PIAGGIO

WORKSHOP MANUAL

633257

NRG Power DT

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PIAGGIO & C. S.p.A. - After Sales Service
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WORKSHOP MANUAL
NRG Power DT

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.


sportseries

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INDEX OF TOPICS

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

Frame prefix: ZAPC45300 ÷ 1001

Engine prefix: C453M

Dimensions and mass

DIMENSIONI E MASSA

Specification	Desc./Quantity
Max length	1790 mm.
Max width	850 mm.
Seat height	795 mm.
Wheelbase	1270 mm.
Dry weight	95 kg.

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 cm³
Compression ratio	9,4÷10,4:1
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 supply	With vacuum fuel pump, unleaded petrol (with min octane no. 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

CAPACITY

Specification	Desc./Quantity
Rear hub oil	Quantity : ~ 85 cc
Mixer oil	1.2 litres
Fuel tank capacity	6.5 litres (1.5 litres of 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° ± 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	Upside-down telescopic hydraulic fork
Front suspension travel	75 mm
Rear suspension	with coil spring and coaxial hydraulic shock absorber. Swinging arm engine/frame coupling.

Brakes

BRAKES

Specification	Desc./Quantity
Front brake	220 mm disc brake with hydraulic linkage (r.h. brake lever).
Rear brake	Drum brake (110 mm. diameter) with mechanical expansion type shoes (lever on the left end of the handlebars).

Wheels and tyres

WHEELS AND TYRES

Specification	Desc./Quantity
Front tyre	Tubeless 120/70-13"
Rear tyre	Tubeless 140/60 x 13"
Wheels	With circles of 3.50 x 13" in light alloy.

Secondary air

Per eseguire la pulizia dei filtri in spugna dell'impianto di aria secondaria occorre procedere come segue:

Svitare le due viti di fissaggio (**2**) del coperchietto in alluminio della scatola aria secondaria per poter accedere alla spugna poliuretanica contenuta all'interno della scatola stessa; eseguire la pulizia con acqua e sapone neutro, quindi asciugare la spugna con un panno pulito senza strizzarla e rimontare il tutto, dopo aver verificato nel contempo che la lamella di acciaio non risulti deformata e/o non garantisca la tenuta sul proprio piano di battuta; eventualmente sostituire.

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

DURANTE L'OPERAZIONE VERIFICARE SEMPRE L'INTEGRITÀ E LA TENUTA DEI DUE MANICOTTI (3) IN GOMMA POSTI ALLA ESTREMITÀ DEL TUBO ARIA SECONDARIA; IN CASO DI NECESSITÀ SOSTITUIRE UTILIZZANDO PER IL LORO FISSAG-GIO FASCETTE NUOVE.

Carburettor

50cc Version

Dell'Orto

DELL'ORTO CARBURETTOR

Specification	Desc./Quantity
Type	PHVA 17,5 RD
Choke diameter	Ø 17,5
Adjustments reference number	8440
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
Secondary idle air jet	Ø 2,5
Initial minimum mixture screw opening:	1 1/2
Starter jet	50
Starter air thrust (on body)	Ø 1,5
Starter pin stroke	11 mm
Fuel inlet hole	Ø 1,0

Tightening Torques

STEERING ASSEMBLY

Name	Torque in Nm
Top steering ring-nut (safety torque)	35÷40 N·m
Lower steering ring-nut (safety torque)	8÷10 N·m

Name	Torque in Nm
Handlebars fixing bolt (safety torque)	45÷50 N·m

FRAME ASSEMBLY

Name	Torque in Nm
Swing arm - engine bolt (safety torque)	33 ÷ 41
Frame - swing arm bolt (safety torque)	64÷72
Shock-absorber - frame nut (safety torque)	20 ÷25 N·m
Shock-absorber - engine bolt (safety torque)	33÷41 N·m
Rear wheel axle (safety torque)	104÷126 N·m
Centre-stand - engine securing bolt	18÷19 N·m
Side-stand fixing screw	12÷20 N·m
Side-stand mounting bracket fixing screw	15÷20 N·m
Rear rim fixing screw	20÷25

FRONT SUSPENSION

Name	Torque in Nm
Front wheel axle nut (safety torque)	45÷50 N·m
Wheel axle lock nut screw	6÷7
Lower stanchion screw	15÷20 N·m
Hydraulic damper shaft nut	15÷18

FRONT BRAKE

Name	Torque in Nm
Brake reservoir cover fixing screw	2÷4 N·m (Grimeca) - 0,8÷1,5 N·m (Brembo) - 1,5÷2 N·m (Hengtong)
Brake pump fixing screw	7÷10 N·m
Brake hose bracket on fork	5÷6,5
Brake fluid pump - hose joint	13÷18
Brake fluid hose - calliper joint	20÷25 N·m
Calliper fixing screw	20÷25
Disk fixing screw (safety torque - apply LOCTITE THREADLOCK MEDIUM TYPE 243)	6÷7 N·m
Fluid breathing screw	7÷10 N·m
Calliper mating screw	20÷25 N·m

ENGINE ASSEMBLY

Name	Torque in Nm
Clutch drum nut	40÷44 N·m

Name	Torque in Nm
Clutch securing ring-nut	55÷60 N·m
Drive pulley - crankshaft lock nut	40÷44 N·m
Starter lever screw	12÷13 N·m
Flywheel nut	40÷44 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
Pick-up fixing screw	4÷5 N·m
Mixer fixing screw	3÷4 N·m
Brake lever-engine screw	12÷13 N·m

Overhaul data

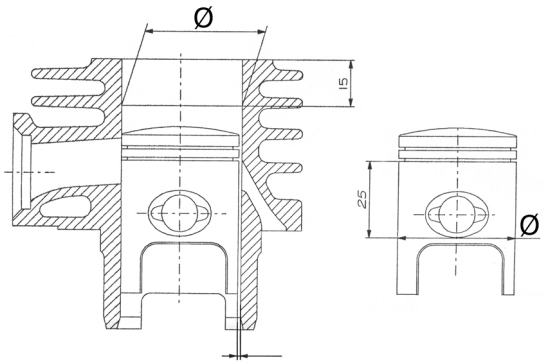
Assembly clearances

Cylinder - piston assy.

CONNECTION PISTON AND CYLINDER

Name	Play	Initials	Cylinder	Piston	Play on fitting
Standard fitting		M	40,005 - 40,012	39,943 - 39,95	0,055 - 0,069
Standard fitting		N	40,012 - 40,019	39,95 - 39,957	0,055 - 0,069
Standard fitting		O	40,019 -	39,957 -	0,055 - 0,069

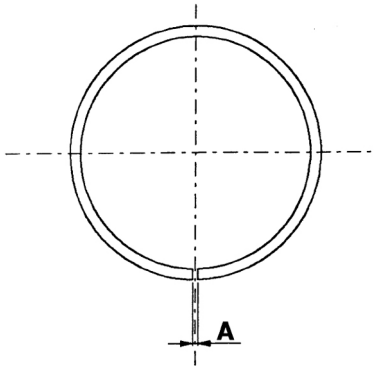
Name	Play	Initials	Cylinder	Piston	Play on fitting
			40,026	39,964	
Standard fitting		P	40,026 - 40,033	39,964 - 39,971	0,055 - 0,069
1st oversize fitting		M1	40,205 - 40,212	40,143 - 40,15	0,055 - 0,069
1st oversize fitting		N1	40,212 - 40,219	40,15 - 40,157	0,055 - 0,069
1st oversize fitting		O1	40,219 - 40,226	40,157 - 40,164	0,055 - 0,069
1st oversize fitting.		P1	40,226 - 40,233	40,164 - 40,171	0,055 - 0,069
2nd oversize fitting		M2	40,405 - 40,412	40,343 - 40,35	0,055 - 0,069
2nd oversize fitting		N2	40,412 - 40,419	40,35 - 40,357	0,055 - 0,069
2nd oversize fitting		O2	40,419 - 40,426	40,357 - 40,364	0,055 - 0,069
2nd oversize fitting		P2	40,426 - 40,433	40,364 - 40,371	0,055 - 0,069



Piston rings

PISTON RINGS

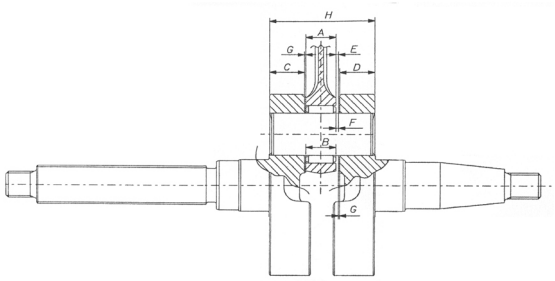
Name	Description	Dimensions	Initials	Quantity
Compression lining		40	A	0,10 ÷ 0,25
Compression lining 1° greater		40,2	A	0,10 ÷ 0,25
Compression lining 2° greater		40,4	A	0,10 ÷ 0,25



Crankcase - crankshaft - connecting rod

END PLAY BETWEEN CRANKCASE, CRANKSHAFT, AND CONNECTING ROD

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

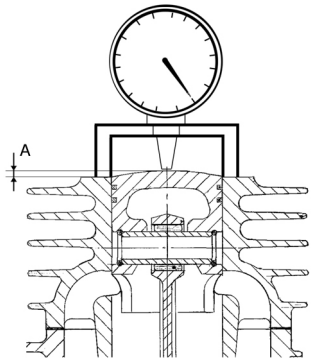


Slot packing system

- Fit the cylinder without positioning the base gas-

ket

- 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

SLOT 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 MATRYX MOTO RIDER	Oil for rear hub	Oil synthetic multidegree SAE 75W/85 API GL4
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 ingreasing the ISO VG 150
SELENIA HI Scooter 2 Tech	Mixer Oil	Synthetic oil that passes API TC ++ specifications
TUTELA TP1	Grease for brake control lever, gas	NLGI 1-2 calcium soap based white spray grease
TUTELA MRM 2	Grease for the phonic wheel turning ring	Molybdenum disulphide grease and lithium soap
TUTELA TOP 4	Brake fluid	Synthetic fluid SAE J1703, NHTSA 116 DOT 4, ISO 4925

Product	Description	Specifications
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

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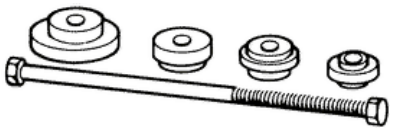
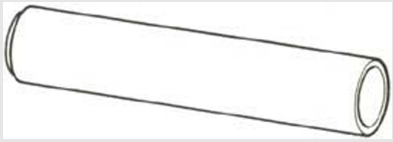
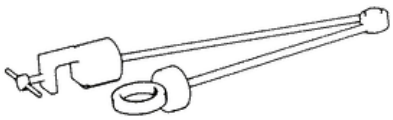
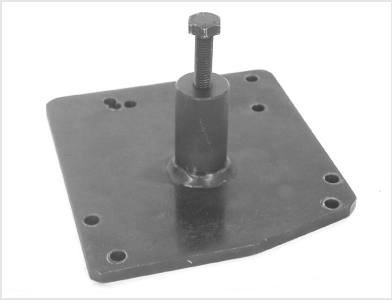
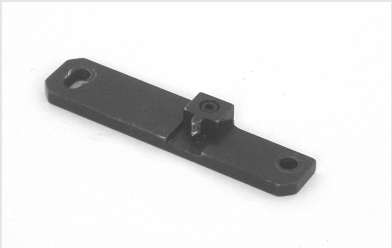
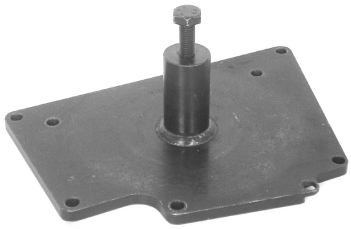
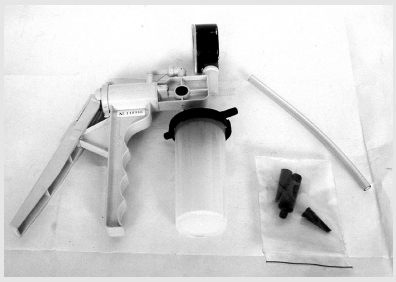
ATTREZZATURA

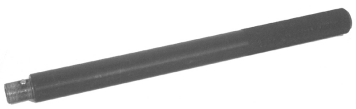
Stores code	Description	
001330Y	Steering seat installer, to be fitted with parts: 001330Y009-For lower seat, 001330Y013-For upper seat	
001467Y006	20-mm pliers	
001467Y007	Bell for bearings external Ø 54 mm	
001467Y009	Bell for bearings external Ø 50 mm	
001467Y013	15-mm pliers	
001467Y014	15 mm pliers	

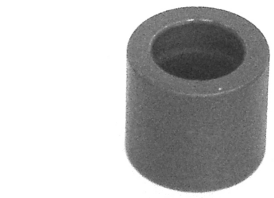
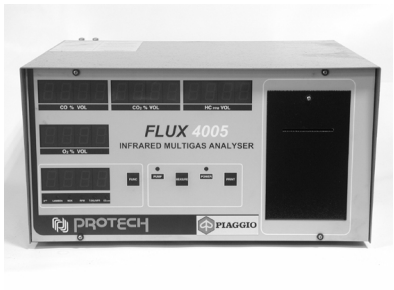
Stores code	Description	
001467Y017	Bell for bearings external Ø 39 mm	
001467y021	11 mm bearing clip	
002465Y	Pliers for snap rings	
006029y	Drift for fitting thrust ring seats on steering tube	
020004Y	Drift for removing thrust rings from steering head tube	
020055Y	Steering tube ring nut spanner	

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	
020261Y	Kick-starter spring assembler	
020262Y	Crankcase detachment plate	
020265y	Bearing fitting stand	
020325y	Pliers 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	
020334Y	Multiple battery charger	

Stores code	Description	
020335Y	Magnetic stand and comparator	
020350y	Electric system diagnostic device	
020357Y	32 x 35 mm adaptor	
020359Y	42 x 47 mm hub bearing fitting adaptor	
020376Y	Handle for punches	
020412Y	15 mm guide	

Stores code	Description	
020456Y	Ø 24 mm adaptor	
020483Y	30 mm guide	
020565Y	Compass flywheel stop spanner	
020625Y	Exhaust gases collecting kit	
494929	Exhaust gas analyser	

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Maintenance chart

EVERY 2 YEARS

Action
Brake fluid - Change

AT 1000 KM OR 4 MONTHS

50'

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

40'

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

95'

Action
Hub Oil - Replacement

Action
Spark plug/spark gap - replacement
Air filter - cleaning
Idle speed/Fuel (*) - Adjust
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

65'

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
SAS box (sponge) (**) - Clean
Vehicle and brake test - Road test

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

AT 20000 KM AND 40000 KM

110'

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
Fule-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

130'

Action
Hub Oil - Replacement
Spark plug/spark gap - replacement
Air filter - cleaning
Idle speed/Fuel (*) - Adjust
Oil mixer/throttle linkage - Adjust
Transmission Belt - Replacemen

Action
Variator rollers - 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
Electrical system and battery - Check
Headlight - Adjust
Tires-inflation and wear - Check
SAS box (sponge) (**) - Clean
Vehicle and brake test - Road test

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

AT 60000 KM

150'

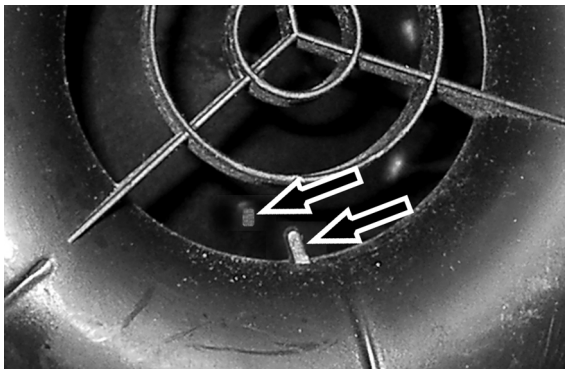
Action
Hub Oil - Replacement
Spark plug/spark gap - replacement
Air filter - cleaning
Idle speed/Fuel (*) - Adjust
Cylinder cooling system - Check/Clean
Oil mixer/throttle linkage - Adjust
Transmission Belt - Replacemen
Variator rollers - Change
Fule-oil mixer belt - Change
Speedometer cable - Grease
Steering - Adjust
Brake levers - Grease
Brake pads - Check condition + wear
Braking circuit hose - Replacement
Brake fluid level - Check

Action
Transmissions - Lubricate
Nuts, bolts and fasteners - Check
Suspensions - Check
Electrical system and battery - Check
Headlight - Adjust
Tires-inflation and wear - Check
SAS box (sponge) (**) - Clean
Vehicle and brake test - Road test

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

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 KEYED ONTO THE CRANKSHAFT

Specific tooling

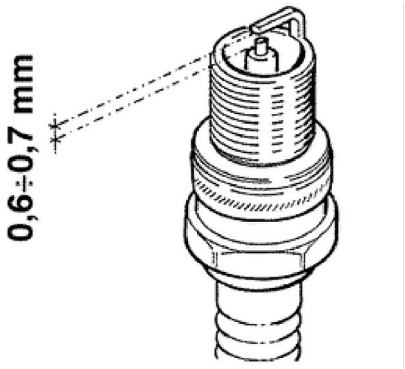
020330Y Stroboscopic gun for two- and four-stroke engines

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

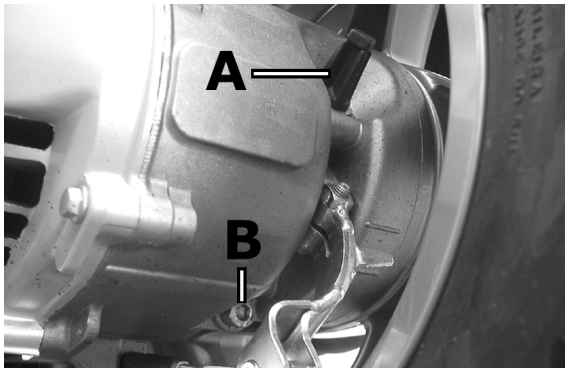
To check the level, proceed as follows:

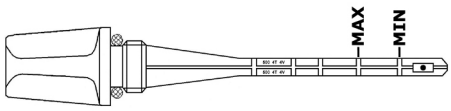
1) Rest the vehicle onto its centre-stand, on flat ground;

2) Remove dipstick «**A**»; dry it with a clean cloth and reinsert it, using the whole thread;

3) Remove the dipstick and check the oil mark reaches just below the second notch from the bottom;

4) Screw the dipstick back in with the correct torque.





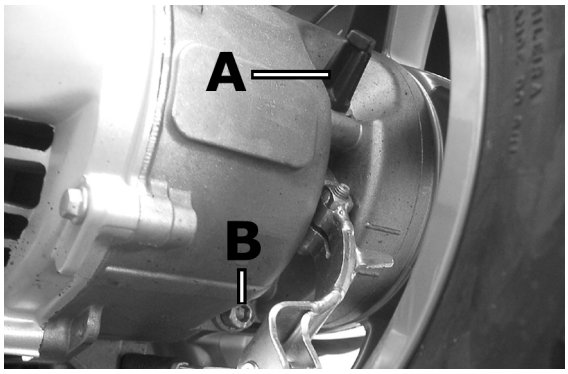
Recommended products

TUTELA MATRYX MOTO RIDER Oil for rear hub

Oil synthetic multidegree SAE 75W/85 API GL4

Replacement

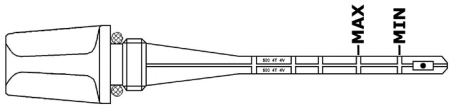
- Remove oil filler cap «**A**».
- Loosen oil draining cap «**B**» and allow for the system to drain completely.
- Refit the draining cap and refill the hub with the prescribed oil.



Characteristic

Rear hub oil

~ 85 cc



Air filter

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

Cleaning:

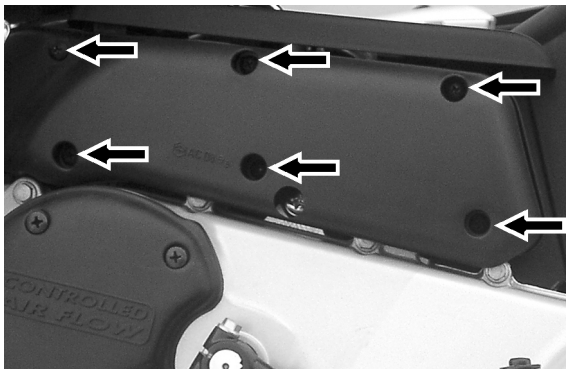
-Wash with water and neutral soap.

-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

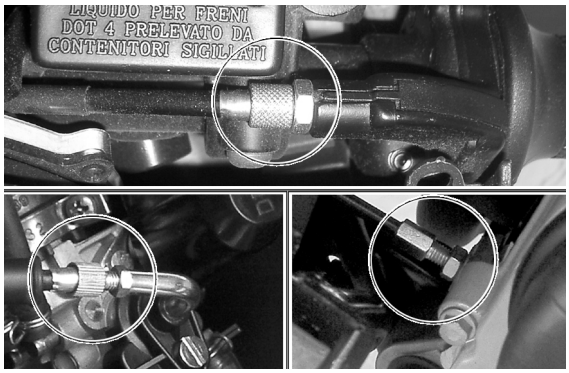
-Adjust the control cables:

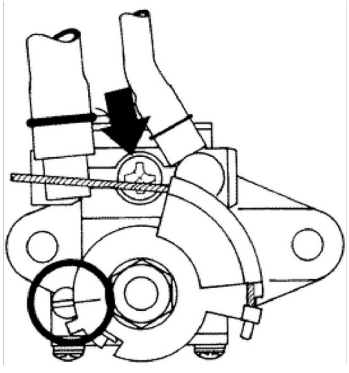
Mixer cable: see "Mixer timing" procedure, below.

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 crankcase, 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 mix-

ture (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

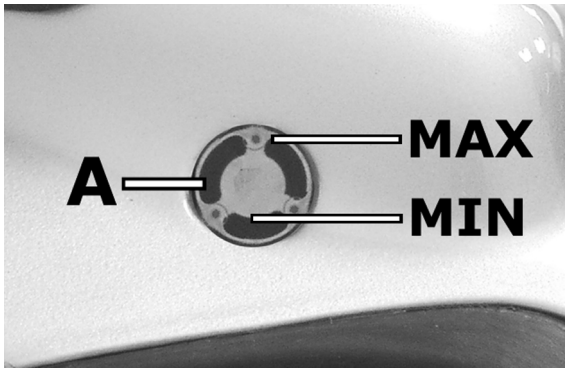
Braking system

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.



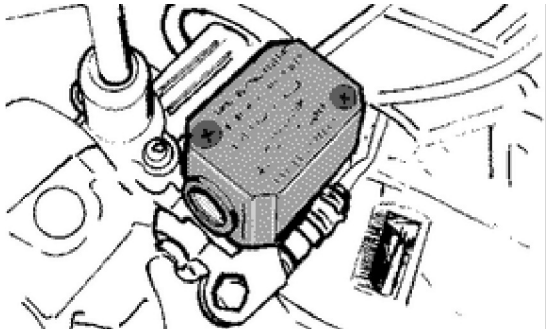
Top-up

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

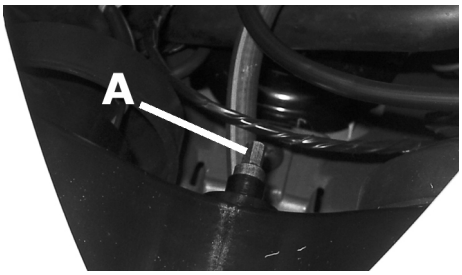
Synthetic fluid SAE J1703, NHTSA 116 DOT 4, ISO 4925

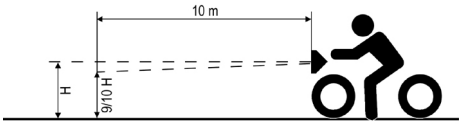
Headlight adjustment

Proceed as follows:

1. Position the vehicle in riding conditions, and with the tyres inflated at the prescribed pressure, on a horizontal surface 10 m away from a half-lit white screen, ensuring the vertical axis of the vehicle is perpendicular to the screen;

2. Turn on the headlight and check the distance between the ground and the horizontal line which separates the lit area from the dark region, is no more than 9/10 and not less than 7/10 of the





height of the headlight, measured from the ground;

3. If this is not the case, adjust the headlight via screw «**A**», which may be reached by removing the front grid.

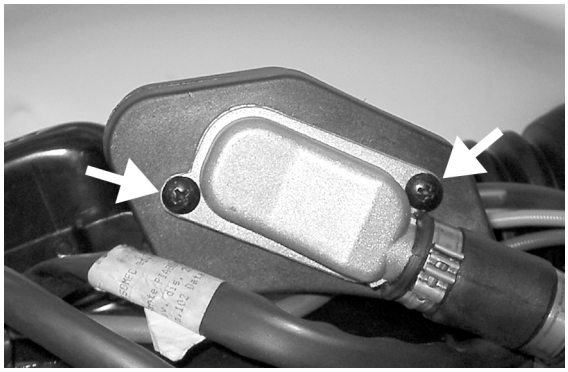
WARNING

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

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
- Warn-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

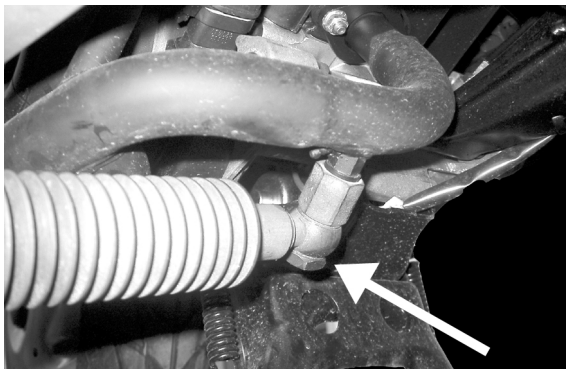


− Place a plastic sheet between the one-way valve and the aluminium outlet as shown in the figure

− 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 ± 100 rpm and check the CO value is equal 3.5 ± 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

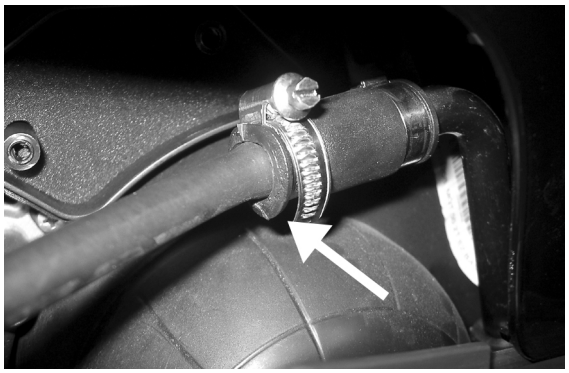
020320Y Exhaust gases analyser

020332Y Digital rpm counter

020625Y Exhaust gases collecting kit

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 ± 100 rpm and check the CO value is equal 3.5 ± 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

INDEX OF TOPICS

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
Fuel pump defective or vacuum tube damaged	Replace pump or tubing
Carburettor jets clogged or dirty	Remove, wash in solvent and dry with compressed air
Fuel filter on tank outlet joint dirty or obstructed	Clean the joint filter
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
Rollers worn, presence of oil, dirt	Clean the variator; replace rollers if worn

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 DIFFICULTY

Possible Cause	Work
Carburettor jets clogged or dirty	Remove, wash in solvent and dry with compressed air
Fuel pump defective or vacuum tube damaged	Replace pump or tubing
Choke failure	Check: electrical connections, circuit continuity, mechanical sliding and power supply
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, or electrode gap incorrect	Clean; adjust electrode gap or replace, always using recommended spark plugs. Please keep in mind that most engine problems result from the use of inappropriate spark plugs
Intake duct cracked or not sealing	Replace intake duct and check its sealing with crankcase and carburettor
Cleaner-carburettor union damaged	Replace

Excessive oil consumption/Exhaust smoke

EXCESSIVE OIL CONSUMPTION/SMOKE FROM EXHAUST

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

Engine tends to cut-off at full throttle

ENGINE STOPS 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

Possible Cause	Work
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 STOPS AT IDLE

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

NOISE INCREASE

Possible Cause	Work
Secondary air metallic tube deteriorated	Check the seal of the tubing against crankcase and secondary air box. Check tubing between box and exhaust
Secondary air circuit components faulty	Check components and tubing. Check correct assembly. Replace components if damaged

SAS malfunctions

LOOSENESS OF RUBBER UNION OF SECONDARY AIR TUBE TO SILENCER

Possible Cause	Work
Secondary air reed blocking	Replace

Possible Cause	Work
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

BRAKES

Possible Cause	Work
Clutch slippage or irregular operation	Ensure shoes open and close freely Check no grease is present on the shoes Check the shoes' contact surface against the drum is thicker in the centre and equivalent on all three shoes Check the drum is not abnormally scratched or worn Never let the engine run without clutch drum

Insufficient braking

BRAKING SYSTEM FAILURE

Possible Cause	Work
Insufficient braking force	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. The braking action should start when brake levers are pulled at 1/3 of their travel. 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. If surfaces are excessively worn or scored, replace the affected parts as necessary
Air bubbles in the braking hydraulic system	Carefully bleed the hydraulic system (spring action 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

Possible Cause	Work
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.

Steering and suspensions

Rear wheel

POOR ROAD HANDLING

Possible Cause	Work
Suspensions faulty	Check integrity and operation of rear shock-absorber and/or front fork. Replace or overhaul front fork and/or replace rear shock absorber if faulty
Tyres damaged or low inflating pressure	Check tyre inflation pressure and tread. Inflate at

Possible Cause	Work
	correct pressure or replace
Front and/or rear suspension fixings loosen	Check tightening torques between frame, swing-arm, and engine, and those between wheels, hubs, and/or axle. Check the torque on the steering lock-nuts.

