

Camshaft Timing and Setting Fuel Sync

Camshaft installs for the Magnum can be painless, but unless you are aware of a few things, **things can become frustrating.** We get ton's of phone calls on this one and my answer is always the same, re-time the camshaft. Timing a Magnum motor deals with one major aspect, when the injectors are told to fire. There are three pieces here; the cam, the timing chain, and the oil pump driveshaft. The oil pump driveshaft does two things, as the camshaft turns, it rotates the oil pump driveshaft. This in turn, operates the oil pump to supply oil pressure to the engine. The top of this driveshaft, also turns the distributor shaft. The distributor shaft turns rotor for spark delivery, and also pulses the camshaft sensor inside the distributor cap. This sensor tells the PCM when to fire the fuel injectors. So it is very important that this alignment be correct. If it is not correct, then the fuel injectors can fire as the valve is closing or too early. We set the timing for all our motors, so as the valve is opened fully, the fuel injector sprays. This eliminates the need for velocity and vacuum to pull the mixture into the chamber. It's essentially thrown into the chamber. So to begin with timing a camshaft, the motor needs to be set at top dead center of the compression stroke. If you are unsure what this means, remove the valve cover on the driver side, rotate the crank pulley with a 32 mm socket, until you see the intake valve, which is the second valve spring, begin to compress. When I say compress, this means the valve spring is opening the valve. As the valve spring begins to close, the piston will be approaching the top of its travel. The crank shaft pulley/harmonic balancer, will have a mark to indicate top dead center on the timing cover. This Mark will align with the TDC mark on the timing cover just after the intake valve spring closes. Next, using a half inch wrench, remove the distributor and set to the side. With a flashlight, look down inside at the oil pump driveshaft. It will have a slot in the center of the gear. This slot should be pointing towards the number one intake manifold bolt hole. It will almost be front to back, but it will be skewed slightly toward the AC unit. If it is not, using a long flat blade screwdriver, rotate the oil pump driveshaft clockwise until the slot lines up with the number one intake manifold bolt hole. Reinstall the distributor and snug the half inch bolt down. The rotor should be pointing towards the number one cylinder mark on the distributor plate. Reinstall the distributor cap and try to fire the motor over. If the engine idles correctly, then take the vehicle for a test drive. If you do not have any major detonation from pre-ignition, in the last thing to do is to set the sync between the crank shaft sensor and the camshafts sensor. This is done by using a scan tool such as the dealership DRBIII, Snap-On scanners or that any other top of the line scanner. Setting the sync using an ohm-meter has never proved to be accurate and can be off as much as negative six. Using a scanner, the idle is

brought up to 1000 rpm, to reduce valve train fluctuations and the sync signal is set to zero degrees. Most of the cams that we run in the shop, we set six to eight degrees positive. If you do not have a scanner that can do this, then pay to have the dealership do this. **Some of the symptoms that the sync signal is incorrect, you will get back firing through the intake manifold; vehicle will not idle or you will get major detonation at light loads causing the vehicle to lose severe power over 3000 rpm.** The full size RAM is very hard to see down into this area. We use a mirror to do this at KRC Performance but keep in mind, everything in the mirror is backwards.

Courtesy of KRC Performance: <http://www.krcperformance.com>