



1. GENERAL

All hydraulic accumulators are pressure vessels and are subject to the national regulations and directives, valid at the place of installation.

Diaphragm accumulator type AMW are designed and manufactured as per CE/PED in accordance with Directive 2014/68/EU.

As per the provisions of Directive 2014/68/EU all accumulators with $V \leq 1$ ltr and $PS \leq 1000$ bar ($PS = \text{max. working pressure in bar}$) are not allowed to be CE marked [Article 4 - 1(a)(i)].

Accumulators of capacity greater than 1 ltr are available with CE marking. When specified every shipping batch is provided with a conformity declaration and use and maintenance instructions.

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 accumulators, bearing the CE mark 0045 (Certifying authority code) produced for the European market.

In particular, it concerns the **Welded Diaphragm type Series**, (see table 1) for **group 2** fluids (not dangerous), subject to the conformity assessment procedures in accordance with module **H**, as laid down in the European Pressure Equipment Directive (PED) **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);

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 diaphragm / sealing elements with the working medium is the responsibility of the user.

Should the needs arise, we recommend you contact us. 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

| HYDRO-PNEUMATIC WELDED DIAPHRAGM ACCUMULATOR | | | | | | | | | | | | |
|---|---|----------|----------|---------|----------|-------|-----|---|-----|-----|---|---|
| - Only for group 2 fluids - | | | | | | | | | | | | |
| Type | AMW-_____ | | | | | | | | | | | |
| Rated Volume | 0.075 [x] | 0.16 [x] | 0.32 [x] | 0.5 [x] | 0.75 [x] | 1 [x] | 1.4 | 2 | 2.8 | 3.5 | 4 | 5 |
| Max. allowable working pressure PS (bar) | 40 ~ 350 (refer catalogue # 13.001) | | | | | | | | | | | |
| Test Pressure PT (bar) : 1.43 x PS | 57 ~ 501 (refer catalogue # 13.001) | | | | | | | | | | | |
| Permitted No. of Load Cycles & Range of pressure variation | > 2,000,000 at 70 Bar | | | | | | | | | | | |
| Volume of nitrogen V (liters) | 0.075 | 0.16 | 0.32 | 0.5 | 0.75 | 1 | 1.4 | 2 | 2.8 | 3.5 | 4 | 5 |
| Dry mass M (kg) approx | 0.76 ~ 15.56 (refer catalogue # 13.001) | | | | | | | | | | | |
| Min./Max. allowable working and storage temperature TS (°C) | Standard : -20°C ~ +80°C. (The values stamped on the body are normally different because they reflect limits valid for elastomers used. In any case, they must never be lower than -40°C or higher than +150°C. | | | | | | | | | | | |
| Materials | Accumulator Body : Carbon steel (standard) or Stainless Steel (on request) | | | | | | | | | | | |
| | Gas Fill Valve : Carbon Steel (standard) or Stainless Steel (on request) | | | | | | | | | | | |
| | Diaphragm & Seals : Standard P(NBR), On request Y(ECO), V(FKM) etc. | | | | | | | | | | | |
| Protective coatings | Standard : Black paint RAL9005 - 40µ~50µ. | | | | | | | | | | | |
| | On request : Chemical Nickle-Plating (specify thickness)/Phosphating. | | | | | | | | | | | |



3. ACCUMULATOR MARKINGS (name plate)

The name plate punching / engraving on the accumulator bears the following data:

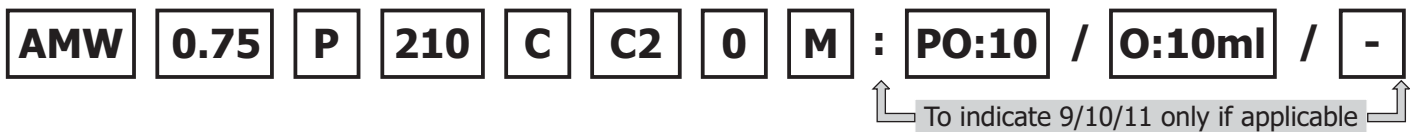
- The name logo of the manufacturer.
- The CE mark with No.0045 of the Certifying Authority.
- The manufacturing number / serial number of the accumulator.
- The minimum and maximum allowable temperatures TS (°C)
- The alphanumeric model code assigned to the accumulator.
- The volume of the accumulator in ltrs.
- The precharging pressure Po in bar.
- The maximum allowable working pressure PS in bar.
- The test pressure PT in bar.

