

Filling and testing device for accumulators

Instruction manual
RE 50144-B/08.2013

Replaces: 1539929009
English



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The cover shows an example application. The product delivered may differ from the image on the cover.

The original instruction manual was created in the German language.

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1 About this documentation

1.1 Validity of the documentation

This documentation contains important information about using the filling and testing device from Bosch Rexroth for diaphragm- and bladder-type accumulators.

- ▶ Read this documentation completely and in particular chapter 2 "Safety instructions" on page 9 and chapter 3 "General instructions on damage to equipment and the product" on page 12 before you start work with the filling and testing device.

1.2 Required and supplementary documentation




- ▶ Only commission the filling and testing device if the documentation marked with the book symbol  is available to you and you have understood and observed it.

Table 1: Required and supplementary documentation

	Title	Document number	Document type
	Diaphragm-type accumulators Contains the permissible technical data, operating conditions, performance limits and project planning notes for diaphragm-type accumulators of type HAD..1X/-2X.	50150	Data sheet
	Diaphragm-type accumulator type HAD Contains important information for safely and professionally transporting, installing, commissioning, maintaining and removing the diaphragm-type accumulator.	50150-B	Instruction manual
	Bladder-type accumulator Contains the permissible technical data, operating conditions, performance limits and project planning notes for bladder-type accumulators of type HAB..4X.	50170	Data sheet
	Bladder-type accumulator Contains important information for safely and professionally transporting, installing, commissioning, maintaining and removing the bladder-type accumulator.	50170-B	Instruction manual

All documents can be found on the Internet under
www.boschrexroth.com/various/utilities/mediadirectory/index.jsp?language=en-GB

Further information can be found in the online product catalog
 Industrial Hydraulics: www.boschrexroth.com/ics

1.3 Display of information

Standardized safety instructions, symbols, terms and abbreviations are used so that you can use this documentation to work quickly and safely with your product. To give you a better understanding they are explained in the sections below.

1.3.1 Safety instructions




This documentation includes safety instructions in chapter 2.6 "Product-specific safety instructions" on page 11 and in chapter 3 "General instructions on damage to equipment and the product" on page 12 and before a sequence of actions or an instruction for action involving a risk of personal injury or damage to equipment. The described danger prevention measures must be observed.

Safety instructions are set out as follows:

 SIGNAL WORD
<p>Type and source of danger!</p> <p>Consequences in case of noncompliance</p> <ul style="list-style-type: none"> ▶ Measure for danger prevention ▶ <List>

- **Warning sign:** draws attention to the danger
- **Signal word:** identifies the degree of the danger
- **Type and source of danger:** identifies the type and source of the danger
- **Consequences:** describes what occurs if the safety instructions are not complied with
- **Precautions:** states how the danger can be avoided


Table 2: Danger classes in accordance with ANSI Z535.6-2006

Warning sign, signal word	Meaning
 DANGER	Identifies a dangerous situation that will result in death or serious injuries if it is not avoided.
 WARNING	Identifies a dangerous situation that may result in death or serious injuries if it is not avoided.
 CAUTION	Identifies a dangerous situation that may result in minor to moderate injuries if it is not avoided.
NOTE	Damage to equipment: the product or the environment may be damaged.

1.3.2 Symbols

The following symbols mark notes that are not safety-relevant but which increase the understanding of the documentation.

Table 3: Meaning of the symbols

Symbol	Meaning
	If this information is disregarded, the product can not be used and/or operated to the optimum extent.
▶	Single, independent step
1.	Numbered instruction:
2.	The numbers specify that the steps are completed one after the other.
3.	

