SERVICE STATION MANUAL

664787-664795 (IT-EN-FR-DE-ES-PT-NL-EL)

Vespa S 50 2T
Vespa S 50 2T

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PIAGGIO & C. S.p.A. - After-Sales
V.le Rinaldo Piaggio, 23 - 56025 PONTEDERA (Pi)
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 concerning 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](image) **Personal safety** Failure to completely observe these instructions will result in serious risk of personal injury.

![Safeguarding the environment](image) **Safeguarding the environment** Sections marked with this symbol indicate the correct use of the vehicle to prevent damaging the environment.

![Vehicle intactness](image) **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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<td>CHARACTERISTICS</td>
</tr>
</tbody>
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Rules

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

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 naked 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 refitting.
- After removal, clean the components using non-flammable or low flash-point solvents. Lubricate all the work surfaces, except tapered couplings, before refitting these parts.
- 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 sizes. Using unsuitable coupling members and tools may damage the scooter.
- When carrying out maintenance operations on the vehicle that involve the electrical system, make sure the electric connections have been made properly, particularly the ground and battery connections.
Vehicle identification

Chassis prefix: ZAPC38103

Engine prefix: C381M

Dimensions and mass
## WEIGHS AND DIMENSIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Desc./Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerb weight</td>
<td>96 ± 4 kg</td>
</tr>
<tr>
<td>Maximum weight allowed</td>
<td>290 kg</td>
</tr>
<tr>
<td>Maximum height</td>
<td>1,140 mm</td>
</tr>
<tr>
<td>Width</td>
<td>740 mm</td>
</tr>
<tr>
<td>Wheelbase</td>
<td>1,290 mm</td>
</tr>
<tr>
<td>Length</td>
<td>1,755 mm</td>
</tr>
</tbody>
</table>

## Engine

### ENGINE

<table>
<thead>
<tr>
<th>Specification</th>
<th>Desc./Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>single-cylinder, two-stroke</td>
</tr>
<tr>
<td>Cubic capacity</td>
<td>49 cm³</td>
</tr>
<tr>
<td>Bore x stroke</td>
<td>40 X 39.3 mm</td>
</tr>
<tr>
<td>Compression ratio</td>
<td>9.9 ± 0.5 : 1</td>
</tr>
<tr>
<td>Engine idle speed</td>
<td>1,800 ± 100 rpm</td>
</tr>
<tr>
<td>Timing system</td>
<td>-</td>
</tr>
<tr>
<td>Valve clearance</td>
<td>-</td>
</tr>
<tr>
<td>Max. Power</td>
<td>3.2 kW at 7,500 rpm</td>
</tr>
<tr>
<td>MAX. torque</td>
<td>4.4 Nm at 6,500 rpm</td>
</tr>
<tr>
<td>LUBRICATION</td>
<td>Engine lubrication carried out by fuel mixture oil.</td>
</tr>
<tr>
<td>Lubrication pressure</td>
<td>-</td>
</tr>
<tr>
<td>Minimum lubrication pressure</td>
<td>-</td>
</tr>
<tr>
<td>Fuel supply</td>
<td>Carburettor: DELL’ORTO PHVA 17.5 RD</td>
</tr>
<tr>
<td>Cooling</td>
<td>Forced-air circulation cooling.</td>
</tr>
<tr>
<td>Exhaust muffler</td>
<td>absorption-type exhaust muffler with catalytic converter.</td>
</tr>
<tr>
<td>Emissions</td>
<td>EURO 2</td>
</tr>
</tbody>
</table>

## Transmission

### TRANSMISSION

<table>
<thead>
<tr>
<th>Specification</th>
<th>Desc./Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission</td>
<td>Automatic expandable pulley variator with torque server, V belt, automatic centrifugal dry clutch.</td>
</tr>
<tr>
<td>Final reduction</td>
<td>Gear reduction unit in oil bath.</td>
</tr>
</tbody>
</table>

## Capacities

### CAPACITY

<table>
<thead>
<tr>
<th>Specification</th>
<th>Desc./Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling system fluid</td>
<td>-</td>
</tr>
<tr>
<td>Transmission oil</td>
<td>80 cm³</td>
</tr>
<tr>
<td>Fuel tank (reserve)</td>
<td>~ 8.5 l (2 l)</td>
</tr>
<tr>
<td>Mixer oil reservoir (reserve)</td>
<td>~ 1.5 l (0.5 l)</td>
</tr>
</tbody>
</table>

## Electrical system

### ELECTRICAL SYSTEM

<table>
<thead>
<tr>
<th>Specification</th>
<th>Desc./Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start-up</td>
<td>Electrical and kick start</td>
</tr>
</tbody>
</table>
## Ignition

<table>
<thead>
<tr>
<th>Specification</th>
<th>Desc./Quantity</th>
</tr>
</thead>
</table>
| Ignition              | Capacitive discharge ignition, with variable advance and sepa-
|                       | rate HV coil.                                               |
| Ignition advance      | 17° at 4,000 rpm                                             |
| Spark plug            | CHAMPION RN3C                                                |
| Alternative spark plug| -                                                            |
| Battery               | 12V/9 Ah                                                     |
| Generator             | -                                                            |

## Frame and suspensions

### FRAME AND SUSPENSIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Desc./Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame</td>
<td>Stamped plate body with welded structural reinforcements.</td>
</tr>
</tbody>
</table>
| FRONT SUSPENSION      | Single arm with helicoidal spring and single double-acting hy-
|                       | draulic shock absorber.                                     |
| Front suspension travel| 70.3 mm                                                    |
| Rear suspension       | Double-acting shock absorber, adjustable to four positions at
|                       | preloading.                                                 |
| Rear suspension travel| 83 mm                                                       |

## Brakes

### BRAKES

<table>
<thead>
<tr>
<th>Specification</th>
<th>Desc./Quantity</th>
</tr>
</thead>
</table>
| Front brake           | Ø 200 mm disc brake with hydraulic control activated by han-
|                       | dlebar right-side lever.                                    |
| Rear brake            | Ø 110 mm drum brake with mechanical control activated by the
|                       | handlebar left-side lever.                                  |

## Wheels and tyres

### WHEELS AND TYRES

<table>
<thead>
<tr>
<th>Specification</th>
<th>Desc./Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheel rim type</td>
<td>Light alloy rims.</td>
</tr>
<tr>
<td>Front rim</td>
<td>11&quot; x 2.50</td>
</tr>
<tr>
<td>Rear rim</td>
<td>10&quot; x 3.00</td>
</tr>
<tr>
<td>Front tyre</td>
<td>Tubeless, 110/70 - 11&quot; 45L</td>
</tr>
<tr>
<td>Rear tyre</td>
<td>Tubeless, 120/70 - 10&quot; 54L</td>
</tr>
<tr>
<td>Front tyre pressure</td>
<td>1.4 bar (+)</td>
</tr>
<tr>
<td>Rear tyre pressure</td>
<td>2.0 bar (+)</td>
</tr>
</tbody>
</table>

**N.B.**

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

Follow these steps to clean the sponge filters of the secondary air system:
1) Remove the snap-on plastic cover (1) on the transmission cover using a small screwdriver as a lever on the retaining tongues in order to insert one of the three slots found on that cap.
2) Wash the polyurethane sponge with water and soap, dry all components with compressed air and refit to place. Refit the intake cap respecting the angle reference.
3) Undo the two fixing screws (2) on the aluminium cover of the secondary air housing in order to reach the polyurethane sponge inside that housing; clean as indicated in point 2) and refit all elements after checking the steel tab is not deformed and/or does not guarantee correct tightness at its fitting; replace if necessary.

N.B.
UPON REFITTING, MAKE SURE TO CORRECTLY FIT THE TAB IN ITS FITTING ON THE TWO PLASTIC AND ALUMINIUM COVERS.

CAUTION
WHILE CARRYING OUT OPERATION 3), ALWAYS CHECK THE TWO RUBBER COUPLINGS (3) ON ONE END OF THE SECONDARY AIR PIPE FOR CORRECT TIGHTNESS AND CONTINUITY; IF NECESSARY, REPLACE THEM AND USE NEW CLAMPS TO FIX THEM.

Carburettor

50cc Version

Dell’Orto

<table>
<thead>
<tr>
<th>Specification</th>
<th>Dell'Orto Carburettor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>PHVA 17.5 RD</td>
</tr>
<tr>
<td>Diffuser diameter</td>
<td>Ø 17.5</td>
</tr>
<tr>
<td>Regulation reference number</td>
<td>8423</td>
</tr>
<tr>
<td>Maximum nozzle</td>
<td>53</td>
</tr>
<tr>
<td>Maximum air nozzle (on the body)</td>
<td>Ø 1.5</td>
</tr>
<tr>
<td>Tapered pin stamped code</td>
<td>A22</td>
</tr>
<tr>
<td>Pin position (notches from above)</td>
<td>1</td>
</tr>
<tr>
<td>Diffuser</td>
<td>209 HA</td>
</tr>
<tr>
<td>Specification</td>
<td>Desc./Quantity</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Minimum nozzle:</td>
<td>32</td>
</tr>
<tr>
<td>Minimum air nozzle (on the body):</td>
<td>Free</td>
</tr>
<tr>
<td>Initial minimum mix screw opening</td>
<td>1 1/2</td>
</tr>
<tr>
<td>Starter jet</td>
<td>50</td>
</tr>
<tr>
<td>Starter air nozzle (on the body):</td>
<td>Ø 1.5</td>
</tr>
<tr>
<td>Stroke of starter pin:</td>
<td>11 mm</td>
</tr>
<tr>
<td>Gasoline inlet hole</td>
<td>Ø 1.5</td>
</tr>
</tbody>
</table>

## Tightening Torques

### FRONT BRAKE

<table>
<thead>
<tr>
<th>Name</th>
<th>Torque in Nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brake fluid pump-hose fitting</td>
<td>8 ÷ 12</td>
</tr>
<tr>
<td>Brake fluid pipe-caliper fitting</td>
<td>20 ÷ 25</td>
</tr>
<tr>
<td>Screw tightening caliper to the support</td>
<td>20 ÷ 25</td>
</tr>
<tr>
<td>Brake disc screws</td>
<td>8 ÷ 10</td>
</tr>
<tr>
<td>Circuit bleed caliper fitting</td>
<td>20 ÷ 25</td>
</tr>
<tr>
<td>Handlebar pump</td>
<td>7 ÷ 10</td>
</tr>
</tbody>
</table>

### FRONT SUSPENSION

<table>
<thead>
<tr>
<th>Name</th>
<th>Torque in Nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper shock absorber fixing nut</td>
<td>20-30</td>
</tr>
<tr>
<td>Front wheel axle nut</td>
<td>75 ÷ 90</td>
</tr>
<tr>
<td>Shock absorber upper bracket bolts</td>
<td>20 ÷ 25</td>
</tr>
<tr>
<td>Wheel rim screws</td>
<td>20 ÷ 25</td>
</tr>
<tr>
<td>Lower shock absorber clamping screw</td>
<td>20 - 27</td>
</tr>
</tbody>
</table>

### STEERING ASSEMBLY

<table>
<thead>
<tr>
<th>Name</th>
<th>Torque in Nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steering upper ring nut</td>
<td>35 ÷ 40</td>
</tr>
<tr>
<td>Steering lower ring nut</td>
<td>8 ÷ 10</td>
</tr>
<tr>
<td>Handlebar fixing screw</td>
<td>50 ÷ 55</td>
</tr>
</tbody>
</table>

### ENGINE ASSEMBLY

<table>
<thead>
<tr>
<th>Name</th>
<th>Torque in Nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clutch bell nut (**</td>
<td>40 ÷ 44</td>
</tr>
<tr>
<td>Clutch lock ring nut</td>
<td>55 ÷ 60</td>
</tr>
<tr>
<td>Nut locking driving pulley on crankshaft (**</td>
<td>40 ÷ 44 Nm</td>
</tr>
<tr>
<td>Start-up lever screw</td>
<td>12 ÷ 13</td>
</tr>
<tr>
<td>Flywheel nut (**</td>
<td>40 ÷ 44</td>
</tr>
<tr>
<td>Flywheel fan screws</td>
<td>3 ÷ 4</td>
</tr>
<tr>
<td>Half-crank case joint bolts</td>
<td>12 ÷ 13</td>
</tr>
<tr>
<td>Bolts holding exhaust pipe to the crankcase</td>
<td>22 ÷ 24</td>
</tr>
<tr>
<td>Screws holding the filter box to the crank case</td>
<td>4 ÷ 5</td>
</tr>
<tr>
<td>Head nuts</td>
<td>10 ÷ 11</td>
</tr>
<tr>
<td>Starter screws</td>
<td>12 ÷ 13</td>
</tr>
<tr>
<td>Ignition spark plug</td>
<td>25 ÷ 30</td>
</tr>
<tr>
<td>Hub oil drainage cap</td>
<td>3 ÷ 5</td>
</tr>
<tr>
<td>Oil hub level dipstick</td>
<td>Manual</td>
</tr>
<tr>
<td>Rear hub cap screws</td>
<td>12 ÷ 13</td>
</tr>
<tr>
<td>Transmission cover screws</td>
<td>12 ÷ 13</td>
</tr>
<tr>
<td>Inlet manifold screws</td>
<td>8 ÷ 9</td>
</tr>
<tr>
<td>Flywheel hood fixing screws</td>
<td>1 ÷ 2</td>
</tr>
<tr>
<td>Cylinder hood fixing screws</td>
<td>3.5 ÷ 5</td>
</tr>
<tr>
<td>Stator clamping screws</td>
<td>3 ÷ 4</td>
</tr>
<tr>
<td>Pick-Up clamping screw</td>
<td>4 ÷ 5</td>
</tr>
<tr>
<td>Mixer clamping screws</td>
<td>3 ÷ 4</td>
</tr>
<tr>
<td>Screw fixing brake lever to the journal on the engine</td>
<td>12 ÷ 13</td>
</tr>
</tbody>
</table>
FRAME ASSEMBLY

<table>
<thead>
<tr>
<th>Name</th>
<th>Torque in Nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swinging arm to engine pin locknut</td>
<td>33 - 41</td>
</tr>
<tr>
<td>Swinging arm to chassis pin locknut</td>
<td>44 - 52</td>
</tr>
<tr>
<td>Shock absorber to chassis fixing nut</td>
<td>20 - 25</td>
</tr>
<tr>
<td>Swinging arm plate to chassis screw</td>
<td>33 - 41</td>
</tr>
<tr>
<td>Shock absorber to engine fixing nut</td>
<td>33 - 41</td>
</tr>
<tr>
<td>Rear wheel nut</td>
<td>137 + 152</td>
</tr>
<tr>
<td>Stand screw torque</td>
<td>18.5 to 19 Nm</td>
</tr>
<tr>
<td>Side stand fixing screw</td>
<td>12 - 20</td>
</tr>
<tr>
<td>Side stand bracket fixing screw</td>
<td>15 - 20</td>
</tr>
</tbody>
</table>

Overhaul data

Assembly clearances

Cylinder - piston assy.

COUPLING BETWEEN PISTON AND CYLINDER

<table>
<thead>
<tr>
<th>Name</th>
<th>Initials</th>
<th>Cylinder</th>
<th>Piston</th>
<th>Play on fitting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard coupling</td>
<td>M</td>
<td>40.005 - 40.012</td>
<td>39.943 - 39.95</td>
<td>0.055 - 0.069</td>
</tr>
<tr>
<td>Standard coupling</td>
<td>N</td>
<td>40.012 - 40.019</td>
<td>39.95 - 39.957</td>
<td>0.055 - 0.069</td>
</tr>
<tr>
<td>Standard coupling</td>
<td>O</td>
<td>40.019 - 40.026</td>
<td>39.957 - 39.964</td>
<td>0.055 - 0.069</td>
</tr>
<tr>
<td>Standard coupling</td>
<td>P</td>
<td>40.026 - 40.033</td>
<td>39.964 - 39.971</td>
<td>0.055 - 0.069</td>
</tr>
<tr>
<td>coupling 1st oversize</td>
<td>M1</td>
<td>40.205 - 40.212</td>
<td>40.143 - 40.15</td>
<td>0.055 - 0.069</td>
</tr>
<tr>
<td>coupling 1st oversize</td>
<td>N1</td>
<td>40.212 - 40.219</td>
<td>40.15 - 40.157</td>
<td>0.055 - 0.069</td>
</tr>
<tr>
<td>coupling 1st oversize</td>
<td>O1</td>
<td>40.219 - 40.226</td>
<td>40.157 - 40.164</td>
<td>0.055 - 0.069</td>
</tr>
<tr>
<td>coupling 1st oversize</td>
<td>P1</td>
<td>40.226 - 40.233</td>
<td>40.164 - 40.171</td>
<td>0.055 - 0.069</td>
</tr>
<tr>
<td>Coupling 2nd oversize</td>
<td>M2</td>
<td>40.405 - 40.412</td>
<td>40.343 - 40.35</td>
<td>0.055 - 0.069</td>
</tr>
<tr>
<td>Coupling 2nd oversize</td>
<td>N2</td>
<td>40.412 - 40.419</td>
<td>40.35 - 40.357</td>
<td>0.055 - 0.069</td>
</tr>
<tr>
<td>Coupling 2nd oversize</td>
<td>O2</td>
<td>40.419 - 40.426</td>
<td>40.367 - 40.364</td>
<td>0.055 - 0.069</td>
</tr>
<tr>
<td>Coupling 2nd oversize</td>
<td>P2</td>
<td>40.426 - 40.433</td>
<td>40.364 - 40.371</td>
<td>0.055 - 0.069</td>
</tr>
</tbody>
</table>

Piston rings

SEALING RING

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Dimensions</th>
<th>Initials</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compression ring</td>
<td>Description</td>
<td>40</td>
<td>A</td>
<td>0.10 to 0.25</td>
</tr>
<tr>
<td>Compression ring 1st oversize</td>
<td>Description</td>
<td>40.2</td>
<td>A</td>
<td>0.10 to 0.25</td>
</tr>
<tr>
<td>Compression ring 2nd Oversize</td>
<td>Description</td>
<td>40.4</td>
<td>A</td>
<td>0.10 to 0.25</td>
</tr>
</tbody>
</table>
## Slot packing system

