

# HYDRAULIC PISTON ACCUMULATORS





Product development and production at Servi Cylindersservice' top modern facilities in Rissa.





## **SERVI GROUP**

Ever since 1912, Servi Group has been a key player within Power and Motion Control, with particular emphasis on the marine and offshore industry. We follow our customers all over the world and supply high quality components, sophisticated total solutions, and a comprehensive range of repair and maintenance services.

## **SERVI CYLINDERSERVICE AS**

Founded in 1936 and started to develop and manufacture hydraulic cylinders and accumulators in 1956. From day one, our products have been used in extremely demanding operations under some of the toughest climatic conditions in the world. We continuously strive to develop and improve our products to maintain the level of quality our customers expect. We deliver to industry in general, including the offshore, marine and shipbuilding sectors, hydro-electric installations and foundries.

### **Piston Accumulators**

Servi is Norway's largest manufacturer of piston accumulators. This gives us a unique position in the market.

We design and manufacture accumulators according to customer specifications in most materials and with accessories such as end position switches, burst discs, internal or external piston position indicators etc.

The accumulators are manufactured in diameters from 40 to 760 mm, and pressures up to 3000 bar.

In addition to manufacturing our own accumulators, Servi also works with other manufacturers to complement the range.

### **Dampers**

Servi has for a long time designed and delivered dampers for various applications.

### **Heave compensators**

Active and passive top compensators in drill towers and cranes on drilling rigs, as well as active and passive heave compensation cylinders for winch systems for offshore and marine applications.

