L.H. turn signal light	
15	Rear direction indicator lights	N° 2, 12V-10W, spherical
16	Parking and stop light bulbs	Type: SPHERICAL Voltage supply/Power: 12V 21/5W Quantity: 1
17	Fanale posteriore completo	
18	Rear R.H. turn signal light	
19	Voltage regulator	
20	Comando spia olio mix	
21	Starter relay	
22	Earth (-)	
23	gruppo cavetti motorino avviamento	
24	Automatic starter	
25	Carburettor heater	
26	Gruppo cavetti del telaio	
27	Trasmettitore livello carburante	
28	Front R.H. turn signal light	
29	Ignition key-switch	
30	Pulsante avviamento	
31	Pulsante stop freno anteriore	
32	Proiettore	2 lampade 12V - 15W (anabbagliante)
33	Headlight bulb	12V-35/35W
34	Front parking light bulb	Type: BAYONET Voltage supply/Power: 12V 5W Quantity: 1
35	left turn indicator warning light	12V-2W
36	Spia luci	12V 1,2W
37	High beam warning light bulb	12V-1,2W
38	Instrument light bulbs	Type: BAYONET

Specification	Desc./Quantity	
	Voltage supply/Power: 12V 1,2W Quantity: 3	
39	Fuel reserve indicator	
40	Right turn indicator warning light	12V-2W
41	Stop light bulb	12V - 1.2W
42	Contachilometri con spie e strumento indicatore di livello	

Conceptual diagrams

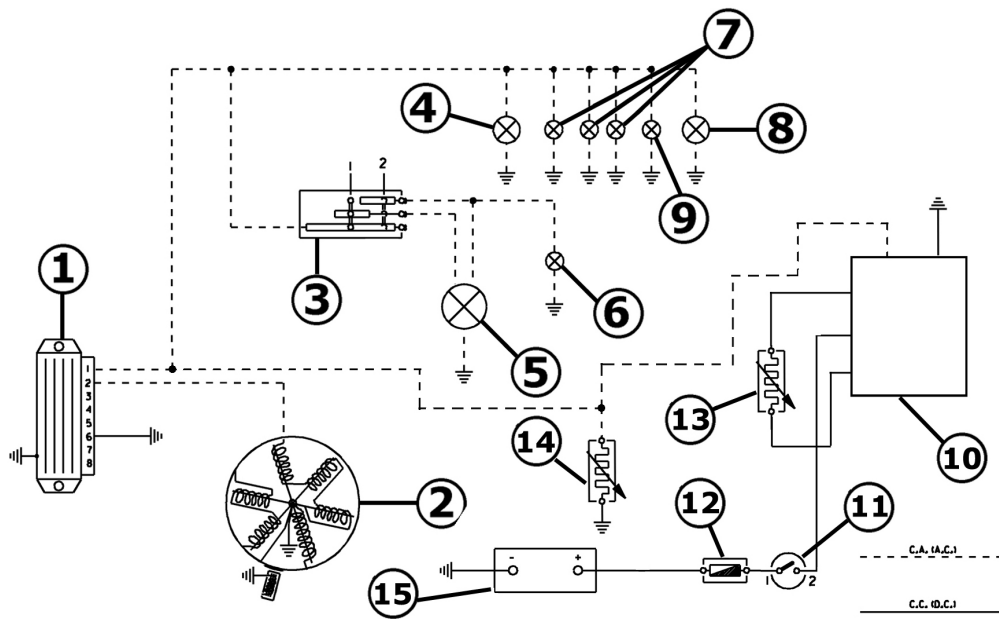
Ignition



IGNITION

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

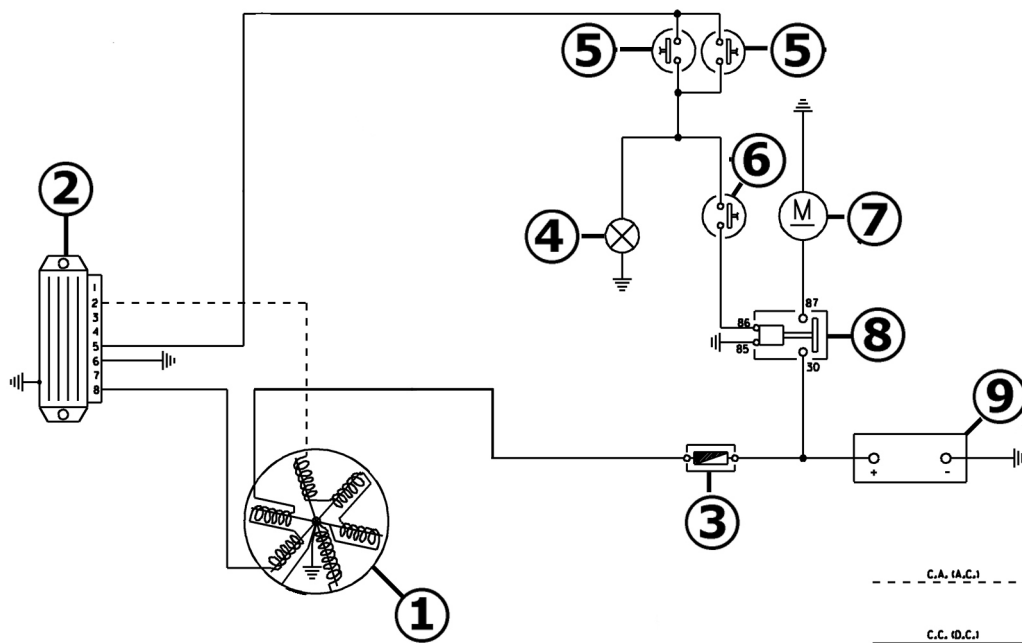
Headlights and automatic starter section



LIGHTS

	Specification	Desc./Quantity
1	Voltage regulator	
2	Magneto flywheel	
3	Light switch with flash	
4	Rear light bulb	12V - 5W
5	Headlight bulb	12V-35/35W
6	High beam warning light bulb	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	Dispositivo comando riscaldatore	
11	Heater control device	
12	Fuse 7,5A	
13	Carburettor heater	
14	Automatic starter	
15	Battery	12V - 4Ah

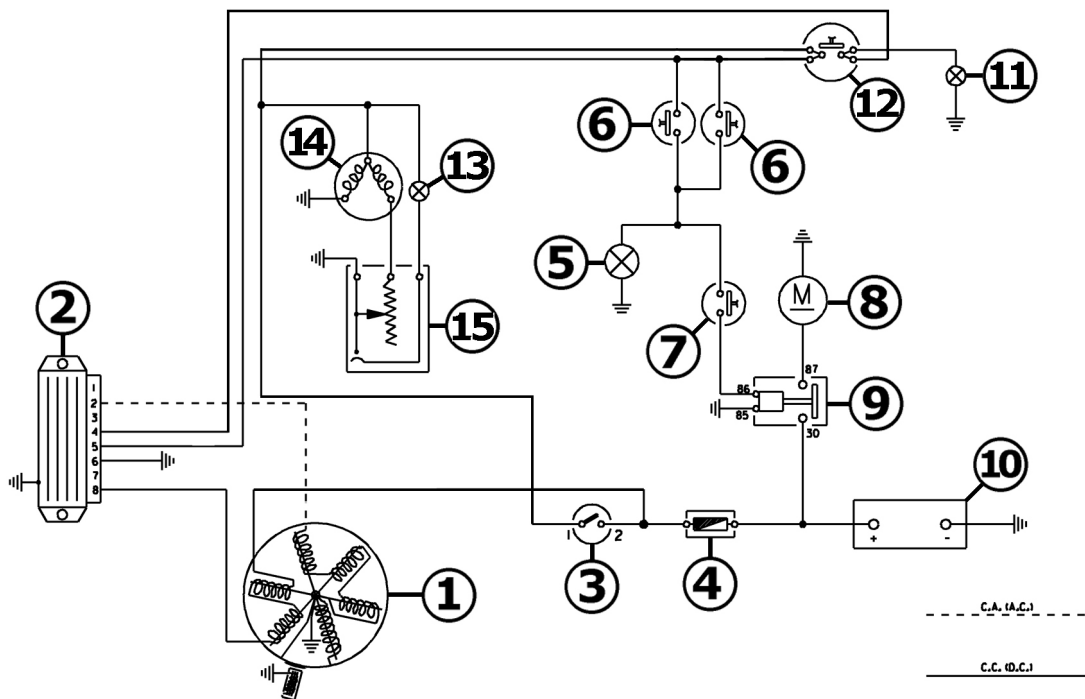
Battery recharge and starting



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

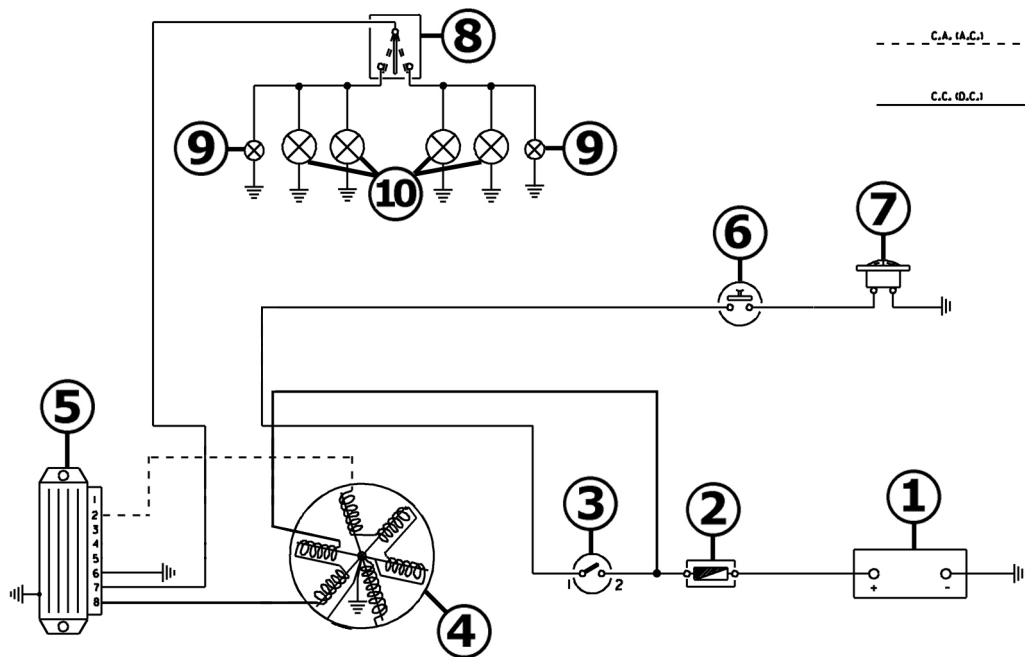
Level indicators and enable signals section



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	Stop light bulb	12V - 1.2W
12	Oil level sender	
13	Reserve fuel light	12V-1,2W
14	Fuel Level Transmitter	
15	Fuel level thermistor	

Turn signal lights

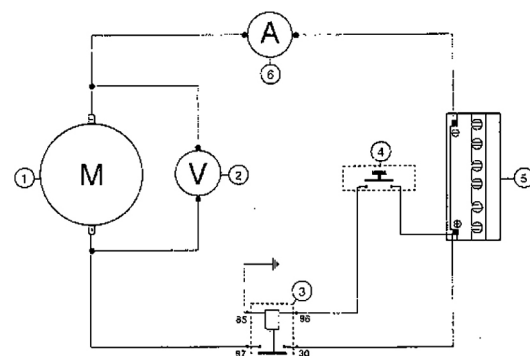


TURN INDICATORS AND HORN

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

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 $\geq 0.2 \text{ N}\cdot\text{m}$ 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·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.

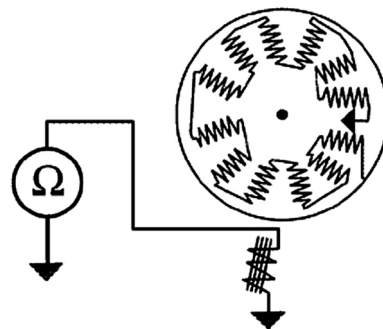
N.B.

THE ABOVE CHARACTERISTICS MUST BE MEASURED WITH A CHARGED BATTERY AND AFTER RUNNING THE STARTER MOTOR FOR 30 SECONDS IN THE CONDITIONS DESCRIBED AT POINT 1.

In case of faulty or failed operation of the ignition system and if the cause cannot be found by a simple visual inspection, replace the C.D.I. module with another of the same type and certainly working.

Remember that the disconnections needed to replace the C.D.I. module are to be carried out while the engine is switched off.

If the replacement restores the ignition system to proper operation, the fault is to be found in the C.D.I. module, which will have to be replaced.

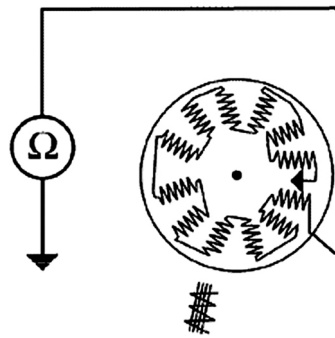


If faulty or failed operation persists, conduct the following checks on the generator and on the stator components:

After a visual inspection of the electrical connections, it is possible to perform measurements on the stator winding and pick-up (see table), using the specific multimeter.

If, during the checks on the charge coil and the pick-up, anomalies are found, replace the stator and other faulty parts.

Disconnect the connector on the flywheel housing and measure the resistance between each of the two contacts and the earth.



Specific tooling

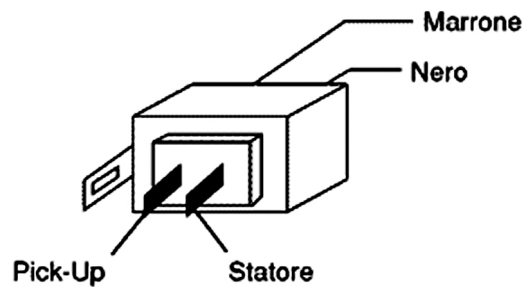
020331Y Digital multimeter

PICK-UP TEST

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

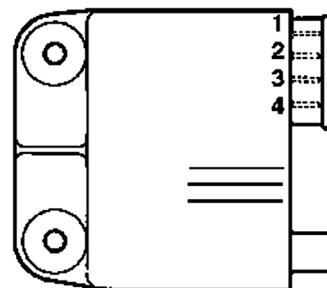
STATOR WINDING CHECK

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



Ignition circuit

All checks on the electrical equipment involving the disconnection of cables (checks on ignition circuit connections and devices) are to be carried out while the engine is switched off. Should the engine be running, the C.D.I. module could suffer irreparable damage.



Stator check

- Using a tester check the resistance between the

brown-ground and black-ground terminal.

N.B.

THE VALUES ARE STATED FOR AMBIENT TEMPERATURE. CHECKING THE STATOR AT OPERATING TEMPERATURE WILL BRING THE VALUES ABOVE THE STATED ONES.

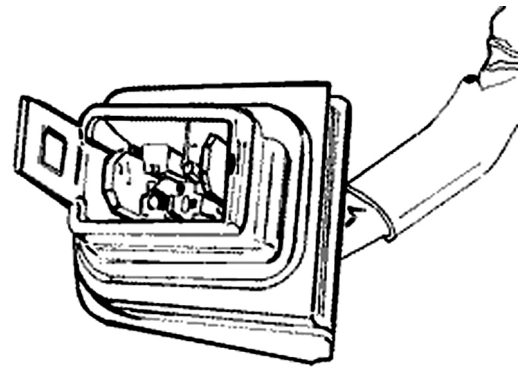
Electric characteristic

Stator : brown - ground

~ 170 Ω (Pick-Up)

Stator : black-ground

~ 1 Ω (Stator)



Sealed battery

Putting a sealed battery into service If the vehicle is equipped with a sealed battery, servicing is limited to checking the charge level and, if necessary, recharging the battery.

These operations must be performed during pre-delivery, and every six months of open-circuit storage.

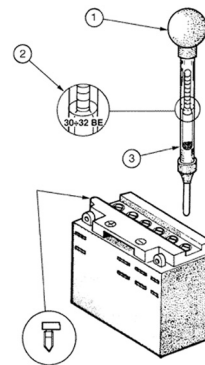
Therefore, in addition to checking and, if necessary, charging the battery before delivery, it is necessary to carry out these operations before storing the vehicle, and subsequently every six months.

RECHARGING THE BATTERY FOLLOWING OPEN-CIRCUIT STORAGE

1) Checking the voltage

Before installing the battery on the vehicle, measure the open-circuit voltage with an ordinary multimeter.

- If the voltage exceeds 12.60 V, the battery can be installed without recharging.
- If the voltage is less than 12.60 V, recharge the battery as described at item 2).



2) Constant-voltage charging method

- Constant voltage: 14.40-14.70 V
- Initial charging current: 0.3-0.5 x rating
- Charging time:
 - Recommended 10-12 hrs

Minimum 6 hrs

Maximum 24 hrs

3) Constant-current charging method

- Initial charging current: 1/10 of rating
- Charging time: Maximum 5 hrs

WARNING

WHEN THE BATTERY IS DEEPLY DISCHARGED (FAR BELOW 12.6V), 5 HOURS' RECHARGING MAY NOT BE ENOUGH TO OBTAIN OPTIMUM PERFORMANCE.

IN THESE CONDITIONS, HOWEVER, TO AVOID DAMAGING THE BATTERY BEYOND REPAIR, IT IS ESSENTIAL NOT TO RECHARGE IT FOR MORE THAN 8 CONSECUTIVE HOURS.

1 hold the tube upright

2 visually check the level

3 the float must be released

Dry-charge battery**WARNING**

BATTERY ELECTROLYTE IS POISONOUS AND CAN CAUSE SERIOUS BURNS AS IT CONTAINS SULPHURIC ACID. AVOID CONTACT WITH THE EYES, THE SKIN AND GARMENTS. IN CASE OF CONTACT WITH THE EYES OR SKIN RINSE ABUNDANTLY WITH WATER FOR ABOUT 15 MINUTES AND SEEK IMMEDIATE MEDICAL ASSISTANCE.

IF THE LIQUID IS INGESTED IMMEDIATELY DRINK LARGE QUANTITIES OF WATER OR MILK. SUBSEQUENTLY DRINK MILK OF MAGNESIA, BEATEN EGG OR VEGETABLE OIL. CALL A DOCTOR WITHOUT DELAY.

BATTERIES PRODUCE EXPLOSIVE GASES. KEEP AWAY OPEN FLAMES, SPARKS AND CIGARETTES. WHEN A BATTERY IS CHARGED IN CLOSED PLACES ENSURE ADEQUATE VENTILATION.

ALWAYS PROTECT THE EYES WHEN WORKING IN THE PROXIMITY OF BATTERIES. POSITION THE TUBE BETWEEN THE MUDGUARD AND THE FILTER.

KEEP OUT OF REACH OF CHILDREN.

The battery is the electrical component which requires the most constant care and accurate maintenance. The main maintenance rules are as follows:

1) Checking the electrolyte level

Frequently check that the electrolyte reaches the upper level. To top up, only use distilled water.

If you need to top up the battery too frequently, check the vehicle electrical equipment as the battery is certainly working in overload conditions, which will lead to rapid deterioration.

2) Checking the battery charge

After restoring the electrolyte level, check its density with the special hydrometer (see figure).

When the battery is charged, electrolyte density must be between 30 and 32 Bé, corresponding to specific gravity of 1.26-1.28 at a temperature not lower than 15°C.

If density has fallen below 20° Bé, the battery is completely discharged and needs recharging.

At the end of the charging, check the level and density of the electrolyte in each cell. If the vehicle is not used for some time (1 month or more) the battery must be periodically recharged.

In three months the battery runs down completely.

When reinstalling the battery on the vehicle, take care not to invert the connections. The black (-) earth wire must be connected to the negative (-) terminal whereas the two red (+) wires must be connected to the positive (+) terminal.

Normal bench charging must be carried out with the specific battery charge (single) or (multiple).

Choose the charger setting corresponding to the type of battery to be recharged. Ensure you connect up to the battery with the correct polarity (+ to + and - to -). The plugs must be removed from the battery throughout the charging procedure.

4) Cleaning the battery

Keep the battery clean, especially the top; coat the terminals with Vaseline.

WARNING

BEFORE CHARGING THE BATTERY REMOVE ALL CELL PLUGS. KEEP FREE FLAMES OR SPARKS AWAY FROM THE BATTERY DURING RECHARGE.

WHEN THE BATTERY HAS TO BE REMOVED FROM THE VEHICLE, DISCONNECT THE NEGATIVE TERMINAL FIRST.

CAUTION

NEVER USE FUSES HAVING A GREATER CAPACITY THAN THE ONE RECOMMENDED. THE USE OF A FUSE OF UNSUITABLE CAPACITY MAY RESULT IN SERIOUS DAMAGE TO THE WHOLE VEHICLE OR EVEN CAUSE A FIRE.

CAUTION

NORMAL DRINKING WATER CONTAINS SALTS THAT ARE HARMFUL FOR BATTERIES. USE ONLY DISTILLED WATER.

CAUTION

TO ENSURE MAXIMUM PERFORMANCE THE BATTERY MUST BE CHARGED BEFORE USING THE

VEHICLE.

INSUFFICIENT BATTERY CHARGE OR LOW ELECTROLYTE LEVEL WHEN FIRST USED WILL RESULT IN PREMATURE FAILURE OF THE BATTERY.

Specific tooling

020333Y Single battery charger

020334Y Multiple battery charger

1) - Remove the short closed tube and the plugs. Fill the cells to the upper level with battery acid, specific gravity 1.26 corresponding to 30° Bé at 15°C.

2) - Leave the battery to stand for about 2 hours and then top up once again with battery acid.

3) - Within 24 hours, recharge the battery using the specific battery charger 020333Y (single) or 020334Y (multiple). Apply an intensity equivalent to about 1/10 of the battery rating until the acid density is approximately 1.27, corresponding to 31° Bé, and these values stabilize.

4) - When the battery is fully charged, top up with **distilled water**, refit the plugs and clean the battery case.

5) - After completing the above operations, proceed to install the battery on the vehicle, taking care to observe the connections between the wiring and the battery terminals.

WARNING

AFTER INSTALLING THE BATTERY AND IN ORDER TO PROVIDE A VENT FOR THE GASES FORMING INSIDE IT, REPLACE THE SHORT CLOSED TUBE NEXT TO THE POSITIVE (+) TERMINAL WITH THE CORRESPONDING LONG OPEN TUBE WHICH IS PRESENT ON THE VEHICLE. CHECK THAT THE TUBE SLOTS ARE TURNED TO THE BATTERY SIDE

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.
- Disassemble the complete exhaust unit.
- Remove the rear wheel.
- Disassemble the rear brake linkage.
- Disconnect the electrical terminals.
- Disassemble the throttle and mixer control cables.
- Disconnect the pipelines (fuel - oil - vacuum tap control).

WARNING

HANDLE PETROL WITH THE UTMOST CARE.

CAUTION

WHEN INSTALLING THE BATTERY ALWAYS CONNECT THE POSITIVE LEAD BEFORE THE NEGATIVE LEAD.

WARNING

WEAR PROTECTIVE GOGGLES WHEN USING HAMMERING TOOLS.

INDEX OF TOPICS

ENGINE

ENG

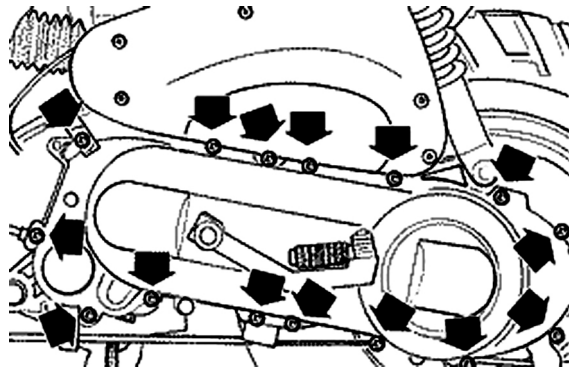
Automatic transmission

Transmission cover

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

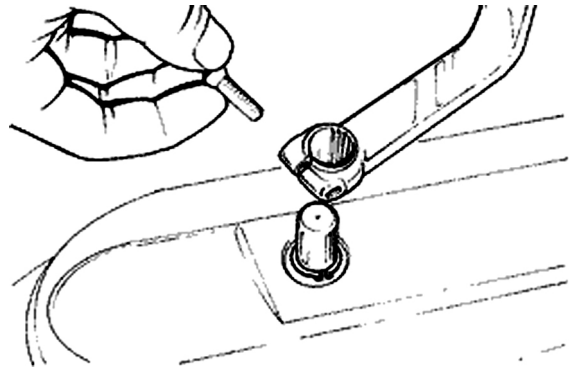
N.B.

THE CRANKCASE IS RESTRAINED BY THE TIGHT FITTING BETWEEN THE SHAFT OF THE DRIVEN HALF-PULLEY AND THE BEARING HOUSED ONTO THE CRANKCASE.



Kickstart

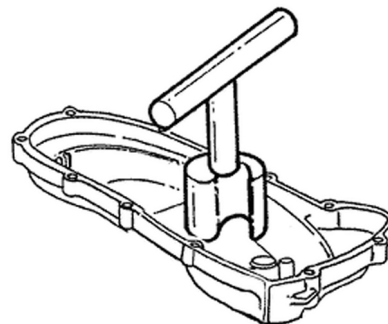
- Remove the screw shown in the figure and detach the kick-start lever.
- When refitting, follow the above operations in the reverse order, tightening the screw to the prescribed torque.



Locking torques (N*m)

Kick-start lever replacement: 12 ÷ 13 N·m

-
- During the reassembly, apply some of the recommended grease on the bushing, the spring, and the toothed segment.
 - To load the spring, use the special tool as shown in the figure.
 - Refit the split ring after checking its condition.



Specific tooling

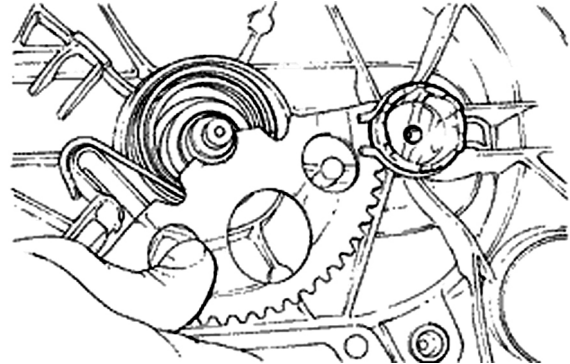
020261Y Kick-starter spring assembler

Recommended products

JOTA 3 FS Speedometer transmission

Lithium soap grease NLGI 33

- Remove the split ring positioned on the external side of the transmission cover.
- Remove the drive gear from its housing, decreasing the tension that the toothed segment applies via the spring; to do so, it is necessary to slightly rotate the toothed segment (see figure).

