ACCUMULATOR
BLADDER SHBS

- Bladder accumulator SHBS, Standard-range, 330 - 350 bar
- Bladder accumulator SHBS-XL, 330 bar
- Bladder accumulator SHBS, 420 bar/ CE - 4100 PSI / ASME

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The bladder accumulators are pressure vessels, which are designed and bult according to official regulations. Changes to the pressure vessel, such as heat treatment, welding, soldering or machining is not allowed in any form, must not be performed. The owner/operator of the vessel is responsible for the operation and the strict compliance with the official regulations.

1. FUNCTION

Liquids are for practical purposes, not compressible. Therefore hydraulic accumulators use the compressibility of Nitrogen gas (N2) for the storage of liquids under pressure. Servi hydraulic accumulators are based on this principle. Gas and liquid are separated by an elastic rubber bladder. The fluid side is connected to a hydraulic system. At Increasing hydraulic pressure, the fluid introduced into the accumulator compresses the gas. When the pressure is reduced, the gas expands and introduces fluid back into the hydraulic system.

Maximum permissible operating pressure

The maximum operating pressure is the maximum pressure that the accumulator must be subject to. This value may differ according to various approvals.

Acceptalbe operating temperatures- and fluids depend on the temperatures of the materials used. The standard version with NBR bladder is for -20 ° C up to 80°C. There are special rules, see ATEX series in hazardous areas.

2. INSTALLATION

Installation

Preferably vertical with fluid side down (but can vary depending on the application). For installation of the charging and gauging device, a maintenance access of approx. 200 mm above the gas valve is required. Make sure the gas valve is easily accessible for easy access during maintenance.

Max flow Q

The maximum values given in the tables applies for vertical installation with the fluid port down. When sizing the accumulator, be sure to use a pre-charge pressure 10% lower than the lowest working pressure to ensure that there is always fluid left in the accumulator during normal operation.

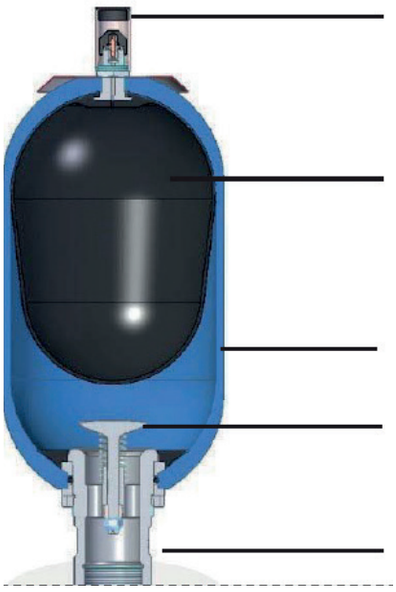
Pre-charge pressure

Pre-charging with Nitrogen gas (N2) should be done to 0,9 x P_1 and 0,25 x P_2, depending on application. Servi can help you determine correct gas charge for your application. Never use air or oxygen as this may cause an explosion.

Installation

The accumulator should be installed using original clamps and supports from Servi. This ensures that the accumulator is properly fixed in place for it's intended use.

3. TECHNICAL DATA



Gas valve with protective cap
To charge, please use the filling and testing equipment "HFP/HFPH"

The elastic rubber bladder ensures the separation between
the Nitrogen gas and the hydraulic fluid.
The pliable bladder changes form to ensure close to 100% efficiency.

Seamless forged shells for best performance

The fluid port connected to the liquid prevents damage to
the bladder filled gas side with P_0 in pressureless storage

No dynamic sales

4. BLADDER GROUND POSITION

P_0	Precharge pressure
P_1	Min. working pressure
P_2	Max. working pressure
V_0	Accumulator gas volume
V_1	Gas volume at P_1
V_2	Gas volume at P_2

A. The accumulator is shown filled with Nitrogen to pre-charge pressure P_0. The fluid port closes to prevent extrusion of the bladder.

B. Bladder position at minimum working pressure P_1. The pre-charge pressure P_0 must always be lower than the minimum working pressure to ensure that the bladder does not come in contact with the poppet valve during normal operation..

