SBO Series Diaphragm Accumulators



Description

Diaphragm accumulators are a cost effective option for numerous functions involving energy storage, shock absorption or pulsation dampening in a hydraulic or fluid system. They are well suited for applications where smaller fluid volumes and flow rates are adequate and that require or involve:

- Compact design
- Low weight
- Flexible mounting positions
- Extremely quick shock response
- Low cost
- Low lubricity fluids, like water

Diaphragm Accumulators have been successfully applied in both industrial and mobile applications for energy storage, maintaining pressure, leakage compensation, and vehicle hydraulic systems.

HYDAC manufactures two types of diaphragm accumulators:

- Non-repairable (welded)
- Repairable (threaded)

Construction

Both types of diaphragm accumulators have the same basic construction. The difference is in the shell. The welded version has a shell that is electron-beam welded, and therefore cannot be repaired. The threaded type has a shell made up of two halves (*top and bottom*) which are held together by a threaded locking ring.



Diaphragm Materials

Not all fluids are compatible with every elastomer at all temperatures, therefore, HYDAC offers the following materials:

- NBR (Standard Nitrile)
- LT-NBR (Low Temperature Nitrile)
- ECO 30 (Epichlorohydrin)
- IIR (Butyl)
- FPM (Fluorelastomer)
- others (available upon request)

To determine which material is appropriate, always refer to fluid manufacturer's recommendation.

Corrosion Protection

For use with certain aggressive or corrosive fluids, or in a corrosive environment, HYDAC offers protective coatings and corrosive resistant materials *(i.e. stainless steel)* for the parts that interface with the fluid or are exposed to the hostile environment.

Mounting Position

Diaphragm accumulators are designed to mount in any position. In systems where contamination is a problem, we recommend a vertical mount with the fluid port oriented downward.

System Mounting

HYDAC diaphragm accumulators are designed to be screwed directly onto the system. We also recommend the use of our mounting components, (detailed on page 86) to minimize the risk of failure due to system vibrations.

Applications

Some common applications of diaphragm accumulators are:

- Agricultural Machinery & Equipment
- Forestry Equipment
- Machine Tools
- Mining Machinery & Equipment
- Mobile & Construction Equipment
- Off-Road Equipment

For specific examples of applications using diaphragm accumulators, please see pages 75 and 76.

Model Code

Model Codes containing RED selections are non-standard items – Contact HYDAC for information and availability Not all combinations are available

			SBO 210 -	1 E4 / 112	<u>S - 210 CK XX</u>	X
Series				$\overline{1}$ $\overline{1}$ $\overline{111}$	$\overline{1}$ $\overline{1}$ $\overline{1}$ $\overline{1}$ $\overline{1}$	_
SBO XXX = Diaphragm Accumulator (XXX (see tables on following pages for most common		,				
Size (in Liters, see tables on dimension pages to for 0.075 = 0.075 Liters see tables on following pages for complete list	,	ich versions they a	re available in			
3.5 = 3.5 Liters						
Shell Construction and Gas Port Design E1 = Welded Construction, recharge E2 = Welded Construction, factory (Not available on SB0330 or on a E4 E4 = Welded Construction, recharge A6 = Threaded Construction, recharge Material Code	geable, HYDAC precharged ar ny accumulator la geable, HYDAC	nd sealed, (not re arger than 1.4 liter Gas Valve Vers	chargeable) s) ion 4 (8VI-ISO 4570)			
Depending on Application 112 = Standard for oil service (miner	al oil)					
Fluid Port1= Carbon steel3= Stainless steel4= Chemically plated carbon steel6= Low temperature carbon steel		D SURFACES for	water service)			
Shell 0 = Synthetic coated carbon steel 1 = Carbon steel 2 = Chemically plated carbon steel 4 = Stainless steel (please note: MA 6 = Low temperature carbon steel	el (internal & exte AWP decreases fe	ernal for water ser	vice)			
Diaphragm Compound						
2 = NBR (Buna N) 3 = ECO (Hydrin) 4 = IIR (Butyl) 5 = LT-NBR (low temp. Buna)	Compound NBR Low Temp NBR	5° to 180°F 32° to 180°F -50° to 180°F	nge Typical Fluids mineral oils water & water-glycols (5% mineral oils	5 minimum glycol)		
	ECO113 ECO663 IIR FPM	-20° to 250°F -40° to 250°F -20° to 200°F 5° to 300°F	mineral oils mineral oils & water (with lo phosphate esters & brake chlorinated hydrocarbons	fluids		
Country of Installation S = USA (for other countries see page 3 for proper code c	designation)					
Maximum Working Pressure in bar (see tab. 100 =1500 psi 140 =2000 psi 200 =3000 psi 210 =3000 psi 250 =3600 psi 330 =4700 psi 400 =5800 psi 450 =6500 psi 500 =7200 psi 750 =10000 psi	les on dimension	pages to follow)				
Fluid Port Connection AK = BSP connection AB = Male / Female combination or	onnection					
CK = Standard SAE connection (other fluid ports available upon request — const	ult factory)					
Gas Precharge Pressure (P ₀) in bar (always	required for E2 n	nodel gas valve)				

