

# INTRODUCTION

Information in this document is current at date of publication. As a result of improvements, some numerical values and illustrations contained in this publication may not correspond to the actual specification of the machine supplied to the user. The manufacturer reserves the right to introduce design changes in machines produced that facilitate and improve the quality of machine operation, without making minor amendments to this Operator's Manual.

This Operator's Manual is an integral part of the machine documentation. Before using the machine, the user must carefully read this Operator's Manual and observe all recommendations. This guarantees safe operation and ensures failure-free work of the machine. The machine is designed to meet obligatory standards, documents and legal regulations currently in force.

The manual describes the basic principles of safe use and operation of agricultural trailers Pronar T682 and Pronar T682/1

If the information in this Operator's Manual needs clarification, refer for assistance to the sale point where the machine was purchased or to the Manufacturer.

## MANUFACTURER'S ADDRESS:

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17-210 Narew*

## CONTACT TELEPHONES

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## SYMBOLS APPEARING IN THIS OPERATOR'S MANUAL

Information, descriptions of danger and precautions and also recommendations and prohibitions associated with user safety instructions are marked:



and also preceded by the word "**DANGER.**" Failure to observe the instructions may endanger the machine operator's or other person's health or life.

Vital information and instructions that must be observed are by the symbol:



and also preceded by the word "**IMPORTANT**". Failure to observe the instructions may lead to damage to the machine as a result of improper operation, adjustment or use.

In order to focus the user's attention on the need to perform maintenance, the relevant section of the Operator's Manual is marked with the pictogram:



Additional tips and advice for machine operation are marked with the sign:



and also preceded by the word "**TIP**".

## **DIRECTIONS USED IN THIS OPERATOR'S MANUAL**

Left side – side to the left hand of the operator facing in the direction of machine's forward travel.

Right side – side to the right hand of the operator facing in the direction of machine's forward travel.

## **REQUIRED MAINTENANCE**

Maintenance actions described in the manual are marked with the sign:

Result of maintenance/adjustment actions or comments concerning the performance of actions are 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>TRAILER</b>
Type:	<b>T682</b>
Model:	-----
Serial number:	
Commercial name:	<b>TRAILER PRONAR T682</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 03.06.2014

*Place and date*

Z-CA DYREKTORA  
d/s technicznych  
działek zarządku  
*Ryszard Cielaniuk*

*Full name of the empowered person  
position, signature*



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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>TRAILER</b>
Type:	<b>T682/1</b>
Model:	-----
Serial number:	
Commercial name:	<b>TRAILER PRONAR T682/1</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).

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Narew, the 03.06.2014

Place and date

Z-CIA DYREKTORA  
d/s technicznych  
i bezpieczeństwa

*[Signature]*

Full name of the empowered person  
position, signature

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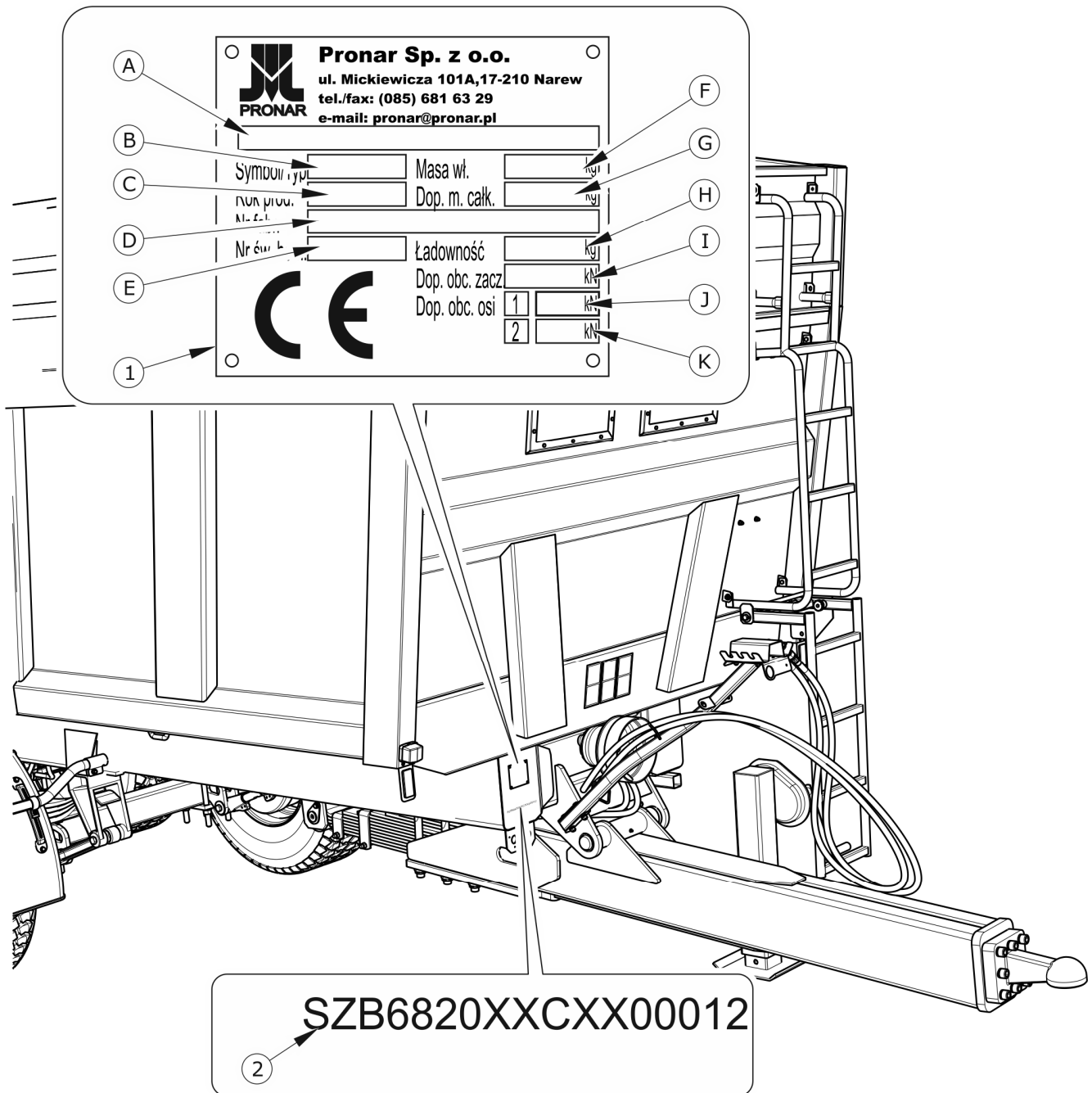
*SECTION*

**1**

**BASIC INFORMATION**

# 1.1 IDENTIFICATION

## 1.1.1 TRAILER IDENTIFICATION



**FIGURE 1.1** Location of the nameplate and vehicle identification number (VIN)

(1) nameplate, (2) example of vehicle identification number

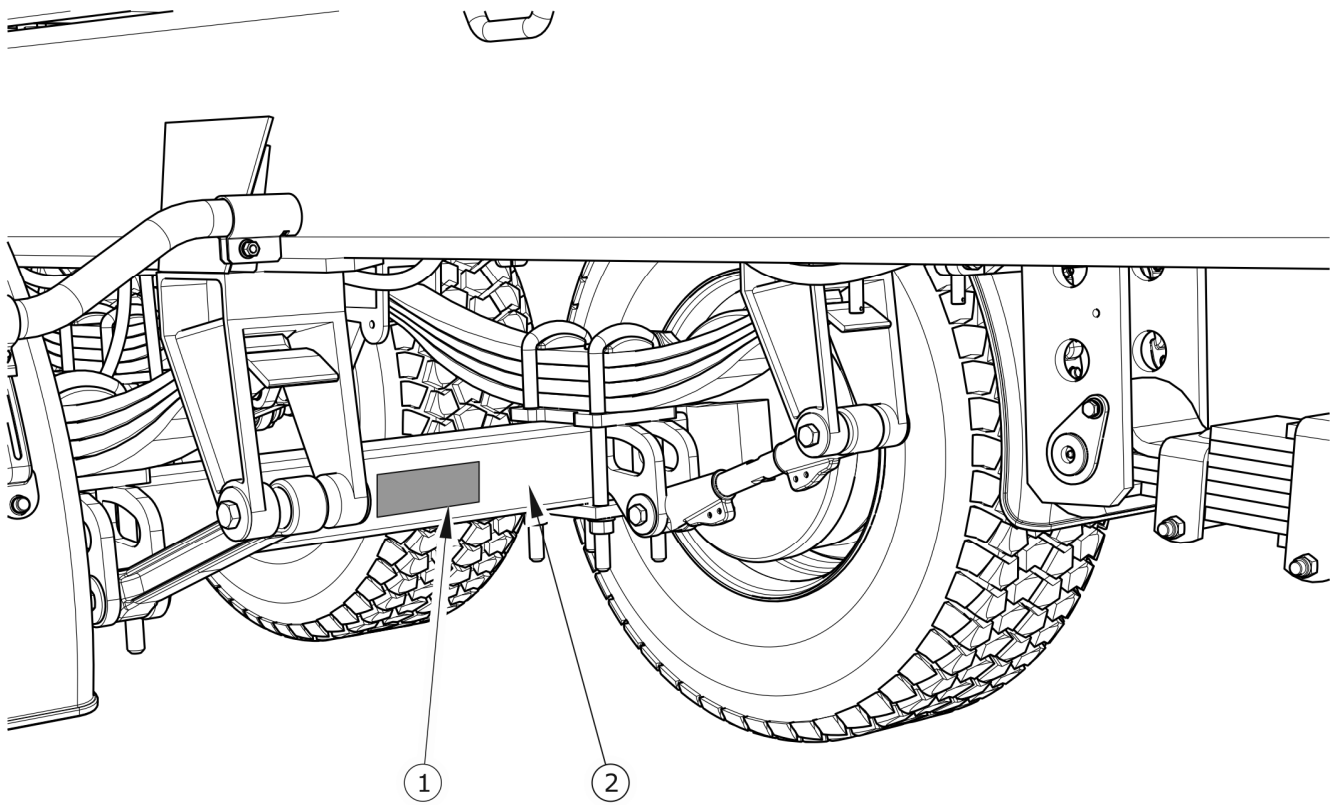
The trailer is marked with a nameplate (1) and a Vehicle Identification Number (2). The VIN and the nameplate are located on the plug of the right longitudinal member of the frame □ figure (1.1). When purchasing the machine make sure that the numbers on the machine agree with the numbers stated in the *WARRANTY BOOK* and in the sales documents. The meaning of the items on the nameplate is shown in the table below.

**TABLE 1.1** *Markings on nameplate*

ITEM	MARKING
<b>A</b>	General description and purpose
<b>B</b>	Symbol /Machine type
<b>C</b>	Year of manufacture
<b>D</b>	Seventeen digit vehicle identification number (VIN)
<b>E</b>	Official certificate number
<b>F</b>	Machine tare weight
<b>G</b>	Maximum gross weight
<b>H</b>	Carrying capacity
<b>I</b>	Permissible hitching system load
<b>J</b>	Permissible axle load
<b>K</b>	Permissible axle load

### 1.1.2 AXLE IDENTIFICATION

The serial number of the wheel axle and its type are stamped onto the nameplate (2) secured to the wheel axle beam (1) – figure (1.2).



**FIGURE 1.2** Location of the axle nameplate

(1) nameplate, (2) wheel axle

**1.1.3 LIST OF SERIAL NUMBERS**

**TABLE 1.2** List of serial numbers

<b>VIN</b>														
<b>S</b>	<b>Z</b>	<b>B</b>	<b>6</b>	<b>8</b>	<b>2</b>		<b>X</b>	<b>X</b>			<b>X</b>			
<b>SERIAL NUMBER OF FRONT AXLE</b>														
<b>SERIAL NUMBER OF CENTRAL AXLE</b>														
<b>SERIAL NUMBER OF REAR AXLE</b>														

**TIP**

*In the event of ordering a replacement part or in the case of the appearance of problems it is often essential to give the serial number of the agricultural trailer or the serial number of the axle, therefore it is recommended that these numbers are inscribed in the table (1.2).*

## 1.2 INTENDED USE

The trailer is designed for transport of harvested crops and agricultural products as well as loose, bulk and long load materials at the farm and on public roads. It is acceptable to transport construction materials, mineral fertilisers and other loads, if fulfilling conditions indicated in section 4. Non-compliance with the recommendations for the carriage and loading of goods described by the Manufacturer and the road transport regulations in force in the country in which the trailer is used shall void the warranty and is regarded as use of the machine contrary to its intended purpose.

The trailer is not intended or designed for transporting people, animals or goods classified as dangerous materials.

The machine can be aggregated with agricultural tractors only.

The trailer is designed and constructed according to current safety and engineering standards. The brake system and the light and indicator system meet the requirements of road traffic regulations. The maximum speed of the trailer on public roads in Poland is 30 km/h (pursuant to Traffic Law Act of June 20th 1997, article 20). In the countries where the trailer is used, the limits stipulated by the road traffic legislation in force in a given country must be observed. The trailer speed must not, however, be greater than the maximum design speed of 40 km/h.

**IMPORTANT**

*The trailer must not be used for purposes other than those for which it is intended. DO NOT:*



- *transport people, animals, hazardous materials, chemically aggressive loads that will corrode the structural elements of the trailer (causing corrosion of steel, destruction of paint coat, dissolving plastic elements and destruction of rubber elements etc.),*
- *transport incorrectly secured load, which during travel may cause contamination of the road and natural environment,*
- *transport incorrectly secured load, which during travel may change position in load box or fall out of the load box,*
- *transport loads, whose centre of gravity may destabilise the trailer,*
- *transport loads, which have uneven load distribution and/or overload axles and suspension elements.*

Using it as intended also involves all actions connected with the safe and proper operation and maintenance of the machine. Due to the above, the user is obliged to:

- carefully read the *OPERATOR'S MANUAL* and the *WARRANTY BOOK* and follow instructions in these documents,
- understand the trailer's operating principle and how to operate it safely and correctly,
- adhere to the established maintenance and adjustment plans,
- comply with general safety regulations while working,
- prevent accidents,
- comply with the road traffic regulations and transport regulations in force in a given country, in which the trailer is used,
- carefully read the Operator's Manual and comply with its recommendations,
- only hitch the trailer to an agricultural tractor which meets all the Manufacturer's requirements.



The trailer may only be used by persons, who:

- are familiar with the contents of this publication and with the contents of the agricultural tractor Operator's Manual,
- have been trained in trailer operation and work safety,
- have the required authorisation to drive carrier vehicles and are familiar with the road traffic regulations and transport regulations.



### TIP

*Tractor requirements depend on trailer accessories.*

**TABLE 1.3** *Requirements for agricultural tractor*

CONTENTS	UNIT	REQUIREMENTS
<b>System pressure rating</b>		
Single conduit pneumatic system	bar	5.8 – 6.5
Double conduit pneumatic system	bar	6.5 - 7
Hydraulic system	bar	150
<b>Electrical system</b>		
Electrical system voltage	V	12
Connection socket	-	7-pole
Solenoid valve power supply socket	-	3-pole
<b>Tractor hitches</b>		
Type of hitch	-	transport hooks (lower or upper position)
Minimum static vertical load capacity	kg	3,000
<b>Other requirements</b>		
Min. Tractor power (T682)	KM / kW	182 / 133.8
Minimum tractor power (T682/1)	KM / kW	182 / 133.8

CONTENTS	UNIT	REQUIREMENTS
<b>Turning interlock hydraulic system</b> Hydraulic oil System pressure rating Oil demand:	- MPa l	L HL 32 Lotos 16 5
<b>PTO</b> PTO speed	rpm	540

## 1.3 EQUIPMENT

**TABLE 1.4** *Equipment*

EQUIPMENT	STANDARD	ADDITIONAL	OPTION
<i>OPERATOR'S MANUAL, WARRANTY BOOK</i>	•		
Rotating drawbar eye Ø50	•		
Fixed drawbar eye Ø50			•
Fixed drawbar eye Ø40			•
Fixed ball drawbar Ø80			•
Spare wheel		•	
PTO shaft			•
Turning interlock hydraulic system	•		
Double line pneumatic brake system	•		
2-line pneumatic brake system with ALB regulator			•
Single line pneumatic brake system			•
Hydraulic brake system			•

EQUIPMENT	STANDARD	ADDITIONAL	OPTION
Plastic mudguards (front and rear axle)	•		
Wheel chocks	•		
Automatic rear hitch		•	
Spare wheel		•	
Grain chute	•		
Chute		•	
580 mm extensions		•	
700 mm extensions		•	

**TIP**

*Information concerning tyres is provided at the end of this manual in ANNEX A.*

## 1.4 TERMS & CONDITIONS OF WARRANTY

PRONAR Sp. z o.o. Narew guarantees the reliable operation of the machine when it is used according to its intended purpose as described in the *OPERATOR'S MANUAL*. The repair period is specified in the *WARRANTY BOOK*.

The warranty does not cover those parts and sub-assemblies of the machine which are subject to wear in normal usage conditions, regardless of the warranty period.

Consumables include the following parts/sub-assemblies:

- drawbar hitching eye,
- pneumatic system connector filters,
- bulbs and LED lamps,

- tyres,
- seals,
- bearings.

The warranty service only applies to such cases as: mechanical damage which is not the user's fault, factory defects of parts, etc.

**TIP**

*Demand that the seller carefully and accurately fills out the WARRANTY BOOK and warranty repair coupons. A missing date of purchase or sale point stamp may make the user ineligible for any warranty repair or refund.*

In the event of damage arising from:

- mechanical damage which is the user's fault, damage caused by road accidents,
- inappropriate use, adjustment or maintenance, use of the machine for purposes other than those for which it is intended,
- use of damaged machine,
- repairs carried out by unauthorised persons, repairs carried out improperly,
- making unauthorised alterations to machine design,

the user loses the warranty.

The user is obliged to report immediately on noticing any wear in the paint coating or traces of corrosion, and to have the faults rectified whether they are covered by the warranty or not. For detailed Terms & Conditions of Warranty, please refer to the *WARRANTY BOOK* attached to each newly purchased machine.

Modifications of the machine without the written consent of the Manufacturer are prohibited. In particular, do NOT weld, drill holes in, cut or heat the main structural elements of the machine, which have a direct impact on the machine operation safety.

## **1.5 TRANSPORT**

The machine is prepared for sale completely assembled and does not require packing. Packing is only required for the machine's technical documentation and any extra accessories. The trailer is delivered to the user either transported on a vehicle or, after being attached to a tractor, independently (trailer towed with a tractor).

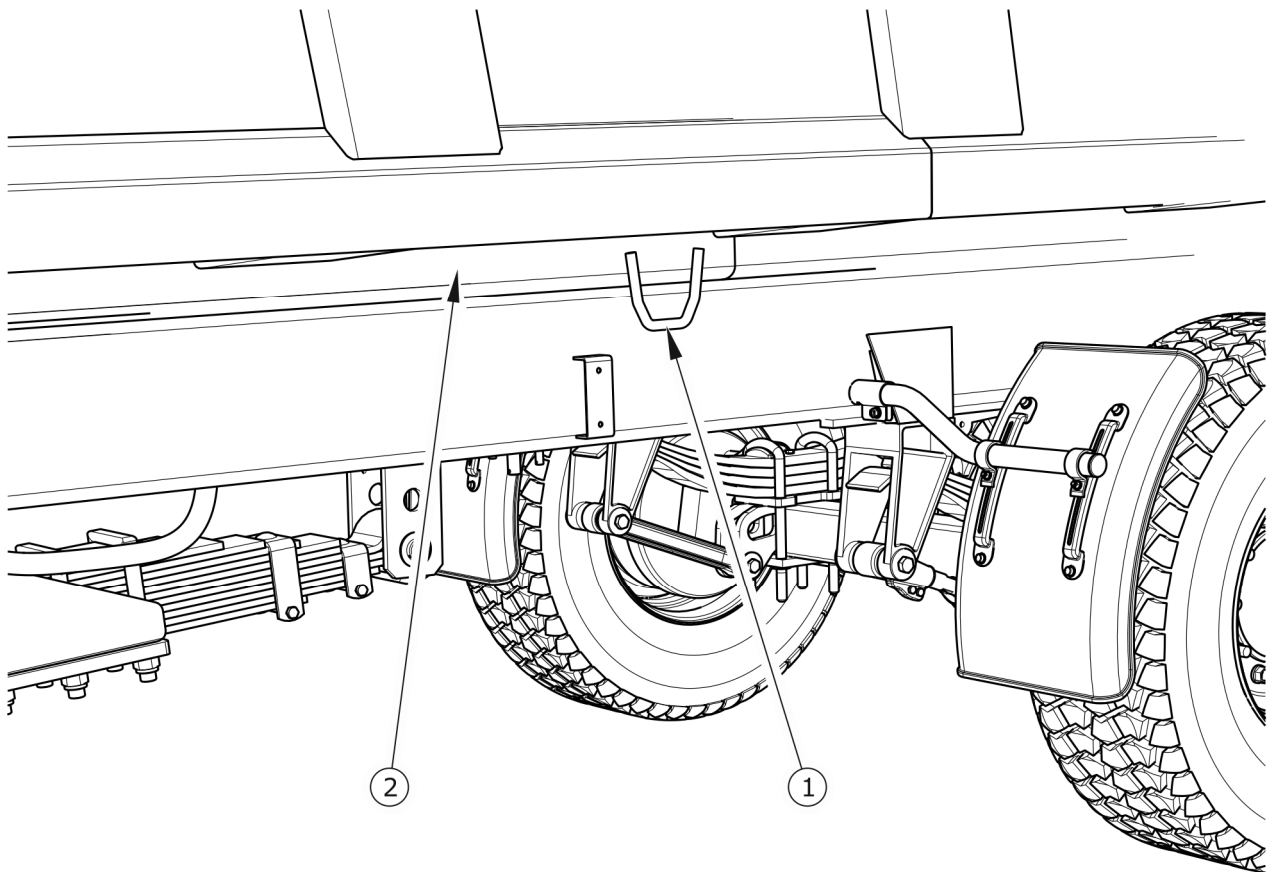
### **1.5.1 SHIPPING BY ROAD**

Loading and unloading of the agricultural trailer from vehicle shall be conducted using loading ramp with the aid of agricultural tractor, overhead crane or hoisting crane. During work, adhere to the general principles of occupational health and safety (OHS) applicable to reloading work. Persons operating reloading equipment must have the qualifications required to operate these machines.

Lifting equipment used for transporting the machine must be attached only to the fixed structural elements of the machine. These elements are, first of all: frame, drawbar and axle.

The trailer should be attached firmly to the platform of the vehicle using straps or chains fitted with a tightening mechanism. In order to attach the machine in a proper manner, use transport lugs (1) – figure (1.3) and fasten axles, frame longitudinal members and possibly drawbar.

Additionally, support the drawbar with a wooden block of such a height that the trailer frame is positioned parallel to the load box. Chocks, wooden blocks or other objects without sharp edges should be placed under the wheels of the slurry tanker to prevent it from rolling. Wheel blocks must be nailed to the vehicle load box planks or secured in another manner preventing their movement.



**FIGURE 1.3** *Transport lugs*

*(1) transport lug, (2) upper longitudinal frame*



### **IMPORTANT**

*Do not attach or hitch the trailer by drawbar eye, absorber springs or other structural elements that are not sufficiently strong to withstand such a load.*

Use certified and technically reliable securing measures. Worn straps, cracked securing catches, bent or corroded hooks as well as elements damaged in a different way may be unsuitable for use. Carefully read the information stated in the Operator's Manual for the given securing measure. The number of securing elements (cables, straps, chains and stays etc.) and the force necessary for their tensioning depend on such factors as the machine weight, the carrier vehicle design, ground speed and other conditions. For this reason it is impossible to define the securing plan precisely.

A correctly secured machine does not change its position with regard to the transporting vehicle. The securing elements must be selected according to the guidelines of the Manufacturer of these elements. In case of doubt apply a greater number of securing straps in order to secure the load. If necessary, cover the sharp edges of the machine in order to protect the securing elements from tearing or breaking during transport.

**DANGER**

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

During reloading work, take special care not to damage any accessories or paint finish. The tare weight of the machine is given in table (3.1).

**IMPORTANT**

*When shipped by road on a motor vehicle the machine must be mounted on the vehicle's platform in accordance with the safety requirements and regulations.*

*Vehicle driver should be especially careful when driving. This is due to the vehicle's centre of gravity shifting upwards when the machine is loaded.*

*Use only certified and technically reliable securing measures. Carefully read the information contained in the Operator's Manuals for the given securing measures.*

**1.5.2 INDEPENDENT SHIPPING BY THE USER**

In the event of independent shipping by the user, carefully read the *OPERATOR'S MANUAL* and follow its recommendations. Independent transport involves towing the machine with own agricultural tractor to destination. During shipping adjust ground speed to the prevailing road conditions, but do not exceed the maximum design speed.

**IMPORTANT**

*Before transporting independently, the tractor unit driver must carefully read this Operator's Manual and observe its recommendations.*

## 1.6 ENVIRONMENTAL RISK

A hydraulic oil leak constitutes a direct threat to the natural environment owing to its limited biodegradability. The negligible solubility of hydraulic oil in water does not cause extreme toxicity of organisms living in the aquatic environment. The formation of a film of oil on the water may be the direct cause of physical action on organism, perhaps causing change of oxygen values in the water because of lack of direct contact of air with the water. An oil leak into water reservoirs may however lead to a reduction of the oxygen content.

While carrying out maintenance and repair work, which involves the risk of an oil leak, this work should take place on an oil resistant floor or 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. Remaining oil should be collected using sorbents, or by mixing the oil with sand, sawdust or other absorbent materials. The oil pollution, once gathered up, should be kept in a sealed, marked, hydrocarbon resistant container. The container should be kept away from heat sources, flammable materials and food.

**DANGER**

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

Used oil or oil unsuitable for further use due to loss of its properties should be stored in its original packaging in the conditions described above. Waste oil should be taken to the appropriate facility dealing with the re-use of this type of waste. Waste code (L-HL 32 Lotos hydraulic oil): 13 01 10. Detailed information concerning hydraulic oil may be found on the product's Material Safety Data Sheet.



**TIP**

*The hydraulic system of the trailer is filled with L-HL32 Lotos hydraulic oil.*

**IMPORTANT**

*Waste oil should only be taken to the appropriate facility dealing with the re-use of this type of waste. Do NOT dispose of or pour oil into sewerage drains or water reservoirs.*

## 1.7 WITHDRAWAL FROM USE

Should you decide to withdraw the machine from use, comply with the regulations in force in the given country regarding withdrawal from use and recycling of machines withdrawn from use. Before proceeding to dismantle equipment, oil shall be completely removed from hydraulic system.

Worn out or damaged parts that cannot be reclaimed should be taken to a collection point for recyclable raw materials. Hydraulic oil should be taken to the appropriate facility dealing with the re-use of this type of waste.

**DANGER**

*During dismantling, use the appropriate tools, equipment (overhead crane, crane or hoist etc.) and use personal protection equipment, i.e. protective clothing, footwear, gloves and eye protection etc.*

*Avoid contact of skin with oil. Do not allow used hydraulic oil to spill.*



***SECTION***

**2**

**SAFETY ADVICE**

## 2.1 SAFETY INFORMATION

### 2.1.1 BASIC SAFETY RULES

- Before using the machine thoroughly read this Operator's Manual and the PTO shaft instructions. When operating the machine, follow all instructions in these documents. Do NOT start the trailer without knowledge of its function.
- The user is obliged to acquaint himself with the construction, action and the principles of safe usage of the machine.
- Before using the slurry tanker always check the machine, whether it is properly prepared for work, especially in terms of safety.
- If the information in this Operator's Manual is difficult to understand, contact the seller who runs the authorised technical service on behalf of the Manufacturer, or contact the Manufacturer directly.
- Careless and incorrect use and operation of the trailer and also failure to follow the instructions of this Operator's Manual may pose risk to the health and life of bystanders and/or machine operator.
- Be aware of the residual risk. Use caution when operating this machine and follow all relevant safety instructions.
- The machine must never be used by persons who are not authorised to drive the agricultural tractors and not trained in the safety principles and use of the machine, including children and people under the influence of alcohol.
- The trailer must not be used for purposes other than those for which it is intended. Anyone who uses the machine other than the way intended takes full responsibility for himself for any consequences of this use. Use of the machine for purposes other than those for which it is intended by the Manufacturer may invalidate the warranty.
- Use close fitting protective clothing.
- Any modification to the trailer frees PRONAR Narew from any responsibility for damage or detriment to health which may arise as a result.

- Before using the machine always check its technical condition, and in particular: technical condition of the drawbar, systems, safety guards and air pressure in tyres.
- Hitching and unhitching the trailer may only take place when the machine is immobilised by use of the parking brake and it is not loaded.
- Before using the trailer, always ensure that all the safety guards are in good condition and in place. Damaged or incomplete sub-assemblies must be exchanged for original new ones.
- The user is obliged to acquaint himself with the principles of safe operation, adjustment methods and inspection points of the machine and with the risks resulting from operation and maintenance of the machine.
- People or objects must not be carried on the machine.
- The trailer may be operated only by one person at a time.