This type of engines foresees the use of one size of basic gaskets.
## Products

### RECOMMENDED PRODUCTS TABLE

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGIP ROTRA 80W-90</td>
<td>Rear hub oil</td>
<td>SAE 80W/90 Oil that exceeds the requirements of API GL3 specifications</td>
</tr>
<tr>
<td>AGIP CITY HI TEC 4T</td>
<td>Oil to lubricate flexible transmissions (brake, throttle control and mixer, odometer)</td>
<td>Oil for 2-stroke engines: SAE 5W-40, API SL, ACEA A3, JASO MA</td>
</tr>
<tr>
<td>AGIP FILTER OIL</td>
<td>Oil for air filter sponge</td>
<td>Mineral oil with specific additives for increased adhesiveness</td>
</tr>
<tr>
<td>AGIP CITY TEC 2T</td>
<td>Mixer oil</td>
<td>Synthetic oil for 2-stroke engines: JASO FC, ISO-L-EGD</td>
</tr>
<tr>
<td>AGIP BRAKE 4</td>
<td>Brake fluid</td>
<td>FMVSS DOT 4 Synthetic fluid</td>
</tr>
<tr>
<td>MONTBLANC MOLYBDENUM</td>
<td>Grease for driven pulley shaft adjusting ring and movable driven pulley housing</td>
<td>Grease with molybdenum disulphide</td>
</tr>
<tr>
<td>AGIP GREASE PV2</td>
<td>Grease for the steering bearings, pin seats and swinging arm</td>
<td>White anhydrous-calcium based grease to protect roller bearings; temperature range between -20 C and +120 C; NLGI 2; ISO-L-XBCIB2.</td>
</tr>
<tr>
<td>AGIP GREASE SM 2</td>
<td>Grease for odometer transmission gear case</td>
<td>Lithium grease with NLGI 2 molybdenum disulphide; ISO-L-XBCHB2, DIN KP2K-20</td>
</tr>
<tr>
<td>AGIP GP 330</td>
<td>Grease for brake control levers, throttle, stand</td>
<td>White calcium complex soap-based spray grease with NLGI 2; ISO-L-XBCIB2</td>
</tr>
</tbody>
</table>

### UNIT OF MEASUREMENT - CONVERSION - ENGLISH SYSTEM AND INTERNATIONAL SYSTEM (IS).

<table>
<thead>
<tr>
<th>Specification</th>
<th>Desc./Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Inch (in)</td>
<td>25.4 Millimetres (mm)</td>
</tr>
<tr>
<td>1 Foot (ft)</td>
<td>0.305 Meter (m)</td>
</tr>
<tr>
<td>1 Mile (mi)</td>
<td>1.609 Kilometre (km)</td>
</tr>
<tr>
<td>1 US Gallon (US gal)</td>
<td>3.785 Litre (l)</td>
</tr>
<tr>
<td>1 Pound (lb)</td>
<td>0.454 Kilogram (Kg)</td>
</tr>
<tr>
<td>1 Cubic inch (in³)</td>
<td>16.4 Cubic centimetres (cm³)</td>
</tr>
<tr>
<td>1 Foot pound (ft lb)</td>
<td>1.396 Newton meter (Nm)</td>
</tr>
<tr>
<td>1 Miles per hour (mi/h)</td>
<td>1,602 Kilometres per hour (km/h)</td>
</tr>
<tr>
<td>1 Pound per square inch (PSI)</td>
<td>0.069 (bar)</td>
</tr>
<tr>
<td>1 Fahrenheit (°F)</td>
<td>32+((9/5) Celsius (°C))</td>
</tr>
</tbody>
</table>
INDEX OF TOPICS

TOOLING

TOOL
<table>
<thead>
<tr>
<th>Stores code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>001330Y</td>
<td>Tool for fitting steering seats</td>
</tr>
<tr>
<td>001467Y006</td>
<td>Pliers to extract 20 mm bearings</td>
</tr>
<tr>
<td>001467Y009</td>
<td>Driver for OD 42-mm bearings</td>
</tr>
<tr>
<td>001467Y013</td>
<td>Pliers to extract ø 15-mm bearings</td>
</tr>
<tr>
<td>001467Y014</td>
<td>Pliers to extract ø 15-mm bearings</td>
</tr>
<tr>
<td>001467Y017</td>
<td>Bell for bearings, OD 39 mm</td>
</tr>
<tr>
<td>002465Y</td>
<td>Pliers for circlips</td>
</tr>
<tr>
<td>Stores code</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>006029Y</td>
<td>Punch for fitting fifth wheel seat on steering tube</td>
</tr>
<tr>
<td>020004Y</td>
<td>Punch for removing fifth wheels from headstock</td>
</tr>
<tr>
<td>020055Y</td>
<td>Wrench for steering tube ring nut</td>
</tr>
<tr>
<td>020150Y</td>
<td>Air heater support</td>
</tr>
<tr>
<td>020151Y</td>
<td>Air heater</td>
</tr>
<tr>
<td>020162Y</td>
<td>Flywheel extractor</td>
</tr>
<tr>
<td>020163Y</td>
<td>Crankcase splitting plate</td>
</tr>
<tr>
<td>Stores code</td>
<td>Description</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>020166Y</td>
<td>Pin lock fitting tool</td>
</tr>
<tr>
<td>020261Y</td>
<td>Starter spring fitting</td>
</tr>
<tr>
<td>020265Y</td>
<td>Bearing fitting base</td>
</tr>
<tr>
<td>020325Y</td>
<td>Brake-shoe spring calliper</td>
</tr>
<tr>
<td>020329Y</td>
<td>MityVac vacuum-operated pump</td>
</tr>
<tr>
<td>020330Y</td>
<td>Stroboscopic light to check timing</td>
</tr>
<tr>
<td>Stores code</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>020331Y</td>
<td>Digital multimeter</td>
</tr>
<tr>
<td>020332Y</td>
<td>Digital rev counter</td>
</tr>
<tr>
<td>020333Y</td>
<td>Single battery charger</td>
</tr>
<tr>
<td>020334Y</td>
<td>Multiple battery charger</td>
</tr>
<tr>
<td>Stores code</td>
<td>Description</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>020335Y</td>
<td>Magnetic support for dial gauge</td>
</tr>
<tr>
<td>020350Y</td>
<td>Electrical system check instrument</td>
</tr>
<tr>
<td>020359Y</td>
<td>42x47-mm adaptor</td>
</tr>
<tr>
<td>020376Y</td>
<td>Adaptor handle</td>
</tr>
<tr>
<td>020412Y</td>
<td>15 mm guide</td>
</tr>
<tr>
<td>Stores code</td>
<td>Description</td>
</tr>
<tr>
<td>-------------</td>
<td>---------------------------------------</td>
</tr>
<tr>
<td>020456Y</td>
<td>Ø 24 mm adaptor</td>
</tr>
<tr>
<td>020565Y</td>
<td>Flywheel lock calliper spanner</td>
</tr>
<tr>
<td>001467Y029</td>
<td>Bell for bearings, O.D. 38 mm</td>
</tr>
<tr>
<td>020037Y</td>
<td>Punch</td>
</tr>
<tr>
<td>020036Y</td>
<td>Punch</td>
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</tbody>
</table>
### Stores code

<table>
<thead>
<tr>
<th>Stores code</th>
<th>Description</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>020021Y</td>
<td>Front suspension service tool</td>
<td><img src="image1.png" alt="Front suspension service tool" /></td>
</tr>
<tr>
<td>020038Y</td>
<td>Punch</td>
<td><img src="image2.png" alt="Punch" /></td>
</tr>
<tr>
<td>020074Y</td>
<td>Support base for checking crankshaft alignment</td>
<td><img src="image3.png" alt="Support base for checking crankshaft alignment" /></td>
</tr>
<tr>
<td>004499Y001</td>
<td>Bearing extractor bell</td>
<td><img src="image4.png" alt="Bearing extractor bell" /></td>
</tr>
<tr>
<td>004499Y006</td>
<td>Bearing extractor ring</td>
<td><img src="image5.png" alt="Bearing extractor ring" /></td>
</tr>
<tr>
<td>Stores code</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>--------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>004499Y002</td>
<td>Bearing extractor screw</td>
<td></td>
</tr>
<tr>
<td>004499Y007</td>
<td>Half rings</td>
<td></td>
</tr>
<tr>
<td>020171Y</td>
<td>Punch for driven pulley roller bearing</td>
<td></td>
</tr>
<tr>
<td>020340Y</td>
<td>Flywheel and transmission oil seals fitting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>punch</td>
<td></td>
</tr>
<tr>
<td>020360Y</td>
<td>Adaptor 52 x 55 mm</td>
<td></td>
</tr>
<tr>
<td>020358Y</td>
<td>37x40-mm adaptor</td>
<td></td>
</tr>
<tr>
<td>020362Y</td>
<td>12 mm guide</td>
<td></td>
</tr>
</tbody>
</table>
### Vespa S 50 2T Tooling

<table>
<thead>
<tr>
<th>Stores code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>020363Y</td>
<td>20 mm guide</td>
</tr>
<tr>
<td>020365Y</td>
<td>22 mm guide</td>
</tr>
<tr>
<td>020439Y</td>
<td>17 mm guide</td>
</tr>
<tr>
<td>020441Y</td>
<td>26 x 28 mm adaptor</td>
</tr>
<tr>
<td>020452Y</td>
<td>Tube for removing and refitting the driven pulley shaft</td>
</tr>
<tr>
<td>Stores code</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>020451Y</td>
<td>Starting ring gear lock</td>
</tr>
<tr>
<td>020444Y</td>
<td>Tool for fitting/ removing the driven pulley clutch</td>
</tr>
<tr>
<td>MAINTENANCE</td>
<td>MAIN</td>
</tr>
</tbody>
</table>
# Maintenance chart

## EVERY 2 YEARS

<table>
<thead>
<tr>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brake fluid - change</td>
</tr>
</tbody>
</table>

## AFTER 1,000 KM

<table>
<thead>
<tr>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hub oil - change</td>
</tr>
<tr>
<td>Oil mixer/throttle linkage - adjustment</td>
</tr>
<tr>
<td>Odometer gear - greasing</td>
</tr>
<tr>
<td>Steering - Check</td>
</tr>
<tr>
<td>Brake control levers - greasing</td>
</tr>
<tr>
<td>Brake fluid level - check</td>
</tr>
<tr>
<td>Safety locks - check</td>
</tr>
<tr>
<td>Electrical system and battery - check</td>
</tr>
<tr>
<td>Tyre pressure and wear - check</td>
</tr>
<tr>
<td>Vehicle and brake test - road test</td>
</tr>
</tbody>
</table>

## AFTER 5,000 KM; 25,000 KM; 35,000 KM AND 55,000 KM

<table>
<thead>
<tr>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hub oil - check</td>
</tr>
<tr>
<td>Spark plug/electrode gap - replacement</td>
</tr>
<tr>
<td>Air filter - clean</td>
</tr>
<tr>
<td>Oil mixer/throttle linkage - adjustment</td>
</tr>
<tr>
<td>Brake control levers - greasing</td>
</tr>
<tr>
<td>Brake pads - check condition and wear</td>
</tr>
<tr>
<td>Brake fluid - check</td>
</tr>
<tr>
<td>Electrical system and battery - check</td>
</tr>
<tr>
<td>Tyre pressure and wear - check</td>
</tr>
<tr>
<td>Vehicle and brake test - road test</td>
</tr>
</tbody>
</table>

## AFTER 10,000 KM; 50,000 KM

<table>
<thead>
<tr>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hub oil - change</td>
</tr>
<tr>
<td>Spark plug - replacement</td>
</tr>
<tr>
<td>Air filter - clean</td>
</tr>
<tr>
<td>Idling speed (*) - adjustment</td>
</tr>
<tr>
<td>Oil mixer/throttle linkage - adjustment</td>
</tr>
<tr>
<td>Variable speed rollers - replacement</td>
</tr>
<tr>
<td>Odometer gear - greasing</td>
</tr>
<tr>
<td>Driving belt - checking</td>
</tr>
<tr>
<td>Steering - Check</td>
</tr>
<tr>
<td>Brake control levers - greasing</td>
</tr>
<tr>
<td>Brake pads - check condition and wear</td>
</tr>
<tr>
<td>Brake fluid - check</td>
</tr>
<tr>
<td>Transmission elements - lubrication</td>
</tr>
<tr>
<td>Safety locks - check</td>
</tr>
<tr>
<td>Suspensions - check</td>
</tr>
<tr>
<td>Electrical system and battery - check</td>
</tr>
<tr>
<td>Headlight - adjustment</td>
</tr>
<tr>
<td>Tyre pressure and wear - check</td>
</tr>
<tr>
<td>Vehicle and brake test - road test</td>
</tr>
</tbody>
</table>

(*) See the «Idle speed adjustment» section
### AFTER 15,000 KM AND 45,000 KM

<table>
<thead>
<tr>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hub oil - check</td>
</tr>
<tr>
<td>Spark plug - replacement</td>
</tr>
<tr>
<td>Air filter - cleaning</td>
</tr>
<tr>
<td>Oil mixer/throttle linkage - adjustment</td>
</tr>
<tr>
<td>Driving belt - replacement</td>
</tr>
<tr>
<td>Brake control levers - greasing</td>
</tr>
<tr>
<td>Brake pads - check condition and wear</td>
</tr>
<tr>
<td>Brake fluid - check</td>
</tr>
<tr>
<td>Electrical system and battery - check</td>
</tr>
<tr>
<td>Tyre pressure and wear - check</td>
</tr>
<tr>
<td>Secondary air filter - cleaning</td>
</tr>
<tr>
<td>Vehicle and brake test - road test</td>
</tr>
</tbody>
</table>

### AFTER 20,000 KM AND 40,000 KM

<table>
<thead>
<tr>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hub oil - change</td>
</tr>
<tr>
<td>Spark plug - replacement</td>
</tr>
<tr>
<td>Air filter - clean</td>
</tr>
<tr>
<td>Idling speed (*) - adjustment</td>
</tr>
<tr>
<td>Cylinder cooling system - check/cleaning</td>
</tr>
<tr>
<td>Oil mixer/throttle linkage - adjustment</td>
</tr>
<tr>
<td>Driving belt - checking</td>
</tr>
<tr>
<td>Variable speed rollers - replacement</td>
</tr>
<tr>
<td>Mixer belt - replacement</td>
</tr>
<tr>
<td>Odometer gear - greasing</td>
</tr>
<tr>
<td>Steering - Check</td>
</tr>
<tr>
<td>Brake control levers - greasing</td>
</tr>
<tr>
<td>Brake pads - check condition and wear</td>
</tr>
<tr>
<td>Brake fluid - check</td>
</tr>
<tr>
<td>Transmission elements - lubrication</td>
</tr>
<tr>
<td>Safety locks - check</td>
</tr>
<tr>
<td>Suspensions - check</td>
</tr>
<tr>
<td>Electrical system and battery - check</td>
</tr>
<tr>
<td>Headlight - adjustment</td>
</tr>
<tr>
<td>Tyre pressure and wear - check</td>
</tr>
<tr>
<td>Vehicle and brake test - road test</td>
</tr>
</tbody>
</table>

(*) See the «Idle speed adjustment» section

### AFTER 30,000 KM

<table>
<thead>
<tr>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hub oil - change</td>
</tr>
<tr>
<td>Spark plug - replacement</td>
</tr>
<tr>
<td>Air filter - clean</td>
</tr>
<tr>
<td>Idling speed (*) - adjustment</td>
</tr>
<tr>
<td>Oil mixer/throttle linkage - adjustment</td>
</tr>
<tr>
<td>Driving belt - replacement</td>
</tr>
<tr>
<td>Variable speed rollers - replacement</td>
</tr>
<tr>
<td>Odometer gear - greasing</td>
</tr>
<tr>
<td>Steering - Check</td>
</tr>
<tr>
<td>Brake control levers - greasing</td>
</tr>
<tr>
<td>Brake pads - check condition and wear</td>
</tr>
<tr>
<td>Brake fluid level - check</td>
</tr>
<tr>
<td>Transmission elements - lubrication</td>
</tr>
<tr>
<td>Safety locks - check</td>
</tr>
<tr>
<td>Electrical system and battery - check</td>
</tr>
<tr>
<td>Headlight - adjustment</td>
</tr>
<tr>
<td>Tyre pressure and wear - check</td>
</tr>
<tr>
<td>Secondary air filter - cleaning</td>
</tr>
<tr>
<td>Vehicle and brake test - road test</td>
</tr>
</tbody>
</table>

(*) See the «Idle speed adjustment» section
**AFTER 60,000 KM**

<table>
<thead>
<tr>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hub oil - change</td>
</tr>
<tr>
<td>Spark plug - replacement</td>
</tr>
<tr>
<td>Air filter - clean</td>
</tr>
<tr>
<td>Idling speed (*) - adjustment</td>
</tr>
<tr>
<td>Cylinder cooling system - check/cleaning</td>
</tr>
<tr>
<td>Oil mixer/throttle linkage - adjustment</td>
</tr>
<tr>
<td>Driving belt - replacement</td>
</tr>
<tr>
<td>Variable speed rollers - replacement</td>
</tr>
<tr>
<td>Mixer belt - replacement</td>
</tr>
<tr>
<td>Odometer gear - greasing</td>
</tr>
<tr>
<td>Steering - Check</td>
</tr>
<tr>
<td>Brake control levers - greasing</td>
</tr>
<tr>
<td>Brake pads - check condition and wear</td>
</tr>
<tr>
<td>Brake fluid - check</td>
</tr>
<tr>
<td>Transmission elements - lubrication</td>
</tr>
<tr>
<td>Safety locks - check</td>
</tr>
<tr>
<td>Suspensions - check</td>
</tr>
<tr>
<td>Electrical system and battery - check</td>
</tr>
<tr>
<td>Headlight - adjustment</td>
</tr>
<tr>
<td>Tyre pressure and wear - check</td>
</tr>
<tr>
<td>Secondary air filter - cleaning</td>
</tr>
<tr>
<td>Vehicle and brake test - road test</td>
</tr>
</tbody>
</table>

(*) See the «Idle speed adjustment» section

---

**Carburettor**

- Disassemble the carburettor in its parts, wash all of them with solvent, dry all body grooves with compressed air to ensure adequate cleaning.
- Check carefully that the parts are in good condition.
- The throttle valve should move freely in the chamber. Replace valve in case of wear due to excessive clearance.
- If there are wear marks in the chamber causing inadequate tightness or a free valve slide (even if it is new), replace the carburettor.
- It is advisable to replace the gaskets at every refit.

