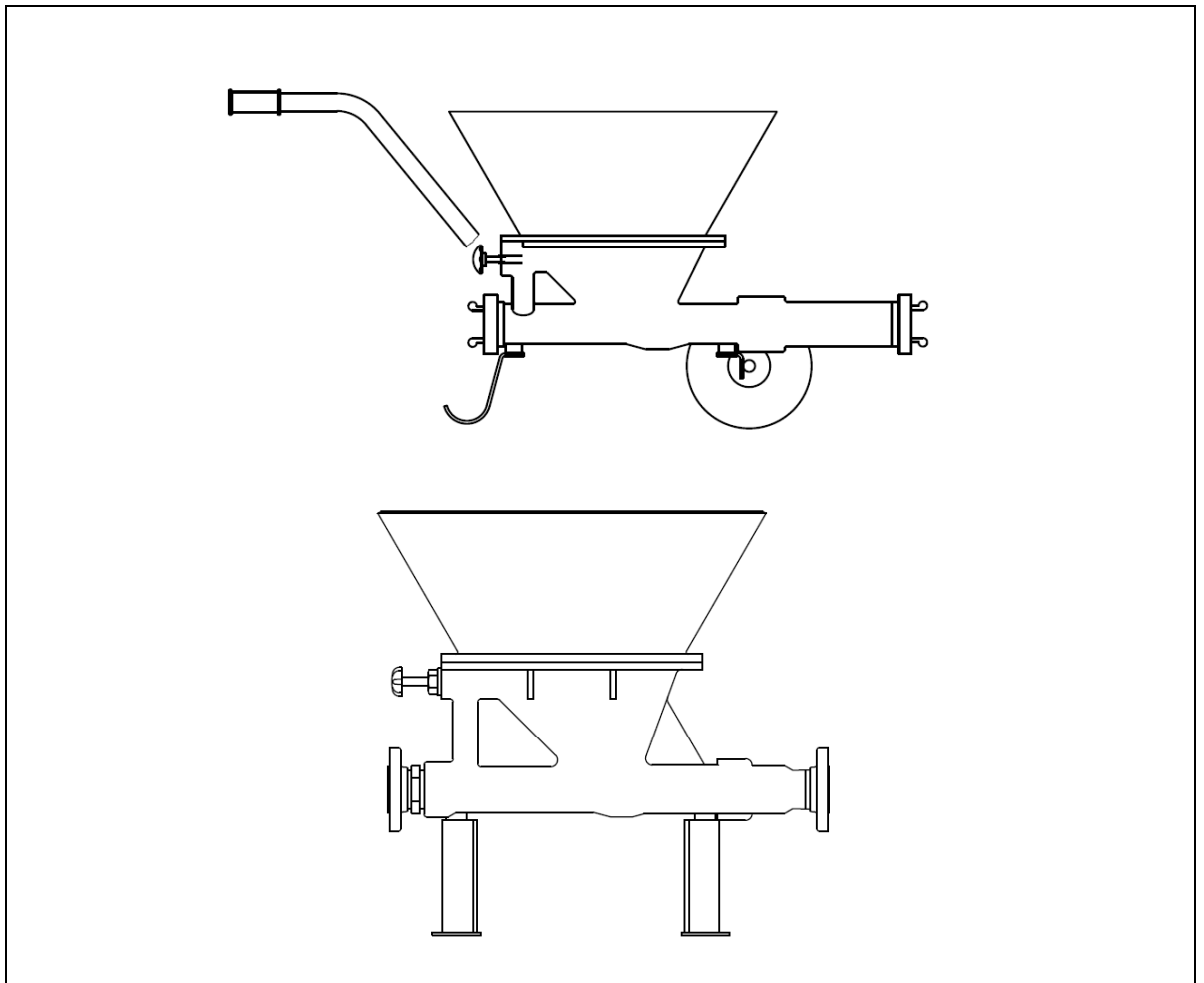


# OPERATING INSTRUCTIONS

**Liquid jet ejector**

**Liquid jet solids ejector**

**Movable / stationary design**

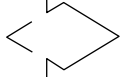


<b>Manufacturer:</b>	Körting Hannover GmbH
<b>Project no.:</b>	181001 / 184001
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The original operating instructions are written in German.  
Any translations are based on these original instructions.



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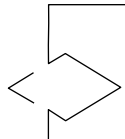
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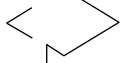
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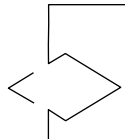
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# **1 Comments about the operating instructions**

## **1.1 Product these operating instructions apply to**

These operating instructions are only relevant to the following product:

Liquid jet solids ejector

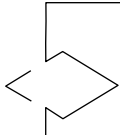
referred to as the “device” in the rest of the document.

## **1.2 Rating plate/factory no.**

The product identification is performed with a factory number that is punched in.



The factory number contains information about the product and is important for orders of spare parts or revision tasks. A unique factory number is issued for every product. The manufacturer can use this number to identify all product data.



### 1.3 Usage and purpose of the operating instructions

The operating instructions have been drawn up for:

- the party operating the device and
- trained personnel responsible for assembling, commissioning, operating and carrying out maintenance on the device.

These operating instructions will help you to do the following:

- to operate the device properly and safely;
- to prevent hazards;
- to cut repair costs and outage times and
- to ensure the reliability of the device and to extend its service life.

You must adhere to all hazard warnings, safety regulations and specifications in these operating instructions without exception. In order to operate and carry out all work on the device safely and without any problems you must read, understand and apply these operating instructions.

The fitter and personnel/operator concerned must read and apply these operating instructions before transporting, assembling, disassembling, commissioning, operating and carrying out maintenance on the device.

### 1.4 Filing the documents

- ▶ File away these instructions and all associated documents so that they are always available at the point of use when required.
- ▶ Please forward all the documents to subsequent owners.

### 1.5 Symbols in these operating instructions


Various signs and symbols are used in these instructions. These are outlined below.


- 1 Numbered steps in the process
- ▶ A request to perform a task
- ☑ A result of a sequence of actions
- Symbol for a list

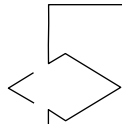
1. Lists

⇒ *Reference to a chapter or a figure*

Display text

 Additional information and notices.

-  Various warning symbols are used for warnings.
  - ▶ Please see explanations about and comments on these in the relevant chapter. ⇒ *Chapter 2°Safety advice*



### 1.6 Documents and regulations that also apply

Other documents also apply in conjunction with these operating instructions.

- ▶ In the case of complementary components, see the instructions supplied with them.
- ▶ When handling devices and while carrying out any servicing, please observe the following:
  - accepted technical regulations for safe and professional working practices;
  - the statutory regulations on accident prevention;
  - the statutory regulations on environmental protection;
  - the regulations specified by the German Social Accident Insurance Institution;
  - any regulations that apply in other countries and specifications that are relevant for the state of the art;
  - the regulations and instructions specified by the operator.

### 1.7 Skilled personnel

Only properly trained personnel are permitted to assemble, commission, operate and carry out maintenance on the device.

The operator must therefore ensure that the personnel deployed to carry out the work described in these operating instructions are properly trained and fully understand these operating instructions.

The following qualifications are mandatory for the personnel operating the device:

- a briefing by the operator regarding the operating instructions of the entire plant on site.

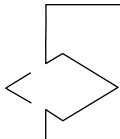
Certain servicing work may only be carried out by authorised and trained personnel. The operator must precisely specify the area the personnel are responsible for and ensure the personnel are monitored.

### 1.8 Duties of the operator

- ▶ Only deploy qualified maintenance and assembly personnel that have received a briefing.
- ▶ Ensure that the personnel know the area in question and that they are monitored appropriately.
- ▶ Check all the safety devices regularly to ensure they are complete and in working order.
- ▶ Ensure that scheduled maintenance is carried out on time.
- ▶ Inform the manufacturer if you discover any damage.
- ▶ Provide personnel with the protective gear required.
- ▶ Replace faulty parts.
- ▶ Keep access to workspaces and escape routes clear and in proper condition.
- ▶ Find out about any health and safety regulations that apply at the point of use.
- ▶ In a risk assessment, identify any additional dangers that the special working conditions on-site might entail.
- ▶ Add any findings resulting from the risk assessment to operating instructions.

### 1.9 Compliance

The device has been designed and manufactured safely to comply with current technical regulations.



### 1.10 Liability for defects

The conditions established in Körting Hannover GmbH's order confirmation or in the contract apply.

