

Bladder-type accumulators

Model HAB..-7X

**Installation and operating
instructions**

RA 50175-B/07.2016

Replaces: --



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Original instruction manual.

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1 About this documentation

1.1 Scope and purpose

This documentation applies to the following products:

- Hydraulic bladder and diaphragm accumulators.

This documentation is intended for installation personnel and machinery/plant users or manufacturers.

This documentation contains important information for proper and safe installation and operation of the product and for troubleshooting simple errors oneself.

- ▶ Before commencing any work with the product, be sure to read these Instructions carefully and completely.

1.2 Required and amending documentation



- ▶ Only commission the bladder-type accumulator type HAB..-6X 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
 Bladder-type accumulator, type HAB, component series 7 Technical data, operating conditions, performance limits and project planning information concerning bladder-type accumulators type HAB..-7X	50175	Data sheet
Filling and testing device for accumulators Describes the set-up and use of a filling and testing device for accumulators	50144-B	Operating instructions
Hydraulic fluids based on mineral oils and related hydrocarbons Describes the requirements on hydraulic fluids on mineral oil basis and related hydrocarbons for operation with Rexroth hydraulic components and helps you to select a hydraulic fluid for your hydraulic system	90220	Data sheet
General product information on hydraulic products Contains general information on hydraulic products	07008	Operating instructions
Installation, commissioning and maintenance of hydraulic systems Contains general information on the installation, commissioning and maintenance of hydraulic systems	07900	Data sheet

The bladder-type accumulator type HAB..-7X is a system component.

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

1.3 Presentation of information

To enable users to work rapidly and safely with the product while following these Instructions, this documentation uses standardized safety instructions, symbols, terms and definitions, and abbreviations. These are explained in the following sub-sections.

1.3.1 Safety instructions

These Instructions contain safety instructions preceding any actions that involve a risk of personal injury or damage to property. The safety precautions described must be adhered to. Safety instructions are structured as follows:

SIGNAL WORD

Type and source of hazard!!




Consequences if ignored.

- ▶ Hazard avoidance precautions.

- **Safety alert symbol:** draws attention to the hazard
- **Signal word:** indicates the severity of the hazard
- **Type and source of hazard:** indicates the type or source of the hazard
- **Consequences:** describes the consequences that may occur if the hazard avoidance precautions are ignored
- **Hazard avoidance precautions:** indicates how to avoid the hazard

The safety instructions cover the following hazard levels. The hazard level describes the risks involved if the safety instruction is ignored.

Table 2: Hazard levels as per ANSI Z535.6 - 2006

Safety alert symbol, Signal word	Meaning
 DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
NOTICE	Damage to property: Risk of damaging the product or the surrounding environment.

1.3.2 Abbreviations

The following abbreviations are used in this documentation:

Table 3: Abbreviations

Abbreviation	Meaning
Type HAB..-7X	Bladder-type accumulator HAB, component series 7X
RA	Rexroth document in American English language
RE	Rexroth document in English language

2 Safety instructions

2.1 About this chapter

This product has been manufactured in strict compliance with the generally accepted rules of technology. However, this does not exclude the risk of damage to persons or property if this chapter and the safety instructions included in the present documentation are not observed.

- ▶ Read the entire documentation carefully before starting to use the product.
- ▶ Keep this documentation in a location where it is accessible to all users at any time.
- ▶ When passing over the product to third parties, make sure to include the necessary documentation.

2.2 Intended use

Rexroth bladder type accumulators are intended for the setup of hydraulic drive systems in the field of stationary machine-building and plant construction.

In mobile applications or applications, in which acceleration forces act on the bladder-type accumulator during operation according to the intended purpose, the use is subject to approval by the responsible Bosch Rexroth product manager. Please contact the technical sales organization.

The product is intended for professional and not for private use. Intended use includes having read and understood the entire documentation, in particular the “Safety instructions” chapter.

2.3 Improper use

Any use of the product not in accordance with the above definition is improper and thus inadmissible.

Inadequate products installed or used for safety-relevant applications may produce unintended operating behavior and result in product or property damage. For this reason, use a product in safety-relevant applications only on condition that such use is specified and allowed in the corresponding product documentation. For instance in a potentially explosive atmosphere or in safety related parts of a control system (functional safety).

Bosch Rexroth Corporation declines any responsibility for damage resulting from improper use. The user of the equipment is fully responsible for any risk arising from improper use of the product.

They must not be used in potentially explosive atmospheres in accordance with Directive 94/9/EC (ATEX).

2.4 Personnel qualification

Accumulator repairs must be performed by trained hydraulic service personnel experienced in servicing accumulators. Contact your local authorized distributor for application or repair assistance.

