CONTENTS
INDICE DE LOS ARGUMENTOS
ÍNDICE DOS ARGUMENTOS

Safety prescriptions

- If the work to be carried out requires the vehicle engine to be running, make sure the workshop is well ventilated and use proper exhausters. Do not run the engine in closed places. Exhaust fumes are toxic.

- Battery electrolyte contains sulphuric acid. Protect the eyes, clothes and skin. Sulphuric acid is highly corrosive; if it comes into contact with eyes or skin, wash the affected area abundantly with water and seek immediate medical assistance.

- The battery produces hydrogen, a gas which is potentially explosive. Do not smoke near the battery and keep open flames and sparks well clear, especially when the battery is on charge.

- Petrol is highly flammable and can be explosive in certain conditions. Do not smoke in the work area and do not introduce open flames or sparks.

- Clean brake shoes, drums and pads in a well ventilated place. When using compressed air direct the jet away from you to avoid inhaling the dust. Although the brake linings are asbestos-free, inhalation of the resulting dust is harmful.

Maintenance rules

- Use only genuine PIAGGIO spare parts and recommended lubricants. The use of non-original or non-conforming spare parts can cause damage to the vehicle.

- The only special tools that can be used are those expressly designed for this vehicle.

- Always fit new gaskets, sealing rings and split pins when reassembling parts.

- After disassembly, clean parts with non-flammable solvent or a solvent with a high flash point. Lubricate all surfaces before reassembly with the exception of conical couplings.

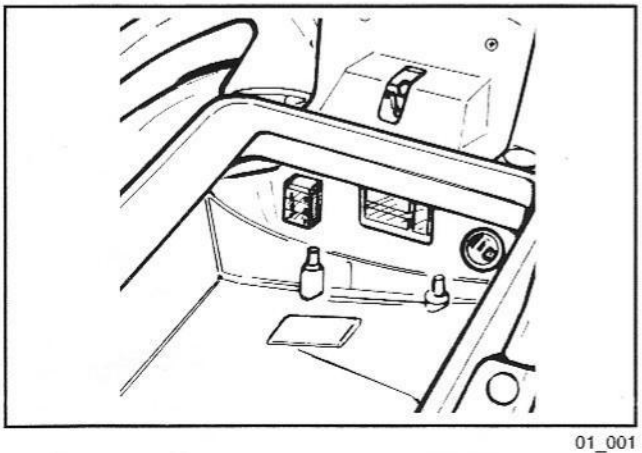
- After reassembling, check that all the components are correctly installed and that they work perfectly.

- Use only metric tools for disassembly, assembly and maintenance work. Metric screws, nuts and bolts cannot be interchanged with BS components. The vehicle may be damaged if unsuitable tools or nuts, bolts or screws are used.

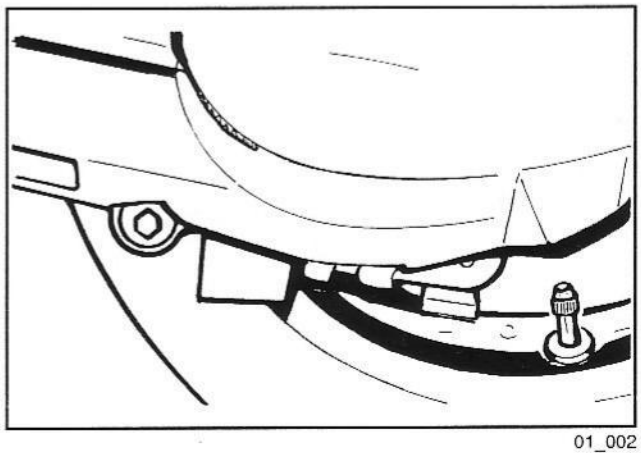
- When working on the electrical system, ensure electrical components are correctly installed, paying particular attention to ground and battery connections.

Vehicle identification

Vehicle	Frame prefix	Engine prefix
X9	ZAPM2300000001001	MFO4E



01_001



01_002

WEIGHT AND DIMENSIONS

Total dry weight ..... 162 Kg
Width (at rearview mirrors) ..... 865 mm
Length ..... 2080 mm
Wheelbase ..... 1460 mm
Height ..... 1350 mm

ENGINE

Type ..... single cylinder 4-stroke
Cylinders 1
Bore ..... 72.7 mm
Stroke ..... 60.0 mm
Displacement ..... 249 cm^3
Compression ratio ..... 10.5 : 1
Timing system ..... two-valve single overhead camshaft
Play of valves: intake ..... 0.10 mm
exhaust ..... 0.10 mm
Valve play adjustment .... outside adjustment by rocker arm pivot off-centred pin.
KEIHIN carburettor Ø 30 mm VE3BD
Idle speed ..... 1500 ± 100 rpm
Air filter ..... paper filter.
Starter system ..... starter motor / kick-start.
Engine lubrication ..... by chain-driven lobe pump (in crankcase) and gauze strainer.
Fuel system ..... by carburettor, with electric fuel pump.
Fuel intake ..... Reed valve on crankcase.
Max. power (crankshaft) ..... 13 kW at 7000 rpm
Max. torque (crankshaft) ..... 23.5 N·m (2.4 kg·m) at 5500 rpm
Cooling system ..... Liquid cooled

TRASMISSIONS

Trasmission ..... By automatic variation with expanding pulleys, V-belt, automatic clutch, reduction gearing.

ELECTRICAL COMPONENTS

Ignition type ..... Electronic capacitive discharge system with separate HT coil.
Ignition advance (before T.D.C.) ..... variable
Spark plug .... NGK DPR7EA-9, DENSO X22EPR-U9
Battery 12V-12Ah
Fuses ..... 1 x 30A, 1 x 20A, 1 x 15A, 3 x 10A, 3 x 7.5A.
Generator ..... three-phase alternating current.

CAPACITIES

Fuel tank (including ~ 2.5 l reserve) ..... 14.5 l
Rear hub ..... 160 cc, oil change
200 cc, overhaul
(recommended oil:TUTELA ZC 90).

FRAME AND SUSPENSION

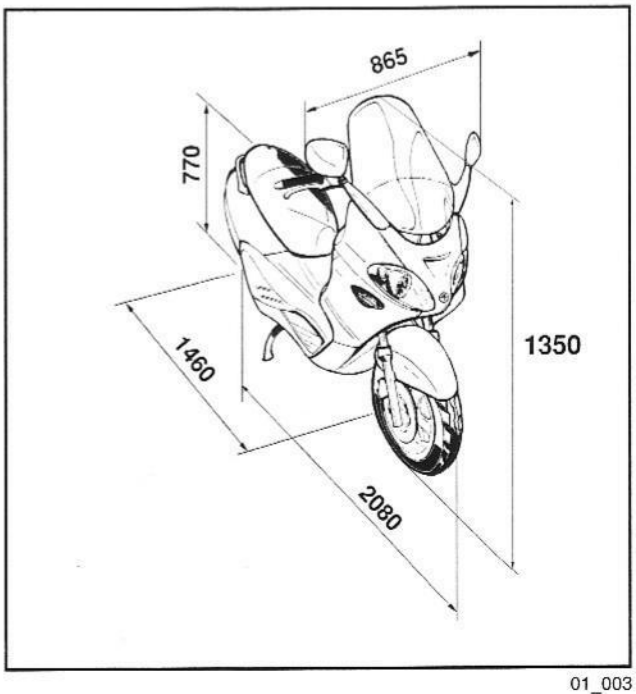
Type ..... Welded steel tubing with pressed steel reinforcements.
Front suspension ..... hydraulic telescopic fork with Ø 35 mm rod.
Front fork travel ..... 90 mm
Rear suspension ..... engine functioning as swing arm pivoting on frame with bushings, dampening pad, engine connection spring. Double-acting hydraulic shock absorbers with variable-pitch coaxial spiral spring, with 4-position adjustable preload.
Rear wheel excursion ..... 88 mm

BRAKES

Front (right side) ..... Disc brake, diameter of 240 mm with hydraulic linkage (right-hand brake lever) Ø 34 mm single-piston caliper
Combined ..... dual disc Ø 240 (front left and rear) with hydraulic control operated by left-hand lever on handlebar. The system is slave to a pressure-distributing valve Ø 32 mm single-piston caliper.

WHEELS AND TYRES

Lightweight alloy wheels: front ..... 3.50x14"
rear ..... 3.50x13"
Tyres: front ..... 120/70-14"
rear: ..... 140/60-13"
Tyre pressure (cold): front ..... 2.0 bar
rear ..... 2.2 bar
(2.5 bar with driver and luggage).



