



## 1. DESCRIPTION

### 1.1. FUNCTION

Fluids are practically incompressible and cannot therefore store pressure energy. The compressibility of a gas is utilized in hydraulic accumulators for storing fluids.

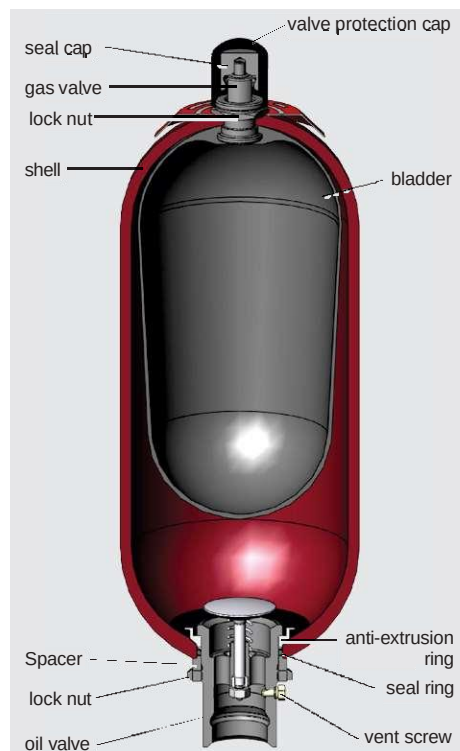
**EURO SERVICES** bladder accumulators are based on this principle, using nitrogen as the compressible medium.

A bladder accumulator consists of a fluid section and a gas section with the bladder acting as the gas-proof separation element. The fluid around the bladder is connected to the hydraulic circuit so that the bladder accumulator draws in fluid when the pressure increases and the gas is compressed. When the pressure drops, the compressed gas expands and force the stored fluid into the circuit.

**EURO SERVICES** bladder accumulators can be used in a wide variety of applications, some of which are listed below:

- energy storage
- emergency operation
- force equilibrium
- leakage compensation
- volume compensation
- shock absorption
- vehicle suspension
- pulsation damping
- Hydraulic Dampers

### 1.2. DESIGN



#### Design

##### ● Standard bladder accumulator SB330/400/500/550

**EURO SERVICES** standard bladder accumulators consist of the pressure vessel, the flexible bladder with gas valve and the hydraulic connection with check-valve. The pressure vessels are seamless and manufactured from high tensile steel.

##### ● Bladder accumulator SB330N

the flow-optimized design of the standard oil valve enables the maximum operating flow rate to increase possible 25 l/s on this accumulator type.

##### ● High flow bladder accumulator

##### SB330H

**EURO SERVICES** High flow bladder accumulators' type SB330 are high performance accumulators with a flow rate up to 30 l/s the fluid port is enlarged to allow higher flow rates

##### SB600

For higher pressures, with ASME U stamp. The series SB600 with approval S ( $p_{max}$  345 bar / 5000 psi)

### 1.3. BLADDER MATERIAL

The bladder material must be selected in accordance with the particular operating medium or operating temperature, see section 2.1

If discharge conditions are unfavorable (high  $p_2/p_0$  pressure ratio, rapid discharge speed), the gas may cool to below the permitted temperature. This can cause cold cracking.

### 1.4 CORROSION PROTECTION

For operation with chemically aggressive media, the accumulator shell can be supplied with corrosion protection, such as chemical nickel-plating. If this is insufficient, then stainless steel hydraulic accumulators must be used

### 1.5 INSTALLATION POSITION

**EURO SERVICES** bladder accumulators can be installed vertically, horizontally and at a slant. When installing vertically or at a slant, the oil valve must be at the bottom. On certain applications listed below, particular positions are preferable:

- Energy storage: vertical
- Pulsation damping: any position from horizontal to vertical
- Maintaining constant pressure: any position from horizontal to vertical
- Volume compensation: vertical

If the installation position is horizontal or at a slant, the effective fluid volume and the maximum permitted flow rate of the operating fluid are reduced.

### 1.6 TYPE OF INSTALLATION

By using an appropriate adapter, **EURO SERVICES** hydraulic accumulators, up to size 1 l, can be installed directly inline.

For strong vibrations and volumes above 1 litre, we recommend the use of **EURO SERVICES** support clamps or the **EURO SERVICES** accumulator installation set.

See catalogue sections:

- Supports for Hydraulic Accumulators No. 3.502
- ACCUSET SB No. 3.503

## 2. SPECIFICATIONS

### 2.1. EXPLANATIONS, NOTES

#### 2.1.1 Operating pressure

see tables in section 3. (PED)

May differ from nominal pressure for other test certificates.

#### 2.1.2 Permitted operating temperature of the hydraulic accumulator

-10 °C ... +80 °C

standard design, others on request

#### 2.1.3 Nominal volume

see tables in section 3.

#### 2.1.4 Effective gas volume

see tables in section 3.

Based on nominal dimensions, this differs slightly from the nominal volume and must be used when calculating the effective fluid volume.

#### 2.1.5 Effective volume

Volume of fluid which is available between the operating pressures  $p_2$  and  $p_1$ .

#### 2.1.6 Max. flow rate of the operating fluid

In order to achieve the max. flow rate given in the tables, the accumulator must be installed vertically. It must be noted that a residual fluid volume of approx. 10 % of the effective gas volume remains in the accumulator.

The maximum fluid flow rate was determined under specific conditions and is not applicable in all operating conditions.

#### 2.1.7 Working temperature and operating medium

The permitted working temperature of a bladder accumulator is dependent on the application limits of the metal materials and the bladder. Outside this temperature range, special materials must be used. The operating medium must also be taken into account.

