PRONAR Sp. z o.o.

17-210 NAREW, UL. MICKIEWICZA 101A, WOJ. PODLASKIE

tel.:	+48 085 681 63 29	+48 085 681 64 29
	+48 085 681 63 81	+48 085 681 63 82
fax:	+48 085 681 63 83	+48 085 682 71 10

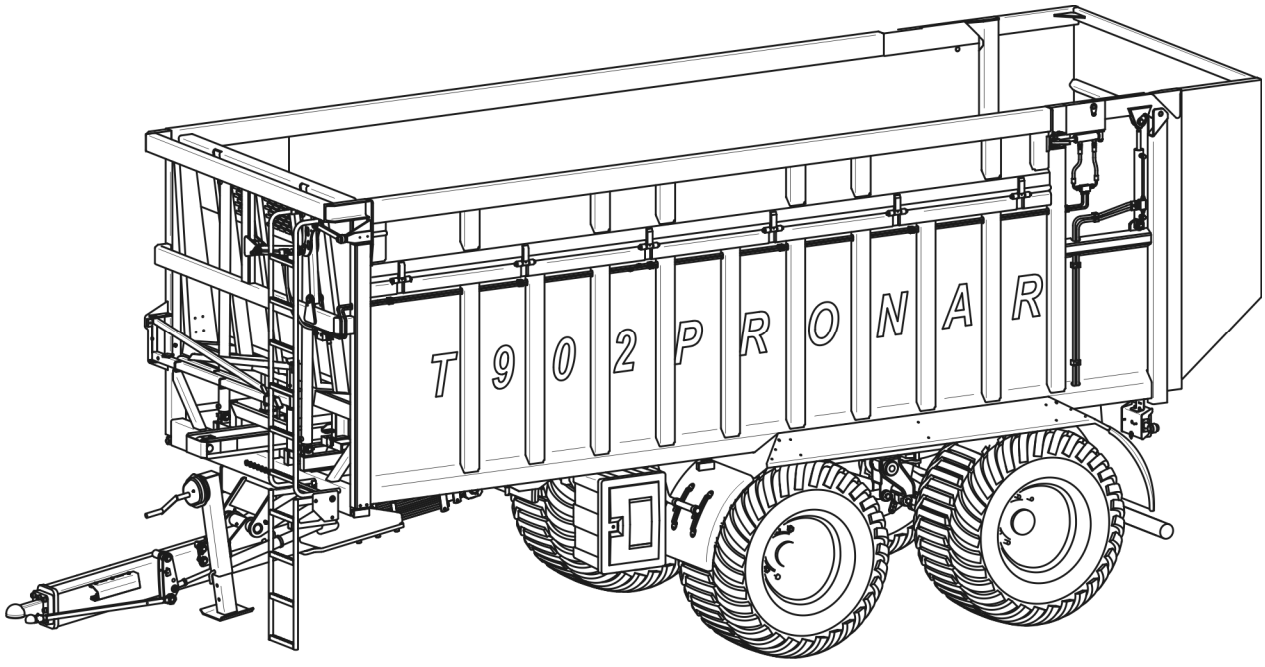
www.pronar.pl

OPERATOR'S MANUAL

TRAILER

PRONAR T902

TRANSLATION OF THE ORIGINAL DOCUMENT



ISSUE 1A-01-2010

PUBLICATION NO 193N-00000000-UM

EN

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 T902 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

PRONAR Sp. z o.o.
ul. Mickiewicza 101A
17-210 Narew, Poland

PHONE NUMBERS

+48 085 681 63 29 *+48 085 681 64 29*
+48 085 681 63 81 *+48 085 681 63 82*

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 ⇨

PRONAR Sp. z o.o.
ul. Mickiewicza 101 A
17-210 Narew, Polska
tel./fax (+48 85) 681 63 29, 681 63 81, 681 63 82,
681 63 84, 681 64 29
fax (+48 85) 681 63 83
http://www.pronar.pl
e-mail: pronar@pronar.pl

EC DECLARATION OF CONFORMITY OF THE MACHINERY

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

Description and identification of the machinery	
Generic denomination and function:	**TRAILER**
Type:	**T902**
Model:	**- - - - -**
Serial number:	
Commercial name:	**TRAILER PRONAR T902**

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

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

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

Z-CA DYREKTORA
d/s technicznych
członek zarządu
Roman Omelianiuk

Narew, the _____

Place and date

Full name of the empowered person position, signature

TABLE OF CONTENTS

SECTION

1

BASIC INFORMATION

1.1 IDENTIFICATION

1.1.1 TRAILER IDENTIFICATION

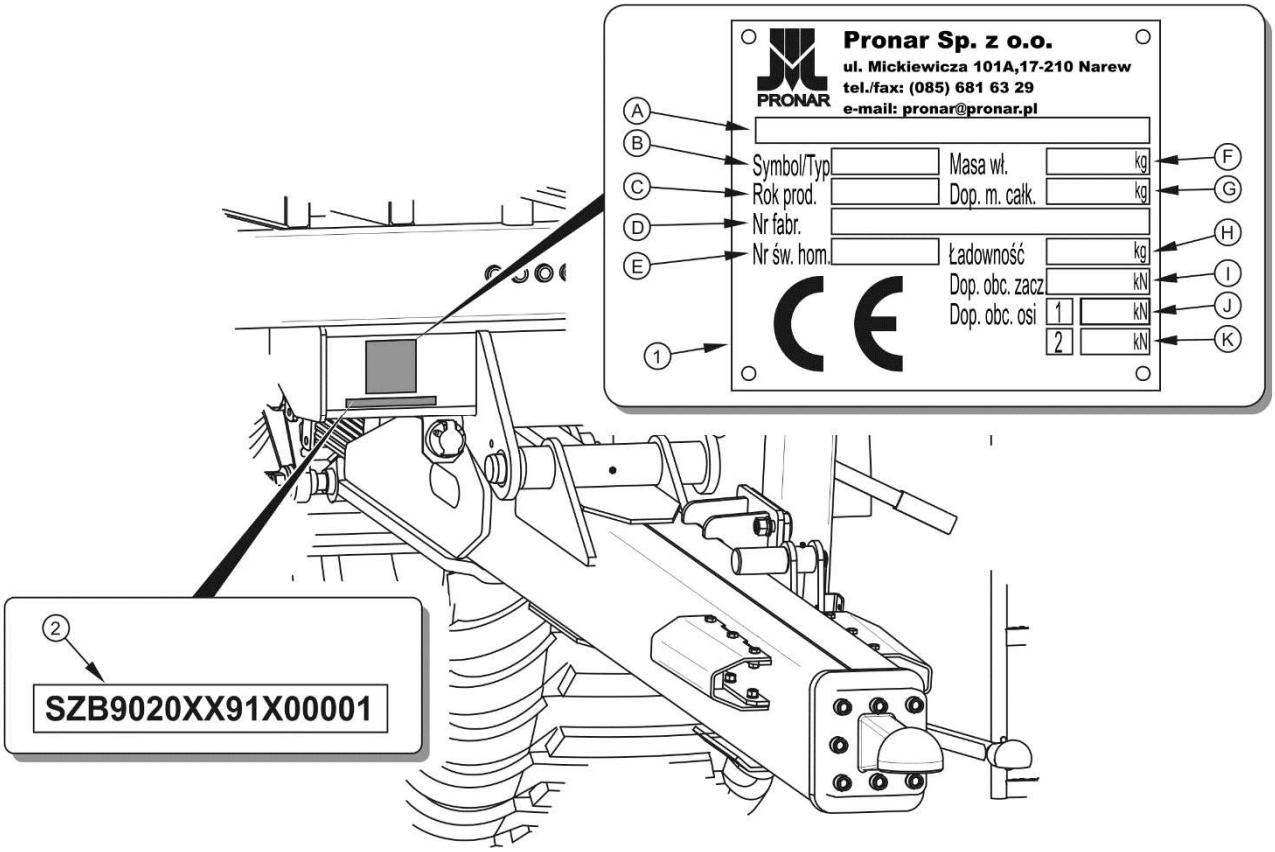


FIGURE 1.1 Location of the data plate and serial number

(1) data plate, (2) serial number

PRONAR T902 trailer is marked with data plate (1) located on the front beam of the load box and with serial number (2) located on a gold painted rectangle. When buying the machine 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 – figure (*1.1*) are presented in table *(1.1)*.

TABLE 1.1 Markings on data plate

ITEM	MARKING
A	General description and purpose
B	Symbol /Type
C	Year of manufacture
D	Seventeen digit serial number (VIN)
E	Official certificate number
F	Tare weight
G	Maximum gross weight
H	Carrying capacity
I	Permissible hitching system loading
J	Permissible front axle load
K	Permissible rear axle load

1.1.2 AXLE IDENTIFICATION

The serial number of the axle and its type are stamped onto the data plate secured to the axle beam. In the event of ordering a replacement part you must know the trailer's serial number and axle type.

