

# Dxx2

Two-chamber three-point spreader



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We are constantly developing our products to offer our customers maximum convenience. Therefore, we ask for your understanding that the manual may deviate from the product in some regards.

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### 3 General information

This chapter gives you information on the following:

- Chapter 3.1 "Spreader identification", page 6
- Chapter 3.2 "Service information", page 7
- Chapter 3.3 "EC Declaration of Conformity in terms of the EC Machinery Directive 2006/42/EC", page 8

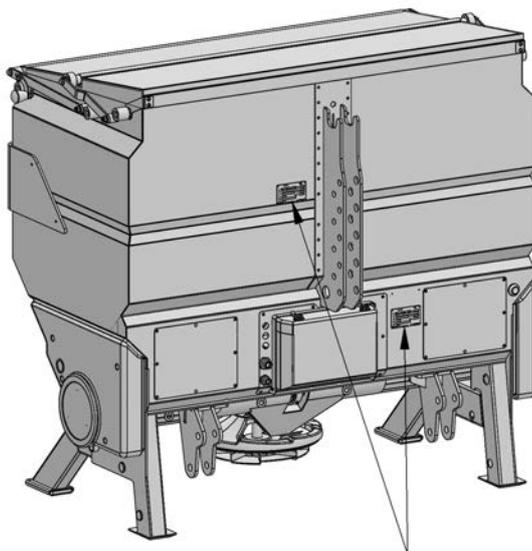
#### 3.1 Spreader identification

Nr.: DO1101		CE	
Type / type:	D352 / D452 Sole		
Fabr.-Nr. / serial no.:	25000		
Art. / code:			
Baujahr / YOM:	2021		
www.kugelmann.com D-87675 Reitenbach a. A. Made in Germany		kugelmann*	

Example:

- Type: D352/D452 brine
  - ⇒ Volume standard: 350 L / volume with headpiece: 450 L
  - ⇒ Brine: Brine equipment
- Serial number: 25000
- Year of construction: 2021

The type plate refers to device type, volume, serial number, year of construction and manufacturer.



Depending on the size of the spreader, you find the type plate at the designated place.

## **3.2 Service information**

Customer service:

Tel.: +49 (0) 8860 / 9190-90

Mobile: +49 (0) 171 / 75 52 372

Fax: +49 (0) 8860 / 9190-49

E-Mail: [service@kugelmann.com](mailto:service@kugelmann.com)

### 3.3 EC Declaration of Conformity in terms of the EC Machinery Directive 2006/42/EC



We herewith declare that the machine designated below complies with the relevant essential health and safety requirements of the respective EC Directives due to its design and construction, and in the version supplied by us.

If the machine is modified without our consent, this declaration shall cease to apply.

Designation: Two-chamber truck-mounted spreader

Machine type: Dxx2

Relevant EC machinery directives:

91/368 EEC

98/37/EC

93/68/EEC

DIN EN 292-1/292-2/294/349/1050/1553

Rettenbach a.A., February 2021

Josef Kugelmann

## 4 Operating instructions

This chapter gives you information on the following:

- Chapter 4.1 *"Target group"*, page 10
- Chapter 4.2 *"Use"*, page 10
- Chapter 4.3 *"Conventions used"*, page 11
- Chapter 4.4 *"Change history"*, page 11

## 4.1 Target group

These operating instructions are intended for skilled persons who are responsible for the following work at the spreader:

- Commissioning
- Control
- Operation
- Use
- Maintenance

At least once a year, all personnel must be trained in the operation of the spreader in accordance with the guidelines of the business liability insurance. The use of the spreader by untrained or unauthorized persons is prohibited.

## 4.2 Use

These operating instructions contain all necessary data and information for a secure control, operation and maintenance of the spreader.

Make sure that all persons responsible for operation or maintenance of the spreader or persons working in the immediate environment of the machine are familiar with the operating and maintenance instructions as well as the safety information in this manual.

These operating instructions are part of the product and have to be kept in a safe place. In case of resale or transfer of the machine to third parties, these operating instructions have to be included.

All information, illustrations and technical data correspond to the technical state at the time of printing. Subject to technical modifications.

## 4.3 Conventions used

This manual uses the following typographic conventions:

Symbol	Signal word	Meaning
	Danger	Indicates an imminent dangerous situation, which - in case of non-observance of the safety instructions - will entail death or grievous bodily harm.
	Warning	Indicates a possibly dangerous situation, which - in case of non-observance of the safety instructions - may entail death or grievous bodily harm.
	Caution	Indicates a possibly dangerous situation, which - in case of non-observance of the safety instructions - may result in minor injuries or damage to property.
	Notice	Contains useful information with respect to proper handling of the machine.

## 4.4 Change history

Date	Version	Modification
3/8/2021	1.1	First edition

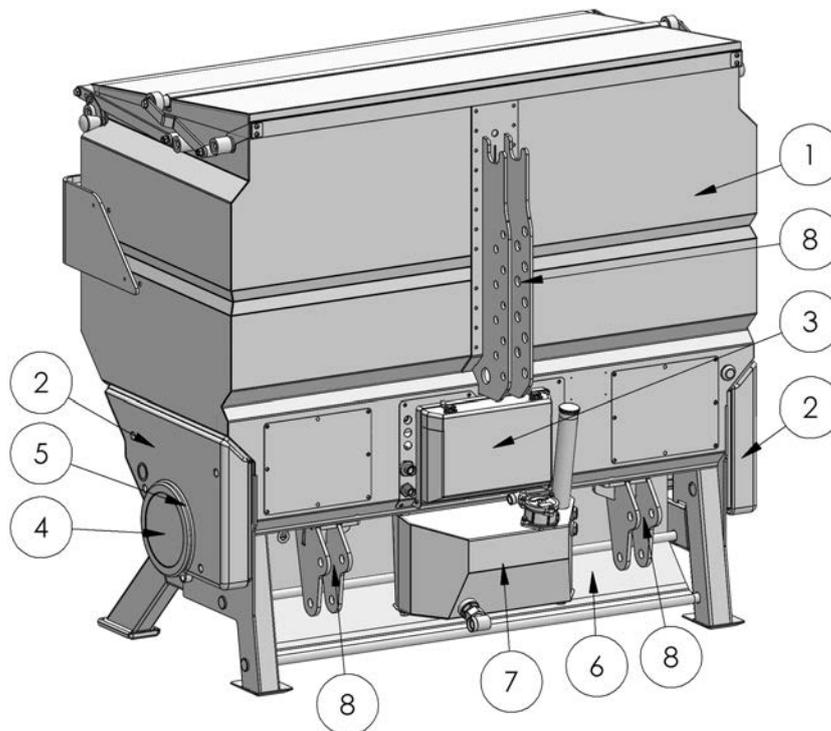
## 5 General description

This chapter gives you information on the following:

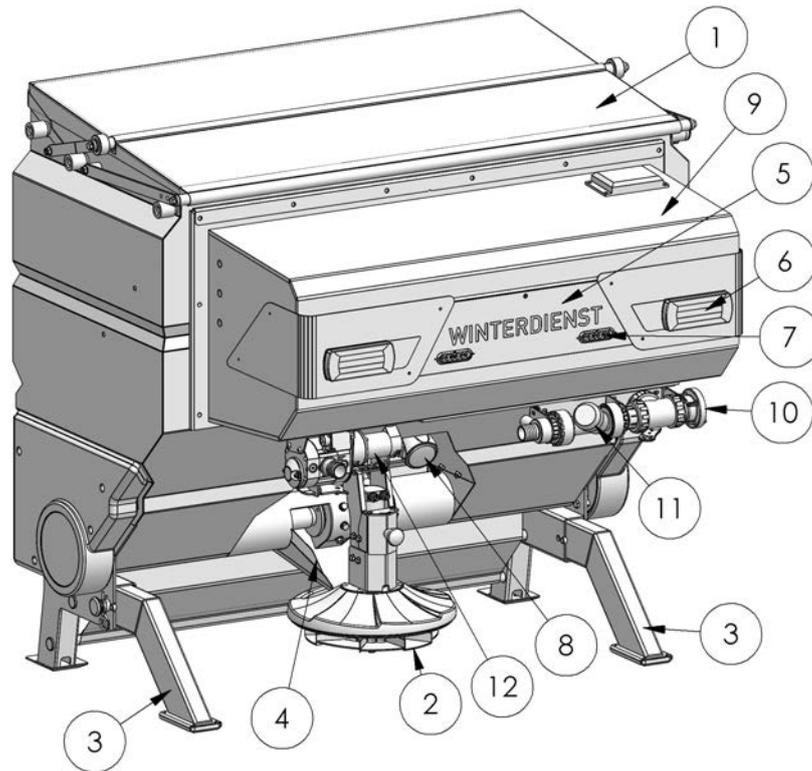
- Chapter 5.1 "Parts", page 12
- Chapter 5.2 "Designated use", page 14
- Chapter 5.3 "Obvious misuse", page 14

### 5.1 Parts

Please see the following illustration for parts of the spreader:



Pos. No.	Component
1	Hopper
2	Lateral plastic covers
3	Hydraulic control block (below cover)
4	Screw drive (under plastic cover)
5	Agitator shaft (option, under plastic cover)
6	Rear apron (optional)
7	Hydraulic reservoir for PTO pump (option)
8	Attachment points



Pos. No.	Component
1	Tarpaulin cover
2	Spreading disc
3	Support legs
4	Chute
5	"Winter road maintenance" sign
6	Lighting in accordance with national road traffic regulations
7	Flash lamps (optional)
8	Working headlight (optional)
9	Brine tank (option brine tank)
10	C-pipe connection (option brine tank)
11	Brine strainer (option brine tank)
12	Brine pump (option brine tank)

## 5.2 Designated use

Please use the spreader exclusively for spreading of salt and/or grit.

Transport and operation of the spreader only at the attachment points provided for this purpose (see Chapter 5.1 "Parts", page 12) at the spreader.

Any kind of use that deviates from the procedure set forth herein is considered contrary to its designated use. The operator of the spreader is liable for any damages arising from such action.

Use, maintenance and reconditioning of the spreader may only be carried out by trained and competent personnel.

To operate the equipment within the limits of its designated use, please note the following:

- These operating instructions as well as all other enclosed documentation.
- Road traffic regulations.
- The relevant accident prevention regulations.
- The generally recognized rules relating to technical safety requirements and occupational health.
- The operating instructions of the carrier vehicle.

## 5.3 Obvious misuse

The spreader may not be used to carry persons or goods.

The spreader shall not be used as lifting attachment.

The spreader and its attached parts may not be used as climbing aid.

The spreader may not spread fertilizer, sand, soil or other organic materials.

## 6 Safety instructions

This chapter gives you information on the following:

- Chapter 6.1 "General safety instructions", page 15
- Chapter 6.2 "Commissioning", page 17
- Chapter 6.3 "Use", page 19
- Chapter 6.4 "Maintenance", page 23
- Chapter 6.5 "Designations", page 26

### 6.1 General safety instructions



#### Warning

Use or maintenance of the spreader by untrained persons.

Risk of serious injury.

- Make sure that all persons responsible for operation or maintenance of the spreader are trained in the operation of the spreader and are familiar with the operating and maintenance instructions as well as the safety information in this manual!
  - Insist on compliance with the applicable safety regulations!
- 



#### Warning

Loose-fitting garments.

Risk of serious injury.

- Always wear tight-fitting clothes during the operation of the spreader!
-

**Warning**

Non-observance of guidelines.

Risk of injuries or death.

- Please observe the regulations relating to accident prevention!
  - Please observe the generally applicable safety regulations, industrial standards and medical guidelines!
  - Please observe the road transport guidelines!
  - Please pay attention to the general advice in these operating instructions!
- 

**Caution**

Accidental ignition of residual dirt.

Risk of injury and property damage.

- Please make sure that the spreader is always kept in a clean condition!
- 

**Caution**

Changes at the spreader.

Damage to functionality and danger of material damage.

- Do not make any changes at the spreader!
- 

**Caution**

Danger of slipping during filling or during work at the spreader.

Risk of injury.

- Provide a slip-resistant climbing possibility!
  - Ensure secure hold by means of a stable railing!
-

## 6.2 Commissioning

---



### Danger

Carrier vehicle rolls away during attachment of spreader.

Risk of serious injury and death.

- Before attaching the spreader to the carrier vehicle, apply the parking brake, stop the engine and remove the ignition key!
  - Never stand between carrier vehicle and spreader when attaching the spreader!
  - Apply all locking bolts and screws at the carrier vehicle and secure them!
- 



### Danger

Danger of contusions due to moving components.

Risk of serious injury and death.

- Never stay between carrier vehicle and spreader!
- 



### Warning

Overload or possible tilting of the carrier vehicle.

Risk of injury, death or damage to property.

- Please observe axle load limits and admissible overall weight!
- 



### Warning

Attachment of spreader at a malfunctioning carrier vehicle.

Risk of serious injury and death.

- Please make sure that the carrier vehicle is in a safe and proper condition!
  - Please make sure that the carrier vehicle is equipped with an appropriate braking system!
  - Please make sure that the carrier vehicle is able to transport the spreader and that the spreader may be attached!
  - Before every journey, make sure that the spreader is securely attached to the carrier vehicle!
-

**Warning**

Starting movement of the spreading disc or conveyor screw when connecting the hydraulic lines.

Risk of serious injury.

- Connect hydraulic lines only if the hydraulic cycles of carrier vehicle and spreader are depressurised!
- 

**Warning**

Damaged hydraulic lines.

Risk of serious injury.

- Damaged hydraulic lines must be replaced immediately!
  - After six years at the latest, replace hydraulic lines even if they are not damaged!
- 

**Warning**

Flying salt or grit.

Risk of serious injury.

- Never stay in the working range of the spreader!
- 

**Caution**

Support legs in parking position.

Risk of injury and property damage.

- During operation, the support legs must be in working position and secured or removed!
- 

**Caution**

Damaged spreading disc.

Danger of property damage.

- Set the upper link in a way that the attachment frame is in vertical position!
-

**Caution**

First commissioning without instruction.

Risk of injury and property damage.

- First commissioning of the spreader must be accomplished by employees of the dealer, the manufacturer or a representative of our works!
- 

**Caution**

Commissioning without making sure that the machine is in perfect technical condition.

Risk of injury and property damage.

- Check all important parts before commissioning!
  - Check all safety-related protection devices before commissioning!
  - If applicable, replace damaged parts!
- 

**Caution**

Tightening torque at screws too high.

Danger of property damage.

- Please use the table for tightening torques when tightening the screws (see Chapter 15. "Tightening torques", page 79)!
- 

## 6.3 Use

**Danger**

Carriage of persons on the spreader.

Risk of serious injury and death.

- Do not carry persons on the spreading machine!
- 

**Danger**

Danger of contusions due to moving components.

Risk of serious injury and death.

- Never stay between carrier vehicle and spreader!
-

**Warning**

Persons present in working range of spreader.

Risk of serious injury and death.

- Never stay in the working range of the spreader!
- 

**Warning**

Careless start-up.

Risk of serious injury and death.

- Before starting up of spreader or during operation, check the area near the spreader!
  - Ensure sufficient visibility!
  - Start the vehicle only with no person or good in the surroundings of the vehicle!
  - Before starting the vehicle, make sure that the spreader is correctly attached and secured!
- 

**Warning**

Changed handling and braking behavior.

