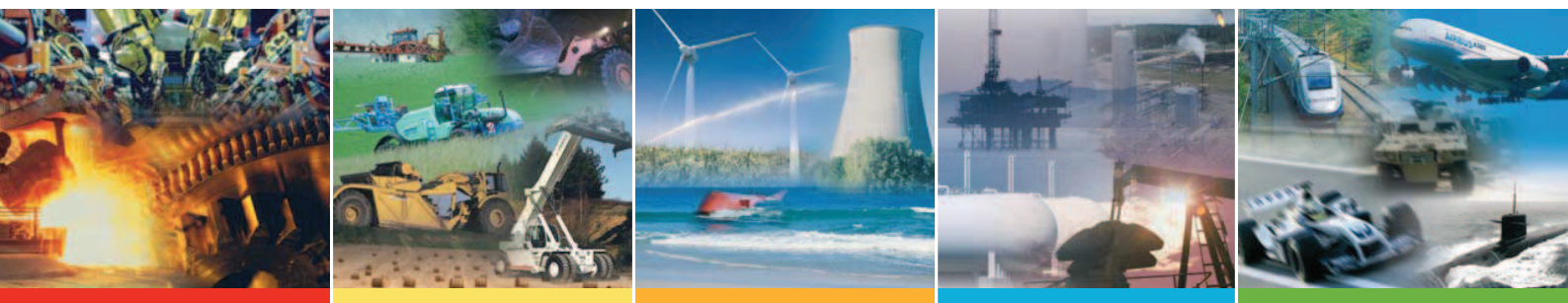




Accumulator

High-pressure diaphragm accumulator
conforming to EC regulations

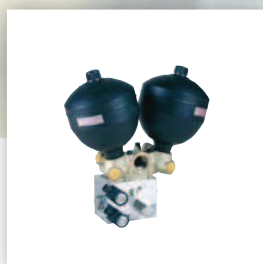
ELM Series



The Professional Choice



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



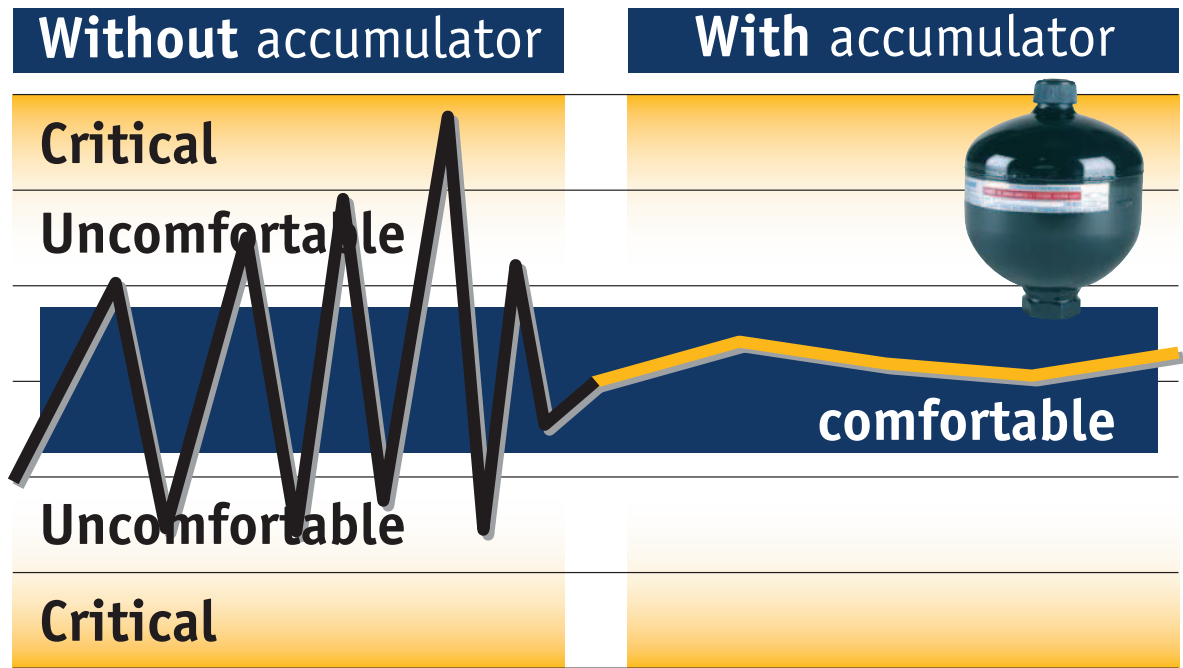
How to enhance **driver** and **vehicle comfort** ?