**WARNING**

PETROL IS HIGHLY EXPLOSIVE ALWAYS REPLACE THE GASKETS TO AVOID PETROL LEAKS

Checking the spark advance

- Check to be made at over 4000 rpm with stroboscopic gun. The advanced ignition measured must be 17° before the TDC.
- This value is correct when the reference mark on the flywheel hood is aligned with the reference mark on the cooling fan and the phase shifter on the stroboscopic gun is set on 17°.

N.B.
IN CASE OF MALFUNCTION, CARRY OUT THE CHECKS PROVIDED FOR IN THE ELECTRICAL SYSTEM CHAPTER.

CAUTION
BEFORE CARRYING OUT THE ABOVE CHECKS, CHECK THE CORRECT KEYING OF THE FLYWHEEL ON THE CRANKSHAFT.

Specific tooling
020330Y Stroboscopic light to check timing

Spark plug

Place the vehicle on its central stand
- Remove the central cover, indicated in the figure, by undoing the 2 fixing screws;
- Disconnect the spark plug HV wire cap;
- Undo the spark plug using the socket wrench;
- Examine the condition of the spark plug, check that the insulating material is whole and measure the distance between the electrodes using a thickness gauge.
- Adjust the distance if necessary by bending the side electrode very carefully.
In the case of defects, replace the spark plug with one of the specified type;
- Engage the spark plug with the due inclination and screw it right down by hand, then do it up with the wrench at the prescribed torque;
- Fit the cap on the sparking plug as far as it will go;
- Refit the central flap.
CAUTION
THE SPARK PLUG MUST BE REMOVED WHEN THE ENGINE IS COLD. REPLACE THE SPARK PLUG AS INDICATED IN THE SCHEDULED MAINTENANCE TABLE. USING NON-COMPLYING IGNITION CONTROL UNITS OR SPARK PLUGS OTHER THAN THOSE PRESCRIBED MAY SERIOUSLY DAMAGE THE ENGINE.

Characteristic
Spark plug
CHAMPION RN3C

Electric characteristic
Electrode gap
0.6 to 0.7 mm.

Locking torques (N*m)
Spark plug 25 - 30 Nm

Hub oil

Check

Do the following to check the correct level:
- Park the vehicle on its centre stand on flat ground;
- Unscrew the oil dipstick «A» and dry it with a clean cloth; then reinsert it, screwing it in all the way;
- Remove the dipstick and check that the oil level is slightly over the second notch starting from the lower end;
- Screw up the oil dipstick back in and make sure it is locked properly in place.
Replacement

- Remove the oil filler cap «A».
- Unscrew the oil drainage cap «B» and drain out all the oil.
- Screw the drainage plug again to the prescribed torque and refill the hub with the recommended oil.

Recommended products
AGIP ROTRA 80W-90 Rear hub oil
SAE 80W/90 Oil that exceeds the requirements of API GL3 specifications

Characteristic
Transmission oil
80 cm³

Locking torques (N*m)
Hub oil drainage cap 3 ÷ 5

Air filter

- Remove the cap of the purifier, unscrewing the six clamping screws and removing the filter.

Cleaning:
- Wash with water and neutral soap.
- Dry with a clean cloth and short blasts of compressed air.
- Saturate with a 50% mixture of gasoline and oil.
- Drip dry the filter and then squeeze it between the hands without wringing.
- Let it dry and refit it again.

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

Recommended products
AGIP FILTER OIL Oil for air filter sponge
Mineral oil with specific additives for increased adhesiveness
transmissions

- Adjust the control cables:
  Mix cable: see procedure indicated in "Mixer timing".
  Throttle cable: adjust the set screw on the carburettor in such a way that the sheath has no backlash.
  Splitter control cable: adjust set screw on the throttle control to the handlebar in such a way that there is no backlash on the throttle control.

Adjust all transmissions in such a way that their sheathing show no sign of backlash.

Mixer Timing

- Using the transmission set screw on the crankcase, with throttle control untwisted, adjust the reference mark on the rotating plate so that it is lined up with the reference mark on the mixer body, as shown in the figure.

While doing this, the engine must be fuelled with a 2 % oil mixture (0.5 litre minimum if the reservoir is empty).

CAUTION

Recommended products
AGIP CITY TEC 2T Mixer oil
synthetic oil for 2-stroke engines: JASO FC, ISO-L-EGD

Braking system
Level check

- Rest the vehicle on its centre stand on flat ground.
- The brake fluid reservoir has a sight glass «A» made of transparent material; the quantity of liquid contained in the sight glass indicates the level of fluid in the reservoir.
- When the sight glass «A» is full, the level inside the reservoir is above the MIN level; when it is partially full, the level has dropped to the MIN level; when it is fully empty, the level of fluid in the reservoir is below the MIN level.

N.B.
THE LEVEL TENDS TO DROP AS THE BRAKE PADS GET WORN, A MINIMUM LEVEL SHOULD NOT BE REACHED.
IF THE LEVEL IS TOO LOW, CHECK AND FIX THE SYSTEM SEALS, IF REQUIRED.
TOP UP THE PUMP TANK, IF REQUIRED, CONSIDERING THAT THE “MAX.” LEVEL MUST ONLY BE OBTAINED WITH NEW PADS.

- Under standard climatic conditions, replace fluid as indicated in the scheduled maintenance table.

Top-up

Proceed as follows:
- Remove the rear-view mirrors.
- Undo the two screws «A».
- Undo the screw «B» and remove the front handlebar cover.
- Remove the reservoir cover «C» by loosening the two fixing screws «D» and refill with the prescribed brake fluid type only and without exceeding the maximum level.

**CAUTION**

ONLY USE DOT 4-CLASSIFIED BRAKE FLUID.

**CAUTION**

AVOID CONTACT OF THE BRAKE FLUID WITH YOUR EYES, SKIN, AND CLOTHING. IN CASE OF ACCIDENTAL CONTACT, WASH WITH WATER.

**CAUTION**

BRAKING CIRCUIT FLUID IS HIGHLY CORROSIVE; MAKE SURE THAT IT DOES NOT COME INTO CONTACT WITH THE PAINTWORK.

**CAUTION**

BRAKE FLUID IS HYGROSCOPIC; THAT IS, IT ABSORBS MOISTURE FROM THE SURROUNDING AIR. IF THE CONTENT OF MOISTURE IN THE BRAKE FLUID EXCEEDS A CERTAIN VALUE, BRAKING WILL BE INEFFICIENT. NEVER USE BRAKE FLUID FROM OPEN OR PARTIALLY USED CONTAINERS. UNDER NORMAL CLIMATIC CONDITIONS, REPLACE FLUID AS INDICATED IN THE SCHEDULED MAINTENANCE TABLE.

**N.B.**

SEE THE BRAKING SYSTEM CHAPTER WITH REGARD TO THE CHANGING OF BRAKE FLUID AND THE BLEEDING OF AIR FROM THE CIRCUITS.

**Recommended products**

AGIP BRAKE 4 Brake fluid

FMVSS DOT 4 Synthetic fluid

**Headlight adjustment**

Proceed as follows:

1. Place the vehicle in running order and with the tyres inflated to the prescribed pressure, on a flat surface 10 m away from a white screen situated in a shaded area, making sure that the longitudinal axis of the scooter is perpendicular to the screen;
2. Turn on the headlight and check that the borderline of the projected light beam on the screen is not lower than 9/10 of the distance from the ground to the centre of vehicle headlamp and higher than 7/10;
3. If otherwise, adjust the right headlight with screw «A».

N.B.
THE ABOVE PROCEDURE COMPLIES WITH THE EUROPEAN STANDARDS REGARDING MAXIMUM AND MINIMUM HEIGHT OF LIGHT BEAMS. REFER TO THE STATUTORY REGULATIONS IN FORCE IN EVERY COUNTRY WHERE THE vehicle IS USED.

SAS filters inspection and cleaning

Remove the right side fairing by undoing the 2 screws marked «B» indicated in the figure.
Remove the two screws «A» from the aluminium SAS cover. Release the metal tube from the rubber housing on the cover without extracting the tube from the cover/sleeve. Remove the tab and plastic cover, extract the sponge and wash it in water and soap. Dry it with compressed air before refitting it, making sure to correctly fit the tab in the housing on the two plastic and aluminium covers. Every time you disassemble the filter, replace the O-ring seal located in the cover.
| TROUBLESHOOTING | TROUBL |
This section makes it possible to find the solutions to use in troubleshooting.
For each breakdown, a list of the possible causes and respective interventions is given.

**Engine**

### Poor performance

<table>
<thead>
<tr>
<th>Poor performance</th>
<th>Possible Cause</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel nozzles or cock clogged or dirty</td>
<td>Dismantle, wash with solvent and dry with compressed air</td>
<td></td>
</tr>
<tr>
<td>Excess of encrustations in the combustion chamber</td>
<td>Remove the encrustations</td>
<td></td>
</tr>
<tr>
<td>Lack of compression wear of the piston rings or cylinder</td>
<td>Check the worn parts and replace them</td>
<td></td>
</tr>
<tr>
<td>Exhaust pipe clogged due to excessive encrustations</td>
<td>Replace the exhaust pipe and check the carburation and mixer</td>
<td></td>
</tr>
<tr>
<td>Air filter blocked or dirty</td>
<td>Clean according to the procedure</td>
<td></td>
</tr>
<tr>
<td>Starter inefficient (stays on)</td>
<td>Check the mechanical sliding, continuity of the circuit, the presence of power and electrical wiring</td>
<td></td>
</tr>
<tr>
<td>Clutch slipping</td>
<td>Check the centrifugal brake shoe assembly and/or clutch bell and replace if necessary</td>
<td></td>
</tr>
<tr>
<td>Defective mobile pulley sliding</td>
<td>Check all the parts, replace the faulty parts and lubricate only the driven pulley using recommended grease</td>
<td></td>
</tr>
<tr>
<td>Transmission belt worn</td>
<td>Replace</td>
<td></td>
</tr>
<tr>
<td>Carburettor nozzles clogged</td>
<td>Dismantle, wash with solvent and dry with compressed air</td>
<td></td>
</tr>
<tr>
<td>Fuel filter on vacuum operated cock blocked</td>
<td>Clean the cock filter</td>
<td></td>
</tr>
<tr>
<td>Roller wear; Presence of oil; Dirt</td>
<td>Check the cap with filter is fitted to the transmission cover; clean the speed variator, replace the rollers if worn out</td>
<td></td>
</tr>
</tbody>
</table>

### Rear wheel spins at idle

<table>
<thead>
<tr>
<th>Rear wheel</th>
<th>Possible Cause</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idling rpm too high</td>
<td>Adjust the idle speed</td>
<td></td>
</tr>
<tr>
<td>Clutch fault</td>
<td>Check the spring/friction mass and the clutch bell</td>
<td></td>
</tr>
<tr>
<td>Air filter housing not sealed</td>
<td>Correctly refit the filter housing and replace it if it is damaged</td>
<td></td>
</tr>
</tbody>
</table>

### Starting difficulties

<table>
<thead>
<tr>
<th>Difficulty starting</th>
<th>Possible Cause</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carburettor nozzles clogged or dirty</td>
<td>Dismantle, wash with solvent and dry with compressed air</td>
<td></td>
</tr>
<tr>
<td>Faulty fuel cock</td>
<td>Check that, at ignition and with throttle untwisted, no petrol flows out the delivery pipe; otherwise, replace the vacuum-operated cock</td>
<td></td>
</tr>
<tr>
<td>Starter inefficient</td>
<td>Check: electric wiring, circuit continuity, mechanical sliding and power supply</td>
<td></td>
</tr>
<tr>
<td>Defective spark plug or with incorrect electrode gap</td>
<td>Check and if necessary replace the spark plug and the electrode gap</td>
<td></td>
</tr>
<tr>
<td>Battery flat</td>
<td>Check the state of the battery. If it shows signs of sulphation replace it and bring the new battery into service charging it for eight hours at a current of 1/10 of the capacity of the battery itself</td>
<td></td>
</tr>
<tr>
<td>Engine flooded</td>
<td>Start up keeping the throttle fully open alternating approximately five seconds of turning it with five seconds still. If however it does not start, remove the spark plug, the engine over with the throttle open being careful to keep the cap in contact with the</td>
<td></td>
</tr>
</tbody>
</table>
**Possible Cause** | **Operation**  
--- | ---  
Spark plug and the spark plug grounded but away from its hole | Refit a dry spark plug and start the vehicle.  
Altered fuel characteristics | Drain off the fuel no longer up to standard; then, refill.  
Faulty spark plug | Remove the encrustation, restore the plug gap or replace being sure to use the types of spark plug recommended at all times.  
Bear in mind that many problems engines have, derive from the use of the wrong spark plug.  
Intake joint cracked or with a bad seal | Replace intake joint and check for correct sealing on the head.  
Purifier-carburettor fitting damaged | Replace.  

**Possible Cause** | **Operation**  
--- | ---  
Excess of encrustations in the combustion chamber | Remove the encrustations.  

**Possible Cause** | **Operation**  
--- | ---  
Maximum nozzle dirty - lean mixture | Wash the nozzle with solvent and dry with compressed air.  
Dirty carburettor | Wash the carburettor with solvent and dry with compressed air.  
Water in the carburettor | Empty the tank through the appropriate bleed nipple.  
Air filter dirty | Clean or replace.  
Defective floating valve | Check the proper sliding of the float and the functioning of the valve.  
Tank breather hole obstructed | Restore the proper tank aeration.  

**Possible Cause** | **Operation**  
--- | ---  
Minimum nozzle dirty | Wash the nozzle with solvent and dry with compressed air.  
Starter that stays open | Check: electric wiring, circuit continuity, mechanical sliding and power supply.  
Reed valve does not close | Check / replace the reed pack.  
Wrong idling adjustment | Adequately adjust the engine idle speed.  
Spark plug defective or faulty | Replace the spark plug with one with the specified degree and check the plug gap.  

**Possible Cause** | **Operation**  
--- | ---  
Secondary metal air pipe deteriorated | Check there are no leaks on the hoses on the crankcase and the housing, check that there is a cap with filter and it is correctly fitted to the transmission cover.  
Good condition of the missing secondary air circuit components | Check the individual components and the piping, check the precision of the fitting. Replace the damaged components.  

---

**Troubleshooting** Vespa S 50 2T

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**TROUBL - 40**
High fuel consumption

<table>
<thead>
<tr>
<th>Possible Cause</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air filter blocked or dirty.</td>
<td>Clean according to the procedure</td>
</tr>
<tr>
<td>Starter inefficient</td>
<td>Check: electric wiring, circuit continuity, mechanical sliding and power supply</td>
</tr>
</tbody>
</table>

SAS malfunctions

**SLACKENING OF THE RUBBER JOINT OF THE SECONDARY AIR PIPE ON THE MUFFLER**

<table>
<thead>
<tr>
<th>Possible Cause</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary air reed blocking</td>
<td>Replace</td>
</tr>
<tr>
<td>Secondary air filter clogging</td>
<td>Clean the filter and the housing</td>
</tr>
<tr>
<td>Blockage of the secondary air fitting on the muffler</td>
<td>Remove the encrustations from the joint being careful not to let the debris fall into the muffler</td>
</tr>
</tbody>
</table>

Transmission and brakes

Clutch grabbing or performing inadequately

**CLUTCH BRAKES**

<table>
<thead>
<tr>
<th>Possible Cause</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slippage or irregular functioning</td>
<td>Check that the masses open and return normally</td>
</tr>
<tr>
<td></td>
<td>Check that there is no grease on the masses</td>
</tr>
<tr>
<td></td>
<td>Check that the clutch masses' contact surface with the clutch bell is mainly in the middle with characteristics equivalent on the three masses</td>
</tr>
<tr>
<td></td>
<td>Check that the clutch bell is not scored or worn abnormally</td>
</tr>
<tr>
<td></td>
<td>Never operate the engine without the clutch bell</td>
</tr>
<tr>
<td></td>
<td>Check the cap with filter is fitted to the transmission cover</td>
</tr>
</tbody>
</table>

Insufficient braking

**BRAKING SYSTEM MALFUNCTION**

<table>
<thead>
<tr>
<th>Possible Cause</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor braking</td>
<td>The rear (drum type) brake is adjusted by regulating the special adjustment (on the wheel) bearing in mind that, with the control levers in the rest position, the wheels must turn freely. The braking action should begin when the brake levers are pressed by about a third. Check the brake pad wear. If it is not possible to remove any problems by simply adjusting the transmissions, check the brake pads and front brake disc, the brake shoes and the rear drum. If you encounter excessive wear or scoring, make the necessary replacements.</td>
</tr>
<tr>
<td>Air bubbles inside the hydraulic braking system</td>
<td>Carefully bleed the hydraulic braking system, (there must be no flexible movement of the brake lever).</td>
</tr>
<tr>
<td>Fluid leakage in hydraulic braking system</td>
<td>Elastic fittings, piston seals or brake pump breakdown, replace</td>
</tr>
<tr>
<td>The brake fluid has lost its properties</td>
<td>Replace the front brake fluid and top up to the correct level in the pump</td>
</tr>
<tr>
<td>Defective sliding of the cables in their sheathes</td>
<td>Lubricate or substitute</td>
</tr>
<tr>
<td>Brake noise</td>
<td>Check the wear of the brake pads and/or shoes</td>
</tr>
</tbody>
</table>
Brakes overheating

**BRAKES OVERHEATING**

<table>
<thead>
<tr>
<th>Possible Cause</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defective sliding of pistons</td>
<td>Replace the calliper.</td>
</tr>
<tr>
<td>Brake disc or drum deformed</td>
<td>Using a dial gauge, check the planarity of the disk with the wheel correctly fitted or the concentricity of the rear drum.</td>
</tr>
</tbody>
</table>

Electrical system

Battery

**BATTERY**

<table>
<thead>
<tr>
<th>Possible Cause</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery</td>
<td>The battery is the electrical device in the system that requires the most frequent inspections and thorough maintenance. If the vehicle is not used for some time (1 month or more) the battery needs to be recharged periodically. The battery runs down completely in the course of 5 ÷ 6 months. If the battery is fitted on a motorcycle, be careful not to invert the connections, keeping in mind that the black ground wire is connected to the negative terminal while the red wire is connected to the terminal marked+. Follow the instructions in the ELECTRICAL SYSTEM chapter for the recharging of the batteries.</td>
</tr>
</tbody>
</table>

Steering and suspensions

Heavy steering

**STEERING HARDENING**

<table>
<thead>
<tr>
<th>Possible Cause</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque not conforming</td>
<td>Check the tightening of the top and bottom ring nuts. If irregularities continue in turning the steering even after making the above adjustments, check the seats in which the ball bearings rotate: replace if they are recessed.</td>
</tr>
</tbody>
</table>

Excessive steering play

**EXCESSIVE STEERING CLEARANCE**

<table>
<thead>
<tr>
<th>Possible Cause</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXCESSIVE STEERING CLEARANCE</td>
<td>Check the tightening of the top and bottom ring nuts. If irregularities continue in turning the steering even after making the above adjustments, check the seats in which the ball bearings rotate: replace if they are recessed.</td>
</tr>
</tbody>
</table>

Noisy suspension

**NOISY SUSPENSION**

<table>
<thead>
<tr>
<th>Possible Cause</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOISY SUSPENSION</td>
<td>If the front suspension is noisy, check: the efficiency of the front shock absorbers; the condition of the ball bearings and relevant</td>
</tr>
</tbody>
</table>
### Possible Cause

- lock-nuts, the limit switch rubber buffers and the movement bushings.

