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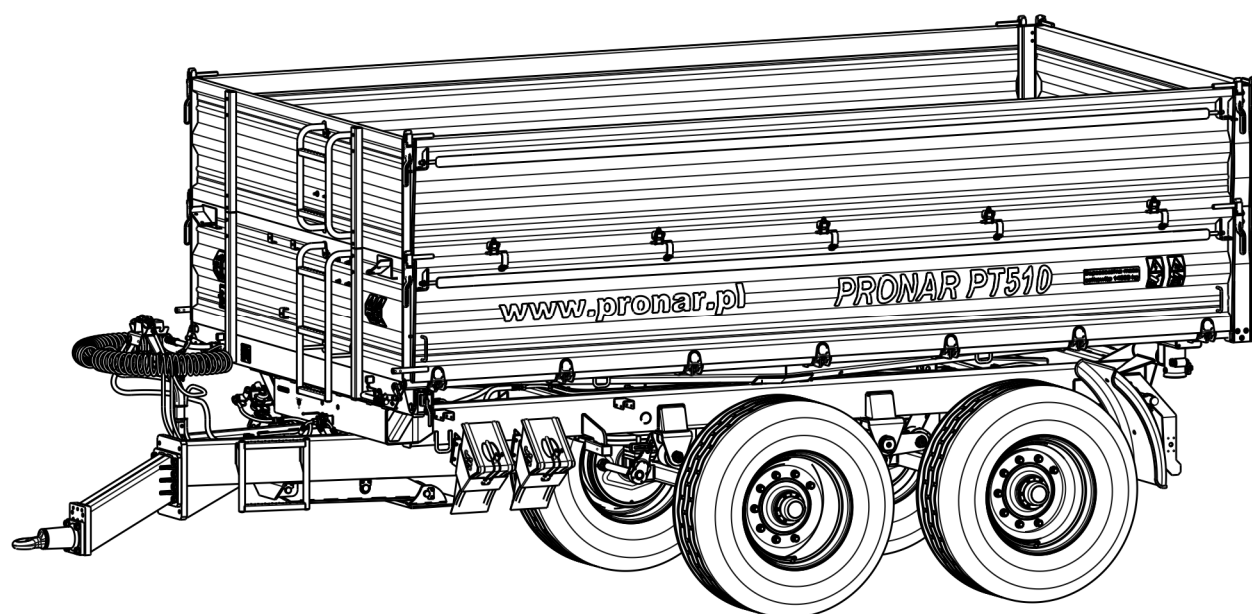
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OPERATOR'S MANUAL

TRAILER

PRONAR PT510

TRANSLATION OF THE ORIGINAL DOCUMENT



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EN

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

Information contained herein is current as of the date of its 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 delivered to the user. The manufacturer reserves the right to introduce design changes in manufactured machines that facilitate operation and improve the quality of their work, without making amendments to this Operator's Manual.

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

The manual describes the basic safety and operation rules of Pronar PT510 trailer.

If the information contained in the Operator's Manual needs clarification, the user should refer for assistance to the sale point where the machine was purchased or to the manufacturer.

MANUFACTURER'S ADDRESS

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PHONE NUMBERS

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SYMBOLS USED IN THIS MANUAL

Information, descriptions of danger, precautions, recommendations and orders associated with user safety instructions are indicated as follows:



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

Particularly important information and instructions, the observance of which is essential, are indicated with the sign:



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

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



Additional tips contained in this document refer to helpful information on the machine operation and are indicated as follows:



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

DETERMINING THE DIRECTIONS FOR THE MANUAL'S NEEDS

Left side — a left hand side of the person facing the machine's forward travel direction.

Right side — a right hand side of the person facing the machine's forward travel direction.

SCOPE OF OPERATION STEPS

Operation steps are indicated with the following sign: ➡

The result of an operation/adjustment task or any notes on execution of the tasks performed is indicated with the sign ⇒

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EC DECLARATION OF CONFORMITY OF THE MACHINERY

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

Description and identification of the machinery	
Generic denomination and function:	Trailer
Type:	PT510
Model:	—
Serial number:	
Commercial name:	Trailer PRONAR PT510

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

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

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

Narew, the 10 MAJ 2012

Place and date

Z-CA DYREKTORA
d/s technicznych
członek zarządu

Roman Omeńianiuk

*Full name of the empowered person
position, signature*

SECTION

1

BASIC INFORMATION

1.1 IDENTIFICATION

1.1.1 TRAILER IDENTIFICATION

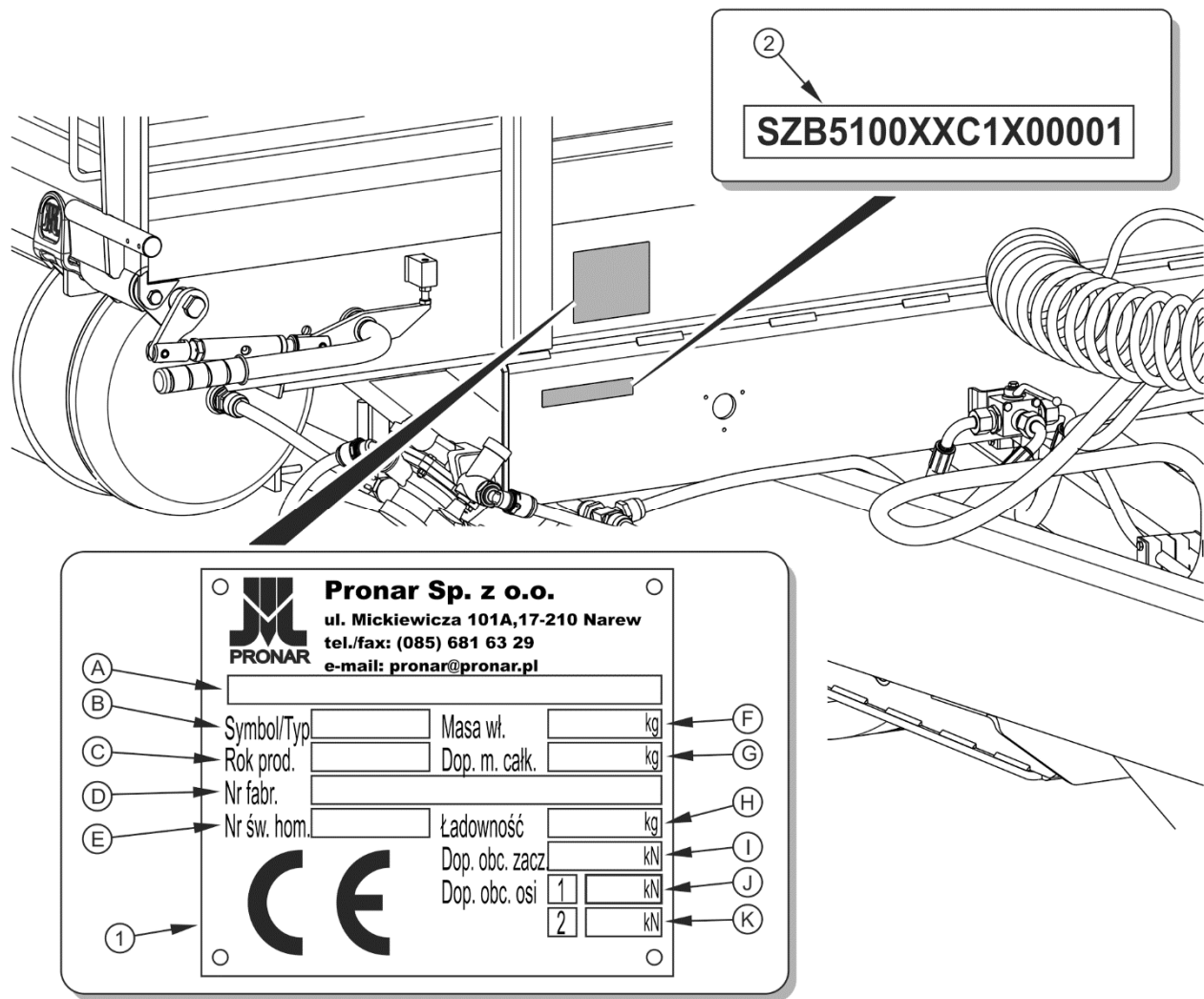


FIGURE 1.1 Location of the data plate and serial number

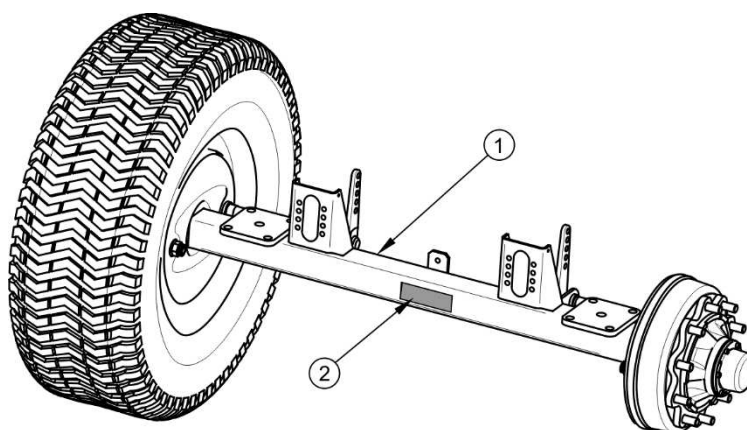
(1) data plate, (2) serial number

The trailer is marked with the data plate (1), and the serial number (2) located on a gold painted rectangle. The data plate is located on the front beam of the main frame and the serial number is stamped into the front beam of the chassis frame – figure (1.1). When buying the trailer check that the serial numbers on the machine agree with the number written in the *WARRANTY BOOK*, in the sales documents and in the *OPERATOR'S MANUAL*. The meanings of the individual fields found on the data plate are presented in the table below:

TABLE 1.1 Markings on data plate

ITEM	MARKING
A	General description and purpose
B	Symbol / type of trailer
C	Trailer's year of manufacture
D	Seventeen digit vehicle identification number (VIN)
E	Official certificate number
F	Tare weight
G	Maximum gross weight
H	Carrying capacity
I	Permissible hitching system loading
J	Permissible axle 1 load
K	Permissible axle 2 load

1.1.2 AXLE IDENTIFICATION

**FIGURE 1.2 Location of the axle data plate**

(1) axle, (2) data plate

The factory number of the axle shaft and its type are stamped onto the data plate (2) secured to the axle beam (1) – figure (1.2).

1.1.3 LIST OF SERIAL NUMBERS

VIN

S	Z	B	5	1	0						X				
---	---	---	---	---	---	--	--	--	--	--	---	--	--	--	--

FRONT AXLE FACTORY NUMBER

REAR AXLE FACTORY NUMBER



TIP

In the event of ordering a replacement part or in the case of the appearance of problems it is often essential to give the factory numbers of parts or the VIN number of the trailer, therefore it is recommended that these numbers are inscribed in the spaces below.

1.2 INTENDED USE

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

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

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

ATTENTION

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



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

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

- carefully read the *OPERATOR'S MANUAL* 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.

TABLE 1.2 Requirements for agricultural tractor

CONTENTS	UNIT	REQUIREMENTS
Brake system - sockets		
Pneumatic system 1 conduit	-	according to A DIN 74 294
Double conduit pneumatic system	-	according to A DIN 74 294
Hydraulic system	-	according to ISO 7421-1
Pressure in the system		
Single conduit pneumatic system	bar / kPa	5.8 – 6.5 / 580 - 650
Double conduit pneumatic system	bar / kPa	6.5 / 650
Hydraulic system	bar / MPa	150 / 15
Hydraulic tipper system		
Hydraulic oil	-	L HL 32 Lotos ⁽¹⁾
Maximum system pressure	bar / MPa	200 / 20
Oil demand:	l	15
Electrical system		
Electrical system voltage	V	12
Connection socket	-	7-pole socket compliant with ISO 1724
Required tractor hitch		
Type of hitch	-	Hitch for single axle trailer
	-	Upper transport hitch
Minimum vertical load capacity	kg	1,950
Other requirements		
Min. tractor power	kW / hp	54.4 / 74

⁽¹⁾ – use of other oil is permitted on condition that it may be mixed with the oil in the trailer. Detailed information can be found on the product information card.

In the event that the trailer shall be hitched to a second trailer it must fulfil the requirements stipulated in table (1.4).

TABLE 1.3 Recommended types of pallets

PALLET NAME - TYPE	LENGTH [MM]	WIDTH [MM]	HEIGHT [MM]
EURO pallet – standard	1,200	800	144
EURO pallet – ½	800	600	144
EUR pallet – extended	1,200	1,200	144

TABLE 1.4 Requirements for second trailer

CONTENTS	UNIT	REQUIREMENTS
Maximum gross weight Double axle agricultural trailer	kg	14 200
Brake system - connectors Pneumatic system 1 conduit Double conduit pneumatic system Hydraulic system Pressure in the system Single conduit pneumatic system Double conduit pneumatic system Hydraulic system	- - - bar / kPa bar / kPa bar / MPa	coupler compliant with A DIN 74294 coupler compliant with A DIN 74294 coupler compliant with ISO 7421-1 5.8 – 6.5 / 580 - 650 6.5 / 650 150 / 15
Hydraulic tipper system Hydraulic oil Minimum system pressure	- bar / MPa	L HL 32 Lotos ⁽¹⁾ 200 / 20
Electrical system Electrical system voltage Connection socket	V -	12 7-pole socket compliant with ISO 1724
Trailer's drawbar Diameter of drawbar eye Type of the drawbar	mm -	40 swing (double axle trailer)

⁽¹⁾ – use of other oil is permitted on condition that it may be mixed with the oil in the trailer. Detailed information can be found on the product information card.

**TIP**

Tractor requirements depend on trailer accessories.

1.3 EQUIPMENT

TABLE 1.5 Trailer's equipment

EQUIPMENT	STANDARD	ADDITIONAL	OPTIONS
Operator`s Manual	•		
Warranty Book	•		
Single conduit pneumatic system			•
Double conduit pneumatic system	•		
2-line pneumatic system with automatic regulator			•
Hydraulic brake system			•
Hand brake	•		
Mudguards set	•		
Mudguards set rear + front			•
Hydraulic shear type support	•		
Rotating drawbar eye Ø50 mm	•		
Drawbar eye Ø40 mm			•
Ball drawbar eye K80.			•

EQUIPMENT	STANDARD	ADDITIONAL	OPTIONS
Wheel chocks	•		
Automatic rear hitch		•	
Manual rear hitch		•	
Slow-moving vehicle warning sign		•	
Reflective warning triangle		•	
Set of walls (600 mm)	•		
Set of wall extensions (600mm)	•		
Set of 600 mm additional middle extensions		•	
Frame with tarpaulin cover and fenced platform		•	
Walls reinforcement	•		
Chute		•	
Under-run protection devices		•	
Side pull-off mechanism		•	
Connection lead for the electrical system	•		

Some standard equipment elements, which were listed in table (1.4), may not be present in the delivered trailer. This allows the possibility of ordering new machines with a different set of optional equipment, replacing standard equipment.

Information on tyres is provided at the end of this publication in *ANNEX A*.

1.4 TERMS & CONDITIONS OF WARRANTY

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

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

- drawbar hitching eye,
- pneumatic system connector filters,
- 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.

**TIP**

Demand that the seller carefully and precisely fills out the Warranty Book and guarantee repair coupons. A missing date of purchase or sale point stamp may make the user ineligible for any warranty repair or refund.

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.

1.5 TRANSPORT

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

1.5.1 TRANSPORT ON VEHICLE.

Loading and unloading of 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 connected with the tractor according to the requirements in this Operators Manual. The trailer braking system must be started and checked before driving off or onto ramp.

The trailer should be attached firmly to the platform of the vehicle using straps or chains fitted with a tightening mechanism. Securing elements should be attached to the transport catches designed for this purpose (1) – figure (1.3), or permanent structural elements of the trailer (longitudinal members, crossbars etc.) Transport catches (hooks and eyes) are welded to upper longitudinal frame (2), with one pair on each side of the trailer. Use certified and technically reliable securing measures. Worn straps, cracked securing catches, bent or corroded hooks as well as elements damaged in a different way may be unsuitable for use. Carefully read the information contained in the Operator's Manual for the given securing measure. Chocks, wooden blocks or other objects without sharp edges should be placed under the wheels of the trailer to prevent it from rolling. Trailer wheel blocks must be nailed to the low platform planks of the vehicle or secured in another manner preventing their movement. The number of securing elements (cables, straps, chains and stay etc.) and the

force necessary for their tensioning depends on a number of things, including weight of the trailer, the construction of vehicle carrying trailer, speed of travel and other conditions. To secure the trailer optimally on the load platform, support the drawbar with wooden blocks. For this reason it is impossible to define the securing plan precisely. 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 apply 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.

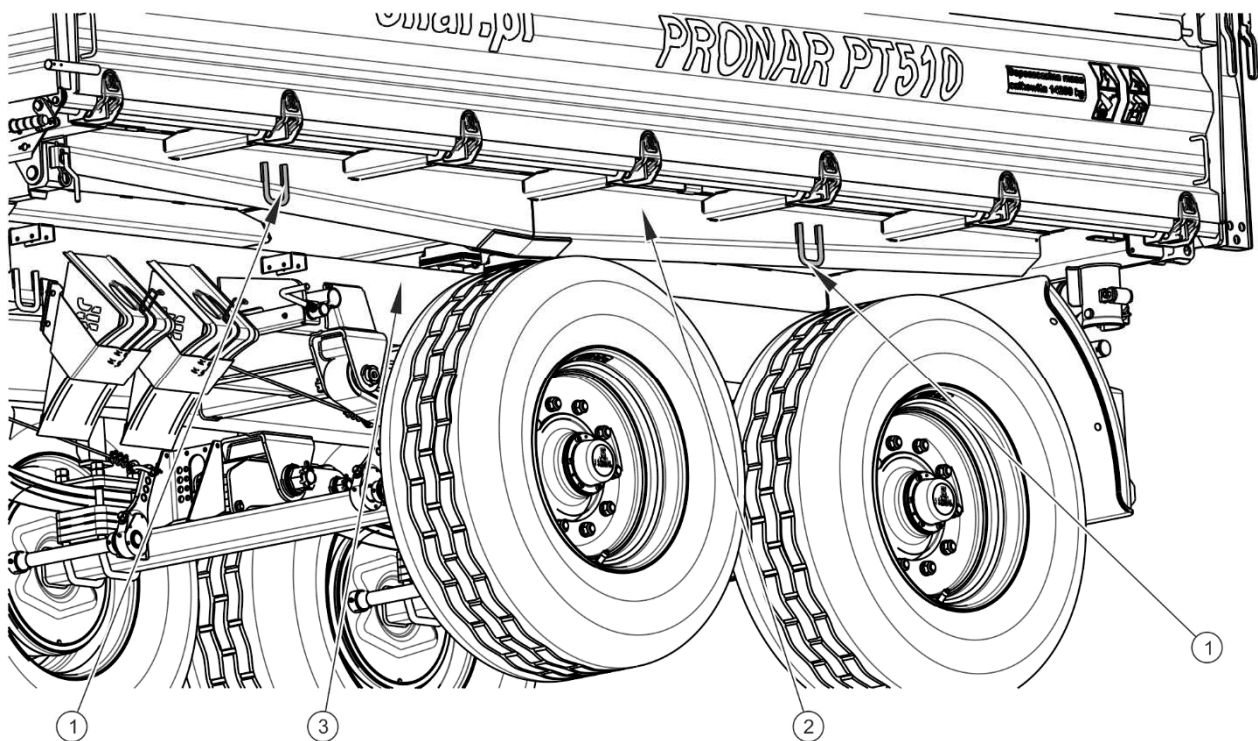


FIGURE 1.3 Positioning of transport lugs

(1) transport lug, (2) longitudinal member of upper frame, (3) longitudinal member of lower frame



DANGER

Incorrect use of securing measures may cause an accident.

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

1.5.2 INDEPENDENT TRANSPORT BY THE USER.

In the event of independent transport by the user after purchase of the 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



When being road transported on a motor vehicle the trailer 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.



ATTENTION

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

1.6 ENVIRONMENTAL HAZARDS

A hydraulic oil leak constitutes a direct threat to the natural environment owing to its limited biodegradability. Because of the low solubility of oil in water, it is not highly toxic to living organisms. An oil leak into water reservoirs may however lead to a reduction of the oxygen content.

While carrying out maintenance and repair work, which involves the risk of an oil leak, this work should take place on an oil resistant floor or surface. In the event of oil leaking into the environment, first of all contain the source of the leak, and then collect the leaked oil using available means. Remaining oil should be collected using sorbents, or by mixing the oil with sand, sawdust or other absorbent materials. The oil pollution, once gathered up, should be kept in a sealed, marked, hydrocarbon resistant container. The container should be kept away from heat sources, flammable materials and food.

**DANGER**

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

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

**TIP**

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

**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.

1.7 WITHDRAWAL FROM USE

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 system (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.

**DANGER**

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

SECTION

2

SAFETY ADVICE

2.1 BASIC SAFETY RULES

2.1.1 USE OF TRAILER

- Before using the machine, the user must carefully read this Operator's Manual and the *WARRANTY BOOK*. When operating the machine, the operator must comply with all recommendations contained in the Operator's Manual.
- The trailer may only be used and operated by persons qualified to drive agricultural tractors with a trailer.
- If the information contained in the Operator's Manual is difficult to understand, contact the seller who runs the authorised technical service on behalf of the Manufacturer, or contact the Manufacturer directly.
- Careless and incorrect use and operation of the trailer, and non-compliance with the recommendations given in this operator's manual is dangerous to your health.
- Be aware of the residual risk. Use caution when operating this machine and follow all relevant safety instructions.
- The machine must never be used by persons who are not authorised to drive agricultural tractors, including children and people under the influence of alcohol, drugs or other abusive substances.
- Non-compliance with the safety rules of this Operator's Manual can be dangerous to the health and life of the operator and others.
- The trailer must not be used for purposes other than those for which it is intended. Anyone who uses the trailer other than the way intended takes full responsibility for himself for any consequences of this potentially incorrect use. Use of the machine for purposes other than those for which it is intended by the Manufacturer may invalidate the guarantee.
- Assembly and disassembly of wall extensions should be carried out with the use of appropriate platforms, ladders or when standing on a ramp. These devices must be in good condition to fully protect the persons working on them against falling. The above procedure should be performed by at least two persons.

- The user is obliged to acquaint himself with the construction, action and the principles of safe usage of the trailer.

2.1.2 HITCHING AND UNHITCHING FROM TRACTOR

- Do NOT hitch trailer to tractor, if it does not fulfil the requirements made by the Manufacturer (minimal tractor power requirement, lack of required tractor hitch etc.) – compare table (1.2) *AGRICULTURAL TRACTOR'S REQUIREMENTS*. Before hitching the trailer make certain that oil in external hydraulic system of tractor may be mixed with the hydraulic oil of the trailer.
- Before hitching the trailer check that both machines are in good technical condition.
- While connecting the trailer to the tractor, use the appropriate hitch. After completed hitching of the machines check that the hitch is properly secured. Carefully read the tractor Operator's Manual. If the tractor is equipped with an automatic hitch, make certain that the coupling operation 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 unhitching the trailer from the tractor when load box 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. If moved there is a risk of damage to the parking stand cylinder.

2.1.3 HITCHING AND UNHITCHING THE SECOND TRAILER

- Do NOT connect a second trailer, if it does not fulfil the requirements made by the Manufacturer of (lack of required drawbar eye, exceeding permissible total weight etc.) – compare table (1.3) *REQUIREMENTS FOR SECOND TRAILER*. Before hitching the machines make certain that the oil in both trailers may be mixed.
- Only trailer built on a double axle chassis with permissible total weight described in table (1.3) may be hitched to the trailer.

- Before hitching the trailer check that both machines are in good technical condition.
- Be especially careful when hitching the machine.
- When hitching, there must be nobody between the trailers. Person assisting in hitching the machines should stand outside the area of danger and be visible to the tractor driver at all times.
- Do NOT proceed with unhitching the second trailer from the tractor when load box is raised.
- After completed hitching of the trailer check the safety of the hitch.

2.1.4 HYDRAULIC AND PNEUMATIC SYSTEMS

- 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. There must be no oil or air leaks.
- Cut-off valve in the hydraulic tipping system limits the tipping angle of the load box when tipped to the sides and to the rear. The length of the control cable controlling this valve is factory adjusted by the Manufacturer and must not be changed when the trailer is used.
- 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 the hydraulic system 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 penetrate the skin and cause infections. In the event of contact of oil with eyes, rinse eyes with a large quantity of water and in the event of the occurrence of irritation 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.

- After changing the hydraulic oil, the used oil should be properly disposed of. 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.

2.1.5 LOADING AND UNLOADING

- Loading and unloading work should be carried out by persons experienced in this type of work.
- Before loading make certain that linking cables are laid and release mechanism is set in proper position and secured with the aid of cotter pin. If the loaded material does not exert any pressure on the trailer sides it is permitted to dismantle clamping cable. Otherwise, load exerting pressure on the walls will cause damage to the walls.
- Use only original tipping pins with a handle. Using non-original pins could damage the trailer.
- The trailer is not intended for transporting people, animals or hazardous materials.
- The load must be arranged in such a way that it does not threaten the stability of the trailer and does not hinder driving.
- The arrangement of the load may not cause an overload on the axle and drawbar of the trailer.
- Incorrect load distribution and overloading the machine may cause the trailer to tip over or cause damage to its components.
- Do NOT climb on load box during loading and unloading.
- Unloading and loading of trailer may only take place when the machine is positioned on level and hard surface and connected to tractor. Tractor and trailer must be placed to drive forwards.

- Ensure that during unloading / loading or raising the load box nobody is near the trailer. Before tipping the load box ensure proper visibility and make certain that there are no bystanders near the trailer.
- During loading and unloading, the drawbar eye and the tractor hitch are subjected to dynamic vertical load.
- Before raising the load box, the tipping pins should be placed on the intended unloading side. Check if the pins are correctly inserted.
- Keep a safe distance from overhead electric power lines during unloading and when load box is raised.
- When opening load box side wall locks take particular care, because of the pressure of the load on the wall.
- Do NOT tip of the load box in windy conditions.
- Bulk materials loaded in excess of 1 m can be unloaded by tipping the load box to the rear only.
- Exercise due caution when unloading bulk materials from Pronar 663/1 SILO trailer or Pronar 663/1 trailer with the second set of wall extensions.
- When using Pronar 663/1 SILO trailer or Pronar 663/1 trailer with the second set of wall extensions there is an increased risk of: loss of trailer stability, trailer overturning, failure of the trailer's structural elements, insufficient visibility of the trailer's body elements, uncontrolled movements of the trailer's load box on an uneven terrain.
- Pay attention to safety of unloading on uneven terrain. Make certain that there is nobody near the trailer.
- If the load does not pour from the raised load box immediately cease unloading. The trailer may only be tipped again after removing the object, which prevented the load from pouring.
- In winter, particular attention must be paid to loads which may freeze during transport. When tipping the load box with frozen load the trailer may become unstable and tip over.

- Do NOT raise the load box if there is any danger whatsoever that the box will tip over.
- Do NOT tip the loaded load box when the walls are closed.
- Do NOT jerk the trailer forwards if load is bulky or reluctant to pour and does not unload.
- After completed unloading, ensure that the load box is empty.
- Do NOT drive with the load box raised.
- When closing or opening the rear grain chute gate or the walls and extensions take particular care to avoid crushing fingers.
- Do NOT go or place hand between opened walls and load box.
- Lower the load box before proceeding to deal with a malfunction. If it is necessary to raise the load box then secure it against dropping with the aid of supports. The load box may not be loaded. The trailer must be hitched to the tractor and secured with chocks and parking brake.

2.1.6 TRANSPORTING THE MACHINE

- 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 (1) should be placed only under one wheel (one chock in front of the wheel, the other behind the wheel - figure (2.1)).
- The machine must NOT be left unsecured. When not connected to the tractor, the trailer must be immobilised with parking brake and protected against rolling with chocks or other objects without sharp edges placed under the front and back wheels.
- Before driving make sure that the trailer is properly hitched to the tractor, especially if coupling bolts are secure.

