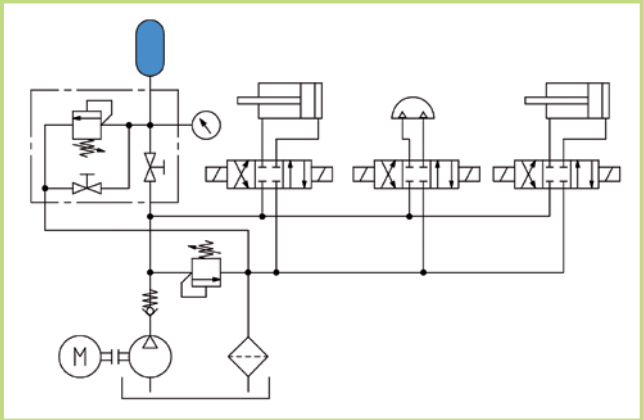
Energy buffering applications

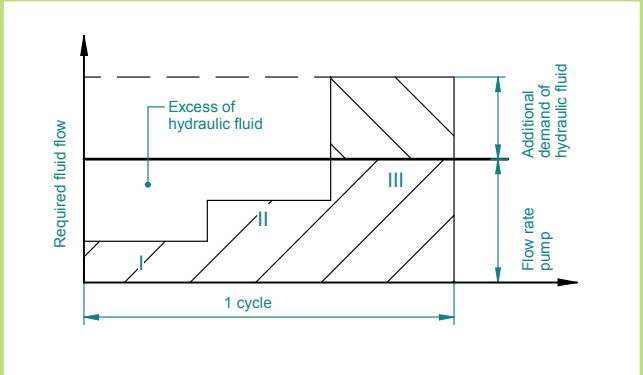
Energy saving - the capacity of buffering energy is one of the main features of OLAER hydraulic accumulators. Hydraulic installations can run with smaller dimensioned oil pumps, saving therefore energy, producing less heat, simplifying maintenance and reducing installation costs, all this reducing the **operational costs**. For installations requiring great quantities of oil in a short period of time or with high cycling rates hydraulic accumulators often offer the only economically viable solution.

Applications are very versatile.

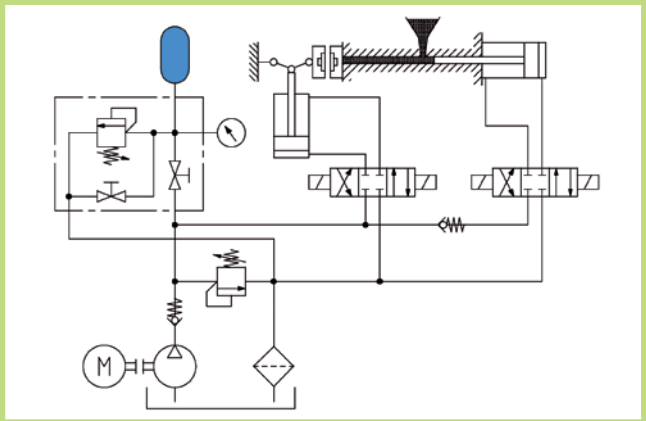
Applications with varying oil requirements



The oil consumption diagram illustrates the highly varying oil needs of the three consumers. Without a hydraulic accumulator the pump would have to cover the needs of consumer III. By using an OLAER hydraulic accumulator, the capacity of the pump and its operational costs can be reduced significantly. Consumers I and II need less oil than the pump can deliver. The latter can therefor be used to accumulate oil under pressure. On the other hand, the needs of consumer exceeds the capacity of the pump. The accumulator can deliver the missing oil. The accumulator will then be refilled with oil between two cycles.