Claims for compensation in the case of personal injury or damage to materials are ruled out when the claims are the result of one or several of the following issues:

- improper usage; ⇒ *Chapter 2.2 Proper usage*
  - personnel without adequate training are deployed;
  - the device is operated when safety devices have not been properly applied or are not in working order;
  - not observing the notices, instructions and prohibitions in the operating instructions;
  - unauthorised structural alterations have been made to the device;
  - wear parts have been poorly monitored;
  - maintenance is not carried out properly and on time.
- ▶ Please observe the statutory regulations.

Alterations to the device can render the warranty null and void. Conversions or alterations are only allowable in consultation with Körting Hannover GmbH.

- ▶ Do not make any unauthorised alterations or manipulations to the device.
- ▶ Only use proper and authorised materials.
- ▶ Only use authorised and suitable spare parts. ⇒ *Chapter 11.1 Spare parts*

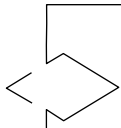
### 1.11 Usage rights for the operating instructions

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## 2 Safety advice

These operating instructions include safety instructions.

- ▶ Follow all instructions in order to prevent personal injury, damages to the environment or damage to materials.

### 2.1 Basic safety advice

Basic safety advice includes instructions that ensure that the device is operated safely or kept in a safe condition.

Not complying with the following safety advice can have the following consequences:

- personal injury, environmental or material damage;
  - important functions in the device fail;
  - maintenance and servicing methods prescribed are unsuccessful;
  - any rights to claim indemnification are rendered null and void.
- ▶ To protect yourself and the environment, please comply with the following instructions.
  - ▶ If necessary, brief people about the safety advice and warnings.

#### **Malfunctions**

Operating the device if it is not operating correctly could be fatal, harm the environment and cause material damage to the device.

- ▶ If a malfunction occurs switch the device off immediately.

#### **Hazardous media**

The device material could be destroyed if you use media not intended for use to operate the device. Physical injury, environmental damage and material damage to the device may result.

- ▶ Before operating the device with media not intended for use, check that the material the device is made of is compatible with the media.

#### **Protective gear**

Operating or carrying out work on the device without protective gear could cause serious injury.

- ▶ When handling the device, please wear the protective clothing required.

#### **Hot surfaces or components**

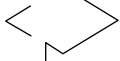
The device can become hot depending on the media used, the area where the device is fitted and the type of operation. Heat can cause serious injuries.

- ▶ Depending on the wall temperature, provide heat insulation for the device when fitting it.
- ▶ Fit protective devices that prevent contact with the device.

#### **Shut-off device**

The device itself has no shut-off device. When installing the device, shut-off devices must be installed separately.

- ▶ Before commissioning the device, install a suitable shut-off device to the motive medium pipe to the device (upstream of the motive medium inlet to the device).



### Excessive noise

During operation, noise emitted from the device can harm hearing and the environment.

- ▶ When fitting the device, take steps to protect against noise.
- ▶ During operation, wear suitable hearing protection.
- ▶ Please observe statutory regulations on noise protection.

### Corrosion

Stainless steel components have been pickled and passivated to protect them from chemicals. A primer has been applied to components made of carbon steel/ductile cast iron. This primer is not sufficient to prevent any impact from ambient conditions if the device is operated outdoors. Operating the device outdoors without any extra corrosion protection will lead to material damage.

- ▶ When operating the device outdoors, take appropriate precautions to protect it from corrosion.

### Maintenance and servicing work

The device is only safe to operate if in perfect condition. The operator is responsible for the device being in a proper and safe condition.

- ▶ Ensure that the specified maintenance work is carried out regularly.
- ▶ Carry out the specified checks before operating the device.

## 2.2 Proper usage

The purpose of the device is to convey media such as liquids and solids in the process concerned. The media are conveyed under higher pressure, mixed and transferred to the next stage in the process.

The device may only be operated within the confines specified and in line with technical specifications. ⇒ *Chapter 12 Technical data*

The device is only suitable for operation outdoors if appropriate protection from corrosion has been applied.

Incorrect handling or other usage of the device is not as intended and is therefore not allowed. The manufacturer accepts no liability for any damage that might be caused as a result.

## 2.3 Danger zones

Depending on how the device is used, the liquid applied and the type of connection, danger zones are defined as the areas where the motive medium and suction medium enter and where the mixed flow is discharged, as well as the area of the body.

- ▶ Only stay in danger zones if there is an urgent need and with due caution.
- ▶ Avoid staying in danger zones unnecessarily.

## 2.4 Safety and protective devices

Malfunctions or improper operation can lead to unacceptably high pressure building up on the outlet side and life-threatening situations, as well as material damage. Depending on how the device is used and which media are applied, the operator might have to fit suitable safety and protective devices separately. The device itself has no safety and protective devices. These are not included in the scope of supply.


- ▶ Ensure that the design pressures specified in the technical data are never exceeded. → *Chapter 12 Technical data*
- ▶ Plan and mount extra safety devices on site (e.g. safety valves, rupture discs).
- ▶ Check the safety devices regularly.

## 2.5 Warnings

Before steps are taken, warnings draw attention to any residual dangers.




### 2.5.1 Structure of warnings

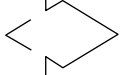
Warnings precede any hazardous steps. Warnings are structured as follows:

 <b>SIGNAL WORD</b>
<p><b>The type and source of the danger</b></p> <p>An explanation of the type and source of the danger.</p> <ul style="list-style-type: none"> <li>▶ Measures to be taken to prevent the danger.</li> </ul>

### 2.5.2 Danger classification of warnings

Warnings are classified to indicate the severity of the danger. Danger classifications and the associated signal words and warning symbols are explained below.

 <b>DANGER</b>
<p>Fatalities or serious injuries are imminent.</p>
 <b>WARNING</b>
<p>Fatalities or serious injuries are possible.</p>
 <b>CAUTION</b>
<p>Slight injuries are possible.</p>
<b>NOTICE</b>
<p>Material damage to the machine, plant or the environment is possible.</p>



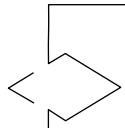
## 2.6 Signs giving information, warnings or instructions

Signs giving warnings, information or instructions can be applied to the device depending on the plant concerned.

- ▶ Get the plant operating company to brief you on the signs giving warnings, information or instructions.
- ▶ Please comply with all these signs.
- ▶ Do not remove any of these signs.
- ▶ Report any damaged signs to the operator.

## 2.7 Restrictions

The device may only be used in compliance with the maximum allowable values for the operating pressure, the temperatures and the media specified in the technical specifications. ⇒ *Chapter 12 Technical data*



### 3 Device structure and how it functions

#### 3.1 Structure of the liquid jet solids ejector

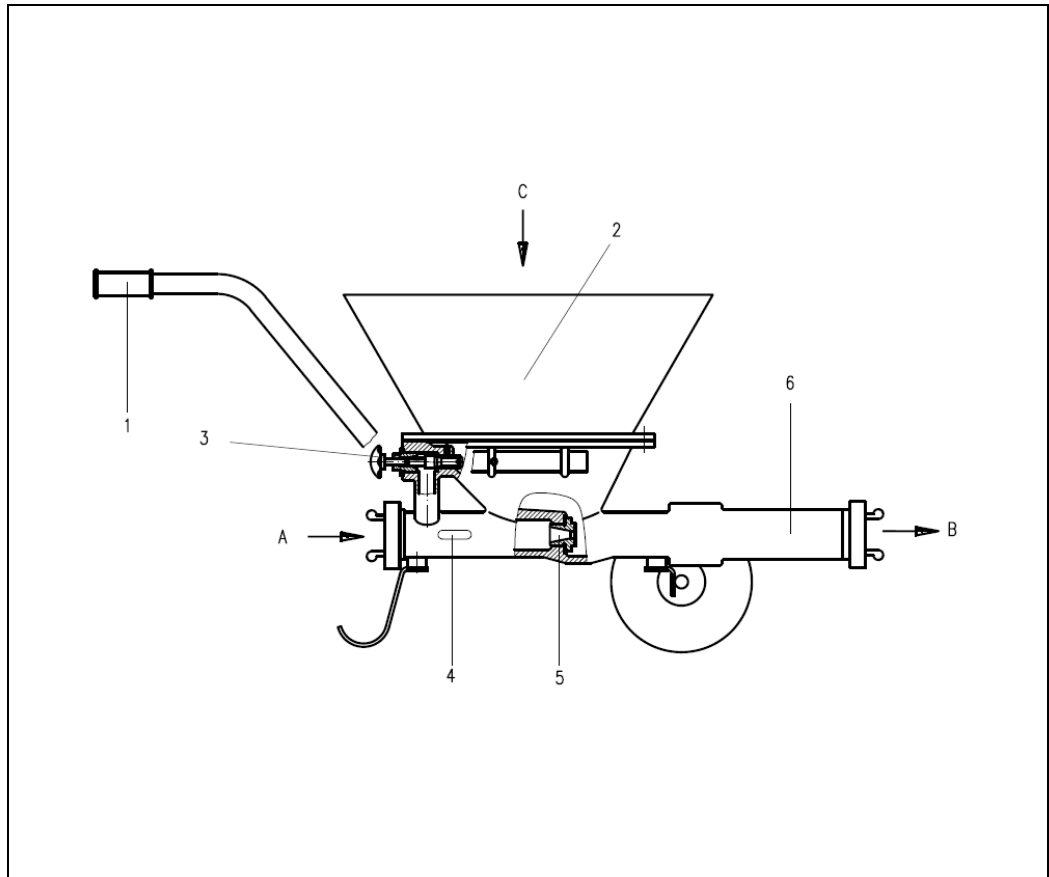
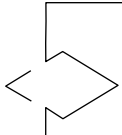