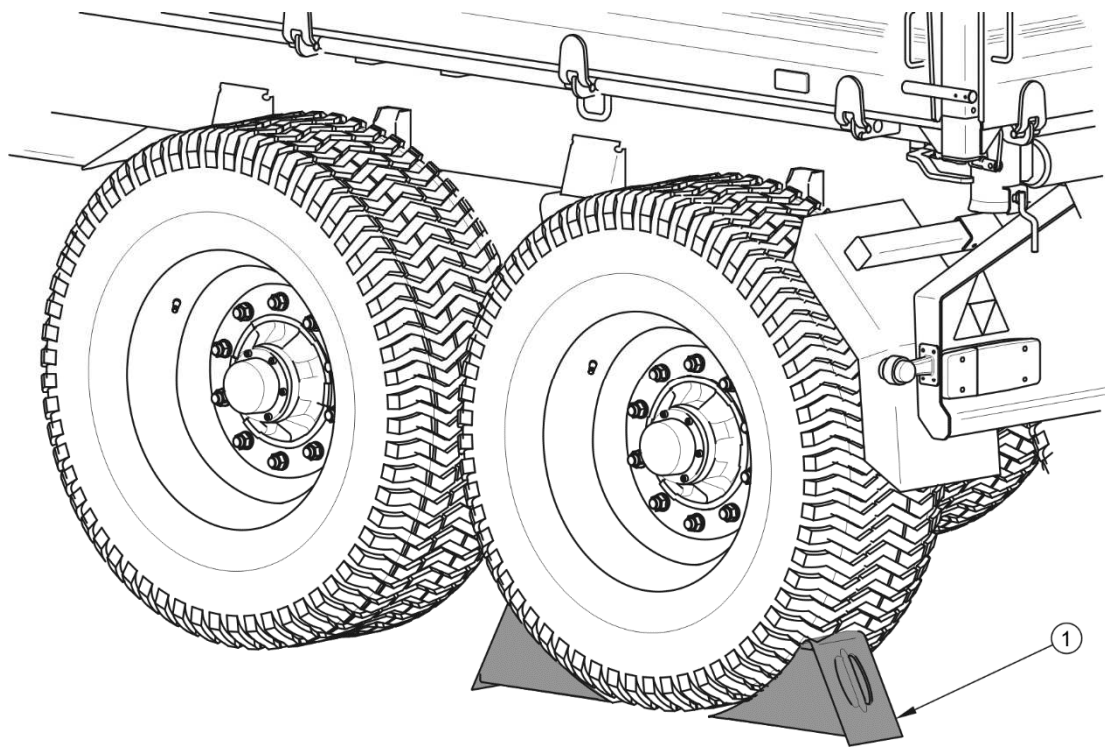


FIGURE 2.1 **Method of placing chocks**

(1) wheel chock

- Do NOT move off or drive when load box is raised.
- Prior to moving off make sure that tipping pins connecting the load box and the lower frame and the side wall hinge pins are secured against falling out. Check if the rear wall slide gate is secured. Check that all walls and extensions are properly closed. Check correctness of the securing of linking cables and a security of cable release mechanism.
- Before using the trailer always check its technical condition, especially in terms of safety. In particular, check the technical condition of the hitch system, the axle system, the brake system, indicator lights and the connective elements of the hydraulic, pneumatic and electrical systems.
- Before driving off check that the parking brake is released, the braking force regulator is positioned in the proper position (applies to pneumatic systems with manual three-position regulator).
- The trailer is designed to operate on slopes up to 8°. 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 and the tractor must be fitted with a certified or authorised reflective warning triangle.
- Periodically drain water from the air tanks in pneumatic system. During frosts, freezing water may cause damage to pneumatic system components.
- Reckless driving and excessive speed may cause accidents.
- 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.

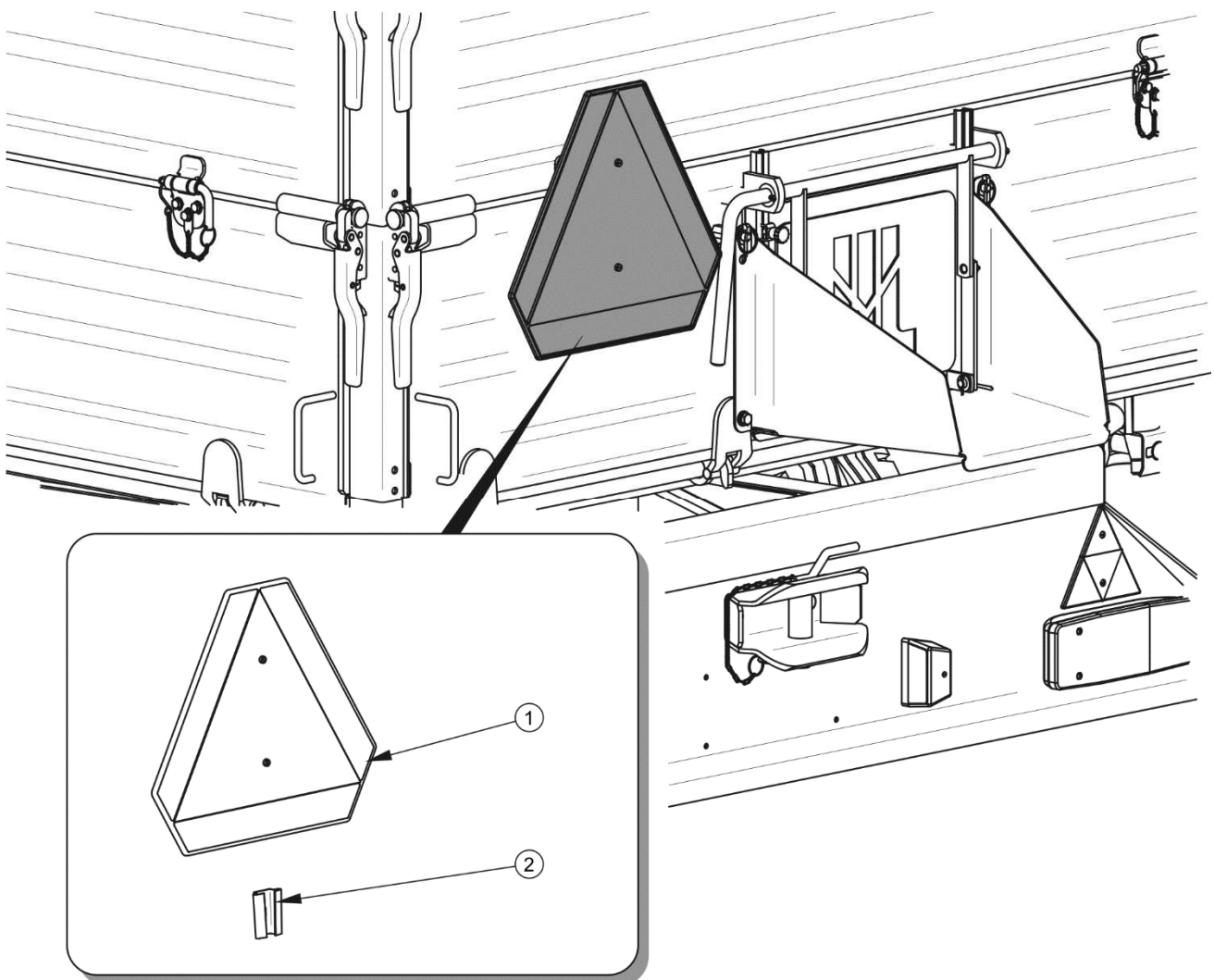


FIGURE 2.2 Mounting place for slow-moving vehicle warning sign

(1) slow-moving vehicle warning sign, (2) attachment point

- Do NOT exceed the trailer's maximum carrying capacity. Exceeding the carrying capacity may lead to damage to the machine, loss of stability while driving, scattering of the load 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.
- If the trailer is the last vehicle in the group, - figure (2.2), a slow-moving vehicle warning sign should be placed on the trailer's rear load box wall. The warning sign (1) should be attached using the specifically prepared holder (2), riveted to the rear wall of the load box.
- Load must be uniformly distributed and it must not obstruct visibility or hinder driving.
- The load must be secured so that it cannot move or fall over.
- 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.
- Do NOT park the trailer on a slope.

2.1.7 TYRES

- When working with tyres, the trailer should be immobilised with parking brake and secured against rolling by placing chocks under wheel. Wheels can be taken off the trailer axle only when the trailer is not loaded.
- Repair work on the wheels or tyres should be carried out by persons trained and entitled to do so. This work should be carried out using appropriate tools.
- Inspect tightness of nuts before the first use of trailer, after the first travel under load and then every 6 months of use or every 25,000 km. In the event of intensive work, check the nut tightening at least every 100 km. The inspection should be repeated individually if a wheel has been removed from the wheel axle.
- Avoid potholes, sudden manoeuvres or high speeds when turning.

- Check the tyre pressure regularly. Air pressure in tyres should be also checked during the whole day of intensive work. Please note that higher temperatures could raise tyre pressure by as much as 1 bar. At high temperatures and pressure, reduce load or speed. Do not release air from warm tyres to adjust the pressure or the tyres will be underinflated when temperatures return to normal.
- Protect tyre valves using suitable caps to avoid soiling.

2.1.8 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 with drawbar and wheel nuts.
- Service inspections should be carried out according to the schedule in this Operator's Manual.
- Before beginning work, which requires raising the load box, it should be emptied and secured with the support leg. The trailer must at this time be hitched to the tractor and secured with chocks and parking brake.
- Before beginning repair work on hydraulic or pneumatic systems reduce oil or air pressure completely.

- Servicing and repair work should be carried out in line with the general principles of workplace health and safety. In the event of injury, the wound must be immediately cleaned and disinfected. In the event of more serious injuries, seek a doctor's advice.
- Repair, maintenance and cleaning work should be carried out with the tractor engine turned off and the ignition key removed. Tractor and trailer should be immobilized with parking brake and chocks should be placed under the trailer wheels. Ensure that unauthorised persons do not have access to the tractor cab.
- During maintenance or repair work, the trailer may be unhitched from tractor, but it must be secured with chocks and parking brake. During this work the load box may not be raised.
- Should it be necessary to change individual parts, use only those parts indicated by the Manufacturer. Non-adherence to these requirements may put the user and other people's health and life at risk, and also damage the machine and invalidate the guarantee.
- Before welding or electrical work, the trailer should be disconnected from the power supply. The paint coating should be cleaned. Burning paint fumes are poisonous for people and animals. Welding work should be carried out in a well lit and well ventilated space.
- During welding work pay attention to flammable or fusible elements (parts of the pneumatic, electric and hydraulic systems, plastic parts). If there is a risk that they will catch fire or be damaged, they should be removed or covered with non-flammable material before commencing welding work. Before beginning work, prepare a CO₂ or foam extinguisher.
- In the event of work requiring the trailer to be raised, use properly certified hydraulic or mechanical lifts for this purpose. After lifting the machine, stable and durable supports must also be used. Work must not be carried out under a trailer, which has only been raised with a lift or jack.
- The trailer must not be supported using fragile elements (bricks or concrete blocks).

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

2.2 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 or hitched to second trailer
- being on the machine during work,
- not maintaining safe distance during loading or unloading of trailer,
- operation of the trailer by persons under the influence of alcohol,
- making modifications to the machine without the consent of the Manufacturer,

- cleaning, maintenance and technical checks of the trailer,
- presence of persons or animals in areas invisible from the driver's position.


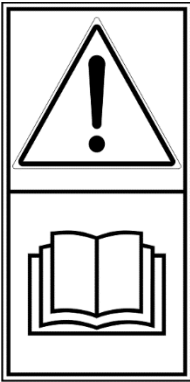
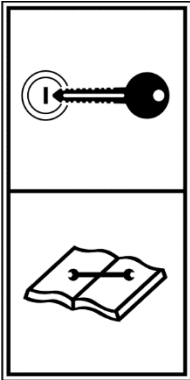

The residual risk can be kept to a minimum by following the recommendations below:

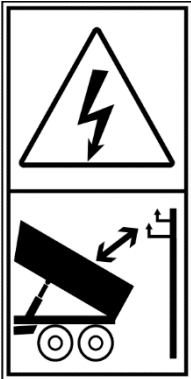
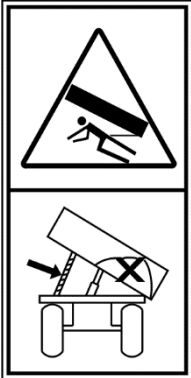
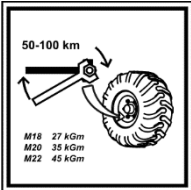



- operate the machine in prudent and unhurried manner,
- sensibly apply the remarks and recommendations contained in the Operator's Manual,
- maintain a safe distance from forbidden or dangerous places during unloading, loading and hitching trailer,
- carry out repair and maintenance work in line with 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 have no access to the machine, especially children.
- maintain a safe distance from forbidden or dangerous places
- a ban on being on the machine during travel, loading or unloading.



2.3 INFORMATION AND WARNING DECALS

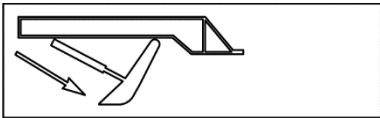
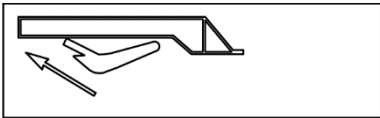


The trailer is labelled with the information and warning decals mentioned in tablev (2.1). The symbols are positioned as shown in figure (2.3). Throughout the time it is in use, the user of the machine is obliged to take care that notices and warning and information symbols located on the trailer are clear and legible. In the event of their destruction, they must be replaced with new ones. Safety decals are available from your PRONAR dealer or directly from PRONAR customer service. New assemblies, changed during repair, must be labelled once again with the appropriate safety signs. During trailer cleaning do not use solvents which may damage the coating of information label stickers and do not subject them to strong water jets.

TABLE 2.1 Information and warning decals

ITEM	DECAL	MEANING
1		Trailer version.
2		Caution! Before starting work, carefully read the Operator's Manual.
3		Before beginning servicing or repairs, turn off tractor engine and remove key from ignition. Ensure that unauthorised persons do not have access to the tractor cab.
4		Before climbing onto the trailer, switch off tractor's engine and remove key from ignition.

ITEM	DECAL	MEANING
5		<p>Caution! Danger of electric shock.</p> <p>Keep a safe distance from overhead electric power lines during unloading.</p>
6		<p>Danger of crushing</p> <p>Do NOT perform any maintenance or repairs on the load box that is loaded, raised or not supported.</p>
7		<p>Regularly check if the nuts and bolts fixing the wheels and other components are properly tightened.</p>
8		<p>Grease the trailer according to the recommendations in the Operator's Manual</p>
9		<p>Conduit supplying hydraulic brake system.</p>
10		<p>Conduit supplying hydraulic tipping system.</p>

ITEM	DECAL	MEANING																		
11	<div><div>Przybliżone masy wybranych towarów 1m =kg</div><table><tr><td>ZIEMIA</td><td>1600-1800</td></tr><tr><td>PSZENICA</td><td>710-820</td></tr><tr><td>RZEPAK</td><td>700-750</td></tr><tr><td>ZIEMNIAKI</td><td>625-725</td></tr><tr><td>BURAKI CUKROWE</td><td>650-700</td></tr><tr><td>ROŚLINY STRĄCZKOWE</td><td>760-820</td></tr><tr><td>KRUSZYWO BUDOWLANE</td><td>1400-1850</td></tr><tr><td>WAPNO</td><td>900-1500</td></tr><tr><td>WĘGIEL KAMIENNY</td><td>1200-1600</td></tr></table></div>	ZIEMIA	1600-1800	PSZENICA	710-820	RZEPAK	700-750	ZIEMNIAKI	625-725	BURAKI CUKROWE	650-700	ROŚLINY STRĄCZKOWE	760-820	KRUSZYWO BUDOWLANE	1400-1850	WAPNO	900-1500	WĘGIEL KAMIENNY	1200-1600	Guideline specific weight of selected goods.
ZIEMIA	1600-1800																			
PSZENICA	710-820																			
RZEPAK	700-750																			
ZIEMNIAKI	625-725																			
BURAKI CUKROWE	650-700																			
ROŚLINY STRĄCZKOWE	760-820																			
KRUSZYWO BUDOWLANE	1400-1850																			
WAPNO	900-1500																			
WĘGIEL KAMIENNY	1200-1600																			
12	<div><div>1</div><div>2</div></div>	Position of the control valve for the hydraulic tipping system.																		
13	<div>www.pronar.pl</div>	Information decal.																		
14	<div>550 kPa</div>	Air pressure in the tyres. ⁽¹⁾																		
15	<div>40</div>	Maximum design speed.																		
16	<div></div>	SILO attachment rising conduit.																		
17	<div></div>	SILO attachment lowering conduit.																		
18	<div><div>O</div><div>Z</div></div>	Position of the hydraulic support control valve.																		

ITEM	DECAL	MEANING
19		Shear type support lowering conduit.
20		Shear type support rising conduit.
21		Quality Control marking.
22		Maximum gross weight

⁽¹⁾ – pressure value should be adapted to tyres

Numbers in the item column correspond to labels in figure (2.3)

Decals, items (9), (10), (16), (17), (19) and (20), are placed on hydraulic conduits. Decals (12) and (18) are located near hydraulic valves.

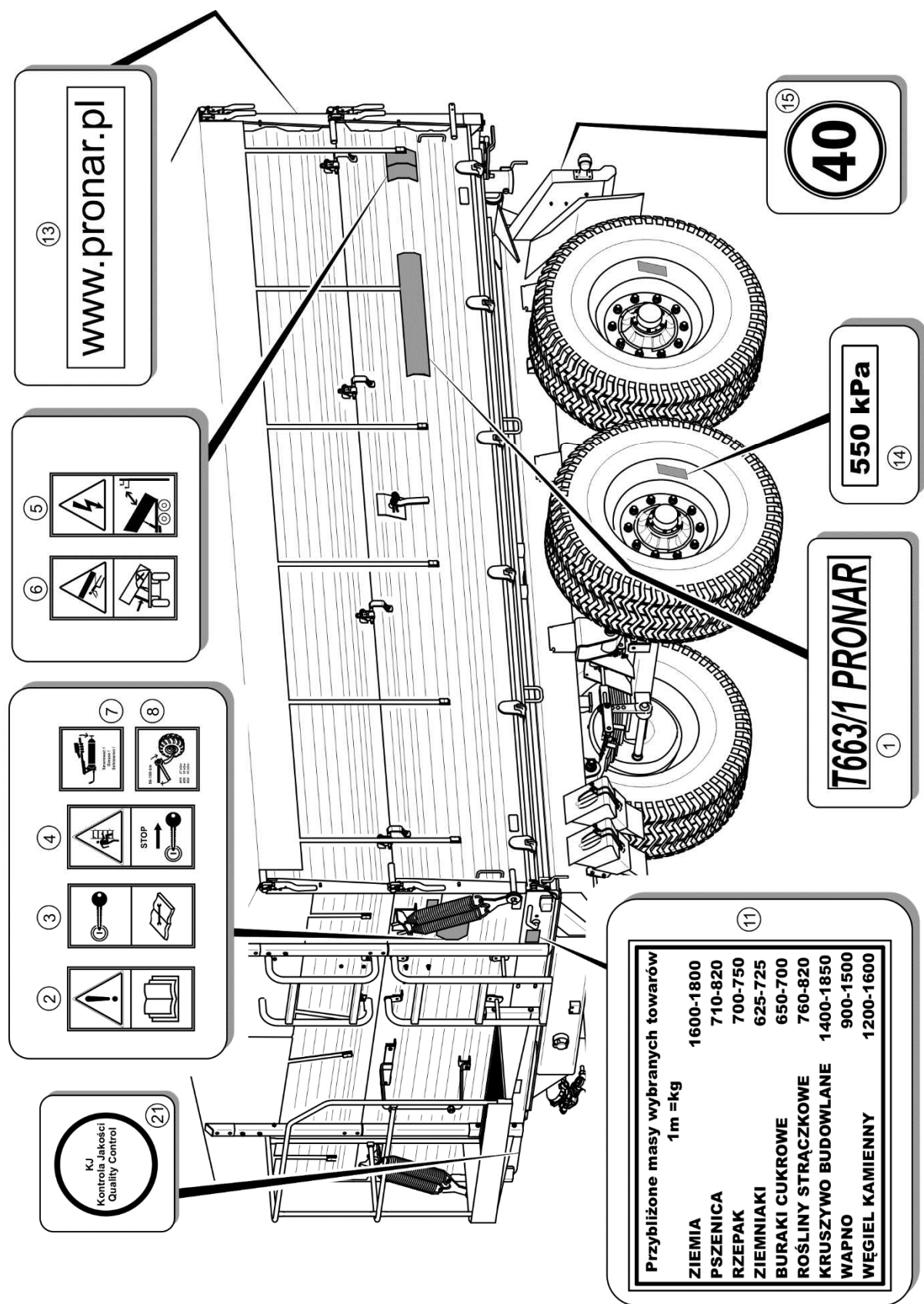


FIGURE 2.3 Locations of information and warning decals

SECTION

3

**DESIGN AND
OPERATION**

3.1 TECHNICAL SPECIFICATION

TABLE 3.1 Basic technical specification

CONTENTS	UNIT	PT510
Trailer dimensions		
Total length	mm	6,139
Total width	mm	2,550
Total height	mm	2,452
Internal load box dimensions		
Length	mm	5,440
Width	mm	2,410
Height	mm	600 + 600
Weight and carrying capacity		
Tare weight	kg	4,050
Maximum gross weight	kg	14,200
Maximum carrying capacity	kg	10,150
Other information		
Wheel track	mm	1,900
Cargo capacity	m ³	15.7
Load surface	m ²	13.1
Lift of load surface	mm	1,250
Load box tipping angle		
- to the sides	(°)	46
- to the rear	(°)	50
Electrical system voltage	V	12
Maximum speed	km/h	40
Noise emission level	dB	below 70
Tractor power demand	hp/kW	74 / 54.4
Hydraulic oil demand	l	16
Maximum drawbar load	kg	1,700

3.2 TRAILER CONSTRUCTION

3.2.1 CHASSIS

The trailer chassis consists of the subassemblies indicated in figure (3.1). Lower frame (1) is a structure welded from steel sections. Lower frame design depends on configuration of a given trailer version. The main support elements are two longitudinal members connected with crossbars. In the middle section there is a socket (2) used for mounting of the hydraulic tipping cylinder. Load box support (9) is mounted in front of the sockets of the tipping cylinder. At the rear part of the lower frame, the rear beam (7) is welded, which is terminated with ball pins. The support structure of the upper frame and the interlocking method allows tipping of the load box to the side and to the rear. Sockets for mounting the upper frame are welded on the left and right side of the front crossbars (8) of the lower frame.

In the rear section of the chassis there is lights support beam (3), to which mounted are all electrical systems elements as well as hydraulic and pneumatic system sockets which are used for connecting another trailer.

The trailer suspension consists of two axles (4) that are mounted to parabolic leaf springs (17) by means of U bolts. Absorber suspension is secured to lower frame (1). Axles are made from square bars terminated with a pin, where wheel hubs (5) are mounted on cone bearings. The wheels are single and equipped with shoe brakes activated by mechanical cam expanders. Rear wheels are shielded with a pair of mudguards (11) secured to the trailer frame brackets. Wheel chocks (12) are placed in the front part of the trailer, on the left longitudinal member. Just behind the chock bracket there is the parking brake crank mechanism bracket (13).

Hydraulic shear type support (10) is located between the drawbar's longitudinal members to which the drawbar faceplate (6) is welded. The drawbar can be set in two positions depending on tractor equipment. Drawbar eye (15) is bolted to the drawbar plate.

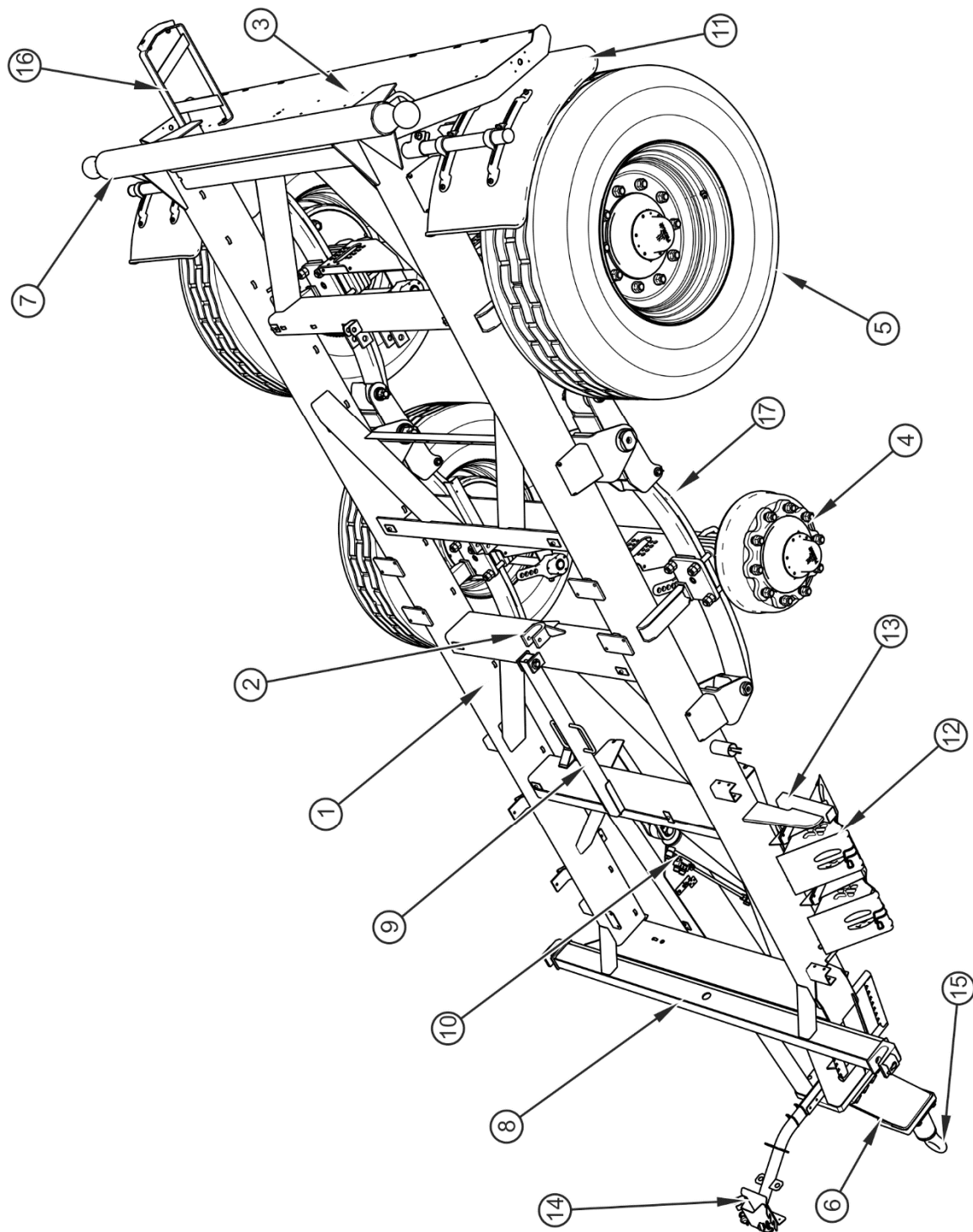


FIGURE 3.1 Trailer chassis

(1) lower frame, (2) tipping cylinder socket, (3) lights support beam, (4) axle, (5) wheel, (6) drawbar, (7) rear beam, (8) front crossbar, (9) load box support, (10) trailer support, (11) mudguard, (12) chocks, (13) brake mechanism, (14) conduit bracket, (15) drawbar eye, (16) rear wall fender, (17) taper leaf spring

3.2.2 LOAD BOX

Trailer's load box consists of: upper frame (1) – figure (3.2) with welded steel floor, side walls (2), front wall (3) and rear wall (4). Side walls are 600 mm high. As standard, Pronar PT510 trailer is also equipped with 600 mm-high wall extensions made of profiled steel sheet; additional 600 mm-high middle wall extensions are also available to obtain the total wall height of 600 + 600 + 600mm. Additional middle extensions are available as optional equipment.

