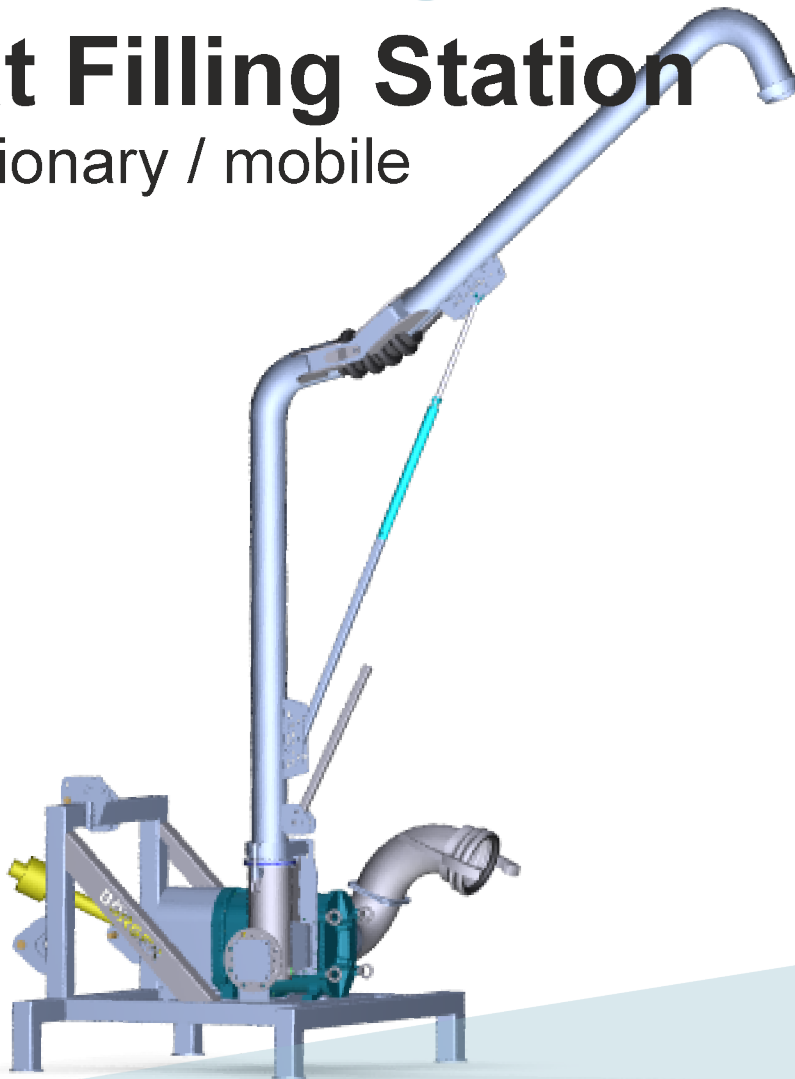


Operating Manual

Vat Filling Station

stationary / mobile



Important!

Please read carefully before performing any activity involving the device! Keep for future reference!

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(Stamp)				

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Product Specifications

Unit:

Product group: Vat filling station
Type: "stationary", "mobile"

Precise product specifications for your unit, with the exception of control units, can be found in the data sheet enclosed with this operating manual.

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1 General information

1.1 Introduction

This operating manual is an important aid for the correct and safe operation of the Börger machine or unit.

It contains important information for operating the Börger machine or unit and the components connected to it in a safe, proper and economical manner.

Relevant information and instructions on the Börger machine installed can be found in the standard operating manual of the corresponding series.

Manuals of other components installed in the Börger machine or unit are also enclosed and must be adhered to.

Adhering to these instructions will help avoid associated dangers, reduce repair costs and downtimes and increase the reliability and service life of the stationary or mobile Börger machine or unit.

The operating manual must be made available at all times. All personnel who work on or with the Börger machine or unit must read and adhere to the manual. This work includes:

- operation and troubleshooting
- maintenance (machine care, maintenance and repairs)
- transportation.

1.2 Notes on copyrights and property rights

This operating manual must be treated as confidential. It may only be made accessible to authorized persons. The manual may only be passed on to third parties following written approval from Börger GmbH.

All documents are protected according to the copyright laws. The distribution and reproduction of documents, in whole or in part, plus the exploitation and distribution of all associated content is forbidden unless expressly authorized in writing.

Violations will be prosecuted and may lead to claims for compensation. All rights for exercising industrial property rights are reserved by Börger GmbH.

1.3 Information for the operator

The operating manual is an integral part of the Börger machine. The operator is responsible for making the operating personnel aware of this manual.

Additionally, the operator is obligated to ensure the notice and observance of national regulations for accident prevention and environmental protection, plus the notice and observance of supervision and reporting duties taking special operational aspects into account, e.g. regarding work organization, work processes and personnel.

Aside from the operating manual and the currently valid accident prevention regulations in the country of operation and at the installation site, all recognized special regulations for safe and proper operation must be observed.

The operator is not permitted to make or arrange for any changes, modifications or alterations to the Börger machine without approval from Börger GmbH.

Any spare parts used must comply with the technical requirements specified by Börger GmbH. This is always guaranteed when original spare parts are used. Only original spare parts may be used during the warranty period, failing which the warranty is void.

Only trained or instructed personnel may be assigned to operate, maintain, repair or transport the Börger machine. Clearly define the personnel responsible for operation, maintenance, repair and transportation.

1.4 Training and instruction

As the operator, you are obligated to inform and, if necessary, instruct your operating personnel in regard to the applicable legal and accident prevention regulations, as well as the available safety equipment on the Börger machine.

This obligation also applies to all other safety equipment on and around the Börger machine. The different technical qualifications of the operating personnel must be taken into account. The operating personnel must have fully understood the instructions, and adherence to the instructions must be guaranteed. Only then can your personnel work safely and be fully aware of associated risks.

Adherence to instructions must be checked on a regular basis. As the operator, you should therefore have each instructed staff member confirm their training participation in writing.

Sample training topics and a sample form for confirming participation in the training/instruction can be found on the following pages.

Börger GmbH, their regional subsidiaries or your local sales partner will be happy to help you regarding staff instruction. They can also carry out training on the functionality, commissioning, maintenance and repair of the Börger machine, on request.

Contact us for a detailed quotation.

1.5 Sample training topics

1. Operational safety

- Accident prevention regulations
- General legal regulations
- General safety instructions
- Measures in the event of emergencies
- Safety instructions for operating the Börger machine
- Using the safety equipment on the Börger machine
- Safety equipment on and around the Börger machine
- Explanation of symbols and signs

2. Operating the Börger machine

- Using the operating elements on the Börger machine
- Explanation of the operating manual for operating personnel
- Specific experiences in using the Börger machine
- Troubleshooting / dealing with malfunctions

3. Repair and maintenance regulations

- Correct handling of cleaning agents and lubricants
- Specific experiences regarding repair, maintenance, cleaning and care of the Börger machine

Confirmation of training

Training topic

Date:

Trainer:

Trainer signature:

No.	Surname, first name	Signature
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2 Safety

2.1 General information

The Börger machine has been developed and constructed according to current state-of-the-art technology and recognized safety guidelines in observance of the valid safety regulations in the country of manufacture.

However, operation of the Börger machine may endanger the operating person and cause damage to the Börger machine or other material assets in the following circumstances:

- When operated by untrained or uninstructed personnel
- When not used properly
- When not maintained or repaired properly

2.2 Notes on signs and symbols

The following terms, signs and symbols are used in this operating manual, and indicate particularly important information.



DANGER!

Warns of an immediate hazardous situation with unavoidable serious injuries or death as a result if the instructions shown are not strictly adhered to.



WARNING!

Warns of a hazardous situation with the possible risk of subsequent serious injuries or death if the instructions shown are not strictly adhered to.



CAUTION!

Warns of a possible hazardous situation with the risk of subsequent moderate or light injuries and material damage if the instructions shown are not strictly adhered to.

**NOTICE!**

Indicates a possible hazardous situation or unsafe, dangerous work processes that may lead to damage to the machine or surrounding area.

**NOTE!**

Offers useful information on safe and proper operation.

► Arrow symbols describe work and/or operational steps. These steps must be carried out in the sequence of the numbering.

— Indents indicate lists.

↪ *Arrow symbols indicate references to further chapters.*

**NOTE!****Illustration of work steps:**

Some of the diagrams and photographic images used in this operating manual, which are only used to illustrate a function or a particular work step, show a different type of device, however the functional principle or work step is the same.

2.3 Proper use



NOTE! Proper use

The Börger machine or unit is configured exclusively for the operating conditions entered in your request/order and specified in the order confirmation and enclosed data sheet.

- Observe the technical specifications in the data sheet.
- Therefore, proper use is restricted to the specified pumped medium, temperatures, speeds and output only.



Proper use includes compliance with the instructions

- on safety,
 - on operation and control,
 - on repairs and maintenance,
- specified in this operating manual.

Any other use or use over and above these specifications is deemed as improper use. The operator of the Börger machine is solely liable for any resulting damage.

2.4 Residual risk

Even when all safety instructions are adhered to, there are residual risks involved in operating the Börger machine as detailed below.

All persons that work on and with the Börger machine must be aware of these residual risks and observe the associated instructions to avoid accidents or damage caused by these residual risks.

It may be necessary to remove on-site safety equipment during installation and when making modifications. This causes a residual risk and potential danger that each operating person must be aware of:

**DANGER!****Risk of fatal injury due to electric power!**

There is an immediate risk of fatal electric shock if live components are touched. Damage to the insulation of the individual components can be fatal.

- Have all work on the electrical equipment performed by skilled electricians.
- In the event of damage to the insulation, cut off the power supply immediately and initiate repairs.
- Before working on live components of electrical systems and equipment, de-energize these components and secure them in this state for the duration of the work.

Adhere to the following safety rules in this regard:

- Disconnect.
- Secure against restart.
- Verify that components have been de-energized.
- Ground and short-circuit.*
- Cover or shield any adjacent live components.*
- Never bypass or disable any fuses. Comply with the correct amperage specification when replacing fuses.
- Keep moisture away from all live components. This may lead to short circuits.
- Ensure that all electric connections have been properly reconnected before switching the unit on again and that the cables used are undamaged and have not been sharply bent.
- Ensure that the control cabinet is properly closed before switching on and during operation.

* Under certain circumstances, exceptions may apply for systems with a nominal voltage of up to 1000V (see DIN VDE 0105-100)

**DANGER!****Risk of injury due to rotating parts!**

Moving parts can cause severe injury.

- Do not reach into rotating parts or handle rotating parts when the machine is in operation.
- Never open protective covers when in operation.
- Perform work on the Börger machine only when stationary.
- Observe the delay time: Prior to opening protective covers, make sure that all components have stopped moving.
- Shut down the machine and upstream and downstream system components before carrying out any work on the Börger machine or accessories ↪ *Chapter 5.2 “Downtimes” on page 69.*
- The operating person is obligated to check that all safety equipment is installed and fully functional before putting the machine into operation.
- The Börger machine must only be switched on when the inlet and outlet connections have been established and the maintenance openings have been securely installed.

**WARNING!****Risk of fatal injury due to suspended loads!**

Loads can swing and fall during lifting operations. This can cause severe injury, including death.

- Never stand under or within the swinging range of suspended loads.
- Do not move loads unsupervised.
- Only use approved hoists and slings with sufficient load-bearing capacity.
- Do not use torn or worn hoists such as ropes and belts.
- Do not place hoists such as ropes and belts near sharp corners and edges and do not tie them together or twist them.
- Put the load down when leaving the operating site.



WARNING!

Risk of serious injuries caused by liquid spouting out or escaping gases!

Gases or liquids may escape uncontrollably from seals and screw connections. Especially when flange connections are released and maintenance openings are opened, pressurized liquid can spout out at the cover.

Never loosen connections when the unit is pressurized.

- Ensure that all valves and shut-off devices on the inlet and outlet are closed.
- Release the pressure and empty the Börger machine via a drainage device (if available).
- Collect any leakage of medium by suitable means and dispose of it in accordance with the applicable local guidelines.
- Therefore, wear your personal protective equipment (PPE)
 ↪ *Chapter 2.6 “Personal protective equipment” on page 24* when opening the cover and take all necessary precautions.



WARNING!

Severe injuries due to pressurized component parts!

In case of improper handling or a defect, liquid may escape under high pressure from pressurized component parts and cause severe injuries.

Before starting work on these parts:

- Depressurize the system, also discharge residual energies.
- Make sure at all times that liquid cannot escape accidentally.
- Defective component parts, that are subjected to pressure during operation must be replaced immediately by qualified technicians.

**CAUTION!**
Risk of burns!

Particularly when used outside at correspondingly high ambient temperatures and high medium temperatures, individual parts of the Börger machine can become hot and should not be touched during operation.

Stop the feed and shut down the Börger machine prior to any troubleshooting, maintenance and repair work on the Börger machine and the accessories.

Allow the system to cool down completely, if necessary, before carrying out troubleshooting, maintenance and repair work.

Avoid dust formation as this contributes to heat build-up.

**CAUTION!**
Health hazard due to residues of dangerous medium inside and on the Börger machine!

There is an increased health hazard from contact with the medium and contaminated components.

Generally, the following applies:

- When using dangerous or health-endangering media, take all necessary safety measures when performing work on the Börger machine.
- Avoid direct contact with the medium (skin/eye contact, swallowing, inhaling).
- Remove spillage from your skin without delay.
- Do not store or consume beverages, food or tobacco in the working area.

**WARNING!****Risk of accident due to extended vat filling pipe!**

An extended vat filling pipe can be ripped off when driving through tunnels, under bridges, through underpasses etc.

- Before setting off, check that the vat filling pipe has been lowered.
- Before driving into a tunnel, an underpass or towards a bridge, pay attention to the traffic signs with the max. permissible vehicle height.

2.5 Qualifications for operating personnel

**WARNING!****Personnel with insufficient qualifications represent a hazard!**

Insufficiently qualified personnel are not able to assess the risks when using the machine and expose themselves and others to the risk of serious or fatal injuries.

- All work must only be performed by personnel with the appropriate qualifications.
- Keep insufficiently qualified personnel away from the working area.

The various tasks described in this manual impose different requirements on the qualifications of personnel who are entrusted with these tasks.

Only personnel of whom it can be expected that they perform these tasks reliably, are approved for all tasks. Persons whose capability to react is impaired, for instance through drugs, alcohol, or medication, are not approved.

