PIAGGIO

SERVICE STATION MANUAL

633616 - 633623

Runner RST 125 - 200

Frame and suspensions

FRAME AND SUSPENSIONS

Specification	Desc./Quantity
Chassis	Tubular and sheet steel.
Front suspension	Hydraulic telescopic fork with Ø 35 mm stem
Rear suspension	Engine with swinging fork articulated to frame by means of an arm with 2 degrees of freedom Pair of double-acting hydraulic shock absorbers and coaxial springs with preloading adjustment in 4 positions.

Brakes

BRAKES

Specification	Desc./Quantity
Front brake	Ø 240 mm disc brake (vehicle LHS), with hydraulic control activated by handlebar right lever.
Rear brake	With Ø 220 mm disc with hydraulic control operated by the left lever in handlebar

Wheels and tyres

WHEELS AND TYRES

Specification	Desc./Quantity
Front wheel	alloy rim: 14" x 3.50
Front tyre	Without inner tube: 120/70-14" 55P
Rear wheel	alloy rim: 13"x 4
Rear tyre	Without inner tube 140/60-1363 P

TYRE PRESSURE

Specification	Desc./Quantity
Front wheel pressure (basic model)	Front wheel inflation pressure (basic model): 2.0 bar
Front wheel pressure (model with accessories)	Front tyre inflation pressure (model with accessories): 2.3 bar
Rear tyre pressure - rider	Rear tyre pressure (rider only): 2.2 bar
Rear tyre pressure (rider and passenger):	2.6 bar

Carburettor

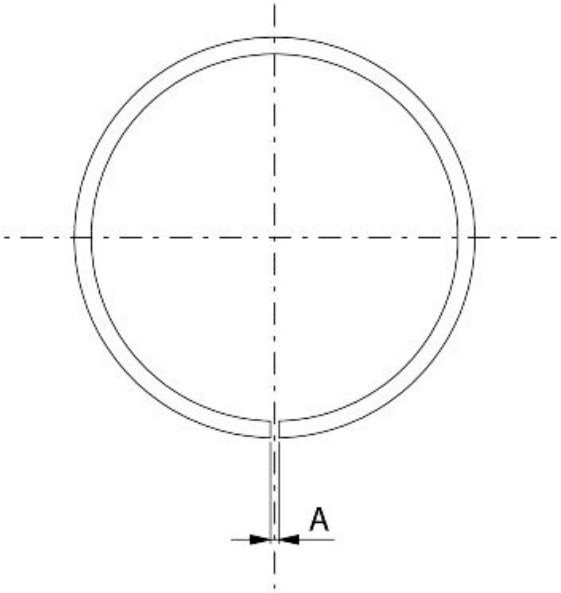
125cc Version

Kehin

KEHIN CVEK-30 CARBURETTOR

Specification	Desc./Quantity
Depression carburettor	CVEK-30
Body stamping	CVEK
Stamping	303A
Max. jet	105
Minimum jet	38
Max. air jet	70
Minimum air jet	130
Throttle valve spring	100 ÷ 160 g

Oversizes

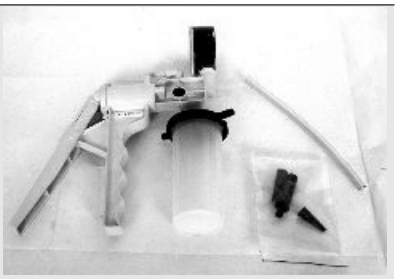


ENGINE 125 OVERSIZE

Name	Description	Dimensions	Initials	Quantity
Compression ring		57 x 1	A	0.15 ÷ 0.30
Oil scraper ring		57 x 1	A	0.10 ÷ 0.30
Oil scraper ring		57 x 2.5	A	0.15 ÷ 0.35
Compression ring 1st oversize		57.2 x 1	A	0.15 ÷ 0.30
Oil scraper ring 1st Oversize		57.2 x 1	A	0.10 ÷ 0.30
Oil scraper ring 1st Oversize		57.2 x 2.5	A	0.15 ÷ 0.35
Compression ring 2nd Oversize		57.4 x 1	A	0.15 ÷ 0.30
Oil scraper ring 2nd Oversize		57.4 x 1	A	0.10 ÷ 0.30
Oil scraper ring 2nd Oversize		57.4 x 2.5	A	0.15 ÷ 0.35
Compression ring 3rd Oversize		57.6 x 1	A	0.15 ÷ 0.30
Oil scraper ring 3rd Oversize		57.6 x 1	A	
Oil scraper ring 3rd Oversize		57.6 x 2.5	A	0.15 ÷ 0.35

ENGINE 200 OVERSIZE

Name	Description	Dimensions	Initials	Quantity
Oil scraper ring		72 x 2.5	A	0.20 ÷ 0.40
Oil scraper ring		72 x 1	A	0.20 ÷ 0.40
Compression ring		72 x 1.5	A	0.15 ÷ 0.30

Stores code	Description	
020382Y	Valve cotters equipped with part 012 removal tool	
020455Y	10-mm guide	
020442Y	Pulley lock wrench	
020440Y	Water pump service tool	
020329Y	MityVac vacuum-operated pump	
020357Y	32 x 35 mm adaptor	

- If there are anomalies, check the Pick-Up and the control unit power supply (positive-negative), replace the control unit if necessary.
- The brand new control unit prevents that the engine rotation exceeds 2000 rpm.
- The programmed control unit allows the engine to rotate within the prescribed limits.

