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

Remember!!!

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

INTRODUCTION

PRONAR SP. Z O.O.

UL. MICKIEWICZA 101A
17-210 NAREW
PODLASKIE PROVINCE

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www.pronar.pl

Before you start using the trailer by yourself, you will be familiarized with its design, principle of operation, available equipment, operation and, above all, basic safety rules to be followed when using the trailer. The machine will be handed over by qualified and authorized personnel of the Seller. Remember that you may start the machine only if you have read the Operator's Manual and been preliminarily trained. The most important thing during the machine operation is your safety. Therefore, no matter what, comply with all the recommendations included in the Operator's Manual and exercise caution and prudence.

When buying the machine check that the serial numbers on the machine agree with the number written in the Warranty Book and in the sales documents. Detailed information on the machine identification can be found in section 1.

Information contained herein 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 factual specification of the machine supplied to the user. The manufacturer reserves the right to introduce design changes in machines produced that facilitate operation and improve the quality of their work, without making minor amendments to this Operator's Manual.

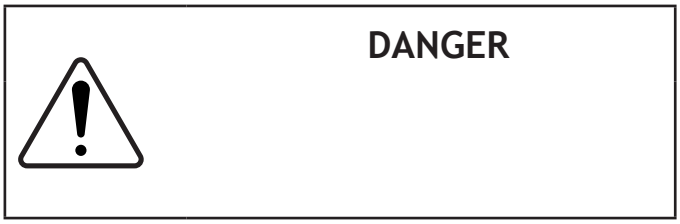
The Operator's Manual is an integral part of the machine's documentation. That is why each new operator of the trailer must receive this Operator's Manual and be trained.

The Operator's Manual describes the basic safety rules and operation of Pronar T185 agricultural trailer. If the information contained in the Operator's Manual needs clarification then the user should refer for assistance to the sale point where the machine was purchased or to the Manufacturer.

SYMBOLS APPEARING IN THIS OPERATOR'S MANUAL

DANGER

Information, descriptions of danger and precautions as well as recommendations and prohibitions associated with the safety of use are marked in the text with the sign **DANGER.** Failure to observe the instructions may endanger the machine operator's or other person's health or life.



ATTENTION

Particularly important information and instructions, the observance of which is essential, are distinguished in the text by the sign **ATTENTION**. Failure to observe the instructions may lead to damage to the machine as a result of improper operation, adjustment or use.

TIP

Additional tips included in the Operator's Manual describe useful advice for the machine operation and are marked with the sign **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.

Rotation to the right – clockwise rotation of a mechanism (the operator is facing the mechanism).

Rotation to the left – counterclockwise rotation of a mechanism (the operator is facing the mechanism).

CHECKING THE TRAILER AFTER DELIVERY

The manufacturer guarantees that the trailer 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 after delivery and before the first use. The machine is delivered to the user completely assembled.

Scope of inspection activities

- Confirm that the specification of the delivered machine is in conformity with your order.
- Check condition of protective paint coat,
- Visually inspect the trailer's components for mechanical damage resulting from, for example, incorrect transport.
- Check technical condition of tyres and tyre pressure.
- Check technical condition of elastic hydraulic conduits.
- Check technical condition of pneumatic conduits.
- Make certain that there are no hydraulic oil leaks.
- Check electrical lamps of the trailer's lighting system.

PREPARING AND HANDING OVER THE TRAILER

PREPARATION PROCEDURES

- Check all the trailer's lubrication points.
- Check if the nuts fixing the wheels, the bolts fixing the drawbar and hook and other major nut and bolt connections are properly tightened.
- Drain the air tank of the pneumatic brake system.

TIP

Hand-over of the trailer to the buyer involves a detailed visual inspection and verification of the trailer operation, as well as instructing the buyer on the basic usage rules. The trailer is operated for the first time in the presence of the Seller.

- Check electrical, pneumatic and hydraulic connections of the trailer and tractor.
- Adjust the drawbar eye position to the tractor hitch.
- Check the hook position and, if necessary, adjust it to the requirements of the load boxes to be used.

If all the above checks have been performed and there is no doubt as to the trailer's good technical condition, it can be connected to tractor. Start the tractor, check all systems and conduct test run of trailer without load (no load in load box). It is recommended that the inspection is conducted by two people, one of which should always remain in the tractor cab. Test start should be conducted according to the sequence shown below.

- Connect the trailer to appropriate hitch on agricultural tractor.
- Connect conduits of braking, electrical and hydraulic systems.
- Connect control panel
- Raise support to transport position.
- Switch on individual lights, check correct operation of electrical system.
- Start and check correct operation of hydraulic

tipping system, rear hydraulic fender, suspension interlock, load box interlock and hook frame.

- When moving off check if the main brakes operate correctly.
- Perform test drive.

The trailer may be hitched only when all preparatory activities including inspection of technical condition have been completed satisfactorily. If during test run worrying symptoms occur such as:

- noise and abnormal sounds originating from the abrasion of moving elements of the trailer structure,
- hydraulic oil leak,
- pressure drop in braking system,
- incorrect operation of hydraulic and/or pneumatic cylinders,

or other faults, find the cause of the problem. If a fault cannot be rectified or the repair could void the guarantee, please contact the dealer for additional clarifications or to make a repair.

After completion of test drive check tightness of wheel and drawbar nuts.

ATTENTION

During the first use, the trailer is checked in the presence of the Seller. The Seller is obliged to conduct the training in safe and correct operation of the trailer.

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http://www.pronar.pl
e-mail: pronar@pronar.pl

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:	**TRAILER**
Type:	**T185**
Model:	- - - - -
Serial number:	
Commercial name:	**TRAILER PRONAR T185**

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.

Z-CA DYREKTORA
d/s technicznych
członek zarządu

Roman [illegible]

Narew, the _____

Place and date

Full name of the empowered person position, signature

Table of contents

MAINTENANCE

ANNEX A

BASIC INFORMATION

SECTION 1

1.1 IDENTIFICATION

S	Z	B	1	8	5	0	X	X								

PRONAR T185 agricultural trailer is marked with data plate (1) located on the side surface of the load box seat and with serial number (2) stamped onto the right longitudinal member of the drawbar. The meanings of the individual fields found on the data plate are presented in the table (1.1). Inscribe the trailer's serial number in the top field.

Table 1.1. Markings on data plate

Item	Meaning
A	General description and purpose
B	Symbol / type of trailer
C	Year of manufacture
D	VIN
E	Official certificate number
F	Tare weight
G	Maximum gross weight
H	Carrying capacity
I	Permissible hitch load
J	Permissible axle 1 load
K	Permissible axle 2 load

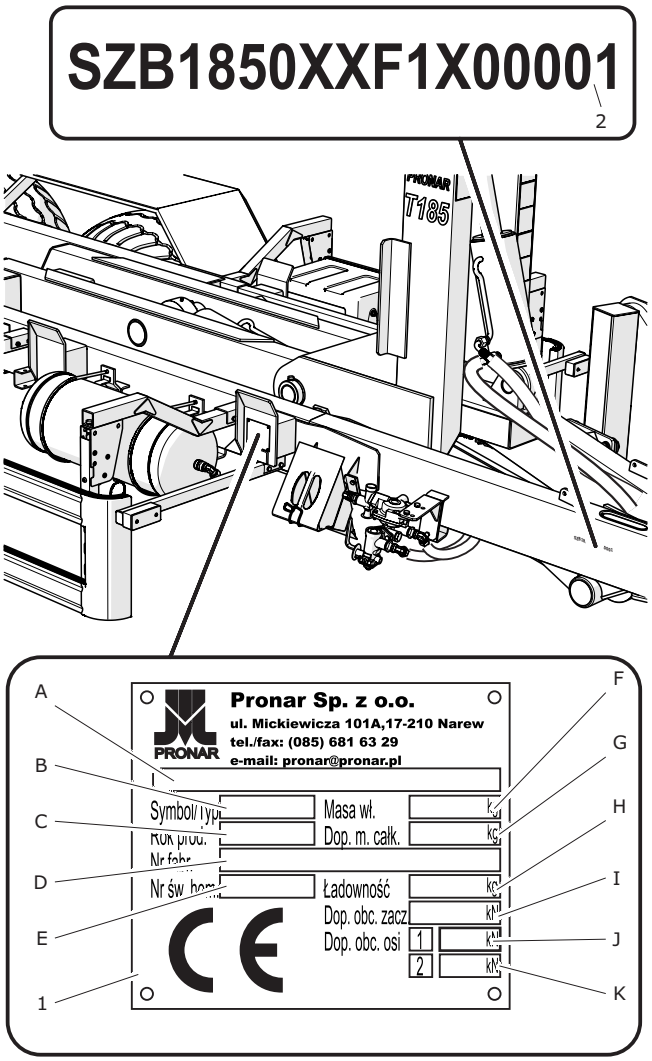


Figure 1.1 Trailer identification

(1) data plate

(2) trailer VIN

1.2 AXLE SHAFT IDENTIFICATION

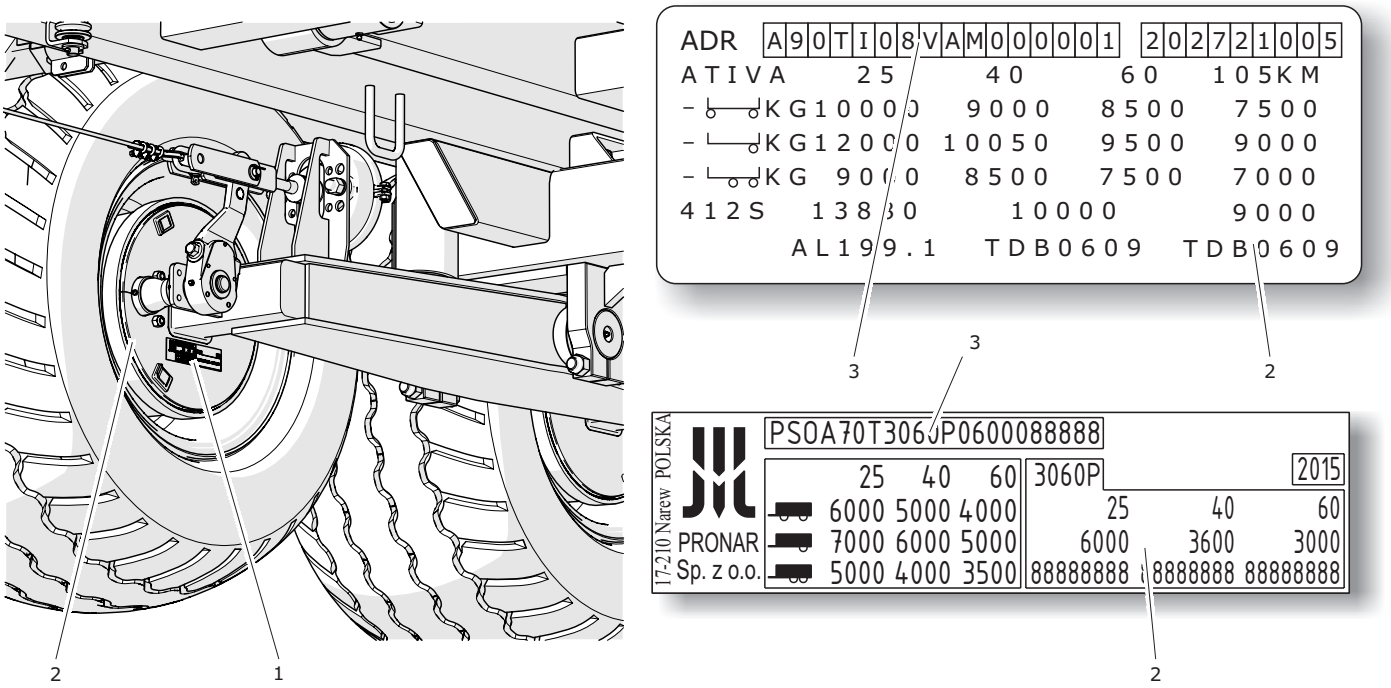


Figure 1.2 Axle shaft identification

(1) axle shaft *(2) data plate* *(3) serial number of axle shaft*

The serial number of the axle shafts and their type are stamped onto the data plate (2) secured to the axle shaft hub shield - figure (1.2). After purchasing the trailer, inscribe individual serial numbers of the axle shafts in the fields below.

1.3 PROPER USE

The hook trailer is intended and designed for cooperating with the load boxes that are made according to the following standards:

- SS3021
- DIN30722-1 (when the trailer is equipped with a hydraulic interlock),

and have the maximum dimensions specified in table (1.2) and with the Pronar load boxes described in table (1.3).

Table 1.2. Requirements for load boxes

Requirements		
Minimum hitch height	h	1,450 mm
Maximum hitch height	h	1,570 mm
Spacing of rollers	w	1,070 mm
Minimum total length	L	4,100 mm
Maximum total length	L	4,900 mm
Total width	W	2,550 mm
Total height	H	2,000 mm

Table 1.3. PRONAR load boxes

Name	L | W | H
KO 01	4,560 | 2,395 | 1,405
KO 02	4,560 | 2,392 | 700
KO 03	4,560 | 2392 | 700

ATTENTION

The use of the load boxes manufactured according to DIN30722-1 standard, with a mechanical interlock, is not permitted.

The trailer must be equipped with the hydraulic interlock of the load box in order to cooperate properly with the load boxes made according to DIN30722-1 standard.

Trailer design enables connection and disconnection of load boxes and their unloading by tipping to the

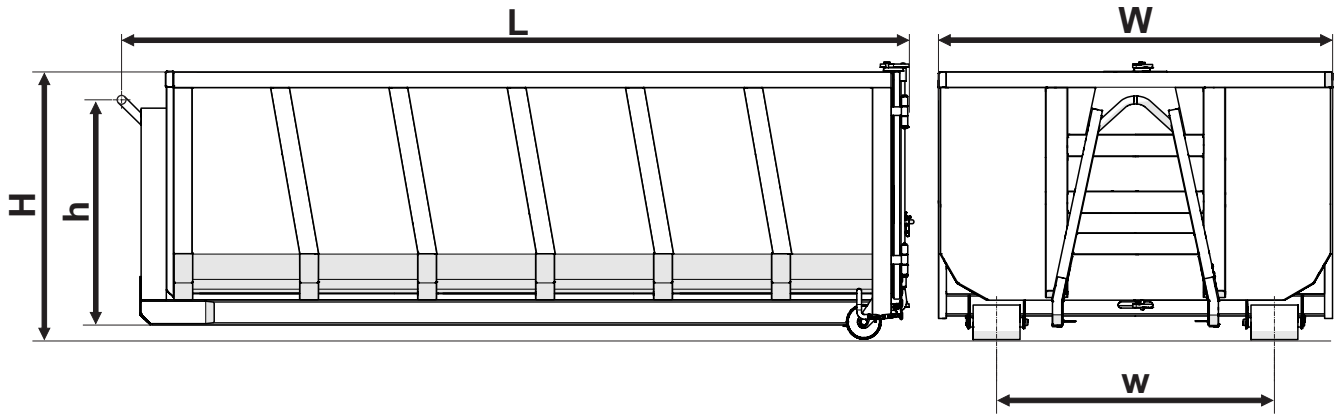


Figure 1.3 Load box dimensions

rear. Type of load carried depends on load box use. The trailer must not be used in any way other than that described above.

ATTENTION

Do NOT use technically unreliable load boxes. The load box should be sufficiently durable to ensure that it can be loaded and unloaded at full load.

ATTENTION

The trailer speed must not, however, be greater than the maximum design speed of 40 km/h.

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.

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* of the trailer and the *Warranty Book* and conform with the recommendations contained 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 fulfils all the requirements made by the trailer's Manufacturer.

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 carrying vehicles and are familiar with the road traffic regulations and transport regulations.

The trailer must not be used for purposes other than those for which it is intended, in particular:

- for transporting people and animals,
- for transporting loose unsecured toxic materials, if there is a possibility of causing environmental damage,
- for transporting machines and equipment, with high centre of gravity affecting trailer stability,
- for transporting loads with uneven loading and overloading of axles,

- for transporting unsecured loads, which may move in the load box.
- with load boxes not complying with the Manufacturer's requirements.

1.4 REQUIREMENTS

Table 1.4. Requirements for agricultural tractor

Contents	Unit	Requirements
Single conduit pneumatic brake system		
Connection	-	PN-ISO 1728:2007
Nominal pressure of the system	bar	5.8 - 6.5
Double conduit pneumatic brake system		
Connections	-	PN-ISO 1728:2007
Nominal pressure of the system	bar	6.5
Hydraulic brake system		
Connection	-	ISO 7241-A
Nominal pressure of the system	MPa	16
Power hydraulics system		
Hydraulic oil	-	HL32
Nominal pressure of the system	MPa	20
Oil demand:	l	15
Electrical lighting system		
Connection	-	7-pole, ISO 1724
Nominal voltage	V	12
Hitch		
Minimum vertical load capacity of hitch	kg	2,000
Other requirements		
Minimum tractor power demand	kW / hp	57.3/78

1.5 EQUIPMENT

1.5.1 STANDARD EQUIPMENT

- *Operator's Manual*
- *Warranty Book*
- connection lead for the electrical system
- wheel chocks

1.5.2 ADDITIONAL AND OPTIONAL EQUIPMENT

- warning sign
- toolbox
- Warning reflective triangle
- side under-run protection device
- additional hydraulic outlets on the hook frame
- hydraulic interlock of rocker arms
- rear protective beam, manually extended
- rear lights shield
- suspension lubrication system

LOAD BOX INTERLOCK

- mechanical
- hydraulic, independent

HITCHING DRAWBARS

- rotating drawbar 50mm
- fixed drawbar 40mm
- ball drawbar 80mm

MUDGUARDS

- metal
- plastic

POWER HYDRAULICS SYSTEM

- with manual switching between "hook trailer" and "tipper" functions
- with electrical wired control (3 functions of the trailer)
- with electrical wired control (4 functions of the trailer)
- hydraulic system with an oil tank and electrical control (3 functions of the trailer)
- hydraulic system with an oil tank and electrical control (4 functions of the trailer)

PARKING STAND

- telescopic parking stand with gear
- telescopic parking stand with a pin
- straight hydraulic parking stand

HOOK

- standard
- with automatic load box interlock

MAIN BRAKE SYSTEM:

- double conduit pneumatic system
- single conduit pneumatic system
- hydraulic system
- hydraulic system with a mechanical safety valve,
- hydraulic system with an electrical safety valve and braking force regulator,
- hydraulic-pneumatic system

- hydraulic-pneumatic system with an electrical safety valve and braking force regulator
- hydraulic-pneumatic system with a mechanical safety valve

ELECTRICAL SYSTEM

- basic version without side clearance lights
- with side clearance lights

1.6 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,
- tyres,
- brake shoes,
- bulbs and LED lamps,
- 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.

In the event of damage arising from:

- mechanical damage which is the user's fault, damage caused by road accidents,
- incorrect use, adjustment or maintenance, use of the trailer 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 will lose the right to warranty service.

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.

Modification of the trailer without the written consent of the Manufacturer is 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.

TIP

Demand that the seller carefully and precisely 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.

1.7 TRANSPORT

The hook trailer is ready for sale completely assembled and does not require packing. Packing is only required for the machine's technical documentation and some extra equipment. 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).

1.7.1 TRANSPORT ON VEHICLE

Loading and unloading of hook trailer from vehicle shall be conducted using loading ramp with the aid of an agricultural tractor. 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. The trailer must be properly hitched to the tractor according to the requirements specified in this Operator's Manual. The trailer braking system must be started and checked before driving off or onto ramp.

The hook trailer should be attached firmly to the platform of the transport vehicle using straps, chains, stays or other securing measures fitted with a tightening mechanism. Securing elements should be attached to the transport lugs designed for this purpose (1) – figure (1.4). Transport lugs are welded to the longitudinal members (2) of the lower frame. Use only 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 in the Operator's Manual for the given securing measure. Chocks or other objects without sharp edges should be placed under the wheels of the trailer to prevent it from rolling. Trailer wheel chocks must be secured to the load platform of the vehicle in a manner preventing their movement. The quantity of securing elements (cables, straps, chains, stays, etc.) and the force necessary for their tensioning depends on a number of things, including weight of the trailer, the design of the transport vehicle, speed of travel and other conditions. To secure the trailer optimally on the load platform, support the drawbar with a wooden

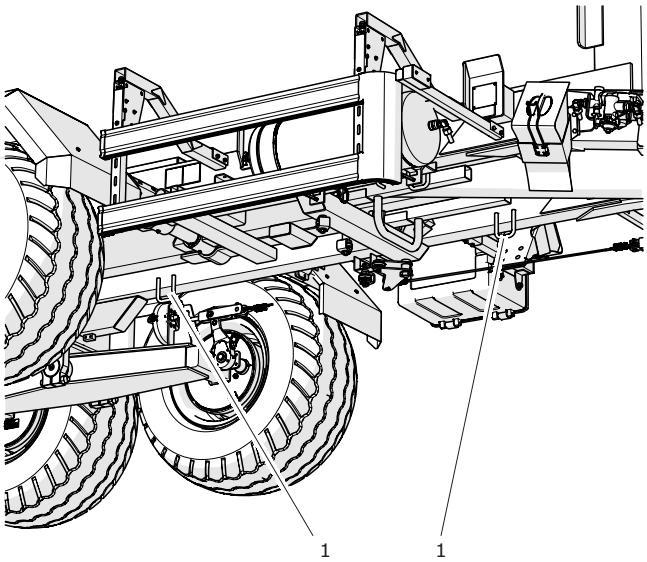


Figure 1.4 Attachment points on the trailer

(1) transport lug

block. A correctly secured trailer does not change its position with regard to the transport vehicle. The securing elements must be selected according to the guidelines of the Manufacturer of these elements. In case of doubt use a greater number of securing straps in order to immobilise the trailer. If necessary, sharp edges of trailer should be protected at the same time protecting the securing straps from breaking during transport.

During reloading work, particular care should be taken not to damage parts of the machine's fittings or the lacquer coating. The tare weight of the trailer in condition ready for travel is given in table (3.1).

1.7.2 TRAILER TRANSPORTED BY THE USER

In the event of independent transport by the user after purchase of the hook trailer, the user must read the trailer Operator's Manual and adhere to the recommendations contained therein. Transport of the trailer by the user involves towing the trailer with own agricultural tractor to destination. During transport adjust travel speed to the prevailing road conditions, but do not exceed the maximum design speed.

ATTENTION

Before transporting independently, the tractor driver must carefully read this operator's manual and observe its recommendations.

Incorrect use of securing measures may cause an accident.

When being road transported on a motor vehicle the machine must be mounted on the vehicle's platform in accordance with the transport safety requirements and the regulations.

Driver of the vehicle should be particularly careful during travel. This is due to the vehicle's centre of gravity shifting upwards when loaded with the machine.

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

1.8 ENVIRONMENTAL HAZARDS

A hydraulic oil leak constitutes a direct threat to the natural environment owing to its limited biodegradability.

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 must be collected using sorbents. The oil pollution, once gathered up, should be kept in a sealed, marked, hydrocarbon resistant container, and then passed on to the appropriate oil waste recycling centre. The container should be kept away from heat sources, flammable materials and food.

Waste oil should be taken to the appropriate facility dealing with the re-use of this type of waste. Waste code: 13 01 10. Detailed information concerning hydraulic oil may be found on the product's Material Safety Data Sheet.

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.

TIP

The hydraulic system of the trailer is filled with HL 32 Lotos hydraulic oil.

ATTENTION

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

1.9 WITHDRAWAL FROM USE

DANGER

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

In the event of decision by the user to withdraw the trailer from use, comply with the regulations in force in the given country concerning withdrawal from use and recycling of machines withdrawn from use. Before commencing dismantling, totally remove the oil from the hydraulic system and reduce air pressure completely in the pneumatic braking systems (e.g. using air tank drain valve).

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.

During dismantling personal protection equipment shall be used i.e. protective clothing, boots, gloves and protective goggles etc.

SAFETY ADVICE

SECTION 2

2.1 BASIC SAFETY RULES

2.1.1 GENERAL INFORMATION

- The trailer must not be used for purposes other than those for which it is intended. Anyone who uses the machine in any other way than the way intended takes full responsibility for any consequences of this use. Use of the trailer for purposes other than those for which it is intended by the Manufacturer may invalidate the guarantee.
- Before using the trailer, the user must carefully read this Operator's Manual. When operating the machine, the operator must comply with all the recommendations included in the Operator's Manual.
- The trailer may only be used and operated by persons qualified to drive agricultural tractors with a trailer.
- The user is obliged to know the functions of all control elements of the machine. It must be done before using the machine. Do NOT start the machine without the knowledge of its functions.
- The user is obliged to acquaint himself with the construction, action and the principles of safe usage of the machine.
- Before using the trailer always check whether it is properly prepared for work, especially in terms of safety.
- If the information contained in the Operator's Manual is difficult to understand, contact a seller, who runs an authorised technical service on behalf of the Manufacturer, or contact the Manufacturer directly.
- Entering the trailer is only allowed when the machine is absolutely motionless. Stop the tractor, remove the key from the ignition and secure the tractor and trailer against rolling by placing chocks under the wheels. Immobilise tractor and trailer with parking brake.
- Careless and improper use and operation of the trailer and also non-observance of the recommendations contained in this Operator's Manual endanger health and life of third persons and/or machine operators.
- The trailer may only be used when all safety guards and other protective elements are technically sound and correctly mounted.
- Pronar Sp. z o.o. warns about the existence of residual risk, and for this reason the fundamental basis for using this trailer should be the application of safety rules. Follow the “Safety First” principle.
- The machine must not be used by persons who are not authorised and not able to operate it, in particular children and persons under the influence of alcohol, drugs or other abusive substances, etc.

- Any modification to the trailer frees Pronar from any responsibility for damage or detriment to health which may arise as a result.
- Do not exceed the permissible travelling speed.

2.1.2 HITCHING AND UNHITCHING THE TRAILER FROM TRACTOR

- Do NOT hitch the trailer to agricultural tractor, if the tractor does not meet the minimum requirements specified by the Manufacturer
- Before hitching the trailer, make certain that oil in external hydraulic system of the tractor is allowed to be mixed with hydraulic oil in the trailer.
- Before hitching the trailer check that both machines are in good technical condition.
- Use the proper tractor's hitch for hitching the trailer. After completed hitching of the machines check that the hitch is properly secured. If necessary, read applicable sections in the tractor Operator's Manual.
- If the tractor is equipped with an automatic hitch, make certain that the hitching is completed.
- Be especially careful when hitching the machine.
- When hitching, there must be nobody between the trailer and the tractor.
- Do NOT proceed with disconnecting trailer from the tractor when tipping frame is raised.
- Hitching and unhitching the trailer may only take place when the machine is immobilised with the parking brake.
- The trailer must not be moved when the parking stand is extended and rests on the ground. While the machine is moving there is a risk that the parking stand may get damaged.
- DO NOT unhitch the trailer from the tractor if the tipping frame or central frame are not fully retracted and when hydraulic cylinder suspension blocks are extended.

2.1.3 PULLING THE LOAD BOX ON AND REMOVING THE LOAD BOX FROM THE TRAILER

- Before pulling the load box on the trailer, remove the slow-moving vehicle warning sign, slide in and secure the rear protective beam.
- Selection of the trailer's working mode is only possible when the tipping frame is retracted to resting position.
- While connecting the load box arrange it in such a way that the longitudinal axis of the trailer is aligned with the longitudinal axis of the load box. If not, the load box longitudinal members of the frame may not fit on the trailer rollers lengthwise. While pulling the load box onto the trailer, observe whether its longitudinal members are properly supported on the trailer guide rollers.. If necessary, manoeuvre the trailer to connect the load box properly.
- Lock the load box on the trailer using the hydraulic lock of the load box (if the trailer is equipped with the interlock option).
- Other persons must NOT be in the immediate vicinity of the trailer and especially behind the connected or disconnected load box.
- Take particular care while working near electric power lines.

2.1.4 LOADING AND UNLOADING LOAD BOX

- Loading and unloading work should be carried out by persons experienced in this type of work.
- Do not exceed the maximum carrying capacity of the trailer, because overloaded trailer creates hazards while driving and may get damaged.
- Do not carry people or animals either on the trailer chassis or in load boxes. The trailer is not intended for transporting people or animals.
- Individual types of load boxes are adapted to carrying various groups of materials, therefore the user is obligated to carefully read the load box operator's manual and comply with its recommendations.
- The load must be arranged in load box in such a way that it does not threaten the stability of the trailer, and does not hinder driving.
- The arrangement of the load in load box may not cause an overload on the axle and drawbar of the trailer.
- Loading and unloading work may be carried out only when the trailer is positioned on level and hard surface. Tractor and trailer must be placed to drive forwards.
- Ensure that there are no bystanders in the load box loading / unloading zone. Before tipping the load box ensure proper visibility and make certain that there are no bystanders near the machine.
- Do NOT move off or drive when load box is raised.
- Take particular care while working near electric power lines.
- When opening load box closure take particular care, because of the pressure of the load on the wall.
- Take particular care when closing the load box walls to avoid crushing fingers.
- Do NOT tip 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 cause of the problem.
- Do NOT jerk the trailer forwards if load is bulky or reluctant to pour and does not unload.
- Do NOT raise the load box if there is any danger whatsoever that the trailer will tip over.
- After completed unloading, ensure that the load box is empty.
- Do NOT move with raised load box.

2.1.5 HYDRAULIC SYSTEM AND PNEUMATIC SYSTEM

- When operating, the hydraulic and pneumatic systems are under high pressure.
- Regularly check the technical condition of the connections and the hydraulic and pneumatic conduits. Do NOT use the trailer with leaky system.
- In the event of malfunction of the hydraulic or pneumatic system, do not use the trailer until the malfunction is corrected.
- When connecting the hydraulic conduits to the tractor, make sure that the hydraulic system of the tractor and that of the trailer are not under pressure. If necessary, reduce residual pressure in the system.
- In the event of injuries being caused by pressurised hydraulic oil, contact a doctor immediately. Hydraulic oil may find its way under the skin and cause infections. In the event of contact of oil with eyes, rinse eyes with a large quantity of water and if irritation occurs, consult a doctor. In the event of contact of oil with skin wash the area of contact with water and soap. Do NOT apply organic solvents (petrol, kerosene).
- Use the hydraulic oil recommended by the Manufacturer.
- Used oil should be disposed of in a professional manner. Used oil or oil which has lost its properties should be stored in original containers or replacement containers resistant to action of hydrocarbons. Replacement containers must be clearly marked and appropriately stored.
- Do not store hydraulic oil in packaging designed for storing food or foodstuffs.
- Rubber hydraulic conduits must be replaced every 4 years regardless of their technical condition.

2.1.6 MAINTENANCE

- During the warranty period, any repairs may only be carried out by the 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.
- While performing maintenance work, use proper, close-fitting protective clothing, gloves, protective shoes, protective goggles and appropriate 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 and wheel nuts.
- Service inspections should be carried out according to the schedule in this Operator's Manual.
- Before beginning repair work on hydraulic or pneumatic systems reduce oil or air pressure completely.

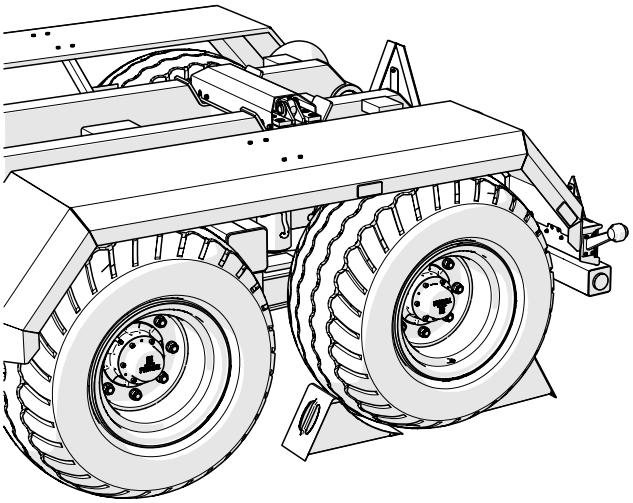


Figure 2.1 Arrangement of chocks

- 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 wheel. 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.
- 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_2 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.
- The user must not repair by himself the components of the hydraulic or pneumatic system i.e. control valves, cylinders and regulators. In the event of damage to these elements, repair should be entrusted to an authorised service point or elements should be replaced with new ones.
- 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.

2.1.7 DRIVING ON PUBLIC ROADS

- During travel on public roads comply with the road traffic regulations and transport regulations in force in a given country, in which the trailer is used.
- Do not exceed the permitted speed arising from road conditions and design limitations. Adjust travel speed to the prevailing road conditions, trailer load and road traffic regulations limits.
- Chocks should be placed only under one wheel (one in front of the wheel, the other behind the wheel).
- Do not leave the machine unsecured. The trailer disconnected from the tractor must be immobilised with parking brake and secured against rolling away with wheel chock placed under one wheel.
- Before driving off make certain that the trailer is correctly hitched to the tractor.
- Vertical load borne by the trailer drawbar eye affects the steering of the agricultural tractor.
- While transporting the load box, the trailer must be set to "tipper" function".
- While transporting the load box, the hydraulic lock should be locked in order to protect the load box against shifting and shaking during transport on the trailer.
- Do NOT drive when load box is raised.
- Before using the trailer always check its technical condition, especially in terms of safety.
- Before driving, make sure that the parking brake is released and the suspension interlock cylinders are withdrawn. Check the setting of the braking force regulator.
- If the journey takes place without load box, a slow-moving vehicle sign should be placed on the rear beam of the trailer, if the machine is the last vehicle in the group. If the trailer travels with the load box installed, then the slow-moving vehicle warning sign should be placed on the rear wall of the load box.
- The trailer is designed to operate on slopes up to 5^0. Driving trailer across ground with steeper slopes may cause the trailer to tip over as a result of loss of stability.
- While driving on public roads the trailer must be fitted with a certified or authorised reflective warning triangle.

