Characteristics

ENGINE

Specifications	Description
Type	single cylinder, 2-stroke
Cylinders	1
Bore	40 mm
Stroke	39.3 mm
Displacement	49.4 cm^3
Compression ratio	10.3
Carburetor Weber	12 OM
Idle speed	1800 ±100 rpm
Air filter	Sponge media impregnated with 50% oil/fuel mixture (use SELENIA HI Scooter 2T oil).
Starter system	Starter motor / kick-start.
Lubrication	mixer oil
Fuel system	With fuel-oil mixture by me-ans of carburetor, automatic fuel/oil mixer (with variable flow rate according to engine speed and throttle opening) and vacuum tap.
Fuel intake	Reed valve on crankcase
Max. power (crankshaft)	3.1 Kw
Max. torque (crankshaft)	4.8 N·m
Cooling	forced air
Carburetor	
Type Weber	12 OM
Venturi diffuser	12
Idle jet	76
Max air jet	100/100
Min jet	34 L
Min air jet	225/100
Emulsion jet (code)	G4
Needle jet (code)	V
Needle position - notches from top	2
Throttle valve (code)	45
Starter jet	50
Booster orifices	50/100
Carburetor level from bowl plane	3.5
Min. air adj. screw open (turns)*	$2\ ^{1/2}$ - $3\ ^{1/2}$
Idle speed orifice	55/100
* Adjustment depends on the CO% value at idle speed.	

TRASMISSION

Specifications	Description
Transmission	Automatic speed variation system by means of variable diameter pulleys, vee belt, centrifugal clutch and gear final drive.

CAPACITIES

Specifications	Description
Fuel tank (including ~ 1.5 l reserve)	~ 8.6 l
Oil mixer tank (including ~ 0.400 l reserve)	~ 1.35 l (recommended oil: SELENIA HI Scooter 2T)
Rear hub	~ 75 cc. (recommended oil:TUTELA ZC 90)

ELECTRICALCOMPONENTS

Specifications	Description
Ignition type	Electronic capacitive discharge system with incorporated HT coil.
Ignition advance (before T.D.C.)	17°±1 fixed
Spark plug	CHAMPION N2C
Battery	12V-4Ah
Fuse	7.5A
Generator	AC current

FRAME

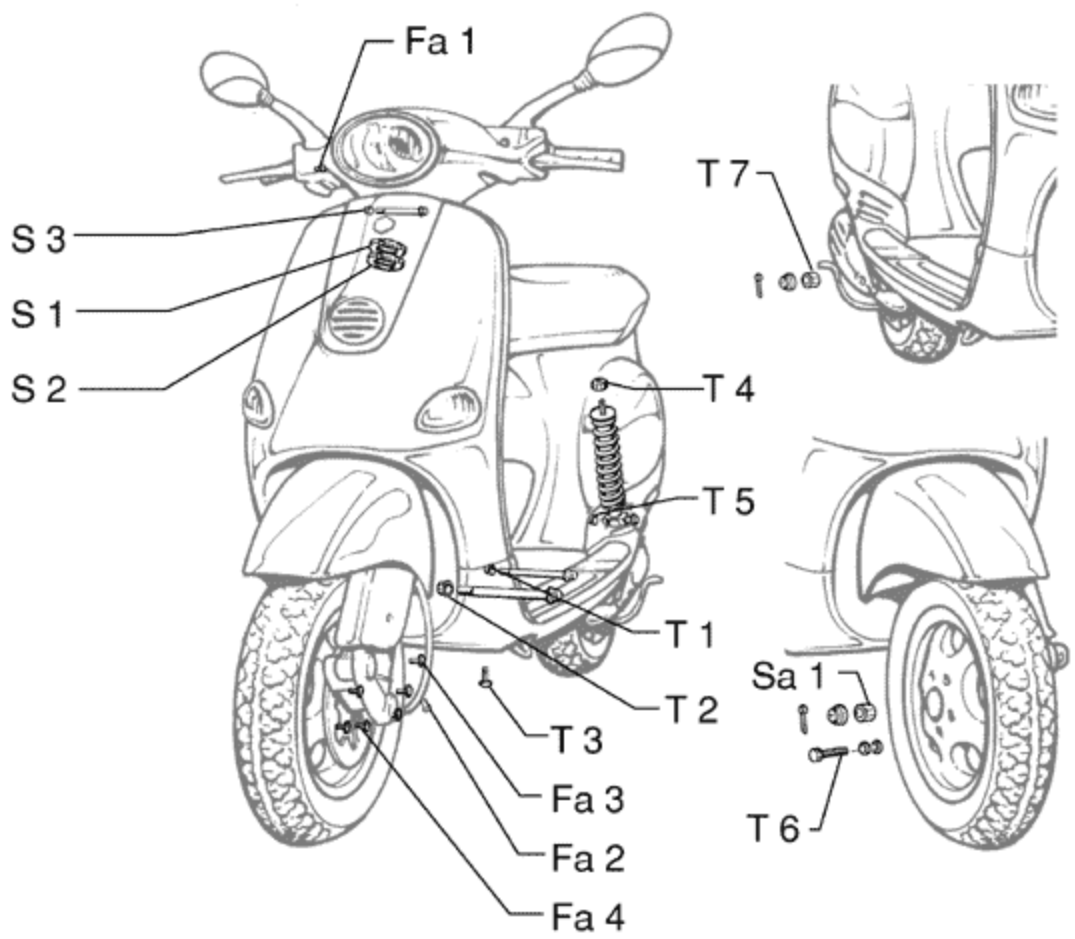
Specifications	Description
Type	Structural frame in pressed sheet steel

Front suspension	Steering tube with single fork arm and double acting hydraulic shock absorber with coil spring
Front shock absorber stroke	70 mm
Trail	71/68 (suspension unloaded/loaded)
Rear suspension	With swing arm and single chamber double acting hydraulic shock absorber with coil spring
Rear wheel excursion	80 mm
Front brake	Disc brake (diameter 200 mm) with hydraulic linkage (r.h brake lever)
Rear brake	Drum brake (diameter 110 mm) with mechanical linkage (l.h. brake lever)
Front tyre	100/80-10"
Rear tyre	120/70-10"
Tyre pressure	Tyre pressure:1.3 bar / Rear:1.8 bar.
Wheels.	Aluminium alloy; front 2.50 x 10"; rear 3.00 x 10".
Note: check and adjust tyre pressure with tyres at ambient temperature. Adjust pressure according to the weight of the rider and accessories.	

Tightening torques

	PART	Q.ty	Tightening torque N·m	LINK
S	**Steering assembly**			
S1	Steering collar locknut	1	30 - 40	[0724] Blocking nut
S2	Lower steering collar	1	50 - 60 (slacken through ~ 120°)	[0723] Location of upper bearing
S3	Handlebar clamp	1	45 - 50	[0701] Removal of handlebar [0907] Handlebar
T	**Frame assembly**			
T1	Engine swinging arm pivot pin	1	33 - 41	[0604] Refitting engine
T2	Swinging arm-frame pivot pin	1	44 - 52	
T3	Swinging arm-frame screw	1	33 - 41	
T4	Frame-shock absorber nut	1	20 - 25	

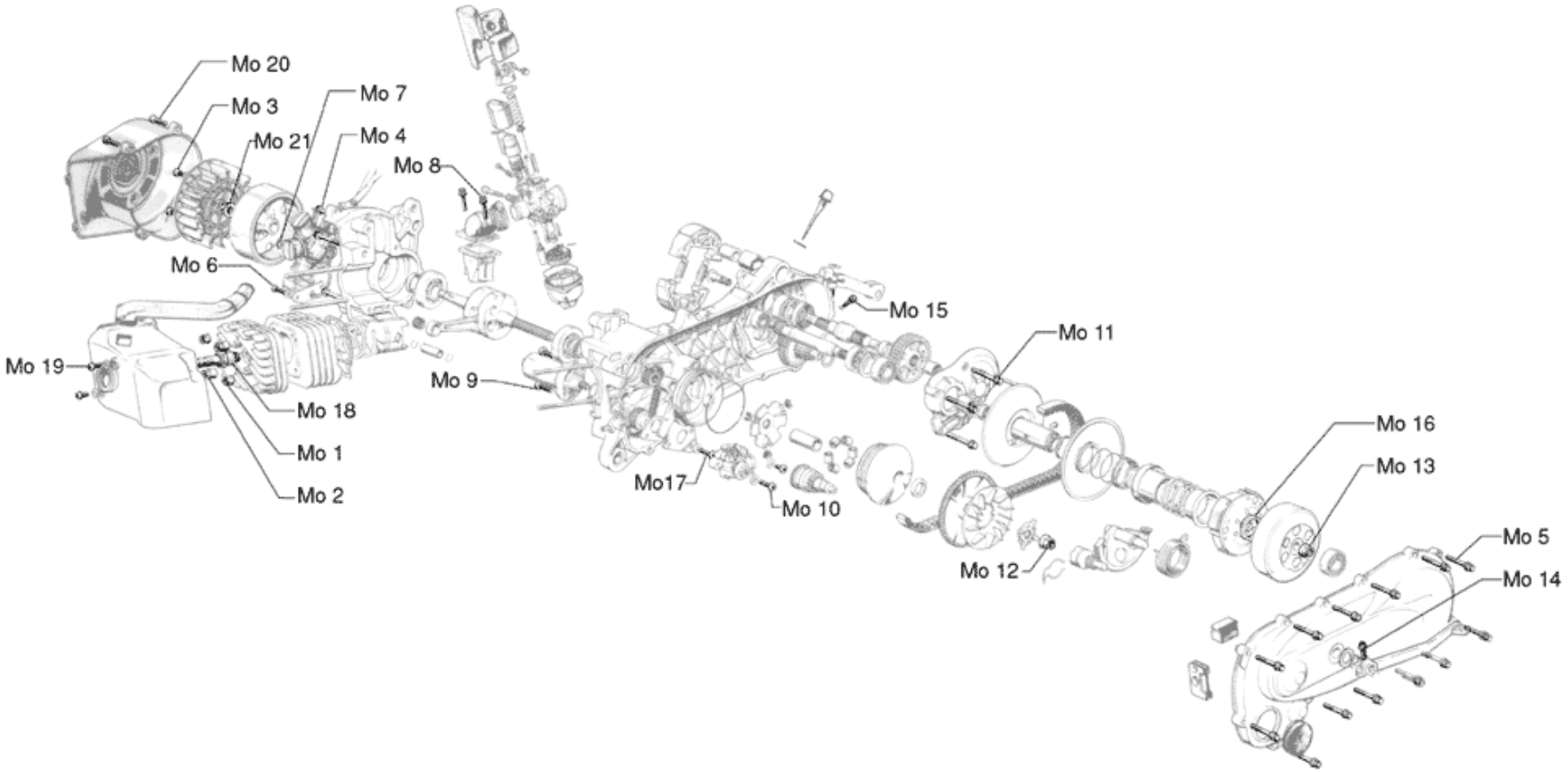
T5	Engine-shock absorber nut	1	33 - 41	[0604] Refitting engine
T6	Front wheel screws	5	16 - 26	[0702] Removal of front tire
T7	Rear wheel nut	1	137 - 152	[0813] Fitting of rear tire
SA	**Front suspension**			
Sa1	Front wheel spindle nut	1	75 - 90	[0707] Fitting hub
Fa	**Front brake**			
Fa1	Brake master cylinder-tube union	1	8 - 12	
Fa2	Brake tube-calliper union	1	15 - 25	[0808] Refitting caliper
Fa3	Calliper to support fixing screw	2	20 - 25	[0706] Fitting caliper support [0808] Refitting caliper
Fa4	Brake disc screw	5	5 - 6,5	[0806] Replacement of brake disk
	Bleed screw (on calliper)	1	10 - 12	[0809] Loading oil drainage
	Brake master cylinder to handlebars	1	7 - 10	
Note: To ensure correct tightening torque, lubricate nuts before assembly.				



Tightening torque

	PART	Q.ty	Tightening torque N·m	LINK
M	**Engine assembly**			
Mo1	Cylinder head nut	2	10 - 11	[12020307] Elastic rings
Mo2	Cylinder head nut	2	10 - 11	[12020307] Elastic rings
Mo3	Fan fixing screw	3	3 - 4	
Mo4	Crankcase assembly screw	8	12 - 13	[12020243] Oil sump coupling [12020407] Halfcase closure
Mo5	Transmission case assembly screw	13	12 - 13	

Mo6	Pick-up screw	2	4 - 5	
Mo7	Stator screw	3	3 - 4	
Mo8	Intake manifold screw	2	8 - 9	
Mo9	Starter motor screw	2	12 - 13	
Mo10	Fuel/oil mixer screw	2	3 - 4	
Mo11	Rear hub cover screw	5	12 - 13	
Mo12	Driving pulley screw	1	40 - 44*	[12020231] Fan
Mo13	Driven pulley screw	1	40 - 44*	
Mo14	Kick-start lever screw	1	12 - 13	[12020244] Replacement starting lever
Mo15	Rear hub oil drain screw	1	3 - 5	
Mo16	Clutch nut	1	55 - 60	[12020224] Fitting clutch [12020228] Clutch bell
Mo17	Mixer plate screw	1	3 - 4	
Mo18	Spark plug	1	25 - 30	[0308] Spark-plug
Mo19	Cylinder cooling jacket screw	2	3,5 - 5	
Mo20	Flywheel housing screw	4	1 - 2	
Mo21	Flywheel fixing nut	1	40 - 44*	[12020106] Pick up stator
	Exhaust manifold-cylinder nut	2	9 - 11	
	Exhaust manifold-silencer nut	2	11 - 13	[0810] Removal of muffler
	silencer-engine screw	2	24 - 27	[0810] Removal of muffler
* Use new nuts				

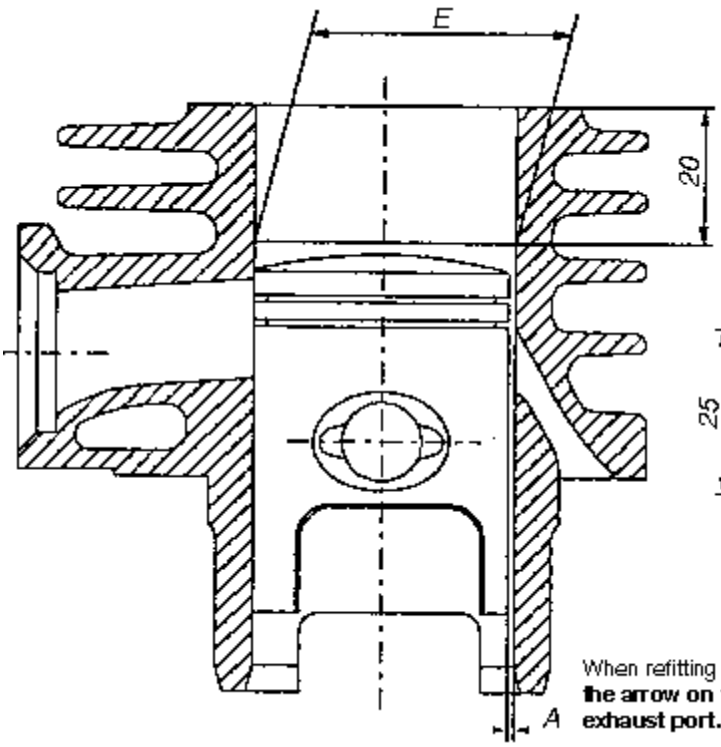

Mo 20
Mo 3
Mo 21
Mo 7
Mo 4
Mo 8
Mo 6
Mo 19
Mo 18
Mo 1
Mo 2
Mo 9
Mo 15
Mo 11
Mo17
Mo 10
Mo 12
Mo 16
Mo 13
Mo 5
Mo 14

Standard tightening torques

Ø 8.8 steel screw	On plastic with metal spacers	On brass, copper, aluminium and related alloys	Iron, steel
M4	2	2	3
M5	4	4	6
M6	6.5	6.5	10.5
M7		10.5	17
M8		16	26
M10			52
M12			100
M14			145

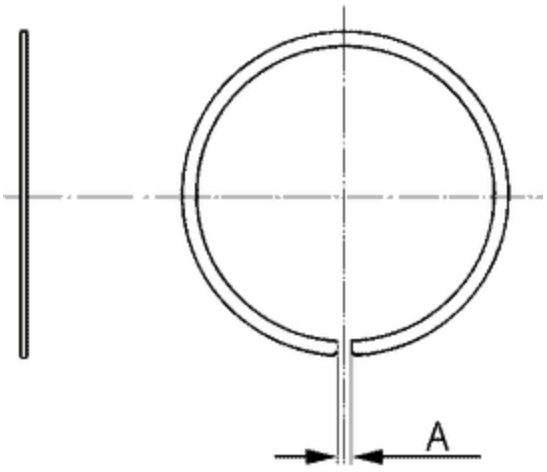
CYLINDER-PISTON MATCH					
DESIGNATION	DIMENSIONS	COUPLING CATEGORIES			assembly clearance
		Code	Cylinder	Piston	
Cylinder	E ø 40 ± 0.010	A	39.995	39.940	0.050 - 0.060
		B	40.000	39.945	
		C	40.005	39.950	
Piston	C ø 39.95 ± 0.010	D	40.010	39.955	
		E	40.015	39.960	
1st over. cylinder	E ø 40.2 $^{+0.015}_{-0.005}$				
1st over. piston	C ø 40.15 ± 0.010				
2st over. cylinder	E ø 40.4 $^{+0.015}_{-0.005}$				
2st over. piston	C ø 40.35 ± 0.010				

The pistons and cylinders supplied byPiaggio as spare parts are marked with letters. If both the piston and cylinderare renewed, be sure to match parts that are marked with the same letter. Ifyou are fitting an oversize cylinder, dimension "E" must exceed dimension "C"of the piston (marked on the piston) by the "Assembly clearance" valueindicated for all vehicles.



When refitting the piston in the cylinder ensure **that the arrow on the piston crown is facing the cylinder exhaust port.**

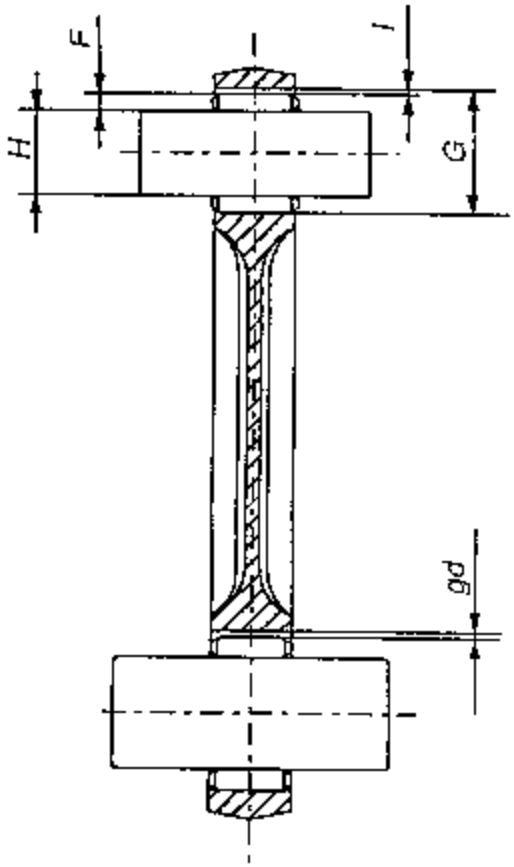
DESIGNATION	DIMENSIONS	clearance	assembly clearance
Seal ring Upper and lower seal rings	ø 40	A	0.10 - 0.25
Seal ring 1st oversize	ø 40.2		
Seal ring 2nd oversize	ø 40.4		



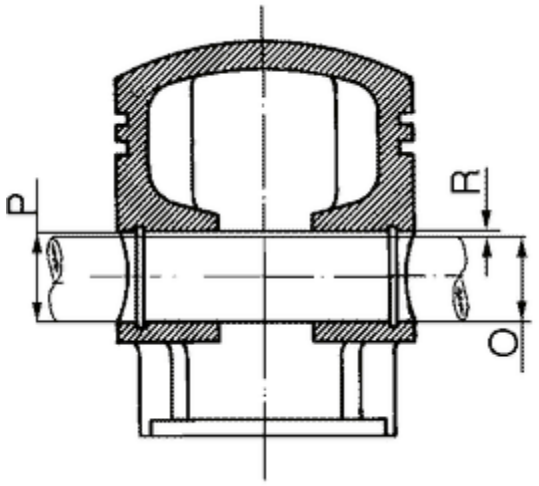
CONNECTING ROD SMALL END - NEEDLE BEARING - GUDGEON PIN									
DESIGNATION	DIMENSIONS	clea-rance	assembly clearance	COUPLING CATEGORY					Gudgeon pin
				Con rod small end		Needle bearing			
		I	0.002 - 0.012	Cat.	ø 17	Cat.	ø 2.5	Options ø 2.5	
Connecting rod	G = ø $17_{+0.011}$			1	+11	1	0	-1	+5

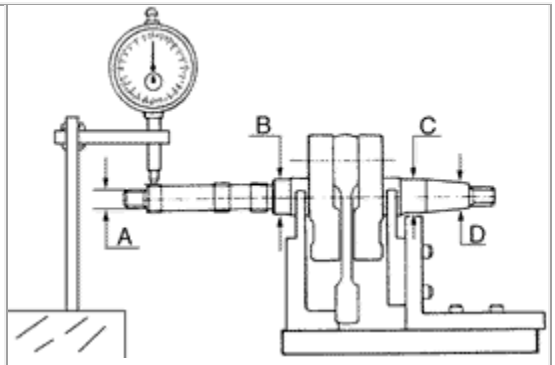
	$^{-0.001}$				+7		-2	-3	+1
Roller case	F = ø 2.5 $^{0}_{-0.007}$			2	+7 +3	2	-2 -4	-3 -5	
Gudgeon pin	H = ø $12^{-0.005}_{-0.001}$			3	+3 -1	3	-4 -6	-5 -7	

Note: Maximum permissibleconnecting rod axial clearance “after use” (longitudinal movement on crankjournal) is 0.7 mm.



DESIGNATION	DIMENSIONS	clearance	assembly clearance
Piston	P= ø $12^{-0.008}_{-0.003}$	R	0 - 0.005
Gudgeon pin	Q= ø 12 $^{-0.005}_{-0.001}$		



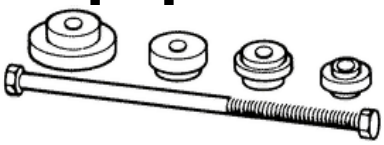
Crankshaft alignment check: use the special tool shown in the figure to check that the out of round of diameters “A”, “B” and “C” is within 0.03 mm (maximum dial gauge reading); check also the out of round of diameter “D”, for which a maximum reading of 0.02 mm is permitted. If out of round is only slightly higher than prescribed values, **retrue** the crankshaft by inserting a wedge between the counterweights or by inserting it in a vice (equipped with aluminium bushes). Jig and dial gauge: 020335Y [02020335Y] 020335Y Special tool: 020074Y [02020074Y] 020074Y	

RECOMMENDED LUBRICANTS ANDBRAKE FLUID

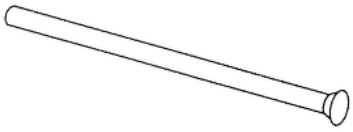
USE	CHARACTERISTICS	RECOMMENDED PRODUCT
Rear hub	SAE 80W/90 API GL3 specification or higher	**TUTELA ZC 90**
Control cable (brakes, throttle and mixer, speedometer)	Synthetic oil to API TC ++ specification or higher	**SELENIA HI Scooter 2T**
Air filter	Synthetic oil to API TC ++ specification or higher	**SELENIA HI Scooter 2T**
Roller case	**Lithium soap grease NLGI 3**	**JOTA 3 FS**

Brake levers, throttle twistgrip	Calcim complex soap grease NLGI 1-2	**SYSTEM TW 249 AREXONS**
Fuel-oil mixer	SAE 20W Synthetic oil to API TC ++ specification or higher	**SELENIA HI Scooter 2T**
Speedometer transmission	**Lithium soap grease NLGI 3**	**JOTA 3 FS**
Brake fluid	**Synthetic SAE J1703, NHTSA 116 DOT 4, ISO 4925**	**TUTELA TOP 4**
Grease for compensator ring	Lithium soap grease with Molybdenum bisulphide NLGI2	**TUTELA MRM 2**
Grease for control levers on engine	Lithium soap grease with zinc oxide NLGI2	**ZETA 2**

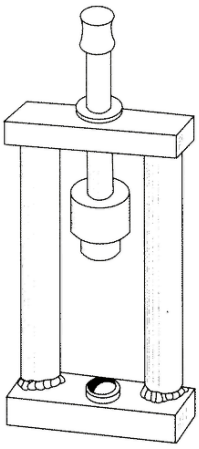
Equipment



DESCRIPTION	PART NUMBER	LINK
Steering seats fitting tool	001330Y	[0722] Lower and upper location frame

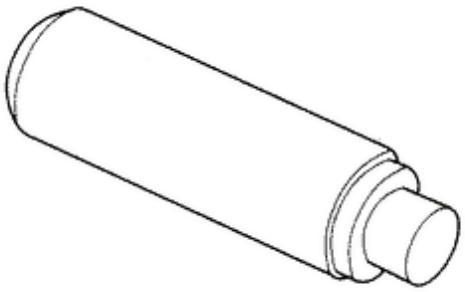


DESCRIPTION	PART NUMBER	LINK
Drift	020004Y	[0715] Lower and upper location frame

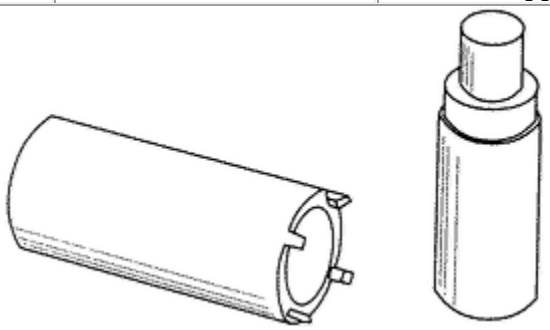


DESCRIPTION	PART NUMBER	LINK
Steering overhauling tool (Parts 1/2/3/4/5/16/17/21/22)	020021Y	[0717] Removal and refitting of piston pin [0718] Fitting piston pin [0719] Fitting washer rings [0721] Wedging washers

		[0720] Case position

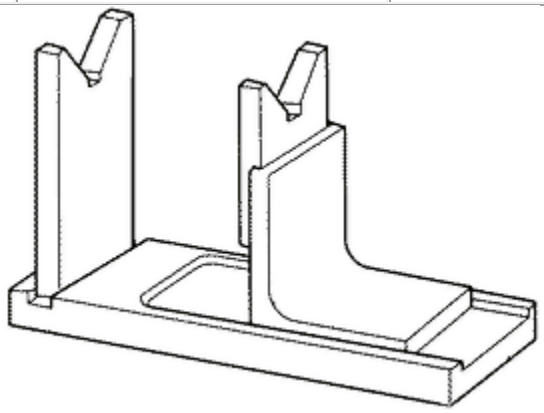


DESCRIPTION	PART NUMBER	LINK
Roller bearing drifts	020036Y 020037Y 020038Y	[0710] Roller case [0712] Case on shock absorber support

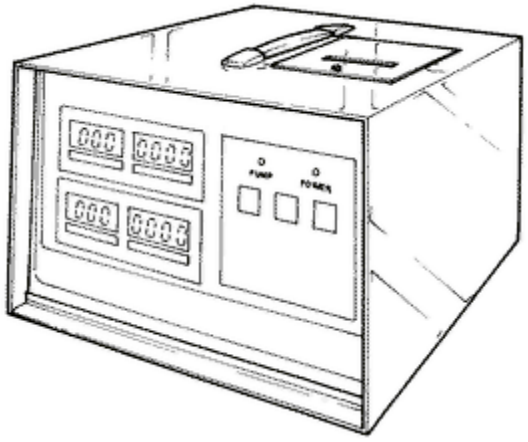


DESCRIPTION	PART NUMBER	LINK
Steering collar spanner	020055Y	[0713] Blocking nut [0714] Upper section washer [0723] Location of upper bearing [0724] Blocking nut

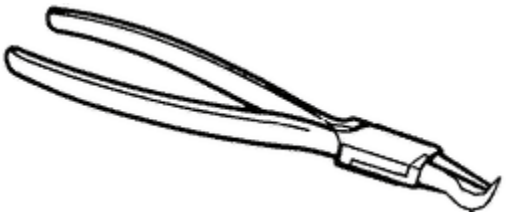
		[03] Maintenance



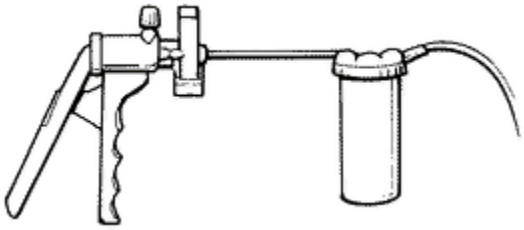
DESCRIPTION	PART NUMBER	LINK
Base	020074Y	[010602] Alignment of driving shaft



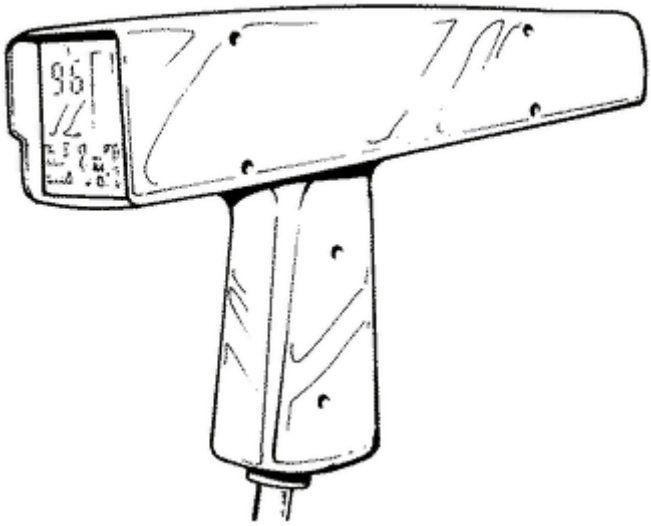
DESCRIPTION	PART NUMBER	LINK
Exhaust gas analyzer	020320Y	[060501] Check co



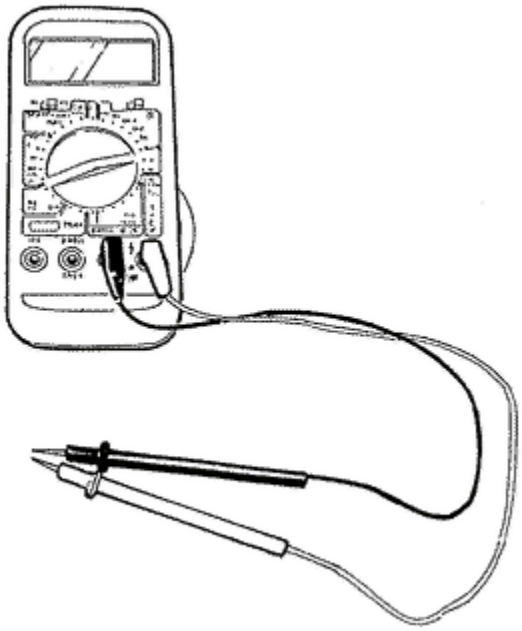
DESCRIPTION	PART NUMBER	LINK
Brake spring pliers	020325Y	[0812] Replacement of rear brake shoe



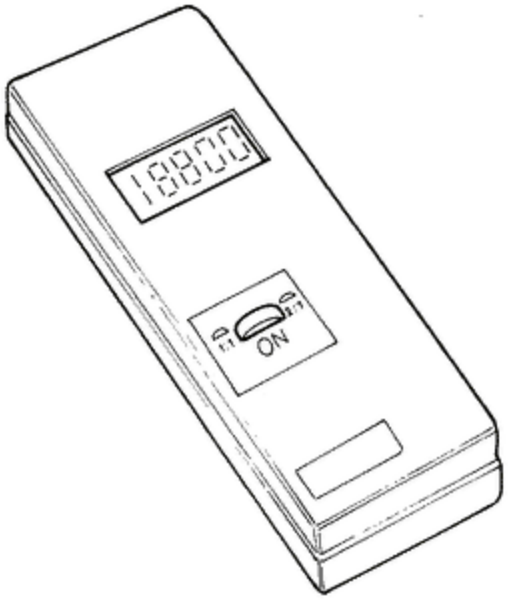
DESCRIPTION	PART NUMBER	LINK
Mityvac for bleeding brake circuit	020329Y	[0809] Loading oil drainage



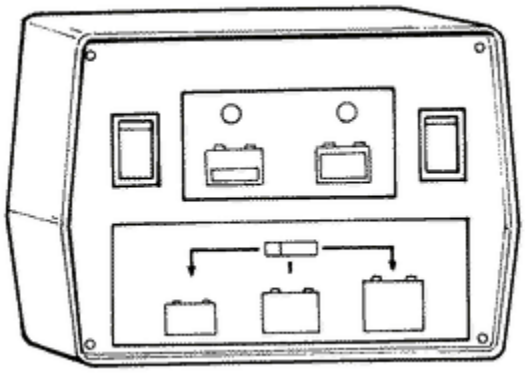
DESCRIPTION	PART NUMBER	LINK
Stroboscopic timing gun	020330Y	[0303] Check engine timing



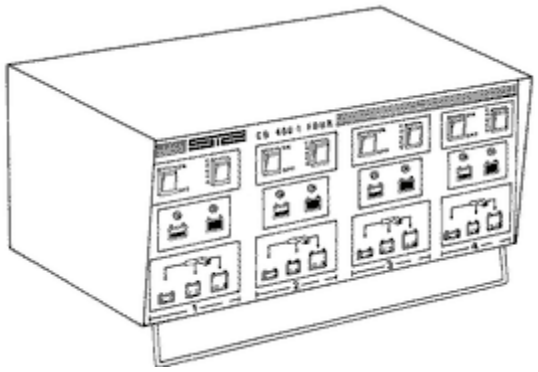
DESCRIPTION	PART NUMBER	LINK
Multitester	020331Y	[050201] Electronic ignition [050204] Direct current [050203] Alternate current [050205] Verifications [050205] Verifications



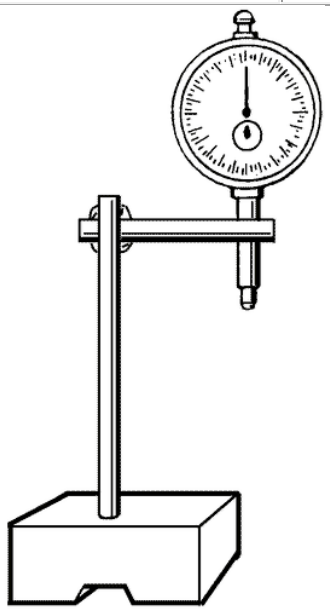
DESCRIPTION	PART NUMBER	LINK
Digital rev counter	020332Y	[0303] Check engine timing [060501] Check co



DESCRIPTION	PART NUMBER	LINK
Single station battery charger	020333Y	[050209] Battery maintenance



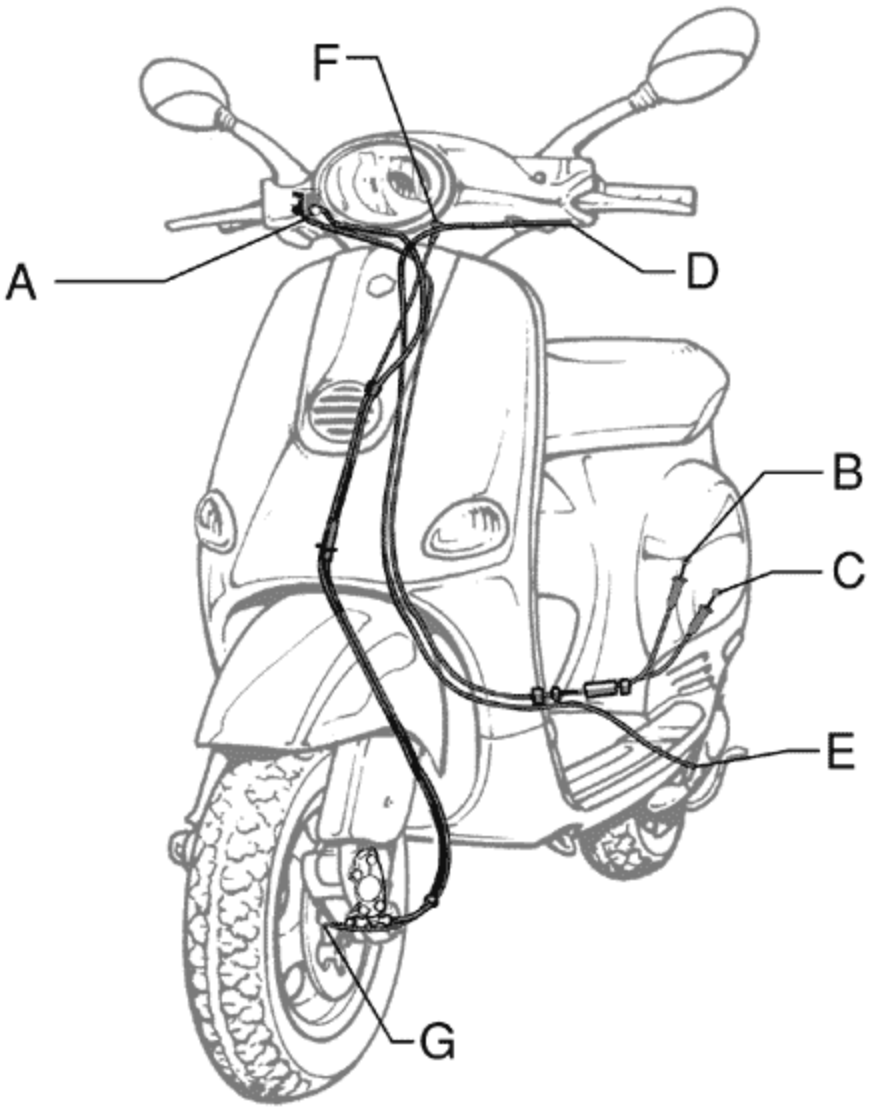
DESCRIPTION	PART NUMBER	LINK
Multiple station battery charger	020334Y	[050209] Battery maintenance

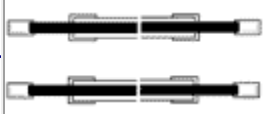


DESCRIPTION	PART NUMBER	LINK
Dial gauge and stand	020335Y	[010602] Alignment of driving shaft [0805] Check brake disc

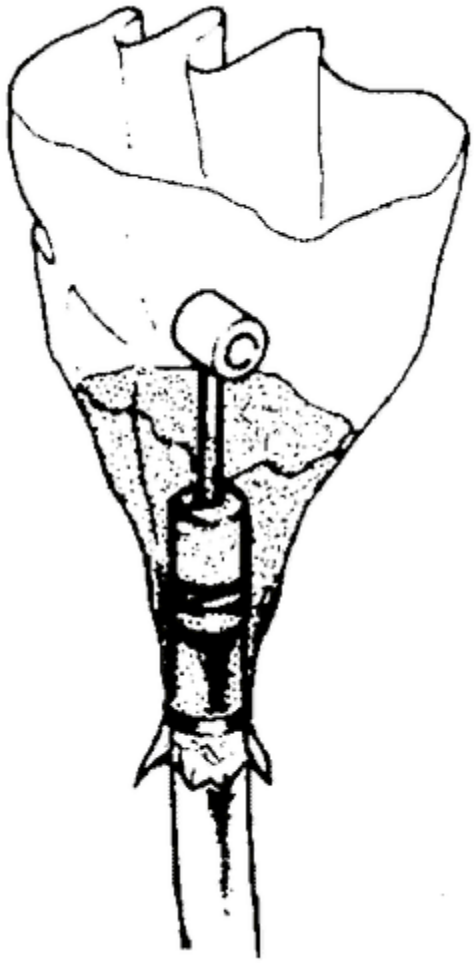
Maintenance

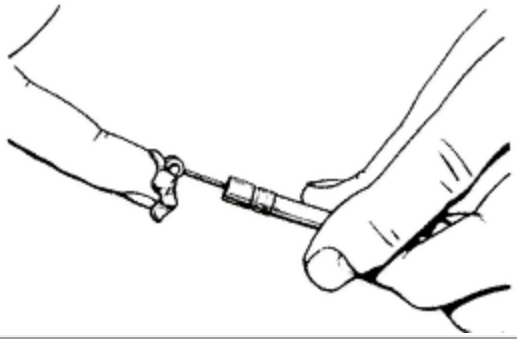
FLEXIBLETRANSMISSIONS



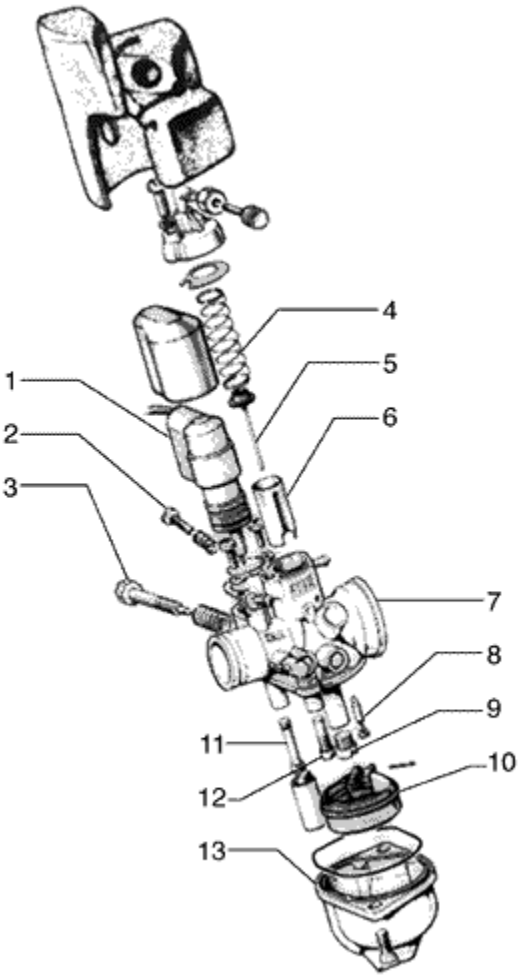
TROTTLE CONTROL LINKAGE	Sheath Cable	**A**		Splitter		**B**
MIXER CONTROL LINKAGE	Sheath Cable					

						C
REAR BRAKE LINKAGE	Sheath Cable	**D**				**E**
ODOMETER LINKAGE	Sheath Cable	**F**				**G**

-Disassemble the control cables and check that they slide freely in their sheaths.	
-Oil the cable with SELENIA HI SCOOTER by affixing a plastic bag as shown in the figure. -If the cable continues to snag (frayed or broken strands etc.) renew both cable and sheath.	

-Grease the ends of the cable.	

Carburettor

-Disassemble all carburettor components, accurately wash them in solvent, then dry them with compressed air. To ensure thorough cleaning, pay special attention to the ducts in the carburettor body. -Carefully check the condition of all components. -The **throttle** must slide freely in the mixture chamber. -If there is excessive play due to wear, the throttle must be replaced. If the mixture chamber shows such signs of wear that tightness or free sliding of the throttle (even if new) are not possible, replace the carburettor. -When reassembling the carburettor, it is a good rule to replace the gaskets. **Caution -** Petrol is highly flammable. Always fit new seals and gaskets to prevent leakage. **1.** Automatic choke **- 2.** Minimum air adjustment screw **- 3.** Idle speed adjustment screw **- 4.** Throttle spring **- 5.** Throttle needle valve**. - 6.** Throttle **- 7.** Carburettor body **- 8.** Needle **- 9.** Idle jet **- 10.** Float **- 11.** Starter jet **- 12.** Main jet **- 13.** Bowl.	

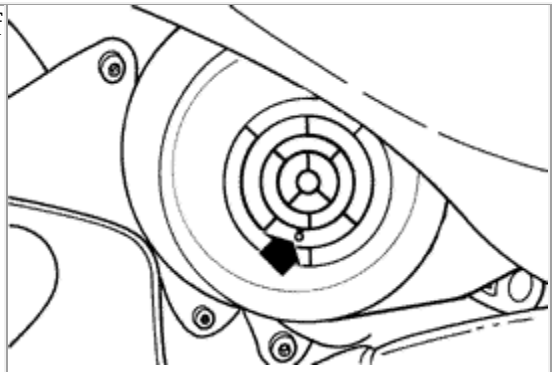
Engine timingcheck

-This check is performed at engine speed of over 4000 rpm using a strobe gun. The resulting timing advance must be 17° ± 1 before T.D.C.

Note: If the strobe system does not work correctly, perform the checks indicated in the section ELECTRICAL SYSTEM.

Warning - Before performing the above checks, ensure that the flywheel is correctly keyed to the crankshaft.

Digital rev counter 020332Y
[02020332Y] 020332Y
Stroboscopic timing gun 020330Y
[02020330Y] 020330Y



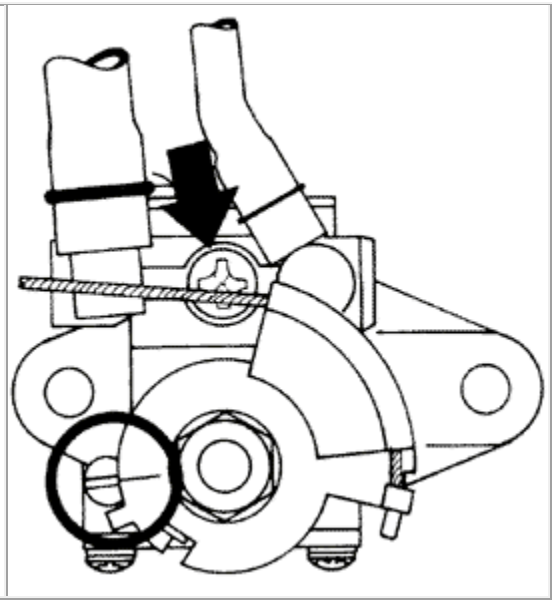
Adjusting flexible control cables

-Adjust control cables:
Mixer cable: see heading "Mixertiming".
Throttle cable: adjust to eliminate play of the sheath.
Splitter cable: adjust so there is no play at throttle twistgrip.
All control cables must be adjusted until there is no play between sheaths and attachment points.

Mixer timing

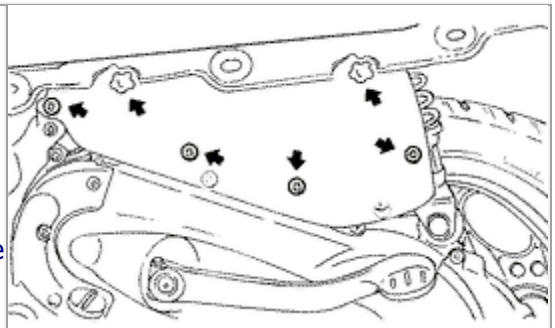
-With the throttle in the fully closed position, adjust the position of the mixer lever as shown in the figure by means of the control cable register.

Warning - After disassembly or emptying of the oil tank, bleed the mixer as follows: with the mixer installed on the vehicle and the engine switched off disconnect the mixer tube from the carburettor and slacken the bleed screw (see arrow in figure) until oil flows out. Now tighten the bleed screw, start the engine and wait until oil flows from the feed tube to the

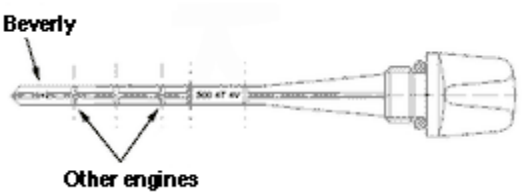


carburettor (previously disconnected). Reconnect the tube to the carburettor and secure it with the hose clamp. During this procedure the engine must be supplied with a 2% fuel-oil mixture with SELENIA HI Scooter 2T oil (at least 0.5 litres if the fuel tank is completely empty).	

Air filter

Disassemble the lh side panel and remove the air filter cover by removing the 2 screws and 2 knobs (accessed by tipping the saddle and removing the helmet compartment). Now remove the filter element, clean it with soap and water and dry with compressed air. Now immerse it in a 50/50 mixture of 2-stroke engine oil and unleaded petrol. Finally, squeeze out excess liquid, leave to dry and, when dry, refit.	

HUB OIL DIPSTICK

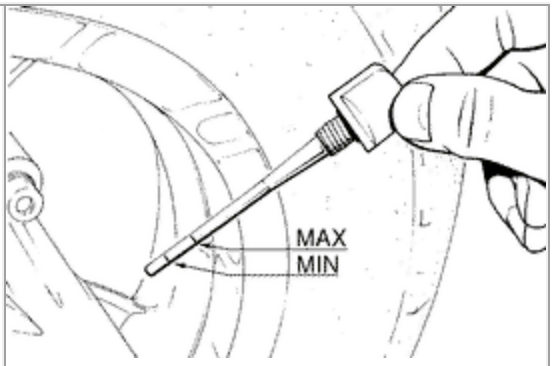
We inform you that new hub oil dipstick part no. **832019** has been introduced. The new dipstick is 5 mm longer the previous one and has a small square with a central dot on two of the four faces in its lower part. The dots constitute the reference marks for checking the oil level in the Beverly engine (see figure).	

Changing hub oil

-Remove the oil filler plug.
-Remove the oil drain plug and allow the oil to drain out into a suitable receptacle.
-Refit the drain plug and tighten it then fill the hub with 75 cc of new oil (max. mark on dipstick).
-Refit the oil filler plug and tighten it.

Caution - Do not remove the oil drain and/or filler plugs immediately after the engine has been running at high speed or when the engine is actually running to prevent the risk of burns due to contact with hot oil.

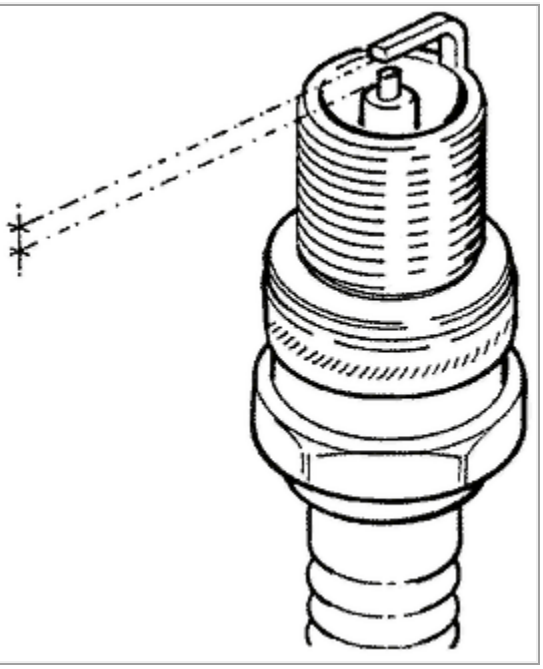
Recommended oil: TUTELA ZC 90



Spark-plug

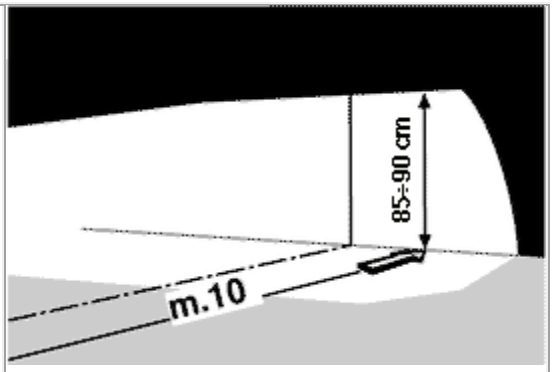
-Disconnect the cap and remove the spark plug.
-Inspect the plug and if the insulator is chipped or damage, renew it.
-Measure the spark plug gap with a feeler gauge. If necessary adjust the gap by bending the outer electrode.
-Make sure the washer is in good condition.
- Fit the spark plug, screwing it in first by hand and then tighten it to the prescribed torque with a plug spanner.

Tightening torque 25-30 N·m
[010502] Engine
Electrode gap mm0.5 – 0.6.
Recommended type: Champion N2C.



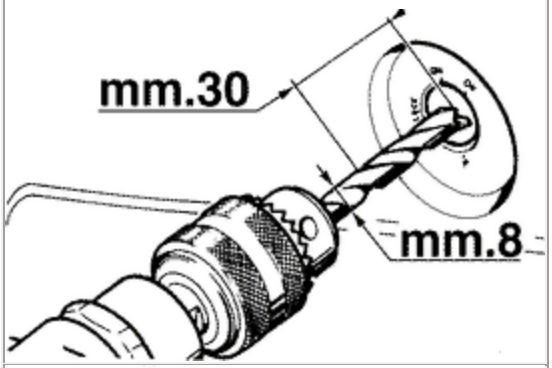
Adjusting theheadlamp

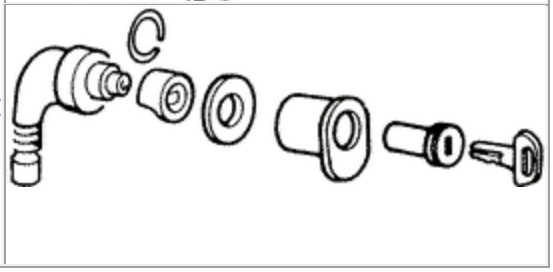
Before adjusting the headlight, check that the tyres are inflated to the prescribed pressure.
Set the unladen scooter on a level floor at a distance of approximately 10 m from a darkened white screen. Make sure the vehicle axis is at right angles to the screen. Draw a horizontal line on the screen between 85 and 90 cm from the ground. Start the engine and switch on the headlight dipped beam. The beam must be positioned so that the reference line intersects the brightest area at the centre. To adjust the headlight position turn the screw in the bottom of the unit.



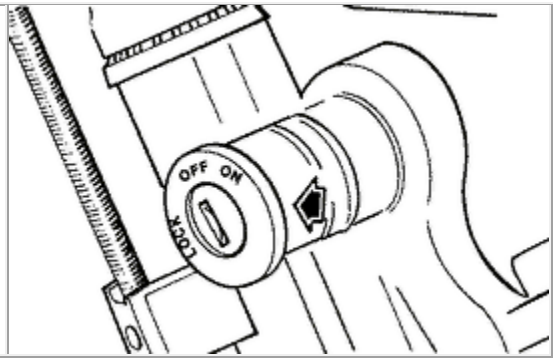
Disassembly withkeyswitch in “lock” position

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





Disassemblywith keyswitch in "OFF" position

-Disassemble the glove box. -Insert the tip of an awl into the hole indicated with the arrow in the figure and press until you disengage the tab that secures the cylinder to the lock body; maintain the pressure on the awl and withdraw the lock body and the cylinder.	