Risk of serious injury and death.

- Please adjust your driving behavior to the dimensions and the additional weight of the spreader!
  - Adjust the driving speed to the snow conditions as well as to road and traffic environment!
- 

**Warning**

Rotating parts.

Risk of serious injury and death.

- During operation, never put your hands into spreading disc, conveyor screw or the optional agitator shaft!
  - During the whole operation at the spreader, all plastic side covers must remain attached!
  - During the whole operation at the spreader, the grid must remain mounted!
-

**Caution**

Parts continue to run.

Risk of injury.

- Always wait until all parts stand still before performing any work at the spreader.
- 

**Caution**

The hydraulic system is under high pressure.

Risk of injury and property damage.

- If any hydraulic fluid that leaks out passes through the skin, seek medical advice immediately!
- 

**Caution**

Heat at parts which use circulating oil as a coolant or at rotating parts.

Risk of injury and property damage.

- After operation, never touch any parts which use circulating oil!
  - After operation, never touch any parts which rotated during operation!
- 

**Caution**

Carriage of goods on the spreader.

Danger of property damage.

- Do not carry any goods on the spreader!
- 

**Caution**

Non-observance of regulations for operating attachments on public roads.

Risk of injury and property damage.

- Follow the pertinent rules and regulations of the information sheet for attachments (Gazette of the Federal Ministry of Transport 1990, page 562)!
  - Take measures to compensate limitations of the field of vision!
-

**Caution**

Non-observance of regulations concerning road safety.

Risk of injury and property damage.

- Please make sure that the spreader complies with the regulations concerning road safety!
  - Apply the prescribed lighting applications, warning and protection devices!
  - Comply with the existing guidelines concerning dimensions and weight, the maximum permissible axle load, the tyre carrying capacity, the overall weight and the speed limit valid in the respective country!
- 

**Caution**

Operating the spreader in the event of malfunctions.

Risk of injury and property damage.

- In the event of malfunction, please stop the spreader immediately!
  - Resolve the error immediately or ask a workshop!
- 

**Caution**

Placing the spreader in an unprotected area.

Risk of injury and property damage.

- Never place the spreader in a highly frequented area or an area accessible to children!
- 

**Caution**

Placing the spreader on uneven or soft ground.

Risk of injury and property damage.

- Make sure that the support legs of the spreader are placed on even, solid and stable ground in parking position!
- 

**Caution**

Delivery volume too high.

Risk of injury and property damage.

- The hydraulic performance of the carrier vehicle must not exceed 50 l/min!
-

## 6.4 Maintenance

---



### Warning

Non-observance of safety regulations.

Risk of serious injury and death.

- Comply with the safety regulations during all maintenance work!
- 



### Warning

Electric shocks during maintenance work.

Risk of serious injury and death.

- Interrupt power supply before executing work at an electrical device!
- 



### Warning

Draining oil during maintenance work.

Risk of serious injury and death.

- Interrupt the hydraulic supply to carrier vehicle and make sure that the hydraulic cycle is depressurised before working at a hydraulic device!
- 



### Caution

Non-observance of maintenance intervals.

Risk of injury and property damage.

- Please pay attention to the prescribed maintenance intervals!
- 



### Caution

Use of wrong spare parts.

Risk of injury and property damage.

- Do only use original parts for repair work!
-

**Caution**

Maintenance work without necessary technical knowledge or appropriate tooling.

Risk of injury and property damage.

- Only carry out maintenance work if you have the necessary expertise as well as suitable tools!
- 

**Caution**

Mixing of oils.

Danger of property damage!

- Never mix oils with different specifications!
- 

**Caution**

Carelessness when handling oil or lubricants.

Risk of injury.

- Avoid skin contact with oil and lubricants!
  - Protect your skin with skin-protection lotion or oil-resistant gloves!
  - Never use oil or lubricants to clean your hands!
  - Change dirty or oily clothes as soon as possible!
- 

**Caution**

Oil leakage at hydraulic system.

Risk of injury and property damage.

- Periodically check all tubes, lines, couplings and connecting elements concerning leaks and external damage!
  - Only use appropriate tooling during the check!
  - Occurring damages have to be removed immediately!
  - Replace hydraulic lines after 6 years at the latest!
-

**Caution**

Cleaning with high-pressure cleaner.

Danger of property damage.

- Cleaning of bearings, plastic parts, electronic parts and hydraulic lines only with low pressure!
- 

**Caution**

Cleaning of metallic surfaces.

Risk of material damage due to detergents.

- Do not use aggressive detergents!
- 

**Caution**

Welding operations at the electric cable system.

Danger of property damage.

- Separate the battery connection to the carrier vehicle before carrying out welding operations at the connected spreader!
- 

**Caution**

Loose bolted/screw connections.

Danger of property damage.

- Retighten loose bolted connections after repair and maintenance work!
- 

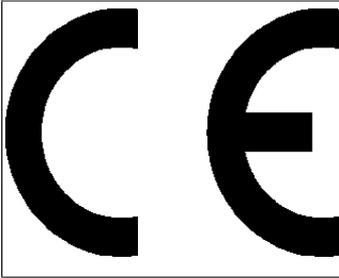
**Caution**

Tightening of screw connections.

Danger of property damage.

- When tightening screw connections, always use the prescribed tightening torque (see Chapter 15. "Tightening torques ", page 79)!
-

## 6.5 Designations

Marking	Explanation
	<p>Prior to commissioning, read and observe operating and safety instructions!</p>
	<p>Do not enter the danger zone of the machine!</p>
	<p>Risk of injury from rotating parts! Only work at the machine in switched-off mode!</p>
	<p>Never use the spreader or the attachments as climbing aid! Do not stand on spreader!</p>
	<p>Basis for Declaration of Conformity</p>



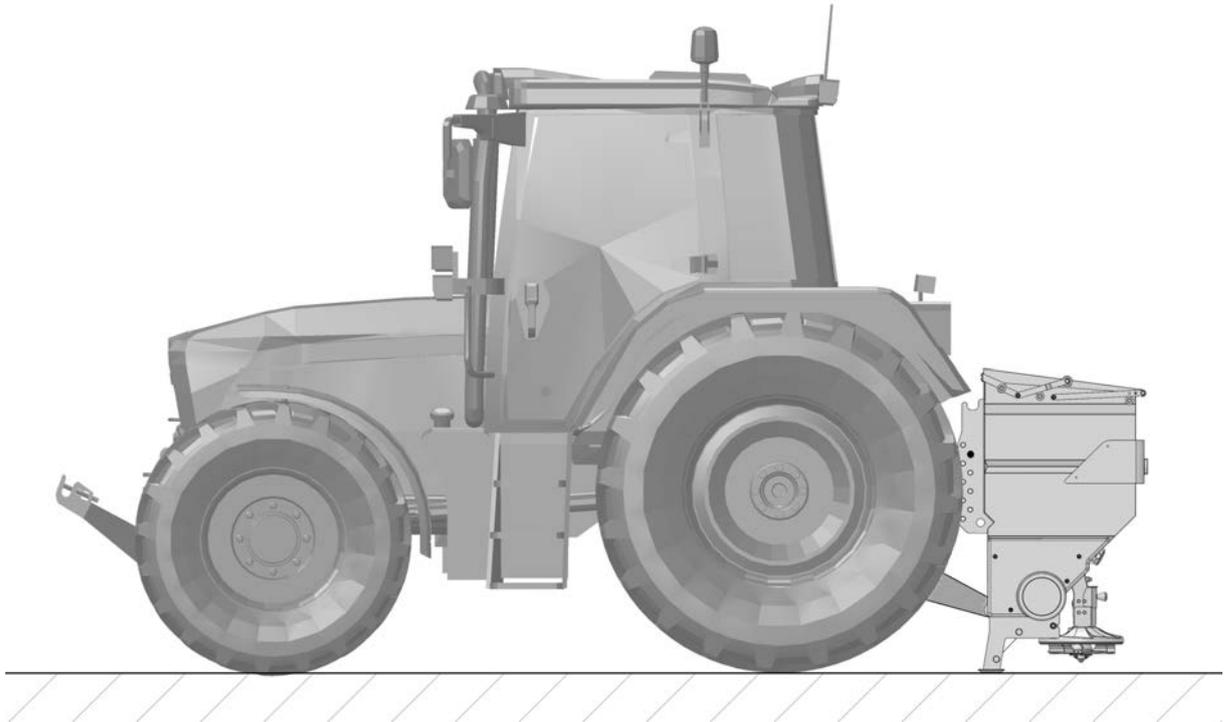
## 7 Commissioning

This chapter gives you information on the following:

- Chapter 7.1 *"Attachment of spreader"*, page 29
- Chapter 7.2 *"Put support legs into working position"*, page 31
- Chapter 7.3 *"Wiring diagram"*, page 33
- Chapter 7.4 *"Setting of working height"*, page 34
- Chapter 7.5 *"Open tarpaulin cover. "*, page 35
- Chapter 7.6 *"Location of spreading pattern"*, page 36

## 7.1 Attachment of spreader

The exact procedure for the attachment of the spreader depends on the carrier vehicle. Comply with the operating instructions of the carrier vehicle. The spreader shall only be attached at the attachment points provided for this purpose.



Proceed as follows to attach the spreader:

- 1 Hang in lower link specific to the vehicle.
- 2 For the upper link, choose the appropriate bore at the spreader (upper and lower link should run as parallel as possible in order to guarantee vertical lifting).
- 3 Secure all locking pins at upper and lower link with the provided securing pins!
- 4 Connect hydraulic lines (first make sure that the hydraulic cycle at the carrier vehicle as well as at the spreader is depressurised).
- 5 Connect lighting with carrier vehicle.
- 6 Connect cable with operating device in carrier vehicle.
- 7 After coupling, put support legs into working position and secure them (see Chapter 7.2 "Put support legs into working position", page 31)!

**Danger**

Carrier vehicle rolls away during attachment of spreader.

Risk of serious injury and death.

- Before attaching the spreader to the carrier vehicle, apply the parking brake, stop the engine and remove the ignition key!
  - Never stand between carrier vehicle and spreader when attaching the spreader!
  - Use the described correct attachment points!
  - Apply all locking bolts and secure them!
- 

**Danger**

Danger of contusions due to moving components.

Risk of serious injury and death.

- Never stay between carrier vehicle and spreader!
- 

**Warning**

Attachment of spreader at a malfunctioning carrier vehicle.

Risk of serious injury and death.

- Please make sure that the carrier vehicle is in a safe and proper condition!
  - Please make sure that the carrier vehicle is provided with a braking system appropriate for the spreader.
  - Please make sure that the carrier vehicle may transport the spreader and that the spreader may be attached!
- 

**Caution**

Damaged spreading disc.

Danger of property damage.

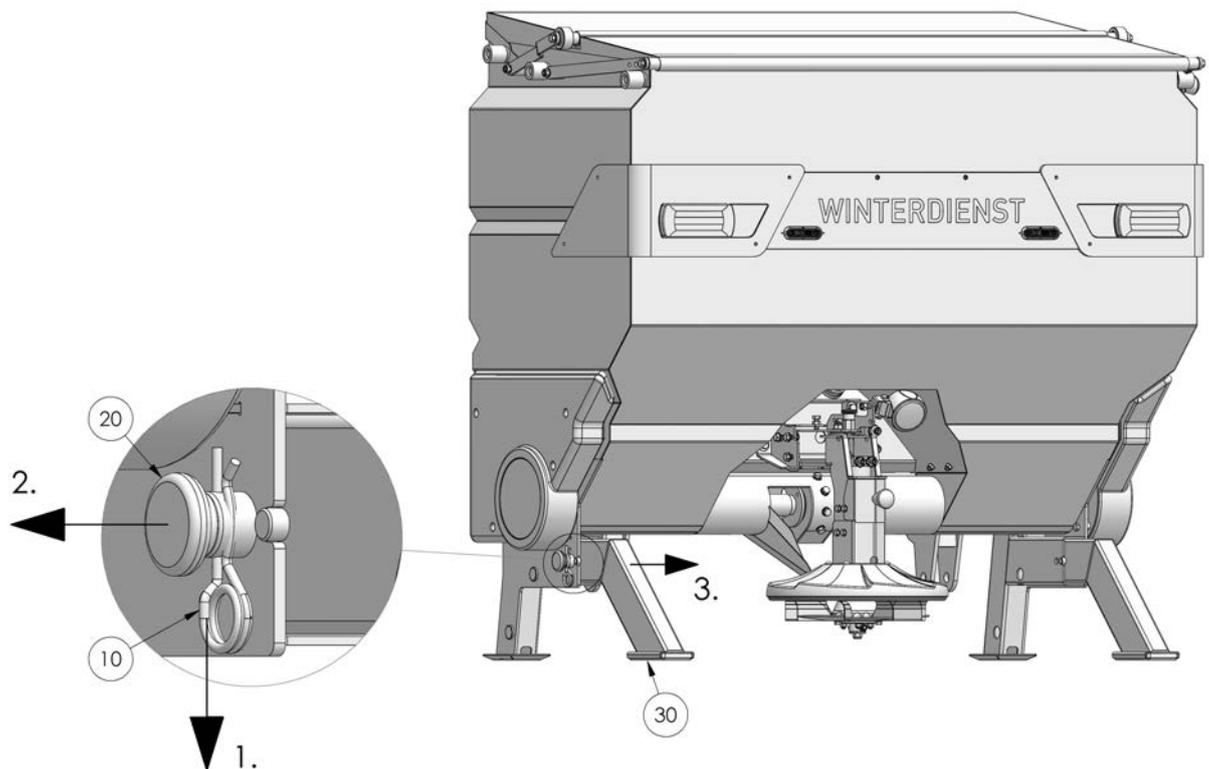
- Set the upper link in a way that the attachment frame is in vertical position!
-

## 7.2 Put support legs into working position

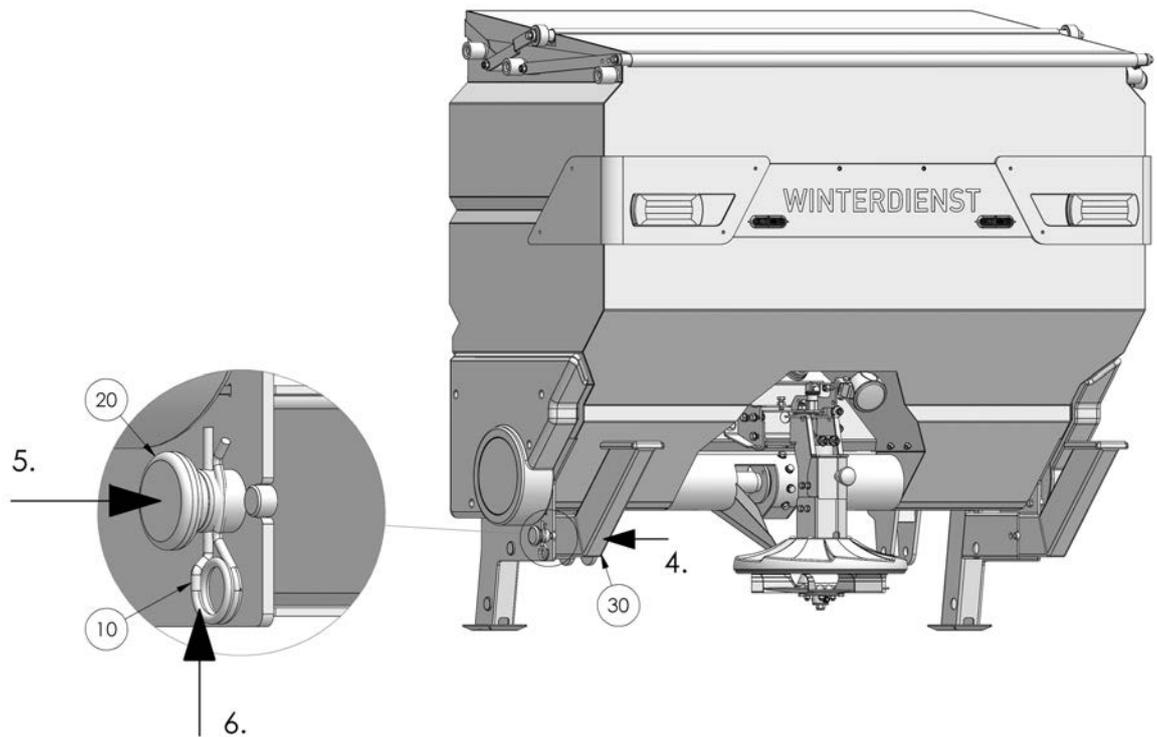


### Notice

The spreader must be attached to the carrier vehicle and the rear linkage must be lifted!



