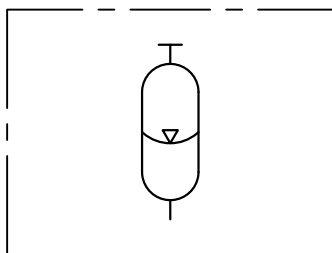


# Diaphragm Accumulator

## Type : AMW



### Hydraulic Symbol



### Specifications

Material of Construction	
Body	: Carbon Steel-Painted or Low Temp Carbon Steel or Stainless Steel.
Diaphragm	: Nitrile(NBR) or Epichlorohydrin(ECO) or Viton (FKM). Others on request.
Diaphragm Plug	: Plastic (Standard) or CS or SS.
Connections	
Gas Side	: M28x1.5(M) or Dia 8 or 5/16" UNEF/Vg8. Others on request.
Fluid Side	: Female Threaded or Combination Thread (M+F) or SAE Ports. Others on request.

### Technical Data

Design	: Welded shell, non-repairable
Max. Pressure (PS)	: 40-350 Bar.
Test Pressure (PT)	: 1.43 x PS
Temperature range	: -20°C to +80°C (Standard)
Permissible Pre. Ratio( $P_2:P_0$ )	: Refer page 4
Max. permissible precharge pressure $P_{0-max}$	: 130 bar. However limitations due to transport regulations.
Nominal capacity	: 0.075 to 5 Ltrs.
Fluid	
Fluid Viscosity range	: 10 to 400 cSt
Recommended viscosity	: 32 cSt
Fluid contamination degree	: Class 21/17/14 according to ISO 4406 or better on request.

### Description

A hydro-pneumatic accumulator is a device used specifically for storage of liquid under pressure. As liquids, for all practical purposes, are incompressible, this objective is achieved by utilizing the compressibility of gases.

A flexible rubber separator i.e., diaphragm is fitted into the accumulator shell.

An inert gas - nitrogen - is filled into the diaphragm through a pressure valve to a pressure  $P_0$ . The diaphragm expands, filling the entire volume  $V_0$  of the accumulator shell.

When the system (circuit) pressure  $P_1$  is higher than the gas precharge pressure  $P_0$ , the liquid enters the shell and the diaphragm is compressed reducing the gas volume to  $V_1$ .

Should the liquid pressure rise to  $P_2$ , the volume of gas reduces to  $V_2$  with an attendant rise in pressure, thus balancing the Liquid pressure.

A potential energy is now stored in the accumulator to be utilised whenever needed.

### Construction

The accumulator, designed & manufactured according to directive 2014/68/EU, consists of a pressure vessel on which the gas connection is located at the top part, while the fluid connection is in the lower part.

The body contains a flexible rubber diaphragm separating hydraulic fluid and nitrogen. The diaphragm incorporates a plug (in polymer, carbon steel or stainless steel), bonded to the lower part which prevents its extrusion through the hole of the liquid port.

The top and bottom portions of the Accumulator body are welded to contain the diaphragm permanently within.

### Gas Charging

Pre-loading and Checking Set type-PCM is used with Version-M Gas Side Connection and type-PC for Version-V. Accumulators with Version-P are non-rechargeable.