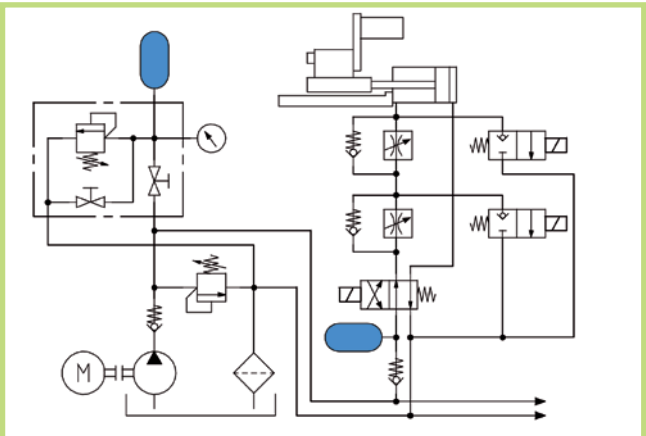


Applications with short term high quantity oil requirements



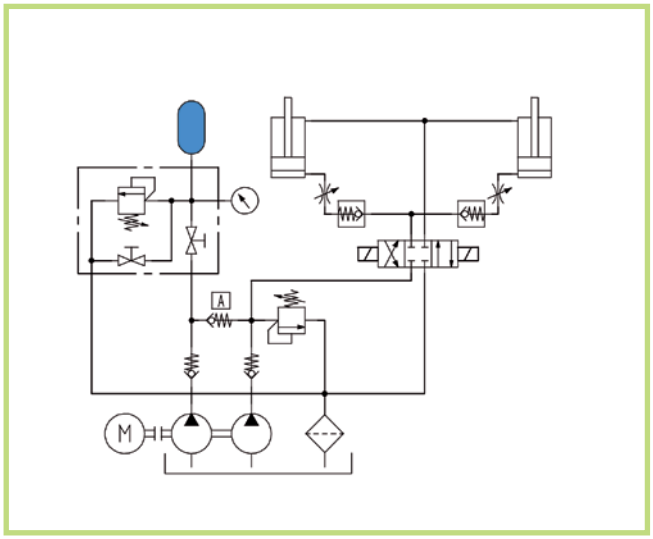
Blow moulding, pressure injection moulding or casting machines require high quantities of oil during the short injection process. This is also true for emergency stop devices of turbines and electric power plants.
In most of the cases, such emergency stop devices are used to control safety equipment normally requiring only very small quantities of oil (leak compensation). Without accumulators the pumps would be forced to deliver high quantities of low pressure oil. This only once or twice a year when oil is immediately required for driving the safety equipment. Such solutions would really not be economically viable.

Applications increasing machine-tools outputs



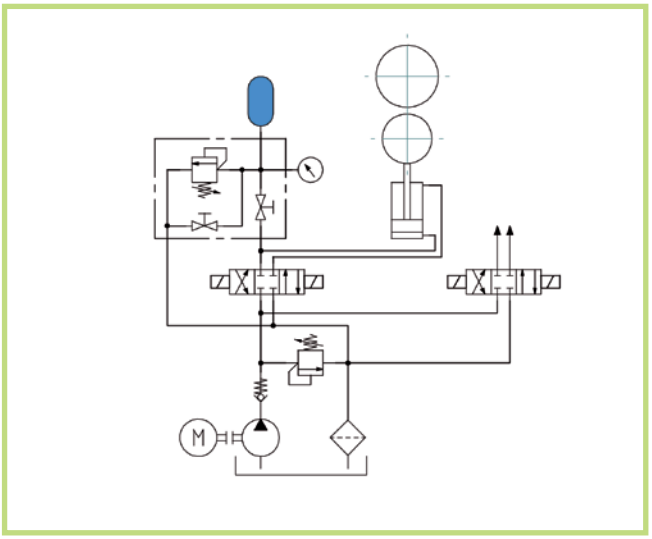
Cutting, advance and retraction speeds, cutting pitch and section of machine-tools with multiple machining units are individually controlled. Therefore, the oil consumption varies significantly. By fitting these machines with an accumulator their irregular oil requirements can be handled guarantying high stating speeds thanks to the low inertia of each oil column compared to those experienced with the complete pumping system.