Thanks to our comprehensive range of diaphragm accumulators, we offer our customers flexibility of driving and 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 the EC regulation compliant 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 from 3,5 à 100 %

An eloquent example*

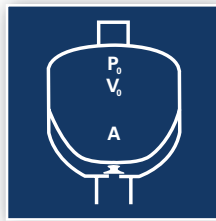
of application

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

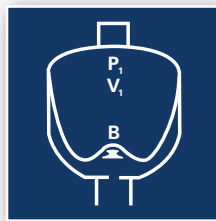
OPERATING PRINCIPLE

Due to the compressibility of the gas, nitrogen, the diaphragm accumulator enables to store, stock and return a liquid under pressure.

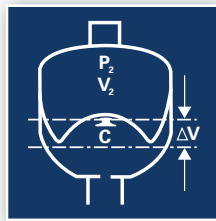
- V0** = Capacity in nitrogen of the accumulator
- V1** = Gas volume at the minimum hydraulic pressure
- V2** = Gas volume at the maximum hydraulic pressure
- ΔV** = Returned and/or stored volume between P1 and P2
- P0** = Initial preload of the accumulator
- P1** = Gas pressure at the minimum hydraulic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

THE BENEFITS FOR YOU

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 regulation compliant accumulator can be used in over 35 destination countries, thus facilitating their free movement.

TECHNICAL CHARACTERISTICS

The technical characteristics are as follows:

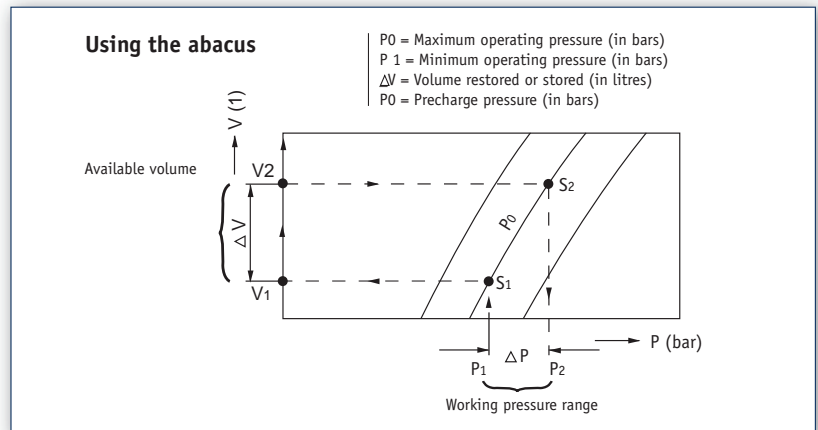
Minimum/maximum temperature allowable (° Celsius) : - 10/+80

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



Calculations

Olaer has developed highly advanced calculation software applications designed to simulate the operation of accumulators in terms of water hammer arresting, pulsation dampening, thermal expansion, and energy storage. These software applications are available on CD-ROM and on our website: www.olaer.com.