Characteristic

Check ignition advance 125

10° ± 1° at 2000 rpm - 34° ± 1° at 6000 rpm

variable ignition advance (before T.D.C.) 200

10°±1 at 2000 rpm - 32°±1 at 6500 rpm

Spark advance variation

VERSION 125

Specification	Desc./Quantity
Operation threshold	First threshold : 10700 ±50 Second threshold : 11000 ±50
Reactivation threshold	First threshold : 10600±50 Second threshold : 10900±50
Spark elimination	First threshold : 1 spark on 7 Second threshold : 2 sparks on 3

Headlight adjustment

Proceed as follows:

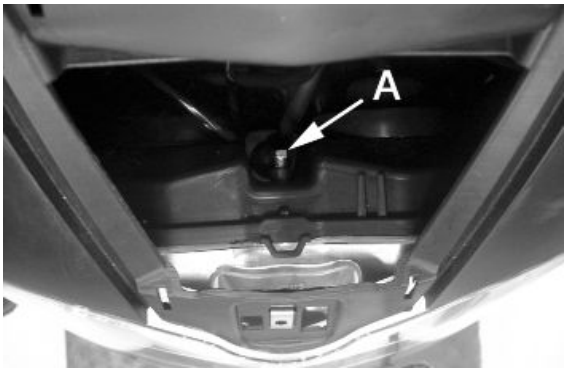
1. Place the vehicle in running order and with the tyres inflated to the prescribed pressure, on a flat surface 10 m away from a white screen situated in a shaded area, making sure that the longitudinal axis of the vehicle is perpendicular to the screen;

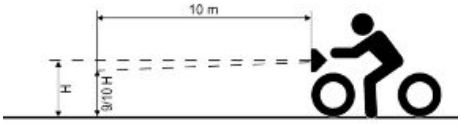
2. Turn on the headlight and check that the borderline of the projected light beam on the screen is not lower than 9/10 of the distance from the ground to the centre of vehicle headlamp and higher than 7/10;

3. Otherwise, regulate the headlight by adjusting the screw «**A**», after removing the front grille.

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.





CO check

Proceed as follows:

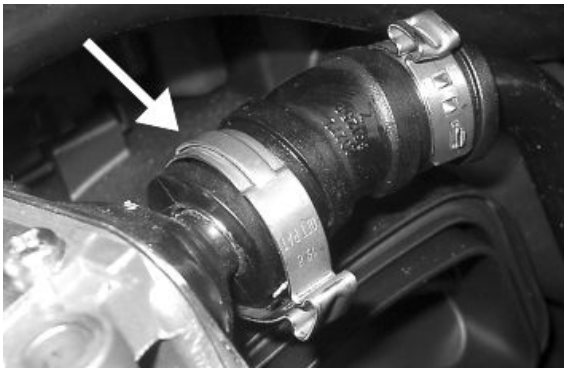
- Remove the clamp and the secondary air valve as shown in the photograph.
- Connect the exhaust fumes outlet tube with the secondary air tube rubber coupling. This connection should guarantee the system tightness to avoid distorting the CO value reading

N.B.

IN CASE OF 1000 PPM UNBURNED HYDROCARBONS (HC) >, CHECK THE IGNITION SYSTEM, THE TIMING SYSTEM, THE VALVE CLEARANCE AND THE EXHAUST VALVE TIGHTNESS.

N.B.

IN CASE OF UNSTABLE CO, CHECK THAT THE CARBURETTOR IS CLEAN AND THAT THE FUEL SUPPLY SYS-



Steering and suspensions

Rear wheel

REAR WHEEL ROTATES WITH ENGINE AT IDLE

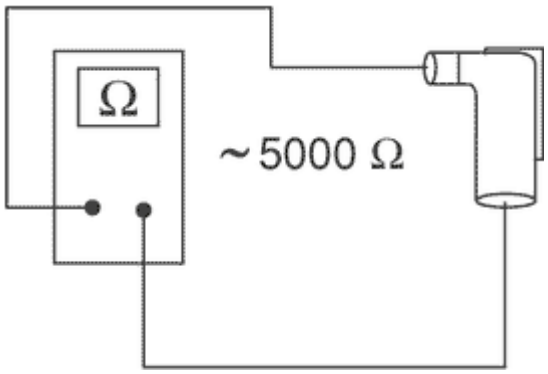
Possible Cause	Operation
Idling rpms too high	Adjust the engine idle speed and the CO%, if necessary.
Clutch fault	Check the springs / clutch masses

Controls

STEERING CONTROLS AND SUSPENSIONS

Possible Cause	Operation
Torque not conforming	Check the tightening of the top and bottom ring nuts. If irregularities in turning the steering continue even after making the above adjustments, check the seats on which the ball bearings rotate: replace them if they are recessed or if the balls are flattened.
Steering hardening	Check the tightening of the top and bottom ring nuts. If irregularities in turning the steering continue even after making the above adjustments, check the seats on which the ball bearings rotate: replace them if they are recessed or if the balls are flattened.
Malfunctions in the suspension system	If the front suspension is noisy, check: the efficiency of the front shock absorbers; the condition of the ball bearings and relevant lock-nuts, the limit switch rubber buffers and the movement bushings. In conclusion, check the tightening torque of the wheel hub, the brake calliper, the shock absorber disk in the attachment to the hub and the steering tube.
Seal fault or breakage	Replace the shock absorber Check the condition of wear of the steering covers and the adjustments.