01_003

PART	Q.ty	Tightening torque N·m
Steering assembly		
Upper steering collar	1	27 ÷ 33
Lower steering collar	1	8 ÷ 10
Handlebar fixing screw (*)	1	43 ÷ 47
Frame assembly		
Swing arm - engine pivot	1	56 ÷ 70
Swing arm - frame pivot	1	66 ÷ 80
Swing arm pad nut	1	20 ÷ 25
Engine arm - frame arm pin	1	60 ÷ 64
Centre stand nut	2	25 ÷ 30
Side stand screw	1	35 ÷ 40
Side stand switch screw	1	5 ÷ 7
Side stand nut	1	40 ÷ 45
Front suspension		
Fork plate screw	4	25 ÷ 34
Front wheel axle	1	45 ÷ 50
Fork rod screw	2	6 ÷ 7
Front brake		
Caliper support fastening screw on fork	4	45 ÷ 55
Oil pump-tube union	1	17 ÷ 20
Oil tube-caliper union	1	16 ÷ 20
Caliper to support retaining bolt	4	20 ÷ 25
Disc retaining bolts (°)	5	5 ÷ 6
Oil bleed screw	1	12 ÷ 16
Front brake caliper - combined braking device connection	1	20 ÷ 25
Rear brake caliper - combined braking device connection	1	20 ÷ 25
Rear suspension		
Shock absorber upper fastening	2	33 ÷ 41
Shock absorber lower fastening	2	33 ÷ 41
Rear wheel spindle	1	104 ÷ 126
Rear brake		
Oil pump-tube union	1	17 ÷ 20
Oil tube-caliper union	1	16 ÷ 20
Caliper to support retaining bolt	2	20 ÷ 25
Disc retaining bolts (°)	5	9 ÷ 11
Oil bleed screw	1	12 ÷ 16
Hose - rigid tube connection	1	13 ÷ 18

(*) Use new nuts.
(°) Apply medium threadlocking LOCTITE type 242.

PART	Q.ty	Tightening torque N·m
Engine assembly		
Clutch bell nut	1	78
Clutch locking collar	1	78
Driving pulley nut (°)	1	93
Flywheel nut (°)	1	116
Crankcase joining screw (°)	7	10
Cylinder head cover screw	6	10
Cylinder head nuts (°)	4	24
Cylinder stud bolt	4	20
Water pump impeller	1	12
Starter motor screws	2	10
Ignition spark plug	1	18
Hub oil drain plug	1	13
Hub oil filler plug	1	13
Hub oil level plug	1	13
Hub cover screws	7	25
Transmission cover screws	4	10
Oil pump screw	2	2
Oil drain plug	1	20
Water pump cover screw	4	10
Oil pump to crankcase fixing screw	2	9
Stator fixing screw	3	12
Starting free wheel screw	3	29
Flywheel cover screw	1	10
Intake manifold screws	2	10
Radiator fixing screw	4	4 ÷ 7
Chain tensioner shoe screw	1	10
Chain stretcher screw	1	22
Chain stretcher support screw	2	10
Silencer fixing screw	4	20 ÷ 25
Exhaust manifold - cylinder nut	2	27 ÷ 33
Water temperature sensor (on radiator) (^)	1	15 ÷ 18
Thermal switch (on radiator) (^)	1	25 ÷ 35

(°) Lubricate the parts before assembly.

(^) Apply LOCTITE for flat surfaces type 510.

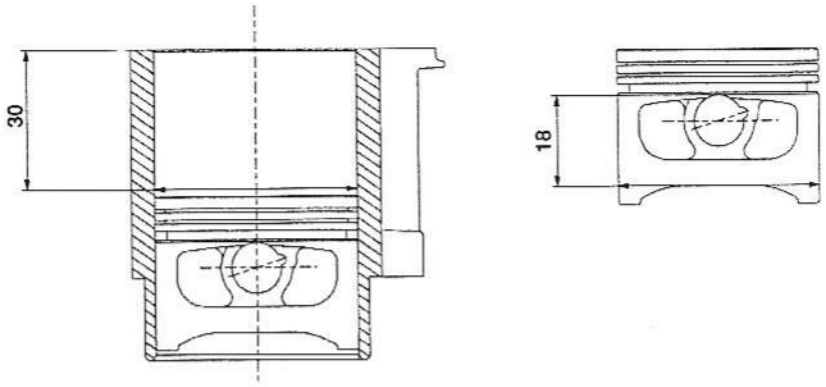
Standard tightening torques

TIGHTENING TORQUES IN N·m ACCORDING TO MATERIAL			
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

Pares de apriete estandard

PARES DE APRIETE EN N·m PARA TIPO DE MATERIAL CERRADO			
Ø Tornillo acero 8,8	Sobre plástico con distanciadores metálicos	Sobre latón, cobre, aluminio y relativas aleaciones	Hierro, acero
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

Assemby clearances



01_004

Cylinder-piston table

Cylinder	Inside diameter	72.750 ÷ 72.760	73.01
	Ovalization - Taper - Distortion	—	0.05
	Cylinder-piston clearance	0.01 ÷ 0.04	0.10
Piston	Piston outside diameter (18 mm from lower end)	72.720 ÷ 72.740	72.65
Piston rod small end, Piston pin	Piston pin bore inside diameter	17.002 ÷ 17.008	17.04
	Piston pin outside diameter	16.996 ÷ 17.0	16.96
	Connecting rod small end inside diameter	17.016 ÷ 17.034	17.06
	Piston pin bore - piston pin clearance	0.002 ÷ 0.014	0.02
	Piston pin - small end clearance	0.016 ÷ 0.040	0.06
Piston, piston rings (*)	Piston ring groove - upper and lower piston ring clearance	0.015 ÷ 0.050	0.09
	Piston ring end gap in cylinder	upper 0.15 ÷ 0.30	0.50
		lower 0.30 ÷ 0.45	0.65
		scraper 0.20 ÷ 0.70	0.90
	1st oversize (0.25) piston	Grind cylinder so that cylinder-piston clearance is 0.01 to 0.04	

(*) Fit the piston so that the "IN" mark faces the intake side. Fit the piston rings with the marks facing upwards.

Crankshaft alignment check: using the specially designed equipment shown in the figure, check that the runout at points "A" and "B" does not exceed 0.20 mm (maximum reading on dial gauge). 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). If the truing cannot be obtained, or if the runout is excessive, replace the crankshaft.

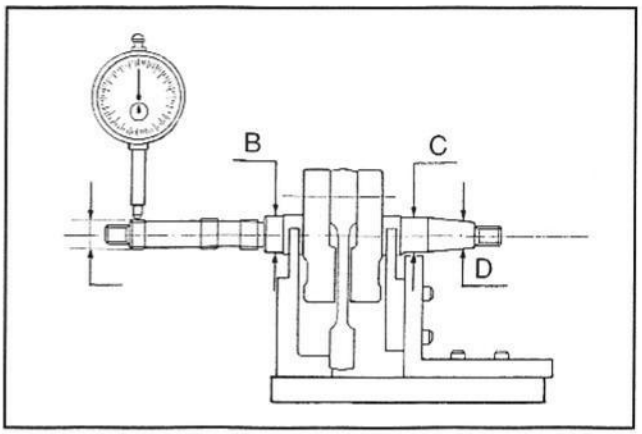
Jig and dial gauge: 19.1.20335
Special tool: 19.1.20074

Control alineacion cigüenal: Con el útil específico representado, controlar que la excentricidad en los puntos «A» y «B», esté comprendida entre 0,03 mm. (límite máximo de lectura en el reloj comparador). En caso de excentricidad no demasiado superior a la prescrita, **efectuar el enderezamiento** del cigueñal, actuando entre los contrapesos con una cuña o apretándoles con una prensa de tornillo (dotada de casquillos de aluminio) según las necesidades). En el caso no se consiga realizar el enderezamiento, o se detectaran valores de excentricidad, sustituir el cigüeñal.

Soporte y comparador: 19.1.20335
Útil específico: 19.1.20074

Controlo alinhamento árvore motor: com a respectiva ferramenta específica representada, controlar que as excentricidades nos pontos «A» e «B» resultem compreendidas entre 0,03 mm (limite máximo de leitura sobre o relógio comparador). No caso de excentricidade não muito superior àquela prescrita, **endireitar a árvore** agindo sobre os contra-pesos com um calço ou apertando-os com torno (dotado de buchas de alumínio) conforme fôr necessário. Caso não se consiga endireitar o eixo, ou se encontrem valores de excentricidade excessivos, substituir o eixo motor.

Suporte e comparador: 19.1.20335
Ferramenta específica: 19.1.20074



01_006

RECOMMENDED TOOLS	
DESCRIPTION	**DRAWING NO.**
Driving shaft alignment tool	19.1.20074
Air heater "Metabo hg 1500/2"	19.1.20151
Vacuum pump Mitivac type	19.1.20329
Stroboscopic gun for two - and four-stroke engines	19.1.20330
Digital multimeter	19.1.20331
Digital rev indicator	19.1.20332
Single station battery charger	19.1.20333
Multiple station battery charger	19.1.20334
Float level checking tool	19.1.20353
Valve guide positioning drift	19.1.20356
Valve guide removing drift	19.1.20373
5 mm valve guide reamer	19.1.20377
Driven pulley remover	19.1.20379
Multimeter adaptor	19.1.20409
32° cutter, diameter 33 mm	19.1.20416
60° cutter, diameter 30 mm	19.1.20417
Cutter stand	19.1.20445
45° cutter, diameter 29 mm	19.1.20446
32° cutter, diameter 28 mm	19.1.20447
Pliers for split rings	19.1.22465
Exhaust gas analyzer	494929