**CAUTION**

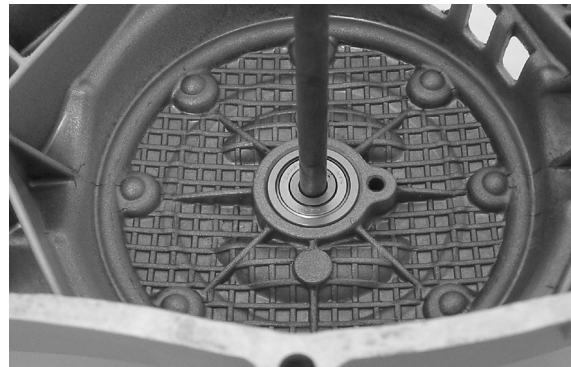
WHEN REMOVING THE GEAR, PAY PARTICULAR ATTENTION TO THE LOADING OF THE SPRING AS THIS MAY BE DANGEROUS FOR THE OPERATOR.

Removing the driven pulley shaft bearing

- Slightly heat the crankcase on the inside to avoid damaging the painted surface. Remove the bearing using the driven pulley shaft or a pin of the same diameter.

N.B.

IF THIS IS DIFFICULT A GENERIC 8 MM EXTRACTOR FOR INNER PARTS CAN BE USED.



Refitting the driven pulley shaft bearing

- After slightly heating the crankcase on the inside, fit the bearing using a bush of the same diameter as the bearing outer race.

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 ASSEMBLY CAN ALSO BE REMOVED WITH THE DRIVE PULLEY IN PLACE.

Specific tooling

020565Y Compass flywheel stop spanner



Inspecting the clutch drum

- To verify that the bell clutch is not usurata or damaged.
- To measure the inner diameter of the bell clutch.

Characteristic

Clutch bell diameter/standard value

Ø 107+0,2 +0 mm

Clutch bell diameter/max. value allowed after use

Ø 107,5 mm

Found eccentricity /max.

0,20 mm

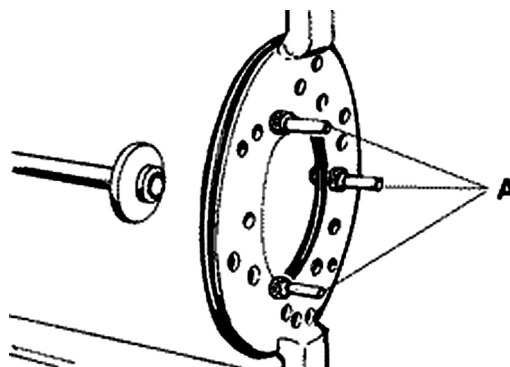


Removing the clutch

- Fit the tool with the long pins screwed on from the outside in positions «A». Insert the driven pulley assembly into the tool and tighten the central screw.

CAUTION

OVERTIGHTENING OF THE CENTRAL SCREW CAUSES THE DISTORTION OF THE TOOL.



- Using a 34 mm socket wrench, remove the clutch locknut.

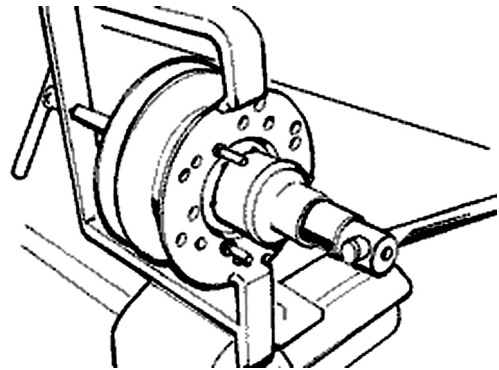
- Loosen the central screw, unloading the spring

of the driven pulley assembly.

- Separate the components.

Specific tooling

020444Y Driven half pulley spring compressor tool



Inspecting the clutch

- Check the thickness of the clutch mass friction material.
- The masses must exhibit no traces of lubricants; in that case, check the driven pulley unit seals.

N.B.

UPON RUNNING-IN, THE MASSES MUST EXHIBIT A CENTRAL CONTACT SURFACE AND MUST NOT BE DIFFERENT FROM ONE ANOTHER.

DIFFERENT CONDITIONS MAY CAUSE THE CLUTCH TEARING.

CAUTION

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

Characteristic

Check . Minimum thickness

1 mm

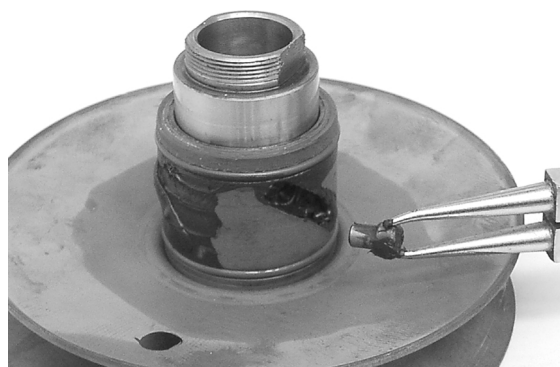


Pin retaining collar

- Remove the collar with the aid of two screw-drivers.



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



Removing the driven half-pulley bearing

- Remove the roller bearing using the specific extractor inserted from the lower side of the stationary half pulley

CAUTION

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

Specific tooling

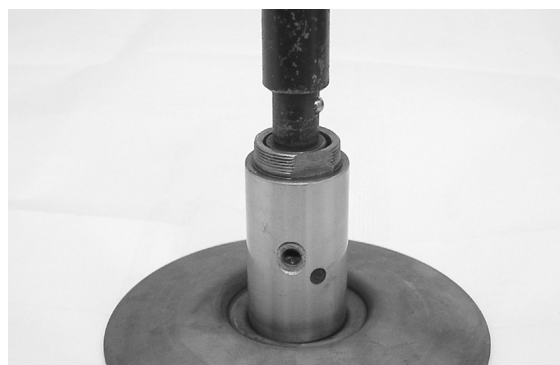
001467y029 Bell



- Remove the snap ring from the roller bearing.
- Remove the roller bearing from the side of the clutch using the specific device.

N.B.

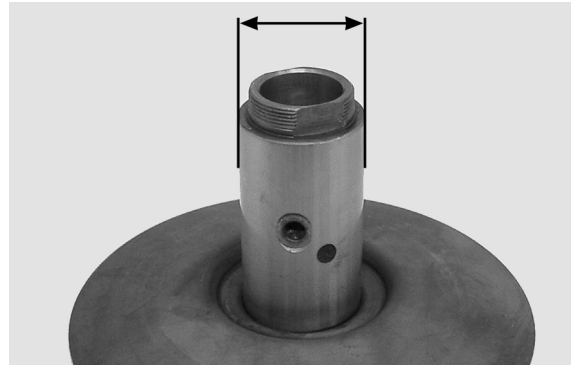
ADEQUATELY SUPPORT THE HALF PULLEY TO PREVENT THE DRIVE BELT SLIDING SURFACE FROM BEING DISTORTED.



Specific tooling**020376Y Handle for punches****020363Y 20mm guide**

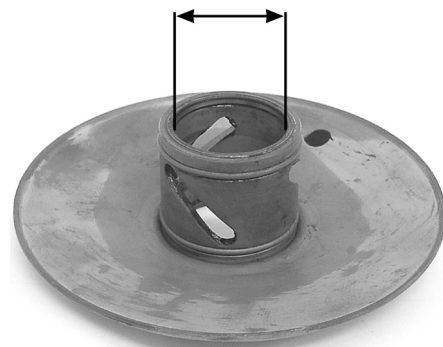
Inspecting the driven fixed half-pulley

- Make sure there are no signs of wear on the work surface of the belts, if there are replace the half pulley.
- Make sure the bearing do not show signs of unusual wear.
- Measure the external diameter of the pulley bushing.

**Characteristic****Standard diameter** $\varnothing 33,965 \div 33,985 \text{ mm}$ **Stationary driven half pulley/ Minimum diameter allowed after use** $\varnothing 33,96 \text{ mm}$

Inspecting the driven sliding half-pulley

- Remove the two inner seal rings and the two O-rings.
- Measure the inside diameter of the movable half pulley bushing.

**Characteristic****Maximum allowable diameter** $\varnothing 34,08 \text{ mm}$

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

Recommended products**TUTELA MRM 2 Grease for the phonic wheel turning ring**

Molybdenum disulphide grease and lithium soap



- 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 gr. of grease, this operation must be carried out through one of the holes inside the bushing until grease comes out of the opposite hole. This operation is necessary to avoid the presence of grease beyond the O-rings.

Recommended products**TUTELA MRM 2 Grease for the phonic wheel turning ring**

Molybdenum disulphide grease and lithium soap

Refitting the driven half-pulley bearing

- Fit a new ball bearing with the specific tools.
- Fit the ball bearing circlip.
- Fit the new roller bearing so that the lettering is visible from the outside.

CAUTION

ADEQUATELY SUPPORT THE HALF PULLEY TO AVOID DAMAGING THE THREADED END WHILE FITTING THE BEARINGS.

**Specific tooling**

020376Y Handle for punches

020456Y Ø 24 mm adaptor

020362y 12 mm guide

020171y Roller bearing drift

Inspecting the clutch spring

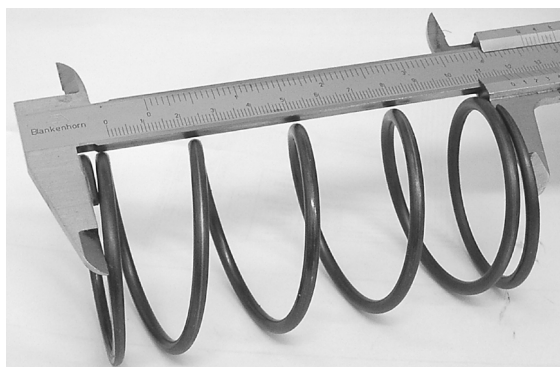
- Make sure that the driven pulley contrast spring is not deformed.
- Minimum length allowed after use

Characteristic**Standard length**

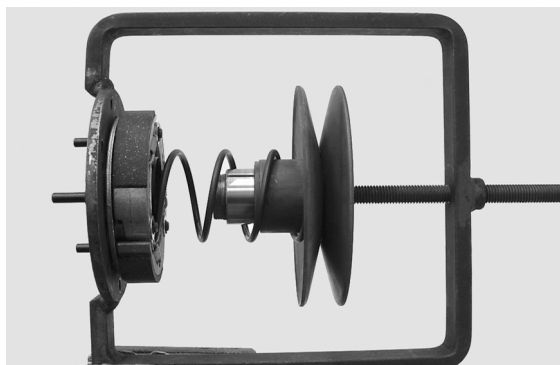
118 mm

Limit after use

XXXX

**Refitting the clutch**

- Preassemble the driven pulley unit with spring, sheathing and clutch.
- Position the spring with the plastic shielding supporting the clutch
- Insert the parts in the device and preload the spring, being careful not to damage the plastic sheathing and the end of the threaded shank.



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

CAUTION

TO AVOID DAMAGING THE CLUTCH NUT, USE A SOCKET WRENCH WITH A SMALL BEVEL.

CAUTION

POSITION THE UNBEVELLED SURFACE OF THE NUT IN CONTACT WITH THE CLUTCH.

**Locking torques (N*m)**

Nut locking clutch assembly on pulley 55 ÷ 60 Nm

Refitting the driven pulley

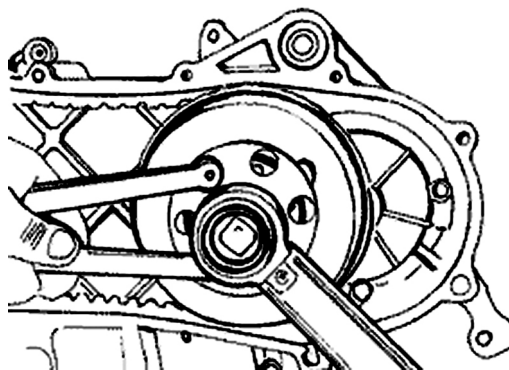
- Fit the driven pulley assembly, the clutch bell housing and the nut using the specific tool.

Specific tooling

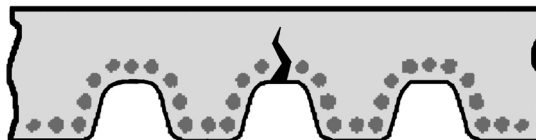
020565Y Compass flywheel stop spanner

Locking torques (N*m)

Driven pulley shaft nut 40 -÷ 44 Nm

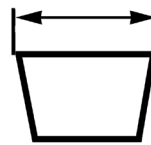
**Drive-belt**

- Make sure the transmission belt is not damaged and does not have cracks in the toothed grooves.
- Check the width of the belt.

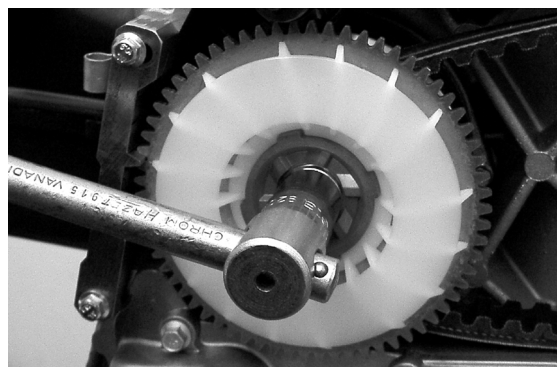
**Characteristic**

transmission belt/Minimum width

17,5 mm

**Removing the driving pulley**

- Lock the pulley with the specific tool.
- Remove the central nut with the related washer, then remove the drive and the plastic fan.
- Remove the fixed half pulley.



- Remove the belt, washer and remove the mobile half pulley with its bushing, being careful of the rollers and contrast plate fitted loosely on it.

Specific tooling

020451y Drive pulley stop spanner

Mixer gears and belt

- Remove belt and gear

CAUTION

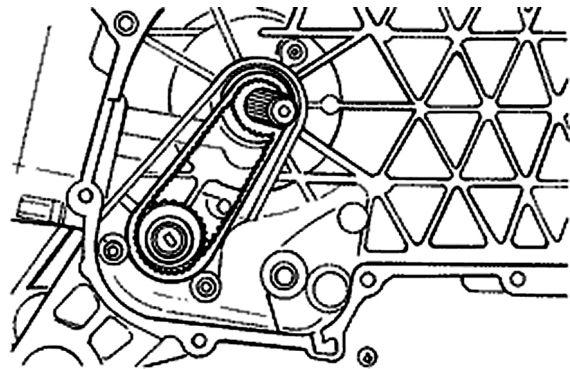
DO NOT TWIST OR BEND THE BELT WHEN REFITTING IT

CAUTION

BEFORE REFITTING THE BELT, CAREFULLY LUBRICATE THE PIN AND THE MIXER DRIVE GEAR BUSHING WITH OIL, MAKING SURE THIS IS FREE FROM ANY LOAD.

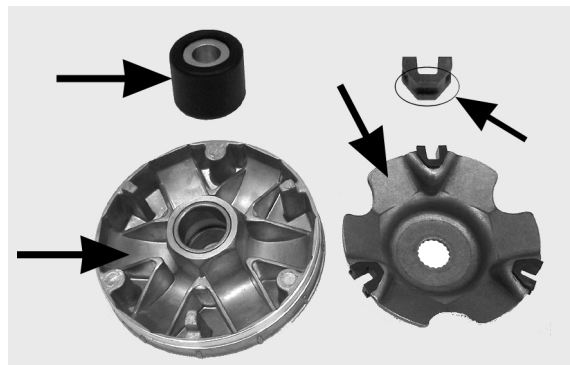
N.B.

REPLACE THE BELT EVERY 20,000 KM.



Inspecting the rollers case

- 1) Make sure that the bushing and sliding rings on the mobile pulley are not lined or deformed.
- 2) Check the track where the rollers slide on the contact pulley, there should not be any signs of wear and check the conditions of the belt contact surfaces on the half pulleys (mobile and stationary).
- 3) Make sure that the rollers do not have marked facing on the sliding surfaces and that the metal insert does not protrude from the edges of the plastic cover.
- 4) Make sure that the contact plate sliding blocks are intact.

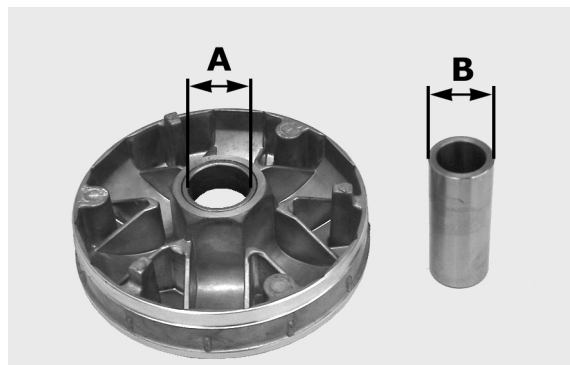


- Check that the internal bronze bushing shown in the figure is not abnormally worn and measure inside diameter «A».

- Measure outside diameter «B» of the pulley sliding bushing shown in the figure.

CAUTION

DO NOT LUBRICATE OR CLEAN THE BRONZE BUSHING.



Characteristic**Maximum allowable diameter:**

20,12 mm

Standard diameter:

20,021 mm

Sliding pulley brass/ Diameter maximum:

XXX mm

Sliding pulley brass/ Standard diameter:

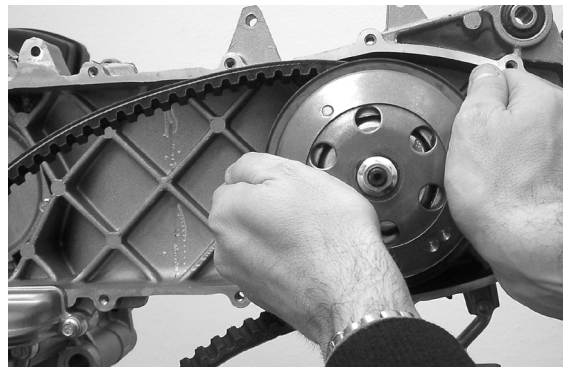
XXX mm

Refitting the driving pulley

- Manually move the mobile driven pulley by pulling it towards the clutch unit and insert the belt keeping the rotation direction of the first assembly.

N.B.

IT IS ALWAYS A GOOD IDEA TO FIT THE BELT SO THAT THE WORDS ARE LEGIBLE IN CASE THE BELT DOES NOT SHOW AN ASSEMBLY DIRECTION.



- Reassemble the unit parts (roller housing unit with bushing, washer, stationary half pulley, belt cooling fan with intake, washer and nut).
 - Tighten the nut to a torque of 20 Nm and then finally tighten 90° with the specific tool preventing rotation of the drive pulley.

N.B.

REPLACE THE NUT WITH A NEW ONE EVERY TIME THE PARTS ARE REASSEMBLED

CAUTION

IT IS VERY IMPORTANT THAT WHEN THE DRIVE PULLEY IS SECURED THAT THE BELT IS FREE INSIDE IT, TO AVOID INCORRECTLY TIGHTENING IT WITH LATER DAMAGE TO THE ENGINE SHAFT MM SCALE.



Specific tooling

020451y Drive pulley stop spanner

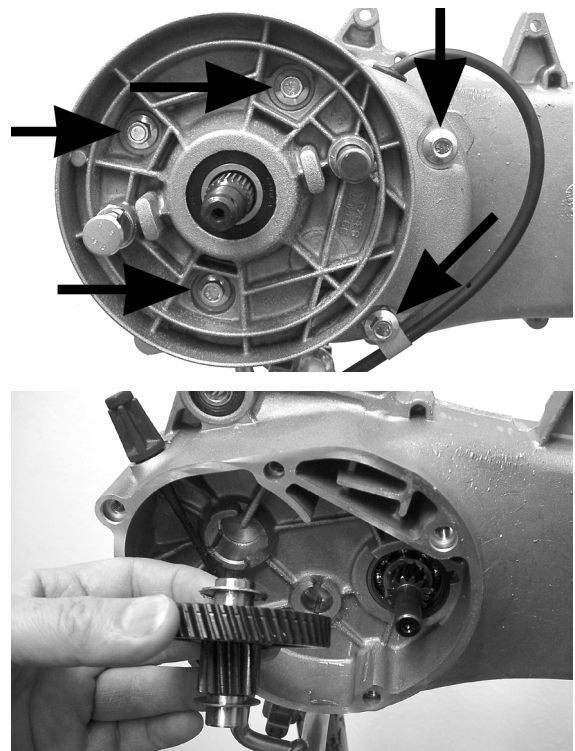
Locking torques (N*m)

Tightening torque plus angle $18 \div 20 + 90^\circ$
N.m

End gear

Removing the hub cover

- Drain the oil from the rear hub
- Remove the driven pulley
- Remove the rear brake shoes
- Remove the 5 screws securing the cover to the chassis
- Remove the cover including the wheel axle and extract it
- Remove the intermediate gear with related shear rings

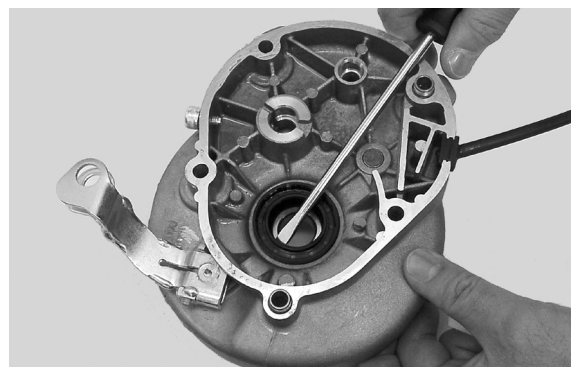


Removing the wheel axle bearings

- Remove the oil guard and seeger ring
- Adequately support the hub cover to avoid damaging the seal surface with the chassis
- Remove the wheel axle bearing with the specific tool

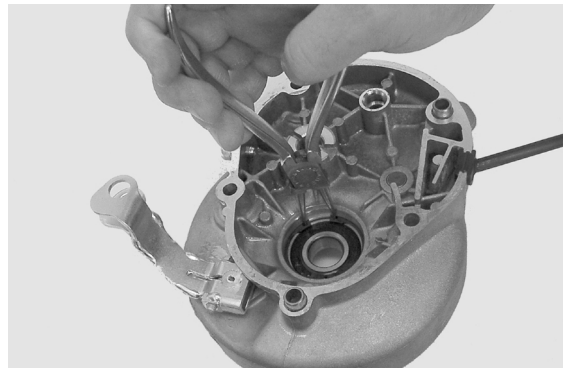
Specific tooling

020363Y 20mm guide



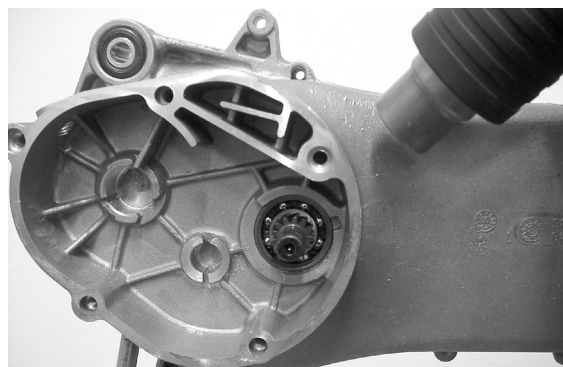
020376Y Handle for punches

020477Y Adapter 37 mm



Removing the driven pulley shaft bearing

- Remove the seeger ring
- Heat the engine chassis, avoid aiming hot air at the bearing
- Remove the driven pulley shaft with the bearing by hitting it a few times with a mallet



-
- Remove the bearing from the driven pulley shaft with the specific tool and a gripper

N.B.

USE THE SPECIFIC TOOL FROM THE SIDE WITH A SMALLER INNER DIAMETER

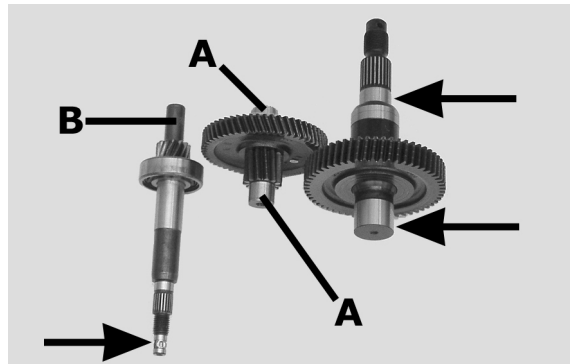
Specific tooling

020452y Driven pulley shaft fitting/removing tube



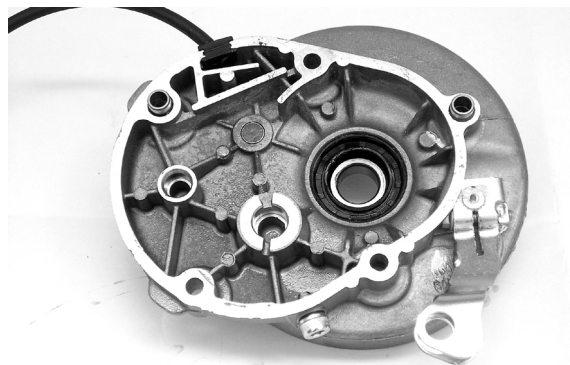
Inspecting the hub shaft

- Make sure the three shafts are not worn or deformed on the toothed surfaces, bearing and oil guard spans.
- If faults are discovered replace the damaged parts.
- Check the span (A) of the counter gear (wear, lines etc.)
- Check the seat of the pulley shaft: Worn surfaces (B) can indicate irregularity in the seats on the chassis or in the pulley shaft span



Inspecting the hub cover

- Make sure the coupling surface is not dented or deformed.
- If faults are discovered replace the hub cover.



Refitting the driven pulley shaft bearing

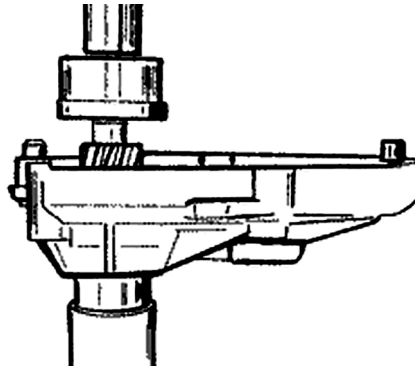
- Using the specific tool under the press, support the inner race of the bearing on the outside of the

hub cover. Fit the driven pulley shaft.

- Fit the oil seal so it is flush with the cover.

Specific tooling

020452y Driven pulley shaft fitting/removing tube



- 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.

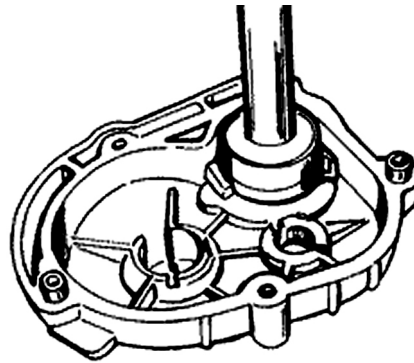
Specific tooling

020151Y Air heater "METABO HG 1500/2"

020376Y Handle for punches

020439Y 17 mm guide

020358y 37 x40 adaptor



Refitting the wheel axle bearing

- Place the hub cover on a wooden surface

- Heat the hub cover using the heat gun

- Preassemble the bearing on the specific punch using the grease then insert the bearing in its seat.

