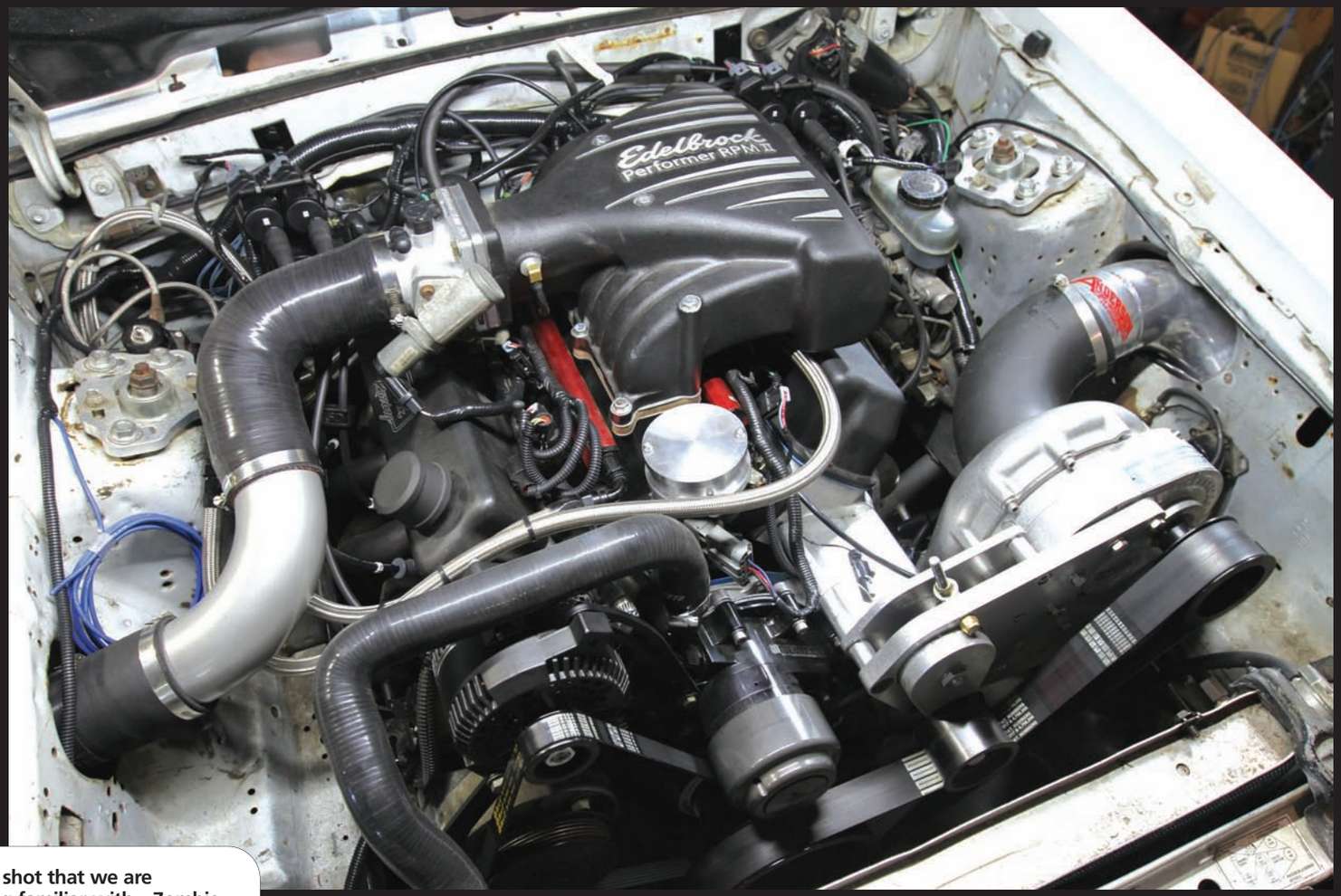
EXPRESS LANE TO BIG POWER

Zombie Coupe gets a quick hit of power thanks to a Nitrous Express single-stage EFI nitrous system

BY **MICHAEL GALIMI** PHOTOS **JPC RACING**



This is a shot that we are becoming familiar with—Zombie Coupe's ProCharger-blown 363ci stroker engine. This month we are adding nitrous to it.