Fig.: 1 Lengthways view (example)

- |   |                 |   |                      |
|---|-----------------|---|----------------------|
| 1 | handle          | A | motive medium inlet  |
| 2 | hopper          | B | mixed flow outlet    |
| 3 | flushing nozzle | C | suction medium/solid |
| 4 | label           |   |                      |
| 5 | nozzle          |   |                      |
| 6 | outlet diffuser |   |                      |



### 3.2 How it functions

The liquid jet ejector is a jet ejector that pumps by using a motive medium as the source of energy. A jet ejector does not have a mechanical drive or any movable parts. The field of application is determined by the shape of the flow area.

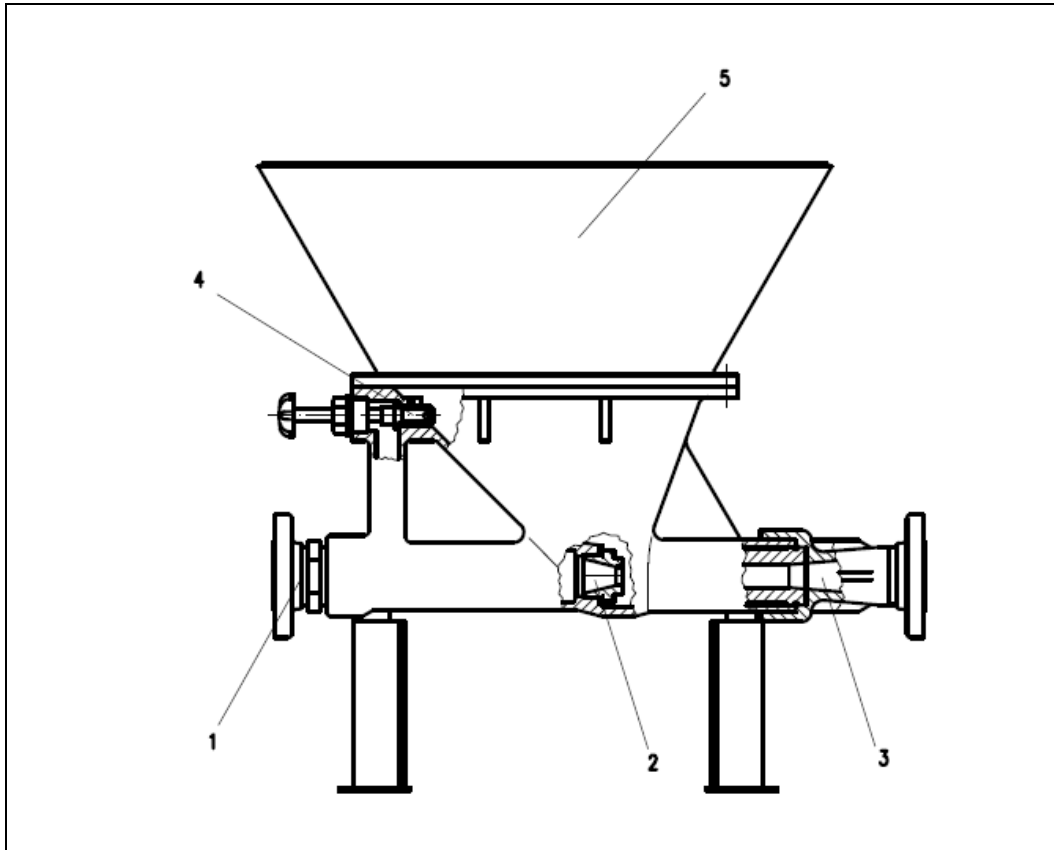


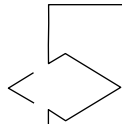
Fig.: 2 Liquid jet liquid ejector (example, not to scale)

- |   |                     |   |        |
|---|---------------------|---|--------|
| 1 | motive medium inlet | 5 | hopper |
| 2 | motive nozzle       |   |        |
| 3 | outlet diffuser     |   |        |
| 4 | flushing nozzle     |   |        |

On the liquid jet ejector, the liquid serves as the motive medium for sucking up another medium and conveying it at a higher pressure. Between the motive nozzle and the diffuser, the suction medium is introduced into the head through the hopper. The motive medium is accelerated in the motive nozzle. The motive medium and the suction medium are then mixed and compressed together to the required pressure up to the outlet diffuser.

### 3.3 Equipment and accessories

In order for the device to work properly, shut-off devices are not required in the suction pipe and mixed flow pipe. Shut-off devices (shut-off valve, gate valve or ball valve), measuring instruments and pipes are functional components associated with the device. These could be necessary if the operator needs them. They are not included in the scope of supply.



## 4 Transport and storage

### **WARNING**

#### **Potential fatal injuries due to overhead loads**

During lifting operations, loads can sway and fall. These loads could crush people and cause serious or fatal injuries.

- ▶ Please comply with the accident prevention regulations.
- ▶ Only use hoisting equipment as intended and in perfect condition.
- ▶ If required by statutory or other regulations, verify that the appropriate tests have been performed before operating the hoisting equipment.
- ▶ Never walk under overhead loads.
- ▶ When using hoisting equipment, be careful of your hands and feet when lifting and putting down loads.
- ▶ Only lift the loads specified for the hoisting equipment.

### **WARNING**

#### **Potential fatal injuries due to damaged and/or worn-out hoisting equipment**

If the hoisting equipment is damaged or shows signs of wear, no guarantee can be given that it will work properly. As a result, loads can be dropped and lead to serious or fatal injuries.

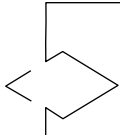
- ▶ Before each use of the hoisting equipment, perform a visual inspection to ensure no damage or deformations have occurred and that it is complete.
- ▶ An authorised person must analyse any faults identified and repair these.

### **NOTICE**

#### **Potential material damage due to overhead loads**

During lifting operations, loads can sway and fall. The device you wish to transport can be damaged by hitting or dropping it.

- ▶ Only use hoisting equipment as intended and in perfect condition.
- ▶ If required by statutory or other regulations, verify that tests have been performed before operating the hoisting equipment.
- ▶ Never walk under overhead loads.
- ▶ When using hoisting equipment, be careful of your hands and feet when lifting and putting down loads.
- ▶ Only lift the loads specified for the hoisting equipment.



### NOTICE

#### **Potential material damage due to damaged and/or worn out hoisting equipment**

If the hoisting equipment is damaged or shows signs of wear, no guarantee can be given that it will work properly. As a result, loads can be dropped and lead to material damage.

- ▶ Before each use of the hoisting equipment, perform a visual inspection to ensure no damage or deformations have occurred and that it is complete.
- ▶ An authorised person must analyse any faults identified and repair these.

### NOTICE

#### **Material damage due to incorrect lifting of loads**

Lifting a load in unsuitable places can seriously damage the device.

- ▶ Please comply with the accident prevention regulations.
- ▶ Only lift the device from the lifting points.
- ▶ Please observe the centre of gravity to prevent any uncontrolled movement of the device.
- ▶ Never attach the hoisting equipment or slings to fitted pipes.
- ▶ Always use an assembly frame or a crane.
- ▶ Ensure that the assembly frame or crane's minimum load-bearing capacity and the minimum height are complied with.