NECESSARY TOOLS	
DESCRIPTION	**DRAWING NO.**
37 x 40 mm adaptor	19.1.20358
42 x 47 mm adaptor	19.1.20359
52 x 55 mm adaptor	19.1.20360
22 mm drift	19.1.20361
20 mm guide	19.1.20363
25 mm guide	19.1.20364
22 mm guide	19.1.20365
Flywheel extractor	19.1.20369
Water sealing ring drift adaptor	19.1.20374
Adaptor sleeve	19.1.20376
Clutch nut tightening spanner	19.1.20378
Valve cotter half remover	19.1.20391
Piston retaining fork	19.1.20392
Band for fitting piston on cylinder	19.1.20393
15 mm guide	19.1.20412
Driven pulley needle roller casing fitting drift	19.1.20435
Needle roller casing fitting drift	19.1.20436
Needle roller case fitting drift	19.1.20437
Driven pulley shaft removing tube	19.1.20438
26 x 28 mm adaptor	19.1.20441
Compass spanner	19.1.20442
Flywheel retainer	19.1.20443
20 mm spanner	19.1.20467/6
Bell	19.1.20467/7
Bell	19.1.20467/10
15 mm spanner	19.1.20467/14
Bell	19.1.20467/17
Bell	19.1.20467/31
14 mm spanner	19.1.20467/32

Check ■ Replace ●	x 1000 km	1	6	12	18	24	30	36	42	48	54	60	66	72
	Months	4	12	24	36	-	-	-	-	-	-	-	-	-
Engine oil	*Renew*	●	EVERY 3,000 km			EVERY 3,000 km			EVERY 3,000 km					
Hub oil level	*Check/Renew*	CHECK EVERY 12.000 km - RENEW EVERY 2 YEARS												
Spark plug/Spark gap	*Replace*		●	●	●	●	●	●	●	●	●	●	●	●
Air filter	*Replace*				●			●			●			●
Transmission box air filter	*Clean*	■	■	■	■	■	■	■	■	■	■	■	■	■
Oil filter	*Clean*			■		■		■		■		■		■
Play of valves	*Check*	■		■		■		■		■		■		■
Idle speed/Carburetion	*Tune up*	■	■	■	■	■	■	■	■	■	■	■	■	■
Throttle control	*Adjust*	■		■		■		■		■		■		■
Crankcase breather	*Check*	■	■	■	■	■	■	■	■	■	■	■	■	■
Drive belt	*Check/Replace*			■	●	■	■	●	■	■	●	■	■	●
Roller container	*Check*		■	■	■	■	■	■	■	■	■	■	■	■
Coolant	*Renew*	EVERY 2 YEARS			EVERY 2 YEARS			EVERY 2 YEARS						
Steering	*Adjust*	■		■		■		■		■		■		■
Brake levers	*Grease*	■		■		■		■		■		■		■
Brake pads	*Check condition/wear*	EVERY 3,000 km			EVERY 3,000 km			EVERY 3,000 km						
Brake lines/Pressure hose	*Replace*							●						●
Brake fluid level	*Check*	■	■	■	■	■	■	■	■	■	■	■	■	■
Brake fluid	*Renew*	EVERY 2 YEARS			EVERY 2 YEARS			EVERY 2 YEARS						
Transmissions	*Lubricate*			■		■		■		■		■		■
Safety locks	*Check*	■		■		■		■		■		■		■
Suspensions	*Check*			■		■		■		■		■		■
Electrical equipment and battery	*Check*	■	■	■	■	■	■	■	■	■	■	■	■	■
Headlight	*Check/Adjust*			■		■		■		■		■		■
Tyres	*Check condition/wear*		■	■	■	■	■	■	■	■	■	■	■	■
Tyre pressures	*Check*	■	■	■	■	■	■	■	■	■	■	■	■	■
Vehicle and braking system	*Road test*	■	■	■	■	■	■	■	■	■	■	■	■	■
Labour time		95'	90'	160'	105'	160'	90'	230'	90'	160'	105'	160'	90'	230'

Safety tightening torques: Refer to Chapter 9 "PREDELIVERY OPERATIONS".

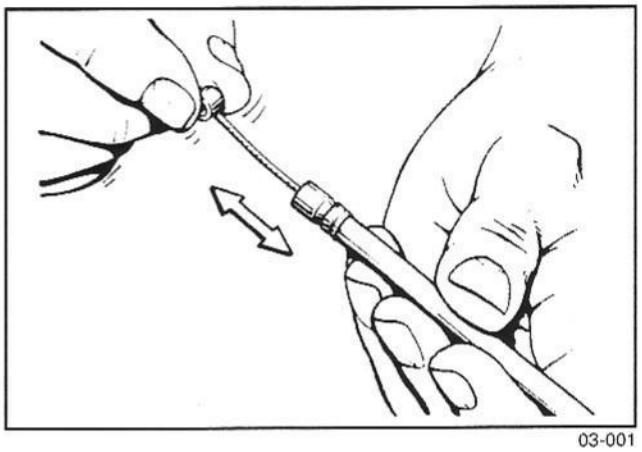
RECOMMENDED LUBRICANTS AND BRAKE FLUID		
USE	**CHARACTERISTICS**	**RECOMMENDED PRODUCT**
Rear hub	SAE 80W/90 API GL3 specifications or higher	TUTELA ZC 90
Control cables (brakes, throttle, speedometer)	Four-stroke engine oil	SELENIA HI Scooter 4 T
Brake levers, throttle twistgrip	Calcium complex soap grease NLGI 1-2	SYSTEM TW 249 AREXONS
Engine oil	SAE 20W/50 synthetic oil exceeding API SG specifications	SELENIA HI Scooter 4 T
Brake fluid	Synthetic SAE J1703, NHTSA 116 DOT 4, ISO 4925	TUTELA TOP 4
Grease for flexible transmission control levers	Lithium soap and zinc oxide grease NLGI2	ZETA 2
Driven pulley bushing	Lithium soap grease with Molybdenum bisulphide NLGI2	TUTELA MRM 2
Coolant	Monoethylene glycol-based antifreeze, CUNA NC 956-16	PARAFLU 11 FE (DILUTED)

TABLA PRODUCTOS ACONSEJADOS		
EMPLEO	**CARACTERíSTICAS**	**PRODUCTOS ACONSEJADOS**
Aceite cubo caja reductora	Aceite SAE 80W/90 que sobrepase especificaciones API GL3	TUTELA ZC 90
Aceite para lubricación transmisiones flexibles (frenos, mando gas, cuentakilómetros)	Aceite para motores 4 tiempos	SELENIA HI Scooter 4 T
Grasa (palancas mando frenos, gas)	Grasa al jabón de calcio complejo NLGI 1-2	SYSTEM TW 249 AREXONS
Aceite para motor	Aceite sintético SAE 20W/50 que supere la específica API SG	SELENIA HI Scooter 4 T
Líquido frenos	Fluido sintético SAE J1703, NHTSA 116 DOT 4, ISO 4925	TUTELA TOP 4
Grasa palancas mando transmisiones	Grasa al jabón de Litio y oxido de Zinc NLGI2	ZETA 2
Grasa buje polea conducida	Grasa al jabón de Litio con Bisulfuro de Molibdeno NLGI2	TUTELA MRM 2
Líquido de refrigeración	Fluido anti-congelante a base de glicol monoetilénico, CUNA NC 956-1	PARAFLU 11 FE (DILUIDO)

- Disassemble the control cables and check that they slide freely in their sheaths.

- Após ter desmontado as transmissões, certificar-se de que o deslizamento no interior da bainha seja perfeito.

- Después de desmontar las transmisiones, controlar el perfecto deslizamiento en el interior de la funda.

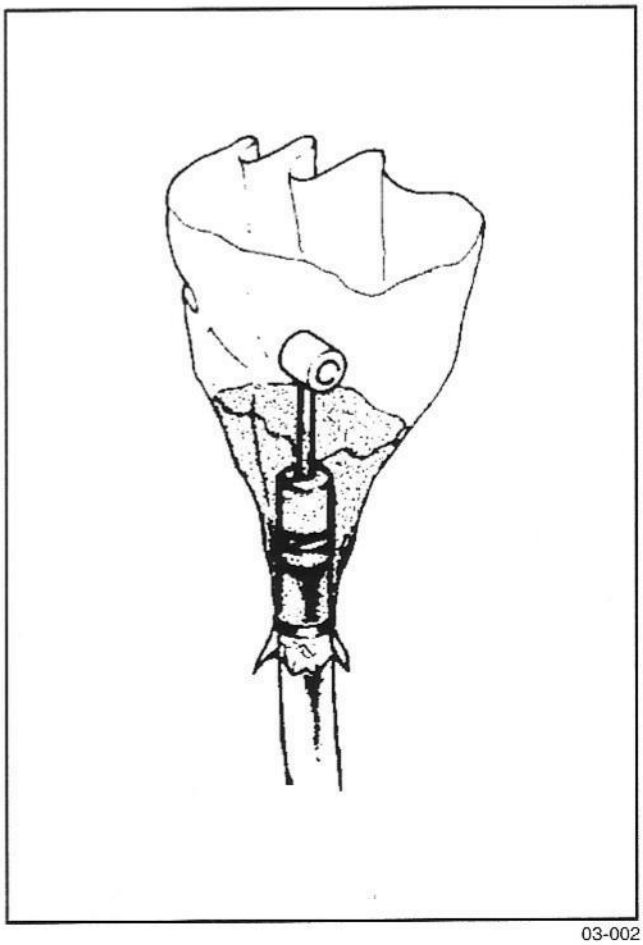


03-001

- Oil the cable with SELENIA HI SCOOTER 4 T 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.

