

Hydraulic accumulators

volumes nominal 13, 40 and 75 cm³, p_{max}. 500 bar

600-20

Issue: 10/2022

Description:

When using hydraulic clamping systems, internal leaks and volume changes (e.g. because of temperature fluctuations) must be balanced. These tasks are performed by the hydraulic accumulator.

In intermittent applications, the attached pressure generator fills the hydraulic accumulator during the interruptions. As a result, a short-term high volume flow is achieved, which can be used, as required, to reduce power at the pressure generator.

As volume storage, the hydraulic accumulators are also suitable as a source of pressure oil upon failure of the pressure oil supply at the hydraulic pump.

When using hydraulic accumulators, the system must be equipped with additional security elements (see safety information).

Only qualified personnel may work on the hydraulic accumulator.

Applications:

Balancing internal system leaks

In hydraulic clamping systems, the pressure generator usually operates in off mode. A pressure switch thereby controls the switching operations of the drive motor.

If elements that cause a leak due to their construction are connected to the system (e.g. rotary valve coupling), this causes frequent switching. The hydraulic accumulator substantially reduces the on and off cycles of the drive motor, thus saving energy and reducing wear and tear.

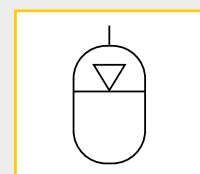
Balancing volume changes

In uncoupled clamping systems, temperature fluctuations may arise. These will inevitably lead to substantial changes in the clamping pressure (± 10 bar at $\pm 1^\circ$ C).

The installation of a hydraulic accumulator in the system equalizes volume, thus preventing undesirable fluctuations in pressure.



Webcode: 060020



Design:

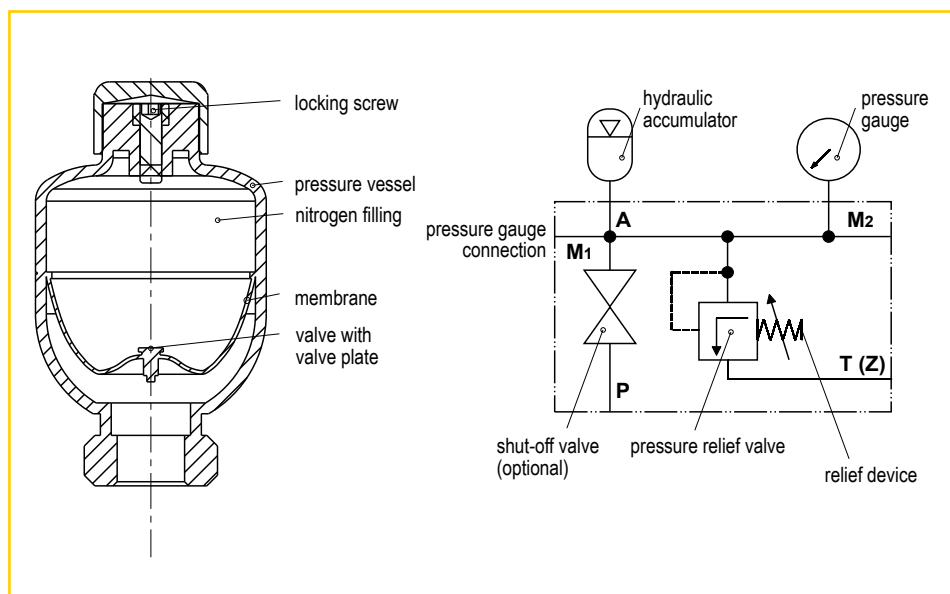
- Membrane accumulator with filling gas nitrogen (min 99.8%)

Connection:

- Threaded ports
G1/4 G 1/2 M14x1,5

Advantages:

- Robust construction
- Available in three standard sizes
- Can be mounted in any position
- Discharge of hydraulic components for pressure fluctuations/surges
- Helps to conserve energy
- Reduces wear



Functioning:

The membrane is pressurized with nitrogen. The integrated valve plate closes the opening of the oil inlet, thus preventing damage to the membrane.

At minimal operating pressure, a small amount of pressure oil must remain in the vessel so that the membrane does not close during discharge due to the pressure on the valve plate; p_0 must therefore always be set lower than p_1 .

The stored amount of liquid corresponds to the volume change ΔV between the position at minimum and maximum operating pressure.

