

4.15 Magnetic Pressure Valves

Statement: Magnetically retained fast-response pressure relief valve that is designed to fully open at precise cracking pressures and that operates in a fully open/fully closed manner.

Problem: Spring-based relief valves require increasing pressure and force to continually compress the spring and open the relief valve. This requirement greatly complicates the design of a system relief mechanism. Existing relief valve springs are exposed to corrosive environmental factors and system fluids. This environmental exposure leads to corrosion that can cause changes in the cracking pressure.

Solution: A magnetic relief valve reduces these design complexities by eliminating the spring.

Technology description: The magnetic relief valve eliminates the need for a spring by instead incorporating magnets to hold the poppet relief valve in the closed position. The use of magnets in a pressure relief valve exploits the exponential decay of the magnetic field between two magnets as they are separated. This leads to a faster acting valve that does not require an increasing force to open the relief valve after cracking pressure has been surpassed, as is the case in standard pressure relief valves.

Benefits of the product:

- Fully on/fully off valve operation at design pressure Improved crack pressure accuracy at low operating pressure.
- Reduced maintenance in corrosive environments.
- Handles larger flow rates and larger range of pressures.

Areas of application: This technology has great potential where traditional relief valves should be replaced with fast-actuating reliable units:

- Pressure Vessels.
- Vacuum Chambers.
- Low Pressure Systems.
- Basic Industrial Systems.
- Gas and Liquid Systems.