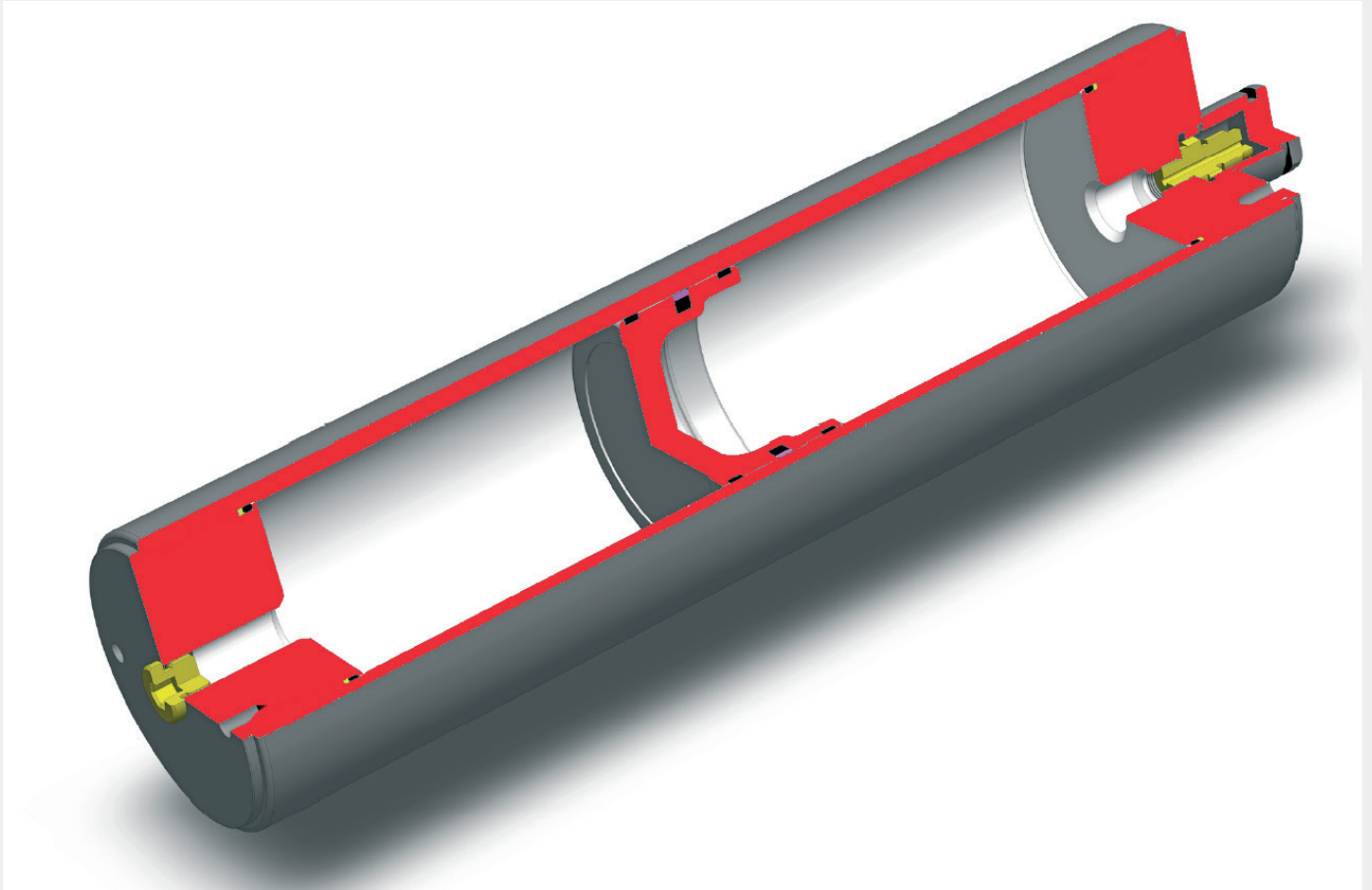
### **Special products**

Servi manufactures accumulators for various applications within offshore, hydro power, marine, subsea and land based industries with unique designs, dimensions, pressure ratings, materials and integrated valves and sensors.

Servi works closely with the customer to develop a quality product which covers all customer requirements.



# Over 50 years in piston accumulators



**Servi manufactures a standard programme covering several different products, as well as specific special applications.**

## **SERVI PAC – standard range of accumulators**

Carbon steel piston accumulators for 250 and 350 bar operating pressure are particularly suitable for applications in the fields of Offshore & Marine, Energy, Mobile systems and Industry in general.

## **SERVI PAS – standard range of accumulators**

Stainless steel piston accumulators that are suitable for Offshore & Marine applications with an operating pressure of up to 350 bars. Use PACX or PASX for ATEX approved accumulators.

## **Examples of areas of use**

The piston accumulators are used in applications for shock absorption, braking systems, energy storage, backup power and volume compensation. Many advantages

- Can be easily connected to gas (backup) bottles to generate larger accumulator systems.
- (As additions) Visual as well as electric piston position indicators can be installed for increased control.
- We provide complete accumulator stands and other hydraulic solutions.
- Servi also markets accessories and other products such as pulsation dampers, gas bottles, safety blocks, burst discs and charging kits.

In addition to our standard range listed in this document, we can offer sizes, pressures, materials and connections to suit our customers' needs as they arise.

**Servi, with all its products from either in-house manufacturing or one of our many partners, will be able to fulfil all your hydraulic requirements.**

# Technical specifications

Servi has 50 years' experience in manufacturing piston accumulators, and is now introducing two new series that are CE approved as per PED 97/23/EC:

- SERVI PAC (Piston Accumulators Carbon steel)
- SERVI PAS (Piston Accumulators Stainless steel)

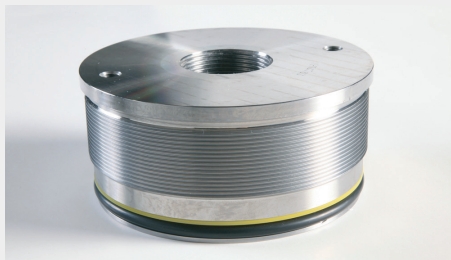
Specifications	Standard Range	Limits
Volume	0.2 - 500 litres	0.2 litre to 1500 litres
Diameter	Ø50 - 500 mm	Ø40 mm to Ø750 mm
Operating pressure	Up to 350 bar	Up to 3000 bar
Temperature range	-20°C to +80°C	-50°C to +200°C

## Available Materials

Carbon Steel, Alloy Steel, 17-4HP Stainless Steel, 316 Stainless Steel, Duplex, Super Duplex, Brayco Hastelloy, Aluminium.

