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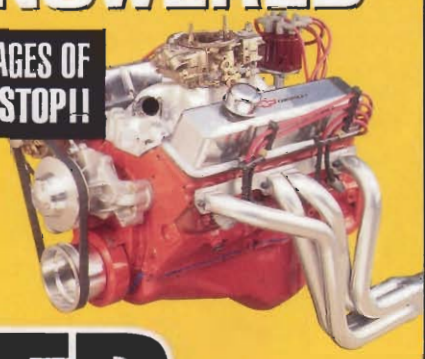

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Output of Nearly 3 Hp/Ci Spells Death for Unsuspecting V-8s... and Hondas

By Steve Magnante

Photography: Steve Magnante and Terry McGean

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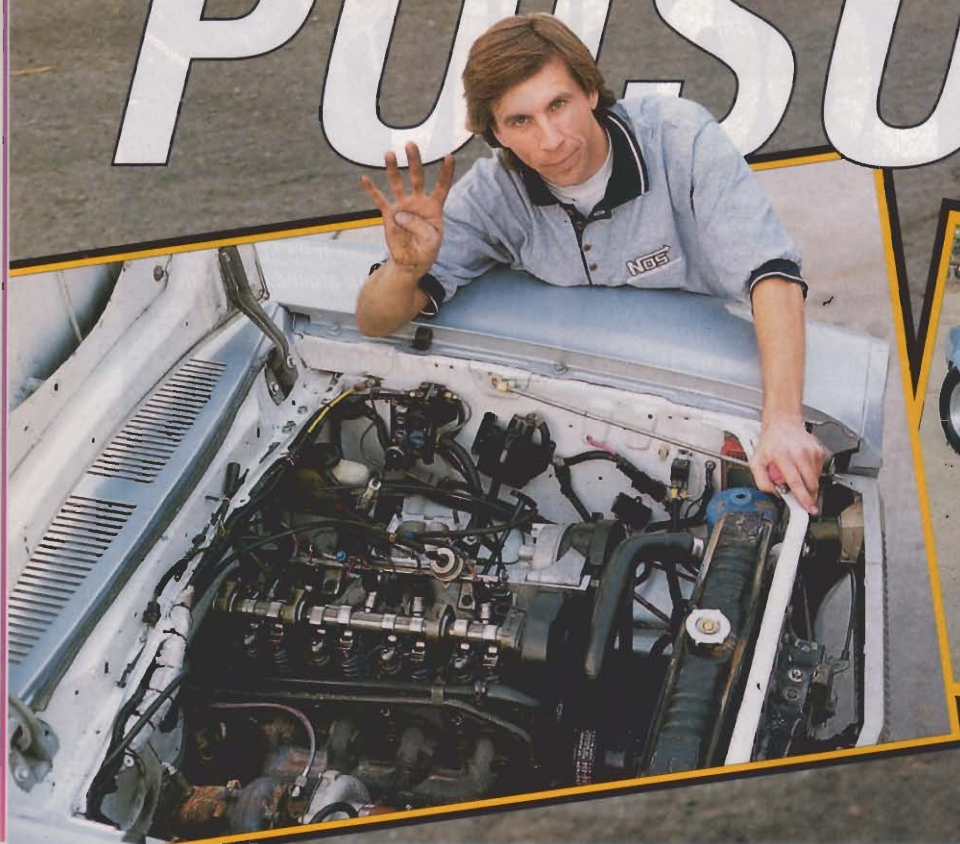


US PINTO

Joe Morgan is our kind of guy. He likes to go fast but insists on low cost and the utmost in streetability. After we watched his '76 Pinto run a string of 10.75s at 118 mph, we assumed it was powered by a small-block Ford. We caught up with Morgan, a high-school teacher from Corona, California, for the straight skinny on his 400hp four-popper–powered, 2,500-pound turbo bomb and how anybody can duplicate it for less than seven grand.