Safety instructions:

In Germany, hydraulic accumulators are subject to the rules and regulations of the TRB (Technische Regeln Druckbehälter / technical rules for pressure vessels). Accordingly, the following supplementary equipment is required when using hydraulic accumulators:

- pressure gauge
- relief device
- pressure relief valve
- shut-off valve (optional)
- test pressure gauge connection

Outside of Germany, the national rules and regulations on the use of pressure vessels of the respective country apply.

We also design and manufacture customized variants!



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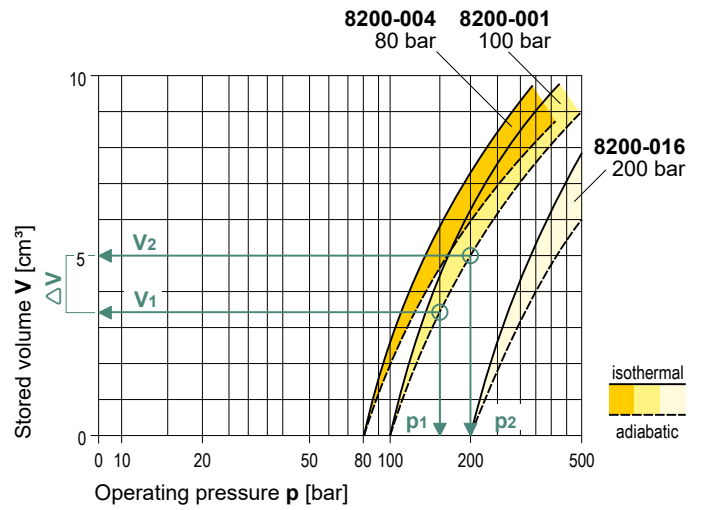
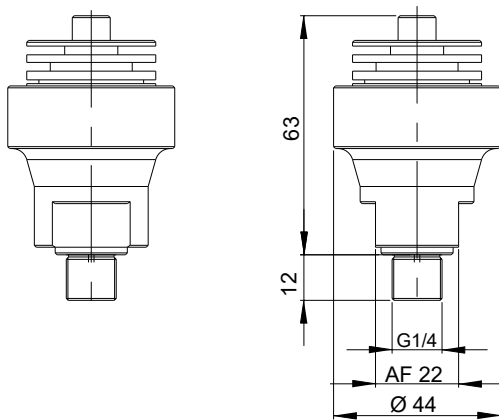
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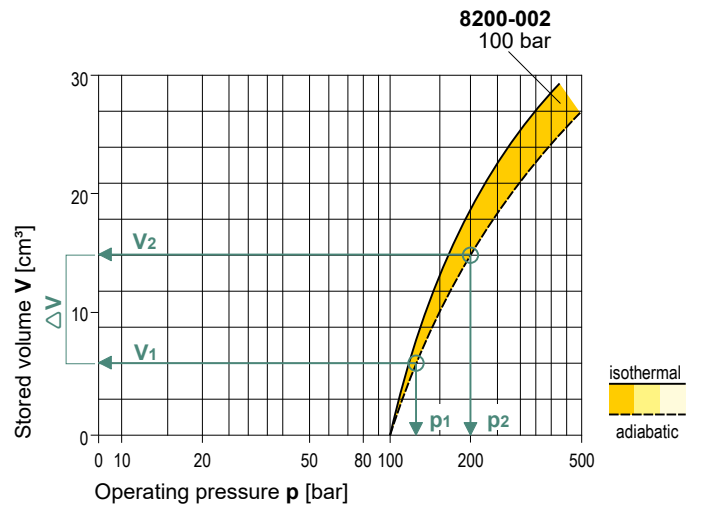
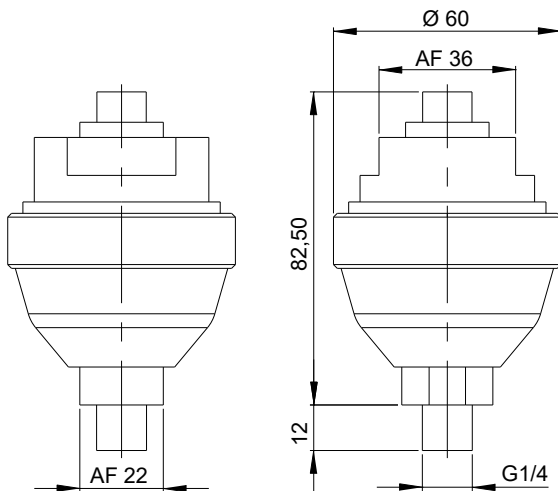
Technology that connects