1.1.3 LIST OF SERIAL NUMBERS

VIN

S	**Z**	**B**	**9**	**0**	**2**	**0**	**X**	**X**			**X**					

SERIAL NUMBER OF FRONT AXLE

SERIAL NUMBER OF REAR AXLE

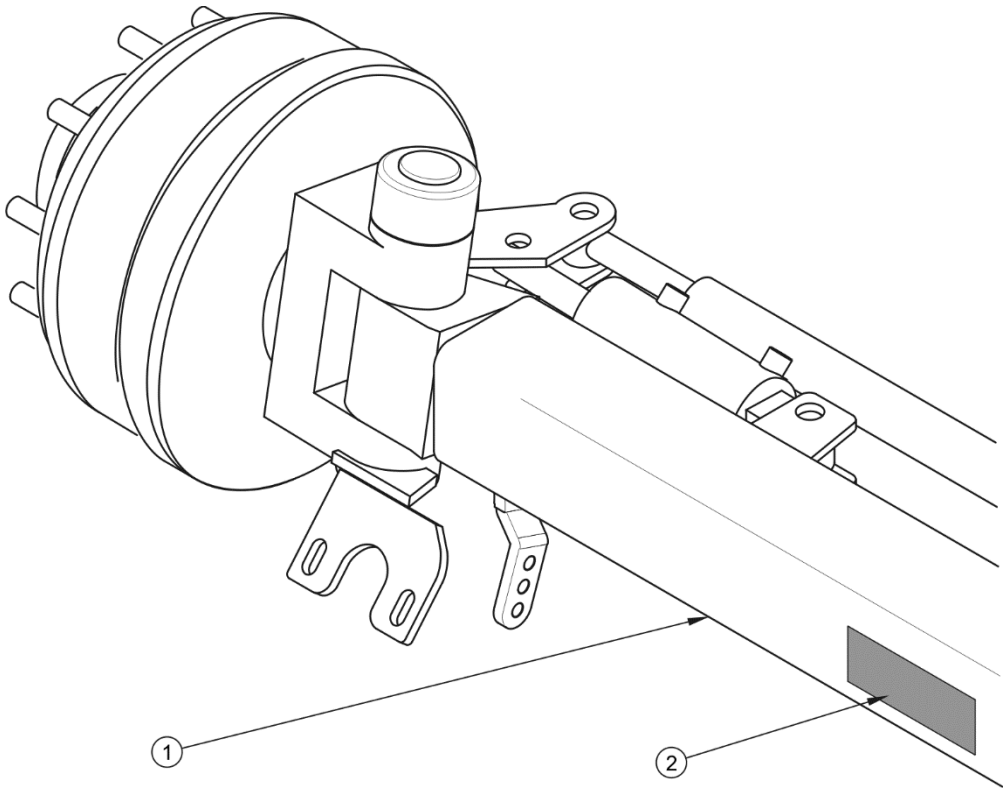


FIGURE 1.2 Location of the axle data plate

(1) axle, (2) data plate

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 above.

1.2 INTENDED USE

T902 movable wall trailer is designed for transport of harvested crops and agricultural products as well as loose and bulk materials at the farm and on public roads at a maximum speed of 40 km/h.

The trailer must not be used in any way other than that described above. Using it as intended also involves all actions connected with the safe and proper operation and maintenance. The trailer is not intended or designed for transporting people or animals.

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

IMPORTANT!

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

- **transport people, animals, hazardous materials, chemically aggressive loads that will corrode the construction 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.**

Axle system (axles, wheels and tyres), meet the requirements of agricultural trailers. The trailer user must carefully read the Operator's Manual and comply with it,

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 or acquired proper knowledge on trailer operation and work safety,
- have the required authorisation to drive and are familiar with the road traffic regulations and transport regulations.

TIP

Tractor requirements depend on trailer accessories.

TABLE 1.2 Agricultural tractor's requirements

CONTENTS	UNIT	REQUIREMENTS
Brake system		
Double conduit pneumatic system	-	according to ISO 1728:2007
Maximum system pressure	bar / kPa	8 / 800
Hydraulic system		
Hydraulic oil	-	L HL 32 Lotos (1)
Pressure rating of the system	bar / MPa	200 / 20
Oil demand:	l	30
Electrical system		
Electrical system voltage	V	12
Connection socket	-	7-pole compliant with ISO 1724
Tractor hitches		
Maximum vertical drawbar load	kg	3,000
Required tractor hitch	-	Lower ball hitch
Other requirements		
Minimum tractor power demand	kW / Horsepower	91.7 / 124.8

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

1.3 EQUIPMENT

Some standard equipment elements, which were listed in table (*1.3*), 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 concerning tires is provided at the end of this publication in *ANNEX A.*

TABLE 1.3 Trailer's equipment

EQUIPMENT	STANDARD	ADDITIONAL
Operator's Manual	•	
Warranty book	•	
Connection lead for the electrical system	•	
Double conduit pneumatic system	•	
Set of plastic mudguards	•	
Folding ladder	•	
Additional metal mudguards		•
Support with mechanical gear	•	
Drawbar with shock absorbing leaf spring	•	
Rotating drawbar eye ∅50 mm	•	
Wheel chocks	•	
Grain chute trough		•
Slow-moving vehicle warning sign		•
Warning reflective triangle		•

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 apply to 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 factory defects and mechanical damage that is not due to the user's fault.

In the event of damage arising from:

- mechanical damage which is the user's fault, caused by road accidents,
- by inappropriate 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, improperly carried out repairs,
- 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 warranty 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 machine.

Modification of the trailer without the written consent of the Manufacturer is forbidden. 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 fittings. 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 Health and Safety at Work applicable to reloading work. Persons operating reloading equipment must have the qualifications required to operate these machines. During loading, the trailer must be properly connected with the tractor according to the requirements specified in this Operator's Manual. The trailer brake 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)*, permanent structural elements of the trailer (longitudinal and transverse frame sections etc.). Transport lugs are welded to the cross-bars of the lower frame (2), one pair on each trailer's cross-bar. Use certified and technically reliable securing measures. Worn straps, cracked securing catches, bent or corroded hooks as well as other damage may disqualify use of the given element from use. Carefully read the information stated 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. 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.

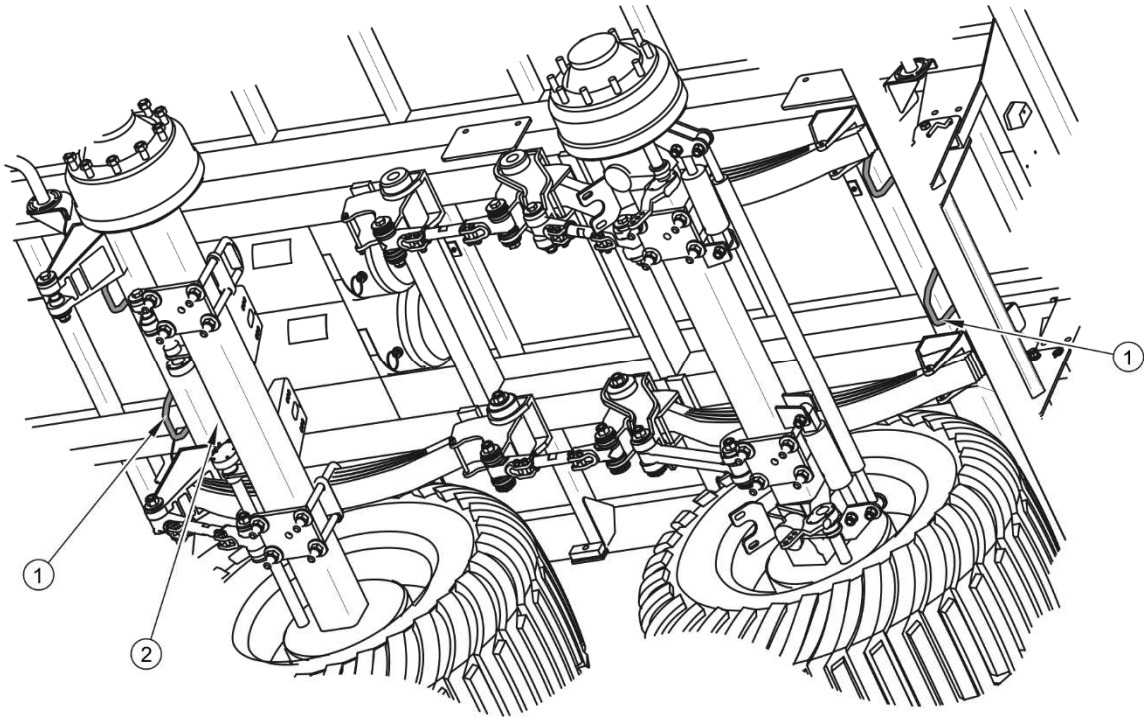


FIGURE 1.3 Arrangement of transport lugs

(1) transport lug, (2) cross-bar of the lower frame

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

DANGER

Incorrect application of securing measures may cause an accident.

