PULSATION DAMPENERS

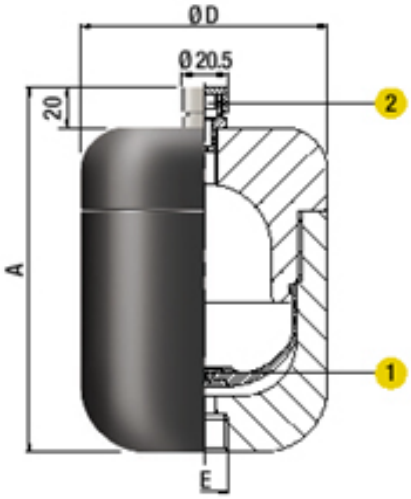
Plastic body accumulator with exchangeable diaphragm **From Lt. 0,05 to Lt. 0,35**

Technical data

Operating pressure:	max. 10 bar
Gas filling (nitrogen only):	max. 90% of min. operating pressure
Admissible pressure ratio:	max. ≤ 4/1
Operating temperature:	PVC -10 +30°C in Polypropylen and PVDF +40°C
Mounting:	vertical/horizontal

Standard construction characteristics

Material of body:	PVC, PP or PVDF
Membrane:	according to fluid
Gas connection valve:	5/8"UNF version 1
Test:	on request



Dimensions

Type		Pressure	P.F.C.	Gas valve	A	øD	Weight
	cm³	max bar	E		mm		kg
APL0000301	50	10	1/2" GAS	M28x1.5 • 5/8" UNF • plug	80	122	0,7
1POL001	100	10	1/2" GAS	M28x1.5 • 5/8" UNF • plug	140	90	1
1POL007	350	10	1/2" GAS	M28x1.5 • 5/8" UNF • plug	165	110	1.5

Spare parts code

Type	Diaphragm	Gas valve	Gasket kit
	1	2	
APL0000301	MEMAPV005NBR /*	VALPR58X	
1POL001	MEML01NBR /*	VALPR58X	
1POL007	MEML035NBRNV1 /*	VALPR58X	

*** BODY MATERIAL TYPE: PVC/PP/PVDF**

The number of cycles is inversely proportional with the increase of the pressure relationship.

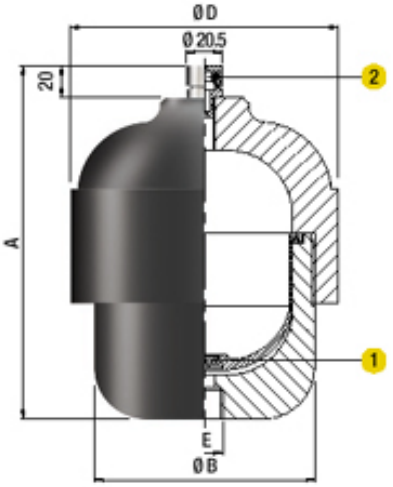
Plastic body accumulator with exchangeable diaphragm — From Lt. 0,5 to Lt. 0,75

Technical data

Operating pressure:	max. 10 bar
Gas filling (nitrogen only):	max. 90% of min. operating pressure
Admissible pressure ratio:	max. ≤ 4/1
Operating temperature:	PVC -10 +30°C in Polypropylen and PVDF +40°C
Mounting:	vertical/horizontal

Standard construction characteristics

Material of body:	PVC, PP or PVDF
Membrane:	according to fluid
Gas connection valve:	5/8"UNF version 1
Test:	on request



Dimensions

Type		Pressure	P.F.C.	Gas valve	A	øB	øD	Weight
	cm³	max bar	E		mm			kg
APL0000701	500	10	1/2" GAS	M28x1.5 • 5/8" UNF • plug	185	105	132	2
APL0000601	750	10	1/2" GAS	M28x1.5 • 5/8" UNF • plug	203	125	152	2.5

Spare parts code

Type	Diaphragm	Gas valve	Gasket kit
	1	2	
APL0000701	MEMLAV05NBR /*	VALPR58X	
APL0000601	MEMLAV075NBR /*	VALPR58X	OR4450

*** BODY MATERIAL TYPE: PVC/PP/PVDF**

The number of cycles is inversely proportional with the increase of the pressure relationship.