The primary ingredients in this tasty little recipe include a light body, a junkyard 2.3L turbo motor, a C4 automatic transmission, a big bottle of nitrous oxide, and a few inexpensive speed parts. Roll them all together, as Morgan has, and you'll end up with a 10-second screamer that gets more than 20 mpg, runs all day in traffic, and passes California's tough emissions schedule. It's one of those rare situations where one plus one equals three. Morgan's favorite pastime is cleaning house at the import-car drag races. By virtue of its cast-in-Brazil engine block, the officials are obliged to let him compete, and the results are always the same: Morgan's name appears in the winner's column.

Engine Assembly

It begins with a trip to the boneyard to locate a 1983-89 Ford, Mercury, or Merkur with the 2.3L turbo motor. On a recent foray to the Pick-Your-Part salvage emporium, we found four complete motors for less than $300 each. Classic donors include the '83-'88 Thunderbird Turbo Coupe, '85-'89 Merkur XR4Ti, '84-'86 SVO Mustang, '83-'86 Capri RS Turbo, and '83-'86 Cougar XR7. Avoid motors produced prior to 1983; they are equipped with a carburetor and are not as well suited to nitrous oxide or stratospheric boost.

Thanks to iron construction, used turbo motors are sturdy, and all their parts are usually acceptable for reuse when rebuilt. However, high-mileage cylinder heads should be checked for cracks emanat-

ing outward from the exhaust valve seats, a condition prevalent on pre-'87 castings that have integral, induction-hardened valve seats. Later mid-'87 to '89 heads, as well as over-the-counter service heads from Ford, use hardened valve-seat inserts, which are much less likely to foster cracks. Either way, you'll be able to spot the trouble before purchase if you remove the head.

The turbo motor is unique in that it has a special boss cast into the passenger side of the block that is tapped for an oil-return tube from the turbocharger. Nonturbo 2.3 blocks lack this provision, although Morgan has seen a few with undrilled bosses. In his 15-year relationship with these crazy little bombs, Morgan says it is rare to find a used turbo block with significant ring wear, further indication that these cylinder cases may be made of better, harder iron than nonturbo variants.

Naturally, there are some potential stumbling blocks if you attempt to piece a motor together from several sources. First, pre-'83 blocks employed a two-piece rear main seal and a crankshaft with an integral oil slinger. If this early crank is installed in a later block, the oil slinger will need to be eliminated for proper clearance. Normally aspirated motors built in 1989 and beyond were equipped with a dual-plug cylinder head, had altered rod length, and reduced diameter for the main bearing journals. Avoid these cores. Their internals are not readily interchangeable with their turbocharged cousins. For best results, begin your foray into teenie-weenie territory with a complete turbo engine.

The reciprocating assembly in Morgan's cherry bomb is remarkably stock—a tribute to the beefy design of the turbo 2.3. The crankshaft is cast of high-nodular iron and features fully radiused journals. Morgan has never known one to fail. The stock turbo forged connecting rods are actually larger in all critical areas than those of a 350 Chevy pink rod. The drawback with stock rods is that pressed pins are mandatory because there isn't enough meat at the small end to enlarge the bores for full-floating piston pins. And herein lies a tale. After years of developing this obscure combination, Morgan has seen well-meaning but misinformed machine shops overheat the small ends of the stock rods during piston, pin, and rod assembly. If there is any sign of discoloration, the rod has been weakened and should be discarded. To avoid this, Morgan uses 5.202-inch Crower Sportsman rods because they are machined to accept full-floating pins that he can install in the privacy of his own garage. Of course, he only needs four of them: At $350, they are cheap insurance.

You might assume that the intense cylinder pressure generated by a 17psi boost and a 150hp shot of nitrous oxide would require exotic pistons and rings. Think again. Forged Ford 8.0:1 replacement pistons are quite sufficient. Though Morgan back cuts the upper ring lands for enhanced sealing, the $150 pistons are otherwise stock. If you can't find them, TRW L2500F forgings are a direct replacement. Stock Ford turbo rings are also acceptable. Unfortunately, they have been discontinued; $100 Total Seal moly rings are an excellent substitute. Morgan relies on Ford tri-metal rod and main bearings, which he changes once a year whether they show signs of wear or not. Again, that's $75 worth of cheap insurance.