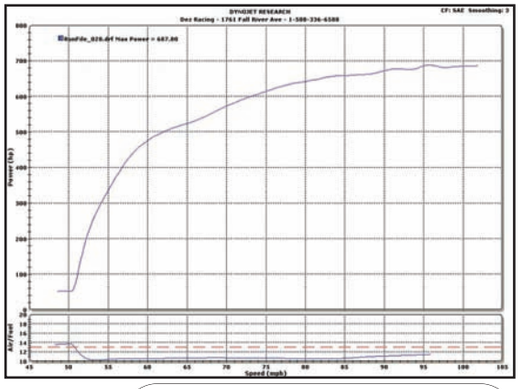
Add nitrous to anything and the results are always impressive, be it lawn mowers, R/C cars, Mustangs, NHRA Pro Stock cars—the track-record of nitrous being injected into internal combustion engines is well-documented. That shouldn't come as a surprise to anyone and we aren't here this month to just say, "Yeah, look at this awesomeness." Nope, we are here to test the integration of nitrous into Zombie Coupe. Integration might be a fancy word normally found in the textbooks for Business 101 courses but in our case it is the truth as the Nitrous Express kit is controlled by the Pro-M EFI system.

Just to review, our test subject is our resident project car, Zombie Coupe, of which Dez Racing resurrected from the dead and is in the middle of turning it into a street/strip assault vehicle. To do so we ditched the old combination of a stock short-block, Trick Flow heads, a very dated Lunati blower camshaft, and GT-40 intake. The car also sported a Vortech S-trim and an AOD transmission for a grand total of 374 rwhp and 362 rwtq; not too bad for a car that sat for nearly seven years. We quickly swapped out the ancient running gear and replaced it with a Coast High Performance 363ci short block that was topped with Edelbrock E-205 heads and Performance RPM II intake manifold. A custom Dez Racing camshaft was slid into the Dart Sportsman block and a ProCharger D-1SC supercharger supplies 18 psi of boost. Utilizing a Snow Performance methanol injection system, Dez Racing extracted 655 rwhp and 559 rwtq from the sporty stroker engine. Those results were obtained while running it all through a Dynamic Racing Mighty Mite C4 automatic transmission, with a TCT torque converter in the SFI-approved bell housing.

The adventure to the mid-600 rwhp was made easy for a variety of reasons, of course Dez Racing is a factor since the shop has been there, done that with this type of setup. They seem to churn out these combinations on a weekly basis but another element that made our life easy is the Pro-M EFI system that controls it all. The system is a self-learning stand-alone EFI that utilizes a Ford OEM processor so the computing power is enormous. The Ford processor allows the engineers a platform to combine a MAF sensor and wide-band oxygen sensors to keep the engine running smoothly and efficiently by adapting engine calibration seamlessly while running. That means when we switched from the old school setup making a paltry 374 rwhp and added the stroker engine with the big boost, different fuel injectors, and larger MAF sensor, all Mike Dezotell of Dez Racing had to do was adjust the parameters on a setup screen and the Pro-M EFI did the rest of the work itself.

The Pro-M system has a variety of applications to control different add-ons on top of its normal engine running duties. We put the Pro-M EFI processing capabilities to task by installing a Snow Performance methanol injection kit and wired it into the EFI system. A methanol flow sensor feeds the Pro-M processor with information so it can adjust the engine calibration based on methanol flow into the engine. That means the engine runs as it would in non-meth trim and as meth is introduced (turned on by the Pro-M EFI) then the EFI can compensate with increased ignition timing for more power. Zombie Coupe went from 622 rwhp

We turned to a Nitrous Express Ford EFI single-stage nitrous system (P/N 20922-10) to add a chemical kick. It is adjustable from 35hp up to 150hp. We opted for a 75hp hit to bring output to 687 rwhp.