- 1 Pull out the cotter pin (Pos. 10).
- 2 Pull out the locking pin (Pos. 20).
- 3 Pull out support legs (Pos. 30).



- 4 Turn support legs (Pos. 30) upwards and reinsert them.
- 5 Reinsert the locking pin (Pos. 20).
- 6 Reinsert the cotter pin (Pos. 10).



### Caution

Support legs in parking position.

Risk of injury and property damage.

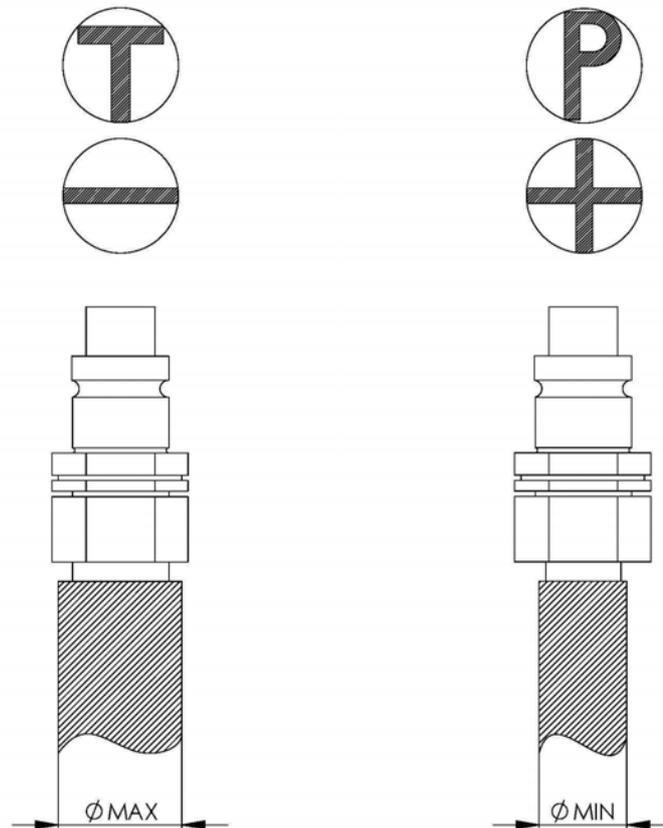
- During operation, the support legs **must** be in working position and secured or removed!

### Put support legs into parking position:

Perform the steps described above in reverse order!

## 7.3 Wiring diagram

The hydraulic lines must be connected with the hydraulic system of the carrier vehicle as follows:



### Notice

If possible, use the pressure-free return flow at the carrier vehicle. If no pressure-free return flow is available, use the marked return flow.



### Notice

Make sure that the hydraulic lines are properly installed.

- Consider the laying radii appropriate for the hydraulic lines. Please refer to the assembly instructions of the line manufacturer.
- The hydraulic lines must not be crushed.
- The hydraulic lines must not touch moving parts as chafe marks could result.

**Caution**

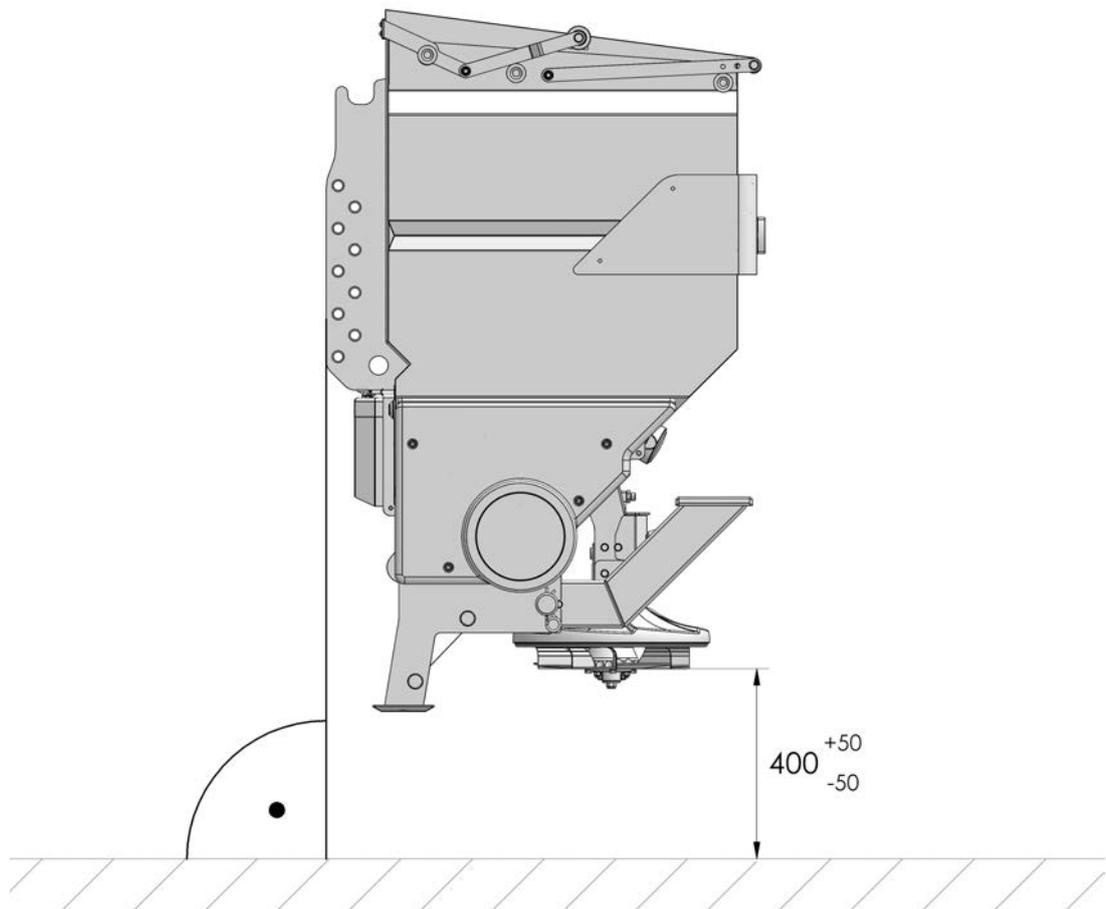
Delivery volume too high.

Danger of property damage.

- The hydraulic performance of the carrier vehicle must not exceed 50 l/min!

## 7.4 Setting of working height

The height of the spreader should be set so that the lower border of the spreading disc is located approx. 400 mm above the ground.

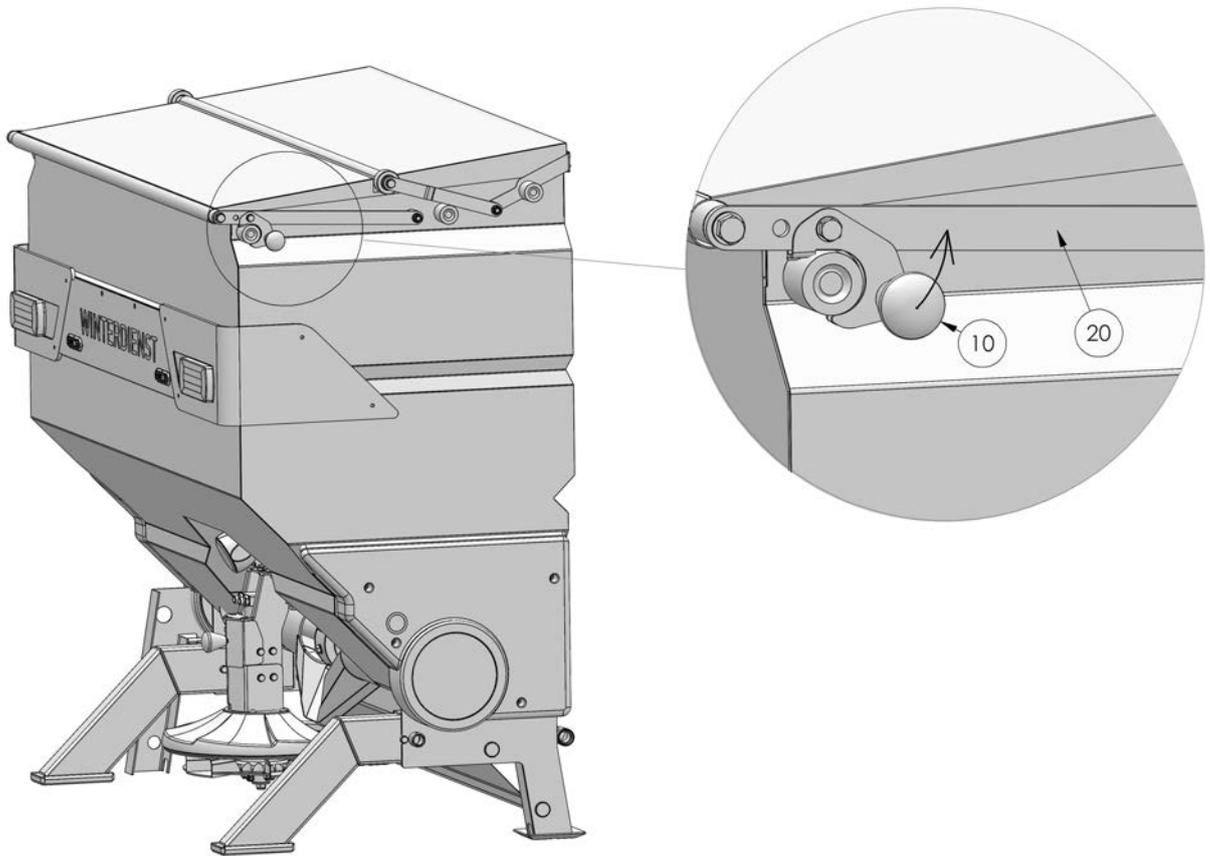
**Danger**

Danger of contusions due to moving components.

Risk of serious injury and death.

- Never stay between carrier vehicle and spreader!

## 7.5 Open tarpaulin cover.



- 1 Push the locking (Pos. 10) upwards in the direction of the arrow.
- 2 Push locking (Pos. 10) and tarpaulin bow (Pos. 20) upwards and open cover.



### Notice

The locking (Pos. 10) can also be mounted on the left side.



### Caution

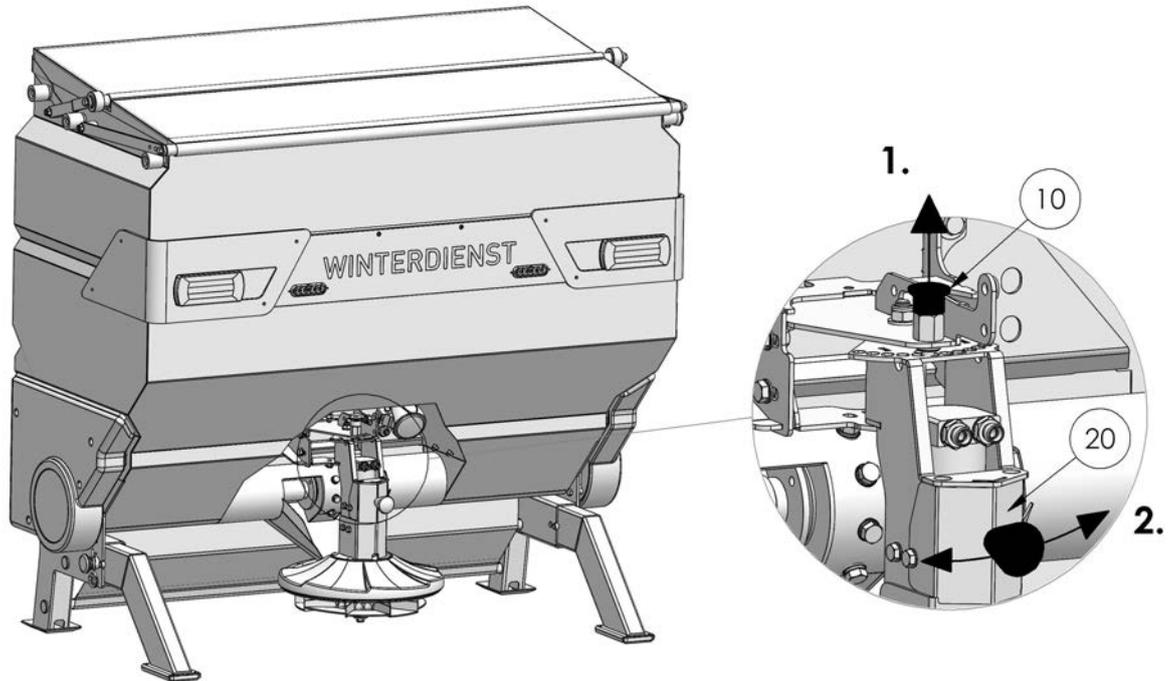
Danger of contusions due to moving components.

Risk of injury.

- Never stay between carrier vehicle and spreader!
- Never put your hands between moving parts!

## 7.6 Location of spreading pattern

The location of the spreading pattern can be set as follows:



Pos. No.	Function
10	Locking bolt
20	Spreading disc panel

- 1 Mechanical adjustment of spread pattern:
  - Pull out locking bolt (Pos. 10) and pivot spreading disc panel (Pos. 20) to the left or right until the locking bolt engages.
    - ⇒ Pivot to the right-hand side (in direction of travel), spreading image is shifted to the right side.
    - ⇒ Pivot to the left-hand side (in direction of travel), spreading image is shifted to the left side.
- 2 Electrical adjustment of spreading pattern (optional):
  - Execute settings in the menu of the control system (see instruction manual of control system)



---

## Caution

Rotating parts.

Risk of injury.