C. The bladder position at maximum working pressure P_2. The volume change between P_2 and P1 corresponds to the amount of liquid stores in the accumulator.

HOW A BLADDER ACCUMULATOR WORKS

The gas is introduced into the bladder through the gas valve at the top. The bladder then fills out the shell and closes the fluid port. Fluid pressure is applied through the fluid port at the bottom, compressing the gas. The usable amount of fluid is what is stored between minimum and maximum working pressure.

5. SELECTION OF VARIOUS ELASTOMERS

The bladder accumulators presented here are made according to the European Pressure Equipment Directive, 2014/68/EC (PED). With short delivery, we also offer bladder accumulators according to TR-CU 032/2013 for the Eurasian Customs Union (Russia, Belarus and Kazakhstan, Armenia and Kyrgyzstan). More inspections and vessel classifications on request.

Due to the permanent development of hydraulic fluids, this table gives only an overview of the basic fluids.
For temperatures below -20 ° C or above 80 ° C please keep in mind.

Code	Elastomer	Temperaturbereich Elastomer	Bemerkung
02	Hydrin C (ECO)	-32 °C to +115 °C2 3	Special for low temperature [1]
10	Low temperature Nitrile	-28 °C to +70 °C3	See Code 25
25	NBR	-20 °C to +100 °C2	Mineral oil based fluids
		+5 °C to +55 °C	HFA, HFB [1]
		-15 °C to +60 °C	HFC [1]
40	Butyl	-15 °C to +120 °C2 3	Phosphate ester based fluids and some synthetic fluids [1]
47	Etylen-Propylen-Dien (EPDM)	-40 °C to +120 °C2 3	Phosphate ester based fluids [1]
80	Viton (FKM)	-20 °C to +140 °C2	Flame retardant and / or synthetic liquids

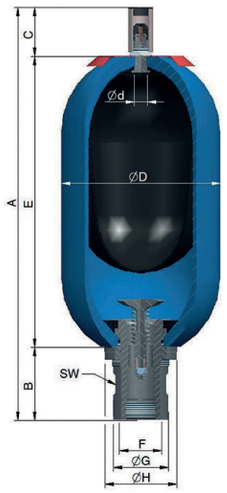
These accumulators are designed according to the PED 2014/68/EC and the European explosion directive 2014/34/CE, (ATEX). group II / category 2 G and 2D (see name plate). This version can have a maximum surface temperature of 80 ° C for class T6.

6. MODEL CODE

SHBS 50 - 330 / 90 E 330 A A 25 A A D 000 X

SERVI bladder accumulators	
Normal size (litre)	
1 / 2,5 / 4,0 / 5,0 / 6,0 / 10 / 12 / 20 / 24 / 32 / 50 / 57	
max. Working Pressure [bar]	
330 or 350	
Approvals	
CE	90
CE + ATEX	96
U-Stamp (USA)	48*
Indien	63*
TR CU (GOST R)	71
Australien (AS1210)	79*
China	85*
90 + 85 (CE + China)	88*
Design Rules	
EN 14359 (Fluid group 2, fluid group 2)	E
AD 2000 (Fluid group 1+2, fluid group 1+2)	D*
ASME	A
Approval Operating Pressure [bar] / psi	
Shell Material	
Carbon Steel	A
Carbon Steel with internal and external plastic coating	B
Carbon Steel with internal and external nickel coating	C
Fluid Connection Material	
Carbon Steel	A
Stainless Steel	R
Bladder Material	
NBR / Nitrile (Standard)	25
ECO (Hydrin)	02
TT-NBR (Tieftemperatur)	10
IIR (Butyl)	40
EPDM	47
FKM (Viton)	80
Gas Connection Material	
Carbon Steel	A
Special connection, details in clear text	Z
7/8“ - 14 UNF	A
Special connection, details in clear text	Z
Fluid Connection size	
IG 3/4“	B
IG 1 1/4“	C
IG 2“	D
M30 x 1,5	E
M40 x 1,5	F
M50 x 1,5	G
Flanged connection, details in clear text	H
Special connection, details in clear text, „XL“ for high flows	Z
Nitrogen filling	
Standard 002 = ca. 2 bar	
Special Configuration (optional, depending on order)	
ATEX-Zone 1 (II 2G)	X
Details in clear text, such as "paint system xxx RAL 5003"	Z

