



OPERATOR'S MANUAL

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1. GENERAL

The aim of this manual, written in accordance with directive **2014/68/EU**, is to provide the necessary instructions for the safety, installation, use and maintenance, as well as the packaging, shipment and storage of the EPE hydropneumatic bladder accumulators, bearing the **CE** mark 0343 (Certifying authority code) produced for the European market.

In particular, it concerns the “High Pressure” Series, (see table 1) for **group 2** fluids (not dangerous), subject to the conformity assessment procedures in accordance with modules **H / H1**, as laid down in the European Directive for Pressurised equipment **2014/68/EU**.

The following are laid down for each type of accumulator:

- The calculation, static and fatigue strength report. No additional external loads (like wind, seismic etc) are considered during verification;
- A hydrostatic test at a pressure ≥ 1.43 PS (max. working pressure);
- Final hydraulic test on each accumulator to test sealing of the components. This test is equivalent to 4 times the precharging pressure (P_0) indicated by the end user, but not greater than the maximum working pressure (PS) stamped on the cylinder and, in any case no less than 120 bars. This pressure is equivalent to 4 times the standard storage precharging pressure and the accumulators to be provided with lower or even no precharge are also tested at this pressure.
- Internal inspection to be conducted when half the load cycles have been reached. The user is obliged to record the number of load cycles arising by suitable means. Thereafter next internal inspection shall be performed as per applicable national regulations.

Their safety is guaranteed not only by the quality of the design, construction and testing by the manufacturer of the accumulator but also by their correct use by the user who is obliged to **strictly follow the instructions given in this manual**.

These accumulators may not be used with group 1 fluids (dangerous or aggressive fluids), or for pressure or temperature different from those specified. Ensuring compatibility of the vessel and bladder / sealing elements with the working medium is the responsibility of the user.

Should the needs arise, we recommend you call our Marketing Department. Damage to things or injuries to persons caused by the failure to follow these instructions, **disperse the manufacturer from all liability**.

2. IDENTIFICATION DATA

Table 1

HIGH PRESSURE HYDRO-PNEUMATIC BLADDER ACCUMULATOR																			
- Only for group 2 fluids -																			
Type	AS-___ / ASL-___ / AST-___ / ASWP-___																		
	1.5	3	4	5	6	10	12	15	20	25	28	32	35	37	42	50	55	54	57
Max. allowable working pressure PS (bar)	30 ~ 360 [[based on material, design and construction]																		
Test Pressure PT (bar)	42.9 ~ 515 [1.43 times PS]																		
Permitted No. of Load Cycles & Range of pressure variation	> 2,000,000 at 70 Bar																		
Volume of nitrogen V (liters)	1.5	3	4	5	6	10	12	15	20	25	28	32	35	37	42	50	52	54.5	57
Dry mass M (kg) approx	Based on material, design & construction																		
Min./Max. allowable working and storage temperature TS (°C)	Standard : -20°C ~ +80°C. On request : -40°C ~ +80°C																		
Materials	Accumulator Body : Alloy and forged steel, 34CrMo4/SA372 CS SS316/SS316L																		
	Liquid Valve : Carbon Steel with KV > 27J													SS316/SS316L					
	Gas Valve : Carbon Steel with KV > 27J													SS316/SS316L					
	Bladder & Seals : Standard P (NBR). On request K (HNBR), B (IIR), E (EPDM), N (CR), Y (ECO), V (FKM) etc																		
Protective coatings	Standard body : RAL-5010 for CS Accumulators. Sand-Blasting for SS.																		
	Standard valves : Phosphated for CS Accumulators. Sand-Blasting for SS.																		
	Body on request : Nickle Plated or Stainless Steel																		
	Valves on request : Nickle Plated or Stainless Steel																		



3. ACCUMULATOR MARKINGS (name plate)

The name plate at the top of the accumulator (gas side) bears the following data:

