Operating and maintenance instructions

Two and three-axle push-off trailers
TAW

CE

Original operating instructions – Keep for future reference!

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Foreword

Dear Reader,

These operating instructions will help you to familiarise yourself with the safe operation of the vehicle. They should help you to get to know the two and three-axle push-off trailers (hereinafter referred to as the “pusher”), learn how to use them effectively and avoid any unnecessary malfunctions.

The pusher has been designed and built according to the current state of the art and in accordance with all applicable safety rules. Nevertheless, dangers for people or property may still arise, as not all dangers can be avoided if the full functionality of the pusher is to be maintained. You can, however, prevent accidents resulting from these dangers and malfunctions by observing these operating instructions and the instructions given during the briefing.

WARNING!

When operating and maintaining the pusher there are many dangers that can cause injury and property damage.

Therefore:

- Please be sure to carefully read these operating instructions before operating the pusher or performing any maintenance work on the pusher.
- Observe all the instructions and information that they contain, in particular the safety instructions.
- If you lose the operating instructions, or parts of the operating instructions, or if they are in a poor condition, request a new copy from the manufacturer (CD-ROM, paper copy) (see Page 152).

These operating instructions contain information for beginners and experienced users. Unfortunately, they cannot meet all needs. Nevertheless, we always endeavour to optimise the instructions and the products for practical use in the future. If you, as the operator, require further instructions or have any suggestions for improvements, feel free to contact us at any time.

After working through the operating instructions for the first time, keep them in a safe place for the entire service life of the pusher so that you can look up information later if needed.

If the pusher changes owner, the operating instructions must be passed on to the next owner.

Documentation provided by the suppliers of certain assemblies and components must also be observed. The manufacturer of the pusher does not accept any responsibility or liability for the content of such third party documentation.

Copyright protection

These operating instructions are copyright protected.

Any reprinting and reproduction of these operating instructions, including any extracts thereof, requires the manufacturer's written approval.

Guarantee and liability

The pusher may only be converted or modified if the manufacturer has given its written approval. If any unauthorised modifications are made, the manufacturer shall not be held liable for them and the guarantee shall lapse.

Guarantee and liability claims are also excluded if they can be traced back to one or more of the following causes:

- Improper use of the pusher
- Improper assembly, commissioning, operation and maintenance of the machine
- If the pusher is operated with defective, improperly installed or non-functioning safety and protective devices
- Failure to comply with the information provided in the operating instructions
- Poor maintenance or repairs
- Force majeure

The pusher is operated at the risk of the operator. The manufacturer cannot be held liable for any damage that occurs when using the pusher unless this damage is caused by gross negligence or a wilful breach of contract on the part of the manufacturer.

The guarantee provisions are listed in the General Terms and Conditions of the manufacturer (see annex).

Only use original replacement parts and accessories approved by the manufacturer. Otherwise, the structural properties, functionality or safety of the pusher could be negatively impacted. Using other parts therefore negates the manufacturer's liability for any arising consequences.

Definitions in the operating instructions

The following conventions apply in these operating instructions for ease of understanding:

1. Information

The following types of special symbols are used to highlight important information:

DANGER!

...indicates an imminently dangerous situation that will cause death or serious injury if not avoided.

WARNING!

...indicates a potentially dangerous situation that could cause death or serious injury if not avoided.

CAUTION!

...indicates a potentially dangerous situation that could cause minor injuries if not avoided.

ATTENTION!

...indicates a potentially dangerous situation that could cause property damage if not avoided.

...contains general instructions and useful information.

...indicates important information in other sections and documents.

2. Text structure

Some texts serve a specific purpose. These are identified as follows:

- Lists

  ⇨ Instructions

    ↳ Consequences of an action

3. Position numbers

Numbers in round brackets, e.g. “(2)”, refer to the position numbers of the operating elements listed in Section 2.4.

4. Orientation

Directions and indications of sides (left, right, front, back, etc.), always refer to the forward direction of the push-off trailer.

5. Figures

These operating instruction apply for the models TAW 20 / TAW 20-K and TAW 30. The figures in these operating instructions mainly refer to the TAW 20 model. The representations can, however, be transferred to other models.

If a description applies to all models listed above, only the model series TAWis mentioned.

Contents

1 Safety

A prerequisite for the safe and fault-free operation of the pusher is thorough knowledge of the safety information and safety regulations.

As such, read this chapter through carefully before starting any work and always observe the information and warnings that it contains. The warning information that can be found at the corresponding points in the text of the following chapters must be observed. The manufacturer cannot be held liable if the information and warnings have not been observed.

The manufacturer cannot foresee every danger. The warnings included in these instructions and displayed on the pusher therefore may not cover all dangers associated with the pusher.

The operator is responsible for complying with all safety regulations and for ensuring the proper use of the pusher.

In addition to the information in these operating instructions, any applicable statutory regulations, in particular the safety and accident prevention regulations, must be taken into account.

1.1 Intended use

The operational safety of the two-axle pusher TAW 20 / TAW 20-K and the three-axle pusher TAW 30 is only guaranteed if the pusher is used as intended. Therefore, it must only be used as intended.

The intended use is only given if the two-axle pusher TAW 20 / TAW 20-K or three-axle pusher TAW 30 is used in the agricultural and forestry sector, if the permissible total weight is taken into account and if it is coupled to an approved towing vehicle and used for transporting pourable and bulk goods. The pusher is particularly suitable for transporting silage, woodchips and humus.

During a pushing process, the pusher may only be operated by the driver of the towing vehicle, who must remain seated in the driver's seat of the towing vehicle at all times. During a pushing process, no-one should be in the danger zone of 5 m around the pusher and towing vehicle.

The tailgate should not be operated while the pusher is moving.

Compliance with all information provided in these operating instructions forms part of intended use.

The TAW 20 (tandem push-off trailer), TAW 30 (tridem push-off trailer) and TAW 20-K (tandem push-off trailer) (compact) are all centre-axle trailers.

WARNING!

Danger of injury due to improper use.

If the two-axle pusher TAW 20 / TAW 20-K or the three-axle pusher TAW 30 is used for applications other than the intended use, dangerous situations can arise that may cause bodily injuries or property damage. In addition, any guarantee claims will not be valid.

Therefore:

- Only use the two-axle pusherTAW 20 / TAW 20-K or the three-axle pusher TAW 30 as intended.

1.2 Improper use

Any use that deviates from the uses mentioned in Section 1.1 is considered to be improper use.

In particular, this includes:

- The transportation of pourable and bulk goods that can be carried by the pusher in terms of volume but which exceed the permissible total weight for the pusher. This can easily happen with grains.
- The transportation of people and animals.
- Travelling with the tailgate open.
- The transportation of sharp objects that can cause damage, e.g. erratic boulders, cullet or steel scrap.
- Climbing on parts of the pusher. Exception: Unless this is required for maintenance or repair work.
- Operating the pusher when it is in a defective state or affected by safety-relevant malfunctions.
- If any modifications have been made without the authorisation of the manufacturer. It is expressly prohibited to drill holes into the chassis, to counter drill any existing holes on the upper and lower flange of the chassis frame and to perform welding work on any load-bearing parts.
- The pusher being operated by unsuitable personnel.

1.3 Product monitoring

Malfunctions or problems that occur during operation, as well as accidents and near misses, must be reported to the manufacturer immediately. The manufacturer will work with the operator to find a solution to the problem and will use the knowledge gained in any subsequent work.

Contact: See Chapter 0, Page 152.

1.4 Personnel requirements

WARNING!

Danger of injury with insufficient qualification.

Mishandling of the pusher can lead to significant personal injury and property damage which can result in serious injuries.

Therefore:

- Only the groups of people mentioned below may work with the pusher.

The only people that may work with the pusher are:

- People who hold a valid category L driver's licence
- People who have the physical and mental capacity to operate the pusher
- People who are rested and focused
- People who are not under the influence of alcohol, drugs, narcotics, medication or other substances
- People who have sufficient experience with pushers or have been instructed by experienced people
- People who have read and understood these operating instructions and the additional documents in the annex
- People who can be expected to complete the tasks assigned to them responsibly and reliably
- People who are familiar with the basic occupational safety and accident prevention rules
- People who comply with the requirements of the EU Directive 89/655/EEC
- People who have been authorised to use the pusher by the operator

The assembly, maintenance, repair, troubleshooting and disposal of the pusher may only be done by personnel with the relevant technical training and experience, e.g. particularly with regards to mechanical, hydraulic or electrical systems.

WARNING!

Risk of death caused by work that has not been carried out properly.

If assembly, maintenance and repair work, troubleshooting and disposal is not performed by qualified and authorised personnel, there is a very high risk of injury. This risk exists during this work and as a result of work that has not been performed correctly.

Therefore:

- Assembly, maintenance and repair work, troubleshooting and disposal should only be performed by authorised and trained personnel.

These people must be carefully selected by the operator. The area of responsibility and competences of the respective personnel must be clearly defined by the operator. The operator must conduct or have conducted a qualified training course and have evidence to prove it.

1.5 Danger zone

The danger zone is the zone in which the safety or health of personnel is at risk.

No-one should enter the pusher when it is being towed by a towing vehicle. Riding on the pusher is prohibited.

The pusher may only be parked on sufficiently solid ground that can bear the weight of a fully loaded pusher. When parking on an incline, the pusher must be secured against unintentional rolling away.

When the pusher is at a standstill, people may enter the following areas:

- When coupling and decoupling, the supply lines between the towing vehicle and pusher.
- No-one should be in the danger zone when the plate is being pushed (see Figure 1, Page 17).
- During a pushing process, the pusher may only be operated by the driver of the towing vehicle. They must remain seated in the driver's seat of the towing vehicle at all times so that they can stop the pushing process in an emergency.

All information provided in the technical specifications must be complied with (see Section 2.5, Page 47).

WARNING!

Risk of death during the pushing process:

During a pushing process, there is a risk of the centre of gravity of the pusher shifting, e.g. due to heavy sliding cargo or overloading, causing the pusher to tip over and pull the towing vehicle with it. For people in the danger zone, there is a risk of being struck by or buried beneath the toppling vehicles and any falling cargo.

Therefore:

- Never start a pushing process if there are people in the danger zone.
- Stop the pushing process if anyone enters the danger zone.
- Only restart the pushing process when these people have left the danger zone.

The danger zone of the pusher TAW 20 / TAW 20-K TAW 30 and the towing vehicle (see Figure 1).

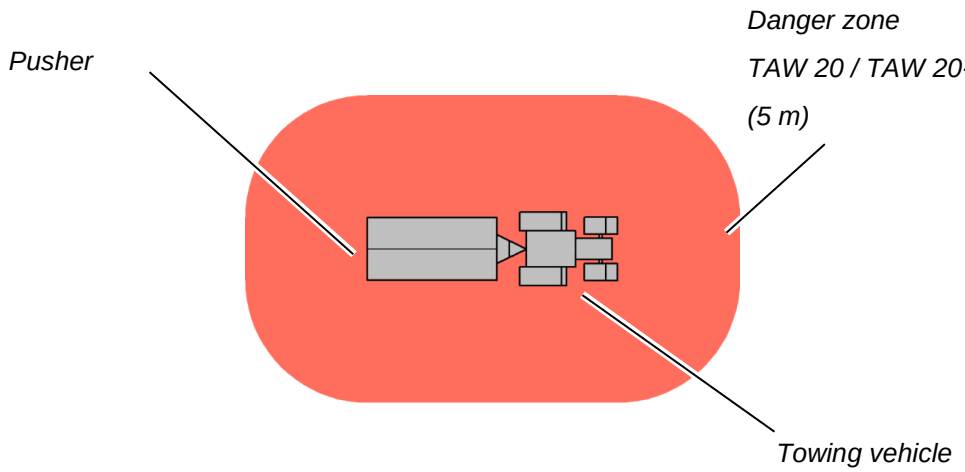


Figure 1: Danger zone of the pusher TAW 20 / TAW 20-K / TAW 30 and towing vehicle

During a pushing process, there is a risk of the centre of gravity of the pusher shifting, e.g. due to heavy sliding cargo or overloading, causing the pusher to tip over and pull the towing vehicle with it. This can result in serious or fatal injuries for anyone standing in the danger zone. As such, no-one may be in this zone during a pushing process.

1.6 Hazard points

The pusher has certain hazard points that cannot be structurally avoided without the function of the pusher being affected. These are listed below. However, this list is not a complete list of all possible hazard points.

When being in close proximity to hazard points is not absolutely necessary, e.g. for the operator, people must maintain a safety distance of at least 5m from any hazard points.

If this is not possible for operational reasons, people must approach any hazard points with extreme caution.

Danger of crushing:

- In the folding and swivelling range of the open tailgate
- In the cargo area during loading and unloading
- Between the towing vehicle and pusher, particularly during coupling and decoupling
- During decoupling if the unsecured pusher rolls away
- Under moving vehicle superstructures and body sections that are in an open or raised position
- In the area around the (optional) hydraulic mulching flap

Electrical hazards:

- When performing the (optional) hydraulic covering process near overhead power lines

Danger of impact:

- In the folding and swivelling range of the open tailgate
- When unfolding the ridge pipe

Danger of falling:

- During set-up work in the cargo area, e.g. when opening or closing the (optional) roller tarpaulin

1.7 Operator obligations

In addition to the safety instructions in these operating instructions, the applicable safety, accident prevention and environmental regulations for the operational area of the pusher must be complied with.

In particular, the following applies:

- The operator must carefully select the personnel to work with the pusher (see Section 1.4, Page 14).
- The area of responsibility and competences of the respective personnel must be clearly defined by the operator.
- All personnel tasked with working with the pusher must also read and observe these operating instructions and the documents in the annex. In addition, they must be instructed on the dangers associated with the pusher and the workplace.
- All personnel working in the area surrounding the pusher must be informed of the associated dangers.
- Personal protective equipment (PPE) suitable for the operational circumstances must be chosen, provided and worn (e.g. safety boots, safety goggles, protective clothing, ear protectors).
- The operator must inform personnel about how to use the protective equipment correctly in a safety training course. All personnel must be required to read all instructions for the PPE provided.
- If a danger or non-compliance with a regulation becomes known, corresponding measures must be taken immediately to counteract it.
- The operator must take care to ensure that the pusher and the surrounding area remain clean and clear at all times.
- The operator must ensure that the operating instructions are kept within close proximity of the pusher and that they are easily accessible and legible at all times. If the instructions are in a poor condition, or if any parts of the instructions are missing, the operator must request and provide a new copy.
- The operator must ensure that in addition to the information in these operating instructions, the German Road Traffic Registration Ordinance (StVZO), the German Road Traffic Regulations (StVO) and the German Accident Prevention Regulation for Vehicles (BGV D29), as well as all general and local accident prevention and environmental protection regulations, are also complied with.

1.8 Disposal

At the end of its service life, the pusher may only be disposed of by qualified professionals. The manufacturer accepts no liability for any damage caused by the improper disposal of the pusher.

During all work, take care to ensure that no unnecessary environmental pollution occurs. Always remove oil and grease residues after maintenance work. Collect any leaking operating materials (e.g. oil). If oil needs to be drained from the pusher, ensure that there is a suitable collection container nearby.

All operating materials and oil-containing parts must be disposed of properly and in an environmentally friendly way in accordance with all applicable environmental protection regulations.

1.9 Safety and information signs

WARNING!

Risk of serious injury, or possibly death, if safety signs are not visible.

The safety signs attached to the pusher warn of dangers and hazards that are not immediately identifiable. Removed or illegible safety signs can result in serious injuries.

Therefore:

- All safety signs on the pusher must be observed.
- Never remove safety signs and ensure that they are always legible.
- Replace any loose, missing or illegible safety signs immediately (contact our customer service team: see Chapter 0, Page152).

Safety signs	Meaning
	• All personnel must read the operating instructions before using the pusher. All information in the operating instructions must always be observed.
	Check that the wheel nuts are secure. Check that the wheel nuts are secure after the first loaded journey, or at the latest after 50km, as well as after each tyre change. Tighten with the specified tightening torque if necessary.
	Risk of crushing in the areas around moving parts.
	Risk of crushing in the area around the drawbar. There is a risk of being crushed between the towing vehicle and pusher when the towing vehicle is

Safety signs	Meaning
	moving.
	Risk of injury in the area around the raised cover. Sufficient distance from the cover must be maintained at all times.
	Risk of falling when riding on the pusher. Riding on the pusher is prohibited.
	Risk of injury if the pusher rolls away. Before the pusher is coupled to the towing vehicle, it must be secured against unintentional rolling with wheel chocks.
	Risk of injury in the area around the raised, unsecured tailgate. It is prohibited to stand beneath the unsecured tailgate. Before any work is performed beneath the raised tailgate, the tailgate must first be secured with a mechanical support.

Safety signs	Meaning
	Risk of fatal electric shock. A sufficient distance must be maintained between the pusher and any power supply lines.
	Danger as a result of mechanical work on frame parts. Mechanical work can result in dangerous, structural changes. It is therefore expressly prohibited to drill holes into the chassis, to counter-drill existing holes on the upper and lower flange of the chassis frame and to perform welding work on any load-bearing parts.

Information signs	Meaning
	Crossrail position Parked position with a bulk cargo pile (e.g. manure, silage maize) Installed horizontally for free-flowing products (high side pressure) Mulching flap in folded down position
	Pusher plate Seal can be pinched!!! Move the pusher plate far enough forwards, before the tailgate is closed.
	Pre-press max. 100 bar First load fully, then press (suitable for grass and maize silage)

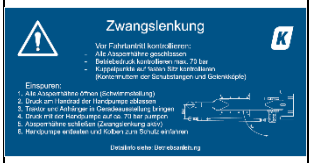
Information signs	Meaning
	Forced steering Brief instructions on how to set the forced steering (optional) (description in this document)
	Adjusting the ride height Brief instructions on how to set the hydraulic running gear (optional) (description in this document)
	Only fill this vehicle with HLP 32 hydraulic fluid (with the on-board hydraulics option) (description in this document)

Figure 2: Safety and information signs on the front of the pusher

Figure 3: Safety and information signs on the left-hand side of the pusher

Figure 4: Safety and information signs on the left-hand side of the pusher

Information signs	Meaning
	Lever point for a jack A jack may be used at the points identified in this way
	Speed display Shows vehicles travelling behind the pusher the maximum permitted speed for the pusher

Figure 5: Information signs on the rear of the chassis

2 Description of the pusher

The TAW 20 / TAW 20-K are centre-axle trailers with two axles (see Figure 6).

Figure 6: TAW 20 / TAW 20-K centre-axle trailer

The TAW 30 is a centre-axle trailer with three axles (see Figure 7).

Figure 7: TAW 30 centre-axle trailer

The aim of this chapter is to illustrate the structure and function of a pusher. The individual assemblies and components are described below for this purpose.

2.1 Type plate

The pusher has a type plate that lists the pusher's basic data. (See Figure 8). It is located on the front right of the frame.

Figure 8: Type plate

Components and accessories from suppliers have their own type plates (see the documentation provided by suppliers in the annex).

2.2 ALB sign

The ALB sign contains the data needed to correctly set the automatic load-dependent brake force control (ALB) (basic setting) (see Figure 9). It is located on the front right of the frame.

Figure 9: ALB sign

INFORMATION

In its basic configuration, the TAW has automatic load-dependent brake force control (ALB) on the entire axle group.

2.3 Structure

The pusher has the following main assemblies (also see Figure 10):

- Chassis
- Side panel
- Pusher plate
- Running gear
- Tailgate

The individual assemblies are described in more detail in the following sections.

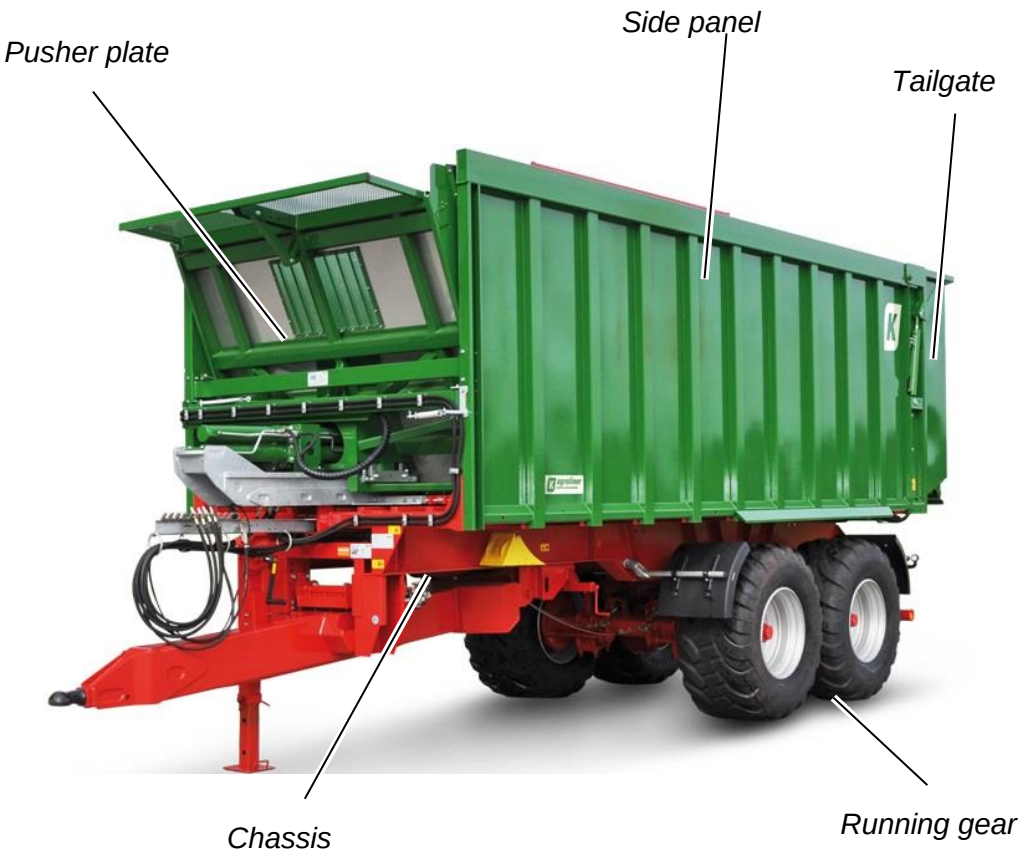


Figure 10 Pusher main assemblies, here: TAW 20

2.3.1 Chassis/ side panel

The chassis (red) forms the basis of the pusher.

With the TAW 20, TAW 20-K and TAW 30, the chassis differs in the following ways:

- The TAW 20 and the TAW 20-K have two axles, the TAW 30 has three.

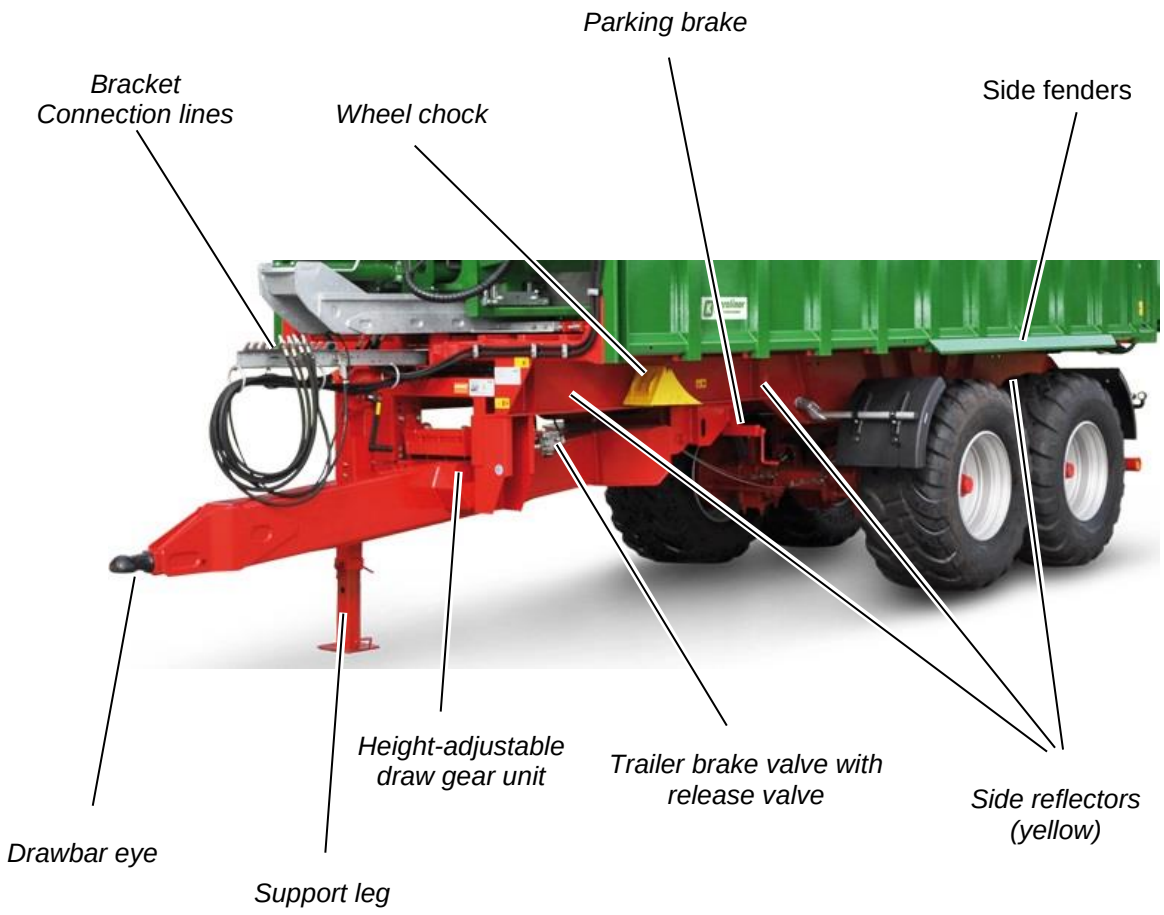


Figure 11: TAW 20 chassis from the front left

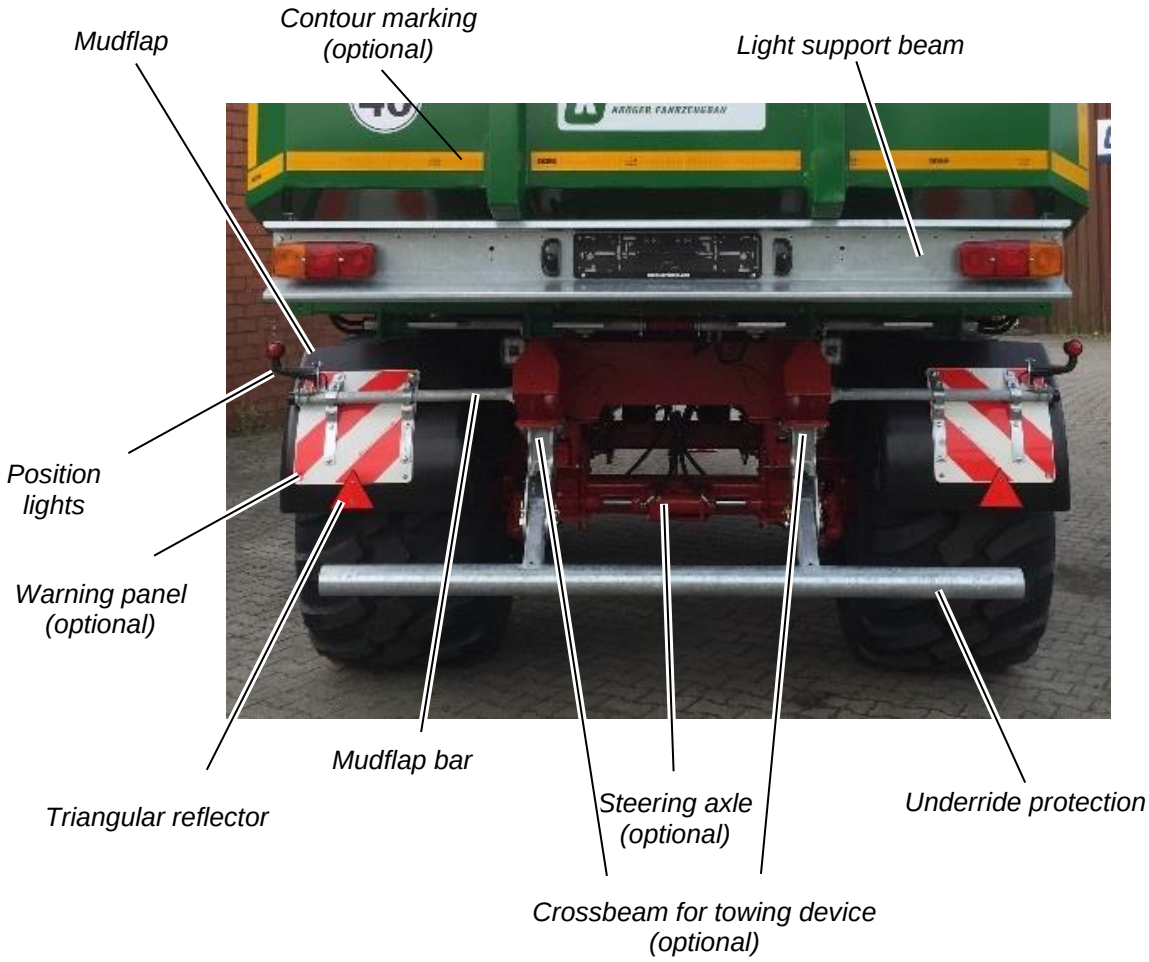


Figure 12: TAW 20 chassis from the rear

WARNING!