- Never put your hands into the spreading disc during operation!
  - Switch off the hydraulic system or the PTO shaft of the carrier vehicle and disconnect the vehicle!
-

## **8 Operating instructions**

This chapter gives you information on the following:

- Chapter 8.1 *"Checks before operation"*, page 38
- Chapter 8.2 *"Functional diagram"*, page 39
- Chapter 8.3 *"Fill spreader with dry material"*, page 41
- Chapter 8.4 *"Fill brine reservoir (optional)"*, page 41
- Chapter 8.5 *"Working speed and safety"*, page 42
- Chapter 8.6 *"Parking the spreader"*, page 43

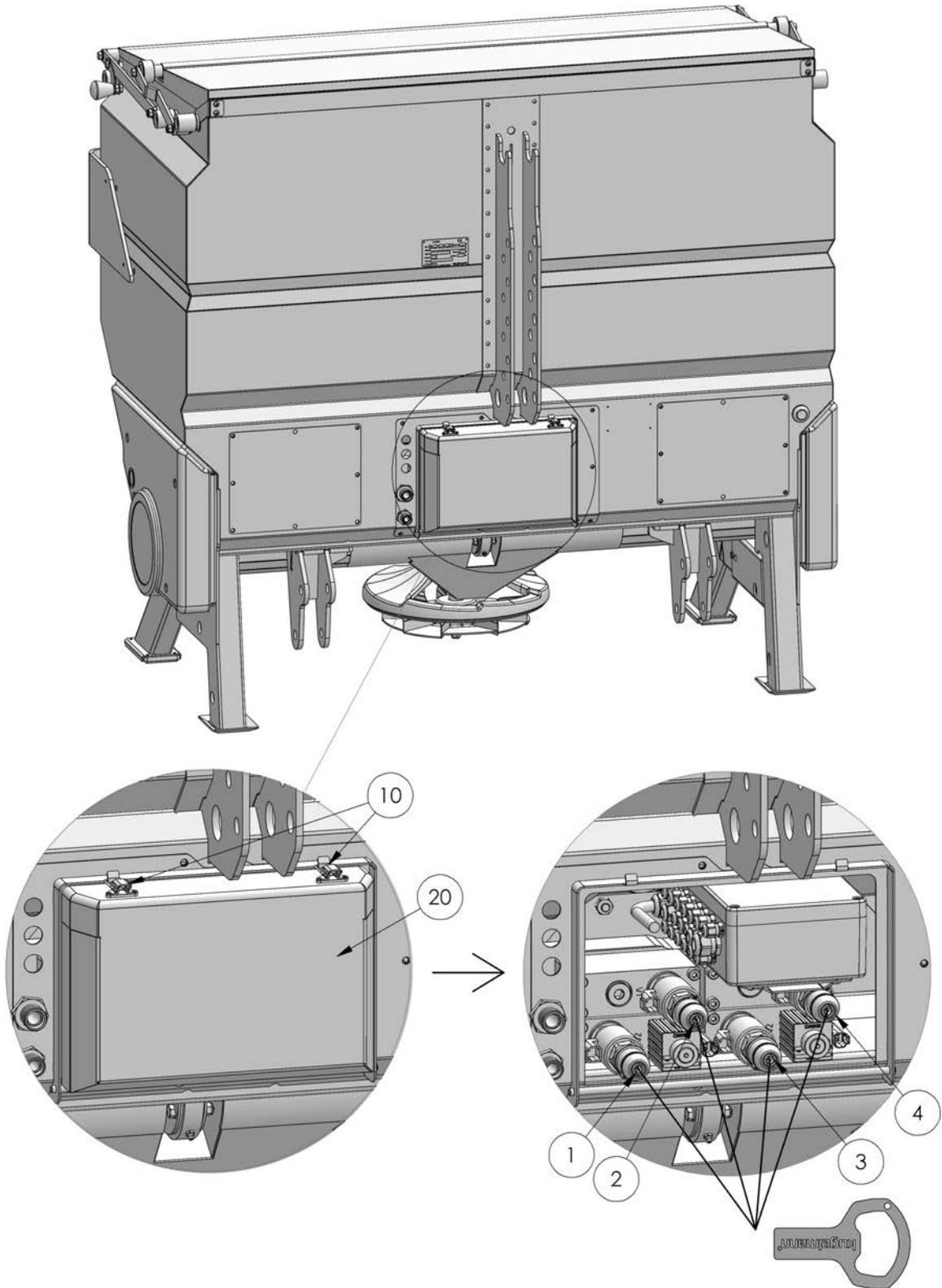
### **8.1 Checks before operation**

Before every operation of the spreader, check whether the hydraulic lines are tight and undamaged. Replace damaged hydraulic lines immediately.

Before every operation of the spreader, check the lighting in accordance with national road traffic regulations (in Germany StVO).

## 8.2 Functional diagram

Irrespective of the control system, the functions of the spreader can be controlled by means of the manual emergency actuation:



- 1 Open fasteners (Pos. 10).
- 2 Remove cover (Pos. 20).
- 3 Setting with key:

Pos:	Function:
1	Setting of spreading quantity right-hand screw
2	Setting of spreading width
3	Setting of spreading quantity left-hand screw
4	Setting of brine quantity (optional)

## 8.3 Fill spreader with dry material



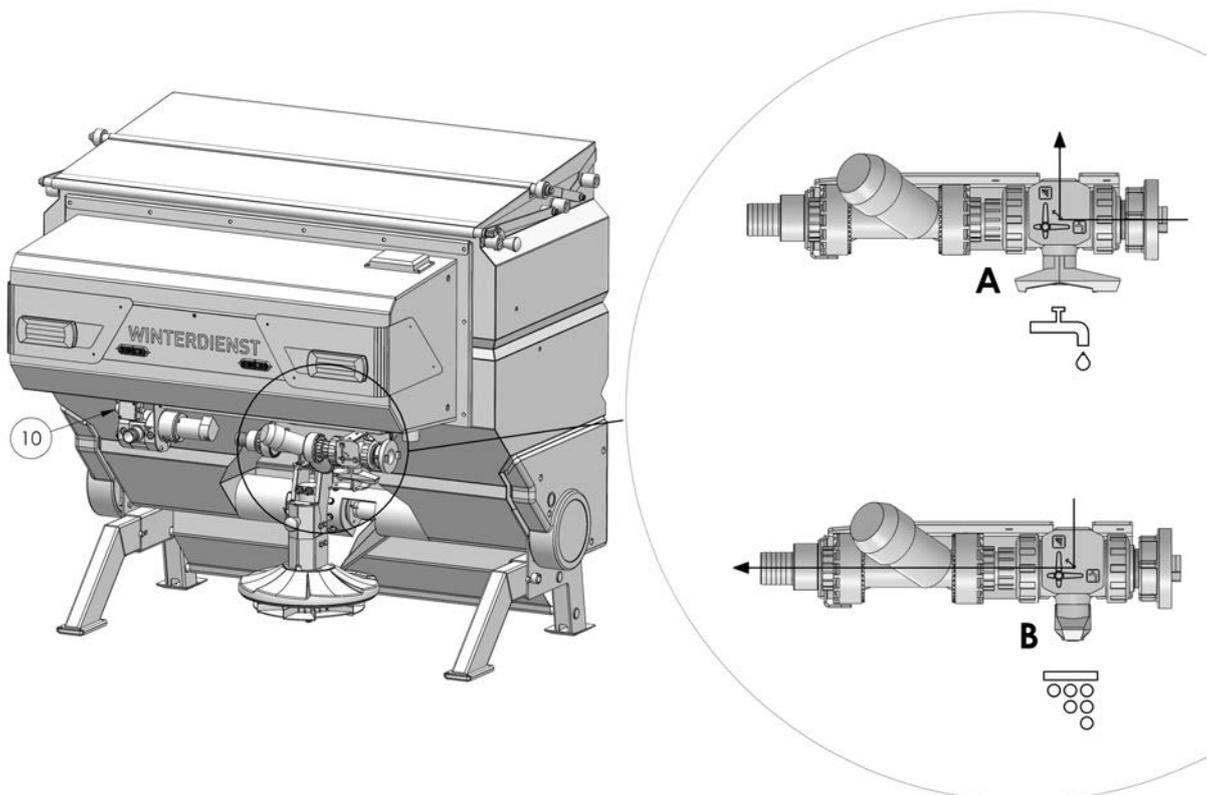
### Notice

When operating the spreader with refined salt, the screw covers must be removed. Otherwise, disturbances during material transport are possible!

Proceed as follows to load the spreader:

- 1 Open tarpaulin cover (see Chapter 7.5 "Open tarpaulin cover.", page 35).
- 2 Load spreader with dry material.
- 3 Close tarpaulin cover.

## 8.4 Fill brine reservoir (optional)



- 1 Connect cable of limit value transmitter for automatic brine switch-off (Pos. 10) with brine filling system.



### Notice

The limit value transmitter can be varied in the lateral hole pattern of the brine tank.

2 Connect filling pipe.

3 Ball valve in **position A** .

4 Start filling procedure.

5 After terminating the filling procedure, switch to **position B** .

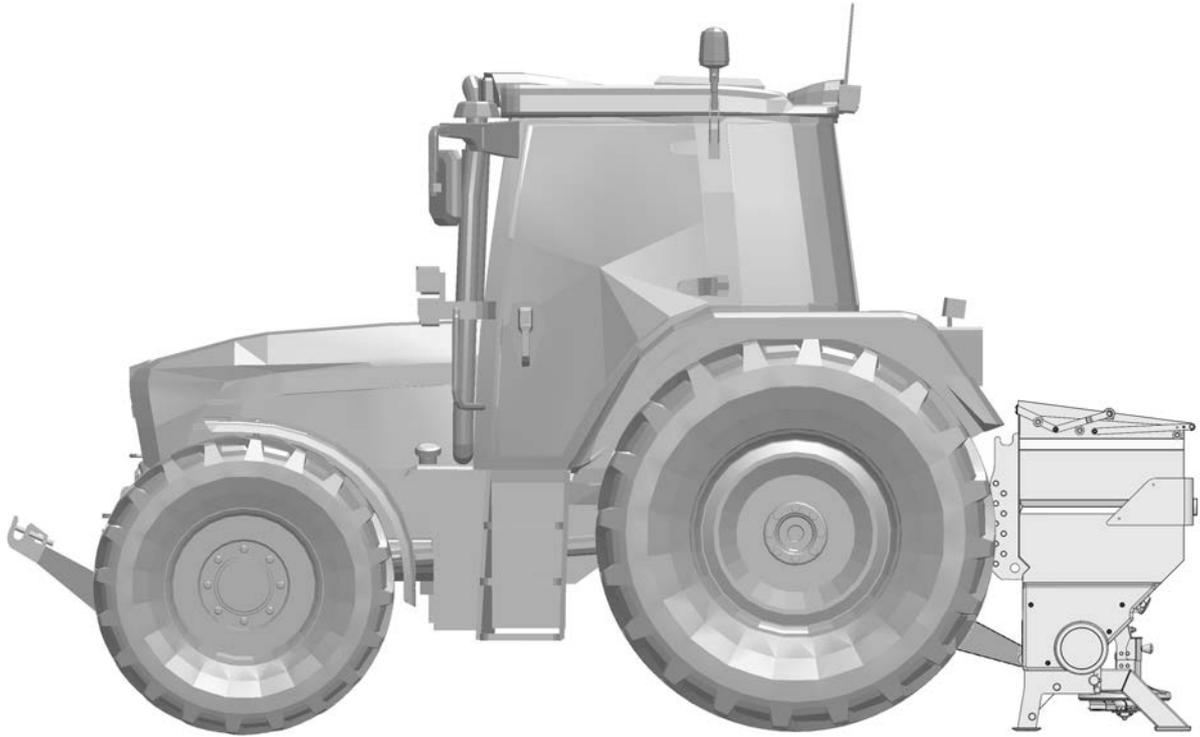
6 Remove filling pipe.

7 Separate cable connection of limit value transmitter (Pos. 10).

## 8.5 Working speed and safety

When using the spreader, please pay attention to the safety instructions for operation (see Chapter 6.3 "Use", page 19)!

## 8.6 Parking the spreader



Proceed as follows to place the spreader down:

- 1 Turn support legs downwards into parking position and secure them (see Chapter 7.2 "Put support legs into working position", page 31).
- 2 Lower the rear hydraulics of the carrier vehicle until the support legs rest on the ground and the spreader stands alone.
- 3 Remove top link pin at the spreader.



### Notice

Depressurize control units in order to guarantee a pressure-free hydraulic cycle.

- 4 Separate hydraulic hoses and electronics from the carrier vehicle.



### Danger

Danger of contusions due to moving components.

Risk of serious injury and death.

- Never stay between carrier vehicle and spreader!

**Caution**

Placing the spreader in an unprotected area.

Risk of injury and property damage.

- Never place the spreader in a highly frequented area or an area accessible to children!
- 

**Caution**

Placing the spreader on uneven or soft ground.

Risk of injury and property damage.

- Place the spreader only on even, solid and stable ground!
-

## 9 Maintenance

This chapter gives you information on the following:

- Chapter 9.1 *"Maintenance intervals", page 46*
- Chapter 9.2 *"Wear parts", page 47*
- Chapter 9.3 *"Lubrication schedule", page 48*
- Chapter 9.4 *"Lubricants and oils", page 50*
- Chapter 9.5 *"Clean brine strainer (optional)", page 51*
- Chapter 9.6 *"Change of hydraulic oil and hydraulic oil filter (optional)", page 52*
- Chapter 9.7 *"Cleaning/replacing of hydraulic oil pressure filter (optional)", page 55*
- Chapter 9.8 *"Tighten chain", page 56*
- Chapter 9.9 *"Setting of spreading disc", page 57*
- Chapter 9.10 *"Safety", page 59*

## 9.1 Maintenance intervals

In order to ensure proper operation, please carry out the following maintenance work in the indicated time intervals:

Interval	Work
After the first 50 operating hours	<ul style="list-style-type: none"> <li>• check screw connections (see Chapter 15. "Tightening torques ", page 79).</li> <li>• Check hydraulic connections regarding tightness.</li> <li>• Clean/replace hydraulic oil pressure filter (optional) (see Chapter 9.7 "Cleaning/replacing of hydraulic oil pressure filter (optional)", page 55).</li> </ul>
Before each use	<ul style="list-style-type: none"> <li>• Visual inspection of the whole spreader.</li> <li>• Oil level check at hydraulic tank (optional).</li> <li>• Check torque support at additional PTO pump (optional).</li> <li>• Check hydraulic lines.</li> <li>• Check lighting.</li> <li>• Check connection to carrier vehicle.</li> <li>• Check and clean brine strainer (see Chapter 9.5 "Clean brine strainer (optional)", page 51).</li> </ul>
Monthly	<ul style="list-style-type: none"> <li>• Check chain tension at conveyor screw (see Chapter 9.8 "Tighten chain", page 56).</li> <li>• Lubrication (see Chapter 9.3 "Lubrication schedule", page 48).</li> <li>• Check wear parts (see Chapter 9.2 "Wear parts", page 47).</li> <li>• Check hydraulic connections regarding tightness.</li> </ul>
Yearly	<ul style="list-style-type: none"> <li>• Inspection by an expert.</li> <li>• Removal of damage to the paintwork.</li> <li>• Rinse brine tanks and rinse brine pump with Glysantin and fill it.</li> </ul>
After 500 operating hours	<ul style="list-style-type: none"> <li>• Change hydraulic oil (optional hydraulic tank).</li> <li>• Change hydraulic oil filter (optional hydraulic tank).</li> <li>• Clean/replace hydraulic oil pressure filter (optional) (see Chapter 9.7 "Cleaning/replacing of hydraulic oil pressure filter (optional)", page 55).</li> </ul>

Hydraulic lines must be replaced every 6 years!