- Lubrificar o cabo com óleo SELENIA HI SCOOTER 4 T aplicando um pequeno saco de plástico como ilustrado na figura.
- Se o cabo não devesse deslizar perfeitamente por causa de uma desfiadura, substituir o cabo e a bainha.

- Lubricar el cable con aceite SELENIA HI SCOOTER 4 T aplicando una bolsita de plástico según aparece en la figura.
- De todas maneras si el cable no deslizara perfectamente por una eventual deshilachadura, sustituir el cable y la funda.

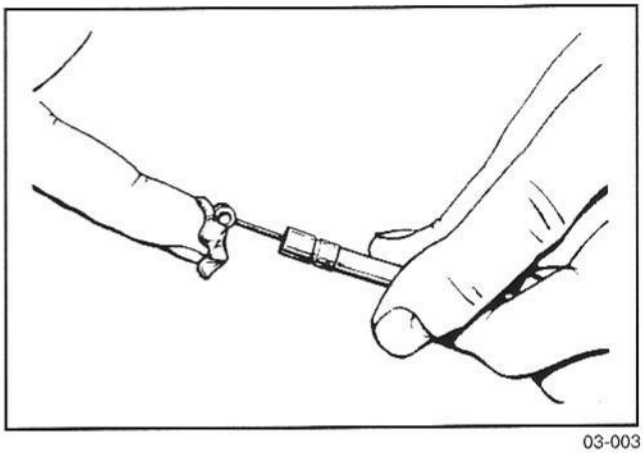


03-002

- Grease the ends of the cable.

- Untar as extremidades do cabo.

- Engrasar las extremidades del cable.



03-003

Carburettor

- Disassemble all carburettor components, accurately wash them in solvent, then dry them with compressed air. To ensure thorough cleaning, pay special attention to the passages in the carburettor body.
- Carefully check the condition of all components.
- The **throttle** must slide freely in the mixture chamber. If the play is excessive because of wear, replace the throttle.
- If the chamber is so worn that the valve, though new, does not seal and slide properly, replace the carburettor.
- When reassembling the carburettor, it is a good rule to replace the gaskets.

Specifications

Type: vacuum-operated KEIHIN VE3BD

Main jet: 105

Idle jet: 40

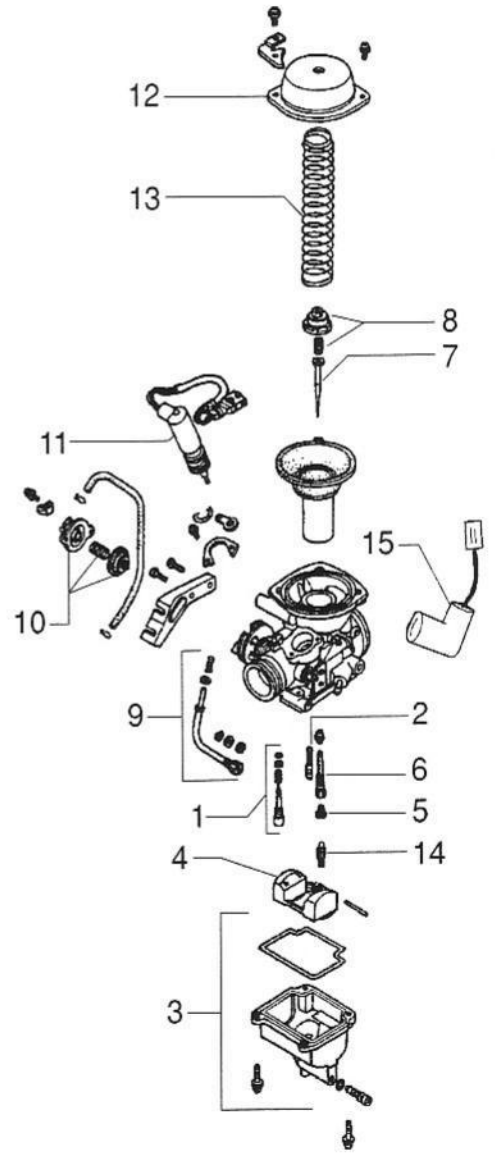
Conical needle: A15D

Fuel inlet port: Ø 2 mm

Float level: 18.5 mm from float chamber surface

Venturi air choke tube diameter: equivalent to 27.5 mm

Throttle valve spring free length: ~ 130 mm



1. Flow screw - **2.** Idle jet - **3.** Float chamber - **4.** Float - **5.** Main jet - **6.** Diffuser - **7.** Conical needle - **8.** Needle seat - **9.** Idle-speed adjusting screw - **10.** Cut-off valve - **11.** Starting device - **12.** Cover - **13.** Spring - **14.** Float valve - **15.** Throttle valve position sensor.

03-004

Caution - Petrol is highly flammable. Always fit new seals and gaskets to prevent leakage.

Air filter

Follow these steps to remove the engine air filter:
- Lean the vehicle on the side stand.
- Remove the left-hand lower side panel.
- Loosen the filter box fixing screws and release the retaining spring.
- Loosen the air filter fixing screw, extract the filter and replace it.

Put the parts back into place by following the same procedure in reverse order.

Warning - Do not run the engine with the air filter disassembled or excess wear of cylinder and piston will result.

Filtro de aire

Desmontaje del filtro del aire del motor;
- Colocar el vehículo sobre el caballete central;
- Quitar el lateral inferior izquierdo;
- Destornillar los tornillos de fijación caja del filtro, luego desenganchar el muelle de sujeción
- Destornillar el tornillo de fijación filtro del aire y extraerlo, sustituirlo.

Proceder al montaje siguiendo la secuencia contraria al desmontaje.

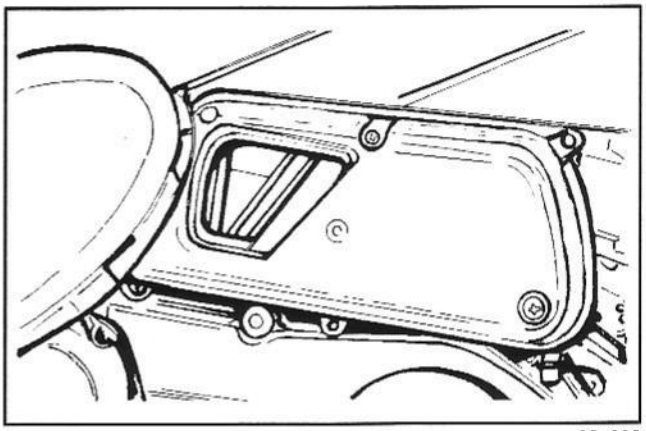
Atención - No hacer girar nunca el motor sin el filtro de aire, se dañaría enormemente el cilindro y el pistón.

Filtro do ar

Desmontagem filtro de ar do motor:
- Posicionar o veículo sobre o cavalete central;
- Remover a lateral inferior esquerda;
- Soltar os parafusos de fixação da caixa do filtro desenganchar então a mola de bloqueio;
- Soltar o parafuso de fixação do filtro de ar e extrair o filtro; substituí-lo.

Proceder à montagem seguindo as operações acima em ordem inversa.

Atenção - Não pôr nunca o motor a rodar sem o filtro do ar. Provocaria um desgaste excessivo no cilindro e no pistão.



03_006

Changing hub oil

- Loosen oil drain screw A and drain the oil completely.
- Retighten the drain screw, remove the transmission casing, unscrew filler screw B and fill the hub with oil of the prescribed type.

Caution - Do not remove the oil drain screw soon after running the engine at full rpm and/or while the engine is running: the hot oil may spurt out and cause burns.

Recommended oil: TUTELA ZC 90

Cambio de aceite en la caja reductora

- Destornillar el tornillo de vaciado del aceite (figura A) y dejar caer todo el aceite.
- Volver a enroscar el tornillo de descarga y abastecer el cubo con aceite específico a travez del orificio de carga (figura B), después de haber quitado el carter transmisión.

Advertencia - No quitar el tornillo de carga del aceite enseguida después que el motor haya marchado al régimen máximo y/o con el motor encendido. El aceite caliente podría salir con el peligro de quemaduras.

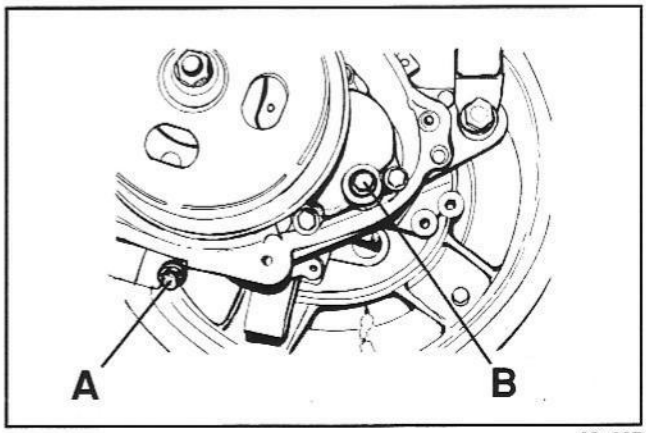
Aceite aconsejado: TUTELA ZC 90

Substituição óleo cubo

- Soltar o parafuso de descarga de óleo (figura A) e deixar o óleo defluir completamente.
- Parafusar novamente o parafuso de descarga e abastecer o cubo com óleo específico por meio do parafuso de carga (figura B), após ter removido o carter transmissão.