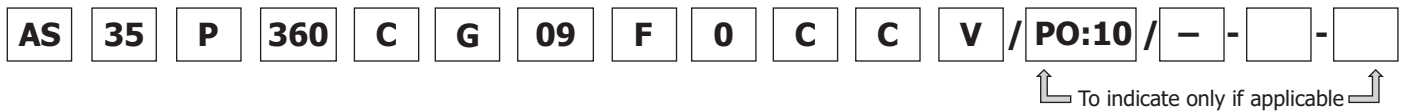
- The name, logo and contact details of the manufacturer.
- The CE mark with No.0343 of the Certifying Authority.
- Some essential safety requirements.
- The fluid group
- The manufacturing number / serial number of the accumulator.
- The minimum and maximum allowable temperatures TS (°C)
- The alphanumeric model code assigned to the accumulator.
- The precharging pressure Po in bar.
- The maximum allowable working pressure PS in bar.

The alphanumeric code (see table 2) uniquely defines:

- | | |
|---|------------------------------------|
| - The type / series of the accumulator | - The liquid connections |
| - The rated volume in liters | - The Final Tests |
| - The material of the bladder & the seals | - The material of the liquid valve |
| - The maximum allowable working pressure | - The material of the gas valve |
| - The material & coating of the body | - The Gas Fill valve connection |

3. CODIFICATION / ORDERING CODE : as per annexure hereto.

Table 2



Warning : Modifying or adding data to the markings without the manufacturer's authorization is prohibited.

4. SHIPMENT AND STORAGE METHODS

The accumulators are supplied with a nitrogen precharge pressure expressly specified by the customer. In cases where no indication has been given, they are supplied without any storage/precharge pressure. The precharge pressure is indicated on the name plate of the accumulator.

For shipment the accumulators are packed either in cartons or in boxes or on pallets. This package is suitable for storage at the warehouse but not for stacking during transportation.

On receipt make sure that the package and accumulators have not undergone damage during transportation. The goods must be handled with care so as to avoid knocking, above all, the gas valve and the name plate.

When stored they are to be kept in horizontal position in a cool and dry indoor environment.

Do not expose to flames or heat. The storage condition may affect the aging of the elastomers. In any case, the bladders and seals are to be replaced after 6 years.

5. INSTALLATION

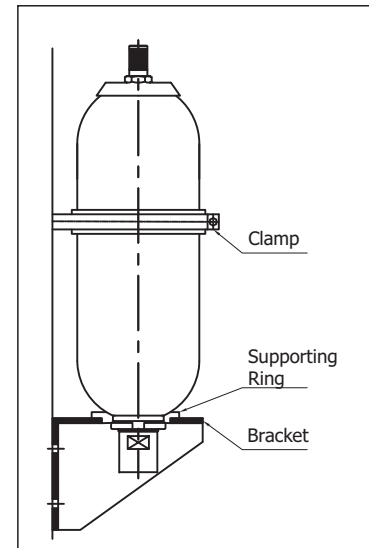
Before installation, it is indispensable to check that :

- **the assigned code and precharging pressure (Po)** indicated on the label correspond to the intended use.
- **the maximum working pressure (PT)** of the accumulator is equal to or greater than the maximum working pressure of the hydraulic circuit.
- **the working temperatures (TS)** lie within the limits indicated on the data plate.
- The accumulator is undamaged and is assembled **as close as possible** to the user to ensure optimum performance.

The position ranges from vertical, with the gas valve at the top (fig.1) to horizontal. **Installing with the gas valve at the bottom is strictly prohibited.** In addition, we recommend you :

- protect the accumulator against heat sources, electric and magnetic fields, lightning, damp and adverse weather conditions.
- leave a gap of about 200mm on the gas valve side, which is necessary to use the PC-type charging equipment (fig.2)
- leave the marking clearly visible - ensure easy access to the bleed screw.
- **do not** install the accumulator with the gas valve in a lower position than the liquid valve.
- Insert a check valve between the pump and the accumulator.
- assemble a safety block to isolate the accumulator from the pressurized pipe and set it to bleed, if necessary. We recommend using EPE accumulator safety block type B.
- use the bracket and clamp (fig.1) to ensure correct assembly.
- set the accumulator in a vertical position (fig.1) to enhance its performance and the reduce wear of the bladder to a minimum.

