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PIAGGIO

SERVICE STATION MANUAL

633823



MP3 250 i.e.

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SERVICE STATION MANUAL

MP3 250 i.e.

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

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SERVICE STATION MANUAL MP3 250 i.e.

This service station manual has been drawn up by Piaggio & C. Spa to be used by the workshops of Piaggio-Gilera dealers. It is assumed that the user of this manual for maintaining and repairing Piaggio vehicles has a basic knowledge of mechanical principles and vehicle repair technique procedures. Any significant changes to vehicle characteristics or to specific repair operations will be communicated by updates to this manual. Nevertheless, no mounting work can be satisfactory if the necessary equipment and tools are unavailable. It is therefore advisable to read the sections of this manual relating to special tools, along with the special tool catalogue.

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

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

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



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



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



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



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INDEX OF TOPICS

CHARACTERISTICS

CHAR

This section describes the general specifications of the vehicle.

Rules

This section describes general safety rules for any maintenance operations performed on the scooter.

Safety rules

- If work can only be done on the vehicle with the engine running, make sure that the premises are well ventilated, using special extractors if necessary; never let the engine run in an enclosed area. Exhaust fumes are toxic.
 - The battery electrolyte contains sulphuric acid. Protect your eyes, clothes and skin. Sulphuric acid is highly corrosive; in the event of contact with your eyes or skin, rinse thoroughly with abundant water and seek immediate medical attention.
 - The battery produces hydrogen, a gas that can be highly explosive. Do not smoke and avoid sparks or flames near the battery, especially when charging it.
 - Fuel is highly flammable and it can be explosive given some conditions. Do not smoke in the working area, and avoid open flames or sparks.
 - Clean the brake pads in a well ventilated area, directing the jet of compressed air in such a way that you do not breathe in the dust produced by the wear of the friction material. Even though the latter contains no asbestos, inhaling dust is harmful.
-

Maintenance rules

- Use original PIAGGIO spare parts and lubricants recommended by the Manufacturer. Non-original or non-conforming spares may damage the vehicle.
 - Use only the appropriate tools designed for this vehicle.
 - Always use new gaskets, sealing rings and split pins upon reassembly.
 - After removal, clean the components using non-flammable or low flash-point solvent. Lubricate all the work surfaces except the tapered couplings before refitting.
 - After refitting, make sure that all the components have been installed correctly and work properly.
 - For removal, overhaul and refit operations use only tools with metric measures. Metric bolts, nuts and screws are not interchangeable with coupling members with English measurement. Using unsuitable coupling members and tools may damage the scooter.
 - When carrying out maintenance operations on the scooter that involve the electrical system, make sure the electrical connections have been made properly, particularly the ground and battery connec-
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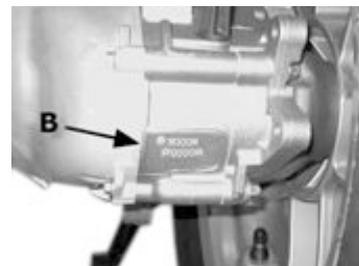
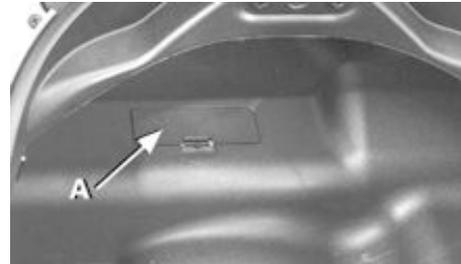
tions.