The load box is mounted on sockets of the rear beam and front crossbar of the lower frame - compare with figure (3.1). The chosen tipping direction is achieved by positioning the pin in the appropriately profiled socket opening, the construction of which prevents their inappropriate placing by trailer operator.

Load box rear and side walls are secured using pins in front side locks and locks welded to rear stakes (5) of side housing. In the lower part they are locked using bolting hooks placed in the left and right longitudinal beam and also in the rear upper frame beam. Closing and opening the walls is performed using two levers (1) - figure (3.3), placed on the front beam and in the case of the rear wall, using a lever (6) – figure (3.2), placed on the left side of the load box.

Extensions are secured in the same way as the load box walls. Upper pins of the wall extensions are secured in the front extension locks and locks of rear stakes (7). In the lower part the closure is formed by hinges (8) welded to the side wall edge. All hinges are equipped with pins with cotter pins preventing them from falling out.

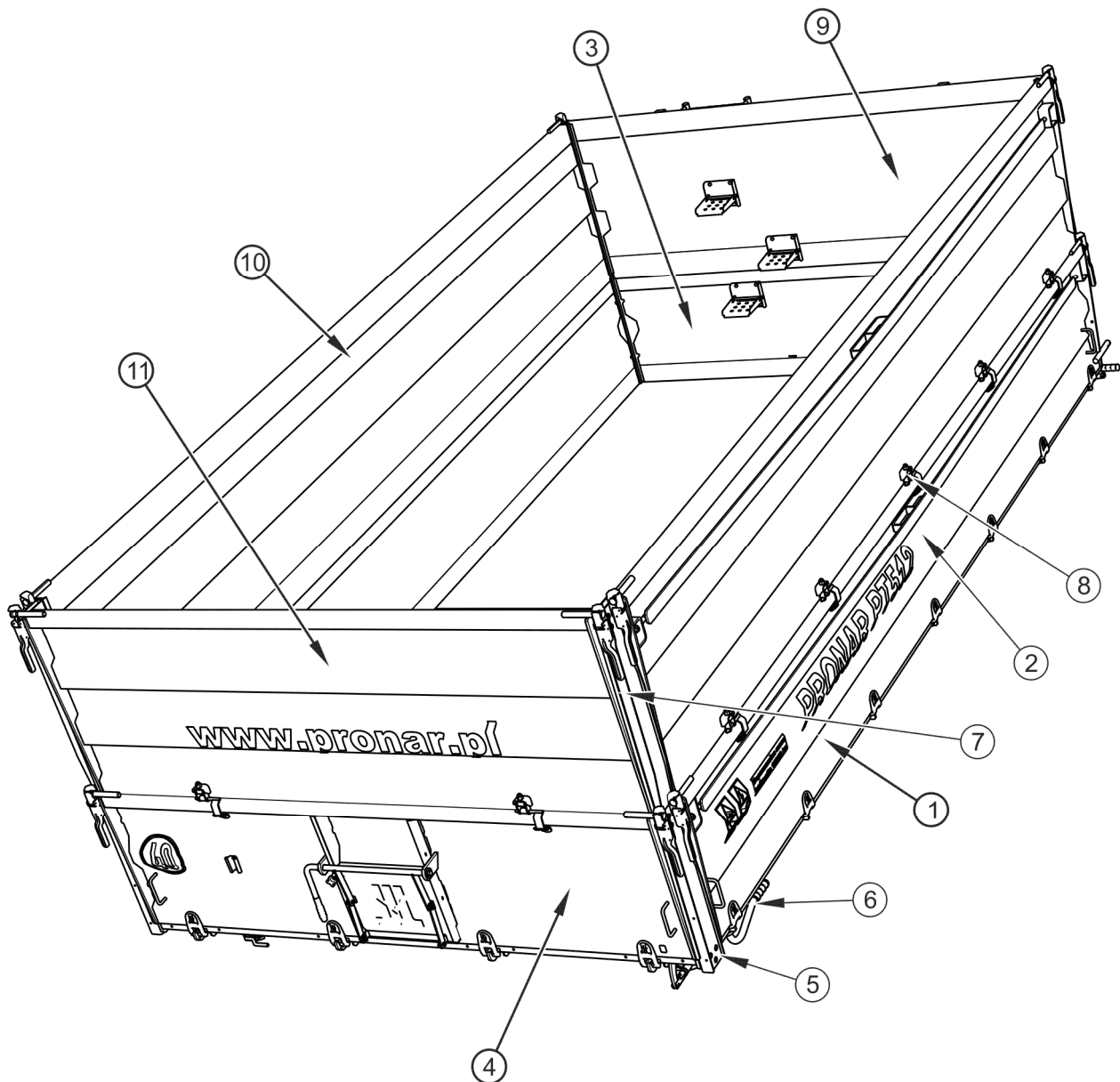


FIGURE 3.2 Load box – rear view

(1) upper frame, (2) side wall, (3) front wall, (4) rear wall, (5) rear stake of walls, (6) lever, (7) rear stake of wall extensions, (8) hinge, (9) front wall extension, (10) side wall extension, (11) rear wall extension

Access ladders (2) and (3) are secured to front walls and extensions. An additional step facilitating entrance to load box is bolted from the inside of the front extension.

Rollable tarpaulin cover (5) on the frame can be provided as additional equipment. The additional equipment that facilitates the use of tarpaulin cover is fenced platform (4) attached

to the trailer's front wall. Stay springs (6) facilitate opening of side walls. Springs (6) and fenced platform (4) are available as accessories.

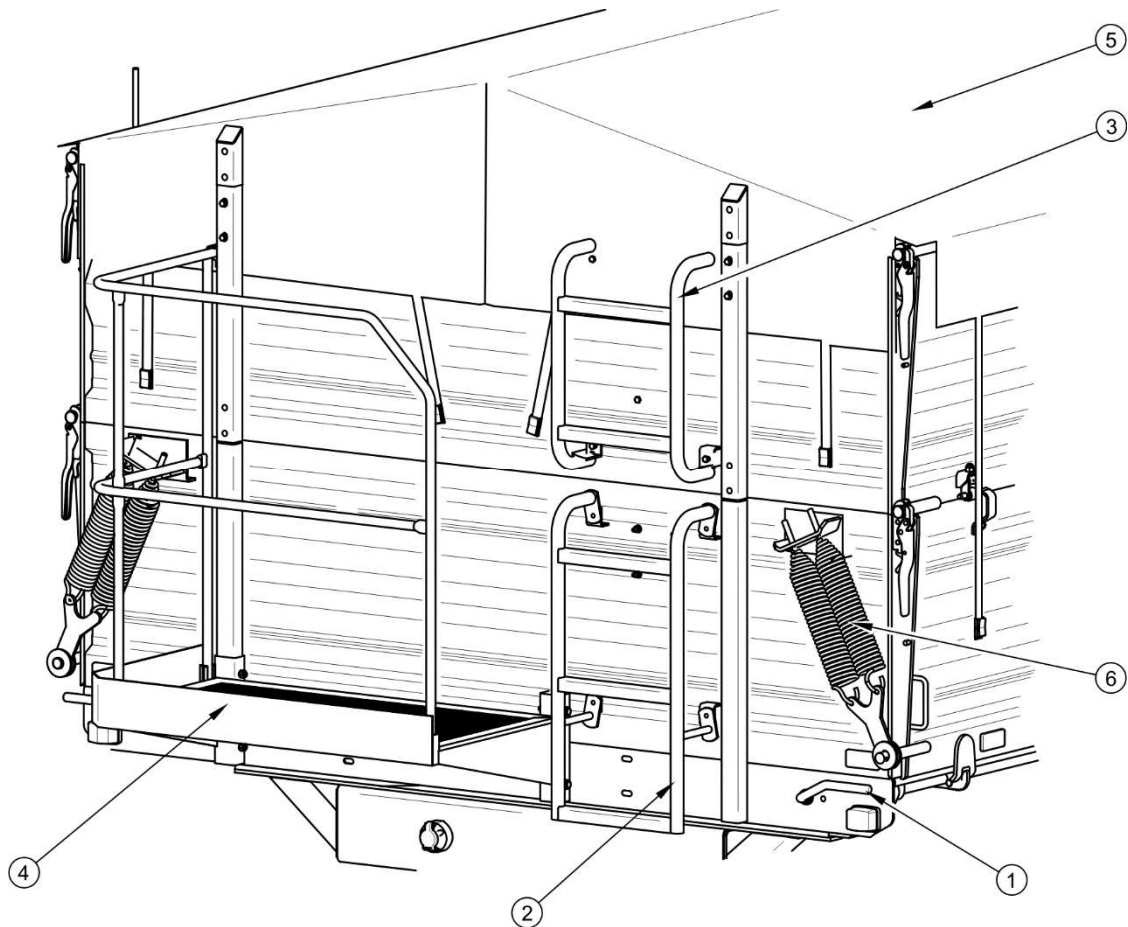


FIGURE 3.3 Load box – front view

(1) side wall closing lever, (2) lower ladder, (3) wall extension ladder, (4) fenced platform (5) tarpaulin cover, (6) tensions springs

In order to enable very precise unloading of loose materials there is a slide gate (1) placed in the rear wall (1) – figure (3.4), which is raised using lever (2). When in upper position and also during transport the slide gate must be secured by tightening the locking screw (3). A chute for the trailer, secured under the lower edge of the chute opening slide gate can be supplied as additional equipment.

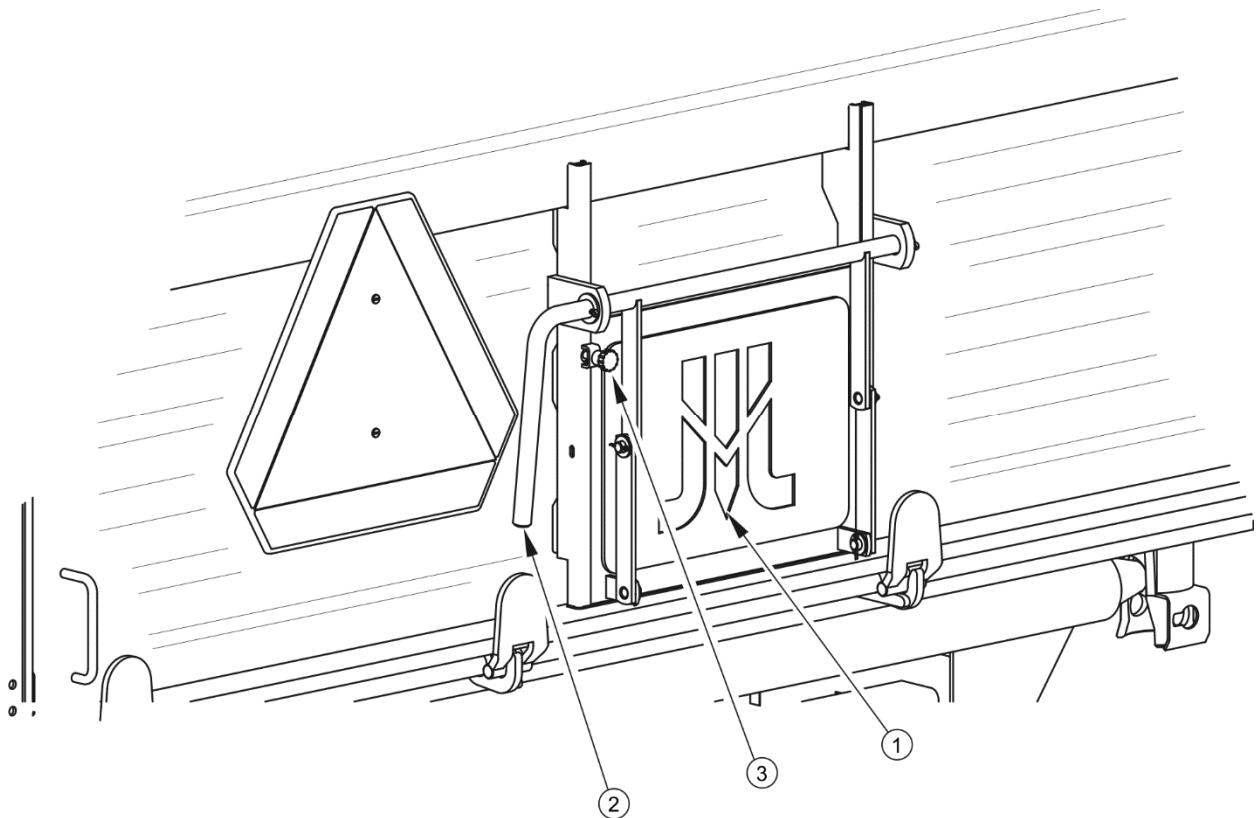


FIGURE 3.4 **Rear wall slide gate**

(1) slide gate, (2) lever, (3) locking screw

3.2.3 MAIN BRAKE

The trailer is equipped with one of four types of main brake:

- single conduit pneumatic system with manual three position regulator, figure (3.5),
- double conduit pneumatic system with manual three position regulator, figure (3.6),
- double conduit pneumatic system with automatic regulator, figure (3.7),
- hydraulic braking system, figure (3.9).

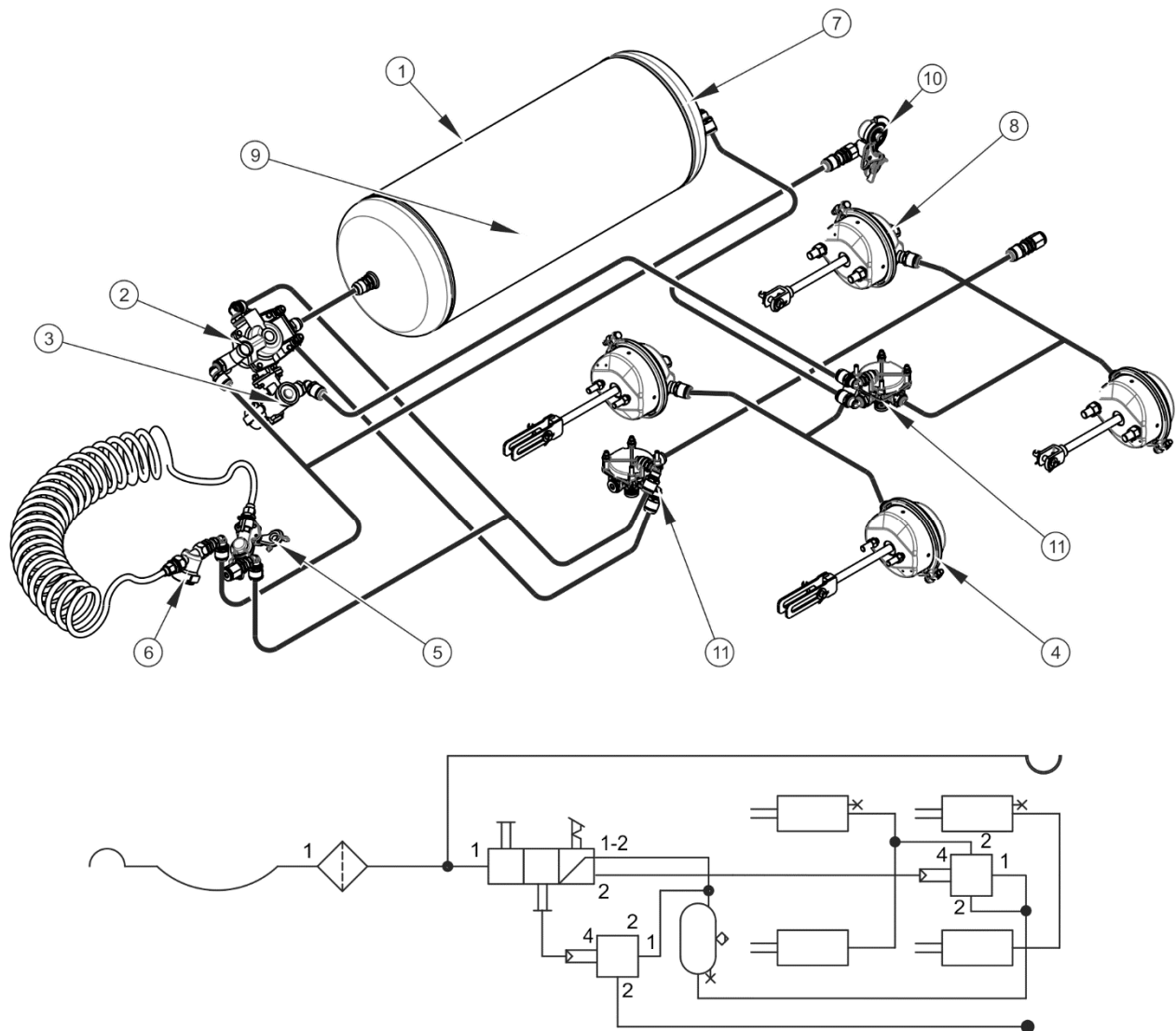


FIGURE 3.5 Design and diagram of the single conduit pneumatic braking system

(1) air tank, (2) control valve, (3) braking force regulator, (4) pneumatic cylinder, (5) conduit connector (black), (6) air filter, (7) air tank control connector, (8) pneumatic cylinder control connector, (9) drain valve, (10) socket (black), (11) relay valve

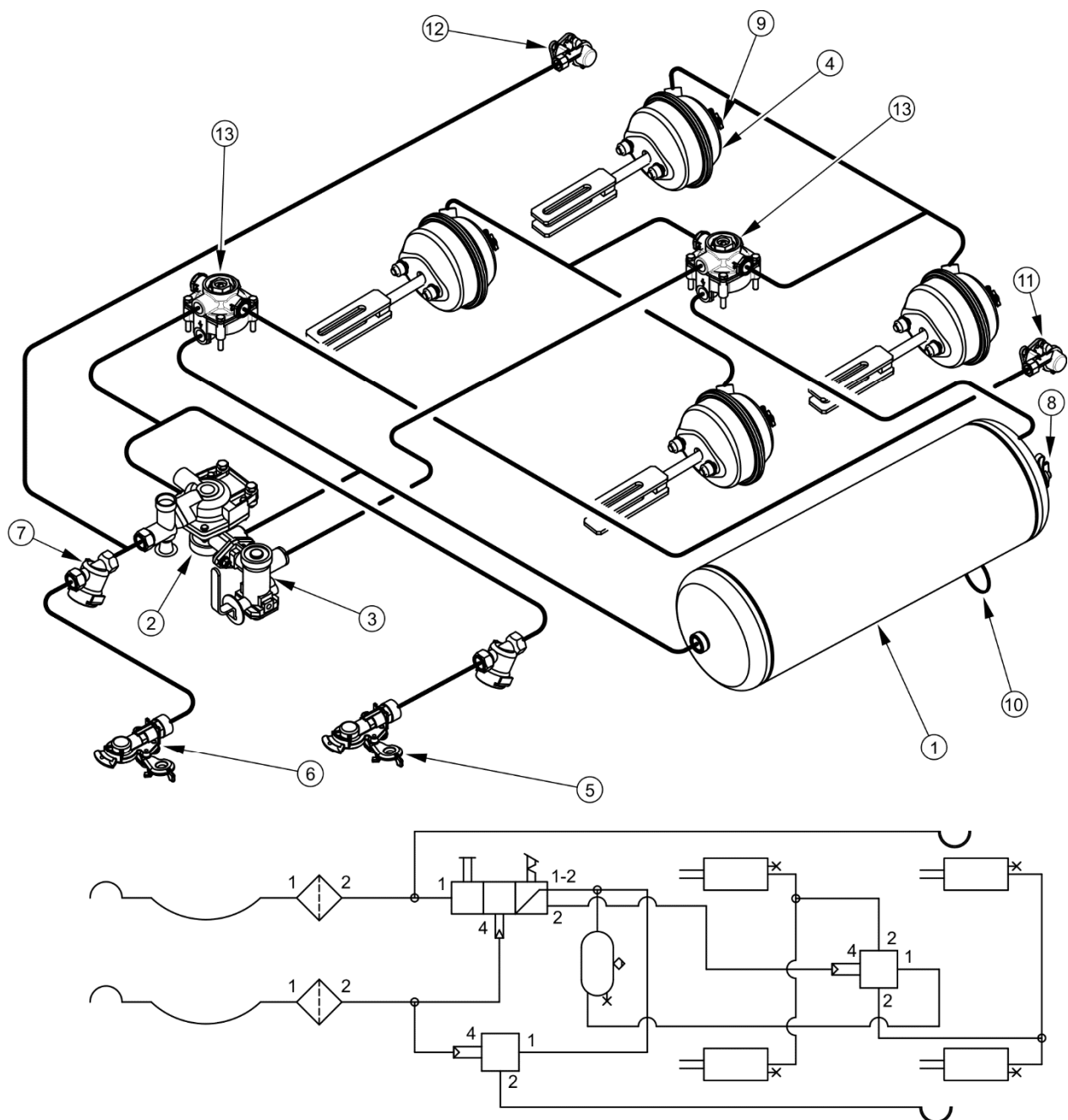


FIGURE 3.6 Design and diagram of double conduit pneumatic braking system with manual braking force regulator

(1) air tank, (2) control valve, (3) braking force regulator, (4) pneumatic cylinder, (5) conduit connector (red), (6) conduit connector (yellow), (7) air filter, (8) air tank control connector, (9) pneumatic cylinder control connector, (10) drain valve, (11) socket (red), (12) socket (yellow) (13) relay valve

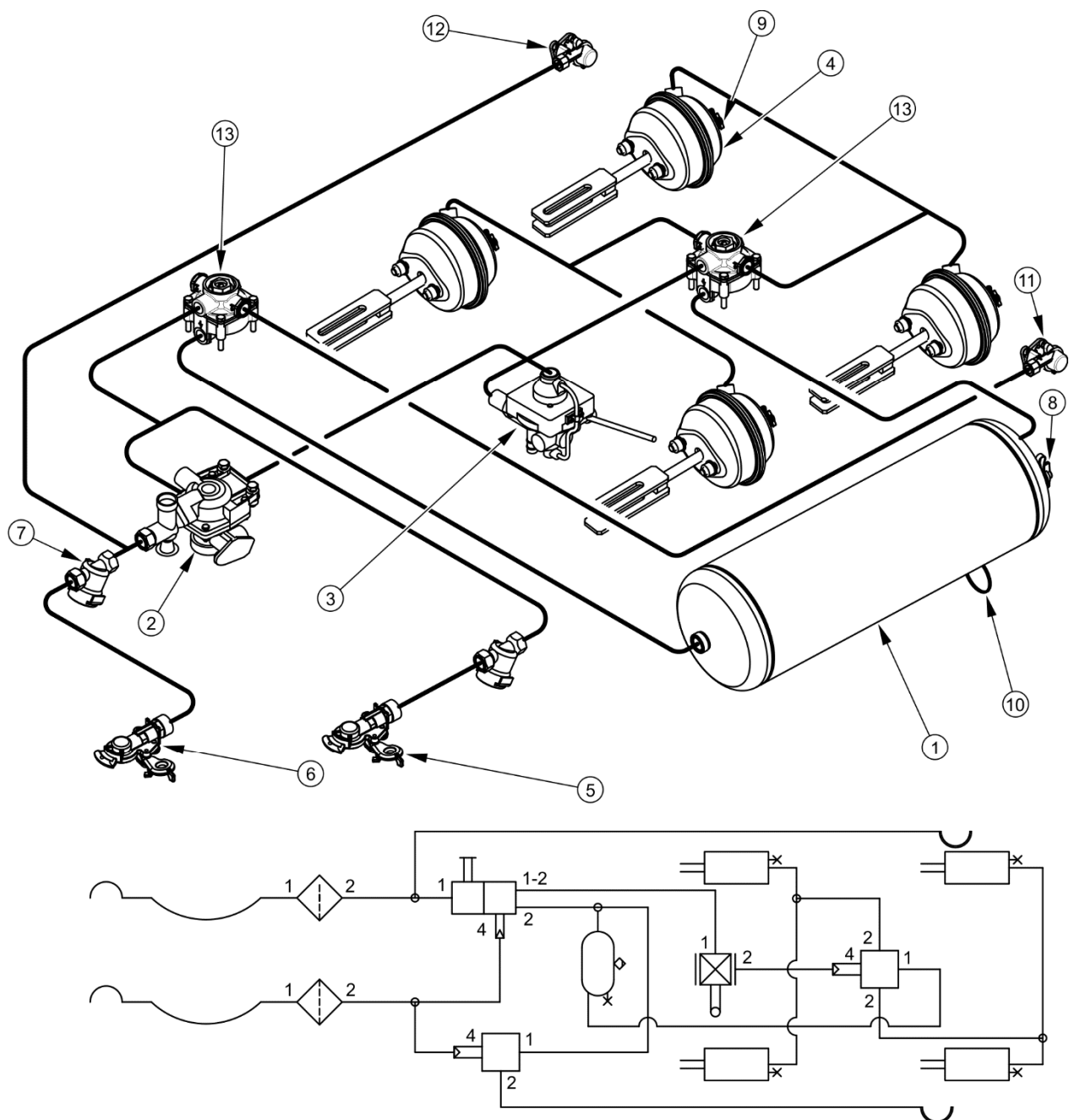


FIGURE 3.7 Design and diagram of double conduit pneumatic braking system with automatic braking force regulator

(1) air tank, (2) control valve, (3) braking force regulator, (4) pneumatic cylinder, (5) conduit connector (red), (6) conduit connector (yellow), (7) air filter, (8) air tank control connector, (9) pneumatic cylinder control connector, (10) drain valve, (11) socket (red), (12) socket (yellow) (13) relay valve

The main brake (pneumatic or hydraulic brake) is activated from the tractor driver's cab by depressing the brake pedal. The function of the control valve (2) - figure (3.5), (3.6) and (3.7) is to activate the trailer's brakes simultaneously with the tractor's brakes. 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. The valve used in the system is equipped with a circuit causing the brakes to be applied when the trailer is disconnected from the tractor, compare figure (3.9). When compressed air conduit is connected to the tractor, the device automatically applying the brakes now changes its position to allow normal brake operation.

Three-step braking force regulator (2)- figure (3.8), adjusts braking force depending on setting. Switching to a suitable working mode is done manually by the machine operator using the lever (4) prior to moving off. Three working positions are available: A - "no load", B - "half load" and C - "full load".

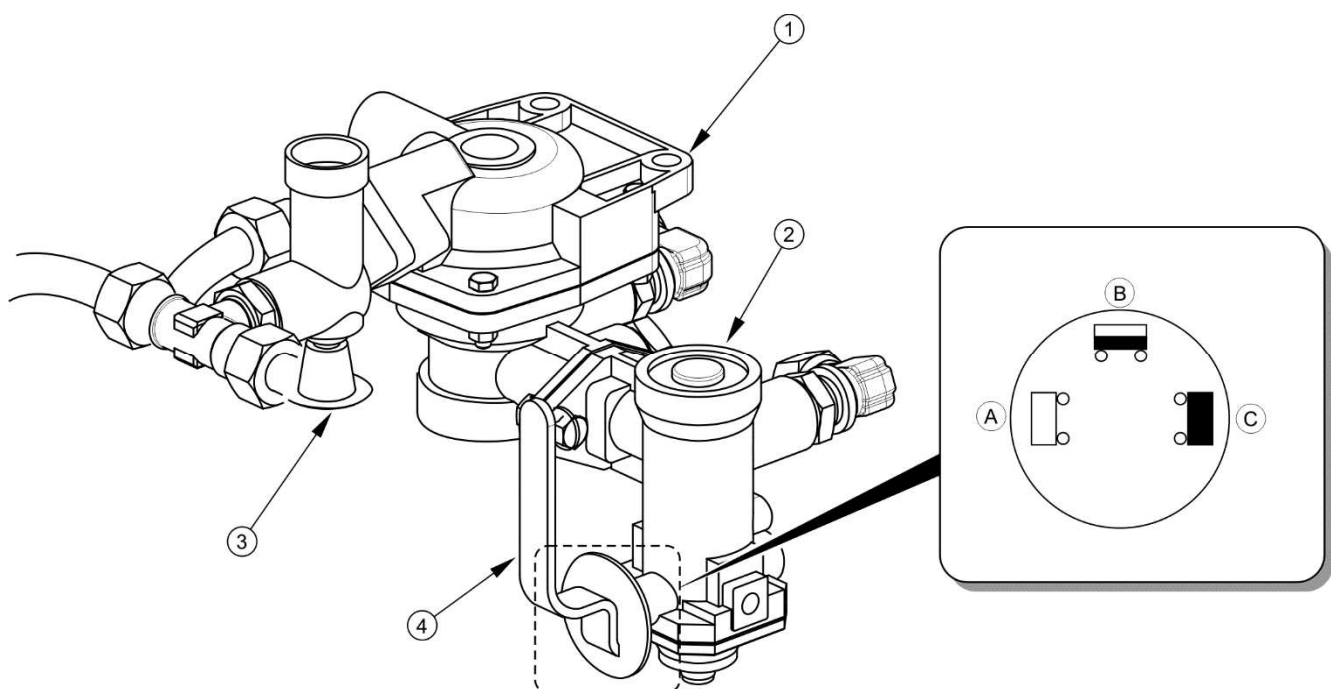


FIGURE 3.8 Control valve and braking force regulator

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

The main hydraulic brake (available as optional equipment) is activated from the tractor driver's cab by depressing the brake pedal. Agricultural tractor equipped with suitable

hydraulic system is required to operate the hydraulic braking system. The function of the hydraulic solenoid valve (1) - figure (3.9) is to activate the trailer's brakes simultaneously with the tractor's brakes. Before moving off, perform test braking by pressing brake pedal several times in order to obtain proper pressure in hydraulic accumulators.

