

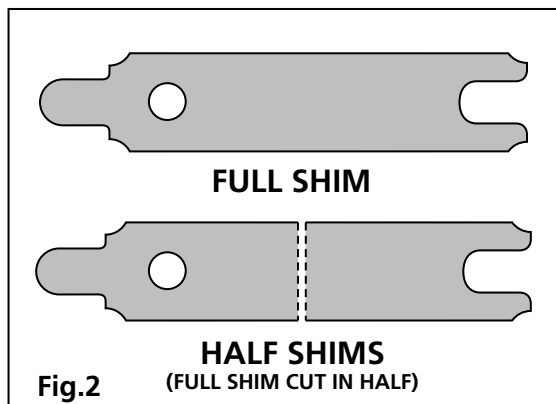
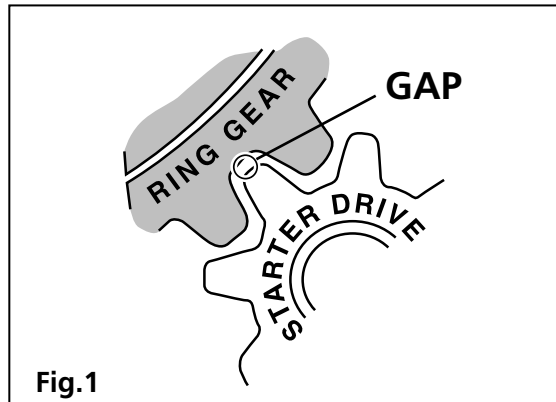
# GM STARTER MOTORS

"To shim or not to shim"



## NOISY, GRINDING STARTER?!

- ▶ In order for the starter to operate efficiently and quietly, shimming *may* be required, even if shims were not used on original installation.
- ▶ On some applications, you will have to either add shim(s) or remove shim(s) to achieve correct "gap" (clearance).
- ▶ Proper clearance between starter drive gear teeth and flywheel ring gear is critical for correct operation of starter.
- ▶ To achieve correct gap between ring gear and starter drive, usage of one or more shims *may be required* on certain GM engines. (See Fig. 2)



## DOES YOUR STARTER MOTOR REQUIRE A SHIM(S)?



### USE YOUR EARS TO LISTEN FOR PROBLEM SOUNDS!

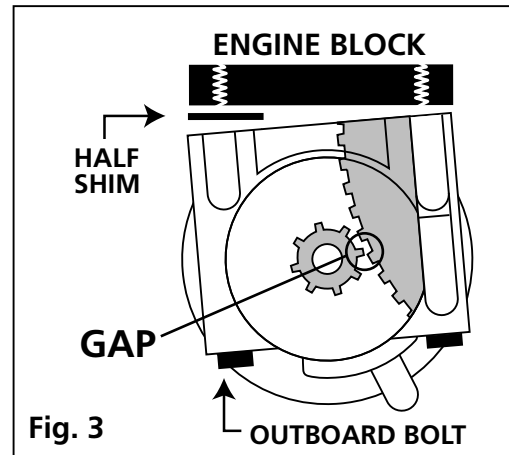
See reverse side for problem "sounds" and directions on how to remedy them.

# GAP TOO LOOSE?

**Do you hear a high pitched whine or clanging sound while cranking, before engine starts?**

## PROBLEM: EXCESSIVE CLEARANCE!

- ▶ Is the gap *greater* than the thickness of a paper clip?
- ▶ Starter must be shimmed closer (into) ring gear to reduce gap (clearance).
- ▶ Remove any existing shims.
- ▶ Start with one .015" shim cut in half on *outboard* bolt only (the bolt on outside of starter motor away from engine) See Fig. 3
- ▶ This will move starter closer into the ring gear.



# GAP TOO TIGHT?

**Do you hear a high pitched whine after engine starts, as key is being released?**

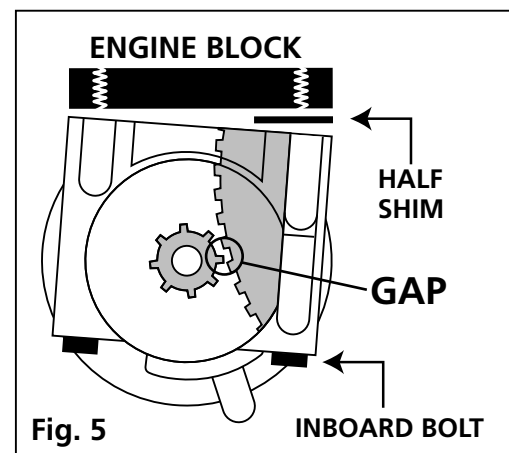
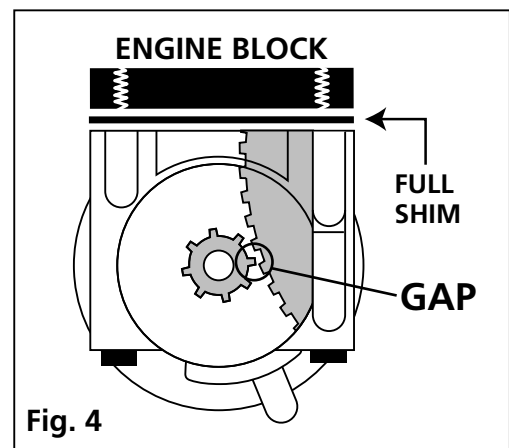
## PROBLEM: NOT ENOUGH CLEARANCE!

- ▶ Is the gap *less* than thickness of a paper clip?
  - ▶ Starter must be shimmed away from ring gear to increase gap (clearance).
  - ▶ Install one .015" shim across both bolt holes to increase gap. See Fig. 4.
- OR**
- ▶ Install one .015" shim cut in half or a substitute shim on inboard bolt only. (the bolt on inside of starter motor closest to engine) See Fig. 5.
  - ▶ Usage of one shim on inboard bolt only, will provide greater clearance.

**Note: Do not use more than 3 shims on either side.**

## When installing replacement starter motor:

- ▶ **DO NOT** use an impact gun or breaker bar to tighten bolts! Nose cones are made of aluminum and are very easy to distort or crack by over tightening.
- ▶ Always reinstall any existing heat shields and rear support brackets.
- ▶ Make sure all connections at solenoid are clean & tight.
- ▶ Add or remove shims one at a time to avoid damage.



**PROVIDING THE PROPER GAP, WILL AWARD YOU WITH A STARTER THAT IS QUIETER AND HAVE A LONGER LIFE!**