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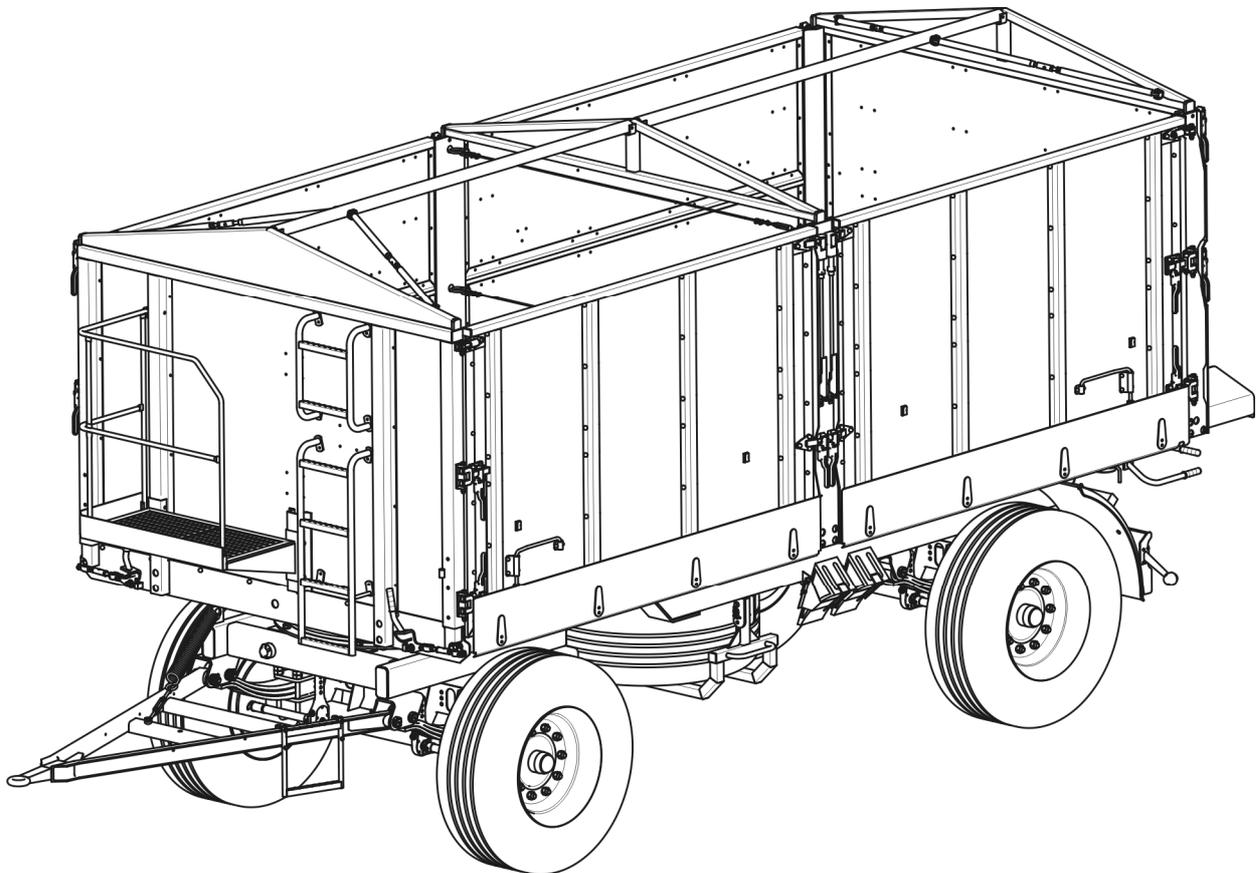
*www.pronar.pl*

# USER MANUAL

## AGRICULTURAL TRAILER

### PRONAR T680P

TRANSLATION OF ORIGINAL MANUAL



REVISION 4A-01-2010

PUBLICATION NUMBER 116N-0000000-UM





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*Thank you for purchasing our trailer. In the interests of your safety and care for the reliability and durability of the machine, we ask that you familiarise yourself with the content of this manual.*

***Remember!!!***

***Before using the trailer for the first time, check if the wheels are properly tightened!!! Regularly check the technical condition of the machine in accordance with the attached schedule.***

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# INTRODUCTION

The information contained in the publication is current as at the date of publication. As a result of improvement, some sizes and illustrations contained in this publication may not correspond to the actual state of the machine delivered to the user. The manufacturer reserves the right to introduce constructional changes in the manufactured machines to facilitate operation and improve the quality of their work, without making any current changes to this publication.

The operating instruction is the basic equipment of the machine. Before using the machine, the user must read the contents of this manual and observe all recommendations contained therein.

This will guarantee safe and trouble-free operation of the machine. The machine was constructed in accordance with applicable standards, documents and current legal regulations.

The User Manual describes the basic principles of safe use and operation of Pronar T680P agricultural trailer.

If the information contained in the operating instructions does not turn out to be comprehensible, please contact the sales office where the machine was purchased or to the Manufacturer.

## MANUFACTURER'S ADDRESS

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## SYMBOLS USED IN THE MANUAL

Information, descriptions of hazards and precautions as well as instructions and orders related to safe use in the manual are marked with:



and preceded by the word „**DANGER**”. Failure to comply with these recommendations may endanger the health or life of persons operating the machine or unauthorized bystanders.

Particularly important information and recommendations, the observance of which is absolutely necessary, are highlighted in the text with a sign:



and preceded by the word „**CAUTION**”. Failure to comply with these recommendations creates the risk of damage to the machine due to improper handling, adjustment or use.

In order to draw the user's attention to the necessity to perform periodic maintenance, the content of the manual is marked with the following sign:



Additional instructions contained in the manual describe useful information on operating the machine and are marked with a sign:



and preceded by the word „**ADVICE**”.

## **DESIGNATION OF DIRECTIONS IN THE MANUAL**

Left side – the left-hand side of the observer facing the machine in the forward direction.

Right side – the right-hand side of the observer facing the machine in the forward direction.

## **THE SCOPE OF SERVICE ACTIVITIES**

The maintenance activities described in the manual are marked with the sign: ➡

The result of the maintenance / adjustment activity or remarks concerning the performed activities is marked with the sign: ⇨



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## EC DECLARATION OF CONFORMITY OF THE MACHINERY

PRONAR Sp. z o.o. declares with full responsibility, that the machine:

Description and identification of the machinery	
Generic denomination and function:	<b>AGRICULTURAL TRAILER</b>
Type:	<b>T680</b>
Model:	-----
Serial number:	
Commercial name:	<b>AGRICULTURAL TRAILER PRONAR T680 AGRICULTURAL TRAILER PRONAR T680P AGRICULTURAL TRAILER PRONAR T680H AGRICULTURAL TRAILER PRONAR T680U</b>

to which this declaration relates, fulfills all the relevant provisions of the Directive **2006/42/EC** of The European Parliament and of The Council of 17 May 2006 on machinery, and amending Directive 95/16/EC (Official Journal of the EU, L 157/24 of 09.06.2006).

The person authorized to compile the technical file is the Head of Research and Development Department at PRONAR Sp. z o.o., 17-210 Narew, ul. Mickiewicza 101A, Poland.

This declaration relates exclusively to the machinery in the state in which it was placed on the market, and excludes components which are added and/or operations carried out subsequently by the final user.

Narew, the 2014 -08- 2 8

*Place and date*

Z-CIA DYREKTORA  
d/s technicznych  
członek zarządu  
  
Roman Omietaniuk  
*Full name of the empowered person  
position, signature*

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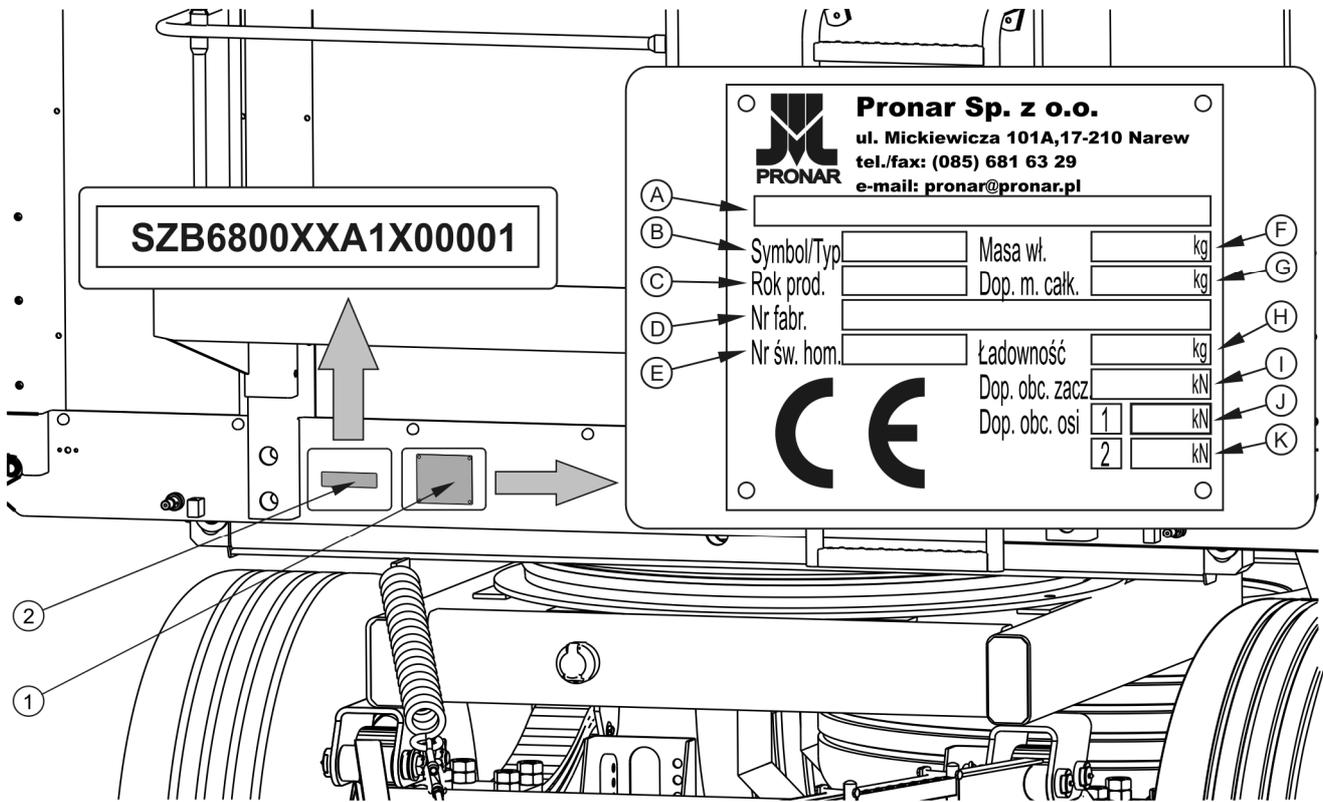
**CHAPTER**

**1**

**GENERAL**

# 1.1 IDENTIFICATION

## 1.1.1 IDENTIFICATION OF TRAILER



**FIGURE 1.1. Location of nameplate and serial number**

(1) nameplate, (2) serial number

The trailer was marked with a nameplate (1) and the serial number (2) placed on a rectangular field painted in gold. The serial number and the nameplate are located on the front beam of upper frame - figure(1.1).

When purchasing the trailer, check that the serial numbers on the machine match the number entered in the *WARRANTY CARD*, in the sales documents and in the *USER MANUAL*. The meaning of the individual fields on the nameplate is shown in the table below.

**TABLE 1.1. Nameplate markings**

ITEM	MARKING
<b>A</b>	General information and function
<b>B</b>	Trailer symbol / type
<b>C</b>	Year of trailer production
<b>D</b>	Seventeen-digit serial number (VIN)
<b>E</b>	Certificate approval number
<b>F</b>	The trailer's karb weight
<b>G</b>	Permissible gross weight
<b>H</b>	Capacity
<b>I</b>	Permissible load on the coupling device (not applicable)
<b>J</b>	Permissible front axle load
<b>K</b>	Permissible rear axle load

### 1.1.2 IDENTIFICATION OF DRIVING AXLES

The serial number of the driving axle and its type are stamped on the nameplate (2) attached to the driving axle beam (1) - figure (1.2).



## 1.2 INTENDED USE

The trailer is designed for transporting crops and agricultural products (loose, volumetric, long-haul, etc.) and loads on euro-pallets and box-pallets within the farm and on public roads. Transportation of building materials, mineral fertilizers and other loads is allowed provided that the requirements of Chapter 4 are met. Non-compliance with the recommendations of carriage and loading specified by the Manufacturer and road transport regulations in force in the country in which the trailer is used will void the warranty services and is treated as using the machine for purposes other than those intended.

The trailer is not adapted and intended for the transport of people, animals and goods classified as hazardous materials.

### CAUTION

The trailer may not be used for purposes other than those for which it is intended. In particular, it is forbidden to:



- Transport of people, animals, dangerous materials, aggressive loads as a result of chemical reactions to trailer structural elements (causing corrosion of steel, damaging paint coverings, dissolving plastic elements, destroying rubber elements, etc.),
- transport of improperly secured cargo that could cause road and environmental pollution while driving,
- transport of improperly secured load that could change its position in the box or fall out of the load box while driving,
- transport of cargo that location of the centre of gravity adversely affects the stability of the trailer,
- carry loads that affect uneven loading and/or overloading of the axles and suspension components.

The trailer was constructed in accordance with applicable safety requirements and machine standards. The braking system as well as the lighting and signalling system meet the requirements arising from traffic regulations. Permissible speed of a trailer on public roads in Poland is 30 km/h (in accordance with the Act of 20 June 1997, "Road Traffic Law", Art. 20). In the countries where the trailer is used, restrictions related to the road traffic laws in force in

a given country must be observed. The trailer speed must not, however, be greater than the maximum design speed 40 km/h.

Intended use also includes all activities related to the correct and safe operation and maintenance of the machine. Therefore, the user is obliged to:

- Read the content of trailer's *USER MANUAL* and with *WARRANTY CARD* and to the guidelines contained in these documents,
- understand the principle of machine operation and the safe and proper operation of the trailer,
- work in compliance with established maintenance and adjustment plans,
- work in compliance with general safety regulations,
- accident prevention,
- comply with road traffic regulations and transport regulations in force in the country in which the trailer is used,
- get acquainted with the contents of the farm tractor instruction manual and comply with its recommendations,
- couple the vehicle only with such an agricultural tractor that meets all the requirements set by the trailer Manufacturer.

The trailer may only be used by persons who:

- Become familiar with the contents of publications and documents attached to the trailer and the contents of manual agricultural tractor,
- have been trained in trailer operation and work safety,
- have the required authorization to drive and are familiar with the traffic rules and transport regulations.

**TABLE 1.2. Recommended pallet types**

PALETTE NAME– TYPE	LENGTH [mm]	WIDTH [mm]	HEIGHT [mm]
EUR pallet - standard	1,200	800	144
EUR pallet - 1/2	800	600	144
EUR pallet - large	1,200	1,200	144

Requirements for the cooperation of the trailer with an agricultural tractor are presented in the table below.

**TABLE 1.3. Agricultural tractor requirements**

CONTENT	UNIT	REQUIREMENTS
<b>Braking system - sockets</b>		
Pneumatic 1 - wire	-	in accordance with ISO 1728
Pneumatic 2 - wire	-	in accordance with ISO 1728
Hydraulic	-	in accordance with ISO - 7421-1
<b>Maximum system pressure</b>		
Pneumatic 1 - wire	bar / kPa	5.8 / 580
Pneumatic 2 - wire	bar / kPa	8 / 800
Hydraulic	bar / MPa	150 / 15
<b>The hydraulic system</b>		
Hydraulic oil	-	L HL 32 Lotos <sup>(1)</sup>
Nominal pressure of the system	MPa	200 / 20
Oil demand	l	18
<b>Electrical system</b>		
Electrical system voltage	V	12
Connection socket	-	7 poles in accordance with ISO 1724
<b>Tractor hitch required</b>		
Type	-	Upper transport hitch
<b>Other requirements</b>		
Min. tractor power	kW / KM	80.3 / 109.2

<sup>(1)</sup> – a different oil may be used, provided it can be mixed with oil in the trailer. Detailed information can be found in the product information card.

If a second trailer is connected to the trailer, it must meet the requirements specified in table (1.4).



### ADVICE

The tractor's requirements depend on the completion of the trailer.

**TABLE 1.4. Second trailer requirements**

CONTENT	UNIT	REQUIREMENTS
<b>Permissible gross weight</b>	kg	18000
<b>Braking system - connectors</b>		
Pneumatic 1 – wire	-	connector in accordance with ISO 1728
Pneumatic 2 – wire	-	connector in accordance with ISO 1728
Hydraulic	-	connector in accordance with ISO - 7421-1
<b>Maximum system pressure</b>		
Pneumatic 1 - wire	bar / kPa	5.8 / 580
Pneumatic 2 - wire	bar / kPa	8 / 800
Hydraulic	bar / MPa	150 / 15
<b>Hydraulic tipping system</b>		
Hydraulic oil	-	L HL 32 Lotos <sup>(1)</sup>
Maximum system pressure	bar / MPa	200 / 20
<b>Electrical system</b>		
Electrical system voltage	V	12
Connection socket	-	7 poles in accordance with ISO 1724
<b>Trailer drawbar</b>		
The drawbar eye diameter	mm	40

<sup>(1)</sup> – a different oil may be used, provided it can be mixed with oil in the trailer. Detailed information can be found in the product information card.

## 1.3 EQUIPEMENT

Standard equipment and equipment available on special customer's request are presented in table (1.5).

**TABLE 1.5. T680P trailer equipment**

EQUIPMENT	STANDARD	ADDITIONAL
User manual	•	
Warranty Card	•	
Electrical installation connection cable	•	
Wheel chocks	•	
Tarpaulin frame	•	
Spare wheel with mounting basket	•	
Rear automatic hitch		•
Chute for the discharge chute		•
Chute system (side and rear plates)		•
Balcony		•
Rolled tarpaulin		•
Plate for slow-moving vehicles		•
Warning reflective triangle		•

Some standard equipment items that are listed in table(1.5), may not be included in the trailer supplied. This is due to the possibility of ordering a new machine with a different set - optional equipment, replacing the standard equipment.

Tire information is provided at the end of the publication in *APPENDIX A*.

## 1.4 TERMS OF WARRANTY

PRONAR Sp. z o.o. in Narew guarantees smooth operation of the machine when it is used in accordance with the technical and operational conditions described in the *USER MANUAL*. Deadline for completion of repairs is specified in the *WARRANTY CARD*.

The warranty does not apply to parts and sub-assemblies of the machine, which are subject to wear in normal operating conditions, regardless of the warranty period. The group of these elements includes min. the following parts/components:

- drawbar hitch eye,
- filters on pneumatic system connectors,
- tires,
- brake shoes,
- bulbs and LED lamps,
- gaskets,
- bearings.

The warranty services only apply to such cases as: mechanical damage not caused by the fault of the user, factory defects of parts, etc.

In the event that damage occurs as a result of:

- mechanical damage caused by the user's fault, road accident,
- from improper operation, adjustment and maintenance, using the trailer contrary to its purpose,
- use of a damaged machine,
- repairs carried out by unauthorized persons, improper repairs,
- execution of user changes in machine design,

the user loses the warranty.

**ADVICE**

You should require the seller to carefully fill out the Warranty Card and complaint coupons. The lack of e.g. date of sale or point of sale stamp exposes the user to not accept any complaints.

The user is obliged to immediately report all noticed defects in the paint coatings or traces of corrosion, and order removal of defects regardless of whether the damage is covered by the warranty or not. Detailed warranty conditions are given in the *WARRANTY CARD* attached to the newly purchased machine.

Modifications to the trailer without the written consent of the Manufacturer are prohibited. In particular, welding, reaming, cutting and heating of the main machine components that directly affect safety during use are not permitted.

## 1.5 TRANSPORT

The trailer is ready for sale completely assembled and does not require packing. Only the machine's technical documentation and any additional equipment elements are packed. Delivery to the user is carried out by road or independent transport (towing a trailer with an agricultural tractor).

### 1.5.1 TRUCKING

Loading and unloading a trailer from a car should be carried out using a loading ramp using a farm tractor. During work act in compliance with the general principles of workplace health and safety for reloading work. Persons operating reloading equipment must have the required permissions to use these devices. The trailer must be correctly connected to the tractor in accordance with the requirements contained in this operator's manual. The trailer braking system must be activated and checked before going down or onto the ramp.

The trailer should be attached firmly to the platform of the vehicle using straps, chains, lashings or other fastening devices equipped with a tensioning mechanism. The fastening elements should be attached to the transport eyelets designed for this purpose (1) - figure (1.3), or to the fixed structural elements of the trailer (stringers, crossbars, etc.). Transport handles are welded to the upper side member (2), one pair on each side of the trailer. Use certified and technically reliable securing measures. Wiping belts, cracked fasteners, bent or corroded hooks or other damage may disqualify the product from being used. Please refer to

the instructions in the operating instructions of the manufacturer of the securing material used. Chocks, wooden beams or other elements without sharp edges should be placed under the trailer wheels, protecting the machine against rolling. Trailer wheel blocks must be nailed to the load platform planks of the car or secured in another way preventing their movement. The number of fastening elements (ropes, belts, chains, lashings, etc.) and the force needed for their tension depends, among others, on the weight of the trailer, the construction of the car carrying the trailer, the speed of travel and other conditions. Therefore, it is not possible to specify the fastening plan in detail. A properly attached trailer will not change its position relative to the transporting vehicle. The fastening means must be selected according to the manufacturer's instructions. In case of doubt, a larger number of attachment and securing points for the trailer should be used. If necessary, protect the sharp edges of the trailer, thus securing the securing means against damage during transport.

### **CAUTION**



**During road transport, the trailer must be mounted on the platform of the vehicle in accordance with safety requirements and regulations.**

**While driving, the car driver should exercise extreme caution. This is due to the vehicle's centre of gravity shifting upwards with the machine loaded.**

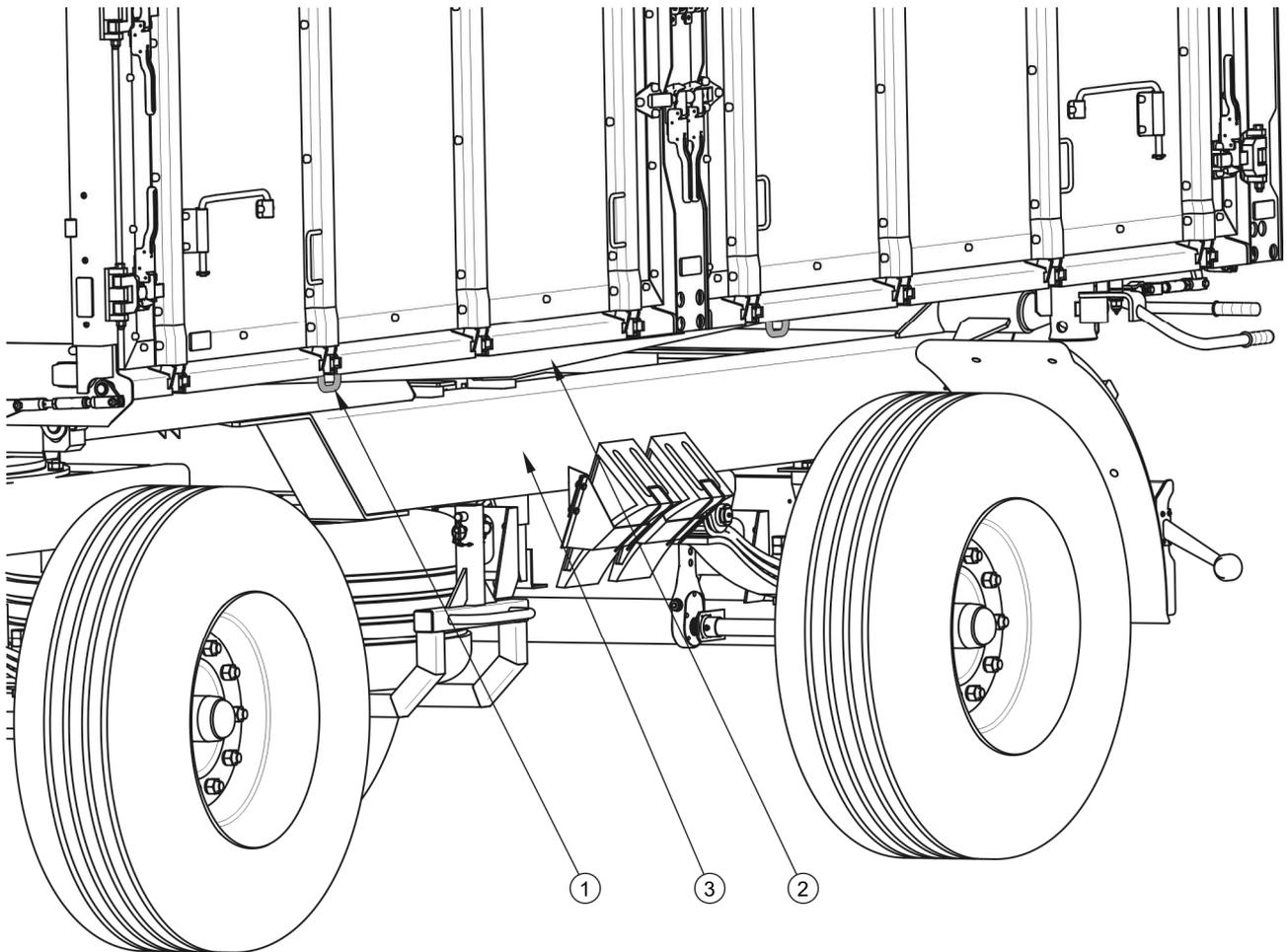
**Use only approved and technically reliable securing measures. Read the operating instructions of the securing measures manufacturer.**

During reloading work, particular attention should be paid so as not to damage the machine equipment components and the paint coating. The kerb weight of the trailer in running order is given in table (3.1).

### **DANGER**



**Incorrect use of securing measures can cause an accident.**



**FIGURE 1.3. Arrangement of transport handles**

*(1) carrying handle, (2) upper frame member, (3) bottom frame member*

### 1.5.2 USER'S TRANSPORT

In the case of independent transport by the user after purchasing the trailer, read the trailer User Manual and follow its recommendations. Independent transport involves towing a trailer with own agricultural tractor to its destination. While driving, adjust the speed to the prevailing road conditions, but it must not be greater than the maximum design speed.



#### **CAUTION**

**When transporting independently, the tractor operator should read the instructions and follow the recommendations contained therein.**

## 1.6 THREAT TO THE ENVIRONMENT

A hydraulic oil leak is a direct threat to the natural environment owing to its limited biodegradability. The negligible solubility of hydraulic oil in water does not cause acute toxicity of organisms living in the aquatic environment. The formed layer of oil on the water may cause direct physical impact on organisms, it may cause changes in the oxygen content in water due to the lack of direct contact of air with water. An oil leak into water reservoirs can, however, lead to a reduction in oxygen content.