## 9.2 Wear parts

---



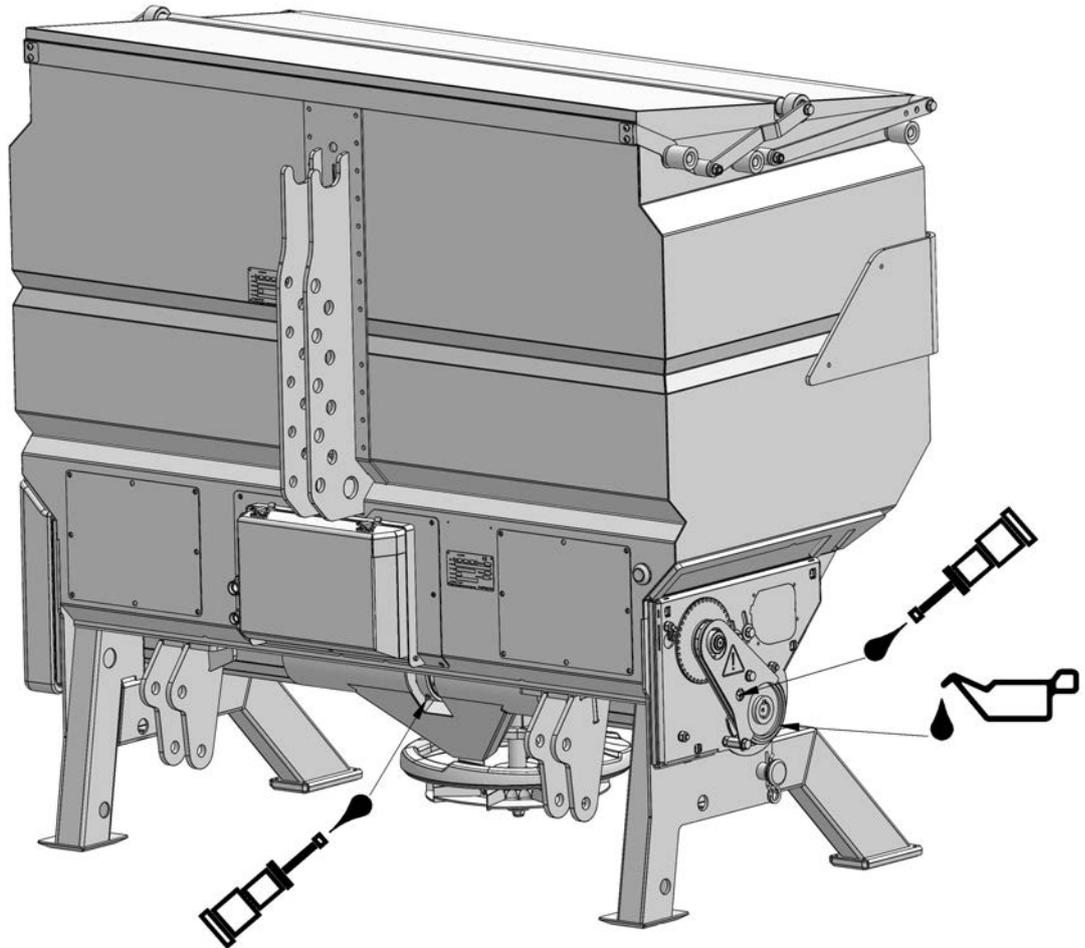
### Notice

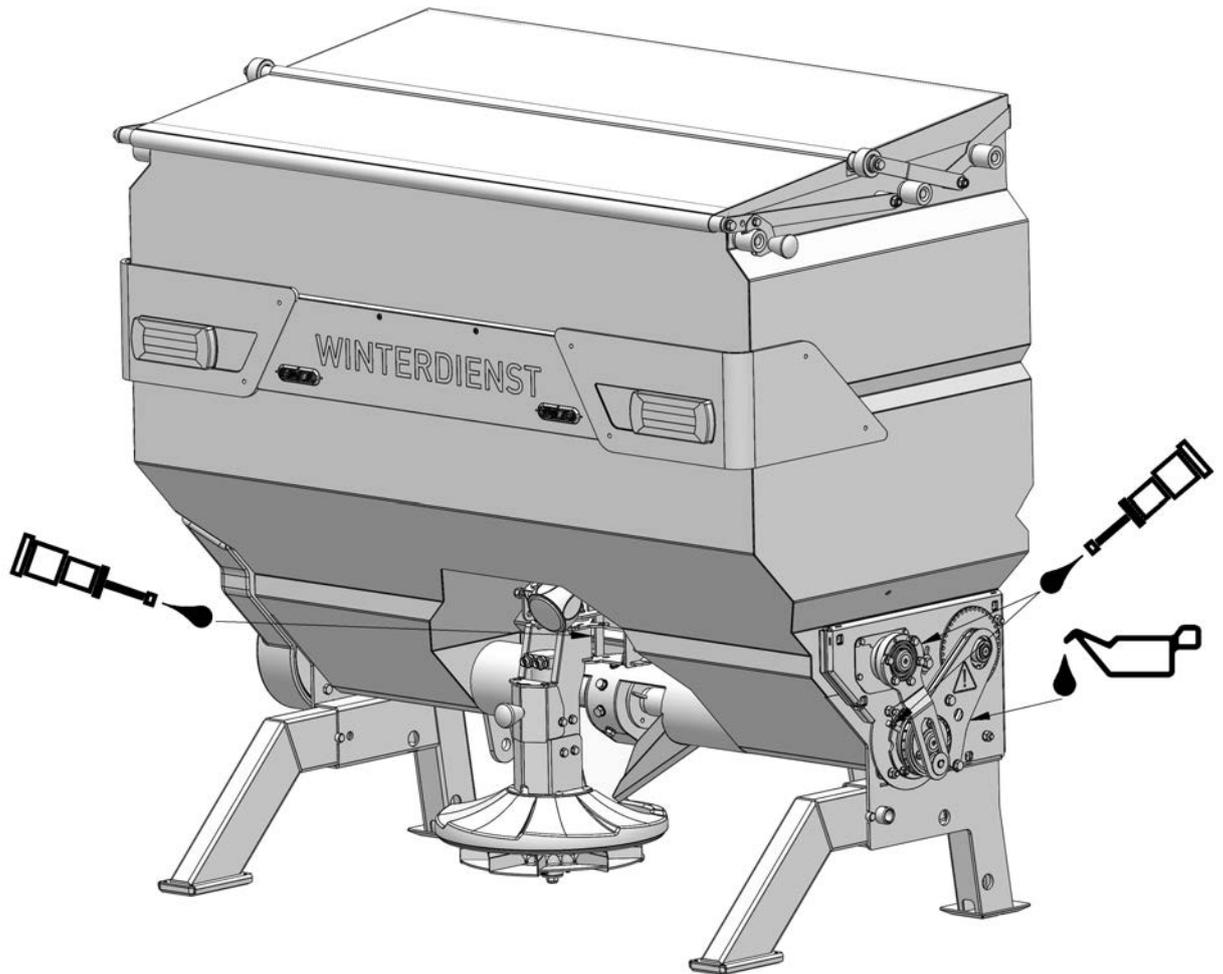
Wear parts are:

- Spreading disc
  - Screw conveyors
  - Chain and chain wheels
  - Bearing of spreading disc and conveyor screw
  - Bearing bushes
  - Illuminants
  - Hydraulic lines (replace every 6 years)
  - Hoses and collars
  - Tarpaulin cover
  - Splash guard
  - Hydraulic motors
  - Support legs, bases plates and their fixing elements
  - PTO hydraulic pump (optional)
  - Hydraulic oil pressure filter (optional)
  - Brine strainer (optional)
  - Brine pump (optional)
-

## 9.3 Lubrication schedule

The lubricating nipples and lubricating points at the spreader have to be lubricated according to the maintenance schedule (see Chapter 9.1 "Maintenance intervals", page 46).





## Caution

Carelessness when handling oil or lubricants.

Risk of injury.

- Avoid skin contact with oil and lubricants!
- Protect your skin with skin-protection lotion or oil-resistant gloves!
- Never use oil or lubricants to clean your hands!
- Change dirty or oily clothes as soon as possible!
- Wear protective goggles!

## 9.4 Lubricants and oils

Lubricants and oils to be used:

Lubricating point:	Symbol:	Lubricant / oil	Standard:
		Universal multi-purpose grease	
		Spray oil/maintenance oil	
Hydraulic system		Eurolub HLP ISO-VG 46	DIN 51524 part 2
		Autol HYS 46	DIN 51524 T.2 - HLP
		Panolin HLP Synth 32 (biodegradable)	ISO 15380
Transmission oil PTO hydraulic pump (optional)		SAE 80W-90	API GL-4



### Caution

Mixing of oils.

Danger of property damage!

- Never mix oils with different specifications!



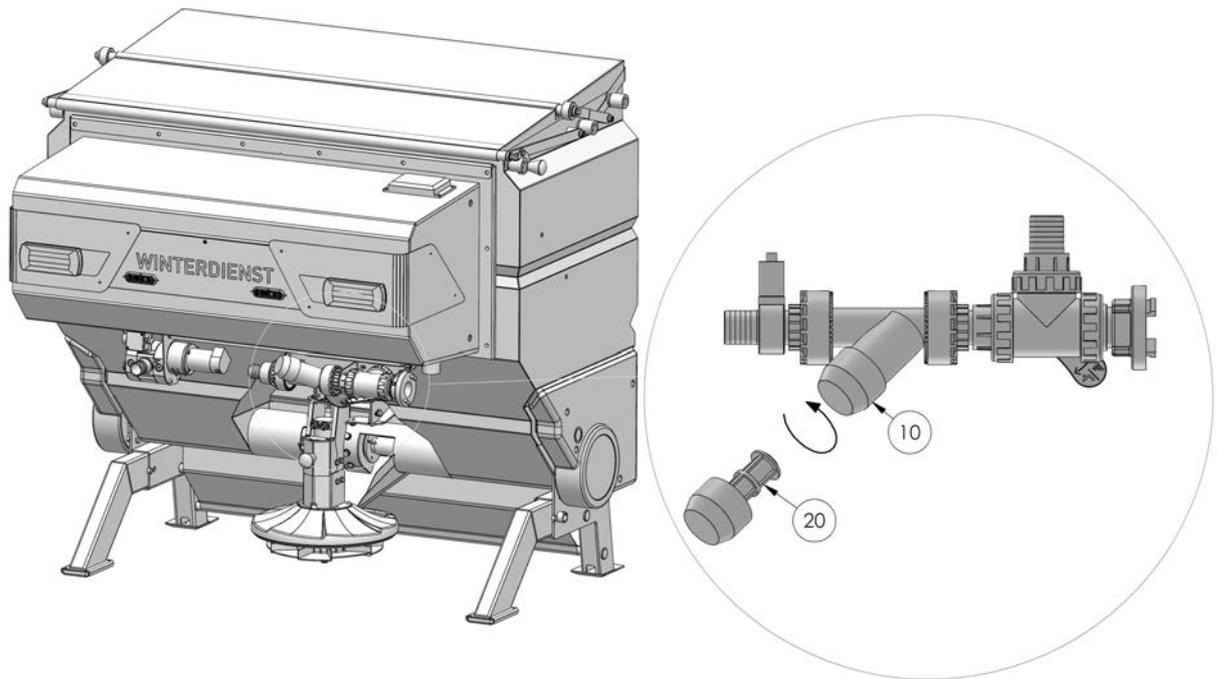
### Caution

Carelessness when handling oil or lubricants.

Risk of injury.

- Avoid skin contact with oil and lubricants!
- Protect your skin with skin-protection lotion or oil-resistant gloves!
- Never use oil or lubricants to clean your hands!
- Change dirty or oily clothes as soon as possible!
- Wear protective goggles!

## 9.5 Clean brine strainer (optional)



### Notice

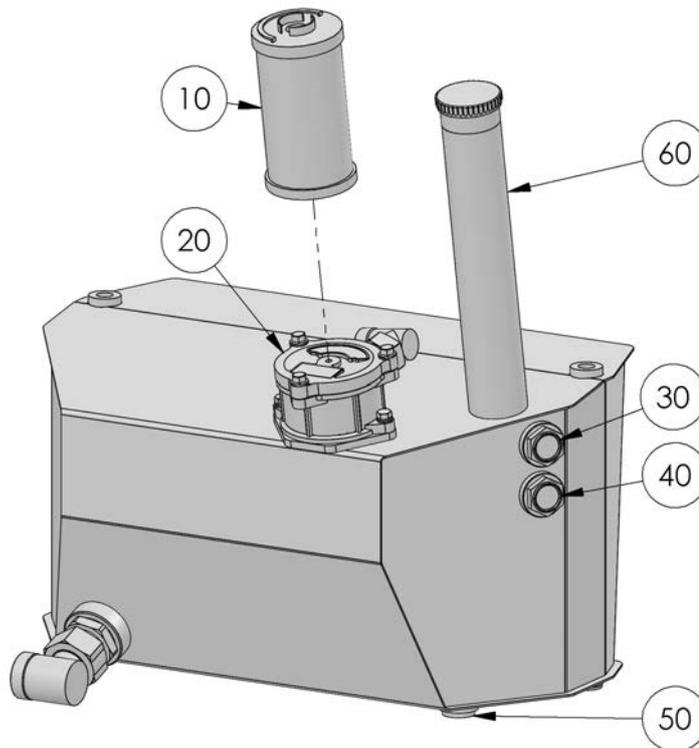
Only with empty brine tank!

- 1 Remove strainer (Pos. 10).
- 2 Clean strainer filter (Pos. 20).
- 3 Refit strainer (Pos. 10).

## 9.6 Change of hydraulic oil and hydraulic oil filter (optional)

Only with optional PTO hydraulic pump!

Change of hydraulic oil and hydraulic oil filter as follows:



Pos. No.	Function
10	Oil filter
20	Oil filter housing
30	Max. oil filling level
40	Min. oil filling level
50	Oil draining screw
60	Filler neck

- 1 Open oil draining screw (Pos. 50)
- 2 Collect the oil in an appropriate vessel.
- 3 Slacken three screws at the lid of the oil filter housing (Pos. 20)
- 4 Remove the old oil filter (Pos. 10) and dispose of properly.
- 5 Insert the new oil filter and screw the lid of the oil filter housing (Pos. 20) onto it.
- 6 Screw the oil draining screw (Pos. 50) into the tank and tighten it.
- 7 Fill hydraulic oil according to table (see Chapter 9.4 "*Lubricants and oils*", page 50) into the tank via filler neck (Pos. 60) (oil level should be between at least (Pos. 40) and max. (Pos. 30)).
- 8 Filling volume: 20 L

**Caution**

Mixing of oils.

Danger of property damage!

- Never mix oils with different specifications!
- 

**Caution**

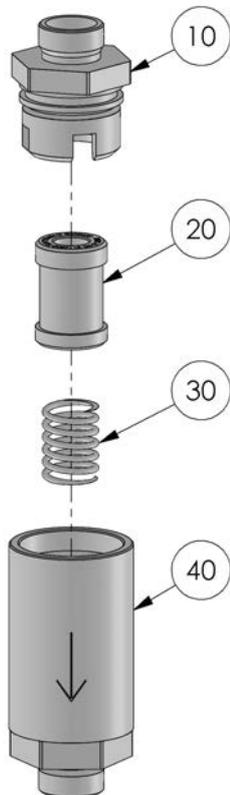
Carelessness when handling oil or lubricants.