### **2.1.2 HITCHING AND UNHITCHING FROM TRACTOR**

- Be especially careful when hitching and unhitching the machine.
- While connecting the trailer to the tractor, use the appropriate hitch. After completed hitching of the machines check the safety of the hitch Carefully read the tractor Operator's Manual. If the tractor is equipped with an automatic hitch, make certain that the coupling operation is completed.
- When hitching, there must be nobody between the tractor and the trailer.
- Do NOT connect the trailer if the agricultural tractor does not meet the basic requirements of the Manufacturer. Before hitching the machine, make certain that oil in the external hydraulic system of tractor may be mixed with the hydraulic oil in the machine's hydraulic system.
- When connecting the hydraulic lines to the tractor, make sure that the hydraulic system of the tractor and the hydraulic system of the trailer are not under pressure. If necessary, reduce residual pressure in the system.
- Before hitching slurry tanker to tractor check that both machines are in good technical condition.

- The machine unhitched from tractor must be immobilised with parking brake. If the machine is positioned on a slope, it should be additionally secured against moving by placing chocks under the machine's wheels. Terminals of hydraulic, electrical and pneumatic conduits should be protected against contamination.

### **2.1.3 HYDRAULIC SYSTEM AND PNEUMATIC SYSTEM**

- When operating, the hydraulic and pneumatic systems are under high pressure.
- Regularly check the technical condition of the hydraulic line and all connections. There must not be any leaks of hydraulic oil.
- Before proceeding to maintenance-repair work, make certain that the hydraulic system is not under pressure.
- Rubber hydraulic lines must be replaced every 4 years regardless of their technical condition.
- Use the hydraulic oil recommended by the Manufacturer.
- After changing the hydraulic oil, the used oil should be properly disposed of. Used oil or deteriorated oil should be stored in original containers or replacement containers resistant to hydrocarbons. Replacement containers must be clearly marked and appropriately stored.
- Do not store hydraulic oil in packaging designed for storing food or foodstuffs.

### **2.1.4 LOADING AND UNLOADING**

- Loading and unloading work should be carried out by persons experienced in this type of work.
- The trailer is not intended for transporting people, animals or 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 may not cause an overload on the axle and drawbar of the trailer.

- Incorrect load distribution and overloading the machine may cause the trailer to tip over or cause damage to its components.
- Do NOT climb on load box during loading and unloading.
- Unloading and loading of trailer may only take place when the machine is positioned on level and hard surface and connected to tractor. Tractor and trailer must be placed to drive forward.
- Ensure that during unloading / loading or raising the load box nobody is near the trailer. Before tipping the load box ensure proper visibility and make certain that there are no bystanders near the trailer.
- During loading and unloading the trailer the drawbar eye and the tractor hitch are subjected to great vertical loading.
- Keep a safe distance from overhead electric power lines during unloading and when load box is raised.
- When opening the tailgate, make sure that there are no bystanders behind the trailer.
- Do NOT tip of the load box in windy conditions.
- If the load does not pour from the raised load box immediately cease unloading. The trailer may only be tipped again after removing the object, which prevented the load from pouring.
- In winter, particular attention must be paid to loads which may freeze during transport. When tipping the load box with frozen load the trailer may become unstable and tip over.
- Do NOT raise the load box if there is any danger whatsoever that the box will tip over.
- Do NOT lift the load box with the tailgate closed.
- Do NOT jerk the trailer forward if load is bulky or reluctant to pour and does not unload.
- After completed unloading, ensure that the load box is empty.
- Do NOT drive with the load box raised.

- When closing or opening the rear grain chute gate, be very careful to avoid crushing your fingers.
- Do NOT go or place hand between open tailgate and load box.

### **2.1.5 CLEANING, MAINTENANCE AND ADJUSTMENT**

- During the warranty period, any repairs may only be carried out by warranty service authorised by the Manufacturer. After the expiry of the warranty period it is recommended that possible repairs to the trailer be performed by specialised workshops.
- In the event of any fault or damage, do not use the trailer until the fault has been fixed.
- When servicing, use appropriate, close-fitting protective clothing, gloves, shoes, glasses and the correct tools.
- Any modification to the trailer frees the manufacturer from any responsibility for damage or detriment to health, which may arise as a result.
- The trailer can only be stood on when it is absolutely motionless and the tractor engine is switched off. Tractor and trailer should be immobilized with parking brake and chocks should be placed under the trailer wheels. Ensure that unauthorised persons do not have access to the tractor cab.
- Regularly check the condition of nut and bolt connections, in particular connections of drawbar eye with drawbar and wheel nuts.
- Service inspections should be carried out according to the schedule in this Operator's Manual.
- Lower the load box before proceeding to deal with a malfunction. If it is necessary to raise the load box, it should be tipped to the rear and secured against dropping with the aid of load box support. The load box may not be loaded. The trailer must be hitched to the tractor and secured with chocks and parking brake.
- Before beginning repair work on hydraulic or pneumatic systems reduce oil or air pressure completely.

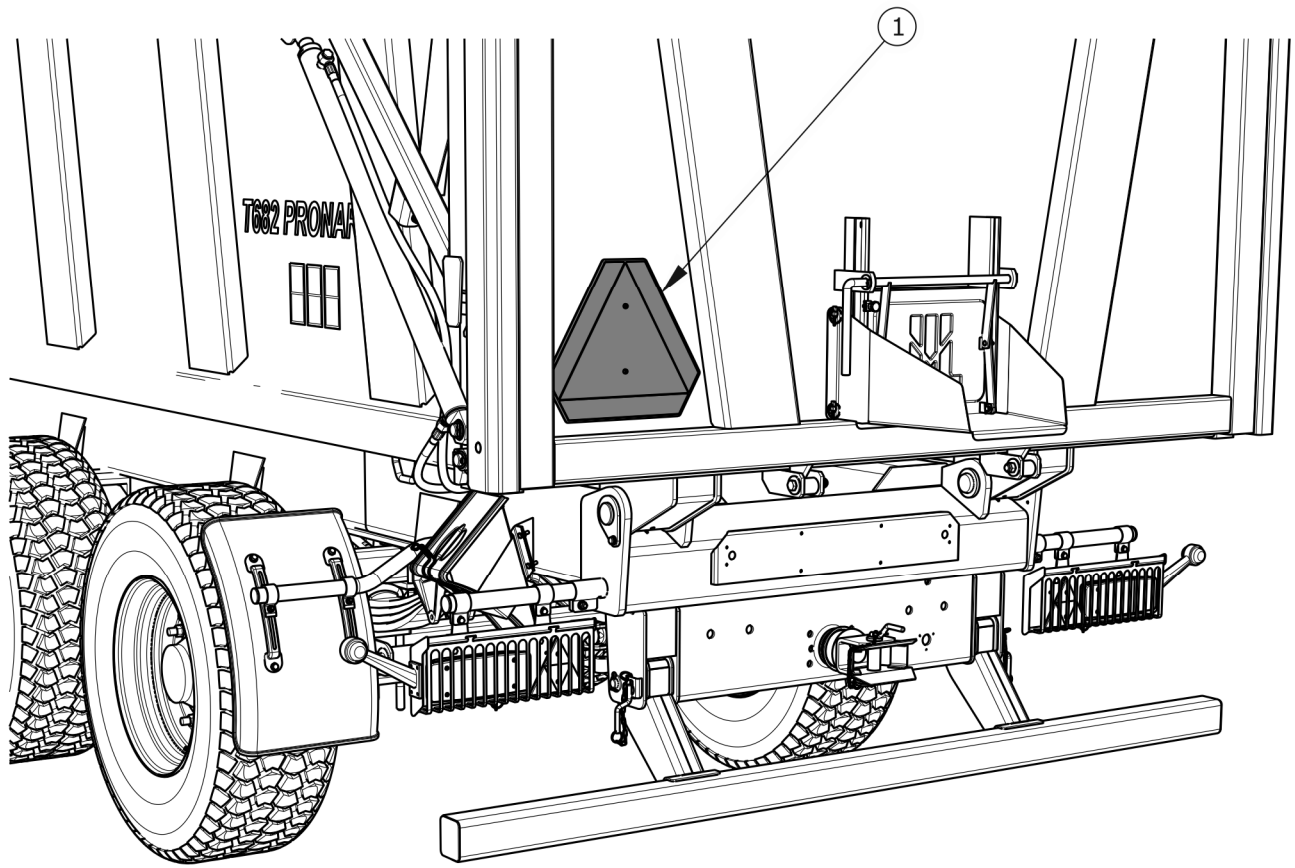


- Servicing and repair work should be carried out in line with the general principles of workplace health and safety. In the event of injury, the wound must be immediately cleaned and disinfected. In the event of more serious injuries, seek a doctor's advice.
- Repair, maintenance and cleaning work should be carried out with the tractor engine turned off and the ignition key removed. Tractor and trailer should be immobilized with parking brake and chocks should be placed under the trailer wheels. Ensure that unauthorised persons do not have access to the tractor cab.
- During maintenance or repair work, the trailer may be unhitched from tractor, but it must be secured with chocks and parking brake. During this work the load box may not be raised.
- Should it be necessary to change individual parts, use only those parts indicated by the Manufacturer. Non-adherence to these requirements may put the user and other people's health and life at risk, and also damage the machine and invalidate the guarantee.
- Before welding or electrical work, the trailer should be disconnected from the power supply. The paint coating should be cleaned. Burning paint fumes are poisonous for people and animals. Welding work should be carried out in a well lit and well ventilated space.
- During welding work pay attention to flammable or fusible elements (parts of the pneumatic, electric and hydraulic systems, plastic parts). If there is a risk that they will catch fire or be damaged, they should be removed or covered with non-flammable material before commencing welding work. Before beginning work, 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. Work must not be carried out under a trailer, which has only been raised with a lift or jack.
- The trailer must not be supported using fragile elements (bricks or concrete blocks).

- After completing work associated with lubrication, remove excess oil or grease. The trailer should be kept clean and tidy.
- Exercise caution when climbing on top of the load box. Climbing on top of the load box is possible by use of ladders placed on the front wall, extension and also folding steps inside the load box. Components not intended to aid access may not be used for this purpose. Before entering load box prevent trailer moving with parking brake and chocks.
- Do NOT make independent repairs of control valve, brake cylinders, tipping cylinder and braking force regulator. In the event of damage to these elements, repair should be entrusted to authorised service point or elements should be replaced with new ones.
- Do NOT make repairs to drawbar (straightening, pad welding or welding). A damaged drawbar must be replaced.
- Do NOT install additional appliances or fittings not according to the specifications defined by the Manufacturer.
- The trailer may only be towed when axles and wheels, lighting system and brakes are reliable.

### **2.1.6 SAFE DRIVING**

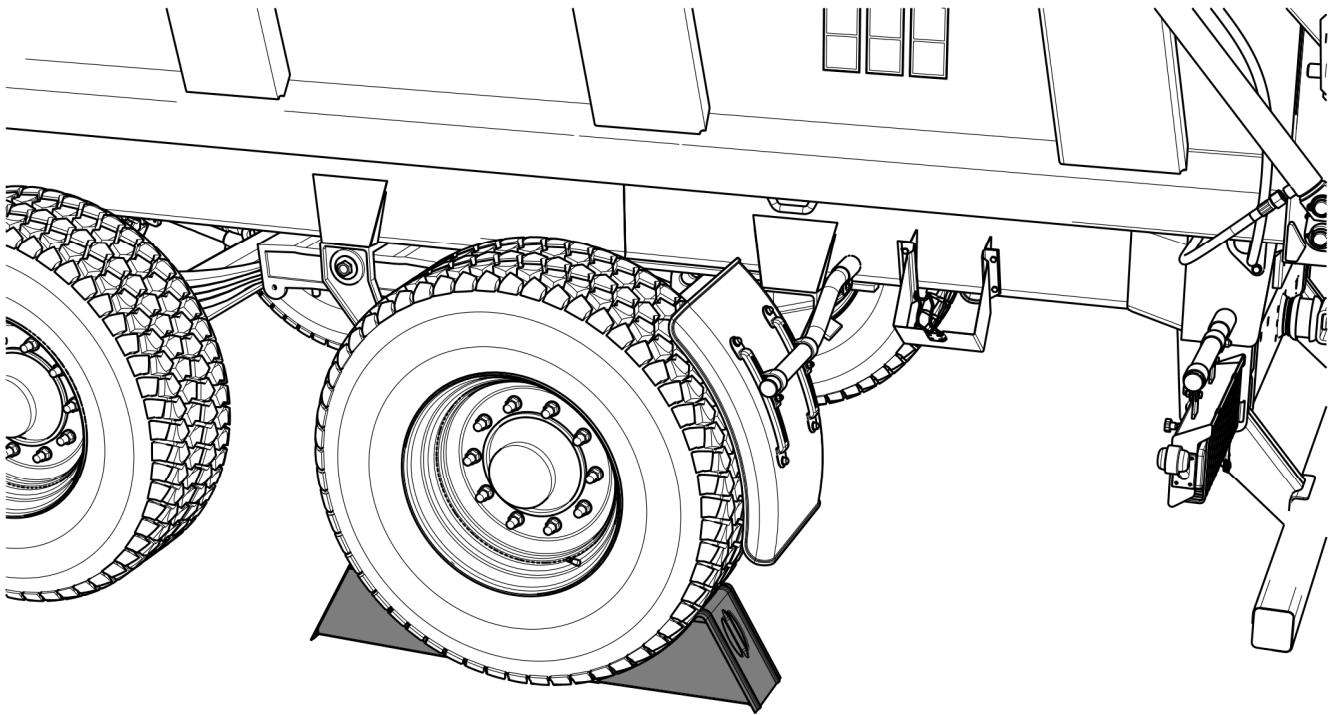
- When driving on public roads, comply with the road traffic regulations.
- During transport adjust ground speed to the prevailing road conditions. If possible avoid travelling on uneven terrain and unexpected turning.



**FIGURE 2.1** *Mounting place for the slow-moving vehicle warning sign*

*(1) slow-moving vehicle warning sign*

- If the trailer is the last vehicle in the group, a slow-moving vehicle warning sign should be placed on the trailer's tailgate.
- Before moving off check that the machine is correctly hitched to the tractor (check if hitching pin is secure).
- The vertical load carried by the drawbar eye of the machine affects the steering of the tractor unit.
- Do NOT exceed permissible ground speed. Excessive speed may lead to the loss of control of the set, damage to the trailer and/or tractor and lower breaking efficiency of the set.



**FIGURE 2.2** *Method of placing chocks*

- Do NOT attempt to climb on the trailer while driving.
- Do NOT park the trailer on a slope.
- Before driving off check that the parking brake is released, the braking force regulator is positioned in the proper position (applies to pneumatic systems with manual three-position regulator).
- During reversing one should use the assistance of another person. During manoeuvring the assistant must stay at a safe distance from the danger zone and be visible all the time to the tractor driver.
- While driving on public roads, the trailer and the tractor must be fitted with a certified or authorised reflective warning triangle.
- The machine must NOT be left unsecured. The trailer unhitched from the tractor must be secured against rolling away by means of parking brake and wheel chocks placed under the wheel - figure (2.2). Chocks should be placed only under one wheel (one in front of the wheel, the second behind the wheel).
- Periodically drain water from the air tanks in pneumatic system. During frosts, freezing water may cause damage to pneumatic system components.

- Reckless driving and excessive speed may cause accidents.

### **2.1.7 TYRES**

- When working with tyres, the trailer should be immobilised with parking brake and secured against rolling by placing chocks under wheel. Wheels can be taken off the trailer axle only when the trailer is not loaded.
- Repair work on the wheels or tyres should be carried out by persons trained and entitled to do so. This work should be carried out using appropriate tools.
- Inspect tightness of wheel nuts after the first use of the trailer, every 2 - 3 hours during first month of work and then every 30 hours of use (travel). The inspection should be repeated individually if a wheel has been removed from the wheel axle. Wheel nuts should be tightened according to recommendations provided in section 5 *MAINTENANCE*.
- Avoid potholes, sudden manoeuvres or high speeds when turning.
- Check the tyre pressure regularly. Air pressure in tyres should be also checked during the whole day of intensive work. Please note that higher temperatures could raise tyre pressure by as much as 1 bar. At high temperatures and pressure, reduce load or speed. Do not release air from warm tyres to adjust the pressure or the tyres will be underinflated when temperatures return to normal.
- Protect tyre valves using suitable caps to avoid soiling.

### **2.1.8 OPERATING PTO SHAFT.**

- The user should thoroughly acquaint himself with the PTO shaft Operator's Manual and adhere to the recommendations contained in it.
- The machine may only be connected to the tractor by appropriately selected PTO shaft. Use PTO shaft recommended by the Manufacturer.
- The drive shaft must be equipped with guards. Do NOT use the shaft with damaged or missing guards. Before starting the machine, always ensure that all the safety guards are in good condition and in place. Damaged or incomplete sub-assemblies must be exchanged for original new ones.

- After connecting shaft ensure that it is correctly and safely connected to the tractor and to the machine.
- Do NOT use the securing chains to support the shaft while machine is parked or being transported.
- Do NOT wear loose clothing, straps or whatever that may become wrapped round the rotating drive shaft. Contact with rotating PTO shaft may cause severe injuries.
- Before connecting or disconnecting the shaft, turn off the tractor engine and remove the key from the ignition. Immobilise tractor with parking brake.
- When working in limited visibility conditions, use the tractor's forward working lights to illuminate the articulated shaft and its vicinity.
- During transport, the shaft must be stored in the horizontal position to avoid damage to safety guards or other protection elements.
- During shaft operation, the telescopic pipes must overlap by at least one third of their length.
- When using the PTO shaft and trailer, do not use PTO rotation speed greater than 540 rpm. Do NOT overload shaft and machine and also engage the clutch suddenly. Before starting PTO shaft make certain that the PTO rotation direction is correct.
- The chains preventing the shaft cover from turning while the shaft is working should be secured to a fixed element of machine structure.
- Do NOT go over and under the shaft or stand on it equally during work as also when the machine is parked.
- The PTO shaft has markings on the casing, indicating, which end of the shaft should be connected to the tractor.
- Never use a damaged PTO shaft, it may cause an accident. A damaged shaft must be repaired or replaced.
- Disconnect the drive shaft each time when it is not necessary to drive the machine, or when the tractor and mixer feeder are at an unsuitable angle to each other.

### **2.1.9 DESCRIPTION OF RESIDUAL RISK**

Pronar Sp. z o. o. in Narew has made every effort to eliminate the risk of accidents. There is, however, a certain residual risk, which could lead to an accident, and this is connected mainly with the actions described below:

- using the machine for purposes other than those for which it is intended,
- being between the tractor and the machine while the engine is running and when the machine is being hitched,
- operating the machine with removed or faulty safety guards,
- not maintaining safe distance while the slurry tanker is in operation,
- operation of the trailer by persons under the influence of alcohol,
- cleaning, maintenance and technical checks,
- work of machine on unstable and sloping surface.

The residual risk may be kept to a minimum by following the recommendations below:


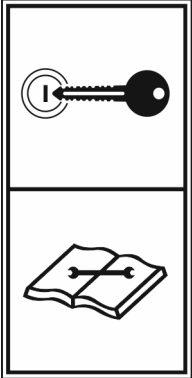

- operate the machine in prudent and unhurried manner,
- sensibly adhere to the remarks and recommendations contained in the OPERATOR'S MANUAL,
- maintain a safe distance from the danger zones,
- a ban on being on the machine when it is operating, except the places specially designed for this purpose,
- carry out repairs and maintenance work in line with operating safety rules,
- use close fitting protective clothing,
- ensure unauthorised persons have no access to the machine, especially children.

## **2.2 INFORMATION AND WARNING DECALS**





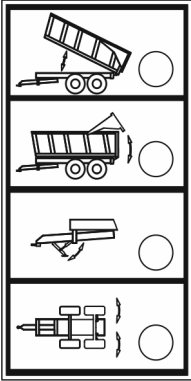
The trailer is labelled with the information and warning decals mentioned in table (2.1). Locations of pictograms on the machine are shown in figure (2.3). Throughout the machine use, you must ensure that any warning messages and information decals located on the

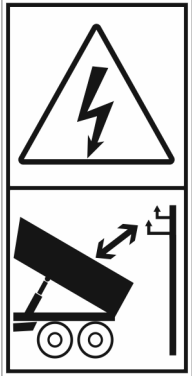

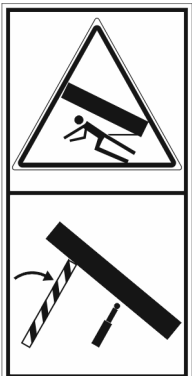
machine are clear and legible. If any are destroyed or damaged, they must be replaced with new. Information and warning decals may be purchased directly from the Manufacturer or your PRONAR dealer. Part numbers of information decals are given under pictogram description in table (2.1) and in *SPARE PARTS LIST*. New assemblies, changed during repair, must be labelled once again with the appropriate safety signs. During machine cleaning do not use solvents, which may damage the coating of information decals and do not subject them to strong water jets.



**TABLE 2.1** *Information and warning decals*

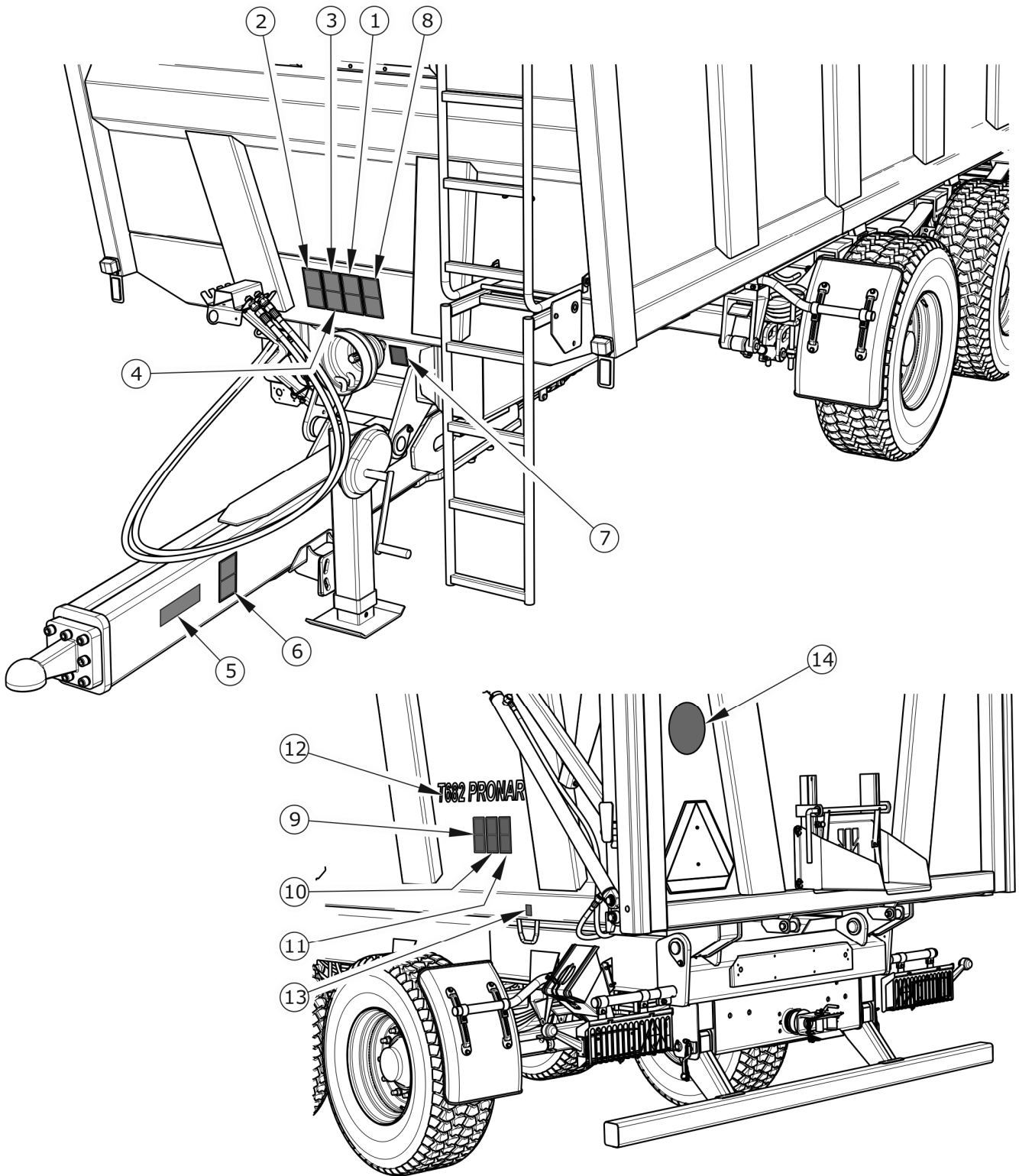
ITEM	SAFETY SYMBOL	DESCRIPTION
1		<p>Note</p> <p>Before starting work, carefully read the <i>OPERATOR'S MANUAL</i>.</p> <p><b>70N-00000004</b></p>
2		<p>Before maintenance or repairs, turn off engine and remove key from ignition.</p> <p><b>70N-00000005</b></p>
3		<p>Regularly check if the nuts and bolts fixing the wheels and other components are properly tightened.</p> <p><b>104N-00000006</b></p>



ITEM	SAFETY SYMBOL	DESCRIPTION
4		<p>Grease the machine according to the recommendations in the <i>OPERATOR'S MANUAL</i></p> <p><b>104N-00000004</b></p>
5		<p>Maximum static drawbar load</p> <p><b>103RPN-00.00.00.02</b></p>
6		<p><i>IMPORTANT</i></p> <p>Danger of getting caught by the rotating drive shaft.</p> <p><b>78RPN-00000005</b></p>
7		<p>Maximum PTO speed.</p> <p><b>75N-00000004</b></p>
8		<p>Line functions.</p> <p><b>58RPN-00000041</b></p>

ITEM	SAFETY SYMBOL	DESCRIPTION
9	 <p>The top symbol shows a lightning bolt inside a triangle, indicating a danger of electric shock. The bottom symbol shows a tailgate being raised on a truck, with an arrow pointing upwards, indicating a danger of crushing or falling objects.</p>	<p>Note Danger of electric shock.                      Keep a safe distance from overhead electric power lines during unloading.</p> <p><b>58RPN-00.00.020</b></p>
10	 <p>The top symbol shows a person being crushed by a falling load, indicating a danger of crushing the whole body. The bottom symbol shows a person standing near a tailgate with a double-headed arrow, indicating a danger of crushing or falling objects from the tailgate.</p>	<p>Danger of crushing the whole body.                      Keep a safe distance from the tailgate.</p> <p><b>58RPN-00.00.013</b></p>
11	 <p>The top symbol shows a person being crushed by a falling load, indicating a danger of crushing the whole body. The bottom symbol shows a load box being raised, with a warning sign, indicating a danger of crushing or falling objects from the load box.</p>	<p>Danger of crushing the whole body.                      Do NOT perform any maintenance or repairs on the load box that is loaded, raised or not supported.</p> <p><b>58RPN-00.00.012</b></p>
12	<p><b><i>PRONAR T682</i></b>  <b><i>PRONAR T682/1</i></b></p>	<p>Machine type.</p> <p><b>75RPN-00000002 (T682)</b>  <b>75RPN-00000005 (T682/1)</b></p>

ITEM	SAFETY SYMBOL	DESCRIPTION
13		Marking of trailer attachment points during transport. <b>58RPN-00.00.019</b>
14		Maximum design speed. <b>204N-00000008</b>



