



HYDRAULIC ACCUMULATOR – DIAPHRAGM – GAS VALVE RELATIONSHIP

The Importance of Hydraulic Accumulators in Hydraulic Systems

A hydraulic accumulator is a hydraulic circuit component that stores pressurized energy and releases this energy rapidly when required by the system.

Due to the low compressibility of hydraulic fluids, nitrogen gas is used in hydraulic accumulators to store hydraulic energy. Pressurized hydraulic fluid acts on the separating element inside the accumulator, compressing the nitrogen gas and reducing its volume while increasing its pressure. As the gas volume decreases, hydraulic fluid fills the available space. In this way, pressurized hydraulic fluid is stored inside the accumulator.

During a hydraulic system's operating cycle, different flow rates may be required at different stages. In such applications, selecting a hydraulic pump and electric motor capable of supplying the system's maximum required flow rate may be necessary. Hydraulic accumulators can help meet peak flow demands, reduce pressure fluctuations and improve the overall efficiency of the hydraulic system.

Hydraulic accumulators are also used to dampen pressure shocks, pulsations and vibrations within hydraulic circuits. These disturbances may result from valve closing, the intermittent delivery characteristics of certain pump designs or external forces acting on the system. By absorbing and dampening these effects, accumulators can help reduce stress on hydraulic components and extend their service life.

The Importance of Diaphragms and Gas Valves in Drifter Accumulators

In hydraulic rock drilling equipment, particularly in the drifter units of mining and construction machinery, accumulators play a critical role in supporting drilling performance and hydraulic system stability.

The two most important components of these accumulators are the **diaphragm and the gas valve**. The quality, durability and compatibility of these components have a direct impact on accumulator reliability and the overall performance of the drilling system.

Diaphragm

The diaphragm is the flexible separating element that isolates the nitrogen gas from the hydraulic fluid inside the accumulator. Throughout the accumulator's operating cycle, the diaphragm responds to changes in pressure as the nitrogen gas is compressed and expands.

The material quality, manufacturing precision and durability of the diaphragm are essential for reliable and long-term accumulator performance.

A low-quality or unsuitable diaphragm may:

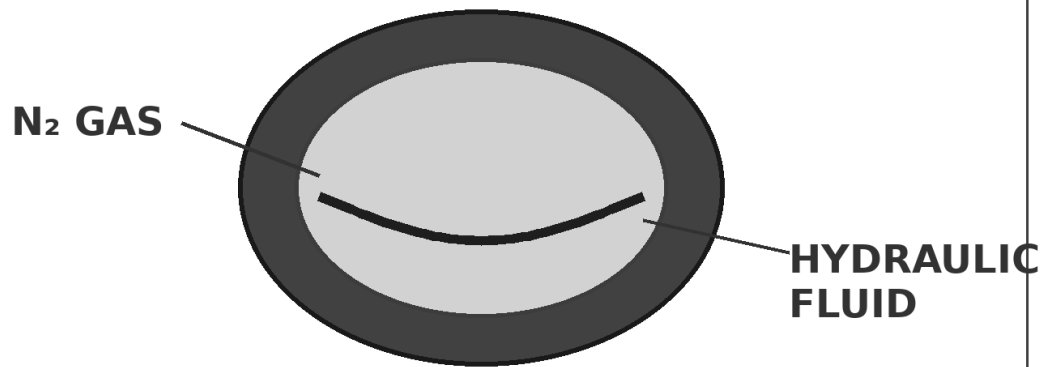
- Wear prematurely under repeated pressure cycles and mechanical movement.
- Develop cracks, deformation or rupture.
- Reduce the accumulator's energy storage capacity and response performance.
- Cause pressure fluctuations and performance losses within the hydraulic circuit.
- Negatively affect the operating efficiency and drilling performance of the drifter unit.

One of the primary reasons for using diaphragm-type accumulators is their **rapid response capability**. Their relatively low weight, compact design and simple construction may also provide advantages compared with other accumulator designs, depending on the application.

15235798 — DIAPHRAGM

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Concept product illustration — reference / visual concept

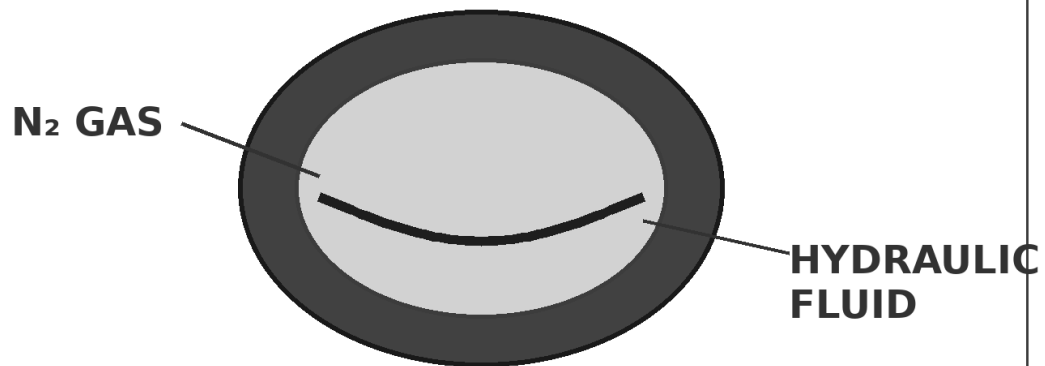


Flexible separating element for accumulator applications

04114808 — DIAPHRAGM

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Concept product illustration — reference / visual concept