IMPORTANT!

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.

During loading, make sure that the total height of the trailer-semi-trailer combination does not exceed four meters.

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 manufacturer's instructions for the securing measures.

1.5.2 INDEPENDENT TRANSPORT BY THE USER

In the event of independent transport of purchased trailer by the user, carefully read the *OPERATOR'S MANUAL* for the trailer. Comply with all recommendations contained in the Operator's Manual. Independent transport 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.

IMPORTANT!

When transporting independently, the user 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.

Oil, which has been used up or is unsuitable for further use owing to a 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.

IMPORTANT!

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 brake system (e.g. using air tank drain valve).

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

DANGER

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

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 trailer, the user must carefully read this operator's manual. When operating the machine, the operator must comply with all the recommendations included in the operator's manual.
- The trailer may only be used and operated by persons qualified to drive agricultural tractors with a trailer.
- The user is obliged to acquaint himself with the construction, action and the principles of safe usage of the trailer.
- If the information stated in the Operator's Manual is difficult to understand, contact a seller, who runs an authorised technical service on behalf of the Manufacturer, or contact the Manufacturer directly.
- Careless and improper 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 existence of a residual risk, and for this reason the fundamental basis for using this trailer should be the application of safety rules and sensible behaviour.
- The machine must never be used by persons, who are not authorised to drive agricultural tractors, including children and people under the influence of alcohol or other drugs.
- Non-compliance with the safety rules of this Operator’s Manual can be dangerous to the health and life of the operator and others.
- 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 improper use. Use of the machine for purposes other than those for which it is intended by the Manufacturer may invalidate the warranty.

- The trailer may only be used when all the safety guards and other protective elements are technically sound and correctly positioned. In the event of loss or destruction of the safety guards, they must be replaced with new ones.

2.1.2 HITCHING AND DISCONNECTING THE TRAILER

- Do NOT connect the trailer to tractor if it does not fulfil the requirements made by the Manufacturer (lack of required drawbar eye, exceeding permissible total weight etc.) Before hitching the trailer, make certain that the oil in both machines may be mixed.
- Before hitching the trailer, make certain that agricultural tractor and trailer are in good technical condition.
- When connecting the trailer to the tractor, use the appropriate hitch equipped with ball which enables operation of hydraulic steering system. After completing the hitching of the machines check the safety of the hitch Carefully read the tractor Operator's Manual.
- Be especially careful when hitching the machine. Ensure that the driver has sufficient visibility. When hitching, there must be nobody between the tractor and the trailer.
- Do NOT unhitch the trailer from the tractor when the tailgate and the sliding wall are raised on telescopic cylinders. Exercise caution when disconnecting trailer.
- Hitching and unhitching the trailer may only take place when the machine is immobilised with the parking brake.
- When the trailer hitching is completed, raise the support to transport position.
- While placing the support in transport position or rest position, do not place hand between moving elements of the support. Make sure that the support is properly locked with a pin.

2.1.3 HYDRAULIC AND PNEUMATIC SYSTEMS

- The hydraulic system is under high pressure when operating.
- Regularly check the technical condition of the connections and the hydraulic and pneumatic leads. There must no oil or air leaks.

- The limit valves in the wall sliding hydraulic system limit the load box sliding to the rear. Position of bumpers controlling the operation of this valve is set by the Manufacturer and must not be changed during trailer operation.
- 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 tractor hydraulic system and trailer are not under pressure. If necessary, reduce residual pressure in the system.
- In the event of injuries being caused by pressurised hydraulic oil, contact a doctor immediately. Hydraulic oil may find its way under the skin and cause infections. In the event of contact of oil with eye, rinse with 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. Never mix two types of oil.
- 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.
- Unauthorised adjustment of the hydraulic manifold's settings is strictly forbidden.

2.1.4 TRANSPORTING THE MACHINE

- When driving on public roads, comply with the road traffic regulations in force in the country in which the trailer is used.
- Do not exceed the maximum design speed.
- Adjust speed to road conditions.

- 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 trailer wheels.

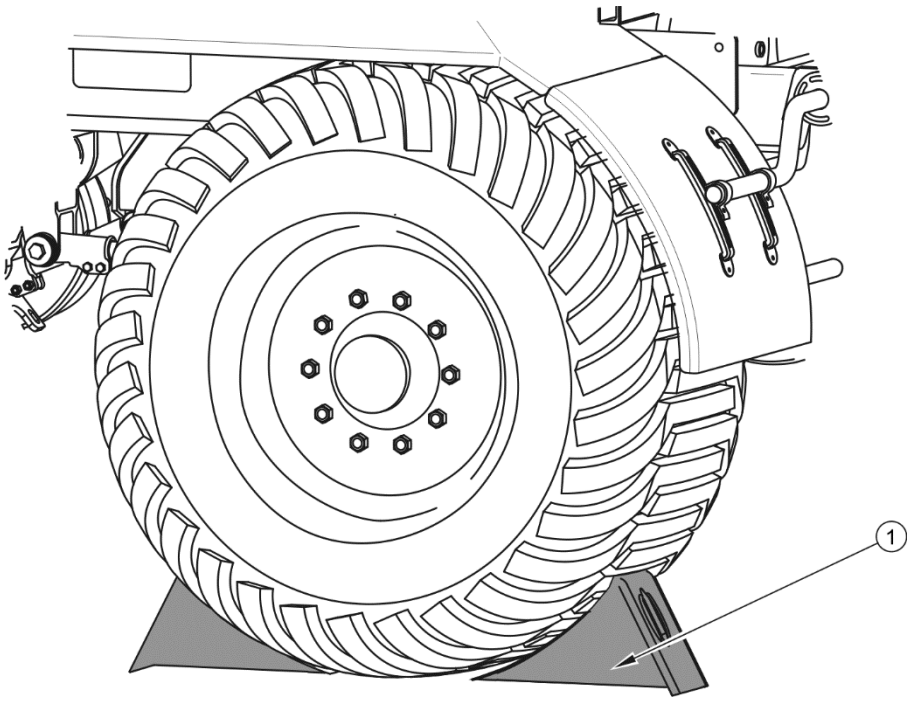


FIGURE 2.1 Method of placing chocks

(1) wheel chock

- Before driving off, make sure that the trailer is properly hitched to the tractor, especially, check that the drawbar eye and steering mechanism eye are secured.
- Chocks should be placed only under one wheel (one in front of the wheel, the second behind the wheel - figure (*2.1*)). Chocks should not be placed under the rear steering axle wheel.
- Vertical load borne by the trailer drawbar eye affects the steering of the agricultural tractor.
- Do NOT drive with the tailgate raised and the side wall extension opened.
- Before using the trailer always check its technical condition. 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.