Dimensions Non-Repairable Welded Diaphragm Accumulators

AK

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- AK-ISO 228

- Ki (hex)



Version E2 Version E4

Not available on SBO330 or on any accumulator larger than 1.4 liters, minimum lot size 200pcs.

				DIN 15			.						
	Max.	Size	Effective	MAWP	Weight	A	øD**	СК	AK	A	В	K-Hex	Q
Sariac	p2:p0	(L)	Gas Vol (in³)	psi/(bar)	lbs/(kg)	in (mm)	in (mm)	(SAE - female)	(BSPP - female)	(BSPP - female)	(DIN 13 - male)	in (mm)	gpm
SBO 250	8:1	0.075	5	3600 (250)	1.5 (0.7)	2.68 (68.0)	2.52 (64.0)	9/16-18 UNF	G 1/2	N/A	N/A	1.18 (30)	10
SBO 210	8:1	0.16	10	2600/(180)* 3000/(210)	1.8 (0.8)	3.15 (80.0)	2.91 (74.0)	9/16-18 UNF	G 1/2	N/A	N/A	1.18 (30)	10
SBO 210	8:1	0.32	20	2400/(160)* 3000/(210)	2.9 (1.3)	3.66 (93.0)	3.66 (93.0)	3/4-16 UNF	G 1/2	N/A	N/A	1.42 (36)	25
SBO 210	8:1	0.5	30	3000 (210)	3.7 (1.7)	4.35 (124.0)	4.13 (105.0)	3/4-16 UNF	G 1/2	N/A	N/A	1.42 (36)	25
SBO 330	8:1	0.6	36	4700 (330)	7.3 (3.3)	5.04 (128.0)	4.53 (115.0)	3/4-16 UNF	G 1/2	G 1/2	M33 x 1.5	1.42 (36)	25
SBO 210	8:1	0.75	45	2000/(140)* 3000/(210)	6.2 (2.8)	4.88 (124.0)	4.76 (121.0)	3/4-16 UNF	G 1/2	G 1/2	M33 x 1.5	1.42 (36)	25
SBO 330	8:1	0.75	45	4700 (330)	8.9 (4.0)	4.78 (122.0)	4.96 (126.0)	3/4-16 UNF	G 1/2	G 1/2	M33 x 1.5	1.42 (36)	25
SBO 200	8:1	1	60	3000 (210)	7.9 (3.6)	5.39 (137.0)	5.35 (136.0)	3/4-16 UNF	G 1/2	G 1/2	M33 x 1.5	1.42 (36)	25
SBO 140	8:1	1.4	85	2000 (140)	8.6 (3.9)	5.91 (150.0)	5.71 (145.0)	3/4-16 UNF	G 1/2	G 1/2	M33 x 1.5	1.42 (36)	25
SBO 210	8:1	1.4	85	3000 (210)	11.9 (5.4)	6.14 (156.0)	5.91 (150.0)	3/4-16 UNF	G 1/2	G 1/2	M33 x 1.5	1.42 (36)	25
SBO 330	8:1	1.4	85	4700 (330)	16.6 (7.5)	6.33 (160.0)	6.1 (155.0)	3/4-16 UNF	G 1/2	G 1/2	M33 x 1.5	1.42 (36)	25
SBO 100	8:1	2	120	1500/(100)* 1500/(100)	8.8 (4.0)	6.57 (167.0)	6.3 (160.0)	1 1/16 -12 UNF	G 3/4	G 3/4	M45 x 1.5	1.81 (46)	40
SBO 210	8:1	2	120	3000 (210)	14.6 (6.6)	6.81 (173.0)	6.57 (167.0)	1 1/16 -12 UNF	G 3/4	G 3/4	M45 x 1.5	1.81 (46)	40
SBO 330	8:1	2	120	4700 (330)	17.7 (8.0)	7.12 (180.0)	6.77 (172.0)	1 1/16 -12 UNF	G 3/4	G 3/4	M45 x 1.5	1.81 (46)	40
SBO 210	4:1	2.8	170	3000 (210)	18 (8.2)	8.94 (227.0)	6.57 (167.0)	1 1/16 -12 UNF	G 3/4	G 3/4	M45 x 1.5	1.81 (46)	40
SBO 250	4:1	3.5	230	3000 (210)	24.6 (11.2)	11.14 (283.0)	6.69 (170.0)	1 1/16 -12 UNF	G 3/4	G 3/4	M45 x 1.5	1.81 (46)	40
SBO 330	4:1	3.5	230	4700 (330)	30.6 (13.8)	10.78 (274.0)	6.77 (172.0)	1 1/16 -12 UNF	G 3/4	G 3/4	M45 x 1.5	1.81 (46)	40