### Suspension oil leakage

<table>
<thead>
<tr>
<th>Possible Cause</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil leakage from suspension</td>
<td>Service the pumping members and check the sleeves and sealing rings are in good conditions. Replace the damaged parts</td>
</tr>
</tbody>
</table>
INDEX OF TOPICS

ELECTRICAL SYSTEM

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KEY
1. Electronic ignition device
2. Magneto flywheel - Pick-up
3. Key switch
4. Voltage regulator
5. 7.5A Fuse
6. 12V - 9Ah Battery
7. Starter motor
8. Start-up remote control switch
9. Horn button
10. Horn
11. Starter button
12. Stop button on rear brake
13. Stop button on front brake
14. Turn indicator switch
15. Light switch
16. Rear left turn indicator
17. Rear light
18. Rear right turn indicator
19. Front left turn indicator
20. Front light
   A. Tail light bulb
   B. High-/low-beam light bulb
21. Front right turn indicator
22. Fuel level transmitter
23. Instrument panel
   A. Turn indicator warning light
   B. Headlight warning light
   C. Instrument panel lighting bulbs
   D. Fuel gauge
   E. Low fuel warning light
   F. Oil warning light
   G. High-beam warning light
24. Automatic starter
25. Heater
26. Heater control device
27. Oil reserve warning light
28. Spark plug

R = Red - B = White - Bl = Blue - N = Black - V = Green - Rs = Pink - Mr = Brown - Gr = Grey - Az = Sky
Blue G = Yellow Vi = Purple A = Orange
Components arrangement

1 / 2 / 5 / 6 / 7 / 8 / 24 / 25 / 28 - Electronic ignition device / Magneto flywheel - Pick-Up / 7.5A Fuse / 12V-9Ah Battery / Starter motor / Start-up remote control / Automatic starter / Heater / Spark plug.

3 / 4 / 10 / 26 - Key switch / Voltage regulator / Horn / Heater control device.
Conceptual diagrams

Ignition
KEY

1. Electronic ignition device
2. Magneto flywheel - Pick-up
3. Key switch
5. 7.5A Fuse
6. 12V - 9Ah Battery
28. Spark plug

Headlights and automatic starter section

KEY

2. Magneto flywheel - Pick-up
3. Key switch
4. Voltage regulator
5. 7.5A Fuse
6. 12V - 9Ah Battery
15. Light switch
17. Rear light
20. Front light
A. Tail light bulb
B. High-/low-beam light bulb
23. Instrument panel
   B. Headlight warning light
   C. Instrument panel lighting bulbs
   G. High-beam warning light

24. Automatic starter

Battery recharge and starting

**KEY**

2. Magneto flywheel - Pick-up
3. Key switch
4. Voltage regulator
5. 7.5A Fuse
6. 12V - 9Ah Battery
7. Starter motor
8. Start-up remote control switch
11. Starter button
12. Stop button on rear brake
13. Stop button on front brake
17. Rear light
Level indicators and enable signals section

KEY

2. Magneto flywheel - Pick-up
3. Key switch
4. Voltage regulator
5. 7.5A Fuse
6. 12V - 9Ah Battery
22. Fuel level transmitter
23. Instrument panel
D. Fuel gauge
E. Low fuel warning light
F. Oil warning light
27. Oil reserve warning light
Devices and accessories

KEY

2. Magneto flywheel - Pick-up
3. Key switch
4. Voltage regulator
5. 7.5A Fuse
6. 12V - 9Ah Battery
9. Horn button
10. Horn
14. Turn indicator switch
16. Rear left turn indicator
18. Rear right turn indicator
19. Front left turn indicator
21. Front right turn indicator
23. Instrument panel
A. Turn indicator warning light
25. Heater
26. Heater control device
Checks and inspections

All the control operations of the system that entail disconnecting cables (to check connections and the devices making up the ignition circuit) must be done with the engine off: if this is not done, the controls might be irreparably damaged.

Ignition circuit

1) Check the condition of the spark plug (clean it with a metal brush, remove deposits, apply short blasts of compressed air and, if necessary, replace it).
2) Without removing the stator, carry out the following checks:
   After visually checking the electrical wiring, use a specific tester to measure the loading reel, the pick-up (see chart) and cable continuity.
   - If checks on the loading boil, the pick-up and cable continuity show irregularities, replace the stator; otherwise replace the control unit.
   - Remember that the engine must be off to disconnect any connections in order to replace the central unit.

Specific tooling

020331Y Digital multimeter

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description/Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Red cable (1) and White cable (2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description/Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Red cable (3) and Green cable (4)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description/Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>White cable - Engine</td>
</tr>
<tr>
<td>2</td>
<td>White cable - Frame</td>
</tr>
</tbody>
</table>
Voltage regulator check

Voltage regulator
The malfunctioning of the voltage regulator might cause the following problems depending on the type of fault:
1) Lighting system bulbs burn out.
2) Lighting system is not working.
3) Battery overcharges (the main fuse blows).
4) Battery not recharging.
5) Turn indicators not working.
6) Oil and fuel check warning light not working.

Remedies

FAULT 1
Check that the control voltage is between 13V and 14.5V at 5000 rpm with the lights on.
Check that the control voltage is 16V at 5000 rpm with the lights off.
Replace the voltage regulator if control voltages are over >16V.

FAULT 2
a) Check that voltage to stator is correctly supplied: disconnect the regulator connector and place the tester to detect alternating voltages between the connection of the grey-blue cable (2) and the black cable (6) to check that the voltage supplied at 3000 rpm is within 25-30 V (FIG. A). If faults are detected, replace the stator.
b) If no faults are detected with these controls, replace the regulator.
c) If functioning is still not correct even when the regulator has been replaced, check the connections of the electrical system.
**FAULT 3**

After checking that there are no short circuits in the system towards earthing with the engine off and the regulator connector detached, replace the regulator because it is certainly inefficient, and replace the protection fuse.

Following the replacement, measure the current and the recharging voltage on the battery ends (FIG. B). The values detected must be 1.5 ÷ 2 A and 13 V at 3000 rpm.

---

**FAULT 4**

*a* Place the tester that detects alternating voltages between the connection of the yellow cable (8) on the regulator and the black cable (6) (FIG. D) to check that the voltage supplied by the generator at 3000 rpm is within 26 ÷ 30 V (the battery should be disconnected to measure this). If faults are detected, replace the stator; otherwise, proceed to point b).

*b* Yellow/black cable (1) connected to the regulator. Insert an ammeter between the grey/blue cable (2) of the stator and the battery and use the tester to check that the current supplied at 3000 rpm is approx. 1.5 ÷ 2 Ampere (FIG. C).

If the values detected are lower than those specified, replace the regulator.

Before carrying out the checks on the regulator and the corresponding system, it is always good practice to check that there is continuity between the black cable and the earthing.
FAULT 5

(FIG. E) If the turn indicators do not work, proceed as follows:
- Remove the regulator connector, and insert the tester probes between the contact 5 (yellow-red) and the ground lead.
- Turn the key switch to ON and check that the battery is getting voltage. If no voltage is detected, check the wiring and the contacts on the key switch and on the battery.

(FIG. F) Repeat the procedure now placing the tester probes between contacts 5 (yellow/red) and 6 (black), and check the presence of the battery voltage with the key switch set to ON. If there is no voltage, check the regulator ground wiring.

(FIG. G) If the above tests have positive results, jump the contacts 5 (yellow/red) and 7 (blue/black) on the connector, set the key switch to ON and shift the turn indicator switch to the right and left to see when the lights are steadily on (as they are powered directly from the battery). If even after this operation the turn indicators fail to turn on, check that the wiring is not damaged and the switch works properly. If these last two tests have a positive result, replace the regulator because it is certainly not functioning properly.

FAULT 6
Oil reserve check warning light not working

(FIG H) - Disconnect the voltage regulator connector.
- Supply 12V to the terminal marked with number 5; with a digital tester check that the terminal number 4 has a similar output (12V) for about 5 seconds.
- If no voltage is detected for terminal number 4, replace the regulator.
- If there is voltage for terminal number 4, check both the installation and the bulb of the oil warning light.

Specific tooling
020331Y Digital multimeter

Level indicators

- Check resistance between Pin 4 and the ground connection on the 5-way connector in the instrument panel to check the efficiency of the fuel gauge.

Electric characteristic
Resistance value when the tank is full
< = 7Ω
Resistance value when the tank is half-full
38Ω ±4Ω
Resistance value with empty tank and low fuel warning light on
90Ω ±13Ω -3Ω

Lights list

<table>
<thead>
<tr>
<th>BULBS</th>
<th>Specification</th>
<th>Type</th>
<th>Power</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High/low beam light bulb</td>
<td>Spherical</td>
<td>12V 35/35W</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Front tail light bulb</td>
<td>All glass</td>
<td>12V 5W</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Front turn indicator bulb</td>
<td>Spherical</td>
<td>12V - 10W</td>
<td>1 RHS + 1 LHS</td>
</tr>
<tr>
<td>4</td>
<td>Rear turn indicator light bulb</td>
<td>Spherical</td>
<td>12V - 10W</td>
<td>1 RHS + 1 LHS</td>
</tr>
<tr>
<td>5</td>
<td>Stop and tail light bulb</td>
<td>Spherical</td>
<td>12V 21/5W</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Warning light bulbs: turn indicators, low-beam lights, high-beam lights, low fuel, low oil</td>
<td>All glass</td>
<td>12V - 1.2W</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>Instrument panel lighting bulbs</td>
<td>All glass</td>
<td>12V 1.2W</td>
<td>3</td>
</tr>
</tbody>
</table>
Fuses

The electrical system is protected by a plug fuse «B» located to the left of the battery compartment. The ignition system, headlight and the rear light are not fuse-protected. Before replacing a blown fuse, find and solve the problem that caused it to blow. Do not replace the fuse with any alternative form of conductor.

**CAUTION**

IN ORDER TO AVOID DAMAGING THE ELECTRICAL SYSTEM, NEVER DISCONNECT THE WIRING WHILE THE ENGINE IS RUNNING. DO NOT TIP THE SCOOTER TOO MUCH IN ORDER TO AVOID DANGEROUS LEAKAGE OF BATTERY ELECTROLYTE.

Electric characteristic

Fuse

7.5 A

Sealed battery

INSTRUCTIONS FOR REFRESHING THE STOCK CHARGE OF AN OPEN CIRCUIT

1) Voltage check

Before installing the battery on the vehicle, check the open circuit voltage with a normal tester.

- If the voltage exceeds 12.60 V, the battery may be installed without any renewal recharge.
- If voltage is below 12.60 V, a renewal recharge is required as explained in 2).

2) Constant voltage battery charge mode

- Constant voltage equal to 14.40÷14.70V
- Initial charge voltage equal to 0.3÷0.5 for nominal capacity
- Duration of the charge: 10 to 12 h recommended

Minimum 6 h
Maximum 24 h

3) Constant current battery charge mode

- Charge current equal to 1/10 of the nominal capacity of the battery
- Duration of the charge: 5 h

**WARNING**

- WHEN THE BATTERY IS REALLY FLAT (WELL BELOW 12.6V) IT MIGHT BE THAT 5 HOURS OF RECHARGING ARE NOT ENOUGH TO ACHIEVE OPTIMAL PERFORMANCE. IN THESE CONDITIONS IT IS HOWEVER ESSENTIAL NOT TO EXCEED EIGHT HOURS OF CONTINUOUS RECHARGING SO AS NOT TO DAMAGE THE BATTERY ITSELF.
Dry-charge battery

**WARNING**

THE BATTERY ELECTROLYTE IS POISONOUS AS IT MAY CAUSE SERIOUS BURNS. IT CONTAINS SULPHURIC ACID. AVOID CONTACT WITH THE EYES, THE SKIN AND CLOTHING. IF COMING INTO CONTACT WITH EYES OR SKIN, WASH ABUNDANTLY WITH WATER FOR APPROX. 15 MIN. AND SEEK IMMEDIATE MEDICAL ATTENTION.

IN THE EVENT OF ACCIDENTAL INGESTION OF THE LIQUID, IMMEDIATELY DRINK LARGE QUANTITIES OF WATER OR MILK, MAGNESIUM MILK, BATTERED EGG OR VEGETABLE OIL. SEEK IMMEDIATE MEDICAL ATTENTION.

THE BATTERIES PRODUCE EXPLOSIVE GAS; KEEP CLEAR OF NAKED FLAMES, SPARKS OR CIGARETTES; VENTILATE THE AREA WHEN RECHARGING INDOORS.

ALWAYS WEAR EYE PROTECTION WHEN WORKING IN THE PROXIMITY OF BATTERIES. KEEP OUT OF REACH OF CHILDREN.

The battery is an electrical device which requires careful monitoring and diligent maintenance. The maintenance rules are:

1) **Check the level of the electrolyte**

   The electrolyte level must be checked frequently and must reach the upper level. Only use distilled water, to restore this level.

   If it is necessary to add water too frequently, check the vehicle’s electrical system: the battery works overcharged and is subject to quick wear.

2) **Load status check**

   After restoring the electrolyte level, check its density using an appropriate densitometer (see the figure).

   When the battery is charged, you should detect a density of 30 to 32 Bé corresponding to a specific weight of 1.26 to 1.28 at a temperature of no lower than 15° C.

   A density reading of less than 20° Bé indicates that the battery is completely flat and it must therefore be recharged.

   After charging the battery, check each element electrolyte level and density. If the scooter is not used for a given time (1 month or more) it will be necessary to periodically recharge the battery.

   The battery runs down completely in the course of three months.
If it is necessary to refit the battery in the vehicle, be careful not to reverse the connections, remembering that the earth wire (black) marked (-) must be connected to the - negative terminal while the other two red wires marked (+) must be connected to the terminal marked with the + positive sign. Regular bench charging must be carried out with the specific battery charger, (single) or (multiple), setting the battery charger selector to the type of battery to be recharged. Connections to the power supply source must be implemented by connecting the corresponding poles (+ to + and - to -).

4) Cleaning the battery

The battery should always be kept clean, especially on its top side, and the terminals should be coated with Vaseline.

**WARNING**

- Before recharging the battery, remove the plugs of each cell. Keep the battery away from naked flames or sparks when charging. Remove the battery from the vehicle removing the negative clamp first.

**CAUTION**

- **NEVER USE FUSES WITH A CAPACITY HIGHER THAN THAT RECOMMENDED.** USING A FUSE OF UNSUITABLE RATING MAY SERIOUSLY DAMAGE THE VEHICLE OR EVEN CAUSE A FIRE.
- **CAUTION**
  - **DRINKING WATER CONTAINS MINERALS THAT CAN BE EXTREMELY HARMFUL TO THE BATTERY: USE DISTILLED WATER ONLY.**
- **CAUTION**
  - **TO ENSURE MAXIMUM PERFORMANCE THE BATTERY MUST BE CHARGED BEFORE USE. INADEQUATE CHARGING OF THE BATTERY WITH A LOW ELECTROLYTE LEVEL BEFORE IT IS FIRST USED SHORTENS THE LIFE OF THE BATTERY.**

**Specific tooling**

- **020333Y Single battery charger**
- **020334Y Multiple battery charger**

1) - Remove the short closed tube and the caps, then pour sulphuric acid into the cells using the type specified for batteries, with a specific gravity of 1.26, corresponding to 30°C Be, at a minimum temperature of 15°C until the upper level is reached.

2) - Leave to rest for at least 2 hours; then, restore the level with sulphuric acid.
3)- Within the following 24 hours, recharge with the specific battery charger (single) or (multiple) at a density of about 1/10 of the battery nominal capacity and until the acid density is about 1.27, corresponding to 31º Bé, and these values are stabilised.

4) - Once the charge is over, level the acid (by adding distilled water). Close and clean carefully.

5)- Once the above operations have been performed, install the battery in the vehicle ensuring the connections between the wiring and the battery terminals are correct.

WARNING
- ONCE THE BATTERY HAS BEEN INSTALLED IN THE VEHICLE IT IS NECESSARY TO REPLACE THE SHORT TUBE (WITH CLOSED END) NEAR THE + POSITIVE TERMINAL WITH THE CORRESPONDING LONG TUBE (WITH OPEN END), THAT YOU FIND FITTED TO THE VEHICLE, TO ENSURE THAT THE GASES THAT FORM CAN ESCAPE PROPERLY.

