OLAER®

The Professional Choice

ELM

Diaphragm Accumulator

OLAER ELM | High pressure diaphragm accumulator conforming to EC directives

Day to day, the agricultural, forestry, construction and public works sectors are faced with the fundamental question:

How to enchance driver and vehicle comfort?

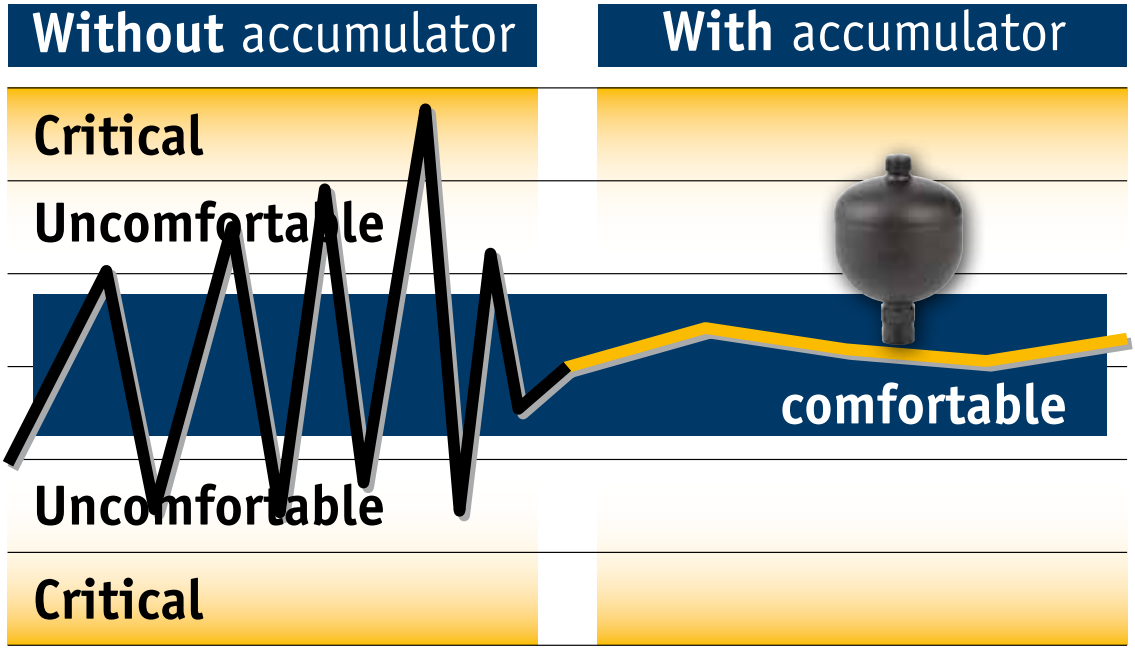
Thanks to our comprehensive range of diaphragm accumulators, we offer our customers flexibility of driving at record speeds while guaranteeing enhanced machinery longevity.

The accumulator offers the possibility of extending the range of use of your machine and tools.

Don't wait any longer; you can be a winner by standardizing OLAER diaphragm accumulator on your machines.

Comparative cycle for a tractor

and its accessories **in working conditions !**



*Study carried out in cooperation with one of the largest manufacturers of agricultural machinery

Speed 50 kph

Load variation on front axle **3,5 to 100 %**

An eloquent example*

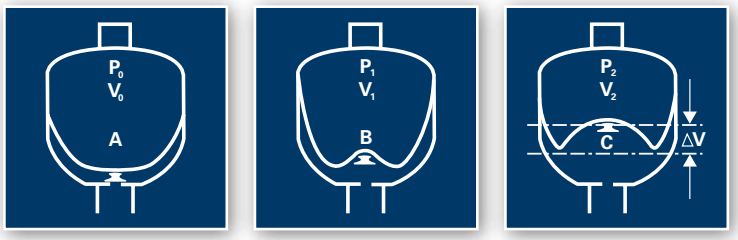
of application

Faced with difficult working conditions, a farm supervisor wants **to increase his driving comfort and reduce breakage** among his fleet of machines.

Main Features

Operating principle

Operation of the OLAER gas loaded diaphragm accumulator is based on the considerable difference in compressibility between a gas and a liquid, enabling a large quantity of energy to be stored in an extremely compact form. This enables a liquid under pressure to be accumulated, stored and recovered at any time.