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 SUSPENSIONS

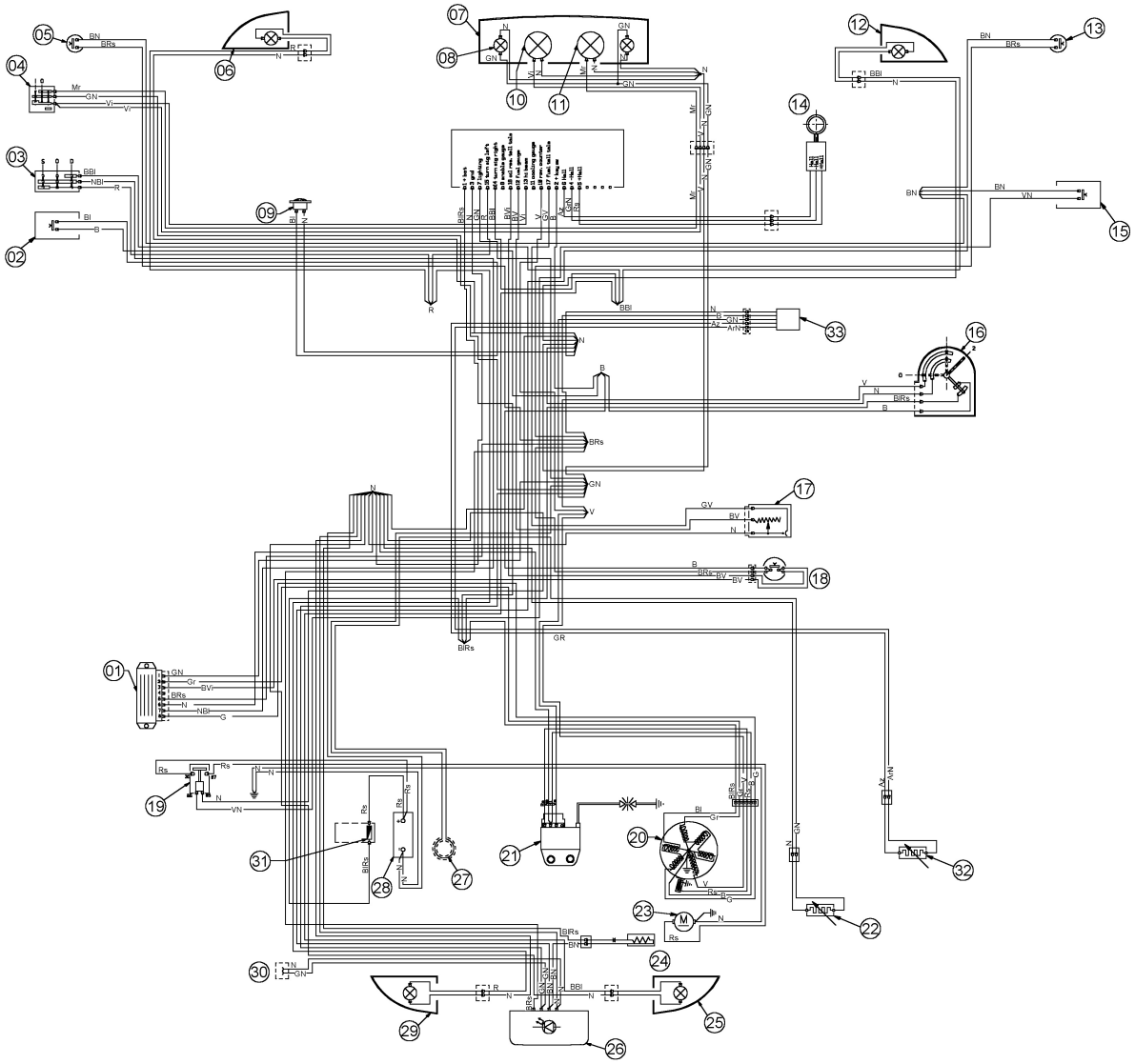
Possible Cause	Work
Front suspension components damaged	Check for the absence of noise coming from the fork during compression and rebound. If necessary, overhaul the fork. Ensure the wheel spins freely and without any noise; otherwise replace the wheel bearings.
Rear suspension components damaged	Check for the absence of noise coming from the fork during compression and rebound. If necessary, check the tightening torques on the swing-arm and the absence of oxidations, or replace the shock-absorber. Ensure the wheel spins freely and without any noise; otherwise replace the final gearing train.

Suspension oil leakage

OIL LOSS FROM SUSPENSION

Possible Cause	Work
Shock-absorber faulty	Replace the shock-absorber assembly
Inner fork hydraulic damper damaged	Replace the hydraulic damper

INDEX OF TOPICS



LEGEND

	Specification	Desc./Quantity
1	Voltage regulator	
2	Horn button	
3	Turn signal switch	
4	Light switch with flash	
5	Rear brake stop button	
6	Front L.H. turn signal light	
7	Front headlight	
8	Two rear parking light bulbs	12V - 3W
9	Horn	
10	Light bulb 12V - 35W for high-beam lamp	
11	Light bulb 12V - 35W for low-beam lamp	

	Specification	Desc./Quantity
12	Front R.H. turn signal light	
13	Front brake stop light switch	
14	Wheel rpm sensor	
15	Starter button	
16	Ignition key-switch	
17	Fuel level thermistor	
18	Mixture oil warning light switch	
19	Starter relay	
20	Magneto flywheel	
21	Control device ignition	
22	Automatic starter	
23	Starter motor	
24	Taillight resistor	
25	Rear R.H. turn signal light	
26	Taillight assembly	
27	Choke device continuity check light	
28	Battery	12V - 4Ah
29	Rear L.H. turn signal light	
30	License plate light pre-wiring	
31	Fuse	7,5A
32	Carburettor heater	
33	Carburettor heater control device	

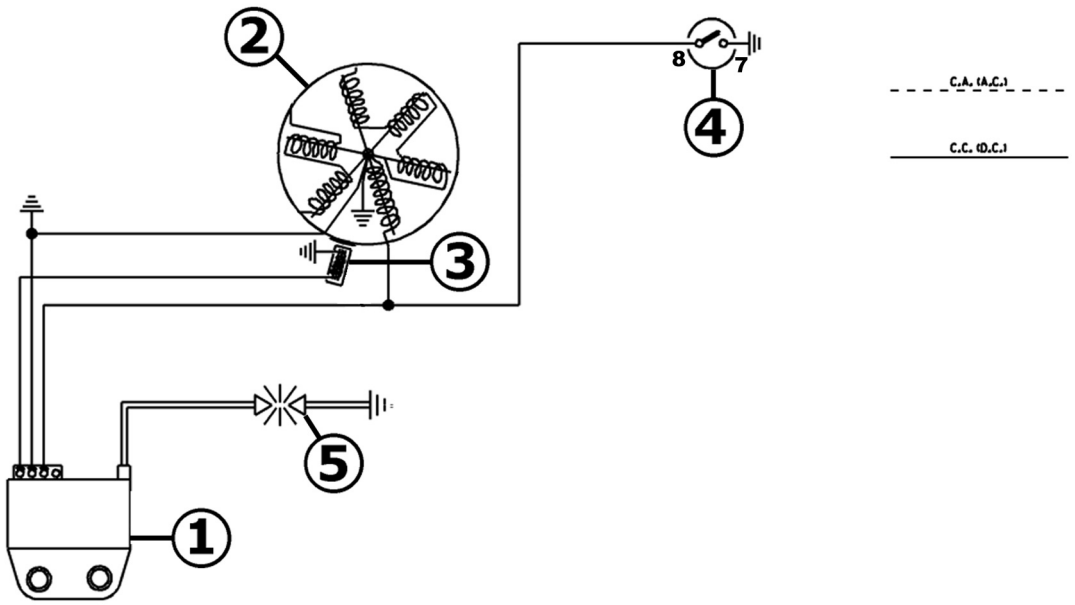
Electrical cables color:

B = White, **Bl** = Blu, **G** = Yellow, **Mr** = Brown, **N** = Black, **Gr** = Gray,

Rs = Pink, **R** = Red, **Vi** = Purple, **V** = Green

Conceptual diagrams

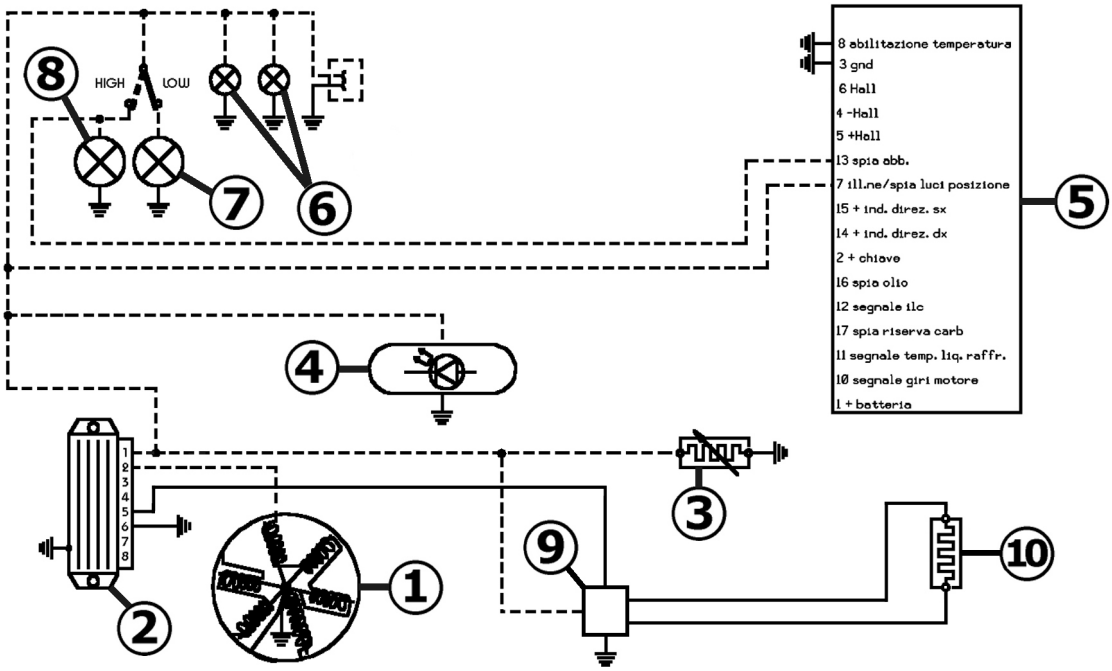
Ignition



IGNITION

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

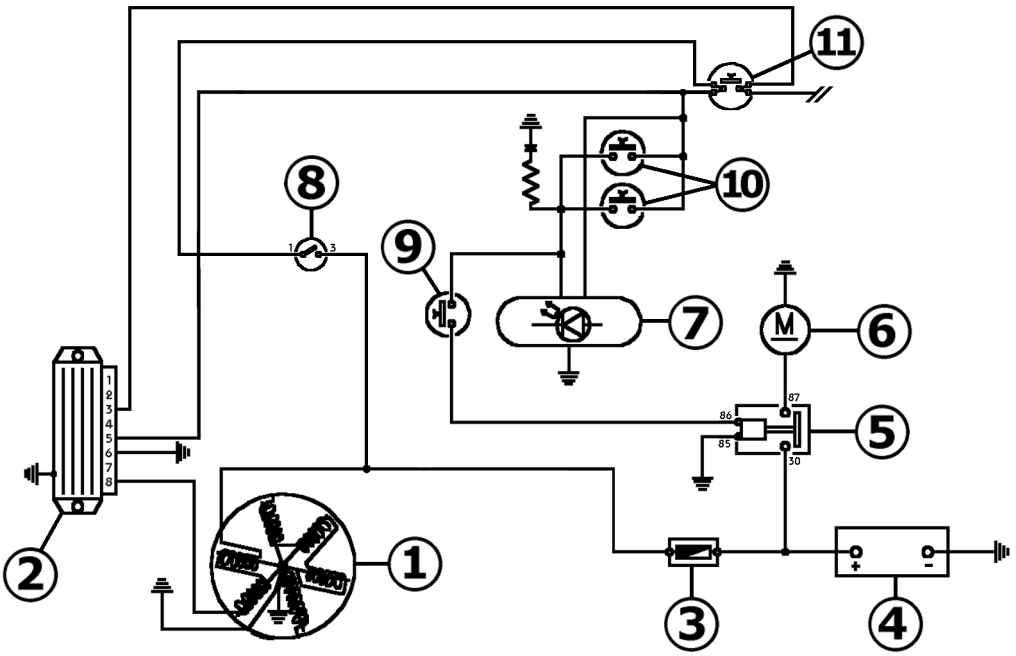
Headlights and automatic starter section



HEADLIGHTS AND AUTOMATIC STARTER SECTION

	Specification	Desc./Quantity
1	Flywheel magneto	
2	Voltage regulator	
3	Automatic starter	
4	LED taillight	
5	Digital instrument unit	
6	Headlamp sidelight bulbs	
7	Headlamp low-beam light bulb	
8	Headlamp high-beam light bulb	
9	Heating control device	
10	Carburettor heater	

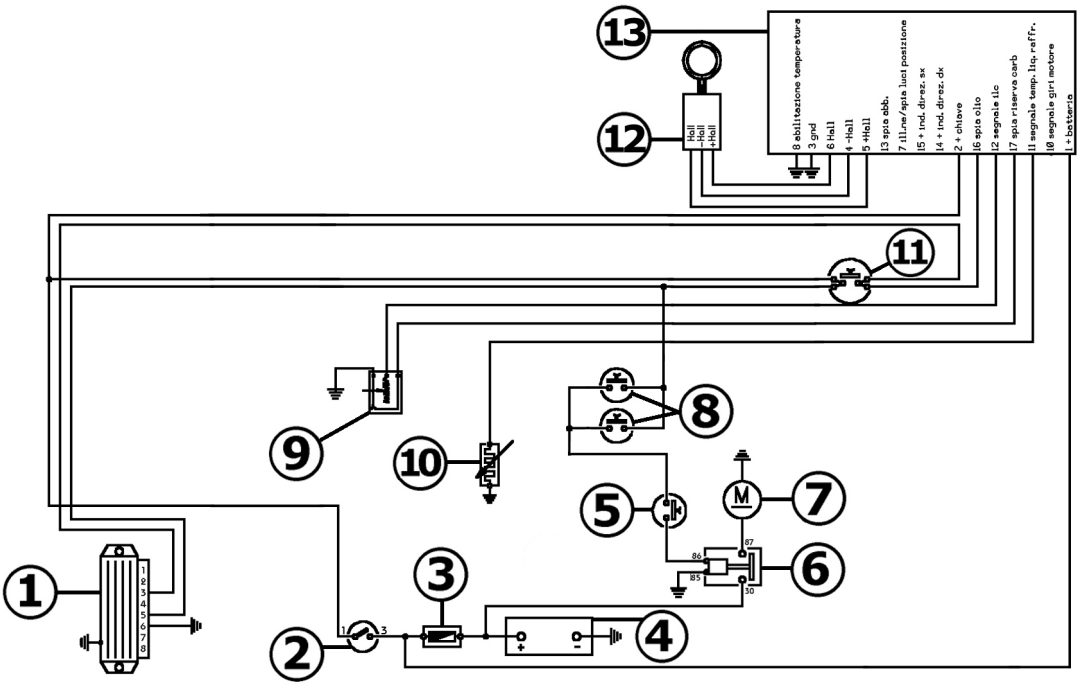
Battery recharge and starting



BATTERY RECHARGE AND STARTING

	Specification	Desc./Quantity
1	Flywheel magneto	
2	Voltage regulator	
3	Fuse 7,5A	
4	Battery 12V-14Ah	
5	Starter relay	
6	Starter motor	
7	LED taillight	
8	Ignition key-switch	
9	Start up button	
10	Stoplight switches	
11	Mixture oil level sender	

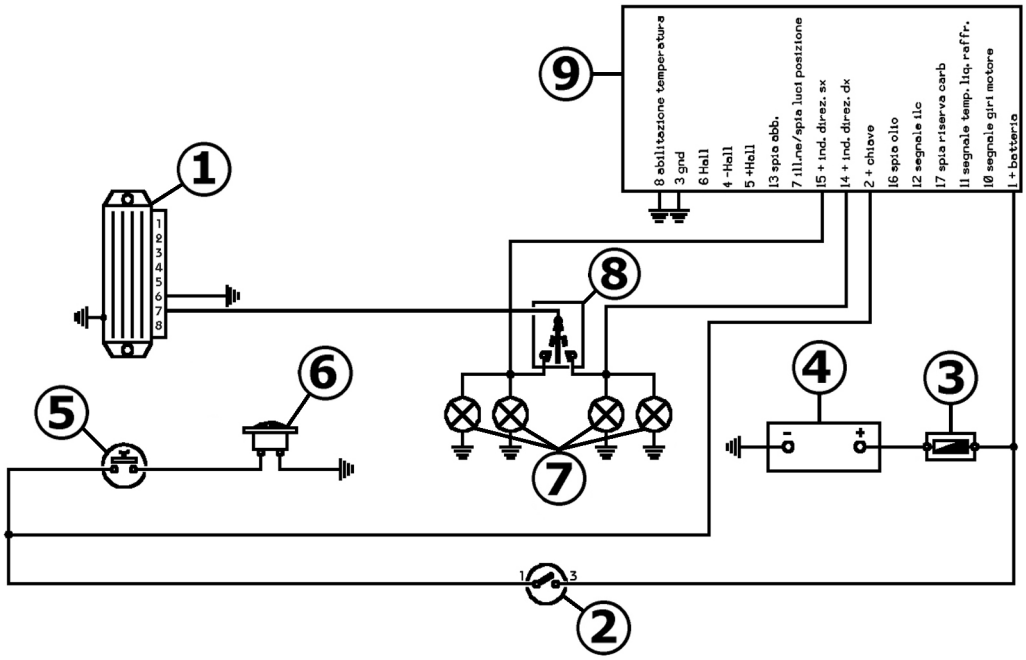
Level indicators and enable signals section



SAFETY SWITCHES AND LEVEL GAUGES

	Specification	Desc./Quantity
1	Voltage regulator	
2	Ignition key-switch	
3	Fuse 7,5A	
4	Battery 12V-14Ah	
5	Starter button	
6	Starter relay	
7	Starter motor	
8	Stoplight switches	
9	Fuel level sender	
10	Coolant temperature sensor	
11	Mixture oil level sender	
12	Phonic wheel	
13	Digital instrument unit	

Turn signal lights



TURN SIGNALS AND HORN

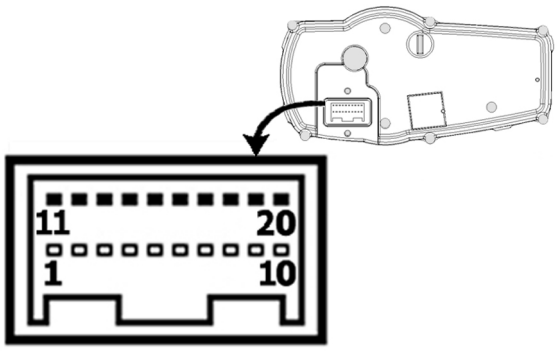
	Specification	Desc./Quantity
1	Voltage regulator	
2	Ignition key-switch	
3	Fuse 7,5A	
4	Battery 12V-14Ah	
5	Horn button	
6	Horn	
7	Turn signal lights	
8	Turn signal switch	
9	Digital instrument unit	

Digital instrument panel

DASHBOARD CONNECTOR

	Specification	Desc./Quantity
1	+ Battery	
2	+ Under-key	
3	Earth	
4	Wheel speed earth	
5	Wheel speed power supply	
6	Wheel speed signal	

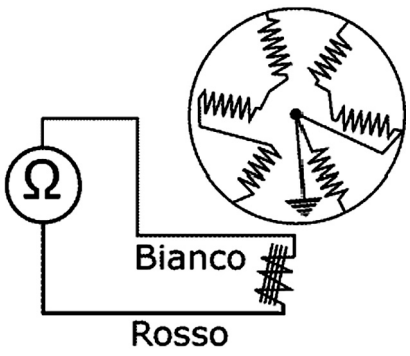
	Specification	Desc./Quantity
7	Dashboard light and headlight warning light	
8	Not connected (temperature tool earth)	
9	Not connected	
10	Tachometer signal	
11	Not connected (temperature tool signal)	
12	Fuel level signal	
13	High-beam warning light	
14	+ r.h.s. turn signal light	
15	+ l.h.s. turn signal light	
16	Low-oil warning light	
17	Fuel reserve indicator	
18	Not connected	
19	Not connected	
20	Not connected	



Checks and inspections

Checks to be carried out in the event of ignition faults and/or missed sparking.

Check the spark plug (clean with a metal brush. Remove all incrustations. Blow with an air jet and replace if necessary). Without removing the stator, perform the inspections given below.

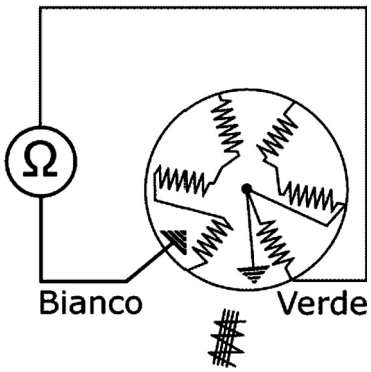


CHECKING THE PICK-UP

	Specification	Desc./Quantity
1	Red/white cable	90±140 ohm

After a visual inspection of the electrical connec-

tions, carry out measurements on the recharge coil, on the pick-up (see table), and continuity measurements using the special tester.
If faults are identified through the above inspections, proceed by replacing the stator, otherwise replace the ECU. Bear in mind that the ECU connections must only be detached when the engine is not running.



Specific tooling

020331Y Digital multimeter

CHECKING THE RECHARGE COIL

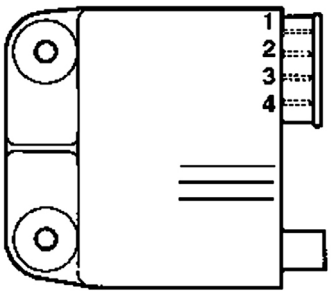
	Specification	Desc./Quantity
1	White/green cable	800±1100 ohm

CHECKING FOR CONTINUITY

	Specification	Desc./Quantity
1	White cable - frame	continuity
2	White cable - engine	continuity

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 OPERAT-

ING TEMPERATURE WILL BRING THE VALUES ABOVE THE STATED ONES.

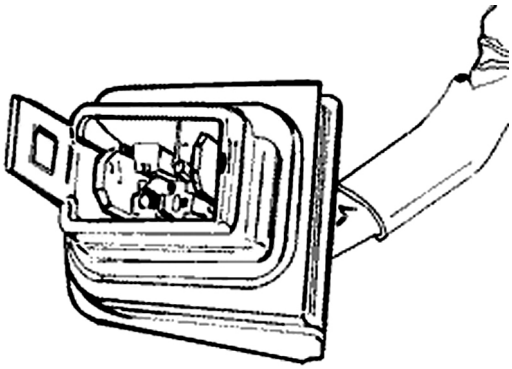
Electric characteristic

Stator : brown - ground

~ 170 Ω (Pick-Up)

Stator : black-ground

~ 1 Ω (Stator)



Voltage regulator check

The fault to the voltage regulator may cause, according to the type of fault, the following inconveni-ents:

Bursting of head and taillight bulbs. Head and taillight not operational. Excessive battery recharge (bursting of main fuse). Battery not recharging. Turn signals not operational. Dashboard check not operational.

Interventions

FAULT 1

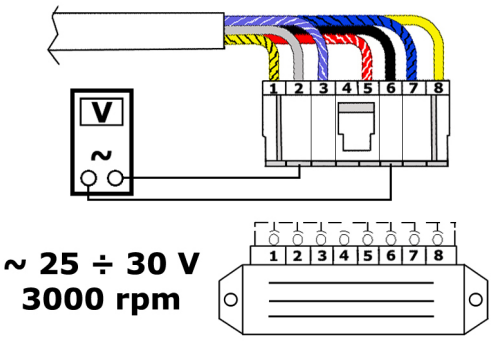
Replace the regulator as definitely faulty.

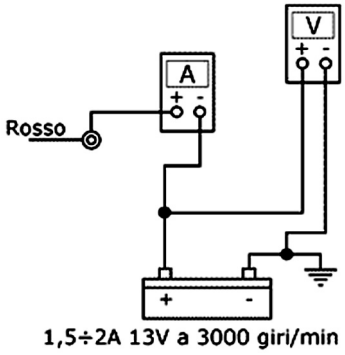
FAULT 2

a) Check the output from the stator gives the cor-rect voltage: detach the stator connector, inter-pose an AC tester between the grey-blue and black cables, and check the output voltage is within the prescribed limits. If anomalies are found, replace the stator.

b) If no anomalies are identified, replace the regu-lator.

c) If the replacement of the regulator does not solve the fault, check the electric connections.





Specific tooling

020331Y Digital multimeter

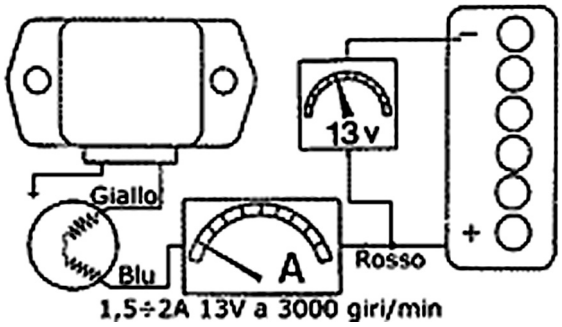
Characteristic

Voltage output at 3,000 rpm

25÷30V

FAULT 3

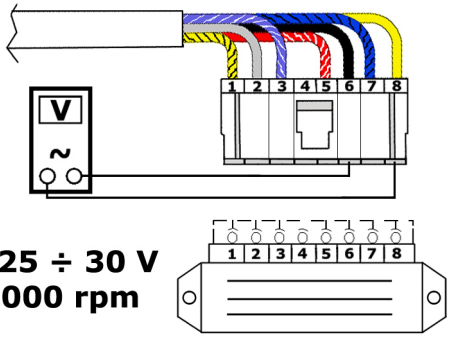
With the engine off and the regulator connector detached, check there are no short-circuits in the system, with reference to ground. Then replace the regulator (with fuse) as this is definitely faulty. After replacing the regulator, measure the charge voltage and current at the battery terminals.



FAULT 4

a) Interposing the AC tester between the black and yellow cables on the regulator, check the generator output voltage is within the prescribed values (this measurement must be carried out with the battery detached). In the event of anomalies, replace the stator; otherwise proceed to point b).

b) Insert an ammeter between the stator (blue cable) and the battery and check with the tester that the current output, at 3,000 rpm and with the battery kept between 12 and 13V, is as shown. If the values thus obtained are lower than prescribed, proceed by replacing the regulator.



N.B.

BEFORE CARRYING OUT INSPECTIONS ON THE REGULATOR AND ITS ELECTRICAL SYSTEMS, IT IS ALWAYS ADVISABLE TO CHECK FOR CONTINUITY BETWEEN THE BLACK CABLE AND GROUND.

N.B.

TO MAINTAIN THE BATTERY BETWEEN 12 AND 13V, RESULTING IN CURRENT BEING ABSORBED FROM THE CIRCUIT, IT IS POSSIBLE TO USE A 12V-35W LIGHT BULB LOCATED BETWEEN BATTERY + AND GROUND.

Specific tooling

020331Y Digital multimeter

Characteristic

Voltage output at 300 rpm

26÷30V

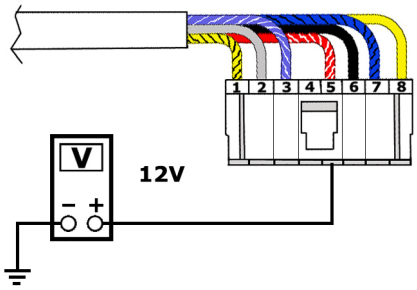
Current output

1,5÷2A

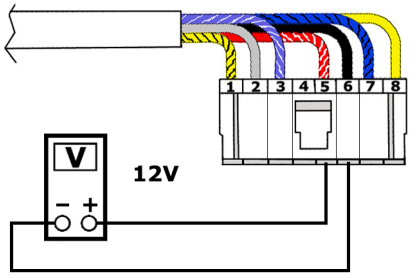
FAULT 5

In the event that the turn signal lights are not operational, proceed as follows:

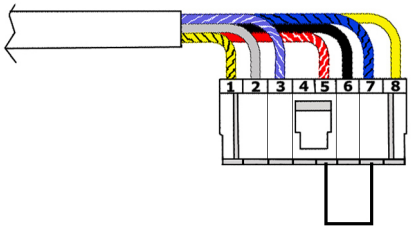
- Remove the regulator connector and insert the tester terminals between pin 5 and ground.
- Turn the ignition switch onto ON and check for battery voltage. If no voltage is found, check wiring and terminals on key-switch and battery.



- Repeat the same operation with the terminals inserted between pins 5 (+) and 6 (-) and check for the presence of battery voltage with the ignition switch onto ON. If unsuccessful, check the ground cable on the regulator.



- If the checks given above are unsuccessful, jump pins 5 and 7 on the connector, turn the key-switch onto ON and turn the turn signal switch alternately from left to right to visualize the continuous operation of the lights (as powered directly by the battery). If the lights do not go on, check the switch and its cable, if these are not damaged or faulty; replace the regulator as



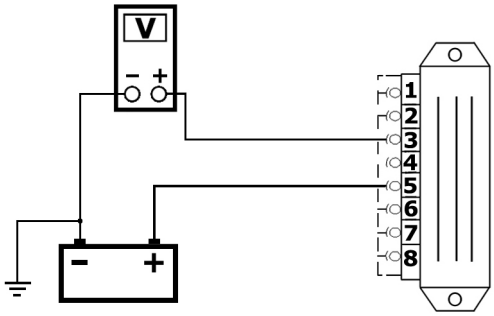
definitely faulty.

Specific tooling

020331Y Digital multimeter

FAULT 6

Dashboard check light does not go on. Detach the connector to the voltage regulator.



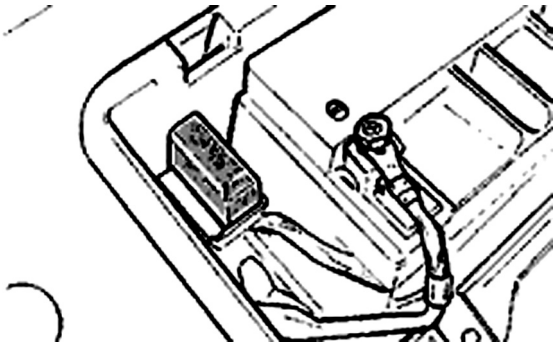
- Apply a tension of 12V to the pin marked with the number 5, check, using the digital tester; there is an equivalent output (12V) from pin 3 for at least 5 seconds.
- If pins no. 4 and/or no. 3 give no output voltage, replace the regulator.
- If pin no. 3 gives output voltage, check the system and the low-oil or low-fuel warning lights.