Advertência - Não tirar o parafuso de descarga de óleo logo após uma actividade do motor a pleno regime e/ou com o motor em movimento. O óleo superaquecido poderia sair causando riscos de queimaduras.

Óleo aconselhado: TUTELA ZC 90



03_007

Checking the fuel level in the float chamber

- Position the float chamber drain pipe so that it faces upwards. The top of the drain pipe must be higher than the float chamber surface.
- Turn out the float chamber drain screw.
- Start the engine. According to the principle of communicating vessels, the petrol in the pipe reaches the same level as the liquid in the float chamber.
- Stop the engine. The distance between the level in the pipe and the float chamber surface must be: 18.5 mm ± 1.0 mm

If the level is not as specified, check the following parts:
- Float valve.
- Float.

N.B.: For instructions on how to check the float height, refer to the engine manual.

Verificação do nível de combustível no tanque do carburador

- Posicionar o tubo de descarga do tanque do carburador voltado para cima, com o topo em posição mais alta com relação ao plano do tanque;
- Soltar o parafuso de descarga do tanque;
- Partir o motor. Pelo princípio dos vasos comunicantes o nível da gasolina no tubo atinge o mesmo nível do líquido no tanque;
- Parar o motor. A distância entre o nível no tubo e o plano do tanque deve resultar: 18,5 mm ± 1,0 mm

Se o nível for diferente do indicado, verificar:
- A válvula da bóia;
- A bóia.

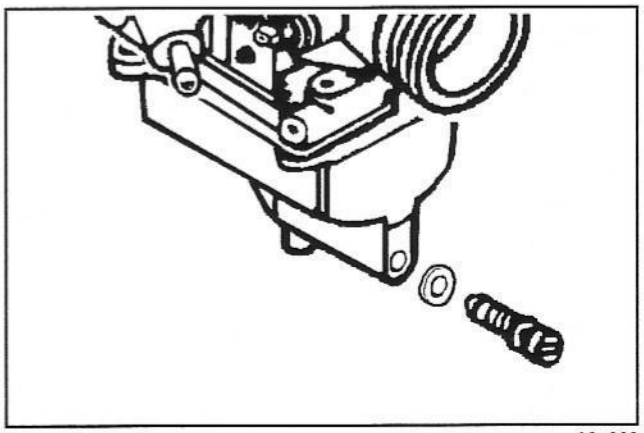
Aviso: Para a verificação da altura da bóia, ver o manual do motor.

Control del nivel del combustible en la cuba

- Colocar el tubo de descarga de la cuba del carburador hacia arriba, con la punta mas alta respecto al plano de la cuba;
- Destornillar el tornillo de descarga de la cuba;
- Arrancar el motor. Por el princípio de los vasos comunicantes el nivel del combustible en el tubo alcanza la misma altura del líquido en la cuba;
- Apagar el motor. La distancia entre el nivel del tubo y el plano de la cuba debe ser 18,5mm ± 1,0mm.

Si el nivel resulta distinto a lo indicado, comprobar:
- La valvula del flotador;
- El flotador.

N.B.: Para verificar la altura del flotador, ver el manual del motor.



03_008

Ignition
Play of valves

Warning - Check and if necessary adjust the play of the valves when the engine is cold (~ 35° C).

- Remove the left-hand side cover.
- Remove the transmission filter box to gain access to the driving pulley.
- Remove the inspection plug from the flywheel cover.
- Remove the plug from the inspection hole in the cylinder head cover.
- Rotate the driving pulley anticlockwise until the mark on the camshaft is aligned with the mark on the cylinder head cover, and the "T" mark on the outside of the rotor is aligned with the reference mark on the thread of the inspection plug hole.
- Unscrew the fixing screws of the valve rocker arm pins on the left side of the cylinder head cover.
- Rotate the adjusters of the two valves towards the outside of the cylinder head cover, moving them away from each other until a slight resistance is felt. Bring the two adjusters closer by rotating them towards the inside by an angle equivalent to one notch.

Warning - A rotation of one notch corresponds to a 0.10 mm shift of the valve, which is the recommended valve play.

- Tighten the fixing screws of the valve adjusters.
- Fit the inspection hole plug, the left-hand cover, the left-hand rear cover and the saddle.

Encendido
Juego de las válvulas

Atención - Verificar y eventualmente regular el juego de las válvulas con el motor frío (~ 35°C).

- Quitar la cobertura lateral izquierda;
- Quitar la caja del filtro para poder acceder a la polea motriz;
- Quitar la tapa de inspección en la tapa del magneto;
- Quitar la tapa del orificio de inspección de la tapa de la culata;
- Girar la polea motriz en sentido contrario a las agujas del reloj hasta alinear la marca situada en el árbol de levas con el que está situado en la tapa de la culata y la marca "T" colocada en el lado externo del rotor con la referencia en la rosca del orificio de la tapa de inspección;
- Destornillar los tornillos de fijación de los pernos de los balancines de las válvulas colocados en el lado izquierdo de la tapa de la culata;
- Girar hacia el exterior de la tapa culata y reguladores de las dos válvulas alejándolas la una de la otra hasta que se encuentre una ligera resistencia. Girar entonces los dos reguladores hacia el interior acercandolos, de un ángulo igual a una raya.

Atención - Un ángulo de rotación igual a una raya, corresponde al desplazamiento de la válvula de 0,10 mm, valor que se recomienda para el juego de las válvulas.

- Apretar los tornillos de bloqueo de los reguladores de las válvulas.
- Colocar la tapa del orificio de inspección, la tapa izquierda del carter, la cobertura trasera izquierda, el sillín.

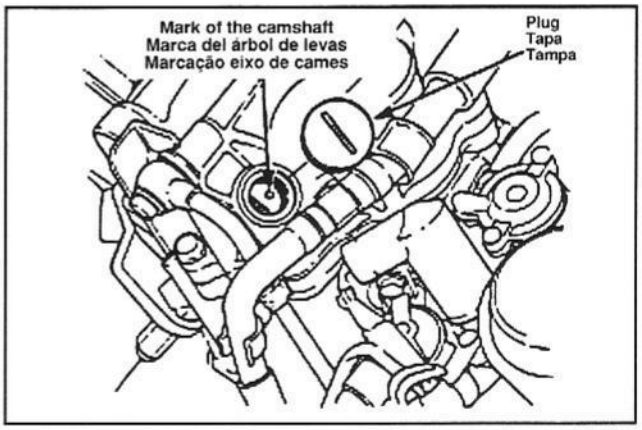
Ignição
Folga das válvulas

Atenção - Verificar e eventualmente regular a folga das válvulas com o motor frio (~ 35ºC).

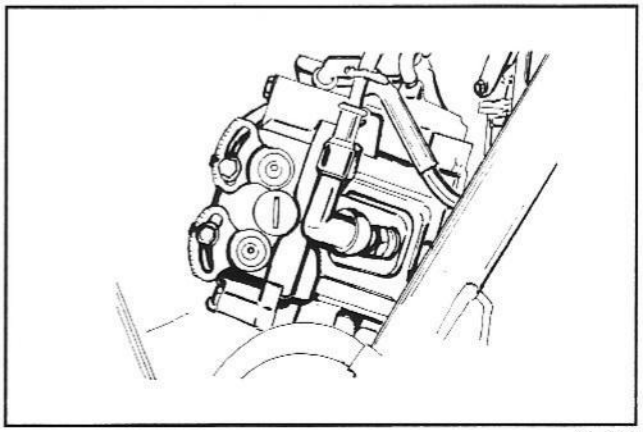
- Remover a cobertura lateral esquerda;
- Remover a caixa do filtro transmissão para poder ter acesso à polia motora;
- Remover a tampa de inspecção na cobertura do volante;
- Remover a tampa do furo de inspecção da cobertura da cabeça;
- Girar a polia motora em sentido anti-horário até alinhar a marcação situada no eixo de cames com aquela situada na tampa da cabeça, e a marcação "T" situada no lado externo do rotor com a referência na rosca do furo da tampa de inspecção;
- Soltar os parafusos de bloqueio dos eixos dos balancins das válvulas situados no lado esquerdo da tampa da cabeça;
- Girar os reguladores das duas válvulas para o externo, afastando-os um do outro, até encontrar uma ligeira resistência. Girar então os dois reguladores para o interno, aproximando-os, de um ângulo equivalente a uma marca.

Atenção - Um ângulo de rotação equivalente a uma marca, corresponde ao deslocamento da válvula de 0,10 mm, valor este recomendado para a folga das válvulas.

- Apertar os parafusos de bloqueio dos reguladores das válvulas.
- Instalar a tampa do furo de inspecção, a tampa esquerda do carter, a cobertura traseira esquerda, o selim.



03_009



03_010

Ignition timing

Warning - The capacitive discharge ignition control unit is factory adjusted. The operations described below are intended to check the operation of the ignition system.

- Remove the plug from the ignition timing inspection hole.
- The check is performed with a stroboscopic gun and a rev counter. The ignition timing at idle is correct when the "F" mark on the flywheel is aligned with the corresponding mark on the crankcase cover hole at a speed of 1,500 rpm.
- To check the spark advance, increase the speed to 6,700 rpm. The mark on the crankcase cover hole should then be positioned between the two flywheel advance marks.
- If the ignition timing is incorrect, check the ignition control unit, the pick-up, the flywheel and the wiring. Repair or replace any faulty components.

N.B.: Use a glass plug to prevent the oil from coming out during the check.