When carrying out maintenance and repair work where there is a risk of leakage, this work should be carried out in rooms with an oil resistant surface. In the event of oil leaking into the environment, first of all contain the source of the leak, and then collect the leaked oil using available means. Collect oil residue with sorbents or mix the oil with sand, sawdust or other absorbent materials. Collected oil contaminants should be stored in an airtight and marked container, resistant to hydrocarbons. The container should be kept away from heat sources, flammable materials and food.



### DANGER

Used hydraulic oil or collected residues mixed with absorbent material should be stored in a precisely marked container. Do not use food packaging for this purpose.

Oil which has been used up or is unsuitable for further use due to the loss of its properties is recommended to be stored in its original packaging in the same conditions as described previously. Oil waste should be taken to an oil disposal or regeneration point. Waste Code: 13 01 10. Detailed information on hydraulic oil can be found in the product safety data sheet.



### ADVICE

The trailer's hydraulic system is filled with L-HL 32 Lotos oil.



### CAUTION

Oil waste can only be delivered to a point dealing with the utilization or regeneration of oils. It is prohibited to throw or pour oil into the sewage system or water reservoirs.

## 1.7 WITHDRAWAL FROM USE

If the user decides to withdraw the trailer from use, comply with the provisions in force in the given country regarding withdrawal from use and recycling of machines withdrawn from use. Before disassembly, remove all oil from the hydraulic system and completely reduce air pressure in the pneumatic braking systems (e.g. by means of the air tank drain valve).

### **DANGER**



During dismantling, use appropriate tools and equipment (overhead cranes, elevators, lifts, etc.) and use personal protective equipment, i.e. protective clothing, footwear, gloves, glasses, etc.

Avoid oil contact with skin. Do not allow hydraulic oil to leak.

Worn or damaged elements that cannot be regenerated or repaired should be taken to a collection point for recyclable materials. Hydraulic oil should be taken to the appropriate facility dealing with the utilization of this type of waste.



**CHAPTER**

**2**

**SAFETY OF USE**

## 2.1 GENERAL TERMS OF SAFETY

### 2.1.1 TRAILER USE

- Before using the trailer, the user should carefully read the content of this document and the *WARRANTY CARD*. During their operation, all recommendations contained therein must be observed.
- The trailer may only be used and operated by persons authorized to drive agricultural tractors with a trailer.
- The trailer user is obliged to become familiar with the construction, operation and principles of safe machine operation.
- If the information contained in the User's Manual is difficult to understand, contact a seller who runs an authorized technical service on behalf of the manufacturer, or contact the manufacturer directly.
- Careless and improper use and operation of the trailer, non-observance of the recommendations contained in these instructions creates a threat to health.
- Be aware of the existence of a minimal risk of danger, therefore the application of the principles of safe use and sound behaviour should be the basic principle of using a trailer.
- The machine must not be used by persons who are not authorized to drive agricultural tractors, including children, people under the influence of alcohol or other drugs.
- Non-compliance with the rules of safe use poses a threat to the health of the operating and bystanders.
- The trailer may not be used for purposes other than those for which it was intended. Everyone who uses the trailer in a manner contrary to its intended use, thus takes full responsibility for all consequences arising from its use. Use of the machine for purposes other than envisaged by the Manufacturer is inconsistent with the purpose of the machine and may void the warranty.

- In the final phase of rolling up the tarpaulin, it is essential to hold one hand on the top of the front frame or other solid structural elements of the trailer. Failure to do so may result in a fall.

### **2.1.2 CONNECTING AND DISCONNECTING THE TRAILER TO THE TRACTOR**

- It is forbidden to connect the trailer to the tractor if it does not meet the manufacturer's requirements (minimum tractor power demand, no required tractor hitch, etc. - compare table (1.2) *AGRICULTURAL TRACTOR REQUIREMENTS*. Before connecting the trailer, make sure that the oil in the tractor's external hydraulic system can be mixed with the trailer's hydraulic oil.
- Before connecting the trailer, make sure that the tractor and trailer are technically sound.
- When connecting the trailer to the tractor, use only the upper transport hitch of the tractor. After coupling the machines, check the hitch safety device. Read the tractor operating instructions. If the tractor is equipped with an automatic hitch, make sure that the coupling operation has been completed.
- Take special care when connecting the machine.
- When connecting, nobody may be between the trailer and the tractor.
- Disconnecting the trailer from the tractor is forbidden if the loading box is raised.
- Hitching and unhitching the trailer may only take place when the machine is immobilized by means of the parking brake.

### **2.1.3 CONNECTING AND DISCONNECTING OF A SECOND TRAILER**

- It is forbidden to connect a second trailer if it does not meet the requirements set by the Manufacturer (lack of the required drawbar eye, exceeding the permissible total weight, etc.) - compare table (1.3) *REQUIREMENTS OF THE SECOND TRAILER*. Before hitching the machine to the tractor, make sure that the oil in both trailers can be mixed.
- Only two-axle trailers may be connected to the trailer.
- Before coupling the trailer, make sure that both machines are technically sound.
- Take special care when connecting the machine.

- When connecting nobody may be between the trailers. The person who helps to aggregate the machine should stand in such a place (outside the danger zone) that it is visible all the time by the tractor operator.
- After completing the coupling of the trailer, check the safety of the hitch.
- Disconnecting of the second trailer is forbidden if its load box is raised.

#### **2.1.4 HYDRAULIC AND PNEUMATIC INSTALLATIONS**

- The hydraulic and pneumatic systems are under high pressure during operation.
- Regularly check the technical condition of connections and hydraulic and pneumatic hoses. Oil leaks and air leaks are not permitted.
- The cut-off valve in the hydraulic tipping system limits the tipping angle of the load box when tilted to the sides and to the rear. The length of the control cable for this valve is set by the Manufacturer and it must not be adjusted when the trailer is used.
- In the event of a failure of the hydraulic or pneumatic system, the trailer should be decommissioned until the failure is removed.
- When connecting the hydraulic conduits to the tractor, make sure that the tractor hydraulic system and trailer are not under pressure. If necessary, reduce the residual pressure of the system.
- In the event of injuries being caused by pressurized hydraulic oil, contact a doctor immediately. Hydraulic oil can penetrate the skin and cause infection. If the oil gets into the eyes, rinse with plenty of water and if irritation occurs, contact a doctor. In the event of contact of oil with skin, wash the area of contact with water and soap. Do not use organic solvents (petrol, kerosene).
- Use hydraulic oil recommended by the manufacturer.
- After changing the hydraulic oil, the used oil must be disposed. Used oil or oil which has lost its properties should be stored in original containers or replacement packaging resistant to hydrocarbons. Replacement containers must be accurately described and properly stored.
- It is forbidden to store hydraulic oil in packaging intended for food storage.

- Rubber hydraulic conduits must be replaced every 4 years regardless of their technical condition.

### **2.1.5 LOADING AND UNLOADING OF A TRAILER**

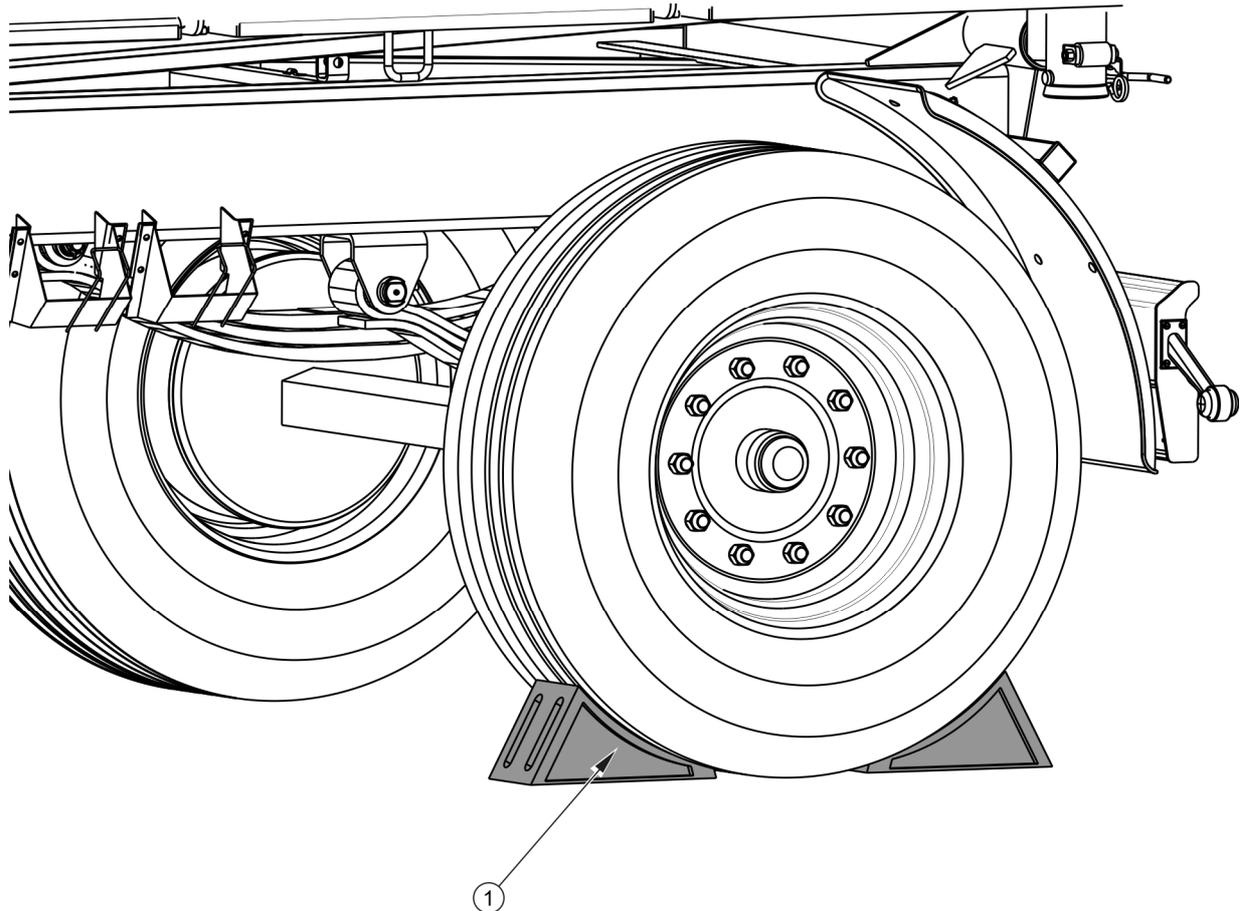
- Loading and unloading work should be carried out by a person experienced in this type of work.
- Before loading, make sure that the securing lines are attached.
- Use only original tipping pins with handle. The use of non-original pins may damage the trailer.
- The trailer is not intended for transporting people, animals and hazardous materials.
- The load must be arranged in such a way that it does not threaten the stability of the trailer and does not hinder driving.
- The arrangement of the load must not cause an overload on the trailer's chassis.
- Incorrectly selected load distribution and overloading the machine may cause the trailer to overturn or damage its components.
- Do not stay on the load box during loading.
- Unloading and loading of the trailer can only be carried out when the machine is placed on level and hard surface and connected to the tractor. Tractor and trailer must be placed for straight-ahead driving.
- Make sure that there are no bystanders in the unloading / loading area or the raised load box. Before tipping the load box make sure that it is visible and make sure there are no bystanders nearby.
- Before raising the load box, the tipping pins should be placed on the intended unloading side. Check the correct installation of the pins.
- Keep a safe distance from overhead power lines when lifting the box.
- When opening wall closures and locks, be extremely cautious due to pressing the load on the walls.
- Tipping the load box is prohibited during strong wind gusts.

- Unloading of volumetric materials that have been loaded above 1 meter can only be done by tilting the load box backwards.
- If the load does not pour from the raised load box, unloading must be stopped immediately. Another tipping over is possible only after removing the cause of the non-sliding load.
- In winter, pay special attention to loads that may freeze during transport. At the time of tipping the load box, the frozen load may lead to the loss of stability of the trailer and cause its overturning.
- Do not raise the load box if there is any danger of the load box tipping over.
- It is forbidden to lift the load box with the sides closed.
- It is forbidden to jerk the trailer forward if the bulk or difficult-to-pour load has not been unloaded.
- After unloading make sure the load box is empty.
- Driving with the raised load box is prohibited.
- When closing or opening the slide window chute, walls and extensions, be very careful to avoid crushing your fingers.
- Do not get in or put your hands between open walls and the load box.
- Before proceeding with the elimination of breakdowns, lower the load box. If it is necessary to raise the load box, it should be turned to the side and secured against lowering with the help of the load box support. The load box cannot be loaded. The trailer must be connected to the tractor and secured with wedges and blocked with the parking brake.

### **2.1.6 TRANSPORT PASSAGE**

- When driving on public roads, comply with traffic regulations and transport regulations in force in the country where the trailer is used.
- The permissible speed resulting from the design limitations should not be exceeded. Adjust speed to prevailing road conditions, trailer loading level, and restrictions resulting from road traffic regulations.

- It is forbidden to leave the machine unsecured. The trailer disconnected from the tractor must be blocked with the parking brake and secured against rolling with wedges or other elements without sharp edges placed under the trailer wheels.
- Before driving, make sure that the trailer is correctly connected to the tractor (in particular check the safety of the hitch pin).



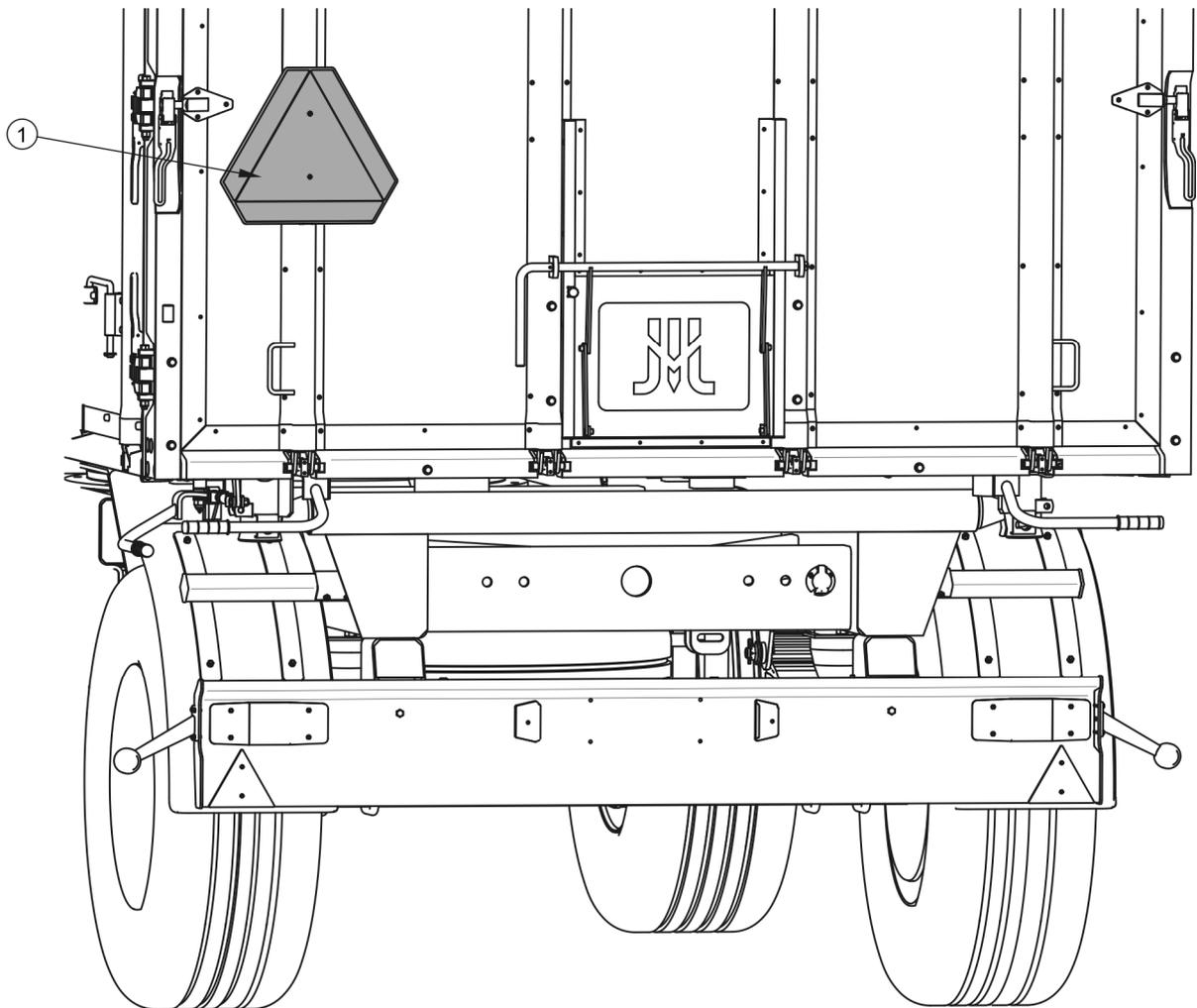
**FIGURE 2.1. How to set the wedges**

*(1) securing wedge, (2) rear axle wheel*

- It is forbidden to drive with the load box raised.
- Wedges (1) should only be placed under one wheel (one in front of the wheel, the other in the rear - Figure (2.1)). Wedges should not be placed under the front axle wheels.
- Before driving, check if the bolts connecting the load box to the lower frame and wall bolts are secured against falling out. Check rear wall slide protection. Make

sure that all walls and extensions are properly closed. Check if the strapping lines are properly attached.

- Before using the trailer always check its technical condition. In particular, check the technical condition of the hitch system, the running gear, the braking system and traffic lights as well as the connecting elements of the hydraulic, pneumatic and electrical systems.
- Before driving, check that the parking brake is released and the braking force regulator is in the correct position (applies to pneumatic systems with a manual three-position regulator).
- The trailer is adapted for driving on slopes up to a maximum of 8°. Moving on such slope requires adjusting your speed and your special care. Moving the trailer over slopes may cause the trailer to overturn as a result of loss of stability. Prolonged driving on sloping ground creates a risk of loss of braking efficiency.
- When driving on public roads, the tractor operator must ensure that the trailer and tractor are equipped with an approved or homologated warning reflective triangle.
- Periodically drain air tanks in the pneumatic system. During frosts, freezing water may cause damage to pneumatic system components.
- Reckless driving and excessive speed can cause an accident.
- Load protruding beyond the outline of the trailer should be marked in accordance with traffic regulations. It is forbidden to transport loads not allowed by the manufacturer.
- The trailer's maximum carrying capacity must not be exceeded. Exceeding the carrying capacity may lead to damage to the machine, loss of stability while driving, scattering of the load and a hazard while driving. The braking system of the machine has been adapted to the total weight of the trailer, exceeding of which will drastically reduce the operation of the service brake.



**FIGURE 2.2. Mounting location for the slow-moving vehicle sign**

*(1) distinguishing sign*

- A triangular plate for slow moving vehicles should be placed on the rear wall, if the trailer is the last vehicle in the set - Figure (2.2). The triangular plate should be placed in a specially prepared holder riveted to the rear wall of the load box.
- The load on the trailer must be evenly distributed and must not hinder driving. The load must be secured so that it cannot slide or tip over.
- When reversing, it is recommended to use the help of another person. During manoeuvres, the helping person must keep a safe distance from danger zones and be visible to the tractor operator at all times.
- It is forbidden to get on the trailer while driving.
- Parking the trailer on a decline is prohibited.

### 2.1.7 TIRES

- When working with tires, the trailer should be immobilized with the parking brake and secured against rolling by placing wedges under the wheels. The wheel can be dismantled only when the trailer is not loaded.
- Repair work on wheels or tires should be carried out by persons trained and authorized to do so. These works should be carried out using appropriately selected tools.
- Inspection of nut tightening should be carried out after the first use of the trailer, after the first journey with a load and then every 6 months of use, or every 25,000 km. In the event of intensive work, check the nut tightening at least every 100 kilometres. Each time, the inspection activities should be repeated if the trailer wheel has been disassembled.
- Avoid damaged road surfaces, sudden and variable manoeuvres, and high speeds when turning.
- Check tire pressure regularly. Tire pressure should also be checked during all-day intensive work. It should be taken into account that an increase in tire temperature can increase the pressure by up to 1 bar. With such a rise in temperature and pressure, reduce the load or speed. Never reduce pressure by venting if it increases due to temperature.
- Tire valves should be protected with caps to avoid penetration of dirt.

### 2.1.8 TECHNICAL SUPPORT

- During the warranty period, any repairs may only be carried out by a Warranty Service authorized by the manufacturer. After the end of the warranty period, it is recommended that any repairs to the trailer be carried out by specialized workshops.
- In the event of any faults or damage, the trailer should be decommissioned until repaired.
- During maintenance work, use appropriate, close-fitting protective clothing, gloves, shoes, glasses and the right tools.

- Any modification of the trailer releases PRONAR Narew from any liability for damage or injury.
- Climbing the trailer is possible only when the trailer is absolutely stationary and the tractor engine is switched off. Tractor and trailer should be secured with parking brake and wedges should be placed under trailer wheels. Secure the tractor cab against unauthorized access.
- Inspect the trailer according to the frequency specified in this manual.
- Regularly check the technical condition of safety devices and correct tightening of screw connections (in particular the drawbar eye and wheels).
- Before starting work that requires lifting the box, it must be unloaded. The box should be turned to the side and secured against accidental falling with the help of the load box support. The trailer must at this time be connected to the tractor and secured with wedges, and blocked with the parking brake.
- Before starting repair work on hydraulic or pneumatic systems, the residual oil or air pressure must be completely reduced.
- Perform maintenance and repair activities applying general principles of health and safety at work. In the event of a cut, the wound should be immediately washed and disinfected. In case of serious injuries consult a physician.
- Repair, maintenance and cleaning work should only be carried out with the tractor engine switched off and the ignition key removed. Tractor and trailer should be secured with parking brake and wedges should be placed under trailer wheels. Secure the tractor cab against unauthorized access.
- During maintenance or repair work, the trailer may be disconnected from the tractor, but secured by means of wedges and parking brake. The load box cannot be raised during this time.
- If it is necessary to replace individual parts, use only parts recommended by the manufacturer. Failure to comply with these requirements may endanger the health or life of bystanders or persons operating the trailer, cause damage to the machine and constitute the basis for withdrawing the warranty.

- Before welding or electrical work, the trailer should be disconnected from the power supply. The paint coating should be cleaned. The fumes of burning paint are poisonous to humans and animals. Welding work should be carried out in a well-lit and ventilated room.
- During welding work pay attention to flammable or fusible elements (elements of pneumatic, electric, hydraulic systems, elements made of plastic). If there is a risk of ignition or damage, they must be removed or covered with non-flammable material before welding. Before starting work, it is recommended to prepare a CO<sub>2</sub> or foam extinguisher.
- In the event of work requiring the trailer to be raised, use properly certified hydraulic or mechanical lifts for this purpose. After lifting the machine, stable and durable supports must also be used. It is forbidden to work under a trailer raised only with a lift.
- It is forbidden to support the trailer with fragile elements (bricks, hollow bricks, concrete blocks).
- After completing work associated with lubrication, remove excess grease or oil. The trailer should be kept clean.
- Be especially careful when entering the load box. Climbing is possible with the use of ladders located on the front wall, extension and drawbar, as well as folding steps inside the load box. Elements of the trailer that are not intended to be entered may not be used for this purpose. Before entering the load box, secure the trailer by immobilizing it with the parking brake and using wedges.
- It is forbidden to carry out independent repairs of the control valve, brake cylinders, tipping cylinder and braking force regulator. In case of damage to these elements, the repair should be entrusted to authorized repair centres or replace the elements with new ones.
- The drawbar must not be repaired (straightening, surfacing, welding). A damaged drawbar must be replaced with a new one.

## 2.2 DESCRIPTION OF RESIDUAL RISK

Pronar Sp. z o. o. in Narew made every effort to eliminate the risk of an accident. However, there is some residual risk that can lead to an accident and is primarily associated with the following activities:

- using the trailer contrary to its purpose,
- being between the tractor and the trailer when the engine is running and when connecting the machine or connecting a second trailer,
- being on the machine during work,
- failure to maintain a safe distance when loading or unloading the trailer,
- trailer operation by unauthorized persons or persons under the influence of alcohol,
- introducing design changes without the consent of the Manufacturer,
- trailer cleaning, maintenance and technical inspection,
- presence of persons or animals in areas invisible from the operator's position.

Residual risk can be reduced to a minimum by following these recommendations:

- prudent and leisurely machine operation,
- sensible application of the remarks and recommendations contained in the operating instructions,
- maintaining a safe distance from prohibited or dangerous places during unloading, loading and coupling the trailer,
- performing maintenance and repair work in accordance with the principles of operating safety,
- carrying out maintenance and repair work by trained persons,
- the use of close-fitting protective clothing and appropriate tools,
- securing the machine against access by unauthorized persons, especially children.
- keeping a safe distance from prohibited and dangerous places,

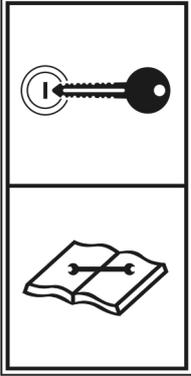
- a ban on being on the machine while driving, loading or unloading.

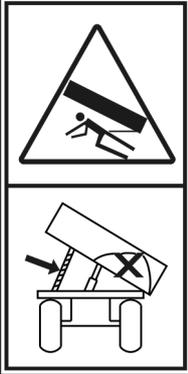
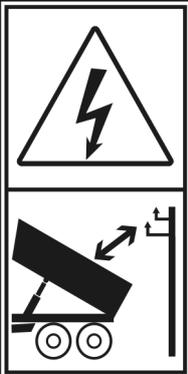
## 2.3 INFORMATION AND WARNING STICKERS

The trailer is marked with information and warning stickers mentioned in table (2.1). The arrangement of symbols is shown in figure (2.3). The machine user is obliged to ensure that the inscriptions, warning and information symbols placed on the trailer are legible throughout the entire period of use. In the event of their destruction, they must be replaced. Labels with inscriptions and symbols are available from the Manufacturer or in the place where the machine was purchased. New assemblies replaced during repair must be marked again with the appropriate safety signs. When cleaning the trailer, do not use solvents that may damage the label coating and do not direct a strong water jet.

**FIGURE 2.1. INFORMATION AND WARNING Stickers**

ITEM	STICKER	MEANING
1		Type of trailer
2		Caution. Before starting work, read the User's Manual.