The operating personnel must have been informed or instructed on the applicable legal and accident prevention regulations as well as the safety equipment on and around the Börger machine. The operating personnel must have fully understood the instructions, and adherence to the instructions must be guaranteed. Only then can all personnel work safely and in full awareness of the associated risks.

- Appoint only trained or instructed personnel.
- Clearly define the personnel responsible for operation, installation, maintenance and repair.
- In addition, also specify the area of responsibility for the operating persons and allow them to reject unsafe instructions from others.

Manufacturer

Certain work may be carried out by manufacturer's qualified personnel only. Other personnel is not authorized to carry out this work. To have this work carried out, please contact our customer service.

Mechanics

Mechanics have completed professional training or are able to provide evidence of having completed further training which enables them to perform the special tasks mentioned in these instructions on the system and its components.

The skills acquired during training or further training enable mechanics to identify and evaluate hazards associated with the system and its components.

These include:

- Knowledge about health and safety at work
- Knowledge about the basics of first aid
- Technical knowledge
- Knowledge about assembly, maintenance and repair
- Knowledge about machine operation, system management and system operation

Operating person

Operating persons are able to provide evidence of having completed further training which enables them to perform the simple tasks mentioned in these instructions on the system and its components.

The knowledge acquired during further training enables operating persons to identify and evaluate hazards associated with the system and its components.

These include:

- Knowledge about health and safety at work
- Knowledge about the basics of first aid
- Technical knowledge
- Knowledge about assembly, maintenance and repair
- Knowledge about machine operation, system management and system operation

Qualified electricians

Qualified electricians have completed professional training in electrical engineering or are able to provide evidence of having completed further training which enables them to perform the special tasks mentioned in these instructions on the electrical system and its components.

The skills acquired during training or further training enable qualified electricians to identify and evaluate hazards associated with the system and its components.

These include:

- Knowledge about health and safety at work
- Knowledge about the basics of first aid
- Basics of electrical engineering
- Construction, wiring and checking of circuits
- Effects and dangers associated with electricity
- Troubleshooting and documentation of the electrical system
- Installation of electrical systems
- Special regulations

Warehouse worker

Warehouse workers are able to provide evidence of having completed further training which enables them to perform the special transport and storage tasks mentioned in these instructions with the system and its components.

The knowledge acquired during further training enables warehouse workers to identify and evaluate hazards associated with the system and its components during transport and storage.

These include:

- Knowledge about health and safety at work
- Knowledge about the basics of first aid
- Receiving goods and checking them for completeness and integrity

- Selecting storage locations with regard to technical and safety-related aspects
- Storing goods using handling equipment, taking into consideration the type, character, volume and weight of the products
- Selecting handling systems or hoists depending on the product type, quantity and distance

2.6 Personal protective equipment

Personal protective equipment serves to protect personnel from adverse effects to safety and health whilst working. Staff must wear personal protective equipment whilst carrying out various work on the plant. The individual sections of these instructions make specific reference to the requirements.



Light respiratory protection

Light respiratory protection protects against harmful dusts.



Occupational safety clothing, chemical-resistant

The chemical-resistant occupational safety clothing is used to protect the skin from contact with chemicals which are a health hazard.



Safety gloves, chemical-resistant

Chemical-resistant safety gloves are used to protect the hands from corrosive chemicals.



Safety goggles

Safety goggles (closed on all sides) are used to protect the eyes from flying particles and liquid spray.



Safety shoes

Safety shoes protect the feet from crushing, falling parts and prevent slipping on a slippery floor.

2.7 Securing the machine against restart



WARNING!

Risk of fatal injury if the plant is switched back on uncontrolledly or without authorization!

Switching the Börger machine on without authorization or uncontrolledly can cause serious injuries.

- Before switching back on, make sure that all safety devices are fitted and fully functional and that staff are not at any risk.
- Always adhere to the sequence to secure the plant to prevent it from being switched back on. ↪ *Chapter 2.7 “Securing the machine against restart” on page 25*

- 1.** ➤ Shut off the media supply by closing the respective shut-off valves.
- 2.** ➤ Shut off the energy supply.
- 3.** ➤ Inform the person responsible that work is being carried out in the danger area.
- 4.** ➤ Attach a sign to the control cabinet to indicate that work is being carried out in the danger area and that switching on is prohibited. The sign must include the following information:
 - Switched off on:
 - Switched off at:
 - Switched off by:
 - Note: Do not switch on!
 - Note: Do not switch on before ensuring that personnel are at no risk.

2.8 Description of the safety equipment



WARNING!

Risk of fatal injury if safety devices are not fully functional!

Non-functional or overridden safety features may cause severe injuries, including death.

- Check whether all safety devices are functional and correctly installed before starting work with the machine.
- Never override or bypass safety devices.
- Ensure that all safety devices are accessible at all times.

The Börger machine is equipped with the required safety equipment according to the applicable legal guidelines in the country of manufacture, current state-of-the-art technology and recognized safety regulations.

2.8.1 EMERGENCY STOP



When pressing the EMERGENCY STOP button, the machine is shut down by the energy supply being switched off or the machine being mechanically disconnected from the drives. Once the EMERGENCY STOP switch has been activated, it must be turned in order to reset it and restart the machine.



WARNING!

Risk of fatal injury if the plant is switched back on uncontrolledly or without authorization!

Switching the machine on without authorization or uncontrolledly can cause serious injuries.

- Ensure that the cause of the EMERGENCY STOP has been eliminated and all safety features are installed and functional prior to a restart.
- Do not reset the EMERGENCY STOP switch before the danger has been eliminated.

2.8.2 Optional monitoring devices

If the Börger machine is equipped with additional monitoring devices, then the corresponding safety instructions can be found in the manufacturer's operating manual in the appendix.

If your Börger machine was supplied with such monitoring devices, you must ensure that these devices function correctly.

2.9 Markings and signs

The symbols and information signs below are located in the work area. They refer to the immediate environment in which they are attached.



WARNING!

Danger due to illegible signage!

Over time, stickers and signs can get soiled or become illegible due to other reasons, so that dangers are not recognized and necessary operating instructions cannot be observed. This poses a risk of injury.

- Do not remove any safety notes, warnings and operating instructions.
- Keep them completely legible.
- Replace damaged signs or stickers immediately.



Meaning:

Nameplate according to Directive 2006/42/EC (Machinery Directive) and DIN EN 809

Location:

In a clearly visible position on the machine

CE marking not applicable for incomplete machines where only a declaration of incorporation may be delivered, and in certain other cases.



Meaning:

Grounding (bore hole for ground screw or terminal)

Location:

On the base frame



Meaning:

Do not touch rotating parts, risk of serious, permanent injury

Location:

In a clearly visible position on the rotary lobe pump



Meaning:

Please read the operating manual carefully before performing any activity involving the device! Keep for future reference!

Location:

In a clearly visible position on the packaging of the operating manual

2.10 Markings and signs to be attached by the operator

The operator may also be required to attach additional markings and signs on or around the Börger machine.

These additional markings and signs may relate to regulations for wearing personal protective equipment, for example.

2.11 Safety instructions for operating personnel

The Börger machine may only be operated while it is in perfect working condition and only for its intended purpose, in a safe and risk-conscious manner having regard to this operating manual. All malfunctions must be rectified immediately, especially those affecting safety.

Every person assigned with commissioning, operation or maintenance work must have fully read and understood this operating manual beforehand – specifically ↗ *Chapter 2 “Safety” on page 13*. Consulting the manual during work is already too late. This applies especially to personnel that only work occasionally on the Börger machine.

The operating manual must always be kept accessible next to the Börger machine.

No liability will be assumed for any damage and accidents caused by non-compliance with the operating manual.

Adhere to the applicable accident prevention regulations and all other generally recognized safety regulations and guidelines for occupational health at work.

Clearly specify the responsible parties for the various maintenance and repair tasks and adhere thereto. Only then can handling errors be avoided, especially in dangerous situations.

The operator must make personal protective equipment mandatory for operating and maintenance personnel. This applies to safety shoes, protective goggles and protective gloves. Always wear this protective equipment when working on the Börger machine.

Keep long hair tied and do not wear loose clothing or jewelry. There is always a danger of getting caught, pulled in or dragged along by moving components.

2.11.1 General work on the Börger machine



NOTE!

Work on the Börger machine!

- Work on the Börger machine may only be carried out by trained, reliable personnel.
- Personnel in training or requiring instruction, as well as persons currently in vocational training, may only operate the Börger machine under the constant supervision of an experienced staff member.

Personnel:

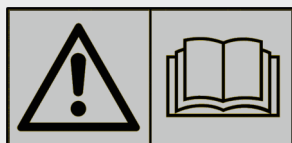
- Mechanics
- Operating person
- Warehouse worker
- Manufacturer

Protective equipment:

- Occupational safety clothing, chemical-resistant
- Safety shoes
- Safety gloves, chemical-resistant
- Safety goggles
- Light respiratory protection

Tool:

- Tools, general



Further operating manuals / supplementary operating manuals

You must completely read the separate operating manuals and/or supplementary operating manuals for components and/or special versions.

Pay particular attention to all instructions

- on safety,
- on operation and control,
- on repairs and maintenance.



Supplier documentation

You must completely read the separate supplier documentation.

Pay particular attention to all instructions

- on safety,
- on operation and control,
- on repairs and maintenance.

If malfunctions occur on the Börger machine:

- 1.** ➤ Shut down the Börger machine and downstream and upstream system components ↪ *Chapter 5.2 “Downtimes” on page 69.*
- 2.** ➤ Secure the Börger machine against unauthorized or uncontrolled reactivation ↪ *Chapter 2.7 “Securing the machine against restart” on page 25.*
- 3.** ➤ Report the malfunction to the responsible department/person.
 - This especially applies to safety-related alterations to the Börger machine.

**NOTE!**

Adhere to the prescribed intervals for regular maintenance and inspections or those specified herein and in the operating manuals of the components.

- Suitable workshop equipment as well as specified special tools are essential for carrying out maintenance work
↳ *Chapter 8.2.1 “Tools / installation aid” on page 89.*
- Modifications, repairs, maintenance and troubleshooting may only be carried out when the Börger machine is switched off. Accidental restarting of the unit must be prevented completely.
- To the extent necessary, amply secure the surrounding area when performing maintenance. Cordon off the working area with a red and white safety chain and a warning sign.
- Also observe any
 - supplementary operating manuals
 - operating manuals of the componentsin the appendix.
- Large assemblies and components must be carefully attached and secured to hoists when they are removed or replaced so that associated dangers are minimized. Only appropriate hoists and lifting media in technically perfect working condition with sufficient load capacities may be used.
 - Never stand under suspended loads.
- At the start of maintenance, repairs or machine care, clean any dirt or cleaning agents off the connections and screw connections. Do not use any aggressive cleaning agents. Use lint-free cleaning cloths.
- During installation, always tighten any screw connections that have been loosened for maintenance and repair work. Tighten to the prescribed torque, where this is specified.
- Dispose of operating materials and replacement parts in a safe and environmentally-friendly manner.

2.11.2 Work on the electrical system

**DANGER!****Risk of fatal injury due to electric power!**

There is an immediate risk of fatal electric shock if live components are touched. Damage to the insulation of the individual components can be fatal.

- Have all work on the electrical equipment performed by skilled electricians.
- In the event of damage to the insulation, cut off the power supply immediately and initiate repairs.
- Before working on live components of electrical systems and equipment, de-energize these components and secure them in this state for the duration of the work.

Adhere to the following safety rules in this regard:

- Disconnect.
- Secure against restart.
- Verify that components have been de-energized.
- Ground and short-circuit.*
- Cover or shield any adjacent live components.*
- Never bypass or disable any fuses. Comply with the correct amperage specification when replacing fuses.
- Keep moisture away from all live components. This may lead to short circuits.
- Ensure that all electric connections have been properly reconnected before switching the unit on again and that the cables used are undamaged and have not been sharply bent.
- Ensure that the control cabinet is properly closed before switching on and during operation.

* Under certain circumstances, exceptions may apply for systems with a nominal voltage of up to 1000V (see DIN VDE 0105-100)

Personnel:

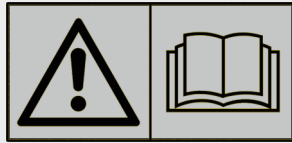
- Qualified electricians

Protective equipment:

- Occupational safety clothing, chemical-resistant
- Safety shoes
- Safety gloves, chemical-resistant
- Safety goggles

Tool:

- Tools for electrical work



Operating manuals of electronic parts

Pay particular attention to all instructions

- on safety,
- on operation and control,
- on repairs and maintenance,
- in the operating manuals of electronic parts in the appendix.



NOTE!

Adhere to the prescribed intervals for regular maintenance and inspections of the electrical system and/or components or to those intervals specified herein and in the operating manuals of the components.

- The electrical system may only be opened, maintained and repaired by qualified electricians, while having proper regard to the attached electric circuit diagrams.
- Carry out modifications, repairs, maintenance and troubleshooting on the control unit only when the electrical system is switched off. Accidental restarting of the unit must be prevented completely.
- To the extent necessary, amply secure the surrounding area when performing maintenance. Cordon off the working area with a red and white safety chain and a warning sign.
- Suitable workshop equipment as well as specified special tools are essential for carrying out maintenance work
 ↪ *Chapter 8.2.1 “Tools / installation aid” on page 89.*
- Also observe any
 - supplementary operating manuals
 - operating manuals of the components
 - Operating manuals of electronic parts
 in the appendix.
- Protect the electronic components from moisture and impurities. Clean the electronic components with suitable agents according to the manufacturers' operating manuals only. Do not use aggressive cleaning agents to clean the surface. Use lint-free cleaning cloths.
- Dispose of any replacement parts in a safe and environmentally-friendly manner.

2.12 Safety instructions for maintenance and rectifying malfunctions



WARNING!

Risk of injury due to inadequate troubleshooting, maintenance and repair work!

Inadequate troubleshooting, maintenance and repair work can lead to severe injury and significant material damage.


- To the extent necessary, amply secure the surrounding area when performing maintenance. Cordon off the working area with a red and white safety chain and a warning sign.
- Ensure sufficient installation space before commencing work.
- Keep the installation site clean and tidy! Loosely stacked or scattered components and tools cause accidents.
- Ensure correct installation where components have been removed, reinstall all fastening elements and observe the tightening torques of screws.
- Ensure the following before putting the machine back into operation:
 - Ensure that all troubleshooting, maintenance and repair work is performed and completed as per the information and notes provided in this manual.
 - Ensure that nobody enters the hazardous area.
 - Ensure that all covers and safety features are installed and function correctly.