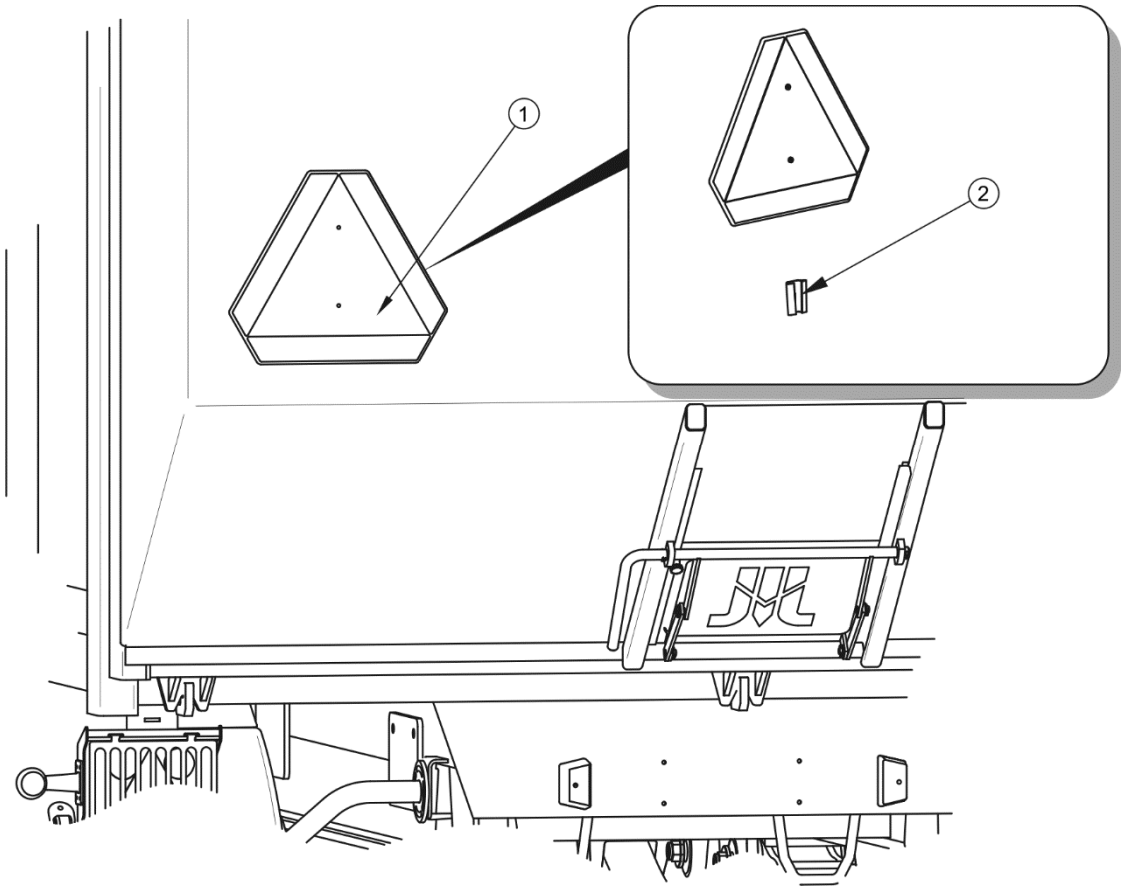


FIGURE 2.2 Mounting place for slow-moving vehicle warning sign

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

- Before driving off, check that the parking brake is released, the braking force regulator is positioned in the proper position (applies to manual three-position regulators).
- Before driving off, confirm that the trailer's wheels are correctly set and that the pressure in the hydraulic steering system is proper.
- Check the grain chute protection.
- While driving on public roads the trailer must be fitted with a certified or authorised reflective warning triangle.
- Place the slow-moving vehicle warning sign on the tailgate – figure *(2.2).*
- The trailer is designed to operate on slopes up to 8° .
- Periodically drain water from the air tanks in pneumatic system. During frosts, freezing water may cause damage to system components.

- Reckless driving and excessive speed may cause accidents.
- The total height of the loaded trailer must not exceed four meters.
- A load protruding beyond the edge of the trailer should be indicated according to the road traffic regulations.
- The load must be secured so that it cannot move or fall over.
- Before moving off make sure that the support is properly placed in transport position and secured.
- Forbidden loads as well as people or animals must not be carried on the trailer.
- 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 permissible total weight of the trailer.
- If the permissible total weight is exceeded, the braking efficiency of the system will be reduced.
- Load must be uniformly distributed and it must not obstruct visibility or hinder driving.
- During reversing one should use the assistance of another person. During manoeuvring the person helping must stay at a safe distance from the danger zone and be visible all the time to the tractor driver.
- do not allow anyone to claim on the trailer when it is moving.
- Do NOT park trailer on slope.

2.1.5 LOADING AND UNLOADING

- Loading and unloading work should be carried out by someone experienced in this type of work.
- The arrangement of the load may not cause an overload on the axle or hitch system of the trailer or tractor.
- Incorrect load distribution and overloading the machine may cause the trailer to tip over or cause damage to its components.

- Do NOT climb on the load box during loading and unloading.
- The load may not protrude further out than the upper edge of the trailer's front wall. The load must be arranged in such a way that it does not threaten the trailer stability.
- When loading or unloading, the trailer must be hitched to the tractor and positioned to travel forwards.
- Ensure that nobody is in the unloading zone or near the tailgate. Before unloading, ensure proper visibility and make certain that there are no bystanders near the machine.
- Keep a safe distance from electric power lines when rising the tailgate.
- When closing the grain chute gate, take particular care to avoid crushing fingers.
- Opening the tailgate, opening the hinged wall and tilting the sliding wall may be performed only when the trailer is hitched to tractor.
- If the load does not pour from the trailer when sliding the wall, immediately cease unloading. Unloading may be started again only after removing the object which prevented the load from pouring out.
- Take particular care when closing the tailgate and hinged wall to avoid the risk of crushing.
- Do NOT slide the trailer's wall to unload when the tailgate is closed.
- During winter, particular attention must be paid to loads which may freeze during transport. Frozen material in the load box may damage the trailer.
- After completed unloading, ensure that the load box is empty.
- Do NOT drive with the tailgate raised and the side wall extension opened.

2.1.6 TYRES

- When working with tyres, the trailer should be immobilised with parking brake and secured against rolling by placing chocks under wheel. Wheels can be taken off the trailer axle only when the trailer is not loaded.

- Repair work on the wheels or tyres should be carried out by persons trained and entitled to do so. This work should be carried out using appropriate tools.
- Inspect tightness of wheel nuts after the first use of 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. Pressure and 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.

2.1.7 MAINTENANCE

- During the warranty period, any repairs may only be carried out by Warranty Service authorised by the manufacturer. It is recommended that necessary repairs to trailer should be undertaken by specialised workshops.
- In the event of any fault or damage whatsoever, do not use the trailer until the fault has been fixed.
- During maintenance work, use the proper, close-fitting protective clothing, gloves and appropriate tools. When working on hydraulic systems it is recommended to use oil resistant gloves and protective goggles.
- Any modification to the trailer frees the manufacturer from any responsibility for damage or detriment to health, which may arise as a result.
- Regularly check the technical condition of the safety devices and correct tightening of bolt connections (in particular connections of drawbar eye, wheels).
- Service inspections of the trailer should be carried out according to the frequency specified in this Operator's Manual.
- Do NOT perform maintenance or repair work under loaded load box.

- Before beginning repair works on hydraulic or pneumatic systems reduce oil or air pressure.
- 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 and the trailer should be climbed on only when the tractor engine is turned off and the ignition key is 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.
- Should it be necessary to change individual parts, use only original parts. Non-adherence to these requirements may cause an accident and put the user and other people's health and life at risk, and also damage the machine and invalidate the warranty.
- Regularly check technical condition and mounting of all guards and protective elements.
- Before welding or electrical work, the trailer should be disconnected from the power supply. The paint coating should be cleaned. Burning paint fumes are poisonous for people and animals. Welding work should be carried out in a well lit and well ventilated space.
- During welding work pay attention to flammable or fusible elements (parts of the pneumatic, electric and hydraulic systems, plastic parts). If there is a risk that they will catch fire or be damaged, they should be removed or covered with non-flammable material before commencing welding work. Before beginning work, prepare a CO□ 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 using the ladder placed on the front wall. Do not use mudguards, wheels etc. for this purpose. Before entering the load box, prevent the trailer from moving with parking brake and chocks.
- Do not make independent repairs of control valve, brake cylinders and braking force regulator. In the event of damage to these elements, repair should be entrusted to an authorised service point or elements should be replaced with new ones.
- Do NOT make repairs to drawbar eye (straightening, repairing or welding). Damaged drawbar eye should be replaced.

2.2 DESCRIPTION OF RESIDUAL RISK

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

- Using the trailer for purposes other than those for which it is intended,
- being between the tractor and the trailer while the engine is running and when the machine is being attached,
- being on the machine while the engine is running,
- operating the trailer with the safety guards removed or faulty,
- not maintaining safe distance during loading or unloading of trailer,
- operation of the trailer by persons under the influence of alcohol,
- cleaning, maintenance and technical checks of the trailer.

