



ABE Bladder Accumulators

For working pressures up to 350 bar

*Catalogue HY07-1235/UK
March 2002*



Bladder Accumulators

Liquids are practically incompressible and therefore cannot be used directly for storing energy. Hydro-pneumatic accumulators use the differing compressibility of liquid and gaseous media to enable energy to be stored in liquids under pressure.

Parker's hydro-pneumatic bladder accumulators provide a means of regulating the performance of a hydraulic system. Their simple, compact, design ensures dependable performance, maximum efficiency and long service life.

Why use a Bladder Accumulator?

- stores energy under pressure
- damps out pump pulsation and flow fluctuations
- improves system efficiency
- supplements pump delivery
- supplies power in emergency
- absorbs hydraulic shocks
- compensates for pressure changes in cases of thermal stress
- very contaminant tolerant
- suitable for use with low-lubricity fluids
- fast response times
- Safety – cannot disassemble under pressure

Technical Data

Standard volumes	1 – 48.5 litres
Operating pressure	Up to 350 bar, with $p_2 < 4 \times p_1$ where p_1 = minimum working pressure and p_2 = maximum working pressure
Precharge pressure	
– energy storage	90% of minimum working pressure
– pulsation dampening	60% of maximum working pressure
– shock suppression	60% of maximum pump pressure
Temperature range	standard compounds: -15°C to +80°C For use at other temperatures, please consult factory.
Fluid type	Mineral oil (standard compounds)

Flow Rate The maximum values listed in the selection table only apply in the case of vertical installation (fluid port facing downwards).

Positioning From vertically downwards to horizontal (a space of 200mm must be left free above the gas valve for mounting the charging and gauging assembly – see page 5).

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is a world leader in the manufacture of components and systems for motion control. Parker has more than 800 product lines for hydraulic, pneumatic and electro-mechanical applications in some 1200 industrial and aerospace markets. With over 45,000 employees and some 210 manufacturing plants and administrative offices around the world, Parker provides its customers with technical excellence and first class customer service. Parker Hannifin's Cylinder Division is

the world's largest supplier of hydraulic actuators and accumulators for industrial applications.

Catalogues describing our standard products are available from your nearest Parker sales office – please see the rear cover of this catalogue for addresses. Where an application demands a non-standard approach, special products can be designed to order – our engineers will be pleased to advise.

Design Features and Benefits

1 Approvals

Parker's ABE bladder accumulators are built to meet the requirements of the European Pressure Directive (PED) 97/23/EC. Bladder accumulators are marked with the CE logo and supplied with a declaration of conformity. Hydraulic accumulators fulfil the safety requirements for all member states of the European Union, as well as Iceland, Liechtenstein, Norway and Switzerland.

2 Shell

Parker's bladder accumulator shells are made from seamless chrome-molybdenum alloy steel with forged ends, for maximum strength.

3 Bladder

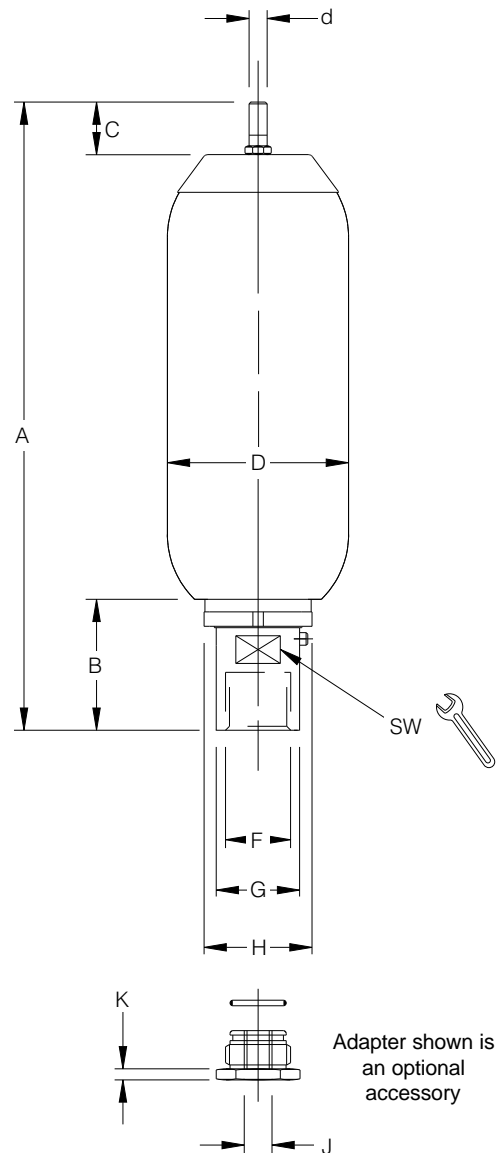
The absence of dynamic sealing surfaces makes bladder accumulators tolerant of contamination and particularly suitable for low-lubricity fluids. Specially formulated for low permeability, Parker's bladders retain their high performance under a wide range of operating conditions including closed loop operation. Optional bladder compounds are available to suit all common fluids and operating temperatures.

