89 inch Evo build up, part three

Hi there again, Mikey here with more on the 89 inch Evolution build up we started a couple of issues ago. With the pistons back from our coating specialist we will get back to it.

The oil pump is installed; the pinion shaft run out is re checked in the crankcase. I make sure that the rear intake cam shaft lobe clearance to the crankcase that I had to modify by cutting the crankcase slightly previously is adequate for the cam we are using, I then feed oil down the pinion shaft to pre oil the connecting rod bearings and the cam chest is buttoned up with the new cam shaft, the end play is set to .006 - .007 **(PIC1)** and the breather gear end play set to .005 - .006. The lifters are placed in the tappet blocks and using alignment dowels the tappet blocks are torqued down. We make it a habit to "pre oil the oil pump at this time" this helps insure that oil pressure will be built up quickly when we are ready to fire the engine up for the first time.

We inspect the pistons and re clean the pistons and cylinders in preparation for the checking of the ring end gaps and if any are found to tight we open up the gaps in a tool made to file piston rings and de burr all end gaps. **(PIC2)** Each piston gets one wrist pin retainer installed while the pistons are off of the connecting rods; we place the open ends at the top of the wrist pin bore. This positioning of the retainer is done this way to help keep the retainer from (closing up) when the engine is running. If the ends were @ 90 degrees to the bore, the theory is that they could pop out when the engine is in operation. Another key note here is that the correct retainer must be used with the piston and the correct type and length of wrist pin must be used. Round wire retainers are of a later style and the wrist pins need to have a taper or (chamfer) on the ends. This chamfer helps lock the retainer tightly in the piston when the wrist pin pushes up against it when in use. If you were to use a wrist pin with a significant chamfer on the end with a (C clip) style of retainer the tapered ended wrist pin could lever out the wrist pin clip when it would push up against the retainer, a flat ended wrist pin is used with this style of retainer.

We place the cylinder base gaskets over both cylinder spigots. With CLEAN towels carefully stuffed around the rods sticking out of the case to make sure that nothing falls in the flywheel cavity, sleeves are placed over the cylinder studs to protect the pistons as we place them on the connecting rods, we put the first piston on and make sure that the wristpin retainer seats properly when it is installed and that the wristpin has some but minimal lateral movement in the piston. More CLEAN towels are laid on the crankcase around the cylinder spigot to absorb any excess oil so it does not get on the gasket surfaces when we place the cylinder over the piston. We put the rings on the pistons using a piston ring expander and correctly orientate the ring end gaps around the piston. The piston and rings are lubricated with clean engine oil and a ring compressor is placed around the piston and rings, the cylinder stud protectors are removed, the cylinder is lightly oiled up and carefully but firmly slid down over the piston while supporting the piston from the bottom until the ring compressor is free of the piston. With the ring compressor released we stop and remove it and the towels from the cylinder spigot we are working on, we make sure that the base gasket is in place and slide the cylinder the rest of the way down until it seats firmly on the crank case. We use a couple of old wrist pins as spacers and place two head bolt nuts on studs that are diagonal from each other and tighten them down to just a couple of ft lbs torque. The remaining towels are removed temporally from the other cylinder and while we hold the loose connecting rod so that it does not strike the case we rotate the crankshaft a couple of revolutions and are feeling the pressure on the tool used to rotate the crankshaft for any snags or abnormalities in the "drag on the tool". With everything feeling fine we then re place the CLEAN cloths around the remaining connecting rod and cylinder spigot, and place the remaining piston on the rod, the wrist pin retainer and the ring sets. Again we place the ring end gaps as they should be, lubricate the pistons and cylinder and install the ring compressor before we remove the sleeves that are placed temporarily over the head bolt studs before sliding the cylinder down over the piston/ring assembly as before making sure that the protecting cloths are completely removed and the gasket checked before we seat the cylinder down on the crankcase.

Again we place a couple of head bolts diagonally on two head bolt studs, tightening them lightly and we turn the engine over a couple more complete turns looking for any problems. This time we are also checking the pistons for any signs of misalignment in the cylinder bore and re checking the piston height as compared to the top of the cylinder before putting the head gaskets and heads on. Everything seems to be in order so now we place the heads and gaskets on the cylinders and torque them down properly, we then install the adjustable pushrods that we selected and the covers and put the lower rocker box housings one cylinder at a time on the heads. We adjust the pushrods to the manufactures settings one at a time and make sure that the pushrods spin before we rotate the engine to install the next rocker box and adjust those pushrods. When this is completed we then pressure feed about 4 -6 more ounces of engine oil to the lifter oil passage, this is done once again to provide oil to the newly assembled parts quickly. We should be seeing oil at the rocker arms now and we do, so it is now time to put the remaining covers on the heads. Now the ignition sensor and rotor are placed in the cam cover, I set the timer plate is the same place that it was when I removed it for starting up for the first time. The intake manifold is checked for its ability to properly fit and seal up as it is installed, if any problems are noted now is the time to straighten them out, I had cleaned up the manifold runners when I cleaned up the ports so I am seeing a smooth path for the air/fuel charge to travel thru, good stuff.

Mikey

www.deluxehdrestoration.com

Picture 1

Picture 2