ITEM	STICKER	MEANING
3		<p>Before starting any servicing or repair work, switch off the tractor engine and remove the ignition key. Secure the tractor cab against unauthorized access.</p>
4		<p>Before starting any servicing or repair work, switch off the tractor engine and remove the ignition key.</p>
5		<p>Lubricate the trailer according to the schedule outlined in the User's Manual.</p>
6		<p>Regularly check the tightness of wheel nuts and other bolted connections.</p>
7	<p style="text-align: center;"><b>Łączenie tylko z górnym zaczepem transportowym</b></p>	<p>Information on hitching the trailer to the upper transport hitch only.</p>
8		<p>Position of the valve controlling the operation of the hydraulic tipping system (1 or 2 trailers).</p>

ITEM	STICKER	MEANING
9		<p>Danger of being crushed.</p> <p>It is forbidden to carry out repair or maintenance works under a loaded and/or unsupported load box.</p>
10		<p>Caution. Danger of electric shock.</p> <p>When unloading the trailer keep a safe distance from overhead power lines.</p>
11		<p>Tire pressure. <sup>(1)</sup></p>
12		<p>Hydraulic supply hose for the braking system.</p>
13		<p>Hydraulic supply hose for the tip system.</p>

<sup>(1)</sup> – the pressure depends on the used tires

The numbering of the ITEM column is consistent with the designations in figure (2.3)

Stickers - item (13) and (14) - are placed on the hydraulic conduits. The sticker (8) is located near the hydraulic valve





**CHAPTER**

**3**

**CONSTRUCTION AND  
PRINCIPLE OF  
OPERATION**

## 3.1 TECHNICAL CHARACTERISTICS

**TABLE 3.1. Basic technical data of the T680P trailer★**

CONTENT	UNIT	DATA
<b>Dimensions</b>		
Total length	mm	7 270
Overall width	mm	2 550
Overall height	mm	3 250
Wheel track	mm	1 900
Internal dimensions of the load box:		
- length	mm	5 250
- width	mm	2 410
- height	mm	1 540
<b>Performance parameters</b>		
Load capacity	m <sup>3</sup>	19.5
Loading area	m <sup>2</sup>	12.7
Loading surface lift	mm	1 390
Load box swing angle		
- rear	(°)	47
- side	(°)	47
<b>Weight</b>		
<b>Capacity</b>		
The trailer's karb weight	kg	13 165
Technical permissible gross weight	kg	4 835
	kg	18 000
<b>Other information</b>		
Rated voltage	V	12
Permissible design speed	km/h	40★★
Hydraulic oil demand	l	18
Noise level	dB	below 70

★ - Technical data in standard picking, with a spare wheel (without a balcony, tarpaulin)

★★ - The permissible speed of the trailer moving on public roads in Poland is 30 km / h (in accordance with the Act of June 20, 1997, "Road Traffic Law", art. 20). 20 June 1997, "Road Traffic Law", Art. 20). In the countries where the trailer is used, restrictions related to the road traffic laws in

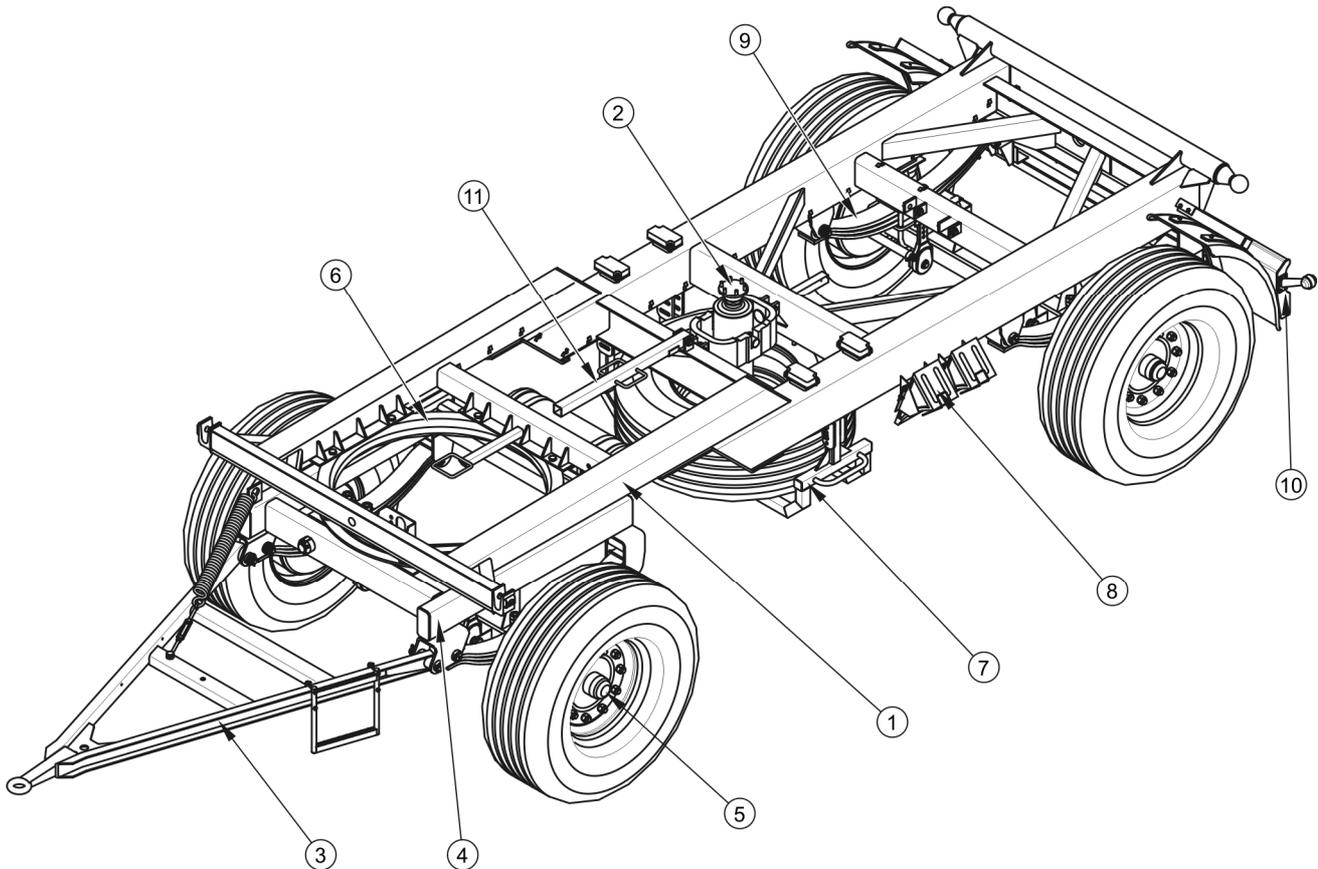
*force in a given country must be observed. The trailer speed must not, however, be greater than the maximum design speed 40 km/h.*

## **3.2 CHASSIS**

The trailer chassis consists of the units specified in figure (3.1). The lower frame (1) is a welded structure made of steel sections. The basic load-bearing element are two longitudinal members connected with crossbars. In the central part there are sockets for mounting the telescopic cylinder (2) and a support for supporting the load box (11). In the rear part of the frame there is a lighting beam (10) to which the elements of electrical equipment and a license plate are attached. Road axles (5) are attached to the spring suspension (9) by means of a spring plate and U bolts. The axles are made of a square bar ended with pivots, on which the hubs of road wheels are mounted on conical bearings. These are single wheels equipped with calliper brakes actuated by mechanical cam expanders.

In the front part of the trailer there are elements of the front axle suspension, parabolic springs (9), turntable (6), turntable frame (4) and drawbar (3). The drawbar is attached to the turntable frame with bolts. The brackets for mounting the upper frame are welded to the front beam of the lower frame.

In the rear part of the lower frame there is a rear beam, ended with ball pins. The design of the foundation of the upper frame and the locking method enables tipping of the load box sideways and backwards.

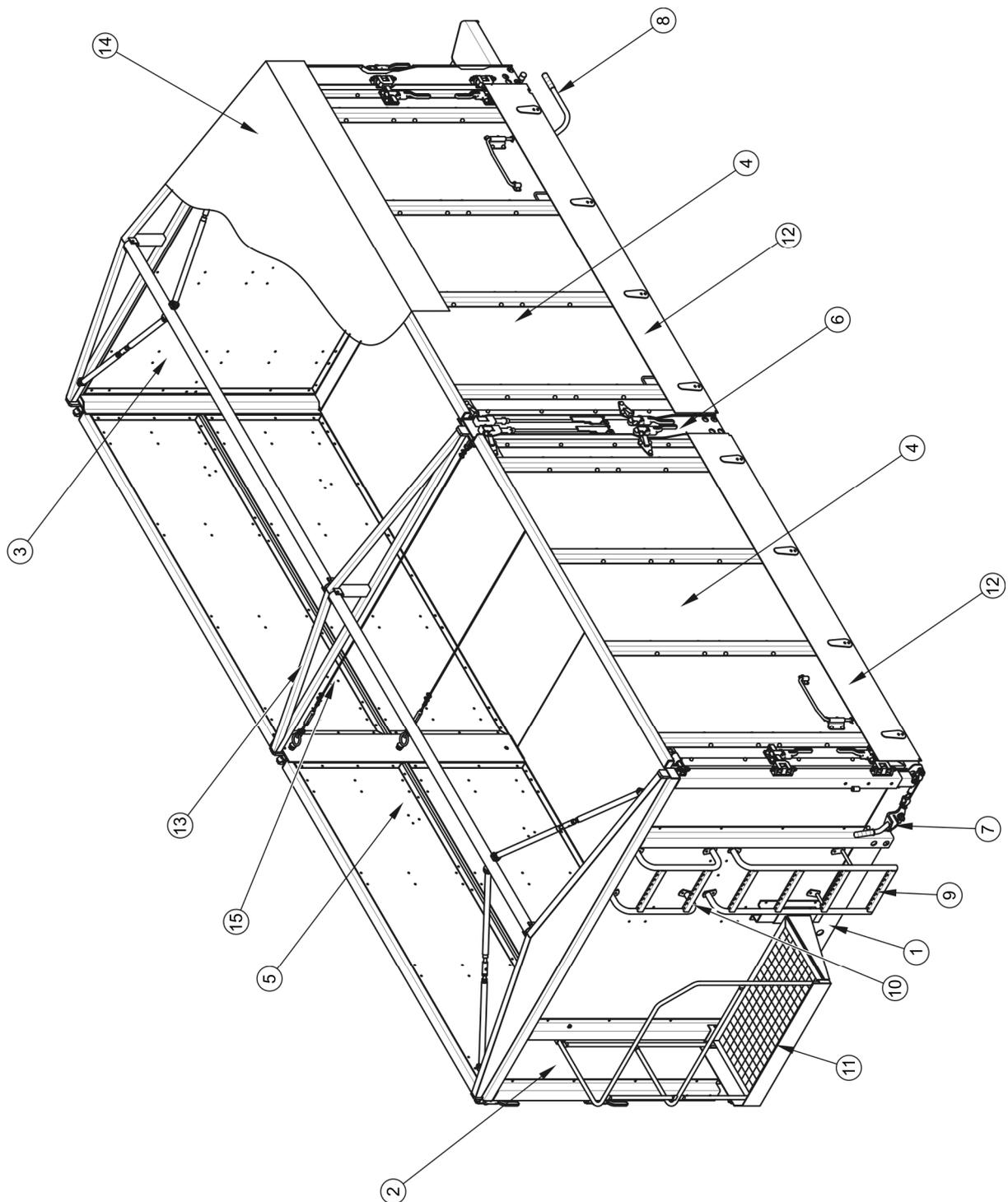


**FIGURE 3.1 Chassis**

(1) lower frame, (2) telescopic cylinder, (3) drawbar, (4) turntable frame, (5) wheel axle, (6) turntable, (7) spare wheel basket, (8) wheel chocks, (9) parabolic spring, (10) lighting beam, (11) load box support

### 3.3 LOAD BOX

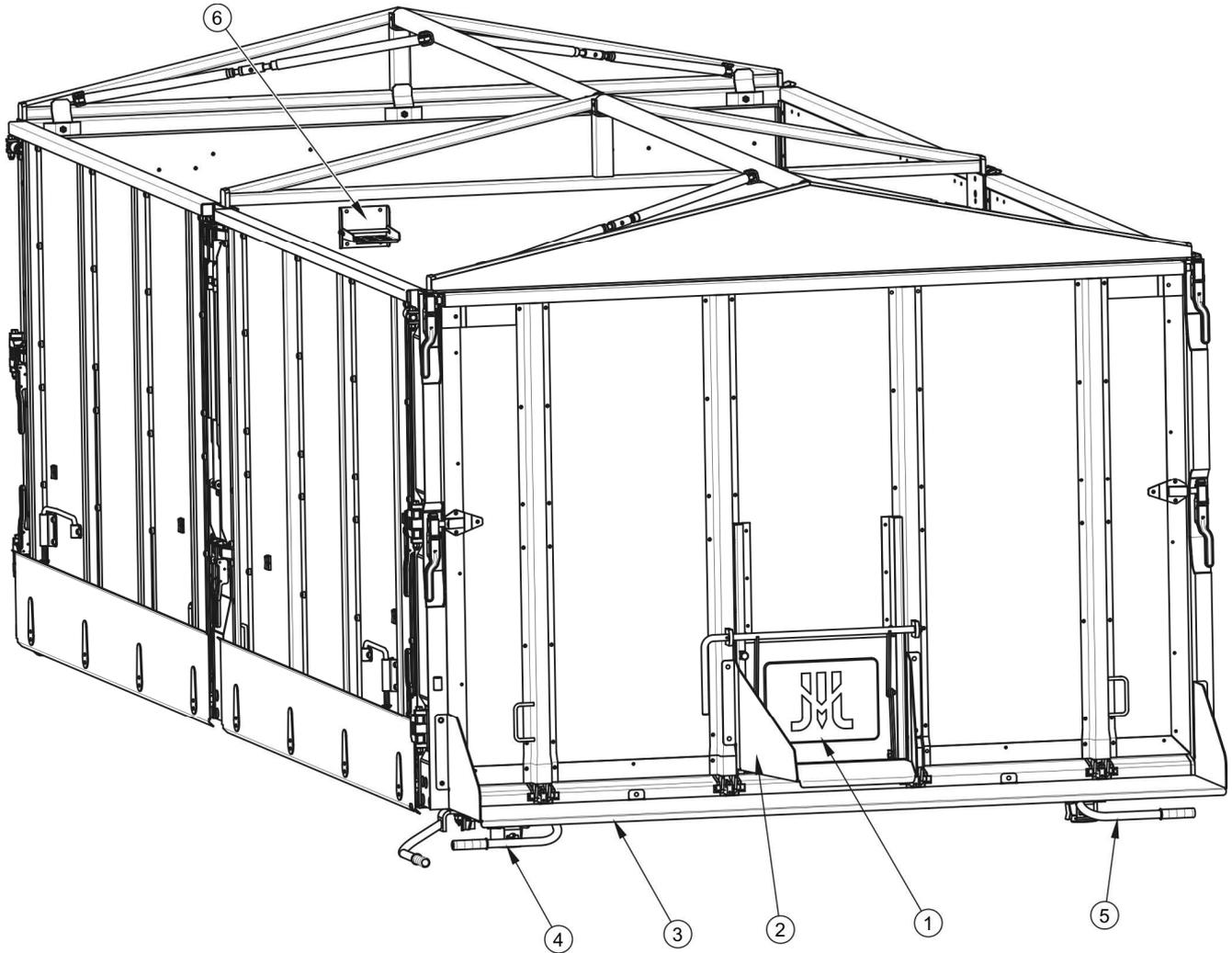
The trailer's load box - figure (3.2) - consists of: upper frame (1), front wall (2), rear wall (3), right side walls with extensions (5), and "portal" side walls (4). In the central part of the trailer there are posts (6) which are connected with each other by means of connecting lines (15). The tarpaulin frame (13) is mounted in the upper part of the box. The lower ladder (9) and the upper ladder (10) are attached to the front wall of the load box, and the balcony (11) (option) is screwed on - figure (3.2). All side walls and the rear wall are opened hinged by unlocking the appropriate locks of the trailer. In addition, the walls on the left side of the trailer can be opened horizontally, thus allowing access to the cargo transported on pallets.



**TABLE 3.1. Load box**

(1) upper frame, (2) front wall, (3) rear wall, (4) portal side wall, (5) right side wall with extension (6) central post (7) front lock, (8) rear lock, (9) lower ladder, (10) upper ladder, (11) balcony, (12) side plates of the chute system, (13) frame, (14) tarpaulin, (15) fastening rope

All walls of the trailer are made of waterproof, laminated plywood with aluminium fittings with rubber seals. As additional equipment, the trailer can be equipped with a balcony (11), a tarpaulin (14), a chute system consisting of side plates (12) and a rear wall chute plate.



**FIGURE 3.2 Load box rear wall**

(1) gate valve, (2) chute for the discharge chute, (3) rear wall chute plate, (4) closing of the left rear wall, (5) closing of the right-side walls, (6) side step

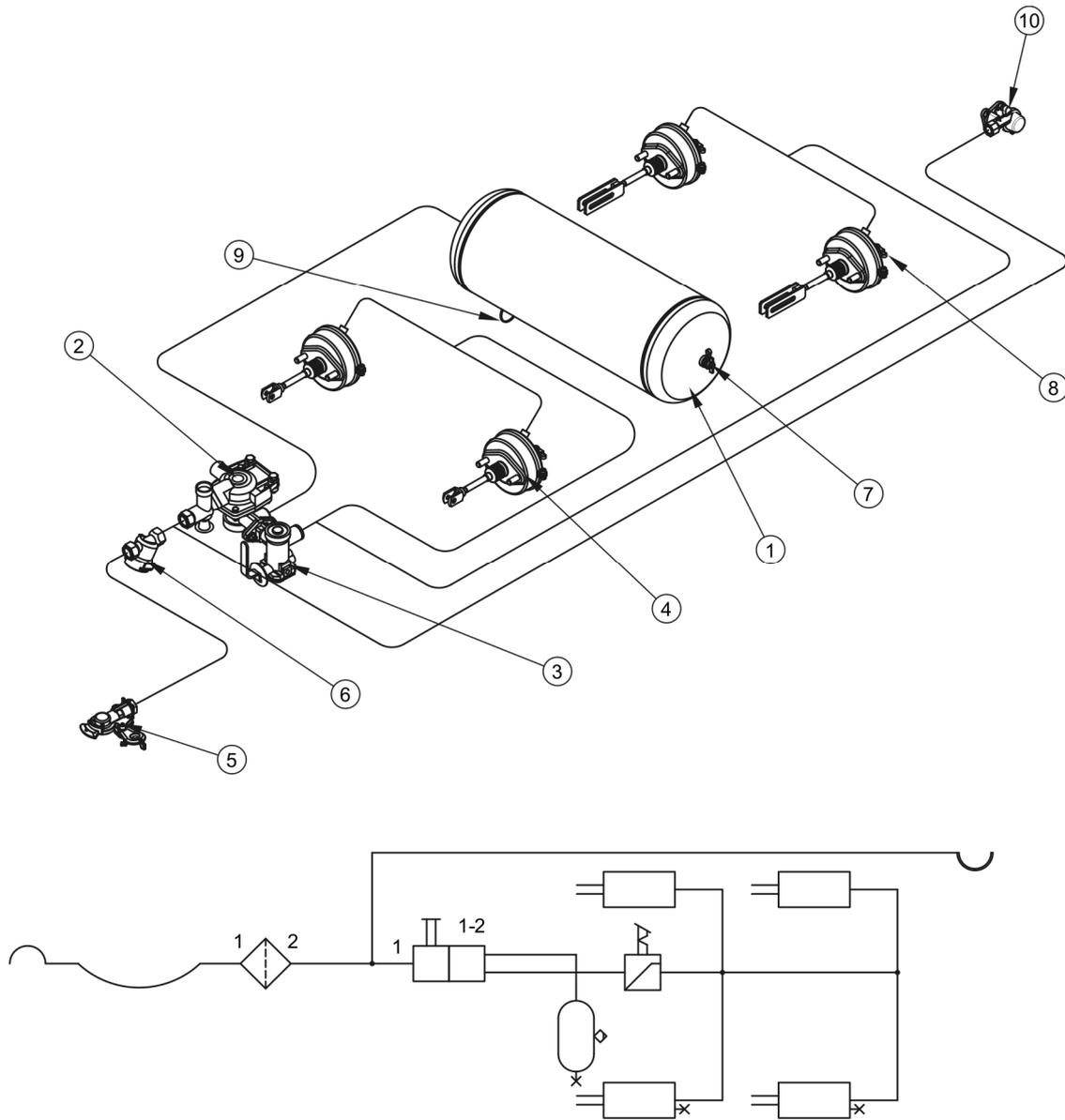
In the rear wall there is a chute slide (1), which can be additionally fitted with a chute (2) enabling more precise unloading of loose materials - figure (3.3).

## 3.4 SERVICE BRAKE

The trailer is equipped with one of four types of service system brake:

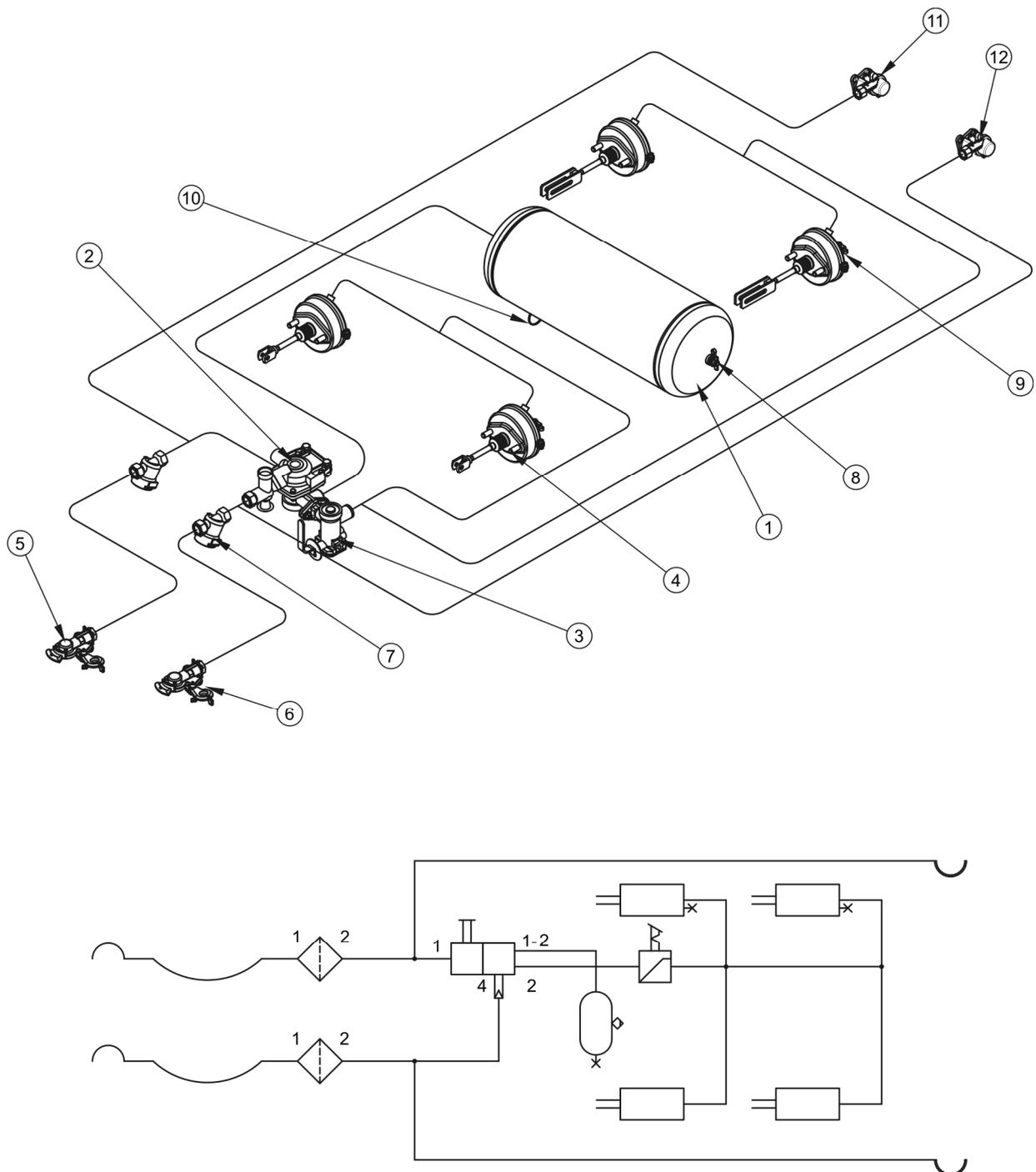
- single conduit pneumatic system - figure (3.4),
- double conduit pneumatic system with three-position manual regulator– figure (3.5),
- double conduit pneumatic system with ALB automatic regulator, figure (3.6),
- hydraulic braking system– figure (3.7).

The service brake is activated from the driver's cab by pressing the tractor brake pedal. The task of the control valve (2) - figure ((3.4), (3.5) and (3.6) is to activate the trailer brakes simultaneously with the tractor brake applied. In addition, in the event of an unforeseen disconnection of the hose between the trailer and the tractor, the control valve automatically applies the machine's brake. The valve used has a brake release system, used when the trailer is disconnected from the tractor. After connecting the air line to the tractor, the release device automatically adjusts to the position enabling normal operation of the brakes.