Specific tooling

020331Y Digital multimeter

Fuses

The electrical system is protected by a fuse located on the r.h.s. of the battery bay. To replace it, lift the seat, remove the battery access door and then the transparent fuse cover. Ignition system, headlight, and taillight are not protected by the fuses.



CAUTION

BEFORE REPLACING THE BLOWN FUSE, TRY TO ELIMINATE THE FAULT THAT HAS CAUSED IT TO BLOW.
NEVER TRY TO REPLACE A FUSE USING DIFFERENT MATERIAL (FOR EXAMPLE A PIECE OF ELECTRIC WIRE) OR A FUSE WITH HIGHER AMPERAGE.

Electric characteristic

Fuse

7,5A

Sealed battery

Commissioning of sealed battery

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 multi-meter.

- 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.

Dry-charge battery

WARNING

THE BATTERY ELECTROLYTE IS POISONOUS AS IT MAY CAUSE SERIOUS BURNS. IT CONTAINS SULPHURIC ACID; HENCE AVOID ANY CONTAC WITH EYES, SKIN OR CLOTHES. IF COMING INTO CONTACT WITH EYES OR SKIN, WASH ABUNDANTLY WITH WATER FOR APPROX. 15 MINS. AND SEEK IMMEDIATE MEDICAL ATTENTION.
IN THE EVENT OF ACCIDENTAL INGESTION OF THE LIQUID, IMMEDIATELY DRINK LARGE QUANTITIES OF MAGNESIUM MILK, BATTERED EGG OR VEGETABLE OIL. SEEK IMMEDIATE

MEDICAL ATTENTION.
BATTERIES PRODUCE EXPLOSIVE GASES; KEEP CLEAR OF FREE FLAMES, SPARKS OR CIGARETTES; VENTILATE THE AREA WHEN RECHARGING INDOORS.
ALWAYS WEAR EYE PROTECTION WHEN WORKING IN THE PROXIMITY OF BATTERIES.
KEEP CLEAR FROM THE REACH OF CHILDREN.

Putting dry batteries into service:

Remove the breather outlet cap and the top cover. Fill up the elements with sulphuric acid for accumulators with specific weight of 1.26, corresponding to 30° Bé at a temperature not lower than 15°C, until reaching the top level. Leave to rest for at least 2 hours, then top-up with sulphuric acid. Using the special battery charger (single or multiple) recharge within 24 hours. The special battery charger allows the batteries to be charged at 1/10 of their own capacity. After charging, check the acid density is approx. 1.27, corresponding to 31° Bé, and stable. After charging, top-up the acid (using distilled water). Cover and clean carefully. After completing the above operations, install the battery on the vehicle ensuring the cable connections are correct.

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

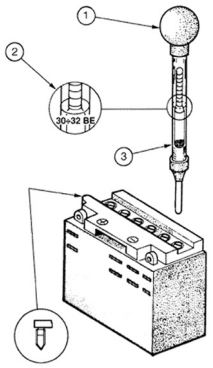
020333Y Single battery charger

020334Y Multiple battery charger

1 hold the tube upright

2 visually check the level

3 the float must be released



Battery maintenance

This is the component that requires the most assiduous inspections and the most diligent maintenance. The main maintenance rules are:

1) Electrolyte level check

The electrolyte level must be check frequently and always at the top mark. To top-up the level, use only distilled water. if excessively frequent top-ups are needed, check the vehicle's electrical system:

the battery may be overcharged and wear out quickly.

2) Charge status check

After topping up the electrolyte, check its density using the special tool (see figure).

With the battery charged, the density must be 30 - 32 Bé, corresponding to a specific weight of 1.26 - 1.28 at a temperature not lower than 15° C.

If the density is below 20° Bé the battery is completely flat and must be recharged.

If the vehicle is not used for some time (1 month or longer) it is necessary to recharge the battery periodically.

In approx. three months the battery loses its charge completely. When reinstalling the battery on the vehicle, take care in not inverting the connections, bearing in mind that the earth wire (black), marked with (-), must be attached to the -negative terminal, while the two red wires are to be attached to the +positive terminal.

3) Battery recharge

Remove the battery from the vehicle disconnecting the negative terminal first. The standard bench charge, must be carried out with the special battery charger (single or multiple), moving the charge type switch on the appropriate battery type. Connections to the power source must be made connecting the corresponding terminals (+ with +, and - with -).

4) Battery cleaning

It is advisable to keep the battery constantly clean, especially on the top, and to protect the terminals with Vaseline.

WARNING

BEFORE CHARGING THE BATTERY, REMOVE THE CAP FROM EACH CELL. KEEP FLAMES AND SPARKS AWAY FROM THE BATTERY WHEN CHARGING.

CAUTION

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

CAUTION

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

CAUTION

CHARGE THE BATTERY BEFORE USE TO ENSURE OPTIMUM PERFORMANCE. FAILURE TO SUITABLY CHARGE THE BATTERY BEFORE ITS FIRST USE AT A LOW ELECTROLYTE LEVEL WILL CAUSE AN EARLY FAILURE OF THE BATTERY.

Specific tooling

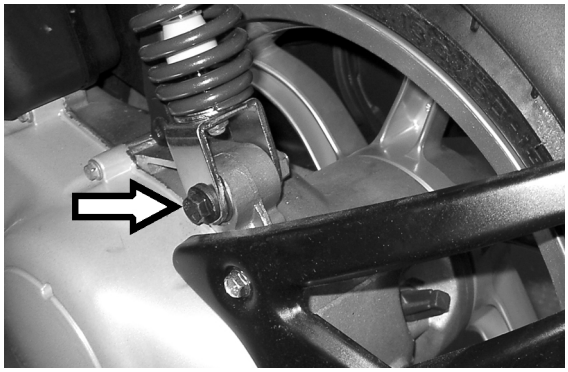
020334Y Multiple battery charger

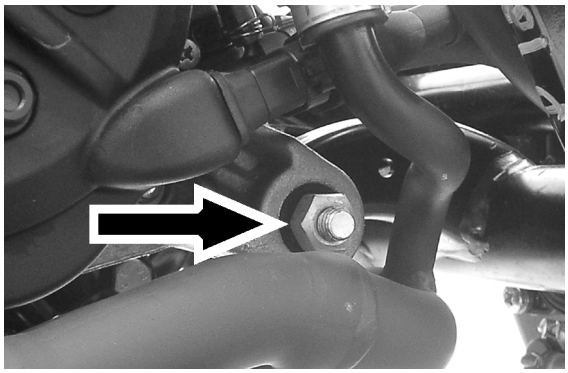
020333Y Single battery charger

INDEX OF TOPICS

Removal of the engine from the vehicle

Detach the battery. Remove the exhaust assy. Remove the rear wheel. Remove the rear brake cable. Detach the electrical connection to the fly-wheel. Detach the throttle and mixer cables. Detach the mixture oil, fuel, and vacuum pump outlet tubing. Detach the H.T. cable from the spark plug. Remove the rear shock-absorber fixing bolt from the engine. Remove the nut on the l.h.s., and hence remove the engine - swing-arm fixing bolt.





Locking torques (N*m)

Oscillating arm pin - engine 33 ÷ 41 Shock absorber - engine bolt 33÷41 N·m Rear wheel spindle nut 104 ÷ 126

INDEX OF TOPICS

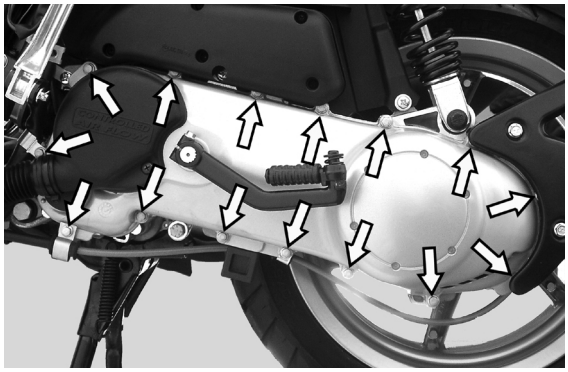
Automatic transmission

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.

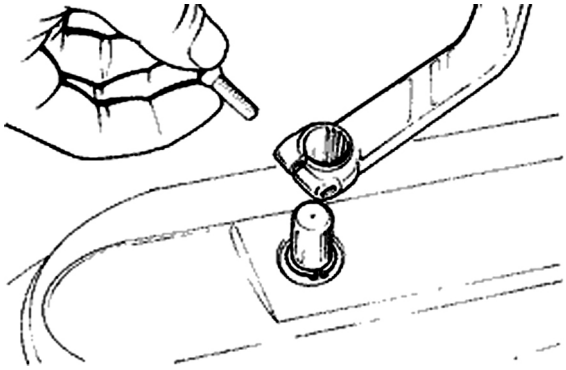


Kickstart

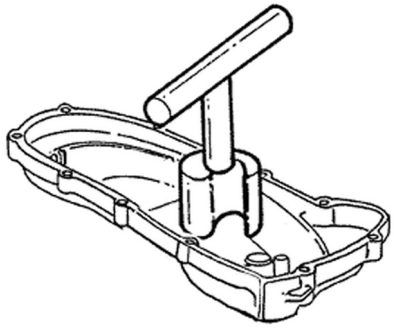
- Remove the screw shown in the figure and detach the kick-start lever.
- When refitting, follow the above operations in the reverse order, tightening the screw to the prescribed torque.

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

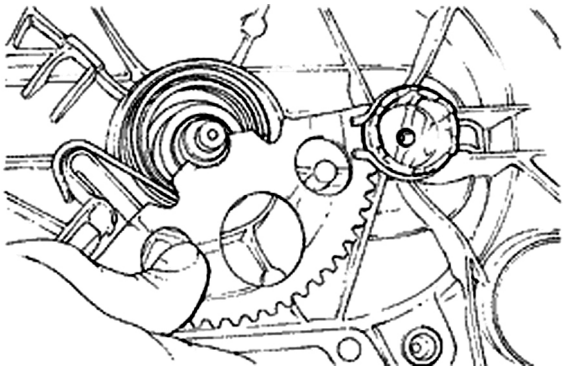
020261Y Kick-starter spring assembler

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).

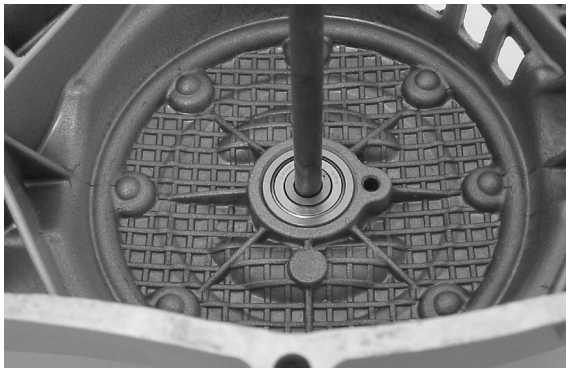


CAUTION

WHEN REMOVING THE GEAR, PAY PARTICULAR ATTENSION 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.

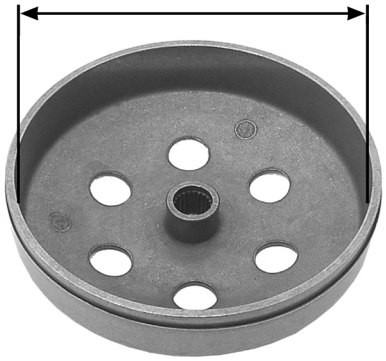
THE ASSEMBLY CAN ALSO BE REMOVED WITH THE DRIVE PULLEY IN PLACE.

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.

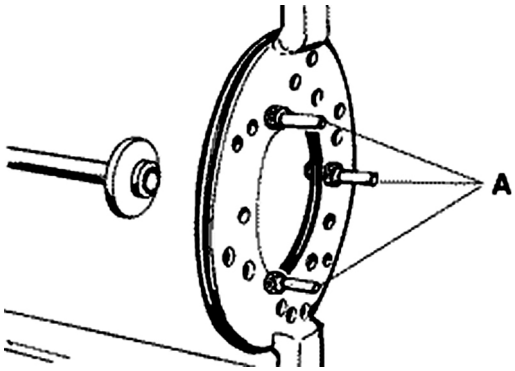
0,20 mm

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

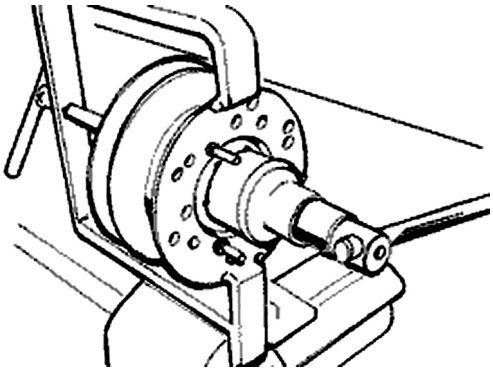
OVERTIGHTENING OF THE CENTRAL SCREW CAUSES THE DISTORTION OF THE TOOL.



- 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.



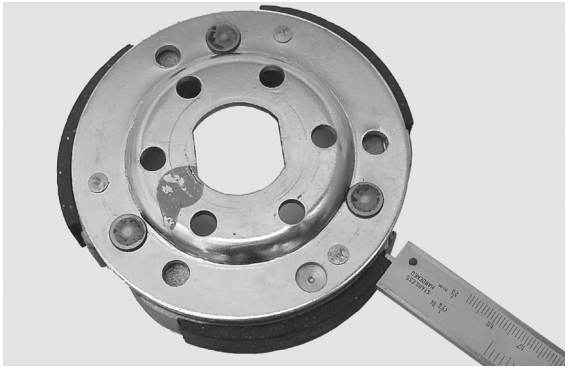
Specific tooling

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

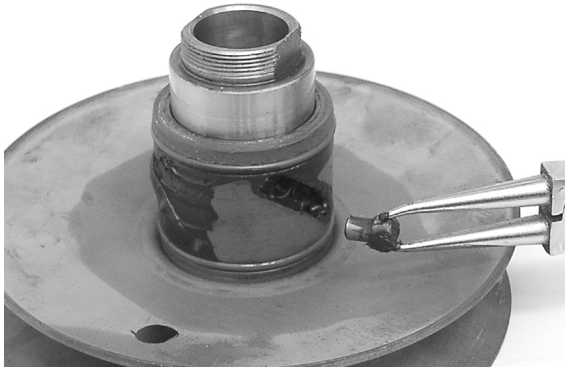
Check . Minimum thickness

1 mm

Pin retaining collar

- Remove the collar with the aid of two screwdrivers.

- 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.

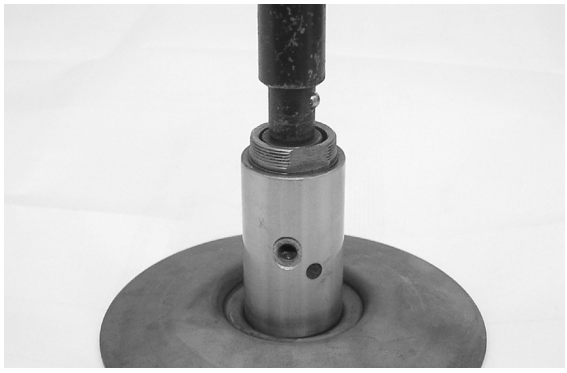
Specific tooling

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.



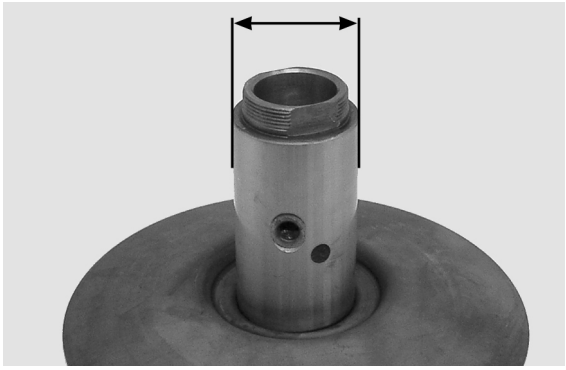
Specific tooling

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

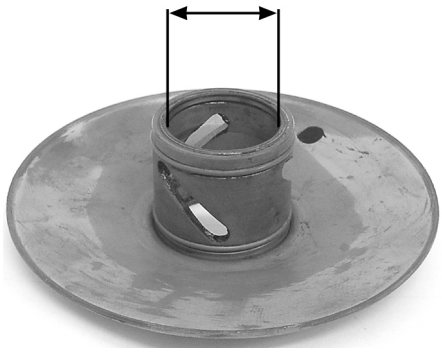
Ø 33,965 ÷ 33,985 mm

Stationary driven half pulley/ Minimum diameter allowed after use

Ø 33,96 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

Ø 34,08 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

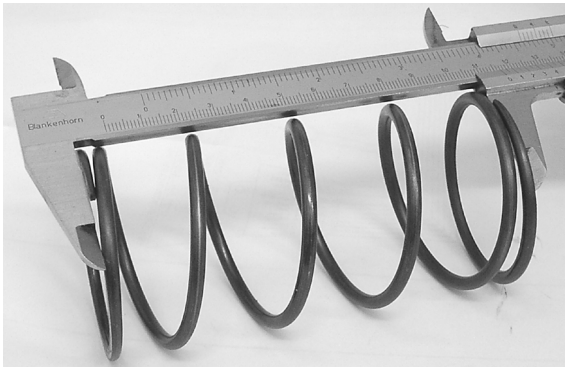
020456Y Ø 24 mm adaptor

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

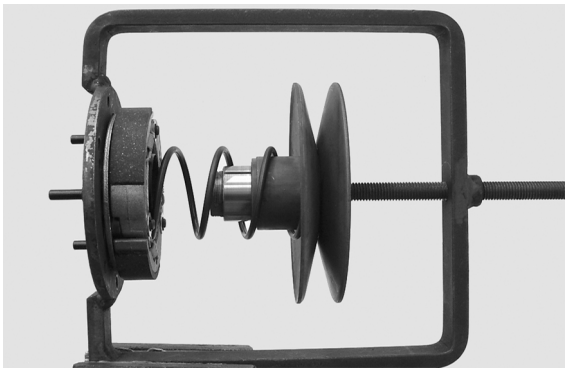
118 mm

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.



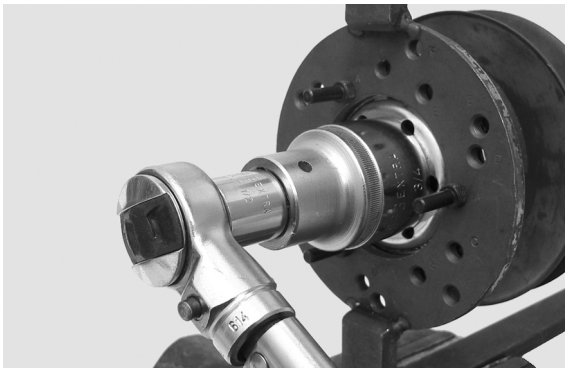
- Reassemble the nut securing the clutch and tighten to the prescribed torque.

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

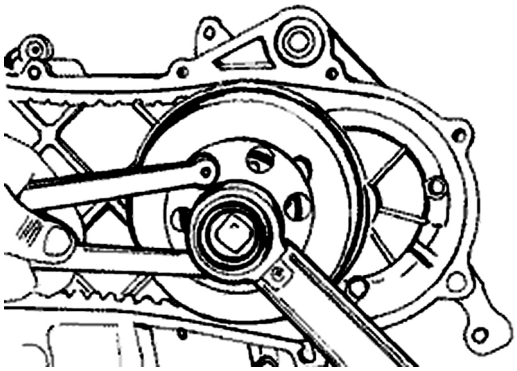
- Fit the driven pulley assembly, the clutch bell housing and the nut using the specific tool.

Specific tooling

020565Y Compass flywheel stop spanner

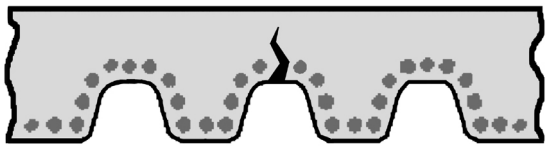
Locking torques (N*m)

Driven pulley shaft nut 40 -÷ 44 Nm



Drive-belt

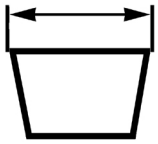
- Make sure the transmission belt is not damaged and does not have cracks in the toothed grooves.
- Check the width of the belt.



Characteristic

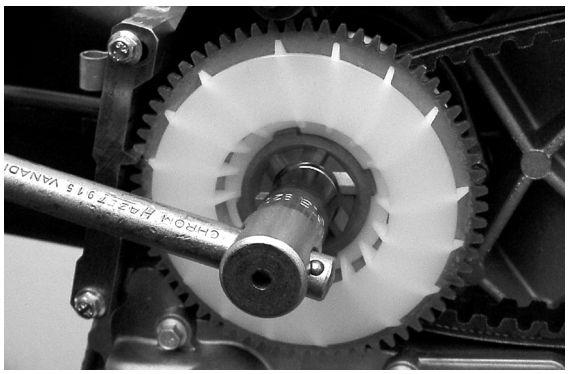
transmission belt/Minimum width

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.



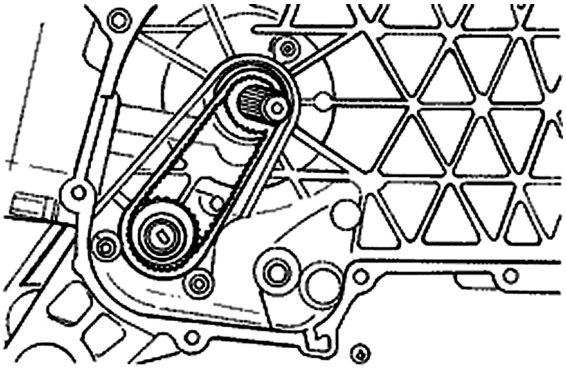
- Remove the belt, washer and remove the mobile half pulley with its bushing, being careful of the rollers and contrast plate fitted loosely on it.

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

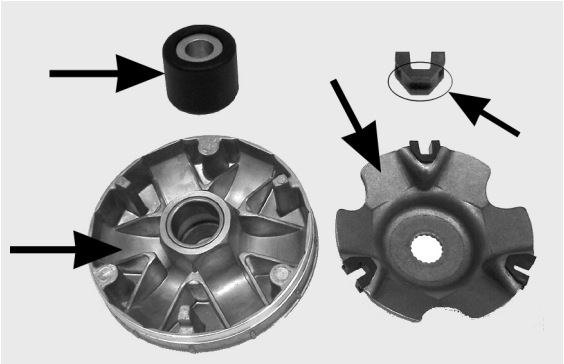
CAUTION

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

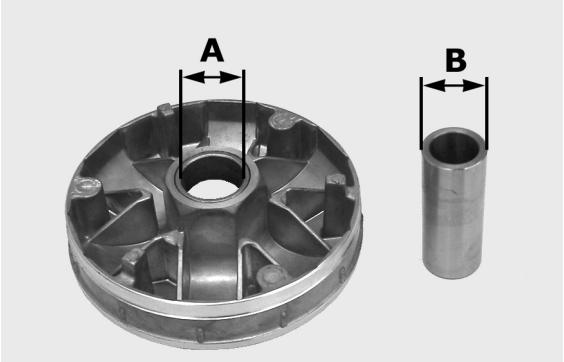
N.B.

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:

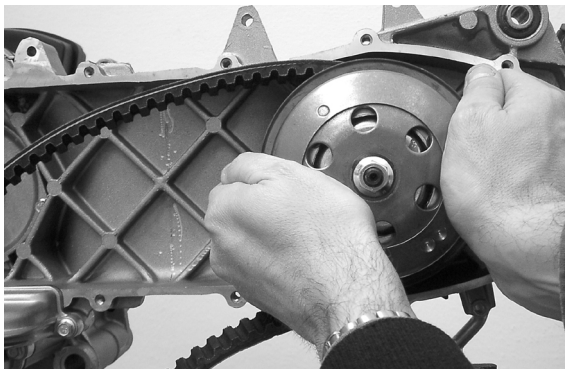
XXX mm

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

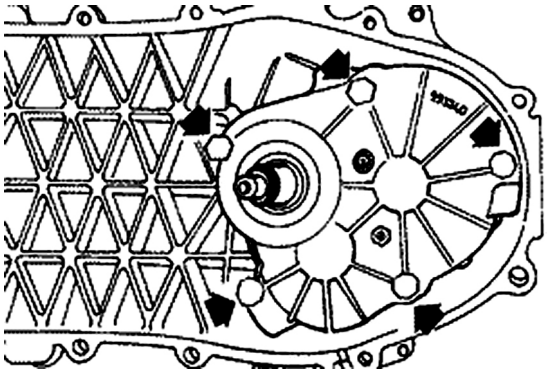
Locking torques (N*m)

Tightening torque plus angle 18 ÷ 20 + 90°
N.m

End gear

Removing the hub cover

• Remove the transmission cover.
• Remove the Driven pulley removal
• Discharge the rear hub oil.
• Remove the 5 screws indicated in the figure.
• Remve the hub cover with pulley shaft.

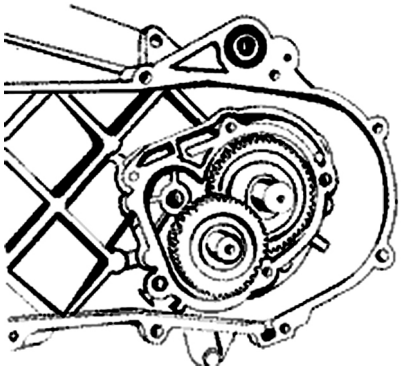


See also

Refitting the clutch

Removing the wheel axle

- Remove the idler gear and the wheel spindle with the related gear.
- While removing the idler gear, pay attention to the related shoulders.



Removing the wheel axle bearings

- Remove the oil seal and the seeger ring.
- Remove the bearing by pushing it with the specially designed drift from the outside towards the

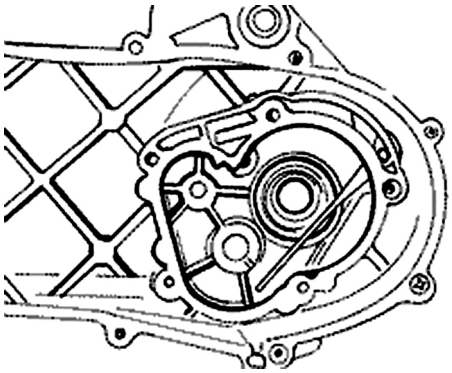
inside of the gear compartment.

Specific tooling

020363Y 20mm guide

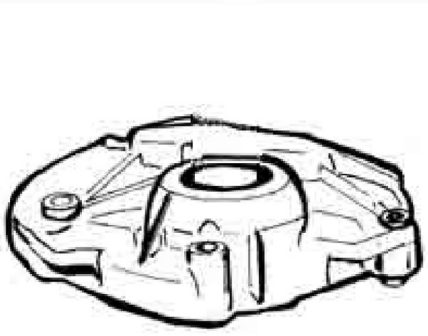
020376Y Handle for punches

020358y 37 x40 adaptor



Removing the driven pulley shaft bearing

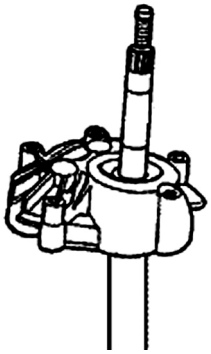
- Remove the seeger ring from inside the cover.
- Remove the oil seal from the outside.
- Remove the two dowel bolts and place the cover on a horizontal surface.
- Position the specific tool on the inner race of the bearing and expel the bearing with the aid of a press.



Specific tooling

020452y Driven pulley shaft fitting/removing tube

- Position the specific tube on the inner race of the bearing and on the pulley shaft teeth side as shown in the figure. Expel the driven pulley shaft with the aid of a press.



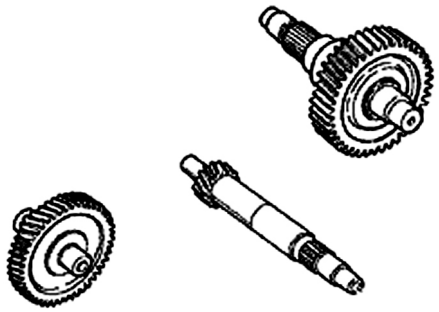
Specific tooling

020452y Driven pulley shaft fitting/removing tube

Inspecting the hub shaft

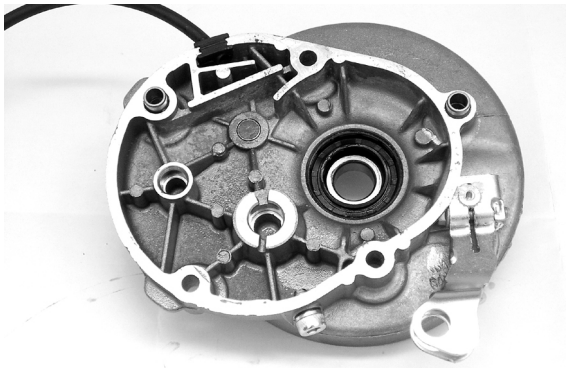
- Check the three shafts for wear or distortion of the toothed surfaces, the bearing housings and the oil seal housings.
- Replace any damaged parts.

- Check that the mating surface is not dented or distorted.
- If any anomalies are found, replace the hub cover.



Inspecting the hub cover

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

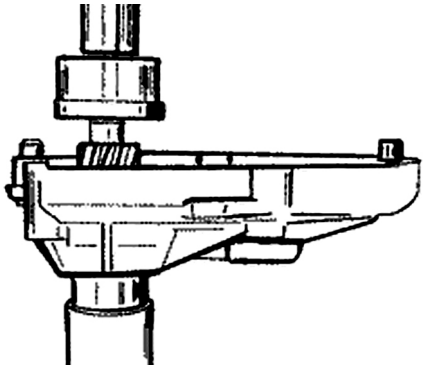


Refitting the driven pulley shaft bearing

- 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



• Heat the hub cover and insert the bearing using the specific punch.
• Fit the elastic ring with the concave part on the bearing side.

