



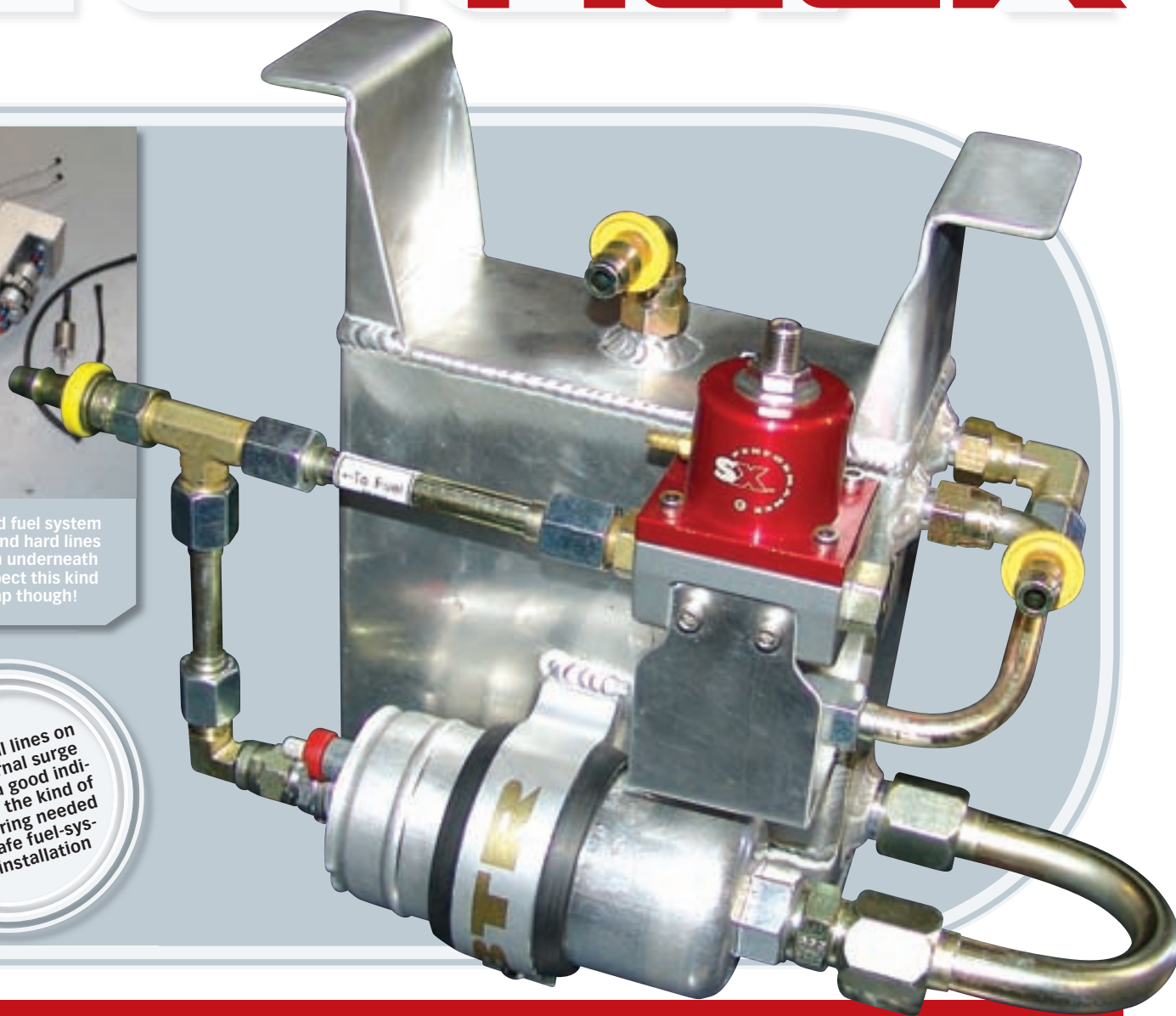
STORY AND PICS BY MARTIN DONNON
WHEN INSTALLING YOUR FUEL SYSTEM,
IT'S SAFETY FIRST

FLAMING HECK



A properly engineered fuel system with quality fittings and hard lines that run all the length underneath the vehicle. Don't expect this kind of thing to come cheap though!