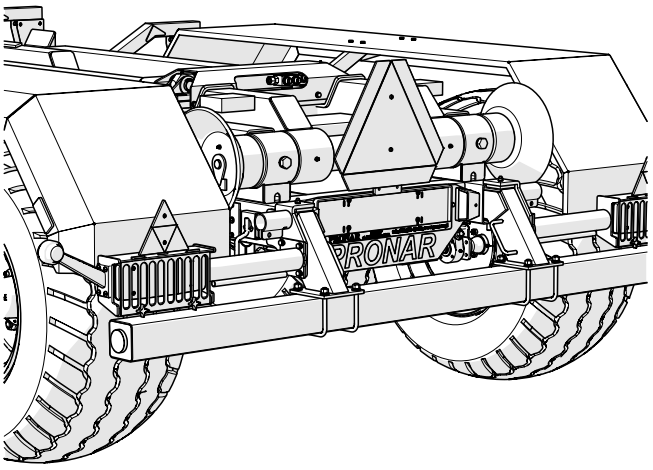


Figure 2.2 Warning sign

- Periodically drain water from the air tank in the pneumatic system. During frosts, freezing water may cause damage to the main brake

system components.

- Reckless driving and excessive speed may cause accidents.
- A load protruding beyond the edge of the trailer should be marked according to the road traffic regulations. Do NOT transport loads forbidden by the Manufacturer.
- Do NOT exceed the trailer's maximum carrying capacity. Exceeding the carrying capacity may lead to damage to the machine, loss of stability and danger while driving. The brake system is adjusted to the gross weight of the trailer, exceeding the weight limit causes drastic reduction of basic braking effectiveness.
- Prolonged driving across steep ground may lead to loss of braking efficiency.
- 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.
- Do NOT attempt to enter the trailer load box while travelling.
- During travel, guards protecting rear light assemblies must be taken from the light beam profiles and secured on the other side of the profiles using star nuts.
- Do NOT park the trailer on a slope.
- During travel on public roads, the rear protective beam must not be withdrawn deeper than 400mm under the load box.

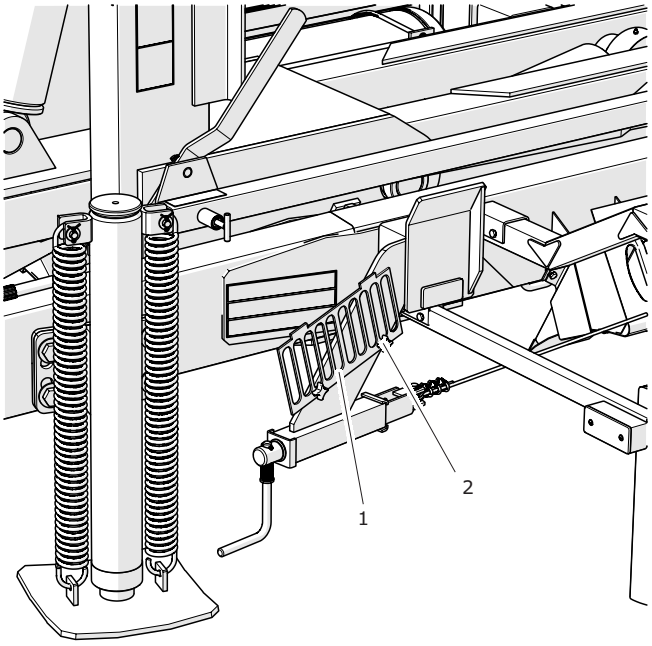


Figure 2.3 Storage of light shields

(1) light shield *(2) bolt*

2.1.8 TYRES

- When working with tyres, the trailer should be secured against rolling by placing chocks under the wheels. Immobilise the trailer with parking brake.
- 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.
- Regularly check if the nuts fixing the wheels are properly tightened.
- Avoid potholes, sudden manoeuvres or high speeds when turning.
- Regularly check air pressure in the tyres.
- Protect valves using suitable caps to avoid soiling.

2.1.9 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 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 the tractor with parking brake.
- When working in limited visibility conditions, use the tractor's working lights to illuminate the PTO shaft and its vicinity.
- During transport, store the shaft in the horizontal position to avoid damage to safety guards or other protection elements.
- During shaft operation 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 the shaft and the drive system and also do NOT engage the clutch suddenly. Before starting PTO, 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 use the securing chains to support the shaft while the trailer is parked or when transporting the trailer.
- Never go over and under the PTO and never stand on it during work and 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 drive 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 trailer are at an unsuitable angle to each other.

2.2 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 trailer for purposes other than those for which it is intended,
- being between the tractor and the trailer while the engine is running and when the machine is being attached,
- being on the machine during work,
- failure to keep a safe distance from dangerous areas during loading, disconnecting, connecting or unloading the load box,
- operation of the trailer by unauthorised persons or persons under the influence of alcohol or other intoxicating substances,
- making modifications to the machine without the consent of the Manufacturer,
- presence of persons or animals in areas invisible from the driver's position.

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

- operate the machine in prudent and unhurried manner,
- reasonably apply all the remarks and recommendations stated in the Operator's Manual,
- maintain a safe distance from prohibited or dangerous places
- carry out repair and maintenance work in line with operating safety rules,
- repair and maintenance work should be carried out by persons trained to do so,
- use close fitting protective clothing and appropriate tools,
- ensure unauthorised persons, especially children, have no access to the machine, do not climb on the machine when it is operating.

2.3 INFORMATION AND WARNING DECALS

The trailer is labelled with the information and warning decals mentioned in table (2.1). The symbols are positioned as presented in figures (2.4) to (2.5). Throughout the time the machine is in use, the user of the machine is obliged to take care that notices and warning and information symbols located on the trailer are clear and legible. In the event of their destruction, they must be replaced with new ones. Safety decals can be purchased from the Manufacturer of the trailer or your PRONAR dealer. Part numbers of information decals are given in table (2.1) and in *Spare Parts List*. New assemblies, changed during repair, must be labelled once again with the appropriate safety signs. When cleaning the trailer, do not use solvents which may damage the coating of information labels and do not subject them to strong water jets.

Other information decals, placed on the system connection leads are shown in section 4.

Table 2.1. Information and warning decals

Item	Description	Part number
1	Attention! Before starting work, carefully read *the Operator's Manual*.	70RPN-00.00.00.04
2	Before maintenance or repairs, turn off the truck tractor's engine and the trommel screen's engine and remove keys from ignition. Ensure that unauthorised persons do not have access to the tractor cab.	70RPN-00.00.00.05
3	Warning decal. Do not perform maintenance or repair work under laden and / or unsupported load box.	104RPN-00.00.00.03
4	Grease the trailer according to the lubrication schedule included in the *Operator's manual*.	104RPN-00.00.00.04
5	Information decal. Information on possibility of application of tipping frame interlock depending on its position	104RPN-00.00.00.05
6	Information decal. Regularly check the wheel nuts for correct tightening.	104RPN-00.00.00.06
7	Information decal. Tipping frame interlock. Position I. Tipping the load box	104RPN-00.00.00.07
8	Information decal. Unlocking the central frame. Position II. Disconnecting/connecting the load box.	104RPN-00.00.00.08
9	Information decal. Information on application of rear light assembly shields.	104RPN-00.00.00.15
10	Information decal.	104RPN-00.00.00.17
11	Information decal.	104RPN-00.00.00.18
12	Warning decal. Keep a safe distance from electric power lines during tipping or connecting and/or disconnecting the load box.	58RPN-00.00.020

Item	Description	Part number
13	40km/h decal	204N-00000008
14	Decal showing the location of lubrication point.	70RPN-00.00.00.22

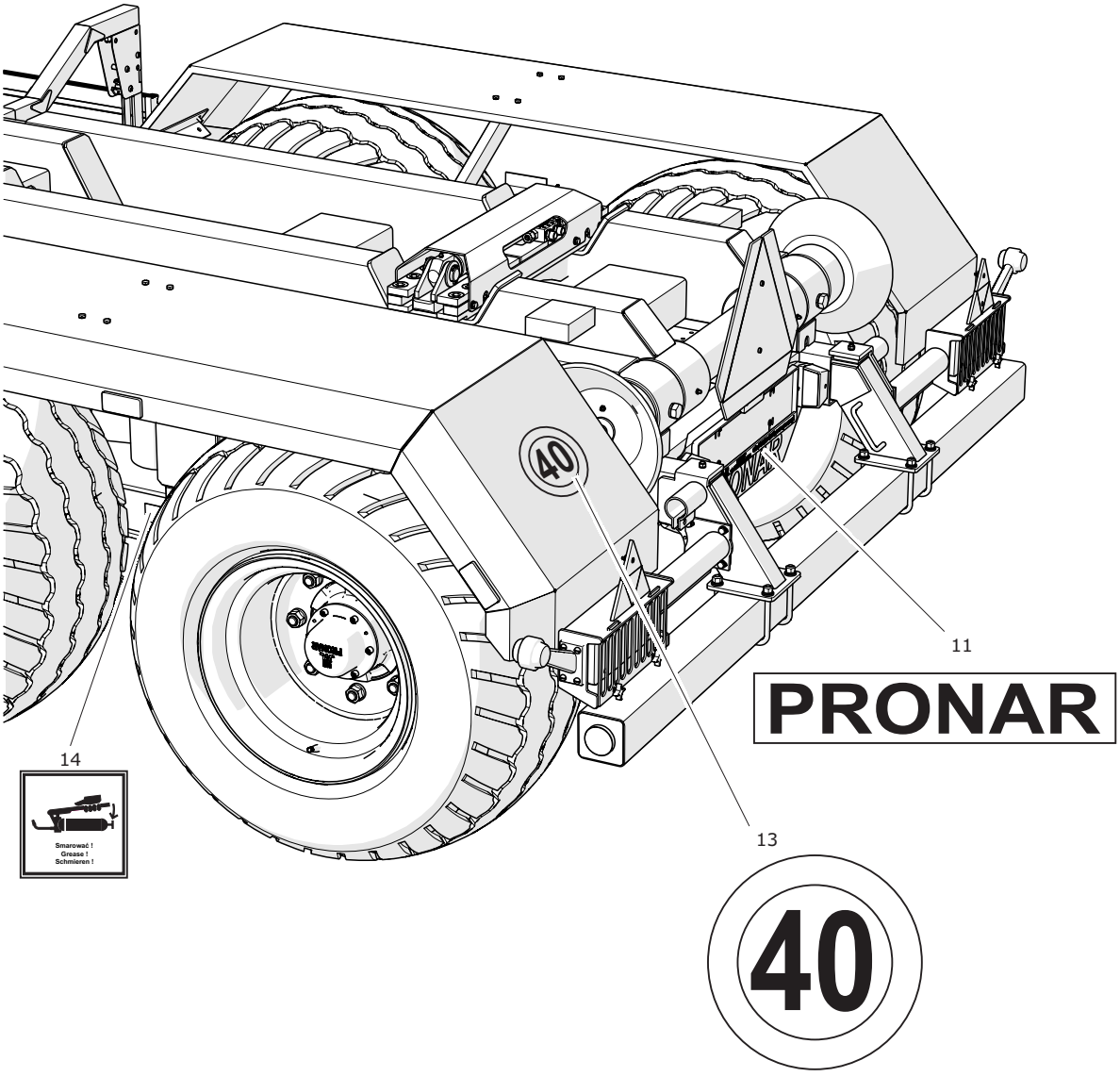


Figure 2.4 Locations of information and warning decals, view 1.

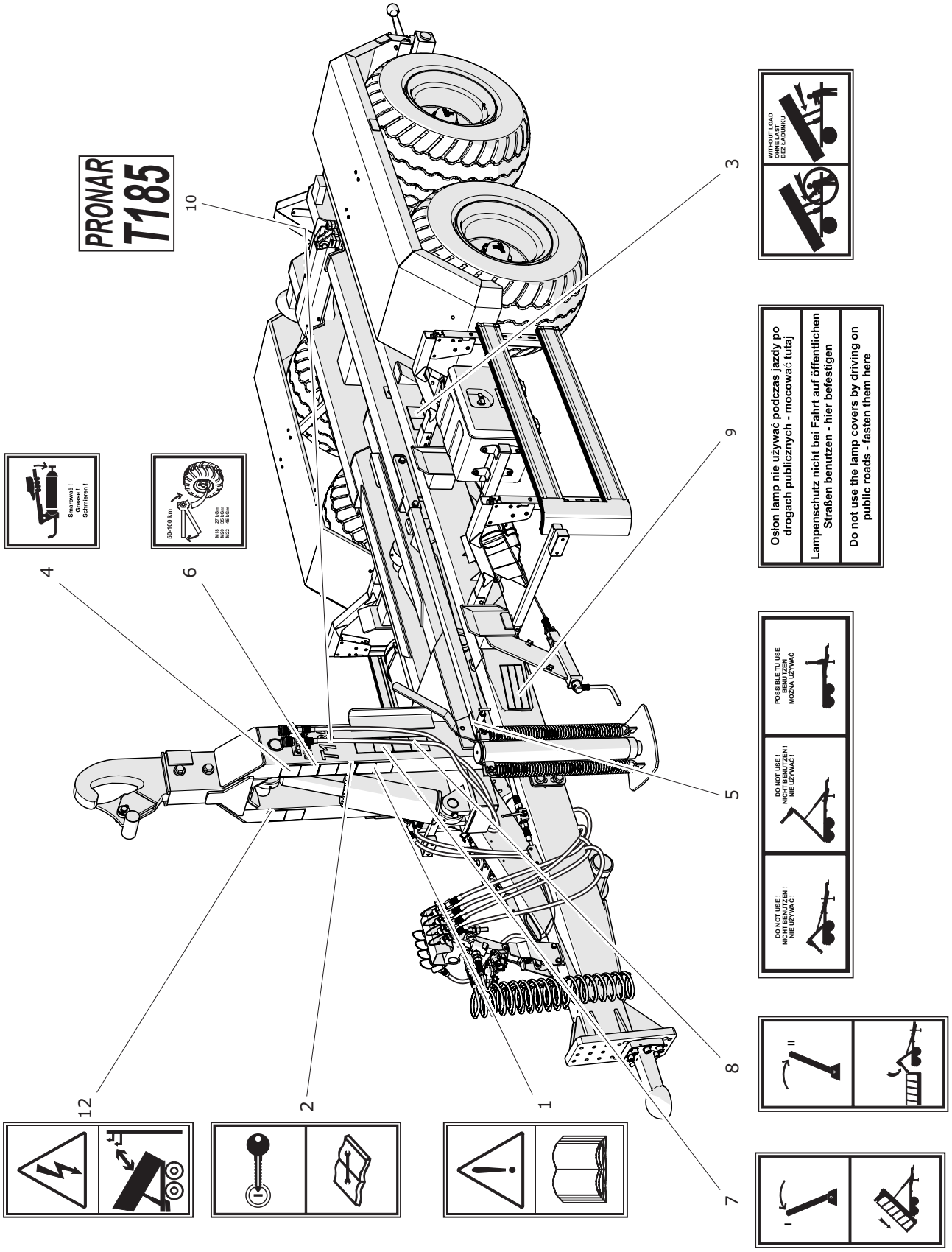


Figure 2.5 Locations of information and warning decals, view 2.

DESIGN AND OPERATION

SECTION 3

3.1 TECHNICAL SPECIFICATION

Table 3.1. Basic technical specification

Contents	unit	T185
Dimensions (without load box)		
Length	mm	5 940
Width	mm	2,360
Height	mm	2,512
Dimensions with load box		
Length with longest load box	mm	6,782
Length with shortest load box	mm	6,415
Width including load box (min/max)	mm / mm	2,360 / 2,550
Loading space length (min/max)	mm / mm	4,540 / 4,907
Weights		
Load capacity (combined with load box weight)	kg	12,130
Tare weight	kg	2,870
Maximum gross weight	kg	15,000
Other information		
Maximum design speed	km/h	40
Height of load box guide rollers	mm	900
Wheel track	mm	1,830
Maximum load box tipping angle	degree	46
Maximum vertical load of drawbar eye	kg	2 000
Electrical system voltage	V	12

3.2 TRAILER CONSTRUCTION

3.2.1 CHASSIS

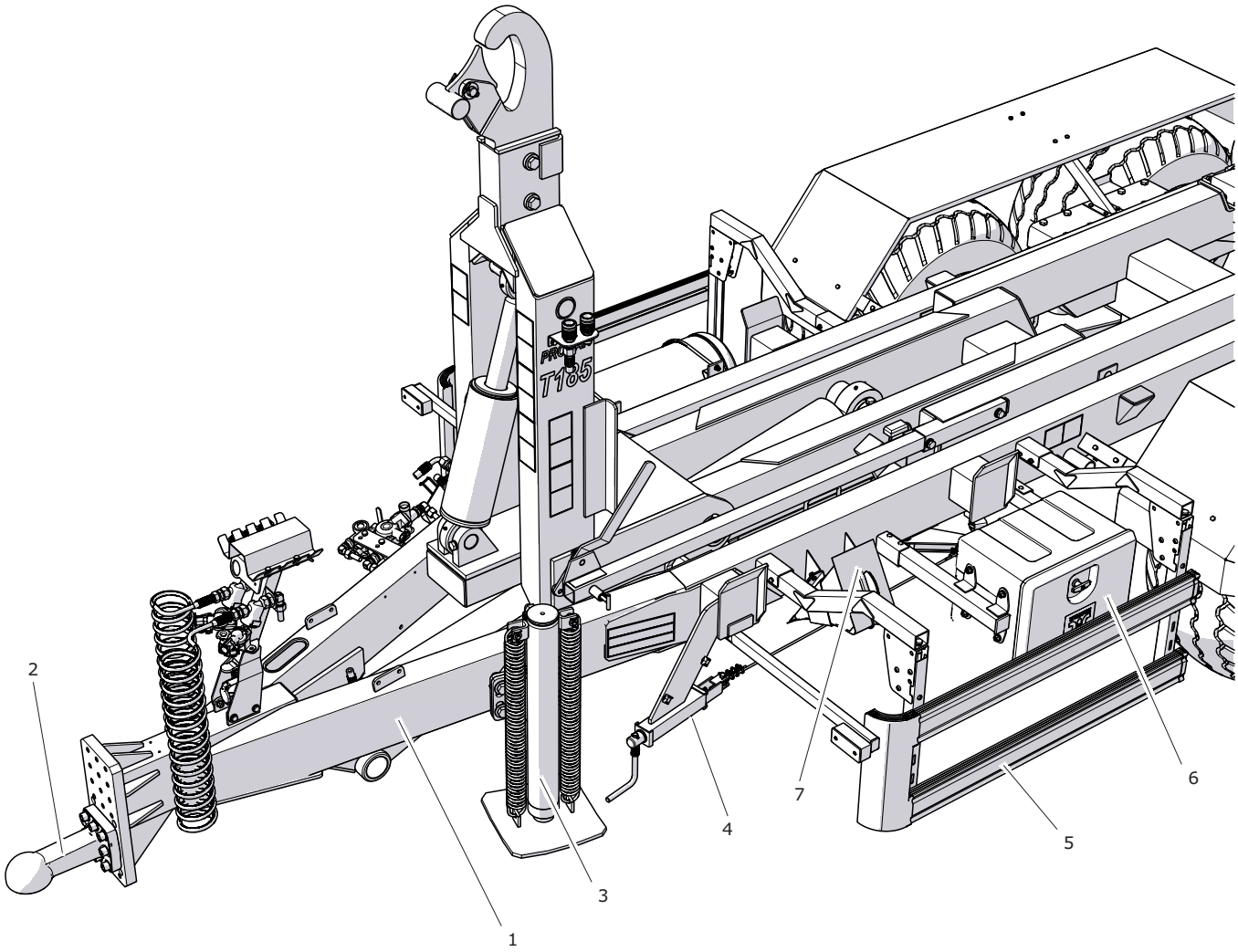


Figure 3.1 Trailer chassis – front view

(1) lower frame *(2) drawbar* *(3) straight hydraulic support*

(4) handbrake mechanism *(5) side under-run protection devices* *(6) toolbox*

(7) wheel chock

TIP

An example of the equipment configuration is presented in the figures showing the trailer design. Detailed information concerning all of the options is given in section *1.5 Equipment*

The main load bearing element of the hook trailer is the lower frame (1), which is a welded structure made of steel sections. To the front of the frame is the drawbar beam, to which the drawbar (2) is secured. The trailer parking stand (3) is bolted to the left longitudinal member of the drawbar beam. On the left side of the frame the parking brake is welded

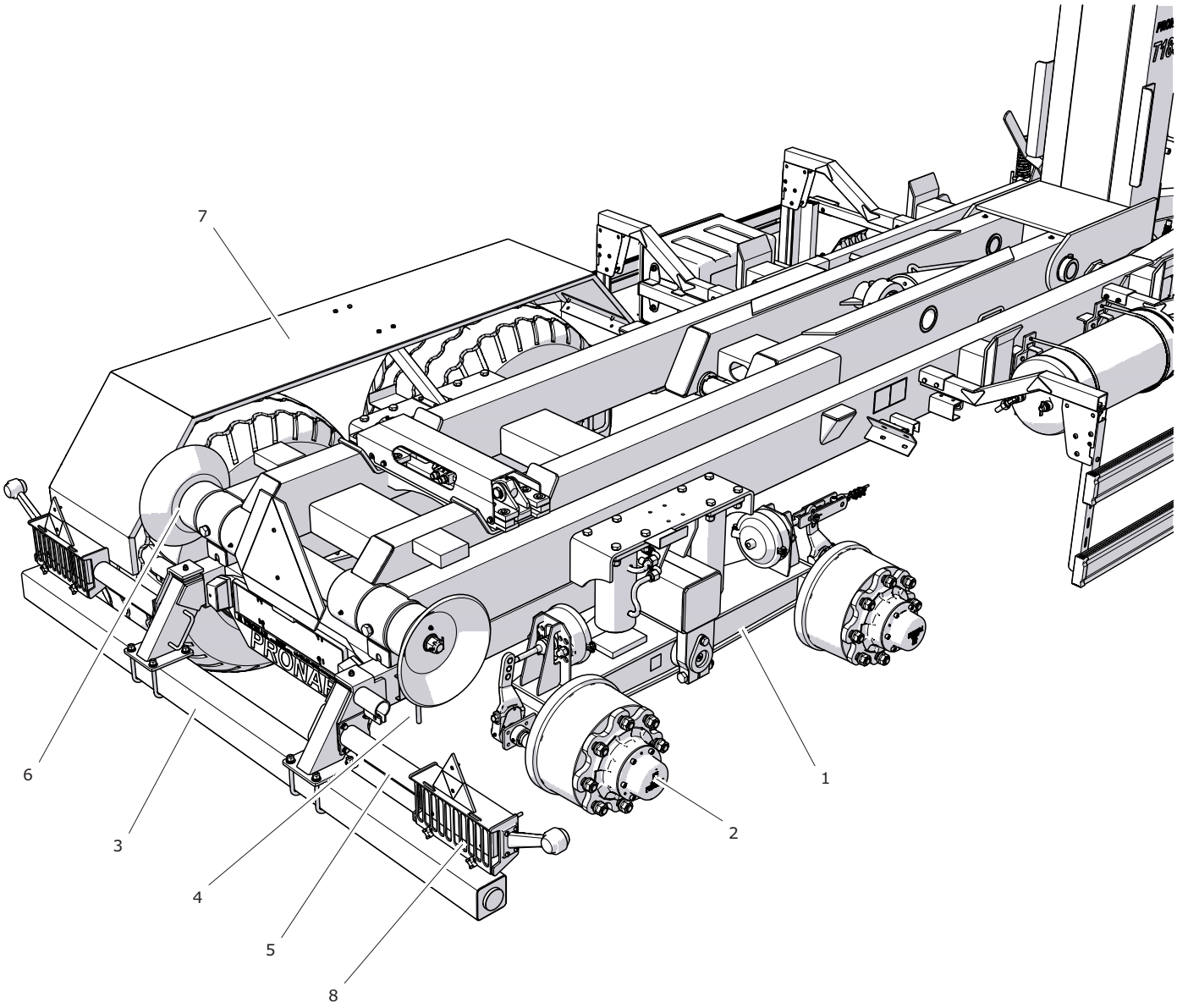


Figure 3.2 Trailer chassis – rear view

(1) rocker arm *(2) axle shaft* *(3) rear beam*

(4) beam pin *(5) rear lighting assembly* *(6) load box guide roller*

(7) mudguard *(8) rear light shield*

to a bracket (4). Rollers guiding the brake cable and the brake lever are mounted to the lower part of the frame.

At the rear of the frame, figure (3.2), there is a tandem wheel combination. The axle shafts (2) are welded to the rocker arms (1). The mudguards (7) are bolted to the frame brackets above the rocker arms.

Rear beam (3) is placed in the holes of the reinforcement of the lower frame longitudinal members and secured against falling out with the pins (5).

At the ends of longitudinal members, on the left and right side, elements of the rear lamp assembly (5) are bolted. The light assemblies are protected with shields (8). While driving on public roads these shields must be transferred to the brackets located in front of the frame, on the left longitudinal member.

3.2.2 TIPPING FRAME

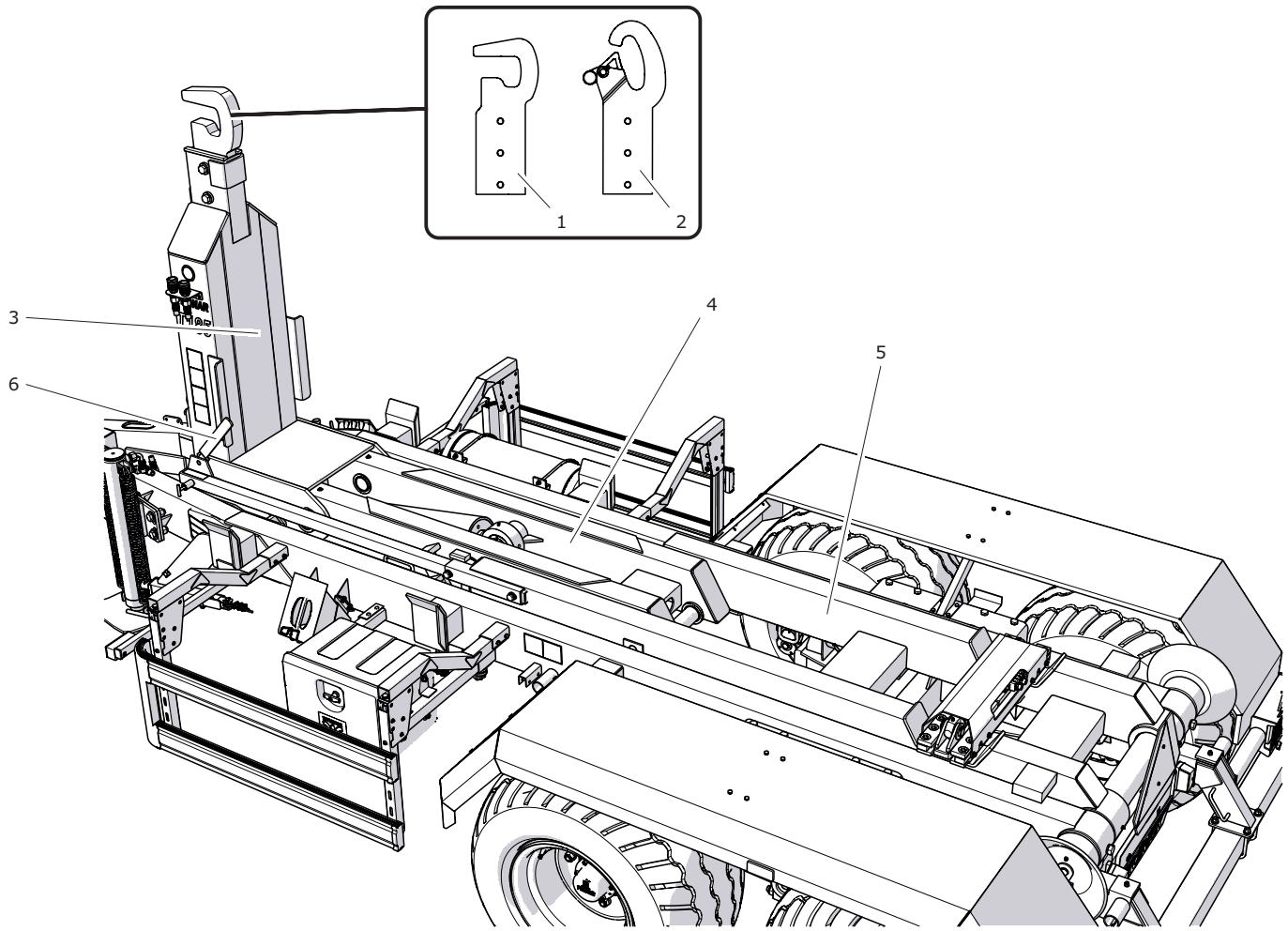


Figure 3.3 Tipping frame

(1) straight adjustable hook *(2) adjustable hook with a catch* *(3) hook frame*

(4) central frame *(5) rear frame* *(6) interlock lever*

The tipping frame is connected to the chassis by means of tipping axle and tipping cylinder. Tipping frame consists of rear frame (5), central frame (4) and hook frame (3) to which one of the two types of hooks available is bolted. Individual frames are connected with the aid of pins. Screwed to the left longitudinal member of the frame is the support, which is a support structure used to attach the interlocking system.

During tipping the load box to the rear, the blocking system immobilises the central frame together with the rear frame. During this process, the lever (1), figure (3.5A), is in position (I). The whole tipping frame is raised by the tipping cylinder. The lever (1) is secured with the aid of a block (4), which prevents accidental connection. When setting lever in position II, the central frame is released. The rear frame remains on the lower trailer frame, the central frame is raised by the tipping cylinder – figure (3.6). Tipping the central frame enables

connection or disconnection of load box. Control of the hook frame is independent from the lever setting (1).

ATTENTION

Connecting interlock lever (1) – figure (3.5) and (3.6), is allowed when, the tipping frame is in the rest position. During this time the rear frame and the central frame are set in such a position relative to each other in which the system can be easily locked or unlocked. An attempt to switch the lever in another setting may cause damage to the trailer and seriously jeopardise the safety of persons operating the trailer or bystanders. The decal placed on the lever bracket warns of this risk - Figure (3.4).

