Assembly Tips for Hughes Engines Stroker Kits

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Boring:

The best boring is accomplished on a fixture that aligns from the main bearing bore, not the pan rails or deck surface. We suggest a Kwik Way "FH" boring fixture. An alternative method would be squaring the decks with the crankshaft centerline and then using a boring bar that clamps to the top of the block. In either case leave a minimum of .003” material for honing to final size.

Honing:

Honing with a torque plate and head gasket using cylinder head bolts/studs of the proper length and thread depth is required. Make sure that you use the same type of head gasket that will be used when the engine is assembled. Rough hone the bores to within .0015"/. 002" of final size with 120 grit stones. Finish hone to final size with a 320 grit stone leaving a crosshatch with an included angle of 100º to 130º. When final size is reached a Soft Hone stone should be used with medium pressure for about 4 strokes to obtain a plateau finish. Hand wash cylinder walls with hot soap and water using a stiff bristle brush. Wipe the bores with a clean, white, oily cloth until no more gray color shows on the cloth. Lubricate the cylinder walls with WD-40®.

Decking:

Decking to the proper dimensions is very critical with Mopar engines. The desired quench height is .035”/ .040". A minimum of .033" is acceptable with steel rods. Larger quench heights increase potential of detonation.

Small Block engines only

For maximum efficiency on the Small Blocks it is recommended that the blocks be zero decked. This will result in a quench dome protrusion of some Keith Black pistons. When using a flat top piston, use a 0.000” deck.

NOTE: When working with a small block stroker kit that is using Keith Black pistons, the top of the small quench dome on the intake side of the piston is where you ***MUST*** measure the deck from. Normally the point that the arrow is indicating will be .000” deck. When using the HUG2020 piston and “LA” heads this point should protrude above the deck an amount equal to the quench depth in the head.

See illustration at left.

Big Block engines only:

The Big Block engines using open chamber heads and either the Keith Black series pistons or our custom pistons will normally have the quench dome protruding .070" out of the block. Normally a stock cylinder head will require .010" to .020" milling and a shim type head gasket of .020" thickness. This will achieve the .040" quench. The cast quench areas in the cylinder are not level or consistent from one chamber to the next. Therefore, check each one for proper quench height before final assembly. Some situations may require individual milling of the quench domes. Our "special" cylinder heads have the quench decks milled flat for maximum efficiency. When using a flat top piston, use a 0.000” deck and a .040” gasket.

Line boring or honing:

We strongly suggest that your block is line honed. The block should be line honed to the minimum side of the tolerance for maximum bearing crush and best clearance. We suggest you measure the crankshaft and main bearings then line hone the block to get the desired bearing clearance, blocks must be line honed when switching the type of fasteners (studs or bolts)

Piston ring end gaps:

All kits using the Keith Black hypereutectic pistons will require additional top ring end gap clearance. Read the supplied KB piston installation information sheet provided with your kit. The last page explains how to choose the top ring gap for your engine. Reduce the gap by .004" on the top ring and use this same gap measurement on the second ring.

On our custom forged pistons use top ring gap of .0045" per 1 inch of cylinder bore and use a .003" larger gap on the 2nd ring.

Keep the end gaps square and very lightly chamfer the edges. **VERY LIGHTLY!**

Oiling system:

Small Blocks

Many times the mounting surface for the oil pump on the main cap is not level. Grind or mill it flat and do not use a gasket. The oil passage from the pump does not line up with the passage in the main cap. Grind out this "stepover" area in the cap to prevent a restriction here. The 360" is worse than the 340". Restrict the oil flow through cam bearings #1 - #3 - #5 only by drilling a new 1/8" oil hole in the cam bearing and then install bearing with this new, smaller hole aligned with the feed passage from the mains. Run a straight ¼" reamer(our P/N 8350) completely through the main bearing oil feed passages #1 -#3 - #5 coming down from the right hand lifter oil galley. Run a 9/32" reamer (P/N 8352) completely through the #2 - #4 main bearing feed passages. The intersection of the large threaded oil passage, from the center of the oil filter to the main passage running to the rear of the block is very rough in many cases. Smooth out all the rough spots and sharp edges in the intersection. Do not attempt to drill the passages deeper.

If you are using our main stud girdle, it needs to clear all rotating parts by .030".

A standard volume oil pump will supply enough oil to a 650 HP engine with the above modifications, a windage tray and 5 quarts of oil in the pan. We suggest our oil pan P/N 6104 for 340's and P/N 6107 for 360's; both use screen, P/N #6907. Position SCREEN 1/4" to 5/16" from the bottom of the pan. Oil pressure of 9# per 1000 RPM is adequate. Maximum pressure over 65 P.S.I. is not recommended.