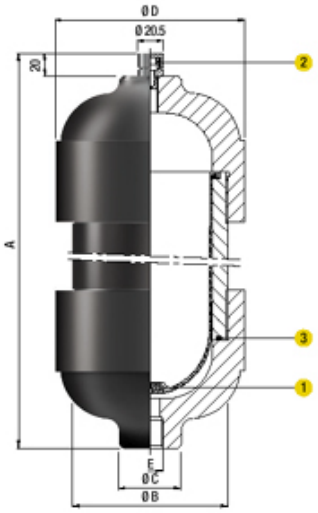
Plastic body accumulator with exchangeable diaphragm — From Lt. 1,5 to Lt. 2,5

Technical data

Operating pressure:	max. 10 bar
Gas filling (nitrogen only):	max. 90% of min. operating pressure
Admissible pressure ratio:	max. ≤ 4/1
Operating temperature:	PVC -10 +30°C in Polypropylen and PVDF +40°C
Mounting:	vertical/horizontal

Standard construction characteristics

Material of body:	PVC, PP or PVDF
Membrane:	according to fluid
Gas connection valve:	5/8"UNF version 1
Test:	on request



Dimensions

Type		Pressure	P.F.C.	Gas valve	A	øB	øC	øD	Weight
	cm³	max bar	E		mm				kg
1POL010	1500	10	1/2" GAS	M28x1.5 • 5/8" UNF • plug	319	125	50	152	4
1POL011	2500	10	3/4" GAS	M28x1.5 • 5/8" UNF • plug	474	125	50	152	5

Spare parts code

Type	Diaphragm	Gas valve	Gasket kit
	1	2	
1POL010	MEMLAV15NBR /*	VALPR58X	OR4412+OR4450
1POL011	MEMLAV25NBR /*	VALPR58X	OR4412+OR4450

*** BODY MATERIAL TYPE: PVC/PP/PVDF**

The number of cycles is inversely proportional with the increase of the pressure relationship.

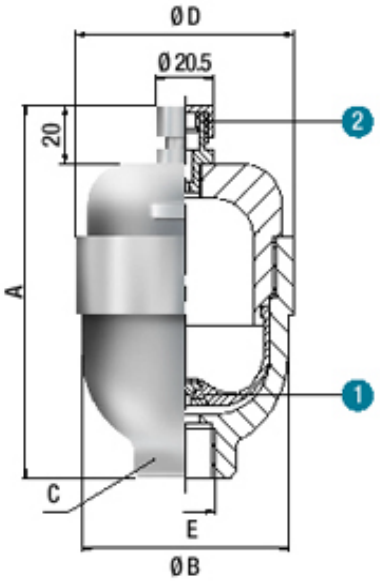
AISI 316L body accumulator with exchangeable diaphragm From Lt. 0,1 to Lt. 0,35

Technical data

Operating pressure:	max. 150 bar
Gas filling (nitrogen only):	max. 90% of min. operating pressure
Admissible pressure ratio:	max. ≤ 6/1
Operating temperature:	-20 +80°C
Mounting:	vertical/horizontal

Standard construction characteristics

Material of body:	Stainless steel AISI 616L
Membrane:	according to fluid
Gas connection valve:	5/8"UNF version 1
Test:	on request



Dimensions

Type		Pressure	P.F.C.	Gas valve	A	øB	C	øD	Weight
	cm³	max bar	E		mm				kg
1POL005	100	150	M18x1.5	M28x1.5 • 5/8" UNF • plug	130	73	36	77	1.6
APL0000401	350	150	M18x1.5	M28x1.5 • 5/8" UNF • plug	160	94	36	99	2.6

Spare parts code

Type	Diaphragm	Gas valve	Gasket kit
	1	2	
1POL005	MEML01NBR	VALPR58X	
APL0000401	MEML035NBR	VALPR58X	

The number of cycles is inversely proportional with the increase of the pressure relationship.