Figure 3.4 Information decal

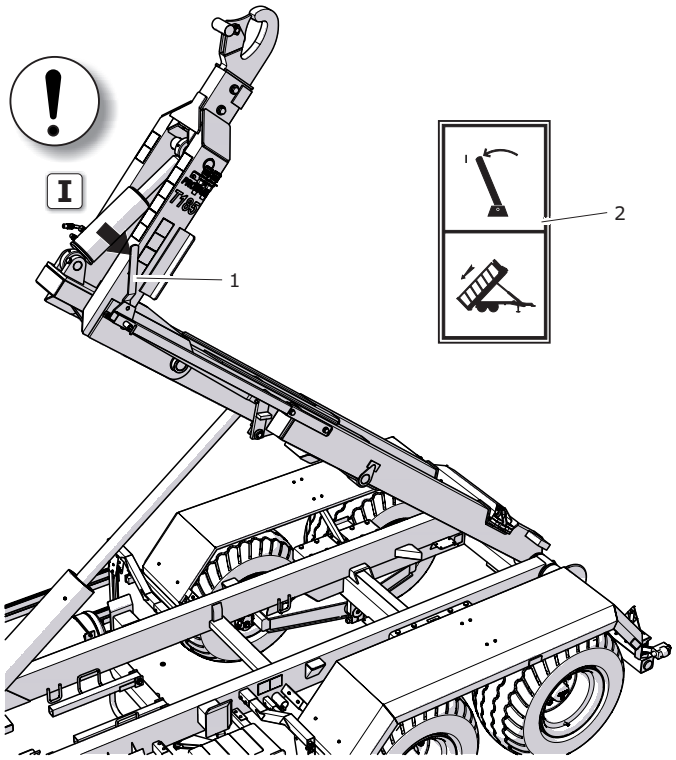


Figure 3.5 Raising the tipping frame

(1) interlock lever *(2) information decal*

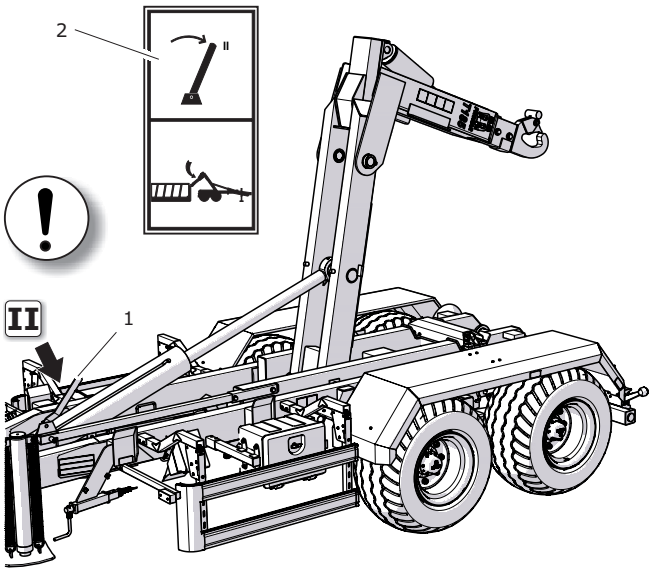


Figure 3.6 Raising the central frame

(1) interlock lever *(2) information decal*

3.3 MAIN BRAKE

The main brake is activated from the tractor driver's cab by depressing the brake pedal. The function of the control valve, applied in pneumatic systems is the operation of the hook trailer brakes simultaneously when tractor's brakes are applied Furthermore, in case of an inadvertent disconnection of the conduit between the trailer and the tractor, the control valve will automatically activate the trailer's brakes. Valve used in the system is equipped with a circuit causing the brakes to be applied when

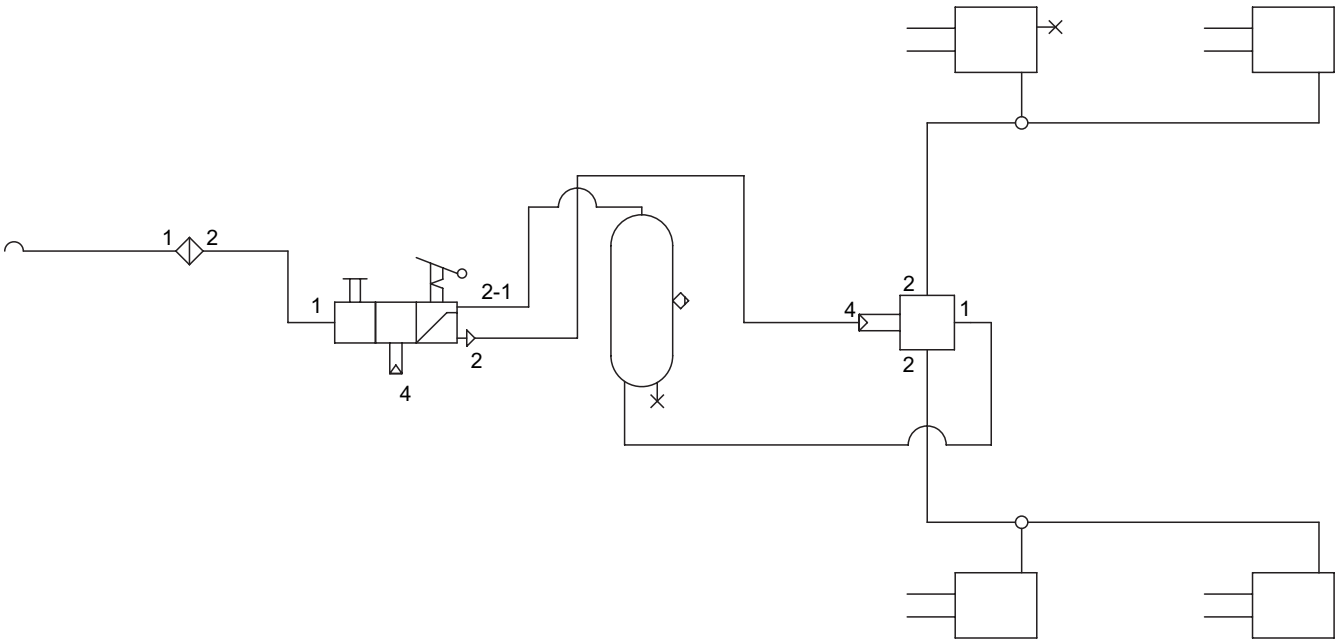


Figure 3.7 Diagram of single conduit pneumatic braking system

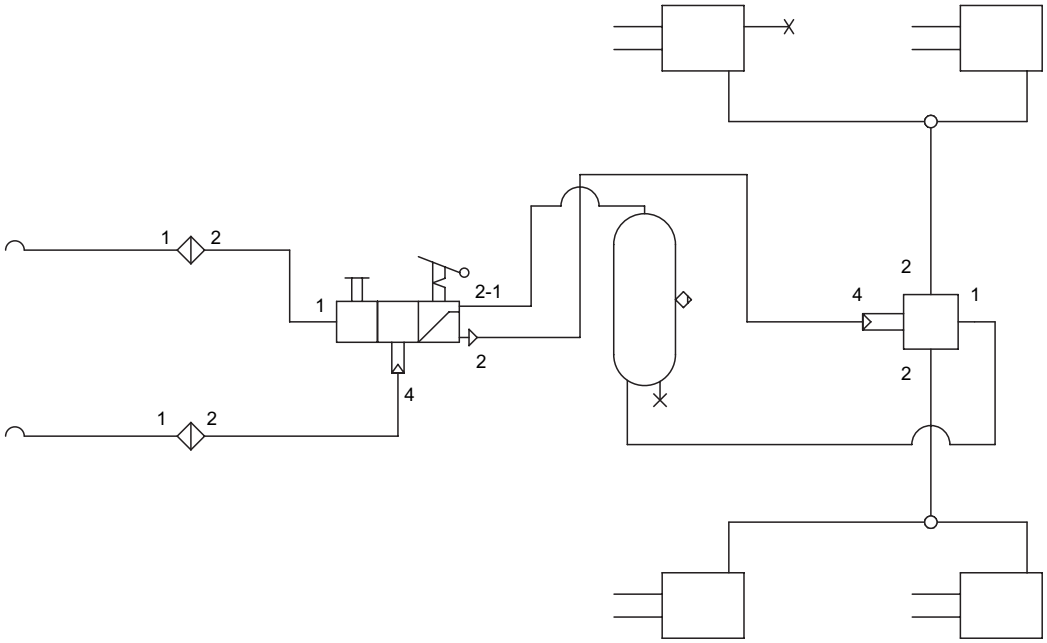


Figure 3.8 Diagram of double conduit pneumatic braking system

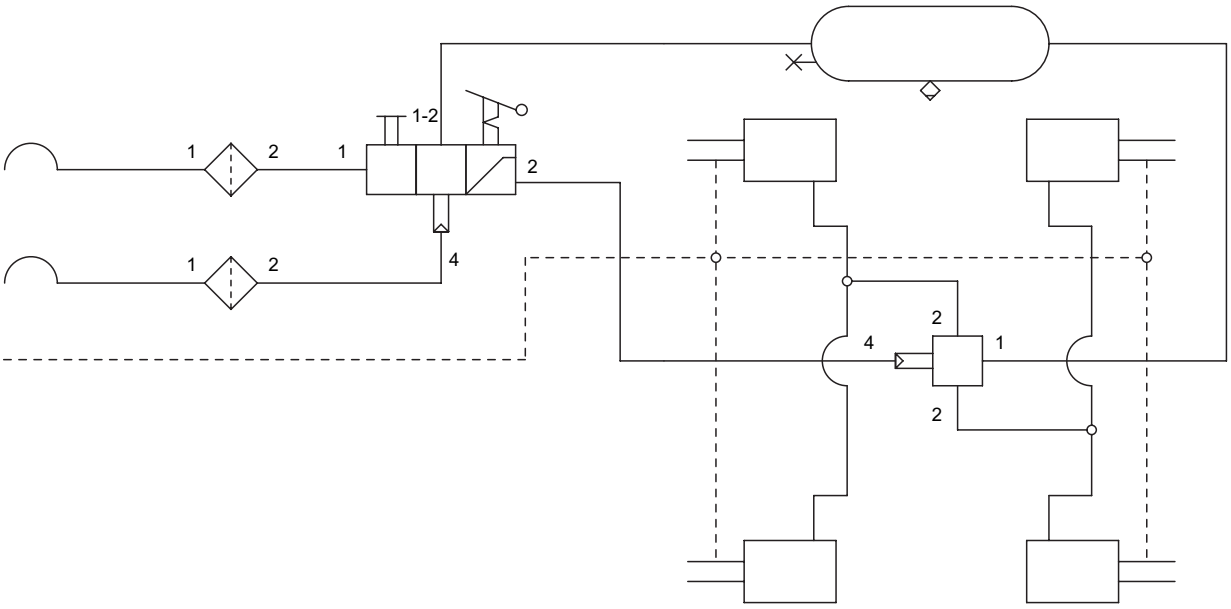


Figure 3.9 Diagram of pneumatic-hydraulic braking system

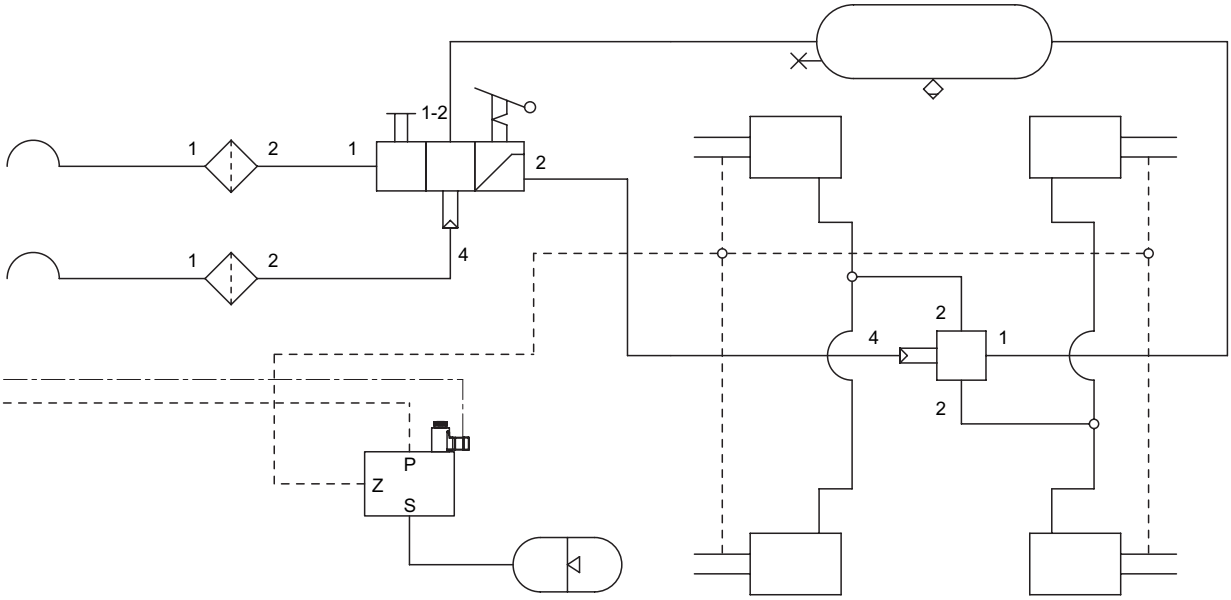


Figure 3.10 Diagram of pneumatic-hydraulic braking system with braking force regulator

trailer is disconnected from the tractor. When compressed air conduit is connected to the tractor, the device automatically applying the brakes changes its position to allow normal brake operation.

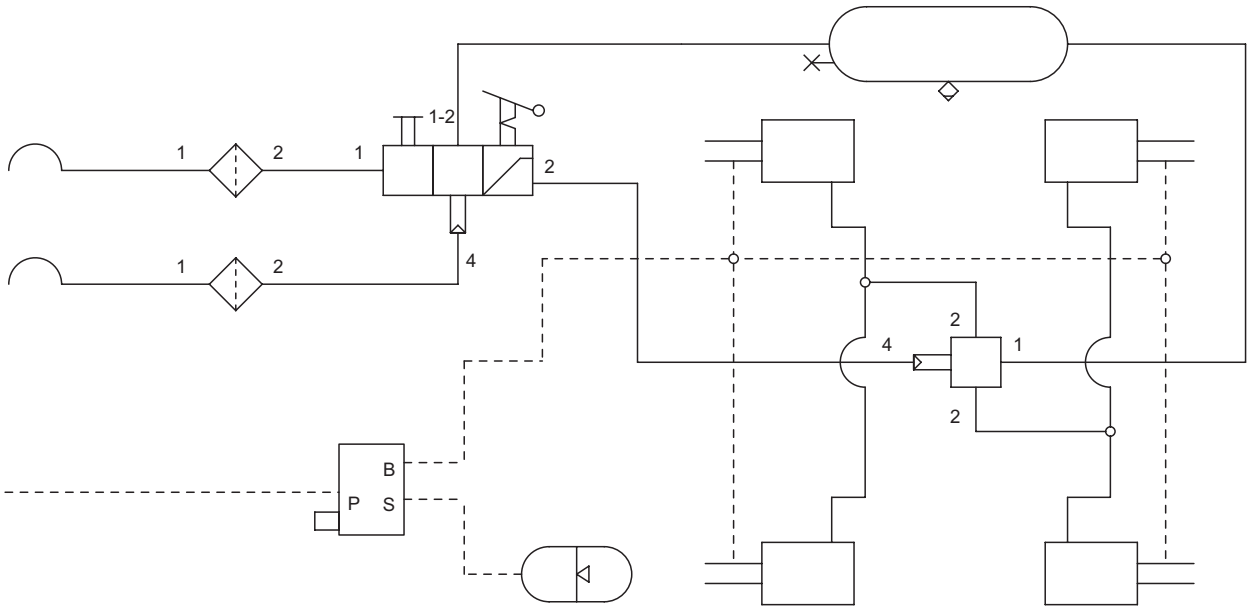


Figure 3.11 Diagram of pneumatic-hydraulic braking system with safety valve

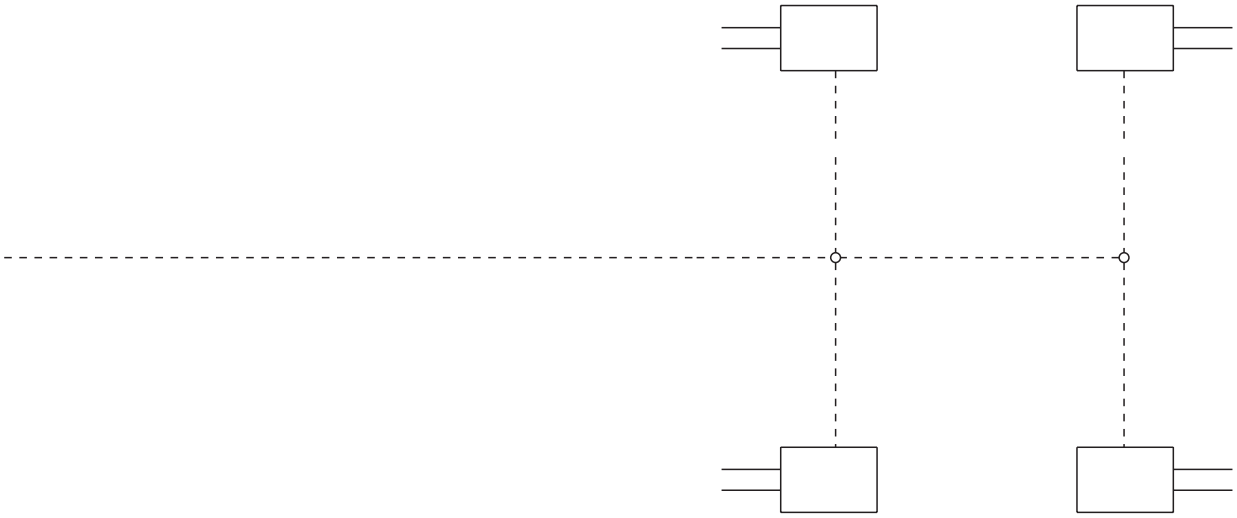


Figure 3.12 Diagram of hydraulic braking system

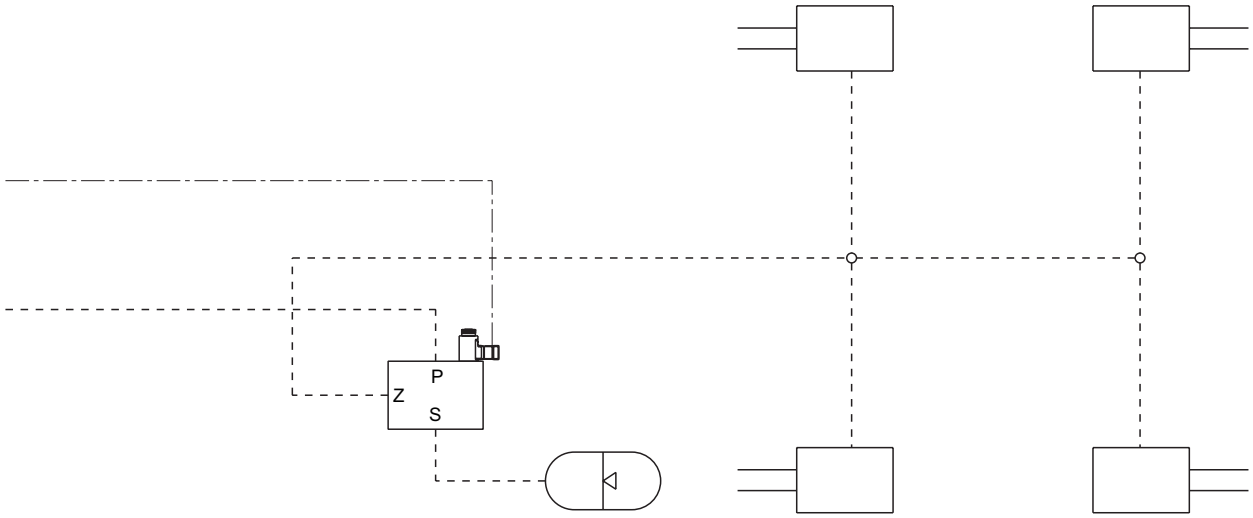


Figure 3.13 Diagram of hydraulic braking system with braking force regulator

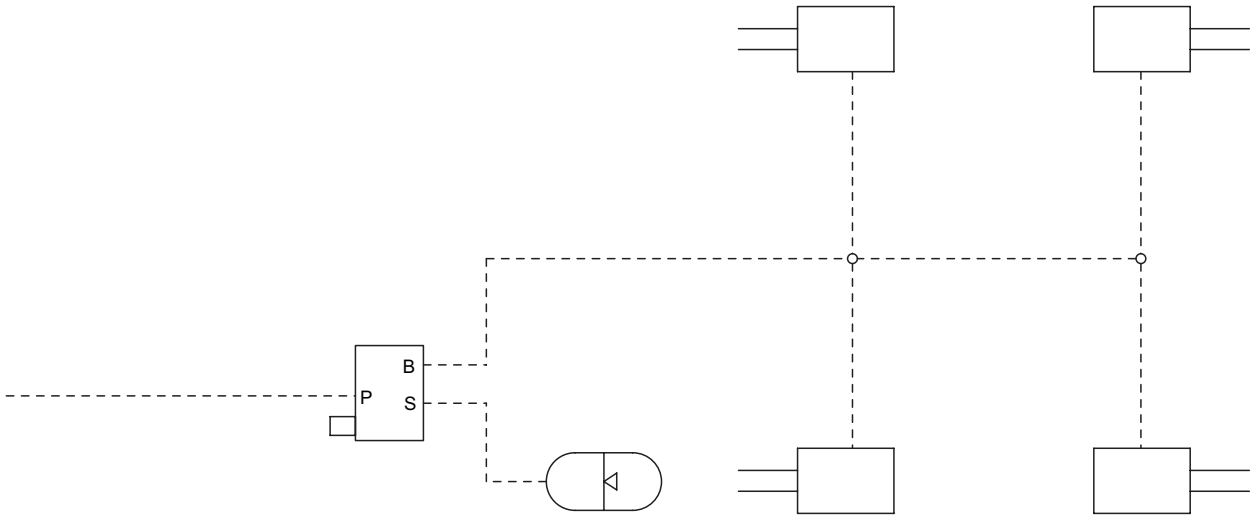


Figure 3.14 Diagram of hydraulic braking system with safety valve

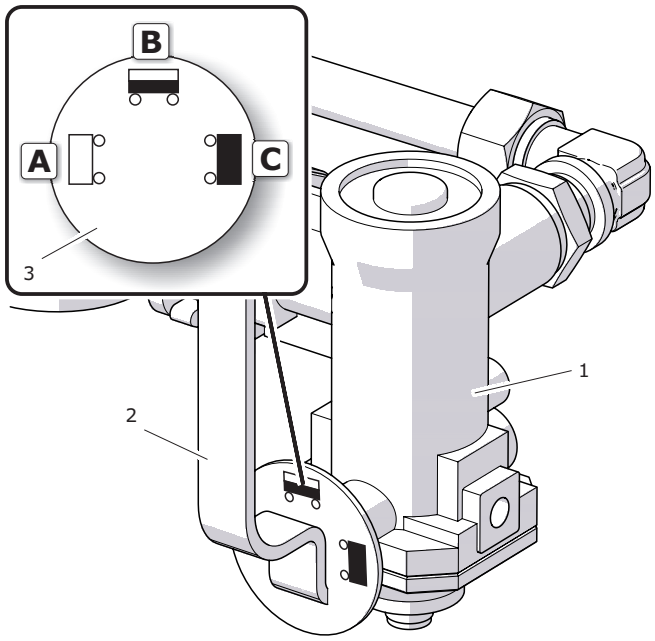


Figure 3.15 Three-step braking force regulator

(1) regulator *(2) setting lever*

(3) disc *(A) (B) (C) settings*

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

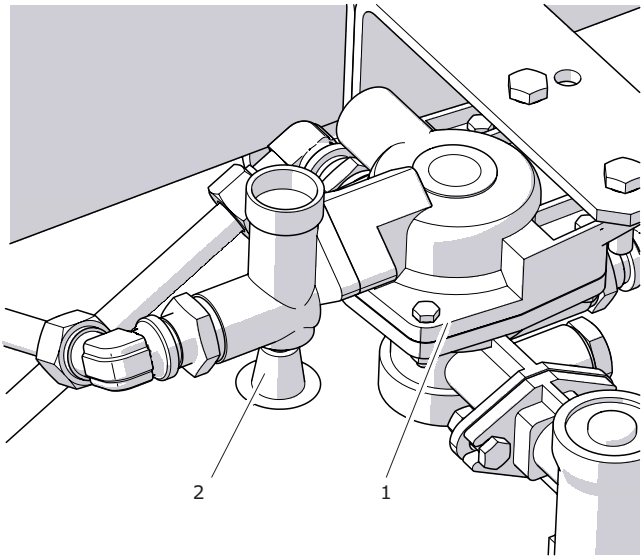
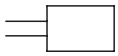
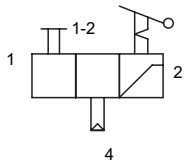
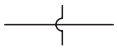


Figure 3.16 Control valve

(1) control valve *(2) brake release button*

In the braking systems equipped with a safety valve (1) - figure (3.17), one end of the safety cable is connected through a clip hook (3) to the tractor and the other end of the cable is connected to the safety valve. In the event of uncontrolled disconnection of the trailer from the tractor, the safety cable is tensioned and the pin with the cotter pin (2) rotates to open the valve and brake the trailer.

Table 3.2. Symbols used in the braking system diagrams

	Cylinder
	Air filter
	Control valve
	Air tank
	Control connector
	Electro-hydraulic brake valve
	Hydraulic brake valve
	Relay valve
	Pneumatic connection
	Hydraulic accumulator
	Conduit connection
	Drain valve
	Conduit crossing
	Pneumatic conduits
	Hydraulic conduits
	Electrical leads

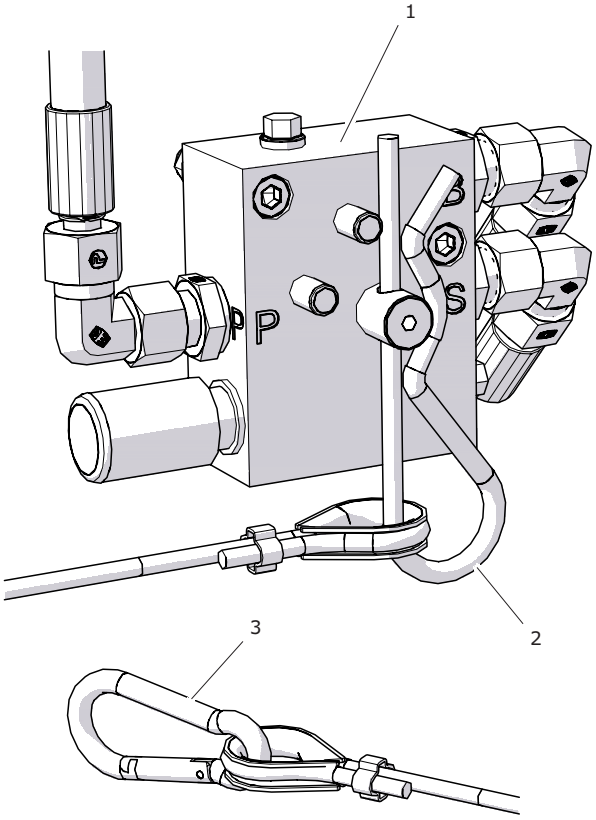


Figure 3.17 Safety valve

(1) safety valve *(2) cotter pin*

(3) clip hook

3.4 PARKING BRAKE

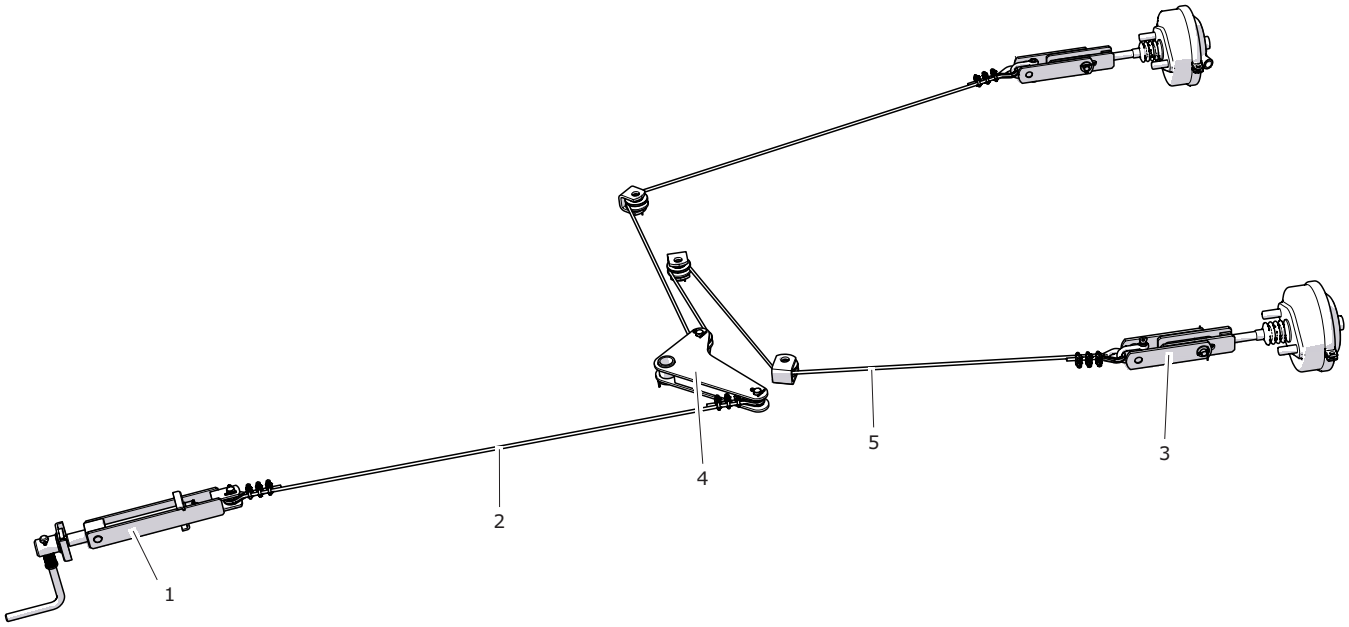


Figure 3.18 Safety valve

(1) crank mechanism *(2) steel cable* *(3) release*

(4) lever *(5) steel cable*

The parking brake is used for immobilising the trailer while parking. The body of the brake crank mechanism (1) is welded to the bracket placed on the left longitudinal member of the lower frame. Steel cable (5) is connected to the wheel axle expander levers through the handbrake release mechanisms (3) with a lever (4). When the cable is tightened, the expander levers tilt and rotate to part the brake shoes immobilising the trailer.