The following table displays a selection of elastomer materials including max. temperature range and a rough overview of resistant and non-resistant fluids. Please contact us for help in selecting a suitable elastomer.

| Materials |                                       | Material code <sup>1)</sup> | Temperature range  | Overview of the fluids <sup>2)</sup>                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                     |
|-----------|---------------------------------------|-----------------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|           |                                       |                             |                    | Resistant to                                                                                                                                                                                                                              | Not resistant to                                                                                                                                                                                                                                                                    |
| NBR       | Acrylonitrile butadiene rubber        | 2                           | -15 °C ... + 80 °C | <ul style="list-style-type: none"> <li>● Mineral oil (HL, HLP)</li> <li>● Flame-retardant fluids from the groups HFA, HFB, HFC</li> <li>● Synthetic esters (HEES)</li> <li>● Water</li> <li>● Sea water</li> </ul>                        | <ul style="list-style-type: none"> <li>● Aromatic hydrocarbons</li> <li>● Chlorinated hydrocarbons (HFD-S)</li> <li>● Amines and ketones</li> <li>● Operating fluids from the group HFD-R</li> <li>● Fuels</li> </ul>                                                               |
|           |                                       | 5                           | -50 °C ... + 50 °C |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                     |
|           |                                       | 9                           | -30 °C ... + 80 °C |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                     |
| ECO       | Ethylene oxide epichlorohydrin rubber | 3                           | -30 °C ... +120 °C | <ul style="list-style-type: none"> <li>● Mineral oil (HL, HLP)</li> <li>● Flame-resistant fluids from the group HFB</li> <li>● Synthetic esters (HEES)</li> <li>● Water</li> <li>● Sea water</li> </ul>                                   | <ul style="list-style-type: none"> <li>● Aromatic hydrocarbons</li> <li>● Chlorinated hydrocarbons (HFD-S)</li> <li>● Amines and ketones</li> <li>● Operating fluids from the group HFD-R</li> <li>● Flame-resistant fluids from the groups HFA and HFC</li> <li>● Fuels</li> </ul> |
| IIR       | Butyl rubber                          | 4                           | -50 °C ... +100 °C | <ul style="list-style-type: none"> <li>● Operating fluids of type HFD-R</li> <li>● Flame-resistant fluids from the group HFC</li> <li>● Water</li> </ul>                                                                                  | <ul style="list-style-type: none"> <li>● Mineral oils and mineral greases</li> <li>● Synthetic esters (HEES)</li> <li>● Aliphatic, chlorinated and aromatic hydrocarbons</li> <li>● Fuels</li> </ul>                                                                                |
| FKM       | Fluorine rubber                       | 6                           | -10 °C ... +150 °C | <ul style="list-style-type: none"> <li>● Mineral oil (HL, HLP)</li> <li>● Hydraulic fluids from the group HFD,</li> <li>● Synthetic esters (HEES)</li> <li>● Fuels</li> <li>● Aromatic hydrocarbons</li> <li>● Inorganic acids</li> </ul> | <ul style="list-style-type: none"> <li>● Amines and ketones</li> <li>● Ammonia</li> <li>● Skydrol and HyJet IV</li> <li>● Steam</li> </ul>                                                                                                                                          |

<sup>1)</sup> see section 2.2. Model code, material code, accumulator bladder

<sup>2)</sup> others on request

### 2.1.8 Gas charging

Hydraulic accumulators must only be charged with nitrogen.

Never use other gases.

#### Risk of explosion!

In principle, only use nitrogen of at least Class 4.0 (filtration < 3 µm).

If other gases are to be used, please contact us for advice.

### 2.1.9 Limits for gas pre-charge pressure

$$p_0 \leq 0.9 \cdot p_1$$

with a permitted pressure ratio of:

$$p_2 : p_0 \leq 4 : 1$$

$p_2$  = max. operating pressure

$p_0$  = pre-charge pressure

### 2.1.10 Certificate codes

| Country          | Certificate code (AKZ) |
|------------------|------------------------|
| EU member states | U                      |
| Australia        | F <sup>1)</sup>        |
| Belarus          | A6                     |
| Canada           | S1 <sup>1)</sup>       |
| China            | A9                     |
| Hong Kong        | A9                     |
| Iceland          | U                      |
| Japan            | P                      |
| Korea (Republic) | A11                    |
| New Zealand      | T                      |
| Norway           | U                      |
| Russia           | A6                     |
| South Africa     | S2                     |
| Switzerland      | U                      |
| Turkey           | U                      |
| Ukraine          | A10                    |
| USA              | S                      |

<sup>1)</sup> = registration required in the individual territories or provinces  
others on request

On no account must any welding, soldering or mechanical work be carried out on the accumulator shell. After the hydraulic line has been connected it must be completely vented.

Work on systems with hydraulic accumulators (repairs, connecting pressure gauges etc.) must only be carried out once the pressure and the fluid have been released.

**The operating instruction must be observed!**

**No. 3.201.BA**

### 2.1.11 Gas-side connection standard model

| Series        | Volume [l] | Gas valve type      |
|---------------|------------|---------------------|
| SB330 / SB400 | < 1        | 5/8-18UNF           |
|               | < 50       | 7/8-14UNF           |
|               | ≥ 50       | M50x1.5 / 7/8-14UNF |
| SB500 / SB600 | 10 ... 50  | M50x1.5 / 7/8-14UNF |
| SB550         | 1 ... 5    | 7/8-14UNF           |

other pressure ranges on request

## 2.2. MODEL CODE

Not all combinations are possible. Order example. For further information, please contact **EURO SERVICES**.

**SB330 (H) – 32 A 1 / 112 U – 330 A 050**

### Series

#### Type code

no details = standard

H = high flow

N = flow-optimised valve, fluid side

A = shock absorber

P = pulsation damper <sup>3)</sup>

B = bladder top-removable

E = bladder with foam filling

DA = bladder integrity system, industry model  
(others on request)

L = light weight

Combinations must be agreed with **EURO SERVICES**.

