rexroth
A Bosch Company

Operating instructions

Charging and test device for hydro-pneumatic accumulators

RE 50144-B, Edition: 2023-01, Replaces: 08.2013

The data specified above only serve to describe the product. No statements concerning a particular 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.

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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LT: Naudoti šį produktą leidžiama tik turint šią vartotojo instrukciją Jums suprantama kalba ir jei supratote jos turinį. Jei instrukcijos nesuprantate, prašome kreiptis į savo Bosch Rexroth konsultantą arba atsakingą aptarnavimo tarnybą. Informaciją apie juos rasite adresu www.boschrexroth.com.

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Contents

1 About this documentation

1.1 Validity of the documentation

This documentation is valid for the following products:

- Charging and test device for bladder-type accumulators, type HAB
  Material number: 0538103011
- Charging and test device for membrane accumulators, type HAD
  Material number: 0538103012
- Charging and test device for bladder-type and diaphragm accumulators, type HAB and HAD
  Material number: 0538103014

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

This documentation contains important information required for the safe and proper use of the product.

▶ Read this documentation thoroughly, and in particular chapter 2 "Safety instructions" and chapter 3 "General information on damage to property and damage to product", before handling the product.

1.2 Required and amending documentation

▶ Only commission the product once you have been provided with the documentation marked with the book symbol 🕮 and you have understood and observed it. You can find the documentation in the online product catalog at www.boschrexroth.com or in the media directory at www.boschrexroth.com/mediadirectory.

Table 1: Required and amending documentation

	Title	Document number	Document type
🕮	**Diaphragm accumulator, type HAD** Contains the admissible technical data, operating conditions, performance limits and project planning information for diaphragm accumulators of type HAD...-1X/ and HAD...-2X/.	50150	Data sheet
🕮	**Diaphragm accumulator, type HAD** Contains important information on the safe and proper transport, assembly, commissioning, maintenance and disassembly of diaphragm accumulators of type HAD...-1X/ and HAD...-2X/.	50150-B	Operating instructions
🕮	**Bladder-type accumulator, type HAB** Contains the admissible technical data, operating conditions, performance limits and project planning information for bladder-type accumulators of type HAB...-6X/.	50171	Data sheet
🕮	**Bladder-type accumulator, type HAB** Contains important information on the safe and proper transport, assembly, commissioning, maintenance and disassembly of bladder-type accumulators of type HAB...-6X/.	50171-B	Operating instructions

1.3 Representation of information

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

1.3.1 Safety instructions

In this documentation, safety instructions are indicated whenever sequences of actions are explained which bear the risk of personal injury or damage to property. The measures described for hazard avoidance 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 moderate 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 Designations

The following designations are used in this documentation:

Table 4: Designations

Designation	Meaning
P0	Gas filling pressure
PS	Maximum admissible pressure
HAD...1X/	Diaphragm accumulator, type HAD, component series 1X
HAD...2X/	Diaphragm accumulator, type HAD, component series 2X
HAB...6X/	Bladder-type accumulator, type HAB, component series 6X

1.3.4 Abbreviations

The following abbreviations are used in this documentation:

Table 5: Abbreviations

Abbreviation	Meaning
RE	**R**exroth document in the **E**nglish language
SW	**W**rench **s**ize

2 Safety instructions

2.1 About this chapter

The charging and test device was designed and 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 product.
- Keep this documentation in a location where it is accessible to all users at all times.
- Always include the required documentation when passing the product on to third parties.

2.2 Intended use

Charging and test devices are used for checking the gas filling pressure P0 and for filling and emptying hydro-pneumatic accumulators.

- Observe the technical data, operating conditions and performance limits specified in data sheets 50150 and 50171.

The charging and test device is technical equipment exclusively intended for professional and not for private use.
Intended use includes having read and understood this documentation, especially chapters 2 "Safety instructions" and 3 "General information on damage to property and damage to product".

2.3 Improper use

Any use deviating from the intended use is improper and thus not admissible. Bosch Rexroth AG does not assume any liability for damage caused by improper use. The user assumes responsibility for all risks surrounding improper use.