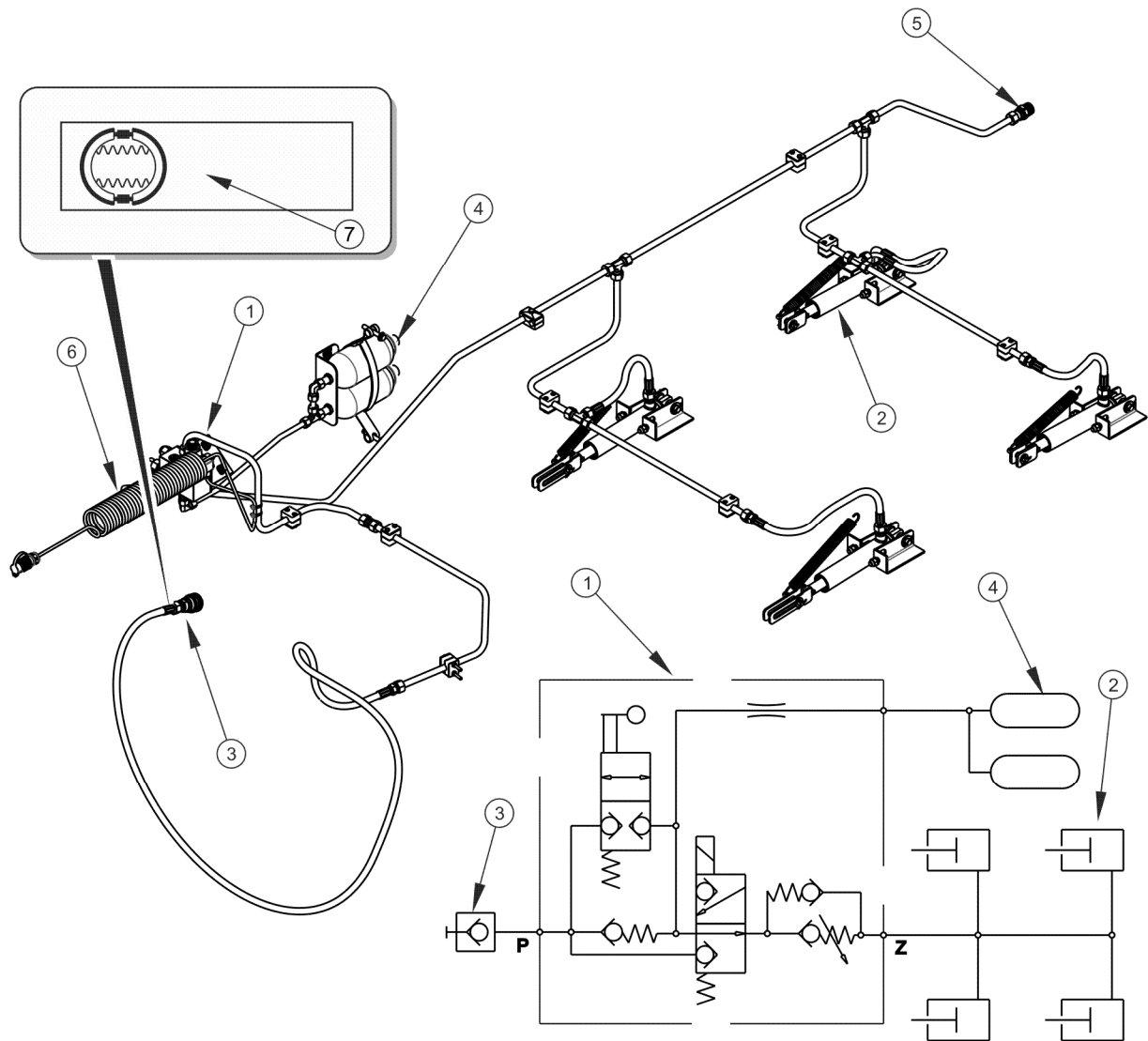


FIGURE 3.9 Design and diagram of hydraulic braking system

(1) *electro-hydraulic brake valve*, (2) *hydraulic cylinder*, (3) *hydraulic quick coupler*, (4) *hydraulic accumulator*, (5) *socket*, (6) *valve connection lead*, (7) *information decal*

Connection lead (6) connects the trailer's brake valve with the tractor's electrical system. In case of an inadvertent disconnection of the lead (6) between the trailer and the tractor, the brake valve will automatically activate the trailer's brakes. The same emergency braking is activated by switching off the tractor's engine or deenergizing the solenoid valve.

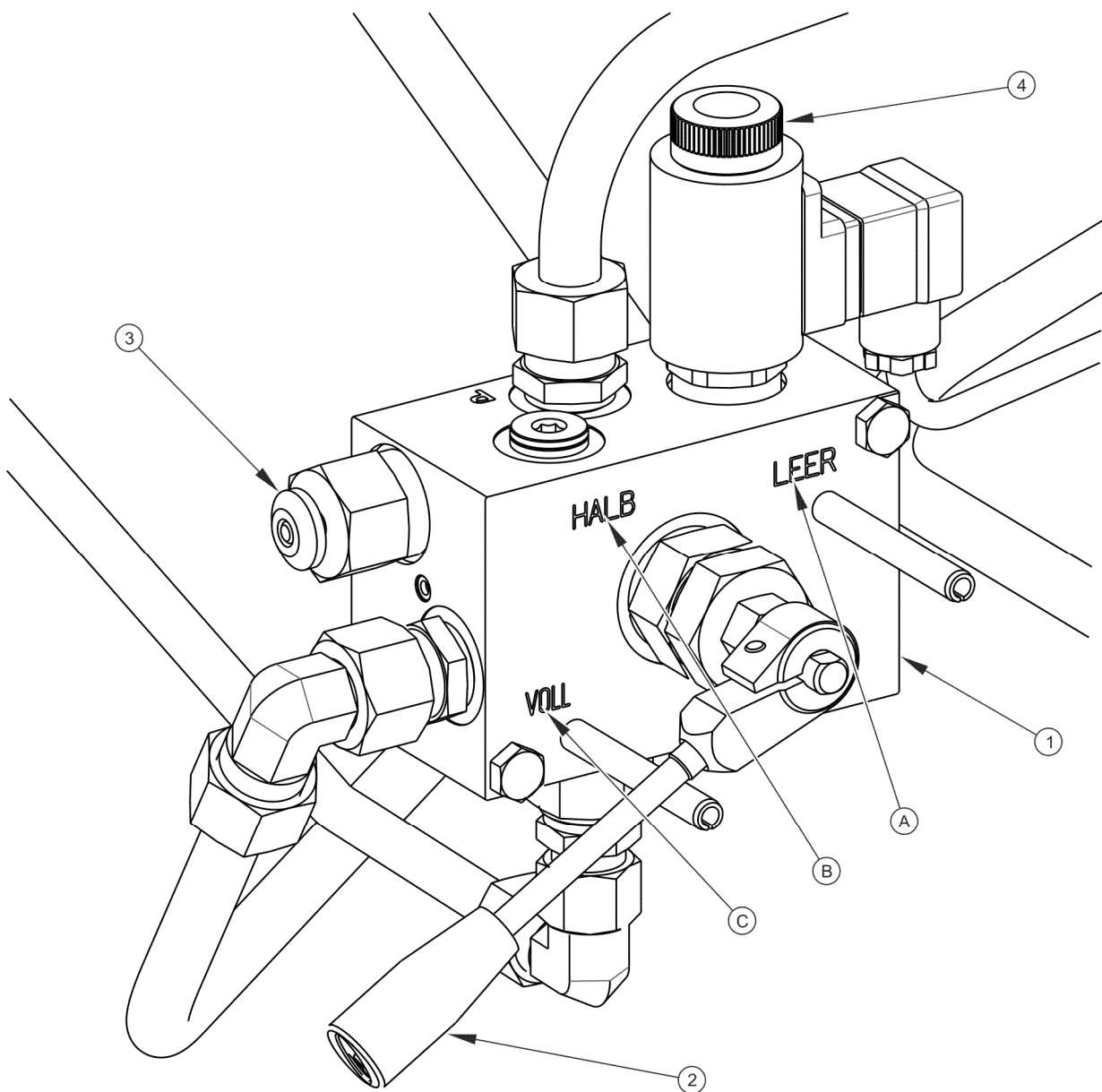


FIGURE 3.10 Electro-hydraulic brake valve

(1) electro-hydraulic valve, (2) valve operation selection lever, (3) release button, (4) electric coil, (A) "NO LOAD" position, (B) "HALF LOAD" position, (C) "FULL LOAD" position

Valve used in the system is equipped with a circuit causing the brakes to be applied when trailer is disconnected from the tractor. Brakes are applied as a result of reduction of pressure in the trailer's braking system (3.8). The brakes can operate normally after connecting the connection lead and supply conduit to tractor and after energizing the control valve.

Electro-hydraulic brake valve (1)- figure (3.10) 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".

3.2.4 HYDRAULIC TIPPING SYSTEM

Hydraulic tipping system is used for automatic unloading of trailer by tipping the load box to the rear or sideways. The hydraulic tipping system is supplied with oil from the tractor's hydraulic system. Hydraulic oil manifold of the tractor's external hydraulic system is used to control the load box tipping mechanism.

The trailer system consists of two independent circuits:

- circuit (A) - to supply the trailer's hydraulic cylinder,
- circuit (B) - to supply the second trailer's hydraulic cylinder (if two trailers are hitched to the tractor).

Three-way valve (2) is used to activate these circuits – figure (3.11). This valve's lever can be placed in two positions:

- **1** - the trailer's tipping circuit is opened - circuit (A),
- **2** - the second trailer's tipping circuit is opened – circuit (B).

On the connection conduit, in the vicinity of plug (4), there is a decal (8) identifying the supply conduit of the hydraulic tipping system.



ATTENTION

Cut-off valve (3) – figure (3.12) - limits the tipping angle of the load box when tipped to the sides and to the rear. The length of the cable (6) controlling this valve is factory adjusted by the Manufacturer and must not be changed when the trailer is used.



TIP

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

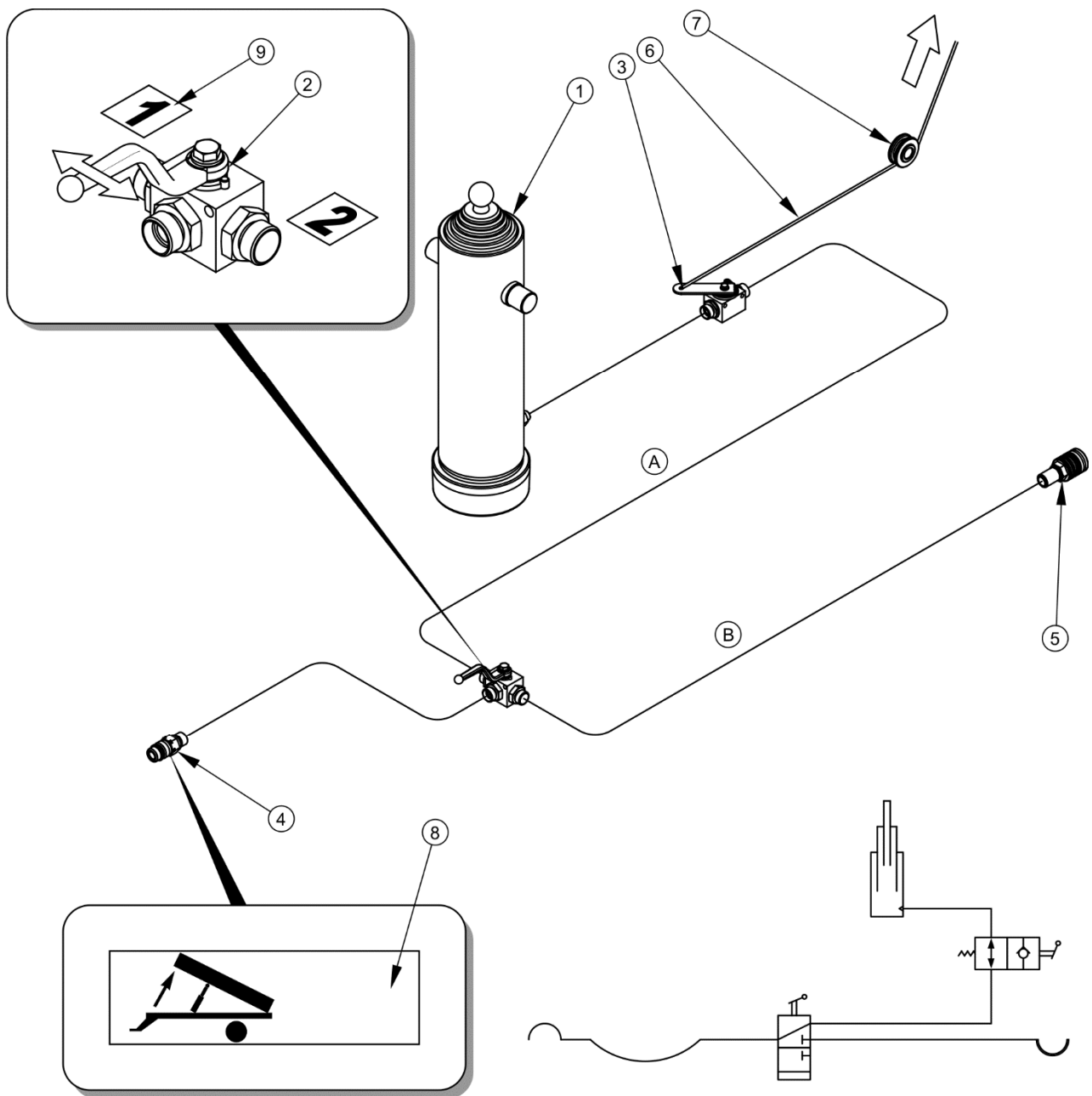


FIGURE 3.11 Hydraulic tipping system design and diagram

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

3.2.5 SUPPORT HYDRAULIC SYSTEM

The hydraulic system – figure (3.12) - is used for automatic unfolding and folding the support leg (3). This is accomplished by extending or withdrawing hydraulic cylinder piston (4). Support hydraulic system is supplied with oil from the tractor hydraulic system through

conduit (1). Hydraulic oil selective control valve of the tractor's external hydraulic system is used to control the support cylinder.

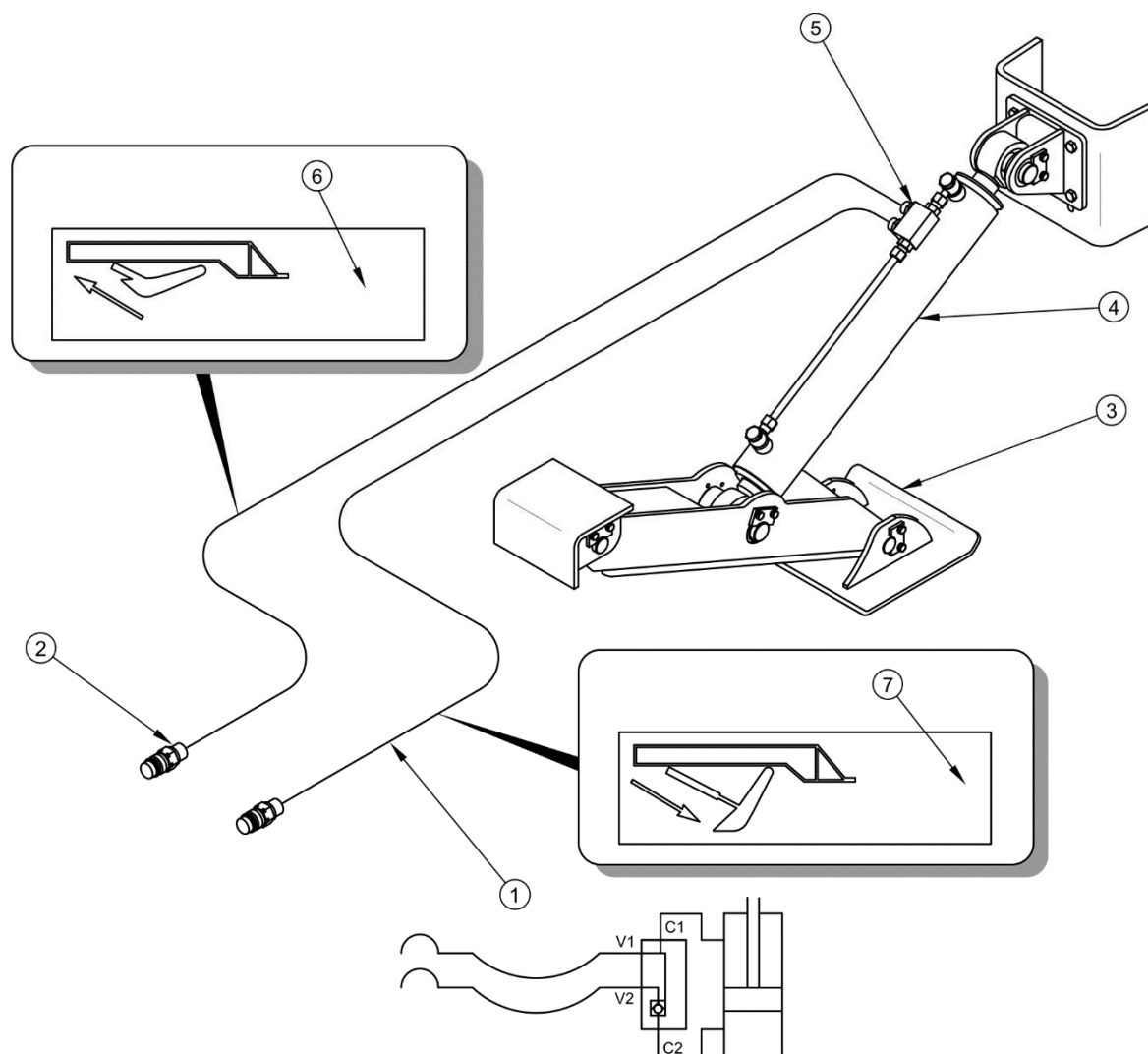


FIGURE 3.12 Design and diagram of the shear type support hydraulic system

(1) supply conduit, (2) return conduit, (3) shear type support, (4) hydraulic cylinder, (5) hydraulic lock, (6), (7) information decals



TIP

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

The system is equipped with a hydraulic lock (5) located on the cylinder (4). Application of hydraulic lock improves safety of trailer operation. During raising or lowering, the support may

damage conduits (rupture, loss of tightness). In such a case, the hydraulic lock will lock cylinder (4) in a fixed position.

3.2.6 PARKING BRAKE

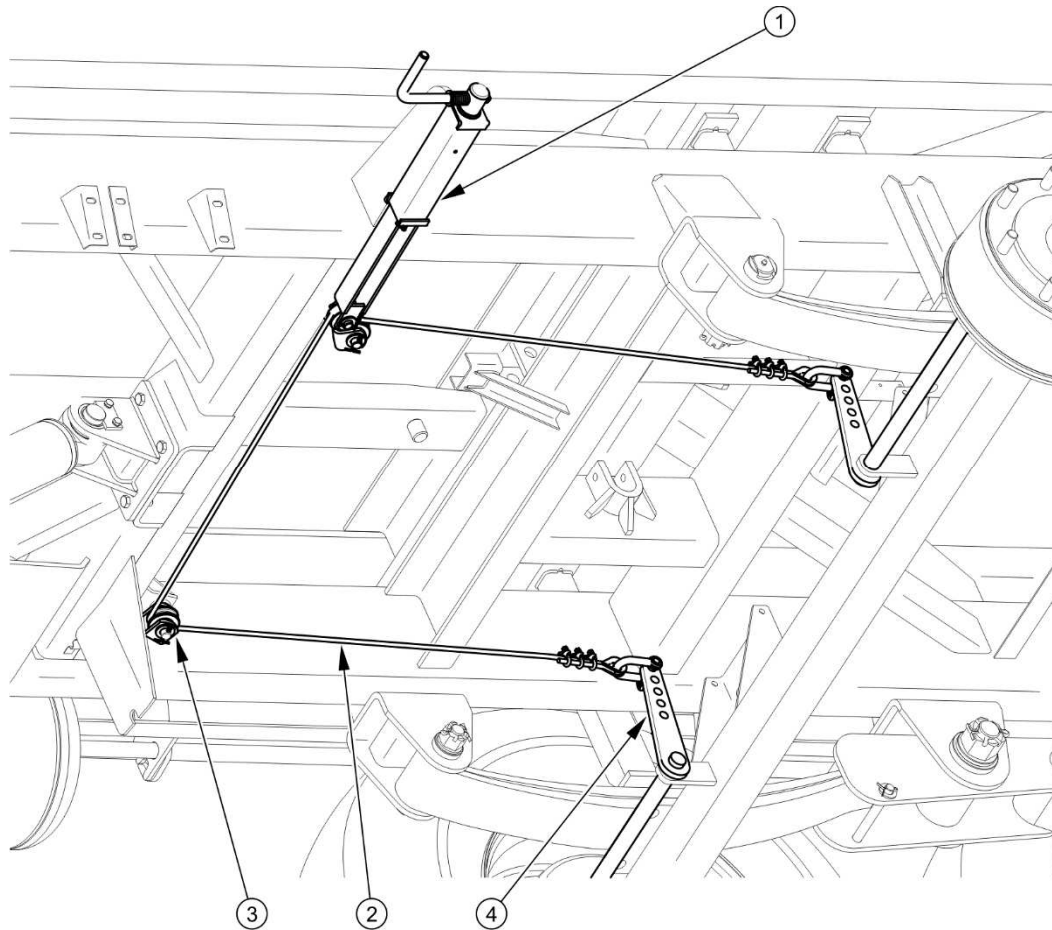


FIGURE 3.13 Parking brake design

(1) crank mechanism, (2) cable, (3) parking brake guide roller, (4) expander arm

The parking brake is used to immobilise and prevent the trailer from moving while standing motionless.

Crank mechanism bracket (1) is welded to the left longitudinal member of the lower frame. Steel cable (2), routed through rollers (3), is connected with the axle expander levers and the brake crank mechanism. Tightening the cable causes tilting of the expander levers, which expand the brake shoes immobilising the trailer.

Cable (2) tightening is achieved by turning the crank clockwise until resistance is felt.

3.2.7 LIGHTING SYSTEM

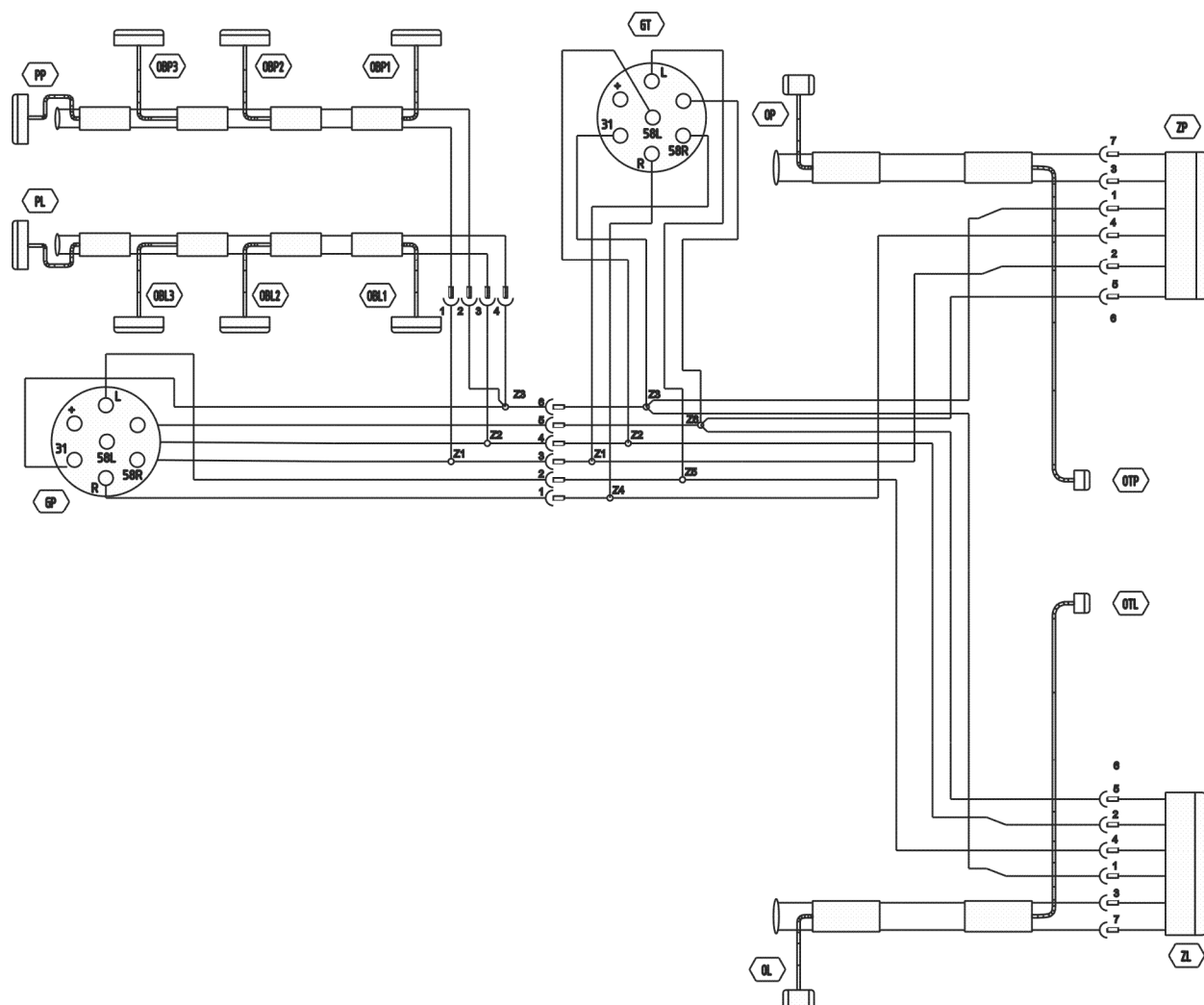


FIGURE 3.14 Electrical system diagram

Marking according to table (3.2)

The trailer electrical system is designed for supply from direct current source of 12 V. Connection of the trailer electrical system with the tractor should be made through an appropriate connection lead delivered with the new trailer.