Dimensions are for general information only, all critical dimensions should be verified.

Dimensions are in inches/(mm) and lbs/(kg)

*Reduced MAWP values for stainless steel models

**Diameter at electron beam weld at shell seam may be up to +0.150" larger in diameter

Repairable Threaded Diaphragm Accumulators



									Thre	ad F					
Series	Max. p2:p0	Size	Eff Gas Vol (in3)	MAWP psi/(bar)	Weight Lbs/(kg)	A in/ (mm)	B in/ (mm)	Ø D in/ (mm)	CK (SAE- female)	AK (BSPP -female)	K - Hex in/ (mm)	Ø L in/ (mm)	M in/ (mm)	N in/ (mm)	Q gpm
SBO 500	10:1	0.1	6	7200 (500)	4.2 (1.9)	4.33 (110)	1.18 (30)	3.74 (95)	3/4 - 16 UNF	G 1/2	1.26 (68)	2.68 (68)	0.87 (22)	1.38 (35)	25
SBO 500	10:1	0.25	15	5000/(350)*	8.6 (3.9)	5.04 (128)	0.79 (20)	4.53 (115)	3/4 - 16 UNF	G 1/2	1.42 (36)	3.62 (92)	0.71 (18)	2.17 (55)	25
				7200/(500)	()	(- /	(-)	(-)	_		()	(-)	(- /	()	
				8700/(600)*	19.8 (9.0)	5.35	0.43 (11)	6.02	3/4 - 16 UNF	G 1/2	1.42 (36)	4.49 (114)	0.59 (15)	2.48 (63)	
SBO 750	10:1	0.25	15	10,000/ (750)		(136)		(153)							25
000 450	10.1	0.0	36	3600/(250)*	12.6	6.69	0.75	5.51	3/4 - 16	G 1/2	1.61	4.53	1.77	2.24	25
SBO 450	0 450 10:1 0.6	30	4700/(330)	(5.7)	(170)	(19)	(140)	UNF	G 1/2	(41)	(115)	(45)	(57)	25	
SBO 210	10:1	1.3	80	3000 (210)	18.7 (8.5)	7.48 (190)	0.31 (8)	6.69 (170)	3/4 - 16 UNF	G 1/2	1.26 (32)	5.71 (145)	2.24 (57)	2.17 (55)	25
SBO 400	10:1	1.3	80	5800 (400)	24.7 (11.2)	7.75 (197)	1.1 (28)	7.91 (201)	3/4 - 16 UNF	G 3/4	1.97 (50)	6.3 (160)	1.97 (50)	2.56 (65)	25
SBO 250	10:1	2.0	120	2600/(180)* 3600/(250)	25.1 (11.4)	8.93 (227)	0.67 (17)	7.91 (201)	1 1/16- 12 UNF	G 3/4	1.61 (41)	6.61 (168)	2.44 (62)	2.52 (64)	40

Dimensions are for general information only, all critical dimensions should be verified. Dimensions are in inches/(mm) and lbs/(kg) *Reduced MAWP values for stainless steel models

Diaphragm Spare Parts

2075359 Vent Screw M8 (w/ NBR Seal Ring) Version 1	2067728 Metal Valve Protection Cap, Version 1
2100344 Vent Screw M8 only	632865 Gas valve core (Version 4)
6004771 NBR Seal Ring, U9.3X13.3X1	237977 Valve seal cap (Version 4)
2127517 Plastic Valve Protection Cap, Version 1	626488 O-ring 7.5x2 (Buna)

Water Service Accumulators

RED selections are not standard item - Contact HYDAC for information and availability.