N.B.

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

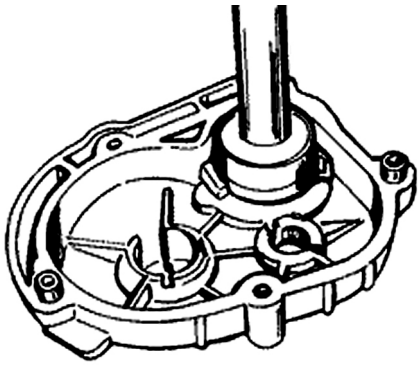
Specific tooling

020151Y Air heater "METABO HG 1500/2"

020376Y Handle for punches

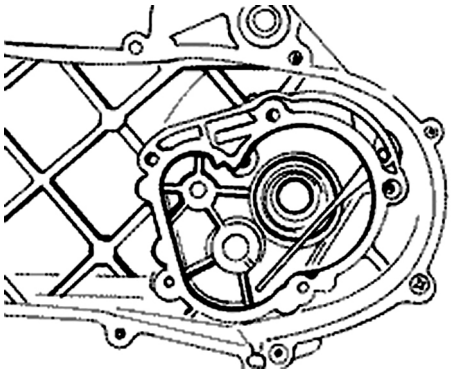
020439Y 17 mm guide

020358y 37 x40 adaptor



Refitting the wheel axle bearing

- Heat the crankcase on the clutch side with the thermal gun.
- After lubricating the bearing outer plate, fit the bearing using the specially designed adaptor with the aid of a hammer.
- Fit the seeger ring and the oil ring using the 42x47 adaptor and the handle.



Specific tooling

020151Y Air heater "METABO HG 1500/2"

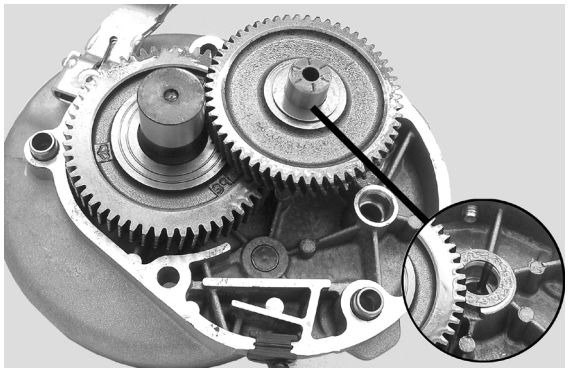
020376Y Handle for punches

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



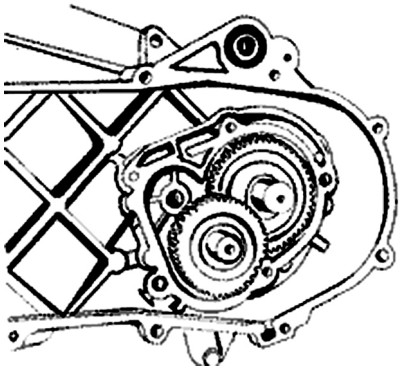
Refitting the ub cover

• Refit the wheel axis.

• Refit the intermediate gear.

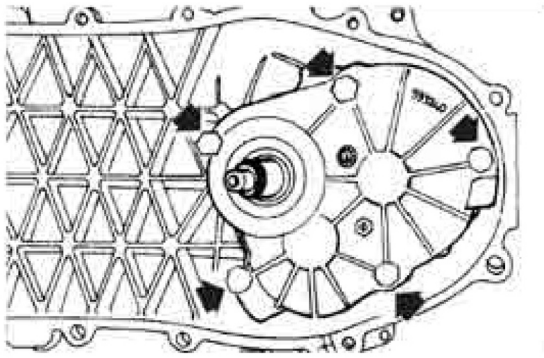
• Apply LOCTITE 510 on the hub cover and refit it with pulley shaft.

• Insert the 5 screws and tighten them at 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.



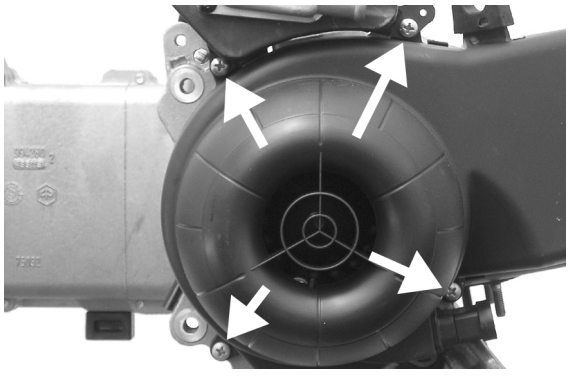
Locking torques (N*m)

Tightening torque: 11 ÷ 13 N·m

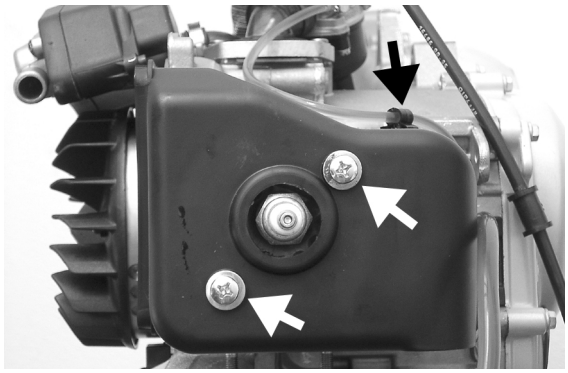
Flywheel cover

Cooling hood

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

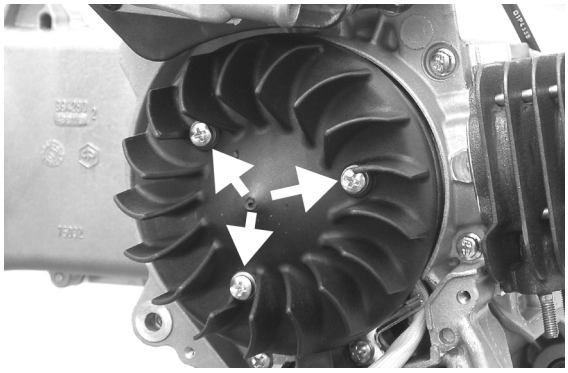


- Remove the oil line retaining zip tie from the cooling hood
- Remove the two screws shown in the picture



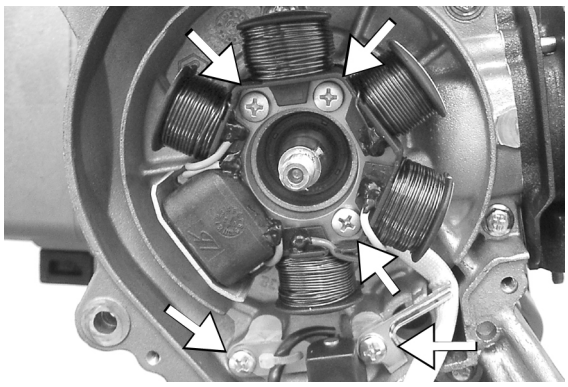
Cooling fan

- 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 CRANKCASE. THIS WILL PREVENT IT FROM BEING CRUSHED BY THE FAN COVER ASSEMBLY.

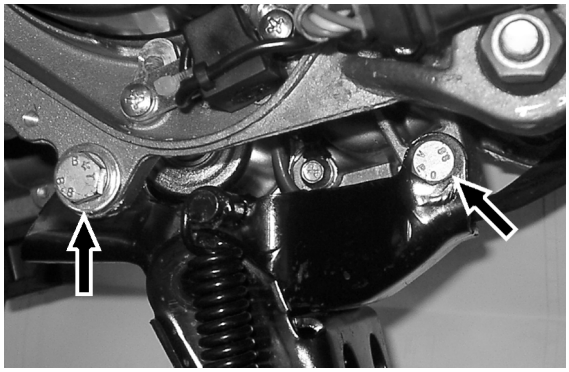
Locking torques (N*m)

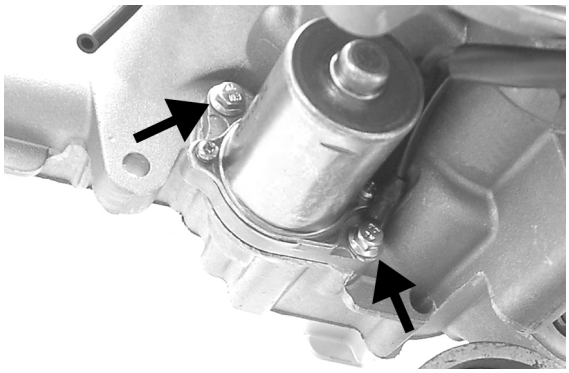
Pick-up screws 3 ÷ 4 Stator screws 3 ÷ 4

Flywheel and starting

Removing the starter motor

- Detach the centre-stand by removing the 4 screws (2 on each side), fixing the bracket to the engine
- Remove the fixings shown in the picture





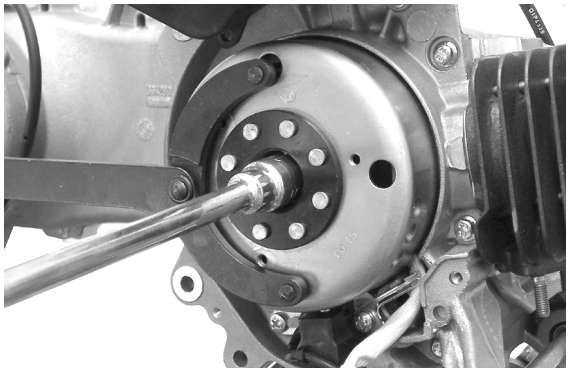
Removing the flywheel magneto

- 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.

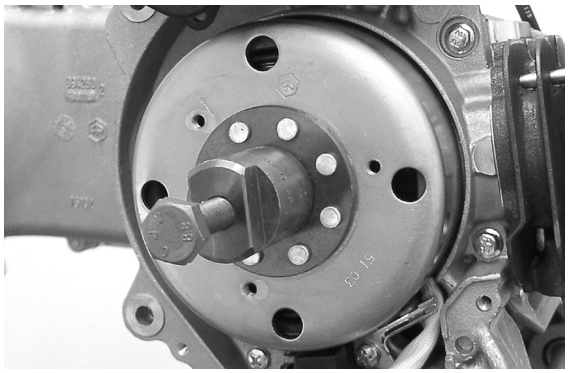


- Extract the flywheel with the specially designed extractor.

Specific tooling

020565Y Compass flywheel stop spanner

020162y Flywheel extractor



Inspecting the flywheel components

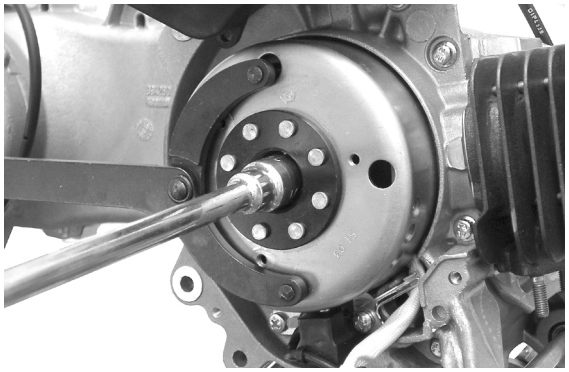
- Check the flywheel for any distortion that might cause rubbing on the stator and the pick-up.

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.

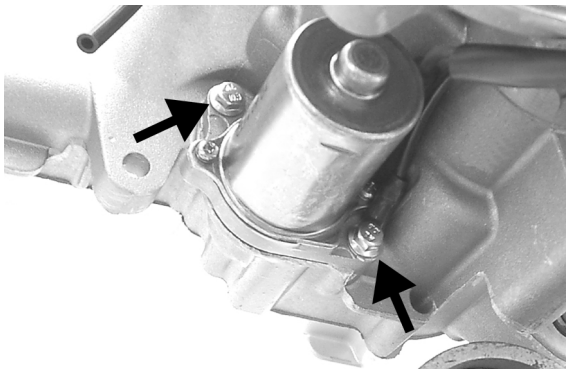
A CHANGE IN THE AIR GAP MAY ALTER THE SPARK ADVANCE AND CAUSE KNOCKING, ETC.

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.

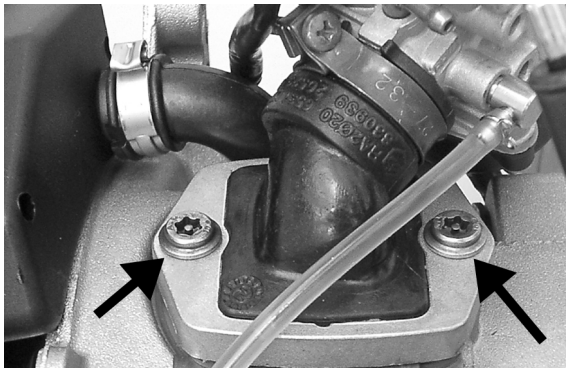
Locking torques (N*m)

Starter motor screws 11 ÷ 13

Cylinder assy. and timing system

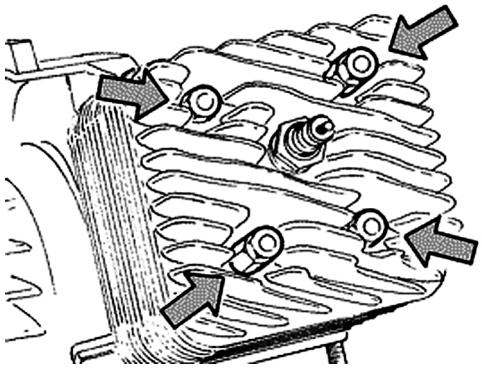
Removing the intake manifold

Using the TORX spanner, remove the 2 intake manifold fixing screws



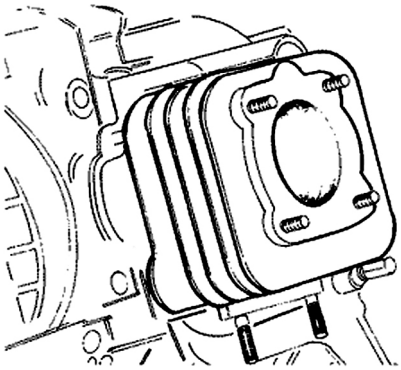
Removing the cylinder head

Remove the four nuts shown in the picture



Removing the cylinder - piston assy.

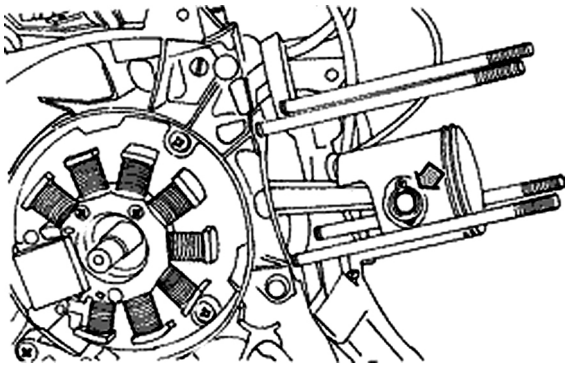
Carefully remove the cylinder



Remove the split rings and the wrist pin

CAUTION

ALWAYS REPLACE THE WRIST PIN SPLIT RINGS WITH NEW ONES

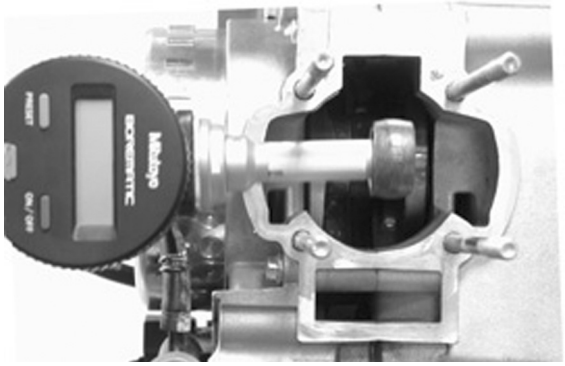


Inspecting the small end

- 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 CRANK-SHAFT".



Characteristic

Standard diameter

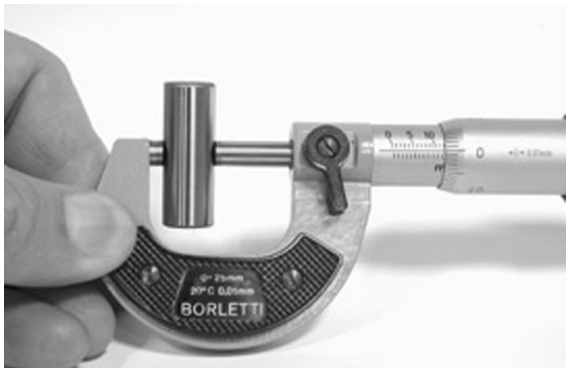
17 +0,011-0,001

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

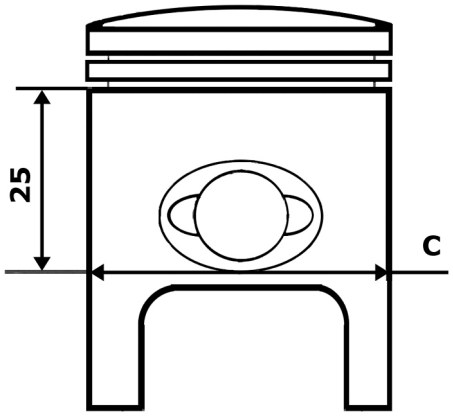
12 +0,007 +0,012

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.

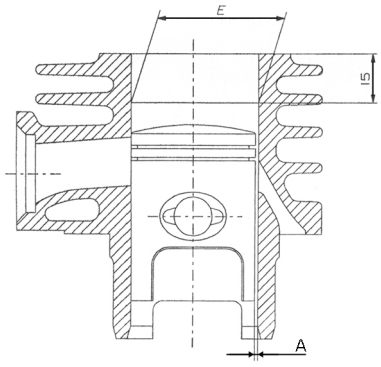
Inspecting the cylinder

- Check the cylinder does not show signs of seizures. If it does proceed by replacing it or per-

forming 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.

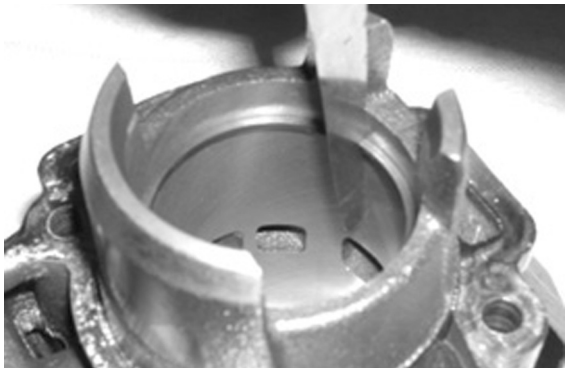
Inspecting the piston rings

- 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.

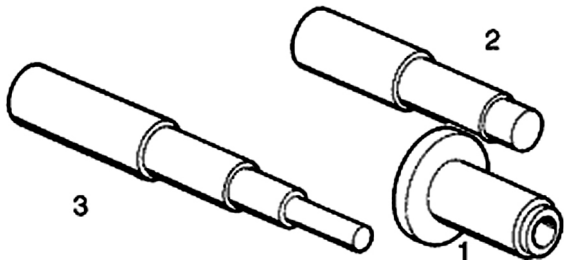
Specific tooling

020166y Piston rings fixing tool

Locking torques (N*m)

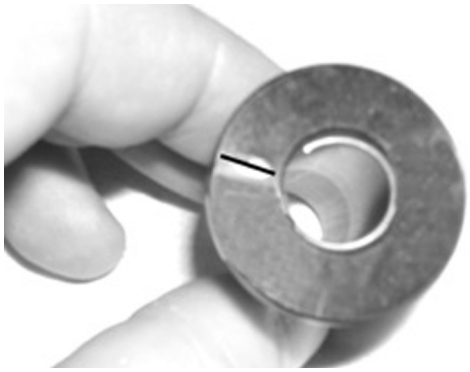
Cylinder head lock nuts 10 ÷ 11 N·m

- 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

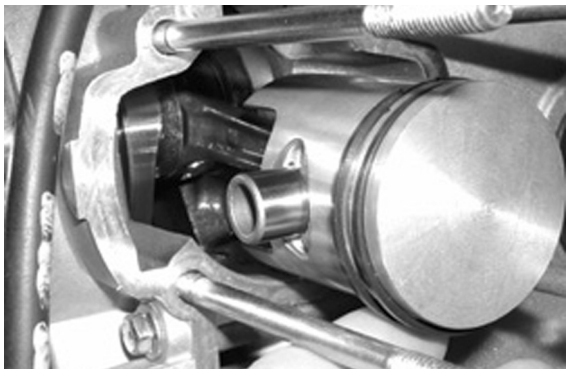
POSITION THE ARROW STAMPED ON THE TOP OF THE PISTON TOWARDS THE EXHAUST PORT. THE WRIST PIN SPLIT RINGS MUST BE POSITIONED ON THE PISTON USING THE SPECIAL TOOL.

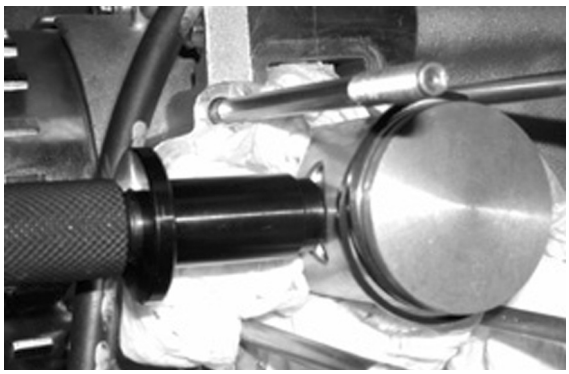


Recommended products

Selenia Hi Scooter 2 Tech Oil

Recommended oil

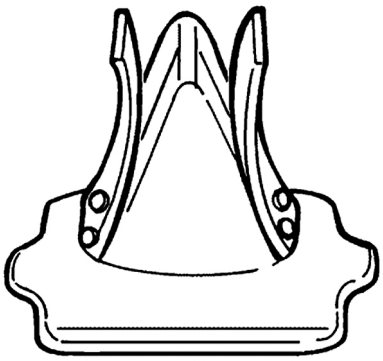




Inspecting the timing system components

CAUTION

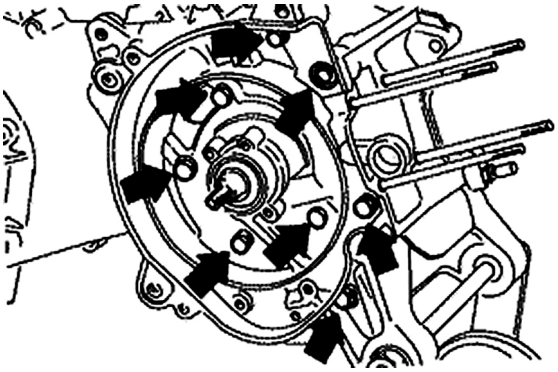
CHECK THE LEAK TIGHTNESS OF THE REED VALVE ASSY.; NO LIGHT BE VISIBLE BETWEEN VALVE AND HOUSING.



Crankcase - crankshaft

Splitting the crankcase halves

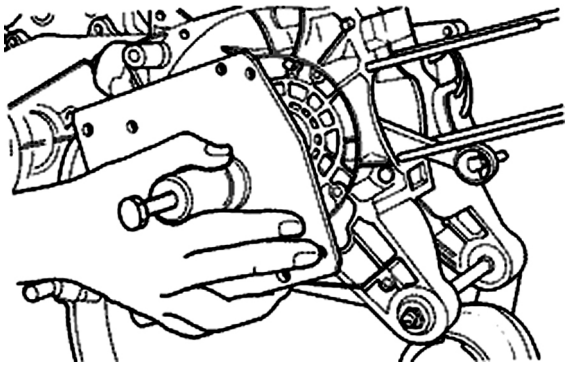
Remove the eight crankcase fasteners.



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

Specific tooling

020163y Crankcase splitting plate

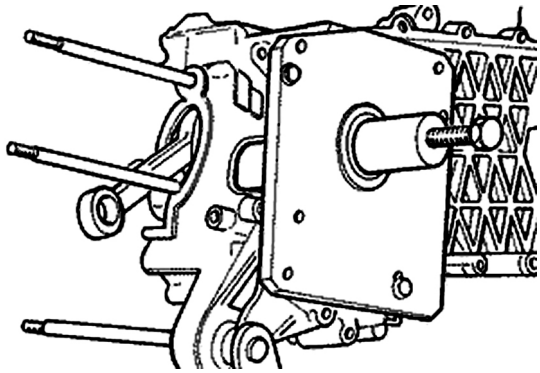


Removing the crankshaft

- 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

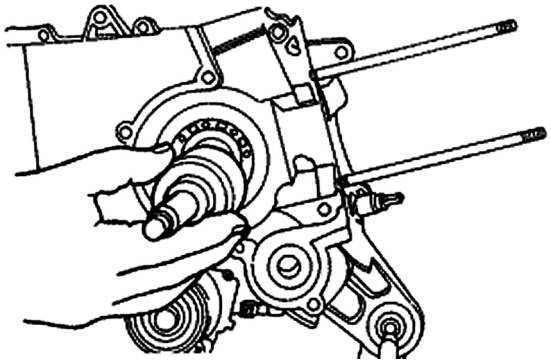
004499y001 Bearing extractor fitted with parts

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

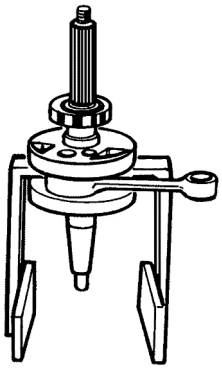
001467Y007 Bell for bearings external Ø 54 mm

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.

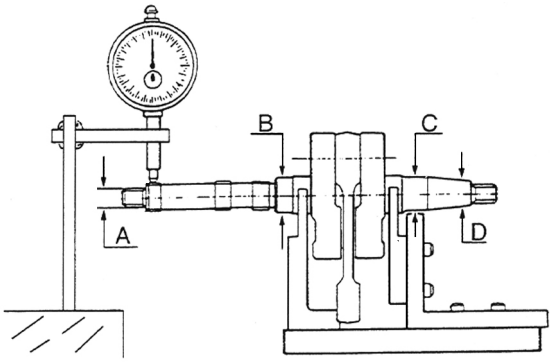


Specific tooling

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.



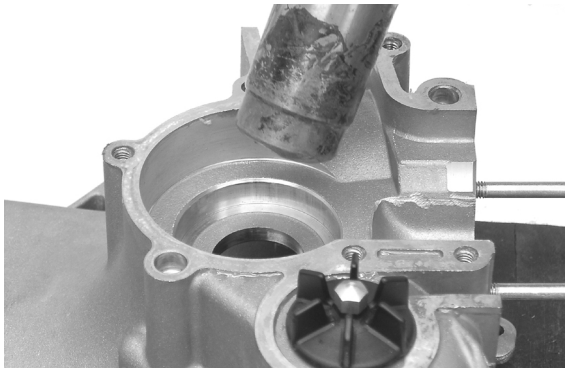
Specific tooling

020335Y Magnetic stand and comparator

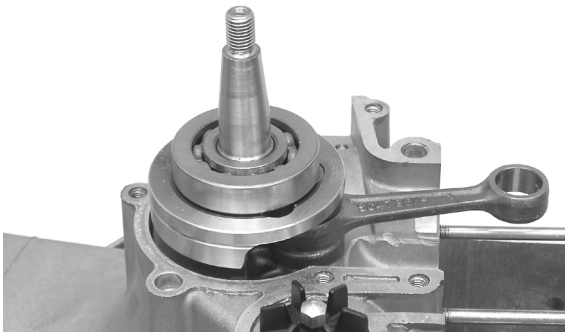
020074Y Crankshaft aligning tool

Refitting the crankshaft

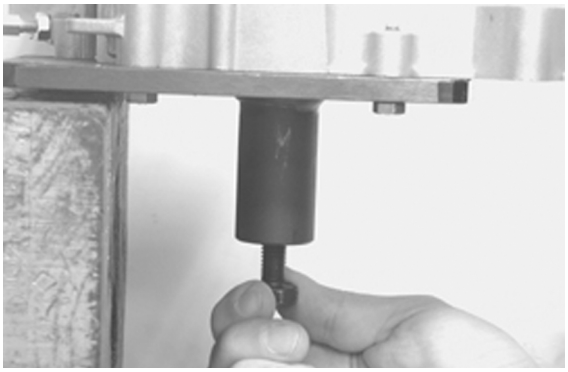
- Rest the transmission-side half-crankcase on two wooden supports.
- Using a heat gun, heat the bearing housing up to approx. 120°.



- 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 pre-load the tool's thrusting screw until the ball bearing play disappears.

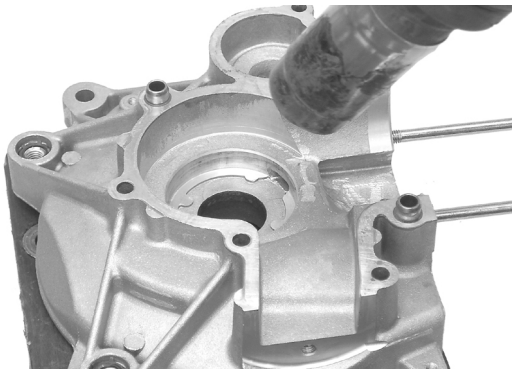


Specific tooling

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 and adequate solvent (e.g. acetylene trichloride).
- Heat the flywheel-side half-crankcase using a heat gun.

