



**RAUCH**  
wir nehmen's genau

# INSTRUCTION MANUAL



**Please read carefully  
before using the ma-  
chine.**

Keep for future reference.

This instruction manual/assembly instruction is to be considered as part of the machine. Suppliers of new and second-hand machines are required to document in writing that the instruction manual/assembly instruction was delivered with the machine and handed over to the customer.

# TWS 85.1

Original instructions

5901746-a-en-1015

## Preface

Dear Customer

By purchasing the load transfer vehicle **TWS 85.1** you have shown confidence in our product. Thank you very much! We want to justify this confidence. You have purchased a powerful and reliable machine.

However, in case unexpected problems arise: Our customer service is always there for you.



**Please read this operator's manual carefully before commissioning the load transfer vehicle and follow the advice given.**

This operator's manual gives detailed instructions on the operation of the machine, as well as valuable information on assembly, maintenance, and care.

This manual may also describe equipment that is not included in your machine.

Please note that damage caused by incorrect operation or improper use is not covered by warranty claims.

### NOTE

**Please enter the type and serial number together with the year of manufacture of your load transfer vehicle here.**

This information can be obtained from the nameplate and/or at the frame.

Please state this information when ordering spare parts or accessories, and in case of complaints.

Type:

Serial number:

Year of manufacture:

## Technical improvements

**We are continuously improving our products. Therefore, we reserve the right to make any improvements and changes to our machine that we consider necessary without notice. This constitutes no obligation to make such improvements or changes on machines that have already been sold.**

We will be pleased to answer any other questions that you might have.

Yours sincerely

RAUCH

Landmaschinenfabrik GmbH

## Preface

Technical improvements

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# 1 Intended use and declaration of conformity

## 1.1 Intended use

The load transfer vehicle **TWS 85.1** may only be used in accordance with the stipulations of the present operator's manual.

The load transfer vehicle **TWS 85.1** has been constructed in accordance with its intended use. It may be exclusively used for the points listed below:

- for the **transport** of dry, granular and crystalline fertilisers and seeds
- for **transfer** of dry, granular and crystalline fertilisers and seeds
- Beyond this, the load transfer vehicle **TWS 85.1** is only suitable for the spreading of dry, granular and crystalline fertilisers and seeds when using a RAUCH attachment fertiliser spreader of the AXIS series.

See [4.3.2: Fertiliser spreader, page 28](#)

Any use beyond these specifications is considered as contrary to the intended use. The manufacturer shall not assume any liability for any damages resulting in this respect. The risk is solely carried by the operator.

The intended use also comprises the compliance with the operating, maintenance and repair conditions prescribed by the manufacturer. For replacement purposes, only original spare parts by the manufacturer may be used.

The load transfer vehicle **TWS 85.1** may only be used, maintained and repaired by people who are familiar with the characteristics of the machine and who are aware of the risks.

The instructions regarding the operation, service and safe handling of the machine as described in this operator's manual and declared by the manufacturer in the form of warning signs and symbols on the machine must be strictly followed during operation.

Moreover, the relevant accident prevention regulations and other generally recognised safety, occupational health, and road traffic regulations must be strictly observed when using the machine.

Unauthorised modifications to the load transfer vehicle **TWS 85.1** are not permitted. Such modifications exclude any liability of the manufacturer for any resulting damages.

In the following chapters, the load transfer vehicle will be referred to as the "**machine**".

### **Foreseeable misuse**

The manufacturer provides warning notes and signs on the load transfer vehicle **TWS 85.1** relating to foreseeable misuse. These warning notes and pictorial warnings are to be respected in any case in order to avoid using the load transfer vehicle **TWS 85.1** in a way that contradicts the intentions of the operator's manual.

## 1 Intended use and declaration of conformity

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### 1.2 EC declaration of conformity

In accordance with 2006/42/EC, Appendix II, No. 1.A

**Rauch - Landmaschinenfabrik GmbH,  
Landstrasse 14, 76547 Sinzheim, Germany**

We hereby declare that the product:

**Load transfer vehicle TWS 85.1**

complies with all relevant regulations of the EC Machinery Directive 2006/42/EC.

**Technical documents compiled by:**

Rauch - Design Management

Landstrasse 14, 76547 Sinzheim, Germany

*Norbert Rauch*

(Norbert Rauch - Managing Director)

## 2 User instructions

### 2.1 About this operator's manual

This operator's manual is an **integral part** of the machine.

The operator's manual contains important information for a **safe, appropriate** and economic **use** and **maintenance** of the machine. Adherence to this operator's manual helps to **avoid risks**, to reduce repair costs and downtime, and to increase the machine's reliability and service life.

The complete documentation, comprising this operator's manual and any other documents provided, must be kept in an easily accessible location close to where the machine is used (e.g. in the tractor).

If the machine is sold, the operator's manual must also be passed to the new owner.

The operator's manual is intended for the operator of the machine and anyone involved in operating and maintaining it. It must be read, understood, and applied by all persons entrusted with the following work on the machine:

- Operation,
- Maintenance and cleaning,
- Repairing faults.

In particular, the following is to be observed:

- The chapter on safety,
- The warning instructions in the text of the individual chapters.

The **operator's manual does not replace** your **own responsibility** as the operator and operating personnel of the control unit.

### 2.2 Structure of the operator's manual

The operator's manual is divided into six key areas in terms of content:

- User instructions
- Safety instructions
- Machine data
- Instructions on the operation of the machine,
  - Transportation
  - Commissioning
  - Spreading operation
- Instructions on detecting and rectifying faults
- Maintenance and repair instructions

### 2.3 Notes on text descriptions

#### 2.3.1 Instructions and procedures

Steps that the operator must carry out are shown as a numbered list.

1. Instruction for action step 1
2. Instruction for action step 2

Instructions involving only one step are not numbered. The same applies for action steps that do not have a specific sequence.

A bullet is placed in front of these instructions:

- Handling instruction

#### 2.3.2 Listings

Listings without a specific sequence are shown with bullet points (level 1) and dashes (level 2):

- Property A
  - Point A
  - Point B
- Property B

#### 2.3.3 References

References to other text passages in the document are indicated with section number, headline text and page number:

- **Example:** See also Chapter [3: Safety, page 5](#).

References to other documents are indicated as note or instruction without exact chapter or page number:

- **Example:** Please also observe the instructions contained in the manual for the universal drive shaft.

### 3 Safety

#### 3.1 General information

The chapter **Safety** contains basic warning notes as well as working and traffic safety instructions for the usage of the towed machine.

The adherence to the instructions in this chapter is a prerequisite for the safe handling and trouble-free operation of the machine.

There are additional warnings in the other chapters of this operator's manual, which must also be observed. The warning instructions are given before the text for the relevant actions.

Warning notes on the supplier components can be found in the respective supplier documentation. These warning instructions must also be observed.

#### 3.2 Significance of warnings

The warning instructions in this manual have been structured according to the degree of danger and the probability of their occurrence.

Danger signs and symbols inform the user about other construction-related and unavoidable residual risks that may be encountered when operating the machine. The warning notes used are structured as follows:

<b>Signal word</b>	
Symbol	Explanation

#### Example

<b>▲ DANGER</b>	
	<p><b>Risk to life if warning is not observed</b></p> <p>Description of the danger and possible consequences.</p> <p>Ignoring these warnings will result in very serious or even fatal injury.</p> <p>▶ Measures to prevent the danger.</p>

### Warning severity level

The degree of danger is indicated by the signal word. The levels are classified as follows:

#### ▲ DANGER



##### Type and source of danger

This warning warns of a danger posing an immediate threat to the health and life of persons.

Ignoring these warnings will result in very serious or even fatal injury.

- ▶ Always observe the measures described to prevent this danger.
- 

#### ▲ WARNING



##### Type and source of danger

This warning warns of a possible dangerous situation for the health of persons.

Ignoring these warnings will result in very serious injury.

- ▶ Always observe the measures described to prevent this danger.
- 

#### ▲ CAUTION



##### Type and source of danger

This warning warns of a potentially dangerous situation for personal health or of material and environmental damage.

Ignoring this warning can result in injuries and damage to the product or the general area.

- ▶ Always observe the measures described to prevent this danger.
- 

#### NOTICE

General information containing application tips and particularly useful information, but which constitutes neither warnings nor hazards.

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### 3.3 General information on the safety of the machine

The machine is constructed in accordance with the state of the art and the recognized technical regulations. However, its usage and maintenance may cause danger to the health and life of the operator or third parties and/or the impairment of the machine and other material assets.

For this reason, the machine may only be operated

- when it is in a proper and roadworthy condition,
- in awareness of safety and dangers.

Therefore, it is imperative that you have read and understood the contents of the operator's manual. You must be familiar with the applicable accident protection regulations and the generally accepted regulations for safety, occupational health, and road traffic, and apply these rules as required.

### 3.4 Instructions for the operator

It is the operator's responsibility that the machine is used as intended.

#### 3.4.1 Personnel qualifications

Before starting any work on or with the machine, all persons who are involved in operation, maintenance or repair must have read and understood this operator's manual.

- The machine may only be operated by instructed personnel authorized by the owner.
- Members of staff who are still in training or subject to coaching/instructions may only work on the machine when an experienced person is present.
- Only qualified maintenance staff may implement maintenance and service work.

#### 3.4.2 Instruction

Distribution partners, works representatives or employees of RAUCH will instruct the operator regarding the operation and maintenance of the machine.

The owner must ensure that newly recruited operating and maintenance personnel are instructed to the same extent and with the same care with regard to the operation and repair of the machine in compliance with this operator's manual.

### 3.4.3 Accident prevention

Safety and accident prevention regulations are governed by law in every country. The operator of the machine shall be responsible for the compliance with these regulations applicable in the country of use.

The following instructions must also be observed:

- Never let the machine run without supervision.
- Do not ride on the machine while it is working or being transported (**no passengers**).
- Do **not** use machine parts as climbing aids.
- Always wear tight fitting clothes. Do not wear work clothes with belts, loose threads or other items that could snag.
- Follow the manufacturer's warning notes when handling chemicals. You may have to wear personal protective equipment (PPE).

### 3.5 Information on operational safety

Only use the machine in an operational safe state. Avoid hazardous situations as follows.

#### 3.5.1 Unhitching and parking the machine

Only park the machine on level, solid ground.

Before uncoupling the machine, ensure that it is secured against tilting and rolling away.

- Has the parking brake been applied?
- Is the parking support folded down and secured?
- Are the wheels secured by wheel chocks?

Further information can be found in chapter [7.7: Parking and decoupling the load transfer vehicle, page 66](#)

### 3.5.2 Filling the machine

- Connect the machine to the tractor before filling it.
- Only fill the machine when the motor of the tractor is stopped. Remove the ignition key in order to ensure that the motor cannot be started.
- Avoid one-sided loading of the axle due to uneven loading of the machine. Since the machine is a uni-axial vehicle, there is a danger of a surging up of the trailer unit in the case of a one-sided, tail-heavy loading.
- Use suitable auxiliary equipment for filling the machine (e.g. front-end loader, feed screw conveyor).
- Please observe the admissible total weight. Check the filling level in the hopper.
- Only fill the machine with the protective grid closed. This way, faults during spreading caused by lumps in the spreading material or other foreign bodies are prevented.

### 3.5.3 Checks before start-up

Check the operating safety of the machine before the first and every subsequent start-up.

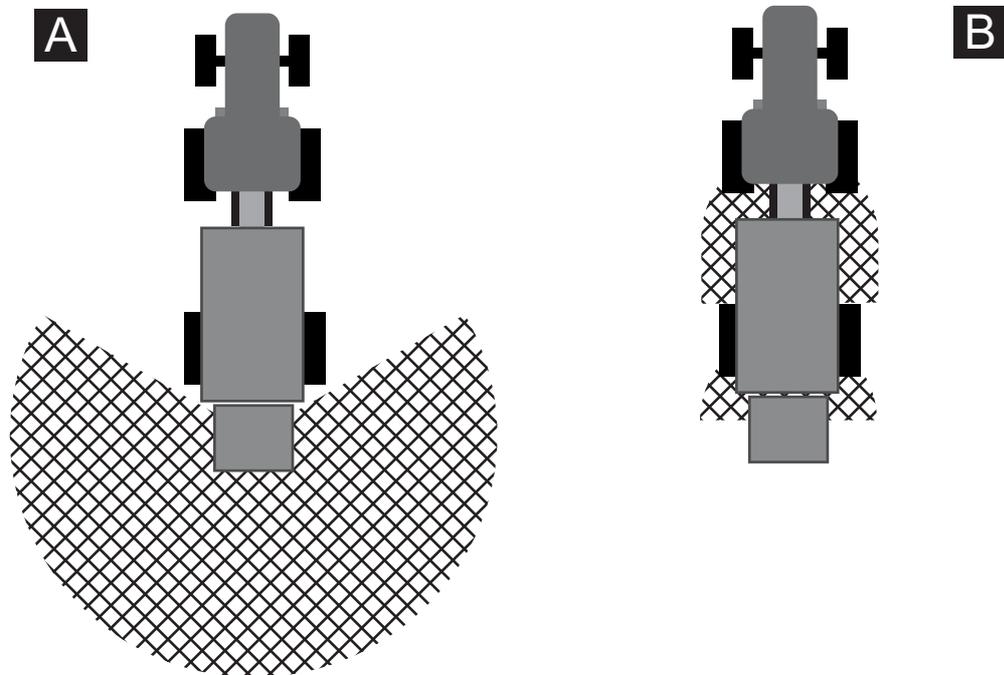
- Are all safety devices at the machine installed and functioning?
- Are all fasteners and load-bearing connections tightly installed and in good condition?
- Are the protective grids in the hopper closed and locked?
- Is the test dimension of the protective grid lock within the proper range? See [figure 9.5](#) on [page 78](#).
- Is the hazard zone of the machine clear of persons?
- Is the drive shaft cover in good condition (depending on model)?

### 3.5.4 Hazard zone

Ejected spreading material may cause serious injury (e. g. to eyes).

When persons are present between the tractor and the machine, there is a great hazard caused by the tractor rolling away or by machine movements which may have fatal consequences.

The following figure shows the hazard zones of the machine.



**Figure 3.1:** Hazard zones of towed and attached devices

[A] Hazard zone in spreading operation

[B] Hazard zone when coupling/de-coupling the machine and the attachment

- For this reason, ensure that nobody is present in the spreading range [A] of the machine.
- Immediately stop the machine and the tractor if persons are present in the hazard zone of the machine.
- When coupling/de-coupling the machine to the tractor or attaching/removing the attachment, ensure that nobody is present in hazard zone [B].

### 3.5.5 Operation

- If the machine malfunctions, stop the machine immediately and secure it. Have the fault repaired immediately by qualified technicians.
- Never climb onto the machine while the spreader unit is running.
- Only operate the machine with the protective grid in the hopper closed. During operation, the protective grid **must neither be opened nor removed**.
- Rotating machine components may cause serious injury. For this reason, ensure that you avoid any contact between body parts or clothes and rotating components.
- Do not deposit any external parts (such as bolts, nuts) in the spreader hopper.
- Powered spreading material may cause serious injury (e. g. to eyes). For this reason, ensure that nobody is present in the overload range of the machine.
- If the wind speed is too high, stop the spreading operation because the specified spreading range cannot be guaranteed under such conditions.
- Never climb onto the machine or the tractor when it is situated beneath high-voltage electrical power lines.

### 3.5.6 Wheels and brakes

Due to the high overall weight and the terrain to be driven on, the chassis of the towed machine is subject to high stress. In order to ensure the operational safety, the following points have to be ensured in particular:

- Only use wheels and tyres which meet the technical requirements stipulated by the manufacturer.
- The wheels may not have any lateral run-out or inadmissible offset.
- Check the inflation pressure and the functionality of the brake before every drive.
- Have the brake pads changed in time. Only use brake pads which meet the technical requirements stipulated by the manufacturer.
- Always cover the wheel bearings with dust caps. This helps to avoid contamination.
- Please also respect the admissible maximum load of the wheels (refer to entry in the type report)

### 3.6 Use of fertiliser

An inappropriate selection or usage of the fertiliser may lead to severe personal injury or environmental damages.

- When selecting the fertiliser, inform yourself about its effects on persons, the environment, and the machine.
- Please follow the instructions of the fertiliser manufacturer exactly.

### 3.7 Hydraulic system

The hydraulic system is under high pressure.

Fluid escaping under high pressure can cause serious injuries and environmental damage. The following instructions must be observed to prevent danger:

- Always operate the machine below the permissible maximum operating pressure.
- Depressurise the hydraulic system **before** any **maintenance work**. Turn the tractor motor off. Secure it against reactivation.
- When looking for leaks, wear **protective glasses** and **protective gloves at all times**.
- In the case of injury in connection with hydraulic oil, **consult a physician immediately** as severe infections may occur otherwise.
- When connecting the hydraulic hoses to the tractor, ensure that the hydraulic system is **depressurised**, both on the tractor and the machine side.
- Attach the hydraulic hoses of the tractor and the spreader hydraulic systems only with the prescribed connections.
- Prevent any contamination of the hydraulic circuit. Always suspend the couplings in the brackets provided. Use the dust caps. Clean the connections before joining them.
- Regularly check the hydraulic components and hydraulic hose lines for mechanical defects, e.g. cuts and abrasions, contusions, bends, tears, porosity etc.
- Even when stored correctly and used within approved load limits, hoses and hose couplings are subject to a natural ageing process. This limits their storage and service life.

The service life of the hose lines may not exceed 6 years, including a possible storage time of maximally 2 years.

The date of manufacture of the hoses is indicated on the hose coupling in month and year

- Replace hydraulic hoses if damaged or aged.
- Replacement of hydraulic hoses must meet the technical requirements of the equipment manufacturer. In particular, note the different maximum pressure ratings of replacement hoses.

## 3.8 Maintenance and service

Maintenance and service work involves additional hazards that do not occur during operation of the machine.

- Any maintenance and service work is to be conducted with increased alertness at all times. Work very carefully and with awareness of danger.

### 3.8.1 Qualifications of maintenance staff

- Welding and work on the electrical and hydraulic systems is to be carried out by qualified technicians only.
- Repair work on tyres and wheels may only be carried out by specialised staff with the suitable mounting tools.
- Setting and repair work on the brake system may only be carried out by specialist workshops.

### 3.8.2 Wear parts

- The maintenance and service intervals described in the present operator's manual are to be strictly adhered to at all times.
- Furthermore, the maintenance and service intervals of the supplier components must also be complied with. See the supplier documentation for the relevant intervals.
- We recommend that you have the condition of the machine checked after each season by your specialist dealer, paying particular attention to its fixing components, safety-relevant plastic components, hydraulic system, metering parts and spreader vanes.
- Spare parts must at least comply with the technical requirements specified by the manufacturer. The technical standards can be guaranteed by using genuine spare parts.
- Self-locking nuts are designed to be used only once. Always use new self-locking nuts to secure components (e. g. covers).

### 3.8.3 Maintenance and service work

- **Always switch off the tractor engine** before all cleaning, maintenance and service work and when troubleshooting. **Wait until all rotating parts of the machine have come to a standstill.**
- Make sure that **no unauthorised person** can start the machine. Remove the ignition key of the tractor.
- Before any maintenance and service work, separate the power supply between the tractor and the machine.
- Disconnect the power supply before working on the electrical system.
- Check that the tractor with the machine is correctly parked. Park the spreader with an empty hopper on level, solid ground and secure it against rolling away.
- Before carrying out any maintenance and service work, depressurise the hydraulic system.
- Never remove any clogging in the spreader hopper with your hand or foot, but use suitable tools for this purpose. In order to avoid clogging, only fill the hopper when the protective grid is mounted.
- Before cleaning the machine with water, steam or other cleaning agents, cover all components that must not get wet (e.g. bearings, electrical connections).
- Regularly check nuts and bolts for their tight seat. Retighten loose connections.
- After having driven the first 5km, check the tightening torque of each wheel nut. [See also “Replacing wheels“ on page 89.](#)
- Regularly check nuts and screws for their tight fit and retighten loose connections.