Fault Finding

SYNTOM	POSSIBLE CAUSE	INTERVENTION	LINK
Poor performance	Air filter clogged or dirty.	Clean.	[0306] Air filter
	Silencer blocked.	Clean the terminal section or renew	[0810] Removal of muffler
	Faulty spark plug	Check that the spark plug is of the prescribed type	[0308] Spark-plug
	Choke not working (remains active)	Check mechanical movement and electrical connections.	[060502] Automatic starter
	Carburettor jets or fuel tap clogged or dirty.	Disassemble, wash with 4-star petrol and dry with compressed air.	[0302] Carburetor
	Belt excessively worn.	Renew.	[12020202] Driven pulley
	Clutch slipping.	Check centrifugal clutch shoes assembly and renew if necessary.	[12020214] Check driven pulley
	Sliding pulleys sticking.	Check, renew any damaged or worn parts and lubricate exclusively with TUTELA MRM2 grease.	[12020216] Collar pivot check
	Variator rollers worn or insufficiently lubricated.	Check the rollers, renew worn components and lubricate with Jota 3 FS grease.	[12020206] Mobile halfpulley
	Excess scale on cylinder ports and combustion chamber.	Descale.	
	Engine timing incorrect.	Check electrical phase and ensure that the flywheel is correctly keyed to the crankshaft.	[0303] Check engine timing

SYNTOM	POSSIBLE CAUSE	INTERVENTION	LINK
Starting problems	Carburettor flooded.	Try starting the engine with wide open throttle. If the engine fails to start, remove the spark plug and clean or renew; before fitting the spark plug turn over the engine a few times to expel excess fuel from the cylinder.	[0308] Spark-plug
	Air filter clogged or dirty.	Wash with soap and water and impregnate with 50% fuel / oil mixture.	[0306] Air filter
	Automatic choke.	Check: electrical connections, circuit continuity, mechanical movements.	[060502] Automatic starter
	Vacuum tap fails to open.	Check that fuel is delivered from the feed line during engine starting with the throttle closed; otherwise renew the vacuum tap.	
	Fuel tap vacuum tube disconnected.	Connect or renew.	
	Carburettor jets dirty or clogged.	Remove, wash in 4 star petrol super and dry with compressed air.	[0302] Carburetor

SYNTOM	POSSIBLE CAUSE	INTERVENTION	LINK
Engine tends to cut out at full throttle	Main jet is dirty - excessively lean mixture.	Wash jet with 4-star petrol and dry with compressed air.	[0302] Carburetor
	Carburettor dirty.	Wash carburettor with 4-star petrol and dry with compressed air.	[0302] Carburetor
	Water in carburettor.	Empty bowl by means of drain valve	[0302] Carburetor
	Faulty H.T. coil, L.T. coil or pick-up.	Perform the prescribed tests.	[05] Electric system

SYNTOM	POSSIBLE CAUSE	INTERVENTION	LINK
Engine tends to stop when idling	Idling jet dirty.	Wash with 4-star petrol and dry with compressed air.	[0302] Carburetor
	Choke stays open.	Check: electrical connections, circuit continuity and mechanical movements.	[060502] Automatic starter
	Reed valve doesn't close.	Check/renew reed valve.	[12020305] Thin plate unit
	Faulty H.T. coil, L.T. coil or pick-up	Perform the prescribed tests.	[05] Electric system

SYNTOM	POSSIBLE CAUSE	INTERVENTION	LINK
Excessive fuel consumption	Air filter clogged or dirty.	Clean.	[0306] Air filter
	Ignition system faulty.	Check: electrical connections, circuit continuity and mechanical movements.	[060502] Automatic starter
	Engine has been tweaked to reach speeds in excess of legal limits.	Restore engine to original condition	

SYNTOM	POSSIBLE CAUSE	INTERVENTION	LINK
Misfiring during acceleration or on uphill gradients	Air filter dirty.	Clean or replace.	[0306] Air filter
	Spark plug faulty.	Clean and set electrode gap or renew. Use only the recommended spark plug type.	[0308] Spark-plug
		Note that numerous engine problems can be traced to the use of an inappropriate spark plug.	[0308] Spark-plug
	Excess carbon on cylinder ports and in combustion chamber.	Decarbonize.	

SYNTOM	POSSIBLE CAUSE	INTERVENTION	LINK
Kick-start lever return fault	Lubricate the spring and the sector gear shaft.		[12020244] Replacement starting lever
	Check kick-start bearings.		

SYNTOM	POSSIBLE CAUSE	INTERVENTION	LINK
Faulty clutch	Grabbing or irregular	Check that the weights move easily (finger pressure should be sufficient) and slide back correctly.	[12020214] Check driven pulley
		Check that there is no grease on the weights.	
		Check that the friction facings are correctly aligned (work zone in centre).	
		Check the clutch drum for signs of scoring.	[12020214] Check driven pulley
		Check: Engine speed at start of drive: 3700 - 4000 rpm Engine speed at full throttle with brake locked on rear wheel (3 - 6 seconds max.): 5400 - 5900 rpm	
		Do not run the engine when the clutch drum is not installed.	

SYNTOM	POSSIBLE CAUSE	INTERVENTION	LINK
Inefficient or noisy brakes	Brake pads or shoes worn.	Replace brake pads or shoes and check wear of brake disc or drum.	../../../08_impianto_frenante/04_sost_pasticche/IF_005.rtf
	Air bubbles in brake circuit.	Carefully bleed brake circuit (Brake lever must not have spongy feel).	../../../08_impianto_frenante/09_caricamento_olio_spurgo/IF_010.rtf
	Brake fluid leaks	Flexible connections, piston seals or brake master cylinder seals damaged. Renew.	../../../08_impianto_frenante/02_smont_pompa_freno/IF_003.rtf
	Excess play on rear brake control cable.	Adjust cable register.	

SYNTOM	POSSIBLE CAUSE	INTERVENTION	LINK
Brakes overheating	Pistons sticking.	Check calliper and renew any damaged parts.	[0807] Review brake calipers
	Master cylinder compensation holes clogged.	Clean thoroughly and blow with compressed air.	[0802] Removal of brake pump
	Rubber seals swollen or sticking.	Renew seals.	

SYNTOM	POSSIBLE CAUSE	INTERVENTION	LINK
Rear brake lever does not spring back	Return spring broken.	Replace spring.	[0812] Replacement of rear brake shoe
	Shoe control pin not lubricated.	Lubricate with ZETA 2 grease.	[0812] Replacement of rear brake shoe

SYNTOM	POSSIBLE CAUSE	INTERVENTION	LINK
Electrical system problems (version with integral flasher unit)	Oil check device not working.	Perform voltage regulator checks.	[050205] Verifications
	Turn indicators not working.	Perform voltage regulator checks.	[050205] Verifications

SYNTOM	POSSIBLE CAUSE	INTERVENTION	LINK
Battery	The battery requires regular maintenance. Regularly check that the electrolyte is covering the plates and top up with distilled water if necessary (**do not** use tap water etc.). At the same time, check the electrolyte specific gravity. If the vehicle is to remain idle for a month or more the battery must be charged from time to time. Over a period of 3 months disuse, the battery will discharge completely. When installing the battery make sure you connect the black ground lead to the negative terminal and the red lead to the positive terminal (+).		

SYNTOM	POSSIBLE CAUSE	INTERVENTION	LINK
Steering is stiff	Upper steering collar tightened excessively.	Restore correct tightening torque. See relevant table.	[0724] Blocking nut
	Steering seats damaged.	Replace steering seats.	[0715] Lower and upper location frame

SYNTOM	POSSIBLE CAUSE	INTERVENTION	LINK
Excess steering play	Upper steering collar is loose	Tighten to prescribed torque. See relevant table.	[0724] Blocking nut
	Bottom race of top bearing and/or top race of bottom bearing present excess clearance with respect to	Check and, if necessary, renew bearing races or frame.	[0714] Upper section washer

SYNTOM	POSSIBLE CAUSE	INTERVENTION	LINK
Front suspension is noisy	Stroke end bumper damaged.	Replace.	
	Shock absorber inefficient.	Replace.	
	Wheel nuts loosened.	Check for damage, and retighten nuts to the prescribed torque (see relevant table) retighten nuts to the prescribed torque (see relevant table).	[0702] Removal of front tire
	Brake disc screws loosened.	Check for damage, and retighten nuts to the prescribed torque (see relevant table) retighten screws to the prescribed torque (see relevant table).	[0806] Replacement of brake disk
	Wheel spindlebearings noisy.	Replace.	[0709] Removal of roller case

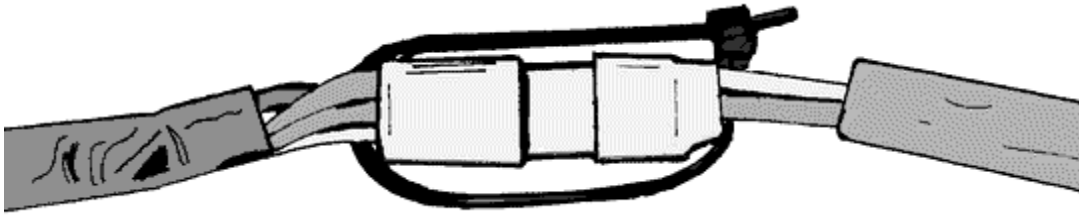
Electrical System

ELECTRICAL CONNECTIONS

Beginning from chassis:

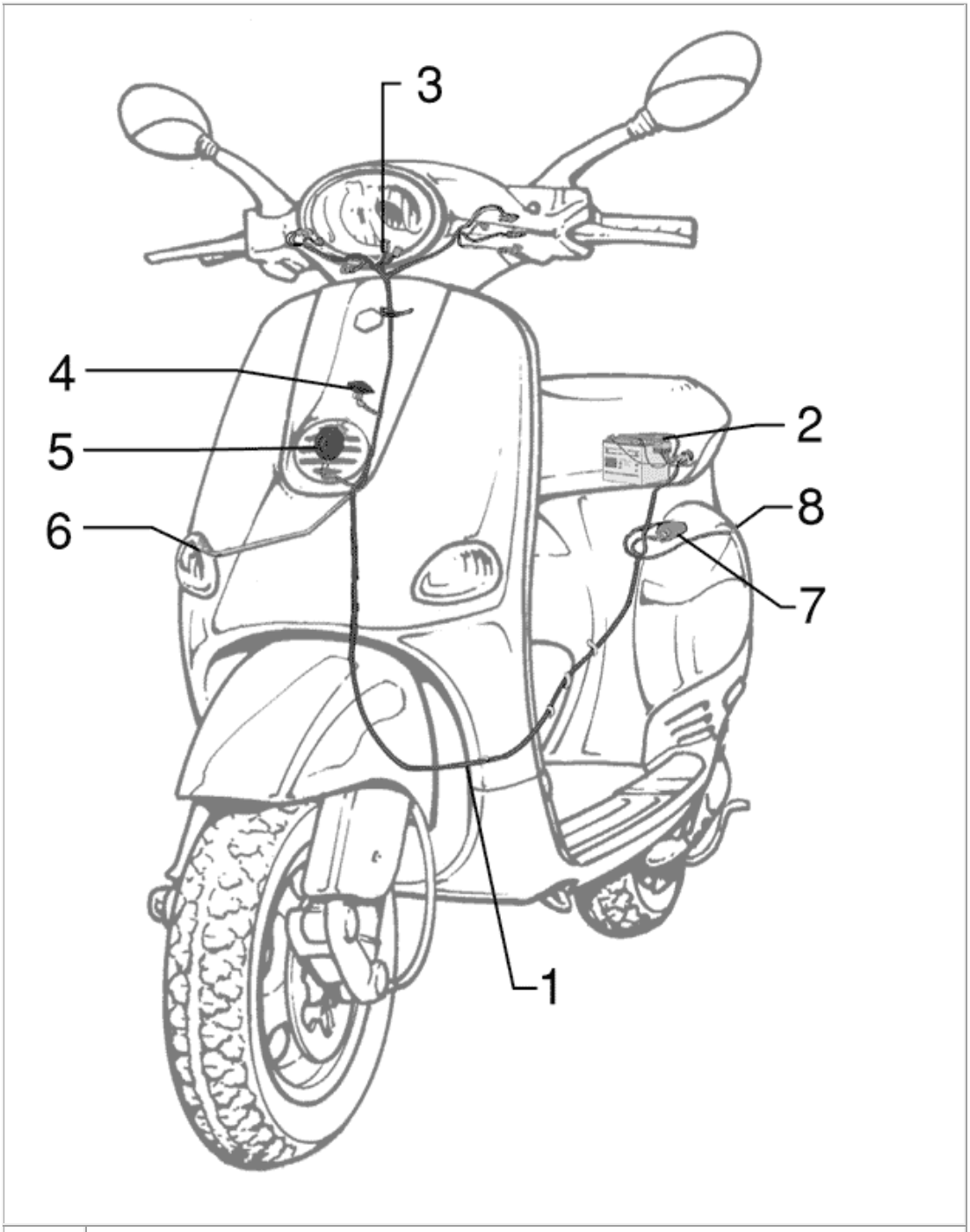
C16000-139707 VESPAET2

a tear-off clamp hasbeen provided on the engine/system harness and carburettor starter/systemharness connections to avoid detachments while running the vehicle or wronginsertion during assembly.



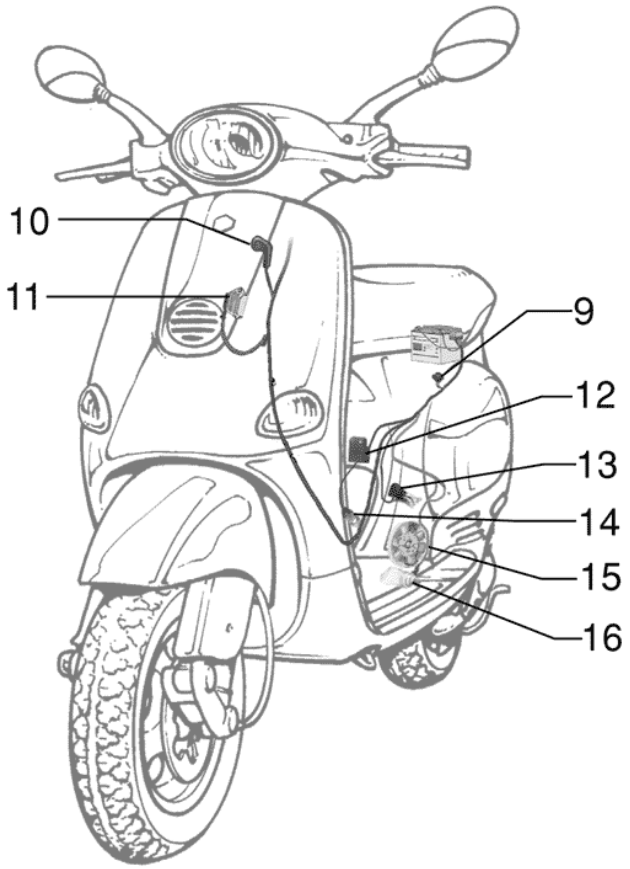
WIRING HARNESSEES

Lights system



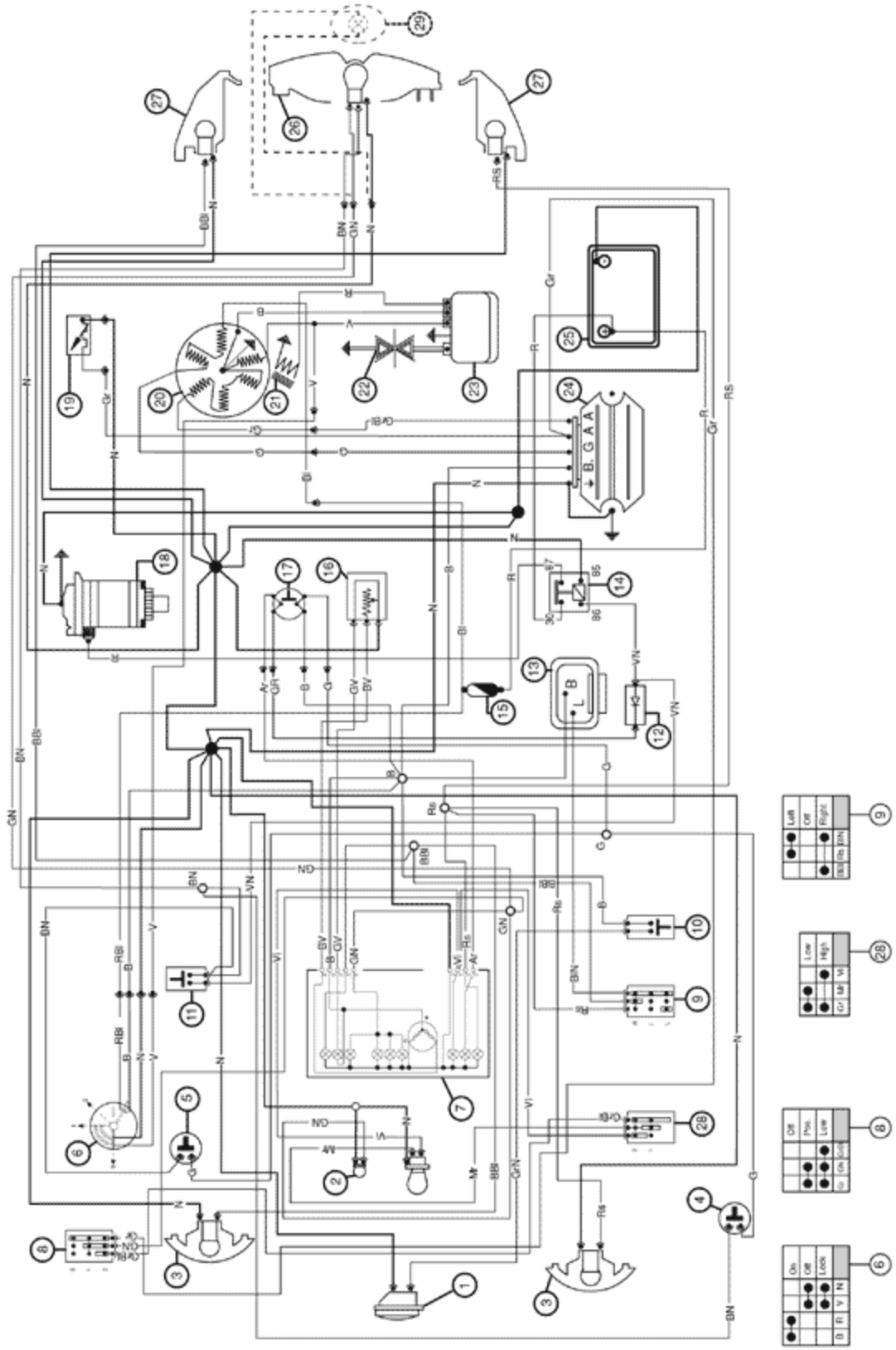
1	CABLES
2	BATTERY (12V-4Ah)
3	HEADLIGHT (12V 35/35W) + SIDE LIGHT (12V-5W)
4	TURN INDICATOR SELECTOR AND DIODE (not present in version with voltage regulator with integral flasher unit)
5	HORN
6	FRONT TURN INDICATOR (12V-10W)
7	REAR TURN INDICATOR (12V-10W)
8	REAR LIGHT UNIT (12V-5/21W)

Ignition system



9	STARTER MOTOR CONTACTOR
10	KEYSWITCH
11	VOLTAGE REGULATOR
12	ELECTRONIC CONTROL UNIT
13	AUTOMATIC CHOKE
14	SPARK PLUG (Champion N2C)
15	FLYWHEEL MAGNETO
16	STARTER MOTOR

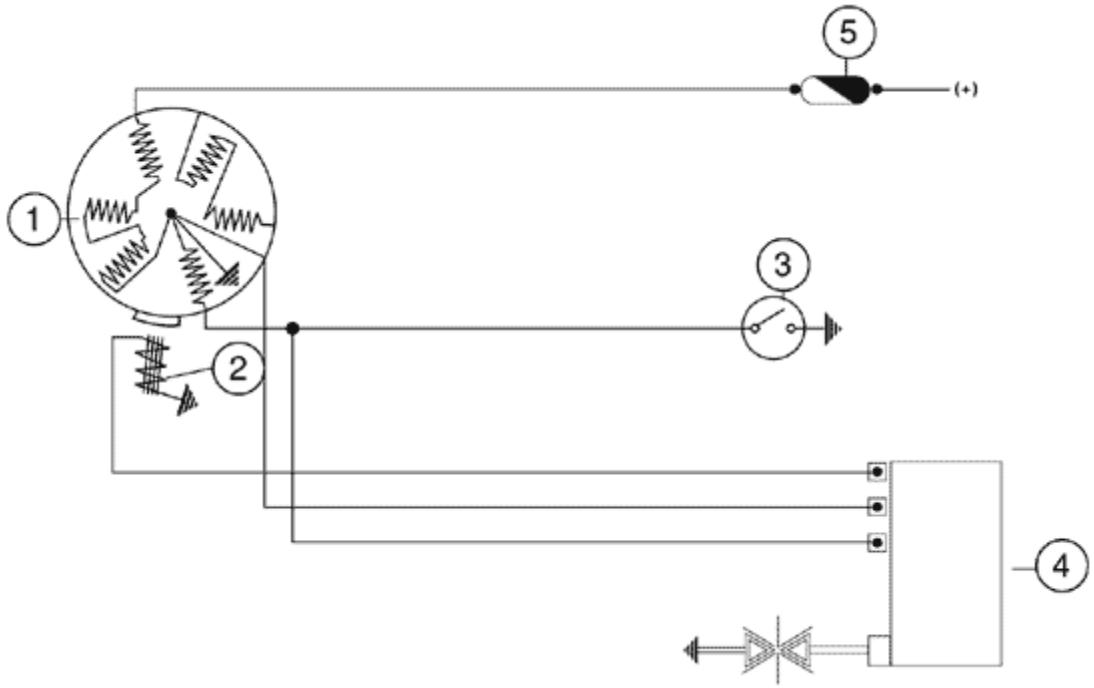
Electrical equipment diagram



Warning - During the interventions to the electrical equipment care in a particular manner that the wires which end to the electronic control boxes are correctly connected.

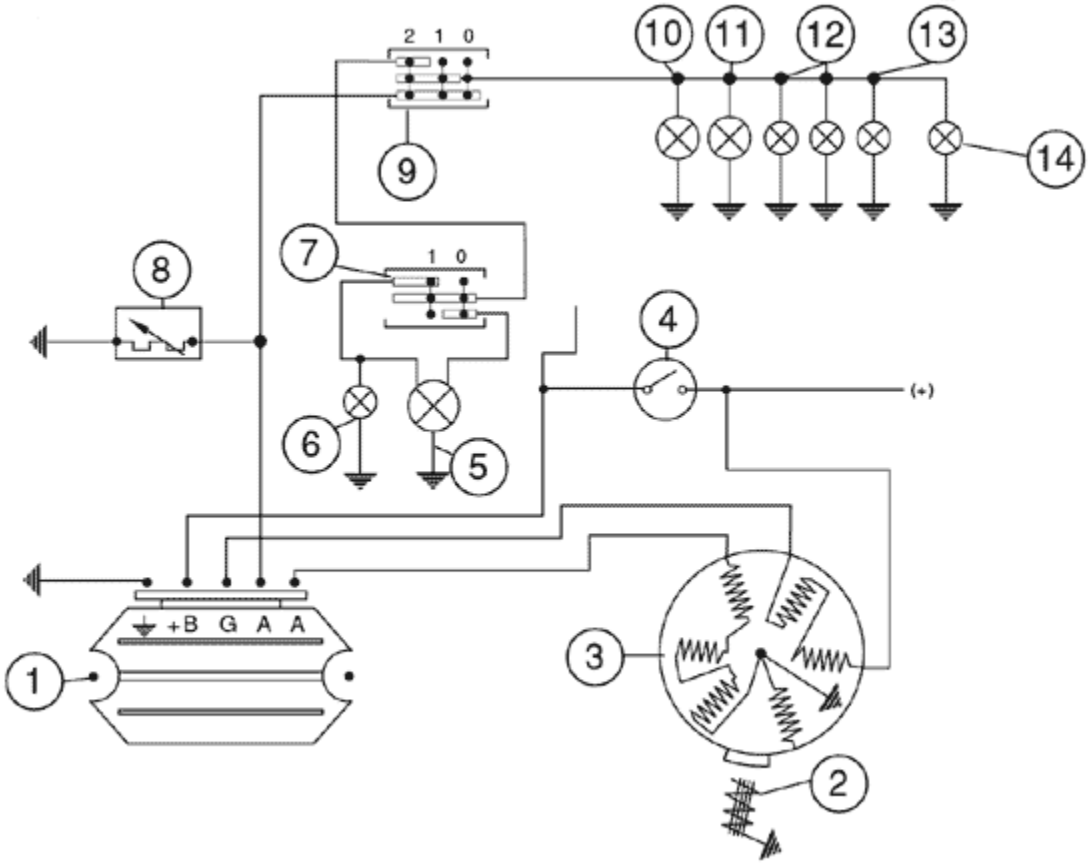
1. Horn. - **2.** Headlight with one 12V-35/35W bulb (dipped/full beam) and one 12V-5W bulb (side light). - **3.** Front turn indicators, 12V-10W bulbs. - **4.** Brake light/engine start permissive button (rear brake). - **5.** Brake light/engine start permissive button (front brake). - **6.** Keyswitch. - **7.** Instrument panel: two 12V-1.2W bulbs and one 12V-2W bulb (instruments); four 12V-1.2W indicator bulbs (lights - main beam - fuel warning - mixer oil warning); two 12V-2W bulbs (turn signal indicators). - **8.** Lights selector switch. - **9.** Turn indicator selector. - **10.** Horn button. - **11.** Start button. - **12.** Diode. - **13.** Flasher unit. - **14.** Starter motor contactor. - **15.** Fuse - 7.5 A - **16.** Fuel warning light transmitter. - **17.** Mixer oil warning light transmitter. - **18.** Starter motor. - **19.** Automatic choke - **20.** Magneto. - **21.** Pick-up. - **22.** Spark plug. - **23.** C.D.I. module. - **24.** Voltage regulator. - **25.** 12V-4Ah battery. - **26.** Rear light, 12V-5/21W bulb (side light and brake light). - **27.** Rear turn indicators - 12V-10W bulbs. - **28.** Full beam/dipped beam selector. - **29.** Number plate light 12V-5W (depending on version).

B=White - **Bl**=Blue - **G**=Yellow - **Mr**=Brown - **N**=Black - **BV**=White-Green - **GN**=Yellow-Black - **Gr**=Grey - **Rs**=Pink - **R**=Red - **Vi**=Purple - **V**=Green - **VN**=Green-Black - **BN**=White-Black - **BBl**=White-Blue - **GV**=Yellow-Green - **Ar**=Orange - **GrBl**=Grey-Blue - **GrN**=Grey-Black - **BR**=White-Red - **RN**=Red-Black. - **GR**=Yellow-Red - **BlN**=Blue-Black.



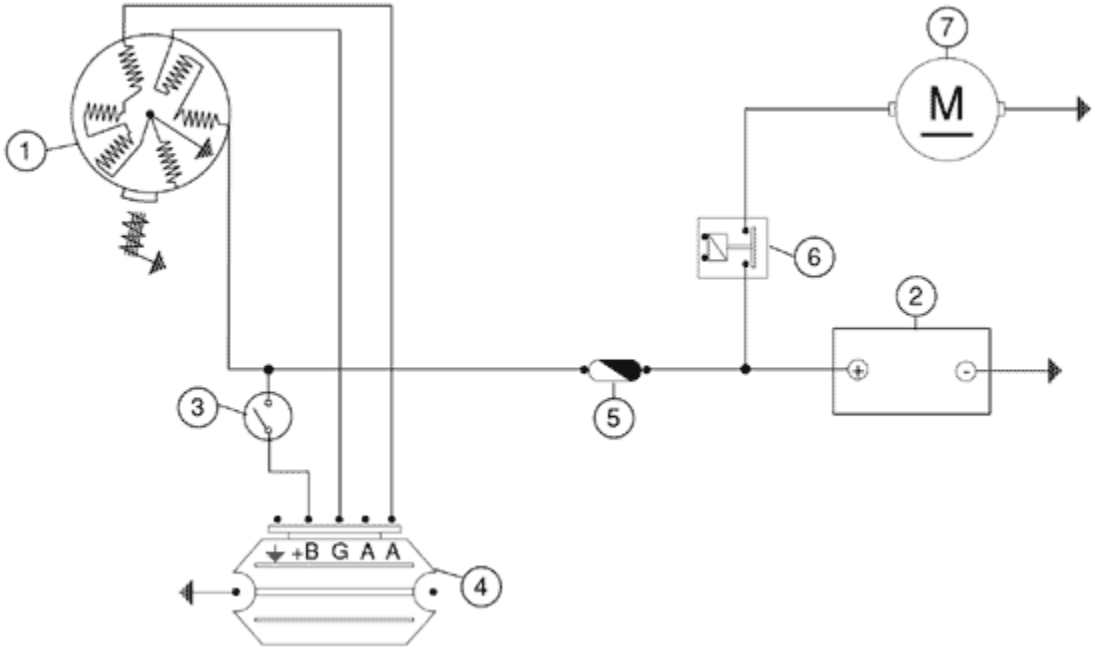
1	FLYWHEEL MAGNETO
2	PICK-UP
3	KEYSWITCH CONTACTS
4	C.D.I. MODULE
5	7.5A FUSE

Lightsand automatic choke section
(versionwith independent flasher unit)



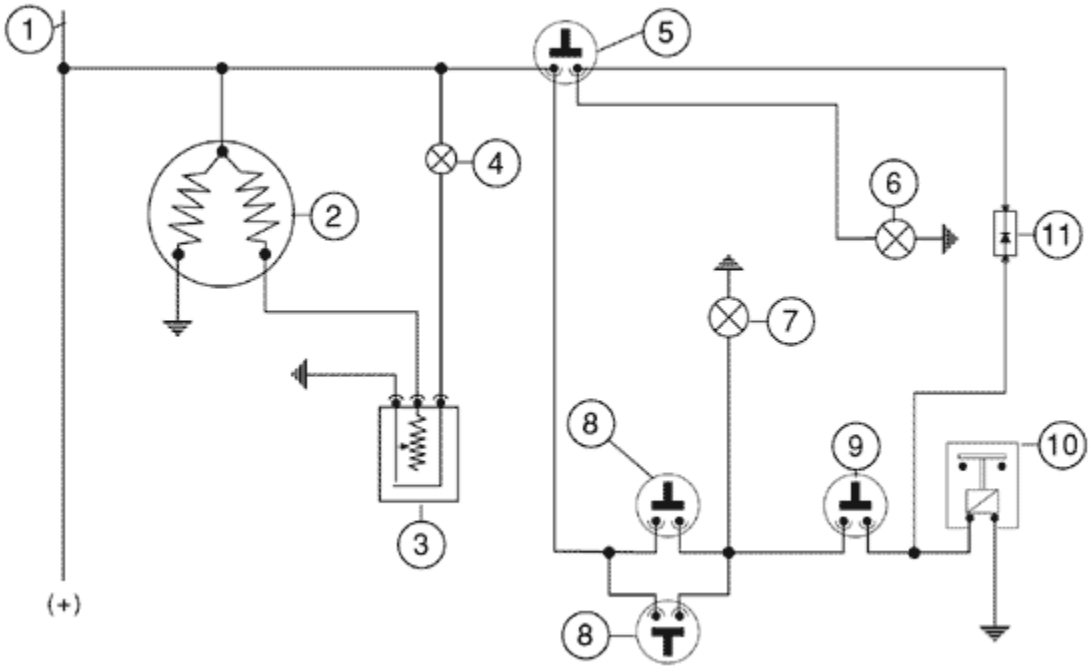
1	VOLTAGE REGULATOR
2	PICK-UP
3	FLYWHEEL MAGNETO
4	KEYSWITCH CONTACTS
5	12v - 35/35W HEADLIGHT BULB
6	FULL BEAM INDICATOR LAMP 12V-1.2W
7	FULL/DIPPED BEAM SELECTOR
8	AUTOMATIC CHOKE
9	LIGHTS SELECTOR SWITCH
10	REAR SIDE LIGHT BULB 12V-5W
11	FRONT SIDE LIGHT BULB 12V-5W
12	N°2 INSTR. PANEL BULBS 12V-1.2W.
13	LIGHTS INDICATOR LAMP 12V-1.2W
14	INSTRUMENT PANEL BULB (12V-2W)

Battery rechargeand starting section
(version withindependent flasher unit)



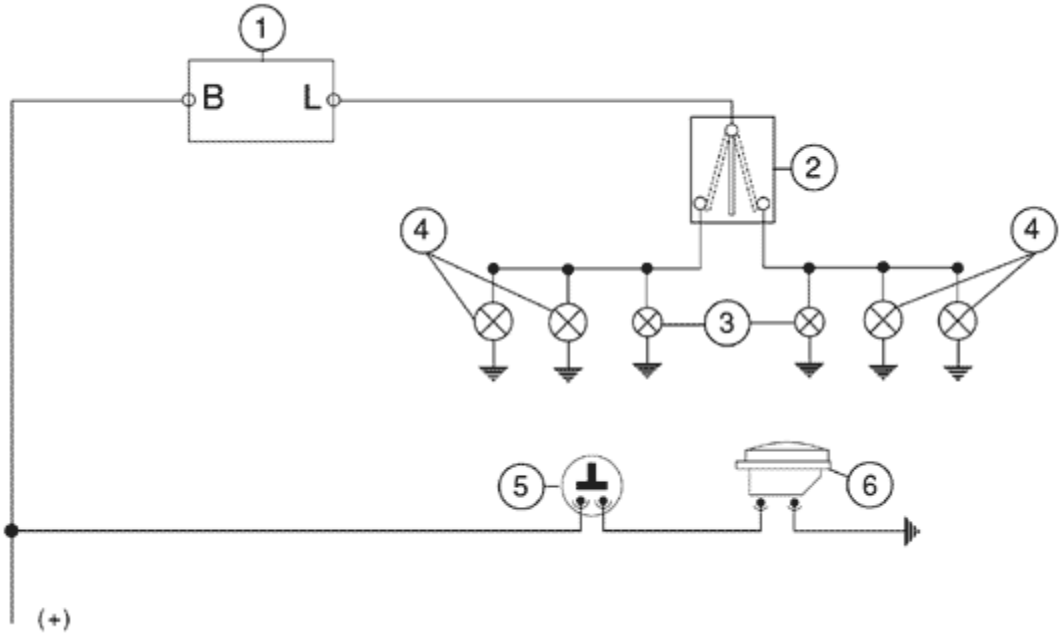
1	FLYWHEEL MAGNETO
2	12V-4Ah BATTERY
3	KEYSWITCH CONTACTS
4	VOLTAGE REGULATOR
5	7.5A FUSE
6	STARTER MOTOR CONTACTOR
7	STARTER MOTOR

Start permissivebuttons and level indicators
(version withindependent flasher unit)



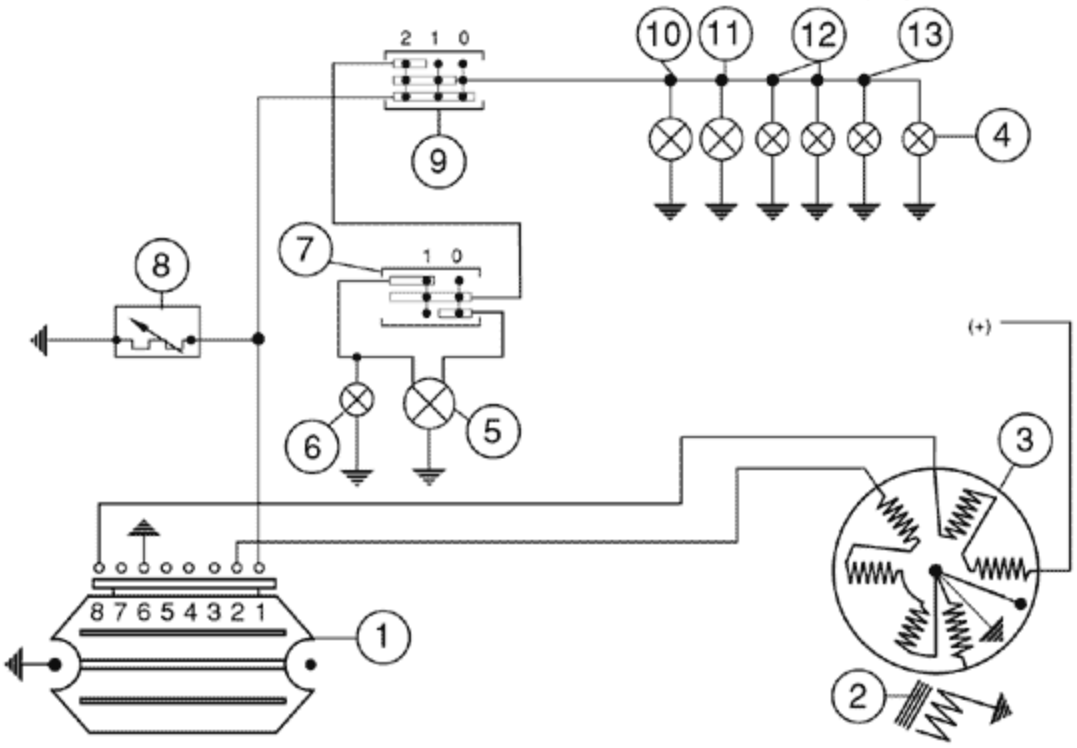
1	TO SERVICES
2	FUEL GAUGE
3	FUEL LEVEL TRANSMITTER
4	FUEL WARNING LIGHT 12V - 1.2W
5	MIXER OIL LEVEL TRANSMITTER
6	OIL WARNING LIGHT 12V - 1.2W
7	BRAKE LIGHT (12V - 21W)
8	BRAKE LIGHT SWITCHES
9	START BUTTON
10	STARTER MOTOR CONTACTOR
11	Diode

Turn indicatorsand horn
(version with independent flasher unit)



1	FLASHER UNIT
2	TURN SIGNAL Selector
3	TURN SIGNAL INDICATOR LIGHT 12V - 2W
4	TURN INDICATOR BULBS 12V - 10W
5	HORN BUTTON
6	HORN (D.C.)

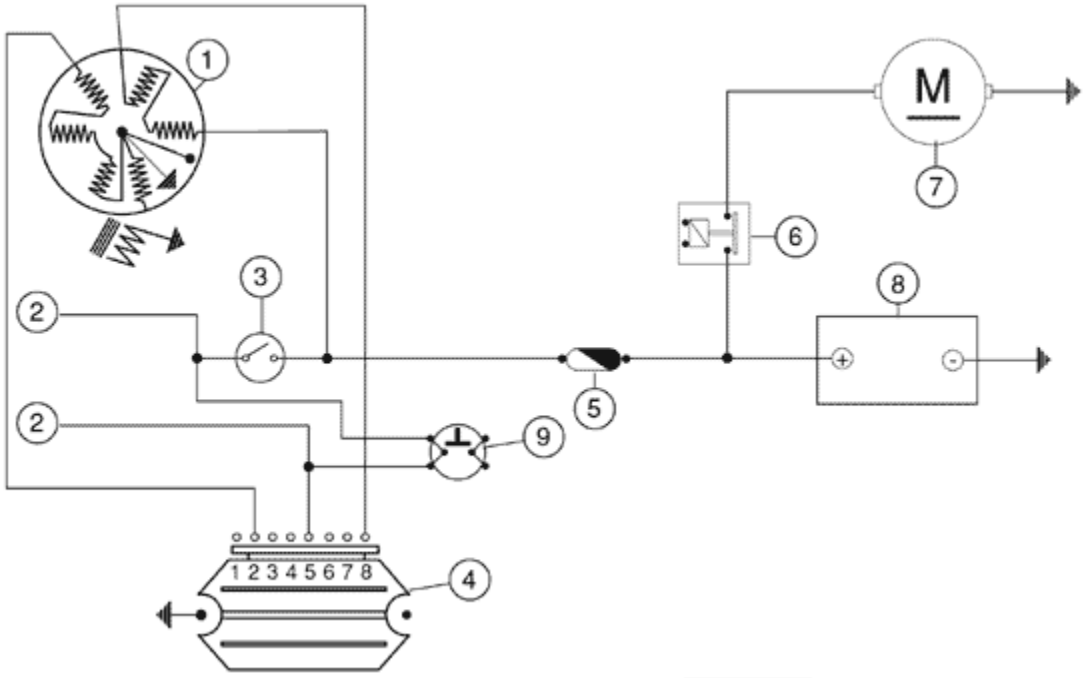
Lights and automatic choke section
(version withvoltage regulator incorporating flasher unit and mixer oil check device)



1	VOLTAGE REGULATOR
2	PICK-UP
3	FLYWHEEL MAGNETO
4	INSTRUMENT PANEL BULB (12V-2W)
5	HEADLIGHT BULB (12V - 35/35W)
6	FULL BEAM INDICATOR BULB (12V-1.2W)
7	FULL/DIPPED BEAM SELECTOR
8	AUTOMATIC CHOKE
9	LIGHTS SELECTOR SWITCH
10	REAR SIDE LIGHT BULB (12V-5W)
11	FRONT SIDE LIGHT BULB (12V-5W)
12	N°2 INSTR. PANEL BULBS (12V-1.2W)
13	LIGHTS INDICATOR BULB (12V-1.2W)

Battery recharge andstarting section

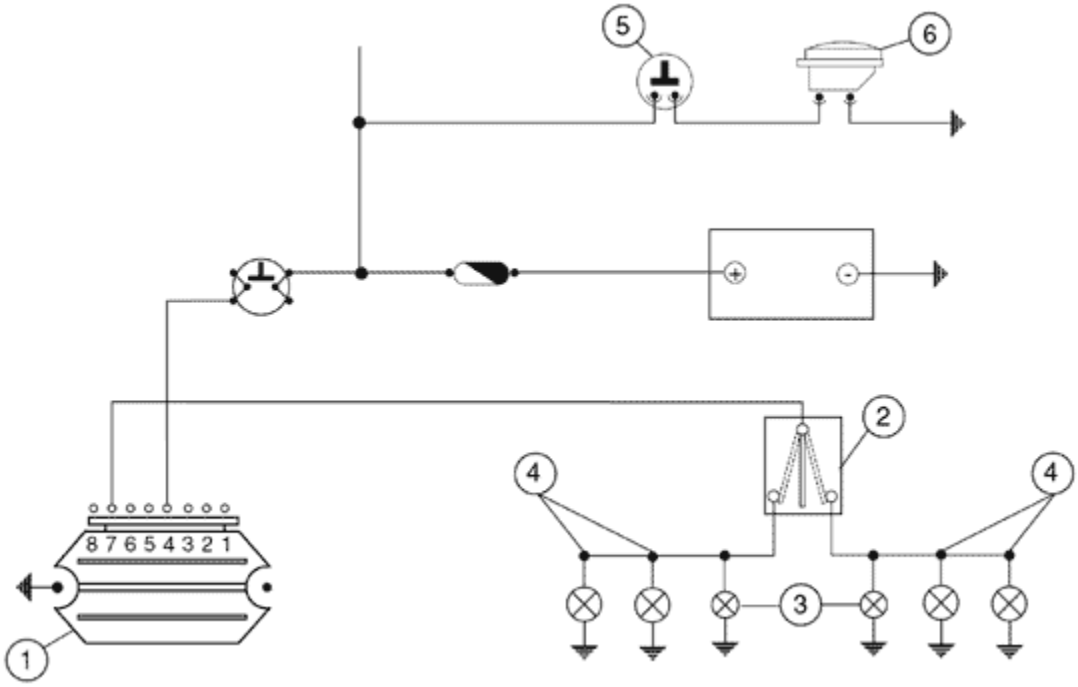
(version withvoltage regulator incorporating flasher unit and mixer oil check device)



1	FLYWHEEL MAGNETO
2	TO SERVICES (D.C.)
3	KEYSWITCH CONTACTS
4	VOLTAGE REGULATOR
5	7.5A FUSE
6	STARTER MOTOR CONTACTOR
7	STARTER MOTOR
8	12V-4Ah BATTERY
9	MIXER OIL WARNING LIGHT TRANSMITTER

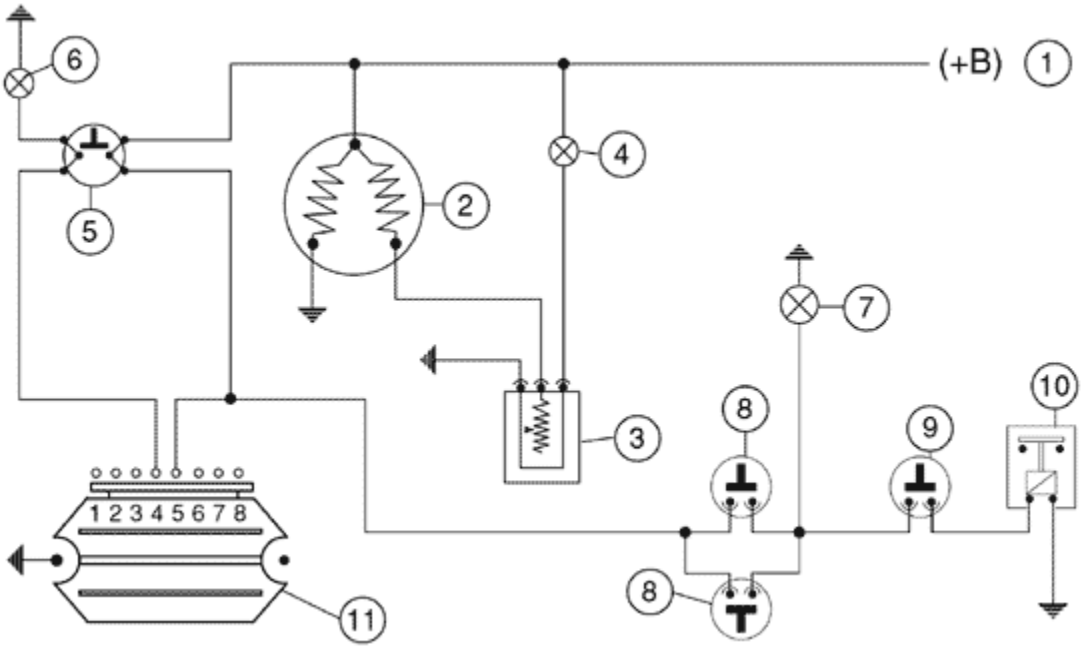
Turn indicators and horn

(Version with voltageregulator incorporating flasher unit and mixer oil check device)



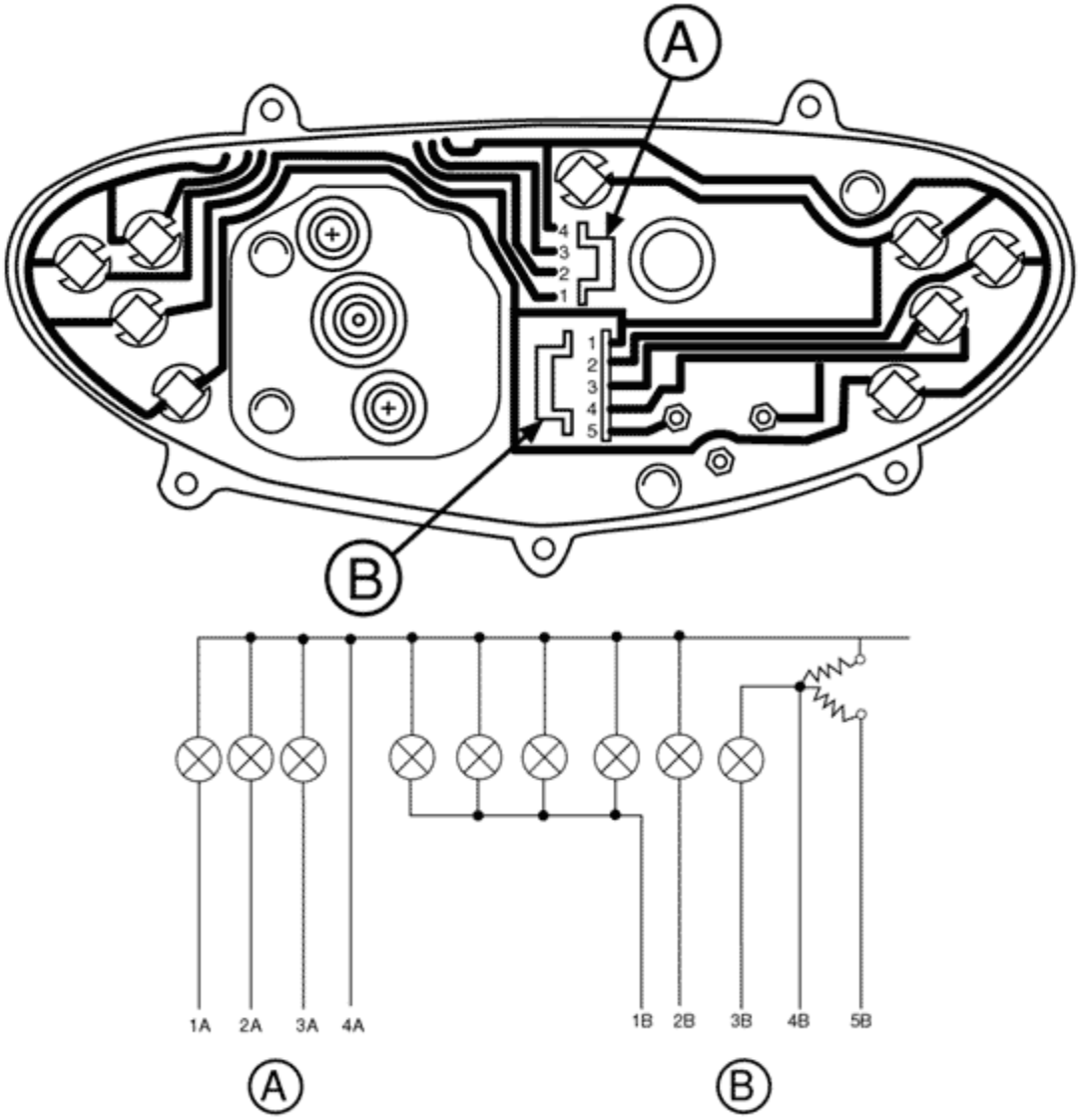
1	VOLTAGE REGULATOR
2	TURN SIGNAL SWITCH
3	TURN SIGNAL INDICATOR LIGHT (12V - 1.2W)
4	TURN INDICATOR BULBS (12V - 10W)
5	HORN BUTTON
6	HORN (C.C.)

Start permissive buttons and level indicators
(Version withvoltage regulator incorporating flasher unit and mixer oil check device)



1	TO SERVICES (D.C.)
2	FUEL GAUGE
3	FUEL LEVEL TRANSMITTER
4	FUEL WARNING LIGHT (12V-1.2W)
5	MIXER OIL WARNING LIGHT TRANSMITTER
6	HORN BUTTON
7	BRAKE LIGHT (12V - 21W)
8	BRAKE LIGHT SWITCHES
9	START BUTTON
10	STARTER MOTOR CONTACTOR
11	VOLTAGE REGULATOR

Instrument panel

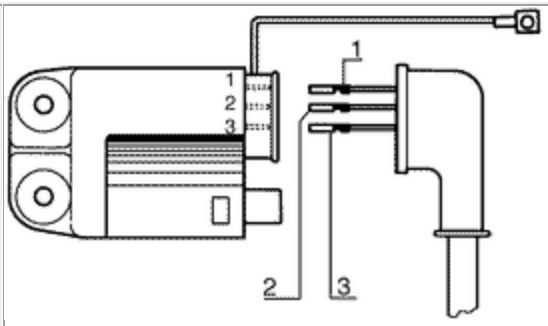


A	
1A	LEFT TURN SIGNAL INDICATOR LIGHT
2A	MIXER OIL WARNING LIGHT TRANSMITTER
3A	FULL BEAM INDICATOR LIGHT
4A	GROUND
B	
1B	INSTRUMENT PANEL ILLUMINATION
2B	FUEL WARNING LIGHT
3B	RIGHT TURN SIGNAL INDICATOR LIGHT
4B	+ BATTERY
5B	FUEL GAUGE

Electronicignition

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.

For the same reason, whenever the cables are disconnected and subsequently reconnected, make sure that each cable is properly reconnected to its terminal by observing the colour coding (see figure).

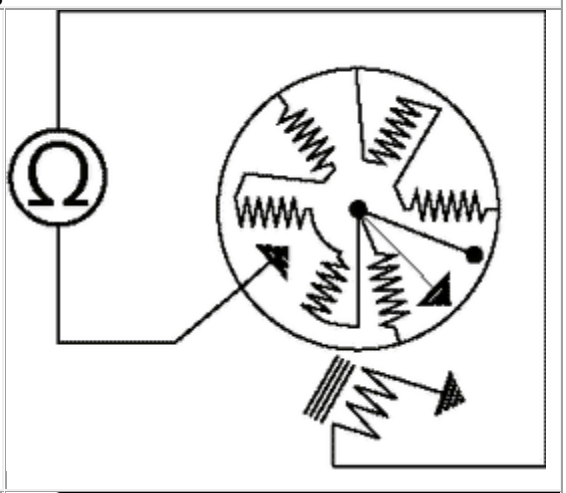


1	RED	3	GREEN
2	WHITE		

Check to be conducted in case of faulty ignition

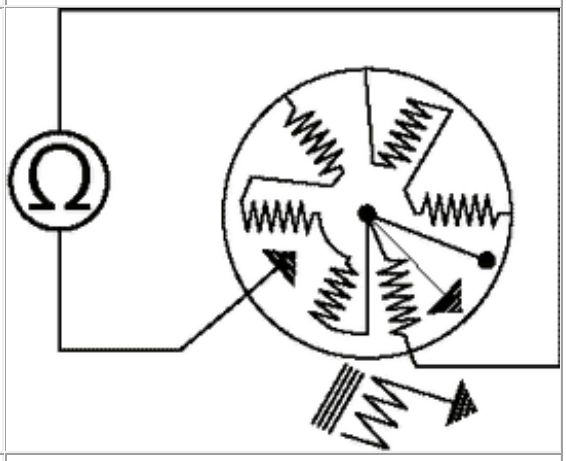
In case of faulty or failed operation of the ignition system and if the cause cannot be found by a simple visual inspection, replace the C.D.I. module with another of the same type and certainly working.
Remember that the disconnections needed to replace the control unit are to be carried out while the engine is switched off.