Danger of accident.

Never couple a 2nd trailer to the pusher.

Therefore:

- Only use the towing device (optional) as such
- Only use one side when towing (towing cable length min. 3m).

2.3.1 Tailgate

The light support beam shown in the picture is a component of the tailgate.

Figure 13: Tailgate

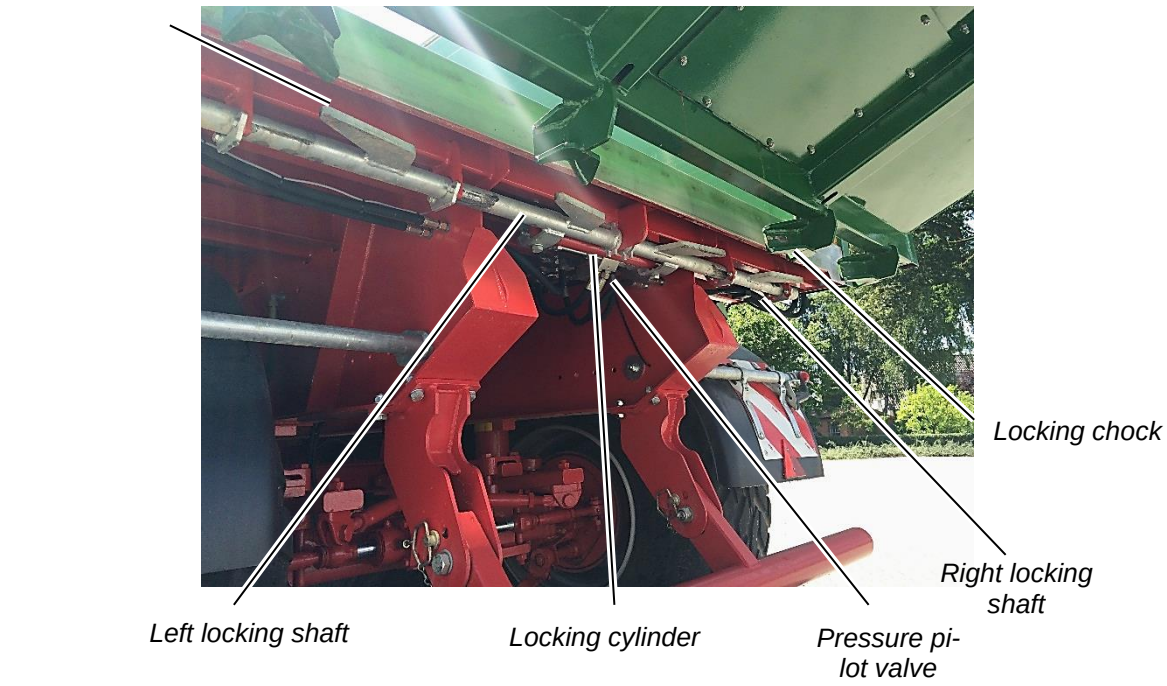


Figure 14: Tailgate slightly open, from below

As you can see in Figure 14, two locking shafts that are connected by a cylinder are installed. When the tailgate is closed, both shafts are pushed outwards by the cylinder. The arrester hooks (two on each side) catch the locking chocks on the tailgate.

As a result, the tailgate is pressed against the cargo area until the seal and rubber buffer come into contact with it.

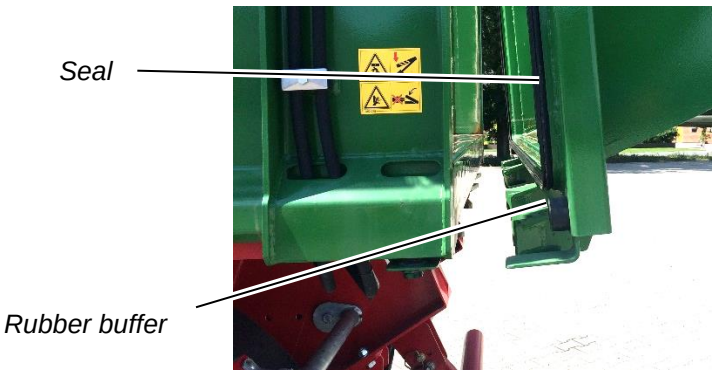


Figure 15: Tailgate slightly open, from the side

Pusher plate

Figure 16: Pushing process

The floor is made up of two pieces. The front part of the floor rests on the rear floor assembly in the transition area. During the pushing process, the pusher plate and the front floor assembly are moved back over the rear, fixed floor assembly. The pressure plate then pushes off completely over the front floor to the rear spoiler.

The system is rail-mounted and is guided by 3 double-acting hydraulic cylinders that are connected to a control unit.

The design of the TAW 20 / TAW 20-K and the TAW 30 differ only slightly in this respect.

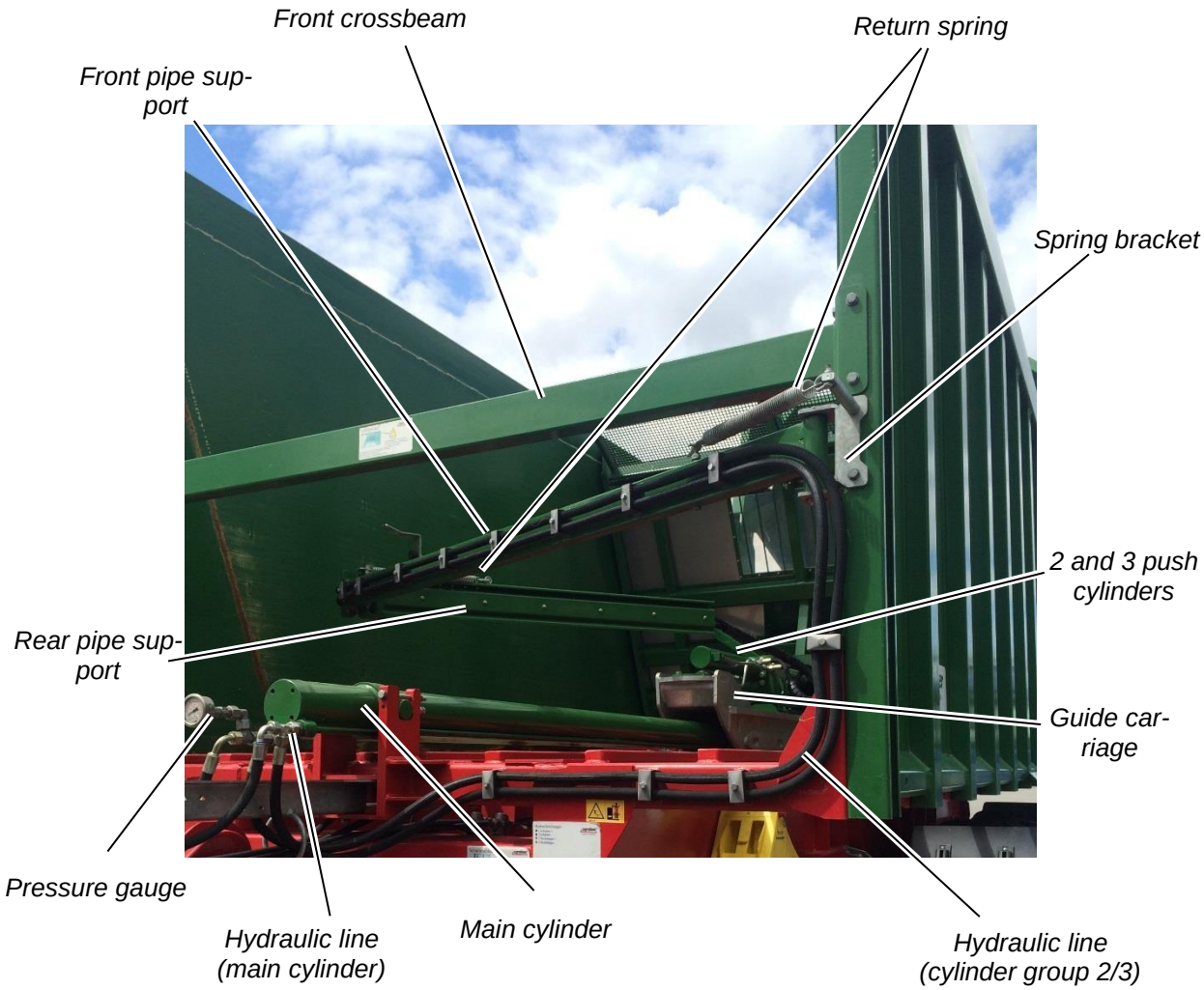


Figure 17: TAW 20 pusher plate half back

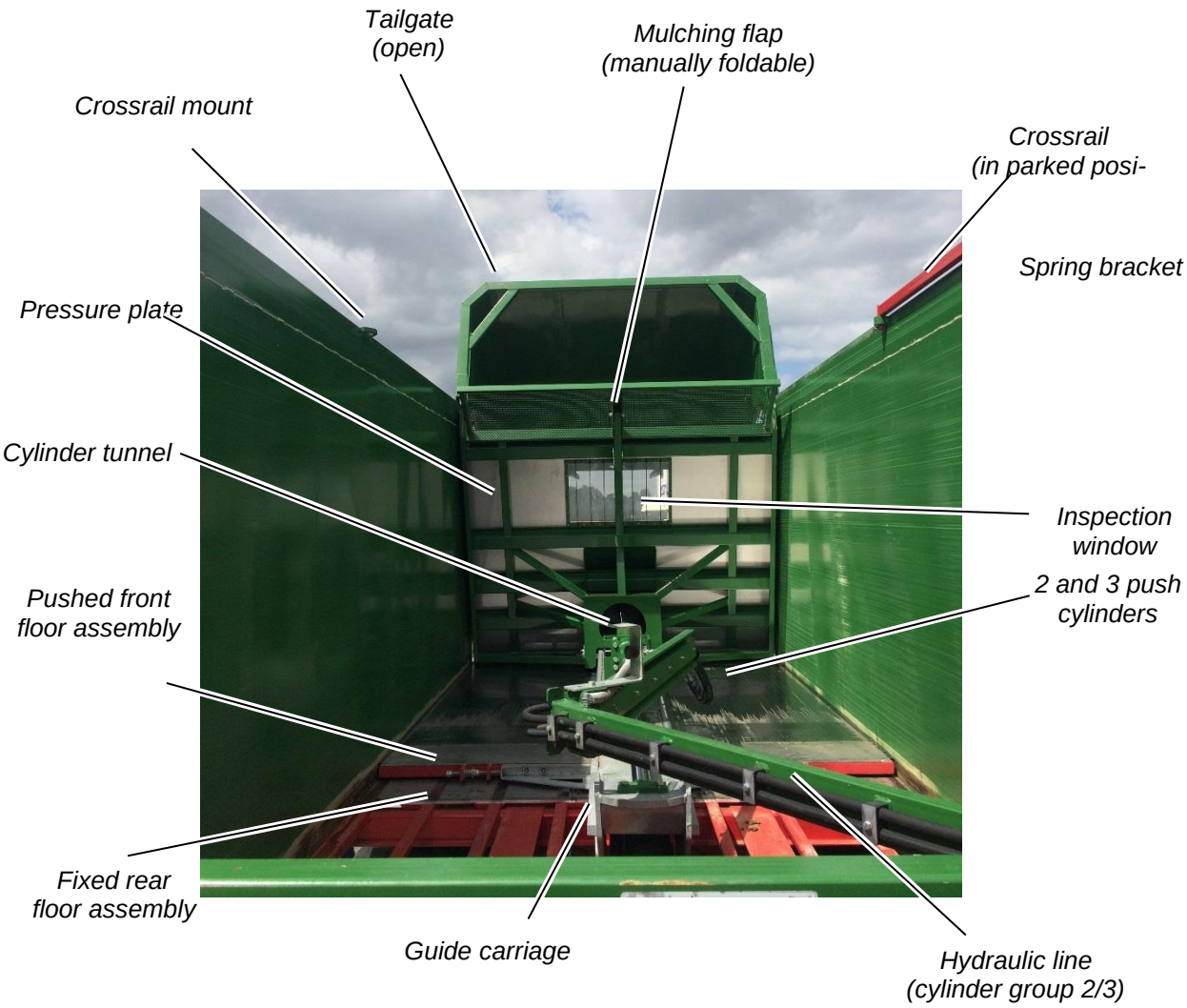


Figure 18: TAW 20 pusher plate view from the rear

Tyres

In its basic configuration, the pusher is equipped with 550/60-22.5 16PR tyres, which can only be driven at a maximum speed of 40 km/h.

Different types of tyres and tyre sizes are available as an option.

The permissible dimensions of vehicles that should not be surpassed are determined in Section 32 of the German Road Traffic Registration Ordinance (StVZO). This section states that a maximum vehicle width of 2.55m must be observed. If low pressure tyres are used, the 35th derogating provision of the StVZO applies. This provision states that, contrary to Section 32, Para. 1, No. 1 of the StVZO, the total width of agricultural or forestry towing machines and their trailers may exceed 2.55m, if the greater width results solely from these vehicles being optionally equipped with wide tyres, which at a reference speed of 10 km/h have the tyre load capacity required to achieve the respective permissible axle load at an internal pressure of no more than 1.5 bars, and if safe travel on public roads in ensured. However, the total width must not exceed 3m. (Attention: From 2.75m, the larger width must be indicated to other road users with warning signs!)

For more information (see Section 6.3.6 Checking and correcting the tyre pressure).

Hydraulic system

The hydraulic system is designed individually for each vehicle, depending on its equipment.

In the basic version, two double-acting control units are required (pusher plate and tailgate).

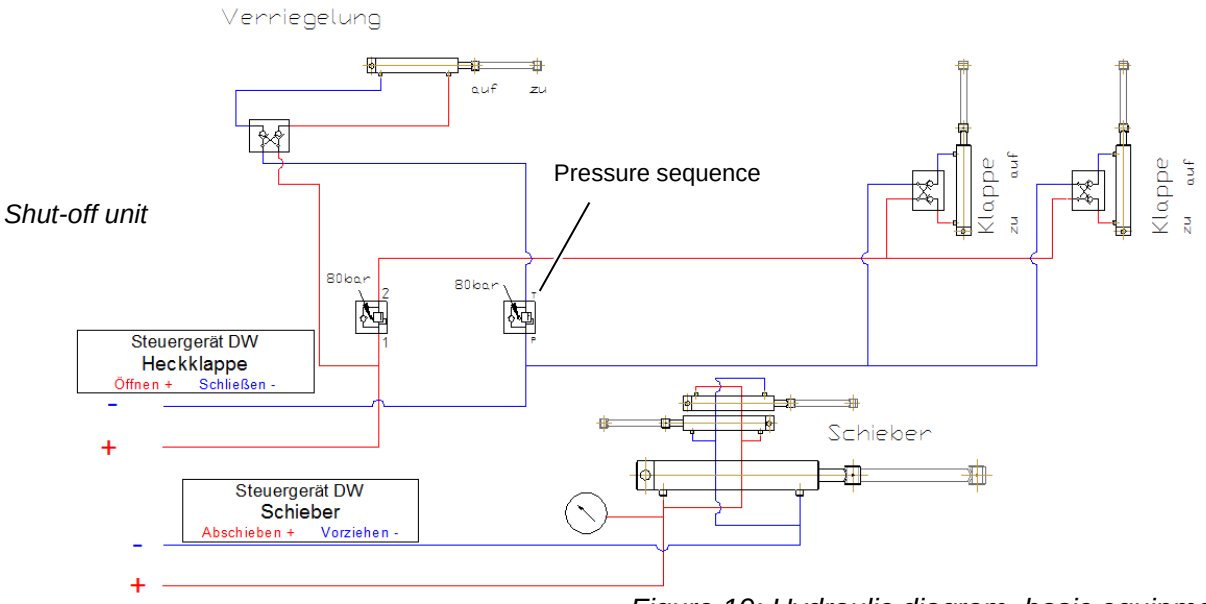


Figure 19: Hydraulic diagram, basic equipment

When opening the tailgate, the lock must be opened first. The tailgate is only opened when the system pressure has reached 80 bar. The pressure sequence valve then activates the intake to the tailgate.

To close the tailgate, perform the steps above in reverse order. Once the tailgate has been closed, the pressure increases again until the lock is activated.

All components of the tailgate, and many of the optional components, are equipped with a shut-off unit. This prevents the components from being moved by external influences, such as loading on the cylinder by weight, for example. Only the oil pressure on the tractor side enables the path and function. In addition, the connected line can be depressurised (float position "〜"). The pressure is maintained behind the shut-off unit. (simplified-automatic stopcock)

Several double-acting control units may be required depending on the vehicle's equipment.

This includes hydraulic options, such as:

- Mulching flap
- Drawbar suspension
- Running gear
- Cover system
- Support leg

The individual options are described in more detail in the sections covering the operation of the pusher.

A 6/2-way valve can be installed on the draw gear unit to save a double-acting connection to the towing vehicle.

One possible combination is to connect the hydraulic support leg and the tailgate.

After coupling, the lever must be operated in order to activate the 2nd function.

If the valve is not used regularly, its function should be checked during maintenance and the valve serviced with multifunctional oil.

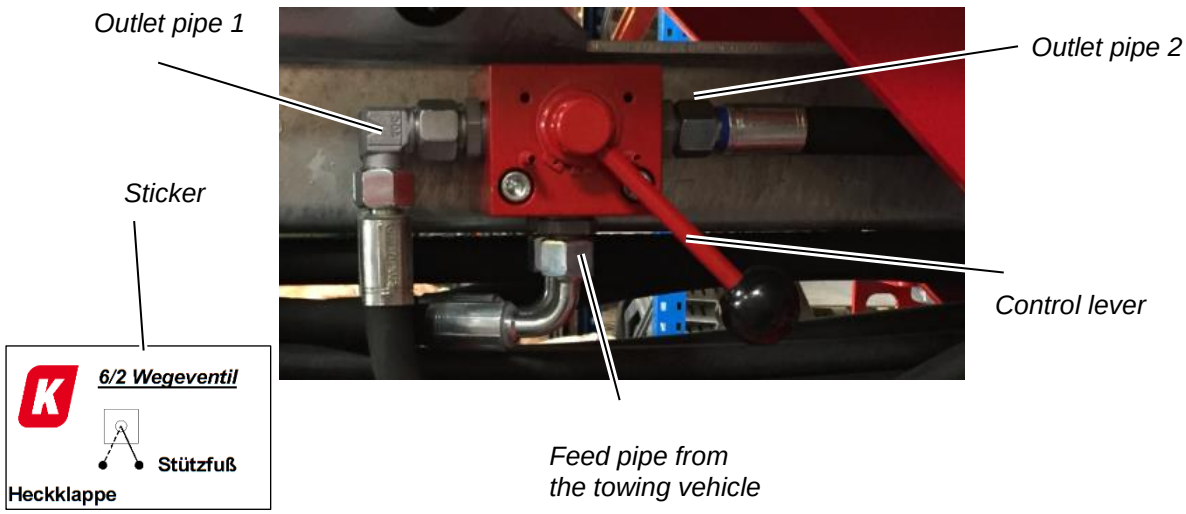


Figure 20: 6/2-way valve, here: TAW 20

Service brake

The service brake is a dual line service brake system with automatic load-dependent brake force control (ALB). It acts on all tyres.

The brake line, marked in yellow, directly controls the service brake (0 bar = no brake applied, 6.5 bar = brake fully applied).

The supply line, marked in red, feeds a compressed air tank which serves as an energy storage device so that the service brake engages when the pusher is uncoupled. Should the pusher break away from the towing vehicle, the trailer brake valve will trigger the emergency brake.

If the securing pressure in the compressed air tank is not below the limit, the operator can release the service brake again by activating the release valve.

If the compressed air tank is unpressurised, the brakes cannot be applied to the pusher.

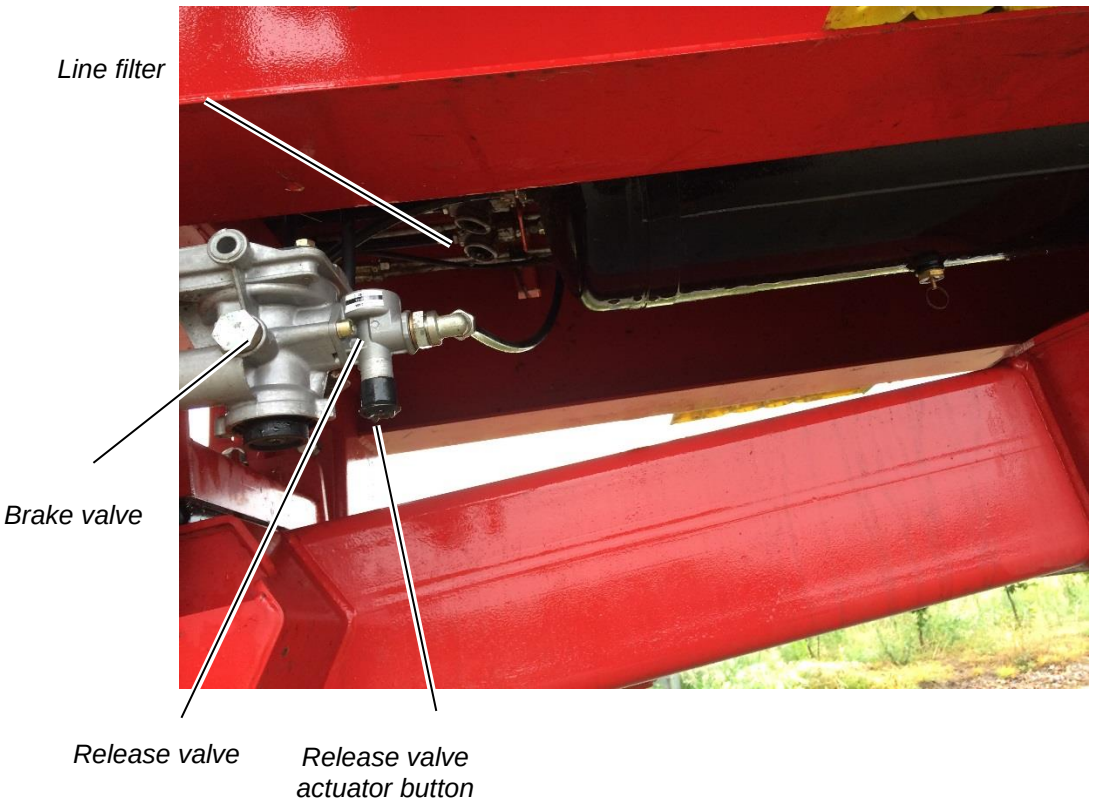


Figure 21: Service brake valves and filters, here: TAW 20

ALB (Automatic load-dependent brake force control)

The ALB regulates the brake force of the service brake depending on the load condition of the pusher and acts on all wheels. To determine the height, a spring-loaded connecting rod is mounted between the axles.

