



## *Installation Instructions for Starter*

1. First ensure that the threads in the block are clean and deep enough to tighten the starter nose without the thick washers or shims. The threads on the bolts may be shortened, but there must be  $\frac{3}{4}$ " thread engagement left and 1" in Aluminum Block.
2. If the nose of the starter is not attached to the starter yet, bolt the nose on the block without shims. Then place the drive gear assembly in the nose. By pressing the end of the shaft and depressing the spring, you will engage the pinion gear. Backlash should be .015" to 0.30", with .025" optimum. It will feel like an intake rocker arm (if that helps) .015" shims are provided. If more than .060 is needed, call us. The gear must engage  $\frac{2}{3}$  of the ring gear (front to back) fully.
3. The flywheel or flex plate must be checked at four places. The ring gear runout should be .030 max which is easy on a flywheel but sometimes hard on a flex plate. If more than this, the starter will need more clearance for the tight spots. Otherwise the starter will never sound good, and more importantly, will never work well and last.
4. It goes without saying the ring gear should have all its teeth and should not be burred or chipped. Chipping will occur on four spots on a V8, 3 cylinder, 2 on a 4 cylinder, so rotate the ring gear at least one turn to check the teeth.
5. At rest, the ring gear should be minimum of .050 (a dime) for a flywheel. The flywheel must be pushed forward for correct measurements (stepping on the clutch is fine). It should be a minimum of .075 (a nickel) for a flex plate.
6. The torque converter must be bolted to the flex plate for proper measurement. If the torque converter bottoms out in the crank and the flex plate is pulled to the back of the car while tightening the clearance, measurement can be a little tighter. If the converter does not bottom out in the crank, the clearance must be opened up .020" to .040". The flex plate will be pushed forward under load, especially with a transbrake. Check for rubbing of the pinion after a couple of runs.

Shims are available to move the pinion forward .060 and .120. More than that, contact us and we can relocate the mounting bolts to correct this.

### *A Complete Starter*

The procedures are the same. However, to engage the pinion, grab the pinion shaft, which sticks out of the nose with a vice grip (the shaft is hard and doesn't even ride in the bearing) and pull it out. After all clearances are checked and corrected, bolt the starter to the block and torque to 45 ft lbs.

### *Wiring*

Do not use a jumper on the starter solenoid. Wire the starter just like a Pontiac car.

The starter wire should be 14 gage minimum, 12 gauge if over 10 feet total.

Total wiring, is starter to key starter or starter button to battery, not just to the starter button.

A starter delay may be used. VW sells a small Bosch unit which works well.

The starter cable should be #2 wire for very short lengths; #1 is used for average, #0 for cars with trunk mounted batteries.

Make sure the ground side is the same with engines with rubber motor mounts.

Solid mounted engines, #1 should be fine. With the starter cables or with any wiring, bigger is better.

Following these instructions you should see an improvement in starter performance, life, and reliability.