rexroth
A Bosch Company

Diaphragm type accumulator

Type HAD...-1X/ and HAD...-2X/

Operating instructions
RE 50150-B/10.20

Replaces: 12.11
English

The data specified serves to describe the product. If information on the use of the product is given, it is only to be regarded as application examples and recommendations. Catalog information does not constitute warranted properties. The information given does not release the user from the obligation of own judgment and verification. Our products are subject to a natural process of wear and aging.

The cover shows an example configuration. The product supplied may therefore differ from the figure shown.

The original operating instructions were prepared in German.

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ES: Este producto únicamente podrá utilizarse cuando disponga de las instrucciones de servicio en un idioma que entienda y haya entendido su contenido. En caso contrario, diríjase a su persona de contacto de Bosch Rexroth o al servicio técnico competente, que podrá encontrar también en la dirección www.boschrexroth.com.

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HU: A terméket csak akkor szabad használni, ha ez a kezelési útmutató rendelkezésre áll az Ön számára érthető egyik nyelven, és megértette annak tartalmát. Egyéb esetben forduljon a Bosch Rexroth kapcsolattartójához vagy az illetékes szervizhez. Ezeket is megtalálja az alábbi címen: www.boschrexroth.com.

IT: Questo prodotto può essere impiegato solo se si dispone del presente manuale d'uso in una lingua conosciuta e se ne è stato compreso il contenuto. In caso contrario rivolgersi al referente Bosch Rexroth o al punto di assistenza competente. Questi sono anche riportati sul sito www.boschrexroth.com.

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PL: Przed przystąpieniem do eksploatacji niniejszego produktu należy zapoznać się z instrukcją obsługi w Państwa wersji językowej. W przypadku, gdy nie dołączono instrukcji w danym języku, należy zwrócić się z zapytaniem do osoby kontaktowej Bosch Rexroth lub do odpowiedniego punktu obsługi. Listę takich punktów można znaleźć na stronie www.boschrexroth.com.

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ZH: 使用该产品前，请您确保已拥有一份您所熟悉语言版本的使用说明书并已理解其内容。 如果尚未拥有，请向博世力士乐合作伙伴或相关服务部门索取，也可登录 www.boschrexroth.com 下载。

Contents

1 About this documentation

1.1 Validity of the documentation

This documentation applies to the following products:

• Diaphragm type accumulator HAD...-1X/ and HAD...-2X/

This documentation is intended for machine/system manufacturers, assemblers and service engineers.

This documentation contains important information on the safe and proper transport, assembly, commissioning, maintenance, disassembly and simple troubleshooting of the diaphragm type accumulator HAD...-1X/ and HAD...-2X/.

- ▶ You should read this documentation thoroughly and in particular the chapters 2 "Safety instructions" and 3 "General information on damage to property and damage to product" before working with the diaphragm type accumulator HAD...-1X/ and HAD...-2X/.

1.2 Required and amending documentation

- ▶ Only commission the diaphragm type accumulator HAD...-1X/ and HAD...-2X/ if you have been provided with the documentation marked with the book symbol 🕮 and you have understood and observed it.

Table 1: Required and amending documentation

	Title	Document number	Document type
🕮	**Diaphragm type accumulator type HAD, series 1X and 2X**	50150	Data sheet
	Hydraulic Fluids Based on Mineral Oils and Related Hydrocarbons	90220	Data sheet
	Environmentally compatible hydraulic fluid	90221	Data sheet
	Flame-resistant, water-free hydraulic fluids (HFDR/HFDU)	90222	Data sheet
	Flame-resistant hydraulic fluids - containing water (HFAE, HFAS, HFB, HFC)	90223	Data sheet
	General product information on hydraulic products	07008	Operating instructions
	Installation, commissioning, maintenance of hydraulic systems	07900	Data sheet

The diaphragm type accumulator HAD...-1X/ and HAD...-2X/ is a system component.

- ▶ Also observe the instructions for the other system components and the system manufacturer’s documentation.

1.3 Representation of information

Consistent safety instructions, symbols, terms and abbreviations are used in this documentation so that you can quickly and safely work with your product. For a better understanding, they are explained in the following sections.

1.3.1 Safety instructions

In this documentation, safety instructions are included in chapter 2.6 "Product-specific safety instructions" and in chapter 3 "General information on damage to property and damage to the product" and whenever a sequence of actions or instructions are explained which bear the risk of personal injury or damage to property. The hazard avoidance measures described must be observed.

Safety instructions are set out as follows:

⚠ SIGNAL WORD

Type and source of danger!
Consequences in case of non-compliance
- Hazard avoidance measures
- <Enumeration>

- **Warning sign:** Draws attention to the danger
- **Signal word:** Identifies the degree of danger
- **Type and source of danger:** Specifies the type and source of danger
- **Consequences:** Describes the consequences of non-compliance
- **Precaution:** Specifies how the danger can be prevented

Table 2: Risk classes according to ANSI Z535.6-2006

Warning sign, signal word	Meaning
⚠ DANGER	Indicates a dangerous situation which will cause death or severe injury if not avoided.
⚠ WARNING	Indicates a dangerous situation which may cause death or severe injury if not avoided.
⚠ CAUTION	Indicates a dangerous situation which may cause minor or medium (personal) injury if not avoided.
NOTICE	Damage to property: The product or the environment could be damaged.

1.3.2 Symbols

The following symbols indicate notes which are not safety-relevant but increase the comprehensibility of the documentation.

Table 3: Meaning of the symbols

Symbol	Meaning
	If this information is not observed, the product cannot be optimally used and/or operated.
▶	Individual, independent action
1. 2. 3.	Numbered instruction: The numbers indicate that the actions must be carried out one after the other.

1.3.3 Abbreviations

The following abbreviations are used in this documentation:

Table 4: Abbreviations

Abbreviation	Meaning
Type HAD...-1X/ and HAD...-2X/	Diaphragm type accumulator HAD series 1X and 2X
RD	Rexroth document in German language

2 Safety instructions

2.1 General information on this chapter

The diaphragm type accumulator HAD..1X and HAD...-2X/ was manufactured according to the generally accepted code of practice. However, there is still the danger of personal injury and damage to property if you do not observe this chapter and the safety instructions in this documentation.

- Read this documentation completely and thoroughly before working with the diaphragm type accumulator HAD...-1X/ and HAD...-2X/.
- Keep this documentation in a location where it is accessible to all users at all times.
- Always include the required documentation when you pass the diaphragm type accumulator HAD...-1X/ and HAD...-2X/ on to third parties.

2.2 Intended use

Diaphragm type accumulators are hydraulic components intended for the installation into hydraulic drive systems for the purposes of energy storage, shock and vibration absorption, and leakage oil or volume compensation.
Diaphragm type accumulators are pressure equipment in the sense of the Pressure Equipment Directive 2014/68/EU.
The diaphragm type accumulator HAD...-1X/ and HAD...-2X/ is exclusively intended for integration into a machine or system or to be assembled with other components to form a machine or system.
During project planning, the basic principles of the Pressure Equipment Directive and the Machinery Directive are to be observed for the intended use of the diaphragm type accumulator within the EU. For the intended use outside the EU, the regulations valid in your country must be observed.
The diaphragm type accumulator may only be commissioned if it has been integrated into the machine/system for which it is intended and after it was confirmed that the machine/system complies with the provisions of the Machinery Directive, the Pressure Equipment Directive and other locally applicable provisions.
Imperatively observe the technical data, operating conditions and limits of performance specified in data sheet 50150.
The diaphragm type accumulator is a technical equipment and not intended for private use.
Intended use also includes having read and understood these operating instructions completely, especially the chapters 2 "Safety instructions" and 3 "General information on damage to property and damage to the product".

2.3 Improper use

Any use deviating from the intended use is improper and thus inadmissible.
Bosch Rexroth AG does not assume any liability for damage caused by improper use.
The user assumes all risks involved with improper use.
Improper use of the diaphragm type accumulator includes:

- Use outside the admissible operating data according to data sheet 50150, e.g. exceeding the maximum operating pressure specified in the data sheet and indicated on the device
- Charging the diaphragm type accumulator with a gas other than nitrogen (at least cleanliness class 4.0, N_2 99.99 vol.%)
- Operation of the diaphragm type accumulator using group 1 hydraulic fluids (potentially explosive, inflammable, fire-accelerating, toxic) or corrosive fluids
- Performing welding or soldering works at the diaphragm type accumulator
- Mechanical processing of the diaphragm type accumulator

2.4 Qualification of personnel

The activities described in this documentation require basic knowledge of mechanics and hydraulics as well as knowledge of the appropriate technical terms. For transporting and handling the product, additional knowledge of how to handle lifting gear and the necessary attachment devices is required. In order to ensure safe use, these activities may only be carried out by an expert in the respective field or an instructed person under the direction and supervision of an expert.

Experts are those who can recognize potential dangers and apply the appropriate safety measures due to their professional training, knowledge and experience, as well as their understanding of the relevant conditions pertaining to the work to be undertaken. An expert must observe the relevant specific professional rules and have the necessary hydraulic expert knowledge.
Hydraulic expert knowledge means, among other things:

- Reading and completely understanding hydraulic schemes,
- in particular, completely understanding the correlations regarding the safety equipment and
- having knowledge of the function and set-up of hydraulic components.