The work steps described in the present documentation require basic skills in mechanics and hydraulics, as well as knowledge of the corresponding technical terms. In order to ensure safety at work, these jobs must be exclusively carried out by qualified technical personnel or by trained staff under the direction and supervision of qualified personnel.

Qualified personnel are in a position to recognize possible hazards and institute appropriate safety measures thanks to their professional training, knowledge and experience, as well as

their understanding of the relevant conditions pertaining to the work to be done. Qualified personnel must observe the subject-specific rules.

2.5 General safety instructions

- Observe the regulations for accident prevention and environmental protection.
- Comply with the local safety provisions and regulations of the country in which the product is used.
- Make sure to use Rexroth products in perfect working order.
- Strictly observe all instructions 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 respond.
- Use exclusively accessories and spare parts explicitly approved by the manufacturer to avoid accidents due to improper accessories and spare parts.
- Strictly observe the technical data and ambient conditions specified in the product documentation.
- Inadequate products installed or used for safety-relevant applications may produce unintended operating behavior and result in product or property damage. For this reason, use a product in safety-relevant applications only on condition that such use is specified and allowed in the corresponding product documentation.
- Prior to commissioning the product, make sure that the end product (e. g. a machine or line), into which Rexroth products are integrated, perfectly complies with the country-specific provisions, safety regulations and standards applicable to its use.

2.6 Product and technology-related safety messages

Before commissioning and during operation of hydraulic accumulators, observe the regulations valid at the place of installation.

The operator is solely responsible for observing applicable regulations.

Documents included in the scope of supply must be properly kept; they are required by the surveyor for recurring inspections.

WARNING

Risk of Personal Injury – Risk for personal injury from release of pressurized fluid!

- ▶ Before carrying out any work on hydraulic systems, depressurize the system and secure it against restarting!

2.7 Personal protective equipment

During operation and maintenance work as well as during installation and removal of the bladder-type accumulator, 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 Operator's obligations

The operator is solely responsible for observing applicable regulations.

Documents included in the scope of supply must be properly kept; they are required by the surveyor for recurring inspections.

The operator should never attempt to adjust, loosen, or remove the bleeder port plug without completely depressurizing the system. Installing replacement bleeder plugs not approved or supplied from the manufacturer is strictly forbidden.

WARNING

Risk of Personal Injury – Risk for personal injury from release of pressurized fluid!

- ▶ Never attempt to adjust, loosen, or remove the bleeder port plug without completely depressurizing the system!

WARNING

Risk of Explosion – Never carry out any welding, soldering or mechanical work on the accumulator vessel!

Risk of explosion during welding and soldering!

- ▶ Risk of bursting and loss of the operating permission in the case of mechanical working!
- ▶ Never charge hydraulic accumulators with oxygen or air. Risk of explosion!
- ▶ Before carrying out any work on hydraulic systems, depressurize the system and secure it against restarting!
- ▶ Improper mounting can lead to severe accidents!

Note! Commissioning must exclusively be carried out by qualified personnel.

Accumulator repairs must be performed by trained hydraulic service personnel experienced in servicing accumulators. Contact your local authorized distributor for application or repair assistance.

3 General notes regarding property damages and product damages

Hydraulic accumulators are pressure vessels and are subject to the national regulations and ordinances valid at the place of installation.

Special rules must be observed in the fields of shipbuilding, aircraft construction, mining, etc.

The following notices apply to chapter 6 to 14:

NOTICE

Danger due to improper handling!

Damage to property!

- ▶ Do not expose the bladder-type accumulator to any inadmissible mechanical load.
- ▶ Do not place any objects on top of the bladder-type accumulator.
- ▶ Never use the bladder-type accumulator as a handle or step.
- ▶ Leave the protective covers (e. g. cover cap of gas valve, protective cap of oil valve) on the bladder-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 of the bladder-type accumulator. The bladder-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.
- ▶ Prevent contamination from occurring when closing the ports.
- ▶ 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 bladder-type accumulator.

Environmental pollution caused by incorrect disposal!

Environmental pollution! Damage to property!

- ▶ Dispose of the bladder-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.

NOTICE

Leaking or spilled hydraulic fluid!

Environmental pollution and contamination of the ground water!

- ▶ Immediately remedy possible leakage.
- ▶ If hydraulic fluid is spilled, use an oil binding agent.
- ▶ Observe the information in the safety data sheet of the hydraulic fluid and the system manufacturer's provisions.