Big Blocks

Enlarge the #2, 3 and 5-main bearing oil supply holes to 1/4". Use our straight fluted reamer, P/N 8350. Enlarge the #4 hole to 9/32". Use our P/N 8352 reamer. For engines developing over 500HP, a modified Hemi oil system is required. This is a combination of the 1/2" Hemi oil pickup and the reamed oil feed passages. Use a standard volume oil pump, windage tray, and an oil pan with 5 quarts of oil in the pan. You will need 9lbs of oil pressure for every 1000rpm and a maximum of 65lbs. The oil pump pickup SCREEN should be positioned 1/4" to 5/16" from the bottom of the pan.

Stroker crank clearance:

Small Blocks with 4.00” or 4.180” stroke

The oil pan may require dimpling to clear the heads of the front two connecting rod bolts with OEM Magnum oil pans. .030” – .050” clearance is all that is required. The rear counterweight may come very close to the upper edge/corner of some oil pumps. Grind the pump, NOT THE COUNTERWEIGHT to get the necessary clearance. The rod bolt head may come close to some oil pump pickup tubes. Slightly dimple the tube for clearance. Other areas to check for clearance problems are the bottom of the cylinder bores and the dipstick hole in the block. The connecting rod bearing chamfers face away from each other, towards the radius on the crank rod journal. Check all bearings to assure that the journal radius does not contact the bearing corner. Most windage trays will need some clearance work. Windage trays will not fit with factory Magnum oil pans. The bottom of the cylinder will require a .200” deep notch for rod bolt heads. The 4.180 stroke assembly will have more room. A windage tray will not work with our girdle.

340 Block Modifications

Note: Some 340 blocks have wider than normal main bearing bosses and / or main caps on the #2 and #4 positions. They may rub against the crank counter weights that are next to them when using stroker cranks.

Check for interference with the block upside down. Install the upper main bearing shells and oil them in #1, #3, #5 positions.

The crank must spin free and the crank must slide forward and backward limited only by the thrust bearing. If it doesn’t, clearance the block, do not modify the crankshaft!

Big Blocks

Kits using steel connecting rods with the 2.200” rod journal size should clear everything (but check the following anyway), and kits using the 2.375” rod journals will require modifications in the following areas. The cylinders will have to be notched at the bottom to clear the rods. The notch will need to be about 3/16”-1/4” deep and ½” round at the bottom corner of the cylinder. .030” – .040” clearance is all that is required Also check the #2 connecting rod for clearance with the oil pump pickup tube boss. This is more of a problem with the 2.375 rod journals. Mopar Performance windage trays will not fit without modifications. We offer a windage tray that will fit without modifications and acts as a very good scraper. This is part number HUG 6504. Call for more details. The connecting rod bearing chamfer faces away from each other, toward the radius on the crank rod journals. When using kits with rod bearings that have a dowel hoe in one half of the insert, the insert with the hole goes into the rod cap. Check all bearings to insure that the chamfer or bearing edges do not touch the radius. For a 4.500 stroker, please call for instructions to use O.E.M. oil pump pick-up.

Bearing Clearances:

Small Blocks	Rods .002"/. 0025"	
	Mains .0022"/. 003"	
	Rod side clearance	min .012"/max ups to .050” is not a problem
Big Block	Rods .0022"/. 0027"	
	Mains .0025"/. 0031"	
	Rod side clearance	min .012"/max up to .090" is not a problem

These clearances can be altered for special applications. Checking clearance with Plastigage is not as accurate as a micrometer and dial bore gauge. Plastigage is also only accurate +/- .0005".

Torque Specs:

	Fastener Type	
	Factory (with 30W oil)	ARP (with ARP lube)
Small Blocks		
Rods (factory)	N/A	50 ft-lbs
I-Beam	N/A	43 ft-lbs
H-Beam	N/A	63 ft-lbs (MSA fasteners also)
K-1	ARP .006-.0064" stretch	30 ft-lbs + 60º
Mains		
Bolts	85 ft-lbs	85 ft-lbs
Studs	N/A	90 ft-lbs
Heads		
Bolts	95 ft-lbs	85 ft-lbs (iron heads) 75 ft-lbs (aluminum heads)
Studs	N/A	95 ft-lbs (iron heads) 85 ft-lbs (aluminum heads)
Big Block		
Rods (factory)	N/A	50 ft-lbs
I-Beam	N/A	63 ft-lbs
H-Beam	N/A	63 ft-lbs (MSA fasteners also)
K-1	ARP .0068-.0072" stretch	30 ft-lbs + 60º
Mains		
Bolts	85 ft-lbs	85 ft-lbs
Studs	N/A	90 ft-lbs
Heads		
Bolts	70 ft-lbs	65 ft-lbs (iron heads) 60 ft-lbs (aluminum heads)
Studs	N/A	63 ft-lbs (iron heads) 58 ft-lbs (aluminum heads)

Warning: DO NOT use a counter-weighted torque converter with these crank kits. They are all internally balanced unless prior arrangements are made.

If you have any questions, contact us!

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