#### Nominal volume [l]

#### Fluid connection

A = standard connection, thread with internal seal face

F = flange connection

C = valve mounting with screws on underside

E = sealing surfaces on front interface  
(e.g. on thread M50x1.5 - valve)

G = male thread

S = special connection, to customer specification

#### Gas side

1 = standard design (see section 2.1.11)

2 = back-up version <sup>4)</sup>

3 = gas valve 7/8-14UNF with M8 internal thread

4 = gas valve 7/8-14UNF with gas valve connection 5/8-18UNF

5 = gas valve M50x1.5 in accumulators smaller than 50 l

6 = 7/8-14UNF gas valve

7 = M28x1.5 gas valve

8 = M16x1.5 gas valve

(with M14x1.5 bore in gas valve)

9 = special gas valve, to customer specification

#### Material code

dependent on operating medium

standard model = 112 for mineral oils

others on request

#### Fluid connection

1 = carbon steel

2 = high tensile steel

3 = stainless steel <sup>2)</sup>

6 = low temperature steel

#### Accumulator shell

0 = plastic coated (internally)

1 = carbon steel

2 = chemically nickel-plated (internal coating)

4 = stainless steel <sup>2)</sup>

6 = low temperature steel

#### Accumulator bladder <sup>1)</sup>

2 = NBR <sup>5)</sup>

3 = ECO

4 = IIR

5 = NBR <sup>5)</sup>

6 = FKM

7 = other

9 = NBR <sup>5)</sup>

#### Certification code

U = European Pressure Equipment Directive (PED)

#### Permitted operating pressure [bar]

#### Connection, fluid side

Thread, codes for fluid connections: A, C, E, G

A = thread to ISO 228 (BSP)

B = thread to DIN13 or ISO 965/1 (metric)

C = thread to ANSI B1.1 (UN..-2B seal SAE J 514)

D = thread to ANSI B1.20.1 (NPT)

S = special thread, to customer specification

Flange, codes for fluid connection: F

A = EN 1092-1 welding neck flange

B = flange ASME B16.5

C = SAE flange 3000 psi

D = SAE flange 6000 psi

S = special flange, to customer specification

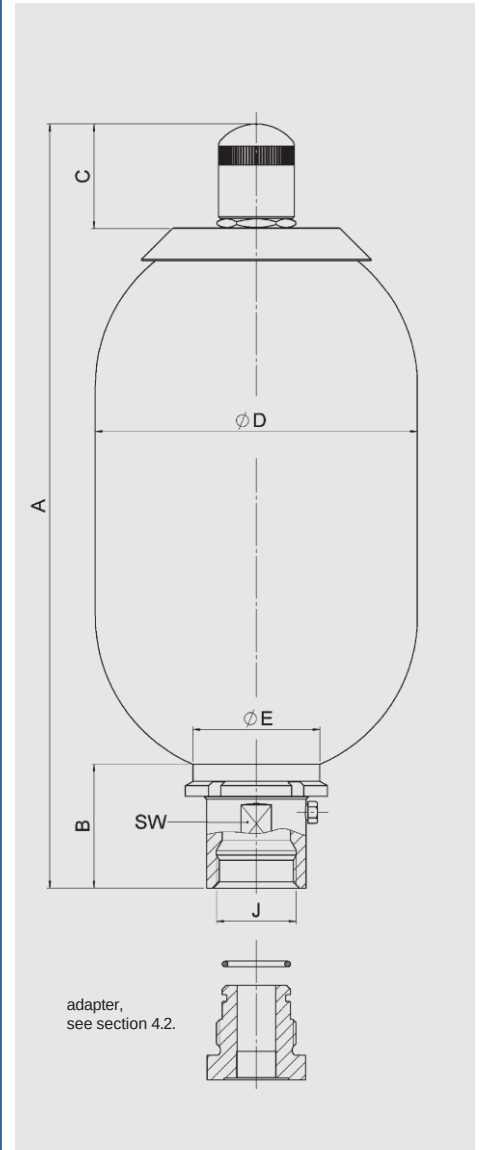
**Pre-charge pressure  $p_0$  [bar] at 20 °C, must be stated clearly, if required!**

<sup>1)</sup> when ordering a replacement bladder, state diameter of the smaller shell port

