

Spica Fuel Injection

A mechanical brain helped Alfa Romeo meet U.S. emissions laws

BY DAVID LaCHANCE

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Part of Alfa Romeo's genius has been its practice of incorporating competition-car machinery into its mainstream production vehicles. Who else in the mid-1950s was offering an all-aluminum, dual-overhead-camshaft, hemi-head four-cylinder in all of its family sedans? So, when the U.S. government required automakers to reduce emissions at the tail end of the 1960s, Alfa responded by going down the hall to the workshops of its racing arm, Autodelta, and borrowing the fuel-injection system developed for its sports racing prototype, the Type 33.

Despite its race-track prowess, the Spica (SPEE-ka) mechanical fuel-injection system, developed and produced by the Società Pompe Iniezione Cassani & Affini, was originally intended for use on diesel-powered tractors. It was the Spica's ability to precisely meter just the right amount of fuel to each cylinder at just the right time that led Alfa to use the system on its U.S.-spec cars, beginning in 1969. While most other European cars were strangled by emissions equipment, the Alfas sold in the U.S. were just as power-

ful, and driveable, as their home-market counterparts.

The system consists of an electric pump near the fuel tank; a circular pressurized fuel line to the injection pump and back to the tank; a mechanical pump, driven by a toothed belt off the crankshaft; and a set of injector nozzles mounted in the intake manifold. The mechanical pump itself is really two components: a four-plunger unit that resembles a miniature engine, and an all-mechanical logic unit that regulates the pump's output.

The pump itself has four pistons, which are attached by connecting rods to a crankshaft that runs at half engine speed. The works are lubricated by engine oil, drawn off the main gallery. A toothed rack that slides back and forth inside the pump rotates the pistons, thus metering fuel delivery. The rack, in turn, is controlled by a mechanical computer; a three-dimensional cam and six centrifugal balls. The control unit adjusts for throttle angle and engine speed, and also compensates for changes in engine temperature and barometric pressure. It's a bit of mechanical wizardry that, once properly

set up, seldom needs to be touched.

The Spica system had some advantages over the more common electro-mechanical systems: It could deliver all of its fuel into the port during the period of highest airflow, and its high, 400 PSI pressure meant thorough atomization and high resistance to clogging. Still, it required specialized tools and a competent technician when problems arose, and desperation led many car owners to turn to Weber carburetors and toss their Spicas into the trash.

Too bad, because cars that still have their original injection systems tend to be worth the most, according to Spica guru Wes Ingram (www.wesingram.com). "Today, carb conversions are not very popular. We have rebuilt more than 4,000 injection pumps and we have as many orders today as we had in 1985 when Ingram Enterprises was incorporated," Wes says. "We have found that present day buyers/collectors are more sophisticated, and are very intrigued with the mechanical systems that do not have ECUs. Resale values are higher with original equipment." 🏎️