2.4 Qualification of personnel

The checking of the gas filling pressure P0 and the filling and emptying of hydro-pneumatic accumulators require basic knowledge of mechanics and hydraulics as well as knowledge of the associated technical terms.
In order to ensure operational safety, these activities may only be carried out by corresponding experts 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 circuit drawings,
- in particular, completely understanding the relationships regarding the safety equipment and
- having knowledge of the function and set-up of hydraulic components.

The expert has to have successfully completed training for qualified persons for pressure containers and have regularly attended further trainings courses.

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

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.
- Only use Rexroth products in technically perfect condition.
- Observe all information on the product.
- Persons assembling, operating, disassembling or maintaining Rexroth products must not be under the influence of alcohol, other drugs or medications influencing the ability to react.
- Only use accessories and 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.
- The installation or use of inappropriate products in safety-relevant applications could result in unintended operating conditions in the application, which in turn could cause injury 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, or if the safe suitability of the product in the application is confirmed by a separate conformity assessment procedure for the end product, e.g. in explosion protection zones 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 or system) where the Rexroth product is installed complies with the country-specific provisions, safety regulations and standards of the application.

2.6 Product- and technology-dependent safety instructions

The following safety instructions apply to chapters 6 to 10:

⚠ WARNING

Pressurized hydro-pneumatic accumulators!
Danger to life, risk of injury, severe injury when working at hydro-pneumatic accumulators which have not been stopped or which have not emptied of gas!
Damage to property!

- ▶ Always relieve the pressure from the relevant system part before assembling the charging and test device.
- ▶ Secure the system against restarting.
- ▶ In this connection, always observe the operating instructions and any other technical documentation relating to the system.
- ▶ Observe the hydro-pneumatic accumulator's operating instructions.

Uncontrolled release of a significant amount of nitrogen!
Danger to life! Risk of suffocation! Risk of injury caused by components being swept away!

- ▶ When draining hydro-pneumatic accumulators, ensure that the working space is sufficiently ventilated.
- ▶ Always use a charging and test device to drain hydro-pneumatic accumulators.

⚠ CAUTION

Hot/cold surfaces on the charging and test device as well as on the hydro-pneumatic accumulator!
Risk of burning! Danger of frostbite!
The charging and test device as well as the hydro-pneumatic accumulators can heat up/cool down significantly during draining.

- ▶ Only touch the surfaces of the hydro-pneumatic accumulator when wearing heat/cold resistant protective clothing, e.g. gloves, or do not work at hot/cold surfaces.
- ▶ Allow the hydro-pneumatic accumulator to cool down/warm up sufficiently before touching it.
- ▶ Observe the protective measures of the system manufacturer.

2.7 Personal protective equipment

In principle, the following personal protective equipment must be worn for filling and emptying hydro-pneumatic accumulators:

- Heat or cold-resistant protective gloves
- Ear protection
- Safety shoes
- Perfectly fitting safety goggles
- Protective helmet

3 General information on damage to property and damage to product

The following safety instructions apply to chapters 6 to 10:

NOTICE
Danger due to improper handling! Damage to property! ▶ Do not place unpermitted mechanical loads on the charging and test device. ▶ Never use the charging and test device as a handle or step. ▶ Do not place any objects on the charging and test device. ▶ Do not hit the charging and test device. ▶ Do not apply any further external loads.

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

4 Scope of delivery

The scope of delivery includes:
- Individual components depending on the case design (see Table 6)
- One set of operating instructions in German and one in English

Table 6: Case design

Measurement case complete for **consisting of**	**Bladder-type accumulators 0538103011**	**Diaphragm accumulators 0538103012**	**Bladder- and diaphragm type accumulators 0538103014**
Case		R901079781	
Charging and test valve	0538103005	0538103006	0538103005 0538103006
Pressure gauge 0 to 250 bar		1537231001	
Hose l = 2.5 m with transition socket form D (W24.32x1/14")		1530712005	

5 Product information

Bosch Rexroth's charging and test device is used to check the gas filling pressure and to fill and empty hydro-pneumatic accumulators. For filling, you also need nitrogen from a standard gas bottle with pressure regulator or a charging device.

