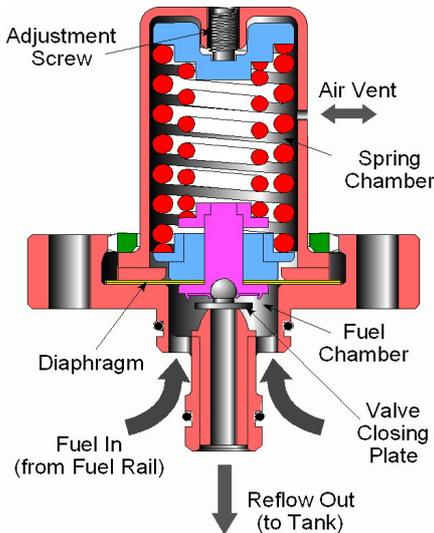


Fuel Pressure Regulators

The fuel pressure regulator controls the pressure of the fuel supply to the injectors in a fuel injection system. It is typically located in the fuel rail, downstream of the injectors.

Principle of operation



The regulator operates on hydro-mechanical principles. It consists of a fuel chamber and a spring chamber. These are separated by a fabric reinforced, fluoro-rubber diaphragm which carries the valve closing plate. The valve is held shut by a compression spring chosen for the specified pressure rating. When the pressure in the fuel rail exceeds the regulator set point pressure, the valve closing plate begins to lift off the outlet nozzle. The excess pressure is relieved by permitting fuel to flow back to the fuel tank (reflow). Once open, the valve continually adjusts to regulate the fuel rail pressure.

Design

All of our fuel pressure regulators have a lightweight aluminium body, which is hard anodised to give it a rugged finish. The internal components are machined from stainless and carbon steels and are hardened, ground and polished, where necessary, to ensure smooth and reliable operation.

The spring chamber of every one of our regulators has a small hole that vents to atmosphere. This prevents the build up of back pressure on the diaphragm, which could otherwise affect the performance of the regulator. Alternatively, the spring chamber can be fitted with a manifold pressure reference port. When left unconnected, this acts in the same way as the vent hole. When the port is connected to the inlet manifold, the pressure in the spring housing will follow any changes in the manifold pressure. Intended mainly for use in turbo-charger applications, this feature allows the fuel pressure to track changes in manifold pressure.

Performance

The performance characteristic of a fuel pressure regulator breaks down into: the valve opening phase, when the closing plate begins to lift, and the valve open phase, when the closing plate is fully lifted. Once the valve is open, the spring rate of the compression spring determines the reflow gradient. This reflow gradient ranges from the order of 30 mbar per 100 l/hr for our 3.5barg regulator to a maximum of 180 mbar per 100 l/hr for our 30barg regulator.

Each of our fuel pressure regulators is individually calibrated to achieve a reflow of 110 litres per hour at its rated pressure. The adjustment screw is sealed after calibration and should not be moved or calibration will be lost.