Once again we charted our gains on the DynoJet chassis dyno at Dez Racing. Mike Dezotell had removed two degrees of ignition timing prior to running nitrous, dropping output below the 655 rwhp that we made in the last installment when we tested a Snow Performance kit. The final 687 rwhp is impressive and certainly capable of propelling Zombie Coupe into the nines, on pump gas, with ease.

The Shark nozzle is a tried and true nozzle that comes standard in the Nitrous Express EFI kits. It is a wet type system, meaning nitrous and fuel is sprayed into the intake tract. Nitrous Express provides a jetting chart to go along with its system as the user can adjust the hit from 35hp up to 150hp in this kit.

Doug Paradis of Dez Racing chose to install the Shark nozzle in an existing port in the Edelbrock Performer RPM II intake manifold. The port is located after the throttle body, making it an easier installation since we run a big rubber elbow on the throttle body leaving us without a solid tube to put the nozzle in.

Since this is a wet system there needs to be a way to control the fuel and the nitrous. These are the Lightning series solenoids with lightweight carbon fiber covers and CNC-billet bases. Each features a side-entry and bottom-exit for optimum flow and performance.

up to 655 rwhp thanks to the Snow Performance kit, which allowed more ignition timing despite the pump gas in the tank.

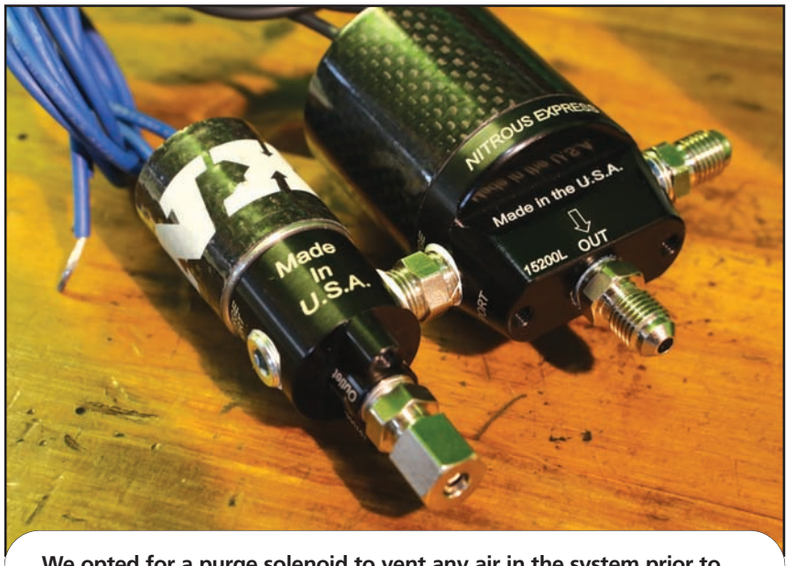
The Pro-M EFI keeps the engine running smoothly even when we added the methanol injection to its list of duties. This month, the Pro-M EFI is getting yet another task in the form of a single-stage EFI nitrous system from Nitrous Express. The built-in nitrous controller acts as both a progressive controller and offers the same self-tuning capabilities like the meth injection function. Rather than add timing like the methanol, the nitrous controls can retard the timing and also keep the air/fuel ratio optimum for nitrous use. The Nitrous Express kit is normally activated via a micro-switch that is triggered at WOT. Instead of using that stand-alone operation, the Pro-M EFI uses the throttle position sensor to kick on the juice—hence the integration of nitrous to the EFI systems. As a side note, we added a second high-current driver module for the physical control of the Nitrous Express kit, which is connected to the wiring harness so the processor can activate and de-activate the system.