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

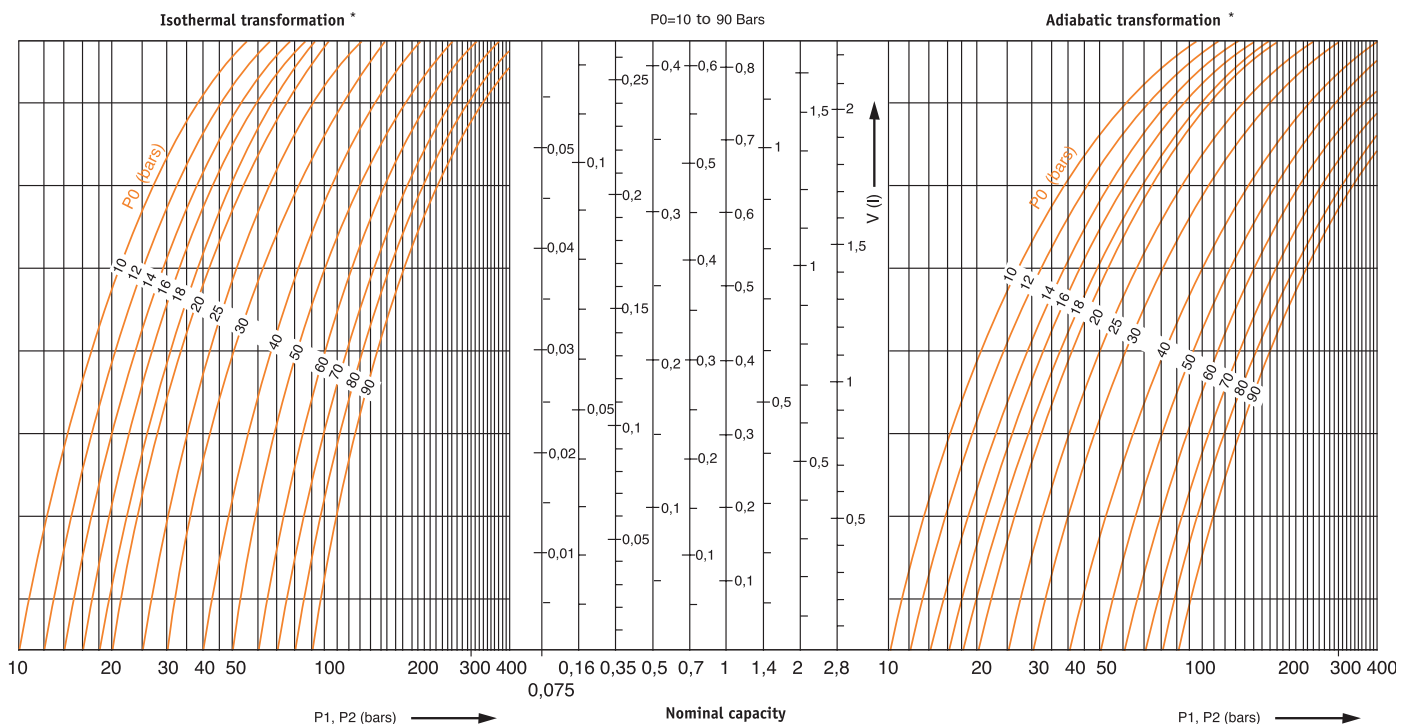
In load dampening configuration :
 $P_0 = 0,6 \text{ à } 0,9 P_m$
 (P_m = average working pressure)
 Pulsation dampening :
 $P_0 = 0,6 \text{ à } 0,8 P_m$
 (P_m = average working pressure)
 Energy storage :
 $P_0 = 0,9 P_1$
 (P_1 = minimum working pressure)

***REMINDER**

Isothermal : The conversion is referred to as isothermal when the compression or expansion of the gas occurs slowly to allow for heat exchange so as to maintain a constant temperature

Adiabatic : The conversion is referred to as adiabatic when the compression or expansion occurs rapidly without exchange of heat with the ambient surroundings.