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

4 Scope of delivery

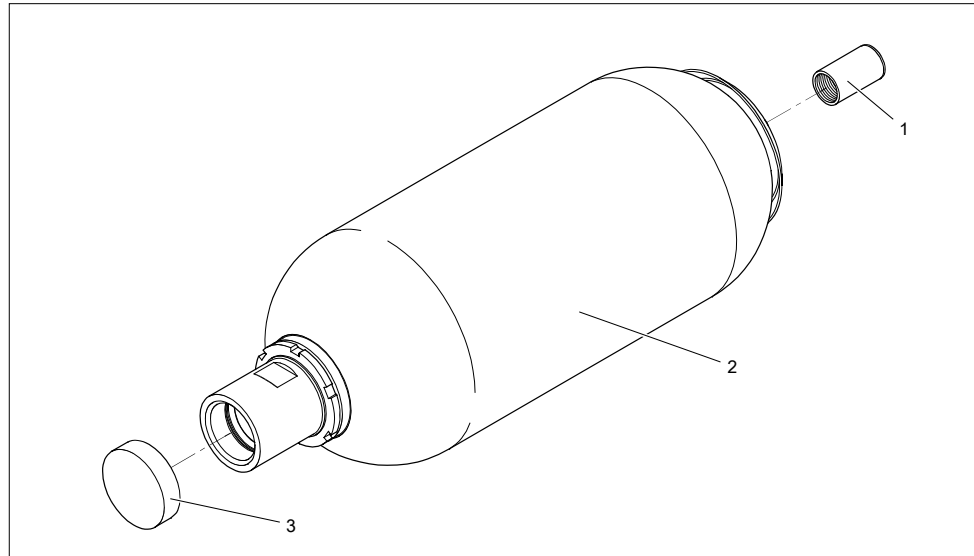


Fig. 1: Scope of delivery of the bladder-type accumulator type HAB..-7X

The scope of delivery includes:

- 1 bladder-type accumulator type HAB..-7X (2)
- 1 operating instructions

Upon delivery, the following parts are also mounted:

- Cover cap at the gas valve (1)
- Protective cap at the oil port (3)

Bladder type accumulators are supplied with a primer coat of paint. Further details are in section 5.1.

5 General

Hydraulic circuits incorporating accumulators may store hydraulic oil under pressure depending on the function of the accumulator in the system. Therefore, the system may remain pressurized after the pump is turned off.

CAUTION

Prior to performing any maintenance or system modifications, bleed off any stored system pressure.

- ▶ Completely release all hydraulic fluid pressure in a safe controlled manner using appropriate valving.
- ▶ Installation of an automatic accumulator discharge valve in the hydraulic circuit is recommended.

5.1 Bladder accumulators

Bladder accumulators will ship from the factory with a primer coating on the shell and with a rust preventative applied to other surfaces. The exception to this policy would be if Bosch Rexroth supplies a complete power unit assembly or accumulator stand and the customer specifies a particular finish coating on the entire unit.

It is the user's responsibility to provide sufficient corrosion protection corresponding to the ambient conditions that the accumulator will be exposed to over the life time of the equipment. If a finish coat is desired, it is strongly recommended to mask the accumulator nameplate and all caution / warning labels prior to painting.

NOTE! Nameplate information is required for warranty evaluation and replacement purposes, therefore proper masking should preserve the condition of the nameplate for future use!!

Bladder type accumulators are delivered with a nitrogen precharge pressure of approximately 25 psi (2 bar) for shipping purposes unless a higher pressure is specified in the accumulator model code. After installation and prior to initial start-up, the precharge pressure must be set to the application requirements, or machine manufacturer's specifications.

CAUTION

Improper accumulator precharge may result in decreased life or failure of the bladder.

6 Mounting and installation

Bladder type accumulators should be mounted in a vertical position with the fluid port assembly at the bottom. Mounting bladder type accumulators in other orientations may result in reduced bladder life. Please consult the factory if other mounting positions are necessary. All accumulators must be rigidly installed using clamps and support brackets specifically designed for accumulator mounting. The fluid port assembly must not be used to support the weight of the accumulator.

CAUTION

DO NOT use gas valve or fluid port assembly as lifting points.

The accumulator shell must not be altered. DO NOT weld or machine pressure vessel.

- ▶ Improper handling may result in damage to the gas valve or fluid port assembly, accumulator shell, or seals.

NOTE! Exercise care not to paint over rating nameplate or the warning label.

6.1 Checking the gas pre-charge pressure

Bleed off hydraulic system pressure.

- ▶ After the accumulator has been put in service, the precharge pressure should be checked with an accumulator charging and testing device at least once in the first week. If this check reveals no loss in pressure, the precharge should be checked on the following schedule:
 - 1st Check – 1 week
 - 2nd Check – 3 months
 - 3rd Check – 1 year
 - 4th & Continued – yearly

If the gas precharge is low, investigate cause and correct. Possible causes of lost precharge pressure includes leaking or damaged gas valve, or damaged bladder or diaphragm.