<sup>2)</sup> dependent on type and pressure range

## 3. DIMENSIONS AND SPARE PARTS

### 3.1. DIMENSIONS



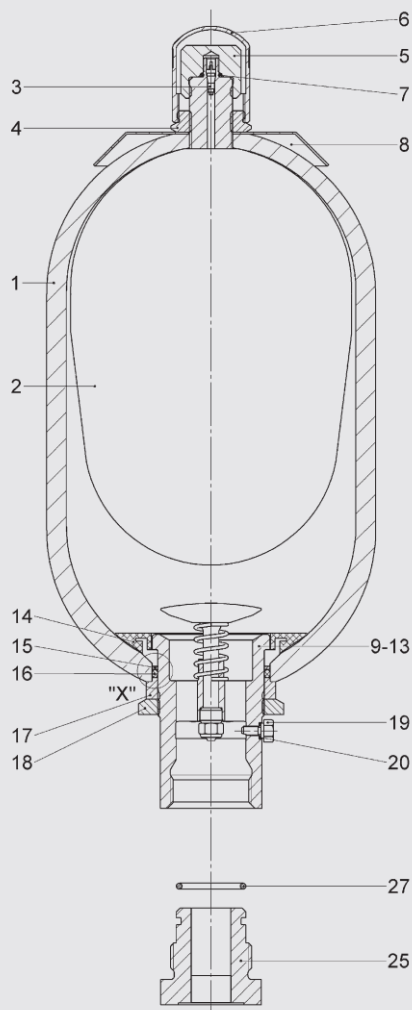
## NBR, carbon steel

| Nominal<br>volume | Series | Max. operating pressure     |          |                             |          | Eff. gas<br>volume | A<br>max. | W   | C    | Ø D<br>max. | J<br>Thread | Ø E | SW      | Q <sup>1)</sup> | Weight |     |    |  |  |  |
|-------------------|--------|-----------------------------|----------|-----------------------------|----------|--------------------|-----------|-----|------|-------------|-------------|-----|---------|-----------------|--------|-----|----|--|--|--|
|                   |        | Certificate code<br>(AKZ) U |          | Certificate code<br>(AKZ) S |          |                    |           |     |      |             |             |     |         |                 |        |     |    |  |  |  |
|                   |        | [bar]                       | Part no. | [bar]                       | Part no. |                    |           |     |      |             |             |     |         |                 |        |     |    |  |  |  |
| [l]               |        |                             |          |                             |          |                    |           |     |      |             |             |     |         |                 |        |     |    |  |  |  |
| 0.5               | SB400  | 400                         | 3047163  | —                           | —        | 0.5                | 270       | 57  | 33.5 | 96          | G 3/4       | 50  | 32      | 4               | 4      |     |    |  |  |  |
| 1                 | SB330  | 330                         | 3047162  | —                           | —        | 1                  | 316       | 57  | 56   | 115         | G 3/4       | 50  | 32      | 4               | 7      |     |    |  |  |  |
|                   | SB550  | 550                         | 3110531  | —                           | —        |                    | 343       | 67  |      | 123         | G 1         | 67  | 45      | 6               | 10     |     |    |  |  |  |
| 2.5               | SB330  | 330                         | 3047165  | —                           | —        | 2.4                | 528       | 64  | 56   | 115         | G 1 1/4     | 67  | 50      | 10              | 11     |     |    |  |  |  |
|                   | SB550  | 550                         | 3068916  | —                           | —        | 2.5                | 550       | 67  |      | 123         | G 1         |     | 45      | 6               | 14     |     |    |  |  |  |
| 4                 | SB330  | 330                         | 3047166  | —                           | —        | 3.7                | 412       | 65  | 56   | 170         | G 1 1/4     | 67  | 50      | 10              | 15     |     |    |  |  |  |
|                   | SB400  | 400                         | 3017905  | —                           | —        |                    |           |     |      |             |             |     |         |                 |        |     |    |  |  |  |
| 5                 | SB550  | 550                         | 3090654  | —                           | —        | 4.9                | 876       | 64  | 56   | 123         | G 1         | 67  | 45      | 6               | 17     |     |    |  |  |  |
| 6                 | SB330  | 330                         | 3047168  | —                           | —        | 5.7                | 534       | 65  | 56   | 170         | G 1 1/4     | 67  | 50      | 10              | 18     |     |    |  |  |  |
| 10 <sup>2)</sup>  | SB330  | 330                         | 3047170  | —                           | —        | 9.3                | 810       | 65  | 56   | 170         | G 1 1/4     | 67  | 50      | 10              | 31     |     |    |  |  |  |
| 10                | SB330  | 330                         | 3047172  | 262                         | 3141237  | 9.3                | 582       | 101 | 56   | 229         | G 2         | 100 | 70      | 15              | 33     |     |    |  |  |  |
|                   | SB330N |                             | 3156632  | —                           | —        |                    |           |     |      |             | G 2 1/2     |     |         | 25              | 34     |     |    |  |  |  |
|                   | SB330H |                             | 3079081  | —                           | —        | 9                  | 617       | 136 |      |             | G 2 1/2     | 125 | 90      | 30              | 38     |     |    |  |  |  |
|                   | SB400  | 400                         | 3107393  | —                           | —        | 9.3                | 578       | 101 |      | 234         | G 2         | 100 | 70      | 15              | 41     |     |    |  |  |  |
|                   | SB500  | 500                         | 3130252  | —                           | —        | 8.8                | 598       |     | 69   | 241         |             |     |         |                 | 46     |     |    |  |  |  |
|                   | SB600  | —                           | —        | 345                         | 332265   |                    |           |     |      |             |             |     |         |                 |        |     |    |  |  |  |
| 13                | SB330  | 330                         | 3047173  | —                           | —        | 12                 | 695       | 101 | 56   | 229         | G 2         | 100 | 70      | 15              | 46     |     |    |  |  |  |
|                   | SB330N |                             | —        | —                           | G 2 1/2  |                    |           |     |      |             | 25          |     |         | 47              |        |     |    |  |  |  |
|                   | SB330H |                             | —        | —                           | G 2 1/2  |                    |           |     |      |             | 125         | 90  | 30      | 45              |        |     |    |  |  |  |
|                   | SB400  | 400                         | —        | —                           | —        |                    | 695       | 101 |      | 234         | G 2         | 100 | 70      | 15              | 49     |     |    |  |  |  |
| 20                | SB330  | 330                         | 3047174  | 262                         | 3117153  | 18.4               | 895       | 101 | 56   | 229         | G 2         | 100 | 70      | 15              | 49     |     |    |  |  |  |
|                   | SB330N |                             | 3162982  | —                           | —        |                    |           |     |      |             | G 2 1/2     |     |         | 25              |        |     |    |  |  |  |
|                   | SB330H |                             | 3092659  | —                           | —        | 17.5               | 930       | 136 |      |             | G 2 1/2     | 125 | 90      | 30              | 62     |     |    |  |  |  |
|                   | SB400  | 400                         | 3115007  | —                           | —        | 18.4               | 895       | 101 |      | 234         | G 2         | 100 | 70      | 15              | 71     |     |    |  |  |  |
|                   | SB500  | 500                         | 3118156  | —                           | —        | 17                 | 913       |     | 69   | 241         |             | 110 | 75      | 15              | 77     |     |    |  |  |  |
|                   | SB600  | —                           | —        | 345                         | 332266   |                    |           |     |      |             |             |     |         |                 |        |     |    |  |  |  |
| 24                | SB330  | 330                         | 3047175  | —                           | —        | 23.6               | 1060      | 101 | 56   | 229         | G 2         | 100 | 70      | 15              | 72     |     |    |  |  |  |
|                   | SB330N |                             | —        | —                           | G 2 1/2  |                    |           |     |      |             | 25          |     |         | 73              |        |     |    |  |  |  |
|                   | SB330H |                             | —        | —                           | 24       |                    |           |     |      |             | 1095        | 136 | G 2 1/2 | 125             | 90     | 30  | 76 |  |  |  |
| 32                | SB330  | 330                         | 3047176  | 262                         | 3117154  | 33.9               | 1410      | 101 | 56   | 229         | G 2         | 100 | 70      | 15              | 80     |     |    |  |  |  |
|                   | SB330N |                             | 3220899  | —                           | —        |                    |           |     |      |             | G 2 1/2     |     |         | 25              | 81     |     |    |  |  |  |
|                   | SB330H |                             | 3059515  | —                           | —        | 32.5               | 1445      | 136 |      |             | G 2 1/2     | 125 | 90      | 30              | 98     |     |    |  |  |  |
|                   | SB400  | 400                         | 3125141  | 290                         | —        | 33.9               | 1410      | 101 |      | 234         | G 2         | 100 | 70      | 15              | 104    |     |    |  |  |  |
|                   | SB500  | 500                         | 3760577  | —                           | —        | 33.5               | 1423      |     | 69   | 241         |             | 110 | 75      | 15              | 112    |     |    |  |  |  |
|                   | SB600  | —                           | —        | 345                         | 332267   |                    |           |     |      |             |             |     |         |                 |        |     |    |  |  |  |
| 50                | SB330  | 330                         | 3047177  | 262                         | 362904   | 47.5               | 1933      | 101 | 69   | 229         | G 2         | 100 | 70      | 15              | 114    |     |    |  |  |  |
|                   | SB330N |                             | 3185604  | —                           | —        |                    |           |     |      |             | G 2 1/2     |     |         | 25              | 115    |     |    |  |  |  |
|                   | SB330H |                             | 3089605  | —                           | —        |                    |           |     |      |             | G 2 1/2     | 125 | 90      | 30              | 128    |     |    |  |  |  |
|                   | SB400  | 400                         | 3114662  | —                           | —        | 48.3               | 1933      | 101 |      | 234         | G 2         | 100 | 70      | 15              | 137    |     |    |  |  |  |
|                   | SB500  | 500                         | 3130253  | —                           | —        |                    |           |     |      | 241         |             |     |         |                 |        | 167 |    |  |  |  |
|                   | SB600  | —                           | —        | 345                         | 332268   |                    |           |     |      |             |             |     |         |                 |        |     |    |  |  |  |
| 60                | SB330  | 330                         | 3341217  | —                           | —        | 60                 | 1210      | 138 | 69   | 360         | G 2 1/2     | 125 | 90      | 30              | 160    |     |    |  |  |  |
| 80                | SB330  | 330                         | —        | —                           | —        | 85                 | 1460      | 138 | 69   | 360         | G 2 1/2     | 125 | 90      | 30              | 200    |     |    |  |  |  |
| 100               | SB330  | 330                         | 3098489  | —                           | —        | 105                | 1710      | 138 | 69   | 360         | G 2 1/2     | 125 | 90      | 30              | 234    |     |    |  |  |  |
| 130               | SB330  | 330                         | —        | —                           | —        | 133                | 2030      | 138 | 69   | 360         | G 2 1/2     | 125 | 90      | 30              | 283    |     |    |  |  |  |
| 160               | SB330  | 330                         | —        | —                           | —        | 170                | 2059      | 137 | 69   | 410         | G 2 1/2     | 125 | 90      | 30              | 345    |     |    |  |  |  |
| 200               | SB330  | 330                         | —        | —                           | —        | 201                | 2359      | 137 | 69   | 410         | G 2 1/2     | 125 | 90      | 30              | 403    |     |    |  |  |  |