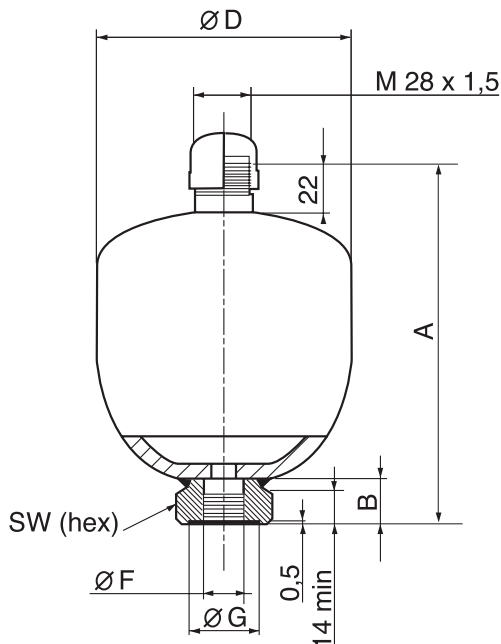
ENERGY STORAGE CALCULATION ABACUS



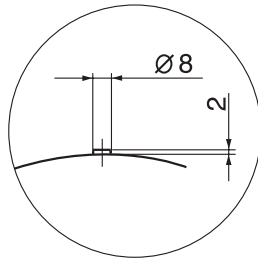
Technical characteristics

Form A

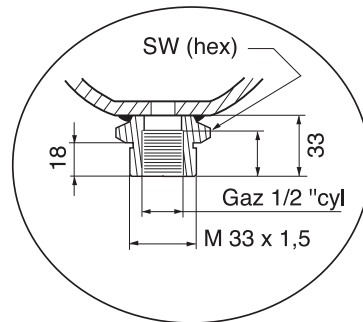
Standart F execution
nitrogen rechargeable