# Ordering Code

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

1	<b>Type</b>	Diaphragm Accumulator - Welded design	= <b>AMW</b>
2	<b>Nominal Capacity</b>	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. 5.00 Ltr.	= <b>0.07</b> = <b>0.16</b> = <b>0.32</b> = <b>0.50</b> = <b>0.75</b> = <b>1</b> = <b>1.4</b> = <b>2</b> = <b>2.8</b> = <b>3.5</b> = <b>5</b>
3	<b>Diaphragm Material</b>	Nitrile (NBR) (-20°C to +80°C) Epichlorohydrin (ECO) (-30°C to +110°C) Viton (FKM) (-10°C to +150°C) Without diaphragm	= <b>P</b> = <b>Y</b> = <b>V</b> = <b>0</b>
4	<b>Max. Working Pressure (Bar)</b> (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   0.50   0.75   1.40   2.00   2.80) 250 Bar (0.07   0.16   0.75   1.00   1.40   2.00   2.80   3.50   5.00) 350 Bar (0.75)	= <b>40</b> = <b>100</b> = <b>130</b> = <b>140</b> = <b>160</b> = <b>210</b> = <b>250</b> = <b>350</b>
5	<b>Body Material</b>	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	= <b>C</b> = <b>L</b> = <b>X</b>
6	<b>Fluid Side Connection</b>	Female Thread Combination Thread (Male + Female) SAE Connection Others With locking nut (external threading only)	= <b>C..</b> = <b>E..</b> = <b>S..</b> = <b>Z</b> = <b>...N</b>
7	<b>Certification</b>	Factory Testing (design as per PED) CE/PED directive 2014/68/EU - marking	= <b>0</b> = <b>8</b>
8	<b>Gas Side Connection</b>	M28x1.5(M) (Rechargeable type) ø8 (Non-rechargeable / sealed type) Plunger design (Rechargeable type)	= <b>M</b> = <b>P</b> = <b>V..</b>
9	<b>Precharge Pressure (Bar)</b>	Uncharged condition - Standard xx Bar at 20°C	= <b>-</b> = <b>PO-xx</b>
10	<b>Oil Filling on Gas Side (ml)</b>	Without any oil fill - Standard yy ml	= <b>-</b> = <b>O-yy ml</b>
11	<b>Others</b>	CS Accumulators painted in RAL9005 - std Diaphragm plug in Carbon Steel Diaphragm plug in Stainless Steel Other requirements (to specify)	= <b>-</b> = <b>C</b> = <b>X</b> = <b>Z</b>