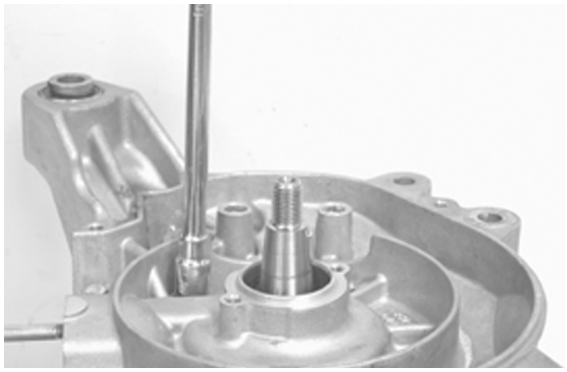


Recommended products

Loctite 510 Packing fluid

Packing

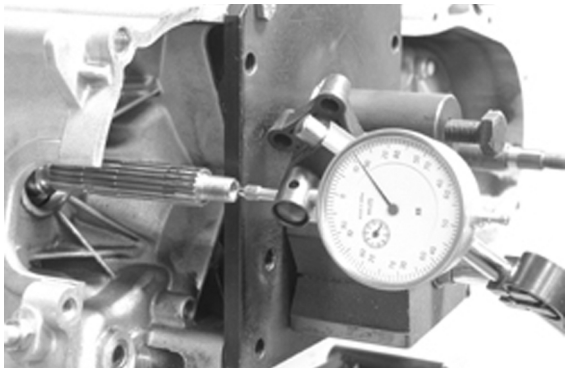
- Keeping the transmission-side half-crankcase in horizontal position, vigorously and accurately insert the flywheel-side half-crankcase.
- Insert at least 3 fixing screws and tighten them quickly.
- Insert the other 5 screws and tighten them at the prescribed torque.



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

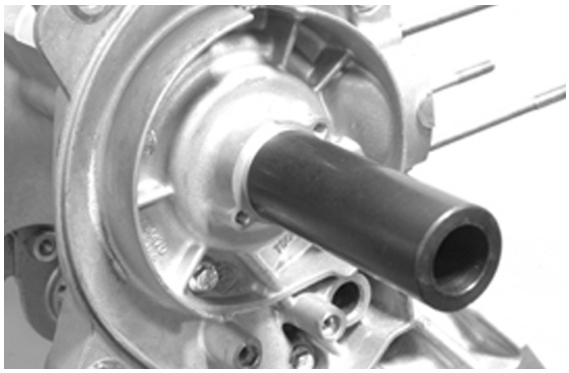
0,02 ÷ 0,03 mm

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.

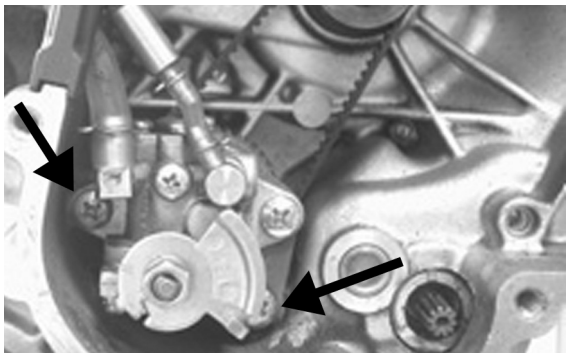
Specific tooling

020340Y Punch for fitting oil guard magneto and transmission

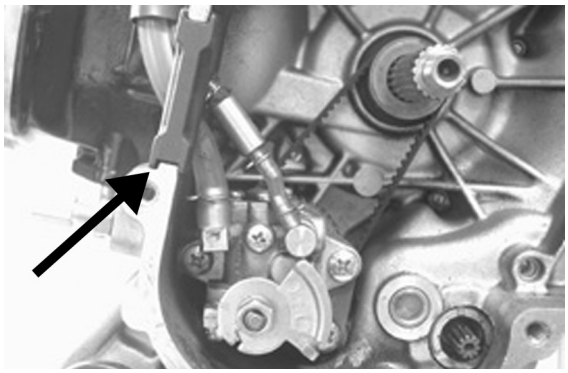
Oil pump

Removal

Remove the two screws shown in the figure

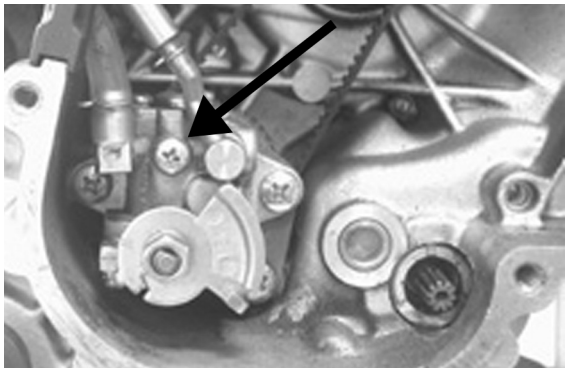


Remove the fairlead from the crankcase, as indicated in the figure.



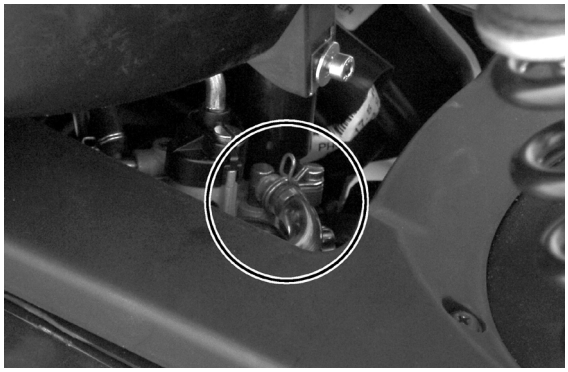
Refitting

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

The vehicle is fitted with a membrane pump controlled via the vacuum generated in the intake duct. The tank is therefore fitted with a hole located at its lowest point, which allows fuel to flow to the pump and then to the carburettor.
To check the pump performance, the following mass flow measurement may be carried out:
Start the engine, warm it up to the standard operating temperature, and shut it down. Detach the fuel inlet tube on the carburettor and insert it inside a scaled recipient. Start the engine without twisting the throttle, and let it run at idle. Let the engine run for a total of 10 seconds, from start-up and shut it down. Check the quantity of fuel is not less than prescribed.



Characteristic
Fuel supplied
~100cc X 10"

INDEX OF TOPICS

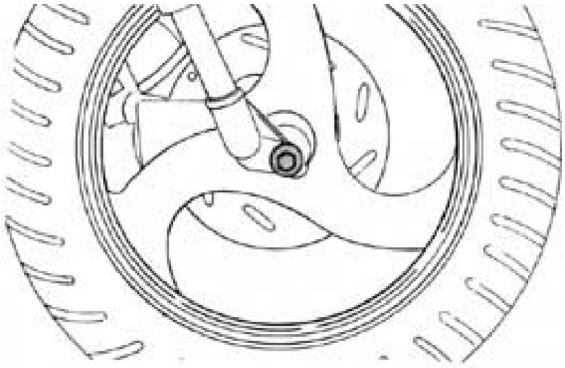
Sospensioni anteriore

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

Front

Removing the front wheel

- Rest the vehicle so that the front wheel is lifted from the ground.
- Using two 18 mm spanners, remove the front wheel axle.



Refitting the front wheel

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

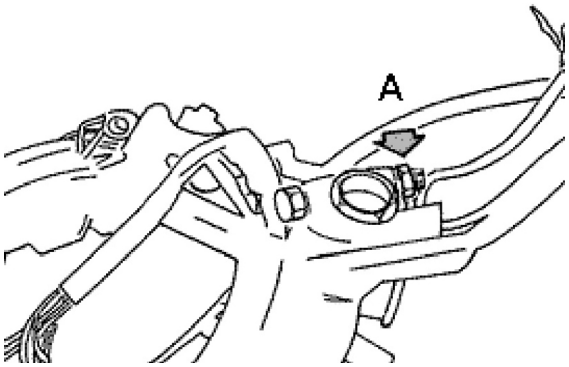
Handlebar

Removal

- Remove the front handlebars cover.
- Remove the rear handlebars cover.
- After removing the transmissions and detaching the electrical terminals, remove the handlebar fixing bolt «A».
- Check all components and replace faulty parts.

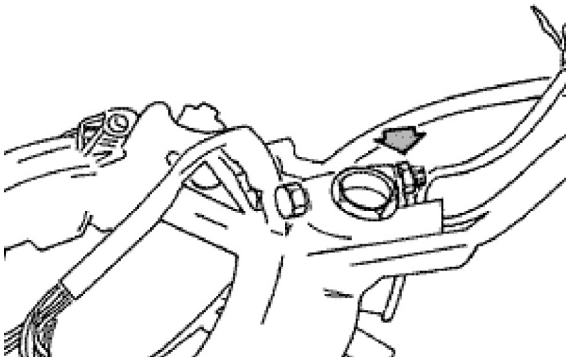
N.B.

IF THE HANDLEBAR IS BEING REMOVED ONLY TO ALLOW FOR THE REMOVAL OF THE STEERING, IT IS SUFFICIENT TO TILT THE HANDLEBAR FORWARD, THUS AVOIDING DAMAGING THE CABLES.



Refitting

When refitting, tighten at the prescribed torque and apply the recommended grease on the threaded cone.



Recommended products

ZETA 2 Grasso leve comando sul motore

Grasso al sapone di Litio e ossido di Zinco NLGI2

Locking torques (N*m)

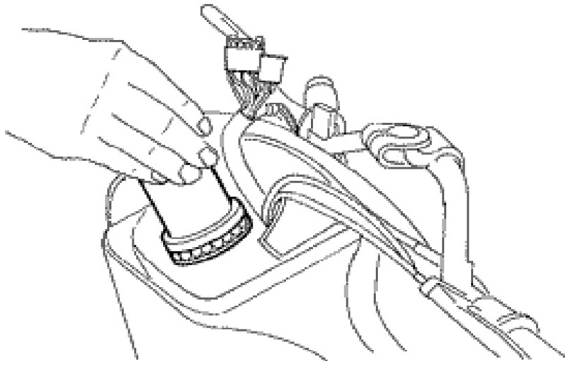
Coppia di bloccaggio: 65 ÷ 70 N•m

Front fork

Removal

- Remove the front brake calliper.
- Remove the odometer cable from the reduction gear box.
- Remove the front mudguard.
- Remove the handlebar.

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



Specific tooling

020055Y Steering tube ring nut spanner

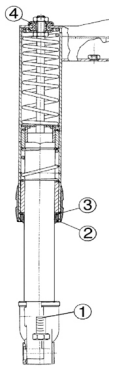
Overhaul

Removing the damper

- Remove fixing screw 1 from the stanchion bracket, by warming it up with the special heating gun. Then, remove split rings 2 and 3.
- Remove nut 4 and stanchion, spring, and spacers. The damper is built into the stanchion and cannot be overhauled. Therefore, in the eventuality of a need to intervene on the damper

(i.e. loss of oil from the fork), follow the above operations and replace the stanchion.

- When refitting, tighten at the prescribed torque and apply the recommended threadlock on the nut.



Specific tooling

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

020151Y Air heater "METABO HG 1500/2"

Recommended products

Loctite 243 Thread-Brake

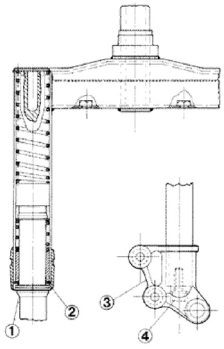
Medium Loctite Thread-Brake 243

Locking torques (N*m)

Fixing screw - stanchion bracket 20 ÷ 25 N·m
Nut tightening torque 20 ÷ 25 N·m

Replacing the seal ring

- Remove the wheel axle.
- Remove screw (4).
- Remove shoe (3).
- Remove dust cover (1).
- Insert a new seal ring after lubricating the inner ring walls and by paying attention not to damage it.
- Insert the shoe applying the recommended product on the clean surface.
- Lock screw (4).



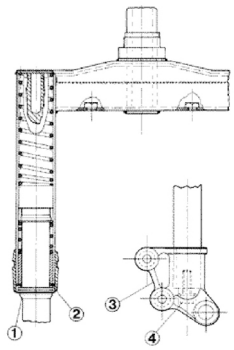
Recommended products

Loctite 243 Thread-Brake

Medium Loctite Thread-Brake 243

Removing the stanchion

- Remove dust cover (1) using a screwdriver as a lever.
- Remove split ring (2) and force the tube out.



N.B.

GREASE SPRINGS AND SPACERS BEFORE REFITTING, WITH A MINIMUM OF GREASE (~ 3 GR.)

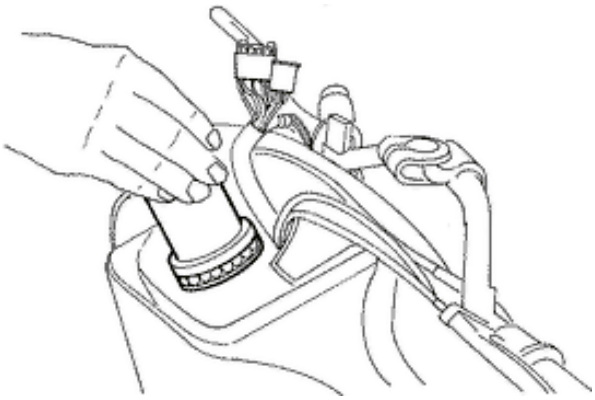
Recommended products

JOTA 3 FS Speedometer transmission

Lithium soap grease NLGI 33

Refitting

Lubricate housing and spheres with the recommended grease.
- Tighten at the prescribed torque and turn the spanner anticlockwise by 90° ÷ 100°.



Specific tooling

020055Y Steering tube ring nut spanner

Recommended products

ZETA 2 Grasso leve comando sul motore

Grasso al sapone di Litio e ossido di Zinco NLGI2

Locking torques (N*m)

Locking torques 50 ÷ 60 N·m

Steering column

Removal

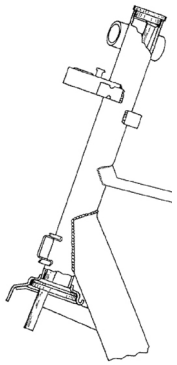
Removing the top and bottom frame housings

- Only remove the housings in the event of actual need.
- Using the special tool, remove the top bearing housing inserting the tool from underneath the steering housing as shown in the figure.

- Insert the drift from above the steering housing and remove the lower ring-nut housing.

Specific tooling

020004Y Drift for removing thrust rings from steering head tube



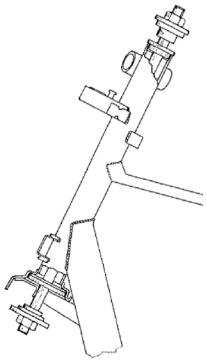
Refitting

Refitting the top and bottom frame housings

- Using the special tool, refit the top and bottom housings on the frame.

Specific tooling

001330Y Steering seat installer, to be fitted with parts: 001330Y009-For lower seat, 001330Y013-For upper seat



Steering bearing

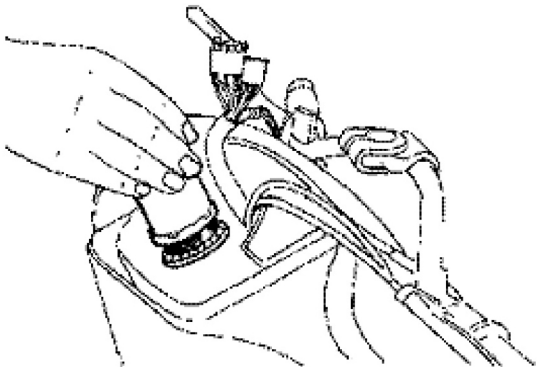
Removal

Removing the steering ring nut

- Remove the handlebar.
- Remove the steering bearing ring nut using the special tool.

Specific tooling

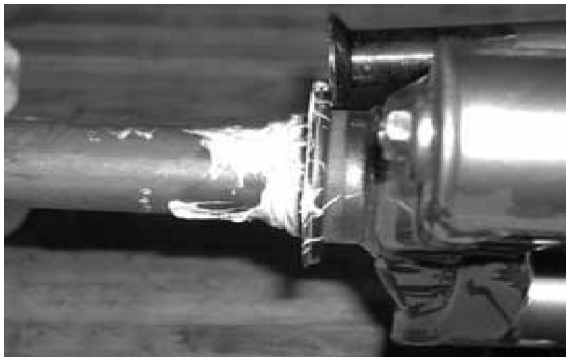
020055Y Steering tube ring nut spanner



Overhauling the bearing housing on the fork

Check the condition of the bearing housing on the fork (steering column), In the event of anomalies, replace it.

- Adequately support the fork.
- Using the special tool, remove the bearing housing on the steering column as shown in the picture, with a light mallet.



Specific tooling

020004Y Drift for removing thrust rings from steering head tube

When refitting, always use a new bearing housing.

- Using the special tool, refit the bearing housing, with the aid of a light mallet, pushing home as shown in the figure.

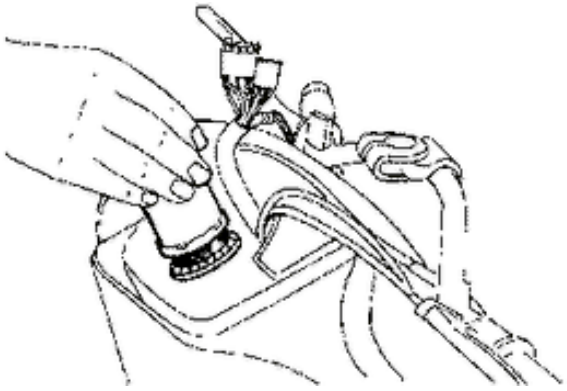
Specific tooling

006029y Drift for fitting thrust ring seats on steering tube

Refitting

Refitting the steering ring-nut

- After tightening the first ring-nut, tighten the second one using the special tool.



Specific tooling

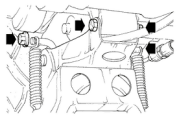
020055Y Steering tube ring nut spanner

Locking torques (N*m)

Tightening torque 30 ÷ 40 N·m

Centre-stand

Replacing the centre-stand assy

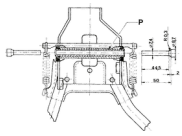


- Remove the 2 screws shown in the figure.
- On reassembly, tighten to the prescribed torque.

Locking torques (N*m)

Stand bracket screws 18,5 ÷ 19 N·m

Calking and fitting of stand bolt to bracket



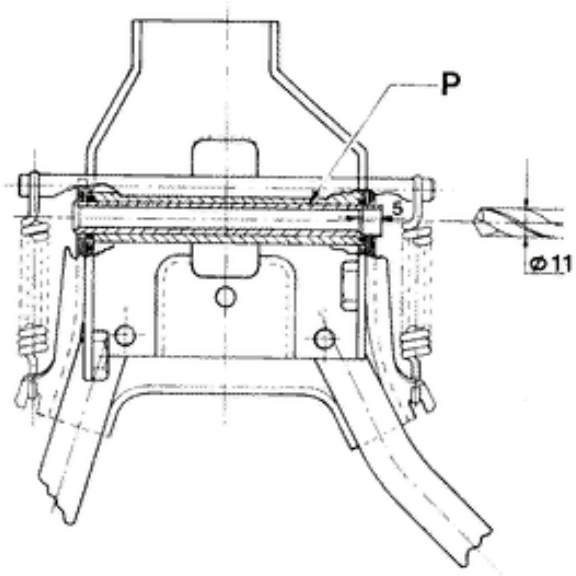
- Stake the end of pin «**P**» using the two punches shown in the figure.
- The stand should turn freely on its pivot after this operation.

N.B.

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

Removal of stand bolt from bracket

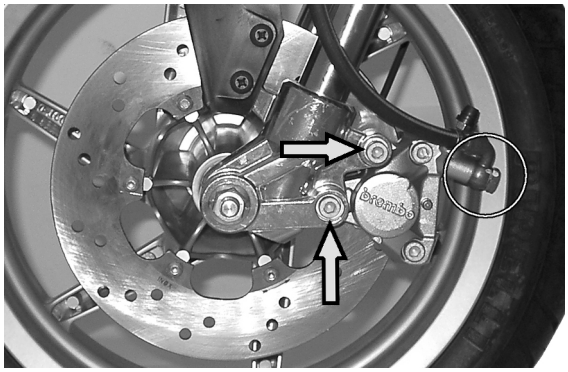
- Disassemble the stand bracket from the engine.
- Drill to a depth of 5 mm from one side in order to remove pivot pin «**P**».



INDEX OF TOPICS

Front brake calliper

Removal



- Check the conditions of the brake cable, sealing and joint. In the presence of losses of liquid from the calliper and/or system components, it is necessary to replace the components themselves.
- Detach the fluid tube from the calliper collecting it in a container.
- Remove the 2 fixings highlighted in the figure.

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.

Insert the following: - sealing rings (1-2);

- pistons (3);

- locate the OR seal inside a calliper body (4).

- Join the inner and outer bodies via fixing bolts. Refit the pads and breathe any air inside the circuit (see previous paragraphs).

- Locate the calliper on the disc and secure to the supporting bracket tightening the fixing bolt.

- Tighten the tube joint on the calliper at the prescribed torque.

- When refitting the components, they must be perfectly clean and free from any trace of oil, fuel, grease, etc... It is therefore necessary to carefully clean them with denatured alcohol.

The seal rings must be immersed in the operating liquid; Protective solution **PRF1** may be used.

CAUTION

RUBBER PARTS MUST NOT BE LEFT IN ALCOHOL FOR MORE THAN 20 SECONDS. AFTER WASHING, DRY THE PARTS WITH COMPRESSED AIR AND A CLEAN CLOTH

Locking torques (N*m)

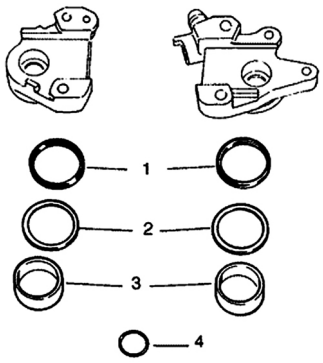
Calliper mating screw 20÷25 N·m Fluid breathing screw 7÷10 N·m

1 DUST SEALS

2 OIL SEALS

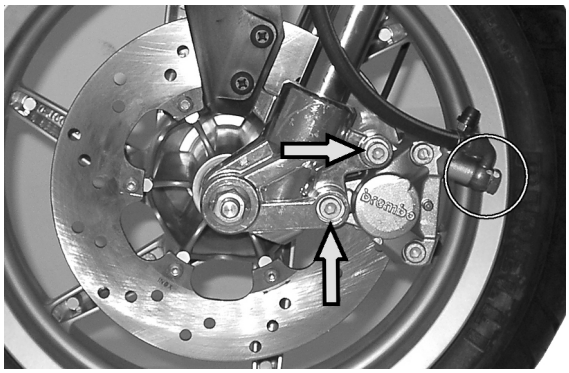
3 PISTONS

4 O-RING



Refitting

- Refit the calliper on the bracket and tighten the screws at the prescribed torque.
- Refit the tubing with its joint and new copper seals.
- Breathe air from the circuit.



Locking torques (N*m)

Brake tube union 20 ÷ 22 Nm Calliper - crank-case fixing screws 20÷25 Fluid breathing screw 7÷10 N·m

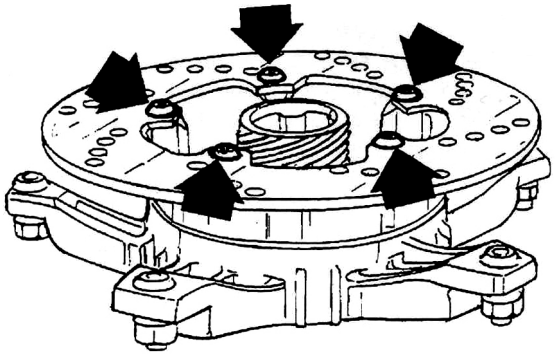
Front brake disc

Removal

- Remove the wheel by removing the spindle fix-

ings.

- Unscrew the 6 disc fixing screws.



Refitting

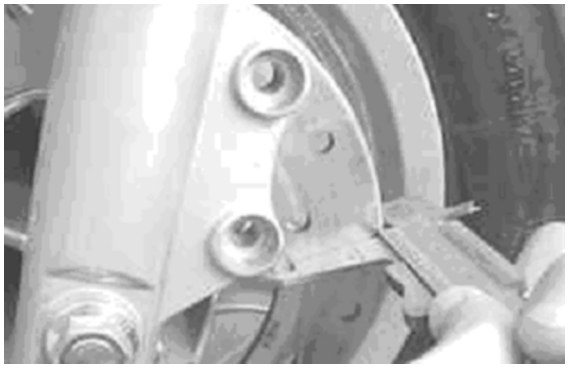
- When reassembling, ensure the disc is positioned correctly in relation to the direction of rotation.

Locking torques (N*m)

Disc screws: 8 ÷ 12

Disc Inspection

It is very important to inspect the disc; this must be perfectly clean and free from rust, oil, grase, and other dirt, and must not present any deep scratches.



Characteristic

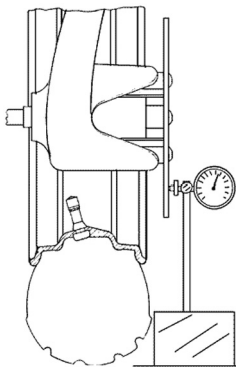
Thickness of front disc (new)

4,0 mm

Min allowable worn disc thickness (front)

3,5 mm

- With the aid of the special tool measure the planar misalignment of the disc with the wheel mounted on the vehicle. This, measured near the outer edge of the disc, must be less than 0.1 mm.
- In the event that measured value does not match the prescribed one, remove the front wheel (Front/Rear Suspen-



sion Chapter) and check the misalignment of the disc. The measure value must be less than 0.1 mm. If this is higher, replace the disc and perform the same test again.

- If the problem cannot be solved by replacing the disc, check and eventually replace the wheel hub.

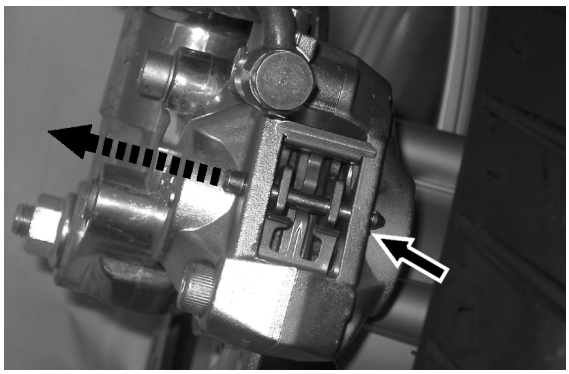
Specific tooling

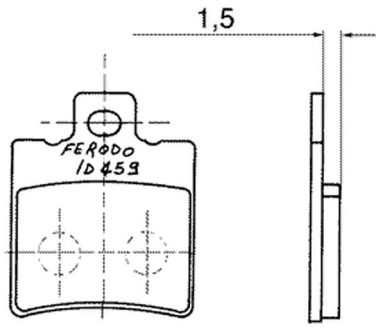
020335Y Magnetic stand and comparator

Front brake pads

Removal

- Remove the pin split ring located at the back of the calliper body.
- Remove the pin, paying attention in recovering the spring, hence remove the pads.
- The pads must be replaced if the working thickness is less than 1.5 mm

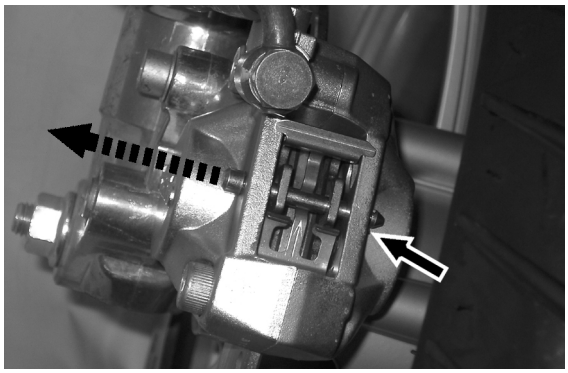




Refitting

- To reassemble perform the above steps in reverse order. Position the leaf spring with the ar-

row facing up.



Fill

Front

-With the bleed valve closed, fill the system to the maximum level with brake fluid.

- Loosen the bleed valve.

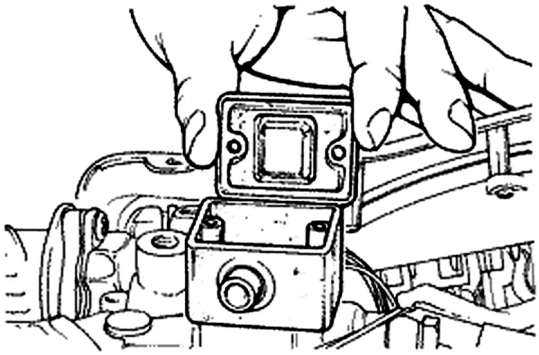
- Apply the Mityvac vacuum pump tube to the bleed valve.

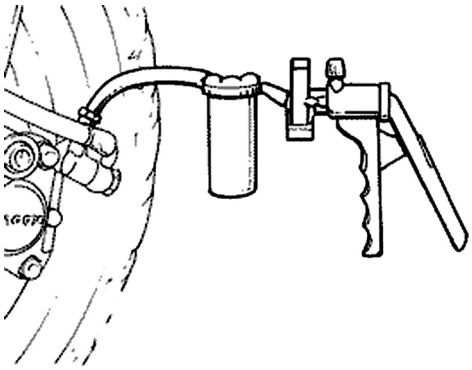
To bleed the circuit you must supply the reservoir constantly with brake fluid while pumping the Mityvac pump until there are no more air bubbles in the circuit.

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 CIRCUIT.
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 HORIZONT-

AL 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 CALLIPER.
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

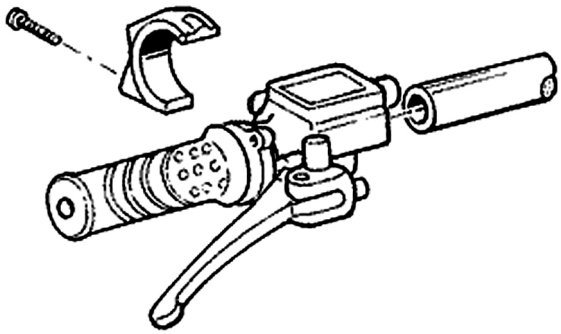
- After removing the front and rear handlebar cover remove the two U clamp fixing screws (see fig-

ure).

- 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.



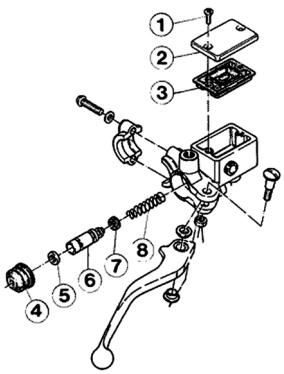
Locking torques (N*m)

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

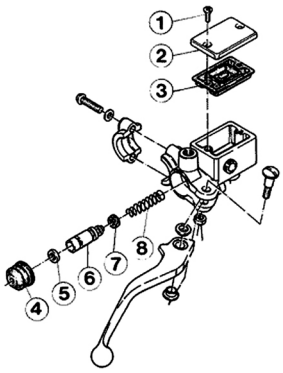
8 - Spring

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 IMMERSED 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

Rear drum brake

After removing the exhaust and the rear wheel, proceed as follows.