- Refit the seeger ring and the oil guard using the 42 x 47 adaptor

N.B.

POSITION THE OIL GUARD WITH THE SEAL RIM FACING THE INSIDE OF THE HUB.



Specific tooling

020150Y Support for air heater "METABO HG 1500/2"

020151Y Air heater "METABO HG 1500/2"

020376Y Handle for punches

020363Y 20mm guide

020359Y 42 x 47 mm hub bearing fitting adaptor



Refitting the hub bearings

- Reassemble the wheel on the cover being careful not to damage the rim of the oil guard seal
- Put a layer of grease on the two intermediate gear shear rings and fit one on the cover so that it does not interfere with the wheel axle gear when inserting the countershaft

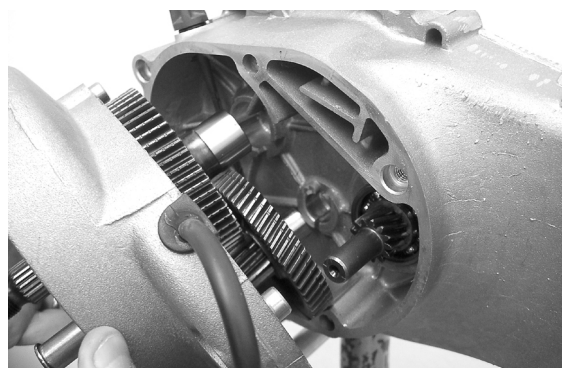


Refitting the hub cover

- Apply a product recommended for surfaces to the hub cover and refit it on the chassis
- Install the 5 screws and tighten to the prescribed torque.

N.B.

BEFORE FITTING A NEW GASKET, REMOVE ANY RESIDUES OF THE OLD GASKET FROM THE MATING SURFACES OF THE HUB COVER AND THE



CRANKCASE HALF.**Recommended products****Loctite 510 Packing fluid**

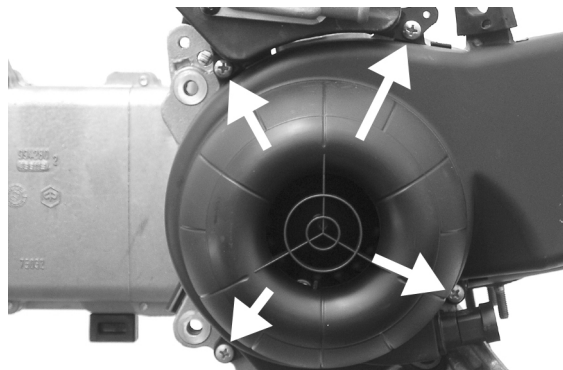
Packing

Locking torques (N*m)**Tightening torque 24 - 26**

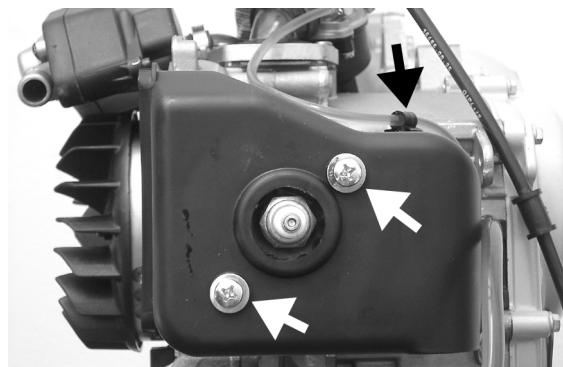
Flywheel cover

Cooling hood

- Remove the 4 fixings shown in the figure
- Remove the fan cover

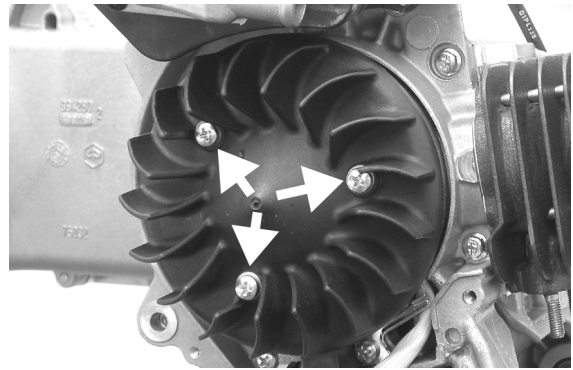


- Remove the oil line retaining zip tie from the cooling hood
- Remove the two screws shown in the picture



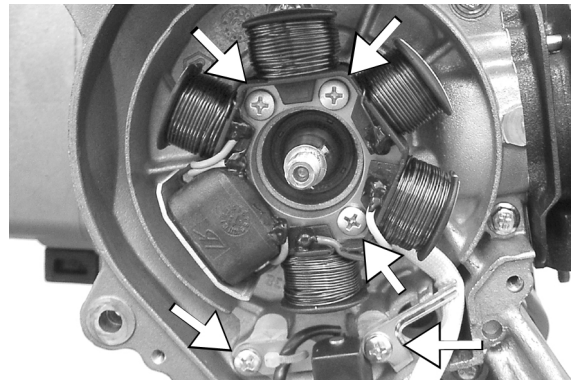
Cooling fan

- Remove the three fastenings shown in the figure.



Removing the stator

- Remove the stator 3 implantations indicated in photo
- Remove the pick-up 2 implantations indicates in photo
- Remove the stator complete with wiring



Refitting the stator

- Fit the stator and the flywheel by following the reverse procedure to the removal. Tighten the fastenings with the prescribed torque.

N.B.

THE PICK-UP WIRE MUST BE POSITIONED SO THAT IT TOUCHES THE CAST TAB ON THE CRANK-CASE. THIS WILL PREVENT IT FROM BEING CRUSHED BY THE FAN COVER ASSEMBLY.

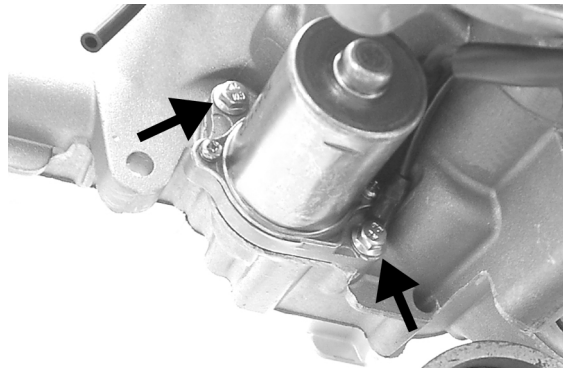
Locking torques (N*m)

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

Flywheel and starting

Removing the starter motor

Remove the fixings shown in the picture

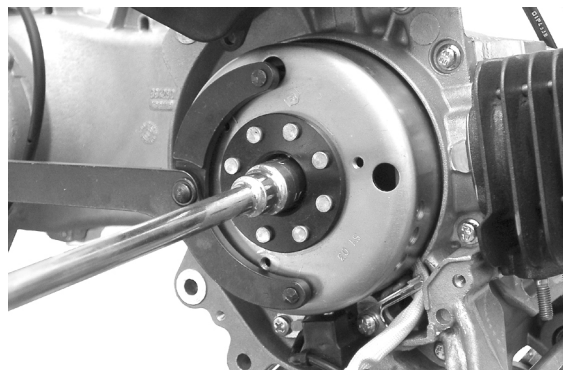


Removing the flywheel magneto

- Lock the flywheel using the compass spanner.
- Remove the nut.

CAUTION

USING A COMPASS SPANNER OTHER THAN THE ONE PROVIDED CAN DAMAGE THE STATOR COILS.

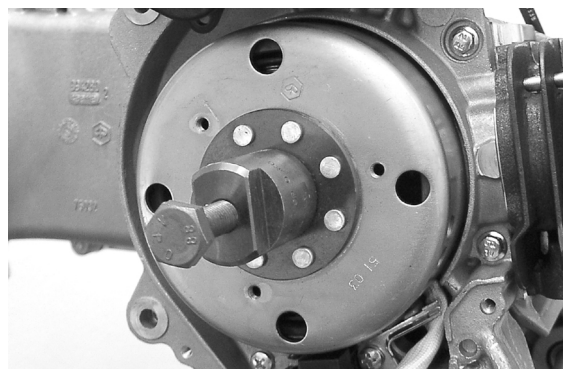


- Extract the flywheel with the specially designed extractor.

Specific tooling

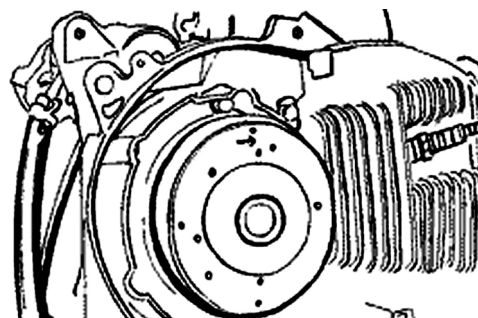
020565Y Compass flywheel stop spanner

020162y Flywheel extractor



Inspecting the flywheel components

- Check the flywheel for any distortion that might cause rubbing on the stator and the pick-up.



Refitting the flywheel magneto

- Fit the flywheel taking care to properly insert the key.
 - Tighten the flywheel locknut with the prescribed torque.
 - Check that the pick-up air gap is 0.5 - 0.6 mm
- No adjustment of the air gap is necessary when fitting the pick-up.

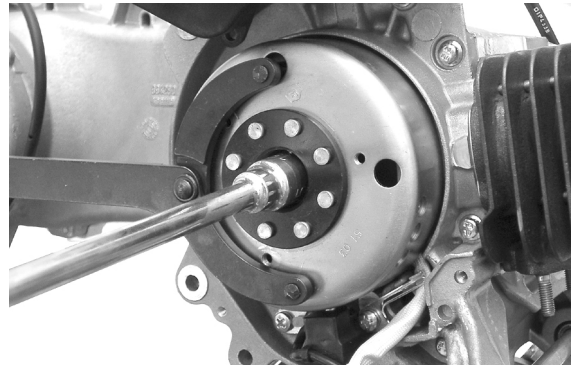
A different air gap denotes distortion of the pick-up support.

N.B.

A CHANGE IN THE AIR GAP MAY ALTER THE SPARK ADVANCE AND CAUSE KNOCKING, ETC.

Locking torques (N*m)

Flywheel nut 40 ÷ 44 N.m



Refitting the starter motor

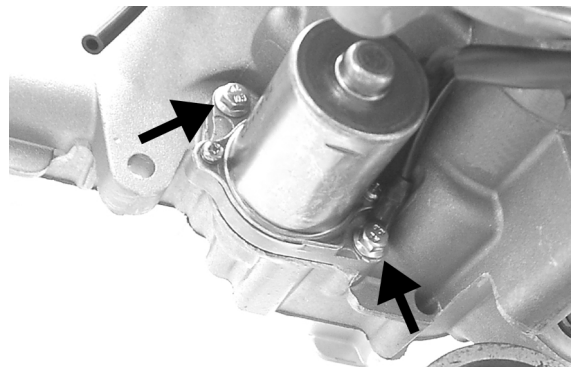
- Fit a new O-ring on the starter motor and lubricate it.
- Install the starter motor on the crankcase and tighten the two screws with the prescribed torque.

N.B.

FIT THE REMAINING PARTS AS DESCRIBED IN THE CHAPTERS CYLINDER, CYLINDER HEAD, VALVE GEAR, LUBRICATION, FLYWHEEL AND TRANSMISSION.

Locking torques (N*m)

Starter motor screws 11 ÷ 13

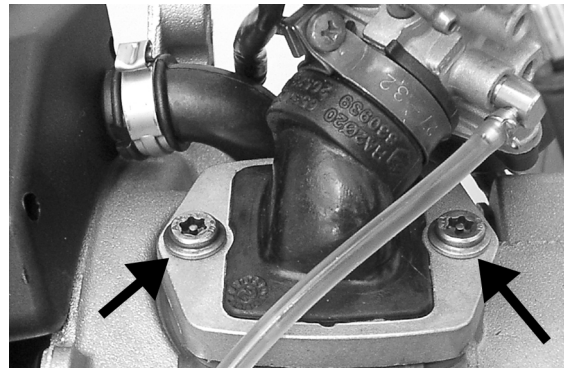


Cylinder assy. and timing system

Removing the intake manifold

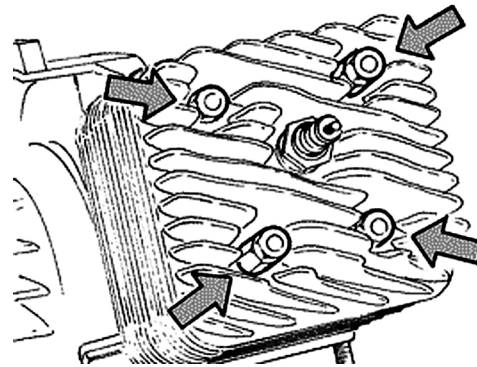
Using the TORX spanner, remove the 2 intake

manifold fixing screws



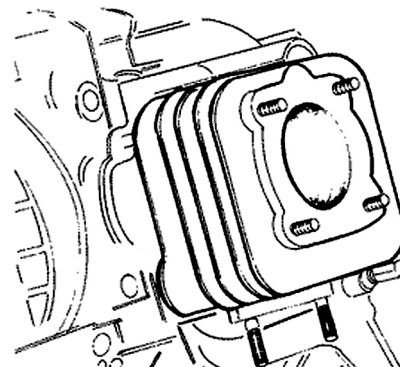
Removing the cylinder head

Remove the four nuts shown in the picture



Removing the cylinder - piston assy.

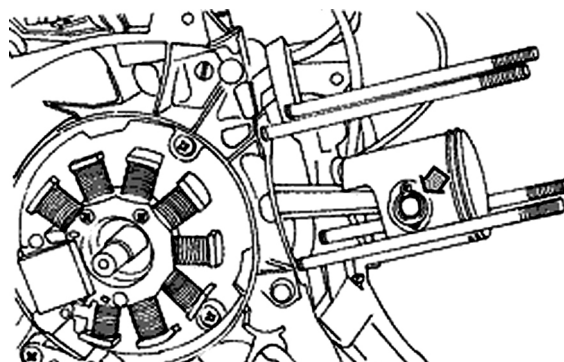
Carefully remove the cylinder



Remove the split rings and the wrist pin

CAUTION

ALWAYS REPLACE THE WRIST PIN SPLIT RINGS WITH NEW ONES

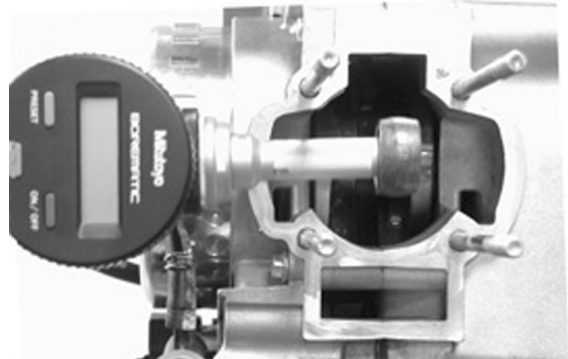


Inspecting the small end

- Using an inside micrometer, measure the small end diameter

N.B.

IF THE SMALL END DIAMETER EXCEEDS THE MAXIMUM ALLOWABLE VALUE, OR IF IT SHOWS SIGNS OF WEAR OR OVERHEATING, PROCEED TO REPLACE THE CRANKSHAFT AS DESCRIBED IN THE CHAPTER "CRANKCASE AND CRANKSHAFT".



Characteristic

Standard diameter

17 +0,011-0,001

Max. allowable diameter

17,060

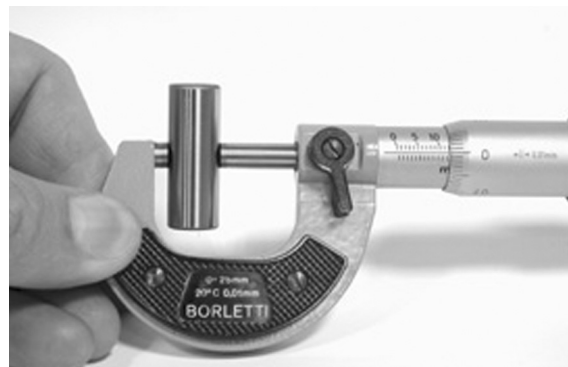
Inspecting the wrist pin

- Check the wrist pin external diameter using a micrometer

Characteristic

Wrist pin: standard diameter

12 +0,005 +0,001 mm



Inspecting the piston

- Using a suitable instrument measure the piston diameter

- Evaluate the piston-wrist pin fitting clearance

Characteristic

Wrist pin housing: standard diameter

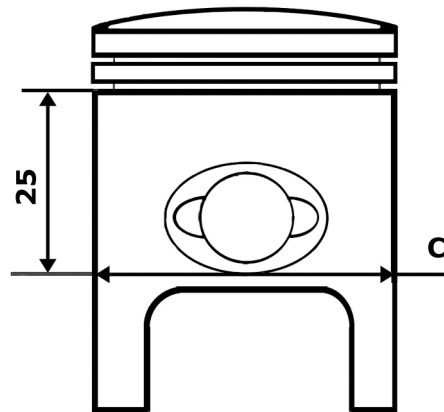
12 +0,007 +0,012

Wrist pin housing: standard tolerance

0,002 ÷ 0,011 mm



- Measure the external diameter of the piston according to a direction orthogonal to the pin axis
 - Carry out the measurement at the location shown in the figure
- To classify the cylinder-piston mating, check the appropriate table

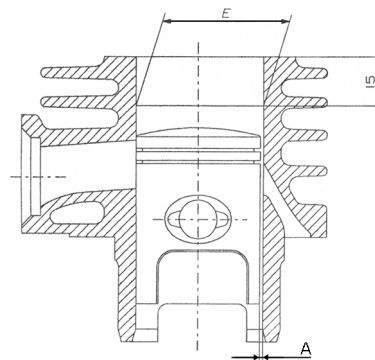


See also

[Cylinder - piston assy.](#)

Inspecting the cylinder

- Check the cylinder does not show signs of seizures. If it does proceed by replacing it or performing a grinding operation befitting the available oversize pistons
- Using an appropriate device, measure the internal cylinder diameter in the directions shown in the figure
- Check the mating surface with the head is free from wear or deformations To classify the cylinder-piston mating, check the appropriate table

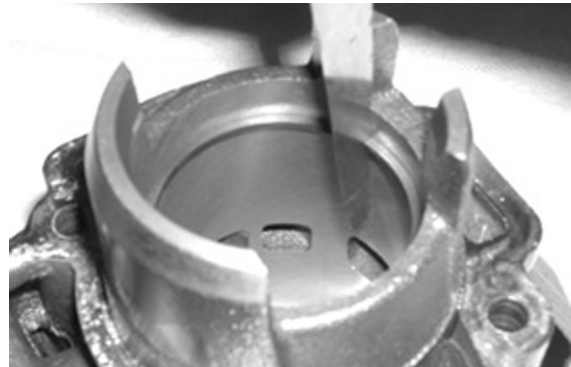


See also

[Cylinder - piston assy.](#)

Inspecting the piston rings

- Alternatively insert the two piston rings inside the cylinder
- Insert the piston rings in the direction orthogonal to the cylinder axis, using the piston to push them through.
- Measure the rings gap using a feeler gauge as shown in the picture.
- If the measured values exceed those shown in the table, proceed by replacing the rings.



Removing the piston

- Position the piston ring inside part 1 with its opening coinciding with the arrow shown on the tool.
- Push part 2 through part 1 as far as it will go and hence extract part 2.
- Insert part 3 inside part 1, position the assembly in the piston ring housing and push part 3 home.

N.B.

REFIT THE REMAINING COMPONENTS FOLLOWING THE OPERATIONS FOR THEIR REMOVAL IN THE REVERSE ORDER.

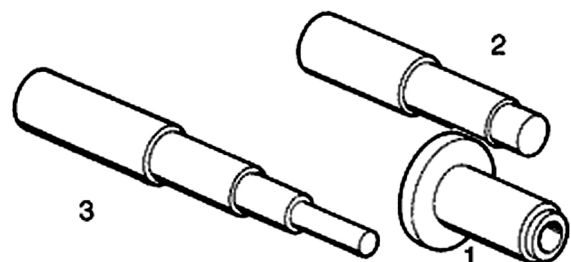
Specific tooling

020166y Piston rings fixing tool

Locking torques (N*m)

Cylinder head lock nuts 10 ÷ 11 N·m

- Use new split rings for the wrist pin.
- Replace the cylinder base gasket with a new one.
- Before proceeding with the reassembly carefully clean all surfaces.
- Lubricate components with two-stroke oil when refitting piston and cylinder.

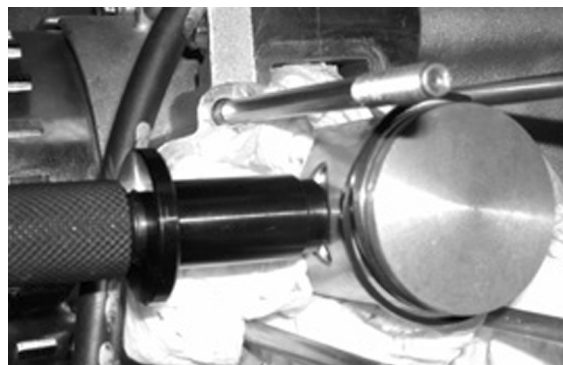
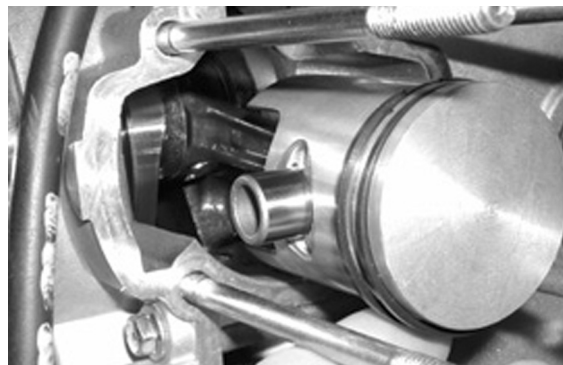
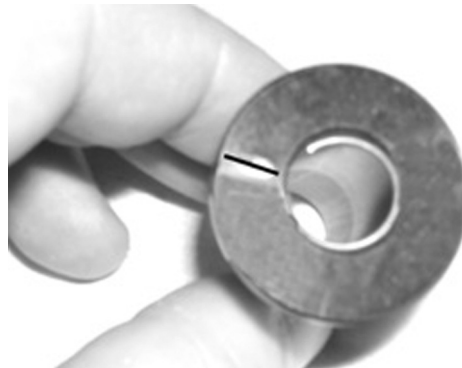


CAUTION

POSITION THE ARROW STAMPED ON THE TOP OF THE PISTON TOWARDS THE EXHAUST PORT. THE WRIST PIN SPLIT RINGS MUST BE POSITIONED ON THE PISTON USING THE SPECIAL TOOL.

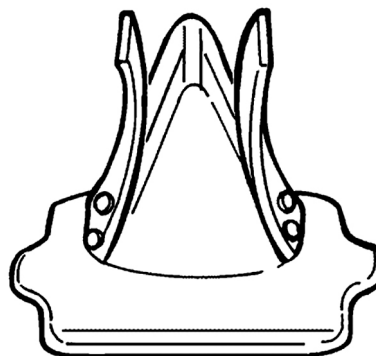
Recommended products**Selenia Hi Scooter 2 Tech Oil**

Recommended oil



Inspecting the timing system components**CAUTION**

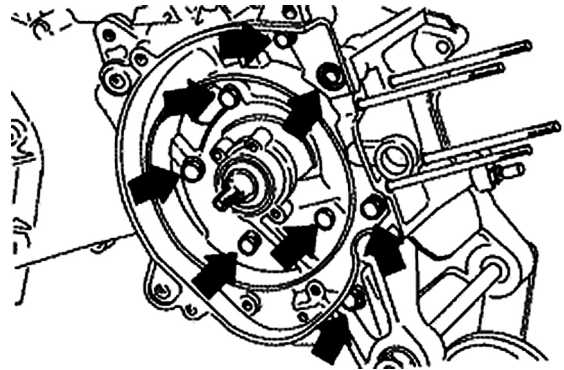
CHECK THE LEAK TIGHTNESS OF THE REED VALVE ASSY.; NO LIGHT BE VISIBLE BETWEEN VALVE AND HOUSING.



Crankcase - crankshaft

Splitting the crankcase halves

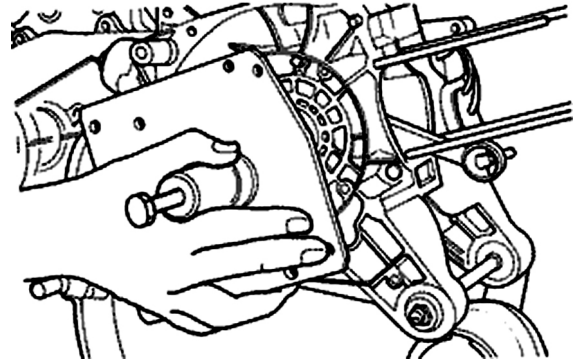
Remove the eight crankcase fasteners.



Install the special plate on the flywheel-side half-crankcase and proceed by splitting the two halves.

Specific tooling

020163y Crankcase splitting plate



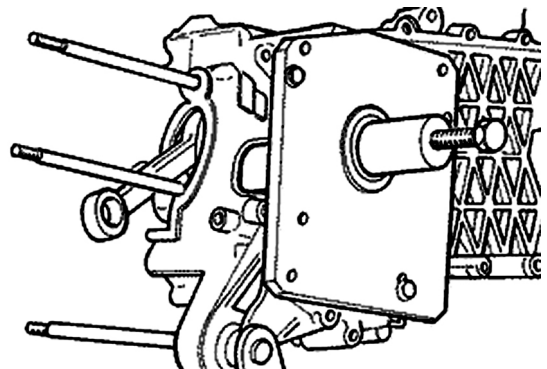
Removing the crankshaft

- Install the special tool onto the transmission-side half-crankcase using four M6 screws of adequate length.

- Remove the crankshaft from the transmission-side half-crankcase.

Specific tooling

020163y Crankcase splitting plate



Removing the crankshaft bearings

The bearings may remain attached either to half-crankcase or crankshaft, indifferently.

- Using the special tool provided, remove only the bearings attached to the engine.

N.B.

THE HALF RINGS MUST BE FITTED ONTO THE BEARINGS WITH THE AID OF A MALLET.

