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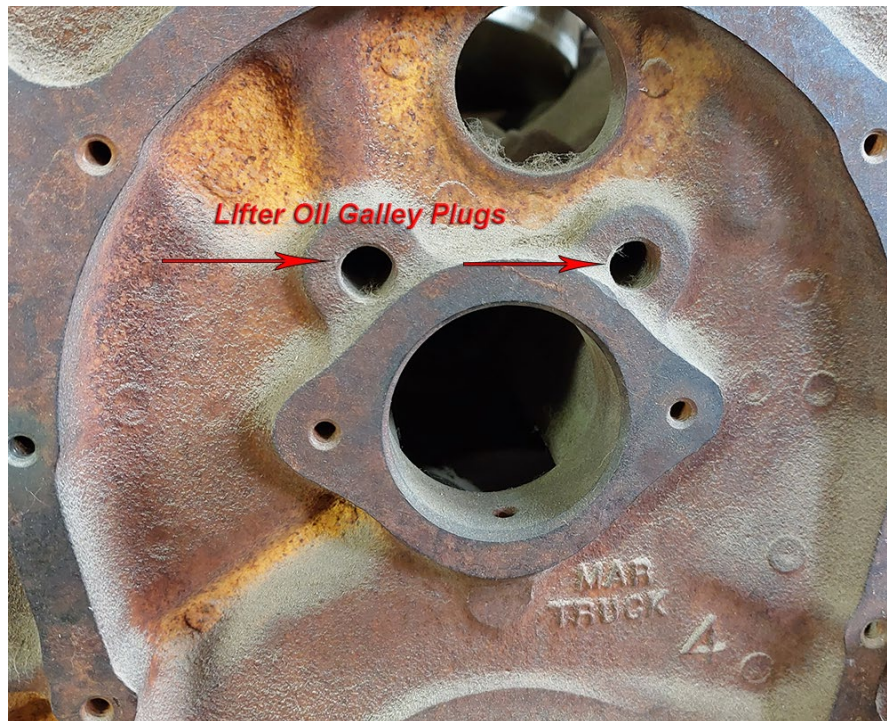
## #5100/5101 BBC Belt Drive Install Instructions

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## 1 – Oil Galley Modification

If not already equipped, it is recommended that a .020 hole be drilled into one of the lifter oil galley plugs shown in the picture below. This hole will allow for additional oil to help lubricate the camshaft roller thrust bearings.