6.2 Testing pre-charge pressure

Completely release accumulator hydraulic system pressure in a safe controlled manner. Install the charging and testing device onto the gas valve. Measure the pre-charge pressure using the gauge supplied in the charge kit.

7 Bladder accumulator product description



More detailed information on operating conditions, connection dimensions and performance limits of the bladder-type accumulator are provided in data sheet RA 50175, see chapter 1.2 “Required and amending documentation”.

7.1 Product description

Bladder-type accumulators are intended for the 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 bladder-type accumulator. Bladder-type accumulators of type HAB..-7X basically comprise the following components:

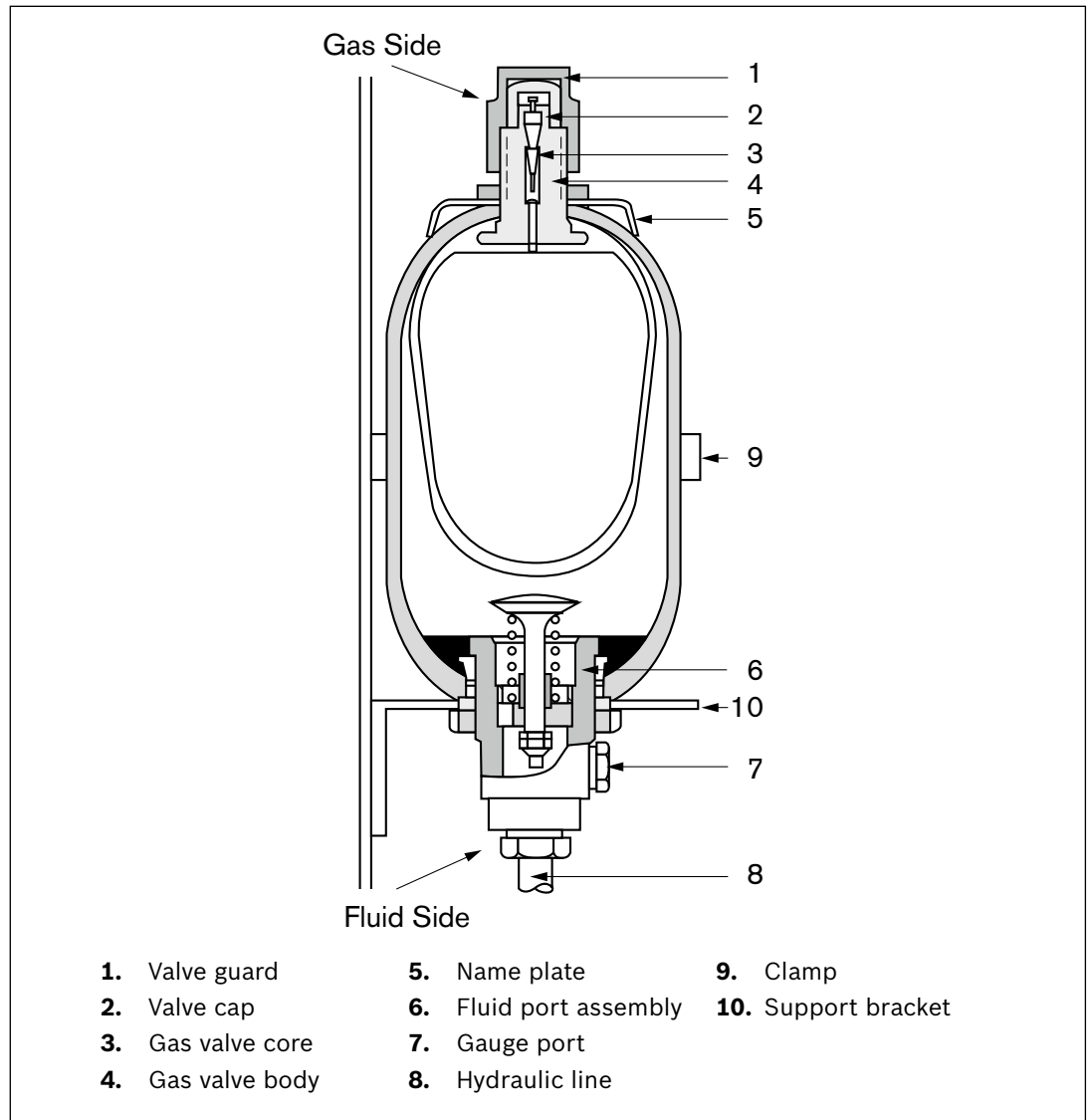


Fig. 2: Typical Bladder Accumulator Installation

7.2 Product identification

The bladder-type accumulator is to be identified based on its nameplate. Below is a typical nameplate used on bottom repairable accumulators.