Specific tooling

004499y001 Bearing extractor fitted with parts

004499y006 Bearing extractor fitted with parts

004499y002 Bearing extractor fitted with parts

004499y007 Half rings

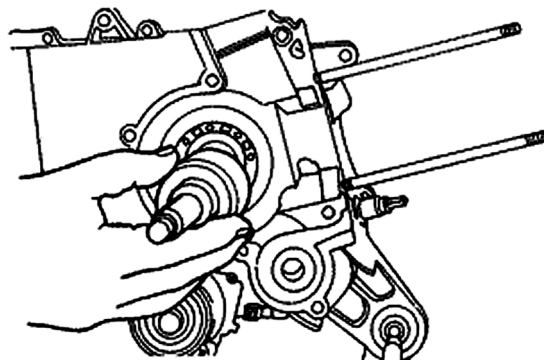


Using the special tool, remove any bearing which remained on the crankcase.

Specific tooling

001467Y007 Bell for bearings external Ø 54 mm

001467Y006 20-mm pliers

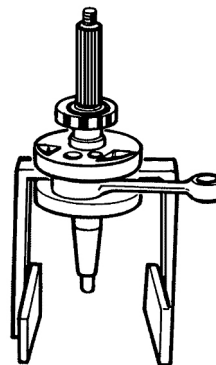


Refitting the crankshaft bearings

Heat the bearings in oil at approx. 100°C and fit them onto the crankshaft with the aid, if necessary of tube section acting directly on the internal ring of the bearing.

Specific tooling

020265y Bearing fitting stand

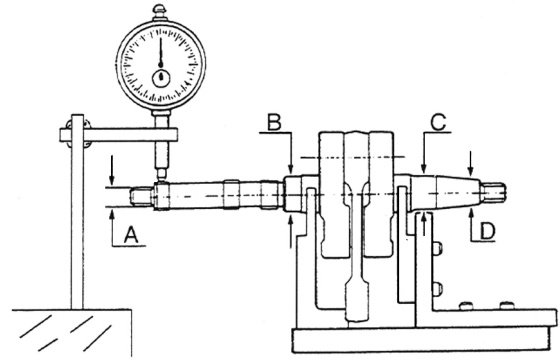


Inspecting the crankshaft alignment

Using the appropriate specific tools, check the eccentricities of the surfaces of diameters

«**A**»-«**B**»-«**C**» are within 0.03 mm (top reading limit for the dial gauge clock); check also the eccentricity of diameter «**D**», for which a maximum

misalignment of 0.02 mm is allowed. In the event that the eccentricities are not too far off the prescribed values, **straighten** the crankshaft by acting with a wedge in between the counterweights or by using vice (with aluminium mouth guards) according to your needs.



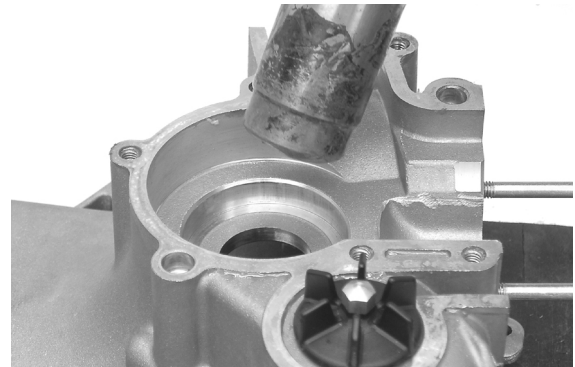
Specific tooling

020335Y Magnetic stand and comparator

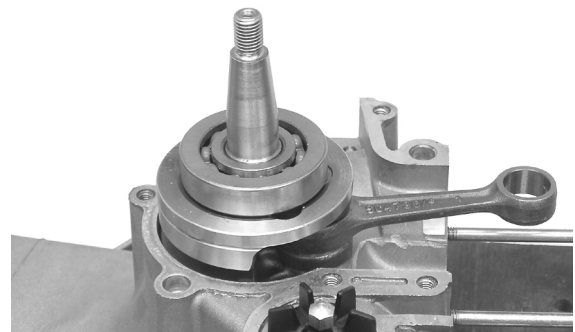
020074Y Crankshaft aligning tool

Refitting the crankshaft

- Rest the transmission-side half-crankcase on two wooden supports.
- Using a heat gun, heat the bearing housing up to approx. 120°.

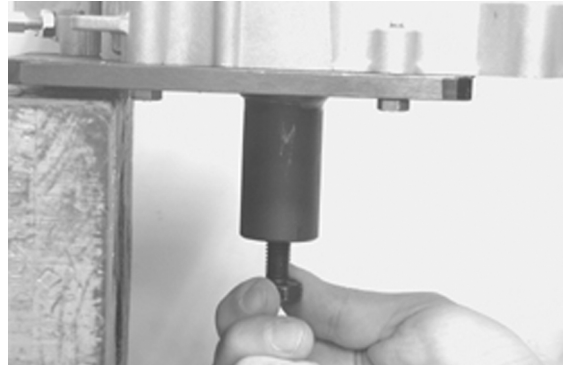


- Insert the crankshaft and push it in as far as the bearing will go.



- Let the half-crankcase temperature settle with that of the crankshaft.
- Reinstall the crankcase splitting plate **WITHOUT** installing the crankshaft protection.
- During the reassembly process keep the centre thrust screw loose.

- Tighten the four fixing screws and then loosen them with the same angle (e.g. 90°)
- When the temperature has settled manually preload the tool's thrusting screw until the ball bearing play disappears.

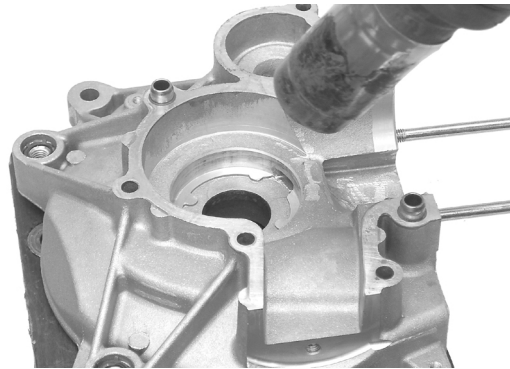


Specific tooling

020163y Crankcase splitting plate

Refitting the crankcase halves

- Prepare the mating plane by applying a thin layer of LOCTITE 510, after cleaning the surface with an adequate solvent (e.g. acetylene trichloride).
- Heat the flywheel-side half-crankcase using a heat gun.

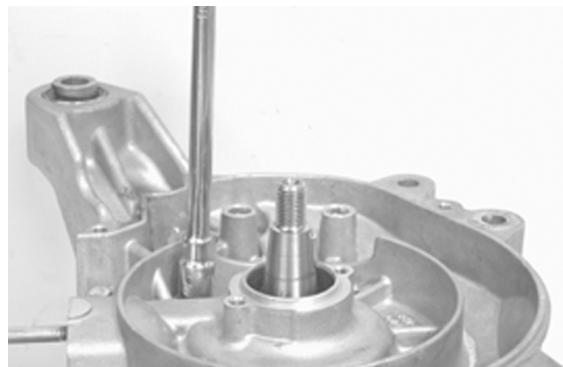


Recommended products

Loctite 510 Packing fluid

Packing

- Keeping the transmission-side half-crankcase in horizontal position, vigorously and accurately insert the flywheel-side half-crankcase.
- Insert at least 3 fixing screws and tighten them quickly.
- Insert the other 5 screws and tighten them at the prescribed torque.



Locking torques (N*m)

Crankcase fixing screws 11 - 13

- Move the crankcase splitting plate backwards as shown in the figure.
- Install the special magnetic mounting with its dial gauge, at the end of the crankshaft.
- Check the crankshaft axial play.

- If the measurements do not match those prescribed, repeat the crankshaft reassembly operation.

Specific tooling

020335Y Magnetic stand and comparator

Characteristic

Axial play with warm crankcase

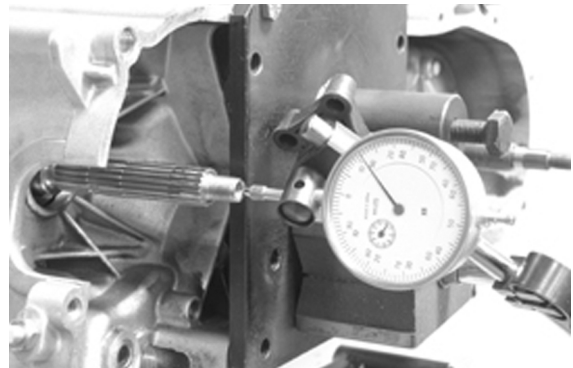
0,10 ÷ 0,12 mm

Axial play with cold crankcase

0,06 ÷ 0,08 mm

Limit value with cold crankcase

0,02 ÷ 0,03 mm



Lubrication

Crankshaft oil seals

Refitting

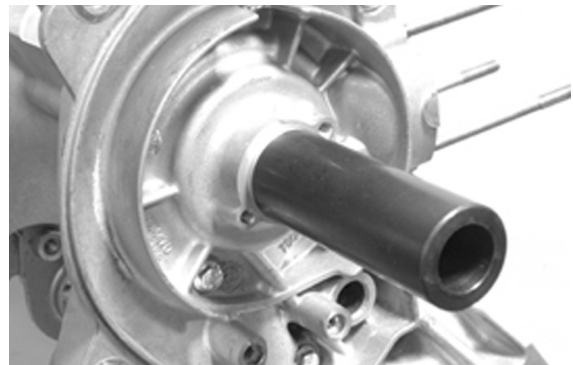
- Install a new flywheel-side oil seal using the puncher from the special tool.
The flywheel-side oil seal may be recognised for having a smaller diameter.

N.B.

THE SPECIAL TOOL MAY NOT BE USED WHEN THE WOODRUFF KEY IS FITTED

Specific tooling

020340Y Punch for fitting oil guard magneto and transmission



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

The transmission-side oil seal may be recognised by its larger diameter.

Specific tooling

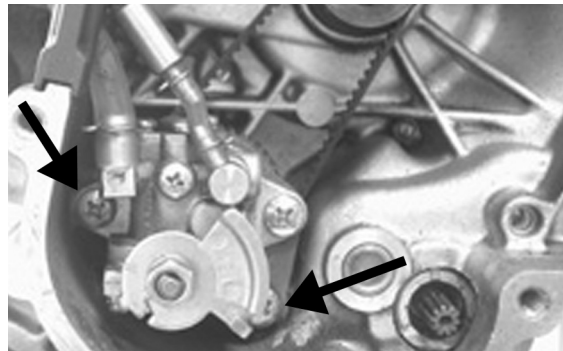
020340Y Punch for fitting oil guard magneto and transmission



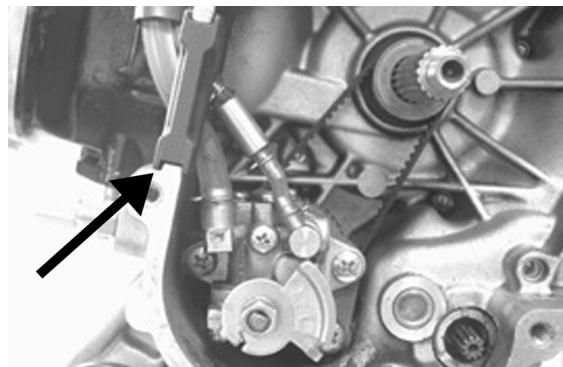
Oil pump

Removal

Remove the two screws shown in the figure



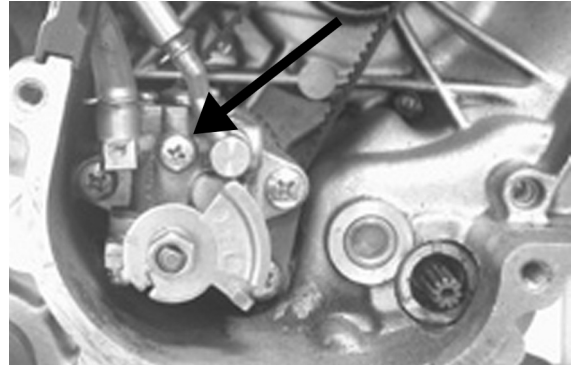
Remove the fairlead from the crankcase, as indicated in the figure.



Refitting

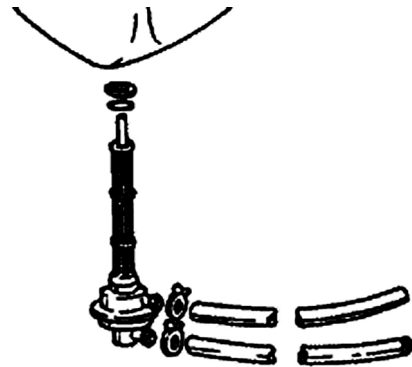
For the reassembly follow the removal operations in the reverse order.

After the reassembly, it is recommended to bleed the system by acting upon the screw shown in the picture.



Fuel supply

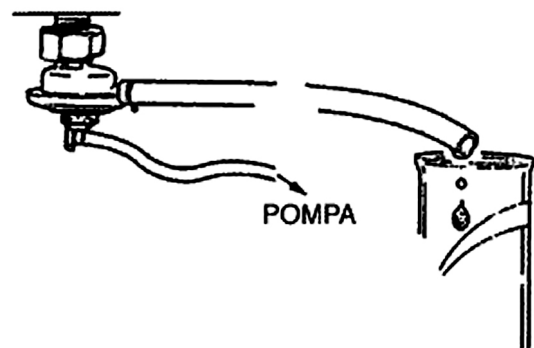
- Drain the fuel from the tank.
- Remove the fuel delivery pipe and the vacuum pipe.
- Release the clamp and remove the cock.
- Clean the tank and the cock filter with a suitable solvent.
- Refit the cock taking care to verify the presence of the O-ring.
- Turn the cock in the same direction as before the removal and then tighten the clamp.



N.B.

THE FILTER CAN BE SCREWED OFF THE COCK TO FACILITATE THE CLEANING.

- Disconnect the fuel feed pipe and the vacuum pipe from the carburettor.
- Ensure that no fuel is leaking from the pipes.
- Close the fuel outlet.
- Using the MITYVAC pump, apply a 0.1 bar vacuum to the cock.
- Ensure that the vacuum does not change, and that no fuel is leaking.
- Reconnect the vacuum pipe to the manifold.
- Position the fuel pipe so that its outlet is on the



same level as the cock.

- Make the engine turn by operating the starter motor for five seconds with the carburettor in the idle position.

- Gather the fuel in a graduated burette.

N.B.

THE MEASUREMENT MAY BE ALTERED BY AN UNSUITABLE ENGINE SPEED OR BY INCORRECT POSITIONING OF THE PIPE. IN THAT CASE, A REDUCED FUEL DELIVERY IS GENERALLY OBTAINED. THE VACUUM HOLE ON THE MANIFOLD HAS AN INTENTIONALLY REDUCED CROSS-SECTIONAL AREA IN ORDER TO IMPROVE THE VACUUM PULSES AND ENSURE CONSTANT DELIVERY OF THE COCK.

Specific tooling

020329Y Pump MITYVAC

Characteristic

Minimum delivery

20 cc

INDEX OF TOPICS

SUSPENSIONS

SUSP

This section describes the operations which can be carried out on the suspensions.

Front

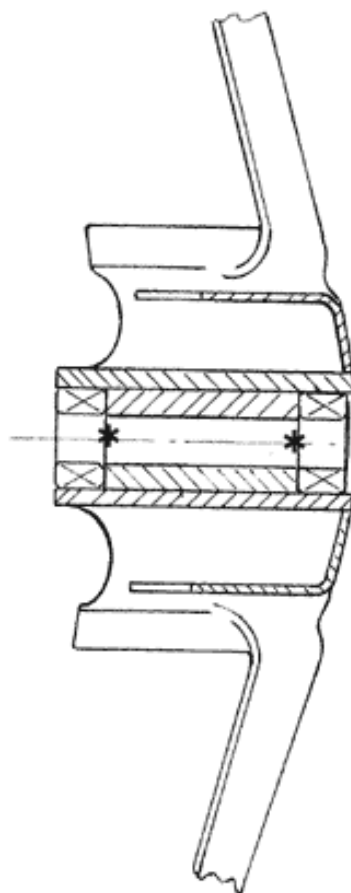
Front wheel hub overhaul

Ball bearings on wheel hub

- Fit the spacer
- Fit the ball bearings and bushes and position the seal rings.

WARNING

PRIOR TO REASSEMBLY, LUBRICATE WITH JOTA 3 F.S. GREASE IN THE AREAS MARKED WITH THE ASTERISK.



Handlebar

Removal

Handlebars removal

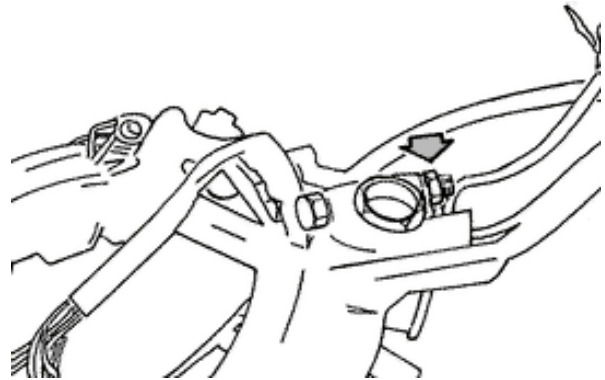
- Before proceeding, remove the handlebar fairing.
 - After detaching flexible transmission cables and
-

disconnecting electrical terminals, loosen the clamp securing the handlebar to the steering tube

- Check all components and replace any damaged or defective parts.

N.B.

IF YOU ARE REMOVING THE HANDLEBAR ONLY SO THAT YOU CAN THEN REMOVE THE STEERING ASSEMBLY, SIMPLY ALLOW THE HANDLEBAR TO TIP OVER THE FRONT OF THE SCOOTER, TAKING CARE THAT FLEXIBLE TRANSMISSION CABLES ARE NOT DAMAGED.

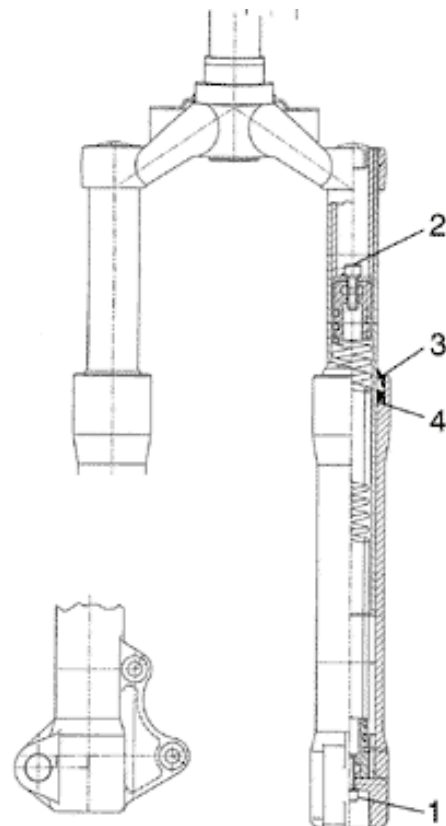


Front fork

Overhaul

Seal replacement and stanchion removal

- Disassemble the wheel spindle.
- Remove lower screw (1).
- Allow the fork oil to drain out.
- Withdraw the rod.
- Renew the O-rings (3 - 4).
- Insert the rod and refit lower screw (1).
- Remove upper screw (2).
- Pour in 30 cc \pm 1 of "**FORK PG**" (SAE 20W fork oil)
- Reassemble all parts.



Locking torques (N*m)

Lower screw tightening torque: 20 \div 25 N·m

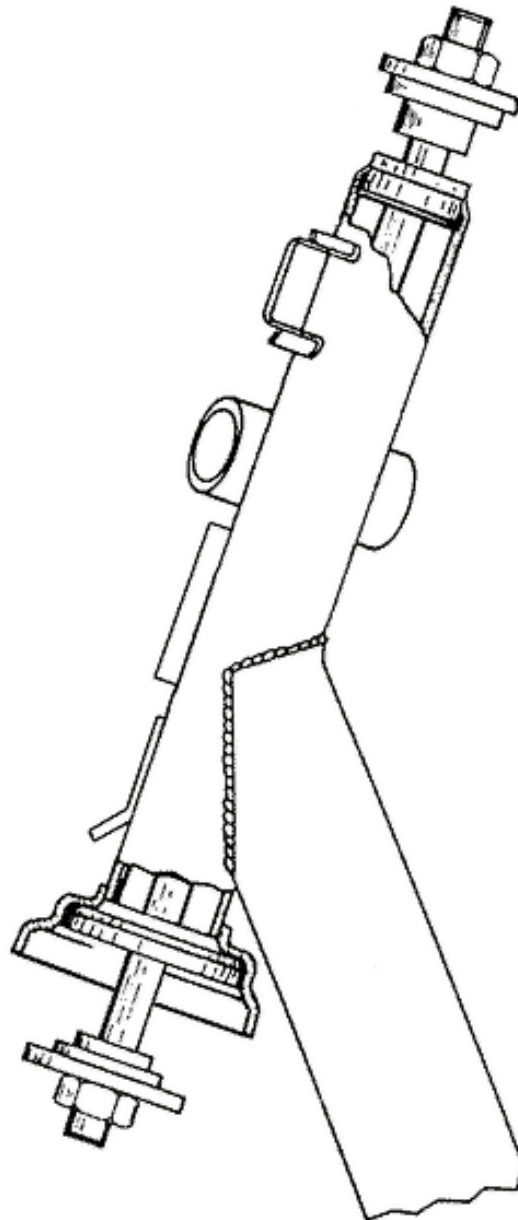
Upper screw tightening torque: 20 \div 25 N·m

Steering column

Refitting**Lower and upper bearing races to frame**

Lower and upper bearing races to frame

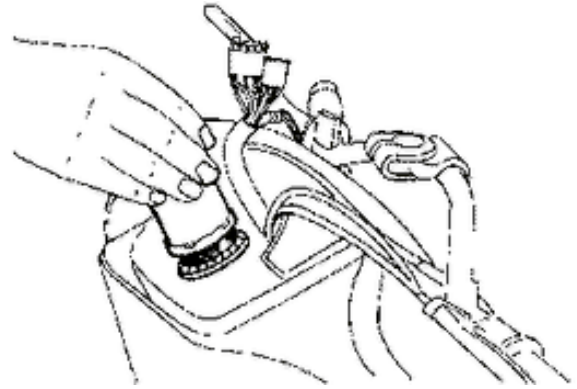
**LOWER AND UPPER BEARING RACES
TO FRAME**



Steering bearing**Top washer and upper bearing housing**

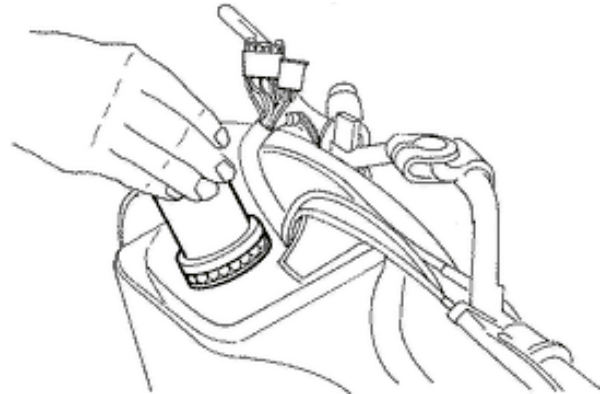
- Lubricate race and balls with **Z2** grease.
 - Tighten to the specified torque and then rotate the tool through 80° - 90° in an anticlockwise dir-
-

ection.



Steering locking ring nut

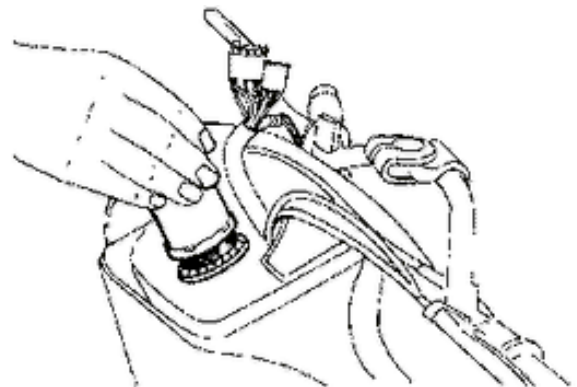
Steering locking ring nut



Removal

Top washer and upper bearing housing

- Remove the upper race and then lean the vehicle over to one side in order to remove the steering tube, after having removed the spray guard and brake calliper.

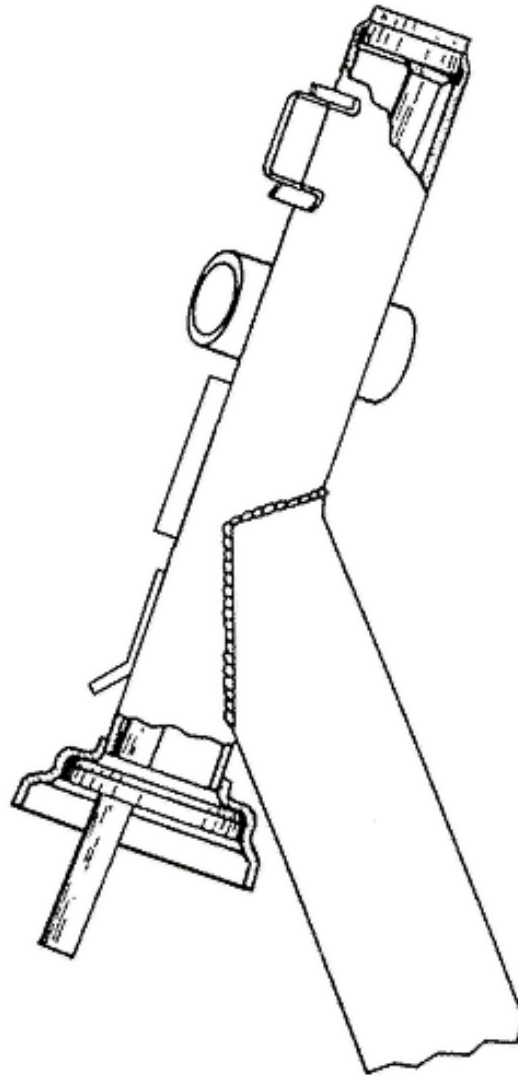


Lower and upper races from frame

- To remove the bearing races from the frame use the relative special tool as shown in the figure.

N.B.

THE LOWER BEARING RACE CAN BE PRISED OFF BY LEVERING IT WITH A SCREWDRIVER OR SIMILAR.