G execution at request
nitrogen pre-charged in factory



Form C



Other connection
at request

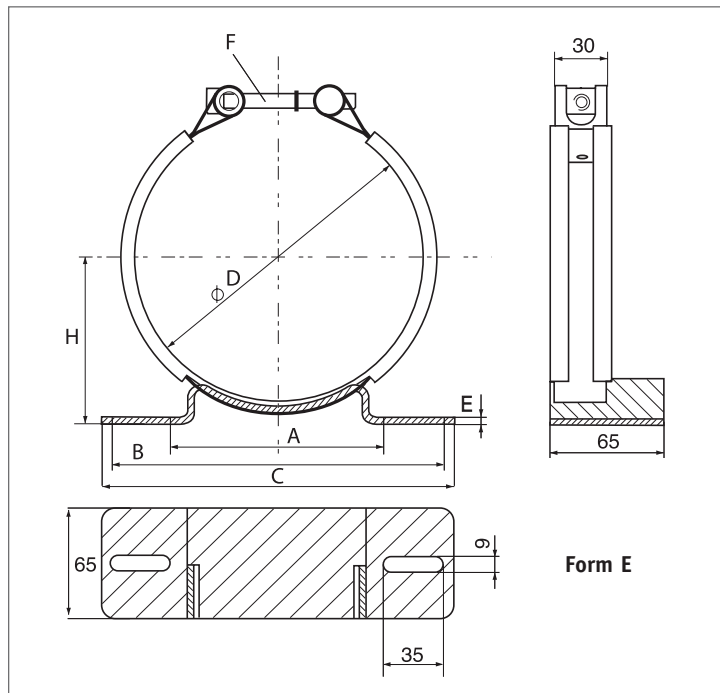
| Designation | Execution Form | Volume V0 in litres | Max pressure in bar | Max precharge pressure in bar | Compression ratio P max / P0 | Pressure amplitude P max / P mini | Weight in kg | A | B | SW | D | G | Oilport | | Clamp designation | Lock-nut designation |
|---------------------|----------------|---------------------|---------------------|-------------------------------|------------------------------|-----------------------------------|--------------|-----|----|----|-----|----|---------|---------|-------------------|----------------------|
| | | | | | | | | | | | | | F | H | | |
| ELM 0.075-250/00/AF | AF | 0,075 | 250 | 130 | 8 | 210 | 0,7 | 111 | 20 | 32 | 64 | 29 | G 1/2 | - | - | - |
| ELM 0.16-250/00/AF | AF | 0,16 | 250 | 130 | 6 | 210 | 1 | 120 | 20 | 32 | 75 | 29 | G 1/2 | - | - | - |
| ELM 0.32-210/00/AF | AF | 0,32 | 210 | 130 | 8 | 140 | 1,4 | 134 | 20 | 32 | 93 | 29 | G 1/2 | - | E95 | - |
| ELM 0.50-210/00/AF | AF | 0,50 | 210 | 130 | 8 | 175 | 2 | 152 | 22 | 41 | 106 | 34 | G 1/2 | - | E106 | - |
| ELM 0.50-210/00/CF | CF | 0,50 | 210 | 130 | 8 | 175 | 2 | 163 | 33 | 41 | 106 | - | G 1/2 | M33x1,5 | E106 | M33 |
| ELM 0.75-160/00/CF* | CF | 0,75 | 160 | 130 | 8 | 120 | 2,6 | 176 | 33 | 41 | 121 | - | G 1/2 | - | E124 | - |
| ELM 0.75-210/00/AF | AF | 0,75 | 210 | 130 | 8 | 175 | 2,6 | 166 | 22 | 41 | 122 | 34 | G 1/2 | - | E124 | - |
| ELM 0.75-210/00/CF | CF | 0,75 | 210 | 130 | 8 | 175 | 2,6 | 177 | 33 | 41 | 122 | - | G 1/2 | M33x1,5 | E124 | M33 |
| ELM 0.75-350/00/AF | AF | 0,75 | 350 | 130 | 8 | 150 | 4,4 | 168 | 18 | 41 | 133 | 34 | G 1/2 | - | E136 | - |
| ELM 0.75-350/00/CF | CF | 0,75 | 350 | 130 | 8 | 150 | 4,5 | 189 | 18 | 41 | 133 | - | G 1/2 | M33x1,5 | E136 | M33 |
| ELM 1-210/00/AF | AF | 1 | 210 | 130 | 8 | 170 | 3,5 | 180 | 22 | 41 | 136 | 34 | G 1/2 | - | E136 | - |
| ELM 1-210/00/CF | CF | 1 | 210 | 130 | 8 | 170 | 3,5 | 191 | 33 | 41 | 136 | - | G 1/2 | M33x1,5 | E136 | M33 |
| ELM 1.4-210/90/AF | AF | 1,4 | 210 | 130 | 8 | 120 | 4,2 | 191 | 22 | 41 | 148 | 34 | G 1/2 | - | E147 | - |
| ELM 1.4-210/90/CF | CF | 1,4 | 210 | 130 | 8 | 120 | 4,2 | 202 | 33 | 41 | 148 | - | G 1/2 | M33x1,5 | E147 | M33 |
| ELM 1.4-350/90/AF | AF | 1,4 | 350 | 130 | 8 | 150 | 7,4 | 199 | 20 | 41 | 160 | 34 | G 1/2 | - | - | - |
| ELM 1.4-350/90/CF | CF | 1,4 | 350 | 130 | 8 | 150 | 7,5 | 220 | 20 | 41 | 160 | - | G 1/2 | M33x1,5 | - | M33 |
| ELM 2-100/90/AF | AF | 2 | 100 | 100 | 8 | 80 | 3,5 | 240 | 22 | 41 | 144 | 34 | G 1/2 | - | E147 | - |
| ELM 2-250/90/AF | AF | 2 | 250 | 130 | 8 | 140 | 7,5 | 251 | 22 | 41 | 155 | 33 | G 3/4 | - | E155 | - |
| ELM 2-350/90/AF | AF | 2 | 350 | 130 | 8 | 200 | 11,3 | 219 | 22 | 55 | 180 | 34 | G 3/4 | - | E180 | - |
| ELM 2-350/90/CF | CF | 2 | 350 | 130 | 8 | 200 | 11,5 | 240 | 22 | 55 | 180 | - | G 3/4 | M45x1,5 | E180 | M45 |
| ELM 2.8-250/90/AF | AF | 2,8 | 250 | 130 | 6 | 140 | 10 | 268 | 21 | 41 | 174 | 34 | G 3/4 | - | E174 | - |
| ELM 2.8-350/90/AF | AF | 2,8 | 350 | 130 | 6 | 200 | 14,3 | 264 | 21 | 55 | 180 | 34 | G 3/4 | - | E180 | - |
| ELM 2.8-350/90/CF | CF | 2,8 | 350 | 130 | 6 | 200 | 14,5 | 285 | 21 | 55 | 180 | - | G 3/4 | M45x1,5 | E180 | M45 |
| ELM 3.5-250/90/AF | AF | 3,5 | 250 | 130 | 4 | 140 | 11 | 307 | 21 | 41 | 174 | 33 | G 3/4 | - | E174 | - |
| ELM 3.5-350/90/AF | AF | 3,5 | 350 | 130 | 4 | 200 | 16 | 304 | 21 | 55 | 180 | 34 | G 3/4 | - | E180 | - |
| ELM 3.5-350/90/CF | CF | 3,5 | 350 | 130 | 4 | 200 | 16,5 | 325 | 21 | 55 | 180 | - | G 3/4 | M45x1,5 | E180 | M45 |

