SECTION I : FRONT COVER INSTALLATION

With Crankshaft, Camshaft and oil Galley plugs installed in engine, you need to verify that the front cover clears the oil galley plugs and fits on engine block. The cover has a notch machined in it to clear oil galley plugs in the front of the engine block (see photo #1). If cover does not fit flush to front face of block, find out where it is hitting and file or grind that part of the cover away. If installing on AR/SVO aluminum block, you can use the dowel pinholes that are in the front cover for alignment to block, two 5/16" X 1.000" dowel pins required.

Next, get the proper length bolts, (5/16"-18) to retain cover to block.We supply one of these bolts on the 429-460 which is the 5/16"-18 x 3/4" socket head, it goes in the hole next to the tensioner,we leave them up to you because every engine will have different accessories on it, and this required different mounting hardware.

NOTE: For engines that are going to have a front motor plate, this would be the time to design and build it. We recommend that motor plate be flush with the water pump mounting bosses on the front cover.They are 2.300" from front face of block on the BBF and 2.100" on the SBF. You can use all of the front cover bolt hole locations for retaining motor plate to engine, you will need to build some spacers that go between the motor plate and the bolt hole bosses that have been spot faced on the front cover.

The spacers can be made out of .750" round aluminum bar with a .3125" to .318" hole drilled in center.

When you are ready for final installation of front cover to engine,We supply a timing cover gasket.Be careful when using a stock type timing cover gasket,the gasket may not seal properly with this cover.Also for those engines that are using a front motor plate, we have found it a lot easier to leave the motor plate off until you get entire belt drive installed. For now, get some temporary bolts that will hold cover to block. Install on engine and install retaining bolts.

SECTION II : LOWER CRANK PULLEY

With front cover sealed and secured to engine, lower crank pulley can be installed. You will need to get or make the proper installation tool for this. What works best is some aluminum tubing or plastic pipe that will fir over front crankshaft snout (approximately 1.500" ID) and fit into the under cut part on the front side of pulley see photos 2 & 3. **Do Not** attempt to install the pulley by pressing or striking against the outer belt guides.It will bend the outer belt guide and probably the pulley as well.

Next, install the proper crankshaft woodruff key into the crankshaft. Check the height of key and compare to depth of key way in the pulley. If woodruff key is too tall, remove it from crankshaft and file off the amount to be removed. With woodruff key correct and in crankshaft, lubricate the ID bore of pulley, the outside of pulley where it

rides against front seal and the crankshaft snout with oil or light grease. Slide pulley on to crank snout. Use a large plastic or shot filled hammer to drive the installation tool and install pulley all the way on crankshaft (until it bottoms on shoulder). **Warning**: If pulley "binds" on snout before it bottoms out on shoulder, stop and remove it (see removal instructions). This probably means that the crankshaft is over size. We recommend that you get some 600 grit wet/dry sandpaper and evenly wet sand the crankshaft snout until the outside diameter is correct. Then repeat installation process.

SECTION III : CAM RETAINER PLATE (SEE PHOTOS 4&5)

A roller thrust bearing camshaft retainer plate is supplied with the 429-460 belt drive unit,and a solid bronze thrustplate is supplied with the 289-351W belt drive.(A optional double Torrington thrustplate can be purchased for your 289-351W belt drive but machine work is required to the engine block).Please refer to instructions supplied with your thrustplate (**note**: **not attempt to use the stock cam retainer plate with belt drive.)**

With camshaft installed in engine, you can clean and lubricate the bearings and race washers (use oil or light grease). Place one of the bearings between two of the race washers and place it in step side of cam plate. Install cam plate assembly onto engine block. Make sure bearing assembly stays in place. Use a low strength type of lock tight on the ¼-20 flat head retaining screws, but apply to threads only. Torque retaining screws 10 to 12 ft. lbs.

SECTION IV : CAM HUB AND TOP SEAL RETAINER PLATE

Take top seal retainer plate, lubricate the inner seal and outer o-ring with motor oil or grease. Now take the cam hub and slide it into front side of seal retainer plate (see photo #6). Take the remaining roller thrust bearing and place this bearing assembly onto the register step on back side of cam hub. Next you need to get a large screwdriver or bar, and use it to hold camshaft against the cam retainer plate. The best way to do this is to lightly pry against distributor drive gear on camshaft, through the distributor-mounting hole in block. Be careful not to pry against the outer edge of the gears teeth.Verify location of camshaft drive pin, and install cam hub assembly onto the camshaft. Use a small plastic hammer and lightly tap cam hub into place (see photo #7). Rotate cam hub and top seal retainer assembly until the Three ¼"-20 bolt holes in the front cover line up with the ones in the top seal retainer plate. Push seal retainer plate back into front cover. Install the Three flat head screws that retain the seal retainer plate to front cover(see photo #8). Install cam hub retaining washer onto cam hub (see photo #9).

With retaining washer in place, you need to check the length of the cam hub retaining bolt. Unfortunately, not all 429-460 Ford Camshaft retaining boltholes are one size and depth.