The alphanumeric code (see table 2) uniquely defines:

- | | |
|--|-------------------------------------|
| - The type / series of the accumulator | - The material of the body |
| - The rated volume in liters | - The liquid & gas side connections |
| - The material of the diaphragm & seals | - The final tests |
| - The maximum allowable working pressure | - Special requirements, if any. |

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

Table 2



(refer catalogue # 13.001)

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 codification data punched / engraved on the body 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 codification data.

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.

The shelf life of these accumulators is 3 years. In case not in use for more than 3 months, the accumulators must be depressurized and stored for a maximum of 3 years. Beyond this disposal action as advised in section 9 must be initiated.

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.

Before installation, you must perform a visual check to verify that the accumulator has not suffered any damage during shipping / handling. Verify that the requested type matches with what stamped on the nameplate.

The accumulators should be properly fitted / clamped on the system. Clamping should not cause the shell or the accumulator connection to be stressed due to over tightening. It is necessary, especially with larger capacities / lengths, horizontal mounting or with heavy units, to use fasteners (clamps, brackets etc) that support the accumulator and prevent dangerous vibrations. The mounting must be such that, should a rupture occur on the pipe system at the liquid connection, or should the gas fill valve break, the accumulator cannot be pulled from its mounting by the forces involved. No welding or other mechanical process must be carried out on the accumulator shell for the purpose of attaching fasteners. The connection of the accumulator nozzle to the external piping should be force and torque free.

Position - It is suggested that the accumulators are installed vertically with gas side on top. The manufacturers name plate stating the initial pressure must be visible. Moreover access to the vent screw, if any, must be kept unobstructed.

- We recommend using the accumulator with a suitable safety valve or a security safety block type B. This device provides user and equipment protection against possible damage caused by pressure surges, and also makes the maintenance of the accumulator easier, so facilitating the interception and the discharge.
- To achieve a high degree of efficiency, the accumulator should be fitted as close as possible to the installation it serves.
- Provide for a clearance of 200 mm above the gas pre-charge valve to allow access to and control of the pre-charge equipment.
- These accumulators may be installed in any position from horizontal to vertical (preferably with the pre-charge valve at the top), and the identification details must be visible.
- Proceed to the assembly so that no abnormal force affects the pipes connected directly or indirectly to the accumulator, so we recommend the use of supporting components and also fastening to avoid the transmission of vibrations.
- Make sure the fluid is compatible with the elastomer of the diaphragm.
- Check that the max. allowed accumulator pressure is equal to or greater than that of the hydraulic circuit and that the temperature during operation is maintained within the range expected.
- Make sure the fluid does not contain contaminants and/or abrasive.

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

Also take care to ensure that :

- 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 diaphragm.

IT IS STRICTLY PROHIBITED

- **To use a group 1 fluid with an accumulator designed for a group 2 fluid.**
- **To weld or solder or carry out any mechanical operations on the accumulator.**
- **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

For Accumulators with M design Gas Valve use Pre-Loading & Checking Set type-PCM. For Accumulators with V design Gas Valve PC type with appropriate adaptor is to be used. Accumulators with P design Gas Valve - Non-rechargeable type.

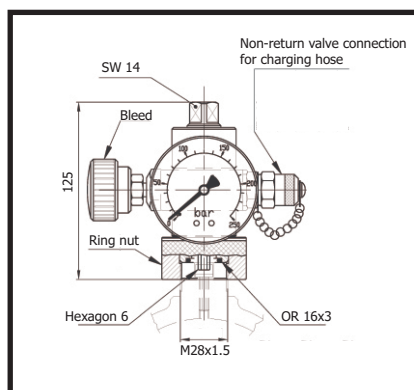
When charging, the nitrogen bottles must be capable of delivering pressure higher than the desired accumulator gas pressure. Use dry industrial nitrogen.