Range conform to EC standart group 2
* Stainless stell version



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

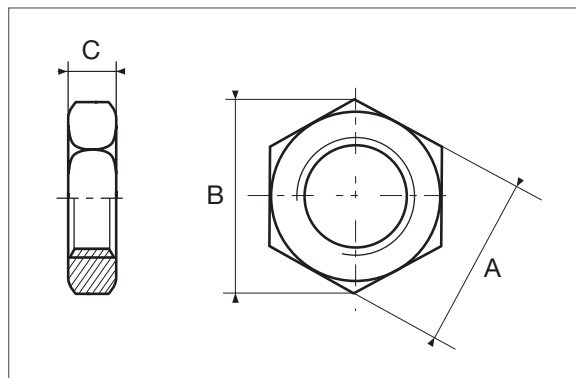
Clamp



| Designation | Holding diameter mini - maxi | A | B | C | D | E | H | MxL |
|-------------|------------------------------|-----|-----|-----|-----|---|-------|---------|
| E95 | 93 à 97 | 78 | 148 | 160 | 95 | 3 | 66,5 | M10x65 |
| E106 | 104 à 108 | 78 | 148 | 160 | 106 | 3 | 72 | M10x65 |
| E124 | 121 à 125 | 78 | 148 | 160 | 121 | 3 | 77,5 | M10x65 |
| E136 | 130 à 136 | 78 | 148 | 160 | 136 | 3 | 83,5 | M10x80 |
| E147 | 143 à 149 | 78 | 148 | 160 | 149 | 3 | 90 | M10x80 |
| E155 | 153 à 157 | 128 | 198 | 210 | 155 | 4 | 90,7 | M10x80 |
| E174 | 171 à 177 | 128 | 198 | 210 | 174 | 4 | 100,7 | M10x100 |
| E180 | 178 à 184 | 128 | 198 | 210 | 180 | 4 | 105 | M10x80 |

Range conforms to EC standard group 2

Lock-nut



| Designation | Pitch | A | B | C |
|-------------|-------|----|------|----|
| M 33 | 1,5 | 50 | 57,5 | 10 |
| M 45 | 1,5 | 70 | 80,8 | 10 |



CHARGING AND GAUGING ASSEMBLY

Suitable for use with all accumulators, the charging and gauging assembly is designed to check, fill and bleed nitrogen. It is screwed onto the filling valve, and connected via a hose to the pressure regulator valve fitted onto the nitrogen source.

VGU MODEL

The universal charging and gauging assembly (VGU) is designed for use with all accumulators on the market

Technical characteristic

Maximum operating pressure : 340 bars

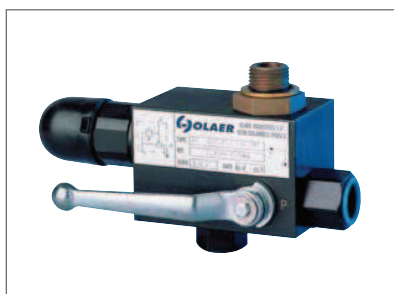
How to order ?