Shortening the vertical displacement time



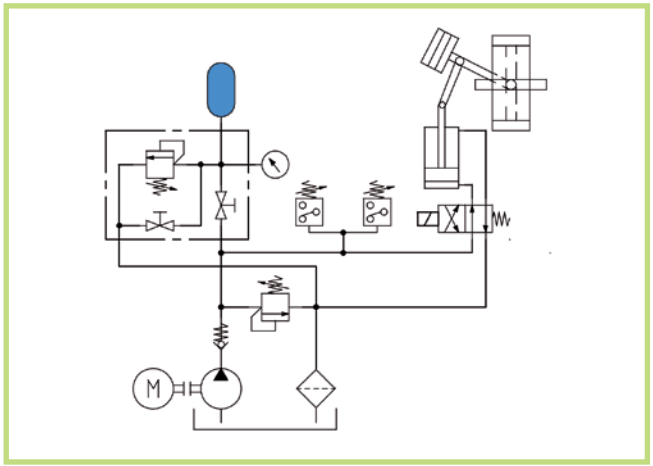
Rational pressing and punching operations are only possible with high-speed empty runs. However, the transformation process must be carried out at low speed and by applying high pressures.
Low and high pressure pumps (pump I and II) as well as the accumulator supply oil for the empty runs and help reach high speeds.
The non-return valve A closes at the end of the stoke as pressure increases. Pump II supplies small amounts of high-pressure oil and pump I recharges the accumulator.

Maintaining the pressur



Accumulators can be used to maintain the mechanical pressure applied between two rolls. After having reached the required pressure the pump can be immediately switched to other users, the hydraulic accumulator securing the pressure between the rolls during the entire process.

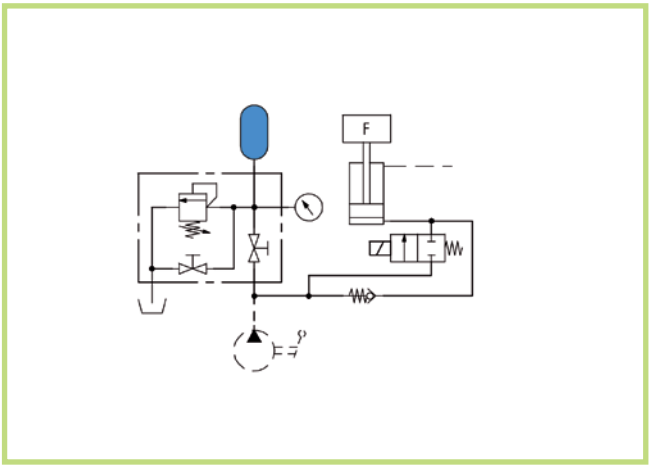
Oil leaks compensation



Oil leaks cannot be avoided in hydraulic systems where high pressures have to be maintained for long periods (examples: throttle valves which are maintained open by means of a spring or a counterweight, chucking systems or pressure tests). Oil topping has to be constantly secured.

A small pump connected to an accumulator will do the job perfectly. After having reached the minimum pressure in the empty accumulator the pump is switched on by means of a pressure switch and refills the accumulator. Having reached the maximum pressure, the pump is automatically switched off.

Kinetic energy recovery



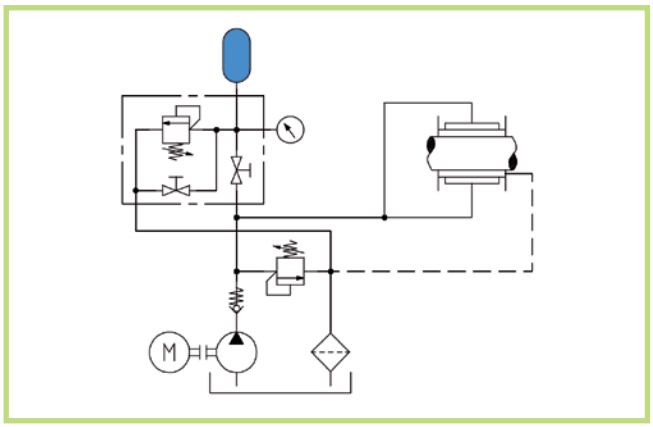
The hydraulic accumulator is used to recover the kinetic energy in a system and return it to the system on demand. This is for instance the case with presses where the press ram pumps the oil back into the accumulator when moving down and reuses the oil when moving back.

Safety applications

Hydraulic accumulators are increasingly used as safety components. Mains breakdowns can happen at any time and disable pumps. OLAER accumulators secure the oil supply for a certain time and protect important machines and installations.