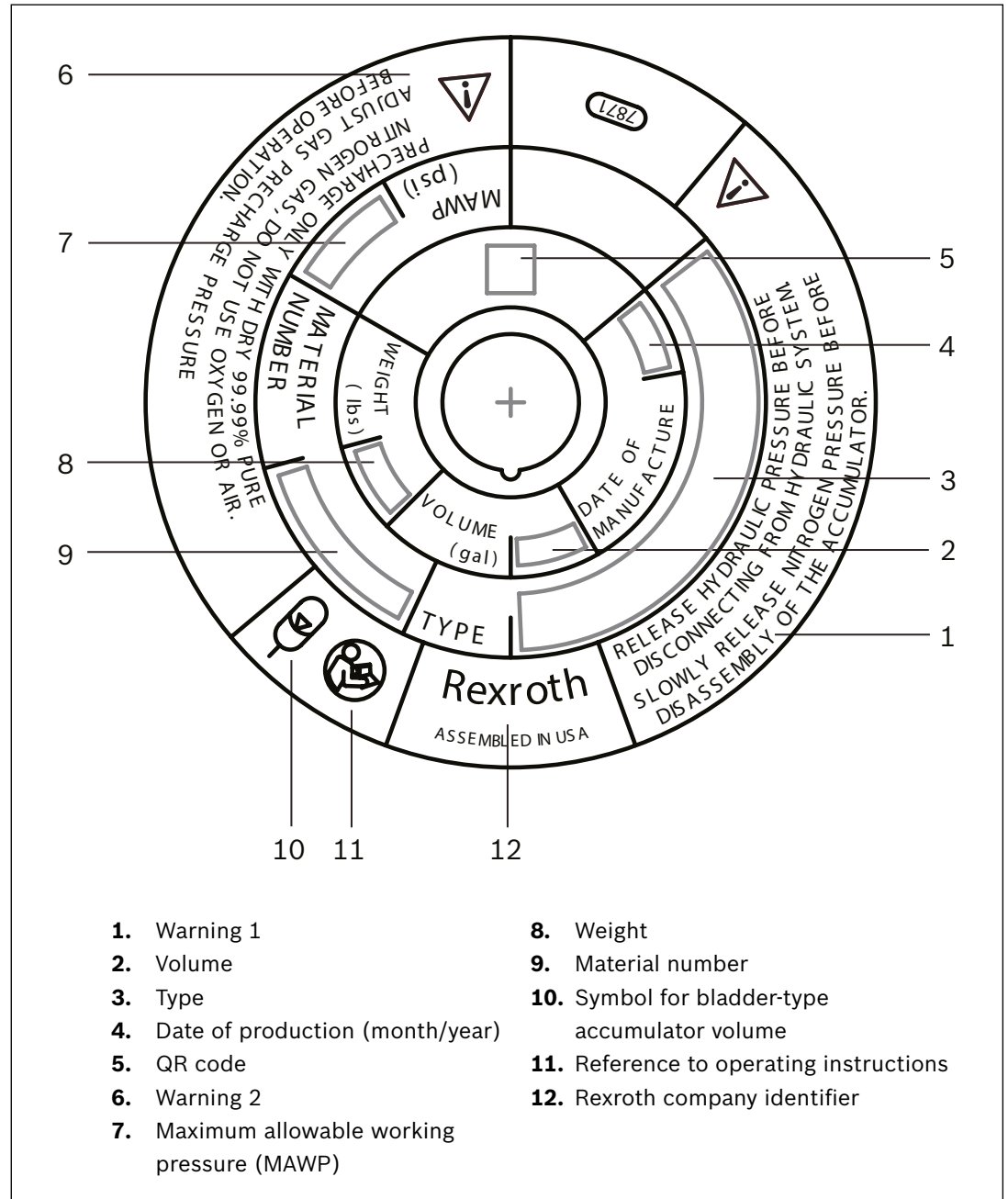


Fig. 3: Typical nameplate used on bottom repairable accumulators

NOTE! for top repairable accumulators, adhesive nameplates are used and affixed directly to the shell surface.

8 Transport and storage

- ▶ Always comply with the required environmental conditions with regards to transport and storage, see chapter 8.2 “Storage of the bladder-type accumulator”.

8.1 Transport of the bladder-type accumulator

WARNING

Falling of the bladder-type accumulator due to improper transport!

Risk of injury! Danger of crushing! Danger of bone fractures! Damage to property!

- ▶ Use lifting gear with sufficient lifting capacity to lift bladder-type accumulators with a weight > 40 lbs. (15 kg).
- ▶ Use lifting straps or lifting slings as attachment devices.
- ▶ 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.
- ▶ Place the bladder-type accumulator carefully onto the contact surface to prevent damage.