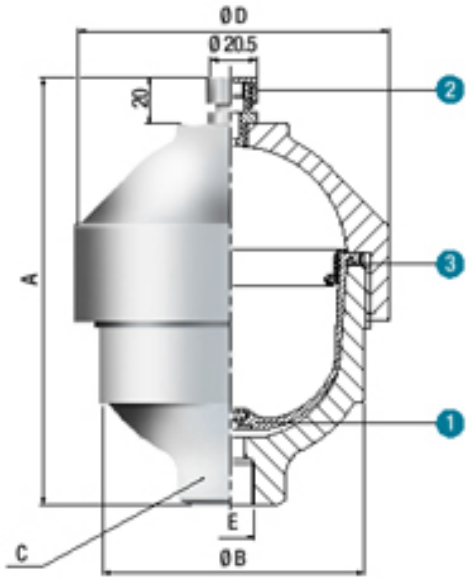
AISI 316L body accumulator with exchangeable diaphragm From Lt. 0,5 to Lt. 0,75

Technical data

Operating pressure:	max. 150 bar
Gas filling (nitrogen only):	max. 90% of min. operating pressure
Admissible pressure ratio:	max. ≤ 6/1
Operating temperature:	-20 +80°C
Mounting:	vertical/horizontal

Standard construction characteristics

Material of body:	Stainless steel AISI 616L
Membrane:	according to fluid
Gas connection valve:	5/8"UNF version 1
Test:	on request



Dimensions

Type		Pressure	P.F.C.	Gas valve	A	øB	C	øD	Weight
	cm³	max bar	E		mm				kg
1POL006	500	150	M18x1.5	M28x1.5 • 5/8" UNF • plug	175	94	36	116	3.6
APL0001201	750	150	M18x1.5	M28x1.5 • 5/8" UNF • plug	190	115	41	137	5.6

Spare parts code

Type	Diaphragm	Gas valve	Gasket kit
	1	2	
1POL006	MEMLAV05NBR	VALPR58X	
APL0001201	MEMLAV075NBR	VALPR58X	OR4450

The number of cycles is inversely proportional with the increase of the pressure relationship.

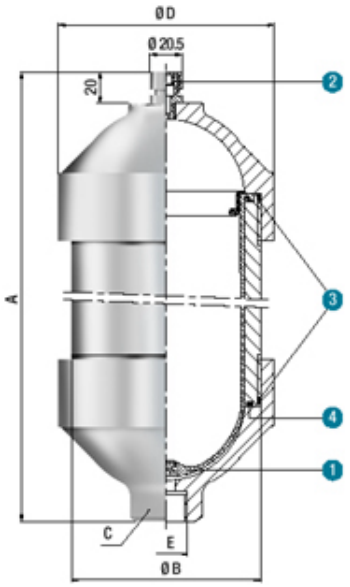
AISI 316L body accumulator with exchangeable diaphragm From Lt. 1,5 to Lt. 2.3

Technical data

Operating pressure:	max. 150 bar
Gas filling (nitrogen only):	max. 90% of min. operating pressure
Admissible pressure ratio:	max. ≤ 6/1
Operating temperature:	-20 +80°C
Mounting:	vertical/horizontal

Standard construction characteristics

Material of body:	Stainless steel AISI 616L
Membrane:	according to fluid
Gas connection valve:	5/8"UNF version 1
Test:	on request



Dimensions

Type		Pressure	P.F.C.	Gas valve	A	øB	C	øD	Weight
	cm³	max bar	E		mm				kg
APL0001301	1500	150	M18x1.5	M28x1.5 • 5/8" UNF • plug	290	120	41	137	9.4
APL0001401	2300	150	M18x1.5	M28x1.5 • 5/8" UNF • plug	445	120	41	137	13.2

Spare parts code

Type	Diaphragm	Gas valve	Gasket kit
	1	2	
APL0001301	MEMLAV15NBR	VALPR58X	OR4412+OR4450
APL0001401	MEMLAV25NBR	VALPR58X	OR4412+OR4450

The number of cycles is inversely proportional with the increase of the pressure relationship.