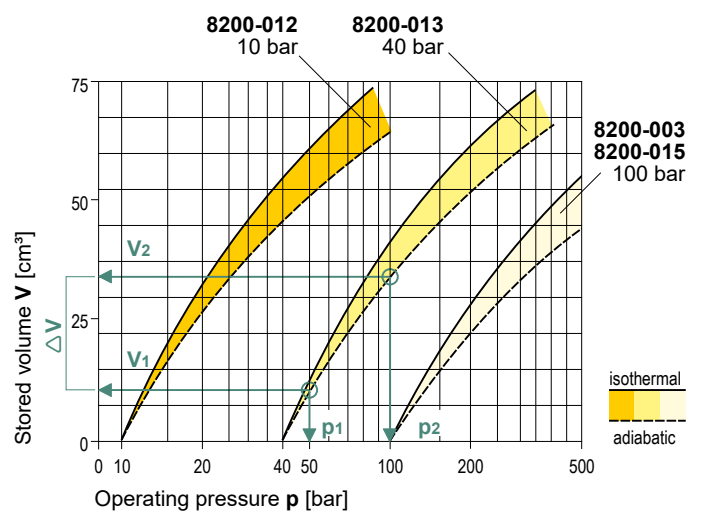
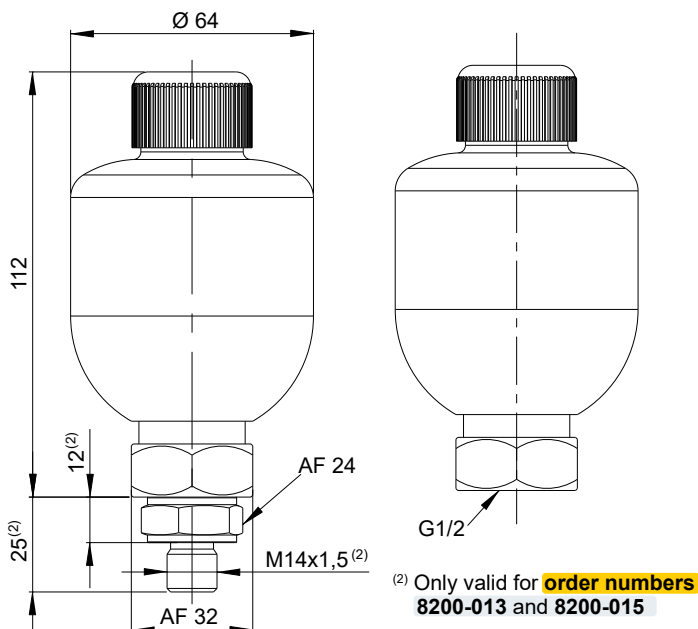
Hydraulic accumulator V = 13 cm³



Hydraulic accumulator V = 40 cm³



Hydraulic accumulator V = 75 cm³



Hydraulic accumulator V = 13 cm³

Nominal value ⁽¹⁾	p _{max.}	Preload pressure p ₀ ⁽²⁾	Thread	Stored volume	Order no.
13 cm ³	500 bar	100 bar	G1/4	9,2 cm ³	8200-001
13 cm ³	500 bar	80 bar	G1/4	9,8 cm ³	8200-004
13 cm ³	500 bar	200 bar	G1/4	8,6 cm ³	8200-016
13 cm ³	500 bar	20 bar	G1/4	8,6 cm ³	8200-019

⁽¹⁾at 22° C and max. operating pressure p_{max.}

⁽²⁾These type of hydraulic accumulator is also available with other preload pressure on request.

Hydraulic accumulator V = 40 cm³

Nominal value ⁽¹⁾	p _{max.}	Preload pressure p ₀ ⁽²⁾	Thread	Stored volume	Order no.
40 cm ³	400 bar	100 bar	G 1/4	28,8 cm ³	8200-002

⁽¹⁾at 22° C and max. operating pressure p_{max.}

⁽²⁾These type of hydraulic accumulator is also available with other preload pressure on request.