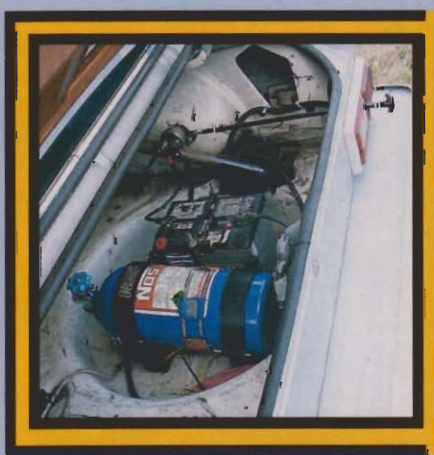
Morgan's 10-second stormer incorporates the cam and roller rockers from an '87 Ford Ranger pickup. Morgan explains that all production 2.3L motors share the same valve lift of 0.400 inches for both intake and exhaust, and that Ford manipulates the duration and lobe centers to tailor cams to specific applications. Though he experimented with a number of wild aftermarket grinds, Morgan has settled on the Ranger cam for its docile street manners, and he lets the nitrous take it from there.

A custom-built turbocharger (Performance Techniques, San Bernardino, California) features a T4 compressor housing and a Turbonetics T3 exhaust housing. At $500, the turbo alone accounts for roughly one fifth of the cost of the engine, but its ability to pump huge quantities of air are worth the investment. This particular unit has an area/radius ratio of 0.82—depending on the year; the stock 2.3 turbo is rated at 0.48 or 0.63. Without nitrous oxide, which Morgan introduces on launch, this outsized turbo would cause severe lag under full throttle. Just the same, thanks to its low mass, the Pinto is quite responsive on the street and a solid high-12-second piece on the motor.

The best injectors are the brown-top units common to factory '85-'89 2.3 turbo motors. Rated at 35 lb/hr, their low-impedance design allows the computer driver to operate them at 100-percent capac-

10 Seconds for Seven Grand Parts and Prices

Engine core:	$300
Rods:	$350
Bearings:	$ 75
Rings:	$100
Pistons:	$150
Balancing:	$ 50
Block machine work:	$100
Gaskets:	$100
Valve and headwork:	$400
Turbocharger:	$500
Intercooler:	$250
Exhaust system:	$100
Computer and wiring:	$200
Nitrous oxide system:	$600
Transmission:	$725
Torque converter:	$100
Aluminum driveshaft kit:	$100
Differential:	$400
Gearset:	$175
Tires:	$400
Rims:	$500
Rollbar:	$450
Used Pinto:	$800
TOTAL:	$6,925



ity (maximum duty cycle) with no deterioration in spray-pattern or delivery quality. The same cannot be said for most other production injectors. A stock 19-lb/hr 5.0L Mustang injector, for instance, is a high-impedance unit that heats up and begins to lose accuracy over 70-percent duty cycle. It is essential to use a computer from a 2.3 turbo application—if the system includes an intercooler, then a computer from an intercooled application is mandatory for maximum intercooler benefits. You can pirate the brain from any '87-'88 T-bird Turbo Coupe or '84-'86 Mustang SVO. Morgan's Pinto is equipped with a used '86 Mustang SVO computer augmented by a Superchips "PE" chip to raise the rev limiter to 7,000 rpm.