TABLE 3.2 List of electrical component markings

SYMBOL	FUNCTION
ZP	Rear right lamp assembly
ZL	Rear left lamp assembly

SYMBOL	FUNCTION
GP	Front seven pin socket
GT	Rear seven pin socket
OTP	Right license plate light
OTL	Left license plate light
PP	Front right parking light
PL	Front left parking light
OP	Rear clearance lamp, right side (LED)
OL	Rear clearance lamp, left side (LED)
OBP1...OBP3	Side clearance lamps, right side (LED)
OBL1...OBL3	Side clearance lamps, left side (LED)

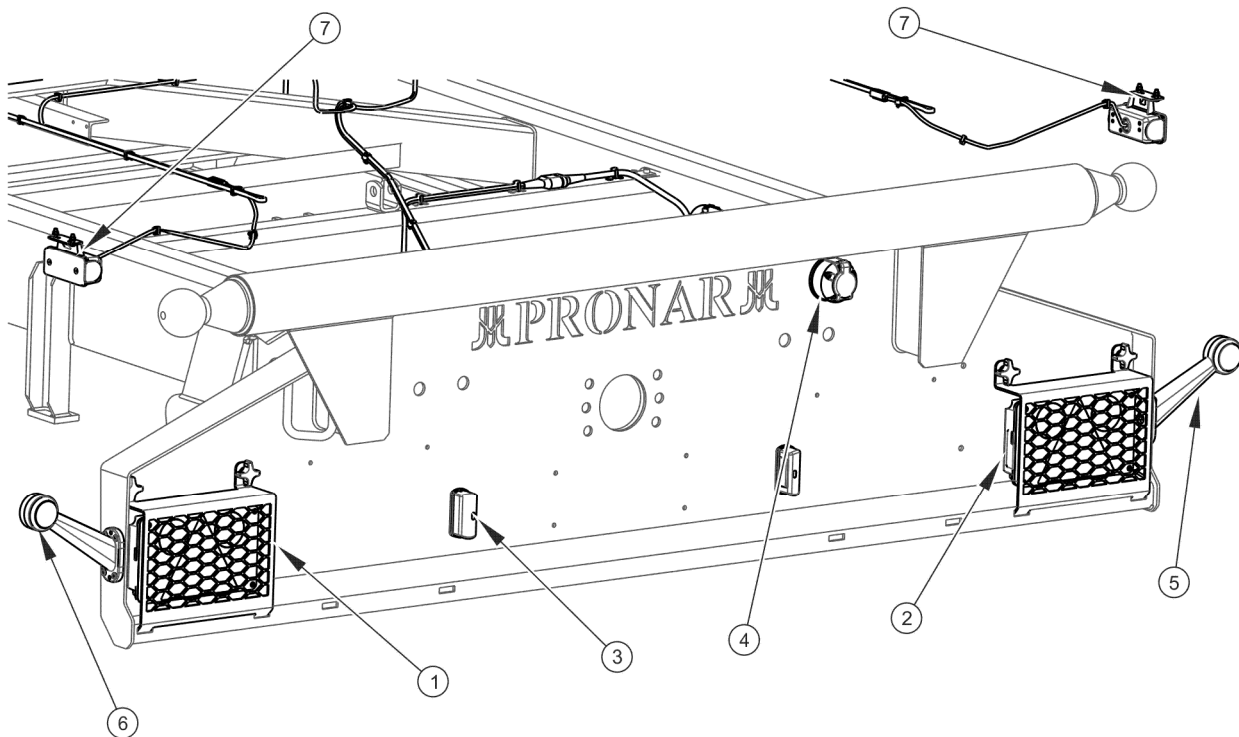
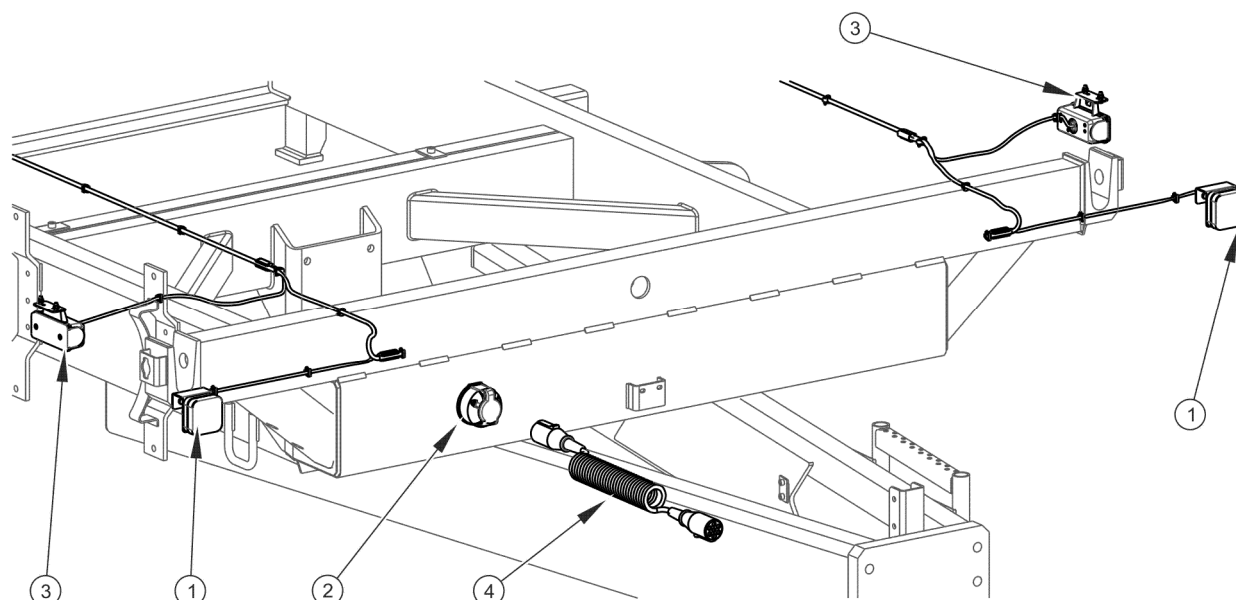


FIGURE 3.15 Arrangement of electrical system components and reflectors – rear view

(1) rear left lamp assembly, (2) rear right lamp assembly, (3) license plate light, (4) rear 7-pin socket, (5) rear right clearance lamp, (6) rear left clearance lamp, (7) side parking light

TABLE 3.3 Marking of connections of GP and GT sockets

SIGN	FUNCTION
31	Ground
+	Power supply +12V (not used)
L	Left indicator
54	STOP light
58L	Rear left parking light
58R	Rear right parking light
R	Right indicator

**FIGURE 3.16 Arrangement of electrical system components and reflectors – front view**

(1) front parking light, (2) front 7-pin socket, (3) side parking light, (4) connection lead

SECTION

4

CORRECT USE

4.1 PREPARING FOR WORK BEFORE THE FIRST USE

4.1.1 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 first use. The machine is delivered to the user completely assembled.

Before commencing work, machine operator must inspect the technical condition of the trailer and prepare it for the first start-up. The user must carefully read this Operator's Manual and observe all recommendations, understand the design and the principle of machine operation.



ATTENTION

Before hitching to tractor and using the trailer, the user must carefully read this Operator's Manual and observe all recommendations.

External inspection

- ➔ Check completeness of machine (standard and optional equipment).
- ➔ Check condition of protective paint coat,
- ➔ Inspect trailer's individual components for mechanical damage resulting from incorrect transport (dents, piercing, bent or broken components).
- ➔ Check technical condition of tyres and tyre pressure.
- ➔ Check technical condition of elastic hydraulic conduits.
- ➔ Check technical condition of pneumatic conduits.
- ➔ Check that there are no hydraulic oil leaks.
- ➔ Check electric lamps.
- ➔ Check hydraulic cylinders for leaks of hydraulic oil.

4.1.2 PREPARING THE TRAILER FOR THE FIRST HITCHING TO TRACTOR

Preparation

- ➔ Check all the trailer's lubrication points, lubricate the machine as needed according to recommendations provided in section 5.
- ➔ Check if the nuts and bolts fixing the wheels and drawbar are properly tightened.
- ➔ Drain air tank of the braking system.
- ➔ Ensure that pneumatic, hydraulic and electric connections in agricultural tractor are according to the requirements, if not the trailer should not be hitched to the tractor.
- ➔ Adjust the height of the drawbar or position of upper transport hitch.
 - ⇒ Detailed description can be found in section 5.

Test drive

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 drive should be conducted according to the sequence shown below.



TIP

Service operation: hitching/unhitching from tractor, adjustment of draw bar position, tipping of load box etc. are described in detail in further parts of the Operator's Manual in sections 4 and 5.

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

- ➡ Turn hydraulic tipping system valve to position "O". Conduct test tipping of load box backwards and sideways.
- ➡ 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 design,
- 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.

DANGER



Careless and incorrect use and operation of the trailer, and non-compliance with the recommendations given in this operator's manual is dangerous to your health.

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

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

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

4.2 HITCHING AND UNHITCHING THE TRAILER FROM TRACTOR

Ensure that pneumatic, hydraulic and electric connections and the hitch of agricultural tractor are according to the Manufacturer's requirements, if not the trailer should not be hitched to the tractor.

In order to hitch the trailer to the tractor, perform the actions below in the sequence presented. Machine must be immobilised by parking brake.

Hitching to tractor

- ➔ Immobilise trailer with parking brake.
 - ⇒ Pull brake mechanism clockwise until resistance is felt.
- ➔ Position agricultural tractor directly in front of drawbar eye.
- ➔ Connect the conduits of the shear type support hydraulic system.
 - ⇒ The conduits of the shear type support hydraulic system are marked with information decals (4) i (5) – figure (4.1).

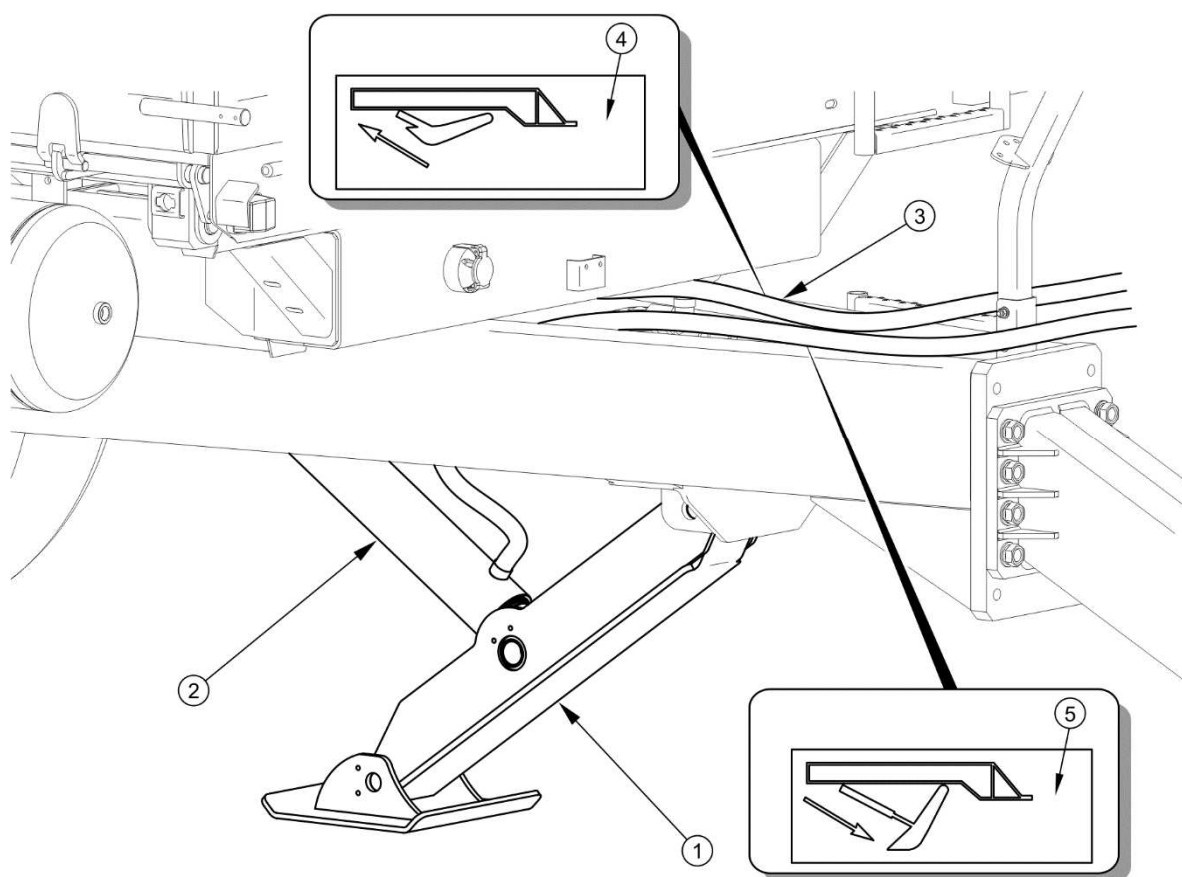


FIGURE 4.1 Trailer support

(1) support, (2) cylinder, (3) hydraulic line, (4) - (5) information decals

- ➔ Set the drawbar eye with the aid of the support at such a height that it is possible to hitch the machine.

- ➡ Reverse tractor, hitch trailer, check coupling lock protecting machine against accidental unhitching.
 - ⇒ If the agricultural tractor is equipped with an automatic coupler, ensure that the hitching operation is completed and that drawbar eye is secured.
- ➡ Turn off tractor engine. Ensure that unauthorised persons do not have access to the tractor cab.
- ➡ Connect pneumatic system conduits (applies to double conduit systems):
 - ⇒ Connect pneumatic conduit marked yellow with yellow socket in tractor.
 - ⇒ Connect pneumatic conduit marked red with red socket in tractor.
- ➡ Connect pneumatic system conduits (applies to single conduit pneumatic system):
 - ⇒ Connect pneumatic conduit marked black with black socket in tractor.
- ➡ Connect hydraulic braking system conduit (applies to trailer version with hydraulic braking system).
 - ⇒ Connect hydraulic conduit marked with information decal (7) – figure (3.8).
 - ⇒ Connect connection lead of valve (6) – figure (3.8).
- ➡ Connect hydraulic tipping system conduits.
 - ⇒ Hydraulic tipping system conduit is marked with information decal (10) – table (2.1).
- ➡ Connect main lead supplying electrical lighting system.
- ➡ Raise the support to driving position.

During connection of braking system conduits (pneumatic double conduit) the correct sequence of conduit connection is very important. First connect the yellow connector to yellow socket in the tractor and only then connect the red connector to the red socket in the tractor. Once the 2nd conduit is connected, the braking system will switch to normal mode of operation (disconnection or interruption of the conduits causes the trailer's braking system

control valve to automatically apply brakes). Conduits are marked with coloured protective covers, which identify the appropriate system conduit.

DANGER



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

When connecting the hydraulic conduits to the tractor, make sure that the hydraulic system of the tractor and the hydraulic system of the trailer are not under pressure.

Ensure sufficient visibility during hitching.

Exercise due caution during folding support - danger of severing limbs.

ATTENTION



Ensure compatibility of oils in tractor hydraulic system and in the trailer hydraulic tipping system.

When connecting the hydraulic braking system conduits, first connect the hydraulic conduit. Then, connect the electric lead of the electro-hydraulic brake valve. After connecting the electric lead and starting the tractor (energizing the connection lead), the braking system is ready for work. If the connection lead is not energized, the trailer will be immobilized with brake.

ATTENTION



Trailer may only be hitched to a tractor, which has the appropriate hitch, connection sockets for braking, hydraulic and electrical systems, and hydraulic oil in both machines is the same type and may be mixed.

When hitching is completed, secure the electrical leads and hydraulic and braking system conduits in such a way that they do not become entangled in tractor's moving parts and are not at the risk of breaking or being severed when making turns.

Unhitching the trailer

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

- ➔ Immobilise tractor and trailer with parking brake.

- ➔ Controlling the valve, set the drawbar eye at such a height that one may safely unlock and unhitch the trailer.
- ➔ Lower the support.
- ➔ Turn off tractor engine. Ensure that unauthorised persons do not have access to the tractor cab.
- ➔ Disconnect all hydraulic tipping system conduits from tractor.
- ➔ Disconnect electric lead.
- ➔ Disconnect pneumatic system conduits (applies to double conduit pneumatic system).
 - ⇒ Disconnect pneumatic conduit marked red.
 - ⇒ Disconnect pneumatic conduit marked yellow.
- ➔ Disconnect pneumatic system conduits (applies to single conduit systems):
 - ⇒ Disconnect pneumatic conduit marked black.

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

- ➔ Disconnect hydraulic braking system conduits (applies to trailer version with hydraulic braking system).
 - ⇒ Disconnect electrical connection lead.
 - ⇒ Disconnect hydraulic conduit.
- ➔ Disconnect the conduits of the support hydraulic system.
- ➔ Protect conduit ends with covers. Place conduit plugs in appropriate sockets.
- ➔ Place chocks under trailer wheel.
 - ⇒ Wheel chocks must be so placed that one is in front of the wheel and the second is behind the wheel - see section 2, figure (2.1).

- ➔ Release tractor hitch and disconnect trailer drawbar from tractor hitch and drive tractor away.

**ATTENTION**

Do NOT park a loaded trailer, which is disconnected from the tractor and resting on the parking stand.

4.3 HITCHING AND UNHITCHING THE SECOND TRAILER

Hitching the second trailer

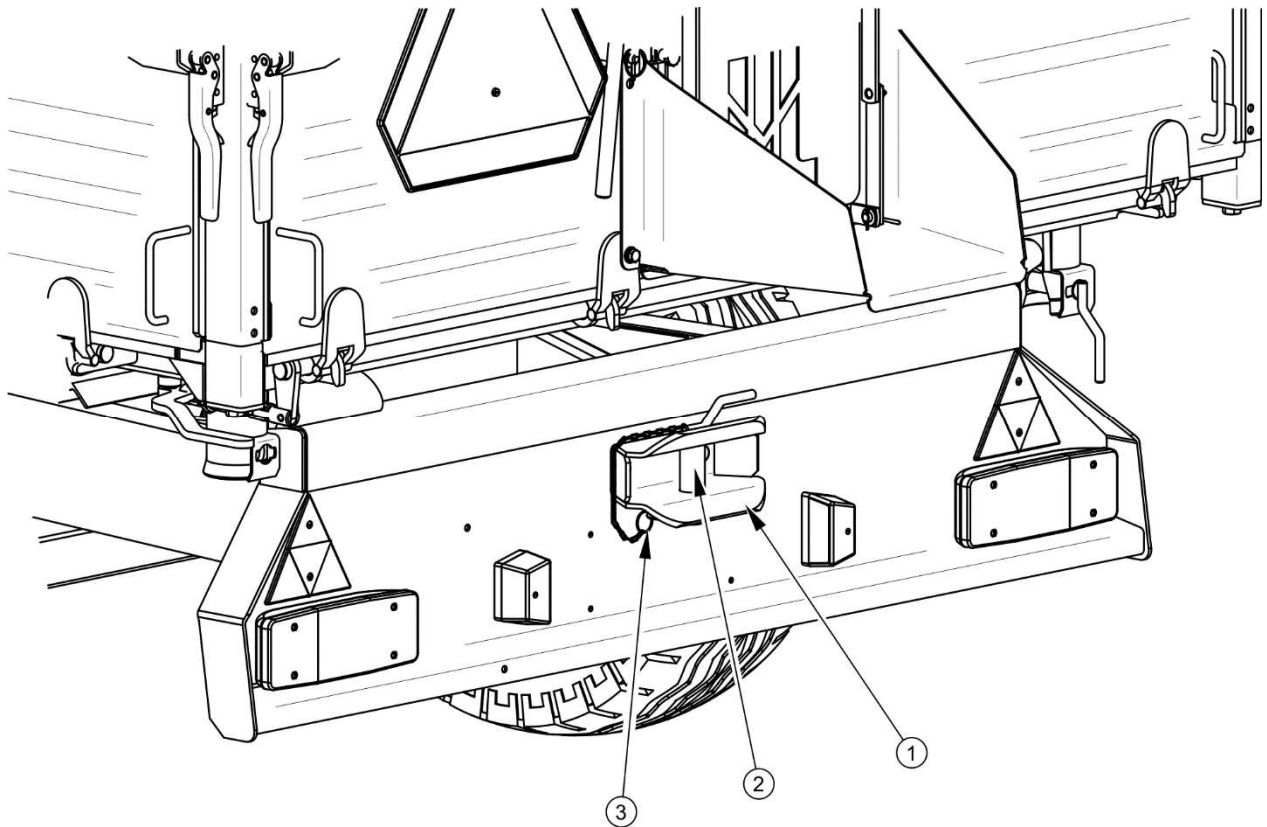


FIGURE 4.2 Rear hitch

(1) hitch body, (2) hitch pin, (3) chain with cotter pin securing pin

A second trailer may only be hitched if it is a machine built on a dual axle chassis and if it fulfils all requirements specified in section 1.

Hitching the second trailer to the tractor - trailer unit requires experience in driving an agricultural tractor with a trailer. While hitching the second trailer, it is recommended to use the help of another person to guide the tractor driver.

- ➡ Remove cotter pin securing pin and take out hitch pin (2) in the first trailer - figure (4.2).
- ➡ Adjust the height of the drawbar of the second trailer in such a manner to enable coupling the machines.
- ➡ Reversing tractor, drive the rear hitch of the first trailer onto the drawbar of the second trailer.
- ➡ Insert drawbar pin and securing cotter pin.
- ➡ Connect conduits of pneumatic, hydraulic and electrical systems according to instructions contained in section (4.2)

Unhitching the second trailer

- ➡ Immobilise tractor and trailers with parking brake.
- ➡ Turn off tractor engine. Ensure that unauthorised persons do not have access to the tractor cab.
- ➡ Disconnect conduits of pneumatic and hydraulic systems and electrical system leads according to instructions contained in section (4.2).
- ➡ Unlock the pin of the hitch of the first trailer. Remove the pin and drive tractor away.



DANGER

The person assisting in coupling the second trailer must stand in such a place as to be visible to the tractor driver at all times. Be especially careful and keep safe distance from danger zones, especially from the area between the trailers.



ATTENTION

Do NOT hitch a second trailer constructed on any chassis except dual axle chassis.

4.4 LOADING AND SECURING LOAD

Secure the load with tarpaulin cover. The load should be covered whenever trailer moves on public roads.

Load protection with tarpaulin cover

- ➔ While standing on the fenced platform, unroll the tarpaulin cover (2) using crank (1).
- ➔ Attach all pull straps (4) to clamps (3) on the trailer load box.
- ➔ Pull tarpaulin cover from the right side.
- ➔ Pull tarpaulin cover to the front and finally to the rear wall of the load box.

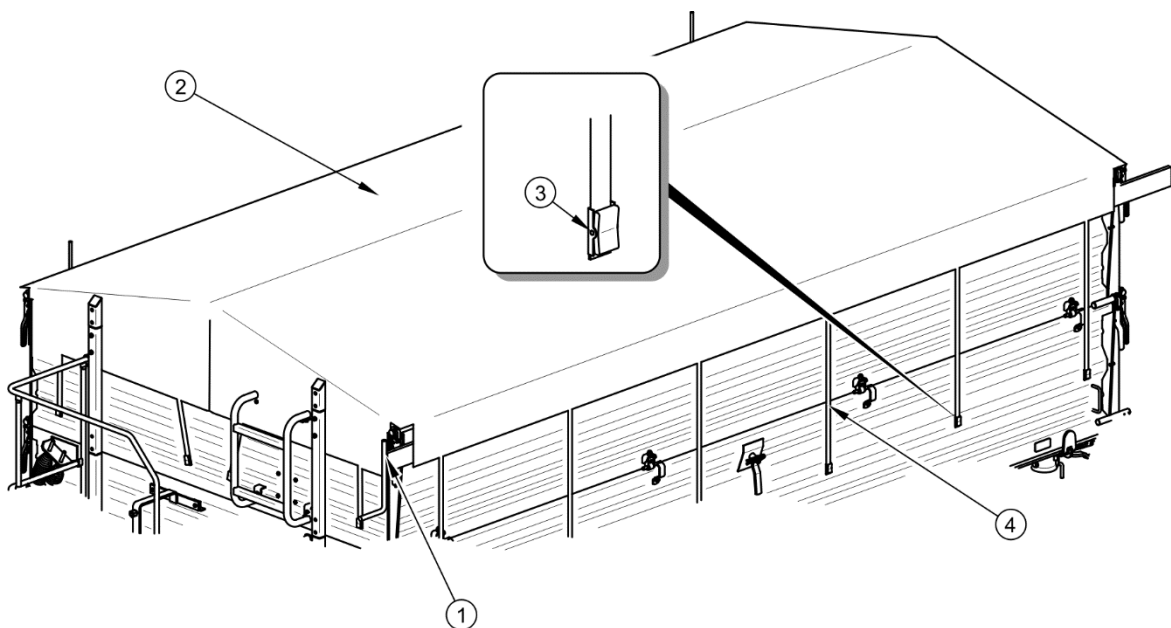


FIGURE 4.3 Tarpaulin cover

(1) strip with crank, (2) tarpaulin cover, (3) clamp, (4) pull strap

4.4.1 GENERAL INFORMATION ABOUT LOADING

Before beginning loading make certain that the load box side walls and slide gate 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.

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

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

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



ATTENTION

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

Do NOT exceed the trailer's maximum carrying capacity.

Due to the various density of materials, using the total load box capacity may lead to exceeding permissible carrying capacity of the trailer. Guideline specific weight of selected materials is shown in table (4.1). Take care not to overload the machine. Loading should be carried out by a person experienced in this type of work and having appropriate authorisation for operating equipment (if required).

TABLE 4.1 Guideline weights by volume of selected materials

TYPE OF MATERIAL	WEIGHT BY VOLUME kg/m ³
Root crops:	
raw potatoes	700 - 820
steamed crushed potatoes	850 - 950
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

TYPE OF MATERIAL	WEIGHT BY VOLUME kg/m ³
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
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

TYPE OF MATERIAL	WEIGHT BY VOLUME kg/m ³
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
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

TYPE OF MATERIAL	WEIGHT BY VOLUME kg/m ³
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
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

The trailer is also designed for transporting harvested crops and agricultural products (volumetric or loose) and loads on EUR-pallets and pallet boxes. It is permissible to transport other loads (wood, building materials, packed loads), on the condition of securing the load box against damage.

DANGER

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

During loading the trailer the drawbar eye and the tractor hitch are subjected to great vertical loading.

Bulk materials

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

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

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

Loads of pieces or solid lumps

Loads of pieces or solid lumps are generally hard materials of significantly greater dimensions than bulk loads (stones, coal, bricks and ballast). These materials without prior preparation of the load box may cause indentation of the floor or walls and abrasion of paintwork. In order to protect it, lay thick plywood, hard particle board, thick planks or other materials of similar properties on the load box platform and possibly on walls and wall

extensions. Non-compliance with the instructions provided could invalidate the guarantee. Loading of material in pieces or solid lumps must be from a low height. The load must not fall with great force on the floor of the load box, even if it is protected.

Hazardous loads

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

DANGER



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

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

High volume loads

High-volume loads (light loads with a high volume), such as hay, straw bales (rectangular or round), green fodder, etc., are recommended to be loaded with the aid of appropriate implements (bail grabs, forks etc.) or directly from suitable machines such as forage harvesters or combine harvesters. The load may be loaded even higher than the load box extensions but taking special care about trailer stability. Remember that the high load placed on the trailer with the use of a special implement has very negative impact on the trailer stability.

Loads in packaging

Loads transported in packaging (boxes, sacks) must be laid closely side-by-side beginning from the front side of the trailer. If it is essential to lay several layers, particular groups should be stacked alternately (in block system). The load must be laid tightly together and on the whole surface of the trailer floor. Otherwise, the load will move during travel. Due to the trailer

design (the load box designed for the transport of agricultural crops and products, lack of load securing points), materials in packaging may not be loaded above the top of the walls or extensions of load box. A higher load layer may move during travel.

**DANGER**

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

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

Final remarks

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

**DANGER**

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

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

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

The trailer is not intended to transport people, animals or hazardous materials (with the exception of loads specified in section 4.4).

The arrangement of the load may not cause an overload on the axle or hitch system of the trailer.