### NOTICE

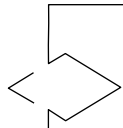
#### **Material damage due to foreign particles in unsealed openings**

The openings on the device are sealed to prevent dirt and foreign particles from entering.

- ▶ Until it is fitted, keep the openings on the device closed.



Hoisting equipment is a combination of load suspension devices, slings and lifting gear.



### 4.1 Transport

The device is supplied ex-works ready for use. It is shipped based on the terms of the contract.

When receiving delivery of and transporting the device, proceed as follows:

- 1 Check the scope of supply.
  - ▶ Inspect the delivery upon acceptance to establish whether the device is complete and whether all the documents handed over are as specified in the packing list.
  - ▶ Ask for a briefing.
  - ▶ If there is anything you are unsure of please ask questions.
- 2 Lift the device at the lifting points using suitable hoisting equipment.

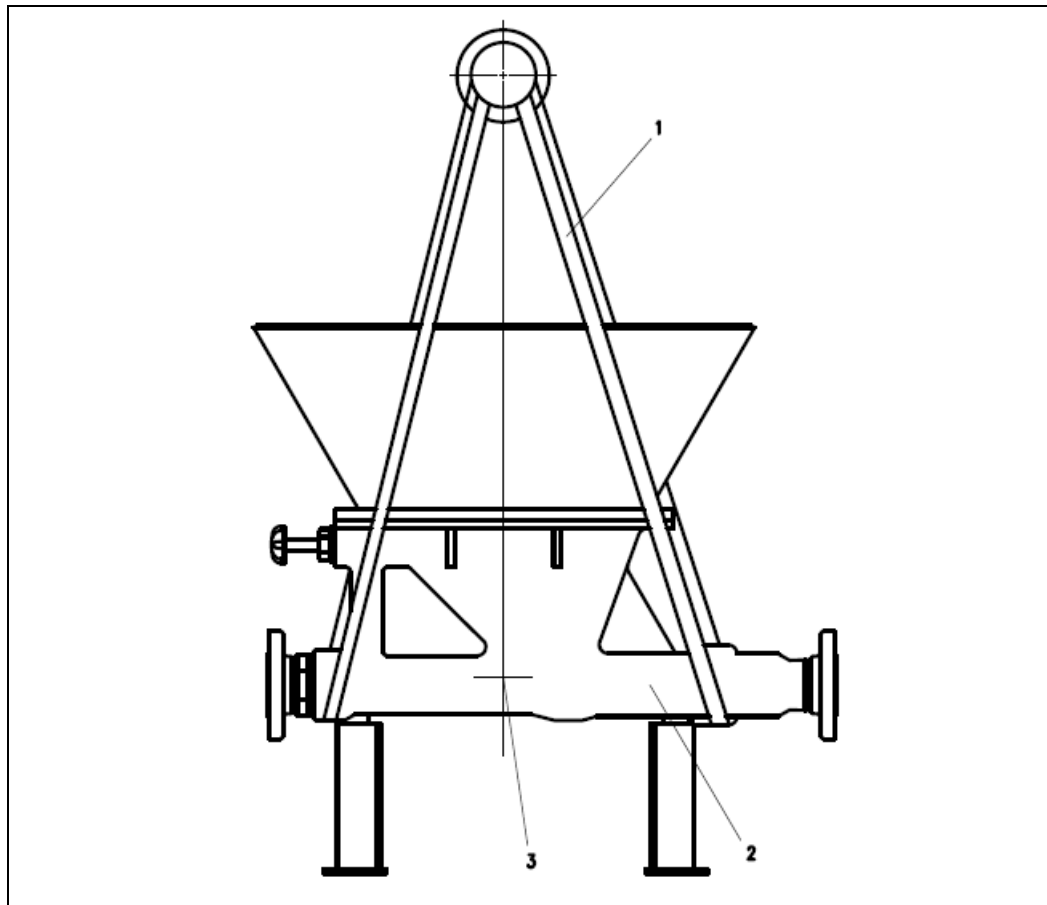
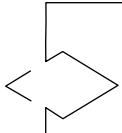


Fig.: 3 Lifting points (example, not to scale)

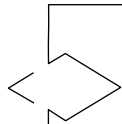
- 1 hoisting equipment
- 2 device (liquid jet solids ejector)
- 3 centre of gravity

- ▶ Note the lifting points as shown in the figure.
  - ▶ Please observe the centre of gravity to prevent any uncontrolled movement of the device.
  - ▶ Transport the device with due care and attention.
- 3 Lift the device to the place or position where it is to be fitted.
  - 4 Put down the device.
- The device has been transported to its destination.



### **4.2 Storage**

- ▶ Store the device as follows:
  - in a sheltered room;
  - in a dry condition;
  - not exposed to frost;
  - protected from dust.



## 5 Assembly and commissioning

### 5.1 Installing and connecting the device

#### DANGER

##### **Potential fatal injuries due to explosions**

Fatal injuries are possible when working on the device in plants located in areas subject to explosion hazard.

- ▶ Work on the device may only be carried out by personnel who are familiar with standard and local regulations and directives regarding working in areas subject to explosion hazard and who are aware of the appropriate safety and health requirements.
- ▶ Please follow instructions issued by the plant operating company.

#### DANGER

##### **Potential fatal injuries due to operating the device without proper earthing**

Fatal injuries are possible if the device is operated without proper earthing.

- ▶ Please observe any local regulations regarding any additional equipotential bonding.
- ▶ Integrate the device in the plant's earthing concept.
- ▶ Ensure earthing is carried out correctly.
- ▶ Use existing earthing connections.
- ▶ Please also observe local regulations from the energy utility and/or plant operating company.

#### WARNING

##### **Potential fatal injuries due to improper connections and incompatible gasket materials**

Connections not executed properly and incompatible gasket materials can lead to life-threatening situations.

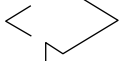
- ▶ Perform all screwed connections properly.
- ▶ Observe the tightening torque for screwed connections.
- ▶ For all welded connections, observe national regulations on welding pressure containers.
- ▶ Consult with the operator and ensure the material the gasket is made of is compatible with the medium and the plant.

#### WARNING

##### **Potential fatal injuries due to unauthorised rise in pressure**

Malfunctions or improper operation can lead to unacceptably high pressure building up on the outlet side and life-threatening situations.

- ▶ Ensure that the design pressures specified in the technical data are never exceeded.
- ▶ Plan and mount extra safety devices on site (e.g. safety valves, rupture discs).
- ▶ Check the safety devices regularly.



## NOTICE

### **Material and environmental damage when working on the device in areas subject to explosion hazard**

Material and environmental damage is possible when working on the device in plants located in areas subject to explosion hazard.

- ▶ Work on the device may only be carried out by personnel who are familiar with standard and local regulations and directives regarding working in areas subject to explosion hazard and who are aware of the appropriate safety and health requirements.
- ▶ Please follow instructions issued by the plant operating company.

## NOTICE

### **Material and environmental damage due to operating the device without proper earthing**

Electrostatic charging may occur when operating the device without proper earthing. This can lead to material and environmental damage.

- ▶ Please observe any local regulations regarding any additional equipotential bonding.
- ▶ Integrate the device in the plant's earthing concept.
- ▶ Ensure earthing is carried out correctly.
- ▶ Use existing earthing connections.
- ▶ Please also observe local regulations from the energy utility and/or plant operating company.

## NOTICE

### **Material and environmental damage due to improper connections**

If connections are not performed properly and incompatible gasket materials are used, there is a danger of material and environmental damage.

- ▶ Perform all screwed connections properly.
- ▶ Observe the tightening torque for screwed connections.
- ▶ For all welded connections, observe national regulations on welding pressure containers.
- ▶ Consult with the plant operating company and ensure the material the gasket is made of is compatible with the medium and the plant.

## NOTICE

### **Functional impairment due to incorrect flow direction**

The device only functions in the flow direction that the arrows indicate.

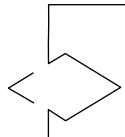
- ▶ Mount the device according to the flow direction that the arrows indicate.
- ▶ Please observe the assembly drawing supplied with the device.

## NOTICE

### **Material damage or functional impairment due to stress**

Stress applied to the device by bending, pulling, pressing or turning it can damage it or impair the way it functions.