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



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

After visually checking the electrical connections, take measurements on the charge coil and the pick-up (see table) using multitester code 020331Y.
[02020331Y] 020331Y
If, during the checks on the charge coil and the pick-up, anomalies are found, **replace the stator and other faulty parts.**



Instrument connected between:	**Resistance**

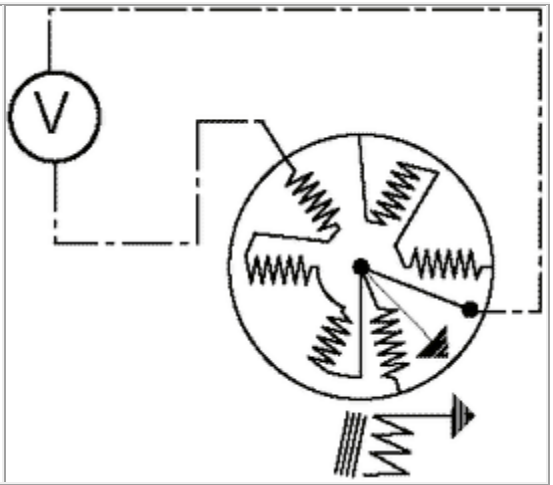
1) Red - white leads	100 - 130 Ω
2) Green - white leads	850 - 1050 Ω

Voltageregulator

Ifa voltage regulator fault is suspected, carry out the following checks:

Alternating current section

A fault in the alternating current section of the regulator can result in the following troubles, depending on the type of fault:
1)Burning out of the bulbs (regulator circuit interrupted).
2)Failed operation of the lighting equipment and the electric choke (regulator short-circuited)

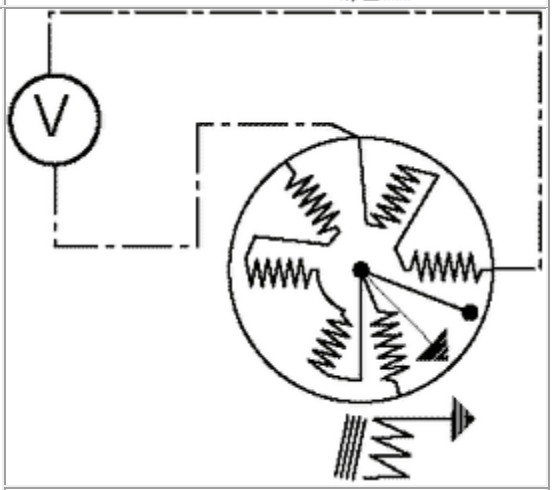


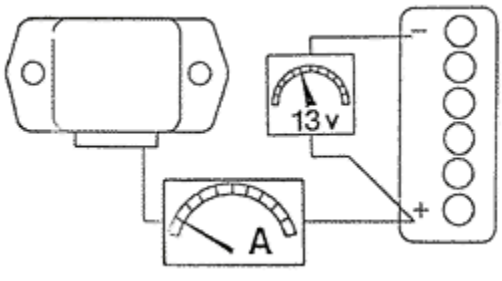
Interventions

FAILURE 1
The regulator must be replaced, as it is certainly faulty.

FAILURE 2
a) Check the current supply of the alternator: disconnect the regulator connector, interpose multitester 020331Y between the grey-blue lead and ground and check that between 25 and 30V is supplied at 3000 rpm.
b) If no faults are found, renew the voltage regulator.
c) If this action still fails to restore normal operation, check the electrical equipment connections.

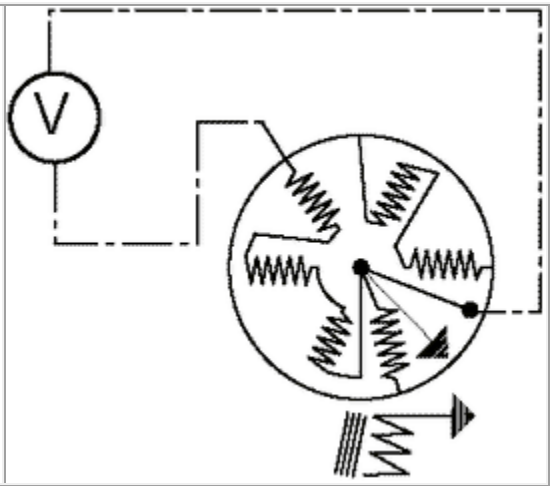
020331Y
[02020331Y] 020331Y





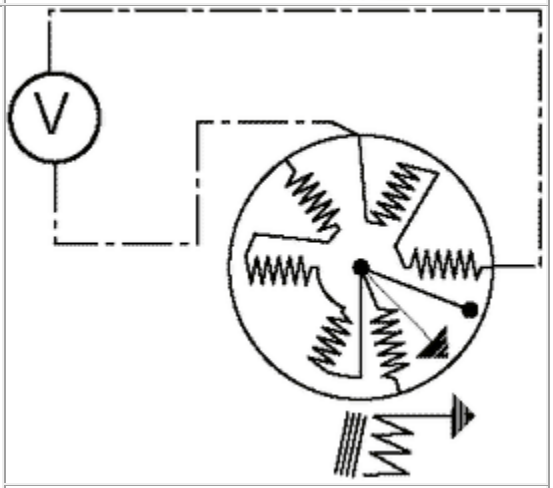
Direct current section

A failure in the direct current section of the regulator can result in the following troubles, depending on the type of failure:
3)Burning out of the protecting fuse (regulator short-circuited); as a result, the battery is not recharged.
4)The battery is not recharged (regulator disconnected).

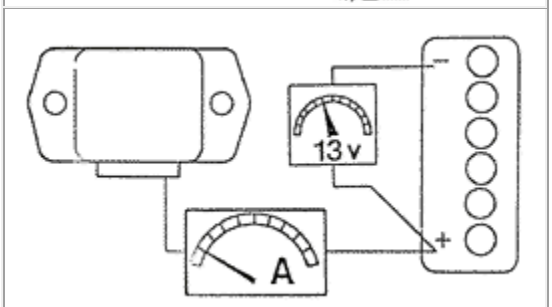


Interventions

FAILURE 3
The regulator must be replaced, as it is certainly faulty. Also replace the protecting fuse.



FAILURE 4
a) Interpose an ammeter between the regulator and the battery and use multitester 020331Y to check that current delivery at 3000 rpm with the battery at 13V is between 1.5 and 2 amperes.
If the measured value is lower than the prescribed value, renew the voltage regulator.
b) If this action still fails to restore normal operation, set multitester 020331Y to the voltage scale and interpose it between the yellow lead terminal and the red (positive) battery lead. The generator should supply between 26 and 30V at 3000 rpm (this measurement must be performed with the battery disconnected).



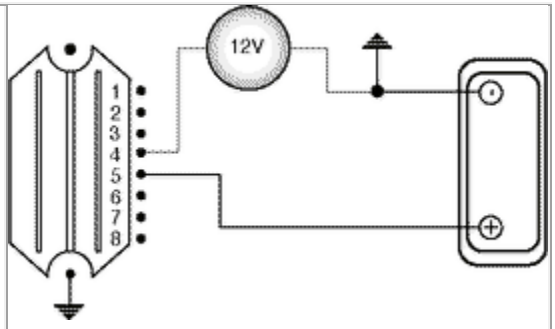
020331Y
[02020331Y] 020331Y

Voltage regulator checks
(version with integral oil check device andflasher unit)

Oil warning check system not working

-Remove the front grille and the horn and disconnect the voltage regulator connector.
-Supply 12V to pin number 5 and use the multitester to check that you get an equivalent output (12V) on pin number 4 for about 5 seconds.
-If there is no output on pin 4, renew the voltage regulator.
-If you get a 12V reading on pin 4, proceed to check the electrical system and the oil warning light.

Multitester: 020331Y
[02020331Y] 020331Y



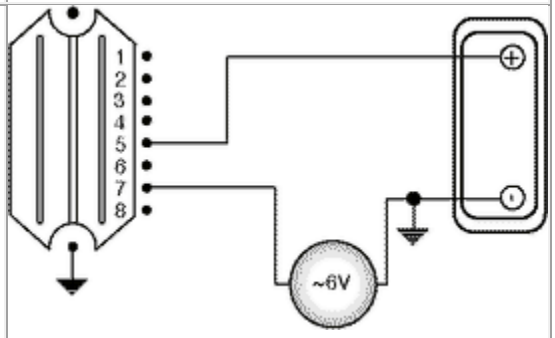
Turn indicators not working

-If the turn indicators are not working, proceed as follows:
-Access the voltage regulator as described above; check for the presence of voltage on regulator pin 5 and then check for the presence of a fluctuating voltage of around 6V on pin 7.

Multitester: 020331Y
[02020331Y] 020331Y

Note: If you get no voltage reading, check the rest of the electrical system (keyswitch, connections, etc.) and, if necessary, renew the regulator.

Note: As the voltage is supplied in pulses, readings may vary with respect to the specified value depending on the type of test instrument (analogue or digital).



Starter motor

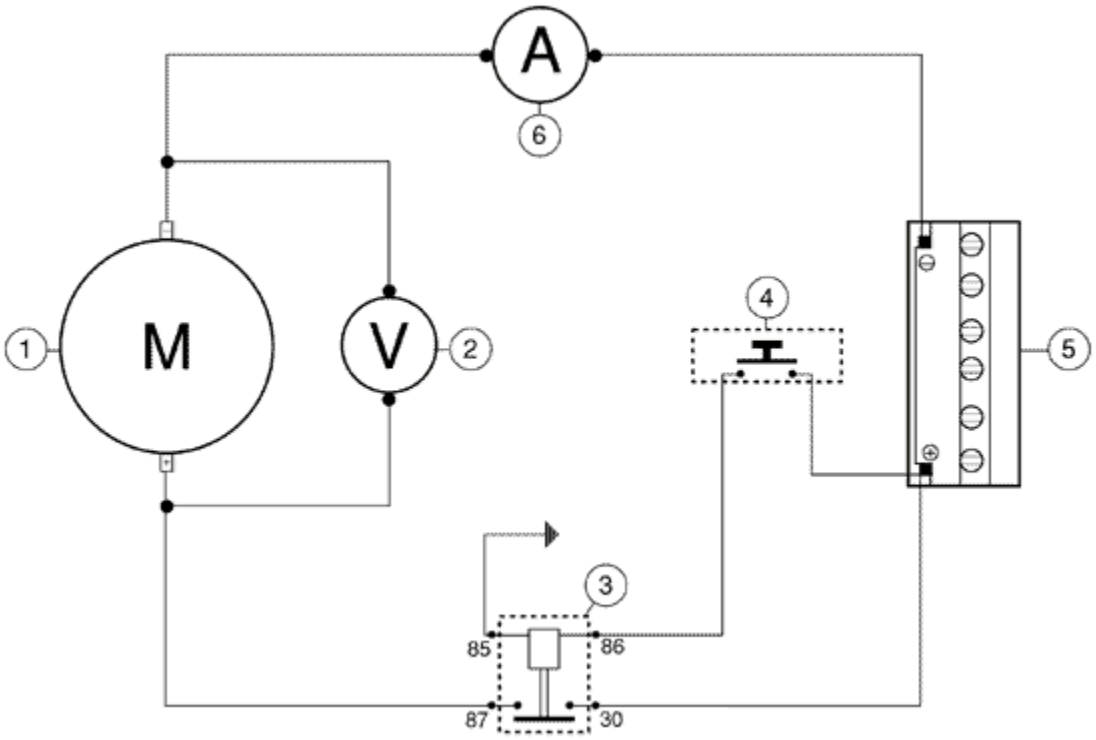
Specifications

-Ratedvoltage 12V.
-Ratedpower 0.15 kW.
-Left-handrotation.
-Connectedto the engine by pinion and crown wheel on crankshaft, transmission side.
-Push-buttonoperated.
-Battery used for thetest: 12V - 4Ah.

Bench tests to be carried out when checking the starter motor

1)- No-load test: the starter motor, whenunloaded, must absorb no more than 10A with a supply voltage ≥ 11.7V andmust rotate at ≥ 18.000 rpm.
2)- Load test: when the starter motor isso braked that it absorbs 40A with supply voltage ≥ 10V, torque of≥ 0.014 N·m must be obtained at 10000 rpm.
3) -Static torque test: when the rotor is lockedand the supply voltage is ≥7V, the absorbed current must not exceed 100Aand the torque must be at least 0.033 N·m.

Note: The abovecharacteristics must be measured with a charged battery and after running thestarter motor for 30 seconds in the conditions described at point 1.



1	STARTER MOTOR	4	START BUTTON
2	VOLTMETER	5	(12V-4Ah) BATTERY
3	STARTER MOTOR CONTACTOR	6	AMMETER

Battery (12 V-4 Ah)

Caution - Battery electrolyte is poisonous and can causeserious burns as it contains sulphuric acid. Avoid contact with the eyes, theskin and garments. In case of contact with the eyes or skin rinse abundantlywith water for about 15 minutes and seek immediate medical assistance. If theliquid is ingested immediately drinklarge quantities of water or milk. Subsequently drink milk of magnesia, beatenegg or vegetable oil. Call a doctor without delay. Batteries produce explosivegases.Keep away naked flames, sparks and cigarettes. When a battery is chargedin closed places ensure adequate ventilation. Always protect the eyes whenworking in the proximity of batteries.

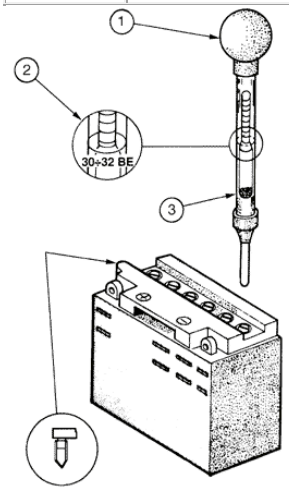
Keep out of reach ofchildren.

Installing charged-dry batteries

1)-Remove theshort closed tube and the plugs. Fill the cells to the upper level with batteryacid, specific gravity 1.26 corresponding to 30° Bé at 15°C.
2)-Leave thebattery to stand for about 30 minutes and then top up once again with batteryacid.
3)-Within 24hours use battery charger 020333Y (single) or 020334Y (multiple) to charge thebattery at approximately 1/10 capacity until the voltage reaches approximately2.7V on each cell with specific gravity of about 1.27 corresponding to 31° Bé(stable values). The battery should be charged for between 15 and 20 hours.
4)-When thebattery is fully charged, top up with distilled water, refit the plugs andclean the battery case.
5)-Aftercompleting the above operations, install the battery on the vehicle. Observethe connections described in point 3) of the heading **Battery recharge**.

Caution - After installing thebattery and in order to provide a vent for the gases forming inside it, replacethe short closed tube next to the positive (+) terminal with the correspondinglong open tube which is present on the vehicle.

1	HOLD THE TUBE UPRIGHT
2	MEASURE THE LEVEL VISUALLY
3	THE FLOAT MUST BE RELEASED



Battery maintenance

The battery isthe electric component which requires the most constant care and accuratemaintenance. The main maintenance rules are as follows:

1) Checkingthe electrolyte level

Frequentlycheck that the electrolyte reaches the upper level. To top up, only usedistilled water..

If you need totop up the battery too frequently, check the vehicle electrical equipment asthe battery is certainly working in overload conditions, which will lead torapid deterioration.

2) Checkingthe battery charge

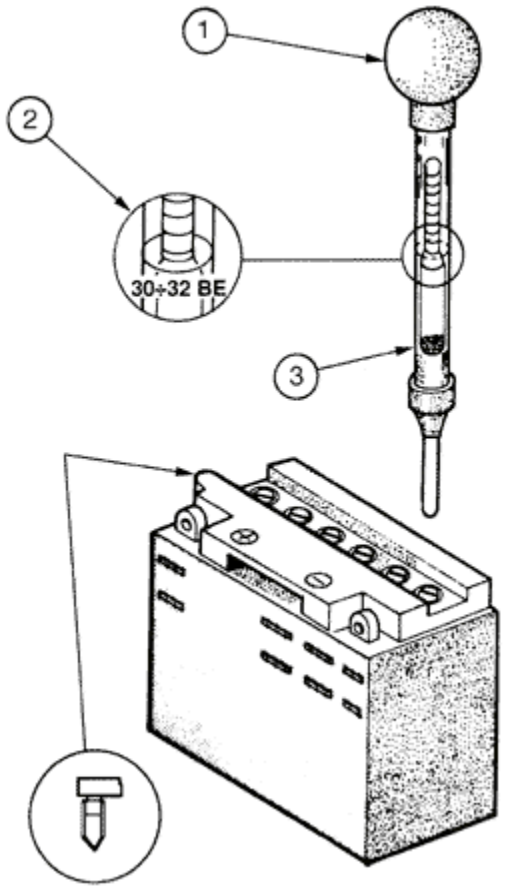
Afterrestoring the electrolyte level, check its density with the special hydrometer(see figure).
When thebattery is charged, electrolyte density must be between 30 and 32 Bé,corresponding to specific gravity of 1.26-1.28 at a temperature not lower than15°C. If density has fallen below 20° Bé, the battery is completely dischargedand needs recharging. At the end of charging, the voltage of each cell must be2.6 - 2.8 V. The discharge limit for each cell is 1.8V.

When chargingis terminated, check the electrolyte level and density as well as the voltageof each cell. If the vehicle is not used for some time (1 month or more) thebattery must be periodically recharged. In three months the battery runs downcompletely.
When refittingthe battery take care not to invert the connections: the ground lead **(black)**is to be connected to the **negative (-)** terminal and the other lead **(red)**must be connected to the **positive (+)** terminal.

3) Batteryrecharge

Caution - Before charging the battery remove allcell plugs. Keep free flames or sparks away from the battery during recharge.When the battery has to be removed from the vehicle, disconnect the negativeterminal first.

Routinebattery charging with the battery off the vehicle must be performed withbattery charger 020333Y (single) or 020334Y (multiple), positioning the batterycharge selector in relation to the type of battery and setting a current of 0.5A for between 6 and 8 hours. Ensure you connect up to the battery with thecorrect polarity (+ to + and - to -). The plugs must be removed from thebattery throughout the charging procedure.



1	HOLD THE TUBE UPRIGHT
2	MEASURE THE LEVEL VISUALLY
3	THE FLOAT MUST BE RELEASED

4) Sealedbattery

Installingthe sealed battery

Remove thecover from the top of the battery and, using the funnel provided with thebattery, fill it with the acid substance contained in the plastic vials.
Close thebattery again by replacing the cover and charge it for 5-10 hours with aninitial current of 0.9 A.

Warning - Do not on any account remove the plugsafter the battery has been installed, as this would result in its rapiddeterioration.

Maintenance
Themaintenance of sealed batteries merely consists in checking their charge and,if necessary, in recharging them. Do not on any account remove the sealingcover from the top of the battery. To install a new sealed battery follow thesesteps:

a) Checkingthe battery charge
Check that thevoltage has not fallen below 12.5 V.

b)Recharging the battery
Charge thebattery with a recommended battery charger (AWA part code 445492 Single/445493Multiple) and make sure the voltage does not exceed 15.2V except for shortperiods.

5) Cleaningthe battery

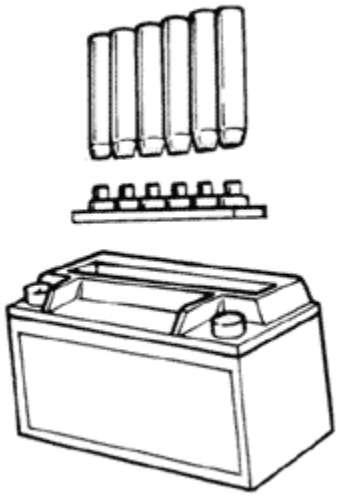
Keep thebattery clean, especially the top; coat the terminals with Vaseline.

Warning - Never use fuseshaving a greater capacity than the one recommended. The use of a fuse ofunsuitable capacity may result in serious damage to the whole vehicle or evencause a fire.

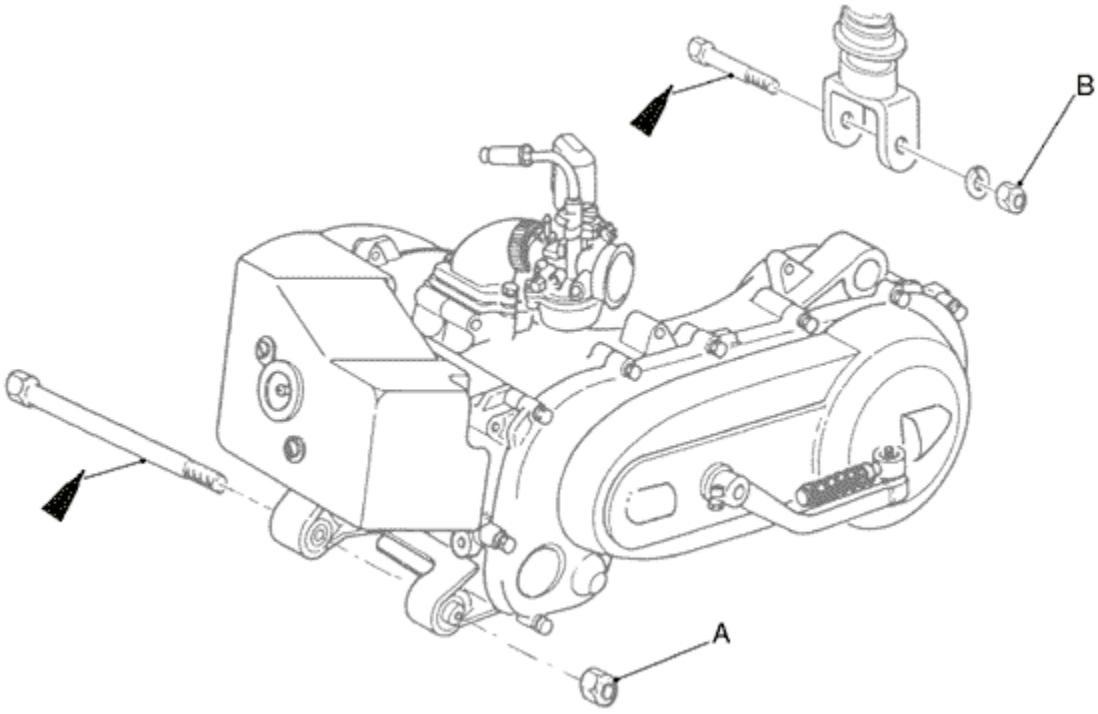
Warning - In case of urgent need, the chargingtime may be reduced to 5-6 hours.

Warning - Normal drinking water contains saltsthat are harmful for batteries. Use only distilled water.

Warning -To ensure maximumperformance the battery must be charged before using the vehicle. Insufficientbattery charge or low electrolyte level when first used will result inpremature failure of the battery.



ENGINE



LUBRICATE	CLEAN WITH CARE
GREASE	CAUTION HANDLE WITH CARE
USE THE PRODUCT	ALWAYS REPLACE

Symbol	A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q	R
Quantity	1	1														
Torque N·M	33 - 41	33 - 41														

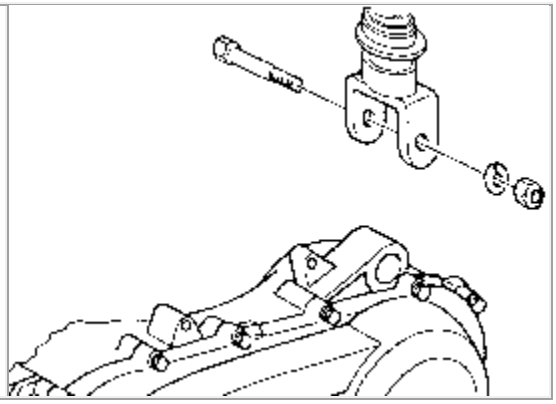
Disassembling engine from frame

-Disconnect the battery.
-Disassemble the complete exhaust unit.
-Remove the rear wheel.
-Disassemble the mechanical linkage to the rearbrake.
-Disconnect the electrical terminals.
-Disassemble the throttle and mixer controlcables.
-Disconnect the pipelines (fuel - oil - vacuumtap control).

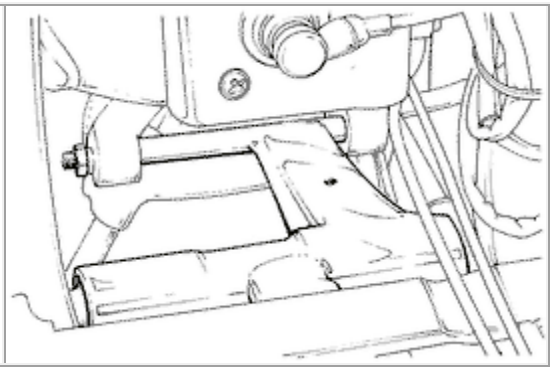
Caution - Handle petrol with the utmost care.

Warning - When installingthe battery always connect the positive cable before the negative cable. **Caution** - Wear protective goggles when using hammering tools.

Removing the engine/shock absorber pivot

-Remove the nut shown in the figure and then withdraw the bolt.	

Removing the engine/swing arm pivot

-Remove the nut shown in the figure and then withdraw the bolt.	

Reassembling engine to frame

Perform thedisassembly steps in reverse order. Observe the prescribed tightening torques.

Engine/shockabsorber 33-41 N·m
Engine/swingarm 33-41 N·m

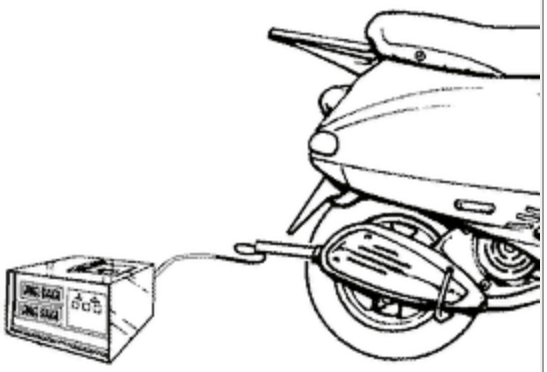
Carburetor

CO levelanalysis

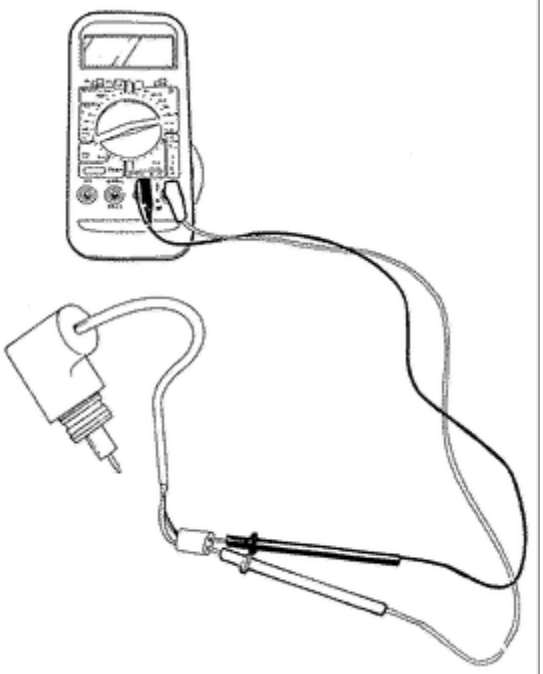
-This test must be carried out after the carburettor has been thoroughly flushed and with a clean air filter and spark plug in perfect condition.

1) Warm up the vehicle by riding at about 30 mph for 10 minutes, thus ensuring that the automatic choke is deactivated.
2) Switch off the engine for the time strictly necessary to perform steps 3) and 4).
3) Insert a tube, approx. 50 cm in length, into the exhaust pipe.
4) Make a perfect seal between the tube and the internal diameter of the exhaust pipe. Insert the exhaust gas analyzer sensor into the tube.
5) Start the engine
6) Switch on the headlight (dipped beam).
7) Wait for about 1 minute for the engine to settle at idle speed.
8) **Without opening the throttle** use the regulator screw to bring the engine up to 1800 ± 100 rpm starting from about 1600/1500 rpm.
9) Turn the mixer adjuster screw until you get a "CO" value of 3.5 ± 0.5 rpm; this value should be obtained with the adjuster screw opened by $2^{1/2}$ - $3^{1/2}$ turns.
10)Slowly turn the throttle grip until you bring the engine to 4000 rpm and then return it to the closed position. Make sure the CO value at idle speed coincides with the value measured earlier, otherwise, repeat the procedure from step (3).

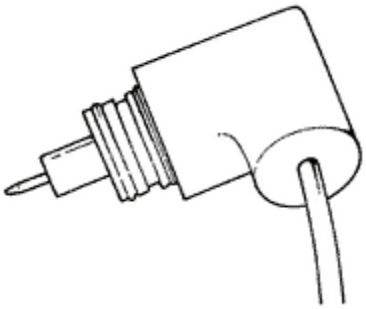
Digital rev counter: 020332Y
[02020332Y] 020332Y
Exhaust gas analyzer: 020320Y
[02020320Y] 020320Y



Automatic choke - Check

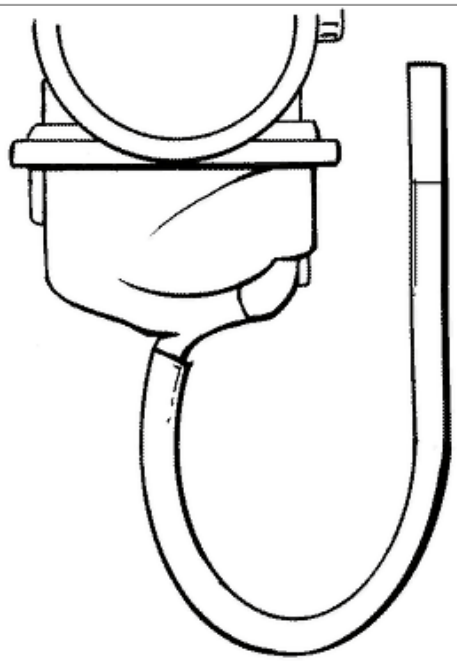
Control -Stop the engine and allow it to cool for at least 10 minutes. -Disconnect the choke connectors and measure the resistance between the terminals. **Resistance: 35 $^{\pm 5}$ ohm (10 minutes after the engine has been switched off).** -The measurement must be made at ambient temperature of around 20°C. - If the value exceeds the prescribed level, renew the automatic choke. **Procedure** -Remove the screw from the mounting plate, the mounting plate itself and the automatic choke.	

Valve check

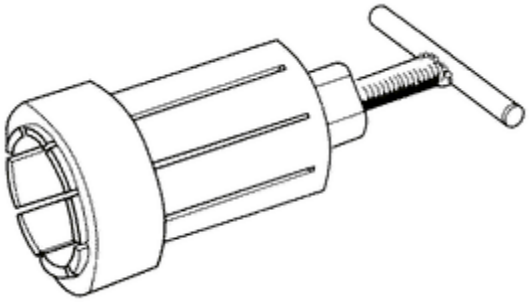
-Check the automatic choke valve and needle for signs of scoring, wear, scratches or other damage.	

Checking carburettor bowl level

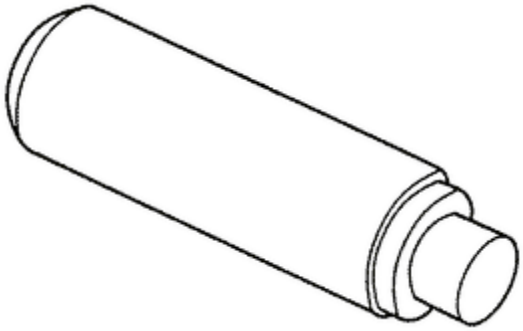
-Substitute the rubber tube utilised for emptying the bowl with an equivalent but transparent tube.
-Position the tube as shown in the figure with the end higher than the bowl plane.
-Slacken the bowl drain screw.
-Start the engine.
-The fuel in the tube will rise to the same level as the fuel in the bowl (communicating vessels principle).
-The distance between the level in the tube and the carburettor bowl plane must be 3.5 mm for the Weber 12 OM.
-You can make this check more easily with the engine switched off.
-If the level is not as specified the problems could be: dirt in needle seat; faulty float.



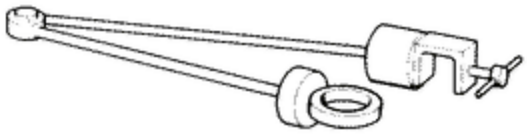
Engine Equipment



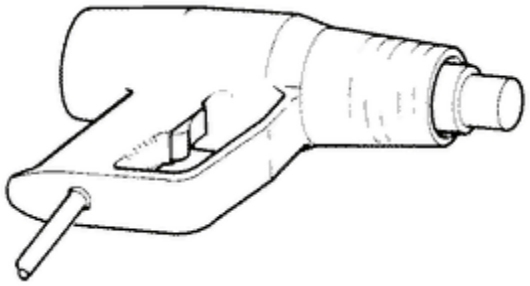
Description	PART NUMBER	LINK
Bearing extractor	004499Y	



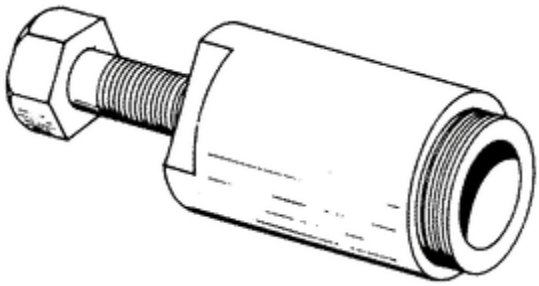
Description	PART NUMBER	LINK
Gearbox Cover Roller Bearing Drift	020080Y	[12020236] Bearing hub cover



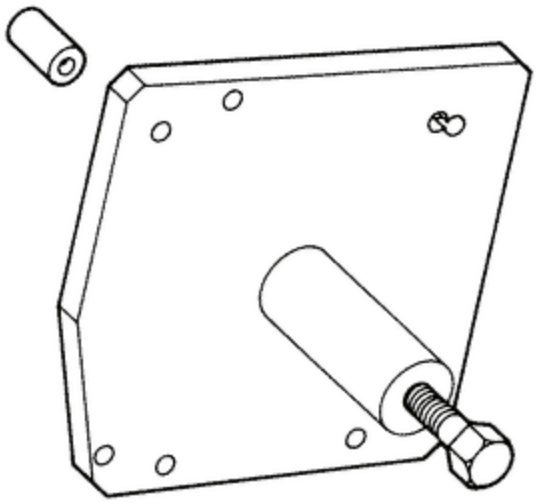
Description	PART NUMBER	LINK
Support	020150Y	[12020236] Bearing hub cover [12020241] Bearing on the case [12020247] Replacement of bearing [12020406] Case union



Description	PART NUMBER	LINK
Thermal gun	020151Y	[12020236] Bearing hub cover [12020241] Bearing on the case [12020247] Replacement of bearing [12020406] Case union

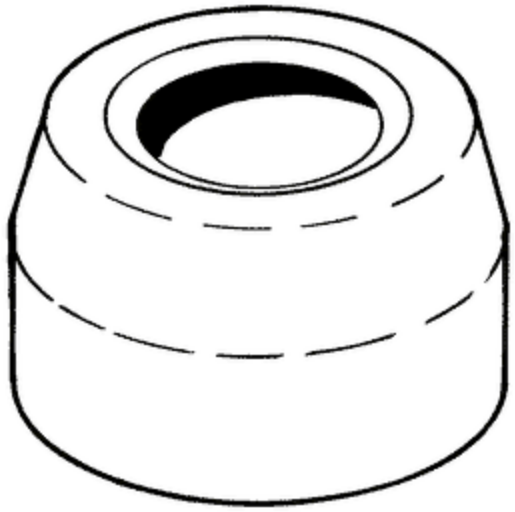


Description	PART NUMBER	LINK
Flywheel extractor	020162Y	[12020105] Flywheel

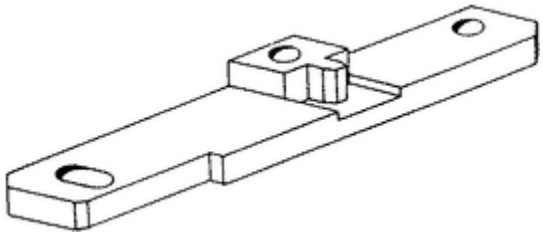


Description	PART NUMBER	LINK
Crankcase separator	020163Y	[12020402] Case

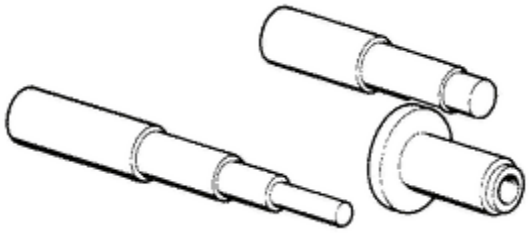
		seperation [12020403] Shaft expulsion [12020406] Case union [12020407] Halfcase closure



Description	PART NUMBER	LINK
Driven Pulley Assembling Collar	020164Y	[12020223] Refitting halfpulley

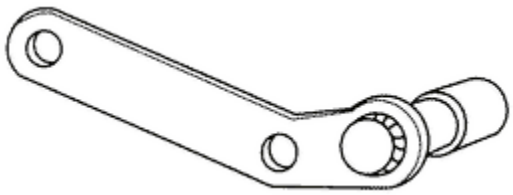


Description	PART NUMBER	LINK
Starter gear retainer	020165Y	[12020203] Starter gearing [12020231] Fan

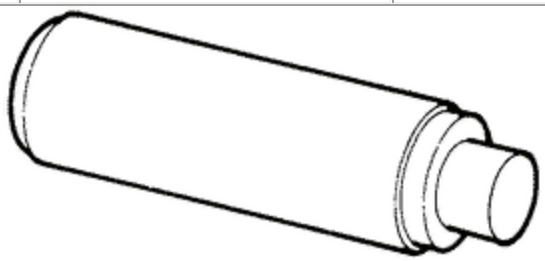


Description	PART NUMBER	LINK

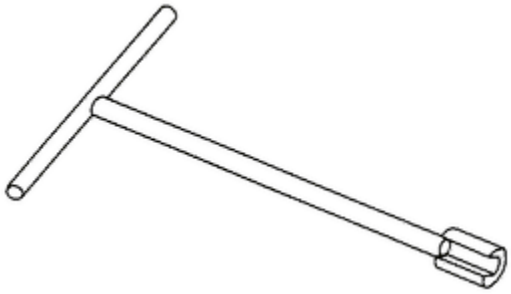
Piston Pin Spring Clips Fitting Tool	020166Y	[12020307] Elastic rings



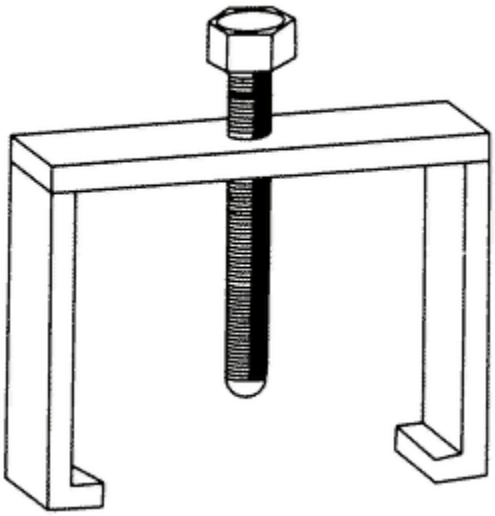
Description	PART NUMBER	LINK
Water pump retainer	020167Y	



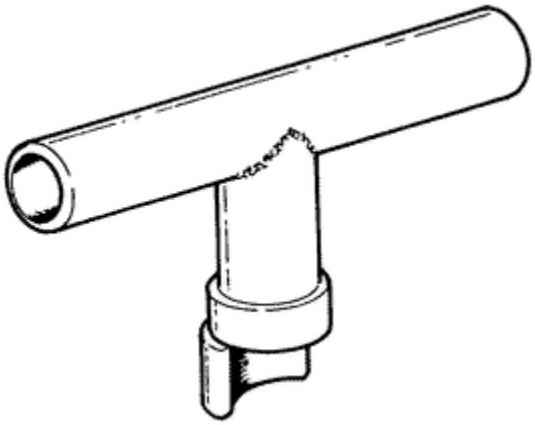
Description	PART NUMBER	LINK
Drift for water pump seal	020168Y	



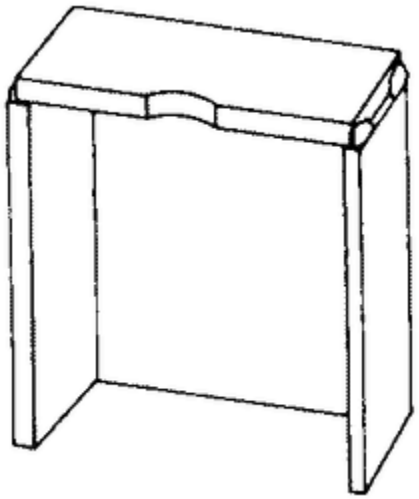
Description	PART NUMBER	LINK
Water pump wrench	020169Y	



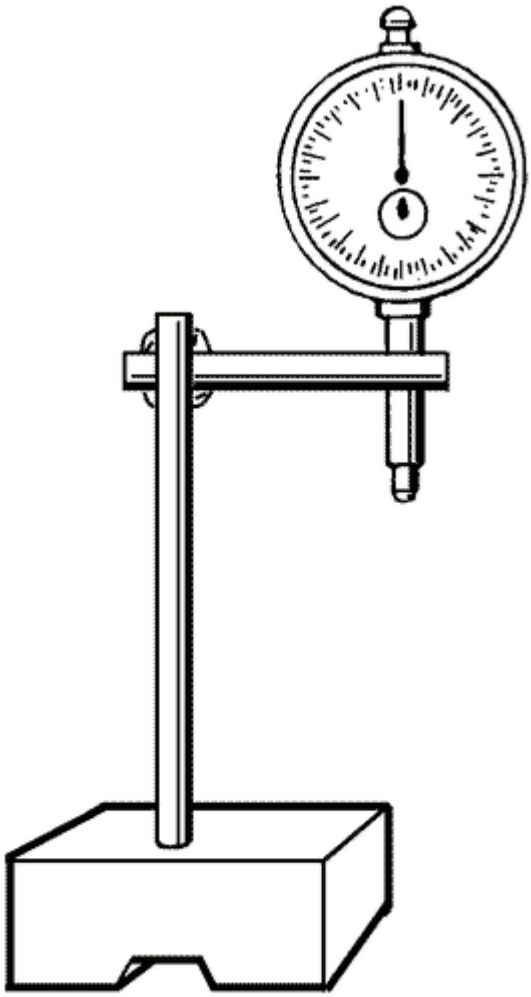
Description	PART NUMBER	LINK
Mixer drive wheel extractor	020170Y	



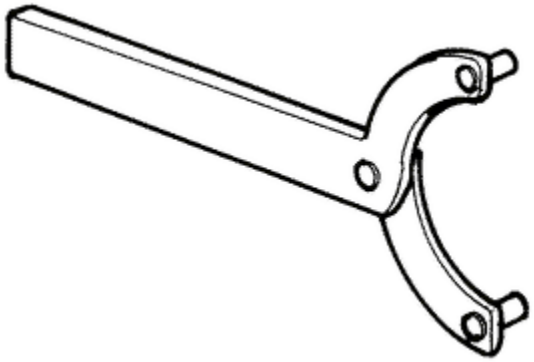
Description	PART NUMBER	LINK
Starter spring fitting tool	020261Y	[12020246] Fitting serrated section



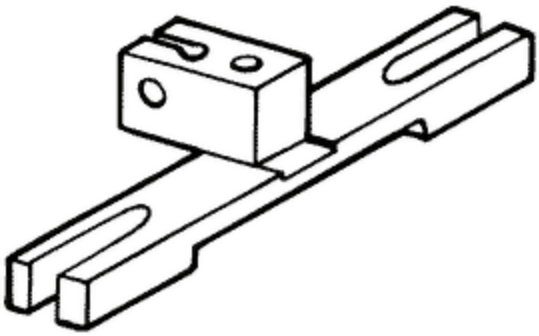
Description	PART NUMBER	LINK
Crankshaft support	020265Y	[12020405] Bearing



Description	PART NUMBER	LINK
Dial gauge and support	020335Y	[12020407] Halfcase closure

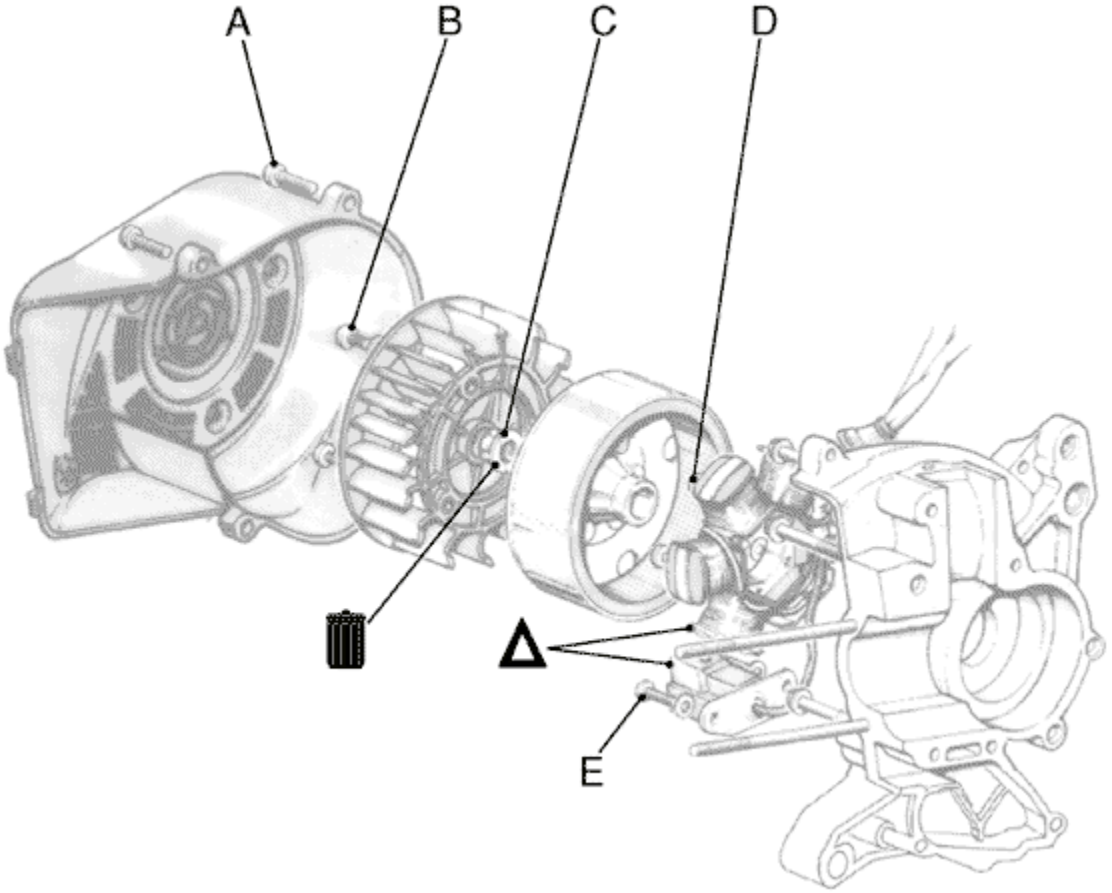


Description	PART NUMBER	LINK
Driven pulley retainer	020565Y	[12020104] Flywheel blockage nut [1202] Engine with air cooling [12020202] Driven pulley [12020215] Clutch [12020224] Fitting clutch [12020228] Clutch bell



Description	PART NUMBER	LINK
Dial guage support for cylinder	020268Y	

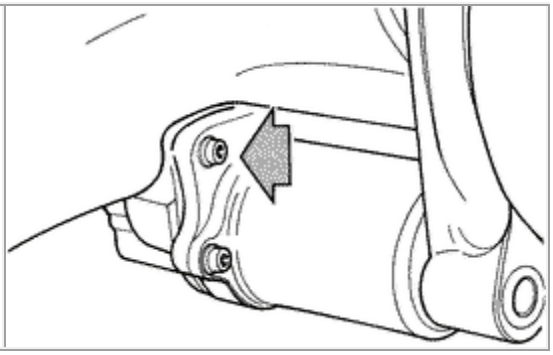
MAGNETIC FLYWHEEL



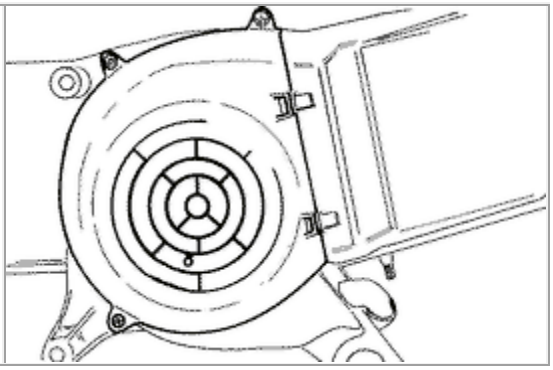
LUBRICATE	CLEAN WITH CARE
GREASE	CAUTION HANDLE WITH CARE
APPLY THE PRODUCT	ALWAYS REPLACE

Symbol	A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q	R
Quantity	4	3	1	3	2											
Torque N·m	1 - 2	3 - 4	40 - 44	3 - 4	3 - 4											

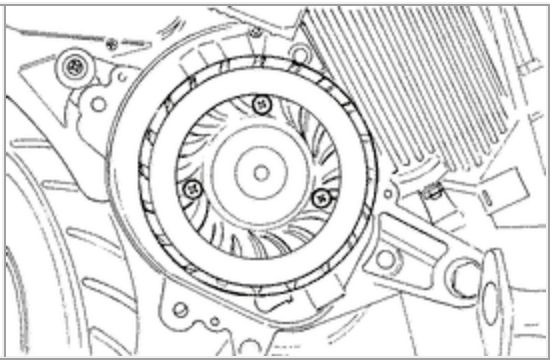
Starter motor

-Perform action on the fastening shown in the figure and on the diametrically opposed one.	

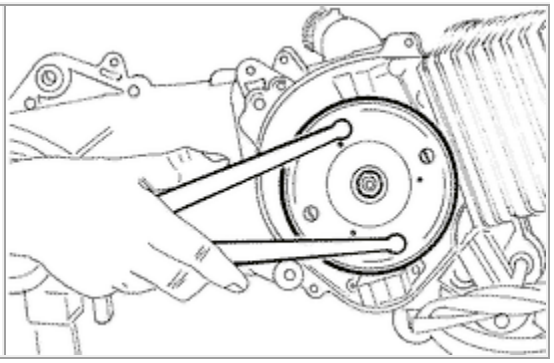
Fan cover

-Remove the four fastenings and unclip the two cogs with the cylinder cooling cover. -If the vehicle is subjected to use off main roads, it is advisable to take off the exterior part of the cover adjusting the retainers situated on the flywheel side and it is necessary to clean the soundproofing element with compressed air and/or water.	

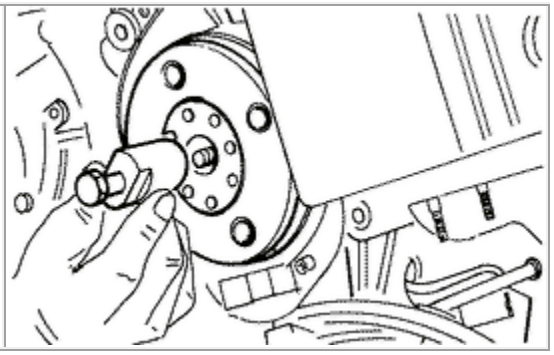
fan

-Take off the three screws that hold the fan tightened on the flywheel. -Verify that the fan is in a good state.	

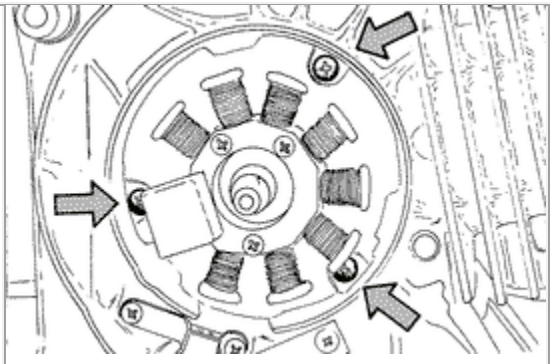
Flywheel locking nut

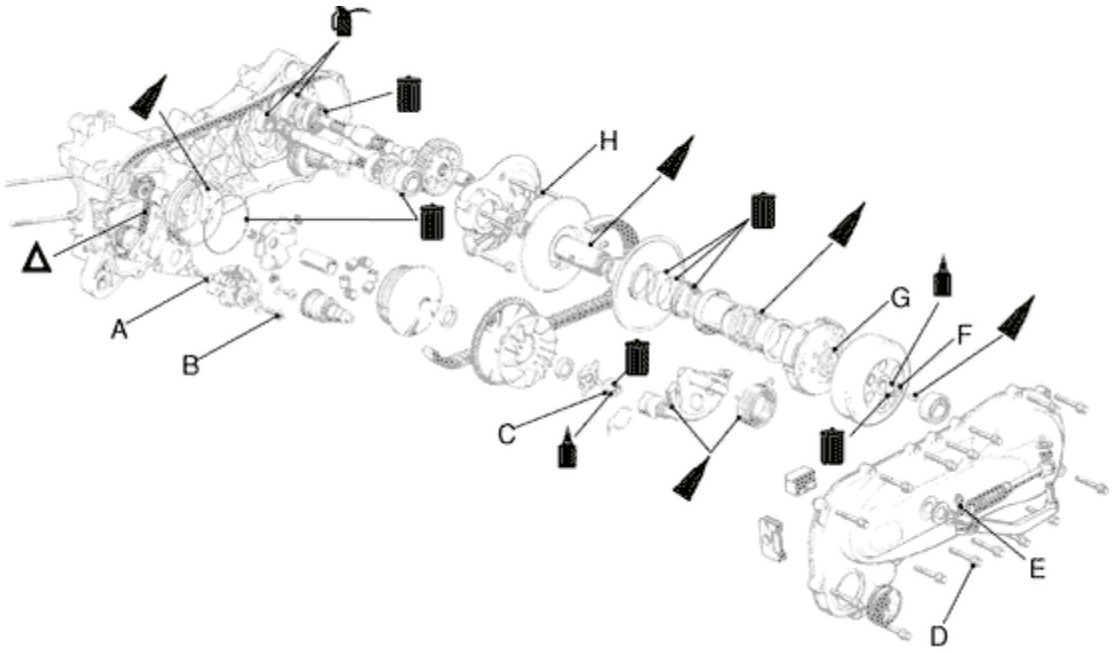
-During the operation keep the flywheel tight with the specific tool. Tool 020565Y [1201020565Y] 020565Y	

Flywheel

Flywheel extractor 020162Y. [1201020162Y] 020162Y	

Statore Pick-up

Note: For reassembling the parts follow the inverse procedure or removal. -Use a new nut so as to ensure levelness of the mounting. **Note:** It is a good rule, after reassembling the flywheel, to protect the thread for the extractor with Z2 grease. Locking flywheel nut 40 - 44 N·m [010502] Engine	



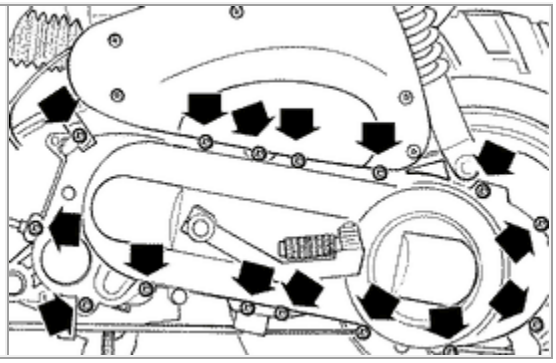
LUBRICATE	CLEAN WITH CARE
GREASE	CAUTION HANDLE WITH CARE
APPLY THE PRODUCT	ALWAYS REPLACE

SYMBOL	A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q	R
QUANTITY	1	2	1	15	1	1	1	5								
TORQUE N·m	3 - 4	3 - 4	40 - 44	12 - 13	12 - 13	40 - 44	50 - 60	12 - 13								

Transmissions cover

-Unscrew the 15 screws and remove the transmission cover, giving it mallet blows.