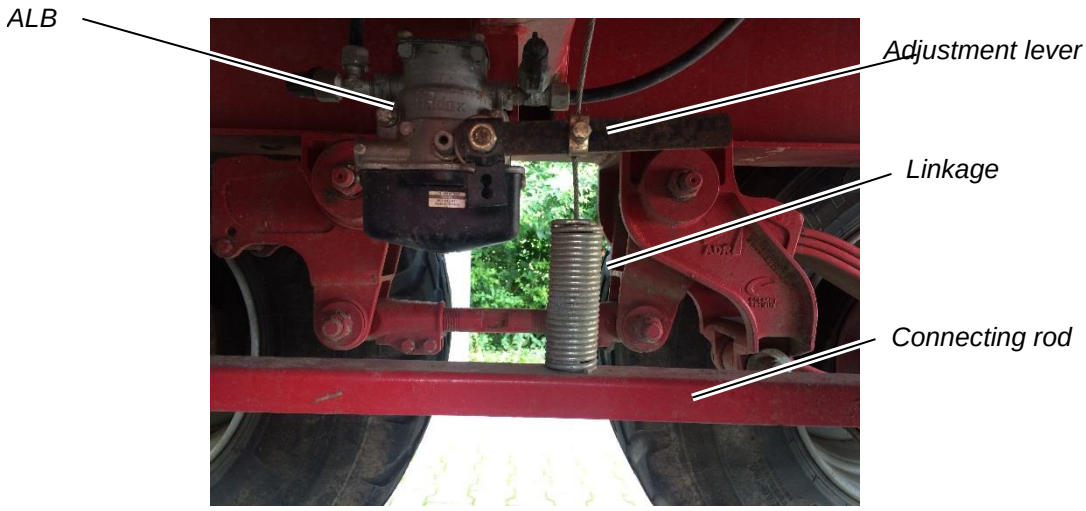


Figure 22: ALB, here: TAW 20

The basic setting of the ALB is given on the ALB sign (see, *Page 31).*

INFORMATION

In its basic configuration, the TAW 20 / TAW 20-K model has automatic load-dependent brake force control (ALB) on the entire axle group. It is installed between the front and rear axle.

In its basic configuration, the TAW 30 has automatic load-dependent brake force control (ALB) on the second axle.

Parking brake

The parking brake stops a pusher weighing the permissible total weight from rolling away on slopes on an incline of up to 7%.

The parking brake is a spindle parking brake. It only acts on the front axle and is manually operated with a crank (see Figure 11, Page 33, and Figure 23).

Figure 23: Parking brake on the front axle, here: TAW 20

2.4 Example of a towing vehicle

The options described in the following chapters partially refer to towing vehicle designations. For example, below is the rear of a tractor.

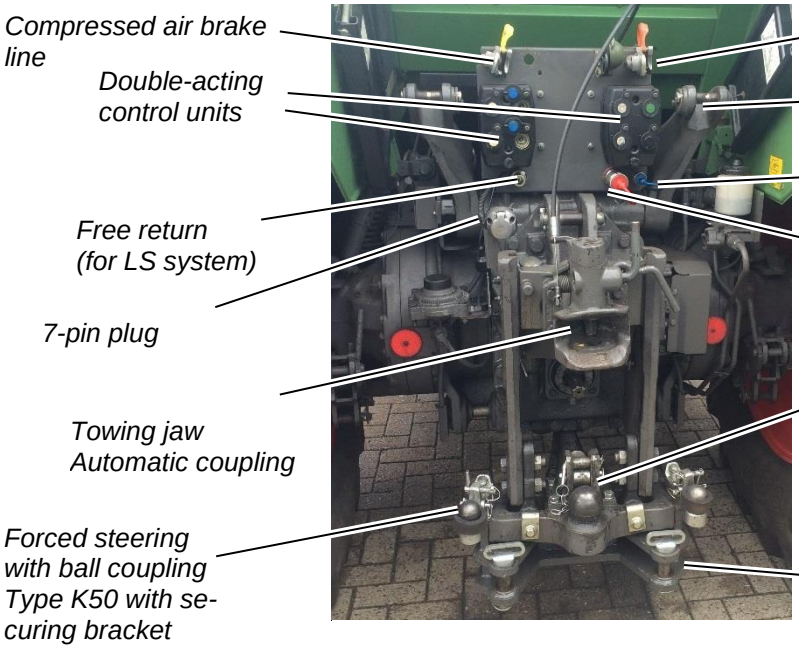


Figure 24: Rear view of a towing vehicle

2.4.1 Operating and control elements in the cab of the towing vehicle

A pushing process is controlled from the cab of the towing vehicle.

A control element to which the pusher is connected is controlled via an operating element in the driver's cab. For example, the control element can be used to open and close the tailgate and move the pusher plate backwards and forwards.

The operating element is usually a control lever.

To operate the control elements to which the pusher is connected in the towing vehicle: see the towing vehicle operating instructions.

2.5 Technical specifications (basic configuration)

2.5.1 Dimensions

	TAW 20-K	TAW 20	TAW 30
External dimensions incl. towing drawbar (L x W x H)	8,100 x 2,550 x 3,560 mm	9,100 x 2,550 x 3,560 mm	11,200 x 2,550 x 3,560 mm
Cargo area external dimensions (L x W x H)	6,290 x 2,550 x 2,020 mm	7,290 x 2,550 x 2,020 mm	9,390 x 2,550 x 2,020 mm
Cargo area internal dimensions (L x W x H)	6,100 x 2,370 x 2,020 mm	7,100 x 2,370 x 2,020 mm	9,200 x 2,370 x 2,020 mm

2.5.2 Weights

	TAW 20-K	TAW 20	TAW 30
Empty weight (basic configuration)	6,446 kg	7,380 kg	9,980 kg
Payload (basic configuration)	13,554 kg	12,620 kg	21,020 kg
Permissible total weight (basic configuration)	20,000 kg	20,000 kg	31,000 kg (optional 34,000kg)
Bearing load	2,000 kg (optional 4,000 kg at 40 km/h)		

2.5.3 Load

	TAW 20-K	TAW 20	TAW 30
Type of cargo	Agricultural pourable and bulk goods up to 1.2to / m^3		
Examples of cargo	Silage, woodchips, grains		
Density of the main goods transported	List of different goods with information in kg/m^3, see Datasheet “Densities (poured)”		

2.5.4 Axles

	TAW 20-K	TAW 20	TAW 30
Type	Tapered roller bearing axles		
Track width	2,050 mm		
Load per axle	11,000 kg		12,000 kg

2.5.5 Tyres (basic configuration)

	TAW 20-K	TAW 20	TAW 30
Dimensions	Atura 550/60 R 22.5 16 PR		425/65 R 22.5 (factory reconditioned)
Total number	4 pieces		6 pieces
Load-bearing capacity (at 80 km/h)			4,500 kg
Speed	max. 40 km/h		max. 80 km/h
Tyre pressure	3.0 bars		9.0 bars
Tightening torque	550 Nm		450 Nm
Rims	Centre well rims		

2.5.6 Speeds

	TAW 20-K	TAW 20	TAW 30
Maximum permitted speed (with ABS and suitable tyres (optional))	80 km/h		

2.5.7 Electrical system

	TAW 20-K	TAW 20	TAW 30
Supply voltage	12 V		

2.5.8 Towing drawbar

	TAW 20-K	TAW 20	TAW 30
Basic version	Flange drawbar eye in accordance with DIN 11026		Scharmüller Type K 80 ball bearing
Optional	Scharmüller Type K 80 ball bearing		-

2.5.9 Operating materials and tools

The following lubricants may be used:

For manual lubrication, grease NLGI Class 3, in accordance with DIN 51818

For central lubrication systems, grease NLGI Class 2, in accordance with DIN 51818 (without solid lubricants)

Different types of hydraulic fluids are used depending on the operating conditions (normal or extreme).

Normal operating conditions are:

- Regular use, travel on surfaced roads,

  occasional transportation of full loads, central European climate

Extreme operating conditions are:

- Long downtimes, travel on unsurfaced roads and

  uneven ground - constant transportation of full loads, extreme climate

The following lubricants may be used:

Manufacturer	**Lubricant name**	
	Normal operating conditions	**Extreme operating conditions**
ARAL	Aralub HL 2	Aralub HLP 2
ESSO	Beacon 2	Beacon EP 2
SHELL	Retinax Hd 2	Retinax Hdx 2
TOTAL	Multis EP2	Multis 2

PANOLIN	HLP SYNTH 46 (biodegradable)
FUCHS	Plantosyn 3268 (biodegradable)

2.5.10 Tightening torque for screws

Thread	Spanner size	Tightening torque (in Nm) depending on the screw / nut grade		
		8.8	10.9	12.9
M 8	13	25	35	41
M°8 x 1		27	38	41
M 10	17	49	69	83
M°10 x 1		52	73	88
M 12	19	86	120	145
M°12 x 1.5		90	125	150
M 14	22	135	190	230
M°14 x 1.5		150	210	250
M 16	24	210	300	355
M°16 x 1.5		225	315	380
M 18	27	290	405	485
M°18 x 1.5		325	460	550
M 20	30	360	460	560
M°20 x 1.5		396	506	616
M 22	32	440	560	660
M°22 x 1.5		484	616	726
M 24	36	530	670	760
M°24 x 2		583	737	836
M 27	41	650	760	880
M°27 x 2		715	836	968
M 30	46	780	890	1050
M°30 x 2		858	979	1155

2.5.11 Tightening torque for wheel nuts

Axle manufacturer	Size	Centring type	Tightening torque (Nm)
BPW	M°18 x 1.5	Conical	290
BPW	M°22 x 1.5	Conical	510
BPW	M°22 x 1.5	Flat	550
SAF	M°18 x 1.5	Conical	270
SAF	M°22 x 1.5	Conical	430
SAF	M°22 x 1.5	Flat	600
GIGANT	M°22 x 1.5	Flat	630

Further tightening torques can be found in the annex.

2.5.12 Tyre pressure

Tyre size	Pressure (bar)
425/65 R 22.5	8.5
Atura 550/60 R 22.5 16 PR	3.0

For other tyres see Section 6.3.6 Checking and correcting the tyre pressure

2.5.13 Requirements for a towing vehicle

	Towing vehicle
Trailer coupling	In accordance with DIN 11028 or Type K80 ball coupling
Control unit required	2 double-acting control units
Maximum operating pressure	210 bar

3 Transport

INFORMATION

The pusher is usually attached to a towing vehicle to be transported. The information in the Initial operation (Chapter 4, Page 53) and Operation (Chapter 5, Page 54) chapters must therefore be taken into account before such transport.

4 Initial operation

Before operating the pusher for the first time, care must be taken to ensure that the service brake of the pusher is optimally matched to the towing vehicle used.

WARNING!

Risk of death caused by long braking distances.

If the service brake of the pusher has not been optimally set, this can result in a long braking distance, which can cause fatal accidents. Therefore, during the initial operation, the pusher's service brake system must achieve a braking coefficient of at least 50 %.

Therefore:

- During the initial operation of the pusher, perform test brakings with the pusher both empty and full.
- Have a tractor/trailer coordination between the towing vehicle and the pusher carried out in a specialist workshop to optimise the braking performance and reduce brake pad wear.

Take a look at the following chapters and sections in particular:

- 5.4 Adjusting the draw gear
- 5.9 Adjusting the forced steering (option))
- 5.10 Adjusting the hydraulic running gear (optional)
- 5.14 Coupling and decoupling the pusher
- 6Maintenance and repairs after 10 operating hours
- 6.3.23Performing a tractor/trailer coordination after

5 Operation

Numbers in round brackets, e.g. “(2)”, refer to the position numbers of the operating elements listed in Section 2.4.

5.1 Safety rules for operating the pusher

DANGER!

Risk of death due to electric shock.

If the pusher is close to overhead power lines and the cover or tailgate is activated, the pusher frame may come into contact with the power lines. The pusher and towing vehicle will then be under high voltage. During storms, there is a risk of lightning striking the cover if it has been set up. In both cases, this usually leads to the death of the driver.

Therefore:

- Covering processes and tailgate operations should never be performed in the vicinity of overhead power lines.
- Do not perform any covering processes during thunderstorms or approaching thunderstorms.
- The same applies for tailgate operations.

WARNING!

Risk of falling.

If there are people on or near the pusher during transport, they may fall and be run over and suffer from fatal injuries.

Therefore:

- Riding on the pusher is prohibited.

WARNING!

Risk of accidents when stepping on the cover. The frame has not been designed to hold the weight of people.

Therefore:

Never step on the cover.

WARNING!

Risk of impact and crushing.

When the pusher is in operation, there are many hazard points which can cause severe or fatal injuries for the operator, people and animals.

Therefore:

- The pusher should only be operated by trained and authorised personnel.
- When operating the pusher, these operating instructions must be followed.
- Do not reach into moving parts.
- The pusher operator must ensure that people and animals maintain a distance of 1 to 2 m from all hazard points at all times.
- The pusher operator must ensure that no people or animals are inside the 5 m danger zone around the pusher and towing vehicle during a pushing process.
- The pusher operator must ensure that no people or animals are endangered when the pusher is being operated.

WARNING!

Danger of injury caused by non-functioning components.

If a component is defective or malfunctioning, its functionality is no longer guaranteed. This can cause accidents that may result in injury of people or animals.

Therefore:

- Machines with defects or malfunctions must not be operated. Have the machine repaired by qualified specialists immediately and take the machine out of operation until the repairs can be carried out.

5.2 Bringing the pusher to a complete stop in an emergency

If people are at risk of being hurt:

⇨ Move the control lever in the cab of the towing vehicle to neutral.

↳ The pushing process will be interrupted.

↳ The pusher plate will immediately come to a standstill.

↳ Loaded pourable and bulk goods will continue to trickle from the pusher.

WARNING!

Risk of death even with interrupted pushing processes.

If a pushing process is interrupted and the pusher is no longer moving, there is still a risk that the loaded goods will continue to trickle from the pusher and bury or injure any people or animals in the vicinity.

Therefore:

- Ensure that there are no people or animals in the danger zone during a pushing process.

For a description of the towing vehicle's operating and control elements: see the operating instructions for the towing vehicle.

5.3 Stopping the pushing process in an emergency

If people are at risk of being hurt:

⇨ Move the control lever in the cab to neutral.

↳ The pusher plate will stop moving.

↳ Loaded pourable and bulk goods will continue to trickle slowly from the pusher.

WARNING!

Risk of death even with interrupted pushing processes.

If a pushing process is interrupted and the pusher is no longer moving, there is still a risk that the loaded goods will continue to trickle from the pusher and bury or injure any people or animals in the vicinity.

Therefore:

- Ensure that there are no people or animals in the danger zone during a pushing process.

For a description of the towing vehicle's operating and control elements: see the operating instructions for the towing vehicle.

5.4 Adjusting the draw gear

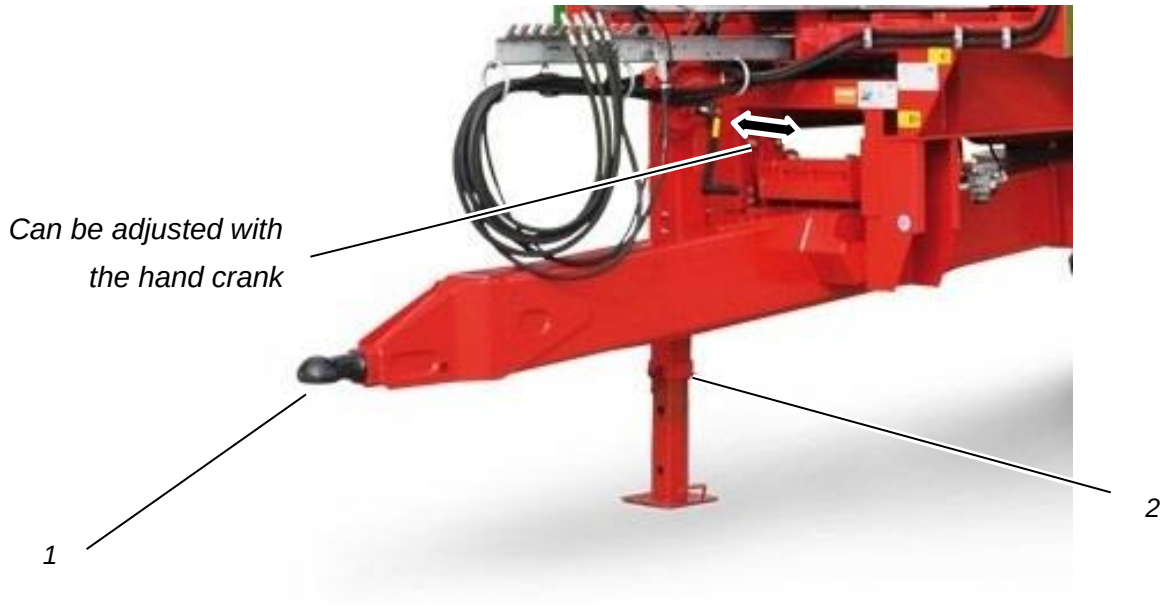


Figure 25: Drawbar eye, here: TAW 20

Pos.	Name	Function
1	Type K80 ball coupling	For coupling the pusher to a towing vehicle.
2	Landing gear	For adjusting the height when the draw gear is in the parked position.

⇨ Turn the crank of the support leg to the height matching the towing vehicle. With a type D40 ball coupling in the centre of the towing jaw (DIN 11029). With a type K80 ball coupling above the towing ball.

⇨ Two gear ratios can be selected with a manual crank.

⇨ Manual crank towards the support leg: slow movement / lots of force

(Position 1)

⇨ Manual crank pulled out: fast movement / little force

(Position 2)

Figure 26: Height adjustment of the towing drawbar, here: TAW 30

Pos.	Name	Function
3	Hydraulic support leg	Alters the height of the draw gear

The height of the support leg can optionally be adjusted hydraulically. One or two support legs can be installed. With the TAW 30 model, it is necessary to use two hydraulic support legs in connection with the forced steering.

It can also be advantageous to have two support legs in the other models, as this reduces the risk of the pusher sinking into the field when parked.

The height adjustment is done via the “+” and “-” control valve on the towing vehicle. There is no stopcock installed as a non-return valve would prevent the pressure build-up in the line when the control unit is in the float position “～” . (for more information about this see Section 5.14 Coupling and decoupling the pusher)

5.5 Applying and releasing the parking brake

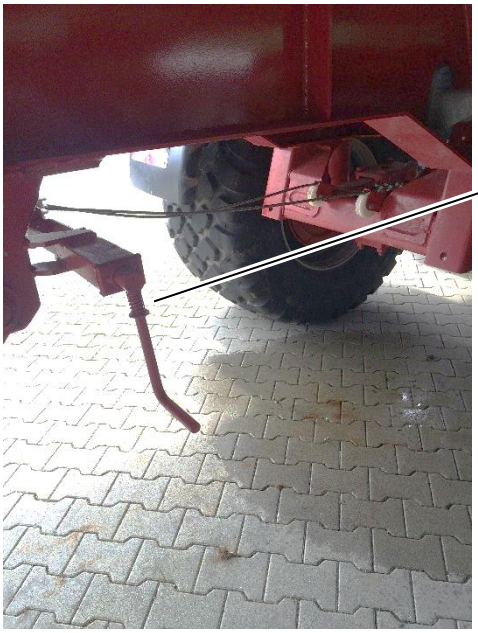


Figure 27: Parking brake (crank in adjustment position), here: TAW 20

Pos.	Name	Function
4	Parking brake crank	Turned clockwise: Applies the parking brake. Turned anti-clockwise: Releases the parking brake.

5.5.1 Applying and releasing the parking brake

⇨ Swivel the parking brake crank (4) 180° outwards.

⇨ Turn the parking brake crank (4) clockwise until it stops.

↳ The parking brake will be applied.

Swivel the parking brake crank (4) 180° inwards.

To release the parking brake, perform the steps above in reverse order.

5.6 Removing the wheel chock from its bracket and stowing it away

Figure 28: Wheel chock, here: TAW 20

Pos.	Name	Function
5	Linchpin	Secures the wheel chock in its bracket.
6	Wheel chock	Secures the coupled pusher against accidental rolling, in addition to the parking brake.

5.6.1 Removing and stowing away the wheel chock

⇨ Pull the linchpin (5) out.

⇨ Remove the wheel chock (6) from its bracket.

To stow it away, perform the steps above in reverse order.

5.7 Draining the compressed air tank

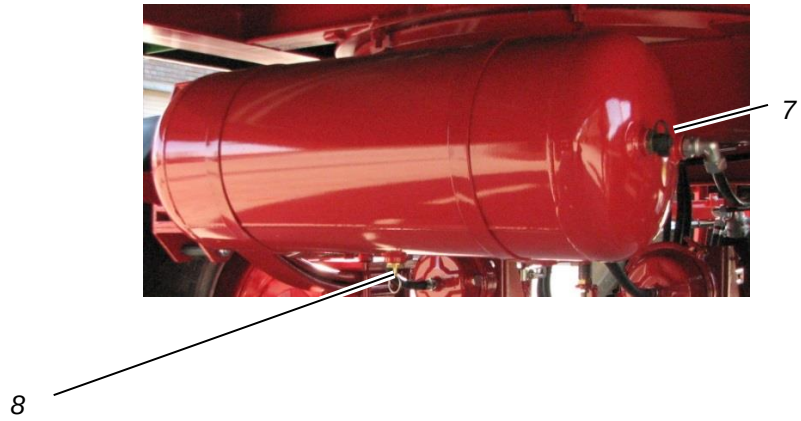


Figure 29: Operating elements on the compressed air tank

Pos.	Name	Function
7	Test connection for the pressure gauge	Can be used to check the pressure in the compressed air tank.
8	Drain valve	Drains condensed water from the compressed air tank.

WARNING!

Danger of injury caused by escaping compressed air.

If the escaping compressed air comes directly in contact with the eyes, this can cause eye injuries.

Therefore:

- Always wear protective equipment (PPE) (safety goggles) when draining the compressed air tank.

Condensed water collects in the compressed air tank and must be removed before each journey.

⇨ To do this, pull the ring of the drain valve (8) sideways.

↳ The condensed water will be blown out of the compressed air tank.

⇨ Keep the drain valve ring (8) pulled sideways until no more condensed water comes out.

⇨ Release the drain valve ring (8).

5.8 Mulching flap and crossrail

INFORMATION

When transporting pourable goods (like grains), the crossrail must be used. However, this cannot be used in conjunction with a raised mulching flap.

Therefore:

When using the crossrail, the mulching flap (mechanic or hydraulic (optional)) must be down.

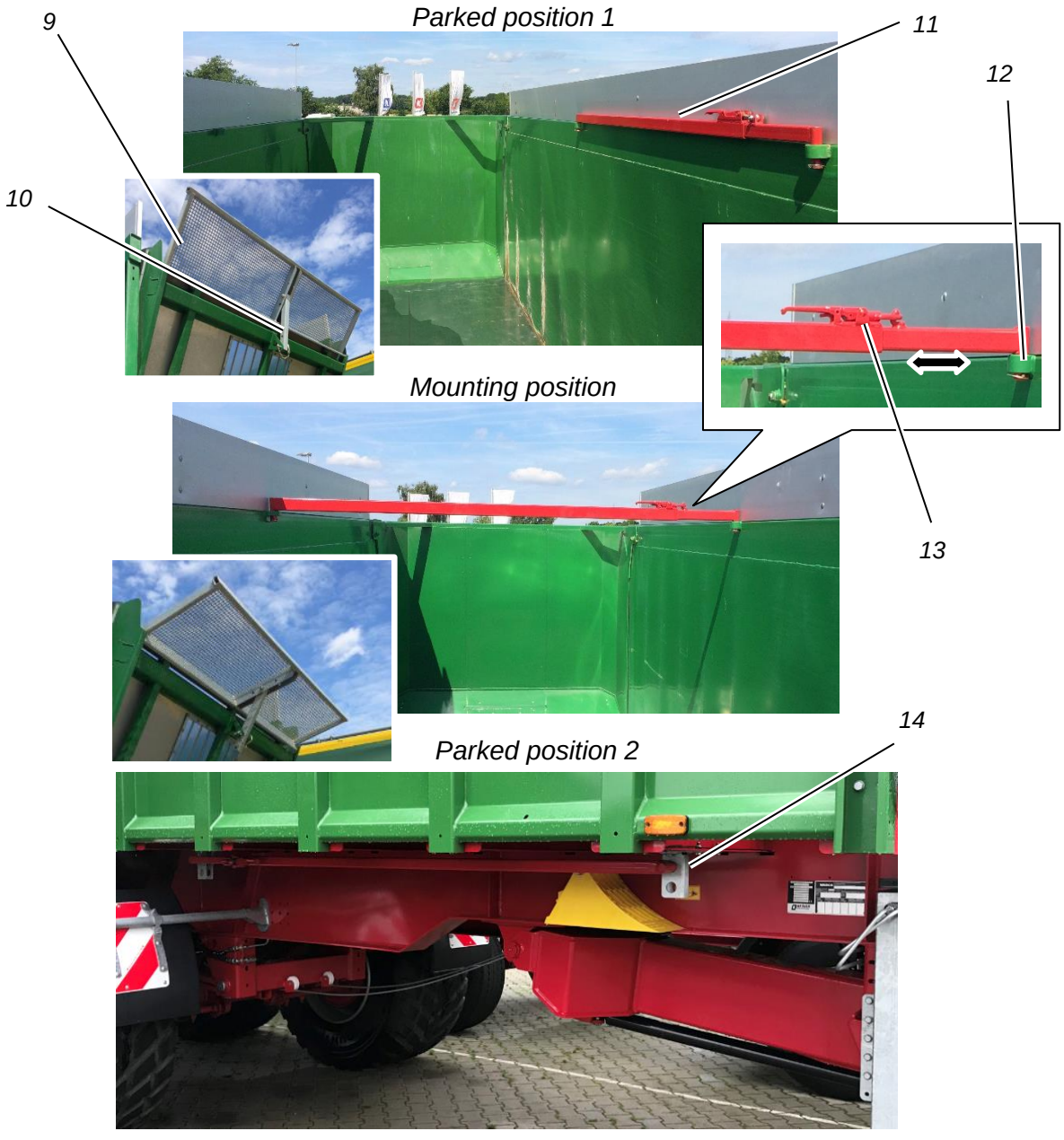


Figure 30: Crossrail, here: TAW 20

Pos.	Name	Function
9	Mulching flap	Reduction of the loading height when mulching
10	Support for mulching flap	Holds the flap in position
11	Crossrail	Ensures stability with high load pressure
12	Parked and/or mounting position	For mounting the crossrail
13	Clamping lever	Clamps the crossrail
14	Parked position 2	Storage outside the cargo area

Mounting the crossrail

⇨ Before mounting the crossrail, the mulching flap (9) must be folded down using the support (10).

