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„Hunger bleibt Hunger“
STRONG ACCUMULATORS
FOR POWERFUL HYDRAULICS

Julia Engstler

Modern accumulator technology continues to be an important foundation for powerful, convenient and efficient hydraulic systems. They are available in four different designs – bladder, piston, diaphragm and metal bellows accumulators – for different applications.

Author: Julia Engstler, HYDAC Technology GmbH, Sulzbach/Saar
Accidents and disasters bring people together – and the complete destruction of HYDAC’s Plant 2 in Sulzbach an der Saar has served as a reminder of this. Rapid and un-bureaucratic action on the part of all employees on site and all over the world, combined with the support of customers and suppliers, helped to safeguard the supply chain. After all, hydraulic accumulators continue to play a significant role in making hydraulics more powerful, convenient and efficient. HYDAC develops, designs and manufactures all four types of accumulator in-house; interested parties can come and see for themselves at bauma from 11 to 17 April 2016 in Hall A5.449.

HYDAC in Sulzbach an der Saar consistently invests in the development of new technologies and the design of modern production processes. The resulting vast capabilities of the company group with worldwide operations, which has remained a family-run business since its foundation, were put to the test in the summer of 2015 when it quite literally faced a trial by fire. On 25 August 2015 a fire spread throughout production plant 2, the core of HYDAC’s accumulator technology. The plant was completely destroyed, but luckily no one was injured.

Company management responded while the flames were still burning: “The plant will be rebuilt at the same spot – and even more so.” This promise turned out to be completely realistic. In no time at all, it was possible to continue supplying the market with all four types of accumulator technology. The company’s success story continued unbroken, proving that the success story of the specialist hydraulic company began in 1963 with the foundation of HYDAC Gesellschaft für Hydraulik und Pneumatik GmbH, as the company was then known. In short, accumulator technology was origin of the company’s present technological position, the immense growth of its extremely broad product portfolio and its strong international focus.

ACCUMULATOR SUPPLY CARRIED ON WORKING EVEN AFTER THE FIRE

Like all the cogs that work together inside a clock, each HYDAC employee did their bit to help put the plant back in action after the fire. In no time at all, it was possible to continue supplying the market with the standard range of accumulator technology.

One factor that made all the difference here was the great solidarity and flexibility displayed by customers and suppliers during this very critical reconstruction phase. For their immense cooperation, HYDAC owes its customers and suppliers its deepest gratitude.

The high technological and quality standards of HYDAC accumulators allow them to cover a broad section of the market. The Saarland-based hydraulics manufacturer is the only company to produce all four types of accumulator – bladder, piston, diaphragm and metal bellows accumulators. This means that the Saarland components, with their distinctive red colouring or red logo, can be seen in almost all types of construction machines, agricultural machines, machine tools, special purpose machines or the like.

For OEMs, the extensive range of standard hydraulic accumulators is a particularly important advantage, alongside quality and performance. The portfolio includes diaphragm accumulators with volumes up to four litres and 750 bar and bladder accumulators with up to 430 litres and 1 000 bar. Piston accumulators are manufactured up to 1 000 bar and even above 3 500 litres in volume. The fourth high-tech accumulator variant, the metal bellows accumulator, completes the range. This variant is used for advanced application fields such as extreme temperatures or where very high media compatibility is needed. The metal bellows that act as a separation element between gas side and fluid side are gas-tight, which makes maintenance particularly straightforward.

RELIABLE DELIVERY THANKS TO REDUNDANT PRODUCTION CAPACITIES

The accumulator production plant fire in Germany has served to highlight two important factors of the company’s success: the high worldwide market coverage and the company’s philosophy of using local production for international markets. Accordingly, the company already has production capacity both in the US and in China, and this is set to expand in future, in accordance with the company’s “local for local” philosophy. These two locations combine with the new Plant 2 in Sulzbach/Saar, which will continue fully auto-
increased production at the same site in autumn 2016, to form the production triad of HYDAC’s accumulator technology.

Until the fully automated assembly line is completely rebuilt back to its original state, all diaphragm accumulators will be produced at interim production sites - a logistics tour de force on the part of the “strong accumulator technology” from Saarland, as customers can confirm.

DIAPHRAGM ACCUMULATORS PROVIDE A HIGH LEVEL OF FLEXIBILITY

The attention given to individuality in the standard product range is perfectly illustrated by its diverse diaphragm accumulators. This is another example of HYDAC’s strength of mobile machinery. This example enables a customer to develop new devices and vehicles, supporting its customers in developing new devices and vehicles. With our expertise garnered over many decades, combined with our flexible accumulator production, both the reservoir design and the system characteristics of diaphragm accumulators can be adjusted to perfectly suit the particular application. The advantage is that hydraulic accumulators can be used to reduce that the total required performance, resulting in significant investment cost savings. Using accumulators as vibration dampers increases driver comfort, reduces service times and ultimately greatly improves the availability of the machine.