Risk of injury!

- Avoid skin contact with oil and lubricants!
  - Protect your skin with skin-protection lotion or oil-resistant gloves!
  - Never use oil or lubricants to clean your hands!
  - Change dirty or oily clothes as soon as possible!
  - Wear protective goggles!
-



## 9.7 Cleaning/replacing of hydraulic oil pressure filter (optional)



- 1 Clamp housing (Pos. 40).
- 2 Unscrew lid (Pos. 10).
- 3 Clean/replace filter (Pos. 20).
- 4 Screw together in reverse order.

### Notice



Make sure the flow direction is correct during refitting [see arrow on housing (Pos. 40)]!



### Caution

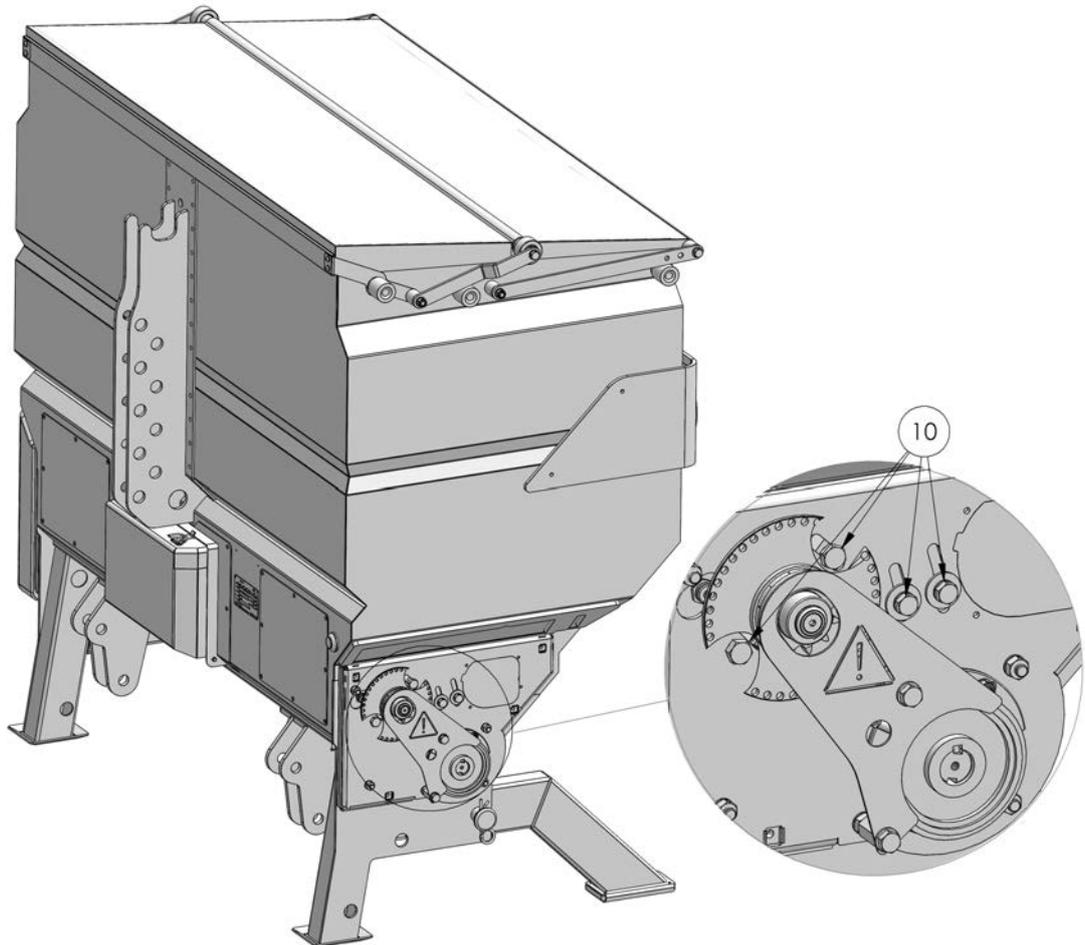
Carelessness when handling oil or lubricants.

Risk of injury!

- Avoid skin contact with oil and lubricants!
- Protect your skin with skin-protection lotion or oil-resistant gloves!
- Never use oil or lubricants to clean your hands!
- Change dirty or oily clothes as soon as possible!
- Wear protective goggles!

## 9.8 Tighten chain

You will find the drive chain of the conveyor screw under the right-hand and left-hand side lid. Remove this.



- 1 Slacken screws (Pos. 10).
- 2 Tighten chain.
- 3 Retighten screws (Pos. 10).



### Notice

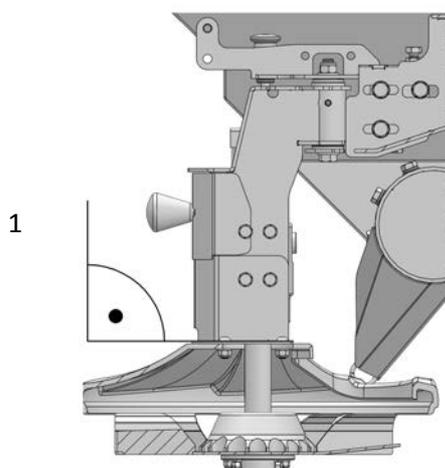
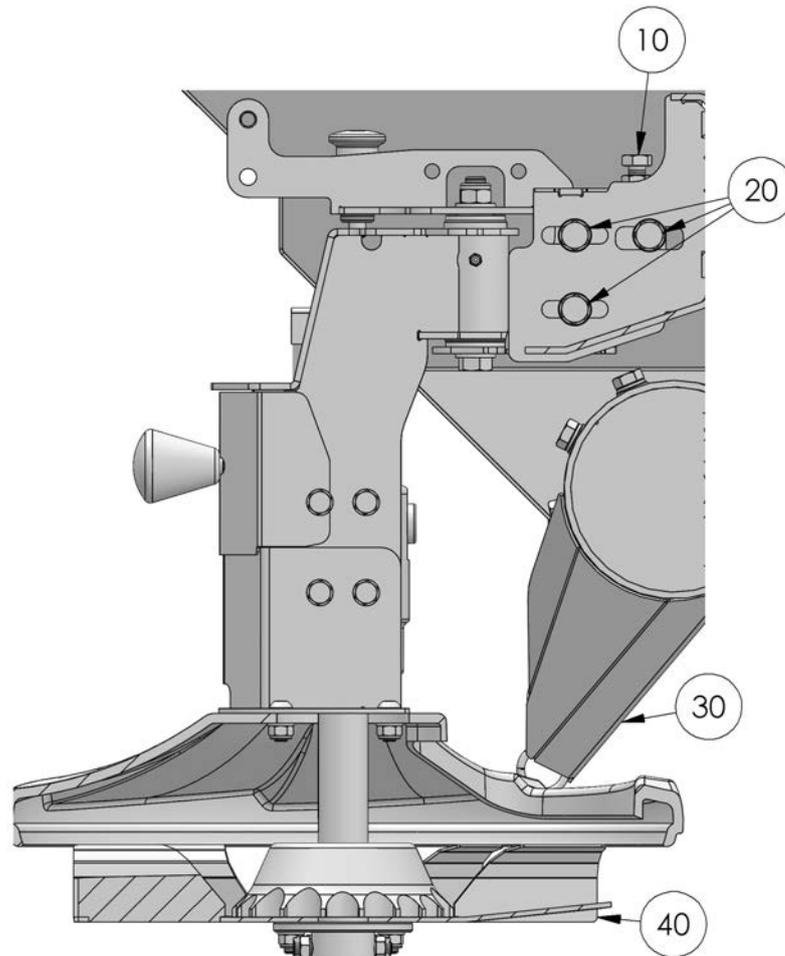
Observe Chapter 15. "Tightening torques ", page 79 !)

## 9.9 Setting of spreading disc

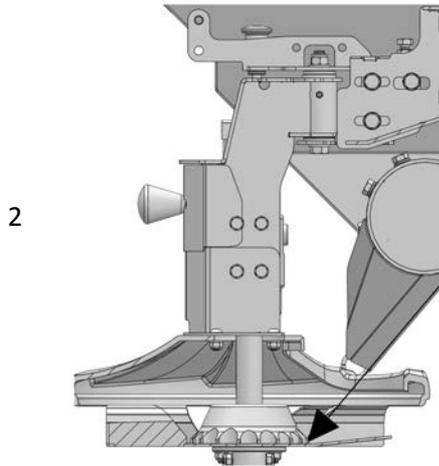


### Notice

The spreading disc is set at the factory.



- Slacken clamping screws on both sides (Pos. 20).
- Orientate the spreading disc (Pos. 40) by means of setting screw (Pos. 10).
- Tighten clamping screws (Pos. 20) on both sides and check orientation.



- Slacken clamping screws on both sides (Pos. 20).
- The chute should be set in a way that an extension of the chute (Pos. 30) would end up in the tothing of the spreading disc cone.
- Tighten clamping screws (Pos. 20) on both sides and check orientation.



### Warning

Rotating parts.

Risk of serious injury and death.

- During operation, never put your hands into spreading disc, conveyor screw or the optional agitator shaft!
- During the whole operation at the spreader, all lids must remain attached!
- During the whole operation at the spreader, the grid must remain mounted!
- During work at rotating parts, switch off the hydraulic system of the carrier vehicle and disconnect the vehicle!



### Caution

Parts continue to run.

Risk of injury.

- Always wait until all parts stand still before performing any work at the spreader!

## 9.10 Safety

During cleaning and maintenance work, please pay attention to the following:

- Make sure that all hydraulic lines are depressurised.
- Switch off the motor of the carrier vehicle and remove the ignition key.
- If possible, uncouple the carrier vehicle.
- Make sure that the spreader as well as the carrier vehicle are placed on even, solid and stable ground!
- Never use components of the spreader as climbing aid.
- When tightening screw connections, always use the prescribed tightening torques (see Chapter 15. "*Tightening torques*", page 79).

Please observe the safety instructions for maintenance (see Chapter 6.4 "*Maintenance*", page 23).

## 10 Transport

This chapter informs you on necessary precautions that have to be taken when transporting the spreader.



### Warning

Improper transport of spreader.

Risk of injury and property damage.

- For transport, use only the correct attachment points provided at the spreader!
  - Make sure that the spreader does not slip or fall over during transport!
  - Make sure that all locking pins are secured!
-

# 11 Storage

This chapter informs you on necessary precautions that have to be taken when putting the spreader into stock.



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## Notice

- Always store the spreader on secured support legs in parking position.
  - Always store the spreader empty.
  - Always store the spreader in a covered and frost-free area.
  - Protect the spreader against direct sunlight.
  - If you disconnect the hydraulic connectors, close the ends of the hydraulic connections with sealing plugs or optional pressure compensation vessels.
  - Clean the interior of the spreader.
  - Repaint damages to the paintwork.
  - After cleaning and repainting, seal the spreader inside and outside with a suitable protective agent, e.g. protective wax or anti-rust spray.
-

## **12 Disconnecting the system**

The spreader must be disposed of in accordance with local or state regulations. Depending on material, dispose of parts with residual waste or hazardous waste or recycle. Kugelmann takes no responsibility for disposal.

## 13 Technical Data

This chapter gives you information on the following:

- Chapter 13.1 *"Requirements for carrier vehicle"*, page 64
- Chapter 13.2 *"Technical data of spreader"*, page 65
  - Chapter 13.2.1 *"Standard"*, page 65
  - Chapter 13.2.2 *"Standard with brine"*, page 66
  - Chapter 13.2.3 *"Headpiece G"*, page 67
  - Chapter 13.2.4 *"Headpiece G with brine"*, page 68
  - Chapter 13.2.5 *"Headpiece S"*, page 69
  - Chapter 13.2.6 *"Headpiece S with brine"*, page 70

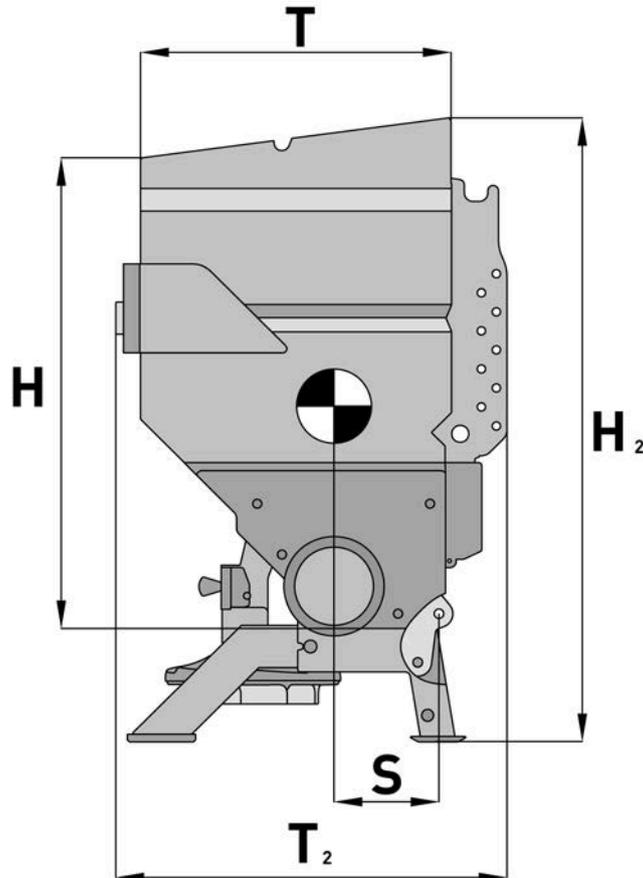
## 13.1 Requirements for carrier vehicle

The following requirements must be fulfilled at the carrier vehicle for faultless function of the spreader:

- Delivery volume of hydraulic system: 40 l/min: max. performance of hydraulic drives.  
  
lower delivery volume: reduced performance of hydraulic drives.  
  
higher delivery volume: possible overheating of hydraulic drives.
- Hydraulic pressure: max. 210 bar
- Ensure that the maximum permissible axle load and overall weight is not exceeded at carrier vehicle with mounted spreader.