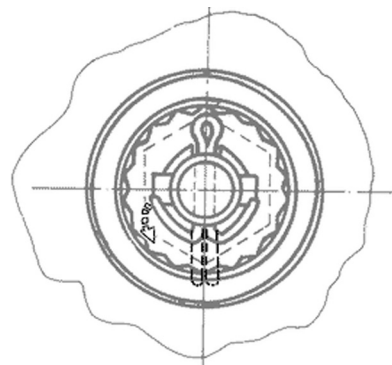


LOWER AND UPPER RACES FROM FRAME

Rear

Removing the rear wheel

- Prise off the hub cap by levering against the brake drum with a screwdriver
- Straighten the split pin and remove the cap.
- Unscrew the wheel spindle nut and remove the wheel.
- On reassembly, tighten the spindle nut to the prescribed torque.



WARNING

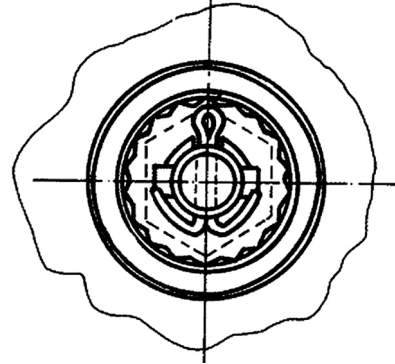
USE A NEW SPLIT PIN.

Refitting the rear wheel

- Refit the parts as directed for disassembly but in the reverse order, tighten the wheel nut to the prescribed torque.

WARNING

BEND OVER THE SPLIT PIN ENDS AS SHOWN IN ORDER TO ELIMINATE PLAY BETWEEN THE CAP AND WHEEL SPINDLE.



Locking torques (N*m)

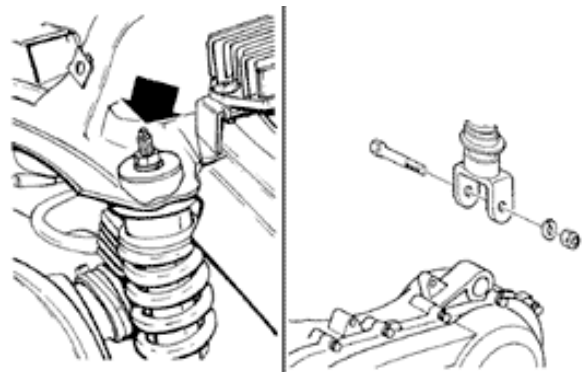
Rear wheel axle 104 ÷ 126

Shock absorbers

Removal

- To replace the shock absorber, remove the rear cover and the battery access door. This action exposes the shock absorber/frame fixing nut, which must now be removed. Subsequently, remove the shock absorber-engine pivot pin.

- At the time of reassembly, tighten the shock absorber-frame fixing nut and the shock absorber/engine pivot pin to the prescribed torques.



Locking torques (N*m)

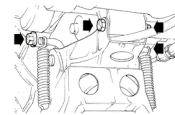
Shock absorber/engine pivot pin 33 ÷ 41 N·m

Shock absorber/frame nut 20 ÷ 25 N·m

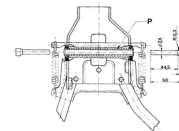
Centre-stand

Centre-stand assy. removal

- Remove the 2 screws shown in the figure.
- On reassembly, tighten to the prescribed torque.

Locking torques (N*m)Stand bracket screws $18,5 \div 19$ N·m**Centre-stand bolt refitting and caulking to mounting bracket**

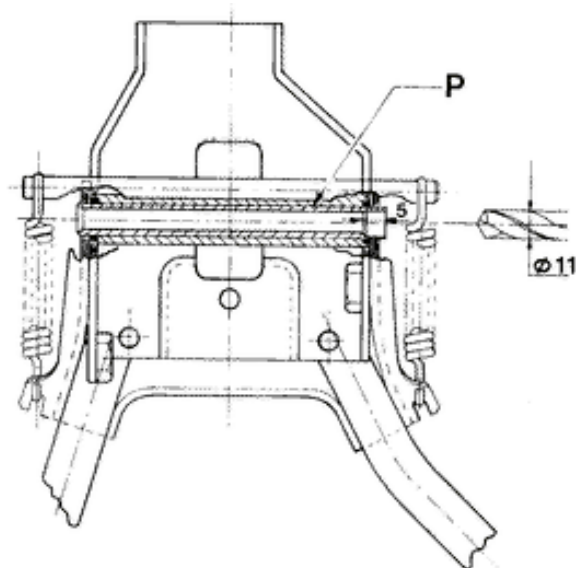
- Stake the end of pin «P» using the two punches shown in the figure.
- The stand should turn freely on its pivot after this operation.

**N.B.**

REASSEMBLE THE STAND USING NEW O-RINGS AND A NEW PIN. GREASE THE SPRING ATTACHMENT POINTS AND THE PIN.

Centre-stand bolt removal from mounting bracket

- Disassemble the stand bracket from the engine.
- Drill to a depth of 5 mm from one side in order to remove pivot pin «P».



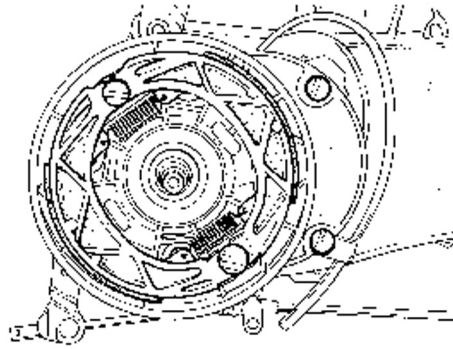
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BRAKING SYSTEM

BRAK SYS

After removing the muffler and wheel proceed as follows:

- 1.Remove the shoe spring using the specific pliers.
- 2.Remove the shoes using a lever.
- 3.Fit the new shoes using a mallet and hitting lightly.
- 4.Hook the spring using the specific pliers.



Specific tooling

020325y Pliers for brake-shoe springs

Front brake calliper

Overhaul

- Remove the calliper assembly bolts and take out the internal parts from both bodies. If necessary, use short blasts of compressed air through the brake fluid passage to facilitate expulsion of the pistons.
- Make sure the cylinders of the calliper inner and outer bodies are not scratched or eroded. If they are, renew the entire calliper.

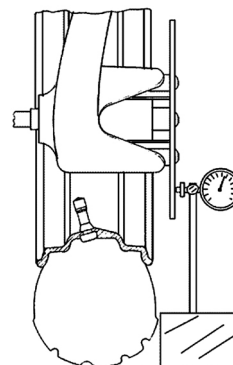
CAUTION

ALL INTERNAL COMPONENTS MUST BE RENEWED AT EACH CALLIPER OVERHAUL.

Front brake disc

Disc Inspection

- Remove the wheel and check disc flatness. 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 if necessary.



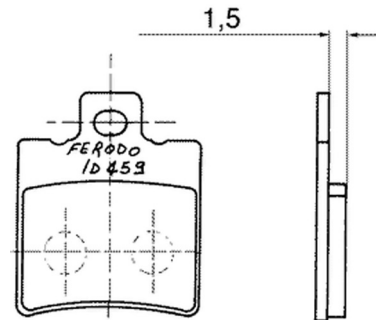
Specific tooling

020335Y Magnetic stand and comparator

Front brake pads

Removal

- To facilitate this operation remove the two caliper 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

- With the bleed valve closed, fill the system to the maximum level with brake fluid.
- Loosen the bleed valve.
- Apply the Mityvac vacuum pump tube to the bleed valve.

To bleed the circuit you must supply the reservoir constantly with brake fluid while pumping the Mityvac pump until there are no more air bubbles in the circuit.

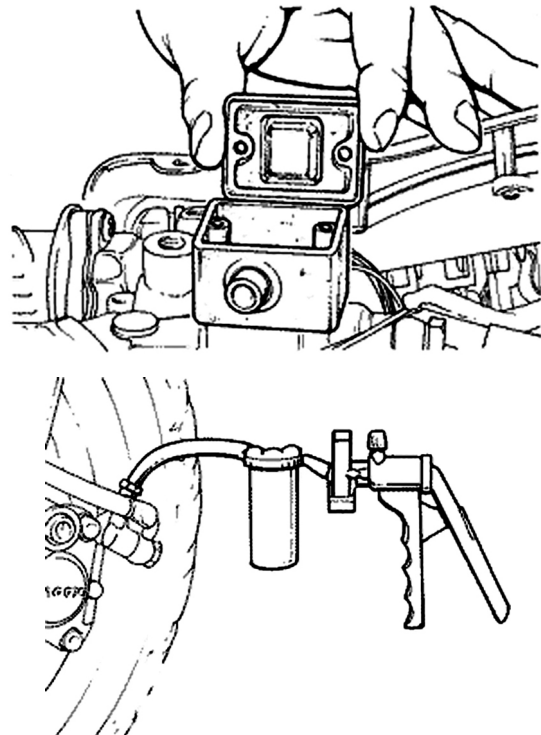
The operation is concluded when the bleed valve delivers brake fluid and no air.

- Close the bleed valve.

When you have finished the above procedure, tighten the bleed screw to the prescribed torque.

N.B.

IF YOU FIND YOU CANNOT ELIMINATE THE AIR, EXAMINE ALL THE UNIONS IN THE CIR-



CUIT.

IF YOU DON'T FIND ANY LEAKS, SEEK THE FAULT IN THE VARIOUS SEALS ON THE MASTER CYLINDER AND BRAKE CALLIPER PISTONS.

CAUTION

DURING THIS PROCEDURE THE VEHICLE MUST BE ON THE STAND ON A LEVEL AND HORIZONTAL FLOOR.

N.B.

DURING THE BLEED PROCEDURE, CHECK THE FLUID LEVEL IN THE MASTER CYLINDER RESERVOIR FREQUENTLY TO PREVENT THE RISK OF AIR ENTERING THE CIRCUIT THROUGH THE MASTER CYLINDER.

WARNING

**BRAKE FLUID IS HYGROSCOPIC. I.E. IT TENDS TO ABSORB MOISTURE FROM THE SURROUNDING AIR.
IF THE LEVEL OF MOISTURE IN THE FLUID EXCEEDS A GIVEN VALUE, BRAKING EFFICIENCY WILL BE REDUCED.
THEREFORE, ALWAYS USE FLUID FROM SEALED CONTAINERS.
IN NORMAL RIDING AND CLIMATIC CONDITIONS THE BRAKE FLUID SHOULD BE CHANGED EVERY 2 YEARS.
IF THE BRAKES ARE USED INTENSELY AND/OR IN HARSH CONDITIONS, CHANGE THE FLUID MORE FREQUENTLY.**

CAUTION

**DURING THE ABOVE PROCEDURES BRAKE FLUID MAY LEAK FROM BETWEEN THE BLEED SCREW AND ITS SEAT ON THE CALIPER.
DRY THE CALLIPER CAREFULLY AND DEGREASE THE DISC TO REMOVE ALL TRACES OF BRAKE FLUID.**

Specific tooling

020329Y Pump MITYVAC

Recommended products

TUTELA TOP 4 Brake fluid

Synthetic fluid SAE J1703, NHTSA 116 DOT 4,

ISO 4925

Locking torques (N*m)

Oil drainage screw 8 ÷ 12

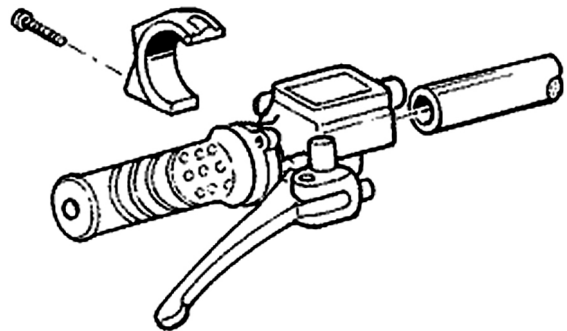
Front brake pump

- After removing the front and rear handlebar cover remove the two U clamp fixing screws (see figure).

- Disconnect the brake tube and allow the brake fluid to flow into a receptacle.

- To reassemble perform the steps in reverse order.

- Tighten the brake tube connection to the prescribed torque and bleed the system.



Locking torques (N*m)

Brake tube connection 20 ÷ 25 Nm

Removal

- Drain the brake fluid from the circuit through the bleeding screw on the calliper. Actuate the brake lever until the fluid stops flowing out.

- Remove the master cylinder from the handlebar, take off the brake lever and proceed to remove the brake cylinder.

1 - Reservoir cover screw

2 - Reservoir cover

3 - Membrane

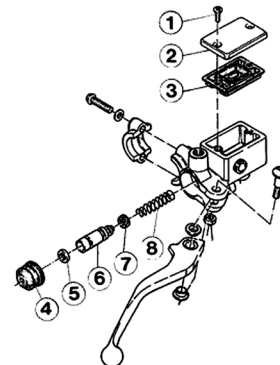
4 - Bellows

5 - Sealing ring

6 - Piston

7 - Gasket

8 - Spring



CAUTION

THE PRESENCE OF BRAKE FLUID ON THE DISC OR PADS REDUCES BRAKING ACTION.

IN THIS CASE, RENEW THE PADS AND CLEAN THE DISC WITH A HIGH QUALITY SOLVENT.

CAUTION: BRAKE FLUID CAN DAMAGE PAINTWORK.

DO NOT LEAVE RUBBER PARTS IN ALCOHOL FOR MORE THAN 20 SECONDS.

AFTER WASHING, DRY THE PARTS WITH A BLAST OF COMPRESSED AIR AND A CLEAN CLOTH.

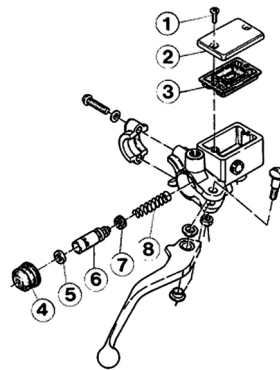
SEALING RINGS MUST BE IMMERSSED IN BRAKE FLUID.

Refitting

Before reassembly, the parts must be perfectly clean and bear no traces of oil, diesel fuel, grease, etc.. They must therefore be washed thoroughly in denatured alcohol before proceeding.

- Perform the disassembly steps in reverse order, taking care to installed rubber parts correctly to ensure an oiltight seal.

- 1 - Reservoir cover screw
- 2 - Reservoir cover
- 3 - Membrane
- 4 - Bellows
- 5 - Sealing ring
- 6 - Piston
- 7 - Gasket
- 8 - Spring



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CHASSIS

CHAS

 Carrozzeria

Removing the ignition key-switch when on *off*

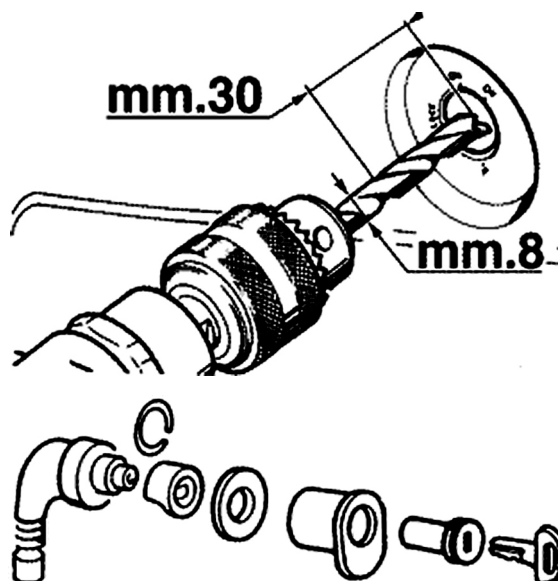
- Remove the countershield
- Press the lock body until the clip appears from the groove
- Keep the lock body still and use pliers to remove the clip
- Remove the lock block

**See also**

[Knee-guard](#)

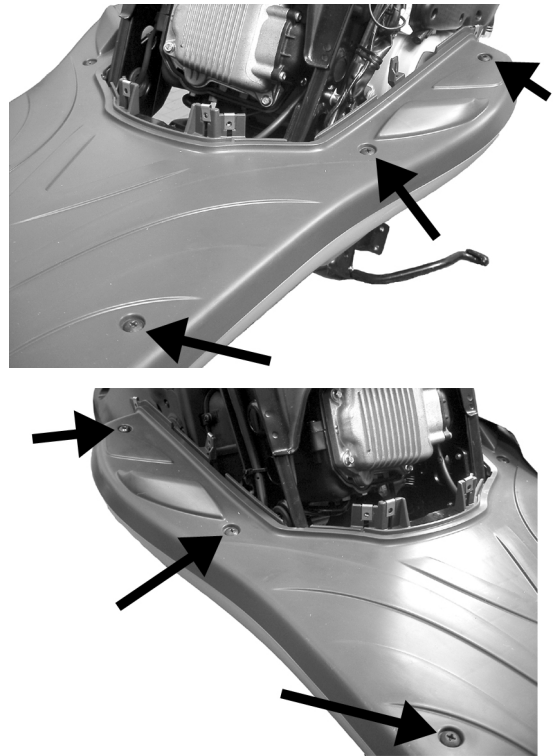
Removing the ignition key-switch when on *lock*

- Disassemble the shield.
- Remove the keyswitch.
- Drill into the block as shown in the figure.
- Insert the cylinder complete with key and with the locking tab facing downwards about half way into the lock body ensuring that during insertion the key is turned to the «ON» position (this is the only position that allows the cylinder to be inserted into the lock body); turn the key to the left towards the «OFF» position and simultaneously press the cylinder fully home.

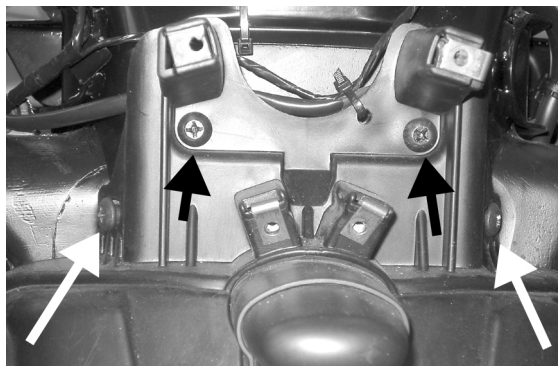


Footrest

- Remove the side panels
 - Remove the countershield
 - Remove the 6 screws shown in the photo
-



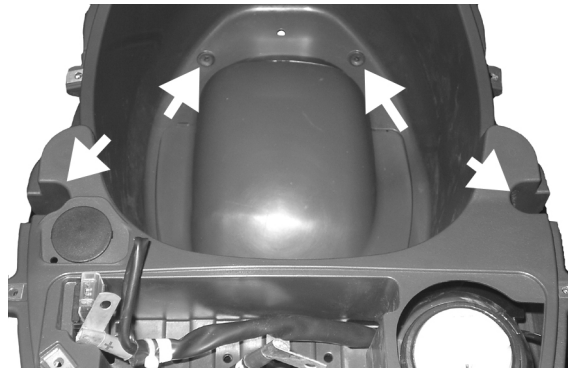
Rear mudguard



- Remove the side panels
- Remove the 4 screws shown in the photo

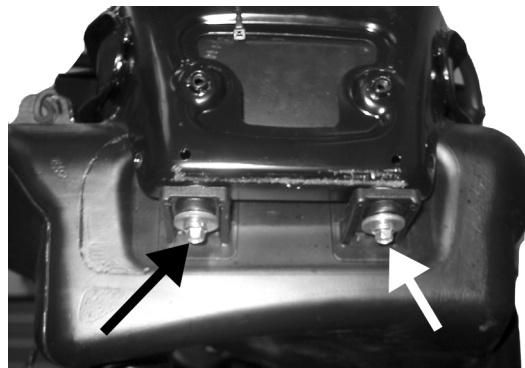
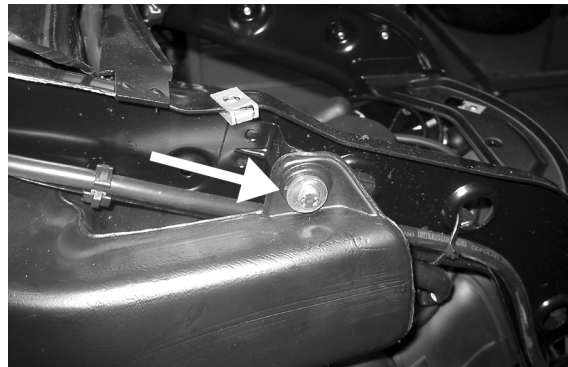
Helmet bay

- Remove the side panels
- Use the 4 screws in the figure to remove the helmet compartment



Fuel tank

- Remove the side panels
- Remove the rear mudguard
- Remove the screws shown in the photo
- Remove the upper shock absorber mounting in order to create enough space to remove the tank.



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PRE-DELIVERY

PRE DE

Aesthetic inspection

Predelivery checks:

- Paintwork
- Mating of plastics
- Scratches
- Dirt

Tightening torques inspection

Locks Inspection

- Safety locks
- Fixing screws

Safety locks:

Rear shock absorber top tightening

Rear shock absorber bottom tightening

Front wheel axle nut

Wheel hub nut

Oscillating arm pin - Chassis

Oscillating arm pin - Engine

Chassis arm-engine arm pin

Handlebar locking nut

Steering wheel lower ring nut

Steering wheel upper ring nut

Electrical system

Electric System:

- Master switch
- Headlights: upper beams, dipped beams, side/taillights , stop lights and relevant light indicators
- Headlight setting according to the regulations in force
- Rear light, parking light, stop light - Front and rear stop switches
- Direction indicators and relevant lights - Instrument panel lights

- Instruments: fuel and temperature indicator
- Instrument unit indicator lights
- Horn
- Starter

CAUTION

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

WARNING

BEFORE RECHARGING THE BATTERY, REMOVE THE PLUGS OF EACH ELEMENT. KEEP SPARKS AND FREE FLAMES AWAY FROM THE BATTERY WHILE RECHARGING. REMOVE THE BATTERY FROM THE VEHICLE DISCONNECTING THE NEGATIVE TERMINAL FIRST.

CAUTION

WHEN INSTALLING THE BATTERY, FIRST FIX THE POSITIVE CABLE AND THEN THE NEGATIVE CABLE.

WARNING

THE BATTERY ELECTROLYTE IS POISONOUS AND CAUSES SEVERE BURNS AS IT CONTAINS SULPHURIC ACID. AVOID CONTACT WITH THE EYES, THE SKIN AND CLOTHING. IN CASE OF CONTACT WITH THE EYES OR THE SKIN, RINSE GENEROUSLY WITH WATER FOR ABOUT 15 MINUTES AND IMMEDIATELY SEEK MEDICAL ATTENTION. IN CASE OF INGESTION, IMMEDIATELY DRINK LARGE QUANTITIES OF WATER OR VEGETABLE OIL. IMMEDIATELY SEEK MEDICAL ATTENTION. BATTERIES PRODUCE EXPLOSIVE GASES. KEEP THEM AWAY FROM OPEN FLAMES, SPARKS AND CIGARETTES. IF THE BATTERY IS CHARGED IN A CLOSED PLACE, TAKE CARE TO ENSURE ADEQUATE VENTILATION. ALWAYS PROTECT THE EYES WHEN WORKING CLOSE TO BATTERIES. KEEP OUT OF REACH OF CHILDREN

CAUTION

NEVER USE FUSES HAVING A HIGHER RATING THAN 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

Road test:

- Cold starting
 - Operation of instruments
 - Operation of throttle control
 - Stability during acceleration and braking
 - Operation of front and rear brakes
 - Operation of front and rear suspensions
 - Abnormal noise from vehicle
-

Static test

Static inspection after test on the road:

- Hot start
- Starter operation
- Idle speed hold (by turning the handlebar)
- Even steering wheel rotation
- Leaks, if any

CAUTION**CHECK THE INFLATING PRESSURES WHEN THE TYRES ARE AT AMBIENT TEMPERATURE.****CAUTION****NOT EXCEED THE RECOMMENDED INFLATING PRESSURES AS THE TYRES MAY BURST.**

Functional inspection

Functional Check:

Braking system (hydraulic)

- Lever stroke

Braking system (mechanical)

- Lever stroke

Clutch

- Proper performance check

Engine

- Gas control stroke check Miscellaneous
 - Document check
 - Check of chassis no. and engine no.
 - Ancillary tools
-

- Plate assembly
 - Check of locks
 - Tyre pressure check
 - Installation of rear-view mirrors and optional fixtures
-

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TIME

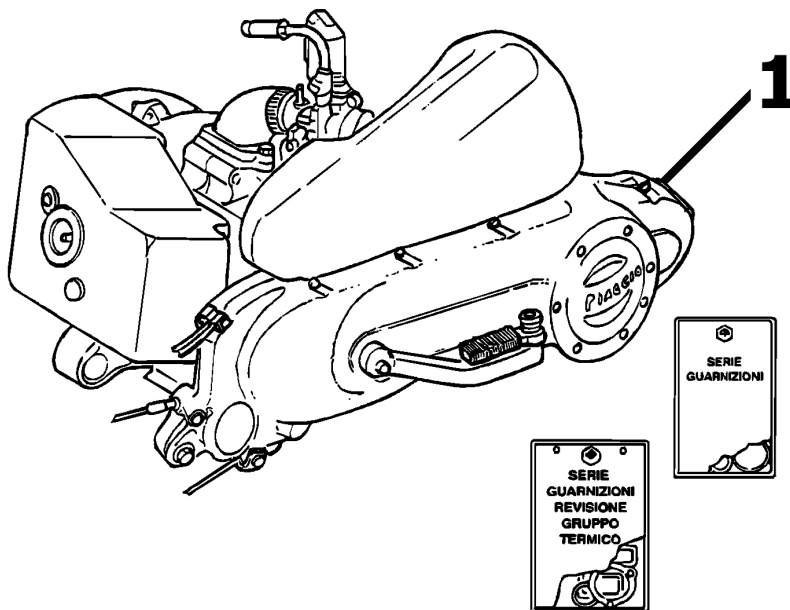
TIME

This section describes the amount of time it takes for repair operations.

The description, code and amount of time for each operation are indicated.