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

- prudent and unhurried operation of the machine,

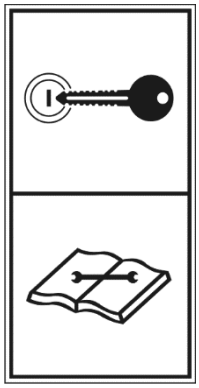
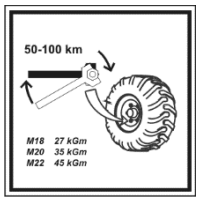
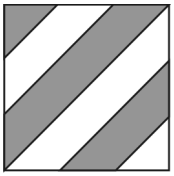
- reasonably apply all the remarks and recommendations stated in the Operator's Manual,
- maintaining safe distance from forbidden or dangerous places during unloading, loading and hitching trailer,
- carry out repairs and maintenance work in line with operating safety rules,
- carrying out repair and maintenance work by persons trained to do so,
- using suitable protective clothing,
- ensure unauthorised persons have no access to the machine, especially children,
- maintain safe distance from prohibited or dangerous places,
- do not climb on the machine when it is operating

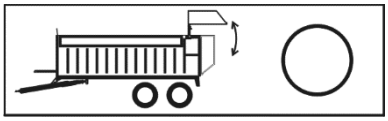
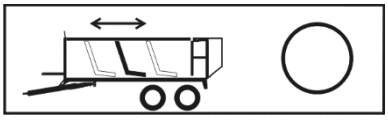
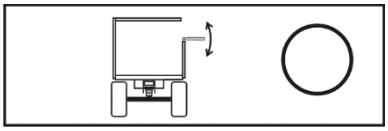
2.3 INFORMATION AND WARNING DECALS

The trailer is labelled with the information and warning decals mentioned in table (*2.1*). The symbols are positioned as presented in 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. When cleaning the trailer, do not use solvents which may damage the label coating. When washing the machine with a pressure washer, do not direct a water jet directly at labels.

TABLE 2.1 Information and warning decals

NO.	DECAL	MEANING
1	T902 PRONAR	Type of trailer

NO.	DECAL	MEANING
2		Before starting work, read *THE OPERATOR'S MANUAL*
3		Before beginning servicing or repairs, turn off engine and remove key from ignition
4		Check the condition of the screw and nut connections of the wheel axles
5		Grease according to the recommendations in the Operator's Manual
6		Warning decal

NO.	DECAL	MEANING
7		Raising / lowering the tailgate Plug cap - black
		Front wall sliding Plug cap - blue
		Opening/closing the hinged wall. Plug cap (green)
8	**3000 kg**	Minimum vertical load capacity of tractor's hitch
9		Do not stand near the opening tailgate.
10	**550 kPa**	Air pressure in the tyres
11		Securing points for the transport

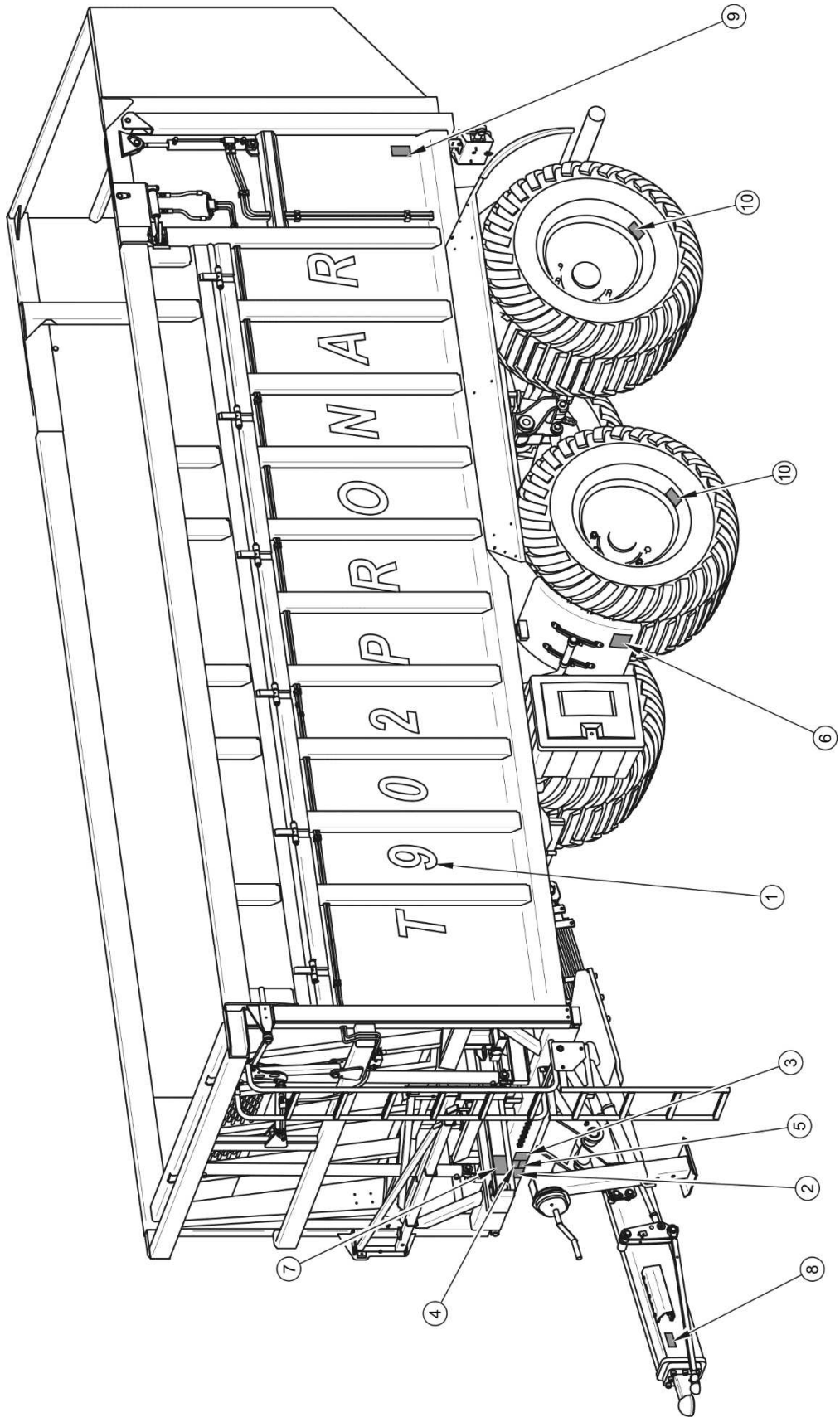


FIGURE 2.3 Locations of information and warning decals.

SECTION

3

DESIGN AND OPERATION

3.1 TECHNICAL SPECIFICATION

TABLE 3.1 Technical data of the standard machine version

CONTENTS	UNIT	T900
Dimensions		
Total length (with drawbar)	mm	9,100
Total width	mm	2,550
Maximum height	mm	3,500
Wheel track	mm	2,150
Axle base	mm	1,810
Load box inside dimensions:		
- length	mm	7,100
- width	mm	2,370
- height	mm	2,000
Technical specification		
Cargo capacity	m^3	30.8
Load surface	m^2	16.8
Maximum gross weight	kg	23,000
Maximum design carrying capacity	kg	16,000
Tare weight	kg	7,000
Minimum tractor power demand	kW / Horsepower	124.8 / 91.7
Hydraulic system		
Maximum pressure in the hydraulic system	bar / MPa	20
Hydraulic oil demand	l	30
Hydraulic oil	-	LHL32 Lotos
Tyres		
Tyre	-	445/65 R22.5 RE
Wheel disc	-	16x22.5”
Air pressure in the tyres	kPa	550
Other information		
Electrical system voltage	V	12

CONTENTS	UNIT	T900
Maximum design speed	km/h	40
Maximum vertical hitch load	kg	3,000