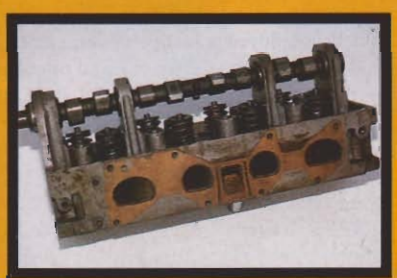
A lightly modified 5.0L Mustang NOS nitrous kit ($600) transforms this Pinto from pony to stallion at the touch of a button—it knocks nearly 2½ seconds off the quarter-mile time. This system is a dry application, meaning that the NOS fan-spray nozzle introduces nitrous at the throttle body while a simultaneous boost in fuel pressure (from 50 to 100 psi) provides added gas (via the injectors) in order to maintain a compatible air/fuel ratio that will prevent lean out. Fuel is supplied by two Ford F-series truck electric pumps that Morgan has mounted in series and flows through ⅜-inch factory-type plastic lines. A stock Ford TFI distributor, MSD-6 controller, Motorcraft wires and plugs, and a Garret intercooler kit—which was designed for a Toyota truck—round things out.

Drivetrain and Suspension

Morgan attributes much of his Pinto's ability to its automatic transmission. With a manual gearbox, he says, consistency and reliability would be elusive at best. So a Pinto C4 transmission, prepared by Pro Trans (Lancaster, California) with heavy-duty internals and a manual valvebody, backs the 2.3. Choosing a torque converter wasn't difficult thanks to the prodigious low-end power unleashed by the nitrous oxide. As such, a remanufactured stock Pinto converter connects the torque. The stall speed is 3,000 rpm, and the nitrous and turbo boost ensure bog-free, wheels-up launches every time. The cost of the prepped C4 and converter was $825.

One of the keys to this potent little package is a somewhat rare bellhousing—a stock Ford item found only in '74-'75 Pintos and Mustang IIs with the 2.3/C4 powertrain. Later cars used a C3 transmission, which incorporates a totally different design. If this special bellhousing isn't available, one from an automatic-equipped '71-'74 2.0L Pinto is a direct replacement but requires custom, stepped-diameter dowel pins to locate it properly. It is imperative to index the housing correctly between crankshaft and torque converter; otherwise, the vibration

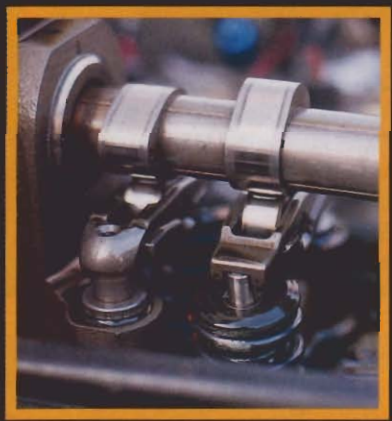
Disc brakes were scavenged from an '88 Turbo Coupe and bolted to the Pinto 8-inch axle. Currie Enterprises offers a bolt-on adapter that mates a T-bird caliper adapter to the axle end.



Most durable cylinder heads carry the casting number E7SE-BA. Morgan installs oversize (1.89-inch intake/1.59-inch exhaust) Manley/Esslinger severe-duty stainless valves. Stock turbo valves, though smaller (1.73/1.50), are high quality and can also be used if the budget is tight. The head receives only minor port matching and chamber cleanup.

Esslinger Engineering cylinder head and main bearing studs from SPS are 12 mm (nearly ½ inch) and torqued to 90 lb-ft. The turbo-only oil-drainback tube opening is visible beneath the freeze plugs.

Morgan says stock Ford parts are engineered so well that there is no need for aftermarket replacements, save for the head gasket (Fel-Pro PN 1035).



To sustain 6,800 rpm, the engine requires Ford Motorsport antipump-up hydraulic lifters and high-pressure (120 pounds closed, 280 pounds open) Crower/Esslinger valvesprings. Morgan says 2.3s are hard on valve guides, and that bronze-wall inserts wear out quickly. For best results, simply knurl the worn iron guides.

Some aftermarket iron-body, high-volume oil pumps can cause lifter pump up and valve float. The stock turbo aluminum pump shown here (PN D42E-6604-AJ) does not pose such problems, and its rotor-cavity volume is greater than a big-block Ford oil pump.

inherent in the four-cylinder will ultimately destroy the flexplate.