The expert has to have successfully passed a training for qualified persons for pressure vessels and regularly have attended further trainings.

Bosch Rexroth offers training measures in specific fields. An overview over the training contents can be found online at:
`http://www.boschrexroth.com/training`.

2.5 General safety instructions

- Observe the valid regulations on accident prevention and environmental protection.
- Observe the safety regulations and provisions of the country in which the product is used/applied.
- Exclusively use Rexroth products in technically perfect condition.
- Observe all notes on the product.
- Persons who assemble, operate, disassemble or maintain Rexroth products must not consume any alcohol, drugs or pharmaceuticals that may affect their ability to react.
- Only use spare parts approved by the manufacturer in order to exclude any hazard to persons due to unsuitable spare parts.
- Comply with the technical data and environmental conditions indicated in the product documentation and on the type cap.
- The installation or use of inappropriate products in safety-relevant applications could result in unintended operating states when being used which in turn could cause personal injuries and/or damage to property. Therefore, only use a product for safety-relevant applications if this use is expressly specified and permitted in the documentation of the product, e.g. in explosion-protected areas or in safety-related parts of control systems (functional safety).
- Do not commission the product until you can be sure that the end product (for example a machine/system) where the Rexroth products are installed complies with the country-specific provisions, safety regulations and standards of the application.

2.6 Product-specific safety instructions

The following safety instructions apply to chapters 6 to 14.

⚠ WARNING

Pressurized diaphragm type accumulator/pressurized machine/system!
Danger to life, risk of injury, severe injury when working at machines/systems that have not been stopped! Damage to property!

- Ensure that all relevant components of the hydraulic system are depressurized. For doing so, observe the specifications of the machine/system manufacturer.
- Do not disconnect line connections, connections or components as long as the hydraulic system is pressurized.

Leakage of (pressurized) hydraulic fluid and oil mist!
Danger to life! Risk of injury! Explosion hazard, risk of fire, health hazard, environmental pollution! Damage to property!

- Switch the machine/system off immediately (emergency off switch).
- Identify and remedy the leakage.
- Never try to stop or seal the leakage or the oil jet using a cloth.
- Avoid direct contact with the leaking hydraulic fluid.
- Use your personal protective equipment, e.g. safety goggles.
- Keep open fire and ignition sources away from the diaphragm type accumulator.
- When dealing with hydraulic fluids, you must imperatively observe the information of the hydraulic fluid manufacturer.

Risk of poisoning and injuries due to leaking hydraulic fluid!
The contact with hydraulic fluids leads to health hazards (e.g.
eye injuries, skin lesions, poisoning during installation).
Slipping may cause serious injuries. When covers are removed,
unpressurized residual hydraulic fluid may leak.

- Wear protective gloves, safety goggles and suitable working clothes.
- Immediately wipe off any leaking hydraulic fluid.
- Check the lines for wear and damage before any commissioning.
- If hydraulic fluid comes into contact with the eyes or penetrates the skin nevertheless, please consult a doctor immediately.

Crush injuries and fractures!
Falling or rolling diaphragm type accumulators may cause serious injuries.

- Secure the diaphragm type accumulator against unintended rolling.

Bursting of the diaphragm type accumulator due to welding, soldering or other mechanical work!
Danger to life! Danger of bursting! Damage to property!

- Do not carry out any mechanical works such as welding or soldering works on the diaphragm type accumulator.

⚠ CAUTION

Hot/cold surfaces at the diaphragm type accumulator!
Risk of burning! Danger of frostbite!
The diaphragm type accumulator may considerably heat up/cool down during operation.
- ▶ Only touch the surfaces of the diaphragm type accumulator with heat-/cold-resistant protective clothing, e.g. gloves, or do not work at hot/cold surfaces.
- ▶ Allow the diaphragm type accumulator to cool down/heat up sufficiently before touching it.
- ▶ Observe the protective measures of the system manufacturer.

⚠ CAUTION

Slip hazard due to oily surfaces!
Risk of injury!
- ▶ Protect and mark the danger zone.
- ▶ Immediately remove leaked hydraulic fluid.
- ▶ Use an oil binding agent in order to bind the leaked hydraulic fluid.
- ▶ Remove and dispose of the contaminated oil binding agent, see chapter 12 "Disposal".
- ▶ Wear the protective equipment, e.g. safety shoes, prescribed for your activity.

2.7 Personal protective equipment

During operation and maintenance work as well as during installation and removal of the diaphragm type accumulator, you must always wear the following personal protective equipment:
- Heat- or cold-resistant protective gloves
- Ear protection
- Safety shoes
- Perfectly fitting safety goggles
- Protective helmet

2.8 Obligations of the machine end-user

The diaphragm type accumulator is supplied ex works with a black coating.
The coating meets the salt spray test of at least 240 hours according to ISO 9227.
The machine end-user is responsible for assuring sufficient corrosion protection corresponding to the environmental conditions and requirements.
In order to ensure safety when handling the diaphragm type accumulator and its components, the machine end-user of the system must:
- Guarantee the intended use of the diaphragm type accumulator and its components according to chapter 2.2 "Intended use".
- Instruct the operating personnel regularly in all items of the operating instructions and make sure that they are observed.
- Ensure compliance with the instructions on occupational safety and with the operating instructions.

- Ensure compliance with the operating data indicated on the embossing (admissible operating temperature, maximum operating pressure).

3 General information on damage to property and damage to product

The following information applies to chapters 6 to 14:

NOTICE
Danger due to improper handling! Damage to property! ▶ Do not expose the diaphragm type accumulator to any inadmissible mechanical load. ▶ Do not place/put any objects on top of the diaphragm type accumulator. ▶ Never use the diaphragm type accumulator as a handle or step. ▶ Do not apply further loads/forces. ▶ Leave the protective covers (e.g. gas valve cover cap, oil valve protective cap) at the diaphragm type accumulator until shortly before connection of the lines. **Contamination of the hydraulic fluid!** Early wear and malfunctions! ▶ It is imperative that the working environment at the site of installation is free of dust and foreign substances in order to prevent foreign particles (e.g. welding beads or metal chips) from getting into the hydraulic lines and causing wear or malfunctions at the diaphragm type accumulator. The diaphragm type accumulator must be protected from dirt during installation. ▶ Make sure that all connections, hydraulic lines and attachment parts (e.g. measuring devices) are clean and free of chips. ▶ For removing lubricants or any other contamination, use a cloth made of fiber-free fabric. ▶ No contamination must enter when closing the connections. ▶ Before commissioning, ensure that all hydraulic connections are tight and that all seals and caps of the plug-in connections are correctly installed and undamaged in order to prevent fluids and foreign particles from penetrating the diaphragm type accumulator. **Environmental pollution caused by incorrect disposal!** Environmental pollution! Damage to property! ▶ Dispose of the diaphragm type accumulator, the hydraulic fluid and the packaging in accordance with the applicable national regulations in your country. ▶ Dispose of the hydraulic fluid according to the applicable safety data sheet of the hydraulic fluid.

The warranty only applies to the delivered configuration.
The claim to warranty expires if the product is incorrectly assembled, commissioned and operated, not used as intended and/or handled improperly.

4 Scope of delivery

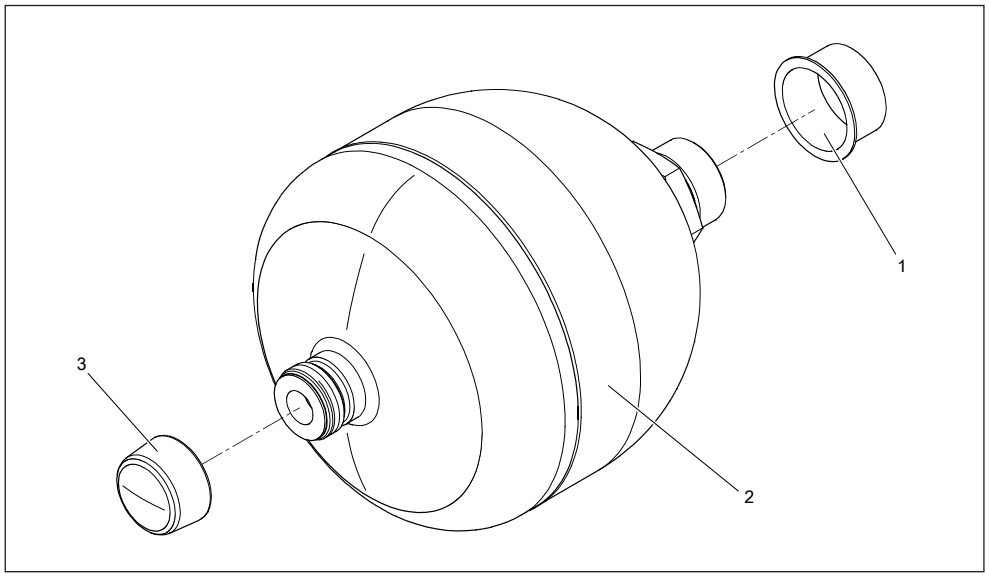

Fig. 1: Scope of delivery of the diaphragm type accumulator type HAD...-1X/ and HAD...-2X/

The scope of delivery includes:
- 1 diaphragm type accumulator type HAD...-1X/ or HAD...-2X (**2**)
- 1 operating instructions in German and English language
- 1 declaration of conformity (only for diaphragm type accumulators having a capacity of more than 1l)

The diaphragm type accumulator is supplied with the following parts being mounted (optional, according to supplied version):
- Cover cap on the gas port (**3**)
- Protective cap on the fluid connection (**1**)

5 Product information

More detailed information on operating conditions, connection dimensions and performance limits of the diaphragm type accumulator are provided in data sheet 50150.