Fig.1



IMPORTANT ! Welding supports and /or performing any other operation on the accumulator that may affect its mechanical properties is strictly prohibited.

The connection to the liquid valve, directly or via a reduction or flange, is to be made with the aid of a wrench so that the **liquid valve cannot turn independently** of the accumulator body.

Also take care to ensure that :

- the pipes connected directly or indirectly do not bear the weight of the accumulator. The connection of the accumulator nozzle to the external piping should be force and torque free.
- if there is a risk of external overheating, a safety valve is installed on the gas (for further details, call our Marketing Department).
- the pressure relief valve is connected directly to the accumulator and is set to a value equal to or less than the working pressure stamped on the data plate.
- there is a shut-off or safety block so that the accumulator may be isolated for testing or inspection even while the system is running.
- there should be a filter if the liquid entering the accumulator contain impurities that may cause abrasion or slow perforation of the bladder.

IT IS STRICTLY PROHIBITED

- **To use a group 1 fluid with an accumulator designed for a group 2 fluid.**
- **To use the accumulator as a construction element for bearing external loads.**
- **To modify the accumulator without the manufacturer's consent.**

IMPORTANT!!!

- **Accumulator must be protected by installation of pressure relief valve according to directive 2014/68/EU.**

6 Checking & Charging

- 6.1 It is important that the gas pressure is kept constant and it should therefore be checked periodically by means of pre-loading & Checking Kit.

The Standard Pre- loading & checking Kit is provided with Two Pressure Gauges of Range 0-280 Bar & 0-70 Bar.

The Same equipment is used for re -inflating the bladder after repair work or change of use.

Connection is made by a hose to nitrogen bottle with an adaptor.

WARNING :- Only Nitrogen must be used. Air or oxygen could cause an explosion.

6.2 : Pressure Checks

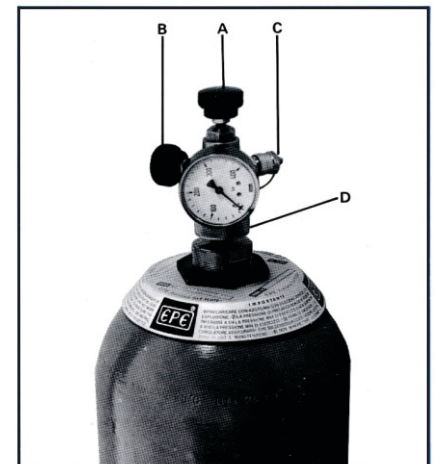
This is a simple operation, the correct procedure is as follows:

Fig. 2

- **Isolate** the Accumulator from the system and reduce the liquid **pressure to Zero.**
- Remove the protective and sealing caps from the gas valve.
- Prior to mounting the PC equipment ensure that **Valve Knob "A" is unscrewed**, that the **Bleed Valve "B" is closed** and that **Non-Return Valve "C" is screwed tight.**
- Attach the unit to the gas-fill valve by means of the **Ring Nut "D"**.
- Screw **Valve Knob "A"** to a point where pressure is registered.

If the pressure is OK remove the PC Kit as follows:

- **Unscrew the Valve Knob "A"**.
- **Open the Bleed Valve "B"** and unscrew the **Ring Nut "D"**.



- 6.3 Pressure Reduction : If pressure has to be reduced this is done by **opening Bleed Valve "B"** slowly while the **Valve Knob "A"** is screwed in until the correct pressure is registered on the gauge.

6.4. Increase or Reset Pre-charge Pressure : Procedure as under :-

- (a) Fit the PC unit as described in section 6.2
- (b) Fit the connection to the nitrogen cylinder
- (c) Connect the hose between cylinder and the non-return valve "C".
- (d) **Slowly** open the valve on the cylinder until the gauge registers a pressure slightly higher than the one desired, than **shut**.