5.1 Charging and test valve for bladder-type accumulators (0538103005)

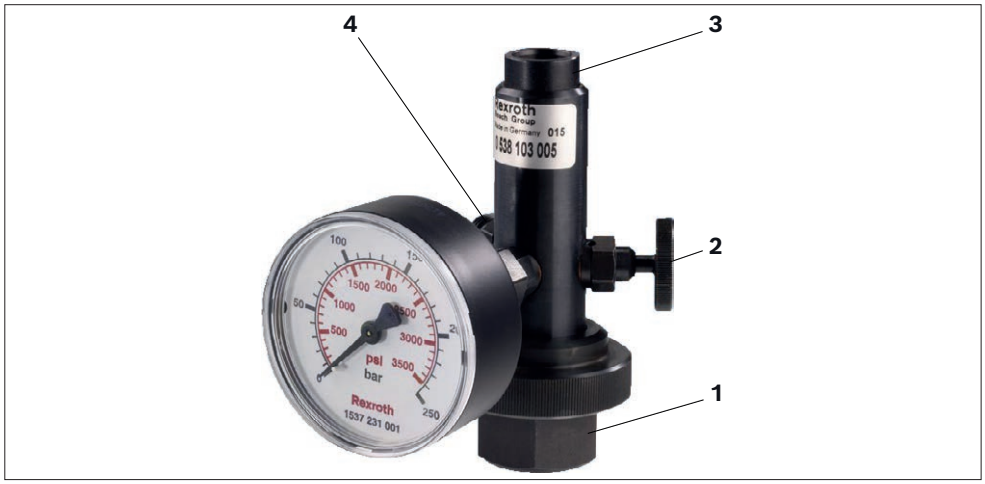

Fig. 1: Charging and test valve for bladder-type accumulators

1 Cap nut
2 Gas drain valve
3 Bladder-type accumulator gas valve actuation
4 Hose attachment

5.2 Charging and test valve for diaphragm accumulators (0538103006)

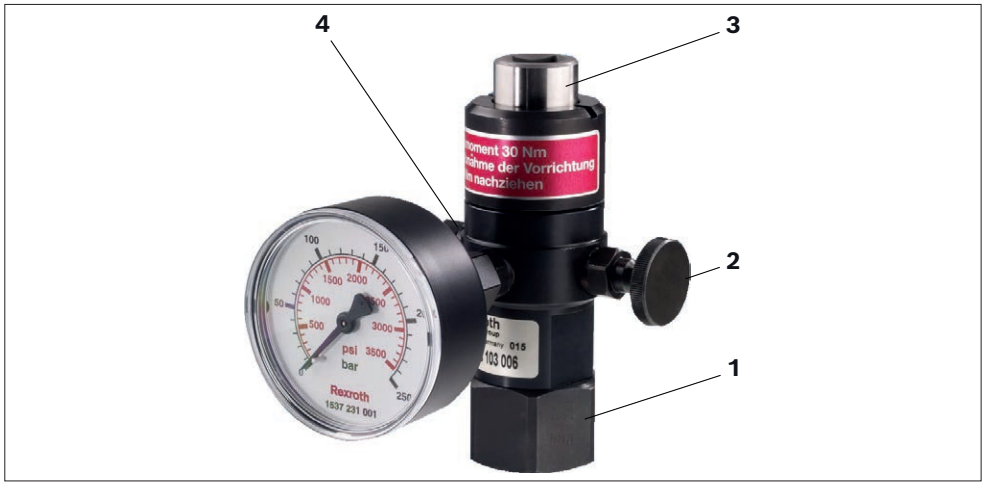

Fig. 2: Charging and test valve for diaphragm accumulators

1 Cap nut
2 Gas drain valve
3 Diaphragm accumulator gas filling screw actuation
4 Hose attachment

6 Transport and storage

- Always comply with the required environmental conditions with regards to transport and storage.