3.2 CHASSIS

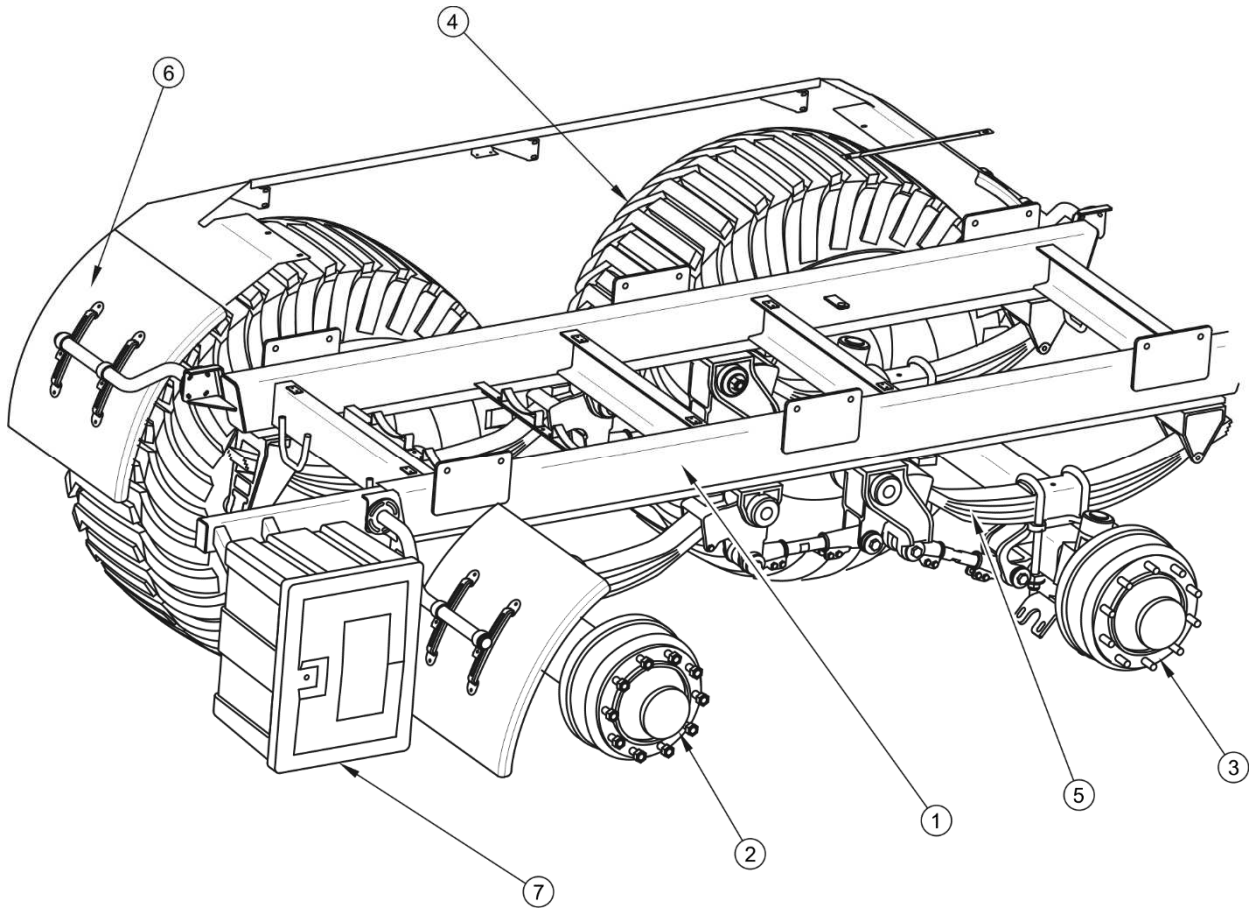


FIGURE 3.1 Chassis components

(1) lower frame, (2) front rigid axle, (3) rear steering axle, (4) wheel, (5) leaf spring, (6) mudguard, (7) hydraulic steering system box

Trailer chassis is shown in figure *(3.1)*. The frame (1) is made as a structure welded from steel sections. The main load-bearing elements are two longitudinal members connected with each other by means of crossbars. Suspension brackets are welded to the longitudinal members.

The axle pressure in the chassis is balanced by rocker arms located between leaf springs (5). The rocker arms are suspended on brackets with maintenance-free metal-rubber sleeves.

Each axle has an adjustment bolt (bottle screw) on one end and a rigid string on the other end. This enables the adjustment of the axles with regard to each other and with regard to the vehicle's longitudinal axis (wheel steering adjustment). The chassis of a new trailer is set in the factory. Axle (3) is a steering axle, while axle (2) is a rigid axle. The trailer's axles are made from square bars terminated with pins, on which wheel hubs are mounted. The trailer is equipped with four single wheels (4) with shoe brakes activated by mechanical cam expanders. Each wheel is shielded with a mudguard (6) installed on brackets bolted to the trailer's frame.

The chassis includes the hydraulic steering system box (7). The box is bolted to the left longitudinal member of the trailer.

3.3 LOAD BOX

The load box (1) of Pronar T902 trailer is a welded structure made from steel sheet and shapes. The load box can be made in four versions:

- without side hinged walls,
- with a left side hinged wall,
- with a right side hinged wall,
- with a left side hinged wall and a right side hinged wall.

Figure *(3.2)* shows the trailer with a left side hinged wall (8). The wall facilitates loading the trailer by lowering the side wall height. In the front of the load box, there is a drawbar with shock absorber (4) equipped with hitching eye with load capacity of 3 000 kg. The drawbar is fixed to the lower frame of the load box by means of pins. The drawbar position can be adjusted as required – see chapter (*4.3.2*). Support (5) with mechanical gear is attached to the left side of the drawbar. At the front of the load box, there is a ladder (7) to facilitate access to the load box. In the front part of the trailer, there is a sliding wall (2), which can be shifted on rollers along the load box and tipped in the final stage of unloading. The wall has elastomeric seals which ensure tightness between the wall and the load box sides.

Hydraulically opening tailgate (3) is located in the rear section of the load box. In the central part of the load box, there is a chute (9) for unloading loose materials.

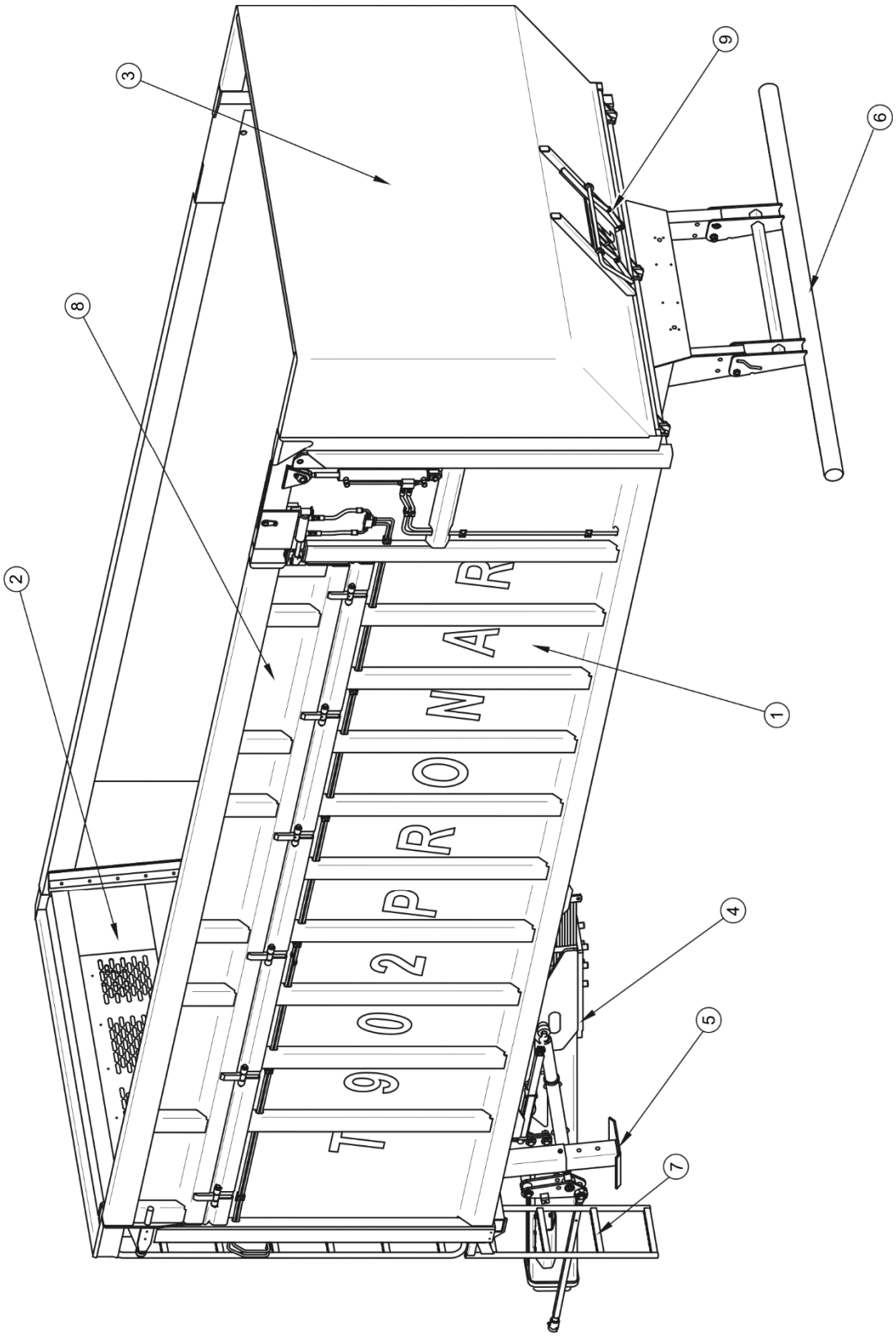


FIGURE 3.2 Load box components

(1) box, (2) sliding wall, (3) tailgate, (4) drawbar, (5) support leg, (6) bumper, (7) ladder, (8) hinged wall extension, (9) chute

The trailer can be also equipment with a chute trough for precise unloading. Adjustable bumper (6) is attached to the frame in the rear part of the load box.