4 Gas Valve

Accurate precharging of a bladder accumulator is the key to long and reliable service life. All Parker's bladder accumulators feature a robust gas valve, which is readily accessible for maintenance purposes. A charging and gauging assembly, see page 5, allows precharging and monitoring to be carried out quickly and easily.

5 Fluids and Fluid Ports

Parker's bladder accumulators are supplied as standard for use with hydraulic mineral oil. They are also available for use with other media, such as bio-degradable hydraulic fluids, non-inflammable liquids, emulsions, etc. Fluid ports are made from high-strength alloy steel, for maximum durability. BSPP ports are fitted as standard. ISO 6149 and SAE ports are also available – see page 7.



Models, Capacities and Dimensions

Model	Volume Litres	Mass Kg	Max flow l/min ¹	A max	B	C max	ØD	Ød	F	ØG	ØH	SW	J	K
ABE01	1	5	240	317	52	57	116	22	G ³ / ₄	36	50	32	G ³ / ₈	8
ABE02	2.4	10	450	539	67	57	116	22	G1 ¹ / ₄	53	67	50	G ³ / ₄	10
ABE04	3.7	14	450	426	67	57	170	22	G1 ¹ / ₄	53	67	50	G ³ / ₄	10
ABE10	9.2	33	900	569	101	57	222	22	G2	76	101	71	G1	13
ABE20	17.8	50	900	878	101	57	222	22	G2	76	101	71	G1	13
ABE24	22.5	58	900	1021	101	57	222	22	G2	76	101	71	G1	13
ABE32	34.6	80	900	1407	101	57	222	22	G2	76	101	71	G1	13
ABE50	50	100	900	1941	101	73	222	50	G2	76	101	71	G1	13

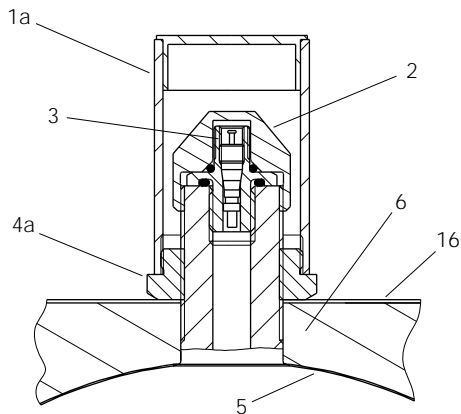
Notes

¹ A minimum liquid volume (10% of V₀) must be maintained inside the accumulator.

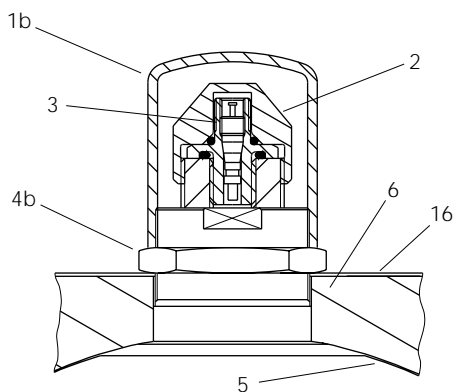
All dimensions are subject to manufacturing tolerances. All dimensions are in millimetres unless otherwise stated.