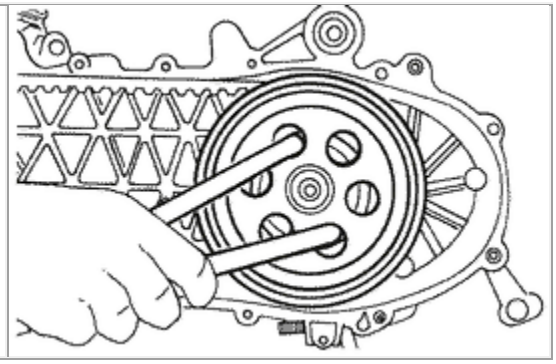
Note: The crankcase remains slightly held from the slight forcing of the shaft of the pipe half-pulley with the bearing housed on the crankcase itself.



Drivenpulley

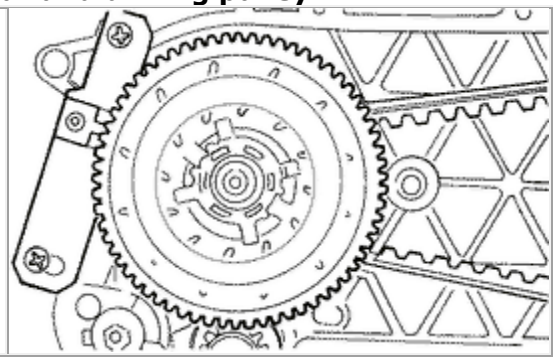
-Remove the nut.
-Take away the unit assy.

Tool 020565Y
[1201020565Y] 020565Y



Starting gear and driving pulley

Tool 020165Y
[1201020165Y] 020165Y

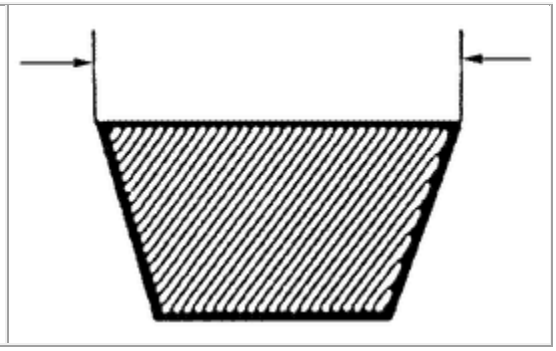


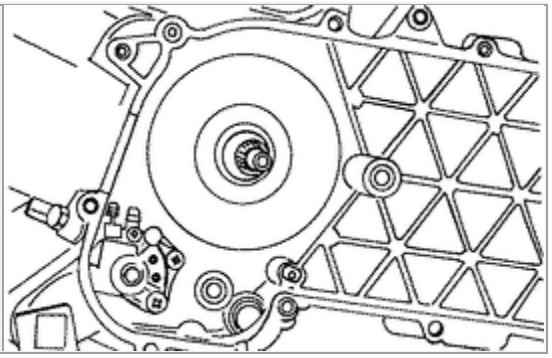
Checks

Drive belt

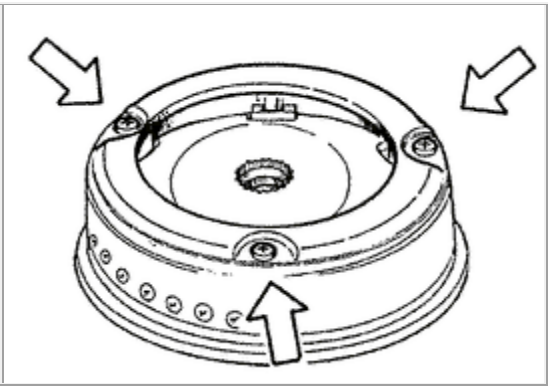
-Make sure that the drive belt is not damaged.
-Check the belt length.
Wear limit 17.5 mm.

Note: Verify the belt and needles holder every 20,000 Km.

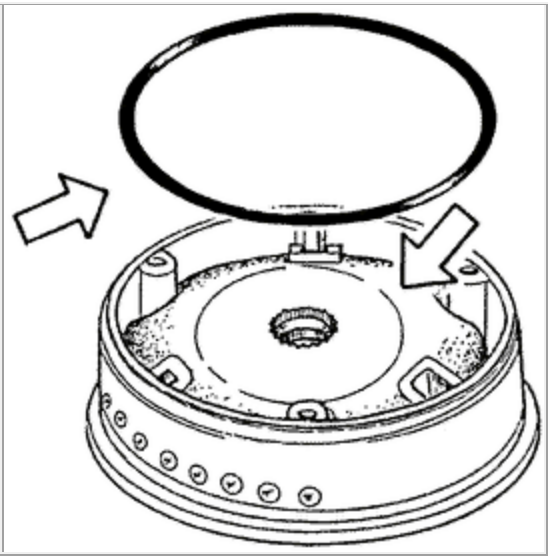


Belt - Starting transmission - Speed governor unit - Mixer	

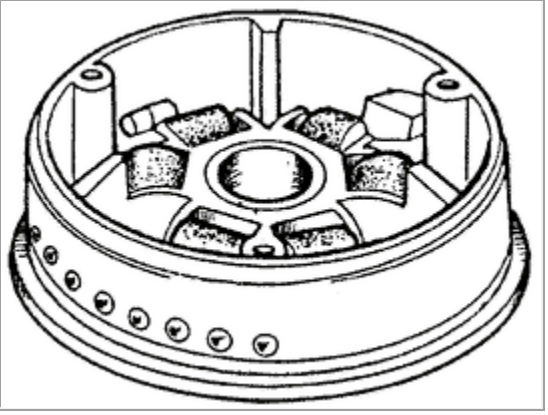
Movable half pulley

-Remove the three screws and the cover.	

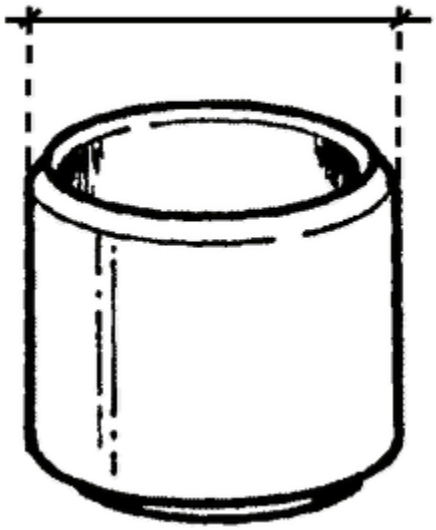
Roller fixed plate

-Remove the roller fixed plate and the O-ring.	

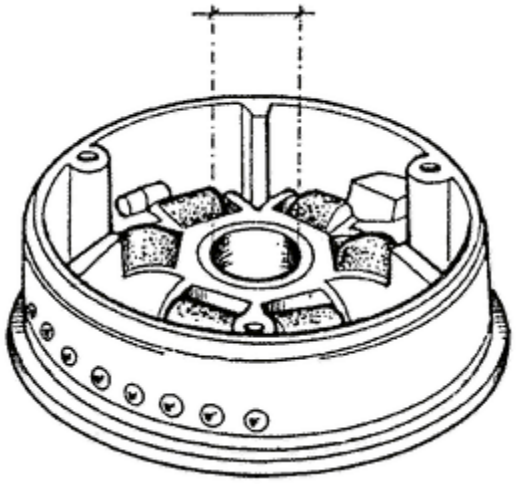
Rollers

-Remove the rollers after marking them with a felt pen to enable correct reassembly.	

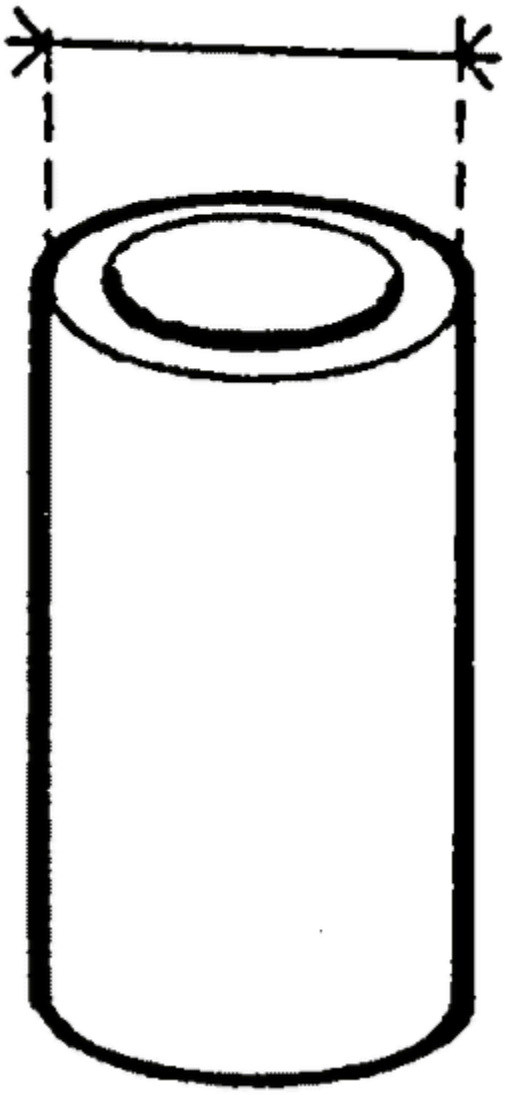
Rollers

-Make sure that the rollers are not damaged or worn. Wear limit Ø 18.5 mm minimum.	

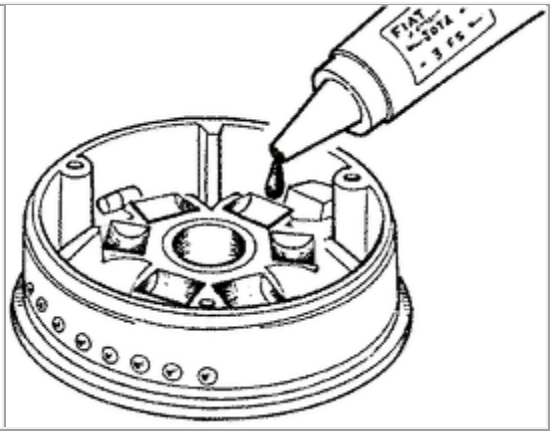
Contenedor rodillos

-Comprobar que el casquillo interior no presente desgastes anómalos y medir el diámetro interior. Diámetro máx. admitido Ø 20.12 mm. máx. **Note: No lubricar ni limpiar el cojinete antifricción.**	

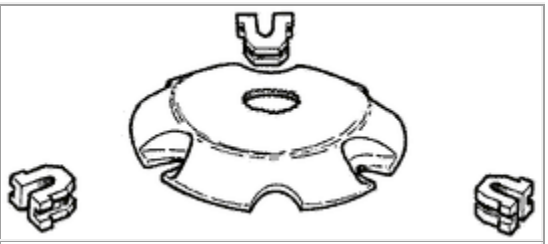
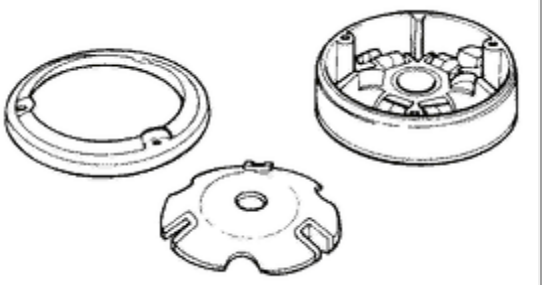
Pulley sliding bush

-Measure the outside diameter of the pulley sliding bush. Wear limit Ø 19.95 mm.	

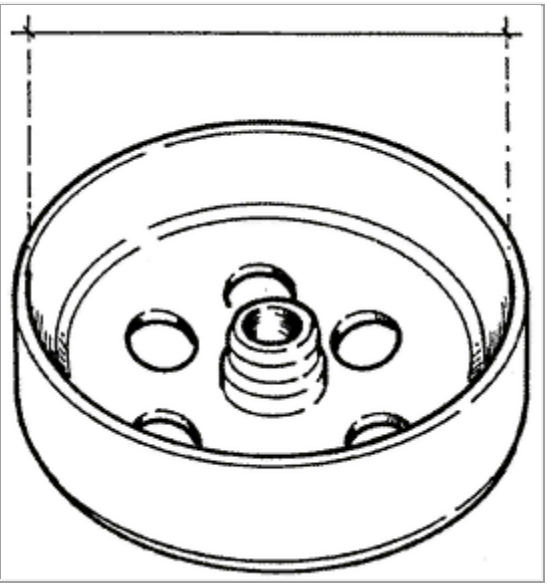
Roller container

-Lubricate the working area of the rollers with Jota 3 FS grease and then refit the rollers. **Note:** Unless you are fitting new parts, take care to replace the rollers in their original positions.	

Guide shoes

-Before fitting, check that the roller holder guide shoes are not worn.	
-Fit the roller fixed plate, the sealing ring and the cover. Fasten the cover with the three screws.	

Driven pulley

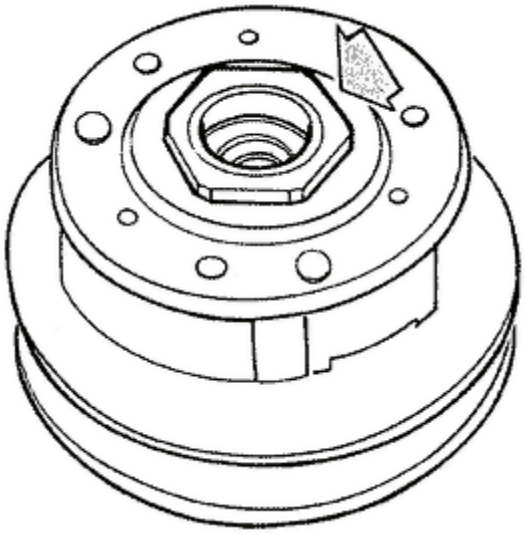
-Check that the clutch drum is not worn or damaged. -Measure the internal diameter (max. Ø 107.5) **Note:** Place the clutch drum on the special peg to check out of round (max. 0.20 mm).	

Clutch

-Remove the central nut, keeping the pulley locked using the specific tool.

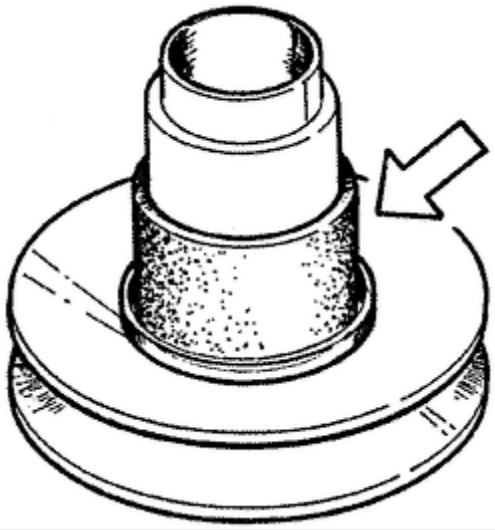
Warning - When removing the clutch unit locknut, be sure to hold the unit in place, as it may suddenly spring off due to the thrust of the spring.

Tool 020565Y
[1201020565Y] 020565Y

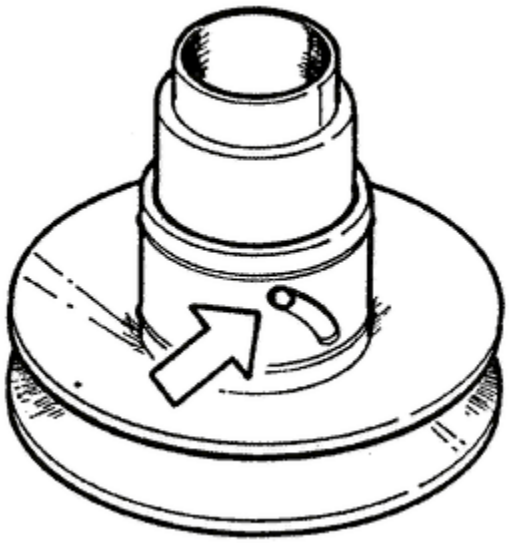


Pin-retaining collar

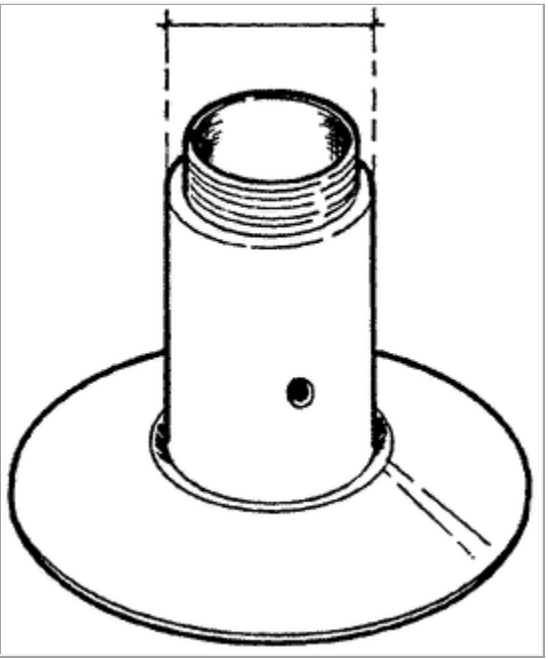
-Remove the retaining collar.



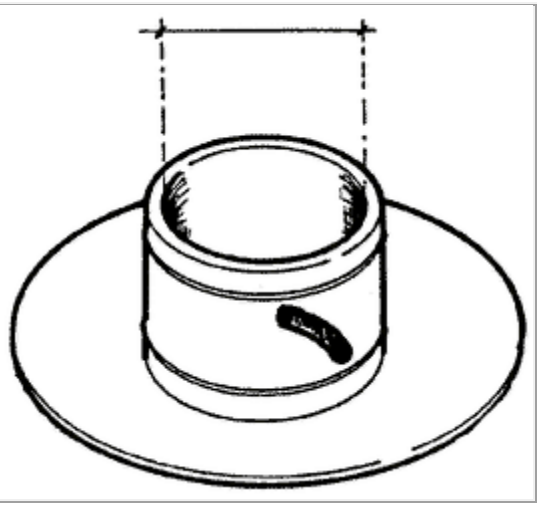
Pulley Slot pins

-Remove the pins from their slots and slide the moving driven pulley half from the fixed driven pulley half.	

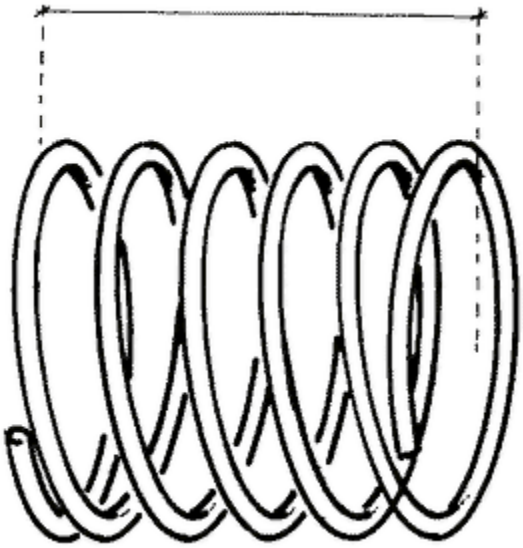
Fixed driven pulley half

-Measure the outside diameter of the pulley's central bush. Wear limit Ø 33.96 mm. minimum.	

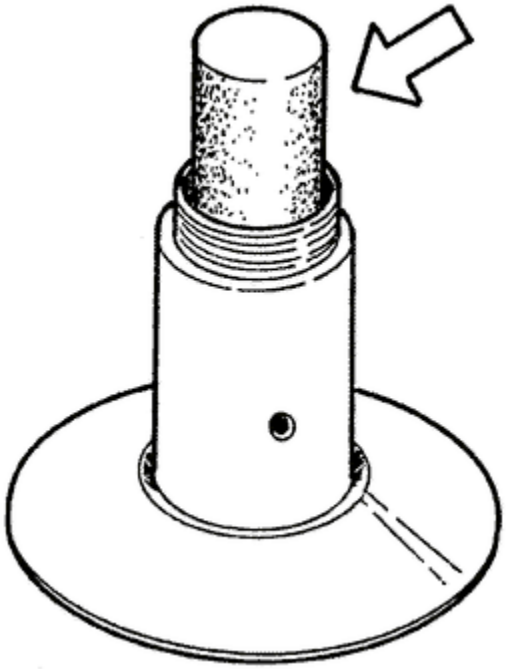
Moving driven pulley half

-Measure the internal diameter of the pulleys central bush. Wear limit Ø 34.08 mm. maximum.	

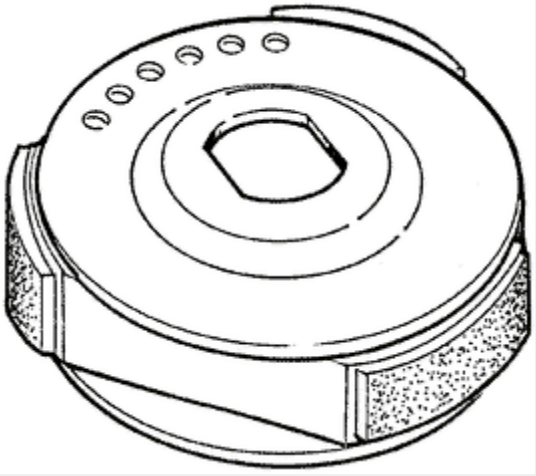
Spring

-Remove the spring located within the driven pulley half and measure its length while it is relaxed. Limit: 110 mm. minimum length.	

Fixed driven pulley half bearings

-Remove the old bearings and insert new ones using a length of tube of suitable diameter as a drift.	

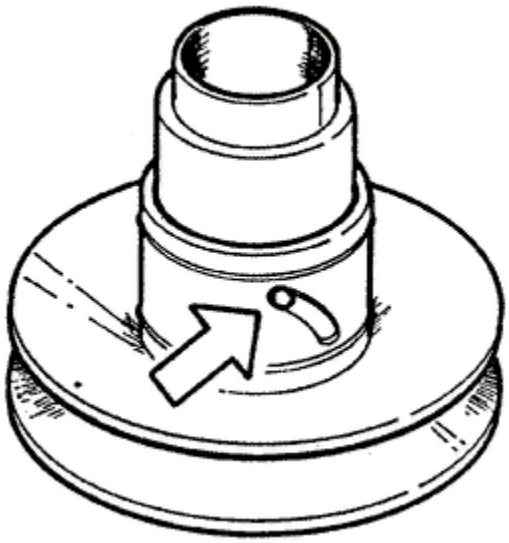
Clutch

-The clutch unit must be replaced when the thickness of the friction material on the shoes is less than 1 mm at its thinnest point. -The shoes must be replaced as a complete unit, as the assembly is factory-balanced only after the shoes are fitted.	

Reassembling the sliding half-pulley

-Fit the sliding half-pulley over the fixed half-pulley by means of the assembly sleeve. Fit new seals and O-rings and then fit the roller pins and rollers with a very small amount of TUTELA MRM2 grease.
-Following the above operations use a grease gun with curved nozzle and inject TUTELA MRM2 into one of the two holes on the inside of the bushing until the grease starts to seep out of the hole on the opposite side.

Special tool 020164Y
[1201020164Y] 020164Y

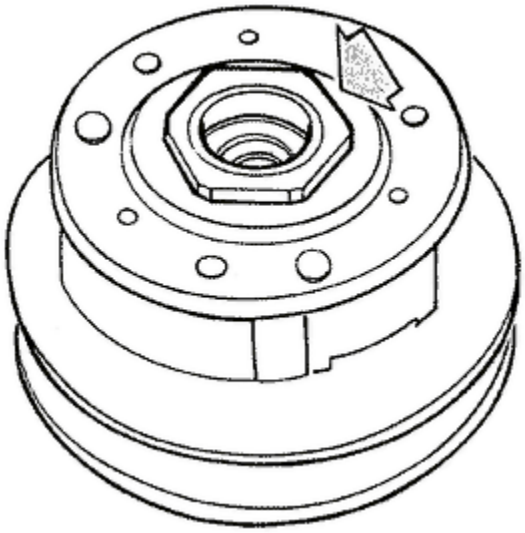


Fitting the clutch

-Fit the pin-retaining collar, the spring, the clutch unit and lock the clutch nut.

Warning - When removing the clutch unit locknut, be sure to hold the unit in place, as it may suddenly spring off due to the thrust of the spring.

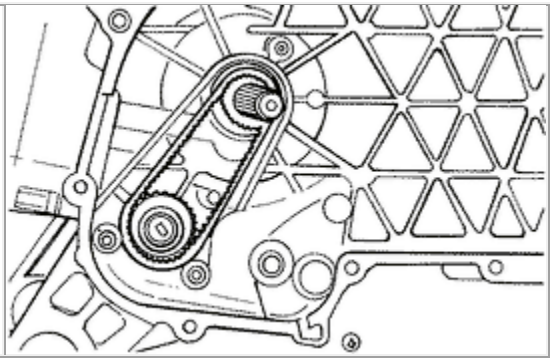
Tool 020565Y
[1201020565Y] 020565Y
Tightening torque 55 - 60 N·m.
[010502] Engine
Average Loctite 242 screw thread glue



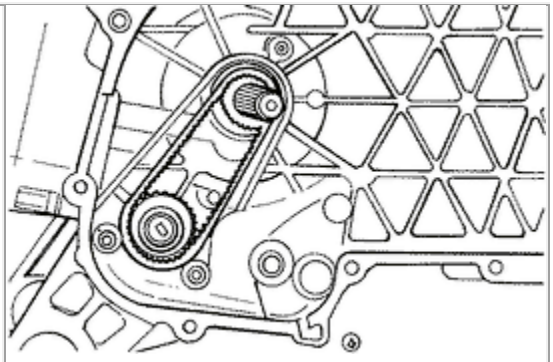
Gearwheelsand mixer control belt

-Remove gearwheel and belt.

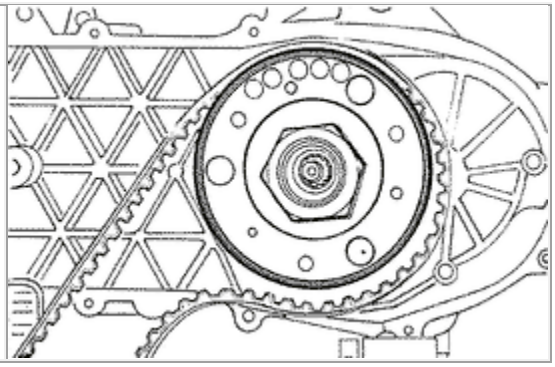
Warning - Do not twist the belt.



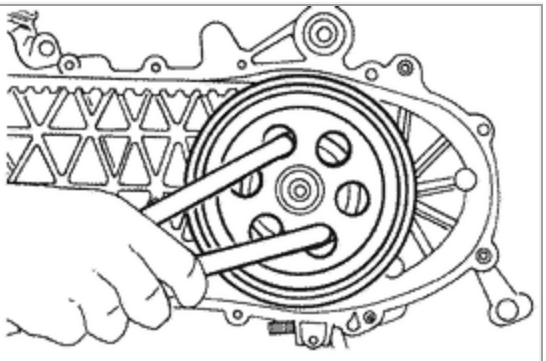
Gear wheels and mixer belt

Warning - Don't twist or fold the belt during the assembling. **Warning** - When reassembling carefully lubricate the pin and the bush of mixer control gear exclusively with CONSTANT GLY 2100 oil and check that there is not any friction. **Note:** Replace the belt every 20,000 Km.	

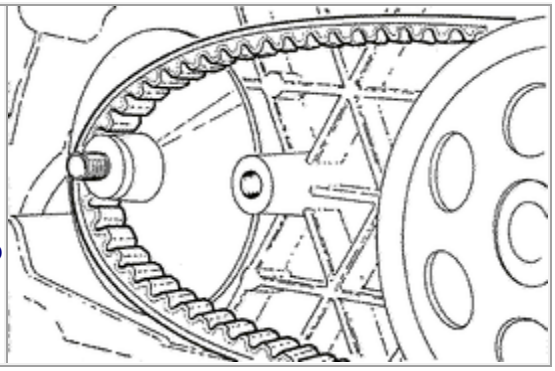
Pipe pulley, clutch, belt

-Remount the pipe pulley-clutch-belt unit.	

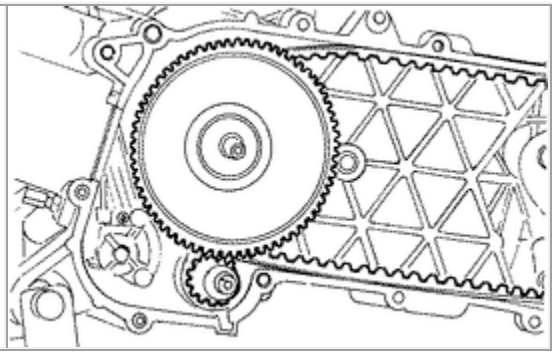
Clutch cover

-Mount the clutch cover and lock the nut, keeping the cover itself tight using the specific tool. **Note:** On remounting use new nuts and apply 'Super Rapido' type tightening Loctite on the 242E screw threading. Tool 020565Y [1201020565Y] 020565Y Tightening torque 55 - 60 N·m [010502] Engine	

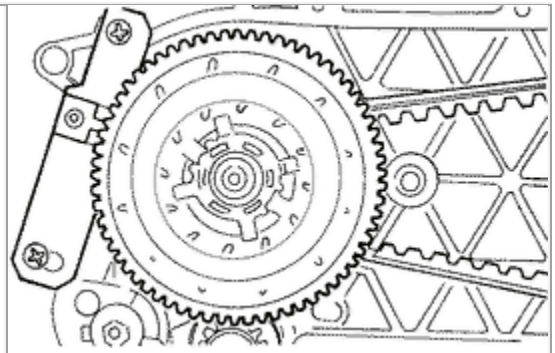
Bush and moveable half pulley

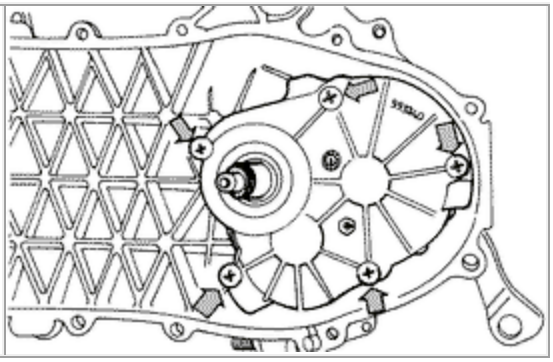
-Fit the assembly taking care not to damage the drive belt. -Open the rear pulley and insert the belt. When you are about to fix the front pulley unit make sure the belt is not trapped, otherwise it will be impossible to tighten the half pulley securely.	

Mixer - Start-up transmission - Moveable half-pulley – belt fixedsemi-pulley

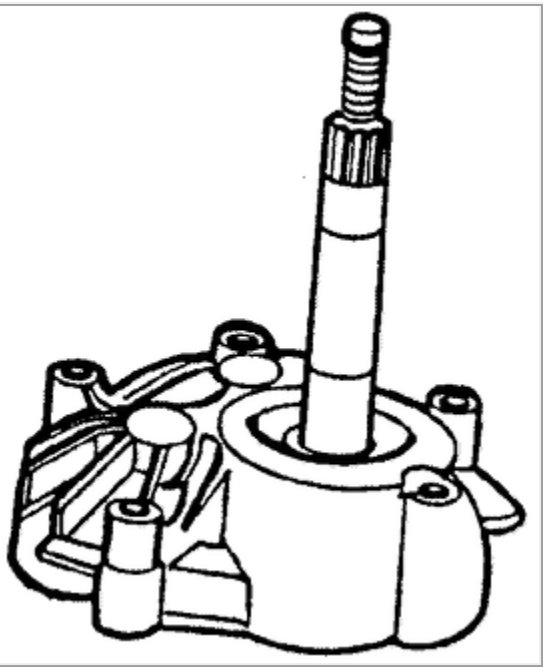
-Handle with care and do not twist the belt.	

Ventola - Fan holder disk - Washer - Locknut

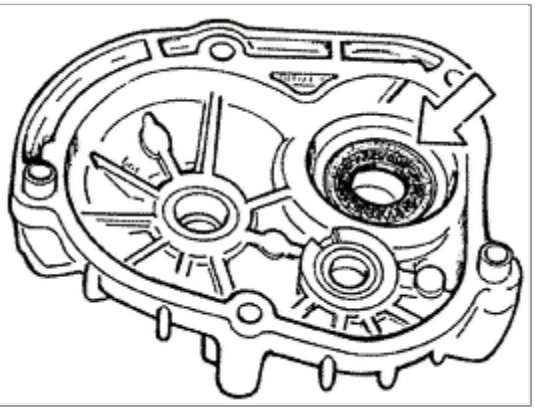
-Apply the recommended glue. **Warning** - Use only nuts supplied as original spare parts. **Note:** On remounting use new nuts, thus ensuring perfect levelness of the mounting. Tightening torque 40 - 44 N·m [010502] Engine Tool 020165Y [1201020165Y] 020165Y Loctite 242 E	

Reducer cover	

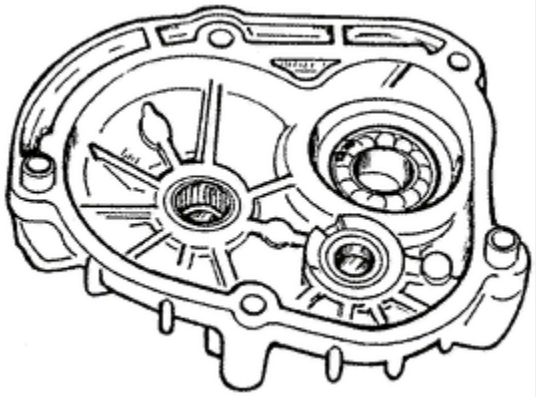
Driven pulley spindle from hubcover

-When the driven pulley spindle is removed from the hub cover, the related bearing must be replaced with a new one. -Check the components. -Remove the spindle by gently tapping it with a mallet.	

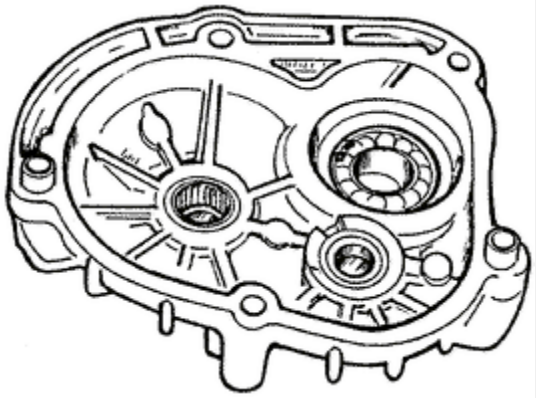
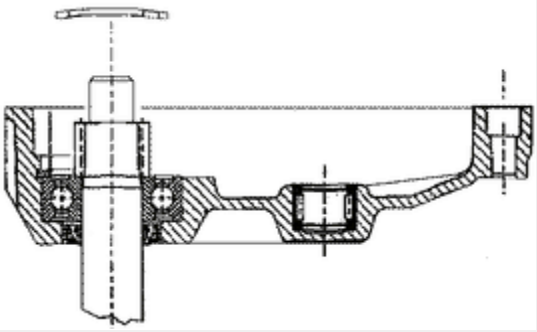
Driven pulley spindle oil seal

-Remove the oil seal.	

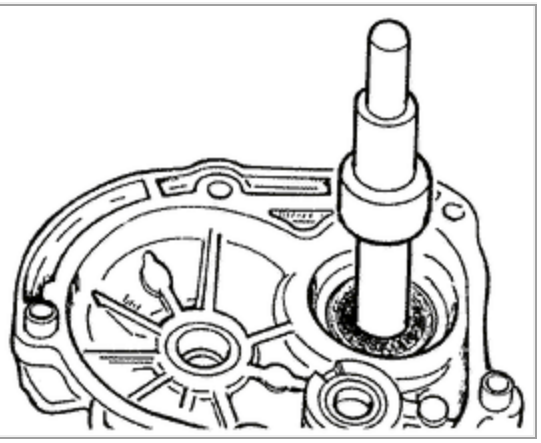
Bearings from hub cover

-After removing the circlip, drive out the bearing. -To remove the wheel axle bearing, use the recommended tool Tool: 001467Y part (13/17) for wheel axle	

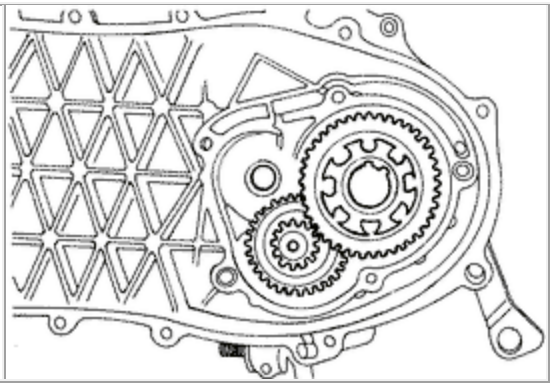
Bearings on the hub cover

Heat the cover with the thermal gun with a support and mount the roller bearing, letting the cover cool, then mount the oil guard and the rollers' case with the appropriate punch driftpin. Mount the inner ring of the pipe pulley shaft bearing, taking care to position it correctly. **The concave part of the inner ring must be turned in the direction of the bearing.** Tool: 020151Y (thermal gun) [1201020151Y] 020151Y Tool: 020150Y (support) [1201020150Y] 020150Y Tool: 020080Y [1201020080Y] 020080Y	 

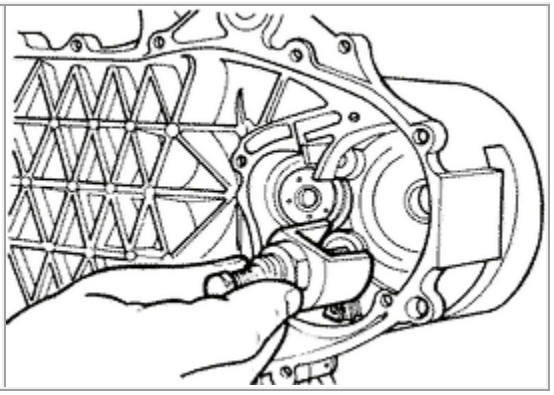
Mounting of drive pulley spin

Fit the pulley spindle on the hub cover by gently tapping with a mallet.	

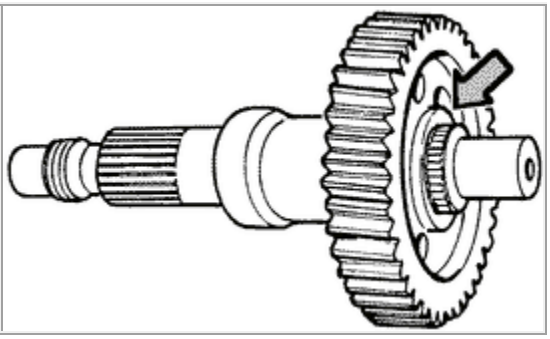
Gearfrom crankcase

Note: If necessary, use a plastic mallet from the opposite side to the one shown in the figure, to remove gears wheels on wheel hub.	

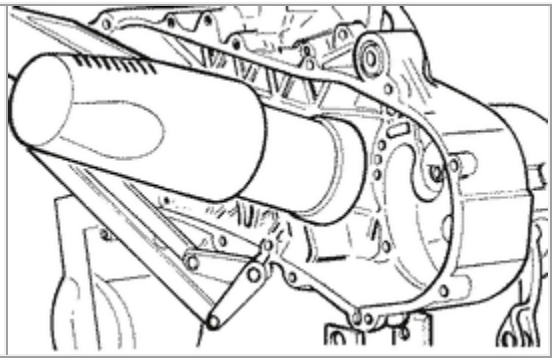
Bearingsfrom crankcase

-Wheel axle bearing: -Remove oil seal and inner ringlet then remove the bearing. -Driven pulley axle bearing. -Use the specific tool. **NOTE:** Act in the analogous manner for cover bearings. Extractor 001467Y/21/17.	

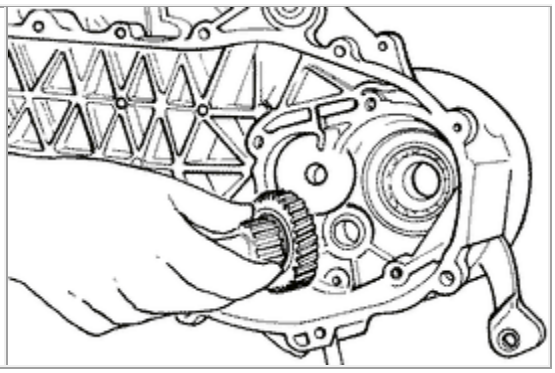
Wheel axle gear

-Remove the circlip. -Remove the gear.	

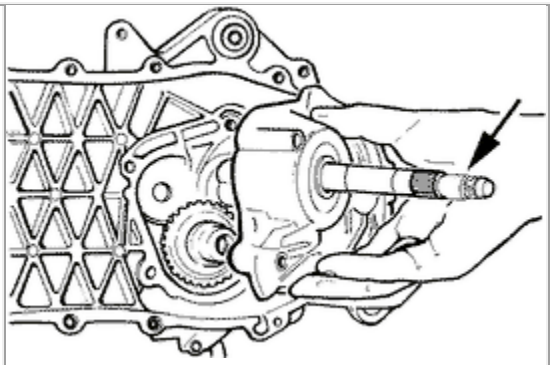
Replacing the bearings in the crankcase

-Heat the crankcase to around 80°C and fit bearings. support 020150Y. [1201020150Y] 020150Y Heat gun 020151Y. [1201020151Y] 020151Y	

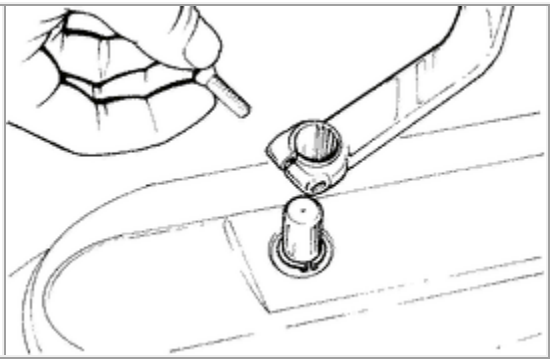
Replacing the Gears in the crankcase

Warning - Fit the spacers, one on either end of the intermediate gear shaft.	

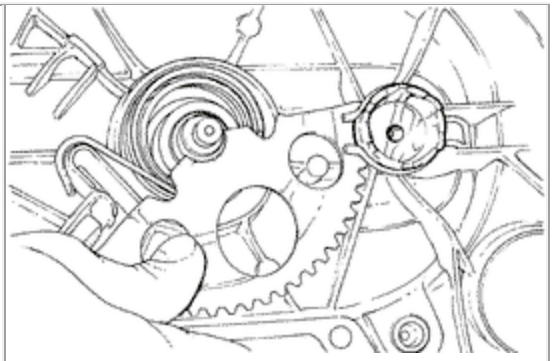
Refitting the Gearbox Cover

-Smear the mating surfaces with Loctite 510. -Tighten the screws to the prescribed torque. **Note:** Check for the presence of the compensator ring; smear TUTELAMRM2 grease on the inside and outside diameters of the compensator ring. Tightening torque 12 - 13 N·m [010502] Engine	

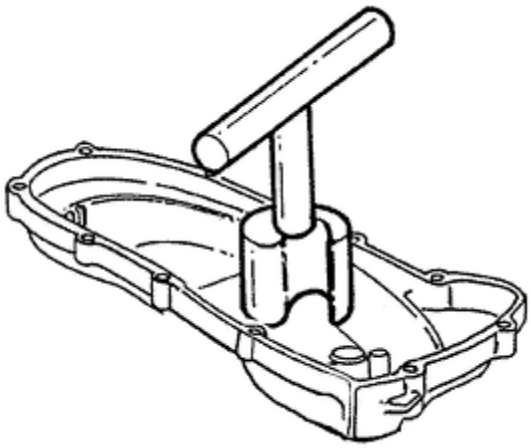
Replacement of start-up lever

-Remove the screw shown in the figure and slide off the starter lever. -For the remounting tighten the screw in the opposite direction to the prescribed torque. Tightening torque 12 - 13 N·m [010502] Engine	

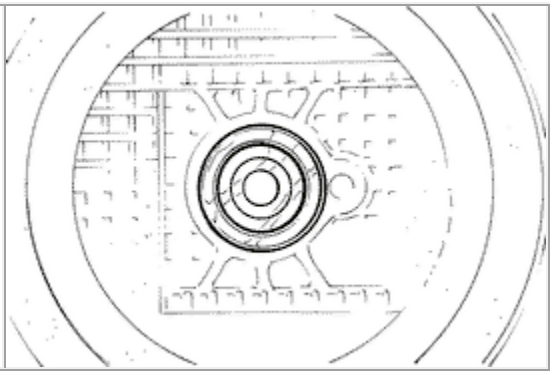
Replacement of of toothed and engine shaften gage gear wheels

-Remove the inner ringlet situated on the external side of the crankcase. -Dismount the engage wheel gear from its own housing loosening the tension that the toothed part applies there due to the spring; to do this it is necessary to exert on the toothed part a slight rotation (see figure). **Warning** - During disassembly of the toothed part be very careful of the tension of the spring: it could be dangerous for the operator.	

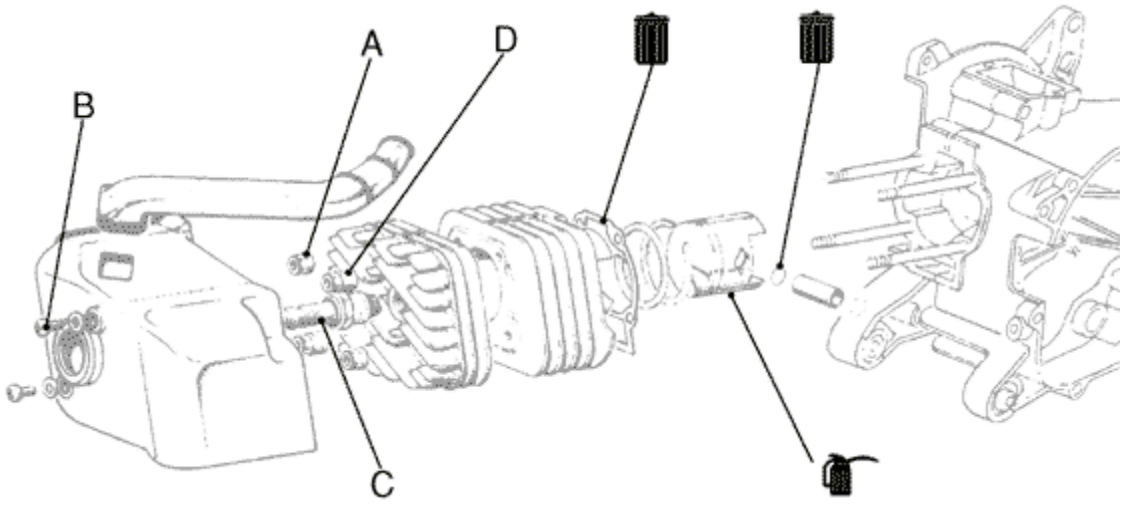
Mounting oftoothed and engine shaft engage gearwheels

-On remounting apply JOTA 3 on the bushing, the spring and along the toothed area. -For the winding up of the spring use the specific tool as indicated in the figure. -Remount the inner ringlet after having verfied its integrity. Tool 020261Y [1201020261Y] 020261Y	

Replacement of transmission cover bearing

-For replacement of the transmission cover bearing, heat the crankcase and remove the bearing, tapping it gently with a mallet. Tool 020150Y [1201020150Y] 020150Y Tool 020151Y [1201020151Y] 020151Y	

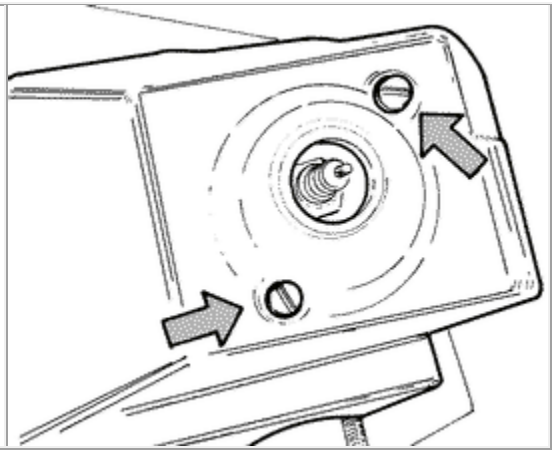
HEAD - CYLINDER -PISTON



LUBRICATE	CLEAN WITH CARE
GREASE	CAUTION HANDLE WITH CARE
APPLY THE PRODUCT	ALWAYS REPLACE

Symbol	A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q	R
Quantity	2	2	1	2												
Torque N·m	10 - 11	3.5 - 5	25 - 30	10 - 11												

Cylinder cooling hood

-Remove the screws shown in the figure.	

HEAD NUTS TIGHTENING

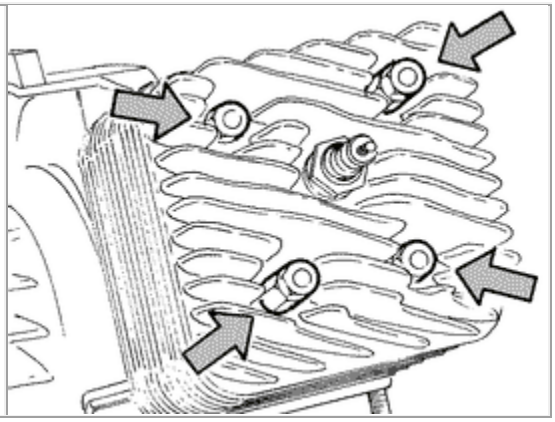
If the four cylinder stud bolts on engines in the above category are tobe replaced, tighten the head nuts as follows:

head tightening nuts (only for stud bolts replacement)6÷7 N·m + 135° + 90°

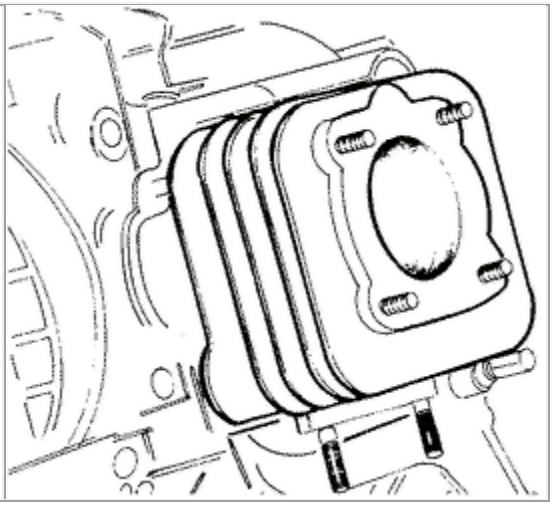
This procedure differs from what is indicated in themanuals of ZIP; ET4 and LIBERTY:
head tightening nuts (only for stud bolts replacement) 6÷7 N·m + 90° +90° + 90°

The reduction by 45° of the wrench turningis necessary to avoid possible strain of the stud bolts.

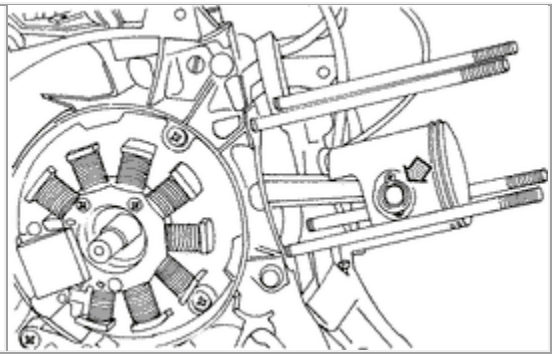
Cylinder head

-Remove the 4 nuts shown in the figure.	

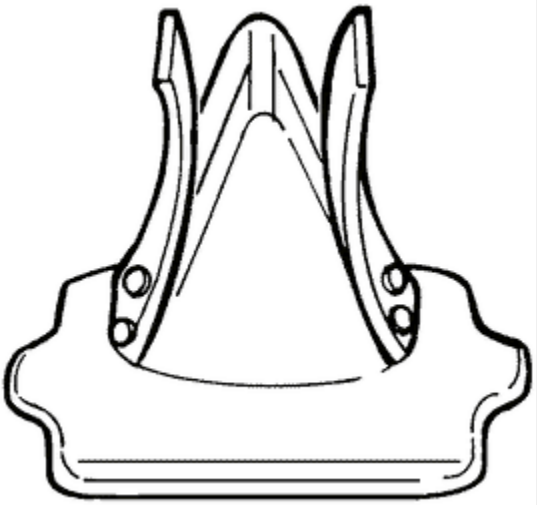
Cylinder

-Slip off the cylinder very carefully.	

Piston

-Remove circlips and extract piston pin. **Warning** - After every removal replace piston pin circlips.	

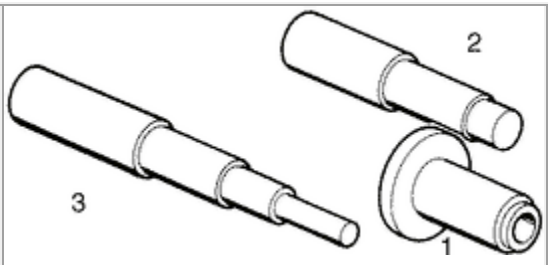
Blades unit

Warning - Check the correct sealing of blades unit: light must not pass between support and blades.	