V0 = Capacity in nitrogen of the accumulator
V1 = Gas volume at the minimum hydraulic pressure
V2 = Gas volume at the maximum hydraulic pressure
ΔV = Returned and/or stored volume between P1 and P2
P0 = Initial preload of the accumulator
P1 = Gas pressure at the minimum hydraulic pressure
P2 = Gas pressure at the maximum hydraulic pressure

A - The diaphragm is in the precharge position, which means that it is only filled with nitrogen. The knob closes the hydraulic orifice and prevents the destruction of the diaphragm.

B - Position at the minimum operating pressure : there must be a certain amount of fluid between the diaphragm and the hydraulic orifice, such that the knob does not close the hydraulic orifice. Thus, P0 must always be < P1.

C - Position at the maximum operating pressure: the volume change Delta V between the minimum and maximum positions of the operating pressures represents the fluid quantity stored.

Your Benefits

The adaptation of a hydraulic shock absorber made up of a diaphragm accumulator improves driver comfort and offers immediate response times when driving over obstacles and the same flexibility for variable operating conditions.
0 < speed < 50 kph
3.5 < load variation < 100%
Identical flexibility depending on your use.

The same EC pressure directive (PED) compliant accumulator can be used in over 35 destination countries, thus facilitating
their free movement.

Technical Characteristics

The technical characteristics are as follows:

Minimum/maximum temperature allowable (° Celsius) :
- 10/+80 for standard nitrile elastomers
- 35/+80 for hydrin elastomers

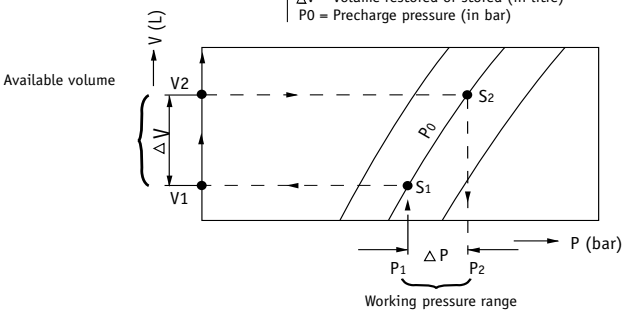
Materials : steel casing, nitrile diaphragm or bladder depending on model, for other constructions:
consult OLAER.

How to size?

Olaer has developed a very sophisticated simulation software to optimize accumulator sizing recommendations. The behaviour of accumulators used in applications such as pulsation dampening, surge alleviation, thermal expansion and energy storage can be simulated. Our software is available on CD-Rom and can be downloaded from our website. You may also contact your local Olaer office for sizing assistance

Using the abacus

P2 = Maximum operating pressure (in bar)
P1 = Minimum operating pressure (in bar)
ΔV = Volume restored or stored (in litre)
P0 = Precharge pressure (in bar)



This abacus can be used, on the basis of the arrangement of the various parameters, to determine the volume of oil available, the size of the accumulator or the pressures. It does not take account of the correction for actual compressibility of the real gas, the actual adiabatic coefficient or the polytropic coefficient of the application. Depending on the conditions of use, these can have a significant effect and may entail the need for certain corrections.