Virgin circuit



When the ignition system is not encrypted, any key will start the engine but limited to 2000 rpm. The keys can only be recognised if the control unit has been programmed properly. The data storage procedure for a previously unprogrammed control unit provides for the recognition of the master as the first key to be stored to memory: this becomes particularly important because it is the only key that enables the control unit to be wiped clean and reprogrammed for the memorisation of the service keys. The master and service keys must be used to code the system as follows:

- Insert the Master key, turn it to «ON» and keep this position for two seconds (lower and upper limits 1 to 3 seconds).
- Insert the service key and turn it to "ON" for 2 seconds.
- If you have copies of the key, repeat the operation with each key.
- Insert the MASTER key again and turn it to "ON" for 2 seconds.

The maximum time to change keys is 10 seconds. During a single data storage sequence a maximum of 7 service keys are allowed.

It is essential to adhere to the times and the procedure. If you do not, start again from the beginning. Once the system has been programmed, master key transponder, decoder and control unit are strictly matched. With this link established, it is now possible to encode new service keys, in the event of losses, replacements, etc. Each new programming deletes the previous one so, in order to add or eliminate keys, you must repeat the procedure using all the keys you intend to keep using. If a service key should become un-coded, the efficiency of the high voltage circuit shielding must be

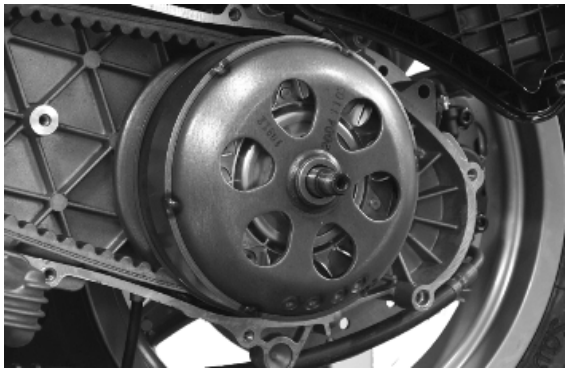
INDEX OF TOPICS

Removing the driven pulley

- Remove the clutch bell housing and the driven pulley assembly.

N.B.

THE UNIT CAN ALSO BE REMOVED WITH THE DRIVING PULLEY MOUNTED.



Inspecting the clutch drum

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

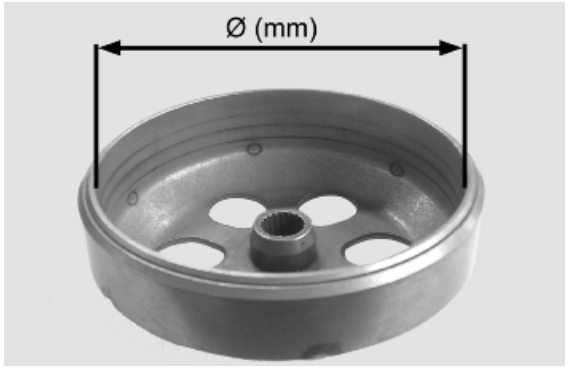
Characteristic

Max. value clutch bell

Max. value: Ø 134.5 mm

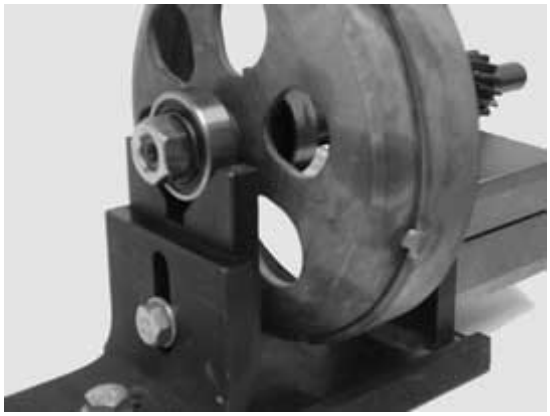
Clutch bell standard value

Standard value: Ø 134 - 134.2 mm



Checking the bell working surface eccentricity

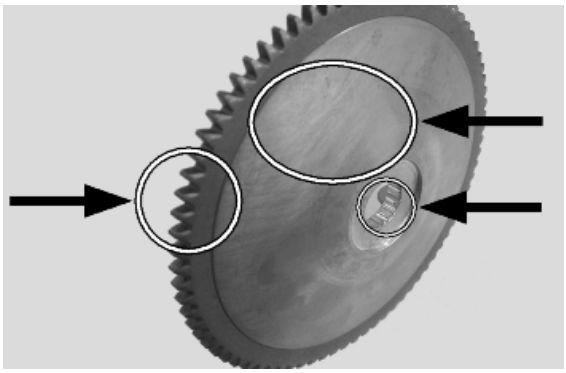
- Install the bell on a driven pulley shaft using 2 bearings (inner diameter 15 and 17 mm).
- Lock it with the original nut.
- Place the bell/shaft assembly on the support to check the crankshaft alignment.



- Check the wear of the roller housings and of the belt contact surfaces on both pulley halves.
- Check that stationary driving pulley does not show signs of abnormal wear on the grooved edge and on the surface in contact with the belt.
- Check that the O-ring is not pushed out of shape.