<sup>1)</sup> Q = max. flow rate of the operating fluid under optimum conditions<sup>2)</sup> slimline version, for confined installation spaces

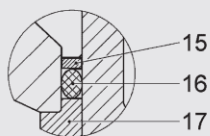
### 3.2. SPARE PARTS

**SB330/400/500/550/600  
SB330H / SB330N**

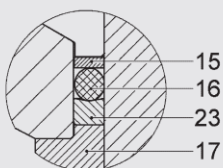


#### Detail "X"

SB330/400 – 0.5 ... 6 l  
SB330 – 10 l slimline version



SB330/400/500/600 – 10 ... 50 l  
SB330 - 60 ... 200 l  
SB330H/N – 10 ... 50 l  
SB550 – 1 ... 5 l



| Description                           | Item |
|---------------------------------------|------|
| <b>Bladder assembly <sup>1)</sup></b> |      |
| consisting of:                        |      |
| Bladder                               | 2    |
| Gas valve insert*                     | 3    |
| Lock nut                              | 4    |
| Seal cap                              | 5    |
| Protective cap                        | 6    |
| O-ring                                | 7    |
| <b>Seal kit</b>                       |      |
| consisting of:                        |      |
| O-ring                                | 7    |
| Washer                                | 15   |
| O-ring                                | 16   |
| Vent screw                            | 19   |
| Support ring                          | 23   |
| O-ring                                | 27   |
| <b>Repair kit <sup>1)</sup></b>       |      |
| consisting of:                        |      |
| Bladder assembly (see above)          |      |
| Seal kit (see above)                  |      |
| <b>Oil valve assembly</b>             |      |
| consisting of:                        |      |
| Valve                                 | 9-13 |
| Anti-extrusion ring*                  | 14   |
| Washer                                | 15   |
| O-ring                                | 16   |
| Spacer                                | 17   |
| Lock nut                              | 18   |
| Vent screw                            | 19   |
| Support ring                          | 23   |

\* available separately

<sup>1)</sup> when ordering, please state diameter of the smaller shell port

Accumulator shell (item 1) and company label (item 8) not available as a spare part

Vent screw (item 19) for NBR/carbon steel:

seal ring (item 20) included

Adapter (item 25) incl. O-ring (item 27)

available as an accessory, section 4.