Refer  
page 3

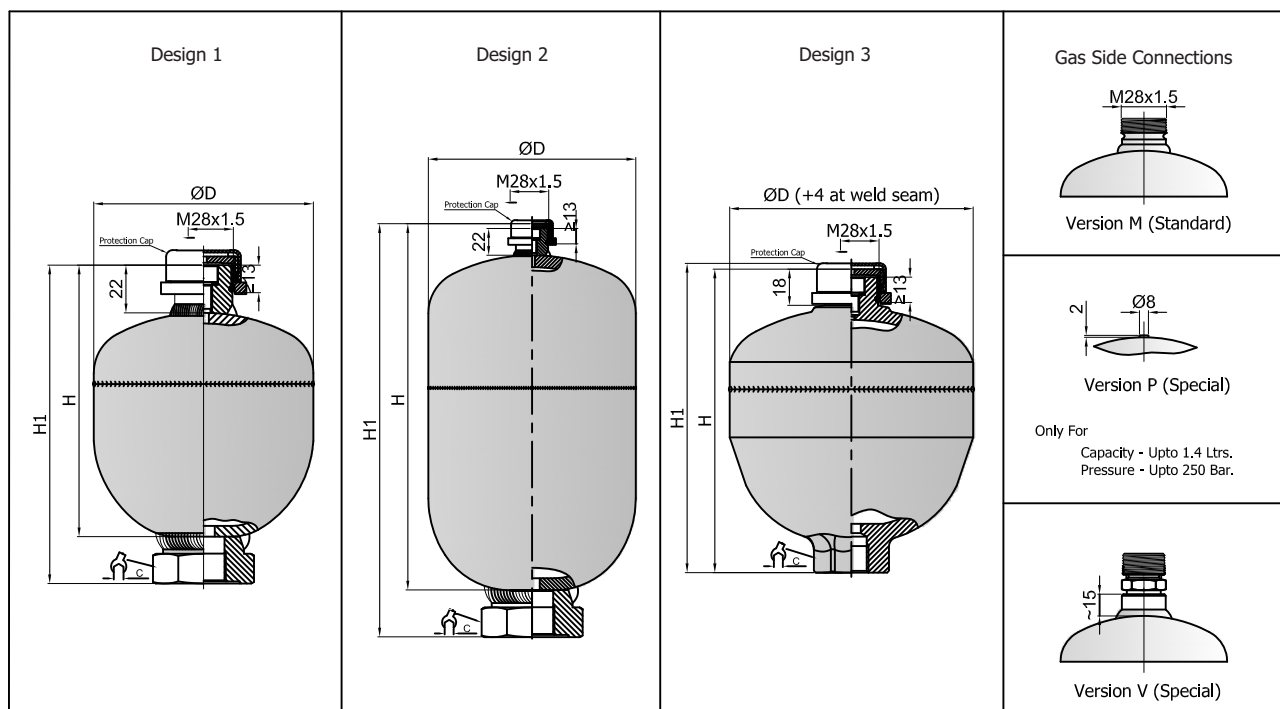
Refer  
page 3

# Ordering Code

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

6	<b>Fluid side Connection</b>	<b>For upto 250 Bar - Female Thread</b> 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
		<b>For upto 250 Bar - Combination Thread</b> 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 G3/8" (M) with ø8 hole M27x2(M) x M16x1.5(F) E	= E1 = E2 = E3 = E4 = E5 = E6 = E9 = E10 = E11 = E12 = E13 = E14 = E15
		<b>For upto 250 Bar - SAE Thread</b> S1 .. S8 (SAE Port Size) S	= S1-S8
		<b>For above 250 Bar - Female Thread</b> G1/2" (F) G3/4" (F) C	= C4 = C5
		<b>For above 250 Bar - Combination Thread</b> M33x1.5(M) x G1/2" (F) M45x1.5(M) x G3/4" (F) E	= E7 = E8
8	<b>Gas Side Connection</b>	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) .. M16x2(M) .. M16x1.5(M) .. Without Gas Valve	= M = P = VV = VX = V1 = VM = V2 = V4 = V5 = V6 = V0

# Dimensions



Model	AMW-0.07	AMW-0.16	AMW-0.32	AMW-0.5	AMW-0.5	AMW-0.75	AMW-0.75	AMW-0.75
Capacity (Ltrs)	0.075	0.16	0.32	0.50	0.50	0.75	0.75	0.75
MWP (Bar)	250	250	210	160	210	140	210	250
Height H (mm)	91	99.5	118	127	129.5	138	140	144
Height H1 (mm)	111	119.5	138	149	151.5	160	162	166
Diameter D (mm)	Ø64	Ø75	Ø92.5	Ø103	Ø105	Ø115.5	Ø118	Ø121.5
Weight (kgs)	0.76	0.95	1.42	1.82	2.00	2.22	2.52	3.30
Standard Connection	C1	C1	C1	C2	C2	C2	C2	C2
Design	1	1	1	1	1	1	1	1
Permissible Pre. Ratio	8 : 1	8 : 1	8 : 1	8 : 1	8 : 1	8 : 1	8 : 1	8 : 1

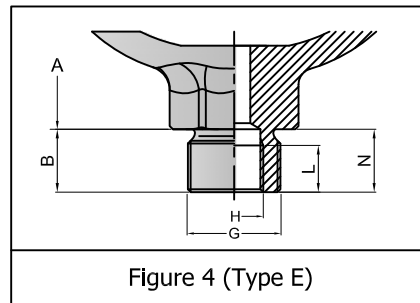
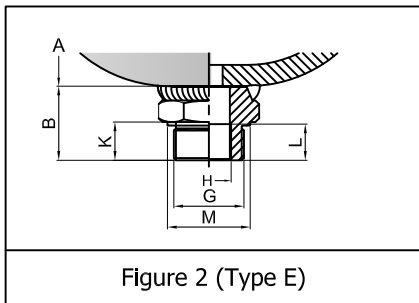
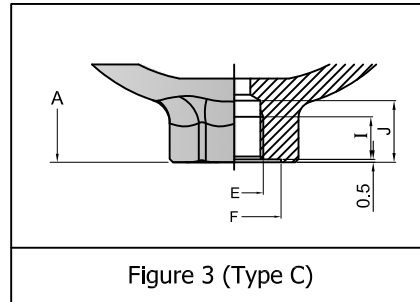
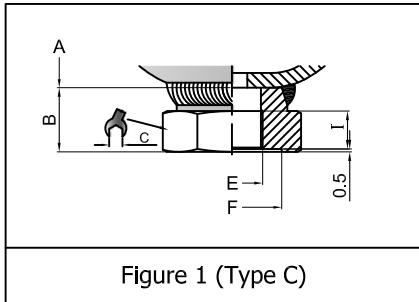
Model	AMW-0.75	AMW-1	AMW-1	AMW-1.4	AMW-1.4	AMW-1.4	AMW-1.4	AMW-2
Capacity (Ltrs)	0.75	1.00	1.00	1.40	1.40	1.40	1.40	2.00
MWP (Bar)	350	140	250	130	160	210	250	130
Height H (mm)	148	152	158	170	172	176	180	223
Height H1 (mm)	170	174	180	192	194	199	202	245
Diameter D (mm)	Ø125.5	Ø130	Ø136	Ø148	Ø150	Ø155	Ø157	Ø148
Weight (kgs)	3.92	2.70	4.20	3.60	3.94	5.20	6.34	4.68
Standard Connection	C2	C2	C2	C2	C2	C2	C2	C3
Design	1	1	1	1	1	1	1	2
Permissible Pre. Ratio	8 : 1	8 : 1	8 : 1	8 : 1	8 : 1	8 : 1	8 : 1	6 : 1