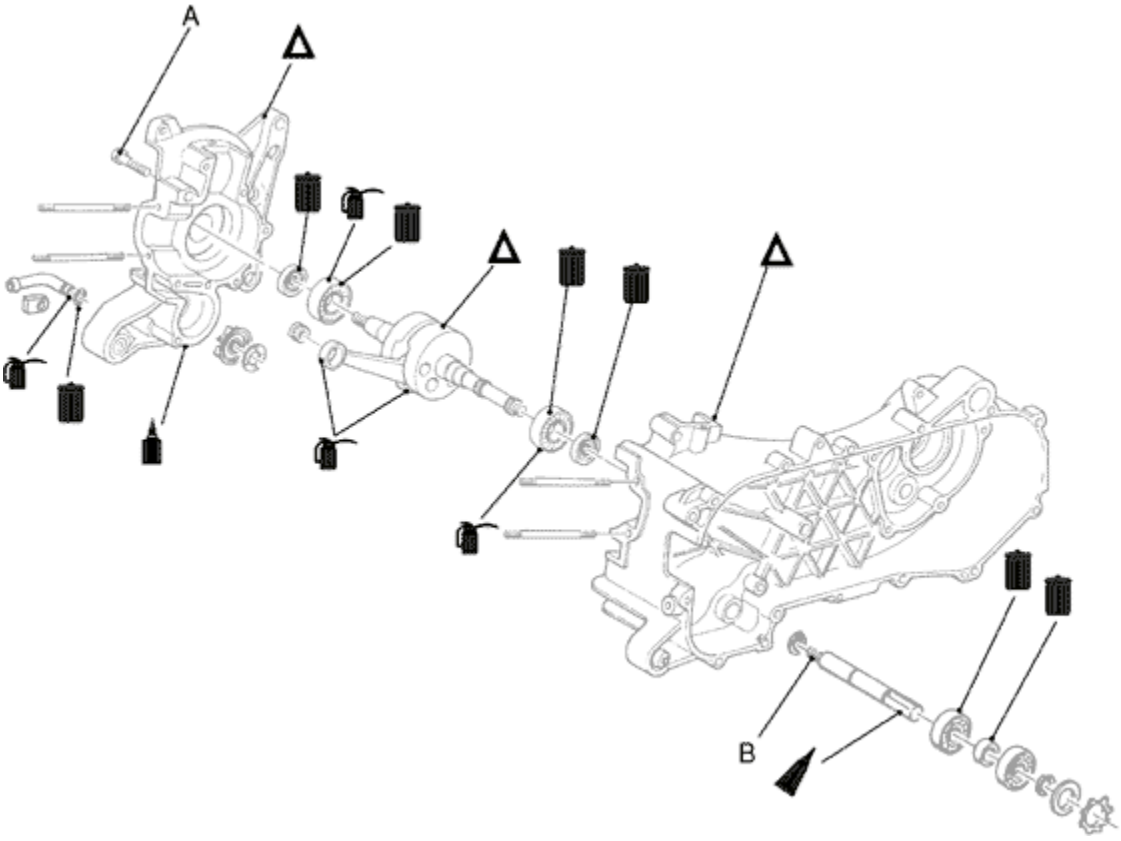
Piston

Warning - The arrow stamped on the crown of the piston must be facing the cylinder exhaust port. **Warning** - The piston pin circlips must be positioned, on the piston, by means of the specific tool.	

Piston pin circlips on piston

-Position the circlip on part 1 with the opening astride the arrow stamped on the tool. -Push to the beat part 2 into part 1 and extract part 2. -Insert part 3 into part 1, position the unit in the fitting zone of the circlip and push to the end part 3. Tool 020166Y [1201020166Y] 020166Y **NOTE:** Reassemble the remaining parts by following the inverse procedure of removal. -Use new elastic piston pin circlips. -Use a new cylinder base seal. -Before remounting, clean carefully all surfaces. -Use Selenia HI Scooter 2T oil mix during the mounting of the piston and the cylinder. Torque cylinder heat nuts 10 - 11 N·m [010502] Engine	

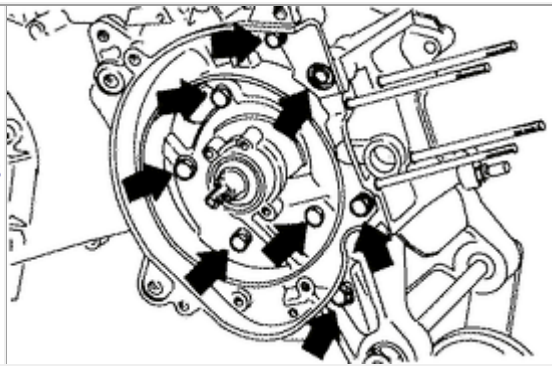
SEMICARTERS -CRANKSHAFT



LUBRICATE	CLEAN WITH CARE
GREASE	CAUTION HANDLE WITH CARE
APPLY THE PRODUCT	ALWAYS REPLACE

Symbol	A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q	R
Quantity	8															
Torque N·m	12 - 13															

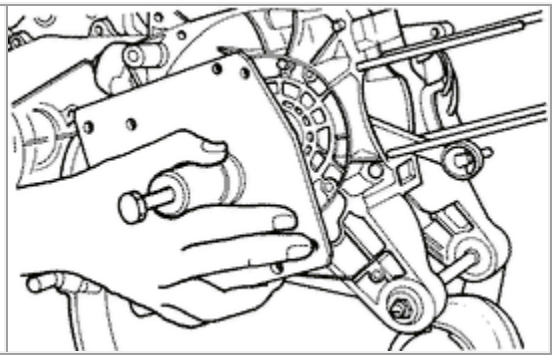
Removal of union bolts

Remove the eight union fastenings of the crankcase.	

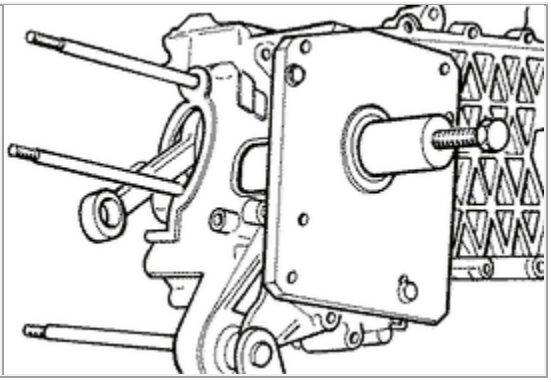
STANDARDIZATION OF CRANKCASE HALVES,TRANSMISSION SIDE

Starting from engine no. **C151M 150886**,the casts of the crankcase halves on the air filter transmission side have beenstandardized for engines with or without a secondary air system.
Thecrankcases of the engines not equipped with a S.A.S. are fitted with rubberplug **part no. 827173** in place ofthe air intake pipe to prevent dirt or water from getting into the drive beltcompartment through the hole. No special procedure is required to insert therubber plug.

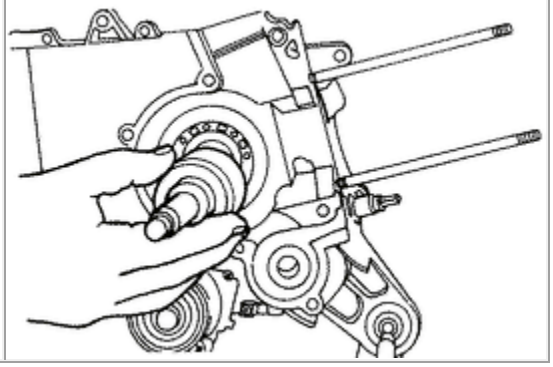
Crankcase Separation

Tool 020163Y [1201020163Y] 020163Y	

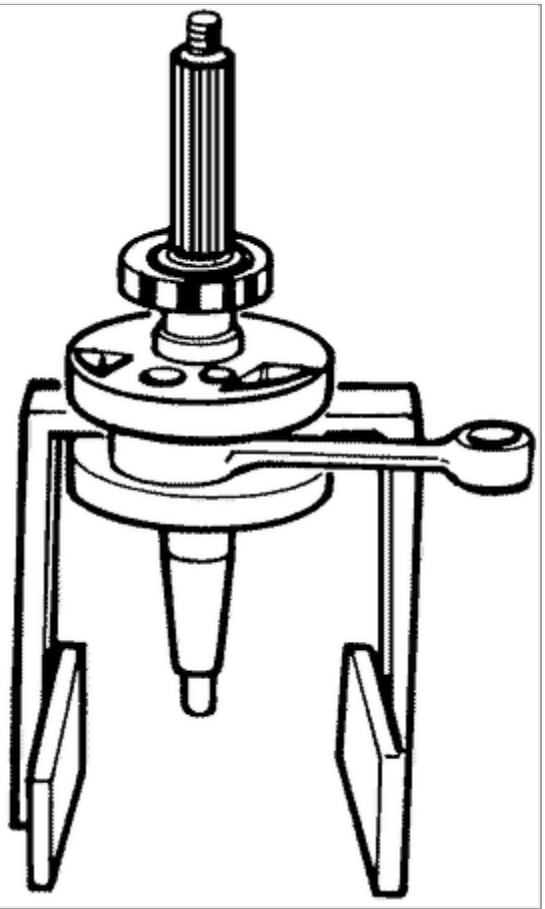
Pulling out of crankshaft

Tool 020163Y [1201020163Y] 020163Y	

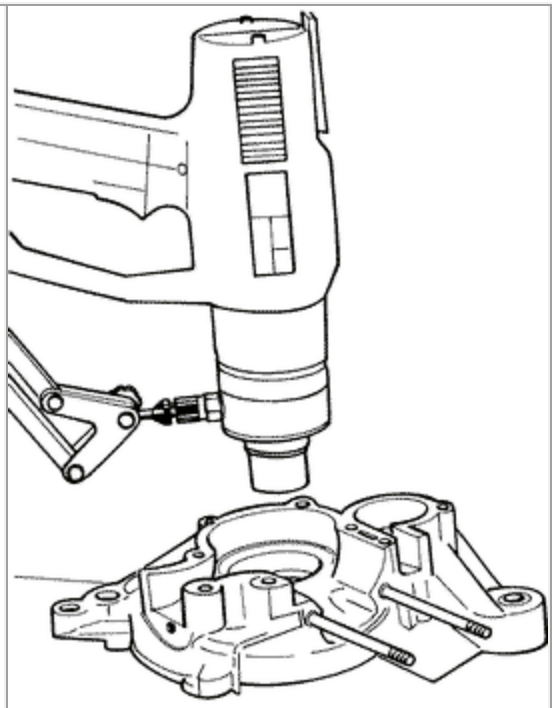
Bearings from crankcase

Note: Act in the same way to dismantle crankshaft bearing, flywheel side. **Warning** - Should the main bearings remain fitted on crankshaft, use tool 001467Y/7. Tool 001467Y	

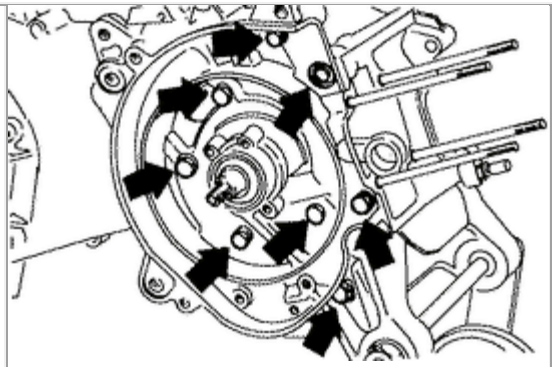
Main bearings on crankshaft

-Heat bearings in an oil bath at about 100°C and fit them on crankshaft, if necessary by employing a length of tube which would act on the inside race of the bearing Base 020265Y [1201020265Y] 020265Y	

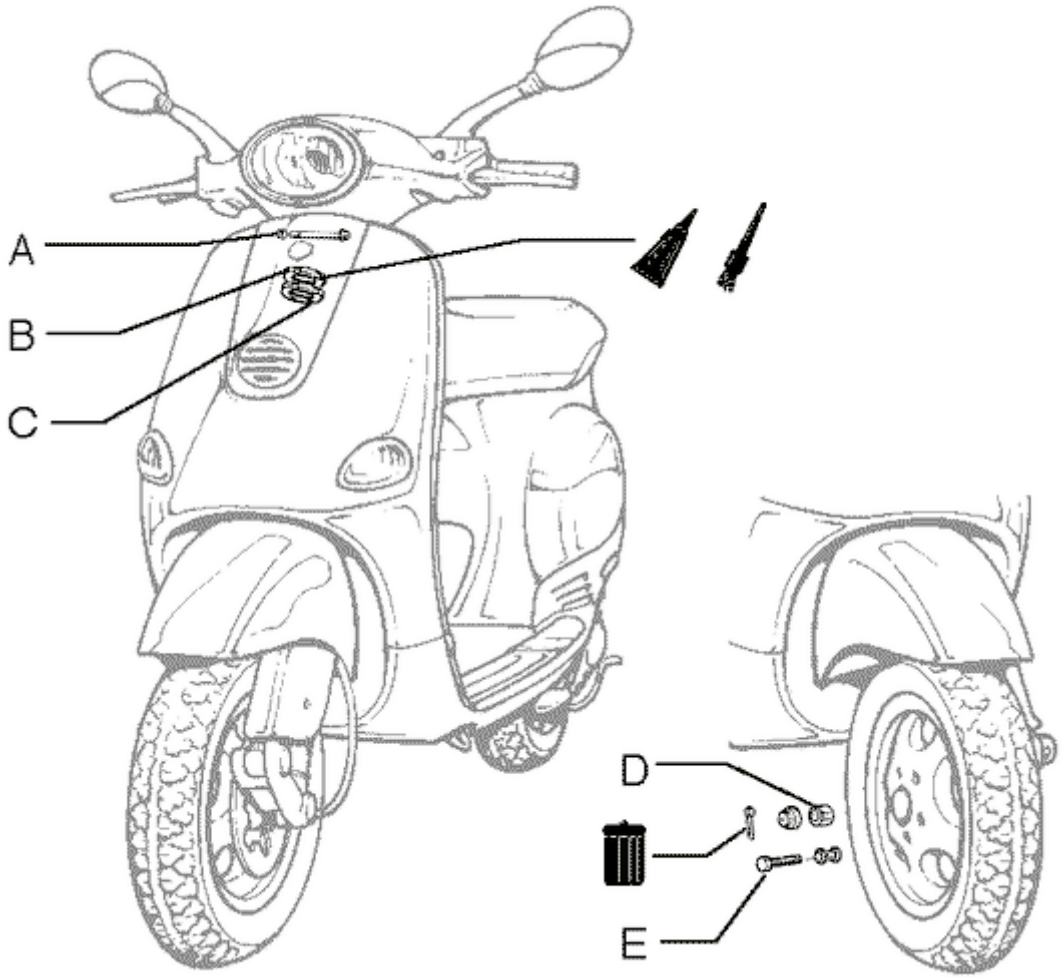
Crankcase union

-Heat main bearing housing zone of crankcase transmission side at about 80°C. -Fit output shaft. -Let crankcase become cold. -Mount the specific tool on the halfcrankcase, on the transmission side and push the output shaft and push slightly the output shaft so as to recover the end float. -Smear mating surfaces with Loctite 510. -Analogously to what we have carried out before, heat crankcase, flywheel side. -Couple crankcase. Support 020150Y [1201020150Y] 020150Y thermal gun 020151Y [1201020151Y] 020151Y Tool 020163Y [1201020163Y] 020163Y	

Closing crankcase, half - Oil seal, flywheel side

-8 fasteners. -Take out the tool 020163Y [1201020163Y] 020163Y -Let crankcase become cold and check that the axial play of crankshaft is 0.03 - 0.09 mm. **NOTE:** For fitting oil seal, flywheel side, use an outside dia. 30.5 mm tube. Tightening torque 12 - 13 N·m [010502] Engine Dial gauge base and dial gauge 020335Y [1201020335Y] 020335Y	

FRONT SUSPENSION



LUBRICATE	CLEAN WITH CARE
GREASE	CAUTION HANDLE WITH CARE
USE THE PRODUCT	ALWAYS REPLACE

Symbol	A	B	C	D	E	F	G	H	I	L	M	N
Quantity	1	1	1	1	5							
Torque N·M	45 - 50	30 - 40	50÷60 slacken 120°	75 - 90	16 - 26							

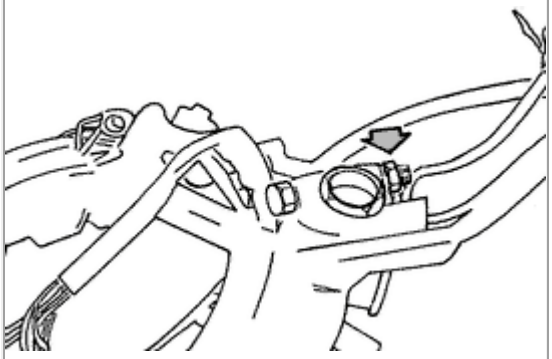
Disassembling the handlebars

- Before proceeding, remove the stet fairing as described in chapter Bodywork.

-After detaching flexible transmission cables and disconnecting electrical terminals, loosen the clamp securing the handlebar to the steering tube
-Check all components and replace any damaged or defective parts.

Note: If you are removing the handlebars only so that you can then remove the steering assembly, simply allow the handlebars to tip over the front of the scooter, taking care that flexible transmission cables are not damaged.

Handlebars (fitting)
Stet nut tightening torque 45 - 50 N·m
[010501] Frame



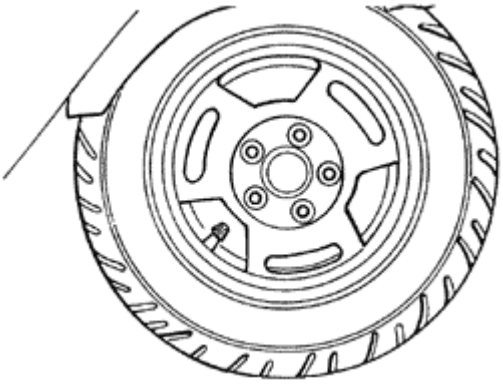
Removing the front wheel

-Remove the five socket-head screws fastening the wheel to the hub.

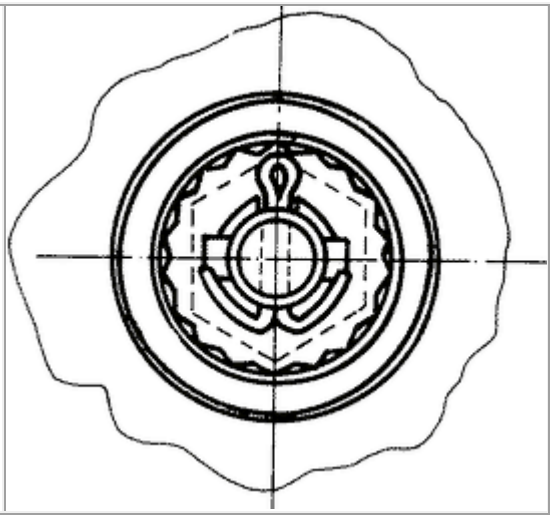
Note: Remove the brake calliper before removing the wheel hub.

-Reassembly, tighten the five screws to the prescribed torque.

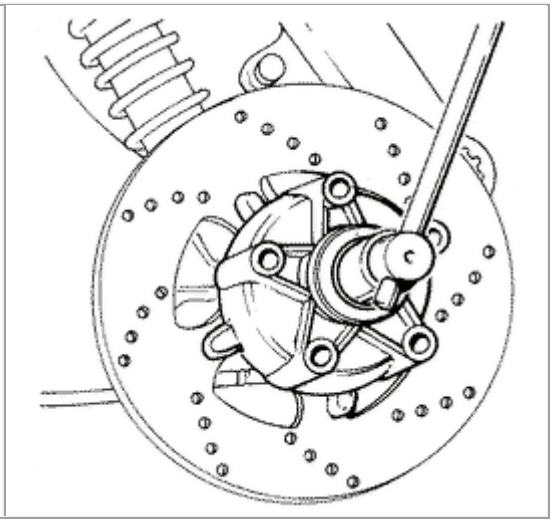
Tightening torque 16 - 26 N·m
[010501] Frame



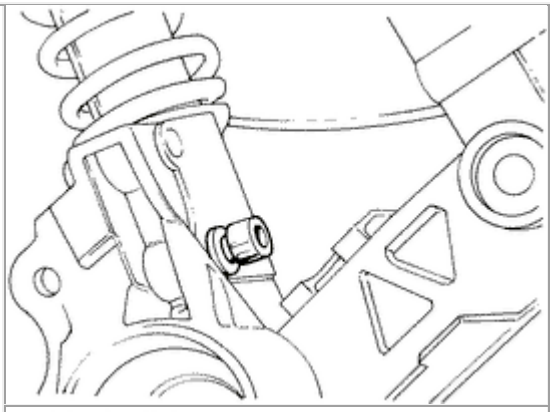
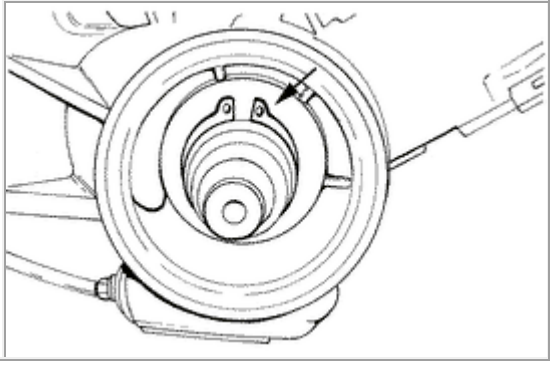
Brake calliper - Split pin - Nut retainercap - Nut

-Remove the brake calliper by removing the two screws. - Remove the split pin and the nut cap. **Warning** - Always reassemble with new split pins.	

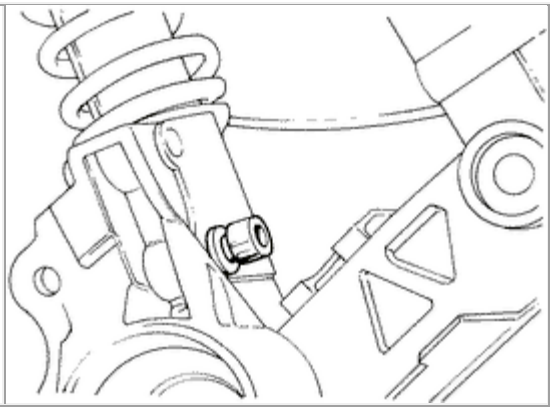
Hub disassembly

-Loosen the central nut (see figure) to remove the hub.	

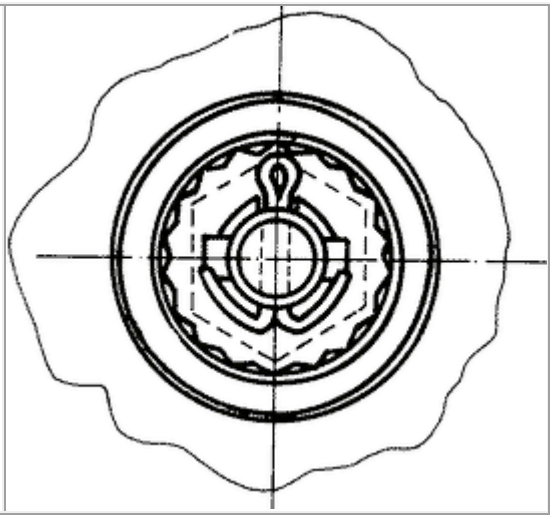
Calliper support disassembly

-Slacken the two fixings between the support and the shock absorber. -Remove the circlip from the wheel spindle. -Remove the speedometer cable. -Withdraw the calliper support.	 

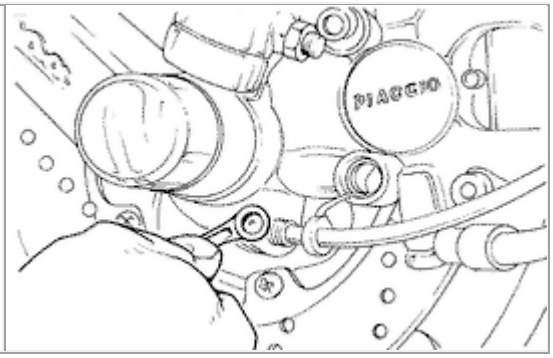
Calliper support assembly

-Perform the disassembly steps in reverse order. -Fit a new O-ring. -Torque the two screws to the prescribed value. - Fit the spacer and O-ring on the wheel spindle. Tightening torque 20 - 25 N·m [010501] Frame	

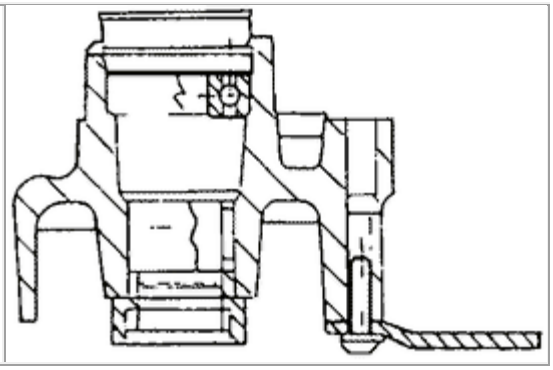
Fitting the hub

-Position the hub on the spindle and drive it into place with the aid of light mallet blows. -Tighten the central nut with the prescribed torque. - Fit the nut cap and the split pin. **Warning** - Bend the ends of the split pin as shown in the figure to eliminate play between nut cap and axle. Tightening torque 75 - 90 N·m [010501] Frame	

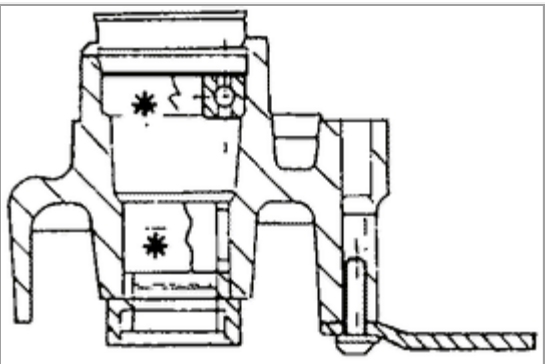
Changing the speedometer gear

-Slacken the brake calliper screw and the plate screw as shown in the figure. -Remove the rubber seal and the speedo gear. -Fit the new gear by following the steps in reverse order.	

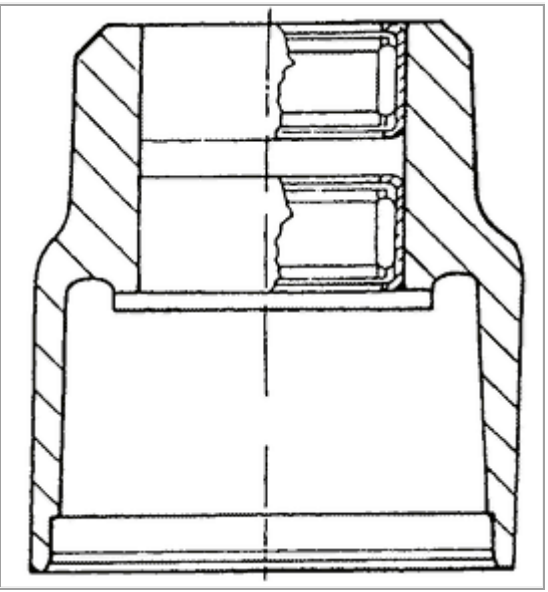
Removing the needle bearing and ballbearing

-Remove the needle bearing by driving it out from the ball bearing side using a suitable drift. -Drive out the ball bearing from the needle bearing side.	

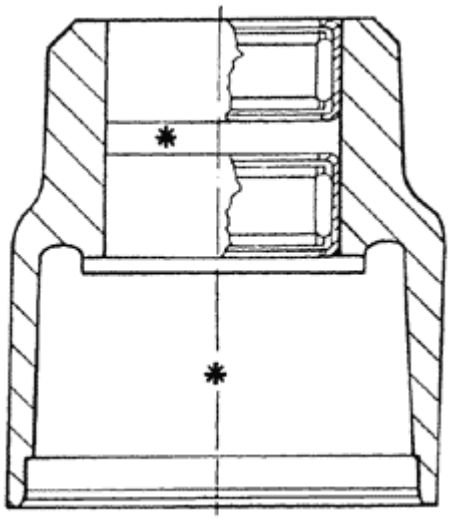
Wheel hub needle bearing and ball bearing

-Fit the needle bearing by means of the specially designed drift. -Fit the ball bearing. -Position the seal ring and the circlip. **Warning** - Before refitting, smear the parts with Jota 3 FS grease in the areas marked with an asterisk. Drift 020038Y [02020036Y] 020036Y	

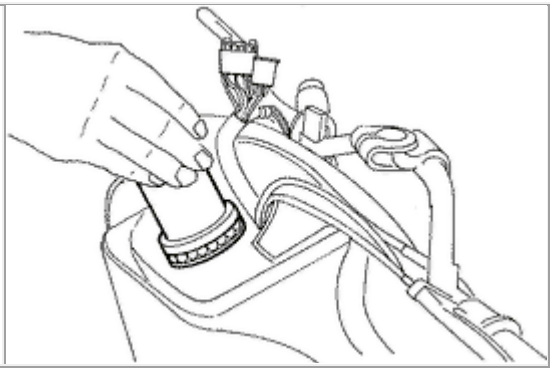
Disassembling the needle bearings from theshock absorber and brake calliper support

-Using a suitable drift, drive out the two needle bearings from the side opposite to the assembly side.	

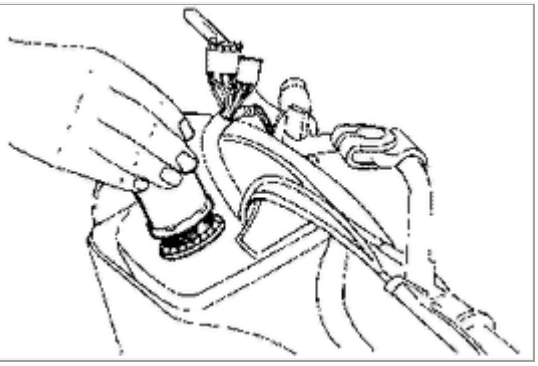
Needle casing on caliper and shock absorbersupport

-Using a suitable drift, drive out the two needle bearings from the side opposite to the assembly side. **Warning** - Before refitting, use ZETA 2 grease in the areas marked with an asterisk. Drift 020036Y Casing “1” Drift 020037Y Casing “2” [02020036Y] 020036Y	

Steering locking ring

Special tool 020055Y [02020055Y] 02005Y	

Washer and top race of upper bearing

-After removing the top race, tilt the vehicle to one side and withdraw the steering tube. Tool 020055Y [02020055Y] 02005Y	

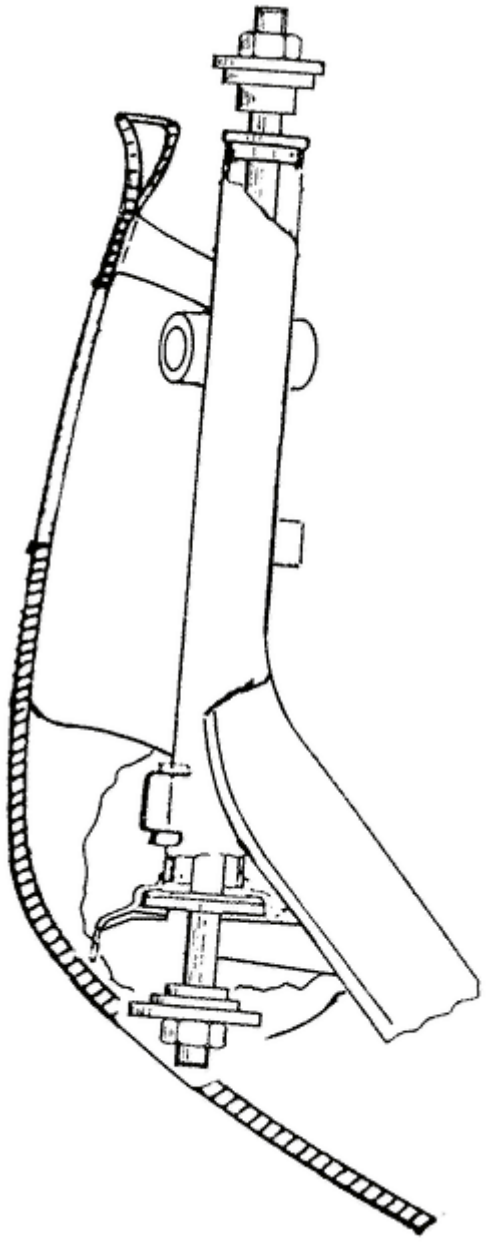
Lower and upper races from frame

-Use the special tool to remove the lower race of the top bearing and the upper race of the bottom bearing from the frame.

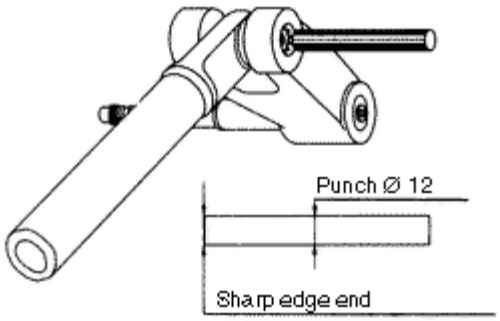
Note: The lower bearing race can be prised off by levering it with a screwdriver or similar.

Tool: 020004Y
[02020004Y] 020004Y

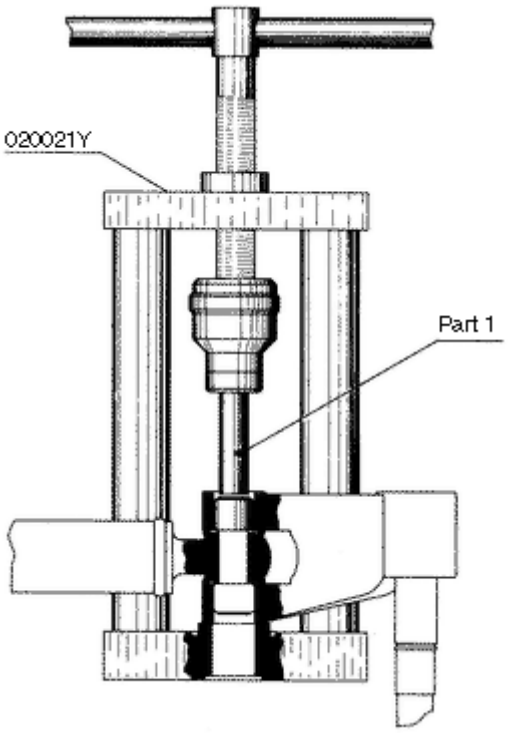
-Overhauling the front suspension serves to renew the parts connecting the steering tube and the trailing link. This operation is only effective if both steering tube and trailing link are in perfect condition.



Removing the retaining washers

-Crush the retaining washer and remove it by means of a punch. -Repeat the operation for the second washer using the punch on the opposite side to the one shown in the figure.	

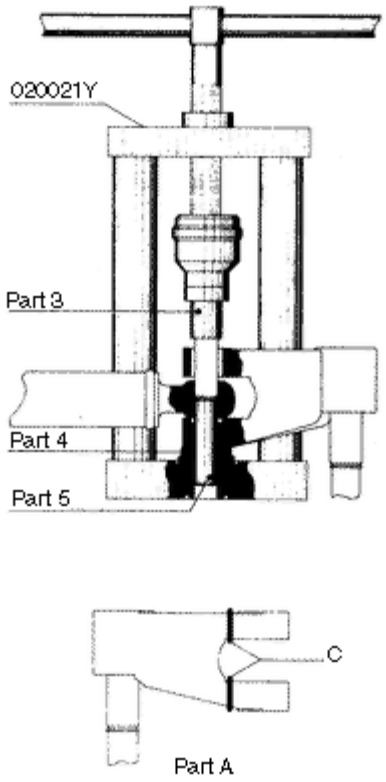
Removal of pin and needle bearing

-Apply the special tool fitted with part 1* and turn the handle until both the pin and the needle bearing opposing the force exerted by the tool are expelled at the same time. - To remove the second needle bearing, fit the tool with part 2* working from the side opposite to the one shown in the figure. * supplied with the tool Tool: 020021Y [02020021Y] 020021Y **Reassembly** **Warning** - Reassemble with new roller bearings, pin, oil seals and dust seals.	

Reassembling the pin

-Fit the two dust seals “C” on the trailing link as shown in detail “A”.
- Connect the trailing link to the steering tube by means of guide pin 5*.
-Apply the special tool equipped with part 3* on the shaft and part 4* at the bottom.
-Smear Z2 grease on the pin and insert it into the trailing link and turn the tool handle until part 3 locates against the steering tube.
- After fitting the pin, insert the two spacers, part 17*, by tapping lightly with a mallet (see following figure).

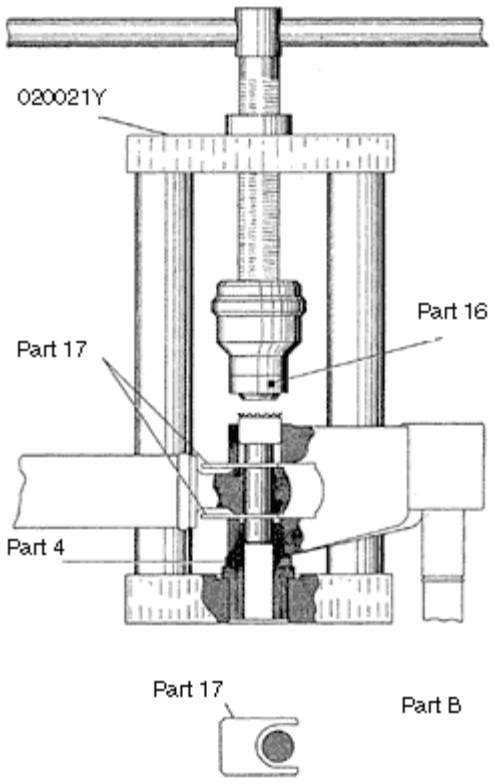
* supplied with the tool
Specific tool: 020021Y
[02020021Y] 020021Y



Fitting needle bearing oil seals and retaining washers

-Lubricate the oil seals with mineral oil and half-fill the needle bearings with **Z2** grease.
-Fit the oil seal and the needle bearing on the pin, complete with retaining washer.
-Remove the special tool and then remove part 5 (guide) which was partially expelled in the previous assembly step. Leave part 4* mounted on the tool.
-Remove part 3 from the tool and replace it with part 16*.
-Turn the tool handle to insert the retaining washer - needle bearing - seal ring assy. until part 16 comes into contact with the trailing link.
- To fit the second retaining washer - needle bearing - seal ring assy. repeat the above operation with the tool on the opposite side to that shown in the figure, still equipped with part 16 and with part 22* instead of part 4.

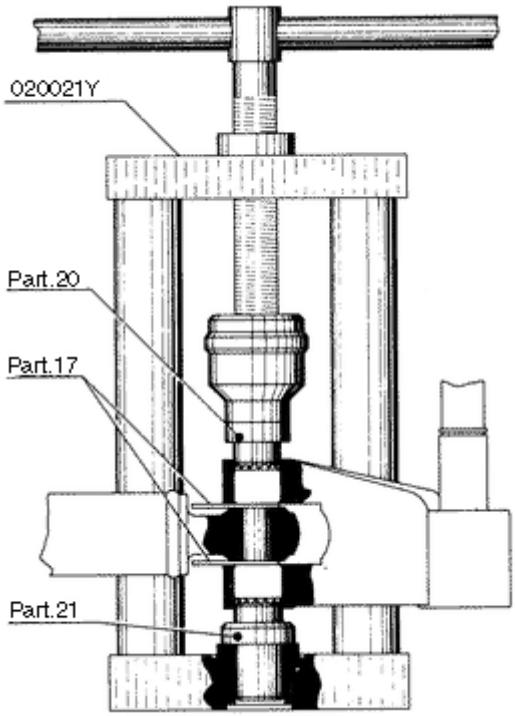
* supplied with the tool
Special tool: 020021Y
[02020021Y] 020021Y



Positioning of needle bearings on pin (pin ends in contact with inside diameter of needle bearings)

-Use the special tool equipped with parts 20* and 21* as shown in the figure.
-Turn the handle to force the base of the needle bearings into contact with the end of the pin.

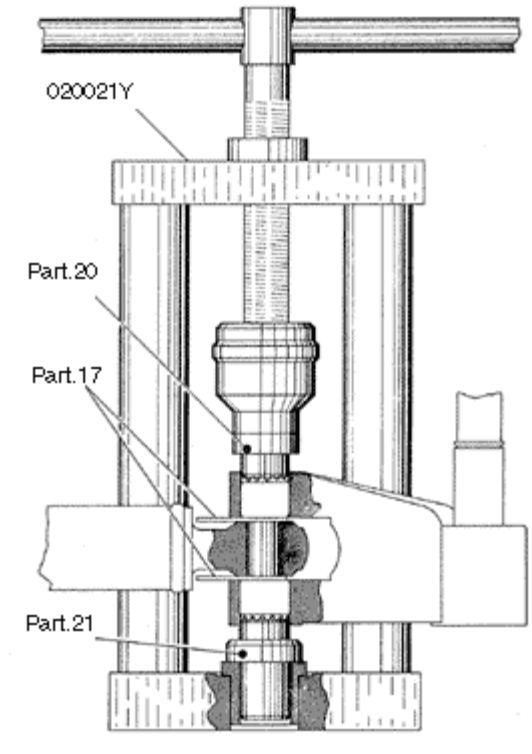
020021Y
[02020021Y] 020021Y



Fitting the retaining washers

-Use the tool equipped with parts 3 and 4 (see figure relative to the heading "Reassembling the pin") and turn the tool handle until the washers are wedged into the trailing link.
-Remove spacers, part 17, and pack the clearance between the steering tube and the trailing link with **Z2** grease. Now slide the dust seals into position.

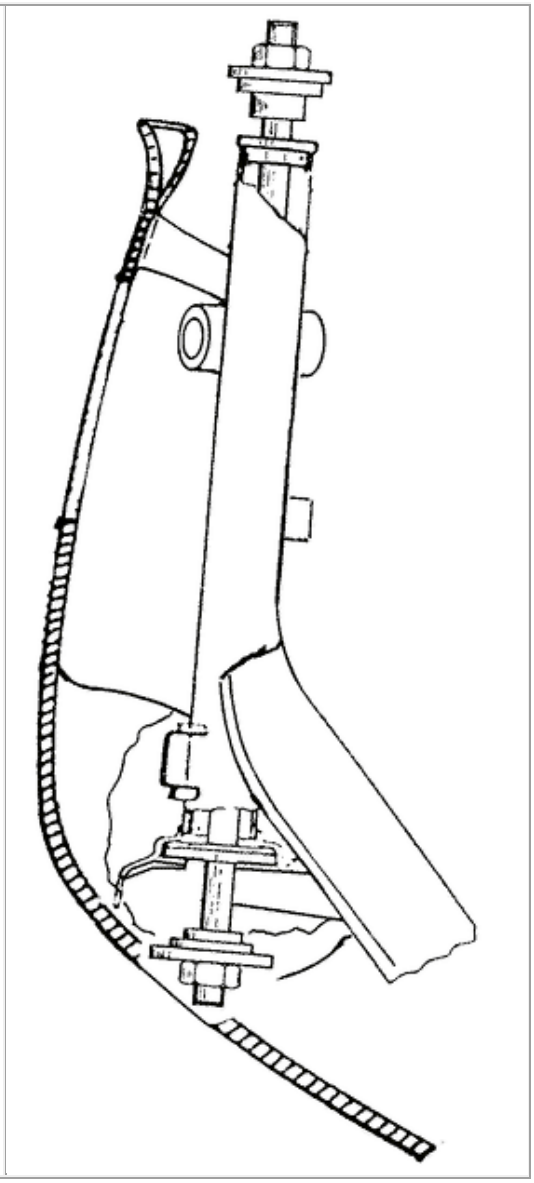
* Supplied with the tool
Tool: 020021Y
[02020021Y] 020021Y



Lower and upper races to frame

Note: The lower race on the steering tube must be fitted with the aid of a length of suitable diameter pipe.

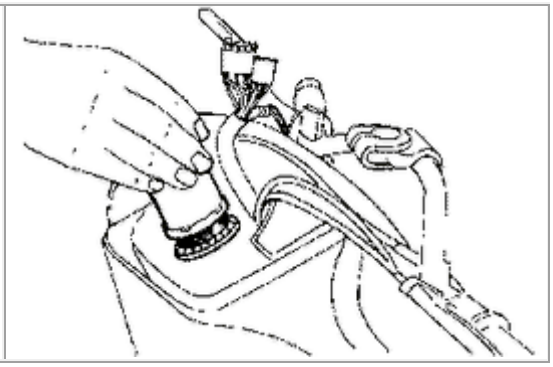
Special tool: 001330Y
[02001330Y] 001330Y



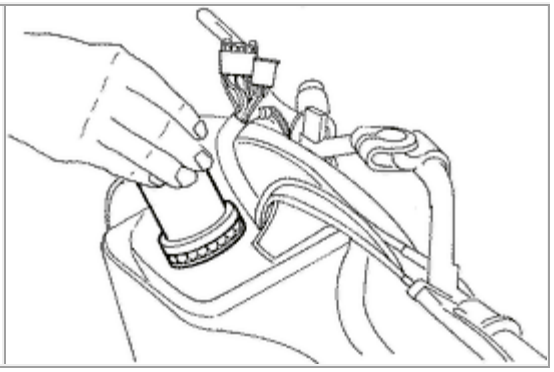
Steering bearing top race

-Lubricate the races and balls with **Z2 grease**.
-Tighten to the specified torque and then turn the tool 120° anti-clockwise.

Tightening torque: 50 - 60 N·m.
[010501] Frame
Spanner 020055Y
[02020055Y] 02005Y



Locking ring

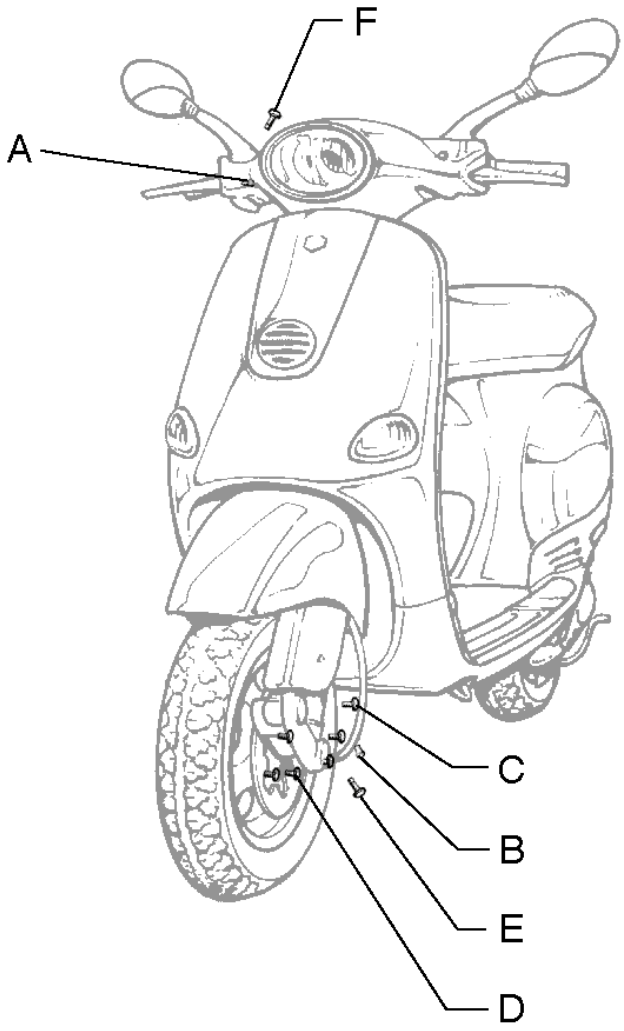
Tightening torque: 30 - 40 N·m. [010501] Frame Spanner 020055Y [02020055Y] 02005Y	

HANDLEBAR TIGHTENING TORQUE

Following theintroduction of the new handlebars dealt with in T.I. 10/99 and beginning fromthe frame numbers listed below, the handlebar tightening torque with respect tothe steering tube has been changed to 40-45 N·m.

VESPA C16000 117824

BRAKING SYSTEM

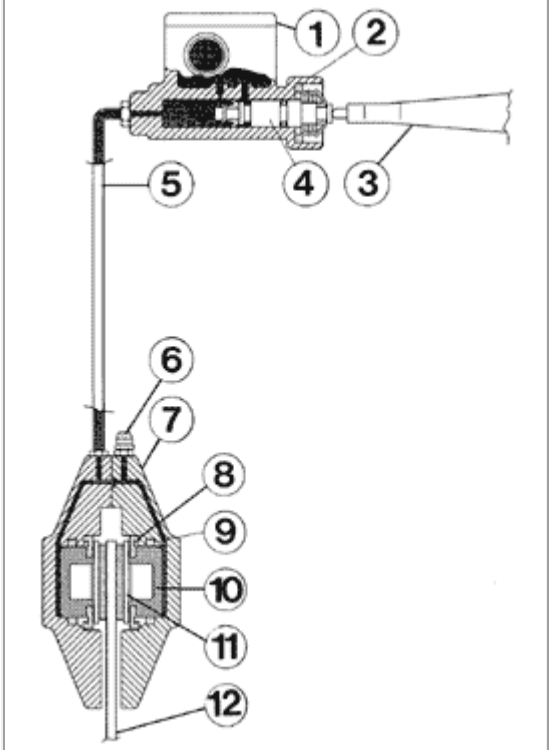


LUBRICATE	CLEAN WITH CARE
GREASE	CAUTION HANDLE WITH CARE
USE THE PRODUCT	ALWAYS REPLACE

Symbol	A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q	R
Quantity	1	1	2	5	1	1										
Torque N·M	8 - 12	15 - 25	20 - 25	5 - 6,5	10 - 12	7 - 10										

Braking system diagram

1 - Reservoir cap
2 - Master cylinder
3 - Brake lever
4 - Master cylinder piston
5 - Flexible brake line
6 - Bleed screw cap
7 - Calliper
8 - Piston seal ring
9 - Plunger seal ring
10 - Piston
11 - Brake pad
12 - Brake disc



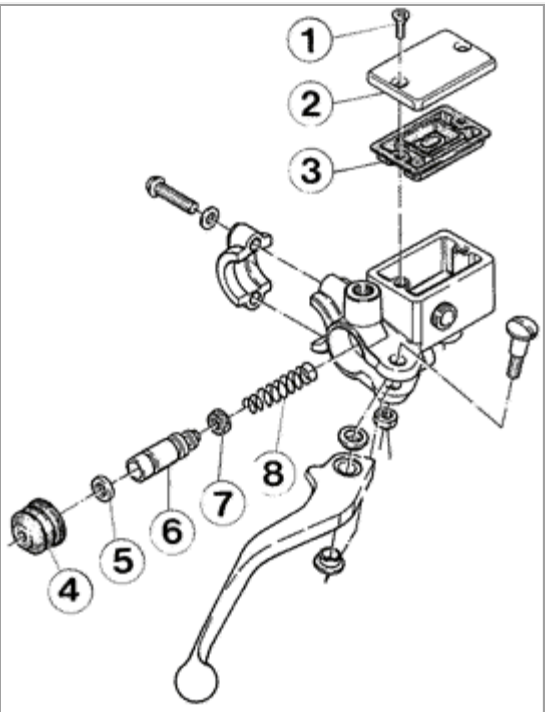
Removing the brake master cylinder

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

-Remove master cylinder from handlebars: remove brake lever and disassemble cylinder.

1 - Reservoir cover screw
2 - Reservoir cover
3 - Cover seal
4 - Bellows
5 - Seal ring
6 - Plunger
7 - Seal
8 - Spring

Warning - 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 good quality solvent. Brake fluid damages paintwork. Do not leave disassembled rubber parts in alcohol for more than 20 seconds. After washing, dry the parts with compressed air and a clean cloth. Seal rings must be immersed in brake fluid before refitting.

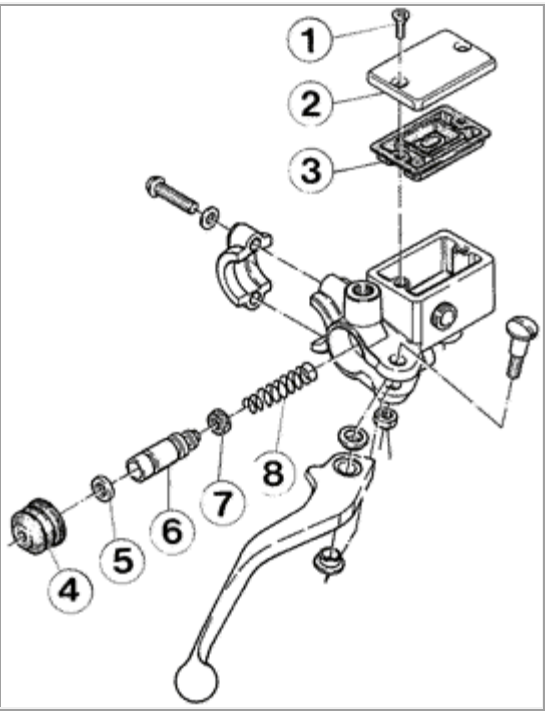


Re-fitting the brake master cylinder

-Before reassembly, the parts must be completely dry and free of traces of oil, diesel fuel, grease, etc.. They should therefore be rinsed thoroughly in denatured alcohol.

-Perform the disassembly steps in reverse order. Rubber parts must be fitted with care to ensure they seal correctly.

1 - Reservoir cover screw
2 - Reservoir cover
3 - Cover seal
4 - Bellows
5 - Seal ring
6 - Plunger
7 - Seal
8 - Spring

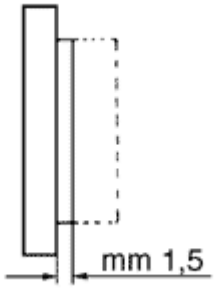


Replacing the brake pads

- Replace the brake pads when the friction material has come to its wear limit.

-To replace the pads, remove the protection cover, the pin and the leaf spring, then take out the pads and replace them after sending the pistons back in. Fit the parts again by following the same steps in reverse order.

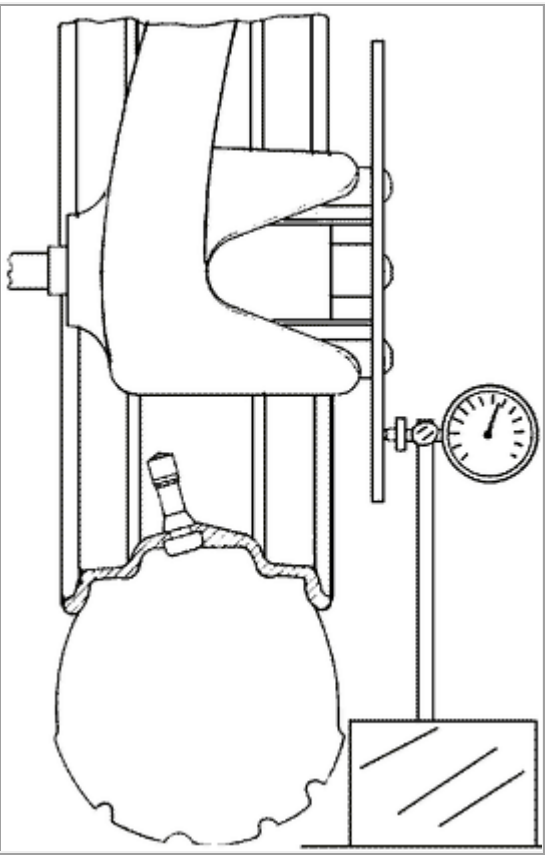
Warning - Actuate the lever a few times before using brake.