SB330/400

NBR, carbon steel  
standard gas valve

| Volume [l] | Bladder assembly      | Seal kit              | Repair kit            |
|------------|-----------------------|-----------------------|-----------------------|
| 0.5        | 365263                | 353606                | 2128169 <sup>2)</sup> |
| 1          | 237624                |                       | 2106261               |
| 2.5        | 236171                |                       | 2106200               |
| 4          | 236046                | 353609                | 2106204               |
| 5          | 240917                |                       | 2106208               |
| 6          | 2112097               |                       | 2112100               |
| 10*        | 2127255 <sup>1)</sup> |                       | 3117512 <sup>1)</sup> |
| 10         | 236088                | 353621                | 2106212               |
| 13         | 376249                |                       | 2106216               |
| 20         | 236089                |                       | 2106220               |
| 24         | 376253                |                       | 2106224               |
| 32         | 235335                |                       | 2106228               |
| 50         | 235290                |                       | 2106252               |
| 60         | 3364274               | 3102043 <sup>1)</sup> | 3117513               |
| 80         | 3364312               |                       | 3117514               |
| 100        | 3127313               |                       | 3117515               |
| 130        | 3201384               |                       | 3117516               |
| 160        | 3184769               |                       | 3117517               |
| 200        | 3461300               |                       | 3117558               |

| Volume [l] | Oil valve assembly | Anti-extrusion ring | Gas valve insert |  |
|------------|--------------------|---------------------|------------------|--|
| 0.5        | 2102355            | 2105411             | 632865           |  |
| 1          |                    |                     |                  |  |
| 2.5        |                    | 2105431             |                  |  |
| 4          | 238523             | 2105451             |                  |  |
| 5          | 236045             | 2105431             |                  |  |
| 6          | 238523             | 2105451             |                  |  |
| 10*        |                    |                     |                  |  |
| 10         |                    |                     |                  |  |
| 13         | 352572             | 2105491             |                  |  |
| 20         |                    |                     |                  |  |
| 24         |                    |                     |                  |  |
| 32         |                    |                     |                  |  |
| 50         | 3273734            | 3102326             |                  |  |
| 60         |                    |                     |                  |  |
| 80         |                    |                     |                  |  |
| 100        |                    |                     |                  |  |
| 130        |                    |                     |                  |  |
| 160        |                    |                     |                  |  |
| 200        |                    |                     |                  |  |

\* slimline version, for confined installation spaces

<sup>1)</sup> only for SB330

<sup>2)</sup> only for SB400

others on request

**When replacing seals and/or bladders, please read the Instructions for Assembly and Repair (No. 3.201.M).**



4. ACCESSORIES FOR BLADDER ACCUMULATORS

4.1. ADAPTERS (GAS SIDE)

The adapters shown below are available for standard connections on bladder accumulators and must be specified separately in the order.

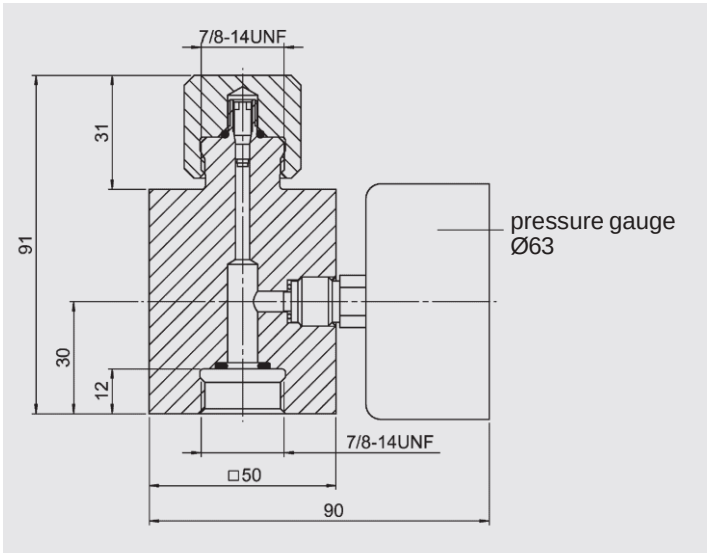
4.1.1 Adapter for safety devices

Adapter for connecting safety devices, such as burst disc or temperature fuse, see brochure section:

- Safety Equipment for Hydraulic Accumulators No. 3.552

4.1.2 Pressure gauge model

Gas-side connection on the bladder accumulator for permanent monitoring of the pre-charge pressure