CAUTION

DO NOT LUBRICATE OR CLEAN SINTERED BUSHINGS



Characteristic

Roller: Minimum diameter permitted

Ø 18.5 mm

Sliding bushing: Minimum admissible diameter

Ø 25.95 mm

Movable driving half-pulley bushing: Maximum allowable diameter

Ø 26.12 mm

Roller: Standard Diameter

Ø 18.9 ÷ 19.1 mm

Sliding bushing: Standard Diameter

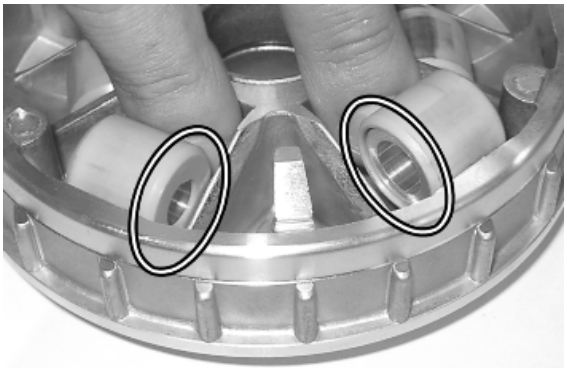
Ø 25.959 ÷ 25.98 mm

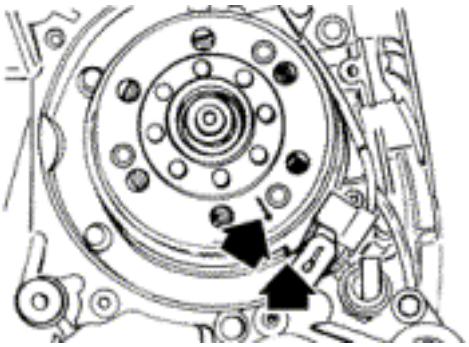
Movable driving half-pulley bushing: Standard Diameter

26.000 - 26.021 mm

Refitting the driving pulley

- Preassemble the movable half-pulley with the roller contrast plate by putting the rollers in their housings with the larger support surface touching the pulley according to the direction of rotation.
- Check that the roller contact plate does not have flaws and is not damaged on the grooved edge.
- Mount the complete bushing unit on the driving shaft.
- Fit the driven pulley/Clutch/belt unit on the engine.





Flywheel and starting

- Check the integrity of the internal plastic parts of the flywheel and the Pick-Up control plate.

Removing the flywheel magneto

- Lock the rotation of the Flywheel using a calliper spanner.
- Remove the flanged nut M10X1.25
- Extract the flywheel with the extractor.

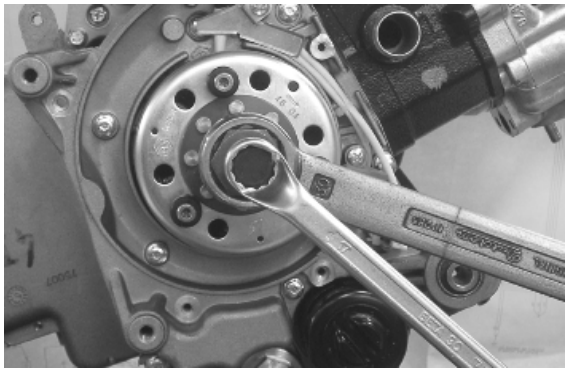
Specific tooling

020565Y Flywheel lock calliper spanner

020162Y Flywheel extractor

Locking torques (N*m)

Electric start-up flywheel nut: 40 ÷ 44 Nm

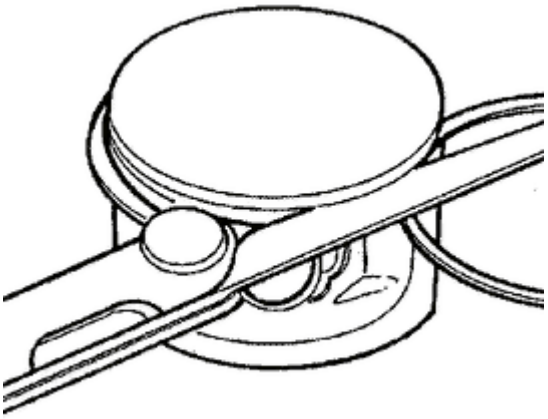


Inspecting the flywheel components

- Check the integrity of the internal plastic parts of the flywheel and the Pick-Up control plate.

Inspecting the piston

- Carefully clean the seal housings.
- Measure the coupling clearance between the seal rings and the grooves using suitable sensors, as shown in the diagram.
- If the clearance is greater than that indicated in the table, replace the piston.



Inspecting the piston rings

- Alternately insert the three sealing rings into the cylinder, in the area where it retains its original diameter. Using the piston, insert the rings perpendicularly to the cylinder axis.
- Measure the opening (see figure) of the sealing rings using a feeler gauge.
- If any measurements are greater than specified, replace the piston rings.

N.B.

BEFORE REPLACING ONLY THE PISTON RINGS, ENSURE THAT THE CLEARANCE BETWEEN THE PISTON RINGS AND THE PISTON RING GROOVES, AND BETWEEN THE PISTON AND THE CYLINDER, IS AS SPECIFIED. IN ANY CASE, NEW PISTON RINGS USED IN COMBINATION WITH A USED CYLINDER MAY HAVE DIFFERENT BEDDING CONDITIONS THAN THE STANDARD.