## 3.9 Safety in traffic

When driving on public streets and roads, the tractor with the towed machine and attached fertiliser spreader must comply with the road traffic regulations of the respective country. The owner and driver are responsible for compliance with these regulations.

### 3.9.1 Checks before driving

The pre-departure check is an important contribution to road safety. Before every trip, check compliance with the operating conditions, traffic safety, and the regulations of the country of use.

- Is the permissible total weight complied with? Check that the admissible trailer load and bearing load of the trailer unit as well as the admissible axle load are not exceeded.
- Check that the admissible trailer load and bearing load of the trailer unit as well as the admissible axle load, the admissible braking load, the tyre load capacity and the inflation pressure are not exceeded.
- Is the machine attached appropriately?
- Could fertiliser be lost while travelling?
  - Check the level of the fertiliser in the hopper.
  - The slide must be closed.
  - Switch off the electronic control unit.
- Check the wheel pressure and the function of the braking system of the machine. Note the permitted axle load and the permitted tyre load capacity.
- Is the hopper cover closed and secured against unintentional opening?
- Does the lighting and marking of the machine comply with the regulations of your country with respect to driving on public roads? Make sure that warning signs, reflectors, and auxiliary lights are correctly placed.

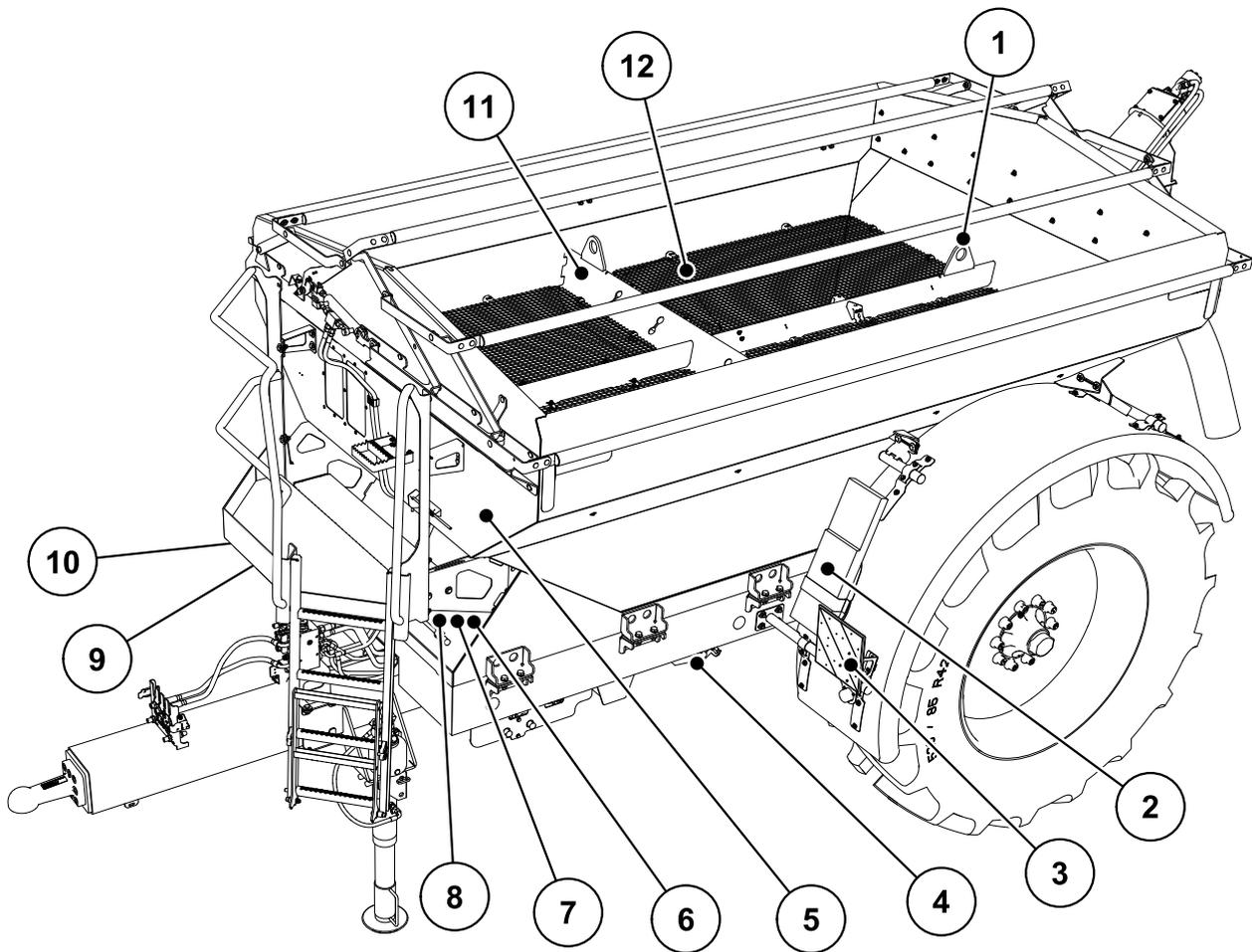
### 3.9.2 Using the machine for transport

Handling, steering, and braking performance of the tractor are affected by the towed machine. This means, for example, that an excessive static load of the machine will reduce the weight on the tractor's front axle and affect its steering.

- Be aware of the changed driving behaviour.
- When driving, always ensure that there is sufficient visibility. If vision is restricted (e.g. when reversing), another person is required to direct the driver.
- Observe the permissible maximum speed.
- Avoid sudden turns when driving uphill or downhill or across a slope. Due to the changed centre of gravity, there is a danger of overturning. Special care is to be particularly applied when driving on uneven, soft ground (e.g. when entering fields, kerbs).
- Passengers are prohibited on the machine during the drive and during operation.
- If required, attach a front weight to your tractor. For further information, please refer to the operator's manual of the tractor.

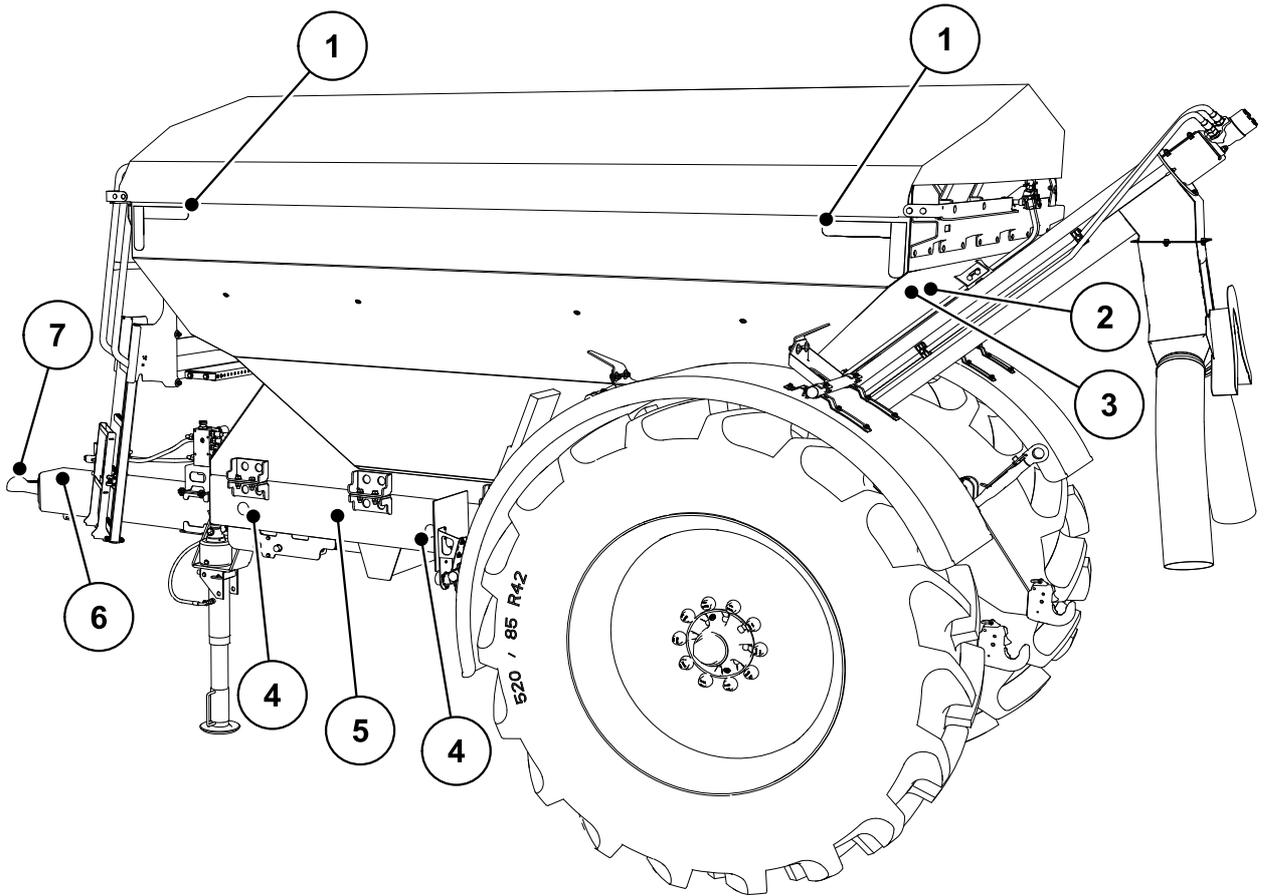
### 3.10 Safety devices at the machine

#### 3.10.1 Position of safety devices



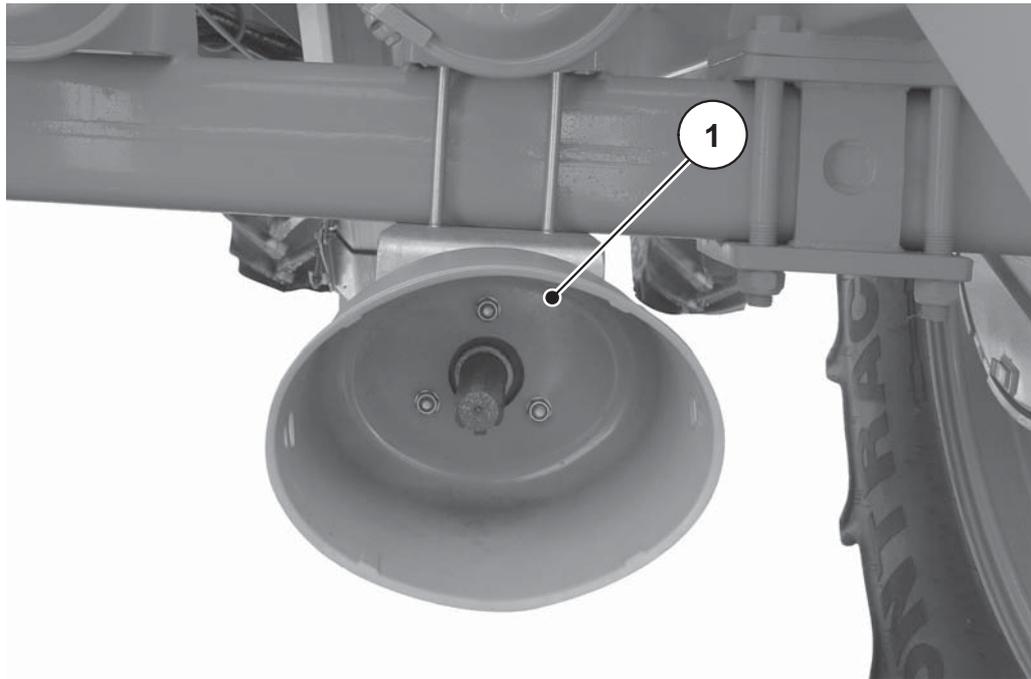
**Figure 3.2:** Position of safety devices, warning and instruction notices, and reflectors

- |   |  |
|---|--|
| [1] Eyelets   | [7] Instructions: passenger transport prohibited.      |
| [2] Wheel chock   | [8] Warning: turn off TWS 85.1 and fertiliser spreader |
| [3] Warning sign  | [9] Nameplate  |
| [4] Warning: moving parts   | [10] Serial number                                     |
| [5] Warning: high-voltage line                                      | [11] Instructions: eyelet in hopper                    |
| [6] Warning: read operator's manual<br>Warning: remove ignition key | [12] Protective grid in hopper                         |



**Figure 3.3:** Position of safety devices, warning and instruction notices

- |  |                                      |
|--|--------------------------------------|
| [1] White contour markings               | [5] Instructions: check wheel nuts   |
| [2] Warning: connect fertiliser spreader | [6] Instructions: lubrication points |
| [3] Admissible maximum speed             | [7] Trailer unit nameplate           |
| [4] Yellow side reflectors               |                                      |



**Figure 3.4:** Drive shaft guard (TWS-M only)

[1] Drive shaft guard

### 3.10.2 Function of safety devices

The safety devices are designed to protect your health and life.

- Before working with the machine, ensure that the safety devices are functional.
- Only operate the machine if the safety equipment is functional.

Designation	Function
Protective grid in hopper	Prevents body parts from being caught by the rotating auger conveyor. Prevents body parts from being cut off by the slide. Prevents faults during spreading caused by lumps in the spreading material, large stones or other large objects (screening effect).
Drive shaft guard	Prevents body parts and clothing from being pulled into the rotating drive shaft.
Wheel chock	Prevents the machine from rolling away

### 3.11 Warning and instruction stickers

Various warning and instruction stickers are attached to the machine (for the position at the machine, please refer to [figure 3.2](#) to [figure 3.4](#))

The warning and instruction stickers are components of the machine. They must not be removed or modified. Missing or illegible warning and instruction stickers must be replaced immediately.

If new components are installed during repairs, the same warning and instruction stickers that were on the original parts must be placed on the new parts.

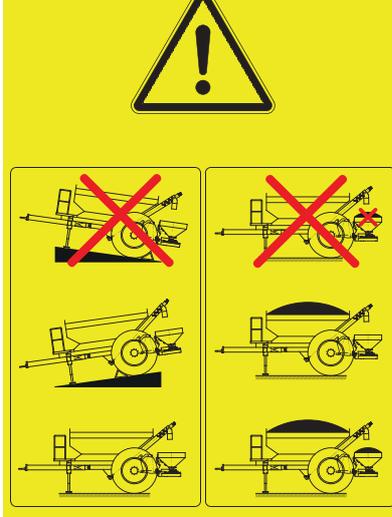
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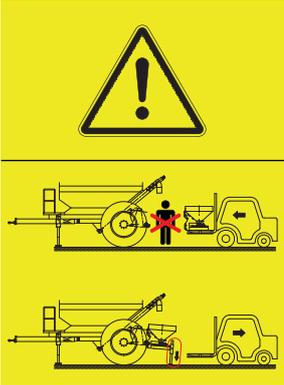
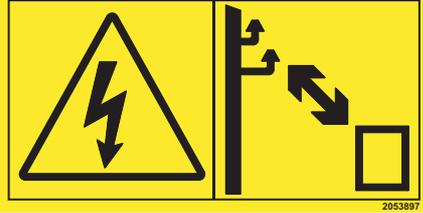
**NOTICE**

The correct warning and instruction notices can be obtained from the spare parts service.

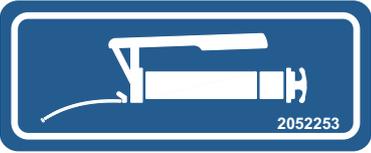
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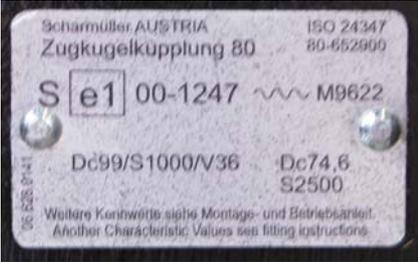
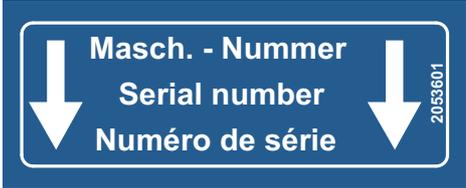
3.11.1 Warning stickers

	<p>Read the operator's manual and warning messages.</p> <p>Read and observe the operator's manual and warning messages before commissioning the machine.</p> <p>The operator's manual explains in detail how to operate the spreader and contains valuable information on operation, care and maintenance.</p>
	<p>Danger due to moving parts</p> <p>Risk of body parts being cut off</p> <p>It is prohibited to reach into the hazard zone of the rotating auger conveyor.</p> <p>Switch off the engine and remove the key before carrying out maintenance, repair and adjustment work.</p>
	<p>Remove the ignition key.</p> <p>Before carrying out any repair and maintenance work, shut off the engine and remove the ignition key. Disconnect the power supply:</p>
	<p>Taking passenger prohibited</p> <p>Risk of slipping and injury. Do not climb on the platform of the machine during spreading and transport.</p>
	<p>Switch off TWS 85.1 with attached fertiliser spreader</p> <p>Danger of tipping.</p> <ul style="list-style-type: none"> <li>• When parking the empty machine and the empty fertiliser on an uneven ground, they must be <b>facing downhill</b>.</li> <li>• Park the empty machine and the empty fertiliser on a level ground.</li> <li>• <b>The empty machine must not be parked with the fertiliser spreader loaded.</b></li> <li>• Park the loaded machine with empty fertiliser on a level ground.</li> <li>• Park the loaded machine with loaded fertiliser on a level ground.</li> </ul>

	<p>Attach the fertiliser spreader</p> <p>Ensure that nobody is in the hazard zone.</p> <p>Park the fertiliser spreader using the optional parking rests.</p> <p>Further information can be found in chapter <a href="#">6.9: Mount the fertiliser spreader to the load transfer vehicle, page 48.</a></p>
	<p>Danger to life caused by live overhead lines</p> <p>The towed load transfer vehicle TWS 85.1 must never be parked below live overhead lines. Observe the prescribed safety clearance.</p>
	<p>Wheel chock</p> <p>Secure the machine against rolling away when parking with wheel chocks.</p>
	<p>Danger of crushing when folding and/or unfolding the wheel chock</p>

3.11.2 Instruction stickers and nameplate

	<p>Eyelets on frame</p> <p>Labelling of the bracket for fixing the hoisting gear</p>
 <p>Radmuttern auf Festsitz prüfen          → nach der ersten Belastungsfahrt          → nach 50 Betriebsstunden.          Radmuttern ueber Kreuz festziehen. ? Nm          Erforderliches Drehmoment:          → siehe Betriebsanleitung.</p> <p>Controle du serrage des ecrous          → apres la premiere utilisation          → apres 50 heures d'utilisation.          Resserer les ecrous en croix. ? Nm          Couple de serrage necessaire:          → voir notice d'utilisation.</p> <p>Please check tight fit of wheel nut          → after the first drive          → after the first 50 working hours.          Tighten wheel nuts over cross. ? Nm          Necessary turning moment:          → see operators manual.          2054616</p>	<p>Wheel nut check</p> <p>Reference to tightening torques according to the specification in the operator's manual.          Refer to chapter <a href="#">9.9.3: Replacing wheels. page 89.</a></p>
	<p>Lubrication points</p>
	<p>Admissible maximum speed</p>

	<p>Nameplate</p>
	<p>Tow coupling nameplate</p>
	<p>The serial number is located on the frame below the sticker.</p>

### 3.12 Reflector

The machine is factory-fitted with lateral reflectors (for an illustration of the positioning on the machine, see [figure 3.2](#)).