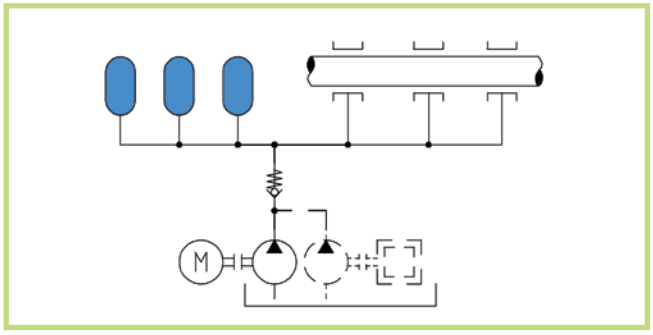
Here some applications:

Hydrostatic bearings



Hydrostatic bearings on machines must be held under pressure. In case of a mains breakdown the pumps stop and the oil pressure falls. OLAER hydraulic accumulators maintain a minimum pressure up to the complete halt of the machine and avoid expensive bearing damages.

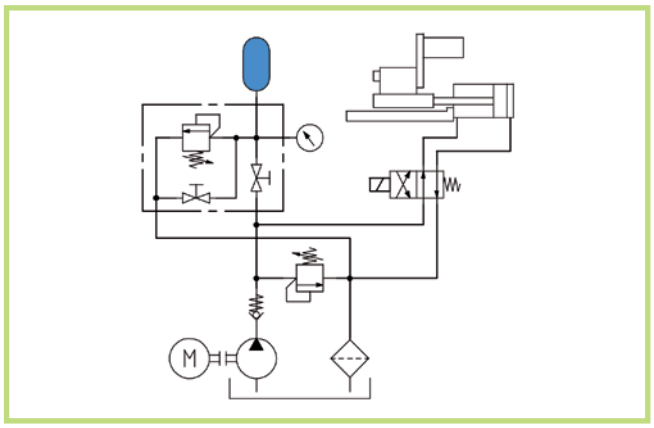
Lubricant supply



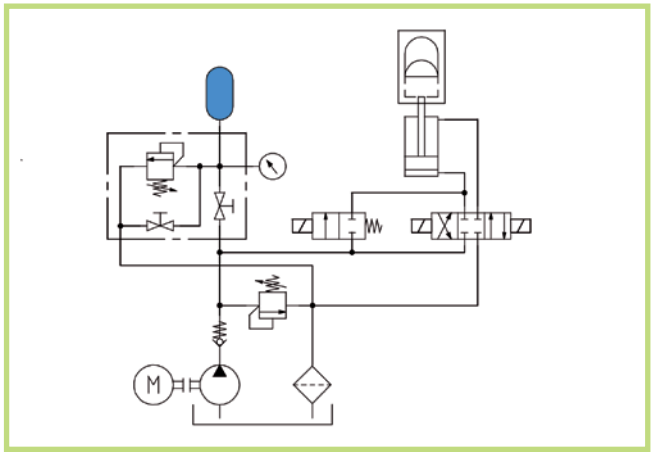
Bearings of big machines such as turbines, compressors and very high capacity water pumps must be constantly lubricated. When mains fail emergency pumps driven for instance by a diesel motor must immediately enter into operation. When starting, the auxiliary pump receives no lubricant during a few seconds. OLAER hydraulic accumulator enter at this precise moment into service and secures a constant pressure of the lubricating oil.

Machine-tools

Mains failures during machining on a machine-tool or on textile machines to costly production breakdowns. OLAER hydraulic accumulators help finish the initiated operation, protect the tools from costly damages and prevent the need to carry out new settings, thereby reducing downtimes to a minimum.

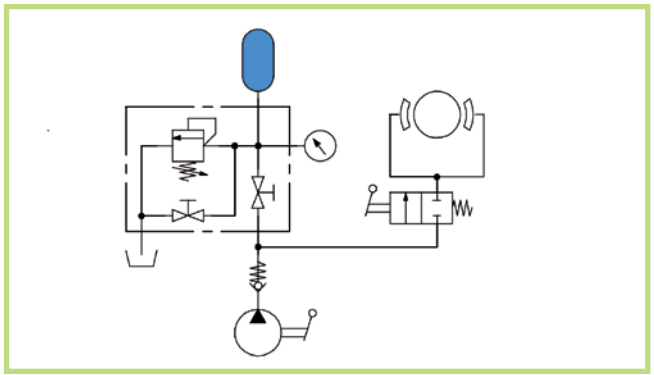


Safety devices



Safety devices enter into function in case of breakdowns. They shut partitions, valves, by-passes or hopper valves, silos or conveyors. These devices can also control stop valves of foundry aggregates or ladles, as well as open and close high capacity circuit breakers.
Normally the accumulators used in these applications are inactive. They are filled with oil, buffering energy which is immediately available on demand.