We recommend

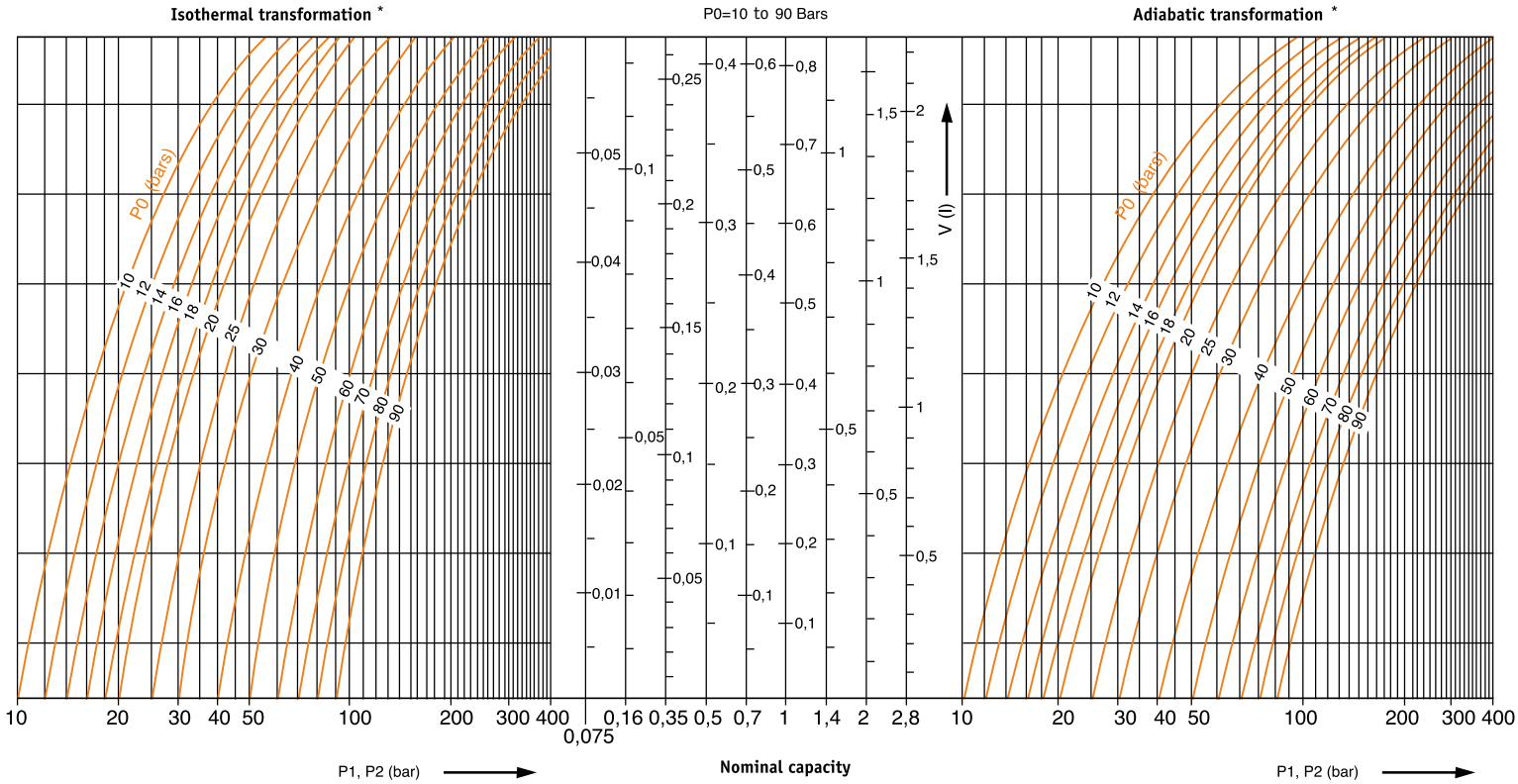
In load dampening configuration :
P0 = 0,6 à 0,9 Pm
(Pm = average working pressure)
Pulsation dampening :
P0 = 0,6 à 0,8 Pm
(Pm = average working pressure)
Energy storage :
P0 = 0,9 P1
(P1 = minimum working pressure)

*Reminder

Isothermal: The transformation is said to be isothermal when the compression or expansion of the gas occurs at a rate slow enough to allow a good thermal exchange, allowing the gas to remain at constant temperature.

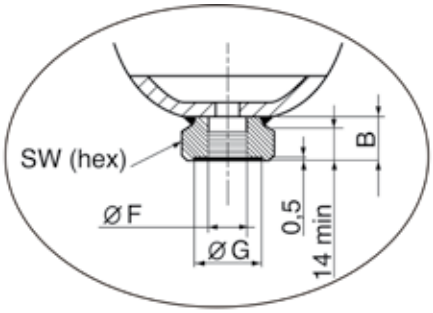
Adiabatic: The transformation is said to be adiabatic when the cycle is quick and does not allow a temperature exchange with the ambient media.