Model	AMW-2	AMW-2	AMW-2.8	AMW-2.8	AMW-3.5	AMW-5		
Capacity (Ltrs)	2.00	2.00	2.80	2.80	3.50	5.00		
MWP (Bar)	210	250	210	250	250	250		
Height H (mm)	229	233	247	251	278	361.5		
Height H1 (mm)	251	255	269	273	300	383.5		
Diameter D (mm)	Ø155	Ø159	Ø166.5	Ø170.5	Ø174	Ø174		
Weight (kgs)	6.60	8.72	8.64	10.86	11.44	14.90		
Standard Connection	C3	C3	C3	C3	C3	C3		
Design	2	2	2	2	2	2		
Permissible Pre. Ratio	6 : 1	6 : 1	4 : 1	4 : 1	4 : 1	4 : 1		

All dimensions in mm

# Liquid Side Connection Dimensions

Fluid Side Connections



Fluid Side Connection Dimensions

Fig	Type	Thread Code	Thread	B	C (A/F)	E	G	F (SPOT FACE)	H	I	J	K	L	M	N
1	C	C1	G1/2"(F)	20	32	G1/2"	Ø29	-	-	16	-	-	-	-	-
		C2	G1/2"(F)	22	41	G1/2"	Ø34	-	-	16	-	-	-	-	-
		C3	G3/4"(F)	22	41	G3/4"	Ø34	-	-	16	-	-	-	-	-
		C6	M18x1.5(F)	22	32	M18x1.5	Ø29	-	-	16	-	-	-	-	-
		C7	G3/4"(F)	32	41	G3/4"	W/O	-	-	24	-	-	-	-	-
		C8	1/2"NPT(F)	-	36	1/2"NPT	-	-	-	-	-	-	-	-	-
2	E	E1	M14x1.5(M)	21.5	19	-	-	M14x1.5	Ø5	-	-	12	-	-	-
		E2	G1" x G1/2"	33	41	-	-	G1"	G1/2"	-	-	18	16	Ø39	-
		E3	M33x1.5 X G1/2"	35	41	-	-	M33x1.5	G1/2"	-	-	18	18	Ø39	-
		E4	M42x1.5 X G3/4"	44	55	-	-	M42x1.5	G3/4"	-	-	25	26	-	-
		E5	M32x1.5 X M22x1.5	33	41	-	-	M32x1.5	M22x1.5	-	-	-	24	-	-
		E6	M33x1.5 X M22x1.5	33	41	-	-	M33x1.5	M22x1.5	-	-	18	24	Ø39	-
		E9	M45x1.5 X G3/4"	36	55	-	-	M45x1.5	G3/4"	-	-	20	16	Ø52	-
		E10	G1"(M)	38	41	-	-	G1"	Ø20	-	-	-	16	Ø39.9	18
		E11	G3/4"(M) x M16x1.5	35	32	-	-	G3/4"	M16x1.5	-	-	16	12	Ø32	-
		E12	M18x1.5(M)	30	30	-	-	M18x1.5	Ø8	-	-	16.5	14	Ø29	-
		E13	M18x1.5(M)+OR	31	30	-	-	M18x1.5	-	-	-	15	12.5	Ø23.8	-
		E14	G3/8"(M)	30	30	-	-	G3/8"	Ø8	-	-	16.5	14	Ø29	-
		E15	E15	30	41	-	-	M27x2	M16x1.5	-	-	18.5	16	Ø32	-
3	C	C4	G1/2"(F)	-	41	G1/2"	Ø34	-	-	14	20	-	-	-	-
		C5	G3/4"(F)	-	46	G3/4"	Ø34	-	-	16	23.5	-	-	-	-
4	E	E7	M33x1.5 X G1/2"	20	41	-	-	M33x1.5	G1/2"	-	-	-	14	-	20
		E8	M45x1.5 X G3/4"	20	55	-	-	M45x1.5	G3/4"	-	-	-	16	-	25.5