3.4 HYDRAULIC SYSTEM OF SLIDING WALL

T902 trailer is equipped with hydraulic wall sliding system – figure *(3.3).* The system is used for automatic unloading of loose materials by shifting the wall (1) to the rear by means of a telescopic cylinder (3). The system enables unloading in adverse terrain conditions or in confined space, for example in low ceiling buildings, on steep slopes or during strong wind.

The system consists of hydraulic cylinders (4) for tipping the sliding wall and a telescopic cylinder (3) for shifting the wall along the load box. Cylinders (4) are used for tipping the front wall in the final stage of unloading in order to thoroughly remove the remains of transported material from the load surface. In the lower part of the wall, there are rollers for shifting the wall along the load box surface. The sliding wall mechanism also makes it possible to compact the material during loading. This is particularly important when harvesting green fodder because silage is compacted by the trailer's sliding wall.

The design of the sliding wall mechanism and arrangement of individual components of the system are shown in figure *(3.3)*. The hydraulic system of the sliding wall mechanism is supplied with oil from the tractor's external hydraulic system. Oil pumped from the tractor's hydraulic system is supplied through conduits (7) to the trailer's hydraulic system. The conduits of the sliding wall mechanism are marked with blue plugs. In the first stage, pumped oil extends cylinder (3) and the wall is shifted backwards. The wall shifting occurs until connecting arm (2) reaches the position in which the limit valve (5) switches the oil flow to cylinders (4). In the maximally tilted position, the wall creates the angle of 55^{O} with the load box surface. After switching the control lever in the tractor, oil is pumped through the other circuit of the system and the wall is lowered. When the sliding wall is lowered and rests on the frame, the limit valve (6) switches on. Then, the supply is switched from cylinders (4) to telescopic cylinder (3) and the cylinder returns to its original position.

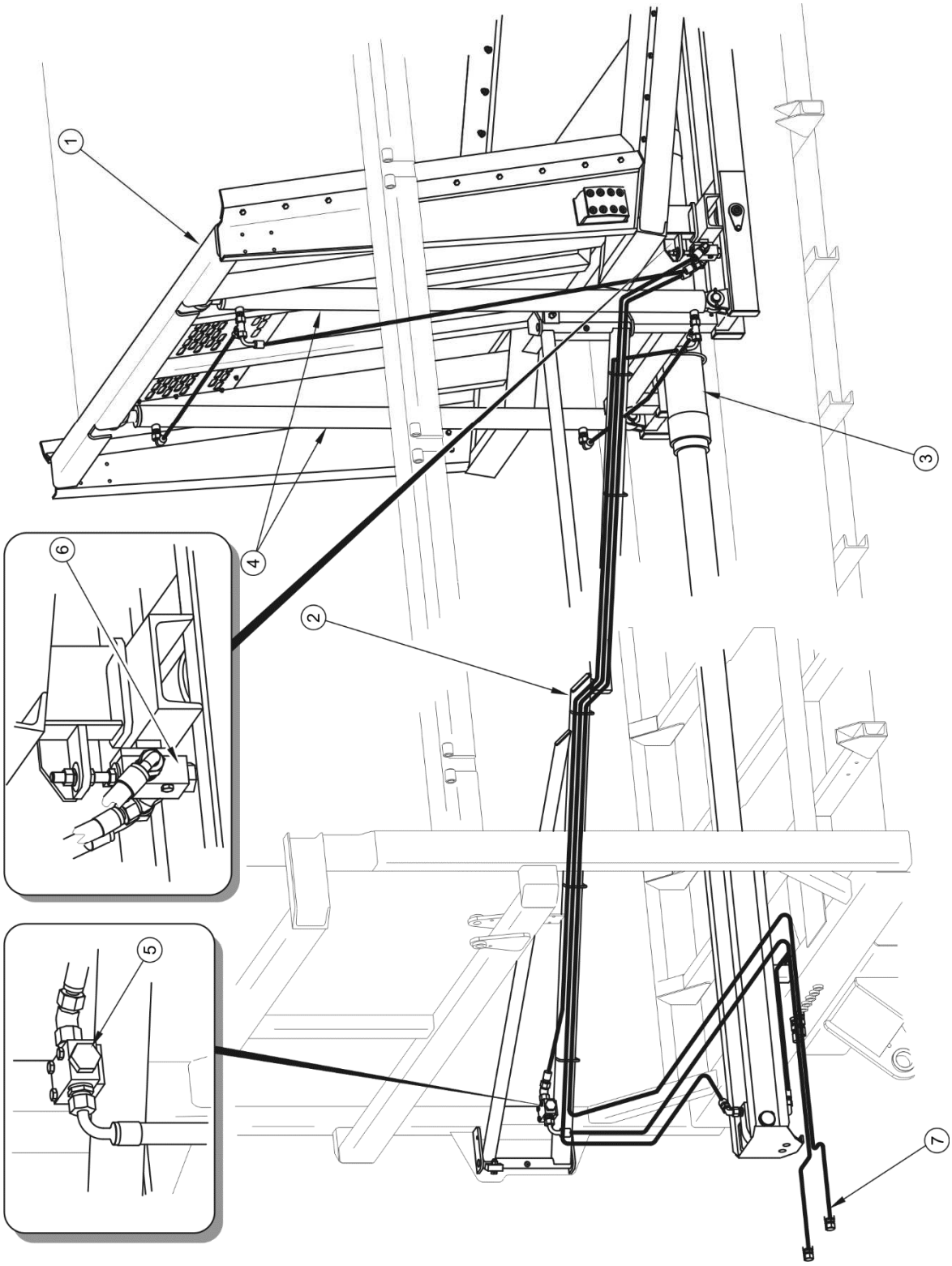


FIGURE 3.3 Design of the hydraulic system of the sliding wall

(1) sliding wall, (2) arm, (3) sliding cylinder, (4) rising cylinders, (5), (6) limit valves, (7) connection conduit

Proper adjustment of the limit valves is described in chapter *(5.11) SETTING AND ADJUSTING THE LIMIT VALVES.*

The diagram of the hydraulic system of the sliding wall is shown in figure *(3.4)*.

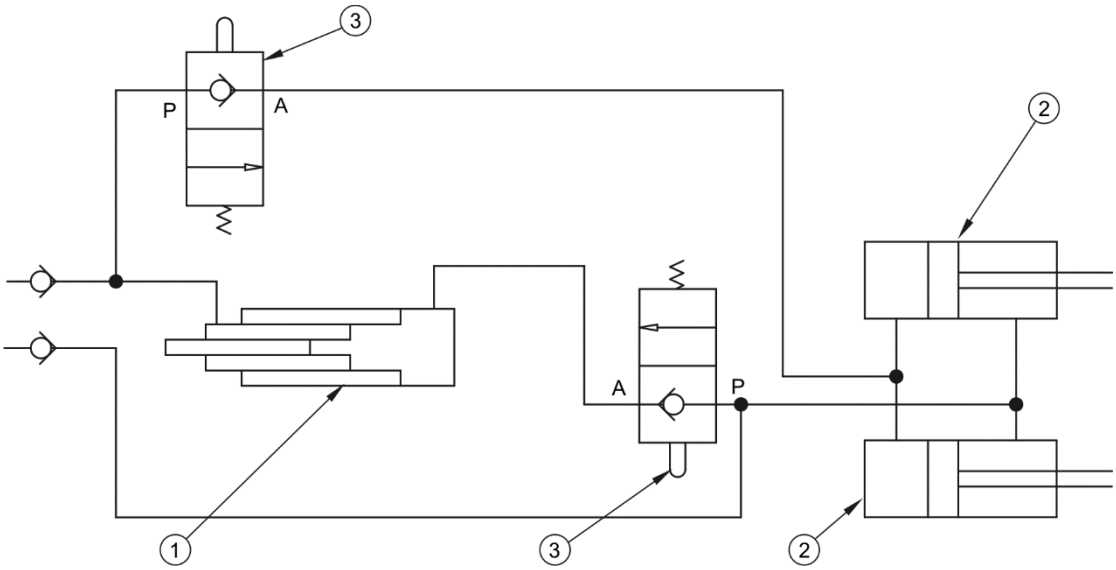


FIGURE 3.4 Concept diagram of the hydraulic system of the sliding wall

(1) sliding cylinder, (2) tipping cylinder, (3) limit valve

3.5 TAILGATE HYDRAULIC SYSTEM

Tailgate is located in the rear section of the trailer. The tailgate is raised and lowered by means of the hydraulic system shown in figure *(3.5)*.

The system is supplied with oil from the tractor's external hydraulic system. Pressurised oil is supplied through hydraulic conduits (4) to hydraulic cylinders (2). Double-acting cylinders used for opening and closing the tailgate are equipped with hydraulic locks (3), which are designed to lock the tailgate in the raised position. Hydraulic locks improve safety of trailer operation. When raising or lowering the tailgate, the system conduits may get damaged (rupture, loss of tightness). In such a case, the hydraulic locks will lock cylinders (2) in a fixed position.