6.1 Transporting the charging and test device

A sensitive pressure gauge (manometer) is part of the charging and test device.

- Always use the supplied plastic case to protect it during transport.

6.2 Storing the charging and test device

Requirements

- Ensure that the storage facilities are free from etching substances and gases.
- Make sure the storage rooms are dry.
- Ensure a constant temperature, if possible.
  Ideal storage temperature: +5 °C to +30 °C

7 Use

7.1 Preparation

1. Check the charging and test device for obvious defects before working with it.
2. Make sure that the system is depressurized.
3. Make sure the hydro-pneumatic accumulator is intact.
4. Make sure that the available pressure in the nitrogen bottle is greater than the hydro-pneumatic accumulator gas filling pressure P0 to be set.
5. Make sure that the load capacity of the pressure gauge in place matches the gas filling pressure P0 specified in the installation's hydraulic circuit diagram and is not exceeded.
6. Verify that the gas filling pressure P0 to be set according to the hydraulic circuit diagram does not exceed the maximum operating pressure of the system or the maximum gas filling pressure PS of the accumulator.
7. Connect the charging and test device with the hydro-pneumatic accumulator and a nitrogen bottle, see Fig. 3.

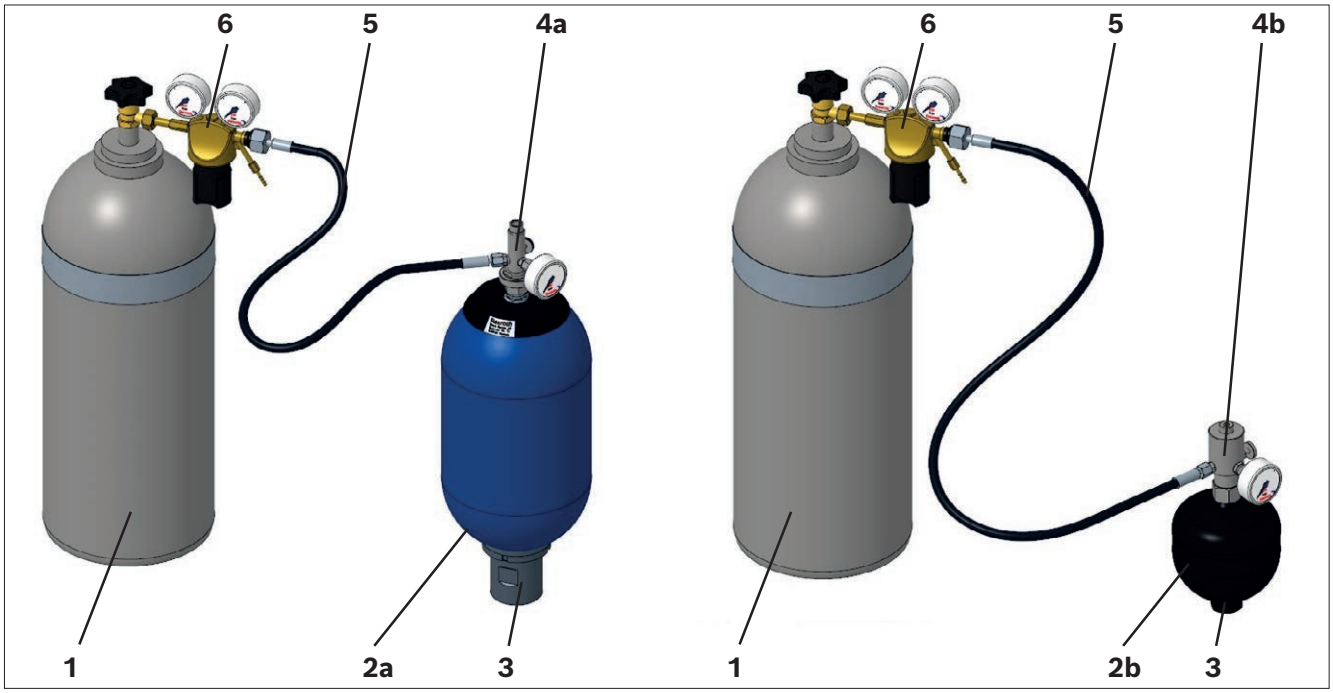

Fig. 3: Setup for testing and filling

1 Nitrogen bottle
2 **a:** Bladder-type accumulator HAB
b: Diaphragm accumulator HAD
3 Hydraulic fluid connection
4 **a:** Charging and test device HAB
b: Charging and test device HAD
5 Filling hose
6 Pressure regulator

