

# Morini Carburettor Balancing

Based on notes published in the Morini Riders Club magazine "A Tutto Gas" in 1980.

## Your carbs may need balancing if :

- You have put on new throttle cables,
  - You have any flat spots, or the motor does not "sing" like a good 2-stroke when ridden hard,
  - General power loss, roughness or lethargy,
  - Poor starting
  - You have changed the exhaust system or
  - As part of the general routine service
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## Before attempting to balance the carbs, check the following :

- The ignition timing is correct, use a strobe light, Plug leads and plugs are in good condition.
  - The intake tubes are not leaking and any rubber parts are not cracked, if they are, replace them.
  - Air filters are clean and correctly secured
  - The tappets are adjusted correctly (All V-twins and singles based on the V twins, 1.0mm inlet and exhaust)
  - Petrol can flow easily through the taps, swill out the tank if needed.
  - Carb internals are clean and no jets or holes are blocked
  - Chokes are firmly closed
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## You will need the following equipment :

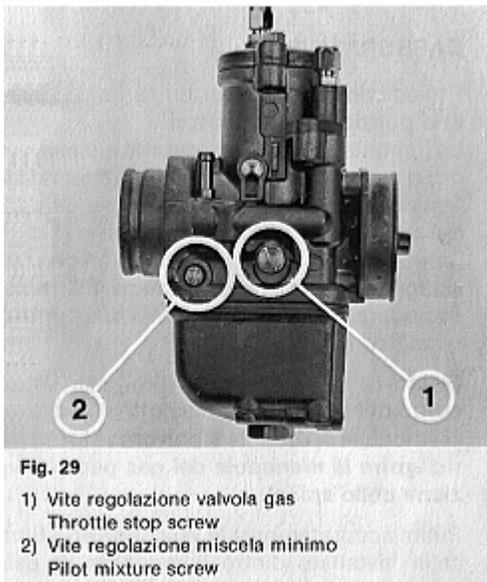
A couple of 8mm open ended spanners, a flat blade screwdriver that will fit the mixture screws and a set of mercury vacuum gauges with adaptors to fit your bike. Mercury U-tube gauges are preferable to the dial type gauges (cheaper and will give more accurate results).

Some WD40 or rubber lubricant spray will also come in handy

If this is your first time allow a couple of hours, as with everything else it gets easier with practice.

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## What to adjust



The throttle stop screw is the larger one with the knurled edge with the spring visible behind it. This controls the height of the throttle slide and so the tick over speed.

The mixture screw is the smaller one in the body of the carb, this adjusts the idle mixture.

On top of the carb is the hex nut cable adjuster which is covered by a rubber boot. This alters the length of the cable and so controls the movement of the slide. If possible, try to obtain throttle cables with in-line adjusters, these are usually positioned a few inches away from the handlebar end and will make balancing a lot easier, no more fumbling under the tank.

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## Balancing

Firstly, go for a ride. Use the motor hard, full throttle if possible. There is no point balancing the carbs on a cold or cool motor. On returning home, switch the manual fuel tap to reserve and start the balancing procedure at once. Do all adjustments outside or in a well ventilated garage or shed.

During balancing the motor may start to overheat, if it does, stop at once and allow it to cool to normal.

1. Take off or lift seat and prop up the rear of the tank so that you can reach the carb top adjusters with the spanners. Don't lift it too high or the petrol pipes will be stretched and

may disconnect. Connect the mercury gauges. Mine have a strap so they can be hung from the handlebars. There should be a rubber plug in each manifold between the carb and the cylinder head, remove these and attach the tubes from the mercury gauges to the holes using the adaptors provided with the gauges. On rubber manifolds, ensure that there is no rubber flap on the inside of the hole when the plug is removed. Connect right hand carb to right hand mercury column to make life easier. The carbs on my 500 are joined by a balance pipe, this is disconnected from both carbs and the mercury gauges are connected to the balance pipe stubs on each carb.

**2.** Start the motor, try not to open the throttle when doing so, if the motor revs too high there is a slim chance that some of the mercury may be sucked into the motor. If this happens, stop immediately and drain the motor oil. Drain the clean oil again after 250 miles. If mercury is picked up by the oil pump it will destroy the bearings. Adjust the tick over to around 2500rpm by screwing in the throttle stop screws (clockwise) a little at a time and by the same amount on each carb.