Checking the brake disc

-Max. allowable wobble: mm 0.1.

Special tool: 020335Y
[02020335Y] 020335Y

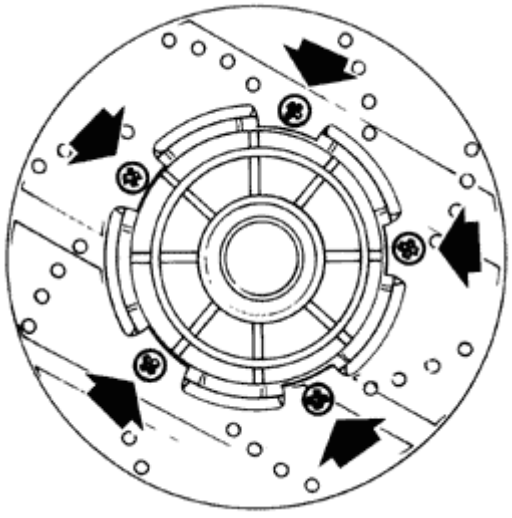


Brake disc replacement

-After replacing the brake disc smear LOCTITE 242 on the screw threads and then tighten to the prescribed torque.

Warning - The side of the disc stamped with the **direction of rotation arrow** must face the shock absorber.

Tightening torque 5 - 6.5 N·m
[010501] Frame

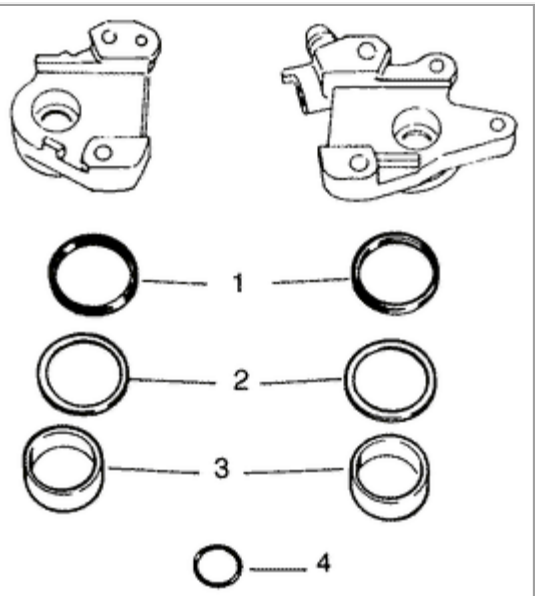


Brake calliper overhaul

-Remove the calliper assembly bolts and take out the internal parts from both bodies. If necessary, use short blasts of compressed air through the brake fluid passage to facilitate expulsion of the pistons.

- Make sure the cylinders of the calliper inner and outer bodies are not scratched or eroded. If they are, renew the entire calliper.

Warning - All internal components must be renewed at each calliper overhaul.



1	**DUST SEALS**	**3**	**PISTONS**
2	**OIL SEALS**	**4**	**O-RINGS**

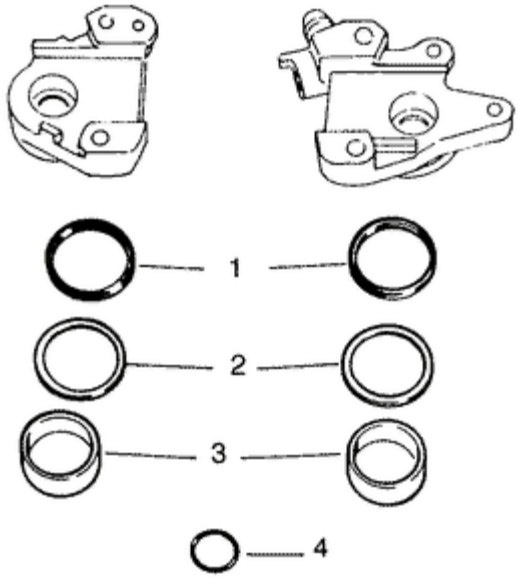
Reassembling the brake calliper

Insert the following parts into the calliper bodies
-seal rings (1-2)
-pistons (3)
-O-ring (4) (in one of the bodies)

-Join the two bodies by means of the assembly bolts. Fit the pads and air bleed screw (see previous paragraphs).
-Position the calliper on the disc and fasten it to the hanger, tightening the bolts.
-Secure the brake tube union to the calliper and tighten to the prescribed torque.
- 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.

Calliper to hanger: 20 - 25 N·m
Calliper to tube union: 15 - 25 N·m
[010501] Frame

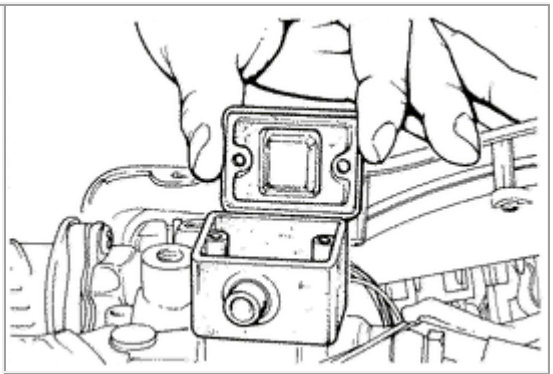
Warning - Rubber parts must not be left in alcohol for more than 20 seconds. After washing, dry the parts with compressed air and a clean cloth. **Immerse the seals in brake fluid;** the use of protective agent **PRF1** is tolerated.

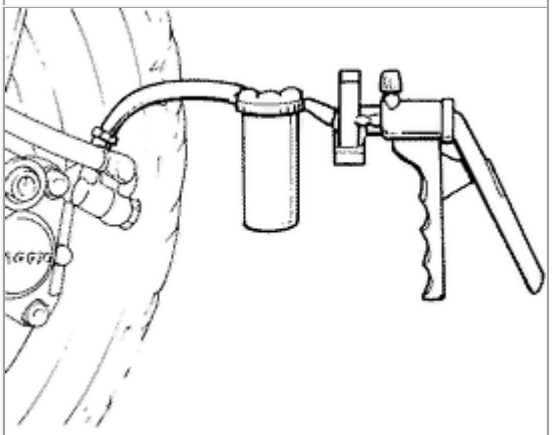


1	DUST SEALS	**3**	PISTONS
2	OIL SEALS	**4**	O-RINGS

Filling andbleeding the brake system

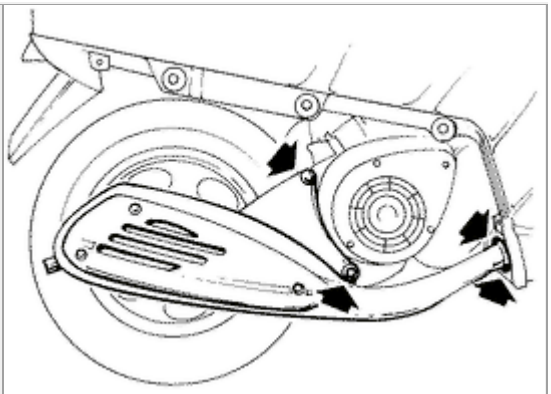
-With the bleed valve closed, fill the system to the maximum level with TUTELA TOP 4 brake fluid.
-Loosen the bleed valve.
-Apply the Mityvac vacuum pump tube to the bleed valve. To bleed the circuit you must supply the reservoir constantly with brake fluid while pumping the Mityvac pump until there 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.
Note: 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.
Warning - During this procedure the vehicle must be on the stand on a level and horizontal floor.
Note: 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.
Caution - 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.
Warning - 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.
When you finished the above procedure, tighten the bleed screw to the prescribed torque.



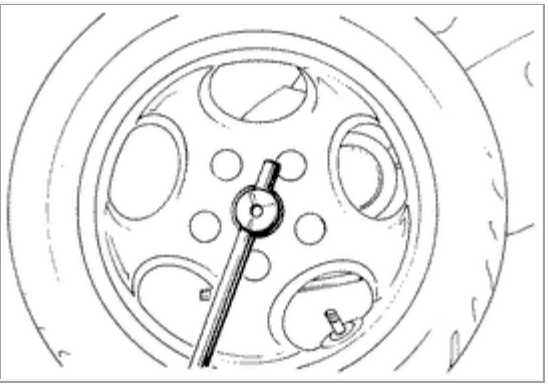


Tightening torque:10 - 12 N·m [010501] Frame Special tool: 020329Y [02020329Y] 020329Y	

Removing the silencer

-Remove the right-hand side panel. -Loosen the screws fastening the silencer to the manifold. -Loosen the two screws fixing the silencer to the engine. - When fitting the silencer, tighten the screws to the prescribed torque. Silencer-engine tightening torque 24 - 27 N·m. Silencer-manifold tightening torque 11 - 13 N·m [010502] Engine	

Removing the rear wheel

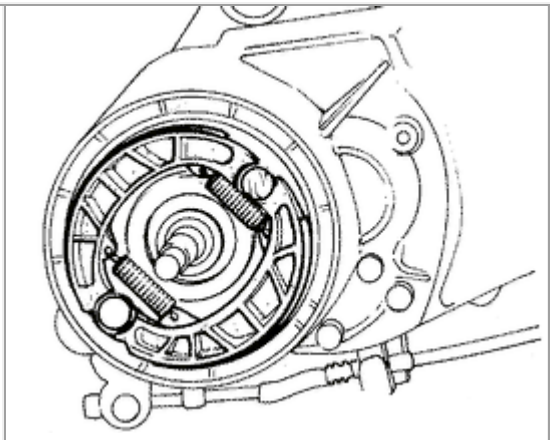
-Straighten the split pin and remove. -Remove the central nut as shown in the figure.	

Renewing the rear brake shoes

-After removing the exhaust pipe and wheel, proceed as follows:

1.Use the special pliers to remove the brake shoe spring.
2.Remove the brake shoes, prising them off with the aid of a lever if necessary.
3.Fit the new shoes with the aid of light mallet blows.
4.Attach the spring with the aid of the special pliers.

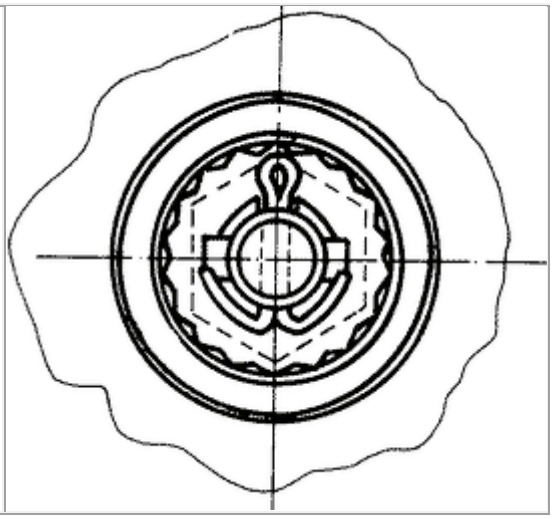
Brake spring pliers 020325Y
[02020325Y] 020325Y



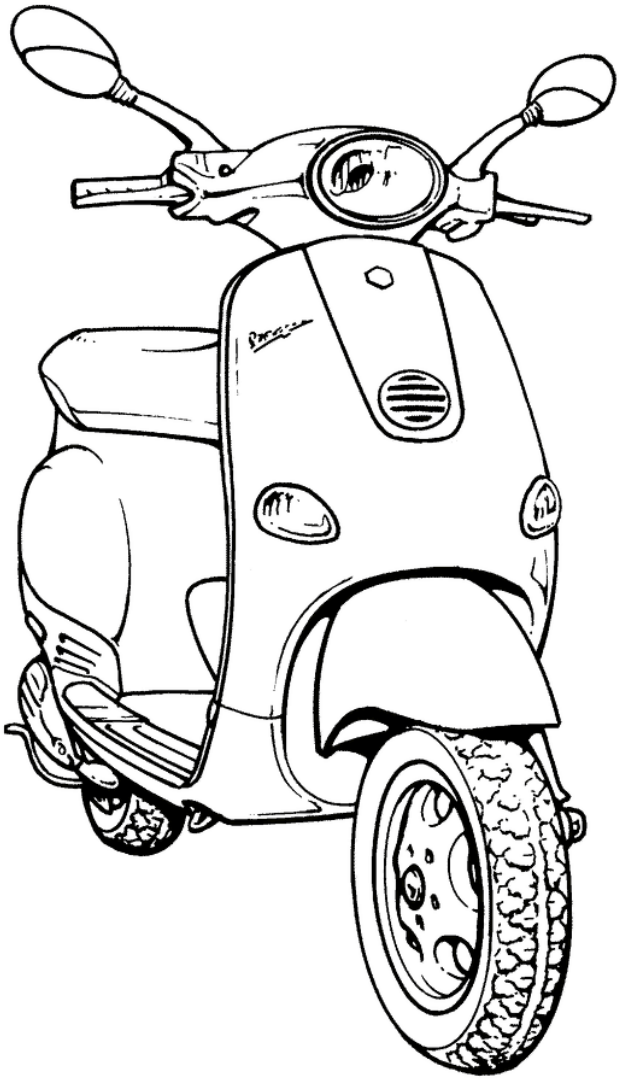
Fitting the rear wheel

-Fit the wheel and tighten the central nut to the prescribed torque.
-Fit the nut cap and insert the split pin, peening over the ends as shown in the figure.

Tightening torque: 137 - 152 N·m
[010501] Frame



BODYWORK

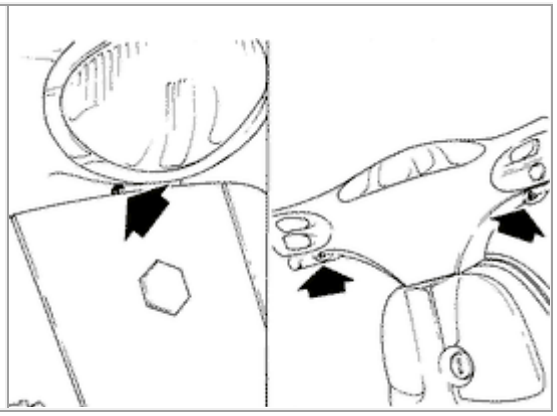


LUBRICATE	CLEAN WITH CARE
GREASE	CAUTION HANDLE WITH CARE
USE THE PRODUCT	ALWAYS REPLACE

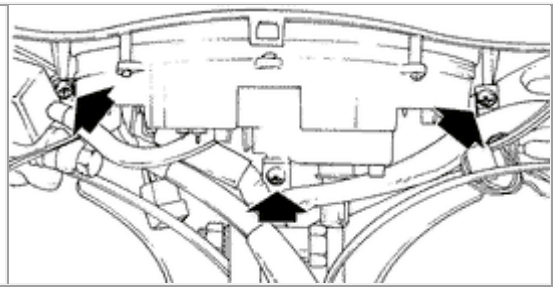
: Exercisecaution during bodywork operations. thefairings are delicate.

: Do not cleanpainted plastic body parts with solvents containing petrol or its derivatives.

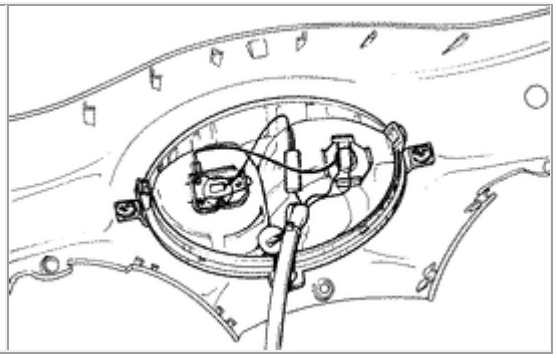
Handlebar frontfairing

-Remove the handlebar front fairing as shown in the figure.	

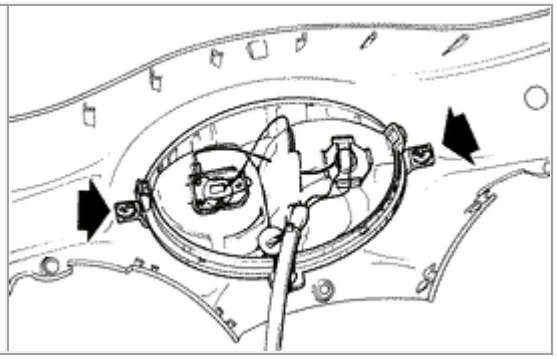
Handlebar rear fairing

-Remove the handlebar rear fairing after loosening the screws as shown in the figure.	

Replacing the headlight bulbs

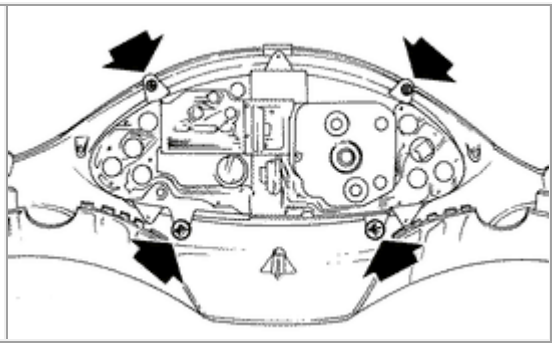
-Remove the bulbs as shown in the figure.	

Headlight

-To replace the headlight, unscrew the 2 screws.	

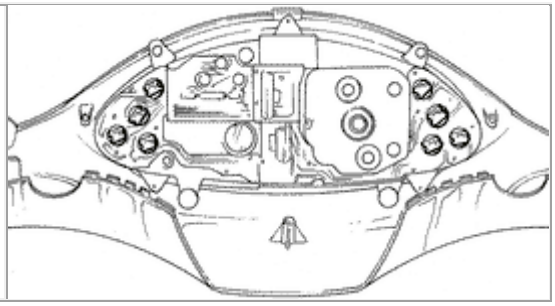
Replacing the instrument panel

-To replace the instrument panel, loosen the 4 screws shown in the figure.



Replacing warning light bulbs

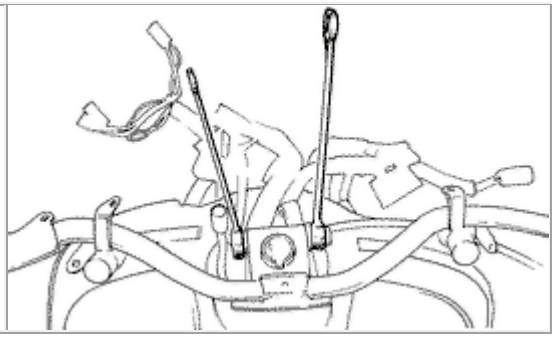
-The bulbs have a bayonet fitting. Simply rotate them1/4 of a turn to extract and replace them.



Removing the handlebars

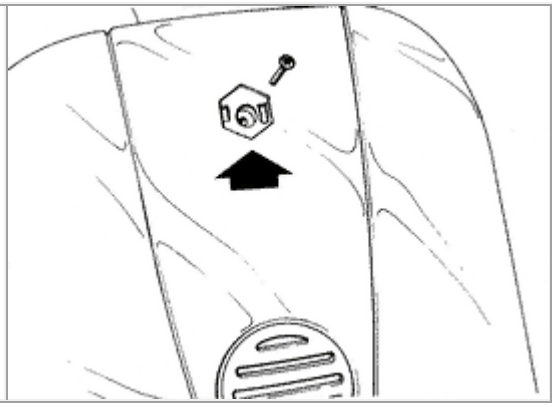
-To remove the handlebars, use 2 spanners (17-13 mm) as shown in the figure after detaching the LH and RH controls.

Handlebars (fitting)
Handlebars stet nut tightening torque
45 - 50 N·m.
[010501] Frame

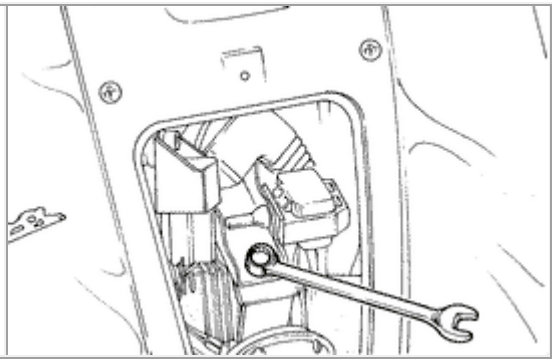


Replacing the front grille

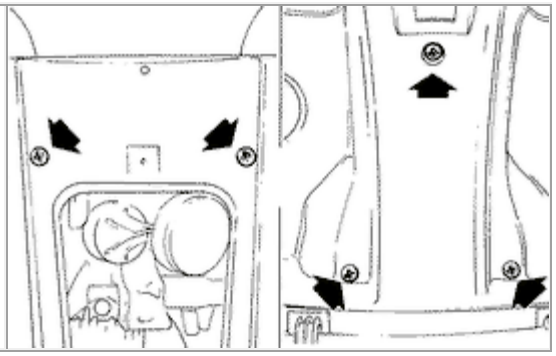
-To replace the grille, first remove the Piaggio emblem and then the screw located underneath.



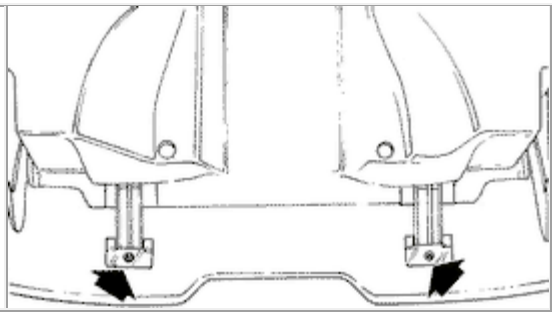
Replacing the horn

-Remove the screw and disconnect the electric terminals.	

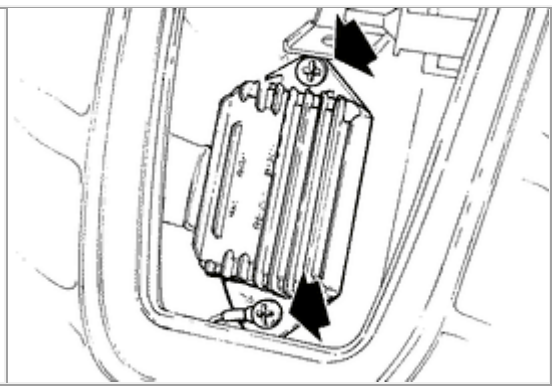
Replacing the glove compartment

-Loosen the two screws located under the front grille (see figure). -Open the glove compartment door and remove the three screws located inside (see figure).	

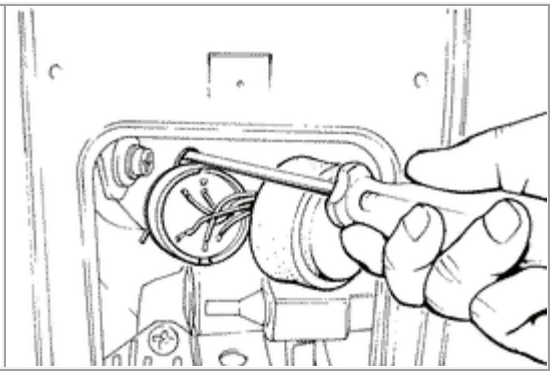
Replacing the glove compartment door

-Loosen the 2 screws and detach the door.	

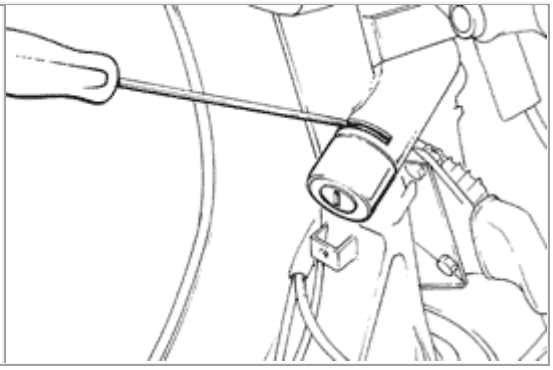
Replacing the voltage regulator

-Loosen the two screws and disconnect the terminal block.	

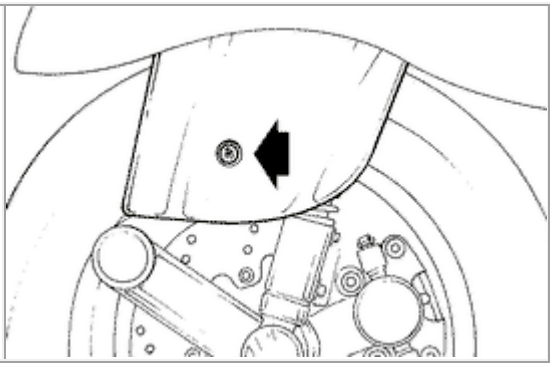
Replacing the ignition switch

-Remove the rubber hood and then the retaining clip as shown in the figure.	

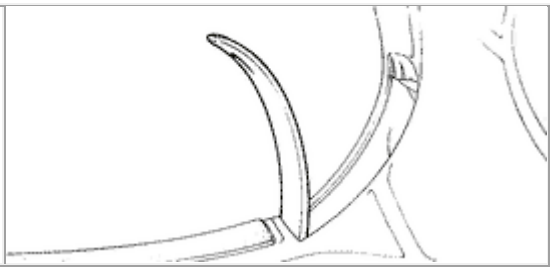
Replacing the ignition switch lock

-Press the spring clip with a screwdriver and withdraw the switch lock. To remove the part of the lock that is left inside the steering tube, you must first disassemble the steering tube.	

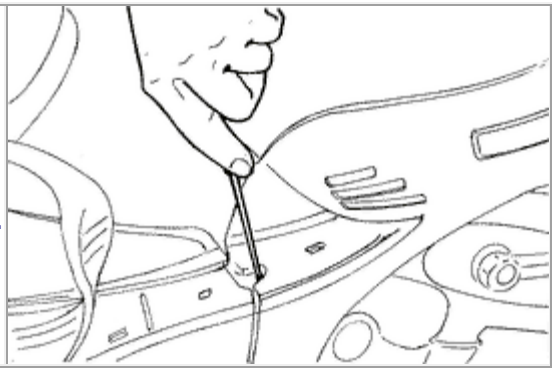
Replacing the front shock absorber cover

-Unscrew the screw as shown in the figure and remove the plastic fairing.	

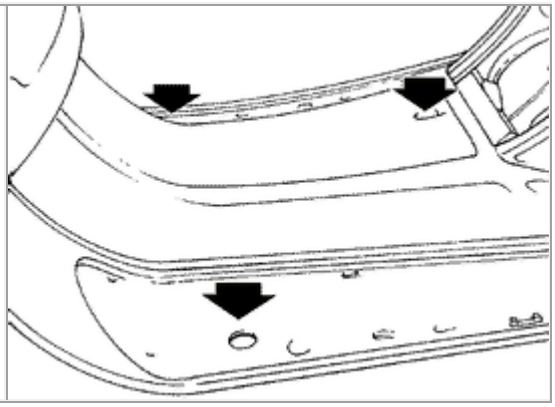
Replacing the spark plug access door

-Unscrew the screw as shown in the figure, then remove the spark plug access door.	

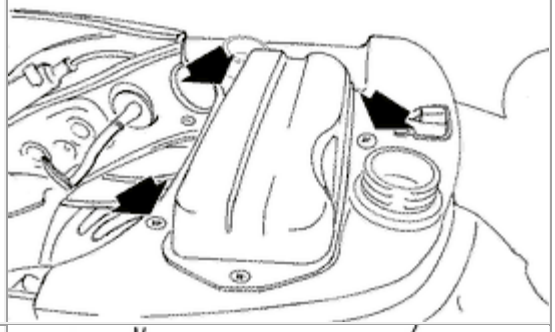
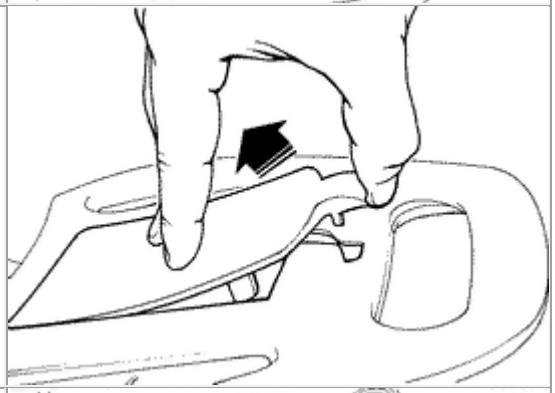
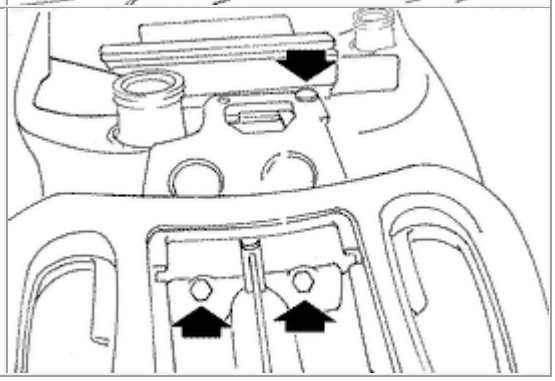
Side fairings

-Remove the screws under the footboard mat, then remove the two side fairings, by disengaging the interlocking elements.	

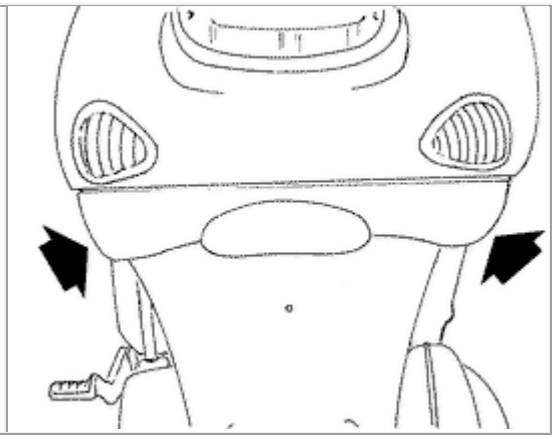
Footboard

-Loosen the three screws shown in the figure after removing the glove compartment and the side fairings.	

Replacing the luggage-carrier

-Tip up the saddle. -Remove the helmet compartment. - Remove the plastic fairing under the saddle after unscrewing the three screws shown in the figure.	
- Remove the plastic cover on the luggage-carrier.	
-Unscrew the three screws and remove the luggage-carrier.	

Rear splash guard

-Unscrew the 2 side screws and the 2 nuts at the back of the splash guard. -Unclip the number plate light (no tools needed).	

Pre Delivery

Vehicle

-Paintwork
- Joins between plastic fairings
-Damage
-Cleannes

Fastenings

- Check all tightening torques

Electrical system:

-Fill the battery with battery acid and chargeit with a suitable battery charger.
-Keyswitch
-Headlight full/dipped beam, panel indicatorlights, side lights
-Headlight adjustment
-Taillight
-Brake light (front and rear brake)
-Turn signals and relative indicators
-Speedometer and instrument panel lighting
-Horn
-Start button

Warning - The battery must becharged before use to ensure optimal performance. Premature failure of thebattery will ensue if it is used for the first time without an adequate chargeor with a low electrolyte level.

Warning - Before charging thebattery remove the plugs from each cell.
Keep the battery wellclear of naked flames and sparks during charging.
Remove the battery from the vehicle bydisconnecting the negative lead first.

Warning - When installing thebattery on the vehicle connect the positive lead before the negative lead.

Caution - Battery electrolytecontains sulphuric acid. Battery electrolyte is poisonous and causes severeburns. Avoid contact with the eyes, skin and clothes.

In case of contact withthe eyes and/or skin, wash the affected area with plenty of clean water forabout 15 minutes and seek medical assistance immediately.
In the case of ingestion of electrolytedrink plenty of water or vegetable oil and call a doctor immediately.

Batteries produceexplosive gases; keep the battery well away from naked flames, sparks orcigarettes. Ensure there is adequate ventilation when charging batteries inclosed areas.
Protect the eyes whenworking with batteries or in their immediate vicinity.
KEEP BATTERIES AWAY FROMCHILDREN

Warning - Never use a fusewith a higher rating than the prescribed value. The use of unsuitably ratedfuses can result in widespread damage to the vehicle, including fire.

Levels:
-Brake fluid
-Gearbox
-Mixer

Functional check:
-Brake lever travel
-Throttle twistgrip adjustment
-Uniform left and right steering with no stiffpoints

Other
-Tyre inflation pressure
-Locks
-Mirrors and accessories
-Toolkit, user handbook, guarantee certificateand customer service card

Warning-Check and adjust tyre inflation pressureonly when the tyres are at ambient temperature.

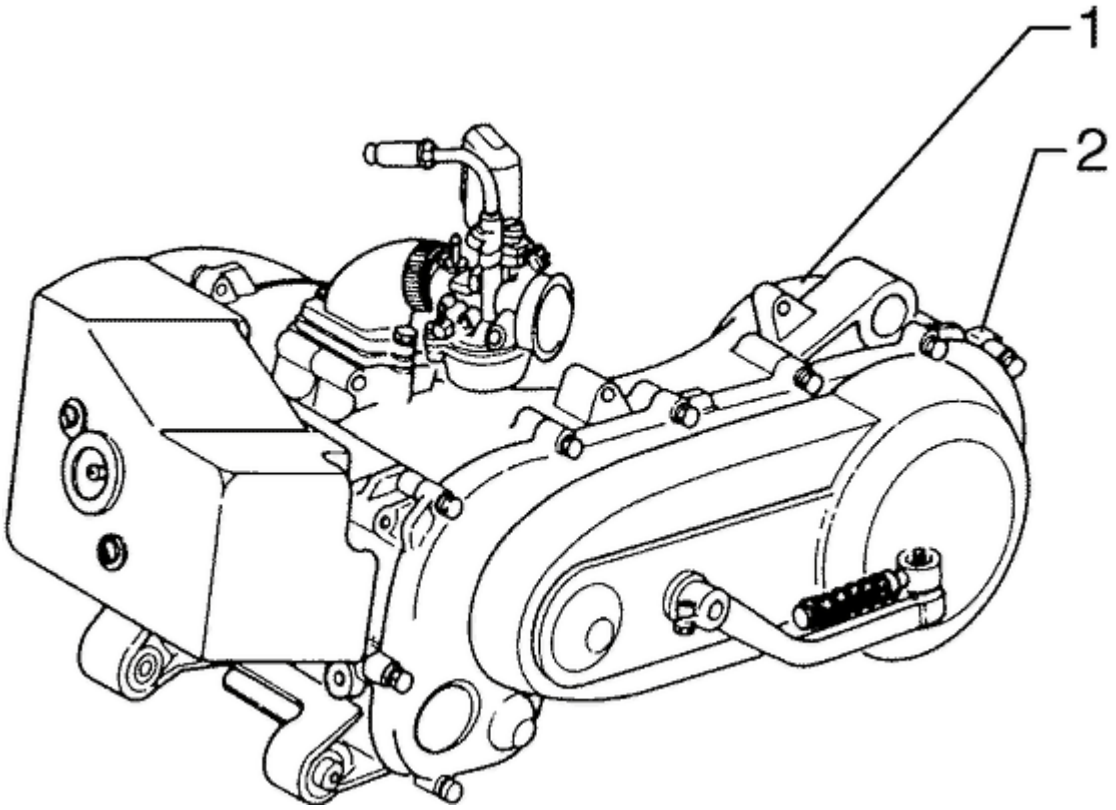
Warning - Over-inflated tyres can burst. Never exceed theprescribed inflation pressure.

Caution-Handle petrol with the utmost care.

Road test:
-Cold start
-Speedometer
-Throttle operation
-Stability
-Efficiency of front and rear brakes
-Front and rear shock absorbers
-Anomalous noises
-Restart with warm engine
-Liquidleaks (after road test)

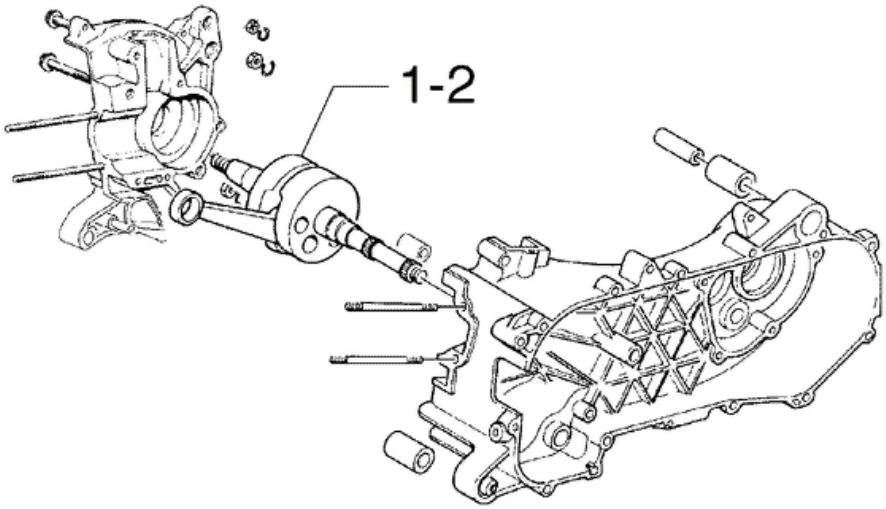
Time Charts

1 ENGINE



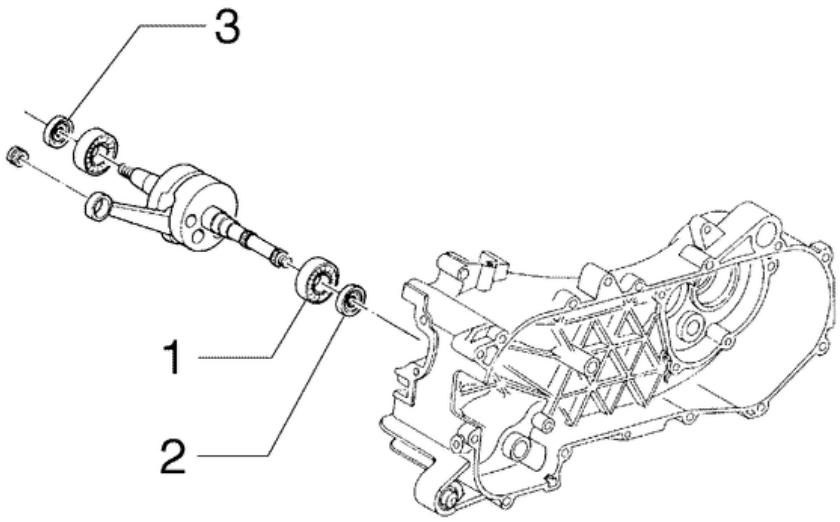
Description	Code	Op.	Time
Engine from the chassis - dismant. and reass. [0601] Removing engine	001001	1	95'
Engine mounts - Torque nuts [0604] Refitting engine	003057	2	10'

2 Crankcase



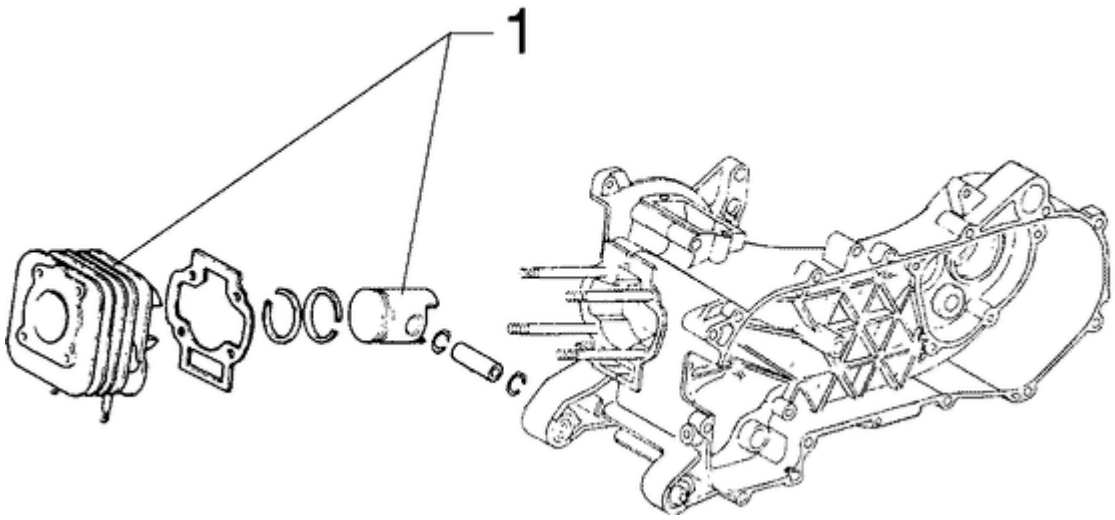
Description	Code	Op.	Time
Driving shaft - overhauling	001101	1	175'
Crankshaft - replace. [12020401] Removal of bolts	001117	2	155'

3. CRANKSHAFT



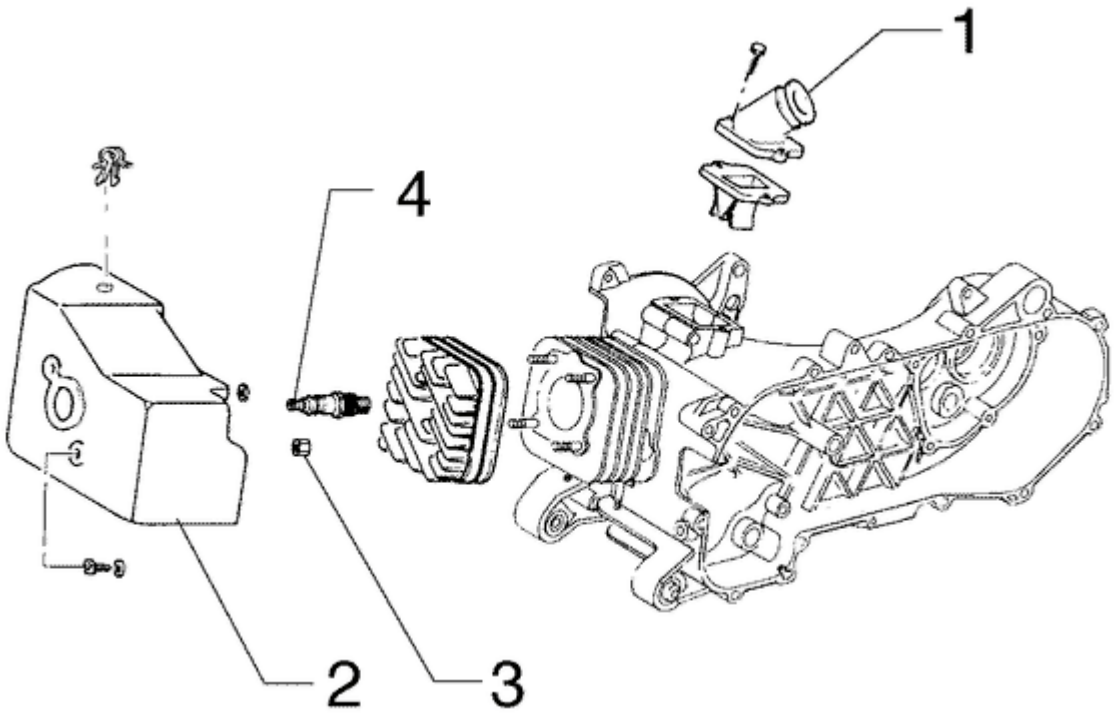
Description	Code	Op.	Time
Main bearings - replace. **[12020405] Bearing**	001118	1	155'
Oil seal clutch side - replace.	001100	2	55'
Oil seal - Replace.	001099	3	50'

4Cylinder-piston - GUDGEON PIN ASSEMBLY



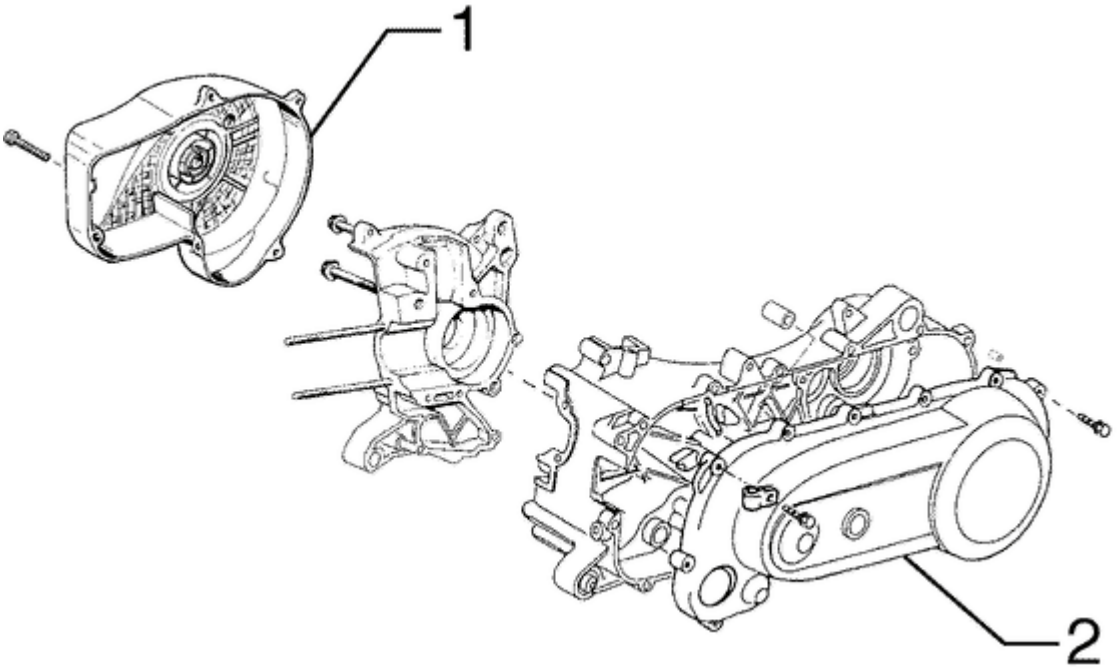
Description	Code	Op.	Time
Cylinder/piston - replace. [12020303] Cylinder	001002	1	55'
Cylinder/piston - Overhaul/clear [12020305] Thin plate unit	001107	1	50'

5 HEAD -COOLING JACKET



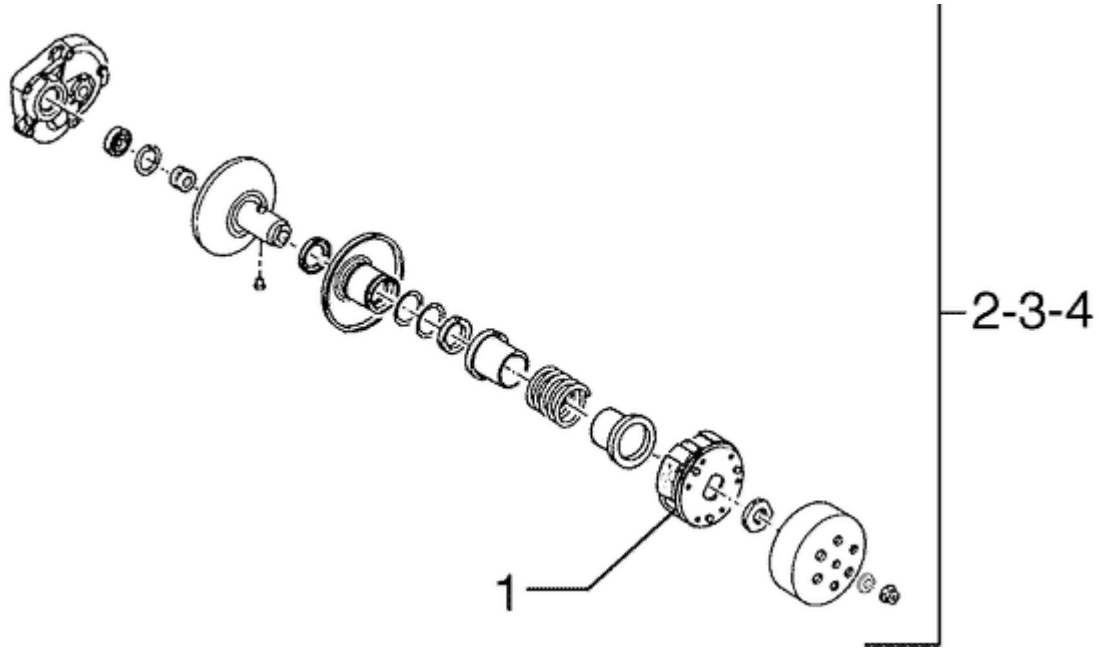
Description	Code	Op.	Time
Intake manifold - Replace	001013	1	40'
Cooling cap - replace. [12020301] Cylinder cooling grill	001097	2	25'
Cylinder head - nut tighting	003056	3	25'
Spark plug - replace. [0308] Spark-plug	001093	4	10'

6 FLYWHEELHOUSING - TRANSMISSION COVER



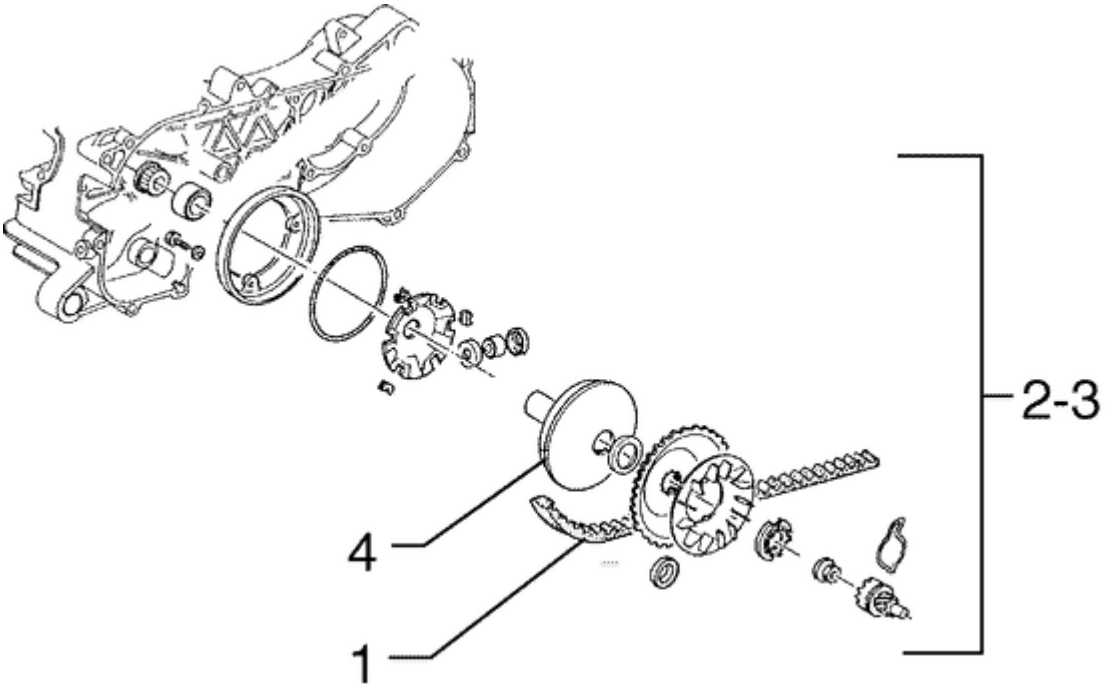
Description	Code	Op.	Time
Flywheel housing - Replace [12020102] Fan cover	001087	1	25'
Mechanical transmission cover - Replace [12020201] Transmission cover	008002	2	30'

7 DRIVENPULLEY



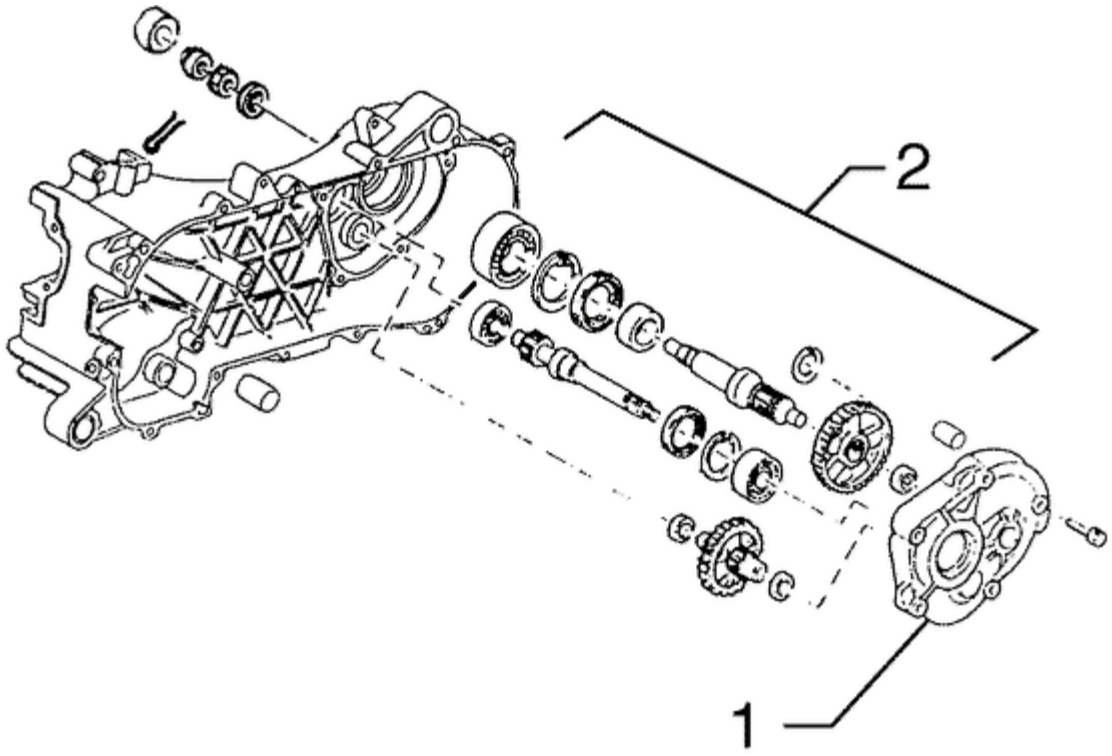
Description	Code	Op.	Time
Clutch - Replace **[12020215] Clutch**	001022	1	50'
Driven pulley - Overhaul [12020214] Check driven pulley	001012	2	55'
Driven pulley - Replace [12020202] Driven pulley	001110	3	45'
Clutch assembly - Check wear [12020222] Check clutch	003072	4	25'