Hard metal lines on this external surge tank are a good indication of the kind of engineering needed for a safe fuel-system installation



Prepare the injector O-rings thoroughly with rubber grease or petroleum jelly to stop them snagging in the fuel rail when you push them in, or the result can be massive leakage



Bolt-on brackets made from billet aluminium give much greater bend resistance and are totally safe when installed correctly

One of the cool things for the DIY guy to attempt these days is the installation of a full competition-style fuel system. Power outputs of 400rkwW are fairly easy to attain with 'bolt-on style' forced-induction systems, so the requirement for adding fuel into the mix is now almost a mandatory part of any serious build-up project.

Fuel system installation isn't a job for the fainthearted as they are designed to burn and release huge amounts of energy when it combusts.

The difference between a successful fuel system installation and one that quickly turns your pride and joy into a blazing fireball can be a single critical oversight in the implementation.

Our best advice is that if you have any doubts at all about screwing together a fuel system to leave it to a professional that has experience. You only ever get one shot at making it right, and the downside can be devastation of the highest level. Here are some of the more common mistakes being made out there in DIY fuel system land.





Make sure you tighten all fittings thoroughly after a fuel system install and then check for leaks. Also, make sure you use the right tool for the job, which is questionable in this case!



A pair of LS1 fuel rails. One has the correct mounting brackets to stop flex, and one doesn't. Can you pick which one is which?

GARDEN HOSE

Substituting conventional rubber hose for proper EFI hose is a shocking short cut that some have taken to over the years. The saving for running cheap low-pressure hose rather than full pressure EFI hose can be a couple of hundred dollars so the attraction is there, but the result certainly isn't.

With most late-model Commodores running at 58psi base fuel pressure (plus additional boost-fed

pressure if the vehicle has forced induction) conventional low-pressure hose will fail instantly. If you are lucky, a massive fuel leak will be the only evidence rather than a catastrophic failure followed by fire.

Always check the hose you are using anywhere on the system is properly rated EFI hose (which is stamped on the side of the hose and plain to see) and listed to handle continuous pressure of over 100psi. It costs some money, but it is well worth the expense.



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GROUND SCRAPER

Rather than having neon lights hanging down under the car for all to see, the latest lethal fashion in Commodore land would be running wads of EFI hose the length of the vehicle, and then loosely cable strapping the hose at various random points along the distance between fuel pump(s) and engine. Don't laugh, there are many that get excited towards the end of a fuel system installation and make this critical error that may cost them the lot.

All you need to do is have a look at the attitude the manufacturer takes to the very same task. The factory fuel lines that run outside the engine bay are primarily steel in construction, bent from single piece tubing commonly referred to as 'bundy' tubing. Not only that, but between these lines and the road surface is a metal clip on shroud that runs the length of the vehicle.

It is possible to run EFI hose the whole way under the car. However, in the case where this does occur, there must be a shield between the hose and the ground – even if it means stuffing the fuel line inside the factory cover.

Although the colour coordination is terrible, you can use rubber EFI fuel line in the engine bay providing it doesn't abrade against any other surfaces. Shy away from using it under the car if possible, though