3.5 HYDRAULIC SYSTEM

The standard version of the trailer is equipped with the hydraulic system that consists of the hydraulic tipping system - figure (3.20) and the rocker arm interlock system - figure (3.19). Optionally, the load box interlock system can be connected to the tipping system circuit. The supply and return conduits of the above-mentioned hydraulic circuits must be connected to the connections of the

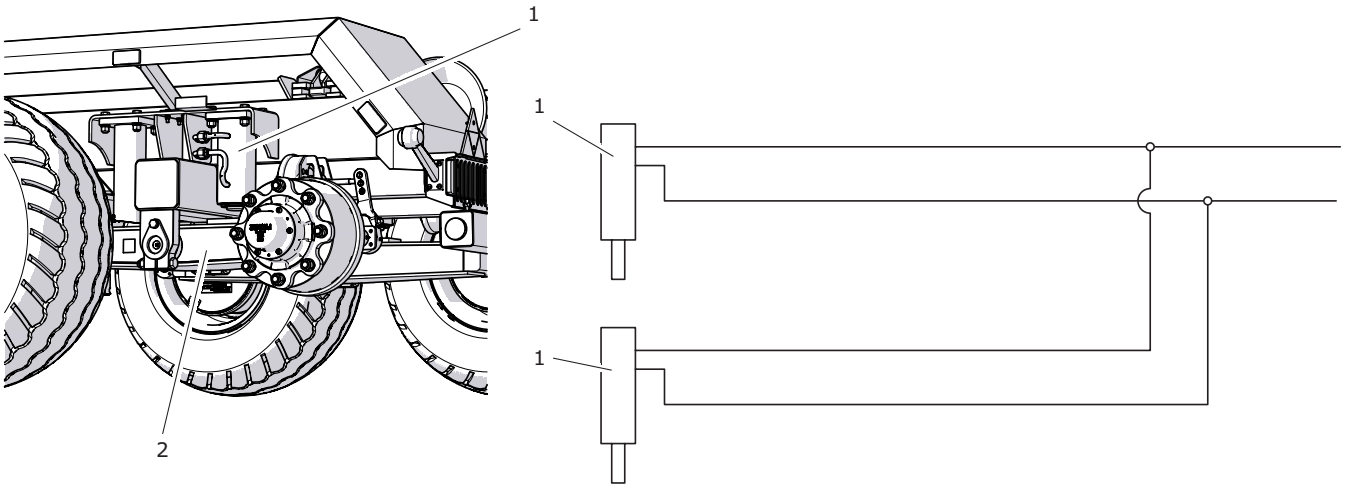


Figure 3.19 Rocker arm interlock system diagram

(1) rocker arm interlock cylinder (2) rocker arm

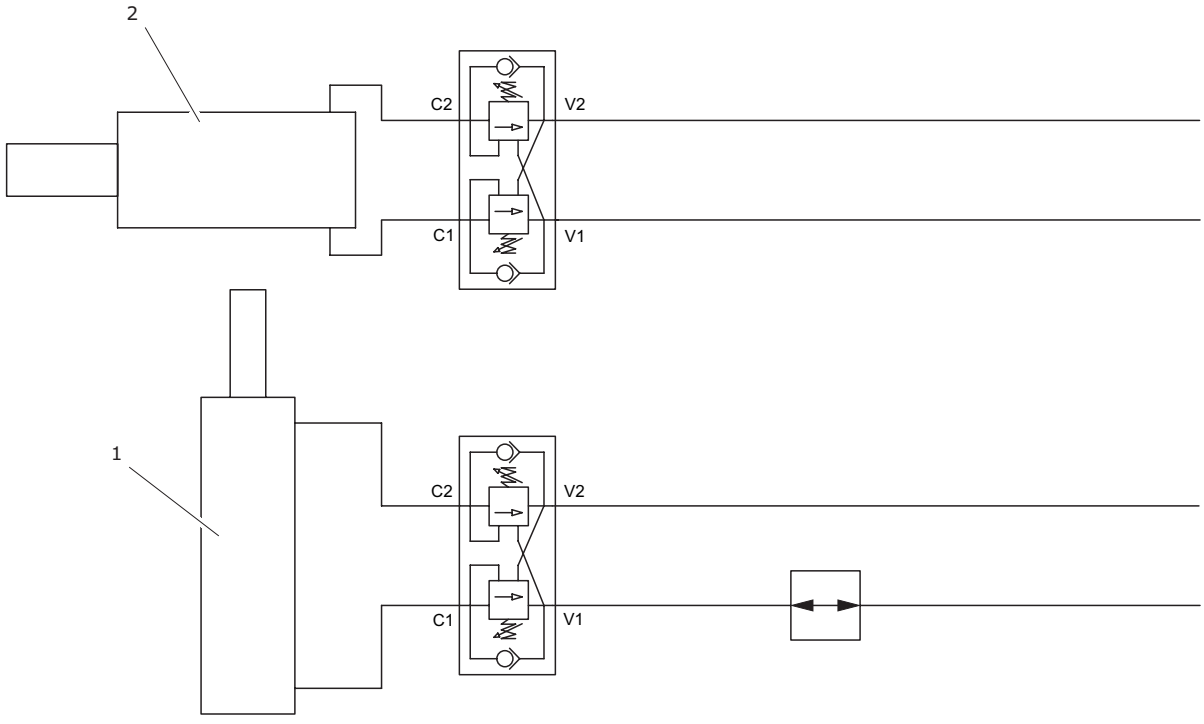


Figure 3.20 Diagram of standard tipping system

(1) hook frame cylinder (2) tipping cylinder

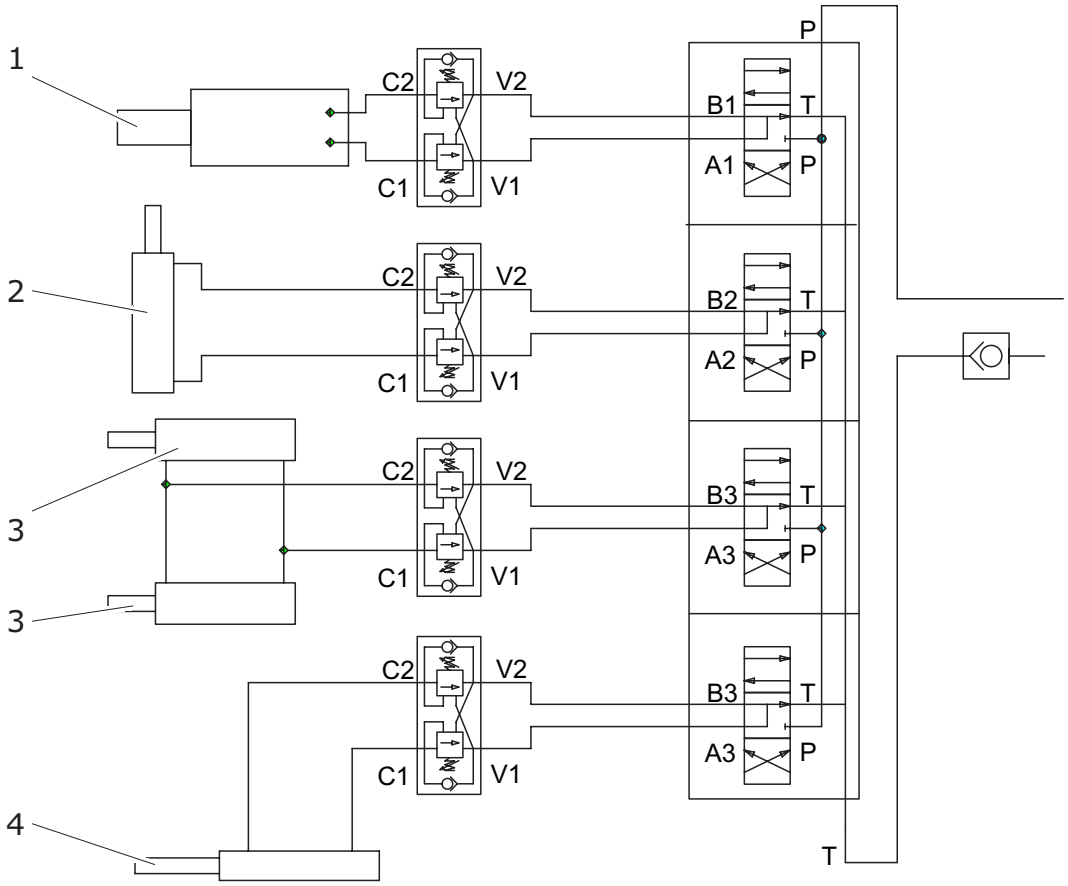


Figure 3.21 Diagram of the hydraulic system with a 4-section manifold

(1) tipping cylinder *(2) hook frame cylinder* *(3) rocker arm interlock cylinders*

(4) load box interlock cylinder

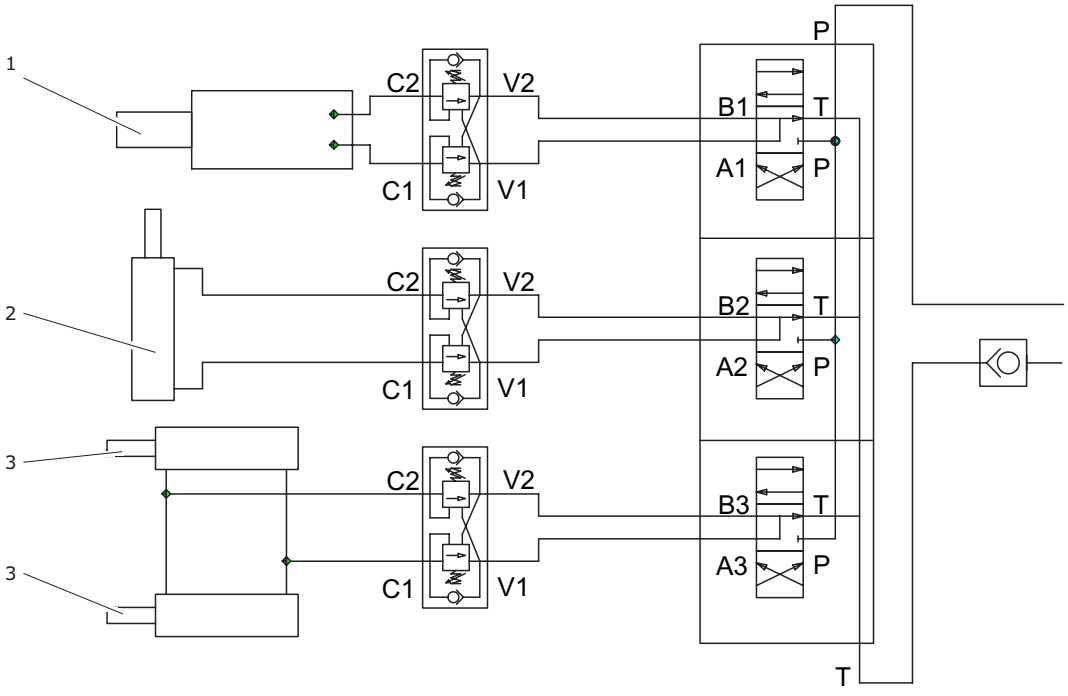


Figure 3.22 Diagram of the hydraulic system with a 3-section manifold

(1) tipping cylinder *(2) hook frame cylinder* *(3) rocker arm interlock cylinders*

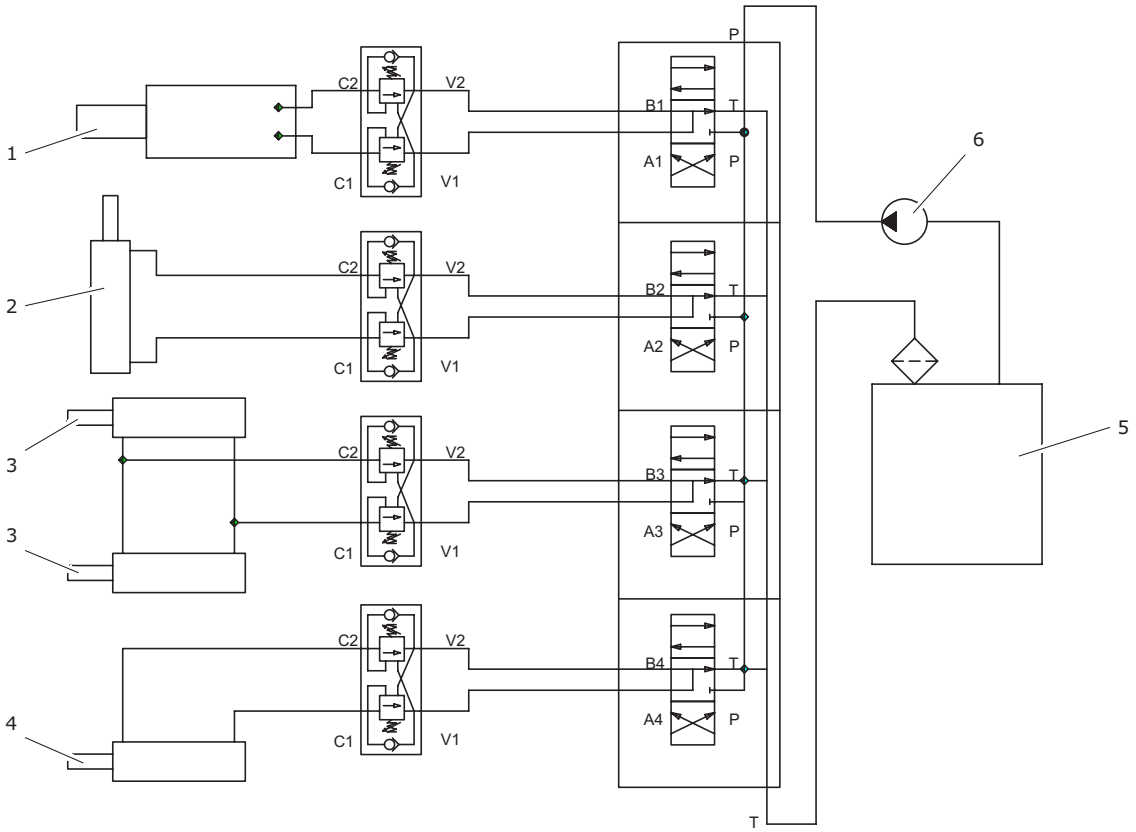


Figure 3.23 Diagram of the hydraulic system with PTO drive with its own oil tank

(1) tipping cylinder *(2) hook frame cylinder* *(3) rocker arm interlock cylinders*

(4) load box interlock cylinder *(5) oil tank* *(6) pump*

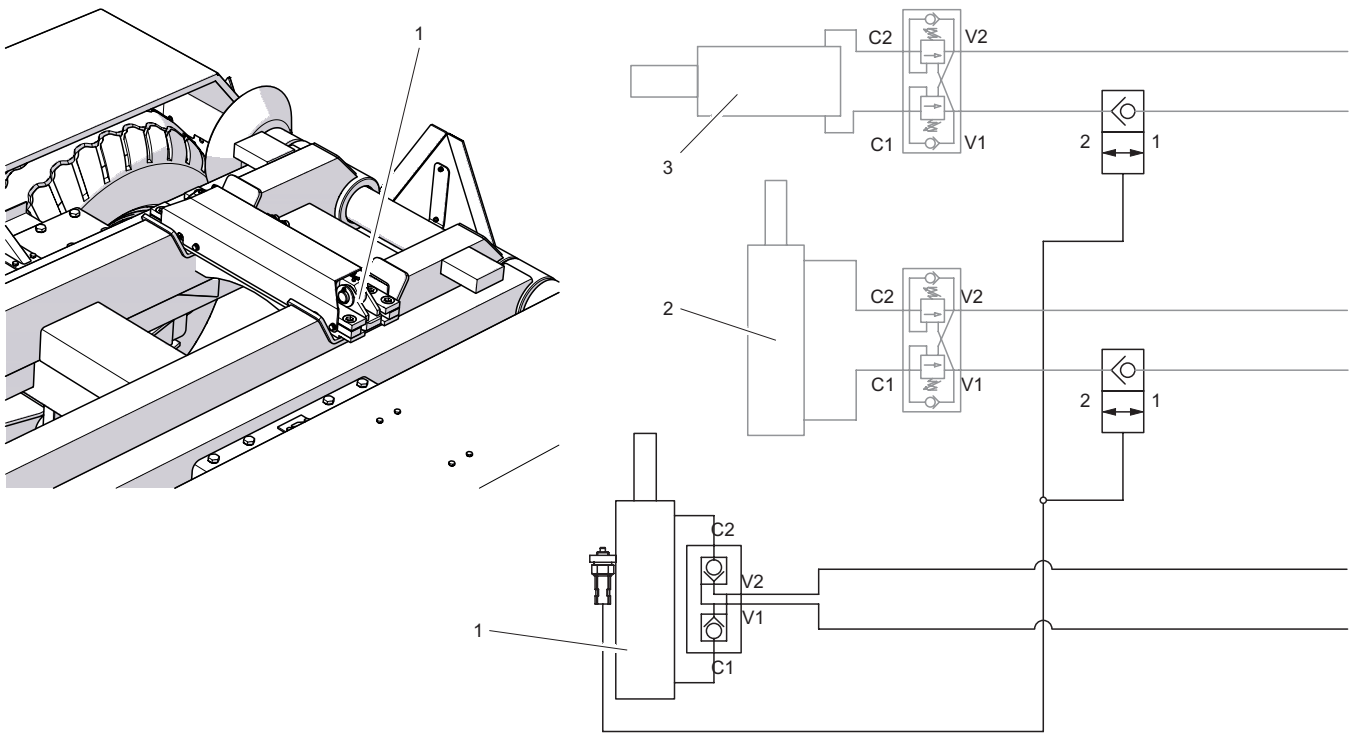


Figure 3.24 Diagram of the hydraulic system of the load box interlock

(1) load box interlock cylinder *(2) hook frame cylinder* *(3) tipping cylinder*

tractor's external hydraulic system. In the systems equipped with a manifold (3 or 4-section manifold), only 2 conduits (supply and return) are connected. The system is controlled using a wired control or manifold levers - see section *4.3 Hydraulic system operation.* The last version of the system is the hydraulic system equipped with its own oil tank and a shaft-driven pump unit. This system is controlled in the same manner as the system with a 4-section manifold.

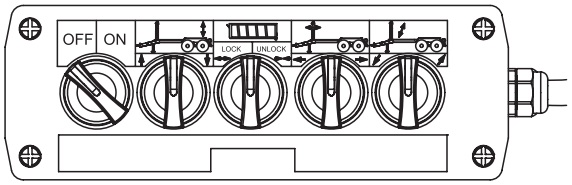


Figure 3.25 Wired control

3.6 ELECTRICAL LIGHTING SYSTEM

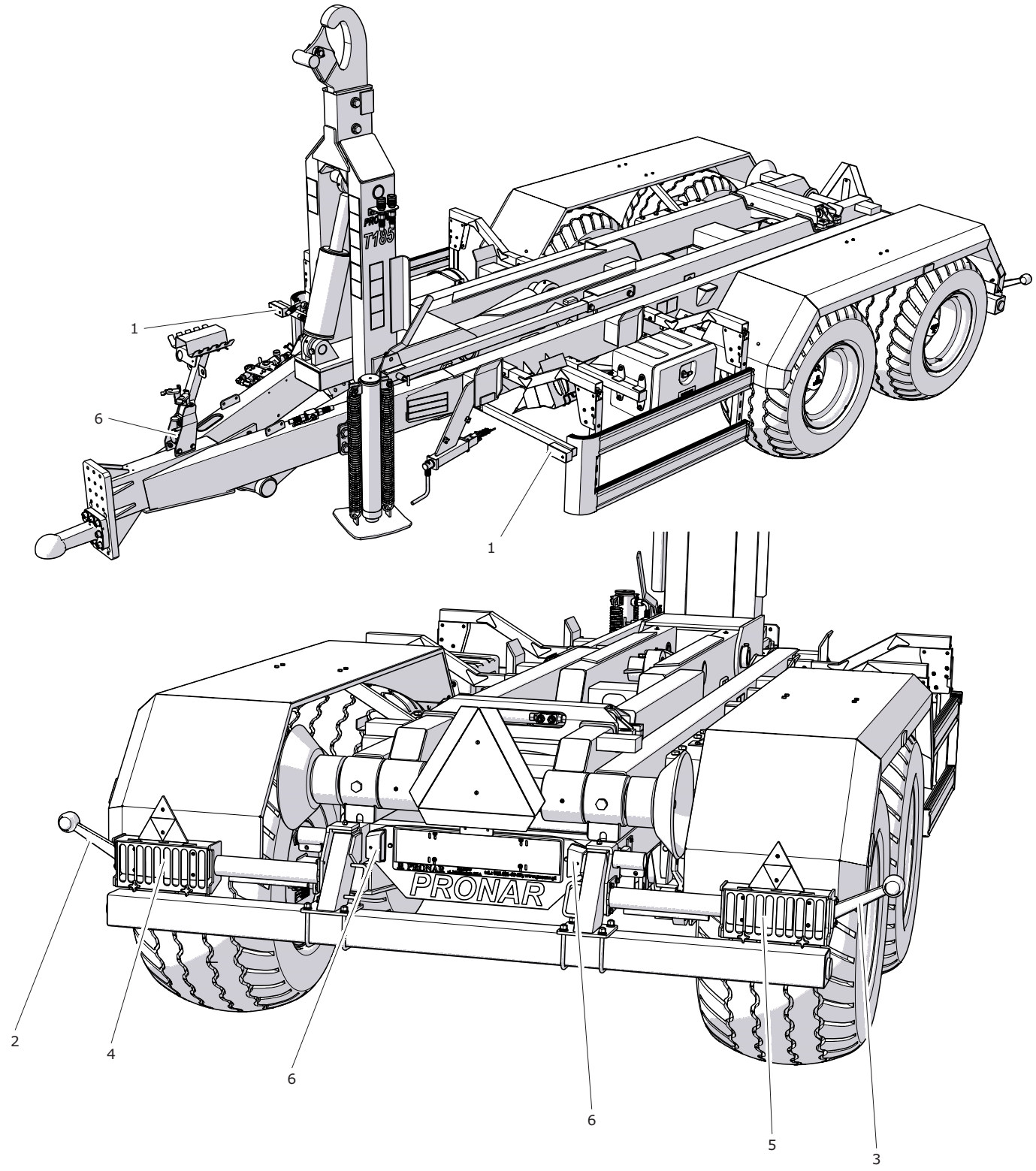


Figure 3.26 Arrangement of lighting system components

(1) front lamp assembly *(2) left clearance lamp* *(3) right clearance lamp*

(4) left rear lamp assembly *(5) right rear lamp assembly* *(6) licence plate light*

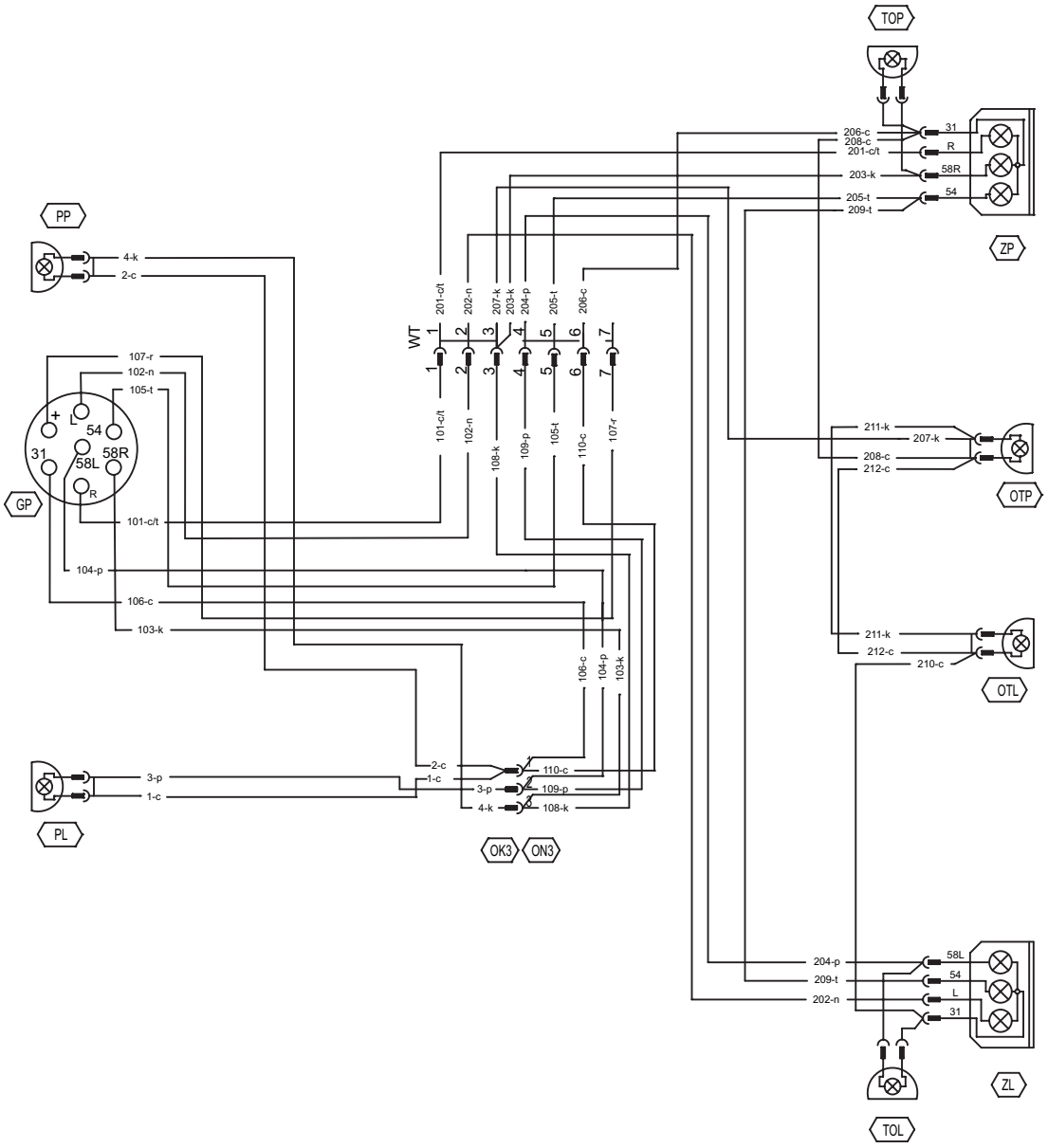


Figure 3.27 Electrical system diagram

The trailer's electrical system is designed for supply from direct current source of 12 V. Connection of the hook trailer's electrical system with the tractor should be made using the connection lead delivered with the machine. Arrangement of electrical components of the standard lighting system is shown in figure (3.27).

CORRECT USE

SECTION 4

4.1 OPERATION OF EQUIPMENT/SUBASSEMBLIES

4.1.1 REAR BEAM

- Turn the pin from position (A) to (B).
- Pull the pin out of the frame - position (C).
- Take the pin out from the other side of the trailer.
- While holding the handle (4), move the beam to the desired position.
- Insert the pin into the seat at an angle - position (C).
- Slide the pin until the peg is between the frame profile and the seat metal plate (3).
- Turn the pin to position (A), the pin handle must point vertically downwards.
- Install and secure the pin on the other side of the trailer.

ATTENTION

Before each use, check if the pins are properly secured.

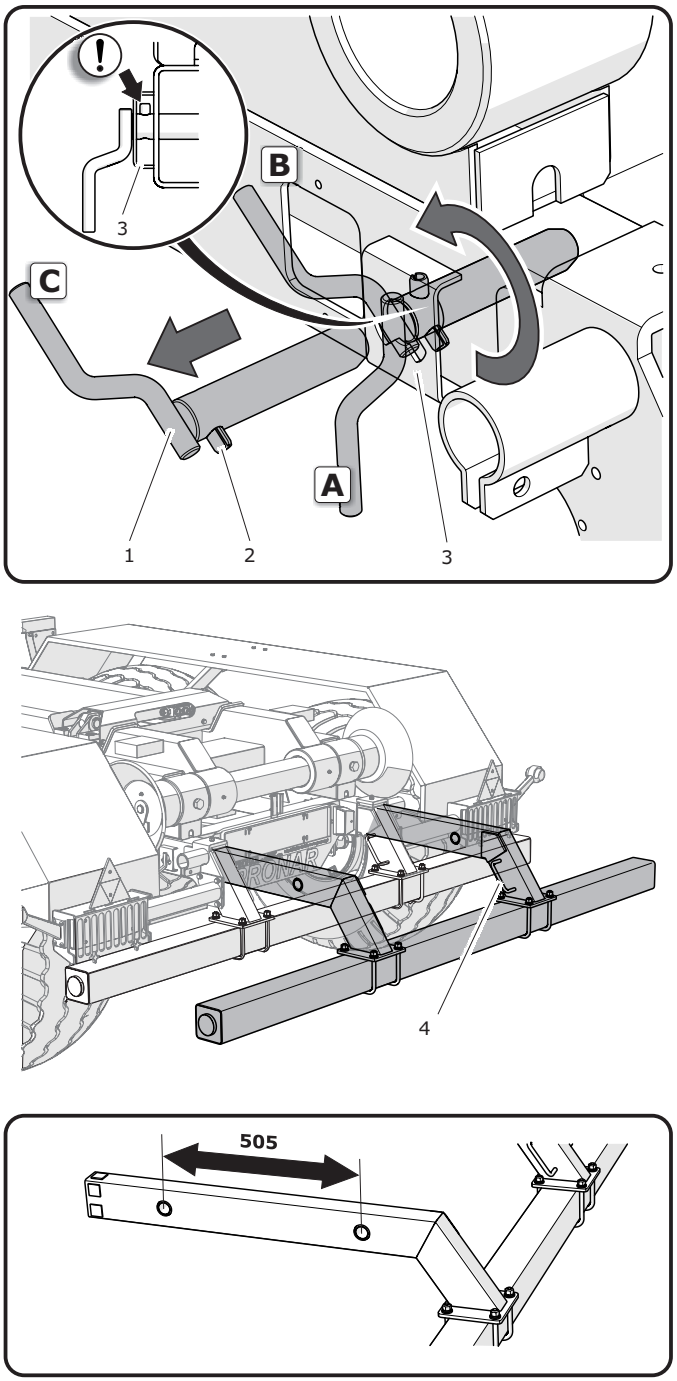


Figure 4.1 Rear protective beam

(1) pin holder *(2) peg*

(3) socket metal plate *(4) beam holder*

4.1.2 OPERATION OF MECHANICAL SUPPORT

DANGER

Be careful because there is a risk of crushing feet.

ATTENTION

Remember that the high gear of the crank gear, position (B) of the crank, may be used only for operating the support if the support foot is not loaded. Use this gear only when the foot is not resting on the ground.

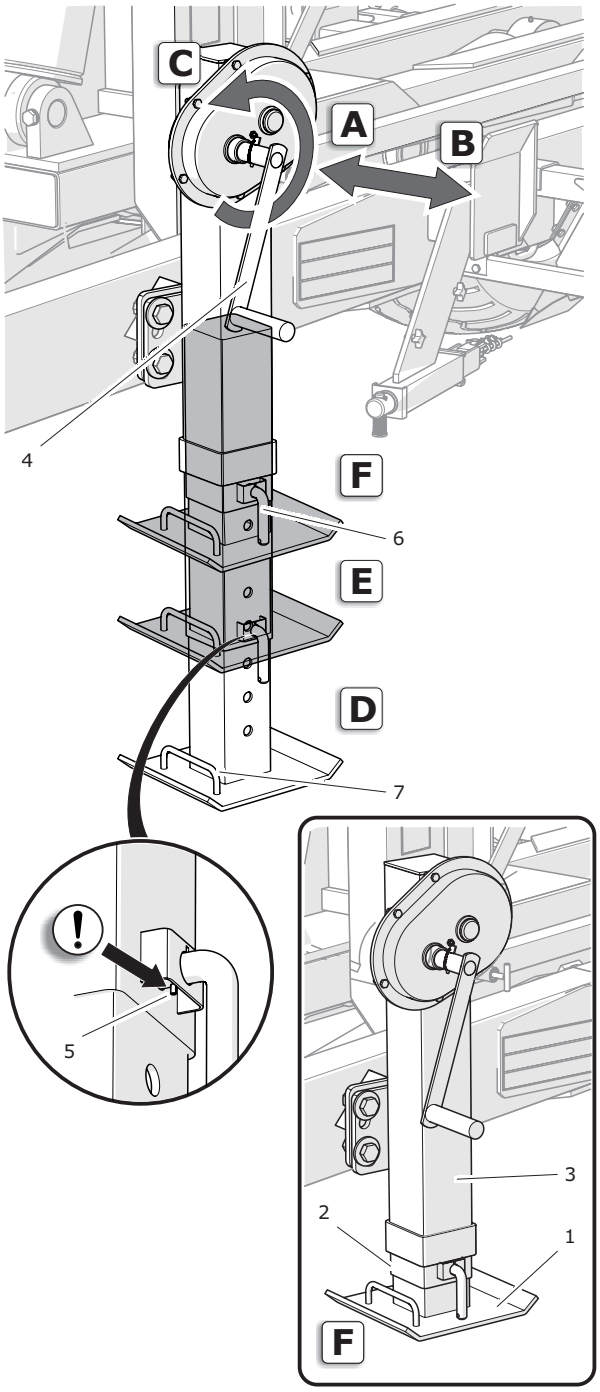


Figure 4.2 Mechanical support

(1) support foot *(2) telescopic element*

(3) body *(4) crank*

(5) spring peg *(6) pin*

(7) holder

LIFTING

- Press crank (4) in direction (A) - low gear.
- Turn the crank in direction (C) (anticlockwise) to raise the support foot from position (D) to position (E).
- If the support foot loses contact with the ground, the support gear can be set to a higher gear. To do this, pull the crank in direction (B).
- Turn pin (6) in such a manner that its handle is directed upwards and slide the pin out of the telescopic element (2).
- Holding the handle (7), raise the support foot to the uppermost position (F).
- Insert the pin and secure it. Remember! The spring peg of the pin must be located between the metal plate and telescopic element.

LOWERING

- Hold the handle (7) of the support foot and

remove the pin (2).

- Set the support foot at a selected position.
- Secure the support foot with the pin. Remember! The spring peg of the pin must be located between the metal plate and telescopic element.
- Set the support gear to a higher gear. To do this, pull the crank in direction (B).
- Turn the crank clockwise to lower the support foot until it touches the ground.
- Set the support gear to a lower gear. To do this, move the crank in direction (A).
- Set the support at a selected height.

4.1.3 HYDRAULIC SUPPORT OPERATION

DANGER

Be careful because there is a risk of crushing feet.

- Set the cut-off valve in position O - open.
- Use the lever of the tractor's external hydraulic system to set the support at the correct height.
- Set the cut-off valve in position Z - closed.

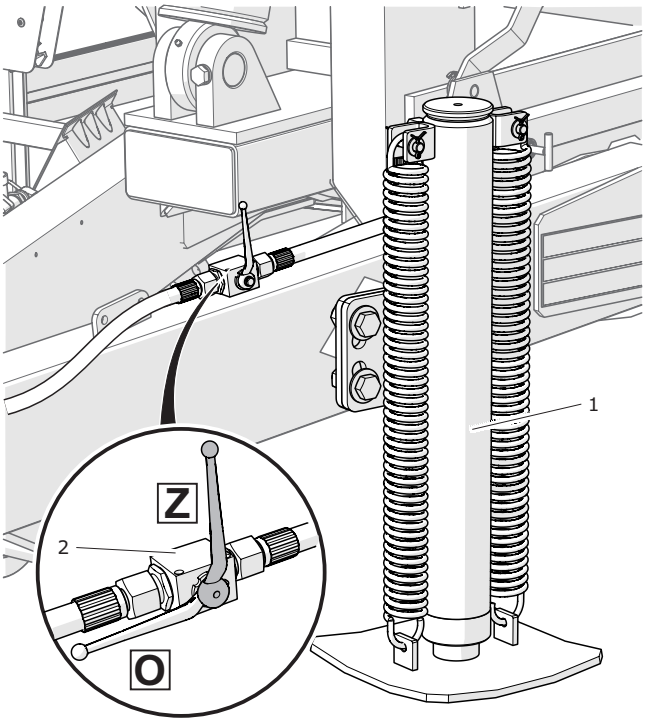


Figure 4.3 Hydraulic support

(1) support *(2) cut-off valve*

4.1.4 TELESCOPIC SUPPORT OPERATION

DANGER

Be careful because there is a risk of crushing feet.

LIFTING

- After hitching the trailer to tractor, raise the drawbar slightly using the hydraulic system of the agricultural hitch.
- Turn pin (2) in such a manner that its handle is directed upwards and slide the pin out of the body.
- Holding the support foot (1) by the handle (3), raise the foot to the uppermost position.
- Secure the support foot with the pin. Remember! The spring peg of the pin must be located between the metal plate and body.

LOWERING

When lowering the support, perform the above activities in reverse order.