## 13.2 Technical data of spreader

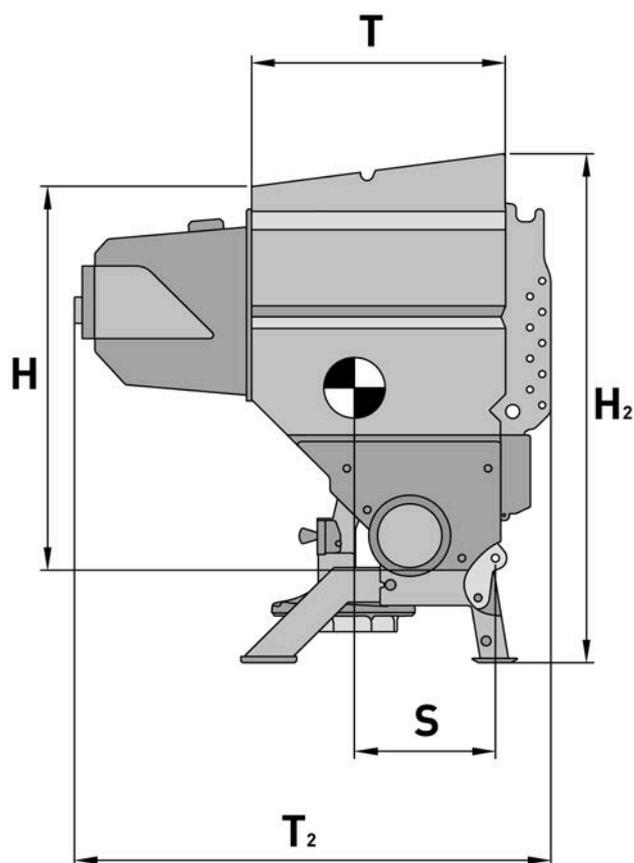
### 13.2.1 Standard



Type	D352	D652	D502	D902	D602	D1102	D752	D1352
Volume [m <sup>3</sup> ]	0.35	0.65	0.50	0.90	0.60	1.10	0.75	1.35
B [cm]	108		148		178		218	
T [cm]	52	73	52	73	52	73	52	73
H [cm]	90	110	90	110	90	110	90	110
T <sub>2</sub> [cm]	65	92	65	92	65	92	65	92
H <sub>2</sub> [cm]	128	148	128	148	128	148	128	148
S* [cm]	22	30	22	30	22	30	22	30
Net weight [kg]	270	320	310	350	350	380	390	430
Attachment 3-point CAT	0 / 1		1 / 2				1 / 2 / 3 / 4	

\* Dry material: Rock salt

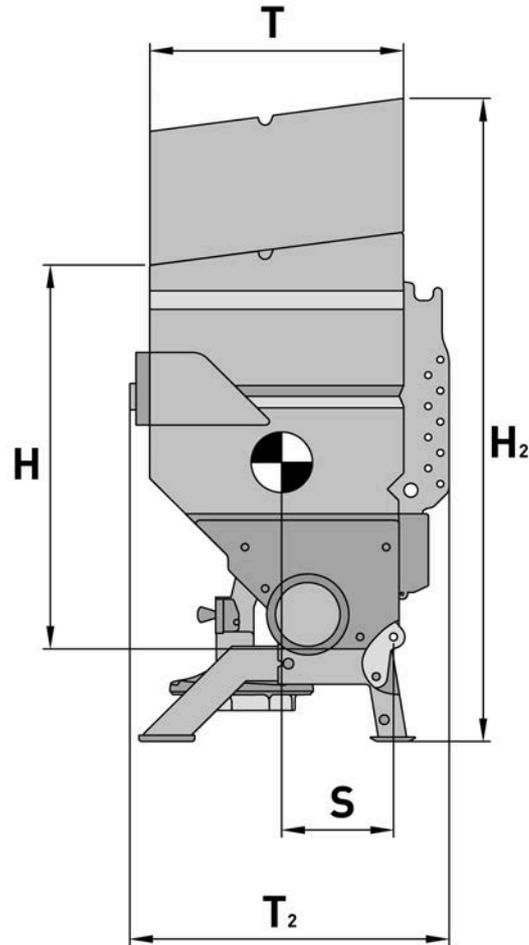
### 13.2.2 Standard with brine



Type	D352	D652	D502	D902	D602	D1102	D752	D1352
Volume [m <sup>3</sup> ]	0.35	0.65	0.50	0.90	0.60	1.10	0.75	1.35
B [cm]	108		148		178		218	
T [cm]	52	73	52	73	52	73	52	73
H [cm]	90	110	90	110	90	110	90	110
T <sub>2</sub> [cm]	110	144	110	144	110	144	110	144
H <sub>2</sub> [cm]	128	148	128	148	128	148	128	148
S* [cm]	30	37	31	38	32	39	33	40
Brine volume [l]	145 (FS30)	255 (FS30)	220 (FS30)	380 (FS30)	270 (FS30)	470 (FS30)	350 (FS30)	600 (FS30)
Net weight [kg]	345	405	395	445	440	485	490	550
Attachment 3-point CAT	0 / 1		1 / 2			1 / 2 / 3 / 4		

\* Dry material: Rock salt / tank: Brine

### 13.2.3 Headpiece G

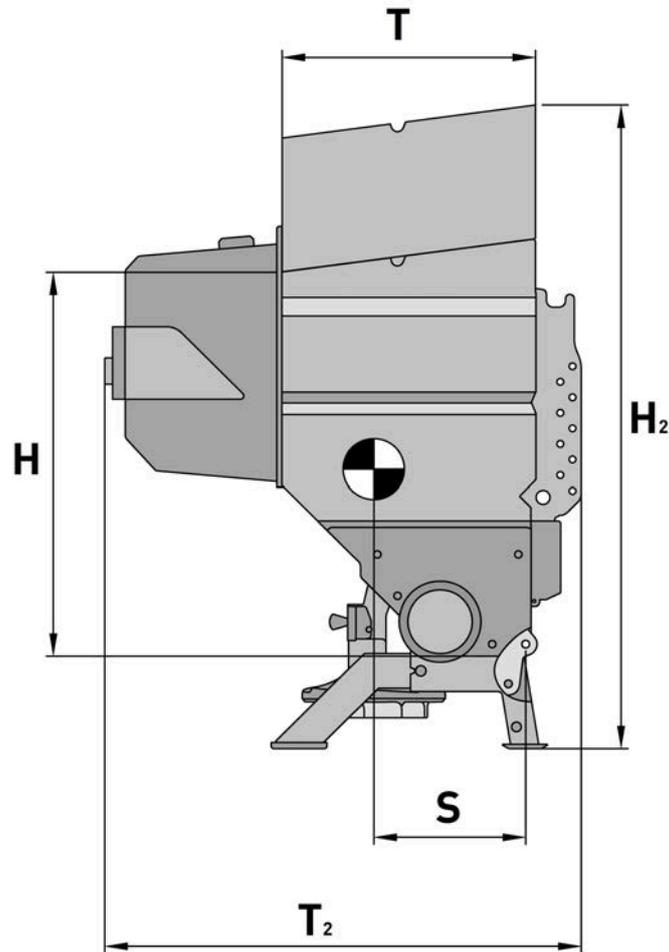


Type**	D352/ D452	D352/ D602	D652/ D802	D652/ D1002	D502/ D652	D502/ D802	D902/ D1102	D902/ D1302	D602/ D752	D602/ D1002	D1102/ D1302	D1102/ D1602	D752/ D952	D752/ D1202	D1352/ D1602	D1352/ D2002
Volume [m <sup>3</sup> ]	0.45	0.60	0.80	1.00	0.65	0.80	1.10	1.30	0.75	1.00	1.30	1.60	0.95	1.20	1.60	2.00
B [cm]	108				148				178				218			
T [cm]	52		73		52		73		52		73		52		73	
H [cm]	90		110		90		110		90		110		90		110	
T <sub>2</sub> [cm]	65		92		65		92		65		92		65		92	
H <sub>2</sub> [cm]	148	168	168	188	148	168	168	188	148	168	168	188	148	168	168	188
S* [cm]	23		31		23		31		23		31		23		31	
Net weight [kg]	300	310	350	360	340	355	385	400	385	400	420	435	430	450	470	490
Attachment 3-point CAT	0 / 1				1 / 2								1 / 2 / 3 / 4			

\* Dry material: Rock salt

\*\* Example D352/D452: Volume standard: 350 l / volume with headpieceG: 450 l

### 13.2.4 Headpiece G with brine

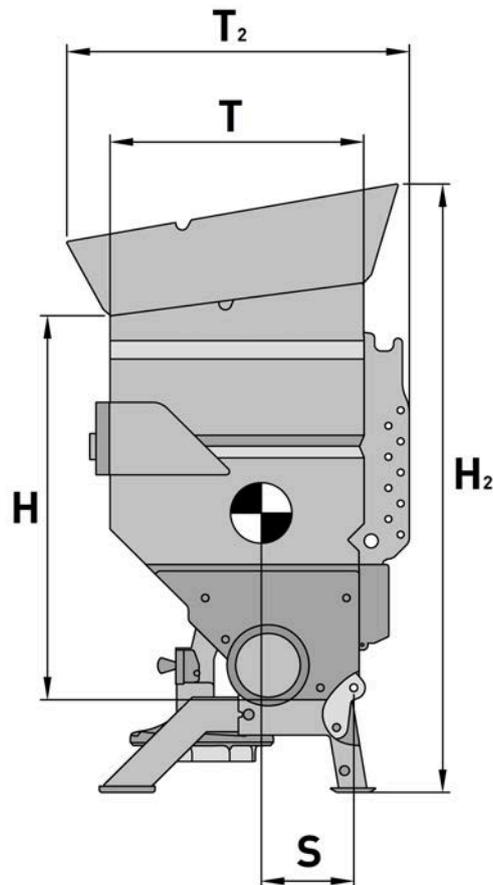


Type**	D352/ D452	D352/ D602	D652/ D802	D652/ D1002	D502/ D652	D502/ D802	D902/ D1102	D902/ D1302	D602/ D752	D602/ D1002	D1102/ D1302	D1102/ D1602	D752/ D952	D752/ D1202	D1352/ D1602	D1352/ D2002
Volume [m <sup>3</sup> ]	0.45	0.60	0.80	1.00	0.65	0.80	1.10	1.30	0.75	1.00	1.30	1.60	0.95	1.20	1.60	2.00
B [cm]	108				148				178				218			
T [cm]	52		73		52		73		52		73		52		73	
H [cm]	90		110		90		110		90		110		90		110	
T <sub>2</sub> [cm]	110		144		110		144		110		144		110		144	
H <sub>2</sub> [cm]	148	168	168	188	148	168	168	188	148	168	168	188	148	168	168	188
S* [cm]	35	33	36	35	35	33	36	35	35	33	36	35	35	33	36	35
Brine volume [l]	255	255	255	255	380	380	380	380	470	470	470	470	600	600	600	600
Net weight [kg]	385	395	435	445	435	450	480	495	490	505	525	540	550	570	590	610
Attachment 3-point CAT	0 / 1				1 / 2								1 / 2 / 3 / 4			

\* Dry material: Rock salt / tank: Brine

\*\* Example D352/D452: Volume standard: 350 l / volume with headpieceG: 450 l

### 13.2.5 Headpiece S

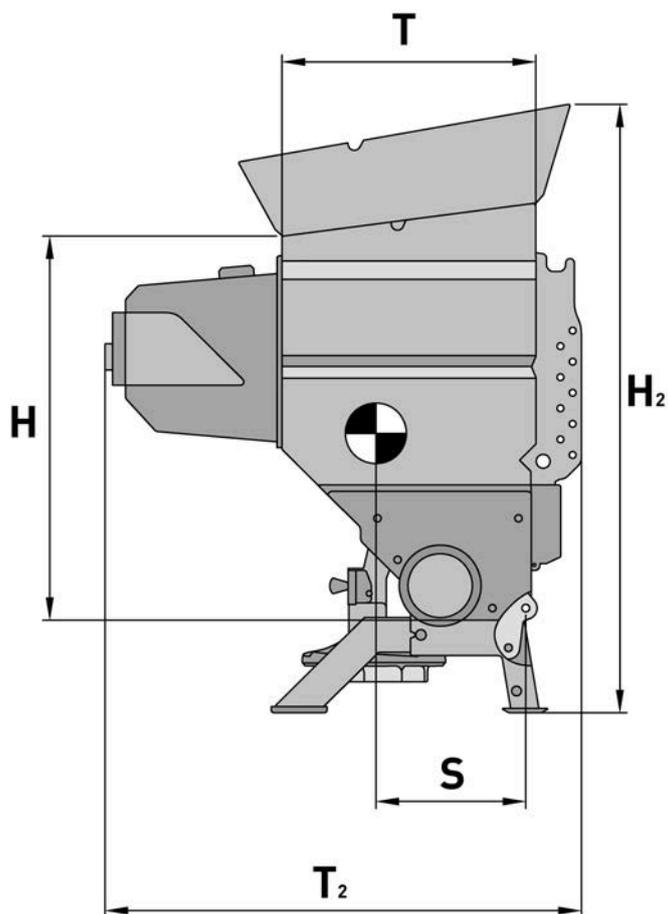


Type**	D652/ D902	D652/ D1102	D902/ D1252	D902/ D1552	D1102/ D1552	D1102/ D1852	D1352/ D1902	D1352/ D2302
Volume [m <sup>3</sup> ]	0.90	1.10	1.25	1.55	1.55	1.85	1.90	2.30
B [cm]	108		148		178		218	
T [cm]	73		73		73		73	
H [cm]	110							
T <sub>2</sub> [cm]	100		100		100		100	
H <sub>2</sub> [cm]	177	202	177	202	177	202	177	202
S* [cm]	30							
Net weight [kg]	355	370	390	410	425	445	480	505
Attachment 3-point CAT	0 / 1		1 / 2				1 / 2 / 3 / 4	

\* Dry material: Rock salt

\*\* Example D652/D902: Volume standard: 650 l / volume with headpieceS: 900 l

### 13.2.6 Headpiece S with brine



Type**	D652/D902	D652/ D1102	D902/ D1252	D902/ D1552	D1102/ D1552	D1102/ D1852	D1352/ D1902	D1352/ D2302
Volume [m <sup>3</sup> ]	0.90	1.10	1.25	1.55	1.55	1.85	1.90	2.30
B [cm]	108		148		178		218	
T [cm]	73		73		73		73	
H [cm]	110							
T <sub>2</sub> [cm]	110							
H <sub>2</sub> [cm]	177	202	177	202	177	202	177	202
S* [cm]	36	34	35	33	35	33	35	33
Brine volume [l]	255	255	380	380	470	470	600	600
Net weight [kg]	440	455	485	505	525	550	590	625
Attachment 3-point CAT	0 / 1		1 / 2				1 / 2 / 3 / 4	

\* Dry material: Rock salt / tank: Brine

\*\* Example D652/D902: Volume standard: 650 l / volume with headpieceS: 900 l

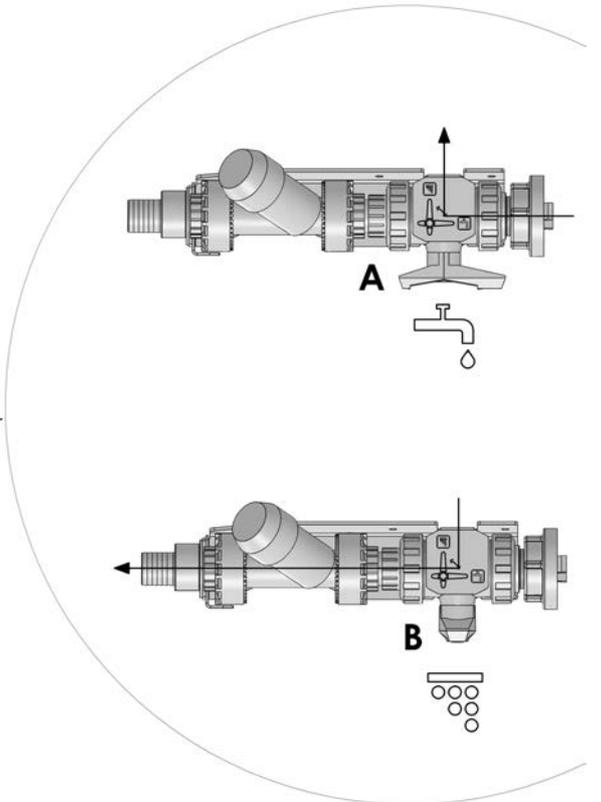
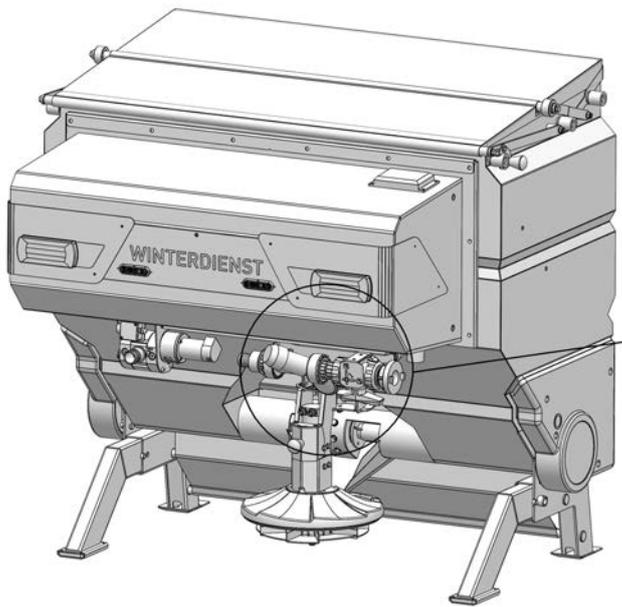
## 14 Options

The spreader can be equipped with optional components.