WARNING!

Risk of fatal injury if the plant is switched back on uncontrolledly or without authorization!

Switching the control unit on without authorization or uncontrolledly can cause serious injuries.

- Before switching back on, make sure that all safety devices are fitted and fully functional and that staff are not at any risk.
- Always adhere to the sequence to secure the plant to prevent it from being switched back on according to  *Chapter 2.7 “Securing the machine against restart” on page 25.*

**WARNING!****Risk of fatal injury if safety devices are not fully functional!**

Non-functional or overridden safety features may cause severe injuries, including death.

- Check whether all safety devices are functional and correctly installed before starting work with the machine.
- Never override or bypass safety devices.
- Ensure that all safety devices are accessible at all times.

**WARNING!****Risk of injury when using unsuitable spare parts!**

The use of unsuitable spare parts can cause malfunctions which can lead to severe injury, including death, and to significant material damage.

- Only use suitable spare parts.
- Always contact the manufacturer if in doubt.

**WARNING!****Severe injury due to residual pressure!**

Despite having depressurized the Börger machine, it may be under residual pressure in the event of congestion or lump formation in the medium.

- Take extra care when removing the flange connections and maintenance openings to prevent accidents caused by the release of residual pressure.

**NOTICE!****Risk of severe material damage due to a delayed shut-down in the event of a malfunction!**

A delayed shut-down in the event of malfunction can cause permanent damage to the Börger machine.

- In the event of a malfunction, shut down the Börger machine and all upstream and downstream system components immediately until the cause has been rectified.

**NOTICE!****Risk of damage caused by frost!**

Frost can cause damage to the Börger machine.

- Protect the Börger machine and its connections against frost.

**NOTICE!****Risk of material damage due to impermissible changes to limit values.**

The settings at the evaluation units or at the frequency converter must not be changed. Non-compliance may lead to material damage.

**NOTE!****Presettings of parameters**

Unit-specific values, limits as well as variable parameters are preset by factory default according to the order specifications for the particular case.

**Further operating manuals / supplementary operating manuals**

You must completely read the separate operating manuals and/or supplementary operating manuals for components and/or special versions.

Pay particular attention to all instructions

- on safety,
- on operation and control,
- on repairs and maintenance.

**Supplier documentation**

You must completely read the separate supplier documentation.

Pay particular attention to all instructions

- on safety,
- on operation and control,
- on repairs and maintenance.

**Operating manuals of electronic parts**

Pay particular attention to all instructions

- on safety,
- on operation and control,
- on repairs and maintenance,
- in the operating manuals of electronic parts in the appendix.

2.13 Information on special dangers

2.13.1 Oil, grease and other chemical substances



ENVIRONMENT!

Danger due to incorrect handling of environmentally hazardous substances!

Inappropriate handling of environmentally hazardous substances, especially incorrect disposal, can cause significant damage to the environment.

- Especially water-polluting materials such as grease and lubricating oil must not pollute the soil or enter the sewage system during installation, repair and maintenance work.
 - These materials must be collected, stored, transported and disposed of in suitable containers.
- When handling oil, grease and other chemical substances, pay attention and adhere to the applicable regulations and safety data sheets issued by the respective manufacturer relating to storage, handling, correct use and disposal.
- Comply with the legal obligations regarding waste avoidance and the proper recycling/disposal of waste during all work

When handling oil, grease and other chemical substances, pay attention and adhere to the applicable regulations and safety data sheets issued by the respective manufacturer relating to storage, handling, correct use and disposal.

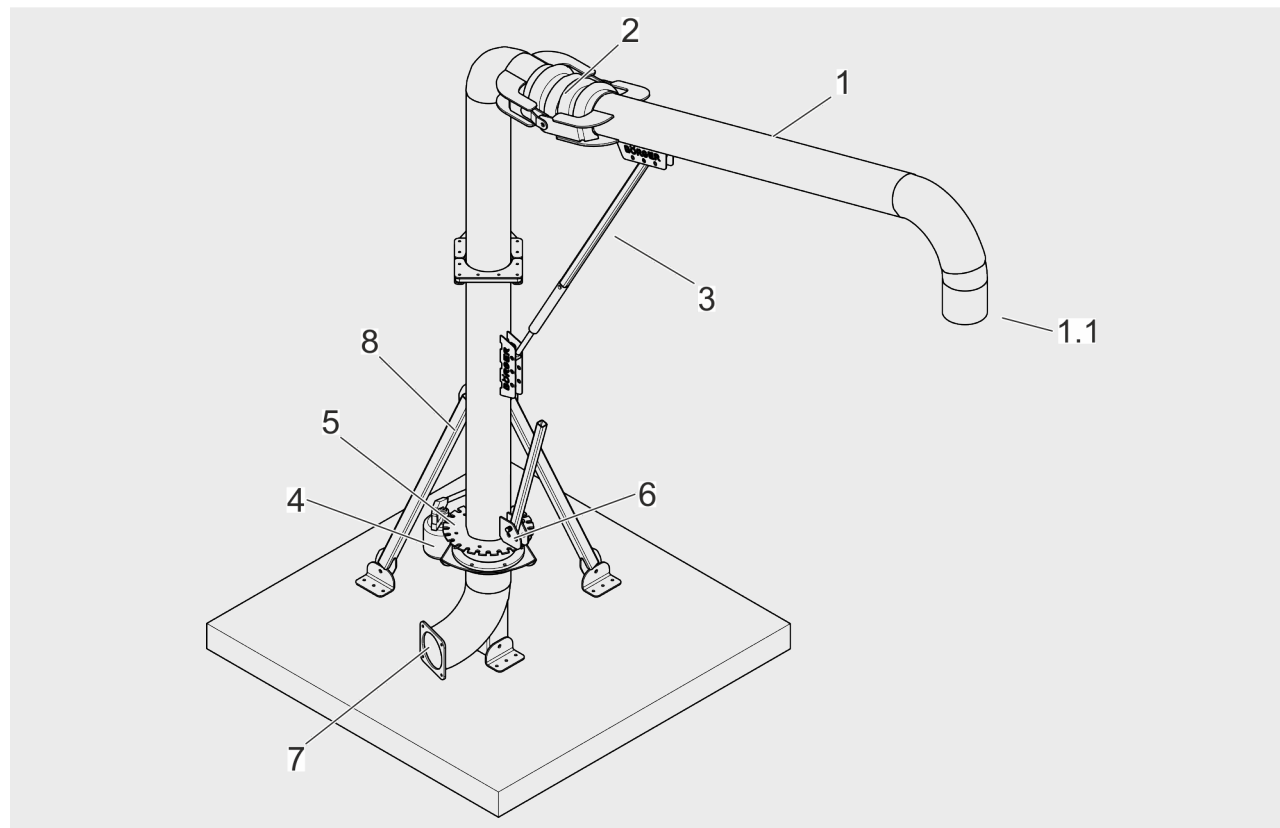
2.13.2 Noise

The A-weighted equivalent continuous noise level on the workstations is below 80 dB(A) during normal operation of the Börger machine. Higher noise levels may occur at the Börger machine installation site due to local conditions. In this case, the operator is obligated to provide operating personnel with appropriate protective equipment.

3 Product Description

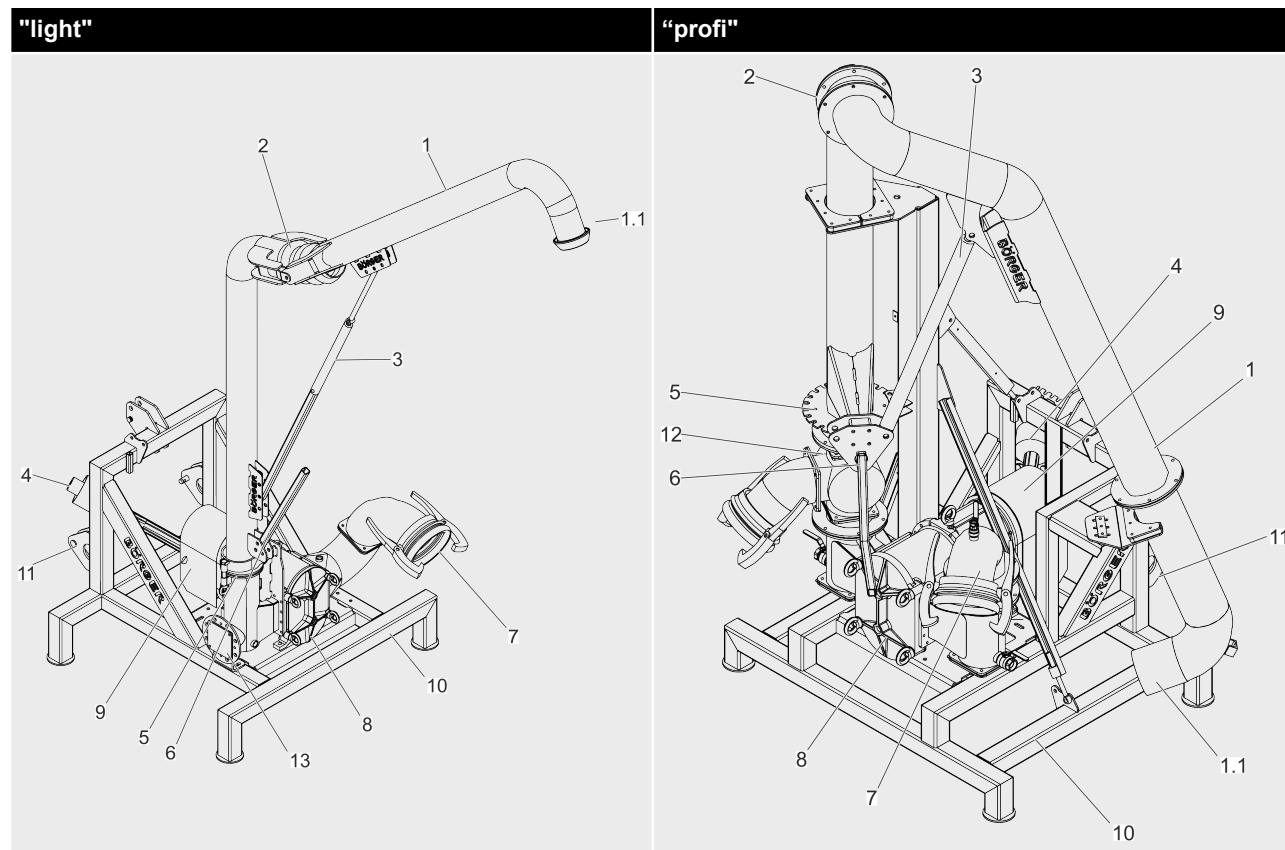
3.1 Construction of the Börger machine

Stationary vat filling station



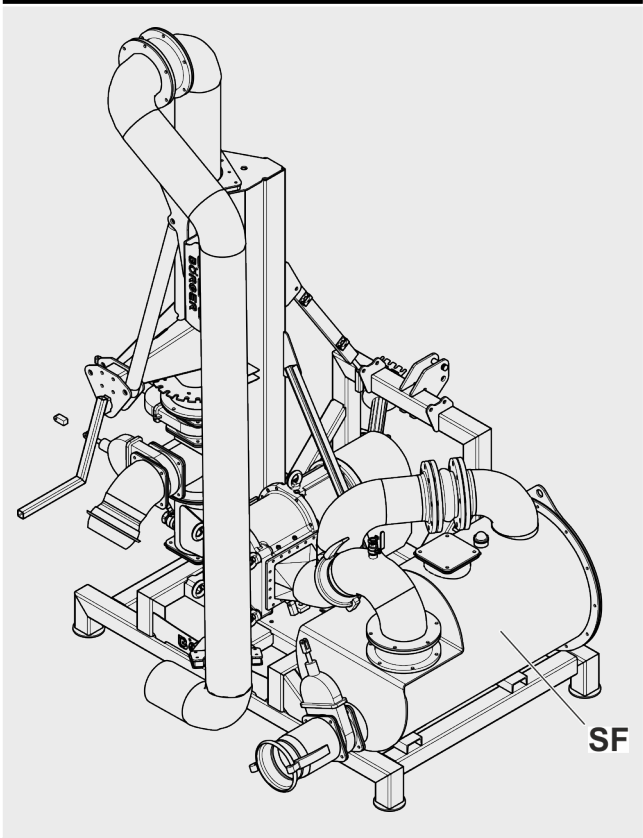
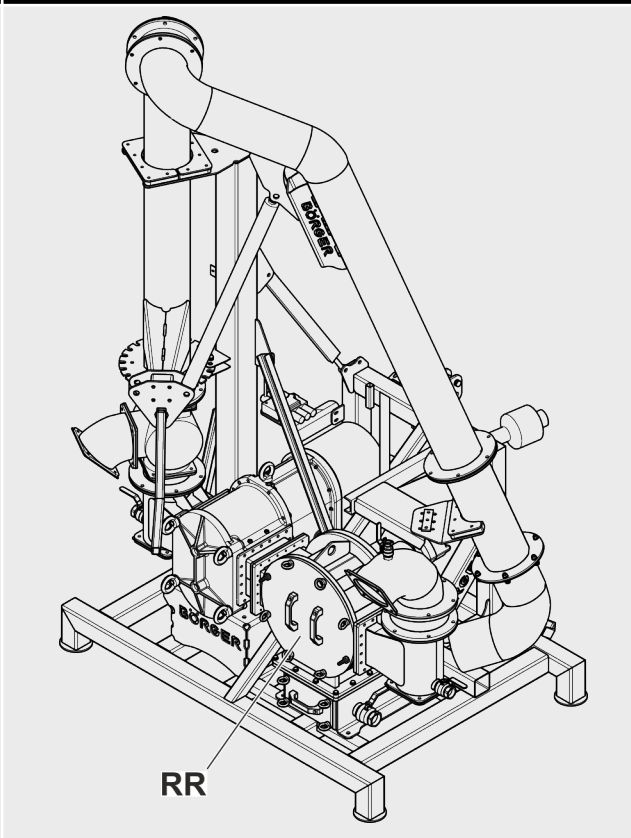
1	Vat filling pipe	5	Swivel joint
1.1	Filler neck	6	Hand lever with securing pin
2	Bellows	7	Connection flange
3	Hydraulic cylinder	8	Pole for stabilization
4	Hydraulic pump		

