

VALVE ADJUSTMENT

The following instructions cover valve adjustment on non-hydraulic (solid lifter) engines. Check the specification sheet on your vehicle to establish your specific engine. If not available, check any engine with no spin on filter will be solid lifter. If there appears to be no valve lash on any valve and if push rod moves out as adjusting screw is loosened, you are dealing with hydraulic valves. See instructions at end.

To perform a valve adjustment, the engine must be cold: minimum of 4 hours after shutoff, overnight is preferable.

As rocker assemblies for stock 1600 cc motors, 1600 "S" motors, 2000 cc and 2100 cc motors vary, this description will try to describe methods for both types. Please keep in mind that not all adjustment mechanisms are the same.

Tools: For STOCK 1600 cc, you will need a slot screwdriver, a 15 mm combination or, preferable, offset boxed wrench.

For 1600 "S" MOTORS you will need a 1/8" Allen wrench and 13 mm (1/2") combination or preferably offset boxed end wrench, an 11 mm (7/16") wrench, as well as a slot screwdriver.

For 2000 cc and 2100 cc MOTOR a slot screwdriver, a 13 mm (1/2") combination or preferable offset boxed end wrench and an 11 mm (7/16") wrench will do.

For all 1600 cc motors and 2000 cc as well as 2100 cc motors equipped with aluminum push rods you will need a .004" and a .005" feeler gauge. For recent 2000 cc 2100 cc motors equipped with chrome molly steel push rods you will need .001" and a .002" feeler gauge. Check the specifications sheet on your specific vehicle for proper clearance. If not available, remove rocker assembly and establish push rod material prior to adjusting.

For ALL MOTORS feeler gauges are needed. The "go - no go" style is recommend. A 19 mm boxed end wrench to turn over the motor is also needed.

1. Remove both valve covers by popping retaining clips downward over covers with screwdriver. Gaskets are bonded to the covers and should not stick to the head flange.

2. Unclip distributor cap and lift so that you can identify the spark plug that the distributor rotor is pointing towards.

On the 1600 and 1600 "S" MOTORS the stock crank pulley has 4 notches.

The 2000 cc and 2100 cc MOTORS have an aluminum pulley with degree markings. The alignment mark on the engine case is the split line between the two halves of the case, which runs directly behind the pulley.

3. Using a boxed 19 mm wrench on the chrome nut of the alternator pulley, slowly turn the crank in clockwise direction. You may need to put pressure on the belt with your other hand to overcome the compression pressure of the engine. On 1600 and 1600 "S" MOTORS keep looking for the notches. If the first notch that comes up is a single notch with no other notches to either side of it for 1 1/2", then you have Bottom Dead Center mark. If the notch that comes up has notches to its left, the marks from right to left are 30 degrees BTDC, 7 degrees BTDC and Top Dead Center respectively. On the aluminum pulley both TDC and BDC are clearly marked.

Always turning clockwise, place the crank at either TDC or BDC. NEVER turn engine backwards. If you pass the mark you want, keep turning clockwise until you return to that same spot, keeping in mind that you will need to go two complete revolutions. With the engine either in TDC or BDC position, identify which cylinder the distributor rotor is pointing towards by simply following the spark plug lead to the plug. The number of the cylinder is stamped on the sheet metal just outboard of each opening for the plug for easy identification.

4. You now have identified the cylinder that is firing. At this time go to the cylinder head on that side and verify that the pair of valves has some play. This is easily done by manually pulling and pushing the rocker assembly. If you do not feel the play, redo step 3. until you are certain you have a cylinder in firing position. Before adjusting your first pair of valves, you must check for tightness of the two 8 mm (13 mm across the flats) nuts that hold the rocker assembly to the head. On the 1600 "S" MOTOR and 2000 cc and 2200 cc MOTOR you must also check the two bolts that hold the caps on either end of the rocker shaft.

5. You are now ready to set your valve clearance. The two central valves on either head are the intake valves and the outer valves on either head are the exhaust valves. The lash for these are .004" and .005" for aluminum push rods, and .001" and .002" for steel push rods respectively. Start on either valve on the firing cylinder, with the proper feeler gauge. Insert it between the top of the valve stem and the rocker. You should feel some drag on the gauge, but it should not bind. If an adjustment is needed, undo the lock nut on the adjusting screw and turn the screw in the correct direction. Retighten the same nut and recheck. It will probably take several tries on each valve before you hit the perfect spot. A "go - no go" gauge is helpful, but a good feel in your hand is all you really need. Keep in mind that for a nice, quiet even sounding engine it is important to have all the lashes on all the valves very close to one another.

Once you have finished with the adjustment of each cylinder, it is important to check the push rods. Simply turn the push rods one at a time with your fingers while you watch. The rod should turn freely and with no wobble in it. If it binds when you turn it, you may have the lash too tight and if it wobbles as you turn it, it may be slightly bent. In that case it must be replaced before it fails. This occurrence is rare, but should always be checked.

6. The firing order is 1-4-3-2. Once you have identified the first cylinder and adjusted your first pair of valves, you simply have to turn the crank 180 degrees to the next mark BDC or TDC. Figure out which is the next cylinder to fire, and you repeat step 5. Keep in mind that when you go to the other head, you must first check the rocker shaft nuts, then proceed with the valve adjustment. Once you have gone around, turned over the engine and adjusted the valves and checked the push rods on all four cylinders, you should go around again and recheck all the lashes. This might catch a slightly misadjusted valve.

7. To reinstall the valve covers, wipe the oil off the gasket surface and the sealing surface of the cylinder head. If not leaking and in good shape these gaskets do not need to be replaced. If needed scrape old gasket off cover and clean. Bond new gasket with aviation Permatex or silicone. Place the cover over the flange, hold it firmly with one hand and pop the clip back over it, using a screwdriver. Check that the valve cover is still in the correct position and that it is seated properly. On the 2200 cc MOTOR, check the crankcase vent hose clamps. Reinstall the distributor cap, remove the 19 mm wrench from the pulley nut. Remove any tools from inside the engine compartment and start the engine. Check that you do not have an oil leak at the valve covers.

Hydraulic valve check and adjustment.

This check need only be performed at the 5000 km service and any subsequent 'major' services or if valve noise is evident during regular engine operation (after initial warm/pump up). This check can be completed on a warm engine.

Follow steps 1 to 4 in the above description. Once the firing cylinder is identified, first try to push rocker against the push rod with your thumb. If all is normal you should not be able to move the rocker; the lifter is pumped up. Now loosen the adjusting screw jamb nut and back off the adjuster until you a.) develop some valve

lash or b.) run out of adjustment. The correct 'pre-tension' on the lifter is 1 turn. Eliminate all play with the adjusting screw, then turn adjusting screw in one full turn and lock jamb nut. If you were able to move the rocker against the push rod that lifter is not pumped up. What you are pushing against with your thumb is a light spring that keeps the lifter open so that it can fill. If you are adjusting this valve it is important that you be very observant. Loosen the jamb nut on that adjuster, back off the adjusting screw until you develop some "true" valve lash. You must not confuse this with lightness of the spring in the lifter. Once you have established the point of "no lash", turn the adjusting screw in one full turn and lock the jamb nut. You should recheck this once the lifter is fully pumped up.

It is not uncommon for hydraulic valve lifters to loose pressure (leak down) if the vehicle/engine is parked for an extended period of time. Sometimes a few days is all it takes. When starting the engine in this situation it might not start that easily and will be quite noisy for seconds or minutes, even at driving speed. If after an hour of running one or two valves still make noise it might be wise to check the lash and rocker assemblies. If ever in doubt, contact Intermeccanica.