

ADVANCED FUEL PUMP TECHNOLOGY

DRIVING PERFORMANCE AND EFFICIENCY

Fuel pump technology has evolved rapidly since the days of mechanical fuel pumps. Although mechanical fuel pumps can still be found on classic and vintage cars running carburetors, they simply cannot deliver the higher pressures or volume of fuel required by modern cars and trucks with electronic fuel injection. A mechanical pump moves fuel by cycling a diaphragm inside the pump to increase fuel pressure in the fuel line. It is called 'mechanical' because the diaphragm is operated by a lever driven by moving parts (the camshaft) inside the engine. It's a reliable system, but mechanical fuel pumps can only supply fuel to the engine at very low pressure; often around 10 pounds per square inch or PSI.



The aftermarket performance versions of the Dual Channel Single Stage (DCSS) pump design provide ample and reliable fuel flow for engines producing more than 500 horsepower.

By contrast, today's electric fuel pumps can deliver much more pressure, a requirement of modern fuel injected engines. Unlike mechanical fuel pumps, electric fuel pumps do not need to be attached to the engine to which they supply fuel. When the fuel pump is attached to a hot engine block, the heat can interrupt the fuel supply causing a condition commonly referred to as vapor lock.

Electric pumps can be mounted in the actual fuel tank or inline in the fuel supply line to push fuel to the engine, which is a much more efficient design. In today's electronically fuel injected en-

gines, fuel pressure can be varied depending on the demand. Pressure is controlled by the vehicle's computer (ECM) to increase performance and/or efficiency while reducing emissions.

Positive displacement pumps, often referred to as constant volume pumps, can provide higher pressures and operate at lower suction values in the tank. Their capacity is not determined by pressure against the flow rate.



When greater fuel pressure is needed for higher-performance applications, turbine and rotary vane style pumps are often used. As their names indicate, they create fuel pressure by centrifugal force from a spinning rotor or turbine wheel inside the housing thereby forcing fuel into the fuel line and engine. These designs are very reliable, supply fuel pressure quickly, and generally, are not susceptible to heat issues. Again, in-tank fuel pump designs, though bathed in fuel and operating in a harsh environment, are liquid-cooled and temperature-controlled in hot and cold weather by the fuel in the tank. An inline pump is often mounted under the vehicle where heat can build up under extreme conditions.

Often, the best solution for higher-performance production car applications is a direct drop-in performance fuel pump module. Designed like original equipment in-tank fuel pumps, they offer the best of both worlds. The module mounts in the tank and has everything needed without the hassles of external plumbing or wiring. Performance replacement fuel pump modules for popular performance cars make the most of a performance car's power increases when aftermarket performance parts are installed.

High-performance fuel pump kits are available as a direct fit replacement for a variety of vehicles. Designed to increase fuel pump performance, they are based on original equipment pump designs for optimum reliability and provide an OE style installation.

For high-performance and race engines that can exceed 750 horsepower a dual channel fuel pump is the way to go. Instead of a single impeller wheel, dual channel pumps have two parallel rows of turbine blades that feed high pressure fuel lines to the engine. In addition to redundancy, one big advantage to this design is greatly improved hot fuel flow. Dual channel fuel pumps are also generally quieter than single channel pumps.

The aftermarket performance versions of the Dual Channel Single Stage (DCSS) pump design provide ample and reliable fuel flow for engines producing more than 500 horsepower. That dual channel performance comes with TI Automotive's worldwide reputation for original equipment (OE) advanced engineering and quality control. Innovation and technology are the keys to TI Automotive's global leadership in the field of fuel delivery systems.

ABOUT TI AUTOMOTIVE

Fluid thinking™ shapes the mindset of TI Automotive. Global automotive manufacturers turn to TI Automotive to develop and produce industry-leading automotive fluid systems technology. Two-thirds of the world's vehicles contain technology from TI Automotive.

With 25,000 employees at more than 125 locations in 29 countries, our strength lies in our ability to creatively meet and exceed the increasing fuel economy and emissions regulations of tomorrow's auto industry.



MEET OUR MICHIGAN MANUFACTURING SITE

The Caro, MI plant is TI Automotive's high performance and aftermarket fuel pump and module manufacturing site. Our fuel pumps and modules are never manufactured or assembled by a third party or sourced from an outside company. Contact us at aftermarket@us.tiauto.com to visit our facility.