7. BLADDER ACCUMULATOR SHBS, STANDARD-RANGE, 330 - 350 BAR

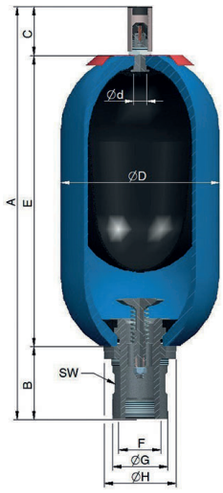


Hydropneumatic accumulators, which can be used depending on use in different versions. All accumulators of this SHBS range are manufactured, approved and certiied according PED 2014/68/EEC. Other approvals on request. STANDARD materials / STANDARD MATERIAL bodies and connectors / shell and connection: carbon steel / C-steel bubble / bladder: NBR temperature range / TEMPERATURE RANGE-20 ° C up to + 80 ° C on request / others on request.

Designation	Gas vol-ume Vo [l]	MWP [bar]	Weight [kg]	Q max.	Abmessungen / Dimensions									
					[l/	Di-	C	øD	ød	E	F	øG	øH	SW_1
					A	B	C	øD	ød	E	F	øG	øH	SW1
SHBS 1 - 350/..	1	350	5	240	330	54	68	114	22	208	G 3/4“	36	50	32
SHBS 2,5 - 350/..	2,4	350	10	450	549	66	68	114	22	415	G 1 1/4“	36	50	50
SHBS 4 - 350/..	3,7	350	16	450	436	66	68	168	22	302	G 1 1/4“	53	68	50
SHBS 5 - 350/..	5	350	17	450	898	66	68	114	22	764	G 1 1/4“	36	50	50
SHBS 6 - 350/..	6	350	20	450	562	66	68	168	22	428	G 1 1/4“	53	68	50
SHBS 10 - 350/..	10	350	28	450	826	66	68	168	22	692	G 1 1/4“	53	68	50
SHBS 10 - 330/..	9,2	330	32	900	586	101	68	221	22	417	G 2“	76	101	70
SHBS 12 - 330/..	11	330	35	900	686	101	68	221	22	517	G 2“	76	101	70
SHBS 20 - 330/..	18	330	53	900	896	101	68	221	22	727	G 2“	76	101	70
SHBS 24 - 330/..	23	330	61	900	1031	101	68	221	22	862	G 2“	76	101	70
SHBS 32 - 330/..	33	330	85	900	1419	101	68	221	22	1250	G 2“	76	101	70
SHBS 50 - 330/..	48,7	330	123	900	1927	101	68	221	22	1758	G 2“	76	101	70
SHBS 57 - 330/..	53,0	330	129	900	2012	101	68	221	22	1843	G 2“	76	101	70

Manufacturing tolerances are not considered. We reserve the right to make changes without prior notice
Now available with a larger oil valve with higher flows.

8. BLADDER ACCUMULATOR SERIE SHBS-XL, 330 BAR



Hydropneumatic accumulators, which can be used depending on use in different versions. All accumulators of this SHBS range are manufactured, approved and certiied according PED 2014/68/EU. Other approvals on request.
The XL-series features a flow-optimized oil valve for particularly high volume flow.