Mobile vat filling station

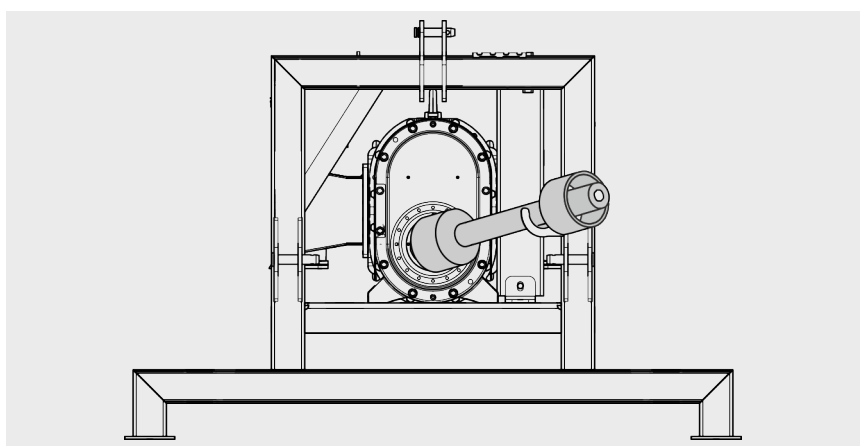


1	Vat filling pipe
1.1	Filler neck
2	Bellows / swivel joint
3	Hydraulic cylinder
4	PTO shaft
5	Swivel joint
6	Hand lever
7	Feed / suction line
8	Rotary lobe pump
9	PTO shaft protection
10	Three-point hitch
11	Pin for tractor
12	Three-way tap
13	Connection option for transfer operation

3.1.1 Optional additions for “profi” vat filling station

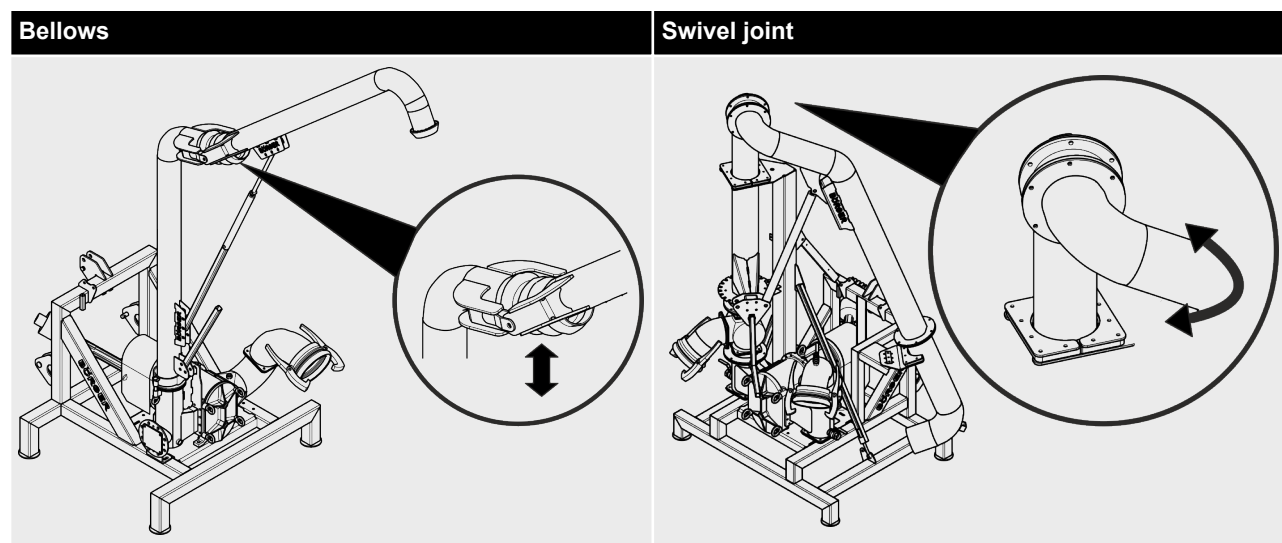
with stone trap	with Rotorrake
	
SF Stone trap - addition	RR Rotorrake - addition

3.2 Drive of rotary lobe pump and boom

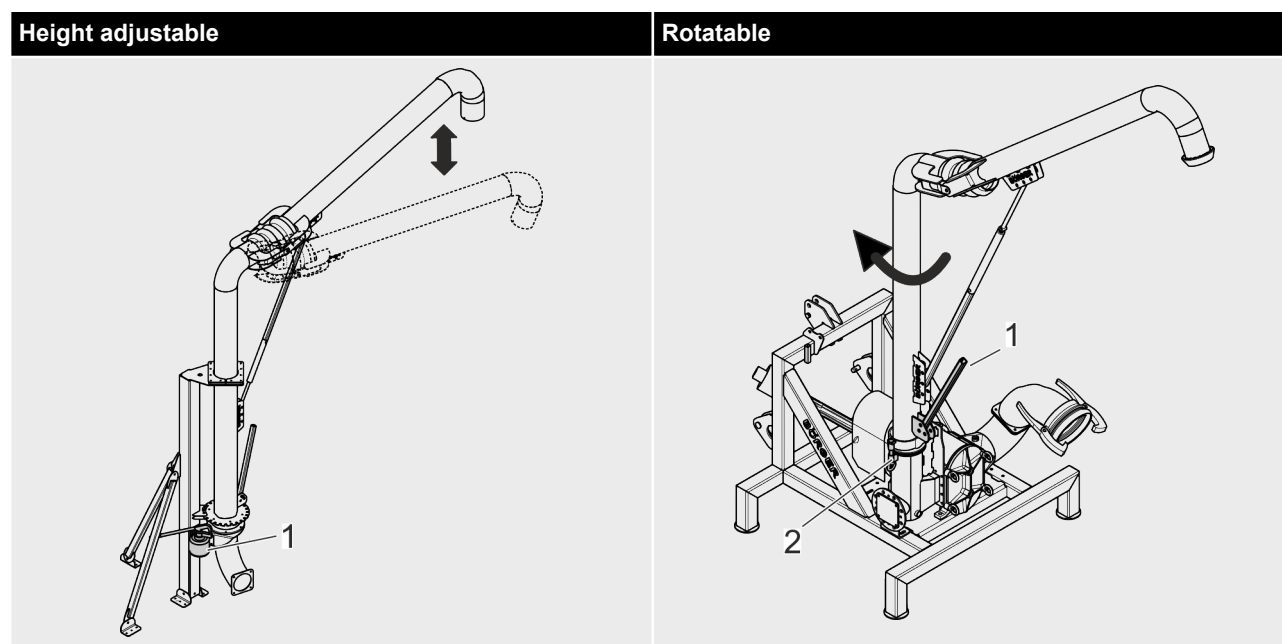


The rotary lobe pump is driven by a tractor via a PTO. The hydraulic function of the vat filling pipe and/or the Rotorrake are controlled by tractor's hydraulic system.

3.3 Bellows / swivel joint



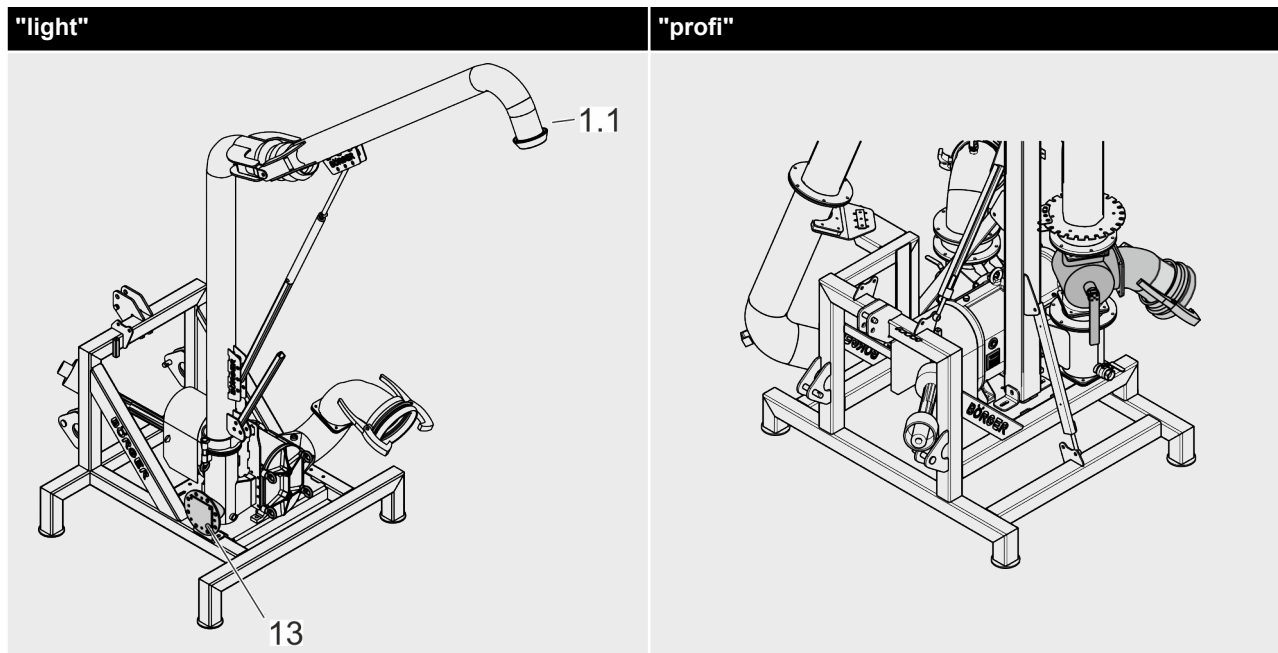
3.4 Rotation and height adjustment



- Via double-acting hydraulic hand pump (1) with protection by shutoff valve
- Via the tractor's hydraulic system

- Rotatable by means of hand lever (1), protection by locking pin (2)
- Rotatable by means of hydraulic swivel joint

3.5 Transfer operation (optional)



By installing a corresponding coupling piece to the connection (13) provided for this, the vat filling station can also be used for transfer operations.

To this end, the opening of the filler neck (1.1) of the vat filling pipe must be closed with a corresponding coupling piece.

Using the three-way tap which is optionally available, the vat filling station can also be used for transfer operations.

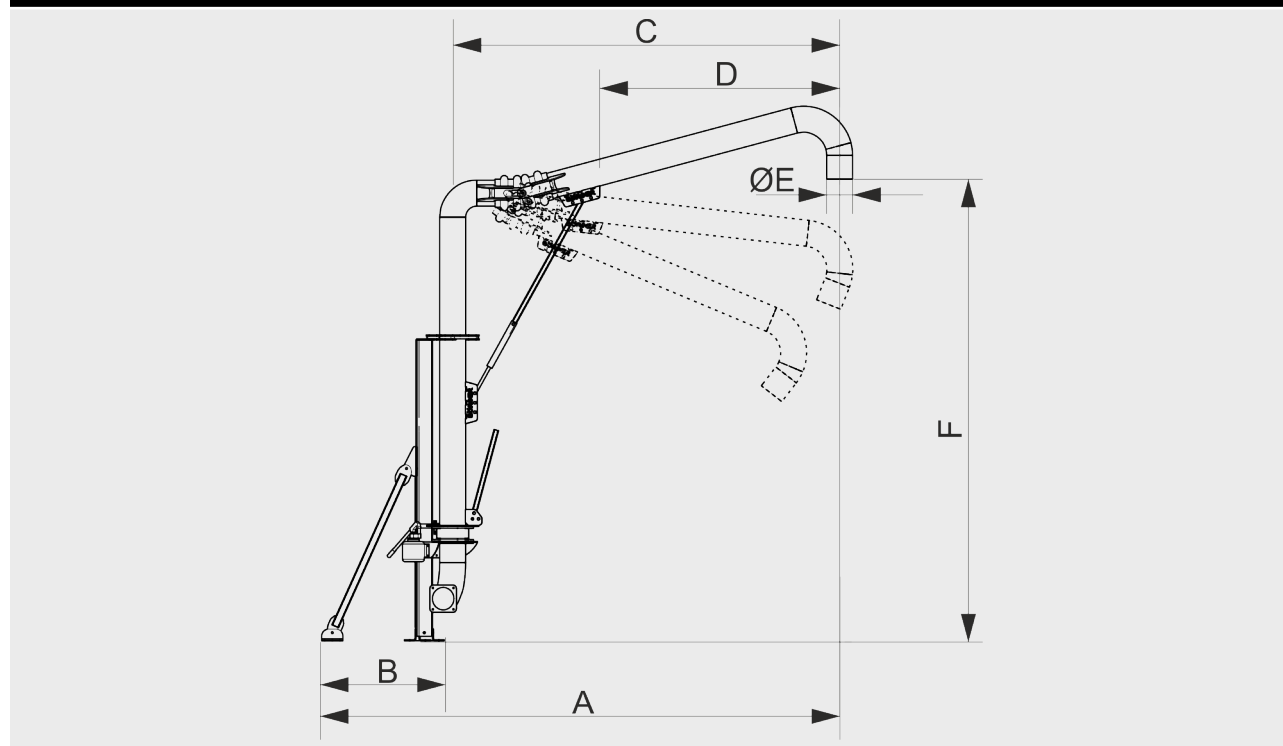
3.6 Technical data

Börger machines are configured individually for the application requirements. This leads to a wide range of variations that have been optimized for specific applications. Therefore, only the data of some of the standard versions can be listed here as examples.

Detailed specifications for your Börger machine or unit can be found in the data sheet and the **individual dimensional drawing** sent when the machine was ordered.

Please contact Börger customer service if you require a copy of this drawing.