Size (liters)	Effective Gas Vol (in3)	MAWP psi/(bar)	Model Code	Part Number	Fluid Connection Thread Size		
Stainless	Steel Port / S	tainless Steel Sl	hell		1		
0.16	10	2600 / 180	SBO210-0.16E1/342S-180CA	3344456	SAE 3/4-16UNF-2A male		
0.16	10	2600 / 180	SBO210-0.16E1/342S-180HA	2104224	1/2" NPTF male		
0.16	10	2600 / 180	SBO210-0.16E1/346S-180HA	2108258	1/2" NPTF male		
0.16	10	2600 / 180	SBO210-0.16E1/346U-180AK	O210-0.16E1/346U-180AK 3041996 G 1/2" BSPP fem			
0.25	15	5000 / 345	SBO500-0.25A6/342S-350AK	2110031	G 1/2" BSPP female		
0.25	15	5000 / 345	SBO500-0.25A6/346S-350AK	2122000	G 1/2" BSPP female		
0.25	15	10,800 / 745	SBO750-0.25A6/342S-750AK	2103443	G 1/2" BSPP female		
0.25	15	10,800 / 745	SBO750-0.25A6/342S-750CK	2110811	SAE 3/4" -16 UNF female		
0.25	15	10,800 / 745	SBO750-0.25A6/342U-750AK	3042064	G 1/2" BSPP female		
0.32	20	2300 / 160	SBO210-0.32E1/342S-160HF	2111137	3/4" NPTF male		
0.32	20	2300 / 160	SBO210-0.32E1/346S-160HF	2111138	3/4" NPTF male		
0.6	36	3600 / 250	SBO450-0.6A6/342S-250AK	2121077	G 1/2" BSPP female		
0.6	36	3600 / 250	SBO450-0.6A6/346U-250AK	3042074	G 1/2" BSPP female		
0.75	45	2000 / 140	SBO210-0.75E1/342S-140HD	2108260	1" NPTF male		
0.75	45	2000 / 140	SBO210-0.75E1/343S-140HD	2108850	1" NPTF male		
0.75	45	2000 / 140	SBO210-0.75E1/346S-140HD	2106833	1" NPTF male		
2.0	120	1450 / 100	SBO100-2E1/342S-100HC	2106047	1 1/4" NPTF male		
2.0	120	1450 / 100	SBO100-2E1/342U-100AK	2105229	G 3/4" BSPP female		
2.0	120	1450 / 100	SBO100-2E1/346S-100HC	2108262	1 1/4" NPTF male		
2.0	120	2600 / 180	SBO250-2A6/342S-180AK	2103395	G 3/4" BSPP female		
4.0	260	725 / 50	SBO50-4E1/342U-50AB	3107029	G 3/4" BSPP / M45 x 1.5		
4.0	260	725 / 50	SBO50-4E1/346U1-50AB	3108261	G 3/4" BSPP / M45 x 1.5		
4.0	260	2600 / 180	SBO250-4E1/344U-180CK	3586865	SAE 1 1/16" - 12 UNF female		
Plated Po	rt / Plated Sh	ell	·				
0.16	10	3000/210	SBO210-0.16E2/422S-210HB031	2067722	1/2" NPTF male		
0.16	10	3000 / 210	SBO210-0.16E2/422S-210HB034	2100033	1/2" NPTF male		
0.16	10	3000 / 210	SBO210-0.16E2/422S-210HB086	2106845	1/2" NPTF male		
0.75	45	5000 / 340	SBO330-0.75E1/422S-345AK	2120586	G 1/2" BSPP female		
Stainless	Steel Port / S	ynthetic Coated	Shell				
0.6	36	4700 / 320	SBO330-0.6E1/302U-330AB	2111755	G 1/2" BSPP / M45 x 1.5		
0.75	45	3000 / 210	SBO210-0.75E1/302S-210HD*	2114229	1" NPTF male		
0.75	45	3000 / 210	SBO210-0.75E1/302S-210HD048	2084342	1" NPTF male		
3.5	230	3000 / 210	SBO250-3.5E4/302S-210HC	2101745	1-1/4" NPTF male		

32x	Stainless Steel Port	Chemically Plated Shell
40x	Chemically Plated Port	Synthetic Coated Shell
44x	Synthetic Coated Port	Chemically Plated Shell