- ▶ Fit the pipes leading in and out without stress (force and torque) at the device.



## NOTICE

### Functional impairment due to foreign particles

Foreign particles in the device such as scale, welding globules or sealing residues may clog the motive nozzle.

- ▶ Avoid any soiling or clogging caused by scale, welding globules, sealing residues or similar.
- ▶ Before commissioning it for the first time, clean the connecting pipes.
- ▶ Clean the motive medium pipe in particular before the inlet into the motive nozzle.

## NOTICE

### Functional impairment due to incorrect gaskets

If gaskets are not applied centrally, they can protrude into the pipe cross section and prevent the media from flowing through.

- ▶ Apply gaskets concentrically so that flow areas are not constricted.

## NOTICE

### Functional impairment due to incorrect pipe cross sections

Pipes with nominal widths that are smaller than necessary lead to a greater loss of pressure and impair the way the device functions.

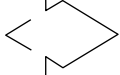
- ▶ Lay a pipe that is at least the nominal width specified for the device.

## NOTICE

### Functional impairment due to shut-off devices at incorrect distances

To be able to reliably adjust the required minimum pressure of the motive medium, the shut-off device in the motive medium pipe must not be mounted too far away from the device.

- ▶ Please also observe local regulations specified by the plant operating company.
- ▶ Mount the shut-off device in the motive medium pipe directly in front of the motive medium inlet.
- ▶ Mount the shut-off device for the motive medium in a place where it is easy to operate.
- ▶ Mount a manometer between the shut-off device and the device in order to be able to adjust the minimum pressure of the motive medium.
- ▶ Calibrate the manometer according to the regulations.



## NOTICE

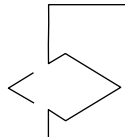
### Potential material damage due to impermissible increase of pressure

Malfunctions or improper operation can lead to unacceptably high pressure building up on the outlet side and to material damage.

- ▶ Ensure that the design pressures specified in the technical data are never exceeded.
- ▶ Plan and mount extra safety devices on site (e.g. safety valves, rupture discs).
- ▶ Check the safety devices regularly.

To mount the device, proceed as follows:

- 1 Install the shut-off device in the motive medium pipe.
  - 2 Transport the device to the position where it is to be fitted.
    - ▶ Please observe the flow direction.
    - ▶ Observe the transport instructions. ⇨ *Chapter 4.1 Transport*
  - 3 Remove locks on the mixed flow, suction and motive medium pipes.
  - 4 Thoroughly clean connecting pipes. ⇨ *Chapter 8.1 Cleaning and care*
    - ▶ If necessary, remove any corrosion protection agent applied on the sealing surfaces of the flanges.
  - 5 Connect the mixed flow pipe.
  - 6 Connect the motive medium pipe.
  - 7 Evenly tighten the screwed connections.
    - ▶ Observe the tightening torques according to the standard.
- The device has been mounted and connected and is ready for operation.



## 5.2 Commissioning



### WARNING

#### Potential fatal injury due to exceeding maximum allowable operating data

If the maximum allowable values for the operating pressure and/or working temperature are exceeded, life-threatening situations as well as damage to materials or the environment can occur.

- ▶ While operating, ensure that the maximum allowable operating data is complied with.
- ▶ Do not exceed the values allowable for the operating pressure and working temperature.



### WARNING

#### Risk of injury due to opening the shut-off devices in the wrong order

If during commissioning a shut-off device in the mixed flow pipe is not opened first, the motive medium can flow back through the suction connection pieces. As a result, mechanical thresholds can be exceeded which can lead to injuries.

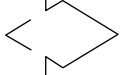
- ▶ If a shut-off device is fitted in the mixed flow pipe, open this shut-off device first.

### NOTICE

#### Material and environmental damage due to opening the shut-off devices in the wrong order

If during commissioning a shut-off device in the mixed flow pipe is not opened first, the motive medium can flow back through the suction connection pieces. As a result, mechanical thresholds can be exceeded which can cause material and environmental damage.

- ▶ If a shut-off device is fitted in the mixed flow pipe, open this shut-off device first.



To commission the device, proceed as follows:



All shut-off devices in the feed and discharge lines must be closed to start with.

- 1 Open the shut-off device in the mixed flow pipe.
  - 2 Open the shut-off device in the motive medium pipe until the appropriate motive medium pressure is reached directly at the inlet into the device.
    - ▶ Do not exceed the values allowable for the operating pressure and working temperature according to the specified plant parameters and the technical specifications.
  - 3 If necessary, adjust the shut-off device in the motive medium pipe.
  - 4 When commissioning for the first time, tighten the screwed connections.
    - ▶ Observe the tightening torques in the technical specifications.
- The device is in operation.

## 6 Operation

### WARNING

#### **Potential fatal injuries due to improper operation**

Improper operation impairs the safety of the device and the plant. This can cause life-threatening situations.

- ▶ Only allow authorised and trained personnel to operate the device.

### CAUTION

#### **Risk of injury and damage due to cavitation**

Cavitation is associated with extreme noise generation which can damage hearing. The vibrations generated through cavitation can also damage the device and/or the connected pipes.

- ▶ Ensure that the device does not exceed the permissible values for operating pressure and working temperature in continuous operation.
- ▶ If the device reaches a critical range, lower the motive medium pressure and/or the suction flow temperature or increase the suction pressure.

### NOTICE

#### **Material and environmental damage due to improper operation**

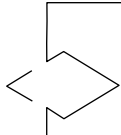
Improper operation impairs the safety of the device and the plant. This can cause material and environmental damage.

- ▶ Only allow authorised and trained personnel to operate the device.

### 6.1 Checking the device each time it is operated

Before operating the device, check it as follows:

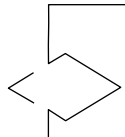
- 1 Check the device for faults.
    - ▶ Eliminate any discovered faults.
  - 2 Check the bolts on the connections.
    - ▶ Tighten any loose screwed connections. ⇒ *Chapter 8.3.4 Tightening screwed connections*
    - ▶ Observe the tightening torques according to the standard.
  - 3 Check safety and protective devices.
    - ▶ Tell the plant operating company and any other plant personnel if you discover any faults.
    - ▶ Ensure that any faults in the safety and protective devices are eliminated.
- The device is now functional and ready for operation.



## 6.2 Operating the device

To operate the device, proceed as follows:

- 1 Open the shut-off device in the mixed flow outlet pipe.
  - 2 Open the shut-off device in the motive medium pipe until the appropriate motive medium pressure is reached directly at the inlet into the device.
  - 3 Do not exceed the values allowable for the operating pressure and/or working temperature according to the specified plant parameters and the technical specifications.
  - 4 If necessary, adjust the shut-off device in the motive medium pipe.
- The device is in operation.



## 7 Rectifying malfunctions

**⚠ WARNING**

**Potential fatal injuries due to malfunctions**

Malfunctions lead to improper operation and impair the safety of the device and the plant. This can cause life-threatening situations.

- ▶ Report any malfunctions to the plant operating company.
- ▶ Only allow authorised and trained personnel to rectify malfunctions.

**NOTICE**

**Material and environmental damage due to malfunctions**

Malfunctions lead to improper operation and impair the safety of the device and the plant. This can cause material and environmental damage.

- ▶ Report any malfunctions to the plant operating company.
- ▶ Only allow authorised and trained personnel to rectify malfunctions.

The following overview will help you to identify any faults and their causes and to take action to correct them.

If you can't rectify a malfunction, please contact an authorised workshop or Körting Hannover GmbH customer services. ⇒ *Chapter 11.2 Customer service*

Malfunction	Cause	Remedy
Loss of capacity	The motive medium pressure is too low	Adjust the motive medium pressure to the maximum allowable via the shut-off device in the motive medium pipe.
	Motive nozzle is clogged	Clean the motive nozzle. ⇒ <i>Chapter 8.1.4 Cleaning the motive nozzle</i>
	Wear, corrosion, erosion or deformations on the motive nozzle or steam chest	Replace the motive nozzle. ⇒ <i>Chapter 8.3.3 Removing the motive nozzle and the steam chest</i> or Replace the whole device. ⇒ <i>Chapter 8.3.2 Removing the device</i> ⇒ <i>Chapter 5.1 Installing and connecting the device</i>
	Leaks	Evenly tighten the screwed connections. ⇒ <i>Chapter 8.3.4 Tightening screwed connections</i>
	Further leaks	Replace the gaskets. ⇒ <i>Chapter 8.3.5 Replacing gaskets</i>

## 8 Servicing

The purpose of servicing is to keep the device operational and prevent premature wear. Servicing includes:

- Cleaning and care
- Maintenance
- Repair

In order to ensure that the device is in proper working order, the personnel operating it must:

- check the safety equipment regularly to ensure it works perfectly;
- ensure that the safety equipment is effective and
- carry out repeated tests.
- ▶ Observe the intervals and information for checking and carrying out maintenance on parts supplied.
- ▶ File confirmation that checks have been carried out.
- ▶ Report any safety faults to the plant operating company.
- ▶ Ensure that servicing work is carried out at the specified maintenance intervals as shown in the following table.