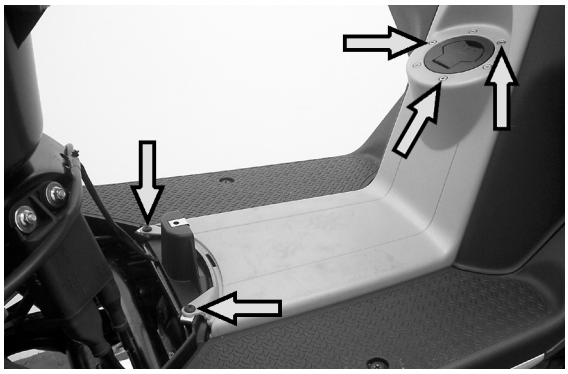
Remove the shoe spring using the special tool Remove the shoes with aid of a lever Refit the new shoes with the aid of a light mallet Attach the spring using the special tool

INDEX OF TOPICS

Carrozzeria

Frame central cover

- Remove the top and bottom fairings.
- Remove the 2 Philips screws fixing the footrest.
- Remove the 3 Allen screws located around the fuel filler cap.
- Remove the fuel filler cap.

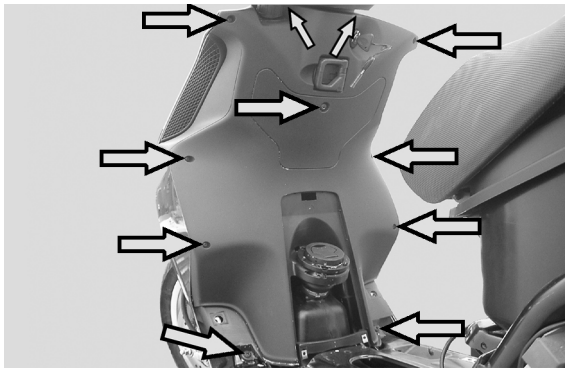


See also

Side fairings

Knee-guard

- Remove the footrest and its side fairings.
- Remove the expansion tank and the fuel filler cap.
- Remove the 11 fixing screws, and hence release the knee-guard.

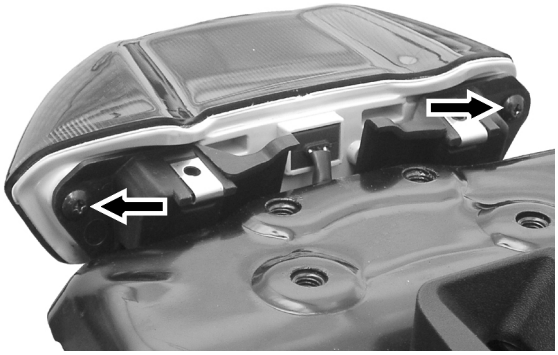


See also

Footrest

Taillight assy.

- Remove the top joining element of the fairings located behind the taillight.
- Remove the two top fairings.
- Remove the 2 fixing screws; hence remove the taillight after disconnecting the connector to the vehicle system.

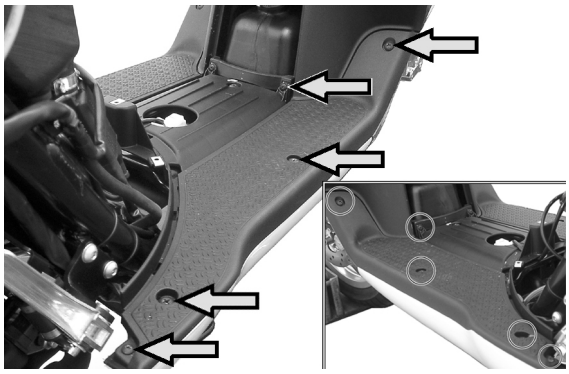


See also

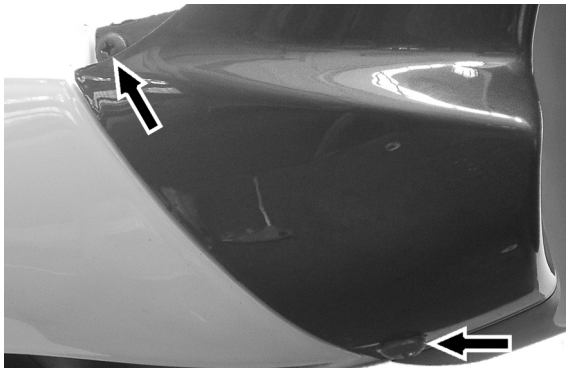
Side fairings

Footrest

- Remove the centre frame cover.
- Remove the 10 screws (5 for each side), hence remove the footrest.



- Remove the side fairing from the footrest, by removing the two screws joining this to the spoiler and the knee-guard.



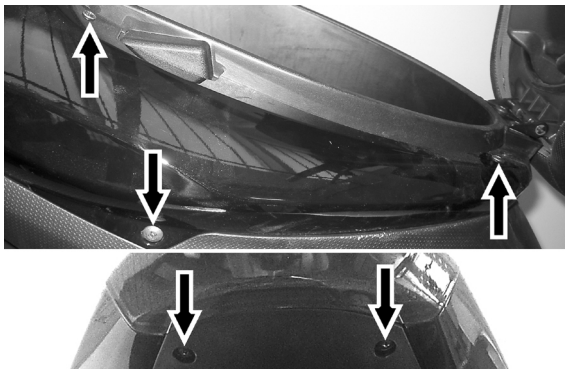
See also

Frame central cover

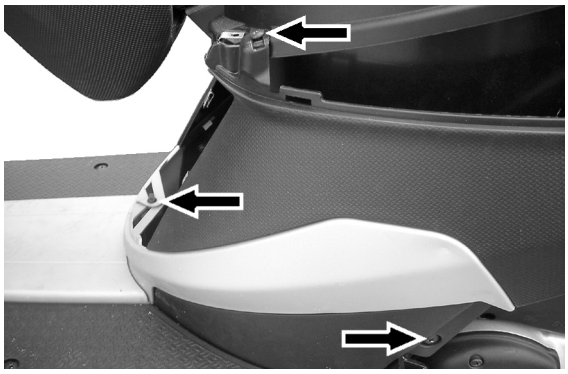
Side fairings

- Remove the top l.h.s. and r.h.s. fairings, by removing the 3 side screws

and the screw located underneath the taillight

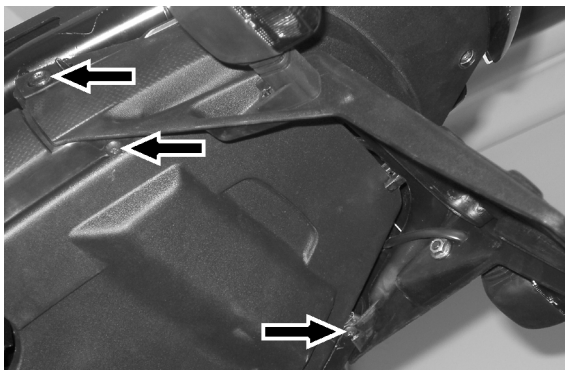


- Remove the lower fairings, removing the 2 side screws and the central joining screw located underneath the spark plug cover.



License plate holder

- Remove the top fairing joining element located behind the taillight.
- Remove the 2 screws joining the top side fairings.
- Remove the 4 lower screws joining the front wheel housing cover with the lower side fairings.



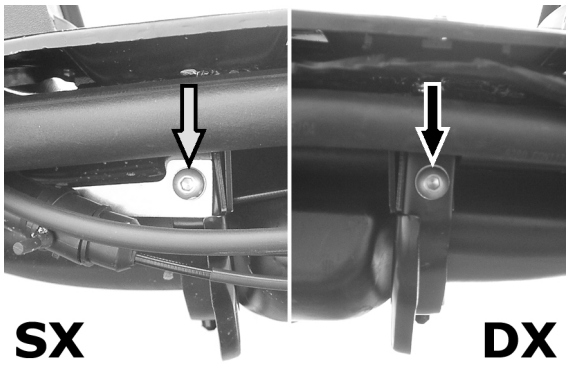
See also

Side fairings

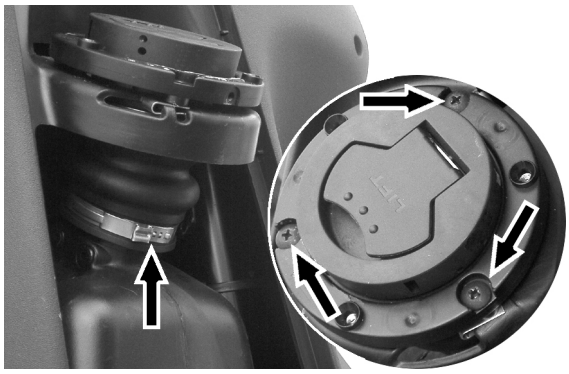
Fuel tank

- Remove the footrest and its side fairings.
- Remove the 2 Allen screws fixing the fuel support cross member, and re-

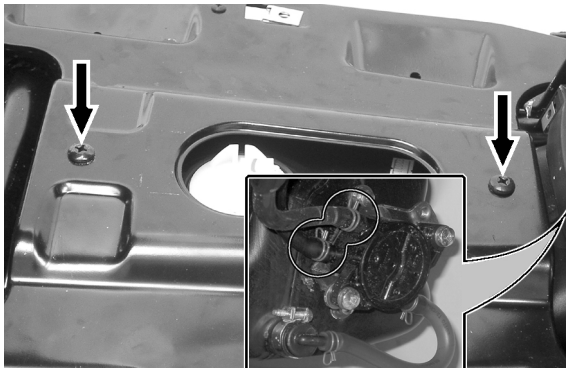
move the bracket



- Remove the metallic clip joining the rubber bellow to the tank and loosen the 3 screws fixing to the knee-guard



- Remove the 2 top screws fixing the tank to the frame and lower the tank so to disconnect the inlet and outlet fuel hoses from the pump.
- Remove the tank completely paying attention to avoid fuel spillage.



See also

Footrest

INDEX OF TOPICS

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
- Idel 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

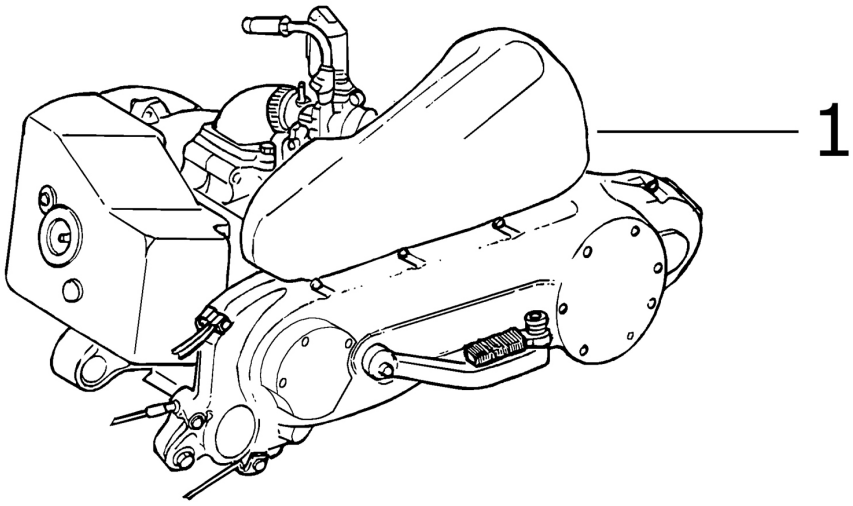
- Gas control stroke check Miscellaneous
- Document check
- Check of chassis no. and engine no.
- Ancillary tools

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

INDEX OF TOPICS

This section describes the amount of time it takes for repair operations.
The description, code and amount of time for each operation are indicated.

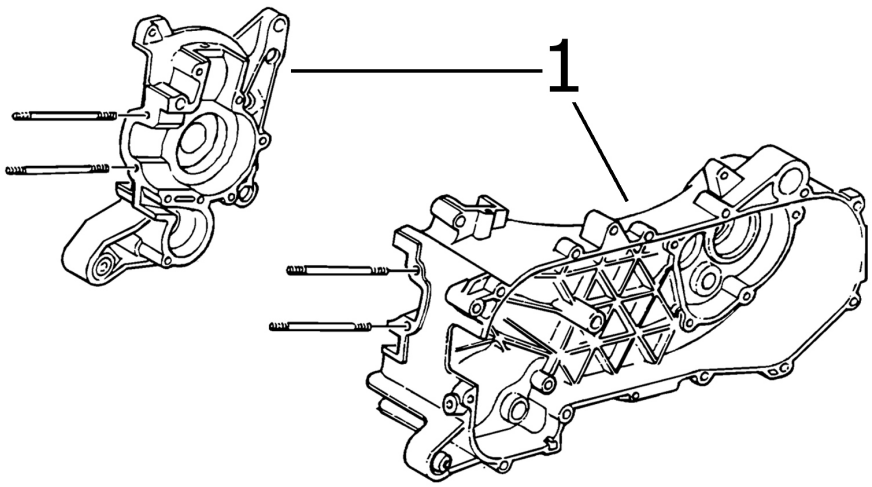
Engine



ENGINE

	Code	Action	Duration
1	001001	Engine from chassis - Replacement	

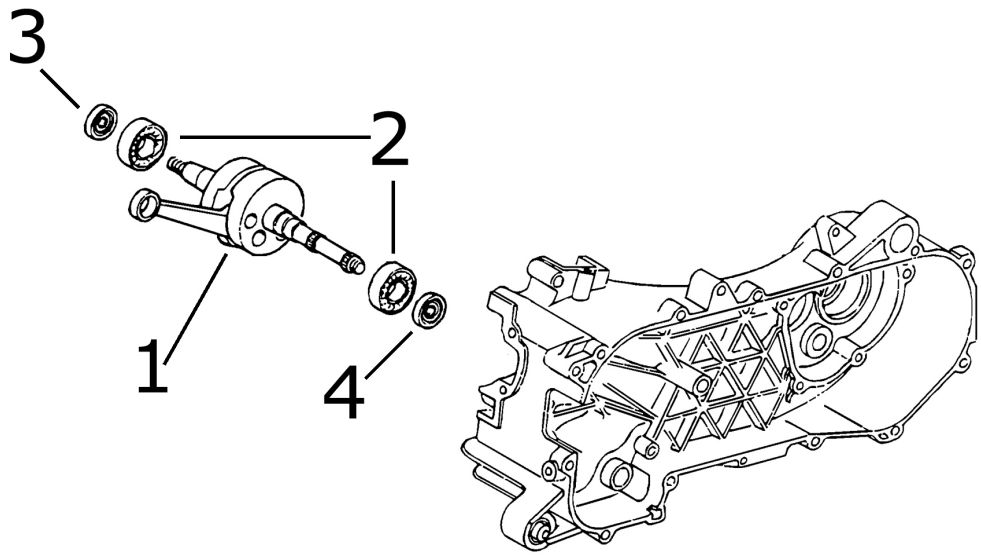
Crankcase



CRANKCASE

	Code	Action	Duration
1	001133	Engine crankcase - Replacement	

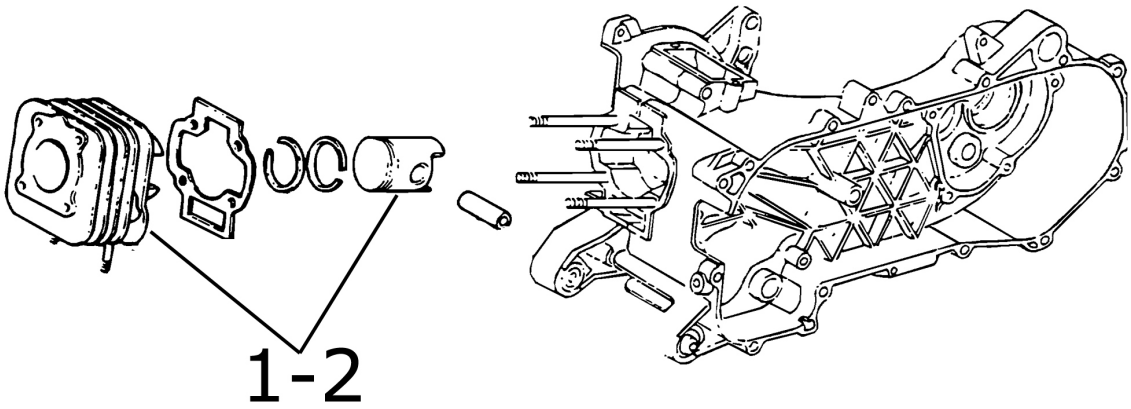
Crankshaft



CRANKSHAFT

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

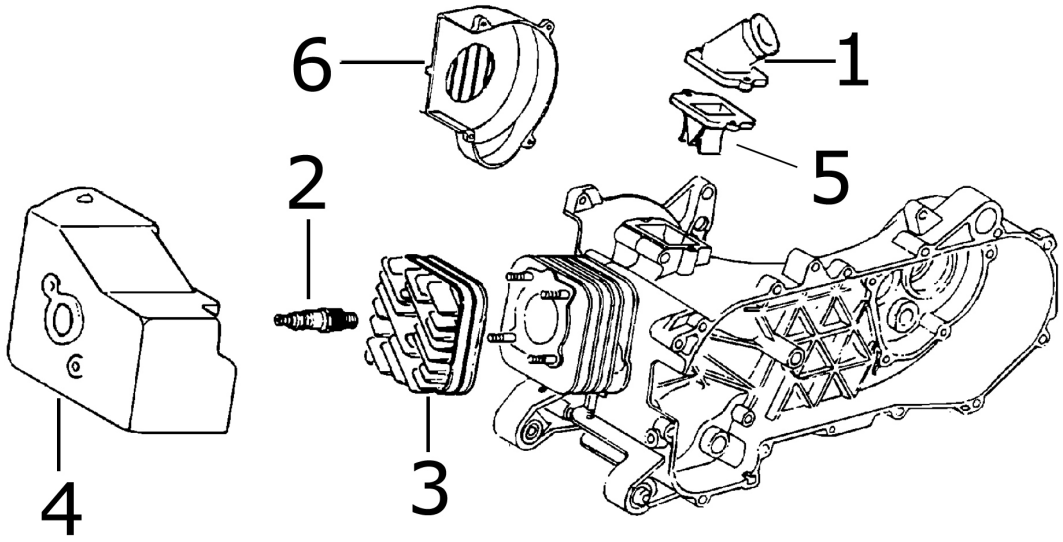
Cylinder assy.



CYLINDER / PISTON

	Code	Action	Duration
1	001002	Cylinder / Piston - Replacement	
2	001107	Cylinder, piston - Overhaul/ Cleaning	

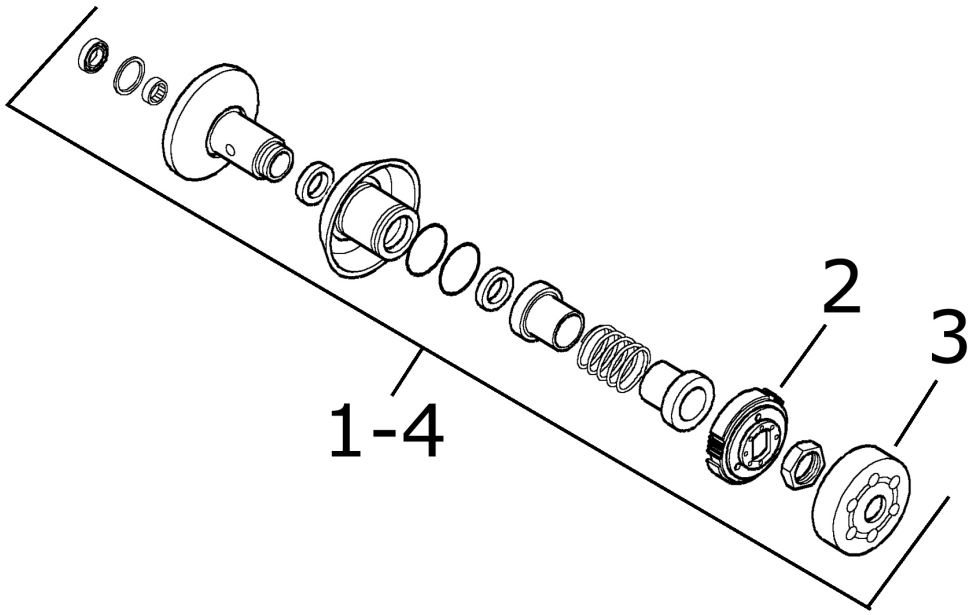
Cylinder head assy.



CYLINDER HEAD ASSY

	Code	Action	Duration
1	001013	Intake manifold - Replacement	
2	001093	Spark plug - Replacement	
3	001126	Head - Replacement	
4	001097	Cooling hood - Replacement	
5	001178	Reed valve assembly - Replacement	
6	001087	Flywheel cover - Replacement	

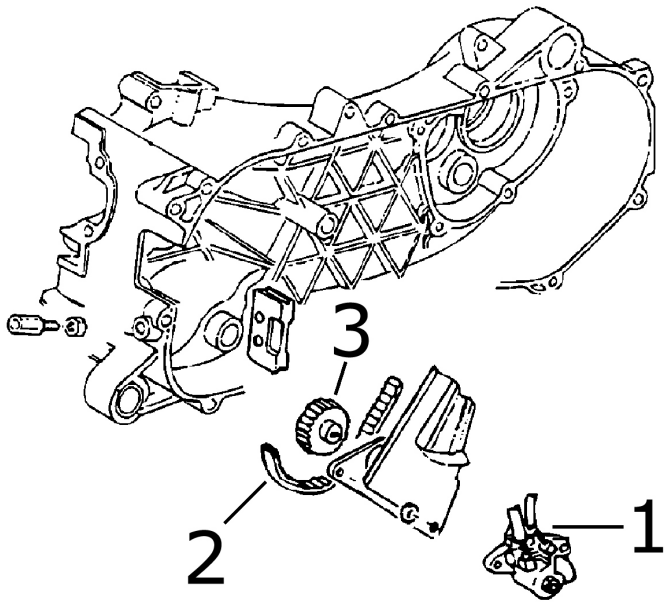
Driven pulley



DRIVEN PULLEY

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

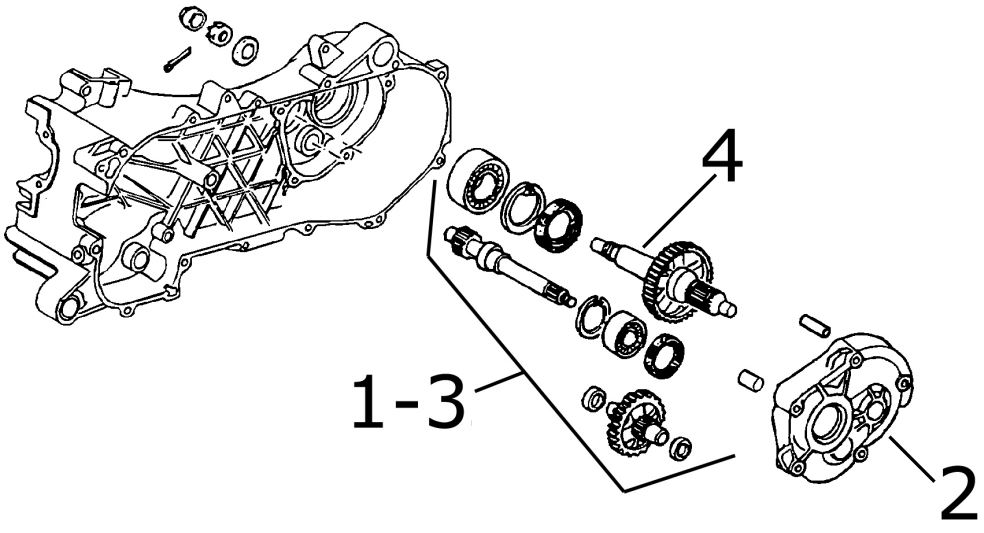
Oil pump



MIX OIL PUMP

	Code	Action	Duration
1	001018	Mixer - Replacement	
2	001019	Mixer belt - Replacement	
3	001028	Mixer drive gear - Replacement	

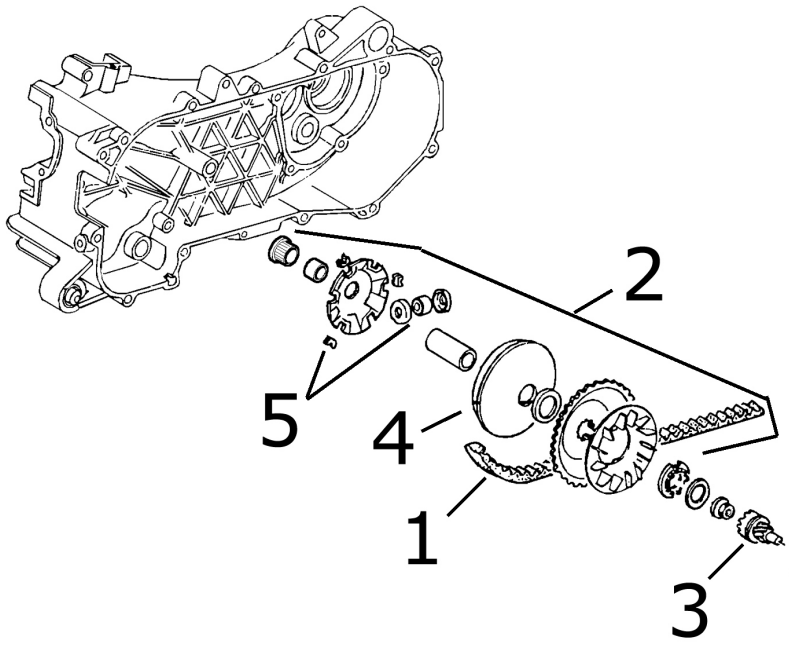
Final gear assy.