⇨ Remove the lower locking pin.

⇨ Fold down the mulching flap and use the upper hole to peg the support in place.

⇨ If this is all done hydraulically, it is recommended that you remove the hydraulic hoses after folding down the mulching flap for safety reasons.

⇨ Remove the crossrail from the parked position.

⇨ Remove the splint and flip the lever up.

⇨ Place the crossrail in the mounts provided at a right angle to the direction of travel.

⇨ Use the clamping lever to stabilise the side board walls in relation to one another.

⇨ Use the splints to stabilise the crossrail.

To remove the crossrail, perform the steps above in reverse order.

INFORMATION

When using the cover system (optional), the crossrail must be removed from the cargo area.

Therefore:

Move the crossrail outside the cargo area in the designated parking position.

5.9 Adjusting the forced steering (option)

Before the TAW with forced steering can be attached for the first time, the attachment point must be mounted on the tractor in accordance with the standard ISO 26402 2008.

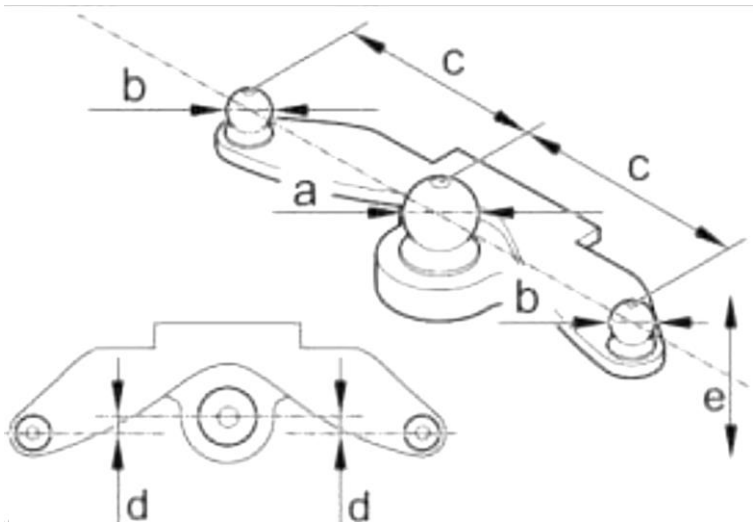


Figure 31: Type K80 coupling point on the tractor

Conditions:

Type K80 Ball – Hitch

a = Ø 80 mm (ball)

b = Ø 50 mm (ball)

c = 250 mm

d = ± 5 mm

e = ± 5 mm

α = max. ± 60°

As certain tolerances are permissible, adjustments may need to be made.

Attach the machines to the vehicle so that the two are in a straight line (for more information see 5.14.1 Coupling the pusher).

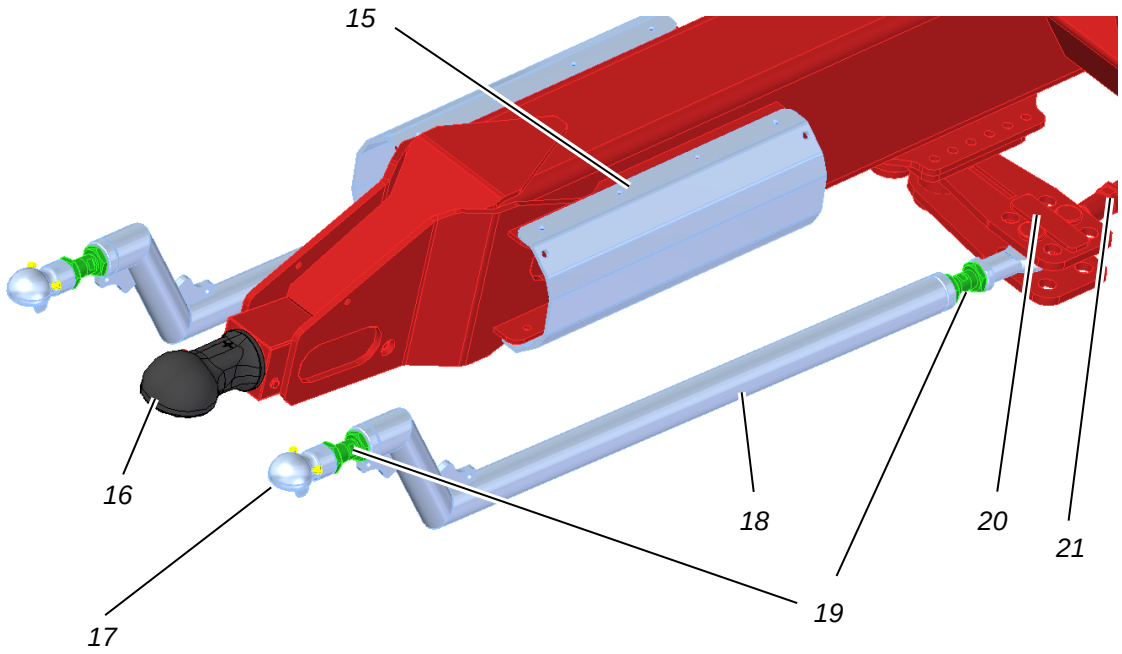


Figure 32: Type K80 coupling point on the TAW 30

Pos.	Name	Function
15	Type 105 deflector	Limits max. steering angle
16	Type K80 ball coupling	Transmits traction
17	Type K50 ball coupling	Transmits steering
18	Push rod	Transmits the steering forces
19	Adjustment spindle with lock nuts	Adjusts the push rod length
20	Double compensator rocker	Transmission to the synchronised cylinder
21	Synchronised cylinder	Transforms steering force into hydraulic pressure

Correcting length deviations:

Fig. Figure 32 shows a forced steering for two axles. The following adjustments apply for both the 1st and 2nd forced steering units.

⇨ Take care to ensure that the double compensator rocker (20) sits at 90° to the towing drawbar.

⇨ Loosen the lock nuts on the adjustment spindle (19).

⇨ Adjust the length of the push rod (18) evenly at the front and back using the adjusting spindles (19) so that the ball coupling (17) sits in the correct position.

⇨ Secure the lock nuts.

⇨ An adjustment of the bolts on the compensator rocker (20) is not permitted. This can damage components, like the synchronised cylinder (21).

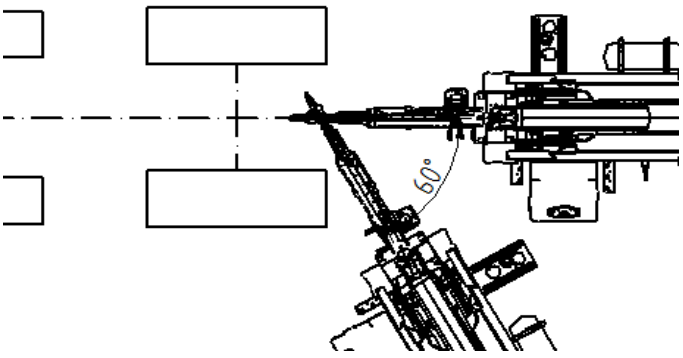
Checking and correcting the steering angle

INFORMATION

The maximum steering angle varies depending on the position of the coupling point on the towing vehicle (distance of the coupling point to the rear axle) and the tyres of the towing vehicle.

Therefore:

Carefully check the maximum steering angle and keep an eye out for potential collision between the type K50 ball coupling (17) and the draw gear.



If the maximum angle of 60° is exceeded or if there is a risk of collision, an alternative deflector (15) can be ordered. Please contact the manufacturer for this.

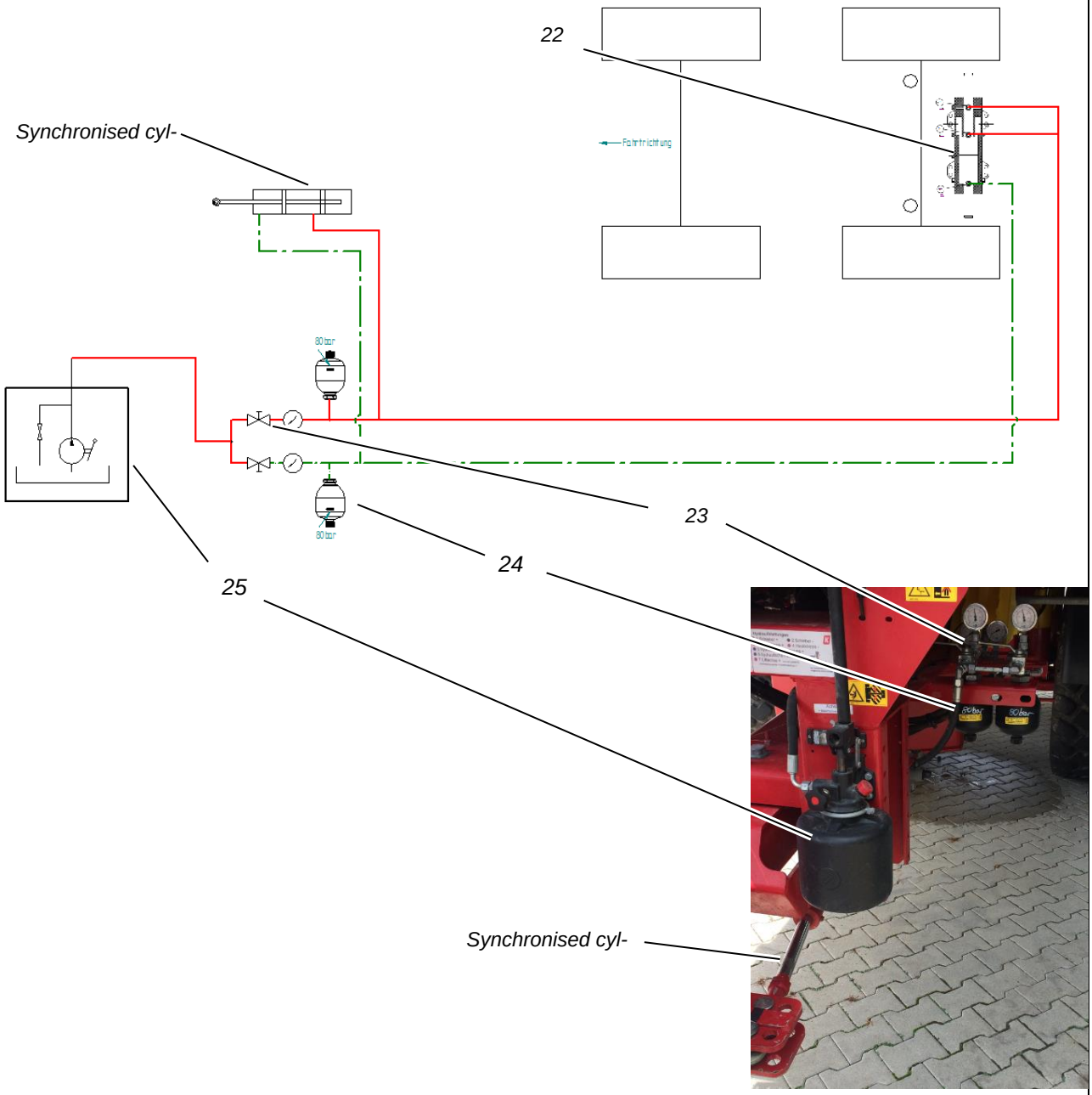


Figure 33: Schematic diagram of the forced steering, here: TAW 20

Pos.	Name	Function
22	Steering cylinder	Controlled by the fluid from the master cylinder and steers the axles
23	Stopcocks	Separates the lines (green and red)
24	Nitrogen accumulator	Maintains the preload pressure

Pos.	Name	Function
25	Manual pump	Can be used to adjust the system pressure

WARNING!

Danger of accidents caused by defective forced steering.

If the steering axles have not been adjusted and set correctly, negative driving characteristics can lead to accidents.

Therefore:

- Before starting a journey, check the coupling points, stop-cocks, operating pressure and screw connections.

The steering axles are set in the factory. However, corrections may need to be made after any length adjustments have been made.

⇨ To do this, open all stopcocks (23).

⇨ There are two stopcocks on the TAW 20 and TAW 20-K.

⇨ The TAW 30 has 4 stopcocks on the 1st and 3rd axles.

⇨ The red line and green line in Figure 33 are now connected.

⇨ Ensure that the towing vehicle and trailer are in a straight line.

⇨ Stand behind the vehicle and check the wheel tracks.

⇨ Close the handwheel on the manual pump and use the lever to increase the system pressure to 70 bar.

⇨ Close the stopcocks (23).

⇨ Release the handwheel on the manual pump again to push the piston down.

⇨ This way, the piston is protected against the effects of the weather.

5.10 Adjusting the hydraulic running gear (optional)

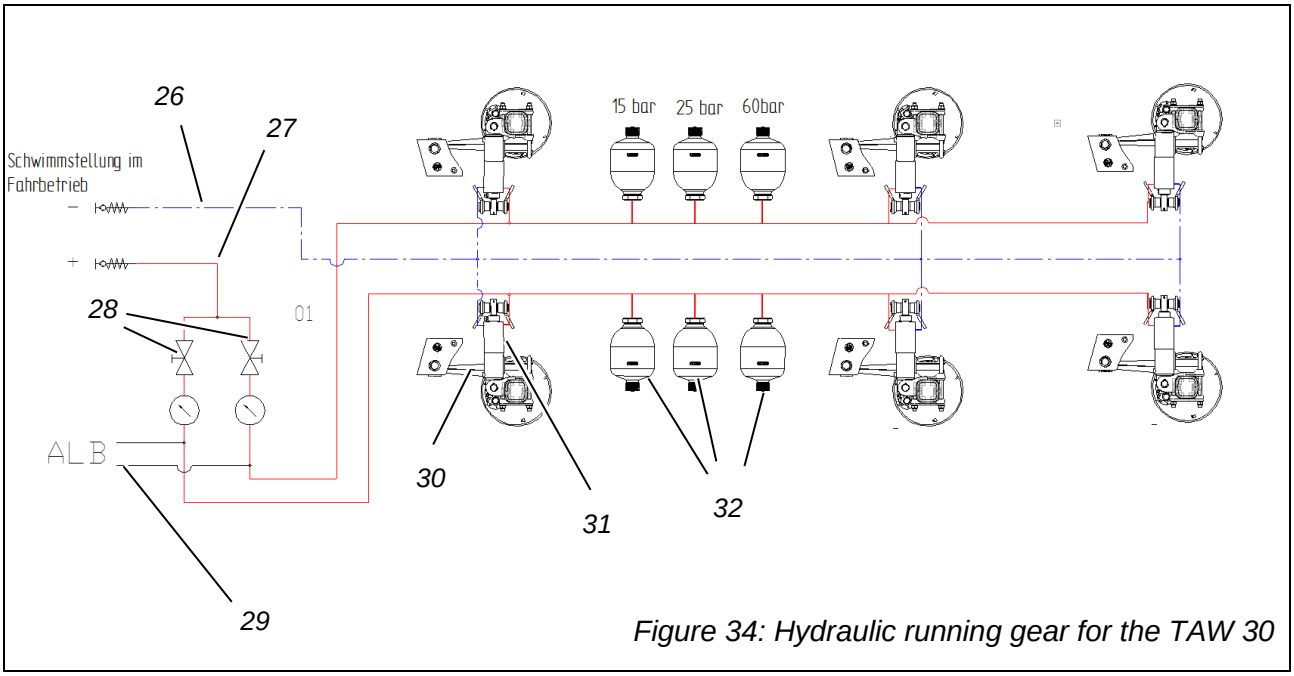


Figure 34: Hydraulic running gear for the TAW 30

Pos.	Name	Function
26	“-” line	Permanently in float position “∼”
27	“+” line	Required to adjust the ride height
28	Stopcocks	Ensure system separation
29	Hydraulic ALB	Load-dependent brake force control
30	Spring links	Guide the axles by stretching and compressing
31	Hydraulic cylinder	Absorbs the axle load
32	Nitrogen accumulator	Suspends the running gear

INFORMATION

Ensure that the control unit connected to the minus line (26) is always in the float position “∼”. It is even better if the line can be connected to a pressure-free return line.

The tridem running gear shown in Figure 34 is an example and can be transferred to a tandem running gear.

⇨ Park the vehicle on a flat surface.

⇨ Connect the “+” line (27) to one of the towing vehicle’s free control units.

⇨ Ensure that the lift axle (optional) is lowered (control unit in float position “∼”).

⇨ To do this, open both stopcocks (28).

⇨ Use the hydraulics system (27) to adjust the height of the running gear so that it is level with the spring links (30).

⇨ Close the stopcocks (28).

⇨ Set the control unit (27) to float position “∼”.

INFORMATION

If no adjustments need to be made, the “+” line (27) can be disconnected.

This does not apply for the line (26), as already described.

WARNING!

Risk of injury if the ride height is set incorrectly.

If the ride height is not set correctly, negative driving characteristics and an incorrect total height can lead to accidents.

Therefore:

- Be sure to not exceed the permissible total height when adjusting the ride height.
- When adjusting the ride height, ensure that the vehicle is level to the ground.

5.11 Raising and lowering the lift axle

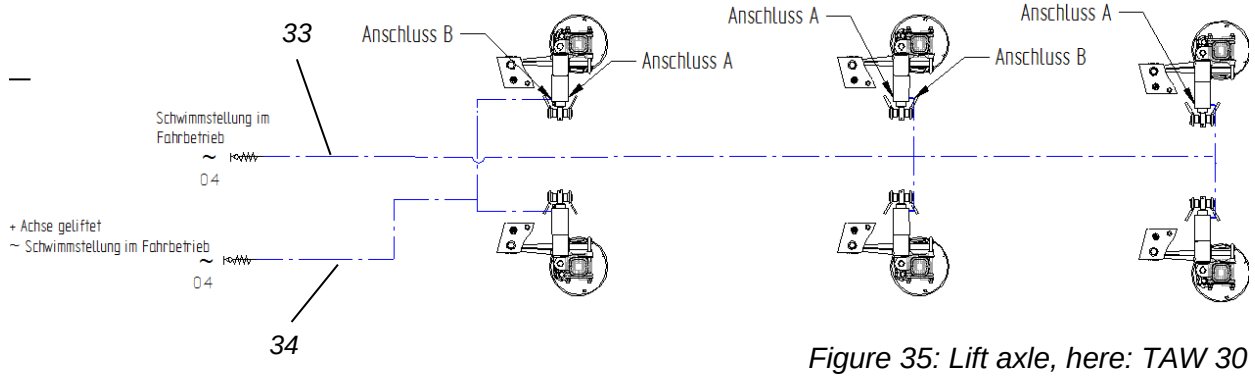


Figure 35: Lift axle, here: TAW 30

Pos.	Name	Function
33	"-" line	Permanently in float position "~" (like line 26).
34	Lift axle line	Raises and lowers the lift axle.

INFORMATION

The "-" line (26) presented in the chapter on the hydraulic running gear is divided for this option. If the lift axle is raised when the pusher is loaded, this can lead to the rear axle becoming overloaded.

Therefore:

The lift axle can only be used when the vehicle is empty.

⇨ To raise the lift axle, set the control unit (34) to "+" until the axle is completely raised.

⇨ Set the control unit to neutral.

⇨ The axle will remain raised.

⇨ Before loading the vehicle, set the control unit (34) to float position "~".

⇨ The axle will be lowered towards the ground.

The line (33), like the line (26), is permanently set to float position "~".

5.12 Hydraulic drawbar suspension (optional)

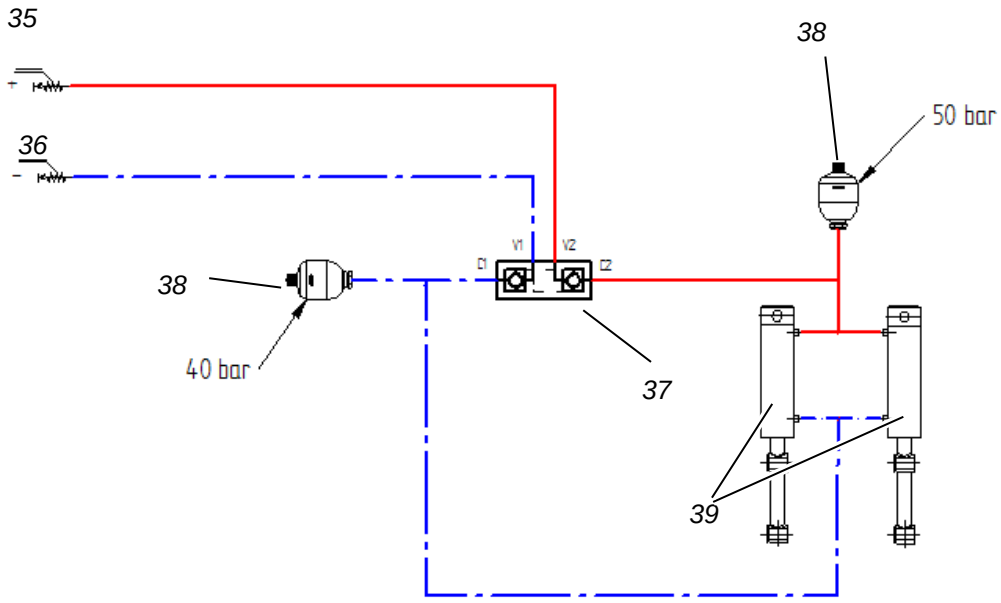


Figure 36: Hydraulic drawbar suspension, TAW

Pos.	Name	Function
35	“+” line	Lowers the draw gear
36	“-” line	Raises the draw gear
37	Non-return valve	Prevents any accidental adjustments
38	Nitrogen accumulator	Dampens the system
39	Hydraulic cylinder	Adjustment and suspension of the draw gear

INFORMATION

To enable the suspension, the pistons (39) should be retracted to a maximum of 5cm. This also applies for any extended pistons. The volume flow in the lines (35/36) must be less than 5 l/min when activated in order to enable the full function of the nitrogen accumulator (38).

Adjustments can only be made when the pusher is empty and if they are done slowly.

5.13 Hydraulic 2-wing cover system

Figure 37: Cover system, here: TAW 20

Pos.	Name	Function	Number
40	Swivel motor	Rotates the cover by up to 270°	2
41	Cover sensor	Transmits a signal when the cover is open	2
42	Net	Secures light cargo	2
43	Tensioning spring	Adapts to the bulk cargo pile	12
44	Sensor	Transmits a signal when the tail-gate is closed	1
45	Control unit	Protects against operating errors	1
46	3-pin plug	Sensor and control unit power supply	1
47	6/2-way valve	Locks the tailgate / cover	2

INFORMATION

The system has been designed so that a power supply to the control unit (45) is required. The control unit ensures that the tailgate cannot be activated when the cover system is closed. Activating the tailgate can damage the cover system.

Therefore:

The tailgate can only be used when the cover is open.

The functioning of the cover system is controlled by a double-acting control unit from the towing vehicle. The oil flows through a 6/2-way valve (47), which is unlocked if there is a power supply from the 3-pin plug (46) and if the sensor (44) is active.

Both swivel motors (40) (left and right) are controlled this way. The cover system may move at an uneven speed. The oil flow rate must not exceed 7l/min!

With this option, the tailgate oil supply is also guided via a 6/2-way valve (47) (but installed on the left). The valve allows for operation when both sensors (41) are active and thus signal that the cover is open.

INFORMATION

In the event of a technical defect, the manual switch on the control unit box (45) can be switched from “Auto” to “Manual”. The interdependent conditions for the cover and tailgate are then deactivated. A power supply is still required.

The signal light on the bulkhead signals manual operation.

Therefore:

The “Manual” function can only be used if the sensors are defective.

5.14 Coupling and decoupling the pusher

WARNING!

Risk of impact due to the bearing load of the drawbar of the TAW moving downwards or upwards.

When coupling and decoupling the TAW drawbar trailer, the drawbar can lift or drop quickly and injure people.

Therefore:

- Anyone in the vicinity must maintain a distance of at least 1 m to the drawbar.
- The operator must proceed cautiously and carefully when coupling and decoupling.

5.14.1 Coupling the pusher

WARNING!

Risk of crushing between the towing vehicle and pusher.

When backing the towing vehicle up to the pusher, people can be crushed between the towing vehicle and pusher. This can cause serious or even fatal injuries.

Therefore:

- There should be no-one between the towing vehicle and pusher during this process.
- Anyone helping the driver must stand next to the towing vehicle and pusher.
- The area between the towing vehicle and pusher should only be entered once the towing vehicle has come to a standstill and been secured against rolling away.

WARNING!

Risk of accident if the operating steps are performed in the incorrect order.

If the compressed air supply lines are connected in the incorrect order, the service brake will be triggered.

Therefore:

- Always connect the brake line marked in yellow first.
- Then connect the supply line marked in red.

WARNING!

Risk of accident due to the hydraulic system being pressurised.

If the hydraulic system of the towing vehicle or pusher is pressurised, it can cause accidents during the coupling process. Anyone standing in the vicinity could be injured.

Therefore:

- Before coupling, take care to ensure that the hydraulic systems of the towing vehicle and pusher have been fully depressurised: The control lever in the cab of the towing vehicle should be in the float position.

CAUTION!

Risk of injury due to an incorrectly coupled pusher.

If the pusher has not been coupled correctly, it can become detached during transport or when travelling on an incline and move uncontrollably. This can lead to many significant dangers and can cause serious or even fatal accidents.

Therefore:

- Take care to ensure that all steps of coupling the pusher to a towing vehicle with automatic hitch are completed in full.
- The manual safety device of the K80 and K50 couplings must be properly placed and secured.

⇨ If there is a hydraulic support leg (optional) installed on your trailer and the coupling height does not fit, the towing vehicle must be parked securely just in front of the trailer.

⇨ Ensure that all the required control levers in the cab of the towing vehicle are in the float position “〜”.

↳ The hydraulic system is depressurised.

⇨ Connect the correct hydraulic lines for the support leg to the towing vehicle.

⇨ Ensure that any installed 6/2-way valves (Figure 20) are in the correct position.