All dimensions in mm

# Mounting Accessories

## General

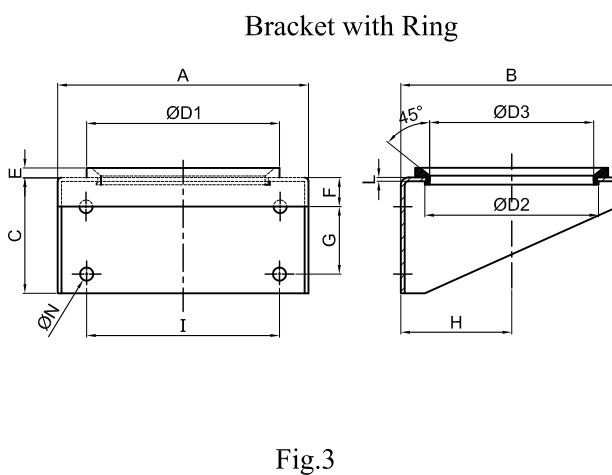
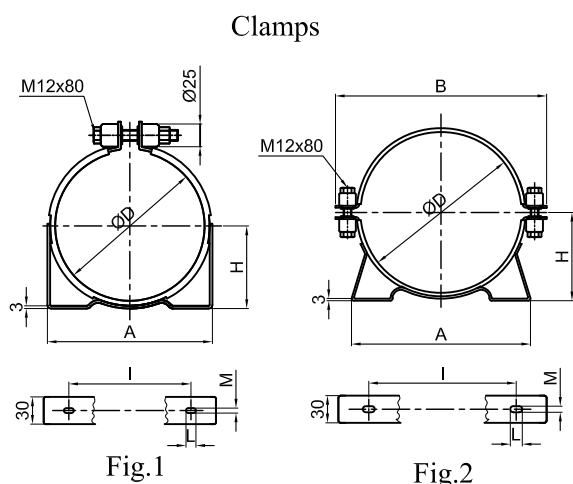
The accumulators should be properly fitted / clamped on the system. Clamping should not cause the shell or the accumulator connection to be stressed due to over tightening. It is necessary, especially with larger capacities / lengths, horizontal mounting or with heavy units, to use fasteners (clamps, brackets etc) that support the accumulator and prevent dangerous vibrations.

To achieve a high degree of efficiency, the accumulator should be fitted as close as possible to the installation it serves. The space necessary for charging & gauging kit is atleast 150mm above the gas fill valve.

## 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.

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.



## Dimensions and Order Codes

Part No	Fig	Weight(kgs)	A	B	C	ØD	ØD1	ØD2	ØD3	E	F	G	H	I	L	M	ØN
10155	1	0.65	125	-	-	89-93	-	-	-	-	-	-	53-55	90	13	9	-
10157	2	0.85	135	194	-	114-122	-	-	-	-	-	-	66-70	100	13	9	-
10250	2	1.10	185	251	-	164-176	-	-	-	-	-	-	95-100	146	13	9	-
10263	3	0.65	200	175	90	-	Ø140	120	90	10	30	40	96	140	3	-	11
10363	3	0.85	263	232	120	-	Ø200	170	150	15	30	70	125	200	4	-	17

All dimensions in mm

# Diaphragm materials | Checking & Charging

The choice of the elastomer used for the seals depends on the liquid to be used and on the operating temperatures (and at times, storage). In the chart below, each polymer has a designated letter to be used in the ordering code.