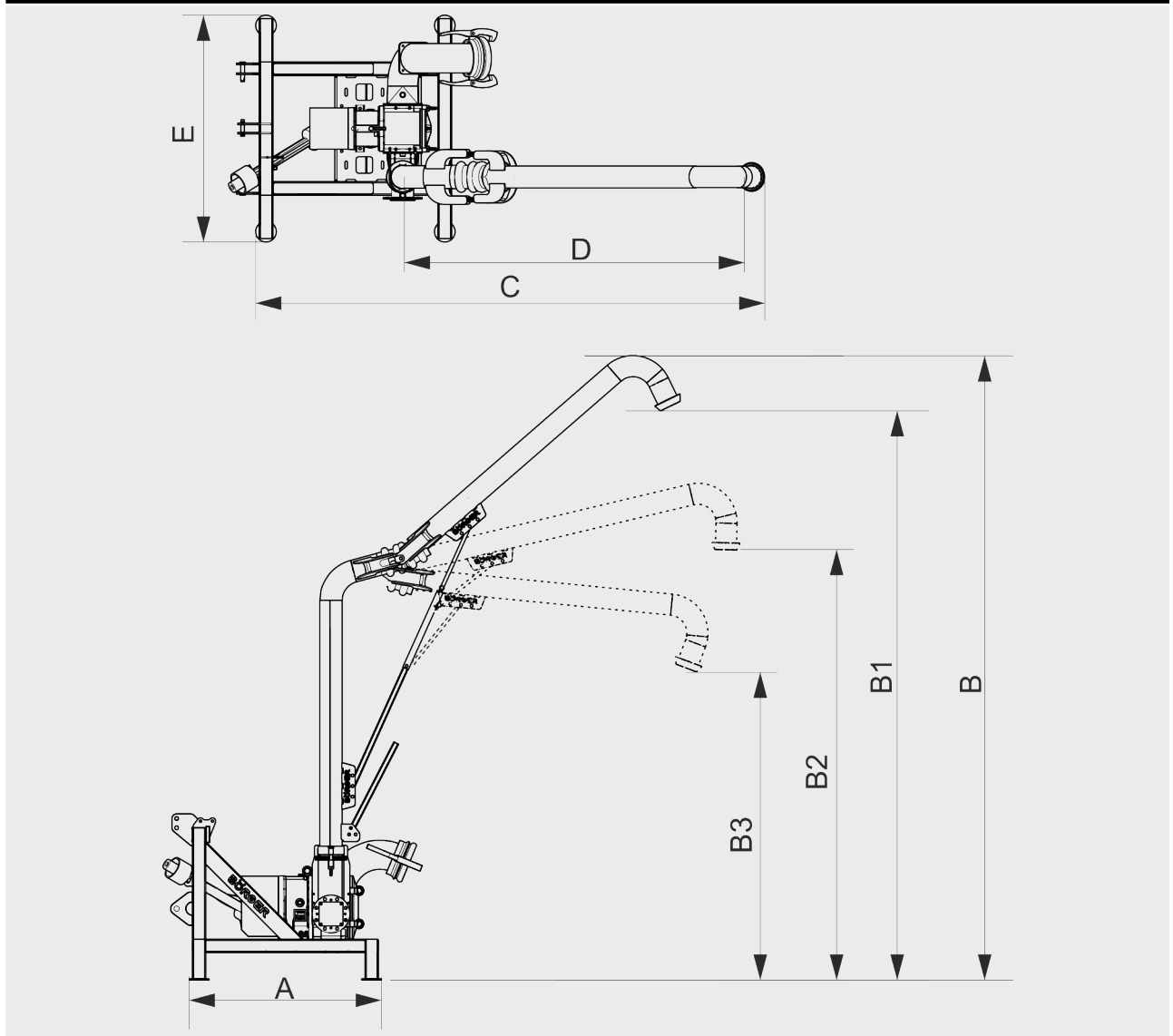
3.6.1 Dimensions

Stationary


	DN 150		DN 200	
	approx. [mm]	approx. [inch]	approx. [mm]	approx. [inch]
A	4270	168.11	4340	170.87
B	1030	40.55	1030	40.55
C	3190	125.59	3300	129.92
D	1980	77.95	2010	79.13
ØE	Ø159	6.26	Ø219.1	8.62
F	3910	153.94	3890	153.15
	(min. 2700, max. 4400)	(min. 106, max. 173)	(min. 2700, max. 4400)	(min. 106, max. 173)

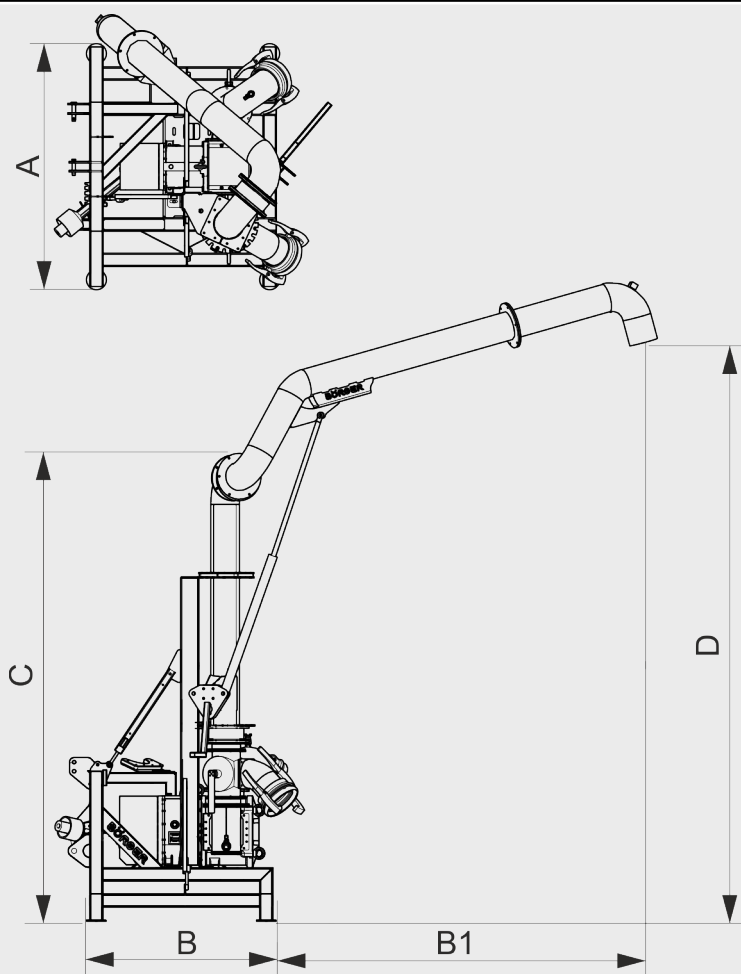
Discharge height: min. 2700 mm (106.30 inch)

Possible rotation angle: 270°

"light"


	approx. [mm]	approx. [inch]
A	1450	57.09
B	4710	185.43
B1	4290	168.90
B2	3320	130.71
B3	2100	82.68
C	4030	158.66
D	2500	98.43
E	1650	64.96

"profi"



	approx. [mm]	approx. [inch]
A	1800	70.87
B	1400	55.12
B1	2830	111.42
C	3580	140.95
D	4460	175.59

4 Transportation, Storage and Installation

4.1 Transportation

**WARNING!****Risk of fatal injury due to suspended loads!**

Loads can swing and fall during lifting operations. This can cause severe injury, including death.

- Never stand under or within the swinging range of suspended loads.
- Do not move loads unsupervised.
- Only use approved hoists and slings with sufficient load-bearing capacity.
- Do not use torn or worn hoists such as ropes and belts.
- Do not place hoists such as ropes and belts near sharp corners and edges and do not tie them together or twist them.
- Put the load down when leaving the operating site.

**WARNING!****Risk of injury by falling or tilting packages!**

Packages can have their center of gravity elsewhere than in the middle. If not properly aligned, the package can tilt and fall. Falling or tilting packages can cause severe injuries.

- Lift the package carefully and monitor whether it tilts. Realign if necessary.

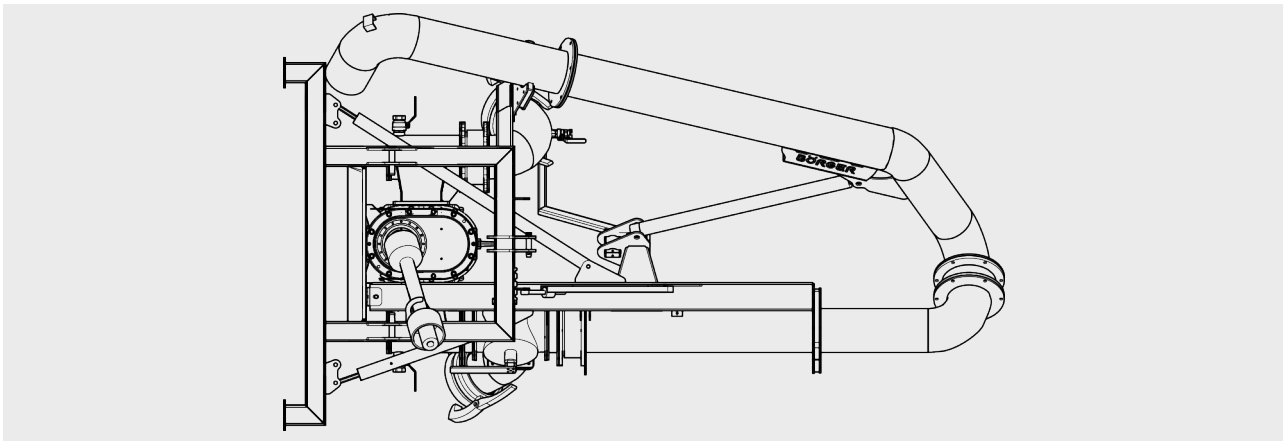
Tool: ■ Hoists

Be sure to read and follow all instructions:

- on safety,
- on operation and control,
- on installation, repairs and maintenance. ↗ *Chapter 2.12*
“Safety instructions for maintenance and rectifying malfunctions” on page 35

1. ➤ Observe the specifications in the hoist instructions, especially for the inclination angle allowed.
2. ➤ Transport the Börger machine using a suitable hoist.
3. ➤ If a special base frame with additional lifting lugs or forklift pockets was delivered, use them accordingly.

Delivery in horizontal position:



- Usually, the vat filling station is delivered as described here.
- To avoid leakage of operating materials, the vent holes of the gear unit and the intermediate chamber are closed with screw plugs.
- **Before commissioning the vat filling station, it is mandatory to replace the plugs by the gear unit breather and the ventilation tube included in the supply!**



NOTICE!

Risk of material damage when the intermediate chamber is closed tightly!

If the vent hole of the intermediate chamber is closed tightly or has become blocked, medium emerging from the working chamber cannot escape through the intermediate chamber and will penetrate the gear unit if the mechanical seal is defective. This could damage the gear unit.

- The safety opening in the intermediate chamber is used for monitoring the integrity of the mechanical seal, and must not be closed.
- Overflowing indicates a seal malfunction.



NOTICE!

Risk of material damage when the gear unit is closed tightly!

If the vent hole of the gear unit is closed tightly, seal damage might occur due to overpressure in the gear unit.

- The vent hole at the gear unit must not be closed tightly!

4.2 As-delivered condition

Be sure to read and follow all instructions:

- on safety,
- on operation and control,
- on installation, repairs and maintenance. ↗ *Chapter 2.12*
“Safety instructions for maintenance and rectifying malfunctions” on page 35

The Börger machine is delivered in a pre-assembled, packed state. Optional accessories may be included in separate packaging.

1. ➤ Observe the applicable delivery conditions for the order.
2. ➤ Check that the delivery is complete when you receive it.
3. ➤ Inspect the delivery immediately for any signs of transport damage.
4. ➤ Ensure that the unit is not put into operation in the event of incorrect or incomplete delivery, or transport damage.
5. ➤ Inform the shipping agent immediately of any transport damage and contact Börger GmbH.

4.3 Installation



WARNING!

Risk of fatal injury as a result of incorrect installation!

Errors during installation may lead to extremely dangerous situations and cause severe material damage.

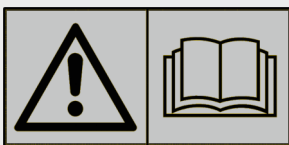
- Install the component parts professionally. Observe specified screw tightening torques.
- Please observe the following prior to initial commissioning.
 - Ensure that all installation work is performed and completed as per the information and notes provided in this manual.
 - Ensure that all covers and safety features are installed and function correctly.
 - Ensure that nobody enters the hazardous area.

**Further operating manuals / supplementary operating manuals**

You must completely read the separate operating manuals and/or supplementary operating manuals for components and/or special versions.

Pay particular attention to all instructions

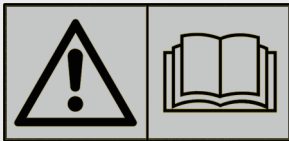
- on safety,
- on operation and control,
- on repairs and maintenance.

**Supplier documentation**

You must completely read the separate supplier documentation.

Pay particular attention to all instructions

- on safety,
- on operation and control,
- on repairs and maintenance.

**Operating manuals of electronic parts**

Pay particular attention to all instructions

- on safety,
- on operation and control,
- on repairs and maintenance,
- in the operating manuals of electronic parts in the appendix.

4.3.1 Setup**DANGER!****Risk of fatal injury due to lightning strike!**

- With a thunderstorm approaching, any work on the mobile Börger unit must be stopped immediately.
- Never touch live system components after a lightning strike.
- Commission a qualified electrician to de-energize the electrical system.



DANGER!

Risk of fatal injury due to contact with high-voltage lines!

- Keep an adequate safety distance from electrical systems and lines.
- In case of contact with live wires:
 - Do not touch conductive (metal) parts of the mobile Börger unit.
 - Commission a qualified electrician to de-energize the electrical system.



WARNING!

Risk of fatal injury due to system tipping over!

Inattentiveness may endanger the stability of the vat filling station! The vat filling station can tip over!

Constantly monitor the wind speed in windy weather:

- Use the Beaufort scale or the optional display of the wind speed.
- At wind speeds of more than 12.5 m/s – or 45 km/h - (wind force 6 Beaufort) operating the boom is not permissible anymore!

Beaufort scale

Force	Description	Effect	[km/h] ([mph])
4	Moderate breeze	Raises dust and loose paper, small branches moved	20 - 28 (13 - 18)
5	Fresh breeze	Small trees in leaf begin to sway	29 - 38 (19 - 24)
6	Strong breeze	Large branches in motion, whistling heard in telegraph wires	39 - 49 (25 - 31)
7	Moderate gale	Whole trees in motion, inconvenience felt when walking against the wind	50 - 61 (32 - 38)
8	Fresh gale	Twigs break off trees, generally impedes progress	62 - 74 (39 - 46)



CAUTION!

Risk of accident due to obstacles in the operating area of the vat filling station!

- Collisions may cause severe damage to the vat filling station!
- Collisions can increase the load and endanger the stability!
- Do not cause the vat filling station to vibrate due to jerky movements
- Keep a sufficient safety distance to any obstacles
- Do not fix any additional ladders, winches, etc. at the vat filling station.

Other versions

- **Mobile units** must be operated on a solid surface and be secured in place. Double-check this.
- **Börger machines that are operated on a vehicle** must be fixed to the vehicle frame. Double-check this.
- When installing **special versions**, check whether a supplementary operating manual is enclosed in the appendix and, if so, follow the instructions.