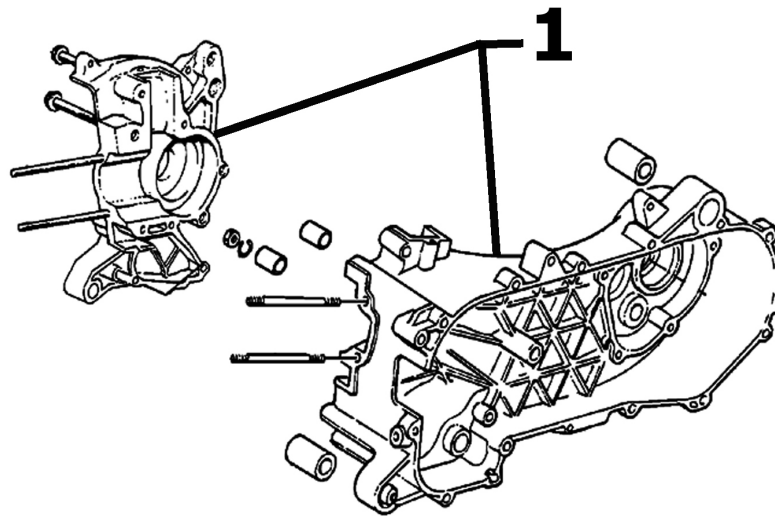
Engine



ENGINE

	Code	Action	Duration
1	001001	Engine to frame - Disassembly and reassembly	90'

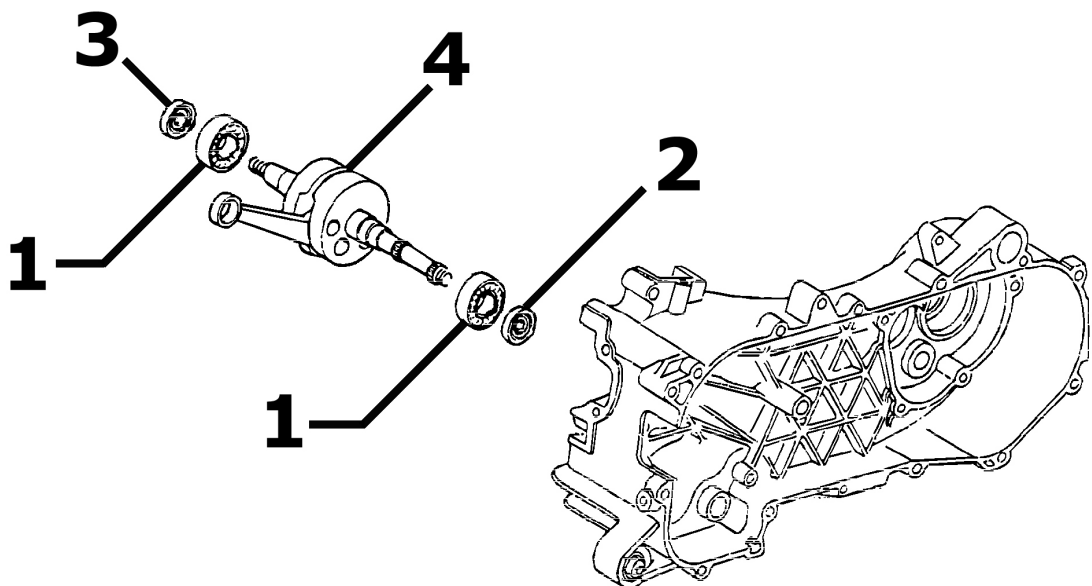
Crankcase



CRANKCASE

	Code	Action	Duration
1	001133	Engine crankcase - Replacement	190'

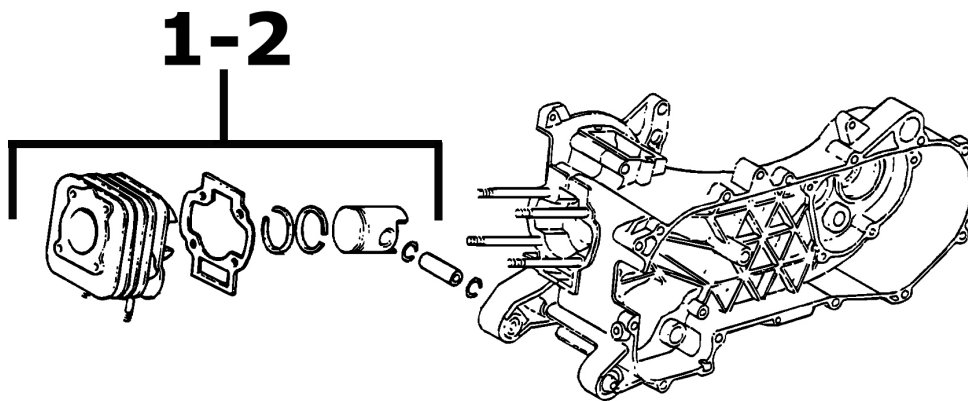
Crankshaft



DRIVING SHAFT

	Code	Action	Duration
1	001118	Main bearings - Replacement	170'
2	001100	Oil seal clutch side - Replacement	55'
3	001099	Oil seal flywheel side - Replacement	50'
4	001117	Crankshaft - Replacement	170'

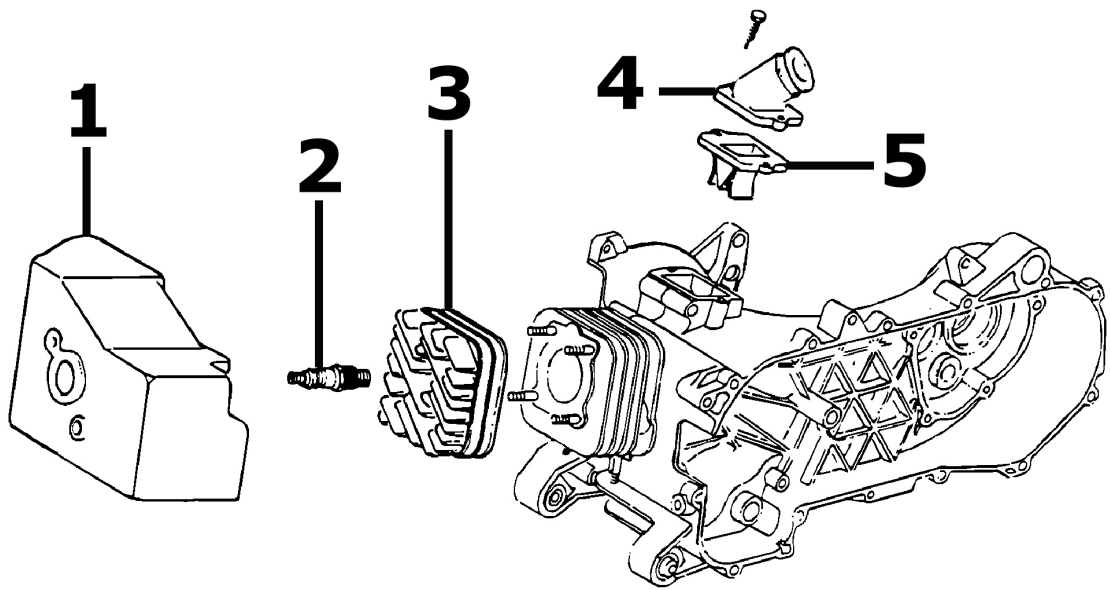
Cylinder assy.



PISTON CYLINDER

	Code	Action	Duration
1	001002	Piston cylinder - Replacement	55'
2	001007	Cylinder, piston - Overhaul/ Cleaning	50'

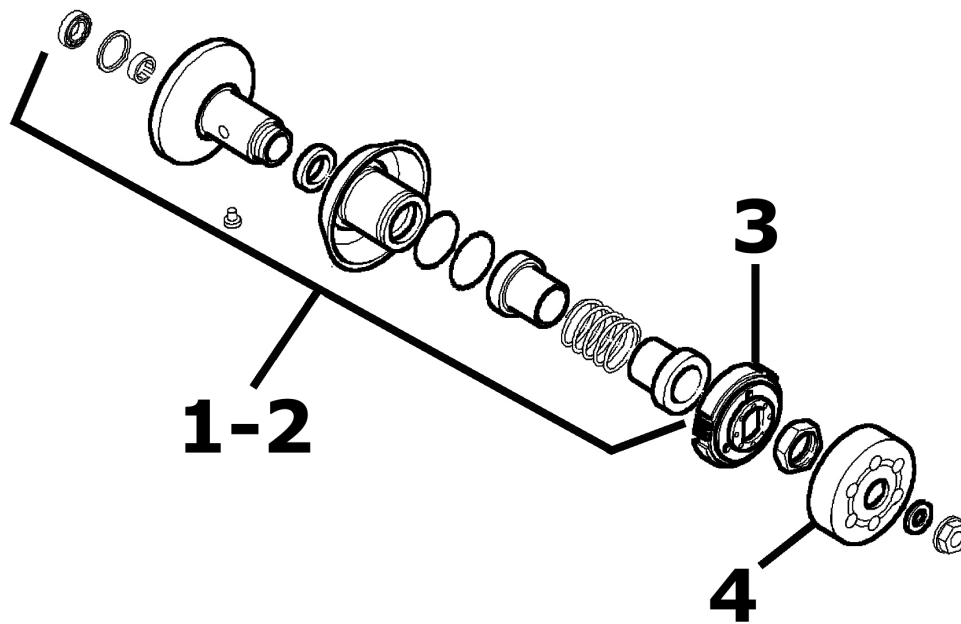
Cylinder head assy.



HEAD

	Code	Action	Duration
1	001097	Cooling hood - Replacement	25'
2	001093	Spark plug - Replacement	10'
3	001126	Head - Replacement	50'
4	001013	Intake manifold - Replacement	40'
5	001178	Reed valve assembly - Replacement	45'

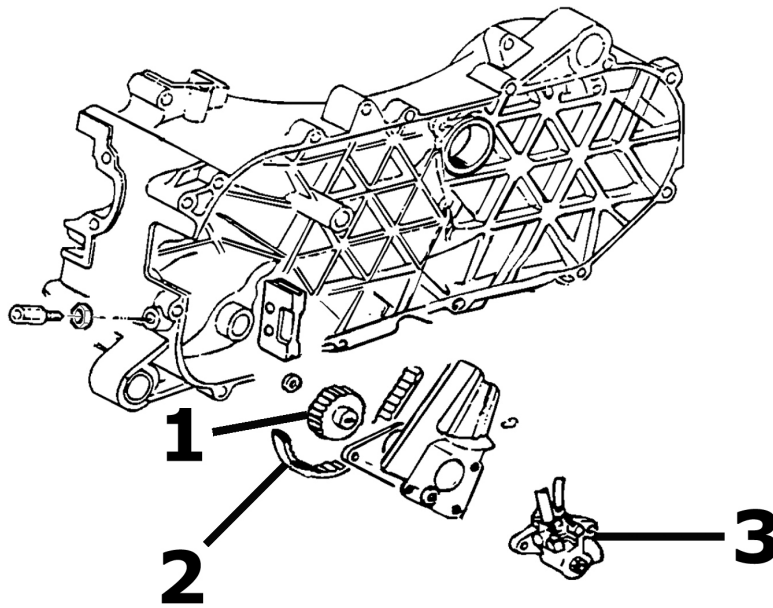
Driven pulley



DRIVEN PULLEY - CLUTCH

	Code	Action	Duration
1	001012	Driven pulley - Overhaul	50'
2	001110	Driven pulley - Replacement	35'
3	001022	Clutch - Replacement	40'
4	001155	Clutch bell housing - Replacement	20'

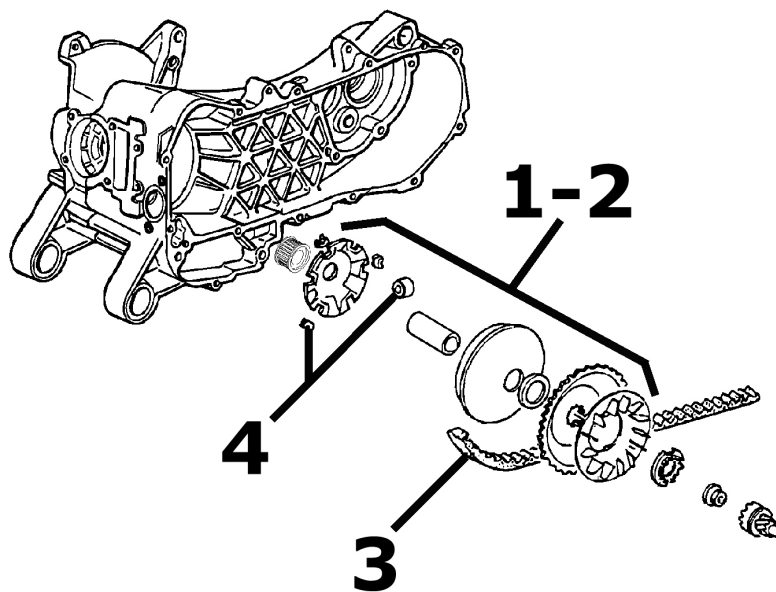
Oil pump



OIL PUMP

	Code	Action	Duration
1	001028	Mixer drive gear - Replacement	55'
2	001019	Mixer belt - Replacement	30'
3	001018	Mixer - Replacement	40'

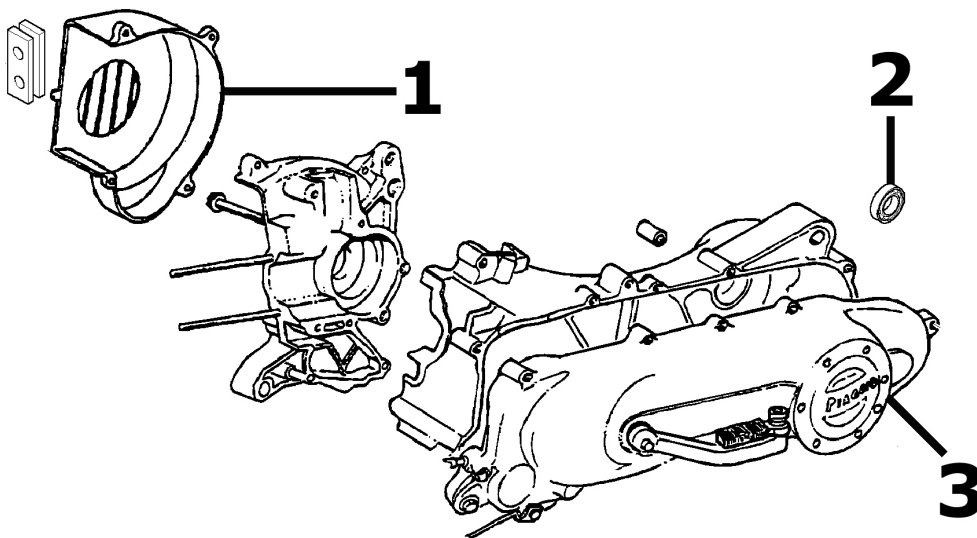
Driving pulley



DRIVING PULLEY

	Code	Action	Duration
1	001066	Driving pulley - Disassembly and reassembly	25'
2	001086	Driving half pulley - Replacement	25'
3	001011	Driving belt - Replacement	25'
4	001177	Rollers / Variator track shoes - Replacement	30'

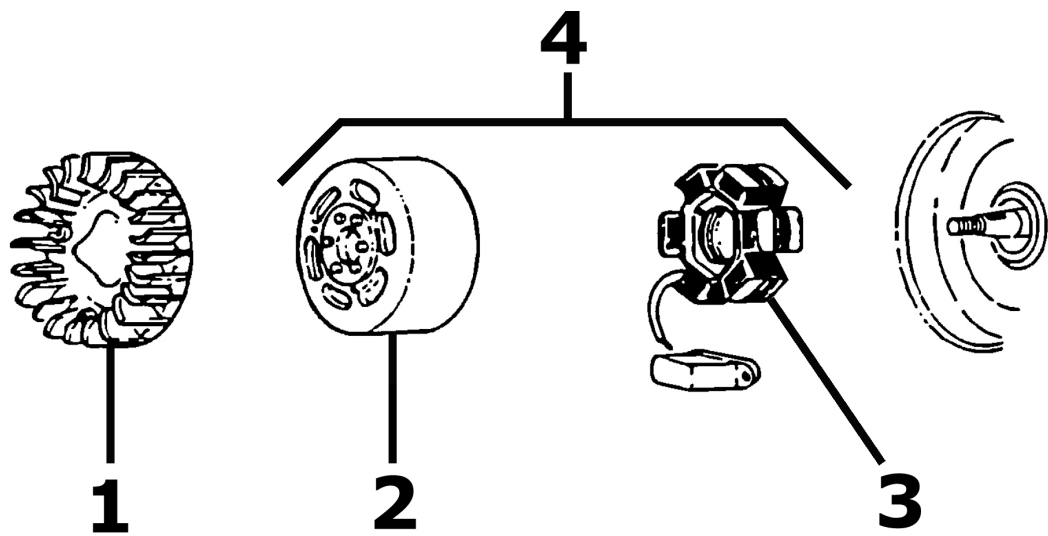
Transmission cover



TRANSMISSION COVER

	Code	Action	Duration
1	001087	Flywheel cover - Replacement	25'
2	001135	Transmission cover bearing - Replacement	30'
3	001096	Transmission casing cover - Replacement	20'

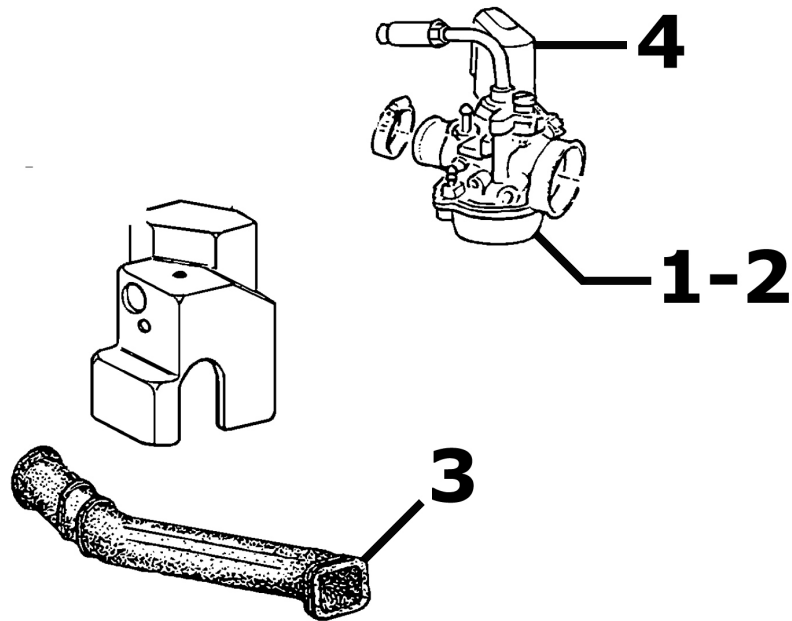
Flywheel magneto



FLYWHEEL - FAN

	Code	Action	Duration
1	001109	Cooling fan - Replacement	30'
2	001173	Rotor - Replacement	50'
3	001067	Stator - Disassembly and re-assembly	50'
4	001058	Flywheel - Replacement	50'

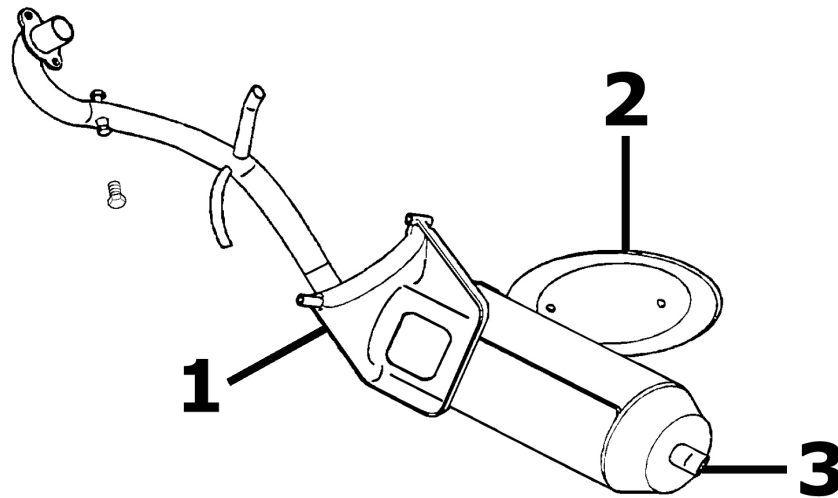
Carburettor



CARBURATOR

	Code	Action	Duration
1	001008	Carburettor - Overhaul	50'
2	001063	Carburettor - Replacement	35'
3	007020	Carburettor heating manifolds - Replacement	20'
4	001081	Automatic starter device - Replacement	30'

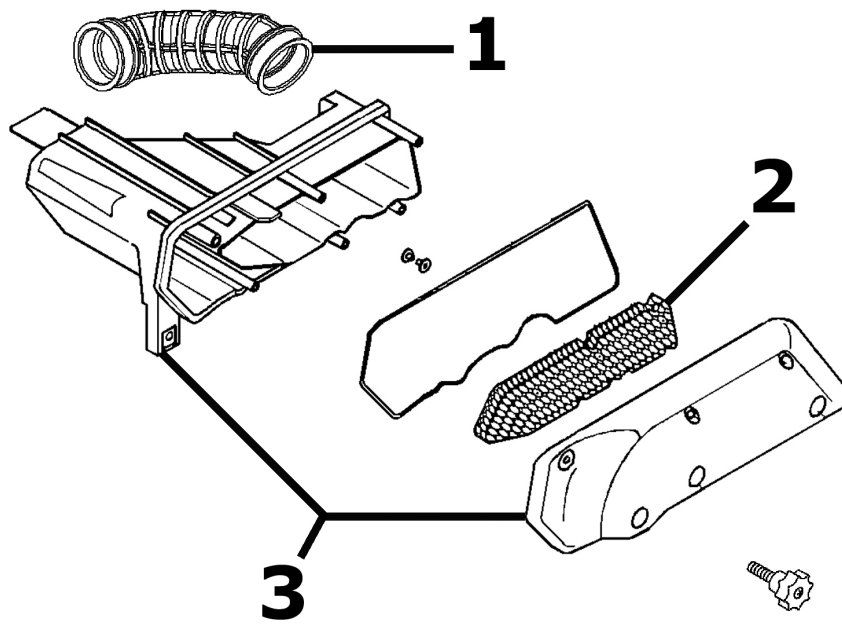
Exhaust pipe



MUFFLER

	Code	Action	Duration
1	001009	Silencer - Replacement	30'
2	001095	Silencer guard - Replacement	10'
3	001136	Exhaust emissions - Adjustment	20'

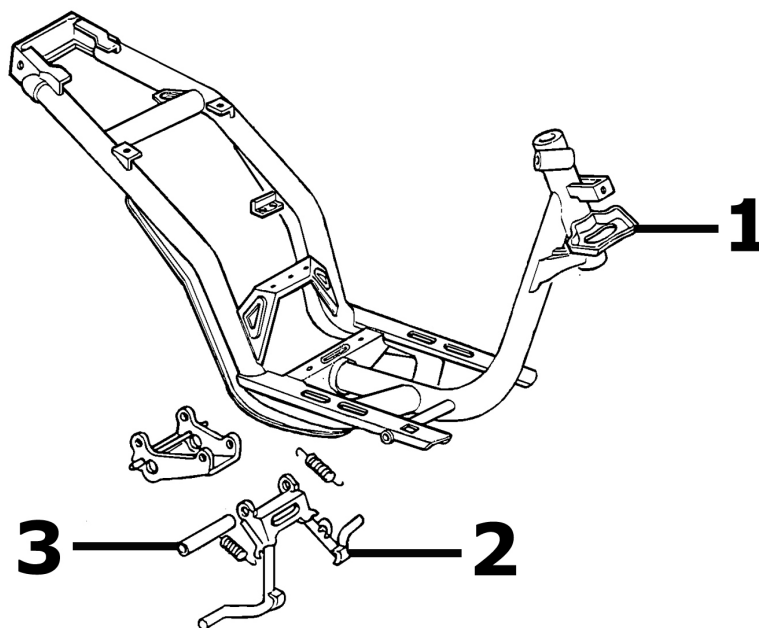
Air cleaner



AIR FILTER

	Code	Action	Duration
1	004122	Carburettor filter manifold - Replacement	25'
2	001014	Air Filter - Replacement	30'
3	001015	Air filter box - Replacement	30'

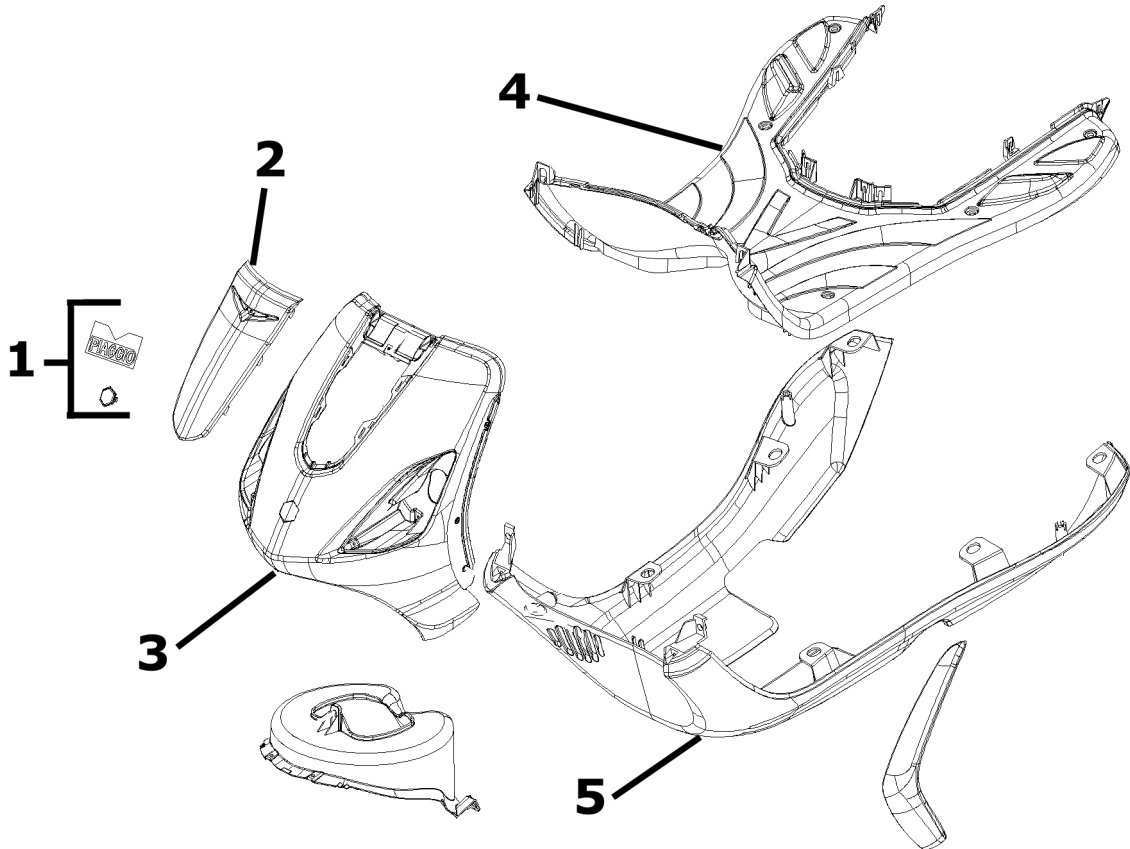
Frame



STAND

	Code	Action	Duration
1	004004	Stand - Replacement	
2	001053	Stand pin - Replacement	20'