**FIGURE 2.3** Locations of information and warning decals

*SECTION*

**3**

**DESIGN AND  
OPERATION**

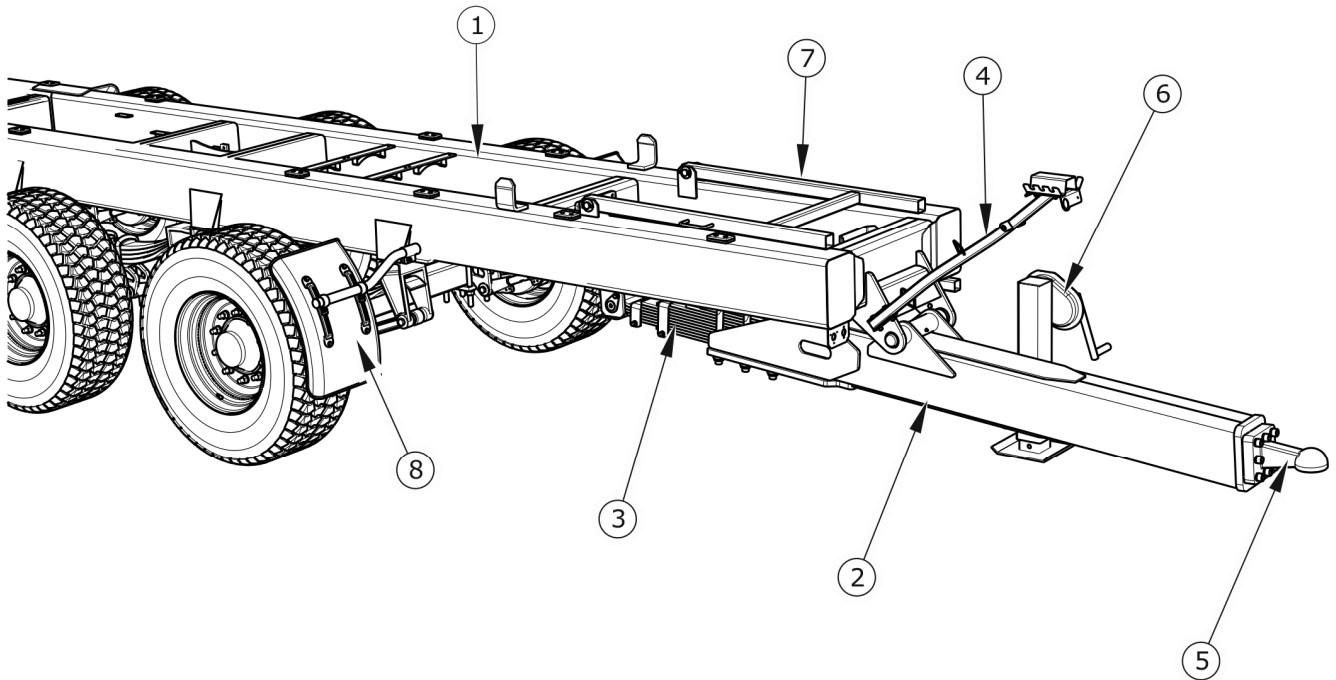
## 3.1 TECHNICAL SPECIFICATION

**TABLE 3.1** *Standard equipment specification*

CONTENTS	UNIT	T682	T682/1
<b>Dimensions</b>			
Length	mm	9,900	
Width	mm	2,550	
Height	mm	3,330	
<b>Load box dimensions</b>			
Inner length	mm	8,000	
Internal width: front / rear	mm / mm	2,200 / 2250	
Height of side walls [mm]	mm	1,200	
Load surface	m <sup>2</sup>	17.8	
Cargo capacity (no wall extensions)	m <sup>3</sup>	22	
<b>Weight and carrying capacity</b>			
Maximum gross weight	kg	30,000	33,000
Carrying capacity	kg	21,000	24,000
Tare weight	kg	9,000	
<b>Other information</b>			
Wheel track	mm	2,100	
Height of platform from ground	mm	1,495	
Maximum static drawbar eye load	kg	3,000	
Nominal voltage of electrical system	V	12	
Maximum design speed	km/h	40	
Maximum PTO rotation speed	rpm	540	
Minimum tractor power demand	KM / kW	182/133.8	

## 3.2 TRAILER CONSTRUCTION

### 3.2.1 CHASSIS



**FIGURE 3.1** *Chassis, front view*

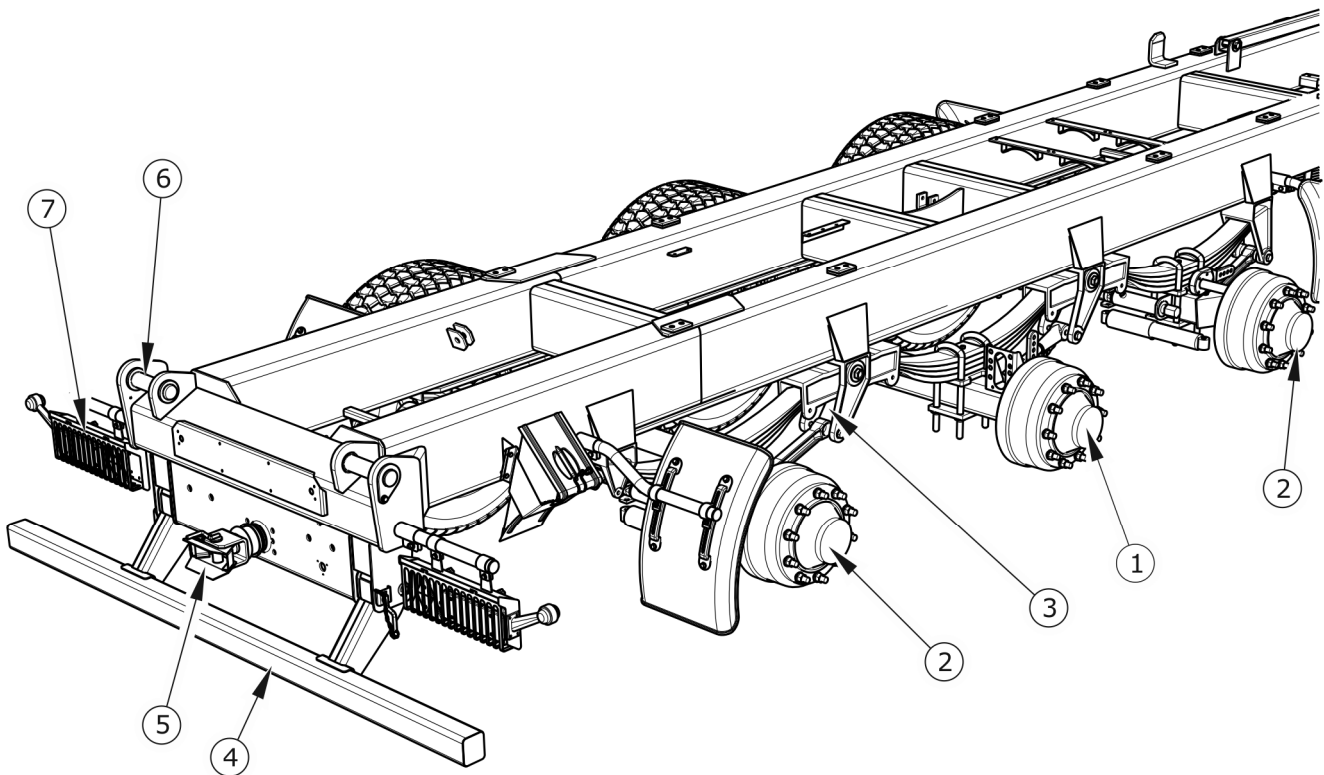
(1) lower frame, (2) drawbar, (3) drawbar spring, (4) cable support, (5) drawbar eye, (6) parking stand, (7) load box support, (8) mudguard

Trailer chassis consists of sub-assemblies indicated on figures (3.1) and (3.2). Lower frame (1) is a structure welded from steel sections. The main support elements are two longitudinal members connected with crossbars. In the front part of the chassis, a sprung drawbar (2) is attached to which, in turn, the drawbar eye (5) and the trailer parking support (6) are screwed. Depending on the version, the trailer may be equipped with the following:

- Ø50 mm rotating drawbar to be connected with the upper hitch,
- Ø40 mm fixed drawbar to be connected with the upper hitch,
- Ø50 mm fixed drawbar to be connected with the lower hitch,
- Ø80 mm fixed ball drawbar to be connected with the lower hitch,

The rear part of the frame has a rear protection (4) - figure (3.2), a trailer lighting assembly attached to the light support beam (7), and a rear hitch (5).

The trailer suspension consists of two steering axles (2) and one fixed axle (1), which are attached to taper leaf springs with U-bolts. The springs are connected with rocker arm. Axles are made from square bars terminated with a pin, where wheel hubs are mounted on taper bearings. The wheels are single and equipped with shoe brakes activated by mechanical cam expanders.

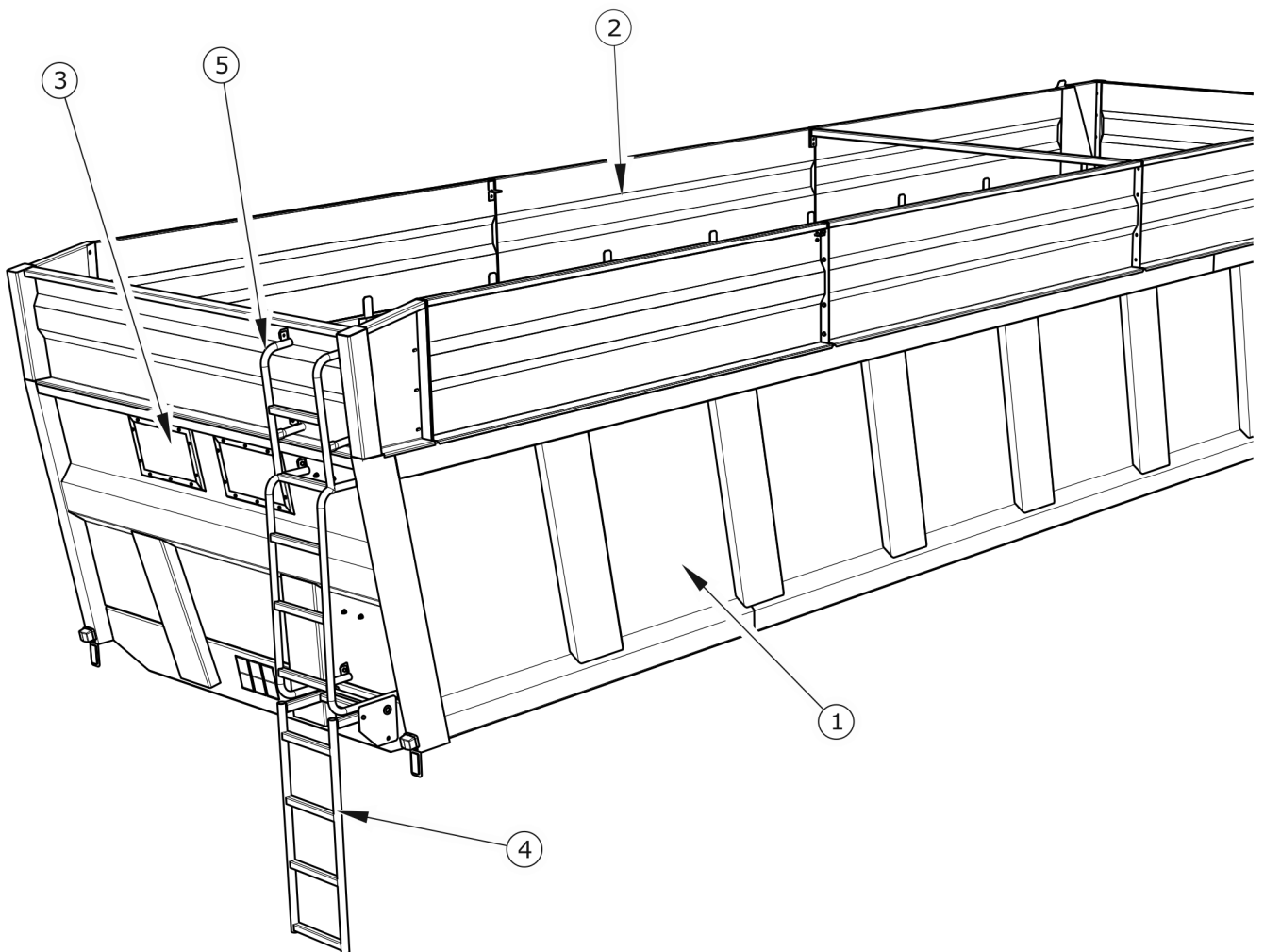


**FIGURE 3.2** Chassis, rear view

(1) fixed axle, (2) steer axle, (3) spring suspension, (4) rear protection, (5) hitch, (6) tipping pin, (7) lights support beam



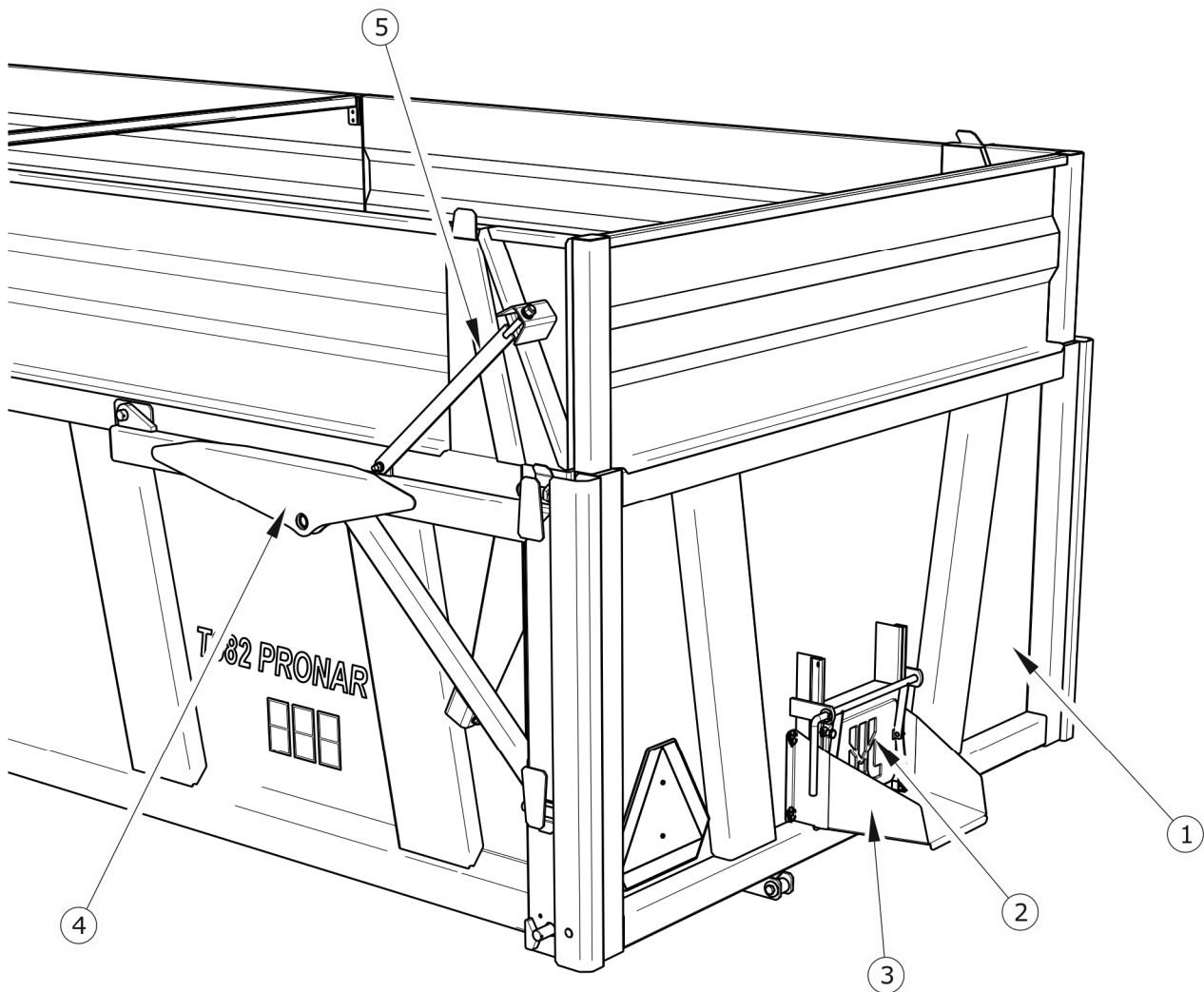
### 3.2.2 LOAD BOX



**FIGURE 3.3** *Load box – front view*

*(1) load box, (2) set of wall extensions, (3) window, (4) platform ladder, (5) extension ladder*

The trailer load box (1) is a welded structure made from steel plate and shapes. – figure (3.3). The box trapezoidal system enables easier unloading of transported materials. The load box is mounted on the lower frame using tipping pins. In the front (the front wall), two inspection windows (3) were placed, and a ladder (4) was screwed on. The load box can be equipped with 580 mm or 700 mm wall extensions (2) (additional equipment), then an additional ladder (5) is mounted to the front extension. A ladder and folding side steps (not shown in the figure), located on the inside of the load box, allow entry to the load space.



**FIGURE 3.4** Load box – rear view

(1) tailgate, (2) damper, (3) chute, (4) tailgate wing, (5) rod

In the rear part of the load box there is the tailgate (1) which is opened and closed using tailgate hydraulic system. In order to enable more precise unloading of bulk materials, a slide gate (2) and a chute (3) -are placed in the tailgate ( additional equipment ).

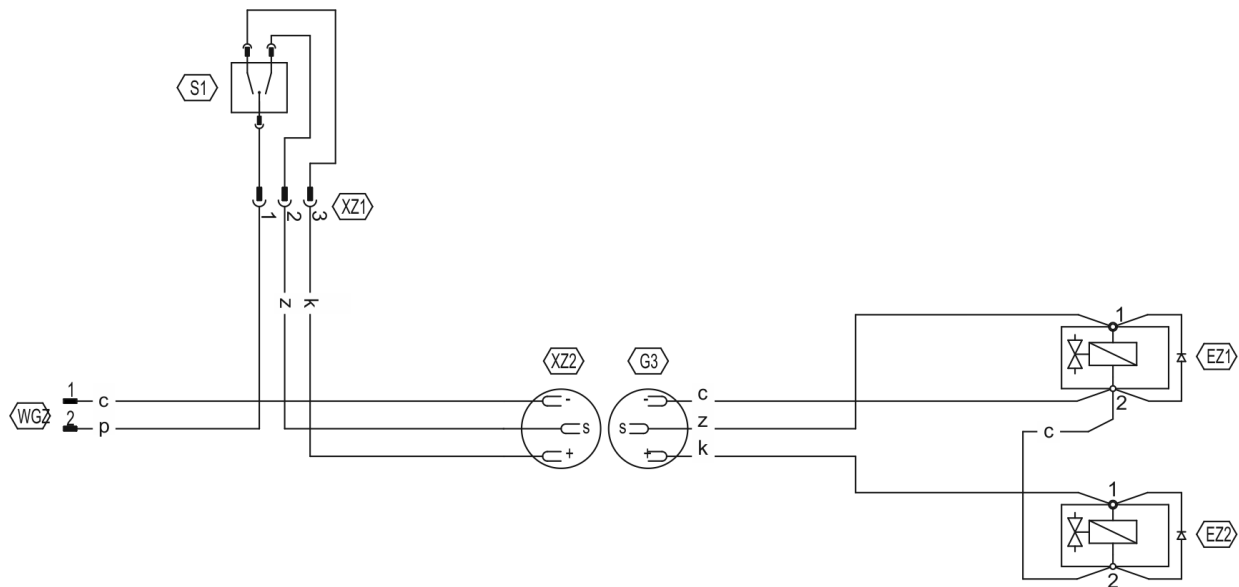
As an option, 1,000 mm silo wall extensions or 580 mm wall extensions with the net protection can be installed on the trailer.

### 3.2.3 ELECTRICAL SYSTEM

The trailer's electrical system is designed for supply of 12 V DC. The electrical system consists of two independently operating systems:

- Electrical lighting system
- power supply and solenoid valve control system.

Diagrams of both systems are presented in Figures (3.5) and (3.6). The trailer is connected to the tractor by means of two wires — the main 7-pin (spiral) connection cable, and the 3-pin cable to supply the solenoid valve system of the hydraulic tipping system. Both cables are standard equipment of the machine.



**FIGURE 3.5** Schematic diagram of the solenoid valve electrical system

**TABLE 3.2** Lead colour marking

MARKING	LEAD COLOUR	MARKING	LEAD COLOUR
B	White	C/T	Black and green
C	Black	T	Green
K	Red	P	Orange
N	Blue		

**TABLE 3.3** *List of electrical component markings*

<b>SYMBOL</b>	<b>NAME OF COMPONENT</b>
ZP / ZL	Rear light assembly, right / left side
X7P	Front seven pin socket
GT	Rear seven pin socket
TOP / TOL	Rear clearance light, right / left
OTP / OTL	License plate light, right / left
PP / PL	Front parking light, right / left
OBP / OBL	Clearance light, right / left
WGZ	3-pole plug
S1	Solenoid valve switch
EZ1, EZ2	Solenoid valves

**TABLE 3.4** *Connection socket marking (GT and X7P)*

<b>MARKING</b>	<b>FUNCTION</b>
31	Ground
+	Power supply +12V
L	Left indicator
54	STOP light
58L	Front left parking light
58R	Front right parking light
R	Right indicator

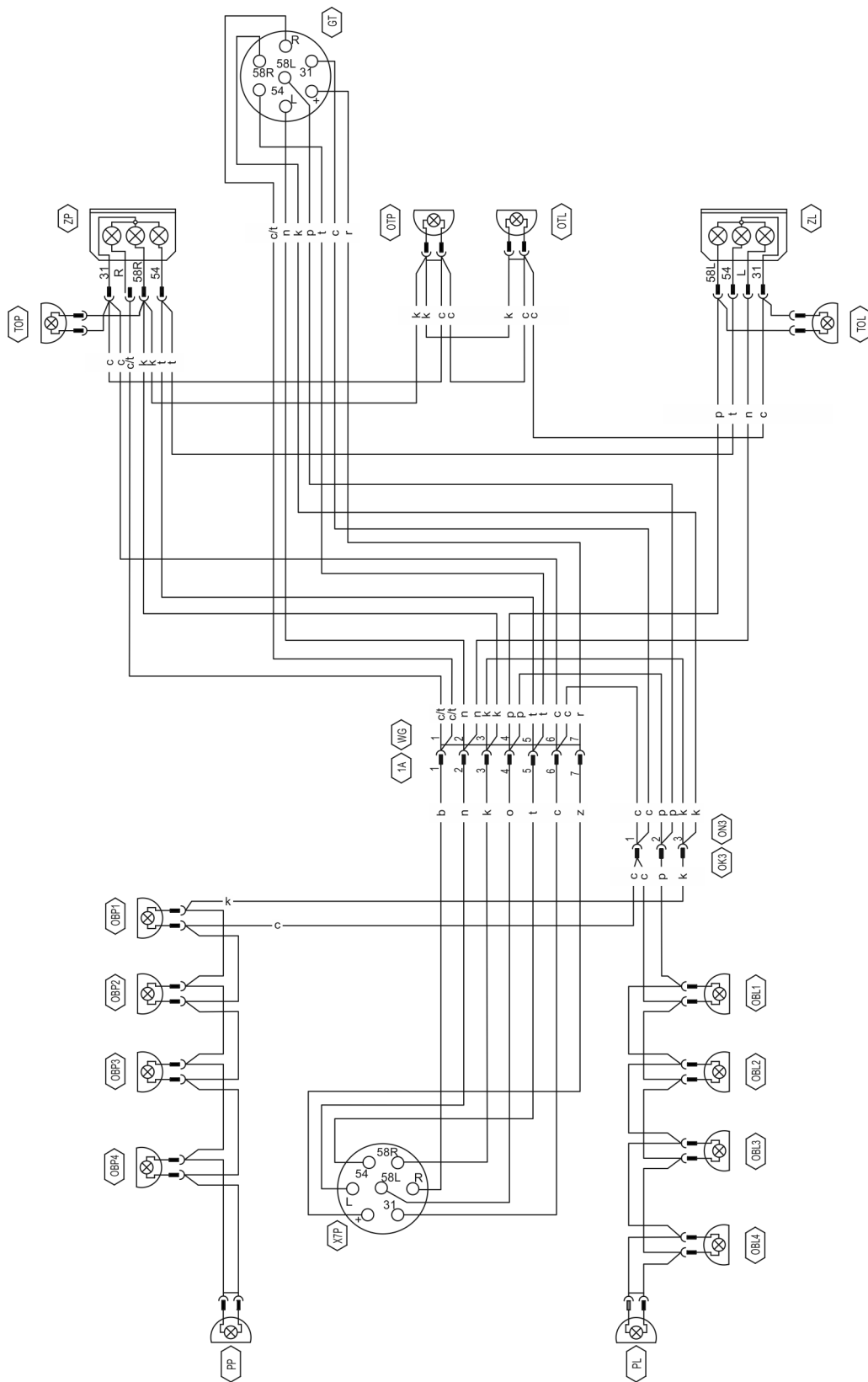
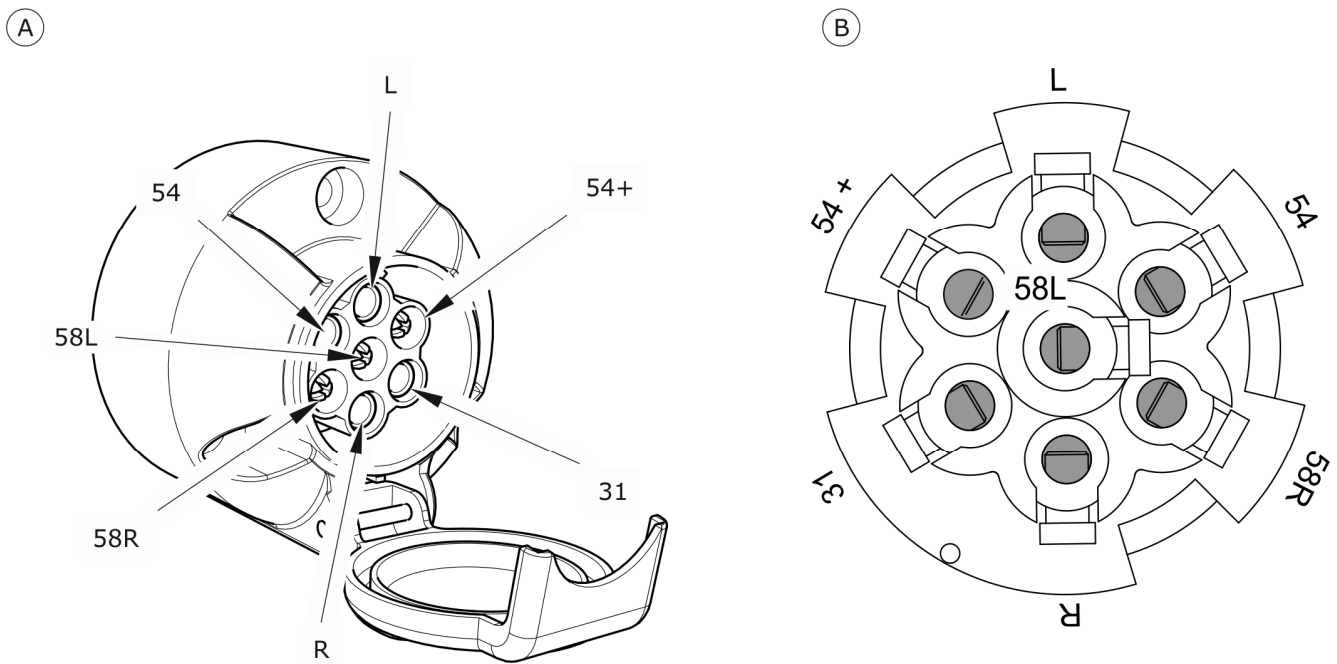


FIGURE 3.6 Electrical lighting system diagram



**FIGURE 3.7** *Connection socket X7P*

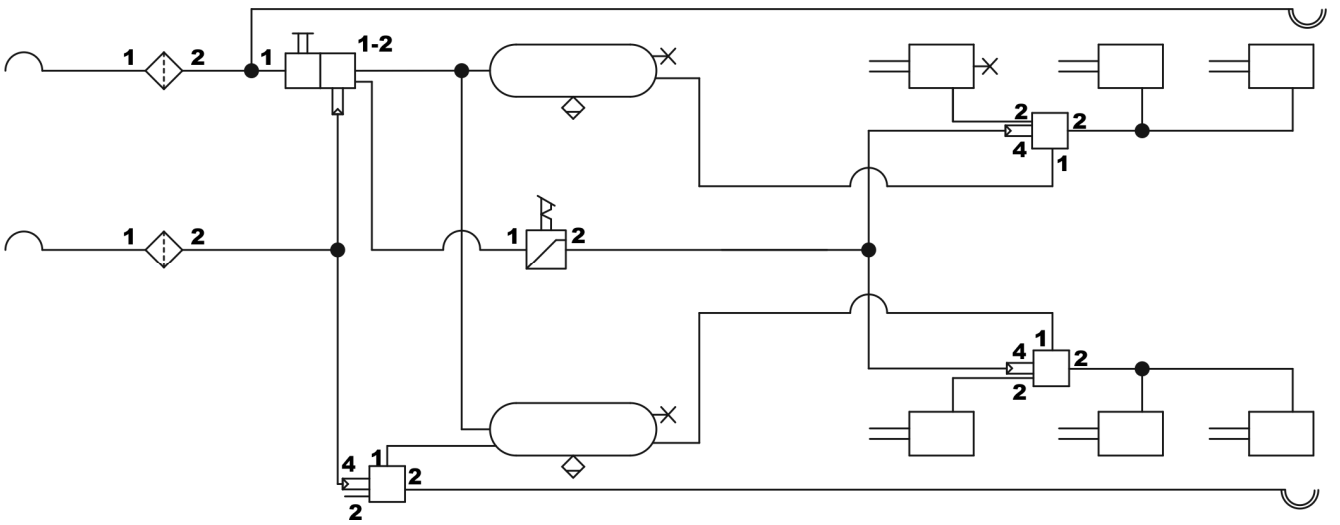
### 3.2.4 MAIN BRAKE

The trailer is equipped with one of the three types of main brake:

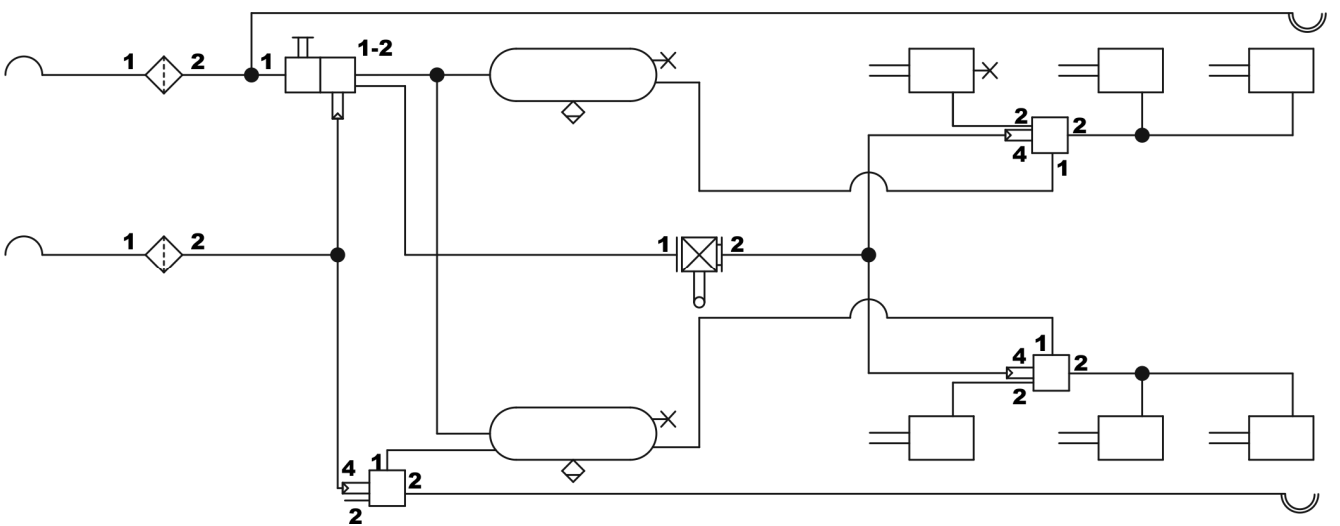
- double conduit pneumatic system with three position regulator, figure (3.8) – standard equipment,
- double conduit pneumatic brake system with automatic regulator, figure (3.9) - optional equipment,
- hydraulic braking system – figure (3.10) - optional equipment,

Figures (3.8) - (3.10) show diagrams of braking systems with rear output for connecting a second trailer. It is an optional equipment of each system variant.