7.2 Checking the gas filling pressure

When checking the gas filling pressure with the charging and test device, nitrogen is inevitably lost. In the case of smaller accumulators, this can have a significant impact on the gas filling pressure. It should therefore be kept in mind that replenishing may be necessary.

7.2.1 Checking the gas filling pressure in case of a bladder-type accumulator

To check the gas filling pressure on the bladder-type accumulator, perform the following steps:

1. Remove the cover cap, see Fig. 4, item 1, and the sealing cap, see Fig. 4, item 2, from the gas side of the bladder-type accumulator.

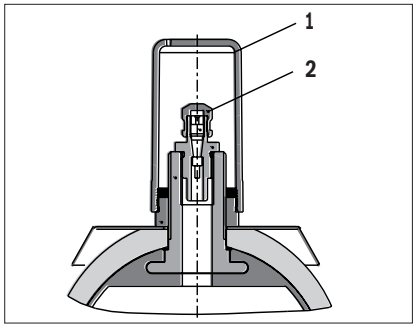

Fig. 4: Bladder-type accumulator: Removing the cover cap and sealing cap

1 Cover cap **2** Sealing cap

2. Close the lateral gas drain valve, see Fig. 5, item 2, of the charging and test device.
3. Screw the charging and test valve with the cap nut (SW 32), see Fig. 5, item 1, on the bladder-type accumulator gas valve, see Fig. 5, item 6, as far as it goes and ensure it is seated tightly.
   – Rotate the device so that you can read the pressure gauge easily.
   – Make sure that the O-ring that seals between both parts, see Fig. 5, item 5, is seated tightly in the groove.
4. Press and hold the gas valve actuator, see Fig. 5, item 3.
5. Read the pressure of the bladder-type accumulator from the pressure gauge.