Emergency stop



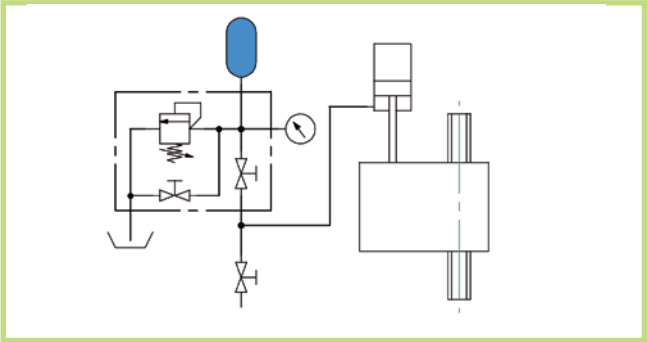
Hydraulic accumulators can for instance be used to control emergency brakes or funicular railway, gondola or bus doors. The accumulators being charged at the station by means of a motorised pump or in emergency case by a hand-pump. The necessary energy is therefor constantly available to carry out an emergency stop.
Often, the command is inverted, braking being carried out by a spring, the accumulator keeping the cylinder operated braking caliper open.

Suspension applications

By its design, the hydraulic accumulator can also serve as an elastic suspension, which elasticity can be simply set by varying the accumulator pre-charge pressure.

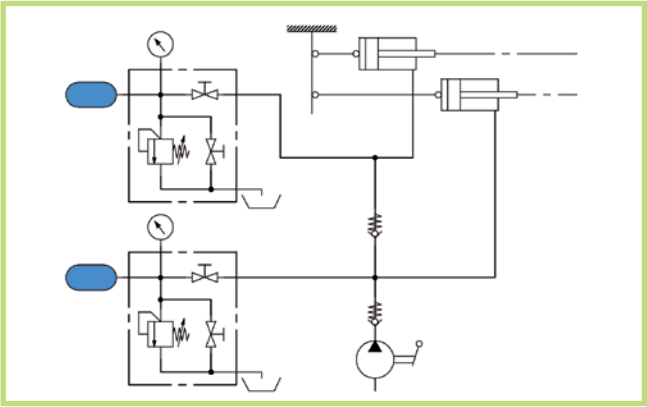
This opens the way to the following applications:

Weight balancing



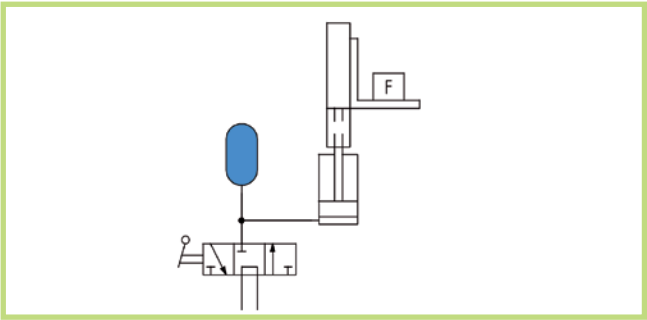
Small dimensions, inertia free accumulators can be used for balancing heads of machine-tools. Compared to a counter-weight system with chains, the hydraulic balancing using an accumulator offers the following advantages: weight reduction, lesser vibrations transmitted to the foundations, more compact solution, easier to transport, higher adaptivity thanks to the possibility of varying the gas filling pressure.

Cable tension



Railway catenaries and suspension cable tensions must be maintained within narrow tolerances. However, the cable length changes as the train passes or depending on the temperature. Accumulators are used for cable length compensation and maintain the cable tension within the prescribed tolerances.