In line with our policy of continuing product improvement, specifications in this catalogue are subject to change without notice.

Spare Parts and Repair Kits



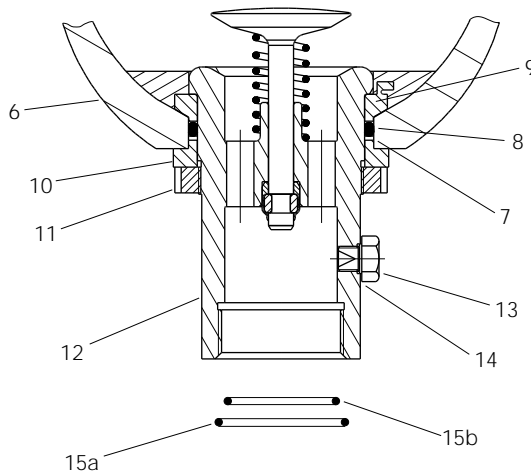
Gas Valve Assembly – ABE01 to ABE32



Gas Valve Assembly – ABE50

Parts List (All Models)

- 1a* Protective cap (ABE01 to ABE32)
 - 1b* Protective cap (ABE50)
 - 2* Valve cap
 - 3* Gas valve
 - 4a* Bladder stem lock nut (ABE01 to ABE32)
 - 4b* Bladder stem lock nut (ABE50)
 - 5* Bladder
 - 6 Shell
 - 7* Back-up washer (ABE04 to ABE50)
 - 8* O-ring – shell
 - 9* Rubber split ring
 - 10 Spacer
 - 11 Fluid port lock nut
 - 12 Fluid port
 - 13* Bleeder plug
 - 14* Seal for bleeder plug
 - 15a* O-ring (outer) – fluid port
 - 15b* O-ring (inner) – fluid port
 - 16 Name plate
- * – included in repair kit



Fluid Port Assembly – All Models

Repair Kits

Repair kits are available for all accumulator models. When ordering repair kits, please supply the complete model number from the identification plate and specify the fluid type and the temperature at which the accumulator is to be used. The repair kit comprises those parts marked with an asterisk in the parts list. For a full description of the compound abbreviations, see 'Bladder Compounds' on page 5.

Model	Compound				
	NBR	IIR	FPM	EPDM	ECO
ABE01	BKE2201CANBR	Consult Factory			
ABE02	BKE2202CANBR				
ABE04	BKE2204CANBR				
ABE10	BKE2210CANBR				
ABE20	BKE2220CANBR				
ABE24	BKE2224CANBR				
ABE32	BKE2232CANBR				
ABE50	BKE5050CANBR				

Bladder Compounds

Parker offers bladders moulded from a variety of compounds, to suit a wide range of fluids and operating temperatures. Unless ordered specially, a Group 1 (nitrile) bladder will be supplied. The table lists the compounds in which bladders are available, their recommended operating temperature ranges,

and the types of fluids with which the different materials are generally compatible. Note that temperature ranges may vary depending on the fluid used in the hydraulic system. If in doubt, contact the factory with details of the application.

Group	Bladder Compound	Fluid Medium	Temperature Range
1	Nitrile (NBR)	General purpose, mineral oil-based fluids	-15°C to +80°C
		HFA and HFB fluids ¹	+5°C to + 55°C
		HFC fluids ¹	-15°C to +60°C
3	Butyl (IIR)	Most phosphate ester and some synthetic fluids	-15°C to +80°C
5	Fluorocarbon Elastomer (FPM)	High temperature and/or synthetic fluids	-20°C to +100°C ²
7	Ethylene Propylene Diene (EPDM)	Phosphate ester-based fluids and water	-40°C to +80°C ³
9	Epichlorohydrine (ECO)	General purpose fluids with enhanced low temperature performance	-32°C to +80°C ³

¹ Check with fluid supplier that fluid is compatible with nitrile compounds

² For operating temperatures above 80°C, please consult the factory

³ For operating temperatures below -20°C, please consult the factory

Port Sizes

Fluid ports are made from high-strength alloy steel, for maximum durability. BSPP ports are fitted as standard. ISO 6149 and SAE ports are also available.