Cam shaft check: Maximum admissible axial clearance

0.42 mm

Cam shaft check: Standard axial clearance:

0.11 - 0.41 mm

Cam shaft check: Standard height

Outlet: 29.209 mm

Cam shaft check: Standard height

Inlet: 30.285 mm

Cam shaft check: Minimum admissible diameter

Bearing B diameter: 19.950 mm

Cam shaft check: Minimum admissible diameter

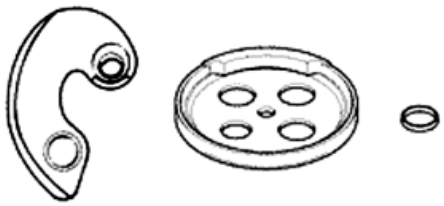
Bearing A Ø: 36.94 mm

Cam shaft check: Standard diameter

Bearing B diameter: 19.959 ÷ 19.98 mm

Cam shaft check: Standard diameter

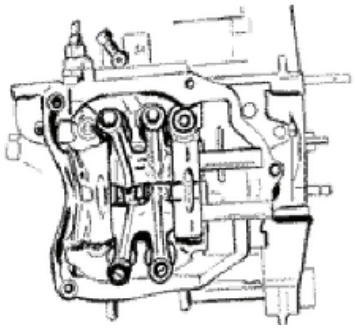
Bearing A Ø: 36.95 ÷ 36.975 mm



Refitting the head and timing system components

Assemble the lower timing chain sprocket wheel on the crankshaft, with the chamfer facing the insertion side.

- Loop the timing chain around the sprocket on the crankshaft.
- Fit the chain tensioner slider from the cylinder head side.
- Fit the spacer and the screw fastener.
- Tighten the screws to the prescribed torque.



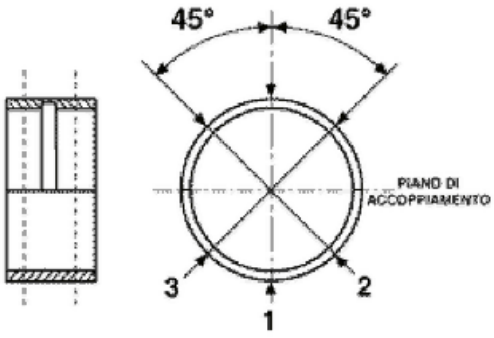
Locking torques (N*m)

Slider screw 10 ÷ 14 Nm

- The solid half-bearing is intended to stand the thrusts caused by combustion, and for this reason it is arranged opposite the cylinder.
- To prevent obstructions in the oil feeding channels, the matching surface of the two half-bearings must be perfectly perpendicular to the cylinder axis, as shown in the figure.
- The oil feeding channel section is also affected by the bushings driving depth compared with the crankshaft axial clearance of the limiting surface.
- Check the inside diameter of the main bushings in the three directions indicated in the diagram.
- Repeat the measurements for the other bushing half. see diagram.
- There are three crankcase versions: with RED main bushings, with BLUE main bushings and with YELLOW main bushings.
- There is only one type of main bushing housing hole in the crankcase

The standard bushing diameter after driving is variable on the basis of a coupling selection.

- The bushing housings in the crankcase are available in two categories, Cat. 1 and Cat. 2, as are the crankshafts.
- The main bushings are available in three thickness categories, identified by colour markings, as shown in the table below.



TYPE	IDENTIFICATION
A	RED
B	BLUE
C	YELLOW

	Type "A" - RED	Type "B" - BLUE	Type "C" - YELLOW
Crankshaft half-bearing	1.970 ÷ 1.973	1.9703 ÷ 1.976	1.976 ÷ 1.979

Inspecting the cut-off

- Remove the SAS valve.
- Connect the MITYVAC pump in low-pressure mode (VACUUM) to the CUT-OFF valve vacuum intake.
- Apply a vacuum value higher than 0.5 BAR.
- Check that this value is kept all the time.
- If a worn seal is detected, replace it.
- With a "T" bypass and flexible rubber hoses make a parallel connection between the rubber coupling and the vacuum intake of the CUT-OFF valve.
- Connect the bypass to the MITYVAC pump.
- Set the pump set to the low-pressure mode (VACUUM).
- Using a pair of long flat pliers, choke the rubber hose next to the valve.
- Operate the pump until vacuum is higher than 0.5 BAR.
- Release the hose and check how the vacuum reacts. - Under normal functioning conditions the vacuum undergoes a slight fall and then readjusts. There follows a slow and continuous loss of depression up to approximately 0.4 BAR. At this point the valve opens and the depression is suddenly set to zero.

Lack of tightness or the fact that the valve opens at different vacuum values should be regarded as anomalies. In this case, replace it.

N.B.

LACK OF TIGHTNESS IN THE CUT-OFF VALVE RESULTS IN EXHAUST NOISE (EXPLOSIONS IN THE MUFFLER). INCORRECT CUT-OFF VALVE CALIBRATION CAN RESULT IN CATALYTIC CONVERTER MALFUNCTIONING

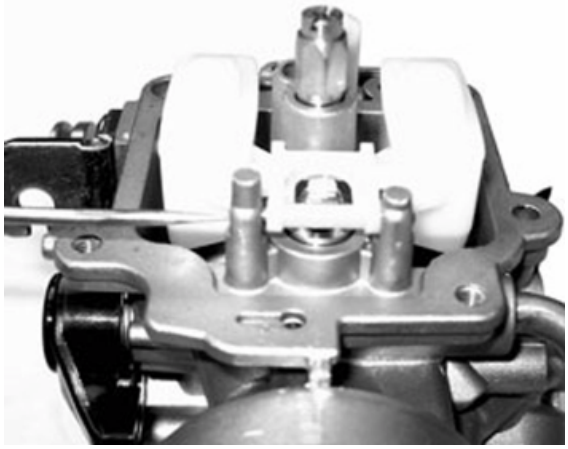
N.B.