4.3.2 Hydraulic connection

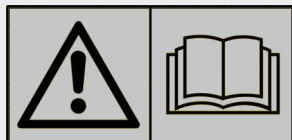


DANGER!

Risk of fatal injury due to hydraulic oil spurting out under pressure!

Hydraulically actuated moving parts can cause severe injury.

- Have all work on the hydraulic system performed by hydraulic specialists.
- Depressurize the hydraulic system completely before starting work on it. Depressurize the pressure accumulator completely.
- Do not reach into moving parts or handle moving parts when the machine is in operation.
- Never hold body parts or any objects into the jet of liquid. Keep personnel away from the hazardous area.
- Activate the EMERGENCY STOP immediately. If required, take further measures to reduce the pressure and stop the jet of liquid.
- Have defective components repaired immediately.
- Collect any escaping fluid properly and dispose of it.



Operating manual of drive manufacturer

Pay particular attention to all instructions

- on safety,
- on operation and control,
- on repairs and maintenance,
- in the operating manual of the drive manufacturer.

The Börger machine must be completely installed before establishing the hydraulic connections.

Be sure to read and follow all instructions:

- on safety,
- on operation and control,
- on installation, repairs and maintenance. ↪ *Chapter 2.12 “Safety instructions for maintenance and rectifying malfunctions” on page 35*

➡ Connect the hydraulic connections on Börger machines with a hydraulic drive according to the operating manual from the drive manufacturer.

4.3.3 PTO shaft connection

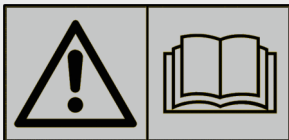


DANGER!

Risk of injury due to rotating parts!

Moving parts can cause severe injury.

- Do not reach into rotating parts or handle rotating parts when the machine is in operation.
- Never open protective covers when in operation.
- Perform work on the Börger machine only when stationary.
- Observe the delay time: Prior to opening protective covers, make sure that all components have stopped moving.
- Shut down the machine and upstream and downstream system components before carrying out any work on the Börger machine or accessories ↪ *Chapter 5.2 “Downtimes” on page 69.*
- The operating person is obligated to check that all safety equipment is installed and fully functional before putting the machine into operation.
- The Börger machine must only be switched on when the inlet and outlet connections have been established and the maintenance openings have been securely installed.



Operating manual for PTO shaft components

- Pay particular attention to all **instructions and safety regulations** contained in the operating manuals for PTO shaft components.

The Börger machine must be completely installed before connecting the PTO shaft.

Be sure to read and follow all instructions:

- on safety,
- on operation and control,
- on installation, repairs and maintenance. ↗ *Chapter 2.12*
“Safety instructions for maintenance and rectifying malfunctions” on page 35

- 1. ▶ On versions with a PTO shaft drive**, ensure that the drive side of the PTO shaft is properly connected to the drive.
- 2. ▶** Connect the suitable PTO shaft - which has to be mounted properly to the drive - with the corresponding shaft end of the Börger machine according to the operating manual from the PTO shaft manufacturer.
- 3. ▶** Check the length of the PTO shaft and adjust it if necessary.

4.4 Checks before commissioning



Standard operating manual

Pay particular attention to all instructions

- on safety,
- on operation and control,
- on repairs and maintenance,
- detailed in the standard operating manual of your Börger machine.



DANGER!

Risk of injury due to rotating parts!

Moving parts can cause severe injury.

- Do not reach into rotating parts or handle rotating parts when the machine is in operation.
- Never open protective covers when in operation.
- Perform work on the Börger machine only when stationary.
- Observe the delay time: Prior to opening protective covers, make sure that all components have stopped moving.
- Shut down the machine and upstream and downstream system components before carrying out any work on the Börger machine or accessories ↪ *Chapter 5.2 “Downtimes” on page 69.*
- The operating person is obligated to check that all safety equipment is installed and fully functional before putting the machine into operation.
- The Börger machine must only be switched on when the inlet and outlet connections have been established and the maintenance openings have been securely installed.

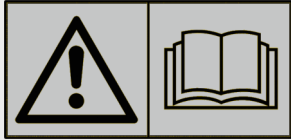
Be sure to read and follow all instructions:

- on safety,
- on operation and control,

- on installation, repairs and maintenance. ↪ *Chapter 2.12 “Safety instructions for maintenance and rectifying malfunctions” on page 35*
 - Ensure that the Börger machine is integrated into an **emergency stop** system, or, if such a system is not mandatory, that the shutdown device is adequately labeled.
1. ➤ If your Börger machine was delivered with special **accessories**, then ensure that these accessories are installed correctly and ready for operation. This especially applies to devices used for safety and monitoring system functionality. Adhere to the relevant operating manuals for the accessories.
 2. ➤ Check the **oil level in the gear unit of the Börger machine**. On standing versions, the oil level must reach at least halfway up the oil sight glass. If this is not the case, the gear oil (cf. data sheet) must be refilled, see chapter 6 “Lubricant fill level” of the standard operating manual.
 3. ➤ Ensure that the **breather system at the gear unit of the pump** is installed correctly and that the fixed screw plugs have been removed.
 4. ➤ Ensure that the **breather at the intermediate chamber** is properly installed and the quench fluid can drain off freely in the event of a seal leakage, or, when medium must not be released into the atmosphere, that a suitable drain system is installed.
 5. ➤ Check whether the **delivered quench fluid** (see enclosed data sheet) is suitable or whether an alternative fluid must be used in order to observe environmental protection regulations, or for biological or other reasons. This must be compatible with the medium, and must not adversely affect the O-rings of the mechanical seals. Consult Börger GmbH regarding this, if necessary.
 6. ➤ Check the **fill level in the intermediate chamber**. On standing versions, the quench fluid must reach halfway up the top shaft. Otherwise, the quench fluid (cf. data sheet) must be refilled. If there is much more fluid in the intermediate chamber than the optimum fill level when the mechanical seal is intact, some of the fluid should be drained off in order to prevent premature overflowing. Otherwise, the functionality of the leak monitor may be compromised. Also see chapter 6 “Lubricant fill level” of the standard operating manual.

- 7.** ➤ Ensure that the **supply lines** to the drive are connected and secured according to the relevant regulations.
- 8.** ➤ Ensure that the unit is properly **grounded**.
- 9.** ➤ Check that the **pipe connectors** are attached correctly and do not leak (torque for the connection between Börger machine and pipe connector).
- 10.** ➤ Check that all **screws and nuts**, which may have become loose during transportation and installation, are tight.
- 11.** ➤ Rectify all errors determined by this check.

5 Operation



Standard operating manual

Pay particular attention to all instructions

- on safety,
- on operation and control,
- on repairs and maintenance,
- detailed in the standard operating manual of your Börger machine.



WARNING!

Risk of injury as a result of improper operation!

Improper operation may cause severe injury and considerable material damage.

- Prior to commissioning, ensure that all installation work is performed and completed as per the information and notes provided in this manual.
- Ensure that all operating steps are performed as per the information and notes provided in this manual.
- Ensure the following before starting work:
 - Ensure that all covers and safety features are installed and function correctly.
 - Ensure that nobody is in the hazardous area.
- Never bridge or disable safety features during operation.

**NOTICE!**

There is a danger of considerable material damage if the limits are not complied with!

Failure to comply with the limits can cause permanent damage to the Börger machine and its components.

- The values may neither exceed nor fall below the limits specified in ↗ *Chapter 3.6 “Technical data” on page 45* of the standard operating manual and the specifications on the data sheet.
- On Börger machines that operate with a frequency converter, make sure that the operating speed is sufficiently below the maximum permissible speed (for speed limit based on machine configuration, see enclosed data sheet).
- Take all necessary precautions to ensure that the permissible differential pressure between the inlet and outlet of the Börger machine is not exceeded.
- Make sure that the pressure on the outlet does not exceed the permissible pressure of the pipe system and the Börger machine, and not overload the drive and its elastic connections.
- The temperature values according to the data sheet may not exceed or fall below the limits. Double-check this.

**NOTICE!**

Risk of damage caused by frost!

Frost can cause damage to the Börger machine.

- Protect the Börger machine and its connections against frost.

**ENVIRONMENT!****Danger due to incorrect handling of environmentally hazardous substances!**

Inappropriate handling of environmentally hazardous substances, especially incorrect disposal, can cause significant damage to the environment.

- Especially water-polluting materials such as grease and lubricating oil must not pollute the soil or enter the sewage system during installation, repair and maintenance work.
 - These materials must be collected, stored, transported and disposed of in suitable containers.
- When handling oil, grease and other chemical substances, pay attention and adhere to the applicable regulations and safety data sheets issued by the respective manufacturer relating to storage, handling, correct use and disposal.
- Comply with the legal obligations regarding waste avoidance and the proper recycling/disposal of waste during all work

5.1 Commissioning



DANGER!

Risk of fatal injury due to hydraulic oil spurting out under pressure!

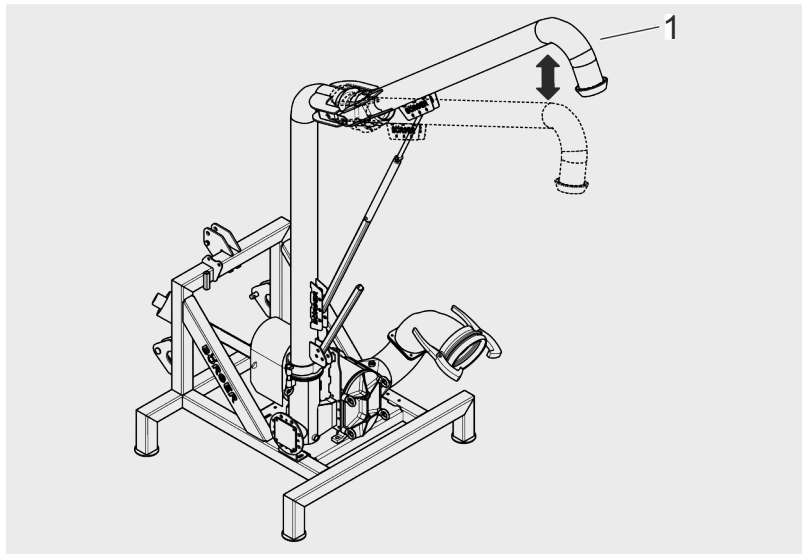
Hydraulically actuated moving parts can cause severe injury.

- Have all work on the hydraulic system performed by hydraulic specialists.
- Depressurize the hydraulic system completely before starting work on it. Depressurize the pressure accumulator completely.
- Do not reach into moving parts or handle moving parts when the machine is in operation.
- Never hold body parts or any objects into the jet of liquid. Keep personnel away from the hazardous area.
- Activate the EMERGENCY STOP immediately. If required, take further measures to reduce the pressure and stop the jet of liquid.
- Have defective components repaired immediately.
- Collect any escaping fluid properly and dispose of it.

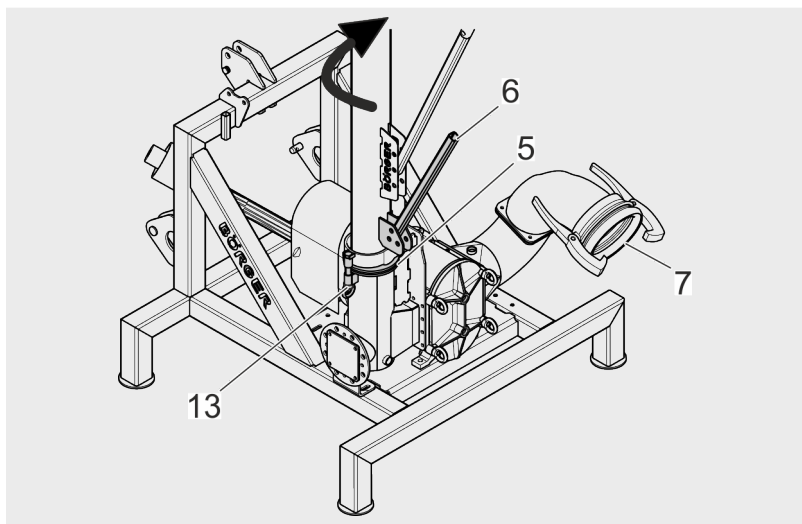
Be sure to read and follow all instructions:

- on safety,
- on operation and control,
- on installation, repairs and maintenance. ↪ *Chapter 2.12 “Safety instructions for maintenance and rectifying malfunctions” on page 35*

1. ➤ Raise the vat filling pipe (1) by means of the hydraulic pump (4) or the tractor's hydraulic system.

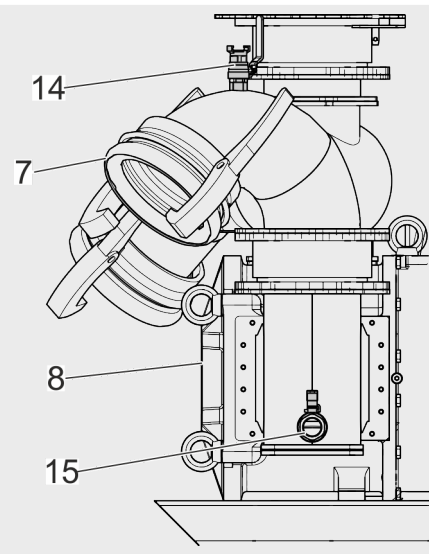


2. ➤ Use the hand lever (6) to rotate the vat filling pipe.



3. ➤ Turn the vat filling pipe into the required position.
4. ➤ Secure this position by inserting the bolt (13) with locking pin into the slewing ring (5).
5. ➤ Establish the connection of the suction line (7) with the hoses intended for this purpose.

6. ➔



Ensure that the rotary lobe pump (8) is pre-filled via one of the nozzles (14 or 15) (e.g. with water) and that dry run is excluded.

7. ➔

**NOTICE!**

Risk of severe material damage caused by running a Børger machine against closed valves!

Running against closed valves may cause permanent damage to your Børger machine.

- The Børger machine must not be run against closed valves.
- Make sure that the pipes are open when the Børger machine is switched on, e.g. by a suitable control unit.

**NOTE!**

At the end of the filling process, the direction of rotation of the pump should be reversed for a short moment.

This way, the vat filling pipe is emptied.

8. ➔

Raise the vat filling pipe (1) by means of the hydraulic pump (4) or the tractor's hydraulic system until the filler neck (1.1) is disengaged.