- (e) **Unscrew Knob “A”** and reduce the pressure on PC Kit to zero by means of **Bleed Valve “B”**
- (f) Disconnect the hose from the non return valve and **replace cap.**
- (g) Close the **Bleed Valve “B”** and wait approximately 5 mins. For the temperature to stabilise.
- (h) Screw **Valve Knob “A”** until the pressure can be read. This should be slightly higher than the desired pressure.
- (I) Adjust by means of the **Bleed Valve “ B “** & removed the Filling unit.
- (k) Use soapy water test for leaks.
- (j) Replace the valve cover and protection caps.

6.5 The Accumulator is now pre-charged as per the requirement.

WARNING :- it is recommended that the gas line be fitted with a safety relief valve when charging accumulators with shell rating of less than gas bottle pressure.

7. PUTTING THE SYSTEM INTO OPERATION

First of all, check that the nitrogen precharging pressure corresponds to the value specified by the user. To precharge or regulate the precharge, follow the instructions given in para 6. Having checked that the setting of the maximum valve setting of the system is equal to or less than the pressure (PS) stamped on the name plate, the system may be brought to pressure, respecting the following indications: make sure that there are no leaks.

The system may then finally be started without having to take any further action.

8. PERIODIC CHECKS

It must be checked that precharging pressure is constantly **maintained** inside the accumulator.

An incorrect precharging value is often the cause of the system malfunctioning and has a detrimental effect on the life of the bladder.

It is therefore necessary to make an initial check **within a week** of the start-up of the system. If no faults (Pressure drops) are found, another check is then made **after 2 months** and subsequently once every 4 months.

If subjected to particularly heavy work loads, the check should be made once a month. In addition to the precharging checks, make a visual inspection to make sure that is no distortion, corrosion or anything else that may cause deterioration of the mechanical parts.

9. MAINTENANCE AND REPAIRS

Before performing operations that entail the disassembly and reassembly or the replacement of components of the accumulator, we recommend you contact the Marketing & Servicing Department of

EPE Process Filters & Accumulators Pvt. Ltd. – India.

Telephone : 0091-40-23778803/23778804

Fax : 0091-40-23871447

e-mail : business@epe-india.com

In all cases, before starting to do any work, it is indispensable to make sure that the accumulator is isolated from the system and that the precharging gas has been completely released. For this purpose we recommend use of the special PC type equipment.



1	2	3	4	5	6	7	8	9	10	11	12	13	14
AS	35	P	360	C	G	09	F	0	C	C	V	/ PO:10 /	- - -

↑ To indicate only if applicable ↓

1	Series	Standard Accumulator - Seamless Shell High-Flow Accumulator - Seamless Shell Welded Accumulator - Poppet Design Welded Accumulator - Disc Design Large Volume Accumulator High Flow Large Volume Accumulator Liquid Separator Accumulator Transfert Accumulator	= AS = ASHF = ASWP = ASWD (P0 ≤ 15 bar) = ASLV = ASLVHF = ASL = AST
2	Nominal Capacity (Ltrs)	MWP - 330 Bar (AS) MWP - 350 Bar (AS) MWP - 360 Bar (AS) MWP - 330 Bar (AS) MWP - 330 Bar (ASHF) MWP - 30~165 Bar (ASWP) MWP - 30~70 Bar (ASWD) MWP - 16/35 Bar (ASLV / ASLVHF)	= 0.2 = 0.7 = 1-57 = 60-130 = 10-55 = 3-57 = 1.5-57 = 150-575
3	Bladder & Seal material	Nitrile (NBR) Butyl (IIR) Viton (FKM) Ethylene-Propylene (EPDM) Hydrogenated Nitrile (HNBR) Neoprene (CR) Nitrile for Hydrocarbons Low Temp. Nitrile Epichlorohydrin (ECO) For Food	= P (standard) = B = V = E = K = N = H = F = Y = A
4	Max working pressure (Bar)	For 0.2 (AS) For 0.7 (AS) For 1-57 (AS) For 60-130 (AS) For 10-55 (ASHF) For 3-57 (ASWP) For 1.5-6 (ASWD) For 10-57 (ASWD) For 150-575 (ASLV / ASLVHF)	= 330 = 350 = 360 = 330 = 330 = 30 / 50 / 70 120 / 165 = 70 = 30 = 16 / 35
5	Shell material	Carbon Steel Nickel Coated Carbon Steel Stainless Steel Rilsan Coated Carbon Steel	= C (standard) = N = X = V