A FAULTY CUT-OFF VALVE DIAPHRAGM, BESIDES JEOPARDISING THE CORRECT OPERATION OF THE CUT-OFF VALVE, ALSO DAMAGES IDLE FUNCTIONING

Specific tooling

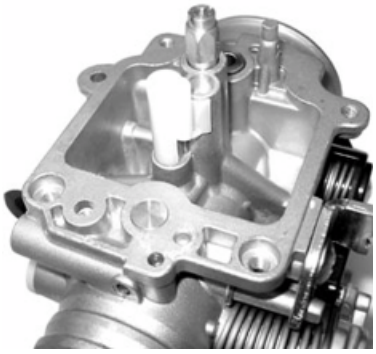
020329Y MityVac vacuum-operated pump

Remove the cover of the duct from the carburettor to the starter nozzle as shown in the figure.



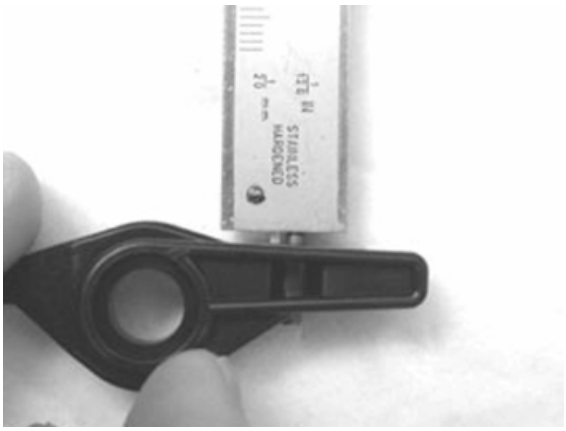
-Remove the maximum nozzle.

-Remove diffuser.



- Prepare the carburettor for adjustment by rotating the screw 3 turns from the close position.

- Check that the rocking lever control of the accelerating pump does not show abnormal wear.
- Check that the end of stroke screw of the rocking lever protrudes 3.2 mm.



Check that the return spring of the rocking lever is not loaded.
- Preassemble the spring and rocking lever as shown in the figure.
- Assemble the rocking lever on the carburettor keeping the throttle valve open.
- Lock the fixing screw of the rocking lever.
- Make sure that the mechanism works correctly.

Inspecting the valve and needle

Kehin

- Check that the tapered pin of the vacuum valve does not show wear.
- Check that the depression valve does not show threads on the external surfaces.
- Check that the vacuum intake hole is not clogged.
- Check that the diaphragm is not damaged or has hardened, otherwise replacement the whole valve.
- Insert the tapered pin into the vacuum valve housing.
- Reassemble the vacuum valve on the carburettor body taking care that the tapered pin is inserted into the sprayer.

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Removal

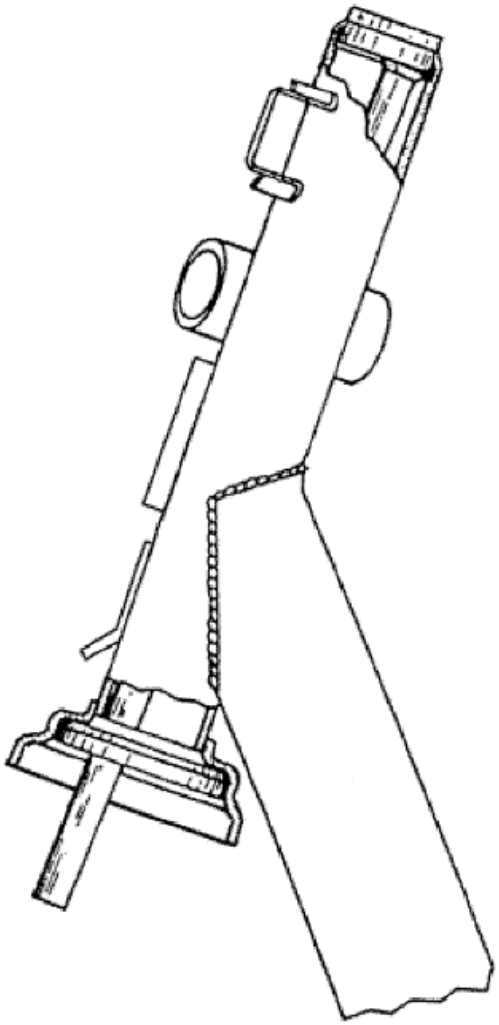
Remove upper bearing with an appropriate tool.

N.B.

