

## SM50 & SM50P Metal Bellows



### Description

In addition to Bladder, Piston and Diaphragm accumulators, HYDAC can now offer a fourth series – Metal Bellows Accumulators.

A metal separating element is used between the fluid and gas side of the metal bellows accumulator. This makes it virtually gas tight, eliminating elastomer separating elements and seals from the accumulator and providing a solution for some very challenging accumulator pulsation application conditions.

- Heavy Diesel Engines-Mobile, Marine & Industrial: Fuel injection systems in heavy diesel engines generate significant cyclic pressure fluctuations or pulsations. The Metal Bellows Accumulator can be used as a pulsation dampener on both the supply and return lines close to the engine which generates the pulsations. The metal bellows element provides a more robust method of separating the nitrogen gas from the diesel fuel and also manages the next two related problems.
- Elastomer Resistance to Fuels & High Temperature: Alternatives to diesel fuels, such as bio-oils or heavy fuel oil require higher fuel injection temperatures up to 320°F. Even FKM (Viton®) will have compatibility problems and shortened service life with fluids of this type under these extreme conditions. Metal Bellows Accumulators eliminate this elastomer compatibility issue.
- Nitrogen Gas Loss Through the Elastomer - Permeation: The high fuel fluid temperatures compound and nitrogen gas permeation through the elastomers creating higher gas losses and increase the need for gas monitoring and gas precharge maintenance. If nitrogen gas losses become excessive, a bladder or diaphragm will experience damage and possible failure in operation.

The recently developed solution from HYDAC is the Metal Bellows Accumulator. Instead of a bladder or diaphragm, a metal bellows is used as the flexible separating element between fluid and gas. The metal bellows is resistant to all conventional fuels over a very wide temperature range. Heavy fuel oil at temperatures from -85 °F to 320 °F is easily handled these dampers. The metal bellows is welded to the other components and is therefore completely gas tight. It is able to expand and contract inside the accumulator without any friction or abrasion and it can operate for a very long period of time (years) with a single adjustment. Monitoring and maintenance for this type of damper is therefore reduced to a minimum.

### Construction

Metal Bellows Accumulators are available in two different styles:

- SM50P – Flange connection with fluid diverter design and
- SM50 – Threaded connection w/o fluid diverter, good for applications requiring a retrofit of competitors accumulators.

A diverting block is built into the fuel side of the damper which forces the fuel directly into the accumulator, thereby increasing the damping efficiency considerably. If two dampers are fitted to the fuel system (in both supply and return line), no pressure fluctuations can leave the engine before passing through one of the metal bellows dampers.

If a conventional accumulator can no longer perform its function, this can lead to expensive maintenance and repair work. We can offer a retrofit alternative - Replacement without the need for modification.

### Features

There are two different design types of metal bellows; convoluted (formed) and diaphragm (welded). Each has a slightly different design and performance advantages also vary.

#### Convoluted bellows (formed)

- Heavy Diesel Engines
- Very good dampening features
- Resistant to contamination



#### Diaphragm bellows (welded)

- Very suitable for high pressures
- Very good energy storage features
- High displacement volume
- Compact



### Areas of Application

- Pulsation dampening
- Volume compensation

### Industry Sectors

- Heavy diesel engines (e.g. power plants and ships)
- Process technology
- Wind energy

Not all combinations are available

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## Metal Bellows SM50 & SM50P

### Technical Information

Technical specifications HYDAC Metal Bellows Accumulators	Flange Connection Design	Threaded Connection Design
Series	SM50P	SM50
Max. design pressure	725 psi	725 psi
Max. working pressure *	43.5 psi - 174 psi	43.5 psi - 174 psi
Max. pre-charge pressure at Tmax	58 psi	116 psi
Design Temperature range	14 F° - 320 F°	
Operating media	Diesel and heavy fuel oil, boifuels	
Size	0.5 - 3.8 L	0.5 - 1.6L
Effective gas volume	≈0.5 L (nitrogen)	
Gas side pre-charge fluid	0.6 L (ethylene glycol)	0.3 L (ethylene glycol)
Fluctuating volume *	max 0.04 L	
Material	Carbon steel (primed externally)	
Design and Approval *	e.g.: PED, ABS, DNV, LR, BV, GL, RMRS	
Fluid connection *	Diverting block SAE 1 1/4" Diverting block SAE 2" Diverting block SAE 3"	2" BSP (female) or with adapter also for 1 1/2" BSP (male)
Gas connection	M28x 1.5 for Universal Charging and Testing Unit - FPU-1	
Mounting position *	vertical (gas connection at top)	preferably vertical (gas connection at top)
Weight	48.5 - 73lbs	20lbs

\*Others on request