5.1 Product description

Diaphragm type accumulators are intended for use in hydraulic systems.
They are used for energy storage, shock and vibration absorption, and leakage oil compensation or volume compensation.
The high compressibility of gases is used for the diaphragm type accumulator.
Diaphragm type accumulators of type HAD...-1X/ and HAD...-2X/ basically comprise the following components:

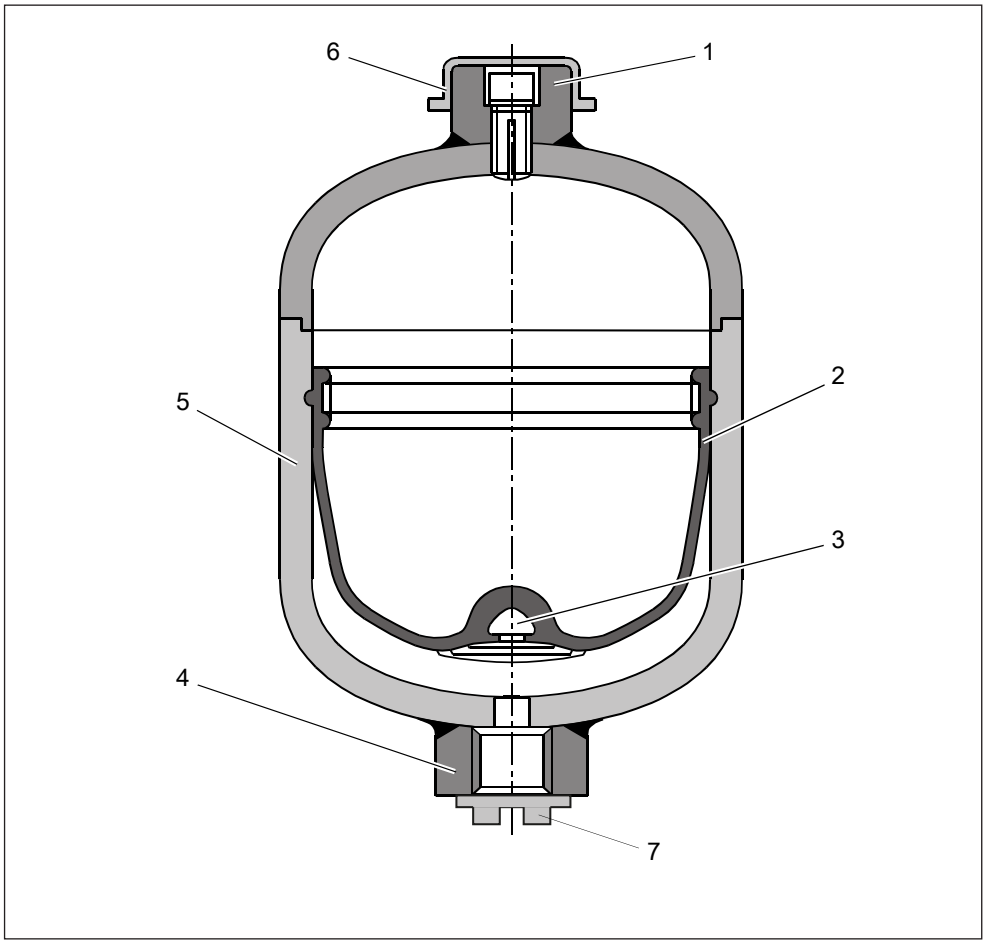

Fig. 2: Structure of the diaphragm type accumulator

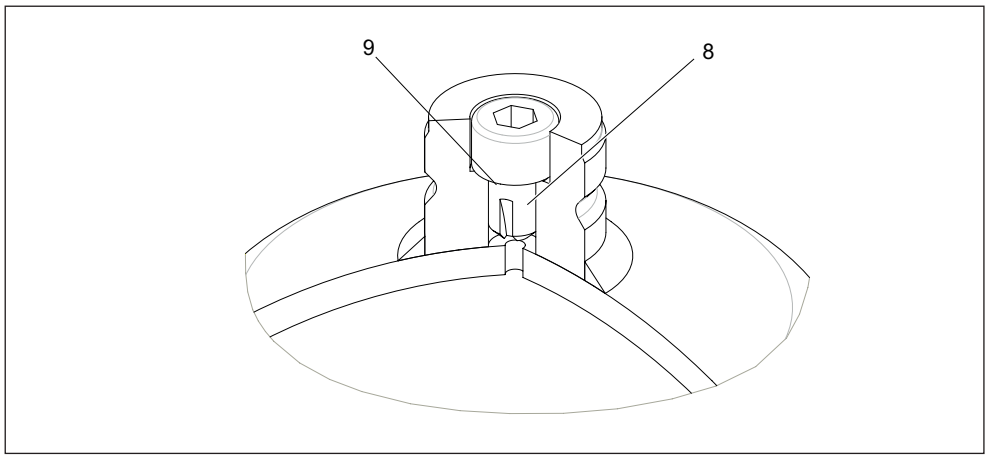

Fig. 3: Structure of the gas port

1 Gas port
2 Diaphragm
3 Closing button
4 Fluid connection
5 Container
6 Cover cap on the gas port
7 Fluid connection protective cap
8 Gas filling screw with venting groove
9 Seal ring (below the gas filling screw)

Diaphragm type accumulators consist of a pressure-resistant vessel **(5)** made of high-tensile steel which most commonly has a spherical or cylindrical form.
The hydraulic accumulator is subdivided into a gas and a fluid side by a diaphragm **(2)** made of an elastic, flexible material (elastomer).
When the operating pressure is increased, hydraulic fluid is flowing into the diaphragm type accumulator and compresses the gas until the gas pressure is identical to the fluid pressure.
When the operating pressure is reduced, the gas expands again and feeds the hydraulic system with fluid.
The closing poppet **(3)** located at the bottom of the diaphragm completely covers the fluid connection **(4)** when the diaphragm type accumulator is discharged, thus preventing the diaphragm from exiting into the fluid channel and being damaged.
Via the gas port **(1)**, the gas side of the diaphragm type accumulator is charged with nitrogen to the provided pre-filling pressure p_0 at the factory or by means of a test and filling device (material number: 0538103012 for diaphragm type accumulators).
The gas filling screw has a slotted thread and should therefore not be removed completely. In order to protect the gas port, a cover cap **(6)** is provided on the gas port.
More detailed information on operating conditions, connection dimensions, weight and limits of performance is provided in data sheet 50150.

5.2 Product identification

The diaphragm type accumulator can be identified by means of its embossing on the housing.

The operation of the diaphragm type accumulator is only admissible, when the embossing is present and fully legible.

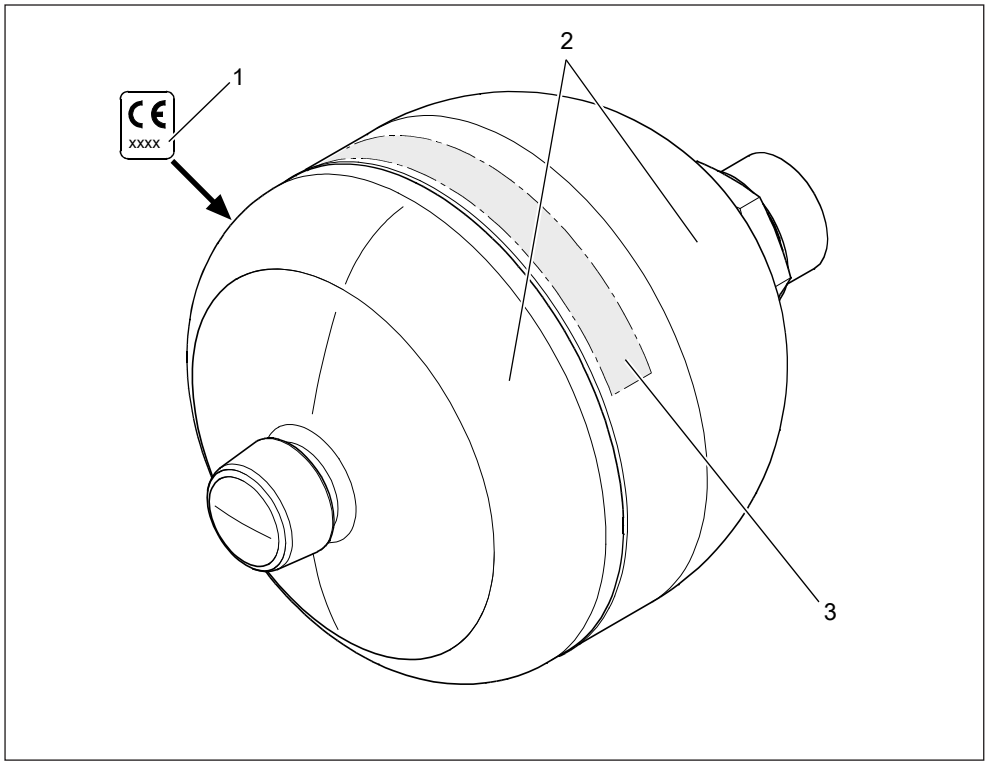

Fig. 4: Position of diaphragm type accumulator marking

1 CE mark (only for diaphragm type accumulators having a capacity of > 1 liter)
2 Marking of material batch
3 Embossing on the housing of the diaphragm type accumulator