**3.** Look at the mercury levels in the U tube, one side will likely be lower than the other, if this is the case, lower that sides carb slide by unscrewing (anti-clockwise) the throttle stop screw, so that both levels are equal. Make any adjustments in small steps and allow the motor and the gauges a few seconds to even out after each change. The tickover will drop, do not allow the motor to stall. If the tick over gets too low, raise the slide on the other carb by screwing in its throttle stop screw and start at **3.** again. When the motor is idling easily and the mercury columns are level go on to the next step.

**4.** Adjust the mixture screws one carb at a time so that the motor runs **fastest**. Turn the screw one way 1/8 to 1/4 of a turn at a time and wait a few seconds to see the effect. A point will be reached where the motor starts to "stumble". Make a mental note of the screws position. Then turn the screw in the opposite direction until another "stumbling" point is reached. The optimum and fastest setting will be approximately mid way between the two. When you have done one carb, adjust the other side. The settings will be different on each side, this does not matter, give each cylinder what it wants to run quickest. Clockwise rotation will lean out the idle mixture, anti clockwise will richen the mixture.

**5.** Gently blip the throttle a couple of times to settle the carbs down.

**6.** Lower the tickover to a normal level (1250-1750 rpm) by unscrewing the throttle stop screws evenly and a little at a time, check that the mercury levels are still the same.

**7.** Re-do step 4.

**8.** Re-do step 6. The motor should now be idling evenly.

**9.** If you have not done so already, switch the motor off and allow it to cool down

**10.** So far we have adjusted the motor to run correctly at slow speed. The procedure so far has allowed for varying cylinder strengths and demands and allows each cylinder to pull as well as it can at idling speeds. Now we need to adjust for higher engine speeds. Apart from the occasional blip, you should not have touched the twist grip so far.

**11.** Slip back the rubber sheaths from the top of each carb, a squirt of the WD40 may help,

to reveal the adjusters. Keep the handlebars pointing in the straight ahead position. Observe the manometer, listen to the note of the engine and gently lean on the twist grip so the engine note just changes and no more. The mercury levels will deflect, one rising, one falling. The cylinder whose mercury level rises indicates that the vacuum formed behind the slide is too high and to reduce this we need to raise the slide by screwing out the hex carb top adjuster using the 8mm spanner.

Watch out for the free play in the cables. If it gets too small the other cylinder's hex adjuster should be lowered. This has the same effect as raising the first one. Switch off the motor while adjusting the hex nuts so as not to overheat. After each adjustment open the throttles wide, with the motor off, a couple of times to seat the cables properly.

Ultimately you will be moving the hex adjusters by a very small amount and getting near that point where, when the twist grip is just leant on and the engine note changes, the mercury columns do not move, but stay level. Slight "warbling" is acceptable. At this point, both levels will drop equally when the throttle is opened slightly and will rise and level off when the throttle is closed.

**12.** Slip the rubber sheaths back down and check again, some of the caps may leak air which the sheaths may plug, affecting the manometer readings. Re-adjust if necessary to get the levels correct again.. Turn the steering from lock to lock with the engine running to check the idle speed does not change due to incorrect cable free play.

**13.** Go back and check 4. and 6. Stop engine.

**14.** Disconnect the gauges, fit back the rubber bungs or balance pipe and refit the tank and seat. That's it. Now go for another ride and be amazed at the difference. Acceleration when quickly opening the throttles should now be smooth with no stuttering. Check the tickover at the end of the ride, if it needs adjusting go back to step 6. for one last little adjustment.

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## Problems

**1.** If you find that, while reducing the idling speed, it is not possible to keep the columns level (ie dropping the slide on one carb does not raise its mercury level), then check for the following likely causes

a. The inlet system is passing too much air, killing the vacuum. Check the manifold for air leaks, or perhaps the throttle slide or carb itself is worn.

b. The cylinder is not drawing enough air to create the vacuum. Check ignition, plugs and spark. If these are OK it could be burnt valves or broken piston rings, do a compression check.

**2.** If you find the optimum position for the idle mixture screw is less than 1/3 of a turn out, then you may have trouble setting up a reliable tickover. Consider reducing the pilot jet by one size.

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