"It is a progressive controller and ramps up the duty cycle to the solenoids using relative throttle position and rpm," said Chris Richards of Pro-M Racing as he explained the virtues of integrating the nitrous system into the EFI system. He continued to tell us that the processor controls the nitrous system flow, monitors the air/fuel ratio through the wide-band 02 sensors, and will constantly adjust the fuel trims in closed loop mode to compensate for any fluctuations. Nitrous kits come with a predetermined nitrous/fuel-jetting package, which uses a specific fuel pressure rating, but in the real world the fuel pressure can be a changing variable for a variety of reasons. By integrating it with the Pro-M EFI, the optimum air/fuel ratio will be commanded digitally. It eliminates any variables that can sacrifice performance or cause harm to the engine. Just like our meth injection test, if the nitrous or fuel element is not flowing (or operating at a reduced flow), then the processor will compensate to the changing situation.

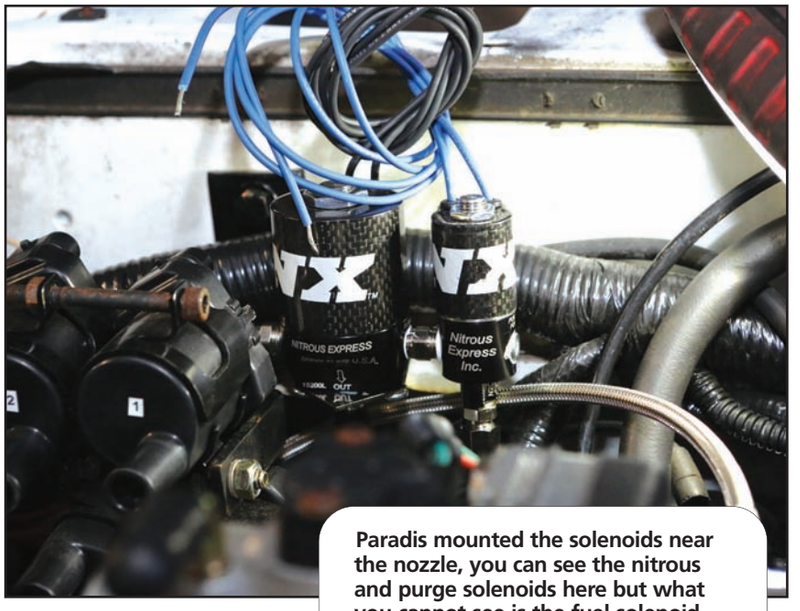
Just to throw examples out there, we've all pushed a nitrous bottle too far and with bottle pressure going down the engine typically surges during a run because the nitrous volume is going down while the fuel flow in the wet system remains the same, causing an overly rich nitrous/fuel mixture. With the Pro-M EFI monitoring the air/fuel ratio via the wideband oxygen sensors, that sort of scenario will correct itself to keep the air/fuel ratio consistent regardless of the nitrous/fuel mixture being off from lack of nitrous flow. In our case, the Pro-M EFI is correcting the air/fuel ratio in closed loop to be a constant 11.4:1 on the bottle.

Talk is cheap, how does it work in the real world? Doug Paradis of Dez Racing make quick work with installing the Nitrous Express kit. Everything installs like any other nitrous system, save for the high-current driver and accompanying 20-amp fuse. Another aspect that is unique to this system is how smooth the Nitrous Express kit kicks on when we were on the Dez Racing dyno. The progressive control ramps in the nitrous, which will help in traction limited scenarios like—cough, cough—street racing or bad track conditions. The progressive controller's solenoid duty-cycle can be adjusted to come in quicker, slower, or instantly so the end-user can tailor the nitrous hit for any application. Richards also told us there is a rpm/time element to the controller that will only let the nitrous ramp in at specific threshold, so if the tires spin and the rpm shoots up, the EFI will not let the nitrous go to 100-percent due to the time component of the progressive application.