4.5 TRANSPORTING LOAD

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

- Before moving off, make sure that there are no bystanders, especially children, near the trailer or the tractor. Ensure that the driver has sufficient visibility.
- Make sure that the trailer is correctly attached to the tractor and tractor's hitch is properly secured.
- Vertical load borne by the trailer drawbar eye affects the steering of the agricultural tractor.
- 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.
- Permissible design speed and maximum speed allowed by road traffic law 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 8° and unloading must take place only on a level surface.
- When not connected to the tractor, the trailer must be immobilised using parking brake and possibly also with chocks or other objects without sharp edges placed under the front and back wheels. Do NOT leave unsecured trailer. In the event of machine malfunction, pull over on the hard shoulder avoiding any risk to other road users and position reflective warning triangle according to traffic regulations.
- When driving on public roads, the trailer must be marked with a slow-moving vehicle warning sign attached to the rear wall of load box, if the trailer is the last vehicle in the group.
- While driving on public roads the trailer must be fitted with a certified or authorised reflective warning triangle.

- When driving, comply with all road traffic regulations, indicate an intention to turn using indicator lamps, keep all road lights and indicator lights clean at all times and ensure they are in good condition. Any damaged or lost lamps or indicator lights must be immediately repaired or replaced.
- Avoid ruts, depressions, ditches or driving on roadside slopes. Driving across such obstacles could cause the trailer or the tractor to suddenly tilt. This is of special importance because loaded trailer's centre of gravity is higher (especially a high volume load), which reduces safety. Driving near ditches or channels is dangerous as there is a risk of the wheels sliding down the slope or the slope collapsing.
- Speed must be sufficiently reduced before making a turn or driving on an uneven road or a slope.
- When driving, avoid sharp turns especially on slopes.

ATTENTION



Prior to moving off with the trailer hitched, check whether:

- pins connecting the load box with the lower frame are secured against falling out,
- lug pins of wall extensions are secured against falling out.

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

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

4.6 UNLOADING

The trailer is equipped with hydraulic tipping system. Appropriate design of the frame and load box allows tipping to side and rear. Tipping of the load box is controlled from driver's cab using external tractor hydraulic system manifold.

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; wheel chocks may be used to provide additional protection,

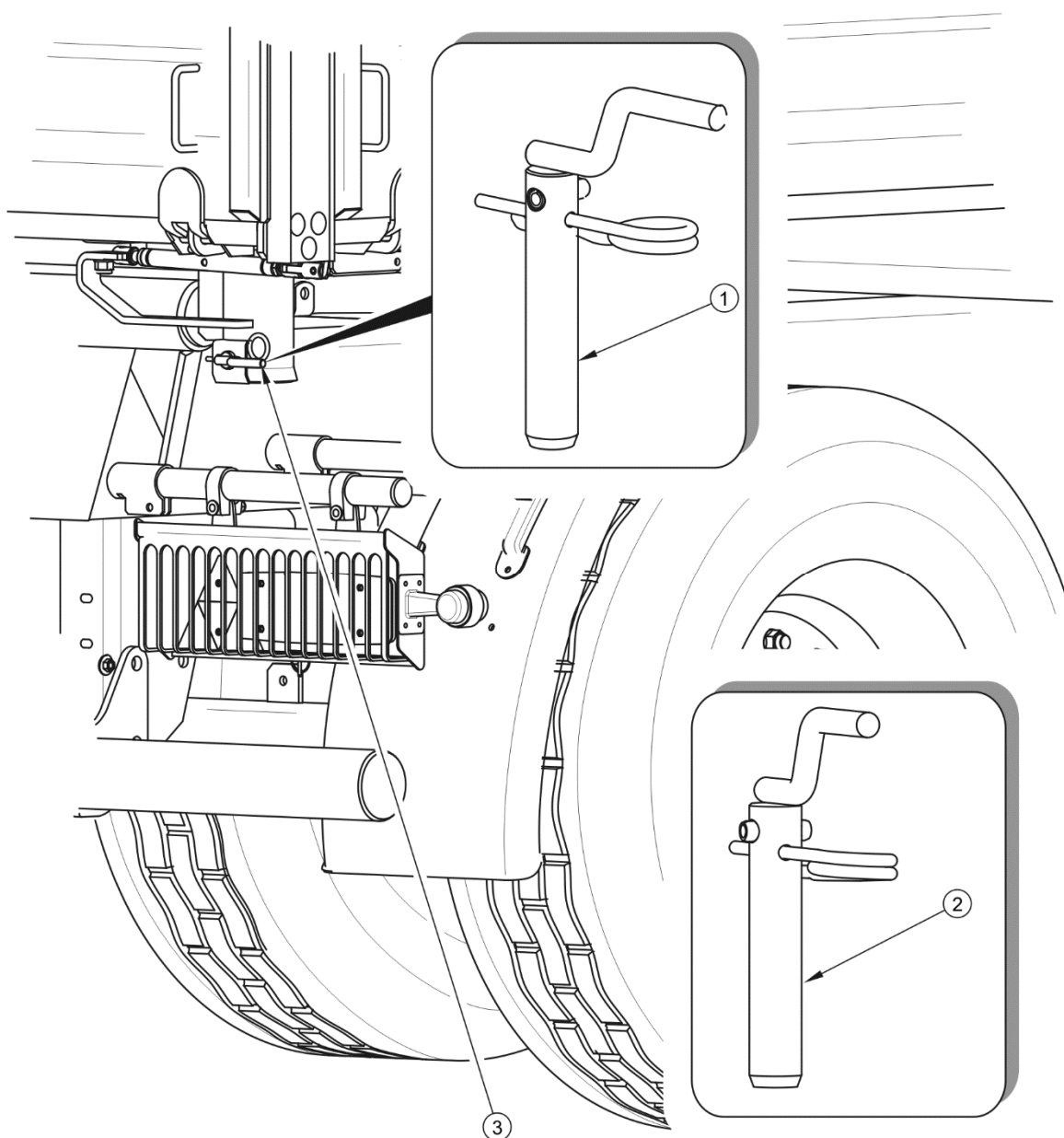


FIGURE 4.4 Bolting of tipping pins

(1) tipping pin I, (2) tipping pin II, (3) tipping pin holder

- ➔ if the load box tipping direction was not planned and set before, place tipping pins (1) and (2) on the unloading side and secure them properly - figure (4.4),

- ⇒ pins and individual sockets are designed so it is impossible to place them on the opposite diagonal side of the load box, which would damage the trailer,
- ⇒ holder (3) of correctly locked front pin is vertical (directed downward),
- ⇒ holder (3) of correctly locked rear pin is directed sideways – figure (4.4),
- ➔ if the load box tipping direction was planned and set before, check the position of pin holders (3),
- ➔ open (unlock) the lower locks of the walls on the unloading side and, possibly, open the chute slide gate in the rear wall – figure (4.6),
 - ⇒ exercise caution while opening these components,
- ➔ open the load box wall locks connecting the wall with the post and the front wall,
 - ⇒ exercise caution while opening these components,
- ➔ place the lever controlling the hydraulic tipping system circuits in position 1 -- tipping of the first trailer,
- ➔ initiate tipping of the load box by activating the hydraulic circuit supplying the hydraulic tipping system of the trailer.
- ➔ after unloading, lower load box, remove the residual material from the load box edges and walls,
- ➔ close and secure the walls and wall extensions or chute opening,
- ➔ before moving off, make sure that the tipping pins are in correct position and are protected with cotter pins.

DANGER



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

Exercise due caution while using the trailer equipped with the second set of wall extensions.

Use only original pins with a handle. Use of non-original pins could damage the trailer. Tipping pins must be correctly interlocked.

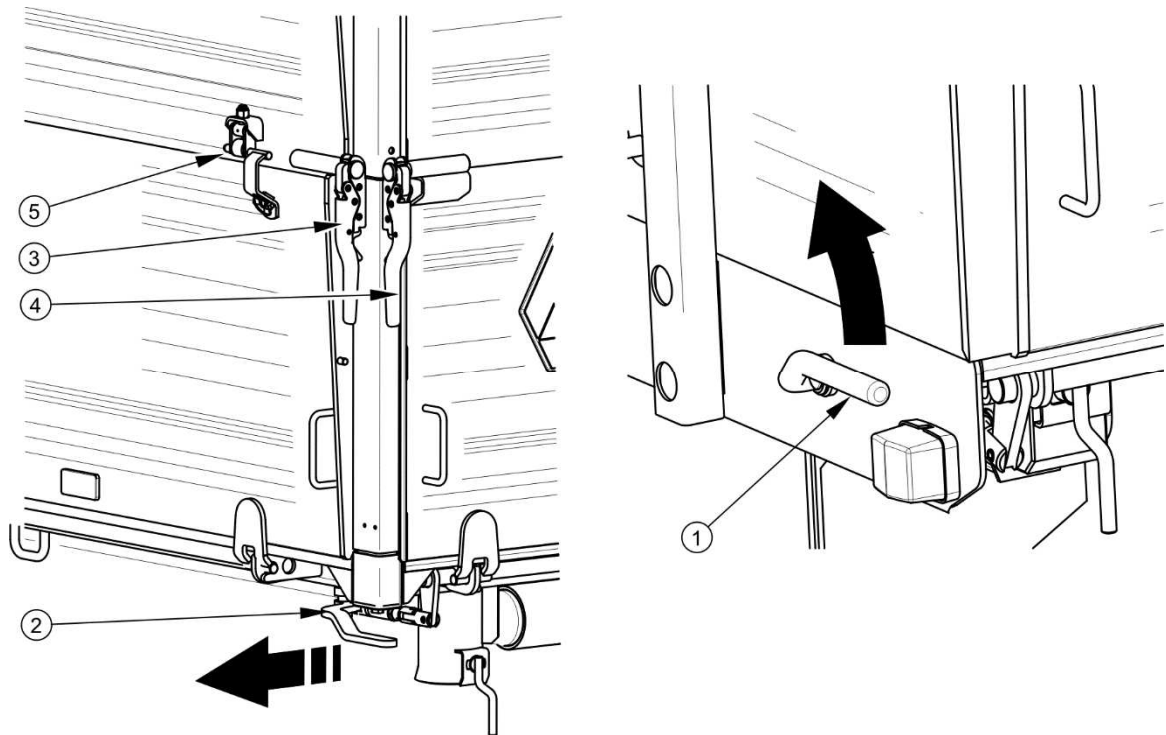


FIGURE 4.5 Locks of load box walls and wall extensions

(1) left wall locking lever, (2) rear wall locking lever, (3) side wall lock (rear left), (4) rear wall lock (left), (5) wall extension lug

If a second trailer is hitched, it should be unloaded only when the load box of the first trailer has been lowered and the hydraulic tipping system control lever is placed in position 2 -- tipping of the second trailer.

DANGER



Incorrectly secured tipping pins may cause serious damage to the trailer.

When opening the load box side wall locks take particular care because of the pressure applied by the load to the walls.

When using the trailer with extra wall extensions, pay attention to the stability and possible tipping over the trailer, monitor trailer body movements on uneven ground.

When unloading, make certain that there is nobody near the load box.

To prevent injury, use protective gloves when opening/closing the wall bolts and locks.

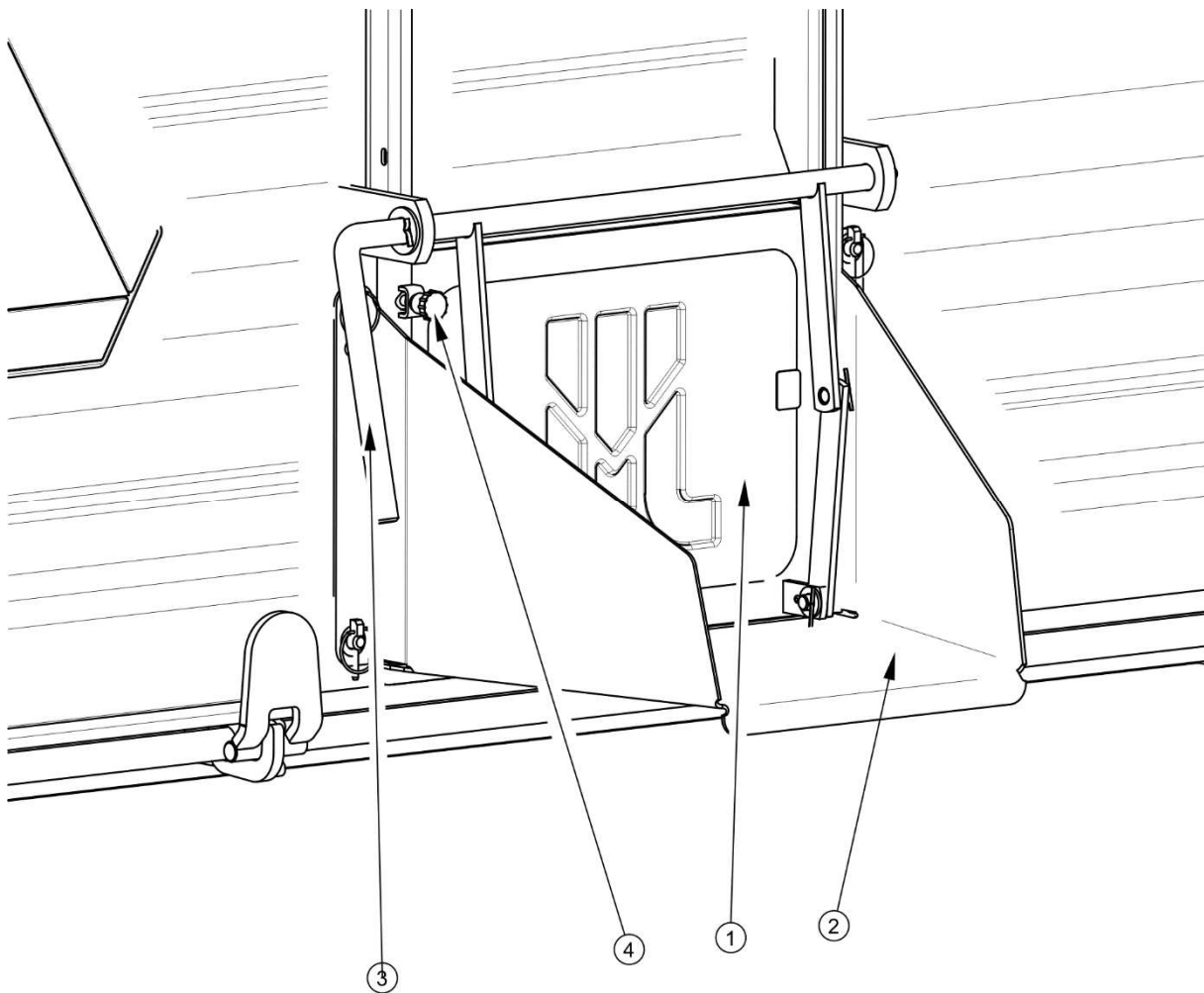


FIGURE 4.6 Chute

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

The rear load box wall is equipped with the chute slide gate (1) – figure (4.6) and chute opening (2) (additional equipment) for unloading bulk materials. Chute design allows very accurate dosing of the material to packaging (sacks, boxes etc.).

The opening gap can be controlled using lever (3). In order to do that loosen the bolt interlocking slide gate (4), open the slide as required and lock again using the bolt. When unloading through the chute do not open wall locks or wall extension locks and tipping of the load box must be done very slowly and without jerking. Raising the load box quickly will exert large pressure on the rear part of the load box due to displacement of the carried material and could compromise trailer's stability.

While unloading high-volume materials be especially careful. Do NOT tip load box on uneven or wet ground and move and jerk trailer during unloading. Bulky materials are normally

difficult to unload. Therefore, proceed cautiously and patiently. Careless operation of trailer may pose a danger to operators and bystanders can also cause damage to the machine.

DANGER



When closing the rear chute gate or the walls take particular care to avoid crushing fingers.

Bulk materials loaded in excess of 1 m can be unloaded by tipping the load box to the rear only.

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

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

Do NOT tip load box in strong gusty winds conditions.

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

TIP



It is recommended to use wheel chocks in order to additionally secure the trailer during unloading.

When unloading high-volume materials, for example branches, the trailer's rear wall may be opened downwards. The help of a second person is recommended during unloading.

ATTENTION



It is not recommended to unload the load box by opening the walls downwards (when lower locks of the load box are locked). Load exerting pressure on the walls may hurt the operator or damage the trailer.

4.7 PROPER USE AND MAINTENANCE OF TYRES

- When working on the tyres, chocks or other objects without sharp edges should be placed under the wheels of the trailer to prevent it from rolling. Wheels can be taken off the trailer axle only when the trailer is not loaded.
- Repair work on the wheels or tyres should be carried out by persons trained and entitled to do so. This work should be carried out using appropriate tools.

- Inspect tightness of nuts before the first use of trailer, after the first travel under load and then every 6 months of use or every 25,000 km. In the event of intensive work, check the nut tightening at least every 100 km. The inspection should be repeated individually if a wheel has been removed from the wheel axle.
- Regularly check and maintain correct air pressure in tyres according to Operator's Manual (especially if trailer is not used for a longer period).
- Air pressure in tyres should be also checked during the whole day of intensive work. Please note that higher temperatures could raise tyre pressure by as much as 1 bar. At high temperatures and pressure, reduce load or speed.
- Do not release air from warm tyres to adjust the pressure or the tyres will be underinflated when temperatures return to normal.
- Protect tyre valves using suitable caps to avoid soiling.
- Do not exceed the trailer's maximum design speed.
- When the trailer is operated all day, stop working for a minimum of one hour in the afternoon.
- Take a 30 minute-break for cooling tyres after driving 75 km or after 150 minutes of continuous travel, depending on which occurs first.
- Avoid potholes, sudden manoeuvres or high speeds when turning.

4.8 USING UNDERRUN PROTECTION DEVICES

Two pairs of hinged tiltable under-run protective devices can be installed as trailer additional equipment. The under-run protective devices fulfil a very important role in road safety and therefore their good technical condition should be ensured.

Lifting

- Pull the under-run protection device by holding its lower bar.
- Raise the under-run protective device to the height shown in Figure (4.7)
- Move the underrun protection device away. Appropriate recess and slotted holes allow the locking of under-run protective device in the raised position.

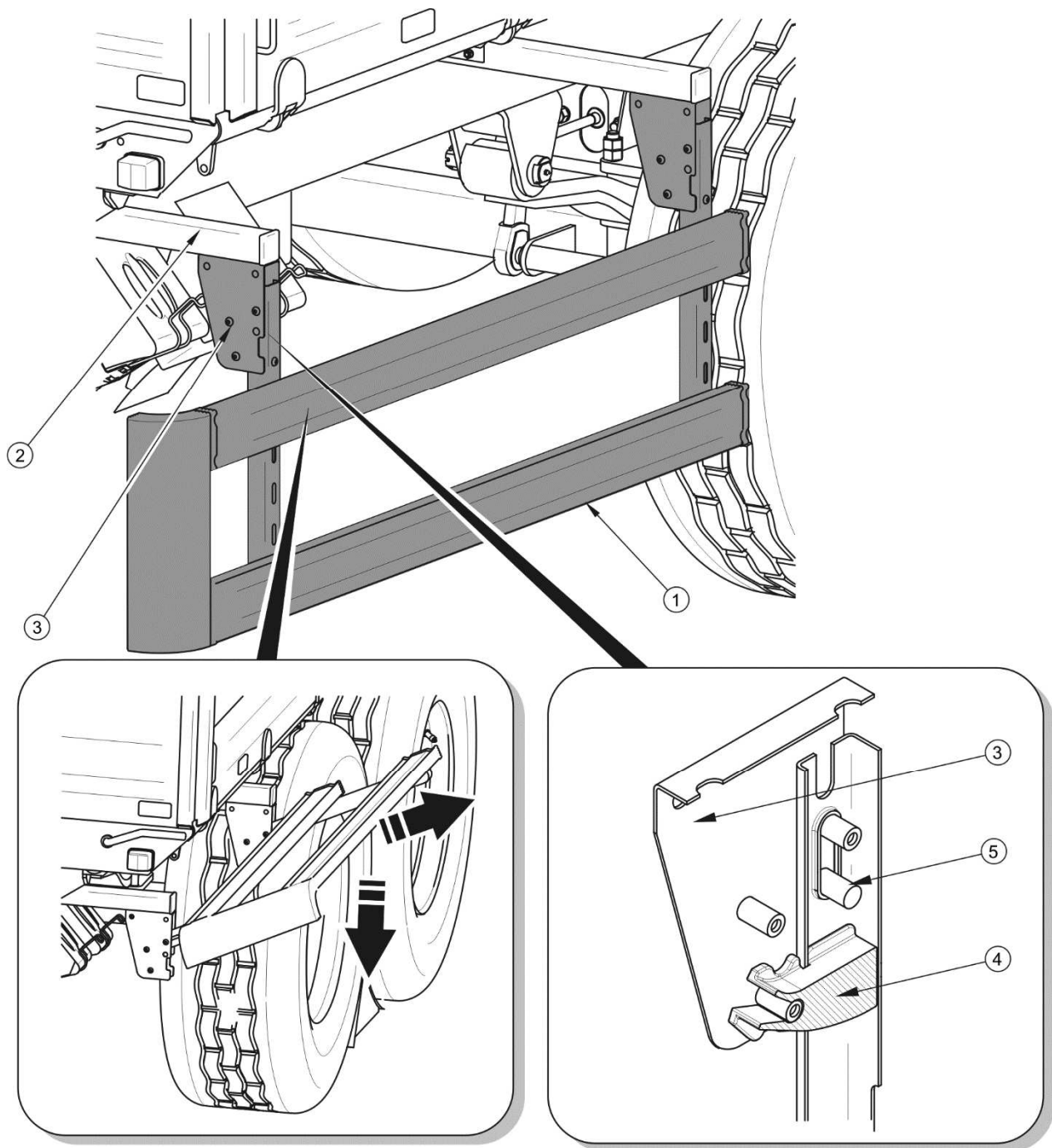


FIGURE 4.7 Underrun protection device, left

(1) under-run protective device, left, (2) barrier bracket support, (3) clamp, (4) latch, (5) securing pin

Lowering

- Pull the underrun protection device.

- Lower the under-run protection device and press until the bracket locks into the pawl.
- Secure the under-run protective device with pins (5).

**DANGER**

Do NOT move off or drive when under-run protection device is raised. Before driving, make sure that underrun protection devices are lowered and locked in the lower position.

Unless necessary, do not leave the underrun protection device in the raised position.

SECTION

5

MAINTENANCE

5.1 PRELIMINARY INFORMATION

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

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

Detailed procedures and extent of activities which the user may perform by himself are described in this section. In the event of 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 warranty.

5.2 MAINTENANCE OF BRAKES AND AXLES

5.2.1 PRELIMINARY INFORMATION

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

The responsibilities of the user are limited to:

- initial inspection of axle brakes,
- inspection and adjustment of slackness of axle bearings,
- mounting and dismounting wheel, inspection of wheel tightening,
- checking air pressure, evaluating technical condition of wheels and tyres,
- mechanical brakes adjustment,
- change of parking brake cable and adjustment of cable tension.

Procedures connected with:

- changing grease in axle bearings,
- changing bearings, hub seals,
- changing brake linings, repairing brake,

may be performed by specialist workshops.

**DANGER**

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

5.2.2 INITIAL INSPECTION OF AXLE BRAKES,

After purchasing trailer, the user is responsible for general checking of brake system of trailer axle.



Initial inspection of axle brakes must be conducted:

- after first use,
- after first travel with load.

Inspection procedures

- ➔ Hitch trailer to tractor and place chocks under trailer wheel.
- ➔ Engage and release in turn the main brake and then the trailer parking brake.
 - ⇒ Main brake and parking brake should be engaged and released without great resistance and severity.
- ➔ Check means of securing cylinders and return springs.
- ➔ Check cylinders movement and correct return of piston to start position.
 - ⇒ The help of a second person is required, who shall engage trailer brake.
- ➔ Check if axle elements are in place, (cotter pins in castellated nuts, expansion rings etc.).
- ➔ Check hydraulic cylinders or pneumatic cylinders for tightness - compare sections 5.3.2 and 5.4.2.

5.2.3 CHECKING WHEEL AXLE BEARINGS FOR SLACKNESS

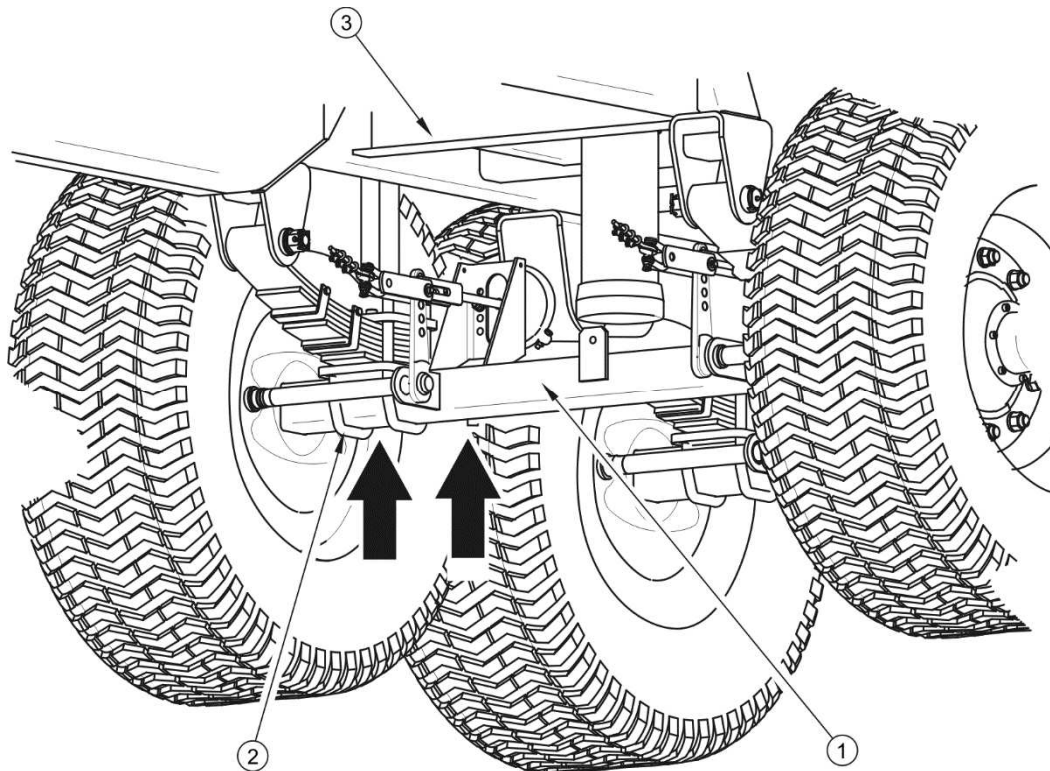


FIGURE 5.1 Lifting jack support point

(1) wheel axle, (2) U bolt, (3) lower frame

Preparation procedures

- Hitch trailer to tractor, braking tractor with parking brake.
- Park tractor and trailer on hard level ground.
 - ⇒ Tractor must be placed to drive forward.
- Place securing chocks under one trailer wheel. Ensure that trailer shall not move during inspection.
- Raise the wheel (opposite to the side where chocks are placed).
 - ⇒ The lifting jack should be placed between U bolts (2) - figure (5.1) securing axle (1) to shock absorber leaf springs, or as near as possible to leaf spring mounting. Recommended support points are marked with arrows. Lifting jack must be suitable for the weight of trailer.

Checking wheel axle bearings for slackness

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

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

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.

Check wheel axle bearings for slackness:



- after travelling the first 1,000 km,
- after intensive use of trailer,
- every six months use or every 25,000 km.

DANGER



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

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

Ensure that trailer shall not move during inspection of axle bearing slackness.

Check condition of hub cover, if necessary replace with a new cover. Inspection of bearing looseness may only be conducted, when the trailer is hitched to a tractor, and the load box is empty.

5.2.4 ADJUSTMENT OF PLAY OF WHEEL AXLE BEARINGS

Preparation procedures

- ➔ Prepare tractor and trailer for adjustment procedures according to description provided in section 5.2.3.

Adjustment of slackness of wheel axle bearing

- ➔ Take off hub cover (1), figure (5.2).
 - ➔ Take out cotter pin (3) securing castellated nut (2).
 - ➔ Tighten castellated nut in order to eliminate looseness.
- ⇒ Wheel should rotate with insignificant resistance.