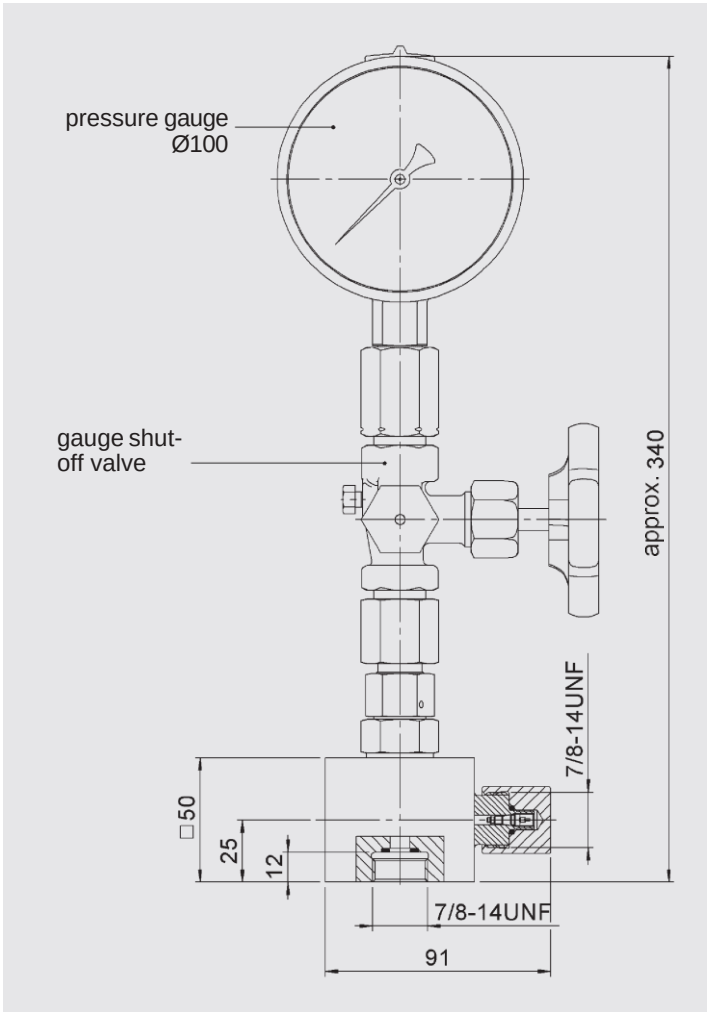


| Gauge indication range | Pressure gauge Part no. | Adapter* assembly Part no. |
|------------------------|-------------------------|----------------------------|
| –                      | –                       | 366621                     |
| 0 - 10 bar             | 614420                  | 2108416                    |
| 0 - 60 bar             | 606886                  | 3093386                    |
| 0 - 100 bar            | 606887                  | 2104778                    |
| 0 - 160 bar            | 606888                  | 3032348                    |
| 0 - 250 bar            | 606889                  | 2100217                    |
| 0 - 400 bar            | 606890                  | 2102117                    |

\* p<sub>max</sub> = 400 bar

4.1.3 Pressure gauge model with shut-off valve

Gas side connection on the bladder accumulator for permanent monitoring of the pre-charge pressure with shut-off option.



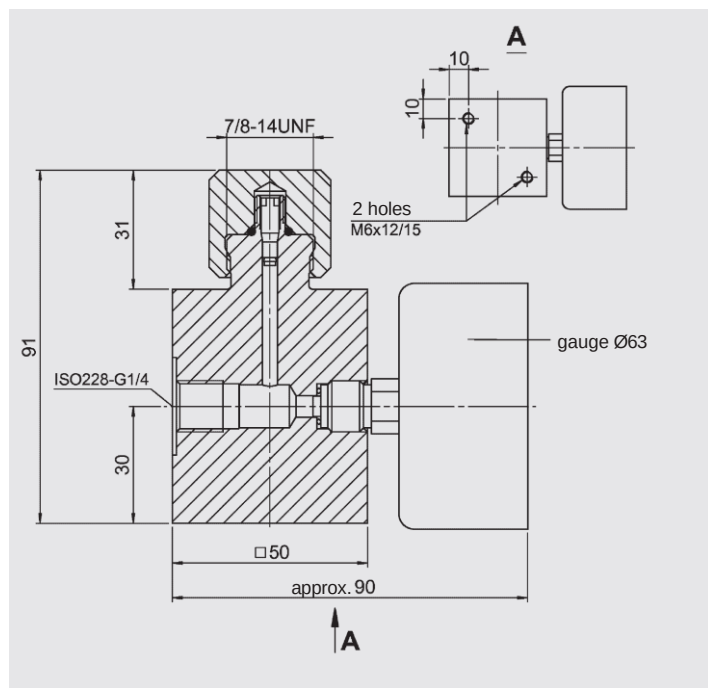
| Gauge indication range | Pressure gauge Part no. | Adapter* assembly Part no. |
|------------------------|-------------------------|----------------------------|
| –                      | –                       | 2103381                    |
| 0 - 25 bar             | 617928                  | 3784725                    |
| 0 - 60 bar             | 606771                  | 2110059                    |
| 0 - 100 bar            | 606772                  | 3139314                    |
| 0 - 160 bar            | 606773                  | 3202970                    |
| 0 - 250 bar            | 606774                  | 3194154                    |
| 0 - 400 bar            | 606775                  | 2103226                    |

\* p<sub>max</sub> = 400 bar

#### 4.1.4 Remote monitoring of the pre-charge pressure

To monitor the pre-charge pressure in hydraulic accumulators remotely, gas-side adapters with pressure gauge and mounting holes are available.

