



Bladder Accumulators

High pressure

1. DESCRIPTION

1.1. FUNCTION

Fluids are practically incompressible and cannot therefore store pressure energy.

The compressibility of a gas (nitrogen) is utilised in hydraulic accumulators for storing fluids.

HYDAC bladder accumulators are based on this principle.

A bladder accumulator consists of a fluid section and a gas section with the bladder acting as the gas-proof separation element.

The fluid around the bladder is connected to the hydraulic circuit so that the bladder accumulator draws in fluid when the pressure increases and the gas is compressed. When the pressure drops, the compressed gas expands and forces the stored fluid into the circuit.

HYDAC bladder accumulators can be used in a wide variety of applications and are also available in different pressure ranges, see catalogue sections:

- Bladder Accumulators Standard No. 3.201
- Bladder Accumulators Low pressure No. 3.202
- HYDAC Accumulator Technology No. 3.000

1.2. DESIGN

The high pressure bladder accumulator consists of the pressure vessel, the flexible bladder with gas valve and the hydraulic connection with check valve.

1.2.1 Shell material

The forged pressure vessel is seamless and manufactured from high tensile chrome molybdenum steel.

1.2.2 Bladder material

The bladder material must be selected in accordance with the particular operating medium or operating temperature, see section 2.2.

If discharge conditions are unfavourable (high p_2/p_0 pressure ratio, rapid discharge speed), the gas may cool to below the permitted temperature. This can cause cold cracking. The gas temperature can be calculated using the HYDAC Accumulator Simulation Program **ASP**.

1.2.3 Corrosion protection

For operation with chemically aggressive media, the accumulator shell can be chemically nickel-plated internally or supplied with a special plastic coating.

For external corrosion protection the hydraulic accumulator can be supplied with an epoxy resin finish especially for offshore applications.

1.3. INSTALLATION POSITION AND TYPE OF INSTALLATION

Information on secure installation positions and mounting elements can be found in the following catalogue sections:

- Bladder Accumulators Standard No. 3.201
- Supports for Hydraulic Accumulators No. 3.502
- ACCUSET SB No. 3.503

On no account must any welding, soldering or mechanical work be carried out on the accumulator shell. After the hydraulic line has been connected it must be completely vented.

Work on systems with hydraulic accumulators (repairs, connecting pressure gauges etc.) must only be carried out once the fluid pressure has been released.

The operating instruction must be observed!

No. 3.201.BA

When replacing seals and/or bladders, please read the Instructions for Assembly and Repair (No. 3.201.M).

Notice:

Application examples, accumulator dimensioning and extracts from approvals regulations relating to hydraulic accumulators can be found in the following catalogue section:

- HYDAC Accumulator Technology No. 3.000

2. SPECIFICATIONS

2.1. MODEL CODE

Not all combinations are possible.
Order example. For further information, please contact HYDAC.

SB690 – 32 A 1 / 312 U – 690 D

Series

Nominal volume [l]

Fluid port

A = standard connection

Gas-side connection

1 = standard design ¹⁾

9 = special design (example.: 1/4" BSP)

Material code

312 = standard design

Fluid port*

3 = stainless steel ²⁾

Accumulator shell

0 = plastic coated (internally)

1 = carbon steel

2 = chemically nickel-plated (internal coating)

6 = low temperature steel

8 = plastic coated (e.g. Duroplastic) internally and externally

Accumulator bladder

2 = NBR ³⁾

3 = ECO

4 = IIR

5 = NBR ³⁾

6 = FKM

7 = other

9 = NBR ³⁾

Certification code

U = European Pressure Equipment Directive (PED)

Permitted operating pressure [bar]

Connection*

A = thread to ISO 228 (1/2" BSP)

D = thread to ANSI B1.20.3 (1/2" NPTF)

Required gas pre-charge pressure must be stated separately!

* others on request

¹⁾ gas valve in SB < 10 l = 7/8-14UNF,
in SB ≥ 10 l = M50x1.5

²⁾ dependent on type and pressure range

³⁾ observe temperature ranges, see section 2.1.

2.2. EXPLANATIONS, NOTES

2.2.1 Operating pressure

690 bar (10000 psi)

higher pressures on request

2.2.2 Permitted operating temperature of the hydraulic accumulator

-10 °C ... +80 °C

standard design, others on request

2.2.3 Working temperature and operating medium

The permitted working temperature of a bladder accumulator is dependent on the application limits of the metal materials and the bladder. Outside this temperature range, special materials must be used. The operating medium must also be taken into account.

The following table displays a selection of elastomer materials including max. temperature range and a rough overview of resistant and non-resistant fluids. Please contact us for help in selecting a suitable elastomer.