Fase de encendido

Atención - La centralita de encendido a descarga capacitiva ha sido regulada por el constructor. Las operaciones descritas a continuación sirven para verificar el correcto funcionamiento del sistema de encendido.

- Quitar el tapón del agujero de inspección de la fase de encendido;
- Para efectuar esta comprobación utilizar una pistola estroboscópica y un cuenta revoluciones. La fase del encendido es correcta si la marca "F", colocada en el magneto, resulta estar alineada con la marca obtenida en el orificio de la tapa del carter a la rotación de 1500 rpm.
- Para verificar el avance del encendido: aumentar la velocidad de rotación a 6700 rpm, en éste caso la marca presente en el orificio de la tapa del carter debe estar entre las dos marcas de avance del magneto.
- Si la fase de encendido no resultase correcta, comprobar la centralita de encendido, el Pick-Up, el magneto y el grupo de cableado.
  Sustituir o reparar los componentes defectuosos.

N.B.: Utilizar un tapón de vidrio para efectuar esta comprobación para evitar salida de aceite.

Fase da ignição

Atenção - A central de comando de ignição, de descarga capacitiva, foi ajustada pelo fabricante. As operações descritas a seguir servem para a verificação do correcto funcionamento do sistema de ignição.

- Remover a tampa do furo de inspecção da fase da ignição;
- Para executar a verificação, utilizar uma pistola estroboscópica e um tacómetro. A fase da ignição em ralenti está correcta se a marcação "F", situada no volante resultar alinhada com aquela existente no furo da tampa do carter à velocidade de 1500 rpm.
- Para verificar a antecipação da ignição: aumentar a velocidade até 6700 rpm, neste caso a marcação presente no furo da tampa do carter deve ficar compreendida entre as duas marcações de antecipação do volante.
- Se a fase da ignição não resultar correcta, verificar a central de comando de ignição, o Pick-Up, o volante e o conjunto da cablagem.
  Substituir ou reparar os componentes defeituosos.

Aviso: Utilizar uma tampa de vidro, ao efectuar esta verificação, de modo a evitar saídas de óleo.

Spark plug

Check and replacement

Warning - The spark plug must be removed when the engine is cold. Replace the spark plug every 6,000 km. The use of electronic control units and spark plugs other than those specified can seriously damage the engine.
Recommended spark plugs: NGK DPR7EA-9
DENSO X22EPR-U9

- Place the vehicle on the centre stand.
- After removing the fixing screw, lever the door on the left side of the vehicle open by using a screwdriver in the specially designed recess in the lower part of the door.
- Disconnect the spark plug HT cable cap.
- Unscrew the spark plug using the spanner provided.
- Check the condition of the spark plug, and in particular of the insulator, and measure the spark gap with a suitable thickness gauge.
  Spark gap: 0.8 ÷ 0.9 mm
- If necessary, adjust the gap by carefully bending the side electrode.
  If the spark plug is faulty, replace it with one of the specified type.
- Insert the spark plug into its hole with the correct inclination, screw it fully in manually and then tighten it with the specially designed spanner.
  Tightening torque: 18 N·m (1.8 kg·m)
- Press the cap firmly down onto the spark plug and then fit the saddle.

Bujía

Control y sustitución

Atención - La bujía se debe quitar con el motor frio. Se debe sustituir la bujía a cada 6000 kms. Centralitas no conformes o bujías distintas de la prescrita puede dañar gravemente el motor.
Bujía recomendada: NGK DRP7EA-9,
DENSO X22EPR-U9

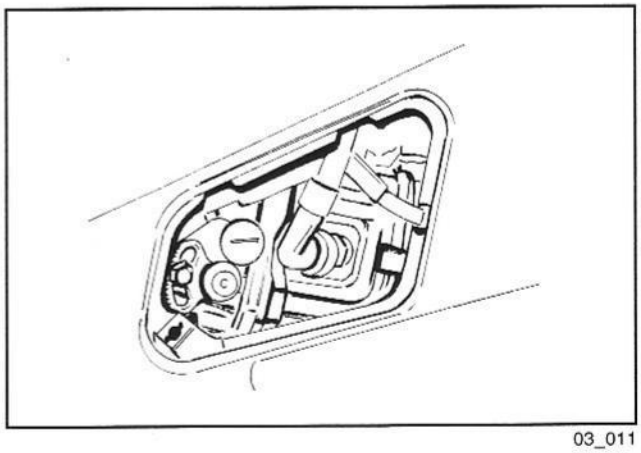
- Colocar el vehículo sobre el caballete central;
- Abrir la puertecilla en el lado izquierdo del vehículo quitando antes el tornillo y forzando en la parte inferior por el hueco;
- Desconectar el capuchón del cable de A.T. de la bujía;
- Destornillar la bujía utilizando la llave en dotación;
- Examinar la bujía, la integridad del aislante, medir la distancia entre eléctrodos con un calibre de espesor.
  Distancia entre eléctrodos: 0,8 ÷ 0,9 mm
- Eventualmente proceder a regular la distancia doblando con mucho cuidado el eléctrodo lateral.
  En el caso se encuentren defectos sustituir la bujía con una del tipo prescrita.
- Introducir con la debida inclinación la bujía enroscar manualménte hasta el fondo, luego apretar con la llave en dotación.
  Par de apriete: 18 N·m (1,8 kg·m)
- Introducir hasta el fondo el capuchón en la bujía, luego montar el sillín.

Vela

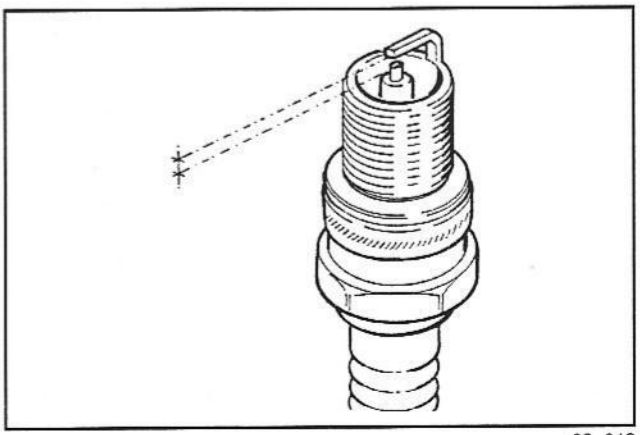
Verificação e substituição

Atenção - A remoção da vela deve ser efectuada com o motor frio. A vela deve ser substituída a cada 6000 km. O uso de centrais de comando de ignição não conformes ou de velas diferentes daquelas prescritas pode danificar gravemente o motor.
Vela recomendada: NGK DPR7EA-9
DENSO X22EPR-U9

- Posicionar o veículo no cavalete central;
- Abrir a portinhola no lado esquerdo do veículo, removendo o respectivo parafuso e fazendo alavanca na parte inferior no encave especial;
- Desconectar o cachimbo do cabo A.T. da vela;
- Desparafusar a vela utilizando a chave em dotação;
- Examinar as condições da vela, a integridade do isolante, medir a distância entre os eléctrodos utilizando um espessímetro adequado.
  Distância entre eléctrodos: 0,8 ÷ 0,9 mm.
- Proceder à eventual regulagem da distância, dobrando com muito cuidado o eléctrodo lateral. Em caso de defeito, substituir a vela por uma do tipo prescrito;
- Posicionar a vela, com a devida inclinação, parafusando-a manualmente até o fim e, em seguida, apertá-la com a chave específica.
  Conjugado de aperto: 18 N.m (1,8 kgm)
- Introduzir firmemente o cachimbo sobre a vela e remontar, então, o selim.



03_011



03_012

Engine cooling
Filling the system with coolant. Bleeding air from the system.
Check the coolant level when the engine is cold by following these steps:
- Place the vehicle on the centre stand.
- Remove the expansion tank cap and top up if the liquid in the tank is below the min. level rim.
- The coolant consists of a 50-percent mixture of distilled water and an antifreeze solution with a base of ethylene glycol and corrosion inhibitors.
  Total coolant capacity: 1.2 l
- Start the engine and rev it up a few times until the coolant reaches the working temperature of 60-70° C.
- Stop the engine and, after a few minutes, remove the expansion tank cap and check the level of the coolant.
- Top up if necessary.

Warning - To prevent the coolant from flowing out of the expansion tank while riding, never pour in coolant above the MAX level mark.

- To drain the coolant from the circuit, loosen the drain screw shown in the figure, attach a rubber pipe to the hole and put the other end of the pipe in a container.