## 4 Technical data

### 4.1 Manufacturer

RAUCH Landmaschinenfabrik GmbH

Landstraße 14

**D-76547 Sinzheim**

Phone: +49 (0) 7221 / 985-0

Fax: +49 (0) 7221 / 985-200

#### **Service Centre, Technical Customer Service**

RAUCH Landmaschinenfabrik GmbH

Postfach 1162

**D-76545 Sinzheim**

Phone: +49 (0) 7221 / 985-250

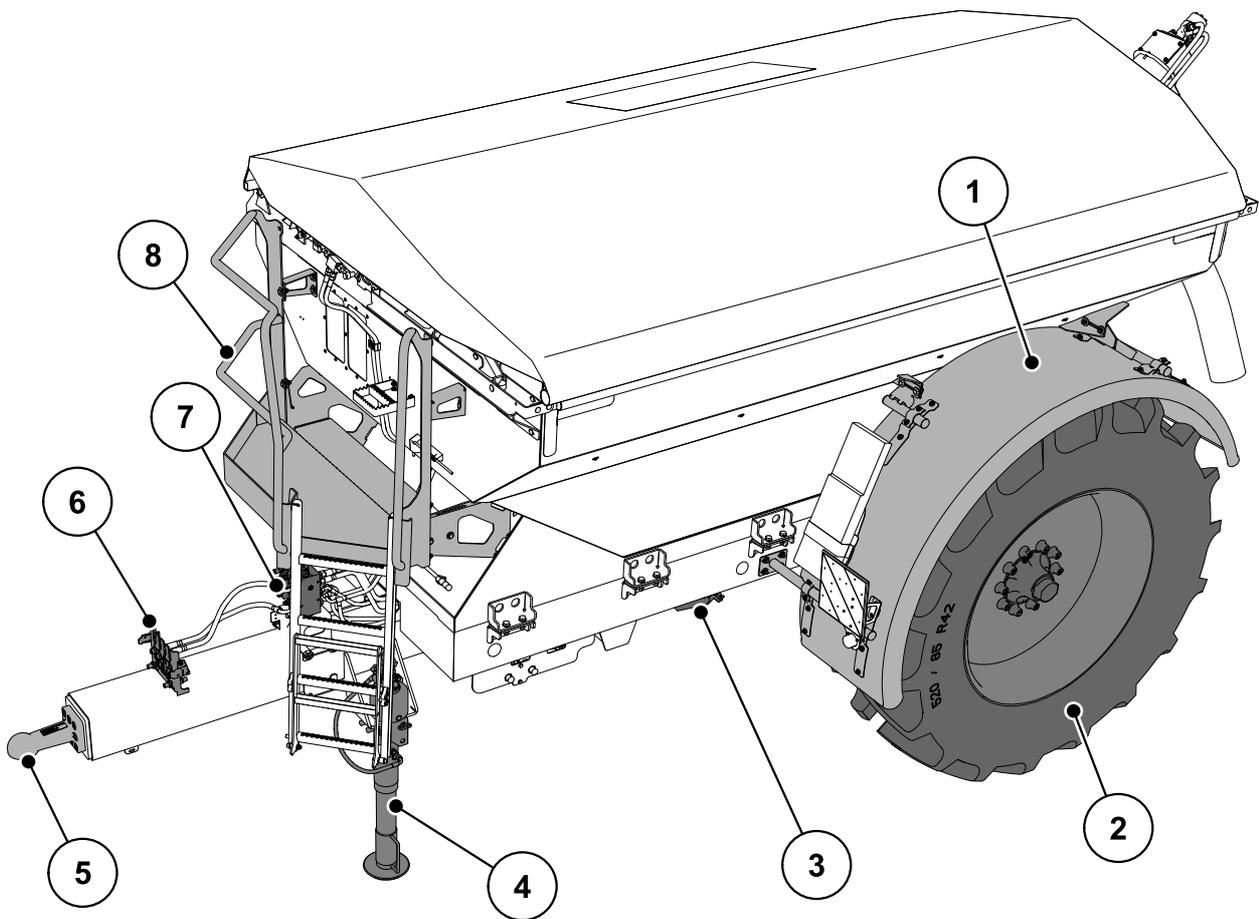
Fax: +49 (0) 7221 / 985-203

## 4.2 Description of the machine

Use the load transfer vehicle in accordance with chapter [„Intended use“ on page 1.](#)

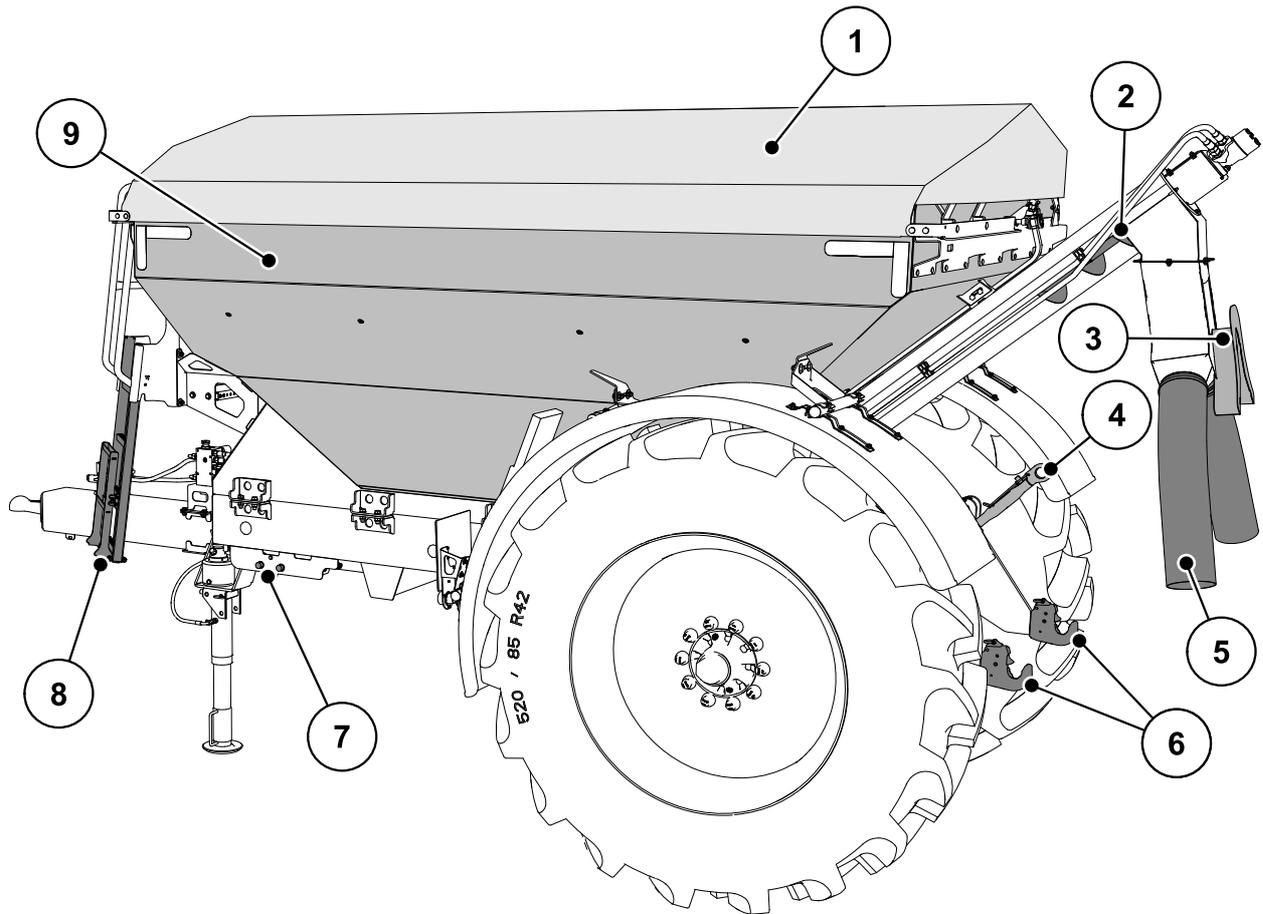
The machine consists of several component assemblies:

- Hopper
- Outlet and transfer elements
- Pin or ball coupling
- Braking system
- Coupling points for fertiliser spreader
- Safety devices, see [„Safety devices at the machine“ on page 16.](#)



**Figure 4.1:** Component assemblies and function of the machine

- |                                    |                                 |
|------------------------------------|---------------------------------|
| [1] Mud guard                      | [5] Pin or ball coupling        |
| [2] Wheel                          | [6] Bracket for hydraulic hoses |
| [3] Emptying flap below the hopper | [7] Control block               |
| [4] Support stand                  | [8] Platform                    |



**Figure 4.2:** Component assemblies and function of the machine TWS

- |   |                               |
|---|-------------------------------|
| [1] Hopper cover  | [5] Outlet pipes              |
| [2] Fertiliser conveyor device with integrated auger conveyor | [6] Lower link coupling point |
| [3] Overflow  | [7] Parking brake             |
| [4] Upper link coupling point                                 | [8] Steps                     |
|   | [9] Hopper                    |

## 4 Technical data

---

### 4.3 Machine data

#### 4.3.1 Versions

Drive of the fertiliser spreader	Load transfer vehicle
Universal drive shaft	TWS-M 85.1
Hydraulic drive	TWS-H 85.1

#### 4.3.2 Fertiliser spreader

You can install the following fertiliser spreaders at the load transfer vehicle:

- AXIS 30.2 version K, D, R, C, Q or W
- AXIS-H 30.2 EMC (+ W)
- AXIS-M 30.2 EMC (+W)
- AXIS-HT 50.2 EMC

#### **NOTICE**

Observe the operator's manual of your fertiliser spreader.

---

### 4.3.3 Technical data of standard equipment

Data	TWS 85.1
Overall length without fertiliser spreader	approx. 6.20 m
Width	max. 2.40 m depending on track width
Height	3.20 m
Ground clearance (relating to lower edge of frame)	0.75 m
Hopper capacity	8000 l in the TWS hopper + 500 l in the fertiliser spreader
Filling level	2.85 m
Length from trailer unit to vehicle end (with fertiliser spreader installed)	approx. 7.0 m depending on the fertiliser spreader installed
Length from trailer unit to axle	4.6 m
Conveying rate (auger conveyor) <sup>1</sup>	max. 500 kg/min
Hydraulic pressure (TWS only)	max. 180 bar
Oil quantity hydraulic system (TWS only)	45l /min
Track width	2.00 m <sup>2</sup>
Standard tyres	520/85 R42 AC85 <sup>3</sup>
Compressed air tank braking system	60 l
Parking brake	Spring brake cylinder
Sound pressure level <sup>4</sup> (measured in the closed driver's cabin of the tractor)	75 dB(A)

1. Max. conveying rate depending on fertiliser type

2. Different track width (1.80 m, 2.25 m) on request

3. Different tyres are available as an option, see [4.4: Optional equipment, page 30](#).

4. Since the sound pressure level of the machine can only be determined when the tractor is running, the actual measured value is greatly dependent on the tractor type being used.

**Weights and loads:**

**NOTICE**

The empty weight (mass) of the machine varies depending on the feature package. The empty weight (mass) indicated on the nameplate refers to the standard version.

The technical specifications of the operating license are decisive and thus may deviate from the tables indicated above.

Each modification of the towed load transfer vehicle may be entered in the operating license.

Data	TWS 85.1
Admissible total weight <sup>1</sup>	12,000 kg
Empty weight <b>with</b> fertiliser spreader approx.	3840 kg
Empty weight <b>without</b> fertiliser spreader approx.	3460 kg
Fertiliser payload	8160 kg
Admissible axle load max.	10,000 kg
Admissible bearing load of the trailer unit max.	2000 kg

1. Please refer to the entries in the operating license regarding the wheel load

**4.4 Optional equipment**

- Support stands for fertiliser spreader
  - We recommend to mount the support stands to the fertiliser spreader before installation at the load transfer vehicle.
- Ball coupling
- Different wheels with a track width of 1.8 m to 2.25 m on request
- Lower link extension for AXIS 30 without weigh frame

## 5 Transportation without tractor

### 5.1 General safety instructions

#### ⚠ CAUTION



#### Material damage due to incorrect transportation

The lifting eyes in the hopper are **not** suited for lifting the entire machine. They are only used for transporting the hopper during manufacture.

Any non-compliance may damage the load transfer vehicle.

- ▶ Observe the shipping instruction of the manufacturer.

#### Read the following instructions before transporting the machine:

- If no tractor is used, the machine may only be transported with an empty hopper.
- The work may only be carried out by suitable, trained and expressly authorised personnel.
- Suitable means of transportation and lifting equipment (e.g. crane, forklift truck, lifting tackle ...) are to be used.
- Determine the transportation route early, and remove possible obstacles.
- Check that all safety and transportation devices are fully operational.
- Secure all danger areas appropriately, even if they only exist briefly.
- The person responsible for transportation must ensure that the machine is transported appropriately.
- Unauthorised persons are to be kept away from the transport route. The areas concerned must be cordoned off.
- Cautiously transport the machine and handle it with care.
- Make sure that allowance is made for the centre of gravity. If necessary, adjust the lifting tackle so that the machine is correctly suspended.

### 5.2 Loading and unloading, parking

1. Determine the weight of the machine.  
Details are provided on the nameplate.  
If applicable, also take the weight of the attached fertiliser spreader and its mounted special equipment into account.
2. Carefully move the machine from or on the loading platform with a suitable tractor.
3. Carefully set the machine down on the loading platform of the transport vehicle or on solid ground.



## 6 Commissioning

### 6.1 Accepting the machine

When accepting the machine, please check the completeness of the delivery.

#### The standard equipment includes

- 1 load transfer vehicle TWS 85.1
- Level sensor in the hopper and the fertiliser conveyor device (auger conveyor, outlet pipes);
- 1 operator's manual TWS 85.1
- Lower link and upper link pins,
- 1 component set: Level sensors for the fertiliser spreader
- 1 protective grid in the hopper
- 2 wheel chocks
- 1 support stand
- 1 wide-angle universal drive shaft for TWS-M 85.1
- 1 control unit QUANTRON-A for TWS with operator's manual
- 1 type certificate

Please also check any optional equipment that you ordered.

Check for any shipping damage or missing parts. Have any shipping damage confirmed by the forwarding agent.

#### **NOTICE**

When receiving the machine, check that all attached components are correctly and securely tightened.

If in doubt, contact your dealer or the RAUCH factory directly.

### 6.2 Operating license

#### 6.2.1 Germany

The towed load transfer vehicle TWS 85.1 requires an operating licence.

Based on the type report included in the scope of delivery, your responsible authority will grant you an operating license for individual vehicles on request.

A valid operating license is a precondition for participating in public road traffic.

#### 6.2.2 Outside Germany

The load transfer vehicle is manufactured in Germany and delivered with a nameplate.

Observe the applicable road traffic regulations of your country or the place of use of the load transfer vehicle. If required, the importer will register your machine with the relevant registration office for use in public road traffic.

- For additional identification (warning sign, lighting) contact your dealer or importer.

### 6.3 Tractor requirements for the load transfer vehicle

#### DANGER



#### **Danger to life due to unsuitable tractor**

Using an unsuitable tractor for the machine may result in severe accidents during operation or road travel.

- ▶ Only use tractors that comply with the technical requirements of the machine.
- ▶ Use the vehicle's documentation to check if your tractor is suitable for the machine.

- 
- Minimum tractor motor capacity 160 hp
  - Admissible bearing load of the pin or ball coupling: 2000 kg
  - For TWS 85.1, drive of the auger conveyor, the slide and the hopper cover:
    - 1 double-acting control unit or
    - 1 single-acting control unit with free return
  - Universal drive shaft connection: 1 3/8 inches, 6 splines, 540 rpm,
  - Hydraulic power: min. 45 l/min at p=180 bar, constant flow
  - Oil supply: max. 180 bar, single or double-acting valve (depending on equipment)
  - Free return
  - Operating voltage: 12 V, must also be ensured if several loads are connected simultaneously

6.4 Tractor requirements for the fertiliser spreader

6.4.1 mechanical drive of the fertiliser spreader

Tractor requirements

- A single-acting control valve

Fertiliser spreader	Hydraulic cylinder	Operation
AXIS 30.2 AXIS-M 30.2 EMC (+W)	Single-acting hydraulic cylinder for TELIMAT device	The oil pressure closes. the spring force opens.

6.4.2 Hydraulic drive of the fertiliser spreader

Fertiliser spreader	Hydraulic motor	Tractor requirements
AXIS-H 30.2 EMC + W AXIS-HT 50.2 + W	Disc drive	a single-acting control valve with free return or load sensing with free return

**constant flow**

For the hydraulic drive of the **AXIS-HT 50.2 EMC** fertiliser spreader, the hydraulic system of the tractor should deliver an **additional** volume flow of **at least 65 l/min at 180 bar**.

For the hydraulic drive of the **AXIS-HT 30.2 EMC** fertiliser spreader, the hydraulic system of the tractor should deliver an **additional** volume flow of **at least 45 l/min at 180 bar**.

If the volume flow from the tractor is not sufficient for the load transfer vehicle **and** the attached fertiliser spreader, the load transfer vehicle can load the spreader only if the spreader is switched off (e.g. in the headlands).

In this case use the QUANTRON-A control unit to set the load transfer function to **semi-automatic**.

**Load sensing**

If the tractor is equipped with a **load sensing** hydraulic system, you can control the hydraulically driven fertiliser spreader. In case of problems with load sensing (e.g. juddering of the spreading discs), set the drive of the fertiliser spreader to constant flow.

## 6.5 Mount the universal drive shaft to the machine (TWS-M only)

### ⚠ CAUTION



#### Material damages due to unsuitable drive shaft

The machine is delivered with a drive shaft that is designed according to the device and performance.

The use of incorrectly dimensioned or inadmissible drive shafts, for instance without guard or suspension chain, may cause personal injury or lead to damage to the tractor and/or the machine.

- ▶ Use universal drive shafts approved by the manufacturer only.
- ▶ Follow the directions in the operator's manual of the universal drive shaft manufacturer.

#### Attachment:

1. Check the attachment position.
  - ▷ The drive shaft end that is marked with a tractor symbol must point to the tractor.
2. Remove the spigot protection and grease the gearbox spigot.

3. Press the slider pin.
4. Pull the universal drive shaft onto the gearbox stub until it latches in the ring groove.
5. Release the slider pin.



**Figure 6.1:** Push the universal drive shaft onto the gearbox stub

6. Secure the suspension chain through the bore holes in the drive shaft guard of the machine.

#### Instructions for dismounting:

- Dismount the universal drive shaft in reverse order of attachment.
- **Never** use the suspension chain for suspending the drive shaft.
- Secure the dismounted drive shaft using a suitable device.

## 6.6 Connecting the machine to the tractor

### DANGER



#### **Danger to life due to unsuitable tractor**

Using an unsuitable tractor for the machine may result in severe accidents during operation or road travel.

- ▶ Only use tractors that comply with the technical requirements of the machine.
  - ▶ Use the vehicle's documentation to check if your tractor is suitable for the machine.
- 

### WARNING



#### **Risk of injury and material damage due to excessive static load**

Exceeding the maximum drawbar load will impair the steering and braking efficiency of the machine and/or the tractor.

