LOW-BUCK AND HIGH-STRENGTH

REBUILDING THE 4.6L SHORT BLOCK

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FORD'S UBIQUITOUS 4.6L MUSTANG ENGINE HAS PROVEN ITSELF TO BE A FORMIDABLE FOUNDATION FOR HIGH PERFORMANCE.

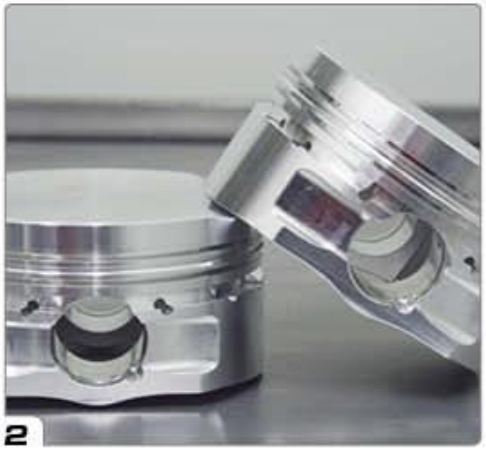
Whether it's fitted with two-, three- or four-valve heads, single or double camshafts, the modular block can handle tremendous power despite a relatively small displacement.

The factory's engine assembly does have its limits when enthusiasts try to pump more power out of it. In two- and three-valve GT engines, the weak link is generally the hypereutectic (cast) pistons. Under the pressure of supercharged or turbocharged boost, or a good dollop of nitrous, it's the pistons that are likely to fail.

The good thing is that the stock cast crank is admirably robust. Mustang performance pioneer Lidio Iacobelli has plenty of field experience to support that observation. His shop, Alternative Auto Performance, has torn down many a customer's engine to find a burned piston or two, but an unblemished crank. So, Iacobelli used the factory crankshaft as the primary building block for high-performance yet relatively affordable short block assembly.

Using the factory crankshaft, Alternative Auto adds a set of forged pistons and rods. The pistons were custom-designed by Alternative in cooperation with Diamond Pistons. They have a more precise fit in the

1 One of the pistons got burned and this short block is going into Alternative Auto's inventory of reconditioned short blocks. It's an aluminum block, which limits overboring of the iron cylinder liners to 0.020-inch.



2 Alternative Auto worked with Diamond Pistons to develop a "just right" forged aluminum piston for the 4.6L engine. Alternative specified the size, pin height and ring lands, taking into account the difference in thermal expansion rates between pistons.

3 Complementing the custom pistons is a set of forged connecting rods. They're the stock 5.933-inch length and use full-floating wrist pins.

4 The short block buildup begins with pinning the pistons to the rods. Full-floating pins are used and are held in place with spiro locks.

5 The rings are installed on the pistons, starting with the lower rings and oil control ring. Nothing exotic is used for the rings, just stock-type rings sized for the new pistons.

cylinder bores that enhances longevity and reduces the typical piston slap noise that accompanies a swap from cast pistons (which expand considerably more under heat) than forged versions.

The short block assembly, as seen in this story, starts at around $3,000. The engine-building options specified by the customer, of course, vary the price. Cleaning up the cylinder bores stretches them 0.020-inch apiece, making for new displacement of approximately 284 cubic inches. Alternative also offers a stroker version with steel crank that delivers about 302 cubes.

"It's a very cost-effective way for an owner to get a stronger bottom end

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8 The crankshaft end play was measured after the main caps were torqued to spec. The 0.08-inch reading on this engine falls right in the middle of the allowable range.

9 The piston/rod assemblies will come next. The "F" mark on the piston denotes the "front of engine" position.

10 The connecting rod fasteners are torqued to the factory specification.

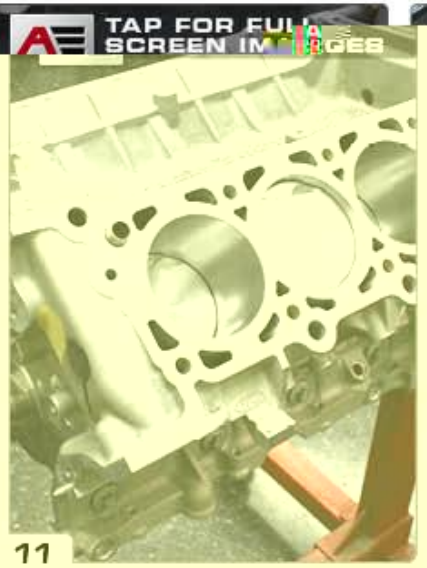
6 The block receives the stock, cast iron crankshaft. Alterative Auto has built numerous high-performance combinations with the stock crankshaft and report excellent results.

7 With crankshaft installed, the main caps are installed. The top bolts are snugged to 60 lbs-ft, while the side bolts are tightened to 30 lbs-ft plus 90 degrees.

at a reasonable price," said Iacobelli. "For someone who unexpectedly found

Some may be skeptical about using a stock, cast crank with forged rods

exceptionally well," he said. "That includes supercharged e



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11 As shown, the completed short block base price is approximately $3,000, making it a very cost-effective option for enthusiasts with a blown engine.

12 The cast crank/forged piston combination has proven very durable in high-boost combinations, such as this supercharged three-valve GT engine

the expense of going with a forged version, according to Iacobelli. It adds about $500 to the cost, right off the top – and that's if the original flywheel or flexplate is used. On 2005 and later engines paired with an automatic transmission, an aftermarket flexplate is needed with a steel crankshaft, adding cost to the package.

A forged crank and the requisite flexplate could add approximately $1,000 to the rebuilt engine's price. For most budget-conscious enthusiasts, that's probably reason enough to stick with the factory crankshaft.

With a proven record for supporting big power, the cost...

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