⇨ Set the correct coupling height (Section 5.4).

⇨ Reverse the towing vehicle until the automatic pin and bush coupling engages with the D40 draw eye of the draw gear or until the K80 ball coupling is directly above the ball coupling of the tractor.

⇨ With automatic pin and bush couplings: Check to ensure that the automatic coupling is closed and secured.

⇨ With non-automatic pin and bush couplings: Secure the inserted coupling pins so that they interlock.

⇨ Lower the draw gear by completely lifting the support leg.

⇨ With support legs with a crank-handle jack, the slide-in unit must be moved up.

WARNING!

Risk of accident if the support leg has not been fully retracted. While moving, the support leg may touch the ground, the trailer may be levered out and / or the driver may loose control of the vehicle.

Therefore:

- Only position the support leg up or down.

⇨ If your vehicle has a ball coupling, secure the manual safety devices on the towing vehicle (Figure 24: Rear view of a towing vehicle).

⇨ Connect the pusher's brake line, marked in yellow, to the towing vehicle.

⇨ Connect the pusher's supply line, marked in red, to the towing vehicle.

↳ The service brake will be released.

↳ The release valve actuator button will be pushed out.

⇨ Connect the pusher's 7-pin plug to the towing vehicle.

⇨ If the pusher is equipped with an anti-lock braking system (ABS) (optional): Connect the pusher's ABS cable to the towing vehicle.

⇨ Check the plugs of the hydraulic connections to ensure that they are clean. If they are dirty: Clean them.

⇨ Plug the hydraulic connectors of the hydraulic hoses into the socket of a control unit on the towing vehicle until the hydraulic connector is locked into place.

⇨ Check the path of all connected supply lines. They should not have any kinks, should not be under tension when the vehicle is moving (even when driving around corners) and should not rub against vehicle parts.

⇨ Drain the compressed air tank (see Section 5.7, page 62).

⇨ Release the pusher's parking brake if needed.

⇨ If necessary remove the wheel chock (6) and stow it away on the pusher.

⇨ Check that the service brake and light system are working correctly.

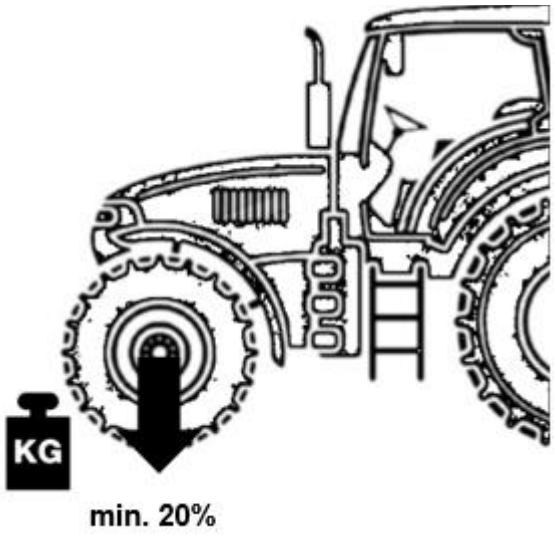
CAUTION!

Risk of accident due to an incorrectly loaded towing vehicle.

With loaded pushers, the resulting bearing load on the hitch can relieve the front axle of the towing vehicle so much that negative driving characteristics develop. There is a particular risk of understeering when cornering.

Therefore:

- Ensure that the towing vehicle is equipped with enough ballast weight to ensure that the vehicle can be steered and braked (at least 20% of the empty vehicle weight on the front axle).



5.14.2 Decoupling the pusher

WARNING!

Risk of accident if the operating steps are performed in the incorrect order.

If the compressed air supply lines are disconnected in the incorrect order, the service brake will not be active.

Therefore:

- Always disconnect the supply line marked in red first.
- Then disconnect the brake line marked in yellow.

⇨ Align the towing vehicle and trailer in a stretched position on a suitable surface.

⇨ Secure the towing vehicle against rolling away.

The decoupling is done in the reverse order.

INFORMATION

Once the supply line, marked in red, is no longer pressurised with compressed air, the supply line to the trailer brake valve is vented and the service brake engages.

5.15 Opening and closing the top side board wall (optional)

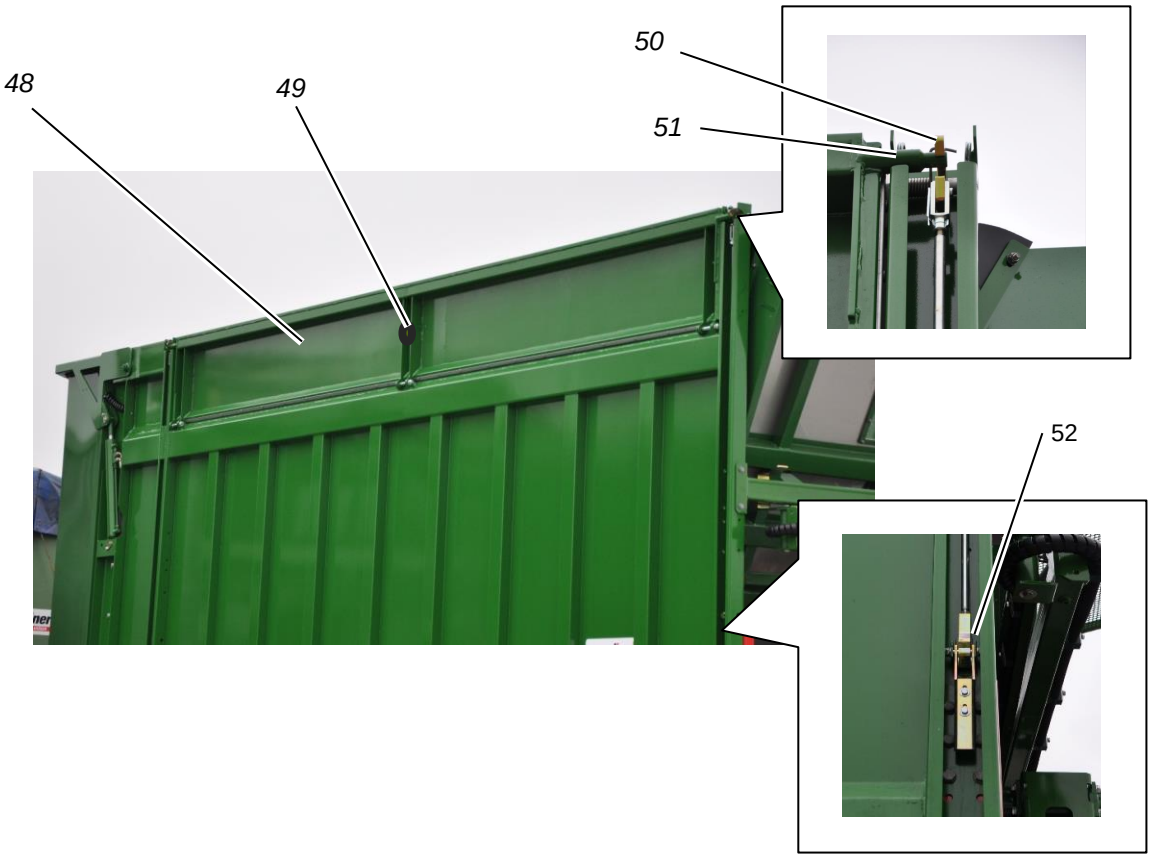
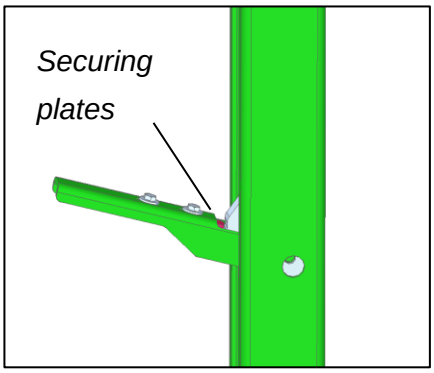


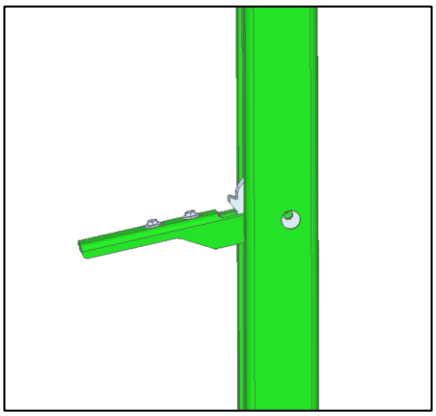
Figure 38: Top side board wall

Pos.	Name	Function
48	Top side board wall	Reduces the loading height by 500mm and is secured by two long levers.
49	Bump stop	Swivels out if the side board wall is folded down.
50	Hooks	Secure the side board wall.
51	Pivot pin	Secured by hooks and holds the side board wall in place
52	Long lever lock	Lock lever



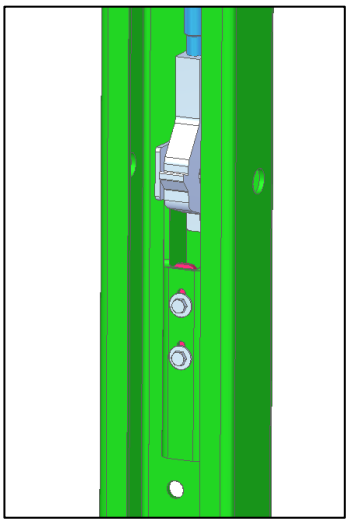
Lever () open and secured with securing plates

➔ *Hook (50) releases pins (51)*



Lever open and not secured

➔ *Hook (50) is set to "catch"*



Lever closed

➔ *Side flap (52) secured*

Figure 39: Lever positions

5.15.1 Opening the side board wall

⇨ Remove the crossrail if it is installed at a right angle to the direction of travel.

⇨ Fasten a suitable towing rope to the crossrail receiving eye using a shackle or alternative fastener. Requirement for the material: minimum breaking load 500kg.

⇨ Fasten the other end to a loader or to another lifting device.

⇨ Pull the towing rope upwards until it is almost taut to secure the side board wall.

⇨ Operate the front and back long lever locks (52) and use the securing plates to secure them in the open position (see Figure 39: Lever positions).

⇨ The side board wall is now free and can be lowered via the loader.

⇨ Close the long lever locks.

⇨ Remove the tools from the eye in the middle.

5.15.2 Closing the side board wall

⇨ Open the long lever locks.

⇨ The locks can be set to “catch” so that they can grab the side board wall as it is lifted by the loader. (see Figure 39: Lever positions).

⇨ Fasten a suitable towing rope to the crossrail receiving eye using a shackle or alternative fastener. Requirement for the material: minimum breaking load 500kg.

⇨ Lift the side board wall with a suitable lifting device until both catch hooks (50) have engaged with the pins (51).

⇨ Close the long lever locks (see Figure 39: Lever positions).

⇨ Remove the tools from the eye in the middle.

5.16 Opening, closing and securing the roller tarpaulin (optional)

WARNING!

Risk of accident due to a moving roller tarpaulin.

The roller tarpaulin must be closed during transport. If not, there is a risk of it being blown off.

This also applies if the roller tarpaulin is damaged, if rubber straps are missing, or if there are any other defects that prevent the roller tarpaulin from being closed safely.

Therefore:

- Always secure the roller tarpaulin during transport.
- Check the roller tarpaulin for defects (tears, missing rubber straps, etc.) before starting your journey. Repair any defects immediately, replace the roller tarpaulin or remove the roller tarpaulin from the pusher completely.

WARNING!

Risk of injury caused by falling.

If people slip from the ladder or tread surfaces, they can fall and injure themselves.

Therefore:

- All tread surfaces may only be used by competent persons and when the machine is at a standstill.
- When climbing the machine, only ladders designed for this purpose may be used.
- Damaged ladders or tread surfaces must not be used. They must be repaired immediately.
- The condition of all ladders must be inspected regularly.
- Ladders must be kept free from dirt, hydraulic fluid, gear oil and any other lubricants.

5.16.1 Opening and closing the roller tarpaulin

⇨ Remove all rubber straps from the rear board wall and the lashing straps from the side board walls.

⇨ Step onto the catwalk on the bulkhead.

⇨ Remove all rubber straps from the bulkhead.

⇨ Fold up the part of the roller tarpaulin that hangs down from the bulkhead.

⇨ Use the hand crank to roll up the roller tarpaulin until it rests on the four stops.

To close the roller tarpaulin, perform the steps above in reverse.

The two middle lashing straps on the front and rear board walls must be crossed over each other.

Figure 40: Roller tarpaulin closed correctly

5.16.1 Open roller tarpaulin

The tailgate can be operated regardless of whether the roller tarpaulin is closed or open.

Figure 41: Roller tarpaulin open and secured

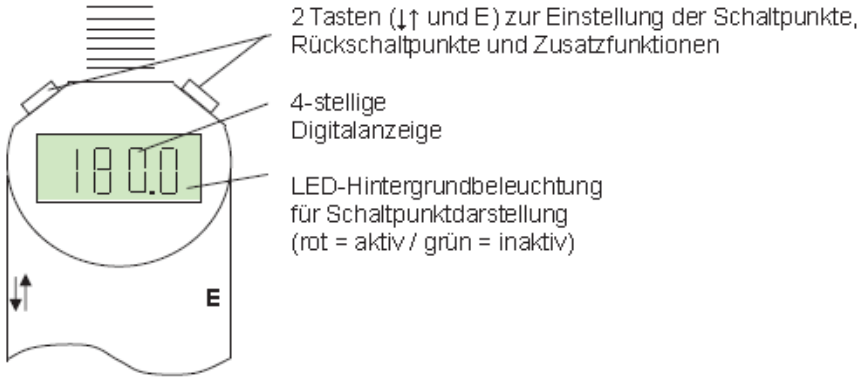
The tarpaulin tube is split at the pivot of the tailgate. A flexible connector enables the transmission of the rotating movement when opening and closing the tarpaulin.

There are two triangles in the cargo area and a frame on the tailgate to support the roller tarpaulin.

The triangles replace the crossrail that would usually be installed here. This is included in the scope of delivery but should only be used when the roller tarpaulin and frame are not installed on the pusher. Otherwise this can damage the roller tarpaulin.

The mulching flap is a triangle shape and must also be folded down when the crossrail is installed.

5.17 Calibrating the loading signal light (optional)



Mit den Tasten kann zum einen der nächste Menüpunkt angewählt werden, zum anderen dienen sie zur Einstellung der Werte.

- ↓↑: Im Menü absteigen; Wert vergrößern; Wird die Taste länger gedrückt, erfolgt ein Schnelldurchlauf der Parameterwerte
- E: Auswahl Menüpunkt; Wert bestätigen

Figure 42: Pressure switch

5.17.1 Setting the switch-on pressure

⇨ Load the vehicle until you reach the desired target weight.

⇨ Read the pressure measurement shown on the display (example: 36 bar).

⇨ Press the left button until “SP1” shows on the display.

⇨ Press the right button to select the menu item that you want.

⇨ Press the left button until the previously read off value is displayed.

⇨ Press the right button once to confirm the value → The light will light up when this pressure is reached.

⇨ Press the left button until the real pressure is displayed → Setting complete.

5.17.2 Setting the switch-off pressure

⇨ Press the left button until you reach the menu item “rP”.

⇨ Here you can set the value at which the light should go out (example: 20 bar).

⇨ Press the right button once to change the value.

⇨ Press the left button until the desired switch-off pressure is displayed as a value.

⇨ Press the right button once to confirm the value.

⇨ Press the left button until the actual pressure is displayed → Settings complete.

5.17.3 Activating and deactivating the programming lock

If you are unable to alter the values in the menu items mentioned above, it is because the programming function is locked.

⇨ Press the left button until you reach the menu item “EF” (extra functions).

⇨ Press the right button once to reach the menu.

⇨ Press the left button until you reach the menu item “PrG” (programming lock).

⇨ Here you can use the right button to switch between “Locked” and “Unlocked”.

⇨ Once you have the desired setting, press the left button until the actual pressure is displayed.

The lock is now activated or deactivated respectively.

5.18 Loading the pusher

WARNING!

Risk of goods falling and spilling.

If people or animals are on the loading surface while the pusher is being loaded, they can be struck or buried by falling pourable and bulk goods.

Therefore:

- Before loading the cargo area, ensure that there are no people or animals in the cargo area.

WARNING!

Risk of accident caused by overloading.

If the pusher is overloaded, the parts, which are not designed to carry this weight, may become overburdened and break. The side panels may not be able to withstand the increased pressure and may give way. Braking distances will increase. The centre of gravity of the pusher may shift, causing the pusher to tip over. Any people or animals in the vicinity may be seriously or fatally injured.

Therefore:

- The payloads, axle loads and permissible total weights listed in the technical specifications must not be exceeded.

WARNING!

Risk of accident caused by uneven loading.

If the pusher is unevenly loaded (more weight on the draw gear, more weight on the right-hand side than on the left), this can negatively impact its driving and braking characteristics. If the centre of gravity shifts, there is a particular risk of understeering in corners and of the vehicles spinning or tipping over. This can cause serious or even fatal injuries for people or animals that are in the vicinity.

Therefore:

- Always load the pusher evenly by distributing loads evenly across the entire cargo area.

WARNING!

Danger of being run over by a pusher that is rolling away.

If the pusher has not been secured against rolling away during the loading process, it may start to move and roll over any people or animals standing in the vicinity.

Therefore:

- The towing vehicle of a coupled pusher must be secured against rolling away while the pusher is being loaded.
- If the pusher is not coupled to a towing vehicle, it must be secured against rolling away while being loaded with the parking brake and wheel chocks (6).
- There must be no people in the danger zone while the pusher is being loaded.

WARNING!

Risk of accident caused by falling cargo.

If cargo falls from the pusher it can injure people and animals in the vicinity. Pourable and bulk goods blown off the pusher during road travel can block the view of following vehicles and cause accidents, for example. If pourable and bulk goods (or other cargo) falls from the cargo area, they can bury or strike any people or animals in the vicinity.

Therefore:

- Before loading, ensure that all locks are closed securely.
- There must be no people in the danger zone while the pusher is being loaded.
- Secure the cargo, e.g. with a roller tarpaulin (optional), so that other people and road users are not in danger.

CAUTION!

Risk of accident and property damage caused by severe impacts.

If heavy goods fall onto the loading surface from a substantial height, they can break components and injure any people and animals in the vicinity.

Therefore:

- Do not load the pusher with large rocks or rubble.

5.18.1 Loading the vehicle from above

INFORMATION

Remove the ridge pipe before loading the vehicle from above (only with the roller tarpaulin option). This prevents pourable and bulk goods from bouncing off the ridge pipe and not fully landing in the cargo area. This also protects the ridge pipe against contamination and wear and tear.

⇨ Open the roller tarpaulin or cover (optional) (see Section 5.16, page 84), if there is one.

⇨ Remove the ridge pipe from its bracket.

⇨ Load the floor of the trailer evenly.

⇨ Secure the cargo in accordance with applicable regulations.

⇨ Close the roller tarpaulin (optional) if there is one.

5.18.2 Pre-pressing the cargo (semi-automatic control)

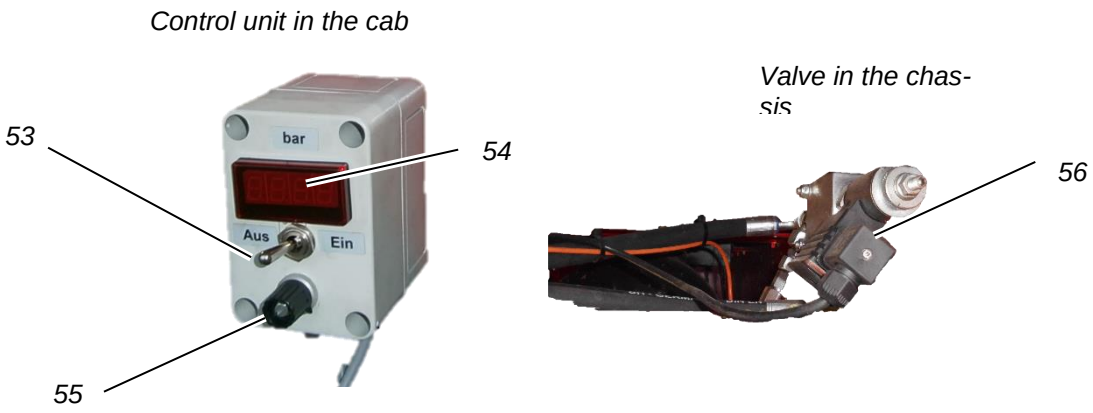


Figure 43: Control unit and pressure limiter

Pos.	Name	Function
53	Main switch	Switches the control unit on and off
54	Display	Shows the actual pressure
55	Control dial	Used to select the desired pressure for pre-pressing
56	Pressure limiting valve	Monitors the pressure and switches

INFORMATION

Before the pre-pressing can be done, the cargo area must be completely filled.

⇨ Switch the control unit (53) on.

INFORMATION

Unloading may be interrupted if the pre-press control unit is switched on when the device is on.

Therefore:

Only activate if necessary.

⇨ Use the control dial (55) to select the desired pre-pressing pressure.

⇨ Actuate the valve to move the pusher plate backwards.

⇨ The actual pressure will be shown on the display (54).

⇨ Once the pre-set pressure has been reached, any excess oil is “blown out” of the pressure limiting valve (56).

⇨ Actuate the valve to move the pusher plate forwards into its parked position.

The pre-pressing process is now complete.

5.19 Towing the pusher

WARNING!

Risk of death in case of service brake malfunction.

If the pusher is towed without a functioning service brake, there is a risk of the braking distances being significantly longer which can lead to serious or fatal accidents that can also affect bystanding people or animals.

Therefore:

- Before towing the pusher, ensure that it is coupled correctly and that the service brake is connected.
- Perform a brake check before starting your journey to ensure that it is working correctly.

WARNING!

Risk of accident caused by dangerous driving.

If the parking brake is not released before starting the journey, the pusher will exhibit dangerous driving behaviour due to the brake being applied to the front axle. The blocked tires will also produce smoke if the pusher continues to be driven. This could obstruct the view of any road users behind you and could lead to accidents. People and animals could be injured as a result.

Therefore:

- Before starting your journey, ensure that the parking brake has been released.

WARNING!

Risk of accident due to excessive speed.

If the pusher is towed at speeds exceeding its maximum permissible speed and / or exceeding what local road conditions allow for, there is a risk of parts becoming overloaded and breaking. There are many dangers for the driver as well as for any people or animals in the vicinity.

Therefore:

- The maximum speed of a tractor/trailer combination must always be based on the trailer with the lowest maximum speed.
- The maximum speed must also be adapted to local conditions.

WARNING!

Risk of accident due to a loss of cargo.

If the board walls and tailgate are not closed correctly, cargo may be lost during the journey. This can result in serious or fatal accidents that may also affect bystanding people and animals.

Therefore:

- Before starting the journey, ensure that all locks, long lever locks (48) (optional) are locked.

WARNING!

Risk of accident due to falling from the pusher.

If there are people on the pusher while it is being towed, they may fall and seriously injure themselves.

Therefore:

- There must be no people or animals on the pusher when it is being moved.
- No-one must jump onto a moving pusher.

5.19.1 Checks to carry out before each journey

⇨ Before starting work each day, perform the tasks that must be carried out in accordance with the Maintenance Plan (see Section 6.2.2, Page 106).

⇨ Ensure that the pusher is coupled correctly and that all necessary supply lines are connected.

⇨ Ensure that the board walls are fully locked.

⇨ Ensure that the roller tarpaulin (optional) is secured (see Section 5.16, page 84).

⇨ Ensure that the parking brake has been fully released.

⇨ Ensure that the wheel chocks (6) have been removed and stowed away in their brackets (see Section 5.6, Page 61).

⇨ Ensure that the cargo area has been loaded evenly.

⇨ Wait until the pressure gauge on the towing vehicle shows 8 bar before starting your journey.

5.19.2 Checks to carry out after each journey

⇨ Use your hand to check that the brake drums and wheel hubs have not overheated.

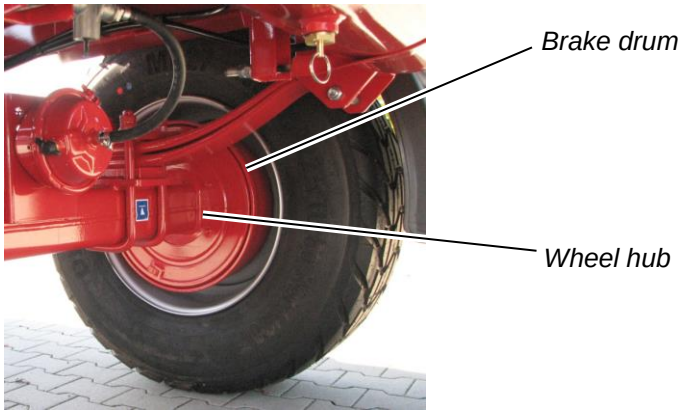


Figure 44: Brake drum and wheel hub

⇨ If you notice any defects: Take the pusher out of operation and carry out the necessary repairs (see Chapter 0, page 152).

5.20 Unloading the pusher

WARNING!

risk of accident caused by cargo that does not slide easily.

If the pusher carries cargo that does not slide easily, such as manure, compost or goods frozen to the floor, this can cause problems when unloading the pusher, if the cargo does not slide off the pusher floor. The centre of gravity of the pusher may shift, causing the pusher to tip over. Any people or animals in the vicinity may be seriously or fatally injured.

Therefore:

- When performing a pushing process with cargo that does not slide easily, drivers must be particularly vigilant and immediately discontinue the pushing process if they notice that the pusher is at risk of becoming unstable.
- If necessary, use a loader to unload goods that do not slide easily from the pusher.

WARNING!

Risk of accident when driving through areas with limited clearance heights.

If a fully loaded pusher has to pass through an area with a low clearance height to be unloaded, it may not be able to pass back through the same area once it has been unloaded. Its structural height is larger without cargo because the suspension springs are decompressed. In particular, if the tailgate is open.

Therefore:

- Only pass through areas with a loaded pusher if you are sure that you will also be able to pass through them when the pusher is empty.
- If possible: Once the pusher has been unloaded, take a different route that does not require you to pass through an area with a limited clearance height.

DANGER!

Risk of death due to electric shock.