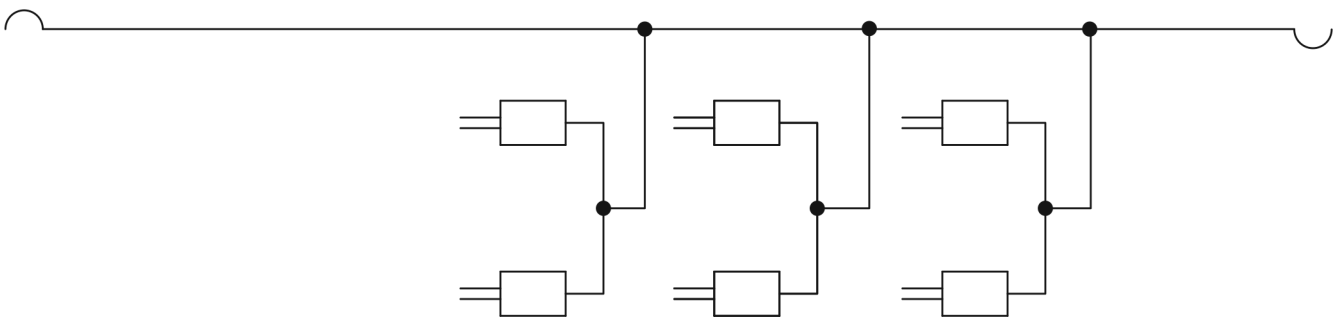
The main brake (pneumatic or hydraulic brake) is activated from the tractor driver's cab by depressing the brake pedal. The task of the control valve is to activate the trailer's brakes when the brake pedal is depressed in the tractor. Furthermore, in case of an inadvertent disconnection of the conduit between the trailer and the tractor, the control valve will automatically activate trailer's brakes - applies only to pneumatic systems.



**FIGURE 3.8** *Diagram of double conduit pneumatic system with manual regulator*





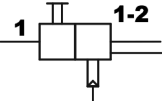
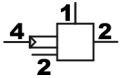
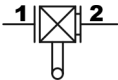
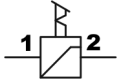

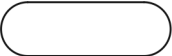
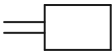



**FIGURE 3.9** *Diagram of double conduit pneumatic system with automatic regulator*

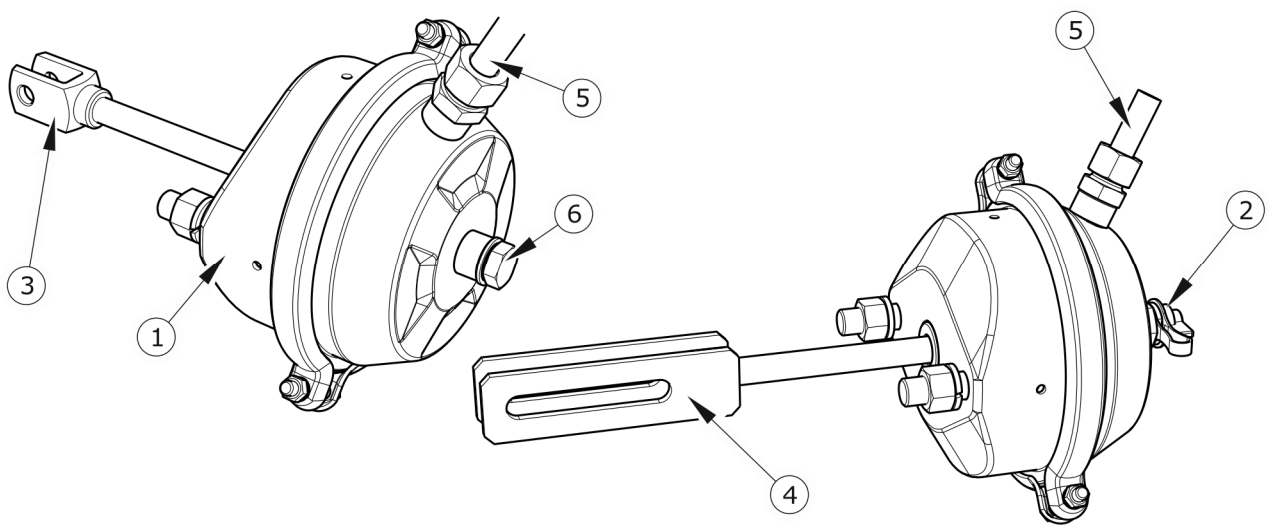


**FIGURE 3.10** *Hydraulic system diagram*

**TABLE 3.5** List of symbols used on the diagrams

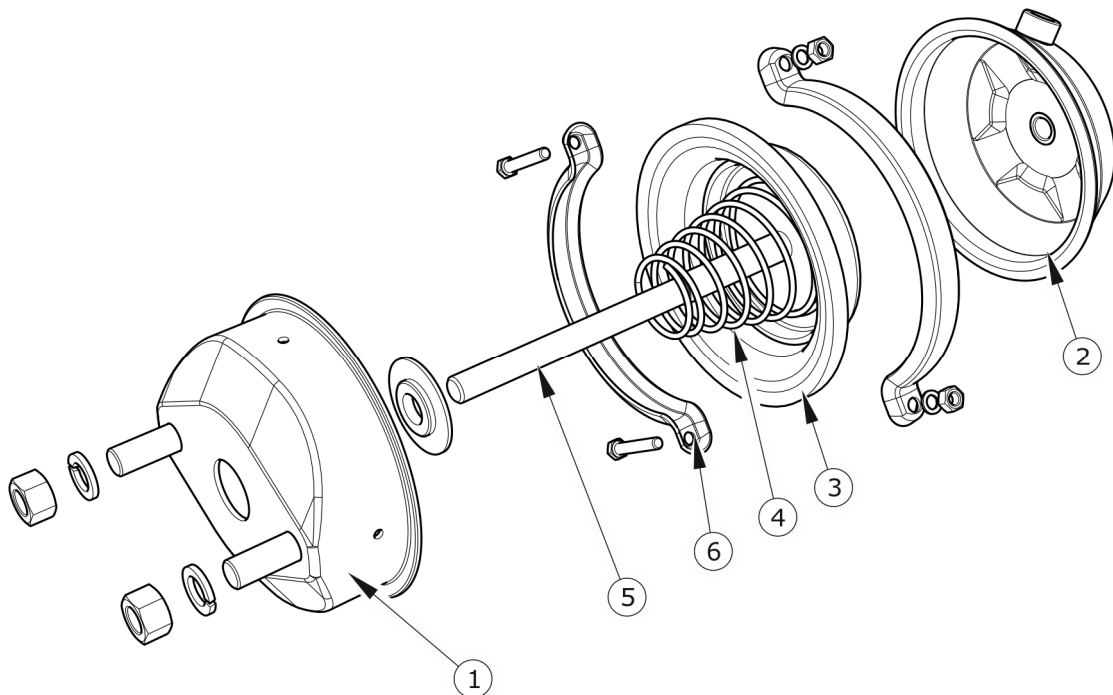
SYMBOL	MEANING
	Pneumatic connection (plug)
	Pneumatic connection with cut-off valve (socket)
	Air filter
	Drain valve
	Main control valve
	Relay valve
	Automatic regulator of braking force
	Three-position manual regulator of braking force
	Conduit connection (connector)
	Air tank
	Pneumatic cylinder
	Valve - control connection





**FIGURE 3.11** Brake pneumatic cylinders

(1) membrane cylinder, (2) control connection, (3) short fork, (4) long fork, (5) pneumatic conduit, (6) plug



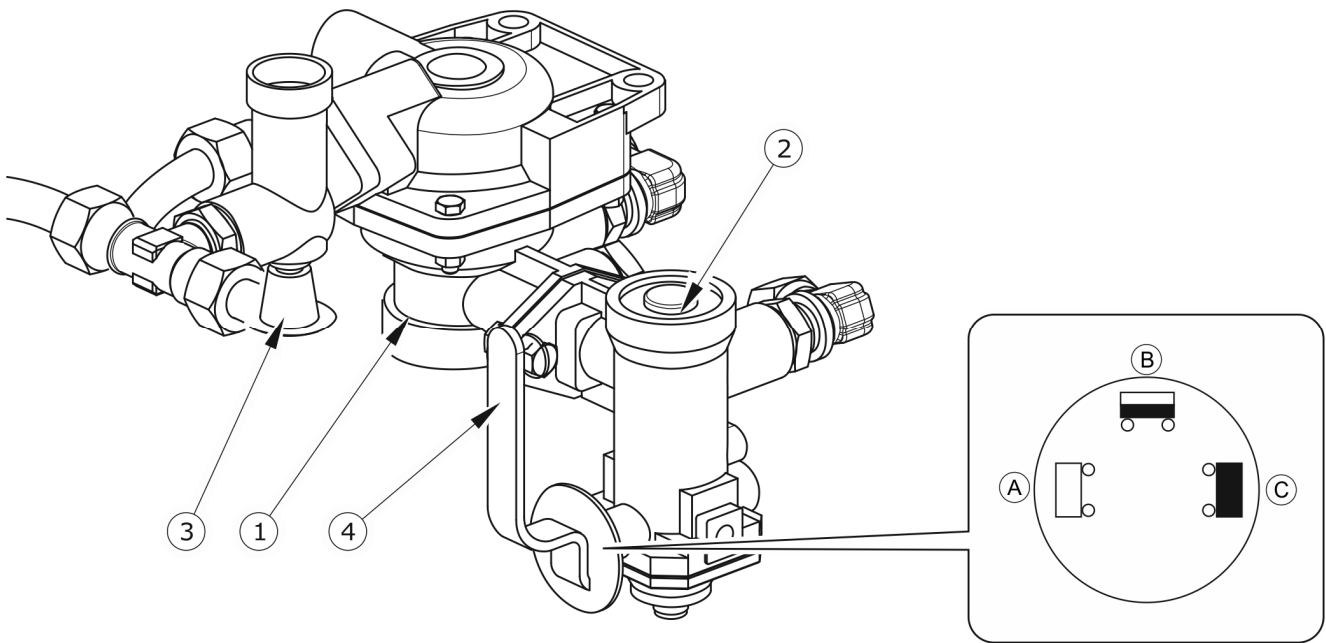
**FIGURE 3.12** Brake cylinder design

(1) front cover, (2) rear cover, (3) membrane, (4) spring, (5) cylinder rod, (6) clamping ring

Valve used in the system is equipped with a circuit causing the brakes to be applied when trailer is disconnected from the tractor - figure (3.13). When compressed air conduit is

connected to the tractor, the device automatically applying the brakes changes its position to allow normal brake operation.

Three-step brake force regulator (2)- figure (3.13), adjusts braking force depending on setting. Switching to a suitable working mode is done manually by the machine operator using the lever (4) prior to moving off. Three working positions are available: A - "no load", B - "half load" and C - "full load".

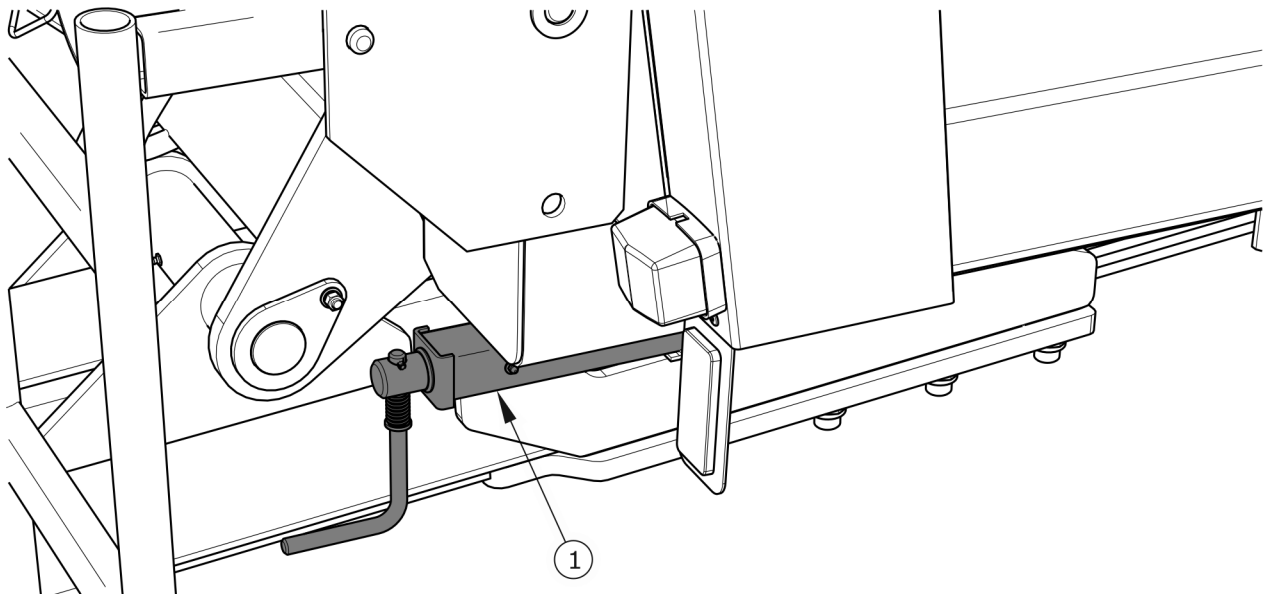


**FIGURE 3.13** Control valve and braking force regulator

(1) control valve, (2) braking force regulator, (3) trailer parking brake release button, (4) work selection regulator lever, (A) position "NO LOAD", (B) position "HALF LOAD", (C) position "FULL LOAD"

In double conduit systems with automatic regulator, braking force is adjusted automatically depending on the trailer load. The automatic regulator does not require maintenance during normal use of the trailer.

### 3.2.5 PARKING BRAKE



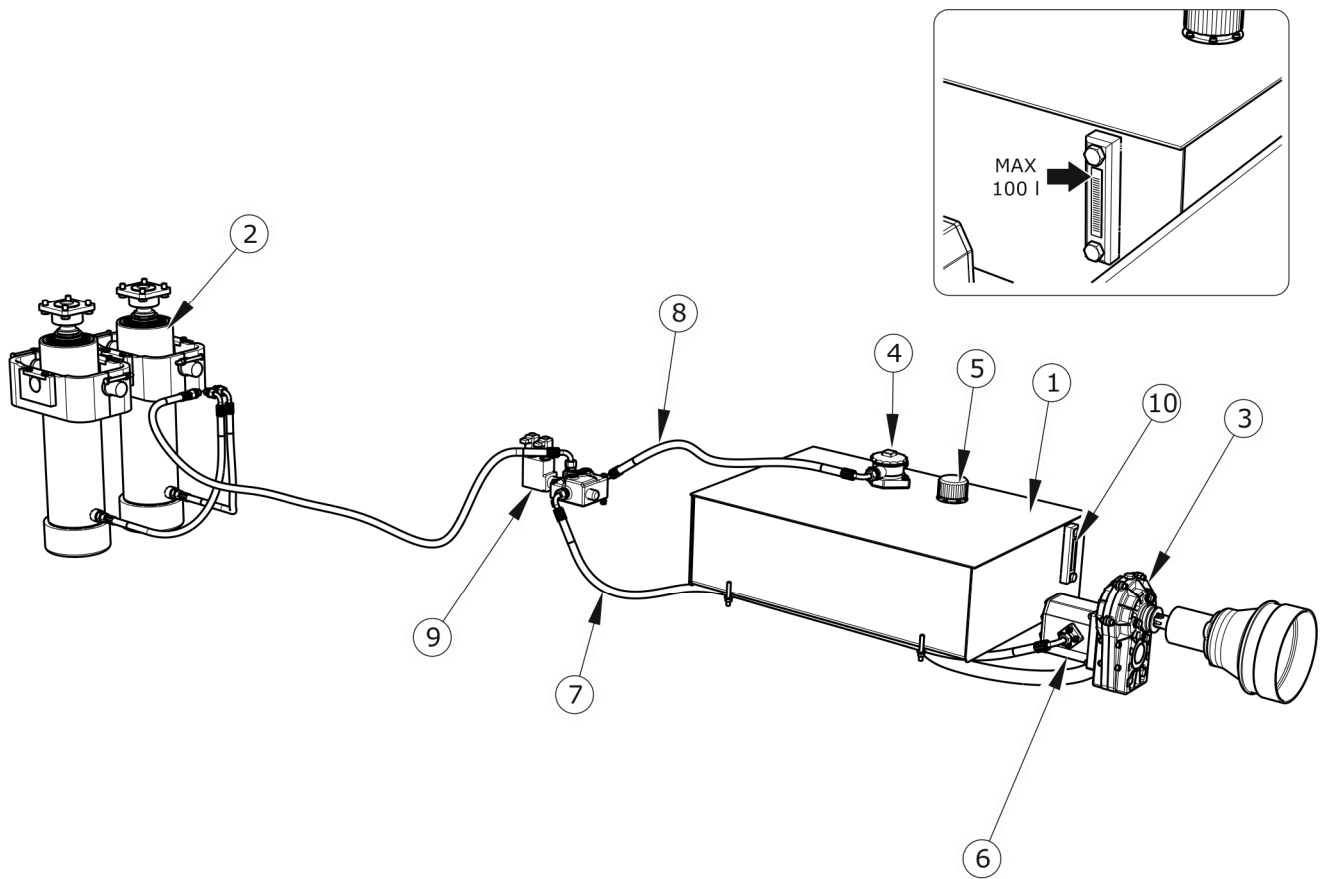
**FIGURE 3.14** *Parking brake*

(1) *brake crank mechanism*

The parking brake is used for immobilising the trailer while parking. Brake crank mechanism (1) is welded to the front beam of the lower frame and is connected with expander shaft levers by means of steel cables and a tensioning lever. Tensioning the cable causes the rotation of both levers, which immobilize the trailer by opening the brake shoes.

### 3.2.6 HYDRAULIC TIPPER SYSTEM

Hydraulic tipping system ensures automatic unloading of trailer by tipping the load box to the rear. The trailer is equipped with an independent hydraulic system. Its design is shown in figure (3.15). The system pump is driven by a transmission and a PTO shaft connected directly to the agricultural tractor. The system is controlled by means of a solenoid valve switch.



**FIGURE 3.15** Hydraulic tipping system design

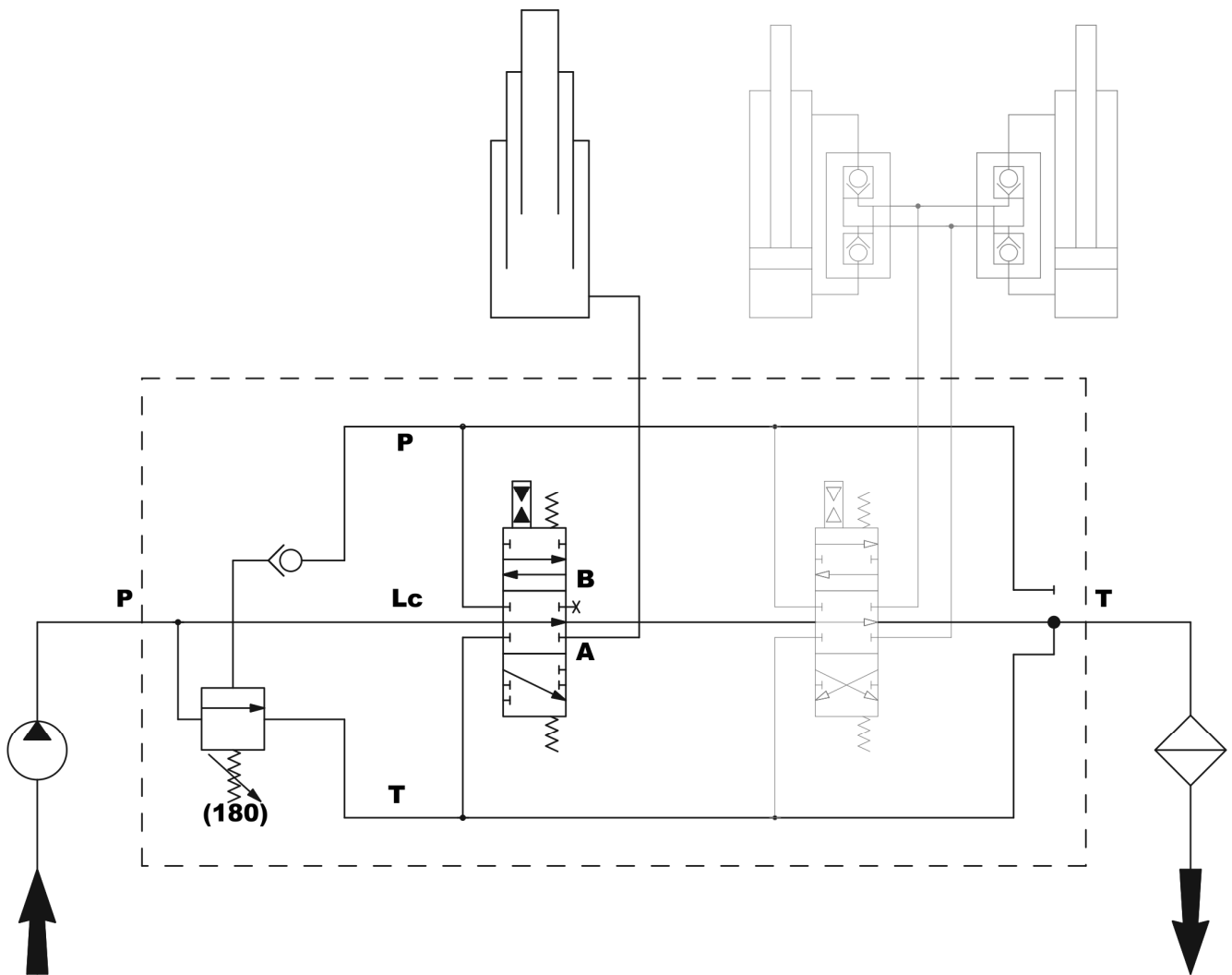
(1) oil tank, (2) tipping cylinder, (3) transmission, (4) oil filter, (5) filler plug, (6) oil pump, (7) supply line, (8) return line, (9) solenoid valve block, (10) oil level indicator

The 100-litre oil tank is located between the bottom frame side longitudinal members. The top of the tank has an oil filler cap (5) and a filter (4) located on the oil return from the solenoid valve block.

**IMPORTANT**



*The maximum tilt angle of the load box when tilting it backwards is limited by steel cables. The cable length is set by the manufacturer and may not be changed while the trailer is in use.*



**FIGURE 3.16** Hydraulic tipping system diagram

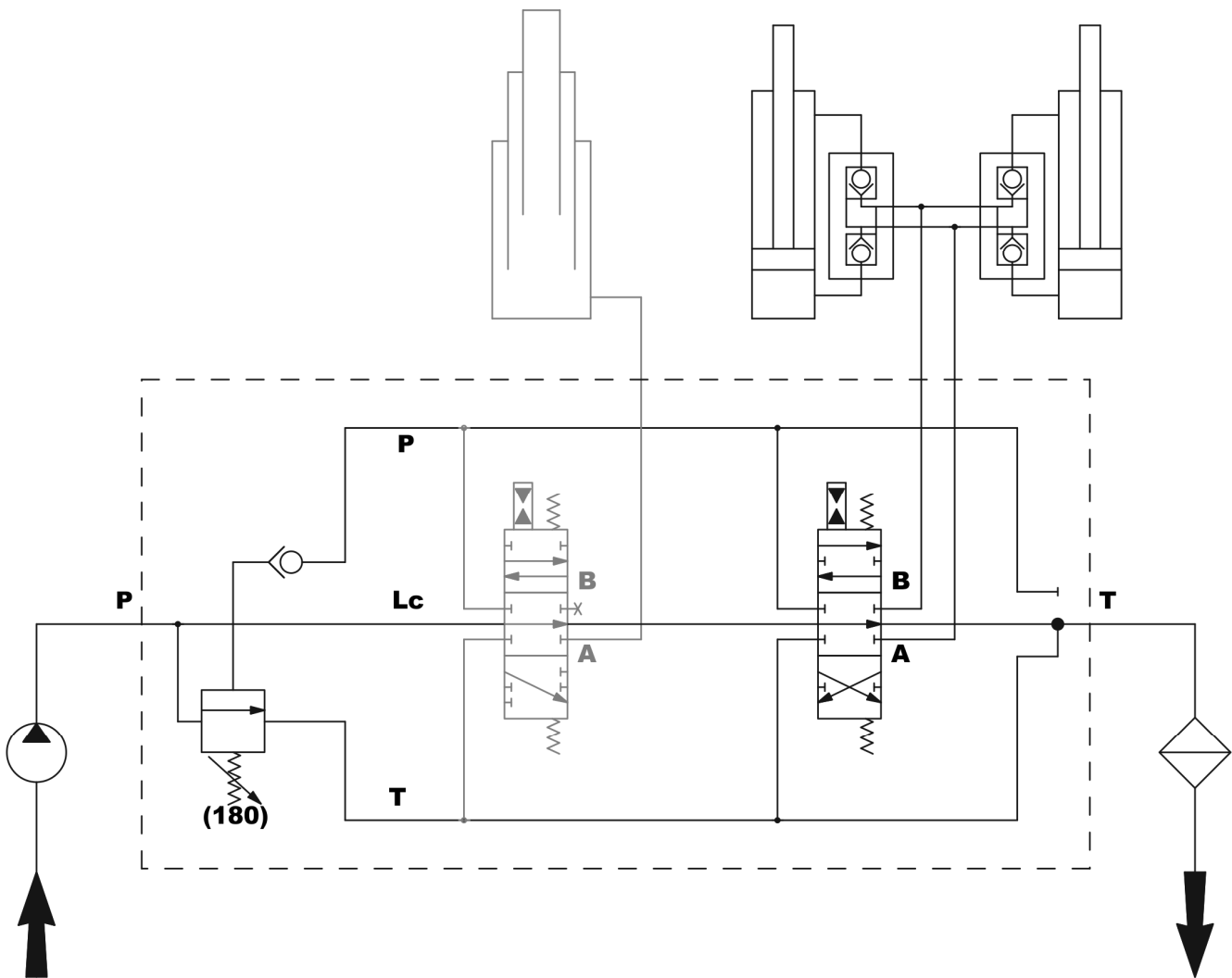


### TIP

The hydraulic system of the trailer is filled with L-HL32 Lotos hydraulic oil.

## 3.2.7 TAILGATE LIFTING HYDRAULIC SYSTEM

The hydraulic system is designed for remote control of the tailgate operation from the position of the agricultural tractor operator. The system is supplied from the trailer's hydraulic oil tank, and the remote control is carried out via the solenoid valve block.