USE THE APPROPRIATE TOOL AGAIN TO REMOVE THE LOWER HOUSING OF THE STEERING LOWER BEARING

Specific tooling

020004Y Punch for removing fifth wheels from headstock



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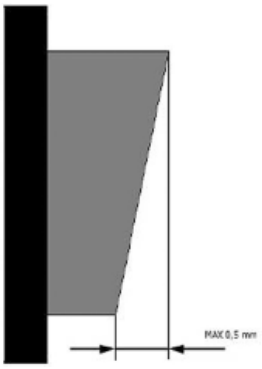


Refitting

To fit, proceed as follows:

- Insert the two pads in the callipers.
- Screw the two pad lock pins to the correct torque, and apply the recommended product.
- Fit the calliper on its support, tightening the two screws to the prescribed torque.

N.B.

IF IT IS NOT POSSIBLE TO CORRECTLY POSITION THE CALLIPER ON THE DISC DURING FITTING, GENTLY EXPAND THE PADS.

Recommended products

Loctite 243 Medium strength threadlock

Loctite 243 medium-strength threadlock

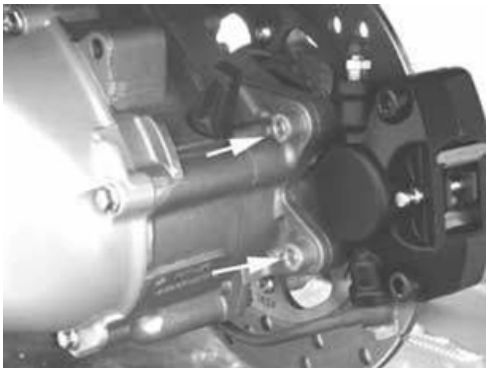
Locking torques (N*m)

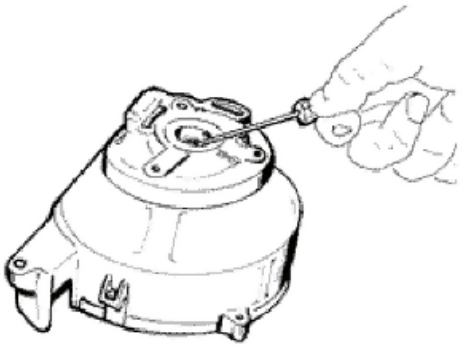
Screw tightening calliper to the support 20 ÷ 25 Pad fastening pin 19.6 ÷ 24.5

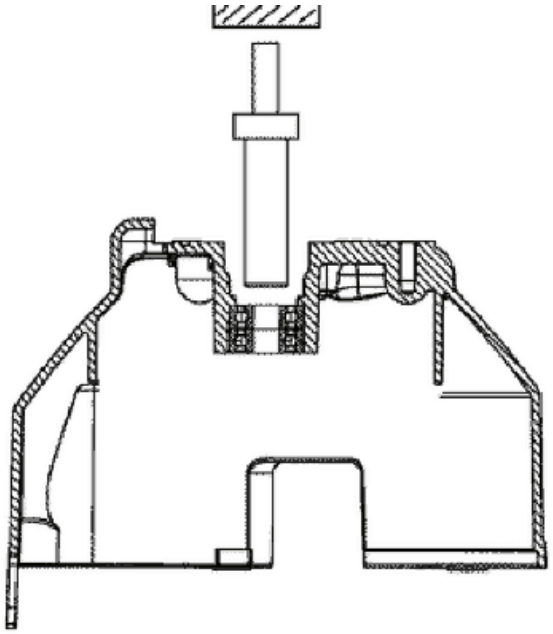
Rear brake pads

Removal

- Remove the rear wheel.
- Remove the rear brake calliper.
- Remove the check spring and the fixing pin.
- Remove the brake pads and check that they show no flaws or warping. If it is, replace it.
- Check that the thickness of the friction material is over 1.5 mm. Otherwise, replace it.
- 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.



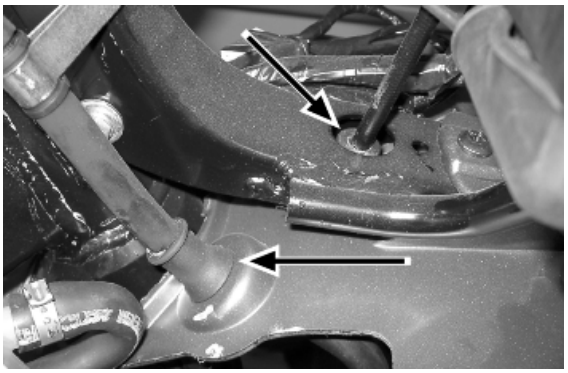




Check components

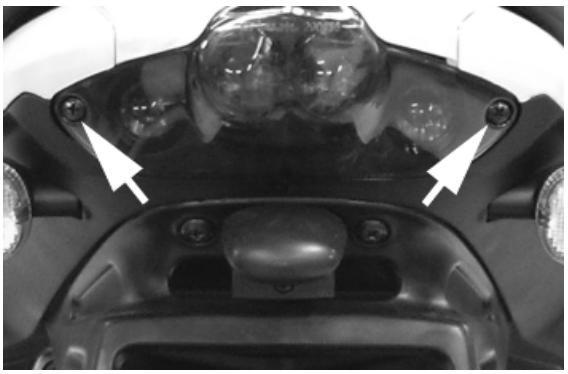
- Check that the rotor does not show abnormal wear or dents;
- Check that the rotor shaft is not rusty;
- Check that there is no rust on the bearing seats or the ceramic seal;
- Check that the drive does not show dents and that it is perfectly integral with the steel hub.

Thermostat



Taillight assy.