This may lead to personal injury. This can cause severe damage to the machine, the tractor and/or the environment.

- ▶ Observe the admissible bearing load of the tractor.
  - ▶ Observe the admissible bearing load of the trailer unit.
- 

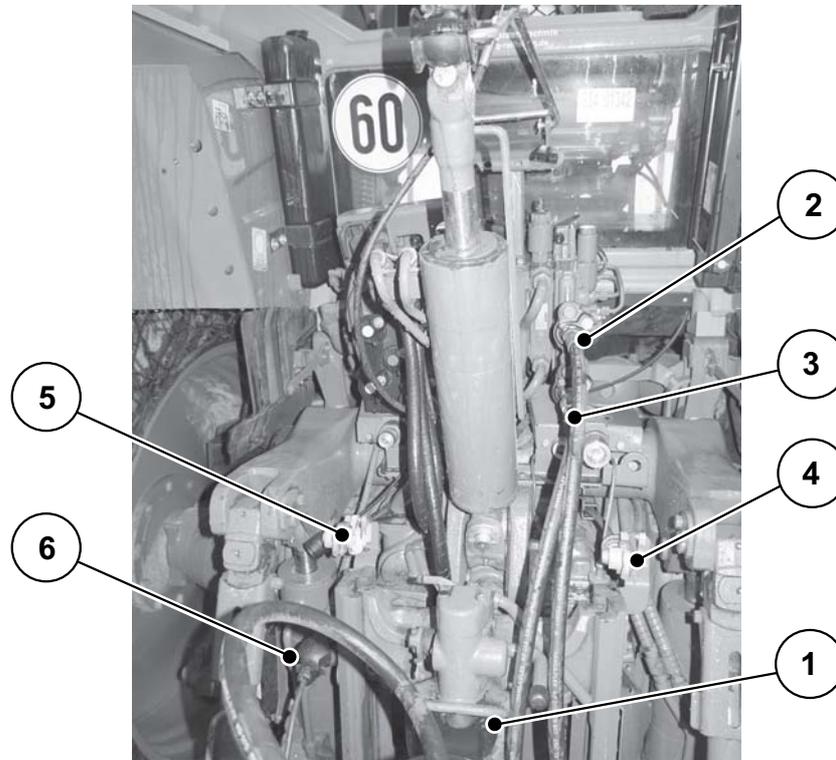
#### **Check the following specific requirements:**

- Are both the tractor and the machine in a reliable condition?
- Does the tractor comply with the mechanical, hydraulic, and electrical requirements (see [„Tractor requirements for the load transfer vehicle“ on page 35](#))?
- Does the trailer unit meet the requirements resulting from the technical data of the towed load transfer vehicle (trailing load, bearing load etc.)?
- Is the machine securely positioned on level and solid ground?
- Is the machine secured appropriately against rolling away?
- Has the QUANTRON-A control unit been installed in the tractor for the load transfer function?
- Is the combination of connection elements (towing eye - pin coupling and/or coupling bracket - ball coupling) admissible?

Attach the machine to the pin coupling or ball coupling of the tractor.  
The figures [\[6.2\]](#) and [\[6.3\]](#) show the pin coupling version.

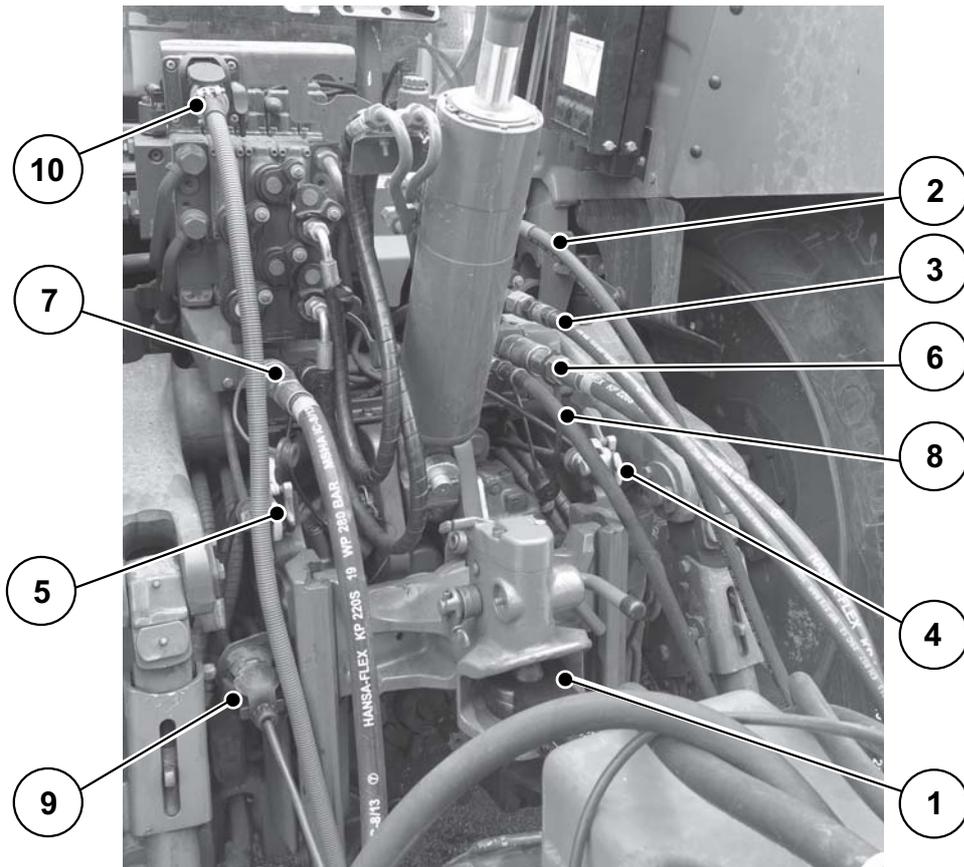
**NOTICE**

Always observe the labellings P and T at the hydraulic lines of the control block.



**Figure 6.2:** Mounting sequence load transfer vehicle with drive shaft TWS-M-85.1

- [1] Pin coupling
- [2] Hydraulic control block line (P)
- [3] Hydraulic line return flow control block (R/T)
- [4] Pneumatic line compressed air tank (compressed air brake)
- [5] Pneumatic control line (compressed air brake)
- [6] Lighting plug



**Figure 6.3:** Mounting sequence load transfer vehicle TWS-H-85.1

- [1] Pin coupling
- [2] Hydraulic control block line (P)
- [3] Hydraulic line return flow control block (R/T)
- [4] Pneumatic line compressed air tank (compressed air brake)
- [5] Pneumatic control line (compressed air brake)
- [6] Pressure line P (spreader)
- [7] Hydraulic line free return (spreader)
- [8] Pressure line LS (load sensing; spreader)
- [9] Lighting plug
- [10] ISOBUS plug

**⚠ DANGER**



**Danger to life due to inattention or faulty operation.**

There is a crushing hazard that may result in fatal injury for persons standing between the tractor and the machine when the tractor approaches or the hydraulic system is actuated.

The tractor may brake too late or not at all because of inattention or faulty operation.

- ▶ Ensure that nobody is present in the hazard zone between the tractor and the machine.

### 6.6.1 Ball coupling

1. Start the tractor.
    - Checking:
      - the PTO shaft is switched off.
      - the hydraulic system is switched off.
      - the holding-down clamp of the ball coupling is open.
  2. Move the tractor to the machine.
    - Make sure there is enough space between the tractor and the machine in order to be able to connect the drives and control elements.
  3. Apply the tractor hand brake.
  4. Switch off the tractor motor. Remove the ignition key.
  5. Attach the tractor coupling bracket to the ball coupling.
  6. Close the holding-down clamp.

In this respect, please also refer to the instructions of the tractor manufacturer.
- ▷ **The connection is secured.**
- ▷ **The machine has been attached to the tractor.**

### 6.6.2 Pin coupling

1. Start the tractor.
    - Checking:
      - the PTO shaft is switched off.
      - the hydraulic system is switched off.
      - the pin coupling is open.
  2. Move the tractor to the machine.
    - Make sure there is enough space between the tractor and the machine in order to be able to connect the drives and control elements.
  3. Apply the tractor hand brake.
  4. Switch off the tractor motor. Remove the ignition key.
  5. Insert the towing eye in the tractor ball coupling.
  6. Close the coupling bolt.

In this respect, please also refer to the instructions of the tractor manufacturer.
- ▷ **The connection is secured.**
- ▷ **The machine has been attached to the tractor.**

6.6.3 Both coupling versions

**For the mechanical drive of the fertiliser spreader only:**

**NOTICE**

Observe the installation and shortening instructions provided in the **operator's manual of the drive shaft manufacturer** when checking and adjusting the drive shaft. The operator's manual is attached to the drive shaft on delivery.

---

7. Mount the drive shaft to the tractor.

With the first commissioning, adjust the universal drive shaft to the tractor.

**⚠ CAUTION**



**Material damage due to excessive length of drive shaft**

When connecting the machine the universal drive shaft halves can come into contact inside each other. This can cause damage to the drive shaft, the gearbox or the machine.

- ▶ Check the clearance between the machine and the tractor.
  - ▶ Make sure there is enough space (at least 20 to 30mm) between the outer pipe of the drive shaft and the protective cone on the spreading side.
- 

8. Shorten the universal drive shaft, if required.

**NOTICE**

**Only** your dealer or your specialist workshop may shorten the universal drive shaft.

---

#### 6.6.4 Braking system

The machine is equipped with a **compressed air braking system**.

In connection with the braking system, please also refer to the respective national regulations of the country where you use the machine.

The machine is equipped with an automatic parking brake as a standard.

#### ⚠ WARNING



#### Risk of injury due to unsecured machine

Until fully connected the machine may roll away and cause personal injury. When connecting the machine always observe the following procedure for the compressed air lines.

- ▶ Ensure that nobody is in the hazard zone.
- ▶ First, connect the yellow coupling head (brake line).
- ▶ Then, connect the red coupling head (supply).

For commissioning, please observe the following instructions:

- Before connecting, clean the gaskets and the coupling heads of the pneumatic system.
- Observe the connecting sequence: See [figure 6.2](#) and/or [figure 6.3](#).
- After connecting and before every drive, check the leak-tightness and the function of the braking system. To do so, apply the driving brake of the tractor.
- Do not drive with the connected machine until the manometer in the tractor cabin shows the operating pressure intended for the tractor.

#### NOTICE

For further information, please refer to the operator's manual of the tractor.

6.7 Connect the hydraulic system

6.7.1 Connection of the control block (TWS-H 85.1)

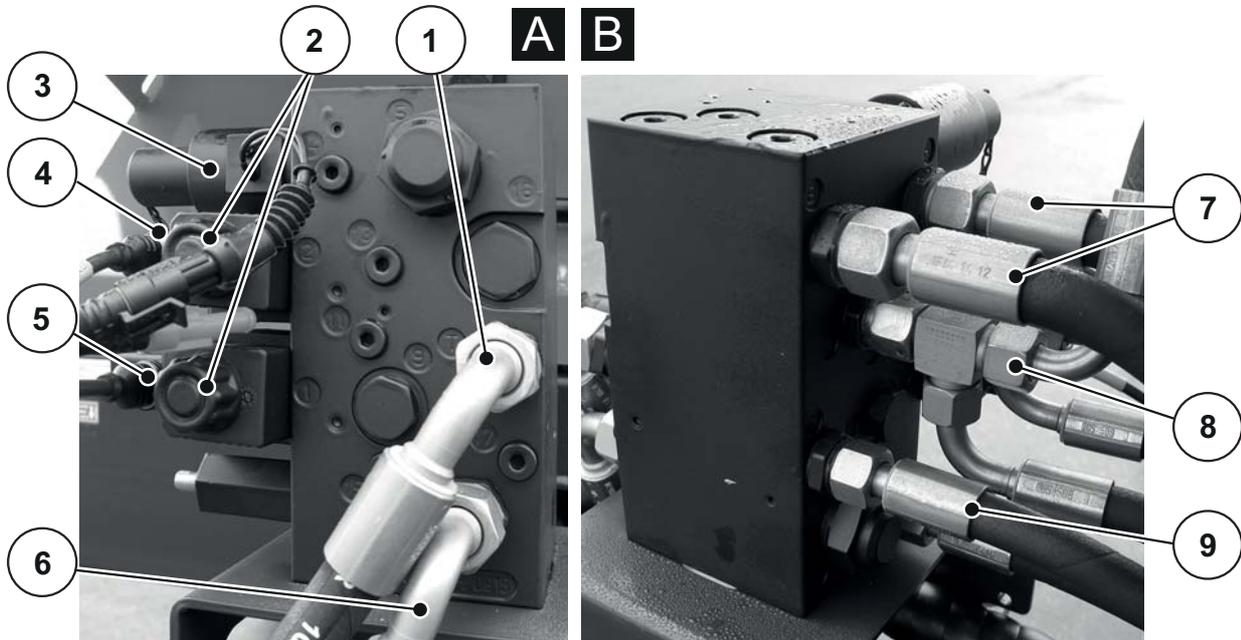


Figure 6.4: Connection of the control block

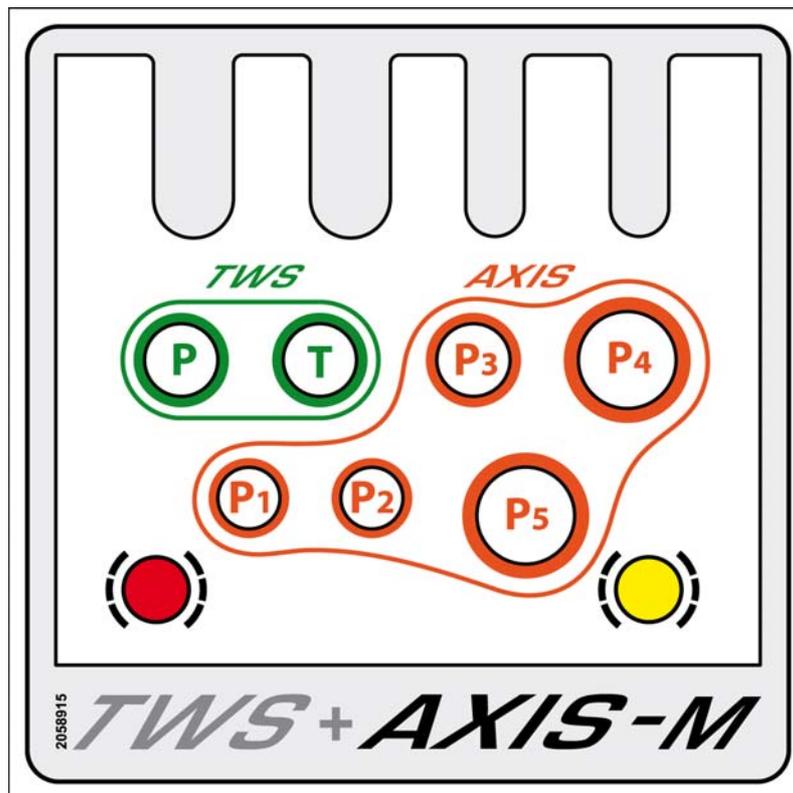
**[A] Tractor side**

- [1] Hydraulic line T
- [2] Emergency actuation of the valve
- [3] Screw valve VSE
- [4] Hopper cover valve VAP
- [5] TWS slide valve VSI
- [6] Hydraulic line P

**[B] machine side**

- [7] Hydraulic lines screw
- [8] Hydraulic line hopper cover
- [9] Hydraulic line TWS slide

## 6.7.2 Mechanical gearbox of the fertiliser spreader: Version M



**Figure 6.5:** Connection of the hydraulic lines for TWS-M

1. Connect the hydraulic lines of the control block to the hydraulic system of the tractor according to the hose designations (P, T).

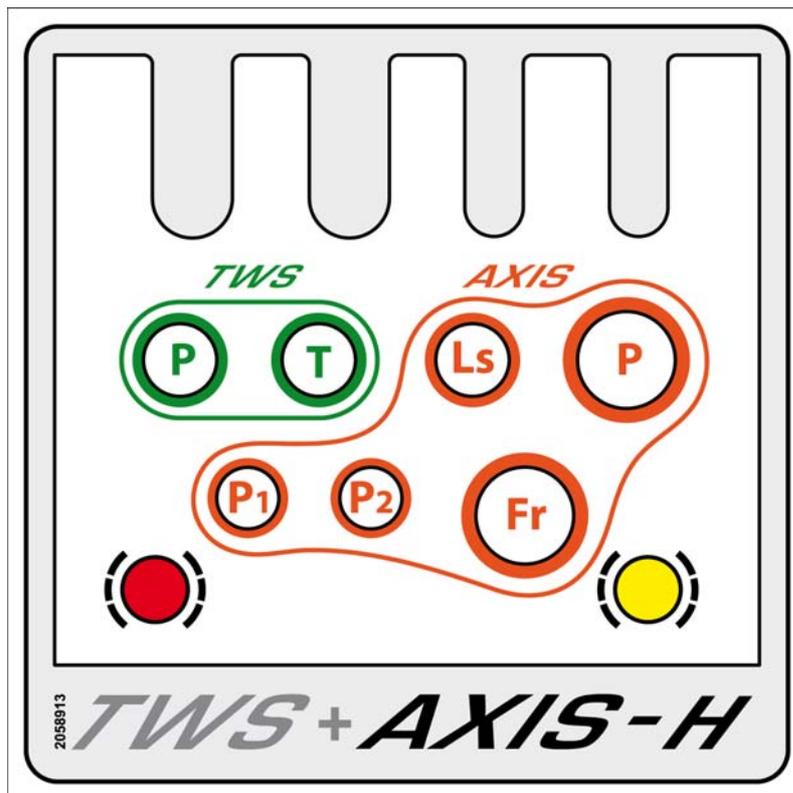
#### NOTICE

The hydraulic line connections are form-fit and the compressed air brake lines are colour-coded.

- Always connect fitting connections with the same colour.
- Keep the connections and coupling heads of the lines clean.

2. Connect the pneumatic control line ([figure 6.2](#): position 5) to the yellow coupling (compressed air braking system).
3. Connect the pneumatic supply line ([figure 6.2](#): position 4) to the red coupling (compressed air braking system).
4. Apply the driving brake of the tractor to check the leak-tightness and the function of the braking system.
5. Connect the lighting plug ([figure 6.2](#): position 6).
6. Connect the machine cables to the QUANTRON-A control unit.

6.7.3 Hydraulic gearbox of the fertiliser spreader: Version H



**Figure 6.6:** Connection of the hydraulic lines for TWS-H

1. Connect the hydraulic lines of the control block to the hydraulic system of the tractor according to the hose designations (P, T).