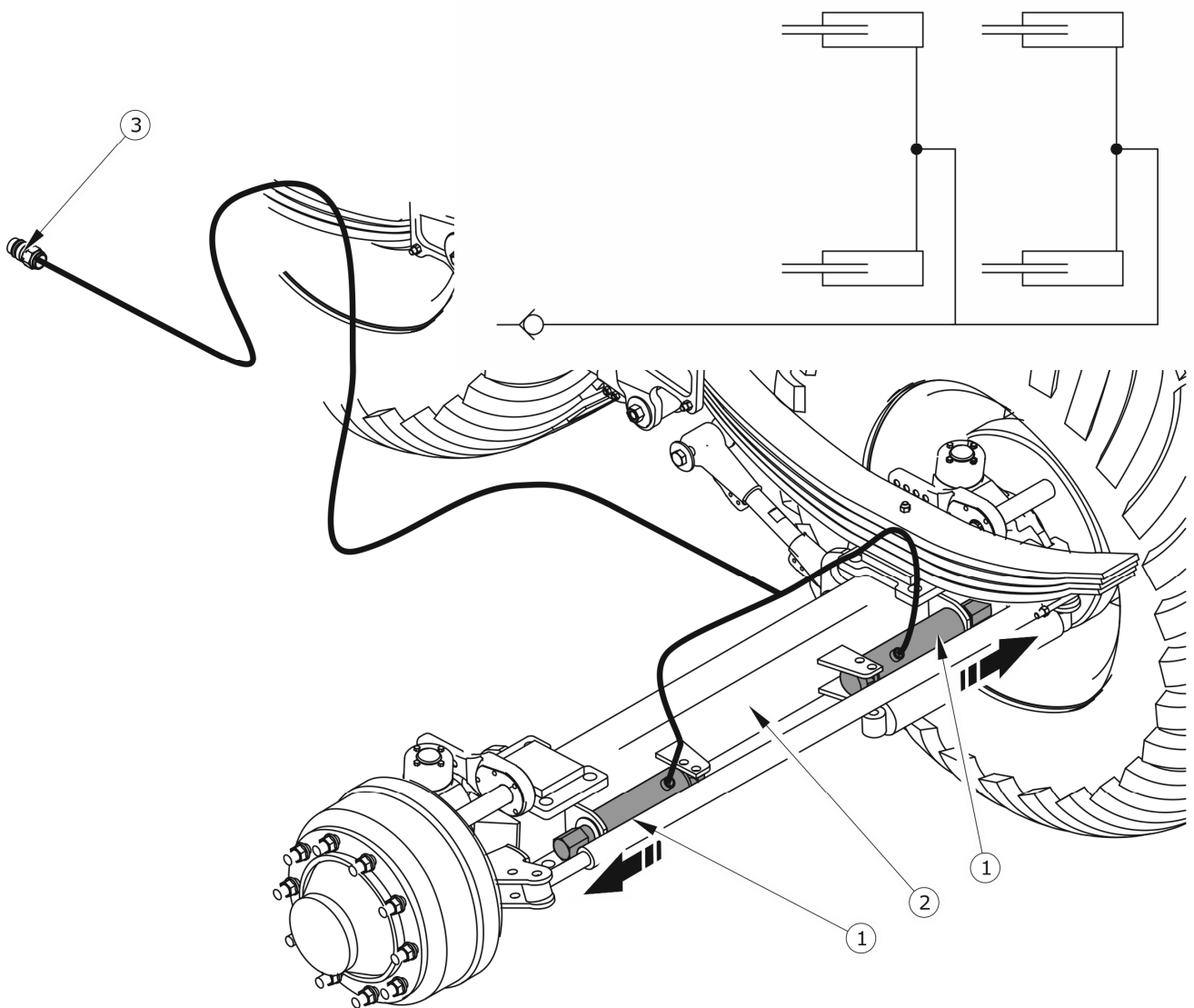


**FIGURE 3.17** Tailgate hydraulic system diagram

### 3.2.8 WHEEL LOCK HYDRAULIC SYSTEM

As standard the trailer is equipped with two passively steered steering axles. Axle design enables easier cornering and easier manoeuvring on marshy terrain, due to which there is less tyre wear on machine. While reversing, axle hub must be blocked, otherwise the trailer will have a tendency to turn uncontrollably to the left or the right during reversing.

The axle can be locked by a single-line hydraulic system as shown in Figure (3.19). Before moving to the rear extend hydraulic turning interlock cylinder (1) with the aid of tractor selective control valve lever.



**FIGURE 3.18** Construction and design of steering lock hydraulic system

(1) locking cylinder, (2) steering axle, (3) hydraulic quick coupler



**TIP**

The turning lock hydraulic system was filled with L-HL32 Lotos oil.





*SECTION*

**4**

**CORRECT USE**

## 4.1 PREPARING THE TRAILER FOR WORK

### 4.1.1 PRELIMINARY INFORMATION

The trailer is supplied to the user completely assembled and does not require additional mounting operations of machine sub-assemblies. The manufacturer guarantees that the machine is fully operational and has been checked according to quality control procedures and is ready for use. This does not release the user from an obligation to check the machine's condition prior to purchasing and before first use.

### 4.1.2 HAND-OVER AND INSPECTION OF THE MACHINE AFTER DELIVERY

After delivery of the machine to the buyer, the user is obliged to check technical condition of the trailer (one-time inspection). While buying the machine, the user must be informed by the seller about the method of use of the machine, risks resulting from the use for purposes other than intended, the method of the machine hitching and the principles of the machine operation and design. Detailed information concerning the machine hand-over are included in the *WARRANTY BOOK*.

#### **Check the trailer after delivery**

- Check completeness of the machine according to order.
- Check condition of paint coating; check the machine for traces of corrosion.
- Check the machine for damage resulting from wrong transport of the machine to its destination (crushing, piercing, bending or breaking of minor elements etc.).
- Check air pressure in tyres and check correct tightening of wheel nuts.
- Check technical condition of drawbar eye and if correctly installed.
- Check the oil level in the tank.

If non-conformities are found, do not hitch and start using the trailer. Discovered defects should be notified directly to the seller in order to remove them.

**IMPORTANT**

*The seller is obliged to conduct the first start up of the trailer in the presence of the user.*

*The user trained by the seller is not released from the obligation to carefully read this Operator's Manual and PTO shaft manual.*

### 4.1.3 PREPARE THE TRAILER FOR THE FIRST USE, TEST RUN OF THE TRAILER

**TIP**

*All maintenance activities concerning the trailer are described in detail in further sections of the Operator's Manual.*

**Preparing for the test run**

- Read this *OPERATOR'S MANUAL* and the PTO shaft manual and follow all relevant instructions in the text.
- Visually inspect the trailer according to the guidelines presented in section *PREPARING THE TRAILER FOR USE*.
- Hitch machine to tractor.
- Park the trailer on an even, hard and level surface.
- Immobilise the tractor with parking brake.

**Test start**

- Check all lubrication points of the trailer and PTO shaft and check level of oil in the tank. Lubricate the machine as needed according to instructions provided in section 5. Add oil is necessary.
- Drain air tank of the braking system.
- Ensure that hydraulic, pneumatic and electric connections in agricultural tractor are according to the requirements. Otherwise, the trailer should not be hitched to the tractor. Hitch trailer to tractor.

- Switch on individual lights, check correct operation of electrical system.
- Release tractor's parking brake. Perform test drive. While driving, check the operation of the trailer brake.
- Stop tractor (do not turn off the engine), immobilise tractor with parking brake.
- Start PTO with a speed of not more than 540 rpm.
- Using the controller, open the tailgate of the load box.
- Using the controller, tip the load box. Lower the load box and close the tailgate.
- Disengage PTO drive
- Use the manifold in the tractor to extend the steering lock hydraulic cylinders.

If during test run worrying symptoms occur such as:

- excessive noise and abnormal sounds originating from the rubbing of moving elements,
- leaky brake system, hydraulic oil leaks,
- incorrect operation of brake cylinders,
- other faults,

stop operating the trailer and do not operate it until the malfunction is corrected. If a fault cannot be rectified or the repair could void the warranty, please contact retailer for additional clarifications or to perform the repair.

#### **4.1.4 PREPARING THE TRAILER FOR NORMAL USE**

##### **Scope of inspection activities**

- Visually inspect if the tyres are properly inflated. In case of doubt, carefully check tyre pressure.
- Check technical condition of drawbar eye.
- Check correctness of electrical system operation.

- Install the slow-moving vehicle warning sign - if the trailer is used on public roads.
- Check the oil level in the tank and add oil if necessary.

## **DANGER**



*Careless and incorrect use and operation of the trailer, and failure to follow instructions in this operator's manual is dangerous to your health.*

*The machine must never be used by persons, who are not authorised to drive agricultural tractors, including children and people under the influence of alcohol or other drugs.*

*Non-compliance with the safety rules of this Operator's Manual can be dangerous to the health and life of the operator and others.*

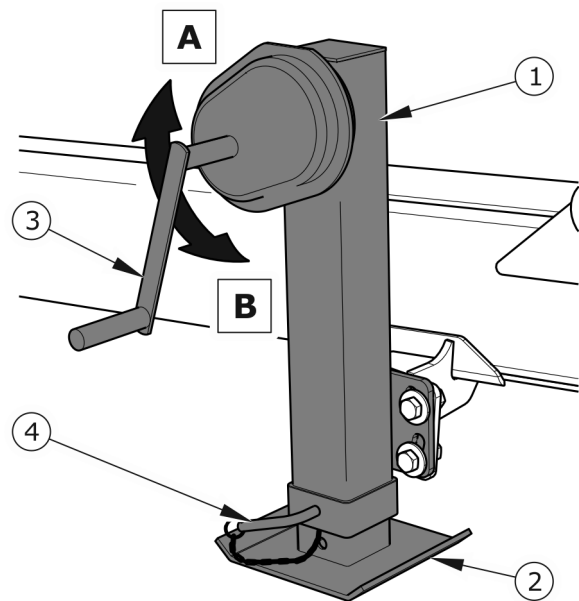
## **4.2 HITCHING AND UNHITCHING THE TRAILER**

The machine can be connected to an agricultural tractor if all electrical, hydraulic and pneumatic connections and the hitch on the agricultural tractor meet the machine manufacturer's requirements. In order to hitch the trailer to the tractor, perform the actions below in the sequence presented.

### **Hitching to tractor**

- ➔ Position agricultural tractor directly in front of the trailer's drawbar eye.
- ➔ Position drawbar eye at the correct height.
  - ⇒ Turn the crank clockwise to raise the drawbar hitching eye (the support foot slides out).
  - ⇒ Turn the crank counter-clockwise to lower the drawbar hitching eye (the support foot slides in).

- ➔ Reverse tractor, hitch trailer to appropriate hitch on tractor, check hitch lock protecting machine against accidental unhitching.
- ➔ If the agricultural tractor is equipped with an automatic coupler, ensure that the hitching operation is completed and that drawbar eye is secured.
- ➔ Turn off tractor engine. Ensure that unauthorised persons do not have access to the tractor cab.



**FIGURE 4.1** Support

(1) support, (2) support foot, (3) crank, (4) cotter pin, (A) lower the foot, (B) raise the foot

- ➔ Connect the braking system conduits.
  - ⇒ If the trailer is equipped with a double conduit pneumatic system, first connect the yellow pneumatic conduit to the yellow socket in the tractor and then connect the red conduit to the red socket in the tractor.
  - ⇒ If the trailer is equipped with a hydraulic braking system, connect the braking system conduit to proper hydraulic socket in the tractor.
- ➔ Connect the two electric system cables (7 wire to control the lights, the solenoid valves of the tipping system and the 3 wire for tailgate).
- ➔ Connect the steering lock hydraulic line.
- ➔ Unlock and remove the bolt (4) - figure (4.1), raise the support to the extreme upper position and secure with the bolt.
- ➔ Connect PTO shaft to trailer and tractor.
- ➔ Check and, if necessary, protect conduits against rubbing or other mechanical damage.

- ➔ Just before driving off, remove chocks from under the trailer's wheels and release parking brake.

**IMPORTANT**

*The trailer must not be used when not in working order.*

When turning, connecting conduits must hang loosely and not become tangled with moving elements of machine and tractor.

**DANGER**

*When hitching, there must be nobody between the trailer and the tractor. When hitching the machine, tractor driver must exercise due caution and make sure that nobody is present in the hazard zone.*

*When connecting the hydraulic or pneumatic conduits to the tractor, make sure that the hydraulic and pneumatic systems of the tractor and the trailer are not under pressure.*

*Ensure sufficient visibility during hitching.*

*Exercise due caution during support operation - danger of severing limbs.*

*After completion of hitching check the security of the hitching pin.*

**Unhitching**

In order to unhitch the trailer from the tractor follow these steps.

- ➔ Immobilise tractor with parking brake, turn off tractor engine
- ➔ Ensure that unauthorised persons do not have access to the tractor cab.
- ➔ Place chocks under the trailer's wheels in order to prevent the machine from rolling.
- ➔ Remove the support bolt, lower the support foot to such a height that it is possible to unlock and disconnect the trailer drawbar eye.
- ➔ Disconnect PTO shaft from tractor and trailer.
- ➔ Disconnect the electric cables.
- ➔ Disconnect braking system conduits.

- ⇒ If the trailer is equipped with a double conduit pneumatic system, first disconnect the red conduit and then disconnect the yellow conduit.
- ⇒ Disconnect proper conduit of the hydraulic braking system from the tractor's socket.
- ➔ Disconnect the steering lock hydraulic lines.
- ➔ Protect conduit ends with covers.
- ➔ Release tractor hitch, drive tractor away from the slurry tanker.

## **DANGER**



*Exercise caution when unhitching the trailer from the tractor. Ensure good visibility. Unless it is necessary, do not go between tractor and machine.*

*Before disconnecting conduits and drawbar eye, close tractor cab and secure it against access by unauthorised persons. Turn off tractor engine.*

*The trailer must not be disconnected when loaded.*

## **4.3 LOADING AND SECURING LOAD**

### **4.3.1 GENERAL INFORMATION ABOUT LOADING**

Before beginning loading make certain that the tailgate and chute slide gate are properly closed and secured. The trailer must be positioned to travel forward and be hitched to the tractor. Loading should only take place, when trailer is placed on flat level surface and hitched to tractor.

Regardless of the type of load carried, the user is obliged to secure it in such a manner that the load is unable to spread and cause contamination of the road. If this is impossible, do NOT transport this type of load.

Materials, which in contact with painted or steel surfaces may cause damage, should be transported in sealed packaging (bags, boxes, barrels, etc.). After unloading, the load box should be thoroughly cleaned with a strong jet of water.

If the transported materials exert high local pressure on the load box platform it should be protected against damage using thick planks, plywood or other materials of similar properties.



**IMPORTANT**

*Always try to distribute the load uniformly in the load box.*

*Do NOT exceed the trailer's maximum carrying capacity.*

Due to various densities of materials, the use of the total load box capacity may lead to exceeding permissible carrying capacity of the trailer. Guideline specific weight of selected materials is given in table (4.1). Take care not to overload the trailer.

**TABLE 4.1** *Guideline weights by volume of selected materials*

TYPE OF MATERIAL	WEIGHT BY VOLUME kg/m <sup>3</sup>
<b>Root crops:</b> raw potatoes steamed crushed potatoes dried potatoes sugar beet - roots fodder beet - roots	700 - 820 850 - 950 130 - 150 560 - 720 500 - 700
<b>Organic fertilisers:</b> old manure mature manure fresh manure compost dry peat	700 - 800 800 - 900 700 - 750 950 - 1,100 500 - 600
<b>Mineral fertilisers:</b> ammonium sulphate potash salt super phosphate basic slag phosphate potassium sulphate milled lime fertiliser	800 - 850 1 100 - 1 200 850 - 1,440 2,000 - 2,300 1 200 - 1 300 1,250 - 1,300

TYPE OF MATERIAL	WEIGHT BY VOLUME kg/m <sup>3</sup>
<b>Building materials:</b> cement dry sand wet sand solid bricks hollow bricks stones soft wood hard sawn timber impregnated timber steel structures milled burnt lime cinders gravel	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 – 7,000 700 - 800 650 - 750 1,600 – 1,800
<b>Straw litter and bulk feeds:</b> meadow hay dried in the swath hay wilted in the swath hay in gathering trailer (dry wilted) wilted cut hay dry baled hay wilted baled hay stored dry hay stored cut hay clover (lucerne) wilted in the swath clover (lucerne) cut wilted on trailer clover (lucerne) wilted on gathering trailer dry stored clover cut dry stored clover dry straw in round bales damp straw in round bales cut damp straw in bulk trailer cut dry straw in bulk trailer	10 - 18 15 - 25 50 - 80 60 - 70 120 - 150 200 - 290 50 - 90 90 - 150 20 - 25 110 - 160 60 - 100 40 - 60 80 - 140 8 - 15 15 - 20 50 - 80 20 - 40

TYPE OF MATERIAL	WEIGHT BY VOLUME kg/m <sup>3</sup>
cut dry straw in gathering trailer	50 - 90
cut dry straw in stack	40 - 100
baled straw (lightly crushed)	80 - 90
baled straw (heavily crushed)	110 - 150
cereal mass in round bales	20 - 25
cut cereal mass in bulk trailer	35 - 75
cut cereal mass in gathering trailer	60 - 100
green fodder in swath	28 - 35
cut green fodder in bulk trailer	150 - 400
green fodder in gathering trailer	120 - 270
fresh beet leaves	140 - 160
cut fresh beet leaves	350 - 400
beet leaves in gathering trailer	180 - 250
<b>Concentrated feeds and mixed feeds:</b>	
stored chaff	200 - 225
pressed cake	880 - 1,000
milled dry feed	170 - 185
mixed feeds	450 - 650
mineral mixtures	1,100 - 1,300
ground oats	380 - 410
wet sugar beet pulp	830-1,000
pressed sugar beet pulp	750 - 800
dry sugar beet pulp	350 - 400
bran	320 - 600
bone meal	700 - 1,000
pasture salt	1 100 - 1 200
molasses	1,350 - 1,450
silage (pit silo)	650 - 1,050
hay silage (tower silo)	550 - 750
<b>Seeds and grains:</b>	
beans	750 - 850
mustard	600 - 700

TYPE OF MATERIAL	WEIGHT BY VOLUME kg/m <sup>3</sup>
peas	650 - 750
lentils	750 - 860
runner beans	780 - 870
barley	600 - 750
clover	700 - 800
grass	360 - 500
maize	700 - 850
wheat	720 - 830
oil seed rape	600 - 750
linseed	640 - 750
lupins	700 - 800
oats	400 - 530
lucerne	760 - 800
rye	640 - 760
<b>Others:</b>	
dry soil	1,300 – 1,400
wet soil	1,900 – 2,100
fresh peat	700 - 850
garden soil	250 - 350

Source: "Technology of machine work in agriculture", PWN, Warszawa 1985

Loading should be carried out by a person experienced in this type of work and having appropriate authorisation for operating equipment (if required).

## DANGER



*The trailer is also designed for transport of harvested crops and agricultural products (volumetric or loose). It is permissible to transport other loads (timber, building materials packed loads), on the condition of securing the load box against damage (abrasion of paint covering, corrosion etc.).*

*Load on trailer must be secured against moving or contaminating road during travel. If it is impossible to properly secure the load, do NOT transport this type of material.*

**Bulk materials**

Loading bulk materials is normally conducted with the use of loaders or conveyors and possibly loading manually. Do not load bulk materials to a height greater than that of side walls or extensions. On completion of loading, the load should be evenly spread over the whole surface of the load box.

Oilseed rape or seeds of other plants of very small size or powder materials can be transported provided the load box is properly sealed in places where gaps are bigger than the seed diameter or other carried material. Profiled rubber seals, silicone sealers, plastic wrap, rope or textile materials are recommended materials to provide sealing of the load box.

Additionally it is essential to protect load with tarpaulin cover. It protects the load against spilling during travel, being blown away by the wind and also protects load against moisture, which is particularly dangerous in the case of bulk materials. They may absorb a significant amount of water, which may increase the bulk of the load during travel. In extreme cases the gross weight of the trailer may exceed the permissible vehicle gross weight.

Some bulk loads (e.g. building materials, such as gravel or slag) may cause more rapid damage to paintwork.

**Loads of pieces or solid lumps**

Chunky loads or can cause dents on the floor or walls and abrasion of the paint coating. In order to protect it, lay thick plywood, hard particle board, thick planks or other materials of similar properties on the load box platform and possibly on walls and wall extensions. Non-compliance with the instructions provided could invalidate the warranty. Loading of material in pieces or solid lumps must be from a low height. The load must not fall with great force on the floor of the load box, even if it is protected.

## Hazardous loads

### **DANGER**



*If it is necessary to carry permitted hazardous materials, acquaint yourself with the regulations concerning transport of hazardous materials in force in the given country and also the regulations of the ADR agreement.*

*It is absolutely essential to carefully read the information leaflets provided by the load manufacturer, and to observe the instructions for transporting and handling the load. Ensure whether during loading work it is necessary to apply additional personal protection (masks, rubber gloves etc.)*

According to the European ADR agreement concerning the international road transport of hazardous materials, the transport of this type of load (defined in detailed by this agreement) is prohibited with the use of agricultural trailers. The only exception are plant protection materials and artificial fertilisers, which may be transported on agricultural trailers on the condition that they are transported in the appropriate packaging and in quantities envisaged by the ADR agreement.

### **High volume loads**

High volume loads (light with large volumes) such as hay, presses blocks or bales, straw, silage etc. should be loaded with appropriate fittings: bale grabs, forks etc. Load may be loaded even exceeding the height of load box extensions but particular attention should be paid to the trailer stability and the proper attachment and securing of the load. Remember that higher loading has a negative effect on trailer stability.

### **Loads in packaging**

Loads transported in packaging (boxes, sacks) must be laid closely side-by-side beginning from the front side of the trailer. If it is essential to lay several layers, particular groups should be stacked alternately (in block system). The load must be laid tightly together and on the whole surface of the trailer floor. Otherwise, the load will move during travel. Due to the trailer design (the load box designed for the transport of agricultural crops and products, lack of load securing points), materials in packaging may not be loaded above the top of the walls or extensions of load box. Due to the characteristic shape of the load box, the trailer is not adapted and is not suitable for transporting pallets, boxes and barrels. Therefore, do not transport such loads.

**DANGER**

*If there is a danger of load packaging moving, do NOT transport this type of material. A moving load constitutes a serious hazard during travel for the tractor driver and other road users.*

Materials which may cause corrosion of steel, chemical damage or react in any other way negatively affecting the trailer structure may be transported only on condition of appropriate load preparation. Materials must be tightly packed (e.g. in plastic or paper bags, etc.). During transport, packaging contents may not come into contact with load box. Therefore, ensure the appropriate tightness of containers.

Due to diversity of materials, tools, methods of fixing and securing the load, it is impossible to describe all methods of loading. While working be guided by caution and own experience. The trailer user must carefully read the regulations concerning road transport and comply with them.

**DANGER**

*Overloading the trailer, erroneous loading and securing of the load is the most frequent cause of accidents during transport.*

*The load must be arranged in such a way that it does not threaten the stability of the trailer and does not hinder driving.*

*Ensure that during unloading / loading or raising the load box nobody is near the trailer. Before tipping the load box ensure proper visibility and make certain that there are no bystanders near the trailer.*

*The arrangement of the load may not cause an overload on the axle of the trailer.*

## 4.4 TRANSPORT THE LOAD

When driving on public or private roads, respect the road traffic regulations, exercise caution and prudence. Listed below are the key guidelines for driving the tractor and trailer combination.

- Before moving off, make sure that there are no bystanders, especially children, near the trailer or the tractor. Ensure that the driver has sufficient visibility.

- Make sure that the trailer is correctly attached to the tractor and tractor's hitch is properly secured.
- The trailer must not be overloaded, loads must be uniformly distributed so that the maximum permissible axle loads are not exceeded. The trailer's maximum carrying capacity must not be exceeded as this can damage the trailer and pose a risk to the operator or other road users.
- Do not exceed the design speed and maximum speed allowed by road traffic regulations. The towing speed should be adapted to the current road conditions, load carried by the trailer, road surface conditions and other relevant conditions.
- Unloading should be performed only on a level ground.
- When not connected to the tractor, the trailer must be immobilised using parking brake and with chocks placed under the wheels. Do NOT leave unsecured trailer. In the event of machine malfunction, pull over on the hard shoulder avoiding any risk to other road users and position reflective warning triangle according to traffic regulations.
- When driving on public roads, the trailer must be marked with a slow-moving vehicle warning sign attached to the rear wall of load box, if the trailer is the last vehicle in the group.
- While driving on public roads the trailer must be fitted with a certified or authorised reflective warning triangle.
- When driving, comply with all road traffic regulations, indicate an intention to turn using indicator lamps, keep all road lights and indicator lights clean at all times and ensure they are in good condition. Any damaged or lost lamps or indicator lights must be immediately repaired or replaced.
- Avoid ruts, depressions, ditches or driving on roadside slopes. Driving across such obstacles could cause the trailer or the tractor to suddenly tilt. This is of special importance because loaded trailer's centre of gravity is higher (especially a high volume load), which reduces safety. Driving near ditches or channels is dangerous as there is a risk of the wheels sliding down the slope or the slope collapsing.



- Speed must be sufficiently reduced before making a turn or driving on an uneven road or a slope.
- When driving, avoid sharp turns especially on slopes.

**IMPORTANT**

*Travelling with a high-volume load over ruts, ditches, roadside slopes etc. constitutes a great risk of overturning the trailer. Exercise extra caution.*

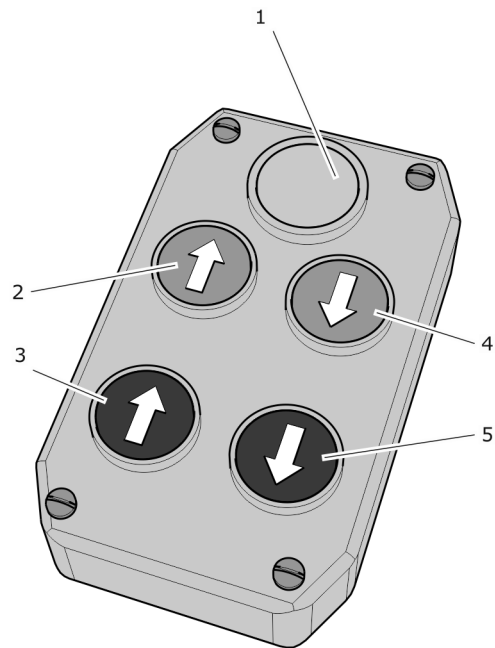
- Please note that the braking distance of the tractor and trailer combination is substantially increased at higher speeds and loads.
- Monitor trailer's behaviour when travelling on an uneven terrain, and adjust driving speed to road conditions, slow down early enough when turning.
- Prolonged driving across steep ground may lead to loss of braking efficiency.

## 4.5 UNLOADING

Unloading of the trailer is performed in the following sequence:

- ➔ tractor and trailer must be placed to drive forward on flat and hard ground,
- ➔ immobilise tractor and trailer with parking brake,
- ➔ start the PTO drive on the tractor at a speed of not more than 540 rpm,
- ➔ press the ON / OFF button (1) in the controller to turn on the control system power,
  - ⇒ the button light will come on,
- ➔ open the slide gate or
- ➔ press and hold the white button (3) of the controller to raise the tailgate,
- ➔ press and hold the blue button (4) of the controller to raise the load box,

- ➔ after unloading, lower the load box by pressing the button (4),
- ➔ clean the edges of the floor and walls,
- ➔ close the tailgate by pressing the button (5) or close the slide gate,
- ➔ press the button (1) to turn the system power off, the power indicator will turn off



**FIGURE 4.2** Controller

(1) power ON/OFF button, (2) / (4) raise / lower the load box, (3) / (5) raise / lower the tailgate

Rear load box wall is equipped with chute slide gate (1) – figure (4.3) and chute (2) (optional equipment) which is used for unloading loose materials. Chute design allows very accurate dosing of the material to packaging (sacks, boxes etc.). The opening gap can be controlled using lever (3). In order to do that loosen the bolt interlocking slide gate (4), open the slide as required and lock again using the bolt. During unloading through chute, load box must be raised slowly and smoothly. Raising the load box quickly will exert large pressure on the tailgate due to displacement of the carried material and could compromise trailer's stability.