Uncontrolled rolling away, overturning or falling of the bladder-type accumulator!

Risk of injury! Damage to property!

- ▶ Make sure that the bladder-type accumulator is positioned safely and secured against unintended rolling away, overturning or falling.

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

Transport The bladder-type accumulator may only be transported separately without screwed block or other attachments.

Dependent on the weight and transport duration, there are the following transport possibilities:

- Transport by hand
- Transport using a forklift
- Transport using lifting gear (e. g. lifting strap, lifting sling)



Further details on the weight and the dimensions of the bladder-type accumulator can be found on the nameplate on the bladder-type accumulator and in data sheet RA 50175, see chapter 1.2 “Required and amending documentation”.

8.1.1 Transport by hand

! CAUTION

Risk of injury due to heavy loads (weight > 40 lbs. (15 kg)!

When carrying bladder-type accumulators, there is a danger of health hazards.

- ▶ Use a suitable technique for lifting, putting down and moving the system.
- ▶ Use your personal protective equipment, e. g. safety shoes.

Bladder-type accumulators with a weight of up to 40 lbs. (15 kg) can be transported by hand for a short time, if necessary.

8.1.2 Transport using a forklift

! WARNING

Falling of the bladder-type accumulator during transport!

Risk of injury! Damage to property!

- ▶ Only transport the bladder-type accumulator using a forklift if it is securely strapped to a pallet or in stable packaging and secured against rolling away.

To transport the bladder-type accumulator using a forklift proceed as follows:

1. Move the fork of the forklift under the pallet/packaging of the bladder-type accumulator.
2. Only lift the bladder-type accumulator as far off the floor as necessary for the transport.

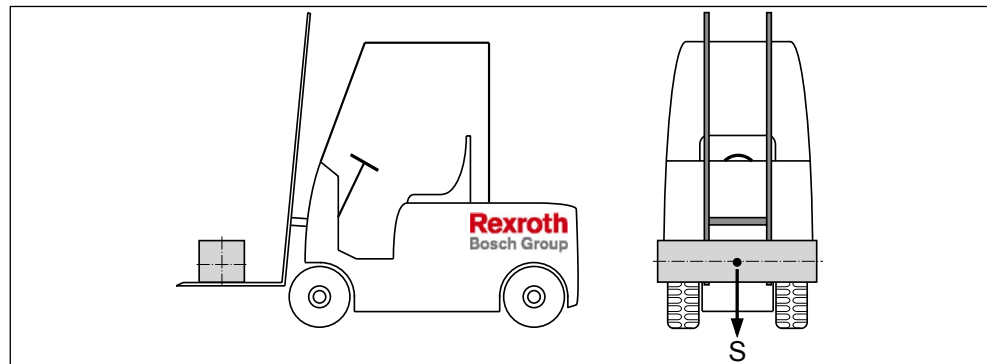


Fig. 4: Transport using a forklift

8.1.3 Transport using lifting gear

For the transport, the bladder-type accumulator can be connected to lifting gear.

- ▶ Always use a lifting strap/lifting sling to lift the bladder-type accumulator.

Transport in horizontal position

To transport the bladder-type accumulator in horizontal position using lifting gear proceed as follows:

! WARNING

During transport using a lifting strap/lifting sling, the bladder-type accumulator may tilt out of the loop!

Risk of injury! Damage to property!

- ▶ Use a lifting strap/lifting sling with sufficient lifting capacity.
- ▶ Make sure that the bladder-type accumulator is safely fixed using the lifting strap/lifting sling.
- ▶ Guide the bladder-type accumulator by hand for fine positioning.

1. Attach the lifting strap/lifting sling by making loops on both sides of the bladder-type accumulator.
2. Carefully lift the bladder-type accumulator to check the center of gravity position. Ensure a stable center of gravity position.
3. Make sure that the bladder-type accumulator cannot move out of the intended position and the lifting straps/lifting slings do not move during lifting.
4. Only lift the bladder-type accumulator as far off the floor as necessary for the transport.