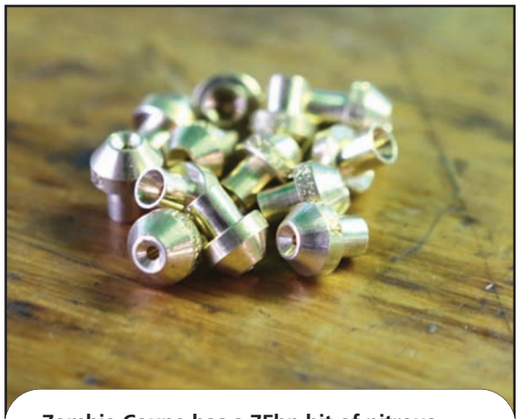
Dezotell jetted the system to 75hp, which the Nitrous Express jetting chart calls for .041 nitrous jet and .024 fuel jets. He did admit to knocking two degrees of ignition timing



We opted for a purge solenoid to vent any air in the system prior to use. It will also help drop bottle pressure when you are in the staging lanes and the pressure creeps above 1,050 psi.

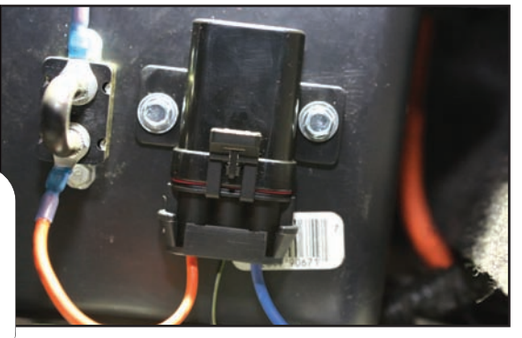


Paradis mounted the solenoids near the nozzle, you can see the nitrous and purge solenoids here but what you cannot see is the fuel solenoid mounted below. This is a crowded area and Paradis bolted the fuel 'noid on the bottom of the coil-on-plug bracket. That location for the fuel solenoid also made it easy to tap into the fuel line.



Zombie Coupe has a 75hp hit of nitrous and that is achieved by running a .041 orifice jet on the nitrous side and a .024 orifice jet on the fuel side.

We ditched the micro-switch activation method and wired the Nitrous Express system into the Pro-M EFI.



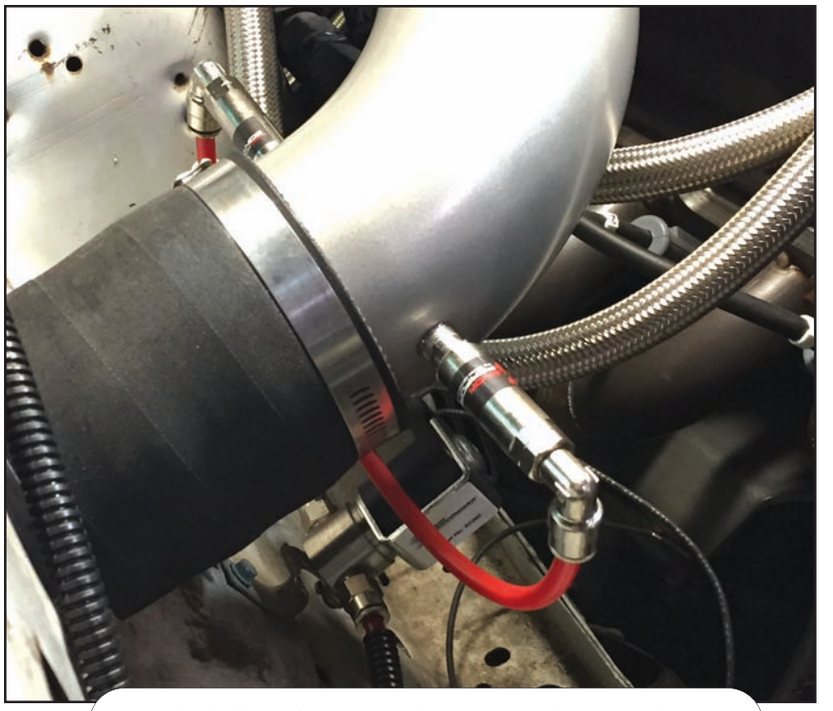
A high-current driver is mounted in the trunk and hardwired into the EFI harness in order for the Pro-M processor to take control of the nitrous system. We used a similar method to control the Snow Performance meth kit.

out of the engine prior to the test just to be safe. We didn't run Zombie Coupe in the blower-only/less timing setup but it is safe to say the 655 rwhp dropped down to the low 600s with the less ignition timing. The end result with the 75hp kit flowing on top of the Snow Performance methanol injection was an impressive 687 rwhp and TK rwtq.