All servicing work is described in the subsequent chapters.

Activity	See chapter	Maintenance interval				
		Daily	Each time a medium is changed	Monthly	Annually	When a fault or a malfunction is identified
Clean the outside of the device	⇒ 8.1 <i>Cleaning and care</i>				•	
Decontaminate the device			•			
Clean the inside of the device			•			
Clean the motive nozzle			•		•	•
Check the internal pressure	⇒ 8.2 <i>Maintenance</i>	•	•			
Check the shut-off device		•	•			
Check the safety and protective devices		•	•			
Carry out a visual inspection		•				
Carry out a hydrostatic test				•		•
Replace the motive nozzle and dismantle/assemble the steam chest	⇒ 8.3 <i>Repair</i>					•
Replace the diffuser						•
Tighten screwed connections				•		
Replace gaskets						•

## 8.1 Cleaning and care

The following warnings apply to any cleaning carried out on the device.

### **WARNING**

#### **Potential risk of injury due to improper cleaning**

Any improper cleaning can lead to serious injuries. Cleaning agents and solvents used incorrectly can impair the safety of the device and the plant and lead to serious injuries on contact with the skin or if inhaled.

- ▶ Only allow authorised and trained personnel to carry out cleaning.
- ▶ When carrying out cleaning, wear appropriate protective clothing (safety shoes, gloves, respirator mask).
- ▶ Please comply with the accident prevention regulations.
- ▶ Please comply with the instructions for the cleaning agents and solvents.

### **WARNING**

#### **Potential risk of injury due to improper fitting/removal of the device or the motive nozzle**

When fitting/removing the device or the motive nozzle, excess pressure, heat or aggressive and harmful media can lead to serious injuries (e.g. burns, scalding or chemical burns).

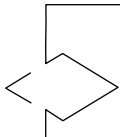
- ▶ Switch the device off before fitting or removing it.
- ▶ Allow any excess pressure to escape.
- ▶ Let the device cool down.
- ▶ Drain the device.
- ▶ Decontaminate and rinse the device after using aggressive and harmful media.
- ▶ Obtain approval for the device before accessing it.
- ▶ Attach any safety and protective devices and make sure these are working as soon as you have finished fitting the device.

### **NOTICE**

#### **Material and environmental damage due to improper cleaning**

Improper cleaning or incorrect use of cleaning agents and solvents can damage the material or the surface of the device. This can cause material and environmental damage.

- ▶ Only allow authorised and trained personnel to carry out cleaning.
- ▶ Please comply with the accident prevention regulations.
- ▶ Please comply with the regulations on disposal and environmental protection.
- ▶ Please comply with the instructions for the cleaning agents and solvents.
- ▶ Only use cleaning agents and solvents that won't attack or destroy the device's surface or the materials it is made of.
- ▶ After cleaning, rinse the device thoroughly with water.



### 8.1.1 Cleaning the outside of the device

To clean the outside of the device, proceed as follows:

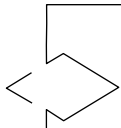
- 1 Switch off the device. ⇒ *Chapter 8.3.1 Switching off the device*
  - 2 Release any pressure from the device.
  - 3 If necessary, let the device cool down.
  - 4 If required, clean by rinsing with water, rinsing with chemicals or applying mechanical processes.
  - 5 Rinse thoroughly with water.
- The outside of the device has now been cleaned.
- ▶ Recommission the device. ⇒ *Chapter 9.2 Recommissioning*

### 8.1.2 Decontaminating the device

When using media that are harmful or aggressive as the motive medium or suction media, you must decontaminate the device before cleaning it from the inside.

To decontaminate the device, proceed as follows:

- 1 Switch off the device. ⇒ *Chapter 8.3.1 Switching off the device*
  - 2 Release any pressure from the device.
  - 3 If necessary, let the device cool down.
  - 4 If necessary, drain the device.
  - 5 Rinse the device with an appropriate decontamination agent.
- ▶ Ask the plant operating company which decontamination agent is to be used.
- The device has now been decontaminated.
- ▶ Recommission the device. ⇒ *Chapter 9.2 Recommissioning*



## 8.1.3 Cleaning the inside of the device

To clean the inside of the device, proceed as follows:

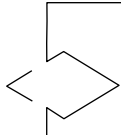
- 1 Switch off the device. ⇒ *Chapter 8.3.1 Switching off the device*
  - 2 Release any pressure from the device.
  - 3 If necessary, let the device cool down.
  - 4 If necessary, drain the device.
  - 5 Rinse the device.
    - ▶ Decontaminate the device if you are using media that is aggressive or harmful.  
⇒ *Chapter 8.1.2 Decontaminating the device*
    - ▶ Obtain approval for the device before accessing it.
  - 6 Loosen the screwed connections on the connections.
  - 7 Open or remove the device (if necessary).
  - 8 Clean the inside of the device.
    - ▶ If required, clean the device on the inside by rinsing with water, rinsing with chemicals or applying mechanical processes.
  - 9 If necessary, replace any worn out parts.
  - 10 Insert the device with new gaskets for the flange connections.  
⇒ *Chapter 5.1 Installing and connecting the device*
    - ▶ Insert the new gasket concentrically.
  - 11 Check that all the flange connections on the device are leak-proof.
  - 12 Reattach, check and render operational any safety and protective devices immediately after completing maintenance on the device.
- The inside of the device has now been cleaned.
- ▶ Recommission the device. ⇒ *Chapter 9.2 Recommissioning*

## 8.1.4 Cleaning the motive nozzle

If there are any deposits, the motive nozzle must be cleaned separately. The motive nozzle is located in the head of the jet ejector. To replace the motive nozzle, the steam chest must be dismantled and reassembled.

To clean the motive nozzle, proceed as follows:

- 1 Remove the motive nozzle.  
⇒ *Chapter 8.3.3 Removing the motive nozzle and the steam chest*
  - 2 Clean the motive nozzle.
    - ▶ If required, clean the motive nozzle by rinsing with water, rinsing with chemicals or applying mechanical processes.
- The motive nozzle has now been cleaned.
- 3 Install the motive nozzle.
  - ▶ Recommission the device. ⇒ *Chapter 9.2 Recommissioning*



## 8.2 Maintenance

The following warnings apply to any maintenance carried out on the device.

**! WARNING**

**Potential fatal injuries due to improper maintenance work**

Any maintenance work improperly carried out will impair the safety of the device and the plant. This can cause life-threatening situations.

- ▶ Only allow authorised and trained personnel to carry out maintenance work.
- ▶ Please comply with the accident prevention regulations.

**! WARNING**

**Potential risk of injury due to improper fitting/removal of the device or the motive nozzle**

When fitting/removing the device or the motive nozzle, excess pressure, heat or aggressive and harmful media can lead to serious injuries (e.g. burns, scalding or chemical burns).

- ▶ Switch the device off before fitting or removing it.
- ▶ Allow any excess pressure to escape.
- ▶ Let the device cool down.
- ▶ Drain the device.
- ▶ Decontaminate and rinse the device after using aggressive and harmful media.
- ▶ Obtain approval for the device before accessing it.
- ▶ Attach any safety and protective devices and make sure these are working as soon as you have finished fitting the device.

**NOTICE**

**Material and environmental damage due to improper maintenance work**

Any maintenance work improperly carried out will impair the safety of the device and the plant. This can cause material and environmental damage.

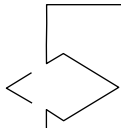
- ▶ Only allow authorised and trained personnel to carry out maintenance work.
- ▶ Please comply with the regulations on disposal and environmental protection.

**NOTICE**

**Material and environmental damage due to improper fitting/removal of the device or the motive nozzle**

When fitting/removing the device or the motive nozzle, excess pressure, heat or aggressive and harmful media can cause damage to material or the environment.