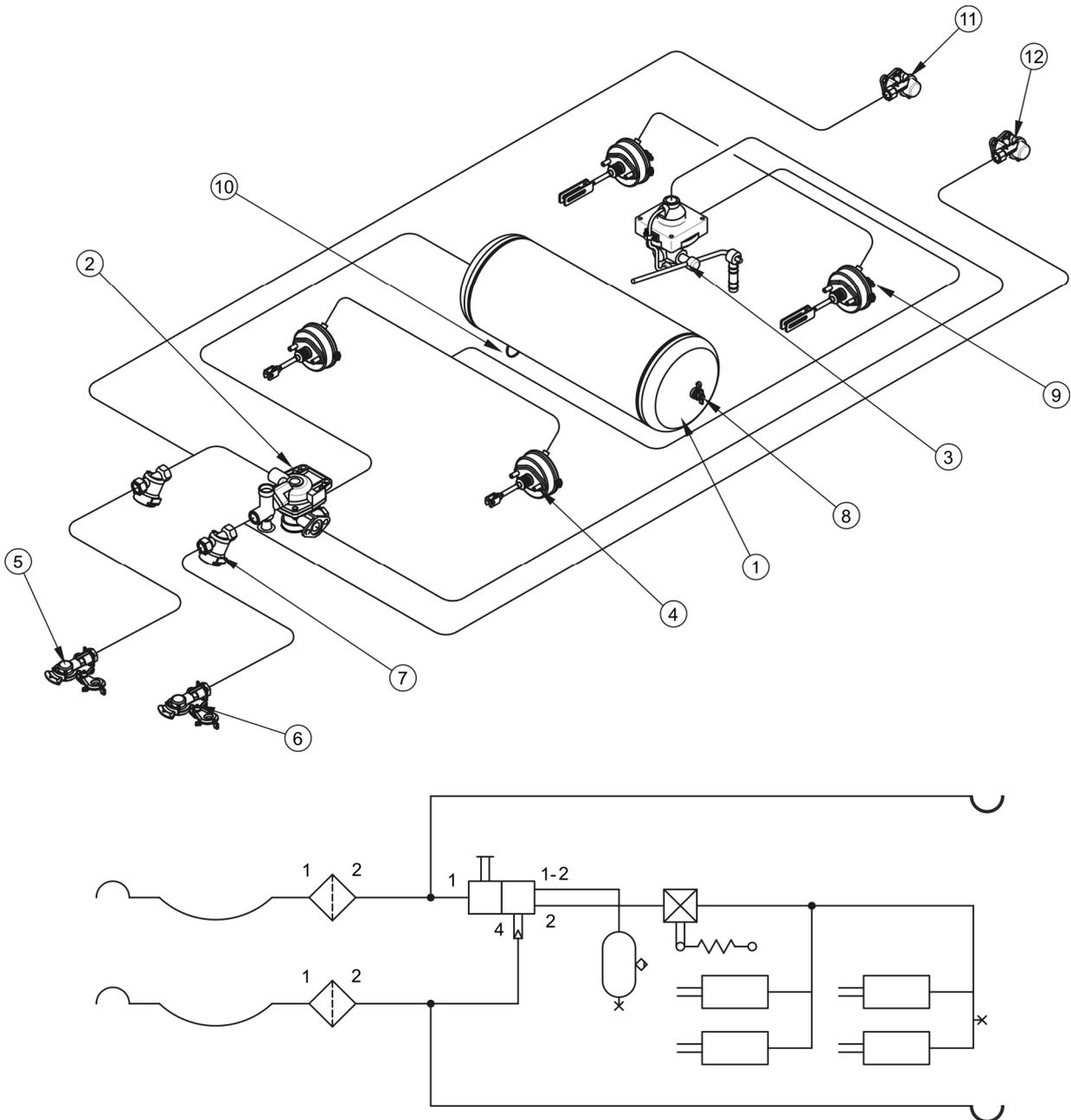
**FIGURE 3.3 Single conduit pneumatic installation**

(1) air tank, (2) control valve, (3) brake force regulator, (4) pneumatic cylinder, (5) hose connector (black), (6) air filter, (7) air tank control connector, (8) pneumatic actuator control connection, (9) drain valve, (10) socket (black)



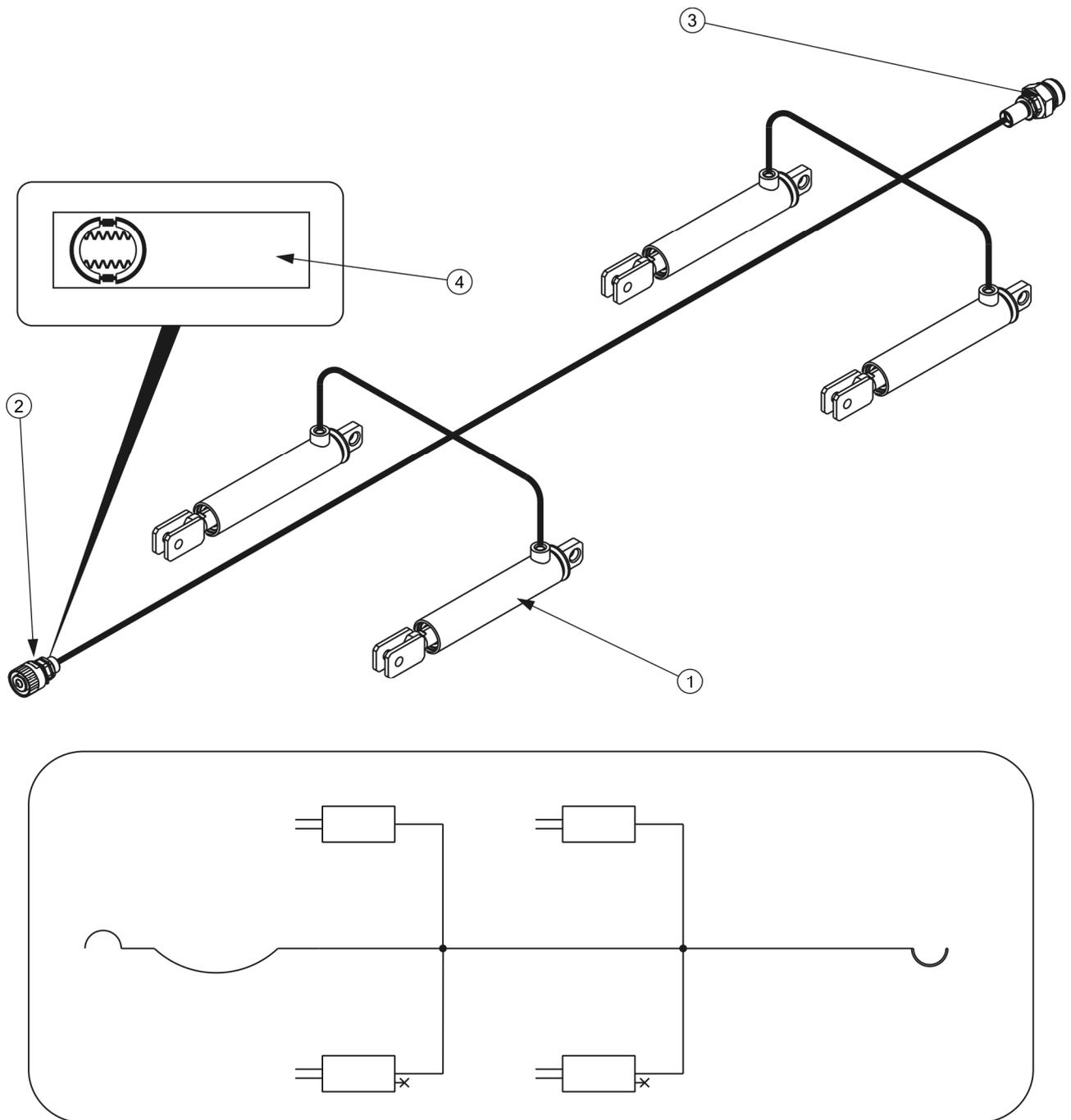
**FIGURE 3.4 Double conduit pneumatic installation**

(1) air tank, (2) control valve, (3) brake force regulator, (4) pneumatic actuator, (5) hose connector (red), (6) hose connector (yellow), (7) air filter, ( 8) air tank control joint, (9) pneumatic actuator control joint, (10) drain valve, (11) socket (red), (12) socket (yellow)



**FIGURE 3.5 Double conduit pneumatic installation with ALB**

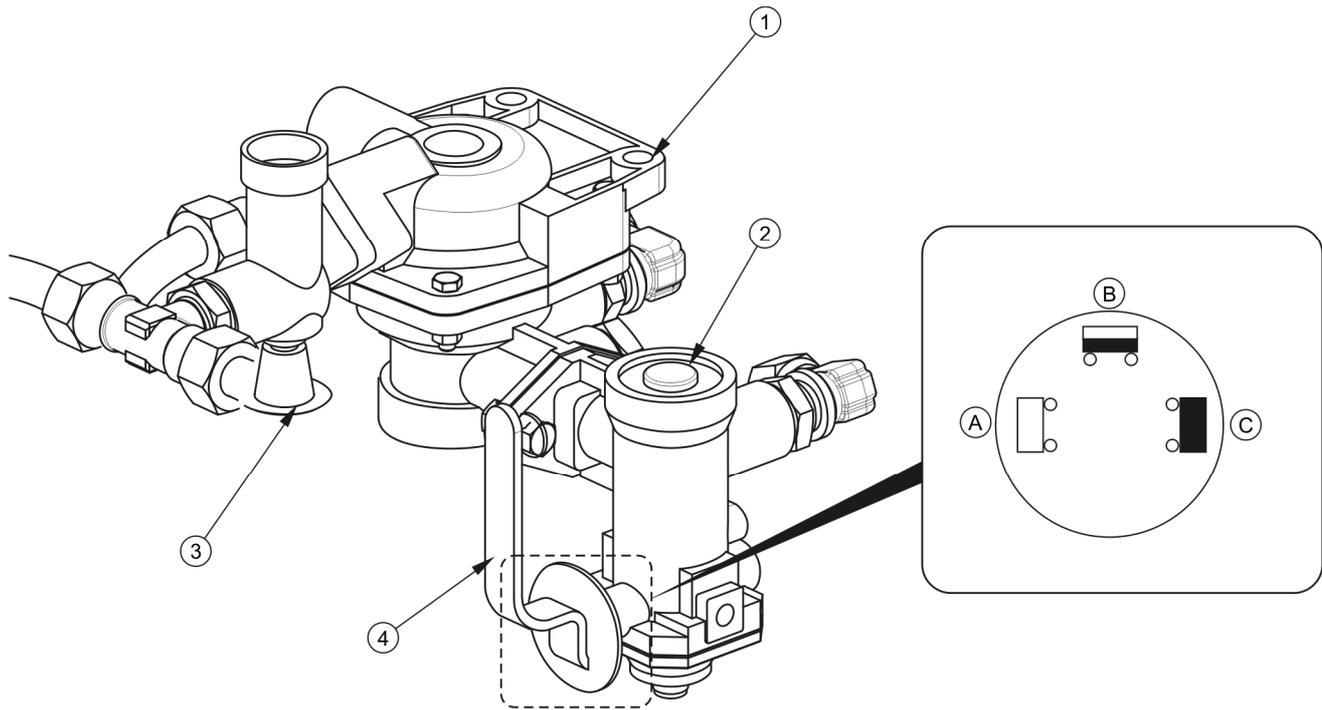
(1) air tank, (2) control valve, (3) brake force regulator, (4) pneumatic actuator, (5) hose connector (red), (6) hose connector (yellow), (7) air filter, ( 8) air tank control joint, (9) pneumatic actuator control joint, (10) drain valve, (11) socket (red), (12) socket (yellow)



**FIGURE 3.6 Hydraulic braking system**

(1) hydraulic cylinder, (2) quick coupler (plug), (3) quick coupler (socket), (4) information sticker

Three-band braking force regulator (2) - figure (3.8), adjusts braking force depending on the setting. Switching to the appropriate operating mode is done manually by the machine operator before starting the journey using the lever (4). Three work positions are available: A - 'No load', B - 'Half load' and C - 'Full load'.

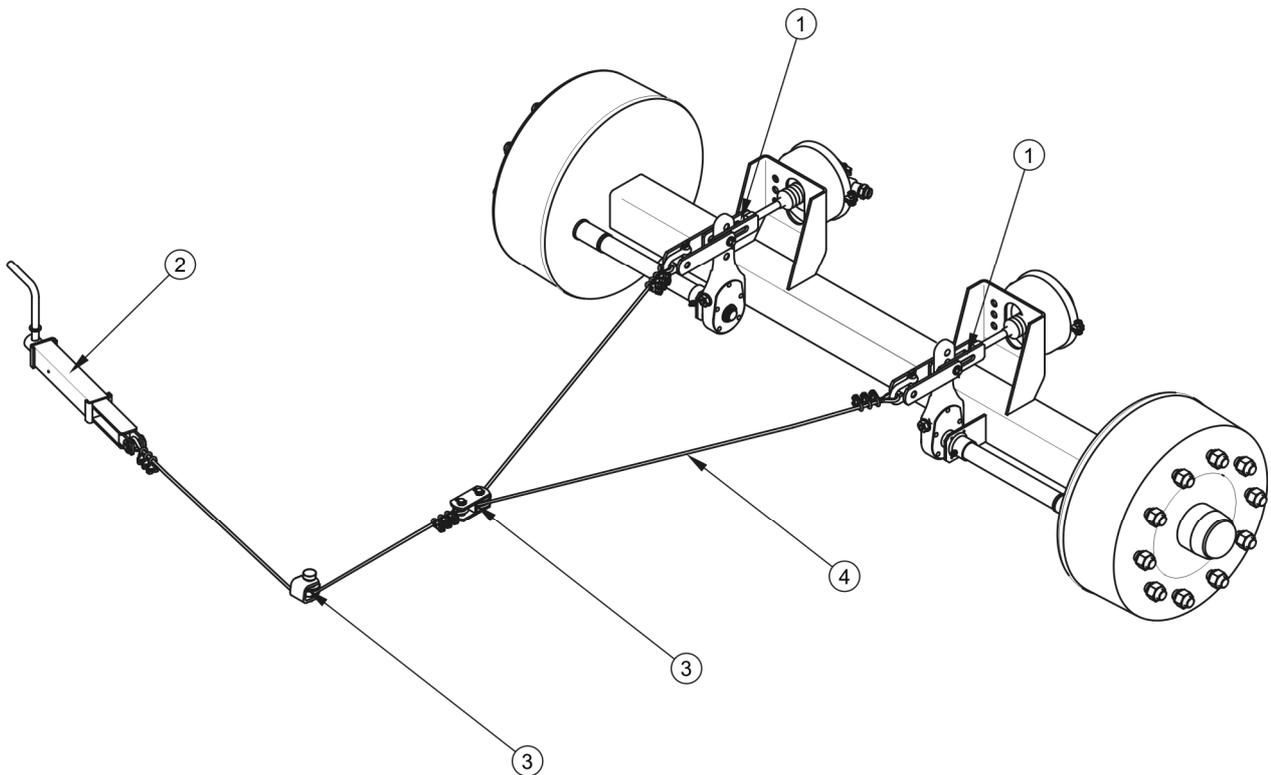


**FIGURE 3.7** Tri-band braking force regulator

(1) control valve, (2) braking force regulator, (3) trailer brake release button when parking, (4) regulator selection lever, (A) 'UNLOADED' position, (B) 'HALF LOAD' position, (C) 'FULL LOAD' position

### 3.5 PARKING BRAKE

The parking brake is used to immobilize the trailer during parking. The brake crank mechanism (2) - located on the right side of the lower frame - is connected with a steel cable (4) to the rear axle tube. By turning the crank of the mechanism, the steel cable is tightened. The expander arms exerting pressure on the brake shoes cause the axle to brake. The parking brake must be released before driving - the steel cable must hang loosely.

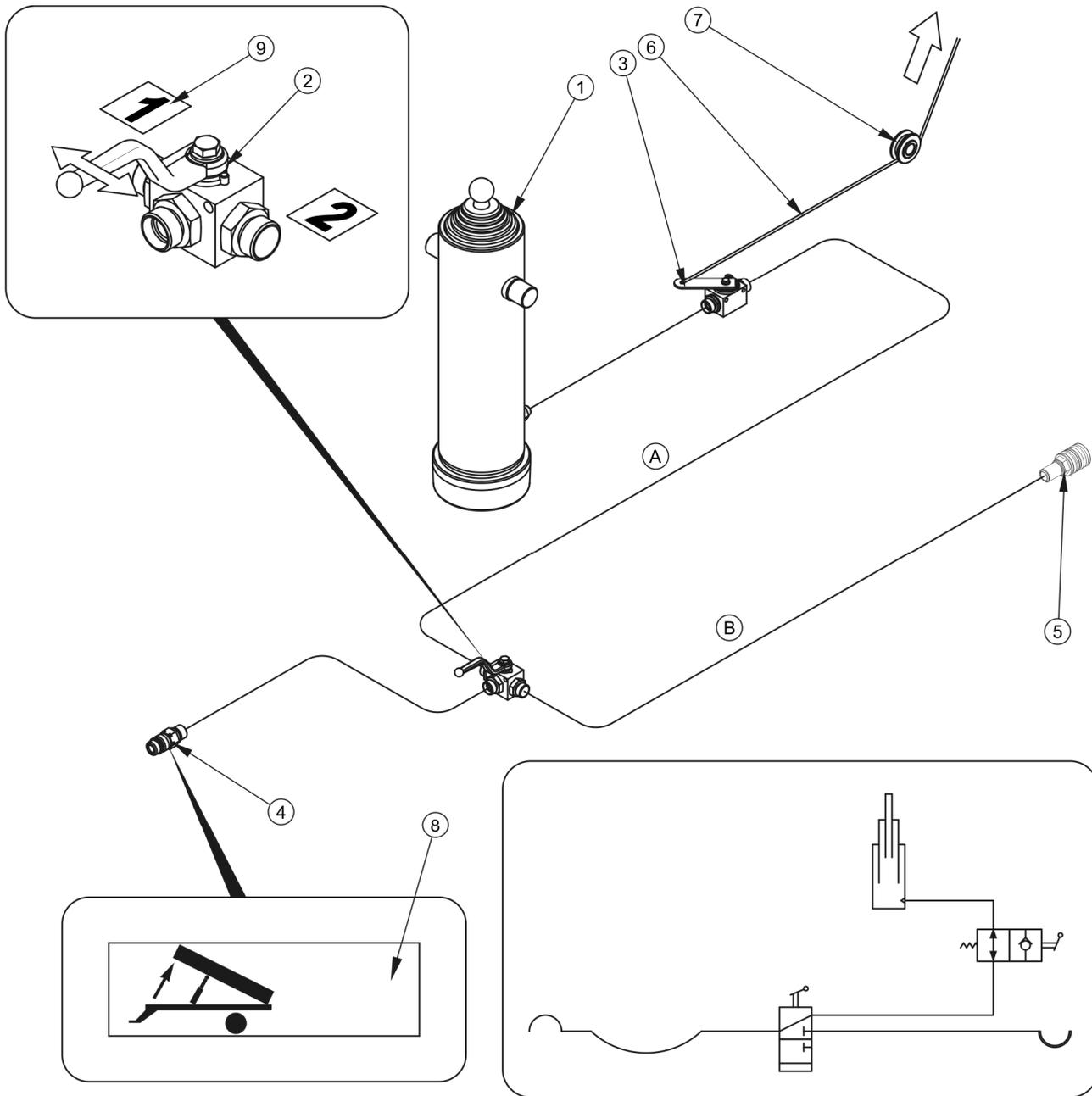


**FIGURE 3.8** Parking brake

*(1) brake puller, (2) brake crank mechanism, (3) guide rollers, (4) steel cable*

## 3.6 HYDRAULIC TIPPING SYSTEM

The hydraulic tipping system is used for automatic unloading of the trailer by tilting the load box backwards or on sides. The hydraulic system of the unloading mechanism is supplied with oil from the tractor's hydraulic system. The lever of oil distributor of external hydraulic system of the tractor is used to control the lifting of the load box.



**FIGURE 3.9** Diagram of the hydraulic tipping system

(1) telescopic cylinder, (2) three-way valve, (3) shut-off valve, (4) quick coupler (5) socket, (6) control cable, (7) guide roller, (8), (9) information stickers

 **CAUTION**

The cut-off valve (3) - figure (3.10) limits the tipping angle of the load box when tilted to the sides and to the rear. The length of the cable (6) controlling this valve is regulated by the Manufacturer and cannot be adjusted when the trailer is used.

In the trailer, the installation consists of two independent circuits:

- circuit (A) - for supplying the hydraulic cylinder of the first trailer,
- circuit (B) - to supply the second trailer hydraulic cylinder in case of connecting two trailers to the tractor.

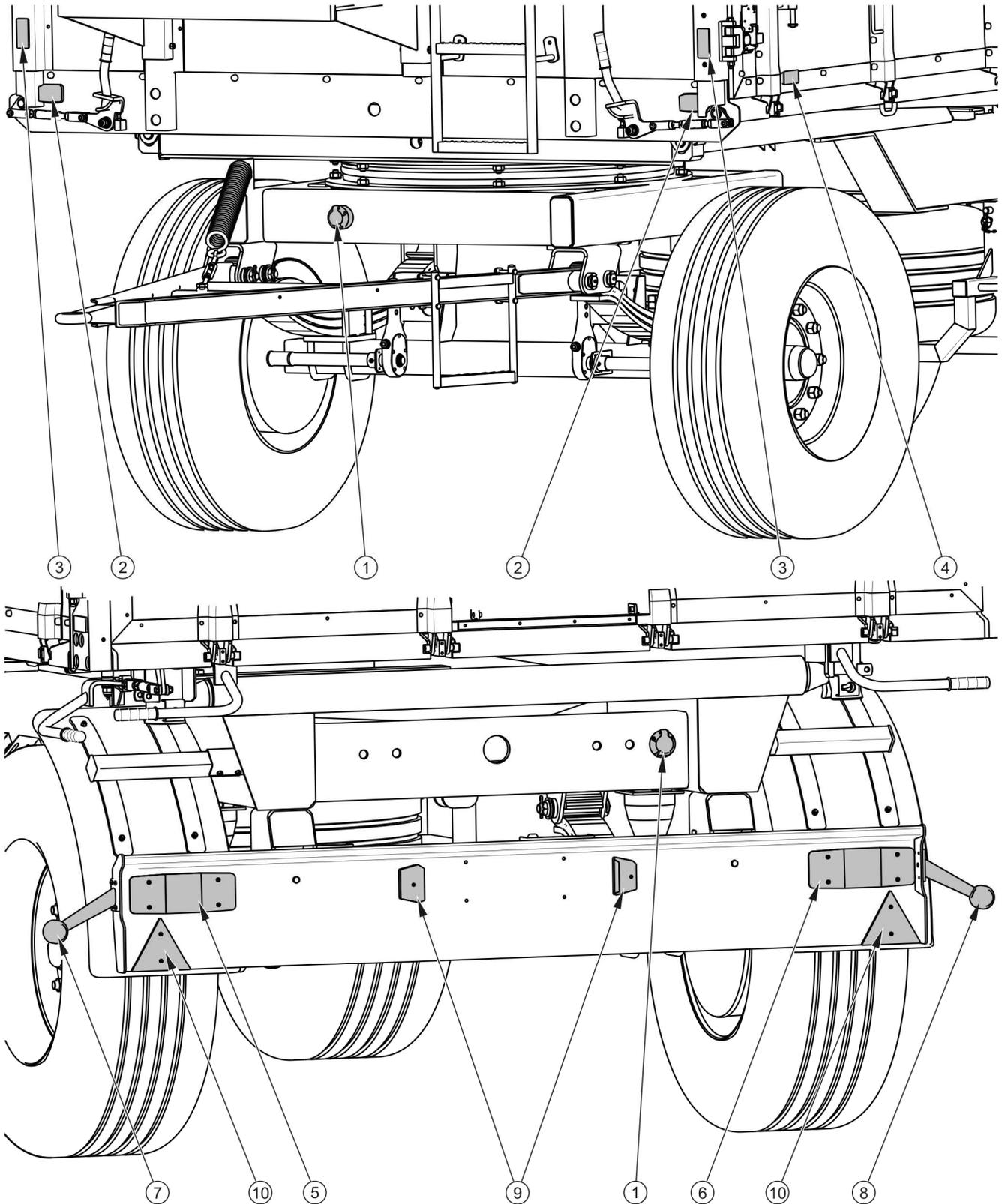
A three-way valve is used to turn on these circuits (3.10). The lever on this valve can occupy two positions:

- 1 - trailer tipping open circuit - circuit (A),
- 2 - second trailer tipping circuit open - circuit (B).

## **3.7 ELECTRICAL INSTALLATION, WARNING ELEMENTS**

The trailer's electrical installation is adapted to be supplied from a 12 V DC source. Connecting the hook trailer's electrical system to the tractor should be made using a suitable connection cable, which is included in the machine's equipment.

The arrangement of electrical components and reflectors is shown in figure (3.11). Figure (3.12) shows a schematic diagram of the electrical installation.



**FIGURE 3.10** Arrangement of electric and reflective elements

(1) seven-pin socket, (2) front position lamp, (3) white reflector, (4) yellow reflector, (5), (6) rear multipurpose lamp, (7), (8) clearance lamp, (9) lamp number plate lighting, (10) reflective triangle



**TABLE 3.2. List of electrical components markings**

<b>SYMBOL</b>	<b>FUNCTION</b>
ZP	Multifunctional rear right lamp
ZL	Multifunctional rear left lamp
X7P	Front seven-pin socket
GT	Rear seven-pin socket
OTP	License plate lighting lamp right
OTL	License plate lighting lamp left
PP	Front right plate lamp
PL	Front left plate lamp
OBP	Multifunctional side right lamp
OBL	Multifunctional side left lamp
TOL	Multifunctional left rear lamp
TOP	Multifunctional right rear lamp

***CHAPTER***

**4**

**RULES OF USE**

## 4.1 PREPARING FOR WORK BEFORE FIRST USE

The trailer is delivered to the user completely assembled and does not require any additional assembly operations of machine components. The manufacturer ensures that the machine is fully functional, has been checked in accordance with control procedures and is approved for use. However, this does not release the user from the obligation to check the trailer before and first use.

Before connecting to the carrying tractor, the operator of the machine must check the technical condition of the trailer. To do this:

- Read the contents of this User Manual and follow the recommendations contained therein,
- immobilize the trailer with parking brake,
- check the condition of the paint coating, signs of corrosion or mechanical damage (dents, punctures, bends or breaks of details),
- check the correctness of opening of walls, locking the locks, completeness of securing pins,
- check if the tipping pins are installed and properly locked (the pin handle should point vertically, the locking cotter pin on),
- check the air pressure in the tires and the correct tightening of the nuts of the road wheels,
- check the correct mounting of the drawbar,
- check the technical condition of the tarpaulin, latches securing the tarpaulin straps and the correctness of the frame installation,
- drain the pneumatic installation - see chapter 5.

If all the above activities have been performed and the trailer is operational, connect it to the tractor - see chapter (4.3). After connecting the brake system conduits and the hydraulic conduits of the tipping system, check the correct operation of individual systems and check the installations and cylinders for tightness. It is forbidden to use the trailer if there are leaks from hydraulic systems or if the braking system is out of order. In the event of a fault, locate the fault. If it cannot be removed or its removal may void the warranty, please contact your dealer for an explanation of the problem.

**CAUTION**

Non-adherence to the recommendations contained in the manual or improper use of the trailer may cause damage to the machine.

The technical condition of the trailer prior to commissioning must not raise any objections.

## 4.2 TECHNICAL INSPECTION OF THE TRAILER TECHNICAL

When preparing the trailer for daily use, check individual elements according to guidelines presented in table (4.1).

**TABLE 4.1. TECHNICAL INSPECTION SCHEDULE**

DESCRIPTION	SERVICE ACTIVITIES	REVIEW PERIOD
The condition of the tires on the road wheels and the air pressure in the tires	Visually check the technical condition of the tires and their inflation	Before each trip
Efficiency of the lighting and signalling system of the trailer	Hitch the trailer to the tractor, turn on the individual lamps one by one, check the completeness of reflectors, installation of a triangular plate for slow-moving vehicles	
Operation of the braking system	Hitch the trailer to the tractor, start from the place and check the effectiveness of the brakes	
Operation of the hydraulic tipping system	Check and evaluate the tightness and quality of the hydraulic system operation while tipping the load box	
The condition of the tires on the road wheels and the air pressure in the tires.	Check the technical condition of the tires (tread, side surfaces, etc.), check and, if necessary, inflate the wheels to the recommended pressure	Once a month
Tightening of the key screw nuts connections.	The tightening torque should be in accordance with the table (5.5)	Every 3 months

DESCRIPTION	SERVICE ACTIVITIES	REVIEW PERIOD
Lubrication	Lubricate the components according to the „LUBRICATION” guidelines in the chapter.	According to Table (5.3)
Degree of tightening of road wheel nuts	The tightening torque should be in accordance with the table (5.6)	According to chapter (4.9) "Rules for the use of tires"

**CAUTION**



It is forbidden to use an inefficient trailer.

Before connecting the individual installation cables, read the tractor manual and follow the manufacturer's instructions.

### 4.3 CONNECTING TO THE TRACTOR

The trailer may be connected to an agricultural tractor, if all connections (electrical, pneumatic, hydraulic) and the hitch on the agricultural tractor are in accordance with the trailer manufacturer's requirements.