Specific tooling
020333Y Single battery charger
020334Y Multiple battery charger

Connectors

**HEATER CONTROL DEVICE CONNECTOR**

1. Positive from voltage regulator (Yellow)
2. Ground (Black)
3. Heater (Sky Blue)
4. Heater (Orange-Black)
5. Not connected
6. Positive from the voltage regulator (Yellow-Black)

**VOLTAGE REGULATOR CONNECTOR**

1. Lights power, instrument panel lighting, heater control device and automatic starter (Yellow-Black)
2. Magneto flywheel (Grey-Blue)
3. Not connected
4. Oil reserve indicator power (Orange)
5. Oil reserve indicator power, start-up circuit and heater control device (Yellow-Red)
6. Ground (Black)
7. Turn indicator switch power (Blue-Black)
8. Magneto flywheel (Yellow)
MAGNETO FLYWHEEL CONNECTOR
1. Pick-up (Red)
2. Voltage regulator (Yellow)
3. Battery positive (Blue)
4. Voltage regulator (Yellow-Blue)
5. Ground (White)
6. Electronic ignition device (Green)

ELECTRONIC IGNITION DEVICE CONNECTOR
1. Pick-up (Red)
2. Ground (Black and White)
3. Magneto flywheel (Green)
4. Not connected

AUTOMATIC STARTER CONNECTOR
1. Positive from voltage regulator (Yellow-Black)
2. Ground (Black)

OIL LEVEL INDICATOR CONNECTOR
1. Positive from voltage regulator (Orange)
2. Oil reserve warning light (Orange)
3. Positive from voltage regulator (Yellow)
4. Live Positive (White)
INSTRUMENT PANEL CONNECTOR «A»
1. Right turn indicator warning light (White-Blue)
2. Left turn indicator warning light (Pink)
3. Positive from voltage regulator (Yellow-Black)
4. Ground (Black)

INSTRUMENT PANEL CONNECTOR «B»
1. Live Positive (White)
2. Low fuel warning light (Yellow-Green)
3. Oil reserve warning light (Orange)
4. Fuel level indicator (White-Green)
5. High-beam warning light (Purple)
INDEX OF TOPICS

ENGINE FROM VEHICLE  ENG VE
Exhaust assy. Removal

- Remove the 2 fixing nuts from the manifold to the head

- Unscrew the 2 screws fixing the muffler to the housing; then remove the whole muffler paying attention to the interference between its supporting bracket and the cooling cover.

Removal of the engine from the vehicle

- Support the scooter adequately.
- Disconnect the battery.
- Remove the muffler assembly.
- Remove the rear wheel.
- Remove the rear brake mechanical transmission.
- Disconnect the electric terminals.
- Remove the throttle grip and mixer transmissions.
- Disconnect the hoses (petrol-oil).
- Remove the engine-side swinging arm and remove the entire engine.

WARNING
Be very careful when handling fuel.

CAUTION
When installing the battery, first attach the positive cable and then the negative cable.

WARNING
Wear safety goggles when using hitting tools.
| ENGINE | ENG |
Automatic transmission

Transmission cover

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


Kickstart

- Upon refitting, apply the recommended grease to the bushing, to the spring and along the toothed sector.
- Use the special tool for the charging of the spring, as shown in the figure.
- Refit the seeger ring after checking that it is in good condition.

Specific tooling

020261Y Starter spring fitting

Recommended products

AGIP GREASE MU3 Grease for odometer transmission gear case
Soap-based lithium grease with NLGI 3; ISO-L-XBCHA3, DIN K3K-20

- Remove the seeger ring located on the exterior of the crankshaft.
- Dismantle the dog gear from its seat, slackening the tension that the toothed sector applies to it by means of the spring; to do this, it is necessary to rotate the toothed sector slightly (see the figure).

CAUTION
WHILE REMOVING THE TOOTHED SECTOR, BE VERY CAREFUL OF THE SPRING TENSION; IT COULD CONSTITUTE A HAZARD FOR THE OPERATOR.

- Remove the screws shown in the figure and remove the engine starting lever.
- For the assembly, work in reverse and tighten the screws to the prescribed torque.

**Locking torques (N*m)**
Starter lever fixing screw 12 + 13

---

Removing the driven pulley shaft bearing

- Slightly heat the crankshaft from the inside side to avoid damaging the coated surface and use the driven pulley shaft or a pin of the same diameter to remove the bearing.

**N.B.**
IN CASE OF DIFFICULTY A STANDARD 8MM-INSIDE DIAMETER EXTRACTOR CAN BE USED.

---

Refitting the driven pulley shaft bearing

- Refit the bearing with the aid of a bushing with the same diameter as the external plate of the bearing after slightly heating the crankcase from the inside.

**N.B.**
WHEN REFITTING, ALWAYS REPLACE THE BEARING WITH A NEW ONE.

**CAUTION**
WHEN REMOVING/REFITTING THE BEARING, TAKE CARE NOT TO DAMAGE THE PAINTED SURFACE.
Removing the driven pulley

- Lock the clutch bell housing with the specific tool.
- Remove the nut, the clutch bell housing and the whole of the driven pulley assembly.

N.B.
THE UNIT CAN ALSO BE REMOVED WITH THE DRIVE PULLEY MOUNTED.

Specific tooling
020565Y Flywheel lock calliper spanner

Inspecting the clutch drum

- Check that the clutch bell is not worn or damaged.
- Measure the inner diameter of the clutch bell.

Characteristic
Clutch bell diameter/standard value
Ø 107+0.2 +0 mm
Clutch bell diameter/max. value allowed after use
Ø 107.5 mm
Eccentricity measured /max.
0.20 mm

Removing the clutch

- Equip the tool with long pins screwed into position «A» from the outside, insert the entire driven pulley in the tool and put the central screw under stress.

CAUTION
THE TOOL WILL BE DEFORMED IF THE CENTRAL SCREW IS TIGHTENED UP TOO FAR.
- Using a 34 mm socket wrench remove the clutch locking nut.
- Loosen the central screw thereby undoing the driven pulley unit
- Separate the components.

**Specific tooling**

020444Y Tool for fitting/ removing the driven pulley clutch

**Inspecting the clutch**

- Check the thickness of the clutch mass friction material.
- The masses must not show traces of lubricants; otherwise, check the driven pulley unit seals.

**N.B.**

UPON RUNNING-IN, THE MASSES MUST EXHIBIT A CENTRAL CONTACT SURFACE AND MUST NOT BE DIFFERENT FROM ONE ANOTHER. VARIOUS CONDITIONS CAN CAUSE THE CLUTCH TO TEAR.

**CAUTION**

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

**Characteristic**

Check minimum thickness

1 mm

**Pin retaining collar**

- Remove the collar with the aid of 2 screwdrivers.
- Remove the three guide pins and the mobile half pulley.

Removing the driven half-pulley bearing

- Remove the roller bearing with the special extractor inserted from the bottom of the fixed half-pulley.

CAUTION

Specific tooling
001467Y029 Bell for bearings, O.D. 38 mm

- Remove the ball bearing retention snap ring.

- Expel the ball bearing from the side of the clutch housing by means of the special tool.

N.B.
PROPERLY SUPPORT THE HALF-PULLEY SO AS NOT TO DEFORM THE SLIDING SURFACE OF THE DRIVING BELT

Specific tooling
020376Y Adaptor handle
020363Y 20 mm guide

Inspecting the driven fixed half-pulley

- Check that there are no signs of wear on the work surface of the belt. If there are, replace the half-pulley.

- Make sure the bearings do not show signs of unusual wear.

- Measure the external diameter of the pulley bushing.

Characteristic
Stationary driven half-pulley/Standard diameter
Ø 33.965 to 33.985 mm
Stationary driven half-pulley / Minimum diameter admitted after use
Ø 33.96 mm

Inspecting the driven sliding half-pulley

- Remove the 2 inner sealing rings and the two O-rings.
- Measure the inside diameter of the mobile half-pulley bushing.

Characteristic
Mobile driven half-pulley/ Maximum diameter allowed
Ø 34.08 mm

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

Recommended products
AGIP GREASE SM 2 Grease for the tone wheel revolving ring
Soap-based lithium grease containing NLGI 2 Molybdenum disulphide; ISO-L-XBCHB2, DIN KF2K-20

- Make sure the pins and collar are not worn, reassemble the pins and collar.
- Use a greaser with a curved spout to lubricate the driven pulley unit with around 6 gr. of grease. This operation must be done through one of the holes inside the bushing until grease comes out of the opposite hole. This procedure is necessary to prevent the presence of grease beyond the O-ring.

Recommended products
AGIP GREASE SM 2 Grease for the tone wheel revolving ring
Soap-based lithium grease containing NLGI 2 Molybdenum disulphide; ISO-L-XBCHB2, DIN KF2K-20
Refitting the driven half-pulley bearing

- Fit a new ball bearing with the specific tool.
- Fit the ball bearing retention snap ring.
- Fit the new roller bearing with the wording visible from the outside.

**CAUTION**
PROPERLY SUPPORT THE HALF-PULLEY TO PREVENT DAMAGE TO THE THREADED END WHILE THE BEARINGS ARE BEING FITTED.

**Specific tooling**
- 020376Y Adaptor handle
- 020456Y Ø 24 mm adaptor
- 020362Y 12 mm guide
- 020171Y Punch for Ø 17 mm roller case

Inspecting the clutch spring

- Check that the contrast spring of the driven pulley does not show signs of deformation
- Measure the free length of the spring

**Characteristic**

**Standard length**

- 118 mm

**Minimum length allowed after use**

- XXXX

Refitting the clutch

- Preassemble the driven pulley group with spring, sheath and clutch.
- Position the spring with the sheath
- Insert the components in the tool and preload the spring being careful not to damage the plastic sheath and the end of the threaded bar.
- Reassemble the nut securing the clutch and tighten to the prescribed torque.

**CAUTION**
SO AS NOT TO DAMAGE THE CLUTCH NUT USE A SOCKET WRENCH WITH SMALL CHAMFER.

**CAUTION**
POSITION THE NON-CHAMFERED SURFACES OF THE NUT IN CONTACT WITH THE CLUTCH

**Locking torques (N*m)**
Clutch lock ring nut 55 - 60

---

**Refitting the driven pulley**

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

**Specific tooling**
020565Y Flywheel lock calliper spanner

**Locking torques (N*m)**
Clutch bell nut 40 - 44

---

**Drive-belt**

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

**Characteristic**
Transmission belt/Minimum width
17.5 mm
Removing the driving pulley

- Lock the driving pulley using the appropriate tool.
- Remove the central nut with the related washer, then remove the drive and the plastic fan.
- Remove the stationary half-pulley.

- Remove the belt, washer and remove the mobile half-pulley with its bushing, being careful that the rollers and contrast plate fitted loosely on it do not come off.

Specific tooling

020451Y Starting ring gear lock

Mixer gears and belt

- Remove gear and belt.

CAUTION
PAY PARTICULAR ATTENTION TO NOT TOUCHING OR BENDING THE BELT BECAUSE THIS COULD BREAK SUD- DENLY DURING OPERATION.

CAUTION
ON REFITTING, MAKE SURE THAT DIRT DOES NOT GET INTO THE INNER BUSHING OF THE MIXER CONTROL GEAR AND THAT IT DOES NOT EXERT ANY STRESS ON THE CRANKCASE PIN.

N.B.
REPLACE THE BELT AS INDICATED IN THE SCHEDULED MAINTENANCE TABLE.

Inspecting the rollers case

1) Check that the bushing and the sliding rings of the mobile pulley do not show signs of scoring or deformation.

2) Check the roller running tracks on the contact pulley; there must not be signs of wear and check the condition of the contact surface of the belt on the half-pulleys (mobile and stationary).

3) Check that the rollers do not show signs of marked facetting on the sliding surface and that
the metallic insert does not come out of the plastic shell borders.

4) Check the integrity of the sliding blocks of the contact plate.

- Check that the internal bushing shown in the figure is not abnormally worn and measure inside diameter «A».
- Measure outside diameter «B» of the pulley sliding bushing shown in the figure.

**CAUTION**
DO NOT LUBRICATE OR CLEAN THE BUSHING.

**Characteristic**

**Driving pulley / Maximum diameter:**
20.12 mm

**Driving pulley/ Standard diameter:**
20.021 mm

**Driving pulley bushing/ Diameter maximum:**
XXX mm

**Driving pulley bushing/ Standard diameter:**
20 -0.020/-0.041 mm

---

**Refitting the driving pulley**

- Manually move the movable driven half-pulley away by pulling it towards the clutch unit and insert the belt observing the direction of rotation of the first fitting.

**N.B.**
IT IS GOOD PRACTICE ALWAYS TO FIT THE BELT SO THAT THE WORDS CAN BE READ IN CASE IT DOES NOT SHOW A FITTING SIDE.
- Refit the particular components of the assembly (roller container assembly with bushing, limiting washer, stationery half-pulley, cooling fan belt with drive, washer and nut).
- With the specific tool tighten the lock-nut to the prescribed torque and then perform a final 90° lock in order to prevent the rotation of the drive pulley.

N.B. REPLACE THE NUT WITH A NEW ONE AT EVERY REFIT

CAUTION

UPON FITTING THE DRIVING PULLEY UNIT IT IS OF UTMOST IMPORTANCE THAT THE BELT IS FREE INSIDE IN ORDER TO AVOID WRONG TIGHTENING AND CONSEQUENTLY DAMAGING THE CRANKSHAFT KNURLING.

Specific tooling

020451Y Starting ring gear lock

Locking torques (N*m)

Crankshaft pulley nut 18 to 20 + 90° Nm

For 25 km/h engine type versions, the limit washer is 5.5 mm thick

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End gear

Removing the hub cover

- Remove the transmission cover
- Remove the clutch assembly
- Discharge the rear hub oil.
- Remove the 5 screws indicated in the figure.
- Remove the hub cover with driven pulley shaft.

See also

Refitting the clutch
Removing the wheel axle

- Remove the intermediate gear and the complete gear wheel axle.
- When removing the intermediate gear pay attention to the various shim adjustments.

Removing the wheel axle bearings

- Remove the oil seal and the seeger ring.
- Remove the bearing by pushing from the outside towards the inside of the gear compartment, using the appropriate punch.

Specific tooling

020363Y 20 mm guide
020376Y Adaptor handle
020358Y 37x40-mm adaptor

Removing the driven pulley shaft bearing

- Remove the seeger ring inside the cover.
- Remove the oil seal from the outside.
- Remove the centring dowels and position the cover on a plane.
- Position the special tool on the internal track of the bearing and remove said bearing with the aid of a press.

Specific tooling

020452Y Tube for removing and refitting the driven pulley shaft
- Position the special tube on the internal raceway of the bearing and from the shaft toothed side as indicated in the figure. Expel the driven pulley shaft with the aid of a press.

**Specific tooling**
020452Y Tube for removing and refitting the driven pulley shaft

### Inspecting the hub shaft

- Check the three shafts for wear or distortion of the toothed surfaces, the bearing housings, and the oil seal housings.
- In case of anomalies, replace the damaged components.
- Check capacity (A) of the transmission gear (wear, deformations, etc.)
- Check the pulley shaft seating: Superficial wear (B) may indicate irregularities in the crankcase seatings or in the pulley shaft capacities.

### Inspecting the hub cover

- Check that the fitting surface is not dented or distorted.
- If faults are found, replace the hub cover.

### Refitting the driven pulley shaft bearing

- Support the inner track of the bearing from the outside of the hub cover with the specific tool positioned under the press and insert the driven pulley axle.
- Refit the oil seal flush with the cover.

**Specific tooling**
020452Y Tube for removing and refitting the driven pulley shaft
• Heat the hub cover and insert the bearing with the specific punch.
• Fit the snap ring with the concave or radial part on the bearing side.

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

Specific tooling
020151Y Air heater
020376Y Adaptor handle
020439Y 17 mm guide
020358Y 37x40-mm adaptor

Refitting the wheel axle bearing
- Heat the half crankcase on the transmission side using a thermal gun.
- After lubricating its outer strip, insert the bearing with the special adapter with the aid of a hammer.
- Refit the seeger ring and the oil seal using the 42 x 47 mm adapter and the handle.

Specific tooling
020151Y Air heater
020376Y Adaptor handle
020363Y 20 mm guide
020359Y 42x47-mm adaptor

Refitting the ub cover
- Refit the whole wheel axle.
- Refit the intermediate gear paying attention to the two shim washers.
- Apply LOCTITE 510 for surfaces to the hub covers and refit the same with driven pulley shaft.
- Refit the 5 screws and tighten them to the specified torque.

N.B.
CLEAN THE CONTACT SURFACES OF THE HUB COVER AND THE HALF CRANKCASE OF RESIDUE FROM PREVIOUS GASKETS BEFORE APPLYING A NEW ONE.
Locking torques (N*m)
Rear hub cap screw 12 ÷ 13

Flywheel cover

Cooling hood

- Remove the four fixings shown in the figure.
- Remove the fan cover

- Remove the oil piping retention band from the hood
- Remove the 2 screws shown in the figure
Cooling fan
- Remove the cooling fan by acting on the three fixings indicated in the figure.

Removing the stator
- Remove the three stator fixings shown in the photo
- Remove the two pick-up fixings shown in the photo
- Remove the stator with the wiring

Refitting the stator
- Refit the stator and flywheel carrying out the removal procedure in reverse, tightening the retainers to the specified torque.

N.B.
THE PICK-UP CABLE MUST BE POSITIONED ADHERING TO THE FUSION TONGUE ON THE CRANKSHAFT IN SUCH A WAY AS TO AVOID BEING CRUSHED BY THE FAN COVER ASSEMBLY.

Locking torques (N*m)
Stator clamping screws 3 ÷ 4 Pick-Up clamping screw 4 ÷ 5

Flywheel and starting
Removing the starter motor

Remove the two clamps shown in the figure.

Removing the flywheel magneto

- Lock the rotation of the flywheel using the calliper spanner.
- Remove the nut.

**CAUTION**
THE USE OF A CALLIPER SPANNER OTHER THAN THE ONE SUPPLIED COULD DAMAGE THE STATOR COILS

- Extract the flywheel with the extractor.

**Specific tooling**
020565Y Flywheel lock calliper spanner
020162Y Flywheel extractor

Inspecting the flywheel components

- Check the condition of the flywheel and any distortions that might cause rubbing on the stator and on the Pick-Up.
Refitting the flywheel magneto

- Fit the flywheel being careful to insert the key properly.
- Lock the flywheel nut at the prescribed torque
- Check the Pick-Up air gap.
- The air gap may not be modified in the fitting of the Pick-Up.
- Other values derive from deformations visible on the Pick-Up support.