Model	BSPP	ISO 6149-1	SAE-Thread	SAE Flange (ISO 6162)
ABE01	G ³ / ₄	M27x2	#12 1 ¹ / ₁₆ "-12	n/a
ABE02 - ABE04	G1 ¹ / ₄	M42x2	#20 1 ⁵ / ₈ "-12	1" 6000 psi Code 62
ABE10 - ABE50	G2	M60x2	#24 1 ⁷ / ₈ "-12	1 ¹ / ₂ " 6000 psi Code 62

Fluid Port Adapters

A range of three adapters is available for use with Parker's bladder accumulators, to reduce the size of the fluid port. Adapters are supplied complete with a nitrile O-ring.

Model	Fluid Port Thread	Adapter Thread	Part No.
ABE01	G ³ / ₄	G ³ / ₈	BPA1
ABE02 - ABE04	G1 ¹ / ₄	G ³ / ₄	BPA2
ABE10 - ABE50	G2	G1	BPA3

Charging and Gauging Assembly

The charging and gauging assembly enables the user to charge Parker's bladder accumulators with nitrogen, and to test and alter the precharge pressure. It attaches to the accumulator's gas valve, and can be connected by hose to a standard commercial nitrogen bottle.

Each kit contains:

- Test and filling apparatus incorporating gas valve key and bleed valve
- Filling hose, length 2.5m
- Protective case
- Gas valve adapters to fit all standard bladder accumulators
- 25 bar and 250 bar pressure gauges

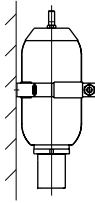
Parker strongly recommends that the nitrogen bottle used should be fitted with a high pressure regulator.

Charging and Gauging Assembly with Adapter – All Models		
Territory	Gas Bottle Fitting	Part No.
UK	5/8 BSP (male)	UCA 02
France	W 21.7 x 1/14" (female)	UCA 04
Germany	W 24.32 x 1/14" (female)	UCA 01
Italy	W 21.7 x 1/14" (male)	UCA 05
US	0,960 x 1/14" (male)	UCA 03

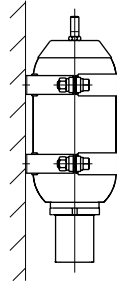
Accessories

Mounting Accessories

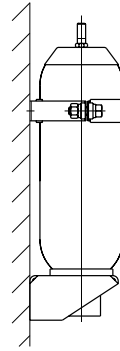
Parker clamp and base brackets provide a simple and secure method of mounting the accumulator. The clamps and brackets are galvanised to resist damage from corrosion. Rubber inserts absorb vibration and resist deformation in high temperature environments.



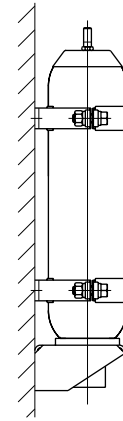
1 litre



2.5 - 4 litres



10 - 25 litres



32 - 50 litres

Clamp Bracket Assembly

Model	Nominal Volume (l)	Part No.	Quantity	See Figure
ABE01	1	CB1	1	1
ABE02	2.5		2	
ABE04	4	CB2	2	2
ABE10	10	CB3	1	3
ABE20	20			
ABE24	24.5			
ABE32	32			
ABE50	50		2	

A	B	C	ØD	E	H	K	ØL	M
138	100	159	114	-	73	30	9	14
188	148	181	168	230	92	40	9	14
270	216	241	226	290	123	40	15	21

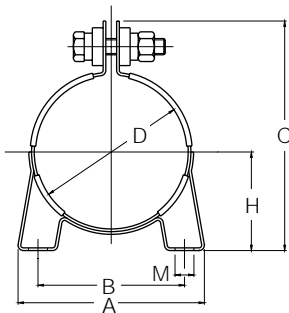


Fig. 1

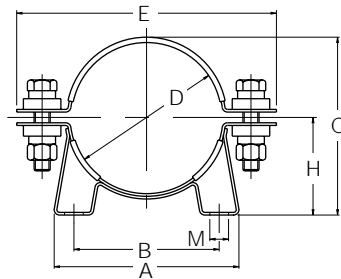
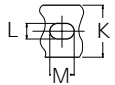