Energy storage calculation abacus

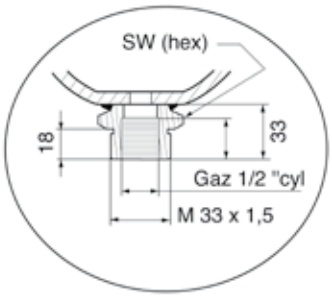


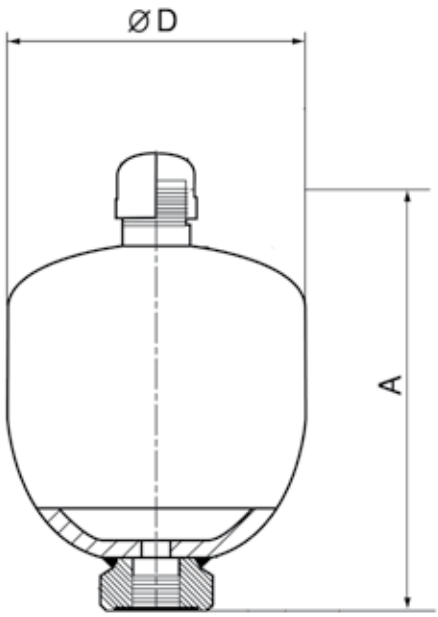
Technical Characteristics

Form A



Form C

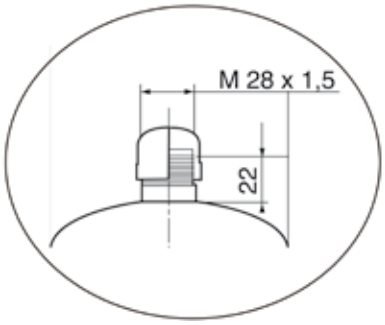




Other connection on request.

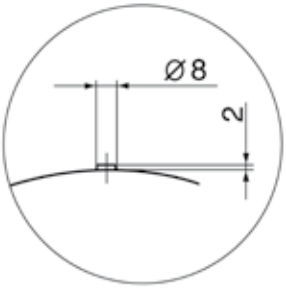
F standard execution

Nitrogen rechargeable



G execution at request

Nitrogen pre-charged in factory



Type	Execution Form	Volume V0 in liters	Max pressure in bar	Max precharge in bar	Max Compression ratio P2/P0	Max Pressure amplitude P2 - P1	Weight in kg	A	B	SW	D	G	Oilport		Clamp type	Lock-nut type
													F	H		
ELM 0.075-250/00/AF	AF	0.075	250	130	8	210	0.7	111	20	32	64	29	G½	-	-	-
ELM 0.16-250/00/AF	AF	0.16	250	130	6	210	1	120	20	32	75	29	G½	-	-	-
ELM 0.32-210/00/AF	AF	0.32	210	130	8	140	1.4	134	20	32	93	29	G½	-	E95	-
ELM 0.50-210/00/AF	AF	0.50	210	130	8	175	2	152	22	41	106	34	G½	-	E106	-
ELM 0.50-210/00/CF	CF	0.50	210	130	8	175	2	163	33	41	106	-	G½	M33x1.5	E106	M33
ELM 0.75-160/00/CF*	CF	0.75	160	130	8	120	2.6	176	33	41	121	-	G½	-	E114	-
ELM 0.75-210/00/AF	AF	0.75	210	130	8	175	2.6	166	22	41	122	34	G½	-	E114	-
ELM 0.75-210/00/CF	CF	0.75	210	130	8	175	2.6	177	33	41	122	-	G½	M33x1.5	E114	M33
ELM 0.75-350/00/AF	AF	0.75	350	130	8	150	4.4	168	18	41	133	34	G½	-	E136	-
ELM 0.75-350/00/CF	CF	0.75	350	130	8	150	4.5	189	18	41	133	-	G½	M33x1.5	E136	M33
ELM 1-210/00/AF	AF	1	210	130	8	170	3.5	180	22	41	136	34	G½	-	E136	-
ELM 1-210/00/CF	CF	1	210	130	8	170	3.5	191	33	41	136	-	G½	M33x1.5	E136	M33
ELM 1.4-210/90/AF	AF	1.4	210	130	8	120	4.2	191	22	41	148	34	G½	-	E155	-
ELM 1.4-210/90/CF	CF	1.4	210	130	8	120	4.2	202	33	41	148	-	G½	M33x1.5	E155	M33
ELM 1.4-350/90/AF	AF	1.4	350	130	8	150	7.4	199	20	41	160	34	G½	-	E155	-
ELM 1.4-350/90/CF	CF	1.4	350	130	8	150	7.5	220	20	41	160	-	G½	M33x1.5	E155	M33
ELM 2-100/90/AF	AF	2	100	90	8	80	3.5	240	22	41	144	34	G½	-	E155	-
ELM 2-250/90/AF	AF	2	250	130	8	140	7.5	251	22	41	155	33	G¾	-	E155	-
ELM 2-350/90/AF	AF	2	350	130	8	200	11.3	219	22	55	180	34	G¾	-	E180	-
ELM 2-350/90/CF	CF	2	350	130	8	200	11.5	240	22	55	180	-	G¾	M45x1.5	E180	M45
ELM 2.8-250/90/AF	AF	2.8	250	130	6	140	10	268	21	41	174	34	G¾	-	E180	-
ELM 2.8-350/90/AF	AF	2.8	350	130	6	200	14.3	264	21	55	180	34	G¾	-	E180	-
ELM 2.8-350/90/CF	CF	2.8	350	130	6	200	14.5	285	21	55	180	-	G¾	M45x1.5	E180	M45
ELM 3.5-250/90/AF	AF	3.5	250	130	4	140	11	307	21	41	174	33	G¾	-	E180	-
ELM 3.5-350/90/AF	AF	3.5	350	130	4	200	16	304	21	55	180	34	G¾	-	E180	-
ELM 3.5-350/90/CF	CF	3.5	350	130	4	200	16.5	325	21	55	180	-	G¾	M45x1.5	E180	M45