1.3.3 Designations

This documentation uses the following designations:

Table 4: Designations

Designation	Meaning
Type HAD..1X/-2X	Diaphragm-type accumulator HAD series 1X/-2X
Type HAB..4X	Bladder-type accumulator HAB series 4X

1.3.4 Abbreviations

This documentation uses the following abbreviations:

Table 5: Abbreviations

Abbreviation	Meaning
RE	Rexroth document in the English language
SW	Width Across Flats

2 Safety instructions

2.1 About this chapter

The filling and testing device has been manufactured according to the generally accepted rules of current technology. There is, however, still a danger of personal injury or damage to equipment if this chapter and the safety instructions in this documentation are not complied with.

- ▶ Read this documentation completely and thoroughly before working with the filling and testing device.
- ▶ 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 filling and testing device on to third parties.

2.2 Intended use

Filling and testing devices are designed for charging and discharging a bladder- or diaphragm-type accumulator as well as for checking its pre-charge pressure.

- ▶ Observe the technical data, operating conditions and performance limits as specified in data sheets 50150 and 50170.

The filling and testing device is technical working equipment and is only intended for professional use and not for private use.

Intended use includes having read and understood the complete documentation, especially the chapter 2 "Safety instructions" on page 9.

2.3 Improper use

Any use other than that described as intended use shall be considered as improper and is therefore impermissible.

Bosch Rexroth AG shall accept no liability whatsoever for damage resulting from improper use. The user shall bear all risks arising from improper use.

2.4 Personnel qualifications

The charging and discharging of hydraulic accumulators and the checking of their pre-charge pressure require basic mechanical and hydraulic knowledge, as well as knowledge of the associated technical terms. In order to ensure operating safety, these activities may therefore only be performed by qualified personnel or an instructed person under the direction and supervision of qualified personnel. Qualified personnel are those who can recognize possible hazards and institute the appropriate safety measures due to their professional training, knowledge, and experience, as well as their understanding of the relevant regulations pertaining to the work to be done. Qualified personnel must observe the rules relevant to the subject area and have the necessary hydraulics expertise.

Hydraulics expertise means, for instance:

- reading and fully understanding hydraulic schematics,
- fully understanding in particular the interrelationships regarding safety devices, and
- having knowledge on the function and assembly of hydraulic components.

2.5 General safety instructions

- Observe the applicable accident prevention and environmental protection regulations.
- Observe the safety regulations and provisions of the country in which the product is used/operated.
- Use Rexroth products only when they are in good technical order and condition.
- Observe all notes on the product.
- Persons who install, operate, remove or maintain Rexroth products must not consume any alcohol, drugs or pharmaceuticals that may affect their ability to respond.
- Only use Rexroth original accessories and spare parts to ensure there is no risk to persons from unsuitable spare parts.
- Observe the technical data and ambient conditions specified in the product documentation.

2.6 Product-specific safety instructions

The following safety instructions apply for chapters 6 to 9.

WARNING

Hydraulic accumulators are pressurized!

Danger to life or risk of injury, serious injuries when working on hydraulic accumulators that have not shutdown and emptied of gas! Damage to equipment!

- ▶ Always depressurize the relevant system part before installing the filling and testing device.
- ▶ Protect the system against being energized.
- ▶ When doing so, observe the instruction manual and other technical documentation for the system.
- ▶ Observe the instruction manual for the hydraulic accumulator.

Escaping nitrogen!

Uncontrolled release of the charging gas, nitrogen, poses a risk of suffocation and a risk of injury from entrained components!

- ▶ When discharging, ensure sufficient ventilation of the workspace.
- ▶ Always use this filling and testing device when discharging the hydraulic accumulator.

CAUTION

Cold surfaces on the filling and testing device and on the hydraulic accumulator!

Risk of freezing! The filling and testing device and the hydraulic accumulator can cool off a great deal when discharging.

- ▶ Allow the hydraulic accumulator to warm up before touching it.
- ▶ Wear cold-resistant protective clothing, e.g., gloves.

2.7 Personal protective equipment

The personal protective equipment is the responsibility of the user of the filling and testing device. Observe the safety regulations and provisions of your country. All components of the personal protective equipment must be intact.