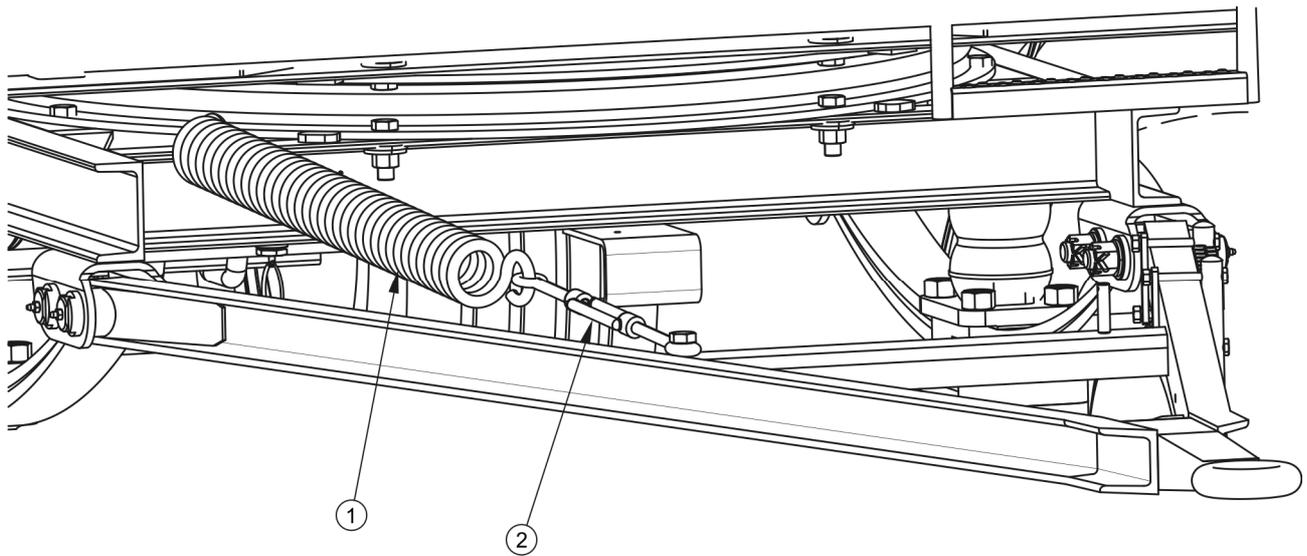
**DANGER**



During hitching, there must be no bystanders between the trailer and the tractor. The tractor operator, while aggregating the trailer, should exercise particular caution during work and make sure that bystanders are not in the danger zone when hitching up.

The trailer must be connected to the agricultural tractor in the sequence described below:

- ➔ immobilize the trailer with parking brake,
- ➔ place the tractor with its back as close as possible to the eye of the trailer drawbar,
  - ⇒ if required - adjust the height of the drawbar. Precise adjustment of the height of the drawbar eye can be achieved by adjusting the spring tension (1) of the drawbar with the screw tensioner (2) - figure (4.1),



**FIGURE 4.1. Drawbar height setting**

(1) tension spring, (2) screw tensioner

- ➔ when reversing the tractor, connect the drawbar eye with the appropriate tractor hitch, secure the tractor hitch against undesirable disconnection of the trailer,
- ➔ connect the electric, brake and tipping system cables to the tractor to the appropriate sockets on the tractor,
- ➔ release the parking brake by turning the crank of the brake mechanism counter clockwise.

### CAUTION



Pay attention to the compatibility of oils in the tractor hydraulic system and in the hydraulic system of the trailer system.

It is forbidden to drive on public roads with inoperative braking, lighting and signalling systems.

When turning, connection conduits must hang loosely and not become entangled in moving parts of the trailer and tractor.

Pneumatic brake system conduits are equipped with connections, the protective covers of which are made of coloured plastic. The colours of these elements correspond to the colours of the connection sockets in the tractor (yellow, red).

## 4.4 CONNECTING AND DISCONNECTING OF A SECOND TRAILER

The second trailer may only be connected if it is a two-axle trailer and if it meets all the requirements specified in chapter (1.2). Hitching a second trailer with a set requires experience in steering an agricultural tractor with a trailer. It is recommended that when coupling the second trailer the operator uses the help of another person who will inform the tractor operator about the course of the operation.

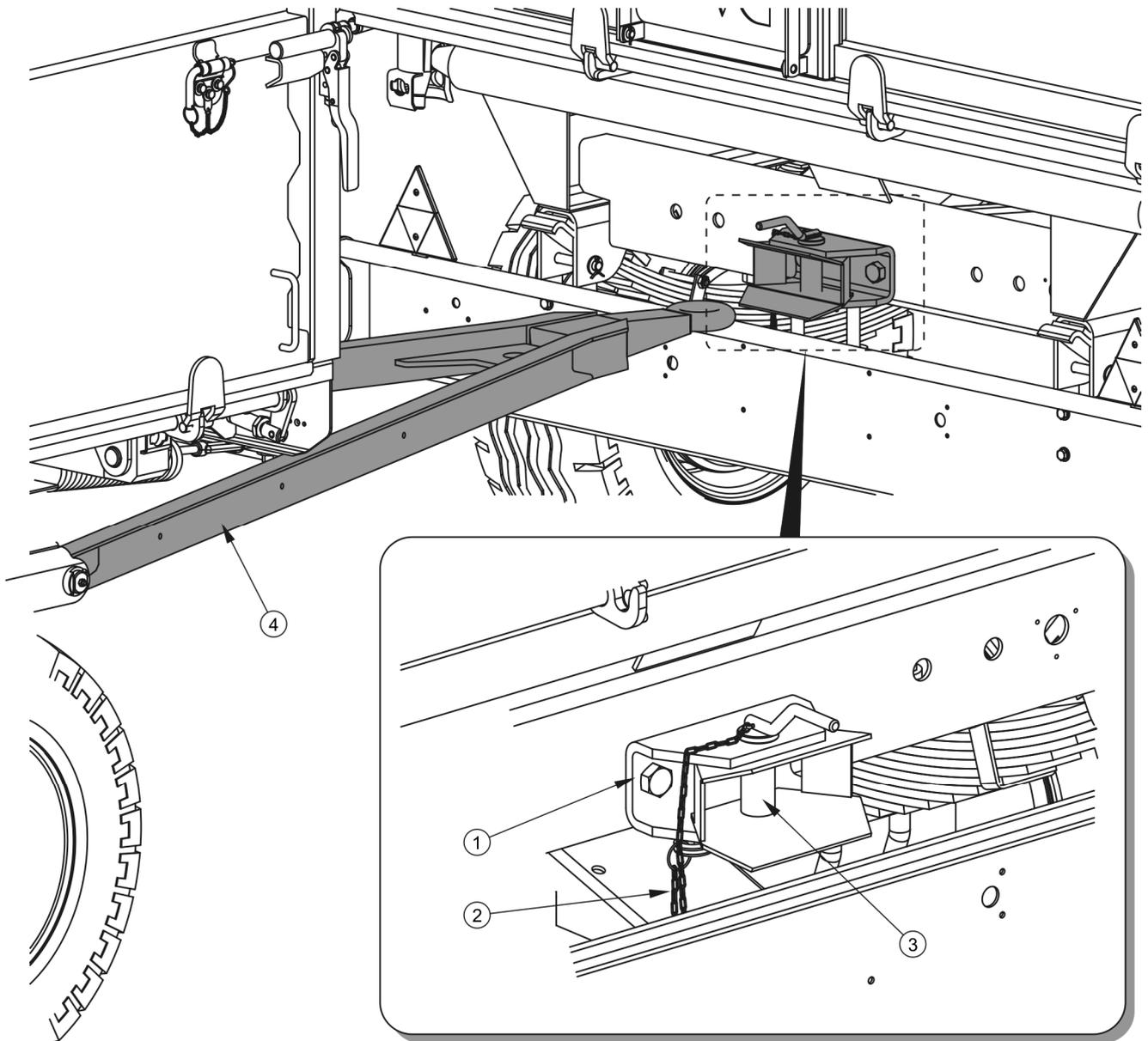


### **DANGER**

**When connecting nobody may be between the trailers. The person who helps aggregate the machine should stand in a place outside the hazardous area and be visible at all times by the tractor operator.**

### **Second trailer requirements**

- ➔ Position the tractor with the first trailer attached straight ahead of the second trailer's drawbar,
- ➔ Immobilize the second trailer with the parking brake,
- ➔ Unlock the coupling bolt on the first trailer,
- ➔ Adjust the height of the drawbar of the second trailer so that the machines can be coupled,
- ➔ When reversing the tractor, drive the rear hitch of the first trailer onto the drawbar of the second trailer,
- ➔ Install the pin and the cotter securing the pin,
- ➔ Connect the pneumatic, hydraulic and electrical system conduits,



**FIGURE 4.2. Connecting of the second trailer**

(1) rear trailer hitch, (2) chain with a cotter pin securing the pin, (3) hitch pin 40 mm, (4) drawbar of the second trailer

#### **Disconnecting of the second trailer**

- ➔ Immobilize the tractor and trailer with parking brake,
- ➔ Switch off the tractor engine. Close the tractor cabin and secure it against unauthorized access,
- ➔ Disconnect the braking, hydraulic and electrical conduits according to the instructions in chapter (4.8),

- ➔ Unlock the coupling bolt on the first trailer. Remove the bolt and drive the tractor away.

**CAUTION**

Only two-axle trailers may be connected to the trailer.

## 4.5 LOADING

Before starting loading, make sure that the side walls, rear wall, extensions and the chute slide gate are properly closed and locked. The trailer must be placed for straight ahead and connected to the tractor. Loading should take place only when the trailer is placed on level and stable ground. If the trailer is equipped with a tarpaulin, it should be rolled to the right side up. If the load will not exert pressure on the walls, the tensioning chain can be detached, otherwise it must be attached to the centre posts. The lack of a strapping cord may lead to the destruction of the sides, especially during very dynamic loading of heavy material.

Distribute the load in the crate evenly. Depending on the type of load, appropriate tools should be used (crane, loader, conveyor, etc.). Loading should be performed by a person with appropriate authorization to operate the equipment (if required). When loading goods in pallets or on pallets, pay attention to their distribution on the platform. The pallets must be secured so that they cannot move freely on the platform. Laying pallets in layers is prohibited.

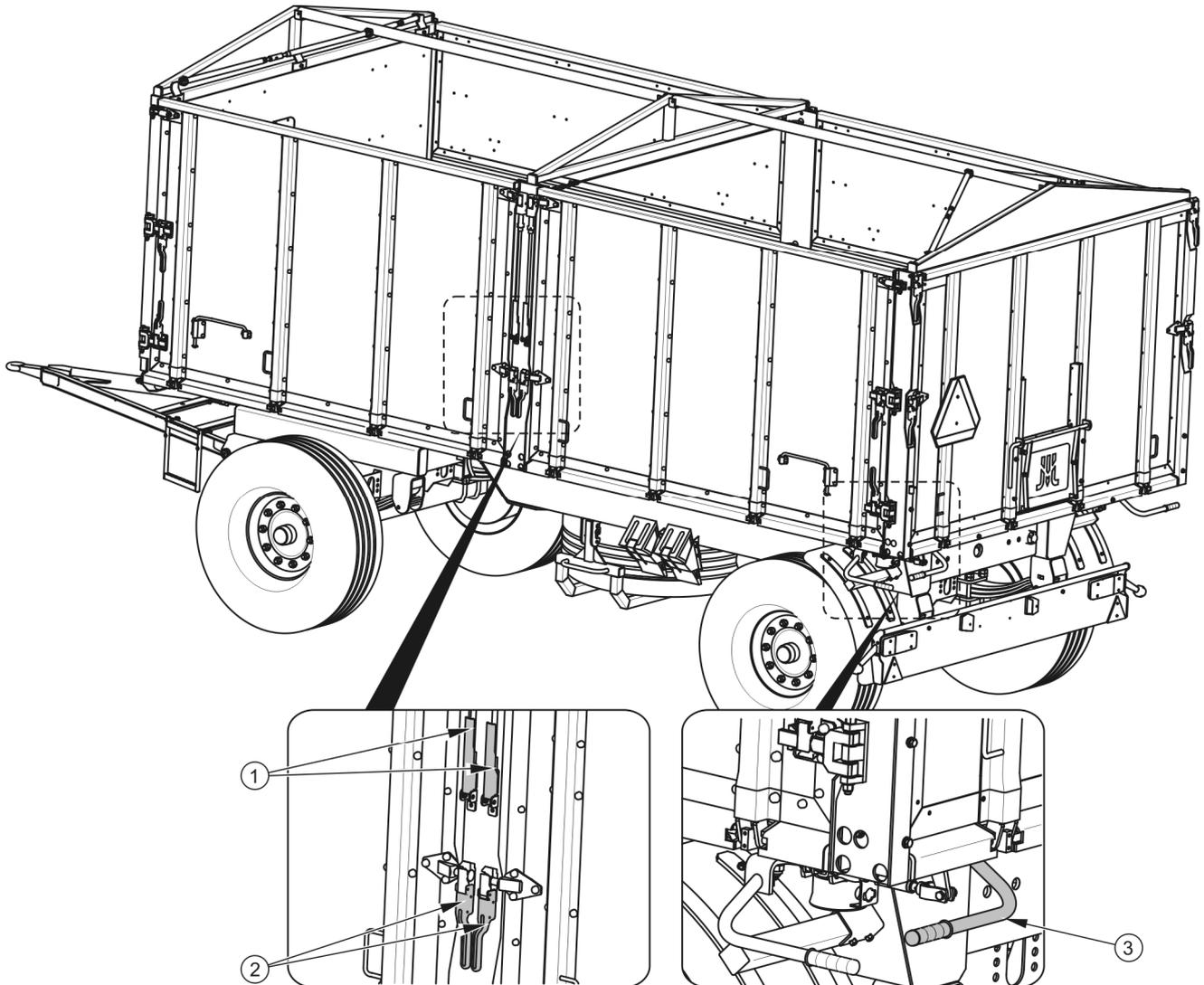
**DANGER**

Farm work should be carried out by a person experienced in this type of work.  
The load must be evenly distributed and must not hinder driving.

During pallets loading, open the side walls on the left side of the trailer. Opening of the side walls:

- ➔ unlock the locks (1) and (2) located on the central pillar of the trailer - figure (4.3),
- ➔ open bottom wall closures,

- ⇒ the lever of the closing mechanism (7) of the left front wall is on the front of the trailer - figure (3.2),
- ⇒ the lever of the closing mechanism (3) of the left rear wall is located in the rear part of the trailer - figure (4.3),



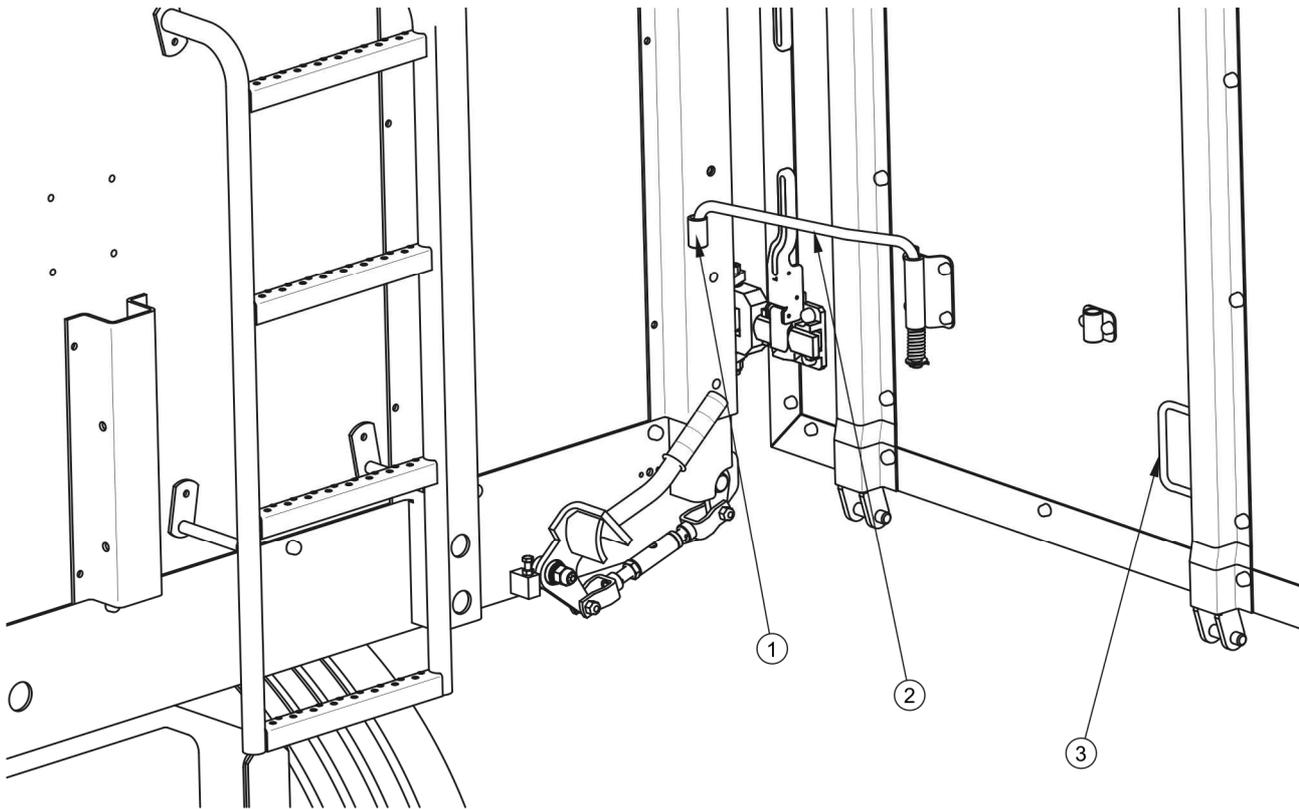
**FIGURE 4.3. Opening of the left side walls**

(1) upper lock, (2) middle lock, (3) lever of the closing mechanism

- ➔ Open the walls by pulling the handles (3) and secure them with the locks (2) located on the walls. The places where the locks are fastened are the lock slots (1) - figure (4.4).

 **DANGER**  
Be especially careful due to the risk of crushing the limbs while closing and unlocking the walls.

After loading the pallets, close the side walls in the reverse order.



**FIGURE 4.4. Blocking the left side walls after opening**

(1) lock slot, (2) lock, (3) handle

Due different density of materials, the use of the total capacity of the load box may exceed the allowable capacity of the trailer. Approximate specific weight of selected materials is presented in table (4.2). Therefore, pay special attention not to overload the trailer.

Light materials with large volumes can be loaded even above the extensions of the load box, paying particular attention to the stability of the trailer. Regardless of the type of transported load, the user is obliged to secure it in such a way that the load cannot move freely and cause contamination of the road.

**TABLE 4.2. Approximate volumetric weights of selected loads**

TYPE OF MATERIAL	VOLUMETRIC WEIGHT kg/m <sup>3</sup>
<b>Root Crops:</b> raw potatoes steamed mashed potatoes dried potatoes sugar beets - roots fodder beets - roots	700 - 820 850 - 950 130 - 150 560 - 720 500 - 700
<b>Organic fertilizers:</b> Old manure Settled down manure Fresh manure Compost Dry peat	700 - 800 800 - 900 700 - 750 950 - 1,100 500 - 600
<b>Mineral fertilizers:</b> ammonium sulphate potassium salt super phosphate basic slag potassium sulphate ground lime fertilizer	800 - 850 1,100 - 1,200 850 - 1,440 2,000 - 2,300 1,200 - 1,300 1,250 - 1,300
<b>Building Materials:</b> cement dry sand wet sand solid bricks brick blocks stone soft wood hardwood timber impregnated timber steel structures ground quicklime	1,200 - 1,300 1,350 - 1,650 1,700 - 2,050 1,500 - 2,100 1,000 - 1,200 1,500 - 2,200 300 - 450 500 - 600 600 - 800 700 - 7000 700 - 800

TYPE OF MATERIAL	VOLUMETRIC WEIGHT kg/m <sup>3</sup>
slag	650 - 750
gravel	1,600 – 1,800
<b>Plant litter and roughage:</b>	
dry meadow hay on the swath	10 - 18
hay wilted on the swath	15 - 25
hay in a collecting trailer (dry, wilted)	50 - 80
hay wilted, cut	60 - 70
dry pressed hay	120 - 150
wilted pressed hay	200 - 290
dry stored hay	50 - 90
cut stored hay	90 - 150
clover (alfalfa) wilted on the swath	20 - 25
clover (alfalfa) withered cut on a trailer	110 - 160
clover (alfalfa) wilted on a collecting trailer	60 - 100
dry stored clover	40 - 60
dry chopped stored clover	80 - 140
dry straw in rollers	8 - 15
wet straw in rollers	15 - 20
wet straw cut on a volume trailer	50 - 80
Dry straw cut on a volume trailer	20 - 40
dry straw cut on a collecting trailer	50 - 90
dry straw cut in a haystack	40 - 100
pressed straw (low compaction)	80 - 90
pressed straw (high compaction)	110 - 150
grain mass in rollers	20 - 25
cereal mass cut on a volume trailer	35 - 75
cereal mass cut on a collecting trailer	60 - 100
forage	28 - 35
forage cut on a volume trailer	150 - 400
forage on a collecting trailer	120 - 270
fresh beet leaves	140 - 160
fresh cut beet leaves	350 - 400
beet leaves on a harvesting trailer	180 - 250

TYPE OF MATERIAL	VOLUMETRIC WEIGHT kg/m <sup>3</sup>
<b>Concentrated feed and compound feed:</b>	
stored chaff	200 - 225
oil cake	880 - 1,000
dried mince	170 - 185
compound feed	450 - 650
mineral mixtures	1,100 - 1,300
oat middlings	380 - 410
wet beet pulp	830 - 1000
expeller pressed beet	750 - 800
dry beet pulp	350 - 400
bran	320 - 600
bone meal	700 - 1,000
fodder salt	1,100 - 1,200
molasses	1,350 - 1,450
silage (underground silo)	650 - 1,050
silage (tower silo)	550 - 750
<b>Seeds:</b>	
broad bean	750 - 850
mustard	600 - 700
pea	650 - 750
lentil	750 - 860
bean	780 - 870
barley	600 - 750
Shamrock	700 - 800
grass	360 - 500
maize	700 - 850
wheat	720 - 830
rape	600 - 750
flax	640 - 750
lupine	700 - 800
oat	400 - 530
Lucerne	760 - 800
rye	640 - 760

TYPE OF MATERIAL	VOLUMETRIC WEIGHT kg/m <sup>3</sup>
<b>Other:</b> dry soil wet soil fresh peat compost soil	1,300 – 1,400 1,900 – 2,100 700 - 850 250 - 350

Source: „Technologia prac maszynowych w rolnictwie”, PWN, Warsaw 1985

Construction materials can be transported on a trailer provided that the load box is properly prepared. To do this, cover the floor of the box with thick plywood, hard chipboard, thick boards or other materials with similar properties. The walls and possibly the extensions of the load box should be secured in a similar way. Failure to comply with these requirements may cause dents in the floor and walls, abrasion of painted surfaces and contribute to corrosion. The user acting contrary to the above recommendations may void the warranty.

Mineral fertilizers and other materials, the contact of which with painted or steel surfaces may cause damage, should be transported in sealed packaging (bags, boxes, barrels, etc.), and after transporting the material, thoroughly wash the load box with a strong jet of water.

If materials that exert point pressure on the floor of the load box are transported, they should be protected against damage by placing thick boards, plywood or other materials with similar properties under the load.

	<p><b>CAUTION</b></p> <p>It is forbidden to exceed the permissible load capacity of the trailer because it threatens road safety and may cause damage to the machine.</p>
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## 4.6 LOAD TRANSPORTATION

When driving on roads comply with traffic regulations, be prudent and considerate. The most important guidelines for steering a tractor with a trailer attached are presented below.

- Before moving off make sure that there are no bystanders, especially children, near the trailer and tractor. Ensure proper visibility.

- Make sure that the trailer is correctly connected to the tractor and tractor's hitch is properly secured.
- The trailer must not be overloaded, the load must be distributed evenly in such a way that it does not exceed the permissible pressure on the trailer's running axles. Exceeding the permissible load capacity of the trailer is forbidden and may cause damage to the trailer, and may also pose a threat during road travel for the tractor and trailer operator or other road users.
- The permissible design speed and speed resulting from restrictions on road traffic regulations must not be exceeded. The travel speed should be adjusted to the prevailing road conditions, trailer load condition, type of load carried and other conditions.
- The trailer may be towed on slopes of up to 8°, unloading should only be carried out on level ground.
- The trailer disconnected from the tractor must be secured by immobilizing it with the parking brake and placing wedges or other elements without sharp edges under the wheel. Leaving an unsecured trailer is prohibited. In the event of a trailer breakdown, stop at the side of the road without endangering other road users and mark the stopping place in accordance with traffic regulations.
- During driving on public roads, the trailer must be marked with a slow-moving vehicle warning sign located on the rear wall of the load box, if the trailer is the last vehicle in the set. The tractor operator is required to equip the trailer with an approved or approved warning reflective triangle. While driving, obey the rules of the road, signal the change of direction by means of direction indicators, keep clean and take care of the technical condition of the lighting and signalling installation. Damaged or lost lighting and signalling components must be repaired or replaced immediately.
- Avoid ruts, depressions, ditches, or driving along roadside slopes. Driving across such obstacles can cause the trailer and tractor to tilt suddenly. This is particularly important because the centre of gravity of the laden trailer adversely affects driving safety. Driving near the edges of ditches or canals is dangerous due to the risk of landslides under the wheels of a trailer or tractor.

- The travel speed should be reduced sufficiently in advance of driving to curves, when driving on uneven or sloping terrain.
- When driving, avoid sharp turns, especially on slopes.
- It should be remembered that the braking distance of the set increases significantly with the increase in the weight of the transported load and the increase in speed.

### CAUTION



Before driving the trailer, check that:

- bolts connecting the load box to the lower frame are secured against spontaneous falling out,
- the wall hinge pins are secured against falling out.