Example:

VGU/F 25/250 7 TS2 3 25/250 = possible choice of pressure gauges depending on the pressure ranges 6/10/25/60/100/160/250/400

Optional, at request

Adapters for foreign nitrogen cylinders, specify the country
Hoses of different lengths
Connection for specific filling valve.



ISOLATION AND DECOMPRESSION BLOCKS

These appliances are designed to bring together, on a single compact block, all the components necessary for the operation of a hydraulic installation fitted with hydro-pneumatic accumulators.

The functions they perform include manual and/or electric decompression, isolation, flow regulation and pressure limitation.

Various nominal passage diameters: 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 operating pressure from 330 to 550 bars depending on the model. **Contact us at Olaer** for our documentation and selection program.



FUNCTION BLOCKS

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

How to order ?

ELM



ORDERING ACCUMULATOR

ELM 0,75 - 350/00/AF 01125 P0=90b

Accumulator series _____

European range of ELM diaphragm accumulators

Volume _____

in litres

Maximum operating pressure _____

in bar

Regulation code _____

00 : EC regulations for volumes ranging from 0.075 to 1 l.

90 : EC regulations for volumes ranging from 1.4 to 3.5 l.

Form _____

A : internal tapped outlet

C : internal tapped end external threaded outlet

Execution _____

F : Standard (nitrogen rechargeable)

G : At request (precharged with nitrogen in factory)

Construction _____

Mineral oils, operating temperature from -10 to + 80 °C, construction 01125 (standard construction).

Other fluids and temperatures, **contact Olaer**

Nitrogen precharge pressure _____

in bar at 20° C

(See calculation abacus on page 5 or contact the Olaer Group technical departments)

ORDERING ACCESSORIES AND PERIPHERALS

Indicate the designation of the accessories mentioned in the tables on page 7 and peripherals on page 8.



Before installing the accumulator, it is essential to perform a visual inspection to detect any damage. For optimum operation, the accumulator should be placed as closely as possible to the operating device or to be protected. The ELM can be mounted vertically, feeling valve at the top, or horizontally.

- Do not stand in front of the openings
- Keep an eye on the environmental conditions and, if need be, protect the accumulator from sources of heat, electrical fields, magnetic fields, lightning, humidity and the bad weather
- Leave a space of 200 mm above the filling valve for connecting it to the gauging and charging assembly
- Preserve accessibility with the bleed hole
- Ensure that the markings are visible
- Install it in a manner that ensures that the pipes directly or indirectly attached to it are not subject to any abnormal stress
- Place the body of the accumulator on a support or surround it by a guard capable of preventing it from moving or of limiting its movement.
- Connect the accumulator to the hydraulic circuit by means of the appropriate connecting devices, such as unions and flanges
- Make sure that the fluid is compatible with the equipment
- Make sure that the maximum allowable pressure of the accumulator is equal to or greater than that of the hydraulic circuit
- Ensure that the temperature and pressure limits are complied
- Fit the hydraulic circuit with a pressure limiting system
- If necessary, make provision for a rupture disk or relief valve to cover the risk of excess pressure linked to thermodynamic phenomena
- To envisage a filter on the hydraulic system and/or to carry out inspections intern as frequent as necessary in the employment case of an abrasive fluid.

IT IS STRICTLY FORBIDDEN TO

- Weld, rivet or screw any part onto the accumulator
- Carry out any operation which could affect the mechanical properties of the accumulator
- Use the accumulator as a construction part: it should not support any constraint or load
- Modify the accumulator without the prior agreement of the manufacturer.

COMMISSIONING

For commissioning, see the instructions delivered with the accumulator.

EC regulation

Extract from European legislation.
Directive 97/23/ EC is applicable from
29-11-1999 and mandatory from 29-05-2002.

WHAT YOU NEED TO KNOW

Decree 99-1046, which applies to new machinery and the ministerial order of 15-03-2000, which applies to the operation of all machinery, transposed the directive into French domestic legislation.

- **Free movement of machinery within the European Union.**
- **Group 2 fluid accumulators whose $V \leq 1$ L and $PS \leq 1000$ bar are not entitled to bear EC marking.**
- **The EC marking should be accompanied by the identification number of the notified authority.**

EC type accumulators are delivered with **instructions for operation** and a **declaration of conformity**.