8 DRIVINGPULLEY



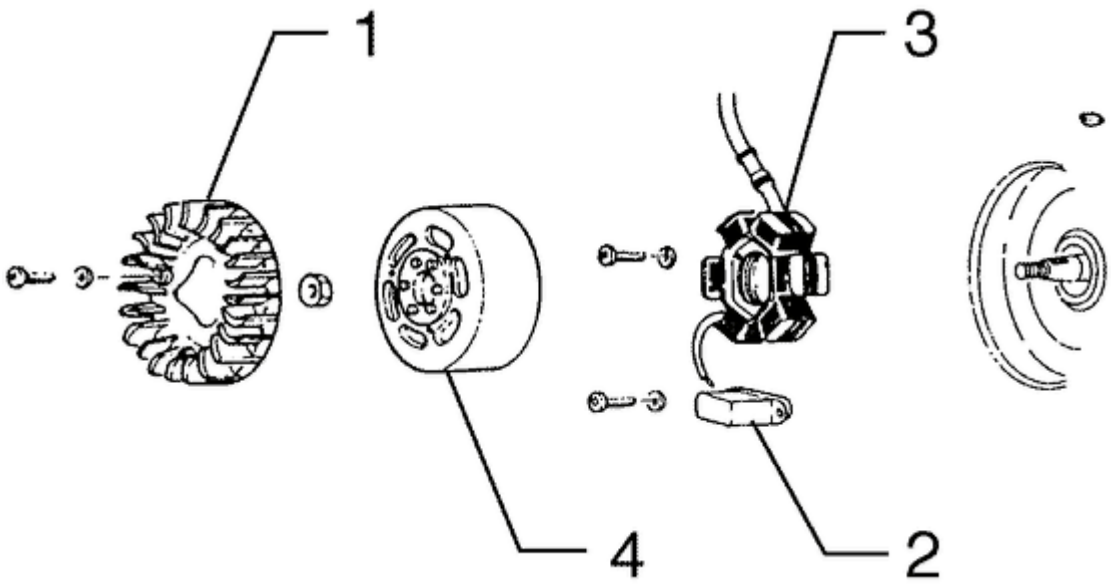
Description	Code	Op.	Time
Drive belt - Replace [12020203] Starter gearing	001011	1	40'
Driving pulley - Overhaul [12020203] Starter gearing	001006	2	50'
Driving pulley - Dismantling and reassembly [12020203] Starter gearing	001066	3	45'
Driving half-pulley - Replace. [12020203] Starter gearing	001086	4	35'

9 REARWHEEL SPINDLE



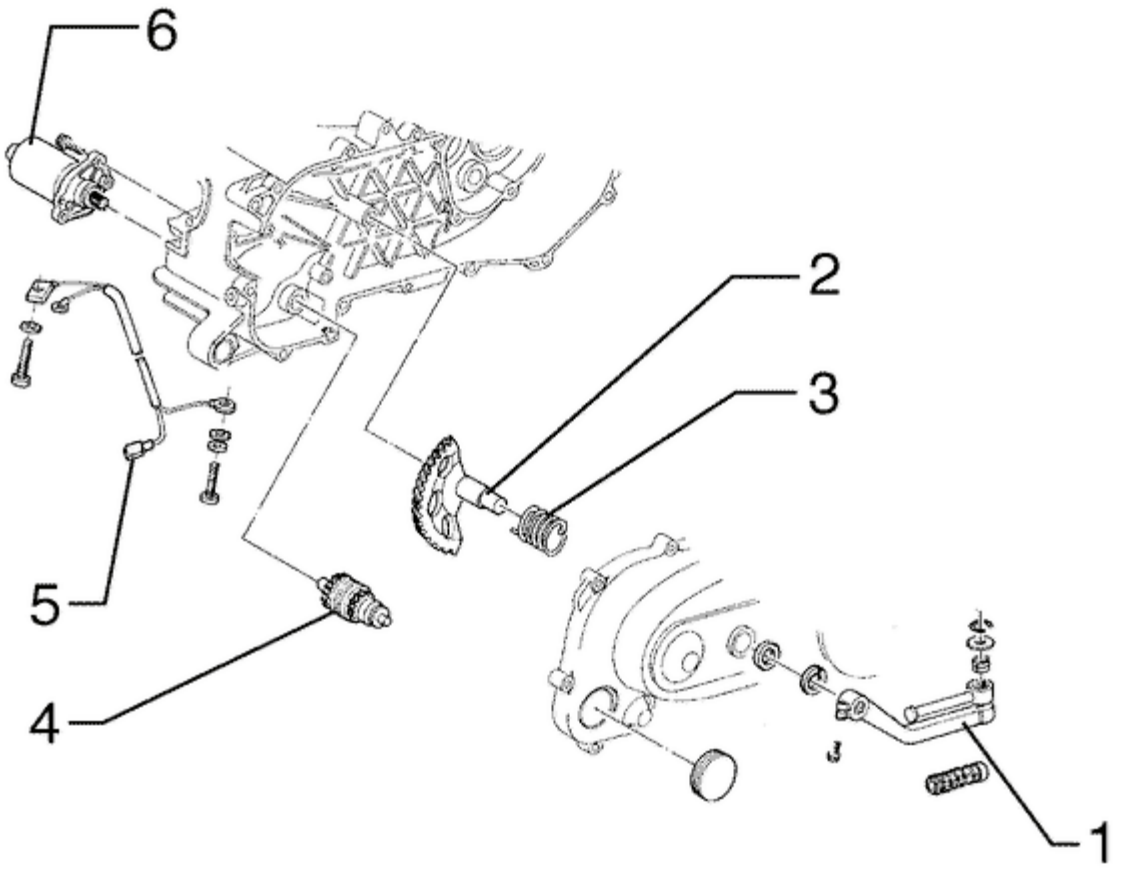
Description	Code	Op.	Time
Gearbox oil - Change [0307] Replacement of hub oil	003065	1	20'
Rear wheel hub - overhaul [12020233] Removal of driven pulley axle	001010	2	60'

10 FLYWHEELMAGNETO



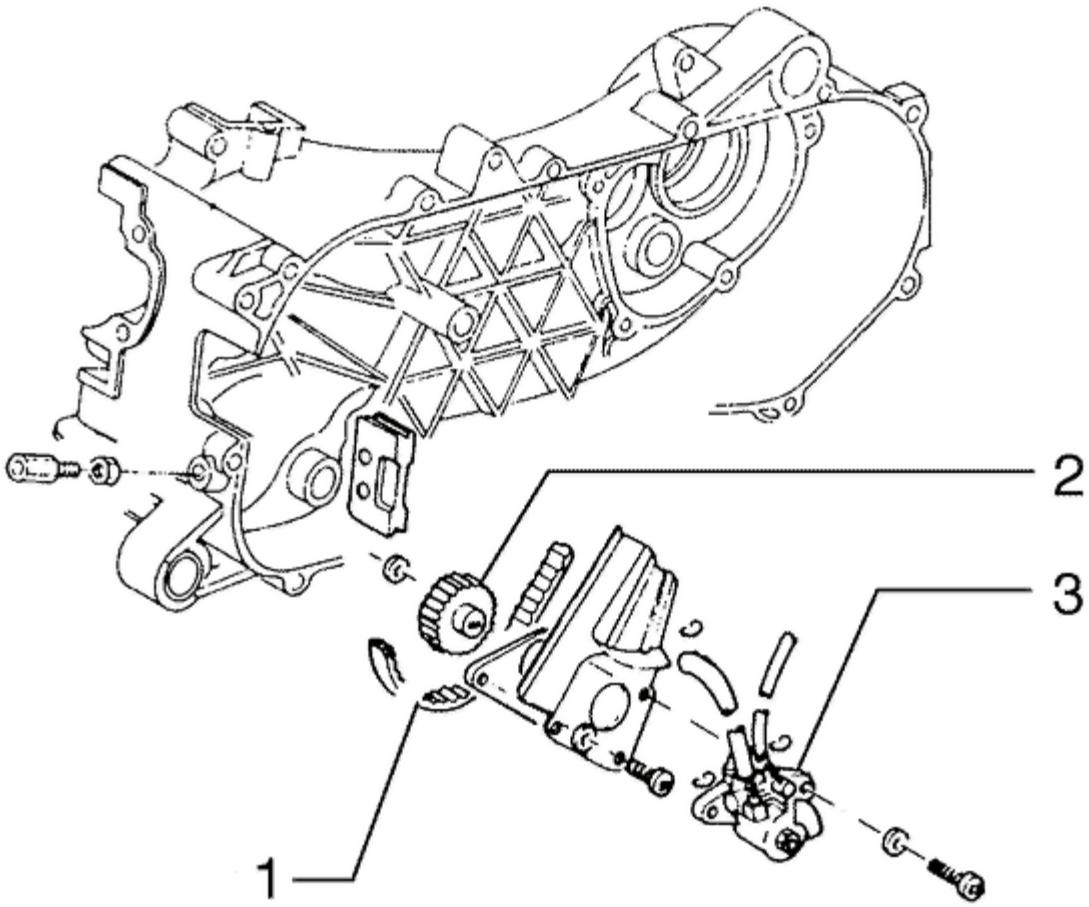
Description	Code	Op.	Time
Cooling fan - Replace [12020103] Fan	001109	1	30'
Pick-up - Replace [12020106] Pick up stator	001059	2	55'
Stator - Dismantling and reassembly [12020106] Pick up stator	001067	3	50'
Flywheel - Replace [12020104] Flywheel blockage nut	001058	4	30'

11 STARTERMOTOR



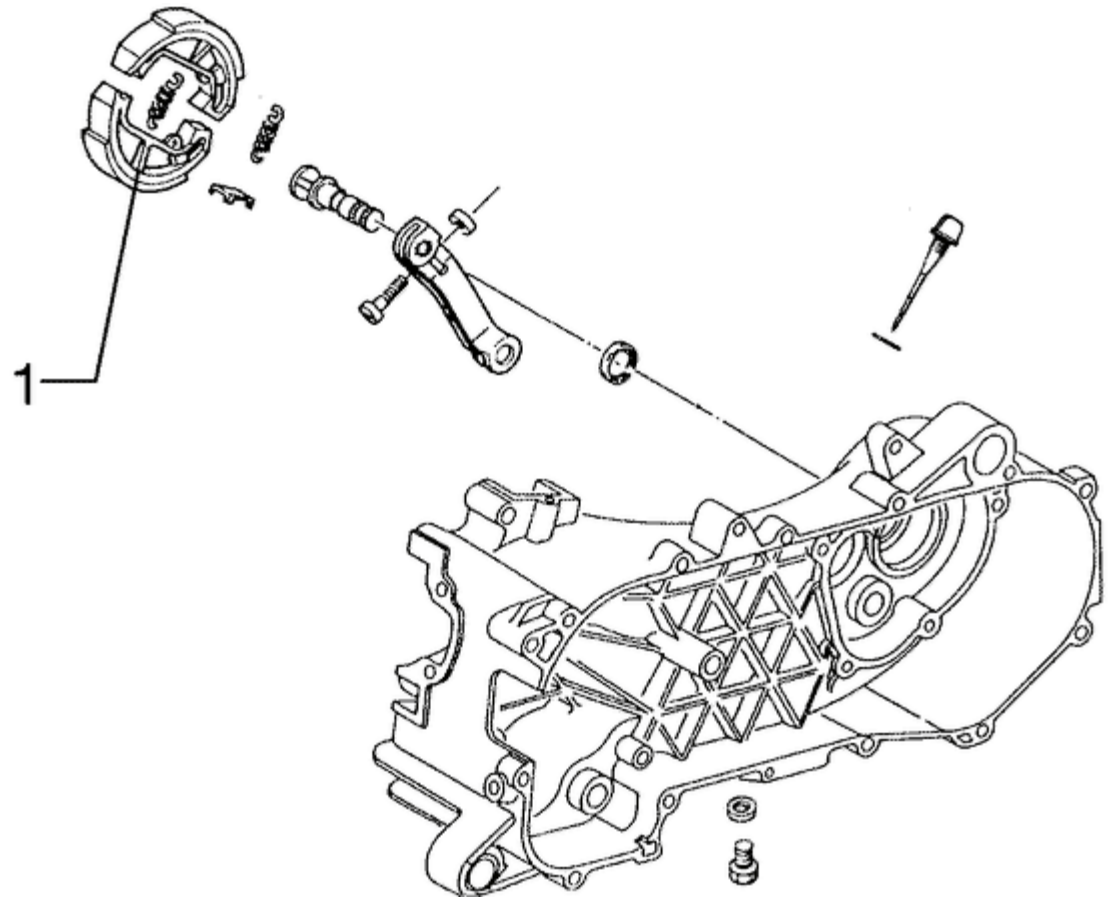
Description	Code	Op.	Time
Kick-start lever - Replace [12020244] Replacement starting lever	001084	1	10'
Kick-start - overhaul [12020245] Replacement of serrated sector	001021	2	35'
Sector spring - replace. [12020245] Replacement of serrated sector	008008	3	45'
Starting pinion - replace. [12020245] Replacement of serrated sector	001017	4	45'
Starter motor harness - replace	005045	5	20'
Starter motor - Replace [12020101] Starter motor	001020	6	25'

12 OIL PUMP



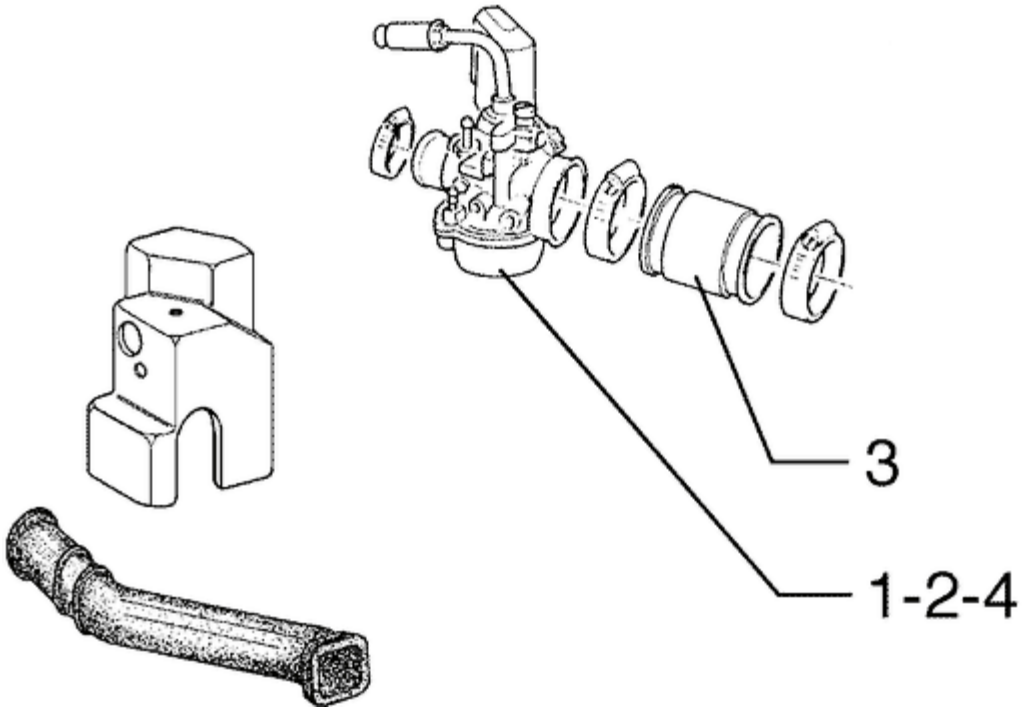
Description	Code	Op.	Time
Mixer belt - Replace [12020225] Belt gearing	001019	1	55'
Mixer drive gear - Replace [12020225] Belt gearing	001028	2	55'
Mixer - Replace [12020205] Belt	001018	3	45'

13 REARBRAKE



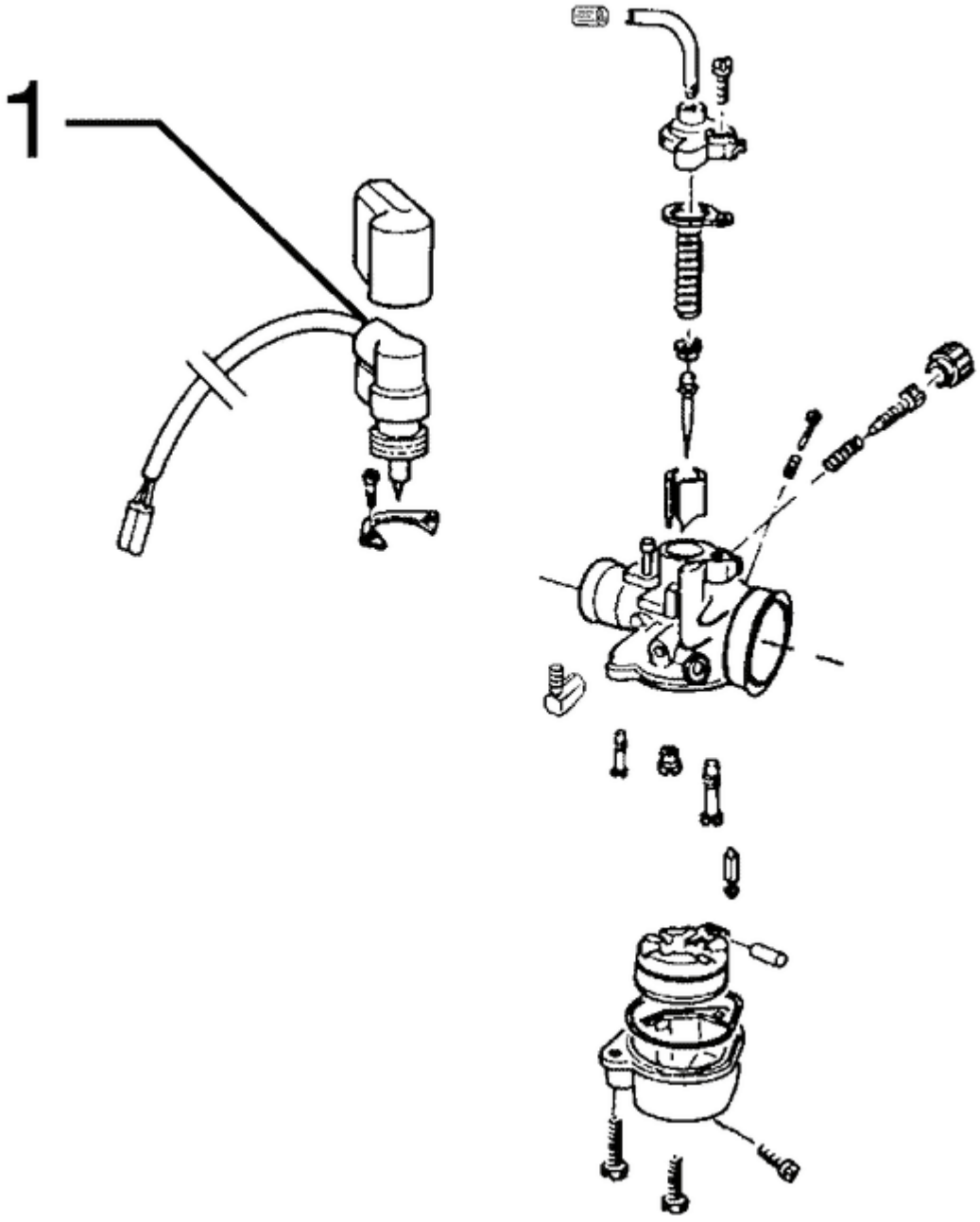
Description	Code	Op.	Time
Rear brake shoe(s) / pad(s) - Replace [0812] Replacement of rear brake shoe	002002	1	40'

14Carburettor



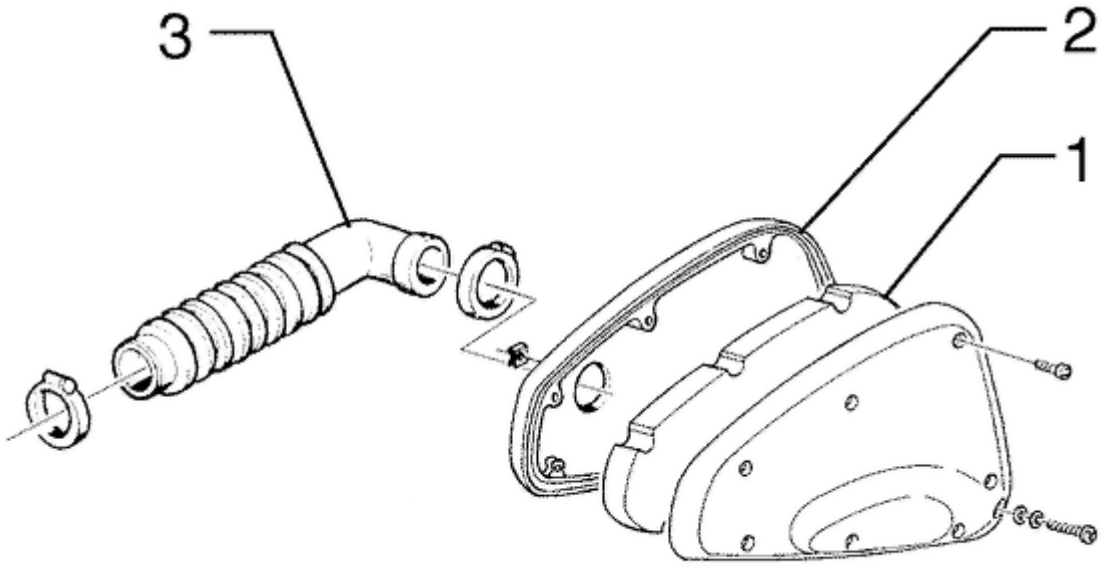
Description	Code	Op.	Time
Carburettor - overhaul [0302] Carburetor	001008	1	50'
Carburettor - replace [0302] Carburetor	001063	2	35'
Carburettor - air filter hose - Replace	004122	3	25'
Carburettor - adjust [0302] Carburetor	003058	4	10'

15 Carburettor



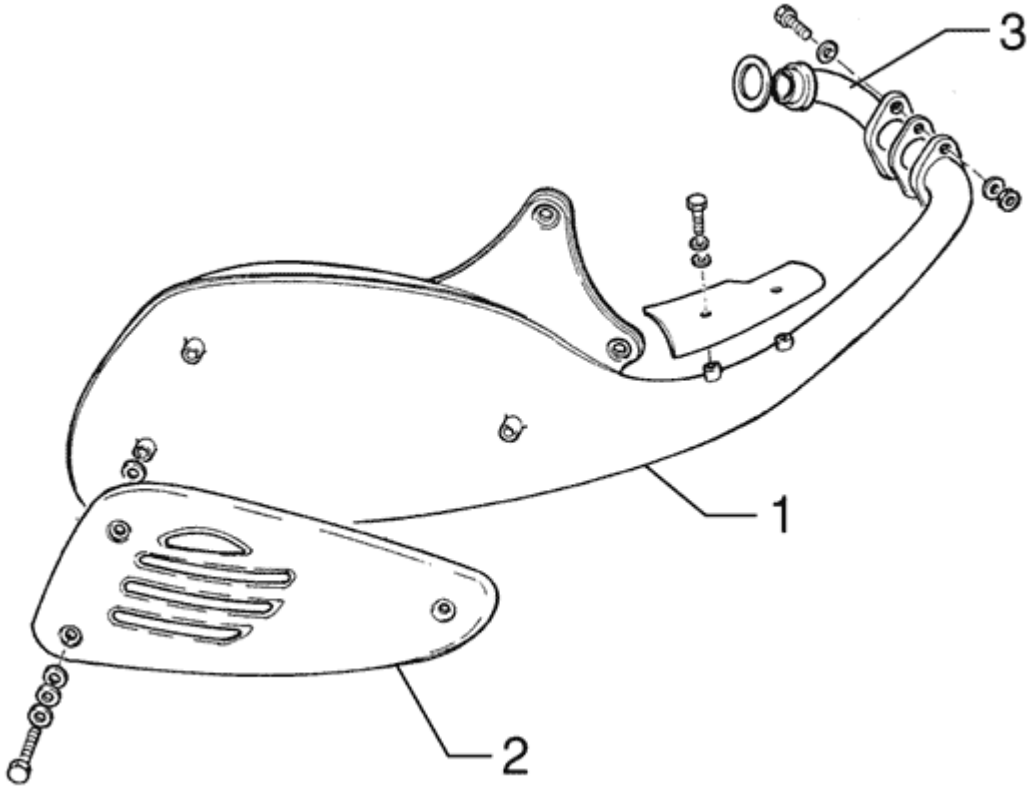
Description	Code	Op.	Time
Automatic choke - replace	001081	1	30'

16 AIRFILTER



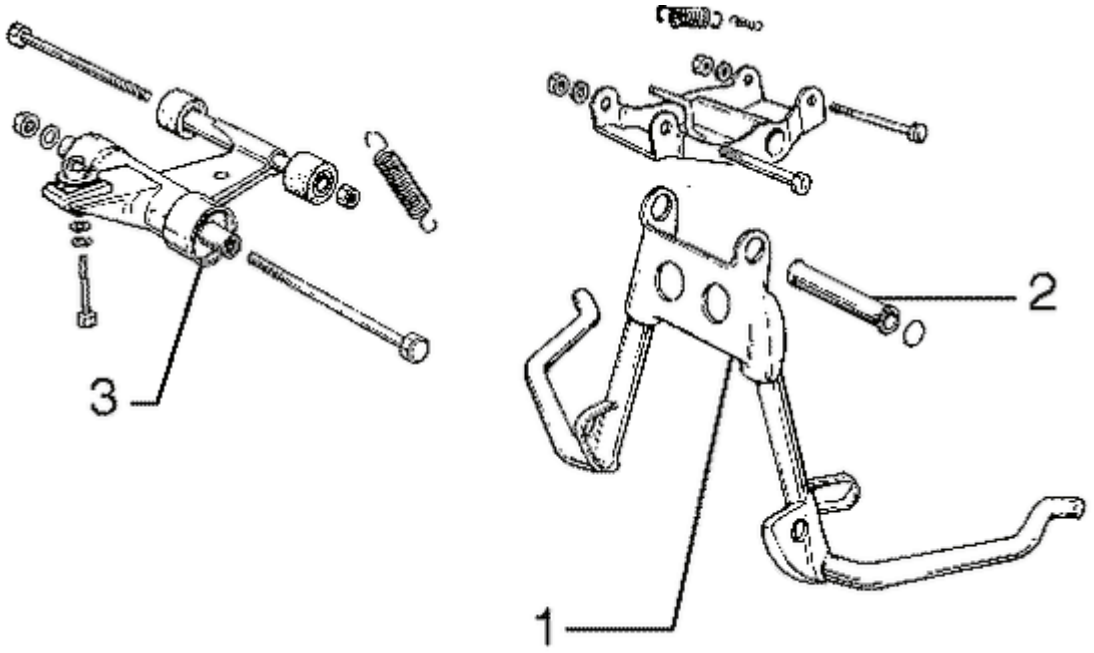
Description	Code	Op.	Time
Air filter - replace. [0306] Air filter	001014	1	30'
Air filter housing - Replace [0306] Air filter	001015	2	30'
Air filter-body connection hose - Replace	001027	3	25'

17 Silencer



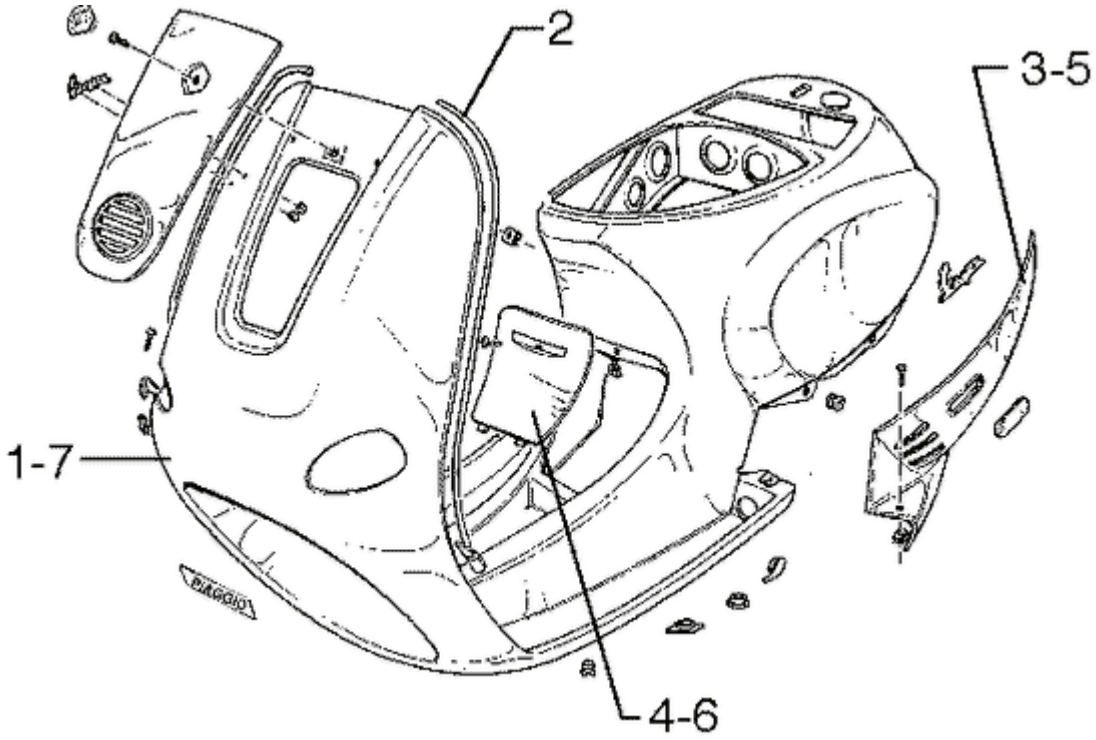
Description	Code	Op.	Time
Silencer - replace. [0810] Removal of muffler	001009	1	30'
Silencer protection - replace.	001095	2	10'
Exhaust manifold - replace.	001092	3	30'

18 STAND -ENGINE/FRAME CONNECTING ARM



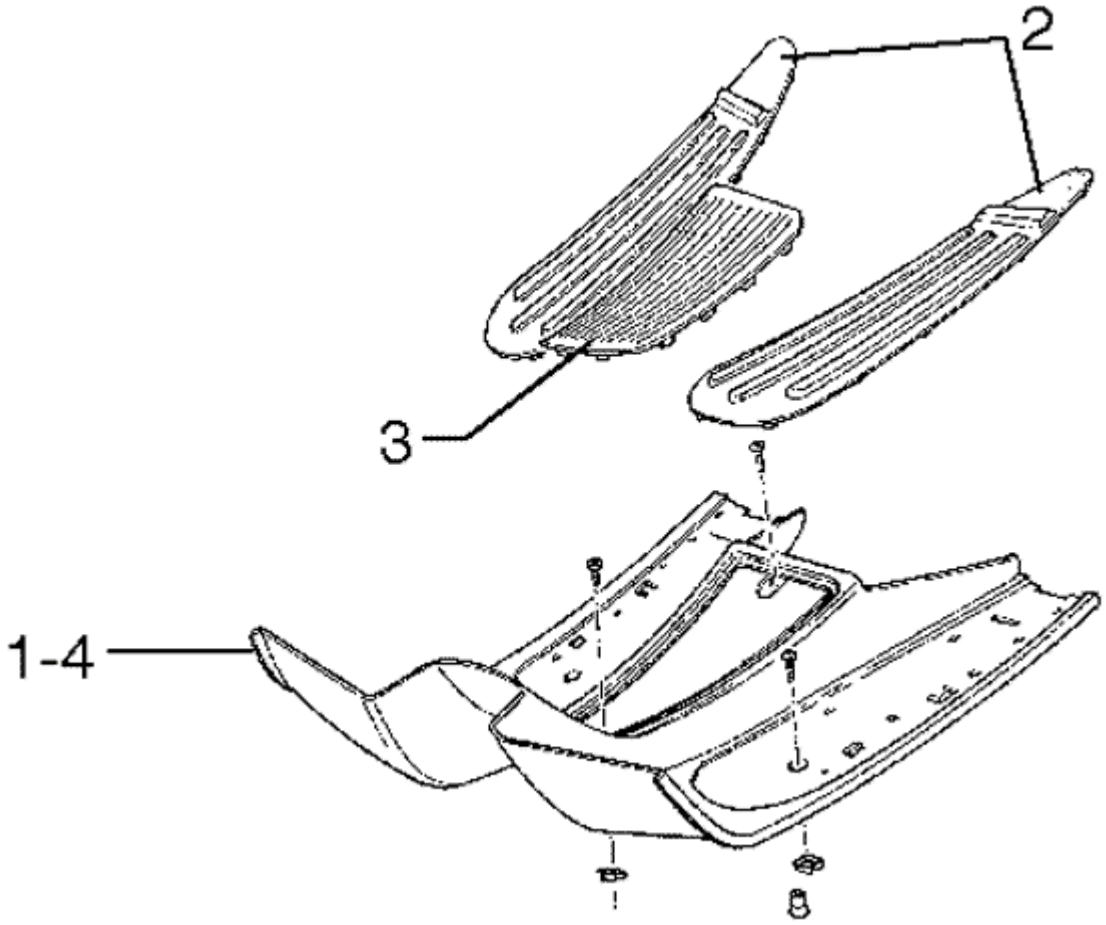
Description	Code	Op.	Time
Central stand - replace	004004	1	20'
Central stand pin - replace	001053	2	20'
Engine-frame connecting arm - replace [0603] Removal of engine pivot swinging arm	001072	3	50'

19 Chassis



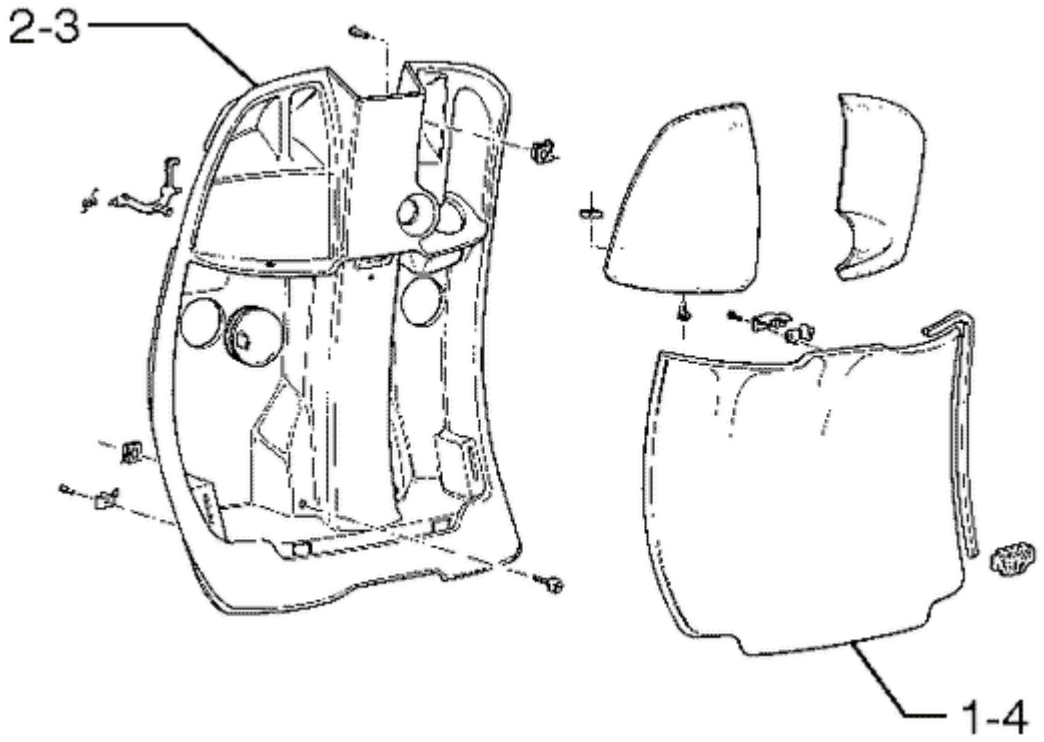
Description	Code	Op.	Time
Chassis - Replace.	004001	1	225'
Shield edging -Replace.	004023	2	20'
Rear bodysides - Dismant. and reass. [0920] Splash guard tang	004012	3	10'
Spark plug access door - Replace. [0916] Replacement of spark plug cover	004059	4	10'
Rear fairings - Painting	006005	5	30'
Central cover and footboard - Painting	006032	6	25'
Chassis - Painting	006001	7	140'

20FOOTBOARD - MATS



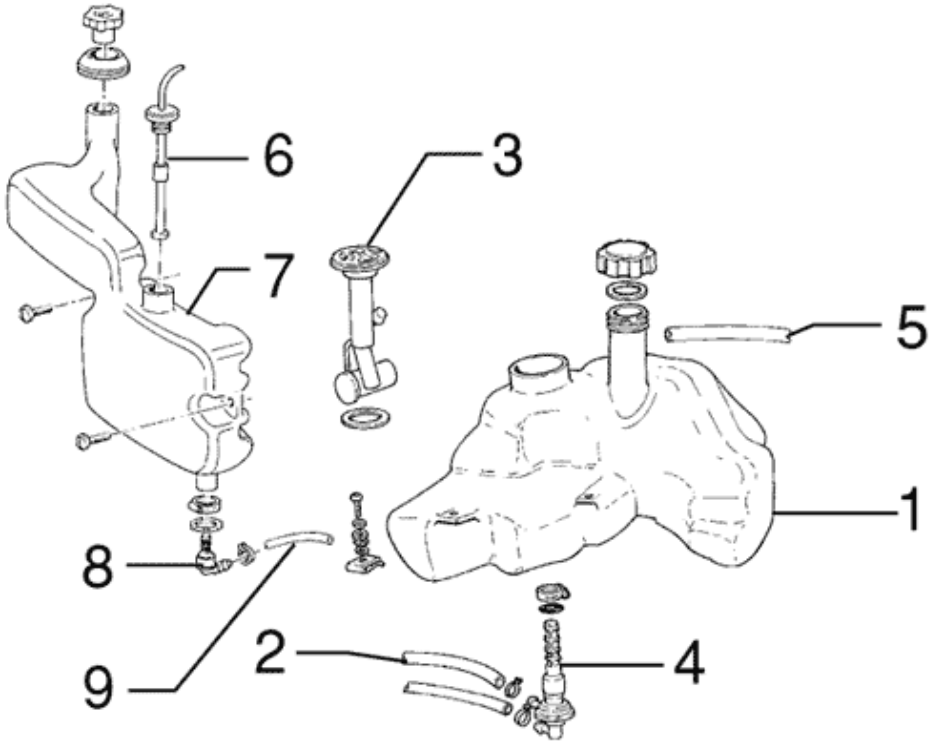
Description	Code	Op.	Time
Footboard - Dismant. and reass. [0918] Footrest board	004015	1	15'
Left-right mats - Replace.	004078	2	20'
Front mat - Replace.	004075	3	10'
Central cover and footboard - Painting	006033	4	30'

21 glovecompartment



Description	Code	Op.	Time
Glove compartment door - replace [0911] Replacement of trunk cover	004081	1	20'
Glove compartment - replace [0910] Replacement of trunk	004083	2	15'
Glove compartment - painting	006019	3	40'
Glove compartment door - painting	006028	4	30'

22 fuel tank

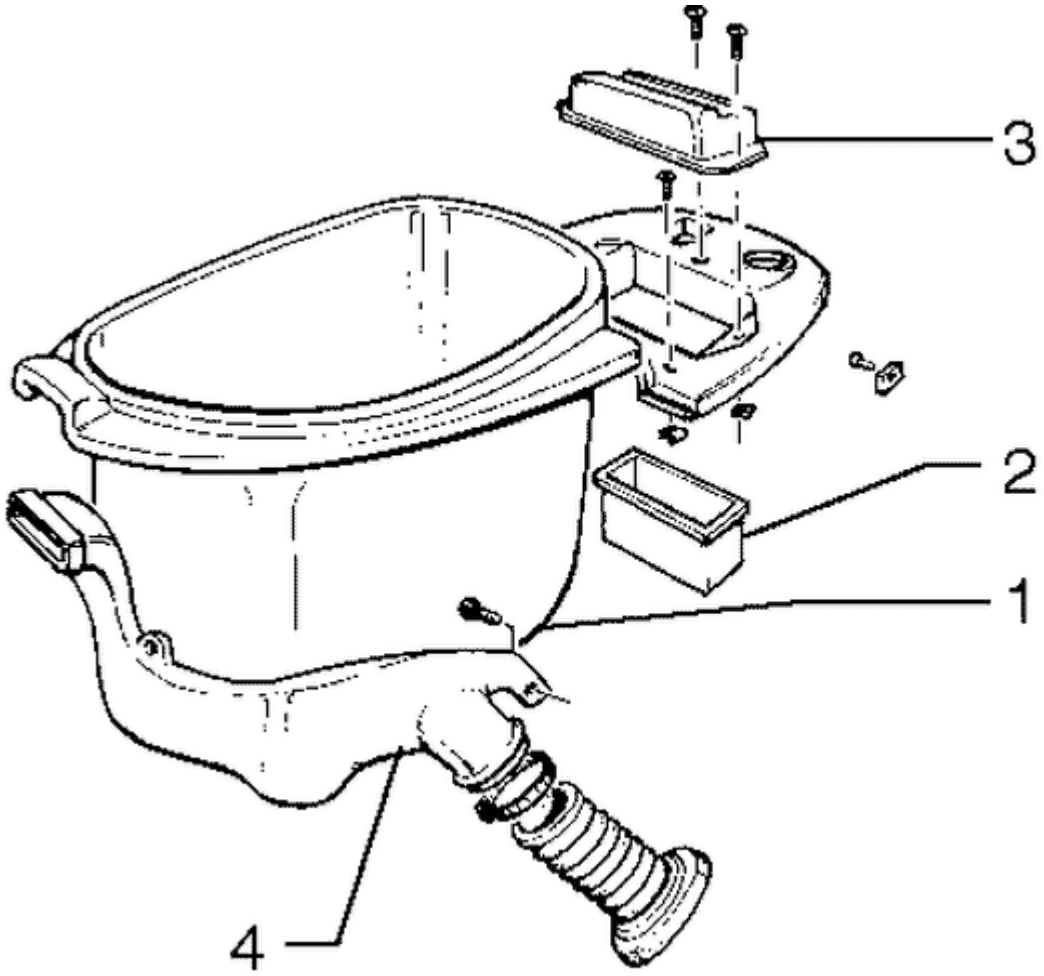


Description	Code	Op.	Time
Fuel tank - replace.	004005	1	40'
Fuel tank tube - replace.	004110	2	10'
Tank float - replace.	005010	3	50'
Fuel mixture tap - replace.	004007	4	25'
Fuel tank breather pipe - replace.	004109	5	40'
Oil warning transmitter - replace	005018	6	25'
Mixer tank - replace	004017	7	20'
Mixer oil tap - replace	004095	8	15'
Mixer tank tube - replace	004091	9	10'

FUEL TANK

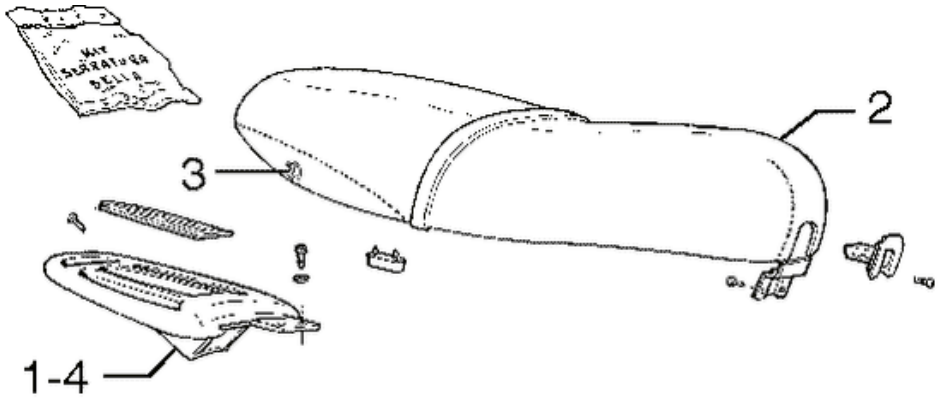
We inform you that, starting from frame nos. **C16000 14138 and M19000 1019212**, a new fuel tank has beenintroduced that differs from the previous version by a modified level gauge(consisting of a vertical slider instead of a float and a rod). The new levelgauge also has a different wiring connection. Connecting bridle part no. 582761has been interposed to allow the old electrical equipment to be connected tothe new gauge.

23 HELMET COMPARTMENT



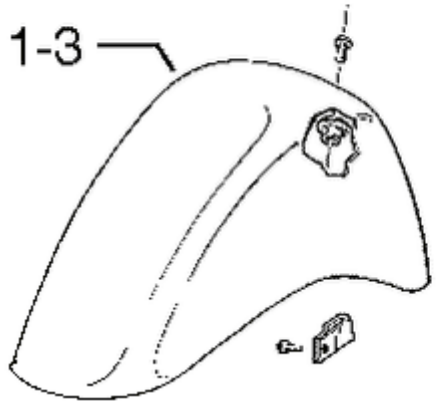
Description	Code	Op.	Time
Helmet compartment - dismant. & reass.	004016	1	15'
Battery compartment - replace	004071	2	20'
Air filter-body connection - replace	005046	3	10'
Air cleaner-body union - replace.	001027	4	25'

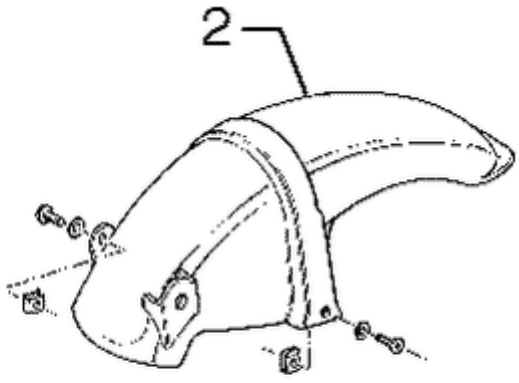
24 Saddle



Description	Code	Op.	Time
Luggage carrier - replace. [0919] Replacement of grid parcel	004008	1	10'
Saddle - replace.	004003	2	10'
Saddle lock catch - replace.	004054	3	35'
Luggage carrier - painting	006002	4	30'

25 front and rear mudguard

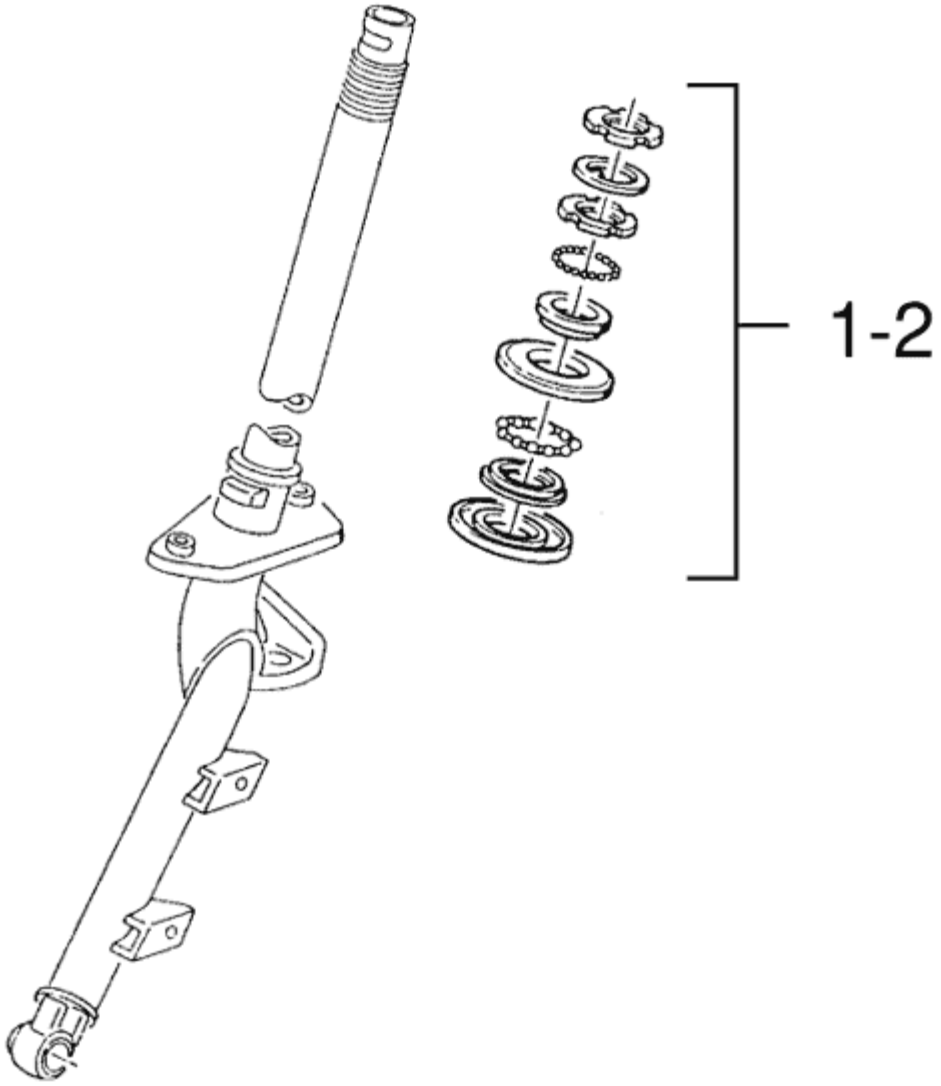




Description	Code	Op.	Time
Front mudguard - replace.	004002	1	40'
Rear mudguard - replace	004009	2	10'

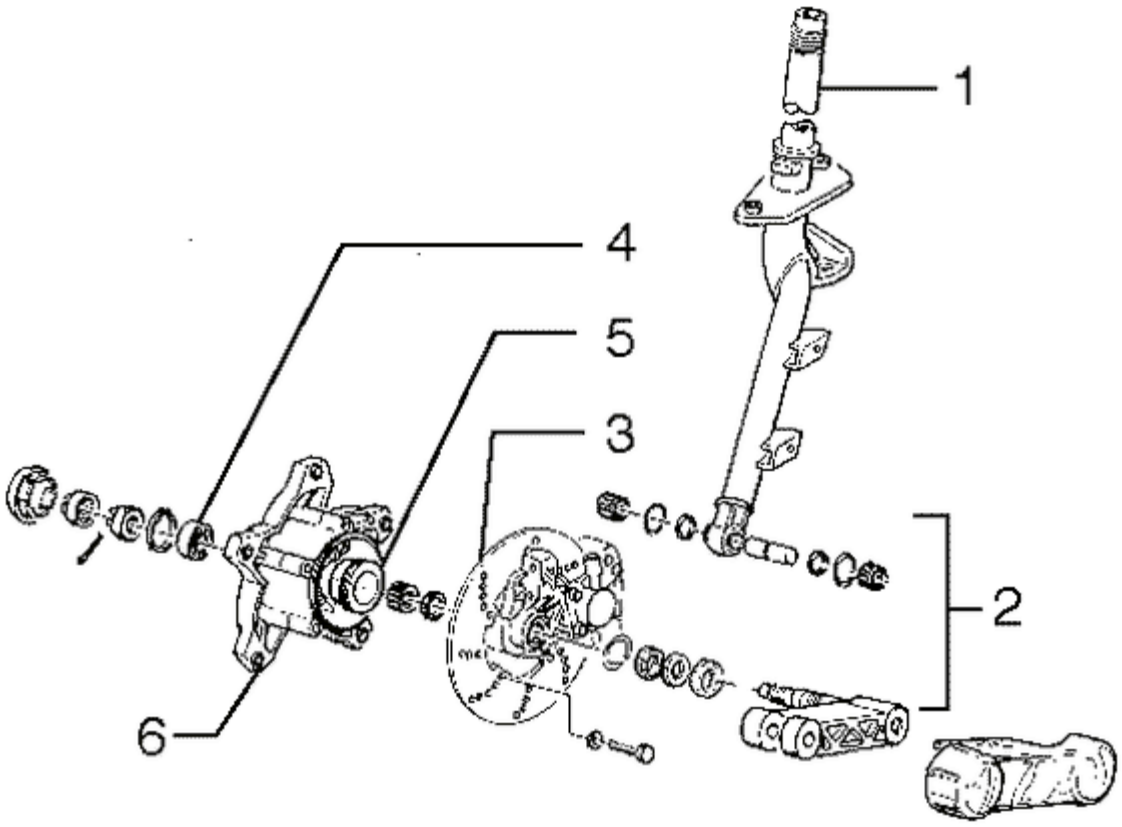
Front Mudguard - painting	006003	3	40'

26 STEERINGBEARINGS



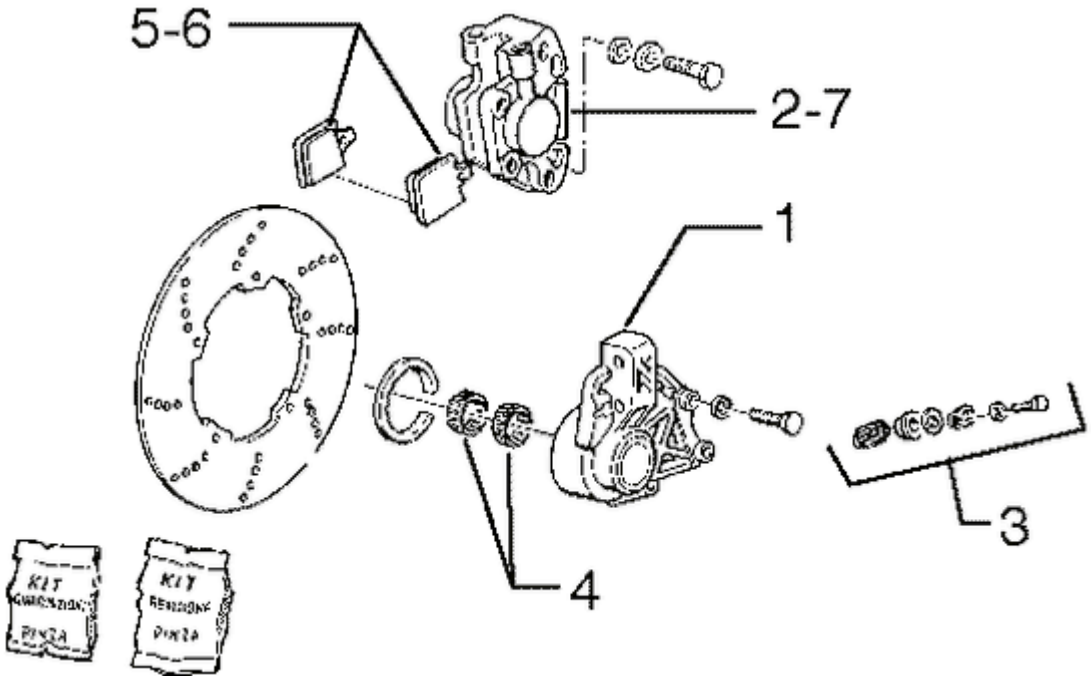
Description	Code	Op.	Time
Steering bearings - replace [0713] Blocking nut	003002	1	55'
Steering play - adjust [0723] Location of upper bearing	003073	2	40'