In order to connect these adapters directly to the hydraulic accumulator using appropriate lines, accumulator connectors are also available for connection at the top (see figure 1) or for side connection (see figure 2).



| Gauge indication range | Pressure gauge Part no. | Adapter* assembly Part no. |
|------------------------|-------------------------|----------------------------|
| —                      | —                       | 3037666                    |
| 0 - 10 bar             | 614420                  | 3095818                    |
| 0 - 60 bar             | 606886                  | 3095819                    |
| 0 - 100 bar            | 606887                  | 3095820                    |
| 0 - 160 bar            | 606888                  | 3095821                    |
| 0 - 250 bar            | 606889                  | 3095822                    |
| 0 - 400 bar            | 606890                  | 3095823                    |

\* p<sub>max</sub> = 400 bar

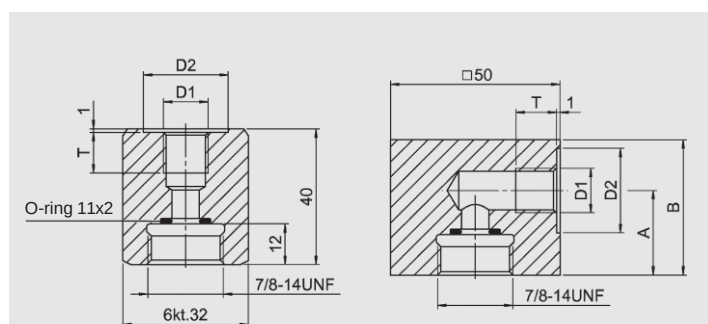


Figure 1

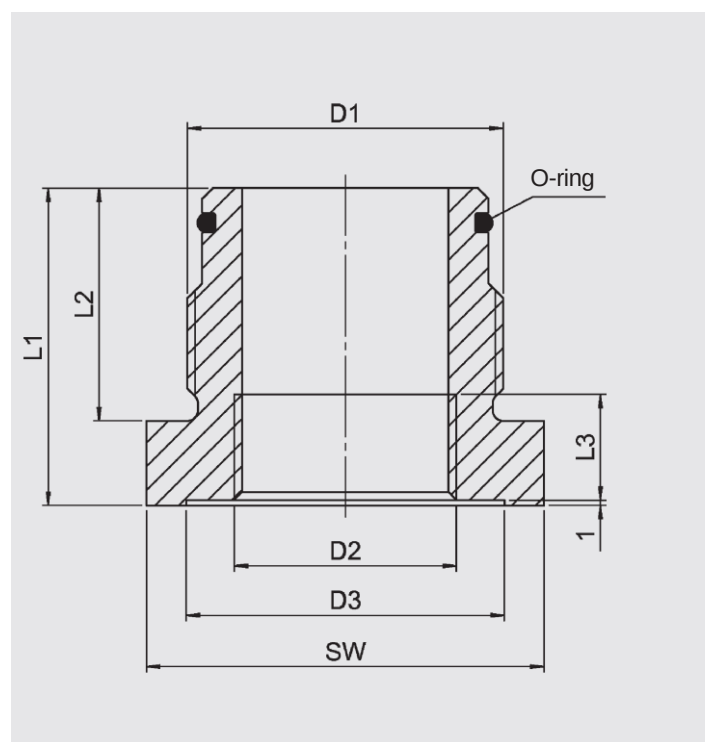
Figure 2

| D1 Threaded connection | D2 [mm] | T [mm] | A [mm] | B [mm] | Adapter* assembly Part no. | Figure |
|------------------------|---------|--------|--------|--------|----------------------------|--------|
| ISO 228 - G 1/4        | 25      | 14     | -      | -      | 2109481                    | 1      |
|                        |         |        | 25     | 40     | 2102042                    | 2      |
| ISO 228 - G 3/8        | 28      | 14     | -      | -      | 2109483                    | 1      |
|                        |         |        | 25     | 40     | 366607                     | 2      |
| ISO 228 - G 1/2        | 34      | 16     | -      | -      | 2110636                    | 1      |
|                        |         |        | 31     | 55     | 366608                     | 2      |

\* p<sub>max</sub> = 400 bar

#### 4.2. ADAPTERS FOR STANDARD BLADDER ACCUMULATOR (FLUID SIDE)

to connect the bladder accumulator to threaded pipe fittings. These are available separately.



| D1 Accum. conn.* | D2            | D3 [mm] | L1 [mm] | L2 [mm] | L3 [mm] | SW [mm] | O-ring [mm] | Part no.          |
|------------------|---------------|---------|---------|---------|---------|---------|-------------|-------------------|
| ISO 228 - BSP    | ISO 228 - BSP | [mm]    | [mm]    | [mm]    | [mm]    | [mm]    | [mm]        | NBR/ Carbon steel |
| G 3/4            | G 3/8         | 28      | 55      | 28      | 12      | 32      | 17x3        | 2104346           |
|                  | G 1/2         | 34      | 60      | 37      | 14      | 36      | 17x3        | 2104348           |
| G 1 1/4          | G 3/8         | 28      | 55      | 28      | 12      | 32      | 17x3        | 2116345           |
|                  | G 1/2         | 34      | 60      | 37      | 14      | 36      | 17x3        | 2105232           |
|                  | G 3/4         | 44      | 80      | 44      | 16      | 46      | 30x3        | 2104384           |
|                  | G 1           | 50      | 88      | 50      | 18      | 65      | 30x3        | 2110124           |
| G 2              | G 1/2         | 34      | 60      | 37      | 14      | 36      | 17x3        | 2104853           |
|                  | G 3/4         | 44      | 80      | 44      | 16      | 46      | 30x3        | 2104849           |
|                  | G 1           | 50      | 88      | 50      | 18      | 65      | 30x3        | 2124831           |
|                  | G 1 1/4       | 60      | 96      | 58      | 20      | 70      | 48x3        | 2107113           |
|                  | G 1 1/2       | 68      | 104     | 66      | 22      | 80      | 48x3        | 2105905           |
| G 2 1/2          | G 1 1/4       | 60      | 96      | 58      | 20      | 70      | 48x3        | 2127406           |
|                  | G 1 1/2       | 68      | 104     | 66      | 22      | 80      | 62x4        | 3243831           |
|                  | G 2           | 96      | 120     | 80      | 27      | 100     | 62x4        | 2113403           |

\* others on request

#### 5. NOTE

The information in this brochure relates to the operating conditions and fields of application described. For fields of application and operating conditions not described, please contact the relevant technical department. Subject to technical modifications.

#### CONTACT

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