N.B.
A VARIATION OF THE AIR GAP DISTANCE CAN LEAD TO A VARIATION IN THE IGNITION ADVANCE SUCH AS TO CAUSE PINGING, KNOCKING ETC.

Locking torques (N*m)
Flywheel nut 40 ÷ 44

Refitting the starter motor

- Fit a new O-ring on the starter and lubricate it.
- Fit the starter on the crankcase, locking the two screws to the prescribed torque.

N.B.
REFIT THE REMAINING PARTS AS DESCRIBED IN THE CYLINDER HEAD, TIMING, LUBRICATION, FLYWHEEL AND TRANSMISSION CHAPTERS.

Locking torques (N*m)
Starter screws 12 ÷ 13

Cylinder assy. and timing system

Removing the intake manifold

Use an anti-tampering TORX spanner to remove the two clamping screws of the intake manifold
Removing the cylinder head

Remove the 4 screws shown in the figure

Removing the cylinder - piston assy.

Remove the cylinder very carefully

Remove the snap rings and remove the pin

CAUTION
AFTER EACH REMOVAL OPERATION REPLACE THE PIN RETENTION SNAP RINGS
Inspecting the small end

- Measure the internal diameter of the small end using an internal micrometer.

N.B.
IF THE DIAMETER OF THE ROD SMALL END EXCEEDS THE MAXIMUM DIAMETER ALLOWED, SHOWS SIGNS OF WEAR OR OVERHEATING REPLACE THE CRANKSHAFT AS DESCRIBED IN THE "CRANKCASE AND CRANKSHAFT" CHAPTER.

Characteristic
Rod small end: standard diameter
17 $+0.011-0.001$

Rod small end: maximum allowable diameter
17,060 mm

Inspecting the wrist pin

- Check the wrist pin external diameter using a micrometer

Characteristic
Wrist pin: standard diameter
12 $+0.005+0.001$ mm

Inspecting the piston

- Measure the bearings on the piston using a bore meter
- Calculate the piston-pin coupling clearance.

Characteristic
Wrist pin housing: standard diameter
12 $+0.007+0.012$

Wrist pin housing: standard clearance
0.002 $+ 0.011$ mm
- Measure the outer diameter of the piston, perpendicular to the pin axis.
- Take the measurement in the position shown in the figure
To classify the cylinder-piston fitting, check the appropriate table

See also
Cylinder - piston assy.

Inspecting the cylinder

- Check that the cylinder does not show seizures. Otherwise, replace it or adjust it respecting the allowable increases
- Measure the internal diameter of the cylinder with a bore meter, according to the directions given in the figure
- Check that the fitting surface with the head is not dented or distorted.
To classify the cylinder-piston fitting, check the appropriate table

See also
Cylinder - piston assy.

Inspecting the piston rings

- Alternatively insert the two sealing rings in the cylinder
Using the piston, insert the seals perpendicularly to the cylinder axis.
- Measure the opening of the sealing rings using a thickness gauge as shown in the photograph
- If the values are higher than the values prescribed in the chart, substitute the rings
Removing the piston

- Position the snap ring in detail 1 with the opening straddling the arrow printed on the tool.
- Push detail 2 into detail 1 until the stop and extract detail 2.
- Insert detail 3 into detail 1, position the assembly in the snap ring assembly area, and push detail 3 all the way in.

N.B.
REFIT THE REMAINING PARTS FOLLOWING THE OPERATIONS IN REVERSE ORDER FROM THE REMOVAL OPERATIONS

Specific tooling
020166Y Pin lock fitting tool

Locking torques (N*m)
Cylinder head nuts 10 -11

- Use new wrist pin snap rings.
- Use new cylinder base gasket.
- Before refitting carefully clean all the surfaces.
- Use oil to be mixed during the fitting of the piston and the cylinder.

CAUTION
POSITION THE ARROW PRINTED ON THE PISTON CROWN TOWARDS THE EXHAUST OPENING.
THE WRIST PIN SNAP RINGS MUST BE POSITIONED ON THE PISTON WITH THE SPECIFIC TOOL

Recommended products
AGIP CITY TEC 2T Oil

Recommended oil
Inspecting the timing system components

CAUTION
CHECK THE CORRECT REED UNIT SEAL; NO LIGHT MUST PASS BETWEEN THE SUPPORT AND LAMELLA.

Crankcase - crankshaft

Splitting the crankcase halves

Remove the eight crankcase union fasteners.
Install the special strip on the half crankcase on the flywheel side and separate the half crankcase on the flywheel side from the transmission side

**Specific tooling**

020163Y Crankcase splitting plate

---

**Removing the crankshaft**

- Install the specific tool on the half crankcase on the transmission side using four M6 screws of an adequate length.
- Remove the crankshaft from the transmission side half crankcase

**Specific tooling**

020163Y Crankcase splitting plate

---

**Removing the crankshaft bearings**

The bearings can stay on either the half crankcase or the crankshaft indifferently

- Using the special tool, remove any bearings that have been left on the crankshaft

**N.B.**

The half rings must be inserted on the bearings with a few mallet blows.

**Specific tooling**

004499Y001 Bearing extractor bell
004499Y006 Bearing extractor ring
004499Y002 Bearing extractor screw
004499Y007 Half rings
- Using the specific tool remove any bearings left on the half crankcase

**Specific tooling**

001467Y007 Driver for OD 54 mm bearing  
001467Y006 Pliers to extract 20 mm bearings

---

**Refitting the crankshaft bearings**

Heat the bearings in an oil bath at around 150°C and fit them on the crankshaft, if necessary using a section of tube that acts on the bearing's inner track

**Specific tooling**

020265Y Bearing fitting base

---

**Inspecting the crankshaft alignment**

With the specific tool shown check that the eccentricity of the surfaces of diam. «A»-«B»-«C» are within 0.03 mm. (reading limit on the dial gauge); in addition, check the eccentricity of diam. «D», for which a maximum reading of 0.02 mm is permitted. In the case where eccentricity is not much above prescribed levels, **straighten** the shaft by acting on the counterweights with a shim or tighten them in a clamp (with an aluminium bushing) as required.

**Specific tooling**

020335Y Magnetic support for dial gauge  
020074Y Support base for checking crankshaft alignment
Refitting the crankshaft

- Position the transmission side half crankcase on two wooden supports
- Using a thermal gun, heat the bearing seat to about 120°

- Firmly insert the crankshaft until the bearing reaches the end-of-stroke stop

- Let the temperature of the half crankcase settle at the temperature of the crankshaft.
- Again install the special crankcase separation plate **NOT** installing the crankshaft protection
- During the assembly phase keep the central thrust screw loose.
- Take the four clamping screws to the end of the stroke and loosen them again with the same angle (e.g. 90°)
- When the temperature has settled, preload the thrust screw of the tool manually until the ball bearing clearance is cancelled out.

**Specific tooling**

020163Y Crankcase splitting plate
Refitting the crankcase halves

- Prepare the coupling surface with LOCTITE 510 applying a thin layer of it after degreasing the surface using a suitable solvent (e.g. trichloroethylene).
- Heat the flywheel-side half crankcase with a thermal gun.

**Recommended products**
Loctite 510 Liquid sealant
Gasket

- Keeping the half crankcase on the transmission side, insert the flywheel side half crankcase with a clean precise movement
- Insert at least three clamping screws and tighten up rapidly
- Insert the other 5 screws and tighten them to the specified torque.

**Locking torques (N*m)**

**Half-crank case joint bolts** 12 ÷ 13

- Move the crankcase separation plate in a position back from the one indicated in the figure
- Install the special magnetic support with dial gauge at the end of the crankshaft
- Check the axial clearance of the crankcase
  If this is not within the maximum limit allowed, repeat the crankcase coupling procedure

**Specific tooling**

020335Y Magnetic support for dial gauge

**Characteristic**

Axial clearance with warm crankcase
0.10 ÷ 0.12 mm

Axial clearance with cold crankcase
0.06 to 0.08 mm

Limit value with cold crankcase
0.02 ÷ 0.03 mm
Lubrication

Crankshaft oil seals

Refitting

- Install a new flywheel-side oil seal only with the special tool’s punch
The flywheel-side oil seal is recognised by its smaller diameter

**N.B.**
THE USE OF THE SPECIFIC TOOL IS NOT COMPATIBLE WITH THE FITTED WRENCH

**Specific tooling**

020340Y Flywheel and transmission oil seals fitting punch

- Install a new transmission side oil seal using the special tool with adapter ring.
The transmission-side oil seal is recognised by the larger diameter

**Specific tooling**

020340Y Flywheel and transmission oil seals fitting punch

Oil pump

Removal

- Remove the 2 screws shown in the figure
Remove the tube passage seal from the crankcase shown in the figure

**Refitting**

To refit, perform the steps in the reverse direction to disassembly

Remember to drain after refitting using the screw shown in the figure

**Fuel supply**

- Completely empty the gas tank.
- Remove the petrol delivery tube and the suction tube.
- Loosen the clip and remove the tap.
- Clean the tank and the filter of the tap with a specific solvent.
- Refit the tap making sure that there is an O-Ring.
- Turn the tap to the direction it had before it was removed and block the clip.

**N.B.**

THE FILTER CAN BE UNSCREWED FROM THE COCK TO FACILITATE CLEANING.
- Disconnect the fuel supply and the suction taking pipe from the carburettor.
- Check that there are no fuel leaks between the two tubes.
- Close the fuel outlet pipe.
- By means of the MITIVAC pump apply 0.1 bar of suction to the tap.
- Make sure that the suction is kept stable and that there are no fuel leaks.
- Reconnect the suction pipe to the manifold.
- Position the fuel pipe with the outlet at the point of the tap.
- Turn the engine by using the starter for five seconds with the carburettor at minimum.
- Take up the fuel by means of a graded burette.

N.B.
THE MEASUREMENT MAY BE FALSIFIED BY THE INCORRECT NUMBER OF REVS OR BY THE WRONG POSITION OF THE TUBE. IN THIS CASE, THE TENDENCY IS TO OBTAIN A REDUCED FUEL FLOW RATE. THE SUCTION OUTLET ON THE MANIFOLD HAS A SECTION INTENTIONALLY REDUCED FOR THE PURPOSE OF ENHANCING THE SUCTION PULSATION AND THEREBY GUARANTEE A CONSTANT TAP FLOW RATE.

Specific tooling
020329Y MityVac vacuum-operated pump

Characteristic
Minimum flow rate
20 cc
| SUSPENSIONS | SUSP |
This section is devoted to operations that can be carried out on the suspension.

Front

Removing the front wheel

- Support the scooter adequately.
- Loosen the five screws fixing the wheel to the hub.

Front wheel hub overhaul

- Support the scooter adequately.
- Remove the front wheel.
- Remove the front calliper.
- Remove the cotter pin and remove the cap.

- Unscrew the nut fixing the front wheel hub.
- Remove the wheel hub.

- Remove the ball bearing check seeger ring indicated in the photograph

Extract the ball bearing using the specific tool

**Specific tooling**

001467Y014 Pliers to extract ø 15-mm bearings
001467Y017 Bell for bearings, OD 39 mm

- Remove the oil seal on the roller bearing side using a screwdriver.
- Remove the roller bearing using the specific tool

**Specific tooling**
020376Y Adaptor handle
020456Y Ø 24 mm adaptor
020363Y 20 mm guide

- Heat the roller bearing seat with a heat gun
- Use the specific tool to introduce and push the bearing until it stops, with the shielded side facing out
- Refit the ball bearing check seeger ring

**Specific tooling**
020151Y Air heater
020376Y Adaptor handle
020357Y 32 x 35 mm adaptor
020412Y 15 mm guide

- Use the specific tool to fit and push the roller casing until it stops
- Refit the oil seal on the roller bearing side
- Lubricate the area between the roller bearing and the ball bearing

**Specific tooling**
020038Y Punch

**Recommended products**
AGIP GREASE MU3 Grease for odometer transmission gear case
Soap-based lithium grease with NLGI 3; ISO-L-XBCHA3, DIN K3K-20

- To refit, follow the removal steps but in reverse order; be careful to tighten to the prescribed torque.

**Locking torques (N*m)**
Front wheel axle nut 75 ÷ 90
Refitting the front wheel

- When refitting, tighten the 5 screws to the specified torque

**Locking torques (N*m)**
*Wheel rim screws 20 ÷ 25*

Handlebar

**Removal**

Remove the handlebar cover before carrying out this operation,
- After removing the transmissions and disconnecting the electrical terminals, remove the terminal fixing the handlebar to the steering.
- Check all components and replace faulty parts.

**N.B.**
*IF THE HANDLEBAR IS BEING REMOVED TO REMOVE THE STEERING, TILT THE HANDLEBAR FORWARD TO AVOIDING DAMAGING THE TRANSMISSIONS.*

**Refitting**

Carry out the removal operations but in the reverse order, observing the prescribed tightening torque.

**Locking torques (N*m)**
*Handlebar fixing screw 50 ÷ 55*

Steering column
Removal

After removing the upper seat, lean the vehicle on one side and extract the steering tube completely from the fork.

**Specific tooling**

020055Y Wrench for steering tube ring nut

Overhaul

Servicing the front suspension-steering assembly, described below, deals mainly with replacing parts (pin- NADELLA roller bushings - sealing rings unit and dust guard) which connect the steering tube to the front wheel holder swinging hub.

**N.B.**

BEFORE PROCEEDING WITH THE DESCRIBED SERVICE, CHECK THAT THE STEERING TUBE AND THE WHEEL HOLDER HUB ARE IN EXCELLENT CONDITIONS: ONLY THEN IS THE SERVICE JUSTIFIABLE.

MOREOVER, REMEMBER THE STEERING TUBE SHOULD BE REPLACED WITH A NEW ONE WHEN DEFORMED.

a = Ø 12 Punch

b = Sharp-edged end

Use a suitable punch with the dimensions indicated on the figure; hit with a mallet until the wedging washer is crushed and then extract it with the help of a pointed end.

Repeat the operation for the second washer using the punch on the side opposite to the one shown in the figure.

Use the tool fitted with part 1 as shown in the figure and move the tool handgrip until the pin and the NADELLA are simultaneously ejected in the direction opposite the tool thrusting force.

After removing the pin and the first NADELLA, the swinging hub gets detached from the steering tube.
To remove the second NADELLA, use the tool fitted with part 2 instead of part 1, on the side opposite the one shown in the figure.

**N.B.**

_DURING THE REMOVAL OPERATIONS DESCRIBED ABOVE, THE ROLLER BUSHINGS ARE DESTROYED WHEN THE EXTRACTOR IS USED. UPON REFITTING, IT IS THEREFORE NECESSARY TO USE NEW BUSHINGS AS WELL AS A NEW PIN, NEW SEALING RINGS AND DUST GUARDS._

**Specific tooling**

**020021Y Front suspension service tool**

Connect the swinging hub to the steering tube with the guiding pin.

- Use the tool fitted with part 3 on the stem and part 4.

Lubricate the pin with recommended grease and insert it temporarily on the swinging hub, move the tool handgrip until part 3 is fully inserted on the steering tube.

After fitting the pin, insert the two spacers, slightly hitting them with the mallet.

**N.B.**

_BEFORE PROCEEDING WITH THE DESCRIBED FITTING, PLACE THE TWO DUST GUARD RINGS ON THE SWINGING HUB AS SHOWN IN THE FIGURE._

**Specific tooling**

**020021Y Front suspension service tool**

**Recommended products**

**AGIP GREASE SM 2 Grease for odometer transmission gear case**

Lithium grease with NLGI 2 molybdenum disulfide; ISO-L-XBCHB2, DIN KF2K-20

Insert the sealing ring on the pin and the roller bushing with its wedging washer at the same time.

- Remove the tool and the part 5 (guide), which has been partially ejected during the previous pin fitting phase, and leave part 4 always fitted.
- Replace part 3 with part 16 (on the stem).
- By moving the tool handgrip, push the wedging washer - roller bushing - seal ring unit, placing part 16 until it stops on the swinging hub.
- Repeat the above operation using the tool with part 16 and part 22, instead of part 4, always fitted to the stem, on the side opposite that indicated in the figure to fit the second wedging washer - roller bushing - sealing ring unit.

**WARNING**

BEFORE PROCEEDING WITH THE DESCRIBED PRE-FITTING, DIP THE SEALING RINGS IN MINERAL OIL AND THE "NADELLA" ROLLER BUSHINGS (PREVIOUSLY WASHED IN PURE PETROL OR NEUTRAL PETROLEUM TO ELIMINATE THE ANTIRUST PROTECTION), HALF-FILLED WITH GREASE.

**Specific tooling**

020021Y Front suspension service tool

**Recommended products**

AGIP GREASE MU3 Grease for odometer transmission gear case

Soap-based lithium grease with NLGI 3; ISO-L-XBCHA3, DIN K3K-20

- Use the tool fitted with part 20 on its stem and part 21 on the tool base as shown in the figure.
- By moving the tool handgrip, push the two NADELLA bushings until their internal bottoms make contact with the pin end.
- Use the tool fitted with parts 3 and 4 to fit the pin, and press moving the tool handgrip, until wedging the washers on the swinging hub.
- Now, remove the two spacers (parts 17 and 16) and, once the space between the NADELLAs - steering tube and swinging hub - has been fully filled with grease, move the dust guard rings until they are placed in that space.
- By wedging the washers as described above, the front suspension unit refitting stage is finished.

**Recommended products**

AGIP GREASE MU3 Grease for odometer transmission gear case

Soap-based lithium grease with NLGI 3; ISO-L-XBCHA3, DIN K3K-20
Refitting

**CAUTION**
USE NEW ROLLER CASINGS, PIN, SEALING RINGS AND DUST GUARDS FOR REFITTING.

When fitting the fork, lubricate with the steering bearing tracks with the recommended grease. Tighten the lower ring nut "A" and the upper ring nut "B" to the specified torque

**Recommended products**

AGIP GREASE PV2 Grease for the steering bearings, pin seats and swinging arm

White anhydrous-calcium based grease to protect roller bearings; temperature range between -20 °C and +120 °C; NLGI 2; ISO-L-XBCIB2.

**Locking torques (N*m)**

- Steering lower ring nut 8 ÷ 10
- Steering upper ring nut 35 ÷ 40

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Front shock absorber
Removal

- Support the scooter adequately.
- Remove the wheel hub.
- Loosen the shock absorber lower clamps and remove the brake calliper shock absorber support.