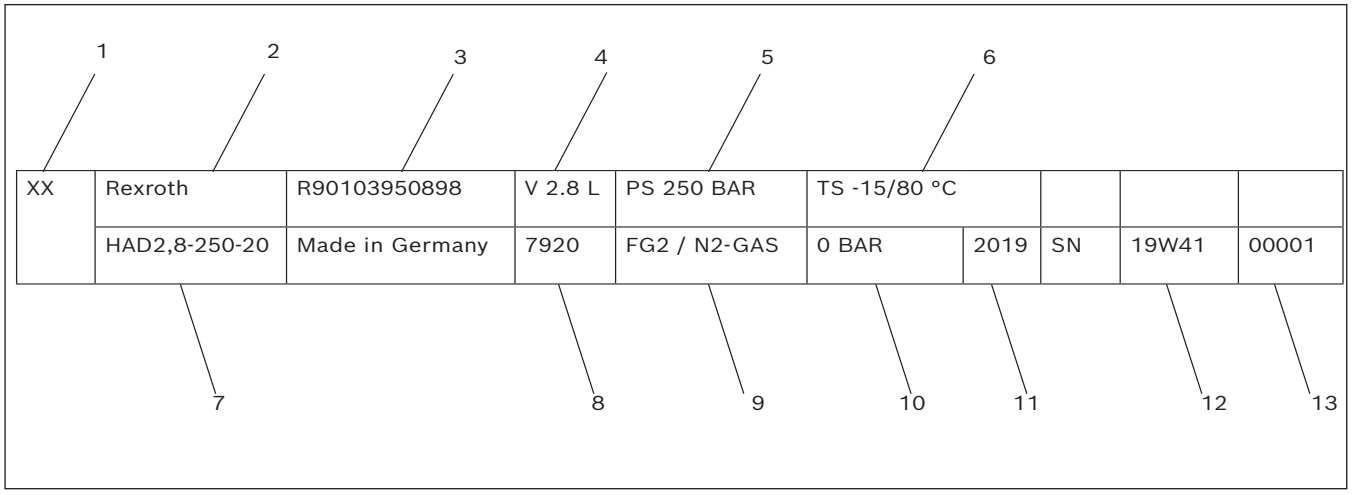

Fig. 5: Example of embossing on the housing of the diaphragm type accumulator

1 Examiner
2 Rexroth word mark
3 Material number
4 Volume
5 Max. admissible pressure
6 Operating temperature
7 HAD volume pressure series
8 Works number
9 Charging gas
10 Preload pressure at 20 °C
11 Manufacturing year
12 Date of production
13 Serial factory no.

6 Transport and storage

- Always comply with the required environmental conditions with regards to transport and storage, see chapter 6.3 "Storage of the diaphragm type accumulator".

For information on unpacking, refer to chapter 7.1 "Unpacking".

6.1 Transport of the diaphragm type accumulator

⚠ WARNING

Falling of the diaphragm type accumulator due to improper transport!
Risk of injury! Danger of crushing! Danger of bone fractures! Damage to property!
- Never step or reach below suspended loads.
- Provide for a stable center of gravity position during transport.
- Use your personal protective equipment, e.g. safety shoes.
- Put the diaphragm type accumulator carefully onto the contact surface in order not to damage it.

⚠ CAUTION

Risk of damage!
Impact or similar forces may damage the diaphragm type accumulator.
- Pack the diaphragm type accumulator using shock-absorbing materials, e.g. cardboard
- Allow the diaphragm type accumulator to cool down/heat up sufficiently before touching it.
- In the case of sea freight, protect the diaphragm type accumulator against salty air with, for example, plastic film.

Close openings
- Before transport, close all openings with the supplied protective caps/cover caps in order to prevent dirt or humidity from penetrating the diaphragm type accumulator.

Weights
- The weight indicated in data sheet 50150 only refers to the diaphragm type accumulator, the weight of any add-on units is not taken into account. Further details on the weight and the dimensions of the diaphragm type accumulator can be found in data sheet 50150

6.2 Shipping of the diaphragm type accumulator

The diaphragm type accumulator may only be shipped alone or installed in a machine or assembly and securely fastened.

If the diaphragm type accumulator is shipped with a preload pressure of 2 bar and more, it must be declared as UN number 3164 (Article under pneumatic pressure containing non-flammable gas). Depending on the type of dispatch, the relevant directives must be observed. Diaphragm type accumulators are only shipped depressurized for air freight ex works. Any existing pre-filling pressures will be released.

6.3 Storage of the diaphragm type accumulator

The diaphragm type accumulator is supplied with a coating. The machine end-user must ensure sufficient corrosion protection during storage.

Requirements

- Ensure that the storage facilities are free from etching substances and gases.
- Optimum storage temperature: +5 °C to +20 °C. Ensure a constant temperature, if possible.
- The storage facilities must be dry.
- Protect the diaphragm type accumulator against impacts during storage.
- Ensure that the cover cap at the gas valve and the protective cap at the oil valve are attached.

Maximum storage time

The maximum storage time of the diaphragm type accumulator amounts to 5 years.

Commissioning after storage

- ▶ Carry out a visual inspection of the diaphragm type accumulator and check for any damage and corrosion.
- ▶ After the expiration of the maximum storage time, have the complete diaphragm type accumulator checked by an expert, see chapter 2.4 "Qualification of personnel".

Please note that the warranty period is not prolonged by the storage time. The claim to warranty expires in case of non-compliance with the requirements and the storage conditions or after expiry of the maximum storage time.

Please note that, according to the provisions and ordinances valid in your country, the test intervals mostly refer to the date of manufacture and are also not prolonged by the storage time.

7 Installation

Prior to assembly, make sure the following documents are at hand:
- Hydraulic circuit diagram or assembly drawing of the machine/system (available from the machine/system manufacturer)
- Data sheet 50150 of the diaphragm type accumulator (contains the admissible technical data), see chapter 1.2 "Required and amending documentation"

7.1 Unpacking

CAUTION! Danger due to falling parts or rolling of the diaphragm type accumulator! Risk of injury! Damage to property!
- ▶ Put the pallet/packaging on level, bearing ground.
- ▶ Only open the packaging from the top.

- ▶ Before opening the packaging and/or loosening the tension belts, make sure that the diaphragm type accumulator cannot roll away.
- ▶ Open the packaging of the diaphragm type accumulator or loosen the tension belts.
- ▶ Remove the diaphragm type accumulator.
- ▶ Check the diaphragm type accumulator for transport damage and completeness, see chapter 4 "Scope of delivery"
- ▶ Dispose of the packaging in accordance with the currently applicable national provisions in your country.

7.2 Installation conditions

Mounting The diaphragm type accumulator is to be fixed in such a way that a safe support during operational accelerations or in case of a potential pipeline break is guaranteed. Bosch Rexroth offers suitable holding devices in the form of mounting clamps as accessories.

For further information on the accessories, refer to data sheet 50150, see chapter 1.2 "Required and amending documentation".

Protection The diaphragm type accumulator has to be secured against operation outside the admissible limits according to the Pressure Equipment Directive 2014/68/EU.

Installation position The diaphragm type accumulator may be installed in any installation position. Above the gas port, a clearance area of at least 200 mm must be observed in order to be able to connect the charging and test devices.

Cleanliness It is imperative to provide for absolute cleanliness. The diaphragm type accumulator and all other parts used must be installed free from dirt.
Contamination of the hydraulic fluid may considerably impair the service life of the diaphragm type accumulator.

Temperature The temperature of the diaphragm type accumulator must correspond to the ambient temperature of the installation site. Allow the diaphragm type accumulator to acclimatize sufficiently in order to adapt to the temperature conditions.

Connections Before mounting the diaphragm type accumulator to the fluid connection, make sure that the connection variant on the side of the hydraulic accumulator corresponds to the connection on the system side.