A MODULAR SYSTEM TO SUPPORT EFFICIENCY

Typical applications for diaphragm accumulators are pilot systems, and also damping solutions for lifting equipment, vibration damping for booms, traction control at higher travel speeds and steering support along with many others. While diaphragm accumulators for the low-pressure range (e.g. 100 bar, 140 bar, 160 bar) have a design that is highly optimised for weight and installation space, and are correspondingly expensive, high-pressure diaphragm accumulators (e.g. 250 bar, 330 bar) are suitable for demanding applications. It is vitally important to use expert knowledge to adapt the diaphragm to suit the requirements in the vehicle or the machine. The expert understands that the installation space, weight, cyclic test pressure, load reversal and material can all be optimally configured to create an accumulator that is just right for the application. HYDAC provides this variability with smart configuration and a diverse range of connection variants from its own diaphragm accumulator system modules.

For the customer this means:

- Compact design thanks to suitable diaphragm accumulator dimensions and
- Robust installation thanks to the perfect connection being selected.

One factor with a lot of potential, and one which was particularly useful during the reconstruction process, is that there is some overlap between the various designs of hydraulic accumulator, so to a certain degree one type can be substituted for another. Because HYDAC produces four types of accumulator, alternative models could be supplied. The HYDAC specialists offer advice as to which type of accumulator has equal or even better system properties in a particular application.

EXPANDED PISTON ACCUMULATOR PRODUCT RANGE

The piston accumulator is the non-conformist among the accumulator types. HYDAC has combined all the benefits of the piston accumulators in a single series: SK280. In the patented manufacturing procedure for the SK280, the gas- and fluid-side covers are fastened by reshaping the ends of the cylinder. This means that the accumulators can be produced inexpensively without losing their flexibility that allows them to be adapted to suit small spaces, as their diameter and length can be adapted to suit the particular installation conditions without any changes to the nominal volume. Additional variants have recently taken this success story one step further: as of 2015, a SK280 variant has been available with a nominal volume of 10 litres.

ACCUMULATORS AND MORE

The large number of combination variants proves that hydraulic accumulators are now much more than simple pressure vessels – they now perform valuable additional functions as large or small compact units. Various valves can be attached or installed, sensors can be mounted and safety equipment can be integrated.

For example, a hydraulic accumulator can be turned into an energy accumulator with directional valves to turn the bucket damping on and off and a sensor mounted to check the gas pressure on the gas side.

To provide increased safety in accumulator technology, several solutions are available such as burst discs (to prevent excess pressure), temperature fuse plugs (to prevent excess temperature increases) and gas safety valves. The first two of these provide complete depressurising of the accumulator while the third is suitable for controlled pressure reduction on the gas side whenever the accumulator’s maximum permitted operating pressure is greatly exceeded.

INCREASING THE ENERGY EFFICIENCY OF MOBILE MACHINERY

Hydraulic accumulators are ideally suited to increasing the energy efficiency of mobile machinery. HYDAC’s hybrid specialists give advice on the topics of energy recovery, peak shaving, load compensation, downsizing and hydraulic start/stop and provide support for implementing them in hydraulic system architectures.

A key success factor is the compact and robust “packaging” of the accumulators on the basis of HYDAC’s extensive product portfolio (with extensive types and sizes) in the often very cramped conditions in mobile machines.

Modern simulation programs are used to predict what working capacity the accumulators will have in the hybrid application, making it possible to assess how much money will be saved by the reduction of energy in the work cycle. Piston accumulators with a sealing system that maximises service life, bladder accumulators with foam filling and multiple chamber accumulators (such as double-piston accumulators) are recent HYDAC-produced innovations that give the customer significant benefits when it comes to the economic feasibility of a hybrid application.

For the on-road or utility vehicle sector, a broad product range of weight-optimised accumulators is also available.

From 11 to 17 April 2016 at the bauma trade fair in Munich (Hall A5-449), manufacturers of mobile machinery can experience first-hand the enthusiasm that drives the company in its operations in Germany and worldwide. For HYDAC is united, and therefore just as strong as ever – despite the fire.

Photos: HYDAC

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With over 8,000 employees, 45 overseas companies and over 500 sales & service partners, HYDAC is your reliable partner worldwide.

Our product range includes hydraulic accumulators, fluid filters, process filters, coolers, electrohydraulic controls, industrial valves, sensors for pressure, displacement and magnet technology, cylinders, pumps, mounting technology, hydraulic fittings, condition monitoring and much more.

We design and supply turnkey hydraulic control and drive systems including the electronic controls for mobile and stationary machines and systems for a diverse range of industries.