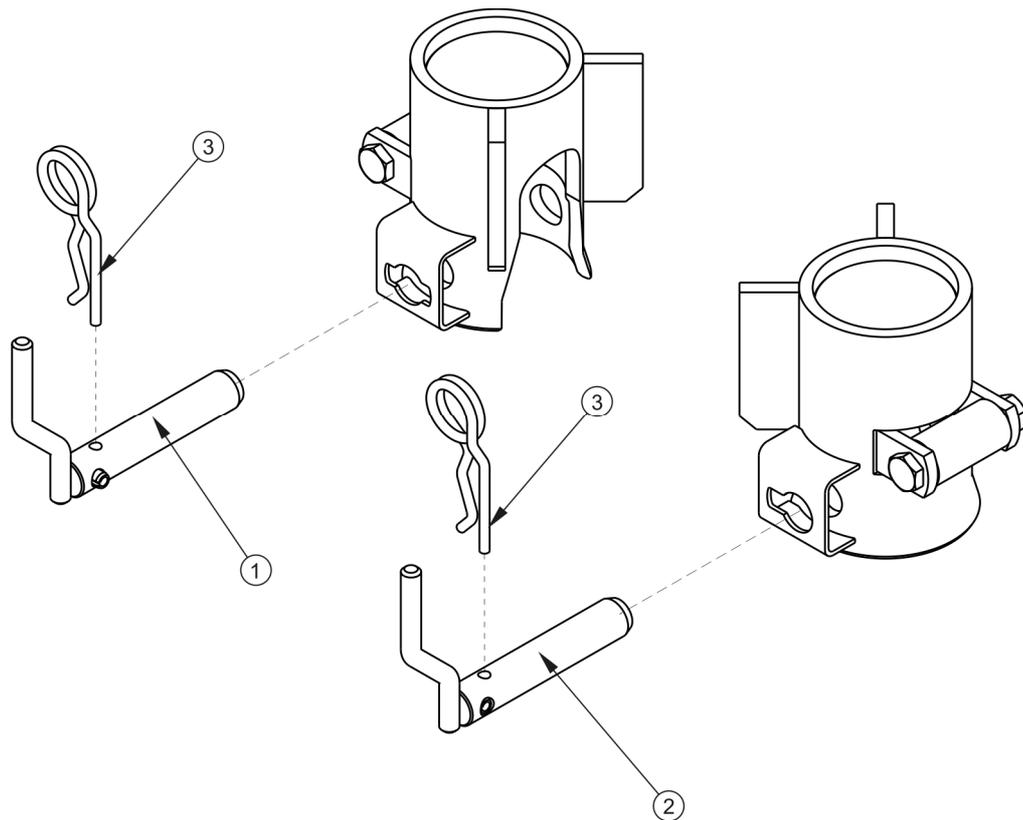
## 4.7 UNLOADING

The trailer is equipped with a hydraulic tipping system, and a suitable frame and load box construction enabling tipping to the sides and to the rear. Tipping the load box is controlled by means of the distributor of the tractor's external hydraulic system.

### 4.7.1 UNLOADING THE CARGO BY TILTING THE WALLS

The trailer is unloaded in the following order:

- ➔ The tractor and trailer should be positioned to drive straight ahead on flat and hard ground,
- ➔ Immobilize the tractor and trailer with parking brake,
- ➔ Place the tipping pins (connecting the load box with the lower frame) on the side on which the unloading will be performed and secure it properly.
  - ⇒ tipping pins and individual seats are designed in such way that they cannot be moved diagonally across the load box, which would cause damage to the trailer,



**FIGURE 4.5. Locking of the tipping pins**

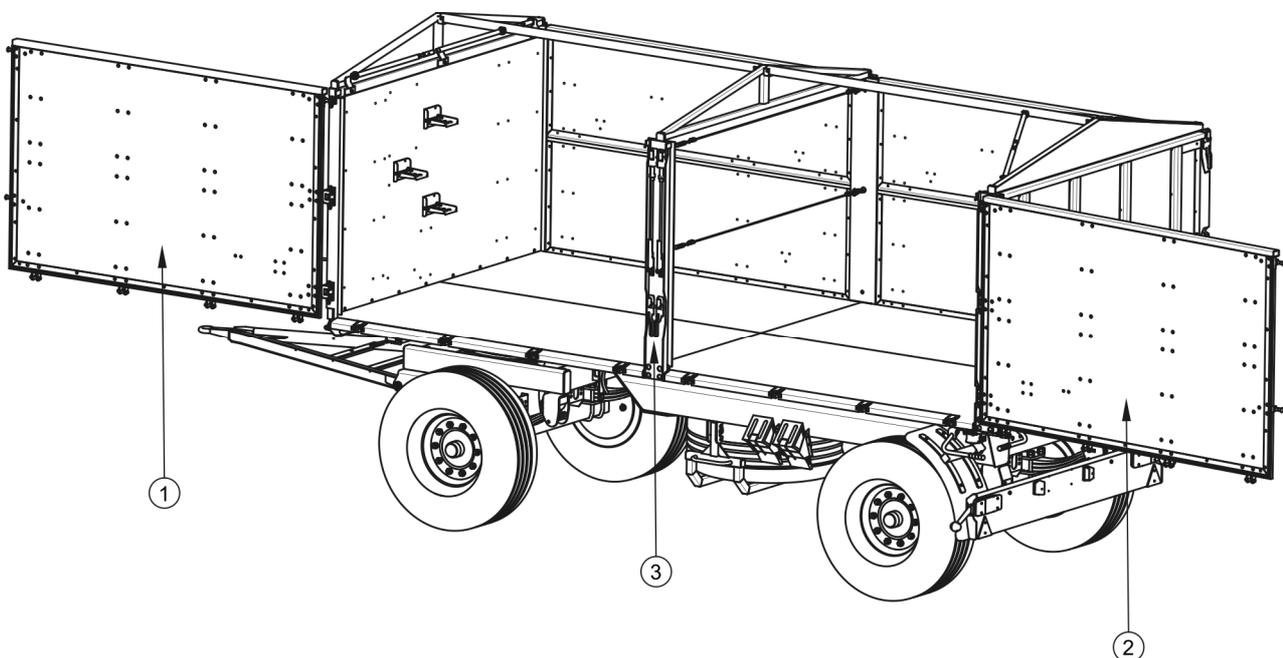
*(1) rear left or right front tipping pin, (2) rear right or left front tipping pin, (3) securing cotter pin*

- ➔ Open the wall closures on the side of the trailer to be unloaded. Be careful when opening it as the load may put a lot of pressure on the walls,
  - ⇒ First, unlock the central locks (2) - see figure (4.3) on the central pillar, then the locks on the outer posts of the load box, and finally unlock the lower bolts of the walls with a suitable lever,
- ➔ Unload the load by tilting the load box using a telescopic cylinder. It is forbidden to start and jerk with the raised box in order to empty the glued load,
- ➔ Lower the cargo box all the way down. It is forbidden to start and jerk with the raised box,
- ➔ Clean the edges of the floor of cargo residues and close the walls of the load box.

## 4.7.2 UNLOADING OF CARGO TRANSPORTED ON PALLETS

The trailer is unloaded in the following order:

- ➔ Immobilize the tractor and trailer with parking brake,
- ➔ Roll up the tarpaulin and place it in the holders provided for this purpose,
- ➔ Make sure that the load does not tip over and rests against the walls of the load box,
- ➔ Open the walls on the left side of the trailer - figure (4.6),



**FIGURE 4.6.** Opening of the walls on the left side of the trailer

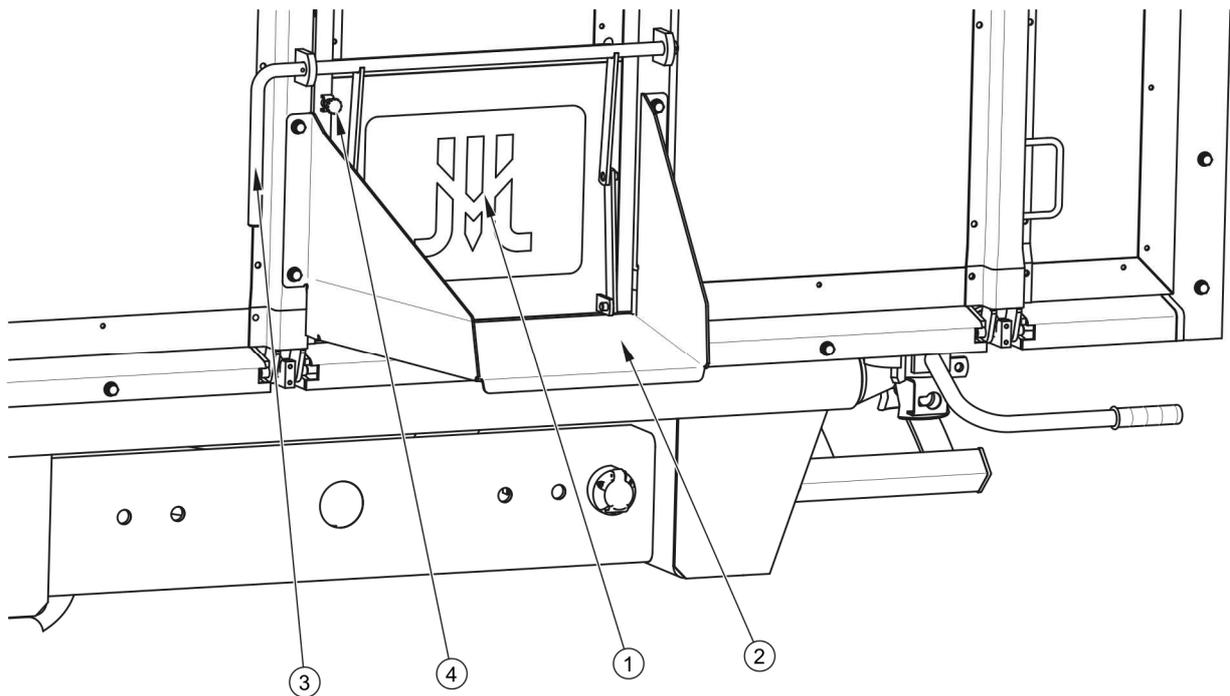
(1) left front wall, (2) left rear wall, (3) central pillar

- ➔ Protect the walls against accidental closing - figure (4.4),
- ➔ Unload the trailer with a forklift, close the walls of the load box,
- ➔ Before moving off, make sure that the tipping pins are in the correct position and are secured with cotter pins.

The trailer can be additionally equipped with side chute plates and a rear chute plate, which ensure unloading of the material transported outside the trailer's track. This solution prevents damage to agricultural crops during unloading.

The rear wall of the load box is equipped with a chute bolt (1) and a chute (2) (additional equipment) - figure (4.7), which are used for unloading loose materials. The chute design

enables accurate dosing of the load into the packaging (bags, boxes, etc.). The size of the gap opening should be determined by the lever (3). To do this, loosen the locking screw (4), open the valve at the desired height and secure it again with the screw. During unloading, using the chute, the wall locks and extensions must not be opened, and the load box must be lifted slowly and smoothly. Rapid lifting of the load box will cause very high pressure on the rear part of the load box as a result of the load shifting and may threaten the stability of the machine.



**FIGURE 4.7. Chute**

*(1) chute slide, (2) chute, (3) lever, (4) locking screw*

**DANGER**

Tilting of the load box may only be performed on firm and flat ground.

Only original pins with a handle and a safety device should be used. The use of non-original pins may damage the trailer. Tipping pins must be properly locked.

When opening wall closures and locks, be extremely cautious due to pressing the load on the walls.

When closing and opening of the walls and the chute latch, be especially careful to avoid crushing your fingers.

Tilting of the load box may be performed only when the trailer is connected to the tractor.

It is recommended to unload bulky materials that are loaded above 1 m by tilting the load box back.

Make sure that during unloading nobody is near the tilted load box and the falling load.

It is forbidden to pull the trailer forward if the bulk or scattering load has not been unloaded.

It is forbidden to tilt the load box during strong gusts of wind.

It is forbidden to start or drive with the load box raised.

Use extreme caution when working near power lines.



## 4.8 DISCONNECTING FROM THE TRACTOR

In order to disconnect the trailer from the tractor, perform the following actions in order.

- ➔ Block the tractor and trailer with parking brake.
- ➔ Switch off the tractor engine. Close the tractor cabin and secure it against unauthorized access.
- ➔ Disconnect the hydraulic tilting system hoses from the tractor.
- ➔ Disconnect the electric wire.
- ➔ Disconnect pneumatic system conduits (applies to double conduit systems).
  - ⇒ Disconnect the red conduit wire.
  - ⇒ Disconnect the yellow conduit wire.
- ➔ Disconnect the pneumatic system conduits (applies to single conduit systems).
  - ⇒ Disconnect the pneumatic conduit marked black.

- ➔ Disconnect the hydraulic brake system hoses (applies to trailer version with hydraulic brake system).
- ➔ Secure the cable ends with covers. Insert the plugs into their respective sockets.
- ➔ Unlock the transport hitch and disconnect the trailer drawbar from the tractor hitch and drive the tractor away.
- ➔ Place safety wedges under the trailer wheel.
  - ⇒ The wheel chocks must be positioned so that one of them is at the front of the wheel and the other at the rear of the rear wheel - see chapter 2.



## **DANGER**

**When disconnecting the trailer from the tractor, take particular care. Ensure good visibility. Unless it is necessary, do not stay between the trailer and the tractor.**

**Before disconnecting wires and drawbar eye, close tractor cab and secure it against unauthorized access. The tractor engine must be turned off.**

## **4.9 USE OF TIRES**

- When working with tires, the trailer should be secured against rolling by placing wedges or other elements without sharp edges under the wheels. The wheel can be dismantled only when the trailer is not loaded.
- Repair work on wheels or tires should be carried out by persons trained and authorized to do so. These works should be carried out using appropriately selected tools.
- Inspection of nut tightening should be carried out after the first use of the trailer, after the first journey with a load and then every 6 months of use, or every 25,000 km. In the event of intensive work, check the nut tightening at least every 100 kilometres. Each time, the inspection activities should be repeated if the trailer wheel has been disassembled.
- Regularly check and maintain proper tire pressure as recommended in the instructions (especially after a long break of not using the trailer).

- Tire pressure should also be checked during all-day intensive work. It should be taken into account that an increase in tire temperature can increase the pressure by up to 1 bar. With such a rise in temperature and pressure, reduce the load or speed.
- Never reduce pressure by venting if it increases due to temperature.
- Tire valves should be protected with caps to avoid penetration of dirt.
- Do not exceed the maximum trailer speed.
- During the whole day cycle, take a minimum of one hour break at noon.
- Observe 30 minutes breaks for cooling the tires after driving 75 km or after 150 minutes of continuous driving, whichever comes first.
- Avoid damaged road surfaces, sudden and variable manoeuvres, and high speeds when turning.

**CHAPTER**

**5**

**TECHNICAL SUPPORT**

## 5.1 PRELIMINARY INFORMATION

When using the trailer, it is necessary to constantly check the technical condition and perform maintenance procedures that will allow the vehicle to be kept in good technical condition. Therefore, the trailer user is obliged to perform all maintenance and adjustment activities specified by the Manufacturer.

Repairs during the warranty period may only be carried out by authorized service centres.

This chapter describes in detail the procedures and scope of activities that the user can perform on his own. In the event of unauthorized repairs, changes to factory settings or activities that were not taken into account as possible for the trailer operator to perform this user loses the warranty.

## 5.2 OPERATION OF BRAKES AND DRIVING AXLES

### 5.2.1 PRELIMINARY INFORMATION

Work related to the repair, replacement or regeneration of driving axle elements of mechanical brakes should be entrusted to specialized workshops that have the appropriate technologies and qualifications to perform this type of work.

User responsibilities include only:

- pre-check of the brakes of driving axle,
- checking and adjusting the clearance of the axle bearings,
- wheel assembly and disassembly, checking wheel tightness,
- air pressure control and maintenance, assessment of the technical condition of wheels and tires,
- adjustment of mechanical brakes,
- replacement of grease in wheel axle bearings,

Activities related to:

- grease replacement in axle bearings axle,
- replacement of bearings, hub seals,

- brake lining replacement, brake repair,

can be performed by specialized workshops.



## **DANGER**

**It is forbidden to use the trailer with inefficient braking system.**

### **5.2.2 PRE-CHECK OF THE BRAKES OF DRIVING AXLE**

After purchasing the trailer, the user is obliged to thoroughly check the braking system of the trailer axles.



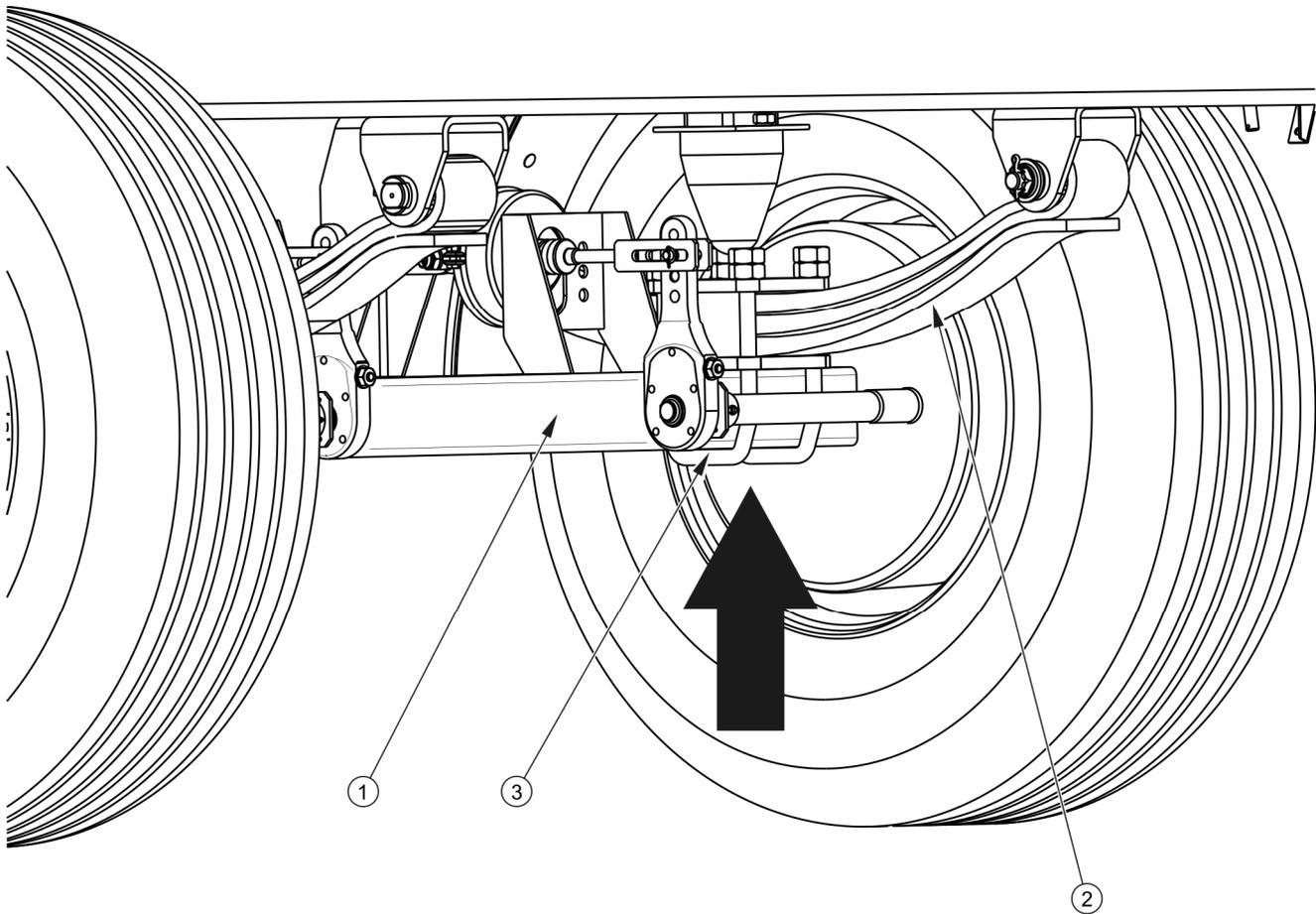
**Preliminary checks of the wheel axle brakes must be carried out:**

- after the first use of the trailer,
- after the first trip with a load.

#### **Control activities**

- ➔ Hitch trailer to tractor and place wedges under rear trailer wheel.
- ➔ Engage and release in turn the main brake and then the trailer parking brake.
  - ⇒ The main brake and parking brake should be engaged and release without any major resistance or jamming.
- ➔ Check the mounting of the actuator and return springs.
- ➔ Check the actuator stroke and the correct return of the piston rod to the starting position.
  - ⇒ The help of a second person is required to activate the trailer brake.
- ➔ Check the completeness of the wheel axle elements (cotter pins in castellated nuts, expansion rings, etc.).
- ➔ Check hydraulic cylinders or pneumatic cylinders for tightness - compare chapters 5.3.2 and 5.4.2.

### 5.2.3 CHECKING THE CLEARANCE OF THE AXLE BEARINGS



**FIGURE 5.1. Hoist support point**

(1) driving axle, (2) spring, (3) U-bolt

#### Preparatory activities

- Hitch trailer to tractor, immobilize tractor with parking brake.
- Place the tractor and trailer on firm and level ground.
  - ⇒ Set the tractor to drive straight ahead (the front axle of the trailer must not be turned).
- Place safety wedges under the trailer rear wheel. Ensure that the trailer will not roll during inspection.
- Raise the front wheel (located on the opposite side of the placed wedges).
  - ⇒ The jack should be placed between the U bolts (3), - figure (5.1) securing the axle (1) to the spring (2), or as close as possible to the

spring mounting. The recommended support point is marked with an arrow. The jack must be suited to the trailer weight.

### Checking the clearance of the axle bearings

- ➔ Turn the wheel slowly in two directions to check if the movement is smooth and the wheel rotates without excessive resistance and jams.
- ➔ Turn the wheel so that it rotates very quickly, check that the bearing does not make any unusual sounds.
- ➔ Try to feel looseness by moving the wheel.
  - ⇒ You can use the lever under the wheel, resting the other end on the ground.
- ➔ Repeat for each wheel separately, remembering that the jack must be on the opposite side of the wedges.

If looseness is felt, adjust the bearings. Unnatural sounds coming from the bearing may be symptoms of excessive wear, dirt or damage. In this case, the bearing together with the sealing rings should be replaced or cleaned and regreased. When checking bearings, make sure that any noticeable looseness comes from the bearings, not the suspension system (e.g. looseness on the spring pins, etc.).

#### ADVICE



**Damaged hub cover or lack thereof will cause the penetration of dirt and moisture into the hub, which will result in much faster wear of bearings and hub seals.**

**Bearing life depends on trailer operating conditions, load, vehicle speed and lubrication conditions.**

Check the technical condition of the hub cover, replace if necessary. Check of the bearing looseness can only be carried out when the trailer is connected to the tractor and the loading box is empty.



#### Checking the clearance of the axle bearings:

- after covering the first 1,000 km,
- before intensive use of the trailer,
- every 6 months of use or 25,000 km.

**DANGER**

Before starting work, read the instructions for the lift and follow the manufacturer's instructions.

The lift must stand firmly against the ground and the axle.

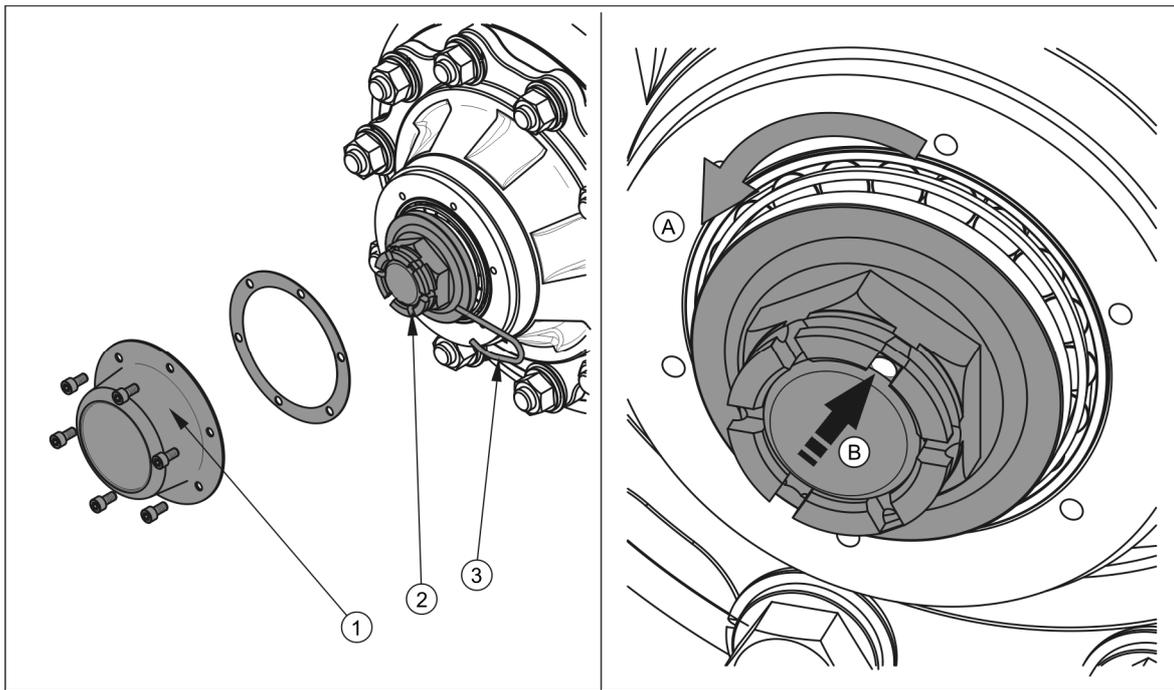
Ensure that the trailer will not roll when checking the looseness of the axle bearings.

**5.2.4 ADJUSTING THE CLEARANCE OF THE AXLE BEARINGS****Preparatory activities**

- ➔ Prepare the tractor and trailer for adjustment as described in chapter 5.2. 3..

**Adjusting the clearance of the axle bearings**

- ➔ Remove the hub cover (1) – figure (5.2).
- ➔ Remove the cotter pin (3) securing the castellated nut (2).
- ➔ Tighten the castellated nut to remove slack.
  - ⇒ The wheel should rotate with slight resistance.
- ➔ Unscrew the nut (not less than 1/3 turn) to cover the nearest nut groove with a hole in the axle pin. The wheel should rotate without excessive resistance
  - ⇒ The nut must not be too tight. It is not recommended to apply too much pressure due to deterioration of bearing operating conditions.
- ➔ Secure the castellated nut with a cotter pin and mount the hub cover.
- ➔ Gently tap the hub with a rubber or wooden hammer.



**FIGURE 5.2. Adjustment of axle bearings**

(1) hub cover, (2) crown nut, (3) cotter pin

The wheel should rotate smoothly, without jams and no noticeable resistance, not from rubbing the shoes against the brake drum. Adjusting of the bearing looseness can only be carried out when the trailer is connected to the tractor and the loading box is empty.



### ADVICE

If the wheel is removed, the bearing clearance is easier to check and adjust.

## 5.2.5 WHEEL ASSEMBLY AND DISASSEMBLY, CHECKING NUT TIGHTNESS

### Wheel disassembly

- ➔ Block the trailer with parking brake.
- ➔ Place wedges under the rear wheel.
- ➔ Ensure that the trailer is properly secured and will not move during wheel dismantling.

- ➔ Loosen the wheel nuts according to the order given in figure (5.3).
- ➔ Place the jack and raise the trailer.
- ➔ Remove the wheel.

### Wheel mounting

- ➔ Clean the axle pins and nuts from contamination.
  - ⇒ Do not lubricate the threads of the nut and stud.
- ➔ Check the condition of the pins and nuts, replace if necessary.
- ➔ Mount the wheel on the hub, tighten the nuts so that the rim fits snugly to the hub.
- ➔ Lower the trailer, tighten the nuts according to the recommended torque and the given order.