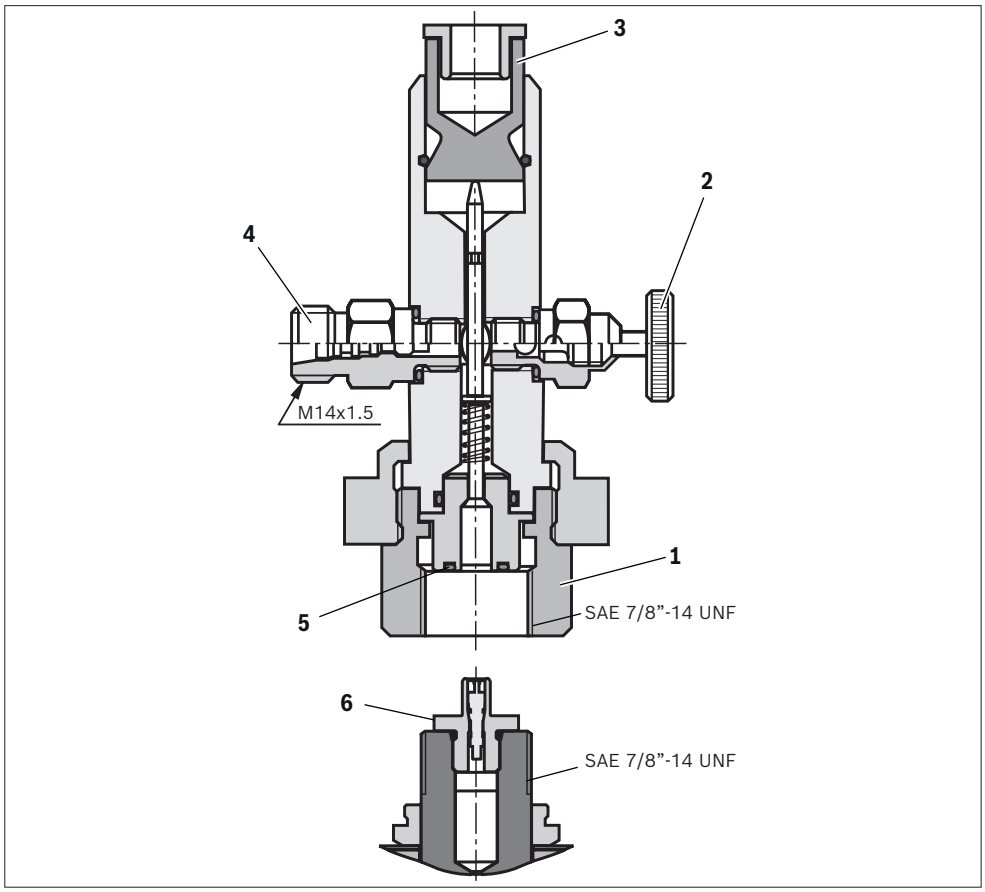

Fig. 5: Bladder-type accumulator: Screwing the charging and test valve onto the gas valve

1 Cap nut (SW 32)
2 Gas drain valve
3 Bladder-type accumulator gas valve actuation
4 Hose attachment
5 O-ring
6 Bladder-type accumulator gas valve

7.2.2 Checking the gas filling pressure in case of a diaphragm accumulator

⚠ WARNING

Flying parts, e.g. shooting out of the gas filling screw (see Fig. 7, item 7), due to unscrewing the gas filling screw without the charging and test device and while there is gas pressure!

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

- ▶ Loosen the gas filling screw using the charging and test device. Only if this is not possible because of excessive tightening torque can the gas filling screw be released by a hexagonal key SW 6 by at most a quarter of a rotation.

To check the gas filling pressure in the diaphragm accumulator, perform the following steps:

1. Remove the cover cap, see Fig. 6, item 1, from the gas side of the diaphragm accumulator.

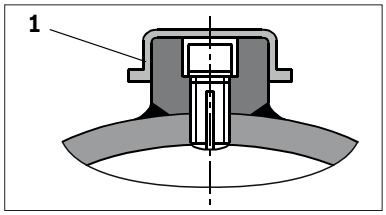

Fig. 6: Diaphragm accumulator: Removing the cover cap

1 Cover cap

2. Close the lateral gas drain valve, Fig. 7, item 2, of the charging and test device.
3. Screw the charging and test valve with the cap nut (SW 36), see Fig. 7, item 1, on the diaphragm accumulator gas valve, see Fig. 7, item 6, as far as it goes and ensure it is seated tightly.
   - – Rotate the device so that you can read the pressure gauge easily.
   - – Make sure that the O-ring that seals between both parts, see Fig. 7, item 5, is seated tightly in the groove.
4. Open the gas valve of the diaphragm accumulator, see Fig. Fig. 7 item 6.
   - – To do this, use a square key SW 13 and open the gas filling screw, see Fig. 7, item 3, via the actuator of the gas filling screw, see Fig. 7, item 7, with a left turn.
5. Read the pressure of the diaphragm accumulator from the pressure gauge.