**NOTICE**

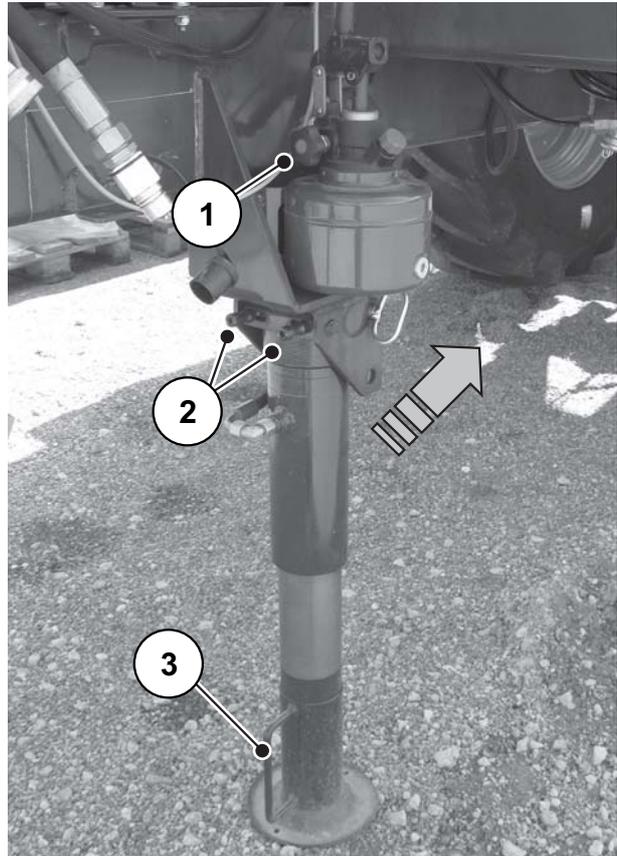
The hydraulic line connections are form-fit and the compressed air brake lines are colour-coded.

- Always connect fitting connections with the same colour.
- Keep the connections and coupling heads of the lines clean.

2. Connect the pneumatic control line ([figure 6.3](#): position 5) to the yellow coupling (compressed air braking system).
3. Connect the pneumatic supply line ([figure 6.3](#): position 4) to the red coupling (compressed air braking system).
4. Apply the driving brake of the tractor to check the leak-tightness and the function of the braking system.
5. Connect the lighting plug ([figure 6.3](#): position 9).
6. Connect the machine cables to the QUANTRON-A control unit.

## 6.8 Fold away the support stand

7. Open the valve [1].
    - ▷ The support stand retracts automatically.
  8. Close the valve [1].
  9. Hold the support stand at the handle [3].
  10. Unlock both locking pins [2].
  11. Fold away the support stand.
    - ▷ The locking bolt engages in the upper position.
- ▷ **The support stand is in the operating position.**



**Figure 6.7:** Fold away the support stand

## 6.9 Mount the fertiliser spreader to the load transfer vehicle

### 6.9.1 Requirements

#### ⚠ CAUTION



#### Inadmissible payload

If the permissible payload is exceeded, this may result in personal injury and cause serious damage to the machine and the environment.

- ▶ The specifications in the chapter **Technical data** are to be observed at all times.
- ▶ Comply with the permissible overall weight.

- 
- Attach compatible fertiliser spreaders only.
    - See [4.3.2: Fertiliser spreader, page 28](#)
  - The load transfer vehicle is empty.
  - The load transfer vehicle has been attached to the tractor.
  - The load transfer vehicle and the tractor have been secured against rolling away.

#### NOTICE

For further information on setting the mounting height refer to the operator's manual of the fertiliser spreader.

---

## 6.9.2 Attachment

### ⚠ DANGER

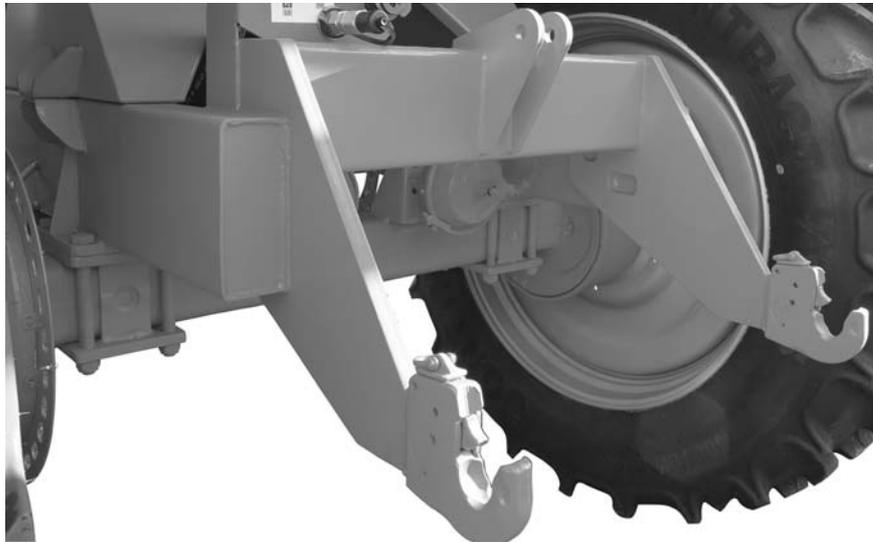


#### **Danger to life due to inattention or faulty operation.**

There is a crushing hazard that may result in fatal injury for persons standing between the load transfer vehicle and the fertiliser spreader when the tractor approaches or the hydraulic system is actuated.

- ▶ Secure the load transfer vehicle against rolling away.
- ▶ Make sure that there is no one between the fertiliser spreader and the load transfer vehicle.
- ▶ Ensure that nobody is in the hazard zone.

Mount the fertiliser spreader to the three-point linkage of the load transfer vehicle.

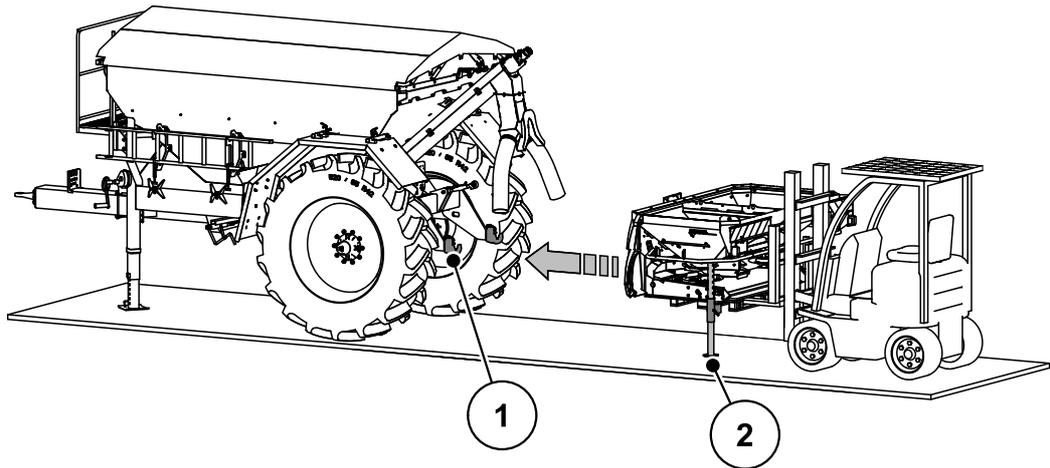


**Figure 6.8:** Three-point linkage TWS 85.1

#### **Mounting instructions**

- The lower and upper link pins must be secured with linch pins or spring clips.
- To ensure correct cross-distribution of the fertiliser, the machine must be mounted as specified in the fertiliser chart.

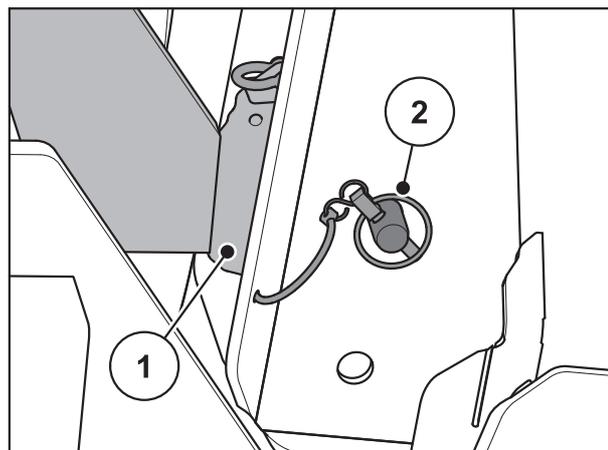
1. Position the fertiliser spreader on a pallet.
    - The universal drive shaft is pre-mounted to the fertiliser spreader. Please refer to the operator's manual of the fertiliser spreader.
  2. Use a forklift to lift the fertiliser spreader and the pallet.
  3. Mount and secure the support stands.
    - The support stands are raised.
- See [4.4: Optional equipment, page 30](#)
4. Approach the load transfer vehicle with the forklift.



**Figure 6.9:** Approach the load transfer vehicle with the forklift

- [1] Lower link tail hook at TWS 85.1  
 [2] Support stands

5. insert the fertiliser spreader in the lower link tail hook.
  - Make sure there is enough space between the load transfer vehicle and the fertiliser spreader in order to be able to connect the drive and control elements.



**Figure 6.10:** Secure the fertiliser spreader at the bottom

6. Secure the fertiliser spreader on both sides of the lower link tail hooks [1] using the pins and linchpins [2].

7. Check the tight seat of the machine.
8. Place the optional support fee ([figure 6.11](#) position [1]) on the ground and secure them.

9. Drive the forklift away.

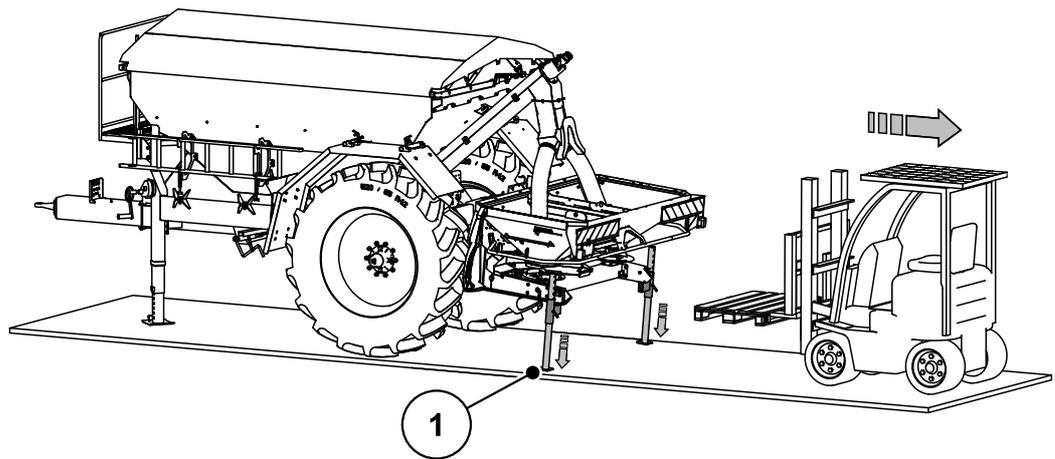


Figure 6.11: Drive the forklift away

10. Secure the fertiliser spreader at the load transfer vehicle using the upper link strut [1].
11. Secure the upper link strut [1] with the linkage pin [2].

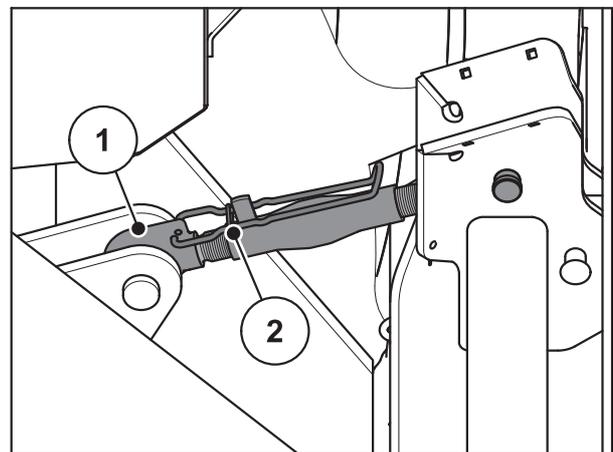


Figure 6.12: Secure the fertiliser spreader at the top

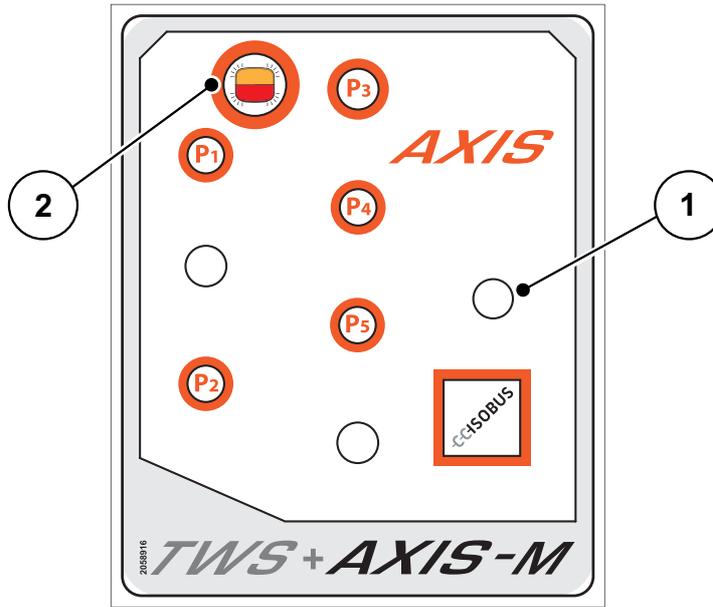
12. Mount the universal drive shaft to the machine (TWS-M 85.1 only)

**NOTICE**

Observe the installation and shortening instructions provided in the **operator's manual of the drive shaft manufacturer** when checking and adjusting the drive shaft. The operator's manual is attached to the drive shaft on delivery.

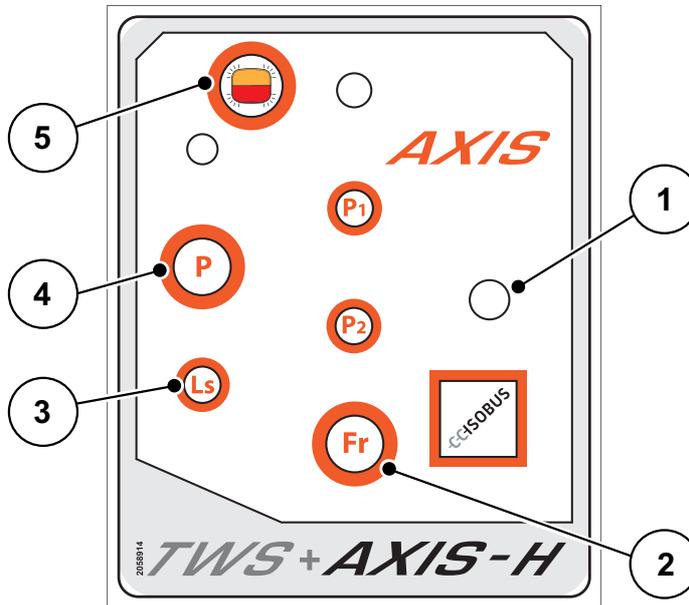
13. Connect the hydraulic and electric slide actuators and the lightning (see [„Establish the connections“ on page 52](#)).
14. Install the sensors in the spreader hopper. You [„Mounting and connection of the level sensor to the fertiliser spreader“ on page 53](#).

6.9.3 Establish the connections



**Figure 6.13:** Connections to TWS-M

- [1] Electric cable for level sensors
- [2] Lighting plug
- P1-P5: Hydraulic gearbox (special equipment)



**Figure 6.14:** Connections to TWS-H

- [1] Electric cable for level sensors
- [2] Hydraulic line free return
- [3] Hydraulic line LS
- [4] Pressure line P
- [5] Lighting plug
- P1, P2: Hydraulic gearbox (special equipment)

## 6.10 Mounting and connection of the level sensor to the fertiliser spreader

### NOTICE

Observe the supplied operator's manual of the sensors. The operator's manual is part of the delivery and is located in the parts set box.

## 6.11 Filling the machine

### ⚠ DANGER



#### Danger caused by tilting or rolling away

During filling, an unsecured machine may tilt or roll away and cause severe personal injury.

- ▶ Only fill the machine on level, solid ground.
- ▶ Ensure that the machine has been connected to the tractor before filling.
- ▶ Ensure that the parking brake is applied.

### ⚠ CAUTION



#### Inadmissible overall weight

If the permissible total weight is exceeded, this will affect the operating and road safety of the vehicle (machine and tractor) and may cause serious damage to the machine and the environment.

- ▶ Before you start filling, calculate the amount you can load.
- ▶ Comply with the permissible overall weight.

### NOTICE

Ensure that the fast emptying flap at the fertiliser auger conveyor is closed.



Figure 6.15: Fast emptying flap

### Requirements:

- The hydraulic system is switched on.
  - 1. Open the hopper cover of the load transfer vehicle using the hydraulics.  
Refer to the operator's manual of the QUANTRON-A control unit for TWS.
  - 2. Fill the load transfer vehicle equally. For this purpose, use a shovel loader or an auger conveyor.
  - 3. Visually inspect the filling level in the hopper.
  - 4. After filling has been completed, re-cover the hopper with the cover.
- ▷ **The load transfer vehicle is filled.**

## 6.12 Checking the filling level

### ⚠ WARNING



#### Risk of injury due to falling off the platform

The platform is located more than 1.50 m above the ground. There is a risk of falling on the side of the steps. Serious injury is possible.

- ▶ Always be extremely careful when moving on the platform.
- ▶ Always keep the platform clean.

The filling level can be checked through the inspection window in the side wall of the hopper.



**Figure 6.16:** Filling level check

- [1] Movable steps
- [2] Foldable steps
- [3] Snap bolts of the foldable steps
- [4] Platform
- [5] Inspection window
- [6] Step (use for maintenance work inside the hopper only)

Operating the steps

1. Push the movable steps upwards and push the hook [1] forward with your hand until the bolt [2] is accessible.

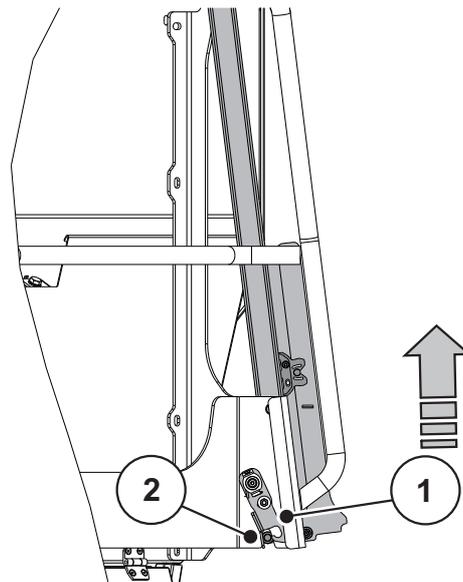
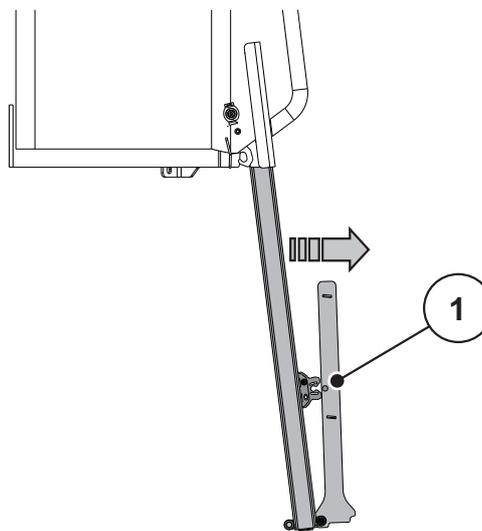


Figure 6.17: Lower the upper part of the steps

2. Slowly lower the movable steps.



3. Pull the foldable steps until the snap bolts [1] are released.
4. Fold the steps down.

Figure 6.18: Folding out the bottom part of the steps

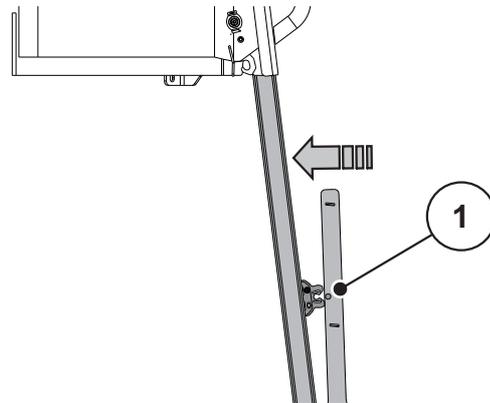
**NOTICE**

Only enter the steps if the following requirements have been met:

- The steps have been lowered to the lowest position.
- The foldable steps have been folded down.