7.3 Required tools

For the assembly of the diaphragm type accumulator, you need:
- Charging and test device (material number 0538103012 for diaphragm type accumulator, material number 0538103014 for diaphragm and bladder-type accumulators)
- Open-end wrench - for information on wrench sizes see data sheet 50150, according to fluid connection variant

Table 5: Required wrench sizes of the open-end wrench

Diaphragm type accumulator: Volume in liters	Open-end wrench: Wrench size
up to HAD...0.35	19 mm, 27 mm, 32 mm
from HAD...0.35	41 mm, 50 mm

7.4 Assembly of the diaphragm type accumulator

⚠ WARNING

Bursting of the diaphragm type accumulator (connection type E and E5) due to insufficient wall thickness caused by corrosion!
Danger to life! Risk of injury! Damage to property!
- ▶ Re-establish sufficient corrosion protection on the male threads after completed assembly of the diaphragm type accumulator with connection type E and E5 (see also data sheet 50150, chapter "Ordering code".

⚠ CAUTION

Danger of damage to property and personal injuries!
The assembly of the diaphragm type accumulator requires basic mechanical and hydraulic knowledge.
- ▶ The diaphragm type accumulator may only be assembled by qualified personnel, see chapter 2.4 "Qualification of personnel".
- ▶ Before the assembly, check the seal and the sealing surface of the accumulator for damage.

7.4.1 Installing the diaphragm type accumulator on a block

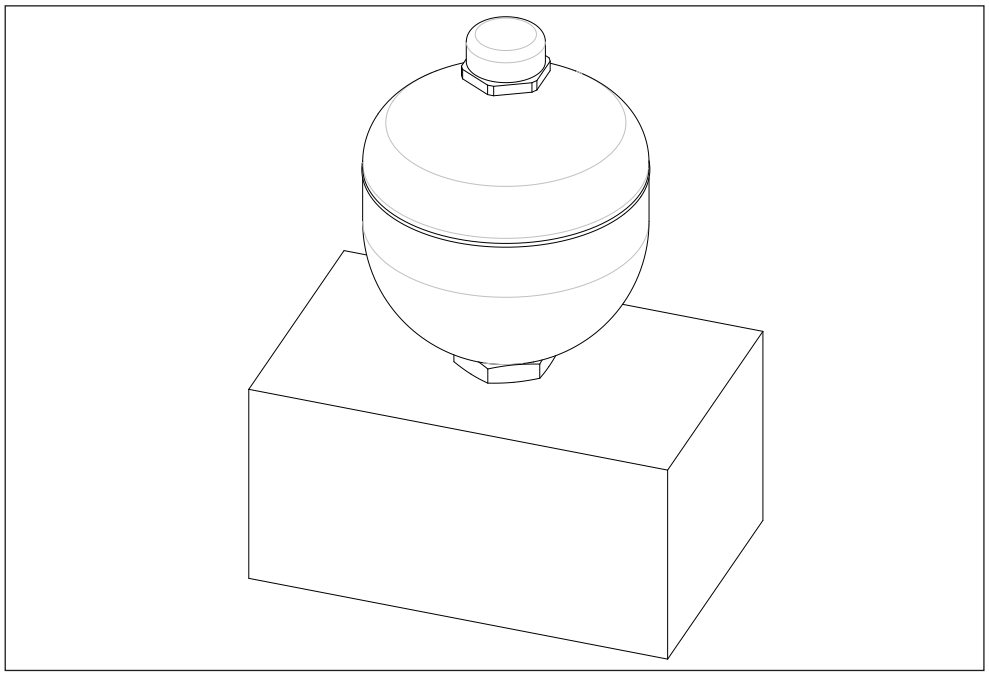

Fig. 6: Diaphragm type accumulator installed on a block

For installing the diaphragm type accumulator on a manifold block, the following work steps are required:

- Remove the protective cap on the fluid connection of the diaphragm type accumulator.
- Make sure that the fluid connection is clean and free from foreign matter.
- Ensure that the connection thread is intact.
- Check the fluid connection for available seals.
- Place the diaphragm type accumulator on the oil port.
- Manually screw the accumulator into the thread of the oil port.
- Make sure that the thread interlocks after one rotation at the latest.
- Tighten the accumulator by means of a suitable tool until it fits tightly.

The diaphragm type accumulator is now mounted.

7.4.2 Mounting the diaphragm type accumulator by means of retaining clamps

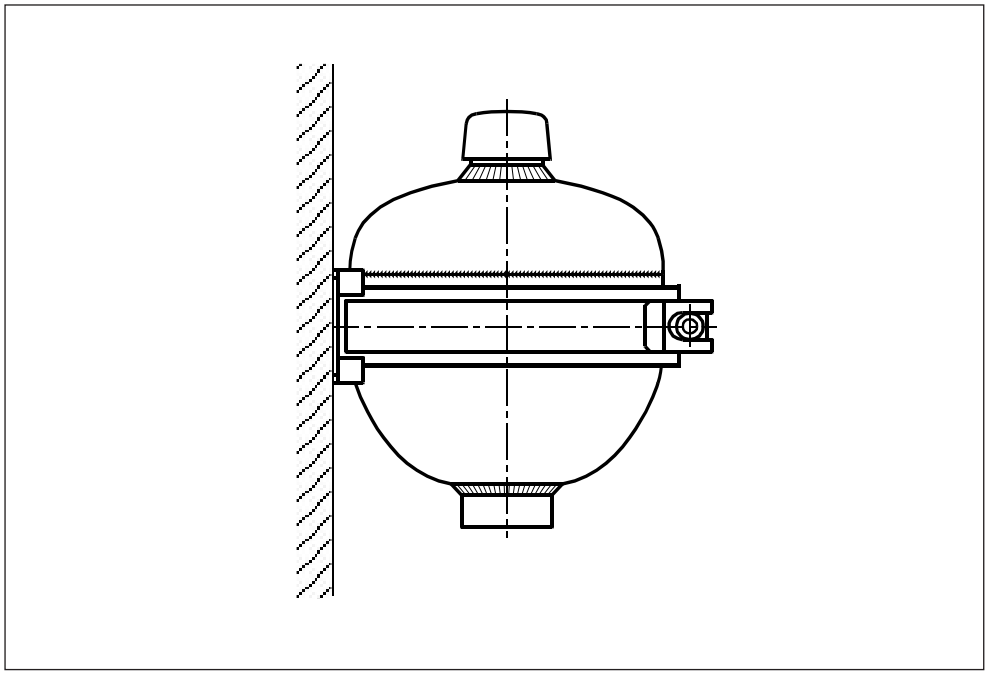

Fig. 7: Mounting by means of a retaining clamp

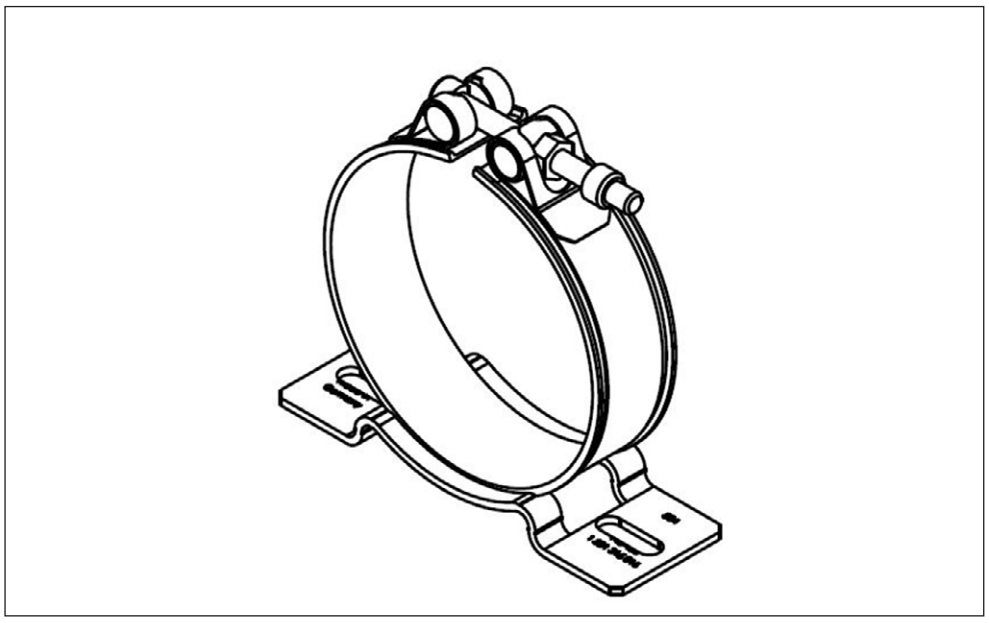

Fig. 8: Retaining clamp

For mounting the diaphragm type accumulator by means of a retaining clamp, the following work steps are required:

- Mount the retaining clamp of the diaphragm type accumulator to the provided positions on the wall or the machine.
- Position the accumulator in the retaining clamp so that the embossing on the housing remains visible.
- Tighten the screws of the retaining clamp.

- Remove the protective cap on the fluid connection of the diaphragm type accumulator.
- Connect the hydraulic lines to the fluid connection of the diaphragm type accumulator.
- Tighten the hydraulic lines by exerting counterpressure with a suitable tool until they fit tightly.
- Ensure that the diaphragm type accumulator is mounted without tension stress and check if any tension stress may occur due to vibrations and/or thermal expansion of the components and/or the piping.