Range conform to EC Directive (PED) fluids group 2.

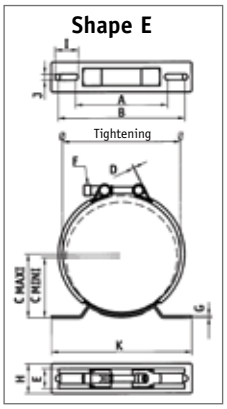
** Stainless Steel Version*

Above dimensions are in mm and are subject to manufacturing tolerances.

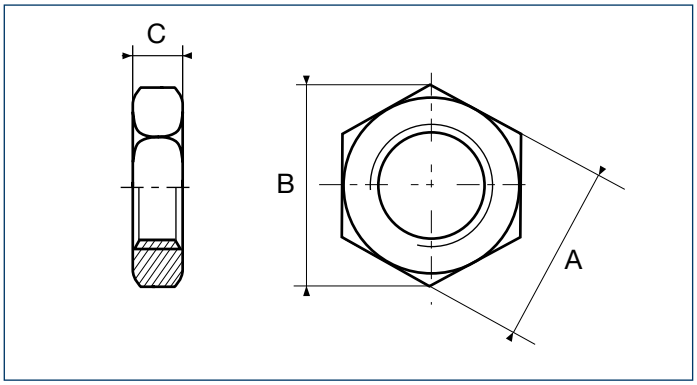
Accessories

CLAMPS

Type	Form	Recommended min/max diameter	Dimensions in mm												Recommended tightening torque N.m.
			A	B	C Min	C Max	D	E	F	G	H	I	J	K	
E95	E	87/97	88	140	61.5	66.5	1.5	28	M8x75	3	40	35	9	210	7
E106	E	99/109	88	140	68	73	1.5	28	M8x75	3	40	35	9	210	7
E114	E	112/124	88	140	73	78	1.5	28	M8x75	3	40	35	9	210	7
E136	E	128/138	88	140	80	85	1.5	28	M8x75	3	40	35	9	210	7
E155	E	146/157	137	189	81	86.5	1.7	30	M10x80	3	45	35	9	210	10.5
E168	E	166/176	137	189	92	96	1.7	30	M10x80	3	45	35	9	210	10.5
E180	E	178/184	137	189	97	100	2	35	M10x80	4	65	35	9	210	10.5



LOCK-NUT



Type	Pitch	A	B	C
M33	1.5	50	57.5	10
M45	1.5	70	80.8	10

These accessories are designed so that the accumulator can be securely attached in all configurations.

Above dimensions are in mm and are subject to manufacturing tolerances.

Accessories

Charging sets are used to inflate, check, top-up or vent the nitrogen gas precharge in all accumulators. They are to be screwed to the gas valve or bladder stem and connected to the gas regulator that fits the Nitrogen bottles. They are supplied in a plastic case.

MODEL VGU

Universal charging set fits most of the hydraulic accumulators available on the market.
Maximum working pressure: limited by the maximum operating pressure of the installed pressure limited to 400 bar in any case.

