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FRPP Z304 HEADS TESTED
475HP 347-INCH STROKER
FOUR-VALVE MANIFOLD SHOOTOUT
SAFETY FIRST

Boost and water/methanol injection can make gobs of power. We show you how to make it safely.

Guys and gals, grab your safety goggles; we’re going to show you a great way to make big power and do it safely using two relatively new safety devices.

Obviously, practicing a little self-restraint when it comes to tuning your supercharged or turbocharged ride will go a long way, but we wanted to tune you in to a couple of neat safety devices that can save your motor in the event of engine knock, detonation, or in our case, the lack of water/methanol flowing freely into the engine.

We’ve worked with Woodland Park, Colorado–based Snow Performance before and have shown you the benefits of using the company’s water/methanol injection kit on both
pushrod and modular powerplants. In this article, we’ll once again show you what the water/methanol injection can do—this time on a supercharged Two-Valve powerplant—in addition to showing you how Snow Performance has taken the next step in its water/meth system’s development with its new SafeInjection control unit.

“Water/methanol injection is great, and our systems are engineered for reliability,” says Matt Snow of Snow Performance, “but in the case where you run out of fluid with an aggressive tune, many want the peace of mind that this system provides.”

The chemical intercooling properties of the water/methanol mixture allows the end user to run more ignition timing than normal. If you run out of the boost juice, though, an aggressive timing table can mean bad things for the engine.

**THE CHEMICAL INTERCOOLING PROPERTIES OF THE WATER/METHANOL MIXTURE ALLLOWS THE END USER TO RUN MORE IGNITION TIMING THAN NORMAL.**

The user-friendly nature of Snow Performance’s Boost Cooler system means a lot of people use it on their street cars. Let’s face it, we’ve all run a few miles over our next oil change at some point, so what’s to say you won’t forget to fill up the Boost Cooler reservoir? Snow Performance is here to prevent anything bad from happening should you have an absent-minded moment.

Snow’s SafeInjection is a handy piece of hardware that monitors the flow of the water/meth mix. If the mixture stops flowing, the unit sends a 12-volt signal which, in addition to illuminating a warning bulb, can be used to trip numerous devices that can activate a bypass solenoid or wastegate to open and dump boost or, as in our case with the J&J Electronics SafeGuard, reduce timing.

The J&J SafeGuard control unit is a handy piece of hardware that retails for about $600 and is wired into the coil packs of your ’95-‘04 Mustang GT. It can detect engine knock using the available Bosch sensor and pull timing through the coil packs to save both your engine and your
THE J&S SAFEGUARD

OUR SUBJECT vehicle was equipped with the J&S Electronics Safeguard, which is an individual cylinder knock-control system that's designed to pull timing when it senses engine knock or detonation. It can also be triggered by a 12-volt signal, like the one from the Snow Performance SafeInjection.

THE J&S Safeguard is almost as easy to install as the SafeInjection unit. You can adjust the sensitivity of the knock sensor, the boost rate, and when it starts to retard the timing. For more information on the installation of the Safeguard, visit www.01bullitt.com or www.jandsafeguard.com.

THE KNOCK-retard monitor tells you how much timing the Safeguard is pulling. Each LED represents a specific amount of timing in degrees, depending on how you have it set up.

YOU'LL WANT to mount the SafeInjection box in a dry area. We mounted our control module right next to the nozzle, which also happened to be the only available space in this cramped Two-Valve engine compartment. Wiring the SafeInjection includes connecting the black wire to a secure ground, connecting the green wire to the device that will receive the 12-volt trigger signal, and connecting the red wire to the red power wire of the water/methanol injection pump. Do not connect the red wire to a direct 12-volt source or the positive battery terminal, as doing so will result in a malfunction of the SafeInjection unit.

OUR SUBJECT vehicle already had the Snow Performance Boost Cooler system installed. Owner Bob Watson mounted the pump and reservoir in the trunk.