The diaphragm type accumulator is now mounted.

7.4.3 Diaphragm type accumulator mounted on the male thread

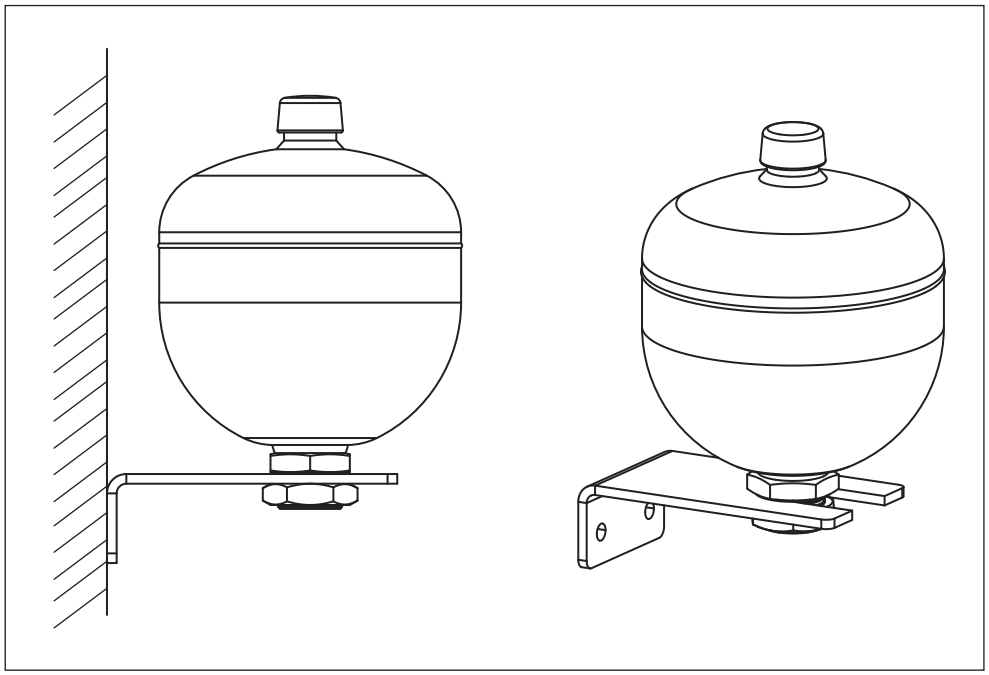

Fig. 9: Mounting on the male thread

For mounting the diaphragm type accumulator by means of fitting at the male thread, the following work steps are required:

- Remove the protective cap on the fluid connection of the diaphragm type accumulator.
- Position the accumulator in the provided opening of the mounting element so that the embossing on the housing remains visible.
- Mount the mounting nut to the male thread of the accumulator.
- Tighten the nut by holding the accumulator in place with a suitable tool until it fits tightly.
- Connect the hydraulic lines to the fluid connection of the diaphragm type accumulator.
- Tighten the hydraulic lines by exerting counterpressure with a suitable tool until they fit tightly.

- Ensure that the diaphragm type accumulator is mounted without tension stress and check if any tension stress may occur due to vibrations and/or thermal expansion of the components and/or the piping.

The diaphragm type accumulator is now mounted.

8 Commissioning

⚠ WARNING

Danger of damage to property and personal injuries!
The commissioning of the diaphragm type accumulator requires basic mechanical and hydraulic knowledge.
- The diaphragm type accumulator may only be commissioned by qualified personnel, see chapter 2.4 "Qualification of personnel".

Bursting of the diaphragm type accumulator due to exceedance of the admissible gas filling pressure!
Danger to life! Risk of injury! Damage to property!
- Observe the gas filling pressure indicated on the embossing.

Leakage of hydraulic fluid under high pressure due to faulty assembly of the diaphragm type accumulator!
Risk of injury! Damage to property!
- Ensure that the diaphragm type accumulator has been mounted by an expert, see chapter 2.4 "Qualification of personnel", completely and without tension stress before commissioning the diaphragm type accumulator.

⚠ CAUTION

Damage to property!
Polluted hydraulic fluid could result in wear and malfunctions.
- During commissioning, absolute cleanliness must be ensured.
- Make sure that the hydraulic system is only filled with a filtered hydraulic fluid.
- Ensure that no pollutants are able to penetrate when sealing the ports.

For commissioning of the diaphragm type accumulator, always observe the operating instructions of the overall system.
For commissioning of the diaphragm type accumulator, always use the suitable charging and test device (for diaphragm type accumulator with material number 0538103012 or for bladder and diaphragm type accumulator with material number 0538103014).

8.1 Preparing for commissioning

The diaphragm type accumulator is shipped ex works with a coating and a level of protection of a salt spray test of 240 hours according to ISO 9227. The machine end-user is responsible for assuring sufficient corrosion protection corresponding to the environmental conditions and requirements.

The examination of the diaphragm type accumulator prior to commissioning as well as the recurring tests are to be performed according to national rules.

- Add the coating at the gas port, if required.
- Make sure that the diaphragm type accumulator is intact.
- By means of the information provided on the embossing, make sure that the diaphragm type accumulator corresponds to the specifications provided on the hydraulic circuit diagram or in the system parts list.
- Check that the hydraulic fluid used in the hydraulic system corresponds to the specifications provided in the data sheet of the diaphragm type accumulator.
- Make sure that the maximum admissible operating pressure of the diaphragm type accumulator is equal to or greater than the maximum operating pressure of the hydraulic circuit.
- Check whether the operating temperatures are within the limits mentioned on the embossing.
- Make sure that the diaphragm type accumulator has been installed completely and without tension stress.
- Lay out ready the Bosch Rexroth charging and test device (for diaphragm type accumulator with material number 0538103012 or for bladder and diaphragm type accumulators with material number 0538103014) and its operating instructions.

8.2 First commissioning

To commission the diaphragm type accumulator, you should proceed as follows:

- Set the diaphragm type accumulator to the specified pre-filling pressure according to the circuit diagram prior to any commissioning.

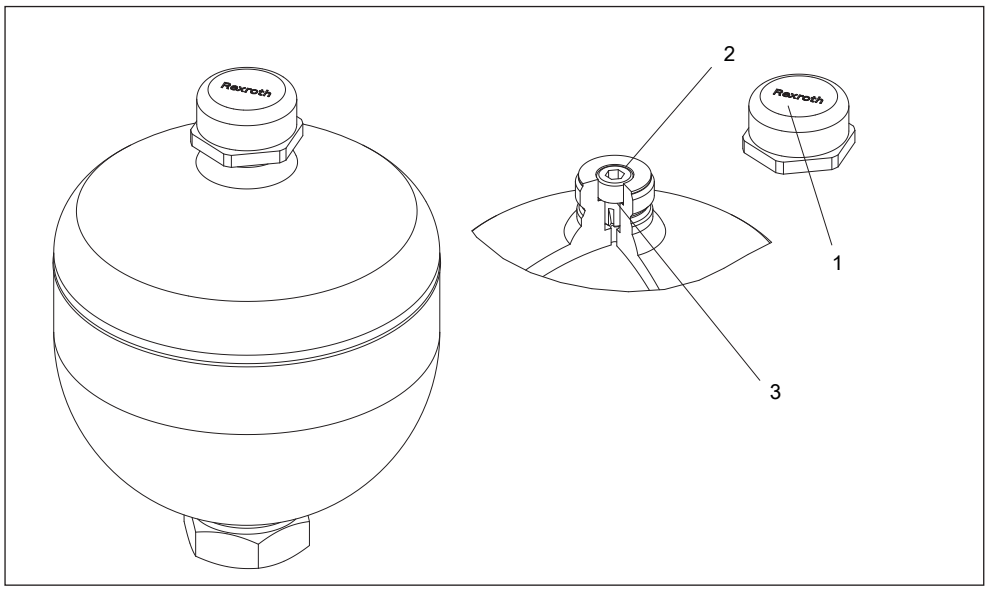

Fig. 10: Checking the gas filling pressure

1 Cover cap on the gas port
2 Gas filling screw with venting groove
3 Seal ring (below the gas filling screw)

Setting the pre-filling pressure

Proceed as follows to set the pre-filling pressure:

- Make sure that the system is depressurized.
- Remove the cover cap from the gas side of the diaphragm type accumulator.
- Connect a nitrogen bottle to the prefill valve via the hose of the charging and test device.

DANGER! Uncontrolled release of a significant amount of gas!
Danger to life! Risk of suffocation!

- Make sure that the workplace is sufficiently ventilated.
- For checking the gas filling pressure, always use the suitable charging and test device (for diaphragm type accumulator with material number 0538103012 or for bladder and diaphragm type accumulator with material number 0538103014).

DANGER! Explosion of the diaphragm type accumulator when charged with unapproved gas!
Danger to life! Risk of injury!

- Only use nitrogen for filling of the diaphragm type accumulator (at least cleanliness class 4.0, N_2 = 99.99 vol.%).

CAUTION! High surface temperature during filling of the diaphragm type accumulator with gas!
Risk of burning!

