

RED SHIFT SPORTSTER AND XB CAMS: WHAT WE DO AND WHY WE DO IT.

Replacing high-contact gears:

2000 XL/XB's use a high-contact pinion and #2 gear. 2001 and up use high-contact gears on all the cam chest components. These gears are quieter and less expensive to produce than the '91-'99 style gears, but also are not as strong as the '91-'99 style. When high-contact gears are exposed to increased RPM and valve spring pressure, gear tooth failure becomes more common. On aggressive grinds such as the Red Shift 643, we strongly recommend changing the pinion and #2 gear to the '91-'99 style gears. If the machine will see severe duty such as racing, all the gears should be changed to the '91-'99 style.

Welding the #2 gear:

Back in the '80's, Harley stopped installing a drive key on the driven gear (the big gear) on the #2 cam. Now only the press fit of the gear to the shaft prevents the gear from rotating on the shaft. High spring pressures and severe duty can cause the gear to rotate on the shaft. If the gear turns enough, valve to piston collision occurs. At the very least all the valve timing is off.

The solution is to put a small weld where the shaft meets the gear. The excess weld is then machined away. The #2 gear should always be placed in the bushing of the cam cover after this modification to check for free rotation. Increase the amount of chamfer at the edge of the bushing as needed. This can be done with a burr knife or cartridge roll sander. Zipper's recommends this for Red Shift cams 585 and larger.

Pinion shaft notes:

Since the end of the pinion shaft is not tapered, the only devices driving the pinion gear are a small key and the torque of the pinion gear nut. The factory torque spec is 35-45 ft-lbs. We recommend increasing the torque to 70 ft-lbs. Use green loctite and always properly support the end of the wrench to prevent bending of the shaft. We sell tools to hold the gear and support the shaft for this step, see below.

A second solution in this area is the use of an S&S crank and pinion shaft, as this product uses a six-spline drive for the pinion gear. This is the most expensive solution but certainly the most effective. If this method is used pay close attention to the alignment marks on the pinion shaft and gear. If this step is not observed, the valve timing can be off by any factor of sixty degrees!

No-Weld cams:

This allows final cam timing to be set by the engine builder. Many times if cams are timed in a factory cam chest and then checked in an after-market engine case, the timing can vary by several degrees. No-weld cams can be degreed during engine assembly, then welded in place. If proper welding facilities are not available at your shop, no-weld cams can be delivered to the engine builder then returned to Zipper's for final weld and lobe polish.

List of Parts and Services:

AP398200 – '91-'99 style #2 Gear

698-162 to -166 – '91-'99 style Pinion Gear (various sizes available)

416-600 – '86-'90 4 speed style new cam cores **[Zipper's cam cores use a keyed #2 gear, do**

416-601 – '91-'99 5 speed style new cam cores **not require the welding step described earlier.]**

758-065 – Pinion gear lock tool for 2000-up XL and Buell engines (fine pitch gear)

758-066 – Pinion gear lock tool for 91-99 XL and Buell engines (wide pitch gear)

Labor Codes:

ZM9238A – Replace #2 gear with proper type, time/weld/machine

ZM9238B – Weld/machine existing #2 gear

Zipper's Performance Products 6655A Amberton Dr Elkridge MD 21075
Phone 410.579.2828 www.zippersperformance.com Fax 410.579.2835