FINAL GEAR ASSY

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

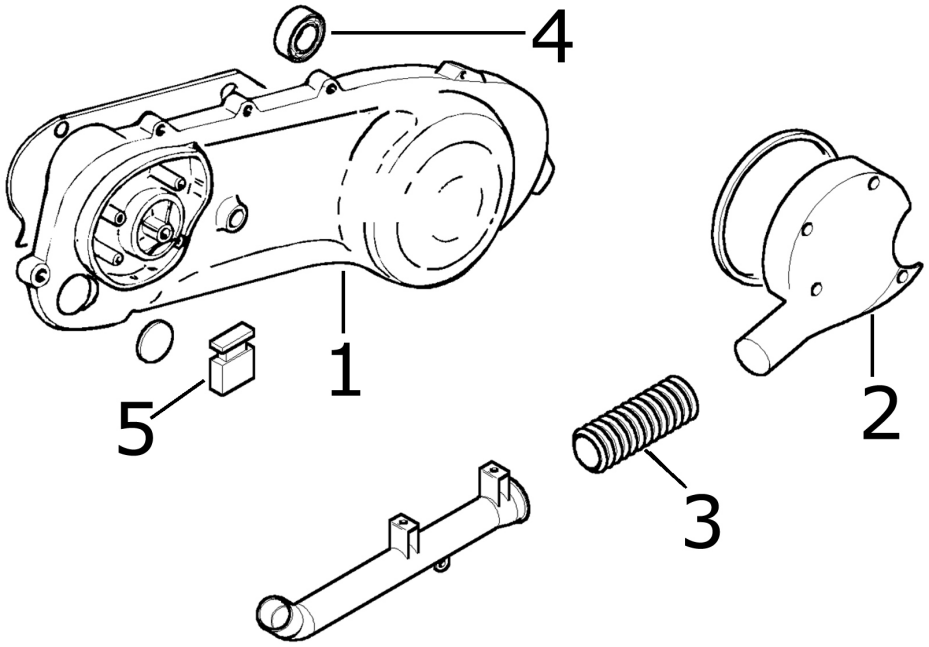
Driving pulley



DRIVING PULLEY

	Code	Action	Duration
1	001011	Driving belt - Replacement	
2	001066	Driving pulley - Removal and re-assembly	
3	001017	Starter pinion - Replacement	
4	001086	Driving half pulley - Replacement	
5	001177	Rollers / Variator track shoes - Replacement	

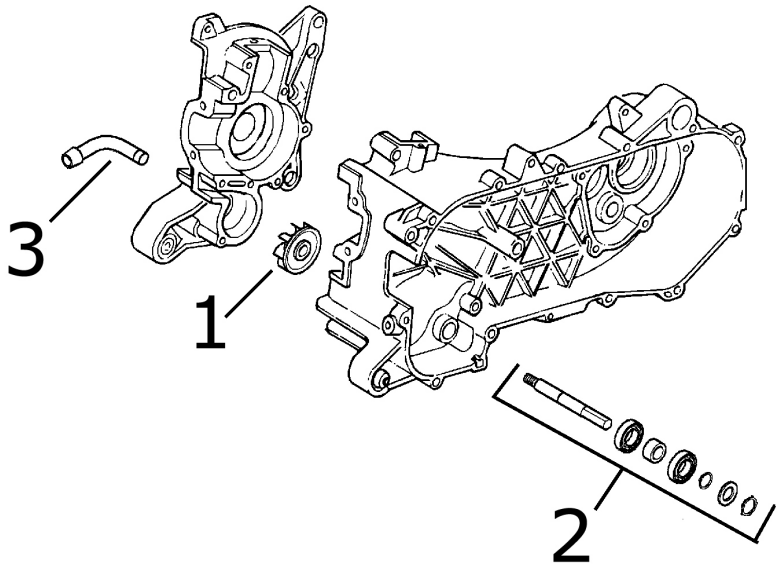
Transmission cover



TRANSMISSION COVER

	Code	Action	Duration
1	001096	Transmission casing cover - Replacement	
2	001131	Transmission air inlet - Replacement	
3	001132	Transmission air intake tube - Replacement	
4	001135	Transmission cover bearing - Replacement	
5	004179	Centre stand buffer - Replacement	

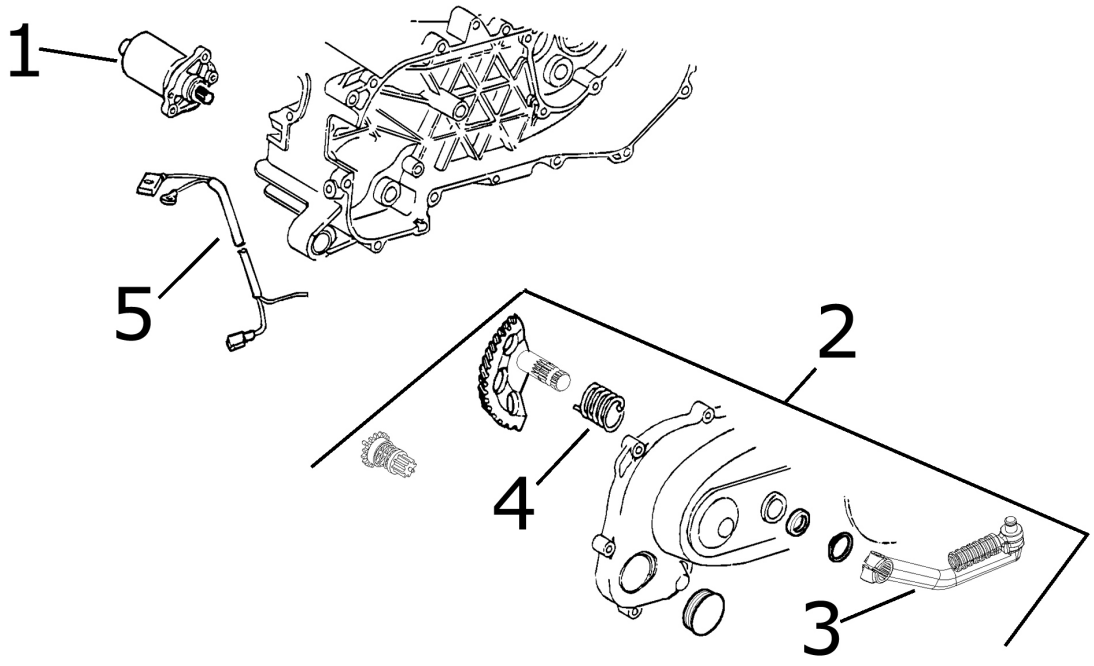
Pompa acqua



WATER PUMP

	Code	Action	Duration
1	001113	Water pump - Replacement	
2	001062	Water pump control shaft - Replacement	
3	007019	Water pump/backflow hose connecting tube - Replacement	

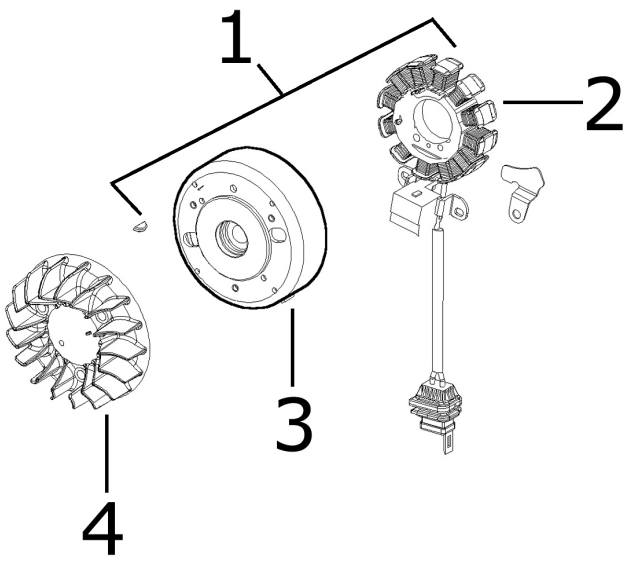
Starter motor



STARTER MOTOR AND KICK STARTER

	Code	Action	Duration
1	001020	Starter engine - Replacement	
2	001021	Kick starter - Overhaul	
3	001084	Starting lever - Replacement	
4	008008	Starting sector spring - Replacement	
5	005045	Starting motor cables - Replacement	

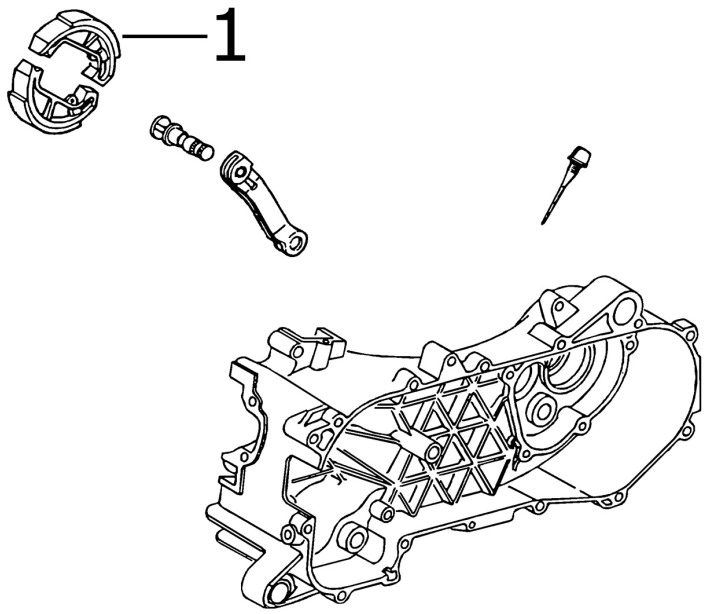
Flywheel magneto



FLYWHEEL MAGNETO

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

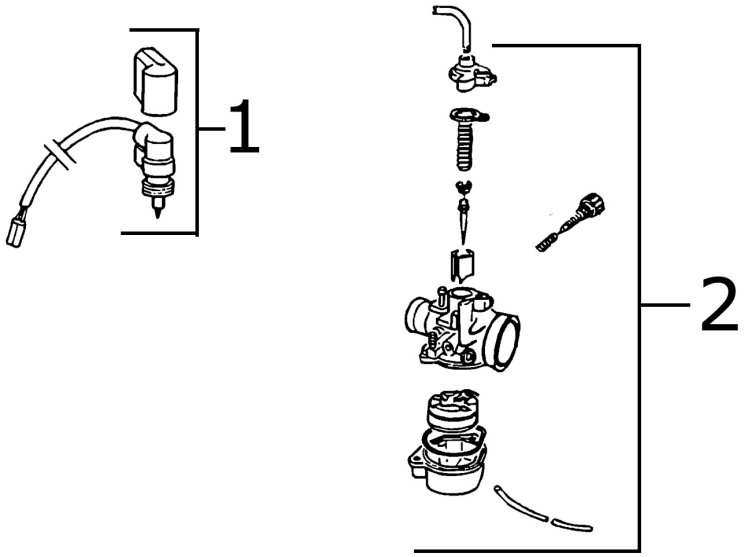
Ganasce freno



BRAKE SHOE

	Code	Action	Duration
1	002002	Rear brake shoe(s) - Replacement	

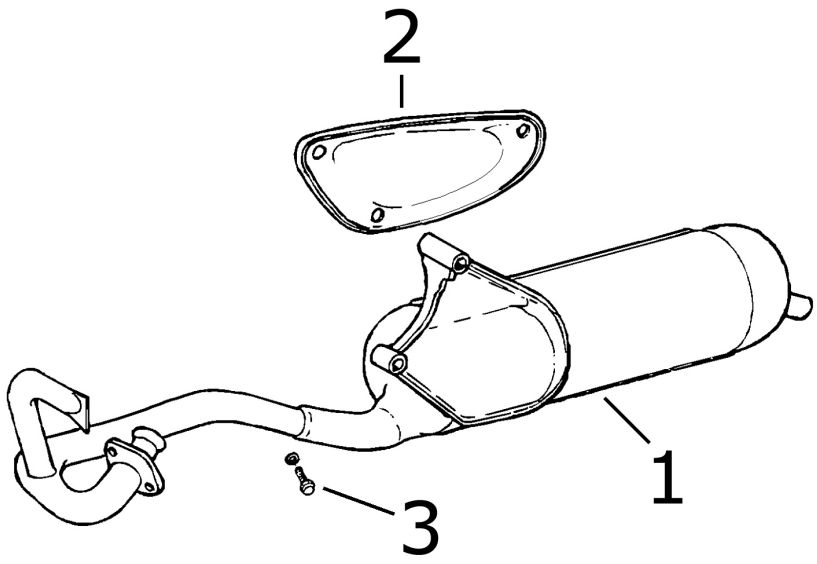
Carburettor



CARBURETTOR, OVERHAUL

	Code	Action	Duration
1	001081	Automatic starter device - Replacement	
2	001008	Carburettor - Overhaul	

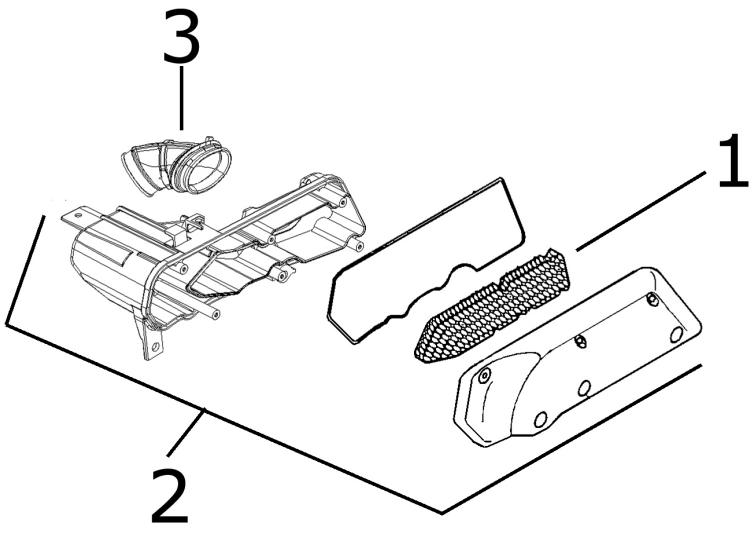
Exhaust pipe



SILENCER

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

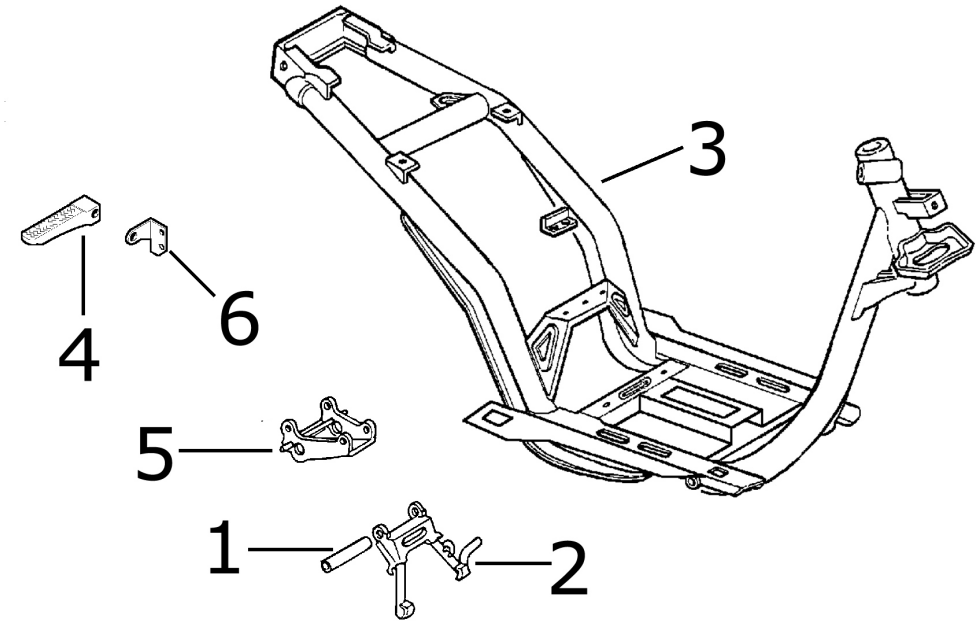
Air cleaner



AIR FILTER

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

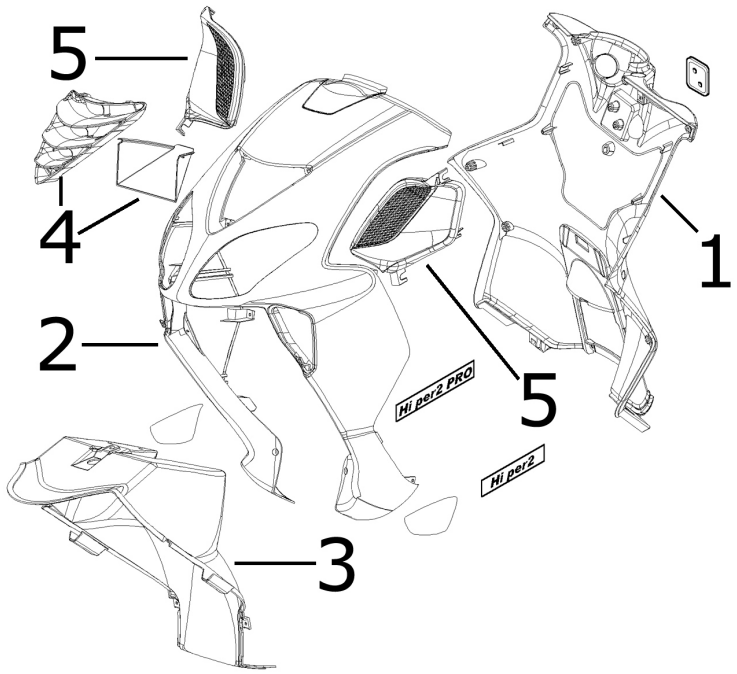
Frame



FRAME

	Code	Action	Duration
1	001053	Centre stand pin - Replacement	
2	004004	Stand - Replacement	
3	004001	Frame - Replacement	
4	004015	Footboards - Replacement	
5	004171	Stand support plate - Replacement	
6	004143	Foot-peg mounting bracket - Replacement	

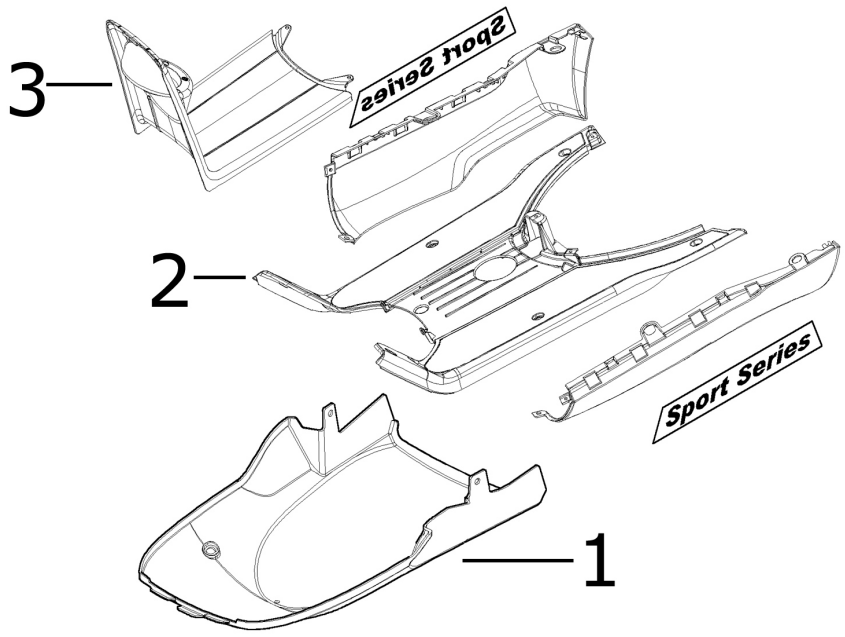
Legshield spoiler



FRONT SHIELD

	Code	Action	Duration
1	004065	Knee-guard - Replacement	
2	004064	Front shield - Replacement	
3	003087	Wheel compartment - Replacement	
4	004167	Radiator grid/cover - Replacement	
5	004176	Cooling vent - Replacement	

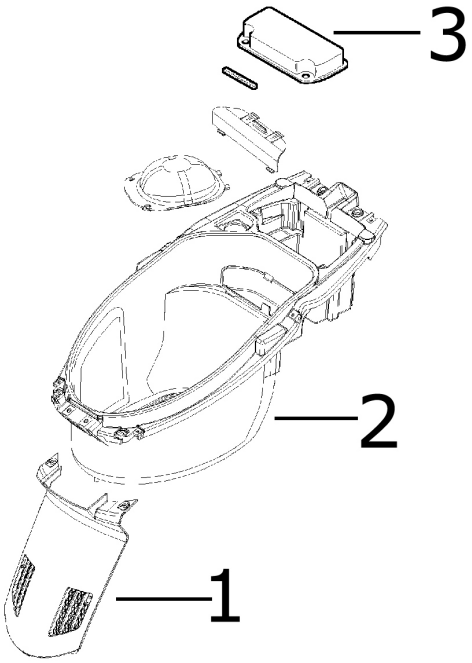
Side fairings



CENTRAL COVER

	Code	Action	Duration
1	004053	Spoiler - Replacement	
2	004178	Footrest - Replacement	
3	004011	Chassis central cover - Replacement	

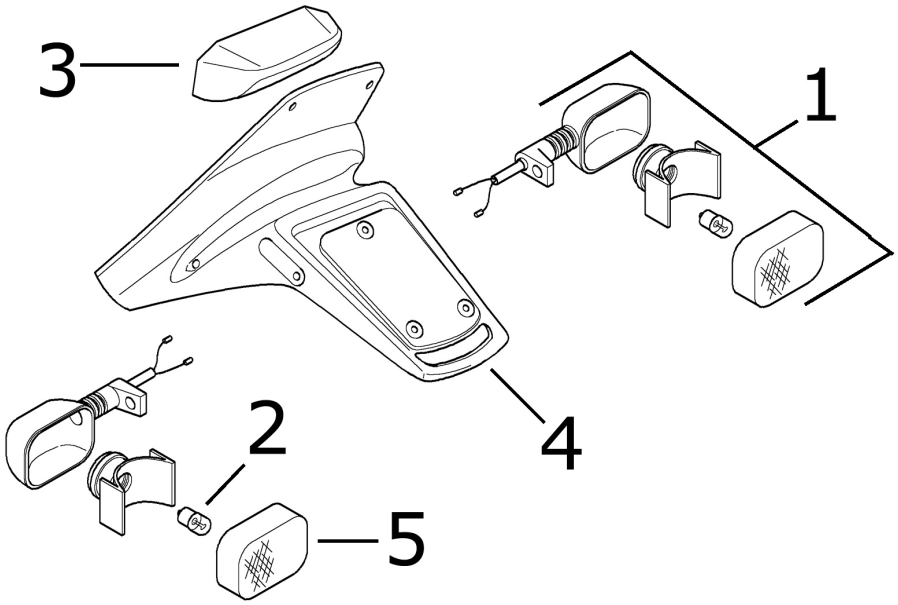
Underseat compartment



HELMET COMPARTMENT

	Code	Action	Duration
1	004059	Spark plug inspection flap - Replacement	
2	004016	Helmet compartment - Replacement	
3	005046	Battery cover - Replacement	

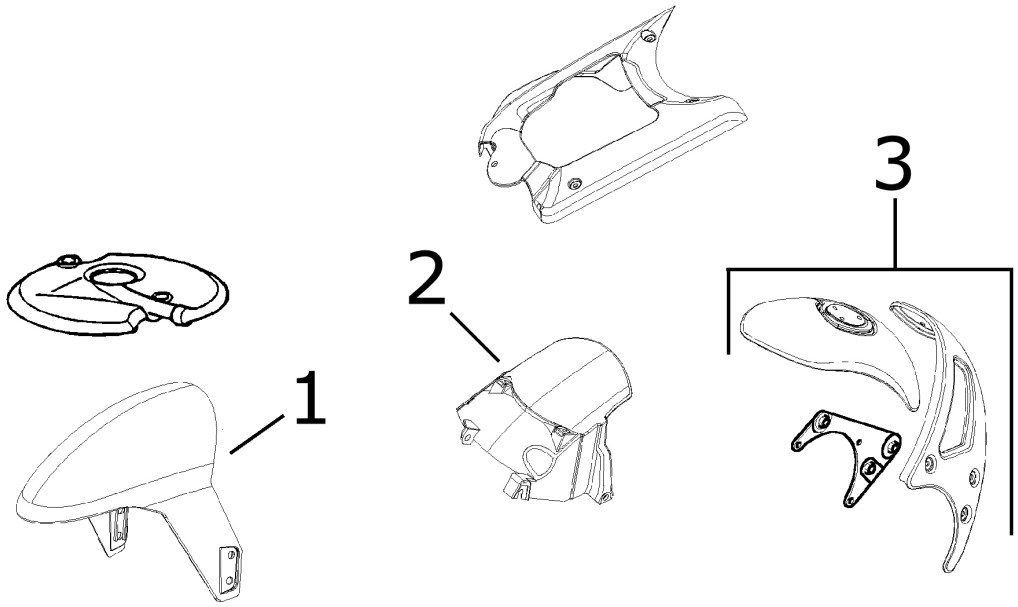
Plate holder



LICENSE PLATE HOLDER

	Code	Action	Duration
1	005022	Rear turn signal light - Replacement	
2	005068	Rear turn indicator bulb - Replacement	
3	005005	Rear light - Replacement	
4	005023	Taillight mounting bracket - Replacement	
5	005091	Direction indicators plastic cover - Replacement	

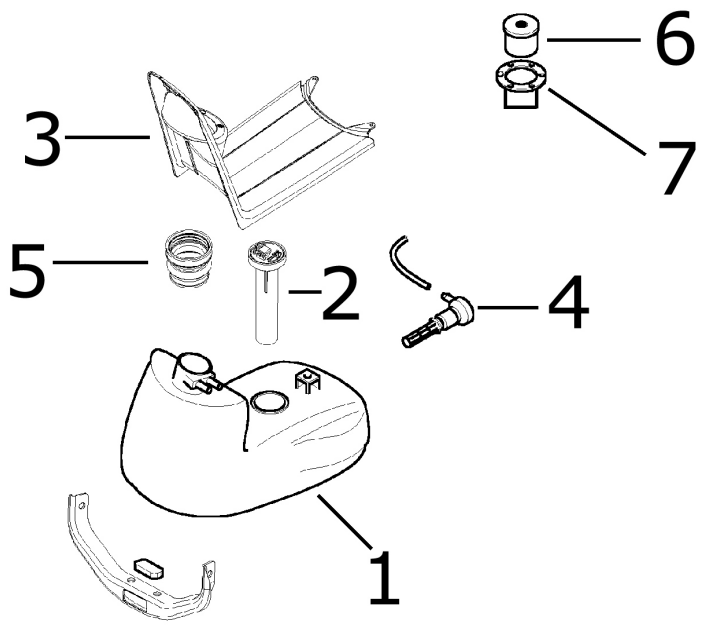
Mudguard



MUDGUARDS

	Code	Action	Duration
1	004009	Rear mudguard - Replacement	
2	004052	Bumper - Replacement	
3	004002	Front mudguard - Replacement	

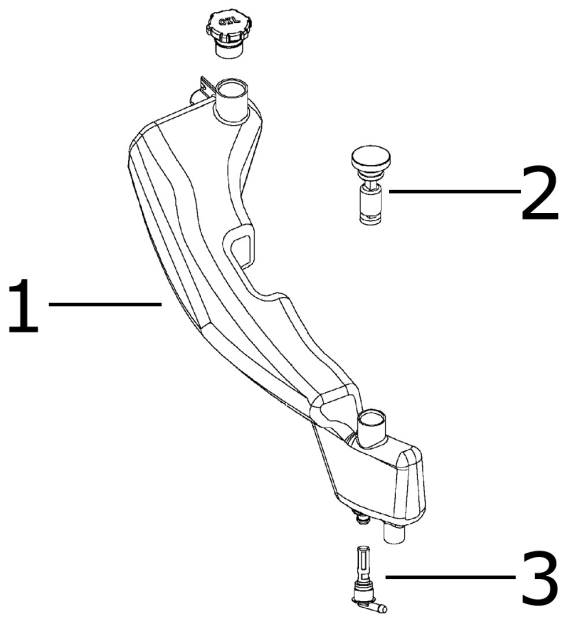
Fuel tank



FUEL TANK

	Code	Action	Duration
1	004005	Fuel tank - Replacement	
2	005010	Tank float - Replacement	
3	004011	Chassis central cover - Replacement	
4	004072	Fuel filter - Replacement	
5	004110	Fuel tank hose - Replacement	
6	004168	Fuel filler cap - Replacement	
7	004170	Tank filler - Replacement	

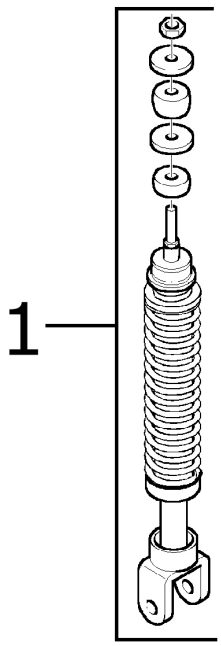
Tank oil



OIL TANK

	Code	Action	Duration
1	004017	Oil tank - Replacement	
2	005018	Oil tank float - Replacement	
3	004095	Oil tank tap - Replacement	

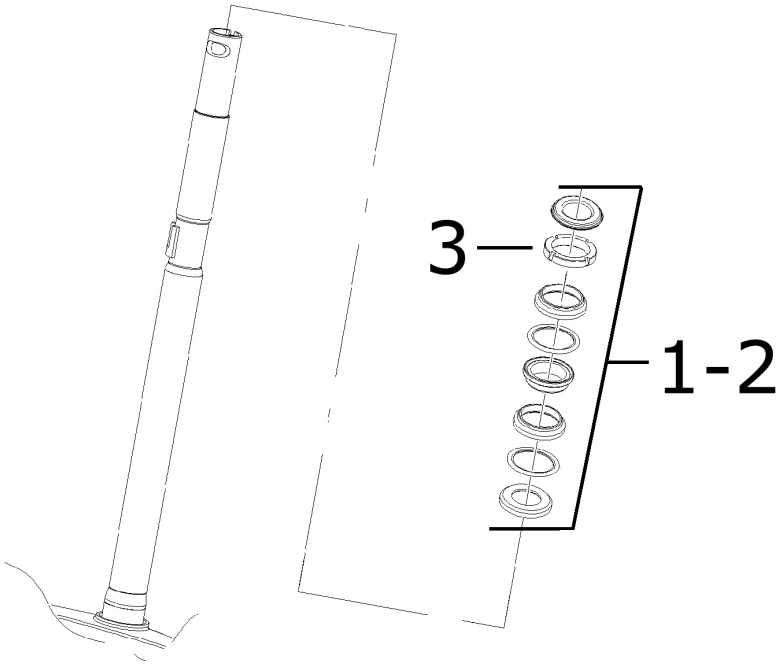
Rear shock-absorber



REAR SHOCK-ABSORBER

	Code	Action	Duration
1	003007	Rear shock absorbers - Replacement	

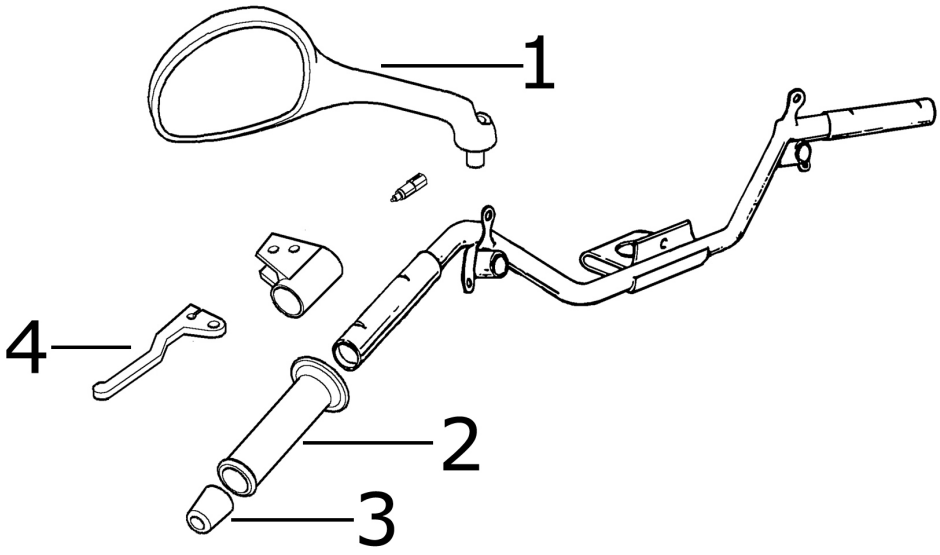
Steering column bearings



STEERING COLUMN BEARINGS

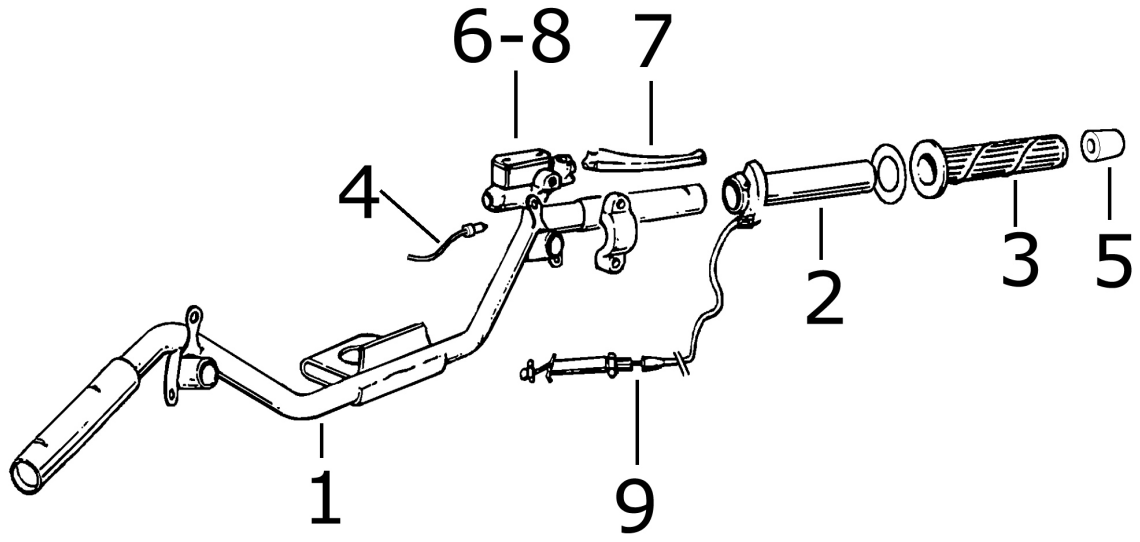
	Code	Action	Duration
1	003002	Steering fifth wheels - Replacement	
2	003073	Steering play - Adjustment	
3	004119	Bearing / Upper steering bearing - Replacement	

