



### 3 Valve Cam Phaser Lockouts

These cam phaser lockouts are designed to allow the use of aftermarket springs and camshafts while still retaining the stock phaser. The lockouts are one piece (except 10 degree version) billet aluminum and designed to fit within the stock phaser.

The use of aftermarket valvesprings with increased spring pressure, as well as aftermarket camshaft profiles do not allow the factory Ford cam phaser to function properly and may even cause it to fail. The increased spring pressures and more aggressive camshaft ramp rates cause the phaser to behave erratically. The factory phaser cannot control these added pressures, and in the majority of cases the phaser will emit a knocking noise as the phaser struggles to control the camshaft position.

These solid lockouts lock the internals of the cam phaser to create a fixed gear with no moving parts and no internal mechanisms to make noise or fail. 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. Place the teeth of the gear loosely into a vice to hold the assembly in place as you removes the bolts.
2. You will remove the 4 bolts holding the phaser together and loosen the one long bolt. There is one long bolt that goes through the assembly and comes out the other side where it holds the spring for the phaser assembly in tension. This bolt will be left in place and only loosened to allow the rear cover to rotate out of the way.
3. After the bolts are loose, you can remove the phaser assembly from the vice and place it on a workbench, where the remaining bolts can be removed by hand. Remember to leave the long bolt in place but loose.
4. Rotate the backing plate of the phaser unit on the long bolt you left in place. When rotating this plate proceed slowly as there is a small spring that will force a small check valve out. Do not disassemble any further.
5. When you rotate the rear backing plate out of the way you will see that there are 5 inner vanes that are positioned against the outer portion of the gear. This position is where you want to install the lockouts.

6. The lockouts are precision machined to fit in one section better than the rest. The lockout should be installed into the void that has the tightest fit. At this point you are all done and can reinstall the small piston, spring and check seat. Then you can rotate the back plate back on the gear and reinstall the other bolts.
7. *This step is only for those with the 10 degree retard units.* To orient the phasers in the correct location you will need to first rotate the inner section of the phaser. This requires removing the spring tension. You will need to take the long bolt all the way out and release the spring. Be sure to mark which hole the long bolt goes in. Be careful when doing this to not get your hand caught in the spring as it's under a lot of tension. Now you can rotate the gear in the correct position. When holding the gear with one hand take your other hand and grab the spring section and rotate it in the direction that it would be naturally held under spring tension. So basically you are trying to wind the spring back to the position it is installed at while holding the outer fixed gear from moving. This will cause the inner section to rotate until the plates of the inner section are stopped against the fixed bosses that form the outer gear. Then take the larger section of the two pieces of lockout and insert it into one of the empty cavities. Then rotate the inner section so that it pins the larger piece you just inserted against the opposing side of the fixed outer gear. After this you will be left with a smaller space which is for the smaller piece to be inserted into. The smaller piece goes to the left side when looking down at the back of the phaser unit. When inserting this piece make sure that it is a slightly snug fit. If not remove both pieces and repeat the same steps trying the next section over. One of these sections will provide a snug fit with no play in it.
8. *This step is only for those with the 10 degree retard units.* After the 10 degree lockouts are installed you can then proceed to re-wrap the spring under tension and reinstall the bolt that holds it in place. You will need to put the phaser back into a vise and wrap the spring around. Be careful as it's a fair amount of force required for this.
9. The lockouts are precision machined to fit in one section better than the rest. Due to variations in the gears though we recommend each of the five areas until you find one that requires a slight bit of pressure to get the lockout installed. This will give the gear and lockout just a little preload and prevent any movement from happening. It does not make a difference what void you install the lockout into.
10. At this point you are all done and can reinstall the small piston, spring and check seat. Then you can install the back plate back on the gear.
11. When installing the back plate make sure to reinstall the long bolt in the marked position so that it can hold the spring again. The spring will need to be wrapped back around so it is back in its original position under tension. This will keep the spring from making noise.

This is how the finished install should look with the lockout orientation as relative to the plate-



12. The torque for the bolts is 145 in lbs. We recommend using a small dab of blue thread locker on each bolt.

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

If you have any questions at all please feel free to contact Livernois at 313-561-5500. We will be glad to assist you.