## Tubes

The tube material has been specially developed to fulfil the PED 97/23/EC requirements or has been through a PMA (Particular Material Appraisal) to ensure safe use. In addition, we can deliver according to other standards



## End caps

The piston accumulator is service-friendly with threaded end caps. Some larger models have threaded rings keeping the end cap in place. Some special models may be welded.

To get the correct flow, there are several different connection options. Various threads or flanges are also available.



## Piston

Pistons of several designs and materials such as

- Steel
- Aluminium (anodised or untreated)
- Stainless steel

## Seals

Available for different types of applications and pressures in the following materials:

- PU/NBR
- PTFE/FPM/NBR
- FKM and others.

We have sealing solutions for most fluids, temperatures and pressures.

Depending on seal solution, we can attain piston speeds from 0.6 to 10 m/s.

## Gas valves. Standard valves are used up to 690 bar.

- Minimes 1620 UNF 1/2"-20 ext. with M16 x 2
- MS28889-2 UNF 1/2"-20 ext. with 5/16"-32 UNF stainless steel
- 1/4" BSP Male
- 5/8" UNF Male
- Others on demand

Above 690 bar, other valve solutions are used.

## Steel gas valve protection

A steel hood reduces the risk of damage from external causes.

## Painting

- 2-part one-coat paint can be delivered on standard accumulators.
- Stainless steel accumulators are normally delivered untreated.
- NORSOK systems 1 or 7, or other paint specifications can be supplied.

# Code key for SERVI PAC

**SERVI PAC(X) - 350 - 100 - 010 - AR - 00 - 02 - 01 - 01 - Y**

C=Carbon steel  
S=Stainless  
X= ATEX

Internal  
diameter, mm

Connection  
fluid side

Gas valve  
MS28889-2  
(UNF ½"-20 body  
5/16"-32 UNF SS)

Painting  
01=Standard,  
2-part, one coat,  
combi-paint

Max working  
pressure  
250 or 350 bar

Volume,  
litres

Connection  
gas side  
00=No extra connection

Sealings  
01=PU/NBR

Options  
Y=Servi std.

Connection fluid side		K	L	M	N	P	R	S	T	U	V	W
Thread ISO 228-1 (G)	A	G1/8	G1/4	G3/8	G1/2	G3/4	G1	G11/4	G11/2	G2	G21/2	G3
Thread ISO 6149-1 (M)	B	M10x1	M12x1.5	M14x1.5	M18x1.5	M22x1.5	M27x2	M33x2	M42x2	M48x2		
SAE-flange ISO6162-1, 3000 psi	C	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"			
SAE-flange ISO6162-2, 6000 psi	D	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"			
NPT	E	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"		



For requirements other than the above, please contact us on telephone +47 64 97 97 97  
Instruction book and manual available on Servi's website.



# SERVI standard line of piston accumulators

## Carbon steel - Low Pressure

Design pressure (bar)	Standard volume range (Litre)	Internal diameter (mm)	External diameter (mm)	Length range (mm)	Weight range (kg)
250	1 - 4	80	92	360 - 957	08.05.2016
250	1 - 15	100	115	294 - 2072	13 - 49
250	4 - 30	140	160	480 - 2170	34 - 95
250	10 - 130	200	230	563 - 4382	34 - 370
250	50 - 220	250	286	1317 - 4785	228 - 619
220	100 - 400	360	419	1388 - 4336	565 - 1396