- ▶ Only allow authorised and trained personnel to carry out maintenance work.
- ▶ Switch the device off before fitting or removing it.
- ▶ Allow any excess pressure to escape.
- ▶ Let the device cool down.
- ▶ Drain the device.
- ▶ Decontaminate and rinse the device after using aggressive and harmful media.
- ▶ Obtain approval for the device before accessing it.
- ▶ Attach any safety and protective devices and make sure these are working as soon as you have finished fitting the device.



In order to ensure that the device is in proper working order, specific maintenance work must be carried out by authorised and trained personnel.

- ▶ Comply with the intervals and information on checking and carrying out maintenance on parts supplied in the operating instructions provided.
- ▶ Ensure that maintenance work is carried out at the specified maintenance intervals as shown in the servicing table.

### 8.2.1 Checking the internal pressure

To check the internal pressure, proceed as follows:

- 1 Connect a calibrated measuring instrument to the measurement connector.
  - 2 Check the pressure inside the device.
  - 3 If necessary, increase or decrease the pressure inside the device by adjusting the shut-off device.
- ▶ Avoid exceeding the maximum allowable working pressure.
  - The pressure in the device has now been checked and properly adjusted.

### 8.2.2 Checking the shut-off device

The type of shut-off device and its capabilities depend on what the plant requires. The shut-off device is not a part of the device.

- ▶ Check the shut-off devices as specified by their manufacturers.

### 8.2.3 Checking the safety and protective devices

The type of protective devices and their capabilities depend on what the plant requires. The protective devices are not part of the device.

- ▶ Check the protective devices regularly as specified by the manufacturer of the safety and protective devices.

### 8.2.4 Carrying out a visual inspection

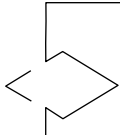
When carrying out a visual inspection, proceed as follows:

- ▶ Look for irregularities such as leaky or loose connections, corrosion and cracks.
- ▶ Document anything suspicious and inform the operator of the plant.

### 8.2.5 Carrying out a hydrostatic test


Carrying out the hydrostatic test allows you to identify any leaks in the device or the connections.


- ▶ Carry out a professional hydrostatic test using the codes of practice.
- ▶ Look for any leaks.
- ▶ Document anything suspicious and inform the operator of the plant.



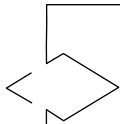
## 8.3 Repair

The following warnings apply to any repair work carried out on the device.

 <b>WARNING</b>
<b>Potential fatal injuries and material damage due to improper repair work</b> Any repair work improperly carried out will impair the safety of the device and the plant. This can cause life-threatening situations. <ul style="list-style-type: none"><li>▶ Only allow authorised and trained personnel to carry out repairs.</li><li>▶ Please comply with the accident prevention regulations.</li></ul>

 <b>WARNING</b>
<b>Risk of injury due to improper fitting/removal of the device or the motive nozzle</b> When fitting/removing the device or the motive nozzle, excess pressure, heat or aggressive and harmful media can lead to serious injuries (e.g. burns, scalding or chemical burns). <ul style="list-style-type: none"><li>▶ Switch the device off before fitting or removing it.</li><li>▶ Allow any excess pressure to escape.</li><li>▶ Let the device cool down.</li><li>▶ Drain the device.</li><li>▶ Decontaminate and rinse the device after using aggressive and harmful media.</li><li>▶ Obtain approval for the device before accessing it.</li><li>▶ Attach any safety and protective devices and make sure these are working as soon as you have finished fitting the device.</li></ul>

<b>NOTICE</b>
<b>Material and environmental damage due to improper repair work</b> Any repair work improperly carried out will impair the safety of the device and the plant. This can cause material and environmental damage. <ul style="list-style-type: none"><li>▶ Only allow authorised and trained personnel to carry out repairs.</li><li>▶ Please comply with the regulations on disposal and environmental protection.</li></ul>



## NOTICE

### Material and environmental damage due to improper fitting/removal of the device or the motive nozzle

When fitting/removing the device or the motive nozzle, excess pressure, heat or aggressive and harmful media can cause damage to material or the environment.

- ▶ Only allow authorised and trained personnel to carry out repairs.
- ▶ Switch the device off before fitting or removing it.
- ▶ Allow any excess pressure to escape.
- ▶ Let the device cool down.
- ▶ Drain the device.
- ▶ Decontaminate and rinse the device after using aggressive and harmful media.
- ▶ Obtain approval for the device before accessing it.
- ▶ Attach any safety and protective devices and make sure these are working as soon as you have finished fitting the device.

## NOTICE

### Material damage due to frost

At temperatures where frost forms, condensate can form on the device and damage it after it has been switched off or decommissioned.

- ▶ Drain the device and the feed and discharge lines created on the plant after switching-off or decommissioning.

Repair work includes replacing and repairing components and is only necessary if components have been damaged due to wear or external factors.

Authorised and trained personnel must proceed as follows:

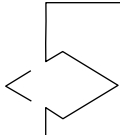
- ▶ Carry out any necessary repair work professionally, using the codes of practice and in line with current regulations.
- ▶ Observe the information on repairing parts supplied in the relevant operating instructions.
- ▶ Don't perform makeshift repairs on worn out or damaged components.
- ▶ Replace any worn out or damaged components with spare parts.
- ▶ Only use suitable spare parts. ⇒ *Chapter 11.1 Spare parts*

### 8.3.1 Switching off the device

Some types of repair work mean the device has to be switched off.

To switch off the device, proceed as follows:

- 1 Close the shut-off device in the motive medium inlet pipe.
  - 2 If necessary, close the shut-off device in the mixed flow outlet pipe.
- The device has now been switched off.

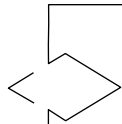


### 8.3.2 Removing the device

Some types of repair work mean the device has to be removed.

To remove the device, proceed as follows:

- 1 Switch off the device. ⇒ *Chapter 8.3.1 Switching off the device*
- 2 Release any pressure from the device.
- 3 If necessary, let the device cool down.
- 4 If necessary, drain the device.
- 5 Rinse the device.
  - ▶ Decontaminate the device if you are using media that is aggressive or harmful.  
⇒ *Chapter 8.1.2 Decontaminating the device*
- 6 Obtain approval for the device before accessing it.
- 7 Loosen the screwed connections on the connections.
- 8 Transport the device out of the plant at the lifting points.
  - ▶ Observe the transport instructions. ⇒ *Chapter 4.1 Transport*
- The device has now been removed.



## 8.3.3 Removing the motive nozzle and the steam chest



### WARNING

#### Risk of injury due to burns

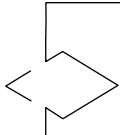
Improper handling of the Bunsen burner for heating and releasing individual components can lead to serious burns to the skin.

- ▶ Wear the required protective clothing.
- ▶ Use care and follow the regulations when working with the Bunsen burner.
- ▶ Use a barrier between the skin and the component when touching the heated component (e.g. a rubber cloth).


The motive nozzle is located in the head of the jet ejector. To remove the motive nozzle, the steam chest must also be removed.

To remove the motive nozzle, proceed as follows:

- 1 Switch off the device. ⇒ *Chapter 8.3.1 Switching off the device*
- 2 Release any pressure from the device.
- 3 If necessary, let the device cool down.
- 4 If necessary, drain the device.
- 5 Rinse the device.
  - ▶ Decontaminate the device if you are using media that is aggressive or harmful.  
⇒ *Chapter 8.1.2 Decontaminating the device*
- 6 Obtain approval for the device before accessing it.
- 7 Disconnect the motive medium from the connecting piece.
- 8 Remove the diffuser.
- 9 Remove the motive nozzle.

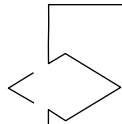


## 8.3.4 Tightening screwed connections

 <b>WARNING</b>
<b>Potential fatal injuries due to incorrect screwed connections</b> Screwed connections performed incorrectly can lead to life-threatening situations. <ul style="list-style-type: none"><li>▶ Perform all screwed connections properly.</li><li>▶ Observe the tightening torque for screwed connections.</li></ul>
<b>NOTICE</b>
<b>Material damage or functional impairment due to stress</b> Stress applied to the device by bending, pulling, pressing or turning it can damage it or impair the way it functions. <ul style="list-style-type: none"><li>▶ Fit the pipes leading in and out without stress (force and torque) at the device.</li></ul>

To tighten the screwed connections, proceed as follows:

- 1 Evenly tighten the following flange connections:
    - Motive medium inlet pipe
    - Suction medium inlet pipe
    - Mixed flow outlet pipe
  - 2 Evenly tighten the bolts of the fitted add-on parts.
    - ▶ Observe the tightening torques according to the applicable regulations.
- The screwed connections have now been tightened.