We prefer camshafts that use a 7/16”-20 retaining bolt, but some use a 3/8”-16. We supply both size bolts and they are 1 ½” long. Check the depth of the retaining bolthole in your camshaft. You may have to shorten the bolt to work with the camshaft you have. You may have to shorten the bolt to work with the camshaft you have. If you choose to use a different bolt than the ones we supply, it should be at least a grade 8.We recommend that you use a low to medium strength lock tight, on retaining bolt and torque as follows; 3/8”-16, 35 to 40 ft. lbs. And 7/16”-20, 45 to 50 ft. lbs. (see photo #11). Now check camshaft end play with a dial indicator (see photo #12). The end play should be a minimum of .004” to a maximum of .012”. If this does not check out within correct range, we recommend that you remove cam hub, top seal and retainer plate, (see removal tips) and verify that the roller thrust bearing and race washers are in place correctly. Also, if you have too much end play, check to see if cam hub is being prevented from going all the way onto camshaft. You may always call for technical assistance. With any of these problems corrected, repeat cam hub installation process and go on.

SECTION V : BELT TENSIONER AND TOP PULLEY

If you remove the belt tensioner assembly from front cover, you may reinstall it the aluminum spacer that locates over the belt tensioners center axel on backside. Install the ½"-20 nut onto ½" retaining stud (see photo #13). Next, rotate crankshaft until the crankshaft woodruff keys and timing mark on pulley are at the 12 o'clock position (up). Rotate the camshaft until the white "zero" line on the am hub is at the 6 o'clock position (down). Place the timing belt around the lower pulley and inside of tensioner assembly, install top pulley with timing belt onto cam hub. The white timing degree marks (A 10' to 10'R) need to line up in the middle with the white zero line on the cam hub. Also, the outer timing mark will line up with the timing mark on the lower pulley (see photo #14 and #15). Install the six 5/16"-24 flange nuts that retain the top pulley to the cam hub. Slightly tighten nuts for now. Next, adjust the timing belt tension. The best way to do this is to get two steel, straight edges or steel rules (see photo #16). Looking at the front of the engine on the right side (#5 through #8 cylinder bank), place one of the straight edges from the top pulley to the lower pulley, in the center of the belt. The other straight edge will be used to measure the amount of belt deflection at the half-way point from where the belt leaves the top pulley and contacts the lower pulley. There are two recommended settings, depending on what block you are using. On all cast iron blocks, the belt deflection should measure between .080" to .090" (thousandths), however, with aluminum blocks, due to the fact that they will "grow" in height from cold to hot conditions, we recommend that the cold setting of belt deflection should measure between .090" to .120" (thousandths). On the 429-420 the ½"-20 12 point nut loosened on the tensioner retaining stud, use a 7/8" open end wrench to rotate the tensioner eccentric axle, turn it counter clockwise to tighten the belt as required.(The 289-351W has two different sized tensioner housings to adjust the belt deflection). With belt tension correct, hold tensioner in place with 7/8" end wrench and tighten the ½"-20 12 point nut. (**Note**: After the engine has been run the first time, the belt tension will need to be checked again, a new belt will usually stretch a small amount).

SECTION VI : SETTING CAM TIMING

When we get to this part, this is where you better know what you are doing. If you are not familiar with degreeing in camshafts, you need to stop here and get some help from some who is! The other thing that has to be checked is the valve to piston clearance. This must be checked if you are using a different camshaft, different pistons or heads, or if you have built a new engine from scratch. Please call for technical assistance if you need help or have any questions.

Going on and having all of the above listed things checked and OK'D, the next thing we need to tell you is a belt drive vs. a timing chain, is when you are setting the cam timing. We recommend that with the belt drive your engine should have the fully assembled cylinder heads installed on it and all the valve train as well. You can leave the rocker arms off the cylinder that you are going to use to degree camshaft from. The reason for having the rest of the valve train installed on now, is to "preload" the timing belt. This will make the cam timing very accurate. If you were to set cam timing without

the valve train installed, the cam will usually end up retarded about 1 to 2 degrees, depending on your valve spring pressure. With degree wheel on crankshaft and a pointer set at top dead center, (TDC) place a dial indicator on the intake or exhaust lobe you want to check. Rotate the crankshaft clockwise until indicator reads proper checking height. Loosen the six 5/16"-24 flange nuts on top pulley. Usually the camshaft will stay where it is, but if it won't, get a socket and a breaker bar and hold it in place. Now you can rotate the crankshaft clockwise or counter clockwise until the degree wheel reads on the correct number. Once this is correct, tighten the six 5/16"-24 flange nuts on top pulley, we recommend a small amount of low strength lock-tight be used on the cam hub studs. Torque the nuts 18 to 22 ft. lbs. Also, you can use the white degree marks on the top pulley to reference the cam timing. If you wish to advance or retard cam timing at a later time, you may do so as long as you have valve to piston clearance, at this point you want to move the cam timing too. At this point, the belt drive is ready to be run on engine. The only things remaining will be any other accessories that will need to be fitted to oil pumps and drives. Unfortunately, every engine combination is different, so feel free to call us for some possible ways you can get these things done.

SECTION VII : REMOVAL TIPS (INSTRUCTIONS)

Most everything will come off the same way it went on, but here are a few things to remember: when removing the cam hub from camshaft, you must first remove the top pulley, cam hub, retaining bolt and washer, then remove the Three ¼"-20x3/4" button head bolts that hold the top seal retainer plate, then pry the plate forward onto cam hub from camshaft (see photo #18). And last, you can use the same puller to remove the lower pulley from crankshaft, but you will need the proper length 5/16"-18 bolts to do so.