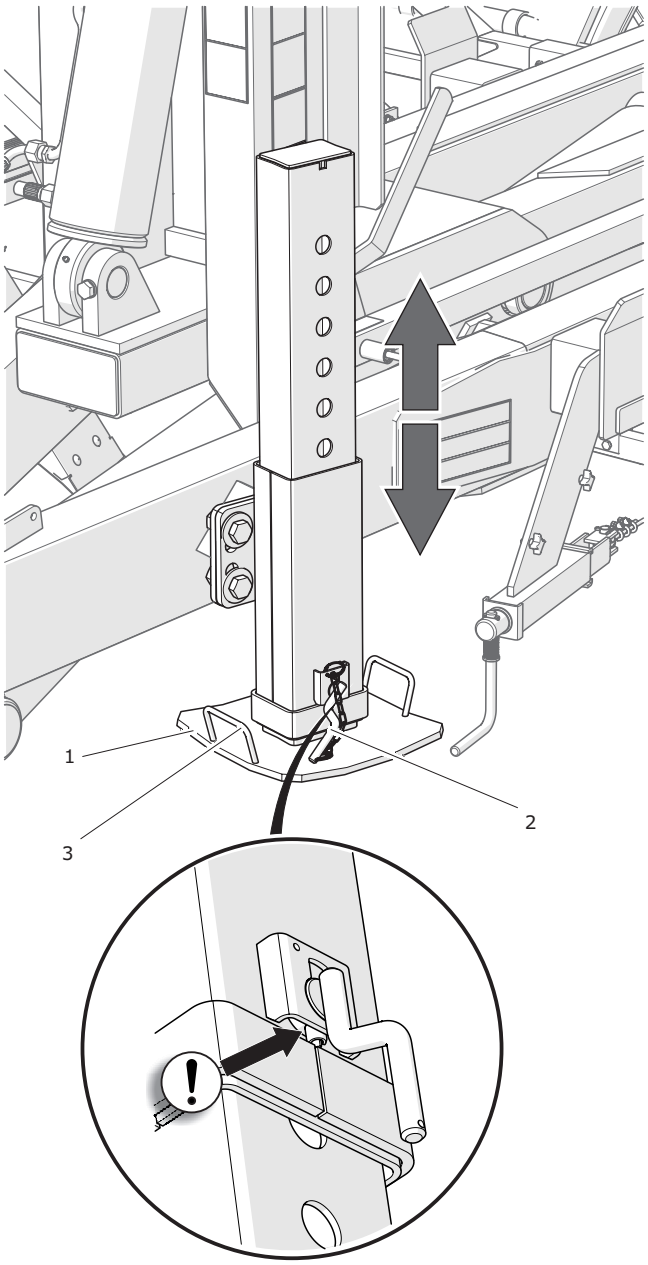


Figure 4.4 Telescopic support

(1) support foot *(2) pin*

(3) holder

4.1.5 OPERATION OF THE SIDE UNDER-RUN PROTECTION DEVICES

LIFTING

- Grasp the lower strip of the shield.
- Pull the barrier towards you and lift it to such a height that the barrier can be locked - position (B).
- Move the barrier along the elongated hole marked with a black arrow in the figure - position (C).

LOWERING

- Pull the barrier towards you.
- Lower the barrier to the vertical position and press until it is snapped in the holder.

ATTENTION

Do NOT drive with the underrun protection device raised.

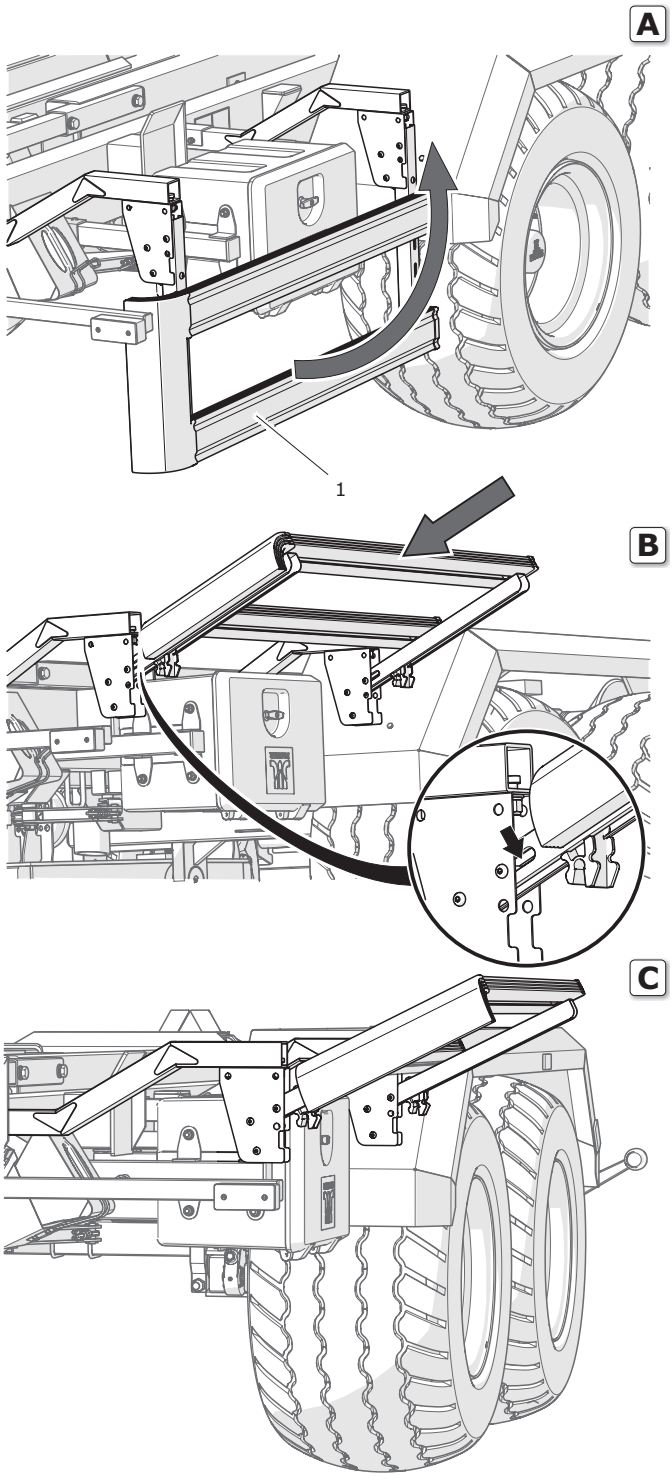


Figure 4.5 Right under-run protection device

(1) under-run protection device barrier

4.2 HITCHING AND DISCONNECTING THE TRAILER

4.2.1 HITCHING TO TRACTOR

ATTENTION

Perform daily inspection of the trailer after hitching it to the tractor but prior to moving off.

Technical condition of the trailer can not be verified by visual inspection if the trailer is not hitched to the tractor.

Detailed information on the inspections is given in section 5.

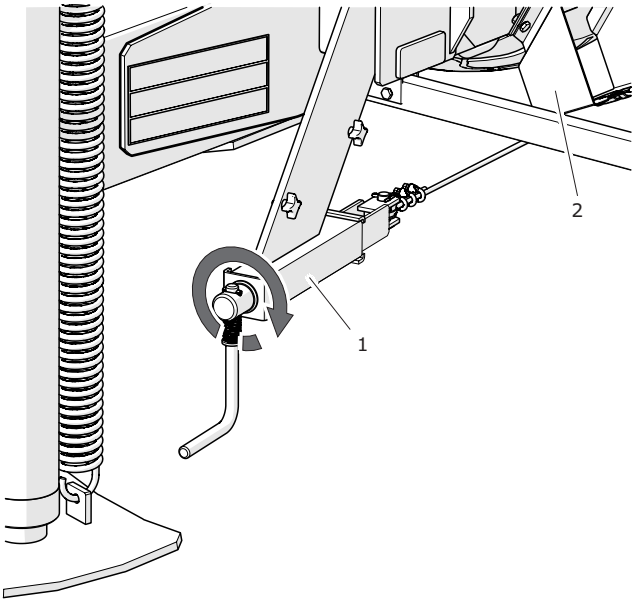


Figure 4.6 Parking brake

(1) brake mechanism, (2) chock bracket

PREPARATION

- Make sure that the trailer is immobilised with parking brake.

  Pull brake mechanism clockwise until resistance is felt - figure (4.6).

- Make certain that chocks are placed under one trailer wheel - figure (4.7).
- Position agricultural tractor directly in front of drawbar eye.

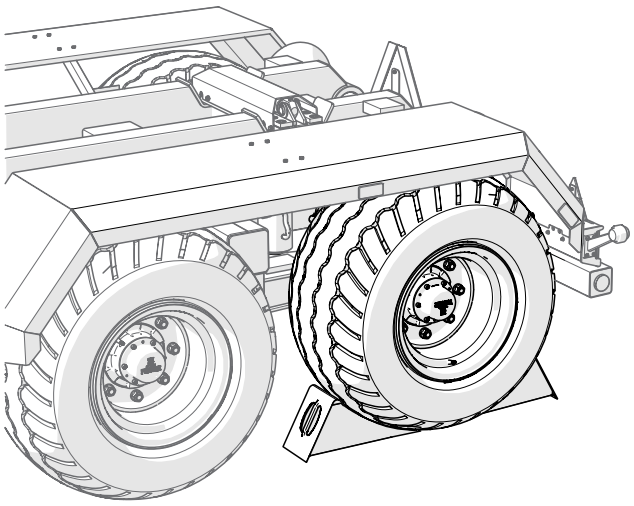


Figure 4.7 Chocks

DANGER

Be especially careful when hitching the trailer to tractor.

Ensure sufficient visibility during hitching.

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

ADJUSTMENT OF TRAILER'S DRAWBAR HEIGHT

- If the trailer is equipped with a hydraulic support, first connect the hydraulic system conduit marked with decal (1) - figure (4.8). Next, follow the instructions given in section 4.1.3.
- If the trailer is equipped with the parking stand with mechanical gear, the adjustment is carried out using the parking stand gear A detailed information can be found in section 4.1.2.
- If the trailer is equipped with the telescopic support, the drawbar eye height adjustment is not required.

HITCHING THE TRAILER TO THE TRACTOR HITCH

- Reverse the tractor, hitch the trailer to the appropriate hitch.
- If the trailer is equipped with a telescopic support, it can be connected only to the tractor equipped with a HITCH-type hitch. Raise the hitch.
- Check the hitch lock protecting the trailer against accidental unhitching.
- If the tractor is equipped with an automatic coupler, ensure that the hitching operation is completed and that drawbar eye is secured.

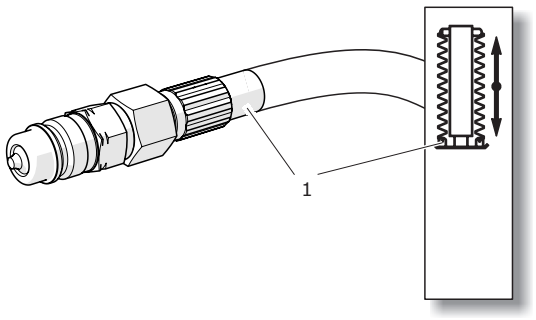


Figure 4.8 Hydraulic connection of the support

(1) information decal

- Set the parking stand in transport position.

CONNECTING BRAKE SYSTEM

- Turn off the engine and remove key from ignition. Immobilise tractor with parking brake.
- Depending on the trailer version, connect hydraulic system connections to appropriate tractor sockets. The combination of connections required for proper connection of the system is shown in table (4.1) and figure (4.9)

For example, in order to connect the combined braking system with electrical protection, you have to connect the pneumatic conduit with a red plug (1), the pneumatic conduit with a yellow plug (1), the hydraulic conduit (3) marked with a decal (6) and the electrical lead with a plug (5) to the 3-pin 12V socket on the tractor.

Table 4.1. Combinations of brake system connections

Single conduit pneumatic system	Double conduit pneumatic system	Hydraulic system	Hydraulic system with electrical protection	Hydraulic system with mechanical protection	Combined system	Combined system with electrical protection	Combined system with mechanical protection
2	1	3	3	3	1	1	1
	1		4	5	1	1	1
					3	3	3
						4	5

The numbers in the table correspond to the markings in figure (4.9)

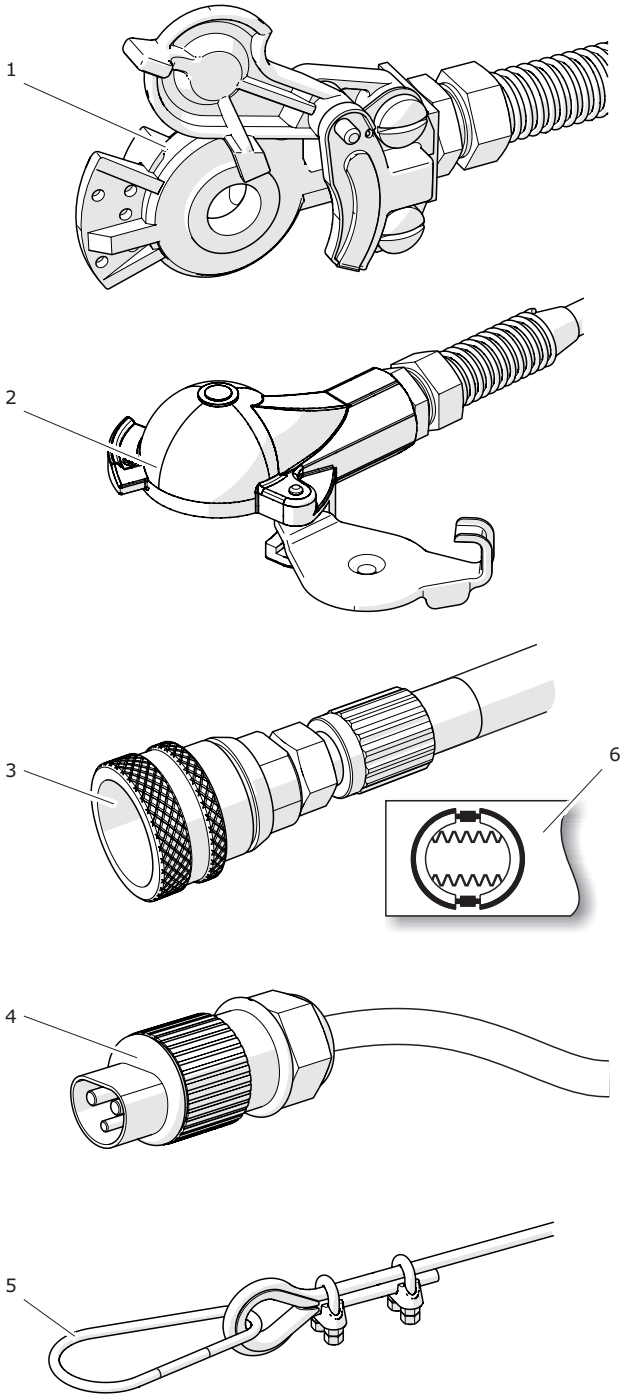


Figure 4.9 System connections

(1) pneumatic plug in double conduit systems (red, yellow)

(2) pneumatic plug in single conduit systems

(3) hydraulic plug *(4) electrical plug*

(5) safety cable *(6) decal*

ATTENTION

When connecting the conduits of the double conduit pneumatic brake system, first connect the yellow conduit and only then connect the red conduit.

HYDRAULIC SYSTEM CONNECTION

- Depending on the trailer version, connect hydraulic system connectors to appropriate tractor sockets. The combination of connections

required for proper connection of the system is shown in table (4.2) and figure (4.10)

Table 4.2. Combinations of hydraulic system connections

Hydraulic tipper system	Hydraulic system with manifold	Hydraulic system of load box interlock	Hydraulic rocker arm block system	Hydraulic system with oil tank
1	7	9	5	9
2	8	10	6	
3	9	10		
4				

The numbers in the table correspond to the markings in figure (4.10)

TIP

Some hydraulic conduits may be equipped with other types of connections, markings remain unchanged.

- In the case of the hydraulic system with an oil tank, connect also the PTO shaft.

CONNECTING ELECTRICAL LIGHTING SYSTEM

- Connect power lead, figure (4.11) to 7-pin

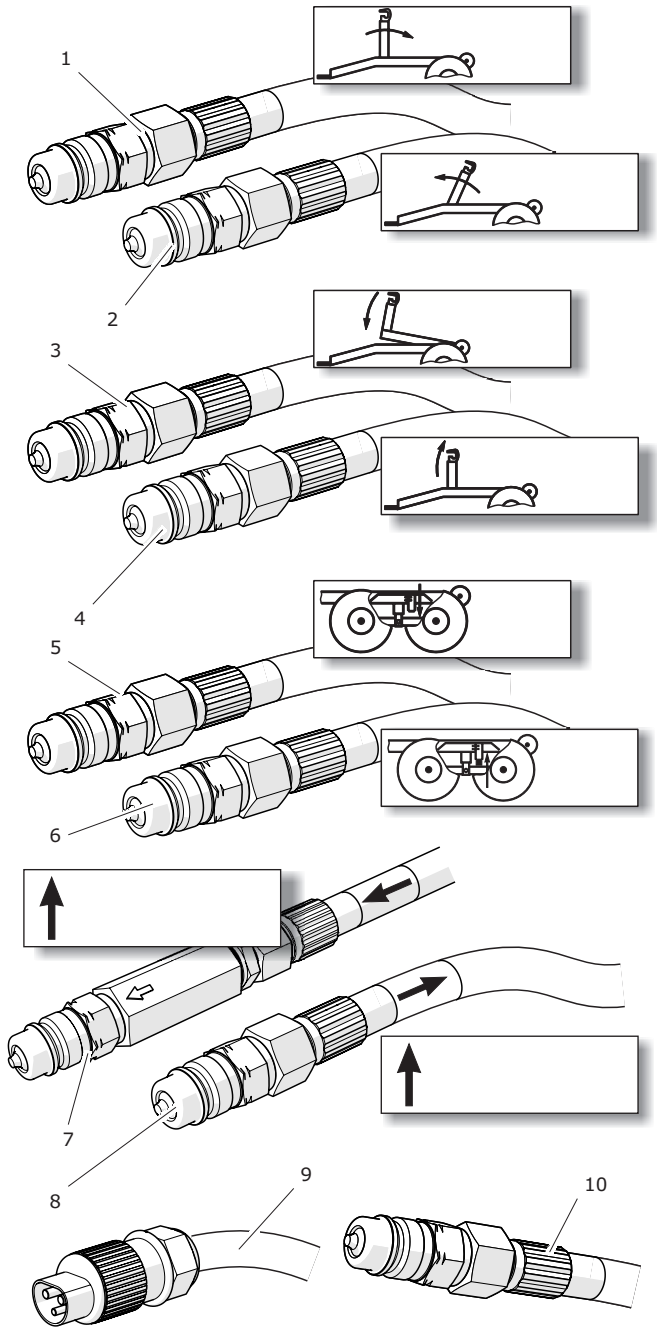


Figure 4.10 Hydraulic connections

(1) (2) conduits of hook frame control system

(3) (4) conduits of tipping frame control system

(5) (6) conduits of rocker arm interlock system

(7) (8) supply conduit and return conduit with check valve

(9) 3 pin electrical lead

(1) hydraulic conduit

socket on the trailer and to 7-pin socket on the tractor.

ADDITIONAL INFORMATION

- After connecting all conduits make sure that they will not get entangled in moving parts of the tractor or trailer during work. If necessary, secure the conduits.
- Conduct daily inspection of the trailer.
- If the trailer is fully operational, one may commence work.
- Immediately before driving remove wheel chocks and release the parking brake. Make certain that the suspension interlock cylinders are withdrawn.

Turn the brake mechanism crank anticlockwise until resistance is felt.

TIP

The return conduit (7) with a check valve should be connected to the drain connector in the tractor, so called "free drain". If there is no such connector, connect the conduits to a single section.

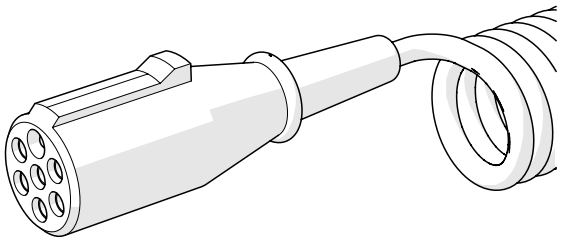


Figure 4.11 Connection lead

ATTENTION

In the event of a prolonged idle period of the trailer, the air pressure in the pneumatic brake system may be insufficient to release the brake shoes. In such a case, start the tractor's engine and air compressor and supplement air in the pneumatic system tank.

DANGER

Do NOT use out of order trailer.

4.2.2 UNHITCHING THE TRAILER

ATTENTION

When disconnecting the conduits of the double conduit pneumatic brake system, first disconnect the red conduit and only then connect the yellow conduit.

Do NOT unhitch and park a loaded trailer.

The trailer must not be unhitched from the tractor if the hook frame or tipping frame are not folded and the suspension interlock cylinders are extended.

DANGER

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

Before disconnecting the conduits and drawbar eye, turn off tractor engine and remove key from ignition. Immobilise tractor with parking brake.

TIP

Reduce pressure prior to disconnecting the hydraulic conduit. To do this, with the tractor engine running, move the lever of the tractor's external hydraulic system manifold to the floating position.

- Park the trailer on hard and level ground.
- Lower the support to parking position.
- If the trailer is equipped with the telescopic support, lower the beam of the HITCH-type hitch.
- Turn off tractor engine and remove key from ignition, immobilise the tractor with parking brake.
- Immobilise trailer with parking brake.
- Place chocks under one trailer wheel, one chock in front of the wheel, the other behind the wheel.
- Disconnect all conduits one at a time. Protect the ends of the conduits by placing rubber caps on the hydraulic connections.
- Place the conduits on the conduit bracket (1) - figure (4.12).
- Unlock the hitch, start the tractor and drive tractor away from the trailer.

4.3 HYDRAULIC SYSTEM MAINTENANCE

Depending on the trailer version, the hydraulic system can be operated using:

- the tractor's external hydraulic system,
- wired control,
- manifold of the trailer's hydraulic system.

OPERATION BY MEANS OF THE TRACTOR'S EXTERNAL HYDRAULIC SYSTEM.

- Connect the trailer according to the instructions in section 4.2.
- Read the operator's manual of the agricultural tractor and follow the instructions of the tractor manufacturer.

OPERATION BY MEANS OF THE WIRED CONTROL OR THE MANIFOLD OF THE TRAILER'S HYDRAULIC SYSTEM

- Connect the trailer according to the instructions in section 4.2.
- With the tractor engine running, move the lever of the tractor's external hydraulic system manifold to the ON position or start the tractor PTO drive, depending on the hydraulic system options.
- The trailer operation is controlled by means of a wired control - figure (4.13) or the trailer's manifold. The functions of the knobs or levers are marked with labels.
- When using the wired control, turn the switch (1) to the ON position and then control the trailer operation with the switches (2), (3), (4) and (5). The central position of the knob is the neutral position.
- When controlling the trailer by means of the manifold, control the trailer using appropriate levers.
- After completed work, turn off the power supply by turning the switch to the OFF position (wired control).
- Move the tractor manifold lever to the neutral position or switch off the tractor PTO drive.

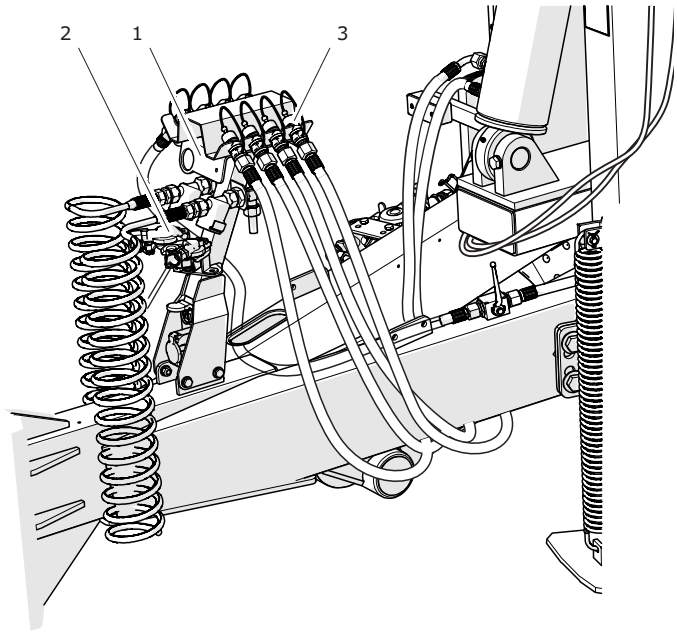


Figure 4.12 Holding sockets

(1) conduit bracket

(2) holders of pneumatic connections

(3) holders of hydraulic connections

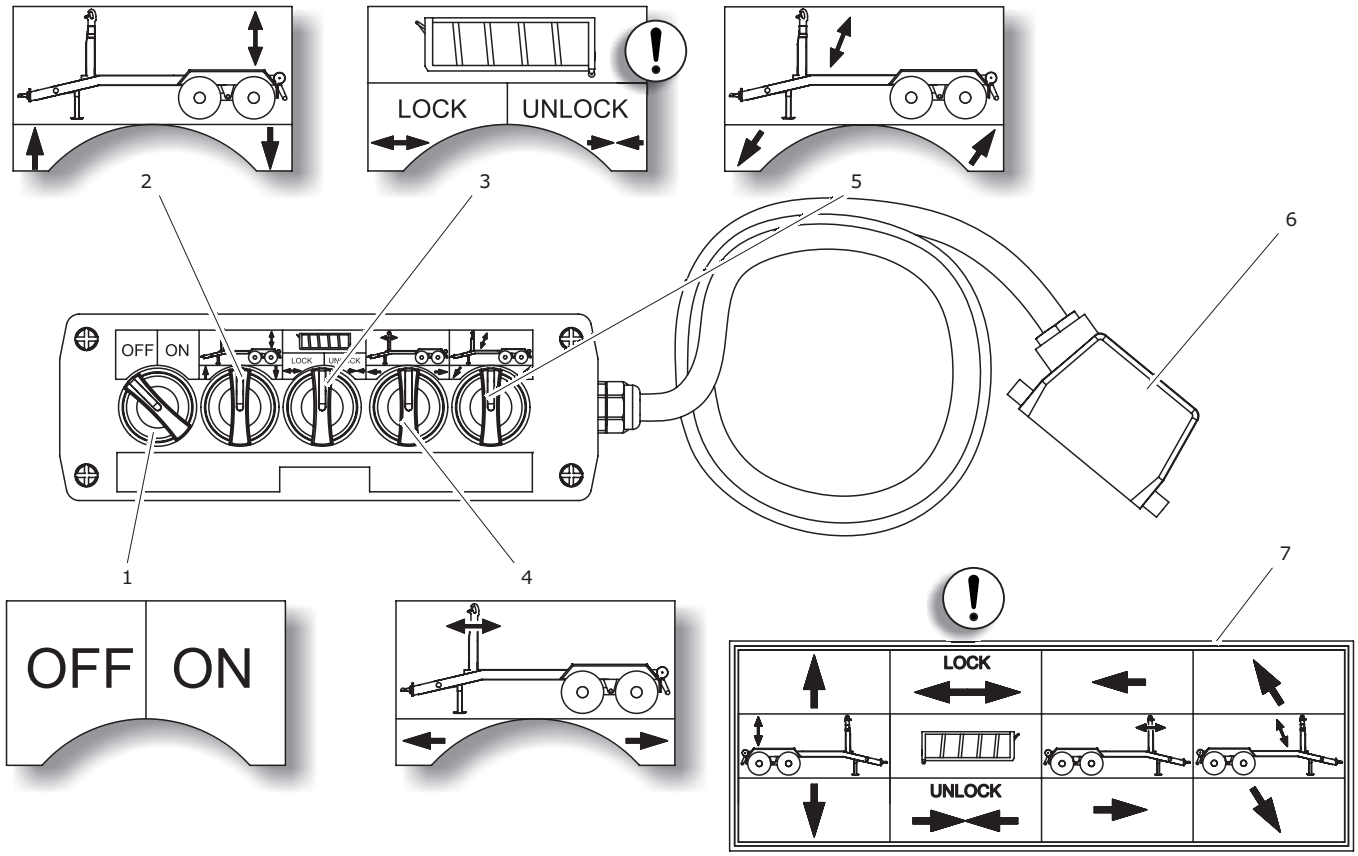


Figure 4.13 Wired control for operating the trailer

(1) power supply switch *(2) control of suspension interlock* *(3) control of load box interlock*

(4) control of hook frame *control of tipping frame* *(6) plug*

(7) manifold decal

TIP

If the hydraulic system is not equipped with the load box interlock control circuit, the wired control or manifold does not have the appropriate section for controlling this circuit - compare figure (4.13).

4.4 CONNECTING THE LOAD BOX

- Retract the rear beam and remove the slow-moving vehicle warning sign..
- Pull the interlock bolt (2) - figure (4.14) and move the lever (1) to position (II).
- Lock the rocker arms by means of the cylinders of the suspension interlock system.
- Make sure the load box interlock is retracted (optional equipment).
- Place the tractor and the trailer in front of the load box, in the straight line, at a distance of about 1 meter from the load box hitch.
- Unfold the hook frame maximally.
- Rise the central frame to the position in which the hook is located at the height of the load box hitch
- Reverse trailer to such a position in order to be able to hook the load box – figure (4.16).
- Fold the hook frame partially until the front of the load box is slightly raised.

ATTENTION

After moving the lever to position (II), make sure that the interlock pin (2) correctly secures the lever against uncontrolled movement.

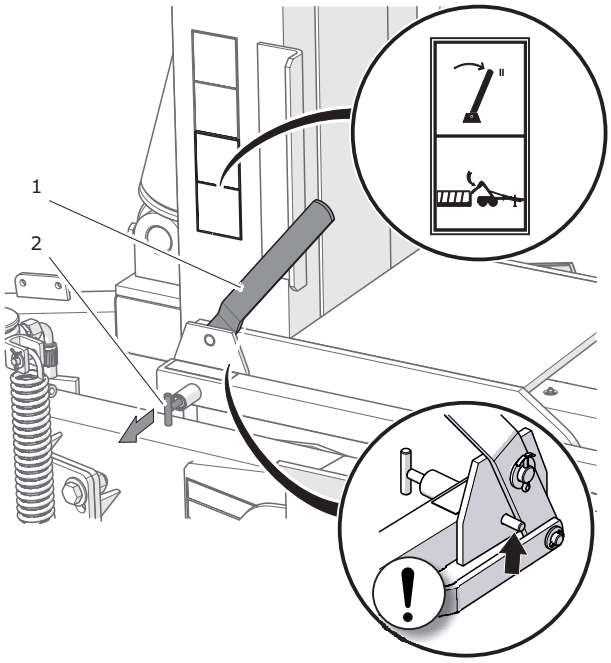


Figure 4.14 Setting the trailer's working mode

(1) lever *(2) lock*

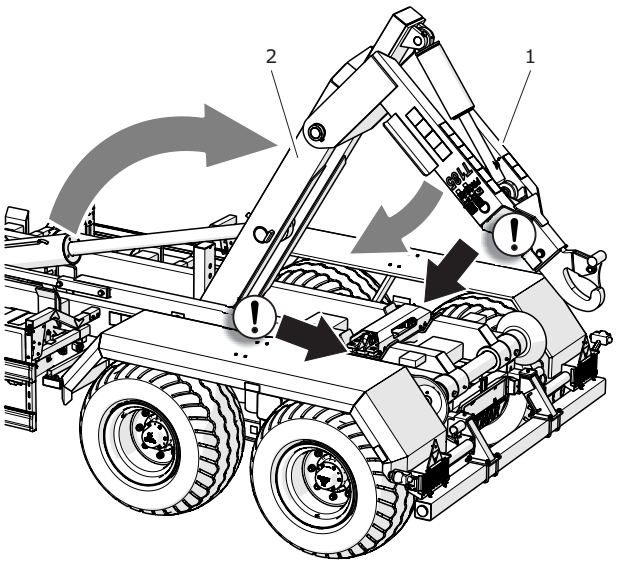


Figure 4.15 Unfolding the frames

(1) hook frame *(2) central frame*

- Fold the central frame to the original position - figure (4.17). Pay attention to ensure that the load box longitudinal members are not jammed by the trailer's guide rollers. Otherwise, stop folding the central frame. Raise the front of the load box slightly by folding the hook frame. When the longitudinal members of the load box are above the rollers, you can restart folding the central frame.
- After folding the central frame to its original position, fold the hook frame completely.
- Retract the suspension interlock cylinders.
- Place the slow-moving vehicle warning sign on the rear wall of the load box.
- Extend and lock the rear beam so as to ensure that the distance between the load box end and the bumper does not exceed 400mm.

ATTENTION

Remember not to fold the hook frame completely. It may be impossible to properly lock the load box if the hook frame is folded while hitching the load box

In the event of pulling the load box, which is not standing on hard ground, it is permissible to reverse the trailer after raising the load box to a height enabling it to be pulled in. Soft ground preventing easy rolling of the load box rollers significantly hinders the load box pulling in process.