Fig. 2

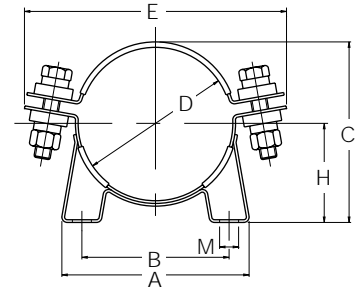
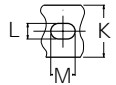
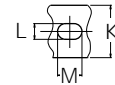


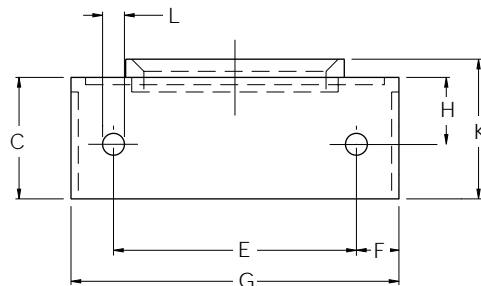
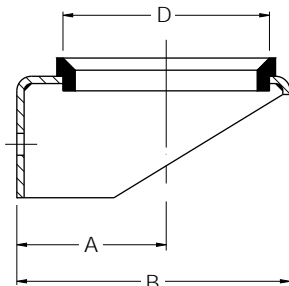
Fig. 3



Base Bracket Assembly

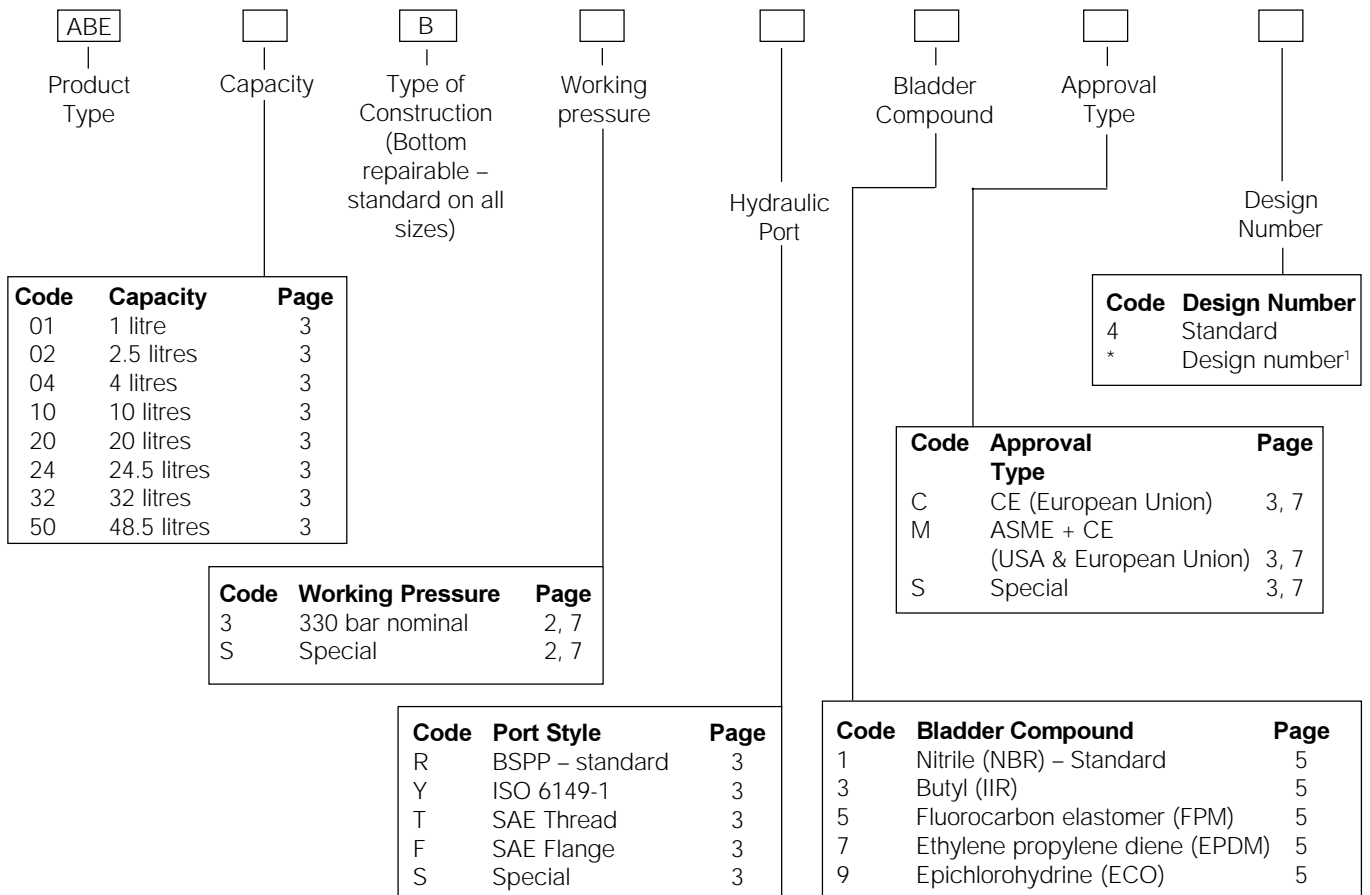
Model	Nominal Volume (l)	Part No.
ABE10 - ABE50	10 - 50	BB1