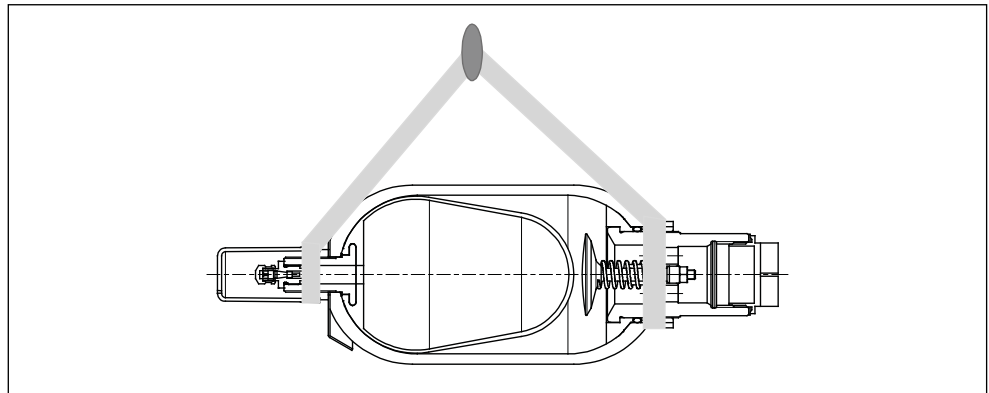


Fig. 5: Transport using lifting gear in horizontal position

8.2 Storage of the bladder-type accumulator

The bladder-type accumulators are supplied with a primer coat of paint. The machine end-user must ensure a 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.
 - Protect the bladder-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 bladder-type accumulator amounts to 5 years.

- Commissioning after storage** Procedure after expiration of maximum storage time:
- ▶ Carry out a visual inspection of the bladder-type accumulator and check for any damage and corrosion.
 - ▶ After the expiration of the maximum storage time, have the complete bladder-type accumulator checked by an expert, see chapter 2.4 „Qualification of personnel“.
 - ▶ After the expiration of the maximum storage time, have the bladder, seals and gas valve insert exchanged 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 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.

9 Charging the accumulator

9.1 Procedures

! WARNING

Risk of Explosion

- ▶ USE only dry 99.99% pure nitrogen for charging accumulators.
- ▶ NEVER USE OXYGEN OR AIR, due to the risk of explosion.

1. Close the drain valve on the charging and testing device and connect the hose to the nitrogen bottle.
2. Remove the valve guard and valve cap and screw the charging and testing device onto the gas valve. More detailed information is provided in the instruction sheet furnished with the charging and testing device.
3. Open the gas shut-off valve on the nitrogen bottle and allow the gas to flow slowly into the accumulator.
4. Close the shut-off valve frequently and check the value of the precharge pressure on the gauge.
5. If the precharge pressure is too high, it may be reduced by opening the drain valve and allowing some nitrogen to escape.

NOTE! The precharge pressure will vary depending on the gas temperature. Once the desired precharge is reached, it is necessary to wait 2 minutes until the gas temperature has equalized.

6. Once again the precharge pressure needs to be checked and adjusted if necessary.
7. Unscrew the charging and testing device and replace the valve guard and cap (see Fig. 1, Item #1 & #2) A check for leaks with a soapy solution should follow. If a leak is found, it should be repaired following recommended repair procedures.
8. If the gas valve core is replaced, use only valve cores approved for accumulator service, **NOTE!** NEVER USE AN AUTOMOTIVE TYPE VALVE CORE.

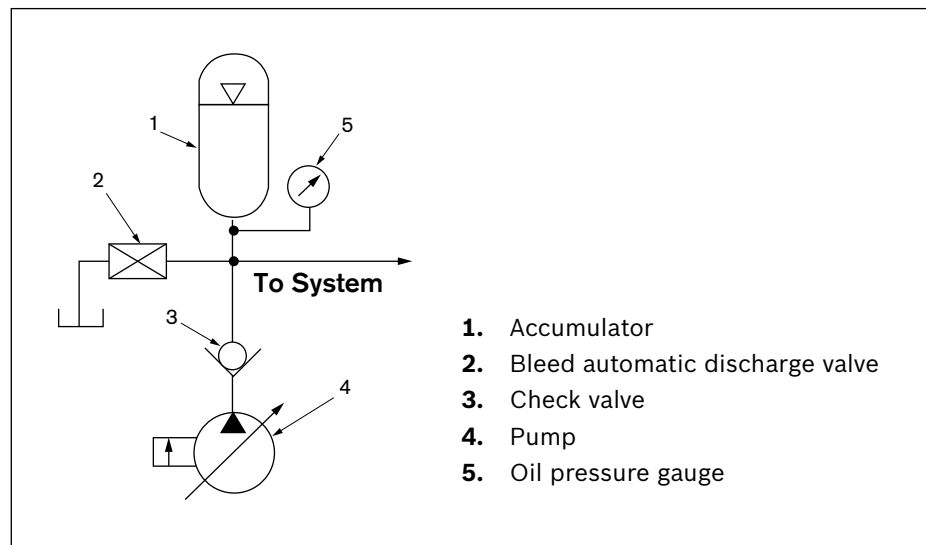


Fig. 6: Typical circuit

10 Charge kits

10.1 Part numbers

See the table below for a list of part numbers for the appropriate charge kit to use with each series of accumulator.