INSERT THE high-pressure line from the output of the pump into the quick-connect fitting labeled PUMP on the front of the SafeInjection unit. Pull on the hose after inserting to ensure a tight connection. Insert a second high-pressure hose into the quick-connect fitting labeled NOZZLE on the front panel—the other end of this hose is connected to the nozzle itself.
pocketbook from melting down. What's better is that the J&S unit can be triggered to work via a 12-volt source, such as the one from Snow Performance's SafeInjection, so in effect, you'll have two safety devices working together to protect your underhood investment.

It's important to note that the J&S SafeGuard is designed to pull up to 20 degrees of timing when reading through its knock sensor, while its switched timing retard (triggered by the Snow Performance SafeInjection in this test), offers only 2 or 4 degrees of timing.

THE SAFEINJECTION unit has a user-adjustable dial that can be used to set the flow point at which the +12-volt trigger signal is activated. The recommended starting point is one half of total nozzle flow rating. For example, if using a 375ml/min nozzle, set the trip point around 187ml/min. If using two 375ml/min nozzles for a total of 750 ml of nozzle flow, set the trip point to 375.

THE SAFEINJECTION unit we used was an early model and featured this warning light, which we installed next to the Boost Cooler power-on light. Later units will be offered with an actual flow gauge.
WORKING IN TANDEM, THE SAFE-INJECTION AND SAFEGUARD ALLOWED US TO CRANK UP IGNITION TIMING BY 7 DEGREES, AND SAFE HORSEPOWER ESCALATED AS A RESULT.

SNOW PERFORMANCE's Matt Snow (right) and HP Performance proprietor Tony Gonyon (left) discuss the dyno results and how much timing could be added once the water/methanol mixture was flowing.

degrees of timing retard. In this test, we were able to increase total timing from 19 degrees to 26 degrees for a total increase of 7 degrees. Obviously, the 4 degrees of retard built into the SafeGuard will not be sufficient, but J&S informed us that the unit can be reprogrammed to provide even more timing retard. Based on your engine combination, this will be something you'll want to consider when ordering the unit.

Our subject vehicle for this test was an '01 Bullitt Mustang belonging to Bob Watson of Jacksonville, Florida. Bob's Bullitt (No. 5094) has the distinguished honor of being the second fastest Bullitt Mustang (according to www.imoc.com) in the country, thanks to its big-bore 302ci, Vortech-supercharged powerplant. It has run a best elapsed time of 10.01 at 136 mph.

We followed along on the install as Matt Snow and HP Performance's Jason Combs handled the SafeInjection installation. HP Performance in Orange Park, Florida, also provided the Dynojet dynamometer for our testing purposes, in addition to SCT custom tuning by HP's Tony Gonyon.

The installation of these two components is fairly easy, though we don't recommend it for the novice. Working in tandem, the SafeInjection and SafeGuard allowed us to crank up ignition timing by 7 degrees, and safe horsepower escalated as a result. Should the water/meth mix run out, Watson now knows that the safety devices he has in place have his back.
PRO STOCK Technology at Sportsman Prices!

Pro Stock is the most technically demanding class in drag racing. Participating as both a manufacturer and a race team, Dart is in a unique position which enables us to apply the technology usually found only in top level racing engines to our entire product line. Wet flow testing is an example of this technology transfer. Our custom built wet flow bench has enabled Dart to develop port and chamber designs which carry more fuel in suspension, resulting in significant increases in horsepower.

DART Windsor style cylinder heads are available with precision cast 170cc or 195cc intake ports or fully CNC ported with 210cc or 225cc runners and CNC machined combustion chambers. Redesigned chambers and raised exhaust ports for increased power. Cast from virgin 355-T6 aerospace aluminum.

Dart blocks are cast from superior alloys with significantly higher strength than OEM or other aftermarket offerings. decks, main webs and cylinder walls are extra-thick for increased strength. Dart’s priority main oiling system increases lubrication to the main bearings. Steel 4-bolt main caps with splayed outer bolts resist main bearing bore distortion.

Dart iron blocks are now available by special order with compacted graphite as used in NEXTEL Cup and NHRA Pro Stock. Huge increases in strength are realized without added weight.


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