* Before ordering, check for availability

Ordering Code

1	2	3	4	5	6	7	8	9	10	11	12	13	14
AS	35	P	360	C	G	09	F	0	C	C	V	/ PO:10 /	- - -

↑ To indicate only if applicable ↑

6	Fluid Port Connection type	BSPP (Parallel Thread) BSPT (Taper Thread) NPT (Taper Thread) To suit SAE 3000 PSI flange To suit SAE 6000 PSI flange Square Flange SAE Internal Thread Metric UNI-DIN Flange ANSI Flange Adaptor (for use with type G connection)	= G (standard) = T = N = 3 = 6 = Q = S = M = D = A = R# {# = G/T/N/S/M}
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7	Fluid Port Connection size	for G 1/8" = 01 1/4" = 02 3/8" = 03 1/2" = 04 3/4" = 05 1" = 06 1-1/4" = 07 1-1/2" = 08 2" = 09 2-1/2" = 10 3" = 11 3-1/2" = 12 4" = 13 Multi Ports (R) = zz <small>(Ref. other variants)</small>	for D DN20/40 = 51 DN20/250 = 52 DN25/16 = 53 DN25/40 = 54 DN25/250 = 55 DN32/40 = 56 DN32/250 = 57 DN40/40 = 58 DN40/250 = 59 DN50/16 = 60 DN50/40 = 61 DN50/64 = 62 DN50/250 = 63 DN65/16 = 64 DN65/40 = 65 DN80/16 = 66 DN100/16 = 67 DN100/40 = 68
		for S 1-1/16"-12 = 21 1-5/8"-12 = 22 1-7/8"-12 = 23	for A 3/4" /300 = 81 3/4" /1500 = 82 1" /300 = 83 1" /1500 = 84 1-1/4" /300 = 85 1-1/4" /1500 = 86 1-1/2" /300 = 87 1-1/2" /1500 = 88 2" /150 = 89 2" /300 = 90 2" /400 = 91 2" /1500 = 92 2-1/2" /150 = 93 2-1/2" /300 = 94 2-1/2" /400 = 95 2-1/2" /1500 = 96 4" /150 = 97 4" /300 = 98

8	Fluid Port Connection design	Female Thread = F Male Thread = M For SAE Flange = S Flange = L Socket Weld Nipple = SW	for A WN-RF = WN WN-RTJ = WJ SO-RF = SO SW-RF = SW SW-RTJ = SJ
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* Before ordering, check for availability