3 General instructions on damage to equipment and the product

The following notes apply for chapters 6 to 9.

NOTE

Danger from improper handling!

Product can be damaged!

- ▶ Do not expose the product to an impermissible mechanical load.
- ▶ Never use the product as a handle or step.
- ▶ Do not place/lay any objects on the product.
- ▶ Do not strike the filling and testing device.
- ▶ Apply no other external forces.

The warranty applies only to the delivered configuration.

The entitlement to warranty cover will be rendered void if the product is incorrectly installed and operated, or if it is used or handled improperly.

4 Scope of supply

Included in the scope of supply are:

- Individual parts depending on case version (see Table 6)
- An instruction manual in German and in English

Table 6: Case version

Complete test case for	Bladder-type accumulator 0538103011	Diaphragm-type accumulator 0538103012	Bladder- and diaphragm-type accumulator 0538103014
consisting of			
Case		R901070141	
Filling and testing valve	0538103005	0538103006	0538103005 0538103006
Pressure gauge 0 to 250 bar		1537231001	
Hose l = 2.5 m with transition socket, Form D (W24 32 x 1/14")		1530712005	

5 About this product

Bosch Rexroth filling and testing devices are used for charging and discharging bladder- or diaphragm-type accumulators and for checking their pre-charge pressures.

