



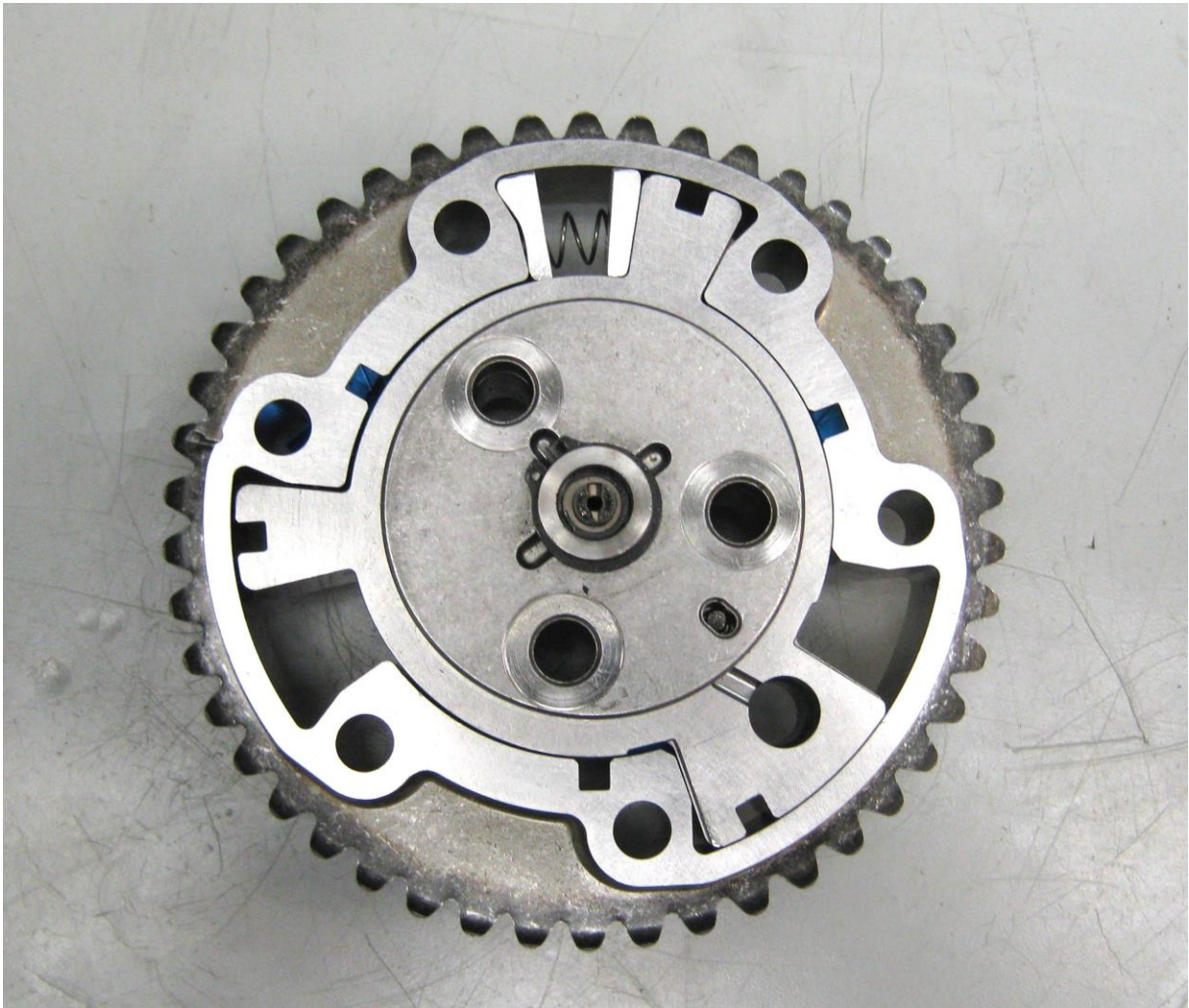
6.2 Raptor Cam Phaser Limiters

These cam phaser limiters are designed to allow the use of aftermarket springs and camshafts while still retaining the stock phaser. The limiters are two piece anodized billet aluminum and designed to fit within the stock phaser.

These limiters are designed to limit the total travel of the cam phaser. They eliminate the durability issues associated with the phasers and allow the use of larger aftermarket camshafts and springs. The following instructions will help to guide you through the installation. These instructions are based on having the camshaft phaser previously removed from the car.

1. Remove the 6 Torx headed bolts holding the phaser together.
2. Remove the front plate slowly as there is a small spring that will force a small check valve out. Do not disassemble any further.
3. When you remove the plate you will see three voids in the outer gear section and 3 vanes in the inner gear section that fit into these spaces. The empty space in the 3 voids next to where the vanes sit are the free space that allows the outer gear to move in relation to the inner gear.
4. There are 2 vane/pocket sections that are identical and smaller, and one vane/pocket section that is larger. The limiter should be installed into one of the smaller sections. The little spring fits in the machined pocket on both pieces. Install the spring ahead of time and keep pressure on it as you slide in the unit. There is a small slot cut into the pieces that corresponds with the oil hole in the inner gear. Make sure this piece is installed and the oil hole is uncovered. At this point you are all done and can reinstall the small piston, spring and check seat. Then you can install the front plate back on the gear and reinstall the other bolts.
5. When reassembling the phaser it's important to keep the sections lined up. The bolts hold the entire unit together like a sandwich. After installing all the bolts just lightly tighten them, enough to where the sections of the phaser are still moveable. It's suggested to install the sections back together, and torque the bolts up with the phaser attached to the end of a camshaft, this helps in aligning everything.

Here is how the finished installed limiter should look before reassembly-



6. The torque for the bolts is 135 in lbs. We recommend using a small dab of blue thread locker on each bolt.
7. When you've finished assembling the unit fully you can check it for correct operation by using some compressed air. It's easiest when done with someone to help. With the phaser attached to the snout of a camshaft use a compressed air gun to blow compressed air into the small oil feed hole located on the camshaft number 1 journal. While doing this be sure to block the other oil hole on the other side of the camshaft. Then push down the small valve on the front of the phaser while trying to turn the outer gear. The camshaft needs to be stationary and not spin, so either clamp it in a vise with soft jaws or rags, or have someone hold it. With compressed air blowing into the oil feed hole, the valve pushed down and some rotational force applied to the outer gear it should rotate. If it does not rotate then something is wrong.

You should now have a fully assembled limited gear. You can now install the gear back into the engine and proceed with the rest of the reassembly.