- Only touch the surfaces of the diaphragm type accumulator with heat-resistant protective clothing, e.g. gloves, or do not work at hot surfaces.
- Allow the diaphragm type accumulator to cool down sufficiently before touching it.
- Observe the protective measures of the system manufacturer.

- The prescribed pre-filling pressure is indicated in the hydraulic circuit diagram.
- Slowly open the shut-off cock of the gas bottle to make sure that the diaphragm evenly touches the interior wall.
- Loosen the gas filling screw via the charging and test valve until gas can flow into the accumulator.
- Charge the diaphragm type accumulator until the prescribed pre-filling pressure is indicated on the pressure gauge of the prefill valve. Always keep an eye on the pressure gauge during the charging process.
- Close the shut-off cock of the gas bottle.
- The gas filling pressure is temperature-dependent. During the charging, the diaphragm type accumulator heats up. Wait until the diaphragm type accumulator has cooled down.
- Check the pre-filling pressure and correct it if necessary.
- Remove the charging and test valve.
- Screw the protective cap back on the accumulator.
- Mark the set pre-filling pressure visibly on the diaphragm type accumulator. In this connection, do not use stamps, punch presses or other mechanical markings. We recommend using a sticker, e.g. warning sign for the diaphragm type accumulator with material number R901441614, see also data sheet 50150.

The pre-filling pressure is now checked and set.

Commissioning the diaphragm type accumulator

- Commission the diaphragm type accumulator with the overall system according to the operating instructions of the overall system.

8.3 Re-commissioning after standstill

- Check whether the pre-filling pressure corresponds to the value p_0 indicated in the circuit diagram. For this, proceed as described in chapter 10.1 "Maintenance".
- Check the gas port for leak-tightness.
- Make sure that the accumulator does not show any signs of corrosion and that the coating is intact.
- Commission the diaphragm type accumulator with the overall system according to the operating instructions of the overall system.
- Check the oil port for leak-tightness.

9 Operation

⚠ WARNING

Bursting of the diaphragm type accumulator due to stability reduction caused by extreme ambient temperature!

Danger to life! Explosion hazard! Damage to property!

- Make sure that the ambient temperature of the diaphragm type accumulator does not exceed or fall below the ambient temperature indicated in data sheet 50150.
- Observe the operating temperature and consider the ambient temperature.

Reduction of wall thickness of the pressure container when operated using corrosive hydraulic fluids!

Danger of bursting! Damage to property!

- Only use the hydraulic fluids recommended in data sheet 50150.

⚠ WARNING

Bursting of the diaphragm type accumulator due to exceedance of the admissible gas filling pressure!

Danger to life! Risk of injury! Damage to property!

- Observe the gas filling pressure indicated.

Bursting of the diaphragm type accumulator due to insufficient wall thickness caused by corrosion!

Danger to life! Risk of injury! Damage to property!

- Check the diaphragm type accumulator for external corrosion regularly – depending on the application.
- Determine the frequency of the corrosion checks according to the application.
- Check which provisions or ordinances are to be complied with in your country and/or for your application.

During operation of the diaphragm type accumulator, observe the following points:

- Make sure that the embossing is always present and legible. Otherwise, further operation is not allowed.
- Make sure that no loads/forces, e.g. temperature expansions or vibrations, occur and are transferred to the diaphragm type accumulator.
  The effects of external forces may lead to damage of the oil port and the uncontrolled release of pressurized hydraulic fluid.
- Ensure that the diaphragm type accumulator is only operated within the performance limits specified in data sheet 50150, in particular regarding gas filling pressure, admissible operating temperature and maximum operating pressure according to the embossing on the accumulator.
- Make sure that the diaphragm type accumulator is only operated in impeccable condition.
- In case of emergency, an error, or in case of other irregularities, switch off the system and secure it against restarting.

Changes in operating speeds, temperatures, increasing noises or power consumption are an indication of wear or damage at the diaphragm type accumulator or the system.
In order to guarantee a high operational safety and availability of the system, it is recommended to continuously monitor these values.

10 Maintenance and repair

⚠ WARNING

Bursting of the diaphragm type accumulator due to insufficient wall thickness caused by corrosion!
Danger to life! Risk of injury! Damage to property!
- Check the diaphragm type accumulator for external corrosion regularly – depending on the application.
- Determine the frequency of the corrosion checks according to the application.

Cleaning and care
- Close the fluid connection (if not connected to the oil port) and cover the gas port by means of the cover caps provided.
- Do not use solvents or aggressive cleaning agents.
- Only clean the diaphragm type accumulator using a dry, lint-free cloth.
- Do not use a high-pressure washer for cleaning.

Inspection
- Check the hydraulic lines, line connections and seals for leak-tightness and check the diaphragm type accumulator for external corrosion.
  To do so, follow the system manufacturer's instructions.

Maintenance
- Perform the prescribed maintenance work at the intervals specified in the operating instructions of the overall system. If no other instructions are available, Bosch Rexroth recommends maintenance intervals according to chapter 10.1 "Maintenance".

Only experts may perform maintenance and repair work at the diaphragm type accumulator, see chapter 2.4 "Qualification of personnel".

Close openings
- Before transport, close all openings with the supplied protective caps/cover caps in order to prevent dirt or humidity from penetrating the diaphragm type accumulator.

10.1 Maintenance

10.1.1 Required tests/maintenance activities

In order to guarantee a fault-free operation and a long life cycle, however, the following tasks are to be carried out:

- Inspection of the pre-filling pressure
- Inspection of the safety equipment, fittings
- Inspection of the line connections
- Inspection of accumulator fixation

During maintenance work for which the accumulator has to be removed, the diaphragm type accumulator or the system must be depressurized on the oil side. For disassembly, assembly and commissioning, proceed as described in the corresponding chapters.
Make sure that no line connections, ports and components are disconnected as long as the system is under pressure and voltage or the diaphragm type accumulator is still under hydraulic pressure. Secure the system against restarting.

Inspection of the pre-filling pressure

To check the gas filling pressure of the diaphragm type accumulator, proceed as follows:

- ▶ Make sure that the system is depressurized.
- ▶ For the specified gas filling pressure p_0, refer to the circuit diagram of the system.

DANGER! Uncontrolled release of a significant amount of gas!
Danger to life! Risk of suffocation!

- ▶ Make sure that the workplace is sufficiently ventilated.
- ▶ For checking the gas filling pressure, always use the suitable charging and test device (for diaphragm type accumulator with material number 0538103012 or for bladder and diaphragm type accumulator with material number 0538103014).

- ▶ Remove the cover cap from the gas side of the diaphragm type accumulator.
- ▶ Screw the charging and test device for pressure accumulators on the gas valve of the diaphragm type accumulator. When doing this, always observe the operating instructions of the charging and test device.
- ▶ The prescribed pre-filling pressure is indicated in the hydraulic circuit diagram.
- ▶ Continue loosening the gas filling screw at the diaphragm type accumulator until the pre-filling pressure is indicated on the pressure gauge.
- ▶ Check whether the pre-filling pressure indicated on the pressure gauge of the charging and test device corresponds to the value indicated in the hydraulic circuit diagram. If the two values differ, set the pre-filling pressure as described in chapter 8.2.
- ▶ Tighten the gas filling screw on the diaphragm type accumulator again.
- ▶ Remove the charging and test device from the gas port of the diaphragm type accumulator.

The pre-filling pressure is now checked and set.

10.1.2 Test intervals of the diaphragm type accumulator

Table 6: Test intervals of the diaphragm type accumulator

Test	Interval	Maintenance activities
Inspection of the pre-filling pressure and external visual inspection	Test 1: Within one week as of commissioning	Inspection of the pre-filling pressure Inspection of leak-tightness, connection thread; Visual inspection of corrosion protection.
	Test 2: Within 3 months after commissioning, if no gas losses during test 1	
	Test 3: Annual test, if no gas losses during test 2	
Internal visual inspection according to national provisions	Every 10 years	An internal visual inspection is not possible due to the design. The accumulator is to be replaced.

10.1.3 Maintenance schedule of the system

For a safe operation and a long service life of the diaphragm type accumulator, a maintenance schedule is to be drawn up for the power unit, the machine, or the system. The maintenance schedule must guarantee that the operating conditions of the diaphragm type accumulator stay in the prescribed limits during the entire period of use.
In particular, compliance with the following operating parameters has to be ensured:

- Operating pressure
- Operating temperature range
- Surface temperature
- Leak-tightness

Changes made to these parameters increase the wear of the diaphragm type accumulator. The cause must be identified and remedied immediately.
In order to achieve high operational safety of the diaphragm type accumulator in the machine/system, Bosch Rexroth recommends checking the parameters mentioned above continuously and automatically and shutting the system off automatically in case of modifications which exceed the usual fluctuations in the intended operating range.

Further information on the maintenance is provided in the operating instructions of the overall system.

10.2 Repair

The diaphragm type accumulator is not repairable. In case of damage, an adequate replacement is to be provided.