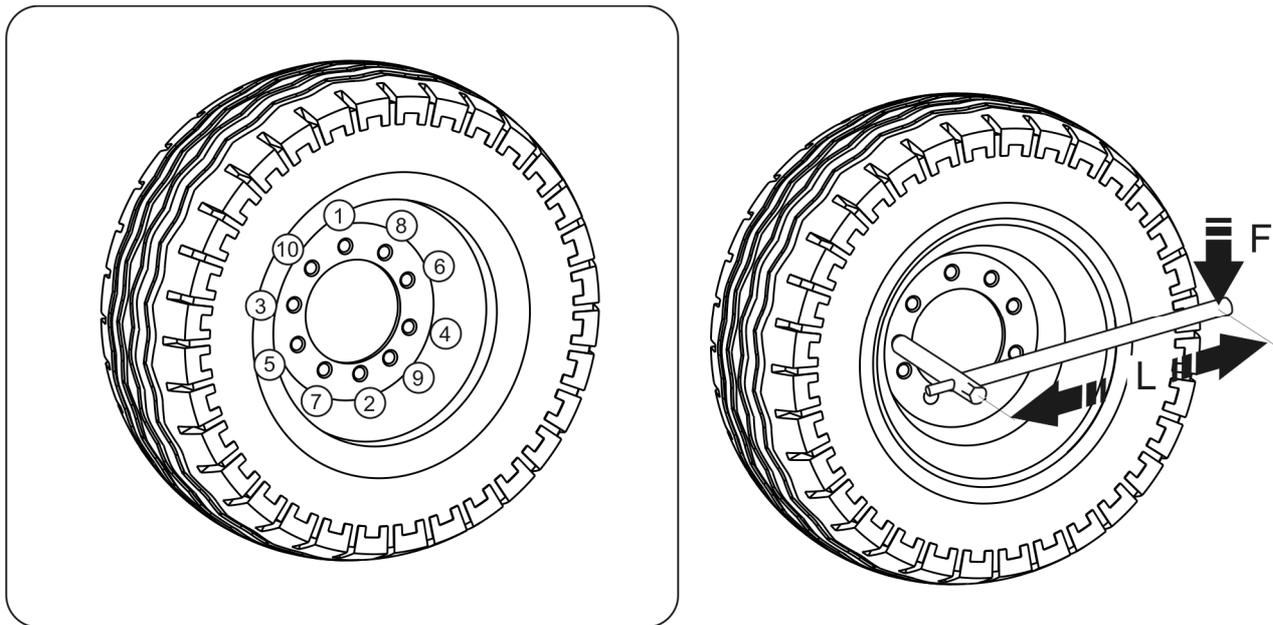


#### **ADVICE**

**Wheel nuts should be tightened to 270 Nm - M18x1.5 nuts.**

### Tightening the nuts

The nuts should be tightened gradually diagonally (in several stages until the required tightening torque is achieved), using a torque wrench. In the absence of a torque wrench, you can use a regular wrench. The wrench arm (L), figure (5.3), should be selected according to the weight of the person (F) tightening the nut. It should be remembered that this method of tightening is not as accurate as when using a torque wrench.



**FIGURE 5.3.** The order of the nuts tightening

(1) - (10) order of tightening the nuts, (L) wrench length, (F) user weight

#### Checking wheel axle tightening:



- after the first use of the trailer,
- after the first trip with a load,
- after covering the first 1,000 km,
- every 6 months of use or 25,000 km.

In the event of intensive use of the trailer, the inspection should be performed at least every 100 km. All operations should be repeated if the wheel was disassembled.

#### CAUTION



Wheel nuts must not be tightened with impact wrenches, due to the danger of exceeding the permissible tightening torque, which may result in breaking the connection thread or breaking the hub pin.

The highest tightening accuracy is obtained with a torque wrench. Before starting work, make sure that the correct torque value is set.

**TABLE 5.1 Key arm selection**

TIGHTENING TORQUE	BODY WEIGHT (F)	ARM LENGTH (L)
[Nm]	[kg]	[m]
270	90	0.30
	77	0.35
	67	0.40
	60	0.45

**5.2.6 AIR PRESSURE CONTROL, ASSESSMENT OF TECHNICAL CONDITION OF TIRES AND STEEL WHEELS**

The tire pressure should be checked after each wheel change, and at least once a month. In the event of intensive use, it is recommended to check the air pressure more often. The trailer must be unloaded at this time. Checking should be carried out before driving, when the tires are not warm, or after a long standstill of the machine.



**ADVICE**

The value of the tire pressure is specified on the information sticker, placed on the rim or upper frame, above the trailer wheel.



**DANGER**

Damaged tires or wheels can be the cause of a serious accident.

When checking pressure, pay attention to the technical condition of rims and tires. Look carefully at the side surfaces of the tires and check the tread condition.

In the event of mechanical damage, consult your nearest tire service centre and ensure that your tire defect is eligible for replacement.

Rims should be checked for deformation, material cracks, weld cracks, corrosion, especially around welds and contact with the tire.

Technical condition and appropriate maintenance of wheels significantly extends the life of these elements and ensures an appropriate level of safety for trailer users.



**Pressure control and visual inspection of steel wheels:**

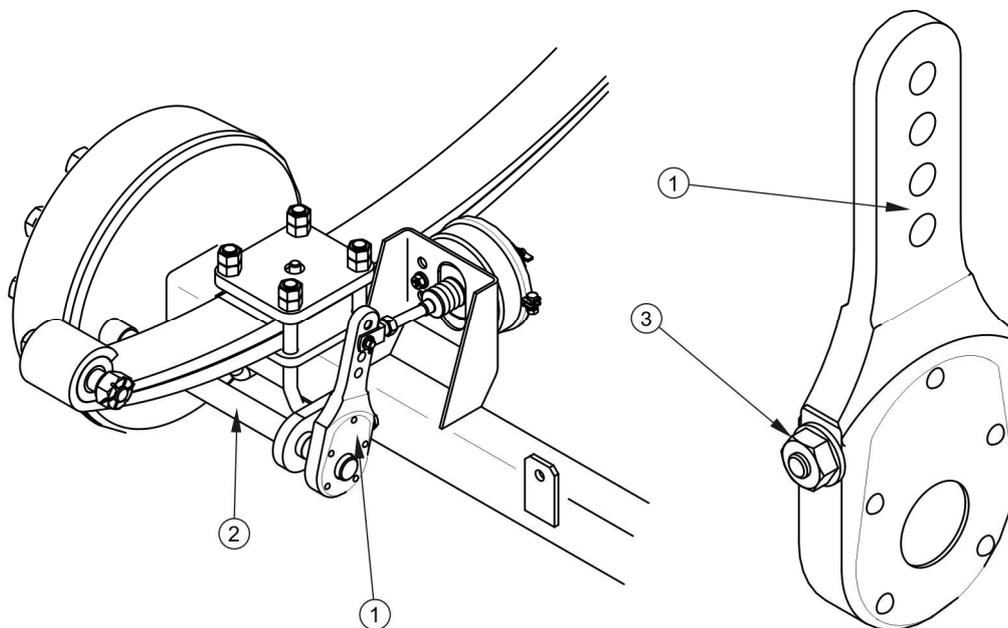
- every 1 month of use,
- every week in case of intensive use,
- after changing the wheel.

### 5.2.7 ADJUSTMENT OF MECHANICAL BRAKES

While using the trailer, the drum brake friction linings will wear out. The piston stroke is lengthened and the braking force is reduced when the limit value is exceeded.

Adjustment must be made when:

- stroke of the actuator piston rod is  $\frac{2}{3}$  of the maximum stroke,
- expander levers are not set parallel to each other during braking, the brake system was repaired.
- after repairing of the braking system.



**FIGURE 5.4. Adjusting of the clearance of the axle bearings**

(1) expander arm, (2) expander shaft, (3) adjusting screw

The trailer wheels must brake simultaneously. Brakes adjustment consists in changing the position of the expander arm (1) - figure (5.4), in relation to the expander shaft (2). To do this, turn the adjustment screw (3) in such a direction that the expander lever moves:

- reverse - if the brake brakes too late,
- forward - if braking is too early.

The adjustment should be carried out separately for each wheel. After correct adjustment of the brakes, with full braking, the expander arms should form an angle of about  $90^{\circ}$  with the actuator piston rod, and the stroke should be about half the length of the total stroke of the piston rod. After releasing the brake, expander arms must not rest against any structural elements, as too little retraction of the piston rod may cause the jaws to rub against the drum and, as a result, overheat the trailer brakes. Expander arms, located on one axle, must be parallel to each other with full braking. If this is not the case, adjust the position of the lever that has the longer stroke.

When removing the cylinder fork, remember or mark the original position of the cylinder fork pin. The mounting position is selected by the Manufacturer and cannot be changed.

### **5.2.8 REPLACEMENT AND ADJUSTMENT OF PARKING BRAKE CABLE TENSION**

The correct operation of the parking brake depends on the effectiveness of the brakes on the rear axle and the correct tension of the brake cable.

Adjustment of parking brake cable tension should be carried out in the case of:

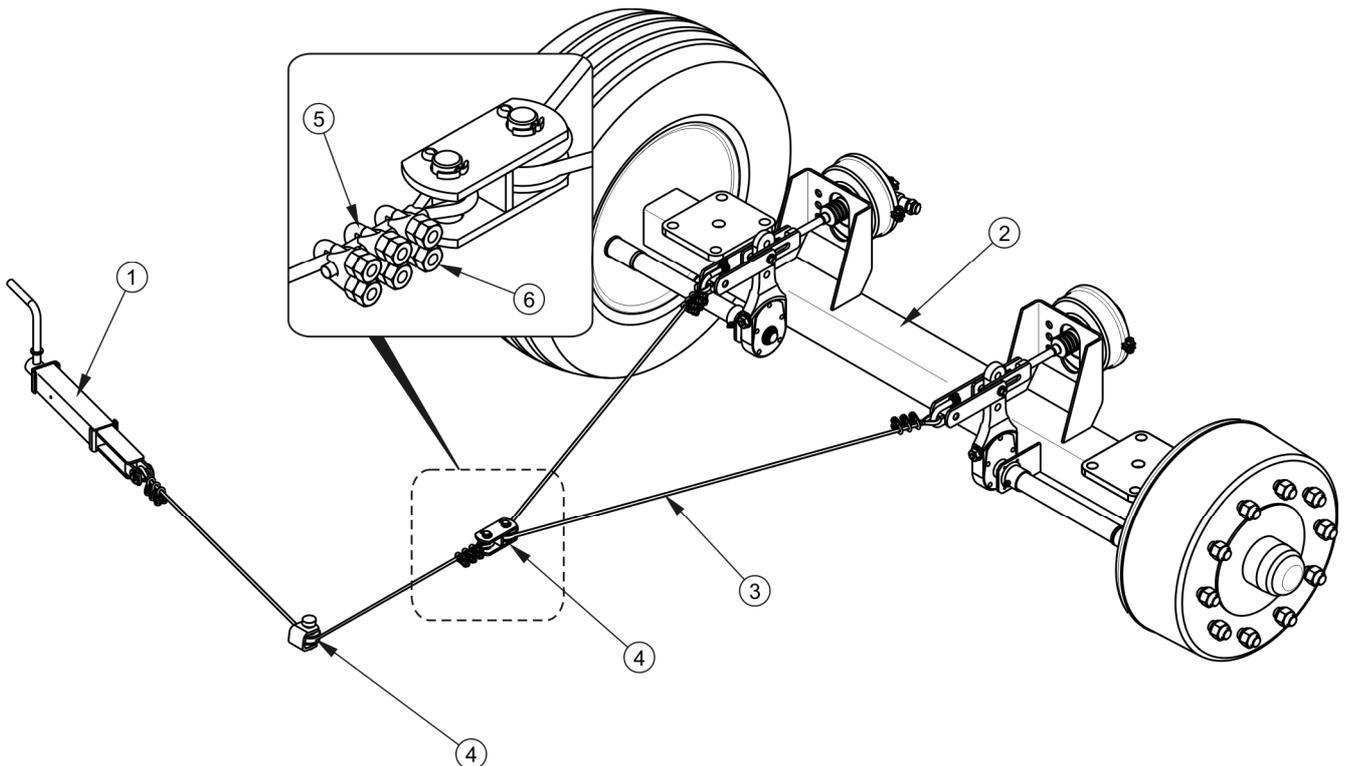
- cable stretching
- loosening the parking brake cable clamps,
- after adjusting the axle brake,
- after repairs to the axle brake system,
- after repairs to the parking brake system.

Before adjusting, make sure that the axle brake is properly adjusted and functions properly.

#### **Parking brake cable replacement**

- ➡ Hitch trailer to tractor. Hitch trailer to tractor.

- ➔ Place the trailer and tractor on a level surface.
- ➔ Loosen the nuts (6) of the clamps cable .
- ➔ Remove cable (3).
- ➔ Lubricate the parking brake crank mechanism and the cable guide pins(4).
- ➔ Install a new cable, adjust cable tension.



**FIGURE 5.5. Adjustment of parking brake cable tension**

(1) brake crank mechanism, (2) travel axle rear, (3) handbrake cable, (4) guide pulley shackle, (5) bow clamp, (6) clamping nuts

#### **Adjustment of parking brake cable tension**

- ➔ Hitch trailer to tractor. Hitch trailer to tractor.
- ➔ Place the trailer and tractor on a level surface.
- ➔ Unscrew the screw of the brake mechanism as much as possible (1) - figure (5.5), (counter clockwise).
- ➔ Loosen the nuts (6) of the clamps (5) on the handbrake cable (3).
- ➔ Tighten the cable and tighten the clamps.

- ⇒ The length of the parking brake cable should be selected so that when the service and parking brake is completely released, the cable is loose and hangs 1-2 cm.



**Parking brake control and/or adjustment:**

- every 12 months.
- in case of emergency.

## 5.3 PNEUMATIC SYSTEM SERVICE

### 5.3.1 PRELIMINARY INFORMATION

Work related to the repair, replacement or regeneration of system components (brake cylinders, lines, control valve, braking force regulator, etc.) should be entrusted to specialized workshops that have the appropriate technologies and qualifications to perform this type of work.

The user's obligations related to the operation of the pneumatic system include only:

- checking system tightness and visual inspection of the system,
- cleaning the air filter (filters),
- air tank drainage,
- cleaning the drainage valve,
- cleaning and maintenance of pneumatic conduit connectors.



**DANGER**

**It is forbidden to use the trailer with inefficient braking system.**

## 5.3.2 TIGHTNESS CHECK AND VISUAL INSPECTION OF THE INSTALLATION

### Checking the tightness of pneumatic systems

- ➔ Hitch trailer to tractor.
- ➔ The tractor and trailer should be immobilized with the parking brake. Additionally, place wedges under the rear wheel of the trailer.
- ➔ Start the tractor to supplement the air in the trailer braking system tank.
  - ⇒ In single conduit systems air pressure should amount to approx. 5.8 bar.
  - ⇒ In double conduit systems, the air pressure should be around 8 bar.
- ➔ Switch off the tractor engine.
- ➔ Check the system components with the tractor brake pedal released.
  - ⇒ Pay special attention to cable connections and brake cylinders.
- ➔ Repeat the system check with the tractor brake pedal depressed.
  - ⇒ The help of another person is required.

In the event of a leak, the compressed air will leak out in places of damage with a characteristic hiss. The system leak can also be detected by coating the checked elements with washing liquid or other foaming agent, which will not aggressively affect the elements of the installation. It is recommended to use commercially available preparations intended for leak detection. Damaged elements should be replaced or sent for repair. If the leak appeared around the connections, the user can tighten the connector on their own. If air still leaks, replace the connector components or seals with new ones.



#### Checking the installation for leaks:

- after covering the first 1,000 km,
- each time after repair or replacement of system components,
- once a year.

### Visual assessment of the system

When checking for leaks, pay attention to the technical condition and degree of cleanliness of the system components. Contact of pneumatic conduits, seals etc. with oil, grease, gasoline etc. may damage them or accelerate the aging process. Bent, permanently deformed, cut or frayed wires are only eligible for replacement.



#### Visual assessment of the system

- carry out a visual inspection of the system at the same time as the leak test.

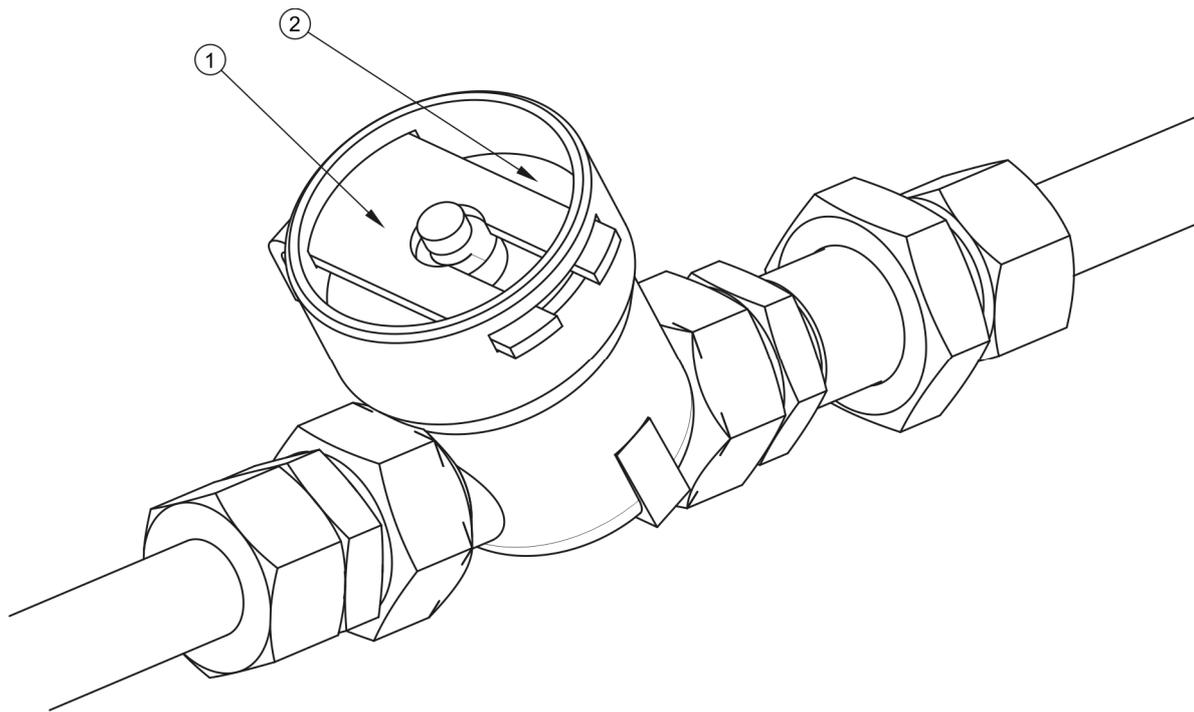


#### CAUTION

Repair, replacement or regeneration of pneumatic system components may only be carried out in a specialized workshop.

### 5.3.3 CLEANING THE AIR FILTERS

Depending on the trailer's working conditions, but at least once every three months, the air filter inserts, which are located on pneumatic system connection hoses, should be removed and cleaned. Cartridges are reusable and cannot be replaced unless they are mechanically damaged.



**FIGURE 5.6.** Air filter

(1) securing slide, (2) filter cover



### **DANGER**

Before removing the filter, reduce the pressure in the supply line. When removing the filter slide, hold the cover with the other hand. Point the filter cover away from you.

#### **The scope of service activities**

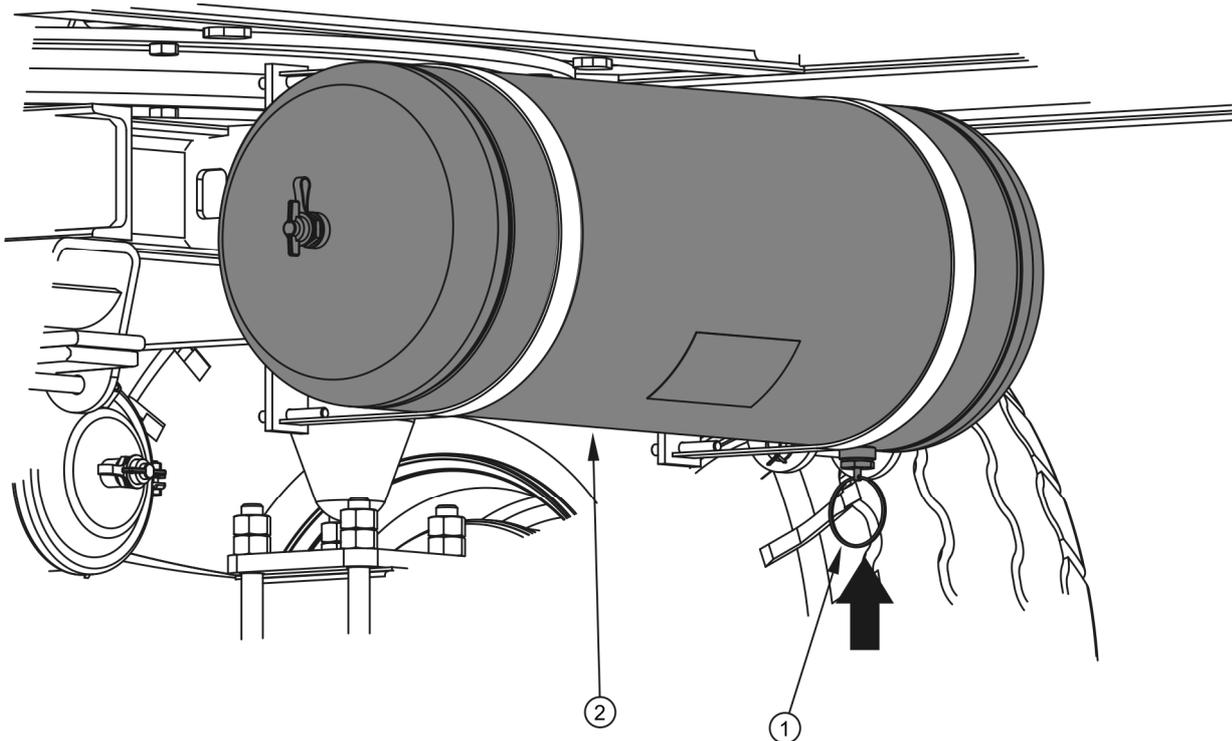
- ➔ Reduce pressure in the supply line.
  - ⇒ The pressure in the pipe can be reduced by pushing the plug of the pneumatic connection as far as it will go.
- ➔ Slide out the securing slide (1) - figure (5.6).
  - ⇒ Hold the filter cover (2) with your other hand. After removing the slide, the cover will be pushed out by the spring located in the filter housing.
- ➔ The filter element and filter body should be thoroughly washed and blown with compressed air. Installation should be in reverse order.



Cleaning the air filter (filters),

- every 3 months of use.

### 5.3.4 AIR TANK DRAINAGE

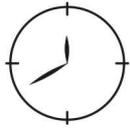


**FIGURE 5.7. Air tank drainage**

(1) drain valve, (2) air tank

#### The scope of service activities

- Deflect the drain valve stem (1) located at the bottom of the tank (2) - the tank is located at the rear of the turntable frame.
  - ⇒ The compressed air in the tank will remove water outside.
- After releasing the stem, the valve should close automatically and stop the outflow of air from the tank.
  - ⇒ In the event that the valve stem does not want to return to its position, the entire drainage valve must be unscrewed and cleaned, or replaced with a new one (if it is damaged) - see chapter 5.3.5.

**Air tank drainage:**

- each week of use.

### 5.3.5 CLEANING THE DRAINAGE VALVE

**DANGER**

Bleed the air tank before removing the drain valve.

#### The scope of service activities

- ➔ Fully reduce the pressure in the air reservoir.
  - ⇒ The pressure in the tank can be reduced by swinging the drain valve stem.
- ➔ Unscrew the valve.
- ➔ Clean the valve, blow with compressed air.
- ➔ Replace the copper gasket.
- ➔ Screw in the valve, fill the tank with air, check the tank for leaks.

**Cleaning the valve:**

- every 12 months (before the winter period).

### 5.3.6 CLEANING AND MAINTAINING PNEUMATIC CONNECTORS AND SOCKETS



#### **DANGER**

Faulty and dirty trailer connections can cause the braking system to malfunction.

A damaged connector body or socket for connecting a second trailer qualifies them for replacement. In the event of damage to the cover or gasket, replace these elements with new, functional ones. Contact of pneumatic connection seals with oils, grease, gasoline etc. may damage them and accelerate the aging process.

If the trailer is disconnected from the tractor, connections should be protected with covers or placed in their designated sockets. Before the winter period, it is recommended to preserve the seal with preparations intended for this purpose (e.g. silicone lubricants for rubber elements).

Each time before connecting the machine, check the technical condition and degree of cleanliness of connections and sockets on the agricultural tractor. If necessary clean or repair tractor sockets.



#### **Checking the trailer connections:**

- each time before connecting the trailer to a tractor or connecting a second trailer.

## 5.4 HYDRAULIC SYSTEM OPERATION

### 5.4.1 PRELIMINARY INFORMATION

Work related to the repair, replacement or regeneration of hydraulic system components (tipping cylinder, valves, etc.) should be entrusted to specialized workshops that have the appropriate technologies and qualifications to perform this type of work.

The user's obligations related to the operation of the hydraulic system include only:

- checking system tightness and visual inspection of the system,

- checking the technical condition of the hydraulic connectors.

**DANGER**

It is forbidden to perform tipping with a faulty hydraulic tipping system.  
It is forbidden to use the trailer with a defective hydraulic brake system.

## 5.4.2 CHECKING THE TIGHTNESS OF THE HYDRAULIC SYSTEM

### The scope of service activities

- ➔ Hitch trailer to tractor.
- ➔ Connect all hydraulic system hoses according to the instructions in the manual.
- ➔ Clean the couplings and cylinders (tipping cylinder and possibly hydraulic brake cylinders).
- ➔ Perform several tipping of the trailer's load box to the rear or to the side.
- ➔ Press the brake pedal on the tractor several times
  - ⇒ If the trailer is equipped with hydraulic braking system.
- ➔ Check hydraulic cylinders and hydraulic lines for leaks.
- ➔ Tighten joints if moisture is visible.

In the event of oiling on the hydraulic cylinder body, the nature of the leakage must be checked. When the cylinder is fully extended, check the seal locations. Slight leaks are permissible with symptoms of "sweating", however in the event of noticing leaks in the form of "droplets" stop using the trailer until the fault is remedied. If a malfunction has appeared in the brake cylinders, it is forbidden to drive the trailer with a damaged system until the fault is removed.



**Checking for leaks:**

- after the first week of use,
- every 12 months of use.

### **5.4.3 CHECKING THE TECHNICAL CONDITION OF THE HYDRAULIC CONNECTORS AND SOCKETS**

Hydraulic connections and sockets intended for connecting a second trailer must be technically sound and kept clean. Each time before connecting, make sure that the sockets on the tractor or the plugs of the second trailer are in good condition. The tractor's and trailer's hydraulic systems are sensitive to the presence of solid impurities that can cause damage to precise components of the installation (impurities can cause stuck hydraulic valves, scratch the surface of cylinders, etc.)



**Checking the hydraulic plugs and sockets:**

- each time before connecting the trailer to the tractor or connecting a second trailer.