Series	Description	Part number
HAB-1X	Charge kit for NAFTA – Complete Assembly – Bladder type & U.S. version Diaphragm type SAE 7/8" – 14 UNF (#10 SAE)	0538103013
HAB-2X	Charge kit for NAFTA – Complete Assembly – Bladder type & U.S. version Diaphragm type SAE 7/8" – 14 UNF (#10 SAE)	0538103013
HAB-3X	Charge kit for NAFTA – Complete Assembly – Bladder type & U.S. version Diaphragm type SAE 7/8" – 14 UNF (#10 SAE)	0538103013
HAB-4X	Charge kit for NAFTA – Complete Assembly – Bladder type & U.S. version Diaphragm type SAE 7/8" – 14 UNF (#10 SAE)	0538103013
HAB-5X	Charge kit for NAFTA	R978046091
HAB-6X	Charge kit for NAFTA – Complete Assembly – Bladder type & U.S. version Diaphragm type SAE 7/8" – 14 UNF (#10 SAE)	0538103013
HAB-7X	Charge kit for NAFTA – Complete Assembly – Bladder type & U.S. version Diaphragm type SAE 7/8" – 14 UNF (#10 SAE)	0538103013

10.2 Equipment details

Dimensions of filling and test valve

– Valve body with check valve, drain valve, pressure gauge connection and gas hose connection.

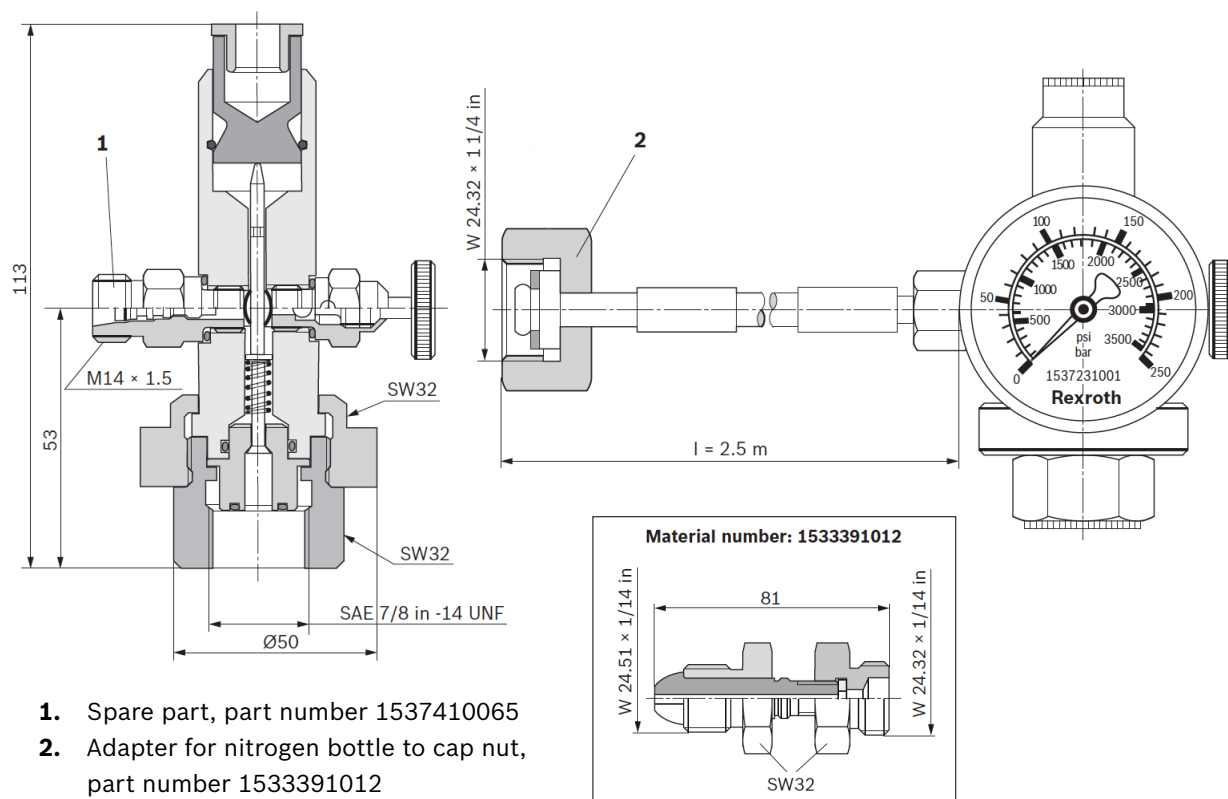


Fig. 7: Charging and test kit (PN 0538103013)

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The data specified above only serve to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.