If you have any questions regarding spare parts and repair, please contact your local Bosch Rexroth service or the service department of the diaphragm type accumulator manufacturer's factory:

Bosch Rexroth AG
Service
Bgm.-Dr.-Nebel-Str. 8
97816 Lohr am Main
Phone: +49 (0) 9352 - 40 - 50 60
service@boschrexroth.de

For the addresses of our sales and service network, please refer to
www.boschrexroth.com

11 Disassembly and replacement

⚠ WARNING

Risk of injury!
Parts flying around due to the residual pressure that is still present after the discharging may lead to serious injuries.
- ▶ Check the residual pressure in the diaphragm type accumulator using the charging and test device.

11.1 Required tools

For the disassembly of the diaphragm type accumulator, you need:
- Charging and test device (for diaphragm type accumulator with material number 0538103012 or for bladder and diaphragm type accumulators with material number 0538103014)
- Open-end wrench

For further details on the wrench sizes, refer to chapter 7 "Assembly", table 5.

11.2 Preparing disassembly

Overall system

- ▶ Decommission the overall system as described in the operating instructions of the system.

Afterwards, prepare the disassembly of the diaphragm type accumulator as follows:
- ▶ Depressurize the hydraulic system.
- ▶ Make sure that the relevant system parts are depressurized and de-energized.

Diaphragm type accumulator

- ▶ Discharge the accumulator via the discharge device of the system. Please note that the pre-filling pressure still exists on the gas side after hydraulic relief.
- ▶ Please decide whether a remaining gas pressure in the diaphragm type accumulator is required or reasonable.

- For safety reasons, we recommend discharging the gas pressure and clearly marking this on the accumulator, if the system is shut-down for a longer time or forever.
- In order to keep the accumulator permanently depressurized, the gas filling screw must be removed.

11.3 Disassembly process

Proceed as follows to disassemble the diaphragm type accumulator:

- Ensure that the hydraulic system is depressurized and the diaphragm type accumulator is hydraulically unloaded.
- Remove the cover cap from the gas side of the diaphragm type accumulator.
- Screw the charging and test valve for pressure accumulators onto the gas port of the diaphragm accumulator. When doing this, always observe the operating instructions of the charging and test device.
- Discharge the pre-filling pressure on the gas side. When doing this, always observe the operating instructions of the charging and test device.

WARNING! Increased nitrogen concentration in the environment when draining the gas!
Danger to life! Risk of suffocation!

- Make sure that the workplace is sufficiently ventilated.

CAUTION! Low surface temperature when draining the gas!
Danger of frostbite!

- Only touch the surfaces of the diaphragm type accumulator with cold-resistant protective clothing, e.g. gloves, or do not work at cold surfaces.
- Observe the protective measures of the system manufacturer.

- The pre-filling pressure depends on the temperature. During the discharging, the diaphragm type accumulator cools down. Wait until the accumulator heats up to ambient temperature again.
- Discharge the pre-filling pressure generated during the heating up on the gas side. When doing this, always observe the operating instructions of the charging and test device.
- Remove the charging and test valve for pressure accumulators from the gas port.

WARNING! Uncontrolled loosening of the gas valve/gas valve assembly/diaphragm type accumulator due to residual pressure!
Danger to life! Risk of injury!

- Ensure that the diaphragm type accumulator has been completely unloaded on the gas side via the relieving nut in the thread of the gas valve (whistles during opening).
- Standard screws must not be used instead of the gas valve (thread with relieving nut).

- Loosen the holding device and remove the diaphragm type accumulator on the oil side from the system in a suitable order depending on the structure.

CAUTION! Leaking residual oil during disassembly of the oil port!
Slip hazard! Health hazard! Environmental pollution!
- Remove leaking residual oil immediately.
- Wear protective gloves and safety goggles.
- If nevertheless hydraulic fluid comes into contact with the eyes or penetrates the skin, please consult a doctor immediately.

The diaphragm type accumulator is now disassembled.

12 Disposal

- Permanently mark a diaphragm type accumulator which should no longer be used, to prevent reuse as a pressure vessel.

For the disposal of the diaphragm type accumulator, the following instructions have to be complied with:
- Drain the diaphragm type accumulator completely.
- Remove the gas filling screw. Also observe the procedure and safety instructions in chapter 11.3 "Disassembly process".

12.1 Environmental protection

Careless disposal of the diaphragm type accumulator, the contained hydraulic fluid and the packaging material may pollute the environment.
- Dispose of the diaphragm type accumulator and the packaging material in accordance with the applicable national regulations in your country.
- Dispose of the hydraulic fluid in accordance with the currently applicable national regulations in your country. Also observe the valid safety data sheet of the hydraulic fluid.

13 Extension and modification

A conversion or extension of the diaphragm type accumulator is not admissible.
If any mechanical works are carried out on the diaphragm type accumulator, it must no longer be operated.

Declarations become invalid

If you undertake any extensions to or modifications of the product marketed by Bosch Rexroth, this means you are changing the condition as supplied. Any statements made by Bosch Rexroth regarding this product will then become invalid.

The Bosch Rexroth warranty applies only to the configuration supplied. Following an extension or a modification, the claim to warranty expires.

14 Troubleshooting

14.1 How to proceed for troubleshooting

- Always work systematically and purposefully, even when under time pressure. Random, thoughtless disassembly and changing of settings might result in the inability to determine the original error cause.
- First, get a general idea of how the diaphragm type accumulator works in conjunction with the overall system.
- Try to establish whether the diaphragm type accumulator worked properly in conjunction with the overall system before the problem first occurred.
- Try to determine any changes in the overall system in which the diaphragm type accumulator is integrated:
  - Were there any changes to the diaphragm type accumulator's operating conditions or operating range?
  - Has any maintenance work been performed recently? Is there an inspection or maintenance record?
  - Have modifications (e.g. refittings) or repair works been performed at the overall system (machine/system, electrical system, control) or at the diaphragm type accumulator? If yes: What were they?
  - Was the hydraulic fluid changed?
  - Was the diaphragm type accumulator or machine used as intended?
  - How did the fault become apparent?
- Try to get a clear idea of the cause of error. If necessary, ask the actual (machine) operator.
- Document all work done.
- If you could not remedy the occurred error, please contact one of the contact addresses you find at `www.boschrexroth.com` or:

  Bosch Rexroth AG
  Service
  Bgm.-Dr.-Nebel-Str. 8
  97816 Lohr am Main
  Phone: +49 (0) 9352 - 40 - 50 60
  service@boschrexroth.de

14.2 Fault table

Table 7: Fault table

Fault	Possible cause	Remedy
Initial gas tension changes during operation	Leakage/gas valve leaks	▶ Perform a visual inspection. ▶ Perform a leak test with leak spray during final assembly.
	Gas valve damaged	▶ Replace the accumulator.
		▶ Always use the charging and test device according to data sheet 50150 for filling with gas and draining.
	Gas valve function impaired due to contamination	▶ Screw the cover caps back on after using the charging and test device.
	System-related change of pressure dependent on the temperature	Temperature-dependent changes to the gas filling pressure cannot be avoided. ▶ The gas filling pressure must therefore be chosen in accordance with the expected operating temperatures.
	Reduction due to permeation	▶ Refill gas.
Cracks on the vessel	Application out of specification	▶ Stop the system immediately. ▶ Replace the diaphragm type accumulator. The diaphragm type accumulator must not be put into operation again, but must be disposed of, see chapter 12 "Disposal".
	Operation outside the prescribed temperature range	▶ Stop the system immediately. ▶ Replace the diaphragm type accumulator. The diaphragm type accumulator must not be put into operation again, but must be disposed of, see chapter 12 "Disposal". ▶ After commissioning, check the operating temperature.
Internal corrosion	Use of inappropriate hydraulic fluid	▶ Stop the system immediately. ▶ Replace the diaphragm type accumulator. The diaphragm type accumulator must not be put into operation again, but must be disposed of, see chapter 12 "Disposal". ▶ Use suitable hydraulic fluid.
	Residual humidity in the vessel due to inappropriate storage conditions	▶ Stop the system immediately. ▶ Replace the diaphragm type accumulator. The diaphragm type accumulator must not be put into operation again, but must be disposed of, see chapter 12 "Disposal". ▶ Observe the prescribed storage conditions.

Table 7: Fault table

Fault	Possible cause	Remedy
Oil loss at interfaces to the outside	Incorrect order of assembly in service case	▶ Have the service performed by an expert only.
	O-ring of the sealing is damaged and/or hardened due to excessive oil temperature	▶ Have the gas valve replaced by an expert. ▶ Check the oil temperature.
	Oil port cracked due to non-tension-free assembly of the diaphragm type accumulator	▶ Assemble it de-energized.
	Inadmissible environmental force effect	▶ Assemble free of stress.
	Damage to the oil valve during transport	▶ Perform a visual inspection after transport.
Impossible to assemble	Wrong thread	▶ Replace the affected parts.
	Thread damaged	▶ Replace the affected parts.

15 Technical data

For the admissible technical data of the diaphragm type accumulator, refer to data sheet 50150, see chapter 1.2 "Required and amending documentation".

The data sheet can be found on the Internet at
www.boschrexroth.com/various/utilities/mediadirectory

For further information, refer to the online product catalog Industrial hydraulics: www.boschrexroth.com/ics

16 Alphabetical index

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