WARNING : Only Nitrogen must be used. NEVER USE OXYGEN OR AIR - may cause explosion.

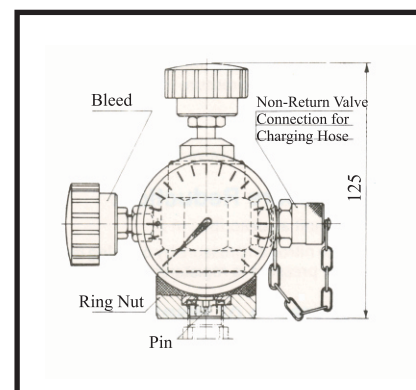
Proceed as follows:

- * Fit the suitable pre-charging equipment to the gas valve;
- * Connect it to the nitrogen cylinder with the charging hose;
- * Slowly introduce nitrogen into the accumulator until reaching a pressure slightly above the required level;
- * Close the valve of nitrogen cylinder and disconnect the charging hose from the equipment;
- * Wait for the gas temperature stabilization;
- * Set the pressure by venting off the excess of gas.
- * Tighten the Charging Valve to 20^{+5} Nm using torque wrench.

Pre-Loading & Checking Set



Type PCM



Type PC

All dimensions in mm

A PRESSURE REDUCING VALVE MUST BE INSTALLED BETWEEN THE NITROGEN GAS CYLINDER AND THE ACCUMULATOR WHEN THE GAS CYLINDER PRESSURE IS HIGHER THAN MAX PERMISSIBLE PRESSURE OF ACCUMULATOR.

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 diaphragm

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

These Welded Diaphragm type Accumulators are non-repairable. In the event of failure the accumulators have to be disposed off.

Disposal - Before the accumulator is sent for disposal or recycling, it should always be discharged completely of the pre-charge pressure and the gas valve unscrewed. Pre-loading and checking kits are suited for this task.

For permanently sealed design Accumulators (Version-P) the diaphragm is preferably damaged on a test rig or the accumulator is carefully drilled ($\text{Ø} \geq 6 \text{ mm}$) on the gas chamber using a suitable clamp . As the gas flowing out can draw metal splinters or particles with it, safety glasses must be worn.

Environmental Protection - Careless disposal of the accumulator and the residual fluid contained therein can cause environmental pollution.

Dispose the Accumulator in accordance with provisions applicable in the country of use.

Fluid residues are to be disposed according to the respective safety data sheets valid for the specific hydraulic fluids.

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 appropriate precharging equipment (PC/PCM).

For any further assistance 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



1 2 3 4 5 6 7 8 : 9 / 10 / 11
AMW 0.75 P 210 C C2 0 M : PO:10 / O:10ml / -
↑ To indicate 9/10/11 only if applicable ↓