STANDARD MATERIAL
Shell and connection: Carbon steel
Bladder: NBR/Nitrile

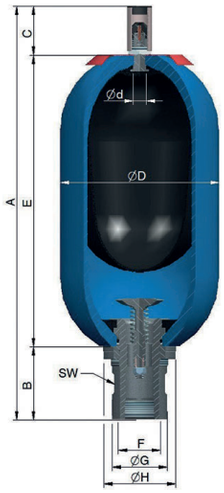
TEMPERATURE RANGE
-20 °C bis +80 °C

Others on request

Designation	Gas vol-ume Vo [l]	MWP [bar]	Weight [kg]	Q max.	Abmessungen / Dimensions									
					[l/ min]	Di-men-sions	C	øD	ød	E	F	øG	øH	SW_1
					A	B	C	øD	ød	E	F	øG	øH	SW1
SHBS 10 - 330/.. K	9,2	330	32	1600	572	101	68	221	22	417	G 2“	76	101	70
SHBS 12 - 330/..	11,2	330	35	1600	686	101	68	221	22	517	G 2“	76	101	70
SHBS 20 - 330/..	18,1	330	53	1600	882	101	68	221	22	713	G 2“	76	101	70
SHBS 24 - 330/..	22,5	330	61	1600	1017	101	68	221	22	848	G 2“	76	101	70
SHBS 32 - 330/..	33,4	330	85	1600	1402	101	68	221	22	1233	G 2“	76	101	70
SHBS 50 - 330/..	48,7	330	123	1600	1917	101	68	221	22	1748	G 2“	76	101	70
SHBS 57 - 330/..	53	330	129	1600	2012	101	68	221	22	1843	G 2“	76	101	70

Manufacturing tolerances are not considered. We reserve the right to make changes without prior notice.

9. BLADDER ACCUMULATOR SERIE SHBS, 420 BAR/ CE - 4100 PSI / ASME



All accumulators of this range are double certified, having both PED 2014/68/EU, fluid group 2 and ASME VIII, Div. 1, App. 22. Approval.

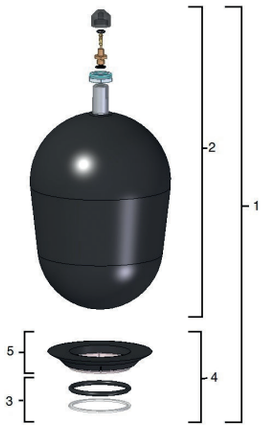
Temperature range (TS): Standard: -20 °C to +80 °C
Working pressure (PS):
max. 420 bar within the scope CE-approval 2014/68/EU max.
4100 psi with ASMEapproval

Others on request

Designation	Gas volume Vo [l]	MWP		Weight [kg]	Q max. [l/min]	Dimensions									
		ASME [psi]	CE [bar]			A	B	C	øD	ød	E	F	øG	øH	SW_1
SHBS 10-4100	9,2	4100	420	38	900	570	101	68	226	22	401	G 2“	76	101	70
SHBS 12-4100	11	4100	420	41	900	670	101	68	226	22	501	G 2“	76	101	70
SHBS 20-4100	18,1	4100	420	60	900	880	101	68	226	22	711	G 2“	76	101	70
SHBS 24-4100	22,5	4100	420	68	900	1015	101	68	226	22	846	G 2“	76	101	70
SHBS 32-4100	33,4	4100	420	93	900	1400	101	68	226	22	1231	G 2“	76	101	70
SHBS 50-4100	48,7	4100	420	125	900	1915	101	68	226	22	1746	G 2“	76	101	70
SHBS 57-4100	53	4100	420	132	900	2010	101	68	226	22	1841	G 2“	76	101	70

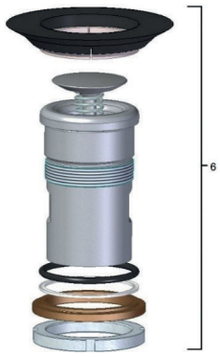
Manufacturing tolerances are not considered. We reserve the right to make changes without prior notice.