## 8.3.5 Replacing gaskets

### **WARNING**

#### **Potential fatal injuries due to incorrect screwed connections and incompatible gasket materials**

Screwed connections performed incorrectly and incompatible gasket materials can lead to life-threatening situations.

- ▶ Perform all screwed connections properly.
- ▶ Observe the tightening torque for screwed connections.
- ▶ Consult with the plant operating company and ensure the material the gasket is made of is compatible with the medium and the plant.

### **NOTICE**

#### **Material and environmental damage due to incorrect screwed connections and incompatible gasket materials**

Screwed connections performed incorrectly and incompatible gasket materials can lead to a danger of material and environmental damage.

- ▶ Perform all screwed connections properly.
- ▶ Observe the tightening torque for screwed connections.
- ▶ Consult with the plant operating company and ensure the material the gasket is made of is compatible with the medium and the plant.

### **NOTICE**

#### **Material damage or functional impairment due to stress**

Stress applied to the device by bending, pulling, pressing or turning it can damage it or impair the way it functions.

- ▶ Fit the pipes leading in and out without stress (force and torque) at the device.

### **NOTICE**

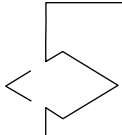
#### **Functional impairment due to incorrect gaskets**

If gaskets are not applied centrally, they can protrude into the pipe cross section and prevent the media from flowing through.

- ▶ Apply gaskets concentrically so that flow areas are not constricted.

To replace gaskets, proceed as follows:

- 1 Switch off the device. ⇒ *Chapter 8.3.1 Switching off the device*
  - 2 Dismantle the device in the places that are no longer leak-proof.
  - 3 Clean the connecting parts and the flange connections.
  - 4 Insert a new gasket.
    - ▶ Take notice of the material compatibility of the gasket material.  
⇒ *Chapter 11.1 Spare parts*
    - ▶ Apply gaskets concentrically so that they do not constrict flow areas.
  - 5 Assemble the components.
  - 6 Install the device in the plant. ⇒ *Chapter 5.1 Installing and connecting the device*
- The gaskets have now been replaced.



## 9 Decommissioning

<b>! WARNING</b>
<b>Potential fatal injuries due to improper decommissioning and recommissioning</b> Improperly performed decommissioning and/or recommissioning impairs the safety of the device and the plant. This can cause life-threatening situations. ▶ Only allow authorised and trained personnel to carry out decommissioning and recommissioning.
<b>NOTICE</b>
<b>Material and environmental damage due to improper decommissioning and recommissioning</b> Improperly performed decommissioning and/or recommissioning impairs the safety of the device and the plant. This can cause material and environmental damage. ▶ Only allow authorised and trained personnel to carry out decommissioning and recommissioning.

### 9.1 Decommissioning

If the device is not being used, then it must be decommissioned.

To decommission the device, proceed as follows:

- 1 Switch off the overall plant.  
▶ Please observe the operator's instructions for the overall plant.
- 2 Switch off the device. ⇒ *Chapter 8.3.1 Switching off the device*
- The device has now been decommissioned.

### 9.2 Recommissioning

The device must be recommissioned if it has not been used or each time it has been decommissioned.

To recommission the device, proceed as follows:

- 1 Check the device. ⇒ *Chapter 6.1 Checking the device each time it is operated*
- 2 Put the overall plant into operation.  
▶ Please observe the operator's instructions for the overall plant.
- 3 Operate the device. ⇒ *Chapter 6.2 Operating the device*
- The device has now been recommissioned.

## 10 Disposal

### **WARNING**

#### **Potential fatal injuries due to improper disposal work**

Improper disposal work can lead to life-threatening situations.

- ▶ Only allow authorised and trained personnel to carry out disposal.
- ▶ Please comply with the accident prevention regulations.

### **WARNING**

#### **Risk of injury due to improper removal of the device**

When removing the device, excess pressure, heat or aggressive and harmful media can lead to serious injuries (e.g. burns, scalding or chemical burns).

- ▶ Switch the device off before removing it.
- ▶ Allow any excess pressure to escape.
- ▶ Let the device cool down.
- ▶ Drain the device.
- ▶ Decontaminate and rinse the device after using aggressive and harmful media.
- ▶ Obtain approval for the device before accessing it.

### **NOTICE**

#### **Material and environmental damage due to improper removal of the device**

When removing the device, excess pressure, heat or aggressive and harmful media can lead to material or environmental damage.

- ▶ Switch the device off before removing it.
- ▶ Allow any excess pressure to escape.
- ▶ Let the device cool down.
- ▶ Drain the device.
- ▶ Decontaminate and rinse the device after using aggressive and harmful media.
- ▶ Obtain approval for the device before accessing it.

### **NOTICE**

#### **Environmental damage due to improper disposal**

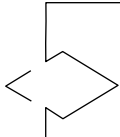
Incorrectly disposing of the device can harm the environment.

- ▶ Hand the device over to a specialist company for proper disposal.
- ▶ Observe national and local regulations when disposing of the device.

At the end of its useful life, the device must be decommissioned, removed and disposed of properly.

For the disposal, proceed as follows:

- 1 Switch off the overall plant.
    - ▶ Please observe the operator's instructions for the overall plant.
  - 2 Switch off the device. ⇨ *Chapter 8.3.1 Switching off the device*
  - 3 Ensure the device is disposed of properly and in an environmentally responsible manner.
- The device has now been disposed of.



## **11 Spare parts and customer service**

### **11.1 Spare parts**

Using unauthorised spare parts can impair safety. Original spare parts are required for proper operation and for your safety. Using other parts can render any liability for the resulting consequences null and void.

- ▶ Only use original spare parts or spare parts approved by Körting Hannover GmbH.

You can order spare parts by phone or online.

- ▶ When ordering spare parts, ensure you have the following details to hand:
  - Information on the rating plate or the factory number (is punched onto the motive nozzle and parts of the jet ejector);

### **11.2 Customer service**

Körting Hannover GmbH's customer service can be reached via the following contact data:

**Körting Hannover GmbH**  
Badenstedter Straße 56  
30453 Hannover  
Germany

Tel.: +49 511 2129 - 0  
Fax: +49 511 2129 - 223

E-mail: [info@koerting.de](mailto:info@koerting.de)  
Internet: [www.koerting.de](http://www.koerting.de)

## 12 Technical data

The design point and the operating data are specified in the technical specifications and, where applicable, in the characteristic curve sheets.

## 13 Glossary

### **Access**

Access is defined as when personnel gain entry to the area of the plant.

### **Diffuser**

A diffuser slows down the flow of gas or liquid, thereby increasing the pressure of the gas or liquid.

### **Flow direction**

The flow direction specifies from where and in what direction a medium flows. In technical drawings, arrows indicate the direction of flow.

### **Fluid**

A medium such as a liquid, vapour or gas is called fluid (⇒ *Medium*).

### **Foreign particles**

A foreign particle is a solid object or a substance which has entered the jet ejector from the outside unintentionally.

### **Gasket**

The purpose of a gasket is to prevent or limit an unintentional pressure drop and/or inadvertent transfer of substances from one area to another.

### **Hoisting equipment**

Hoisting equipment is a combination of load suspension devices, slings and lifting gear.

### **Mixed flow**

The mixed flow is the combination of two substances (motive medium and suction medium) which both flow through the jet ejector's diffuser.

### **Mixed flow outlet**

The mixed flow outlet is the opening through which the mixed flow leaves the jet ejector.

### **Motive medium**

The motive medium is the medium that flows at a specific pressure into the motive medium inlet and then into the motive nozzle in order to achieve the pumping action required.

### **Motive medium inlet**

The motive medium inlet is the opening through which the motive medium enters the jet ejector under pressure.

### **Motive nozzle**

The motive medium flows through the motive nozzle. During the process, the motive medium is accelerated significantly.

### **Shut-off device**

A shut-off device is a component (shut-off valve, gate valve or ball valve) which is used to block liquid, gaseous or vaporous material flows.

### **Suction medium**

The suction medium is the medium which has been expressed.

### **Suction medium inlet**

The suction medium inlet is the opening through which the suction medium is suctioned into the jet ejector.

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