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FANCY PANTS

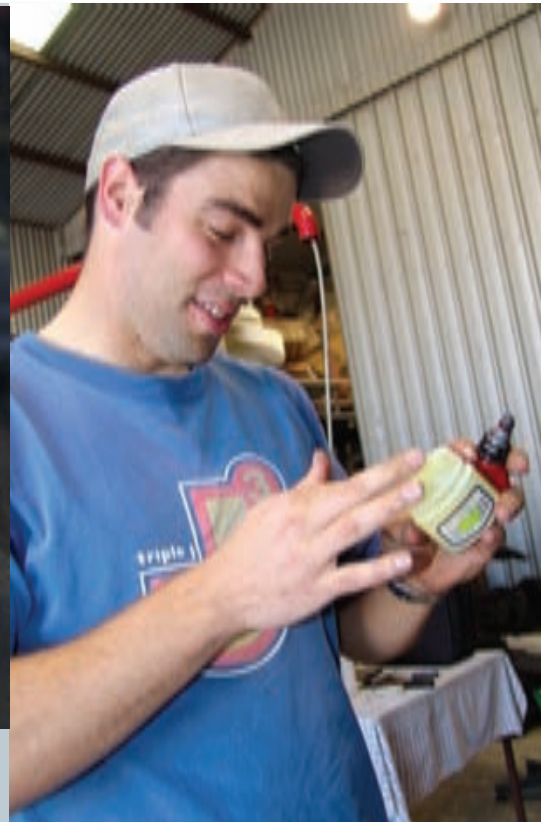
There are plenty of good-looking fittings and fasteners on the market. Just like the bowerbird, it is possible to get lured into a world of pretty-looking gear that may not work as good as it appears. Too many times 'copy fittings', which are imitations of the real quality part, have failed on cars and sprayed high-pressure fuel all over both the vehicle and anything hot in the general direction.

Look at any truck, tractor, or commercial piece of equipment and notice that most of the pressure fittings and joiners are in fact not eye candy but instead serious pieces of hardware that are commonly described as JIC fittings. In other words, it is both quite possible and plausible to have your local ENZED, Pirtek, or hydraulic fitting bloke come out with his van and supply the right bits for your fuel system.

Be warned, though, proper high-quality industrial fittings aren't the cheapest things in the world. The truth is (as any experienced fuel-system installer will tell you) that the fitting side of the installation will be one of the priciest. Cutting corners on fittings though is like cutting corners on hose – you roll the dice and take your chances. Personally, we wouldn't.



A touching process – applying good old vaseline to the injector O-rings to stop them grabbing



Standard fuel rails have no problems coping with most any level of boost pressure as they are well engineered from the factory

All that glitters is not always gold. All of these colourful fittings on my own car had to be replaced with industrial hydraulic JIC types to stop them constantly weeping fuel



RAIL ROADING

Think back to some of the bigger and more famous vehicle fires that have been witnessed lately. From cars turning into fireballs during dyno competitions through to engines exploding into flame on the engine dyno they all have one thing in common, and that's a set of fuel rails that isn't designed to cope with the job at hand.

Just about every single fuel-rail incident I can think of comes back to poor fuel-rail design that allows the rail to flex on its mounting bracket. In turn, this breaks the seal between the fuel injector and the rail, and squirts a high-pressure stream of fuel onto the red-hot engine. Just like a dog, your car will go 'woof', and then it is time for the fire brigade.

More common with boosted applications, the rising rate of the fuel pressure will gradually tilt a poorly designed fuel rail under full noise. This means that when the whole shooting match does in fact let go, your engine will be at maximum boost and more than likely hot as Hades. All you need to do is have a look at the fuel rail mount and apply some commonsense to avoid this problem.

Any fuel rail with a pressed steel bracket may work okay in a normally aspirated application, but it's only the billet-style brackets that will supply enough total strength to stop the assembly flexing and causing you a fiery problem. Really, there is no excuse for having issues with this kind of stuff.

IN THE O-RING

Be very careful when fitting your own fuel injectors. Unless you have an experienced sense of feel, it is probable that you will more than likely crimp a fuel injector O-ring on the way in with a new squirter. This can and will create a massive high-pressure fuel leak all over your engine.

The secret is to use rubber grease (but vaseline will do in a pinch) on the O-ring that will lubricate its slide into the final seated position in the fuel rail. Push the injector into place gently and feel the O-ring seat before letting the job of tensioning the fuel rails bring the injector into its final resting position.

CHECKSUM

A final step in making sure your fuel-system installation is safe can be performed by several applications of the ignition key to run the pump(s) and build up fuel pressure before you first fire the engine into life. Don't just give the system a single prime and exclaim success when no petrol squirts everywhere, though.

The trick is to remember that the entire fuel system will be empty at first prime. Not only will you have to fill the complete rail/hose assembly up before there is any chance of a leak, but the surge tank as well. Don't be surprised to have to trigger the pumps a good dozen times or so before you can be sure that there is a full head of fuel circulating through the system. If you do find a leak, fix it! **SC**