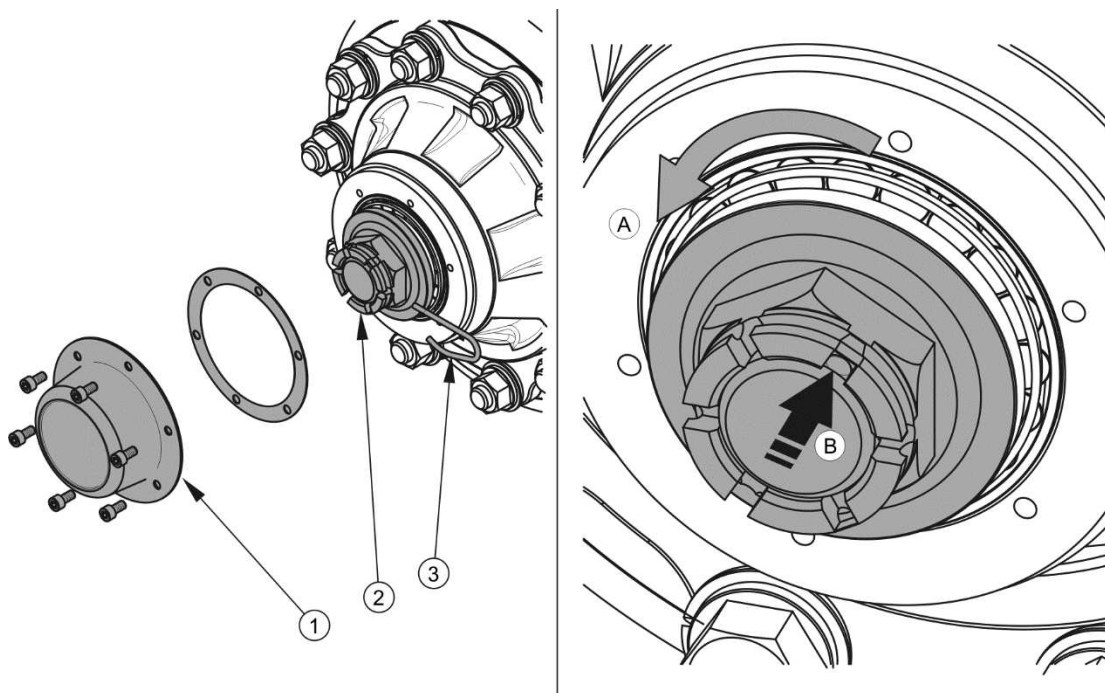


FIGURE 5.2 Adjustment of wheel axle bearings

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

- ➔ Undo nut (not less than 1/3 rotation) to align the nearest thread groove with the opening in wheel axle pin. Wheel should rotate without excessive resistance.
 - ⇒ The nut must not be excessively tightened. Do not apply excessive pressure because working conditions of the bearings may deteriorate.
- ➔ Secure castellated nut with cotter pin and mount the hub cap.
- ➔ Delicately tap the hub cap with rubber or wooden mallet.

The wheel should turn smoothly without stiffness or detectable resistance not originating from abrasion of brake shoes in brake drum. Adjustment of bearing slackness may only be conducted when the trailer is hitched to tractor and the load box is empty.

**TIP**

If the wheel is dismantled, bearing looseness is easy to check and adjust.

5.2.5 MOUNTING AND DISMOUNTING WHEEL, INSPECTION OF WHEEL NUT TIGHTENING

Wheel dismantling

- ➔ Immobilise trailer with parking brake.
- ➔ Place chocks under the wheel that will not be dismantled.
- ➔ Ensure that trailer shall not move during wheel dismantling.
- ➔ Loosen wheel nuts according to sequence given in figure (5.3).
- ➔ Place a lifting jack and raise the trailer – figure (5.1).
- ➔ Dismount wheel.

Wheel installation

- ➔ Clean axle pins and nuts of contamination.
 - ⇒ Do not grease thread of nuts and pins.
- ➔ Check condition of pins and nuts, if necessary replace them.

- ➔ 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.

**TIP**

Wheel nuts should be tightened using the torque of 270 Nm - M18x1.5 nuts.

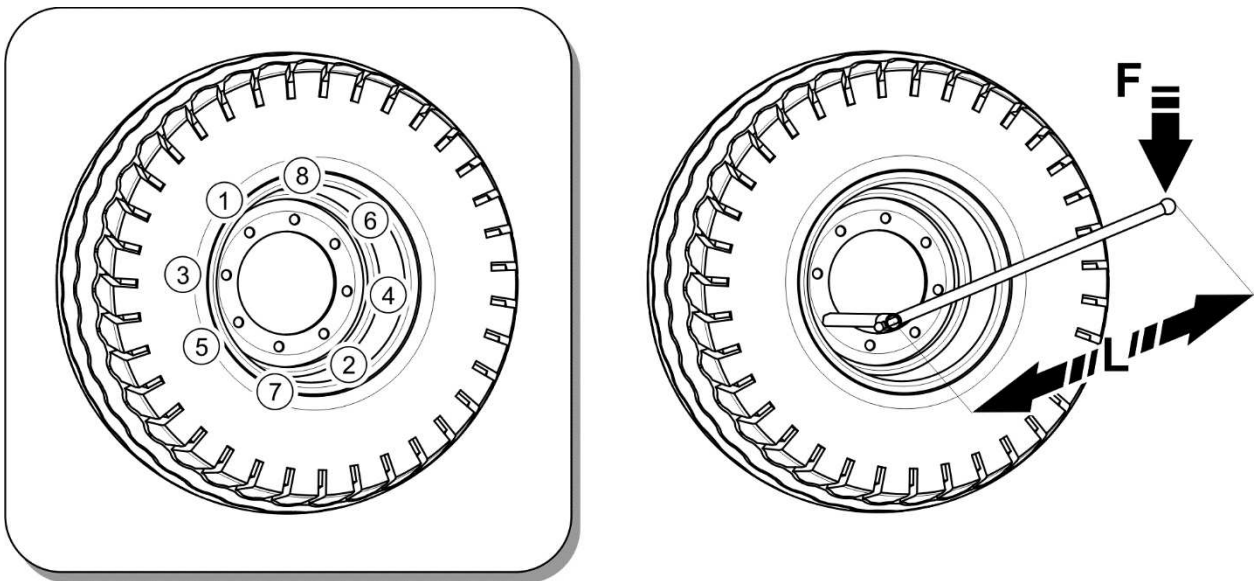


FIGURE 5.3 Sequence of nut tightening

(1) - (6) sequence of nut tightening, (L) spanner length, (F) user weight

ATTENTION


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

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

Tightening nuts

Nuts should be tightened gradually diagonally, (in several stages, until obtaining the required tightening torque) using a torque spanner. If a torque spanner is not available, one may use

an ordinary spanner. The arm of the spanner (L), figure (5.3), should be selected according to the weight of the person (F) tightening the nut. Remember that this method of tightening is not as accurate as the use of a torque spanner.



Check the wheel nut tightening:


- after first use,
- after first travel with load,
- after travelling the first 1,000 km,
- every six months use or every 25,000 km.

In the event of intensive work check the nut tightening at least every 10,000 km. The above actions should be repeated individually if a wheel has been removed from the wheel axle.

TABLE 5.1 Spanner arm

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

5.2.6 CHECKING AIR PRESSURE IN TYRES, EVALUATING TECHNICAL CONDITION OF TYRES AND STEEL WHEELS



TIP

Tyre pressure values are specified in information decal, placed on wheel or on upper frame above trailer wheel.

Air pressure in tyres should be checked each time after changing a spare wheel and at least once a month. In the event of intensive use, air pressure in tyres should be checked more frequently. During this time, the trailer must be unloaded. Checking should be done before travelling when tyres are not heated, or after an extended period of parking.

**DANGER**

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

While checking pressure pay attention to technical condition of wheels and tyres. Look carefully at tyre sides and check the condition of tread.

In case of mechanical damage consult the nearest tyre service and check whether the tyre defect requires tyre replacement.

Wheels should be inspected with regard to distortion, breaking of material, breaking of welds, corrosion, especially in the area of welds and contact with tyre.

Proper technical condition and appropriate maintenance of wheels significantly extends the life of these components and ensures appropriate level of safety to trailer users.

**Checking air pressure in tyres and visual inspection of steel wheels:**

- every 1 month of use,
- if needed.

5.2.7 ADJUSTMENT OF MECHANICAL BRAKES

During trailer operation drum brake linings are subjected to wear. Piston stroke extends, and exceeding braking force limiting value declines.

Adjustment must be made when:

- piston rod stroke amounts to 2/3 of maximum stroke,
- expansion levers are not set in parallel to each other during braking,
- repairs are made to braking system.

Trailer wheels must brake simultaneously. Brakes adjustment involves changing the position of the expander arm (1) – figure (5.4), in relation to expander shaft (2).

Scope of maintenance activities

- ➔ Dismantle pin (3) fixing the cylinder fork (4) to expander arm (3).

- ➔ Mark position of expander arm (1) with regard to the shaft (2).
- ➔ Dismantle arm and set it in the appropriate position.
 - ⇒ in direction (A), if braking is too early,
 - ⇒ in direction (B), if braking is too late.
- ➔ Repeat the process for the second arm.
- ➔ Replace the pin fixing the cylinder fork to expander arm.

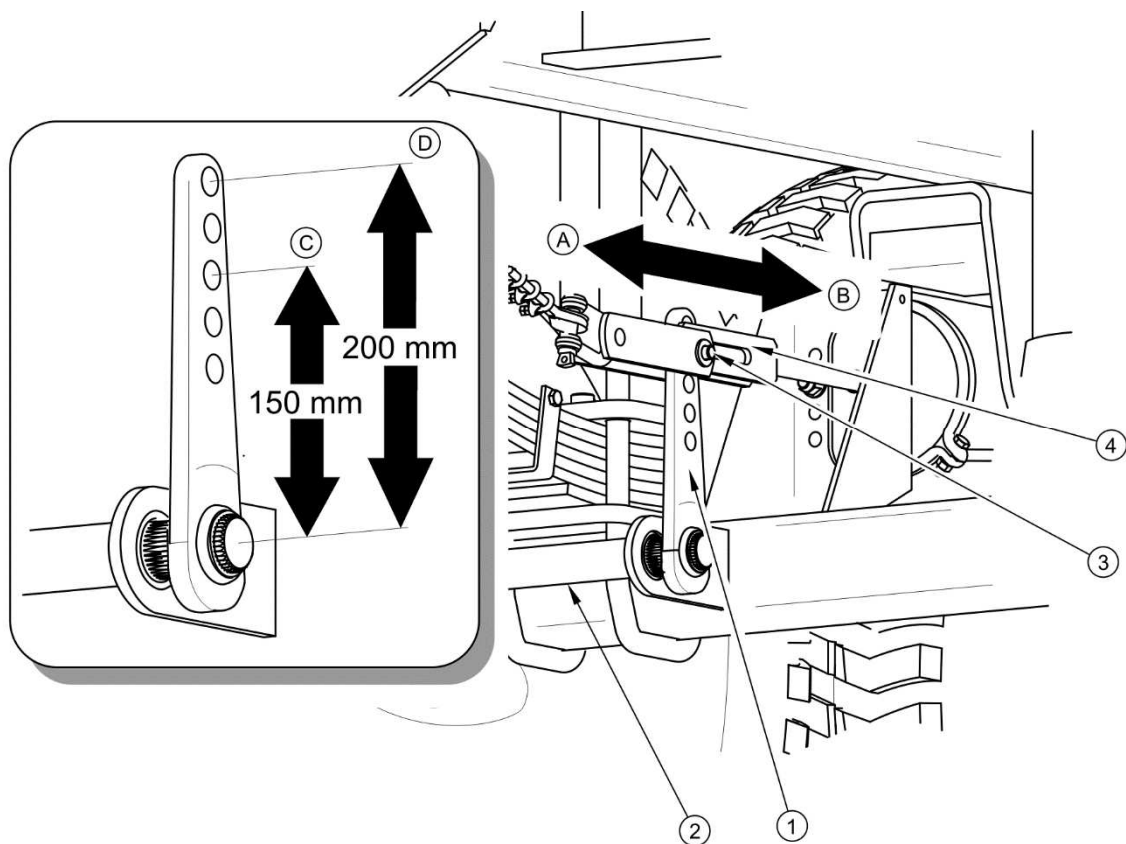


FIGURE 5.4 Adjustment of axle mechanical brakes

(1) expander arm, (2) expander shaft, (3) pin, (4) cylinder fork

Adjustment should be conducted separately for each wheel. Expander arm (1) should be moved by one notch in chosen direction. If the extent of cylinder action is still incorrect, move the lever again. After proper brake adjustment, at full braking, the expander arms should create the angle 90° with the cylinder piston, and the stroke should amount to approximately half the length of the total stroke of the piston. After brake release expander arms may not be supported on any structural elements, because too little withdrawal of a piston ram may cause abrasion of brake shoes in drum and result in overheating trailer brakes. Expander

arms must be positioned in parallel with regard to each other at full braking. If this is not so, adjust the position of the lever, which has the longer stroke.

TABLE 5.2 POSITION OF PIN IN EXPANDER ARMS

TYPE OF BRAKE SYSTEM	PIN POSITION FRONT AXLE [mm] (C)	PIN POSITION REAR AXLE [mm] (D)
Double line system	150	175
Double line ALB system	150	175
Hydraulic system	150	175
Single line system	150	175

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

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

Replacing the parking brake cable

- ➡ Hitch trailer to tractor. Park trailer and tractor on level surface.
- ➡ Place wheel chocks under trailer wheel.
- ➡ Fully unscrew the bolt of the brake crank mechanism (1),
- ➡ Dismantle shackles, remove pins of guide rollers (4),
- ➡ Unlock and remove crank mechanism pin (1),
- ➡ Loosen nuts of cable clamps (2).
- ➡ Dismantle cable (3).
- ➡ Lubricate parking brake mechanism (1) and pins of cable guide rollers (4).
- ➡ Install a new cable.
 - ⇒ Parking brake cable must be fitted carefully.
 - ⇒ Thimbles and three clamps must be fitted at the ends of the cable.
 - ⇒ Clamps must be tightened. The distances between the clamps may not be less than 15 mm.

- ⇒ Clamp jaws must be placed on the side of the load bearing cable - see figure (5.6).
- ⇒ The first clamp should be placed directly on the thimble.

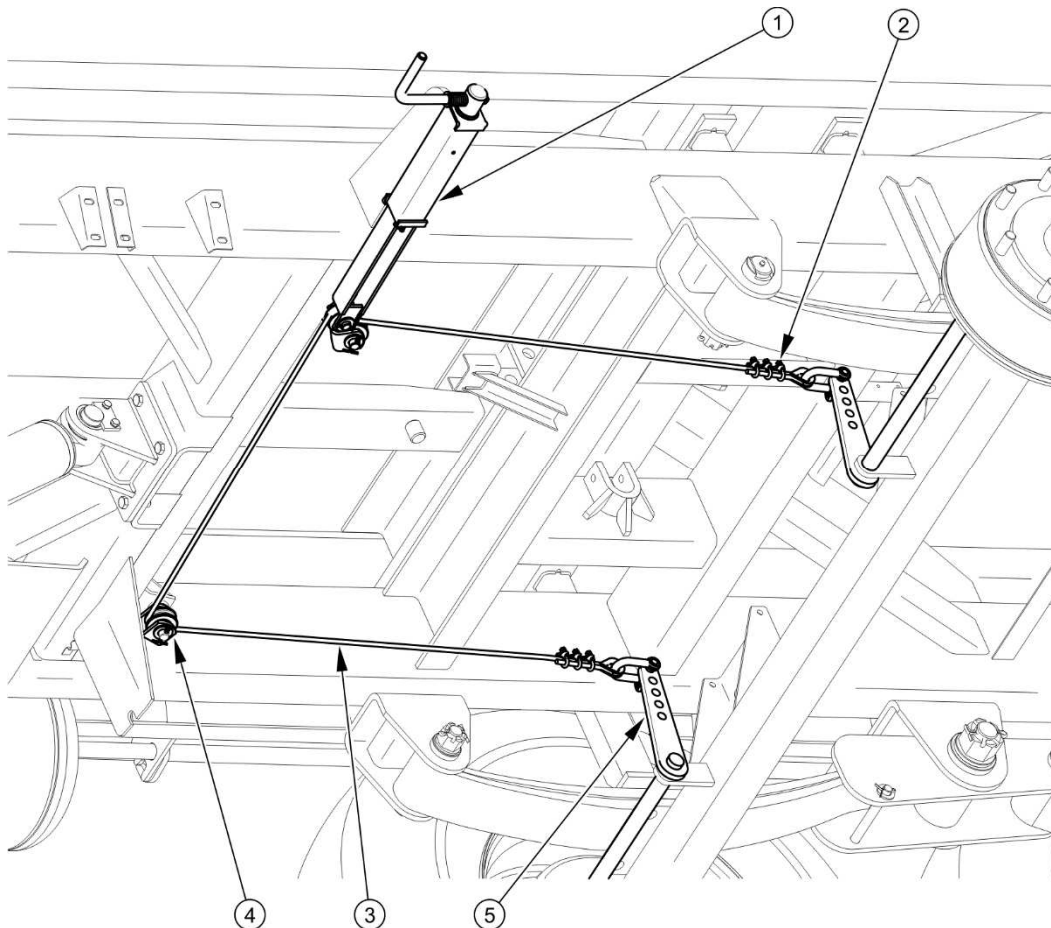


FIGURE 5.5 **Adjustment of parking brake cable tension**

(1) *brake crank mechanism*, (2) *bow clamp*, (3) *hand brake cable*, (4) *guide roller*, (5) *expander arm*

- ➔ Install bolts and new securing cotter pins.
- ➔ Adjust tension of parking brake cables.
- ➔ After first loading of the brake, check tension of brake cable. If necessary, correct the tension.

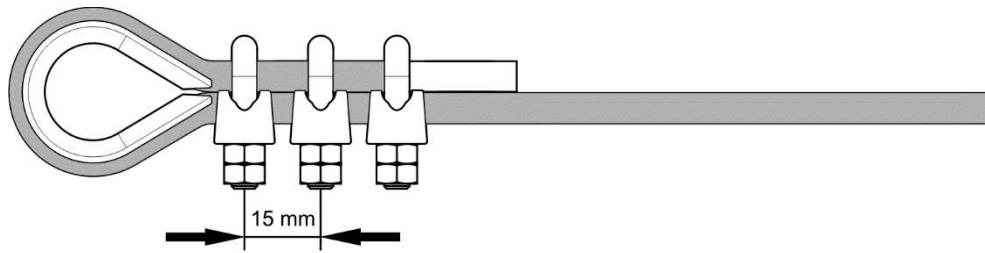


FIGURE 5.6 Installing brake cable clamps

Adjustment of parking brake cable tension

- ➔ Hitch trailer to tractor. Park trailer and tractor on level surface.
- ➔ Place chocks under trailer wheel.
- ➔ Unscrew the brake bolt mechanism maximally (1) – figure (5.5), (anti clockwise).
- ➔ Loosen nuts of handbrake cable clamps (2).
- ➔ Tighten cable and tighten clamps.
 - ⇒ Length of parking brake cable should be so selected that at total release of working and parking brake the cable would be loose and hanging by 1 - 2 cm.



Checking and/or adjustment of parking brake:

- every 12 months,
- if needed.

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

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

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

5.3 PNEUMATIC SYSTEM MAINTENANCE

5.3.1 PRELIMINARY INFORMATION

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

The duties of the operator connected with the pneumatic system maintenance include:

- checking tightness and visual inspection of the system,
- cleaning the air filter (filters),
- draining water from air tank,
- cleaning drain valve,
- cleaning and maintaining pneumatic conduit connections,



DANGER

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

5.3.2 CHECKING AIR TIGHTNESS AND VISUAL INSPECTION OF PNEUMATIC SYSTEM

Checking air tightness of pneumatic system

- ➔ Hitch trailer to tractor.
- ➔ Immobilise tractor and trailer with parking brake. Place chocks under trailer wheel.
- ➔ Start tractor in order to supplement air in trailer brake system tank.

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

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

**Check system tightness:**

- after travelling the first 1,000 km,
- each time after making repairs or changing system components,
- annually.

Visual inspection of the system

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

**Visual inspection of the system**

- Conduct inspection of system at the same time as when checking tightness.

**ATTENTION**

Repair, exchange or regeneration of pneumatic system components may only be performed in a specialised workshop.

5.3.3 CLEANING THE AIR FILTERS

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

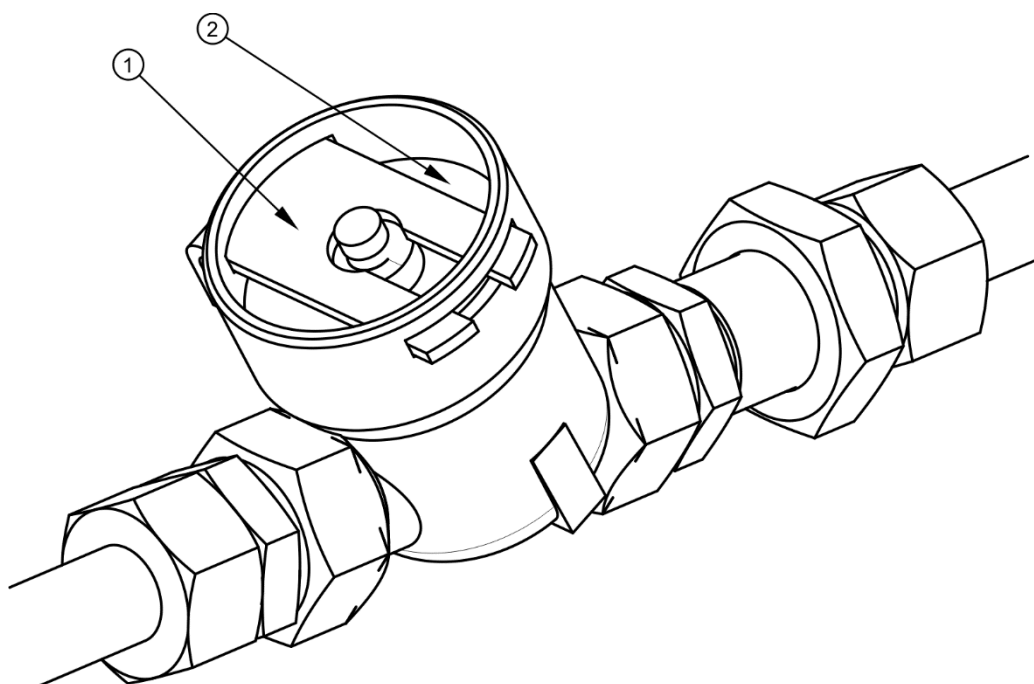


FIGURE 5.7 Air filter

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

**DANGER**

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

Scope of maintenance activities

- ➡ Reduce pressure in supply conduit.
 - ⇒ Pressure in conduit can be reduced by pressing the head of the pneumatic connection until resistance is felt.
- ➡ Slide out securing slide lock (1) – figure (5.7).
 - ⇒ 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 insert and the filter body should be carefully washed with water and blown through with compressed air. Assembly should be done in reverse order.

**Cleaning the air filter (filters):**

- every 3 months of use,

5.3.4 DRAINING WATER FROM AIR TANK**Scope of maintenance activities**

- ➡ Open out drain valve (1) placed in lower part of tank (2) – the tank is placed on brackets of right longitudinal frame of lower frame.
 - ⇒ The compressed air in the tank causes the removal of water to the exterior.

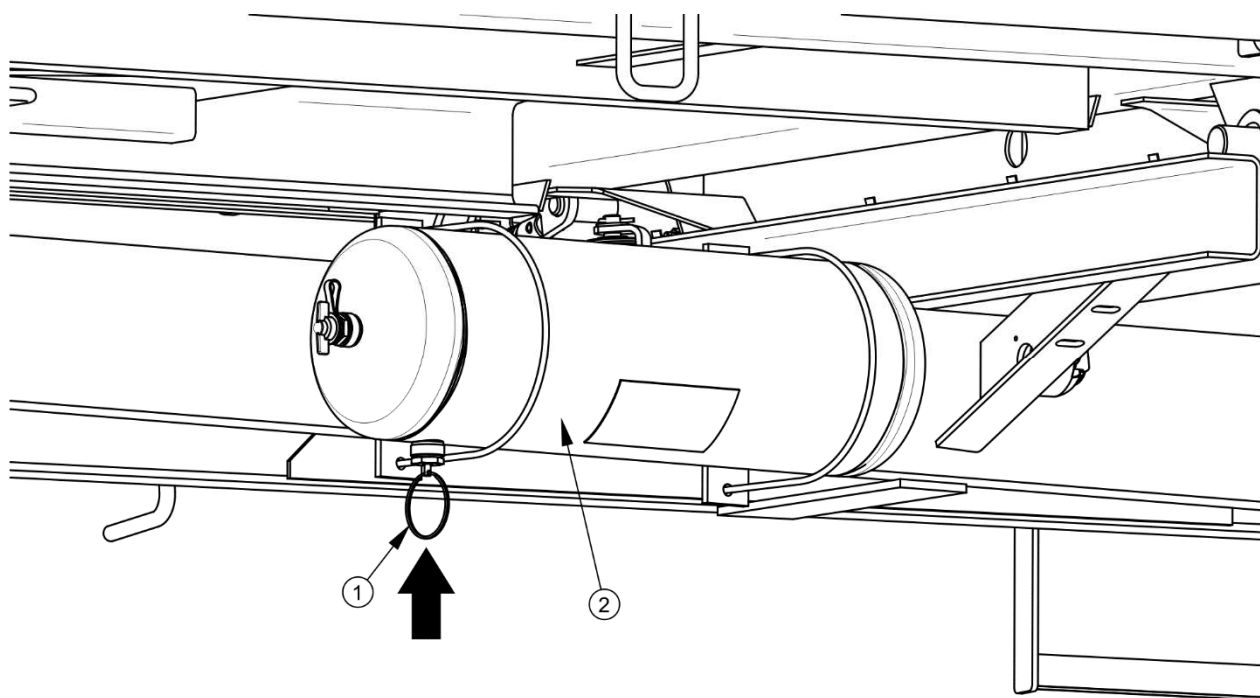


FIGURE 5.8 Draining water from air tank

(1) drain valve, (2) air tank

- ➔ Released valve stem should automatically close and stop flow of air from the tank.
 - ⇒ If the valve stem resists returning to its position, then the whole drain valve must be unscrewed and cleaned or replaced (if it is damaged) - see section 5.3.5.



Draining water from air tank:

- every seven days of use.

5.3.5 CLEANING THE DRAIN VALVE

Scope of maintenance activities

- ➔ Completely reduce pressure in air tank.
 - ⇒ Reduction of pressure in tank is achieved by tilting the drain valve stem.

- ➡ Unscrew valve.
- ➡ Clean the valve, blow it with compressed air.
- ➡ Change copper seal.
- ➡ Screw in valve, fill tank with air and check tank tightness.

**DANGER**

Release air from the air tank before dismantling drain valve.

**Cleaning valve:**

- every 12 months (before winter period).

5.3.6 CLEANING AND MAINTAINING PNEUMATIC CONDUIT CONNECTIONS AND PNEUMATIC SOCKETS

**DANGER**

Unreliable and dirty trailer connections may cause unreliability and faulty functioning of braking system.

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 connector seals with oils, grease, petrol etc. may cause damage and accelerate ageing process.

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

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

5.3.7 REPLACEMENT OF PNEUMATIC CONDUIT

Pneumatic conduits should be replaced when permanently deformed, cut or frayed.