Etatron's products can be divided into two main groups: hydropneumatic accumulators and pulsation dampers of the standard type, with bladder, diaphragm or piston and special accumulators and pulsation dampers. The **standard accumulator**s, manufactured in carbon steel, and normally equipped with NBR diaphragm or bladder, are destinated for the hydraulics market, for both static and mobile applications. The **special accumulators** and **pulsation dampers** are destinated for the petrochemical industries, the food industry, the pharmaceutical industry a.s.o. and can be manufactured in a multitude of different materials such as Hastelloy, Titanium and Incolloy, stainless steel, normally AISI 316L, carbon steel lined with PTFE, Ebonite, Kanigen and also various engineering plastics like PVC, Polypropilene, PVDF and PTFE, with or without antiextrusion valve, according to the design pressure. The bladders, diaphragms and the guiderings and joints for the pistons, may be manufactured in NBR, IIR, CR, FKM, EPDM; ECO, HNBR, VMQ, NR,ACM, PTFE, and in certain cases also in stainless steel AISI 316L. So for every type of fluid and for a big temperature range exists the best solution.

1.1 Description and operation

A hydropneumatic accumulator is a device that can store a large amount of energy in little space in a process circuit. Since liquids are virtually incompressible and therefore unsuitable for energy-storage, a compressible gas is used for this purpose. 1. A metal vessel (the accumulator shell) is fitted with a diaphragm or bladder separating the liquid side from the gas side. 2. An inert gas (nitrogen) is pumped in through a valve at pressure P 0 , suitable for use in the accumulator; the gas fills the whole inner volume of the accumulator V 0 . A metal or plastic disc is inserted in the diaphragm or bladder to prevent its extrusion through the port fluid connection. 3. When the pressure P 1 in the circuit exceeds the filling pressure P 0 the diaphragm or bladder contracts thereby compressing the gas and reducing the volum to V 1 . 4. When the pressure is further increased to P 2 , the gas volume for the same reason will be reduced to V 2 and its pressure will increase to balance the pressure of the fluid. Thus, a volume V = V 1 - V 2 of pressurized fluid is stored and available for any purpose.

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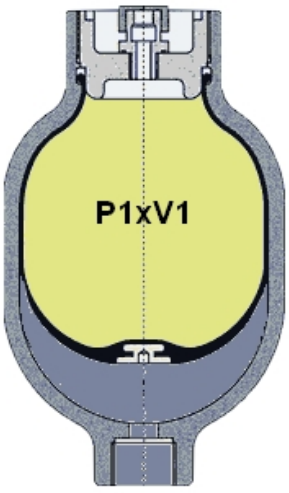

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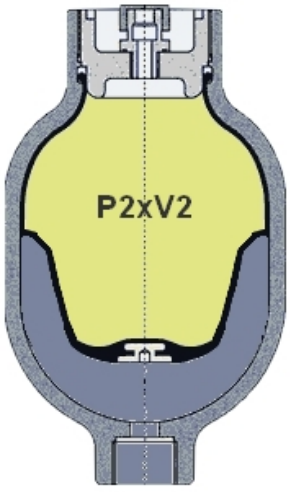

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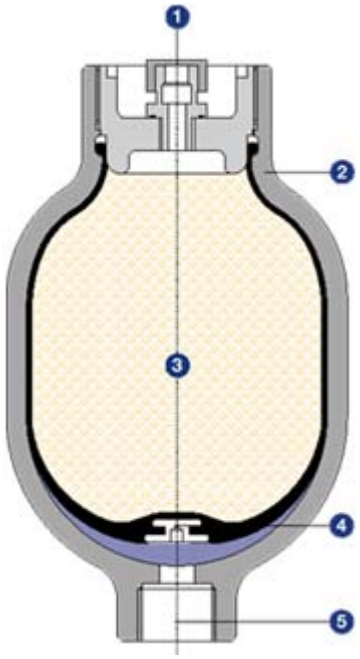
1.2 Construction characteristics