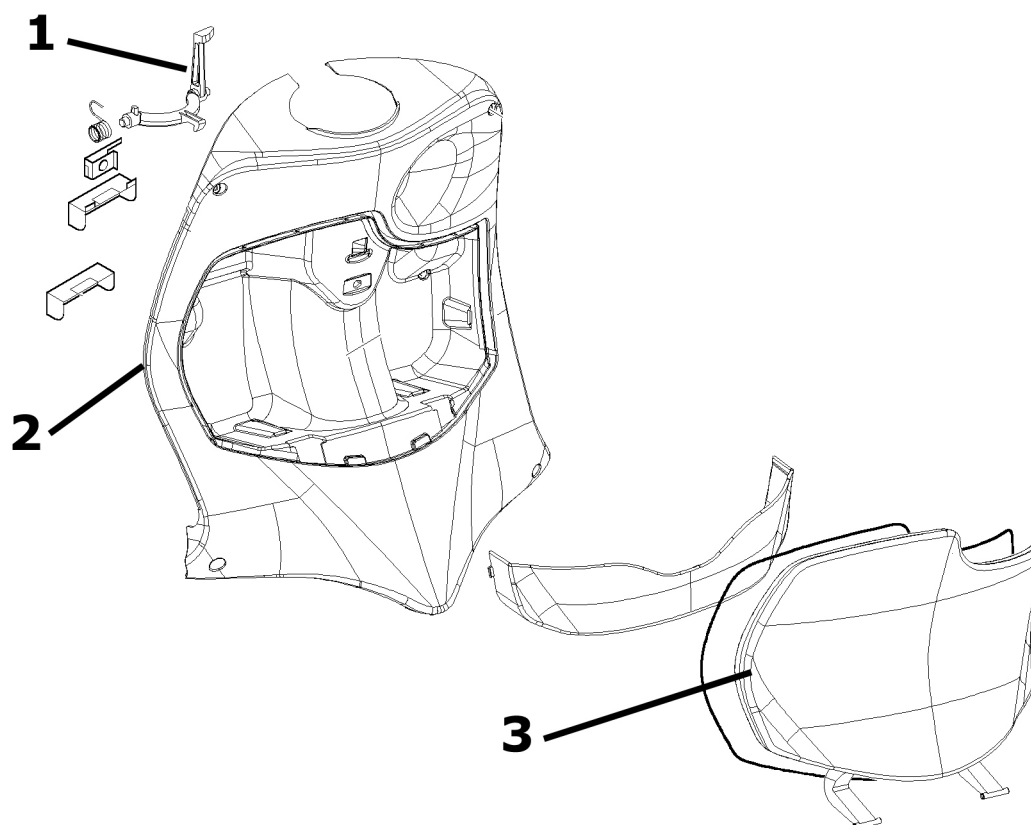
Legshield spoiler



GLOVE COMPARTMENT

	Code	Action	Duration
1	004159	Stickers - Replacement	10'
2	004149	Front shield - Painting	10'
3	004064	Front shield, front section - Removal and refitting	40'
4	004015	Footrest - Disassembly and reassembly	45'
5	004053	Spoiler - Replacement	65'

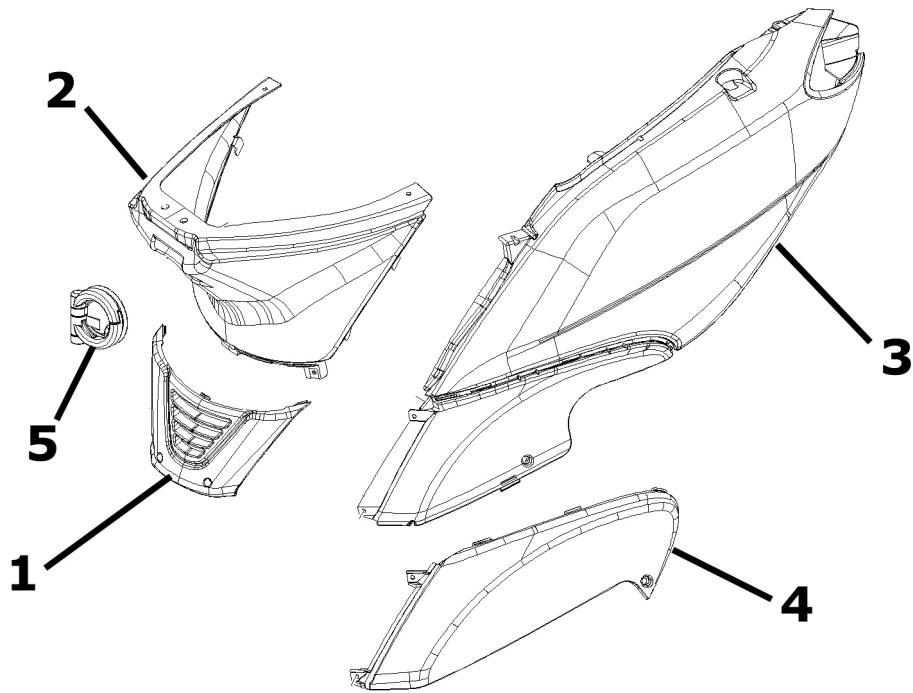
Rear cover



REAR COVER

	Code	Action	Duration
1	004174	Glove-box remote opening linkage - Replacement	</>
2	004065	Knee-guard - Removal and refitting	25'
3	004081	Glove compartment door - Replacement	40'

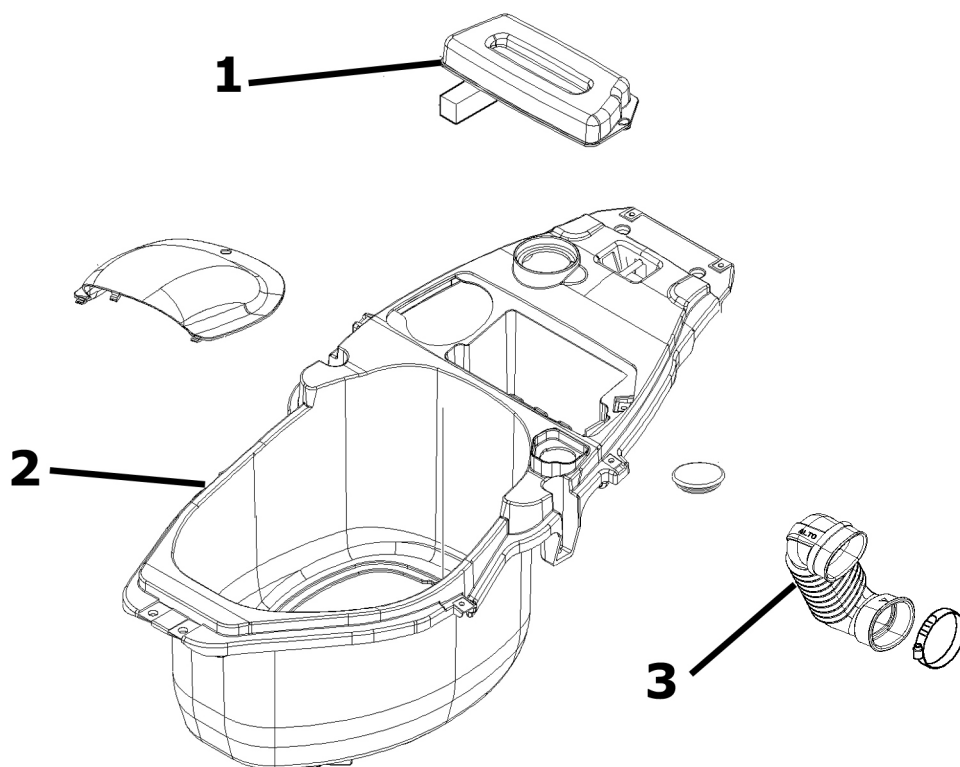
Central cover



CENTRAL COVER

	Code	Action	Duration
1	004059	Spark plug inspection flap - Replacement	10'
2	004106	Undersaddle band - Replacement	25'
3	004085	Side panel (1) - Replacement	30'
4	004105	R.H.S. protection - Replacement	20'
5	004131	Rear rack mounting bracket - Replacement	25'

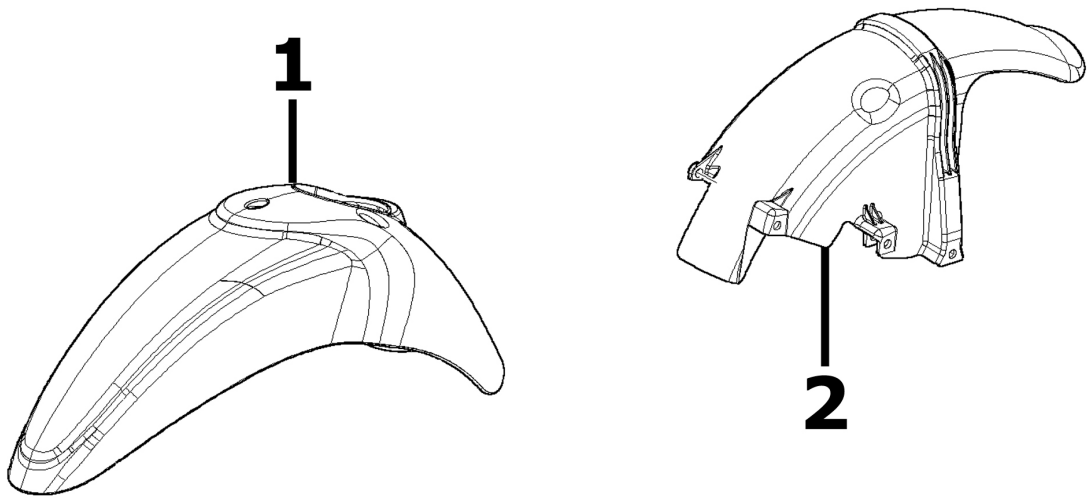
Underseat compartment



UNDERSEAT COMPARTMENT

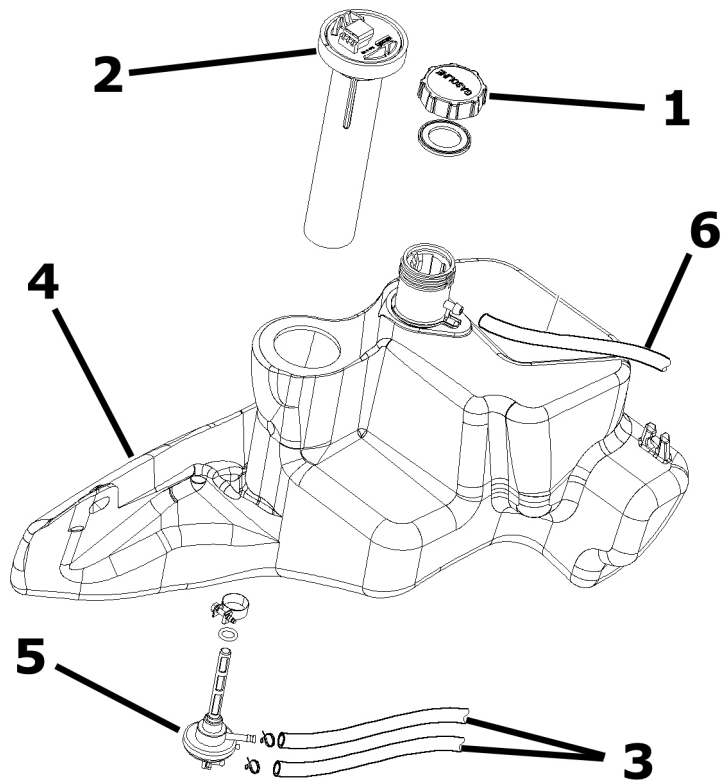
	Code	Action	Duration
1	005046	Battery cover - Replacement	</>
2	004016	Helmet compartment - Disassembly and reassembly	</>
3	001027	Filter bellow - Replacement	</>

Mudguard

**PARAFANGHI**

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

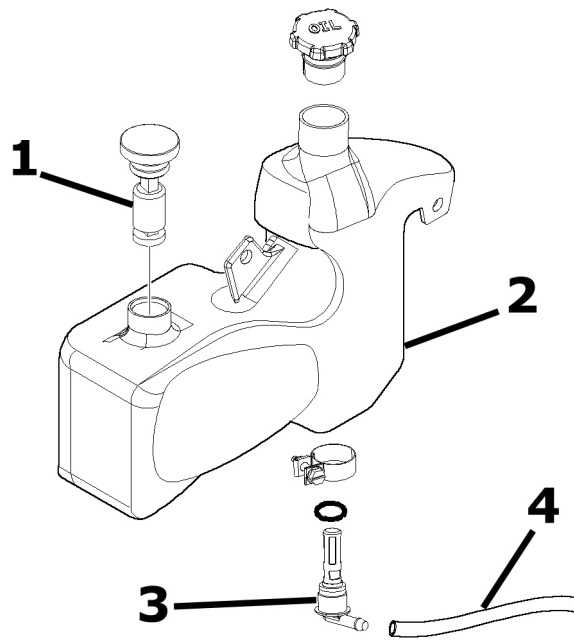
Fuel tank



FUEL TANK

	Code	Action	Duration
1	004168	Fuel filler cap - Replacement	</>
2	005010	Tank float - Replacement	</>
3	004112	Cock-carburettor pipe - Replacement	</>
4	004005	Fuel tank - Replacement	</>
5	004007	Mixture cock - Replacement	</>
6	004109	Fuel tank breather - Replacement	55'

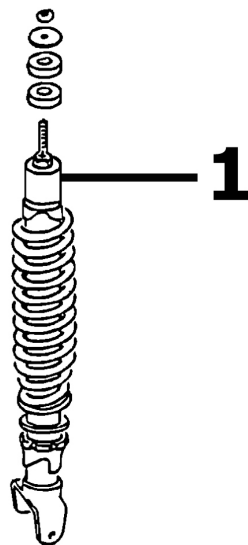
Tank oil



OIL TANK

	Code	Action	Duration
1	005018	Oil tank float - Replacement	45'
2	004017	Oil tank - Replacement	40'
3	004095	Oil tank tap - Replacement	15'
4	004091	Oil tank line - Replacement	15'

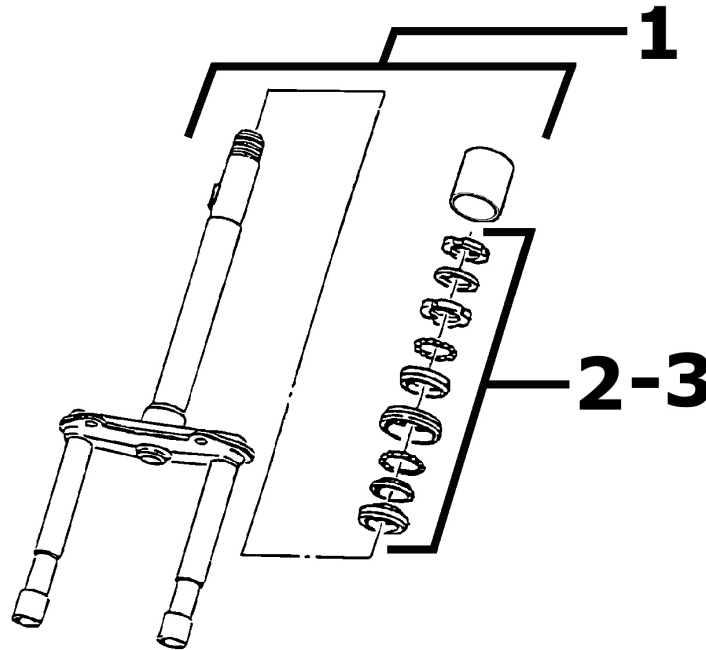
Rear shock-absorber



REAR SHOCK ABSORBER

	Code	Action	Duration
1	003007	Rear shock absorber - Disassembly and reassembly	60'

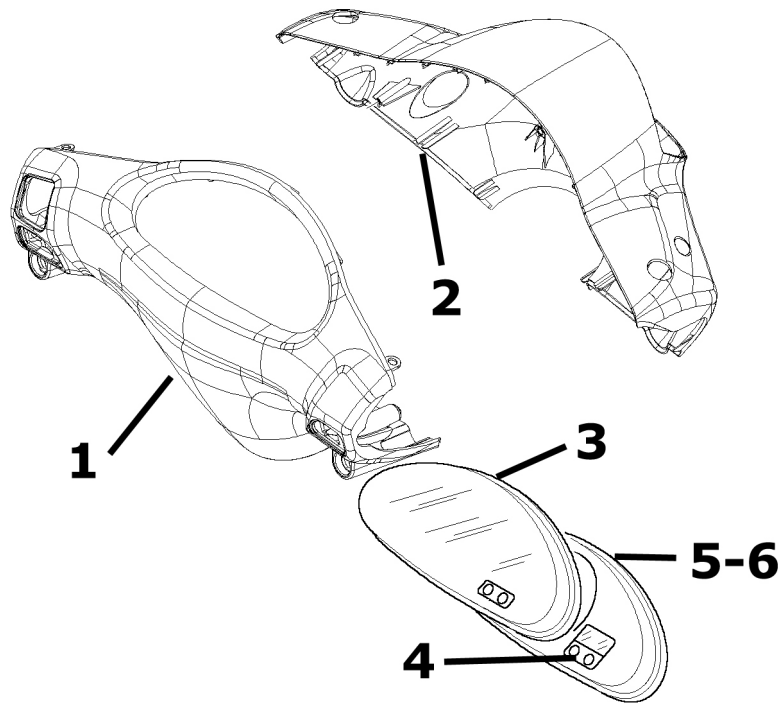
Steering column bearings



STEERING FIFTH WHEELS

	Code	Action	Duration
1	003051	Fork assembly - Replacement	</>
2	003002	Steering fifth wheels - Replacement	65'
3	003073	Steering play - Adjustment	</>

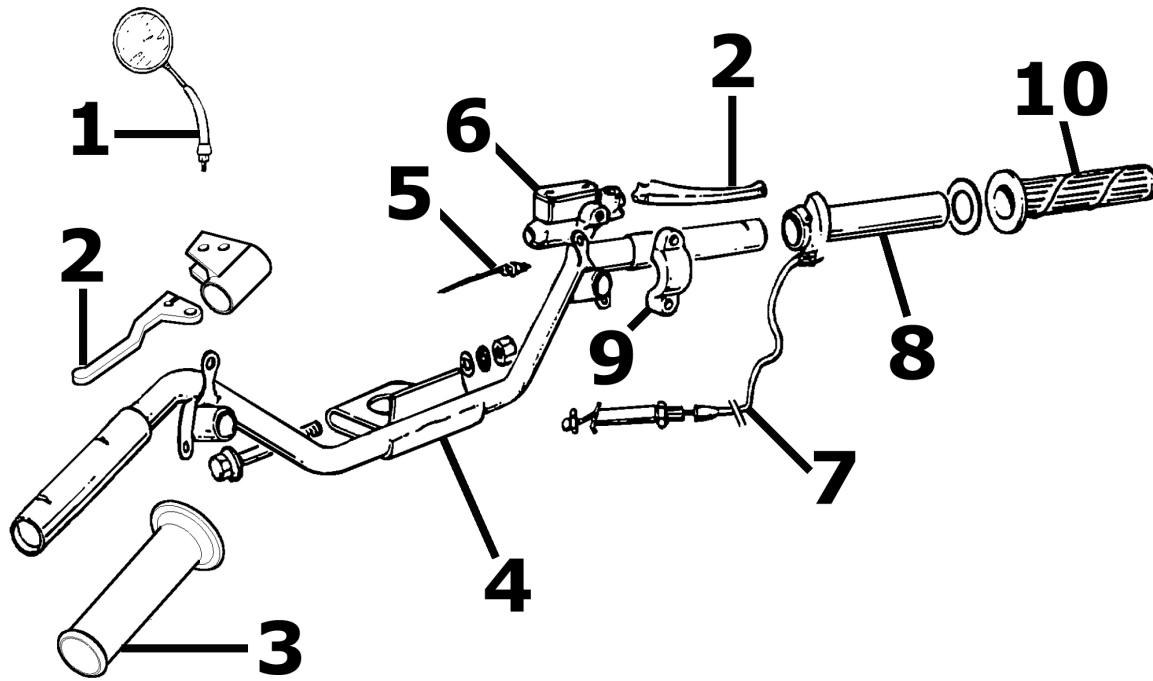
Handlebar covers



HANDLEBAR COVERS

	Code	Action	Duration
1	004019	Handlebar rear part - Replacement	</>
2	004018	Handlebar front section - Replacement	</>
3	005078	Odometer plastic cover - Replacement	</>
4	005076	Clock \ Battery - Replacement	</>
5	005014	Odometer - Replacement	25'
6	005038	Dashboard warning lights - Replacement	15'

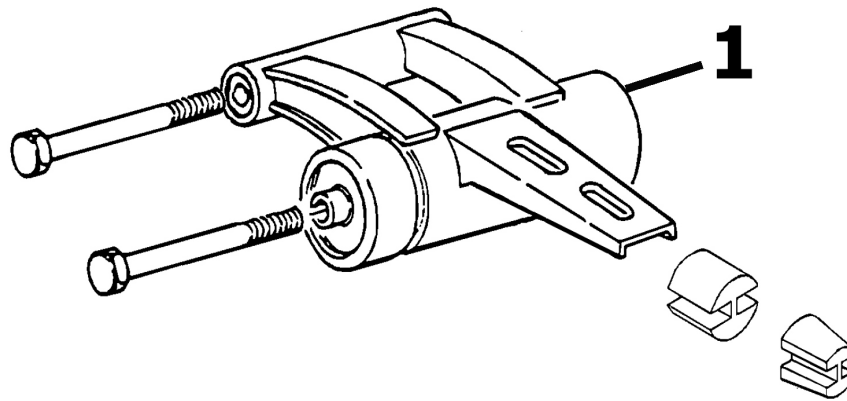
Handlebar components



HANDLEBAR COMPONENTS

	Code	Action	Duration
1	004066	Rearview mirrors - Replacement	</>
2	002037	Complete gas control - Replacement	</>
3	002071	Left knob - Replacement	</>
4	003001	Handlebar - Removal and re-fitting	40'
5	005017	Stop light switch - Replacement	</>
6	002024	Brake pump - Removal and reinstallation	</>
7	002054	Throttle or splitter cable assembly - Replacement	40'
8	002060	Complete gas control - Replacement	</>
9	004162	Mirror U-bolt and/or brake pump fitting - Replacement	</>
10	002059	Right knob - Replacement	</>

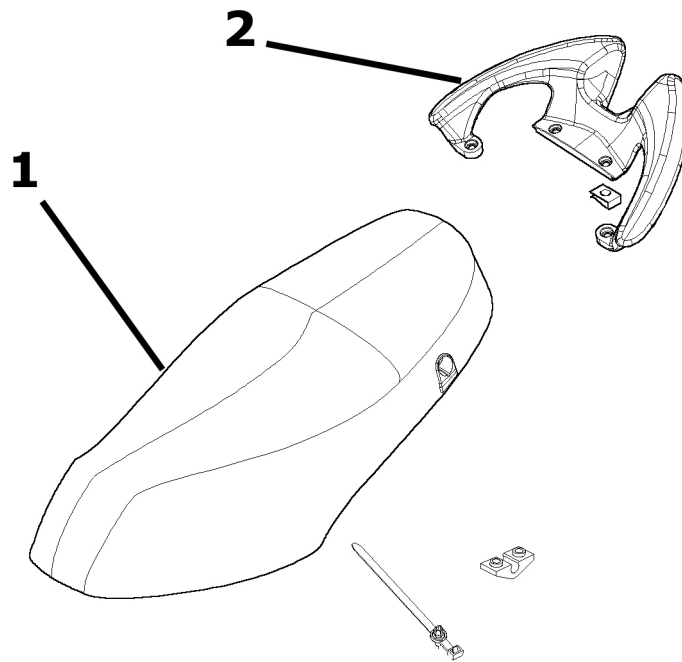
Swing-arm



SWINGING ARM

	Code	Action	Duration
1	001072	Engine-frame connection swing arm - Replacement	60'

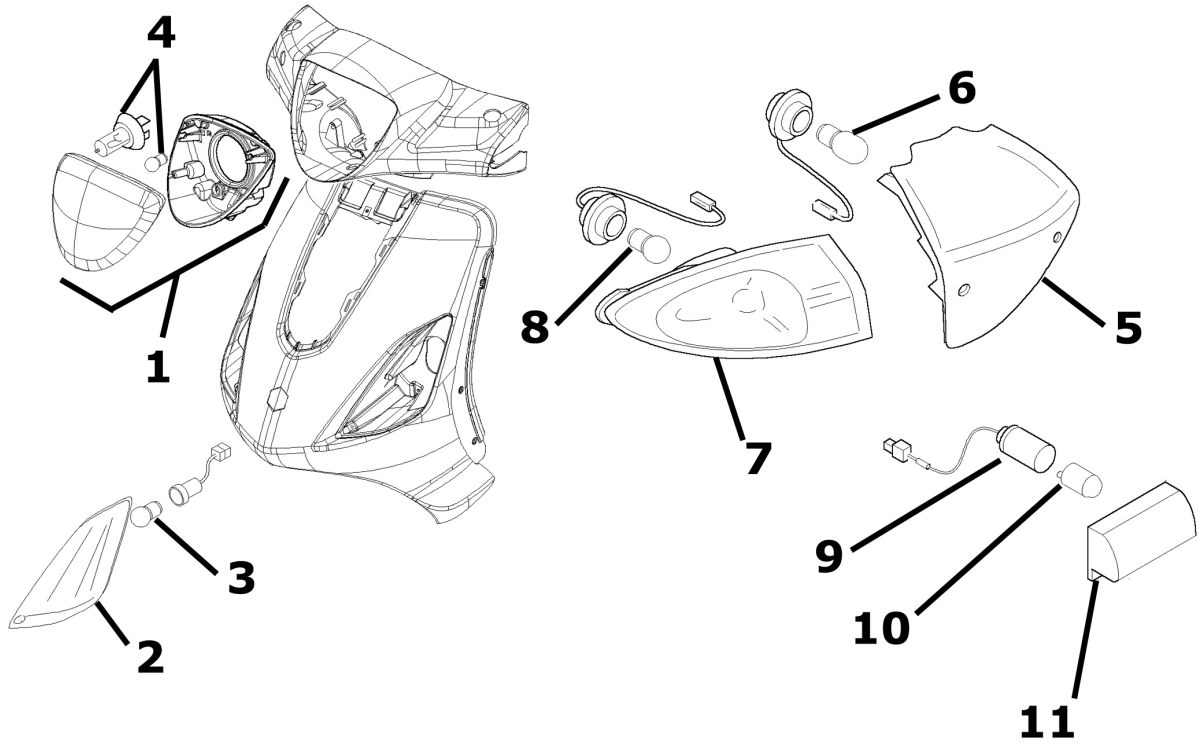
Seat



SEAT

	Code	Action	Duration
1	004003	Saddle - Replacement	</>
2	004068	Passenger handle (1) - Replacement	</>