Hydraulic accumulator V = 75 cm³

Nominal value ⁽¹⁾	p _{max.}	Preload pressure p ₀ ⁽²⁾	Thread	Stored volume	Order no.
75 cm ³	250 bar	100 bar	G 1/2	45,0 cm ³	8200-003
75 cm ³	50 bar	10 bar	G 1/2	70,0 cm ³	8200-012
75 cm ³	250 bar	40 bar	M14x1,5	62,0 cm ³	8200-013
75 cm ³	250 bar	100 bar	M14x1,5	45,0 cm ³	8200-015

⁽¹⁾at 22° C and max. operating pressure p_{max.}

⁽²⁾These type of hydraulic accumulator is also available with other preload pressure on request.

**Note on the curves** (page 2):

The curves are understood to be theoretical directivity limits. The stored volume ΔV is calculated from the appropriate preload pressure p₀ at the two operating pressures, minimum operating pressure p₁ and maximum operating pressure p₂.

$$\Delta V = V_2 - V_1$$

isothermal

(solid curve)



Through the slow charging/discharging of the hydraulic accumulator, the temperature is completely equalized. The clamping pressure remains nearly constant

adiabatic

(dashed curve)



Through the fast charging/discharging, the hydraulic accumulator is subject to strong temperature fluctuations. Complete temperature equalization is not possible. This results in an increase in temperature. This leads to substantial changes in the clamping pressure (± 10 bar bei ± 1° C).



Application example:

Clamping fixture in a processing palette equipped with swing clamp cylinders.

The hydraulic accumulator with a nominal value of 40 cm³ was installed in a manual coupling system.

The pressure oil is supplied via the coupling mechanism board.

In addition to the integrated check valve, the coupling system includes all other safeguards required for the operation of the hydraulic accumulator.

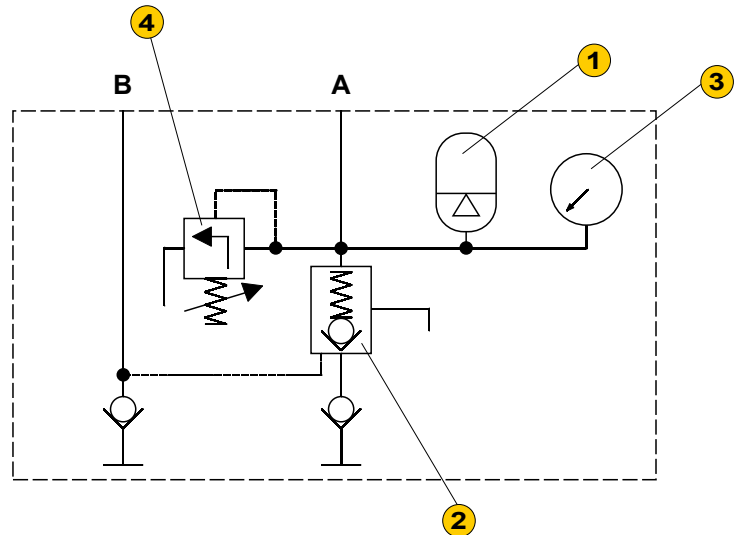
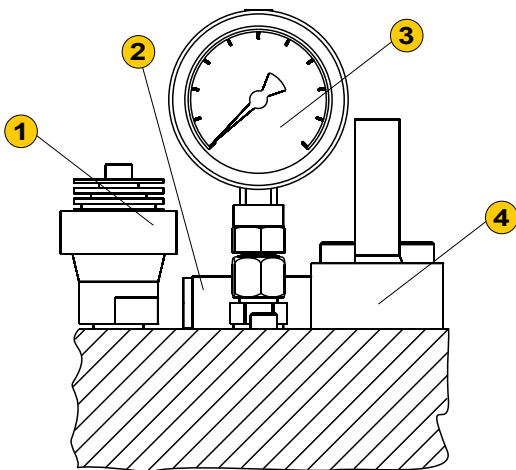
Pressure gauge:

installed in the supply line of the clamping system to monitor the actual pressure

Pressure relief valve:

Function of the relief device, protects the hydraulic accumulator from a pressure increase of more than 10% of the maximum operating pressure.

Component:	Data sheet:
Manual coupling systems	100-2
Swing clamp cylinders	240-10
Pressure gauges with glycerin filling	600-3
Check valve, hydr. pilot operated	700-11



- ① Hydraulic accumulator
- ② Check valve, hydraulically pilot operated
- ③ Pressure gauge with glycerine filling
- ④ Pressure relief valve with relief device