### **5.4.4 REPLACEMENT OF HYDRAULIC HOSES**

Rubber hydraulic hoses should be replaced every 4 years regardless of their technical condition. This operation should be entrusted to specialized workshops.



**Replacement of hydraulic hoses:**

- Every 4 years.

## 5.5 ELECTRICAL SYSTEM SERVICE AND WARNING ELEMENTS

### 5.5.1 PRELIMINARY INFORMATION

Work related to the repair, replacement or regeneration of electrical installation components should be entrusted to specialized workshops that have appropriate technologies and qualifications to perform this type of work.

User responsibilities include only:

- technical inspection of the electrical installation and reflectors,
- replacement of bulbs.



#### CAUTION

Driving with defective lighting installations is prohibited. Damaged lampshades and burned-out bulbs should be replaced immediately before driving off. Lost or damaged reflectors should be replaced with new ones.

#### The scope of service activities

- ➔ Connect the trailer to the tractor with a suitable connection lead.
  - ⇒ Make sure the connection cable is OK. Check the connection sockets on the tractor and on the trailer.
- ➔ Check the completeness, technical condition and correct functioning of the trailer lighting.
- ➔ Check the completeness of all reflectors.
- ➔ Check the correct installation of the triangular plate holder for slow moving vehicles.
- ➔ Before travelling on a public road, make sure that the tractor has a reflective warning triangle.



**Electrical system check:**

- each time when connecting the trailer.



**ADVICE**

Before travelling, make sure that all lamps and reflectors are clean.

**5.5.2 REPLACEMENT OF BULBS**

The bulbs are presented in table (5.2). All lamp shades of lighting lamps are mounted with screws and there is no need to disassemble the entire lamp or trailer components.

**TABLE 5.2 List of bulbs**

LAMP	TYPE OF LAMPS	BULB / QUANTITY IN 1 LAMP	NUMBER OF LAMPS
Left rear lamp assembly	WE 549L	R10W / 1 pc P21W / 2 pcs	1
Right rear lamp assembly	WE 549P	R10W / 1 pc P21W / 2 pcs	1
License plate lighting lamp	LT-120	C5W-SV8,5 / 1 pc	2
Side position lamp	W17d	LED	6
Multifunctional left lamp	127,022 00 00	R5W / 1 pc	1
Multifunctional right lamp	127,023 00 00	R5W / 1 pc	1
Front plate lamp	LO-110PP	C5W-SV8,5 / 1 pc	2

## 5.6 LUBRICATION OF THE TRAILER

**TABLE 5.3** Trailer lubrication schedule

ITEM	LUBRICATION POINT	NUMBER OF LUBRICATION POINTS	TYPE OF GREASE	FREQUENCY
1	Hub bearings	4	A	24M
2	Drawbar eye	1	B	14D
3	Turntable	2	B	3M
4	Crank shaft bushing in the drum hub	4	A	3M
5	Spring leaves	4	C	6M
6	Spring surfaces	4	C	1M
7	Tipping cylinder seats and cylinder sling	4	B	3M
8	Ball bearing of the tipping cylinder	1	B	3M
9	Spring pins	4	A	3M
10	Drawbar pins	2	A	3M
11	Chute guides	2	D	1M
12	Chute tie pins	6	D	1M
13	Extension hinges	4	D	1M

ITEM	LUBRICATION POINT	NUMBER OF LUBRICATION POINTS	TYPE OF GREASE	FREQUENCY
14	Wall locks on the left	2	D	1M
15	Front locking mechanism pin	2	A	3M
16	Rear locking mechanism pin	3	A	3M
17	Bolts and wall locks	20	A	1M
18	Parking brake guide roller pins <sup>(1)</sup>	1	A	6M
19	Parking brake mechanism <sup>(1)</sup>	1	A	6M

*lubrication intervals - M month, D - day, (1) - not shown in the picture*

**TABLE 5.4 Recommended lubricants**

DESIGNATION FROM TABLE (5.3)	DESCRIPTION
A	general purpose machine grease (lithium, calcium),
B	solid grease for heavily loaded components with the addition of MOS2 or graphite
C	anti-corrosive spray
D	plain machine oil, silicone spray grease

The trailer should be lubricated with a hand or foot grease gun, filled with the recommended lubricant. If possible, remove old grease and other contaminants before starting work. After finishing work, wipe off excess grease.

Before lubricating the springs, clean them of impurities, wash with water and allow to dry. Do not use pressure washers for cleaning, the use of which may cause the penetration of

moisture between individual leaves of the spring. To lubricate the space between the blades, use aerosol formulations that have generally available lubricating and anti-corrosive properties, the outer surface should be smeared with a very thin layer of lithium or calcium grease. For this purpose, you can also use a silicone aerosol preparation (also intended for lubrication of guides, locks, etc. - see table). Lubricate the spring surface and spring pin according to the instructions in Table (5.3).

Parts that should be lubricated using machine oil should be wiped with a dry clean cloth and then applied to the lubricated surfaces with a small amount of oil (oiler or brush). Wipe off excess oil.

The replacement of grease in wheel hub bearings should be entrusted to specialized service points equipped with the appropriate tools. According to the axle manufacturer's recommendations, the entire hub must be disassembled, the bearings and individual sealing rings removed. After thorough cleaning and inspection, install lubricated components. If necessary, bearings and seals should be replaced. Lubrication of axle bearings should be carried out at least once every 2 years or after covering 50,000 km. In the event of intensive use, this should be done more often.



**When using the trailer, the user is obliged to follow the lubrication instructions in accordance with the lubrication schedule.**

Empty containers of grease or oil should be disposed of in accordance with the lubricant manufacturer's instructions.

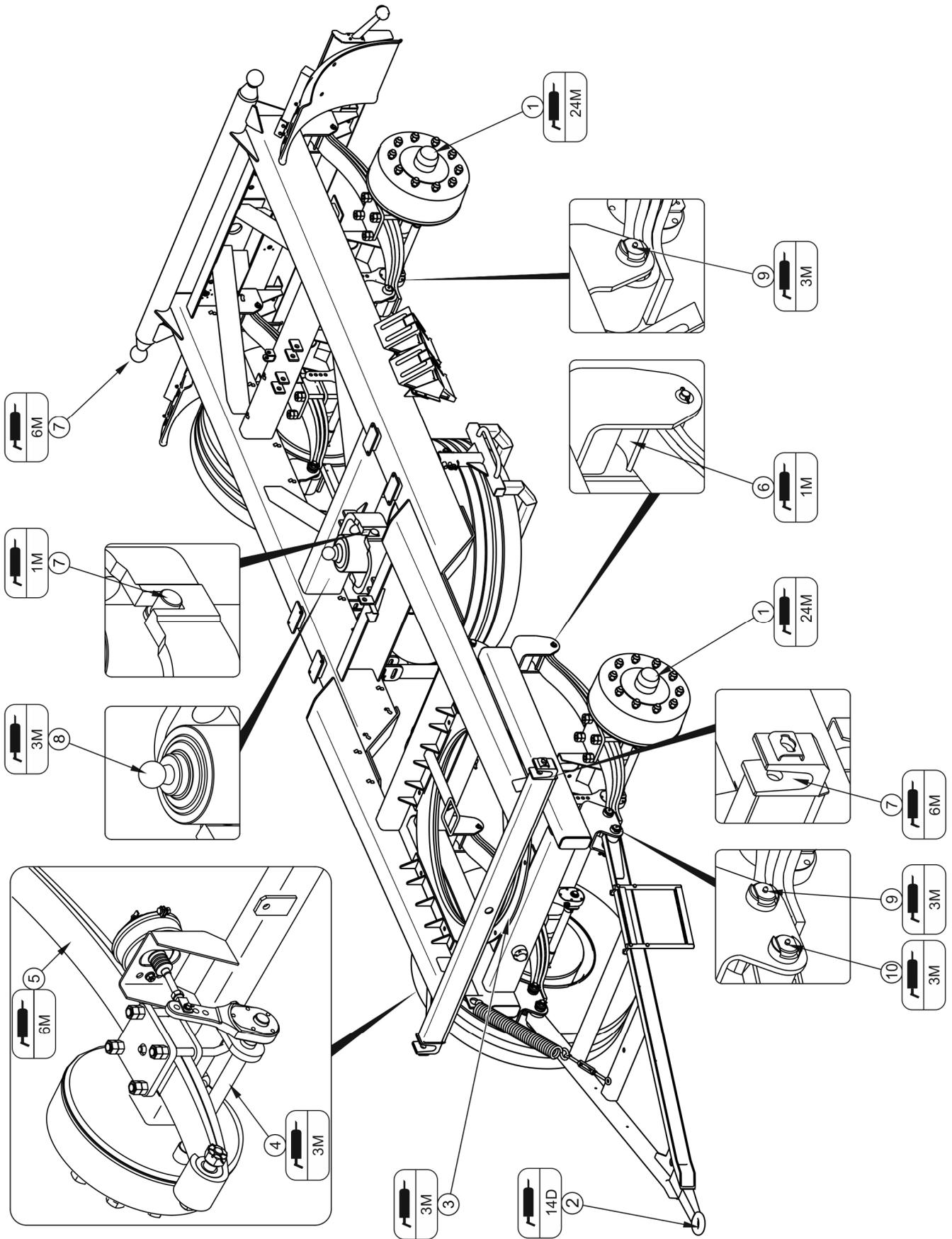


FIGURE 5.8. Trailer lubrication points, part 1

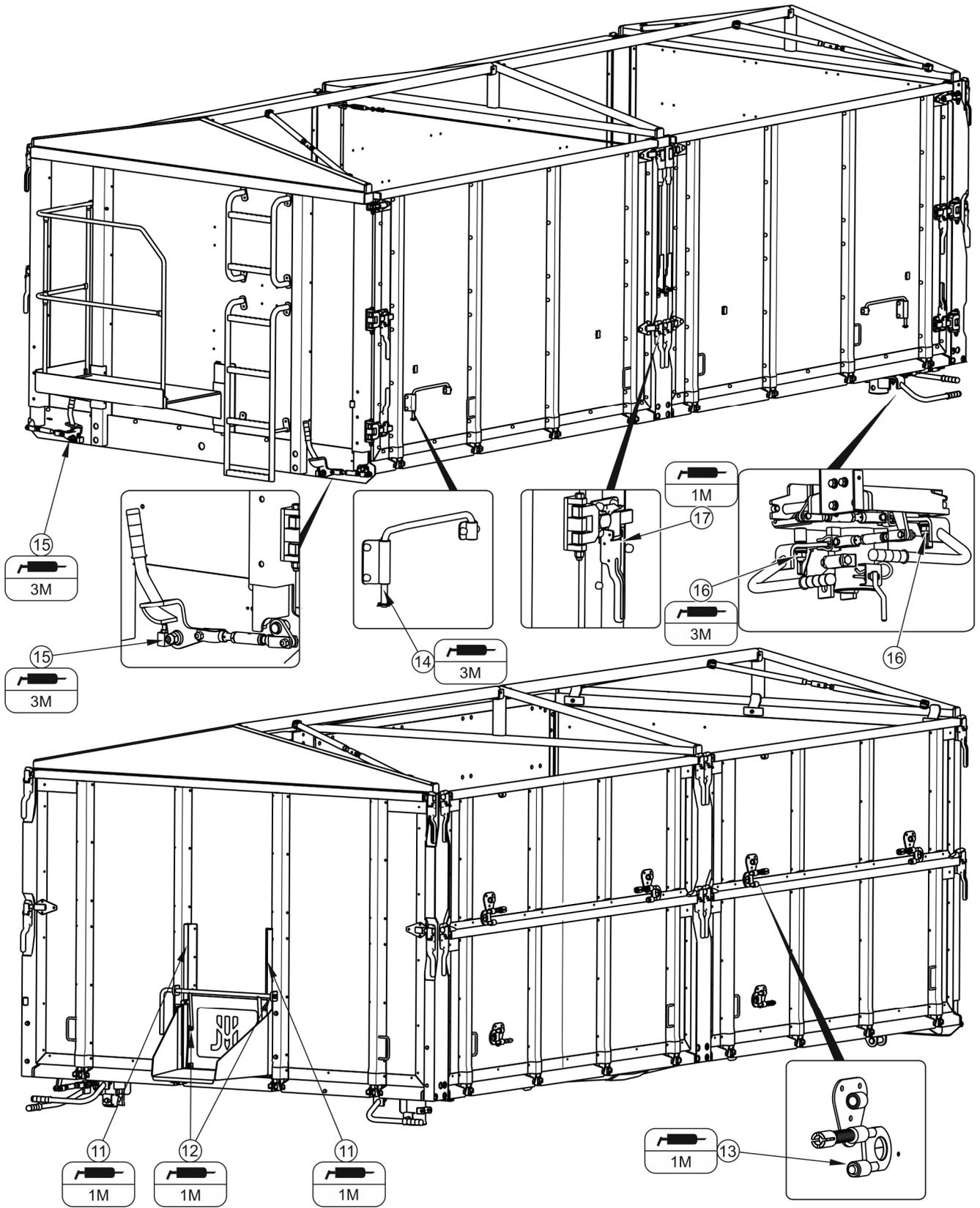


FIGURE 5.9. Trailer lubrication points, part 2

## 5.7 CONSUMABLES

### 5.7.1 HYDRAULIC OIL

It is absolutely necessary to observe that the oil in the trailer's hydraulic system and the tractor's hydraulic system must be of the same type. If different types of oil are used, make sure that both hydraulic means can be mixed together. The use of different types of oil may cause damage to the trailer or agricultural tractor. The new machine is filled with L HL32 Lotos hydraulic oil.

**TABLE 5.5 Characteristics of hydraulic oil L-HL 32 Lotos**

ITEM	NAME	UNIT	AMOUNT
1	Viscosity classification according to ISO 3448VG	-	32
2	Kinematic viscosity at 40 <sup>0</sup> C	mm <sup>2</sup> /s	28.8 – 35.2
3	Qualitative classification according to ISO 6743/99	-	HL
4	Quality classification according to DIN 51502	-	HL
5	Flash-point	C	230

If you need to change the hydraulic oil for another oil, read the oil manufacturer's instructions carefully. If he recommends flushing the system with an appropriate preparation, follow these recommendations. It must be ensured that the chemicals used for this purpose do not act aggressively on the materials of the hydraulic system. During normal operation of the trailer, it is not necessary to change the hydraulic oil, however, if necessary, this operation should be entrusted to specialist service centres.

The oil used, due to its composition, is not classified as a dangerous substance, however long-term effects on the skin or eyes may cause irritation. In the event of contact of oil with skin, wash the place of contact with water and soap. Do not use organic solvents (gasoline, kerosene). Soiled clothing should be removed to prevent oil from getting on your skin. If the oil gets into your eyes, flush them with plenty of water and in case of irritation contact your doctor. Hydraulic oil under normal conditions is not harmful to the respiratory tract. The hazard only occurs when the oil is strongly atomized (oil mist), or in the event of a fire during which toxic compounds may be released. Oil should be quenched with carbon dioxide, foam or extinguishing steam. Do not use water to extinguish a fire.

### 5.7.2 LUBRICANTS

For heavily loaded parts, it is recommended to use lithium grease with the addition of molybdenum disulphide ( $\text{MoS}_2$ ) or graphite. For less loaded components, it is recommended to use general-purpose machine greases that contain anti-corrosive additives and are highly resistant to water washout. Aerosol preparations (silicone greases, anti-corrosive lubricants) should have similar properties.

Before using lubricants, read the information leaflet for the selected product. Particularly important are safety rules and how to handle a given lubricant and how to dispose of waste (used containers, contaminated rags, etc.). The information leaflet (product card) should be kept together with the grease.

## 5.8 CLEANING THE TRAILER

The trailer should be cleaned depending on demand and before a longer standstill (e.g. before winter). The trailer should be washed each time after unloading, if a load was transported that may cause corrosion of machine parts. The use of a pressure washer obliges the user to become familiar with the principle of operation and recommendations for the safe operation of this device.

### Guidelines for cleaning the trailer

- Before washing the trailer, open all walls and extensions. Thoroughly clean the load box from any cargo residues (sweep or blow with compressed air), especially around the wall and extensions.
- In the event of transporting materials corrosive to steel, the trailer should be washed immediately after unloading.
- To clean the trailer, use only clean running water or water with a cleaning detergent additive with a neutral pH.
- The use of pressure washers increases the effectiveness of washing, but be careful when working. During washing, the nozzle of the cleaning aggregate must not be closer than 50 cm from the surface being cleaned.
- The water temperature should not exceed 55 ° C.

- Do not direct the water jet directly at the elements of the installation and equipment of the trailer, i.e. control valve, braking force regulator, brake cylinders, hydraulic cylinders, pneumatic, electric and hydraulic plugs, lights, electrical connectors, information and warning stickers, rating plate, cable connectors, points lubricating trailers, etc. High pressure water jet may cause mechanical damage to these components.
- For cleaning and maintenance of plastic surfaces, it is recommended to use clean water or specialized preparations intended for this purpose.
- Do not use organic solvents, preparations of unknown origin or other substances that may damage the lacquered, rubber or plastic surface. It is recommended to make a test on an invisible surface in case of doubt.
- Surfaces oily or greasy by grease should be cleaned with petrol or degreasing agents, and then washed with clean water and detergent. Follow the cleaning agent manufacturer's instructions.
- Detergents intended for washing should be stored in their original containers, or alternatively, but marked exactly. The preparations cannot be stored in containers intended for storing food and beverages.



## **DANGER**

**Refer to the instructions for using cleaning detergents and preservatives.**

**When washing with detergents, wear suitable protective clothing and eye protection.**

- Keep the hoses and gaskets clean. The materials from which these elements are made may be susceptible to organic substances and some detergents. As a result of long-term effects of various substances, the aging process is accelerated and the risk of damage increases. Elements made of rubber are recommended to be maintained with the help of specialized preparations after thorough washing.
- After washing, wait for the trailer to dry and then grease all control points as recommended. Wipe off excess grease or oil with a dry cloth.
- Observe environmental protection principles, wash trailer in designated places.

- Washing and drying the trailer must take place at an ambient temperature above 0 °C.
- After washing and drying the trailer, lubricate all control points, regardless of the period of the last treatment.

## 5.9 STORAGE

- It is recommended that the trailer be stored indoors or under a roof.
- If the machine will not be used for a long period of time, it must be protected against the effects of weather conditions, especially those that cause corrosion of steel and accelerate the aging of tires. During this time the machine must be unloaded. The trailer should be thoroughly washed and dried.
- Corroded areas should be cleaned of rust, degreased and protected with a primer paint, and then painted with a topcoat according to the colour scheme.
- In the event of a longer stop, it is necessary to lubricate all components regardless of the period of the last treatment.
- Rims and tires should be carefully washed and dried. During longer storage of the unused trailer, it is recommended to move the machine once every 2-3 weeks so that the place of contact of the tire with the ground is in a different position. The tires will not deform and will maintain proper geometry. You should also check your tire pressure from time to time, and if necessary inflate the wheels to the correct value.
- If the trailer is equipped with a tarpaulin, it should be thoroughly washed and dried. If it is possible, it is recommended to store a clean tarpaulin hanging, otherwise it should be rolled up carefully without causing creases and kinks in the material.

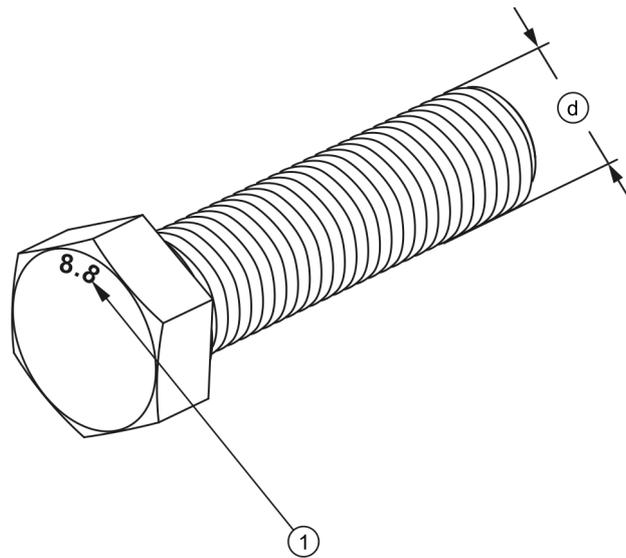
## 5.10 TIGHTENING TORQUE FOR NUT AND BOLT CONNECTIONS

During maintenance and repair work, apply appropriate tightening torques to screw connections, unless other tightening parameters are given. Recommended tightening torques for the most commonly used bolted connections are shown in the table below. The given values apply to non-lubricated steel bolts.

**TABLE 5.6 Tightening torques for screw connections**

METRIC THREAD	5.8 <sup>(1)</sup>	8.8 <sup>(1)</sup>	10.9 <sup>(1)</sup>
	Md [Nm]		
M10	37	49	72
M12	64	85	125
M14	100	135	200
M16	160	210	310
M20	300	425	610
M24	530	730	1,050
M27	820	1,150	1,650
M30	1,050	1,450	2,100

<sup>(1)</sup> - strength class according to DIN ISO 898



**FIGURE 5.10. Metric thread screw**

*(1) strength class, (d) thread diameter*



**ADVICE**

The hydraulic hoses should be tightened with a torque of 50 - 70 Nm.

## 5.11 TROUBLESHOOTING

**TABLE 5.7**     **Faults and how to remove them**

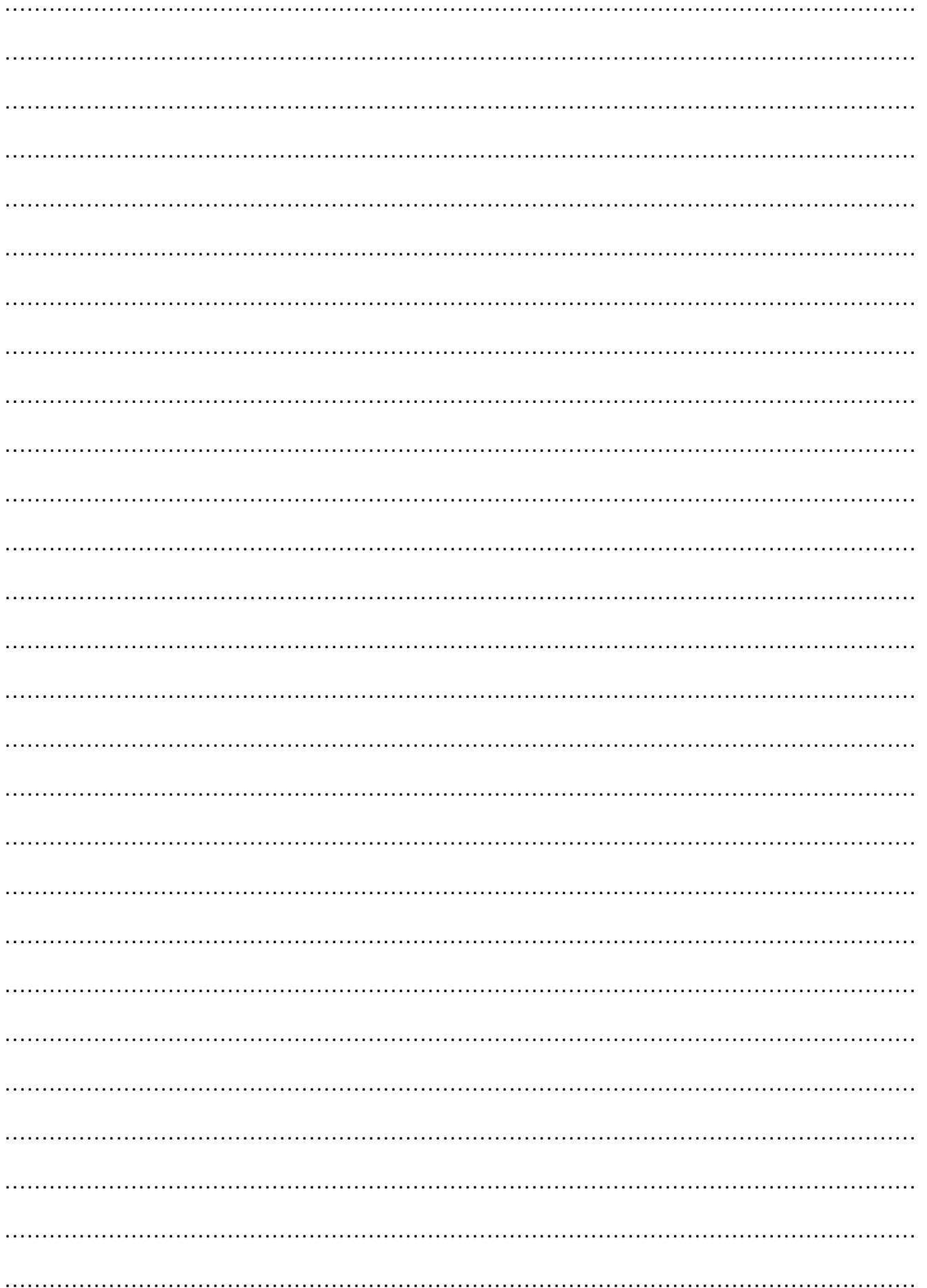
FAULT	CAUSE	REMOVAL METHOD
Trouble with starting.	Brake system lines not connected	Connect the brake lines (applies to pneumatic system).
	Parking brake applied	Release the parking brake.
	Pneumatic connection lines damaged	Replace.
	Connection leakage	Tighten, replace washers or sealing sets, replace hoses.
	Defective control valve or braking force regulator	Check valve, repair or replace.
Noise in the hub of the axle.	Excessive bearing looseness	Check the clearance and adjust if necessary
	Damaged bearings	Replace bearings
	Damaged hub components	Replace
Low braking efficiency. Excessive heating of the axle hub.	System pressure too low	Check the pressure on the pressure gauge on the tractor, wait for the compressor to fill the tank to the required pressure. Damaged tractor air compressor. Repair or replace. Damaged brake valve on the tractor. Repair or replace. System leakage. Check systems for leaks.
	Incorrectly adjusted service or parking brake	Adjust expander arm positions
	Worn brake pads	Replace brake shoes.
Incorrect hydraulic system operation.	Incorrect hydraulic oil viscosity	Check the oil quality, make sure that the oils in both machines are of the same grade. If necessary,

FAULT	CAUSE	REMOVAL METHOD
		change the oil in the tractor and/or trailer
	Insufficient tractor hydraulic pump performance, tractor hydraulic pump defective.	Check the hydraulic pump on the tractor.
	Damaged or dirty actuator	Check the cylinder piston rod (bending, corrosion), check the cylinder for leaks (piston rod seal), repair or replace the cylinder if necessary.
	Actuator load too high	Check and reduce the cylinder load if necessary
	Damaged hydraulic lines	Check and make sure that the hydraulic hoses are tight, not kinked and properly tightened. Replace or tighten as necessary.



# NOTES

A series of horizontal dotted lines for writing notes.



# APPENDIX A

Tire size

TYPE OF TRAILER	FRONT / REAR AXLE
<b>T680P</b>	385 / 65 R22.5 18PR <sup>(1)</sup>

<sup>(1)</sup> - disc wheel 11.75 x 22.5" ET=0