Vehicle identification

Chassis prefix (FULL OPTIONAL): **M47201**

Chassis prefix (BASE): **M47200**

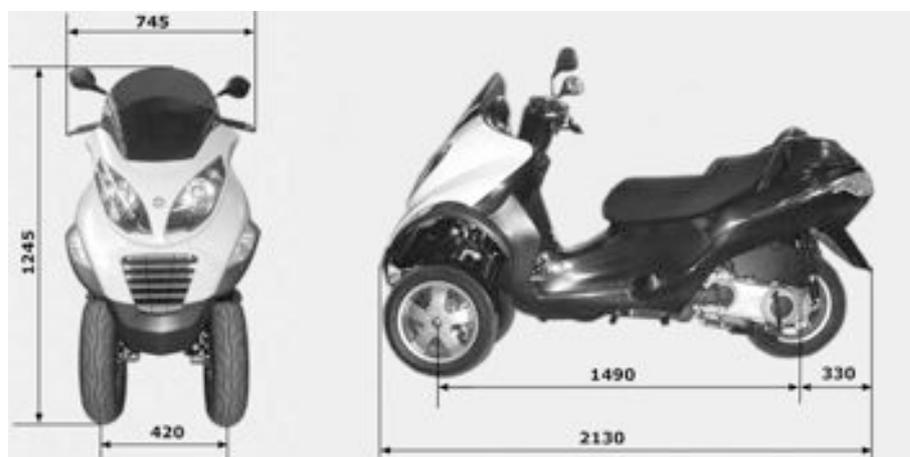
Engine prefix: **M472M**



Dimensions and mass

WEIGHTS AND DIMENSIONS

Specification	Desc./Quantity
Kerb weight	224 ± 5 Kg
Wheelbase	1490 mm
Height	1245 mm
Width (handlebar)	745 mm
Overall length	2130 mm
Track	420 mm



Engine

DATA

Specification	Desc./Quantity
Type	single-cylinder, four-stroke and four liquid-cooled valves
Timing system	single overhead camshaft chain driven on the left-hand side, three-arm rocking levers set up with threaded set screw
Bore	72 mm
Stroke	60 mm
Cubic capacity	249.29 mm
Compression ratio	10.5 ÷ 11.5
Air filter	sponge, impregnated with mixture (50% petrol and 50% oil)
Starting system	electric starter motor with freewheel
Lubrication	with lobe pump (inside the crankcase) chain-driven and double filter: mesh and paper
Fuel supply	by electronic injection with electric fuel pump
valve clearance	intake: 0.10 mm - discharge: 0.15 mm
Engine idle speed	approx. 1600 ÷ 1800 rpm
Max. speed	125 km/h

Transmission

TRANSMISSION

Specification	Desc./Quantity
Transmission	Automatic expandable pulley variator with torque server, V belt, automatic clutch, gear reduction unit and transmission housing with forced air circulation cooling

Capacities

CAPACITY

Specification	Desc./Quantity
Engine oil	approx. 1300 cc (recommended oil Selenia HI Scooter 4 Tech)
Rear hub	250 cc (recommended oil TUTELA MATRIX)
Fuel tank capacity	Tank capacity: ~12 l (approximate value)
Fuel reserve	approx. 2.5 litres (indicative value)

Specification	Desc./Quantity
Cooling circuit	Capacity: ~ 2.0 l

Electrical system

ELECTRICAL COMPONENTS

Specification	Desc./Quantity
Ignition/advance	Electronic, with inductive discharge and variable advance with three-dimensional mapping
Spark plug	CHAMPION RG 4 PHP
Battery	12V-12Ah
Generator	alternating current

Frame and suspensions

FRAME AND SUSPENSIONS

Specification	Desc./Quantity
Chassis	tubular and sheet steel.
Rear suspension	Single arm with two double-acting hydraulic shock absorbers and preloading adjustable to 4 positions.
Front suspension	The tilt mechanism is composed of an articulated parallelogram suspension with die-cast aluminium control arms and two side headstocks plus shock absorbers with hydraulic locking system.

Brakes

BRAKES

Specification	Desc./Quantity
Front brake	Ø 240 mm double disk with hydraulic control activated by the handlebar right-hand lever.
Rear brake	Ø 240 mm disc brake with hydraulic control activated by the handlebar left-side lever.

Wheels and tyres

WHEELS AND TYRES

Specification	Desc./Quantity
Front wheel	Alloy rims: 12" x 3.00"
Rear wheel	alloy rim: 12"x3,00

Specification	Desc./Quantity
Front tyre	120/70-12", without inner tube
Rear tyre	Without inner tube: 130/70-12" 62P

TYRE PRESSURE

Specification	Desc./Quantity
Front tyre pressure (rider)	Front tyre pressure (rider): 1.6 bar
Front tyre pressure (rider and passenger)	Front tyre pressure (rider and passenger): 1.8 bar
Rear tyre pressure (rider)	Rear tyre pressure (rider): 2 bar
Rear wheel pressure (rider and passenger):	Rear tyre pressure (rider and passenger): 2.4 bar

N.B.