Materials		Material code ¹⁾	Temperature range	Overview of the fluids ²⁾	
				Resistant to	Not resistant to
NBR	Acrylonitrile butadiene rubber	2	-15 °C to 80 °C	<ul style="list-style-type: none"> ● Mineral oil (HL, HLP) ● Flame-retardant fluids from the groups HFA, HFB, HFC ● Synthetic esters (HEES) ● Water ● Sea water 	<ul style="list-style-type: none"> ● Aromatic hydrocarbons ● Chlorinated hydrocarbons (HFD-S) ● Amines and ketones ● Operating fluids from the group HFD-R ● Fuels
		5	-50 °C to 50 °C		
		9	-30 °C to 80 °C		
ECO	Ethylene oxide epichlorohydrin rubber	3	-30 °C to +120 °C	<ul style="list-style-type: none"> ● Mineral oil (HL, HLP) ● Flame-resistant fluids from the group HFB ● Synthetic esters (HEES) ● Water ● Sea water 	<ul style="list-style-type: none"> ● Aromatic hydrocarbons ● Chlorinated hydrocarbons (HFD-S) ● Amines and ketones ● Operating fluids from the group HFD-R ● Flame-resistant fluids from the groups HFA and HFC ● Fuels
IIR	Butyl rubber	4	-50 °C to +100 °C	<ul style="list-style-type: none"> ● Operating fluids from the group HFD-R ● Flame-resistant fluids from the group HFC ● Water 	<ul style="list-style-type: none"> ● Mineral oils and mineral greases ● Synthetic esters (HEES) ● Aliphatic, chlorinated and aromatic hydrocarbons ● Fuels
FKM	Fluorine rubber	6	-10 °C to +150 °C	<ul style="list-style-type: none"> ● Mineral oil (HL, HLP) ● Operating fluids from the group HFD ● Synthetic esters (HEES) ● Fuels ● Aromatic hydrocarbons ● Inorganic acids 	<ul style="list-style-type: none"> ● Amines and ketones ● Ammonia ● Skydrol and HyJet IV ● Steam

¹⁾ see section 2.1. Model code, material code, accumulator bladder

²⁾ others on request

2.2.4 Gas charge

Hydraulic accumulators must only be charged with nitrogen.

Never use other gases.

Risk of explosion!

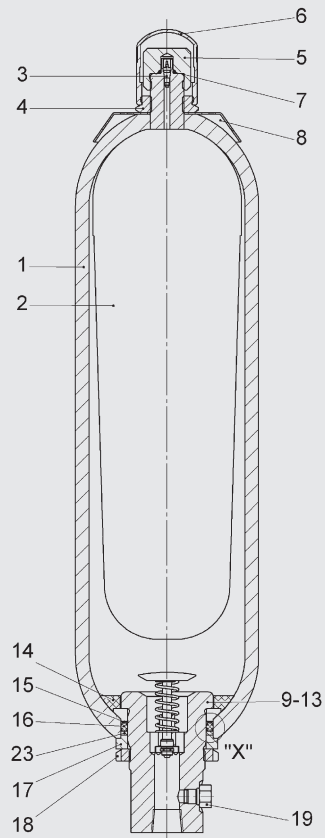
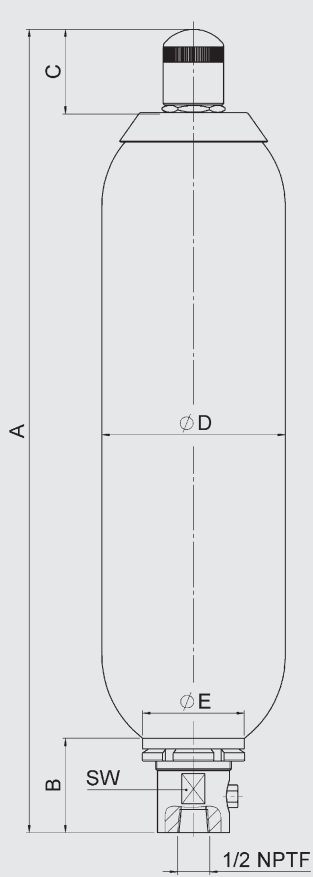
In principle, only use nitrogen of at least Class 4.0 (filtration <3 µm).

If other gases are to be used, please contact HYDAC for advice.