A	B	C	D	E	F	G	H	K	L
123	235	100	170	200	30	260	25	115	17



All dimensions are in mm unless otherwise stated

How to Order Bladder Accumulators



¹ Parker allocated design number.

Pressure Ratings and Approvals

The working pressure of Parker's ABE Series bladder accumulators is nominal, and differs according to the approval required. The maximum working pressures for the different

approvals are shown in the table below. For extended bladder life, Parker recommends that $p_2 < 4 \times p_1$.

Model	CE (bar)	ASME ¹ + CE – for use with	
		CE Accumulators (bar)	ASME Accumulators (bar)
ABE01	350	n/a	n/a ²
ABE02	350	n/a	n/a ²
ABE04	350	n/a	n/a ²
ABE10	330	300	207
ABE20	330	300	207
ABE24	330	300	207
ABE32	330	300	207
ABE50	330	300	207

Notes

¹ ASME, Section VIII, Division 1, Appendix 22.
² ASME approval not required when inside diameter < 6 inches (152.4mm). For sizes below ABE10, an approval type 'C' accumulator will be supplied.

Cylinder Division Sales Offices

Austria – Marchtrenk

Parker Hannifin GmbH
Tel: (7242) 56921
Fax: (7242) 5692120

Belgium – Nivelles

Parker Hannifin S.A. N.V.
Tel: 67 280 900
Fax: 67 280 999

Czech Republic – Prague

Parker Hannifin Corporation
Tel: (02) 830 85 221
Fax: (02) 830 85 360

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Tel + Fax: 1 252 2539

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Fax: (0331) 765612

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Parker Hannifin B.V.
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Fax: (0541) 585459

Norway – Ski

Parker Hannifin A/S
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Poland – Warsaw

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Fax: (22) 863 49 44

Portugal – Leca da Palmeira

Parker Hannifin Portugal Lda.
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Parker Hannifin AB.
Tel: 08-5979 50 00
Fax: 08-5979 51 20

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Hydrel A.G. Romanshorn
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Fax: (714) 66 66 80

Slovakia –

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Fax: (91) 675 77 11

Turkey – Istanbul

Hidroser Hidrolik - Pnömatik
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Parker Hannifin Plc
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