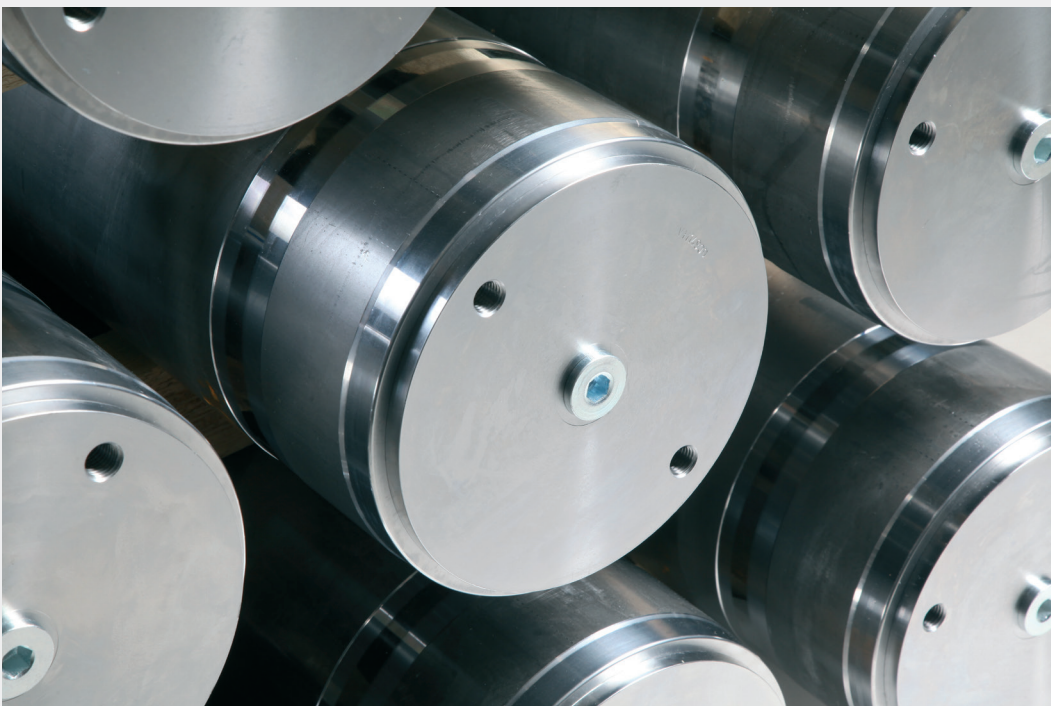
## Carbon steel - Medium Pressure

Design pressure (bar)	Standard volume range (Liter)	Internal diameter (mm)	External diameter (mm)	Length range (mm)	Weight range (kg)
350	0.4 - 0.8	50	60	260 - 515	3.8 - 5.2
350	1 - 4	80	96	360 - 957	09.07.2019
350	1 - 15	100	120	294 - 2072	15 - 64
350	4 - 30	140	170	480 - 2170	44 - 139
350	10 - 120	200	240	563 - 4064	53 - 487
350	50 - 220	250	300	1317 - 4785	299 - 878

## Stainless steel

Design pressure (bar)	Standard volume range (Liter)	Internal diameter (mm)	External diameter (mm)	Length range (mm)	Weight range (kg)
250	0.5 - 15	100	124	270 - 2048	15 - 74
242	10 - 40	180	210	627 - 1803	86 - 176
242	4 - 100	195	236	408 - 3622	85 - 431

See data sheet: 180001-1-3-1/rev. 1 for more information



# Piston accumulator stainless steel



## Model code

SERVI PAS 210-350 bar

(Piston Accumulator Stainless steel)

Standard dimensions

from Ø80 mm to Ø250 mm

For detailed information, please contact us  
on telephone +47 64 97 97 97.

Our long experience has shown that the seals are one of the key components of a piston accumulator. We have therefore chosen the best sealing solutions on the market to ensure safe operation and long life.



An example of an accumulator stand from Servi.



# Accessories

Servi also provides accessories such as:

- Safety blocks for the fluid side
- Burst Discs and Fuse Plugs for the gas side
- Gas cylinders for back-up systems
- Clamps/brackets in carbon or stainless steel
- Supports
- Cushion rings
- Fluid or gas side adaptors
- Charging sets for pre-charging with Nitrogen gas
- Piston position indication systems - analogue, digital and visual
- Special paint and other coatings

## Safety devices for accumulators

### FLUID SIDE

#### Safety blocks from SERVI

The range of BS safety blocks is available in sizes NG10, NG20, NG25 and NG32. The safety blocks combine all the features to protect, isolate and discharge an accumulator. The shut-off valve rotates 90 degrees to instantly isolate the accumulator from the hydraulic system in emergency conditions or for maintenance.