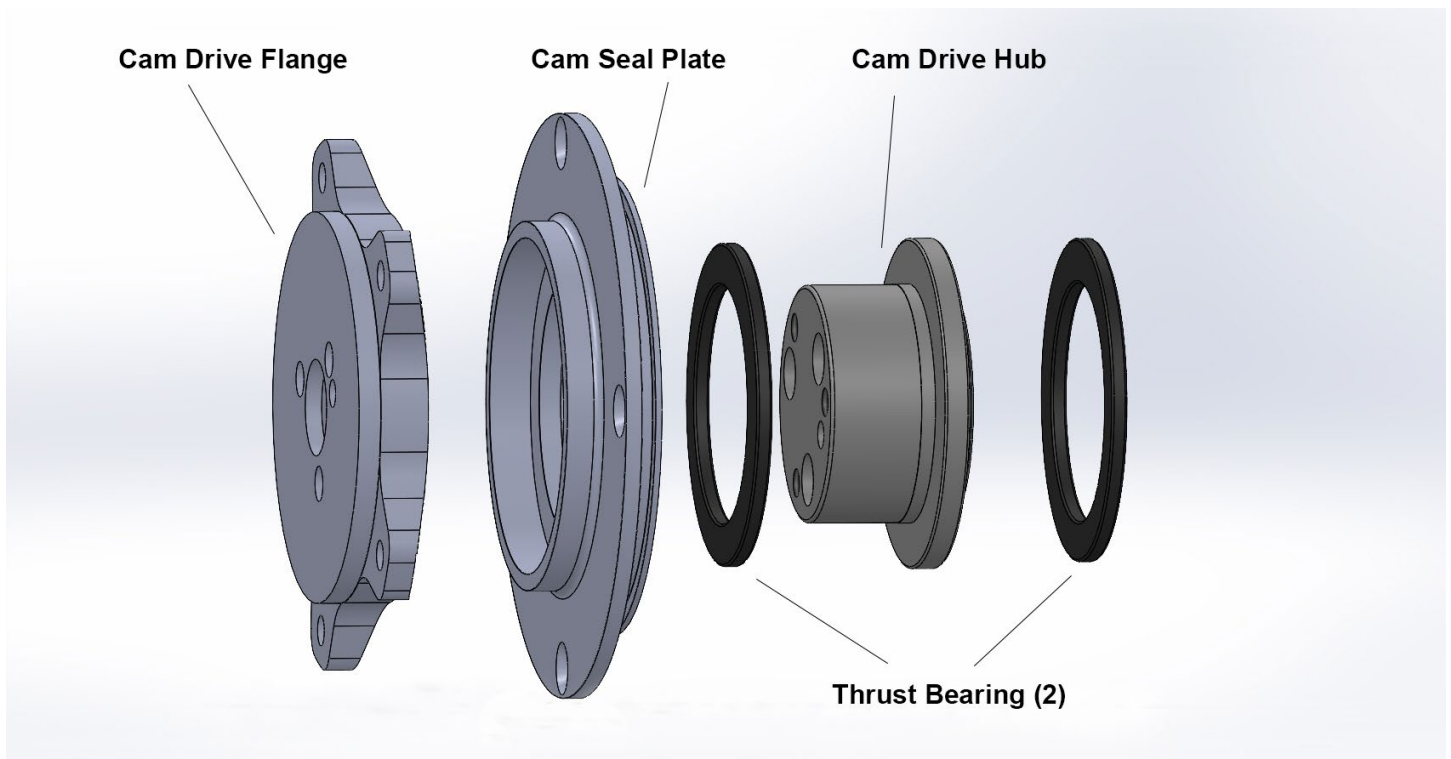


## 2 – Front Cover

Place the front cover onto the front of the engine by hand without the gasket in place. Make sure that the front cover will sit flat onto the block. If the cover does not sit flat, check for obstructions and clearance as necessary. Once proper clearance is obtained, install the front cover using the supplied gasket.

## 3 – Crankshaft Sprocket

The lower crank sprocket can now be pressed onto the crankshaft. The lower sprocket is machined to fit a stock dimension crankshaft snout (1.600"). Aftermarket crankshafts can vary; measure the snout OD to verify this measurement. If the crankshaft is greater than the stock measurement the crankshaft sprocket will likely need honed to fit. The lower sprocket will need to be pressed onto the crankshaft snout. Apply some anti-seize or oil to the sprocket and the crankshaft snout before installing. DO NOT hit the crankshaft sprocket directly with a hammer or other blunt object as damage to the sprocket may occur. Aluminum tubing or plastic pipe is often used to fit over the crankshaft snout and into the ID of the crankshaft sprocket. A harmonic damper installation tool is preferred when installing the sprocket. Drive the sprocket onto the crankshaft snout until it comes to rest on the shoulder of the front main journal. If for some reason the sprocket binds or stops before this point, STOP, remove the sprocket, and see what is keeping the sprocket from being fully installed. To remove the sprocket there are provided 1/4"-20 holes tapped in the sprocket to bolt a pulley removal tool into.



## 4 – Cam Drive Hub

The steel drive flange is designed to bolt up to a standard 3-bolt camshaft. Place one of the Torrington roller thrust bearings onto the back of the drive flange. The rounded edge on the inside diameter of the bearing should face the drive flange. Apply lock-tite to the supplied socket head cap screws and torque them to 20 ft/lbs. This can be done with the engine in the block or on the bench. If done on the bench, then install the camshaft into the engine. Once installed, place the second Torrington bearing over the nose of the cam drive hub. Again, the inside diameter of the bearing with the rounded edge will face the drive hub.