- Loosen the screws fixing the front brake pipe retainer clamp and the odometer cable in order to reach the upper clamps.

- Unscrew the upper fixing nuts.

- Remove the front shock absorber.
Refitting

To refit, carry out the removal operations in reverse order, observing the prescribed tightening torques.

**Locking torques (N*m)**

- **Lower shock absorber clamping screw**: 20 - 27
- **Upper shock absorber fixing nut**: 20-30

---

**Shock-absorber - calliper bracket**

**Removal**

- Remove the front wheel hub with the brake disc
- Remove the front shock absorber lower clamps
- Remove the bracket locking seeger ring
- Unscrew the bracket
- Before refitting the bracket in the wheel axle, place the O-ring as shown in the photograph so that it is correctly placed after fitting the bracket.
- Refit the washer and the Seeger ring.
- Refit the lower screws fixing the shock absorber to the bracket and tighten at the prescribed torque

**Locking torques (N*m)**

- **Lower shock absorber clamping screw**: 20 - 27
Overhaul

- The bracket for the shock absorber -calliper attachment has two roller bearings separated one from the other as shown in the photograph.

- Remove the two roller bearings from the bracket with the specific tool operating on the shock absorber attachment side as shown in the photograph.

Specific tooling

020376Y Adaptor handle
020441Y 26 x 28 mm adaptor
020365Y 22 mm guide

- Remove the oil seal on the wheel hub side with the screwdriver as shown in the photograph.

- Suitably hold the brake calliper - shock absorber attachment bracket.
- Fit a new oil seal and move it until it stops using the specific tool.

Specific tooling

020376Y Adaptor handle
020360Y Adaptor 52 x 55 mm
- Assemble a new roller bearing on the shock absorber side and move it until it stops using the specific tool

Specific tooling
020036Y Punch

- Suitably hold the brake calliper - shock absorber attachment bracket
- Assemble a new roller bearing on the wheel hub side and move it until it stops using the specific tool

Specific tooling
020037Y Punch

Refitting

- Refit the parts in reverse order of the removal operation.

CAUTION
BEFORE CARRYING OUT REFITTING OPERATIONS IN THE AREAS MARKED WITH AN ASTERISK, LUBRICATE THEM WITH THE RECOMMENDED PRODUCT

Specific tooling
020036Y Punch
020037Y Punch

Recommended products
AGIP GREASE PV2 Grease for control levers on the engine
White anhydrous-calcium based grease to protect roller bearings; temperature range between -20 °C and +120 °C; NLGI 2; ISO-L-XBCIB2

Steering bearing

Removal

- Use the specific tool both to remove the lower seat of the upper bearing and to remove the upper seat of the lower bearing fitted on the chassis.
N.B.
TO REMOVE THE LOWER SEAT OF THE LOWER STEERING BEARING JUST USE A SCREW-DRIVER AS A LEVER BETWEEN THE SEATING AND THE SLEEVE.

Specific tooling
020004Y Punch for removing fifth wheels from headstock

- Remove the fifth wheel fitting and the dust guard on the steering tube as shown in figure, using the specific tool. Proceed giving a few taps with the mallet.

Specific tooling
020004Y Punch for removing fifth wheels from headstock

- Refit the fifth wheel fitting and the dust guard on the steering tube until they stop, using the specific tool.

Specific tooling
006029Y Punch for fitting fifth wheel seat on steering tube

Rear

Removing the rear wheel

- Remove the muffler.
- Remove the cotter pin and remove the cap.
- Unscrew the nut fixing the wheel axle and collect the washer.

Refitting the rear wheel

- To refit, follow the removal steps but in reverse order; be careful to tighten to the prescribed torque.

**Locking torques (N*m)**
Locking torque 137 + 152 Nm

Swing-arm
Removal

- Support the scooter adequately.
- Remove the central tunnel inspection door.
- To remove the upper clamp from the chassis, proceed as follows:
  - Unscrew the pin and collect the washer.
  - Remove the cap from the lower part.
  - Collect the lower fixing nut and collect the washer.
- Working on both sides, remove the cover caps.

- Working on the right side, unscrew the side fixing nut to the chassis and collect the washer.

- Working on the left side, remove the pin.

- Remove the spoiler terminal from both sides.
- Working on the right side, unscrew the fixing nut.
- Working on the left side, release the pin from the spring shown.

- Remove the fixing pin to the engine and collect the spacer.
- Now the swinging arm is free.

- Remove the swinging arm from the vehicle; first release it from the engine side and then from the chassis side.

Overhaul

- Check that the silent-blocks are in good conditions.
- Otherwise, replace the swinging arm.
### Refitting

For rifting, respect the locking torques

**Locking torques (N*m)**
- Swinging arm to engine pin locknut 33 ÷ 41
- Swinging arm to chassis pin locknut 44 ÷ 52
- Swinging arm plate to chassis screw 33 ÷ 41

### Shock absorbers

#### Removal

- Adequately support the rear part of the scooter.
- Remove the battery cover.
- Undo the indicated upper fixing screw to the frame.

- Unscrew the lower fixing pin to the transmission crankcase.
Refitting

- To fit, follow the removal steps but in reverse order; be careful to tighten to the prescribed torques.

**Locking torques (N·m)**
Shock absorber/engine pin torque 33 to 41 N·m
Shock absorber/frame nut torque 20 to 25 N·m

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**Centre-stand**

Replace complete stand

- Work on the screws shown in the figure.
- When refitting, secure to the prescribed torque.

**Locking torques (N·m)**
Stand screw torque 18.5 to 19 N·m

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**Side stand**

**REMOVAL**
- Uncouple the centre stand return spring;
Remove the screw shown in the photograph

**FITTING**
To refit, carry out the removal operations in reverse order and comply with the specified torque.

**Locking torques (N·m)**
Side stand fixing bolt 35 ÷ 40
INDEX OF TOPICS

BRAKING SYSTEM  BRAK SYS
Front brake calliper

Removal

- Remove the front wheel.
- Undo the two fixing screws to the shock absorber calliper support.

N.B. SHOULD IT BE NECESSARY TO REPLACE THE CALLIPER, FIRST LOOSE THE FITTING CONNECTING THE PIPE TO THE BRAKE CALLIPER.

Refitting

To fit, follow the removal steps but in reverse order; be careful to tighten to the prescribed torques.

N.B. ONCE REFITTING IS FINISHED, BLEED THE SYSTEM.

Locking torques (N*m)

- Screw tightening calliper to the support 20 ÷ 25 N•m
- Brake pipe connection 20 to 25 N•m

Front brake disc

Removal

- Remove the front wheel
- Remove the front brake calliper
- Remove the hub and the disc operating on the wheel axle nut
- Adequately support the hub with the disc and operating on the five screws shown in the photograph, remove the brake disc
Refitting

- Carry out the operations in the reverse order from
  the removal being careful to respect the direction
  of disc rotation shown by the arrow printed on it
- Tighten the 5 screws to the specified torque

Recommended products
Loctite 243 Medium strength threadlock
Loctite 243 medium-strength threadlock

Locking torques (N*m)
Brake disc screws 8 ÷ 10

Disc Inspection

- Remove the front wheel
- Use a micrometer to check the disc thickness as
  shown in the photograph
- Repeat the measurement in at least 6 points on
  the disk
- Remove the front brake calliper
- In order to secure the appropriate tool adequately
  use a metal plate with M8 threaded hole and fix it
  to one of the two front brake calliper attachment
  points
- Place the dial gauge on the disk outer edge
- Make the wheel hub turn and check the disk de-
  viation

Specific tooling
020335Y Magnetic support for dial gauge
Characteristic
Minimum thickness allowed after use:
4 mm
Disc thickness at wear limit (front)
3.5 mm
Max. deviation allowed:
0.1 mm

- If a value other than that prescribed is detected, replace the disc and check again.
- If the problem persists, check and replace the wheel hub if required.

Front brake pads

Removal

Proceed as follows:
- Remove the front calliper.
- Remove the cotter pin and slide off the pin that locks the two pads.
- Remove the pads, being careful with the pad spring clamp.
- Check the thickness of the friction material of the pads.
- Replace the pads if the thickness is below the minimum value.
- The replacement must be made with greater residual thickness if the pad has not worn evenly. A 0.5 mm thickness difference in the residual friction material is permitted.

Characteristic
Minimum value
1.5 mm

See also
Front brake calliper
- Pads must be replaced when the friction material thickness reaches the wear limit.
- To replace: remove the protection cover, the bolt and the leaf spring. Slide off the pads and replace them once the plungers are down. Carry out these operations in reverse order to fit.

**CAUTION**
BEFORE USING THE BRAKE, OPERATE THE LEVER A FEW TIMES.

**Refitting**

- Insert the brake pads
- Insert the fixing pin being careful to position the clip with the ends towards the bleed screw as in the photo.

- Insert the lock on the bolt and then the protection cover

**Fill**
Front

- Remove the rubber cap from the bleed screw.
- Insert a rubber pipe in the bleed screw to permit the brake fluid to be recovered.
- With the right-hand brake lever, load the system and bring it up to the required pressure.
- Keeping the right-hand brake lever pulled, loosen the bleed screw to purge the air. Then tighten the bleed screw.
- Release the brake lever.
- Repeat the operation until only brake fluid comes out of the rubber pipe.
- Remove the fluid recovery pipe and refit the rubber cap over the bleed screw.
- Top up the brake fluid to the right level in the reservoir.

If necessary, bleeding can be done using a special vacuum pump.

N.B.
DURING PURGING FREQUENTLY CHECK THE LEVEL TO PREVENT AIR GETTING INTO THE SYSTEM THROUGH THE PUMP.

N.B.
DURING THE BLEEDING OPERATIONS, MAKE SURE THE BRAKE FLUID DOES NOT COME INTO CONTACT WITH THE BODYWORK SO AS NOT TO DAMAGE IT. FURTHERMORE, DURING THE BLEEDING OPERATIONS REGARDING THE BRAKE CALLIPERS, MAKE SURE THE BRAKE FLUID DOES NOT COME INTO CONTACT WITH THE DISC BRAKES AND WITH THE BRAKE PADS. FAILURE TO COMPLY WITH THIS NORM WILL ENDANGER THE PROPER WORKING AND EFFICIENCY OF THE BRAKING SYSTEM.

Specific tooling
020329Y MityVac vacuum-operated pump

Locking torques (N*m)
System bleed calliper fitting: 20 ÷ 25 Nm

Brake fluid level check

- Rest the vehicle on its centre stand on flat ground.
- The brake fluid reservoir has a sight glass «A» made of transparent material; the quantity of liquid contained in the sight glass indicates the level of fluid in the reservoir.
- When the sight glass «A» is full, the level inside the reservoir is above the MIN level; when it is partially full, the level has dropped to the MIN level.
when it is fully empty, the level of fluid in the reservoir is below the MIN level.

**N.B.**

THE LEVEL TENDS TO DROP AS THE BRAKE PADS GET WORN, A MINIMUM LEVEL SHOULD NOT BE REACHED. IF THE LEVEL IS TOO LOW, CHECK AND FIX THE SYSTEM SEALS, IF REQUIRED. TOP UP THE PUMP TANK, IF REQUIRED, CONSIDERING THAT THE "MAX." LEVEL MUST ONLY BE OBTAINED WITH NEW PADS.

- Under standard climatic conditions, replace fluid as indicated in the scheduled maintenance table.

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**Front brake pump**

**Removal**

- Remove the front and rear handlebar covers
- Remove the two screws fixing the brake pump to the handlebar indicated in the photograph
- Remove the oil pipe joint from the pump
- Remove the connector to the stop light switch

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**Overhaul**

Proceed as follows:

1) Remove the brake lever by loosening the retaining screw; open the cover (2) and take out the diaphragm (3);
2) remove the cap (4) and take out the internal parts in order;
3) Check that:
   - The body of the pump shows no signs of internal damage or corrosion;
   - The plunger shows no sign of damage or abnormal wear;
   - The plunger return spring is in good condition.
CAUTION

ALL THE SEALS AND GASKETS MUST BE REPLACED EVERY TIME THE PUMP IS SERVICED.

1. Reservoir cap screw
2. Reservoir cap.
3. Diaphragm.
4. Bellows.
5. Sealing ring
6. Piston.
7. Gasket.
8. Spring.
9. Reservoir

**Refitting**

To refit, carry out the removal operations but in reverse order, observing the specified torques.

**N.B.**

USE NEW COPPER GASKETS ON THE JOINTS.

**CAUTION**

ONCE REFITTING IS FINISHED, BLEED THE SYSTEM.

**Locking torques (N*m)**

- Oil pipe joint to the pump: 20 - 25
- Brake pump fixing screws to the handle bar: 7 + 10 Nm
- Pipe / brake calliper coupling 20 ÷ 25
Rear drum brake

Once the muffler and the wheel have been removed, follow these steps:
- Remove the shoe spring using the specific pliers.
- Remove the shoes with the help of a lever.
- Refit the new shoes with a few taps with the mallet.
- Attach the spring using the specific spanner.

CAUTION
REPLACE THE SHOES BEFORE THE FRICTION MATERIAL IS FULLY WORN

Specific tooling
020325Y Brake-shoe spring calliper
| CHASSIS | CHAS |
Seat

- Lift the saddle and remove the helmet compartment «A».
- Undo the two screws indicated.

Rear handlebar cover

- Remove the front handlebar cover.
- Undo the three screws indicated in figure fixing it to the handlebar, the odometer transmission and the electrical connectors.
**Instrument panel**

- Remove the rear handlebar cover.
- Undo the three screws indicated fixing the rear handlebar cover.

**Front handlebar cover**

Proceed as follows:
- Remove the rear-view mirrors.
- Undo the two screws «A».
- Undo the screw «B» and remove the front handlebar cover.
- Disconnect the electrical terminals and remove the turn indicator bulb.
**Headlight assy.**

- Remove the front handlebar cover.
- Undo the four screws indicated fixing the front handlebar cover.

**Knee-guard**

- Undo the five screws indicated.
- Remove the rubber strip from both sides and undo the indicated screw.
- Remove the shield back plate bringing it to the rear part of the scooter.
Taillight assy.

- Undo the two fixing screws and remove the rear light unit.

- Undo the screw indicated and disconnect the connector.

Footrest

- Remove the shield back plate.
- Remove the side fairings.
- Remove the central tunnel inspection door.
From both sides, unscrew:
- The fixing screw at the back.

- The fixing screw on the central part.
- The fixing screw at the front.

- Remove the footrest.

**Side fairings**

- Undo the screw «A» and the smaller screw «B».

- Detach the seats on the fairing.
License plate holder

- Remove the side fairings.
- Working on both sides, undo the two screws indicated.

- Remove the license plate light.

Air filter

- Remove the helmet compartment.
- Remove the side fairings.
- Undo the two indicated clamps to the crankcase.

- Undo the two clamps indicated.
**Fuel tank**

- Adequately support the rear part of the scooter.
- Remove the wheel and the rear mudguard.
- Remove the battery compartment.
- Disconnect the fuel outlet pipe.
- Undo the two fixing screws to the chassis and collect the fuel pipe supporting plate.

- Remove the turn indicators.
- Remove the rear light unit and undo the indicated screw.

- Unscrew the closing cap.
- Lower the fuel tank and disconnect the bleed pipes and the level indicator connector.
- Remove the tank.

---

**Front mudguard**

- First remove the steering tube and uncouple the front brake pipes from the calliper in order to remove the front mudguard
- Remove the three mudguard-steering tube clamps indicated in the figure

---

**Front central cover**

- Remove the "Piaggio" clip-on badge.
- Undo the two screws indicated.

- Remove the front central cover, sliding it upwards.
INDEX OF TOPICS

PRE-DELIVERY

PRE DE
Aesthetic inspection

Appearance check:
- Paintwork
- Fitting of plastics
- Scratches
- Dirt

Tightening torques inspection

Lock check
- Safety locks
- Fixing screws

Safety locks
- Rear shock absorber upper retainer
- Rear shock absorber lower retainer
- Front/rear wheel screws
- Front wheel axle nut
- Rear wheel axle nut
- Swinging arm - Chassis bolt
- Swinging arm - Engine bolt
- Engine arm - Frame arm bolt
- Handlebar lock-nut
- Steering lower ring nut
- Steering upper ring nut

Electrical system

Electrical System:
- Main switch
- Headlamps: high-beam lights, low-beam lights, tail lights and their warning lights
- Adjusting the headlights according to the regulations currently in force
- Rear lights and stop light
- Front and rear stop light switches
- Turn indicators and their warning lights
- Instrument lighting
- Instrument panel: fuel gauge
- Instrument panel warning lights
- Horn
CAUTION
TO ENSURE MAXIMUM PERFORMANCE, THE BATTERY MUST BE CHARGED BEFORE USE. INADEQUATE CHARGING OF THE BATTERY WITH A LOW LEVEL OF ELECTROLYTE BEFORE IT IS FIRST USED SHORTENS BATTERY LIFE.

WARNING
BEFORE RECHARGING THE BATTERY, REMOVE THE CAPS OF EACH CELL.
KEEP THE BATTERY AWAY FROM NAKED FLAMES OR SPARKS WHILE IT IS CHARGED.
REMOVE THE BATTERY FROM THE SCOOTER, DISCONNECTING THE NEGATIVE TERMINAL FIRST.

CAUTION
WHEN INSTALLING THE BATTERY, ATTACH THE POSITIVE LEAD FIRST AND THEN THE NEGATIVE LEAD.

WARNING
BATTERY ELECTROLYTE IS TOXIC AND IT MAY CAUSE SERIOUS BURNS. IT CONTAINS SULPHURIC ACID. AVOID CONTACT WITH EYES, SKIN AND CLOTHING.
IN CASE OF CONTACT WITH EYES OR SKIN, RINSE WITH ABUNDANT WATER FOR ABOUT 15 MINUTES AND SEEK MEDICAL ATTENTION AT ONCE.
IF IT IS SWALLOWED, IMMEDIATELY DRINK LARGE QUANTITIES OF WATER OR VEGETABLE OIL. SEEK IMMEDIATE MEDICAL ATTENTION.
BATTERIES PRODUCE EXPLOSIVE GAS; KEEP THEM AWAY FROM NAKED FLAMES, SPARKS AND CIGARETTES. IF THE BATTERY IS CHARGED IN A CLOSED PLACE, TAKE CARE TO ENSURE ADEQUATE VENTILATION. ALWAYS PROTECT YOUR EYES WHEN WORKING CLOSE TO BATTERIES.
KEEP OUT OF THE REACH OF CHILDREN

CAUTION
NEVER USE FUSES WITH A CAPACITY HIGHER THAN THE RECOMMENDED CAPACITY. USING A FUSE OF UNSUITABLE RATING MAY SERIOUSLY DAMAGE THE VEHICLE OR EVEN CAUSE A FIRE.

