



Piston Accumulators High Pressure

1. DESCRIPTION

1.1. FUNCTION

Fluids are practically incompressible and cannot therefore store pressure energy.

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

HYDAC piston accumulators are based on this principle, using nitrogen as the compressible medium.

A piston accumulator consists of a fluid section and a gas section with the piston acting as the gas-proof screen. The gas section is pre-charged with nitrogen.

The fluid section is connected to the hydraulic circuit so that the piston 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 piston accumulators can be used in a wide variety of applications and are also available in different pressure ranges, see also catalogue sections:

- Piston Accumulators
Standard
No. 3.301
- Piston Accumulators
Series SK280
No. 3.303

1.2. DESIGN

The high pressure piston accumulator consists of:

- a cylinder with very finely machined internal surface,
- end caps on the gas side and the oil side,
- O-ring seals,
- floating metal piston,
- high pressure sealing system.

The piston floats on guide rings which prevent metal-to-metal contact between the piston and the accumulator wall.

For use with aggressive or corrosive fluids, the parts coming into contact with the fluid can be made of corrosion-resistant material. Suitable materials are also available for low temperature applications.

1.3. SEALING SYSTEMS

Precise information about the intended operating conditions is required in order to select the most appropriate sealing system for the application. Important criteria for this selection are, for example:

- Design pressure,
- Actual pressure differential,
- Switching frequency or cycles,
- Piston velocity,
- Operating temperature,
- Operating fluid,
- Cleanliness of fluid (micron rating of filter),
- Maintenance requirements.

On high pressure piston accumulators, a modified version of piston Type 2 is used, developed for applications up to 1000 bar. Hydraulic accumulators must only be operated using hydraulic fluids which are filtered to the following cleanliness class:

- NAS 1638 Class 6 or
- ISO 4406 Class 17/15/12.

1.4. INSTALLATION POSITION AND TYPE OF INSTALLATION

HYDAC piston accumulators operate in any position. Vertical installation with the gas-side uppermost is preferable, to prevent contamination from the fluid settling on the piston seals.

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

- Piston Accumulators
Standard
No. 3.301
- Supports for Hydraulic Accumulators
No. 3.502

**Please read the Operating Manual!
No. 3.301.CE**

**When replacing seals and/or piston,
please read the Instructions for
assembly and repair (No. 3.302.M).**

2. TECHNICAL SPECIFICATIONS

2.1. OPERATING PRESSURE

Three pressure ranges are possible:
690 bar / 800 bar / 1000 bar

2.2. OPERATING TEMPERATURE

-20 °C ... +50 °C
others on request

2.3. FLUID AND TEMPERATURE RESISTANCE OF THE SEALS

NBR/PTFE	-20 ... +80 °C	Mineral oil
NBR/PTFE ¹⁾		Water / Ethylene glycol
FKM/PTFE	-10 ... +80 °C	Mineral oil, petroleum ²⁾

¹⁾ PTFE modified for water applications

²⁾ other compatible fluids on request

For temperatures outside these ranges, or for different fluids, please contact us. There are also special grades available depending on the application.

2.4. GAS CHARGING

Hydraulic accumulators must only be charged with nitrogen.
Never use other gases.

Risk of explosion!

In principle, the accumulator may only be charged with nitrogen class 4.0, filtered to < 3 µm.

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

2.5. MODEL CODE

Not all combinations are possible.

Order example. For further information, please contact HYDAC.

SK690 - 1 / 2212 U - 690 ADE - VB - 08 UP2 - 1 - 300

Series

Nominal volume [l]

Material and piston code

Piston type 2 (High pressure)

Piston material

2 = carbon steel

3 = stainless steel

Material of cylinder and end caps

1 = carbon steel

3 = stainless steel

Material of seals including piston seals

2 = NBR / PTFE

6 = FKM / PTFE

Certification code

U = PED 97/23/EC

Permitted operating pressure [bar]

Fluid connection

Type of connection (see Table 1)

Standard or specification of the type of connection (see Table 2)

Size of connection (see Table 3)

Gas side connection or gas valve

Type of connection (see Table 1)

Standard or specification of the type of connection (see Table 2+3)

Size of connection (see Table 4+5)

Piston diameter

08 = 80 mm

12 = 125 mm

15 = 150 mm

18 = 180 mm

Supplementary equipment*

M = magnetic flap indication ¹⁾

UP.. = piston position switch

(e.g. UP2 = 2 position switches, UPEX = ATEX version)

Safety equipment*

1 = bursting disc (please give nominal pressure and temperature)

Pre-charge pressure p₀ [bar] at 20 °C*

* if required, please state at time of ordering!

¹⁾ not possible for all series and sizes.