If the pusher is close to overhead power lines and the cover system or tailgate is activated, the frames may come into contact with the power lines. The pusher and towing vehicle will then be under high voltage. During storms, there is a risk of the pusher being struck by lightning. In both cases, this usually leads to the death of the driver.

Therefore:

- Never perform covering processes in the vicinity of overhead power lines.
- Do not perform any covering processes during thunderstorms or approaching thunderstorms.
- The same applies for tailgate operations.

WARNING!

Risk of death due to numerous hazards.

If there are people or animals in the immediate vicinity of the pusher during a pushing process, they will be exposed to a range of different hazards. They may be struck by the cargo or by the closing tailgate. They may be knocked by the board walls being raised or buried by poured and bulk goods.

Therefore:

- During a pushing process, nobody must enter the danger zone of 5 m around the pusher and towing vehicle or stand on or under the pusher.

WARNING!

Risk of death if the tailgate breaks off.

If the tailgate bumps into an obstacle it can break off and drop. Any people or animals in the vicinity may be seriously or fatally injured.

Therefore:

- Ensure that there are no obstacles in the ways before opening the tailgate.

⇨ Ensure that the pusher is parked on a flat and solid surface.

⇨ Set up the pusher and towing vehicle in a stretched position. They must not be at an angle.

⇨ Ensure that there is enough space behind the vehicle.

⇨ Open the tailgate.

⇨ Activate the control unit for the pusher and apply the foot brake to prevent the pusher from rolling away accidentally if pressure develops due to the cargo being pushed off.

⇨ To get rid of any built-up pressure, release the foot brake in a controlled manner.

WARNING!

Risk of death if the pusher and towing vehicle roll away forwards in an uncontrolled manner.

People and animals must not stand in this area. People or animals in the vicinity can be seriously injured.

Therefore:

- Always keep an eye on the area in front of the vehicles during the pushing process.

⇨ Ensure that there are no people or animals in the danger zone behind or in front of the pusher and towing vehicle (see Section 1.5, page 16).

WARNING!

Risk of accident due to jerky movements.

If you try to loosen any sticking cargo by moving the cargo area jerkily or by moving the pusher forwards and then braking suddenly, the centre of gravity of the pusher may shift, causing it to tip over. Any people or animals in the vicinity may be seriously or fatally injured.

⇨ Keep the control lever for the connected control unit in the “+” position until the pusher plate has moved as much as possible.

INFORMATION

The pusher plate will be moved for as long as the control lever in the cab of the towing vehicle is held in the corresponding position.

⇨ If you feel that the pusher is no longer stable: Move the control lever for the connected control unit to the neutral position.

⇨ Once all the cargo has been completely pushed out of the cargo area: Move the control lever for the connected control unit to the “–” position and hold it there until the pusher plate has fully moved back to its front parked position.

↳ The telescopic cylinder will retract.

↳ The pusher plate will move forwards.

⇨ Activate the control unit for the tailgate until the lock is fully closed.

5.20.1 Unloading via the grain feed

Figure 45: Grain feed, here on both sides

Pos.	Name	Function
57	Feed lever	Regulates the opening of the feed
58	Locking screw	For securing the feed

WARNING!

Risk of being buried by falling cargo.

If a person is standing directly in front of the grain feed, there is a danger of them being buried by cargo spilling out suddenly or under pressure.

Therefore:

- When opening the feed, the operator must stand on the side that the feed lever is on.
- Before opening the feed, ensure that there is no-one standing directly in front of the grain feed.

⇨ Loosen the locking screw (58).

⇨ Move the feed lever (57) upwards.

To close the grain feed, perform the steps above in reverse order.

6 Maintenance and repairs

6.1 Safety regulations when performing maintenance and repairs.

Numbers in round brackets, e.g. “(2)”, refer to the position numbers of the operating elements listed in Section 2.4.

Before performing any maintenance on outsourced parts, read their operating instructions carefully.

DANGER!

In the event of inadequate maintenance, the proper functioning of the pusher cannot be guaranteed. This can cause injury to people and property damage.

Therefore:

- Maintenance and repair work is classed as part of the pusher’s intended use and must be performed at the specified intervals.
- Maintenance and repair work must only be performed by the manufacturer or by qualified and authorised professionals (e.g. by the manufacturer’s partner workshops).
- Keep a record of all maintenance performed.
- Only use original spare parts or accessories and spare parts authorised by the manufacturer. If any other parts are used, the manufacturer cannot be held liable for the resulting consequences.

WARNING!

Risk of death if the pusher plate is pushed back.

When working underneath the floor frame, there is a risk of serious or fatal accidents occurring if the pusher plate is returned to its starting position and crushes people's limbs during the process.

Therefore:

- If the pusher plate needs to be moved for maintenance and repair work, the cargo area must be empty. There must be no cargo, people or animals in the cargo area.
- With any work beneath the floor frame and between the front transverse spar and pusher plate, the control unit must be turned off and secured against being turned on.

WARNING!

Risk of injury from the pusher during maintenance and repair work.

The pusher and movements carried out by the pusher or any of its parts can cause many hazards during maintenance and repair work.

Therefore:

- Before performing any maintenance and repair work secure the pusher against rolling away.
- Always wear personal protective equipment (PPE), particularly safety boots, when performing maintenance and repair work.

- Let the service brake cool sufficiently to avoid burns from hot parts.
- Only perform work on the electrical systems when the pusher has been disconnected from the towing vehicle's power supply.
- With work that requires the pusher to be left running, always perform the work with a second authorised person.
- Do not reach into moving parts.
- Maintain a sufficient distance from moving parts.
- Tie back long hair and/or wear a hairnet. Wear tight-fitting clothing. Take off any loose, hanging objects, such as scarves, ties, shawls, jewellery, etc. before performing any maintenance and repair work.
- Observe all applicable safety and environmental protection regulations.

WARNING!

Risk of death if safety devices are missing or defective.

If safety devices have been removed or are defective, they cannot protect operators against dangers that may arise.

Therefore:

- Only remove safety devices for maintenance and repair work.
- Replace the safety devices immediately after completing the work.
- Do not modify or bypass any safety devices.
- Regularly check the safety devices according to the Maintenance Plan.

WARNING!

Risk of injury caused by movements.

If the pusher is operated while maintenance and repair work is being carried out, safe handling is not guaranteed. This can cause dangerous situations. Maintenance personnel, people or animals in the vicinity can be seriously injured.

Therefore:

- Bring the machine to a stop before performing any maintenance and repair work and secure it against accidental start-up.

WARNING!

Risk of injury due to incomplete maintenance and repair work.

If the pusher is put back into operation, even though the maintenance and repair work has not yet been completed, there is a risk of injury.

Therefore:

- Only put the pusher into operation once all maintenance and repair work has been completed.
- If the work needs to be interrupted before it is completed, a clearly visible sign must be attached to the pusher that states that the pusher must not be put into operation due to incomplete assembly.

WARNING!

Risk of death from changed statics.

If you make any modifications to load-bearing parts without the manufacturer’s authorisation, the safety of the pusher may no longer be guaranteed. This can cause serious accidents that may result in serious or fatal injuries to people and animals.

Therefore:

- It is expressly prohibited to make unauthorised modifications to load-bearing components, e.g. drilling holes into the chassis, counter-drilling existing holes on the upper and lower flange of the chassis frame and performing welding work on any load-bearing parts.

WARNING!

Risk of death if parts are damaged.

If repair work is carried out carelessly and thoughtlessly, parts may be damaged, and this can lead to a loss of function of the pusher. People and animals may be injured as a result of accidents.

Therefore:

- With welding, drilling, flame cutting and grinding work as well as with work with cutting discs that is performed in the vicinity of plastic and electrical cables, cover the cables to protect them or remove them at particularly critical points.
- With welding, drilling, flame cutting and grinding work as well as with work with cutting discs that is performed in the vicinity of the parabolic springs, these springs must be covered for protection.
- With welding work performed with electrical welding apparatus, never connect the negative terminal of the apparatus to the parabolic springs.
- Never work on parabolic springs with hammer blows or sharp objects.
- After retaining nuts have been removed twice, they must be replaced by new retaining nuts.
- Observe the tightening torques for screws and wheel nuts (see Section 2.5.9, page 49 and Section 2.5.11, page 52).
- Have any damage to paintwork repaired promptly by a professional.

WARNING!

Risk of injury from electrical faults.

Touching live parts can cause injuries. If moisture gets into electrical components, it can cause electrical faults.

Therefore:

- Work on electrical systems must only be performed by qualified and trained professionals.
- Particular care must be taken to ensure that no moisture gets into electrical components during cleaning work.

WARNING!

Risk of injury due to a lack of personal protective equipment.

There is a risk of serious injury if personal protective equipment is not worn during maintenance and repair work.

Therefore:

- Always wear personal protective equipment (PPE) when performing this type of work (safety boots, safety goggles, protective clothing).

WARNING!

Risk of burns from overheated brakes.

If the service brake or parking brake becomes hot due to faults or operating errors, people can burn themselves if they touch the hot parts.

Therefore:

- Only perform maintenance and repair work on brakes and tyres when they have cooled down.

CAUTION!

Risk of death for children.

If children get hold of the operating materials and swallow or ignite them, it can cause serious or fatal accidents.

Therefore:

- Always keep operating materials (e.g. oil, hydraulic fluid, grease) out of reach of children.

CAUTION!

Risk of environmental pollution.

If operating materials are handled incorrectly, it can cause environmental pollution. In the medium term, this indirectly leads to health hazards for people, animals and plants via the soil, water and air.

Therefore:

- Always dispose of operating materials (e.g. oil, hydraulic fluid, grease) and cloths, containers and components containing operating materials separately, carefully and in accordance with all applicable environmental regulations.
- Do not let cleaning agents and waste water containing cleaning agents seep away, instead send them to be processed in accordance with all applicable environmental regulations.

6.2 Regular maintenance work

The Maintenance Plan lists the maintenance work that must be carried out on a regular basis.

For maintenance work that must be performed by a professional, please contact our customer service team (see Chapter 0, page 152).

6.2.1 Maintenance records

Enter any maintenance work performed in the table provided (see Section 6.4, page 149) and have it confirmed where applicable. This allows the maintenance performed to be monitored.
It is recommended that you keep your own lists for further records of maintenance work.

6.2.2 Maintenance plan

The maintenance intervals given in the Maintenance Plan apply if the pusher is used under normal operating conditions. The intervals may need to be shortened depending on the actual operating conditions. In case of any doubt, contact the manufacturer (see Chapter 0).

For the maintenance of built-in components, the documentation provided by the respective suppliers must also be observed (see annex).

Activity	Interval			
	Before the journey starts	After the first 10 operating hours	Every 50 operating hours 3 months	Every 250 operating hours 6 months
Perform a general visual inspection for damage and faults and carry out any necessary repair work:	•			
Check the pusher for mechanical damage, e.g. for				
unusual deformations	•			
Wear and tear	•			
Check the towing drawbar	•			
Check the forced steering	•			
Check the tyres for damage	•			
Check the tyres for sufficient tyre pressure	•			
Check the tyres for sufficient tread depth	•			
Check the braking system:				
Pipe and hose lines	•			
Coupling heads	•			
Cables and pulleys	•			
Drain the compressed air tank	•			
Brake cylinder piston stroke	•			
Check the hydraulic system	•			
Check the light system	•			
Check that the wheel chocks are in place	•			
Check that the pusher is not making any unusual noises	•			
Tighten all screw connections:				
Draw gear		•	•	
Tighten all wheel nuts		•	•	
Other fastenings		•	•	
Fastenings on the running gear (see annex)		•	•	
Check the service brake:				
Clean the brake system line filter		•		•
Check the service brake for leaks			•	
Check the pressure in the compressed air tank			•	
Check the seat of the compressed air tank			•	
Check the brake cylinder pressure			•	
Check the brake cylinder stroke			•	

Activity	Interval			
	Before the journey starts	After the first 10 operating hours	Every 50 operating hours 3 months	Every 250 operating hours 6 months
Check the joints on the brake valves, brake cylinders and brake linkage			•	
Check the ALB (automatic load-dependent brake force control)			•	
Check that all safety signs are in place; replace any missing safety signs immediately			•	
Check the 7-pin plug for damage; carry out any necessary repair work			•	
Check the parabolic springs for any tears and breaks			•	
Check the parking brake and adjust if necessary			•	
Check the ALB for ease of movement of the shaft and for damage to the linkage			•	
Check the parabolic springs for wear			•	
Check the suspension mounting			•	
Check the spring shoes, spring sliding shoes and spring bolts			•	
Check the pushing process and adjust the guide if necessary				•
Check the spring sliders and side plates of the spring shoes for wear				•
Check the pneumatic suspension and tighten any screws				•
Check the drawbar eye for wear				•
Have the electrical system checked by a professional and perform any necessary repairs				•
Check for corrosion				•
Check the ladders and tread surfaces to ensure they are suitable and in good condition				•

6.3 Performing maintenance work

6.3.1 Checking the draw gear

WARNING!

Risk of accident caused by a defective draw gear.

If the draw gear has any defects, the safe operation of the pusher is no longer guaranteed. It can cause accidents that may result in injury to people or animals.

Therefore:

- Only the manufacturer can determine if a damaged draw gear can be repaired. Contact the customer service team (see Chapter 0, page 152).
- Repairs to the draw gear should only be carried out by the manufacturer. Contact the customer service team (see Chapter 0, page 152).
- An irreparably damaged draw gear must be immediately replaced by a new one.
- Welding and drilling into the draw gear is strictly prohibited.

⇨ Check the draw gear for any unusual deformations, corrosion or wear and tear.

⇨ If you notice any defects: Take the pusher out of operation and carry out the necessary repairs (see Chapter 0, page 152).

⇨ Check the diameter of the drawbar eye.

INFORMATION

When new, the drawbar eye has a diameter of 40 mm. The permissible wear of the diameter is 1.5 mm maximum.

⇨ If the diameter of the drawbar eye exceeds the permissible dimensions: Have a recognised specialist workshop change the wear bushing of the drawbar eye.

⇨ Check the screw connections of the rubber buffer. These often only settle after the first few operating hours and as such must be tightened afterwards.

6.3.2 Checking the safety and information signs for completeness

The positions of the safety and information signs are described in Section 1.9, page 21.

⇨ Check each individual safety and information sign to ensure that it is there and legible.

If the safety and information signs are no longer on the pusher or have become illegible:

⇨ Replace them. Contact the customer service team if needed (see Chapter 0, page 152).

⇨ Do not use the pusher until all safety and information signs are complete, in place and legible again.

⇨ Attach new safety and information signs to the pusher immediately.

6.3.3 Checking the locks

Check the:

- Locks on the tailgate.

  Check the shaft guide and the lock path. If the catch hooks are worn, the shafts must be replaced.

- Long lever locks (Section 5.15) (side board wall option)

  ⇨ Open and close each lock several times and check to ensure that they move easily and work correctly.

  ⇨ If you notice any defects, perform the necessary repair work.

6.3.4 Draining the compressed air tank

See Section 5.7, page 62.

INFORMATION

If you notice any impurities or contamination when draining the compressed air tank, you must clean the compressed air tank (see Section6.3.5, page111).

6.3.5 Cleaning the compressed air tank

⇨ Keep the ring of the drain valve (8) pulled sideways until all the compressed air has escaped.

Only clean the compressed air tank with compressed air and water.

ATTENTION!

If the drain valve (8) is blocked, it must be dismantled and cleaned after all the compressed air has been released. Any further repairs may only be carried out by a recognised specialist workshop.

6.3.6 Checking and correcting the tyre pressure

Ensure that the pusher always has the right tyre pressure. If the tyre pressure is too high or too low, it can reduce the mileage of the tyres.

WARNING!

Risk of accident caused by bursting tyres.

If the tyre pressure is too high, it can cause the tyres to burst. This can cause accidents that may result in injury to people or animals.

Therefore:

- Always comply with the stated tyre pressure.

INFORMATION

- You should check the tyre pressure when the tyres are cold – before starting a journey.
- The difference in tyre pressure between two tyres on an axle must not exceed 0.1 bar.
- The tyre pressure can increase by up to 1 bar after driving fast or in warm weather. If this happens, the tyre pressure must not be reduced, as the pressure would then be too low once the tyres have cooled down.

⇨ Use a soft, lint-free cloth to remove all possible contamination from the valve.

⇨ Press the connector of a tyre inflater gauge onto the valve and increase or reduce the tyre pressure according to the table.

⇨ Remove the connector of the tyre inflater gauge from the valve.

	Dimension	Service description	Permissible top speed ([km/h] with axle load)	Tyre load capacity [kg] at 10km/h and 1.5bar	Tyre width (diameter) according to guide [mm]	Recommended tyre pressure*(2) [bar]
Michelin Cargo XBIB	500/60 R 22.5	155 D	40 (9to)	4050*(1)	513 (1180)	4.0
	560/60 R 22.5	161 D	65 (9to)	4835	570 (1251)	4.0
	600/50 R 22.5	159 D	50 (9to)	4575	616 (1181)	4.0
	710/45 R 22.5	165 D	65 (9to)	4975	732 (1210)	4.0
	600/55 R 26.5	165 D	65 (10to)	5385	626 (1348)	4.0
	710/50 R 26.5	170 D	65 (10to)	6275	732 (1405)	4.0
	800/45 R 26.5	174 D	65 (10to)	6470	815 (1395)	4.0
NOKIAN						
	560/60R22.5 CK TL	161 D	65 (9to)	5000	564 (1244)	4.0
	650/50R22.5 CK TL	163 D	65 (9to)	4580	645 (1237)	6.0
	620/60R26.5 CK TL	169 D	65 (5.8to)	5310	625 (1400)	4.0
	710/50R26.5 CK TL	170 D	65 (6to)	5615	727 (1405)	4.0
BKT / Altura						
	550/60-22.5 16PR	163 B	50 (9to)	4875	544 (1232)	3.0
	700/50-22.5 16PR	174 A8	50 (6to)	7125	700 (1270)	2.4
Alliance						
	650/55R26.5 HD	178 D	65 (9to)	6950	641 (1367)	5.0
	650/55R26.5 P380	167 E	70 (10to)	4450	645 (1360)	5.0

*(1): On axles with a track of no more than 2000 mm (e.g. standard axle ADR “Black Bull”) this results in an external width of approx. 2513 mm. The 35th derogating provision does not apply in this situation.

*(2) With tyres not listed here, it is recommended that you get information about the recommended tyre pressure from the tyre manufacturer.

Figure 46: Tyre pressures

6.3.7 Checking the tread depth of the tyres

WARNING!

Risk of accident caused by pushers braking poorly.

If the tread depth of the tyres is no longer sufficient, this can increase the pusher's braking distance. It may also cause the pusher to aquaplane more readily on wet surfaces. This can result in serious or fatal accidents for people and animals.

Therefore:

- Tyres that have reached the minimum permissible tread depth must be replaced by tyres with a deeper tread as soon as possible.

INFORMATION

- The minimum tread depth permitted by law is 1.6 mm. This minimum depth must be present at every point on the tyre surface.
- The smaller the tread depth, the longer the braking distance on wet surfaces and the higher the risk of aquaplaning.
- Thanks to elevations in the tread grooves, known as wear indicators, you can quickly check whether the tread depth is still in the permissible range.

⇨ Check the wear indicators at multiple points on the tread: If the wear indicators are already level with the tread, the tyre is at or even below the minimum tread depth.

⇨ Measure the tread depth with a tread depth gauge.

If the tread depth is below the minimum depth permitted by law:

⇨ Replace the tyre with a tyre with a sufficient tread depth. Always check the age of replacement tyres.

INFORMATION

You can tell how old tyres are by looking at the DOT number located on the tyre sidewall and encircled by an oval.

⇨ If the tyres are “Regroovable”: Get the tread depth regrooved by a tyre specialist.

INFORMATION

The tread of “Regroovable” tyres can be regrooved as long as there is a remaining tread depth of 2.5 mm.

6.3.8 Changing the tyres

WARNING!

Eisk of accident caused by an incorrectly positioned jack.

If a jack is positioned incorrectly, the pusher can slip when changing tyres and injure people and animals in the process.

Therefore:

- Only use jacks at the points marked with information signs.

WARNING!

Risk of accident caused by a lack of knowledge and unsuitable tools.

If people change tyres without having the necessary knowledge and without suitable tools, this can cause accidents. People or animals in the vicinity can be injured as a result.

Therefore:

- Only use appropriate tools.
- Only people that have sufficient experience or that have been instructed by an experienced person may change tyres.

Removing tyres

⇨ Secure the pusher against rolling away (see Section 5.6, page 61).

⇨ Remove the protective caps from the wheel nuts.

⇨ Half loosen the wheel nuts with suitable tools.

⇨ Position a jack at the marked jack points and jack up the pusher.

⇨ Check the stability of the pusher.

⇨ Loosen the wheel nuts completely and remove them.

⇨ Remove the tyres from the wheel hub.

Putting on new tyres

WARNING!

Risk of accident if wheel bolts and nuts become loose.

If wheel bolts and nuts become loose, there is a risk that the entire tyre may come loose and cause injury to people and animals.

Therefore:

- Do not use any lubricants on the wheel bolts and nuts.
- Do not oil the threads of wheel bolts and nuts.

WARNING!

Risk of accident caused by defective rims.

Corrosion around the tyres, rims and axles can lead to accidents while driving and can injure people and animals.

Therefore:

- Do not use corroded rims.
- Eliminate any corrosion professionally or have it eliminated by a professional.

⇨ On the new tyre to be fitted, check the tyre seat surface of the rim for contamination and signs of corrosion.

⇨ If you notice any contamination or signs of corrosion: Remove it thoroughly and permanently from the tyre seat surface.

⇨ Push the tyre onto the wheel hub.

⇨ Tighten the wheel nuts crosswise, but do not tighten them fully.

⇨ Lower the jack so that the tyres are touching the ground.

⇨ Tighten the wheel nuts crosswise, taking into account the permissible tightening torques, (see Section 2.5.11, page 52).

⇨ Put the protective caps back into place on the wheel nuts.

6.3.9 Tightening the wheel nuts

Wheel nuts can loosen over time. This applies after every tyre change.

WARNING!

Risk of accident caused by defective wheel bolts and wheel nuts.

If defective wheel bolts and nuts are used, there is a risk of the tyre becoming loose and causing injury to people and animals as a result.

Therefore:

- Damaged, stiff or rusty wheel nuts and bolts must be replaced immediately.

INFORMATION

For the basic configuration of the pusher, the tightening torque is 600 Nm.

You can find the tightening torques of optional axles and wheels in Section2.5.11, page52.

⇨ Tighten the wheel nuts step by step crosswise with a torque spanner.

6.3.10 Lubrication plan for lubricating parts

CAUTION!

Risk of property damage due to excessively high lubrication pressure, which can result in a loss of function.

Improper maintenance can damage parts and result in a loss of function. This in turn can cause people and animals to be injured.

Therefore:

- When using high-pressure lubrication guns, do not exceed a lubrication pressure of 400 bar.

	Interval		
Lubricating points	Every 10 operating hours Daily	Every 50 operating hours 3 months	Every 250 operating hours 6 months
Lubricate K80 and K50 ball couplings with grease (1-5 lubricating nipples)	•		
Lubricate the tailgate (6 lubricating nipples)	•		
Lubricate the pipe support (4 lubricating nipples)	•		
Lubricate the draw gear with grease (2 lubricating points)		•	
Oil board wall locks (2 pieces)		•	
Oil mulching flap hinges		•	
Lubricate parking brake: Lubricate the ropes and pulleys with a brush Lubricate the spindle with grease (1 lubricating point)			•
For axle units, the intervals stated by the supplier must be observed (see annex).			

Lubricants: see Section 2.5.9, page 49.

Before lubricating the parts:

⇨ Ensure that the pusher is secured against rolling away (see Section5.5.1, page60, and Section5.6, page 61).

⇨ Ensure that the pusher is not loaded.

Lubricating the draw gear

⇨ 1 lubricating nipple per side

Figure 47: *Lubricating nipple on the draw gear (same on the left and right)*

Lubricating K80 and K50 ball couplings

⇨ 1-5 lubricating nipples

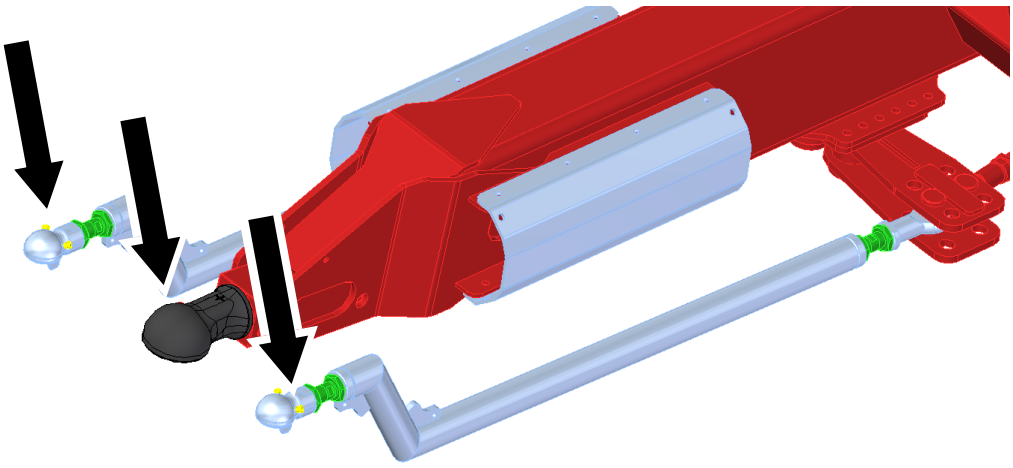


Figure 48: Type K80 coupling point on the TAW 30

Lubricating the tailgate

⇨ 3 lubricating nipples per side(see Figure 49).

Figure 49: *Lubricating the tailgate*

Lubricating the pipe support

⇨ 2 lubricating nipples per side (see *Figure 50*).