CHECK AND ADJUST TYRE PRESSURE WITH TYRES AT AMBIENT TEMPERATURE. REGULATE PRESSURE ACCORDING TO THE WEIGHT OF THE RIDER AND ACCESSORIES

Tightening Torques

STEERING

Name	Torque in Nm
Steering lower ring nut (central headstock)	22 ÷ 27 loosen by 90°
Steering upper ring nut (central headstock)	27 ÷ 33
Handlebar fixing screw	50 ÷ 55
Fixing screws for handlebar control assembly U-bolts	7 ÷ 10

FRAME

Name	Torque in Nm
Engine arm bolt - frame arm	33 ÷ 41
Swinging arm buffer nut	64 - 72
Engine-swinging arm bolt	55 ÷ 61
Frame-swinging arm bolt	55 ÷ 61
Centre stand bolt	31 ÷ 39

FRONT SUSPENSION

Name	Torque in Nm
Shock absorber lower clamp	19 ÷ 26
Upper shock absorber clamp	19 ÷ 29
Front wheel fixing screws	19 ÷ 24
Steering arm bolt nut	20 ÷ 25
Tilt calliper fixing screws	20 ÷ 25

Name	Torque in Nm
Front wheel shaft	74 ÷ 88
Arm coupling screws	45 ÷ 50
Screws fixing arms to side headstocks	45 ÷ 50
Screws fixing arms to central headstock	45 ÷ 50
Screws fixing the half-arm coupling flange	20 ÷ 25
Fixing screws for tilt locking disc section	20 ÷ 25
Side headstock upper ring nut	20 - 24
Side headstock lower ring nut	12 ÷ 15
Screw fixing sliding stem to shock absorber	45 ÷ 50
Clamp for sliding stem locking device	6.5 ÷ 10.5
Fixing nuts for constant-velocity universal joints	18 ÷ 20
Potentiometer to anti-tilting device clamp	8 ÷ 10
Electric motor to anti-tilting device clamp	11 ÷ 13
Clamp fixing pump bolt to anti-tilting device	11 ÷ 13
Pump to anti-tilting device clamp	11 ÷ 13
Pressure switch to distribution frame	18 ÷ 20
Sensor to tilt gripper clamp	2.5 ÷ 2.9
Pipe terminals to fifth wheel check spring	7 ÷ 11
Joint to anti-tilting device pump	20 ÷ 25
Lower fitting for shock absorber sliding locking clamp pipes	20 ÷ 25
Upper fitting for shock absorber sliding locking clamp pipes	20 ÷ 25

REAR SUSPENSION

Name	Torque in Nm
Upper shock absorber clamp	33 ÷ 41
Shock absorber lower clamp	33 ÷ 41
Shock absorber-crankcase attachment bracket	20 ÷ 25
Rear wheel axle	104 ÷ 126
Muffler arm clamping screws	27 ÷ 30

FRONT BRAKE

Name	Torque in Nm
Oil bleed screw	8 ÷ 12
Disc tightening screw (°)	5 - 6

Name	Torque in Nm
Brake fluid pump - hose fitting	16 ÷ 20
Brake fluid hose-calliper fitting	20 ÷ 25
Screw tightening calliper to the support	20 ÷ 25
Calliper upper pipe fitting	20 ÷ 25

REAR BRAKE

Name	Torque in Nm
Rear brake disc screws(°)	5 ÷ 6.5
Rear brake calliper-pipe fitting	20 ÷ 25
Rigid / flexible pipe fitting	13 ÷ 18
Rear brake pump-pipe fitting	16 ÷ 20
Rear brake calliper fixing screws	20 ÷ 25

REAR BRAKE

Product	Description	Specifications
(°) Loctite 243	Medium strength threadlock	Apply LOCTITE 243 medium strength threadlock

MUFFLER

Name	Torque in Nm
Muffler heat guard fixing screw	4 ÷ 5
Screw for fixing muffler to the support arm	20 ÷ 25
Lambda probe clamp on exhaust manifold	40 ÷ 50
Exhaust manifold-muffler joint clamp	12 ÷ 13
Manifold - muffler diaphragm tightening clamp	16 ÷ 18