## Folding the steps in transport position

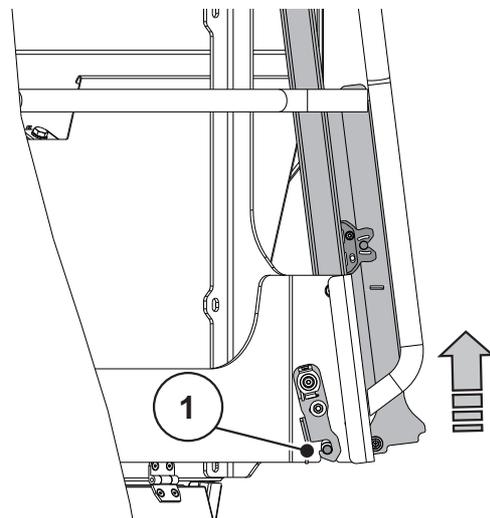
5. Fold the lower part of the steps upwards.
6. Lock the snap bolts [1] in the groove of the snap fits.



**Figure 6.19:** Fold in the steps

7. Push the movable steps upwards through the bar with your hand until the bolt [1] engages in the hook.

▷ **The steps are secured.**



**Figure 6.20:** Secure the sliding slide

8. Before **every drive** check the operating and road traffic safety of the entire train in accordance with the instructions in chapter [3: Safety, page 5](#).

### 6.13 Setting the brake-force distributor

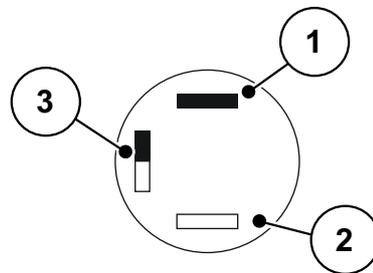
**⚠ DANGER**



**Danger to life due to defective braking system**

There is a danger of life if the braking system is used incorrectly or is defective. The machine may accidentally roll away or tilt and overrun persons.

- ▶ Before every drive, ensure that the manometer in the driver's cabin shows the minimum pressure required by the tractor manufacturer.
- ▶ Check the routing of the hoses. The hoses must not rub against other parts.



**Figure 6.21:** Setting the brake-force distributor

- [A] Brake-force distributor, on the left side in direction of travel
- [1] Full load
- [2] Empty
- [3] Half load

- Adjust the setting of the brake-force distributor to the load of the load transfer vehicle and the fertiliser spreader attached.

## 7 Instructions for load transfer

### 7.1 General information

#### NOTICE

The service life of the machine mainly depends on your manner of driving.

- Reduce your speed on uneven ground.
- Carefully pass the headlands.
- Avoid sudden turns when driving uphill or downhill or across a slope.
  - By repositioning the gravity centre, there is a risk of toppling over.
- Special care is to be particularly applied when driving on uneven, soft ground (e.g. when entering fields, kerbs).

### 7.2 Procedure for load transfer and spreading operation with TWS

The intended use of the machine includes compliance with the operating, maintenance, and service conditions in accordance with the manufacturer specifications. The **load transfer** and **spreading operation** therefore the always includes **preparation** and **cleaning/maintenance** work.

- Carry out the load transfer and spreading operations in accordance with the procedure described below.

#### Preparation

- Install the load transfer vehicle at the tractor [Page 38](#)
- Install the fertiliser spreader at the load transfer [Page 38](#) vehicle
- Close the slide
- Close the emptying flap [Page 53](#)
- Fill the load transfer vehicle and the spreader
- Set the speed of the auger conveyor according to the spreading quantity See the operator's manual of the QUANTRON-A control unit
- Make the settings at the fertiliser spreader (working width, application rate, etc) See the operator's manual of the fertiliser spreader

#### Load transfer/spreading operation

- Travel to the spreading location
- Switch on the PTO shaft and the hydraulic system
- Fill the fertiliser spreader

- Open the slide and start spreading
- Check the filling level of the fertiliser spreader
- Start the load transfer
- Finish spreading and close the slide
- Switch off the PTO shaft and the hydraulic system

---

### Cleaning/maintenance

- Discharging residual material
- Open the emptying flap
- Switch off the TWS
- Remove the fertiliser spreader from the TWS
- Cleaning and maintenance

Chapter 9

### 7.3 Releasing the parking brake

Do not release the parking brake [1] until the load transfer vehicle has been attached to the tractor and the compressed-air lines have been connected.



1. Press in the valve [1] for releasing the parking brake.

**Figure 7.1:** Release the parking brake

## 7.4 Set the auger conveyor speed

The auger conveyor speed has been preset **at the factory**. Usually, no additional adjustment is required. If the hydraulic capacity of your tractor is too low you may adjust the speed using the electronic **QUANTRON-A control unit for TWS**.

### ▲ WARNING

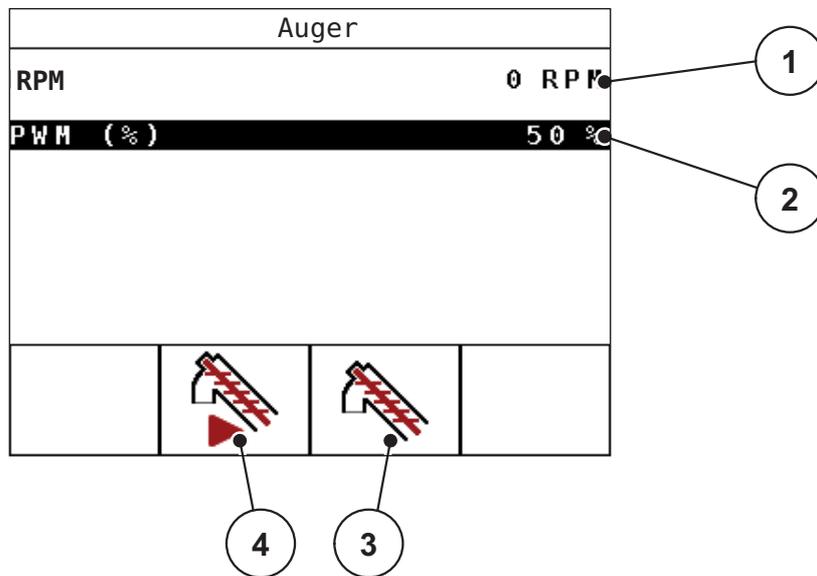


#### Risk of injury due to moving parts

There is a risk of injury during auger conveyor operation.

- ▶ Ensure that nobody is in the hazard zone.

1. Open the menu **Machine settings > Auger**.



**Figure 7.2:** Controlling the hydraulic system

- [1] Auger conveyor speed in RPM
- [2] Performance value of the auger conveyor in %
- [3] F2 function key: Continuous operation
- [4] F3 function key: Jogging mode

2. Turn the hydraulic system of the tractor to full power.
3. Start the auger conveyor by pressing the F2 function key
4. Set the required speed by means of the PWM value.
5. Turn the hydraulic system of the tractor down until the auger conveyor speed is below the minimum value.
6. Slightly increase the volume flow at the tractor.
  - ▷ The control block runs in saturated state (all hydraulic components are operating).
7. Stop the auger conveyor by pressing the F2 function key

### NOTICE

If the auger conveyor speed is too low in respect to the selected spreading quantity of the fertiliser spreader there is no indication if the fertiliser spreader hopper is full. This may lead to spreading errors or underfertilisation in the spread areas due to possible empty spreading.

- Increase the auger conveyor speed.
- 

## 7.5 Fertiliser load transfer

### NOTICE

The load transfer function is controlled by an electronic control unit. Refer to the **operator's manual of the QUANTRON-A control unit for TWS 85.1**.

---

### 7.5.1 Operating sequence

The control unit is used to monitor the filling levels of the attached fertiliser spreader and the load transfer vehicle TWS 85.1.

### NOTICE

Ensure that all sensors are mounted correctly and are in good working order.

---

The operating sequence depends on the operating mode selected in the QUANTRON-A control unit:

- Manual
- Semi-automatic
- Automatic

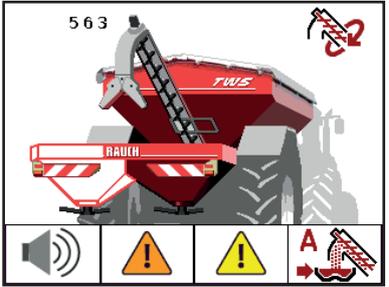
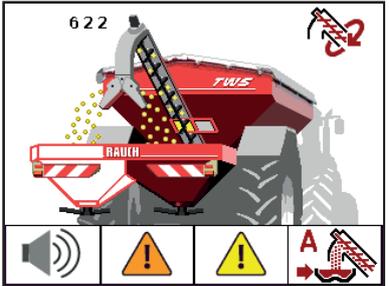
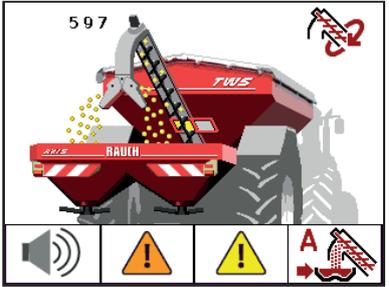
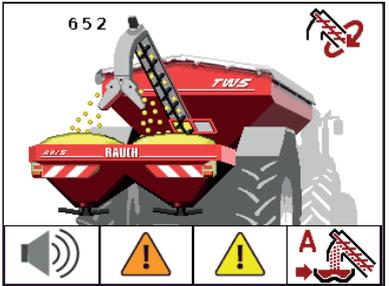
### NOTICE

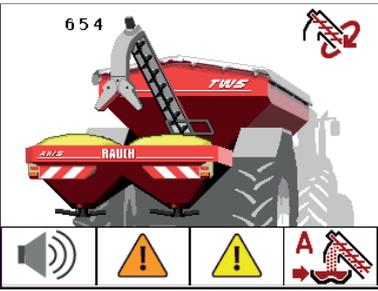
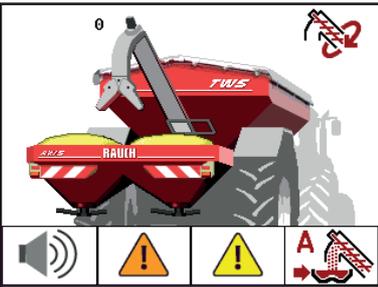
The following chapter contains an **example of the load transfer function** with illustrations of the QUANTRON-A control unit. For additional details or information on controlling your machine refer to the **operator's manual of the QUANTRON-A control unit for TWS 85.1**.

---

7.5.2 Example: Load transfer in automatic operating mode

Load transfer is fully automatic and always in the same sequence.

Function/control	Operating screen display
<ul style="list-style-type: none"> <li>● One of the two level sensors of the fertiliser spreader indicates empty.</li> <li>● The auger conveyor operates for the preset time.</li> </ul>	
<ul style="list-style-type: none"> <li>● The auger conveyor reaches the required speed.</li> </ul>	
<ul style="list-style-type: none"> <li>● The TWS slide opens.</li> <li>● The fertiliser flows in the spreader.</li> </ul>	
<ul style="list-style-type: none"> <li>● Both level sensors of the fertiliser are dampened.</li> </ul>	
<ul style="list-style-type: none"> <li>● The overflow is reached.</li> </ul>	

Function/control	Operating screen display
<ul style="list-style-type: none"> <li>● The TWS slide closes.</li> <li>● The auger conveyor continues to operate for the preset time to prevent clogging.</li> </ul>	
<ul style="list-style-type: none"> <li>● The auger conveyor stops.</li> </ul>	

## 7.6 Discharging residual material

Discharge the machine daily after use. This helps to prevent corrosion and clogging and to maintain the properties of the fertiliser. You may reuse the fertiliser afterwards.

### 7.6.1 Safety notes

#### ⚠ DANGER



#### **Danger from running motor**

Working on the load transfer vehicle while the engine is running may result in serious injuries caused by mechanical components and escaping fertiliser.

- ▶ Never discharge residual quantities while the motor/universal drive shaft is running.
- ▶ Turn the tractor motor off and remove the ignition key.

#### **Furthermore, the following requirements must be met:**

- The machine is parked on even, solid ground and is secured against tilting and rolling away.
- The machine is attached to the tractor during discharge of residual quantities.
- Nobody is present in the hazard zone.

## 7.6.2 Discharging the load transfer vehicle

Residual quantities are discharged by opening the emptying flap at the auger conveyor inlet below the hopper.

### Requirement:

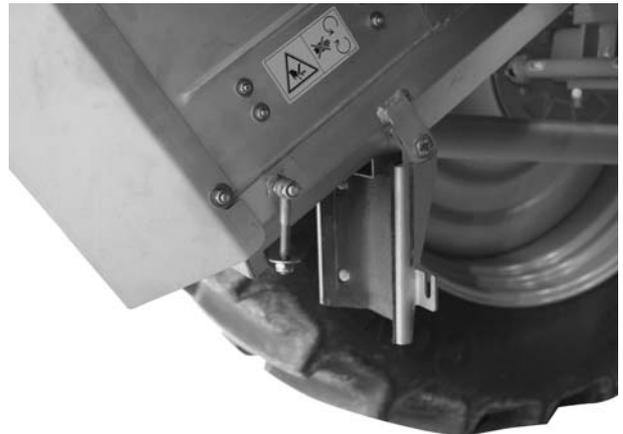
- Open the metering slide above the QUANTRON-A control unit.

1. Place a collecting vessel below the emptying flap.



**Figure 7.3:** Emptying flap below hopper

2. Open the emptying flap using a wrench (AF 17).



**Figure 7.4:** Open emptying flap

3. After having emptied the spreader hopper entirely, clean the machine (see chapter [9.3: Cleaning, page 75](#)).

## 7.7 Parking and decoupling the load transfer vehicle

### 7.7.1 Safety

#### ⚠ WARNING



#### Danger caused by tilting

The machine is a uni-axial vehicle. If there is a one-sided, tail-heavy load, the machine may tilt. This may result in personal injury and material damage.

- ▶ Only park the machine on level, solid ground.
- ▶ If there is a one-sided, tail-heavy load **never** decouple the machine from the tractor.



**Figure 7.5:** Warning sticker for parking the load transfer vehicle TWS 85.1

Left: Parking in empty condition

Right: Parking in loaded condition

- When parking the empty machine and the empty fertiliser on an uneven ground, they must be **facing downhill**.
- Park the empty machine and the empty fertiliser on a level ground.
- **The empty machine must not be parked with the fertiliser spreader loaded.**
- Park the loaded machine with empty fertiliser on a level ground.
- Park the loaded machine with loaded fertiliser on a level ground.

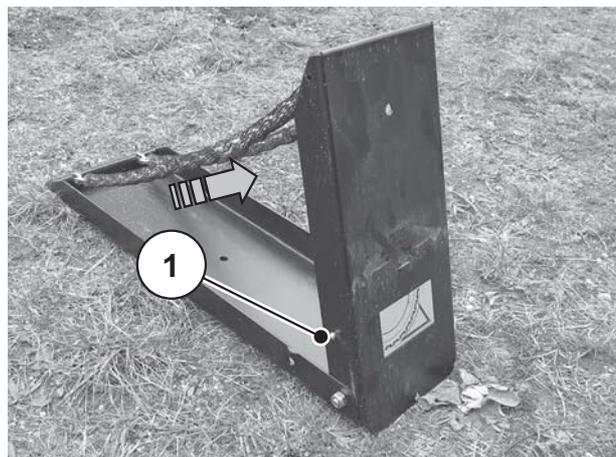
1. Move the entire train on an even, solid parking space.
2. Turn the tractor motor off and remove the ignition key.

3. Pull out the valve [1] for applying the parking brake.



**Figure 7.6:** Apply the parking brake

4. Remove the wheel chocks from the transport storage at the mud guard.
5. Press the slider pin [1] and fold out the wheel chocks.



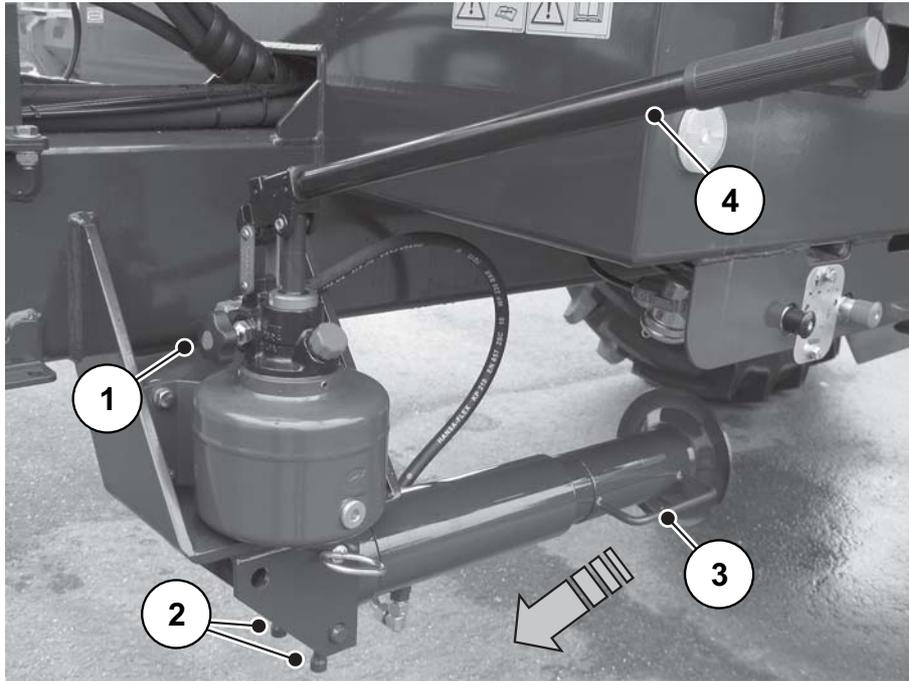
**Figure 7.7:** Fold out the wheel chock

6. Apply the wheel chocks to both wheels.



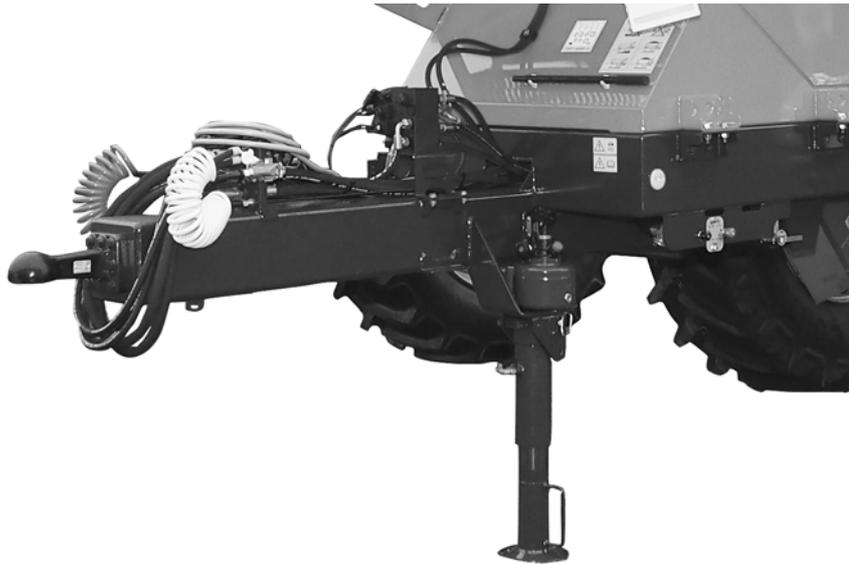
**Figure 7.8:** Position the wheel chock

7. Remove the control lever [4] from the bracket at the frame.
  - ▷ The control lever is located at the front of the frame below the platform.