Once isolated, the accumulator can be discharged to tank through a discharge valve with manual or electric controls. In version BS10 and BS20, when switching over the ball valve, the pump flow rate is stopped and simultaneously the accumulator discharged to tank. During switching, all three ports (P, A and T) are momentarily interconnected (negative switching overlap).

Suitable for use with all types of bladder, piston and diaphragm accumulators, the compact and multifunction design saves space and requires less wiring.

For easy installation, we offer a full range of adapters, suitable for all standard fittings of any size and type. For diagnostic purposes and for continuous monitoring of pressure, all the safety blocks are provided with a pressure gauge connection of 1/4"BSP. The European Directive on pressure equipment 97/23/EC states that all accumulators must be fitted with a safety device that intercepts, limits and discharges the pressure, and also allows carrying out measurements. The Servi range of safety blocks satisfies all these requirements in single and compact device. The safety block should always be mounted as close as possible to the accumulator.

# Gas side

## Burst discs

Our burst discs are safety devices that can be mounted on the gas side of the bladder or piston accumulators. Their function is to protect the accumulator from any excessive pressure that may exceed the maximum design limit of the accumulator itself, causing damage to equipment and people.

### Note that if the disc bursts, it will release all gas pressure!

The burst disc is made from a machined hexagonal cap in stainless steel (AISI 316L) on to which there is brazed a calibrated and concave disc, which will explode at a pre-set value. It can be installed in any position.

Our burst discs are designed, manufactured and tested according to European rules and regulations, and are delivered with CE marking according to PED.

Servi stocks burst discs with a number of pressure settings suitable for the pressure ratings of our accumulators. The burst pressure is normally designated at +80° C, but can be used at temperatures above and below this. Note that the operating temperatures affect the burst pressure. This relationship is inverse to the temperature.

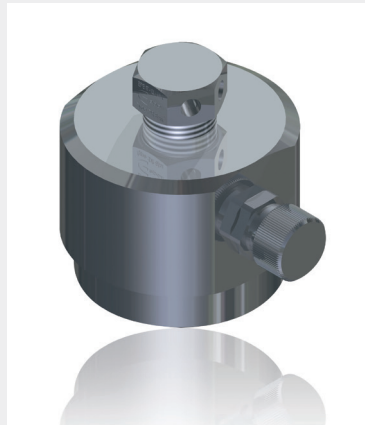
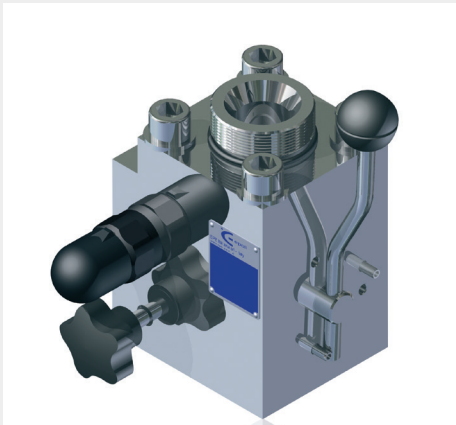
## Fuse Disk/Fuse Plug

Temperature fuses are safety devices that are used to release the gas pressure by discharging the nitrogen completely when a rise in temperature reaches an unacceptable level (i.e. in the case of fire).

Permitted operating pressure:  $\leq 500$  bar

Temperature range: - 10 °C ... +80 °C

Melting point: Approx. 150°C



Installation: Both above gas side solutions are easy to retrofit, either using an existing plugged gas side connection or an adaptor. Contact Servi for details.

Nitrogen pre-charge equipment.

Servi stocks a variety of equipment to pre-charge accumulators.

# Nitrogen pre-charge equipment

Servi stocks a variety of equipment to pre-charge accumulators.



Stainless steel accumulator clamps for all our accumulators.  
Also available in carbon steel.

Contact SERVI for more information on all our accessories.