Other designs and manufactures hydro-pneumatic accumulators for use in all countries and which comply with national regulations in force as ASME / selo...

Acting in accordance with the procedure laid down in Article 189b of the Treaty⁽¹⁾, in the light of the joint text approved by the Conciliation Committee on 4 February 1997,

1. Whereas the internal market is an area without internal frontiers in which the free movement of goods, persons, services and capital is ensured;
2. Whereas there are differences in the content and scope of the laws, regulations and administrative provisions in force in the Member States with regard to the safety and protection of health of persons and, where appropriate, domestic animals or property, where pressure equipment not covered by present Community legislation is concerned; whereas the certification and inspection procedures for such equipment differ from one Member State to another; whereas such disparities may well constitute barriers to trade within the Community;
3. Whereas the harmonization of national legislation is the only means of removing these barriers to free

⁽¹⁾ OJ No C 246, 9. 9. 1993, p. 1 and OJ No C 207, 27. 7. 1994, p. 2.

⁽²⁾ OJ No C 32, 19. 2. 1994, p. 10.

⁽³⁾ Opinion of the European Parliament of 19 April 1994 (OJ No C 128, 9. 5. 1994, p. 61), common position of the Council of 29 March 1994 (OJ No C 147, 21. 5. 1994, p. 1), Decision of the European Parliament of 17 July 1994 (OJ No C 243, 9. 9. 1994, p. 68), Council Decision of 17 April 1997.

4. Whereas it is more than due to provide any of Community equipment PS exceeding 0,3 bar;

5. Whereas this Directive relates also to assemblies composed of several pieces of pressure equipment assembled to constitute an integrated and functional whole; whereas these assemblies may range from simple assemblies such as pressure cookers to complex assemblies such as watertube boilers; whereas, if the manufacturer of an assembly intends it to be placed on the market and put into service as an assembly — and not in the form of its constituent non-assembled elements — that assembly must conform to this Directive; whereas, on the other hand, this Directive does not cover the assembly of pressure equipment on the site and under the responsibility of the user, as in the case of industrial installations;

6. Whereas this Directive harmonizes national provisions on hazards due to pressure; whereas the other hazards which this equipment may present accordingly may fall within the scope of other Directives dealing with such hazards; whereas, however, pressure equipment may be included among products covered by other Directives based on Article 100a of the Treaty; whereas the provisions laid down in some of those Directives deal with the hazard due to pressure; whereas those provisions are considered adequate to provide appropriate protection where the hazard due to pressure associated with such equipment remains

International Network

ELM

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www.rolton.edx.co.za

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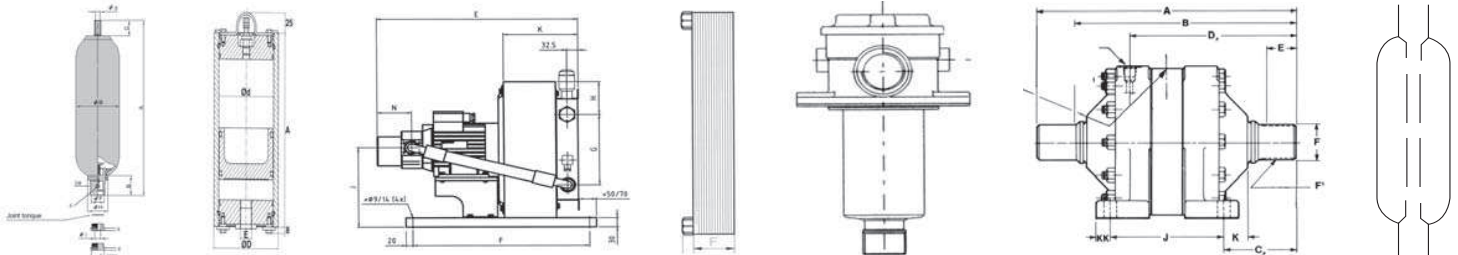
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