This chapter gives you information on the following:

- Chapter 14.1 *"Brine equipment (optional)", page 72*
- Chapter 14.2 *"Asymmetric partition wall (optional)", page 73*
- Chapter 14.3 *"Agitator shaft (optional)", page 73*
- Chapter 14.4 *"Dosage optimization refined salt (optional)", page 74*
- Chapter 14.5 *"Electrical adjustment of spreading pattern (optional)", page 75*
- Chapter 14.6 *"Electrical monitoring of spreading process (optional)", page 75*
- Chapter 14.7 *"Lighting (optional)", page 75*
- Chapter 14.8 *"Pulse generator/GPS sensor (optional)", page 76*
- Chapter 14.9 *"Outdoor temperature sensor (optional)", page 76*
- Chapter 14.10 *"Infrared sensor (optional)", page 76*
- Chapter 14.11 *"Camera kit (optional)", page 76*
- Chapter 14.12 *"PTO hydraulic pump with hydraulic tank (optional)", page 77*
- Chapter 14.13 *"Load sense equipment (optional)", page 78*
- Chapter 14.14 *"Pressure filter (optional)", page 78*
- Chapter 14.15 *"Rear apron (optional)", page 78*

# 14.1 Brine equipment (optional)



Position filling lever:	Symbol:	Function:
A		Filling brine tank
B		Operation spreading of brine



**Notice**

For more information, see Chapter 8.4 "Fill brine reservoir (optional)", page 41.

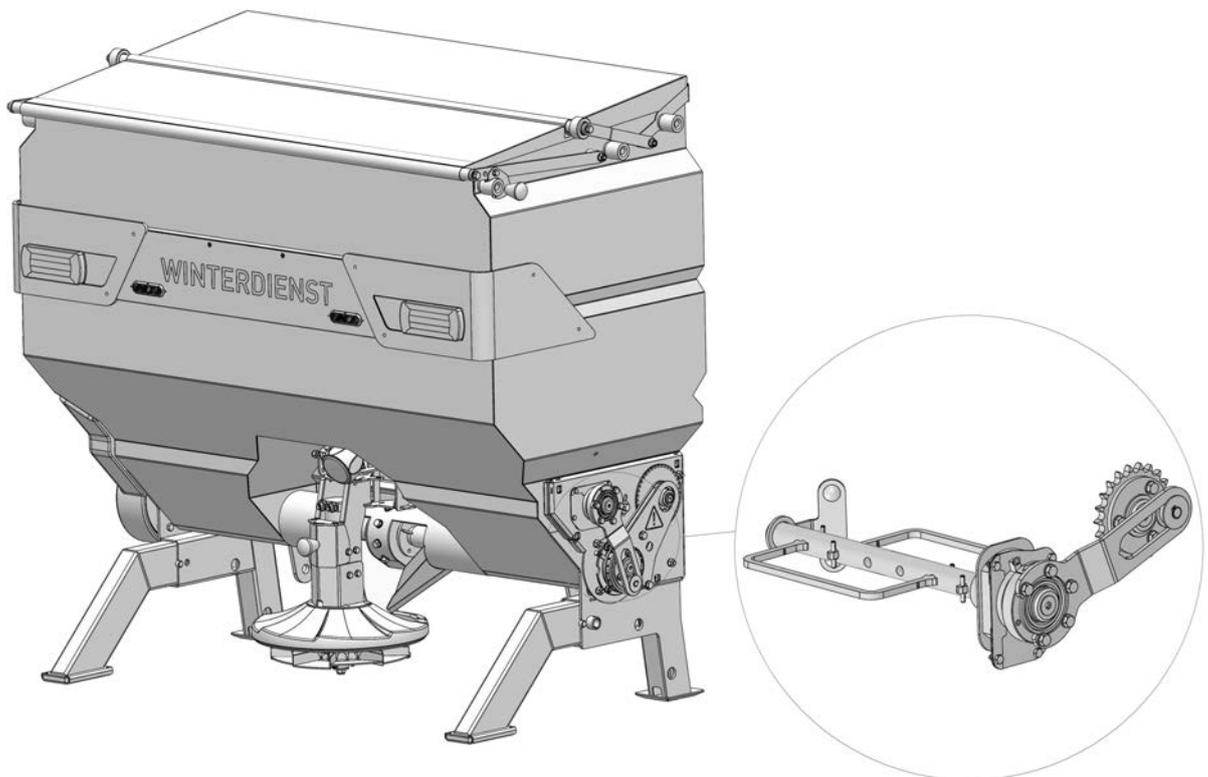
## 14.2 Asymmetric partition wall (optional)

This option leads to different volumes of the spreading chambers.

The standard version features the same volume of both spreading chambers.

## 14.3 Agitator shaft (optional)

An agitator shaft allows for bulking of the spreading agent.



### Caution

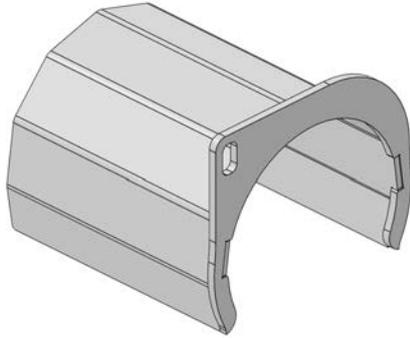
Rotating parts.

Risk of injury.

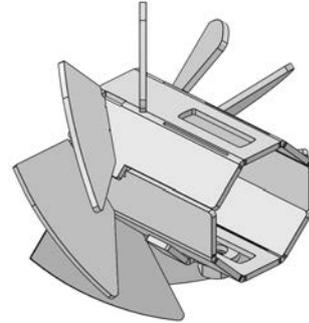
- During the whole operation at the spreader, all plastic side covers must remain attached!
- Never put your hands into the agitator shaft during operation!
- During the whole operation at the spreader, the grid must remain mounted!

## 14.4 Dosage optimization refined salt (optional)

Avoids trickling of refined salt.



Screw tunnel



Dosing star refined salt



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### Notice

Not suitable when using grit!

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## 14.5 Electrical adjustment of spreading pattern (optional)

See Chapter 7.6 "Location of spreading pattern", page 36.

## 14.6 Electrical monitoring of spreading process (optional)

This option serves to check the distribution of spreading material.

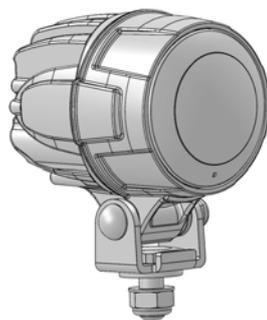
Optical and acoustic control at operating panel.

## 14.7 Lighting (optional)

The following optional lighting is available for the spreader:



"Winter road maintenance" sign  
with set of flash lamps



Working headlight

## **14.8 Pulse generator/GPS sensor (optional)**

With this option, the drive signal is taken as follows:

- via a sensor through a hole pattern/raster band at the carrier vehicle.
- via a GPS sensor.

## **14.9 Outdoor temperature sensor (optional)**

Display of outdoor temperature at operating panel.

## **14.10 Infrared sensor (optional)**

Sensor for non-contact measurement of ground temperature and automatic adjustment of spreading density.

## **14.11 Camera kit (optional)**

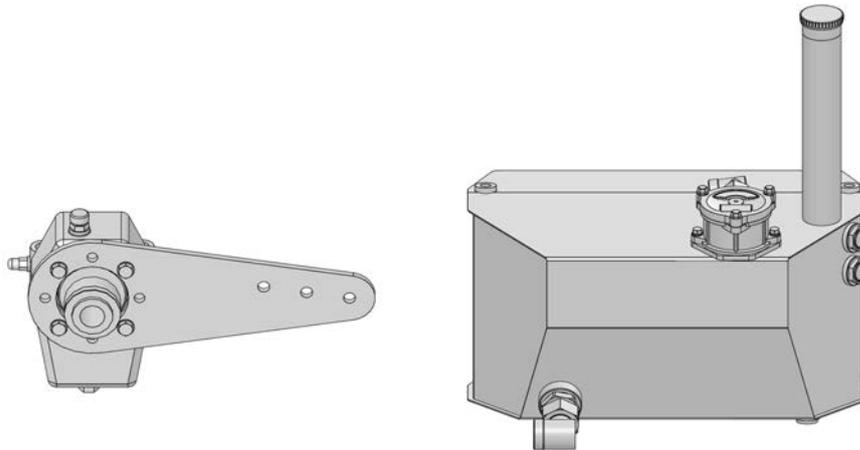
This option consists of a camera and a screen.

Extension for second camera prepared.

## 14.12 PTO hydraulic pump with hydraulic tank (optional)

By means of the additional option "PTO pump with hydraulic tank", a carrier vehicle not disposing of an appropriate hydraulic unit, may be equipped with a spreader.

The attached torque support counteracts the torque of the PTO hydraulic pump. Please attach at an appropriate place at the carrier vehicle.



PTO hydraulic pump:

- Displacement: 14 cm<sup>3</sup>
- Transmission oil: SAE 80W90 API GL-4
- Filling volume: Center of sight glass



### Caution

Max. PTO speed exceeded.

Risk of injury and property damage.

- The PTO speed must not exceed 540 rpm!



### Notice

For more information, see Chapter 9.6 "Change of hydraulic oil and hydraulic oil filter (optional)", page 52

## 14.13 Load sense equipment (optional)

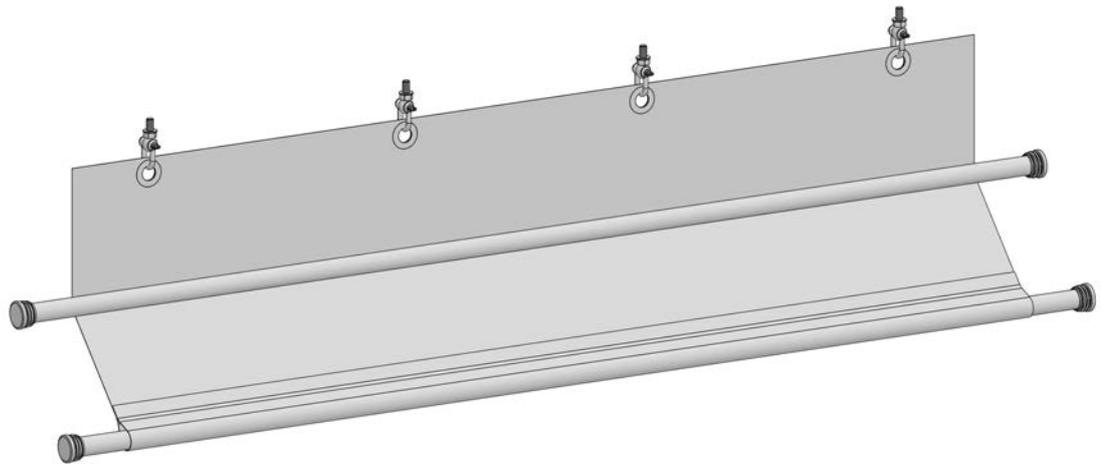
The load sense equipment (active/passive) makes sure that the pump only delivers volume flow needed for the spreader.

## 14.14 Pressure filter (optional)

With this option, a hydraulic oil filter is mounted in the pressure line.

## 14.15 Rear apron (optional)

The option “rear apron” protects the carrier vehicle from flying spreading material.



# 15 Tightening torques

## Shaft screws stainless steel

- metric standard thread
- property class 70
- $\mu = 0.12$  (Anti-seize paste)

Thread	M5	M6	M8	M10	M12	M14	M16
Tightening torque [Nm]	4	7	16	33	56	93	136

## Shaft screws steel

- metric standard thread
- zinc-plated
- property class 8.8 and 10.9
- $\mu = 0.14$  (unlubricated)

Thread	M5	M6	M8	M10	M12	M14	M16
Tightening torque [Nm] 8.8	6	10	25	50	85	140	210
Tightening torque [Nm] 10.9	9	15	35	75	130	200	310

## Shaft screws steel

- metric standard thread
- zinc-flake coated
- property class 8.8 and 10.9
- $\mu = 0.12$  (unlubricated)

Thread	M5	M6	M8	M10	M12	M14	M16
Tightening torque [Nm] 8.8	6	9	24	48	84	133	205
Tightening torque [Nm] 10.9	8	14	34	70	120	180	280

# Warranty

Kugelmann Maschinenbau e.K., 87675 Rettenbach a.A., warrants its machines to be free from defects in material and workmanship and undertakes to replace free of charge all parts ex works which have been purchased from relevant Kugelmann dealers and have been acknowledged as defective after having been checked by Kugelmann. The warranty expressly given shall be limited to a period of 12 months from the date of delivery of the machine to purchaser. All further claims by the customer shall be excluded.

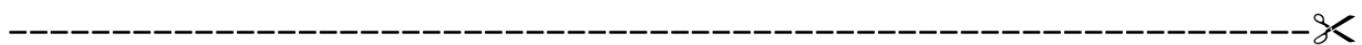
All wear parts are excluded from warranty.

The manufacturer takes no responsibility for third-party products not produced at the works of Kugelmann. However, we assign our claims against the supplier to the customer. No warranty will be given for machines purchased second-hand or used and modified or converted machines.



## Notice

Please make sure that you fill in your warranty card and send it back to the manufacturer immediately. Claims have to be notified with a warranty claim in writing after their occurrence without undue delay (after 30 days at the latest).



*Company*  
*Kugelmann Maschinenbau e.K.*  
*Gewerbepark 1-5*  
  
*87675 Rettenbach a.A.*  
*Germany*

Device type: .....  
Serial number: .....  
Vehicle identification  
number: .....  
Year of construction: .....  
Address of dealer:  
.....  
.....  
.....  
Address of user/owner:  
.....  
.....  
.....

I have read the operating instructions.

Signature of user: .....

The warranty card has to be sent directly to the manufacturer.

ATTENTION: Warranty claims are only accepted with the warranty card of Kugelmann Maschinenbau e.K.