Etatron's diaphragm and bladder type accumulators, consist of an external shell, a diaphragm or bladder and a gas (nitrogen)-filling valve. In the accumulators having a volume of 10 litres and more the disc in the bottom of the diaphragm is replaced by an anti extrusion poppet-valve, mounted at the port fluid connection. The accumulator shell matches the current prescriptions of italian (ISPESL and RINA) and foreign (TÜV, SDM, ASME etc.) laws and prescriptions. For special applications, the body can receive special treatments, like nickel coating, galvanising, ebonite coating, PTFE lining etc. or can be built of stainless steels or other special steels and engineering plastics. The diaphragm or bladder are usually of nitrile rubber but for special applications they can be manufactured of:

- IIR
- Epiclorhydrin
- Ethylene-Propylene
- Natural rubber
- Foodgrade rubber
- Neoprene
- Hydrocarbon proof nitrile rubber
- Nitrile rubber for lowest temperatures (-40°C)
- Silicone rubber
- FKM

The diaphragm or bladder is a single seamless piece. The gasvalve is a leakproof checkvalve; provided with a closing cap.



1. **gas valve**
2. **Accumulator shell**
3. **Diaphragm or bladder**
4. **Anti-extrusiondisc**
5. **Port fluid connection**

2.1 Fluid power storage

In hydraulic circuits often a large flowrate is required for a small period alternating with low or no flow conditions. Installing a hydropneumatic accumulator allows to use smaller pumps and motors, reducing thus installation and operation costs. The operating cycle shown in the figure 2.1 would require a pump having a capacity Q 2 . Using a hydropneumatic accumulator it is possible to store liquid during the periods (t 1 - t 2) and (t 3 - t 4) in which requirements are low or zero and to reutilize the stored liquid during t 1 and (t 2 - t 3) when the required flowrate is higher than the pumps capacity Q 1 . The pump to be used must be selected to have the volumes V 1 +V 2 ≤ V 3 +V 4 . There are many possible application like machinetools, hydraulic presses, injection moulding and blow moulding machines etc.

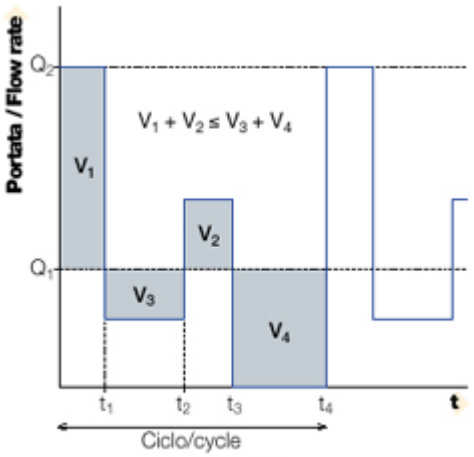


Fig. 2.1

2.2 Volume compensator

In a closed circuit the different coefficient of thermal expansion of the piping and the fluid may create pressure increases when temperature increase occurs. The installation of a hydropneumatic accumulator permits to absorb the bigger volume of fluid and to event pressure increases which might dammage valves, joints instrumentation etc. (figure 2.2)

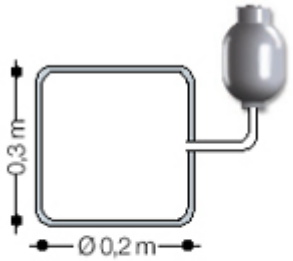


Fig. 2.2

2.3 Pressure loss compensation

When a constant static pressure is required for a long period an accumulator is indispensable as it will compensate for pressure loss due to seepage through joints, seals etc. The accumulator will also absorb pressure peaks which may occur during the operating cycle. Tipical applications are presses, machine tools, central lubrication systems, loading platforms etc. (figure 2.3)