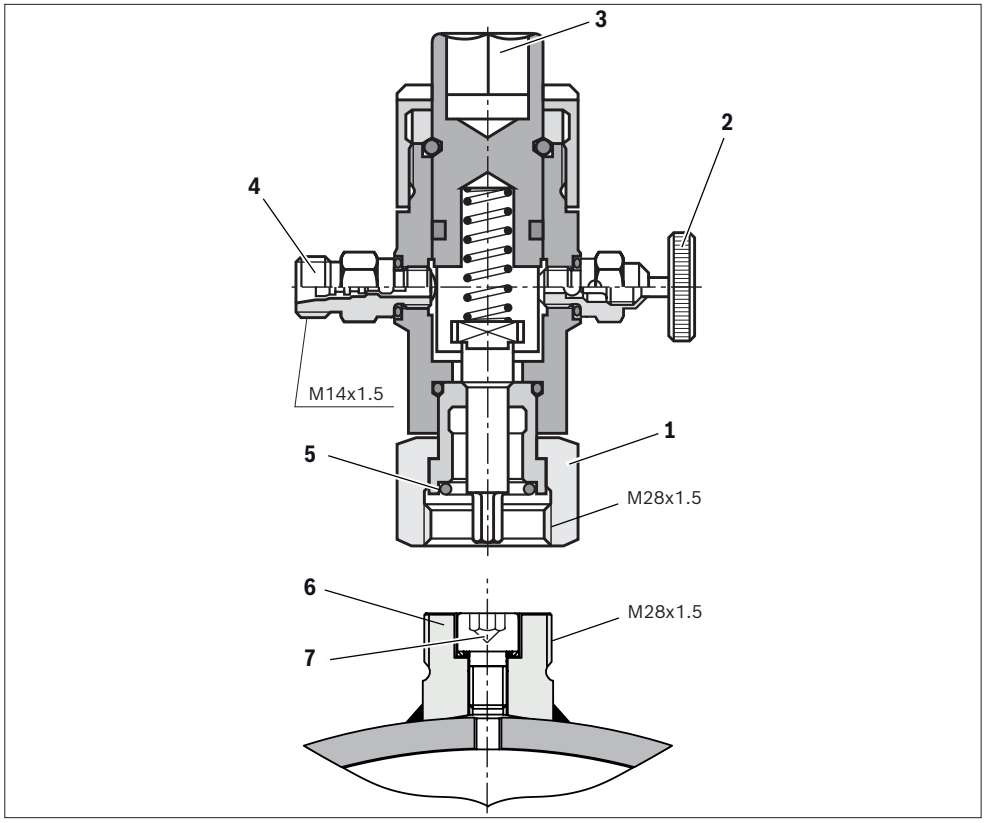

Fig. 7: Diaphragm accumulator: Screwing the charging and test valve onto the gas valve

1 Cap nut (SW 36)
2 Gas drain valve
3 Diaphragm accumulator gas filling screw actuation (SW 13)
4 Hose attachment
5 O-ring
6 Diaphragm accumulator gas valve
7 Gas filling screw (SW 6)

7.3 Filling of the hydro-pneumatic accumulator

⚠ WARNING

Explosion of the hydro-pneumatic accumulator when filled with unauthorized gas, e.g. air or oxygen!
Danger to life! Risk of injury!
▶ Only fill the hydro-pneumatic accumulator with nitrogen 99.99 vol.%.

Uncontrolled filling of the hydro-pneumatic accumulator when the gas pressure of the nitrogen bottle is higher than the maximum admissible pressure PS!
Danger to life! Risk of injury! Danger of bursting!
▶ Fill the hydro-pneumatic accumulator via a pressure regulator.

For non-German nitrogen bottles you need the right transition sockets. For further information on the transition sockets, refer to data sheets 50150 and 50171, see chapter 1.2 "Required and amending documentation".

1. Perform the steps in chapter 7.2 "Checking the gas filling pressure" in the order specified, depending on the type of accumulator you have.
2. Attach the hose to the pressure regulator of the nitrogen bottle and then to the hose attachment, see Fig. 5 and Fig. 7, item 4, of the charging and test device. To do this, tighten the cap nuts hand-tight with an open-end wrench SW 32 and SW 17.

WARNING! Bursting of the bladder-type accumulator due to the maximum admissible pressure PS being exceeded!
Danger to life! Risk of injury! Damage to property!
▶ Adhere to the maximum admissible pressure PS indicated on the type cap.

3. Slowly open the shut-off cock of the nitrogen bottle and allow gas to flow into the hydro-pneumatic accumulator until the intended gas filling pressure P0 appears on the pressure gauge of the prefill valve. Always keep an eye on the pressure gauge during the filling process.
4. Close the shut-off cock of the nitrogen bottle.