| | | | | |
|----|---|---|---|--------------|
| 1 | Type | Diaphragm Accumulator - Welded design | = AMW | |
| 2 | Nominal Capacity | 0.075 Ltrs. 0.16 Ltrs. 0.32 Ltrs. 0.50 Ltrs. 0.75 Ltrs. 1.00 Ltr. 1.40 Ltr. 2.00 Ltr. 2.80 Ltr. 3.50 Ltr. 4.00 Ltr. 5.00 Ltr. | = 0.07 = 0.16 = 0.32 = 0.50 = 0.75 = 1 = 1.4 = 2 = 2.8 = 3.5 = 4 = 5 | |
| 3 | Diaphragm Material | Nitrile (NBR) (-20°C to +80°C) Epichlorohydrin (ECO) (-30°C to +110°C) Viton (FKM) (-10°C to +150°C) Without diaphragm | = P = Y = V = 0 | |
| 4 | Max. Working Pressure (Bar) (available sizes) | 040 Bar 100 Bar 130 Bar (1.40 2.00) 140 Bar (0.75 1.00) 160 Bar (0.50 1.40) 210 Bar (0.32 0.75 1.40 2.00 2.80) 250 Bar (0.07 0.16 0.75 1.00 1.40 2.80 3.50 4.00 5.00) 350 Bar | = 40 = 100 = 130 = 140 = 160 = 210 = 250 = 350 | |
| 5 | Body Material | Carbon Steel (-20°C to +80°C) - painted Low Temp. CS (-40°C to +80°C) - painted Stainless Steel (-20°C to +80°C) - unpainted | = C = L = X | |
| 6 | Fluid Side Connection | Female Thread Combination Thread (Male + Female) SAE Connection Others With locking nut (external threading only) | = C.. = E.. = S.. = Z = ...N | Refer page 3 |
| 7 | Certification | Factory Testing (design as per PED) CE/PED directive 97/23/EC - marking | = 0 = 8 | |
| 8 | Gas Side Connection | M28x1.5(M) (Rechargeable type) ø8 (Non-rechargeable / sealed type) Plunger design (Rechargeable type) | = M = P = V.. | Refer page 3 |
| 9 | Precharge Pressure (Bar) | Uncharged condition - Standard xx Bar | = - = PO-xx | |
| 10 | Oil Filling on Gas Side (ml) | Without any oil fill - Standard yy ml | = - = O-yy ml | |
| 11 | Others | CS Accumulators painted in RAL9005 - std Diaphragm plug in Carbon Steel Diaphragm plug in Stainless Steel Other requirements (to specify) | = - = C = X = Z | |

1 2 3 4 5 6 7 8 : 9 / 10 / 11
AMW 0.75 P 210 C C2 0 M : PO:10 / O:10ml / -
↑ To indicate 9/10/11 only if applicable ↑

| | | | | |
|---|------------------------------|---|----------------------------|---|
| 6 | Fluid side Connection | For upto 250 Bar - Female Thread G1/2" (F) with ø29 G1/2" (F) with ø34 G3/4" (F) M18x1.5 (F) G3/4" (F) without spot face 1/2" NPT(F) with 36 Hex | C | = C1 = C2 = C3 = C6 = C7 = C8 |
| | | For upto 250 Bar - Combination Thread M14x1.5(M) with ø5 hole G1" (M) x G1/2" (F) M33x1.5(M) x G1/2" (F) M42x1.5(M) x G3/4" (F) M32x1.5(M) x M22x1.5 (F) M33x1.5(M) x M22x1.5 (F) M45x1.5(M) x G3/4" (F) G1" (M) with ø20 hole G3/4" (M) x M16x1.5 (F) M18x1.5 (M) with ø8 hole M18x1.5 (M) with OR 3/4" BSP(M) with ø8 hole M27x2(M) x M16x1.5 (F) | E | = E1 = E2 = E3 = E4 = E5 = E6 = E9 = E10 = E11 = E12 = E13 = E14 = E15 |
| | | For upto 250 Bar - SAE Thread S1 .. S8 (SAE Port Size) | S | = S1-S8 |
| | | For above 250 Bar - Female Thread G1/2" (F) G3/4" (F) | C | = C4 = C5 |
| | | For above 250 Bar - Combination Thread M33x1.5(M) x G1/2" (F) M45x1.5(M) x G3/4" (F) | E | = E7 = E8 |
| | | 8 | Gas Side Connection | M28x1.5(M) (Rechargeable type) ø8 (Non-rechargeable / sealed type) Plunger design (Rechargeable) .. 5/8" UNF(M) .. 5/8" UNF(M) in Stainless Steel .. 5/16" UNEF(M) / Vg8 .. 5/16" UNEF(M) / Vg8 - Military design .. 1/4" BSP(M) .. 7/8" UNF(M) .. M16 x 2 (M) .. M16 x 1.5 (M) .. Without Gas Valve |

* Before ordering, check for availability