LUBRICATION

Name	Torque in Nm
Hub oil drainage plug	15 ÷ 17
Oil filter on crankcase fitting	27 ÷ 33
Engine oil drainage plug/mesh filter	24 ÷ 30
Oil filter	4 ÷ 6
Oil pump cover screws	7 ÷ 9
Screws fixing oil pump to the crankcase	5 - 6
Oil pump control crown screw	10 ÷ 14
Oil pump cover plate screws	4 ÷ 6
Oil sump screws	10 ÷ 14
Minimum oil pressure sensor	12 ÷ 14

CYLINDER HEAD

Name	Torque in Nm
Spark plug	12 ÷ 14
Head cover screws	6 ÷ 7
Nuts fixing head to cylinder	7±1 + 10±1 + 270°
Head fixing side screws	11 ÷ 12 Nm
Starter ground screw	7 ÷ 8.5
Tappet set screw lock nut	6 ÷ 8
Inlet manifold screws	11 ÷ 13
Timing chain tensioner slider screw	10 ÷ 14
Start-up counterweight support screw	11 ÷ 15
Timing chain tensioner support screw	11 ÷ 13
Timing chain tensioner central screw	5 - 6
Camshaft retention plate screw	4 ÷ 6

TRANSMISSION

Name	Torque in Nm
Belt support roller screw	11 ÷ 13
Clutch unit nut on driven pulley	45 ÷ 50
Drive pulley nut	75 ÷ 83
Transmission cover screws	11 ÷ 13
Driven pulley shaft nut	54 ÷ 60
Rear hub cap screws	24 ÷ 27

FLYWHEEL

Name	Torque in Nm
Flywheel cover screw	11 ÷ 13
Stator assembly screws	3 - 4 (Apply LOCTITE 242 medium-strength threadlock)
Flywheel nut	94 - 102 Nm
Pick-Up clamping screws	3 ÷ 4
Screw fixing freewheel to flywheel	13 - 15

CRANKCASE AND CRANKSHAFT

Name	Torque in Nm
Internal engine crankcase bulkhead (transmission-side half shaft) screws	4 ÷ 6
Engine-crankcase coupling screws	11 ÷ 13

Name	Torque in Nm
Starter screws	11 ÷ 13
Crankcase timing cover screws	3.5 - 4.5 (Apply LOCTITE 242 medium-strength threadlock)

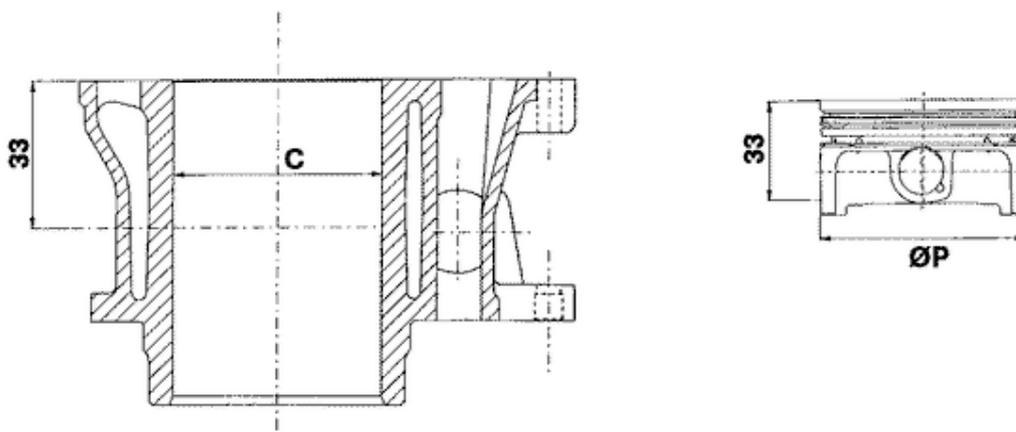
COOLING

Name	Torque in Nm
Water pump rotor cover	3 ÷ 4
Thermostat cover screws	3 ÷ 4
Bleed screw:	3

Overhaul data

Assembly clearances

Cylinder - piston assy.