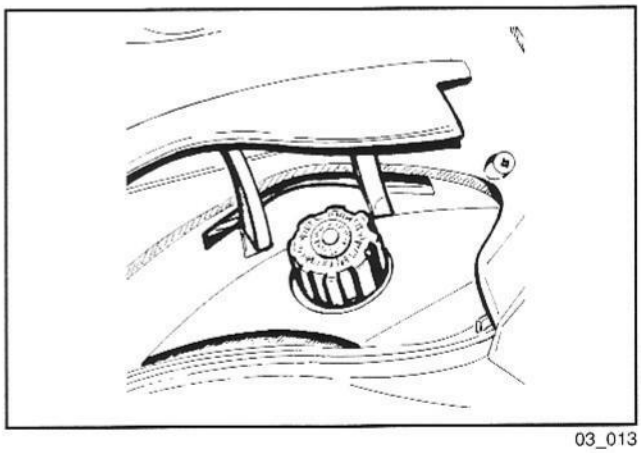
Refrigeración del motor
Introducción del líquido refrigerante del motor y espurgo aire del circuito.
El control del líquido se debe efectuar con el motor frío y como indicado a continuación:
- Colocar el vehículo sobre el caballete central;
- Quitar el tapón del tanque de expansión y en el caso que el líquido se encuentre por debajo del nivel mínimo restablecer el nivel mismo.
- El líquido refrigerante está compuesto por una mezcla al 50% de agua desmineralizada y liquído antihielo con base de glicoetilénico e inhibidores de corrosión. Capacidad total: 1,2 ltrs.
- Arrancar el motor acelerando algunas veces hasta que el líquido refrigerante no haya alcanzado la temperatura de ejercicio de 60° ÷ 70° C.
- Apagar el motor y verificar después de algunos minutos el nivel alcanzado por el líquido abriendo el tapón del tanque de expansión.
- Rellenar con líquido refrigerante hasta el nivel si fuese necesario.

Atención - Para evitar salida del líquido refrigerante del tanque mientras se utilice el vehículo, no sobrepasar el nivel MAX durante el llenado.

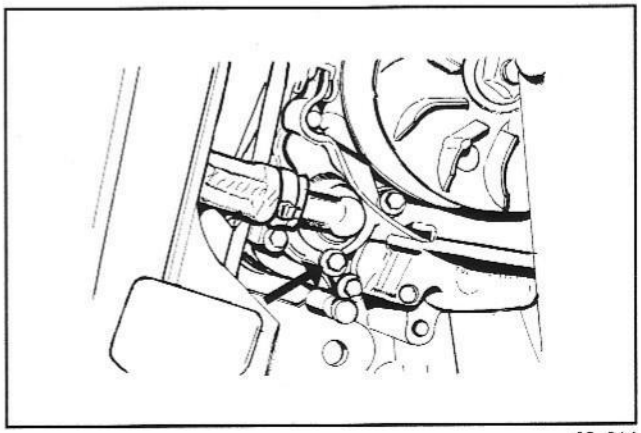
- Para descargar el circuito es necesario destornillar el tornillo de vaciado indicado en la figura y conectar al orificio un tubo de goma pequeño con su extremidad en un recipiente.

Refrigeração do motor
Introdução do líquido de refrigeração do motor e purga do ar da instalação.
A verificação do líquido deve ser feita com o motor frio e seguindo as modalidades descritas a seguir:
- Posicionar o veículo sobre o cavalete central;
- Tirar a tampa do tanque de expansão e completar, eventualmente, o nível de líquido, caso este se encontre abaixo da borda de nível mínimo no interior do tanque.
- O líquido refrigerante é constituído de uma mistura de 50% de água desmineralizada e solução antigelo a base de glicol monoetilénico e inibidores de corrosão. Capacidade total: 1,2 l
- Dar partida no motor acelerando o mesmo algumas vezes até que o líquido de refrigeração não tenha atingido a temperatura de funcionamento de 60º ÷ 70ºC.
- Parar o motor e verificar, após alguns minutos, o nível alcançado pelo líquido, abrindo a tampa do tanque de expansão.
- Se necessário, completar o nível do líquido de refrigeração do tanque de expansão, até alcançar o nível correcto.

Atenção - De maneira a evitar a saída do líquido de refrigeração do tanque de expansão, durante o uso do veículo, não ultrapassar o nível MAX durante a fase de enchimento.
- Para descarregar o líquido de refrigeração do circuito, é necessário soltar o parafuso de descarga, indicado na figura, e conectar ao furo um tubo de borracha, com a outra extremidade em um recipiente.



03_013



03_014

Water pump

Shaft seal inspection

- Check that the drain hole shows no signs of leakage. If there is an oil leak, remove the crankcase cover and replace the sealing ring on the water pump shaft. If, on the other hand, coolant is leaking, replace the stuffing box.

Bomba de água

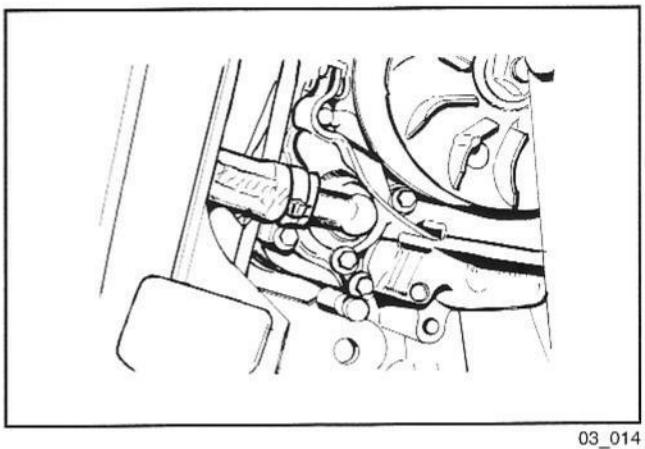
Inspecção da mata-junta de vedação do eixo

- Verificar que o furo de drenagem não apresente sinais de vazamento de líquido. Caso haja perdas de óleo, remover a tampa do carter e substituir o anel de vedação, posto no eixo da bomba de água, se o líquido que estiver vazando for óleo. No caso de vazamento de líquido de refrigeração, substituir o preme-estopa.

Bomba del agua

Inspección de la junta del eje

- Verificar que el agujero de drenaje no tenga señales de pérdida de líquido. En el caso que pierda aceite quitar la tapa del carter y sustituir el retenedor de aceite colocado en el eje de la bomba de agua si el líquido que pierde fuese aceite. En el caso se tratara de perdida de liquido refrigerante, sustituir el prensaestopas de la bomba de agua.



03_014

Steering lock

Disassembly with ignition switch in «lock» position

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

Antifurto

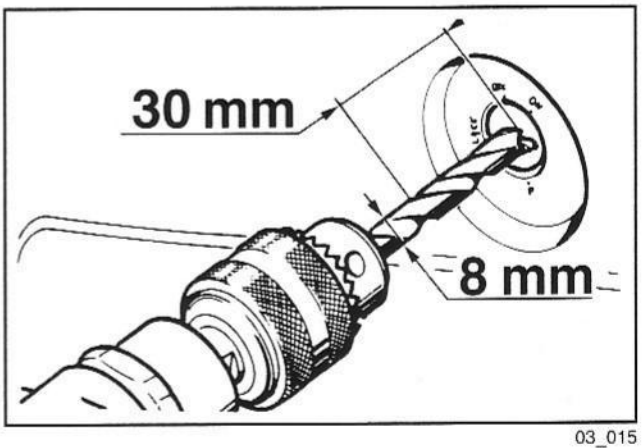
Desmontagem com fechadura na posição «Lock»

- Desmontar o escudo.
- Desmontar o interruptor do comutador de chave.
- Furar o bloque com a ponta de uma broca, como vem representado na figura.
- Inserir o pequeno cilindro com a chave, e com a lingueta de fixação virada para baixo, no corpo da fechadura até cerca da sua metade tendo atenção que na fase de introdução a chave resulte orientada em correspondência com a posição «ON» (única posição que permite a entrada do pequeno cilindro no corpo da fechadura); a seguir rodar a chave para a esquerda para a posição «OFF» e contemporaneamente empurrar até ao fundo o pequeno cilindro.

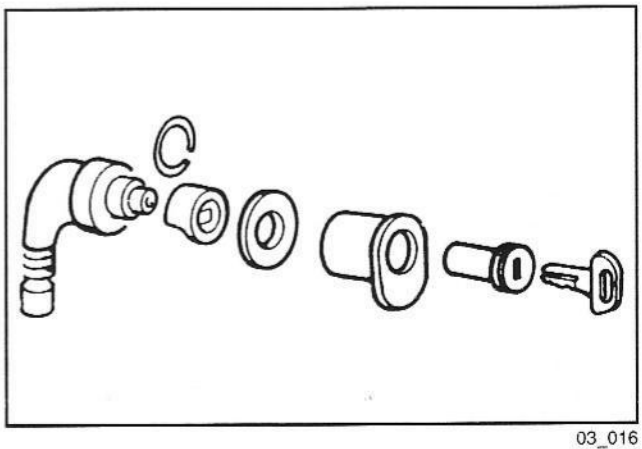
Antirrobo

Desmontaje con cerradura en posición «Lock»

- Desmontar el escudo.
- Desmontar el interruptor del conmutador de llave.
- Agujerear el cuerpo de la cerradura con la punta de una taladradora, como se representa en la figura.
- Introducir el cilindro completo de llave con la lengüeta de anclaje mirando hacia abajo en el cuerpo de la cerradura hasta apróximadamente su mitad, prestando atención al momento de introducir la llave de que esté orientada hacia la posición «ON» (única posición que permite la introducción del cilindro en el cuerpo de la cerradura), después de ello hacer girar la llave hacia la izquierda posición «OFF» y contemporaneamente apretar hasta el tope el cilindro.



