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These instructions are a guide to assist in the installation of your Crane camshaft in an Evolution® "Big Twin" Harley-Davidson®. This instruction guide is not intended to perform as a complete service manual. If you are not sure about dimensions, torques, timing setting, etc., not included in this material, refer to your service manual for your model of motorcycle.

It is important to remember that changes in cam lift, duration, and cam timing can require modifications to valve springs, valves, valve guides and pistons. If you do not have this knowledge or experience for these types of modifications, seek assistance, or have the work performed by your dealer.

Note: This camshaft has been specifically designed to be used with a full complement inner bearing: Crane part number 7-0400. This bearing is included in this box. Failure to use the correct bearing may cause camshaft failure and void your warranty. Evolution® "Big Twins" that were manufactured after mid-1991 may have a caged bearing with plastic spacers between the needles and fewer total needles than a full complement bearing. We recommend that a certified dealer install the bearing due to the special tools required for proper installation. Upon reassembly, you must check the camshaft bearing play to verify that it is within factory specifications of .0005" to .0025".

### REMOVING THE OLD CAMSHAFT

1. Disconnect the battery. Secure the motorcycle on a suitable stand with the rear wheel off the ground. Remove components necessary for easy access to rocker covers, pushrod covers, and gear case cover, i.e., exhaust system, gas tank, air cleaner, footrest, etc. Remove spark plugs.
2. Remove top and middle sections of rocker boxes, then rotate engine so both valves are closed on the cylinder head being worked on (put transmission in high gear and move rear wheel to slowly rotate

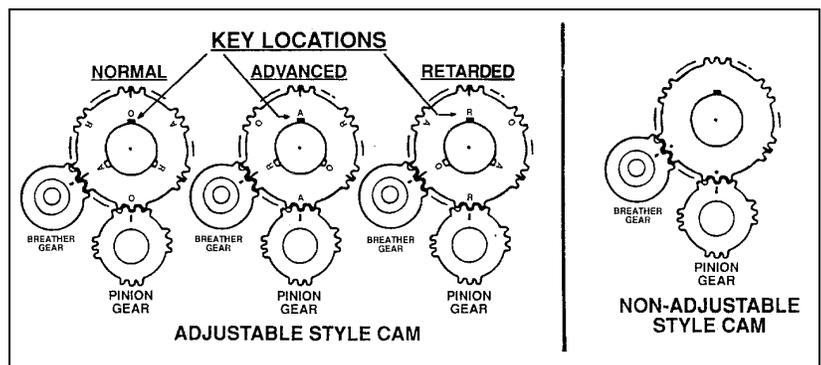
engine). Remove the two 5/16" bolts nearest the rocker arm shafts (keep all shafts, rocker arms, and pushrods in order so they can be installed in their original position). Remove the pushrod covers and pushrods.

3. Remove the tappet guides, keeping the tappets in order for re-assembly. Tappets can be held up in place during removal of guides by using a U-shaped piece of safety wire or paper clip hooked to the tappets.
4. Remove ignition covers on gearcase cover by drilling out rivets to gain access to sensor plate. Remove the inner cover, sensor plate and rotor.
5. Remove the gearcase cover screws and remove cover while holding end of cam inward. Now remove the camshaft, spacing washer and thrust plate.

### INSTALLING YOUR CRANE CAM

NOTE: Check clearances between innermost lobe and engine case with high lift cams. Provide clearance, if necessary, by removing metal on engine case with cutter or grinding wheel. Protect bearings from chips.

1. Place the spacing washer and thrust washer on cam and insert into engine. The camshaft must be installed with timing marks lined up on both



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the pinion gear and breather gear.

To install the camshaft as purchased, line the "0" mark on the pinion gear mark, and the slash mark in line with the breather gear mark.

To install in a 4° advance, or a 4° retard position, the gear must be pressed off the camshaft and the key lined up with the respective mark. The camshaft is then pressed back onto the gear. Make sure the camshaft is lined up straight while doing the pressing operation. The use of a press is required. Use grease or anti-seize when assembling gear on shaft.

2. Camshaft end play must be checked at this point. To check the end play of the camshaft, you must assemble the gear case with cover and gasket, being sure to tighten the screws. Check clearance through tappet guide hole with a feeler gauge between thrust washer and spacer (or use Crane Tune-A-Cam kit 9-0010). End play clearance is between .001" and .016".

The proper end play is obtained by using the correct thickness cam washer, available from your dealer.

Before installing tappets, pour about four ounces of oil through the tappet guide hole over the gears. Install tappets by using the wire clip to hold tappets in the guides and placing the guides in the crankcase. Use a tappet guide alignment tool (Crane part number 9-0021), to assure proper alignment of guides in case.

Check pushrod length following the procedure given in your service manual (if adjustable pushrods are used to replace the non-adjustable type, use their instructions for setting lifter preload).

Replace ignition components in the reverse order of disassembly. Install air cleaner, footrest, exhaust system and all other components you removed to perform the installation.

You are now ready to start your motorcycle and time the ignition according to the service manual. Check for oil or fuel leaks, loose screws or bolts, etc.