**Figure 7.9:** Fold out the support stand

8. Hold the support stand at the handle [3].
9. Unlock the support stand by pressing together the locking pins [2] and fold it down until the locking pins have locked in the lower position.
10. Insert the control lever [4] into the holding fixture of the pump.
11. Securely close the upper valve [1].
12. Extend the support stand by pumping movements until the machine has released the coupling point of the tractor.
13. Suspend the control lever [4] in the bracket provided below the platform.
14. When disconnecting the machine **always disconnect the red coupling button** (supply) of the compressed-air braking system first.
15. Before disconnecting the hydraulic connections, depressurise the hydraulic system of the tractor (**floating position**).
16. Disconnect the hydraulic, electrical and pneumatic connections from the tractor.
17. Protect all connectors with dust caps.
18. Disconnect the universal drive shaft from the tractor.
19. Disconnect the machine from the tractor.



**Figure 7.10:** Storage of cables and hydraulic hoses

- ▷ **The machine is disconnected and parked.**



## 8 Faults and possible causes

**⚠ WARNING**



**Risk of injury when rectifying faults inappropriately**

Delayed or incorrect repairs by unqualified personnel may result in severe personal injury as well as in damages to the machine and the environment.

- ▶ Any faults occurring must be repaired **immediately**.
- ▶ Only carry out repairs yourself if you have the appropriate **qualifications**.

Fault	Possible cause/action
<p>The auger conveyor conveys no fertiliser in the hopper of the fertiliser spreader</p>	<ul style="list-style-type: none"> <li>● The hydraulic system is not connected or not switched on.</li> <li>● The hydraulic connections P and T are swapped.</li> <li>● The QUANTRON-A is not switched on.                             <ul style="list-style-type: none"> <li>- Check all connections.</li> </ul> </li> <li>● The TWS hopper is empty,</li> <li>● The fertiliser spreader is full.</li> <li>● The level sensors are dirty or defective.                             <ul style="list-style-type: none"> <li>- Check the functionality of the sensors or clean them.</li> </ul> </li> <li>● The tractor does not provide enough hydraulic pressure.</li> <li>● The TWS slide does not open.</li> <li>● The auger conveyor is blocked.</li> <li>● The outlet is blocked.                             <ul style="list-style-type: none"> <li>- Clear blockages.</li> </ul> </li> </ul>
<p>The auger conveyor does not convey enough fertiliser.</p>	<ul style="list-style-type: none"> <li>● The performance of the hydraulic system of the tractor is too low.</li> <li>● The slide does not open completely.</li> <li>● The auger conveyor speed is too low                             <ul style="list-style-type: none"> <li>- If required, open the flow control valve with the control unit.</li> <li>- See <a href="#">7.4: Set the auger conveyor speed. page 61</a></li> </ul> </li> </ul>



## 9 General maintenance and service

### 9.1 Safety

#### NOTICE

Please note the warnings in chapter [3: Safety, page 5](#).  
Take **particular note of the instructions** in section [3.8: Maintenance and service, page 13](#).

Maintenance and service work involves additional hazards that do not occur during operation of the machine.

Any maintenance and service work is to be conducted with increased alertness at all times. Work very carefully and with awareness of danger.

Observe the following instructions in particular:

- Welding and work on the electrical and hydraulic systems is to be carried out by qualified technicians only.
- Spare parts must at least comply with the technical requirements specified by the manufacturer. This is assured e. g. with genuine spare parts.
- Repair work on tyres and wheels may only be carried out by specialised staff with the suitable mounting tools.
- Before starting any cleaning, maintenance, or service work, and when troubleshooting, switch off the tractor's engine and wait until all moving parts of the machine have come to a stop.
- Only an **instructed and authorised workshop** may carry out repair work.

## 9.2 Maintenance plan

This maintenance plan applies to vehicles with normal load. In case of an extremely high load reduce the maintenance intervals accordingly. This prevents damage to the tractor, the load transfer vehicle or the fertiliser spreader.

### NOTICE

For further information, please refer to the operator's manual of the tractor and the fertiliser spreader.

### 9.2.1 General maintenance plan

Component parts	Maintenance tasks Maintenance plan	Comment
Wear parts and screw connections	Inspect regularly	<a href="#">Page 79</a>
Cleaning	To be carried out after each deployment	<a href="#">Page 75</a>
Towing eye/ball coupling	Check for wear	
Lubrication plan		<a href="#">Page 91</a>

### 9.2.2 Maintenance plan for axles and braking system

Component parts	Maintenance tasks Maintenance plan	Comment
Brakes	Check function before driving	
	Check condition and function once a year	By specialist workshop
Brake pads	every 1000 operating hours, at least quarterly: check for wear Install new brake pads, if required	
Air reservoir of braking system	Drain daily	
Wheels	Retighten the wheel nuts after the first 50 km	
	After the first 50 operating hours and every 100 hours: Check the bearing clearance of the wheel hubs	
	Check the inflation pressure regularly	

9.2.3 Maintenance plan for hydraulic system

Component parts	Maintenance tasks Maintenance plan	Comment
Hydraulic hoses	Check condition	
	Replace after 6 years	<a href="#">Page 84</a>
Control block	Check for damages/leaks before driving	<a href="#">Page 85</a>

9.3 Cleaning

Fertiliser and dirt promote corrosion.

We recommend cleaning the machine **a soft jet of water** immediately after every use in order to maintain its value.

The following instructions must be observed for cleaning:

- Only clean oiled machines at washing points fitted with an oil separator.
- When cleaning with high-pressure water, **never** aim the jet directly at warning signs, electrical equipment and hydraulic components.

After cleaning, we recommend treating the **dry** machine, **especially stainless steel parts**, with an environmentally friendly anti-corrosion agent.

A suitable polishing kit can be ordered from authorised dealers for use in treating rust spots.

9.4 Opening the protective grid

The rear halves of the protective grid ((viewed in the direction of travel) are foldable.

**▲ WARNING**



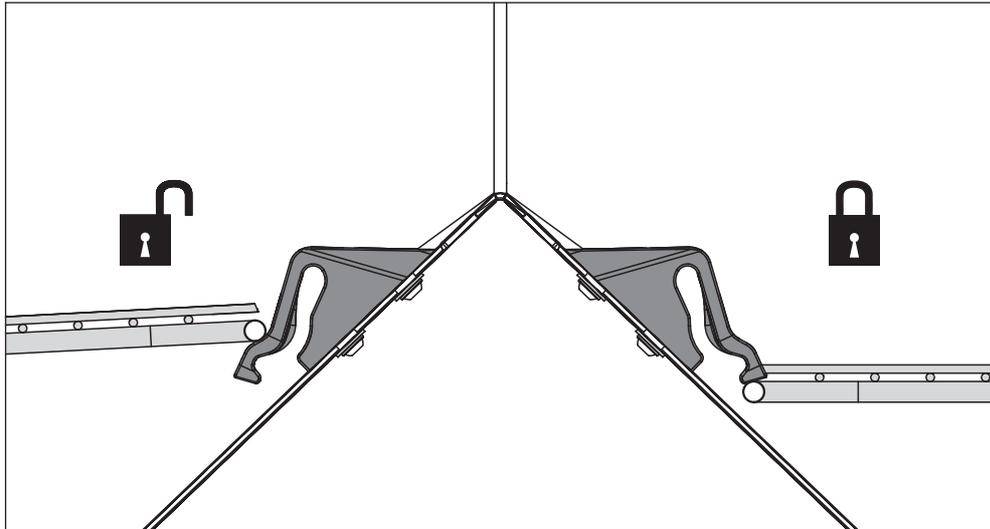
**Risk of injury due to moving parts in the hopper**

There are moving parts in the hopper.

There is a risk of injury to hands and feet during commissioning and operation of the machine.

- ▶ It is important that the protective grid is installed and locked before commissioning and operating the machine.
- ▶ The protective grid may **only** be opened for maintenance purposes or in the event of a fault.

The protective grids lock automatically by means of a protective grid lock.

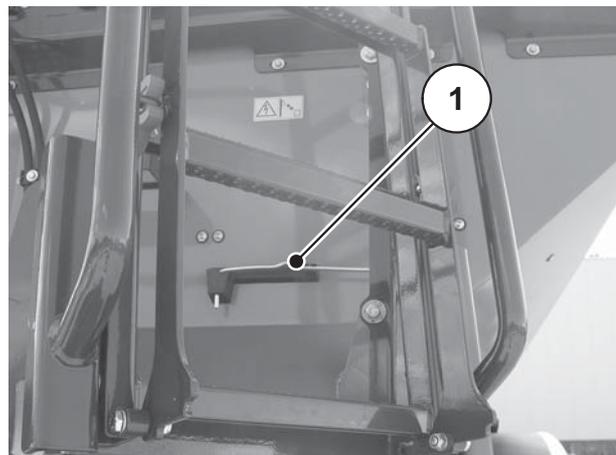


**Figure 9.1:** Protective grid lock open/closed

**Before opening the protective grid:**

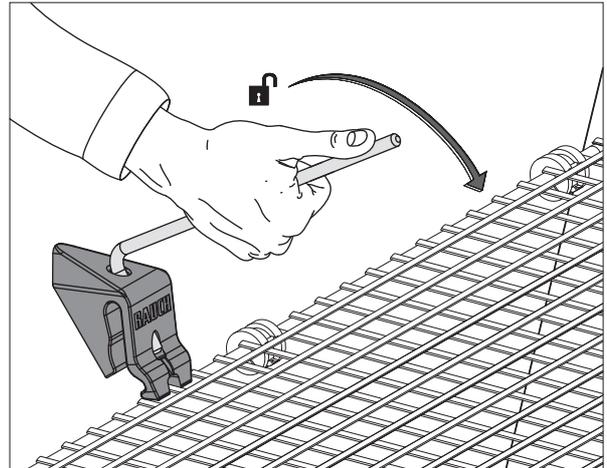
- Open hopper cover
- Disengage the PTO shaft.
- Turn the tractor motor off. Remove the ignition key.

1. Remove the control lever [1] from the bracket at the hopper.



**Figure 9.2:** Control lever

2. Use the control lever to open the protective grid lock.



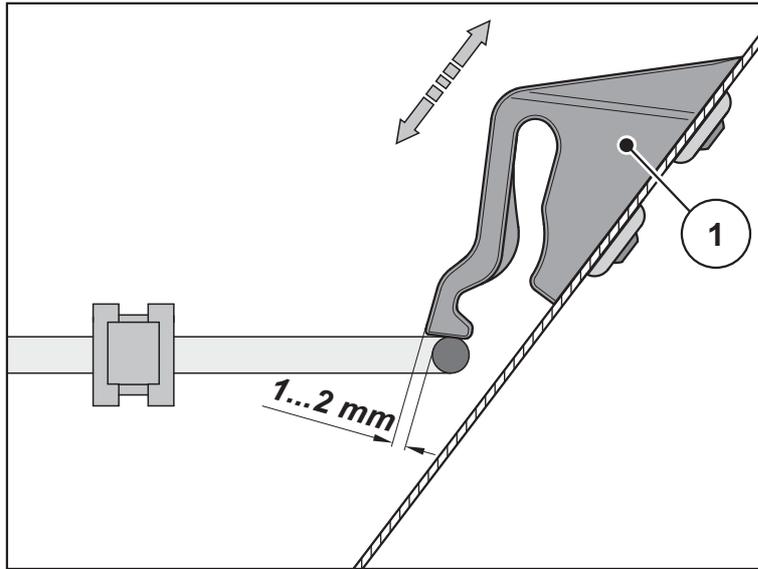
**Figure 9.3:** Open the protective grid lock

3. Open the protective grid.



**Figure 9.4:** Open the protective grid

- Execute a regular function check of the protective grid lock. See figure below.
- Immediately replace defective protective grid locks.
- If required, correct the setting by moving the protective grid lock [1] up/down (see figure below).



**Figure 9.5:** Test dimension for functional check of the protective grid lock

## 9.5 Wear parts and screw connections

### 9.5.1 Checking wear parts

Wear parts include: **auger conveyor pipe, outlet, hydraulic hoses** and all plastic parts.

Plastic parts - e.g. **protective grid lock** - are subject to a certain ageing process even under normal spreading conditions.

- Checking wear parts.

Replace these parts if they show signs of wear, deformation or holes.

The durability of wear parts depends, among other things, on the spreading material.

- Furthermore, all connection elements of the towed load transfer vehicle to the tractor are subject to wear, as well. In particular, this applies to the coupling bracket of the ball coupling or the towing eye of the pin coupling.
- We recommend that you have the condition of the towed load transfer vehicle checked after each season by your specialist dealer, paying particular attention to its fastening components, hydraulic system and hoses.
- Spare parts must at least comply with the technical requirements specified by the manufacturer. This is assured e. g. with genuine spare parts.

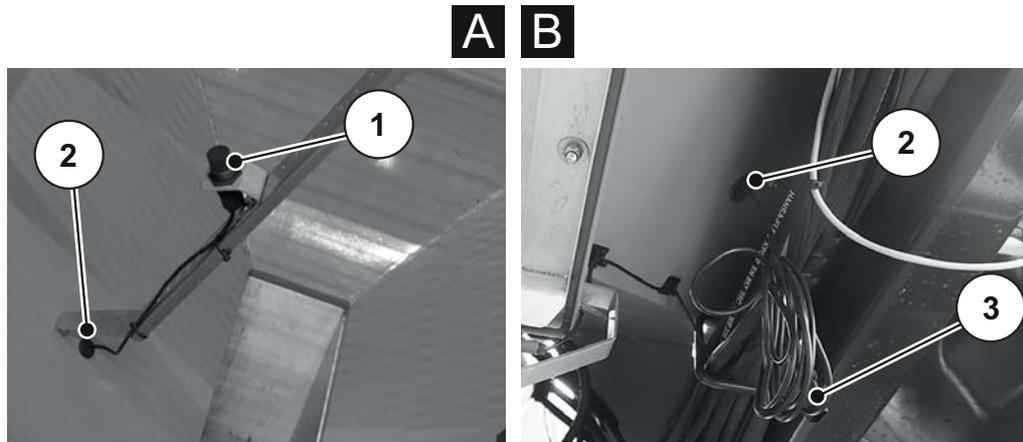
### 9.5.2 Checking screw connections

Bolted joints have been tightened to the specified torque and locked at the factory. Vibrations and shocks, in particular during the initial operating hours, can loosen bolted joints.

- With new machines, all screw connections are to be checked for their tight seat after approx. 30 operating hours.
- Check all the bolted joints regularly for tightness, and definitely before the start of the spreading season.

Some components are mounted with self-locking nuts. When mounting these components always **use new self-locking** nuts.

### 9.6 Replace the level sensor in the hopper



**Figure 9.6:** Level sensor TWS hopper

- [A] Hopper inside
- [B] Hopper bottom, left viewed in the direction of travel
- [1] Level sensor
- [2] Plastic plug
- [3] Level sensor plug connector

1. Remove the cable tie.
2. Unscrew the level sensor [1].
3. Remove the plastic plug [2].
4. Pull the level sensor [1] through the hole in the bottom.
5. Install a new level sensor
6. Insert the plastic plug in the hopper hole.
7. Connect the plug connector [3] of the cable.

## 9.7 Maintenance of chassis and brakes

The machine is braked by a dual-circuit compressed air braking system.

The chassis and the braking system are decisive for the operating safety of the load transfer vehicle.

### ▲ WARNING



#### **Danger of accidents caused by unprofessionally executed work**

Any work at the chassis and the braking system which is executed unprofessionally impairs the operational safety of the load transfer vehicle and may lead to severe accidents with personal injury and material damages.

- ▶ Setting and repair work at the brake system may **only** be carried out by specialist workshops or recognized brake services.

### 9.7.1 Checking the condition and the function of the braking system

#### NOTICE

Since your load transfer vehicle is a working machine, a cyclical main inspection at a safety-related monitoring service is not mandatory.

You are solely responsible for the flawless condition of your machine.

The flawless function of the braking system is of utmost importance for the safety of your load transfer vehicle.

Have the braking system checked regularly, at least once a year, by a specialist workshop.

Check the braking system regularly for damages and leaks, at least before every drive.

When checking the braking system, please respect the following instructions:

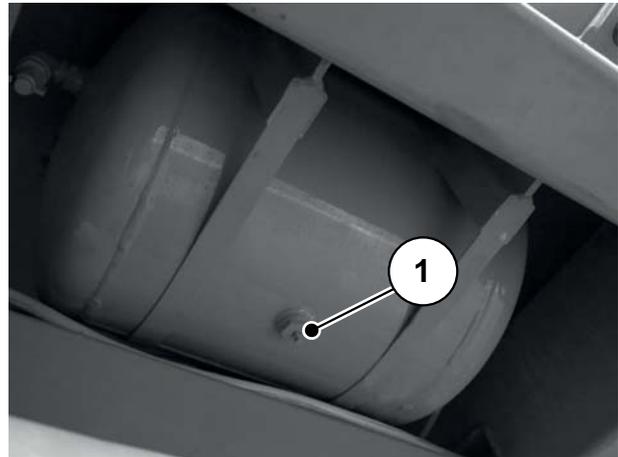
- Check the braking system in a dry state, not when the vehicle is wet or in the rain.
- Check the braking system for leaks and damages.
- Check the free movement of the braking lever and the frame.
- Have the brake pads changed in time. For this purpose, only use the brake pads prescribed for the axles.

### 9.7.2 Draining the air reservoir

Condensed water may form in the compressed air braking system of the braking circuit and collected in the air reservoir.

In order to avoid corrosion damage to the compressed air braking system, drain the air reservoir daily.

1. Actuating pin [1] pull with your finger on one side.  
▷ The tilt valve opens.
2. Drain all of the condensed water.
3. Release the actuating pin [1].  
▷ **The air reservoir is drained.**



**Figure 9.7:** Draining the air reservoir

## 9.8 Maintenance of the hydraulic system

The hydraulic system of the towed load transfer vehicle consists of a hydraulic circuit:

- Control block with oil supply from the tractor.

During operation, the hydraulic system of the load transfer vehicle is subject to high pressure. During operation, the temperature of the oils in the system is approx. 90 °C.

### ▲ WARNING



#### Risk of injury due to the hydraulic system

Hot fluids and fluids escaping under high pressure may cause severe injury.

- ▶ Before starting any work, the hydraulic system is to be depressurised.
- ▶ Switch off the tractor engine and secure the tractor against restart.
- ▶ Let the hydraulic system cool down.
- ▶ When searching for leakage, wear protective goggles and protective gloves at all times.

### ▲ WARNING



#### Risk of infection caused by hydraulic oils

Hydraulic oils escaping the system under high pressure may penetrate the skin and cause infections.

- ▶ In case of injury in connection with hydraulic oil, immediately seek medical attention!

### ▲ CAUTION



#### Danger of environmental pollution caused by hydraulic or gearbox oils

Hydraulic or gearbox oil penetrating the canalisation or the ground may pollute large quantities of ground water and drinking water.