Turn signal lights

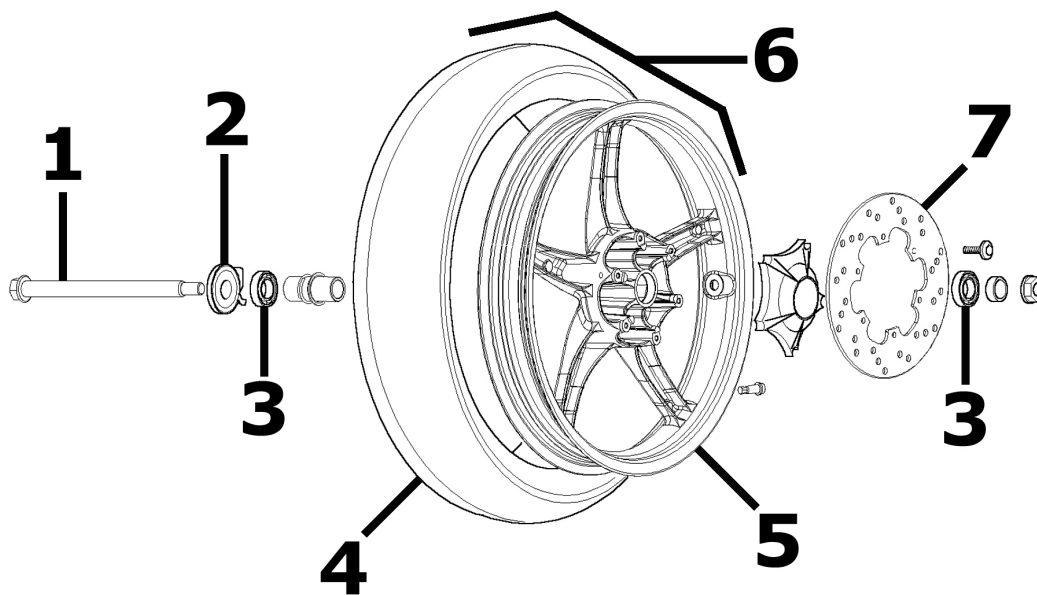


TURN SIGNAL LIGHTS

	Code	Action	Duration
1	005002	Headlight - Replacement	</>
2	005012	Front turn signal light - Replacement	</>
3	005067	Front direction indicator bulb - Replacement	</>
4	005008	Front headlights - Replacement	</>
5	005005	Rear light - Replacement	</>
6	005066	Rear light bulbs - Replacement	</>
7	005022	Rear turn signal light (1) - Replacement	</>
8	005068	Rear turn indicator bulb - Replacement	</>
9	005131	Registration light holder - Re-	</>

	Code	Action	Duration
		placement	
10	005031	Number plate light bulb - Replacement	</>
11	005032	Number plate light cover - Replacement	</>

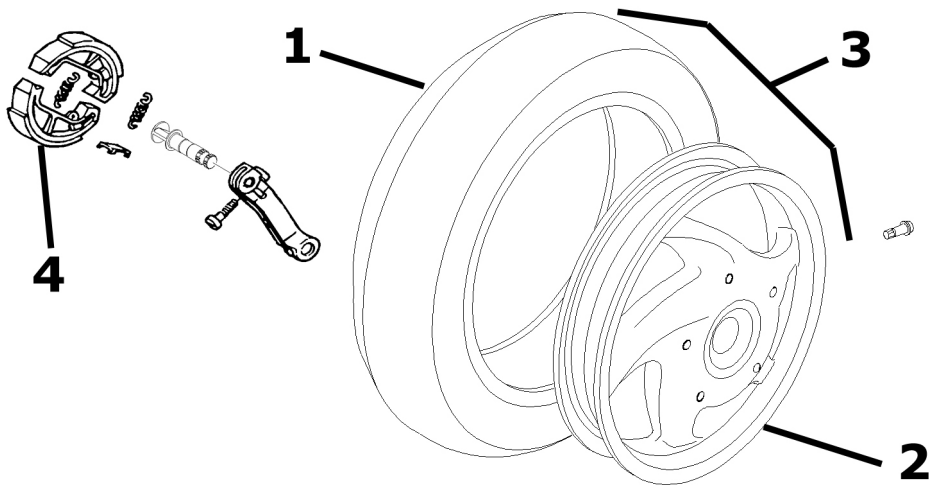
Front wheel



FRONT WHEEL

	Code	Action	Duration
1	003038	Front wheel spindle - Removal and refitting	45'
2	002011	Odometer drive gear - Replacement	30'
3	003040	Front wheel bearings - Replacement	50'
4	003047	Front tyre - Replacement	25'
5	003037	Front wheel rim - Removal and refitting	</>
6	004123	Front wheel - Replacement	25'
7	002041	Brake disc - Replacement	35'

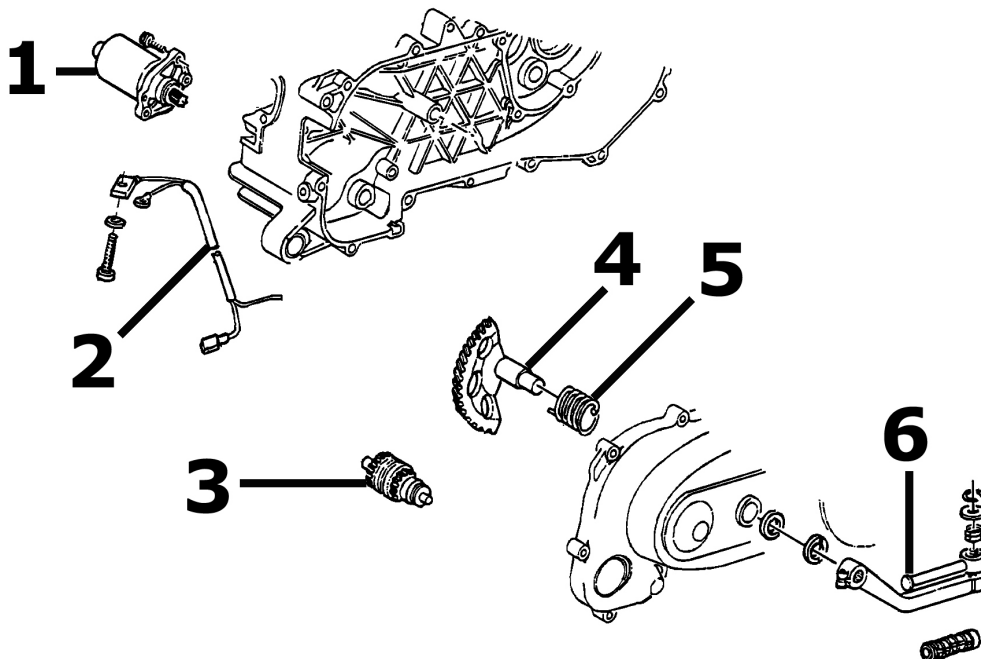
Rear wheel



REAR WHEEL

	Code	Action	Duration
1	004126	Rear tyre - Replacement	
2	001071	Rear wheel rim - Removal and refitting	
3	001016	Rear wheel - Replacement	</>
4	002002	Rear brake shoes/pads - Replacement	</>

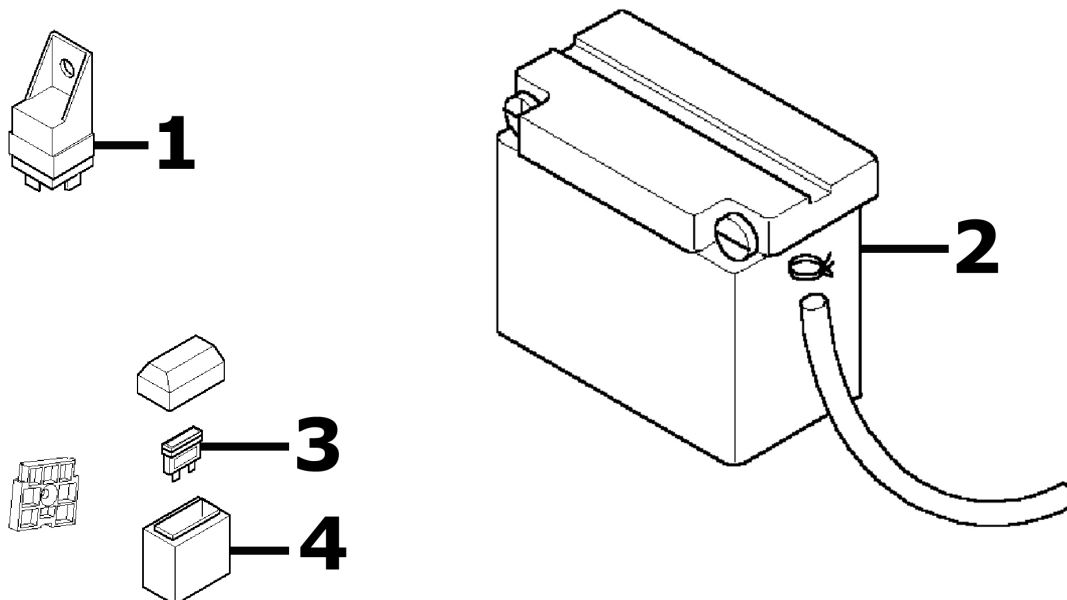
Electric start



ELECTRIC START

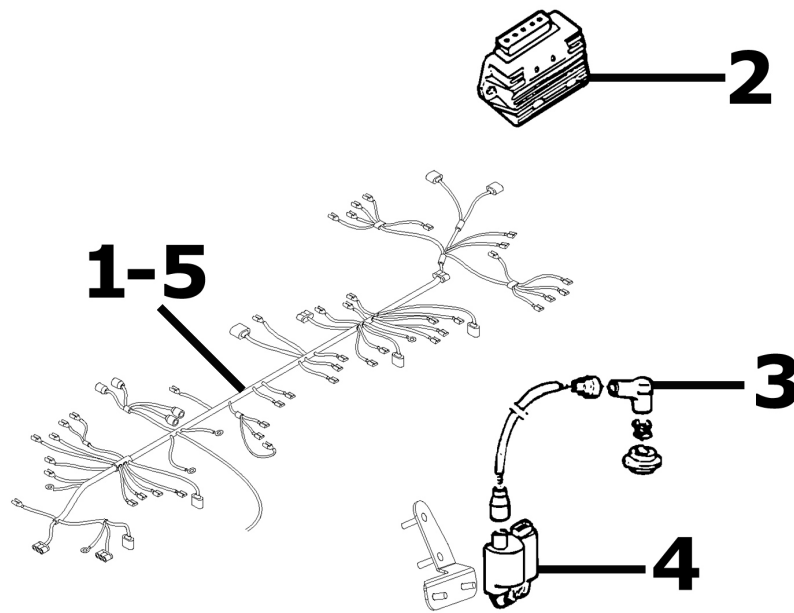
	Code	Action	Duration
1	001020	Starter engine - Replacement	25'
2	005045	Starting motor cables - Replacement	20'
3	001017	Starter pinion - Replacement	25'
4	001021	Kick starter - Overhaul	25'
5	008008	Starting sector spring - Replacement	45'
6	001084	Starting lever - Replacement	10'

Electric devices



ELECTRICAL DEVICES

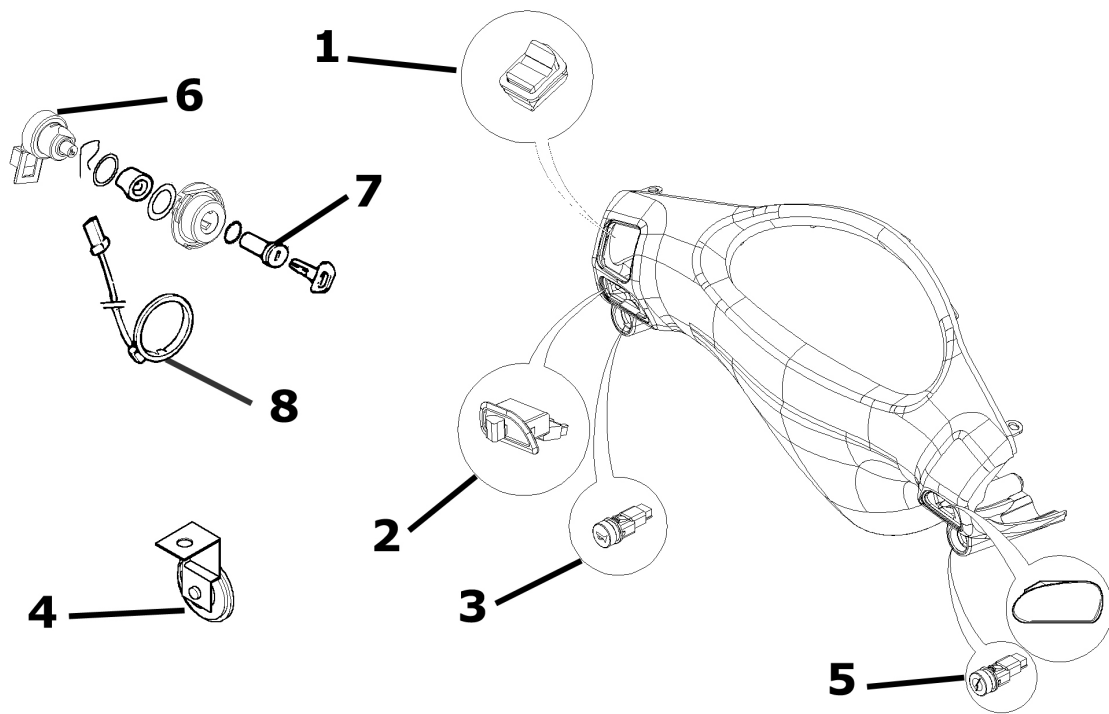
	Code	Action	Duration
1	005007	Battery - Replacement	15'
2	005011	Start-up remote control switch - Replacement	30'
3	005052	Fuse (1) - Replacement	20'
4	005054	Fuse carrier (1) - Replacement	10'



ELECTRIC DEVICES

	Code	Action	Duration
1	005001	Electric circuit - Replacement	140'
2	005009	Voltage regulator - Replacement	30'
3	001094	Spark plug cap - Replacement	</>
4	001023	Controller - Replacement	30'
5	005114	Electric circuit - Overhaul	</>

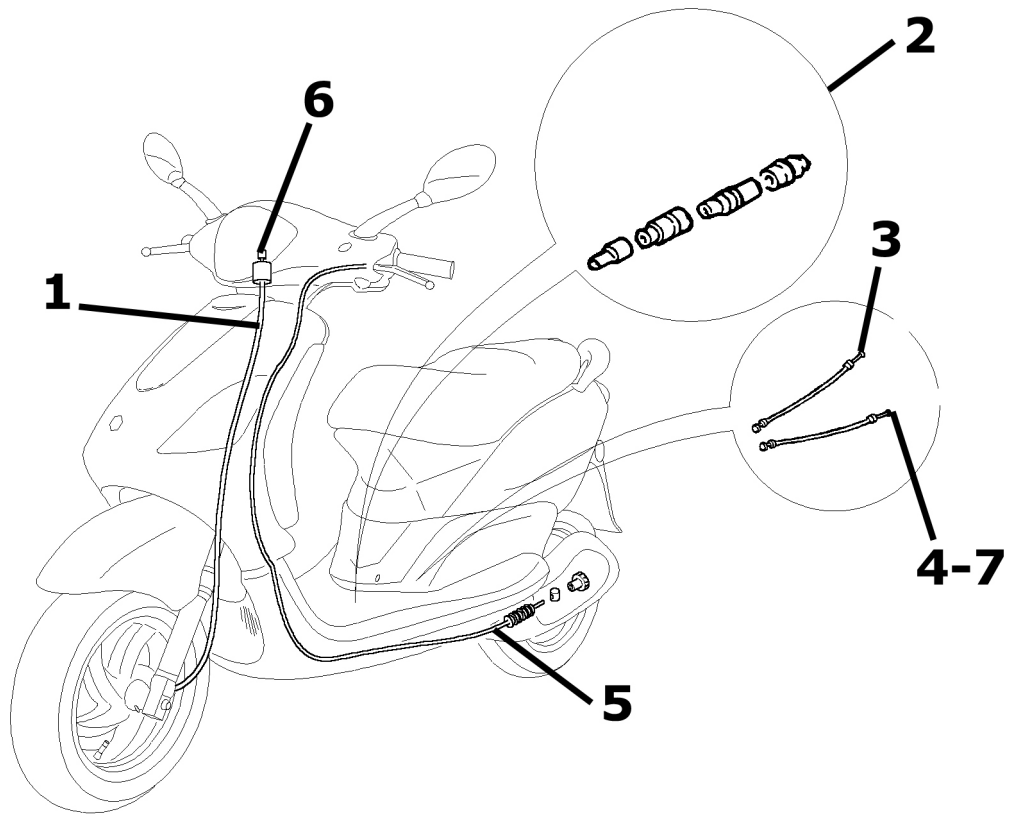
Electronic controls



ELECTRIC CONTROLS

	Code	Action	Duration
1	005039	Light switch - Replacement	</>
2	005006	Lights or flashlights switch - Replacement	</>
3	005040	Horn button - Replacement	</>
4	005003	Electric horn - Replacement	</>
5	005041	Starter button - Replacement	</>
6	005016	Key switch - Replacement	</>
7	004096	Locks series - Replacement	</>
8	005072	Immobiliser antenna - Replacement	</>

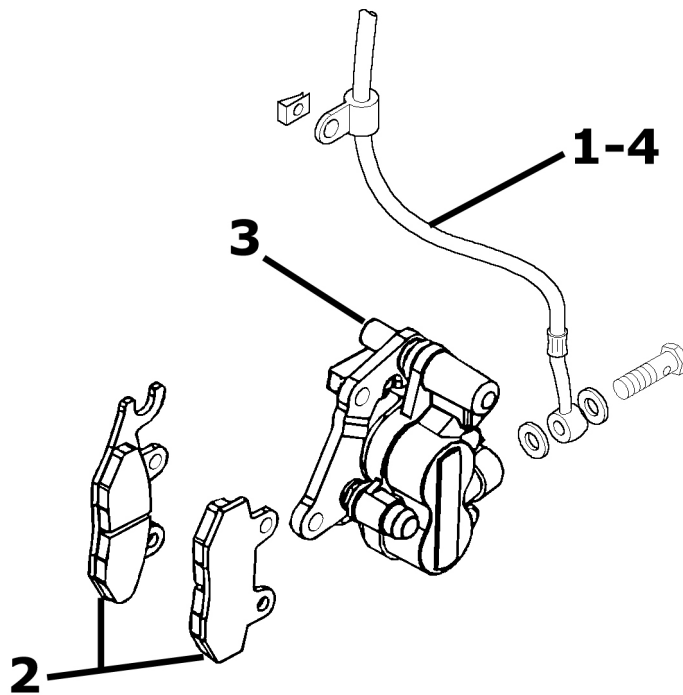
Transmissions



TRANSMISSIONS

	Code	Action	Duration
1	002051	Odometer transmissions assembly - Replacement	</>
2	002012	Splitter - Replacement	30'
3	002057	Splitter-carburettor cable assembly - Replacement	30'
4	002058	Mixer splitter cable assembly - Replacement	35'
5	002053	Rear brake transmissions assembly - Replacement	35'
6	002049	Odometer cable - Replacement	</>
7	003061	Throttle cable - Adjustment	5'

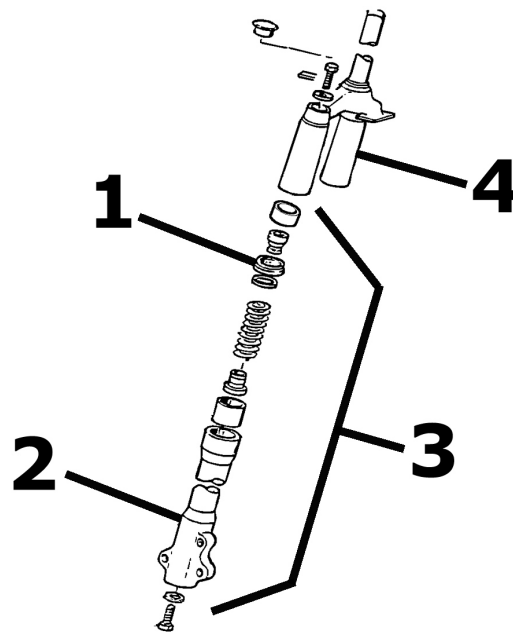
Brake callipers



BRAKE LEVER

	Code	Action	Duration
1	002021	Front brake line - Replacement	</>
2	002007	Front brake shoes/pads - Removal and refitting	</>
3	002039	Front brake calliper - Removal and refitting	35'
4	002047	Front brake liquid and circuit bleeding - Replacement	50'

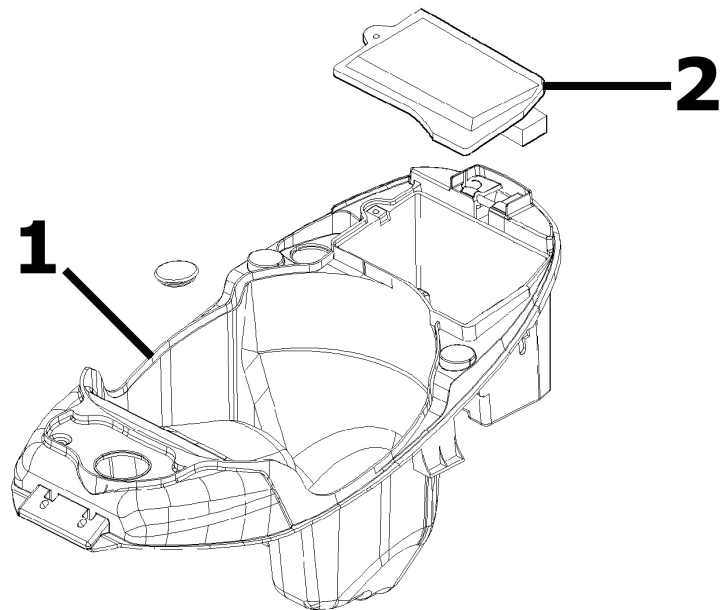
Steering column



STEERING

	Code	Action	Duration
1	003048	Fork oil seal - Replacement	70'
2	003076	Fork leg - Replacement	70'
3	003079	Fork stanchion - Replacement	70'
4	003010	Front suspension - Overhaul	</>

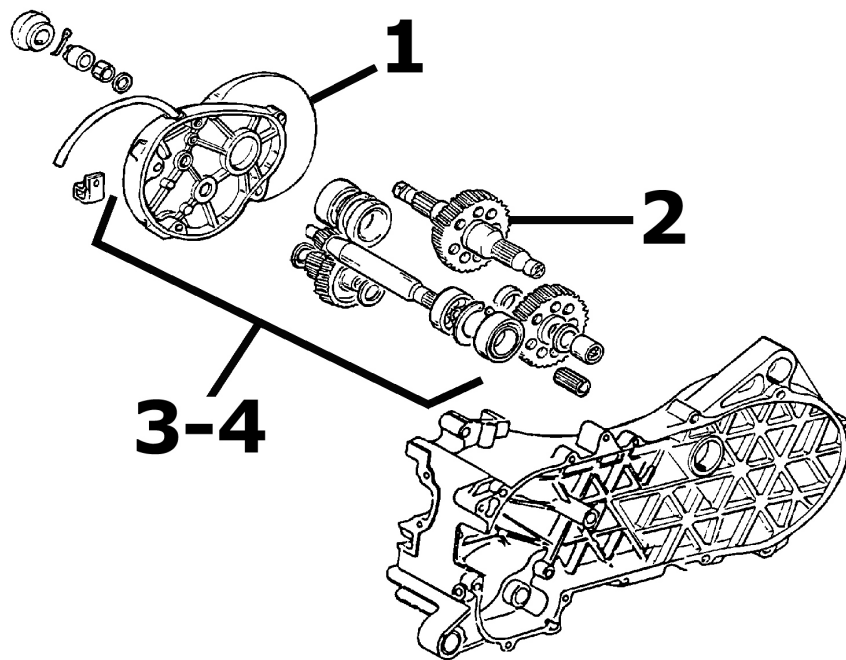
Helmet bay



HELMET CARRIER

	Code	Action	Duration
1	004016	Helmet compartment - Disassembly and reassembly	35'
2	005046	Battery cover - Replacement	</>

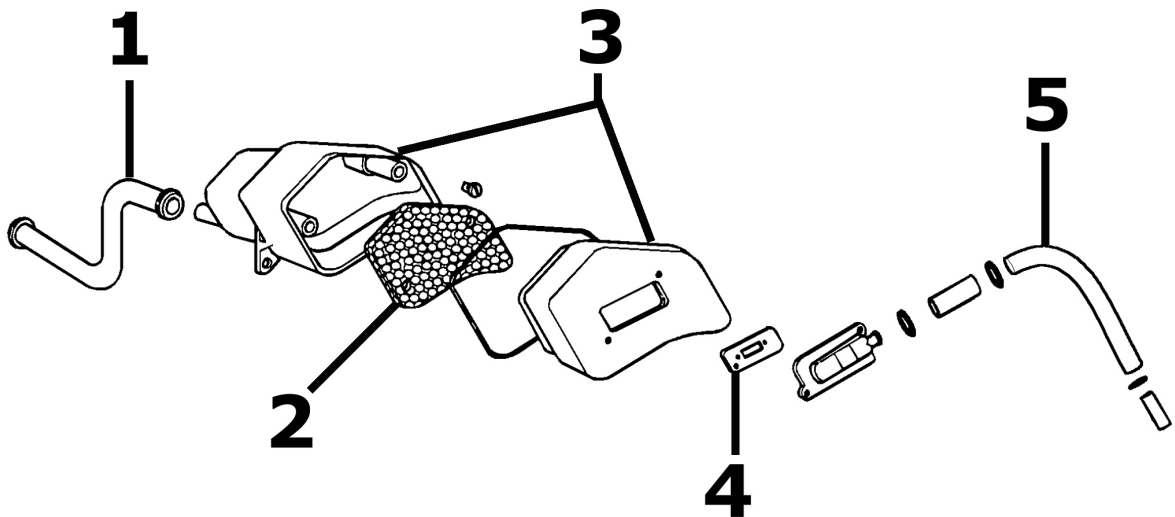
Rear wheel axle



REAR WHEEL AXLE

	Code	Action	Duration
1	001156	Reduction gear cover - Replacement	30'
2	004125	Rear wheel axle - Replacement	30'
3	001010	Reduction gear - Overhaul	60'
4	003065	Gearcase oil - Replacement	20'

Secondary air box



SECONDARY AIR BOX

	Code	Action	Duration
1	001164	Crankcase secondary air junction - Replacement	40'
2	001161	Secondary air filter- Replacement / Cleaning	15'
3	001162	Secondary air box - Replacement	40'
4	001163	Exhaust secondary air junction - Replacement	40'
5	001165	Secondary air valve - Replacement	15'