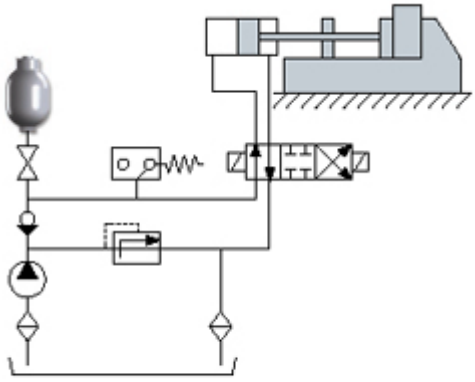


Fig. 2.3

2.4 Energy reserve for emergency

In the case of a sudden power loss e.g. energy blackout or pump breakdown etc. the accumulator can provide sufficient energy to complete the operational cycle, and thus prevent damages to equipment and/or product. In addition the availability of an emergency power supply is essential in those cases where the hydraulic power is needed for closing a safety door, an electrical switch an emergency brake etc. The figure 2.4 shows as example a press which must remain under pressure in case of pump breakdown.

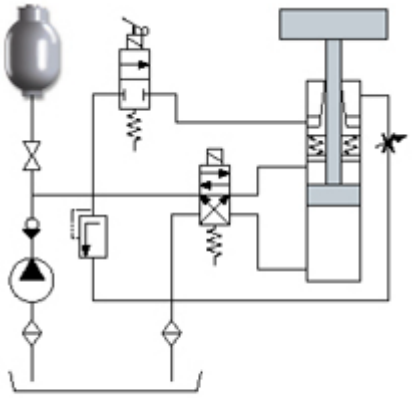


Fig. 2.4

2.5 Peak pressure and waterhammer absorption

Sudden valve closing can cause pressure peaks (waterhammer) resulting in overpressurisation of pipes, joints and valves. The use of a suitable accumulator can neutralize or significantly reduce the shock (figure 2.5). Typical applications are: earth moving equipment, agricultural machines, pipelines for oil and water, car wash equipment etc.

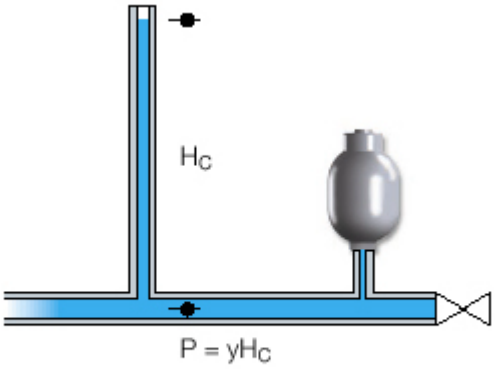


Fig. 2.5

2.6 Shock absorber

Mechanical shocks in hydraulic driven equipment can be easily absorbed by accumulators. Possible applications are in drive and suspension systems for fork-lifts, mobile cranes, agricultural and civil engineering machinery etc.

2.7 Pulsation damper

As a consequence of their design piston and diaphragm pumps create pulsations and pressure peaks in the circuits during operation. This fact reduces lifetime of the pump and reflects negatively on the correct functionning of the systems. Fitting a pulsationdamper of diaphragm or bladder type on the discharge side of the pump, and as close as possible to it, will lower the pulsations to an acceptable level, also according to the volume of the damper (figure 2.7) Typical applications are piston pumps, metering pumps, peristaltic and air operated pumps.

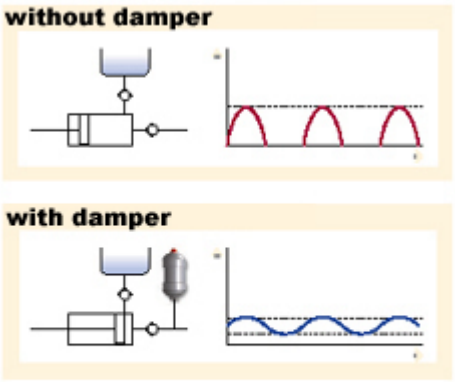


Fig. 2.7