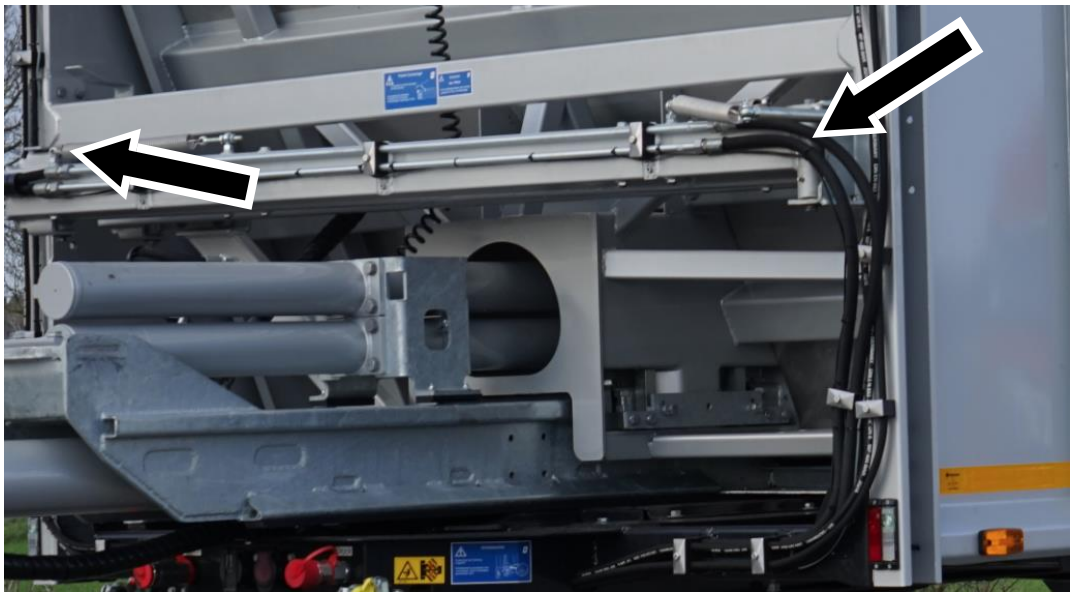


Figure 50: *Lubricating the pipe support*

Side board wall

⇨ Oil the hinges and the mechanism of the catch hooks.

⇨ Activate the mechanism in the process.

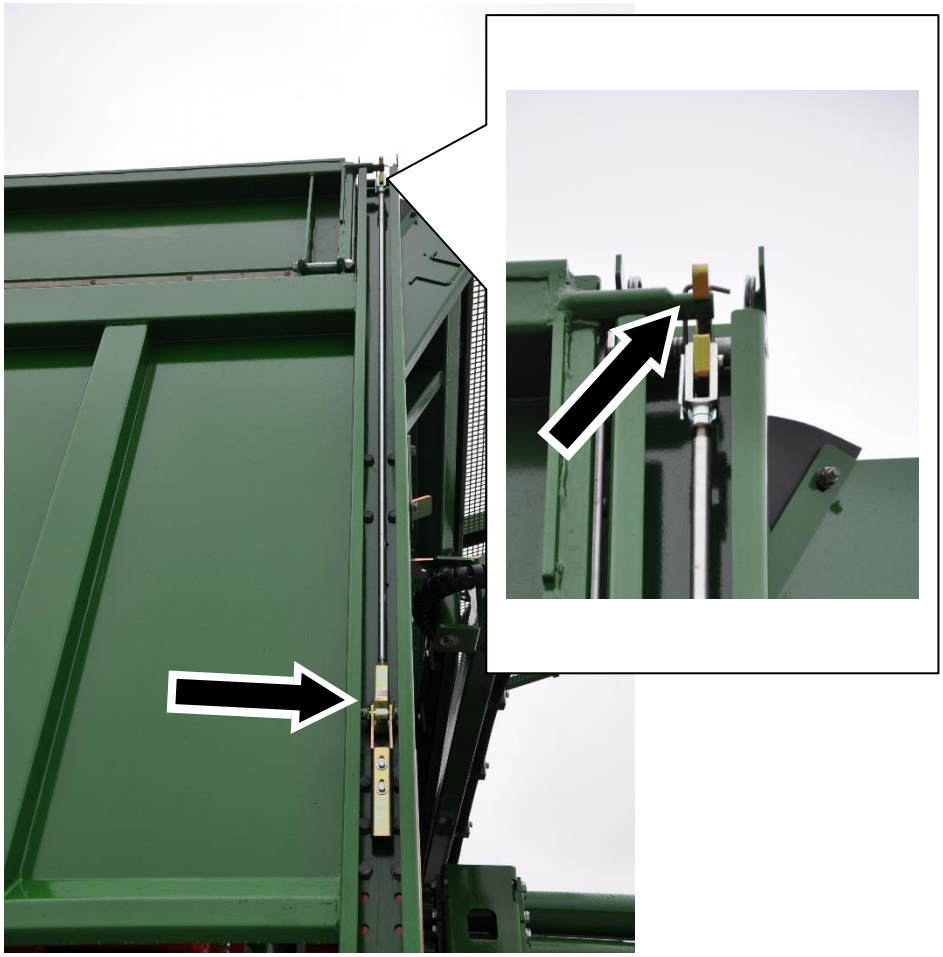


Figure 51: Front long lever locks

Lubricating the parking brake

⇨ Lubricate the brake cable and pulley with a brush (see Figure 52).

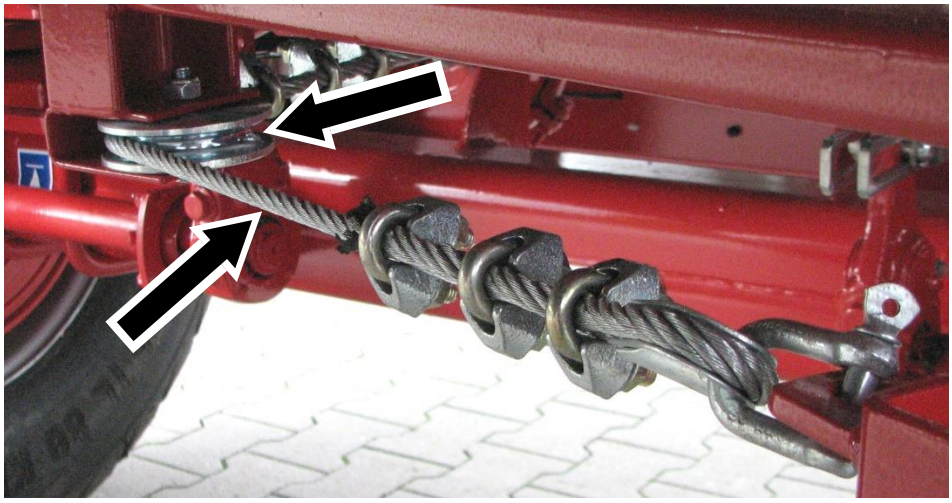


Figure 52: *Lubricating the pulley and brake cable*

⇨ Lubricate the spindle with grease via the lubricating nipple (see Figure 53).

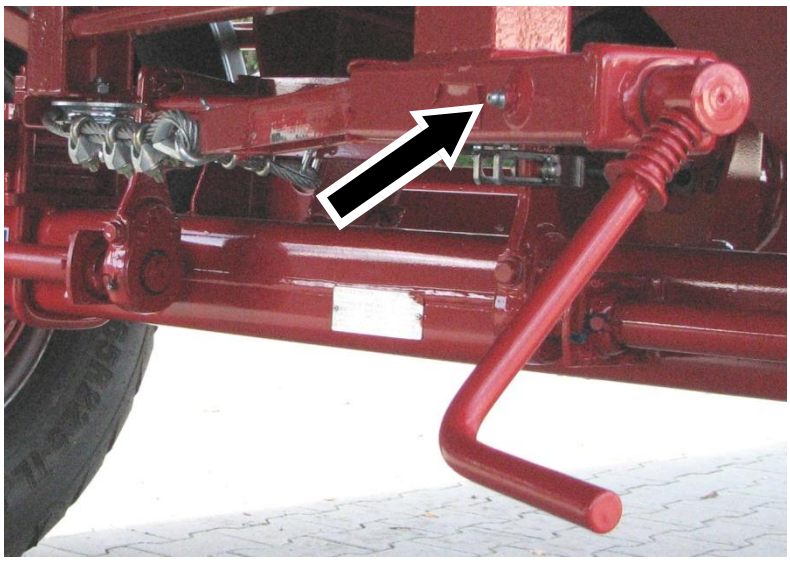


Figure 53: *Spindle lubricating nipple*

6.3.11 Seals

Tailgate seal

- ⇨ Wipe the tailgate seal with a clean and lint-free, soft, slightly damp cloth and remove any contamination.
- ⇨ Do not use solvents!
- ⇨ Check the seal for damage.
- ⇨ It is clamped in place in the U-rail and can simply be pulled out when it needs to be changed without any other fastenings having to be loosened first.
- ⇨ A replacement seal can be tapped into place with a rubber mallet.
- ⇨ Before installing a new seal, it is recommended that you spray a detergent solution on the rubber of the seal and the U-rail.

  It is possible to change only part of the seal at a time. The old seal and new replacement part must be cut cleanly. The edges of the old seal and new seal must be connected with a suitable adhesive.

Pushing element seals

- ⇨ These seals do not require any special maintenance.
- ⇨ Do not use solvents!
- ⇨ However, the seals must be replaced if they are torn or become porous.
- ⇨ All seals are fixed to the vehicle with a counter plate. The counter plate must be removed before the seal can be changed.

6.3.12 Cleaning the pusher

WARNING!

Risk of accident due to brake failure caused by improper cleaning.

If the brake lines are cleaned with unsuitable cleaning agents it can cause damage that can result in a loss of brake function. People and animals in the vicinity could be injured as a result.

Therefore:

- Never treat brake lines with petrol, benzene, petroleum or mineral oils.

WARNING!

Risk of accident as a result of improper cleaning with a pressure washer or steam jet.

Handling pressure washers or steam jets incorrectly can damage parts and result in a loss of function. People and animals in the vicinity could be injured as a result.

Therefore:

- Do not clean electrical components with a pressure cleaner/steam jet.
- Do not clean chrome-plated parts with a pressure cleaner/steam jet.
- Do not aim a pressure cleaner/steam jet directly at lubricating points and bearings.
- Maintain a distance of at least 300 mm between the cleaning nozzle and paintwork or parts. In the first 3 months, 500 mm.
- Observe the safety regulations of your employers' liability insurance association when handling pressure washers.

INFORMATION

To protect against de-icing salt and other environmental influences, we recommend spraying the underside of the pusher with wax-based preservatives to protect it. Contact the customer service team for more information (see Chapter 0, page 152).

In the first 3 months for a new vehicle

- ⇨ - Maximum pressure ***50 bar***
- ⇨ - Minimum distance ***50 cm***
- ⇨ - Spray pipe angle ***25°***
- ⇨ If possible: Wash the pusher with plenty of cold water to help harden the paintwork.
- ⇨ Lubricate all lubricating nipples with grease again (see Section 0, page 119).

After the first 3 months for a new vehicle

- ⇨ When cleaning the pusher, consider the measures mentioned above to avoid damaging the paintwork.
- ⇨ Clean the pusher with plenty of water.
- ⇨ Use a hygienic industrial cleaner in addition if needed.
- ⇨ Lubricate all lubricating nipples with grease again (see Section 0, page 119).

INFORMATION

Clean the pusher more frequently in winter to remove any adhering road salt and any salty condensation and spray.

If you would like to conserve your vehicle with wax, you can order the products that you need from our customer service team (Item No. 2892 997).

Please observe the directions for use provided.

Inhalt	5 Liter
Gebinde	Kanister
Farbe Schutzfilm	Milchig-transparent
Trocknungsdauer Umgebungstemperatur +5°C	24 Std. Stunden
Verarbeitungstemperatur	+15 bis +30°C

6.3.13 Visual inspection of the service brake

WARNING!

Risk of death due to non-functioning brakes.

If any unauthorised work is performed on the service brake, it may impair its functioning. Accidents can occur as a result. Any people or animals in the vicinity may be seriously or fatally injured.

Therefore:

- Do not alter the brake valve settings determined by the manufacturer.
- Take the settings for the brake valve from the ALB sign (see Section2.2, page 31).

WARNING!

Risk of death due to non-functioning brakes.

If the service brake is not functioning correctly, it can result in longer braking distances, which in turn can result in accidents. Any people or animals in the vicinity may be seriously or fatally injured.

Therefore:

- Always perform a brake test after making any adjustments to or carrying out any repair work on the service brake.

INFORMATION

When changing the brake pads, check the wear of the wheel bearings.

⇨ Check all pipe lines, hose lines, connections, screw connections, coupling heads and the compressed air tank for visible damage, corrosion and leaks.

⇨ Change any leaking parts and seal any leaks.

⇨ Change any pipe and hose lines with chafe marks.

⇨ Change any defective and porous pipe and hose lines.

⇨ Check to see whether the compressed air tank moves around in its straps. If it does: Tighten the straps. Ensure that a type plate is fixed on the left-hand side of the compressed air tank and that it is legible.

⇨ If you notice any defects: Take the pusher out of operation and carry out the necessary repairs (see Chapter 0, page 152).

6.3.14 Checking the service brake for leaks

INFORMATION

The service brake is considered to not have any leaks if the pressure does not drop by more than 0.15 bar in 10 minutes.

⇨ Measure the pressure in the compressed air tank via the test connection for the pressure gauge (7).

⇨ Wait for 10 minutes.

⇨ Measure the pressure in the compressed air tank via the test connection for the pressure gauge (7) again.

If the pressure has dropped by more than 0.15 bar:

⇨ Replace any leaking valves.

⇨ Seal any leaks.

6.3.15 Checking the pressure in the compressed air tank

INFORMATION

The set point is between 6.0 bar and 8.1 bar $^{+0.2\ bar}$.

⇨ Remove the protective cap from the test connection (7) (see Figure 54).

⇨ Insert the pressure gauge into the test connection (7) and read the measured air pressure.

⇨ Remove the pressure gauge.

⇨ Place the protective cap back on the test connection (7).

⇨ If the air pressure is lower than the set point: Couple the pusher to a towing vehicle.

↳ The supply line (4), marked in red, will be pressurised with compressed air and will fill the compressed air tank.

⇨ Check the pressure display in the towing vehicle and monitor for any leakage loss.

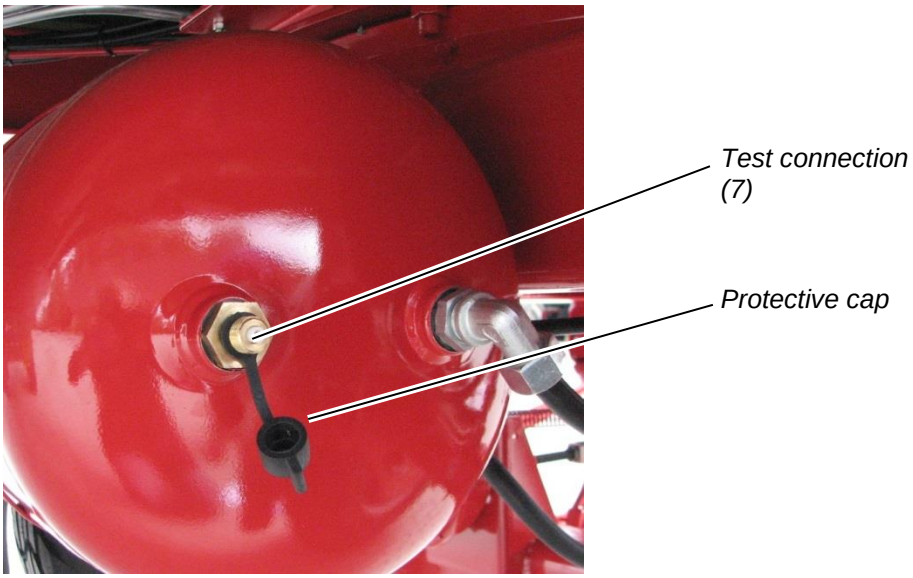


Figure 54: Test connection for a pressure gauge on the compressed air tank

6.3.16 Checking the brake cylinder pressure

INFORMATION

When the brake is not active, the set point is 0.0 bar.

When the brake is active, the information from the ALB sign (see Section 2.2, page 31) applies.

- ⇨ Remove the protective cap from the test connection (see Figure 55).
- ⇨ Insert the pressure gauge into the test connection and read the measured air pressure.
- ⇨ Remove the pressure gauge.
- ⇨ Place the protective cap back on the test connection.
- ⇨ If the air pressure deviates from the set point: Have the brake cylinder pressure set by a recognised specialist workshop.

Figure 55: Test connection for brake cylinder pressure

6.3.17 Checking the brake cylinder stroke

INFORMATION

The brake cylinder stroke should be 30 mm maximum.

⇨ Perform a full brake with the pusher.

⇨ Measure the brake cylinder stroke according to Figure 56.

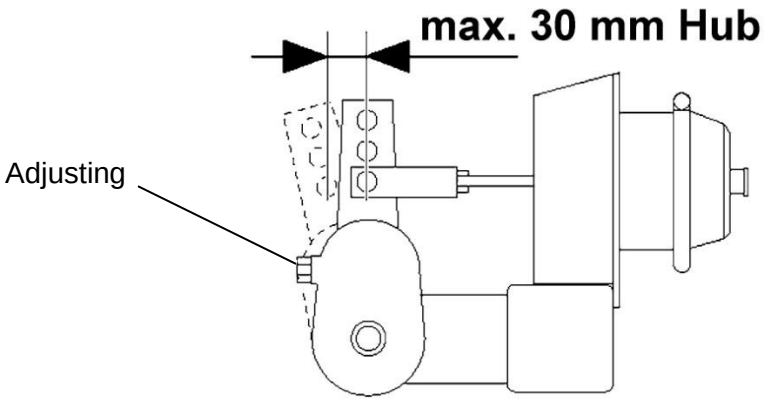


Figure 56: *Brake cylinder stroke*

⇨ If the brake cylinder stroke is more than 30 mm: Adjust the brake cylinder stroke (see Section 6.3.18, page 132).

6.3.18 Adjusting the brake cylinder stroke

⇨ Turn the adjusting screw (see Figure 57) in a clockwise direction until you feel resistance.

⇨ Then turn it half a turn backwards.

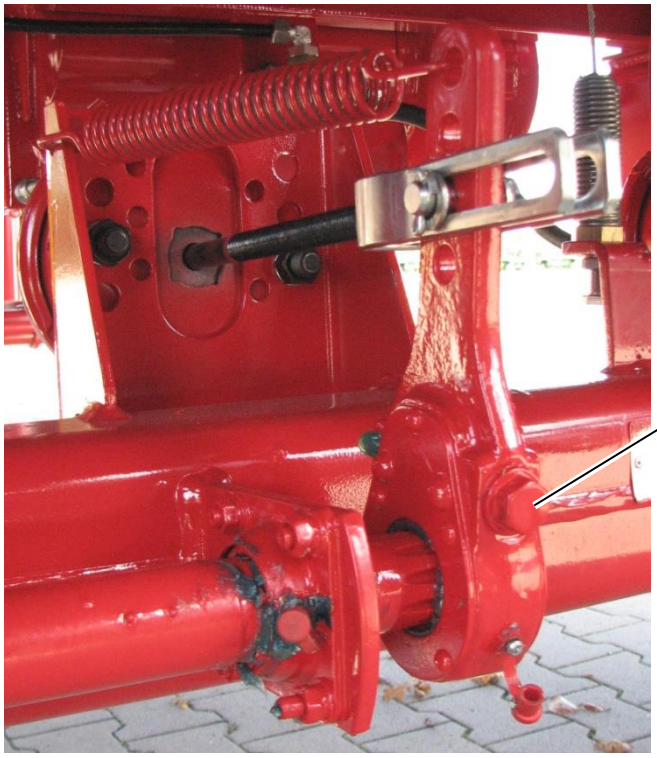


Figure 57: Brake cylinder stroke, brake cylinder

⇨ Check the free wheel of the wheels when the brake is not applied.

⇨ Check the brake cylinder stroke (see Section 6.3.18, page 132).

6.3.19 Cleaning the brake system line filter

WARNING!

Risk of death due to non-functioning brakes.

If the service brake is not functioning correctly, this can result in accidents. Any people or animals in the vicinity may be seriously or fatally injured.

Therefore:

- Replace any defective filter inserts immediately.

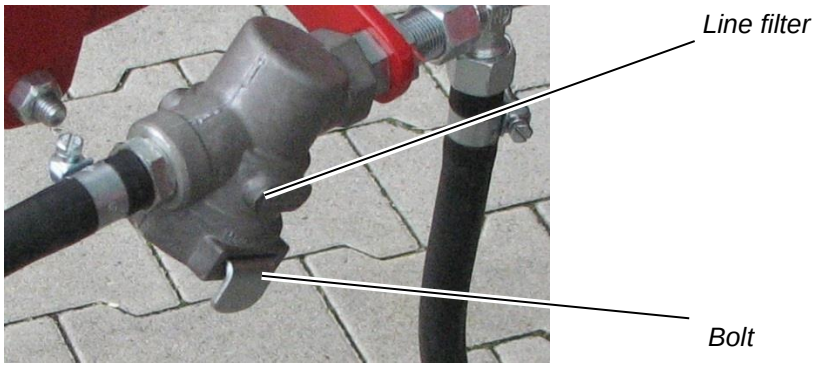


Figure 58: Line filter

⇨ Place one hand under the line filter (see Figure 58).

⇨ With your other hand, pull the bolt out from the line filter (see Figure 58).

⇨ Instead of a bolt, a spring washer may be installed as a lock: In this case, the ring must be compressed.

⇨ Remove the closing piece with the O-ring, compression spring and filter insert.

⇨ Wash the filter insert with petrol or thinner and dry it with compressed air.

⇨ Check the filter insert for defects. Only reuse filter inserts if they are fully intact.

⇨ Check the O-ring and compression spring and if needed clean them with a clean, soft, lint-free cloth.

⇨ Put the closing piece with the O-ring, compression spring and filter insert back into place.

INFORMATION

When inserting the closing piece, take care to ensure that the O-ring does not tilt in the guide slot.

6.3.20 Checking the joints on the brake valves, brake cylinders and brake linkage

⇨ Check all joints on the brake valves, brake cylinders and brake linkage to ensure that they move easily and freely.

⇨ If the joints are stiff: Lubricate them with grease or lightly oil them.

6.3.21 Check the ALB (automatic load-dependent brake force control)

INFORMATION

The ALB can only be checked when the service brake has been released.

Figure 59: ALB, here: TAW 20

⇨ Ensure that the parking brake has been fully released.

⇨ Check that the shaft moves freely and easily.

⇨ Check the linkage for damage.

⇨ If you notice any defects: Take the pusher out of operation and carry out the necessary repairs (see Chapter 0, page 152).

6.3.22 Checking the towing vehicle's air dryer

INFORMATION

Ensure that the towing vehicle's air dryer is working flawlessly. This is a prerequisite for the fault-free functioning of the service brake. This particular part of the towing vehicle must be checked particularly carefully in winter.

6.3.23 Performing a tractor/trailer coordination

For optimal braking behaviour and minimum brake pad wear, we recommended having a tractor/trailer coordination between your towing vehicle and pusher performed by a recognised specialist workshop after a breaking-in period.

If you mainly travel on B-roads, the breaking-in period is the first 1000 to 2000 km. If you mainly travel on motorways, the breaking-in period is the first 3000 to 5000 km. These values are based on our experience.

⇨ If you notice abnormal wear on your pusher, have the tractor/trailer coordination performed before these values are reached.

INFORMATION

During the tractor/trailer coordination, the service brake is checked and adjusted. This can only be done once the brake has been broken in, as the permanent braking effect only sets in during this first breaking-in period.

6.3.24 Checking the parking brake

INFORMATION

Over time, the brake cables can stretch.

The brake cables are too long if three quarters of the spindle's tensioning distance is needed to apply the parking brake.

- ⇨ Check when the parking brake starts to hold by turning the crank that actuates the parking brake (4).
- ⇨ If the brake cables are too long: Adjust them (see Section 6.3.25, page 137).
- ⇨ Ensure that the cable path is free from obstructions: The cable must not rest on any vehicle parts, nor must it rub anywhere.
- ⇨ Ensure that the cable does not have any noticeable cracks.
- ⇨ Ensure that there are no knots in the cable.

6.3.25 Altering the length of the parking brake cable

WARNING!

Risk of accident due to the parking brake releasing.

If not all 6 cable clamps are installed and firmly tightened, the parking brake can release. This can cause the pusher to move and injure people and animals in the vicinity.

Therefore:

- Always fasten each end of the brake cable with 3 cable clamps.
- Firmly tighten the cable clamps.

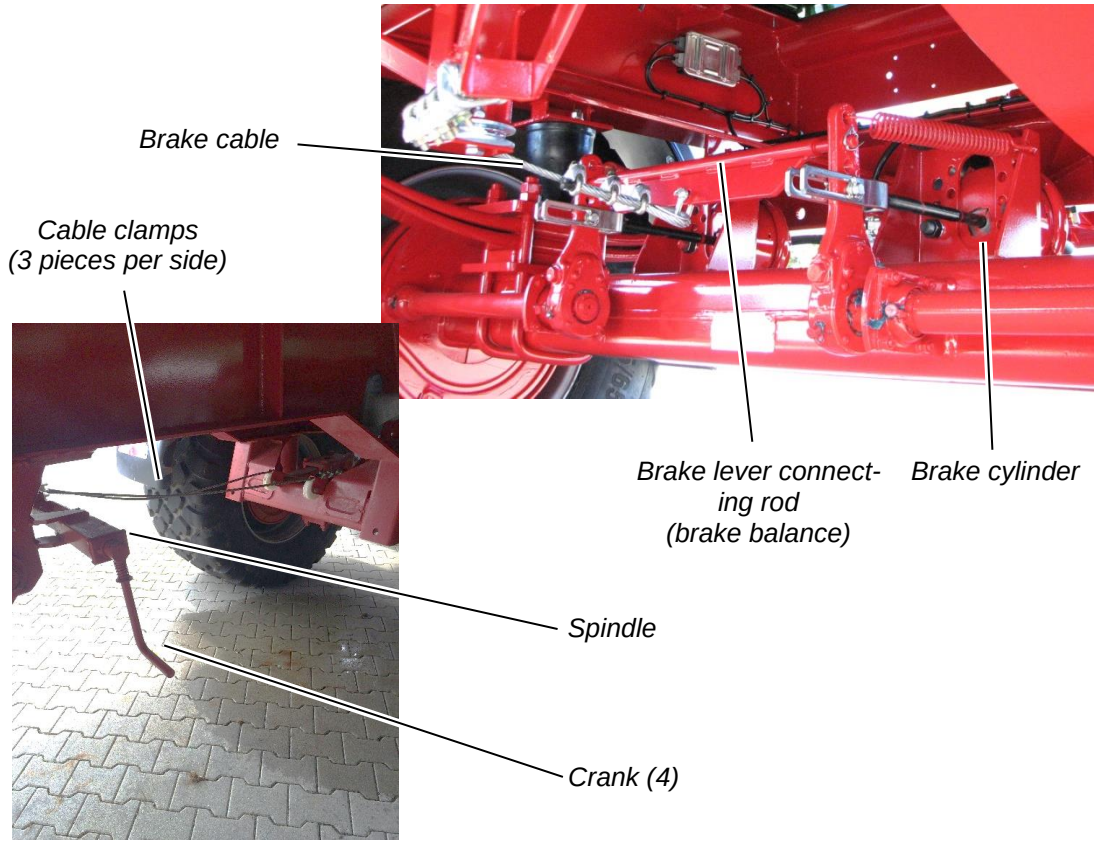


Figure 60: Parking brake on the rear axle

⇨ Secure the pusher against rolling away with the wheel chock (6).