Remove the two screws and take out the whole unit.



Footrest

Remove the 3 screws indicated in the figure and remove the footrest.

- Abnormal noise

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

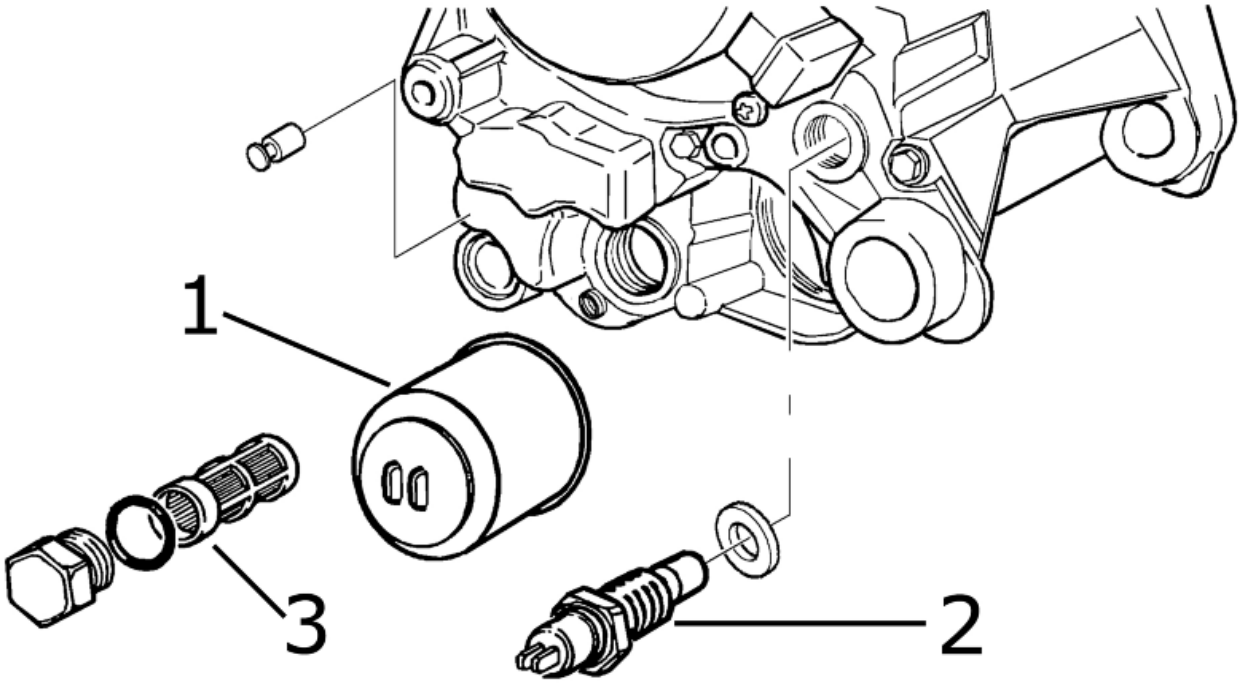
Engine

- 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

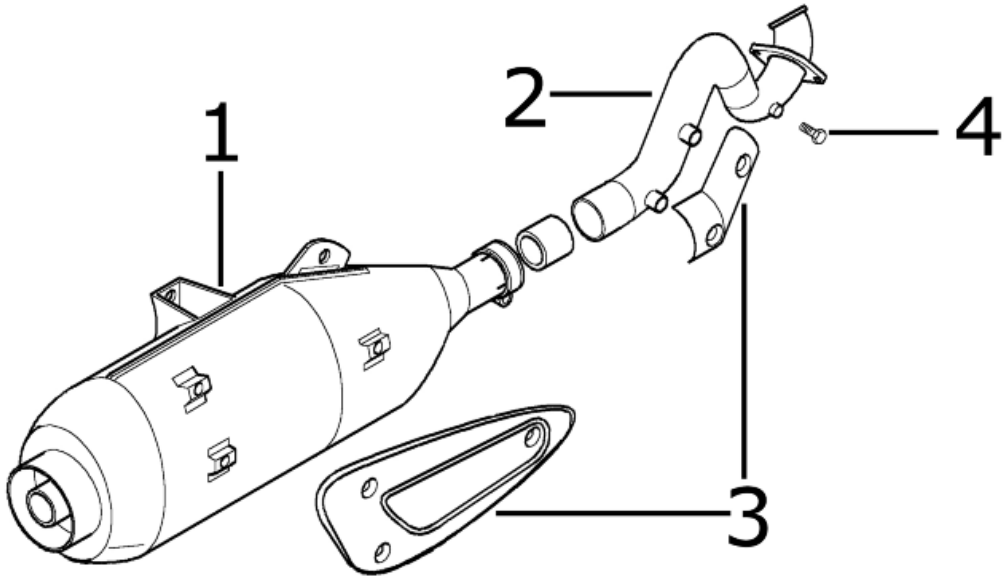
Oil filter



OIL FILTER

	Code	Action	Duration
1	001123	Oil filter -Replacement	
2	001160	Oil pressure sensor - Replacement	
3	001102	Oil mesh filter - Change / Cleaning	

Exhaust pipe



MUFFLER

	Code	Action	Duration
1	001009	Muffler - Replacement	
2	001092	Exhaust manifold - Replacement	
3	001095	Muffler guard - Replacement	
4	001136	Exhaust emissions - Adjustment	