9. ➔

Turn the vat filling pipe (1) into the appropriate position and secure this position by inserting the bolt (13) with locking pin.

- 10.** → Lower the vat filling pipe by opening the valve on the hydraulic pump (4) or via the tractor's hydraulic system.

5.2 Downtimes

- Leave the pumped medium in the rotary lobe pump installed ready for operation during short-term downtimes, provided the type of medium does not prevent this.
 - Clean the pump in the latter case, and before long downtime periods of the rotary lobe pump installed ready for operation.
 - Following a long downtime period of the rotary lobe pump installed ready for operation carry out a function check according to chapter “Transportation, Storage and Installation” of the standard operating manual.
 - If the rotary lobe pump is dismantled from its location, follow the instructions on storage / interim storage according to chapter “Transportation, Storage and Installation” of the standard operating manual.
1. ➤ Disconnect the power supply.
 2. ➤ Remove the hose connection.
 3. ➤ The rotary lobe pump can be emptied at the nozzles (14 or 15).
 4. ➤ If required, decommission the unit according to chapter 5.3 “Downtimes” of the standard operating manual.
 5. ➤ If required, carry out maintenance and inspection as described in chapter 6 “Maintenance and Repairs” of the standard operating manual.
 6. ➤ If required, store the unit as described in chapter 4.3 “Storage and Interim Storage” of the standard operating manual.

5.3 Emergency shut-down



NOTE! EMERGENCY STOP

The **EMERGENCY STOP** button as an **EMERGENCY STOP** enables the **immediate shut-down** of the Börger machine.

In cases of emergency, the Börger machine must be shut down as fast as possible, the energy supply must be switched off and pressure must be released.

Please proceed as follows in emergencies:

1. ➤ Activate the EMERGENCY STOP by pressing the EMERGENCY STOP button immediately.
2. ➤ If a risk to your own life can be excluded, evacuate other persons from the danger zone.
3. ➤ If necessary, initiate first aid measures.
4. ➤ Alert emergency personnel.
5. ➤ Inform person responsible on site.
6. ➤ Switch off the Börger machine and secure against restart.
7. ➤ Clear access routes for emergency personnel.
8. ➤ Brief emergency personnel.
9. ➤ Commission qualified personnel with troubleshooting.



WARNING!

Risk of fatal injury if the plant is switched back on uncontrolledly or without authorization!

Switching the machine on without authorization or uncontrolledly can cause serious injuries.

- Ensure that the cause of the EMERGENCY STOP has been eliminated and all safety features are installed and functional prior to a restart.
- Do not reset the EMERGENCY STOP switch before the danger has been eliminated.

5.4 Malfunctions



WARNING!

Risk of injury due to inadequate troubleshooting, maintenance and repair work!

Inadequate troubleshooting, maintenance and repair work can lead to severe injury and significant material damage.

- To the extent necessary, amply secure the surrounding area when performing maintenance. Cordon off the working area with a red and white safety chain and a warning sign.
- Ensure sufficient installation space before commencing work.
- Keep the installation site clean and tidy! Loosely stacked or scattered components and tools cause accidents.
- Ensure correct installation where components have been removed, reinstall all fastening elements and observe the tightening torques of screws.
- Ensure the following before putting the machine back into operation:
 - Ensure that all troubleshooting, maintenance and repair work is performed and completed as per the information and notes provided in this manual.
 - Ensure that nobody enters the hazardous area.
 - Ensure that all covers and safety features are installed and function correctly.



WARNING!

Risk of injury when using unsuitable spare parts!

The use of unsuitable spare parts can cause malfunctions which can lead to severe injury, including death, and to significant material damage.

- Only use suitable spare parts.
- Always contact the manufacturer if in doubt.



NOTICE!

Risk of severe material damage due to a delayed shut-down in the event of a malfunction!

A delayed shut-down in the event of malfunction can cause permanent damage to the Börger machine.

- In the event of a malfunction, shut down the Börger machine and all upstream and downstream system components immediately until the cause has been rectified.



Standard operating manual

Pay particular attention to all instructions

- on safety,
- on operation and control,
- on repairs and maintenance,
- detailed in the standard operating manual of your Börger machine.

6 Maintenance and repairs



WARNING!

Risk of injury due to inadequate troubleshooting, maintenance and repair work!

Inadequate troubleshooting, maintenance and repair work can lead to severe injury and significant material damage.

- To the extent necessary, amply secure the surrounding area when performing maintenance. Cordon off the working area with a red and white safety chain and a warning sign.
- Ensure sufficient installation space before commencing work.
- Keep the installation site clean and tidy! Loosely stacked or scattered components and tools cause accidents.
- Ensure correct installation where components have been removed, reinstall all fastening elements and observe the tightening torques of screws.
- Ensure the following before putting the machine back into operation:
 - Ensure that all troubleshooting, maintenance and repair work is performed and completed as per the information and notes provided in this manual.
 - Ensure that nobody enters the hazardous area.
 - Ensure that all covers and safety features are installed and function correctly.

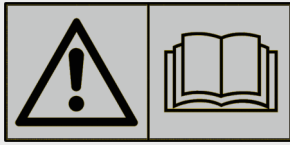


WARNING!

Risk of injury when using unsuitable spare parts!

The use of unsuitable spare parts can cause malfunctions which can lead to severe injury, including death, and to significant material damage.

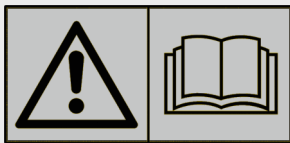
- Only use suitable spare parts.
- Always contact the manufacturer if in doubt.



Standard operating manual

Pay particular attention to all instructions

- on safety,
- on operation and control,
- on repairs and maintenance,
- detailed in the standard operating manual of your Börger machine.



Further operating manuals / supplementary operating manuals

You must completely read the separate operating manuals and/or supplementary operating manuals for components and/or special versions.

Pay particular attention to all instructions

- on safety,
- on operation and control,
- on repairs and maintenance.

Be sure to read and follow all instructions:

- on safety,
- on operation and control,
- on installation, repairs and maintenance. ↪ *Chapter 2.12 “Safety instructions for maintenance and rectifying malfunctions” on page 35*

1. ➤ Observe the assembly drawing, the spare parts list and the wear parts list when carrying out repairs or ordering spare parts. ↪ *Chapter 8.2 “Spare parts list” on page 87*
2. ➤ Read and strictly comply with the applicable regulations, manufacturer's safety data sheets and operator's instructions in respect of the storage, handling, use and disposal of oils, grease and other chemical substances.
3. ➤ Dispose of operating materials and replaced parts in a safe and environmentally-friendly manner.
↪ *Chapter 7 “Disposal” on page 82*

6.1 Machine care

Appropriate machine care helps to maintain the functionality of the Börger machine in the long term. In general, regular cleaning of dust and deposits from all surfaces is sufficient.

**CAUTION!**

Health hazard due to residues of dangerous medium inside and on the Börger machine!

There is an increased health hazard from contact with the medium and contaminated components.

Generally, the following applies:

- When using dangerous or health-endangering media, take all necessary safety measures when performing work on the Börger machine.
- Avoid direct contact with the medium (skin/eye contact, swallowing, inhaling).
- Remove spillage from your skin without delay.
- Do not store or consume beverages, food or tobacco in the working area.

**NOTICE!**

Improper cleaning of the Börger machine can lead to malfunctions and damage!

- Do not use water jets.
- Do not use aggressive cleaning agents, solvents or sandpaper, as these can damage the metallic and plastic surfaces, casing coating and seals.
- Do not use metal objects such as scrapers and screwdrivers for cleaning coated machine parts.
- Never clean sensitive components with hard scrubbing and strong mechanical pressure.
- Do not use a vacuum cleaner or a hand brush with plastic bristles etc. to clean electronic components because the production of static electricity can damage the electronic components.

**ENVIRONMENT!****Danger due to incorrect handling of environmentally hazardous substances!**

Inappropriate handling of environmentally hazardous substances, especially incorrect disposal, can cause significant damage to the environment.

- Especially water-polluting materials such as grease and lubricating oil must not pollute the soil or enter the sewage system during installation, repair and maintenance work.
 - These materials must be collected, stored, transported and disposed of in suitable containers.
- When handling oil, grease and other chemical substances, pay attention and adhere to the applicable regulations and safety data sheets issued by the respective manufacturer relating to storage, handling, correct use and disposal.
- Comply with the legal obligations regarding waste avoidance and the proper recycling/disposal of waste during all work

6.2 Maintenance and inspection

6.2.1 Maintenance and inspection plan



Standard operating manual

Pay particular attention to all instructions

- on safety,
- on operation and control,
- on repairs and maintenance,
- detailed in the standard operating manual of your Börger machine.



NOTICE!

Risk of material damage due to improper maintenance!

- Also observe the maintenance intervals detailed in the operating manuals for the drive gear unit, motor etc., which are included in the appendix.
- Prepare a maintenance schedule adapted to the operating conditions.

6.3 Repairs



WARNING!

Risk of injury due to inadequate troubleshooting, maintenance and repair work!

Inadequate troubleshooting, maintenance and repair work can lead to severe injury and significant material damage.

- To the extent necessary, amply secure the surrounding area when performing maintenance. Cordon off the working area with a red and white safety chain and a warning sign.
- Ensure sufficient installation space before commencing work.
- Keep the installation site clean and tidy! Loosely stacked or scattered components and tools cause accidents.
- Ensure correct installation where components have been removed, reinstall all fastening elements and observe the tightening torques of screws.
- Ensure the following before putting the machine back into operation:
 - Ensure that all troubleshooting, maintenance and repair work is performed and completed as per the information and notes provided in this manual.
 - Ensure that nobody enters the hazardous area.
 - Ensure that all covers and safety features are installed and function correctly.

6.3.1 Notes on repair work

Be sure to read and follow all instructions:

- on safety,
 - on operation and control,
 - on installation, repairs and maintenance. ↗ *Chapter 2.12 “Safety instructions for maintenance and rectifying malfunctions” on page 35*
 - Shut down the Börger machine and downstream and upstream system components. ↗ *Chapter 5.2 “Downtimes” on page 69*
 - Secure the Börger machine against unauthorized or uncontrolled reactivation. ↗ *Chapter 2.7 “Securing the machine against restart” on page 25*
 - Relieve the pressure in the Börger machine .
 - Clean the interior of the Börger machine .
- 1.** ➤ Thoroughly clean all parts and the working chamber of the machine before reinstalling removed parts.
 - 2.** ➤ Check all removed parts for wear and only reuse them if they are undamaged.
 - 3.** ➤ Only replace worn components, seals, screws, nuts etc., but especially the wetted parts, with original spare parts according to the following instructions.



NOTE!

Assembly drawing / spare parts list

- Observe the assembly drawing of the Börger machine
↗ *Chapter 8.1 “Assembly drawing” on page 84.*
- Observe the spare parts list of the Börger machine ↗ *Chapter 8.2 “Spare parts list” on page 87.*

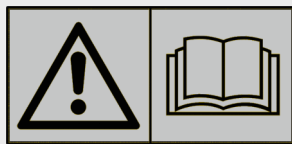
6.3.2 Other repairs

If repairs to your Börger machine are required that are not covered by the described repair and maintenance measures, we recommend contacting Börger customer service.

The factory can only accept repair orders if a completed safety certificate / declaration of decontamination accompany the device submitted for repair, as well as any necessary safety data sheets for the medium and / or cleaning agent.

The relevant form is also available as a download from our website under the service menu.

6.3.3 Maintenance instructions for special equipment



Further operating manuals / supplementary operating manuals

You must completely read the separate operating manuals and/or supplementary operating manuals for components and/or special versions.

Pay particular attention to all instructions

- on safety,
- on operation and control,
- on repairs and maintenance.

6.3.4 Queries

Börger machines are easy to maintain. We hope that we have clearly described all the relevant operating steps in this operating manual. Nevertheless, Börger machines are customized and developed for the specific requirements of the operator so that not all questions can be fully answered in a general operating manual.

— If you have any questions, please contact Börger customer service. We will be happy to help.

We would also be grateful to receive feedback on any errors or unclear passages in this operating manual. This will help us to improve and develop this document and to offer you and all of our customers the best possible service.

7 Disposal

7.1 Environmental protection



ENVIRONMENT!

Danger due to incorrect handling of environmentally hazardous substances!

Inappropriate handling of environmentally hazardous substances, especially incorrect disposal, can cause significant damage to the environment.

- Especially water-polluting materials such as grease and lubricating oil must not pollute the soil or enter the sewage system during installation, repair and maintenance work.
- These materials must be collected, stored, transported and disposed of in suitable containers.
- When handling oil, grease and other chemical substances, pay attention and adhere to the applicable regulations and safety data sheets issued by the respective manufacturer relating to storage, handling, correct use and disposal.
- Comply with the legal obligations regarding waste avoidance and the proper recycling/disposal of waste during all work

7.2 Oil, oily waste and grease

Oil, oily waste and grease pose a significant risk to the environment. Therefore, disposal of such materials must be handled by a specialist company.

- Collect any oil and oily waste and only dispose of them according to the legal requirements through authorized waste disposal companies/authorities.

7.3 Plastics

1. ➤ Sort any plastic waste as thoroughly as possible.
2. ➤ Dispose of plastics according to the legal requirements through authorized waste disposal companies/authorities.

7.4 Metals

- 1.** ➤ Sort and separate different metal types.
- 2.** ➤ Dispose of these metals according to the legal requirements through authorized waste disposal companies/authorities.

7.5 Electrical and electronic waste

Electrical and electronic waste must be disposed of separately.
Electrical and electronic waste must not be disposed of with domestic waste.

- Only dispose of electrical or electronic waste according to the legal requirements through authorized waste disposal companies/authorities, e.g. recycling plants.