5.1 Filling and testing valve for bladder-type accumulators (0538103005)

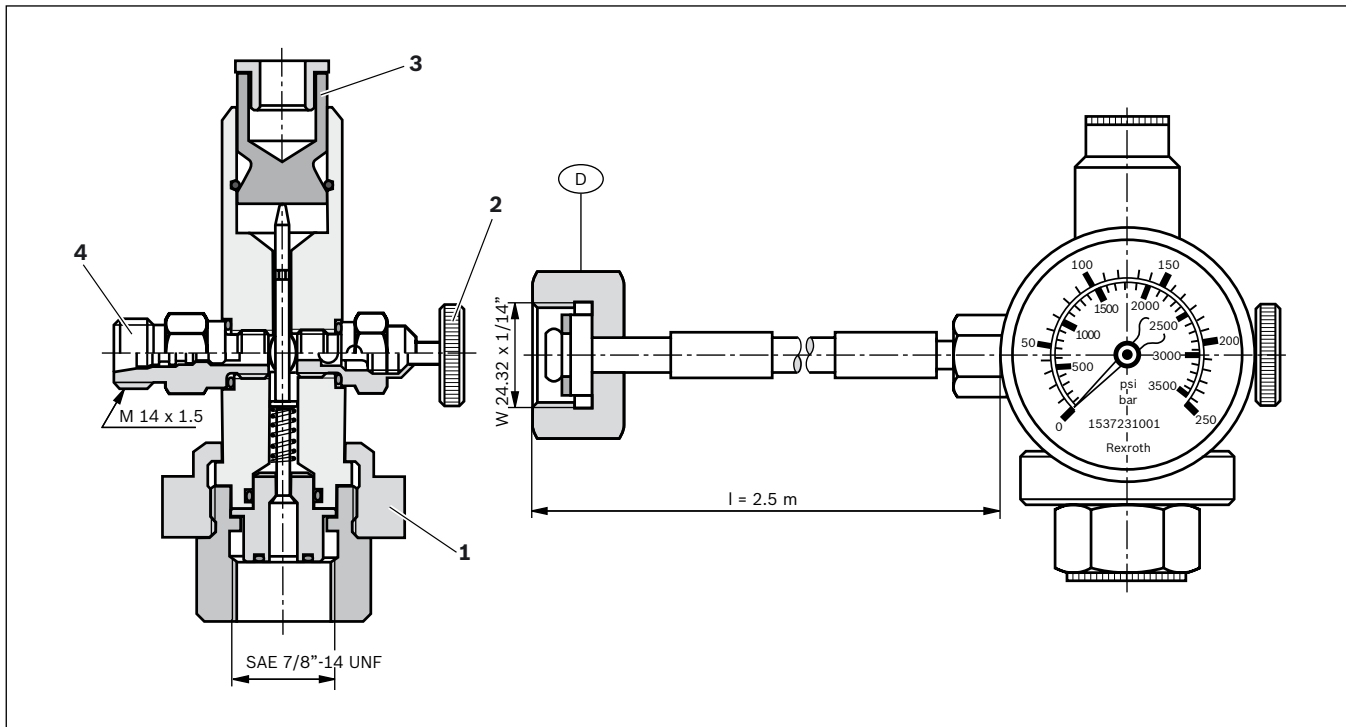


Fig. 1: Filling and testing valve for bladder-type accumulators

- | | |
|---------------|-------------------|
| 1 Union nut | 3 Pushbutton |
| 2 Valve screw | 4 Hose attachment |

5.2 Filling and testing valve for diaphragm-type accumulators (0538103006)

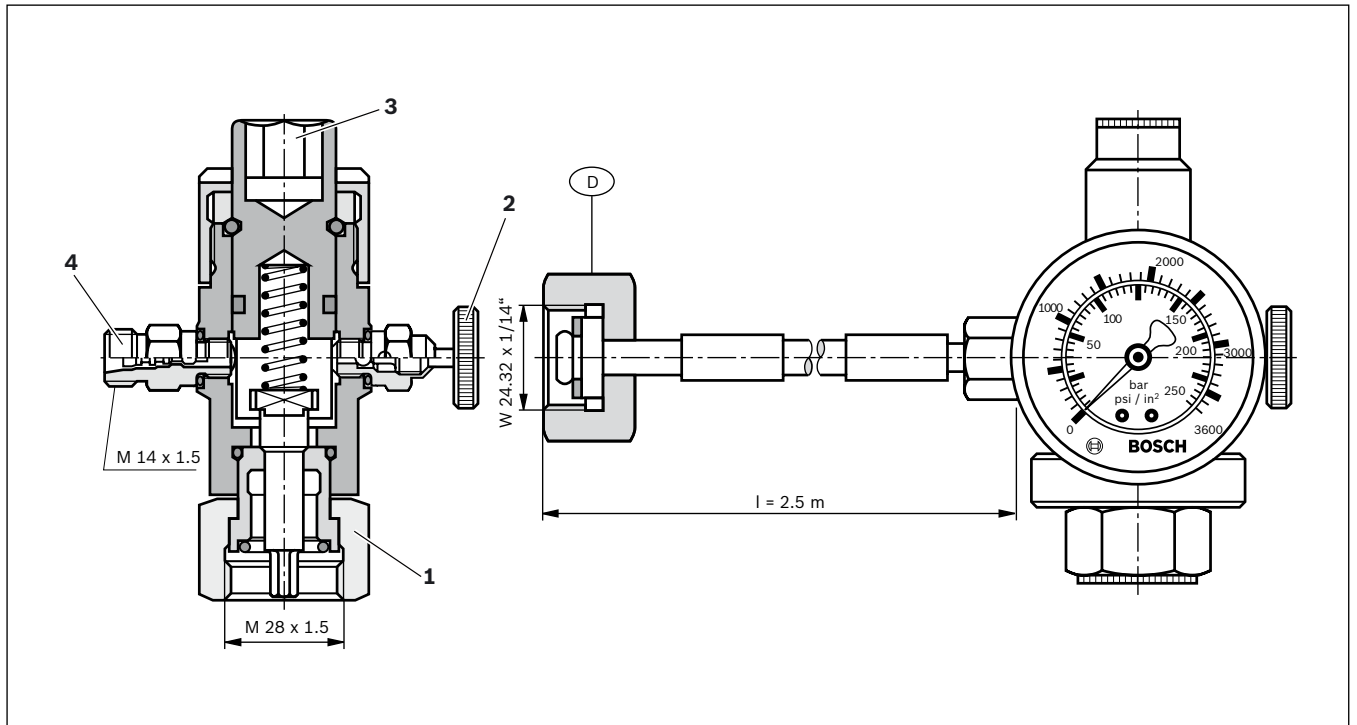


Fig. 2: Filling and testing valve for diaphragm-type accumulators

- | | |
|---------------|-------------------|
| 1 Union nut | 3 Top valve screw |
| 2 Valve screw | 4 Hose attachment |

6 Transport and storage

- ▶ During transport and storage, always maintain the required ambient conditions.