The standard set is delivered in a storage case containing the following:
VGU universal tester and pressurizer (end M28x1.50)

- Pressure gauge kit from 0 to 25 bar
- Pressure gauge kit from 0 to 250 bar
- Connection adapters for inflation valves (7/8" – 5/8" – 8V1 - M28x1.50)
- High pressure hose, 2.5 m long, for connecting to a nitrogen source
- Hexagon socket screw key 6mm
- Seal Kit
- Operating instruction in French, English, German

Note:

The following options are available on request: Pressure gauge kits with different scale divisions: 63mm with glycerol filled back end G1/4" cyl. equiped with coupling for Minimess connection. Scale divisions 0-10, 0-60, 0-100, 0-400, with accuracy class 1.6%.
High pressure hose of different length with adapters for nitrogen bottles from various countries (specify country), at each end with a female swivel coupling G1/4" for connecting to the inflation port

Safety Blocks

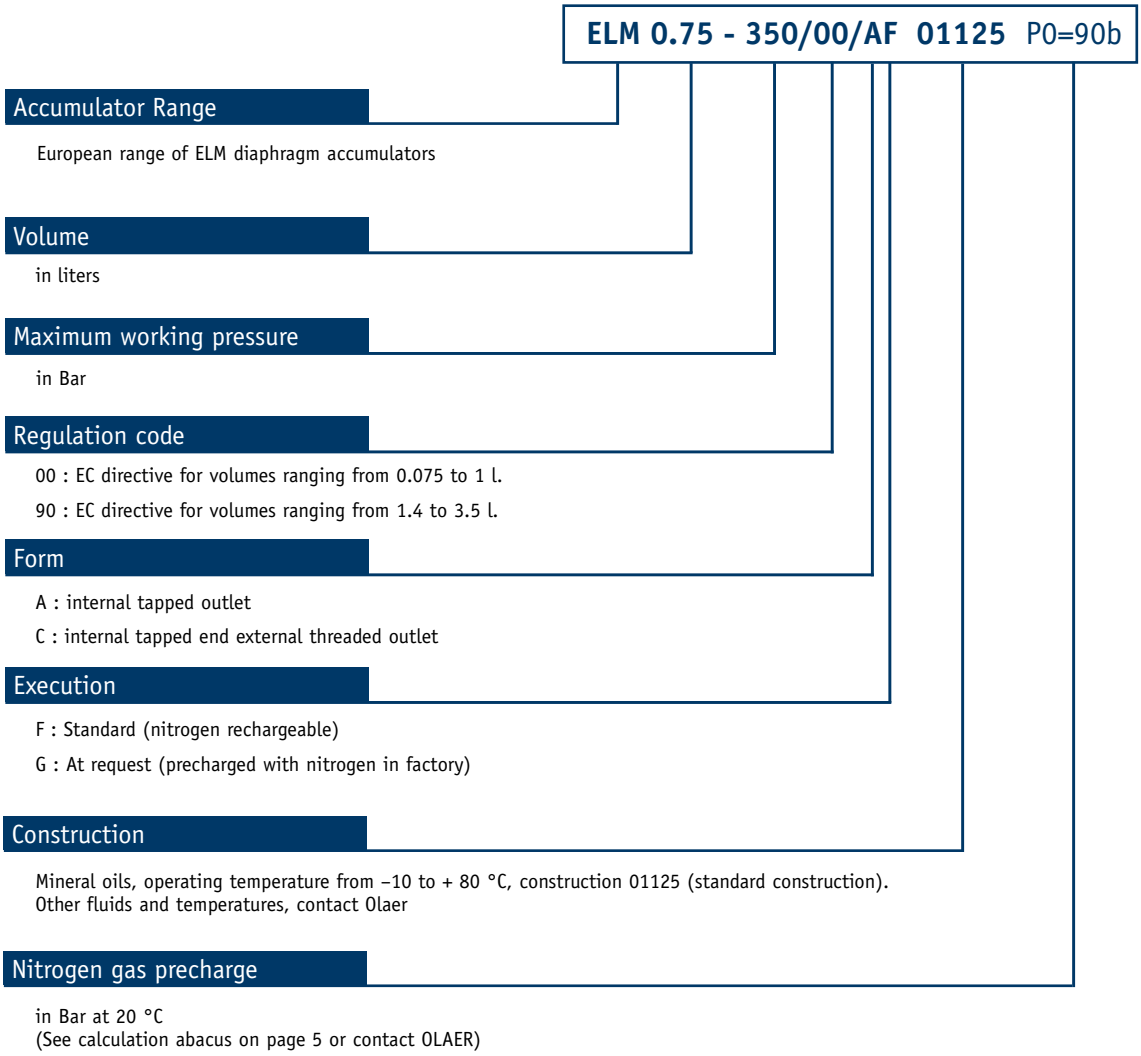
Are designed to incorporate in a single compact block a variety of functions necessary for the correct operation of a hydraulic system fitted with accumulators. This includes manual and/or electrical drain, isolation, flow control and pressure relief.
Channel cross section : 10 mm (DI 10 block), 16 mm (DI 16 block), 20 mm (DI 20 block), 24 mm (DI 24 block), 32 mm (DI 32 block).
Maximum working pressure : 330 to 690 Bar depending on models.
According with the fluids of group 2 (PED). Options for ATEX compliant blocks construction carbon steel or stainless steel.
A specific data sheet is available on request, please contact OLAER.