Ordering Code

1	2	3	4	5	6	7	8	9	10	11	12	13	14
AS	35	P	360	C	G	09	F	0	C	C	V	PO:10	- - -

↑ To indicate only if applicable ↑

9	Test Certification	Factory Testing CE/PED SELO / ML (China) ASME Sec.VIII Divn.1 App.22 (w/o stamp) ASME Sec.VIII Divn.1 App.22 - U stamp Others / Dual Certification - on request	= 0 = 8 = 3 = 7W = 7U
10	Fluid Valve material	Carbon steel Nickel Coated carbon steel Stainless Steel Zn-Ni Coated Carbon Steel	= C (standard) = N = X = Z
11	Gas Valve material	Carbon steel Nickel Coated carbon steel Stainless Steel Zn-Ni Coated Carbon Steel	= C (standard) = N = X = Z
12	Gas Fill Valve connection	Standard - 5/8" UNF 5/8" UNF in Stainless Steel Without Gas Fill Valve 5/16" UNEF/Vg8 1/4" BSP M16x2.0 5/16" UNEF (7/8 UNF Gas Fill Valve Body) Double Lock Military Valve 7/8" UNF (Integral in 7/8 UNF Gas Valve) M28x1.5	= V (standard) = X = 0 = 1 = 2 = 3 = 4 = 8 = 9 = M
13	Precharge Pressure	Uncharged Condition Precharge Pressure in bar	= - = XX
14	Other Variants	<div style="border: 1px solid black; padding: 5px; display: inline-block;">Refer page 7</div>	= -

* Before ordering, check for availability

Ordering Code

1	2	3	4	5	6	7	8	9	10	11	12	13	14
AS	35	P	360	C	G	09	F	0	C	C	V	/ PO:10 /	- - -

↑ To indicate only if applicable ↑

14	Other variants	<p><u>Standard Accumulator - Without any variants</u></p> <p style="text-align: right;">= --</p> <p style="text-align: center;"><u>Liquid Side Variants</u></p> <p>Liquid Adapter in SS (if different from FPA) = L01 Poppet & spring in SS (if different from FPA) = L02 Fluid Port Assembly without Bleed Port = L03 3-Way adaptor - 1/2" BSPF x 1/4" BSPF = L11 3-Way adaptor - 1/2" BSPF x 3/8" BSPF = L12 3-Way adaptor - 1/2" BSPF x 1/2" BSPF = L13 3-Way adaptor - 3/4" BSPF x 1/4" BSPF = L14 3-Way adaptor - 3/4" BSPF x 3/8" BSPF = L15 3-Way adaptor - 1" BSPF x 1/4" BSPF = L16 3-Way adaptor - 3/4" NPTF x 1/4" NPTF = L17</p> <p style="text-align: center;"><u>Gas Side Variants</u></p> <p>Protection cap in SS (if different from GVA) = G01 Protection cap with Plastic Insert = G02 Name plate in Brass = G03 Name Plate in SS = G04 7/8" UNF Gas Valve Body = G05 M50x1.5 with 7/8" UNF Gas Valve Body = G06 Lifting Hook = G07 Adapter for connecting 1/4" Gauge (without gauge) = G11 Adapter with xxx bar 63mm Pressure Gauge = G12(xxx) Adapter with xxx bar rupture disc = G13(xxx) Adapter with xxx bar rupture disc + 1/4" BSPF Port = G14(xxx) Adapter with xxx bar rupture disc + yyy bar 63mm Gauge = G15(xxx/yyy) Adapter with xxx bar rupture disc + 1/4" NPTF Port = G16(xxx) Adapter with xxx bar rupture disc + 3/8" NPTF Port = G17(xxx) Adapter with xxx bar rupture disc + 1/2" NPTF Port = G18(xxx) Adapter with VS214 Gas Safety Valve set at xxx bar = G19(xxx) Adapter with VS224X Gas Safety Valve set at xxx bar = G20(xxx) Adapter with 1/4" BSP Needle Valve = G21 Adapter with 1/4" BSP Needle Valve in SS = G22 Adapter with PGSV (Pressure Gauge Shut-off Valve) = G23 Adapter with PGSV + xxx bar 63mm pressure gauge = G24(xxx)</p> <p style="text-align: center;"><u>External Variants</u></p> <p>Finish Paint - RAL-5003 = E01</p> <p style="text-align: center;"><u>Internal Variants</u></p> <p>Flushing to NAS-10 = F10 Flushing to NAS-9 = F09 Flushing to NAS-8 = F08 Flushing to NAS-7 = F07 Flushing to NAS-6 = F06 Flushing to NAS-5 = F05</p> <p style="text-align: center;">Design Number (EPE internal reference) = Sxxx/Txxx</p> <p style="text-align: center;">Other special requirements = SPL</p>	
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* Before ordering, check for availability