6.1 Transporting the filling and testing device

A sensitive pressure gauge is part of the filling and testing device.

- ▶ To protect it during transport, always use the supplied plastic case.

6.2 Storing the filling and testing device

Requirement

- The storage areas must be free from corrosive materials and gases.
- The storage areas must be dry.
- Ideal storage temperature: +5 °C to +20 °C.
- The temperature should ideally remain constant.

7 Use

7.1 Preparation

1. Check the filling and testing device for obvious defects before working with it.
2. Make sure that the system is depressurized.
3. Make certain that the hydraulic accumulator is undamaged.
4. Make certain that the pressure available in the nitrogen bottle is greater than the pre-charge pressure to be set in the hydraulic accumulator.
5. Make certain that the load capacity of the present pressure gauge matches the gas pressure specified in the schematic of the system and is not exceeded.
6. Make certain that the gas charge pressure to be set according to the schematic exceeds neither the maximum operating pressure nor the maximum pre-charge pressure of the accumulator.

7.2 Checking the pre-charge pressure



When checking the pre-charge pressure with the filling and testing device, nitrogen is inevitably discharged. For smaller accumulators, this can have a considerable impact on the pre-charge pressure. Note that it may therefore be necessary to recharge.

7.2.1 Checking the pre-charge pressure for diaphragm-type accumulators

! WARNING

Danger from flying parts!

Risk of injury! If the valve screw is unscrewed without the filling and testing device, there is a risk that the valve screw could shoot out if there is gas pressure present.

- ▶ Only loosen the valve screw with the help of the filling and testing device! Only if this is not possible due to excessive tightening torque can the valve screw be loosened by no more than one quarter turn with a hex head wrench.



Fig. 3: Valve for diaphragm-type accumulators

- | | |
|----------------------|--------------------------|
| 1 Union nut | 3 Top valve screw |
| 2 Valve screw | 4 Hose attachment |

1. Remove the protection cap of the diaphragm-type accumulator.
2. Screw the filling and testing valve with the union nut (**1**) onto the gas valve of the diaphragm-type accumulator to the stop and ensure a secure fit. In doing so, turn the device so that you can comfortably read the pressure gauge.
3. Close the side valve screw (**2**) of the filling and testing device.
4. Open the top valve screw (**3**) with a square head wrench.
5. Read the pressure on the pressure gauge.

7.2.2 Checking the pre-charge pressure for bladder-type accumulators



Fig. 4: Valve for bladder-type accumulators

- | | |
|----------------------|--------------------------|
| 1 Union nut | 3 Pushbutton |
| 2 Valve screw | 4 Hose attachment |

1. Remove the protection sleeve and the seal cap of the bladder-type accumulator.
2. Make certain that the sealing O-ring between the two parts is correctly seated in the groove below the thread.
3. Close the side valve screw (**2**) of the filling and testing device.
4. Screw the filling and testing valve with the union nut (**1**) onto the gas valve of the bladder-type accumulator to the stop and ensure a secure fit. In doing so, turn the device so that you can comfortably read the pressure gauge.
5. Actuate the pushbutton (**3**) and read the pressure on the pressure gauge.

7.3 Charging the hydraulic accumulator

WARNING

Danger from explosion of the hydraulic accumulator!

Risk of explosion, risk of injury! When charging with other gases – especially air or oxygen – there is a risk of explosion of the hydraulic accumulator.