Believe it or not, many Pintos were produced with 8-inch rear axles. Morgan's '76 is one of them. This same axle is indigenous to V-6 and V-8 Mustang IIs. The Detroit Locker differential, equipped with 4.11:1 Richmond gears, features internal parts identical to those used in a 9-inch application. Stock 28-spline axleshafts are durable enough to withstand the Pinto's brutal 1.37-second short times, but pressure from tech inspectors may force a switch to aftermarket replacements. The driver-side axle is original, and the passenger-side axle was replaced once as a precaution. Morgan knows when that shaft begins to twist because the brake on that side of the car develops an intermittent squeak.

The rear suspension consists of stock leaf springs, which Morgan has modified by clamping the front segments, so they act like traction bars; the rear segments are free to allow body rise and weight transfer. Up front, the stock suspension, steering rack, and disc brakes work with Koni SPA-1 shocks that foster ample front-end rise off the line.

Body

Though Morgan likes the Pinto, he feels that a Fox-platform Mustang ('79-'93) would be an equally good home for the squeezed turbo 2.3 we've outlined here. When stripped of fluff, a Mustang sedan can

The square-tooth timing belt at left is for '74-'90 2.3s, but the tensioner setting must be high to avoid slippage. The round-tooth belt/cog introduced in '91 can be run looser without skipping, thus reducing parasitic drag. It's quieter, lasts longer, can be retrofitted to any 2.3 motor, and costs $80 with cogs.

A stock 2.3 Pinto oil pan gets an antislosh baffle to prevent oil starvation on heavy braking. Oddly enough, the baffle is not needed for acceleration... and the oil-pressure gauge proves it.

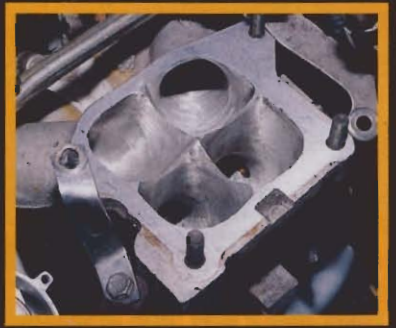
The stock Pinto 8-inch center section is fitted with Richmond 4.11:1 gears and a Detroit Locker and has been totally reliable in the 2,400-pound Pinto. A heavier car, or one with a manual transmission, would necessitate a 9-inch axle.

come within 100 pounds of the Pinto's curb weight, even though the 'Stang is a larger car in every respect. Thinner metal and more plastic account for this unlikely scenario. Pre-'74 Pintos, which were equipped with the 1.6L or 2.0L engine, have a straight-across radiator-core support that requires an electric fan when fitting a 2.3L motor. When the 2.3 became available in '74, Ford reconfigured the radiator-core support with a kick out to provide adequate clearance. For this type of duty, consider the coupe or wagon, as the Runabout hatchbacks lack the former's torsional rigidity. Wagons offer an interesting paradox. They weigh more than the coupes, but the increased overhang helps traction. Further, '77 and up Pintos have aluminum bumpers, which save 20 pounds over the steel counterparts.

Morgan wishes to extend a special thanks to the Raceway Ford (Riverside, California) body shop for helping out with the '95 Mustang Opal Frost paintwork and to his girlfriend Michelle Demora for her tireless support at home and at the dragstrip. Even though hot rodding is dominated by big, burly V-8s, cars like Morgan's Pinto can't be taken lightly. Best of all is the way he terrorizes Hondas at the import drags with this curious combination of traditional and progressive technology. But do the "rice rocket" magazines ever give him ink? Never. Fortunately, we've just solved that problem. **HR**

The stock turbo rod on the left (PN D42EAA) is capable of withstanding the near-3hp/ci output of this motor when outfitted with SPS or ARP rod bolts. The Crower rod at the right was chosen primarily for the luxury of its full-floating pin capability.

The fountain of happiness: The fan-spray nitrous nozzle in the throttle body is the secret to 10-second timeslips.



Morgan hogged out the runners of the lower intake manifold and increased the volume of the upper intake-manifold plenum, which has been relieved of the plenum divider entirely.