"I think this test would show even better results on track as the torque converter is hiding the big number on nitrous," said Dezotell as he dissected the dyno sheet. The Mustang market is definitely hung up on chassis dyno results, especially in stick-shift cars but with automatic cars the dyno can be misleading due to the load on the torque converter. Regardless of any excuse, 687 rwhp is a serious number that can propel Zombie Coupe solidly into the nines, according to all go-fast experts and bench racing professionals.

The final power numbers are augmented by the additional tasks that we have thrown at the Pro-M EFI system over the past year or so. We began with a mildly supercharged 5.0L combination, upped the game with a stroker engine with bigger heads and wilder camshaft, massive fuel injectors, bigger MAF sensor and more boost, threw a methanol kit on top of it, and finally we added the Nitrous Express system for even greater power. Each time the only modifications we did with the EFI system was adjust the parameters to let the PCM know the new parts that we added and the Pro-M processor compensated appropriately. Each time the car idled smoothly, runs smoothly in steady state cruising and part-throttle scenarios, and never missed a beat when at WOT no matter what extra tasks were asked of it to perform. Our next frontier—get on track, hang the wheels, and let Zombie Coupe terrorize the neighborhood. ■

The bottle uses a Lightning valve that has a large diameter siphon tube, a high-flow 45-degree outlet, and dual gauge ports.



Here is dual nozzle Snow Performance meth system that we added a few months ago. Dezotell kept the methanol flowing during all nitrous runs.

The bottle was mounted in the spare tire well using the Nitrous Express supplied brackets.

OK Cancel Undo Read Write Current Op Point Wire Surface Table

XYZ
XZ
YZ

t_n2o_base_duty_cycle(RPM,TP_Rel)

Y\X	500	2500	3000	3500	4000	4500	5000	5500	6000	6450
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
0.000 R1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10.000 R2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20.000 R3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30.000 R4	0.000	0.000	0.000	0.150	0.170	0.180	0.190	0.200	0.200	0.000
40.000 R5	0.000	0.000	0.000	0.200	0.240	0.260	0.280	0.300	0.300	0.000
50.000 R6	0.000	0.000	0.000	0.250	0.310	0.340	0.370	0.400	0.400	0.000
60.000 R7	0.000	0.000	0.000	0.300	0.380	0.420	0.460	0.500	0.500	0.000
70.000 R8	0.000	0.000	0.000	0.350	0.450	0.500	0.550	0.600	0.600	0.000
75.000 R9	0.000	0.000	0.000	0.400	0.500	0.600	0.700	0.800	0.800	0.000
75.000 R10	0.000	0.000	0.000	0.400	0.500	0.600	0.700	0.800	0.800	0.000

Here is a sample of the Pro-M EFI solenoid duty-cycle and its control over the nitrous system. The software can ramp in the nitrous hit progressively, which is customizable and it is activated through throttle position and rpm. The EFI system will also keep the air/fuel ratio at 11.4:1 for optimum performance regardless of fuel or nitrous flow problems. It is both a safeguard and performance related measure.

SOURCES

Dynamic Racing Transmissions
DynamicRacingTrans.com
203 | 315 | 0138

Edelbrock
Edelbrock.com
800 | 416 | 8628

Nitrous Express
NitrousExpress.com
940 | 767 | 7694

ProCharger
ProCharger.com
913 | 338 | 2886

Pro-M Racing
ProMRacing.com
336 | 644 | 8668

Snow Performance
SnowPerformance.com
866 | 365 | 2762