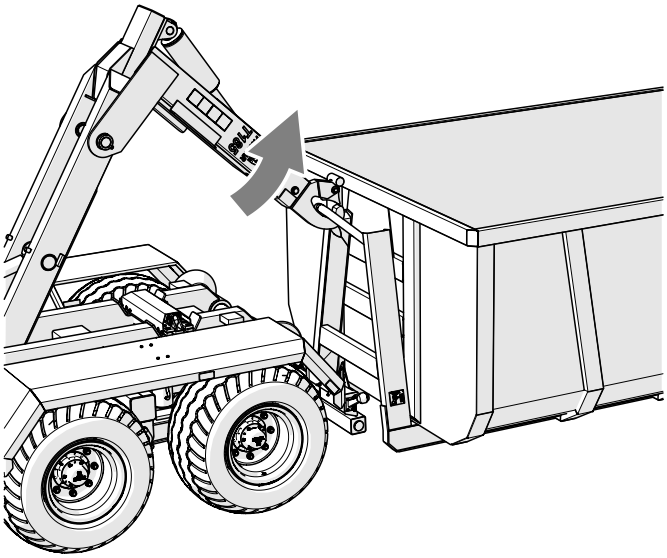


Figure 4.16 Hitching the load box

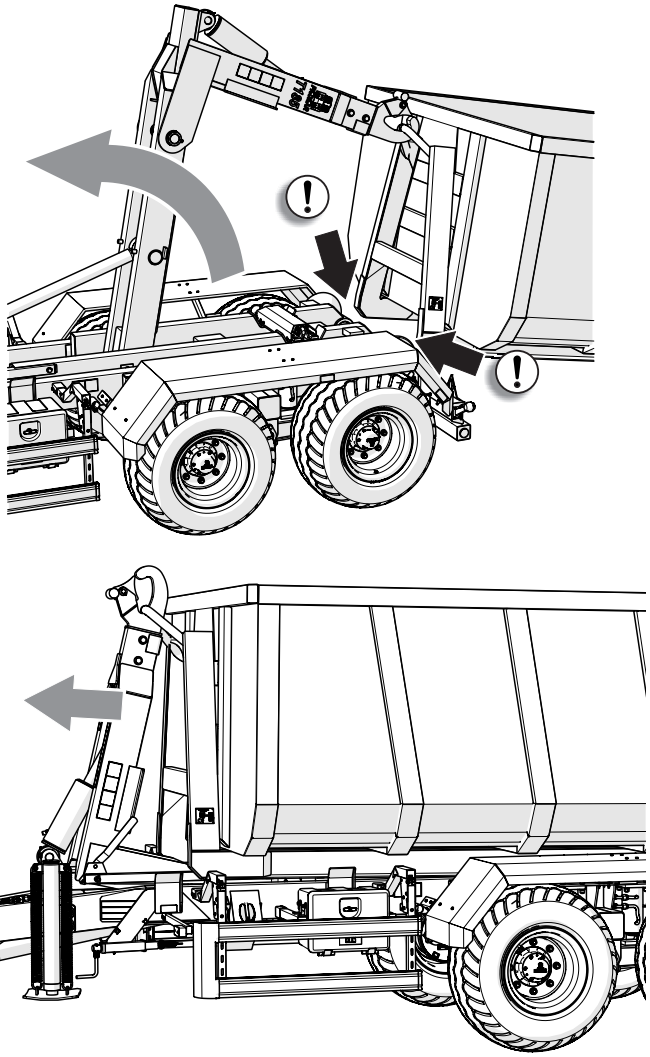


Figure 4.17 Pulling the load box on the trailer

DANGER

When pulling in the load box onto the trailer the drawbar shaft and tractor hitch are subjected to great load.

Other persons must NOT be in the immediate vicinity of the trailer and especially behind the connected load box.

Take particular care while working near electric power lines.

Do NOT operate the frame interlock while connecting the load box. Selection of the trailer's working mode is only possible when the tipping frame is retracted to resting position.

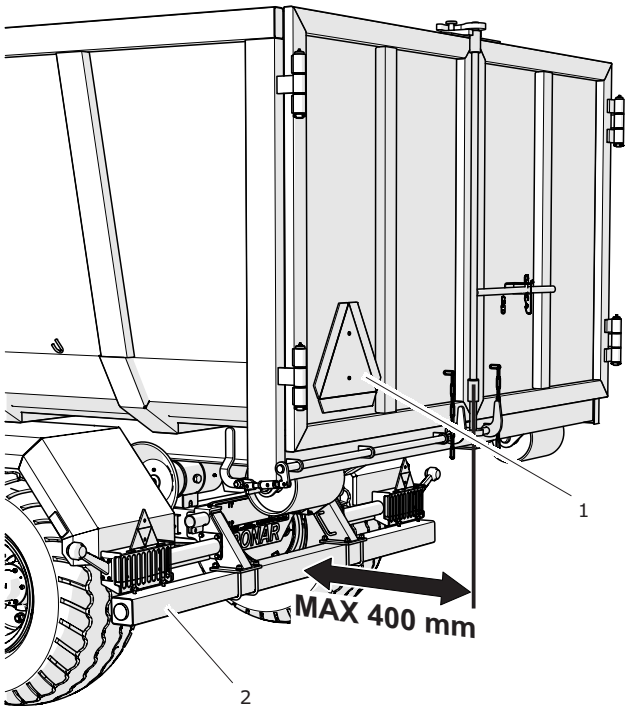


Figure 4.18 Rear beam

(1) slow-moving vehicle warning sign

(2) rear beam

4.5 REMOVING LOAD BOX FROM TRAILER

- Park tractor and trailer on hard level ground. If not, the load box rollers may dig into the earth and hinder disconnection from the trailer.
- The tractor and the trailer must be set to drive straight ahead.
- Retract the trailer's rear beam.
- Remove the slow moving vehicle warning sign.
- Pull the interlock (2) and switch the lever (1) - figure (4.19) to position (II).
- Extend the suspension interlock cylinders.
- Unfold the hook frame completely by moving the load box backwards.
- Unfold the central frame to remove the load box from the trailer. While removing the load box from the trailer, pay attention to ensure that the load box longitudinal members are not jammed by the trailer's guide rollers. Otherwise, stop unfolding the central frame. Raise the front of the load box slightly by folding the hook frame slightly. If the distance between the longitudinal members and rollers is sufficient to avoid collision, continue unfolding the central frame until the load box is completely lowered.
- After putting the load box on the ground, stop tilting the central frame.

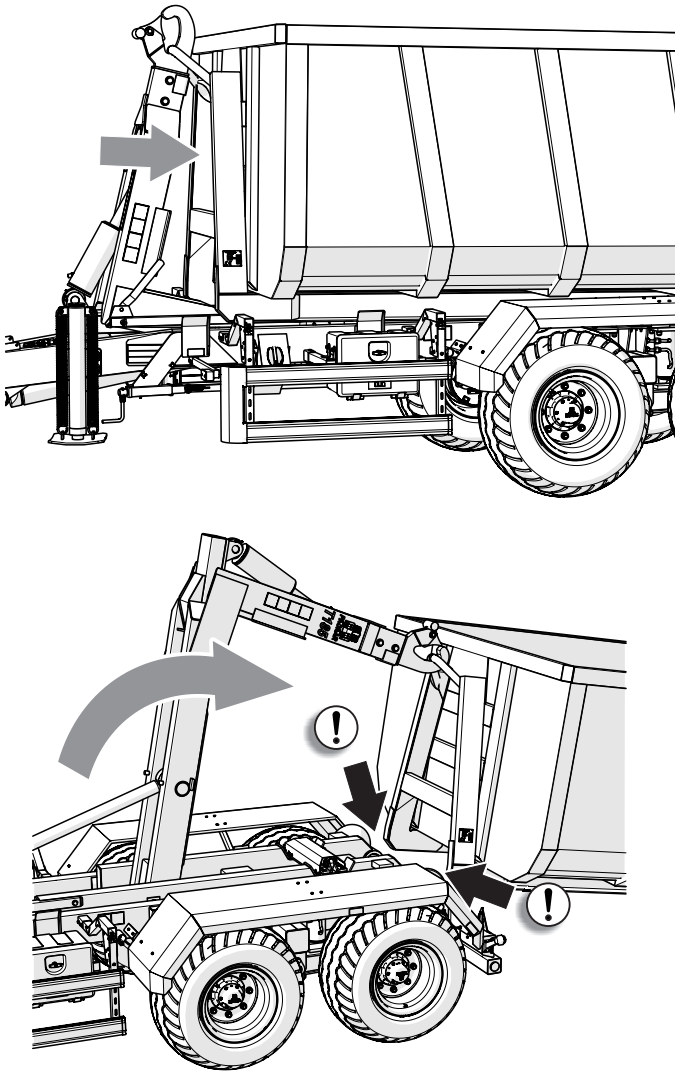


Figure 4.20 Removing load box from trailer

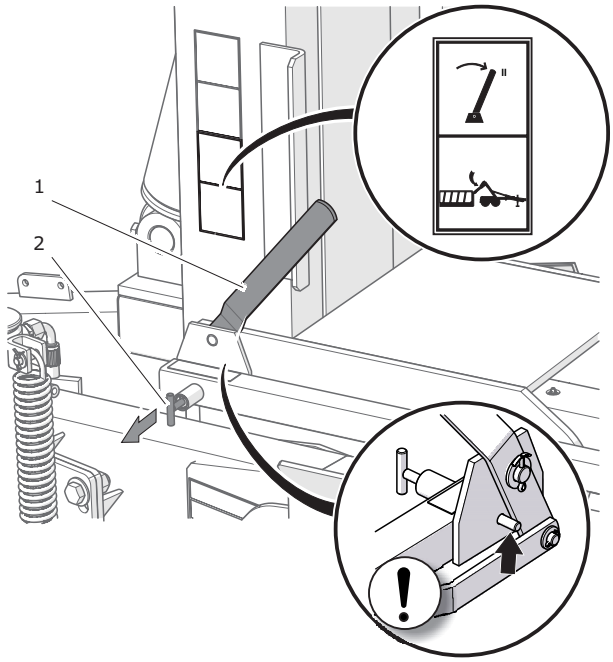


Figure 4.19 Setting the trailer's working mode

(1) lever *(2) lock*

- Set the hook frame in the position that enables disconnecting the hook from the load box and drive the tractor away from the load box in order to disconnect it.

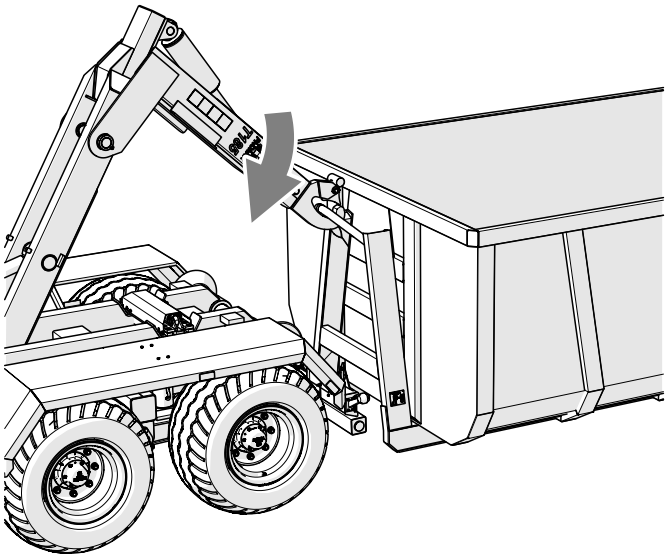


Figure 4.21 Disconnecting the load box

- Retract and fold down hook frame, retract central frame.
- Retract the suspension interlock cylinders.
- Attach slow moving vehicle warning plate.

4.6 LOADING THE LOAD BOX

ATTENTION

Before beginning the load box loading make certain that the load box side walls are properly closed and secured. The trailer must be positioned to travel forwards and be hitched to the tractor. Loading should only take place, when trailer is placed on flat level surface and hitched to tractor.

Distribute load evenly in the load box using suitable tools (crane, loader, conveyor, etc.), depending on type of load. Loading should be carried out by a person experienced in this type of work and having appropriate authorisation for operating equipment (if required). Type of load carried depends on load box use.

ATTENTION

Removing load box from trailer must be done on hard and level ground. Do NOT leave the load box on a slope.

Due to the various density of materials, using the total load box capacity may cause exceeding permissible carrying capacity of hook trailer. Please note that the weight of empty load box and its load must not exceed the permissible carrying capacity of the trailer. Guideline specific weight of selected materials is given in table (4.3). Take care not to overload the trailer.

Light materials with a large volume (hay, round or rectangular bales, straw, green fodder etc.), maybe loaded even above the edge of the load box paying particular attention to trailer stability. 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.

Mineral fertilisers and other materials, which by having contact with painted or steel surfaces may cause damage, are recommended to be carried in sealed packing (sacks, boxes, drums, barrels etc.).

Table 4.3. Guideline weights by volume of selected materials

Material	Weight [kg/m^3]
Root crops:	
raw potatoes	700 - 820
dried potatoes	130 - 150
sugar beet - roots	560 - 720
fodder beet - roots	500 - 700
Organic fertilisers:	
old manure	700 - 800
mature manure	800 - 900
fresh manure	700 - 750
compost	950 – 1 100
dry peat	500 - 600
Mineral fertilisers:	
ammonium sulphate	800 - 850
potash salt	1,100 – 1,200
super phosphate	850 – 1,440
basic slag phosphate	2,000 – 2,300
potassium sulphate	1,200 – 1,300
kainite	1,050 – 1,440
milled lime fertiliser	1,250 - 1,300
Building materials:	
cement	1,200 – 1,300
dry sand	1,350 – 1,650
wet sand	1,700 – 2,050
solid bricks	1,500 – 2,100
hollow bricks	1,000 – 1,200
stones	1,500 – 2,200
soft wood	300 - 450
hard sawn timber	500 - 600

Material	Weight [kg/m³]
impregnated timber	600 - 800
steel structures	700 – 7,000
milled burnt lime	700 - 800
cinders	650 - 750
gravel	1,600 – 1,800
Straw litter and bulk feeds:	
meadow hay dried in the swath	10 - 18
hay wilted in the swath	15 - 25
hay in gathering trailer (dry wilted)	50 - 80
wilted cut hay	60 - 70
dry baled hay	120 - 150
wilted baled hay	200 - 290
stored dry hay	50 - 90
stored cut hay	90 - 150
clover (lucerne) wilted in the swath	20 - 25
clover (lucerne) cut wilted on trailer	110 - 160
clover (lucerne) wilted on gathering trailer	60 - 100
dry stored clover	40 - 60
cut dry stored clover	80 - 140
dry straw in round bales	8 - 15
damp straw in round bales	15 - 20
cut damp straw in bulk trailer	50 - 80
cut dry straw in bulk trailer	20 - 40
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
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

Material	Weight [kg/m³]
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
Concentrated feeds and mixed feeds:	
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)	1,100 – 1,200
molasses	1,350 – 1,450
silage (pit silo)	650 – 1,050
hay silage (tower silo)	550 - 750
Seeds and grains:	
beans	750 - 850
mustard	600 - 700
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

Material	Weight [kg/m^3]
oil seed rape	600 - 750
linseed	640 - 750
lupins	700 - 800
oats	400 - 530
lucerne	760 - 800
rye	640 - 760
Others:	
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

ATTENTION

Individual types of load boxes are adapted to carrying various groups of materials, therefore the user is obligated to carefully read the load box operator's manual and comply with its recommendations.

4.7 LOAD TRANSPORT

When driving on public 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 hitched to the tractor and tractor's hitch is properly secured.
- Vertical load borne by the trailer drawbar eye affects the steering of the agricultural tractor.
- While transporting the load box, set the trailer to "tipper" function".
- The trailer must not be overloaded, loads must be uniformly distributed so that the maximum permissible trailer axle and hitch 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.
- The maximum working speed and the maximum speed allowed by road traffic regulations must not be exceeded. The towing speed should be adapted to the current road conditions, load carried by the trailer, road surface conditions and other relevant conditions.
- Trailer may be towed on slopes of up to 5° and unloading must take place only on a level surface.
- Secure the trailer unhitched from tractor using parking brake and chocks. 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 trailer must be marked with a slow-moving vehicle warning sign attached to the rear chassis beam (travelling without load box), or on rear wall of load box.
- 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 particularly important because the centre of gravity of the loaded trailer adversely affects driving 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.
- Avoid sharp turns especially on slopes.
- When travelling with the trailer, the suspension interlock cylinders must be retracted.
- Please note that the braking distance of the tractor and trailer combination is substantially increased at higher speeds and loads.
- Before driving, adjust the braking force of the trailer by setting the braking force regulator lever in a proper manner - figure (4.22). Before travelling with the trailer on public roads, dismount the shields (1) - figure (4.23) protecting the rear lamp assembly and secure them in the holding socket. Secure the shields with bolts (2).
- Adjust the rear beam to the load box. Remember that the rear overhang must not exceed 400 mm.

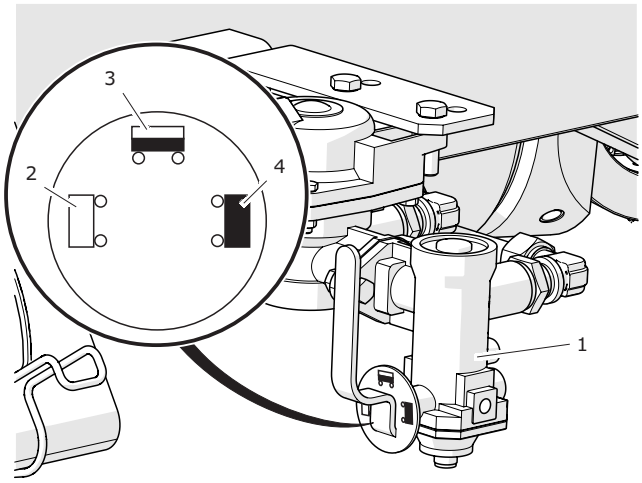


Figure 4.22 Brake force regulator

(1) regulator

(2) NO LOAD position

(3) HALF LOAD position

(4) FULL LOAD position

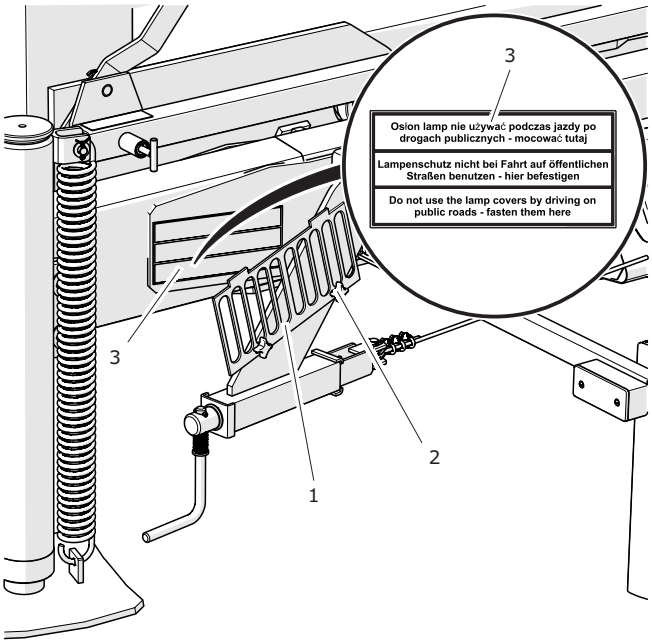


Figure 4.23 Shield holding socket

(1) shield *(2) bolt*

(3) decal

4.8 UNLOADING

Unloading the load box is done by tipping to the rear. Unloading of the trailer is performed in the following sequence:

- Tractor and trailer must be placed to drive forwards on flat and hard ground.
- Immobilise tractor and trailer with parking brake.
- Extend the suspension interlock cylinders.
- Retract the trailer's rear beam.
- Open the rear wall of the load box and protect it against accidental closing.

  Be especially careful when opening the wall. The load may apply a large pressure on the wall being opened.

- Pull the interlock (2) and move the lever (1) to position (I) - figure (4.24).
- Release the hydraulic interlock of the load box.
- Raise the tipping frame, unload the load box.
- If in the initial stage the tipping frame cannot lift the load box, move the load box backwards using the hook frame.
- Lower the tipping frame after unloading.
- If the load box was retracted, move it forwards.
- Remove remains of load from the load box edges and the trailer components.
- Close and secure rear wall of load box.
- Slide hydraulic cylinder suspension blocks maximally upwards.
- Extend the rear beam, if necessary.
- Secure the load box with hydraulic interlock.

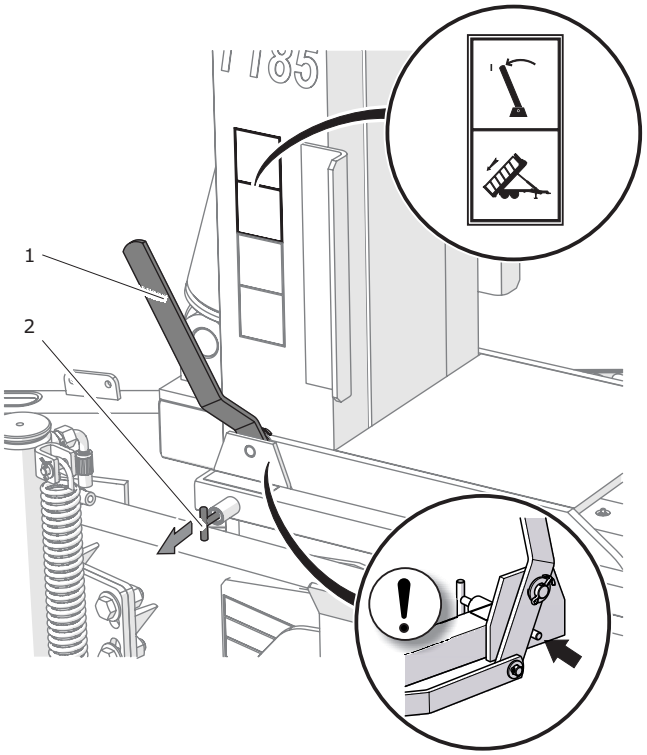


Figure 4.24 Setting the trailer's working mode

(1) lever *(2) lock*

DANGER

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.

Take particular care while working near electric power lines.

Tipping the load box must be done on hard and level ground.

DANGER

When opening load box closure take particular care, because of the pressure of the load on the wall.

When closing load box wall take particular care to avoid crushing fingers.

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

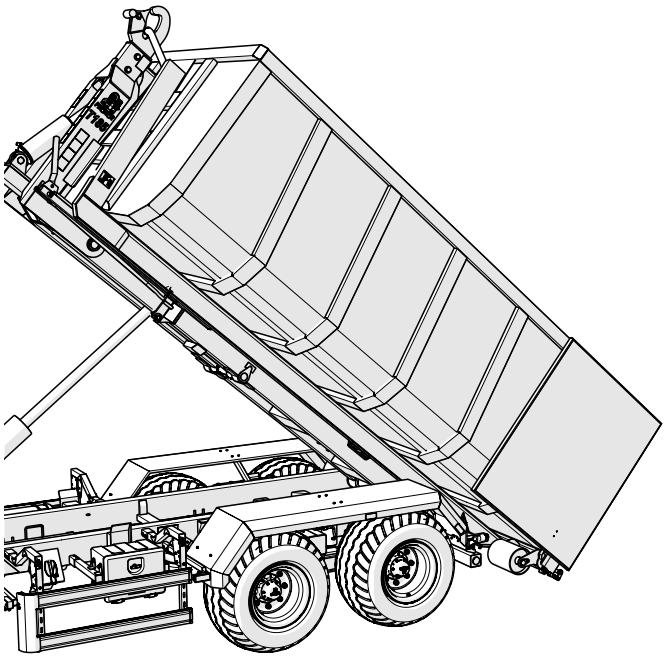


Figure 4.25 Tipping the trailer

4.9 PROPER USE AND MAINTENANCE OF TYRES

- When working with tyres, the machine should be secured against rolling by placing chocks under the wheels.
- 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.
- Tightness of wheel nuts and air pressure in tyres should be regularly checked.
- 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 caps to avoid soiling.
- Do not exceed the trailer's maximum design speed.
- When driving all day, stop for a minimum of one hour at noon.
- Take breaks during driving in order to cool down tyres.
- Avoid potholes, sudden manoeuvres or high speeds when turning.

MAINTENANCE

SECTION 5

5.1 BASIC 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 is obliged to perform all the inspection, maintenance and adjustment procedures defined by the Manufacturer, according to the specified schedule.

Repairs during the guarantee period may only be performed by the Authorised Points of Sale and Service (APSS).

In the event of unauthorised repairs, changes to factory settings and other actions, which are not regarded as possible for the trailer operator to perform, the user shall invalidate the guarantee.

The scope of the complete inspection of the trailer includes the following activities:

- periodic inspection of the trailer performed according to the specified frequency, described in table (5.2), section *5.4 Periodic inspections of the trailer*,
- lubrication according to section *5.6 Lubrication*
- inspection of tightening torque of nut and bolt connections according to section *5.7 Inspection of nut and bolt connections*.

All activities described in this section are performed by the user, also during warranty period. These activities are specified by the Manufacturer and they must be performed in order to maintain the machine in proper technical condition.

DANGER

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

The trailer may only be towed when the brake system, drawbar and axle system are fully operational.

Warranty inspection of the trailer may be carried out only by an authorized warranty service point.

5.2 SCOPE OF WARRANTY INSPECTION

- Checking the trailer according to its specification.
- Checking the trailer for unauthorized design changes.
- Inspection of tightening torque of nut and bolt connections
- Inspection and adjustment of slackness of axle bearings.
- Inspection of air pressure in the tyres.
- Visual inspection of wheels and tyres.
- Inspection of the trailer's paint coating.
- Checking and adjustment of main brake.
- Checking and adjustment of parking brake.
- Checking the operation of the control valve (releasing brakes).
- Checking the position of the brake fork pins in relation to the expander levers.
- Checking thickness of brake shoe linings.
- Applying grease to lubrication points.
- Checking the power hydraulics system and the brake system for leak tightness.
- Checking the operation of electrical system.
- Visual inspection of elastic and steel conduits of hydraulic systems and pneumatic system.
- Draining water from air tank.
- Cleaning the air filters.
- Replacement of filter elements in hydraulic system.
- Checking the drive shaft matching.

5.3 PREPARING THE TRAILER

- Hitch trailer to tractor.
- Park tractor and trailer on hard level ground. Tractor must be placed to drive forwards.
- Engage the tractor's parking brake.
- Turn off the tractor's engine and remove key from ignition. Close the tractor cab to ensure that unauthorised persons do not have access to the tractor cab.
- Place securing chocks under one trailer wheel. Ensure that the trailer will not move during inspection.
- If it is necessary to raise a trailer wheel during inspection, place chocks on the opposite side. Lifting jack should be positioned in the places indicated by the arrow. Remember, lifting jack must be supported on hard and stable ground.
- Lifting jack must be suitable for the weight of trailer.
- In exceptional cases, release the trailer's parking brake, for example when measuring half axle bearing slackness. Exercise particular caution in such situations.

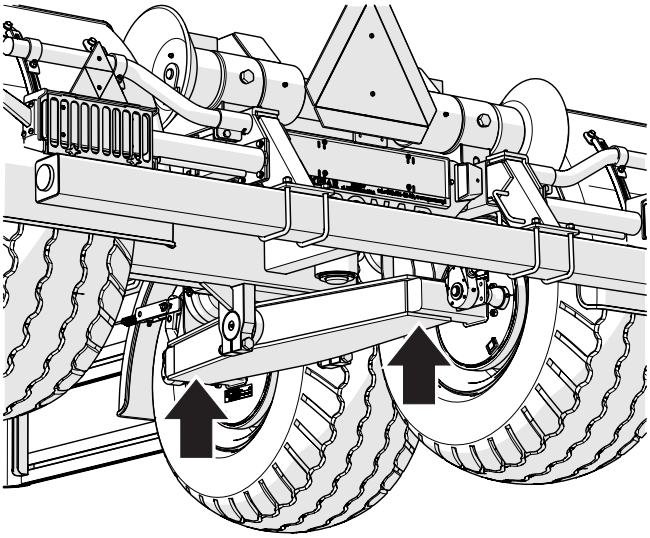


Figure 5.1 Recommended trailer support points

DANGER

Ensure that unauthorised persons do not have access to the tractor cab.

Before using the lifting jack, read the operator's manual of the jack and follow the manufacturer's recommendations. The lifting jack must be stably supported on the ground and trailer components.

Before performing maintenance work and repairs on raised trailer, make certain that the trailer is properly secured and will not move during work.

5.4 PERIODIC INSPECTIONS OF THE TRAILER

Table 5.1. Inspection categories

Category	Description	Carried out by	Frequency
A	Daily inspection	Operator	Inspection conducted daily before the first start or every 10 hours of continuous operation in shift mode.
B	Maintenance inspection	Operator	Inspection carried out periodically every 1000 km or every month of trailer use, whichever occurs first. Daily inspection should be carried out each time before this inspection.
C	Maintenance inspection	Operator	Inspection carried out periodically every 3 months. Daily inspection and monthly inspection should be carried out each time before this inspection.
D	Maintenance inspection	Operator	Inspection made periodically every 6 months. Daily inspection, monthly inspection and 3-monthly inspection should be carried out each time before this inspection.
E	Maintenance inspection	Operator	Inspection made periodically every 12 months. Daily inspection, monthly inspection and 3-monthly inspection should be carried out each time before this inspection.
F	Warranty inspection	Authorised Points of Sale and Service (APSS)(1)	Inspection carried out against payment after the first 12 months of trailer use, after user notification.
G	Maintenance inspection	Service (2)	Inspection carried out every 4 years of the trailer use

(1) - Authorized Point of Sale and Service

(2) - post-warranty service

Table 5.2. Inspection schedule

Category	Description of activities	Page
A	Checking air pressure in tyres	5.7
A	Draining water from air tank	5.8
A	Inspection of connection plugs and sockets	5.9
A	Inspection of shields	5.10
A	Inspection of trailer prior to moving off	5.11
B	Air pressure measurement, inspection of tyres and wheels	5.12
C	Cleaning the air filters	5.13
D	Checking brake shoe linings for wear	5.14
D	Checking wheel axle bearings for slackness	5.15
D	Inspection of mechanical brakes	5.16
D	Cleaning the drain valve	5.17
E	Inspection of parking brake cable tension	5.18
E	Inspection of hydraulic system	5.19
E	Inspection of pneumatic system	5.20
G	Replacement of hydraulic conduits	-

Table 5.3. Adjustment parameters and settings

Description	Value	Remarks
Hook height		
Position I	1,450 mm	
Position II	1,570 mm	
Brake system		
Cylinder rod stroke in pneumatic systems	25 - 45 mm	
Cylinder rod stroke in hydraulic systems	25 - 45 mm	
Cylinder rod stroke in pneumatic-hydraulic systems	25 - 45 mm	
Minimum thickness of brake linings	5 mm	
Angle between expander axle and fork	90^{O}	With depressed brake pedal
Parking brake		
Maximum slackness of parking brake cable	20 mm	

5.4.1 CHECKING AIR PRESSURE IN TYRES

ATTENTION

Wrong air pressure in the trailer tyres may lead to permanent damage of tyres resulting from tyre material delamination.

Wrong air pressure in tyres also accelerates the wear of tyres.

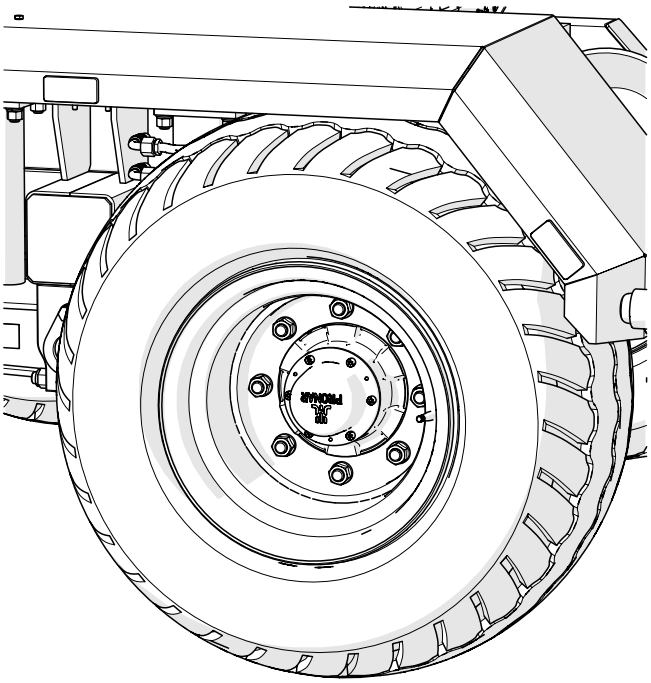


Figure 5.2 Trailer wheel

SCOPE OF ACTIVITIES

- Visually inspect if the tyres are properly inflated.
- If you think that air pressure in tyres is too low, check air pressure using a manometer. If necessary, inflate the tyre up to the recommended pressure.

5.4.2 DRAINING WATER FROM AIR TANK

SCOPE OF ACTIVITIES

- Press drain valve stem (1) located in the lower part of tank (2).

  The compressed air in the tank causes the removal of water to the exterior.

- After releasing the valve stem, the valve should automatically close and stop airflow from the tank.
- If the valve stem does not return to its position, wait until the tank is empty. Then, screw out and clean or replace the valve.

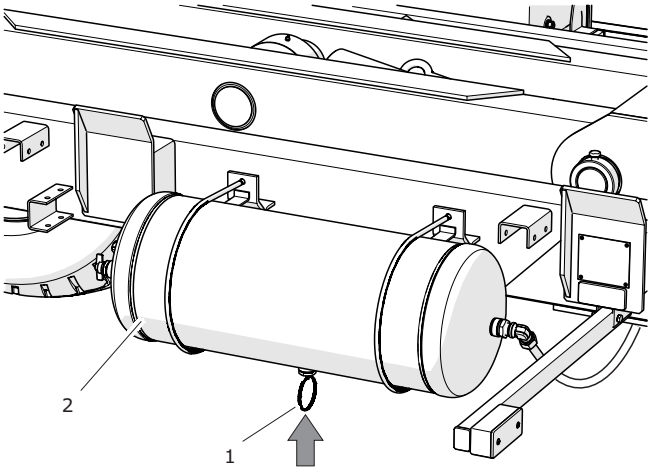


Figure 5.3 Air tank

(1) drain valve *(2) air tank*

5.4.3 INSPECTION OF CONNECTION PLUGS AND SOCKETS

SCOPE OF ACTIVITIES

Damaged connection body or socket for connecting the second trailer 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 covers or placed in their designated sockets. 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.