Code letter	Polymer	ISO	Temperature range (°C)	Some of the liquids compatible with the polymer
P	Nitrile (Buna-N / Perbunan)	NBR	-20 to +80	Mineral, vegetable, silicon and lubricating oils, industrial water, glycols, non-flammable liquids (HFA-HFB-HFC), aliphatic hydrocarbons, butane, diesel oil, kerosene, fuel oils etc.
Y	Epichlorohydrin	ECO	-30 to +110	Mineral oils and greases, aliphatic hydrocarbons (propane, butane and gasoline), silicone oils and greases, water at room temperature, resistance to ozone, aging and weathering..
V	Viton (Flouroelastomer)	FKM	-10 to +150	Mineral oils, greases, non-flammable fluids of HFD group, silicone oils, animal and vegetable oils, aliphatic hydrocarbons (gasoline, butane, propane, natural gas), aromatics hydrocarbons (benzene, toluene), chlorinated hydrocarbons (Tetrachloroethylene, carbon tetrachloride), fuels (regular, super and containing methanol), excellent resistance to ozone, weathering and ageing.

## Checking & Charging

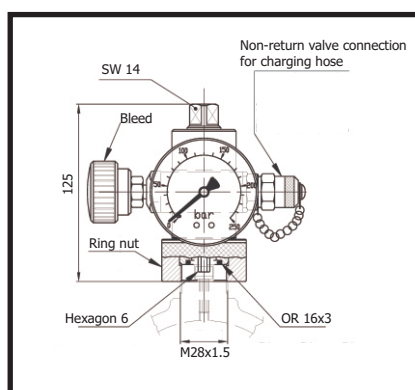
For Accumulators with M design Gas Valve use Pre-Loading & Checking Set type-PCM. For Accumulators with V design Gas Valve PC type with appropriate adaptor is to be used. Accumulators with P design Gas Valve - Non-rechargeable type.

When charging, the nitrogen bottles must be capable of delivering pressure higher than the desired accumulator gas pressure. Use dry industrial nitrogen. **NEVER USE OXYGEN OR AIR.**

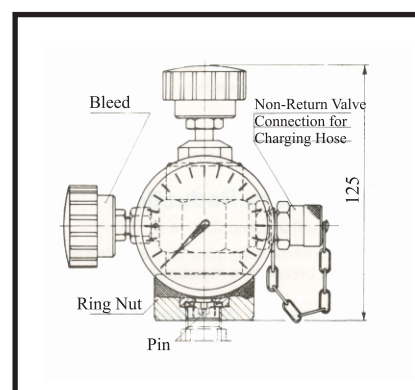
Proceed as follows:

- \* 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<sup>+5</sup>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.**

# Special Instructions

## Certification

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 Clause 3].

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.

## Safety

All pressure vessels must be protected by means of a pressure relief valve in accordance with Directive 2014/68/EU. Safety Blocks type-B are used for this purpose.

The most important elements of the safety-related equipment are the pressure measuring device (pressure gauge), device for the preventing excess pressure (safety valves), non-return valves and shut-off valves and devices for de-pressurising (bleed valves). These functions can be performed with individual components or integrated in the form of a safety block type-B.

## Special Instructions

It is strictly forbidden to:

- weld or solder or carry out any mechanical operations on the accumulator.
- engrave or permanently stamp the surfaces of the accumulator shell and / or carry out other operations that could affect or change the mechanical properties of the accumulator
- use the accumulator as a structural element: it should not be subjected to stresses or loads.
- change the data of the nameplate and / or accumulator without the permission of the manufacturer.
- use a different fluid than those designed for.

## Installation

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.

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.

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.

## 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 ( $\varnothing \geq 6$  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.