If you need to shorten the brake cable:

⇨ Release the 3 cable clamps on one side (see Figure 60).

⇨ Adjust the cable length.

⇨ Screw the 3 cable clamps in again tightly (see Figure 60, page 137).

If the brake cable needs to be longer and is still long enough:

- ⇨ Loosen all 6 cable clamps (see Figure 60) and then reset the 6 cable clamps.
- ⇨ Screw all 6 cable clamps in again tightly (see Figure 60, page 137).

If the brake cable needs to be longer, but the brake cable is no longer long enough:

- ⇨ Use a new brake cable that is long enough.
- ⇨ Screw all 6 cable clamps in again tightly (see Figure 60, Page 137).
- ⇨ Ensure that the parking brake is working properly (see Section 6.3.24, page 136).

6.3.26 Checking the hydraulic system

WARNING!

Risk of accident when checking the hydraulic system.

Hydraulic fluid escaping under high pressure can penetrate the skin and cause serious injuries.

Therefore:

- Always wear personal protective equipment (PPE), in particular safety goggles and protective clothing.
- Contact a doctor immediately in the event of any accidents.

WARNING!

Risk of accident caused by unauthorised maintenance work.

If any errors are made during maintenance and repair work due to ignorance, this can cause accidents when the pusher is in operation, which can injure people and animals.

Therefore:

- Only qualified specialists may perform repairs on the hydraulic system.

INFORMATION

Hydraulic hoses and hose connections still age naturally, even if they are properly stored and only subject to permissible loads. Therefore, as a general rule hydraulic hoses should not be used for more than 6 years. The storage time within these 6 years should generally not be more than 2 years.

For hydraulic hoses made from thermoplastics, other guide values may apply.

The date that the hydraulic hoses were manufactured is printed on them. For example, if “3Q15” is printed on the hose, this means that the hose was made in the 3rd quarter of 2015.

⇨ Carefully examine the entire hydraulic system (hydraulic pipes, hydraulic hoses, screws, hydraulic valves, couplings) for:

- Leakages
- Brittle outer layer
- The hose manufacturing date (hydraulic hoses must not be more than 6 years old)
- Chafe marks, cuts, tears (from the outer layer to the liner)
- Deformations such as layer separation, blistering, crushed areas or kinks (when the hoses are pressurised and un-pressurised)
- Damage to or deformation of hose fixtures
- Hose drifting out of the fixtures
- Corrosion of the hose fixtures
- Incorrect installation
- Heavy contamination

⇨ If you notice any leaks: Tighten the screw connections with a suitable tool.

⇨ If you notice any heavy contamination: Clean the affected areas (see Section 0, page 125).

⇨ If you notice any other defects: Take the pusher out of operation and have the necessary repairs carried out by a qualified professional (see Chapter 0, page 152).

6.3.27 Checking sliding guides

The sliding guides on the pusher plate must be kept free from grease. Using grease in conjunction with accumulated dirt can lead to increased wear!

The sliding guides shown in the image have been designed to last for a long time. This applies when the vehicle is used under normal conditions and is maintained well.

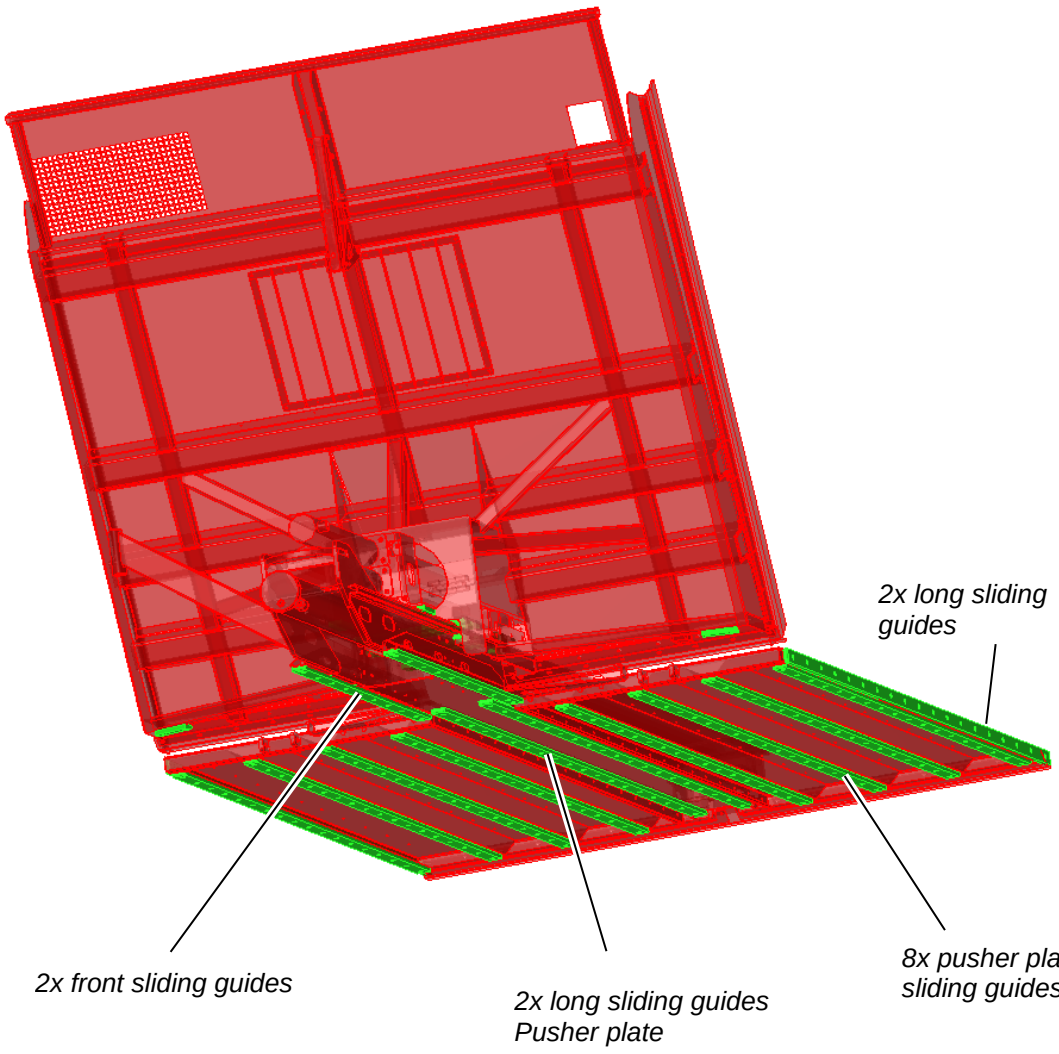


Figure 61: Floor unit sliding guides

⇨ Check the state of wear to counteract any excessive wear through an adjustment.

The following sliding guides are exposed to the greatest stresses. They may need be to changed.

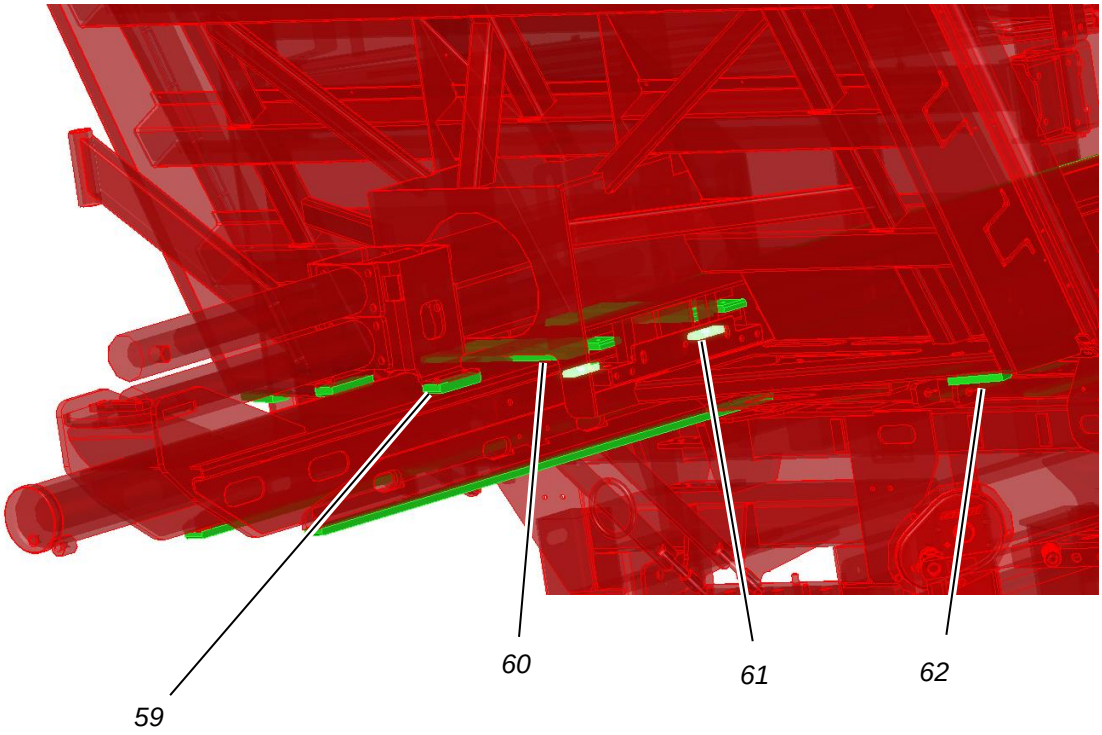


Figure 62: Pusher plate sliding guides

Pos.	Name	Function	Number
59	Sliding plate	Bearing point of the upper cylinder	2
60	Cylinder housing sliding guide	Intercepts the forces from the pushing plate	4
61	Carriage sliding guide	Holds down the carriage	4
62	Pushing plate tilt protection	Limits the tilting movement to the sides	2

The following chapters describe which adjustments can be made and how to change parts.

6.3.28 Adjusting and changing the plate guide

The vehicle must be placed on a level surface when making adjustments or changing parts to prevent twisting.

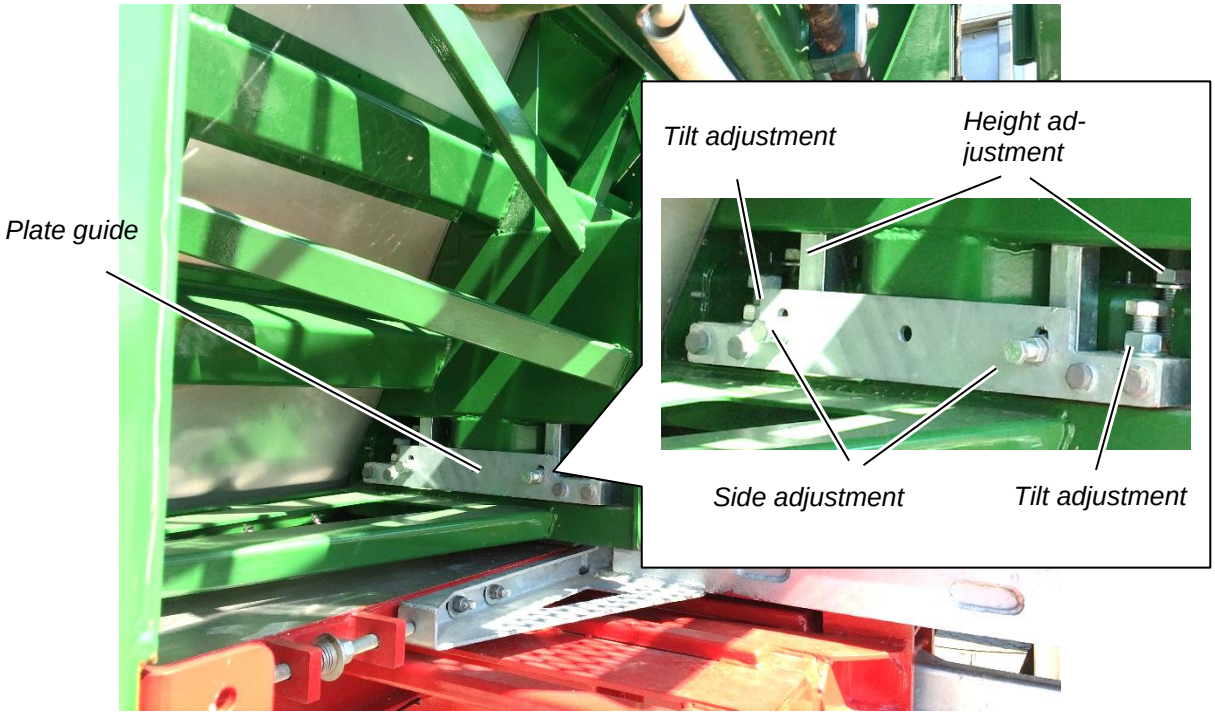


Figure 63: Carriage guide, view from the right

Adjusting the sliding guide carriage (61) The following description refers to the front and rear screws, as well as the screws on the other side.

⇨ Slightly loosen the counter nut and screw for the tilt adjustment.

⇨ Loosen both counter nuts for the side adjustment (do not loosen the screw and the final counter nut!)

⇨ Use the height adjustment screw to set the appropriate height.

⇨ Set the appropriate side guide with the lock nuts.

⇨ Tighten all screws and nuts evenly so that the setting stays in place.

⇨ When changing the sliding guide (61), remove all the screws described above. Also remove the screw for the side adjustment.

⇨ The sliding guide itself is fixed to the sliding guide with a countersunk screw.

The company is not aware of any other changes that need to be made to other sliding guides. You must contact the manufacturer, if a change needs to be made.

6.3.29 Adjusting the carriage guide

The vehicle must be placed on a level surface for any adjustments to prevent twisting.

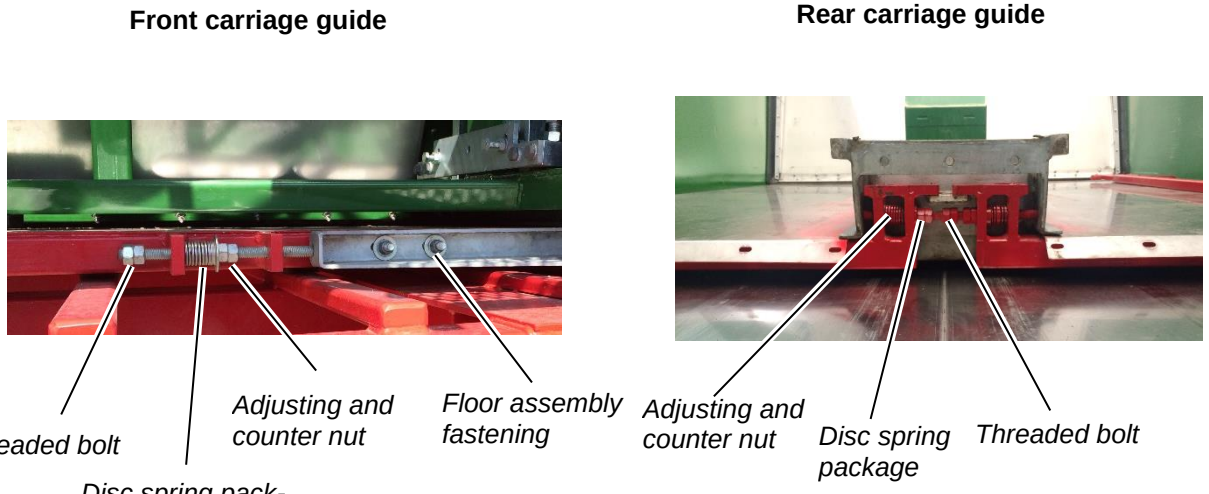


Figure 64: Floor unit, view from the front and back

The floor unit is separated in the middle by the guide carriage. The left and right floor plates are supported on the sides by the guide carriage in the front and rear area (see Figure 64: Floor unit, view from the front). This pushes the sliding guide side-long (see Figure 61: Floor unit sliding guides) against the side walls. This also centres the guide carriage. For this reason, it is necessary to centre the guide carriage in addition to setting the pressure.

⇨ Remove the cover and seal from the carriage guide in the internal space.

⇨ Loosen the adjusting and counter nuts on the front, back, left and right of the carriage guide.

INFORMATION

Do not loosen the floor assembly fastening!

This is only used for this purpose and must always be slightly loose so that the floor can move to the left and right.

⇨ Use a mounting lever to align the carriage guide in the middle.

Align the centrepoint as described in the following illustration.

Front carriage guide

Measurement point (left and right)

Rear carriage guide

Measure-ment point

Figure 65: Floor unit

⇨ Once you have centred the carriage guide, you should also check the other points, such as the path of the cylinder and the seal of the plate on the side panels.

⇨ Firmly hold the threaded bolts in one hand and use your other hand to manually tighten the adjusting nuts.

⇨ At all points.

Now tighten the disc spring packages 1 ½ turns with a spanner!!

⇨ Tighten the counter nuts.

⇨ Perform a trial pushing process and ensure that the balance is right.

⇨ Replace the cover and seal on the carriage guide in the internal space.

6.3.30 Replacing light bulbs 7-pin plug

Replacing the light bulbs in a three-compartment light

- ⇨ Unscrew the two screws from the three-compartment light (see Figure 66).
- ⇨ Remove the protective glass (see Figure 66).
- ⇨ Remove the light bulb.
- ⇨ Replace the light bulb, taking care to ensure that the new light bulb has the correct voltage and wattage.
- ⇨ Replace the protective glass.
- ⇨ Firmly screw the two screws back in.

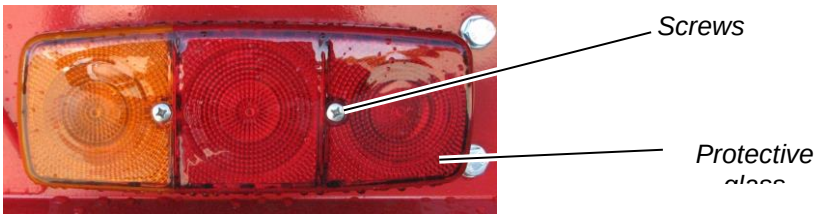


Figure 66: Three-compartment light

Replacing the light bulb in a numberplate light

- ⇨ Unscrew the screws from the numberplate light (see Figure 67).
- ⇨ Remove the housing (see Figure 67).
- ⇨ Remove the light bulb.
- ⇨ Replace the light bulb, taking care to ensure that the new light bulb has the correct voltage and wattage.
- ⇨ Replace the housing.
- ⇨ Firmly screw the screw back in.

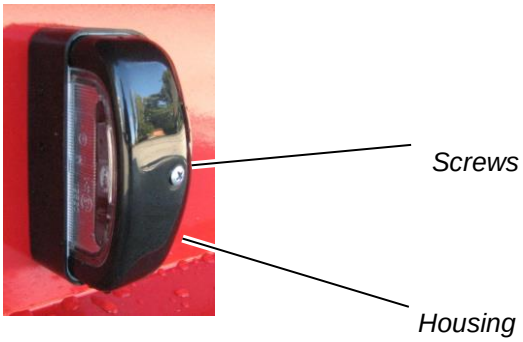


Figure 67: Numberplate light

Replacing the light bulb in a position light

- ⇨ Press the protective glass out of its holder (see Figure 68).
- ⇨ Remove the light bulb.
- ⇨ Replace the light bulb, taking care to ensure that the new light bulb has the correct voltage and wattage.
- ⇨ Press the protective glass back into its holder.

Figure 68: Position light

7-pin plug

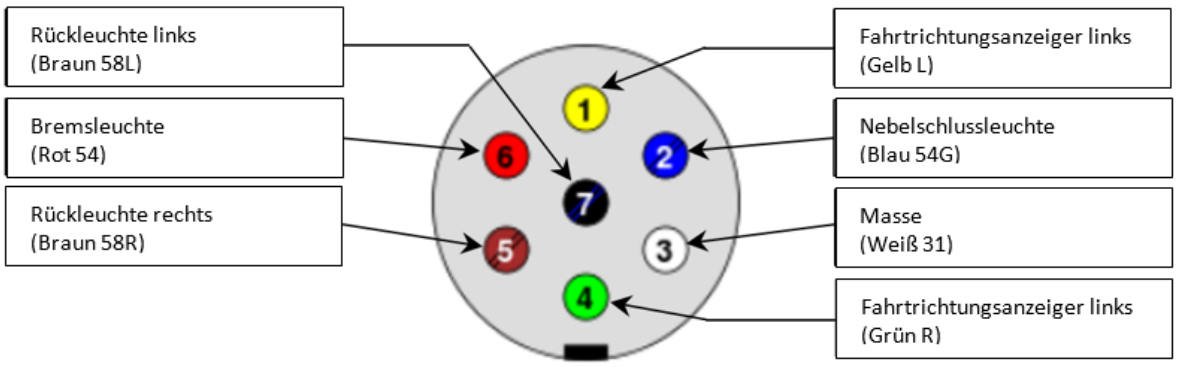


Figure 69: 7-pin plug

6.4 Maintenance and repair instructions

Maintenance work performed		
Date	Signature	Comments/Work performed

7 Decommissioning

The pusher may only be decommissioned by the manufacturer or qualified professionals. The manufacturer shall not be held liable for any damage caused by improper decommissioning or by the disposal of machine parts.

It is not envisaged that the pusher will be decommissioned temporarily. Therefore, preservation measures are not necessary.

8 Malfunctions and troubleshooting

With pusher malfunctions, proceed according to the malfunction table below. If this does not help, contact the customer service team (see Chapter 0, page 152).

Malfunctions are often caused by faulty operation. The information provided in these operating instructions must be observed.

Malfunction	(Possible) cause	Measures
The parking brake is hot and ultimately produces smoke.	The parking brake was not released before the start of the journey. Or: The parking brake was not fully released before the start of the journey. The parking brake was activated again when the pusher was being loaded.	Release the parking brake (see Figure 23: Parking brake on the front axle, here: TAW 20Figure 23).
	The brake cable of the parking brake is too short.	Correct the brake cable length (see Section 6.3.25, page 137).

Malfunction	(Possible) cause	Measures
Brake drums and/or wheels hubs are hot.	Brake lever is stiff or rusted.	Make the brake lever moveable.
	Brake cylinder does not release.	Check the brake cylinder: Check the connections and connect correctly if needed. Check the supply pressure. If the supply pressure is below the set point (see Section 6.3.15, page 129), check the compressed air system for leaks and repair any leaks that you find. Check to see whether the brake shaft moves easily. Make the brake shaft easy to move. If the measures mentioned do not resolve the malfunction: Consult a recognised specialist workshop.
	Return spring broken or weakened.	Replace the return spring.
	Defective bearing.	Have the bearing changed by a recognised specialist workshop.
The service brake does not work effectively.	The pusher is overloaded.	See Section 5.18, page 89.
	Journey was started before the towing vehicle achieved an operating pressure of 8 bars.	See Section 5.19.1, page 95.
	The compressed air tank was not drained.	See Section 5.7, page 62.
	The compressed air tank is contaminated.	See Section 6.3.5, page 111.
	The line filters are contaminated.	See Section 6.3.19, page 132.
	The compressed air from the towing vehicle is too damp.	See Section 6.3.22, page 135.
	The brake cylinder stroke is too long.	See Section 6.3.17, page 131 and Section 6.3.18, page 132.

Malfunction	(Possible) cause	Measures
The pressure in the compressed air tank is often too low.	Leaks in the compressed air system.	Check the compressed air system for leaks and repair any leaks that you find.
	The line filters are contaminated.	See Section 6.3.19, page 132.
The pusher easily becomes unstable during a pushing process.	Uneven surface.	Stop the pushing process and change the position of the pusher.

9 Customer service

The Peter Kröger GmbH customer service team is available to help with orders for spare parts, maintenance and repair work, any questions about construction and conversion work, as well as with any other problems or questions that you may have.

Our address is:

Peter Kröger GmbH

Bloge 4

D-49429 Visbek-Rechterfeld, Germany

Telephone: +49 (0) 4445 9636 - 0

Fax: +49 (0) 4445 9636 - 0

E-mail: info@agroliner.de

Website: www.agroliner.de

10 Declaration of conformity

EC declaration of conformity

according to the EC Machinery Directive 2006/42/EC, Annex II A

We, as manufacturer, hereby declare that the machine described below in its conception and construction, as well as in the version we have put into circulation, complies with the basic health and safety requirements of the EC Directive 2006/42/EC. If any modifications are made to the machine without our authorisation, this declaration will no longer be valid.

Name:	**Two and three-axle push-off trailer**
Type	**TAW 20 / TAW 30**
Year of construction:	2024

Manufacturer

Company:	**Peter Kröger GmbH**
Address:	**Bloge 4**
	D-49429 Visbek, Germany

We also declare that the machine complies with the following additional applicable directives:
Electrical equipment (2006/95/EC),
Electromagnetic compatibility (2004/108/EC)

Applied harmonised standards:
DIN EN ISO 12100

Other applied technical standards and specifications:
-

Authorised representative for the technical documentation:
Peter Kröger GmbH
(Address: see manufacturer's address)

Rechterfeld, 01.01.2024		Managing Director: Peter Kröger
Place, date	Signature	Identification of the signatory

11 Annex

Contents
Supplier’s documentation for the suspension
Supplier’s documentation for the axles