## 5 – Cam Thrust Shims

The belt drive timing system comes with multiple shims for setting the camshaft endplay. We recommend starting with 1 x .003" shim and 1 x .008" shim. These shims are placed over the camshaft drive hub nose and are placed between the outer thrust bearing and the seal plate. Camshaft endplay can be checked after installing the cam seal plate in Step 4 and can be adjusted by adding or subtracting shims. An assortment of shims is provided, but additional shims can be purchased as needed.

## 6 – Cam Seal Plate

The cam seal plate should come with an O-ring installed on the back. Lubricate this O-ring with a light coat of oil or other lubricant. Lubricate the lips on the cam seal as well. Install the cam seal plate into the front cover. Torque the supplied cam seal plate screws to 10-12 ft/lbs.

Once the cam seal plate is torqued in place you will need to check the camshaft endplay. Using a dial indicator measure the forward and rearward play in the camshaft. The endplay should measure between .004" and .012". Shims can be added or removed under the cam seal plate to adjust the endplay as needed.

## **7 – Cam Drive Flange**

The cam drive flange is installed onto the nose of the cam drive hub that protrudes through the cam seal plate. The drive flange is located with a dowel pin. Install the flange with the supplied socket head cap screws. Apply lock-tite to the screws and torque them to 20 ft/lbs.

## **8 – Cam Sprocket & Belt**

Remove the belt tensioner pulley from the front cover. Rotate the crankshaft until the TDC dot on the crankshaft pulley is at 12 o'clock. Rotate the camshaft drive hub until the "zero" mark is at the 6 o'clock position. Place the belt over the crankshaft pulley and the cam sprocket. Install the cam sprocket onto the cam drive hub with the TDC markings on the cam sprocket matching the "zero" marks on the cam drive hub. Install the 6 flange nuts onto the cam drive hub and lightly tighten them.

Install the belt tensioner pulley onto the timing cover and prepare to set the belt tension. To set belt tension you will measure the belt deflection. Belt deflection is measured halfway between the cam sprocket and the crankshaft pulley on the right side (drivers' side) of the engine. With the belt tensioner pulley in place, rotate the tensioner eccentric counterclockwise towards the belt until the proper belt deflection is achieved. On a cast iron block belt deflection should measure between .050-.080" when cold. Aluminum blocks will generally grow more, and the deflection is normally increased to .080-.120" when cold. Once deflection is set, tighten, and torque the nut on the tensioner eccentric to 43-45 ft/lbs. Once the engine has been run and brought up to temp, belt deflection should be checked and adjusted if needed. Periodic checks are a good idea.

## **9 – Cam Timing**

Cam timing is adjusted by loosening the 6 flange nuts on the cam sprocket and rotating the crankshaft independently of the camshaft to advance or retard the camshaft timing. A socket and ratchet may be used on the camshaft bolt to ensure the cam does not rotate while adjusting the crankshaft position. Initial cam timing should be determined using standard camshaft degree methods. Please consult your engine builder or call Innovators West for technical assistance. Once cam timing is set, tighten, and torque the flange nuts to 18-22 ft-lbs.

**NOTE –** During initial setup, it is suggested that you have the valve train assembled. This load on the camshaft from the assembled valve train will help preload the belt. When adjusting camshaft timing, always verify that you have adequate piston to valve clearance.

## **Misc. Install Notes**

- Water pump spacers are included with the belt drive if using an engine mounted electric water pump. The spacers can be machined down to move the pump closer to the engine as needed. Please make sure to keep at least .125" of clearance from the front side of the belt drive to the back of the water pump.
- With the use of the wider, stronger 30mm timing belt and depending on the particular harmonic damper being used, it may be required to space the harmonic damper away from the engine for clearance to the belt drive. We recommend having at least .125" of clearance from the back side of the damper to the belt drive.

## **BBC Belt Drive Service/Option Parts:**

**Replacement Belt – Part # 6003**

**Gasket, Seal & O-Ring Kit – Part # 6008**

**BBC Camshaft Dowel – Part # 6022**

**BBC Belt Drive Distributor Adapter – Part # 6021**

**BBC 3/8" Hex Drive Adapter – Part # 6020**

**Cam Sync Bracket (STD Cam Height) – Part # 6024**

**Cam Sync Bracket (.400" Raised Cam) – Part # 6028**