**DANGER**

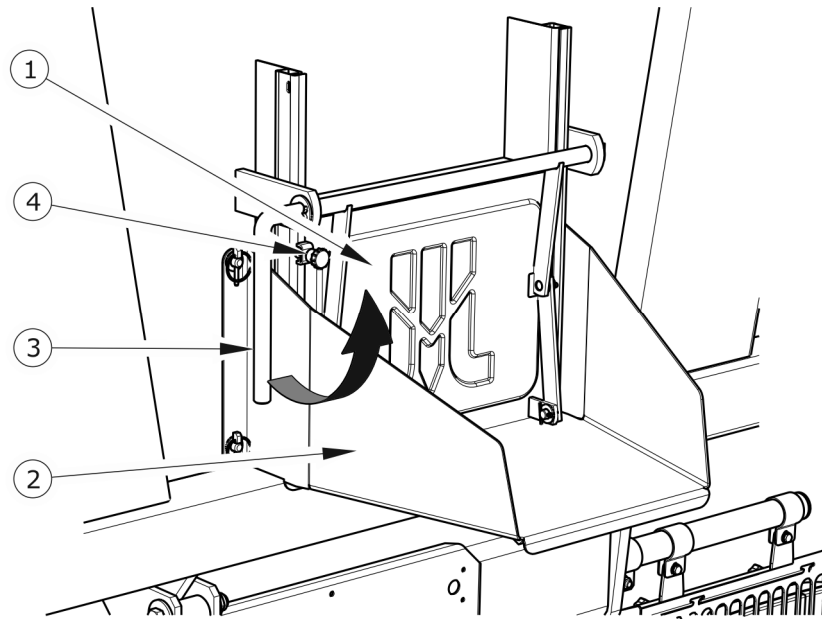


*Tipping the load box must be done on hard and level ground.  
When opening tailgate be especially careful, because of the load pressure.  
Do NOT stand behind the trailer when opening the tailgate. Keep a safe distance.*

**DANGER**



*Use extreme caution when unloading near overhead power lines.  
Be careful when closing the tailgate and slide gate. Danger of crushing limbs.*



**FIGURE 4.3** Chute

(1) slide gate, (2) chute, (3) lever, (4) locking bolt

While unloading bulky materials be especially careful. Do NOT tip load box on uneven or wet ground and move and jerk trailer during unloading. Bulky materials are normally difficult to unload. Therefore, proceed cautiously and patiently. Careless operation of trailer may pose a danger to operators and bystanders can also cause damage to the machine.

## **DANGER**



*Do NOT jerk the trailer forward if load is bulky or reluctant to pour and does not unload.*

*Ensure that during unloading nobody is near tipped load box or load material pouring out.*

*Tipping may only be performed when trailer is hitched to tractor.*

*Do NOT tip load box in strong gusty winds conditions.*

*Do NOT move off or drive when load box is raised.*

## 4.6 PROPER USE AND MAINTENANCE OF TYRES

When working with tyres, the trailer should be secured against rolling by placing chocks under the wheels. Wheels can be taken off the trailer axle only when the trailer is not loaded.

- Repair work on the wheels or tyres should be carried out by persons trained and entitled to do so. This work should be carried out using appropriate tools.
- Inspect tightness of wheel nuts after the first use of the trailer, every 2 - 3 hours during first month of work and then every 30 hours of use (travel). The inspection should be repeated individually if a wheel has been removed from the wheel axle. Wheel nuts should be tightened according to recommendations provided in section 5 *MAINTENANCE*.
- Regularly check and maintain correct air pressure in tyres according to Operator's Manual (especially if trailer is not used for a longer period).
- Air pressure in tyres should be also checked during the whole day of intensive work. Please note that higher temperatures could raise tyre pressure by as much as 1 bar. At high temperatures and pressure, reduce load or speed.
- Do not release air from warm tyres to adjust the pressure or the tyres will be underinflated when temperatures return to normal.
- Tyre valves should be protected with the appropriate caps to avoid soiling.
- Do not exceed the trailer's maximum design speed.
- When the trommel screen is operated all day, stop working for a minimum of one hour in the afternoon.
- Take a 30 minute-break for cooling tyres after driving 75 km or after 150 minutes of continuous travel, depending on which occurs first.
- Avoid potholes, sudden manoeuvres or high speeds when turning.

*SECTION*

**5**

**MAINTENANCE**

## 5.1 PRELIMINARY INFORMATION

When using the trailer, regular inspections of its technical condition and the performance of maintenance procedures are essential, which keep the machine in good technical condition. In connection with this the user of the trailer is obliged to perform all the maintenance and adjustment procedures defined by the Manufacturer.



### **IMPORTANT**

*Repairs during the warranty period may only be performed by authorised service points.*

Detailed procedures and extent of activities which the user may perform by himself are described in this section. In the event of unauthorized repairs, changes to factory settings or activities which the machine operator is not allowed to perform, the warranty will be invalidated.

## 5.2 SERVICING WHEEL AXLE

### 5.2.1 PRELIMINARY INFORMATION

Work connected with the repair, change or regeneration of axle components should be entrusted to specialist establishments, having the appropriate technology and qualifications for this type of work.

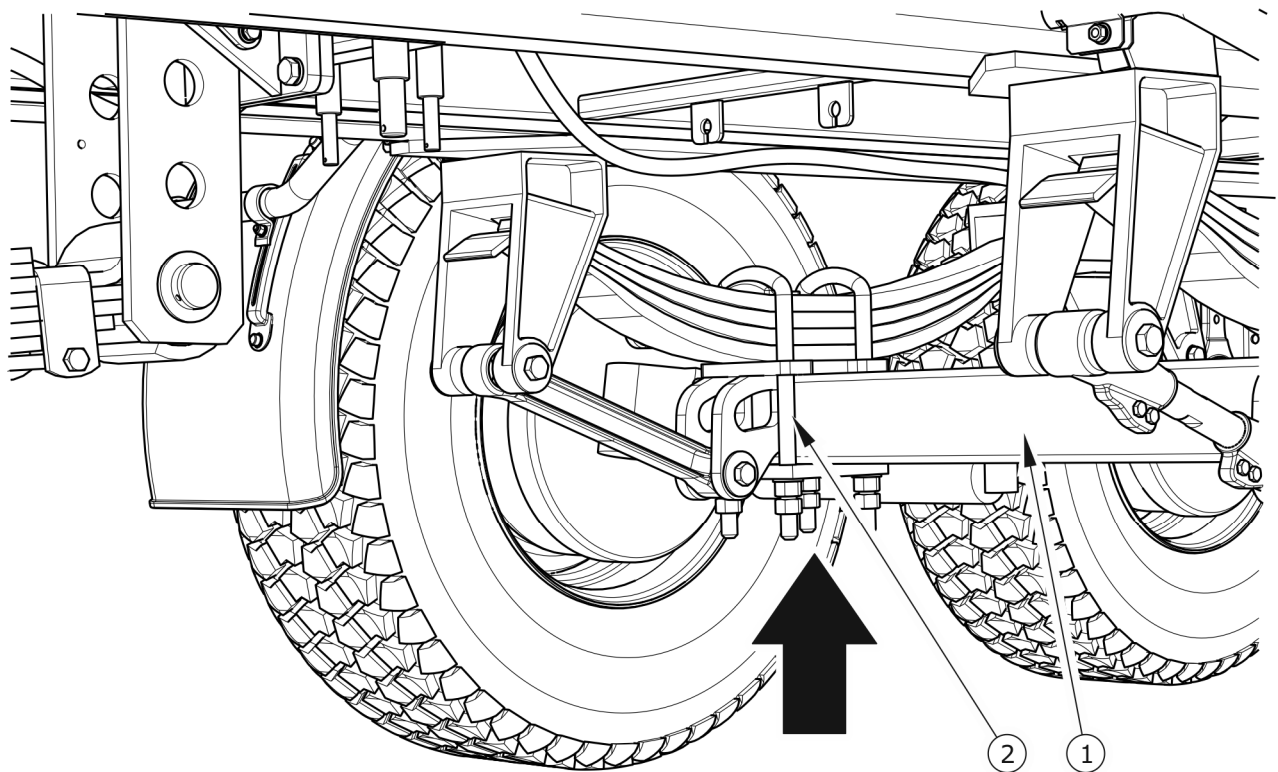
The responsibilities of the user are limited to:

- inspect and adjust slackness of axle bearings,
- Install and remove wheel, inspect wheel nut tightness.
- check air pressure, evaluating technical condition of wheels and tyres.
- mechanical brakes adjustment,
- change of parking brake cable and adjustment of cable tension.
- Inspection of tightening torque of nut and bolt connections

Procedure relating to:

- changing grease in axle bearings,
- changing bearings, hub seals,
- repairing wheel axle,
- may be performed by specialist workshops.

## 5.2.2 CHECK WHEEL AXLE BEARINGS FOR SLACKNESS



**FIGURE 5.1** *Lifting jack support point*

(1) wheel axle, (2) U bolt

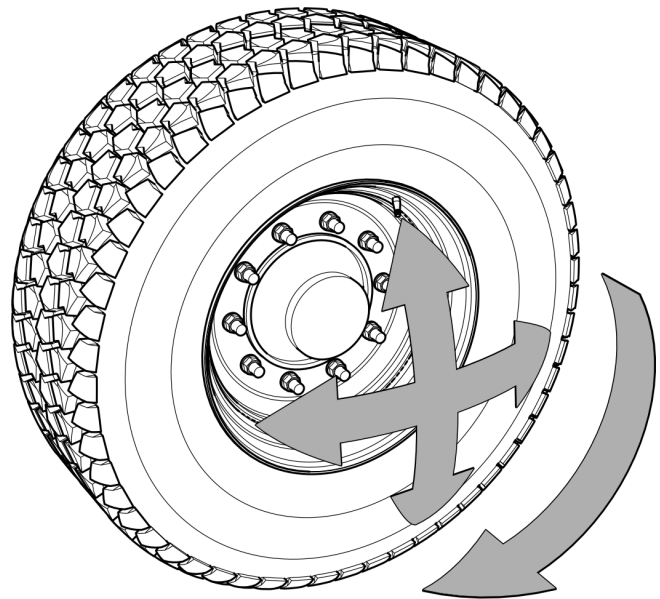
### Preparatory procedures

- ➔ Hitch trailer to tractor, immobilize tractor with parking brake.
- ➔ Park the trailer on hard level ground.
  - ⇒ Tractor must be placed to drive forward.
- ➔ Place chocks under the trailer's wheel that will not be raised. Ensure that machine will not move during inspection.

- ➔ Raise the wheel (opposite to the side where chocks are placed).
  - ⇒ Lifting jack should be positioned in the place indicated by the arrow in figure (5.1). Lifting jack must be suitable for machine weight.

### Check wheel axle bearings for slackness

- ➔ Turning the wheel slowly in both directions check that movement is smooth and that the wheel rotates without excessive resistance.
- ➔ Turn the wheel so that it rotates very quickly, check that the bearing does not make any unusual sounds.
- ➔ Holding the wheel above and below, try to feel any slackness.
  - ⇒ You may use a lever placed under the wheel supporting the other end of the lever on the floor.
- ➔ Lower the lifting jack, relocate the chocks to the other wheel and repeat the inspection procedure for the other wheels.



**FIGURE 5.2** Check bearings for slackness

### TIP



*If hub cover is damaged or missing, contamination and dampness enter the hub, which causes significantly faster wear of bearings and hub seals.*

*Life of bearings is dependent on working conditions of the trailer, loading, ground speed and lubrication conditions.*

If slackness is felt, adjust bearings. Unusual noise made by the bearing may be a symptom of excessive wear, dirt or damage. In such a case, the bearing and sealing ring should be replaced with new parts (if they are not suitable for further operation) or cleaned and greased again.





## INSPECT

- After travelling the first 1,000 km.
- Every six months of use or every 25,000 km.

Check condition of hub cover, if necessary replace with a new cover. Only inspect bearings for looseness, when the machine is hitched to a tractor. The machine may not be loaded.



## DANGER

*Before commencing work the user must read the user's manual for the lifting jack and adhere to the manufacturer's instructions.*

*The lifting jack must be stably supported on the ground and so must the axle.*

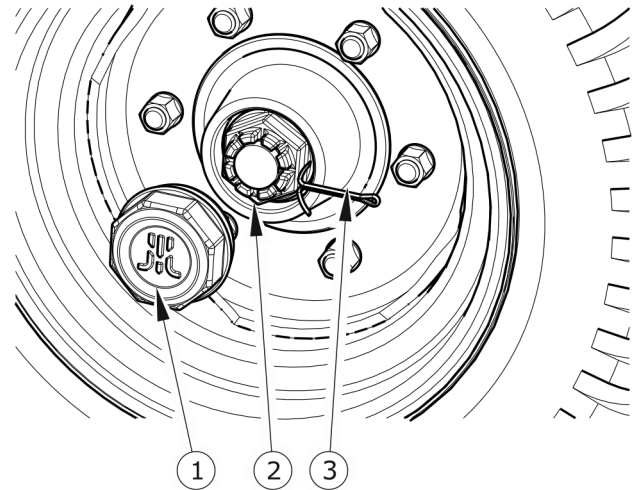
*Ensure that trailer is immobilised during inspection of axle bearing slackness.*

### 5.2.3 ADJUST THE PLAY OF THE AXLE BEARINGS

The wheel should turn smoothly without jamming and detectable resistance. Adjustment of bearing slackness may only be conducted when the trailer is not loaded and is hitched to the tractor.

Ensure that the trailer is properly secured and is immobilised when wheel is being removed.

- ➔ Take off hub cover (1) – figure (5.3).
- ➔ Take out cotter pin (3) securing castellated nut (2).
- ➔ Tighten castellated nut in order to eliminate slackness.
- ➔ Wheel should rotate with insignificant resistance.
- ➔ Undo nut (not less than 1/3 rotation) to align the nearest thread groove with the opening in wheel axle pin. Wheel should rotate without excessive resistance.



**FIGURE 5.3** *Adjust play*  
(1) cover, (2) nut, (3) cotter pin

- ➔ The nut must not be excessively tightened. Do not apply excessive pressure because working conditions of the bearings may deteriorate.
- ➔ Secure castellated nut with cotter pin and mount the hub cap.
- ➔ Delicately tap the hub cap with rubber or wooden mallet.

### 5.2.4 INSTALL AND REMOVE WHEEL, INSPECT WHEEL NUT TIGHTNESS.

#### Remove wheel

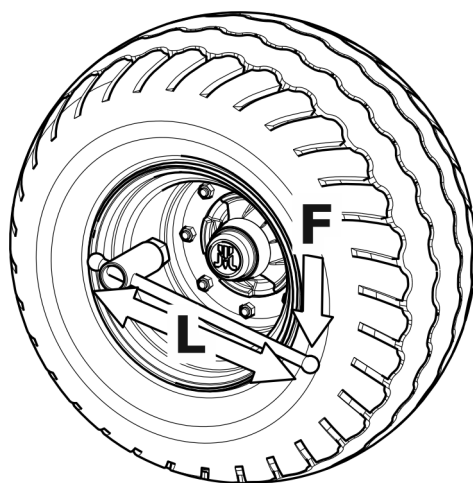
- ➔ Place chocks under the wheel that will not be dismantled.
- ➔ Ensure that trailer is immobilised when wheel is being removed.
- ➔ Loosen wheel nuts according to the



**FIGURE 5.4** Sequence of undoing and tightening nuts

sequence shown in figure (5.4).

- ➔ Place lifting jack and lift the trailer.
  - ⇒ The lifting jack should have sufficient lifting capacity and should be technically reliable.
  - ⇒ The lifting jack must be positioned on a level and hard surface so as to prevent sinking into the ground or relocating the jack during lifting.



$M22 \times 1.5 - 510 \text{ Nm}$

**FIGURE 5.5** Tightening method

(F) – weight of the person tightening the nut,  
 (L) - length of spanner arm

- ⇒ If necessary, use proper backing plates in order to reduce unit pressure of the jack's base on the ground and prevent its sinking into the ground.

- ➔ Dismount wheel.

### Install wheel

- ➔ Clean axle pins and nuts of contamination.
- ➔ Do not grease thread of nuts and pins.
- ➔ Check condition of pins and nuts, if necessary replace.
- ➔ Place wheel on hub, tighten nuts so that wheel rim tightly fits the hub.
- ➔ Lower the trailer, tighten nuts according to recommended torque and given sequence.

### Tightening nuts

Nuts should be tightened gradually diagonally, (in several stages, until obtaining the required tightening torque) using a torque spanner. If a torque spanner is not available, one may use an ordinary spanner. The arm of the spanner (L) figure (5.5) should be selected according to the weight of the person (F) tightening the nut. Remember that this method of tightening is not as accurate as the use of a torque spanner. Tightening of nuts should be checked with the frequency given in the below table. The activities should be repeated after each removal of a wheel from the wheel axle.

#### INSPECT



- *After the first use of the trailer.*
- *Every 2 – 3 hours of trailer use (during the first month of trailer use).*
- *Every 30 hours of use.*



#### TIP

*Wheel nuts should be tightened using the torque of 510 Nm – M22x1.5 nuts.*

**TABLE 5.1**     *Selection of spanner arm length*

WHEEL TIGHTENING TORQUE	BODY WEIGHT (F)	ARM LENGTH (L)
[Nm]	[kg]	[m]
510	90	0.58
	85	0.61
	80	0.65
	75	0.7
	70	0.74

**IMPORTANT**



*Wheel nuts must not be tightened with impact wrench because of danger of exceeding permissible tightening torque, the consequence of which may be breaking the connection thread or breaking off the hub pin.*

*The greatest precision is achieved using a torque spanner. Before commencing work, ensure that correct tightening torque value is set.*

**5.2.5 CHECK AIR PRESSURE IN TYRES, TECHNICAL CONDITION OF TYRES AND STEEL RIMS**



**TIP**

*Tyre pressure values are specified in information decal, placed on wheel or on the frame above machine wheel.*

Tyre pressure should be checked each time after changing spare wheel and not less than every month. In the event of intensive use, air pressure in tyres should be checked more frequently. During this time, the trailer must be unloaded. Check tyres before you drive off when tyres are not warm, or after the machine has been parked for an extended period.

**DANGER**

*Damaged tyres or wheels may be the cause of a serious accident.*

While checking pressure pay attention to technical condition of wheels and tyres. Look carefully at tyre sides and check the condition of tread. In case of mechanical damage consult the nearest tyre service and check whether the tyre defect requires tyre replacement. Wheels should be inspected with regard to distortion, breaking of material, breaking of welds, corrosion, especially in the area of welds and contact with tyre.

**INSPECT**

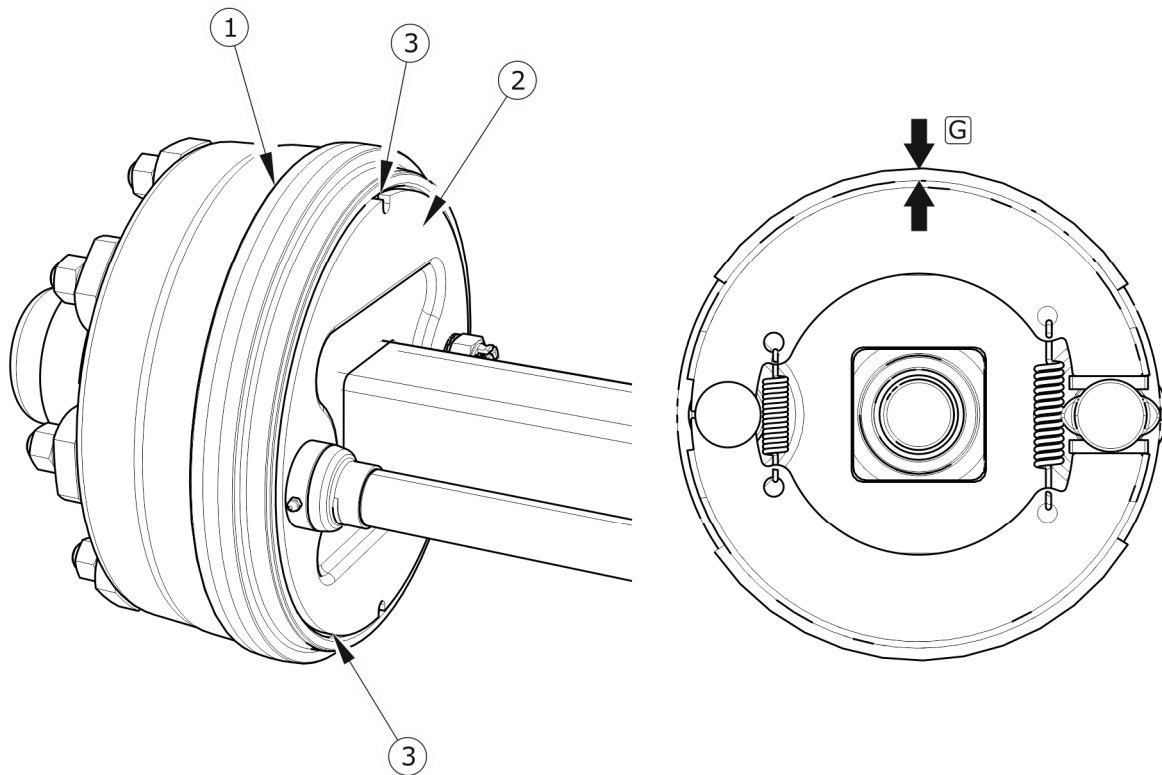
- *Every month of use.*
- *Every week during intensive work.*

### 5.2.6 CHECK THICKNESS OF BRAKE SHOE LININGS

During use of trailer, friction lining of brake drums is subject to wear. In such a case, the complete brake shoes should be replaced with new ones. Excessive wear of brake shoes is the condition in which the thickness of linings which are glued or riveted to steel structures of brake shoes is smaller than the minimum value. This condition is indicated by extended cylinder piston stroke. Check technical condition of brake shoe linings through inspection openings (3) – figure (5.6).

**TIP**

*Minimum thickness of brake shoe linings is 2 mm.*



**FIGURE 5.6** Check brake shoe linings

(1) brake drum, (2) disc, (3) inspection openings, (G) thickness of brake shoe lining



**INSPECT**

*Thickness of brake shoe linings should be checked every 6 months.*

**5.2.7 ADJUSTMENT OF MECHANICAL BRAKES**

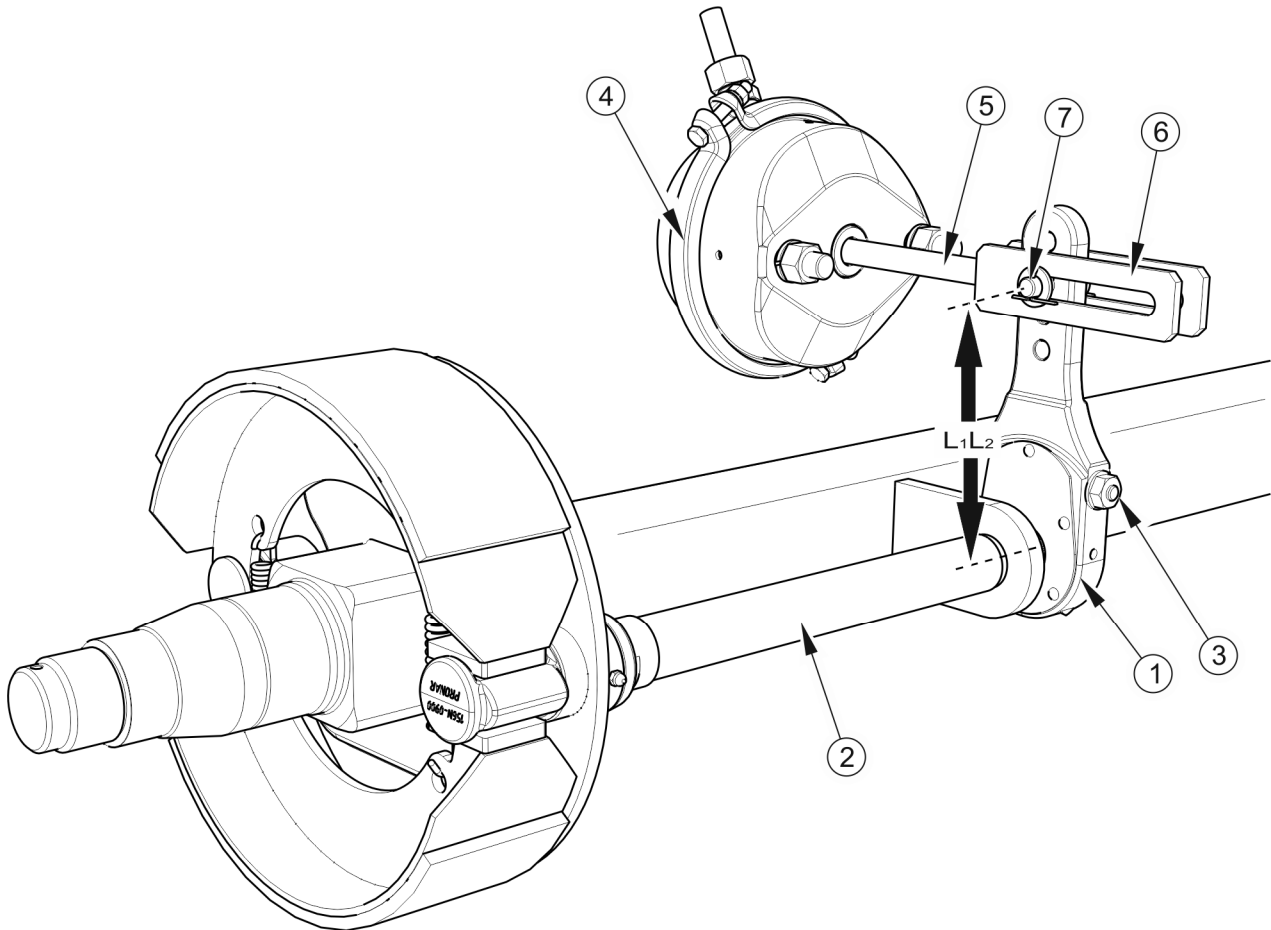
Considerable wear of brake shoe linings results in increased brake cylinder rod stroke and worse braking efficiency.



**TIP**

*Correct brake cylinder piston stroke should be within the range of 25 – 45 mm.*

During braking, the brake cylinder piston stroke should be within the specified operating range and the angle between brake cylinder piston (1) and expander arm (3) should be about  $90^\circ$  – compare figure (5.8). Trailer wheels must brake simultaneously.



**FIGURE 5.7** Adjustment of axle mechanical brakes

(1) expander arm , (2) expander shaft, (3) adjustment bolt, (4) pneumatic cylinder, (5) cylinder piston rod, (6) cylinder fork, (7) cylinder pin

Braking force decreases also when the operating angle of the brake cylinder piston (5), in relation to the expander arm (1), is wrong – figure (5.7). In order to obtain the optimum mechanical operating angle, the cylinder piston fork (6) must be installed on the expander arm (1) in such a manner as to ensure that the operating angle at full braking is about  $90^\circ$ .

The inspection involves measuring the extension length of each brake cylinder rod while braking at parking. If the brake cylinder rod stroke exceeds the maximum value (45 mm), the braking system should be adjusted.

During dismantling of cylinder fork (6) remember or mark the original setting of the cylinder fork pin (7) (L1 distance - front axle, L2 distance - rear axle). Mounting position depends on the type of the braking system and size of the trailer tyres. It is selected by the manufacturer and cannot be changed - see table (5.2).



### **DANGER**

*Incorrectly adjusted brake may cause rubbing of brake shoes against brake drums, which may lead to faster wear of brake linings and/or brake overheating.*



### **INSPECT**

*Check technical condition of brakes:*

- *Before the period of intensive use.*
- *every 6 months,*
- *After repair of braking system.*
- *In case of uneven trailer wheel braking.*



### **IMPORTANT**

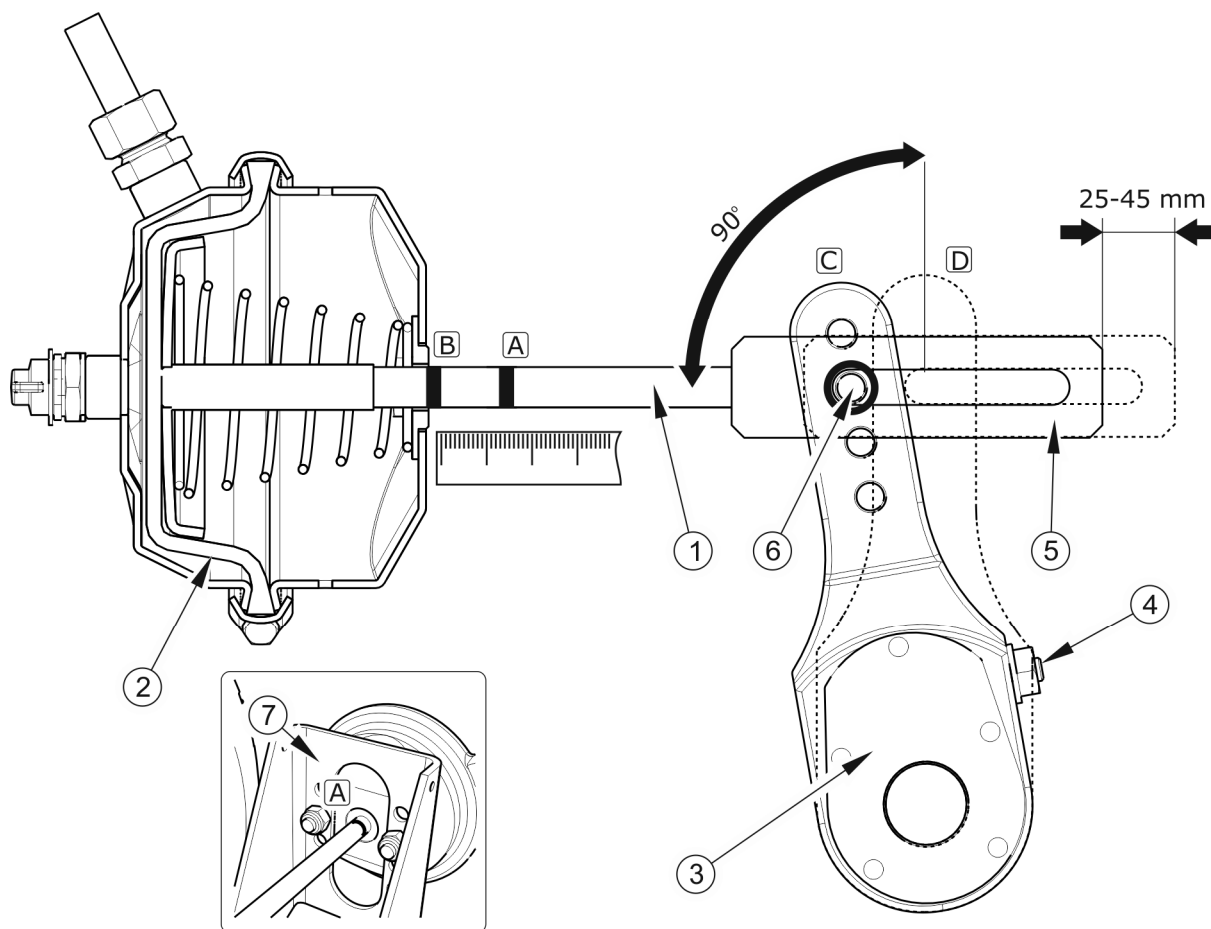
*The positions for fixing the brake cylinder in the bracket openings and the brake cylinder pin in the expander arm are determined by the Manufacturer and must not be changed.*

*Each time when dismantling the pin or brake cylinder, the original fixing position should be marked.*

### **Required maintenance**

- ➔ Hitch trailer to tractor.
- ➔ Turn off tractor engine and remove key from ignition.
- ➔ Immobilise the tractor with parking brake.
- ➔ Make sure that the trailer's brakes are not engaged.
- ➔ Secure the trailer against moving by placing wheel chocks.