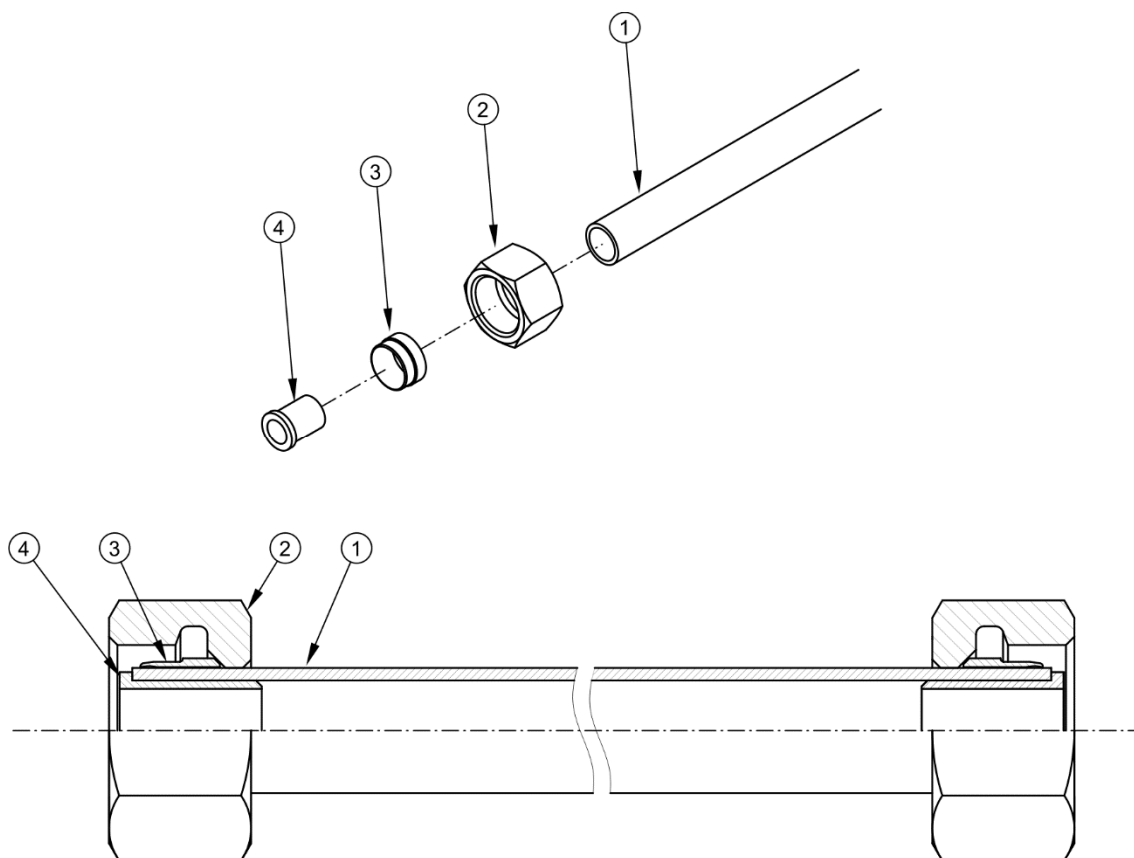


FIGURE 5.9 Design of pneumatic conduit

(1) pneumatic conduit, (2) connecting nut (3) clamping ring, (4) reinforcing sleeve

Required service actions:

- ➔ Reduce pressure in the system.
 - ⇒ Reduction of pressure is achieved by tilting the drain valve mandrel.
- ➔ Remove the pneumatic conduit by loosening the nut (2).
- ➔ Fit the new conduit.
 - ⇒ The conduit interior should be clean.
 - ⇒ The ends of the conduit (1) must be cut exactly at right angles.
 - ⇒ Clamping ring (3) should be fitted according to figure (5.9).

⇒ Reinforcing sleeve (4) of the conduit must be thoroughly depressed.

➡ Check tightness of connections in accordance with section (5.3.2).

5.4 HYDRAULIC SYSTEM MAINTENANCE

5.4.1 PRELIMINARY INFORMATION

Work connected with the repair, change or regeneration of hydraulic system components (tipping cylinder, valves etc.) should be entrusted to specialist establishments, having the appropriate technology and qualifications for this type of work.

The duties of the operator connected with the hydraulic system maintenance include:

- checking tightness and visual inspection of the system,
- checking technical condition of hydraulic connections.



DANGER

Do NOT tip trailer with unreliable hydraulic tipping system.

Do not use the trailer if the support hydraulic system is out of order.

Do NOT use the trailer if hydraulic brake system is unreliable.

5.4.2 CHECKING HYDRAULIC SYSTEM TIGHTNESS

Required maintenance actions

- ➡ Hitch trailer to tractor.
- ➡ Connect all hydraulic system conduits according to maintenance instructions.
- ➡ Clean connections and cylinders (tipping cylinder, supports and possibly hydraulic brake cylinders).
- ➡ Conduct test tipping of load box sideways and backwards.
- ➡ Press tractor brake pedal several times
 - ⇒ If trailer is equipped with hydraulic brake system.
- ➡ Check hydraulic cylinders and conduits for tightness.

If oil leak is detected on hydraulic cylinder body, ascertain 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.

**Checking tightness:**

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

5.4.3 CHECKING TECHNICAL CONDITION OF HYDRAULIC COUPLERS AND SOCKETS.

Hydraulic couplers and sockets designed for connection with second trailer must be in good working condition and kept clean. Each time before connecting, check if sockets in tractor or connections of second trailer are maintained in good working condition. Tractor and trailer hydraulic systems are sensitive to the presence of permanent contamination, which may cause damage to precision system components (contamination may cause scratching of hydraulic valves, abrasion of piston surfaces etc.)

**Inspection of hydraulic couplers and sockets:**

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

5.4.4 REPLACEMENT OF HYDRAULIC CONDUITS

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

**Replacement of hydraulic conduits:**

- every 4 years.

5.5 MAINTENANCE OF ELECTRICAL SYSTEM AND WARNING ELEMENTS

5.5.1 PRELIMINARY INFORMATION

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

The responsibilities of the user are limited to:

- technical inspection of electrical system and reflectors,
- changing bulbs



ATTENTION

Do NOT travel with out of order lighting system. Damaged lamp lenses, and burned-out bulbs must be replaced immediately before travelling. Lost or damaged reflectors must be replaced.

Required maintenance actions

- ➔ Connect trailer to tractor with appropriate connection lead.
 - ⇒ Check if the connection lead is reliable. Check connection sockets in tractor and trailer.
- ➔ Check completeness and technical condition of trailer lights.
- ➔ Check completeness of all reflectors.
- ➔ Check correct mounting of the slow-moving vehicle warning sign holder.
- ➔ Before driving on to public road, check that the tractor is equipped with a warning reflective triangle.



Checking technical condition of electrical system:

- each time while connecting the trailer.

**TIP**

Before driving off, make certain that all lamps and reflectors are clean.

5.5.2 REPLACEMENT OF BULBS

Compatible bulbs are shown in table (5.3). All light lenses are secured by screws and it is not necessary to dismantle whole lamp or trailer subassemblies.

TABLE 5.3 List of bulbs

LAMP	LAMP TYPE	BULB / QUANTITY IN 1 LAMP	NUMBER OF LAMPS
Rear left lamp assembly	WE 549L	R10W / 1 pc. P21W / 2 pcs.	1
Rear right lamp assembly	WE 549P	R10W / 1 pc. P21W / 2 pcs.	1

5.6 TRAILER 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. Remove and wipe off excess oil or grease.

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

Change of grease in hub bearings should be entrusted to specialised service points, equipped with the appropriate tools. According to the recommendations of the axle Manufacturer, dismantle the entire hub, remove the bearing and individual sealing rings. After careful washing and inspection, mount lubricated elements. If necessary, bearing and seals should be replaced with new parts. Lubrication of axle bearings shall be performed at least once in 2 years or every 50,000 km. In the event of intensive use, lubrication should be performed more frequently.

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

TABLE 5.4 Trailer lubrication schedule

ITEM	LUBRICATION POINT	NUMBER OF LUBRICATION POINTS	TYPE OF GREASE	FREQUENCY
1	Hub bearing	4	A	24M
2	Drawbar eye	1	B	14D
3	Expander shaft sleeve	4	A	3M
4	Socket for installation of tipping ram and cylinder suspension	4	B	1M
5	Tipping cylinder ball bearing ⁽¹⁾	1	B	3M
6	Parking brake mechanism	1	A	6M
7	Parking brake guide roller pins	2	A	6M
8	Articulated joints and sockets for installation of load box.	4	B	2M
9	Wall extension lugs	10	A	1M
10				
11	Chute guides	2	C	1M
12	Chute string pins	6	C	1M
13	Wall pins and locks	8	A	1M

ITEM	LUBRICATION POINT	NUMBER OF LUBRICATION POINTS	TYPE OF GREASE	FREQUENCY
14	Shear type support	1	B	3M
15	Shear type support cylinder bearings	2	B	3M
16	Leaf spring absorber sliding surface	4	B	6M
17	Leaf spring	4	B	6M
18	Rocker arm pin	2	B	3M
19	Leaf spring pin	4	B	3M
20	Pin of wall guy cable mechanism ⁽¹⁾	2	A	2M
21	Side wall locking lever	2	A	6M

Lubrication periods – M months, D – days

⁽¹⁾ – not shown in figure

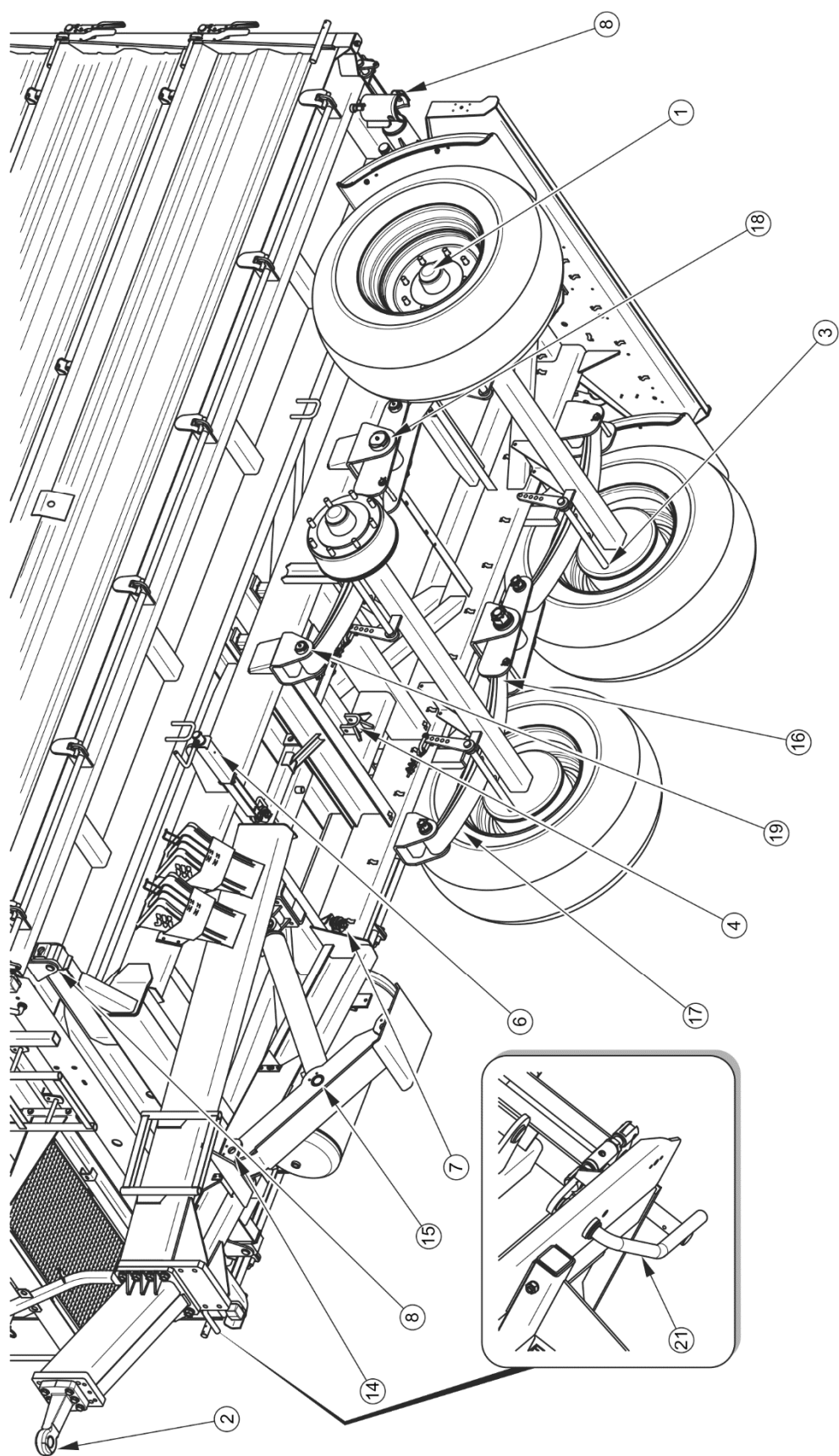


FIGURE 5.10 Trailer's lubrication points, part 1

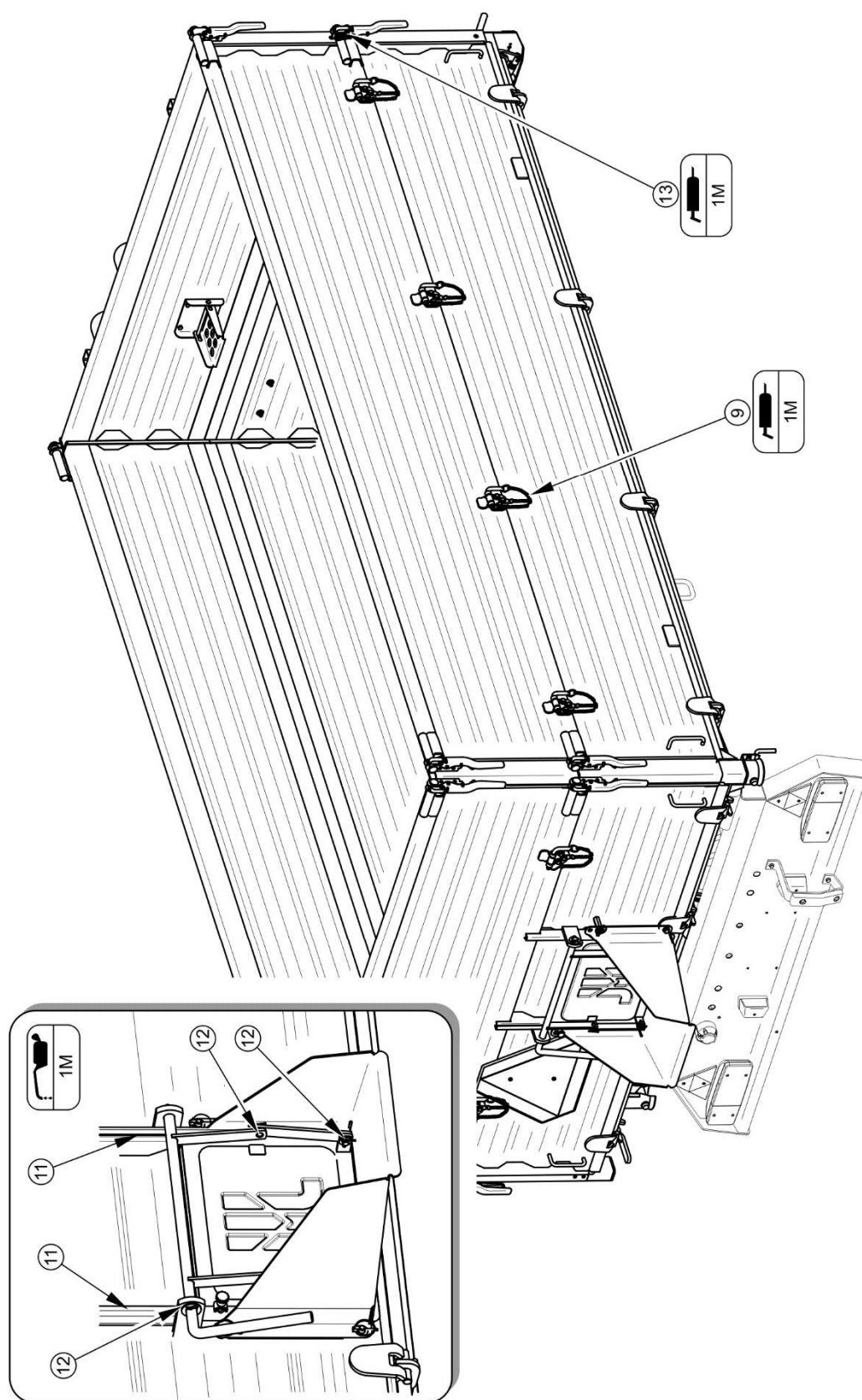


FIGURE 5.11 Trailer's lubrication points, part 2

FIGURE 5.12 Recommended lubricants

MARKING ACCORDING TO TAB. (5.4)	DESCRIPTION
A	machine general-purpose grease (lithium, calcium grease),
B	Grease for heavily loaded elements with addition of MoS ₂ or graphite
C	ordinary machine oil, silicon grease in aerosol



During trailer operation, the user is obliged to observe lubrication instructions according to attached lubrication schedule.

5.7 CONSUMABLES

5.7.1 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.

TABLE 5.5 L-HL 32 Lotos hydraulic oil characteristics

ITEM	NAME	UNIT	VALUE
1	ISO 3448VG viscosity classification	-	32
2	Kinematic viscosity at 40 ⁰ 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

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 is not classified as a dangerous substance, however long-term action on the skin or eyes may cause irritation. In the event of contact of oil with skin wash the place of contact with water and soap. Do NOT apply organic solvents (petrol, kerosene). Contaminated clothing should be changed to prevent access of oil to skin. In the event of contact of oil with eye, rinse with large quantity of water and in the event of the occurrence of irritation consult a doctor. Hydraulic oil in normal conditions is not harmful to the respiratory tract. A hazard only occurs when oil is strongly atomised (oil vapour), or in the case of fire during which toxic compounds may be released. Oil fires should be quenched with the use of carbon dioxide, foam or steam extinguishers. Do not use water to quench oil fires.

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

5.8 CLEANING THE TRAILER

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

Trailer cleaning guidelines

- Before washing trailer open all sides and extensions. Carefully clean load remains from the load box (sweep out or blow out with compressed air), especially where sides and extensions join and.
- 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 °C.
- Do not direct water stream directly at system elements and equipment of the trailer i.e. control valve, braking force regulator, brake 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 elements.
- For cleaning and maintenance of plastic coated surfaces it is recommended to use clean water or special preparations designed for this purpose.
- Do not apply organic solvents, preparations of unknown origin or other substances, which may cause damage to lacquered, rubber or plastic surfaces. In the event of doubt it is recommended to make a test on an unseen surface area.
- Surfaces smeared with oil or grease should be cleaned by application of benzene or other degreasing agents and then washed with clean water with added detergent. Comply with recommendations of the Manufacturer of cleaning agents.



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.

- 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.
- 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.
- Observe environmental protection principles and wash trailer in a place designed for this purpose.
- Washing and drying of the trailer must take place at temperatures above 0°C.
- After washing and drying, trailer should be greased at all control points regardless of previous date of lubrication.

5.9 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 appropriate value.

5.10 TIGHTENING TORQUE FOR NUT AND BOLT CONNECTIONS

TABLE 5.6 Tightening torque for nut and bolt connections

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

⁽¹⁾ – strength class according to DIN ISO 898 standard

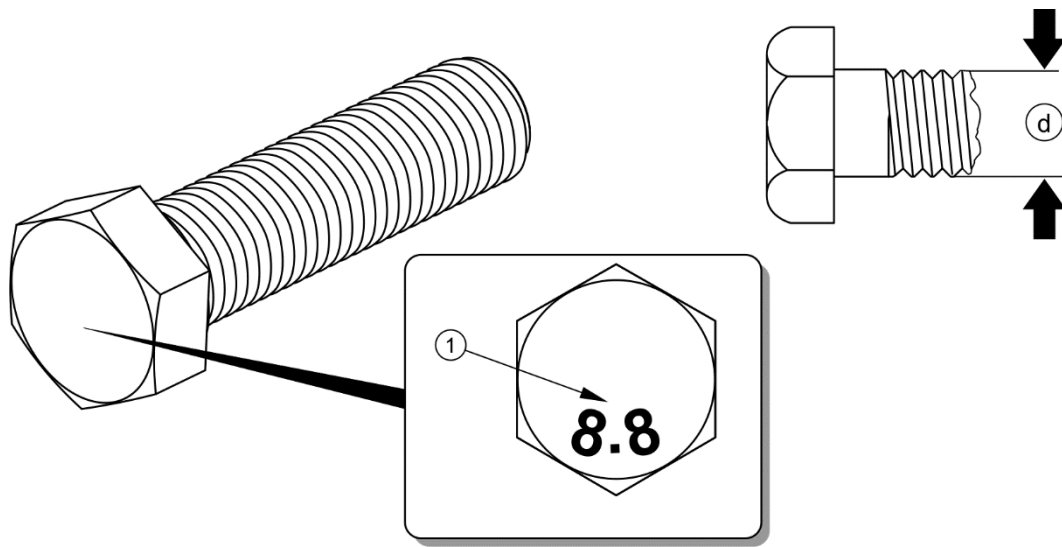


FIGURE 5.13 Bolt with metric thread

(1) strength class, (d) thread diameter

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 (5.6). Given values apply to non-lubricated steel bolts.

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

5.11 INSTALLATION AND DISMOUNTING OF WALL EXTENSIONS

DANGER



Installation and dismantling of wall extensions should be carried out with the use of appropriate platforms, ladders or when standing on a ramp. These tools must be in good condition to fully protect the persons working on them against falling. Work should be performed by at least two persons. Exercise particular caution.

Installation of wall extensions

- ➔ Secure rear extension stakes to rear side stakes.
- ➔ Install front wall extension.

- ➔ Install rear wall extension.
- ➔ Install side wall extensions.
 - ⇒ First place upper pins of extension in appropriate rear stake locks and front walls, and after that secure base of extensions with the aid of pin lugs to upper part of side walls.
- ➔ screw down the wall extension ladder to the front wall.

Dismounting of wall extensions should be performed in reverse order.

5.12 ADJUSTMENT OF DRAWBAR POSITION

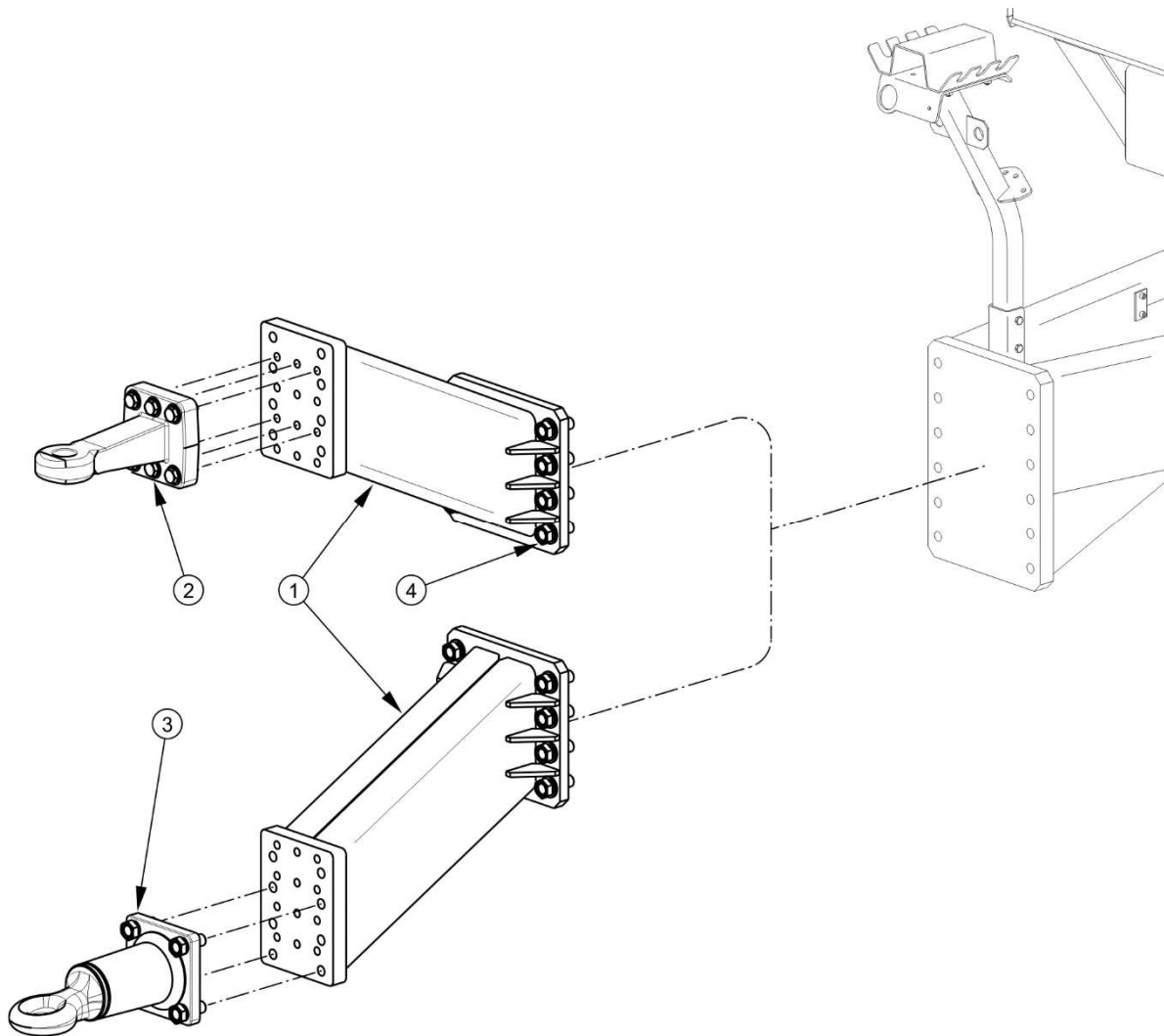


FIGURE 5.14 Adjustment of drawbar position

(1) drawbar body, (2) fixed drawbar eye, (3) rotating drawbar eye, (4) bolt connection

Adjustment of drawbar position is achieved by changing the drawbar body position (1) in relation to the trailer's lower frame.

Scope of activities

- ➔ Immobilise trailer with parking brake.
- ➔ Place wheel chocks under trailer wheels.
- ➔ Unscrew drawbar body from frame.
- ➔ Set drawbar body in new position and tighten with appropriate torque.
 - ⇒ The frame design provides 6 combination possibilities for positioning the drawbar body, compare figure (5.14).
- ➔ Check degree of tightening of drawbar eye and drawbar body after the first travel under load.

5.13 TROUBLESHOOTING

TABLE 5.7 Troubleshooting

FAULT	CAUSE	REMEDY
Problem with moving off	Brake system conduits not connected	Connect brake conduits (applies to pneumatic systems)
	Applied parking brake	Release parking brake.
	Damaged pneumatic system connection conduits	Replace.
	Leaking connections	Tighten, replace washers or seal sets, replace conduits.
	Damaged control valve or brake force regulator	Check valve, repair or replace.
Noise in axle hubs	Excessive bearing slackness	Check slackness and adjust if needed
	Damaged bearings	Replace bearings
	Damaged hub parts	Replace

FAULT	CAUSE	REMEDY
Poor reliability of braking system	Insufficient pressure in the system	<p>Check pressure on tractor pressure gauge, wait till compressor fills tank to required pressure.</p> <p>Damaged air compressor in tractor Repair or replace.</p> <p>Damaged brake valve in tractor. Repair or replace.</p> <p>Leaking system conduits or connections. Check system for tightness.</p>
Excessive heating of axle hubs	Incorrect main or parking brake adjustment	Regulate positions of expander arms
	Worn brake linings	Change brake shoes
Incorrect hydraulic system operation	Improper hydraulic oil viscosity	Check oil quality, make sure that the oil in both machines is of the same type. If necessary change oil in tractor or in trailer
	Insufficient tractor hydraulic pump output, damaged tractor hydraulic pump.	Check tractor hydraulic pump.
	Damaged or contaminated cylinder	Check cylinder piston rod (bending, corrosion), check cylinder for tightness (cylinder piston rod seal), if necessary, repair or replace the cylinder.
	Excessive cylinder loading	Check mechanism controlled by cylinder for mechanical damage
	Damaged hydraulic conduits	Check and make certain that hydraulic conduits are tight, not fractured and properly tightened. If necessary, replace or tighten.

NOTES

[illegible]



ANNEX A

Tire sizes

TRAILER VERSION	FRONT/REAR AXLE
PT510	385/65 R 22.5 PR 385/55 R 22.5 RE 385/65 R 22.5 TL

Disc wheel 11.75x22.5" ET=0