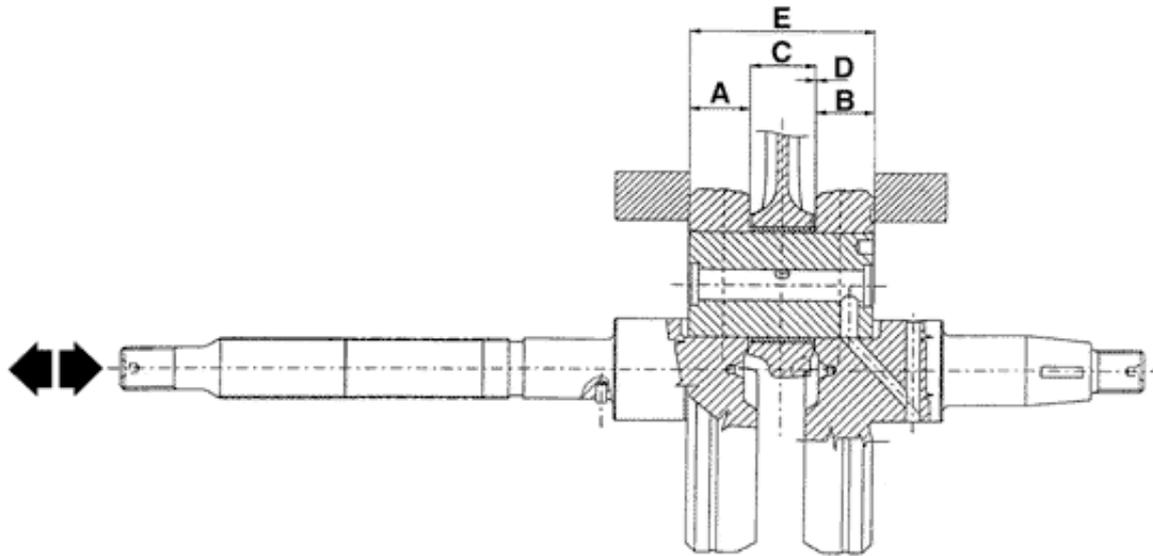
ENGINE COUPLING CATEGORY

Name	Play	Initials	Cylinder	Piston	Play on fitting
Cylinder		M	72.01 ÷ 72.017	71.953 ÷ 71.960	0.050 - 0.064
Cylinder		N	72.017 ÷ 72.024	71.960 ÷ 71.967	0.050 - 0.064
Piston		P	72.031 ÷ 72.038	71.974 ÷ 71.981	0.050 - 0.064
Piston		O	72.024 ÷ 72.031	71.967 ÷ 71.974	0.050 - 0.064

Crankcase - crankshaft - connecting rod

CRANKSHAFT

Crankshaft to crankcase axial clearance



CRANKSHAFT/ CRANKCASE AXIAL CLEARANCE

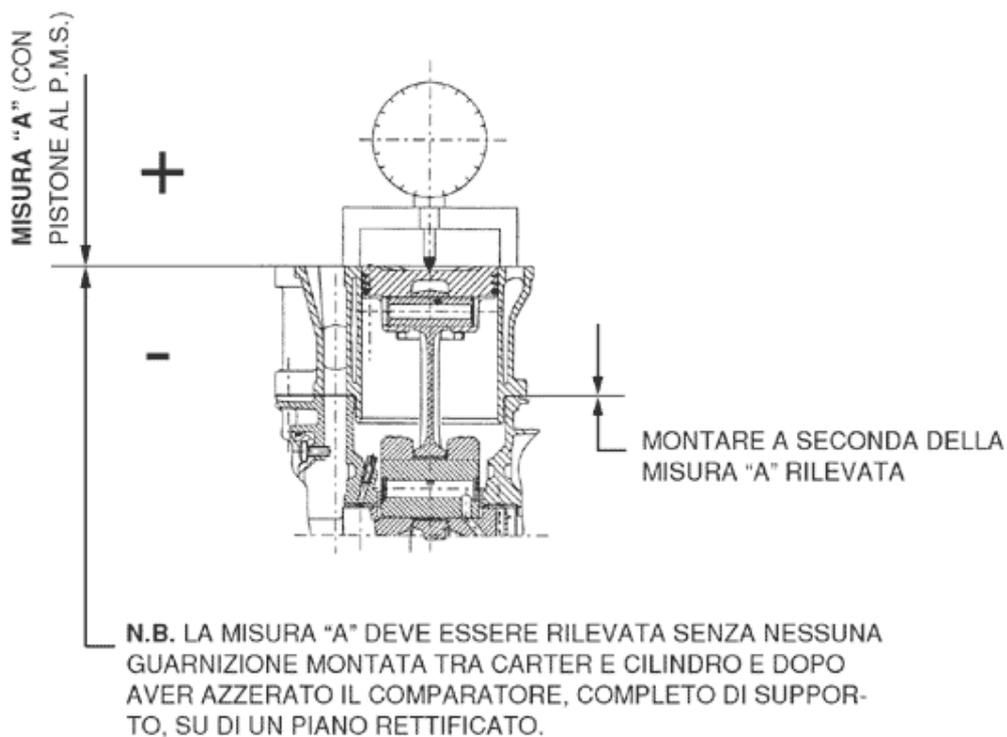
Name	Description	Dimensions	Initials	Quantity
Half-shaft, transmission side		16.6 +0-0.05	A	D = 0.20 - 0.50
Flywheel side half-shaft		16.6 +0-0.05	B	D = 0.20 - 0.50
Connecting rod		18 -0.10 -0.15	C	D = 0.20 - 0.50
Spacer tool		51.4 +0.05	E	D = 0.20 - 0.50