**FIGURE 5.8** *Principle of brake adjustment*

(1) cylinder piston rod, (2) brake cylinder membrane, (3) expander arm, (4) adjustment bolt, (5) cylinder fork, (6) fork pin, (7) brake cylinder bracket, (A) mark on the cylinder piston rod at brake release position, (B) mark on the cylinder piston rod at full braking position, (C) position of arm at brake release position, (D) position of arm at full braking position

- ➔ Make a line (A) on the brake cylinder piston (1) to indicate the position of the maximum withdrawal of the brake cylinder piston rod when the trailer's brakes are released.
- ➔ Press the tractor brake pedal and mark the position of the maximum extension of the brake cylinder piston rod with a line (B).
- ➔ Measure the distance between lines (A) and (B). If the stroke of the brake cylinder piston rod is outside the proper operating range (25 – 45 mm), adjust the expander arm.

- ➔ Remember or mark the original position of pin (6) – figure (5.8), brake cylinder fork (5) in expander arm opening (3).
- ➔ Dismantle brake cylinder fork pin (6).
- ➔ Check if the brake cylinder piston rod moves freely and within the whole nominal range.
- ➔ Check if the brake cylinder vent holes are not blocked with impurities and that there is no water or ice inside the brake cylinder. Check if the brake cylinder is correctly installed.

**IMPORTANT**

*Do not disassemble the membrane cylinder. The membrane is glued into and may lose its tightness.*

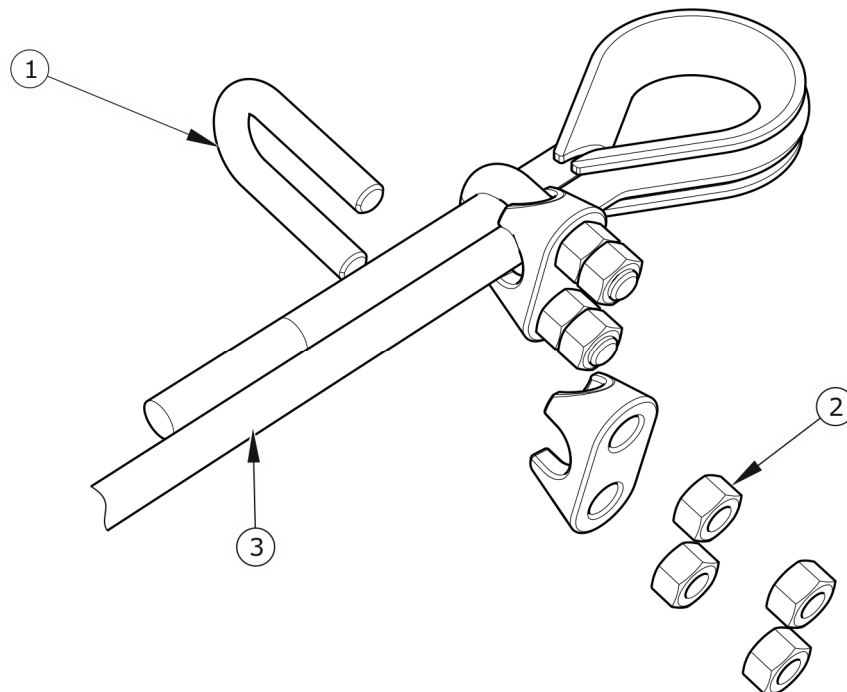
- ➔ Clean the brake cylinder. If necessary, defrost the brake cylinder and drain water through the unblocked vent holes. Replace damaged brake cylinder with a new one. When installing the brake cylinder, maintain its original position with regard to bracket (7).
- ➔ Rotate adjustment bolt (4) to align the marked expander arm opening with the brake cylinder fork opening.
  - ⇒ During adjustment, membrane (2) must rest on the rear wall of the brake cylinder – compare figure (5.8).
- ➔ Install the brake cylinder fork pin and washers and secure the pin with cotter pins.
- ➔ Rotate adjustment bolt (4) to the right until one or two clicking sounds are heard in the expander arm regulating mechanism.
- ➔ Repeat adjustment activities for the other brake cylinder on the same axle.
- ➔ Engage the brake.
- ➔ Remove previous marks and measure the brake cylinder piston rod stroke again.

- ➔ If the brake cylinder piston rod stroke is outside the proper operating range, repeat the adjustment.

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

Proper operation of the parking brake is dependent on the effectiveness of the axle brake and the correct brake cable tension.

### Replacing the parking brake cable



**FIGURE 5.9** *Installing the parking brake cable*

(1) U-bolt clamp, (2) nuts of clamps, (3) handbrake cable

- ➔ Hitch trailer to tractor. Park machine and tractor on level surface.
- ➔ Prevent the trailer from rolling by placing chocks under the wheels. Immobilise tractor with parking brake.
- ➔ Loosen nuts (2) of cable clamps and dismantle the cable.
- ➔ Grease the bolt mechanism of the parking brake and pins of cable guide rollers – see section *LUBRICATION*.

- ➔ Install new cable, adjust cable tension.

### Adjustment of parking brake cable tension

- ➔ Hitch trailer to tractor. Park machine and tractor on level surface.
- ➔ Prevent the trailer from rolling by placing chocks under the wheels. Immobilise tractor with parking brake.
- ➔ Fully unscrew the bolt of the handbrake mechanism.
- ➔ Loosen all nuts (2) – figure (5.9) of handbrake cable clamps on the brake mechanism side.
- ➔ Tighten cable and tighten clamps.

Length of parking brake cable should be so selected that at total release of working and parking brake the cable would be loose and hanging by 1 - 2 cm.

### IMPORTANT



*Parking brake cable clamps must be installed as shown in figure (5.9), i.e. clamp bracket (2) must be installed on the side of the shorter brake cable section. Tighten nuts using tightening torque given in table TIGHTENING TORQUE FOR NUT AND BOLT CONNECTIONS*

Adjustment of parking brake cable tension should be conducted in the event of:

- stretching of cable,
- loosening of parking brake cable clamps
- after adjustment of axle brakes,
- after repairs of axle brake system,
- after repairs of parking brake system.

Before the adjustment, make certain that the axle brake is correctly adjusted and is functioning properly.

**INSPECT**

- *Every 12 months.*

## 5.3 PNEUMATIC SYSTEM MAINTENANCE

### 5.3.1 PRELIMINARY INFORMATION

Work connected with repair, replacement or regeneration of system components (brake cylinders, conduits, control valve, braking force regulator, etc.) should be entrusted to specialist establishments, having the appropriate technology and qualifications for this type of work.

The user responsibilities relating to the operation of the pneumatic system:

- check tightness and visually inspect the system,
- cleaning the air filter (filters),
- draining water from air tank,
- cleaning drain valve,
- cleaning and maintaining pneumatic conduit connections,

**DANGER**

*Do NOT use the trailer when the brake system is out of order.*

### 5.3.2 CHECK TIGHTNESS

#### Check air tightness of pneumatic system

- ➔ Hitch trailer to tractor. Park machine and tractor on level surface.
- ➔ Prevent the trailer from rolling by placing chocks under the wheels. Immobilise tractor and trailer with parking brake.

- ➔ Start the tractor in order to supplement air in the trailer braking system tank.
  - ⇒ In single line systems air pressure should amount to approx. 5.8 to 6.5 bar.
  - ⇒ In double conduit systems air pressure should amount to approx. 6.5 bar.
- ➔ Turn off tractor engine.
- ➔ Check system components by releasing brake pedal in tractor.
  - ⇒ Pay particular attention to conduit connections and brake cylinders.
- ➔ Repeat the system check with depressed tractor brake pedal.
  - ⇒ The help of a second person is required.

In the event of the appearance of leaks, compressed air will escape at the places of damage, with a characteristic hiss. Lack of system tightness may be detected by covering checked elements with washing fluid or other foaming preparations, which will not react aggressively with the system components. It is recommended to use preparations commercially available designed to facilitate detecting air leaks. Damaged components should be replaced or repaired. If leaks appear at connections then tighten the connections. If air continues to escape, replace connection components or seals with new ones.



### INSPECT

- *After travelling the first 1,000 km.*
- *Each time after making repairs or changing system components,*
- *Every 12 months.*

### 5.3.3 INSPECTION OF THE SYSTEM

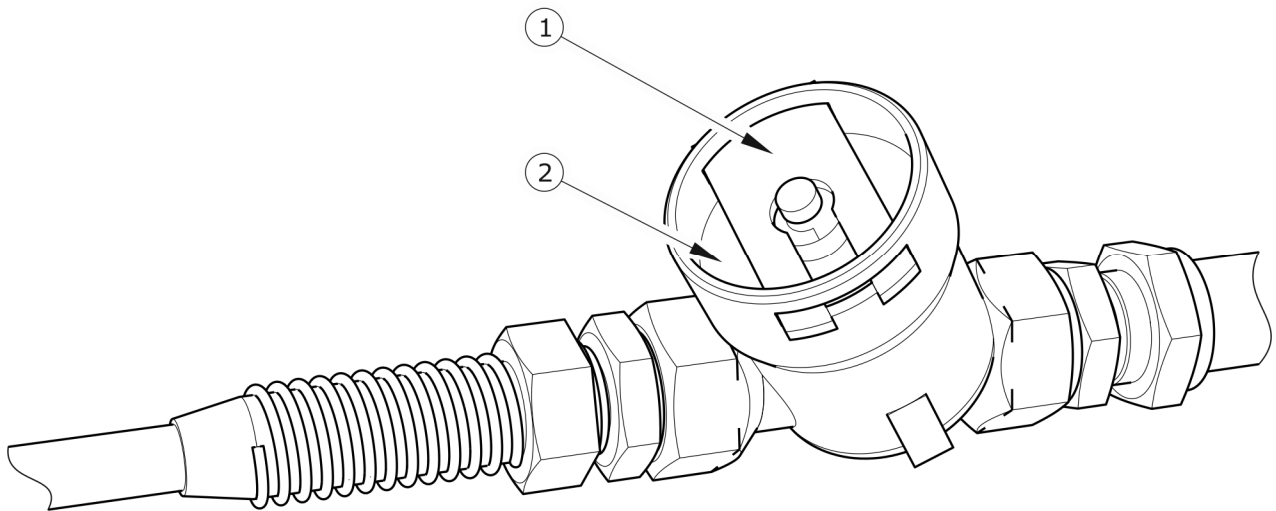
During tightness inspection attention should additionally be given to technical condition and degree of cleanness of the system components. Contact of pneumatic conduit seals etc. with oil, grease, petrol etc. may cause damage and accelerate the ageing process. Bent, permanently deformed, cut or worn conduits should be replaced.

**INSPECT**

- *Each time during tightness inspection.*

## 5.4 CLEANING THE AIR FILTERS

Depending on trailer working conditions, but not less than once in three months, take out and clean air filter elements, which are located in pneumatic system connection conduits. Inserts are used many times and are not subject to changing unless they are mechanically damaged.



**FIGURE 5.10** *Air filter*


*(1) securing slide lock, (2) air filter cover*

**DANGER**

*Before proceeding to dismantle filter, reduce pressure in supply conduit. While dismantling the filter slide gate, hold the cover with the other hand. Stand away from filter cover vertical direction.*

**Required maintenance**

- ➔ Reduce pressure in supply conduit.
  - ⇒ Pressure in conduit can be reduced by pressing the head of the pneumatic connection until resistance is felt.
- ➔ Remove securing slide (1).
- ➔ Hold the filter cover (2) with the other hand. After removing slide lock, the cover is pushed off by the spring located in the filter housing.
- ➔ The filter element and the filter body should be carefully cleaned and blown through with compressed air. Assembly should be done in reverse order.



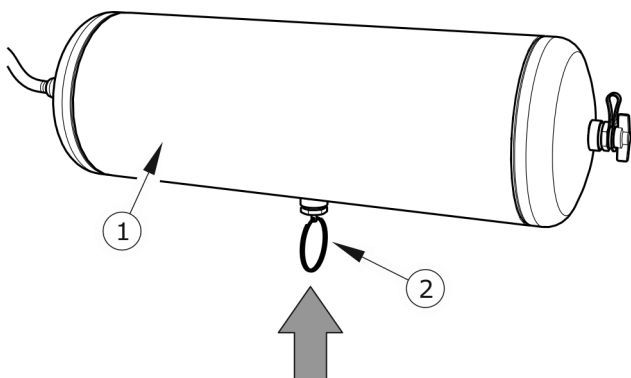
**INSPECT**

- *Every 3 months.*

**5.4.1 DRAIN WATER FROM AIR TANK**

**Required maintenance**

- ➔ Tilt drain valve stem (2) located in the lower part of tank (1).
- ➔ The compressed air in the tank causes the removal of water to the exterior.



- ➔ Released valve stem should automatically close and stop flow of air from the tank.
- ➔ Drain the tank located on the other side of the trailer.
- ➔ In the event, that the valve stem resists returning to its setting, then the whole drain valve must be unscrewed and cleaned, or replaced (if it is damaged) - see section *CLEANING DRAIN VALVE*.

**FIGURE 5.11** *Draining water from the tank*

(1) air tank, (2) drain valve



## 5.4.2 CLEAN THE DRAIN VALVES



### **DANGER**

*Release air from the air tank before dismantling drain valve.*

### **Required maintenance**

- ➔ Completely reduce pressure in air tanks.
  - ⇒ Reduction of pressure in the tanks can be achieved by tilting the stem of drain valve.
- ➔ Unscrew both valves.
- ➔ Clean the valve and blow it with compressed air.
- ➔ Change copper seals.
- ➔ Screw valves in, fill tanks with air, check tightness.



### **INSPECT**

- *Every 12 months (before winter).*

## 5.4.3 CLEANING AND MAINTAINING PNEUMATIC CONDUIT CONNECTIONS AND PNEUMATIC SOCKETS



### **DANGER**

*Unreliable and dirty trailer connections may cause unreliability and malfunction of braking system.*

Connection with damaged body should be replaced. In the event of damage to cover or seal, change these elements for new reliable elements. Contact of pneumatic connection seals with oils, grease, petrol etc. may cause damage and accelerate ageing process.

If the trailer is unhitched from the tractor, connections should be protected by cover or placed in their designated socket. Before the winter, it is recommended to preserve the seal with special preparations (e.g. silicon grease for rubber elements).

Each time before hitching the machine, inspect technical condition and cleanness of connectors and sockets in tractor. If necessary, clean or repair tractor sockets.



### INSPECT

- *Each time before hitching trailer to tractor.*

## 5.5 HYDRAULIC SYSTEM MAINTENANCE

### 5.5.1 PRELIMINARY INFORMATION

Work connected with the repair, replacement or regeneration of hydraulic system components should be entrusted to specialist establishments which have the appropriate technology and qualifications for this type of work.



### TIP

*Bleeding of the hydraulic system is not required during normal operation of the trailer.*

The user responsibilities relating to the operation of the hydraulic system:

- check tightness and visually inspect the system,
- check technical condition of hydraulic connections.

### 5.5.2 CHECK HYDRAULIC SYSTEM TIGHTNESS

#### Required maintenance

- ➔ Hitch trailer to tractor.
- ➔ Connect all hydraulic system conduits according to service instructions.
- ➔ Clean connectors and hydraulic cylinders.

- ➔ Start the tractor and cycle the hydraulic cylinders several times (tailgate and steering lock). Leave the cylinders in the maximally extended position.
- ➔ Switch off the tractor engine and check the hydraulic cylinders.
- ➔ Switch on tractor engine again and start PTO drive , cause tipping of load box. Leave the load box raised. Secure the load box using the load box support.
- ➔ Check both tipping cylinders.
- ➔ Withdraw the support, lower the load box.
- ➔ Stop PTO drive, switch off tractor engine.

**DANGER**

*Exercise extra caution. Do NOT stand near the raised tailgate. Use a load box support.*


If oil is found on hydraulic cylinder body, check origin of leak. Inspect hydraulic seals when hydraulic cylinder is completely extended. Minimum leaks are permissible with symptoms of "sweating". However, if leaks in the form of "droplets" are noticed, stop using the trailer. If leaks appear at connections then tighten the connections. If the leak at connections is not removed, replace conduit, connector and seals (depending on place of leakage).

**INSPECT**

- *After the first week of use.*
- *Every 12 months.*

### **5.5.3 CHECK TECHNICAL CONDITION OF HYDRAULIC COUPLERS AND SOCKETS.**

Hydraulic connections must be technically reliable and kept in a clean condition. Each time before connecting, check if sockets in tractor are maintained in good working condition. Hydraulic systems of the tractor and trailer are sensitive to the presence of permanent contamination, which may cause damage to precision system components.



### INSPECT

- *Each time before hitching trailer to tractor.*

### 5.5.4 REPLACE HYDRAULIC LINES



### INSPECT

- *every 4 years.*

Rubber hydraulic lines must be replaced every 4 years regardless of their technical condition. This should be done in specialised workshops.

## 5.6 LUBRICATION

**TABLE 5.2** *Lubrication schedule*

ITEM	LUBRICATION POINT	NUMBER OF LUBRICATION POINTS	TYPE OF GREASE	FREQUENCY
1	Hub bearing	12	A	24M
2	Drawbar eye	1	B	14D
3	Handbrake mechanism	1	A	6M
4	Handbrake cable guide wheel axle	2	A	6M
5	Driving shaft	1	B	1M
6	Bearings of hydraulic cylinders	4	A	3M
7	Expander shaft slide sleeve	6	A	3M

ITEM	LUBRICATION POINT	NUMBER OF LUBRICATION POINTS	TYPE OF GREASE	FREQUENCY
8	Tailgate locking hook bolt	4	A	3M
9	Load box tipping bolt	2	B	3M
10	Tailgate wing bolt	2	B	3M
11	Drawbar spring	1	C	3M
12	Drawbar rocker arm pin	2	B	3M
13	Drawbar pin	1	B	3M
14	Slide gate guides	1	A	1M
15	Leaf springs	6	C	3M
16	Leaf spring absorber sliding surfaces	12	B	1M
17	Expander lever <sup>1</sup>	6	A	3M
18	Steering axle steering arm <sup>1</sup>	8	A	3M
19	Steering axle steering rod <sup>1</sup>	4	A	3M
20	Tipping cylinder bearing	2	B	1M
21	Sockets and bolts of the tipping cylinder sling	8	B	1M

*Lubrication periods – M months, D – days*

<sup>(1)</sup> – grease every 3 months or each time before intensive work

Trailer lubrication should be performed with the aid of a manually or foot operated grease gun, filled with recommended grease. Before commencing work insofar as is possible remove old grease and other contamination. Remove and wipe off excess oil or grease.

Change of grease in hub bearings should be entrusted to specialised service points, equipped with the appropriate tools. According to the recommendations of the axle Manufacturer, dismantle the entire hub, remove the bearing and individual sealing rings. After

Careful washing and inspection, mount lubricated elements. If necessary, bearing and seals should be replaced with new parts. Lubrication of axle bearings shall be performed at least once in 2 years.

**TABLE 5.3** *Recommended lubricants*

<b>MARKING ACCORDING TO TAB. (5.2)</b>	<b>DESCRIPTION</b>
A	machine general-purpose grease (lithium, alkaline),
B	permanent grease for heavily loaded elements with addition of MOS <sub>2</sub> or graphite
C	Anti-corrosion and penetrating preparation in aerosol.

Empty grease or oil containers should be disposed of according to the recommendations of the lubricant Manufacturer.

**TIP**



*Number of lubrication points and subassemblies requiring lubrication specified in table (5.2) LUBRICATION SCHEDULE depend on the trailer version.  
Locations of grease nipples and areas requiring lubrication are indicated by black arrows in figures (5.12) and (5.13).*

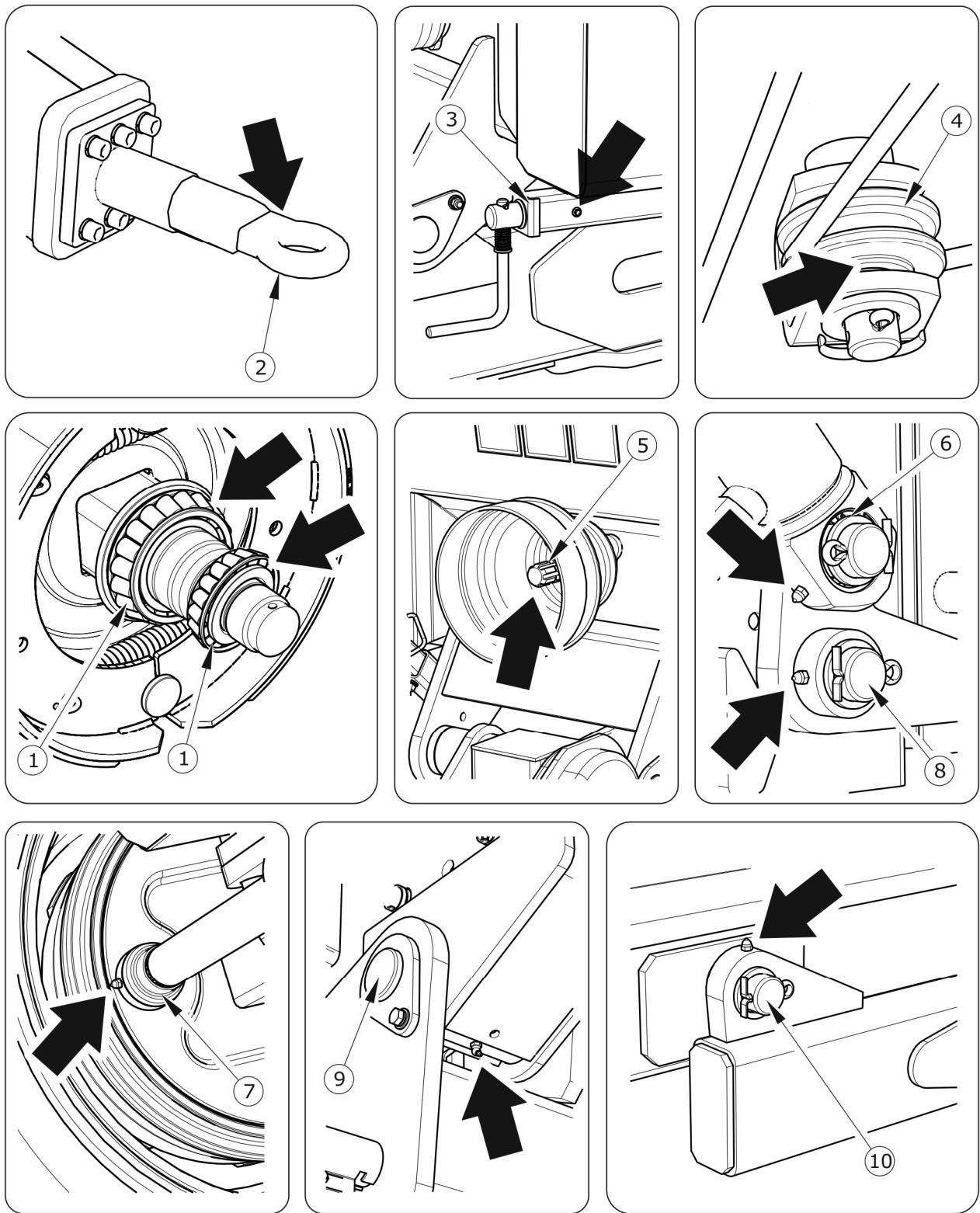
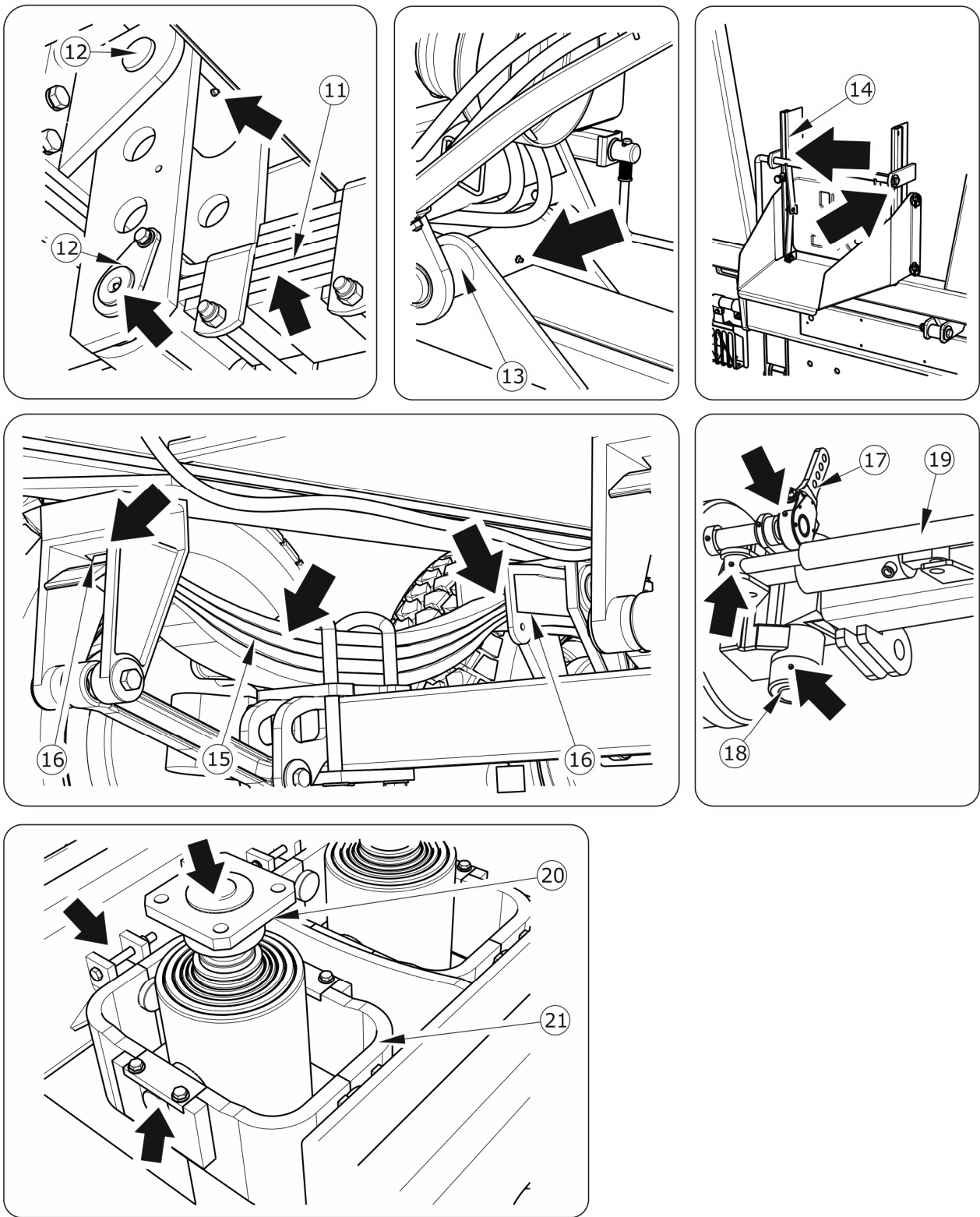


FIGURE 5.12 Trailer's lubrication points



**FIGURE 5.13** Trailer's lubrication points



## 5.6.1 CONSUMABLES

### Hydraulic oil

Always adhere to the principle that the oil in the trailer hydraulic system and in the tractor hydraulic system are of the same type. In the event of application of different types of oil make certain that both hydraulic substances may be mixed together. Application of different oil types may cause damage to trailer or tractor. In a new machine, the hydraulic system is filled with L HL32 Lotos hydraulic oil.