10. SPAREPARTS FOR BLADDER ACCUMULATOR HBS



SPARE PART KITS

1. Repair kit
2. Replacement bladder
3. Seal kit
4. Seal kit complete
5. Anti-extrusion ring
6. Complete fluid port



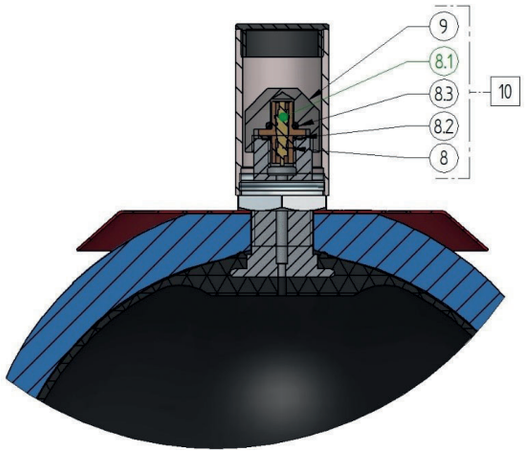
SPARE PART KIT GAS VALVE

8.1 Gas valve insert

10 Gas valve complete

Tool for gas valve insert

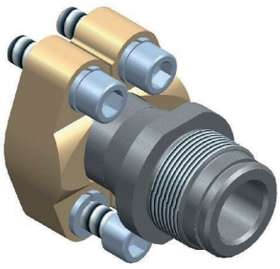
Gas valve key, p/n HGV-VS-001



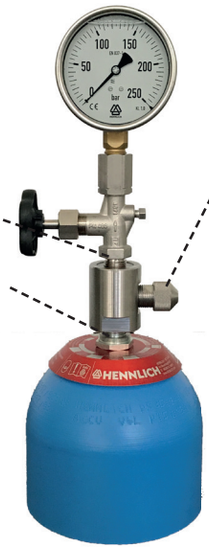
11. ACCESSORIES FOR BLADDER ACCUMULATORS

Customer solutions - Various connections and adaptors

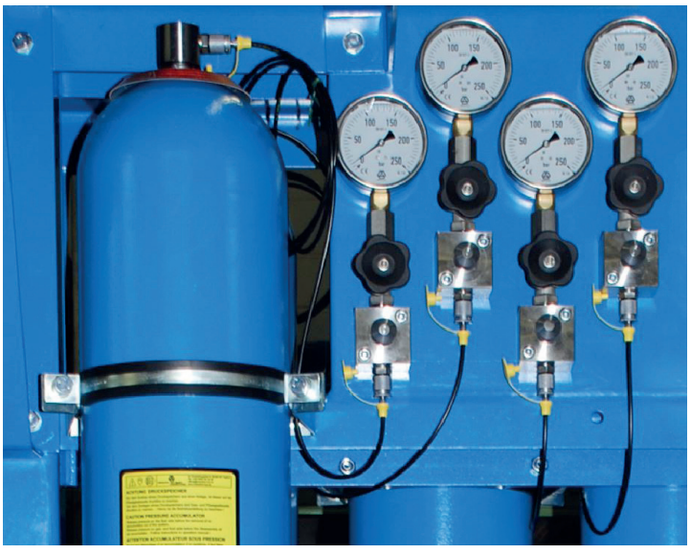
BLADDER ACCUMULATOR GAS SIDE AND / OR OIL SIDE



Adaptor HFS with G2" and SAE-connection



Diaphragm accumulator with mini-measuring connection



Various possibilities, on oil side and gas side. E.g. the gas-side remote connection is a pracicable solution. On request, we can offer a lot of possible customized solutions.

12. SERVI LIFECYCLE SERVICES

Accumulator and cylinder repairs

Servi's accumulator and cylinder factory in Rissa (Trondheim) has the latest servicing and maintenance facilities. We have state-of-the-art CNC lathes and honing machines to accommodate cylinders of any size. We can recondition parts from all other manufacturers. In total Servi has 7 complete service workshops that service and overhaul smaller accumulators and cylinders.

Our services:

- Servicing and modification of cylinders and accumulators of any size
- Field and ad-hoc servicing of critical problems in cylinders and piston accumulators
- Flushing and pressure testing
- Modification and retrofitting of hydraulic cylinders and accumulators
- Painting and coating services in accordance with industrial, marine, hydroelectric, defence and offshore standards