The gas filling pressure is temperature-dependent. During charging, the hydro-pneumatic accumulator heats up. Wait until the accumulator cools down. Depending on the amount of gas supplied and the associated temperature increase, the gas filling pressure can drop again when it cools down. Check the gas filling pressure and correct it if necessary.

5. Close the gas valve on the hydro-pneumatic accumulator, see Fig. 5 and Fig. 7, item 6.
   - **For bladder-type accumulators:** Release the gas valve actuator, see Fig. 5, item 3.
   - **For diaphragm accumulators:** To do this, use a square key SW 13 and close the gas filling screw, see Fig. 7, item 3, via the actuator of the gas filling screw, see Fig. 7, item 7 with a right turn.
6. Release the air pressure within the charging and test device. To do this, open the lateral gas drain valve, see Fig. 5 and Fig. 7, item 2, until you can hear the nitrogen escaping. Then close the valve again.
7. Loosen the hose, see Fig. 5 and Fig. 7, item 4, from the charging and test device and the nitrogen bottle.
8. Remove the charging and test device from the hydro-pneumatic accumulator and return it to the case.
9. **For diaphragm accumulators:** Tighten the gas filling screw, see Fig. 7, item 7, with a hexagonal key SW 6 to a tightening torque of 25 Nm.
10. Fit the protective cap(s) over the hydro-pneumatic accumulator gas valve again.

7.4 Emptying the hydro-pneumatic accumulator

1. Perform the steps in chapter 7.2 "Checking the gas filling pressure" in the order specified, depending on the type of accumulator you have.
2. Open the lateral gas drain valve, see Fig. 5 and Fig. 7, item 2, until you can hear nitrogen escaping.
3. Once the desired pressure has been reached or the cylinder has been completely emptied, close the lateral gas drain valve, see Fig. 5 and Fig. 7, item 2.
4. Close the gas valve on the hydro-pneumatic accumulator, see Fig. 5 and Fig. 7, item 6.
   - **For bladder-type accumulators:** Release the gas valve actuator, see Fig. 5, item 3.
   - **For diaphragm accumulators:** To do this, use a square key SW 13 and close the gas filling screw, see Fig. 7, item 3, via the actuator of the gas filling screw, see Fig. 7, item 7 with a right turn.
5. Remove the charging and test device from the hydro-pneumatic accumulator and return it to the case.
6. **For diaphragm accumulators:** Tighten the gas filling screw, see Fig. 7, item 7, with a hexagonal key SW 6 to a tightening torque of 25 Nm.
7. Fit the protective cap(s) onto the hydro-pneumatic accumulator gas valve again.

8 Maintenance and repair

Repair works to the charging and test device may only be carried out by the manufacturer or its authorized dealers and subsidiaries, otherwise you lose your warranty claim.

8.1 Inspection

The calibration period for the pressure gauge is 12 months.

8.2 Spare parts

Use only accessories and spare parts approved by Bosch Rexroth, otherwise the functional safety of the charging and test device cannot be guaranteed.

For further information about the spare parts, refer to data sheets 50150 and 50171, see chapter 1.2 "Required and amending documentation".

9 Disposal

When disposing of the charging and test device, the following points must be observed:

1. Disassemble the charging and test device into its individual components to recycle them.
2. Separate for example:
   - Steel
   - Non-ferrous metal
   - Plastic
   - Seals

9.1 Environmental protection

Careless disposal of the charging and test device and packaging material can lead to environmental pollution.

▶ Dispose of the charging and test device and packaging material according to the national regulations of your country.

10 Extension and modification

You will be considered responsible for any extensions to or modifications of the product.

Any declarations shall 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.

Replacing the pressure gauge

When replacing the pressure gauge, the following must be observed:

1. Make sure the pressure gauge is not under pressure.
2. Loosen and fasten the pressure gauge using an open-end wrench SW 15.

The tightening torque is 20 Nm.

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