Mechanical shock absorption



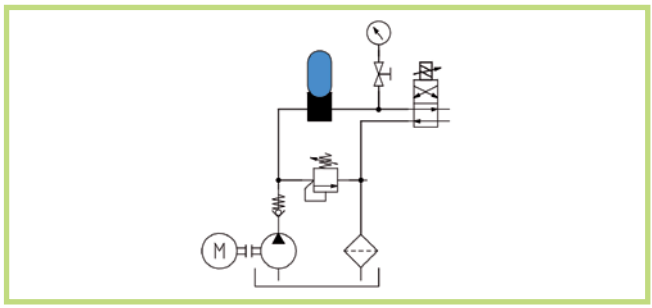
Mechanical shocks occurring for instance when driving on road bumps or obstacles can be absorbed by hydraulic accumulators (e.g. snowploughs). Damping shocks leads to safer manoeuvring and the material is less taken into contribution. Higher vehicle speeds, reducing the risk of accidents, extended equipment service life represent additional advantages.

Fighting pulsations and noise

Machines have to be increasingly efficient, faster but also quieter. These requirements are very difficult to fulfil as fast movements are often linked with shocks and vibrations, noise increase and, over the long term, shorter service life.

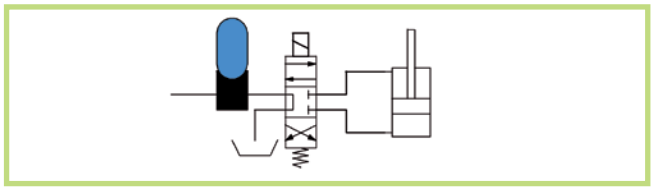
Pulse-Tone pressure accumulators are therefore used for the following applications:

Displacement pumps



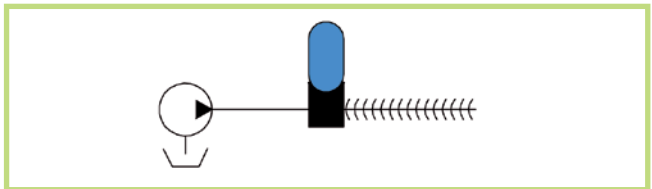
Displacement pumps pulsations generate noise and vibrations and can influence sensitive testing devices.
In hydraulic feedback systems servo-valves may start oscillating in an annoying way.

Fast-response inversion valves



Fast running machines cannot always run "smoothly". Pulse-Tone series accumulators are used here to absorb shocks.

Pressure waves

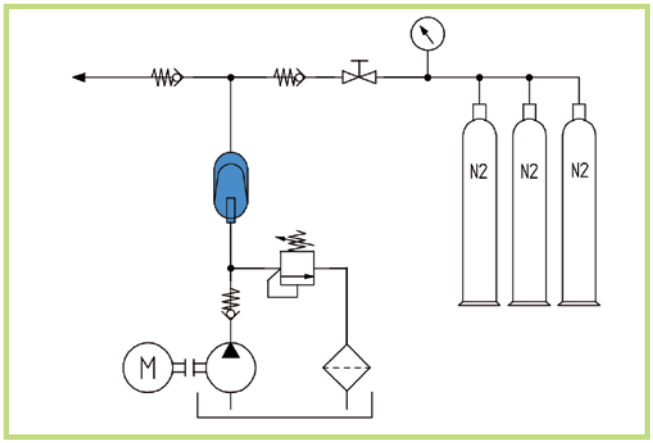


Hammering cannot always be damped at the source. It is often very difficult to find their origin, and, even worse, they propagate themselves allover the hydraulic system.
Pulse-Tone accumulators help protect the pump as well as the testing devices against hammering.

Transfer applications

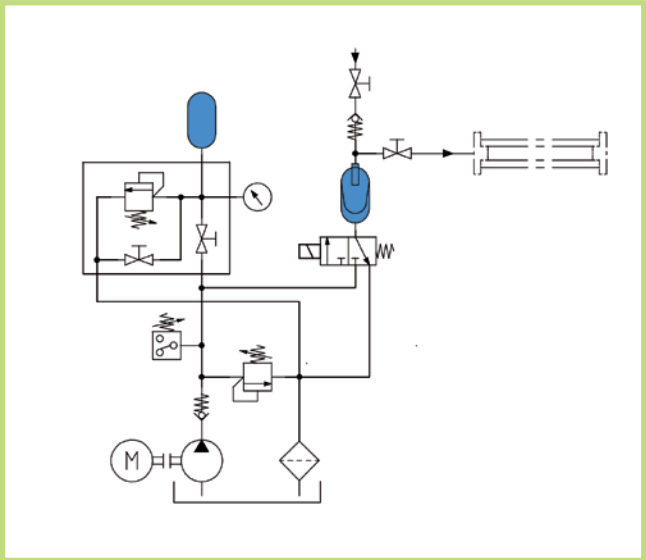
Hydraulic transfer accumulators are used for pressure checking when a complete separation of the medias is required in case of large gas volumes:

Pressure booster equipment



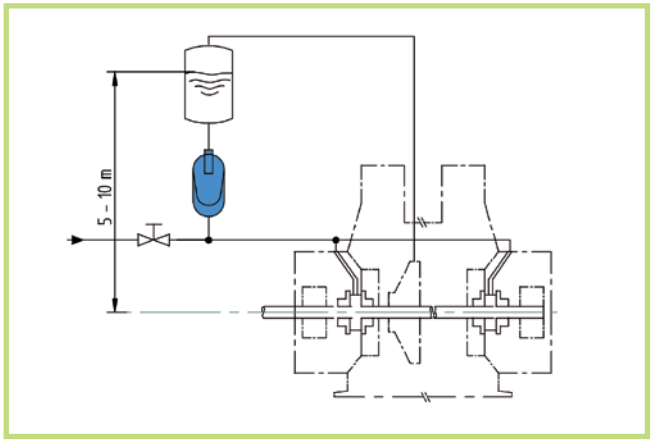
The pressure of gas cylinders available on the market is limited to 200 bar, which is often not sufficient (precharge pressure of hydraulic accumulators). By using a hydraulic unit and a transfer accumulator simple pressure boosting installations can be realised. The gas from the cylinder is sent to the accumulator and compressed by the oil under pressure contained in the accumulator bladder until the accumulator valve shuts and activate a limit switch depressurising the oil of the bladder. The accumulator is then refilled with gas from the cylinder and the cycle is repeated until the required gas pressure is reached.

Pressure tests



In case of leaking pipe systems, pressure tests (for instance for high-pressure pipes) are mostly used with water which is less contaminating than oil. In order not to have to build stainless-steel pumping units a standard hydraulic unit connected to a transfer accumulator is used (an additional standard accumulator us used to maintain the pressure and prevent the pump from having to run continuously).

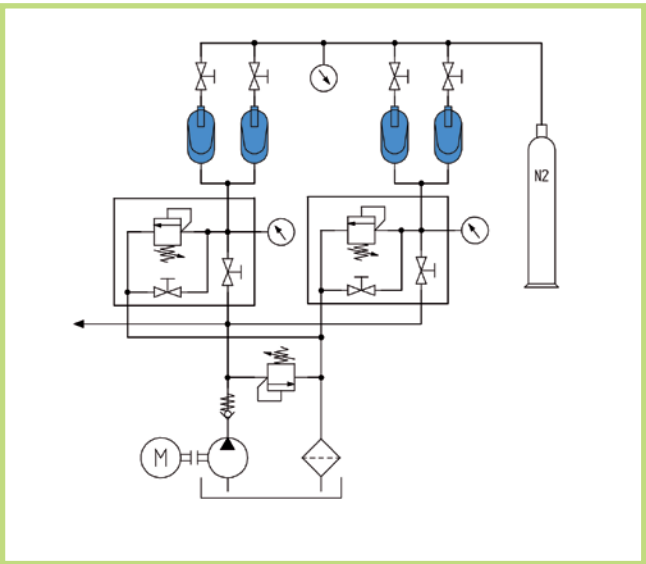
Blocking fluids separation



Compressors use floating seals requiring a blocking fluid, whose pressure must exceed the compressor gas pressure by 0,5 to 1 bar. In petrochemical installations the gas must not get into contact with the blocking fluid to avoid contaminations and functional problems. A reservoir, placed 5 to 10 m above the floating seal and filled with a neutral fluid at the same pressure as that of the compressor gas. Additionally, a transfer accumulator is placed in the circuit to secure a complete separation of both fluids.

A similar application is used for sealing reservoirs in the chemical industry.

Accumulation capacity increase



In certain installations, often only small differential pressures can be tolerated (e.g. in injection moulding machines). In other cases (e.g. in rolling mills), important quantities of oil must be accumulated. In both cases great volumes of gas are required. Cost can be reduced by using transfer accumulators connected to pressurised gas cylinders.