Table 1, Connection type

Code letter	Description
A	Threaded connection (female)
K, S	Combination connection / Special connection
V	Gas valve type

Table 2, Threaded connection: standard or specification

Code letter	Description
A	Thread to ISO 228 (BSP)
B	Thread to DIN 13 or ISO 965/1 (metric)
C	Thread to ANSI B1.1 (UN...-2B, seal SAE J 514)
D	Thread to ANSI B1.20.3 (NPTF)
S	Special version

Table 3, Threaded model connection sizes

Type Table 2	Code letter, size						
	A	B	C	D	E	F	G
A	G 1/8	G 3/4	G 3/8	G 1/2	G 3/4	G 1	G 1 1/4
B	M10x1	M12x1.5	M14x1.5	M16x1.5	M18x1.5	M22x1.5	M27x2
C	5/16-24 UNF	3/8-24 UNF	7/16-20 UNF	1/2-20 UNF	9/16-18 UNF	3/4-16 UNF	7/8-14 UNF
D	1/16-27 NPTF	1/8-27 NPTF	1/4-18 NPTF	3/8-18 NPTF	1/2-14 NPTF	3/4-14 NPTF	1-11 1/2 NPTF

Table 4, Autoclave connection sizes (preferred connection)

	Code letter, size						
	KCQ	KCR	KCT	KUR	KUY	KWB	KWP
1st connection	13/16-16UNF (9MF)	13/16-16UNF (9MF)	9/16-18UNF (6MF)	9/16-18UNF (6MF)	1 3/8-12UNF (16MF)	9/16-18UNF (6MF)	3/4-16UNF (6HF)
2nd connection	13/16-16UNF (9MF)	-	-	9/16-18UNF (6MF)	-	G 3/4-ISO228	-

other connections on request

Table 5, Gas valve models

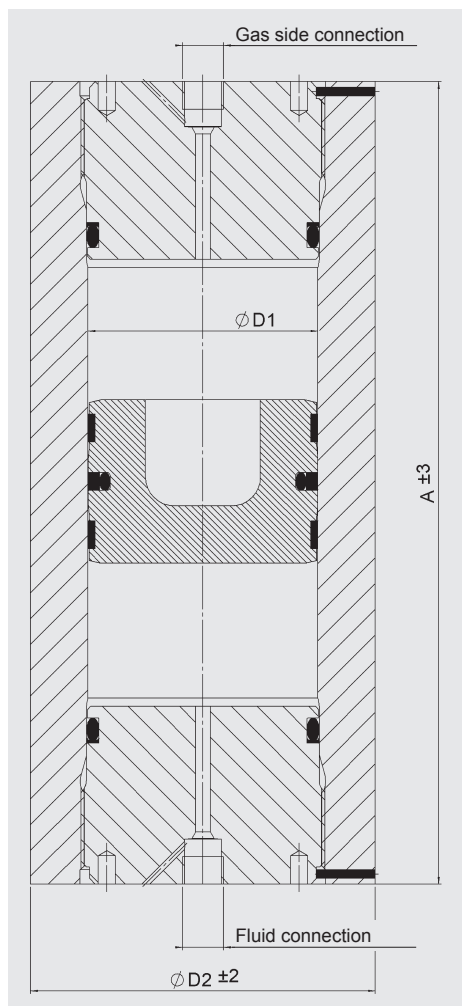
Code letter	Description
B	Gas valve end connection M28x1.5/M8 (max. pre-charge pressure 350 bar using FPU-1, 600 bar with FPK 600)
F	Gas valve end connection M42x1.5 (max. pre-charge pressure 800 bar with FPH 800)
M	Gas valve, male, for Autoclave 9/16-18UNF (6MP) (no limit for pre-charge pressure)

Note:

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

- HYDAC Accumulator Technology
No. 3.000

3. DIMENSIONS



3.1. SERIES: SK690

max. permitted operating pressure: up to 690 bar

Volume [l]	Ø D1 [mm]	Ø D2*		A [mm]	Weight*	
		Carbon steel [mm]	Stainless steel [mm]		Carbon steel [kg]	Stainless steel [kg]
1	80	107	110	380	18	20
10				2170	74.2	83
5	125	160	160	620	57.5	57.5
20				1845	132.9	132.9
10	150	190	200	820	92.5	118.2
30				1950	193.2	240
20	180	246	220	1075	243	163
50				2250	447	279

* according to PED 97/23/EC, others on request

3.2. SERIES: SK800

max. permitted operating pressure: 800 bar

Volume [l]	Ø D1 [mm]	Ø D2*		A [mm]	Weight*	
		Carbon steel [mm]	Stainless steel [mm]		Carbon steel [kg]	Stainless steel [kg]
1	80	107	110	380	20	20
10				2170	83	83
5	125	162	160	620	60	56
20				1845	140.2	132.9
10	150	185	200	820	97.6	120.8
30				1950	179.3	242.7
20	180	246	226	1075	243	180
50				2250	443	316

* according to PED 97/23/EC, others on request

3.3. SERIES: SK1000

max. permitted operating pressure: 1000 bar

Volume [l]	Ø D1 [mm]	Ø D2*		A [mm]	Weight*	
		Carbon steel [mm]	Stainless steel [mm]		Carbon steel [kg]	Stainless steel [kg]
1	80	120	119	380	25.4	24.9
10				2170	113.7	110.5
5	125	172	164	620	71.2	60.8
20				1845	176.6	146
10	150	200	200	855	130	130
30				1990	253	253
20	180	246	255	1100	267.2	298.3
50				2275	471.4	534.6

* according to PED 97/23/EC, others on request

4. NOTE

The information in this brochure relates to the operating conditions and applications described.

For applications and operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.

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