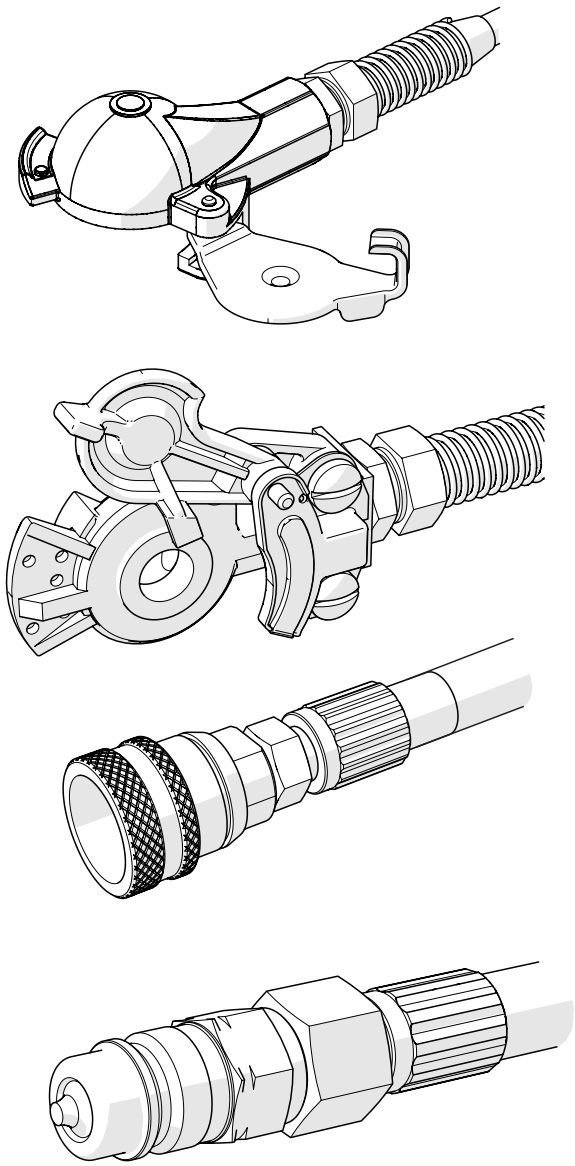


Figure 5.4 Examples of hydraulic and pneumatic system connections

5.4.4 INSPECTION OF SHIELDS

Shields protect the trailer user's health and life and the machine subassemblies against damage. Therefore, their technical condition must be checked before using the trailer. Any damaged or lost components must be repaired or replaced.

SCOPE OF ACTIVITIES

- Check completeness of protective shields.
- Check if the shields are properly mounted. Check if the side under-run protection devices are snapped in the lower driving position, check condition of mudguards and rear beam.
- Check PTO shield and PTO shaft shields.
- Check if the rear beam pins are correctly locked.
- Check if caps are complete.
- If necessary, tighten the bolt connections fixing the shields.

DANGER

Do NOT use the trailer with damaged or incomplete shields.

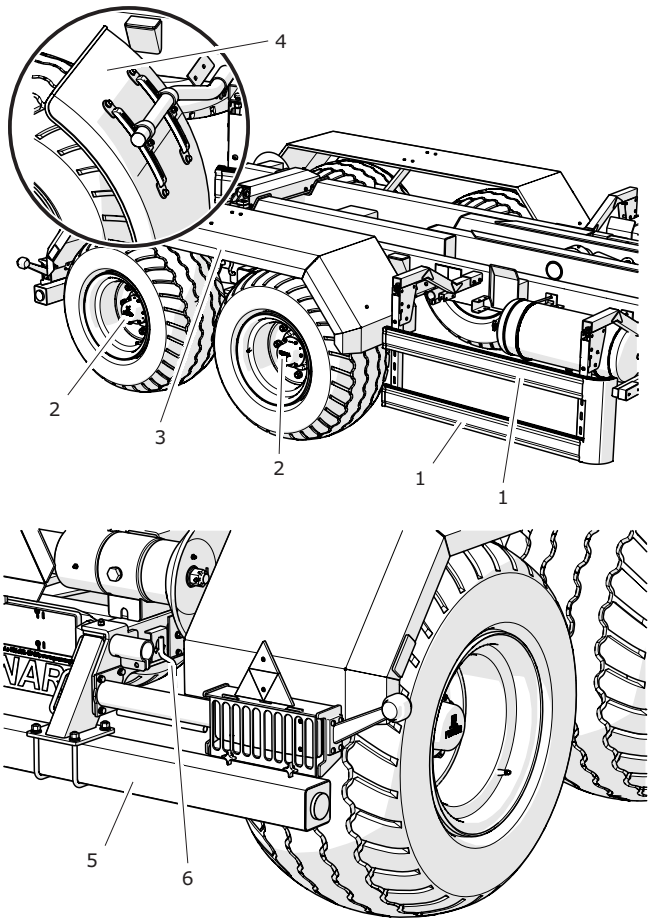


Figure 5.5 Trailer shields

(1) side shield *(2) half axle caps*

(3) metal mudguard *(4) plastic mudguard*

(5) rear beam *(6) beam pin*

5.4.5 INSPECTION OF TRAILER PRIOR TO MOVING OFF

- Before hitching the trailer to tractor, make certain that electrical leads and hydraulic and pneumatic conduits are not damaged.
- Check completeness and technical condition of trailer lights.
- Check if all lights and reflectors are clean.
- Before driving on the public roads, remove the rear light shields and place them in the designated place.
- Check correct mounting of the slow-moving vehicle warning sign holder and the sign itself.
- Make certain that the tractor is equipped with a warning reflective triangle.
- 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.

  Clean the cylinder, if needed. In winter, it may be necessary to defrost the cylinder and drain water through unblocked vent holes. Replace damaged cylinder with a new one. When installing the brake cylinder, maintain its original position with regard to bracket.

- When moving off check if the main brake system operates correctly. Please note that the proper air pressure level in the trailer's air tank is required to ensure proper operation of the pneumatic system.
- Correct operation of other systems should be checked regularly during operation of the trailer.

DANGER

Do NOT use the trailer with out of order lighting system or brake system.

Do not use out of order trailer until it is repaired.

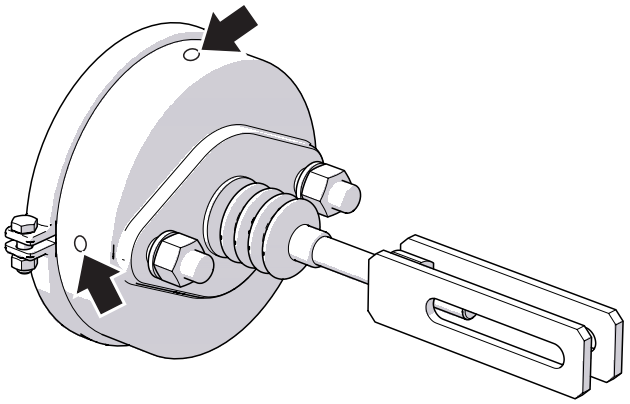


Figure 5.6 Brake cylinder

5.4.6 AIR PRESSURE MEASUREMENT, INSPECTION OF TYRES AND WHEELS

During air pressure measurement the trailer must be unloaded. Checking should be done before travelling when tyres are not heated, or after an extended period of trailer parking.

SCOPE OF ACTIVITIES

- Connect a manometer to tyre valve.
- Check air pressure.
- If necessary, inflate the tyre up to the recommended pressure.
- Required tyre pressure values are specified on the information decal (1) placed on the wheel rim.
- Check tyre tread depth.
- Check tyre side wall.
- Check tyre for mechanical defects such as loss, cut, deformation or bulging.
- Check that tyre is correctly installed on rim.
- Check tyre age.

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.

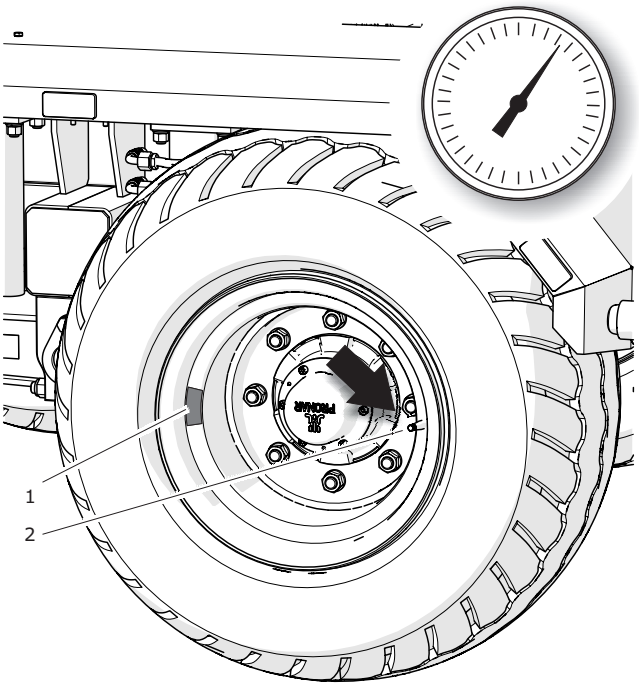


Figure 5.7 Trailer wheel

(1) decal *(2) valve*

TIP

If the trailer is used intensively, air pressure in tyres should be checked more frequently.

ATTENTION

Wrong air pressure in the trailer tyres may lead to permanent damage of tyres resulting from tyre material delamination.

Wrong air pressure in tyres also accelerates the wear of tyres.

5.4.7 CLEANING THE AIR FILTERS

SCOPE OF ACTIVITIES

- 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).
- 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.

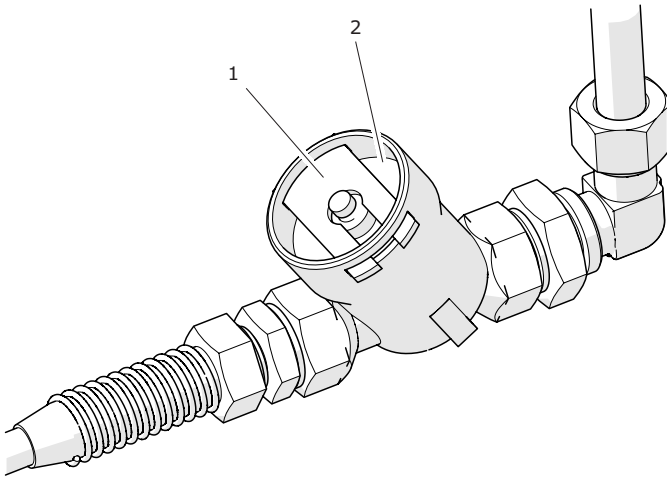


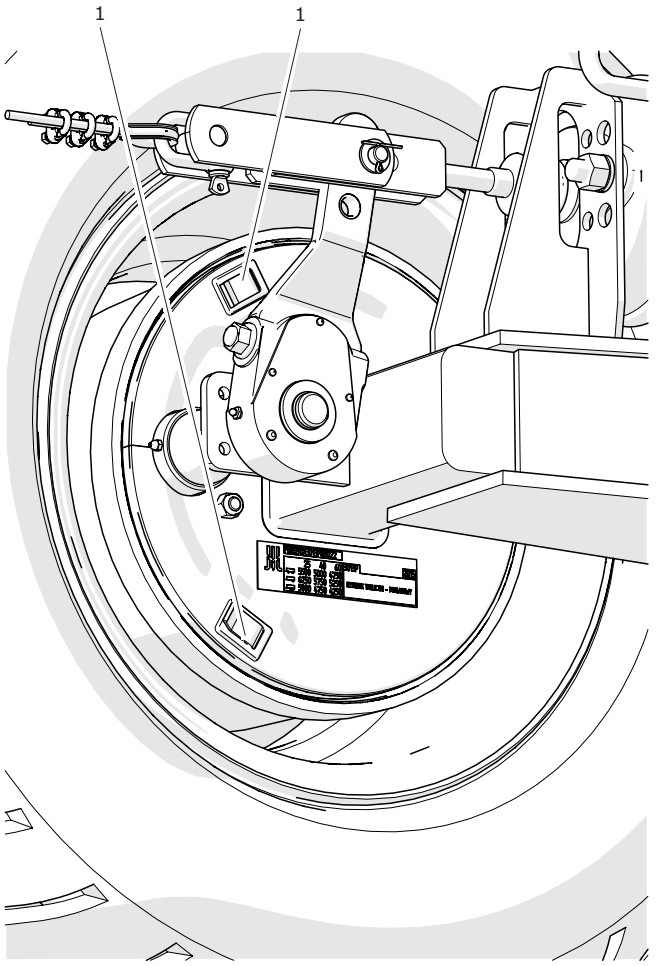
Figure 5.8 Air filter

(1) filter slide gate *(2) cover*

5.4.8 CHECKING BRAKE SHOE LININGS FOR WEAR

SCOPE OF ACTIVITIES

- Find the inspection opening (depending on the axle shaft version, the inspection opening may be located elsewhere than in the place indicated in the figure; however, it is always located on the brake shield disc).
- Remove the upper plug and lower plug and check the brake shoe lining thickness.
- Brake shoes must be replaced when the lining thickness is less than 5 mm.
- Check other axle shafts for wear of brake shoe linings.



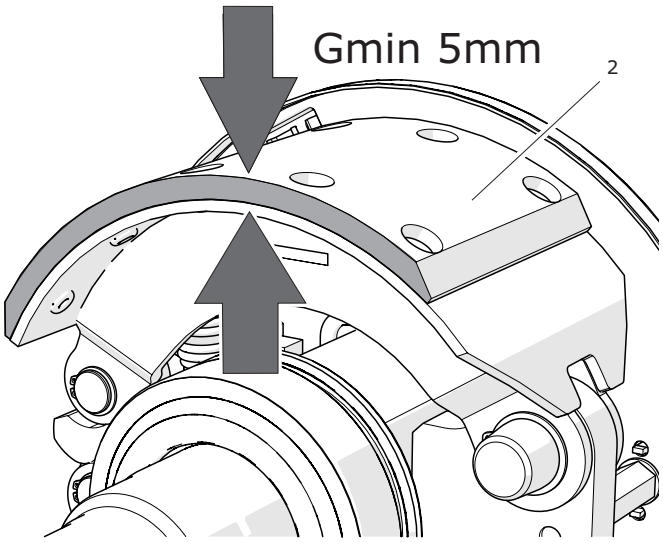


Figure 5.9 Checking thickness of brake shoe linings

(1) plug *(2) brake shoe lining*

5.4.9 CHECKING AXLE SHAFT BEARINGS FOR SLACKNESS

SCOPE OF INSPECTION ACTIVITIES

- Raise the wheel using a lifting jack.
- Turn the wheel slowly in both directions. Check that movement is smooth and that the wheel rotates without excessive resistance and jamming.
- Turn the wheel so that it rotates very quickly, check that the bearing does not make any unusual sounds.
- Moving the wheel try to detect slackness.
- Repeat the procedure for each wheel individually, remembering that the jack must be on the side opposite to the chocks.
- If slackness is felt, adjust bearings. Unusual sounds coming from bearing may be symptoms of excessive wear, dirt or damage. In such an event the bearing, together with sealing ring, should be replaced with new parts, or cleaned and greased again During inspection of bearings, ensure that possibly detected slackness comes from the bearing and not from the suspension system (e.g. slackness of leaf spring pins etc.).
- Check technical condition of hub cover, if necessary replace it with a new one.

Figure 5.10 Checking 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, speed of travel and lubrication conditions.

5.4.10 INSPECTION OF MECHANICAL BRAKES

If the brake is correctly adjusted, the brake cylinder rod stroke should be within the range specified in Table 5.3 and it depends on the cylinder type. At full braking, the optimum angle between the expander lever and the cylinder rod should be about 90°. The inspection of brakes consists in measuring this angle and the brake cylinder rod stroke for each wheel.

SCOPE OF INSPECTION ACTIVITIES

- Measure the X distance when the tractor brake pedal is released.
- Measure the Y distance when the tractor brake pedal is depressed.
- Calculate the difference between the distances.
- Check the angle between the cylinder rod axis and the expander lever.
- If the expander arm angle (2) and the cylinder rod stroke are outside the range specified in Table 5.3, adjust the brake.

During braking, the brake cylinder piston stroke should be within the range specified in table (5.3) depending on the type of installed cylinder (type of system) and the angle between brake cylinder piston and expander arm should be about 90°. This setting ensures the best possible braking force.

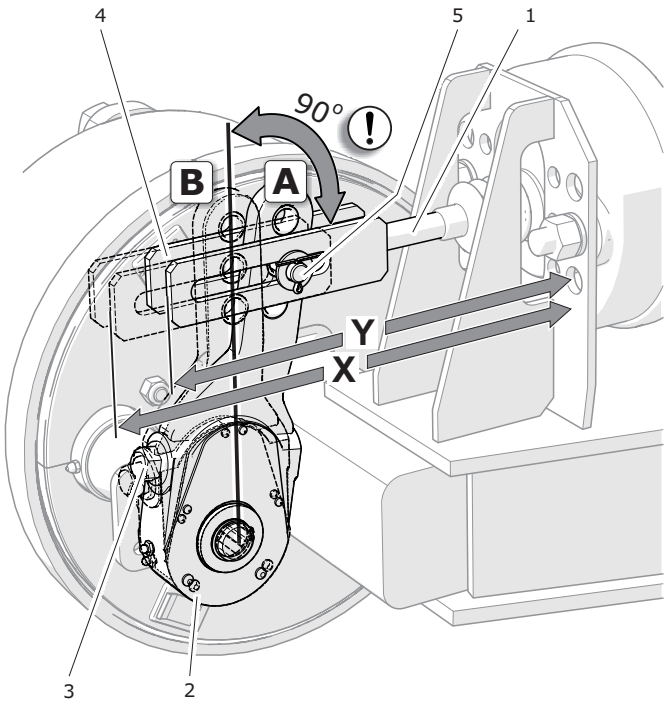


Figure 5.11 Inspection of brake

(1) cylinder piston rod *(2) expander arm*

(3) adjusting bolt *(4) cylinder fork*

(5) pin position

(A) position of arm at brake release position

(B) position of arm at braking position

5.4.11 CLEANING THE DRAIN VALVE

SCOPE OF MAINTENANCE ACTIVITIES

- Completely reduce pressure in air tank (2).

  Reduction of pressure in tank is achieved by tilting the drain valve stem.

- Undo nut (1).
- Clean the valve, blow it with compressed air.
- Replace the seal.
- Screw in valve, fill tank with air and check tank tightness.

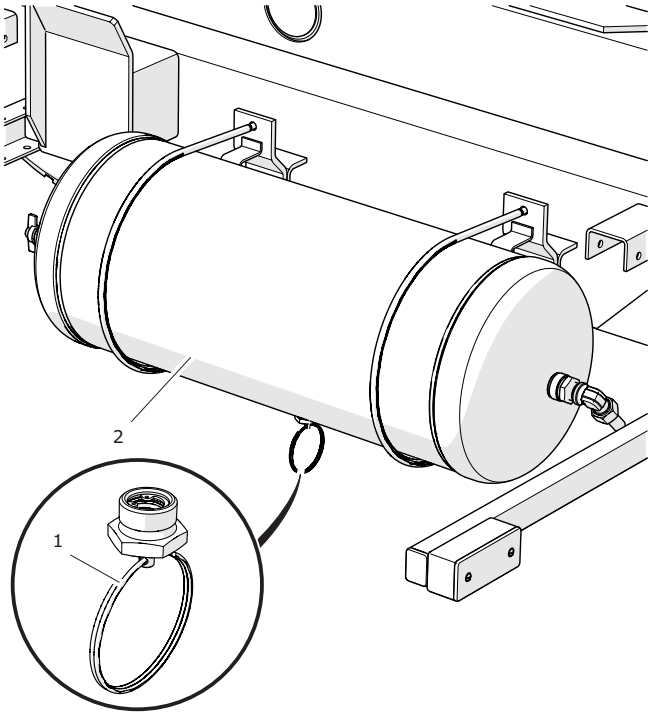


Figure 5.12 Air tank

(1) drain valve *(2) tank*

5.4.12 INSPECTION OF PARKING BRAKE CABLE TENSION

INSPECTION OF TENSION

Parking brake should be checked after checking the mechanical brake of the axle.

- Turn the brake mechanism crank (2) in direction (B) to engage the parking brake.
- Check tension of the cable (1).
- When the brake mechanism bolt is maximally unscrewed, the cable should be loose and hanging by approximately 10 to 20 mm.

ADJUSTMENT OF CABLE TENSION

- Unscrew the brake mechanism bolt maximally (2) by turning the crank in direction (A).
- Loosen nuts (4) of U-bolt clamps (3) on handbrake cable (1).
- Tighten cable (1) and tighten nuts (4) of the clamps
- Engage the parking brake and release it. Check (approximate) cable slackness. When the working brake and parking brake are fully released, the cable should be loose and hanging by approximately 10 - 20 mm. The axle expander levers should be in their rest position.

Should it be necessary to replace the brake cable, follow the instructions in Section *Replacement of parking brake cable*.

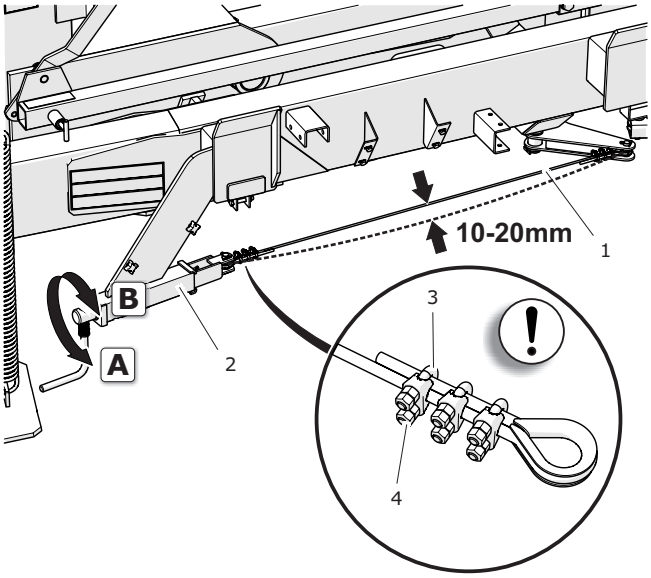


Figure 5.13 Inspection of cable tension

(1) cable *(2) brake mechanism*

(3) U-shaped clamp *(4) clamp nut*

5.4.13 INSPECTION OF HYDRAULIC SYSTEM

SCOPE OF ACTIVITIES

- Hitch trailer to tractor.
- Clean conduit connections, hydraulic cylinders and connectors.
- Start all hydraulic systems in turn by extending and withdrawing the cylinder piston rods. Repeat the above actions 3-4 times.
- Leave the hydraulic cylinders in the maximally extended position. Turn off the tractor engine, immobilise tractor and trailer with parking brake.
- Check all hydraulic circuits for tightness.
- After completed inspection, fold all cylinders to their rest position.

ELIMINATION OF LEAKS

If leaks appear at conduit connections then tighten the connections using the specified torque and recheck the connections. If the problem still exists, replace the leaky component.

If oil is found on hydraulic cylinder body, check origin of leak. Inspect seals when hydraulic cylinder is completely extended. Minimum leaks are permissible with symptoms of "sweating", however in the event of noticing leaks in the form of "droplets" stop using the trailer until faults are remedied. If unreliability is evident in brake cylinders, do NOT use trailer with damaged system until faults are remedied.

5.4.14 INSPECTION OF PNEUMATIC SYSTEM

SCOPE OF ACTIVITIES

- Start tractor in order to supplement air in trailer brake system tank.
- Turn off the tractor engine.
- Check system components by releasing brake pedal in tractor.
- Give particular attention to conduit connections and brake cylinders.
- Repeat system check with depressed truck tractor brake pedal.

ELIMINATION OF LEAKS

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 elements to be checked with washing fluid or other foaming preparations, which will not react aggressively with the system components. 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.

5.5 MAINTENANCE

5.5.1 WHEEL MOUNTING AND DISMOUNTING

WHEEL DISMOUNTING

- Before lifting the wheel to be dismounted, loosen wheel nuts according to the sequence shown in the figure.
- Place the lifting jack under the rocker arm and lift the wheel.
- Dismount the wheel.

WHEEL INSTALLATION

- Using a wire brush, remove contaminations from axle pins and nuts. If necessary, degrease the thread.

  Do not grease the thread of nuts and pins.

- Check technical 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.

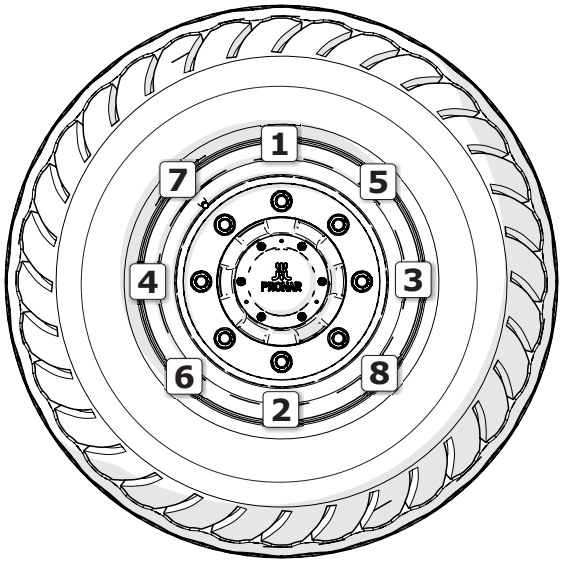


Figure 5.14 Sequence of nut tightening

5.5.2 HOOK POSITION ADJUSTMENT

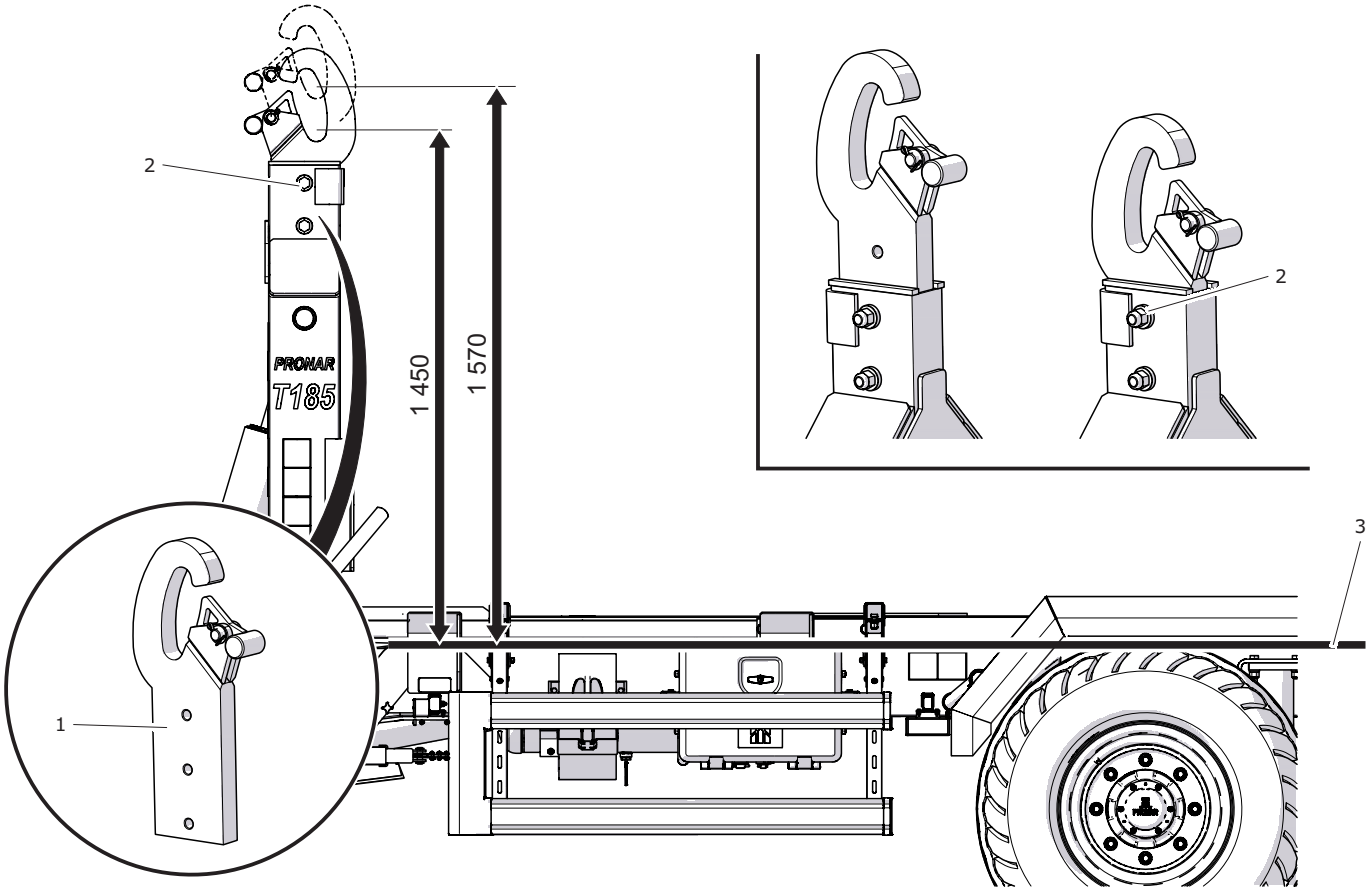


Figure 5.15 Inspection of cable tension

(1) adjustable hook *(2) hook screw joint* *(3) load box mounting plane*

The hook trailer enables connection of load boxes with hitching eye at the height of 1 570 mm (according to DIN 30722-1 standard) or 1 450 mm (according to SS 3021 standard). The height is measured between the plane on which the load box is placed and the hook axis. Changing height of hook should be performed by two persons.

- Undo two M20 nuts.
- Remove the hook fixing bolts.
- Move the hook to a desired position.
- Install the bolts.
- Tighten the nuts using the correct tightening torque according to table *Tightening torque for nut and bolt connections*.

TIP

Self locking nut: M20-10-A2J

Bolt: M20x150-10.9-A2J

5.5.3 REPLACING THE PARKING BRAKE CABLE

- Secure the trailer using additional chocks.
- Fully unscrew the bolt of the brake crank mechanism (2).
- Loosen the nuts (4) of U-shaped clamps (5).
- Dismount shackle, pins, clamps and cable.
- Clean the parking brake components.
- Lubricate parking brake crank mechanism.
- Install shackle and U-shaped clamps on one end of cable. Make certain that clamps are correctly installed - compare figure.
- Attach one end of cable, install pin and secure it with new cotter pins.
- Attach the other end of the cable in the same way adjusting the cable tension.
- Tighten the nuts.
- Tighten the crank mechanism cable and then loosen it. If necessary, correct the brake cable tension.

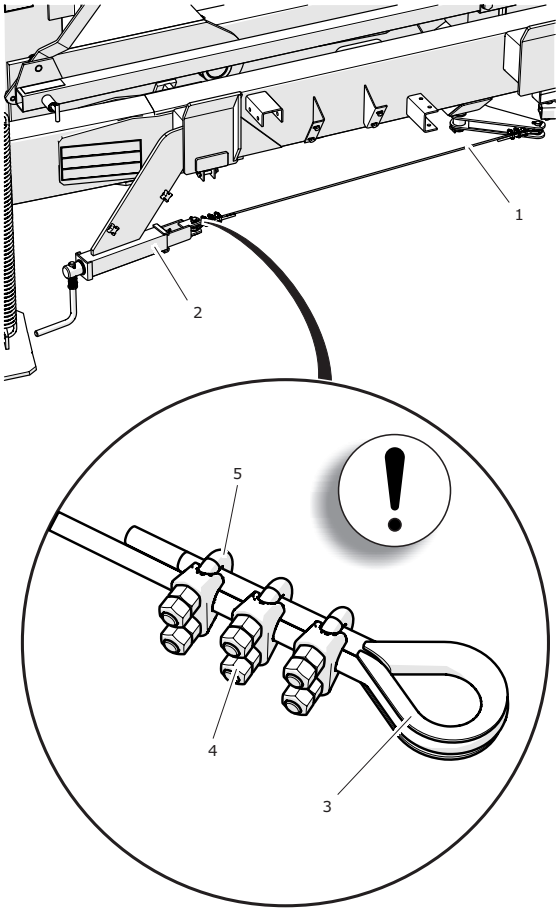


Figure 5.16 Sequence of nut tightening

(1) brake cable *(2) brake mechanism*

(3) thimble *(4) nut*

(5) clamp

ATTENTION

Clamp jaws must be placed on the load bearing side of cable - see figure.

Protect the cable ends using a heat shrink tubing.

The distance between the clamps should be 40 mm. The first clamp must be located as close as possible to the thimble.