- ▶ Always dispose of waste oil in accordance with the manufacturer's instructions, in an environmentally friendly manner at the specified collection point.

### 9.8.1 Checking hydraulic hoses

Hydraulic hoses are subject to extreme stress and aging. They may only be used for a maximum period of 6 years, including a storage period of up to 2 years.

#### NOTICE

The date of manufacture of a hose line is indicated at the hose fittings in a year/month format (e.g. 2016/04).

---

- Regularly check the hydraulic hoses for damage, at the least before the start of the spreading season, by means of visual inspection.
- Replace the hydraulic hoses if one or several of the following damage types are identified:
  - Damages to the external layer up to the inlay
  - Brittleness of the external layer (formation of cracks)
  - Deformation of the hose
  - Hose moves out of the hose fitting
  - Damages to the hose fitting
  - Reduced firmness and function of the hose fitting due to corrosion
- Before the start of the spreading season, check the age of the hydraulic hoses. Change hydraulic hoses as soon as the prescribed period of storage and usage is exceeded.

### 9.8.2 Replacing hydraulic hoses

#### Preparation:

- Ensure that the hydraulic system is **depressurised** and **cooled-down**.
- Position collecting vessels for leaking hydraulic oil under the disconnection points.
- Have suitable closing elements ready in order to prevent leaking of the hydraulic oil from the lines which are not to be replaced.
- Have suitable tools ready.
- Put on protective gloves and protective goggles.
- Ensure that the new hydraulic hose corresponds to the type of the hydraulic hose to be replaced. Particular attention is to be paid to the correct pressure range and hose length.

#### NOTICE

Please also observe deviating maximum pressure specifications of hydraulic lines to be replaced.

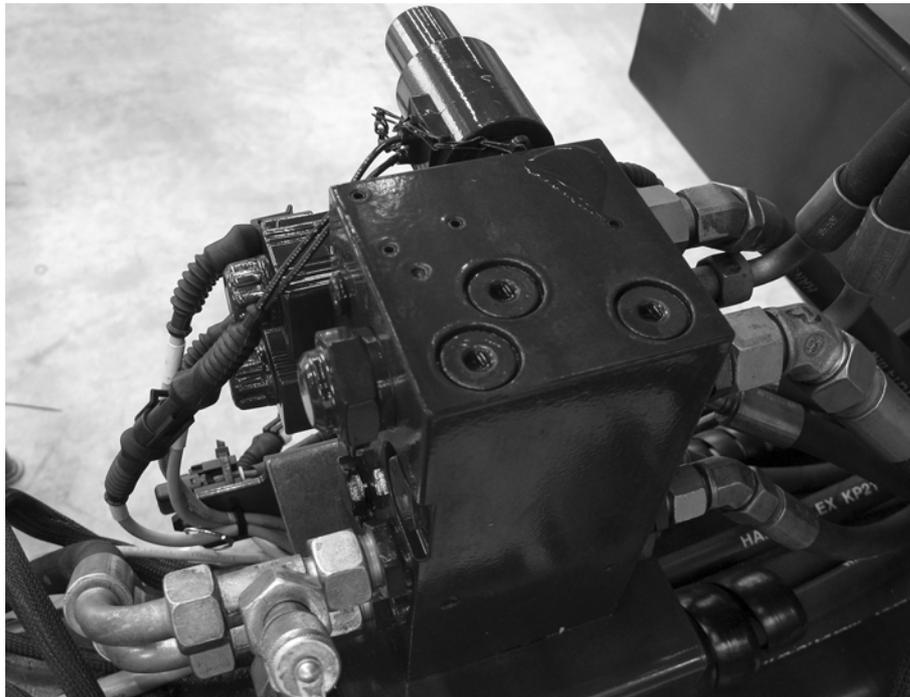
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**Proceed as follows:**

1. Loosen the hose fitting at the end of the hydraulic hose to be replaced.
  2. Discharge the oil from the hydraulic hose.
  3. Loosen the other end of the hydraulic hose.
  4. Immediately discharge the loosened hose end into the oil collecting vessel and close the connection.
  5. Release hose clamps and disconnect the hydraulic hose.
  6. Connect the new hydraulic hose. Tighten the hose fittings.
  7. Secure the hydraulic hose with the hose clamps.
  8. Check the position of the new hydraulic hose.
    - The hose guide must be identical with the one of the old hydraulic hose.
    - There must be no abrasion points.
    - Do not twist the hose or route it under tension.
- ▷ **The hydraulic hoses are now successfully replaced.**

**9.8.3 Maintenance of the hydraulic system hydraulic block**

Via the control block, all drive and control functions are supplied which are activated by the electronic control unit.



**Figure 9.8:** Control block

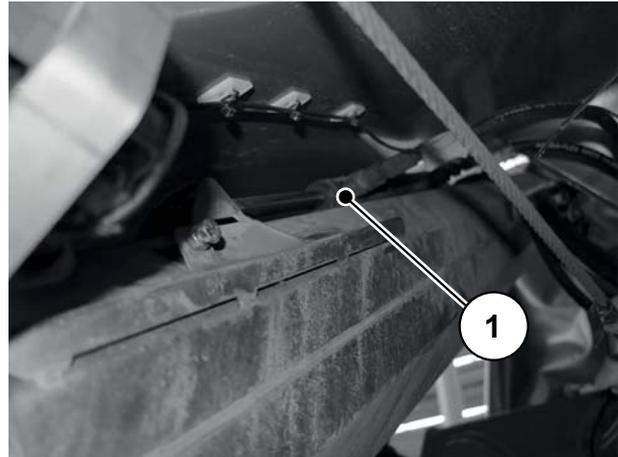
The components of the hydraulic system which are to be maintained are:

- the hydraulic cylinder of the slide
- the hydraulic motor of the auger conveyor drive
- the hydraulic cylinders for the hopper cover drive.

**Checking the hydraulic cylinders for the control function**

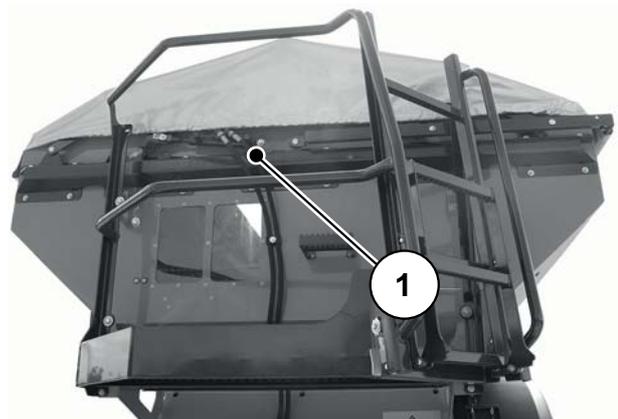
Regularly check all hydraulic cylinders and at least before every spreading operation.

Control functions: Hydraulic cylinder [1] of the slide.

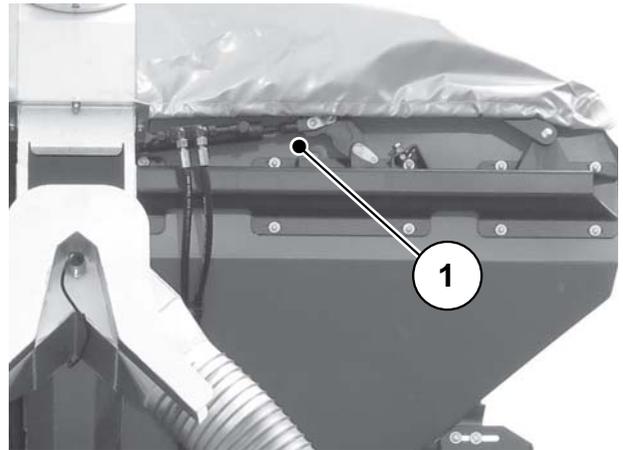


**Figure 9.9:** Slide hydraulic cylinder

Control functions: Hydraulic cylinder [1] for the hopper cover (front and back).



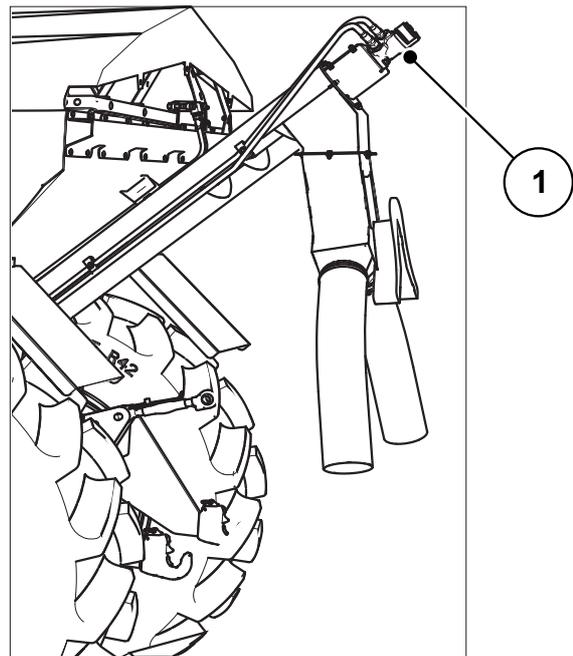
**Figure 9.10:** Hopper cover hydraulic cylinder - front



**Figure 9.11:** Hopper cover hydraulic cylinder - back

- Check the components for external damages and leaks.

#### Checking other components



- Regularly check the **motor** [1] of the auger conveyor and at least before every spreading operation.
- Check the components for external damages and leaks.

**Figure 9.12:** Check the motor of the auger conveyor

## 9.9 Wheels and tyres

The condition of the wheels and tyres is of utmost importance for the operating safety of the load transfer vehicle TWS 85.1.

### ⚠ WARNING



#### **Danger of accidents caused by unprofessionally executed work**

Any work at the wheels and tyres which is executed unprofessionally impairs the operational safety of the load transfer vehicle and may lead to severe accidents with personal injury and material damages.

- ▶ Repair work on tyres and wheels may only be carried out by **by specialist staff** with the suitable mounting tools.
  - ▶ **Never** weld cracked wheel rims or discs. Due to the dynamic stress when driving, the welds would tear within a short period of time.
- 

### 9.9.1 Checking the tyres

Regularly check the tyres for wear, damages and ingress of foreign objects.

Every two weeks, check the inflation pressure of the **cold** tyre. Observe the manufacturer's instructions.

### 9.9.2 Checking the condition of the wheels

Regularly check the wheels for deformation, corrosion, cracks and fractures.

- Corrosion may lead to stress cracks on wheels as well as damages to the tyres. The contact surfaces to the tyre and the wheel hub are to be kept stainless.
- Replace cracked, deformed or otherwise damaged wheels.
- Replace wheels with cracked or deformed bolt holes.

### 9.9.3 Replacing wheels

#### ⚠ WARNING



#### Danger of accidents caused by unprofessionally executed wheel replacement

Wheel replacements of the load transfer vehicle which are executed unprofessionally may lead to severe accidents with personal injury.

- ▶ Wheel replacements may only be executed at an empty load transfer vehicle which is coupled to the tractor.
- ▶ For replacing the wheel, the load transfer vehicle must be parked on even and solid ground.

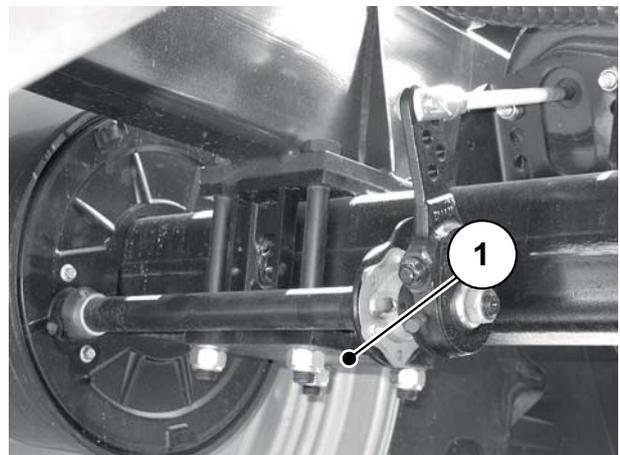
#### Requirements:

- Use a jack which is able to lift a load of at least **5 tons**.
- Use a torque wrench for tightening the wheel nuts.

#### Positioning of the jack:

- Position the jack in a way that the contact surface cannot be displaced under any circumstances (e.g. by a suitable piece of wood or rubber block).

- Additionally secure the jack against sliding away.
- Attach the jack on the left or right side under the axle mounting [1].



**Figure 9.13:** Application points for jack

**Wheel mounting:**

- Before mounting the wheel, clean its contact surface to the hub.
- Before mounting, check the wheel nuts and bolts. Replace damaged, stiff or corrosive wheel nuts or bolts.
- Tighten all wheel nuts **gradually** and **diagonally** using a torque wrench.
  - Tighten the wheel nuts with a tightening torque of **560 Nm**.
  - Attach and tighten all **10** wheel nuts per wheel.

Due to stress activities, the wheel nuts loosen during the first kilometres of drive with the new load transfer vehicle or after a wheel replacement.

- Tighten all wheel nuts after driving **50 km** with the prescribed tightening torque.

**NOTICE**

Observe the instructions and prescribed activities regarding the wheel mounting of the axle manufacturer.

---

### 9.10 Lubrication plan

Lubrication interval: every 50 operating hours, under extreme spreading conditions less.

The lubrication points are distributed over the entire machine and marked correspondingly.

You can recognize the lubrication points pots with this sign:

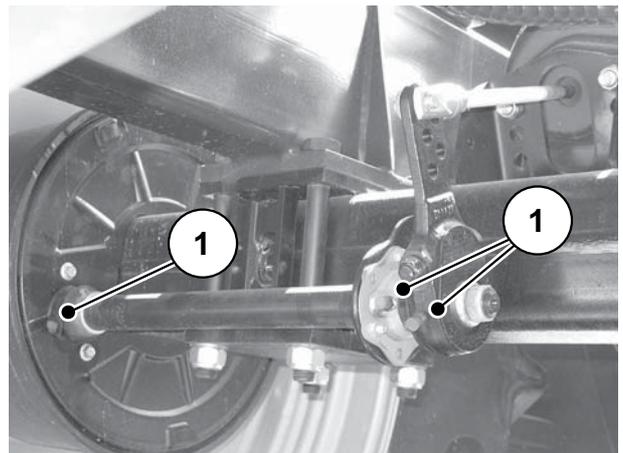


**Figure 9.14:** Lubrication point sign

- Always keep the signs **clean** and **legible**.



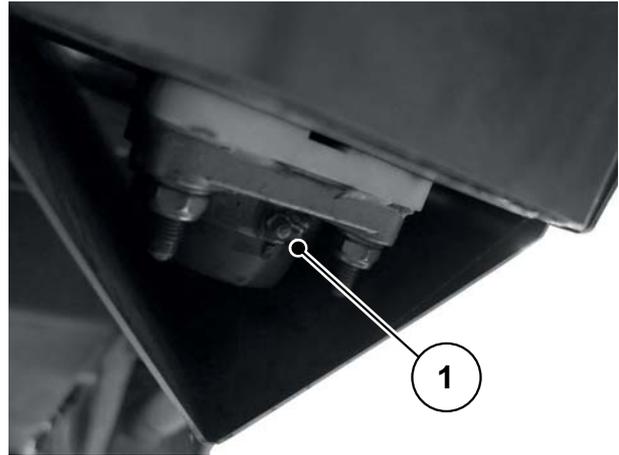
**Figure 9.15:** Ball coupling



[1] Lubrication point for brake

**Figure 9.16:** Brake linkage

[1] Lubrication point at auger conveyor end



**Figure 9.17:** Bottom auger conveyor end

## 10 Disposal

### 10.1 Safety

#### ▲ WARNING



#### **Environmental pollution due to unsuitable disposal of hydraulic and gear oil**

The hydraulic and gearbox oils are not entirely biodegradable. Therefore, oil must be prevented from entering the environment in an uncontrolled manner.

- ▶ Collect/dam escaped oil with sand, earth or other absorptive material.
- ▶ Collect hydraulic and gear oil in a suitable container provided for the purpose, and dispose of it in accordance with the local statutory requirements.
- ▶ Oil must be prevented from spilling and draining into the sewers.
- ▶ The ingress of oil into the sewage system must be prevented by building dams made of sand and/or earth or by other suitable damming means.

#### ▲ WARNING



#### **Environmental pollution caused by inappropriate disposal of packaging materials**

Packaging material contains chemical compounds, which must be dealt with appropriately.

- ▶ Packaging material is to be disposed of at an authorized waste management company.
- ▶ Observe the national regulations.
- ▶ Packaging material may **not** be burned nor disposed of with the domestic waste processing.

#### ▲ WARNING



#### **Environmental pollution caused by inappropriate disposal of components**

The incorrect disposal of ingredients and materials is a threat to the environment.

- ▶ Only authorised companies may be commissioned with the disposal.

### 10.2 Disposal

The following points are applicable without any restriction. Stipulate suitable precautionary measures based on the national legislation and implement them.

1. All components, auxiliary and operating materials from the machine must be removed by specialist staff.

Hereby, these components and substances must be cleanly separated into categories.

2. All waste products are then to be disposed of in accordance with local regulations and directives for recycling or special refuse categories by authorised companies.

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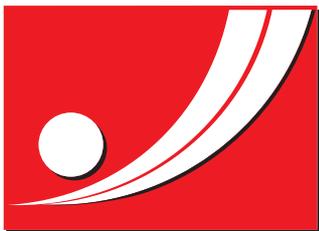
### **B**

## Terms/conditions of warranty

RAUCH units are manufactured with modern production methods and with the greatest care and are subject to numerous inspections.

Therefore RAUCH offers a 12-month warranty subject to the following conditions:

- The warranty begins on the date of purchase.
- The warranty covers material and manufacturing faults. Our liability for third-party products (hydraulic system, electronics) is limited to the warranty of the manufacturer of the equipment. During the warranty period, manufacturing and material faults are corrected free of charge by replacement or repair of the affected parts. Other rights extending beyond the above, such as claims for conversion, reduction or replacement for damages that did not occur in the object of supply are explicitly excluded. Warranty services are provided by authorised workshops, by RAUCH factory representatives or the factory.
- The following are excluded from coverage by the warranty: natural wear, dirt, corrosion and all faults caused by improper handling and external causes. The warranty is rendered void if the owner carries out repairs or modifications to the original state of the supplied product. Warranty claims are rendered void if RAUCH original spare parts were not used. Therefore, the directions in the operating manual must be observed. In all cases of doubt contact our sales representatives or the factory directly. Warranty claims must be submitted to the factory by 30 days at the latest after occurrence of the problem. The date of purchase and the serial number must be indicated. If repairs under the warranty are required, they must be carried out by the authorised workshop only after consultation with RAUCH or the company's appointed representatives. The warranty period is not extended by work carried out under warranty. Shipping faults are not factory faults and therefore are not part of the warranty obligation of the manufacturer.
- No claims for compensation for damages that are not part of RAUCH machines themselves will be accepted. This also means that no liability will be accepted for damage resulting from spreading errors. Unauthorised modifications of RAUCH machines may result in consequential damage, for which the manufacturer will not accept any liability. The manufacturer's liability exclusion will not apply in case of wilful intent or gross negligence by the owner or a senior employee, and in cases where – according to the product liability law – there is liability for personal injury or material damage to privately used objects in the event of defects in the supplied product. It will also not apply in the event that assured properties are absent, if the purpose of the assured properties was to protect the purchaser against damage that does not involve the supplied product itself.



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POWER FOR PRECISION

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