Levels check

Level check:
- Hydraulic brake system fluid level.
- Rear hub oil level

Road test

Test ride
- Cold start
- Instrument operations
- Response to the throttle control
- Stability on acceleration and braking
- Rear and front brake efficiency
- Rear and front suspension efficiency
- Abnormal noise

PRE DE - 138
Static test

Static control after the test ride:
- Starting when warm
- Starter operation
- Minimum hold (turning the handlebar)
- Uniform turning of the steering
- Possible leaks

**CAUTION**
CHECK AND ADJUST TYRE PRESSURE WITH TYRES AT AMBIENT TEMPERATURE.

**CAUTION**
NEVER EXCEED THE RECOMMENDED INFLATION PRESSURES OR TYRES MAY BURST.

Functional inspection

Functional check up:
Braking system (hydraulic)
- Lever travel
Braking system (mechanical)
- Lever travel
Clutch
- Proper functioning check
Engine
- Throttle travel check
Others
- Check documentation
- Check the frame and engine numbers
- Tool kit
- License plate fitting
- Check locks
- Check tyre pressures
- Installation of mirrors and any accessories
Engine

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<tbody>
<tr>
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<td>001001 engine from frame - removal and re-fitting</td>
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Crankcase

CRANKCASE

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<tbody>
<tr>
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<td>001133 Engine crankcase - Replacement</td>
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TIME - 142
### Crankshaft

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<th>Code</th>
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<tr>
<td>1</td>
<td>Main bearings - Replacement</td>
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<tr>
<td>2</td>
<td>Oil seal, clutch side - Replacement</td>
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<tr>
<td>3</td>
<td>Oil seal, flywheel side - Replacement</td>
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<tr>
<td>4</td>
<td>Crankshaft - Replacement</td>
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**Vespa S 50 2T**

**Time**

**TIME - 143**
Cylinder assy.

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<tbody>
<tr>
<td>1</td>
<td>001002 Cylinder-Piston - Replacement</td>
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<tr>
<td>2</td>
<td>001107 Cylinder / piston - Inspection / cleaning</td>
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Cylinder head assy.

<table>
<thead>
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<th>Code</th>
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<tbody>
<tr>
<td>1</td>
<td>001097 Cooling hood - Replacement</td>
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<tr>
<td>2</td>
<td>001093 Spark plug - Replacement</td>
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<tr>
<td>3</td>
<td>001126 Head - Replacement</td>
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</tr>
<tr>
<td>4</td>
<td>001013 Intake manifold - Replacement</td>
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</tr>
<tr>
<td>5</td>
<td>001178 Disc pack - Replacement</td>
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</table>

Vespa S 50 2T

Time - 145
**Driven pulley**

![Diagram of driven pulley and clutch components]

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<th>Code</th>
<th>Action</th>
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<tbody>
<tr>
<td>1</td>
<td>Driven pulley - Service</td>
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<td>2</td>
<td>Driven pulley - Replacement</td>
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<tr>
<td>3</td>
<td>Clutch - Replacement</td>
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<tr>
<td>4</td>
<td>Clutch bell housing - Replacement</td>
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</table>
Oil pump

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<tr>
<td>1</td>
<td>Mix movement gear socket - Replacement</td>
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<td>2</td>
<td>Mixer belt - replacement</td>
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<td>3</td>
<td>Mixer - Replacement</td>
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Final gear assy.

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<th>Code</th>
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<tr>
<td>1</td>
<td>Geared reduction unit - Service</td>
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<tr>
<td>2</td>
<td>Gear reduction unit cover - Replacement</td>
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</tr>
<tr>
<td>3</td>
<td>Gear box oil - Replacement</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Rear wheel axle - Replacement</td>
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</tbody>
</table>
Driving pulley

<table>
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<th>Code</th>
<th>Action</th>
<th>Duration</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Driving pulley - Removal and refitting</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Driving half-pulley - replace</td>
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</tr>
<tr>
<td>3</td>
<td>Driving belt - Replacement</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Variator rollers / shoes - Replacement</td>
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</tbody>
</table>
Transmission cover

<table>
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<th>Code</th>
<th>Action</th>
<th>Duration</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>001087 Flywheel cover - Replacement</td>
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</tr>
<tr>
<td>2</td>
<td>001135 Transmission cover bearing - Replacement</td>
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<tr>
<td>3</td>
<td>001096 Transmission crankcase cover - Replacement</td>
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TIME - 150
### ELECTRICAL START-UP

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<thead>
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<th>Code</th>
<th>Action</th>
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<tbody>
<tr>
<td>1</td>
<td>Starter motor - Replacement</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Starter motor cable harness - Replacement</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Starter sprocket wheel - Replacement</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Kick starter - Inspection</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Starter spring pack - Replacement</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Starter lever - Replacement</td>
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</tbody>
</table>
### MAGNETO FLYWHEEL

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<th>Action</th>
<th>Duration</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>001109  Cooling fan - Replacement</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>001173  Rotor - Replacement</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>001067  Stator - Fitting and Relfitting</td>
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</tr>
<tr>
<td>4</td>
<td>001058  Flywheel - Replacement</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>001087  Flywheel cover - Replacement</td>
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</tr>
</tbody>
</table>
### CARBURETtor

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<thead>
<tr>
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<tr>
<td>1</td>
<td>001008</td>
<td>Carburettor - Inspection</td>
<td>Time</td>
</tr>
<tr>
<td>2</td>
<td>001063</td>
<td>Carburettor - Replacement</td>
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<td>3</td>
<td>007020</td>
<td>Carburettor heating tubing - replacement</td>
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<tr>
<td>4</td>
<td>001081</td>
<td>Automatic choke - Replacement</td>
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<td>5</td>
<td>001082</td>
<td>Carburettor heating resistor - Replacement</td>
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<tr>
<td>6</td>
<td>003058</td>
<td>Carburettor - Adjustment</td>
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<tr>
<td>7</td>
<td>004177</td>
<td>Heating hood - Replacement</td>
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**Vespa S 50 2T**

**Time**

1-2-6
Exhaust pipe

<table>
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<tr>
<td>1</td>
<td>Muffler - Replacement</td>
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</tr>
<tr>
<td>2</td>
<td>Muffler guard - Replacement</td>
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Air cleaner

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<thead>
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<th>Code</th>
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<th>Duration</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Air cleaner carburettor fitting - Replacement</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Air filter - Replacement / cleaning</td>
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<tr>
<td>3</td>
<td>Air filter box - Replacement</td>
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</table>

Vespa S 50 2T

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Frame

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<th>Code</th>
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<tbody>
<tr>
<td>1</td>
<td>004001 Chassis - Replacement</td>
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</tr>
<tr>
<td>2</td>
<td>004023 Shield rim - Replacement</td>
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</tr>
<tr>
<td>3</td>
<td>004149 Shield central cover - Replacement</td>
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<tr>
<td>4</td>
<td>004159 Plates / Stickers - Replacement</td>
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<tr>
<td>5</td>
<td>004012 Rear side panels - Replacement</td>
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</tr>
<tr>
<td>6</td>
<td>004059 Spark plug inspection flap - Replace-</td>
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TIME - 156
Centre-stand

<table>
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<tr>
<th>Code</th>
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<tbody>
<tr>
<td>1</td>
<td>004004 Stand - Replacement</td>
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<tr>
<td>2</td>
<td>004102 Side stand - Replacement</td>
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</tr>
<tr>
<td>3</td>
<td>004179 Stand buffer - Replacement</td>
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</table>
Footrests

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>1</td>
<td>004178 Footrest - Replacement</td>
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</tr>
<tr>
<td>2</td>
<td>004078 Front/rear footrest rubber - Replacement</td>
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</tbody>
</table>
Rear cover

<table>
<thead>
<tr>
<th>Code</th>
<th>Action</th>
<th>Duration</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Front shield, rear part - Removal and refitting</td>
<td>004065</td>
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</table>
Underseat compartment

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<th>Code</th>
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<tbody>
<tr>
<td>1</td>
<td>Helmet compartment - Replacement</td>
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<tr>
<td>2</td>
<td>Battery cover - change</td>
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<tr>
<td>3</td>
<td>Central chassis cover - Replacement</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Battery compartment - replacement</td>
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</table>
Plate holder

<table>
<thead>
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<th>Code</th>
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<tbody>
<tr>
<td>1</td>
<td>004136 License plate support - Replacement</td>
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<tr>
<td>2</td>
<td>005048 Licence plate holder - Replacement</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>005032 Licence plate light glass - Replacement</td>
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</table>
Mudguard

**MUDGUARDS**

<table>
<thead>
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<th>Code</th>
<th>Action</th>
<th>Duration</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>004002</td>
<td>Front mudguard - Replacement</td>
</tr>
<tr>
<td>2</td>
<td>004009</td>
<td>Rear mudguard - Replacement</td>
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</table>
### FUEL TANK

<table>
<thead>
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<th>Code</th>
<th>Action</th>
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<tbody>
<tr>
<td>1</td>
<td>004168 Fuel tank cap - Replacement</td>
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<tr>
<td>2</td>
<td>005010 Tank float - Replacement</td>
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</tr>
<tr>
<td>3</td>
<td>004112 Cock-carburettor hose - Replace-ment</td>
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<tr>
<td>4</td>
<td>004005 Fuel tank - Replacement</td>
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<tr>
<td>5</td>
<td>004007 Fuel valve - Replacement</td>
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<td>6</td>
<td>004109 Fuel tank breather - Replacement</td>
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</table>
Tank oil

<table>
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<tbody>
<tr>
<td>1</td>
<td>Oil reservoir float - Replacement</td>
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</tr>
<tr>
<td>2</td>
<td>Oil reservoir - Replacement</td>
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</tr>
<tr>
<td>3</td>
<td>Oil reservoir cock - Replacement</td>
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<tr>
<td>4</td>
<td>Oil reservoir hose - Replacement</td>
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Rear shock-absorber
### Rear Shock Absorber

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<tr>
<th>Code</th>
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<tbody>
<tr>
<td>003007</td>
<td>Rear shock absorber - Removal and Refitting</td>
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### Steering Column Bearings

#### Steering Fifth Wheels

<table>
<thead>
<tr>
<th>Code</th>
<th>Action</th>
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<tbody>
<tr>
<td>003002</td>
<td>Steering fifth wheel - Replacement</td>
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</tr>
<tr>
<td>003073</td>
<td>Steering clearance - Adjustment</td>
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</tr>
<tr>
<td>004119</td>
<td>Bearing / upper steering fifth wheel - Replacement</td>
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</tbody>
</table>
### Handlebar covers

![Diagram of handlebar covers]

#### ODOMETER - HANDLEBAR COVER

<table>
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<th>Code</th>
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<tbody>
<tr>
<td>1</td>
<td>Handlebar front section - Replacement</td>
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</tr>
<tr>
<td>2</td>
<td>Handlebar rear section - Replacement</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Odometer - Replacement</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Instrument panel warning light bulbs - Replacement</td>
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</table>

**TIME** 166
Handlebar components

<table>
<thead>
<tr>
<th>Code</th>
<th>Action</th>
<th>Duration</th>
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<tbody>
<tr>
<td>1</td>
<td>004066 Driving mirror - Replacement</td>
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</tr>
<tr>
<td>2</td>
<td>002037 Brake or clutch lever - Replacement</td>
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</tr>
<tr>
<td>3</td>
<td>002071 Left hand grip - Replacement</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>003001 Handlebar - Replacement</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>005017 Stop switch - Replacement</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>002024 Front brake pump - Removal and Re-fit</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>002054 Throttle or splitter transmission complete - Replacement</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>002060 Complete throttle control - Replace-</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>004162 Mirror support and/or brake pump fit-</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>002059 Right hand grip - Replacement</td>
<td></td>
</tr>
</tbody>
</table>
### Swing-arm

![Diagram of Swing-arm](image)

#### SWINGING ARM

<table>
<thead>
<tr>
<th>Code</th>
<th>Action</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Swinging arm - Engine-chassis connection - Replacement</td>
<td>Time Vespa S 50 2T - 168</td>
</tr>
</tbody>
</table>
Seat

<table>
<thead>
<tr>
<th>Code</th>
<th>Action</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>004003 Saddle - Replacement</td>
<td></td>
</tr>
</tbody>
</table>
### Turn Signal Lights

<table>
<thead>
<tr>
<th>Code</th>
<th>Action</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>005002 Front headlamp - Replacement</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>005012 Front turn indicator - Replacement</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>005067 Front turn indicator bulb - Replacement</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>005008 Front headlamp bulbs - Replacement</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>005005 Taillight - Replacement</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>005066 Rear light bulbs - Replacement</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>005022 Rear turn indicators - Replacement</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>005068 Rear turn indicator bulb - Replacement</td>
<td></td>
</tr>
</tbody>
</table>
Front wheel

<table>
<thead>
<tr>
<th>Code</th>
<th>Action</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>004123</td>
<td>Front wheel - Replacement</td>
<td></td>
</tr>
<tr>
<td>003047</td>
<td>Front tyre - replace</td>
<td></td>
</tr>
<tr>
<td>003037</td>
<td>Front wheel rim - Replacement</td>
<td></td>
</tr>
<tr>
<td>003033</td>
<td>Front wheel hub - Replacement</td>
<td></td>
</tr>
<tr>
<td>002041</td>
<td>Front brake disc - Replacement</td>
<td></td>
</tr>
<tr>
<td>003034</td>
<td>Front wheel hub bearing - Replace-</td>
<td></td>
</tr>
</tbody>
</table>

Vespa S 50 2T

TIME - 171
Rear wheel

<table>
<thead>
<tr>
<th>Code</th>
<th>Action</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rear wheel tyre - Replacement</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Rear wheel rim - Removal and Refitting</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Rear wheel - Replacement</td>
<td></td>
</tr>
</tbody>
</table>

Vespa S 50 2T

TIME - 172
### Electric devices

#### ELECTRICAL COMPONENTS

<table>
<thead>
<tr>
<th>Code</th>
<th>Action</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>005001</td>
<td>Electrical system - Replacement</td>
<td></td>
</tr>
<tr>
<td>005011</td>
<td>Start-up remote control switch - Replacement</td>
<td></td>
</tr>
<tr>
<td>005009</td>
<td>Voltage regulator - Replacement</td>
<td></td>
</tr>
<tr>
<td>005007</td>
<td>Battery - Replacement</td>
<td></td>
</tr>
<tr>
<td>005052</td>
<td>Fuse (1) - Replacement</td>
<td></td>
</tr>
<tr>
<td>001023</td>
<td>Control unit - Replacement</td>
<td></td>
</tr>
<tr>
<td>001094</td>
<td>Spark plug cap - Replacement</td>
<td></td>
</tr>
<tr>
<td>005054</td>
<td>Fuse block (1) - Replacement</td>
<td></td>
</tr>
</tbody>
</table>
Electronic controls

<table>
<thead>
<tr>
<th>Code</th>
<th>Action</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Headlight switch - Replacement</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Light switch or turn indicators - Replacement</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Horn button - Replacement</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Horn - Replacement</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Starter button - Replacement</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Key switch - Replacement</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Lock series - Replacement</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Anti-theft lock - Replacement</td>
<td></td>
</tr>
</tbody>
</table>

**TIME**

Vespa S 50 2T

TIME - 174
Transmissions

<table>
<thead>
<tr>
<th>Code</th>
<th>Action</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>002051 Odometer transmission assembly - Replacement</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>002012 Splitter - Replacement</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>002057 Carburettor / splitter transmission complete - Replacement</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>002058 Mix / splitter transmission complete - Replacement</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>002053 Rear brake transmission complete - Replacement</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>002049 Odometer cable - Replacement</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>003061 Accelerator transmission - Adjustment</td>
<td></td>
</tr>
</tbody>
</table>

Vespa S 50 2T

TIME - 175
### Front Suspension

<table>
<thead>
<tr>
<th>Code</th>
<th>Action</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Steering tube - Replacement</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Front suspension - Service</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Shock absorber support and brake calliper - Replacement</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Odometer reel - Replacement</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Shock absorber cover - Replacement</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Front shock absorber - Removal and Refitting</td>
<td></td>
</tr>
</tbody>
</table>

**TIME - 176**
### BRAKING SYSTEM

<table>
<thead>
<tr>
<th>Code</th>
<th>Action</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>002021 Front brake hose - Remov. and Refitt.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>002007 Front brake shoes/pads - Remov.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and Refit</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>002039 Front brake calliper - Removal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and Refitting</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>002047 Front brake fluid and air bleeding</td>
<td></td>
</tr>
<tr>
<td></td>
<td>system - Replacement</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>002002 Shoes - Rear brake pads - Replace-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ment</td>
<td></td>
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</tbody>
</table>

**Vespa S 50 2T**

**Time**

TIME - 177
Secondary air box

### SECONDARY AIR HOUSING

<table>
<thead>
<tr>
<th>Code</th>
<th>Action</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>001164 Crankcase secondary air connection - Replacement</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>001161 Secondary air filter - Replacement / Cleaning</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>001162 Secondary air housing - Replacement</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>001163 Muffler secondary air connection - Replacement</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>001165 Secondary air reed - Replacement</td>
<td></td>
</tr>
</tbody>
</table>
A
Air filter: 33, 132

B
Battery: 42, 50, 58, 59
Brake: 118, 120, 122, 123, 125
Brake fluid: 122

C
Carburettor: 11, 30, 153

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F
Fuel: 41, 95, 133, 163
Fuses: 58

H
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Hub oil: 32

I
Identification: 8
Instrument panel: 128

M
Maintenance: 7, 28

O
Odometer:

S
Saddle:
Shock absorbers: 115
Spark plug: 31
Stand: 116
Start-up:

T
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Transmission: 9, 41, 67, 150
Tyres: 10