27 STEERINGTUBE - DISC BRAKE



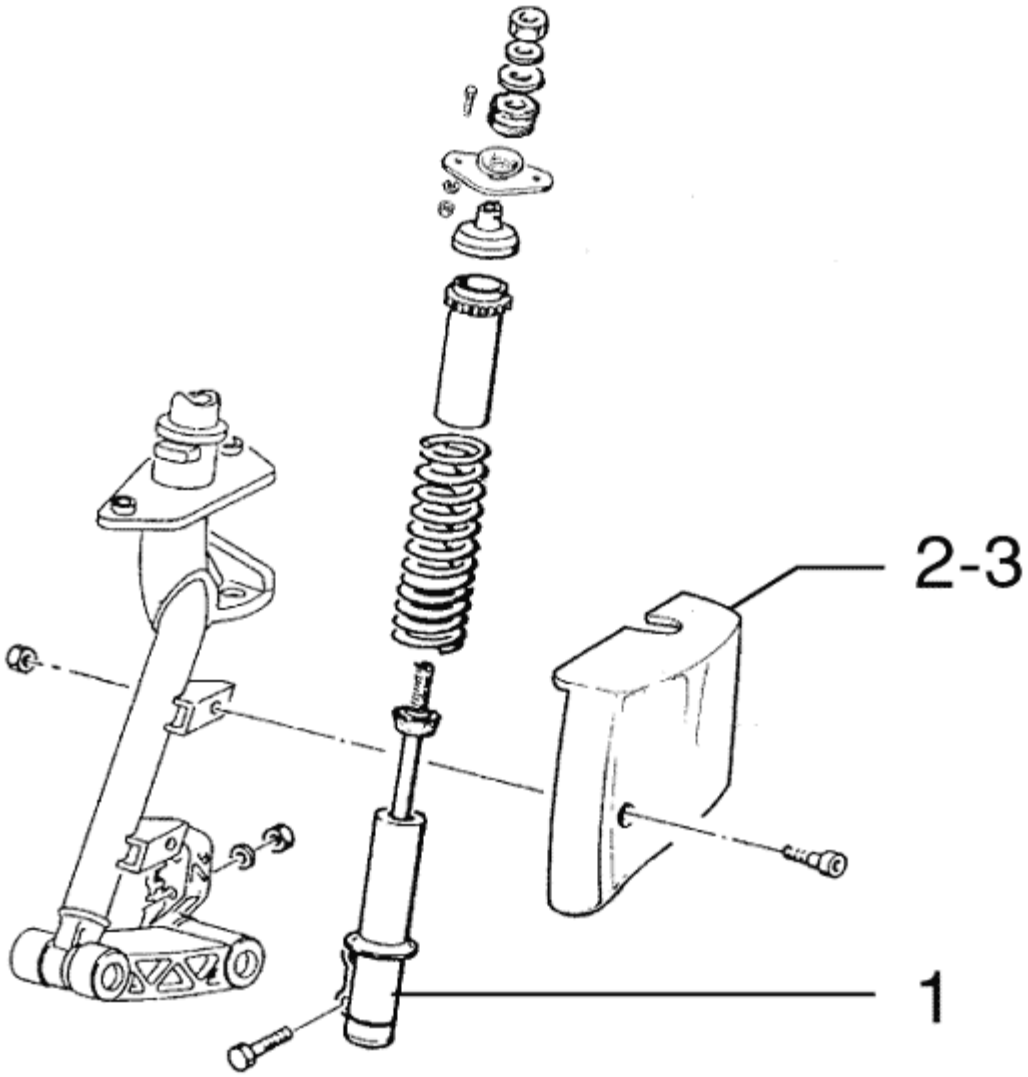
Description	Code	Op.	Time
Steering tube / fork tube - replace	003045	1	70'
Front suspension - overhaul [0715] Lower and upper location frame	003010	2	180'
Brake disk - replace. [0806] Replacement of brake disk	002041	3	40'
Front wheel bearing - replace. [0709] Removal of roller case	003040	4	40'
Speedometer gear - replace [0708] Replacement contakm coil	001064	5	20'
Front wheel hub - replace. [0704] Removal of hub	003033	6	35'

28 discbrake calLiper



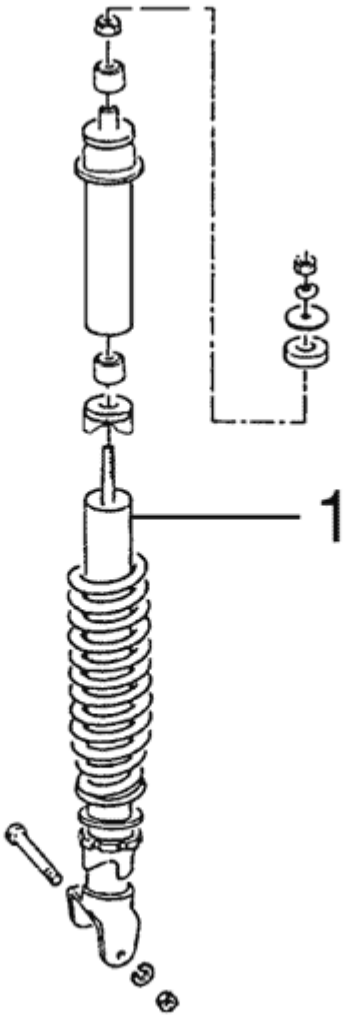
Description	Code	Op.	Time
Hanger and calliper - replace [0705] Removal of caliper support	003035	1	50'
Front brake calliper - dismant. & reass.	002039	2	40'
Speedo drive - replace [0708] Replacement contakm coil	002011	3	30'
Shock absorber bearings & calliper - replace	003036	4	55'
Front brake pads - check wear [0804] Replacement of pads	003070	5	20'
Front brake pads - dismant. & reass. [0804] Replacement of pads	002007	6	30'
Front brake calliper - overhaul [0807] Review brake calipers	002040	7	60'

29 FRONTSHOCK ABSORBER COVER



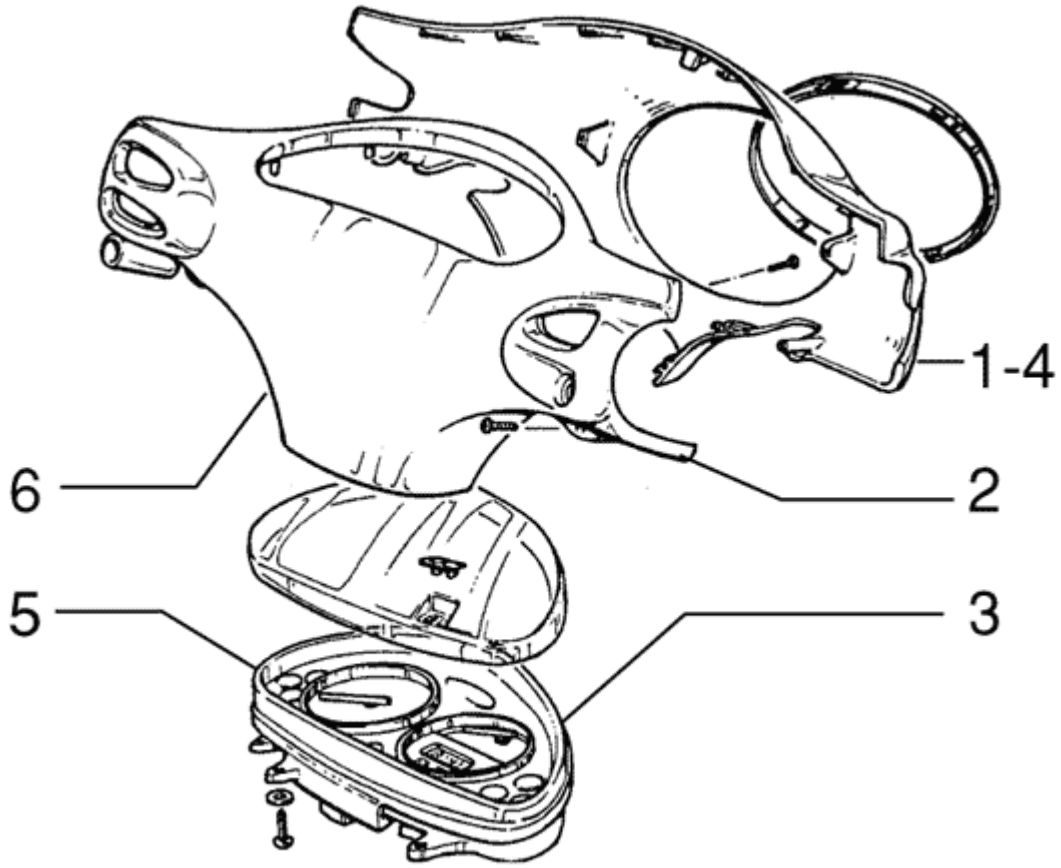
Description	Code	Op.	Time
Front suspension - dismant. & reass. [07] Front suspension	003011	1	30'
Shock absorber cover - replace [0915] Replacement of front shockabsorber cover	003044	2	10'
Shock absorber cover - painting	006038	3	40'

30 REAR SHOCK ABSORBER



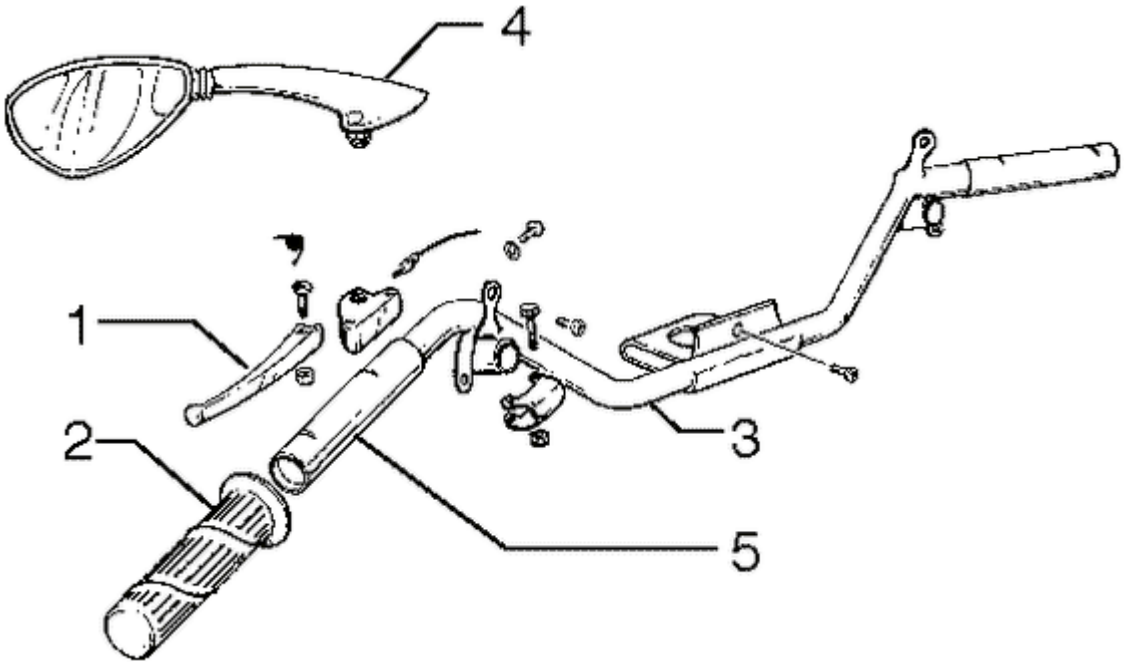
Description	Code	Op.	Time
Rear shock absorber - dismant. & reass.	003007	1	35'

31SPEEDOMETER - HANDLEBAR FAIRINGS



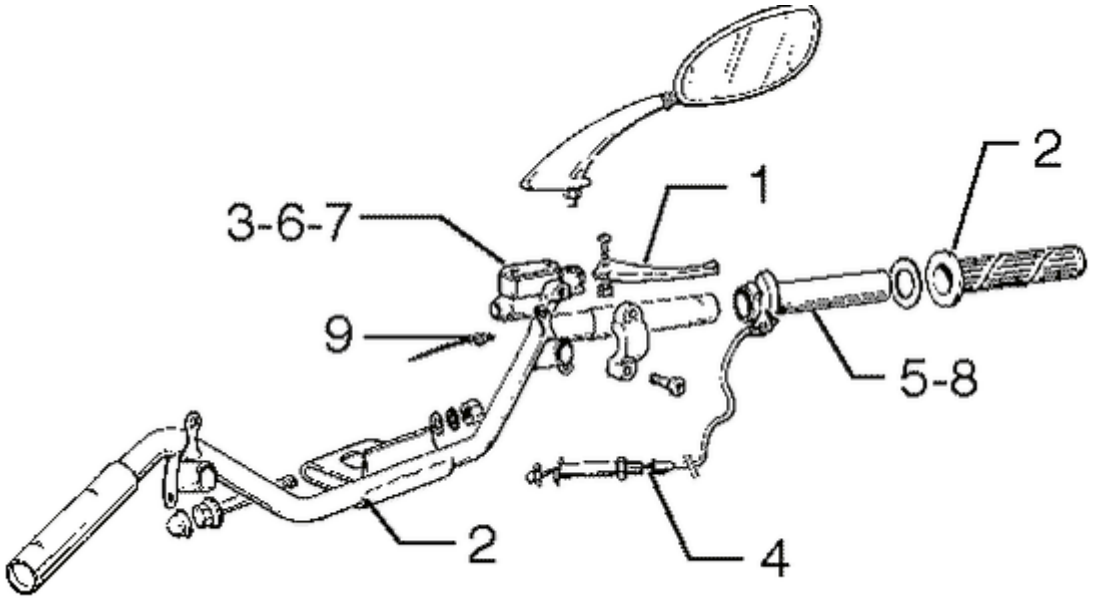
Description	Code	Op.	Time
Front handlebar fairing - replace [0901] Handlebar -front part	004018	1	15'
Rear handlebar fairing - replace [0902] Handlebar rear part	004019	2	10'
Speedometer - replace [0905] Replacement instrumentation	005014	3	30'
Front handlebar fairing - painting	006013	4	30'
Instrument panel bulbs - replace [0906] Replacement of warning light bulbs	005038	5	15'
Rear handlebar fairing - painting	006014	6	30'

32HANDLEBAR COMPONENTS

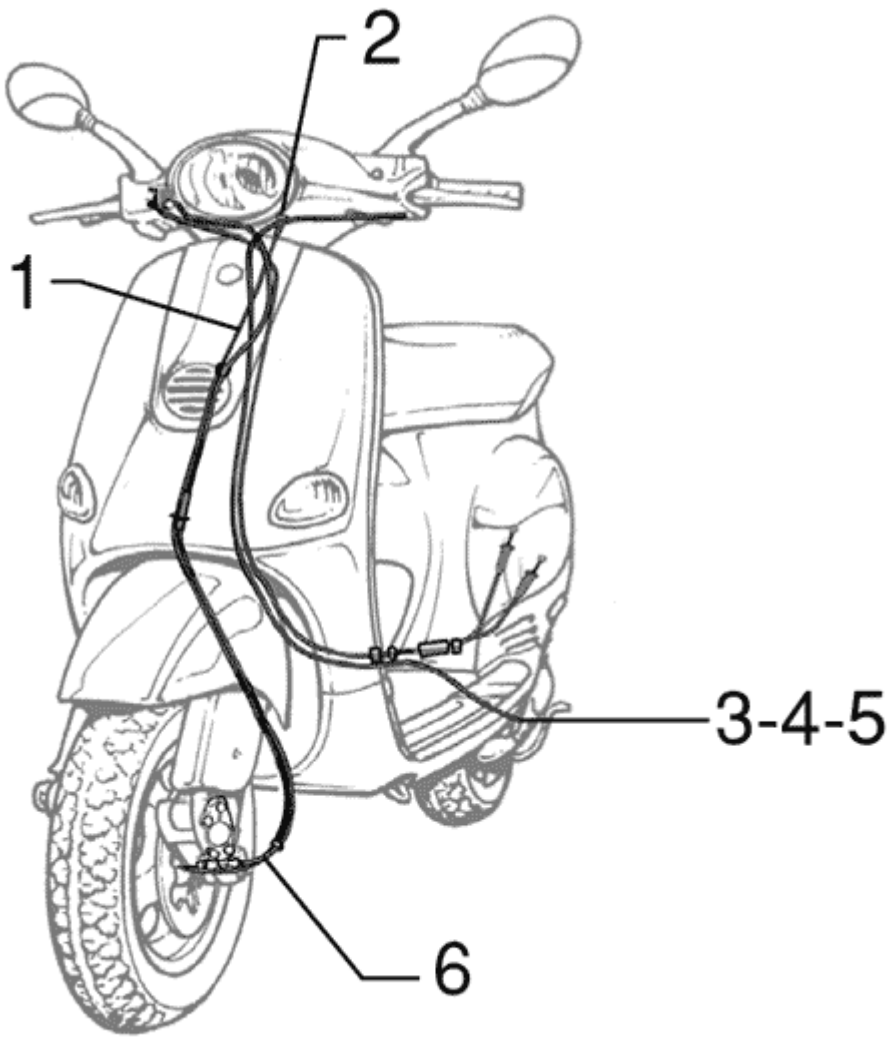


Description	Code	Op.	Time
Brake or clutch lever - replace	002037	1	20'
Lh handgrip - replace	002071	2	10'
Handlebars - dismant. & reass. [0701] Removal of handlebar	003001	3	40'
Rear mirror - replace.	004066	4	10'
Lh control - replace	003075	5	40'

33HANDLEBAR COMPONENTS

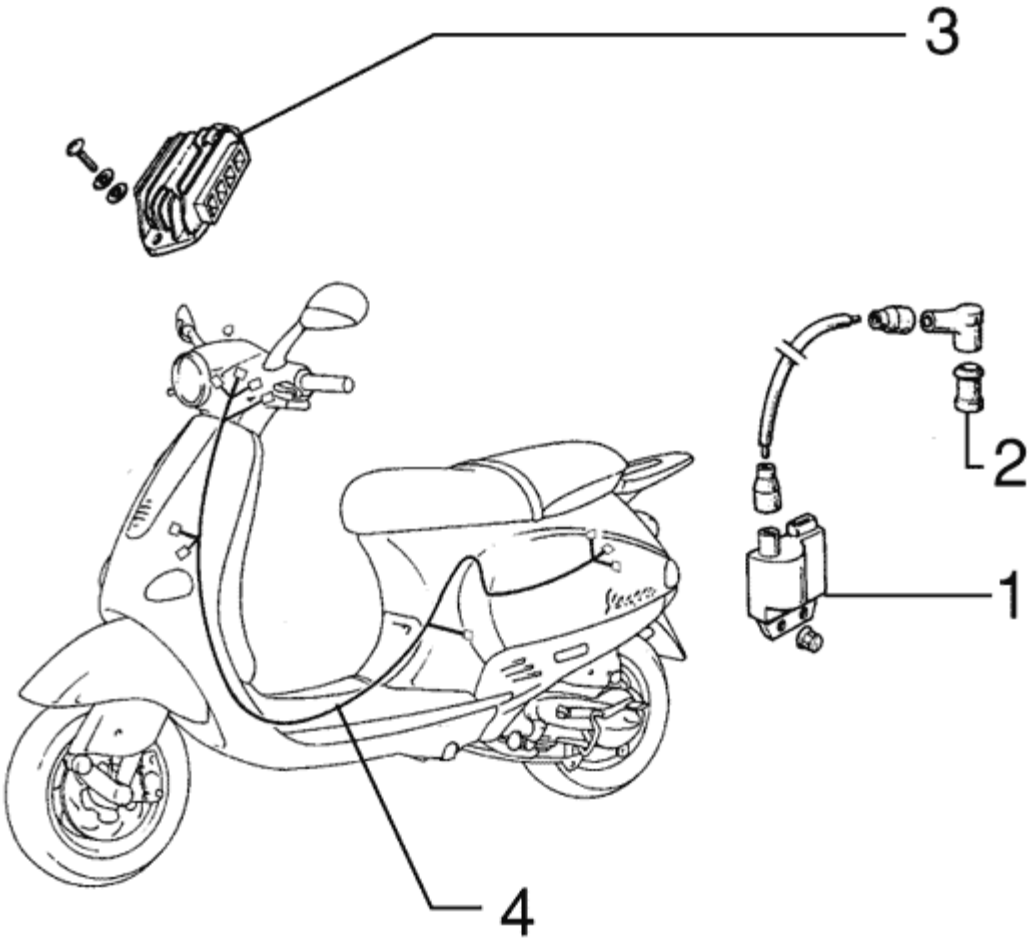


Description	Code	Op.	Time
Brake or clutch lever - replace	002037	1	20'
Rh handgrip - replace	002059	2	10'
Front brake fluid - replace [0809] Loading oil drainage	003067	3	25'
Throttle control cable - adjust	003061	4	10'
Rh control - replace	003074	5	40'
Front brake fluid and bleed [0809] Loading oil drainage	002047	6	35'
Brake master cylinder - Dismant. & reass.	002024	7	40'
Throttle control transmission - replace	002063	8	45'
Brake light switch - replace	005017	9	15'



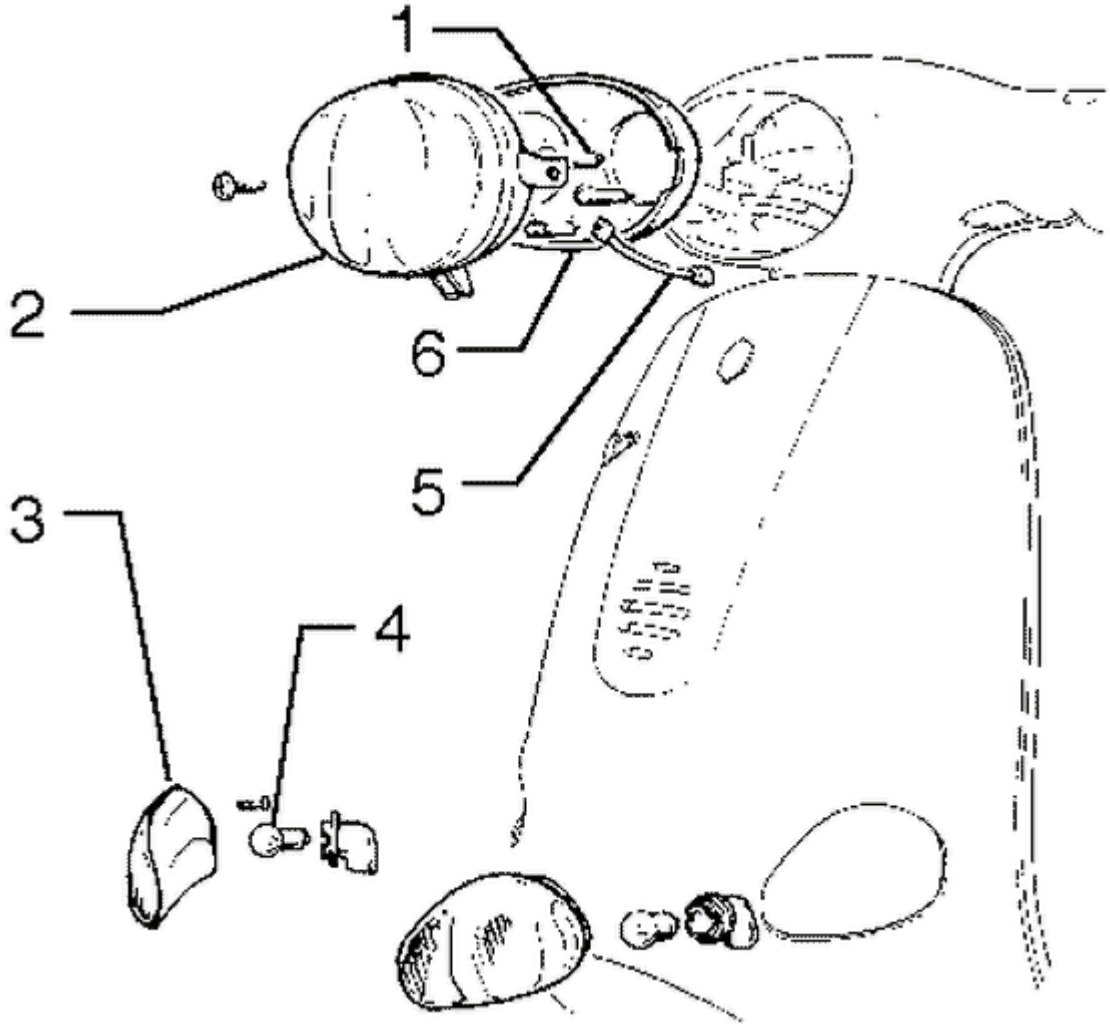
Description	Code	Op.	Time
Complete speedometer transmission - replace.	002051	1	30'
Speedometer transmission cable - replace.	002049	2	15'
Rear brake transmission - replace.	002053	3	40'
Rear brake cable - replace.	002043	4	25'
Rear brake cable - adjust.	003060	5	10'
Front brake line - dismant. and reass.	002021	6	55'

35ELECTRICAL DEVICES



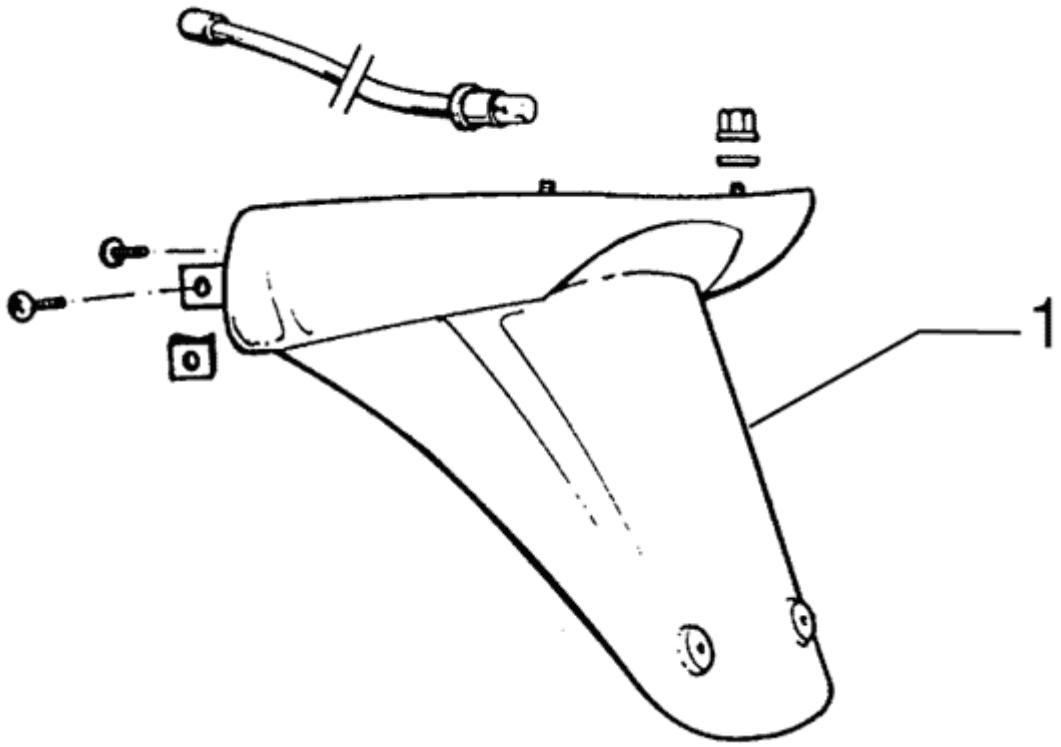
Description	Code	Op.	Time
H.T. coil - replace	001069	1	25'
Spark plug cap - replace	001094	2	10'
Voltage regulator - replace [0912] Replacement of voltage regulator	005009	3	30'
Wiring - dismant. & reass.	005001	4	110'

36HEADLIGHT



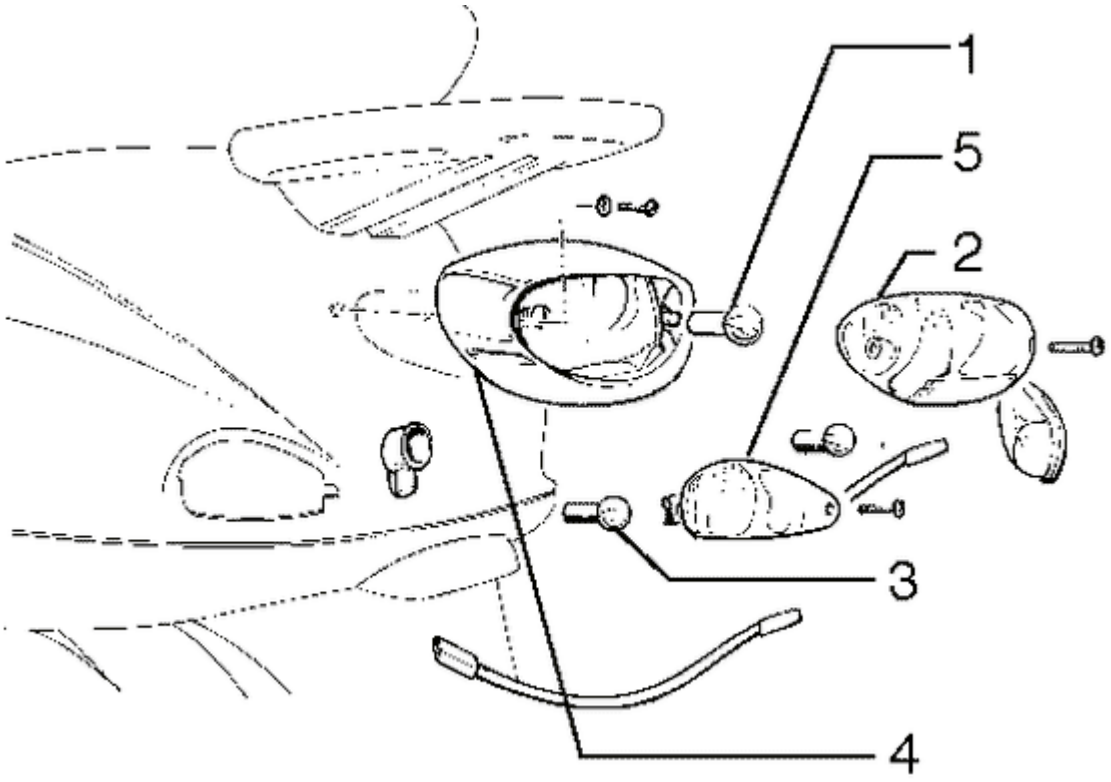
Description	Code	Op.	Time
Headlight bulbs - replace [0903] Replacement of headlight bulbs	005008	1	10'
Headlight - replace [0904] Headlight	005002	2	15'
Front turn indicator - replace	005012	3	15'
Front turn indicator bulb - replace	005067	4	10'
Headlight wiring harness - replace	005044	5	20'
Headlight surround trim - replace	004020	6	10'

37 REARSPLASH GUARD



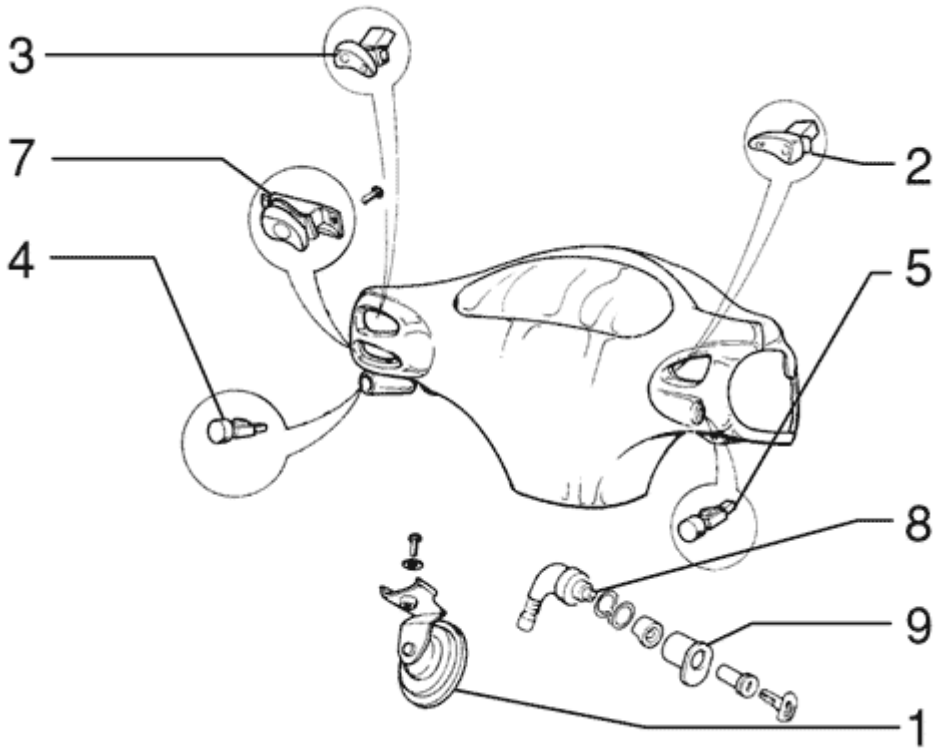
Description	Code	Op.	Time
Rear splash guard - Replace [0920] Splash guard tang	004077	1	15'

38 TAILLIGHT



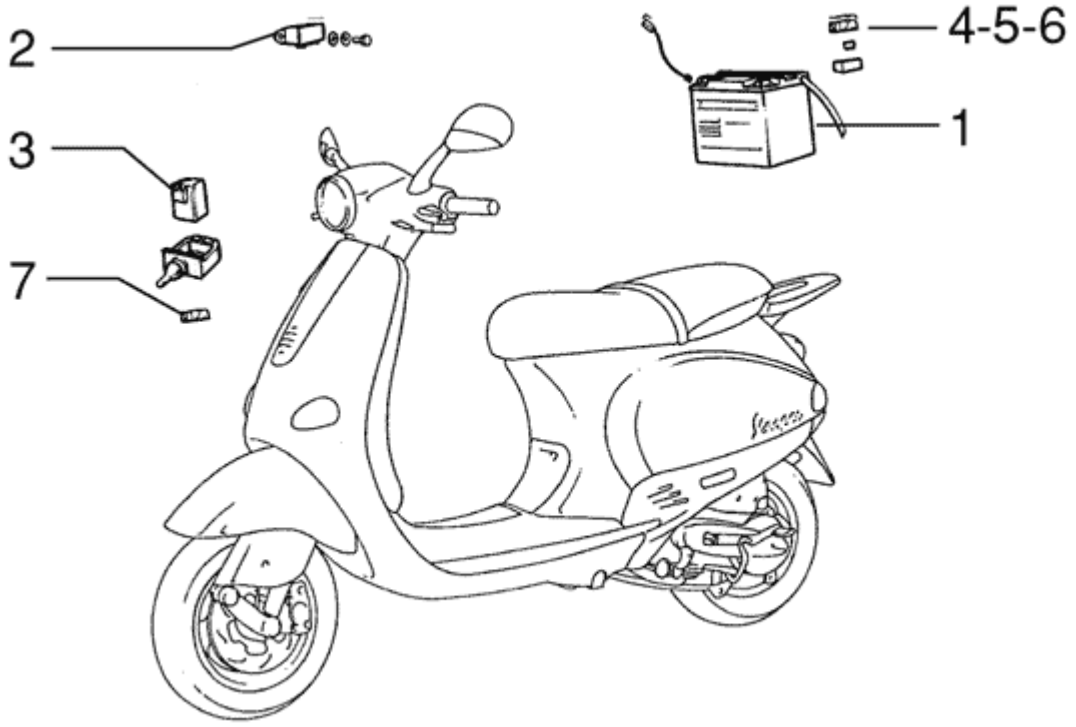
Description	Code	Op.	Time
Rear light bulb - replace	005066	1	10'
Taillight lens - Replace	005028	2	10'
Rear turn indicator bulb - Replace	005068	3	10'
Taillight - Replace	005005	4	10'
Rear turn indicator - Replace	005022	5	15'

39electrical devices



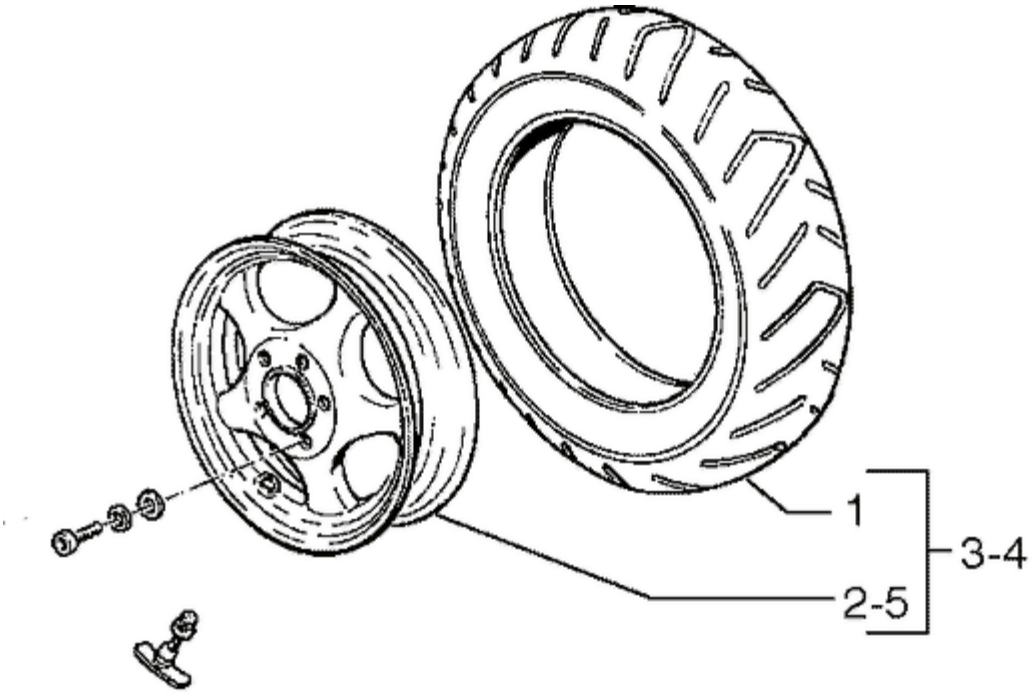
Description	Code	Op.	Time
Horn - Replace [0909] Replacement of horn	005003	1	10'
Lights switch or turn indicator selector - Replace	005006	2	20'
Lights selector - replace	005039	3	20'
Horn button - replace	005040	4	20'
Start button - replace	005041	5	20'
Steering lock - Replace [031001] Removal of lock	004010	6	15'
Turn signal selector - replace	005069	7	20'
Key-switch - replace [0913] Replacement of key switch	005016	8	40'
Locks - replace [0913] Replacement of key switch	004096	9	25'

40electrical devices



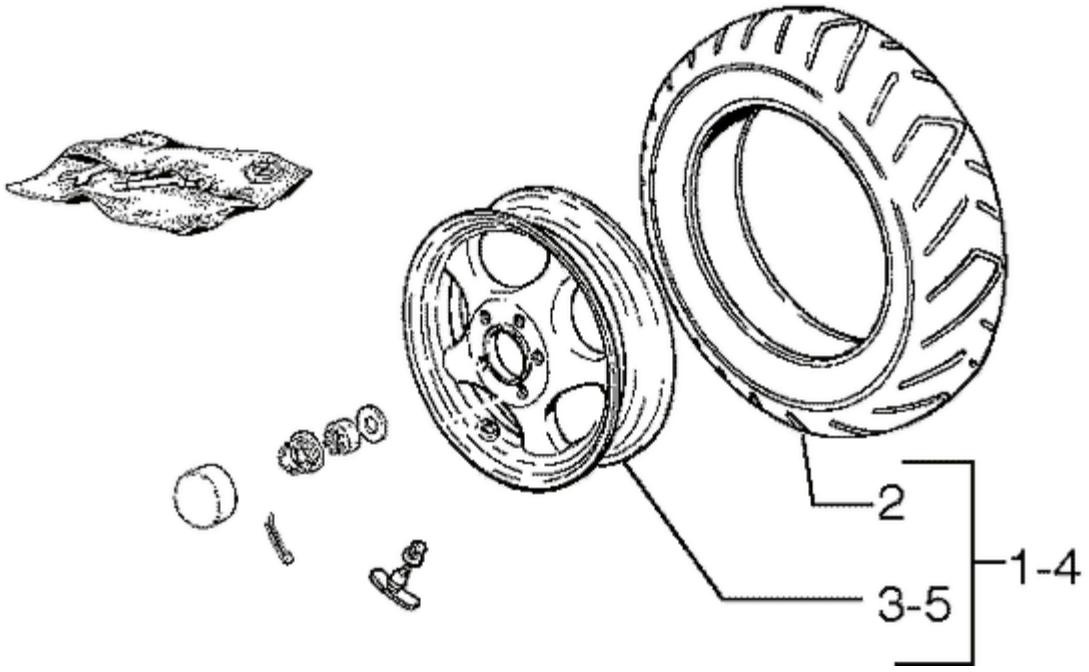
Description	Code	Op.	Time
Battery - replace [050207] Battery	005007	1	20'
Starter contactor - replace	005011	2	25'
Flasher unit - replace	005013	3	10'
Battery fuse - replace	005024	4	15'
Fuse holder - replace	005025	5	10'
Fuse board - replace	005019	6	20'
Diode	005036	7	20'

41 Frontwheel



Description	Code	Op.	Time
Front tyre - replace.	003047	1	25'
Front rim - dismant. and reass.	003037	2	25'
Front wheel - replace. [0702] Removal of front tire	004123	3	35'
Tyre pressure - check [0104] Frame	003063	4	10'
Wheel rim - painting	006018	5	35'

42 Rearwheel



Description	Code	Op.	Time
Rear wheel - replace. [0811] Removal of rear tire	001016	1	20'
Rear tyre - replace	004126	2	40'
Rear rim - dismant. and reass.	001071	3	40'
Tyre pressure - check [0104] Frame	003063	4	10'
Wheel rim - painting	006018	5	35'

Maintenance Intervals

Km x 1000 - Check V - Replace S

OPERATION Months	Km 1 4	 5 12	 10 24	NOTES
Hub oil lever: Check	**S**	**V**	**S**	TUTELA ZC 90 (SAE 80W/90 exceeding API GL3 specifications)
Spark plug: Check Electrode gap and replacement		**S**	**S**	CHAMPION N2C (25-30 N·m) - Electrode gap 0.5 – 0.6 mm.
Air filter on carburettor: Clean			**V**	Wash filter in 50% fuel / oil (Selenia Hi Scooter 2T) mixture and leave to dry naturally.
Idle speed / air-fuel mixture check			**V**	Idle speed: 1800 ± 100 rpm; CO adjustment 3-4% with minimum air adjustment screw opened n°$2^{1/2}$/ $3^{1/2}$ turns.
Cylinder cooling system: Check condition and wear				
Operation-calibration of mixer / throttle linkage adjustment	**V**	**V**	**V**	
Grease variable speed clutch and inspect drive belt-renew if worn				JOTA 3 FS (Lithium soap grease, NLGI3). Fit new nut, smear Loctite on thread (40 - 44 N·m) Minimum belt width = 17.5 mm
Fuel-oil mixer belt: Replace				
Roller case: Grease	**V**		**V**	JOTA 3 FS (Lithium soap grease, NLGI3)
Steering: Adjust	**V**		**V**	Usae tool 020055Y [02020055Y] 02005Y (lower steering collar 50-60 N-m then loosen by approx. 120°; steering locking collar 30-40 N·m)
Brake levers: Grease	**V**	**V**	**V**	SYSTEM TW 249 AREXONS (Calcium complex soap grease NLGI 1-2)
Brake pads/shoes: Check condition and wear		**V**	**V**	Wear limit 1.5 mm

Flexible brake lines: Replace				
Brake fluid lever: Check	**V**	**V**	**V**	TUTELA TOP 4 (SAE J1703 synthetic brake fluid, NHTSA 116 DOT 4, ISO 4925)
Brake fluid: Replace	**EVERY 2 YEARS**			TUTELA TOP 4 (SAE J1703 synthetic brake fluid, NHTSA 116 DOT 4, ISO 4925)
Transmissions: lubricate			**V**	SELENIA HI Scooter 2T (Synthetic oil exceeding API TC ++)
Nuts, bolts and fastenings: Check	**V**		**V**	Front wheel spindle (75-90 N·m) - Front wheel screws (16-26 N·m) -. Rear wheel spindle (140-155 N·m) - Frame to swinging arm (44-52 N·m) - Frame to swinging arm screw (33-41 N·m) - Engine connecting arm (33-41 N·m) - Engine to shock absorber (33-41 N·m) - Shock absorber-frame (20-25 N·m) - Handlebar clamping screw (45-50 N·m) - Calliper (20-25 N·m) - Brake disc (5-6.5 N·m)
Suspension: Check			**V**	
Electric system and battery:Check	**V**	**V**	**V**	
Lights: Check / Adjust			**V**	85-90 cm (with driver only)
Tyres-condition and wear		**V**	**V**	
Tyre pressure: Check	**V**	**V**	**V**	Front: 1.3 bar - Rear: 1.8 bar (2 bar for heavily laden vehicle)
Vehicle and brake test: Road test	**V**	**V**	**V**	About 1 miles
Labour time	**65'**	**60'**	**135'**	

OPERATION	**Km**			**NOTES**	
	15	**20**	**25**		
Month	**36**				
Hub oil lever: Check	**V**	**S**	**V**	TUTELA ZC 90 (SAE 80W/90 exceeding API GL3 specifications)	
Spark plug: Check Electrode gap and replacement	**S**	**S**	**S**	CHAMPION N2C (25-30 N·m) - Electrode gap 0.5 – 0.6 mm.	

Air filter on carburettor: Clean	**V**	**V**	**V**	Wash filter in 50% fuel / oil (Selenia Hi Scooter 2T) mixture and leave to dry naturally.	
Idle speed / air-fuel mixture check		**V**		Idle speed: 1800 ± 100 rpm; CO adjustment 3-4% with minimum air adjustment screw opened n°$2^{1/2}$/ $3^{1/2}$ turns.	
Cylinder cooling system: Check condition and wear		**V**			
Operation-calibration of mixer / throttle linkage adjustment	**V**	**V**	**V**		
Grease variable speed clutch and inspect drive belt-renew if worn	**V**			JOTA 3 FS (Lithium soap grease, NLGI3). Fit new nut, smear Loctite on thread (40 - 44 N·m) Minimum belt width = 17.5 mm	
Fuel-oil mixer belt: Replace		**S**			
Roller case: Grease		**V**		JOTA 3 FS (Lithium soap grease, NLGI3)	
Steering: Adjust		**V**		Usae tool 020055Y [02020055Y] 02005Y (lower steering collar 50-60 N-m then loosen by approx. 120°; steering locking collar 30-40 N·m)	
Brake levers: Grease	**V**	**V**	**V**	SYSTEM TW 249 AREXONS (Calcium complex soap grease NLGI 1-2)	
Brake pads/shoes: Check condition and wear	**V**	**V**	**V**	Wear limit 1.5 mm	
Flexible brake lines: Replace					
Brake fluid lever: Check	**V**	**V**	**V**	TUTELA TOP 4 (SAE J1703 synthetic brake	

				fluid, NHTSA 116 DOT 4, ISO 4925)		
Brake fluid: Replace	**EVERY 2 YEARS**			TUTELA TOP 4 (Fluido sintetico SAE J1703, NHTSA 116 DOT 4, ISO 4925)		TUTELA TOP 4 (SAE J1703 synthetic brake fluid, NHTSA 116 DOT 4, ISO 4925)
Transmissions: lubricate		**V**		SELENIA HI Scooter 2T (Synthetic oil exceeding API TC ++)		
Nuts, bolts and fastenings: Check		**V**		Front wheel spindle (75-90 N·m) - Front wheel screws (16-26 N·m) -. Rear wheel spindle (140-155 N·m) - Frame to swinging arm (44-52 N·m) - Frame to swinging arm screw (33-41 N·m) - Engine connecting arm (33-41 N·m) - Engine to shock absorber (33-41 N·m) - Shock absorber-frame (20-25 N·m) - Handlebar clamping screw (45-50 N·m) - Calliper (20-25 N·m) - Brake disc (5-6.5 N·m)		
Suspension: Check		**V**				
Electric system and battery:Check	**V**	**V**	**V**			
Lights: Check / Adjust		**V**		85-90 cm (with driver only)		
Tyres-condition and wear	**V**	**V**	**V**			
Tyre pressure: Check	**V**	**V**	**V**	Front: 1.3 bar - Rear: 1.8 bar (2 bar for heavily laden vehicle)		
Vehicle and brake test: Road test	**V**	**V**	**V**	About 1 miles		
Labour time	**65'**	**155'**	**65'**			

OPERATION	Km			NOTES	
	30	35	40		
Hub oil lever: Check	S	V	S	TUTELA ZC 90 (SAE 80W/90 exceeding API GL3 specifications)	
Spark plug: Check Electrode gap and replacement	S	S	S	CHAMPION N2C (25-30 N·m) - Electrode gap 0.5 – 0.6 mm.	
Air filter on carburettor: Clean	V	V	V	Wash filter in 50% fuel / oil (Selenia Hi Scooter 2T) mixture and leave to dry naturally.	
Idle speed / air-fuel	V		V	Idle speed: 1800 ± 100 rpm;	
mixture check				CO adjustment 3-4% with minimum air adjustment screw opened n°$2^{1/2}$/ $3^{1/2}$ turns.	
Cylinder cooling system:			V		
Check condition and wear					
Operation-calibration of mixer / throttle linkage adjustment	V	*V*	*V*		
Grease variable speed clutch and inspect drive belt-renew if worn	V			JOTA 3 FS (Lithium soap grease, NLGI3). Fit new nut, smear Loctite on thread (40 - 44 N·m) Minimum belt width = 17.5 mm	
Fuel-oil mixer belt: Replace			S		
Roller case: Grease	V		V	JOTA 3 FS (Lithium soap grease, NLGI3)	
Steering: Adjust	V		V	Usae tool 020055Y [02020055Y] 02005Y (lower steering collar 50-60 N·m then loosen by approx. 120°; steering locking collar 30-40 N·m)	
Brake levers: Grease	V	V	V	SYSTEM TW 249 AREXONS (Calcium	

				complex soap grease NLGI 1-2)	
Brake pads/shoes: Check condition and wear	**V**	**V**	**V**	Wear limit 1.5 mm	
Flexible brake lines: Replace	**V**				
Brake fluid lever: Check	**V**	**V**	**V**	TUTELA TOP 4 (SAE J1703 synthetic brake fluid, NHTSA 116 DOT 4, ISO 4925)	
Brake fluid: Replace	*EVERY 2 YEARS*			TUTELA TOP 4 (Fluido sintetico SAE J1703, NHTSA 116 DOT 4, ISO 4925)	
Transmissions: lubricate	**V**		**V**	SELENIA HI Scooter 2T (Synthetic oil exceeding API TC ++)	
Nuts, bolts and fastenings: Check	**V**		**V**	Front wheel spindle (75-90 N·m) - Front wheel screws (16-26 N·m) -. Rear wheel spindle (140-155 N·m) - Frame to swinging arm (44-52 N·m) - Frame to swinging arm screw (33-41 N·m) - Engine connecting arm (33-41 N·m) - Engine to shock absorber (33-41 N·m) - Shock absorber-frame (20-25 N·m) - Handlebar clamping screw (45-50 N·m) - Calliper (20-25 N·m) - Brake disc (5-6.5 N·m)	
Suspension: Check	**V**		**V**		
Electric system and battery:Check	**V**	**V**	**V**		
Lights: Check / Adjust	**V**		**V**	85-90 cm (with driver only)	
Tyres-condition and wear	**V**	**V**	**V**		
Tyre pressure: Check	**V**	**V**	**V**	Front: 1.3 bar - Rear: 1.8 bar (2 bar for heavily	

				laden vehicle)	
Vehicle and brake test: Road test	**V**	**V**	**V**	About 1 miles	
Labour time	**150'**	**65'**	**155'**		

OPERATION	**Km**				**NOTES**
	45	**50**	**55**	**60**	
Hub oil lever: Check	**V**	**S**	**V**	**S**	TUTELA ZC 90 (SAE 80W/90 exceeding API GL3 specifications)
Spark plug: Check Electrode gap and replacement	**S**	**S**	**S**	**S**	CHAMPION N2C (25-30 N·m) - Electrode gap 0.5 – 0.6 mm.
Air filter on carburettor: Clean	**V**	**V**	**V**	**V**	Wash filter in 50% fuel / oil (Selenia Hi Scooter 2T) mixture and leave to dry naturally.
Idle speed / air-fuel mixture check		**V**		**V**	Idle speed: 1800 ± 100 rpm; CO adjustment 3-4% with minimum air adjustment screw opened n°$2^{1/2}$/ $3^{1/2}$ turns.
Cylinder cooling system: Check condition and wear				**V**	
Operation-calibration of mixer / throttle linkage adjustment	**V**	***V***	***V***	***V***	
Grease variable speed clutch and inspect drive belt-renew if worn	**V**			**V**	JOTA 3 FS (Lithium soap grease, NLGI3). Fit new nut, smear Loctite on thread (40 - 44 N·m)

					Minimum belt width = 17.5 mm
Fuel-oil mixer belt: Replace				**S**	
Roller case: Grease		**V**		**V**	JOTA 3 FS (Lithium soap grease, NLGI3)
Steering: Adjust		**V**		**V**	Usae tool 020055Y [02020055Y] 02005Y (lower steering collar 50-60 N·m then loosen by approx. 120°; steering locking collar 30-40 N·m)
Brake levers: Grease	**V**	**V**	**V**	**V**	SYSTEM TW 249 AREXONS (Calcium complex soap grease NLGI 1-2)
Brake pads / shoes: Check condition and wear	**V**	**V**	**V**	**V**	Wear limit 1.5 mm
Flexible brake lines: Replace				**V**	
Brake fluid lever: Check	**V**	**V**	**V**	**V**	TUTELA TOP 4 (SAE J1703 synthetic brake fluid, NHTSA 116 DOT 4, ISO 4925)
Brake fluid: Replace	*EVERY 2 YEARS*				TUTELA TOP 4 (Fluido sintetico SAE J1703, NHTSA 116 DOT 4, ISO 4925)
Transmissions: lubricate		**V**		**V**	SELENIA HI Scooter 2T (Synthetic oil exceeding API TC ++)
Nuts, bolts and fastenings: Check		**V**		**V**	Front wheel spindle (75-90 N·m) - Front wheel screws (16-26 N·m) - Rear wheel spindle (140-155 N·m) - Frame to swinging arm (44-52 N·m) - Frame to swinging arm screw (33-41 N·m) - Engine connecting arm (33-41 N·m) - Engine to shock absorber (33-41 N·m) - Shock absorber-frame (20-25 N·m) - Handlebar

					clamping screw (45-50 N·m) - Calliper (20-25 N·m) - Brake disc (5-6.5 N·m)
Suspension: Check		**V**		**V**	
Electric system and battery:Check	**V**	**V**	**V**	**V**	
Lights: Check / Adjust		**V**		**V**	85-90 cm (with driver only)
Tyres-condition and wear	**V**	**V**	**V**	**V**	
Tyre pressure: Check	**V**	**V**	**V**	**V**	Front: 1.3 bar - Rear: 1.8 bar (2 bar for heavily laden vehicle)
Vehicle and brake test:	**V**	**V**	**V**	**V**	About 1 miles
Road test					
Labour time	**65'**	**135'**	**65'**	**170'**	