Flexible separating element for accumulator applications

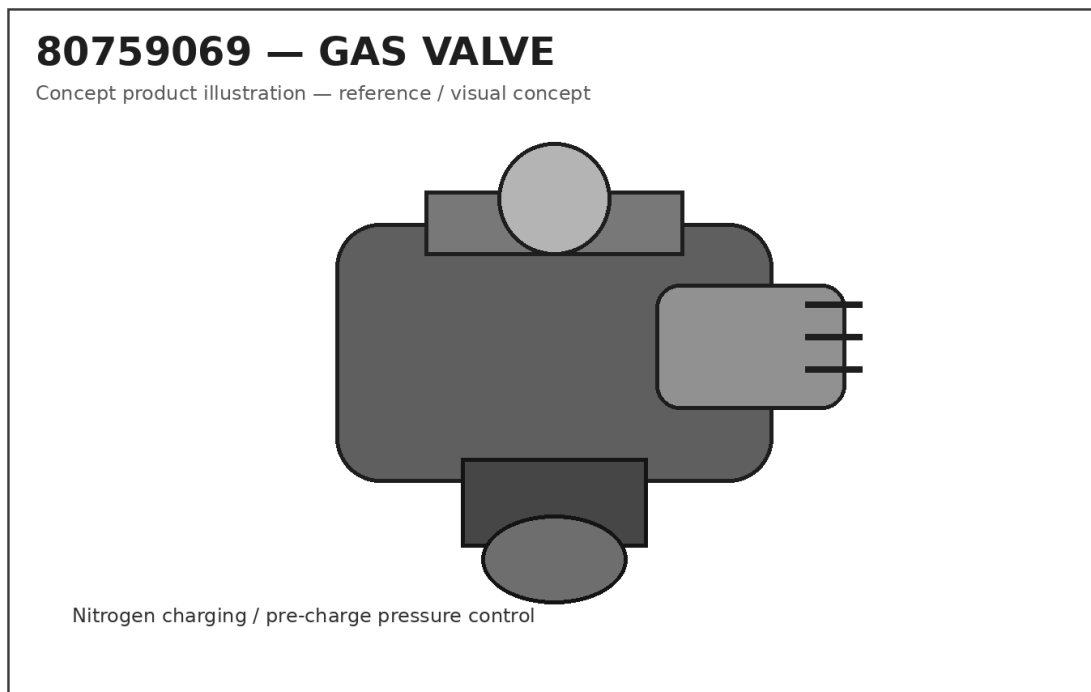
Gas Valve

The gas valve is a critical component responsible for charging the accumulator with nitrogen gas, checking and adjusting the gas pre-charge pressure, and maintaining gas containment under suitable operating conditions.

The sealing performance of the gas valve is particularly important for maintaining the specified nitrogen pre-charge pressure inside the accumulator. A low-quality, damaged or unsuitable gas valve may allow nitrogen to escape over time, resulting in a gradual loss of pre-charge pressure.

A reduction in nitrogen pre-charge pressure can cause the accumulator to operate outside its intended performance range and may prevent the drifter system from achieving its expected operating performance. For this reason, gas valve durability, sealing integrity and application compatibility must be carefully evaluated.

80759069 — GAS VALVE



Why Is the Correct Diaphragm and Gas Valve Selection Important?

For a hydraulic accumulator to operate efficiently in a hydraulic rock drilling machine, the diaphragm and gas valve must be compatible with the specific accumulator make and model.

Accumulator designs, operating pressures, gas volumes and manufacturer-specified nitrogen pre-charge pressures may vary depending on the model and application. Therefore, **the nitrogen pre-charge pressure must always be determined in accordance with the relevant accumulator manufacturer's technical specifications and the drifter manufacturer's instructions.**

Incorrect pre-charge pressure or unsuitable accumulator components may:

- Reduce accumulator operating performance.
- Cause pressure fluctuations and unstable flow conditions within the hydraulic system.
- Negatively affect component service life.
- Impact the drilling performance of the drifter unit.

For this reason, correct product selection, technical compatibility and manufacturing quality are essential for the reliable operation of hydraulic rock drilling systems.

Ultra Group – Alternative Spare Parts Solutions

At Ultra Group, we provide alternative spare parts solutions for hydraulic rock drilling equipment used in the mining and construction industries.

For critical accumulator components such as diaphragms and gas valves, we prioritize product compatibility, material quality, durability and reliability.

Our objective is to provide suitable alternative spare parts solutions for the requirements of hydraulic rock drilling systems across different makes and models, helping our customers support equipment performance and operational continuity.

The right accumulator components. Reliable hydraulic systems. Consistent drilling performance.

For further information about our products and make-and-model compatibility, please contact **ULTRA GROUP**.

Note: Product visuals are conceptual illustrations for technical presentation purposes.