- ▶ Charge the hydraulic accumulator only with nitrogen 99.99 vol.%.

Danger from overpressure!

Risk of injury! If the gas pressure of the nitrogen bottle is higher than the max. permissible operating pressure of the hydraulic accumulator, there is a risk of bursting in the event of uncontrolled charging.

- ▶ In this case, use a pressure reducing fitting that is adjusted to the permissible operating pressure of the hydraulic accumulator.



For non-German nitrogen bottles, the appropriate transition pieces are needed. Additional information can be found in data sheet 50170 (bladder-type accumulators) or 50150 (diaphragm-type accumulators).

1. Perform the steps in chapter 7.2 "Checking the pre-charge pressure" on page 17 according to the accumulator type present in the specified order.
2. Fasten the hose on the pressure reducing valve to the gas bottle and then to the filling and testing device (4). In doing so, hand-tighten the union nut with a wrench.

Note! Damage to equipment!

Product can be damaged or destroyed!

- ▶ Make certain that the maximum permissible pre-charge pressure of the hydraulic accumulator is not exceeded at any time.
3. Slowly open the manual discharging valve of the gas bottle and allow gas to flow into the hydraulic accumulator until the specified pre-charge pressure is displayed on the pressure gauge of the charging valve. Always watch the pressure gauge during the charging process.
 4. Close the manual discharging valve of the gas bottle.



The pre-charge pressure is temperature-dependent. During charging, the accumulator heats up. Wait until the accumulator has cooled. Depending on how much gas was charged and the associated increase in temperature, the pre-charge pressure may decrease as the temperature drops. Check the pre-charge pressure and correct it if necessary.

5. Close the top valve screw (3) (not applicable for bladder-type accumulators).
6. Relieve the air pressure in the filling and testing device. To do this, open the side valve screw (2) until you can hear nitrogen escaping. Then close the valve again.
7. Disconnect the hose from the filling and testing device (4) and the nitrogen bottle.

8. Remove the filling and testing device from the hydraulic accumulator and return it to the case.
9. For diaphragm-type accumulators: retighten the valve screw with a hex head wrench.
10. Reinstall the provided protection cap(s) on the gas valve of the accumulator.

7.4 Discharging the hydraulic accumulator

1. Perform the steps in chapter 7.2 "Checking the pre-charge pressure" on page 17 according to the accumulator type present in the specified order.
2. Open the side valve screw **(2)** until you can hear nitrogen escaping. For bladder-type accumulators press the pushbutton **(3)** additionally.
3. Once the desired pressure is reached or the accumulator has been completely discharged, close the top valve screw or release the pushbutton **(3)**.
4. Close the side valve screw **(2)**.
5. Remove the filling and testing device from the hydraulic accumulator and return it to the case.
6. For diaphragm-type accumulators: retighten the valve screw with a square head wrench.
7. Reinstall the provided protection cap(s) on the gas valve of the accumulator.

8 Maintenance and repair

Repairs to the filling and testing device must only be performed by the manufacturer or his authorized dealers and subsidiaries; the entitlement to warranty cover is otherwise rendered void.

8.1 Inspection

The calibration period of the pressure gauge is 12 months.

8.2 Spare parts

Bosch Rexroth recommends the use of original Bosch Rexroth pressure gauges. The functional reliability cannot otherwise be ensured and you will lose your entitlement to warranty cover. The pressure gauges can be found in data sheets 50150 and 50170.

9 Extension and conversion

Conversion or extension of the filling and testing device is permissible only to a limited extent. Only the replacement of the pressure gauge is permitted. For all other mechanical work on the device, the entitlement to warranty cover is rendered void.

When replacing the pressure gauge, note the following:

1. Check that the pressure gauge is not pressurized.
2. Loosen and fasten the pressure gauge with the help of an open-ended wrench (WAF 15).
3. The tightening torque is 20 Nm.

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