Slot packing system

Characteristic

Compression ratio

10.5 ÷ 11.5 : 1



Measurement "A" to be taken is a value of piston re-entry, it indicates by how much the plane formed by the piston crown falls below the plane formed by the top of the cylinder. The further the piston falls inside the cylinder, the less the base gasket to be applied (to recover the compression ratio) and vice versa.

N.B.

MEASUREMENT "A" MUST BE TAKEN WITHOUT ANY GASKET FITTED BETWEEN THE CRANKCASE AND CYLINDER AND AFTER RESETTING THE GAUGE, EQUIPPED WITH A SUPPORT, ON A GROUND PLANE

ENGINE 250 SHIMMING

Name	Measure A	Thickness
shimming	3.70 - 3.60	0.4 ± 0.05
shimming	3.60 - 3.40	0.6 ± 0.05
shimming	3.40 - 3.30	0.8 ± 0.05

Products

RECOMMENDED PRODUCTS TABLE

Product	Description	Specifications
AGIP GEAR 80W-90	Rear hub oil	SAE 80W-90, API GL-4 mineral multigrade oil
AGIP CITY HI TEC 4T	Oil to lubricate flexible transmissions (throttle control)	Oil for 4-stroke engines

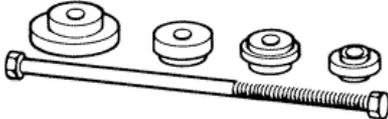
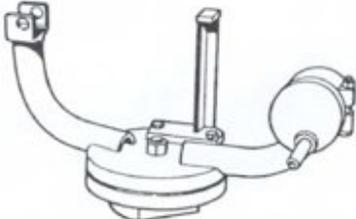
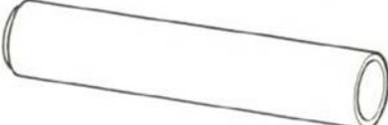
Product	Description	Specifications
AGIP FILTER OIL	Oil for air filter sponge	Mineral oil with specific additives for increased adhesiveness
AGIP GP 330	Grease for brake levers, throttle	White calcium complex soap-based spray grease with NLGI 2; ISO-L-XBCIB2
AGIP CITY HI TEC 4T	Engine oil	SAE 5W-40, API SL, ACEA A3, JASO MA Synthetic oil
AGIP BRAKE FLUID DOT4	Brake fluid	FMVSS DOT4 Synthetic fluid
AGIP PERMANENT SPEZIAL	coolant	Monoethylene glycol based anti-freeze fluid, CUNA NC 956-16.