03_015



03_016

Disassembly with keyswitch in «OFF» position

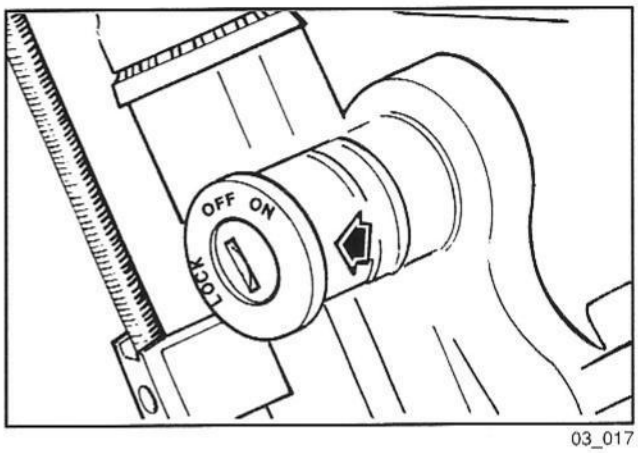
- Remove the protection and the glove compartment.
- Insert the tip of an awl into the hole indicated with the arrow in the figure and press until you disengage the tab that secures the cylinder to the lock body; maintain the pressure on the awl and withdraw the lock body and the cylinder.

Desmontagem com fechadura em posição «OFF»

- Depois de retirar a protecção desmontar a maleta.
- Inserir um pequeno furador no furo indicado com seta na figura e empurrá-lo até desenganchar a lingueta de retenção do pequeno cilindro ao corpo da fechadura: mantendo premida a ponta metálica contra a lingueta, extrair o corpo da fechadura e o pequeno cilindro.

Desmontaje con cerradura en posición «OFF»

- Una vez extraida la protección desmontar la maleta.
- Introducir un pequeño punzón en el orificio indicado con la flecha en la figura y empujarlo hasta desenganchar la lengüeta de retención del cilindro al cuerpo de la cerradura: manteniendo apretada la punta metálica contra la lengüeta extraer el cuerpo de la cerradura y el cilindro.



03_017

Setting the headlamp

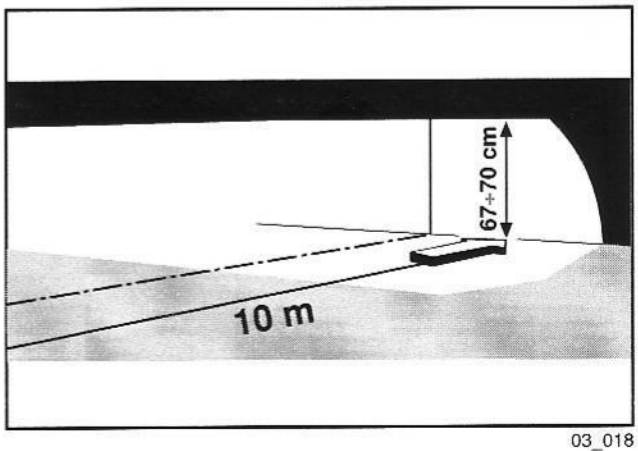
- Set the unladen scooter on level, even ground, with the tyres correctly inflated, at a distance of 10 m from a flat, white wall or screen that is sufficiently darkened to be able to see the headlight beam. Make sure that the scooter axis is at right angles to the screen.
- Mark the screen with a horizontal line 67 ÷ 70 cm from the ground.
- Switch on the headlight dipped beam and check that the boundary between the brightly illuminated area and the surrounding area is no higher than the line you have drawn. To shift the headlight, turn the screw in the front shield.

Regulação farol

- Posicionar o veículo, em condições de uso, sem carga, com os pneus enchidos na pressão indicada sobre uma superfície plana a 10 m de distância de um muro branco que se encontre na penumbra prestando atenção para que o eixo do veículo esteja perpendicular ao muro.
- Traçar, no muro, uma linha horizontal cuja altura do solo corresponda a 67 ÷ 70 cm.
- acender o farol, e com o mesmo ligado nos médios, controlar que a linha de demarcação horizontal entre a zona escura e a zona iluminada, não caia acima da linha horizontal traçada no muro. Para deslocar o farol, agir no parafuso posto no escudo dianteiro.

Regulación proyector

- Poner el vehículo en la condición de utilización, sin cargar, con los neumáticos inflados a la presión prescrita en terreno llano a 10 m. de distancia de una pantalla blanca ubicada en la penumbra cerciorándose de que el eje del vehículo es perpendicular a la pantalla.
- Trazar en la pantalla una línea horizontal de 67 ÷ 70 cm de altura desde tierra.
- Encender el proyector, activar el haz luminoso de las luces de cruce y controlar que la línea de demarcación horizontal entre la zona oscura e iluminada caiga por encima de la línea horizontal trazada en la pantalla. Para mover el proyector, actuar sobre el tornillo colocado en el escudo delantero.



03_018

SYMPTOM	POSSIBLE CAUSE	REMEDY
Poor performance	Carburettor dirty. Fuel pump or one-way valve faulty.	Remove, wash with solvent and dry with compressed air, or replace
	Excessive carbon formation in combustion chamber	Decoke cylinder, piston, cylinder head and valves
	Incorrect valve gear timing, or valve gear components worn	Restore correct valve gear timing or replace any worn parts
	Silencer clogged	Replace
	Air filter clogged or dirty	Replace
	Clutch slippage	Check and if necessary replace the clutch assembly and the clutch bell housing
	Automatic transmission faulty	Check the rollers and the sliding of the pulleys. Replace any faulty components and lubricate the movable driven pulley guide with Montblanc Molybdenum Grease.
	Belt worn	Replace
	Poor compression. Piston rings, cylinder and valves worn.	Replace all worn-out parts
	Engine oil above maximum level	Trace the cause and restore the correct level
Starting difficulties	Carburettor dirty. Fuel pump faulty.	Remove, wash with solvent and dry with compressed air, or replace. Check electric pump wiring.
	Spark plug faulty or spark advance incorrect	Replace the spark plug or check the ignition circuit components
	Air filter clogged or dirty	Replace
	Starting device faulty	Check the device and mechanical sliding
	Engine flooded	Open the throttle wide and try to start the engine. If the engine does not start, remove the spark plug, dry it and, before replacing it, crank the engine to expel the excess fuel, taking care to keep the spark plug cap connected to the spark plug and the spark plug to earth. If the fuel has run out, refuel and then start the engine.
	Valve seal poor or valve adjustment incorrect	Overhaul the cylinder head and/or restore the correct play
	Starting rpm too low or starter motor and starting system faulty	Check the starter motor, the system and the torque limiter
	Fuel deteriorated	Drain all deteriorated fuel and refuel.

SYMPTOM	POSSIBLE CAUSE	REMEDY
Engine tends to stall at full throttle	Main jet dirty. Carburetion lean	Wash the jet with solvent and dry it with compressed air
	Water in carburettor	Drain water from the float chamber using the specially designed drain screw
	Float level incorrect	Restore the correct float level
	Fuel supply circuit faulty	Check and if necessary replace the pump. Check the duct seal. Check the electric pump wiring.
	Filter box leaky	Check and if necessary replace
Engine tends to stall at idle	Idling jet dirty	Wash with solvent and dry with compressed air
	Starting device stays open	Check electrical connections, circuit continuity, mechanical sliding, and power supply
	Spark plug faulty or spark advance incorrect	Replace the spark plug or check the ignition circuit components
	End-compression pressure too low	Check the seal of the thermal unit and replace any worn components
	Idle speed wrongly tuned	Tune up using a rev counter
	Cut-off device broken	Check operation of the valve, membrane and spring; check if the air adjusters are clean
	Valve gear timing incorrect	Restore the correct timing and check the valve gear components
Fuel consumption excessive	Air filter clogged or dirty	Replace
	Starting device faulty	Check electrical connections, circuit continuity, mechanical sliding, and power supply
	Fuel pump faulty	Check the feeding, replace if necessary
	Jets loose	Check that the main and idling jets are securely seated
	Float level incorrect	Check and restore the correct fuel level in the float chamber
Clutch grapping or irregular operation	Clutch faulty	Check for grease on the clutch weights. Check that the area of contact of the clutch weights with the bell housing is chiefly at the centre and equivalent for the three weights. Check that the bell housing is not scored or abnormally worn.

SYMPTOM	POSSIBLE CAUSE	REMEDY
Braking system	Poor braking	Check the wear of the brake pads (MIN. 1.5 mm). Ensure that the brake discs are not worn, scored or distorted. Check the brake fluid level in the pumps. Check for air in the circuits and bleed it as necessary. Ensure that the front brake caliper moves along the disc axis. Check and if necessary renew the brake fluid.
	Brake noisy	Check pad wear
Battery	It is the electrical device that requires the most constant care and accurate maintenance. If the vehicle is not to be used for some time (1 month or longer), the battery will have to be recharged periodically. The battery will run down completely in about three months. When installing the battery on the vehicle, take care not to invert the connections: the black earth cable must be connected to the negative terminal and the red cable to the terminal marked with a "+" sign.	Check the tightening of the upper and lower ring nuts. If steering rotation is still abnormal, check the bearing ball rolling races. Replace if the races appear to be embedded, or if the balls are flattened.
Steering controls and suspensions	Steering stiff	Ditto
	Steering play excessive	If the front suspension is noisy, check the operation of the front shock absorber, the condition of the ball bearings and the related locknuts, the rubber stops and the sliding bushes.
	Suspension noisy	Also check the tightening torques of the wheel hub, the brake caliper, the brake disc and the shock absorber on the hub and steering tube connections.
	Oil leaking from suspension	Replace the shock absorber. Check the wear of the steering caps and the adjusters.