5.5.4 ADJUSTING SLACKNESS OF AXLE SHAFT BEARINGS

- Dismantle hub cover (1).
- Take out cotter pin (2) securing castellated nut (3)
- Tighten castellated nut in order to eliminate looseness.

  Wheel should rotate with insignificant resistance.

- Undo nut (3) (not less than 1/3 rotation) to align the nearest thread groove with the opening in wheel axle pin (cotter pin opening is indicated by black arrow in the figure). Wheel should rotate without excessive resistance.

  The nut must not be excessively tightened. Otherwise, operating conditions of the bearings will deteriorate.

- Secure castellated nut with cotter pin and mount the hub cap (1).
- Delicately tap hub cap with rubber or wooden hammer.

ATTENTION

Adjustment of bearing play may only be conducted, when the rotary rake is hitched to a tractor.

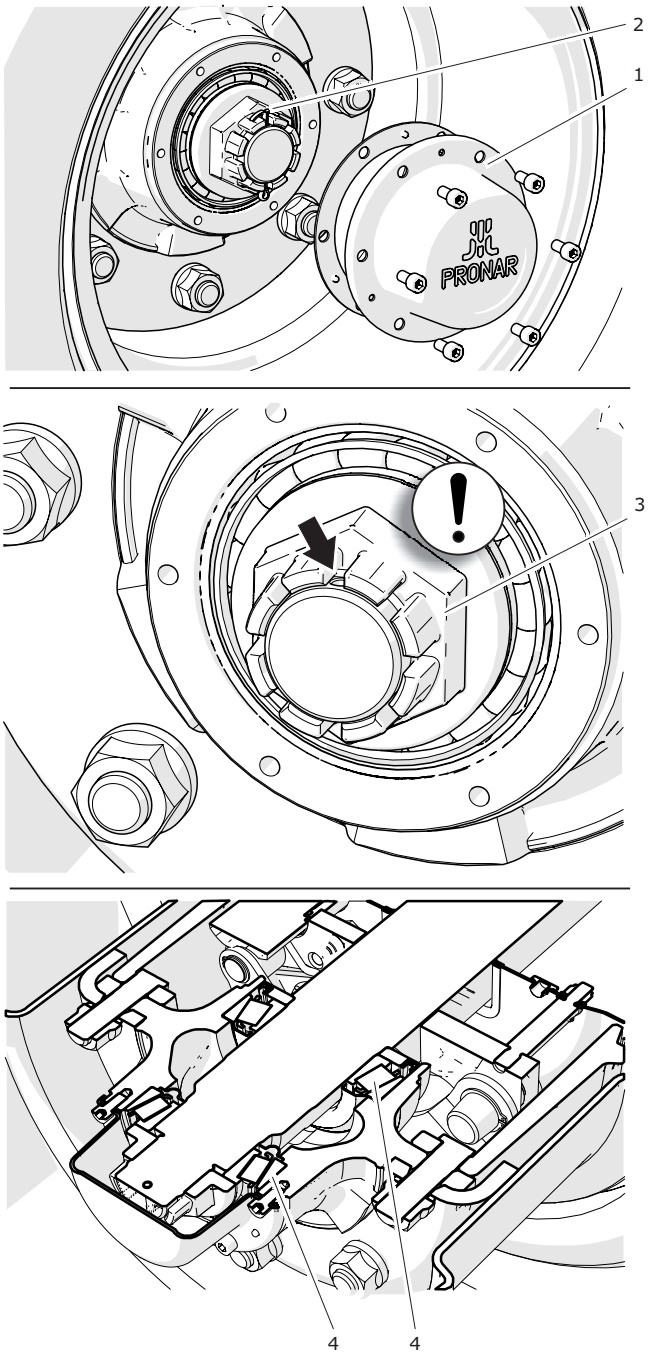


Figure 5.17 Bearing slackness adjustment principle

(1) cap *(2) cotter pin*

(3) nut *(4) cone bearing*

5.5.5 BRAKE ADJUSTMENT

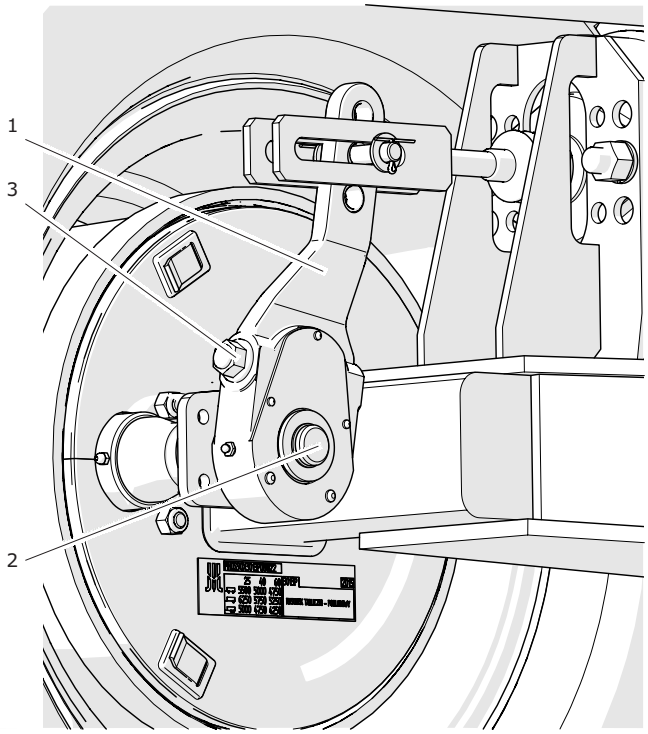


Figure 5.18 Adjustment

(1) expander levers *(2) expander shaft*

(3) adjusting bolt

- Secure the trailer using additional chocks.
- Release trailer's parking brake.
- Dismantle brake cylinder fork pin.
- Make a line (A) on brake cylinder piston rod (1) - figure (5.18) to indicate the position of the maximum withdrawal of brake cylinder piston rod.
- Press the tractor brake pedal and mark the position of the maximum extension of the brake cylinder piston rod (B) with a line.
- Measure the distance between lines (A) and (B). If the brake cylinder rod stroke is outside the proper operating range, adjust the expander arm.
-
- Remember or mark the original position of pin (6) – figure (5.18) in expander arm opening (3).
- Check if the brake cylinder piston rod moves freely and within the whole nominal range.
- Check if the brake cylinder is correctly installed.
- Check if the brake cylinder vent holes are not blocked with impurities and that there is no water or ice inside the brake cylinder.
- 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

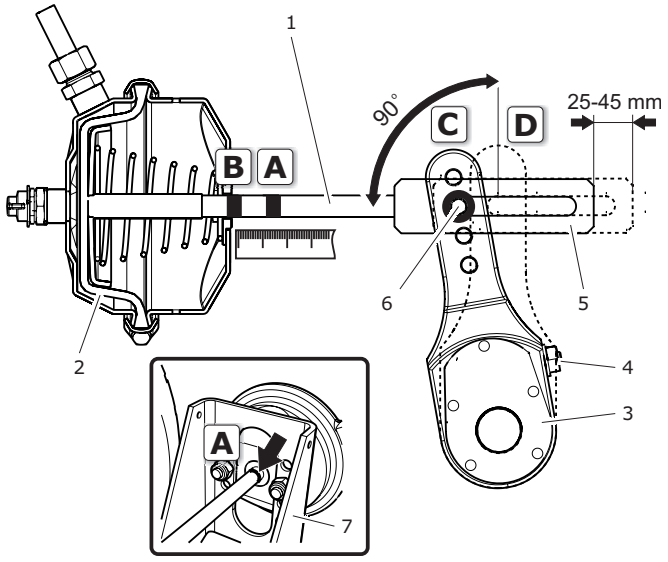


Figure 5.19 Principle of brake adjustment

(1) piston rod *(2) membrane*

(3) expander arm *(4) adjusting bolt*

(5) cylinder fork *(6) pin position*

(7) cylinder bracket

(A) mark on the piston rod at brake release position

(B) mark on the piston rod at braking position

(C) position of arm at brake release position

(D) position of arm at full braking position

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.

- 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 the adjustment activities for other cylinders.
- 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.

CHECKING THE BRAKE OPERATION

- After completed adjustment, perform a trial run.
- Engage the brake several times. Stop the tractor with trailer and check the temperature of brake drums.
- If any of the drums is too hot, correct the brake adjustment and perform a trial run again.

5.5.6 ADJUSTMENT OF DRAWBAR EYE POSITION

To adjust drawbar eye position change the position of drawbar eye (2) with regard to drawbar's faceplate (1).

PROCEDURE

- Unscrew drawbar eye from the drawbar's faceplate (1).
- Set drawbar eye in new position and tighten with appropriate torque.
- The faceplate design (1) allows 2 possible drawbar eye positions with fixing bolts spaced every 120mm and 6 drawbar eye positions with fixing bolts spaced every 110 mm - compare figure.
- Check correct drawbar eye tightening after first travel under load.

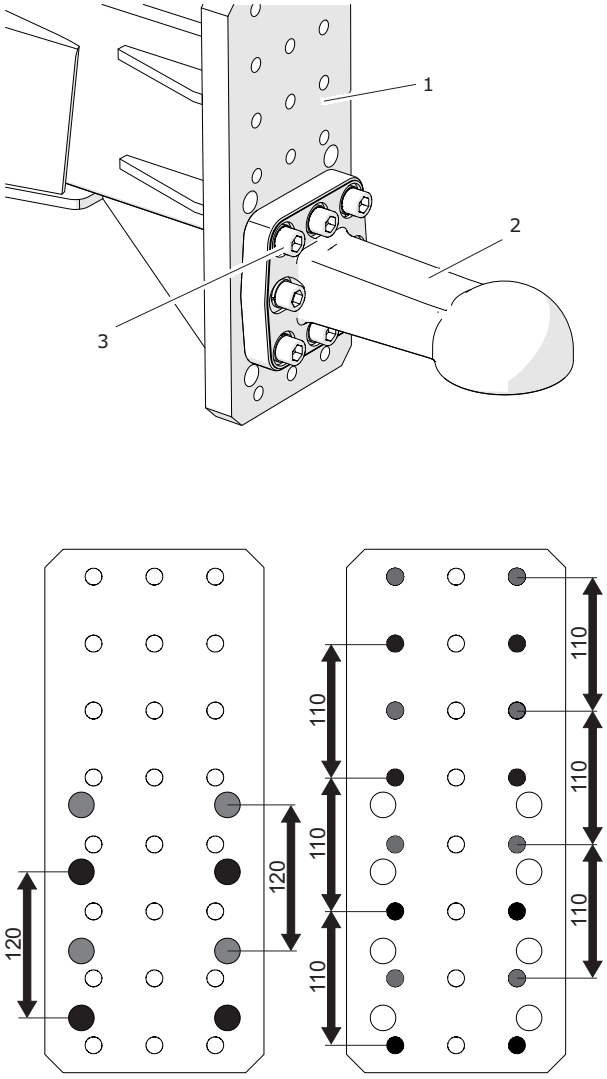


Figure 5.20 Adjustment of drawbar eye position

(1) front plate *(2) tie rod*

(3) screw joint

5.5.7 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, especially rust and accelerated tyre deterioration. 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 work stoppage, 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 longer storage of unused trailer it is recommended that every 2 to 3 weeks the machine may be moved a bit so that the place of contact of tyres with ground is changed. The tyres will not be deformed and maintain proper geometry. Also, air pressure in tyres should be inspected from time to time and, if necessary, pressure should be increased to an appropriate value.
- PTO shafts should be stored in horizontal position.

5.5.8 TRAILER CLEANING

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.

Trailer should be cleaned depending on requirements and before longer idle periods (e.g. before winter period). Should it be necessary to use pressure washer, the user is obliged to acquaint himself with the operating principles and recommendations concerning safe use of this equipment.

Trailer cleaning guidelines:

- To clean the trailer, use only clean running water or water with a cleaning detergent additive with neutral pH.
- Using pressure washer increases washing effectiveness, but particular care must be taken during work. During washing, washer nozzle may not be closer than 50 cm from the surface being cleaned.
- Water temperature should not exceed 55 ^{0}C.
- Do not direct water stream directly at system components 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 and lubrication points etc. Great water jet pressure may damage these components.
- 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 white spirit or other degreasing agents and then washed with clean water with added detergent. Comply with recommendations of the Manufacturer of cleaning preparations.
- 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.
- 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 environmental protection principles and wash trailer in a place designed for this purpose.
- Washing and drying of the trailer must take place at ambient temperatures above 0 ^{o}C.
- After completed washing wait until the trailer is dry and then grease all inspection points according to recommendations. Remove excess oil or grease with a dry cloth.

5.6 LUBRICATION

- 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. After completed lubrication, wipe off excess grease.
- Parts to be lubricated with machine oil should be wiped with dry clean cloth. Apply oil to their surfaces using a brush or oil can. Wipe off excess oil.
- Change of grease in hub bearings should be made at specialised service points, equipped with the appropriate tools. In order to conduct this lubrication, the complete hub should be disassembled as well as bearings and individual sealing rings should be removed. After careful washing and inspection, mount lubricated elements. If necessary, bearing and seals should be replaced with new ones.
- Empty grease or oil containers should be disposed of according to the recommendations of the lubricant Manufacturer.

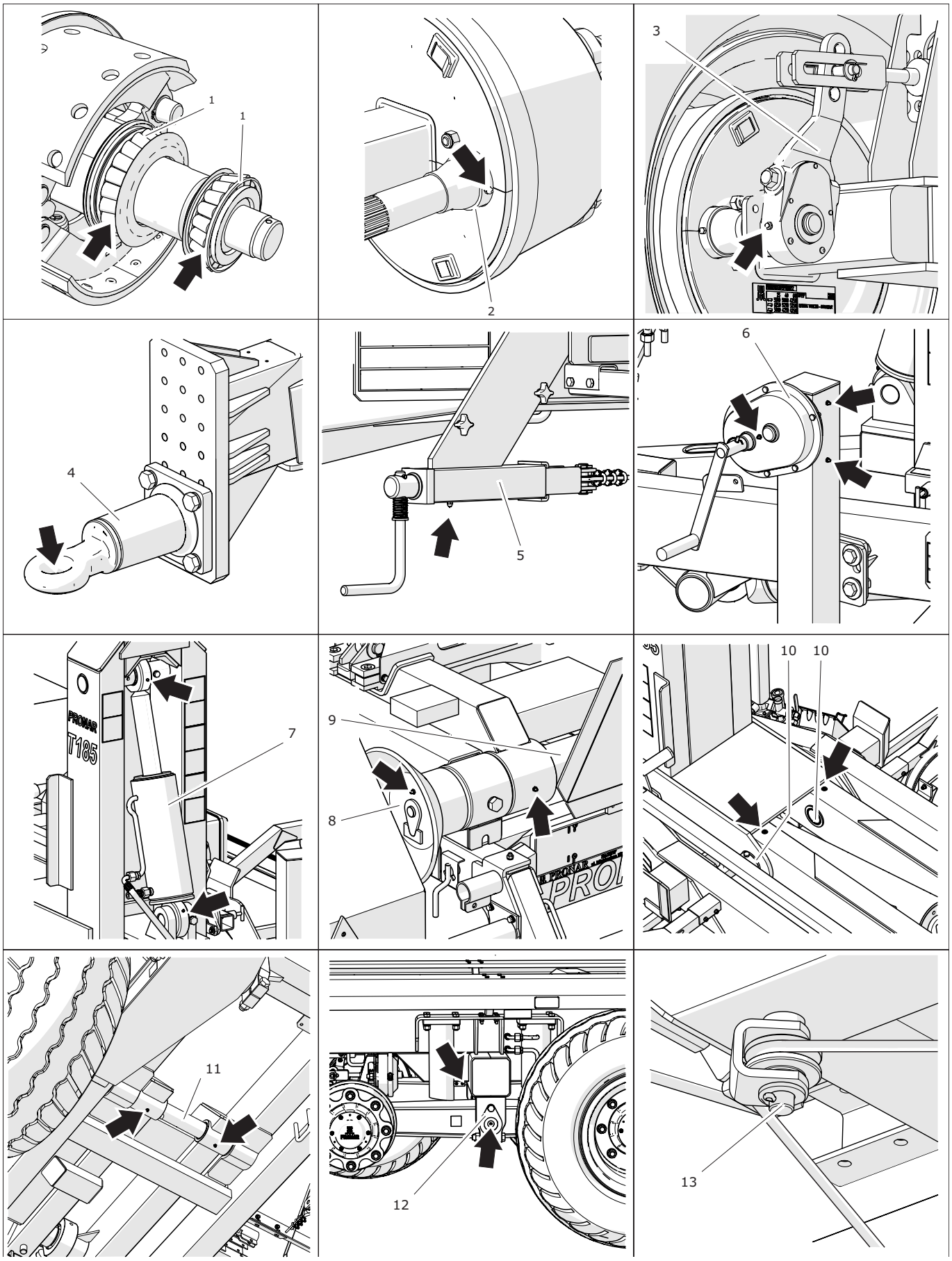


Figure 5.21 Trailer's lubrication points

Table 5.4. Trailer lubrication schedule

Item	Name	Number of lubrication points	TYPE OF GREASE	FREQUENCY
1	Hub bearing	4	A	24M
2	Expander shaft sleeve	4	A	3M
3	Brake expander arm	4	A	3M
4	Drawbar eye	1	B	14D
5	Parking brake mechanism	1	A	6M
6	Telescopic support with gear	3	A	3M
7	Slide bearing of the cylinders	6	A	3M
8	Left/right guide roller	2	A	3M
9	Tipping axis	2	A	1M
10	Hook frame rotation pins	2	B	3M
11	Central frame rotation pin	2	B	3M
12	Rocker arm pin	4	A	3M
13	Parking brake guide roller pins	3	A	3M

A - machine general-purpose grease (lithium, alkaline),

B -grease for heavily loaded elements with addition of MoS_2 or graphite

C – anticorrosion preparation in aerosol

D - ordinary machine oil, silicon grease in aerosol

Frequency: D - working day (8 hours of trailer use), M - month

5.7 INSPECTION OF NUT AND BOLT CONNECTIONS

5.7.1 TIGHTENING TORQUE FOR NUT AND BOLT CONNECTIONS

Unless other tightening parameters are given, during maintenance repair work apply appropriate torque to tighten nut and bolt connections. Recommended tightening torque values for the most frequently used bolt and nut connections are given in table (5.4). Given values apply to non-lubricated steel bolts.

Hydraulic conduits should be tightened using torque of 50–70Nm.

Tightening torque should be checked using a torque wrench according to instructions in section *Tightening of wheel nuts* and *Inspection of bolt and nut connections.* During daily inspection of the trailer, pay attention to loosen connections and tighten them, if necessary. Lost components must be replaced with new ones.

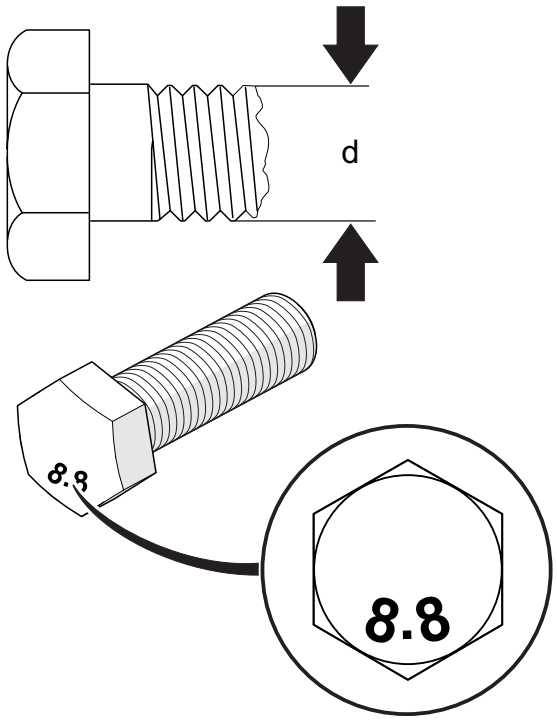


Figure 5.22 Bolt with metric thread.

Table 5.5. Tightening torque values

Thread	Tightening torque		
	5.8	**8.8**	**10.9**
M8	18	25	36
M10	37	49	72
M12	64	85	125
M14	100	135	200
M16	160	210	310
M20	300	425	610
M24	530	730	1,050
M27	820	1,150	1,650
M30	1,050	1,450	2,100

5.7.2 TIGHTENING OF WHEEL NUTS

Wheel nuts should be tightened gradually and diagonally (in several stages, until the required tightening torque is obtained) using a torque wrench. See Figure (5.20) for the recommended nut tightening sequence and tightening torque value.

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.

Wheel nuts should be tightened:

- after the first use of the trailer (one-time inspection),
- every 2–3 hours of the trailer travel during the first month of the trailer use,
- every 30 hours of trailer travel.

The above activities should be repeated if a wheel has been removed from the wheel axle.

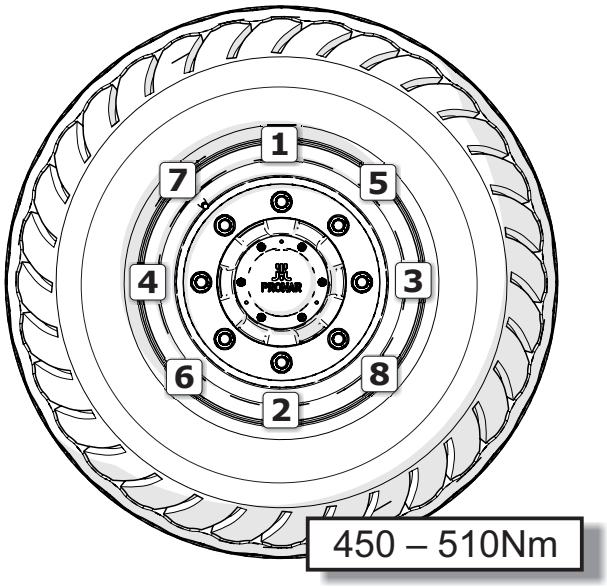


Figure 5.23 Wheel tightening principle

5.7.3 INSPECTION OF NUT AND BOLT CONNECTIONS

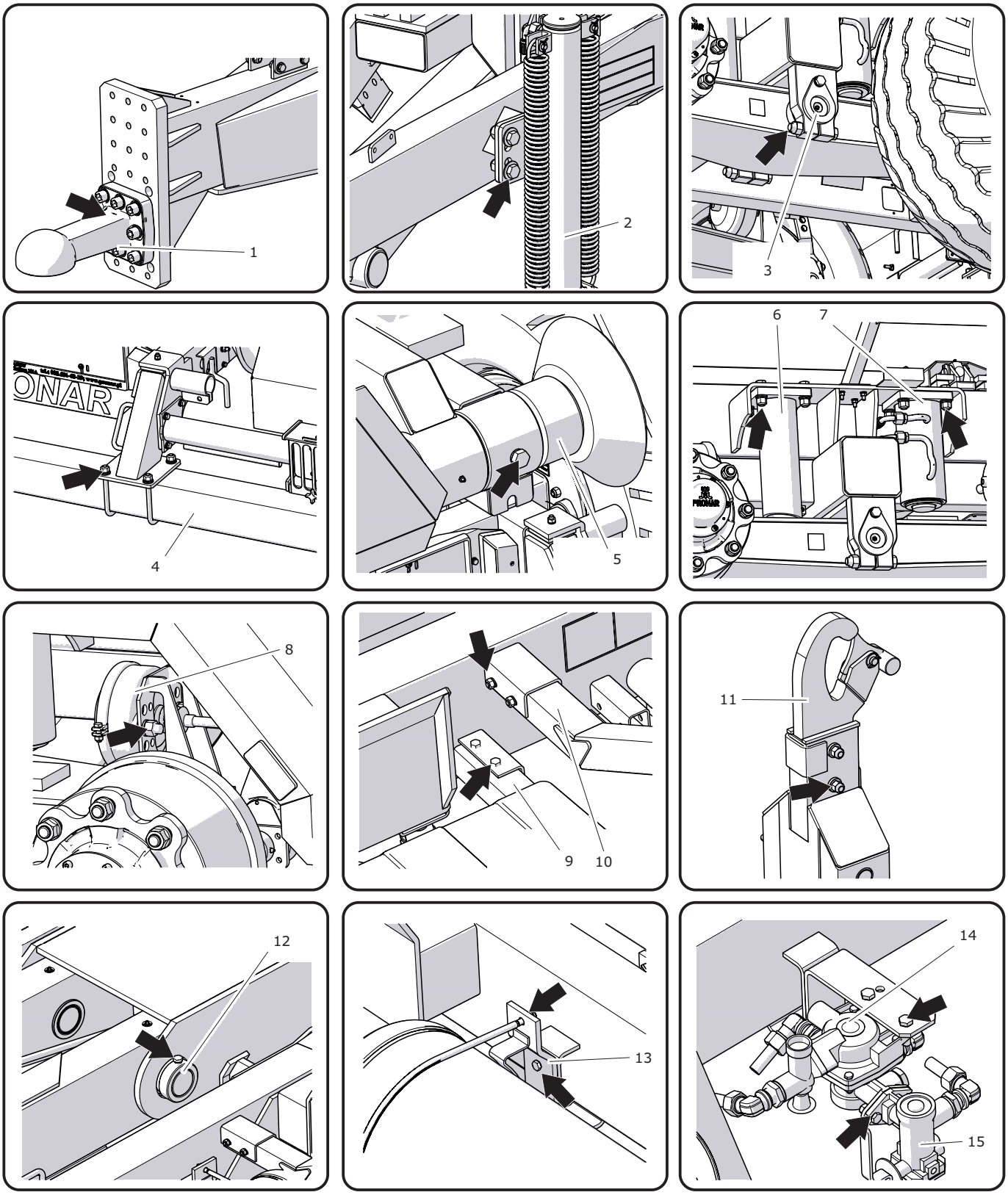


Figure 5.24 Inspection points of screw joints

Table 5.6. Tightening schedule for important bolt and nut connections

Item	Trailer system / part name	Frequency
-	Wheel	according to Section 5.7.2
1	Drawbar hitching eye	30H
2	Parking stand	30H
3	Rocker arm pin	30H
4	Rear beam	30H
5	Frame axle	6M
6	Tipping limiter	6M
7	Suspension interlock cylinder	6M
8	Brake cylinders	3M
9	Toolbox bracket	6M
10	Bracket of under-run protection devices, mudguards.	6M
11	Hook	3M
12	Protection of pins	6M
13	Air tank mounting	6M
14	Mounting of control valve, hydraulic manifold	6M
15	Mounting of regulator	6M

Frequency: H - hours, M - months

5.8 OPERATION CONSUMABLES

5.8.1 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.

Because of its composition the oil applied 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

Table 5.7. L-HL 32 Lotos oil characteristics

Item	Name	Unit	
1	ISO 3448VG viscosity classification	-	32
2	Kinematic viscosity at 40°C	mm^2/s	28.8 – 35.2
3	ISO 6743/99 quality classification	-	HL
4	DIN 51502 quality classification	-	HL
5	Flash-point	C	230

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

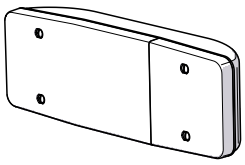
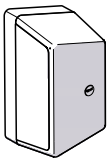
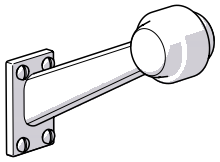
5.8.2 LUBRICANTS

For heavily loaded parts it is recommended to apply lithium greases with addition of molybdenum disulphide (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 grease, read its information leaflet. 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.

5.8.3 BULBS

Table 5.8. List of bulbs used in the lighting system

Item	Name	Unit	Bulb	Number of lamps	Number of bulbs
1	Rear right lamp assembly		R10W P21W	1	1 2
2	Rear left lamp assembly		R10W P21W	1	1 2
3	Licence plate light		C5W-SV8.5	2	1
4	Right clearance lamp		R5W	1	1
5	Left clearance lamp		R5W	1	1

TIP

Light-emitting diodes (LED) are used as the source of light in other points not listed in Table 5.8. Damaged lights can be replaced only as complete units. It is impossible to repair or regenerate them.

5.9 TROUBLESHOOTING

Table 5.9. Troubleshooting

Fault	Cause	Remedy
Problem with moving off.	Brake system conduits not connected	Connect brake conduits.
	Applied parking brake.	Release parking brake.
	Damaged pneumatic system connection conduits.	Replace.
	Leaking connections.	Tighten, replace washers or seal sets, replace conduits.
	Damaged control valve or brake force regulator.	Check valve, repair or replace.
Problem with moving off.	Lack of air in brake system.	Aerate brake system.
Noise in wheel axle hub.	Excessive bearing slackness.	Check slackness and adjust if needed.
	Damaged bearings.	Replace bearings.
	Damaged hub parts.	Replace.
Poor efficiency of braking system.	Insufficient pressure in the system.	Check pressure on tractor pressure gauge, wait till compressor fills tank to required pressure. Damaged air compressor in tractor Repair or replace. Damaged brake valve in tractor. Repair or replace. Leaking system conduits or connections. Check system for tightness.
Overheating of axle hubs.	Damaged self-regulator of expander lever.	Replace.
	Worn brake linings.	Change brake shoes.

Fault	Cause	Remedy
Incorrect hydraulic system operation.	Improper hydraulic oil viscosity.	Check quality of oil. Change oil.
	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 load.	Check and reduce cylinder load, if necessary
	Damaged hydraulic conduits.	Check and ascertain that hydraulic conduits are tight, not fractured and properly tightened. If necessary, replace or tighten.
	Contaminated hydraulic oil.	Check cleanliness of oil, replace filters, replace oil, clean up reservoir.
Excessive wear of left and right tyre shoulders on both sides.	Too low air pressure in tyres. Excessive speed of travel on turns. Too fast loss of air due to damaged wheel, valve, puncture.	Check air pressure. Regularly check correctness of air pressure in tyres. Reduce speed of travel while driving on turns on hardened surface. Check wheel and valve. Replace damaged parts.
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.	Incorrect toe-in. Incorrectly positioned wheel axles.	Damaged leaf spring on one side of the suspension system. Replace leaf springs.
Worn tyre tread.	Damaged suspension system, broken leaf spring. Damaged brake system, blocking of brakes, incorrectly adjusted brake system. Too frequent and violent braking.	Check suspension system for looseness, check leaf springs. Replace damaged or worn elements. Check brake system for malfunctions. Adjust expander lever.

Fault	Cause	Remedy
Side crack.	Prolonged use of tyre with low air pressure. Excessive load of the shredder.	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.
Various functions of the shredder do not operate.	Burnt out fuse	Replace fuse with a correct one.
	Damaged relay.	Check and replace.

ANNEX A

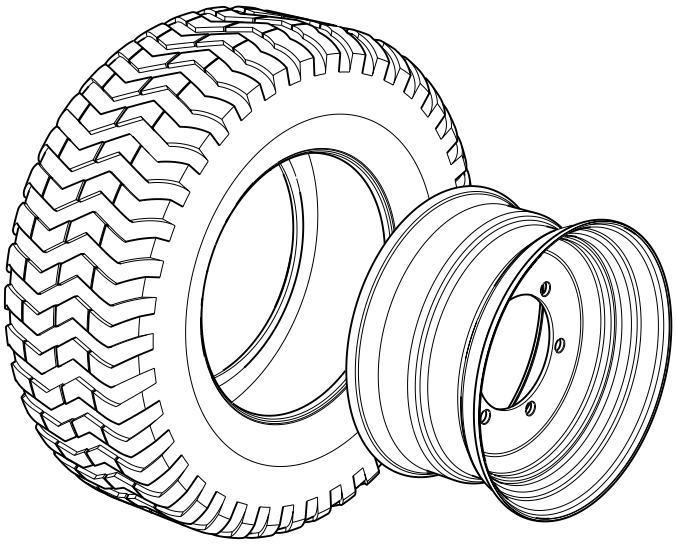


Table A.1. Tyre system

Item	Tyre	Wheel rim	Pressure
1	500/50-17 18PR 157A8 AW-708 TL IMPLEMENT BKT	16.00x17” part number 17.16.33	440 kPa
2	500/50-17 18PR 155A8 IM-07 TL IMPLEMENT MITAS	16.00x17” part number 17.16.33	440 kPa
3	500/50-17 18 PR 157 A8 Farm Impl. Flotation Carlstar Group	16.00x17” part number 17.16.33	475 kPa
4	500/50-17 18PR 154 A8 327 FarmPro IMP Alliance	16.00x17” part number 17.16.33	300 kPa
5	385/55 R22.5 160F reg. Kargo-Radial TL BANDENMARKT	11.75x22.5 ET-30 part number 225.1175.109	550 kPa
6	385/55 R22.5 160F XZA2 TL BANDENMARKT	11.75x22.5 ET-30 part number 225.1175.109	550 kPa
7	385/55 R22.5 160F Farmer G&H EF15	11.75x22.5 ET-30 part number 225.1175.109	550 kPa
8	520/50-17 159A8 Rib Trailer 306 TL TRELLEBORG	16.00x17” part number 17.16.09	360 kPa
9	520/50-17 159A8 ST-156 TL STARCO	16.00x17” part number 17.16.09	390 kPa
10	520/50-17 162A8 AW TL Starco	16.00x17” part number 17.16.09	400 kPa