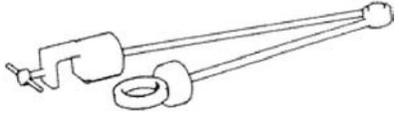
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TOOLING

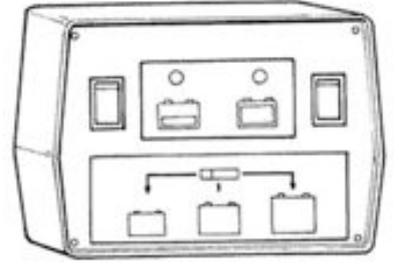
TOOL

APPROPRIATE TOOL

Stores code	Description	
001330Y	Tool for fitting steering seats	
001467Y014	Extraction pliers for \varnothing 15 mm bearings	
005095Y	Engine support	
002465Y	Pliers for circlips	
006029Y	Punch for fitting fifth wheel seat on steering tube	
020004Y	Punch for removing fifth wheels from the headstock	

Stores code	Description	
020055Y	Wrench for steering tube ring nut	
020074Y	Support base for checking crankshaft alignment	
020150Y	Air heater support	
020151Y	Air heater	
020193Y	Oil pressure gauge	
020262Y	Crankcase splitting strip	

Stores code	Description	
020263Y	Sheath for driven pulley fitting	
020306Y	Punch for assembling valve seal rings	
020329Y	Mity-Vac vacuum operated pump	
020330Y	Stroboscopic light for timing control	
020331Y	Digital multimeter	

Stores code	Description	
020332Y	Digital rev counter	
020333Y	Single battery charger	
020334Y	Multiple battery charger	
020335Y	Magnetic support for dial gauge	
020357Y	32 x 35 mm adaptor	

Stores code

Description

020359Y

42 x 47 mm adaptor



020360Y

52 x 55 mm adaptor

020363Y

20 mm guide



020375Y

28 x 30 mm adaptor

020376Y

Adaptor handle



020382Y

Valve cotters equipped with part 012 removal tool

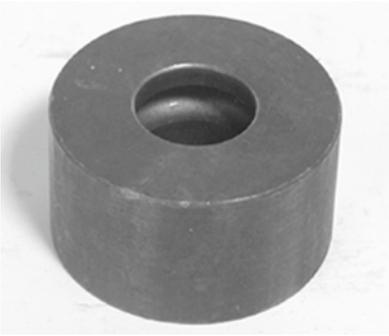


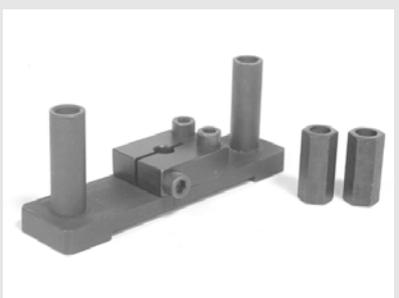
020382Y011

adapter for valve removal tool



Stores code	Description	
020393Y	Piston fitting band	 A dark metal band with a hook-like end, used for fitting pistons.
020412Y	15 mm guide	 A cylindrical metal guide with a central hole and a threaded top section.
020423Y	driven pulley lock wrench	 A circular metal wrench with two vertical pins, used for locking a driven pulley.
020424Y	Driven pulley roller casing fitting punch	 A cylindrical metal punch with a tapered end, used for fitting a roller casing.
020426Y	Piston fitting fork	 A metal fork with two long, parallel arms and a central opening, used for fitting pistons.

Stores code	Description	
020431Y	Valve oil seal extractor	 A long, cylindrical metal tool with a threaded end and a tapered tip, used for extracting valve oil seals.
020434Y	Oil pressure control fitting	 A long, cylindrical metal fitting with a threaded end and a tapered tip, used for oil pressure control.
020444Y	Tool for fitting/ removing the driven pulley clutch	 A complex metal tool consisting of a frame, a central rod, and several circular components, used for fitting or removing a driven pulley clutch.
020456Y	Ø 24 mm adaptor	
020477Y	37 mm adaptor	 A thick, cylindrical metal adaptor with a central hole, used for fitting or removing a driven pulley clutch.
020483Y	30 mm guide	 A small, cylindrical metal guide with a threaded top, used for fitting or removing a driven pulley clutch.

Stores code	Description	
020489Y	Hub cover support stud bolt set	
020428Y	Piston position check support	
020460Y	Scooter diagnosis and tester	
020621Y	H.V. cable extraction adapter	
020481Y	Control unit interface wiring	

Stores code	Description	
001467Y035	Bearing housing outside diameter 47 mm	
020626Y	Driving pulley lock wrench	
001467Y013	Extraction pliers for ø 15 mm bearings	
020627Y	Flywheel lock wrench	
020467Y	Flywheel extractor	