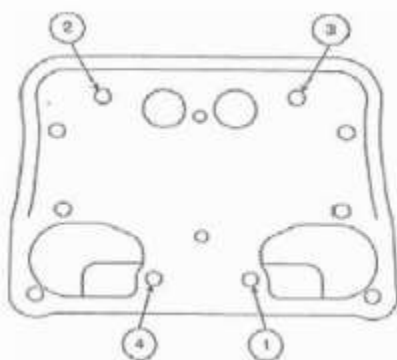


## How to check your Valve stems for TP alignment issues

Make sure the area in and around the rocker boxes is clean and free of loose debris etc. Debris getting into the rocker boxes can cause oil circulation issues and motor damage.

- 1) Put the rear wheel in the air
- 2) Pull the spark plugs, when reinstalling torque to 14ftlbs.
- 3) Rotate the rear wheel while shifting your transmission into 6th gear.
- 4) Remove the pushrod covers.
- 5) Now rotate the rear wheel and watch the intake push rod of the rear cylinder. The intake pushrod will be the front pushrod on the rear cylinder. After the push rod has gone up and come back down on the rear intake continue to turn the wheel about another eighth turn. Using a long flat head screwdriver probe through the spark plug hole of the rear cylinder to feel where the top of the piston is. Be very careful as you don't want to jam the screwdriver into the piston. You just want to feel the top of it. Continue to rotate the wheel, an assistant usually makes this job easier, until it stops rising.
- 6) You now have the motor at TDC, Top Dead Center, on the firing stroke of the rear cylinder.
- 7) Using two 7/16 wrenches, if you have the non-quickie pushrods, loosen the pushrod lock nuts and turn the pushrod main shaft clockwise and the base of the pushrod counterclockwise until there is no tension on the pushrod. Do this on all four, front and rear, pushrods.
- 8) Remove the 8 screws holding the rocker covers on.
- 9) Loosen the four large bolts inside each rocker box in 1/4 turn increments following the below pattern until all four bolts are loose.



- 10) Remove the bolts on the pushrod side to release the rocker arm shafts.
- 11) On one end of the rocker arm shaft there is a small threaded hole. Using a pick, drywall screw or a screw that matches the thread pitch of the hole pull the rocker arm shaft out and remove the rocker arm. Do not mix up the shafts or rocker arms. Everything must go back in the way it came out.

- 12) Now examine the tops of the valve stems. If you see marks like the ones in the following picture then you need the alignment kit. The image below shows how the roller is pushing on the valve in an uneven manor which leads to guide wear and failure.



- 13) If the marks are worse, like the below picture, then you need a valve job. The image below clearly shows a valve that is moving and rotating. WSW recommends John Sachs Engineering for the head work if you can utilize them.



- 14) If your marks are really close to center and there is no moving or rotating then you are likely okay.
- 15) Install the rockers and shafts back into their original positions.
- 16) Put red thread locker on all the bolts you loosened earlier and install them to their original positions. Once snug tighten in 1/4 turn increments, following the previous diagram we showed you for loosening the bolts, to 15-18ftlbs.

- 18) Install the rocker covers. Use blue thread locker on the cover bolts and torque to 80-90inlbs, that is inchlbs not ftlbs, in a cross pattern.
- 19) Now starting with the rear cylinder, since it is already at TDC and ready, turn the pushrods all the way back out until all slack is removed. Put a small mark at one of the points where the two flats meet on the pushrod main shaft. Holding the lower portion of the pushrod in place with a 7/16 wrench turn the main pushrod shaft counterclockwise until the mark you made has passed around four times and is back in the start position. Rotate the locknut down onto the lower portion you were holding in place. Holding the main shaft and lower portion in place with two 7/16 wrenches use a third 7/16 wrench to tighten the locknut down against the lower portion of the pushrod. Repeat for the other pushrod. Wait until the lifters bleed down, about 15 to 20 minutes generally, and you can rotate the pushrods with your thumb and forefinger. Once you can rotate them fairly easily move on to the next step.
- 20) Rotate the rear wheel and watch the intake push rod of the front cylinder. The intake pushrod will be the rear pushrod on the front cylinder. After the push rod has gone up and come back down on the rear intake continue to turn the wheel about another eighth turn. Using a long flat head screwdriver probe through the spark plug hole of the rear cylinder to feel where the top of the piston is. Be very careful as you don't want to jam the screwdriver into the piston. You just want to feel the top of it. Continue to rotate the wheel, an assistant usually makes this job easier, until it stops rising. Now you are at TDC for the front cylinder. Follow the previous step to set the front pushrods. After you can rotate the pushrods fairly easily on the front cylinder put the pushrod covers back in place and install the covers on both cylinders. Make sure the base of the covers is pushed down into the lifter guide blocks and the tops are pushed completely up into the seals of the heads.