If it is necessary to change hydraulic oil for another oil, check the recommendations of the oil Manufacturer very carefully. If it is recommended to flush the system with the appropriate preparation, then comply with these recommendations. Attention should be given, so that chemical substances used for this purpose do not damage the materials of the hydraulic system. During normal trailer use, change of hydraulic oil is not necessary, but if required, this operation should be entrusted to a specialist service point.

**TABLE 5.4** *L-HL 32 Lotos hydraulic oil characteristics*

ITEM	NAME	UNIT	VALUE
1	ISO 3448VG viscosity classification	-	32
2	Kinematic viscosity at 40°C	mm <sup>2</sup> /s	28.8 – 35.2
3	ISO 6743/99 quality classification	-	HL
4	DIN 51502 quality classification	-	HL
5	Flash-point	C	230

Because of its composition, the oil is not classified as a dangerous substance, however long-term action 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 apply organic solvents (petrol, kerosene). Contaminated clothing should be changed to prevent access of oil to skin. In the event of contact of oil with eye, rinse with large quantity of water and in the event of the occurrence of irritation consult a doctor. Hydraulic oil in normal conditions is not harmful to the respiratory tract. A hazard only occurs when oil is strongly atomised (oil vapour), or in the case of fire during which toxic compounds may be released.

**DANGER**

*Oil fires should be quenched with the use of carbon dioxide, foam or steam extinguishers. Do not use water to quench oil fires.*

**Lubricants**

For heavily loaded parts it is recommended to apply lithium greases with addition of molybdenum disulphide ( $\text{MOS}_2$ ) or graphite. In the case of less loaded sub-assemblies the application of general purpose machine greases is recommended, which contain anticorrosion additives and have significant resistance to being washed away by water. Aerosol preparations (silicon greases and anticorrosive-lubricating substances) should have similar characteristics.

Before using the greases, read the information leaflet for a given product. Particularly relevant are safety rules and handling procedures for a given lubricant as well as waste disposal procedure (used containers, contaminated rags etc.). Information leaflet (material safety data sheet) should be kept together with grease.

## 5.7 TRAILER CLEANING

- The trailer should be cleaned as needed. Before using pressure washer the user is obliged to acquaint himself with the operating principles and recommendations concerning safe use of this equipment.
- Use only clean running water. Cleaning detergents with neutral pH may be used, which do not react aggressively with the trailer's structural elements.
- The use of pressure washers increases the effectiveness of washing, but be careful when working. During washing, washer nozzle may not be closer than 50 cm from the surface being cleaned.
- Water temperature should not exceed 55°C.
- Do not direct water jets at system elements and equipment of the trailer i.e. control valve, braking force regulator, brake cylinders, hydraulic cylinders, pneumatic, electric and hydraulic plugs, lights, electrical connections, information and warning decals, identification plate, conduit connections, lubrication points,

leaf springs and drawbar shock absorber, etc. High pressure water jets may get inside the machine and cause mechanical damage or corrosion.

- For cleaning and maintenance of plastic coated surfaces it is recommended to use clean water or special preparations designed for this purpose.
- Do not apply organic solvents, preparations of unknown origin or other substances, which may cause damage to lacquered, rubber or plastic surfaces. In the event of doubt it is recommended to make a test on an unseen surface area.
- Surfaces smeared with oil or grease should be cleaned by application of benzene or other degreasing agents and then washed with clean water with added detergent. Follow the cleaning agent manufacturer instructions.
- Detergents should be kept in original containers, optionally in replacement containers, but very clearly marked. Preparations may not be stored in food and drink containers.



## **DANGER**

*Carefully read the instructions for application of detergents and maintenance preparations.*

*While washing with detergents wear appropriate protective clothing and goggles protecting against splashing.*

- Ensure cleanliness of elastic conduits and seals. The plastic from which these elements are made may be susceptible to organic substances and some detergents. As a result of long-term reaction of some substances, the ageing process may be accelerated and risk of damage increased. Rubber elements should be maintained with the aid of special preparations after previous thorough washing.
- Observe the rules of environmental protection and wash trailer in a place designed for this purpose.
- Washing and drying the machine must take place at temperature above 0°C.
- Leaf springs should be cleaned using a hard brush. The space between spring leaves should be blown using compressed air.

## 5.8 STORAGE

- Trailer should be kept in a closed or roofed building.
- If the machine will not be used for a long time, it is essential to protect it from adverse weather conditions, especially those which initiate corrosion of steel, have aggressive impact on anticorrosion coating and accelerate tyre ageing. During this time the machine must be unloaded. Trailer should be very carefully washed and dried.
- Corroded places should be cleaned of rust, degreased and protected using undercoat paint and then painted with surface paint according to colour scheme.
- In the event of a prolonged storage, it is essential to lubricate all components regardless of the date of the last lubrication.
- Wheel rims and tyres should be carefully washed and dried. During a longer storage of unused trailer it is recommended that the machine should be moved a bit once every 2 - 3 weeks in order to change the place of contact of tyres with the ground. The tyres will not be deformed and maintain proper geometry. Also, tyre pressure should be inspected from time to time, and if necessary pressure should be increased to the appropriate value.

## 5.9 INSPECTION OF TIGHTENING TORQUE OF NUT AND BOLT CONNECTIONS

### 5.9.1 AXLES



#### **INSPECT**

- *every 3 months*
- *Each time before a period of intensive use*

#### **Bolted connections of axles (fixed and steering axle)**

- Brake cylinders mounting.

- Steering axle lock cylinders mounting.
- Steering axle shock absorber mounting.
- Tie rod connection.
- Cap nuts and lock nuts on the steering lock cylinders.
- Lock nuts at the tie rod ends.

## 5.9.2 DRAWBAR

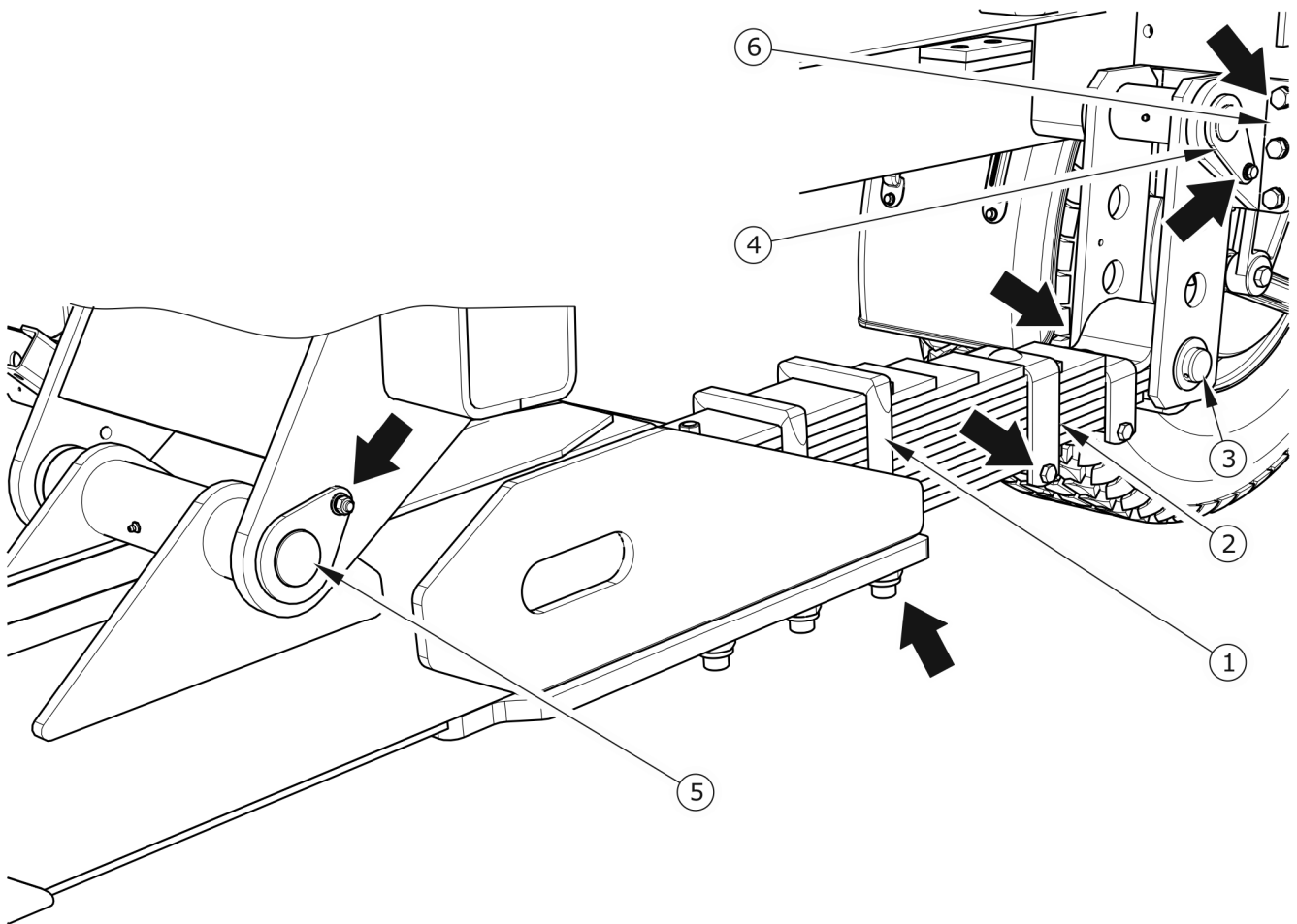
### Drawbar bolted connections

- Connections of nuts and U-bolts (1).
- Clamps (2).
- Mounting of the spring bolt (3).
- Mounting of the rocker arm pin (4).
- Mounting of the drawbar bolt (5).
- Mounting of the rocker arm bracket (6).



### INSPECT

- *After first travel with load.*
- *Every 6 months.*
- *Each time before a period of intensive use*



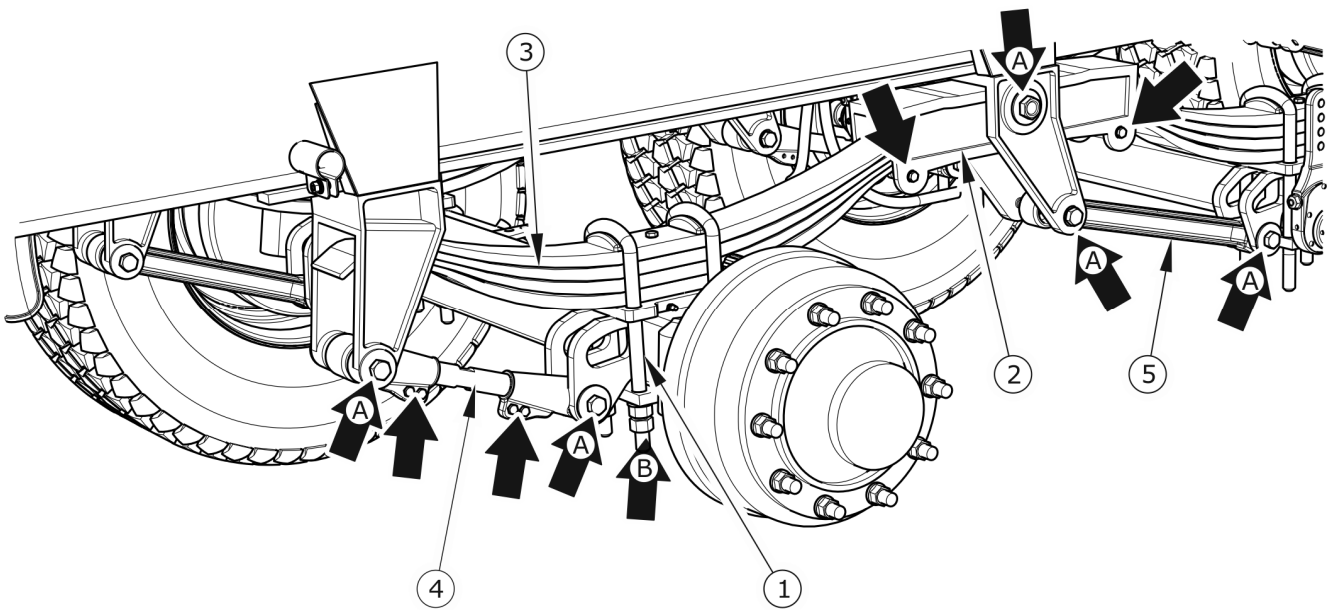
**FIGURE 5.14** Drawbar

(1) U-bolt, (2) bracket, (3) spring pin, (4) rocker arm pin, (5) drawbar pin, (6) rocker arm bracket

### 5.9.3 SUSPENSION

#### Suspension bolt connections

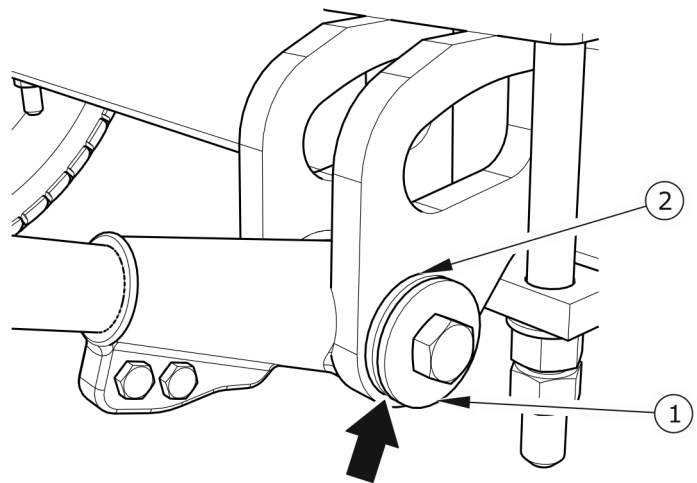
- ➔ Connections of nuts and U bolts (1) securing the spring to the axle.
- ➔ Mounting of the rocker arm (2) and rocker arm lock bolts
- ➔ Rigid (5) and adjustable (4) reaction rod connections.



**FIGURE 5.15** *Absorber suspension*

(1) U-bolt, (2) rocker arm, (3) spring, (4) adjustable control rod, (5) rigid control rod

After tightening the bolts securing the control rods, the washer (1) - figure (5.16) must not touch the bracket flange (2). Otherwise, remove control rod and replace all rubber taper bushings. Before you install new bushings, lubricate them with petroleum jelly or tire grease.



**FIGURE 5.16** *Proper tightening of control rods*

(1) washer, (2) bracket

**TIP**



*Connection tightening torques - figure (5.15)*

- A: 550 – 560 Nm
- B: M24x2 550 – 560 Nm
- M24x2.5 450 – 500 Nm

*Tighten the other bolted connections according to the table (5.5)*

**INSPECT**



- *After first travel with load.*
- *Every 6 months.*
- *Each time before a period of intensive use*

**5.9.4 TIGHTENING TORQUE FOR NUT AND BOLT CONNECTIONS**

During maintenance or repair work, apply appropriate torque when tightening bolt and nut connections, unless other tightening torque values are given. Recommended tightening torque values for the most frequently used bolt and nut connections are given in table (5.5). Given values apply to non-lubricated steel bolts.

**TABLE 5.5** *Tightening torque for nut and bolt connections*

THREAD METRIC	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



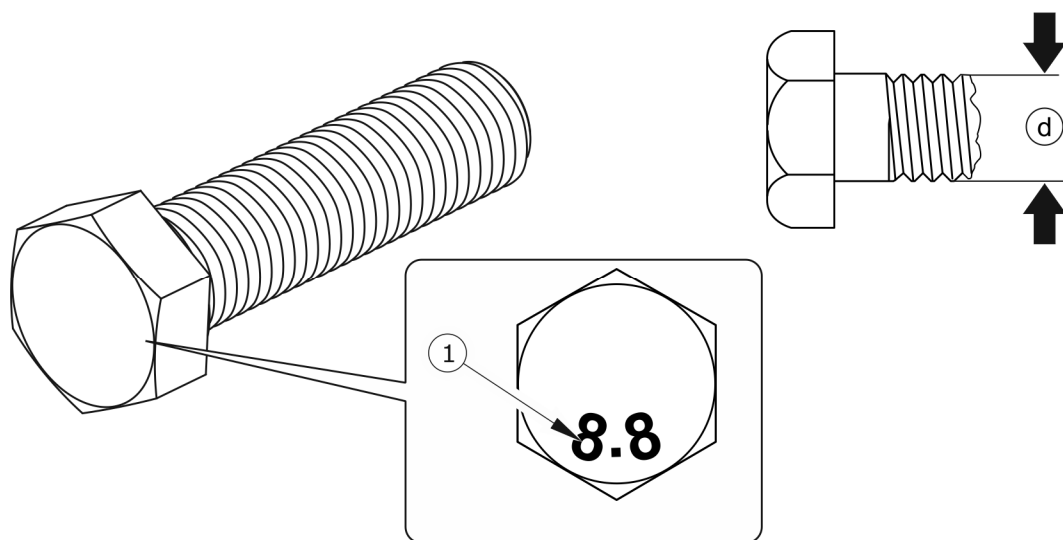
THREAD METRIC	5.8 <sup>(1)</sup>	8.8 <sup>(1)</sup>	10.9 <sup>(1)</sup>
	Md [Nm]		
M30	1,050	1,450	2,100

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



### TIP

hydraulic lines should be tightened using torque of 50 – 70 Nm.



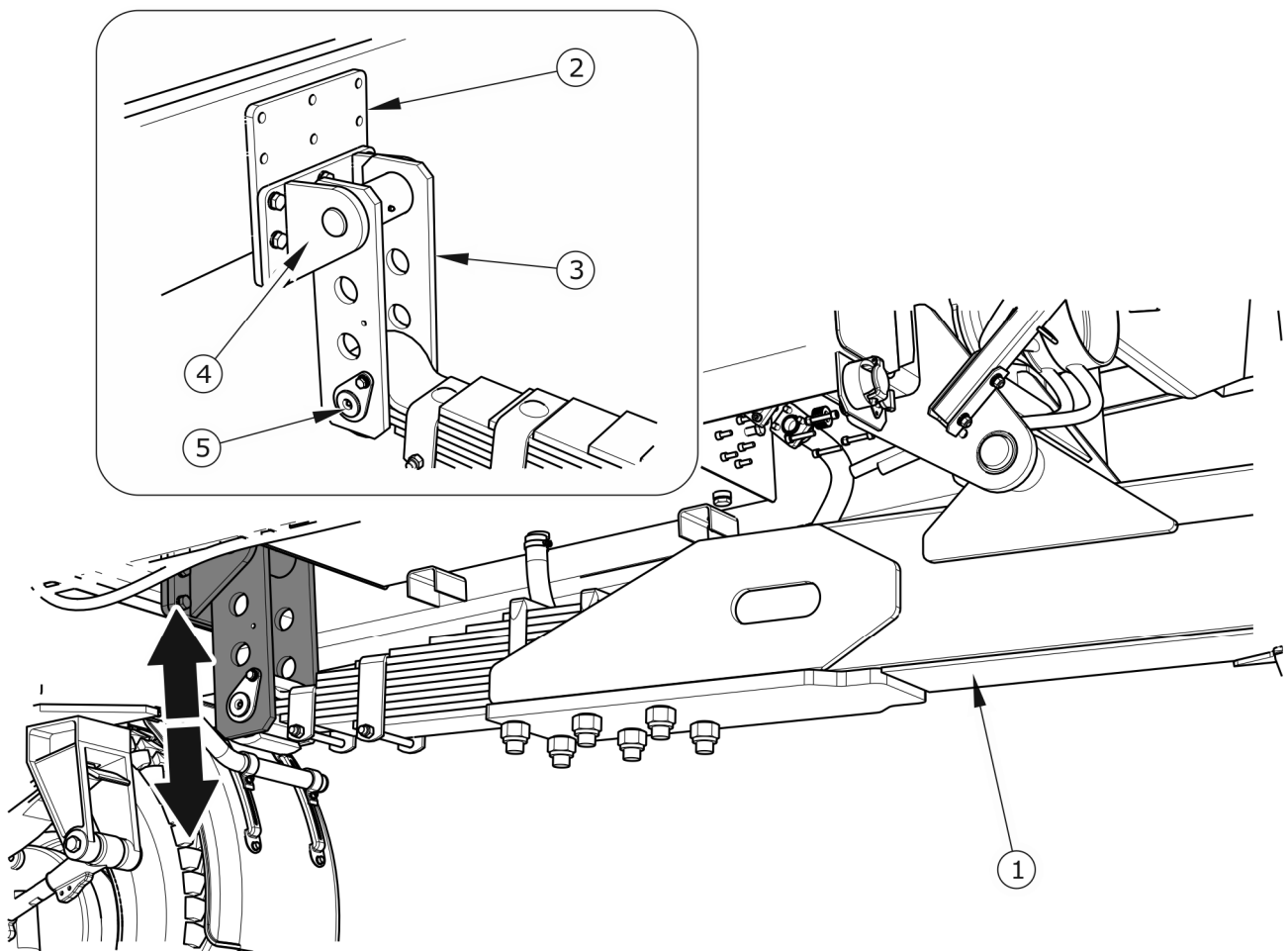
**FIGURE 5.17** Bolt with metric thread

(1) strength class, (d) thread diameter

## 5.10 ADJUSTMENT OF DRAWBAR POSITION

Location of the drawbar should be selected individually depending on the height of the hitch on the tractor that will pull the trailer. If possible, we recommend adjusting the tractor hitch so that the trailer drawbar is positioned horizontally while driving on a flat terrain.

### Description of adjustments



**FIGURE 5.18** *Drawbar control*

(1) drawbar, (2) drawbar mounting plate, (3) suspension spring arm, (4) rocker arm support, (5) rocker arm pin

- Immobilise trailer with parking brake.
- Prevent the trailer from rolling by placing chocks under the wheels.
- Support the trailer on both sides of the drawbar.
  - ⇒ The supports must be sufficiently strong and their length sufficient set the trailer at a height that makes adjustment possible.
  - ⇒ Support the supports under the front beam of the lower frame or under the left and right longitudinal member.
- Support the drawbar with the jack from below so that it cannot tilt when the bracket is removed.
- Remove the rocker arm bracket (4)

- ➔ Adjust the height of the jack and adjust the rocker arm support to the desired position.
- ➔ Tighten the rocker arm support to the plate (2).

**TIP**

*You can also adjust drawbar position by transferring the rocker arm pin (5) to the corresponding hole of the spring (3) rocker arm to obtain different height settings.*

## 5.11 MAINTENANCE OF SUSPENSION SYSTEM

**INSPECT**

*Check the suspension geometry:*

- *after first travel with load,*
- *every six months.*
- *Each time before a period of intensive use*

*Check the springs once a year.*

- ➔ Tighten suspension connections according to the guidelines in chapter 5.9.3.
- ➔ If the bolts of the control rods are loose, check if the distance between the axles on the left and right side of the trailer is equal. In addition, check that the wheels are parallel to the direction of travel.
- ➔ Check the technical condition of the springs, thoroughly clean and brush the side surfaces to check for spring leaf cracks.

## 5.12 TROUBLESHOOTING

### 5.12.1 TROUBLESHOOTING

FAULT	POSSIBLE CAUSE	REMEDY
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FAULT	POSSIBLE CAUSE	REMEDY
Problem with moving off	Brake system conduits not connected	Connect brake conduits (applies to pneumatic systems)
	Applied parking brake	Release parking brake.
	Damaged pneumatic system connection conduits	Replace.
	Leaking connections	Tighten, replace washers or seal sets, replace conduits.
	Control valve or braking force regulator damaged	Check valve, repair or replace.
Noise in axle hubs	Excessive bearing slackness	Check slackness and adjust if needed
	Damaged bearings	Replace bearings
	Damaged hub parts	Replace
Poor reliability of braking system	Insufficient pressure in the system	<p>Check pressure on tractor pressure gauge, wait till compressor fills tank to required pressure.</p> <p>Damaged air compressor in tractor Repair or replace.</p> <p>Damaged brake valve in tractor. Repair or replace.</p> <p>Leaking system conduits or connections. Check system for tightness.</p>
Excessive heating of axle hubs	Incorrect main or parking brake adjustment	Regulate positions of expander arms
	Worn brake linings	Change brake shoes
Incorrect hydraulic system operation	Improper hydraulic oil viscosity	Check oil quality, make sure that the oil in both machines is of the same type. If necessary change oil in tractor or in trailer.
	Insufficient tractor hydraulic pump output, damaged tractor hydraulic pump.	Check tractor hydraulic pump.

FAULT	POSSIBLE CAUSE	REMEDY
	Damaged or contaminated cylinder	Check cylinder piston rod (bending, corrosion), check cylinder for tightness (cylinder piston rod seal), if necessary, repair or replace the cylinder.
	Excessive cylinder loading	Check and reduce cylinder load, if necessary.
	Damaged hydraulic lines	Check and ascertain that hydraulic lines are tight, not fractured and properly tightened. If necessary, replace or tighten.
Excessive wear of left and right tyre shoulders on both sides.	<p>Too low air pressure in tyres.</p> <p>Excessive ground speed of loaded trailer on turns.</p> <p>Too fast loss of air due to damaged wheel, valve, puncture, etc.</p>	<p>Check air pressure. Regularly check correctness of air pressure in tyres.</p> <p>Excessive loading of the trailer. Do not exceed the permissible gross weight of the trailer.</p> <p>Reduce ground speed while driving on turns on hardened surface.</p> <p>Check wheel and valve. Replace damaged parts.</p>
Excessive wear of central part of tyre.	Excessive air pressure in tyres.	Check air pressure. Regularly check correctness of air pressure in tyres.
Excessive wear of left or right tyre shoulder, on one side	<p>Incorrect toe-in.</p> <p>Incorrectly positioned wheel axles.</p>	<p>Check and adjust steering toe-in.</p> <p>Check and adjust axle position by extending or reducing the length of the control (adjustment) rods</p>
Worn tyre tread.	<p>Damaged suspension system, broken leaf spring.</p> <p>Damaged brake system, blocking of brakes, incorrectly adjusted brake system. Too frequent and violent braking.</p>	<p>Check suspension system for looseness, check leaf springs. Replace damaged or worn elements.</p> <p>Check brake system for malfunctions. Adjust expander lever.</p>

FAULT	POSSIBLE CAUSE	REMEDY
Side crack.	Prolonged use of tyre with low air pressure. Excessive loading of the trailer.	Regularly check air pressure in tyres. Check weight of load while loading.
Abrasions on external side edge of tyre.	Too frequent driving over sharp or high obstacles (e.g. curbs).	Control driving technique.
Damaged rim (hardening and cracking near rim), brittleness of tyre.	Incorrect braking technique. Too frequent violent braking. Damaged brake system.	Check brake system. Control braking technique. Damage occurs due to excessive heating of hub which leads to heating of wheel.
Noticeable trailer vibration while driving.	Incorrect toe-in.	Check the steering wheel toe-in
	Incorrect geometry of the axles.	Check and adjust the length of the control rods.
	Excessive play in the suspension system.	Check the correct tightening of bolt connections, check the play in the suspension system. Replace damaged or worn suspension rubber bushings.
	Damaged steering axle shock absorber.	Check the shock absorber. Repair or replace.
The load box cannot be tipped over.	PTO shaft not connected or damaged.	Check the shaft. Replace or repair a damaged shaft.
	Oil level in tank too low. No oil in the tank.	Add oil to tank. Check the cause of the leak.
	Hydraulic pump is damaged	Check pump operation. Repair or replace.
	Damaged solenoid valves in the hydraulic tipping system.	Check the solenoid valves for correct operation. Repair or replace.
	Solenoid valve switch defective. Worn control wiring.	Check switch Check switch wiring.

<b>FAULT</b>	<b>POSSIBLE CAUSE</b>	<b>REMEDY</b>
	Controller harness disconnected. Damaged socket or 3-pole plug.	Connect the line Check the system socket and plug.





# NOTES

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# ANNEX A

TYRE	WHEEL DISC
385/65R22.5 160F TL (regenerated)	11.75x22.5 ET=-30
385/65 R22.5 TL	11.75x22.5 ET=-30
425/65 R22.5 18PR (regenerated)	13.00x22.5"
425/65 R22.5 TL	13.00x22.5"
445/65R22.5 169F TL (regenerated)	14.00x22.5 ET=0
550/60-22.5 171 A8	16.00x22.5 ET=0
600/55-22.5 16PR 169 A8	20.00x22.5H2 ET=-40
620/50R22.5 172 A8	20.00x22.5H2 ET=-40