Handlebar components



LHS HANDLEBAR COMPONENTS

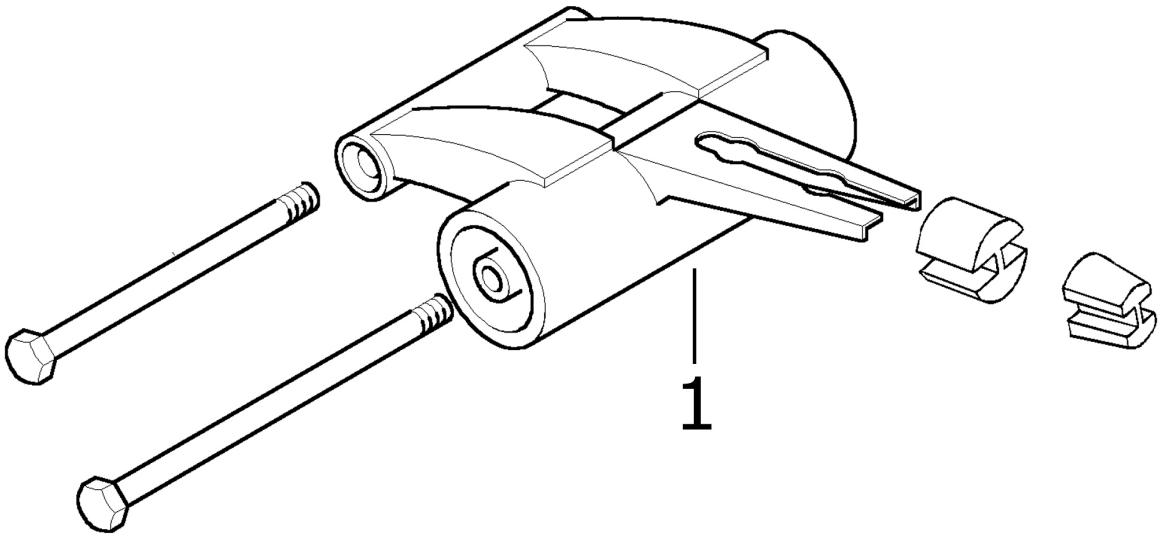
	Code	Action	Duration
1	004066	Rearview mirrors - Replacement	
2	002071	Left knob - Replacement	
3	003059	Balance weight - Replacement	
4	002037	Complete gas control - Replacement	



HANDLEBAR COMPONENTS

	Code	Action	Duration
1	003001	Handlebar - Removal and refitting	
2	002060	Complete gas control - Replacement	
3	002059	Right knob - Replacement	
4	005017	Stop light switch - Replacement	
5	003059	Balance weight - Replacement	
6	002024	Front brake pump - Replacement	
7	002037	Complete gas control - Replacement	
8	002047	Front brake liquid and circuit bleeding - Replacement	
9	003061	Throttle cable - Adjustment	

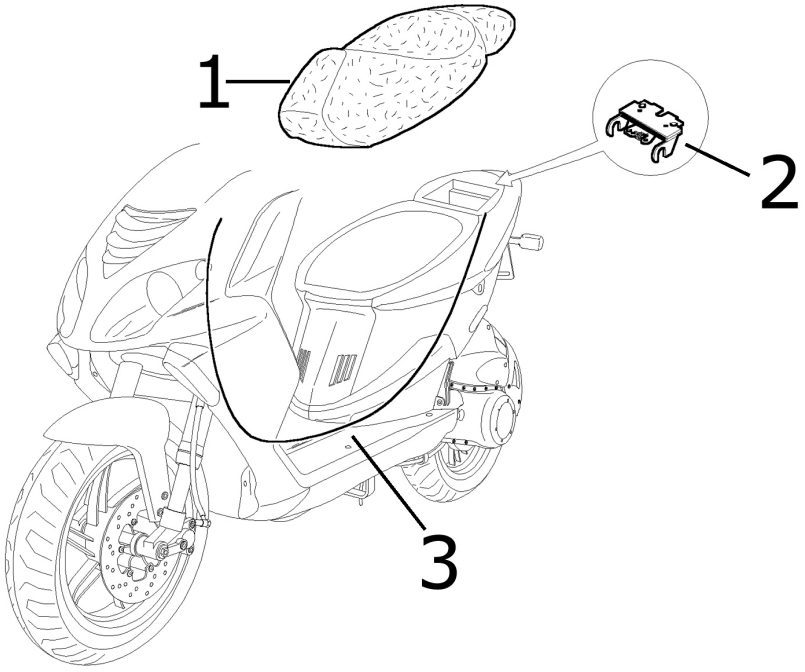
Swing-arm



SWING-ARM

	Code	Action	Duration
1	001072	Engine/chassis fixing oscillating arm - Replacement	

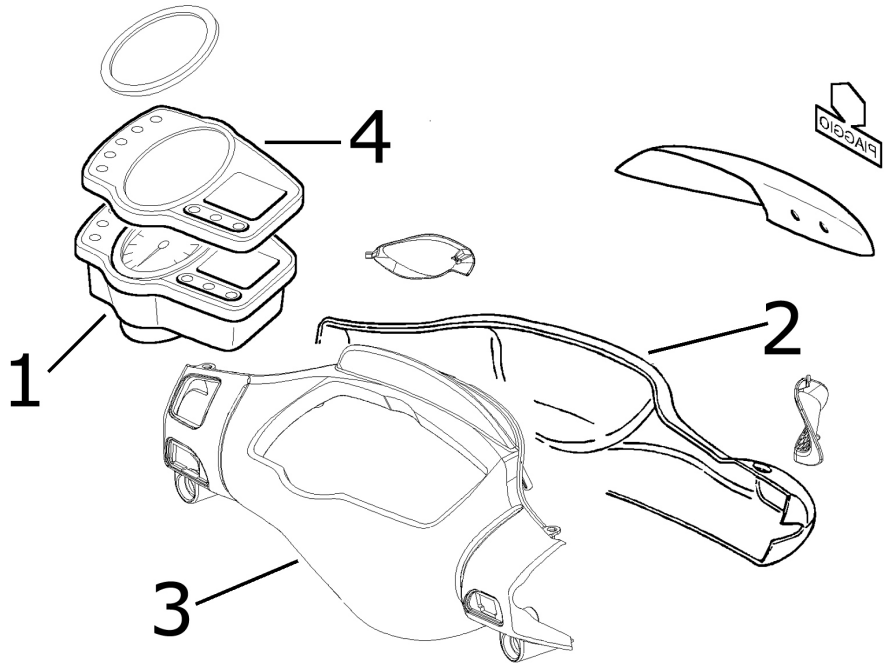
Seat



SADDLE

	Code	Action	Duration
1	004003	Saddle - Replacement	
2	004054	Seat lock hook - Replacement	
3	002083	Seat opening cable - Replacement	

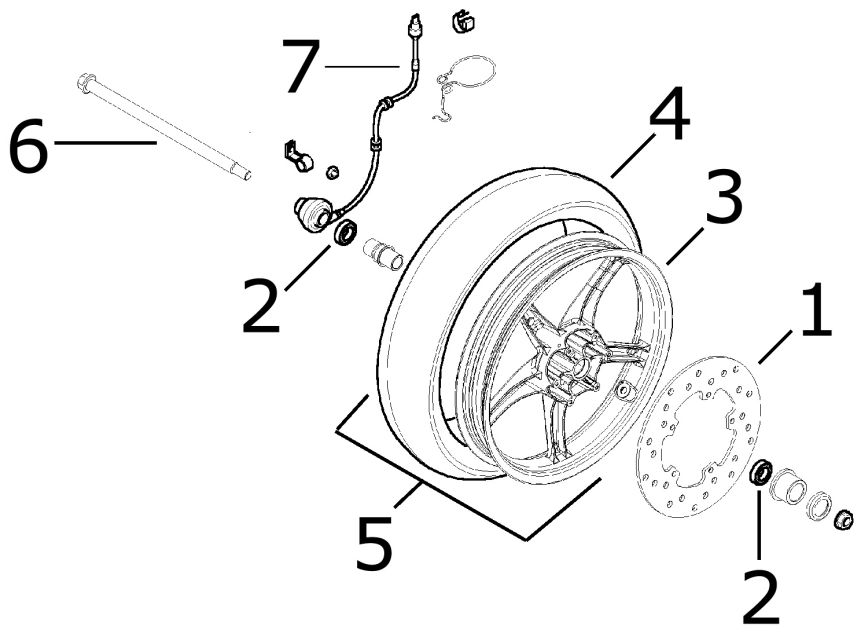
Instrument panel



DASHBOARD AND HANDLEBAR COVERS

	Code	Action	Duration
1	005014	Odometer - Replacement	
2	004018	Handlebar front section - Replacement	
3	004019	Handlebar rear part - Replacement	
4	005078	Odometer plastic cover - Replacement	

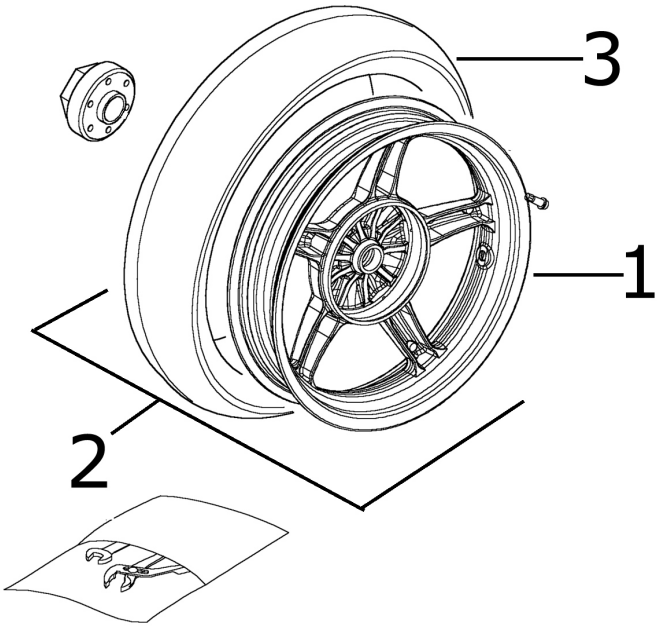
Front wheel



FRONT WHEEL

	Code	Action	Duration
1	002041	Brake disc - Replacement	
2	003040	Front wheel bearings - Replacement	
3	003037	Front wheel rim - Replacement	
4	003047	Front tyre - Replacement	
5	004123	Front wheel - Replacement	
6	003038	Front wheel axle - Replacement	
7	005089	Fifth wheel - Replacement	

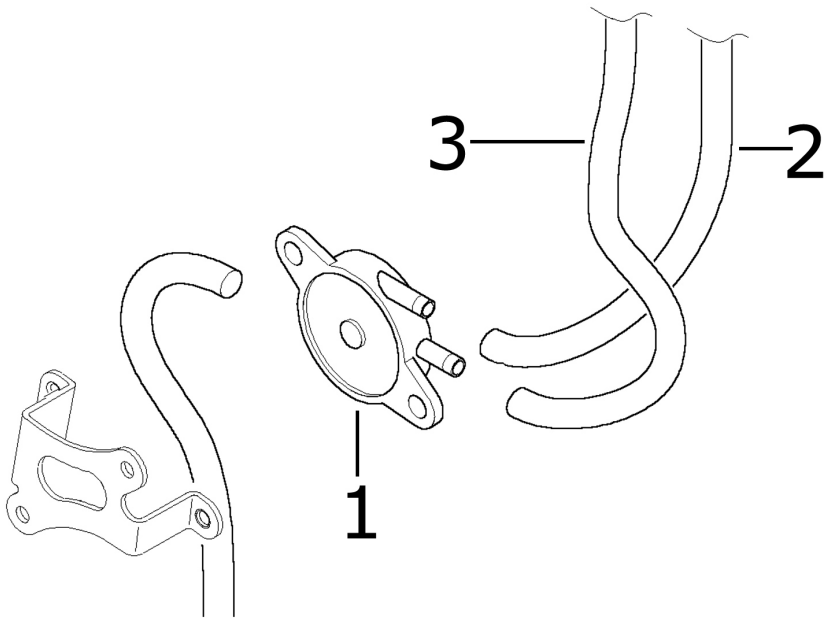
Rear wheel



REAR WHEEL

	Code	Action	Duration
1	001071	Rear wheel rim - Replacement	
2	001016	Rear wheel - Replacement	
3	004126	Rear tyre - Replacement	

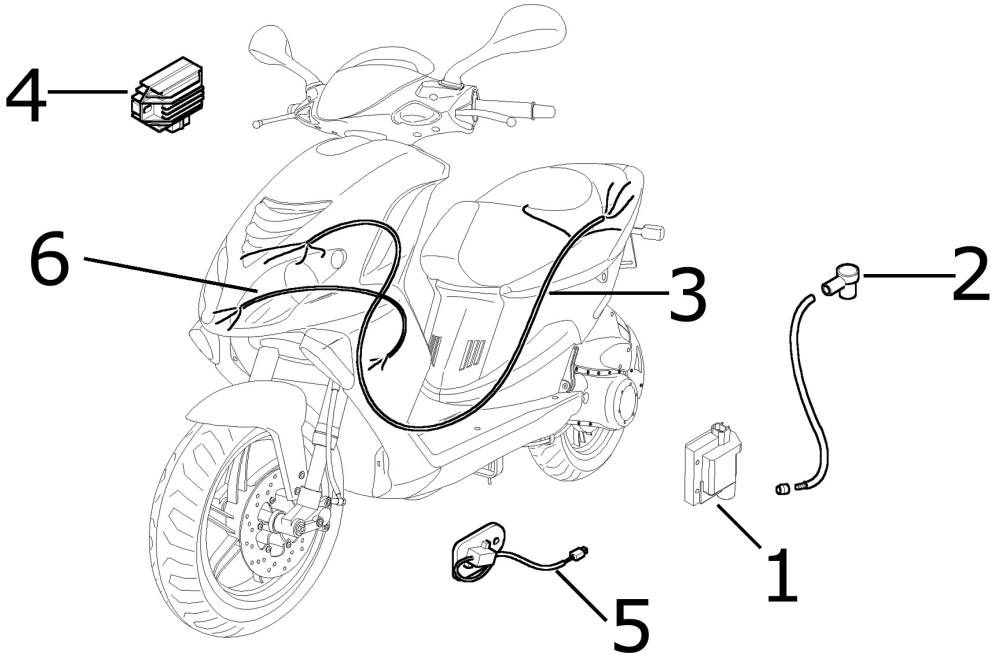
Fuel pump



FUEL PUMP

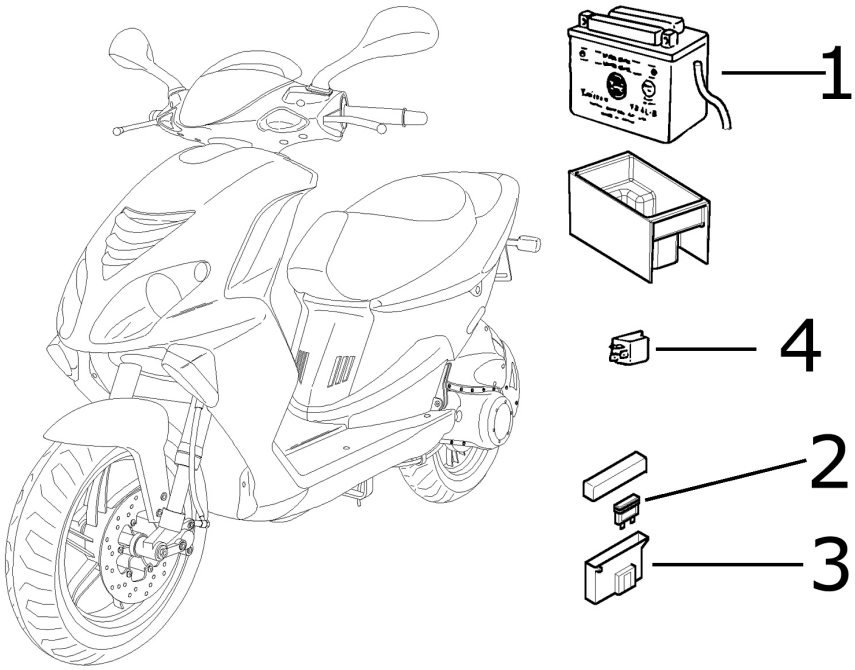
	Code	Action	Duration
1	004073	Fuel pump - Replacement	
2	004137	Fuel pump/carburettor tube - Replacement	
3	004086	Fuel pump vacuum tube - Replacement	

Electric devices



ELECTRIC CIRCUIT

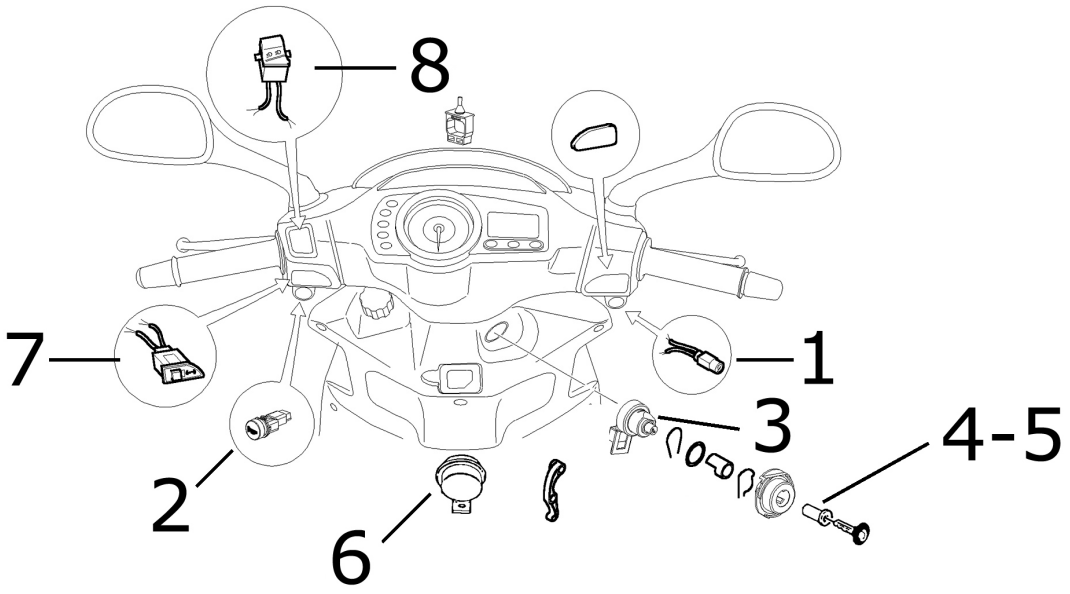
	Code	Action	Duration
1	001023	Controller - Replacement	
2	001094	Spark plug cap - Replacement	
3	005001	Electric circuit - Replacement	
4	005009	Voltage regulator - Replacement	
5	005136	Resistor - Replacement	
6	005044	Cable harness - Replacement	



BATTERY

	Code	Action	Duration
1	005007	Battery - Replacement	
2	005024	Battery fuse - Replacement	
3	005025	Fuse holder - Replacement	
4	005011	Start-up remote control switch - Replacement	

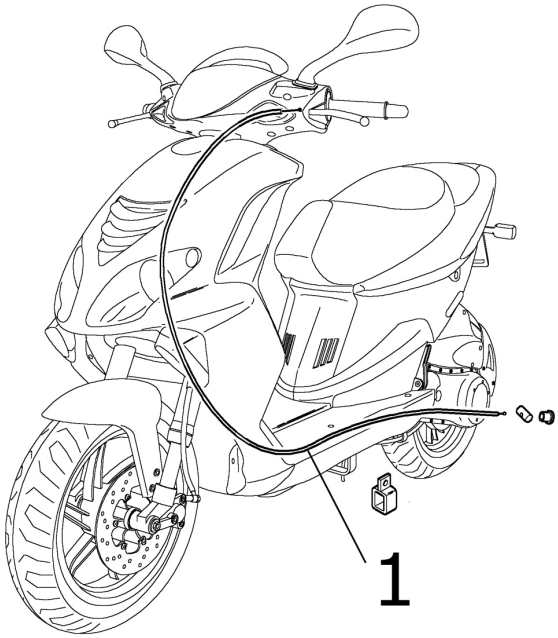
Electronic controls



COMANDI ELETTRICI

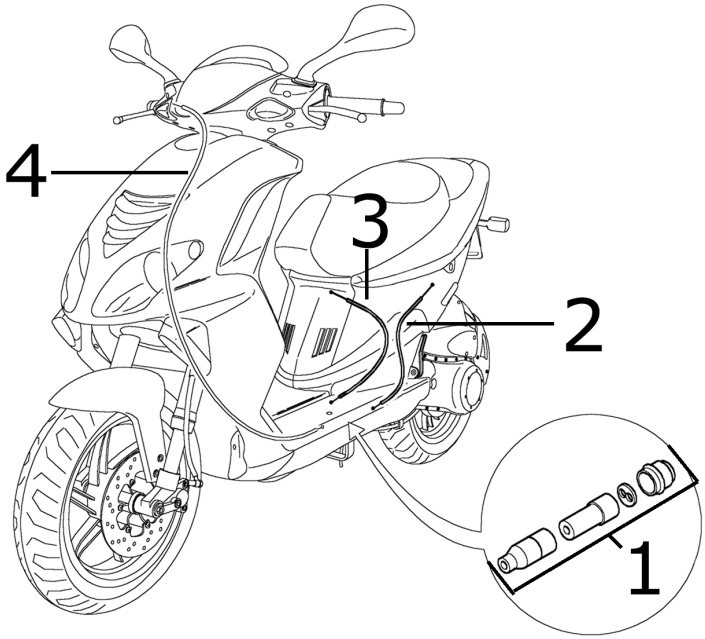
	Code	Action	Duration
1	005041	Starter button - Replacement	
2	005040	Horn button - Replacement	
3	005016	Key switch - Replacement	
4	004096	Locks series - Replacement	
5	004010	Lock - Replacement	
6	005003	Electric horn - Replacement	
7	005006	Lights or flashlights switch - Replacement	
8	005039	Light switch - Replacement	

Transmissions



REAR BRAKE TRANSMISSIONS AND ODOMETER

	Code	Action	Duration
1	002053	Rear brake transmissions assembly - Replacement	

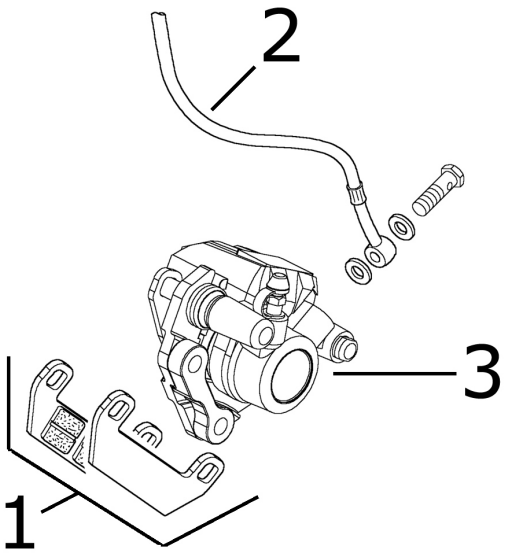


SPLITTER

	Code	Action	Duration
1	002012	Splitter - Replacement	

	Code	Action	Duration
2	002058	Mixer splitter cable assembly - Replacement	
3	002057	Splitter-carburettor cable assembly - Replacement	
4	002054	Throttle or splitter cable assembly - Replacement	

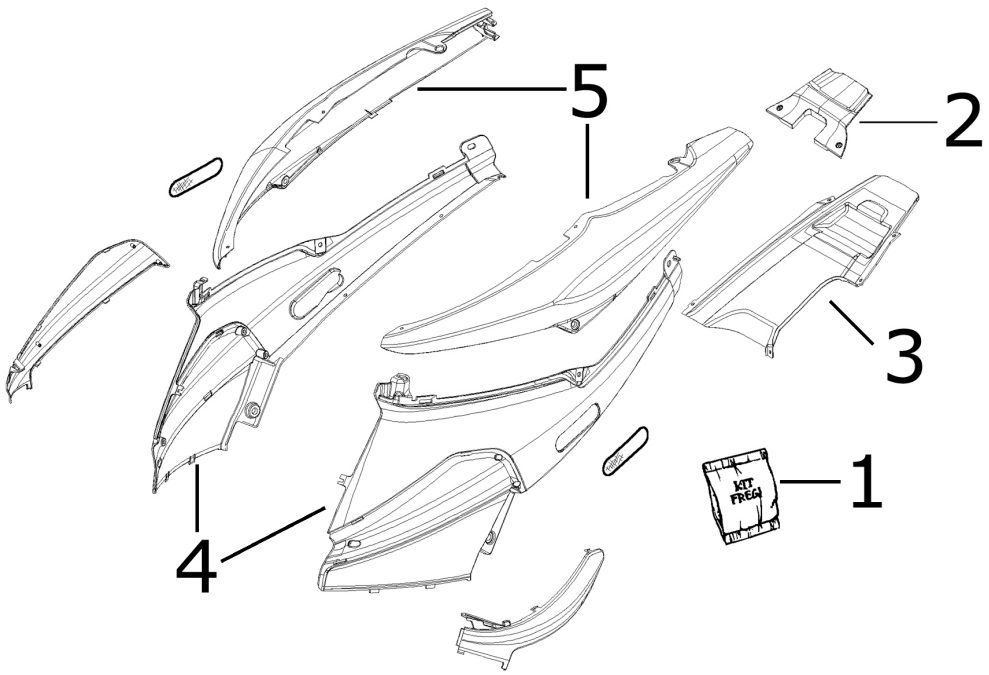
Brake callipers



FRONT CALLIPER

	Code	Action	Duration
1	002007	Front brake pads - replacement	
2	002021	Front brake line - Removal and refitting	
3	002039	Brake caliper - Removal and refitting	

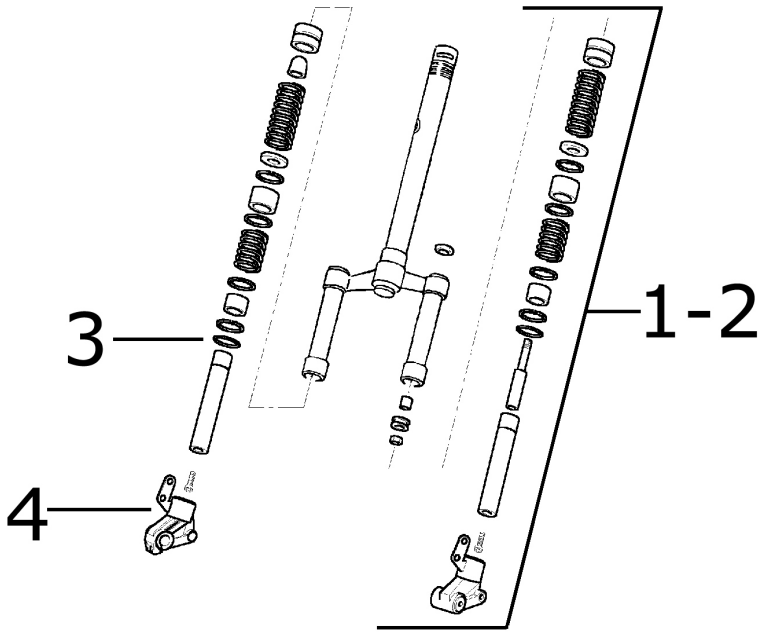
Rear side fairings



REAR SIDE FAIRINGS

	Code	Action	Duration
1	004159	Stickers - Replacement	
2	004056	Rear headlight top cover - Replacement	
3	004036	Bottom chassis cover - Replacement	
4	004085	Side panel (1) - Replacement	
5	004129	Rear side - Replacement	

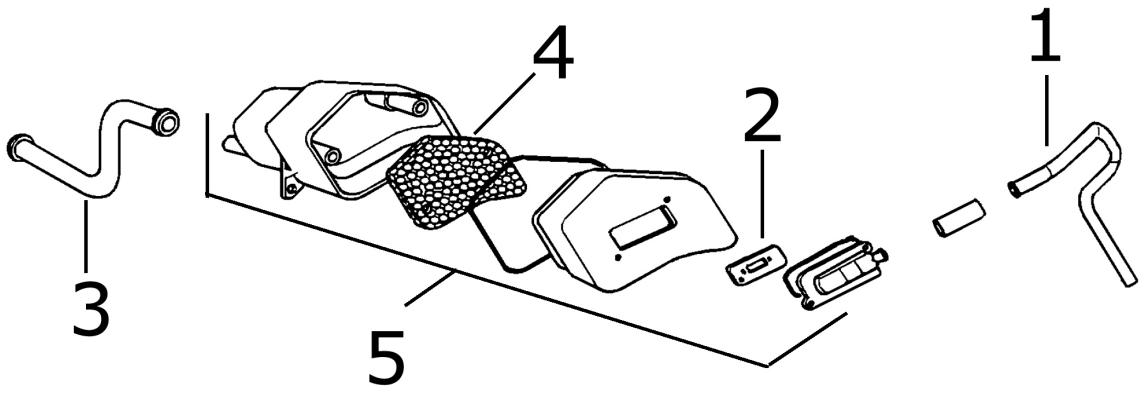
Front suspension



FORK

	Code	Action	Duration
1	003010	Front suspension - Overhaul	
2	003051	Fork assembly - Replacement	
3	003048	Fork oil seal - Replacement	
4	003041	Stanchion shoe - Replacement	

Secondary air box



SISTEMA ARIA SECONDARIA

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