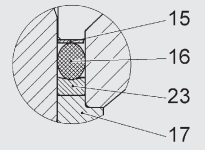
3. DIMENSIONS AND SPARE PARTS

3.1. DRAWINGS

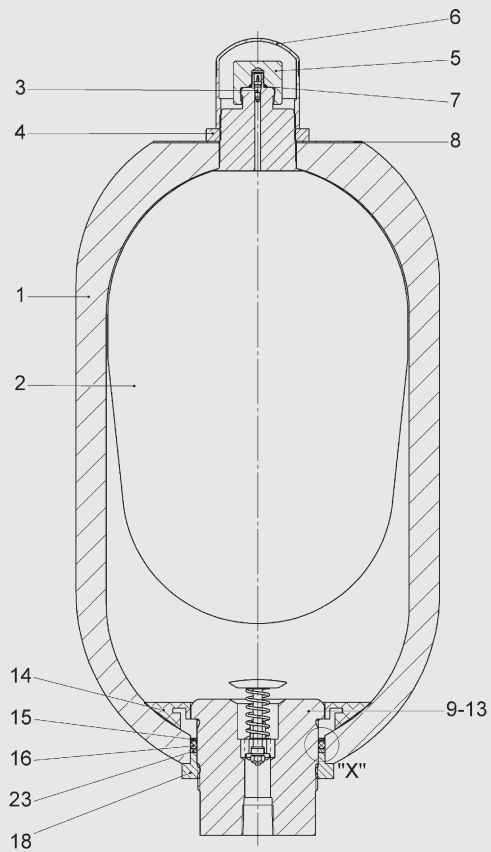
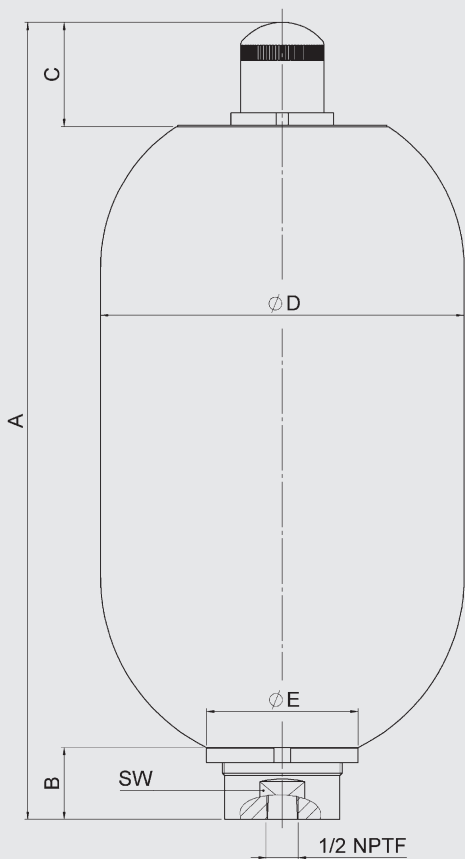
SB690-1 ... 5



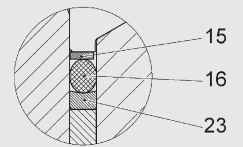
Detail "X" (2:1)



SB690-10 ... 50



Detail "X" (2:1)



3.2. DIMENSIONS

standard model

perm. operating pressure: 690 bar (PED)

Nominal volume [l]	Effective gas volume [l]	Part no.	A max. [mm]	W [mm]	C [mm]	Ø D max. [mm]	Ø E [mm]	SW [mm]	Weight [kg]
1	1	3444800	324	61	58	122	67	45	8.5
2.5	2.5	3129516	531						13.5
5	4.9	3129515	860						23
10	9	3436744	522	77	68	250	110	75	54
20	17	3436795	865						114
32	33.5	3436499	1385						186
50	49.7	4291199	1900						260

3.3. SPARE PARTS

Please request spare parts for versions with spacer (item 17) in volume range 10 ... 50 litres separately.

standard model

perm. operating pressure: 690 bar (PED)

Description	Item
Bladder assembly ¹⁾	
consisting of:	
Bladder	2
Gas valve insert*	3
Retaining nut	4
Seal cap	5
Protective cap	6
O-ring	7
Seal kit	
consisting of:	
O-ring	7
Washer	15
O-ring	16
Bleed screw	19
Backup ring	23
Repair kit ¹⁾	
consisting of:	
Bladder assembly (see above)	
Seal kit (see above)	
Oil valve assembly	
consisting of:	
Valve	9-13
Anti-extrusion ring*	14
Washer	15
O-ring	16
Spacer	17
Lock nut	18
Bleed screw	19
Support ring	23

* available separately

¹⁾ when ordering, please state diameter of the smaller shell port

Accumulator shell (item 1) and company label (item 8) not available as a spare part

Nominal volume [l]	Bladder assembly Part no.	Seal kit Part no.	Repair kit Part no.	Oil valve assembly Part no.
1	3010110	3182615	3182617	4291202
2.5	3211568		3201771	
5	3211569		3201772	
10	3120931	4192830	4347598	4030279
20	3211592		4347600	
32	3211571		4347601	
50	3116598		4347602	

4. NOTE

The information in this brochure relates to the operating conditions and fields of application described. For fields of application and operating conditions not described, please contact the relevant technical department. Subject to technical modifications.

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