7.6 Final decommissioning

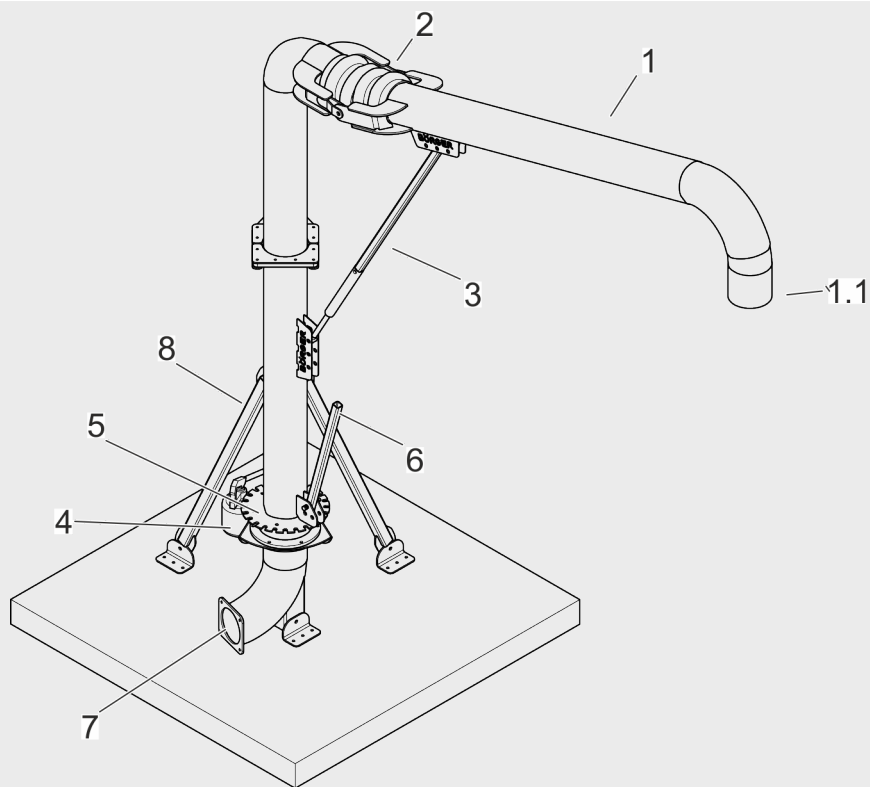
- Check which materials can be recycled and make the appropriate arrangements.

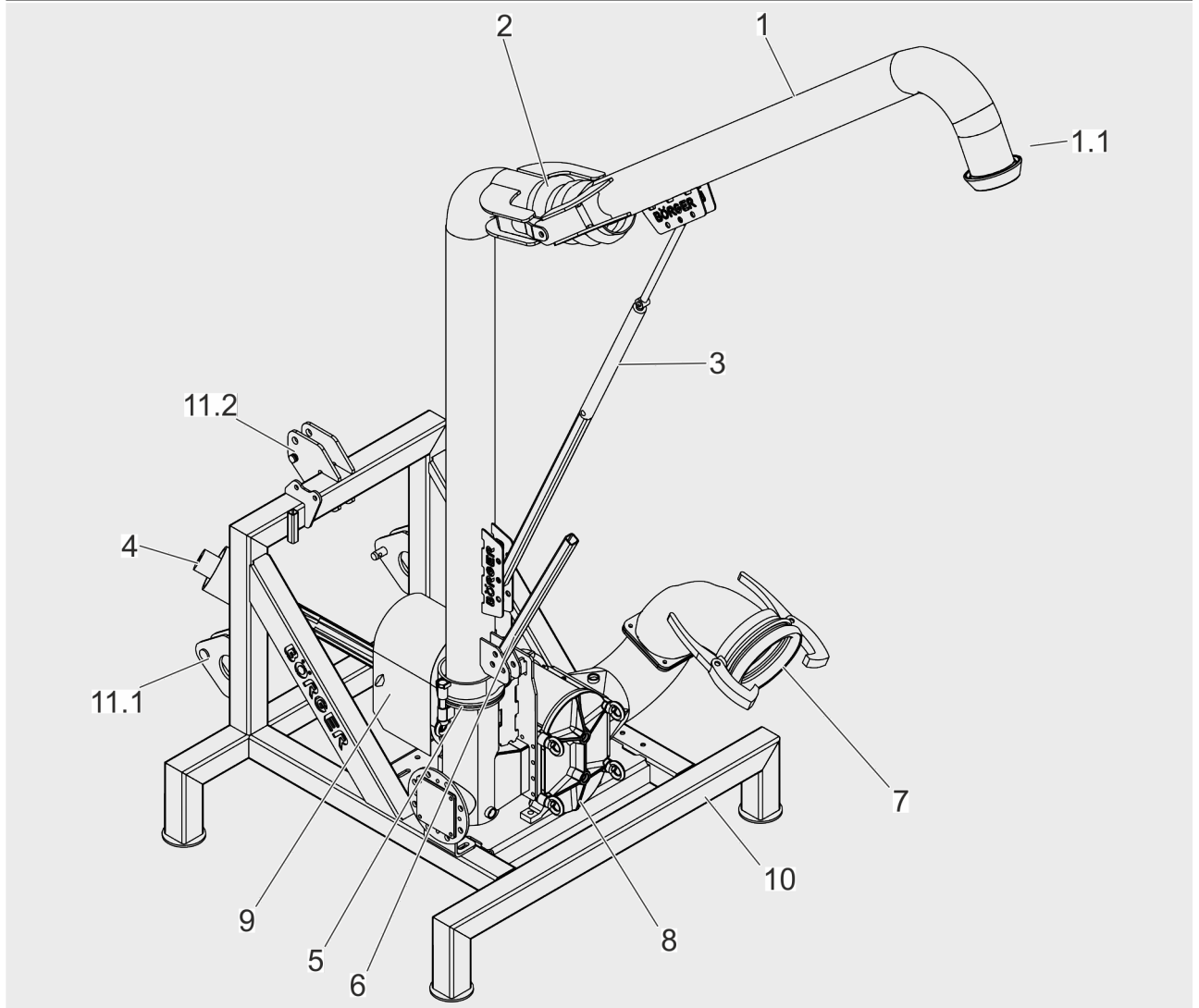
8 Appendix

8.1 Assembly drawing

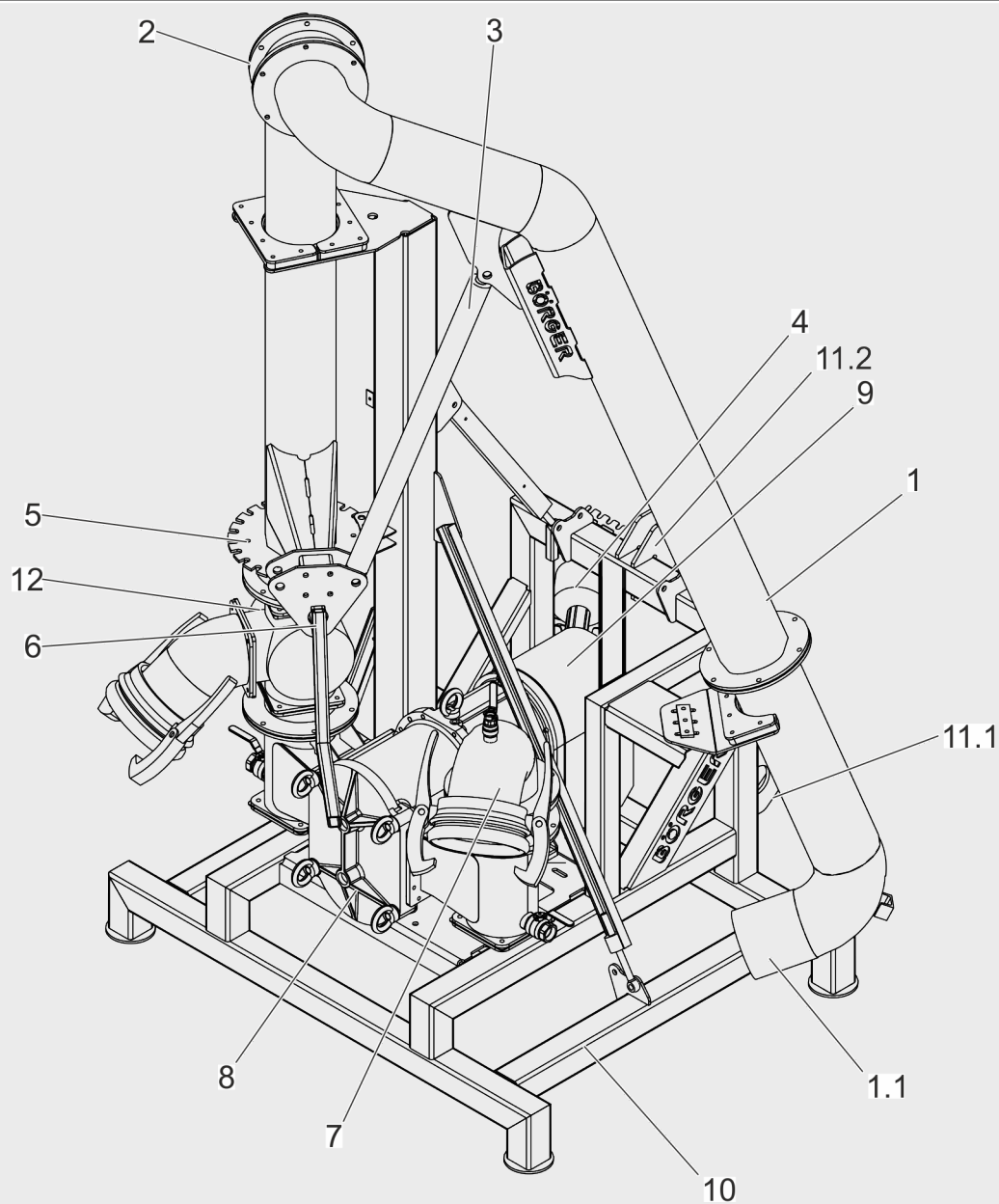
The assembly drawing shows the positions of the spare parts as described in ↗ *Chapter 8.2 “Spare parts list” on page 87.*

Stationary



Mobile - "light"

Mobile - "profi"



8.2 Spare parts list



WARNING!

Risk of injury when using unsuitable spare parts!

The use of unsuitable spare parts can cause malfunctions which can lead to severe injury, including death, and to significant material damage.

- Only use suitable spare parts.
- Always contact the manufacturer if in doubt.

The spare parts list is universal. The positioning of the parts can be seen in the assembly drawing. The parts used in your Börger machine are defined according to the type designation and all the additional specifications in the data sheet.

Stationary

Pos.	Item description	Quantity
1	Vat filling pipe	1
1.1	Filler neck	1
2	Bellows	1
3	Hydraulic cylinder	1
4	Hydraulic pump	1
5	Swivel joint	1
6	Hand lever with securing pin	1
7	Connection flange	1
8	Pole for stabilization	1

Mobile

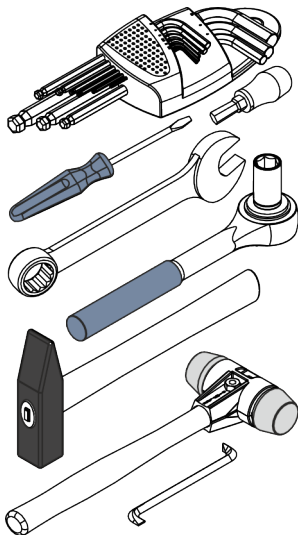
Pos.	Item description	Quantity
1	Vat filling pipe	1
1.1	Filler neck	1
2	Bellows / swivel joint	1
3	Hydraulic cylinder	1
4	PTO shaft	1
5	Swivel joint with sliding plate	1
6	Manual lever / crank	1
7	Feed / suction line	1
8	Rotary lobe pump	1
9	PTO shaft protection	1
10	Three-point hitch	1
11.1	Lower link pin	2
11.2	Top link pin	1
12	Three-way tap for filling another container	1

8.2.1 Tools / installation aid

Standard tools

Tools for electrical work

- These tools shall comply with the international standard **IEC 60900** (identical to **EN 60900** for Europe and **DIN EN 60900** for Germany).
- The standard applies to “Insulated and insulating hand tools” used for live working and work near live parts, with voltage ratings up to 1000V AC or 1500V DC.
- Products designed and manufactured according to this standard contribute to the user’s safety, provided they are used by qualified electricians in compliance with the safe working practices and the operating manual (if applicable).

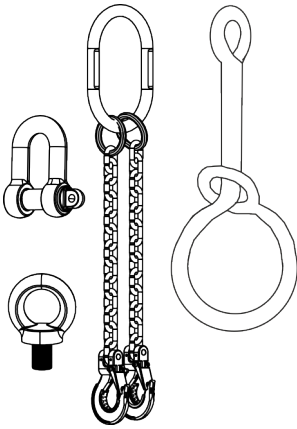


Tools, general

- Various hexagon socket wrenches and/or sockets for hexagon socket head cap screws.
- Various open-end / ring spanners and/or sockets for hexagon head screws.
- Hammer
- Soft face hammer
- Screw drivers in various sizes
- Lever

Special tools**Hoists**

Lifting and slinging gear must be designed and dimensioned adequately according to the particular hazard and the loads occurring during transport.



8.3 Checklist for commissioning

This checklist can be used as an additional aid when commissioning a Börger machine. It is not a substitute for careful reading of the operating manual before commissioning the unit.

Customer:	Börger order confirmation no.:
Machine number:	Type code:
Your project:	Order number:
Commissioning date:	Delivery date:

Test point		Carried out by: (date/signature)	Checked by: (date/signature)
1	Operating manual and appendices read and understood		
2	Screws checked for tight fit, damage to the mobile pump unit was excluded		
3	Correct direction of rotation of the pump is present		
4	Mobile pump unit installed on solid surface and/or secured against rolling away		
5	Rotary lobe pump properly installed		
6	Breather system at the gear unit and intermediate chamber installed correctly, the screw plugs installed for delivery in horizontal position were removed		
7	Electrical connection installed properly, cables checked, no signs of damage		
8	No fault pending, monitoring devices (pressure gauges / thermometers) function properly.		
9	Rotary lobe pump motor started		
10	Maintenance and inspection intervals organized for the machine		

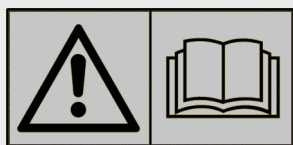
8.4 EU Declaration of Conformity / EU Declaration of Incorporation



EU Declaration of Conformity

The EU Declaration of Conformity is enclosed separately with the operating manual.

8.5 Additional documentation



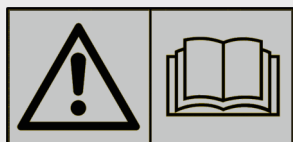
Further operating manuals / supplementary operating manuals

You must completely read the separate operating manuals and/or supplementary operating manuals for components and/or special versions.

Pay particular attention to all instructions

- on safety,
- on operation and control,
- on repairs and maintenance.

8.6 Supplier documentation



Supplier documentation

You must completely read the separate supplier documentation.

Pay particular attention to all instructions

- on safety,
- on operation and control,
- on repairs and maintenance.

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