Function Blocks

Olaer has a broad range of function blocks adapted to your specific use.
Contact OLAER for further information.

How to order?

ORDERING AN ACCUMULATOR



ORDERING AN ACCUMULATOR

Please indicate type for accessories as per tables on page 7, and for peripheral materials on pages 8.

Installation

Position: Preferably vertical (liquid connection downwards) to horizontal, depending upon application. If the accumulator is installed in any position other that vertical with fluid port down, contact Olaer. The accumulator could have reduced volumetric efficiency and Olaer can help you to take these factors into account.

Mounting: A 200mm clearance is required above the accumulator to allow for gas charging. Each accumulator is delivered with a user instructions leaflet. Ensure that the pipes connected directly or indirectly to the accumulator are not subjected to any abnormal force, Ensure that the accumulator cannot move, or minimize any movement that may occur as a result of broken connections. Olaer clamps and brackets are designed for this purpose (and can be supplied as optional extras). The accumulator must not be subjected to any stress or load, in particular from the structure with which it is associated. Contact Olaer in case of mounting on movable structures.

IT IS STRICTLY FORBIDDEN TO

- Weld, screw or rivet anything onto the accumulator body.
- Operate in any way that may alter the mechanical properties of the accumulator.
- Use the accumulator for construction purposes. (No stress or loading)
- To modify the accumulator without prior approval from the manufacturer.

GAS FILLING

For safety reasons, use only pure nitrogen, minimum 99.8% purity. In most of the cases the pre-charge pressure is between 0,9 P1 and 0,25 P2. Your local Olaer office can calculate the correct pre-charge pressure for your application. Olaer offers a range of devices for checking nitrogen pressure as well as pre-charging accumulators. *Please note that various adaptors are required to interface with different accumulator filling valves and nitrogen (N2) cylinder connections throughout the world.*

The part number defines the accumulator and the material construction. Information contained on the labeling/ manufacturer's plate:

- Olaer logo
- Reference Olaer
- Volume
- Max. allowable working Pressure (PS)
- Working temperature range (TS)
- OLAER SELO Identification
- Test pressure (PT)
- Fluid group (1 or 2 according to the PED Directive 97/23/EC)
- Gas
- Precharge pressure
- Serial production n°
- Olaer Warning Label

Maximum allowable operating pressure

The maximum pressure (PS) is indicated on the accumulator. Check that the maximum allowable pressure is greater than that of the hydraulic system. For any other pressure, you will have to contact Olaer.

Maximum allowable operating temperature

The temperature range (TS) is indicated on the accumulator. Check that the allowable temperature range covers the operating temperatures (environment and hydraulic fluid temperatures). For any other temperature, you will have to contact Olaer.

Maintenance

Any intervention, maintenance, repair must be carried out by a qualified and trained personnel.

ELM

Diaphragm Accumulator

- in Fluid Energy Management

Global perspective

and local entrepreneurial flair

Olaer is a global player specialising in innovative, efficient system solutions for temperature optimisation and energy storage. Olaer develops, manufactures and markets products and systems for a number of different sectors, e.g. the aircraft, engineering, steel and mining industries, as well as for sectors such as oil and gas, contracting and transport, farming and forestry, renewable energy, etc.

All over the world, our products operate in the most diverse environments and applications. One constantly repeated demand in the market is for optimal energy storage and temperature optimisation. We work at a local level with a whole world as our workplace – local entrepreneurial flair and a global perspective go hand in hand.

Our local presence, long experience and a wealth of knowledge combine with our cutting-edge expertise to give you the best possible conditions for making a professional choice.