Tailgate is controlled from the tractor cab by means of the manifold lever of the tractor's external hydraulic system.

The diagram of the hydraulic system of the tailgate is shown in figure *(3.6)*.

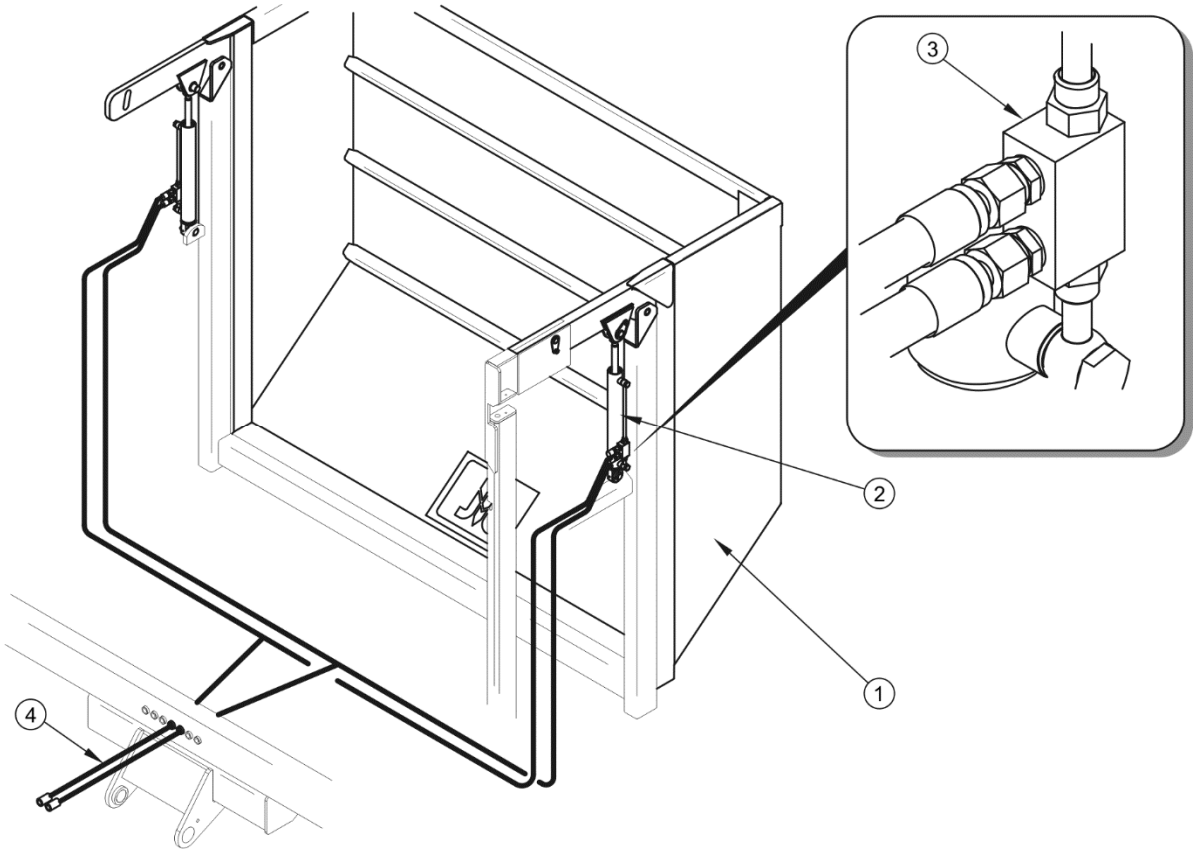


FIGURE 3.5 Design of the hydraulic system of the tailgate

(1) tailgate, (2) cylinder, (3) hydraulic lock, (4) conduit

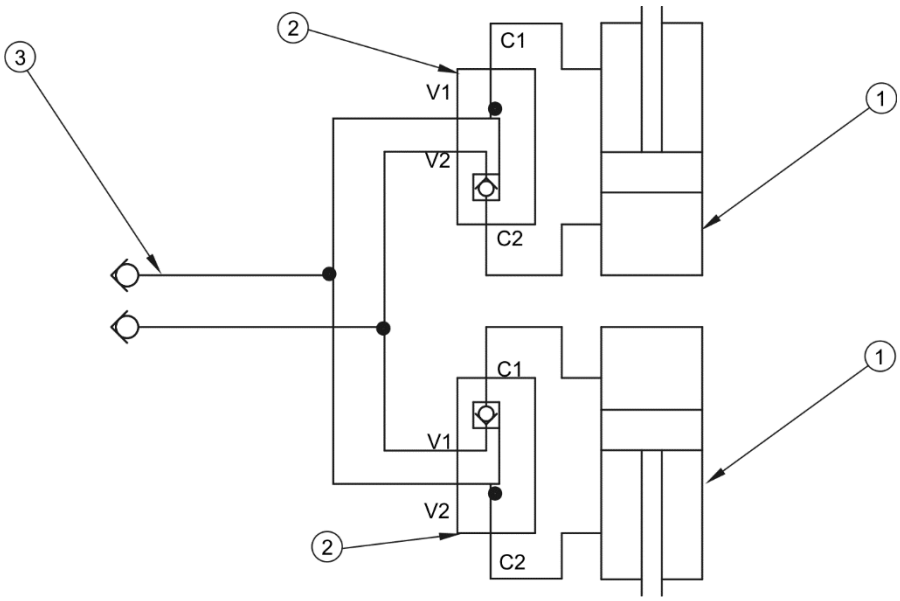


FIGURE 3.6 Concept diagram of the hydraulic system of the tailgate

(1) cylinder, (2) hydraulic lock, (3) conduit

3.6 HYDRAULIC STEERING SYSTEM

As standard, Pronar T902 trailer is equipped with hydraulic steering system for controlling the rear axle wheels of the trailer – figure *(3.8).*

Axle design enables easier cornering and easier manoeuvring on marshy terrain. The wear of tyres of the machine is consequently reduced.

The rear steering axle is equipped with two steering cylinders (3), which are connected with double-acting cylinder (2) by means of rigid and flexible conduits creating a closed-circuit. On the left side of the drawbar, there is a steering mechanism string (4) whose ball-shaped end is connected with the tractor's hitch. The other end of the string is fixed in the steering mechanism lever (6). Under the load box, on the left side, there is a hydraulic hand pump (1) for filling and setting the pressure in the steering system – see chapter *(4.3.3) WHEEL STEERING SYSTEM*.

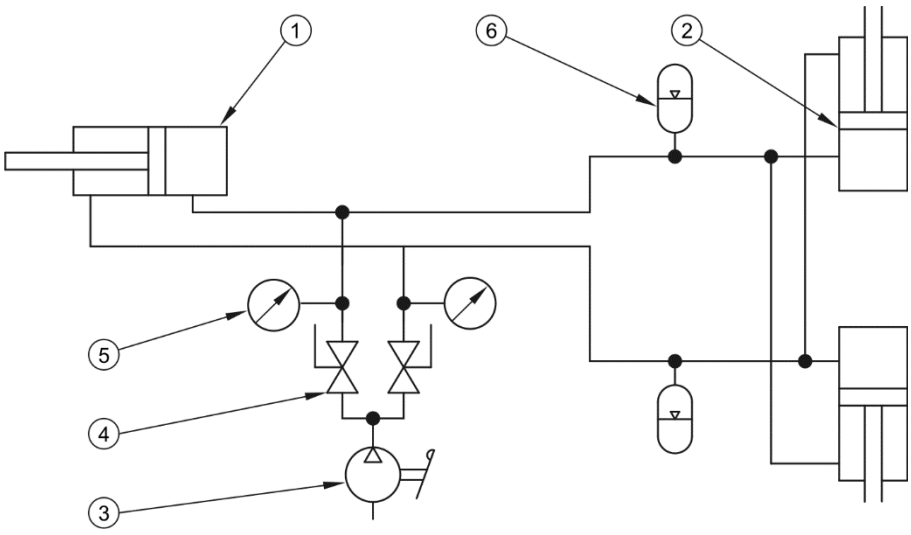


FIGURE 3.7 Concept diagram of the hydraulic steering system

(1) cylinder, (2) axle steering cylinder, (3) hand pump, (4) valve, (5) pressure gauge, (6) hydraulic accumulator

The system is filled with L HL 32 LOTOS oil in the amount of approximately eight litres. During movement of cylinder rod (2), oil in the system flows to axle steering cylinders (3) turning the wheels. Cylinder rod (2) moves when the trailer's drawbar changes its position with regard to tractor when turning.

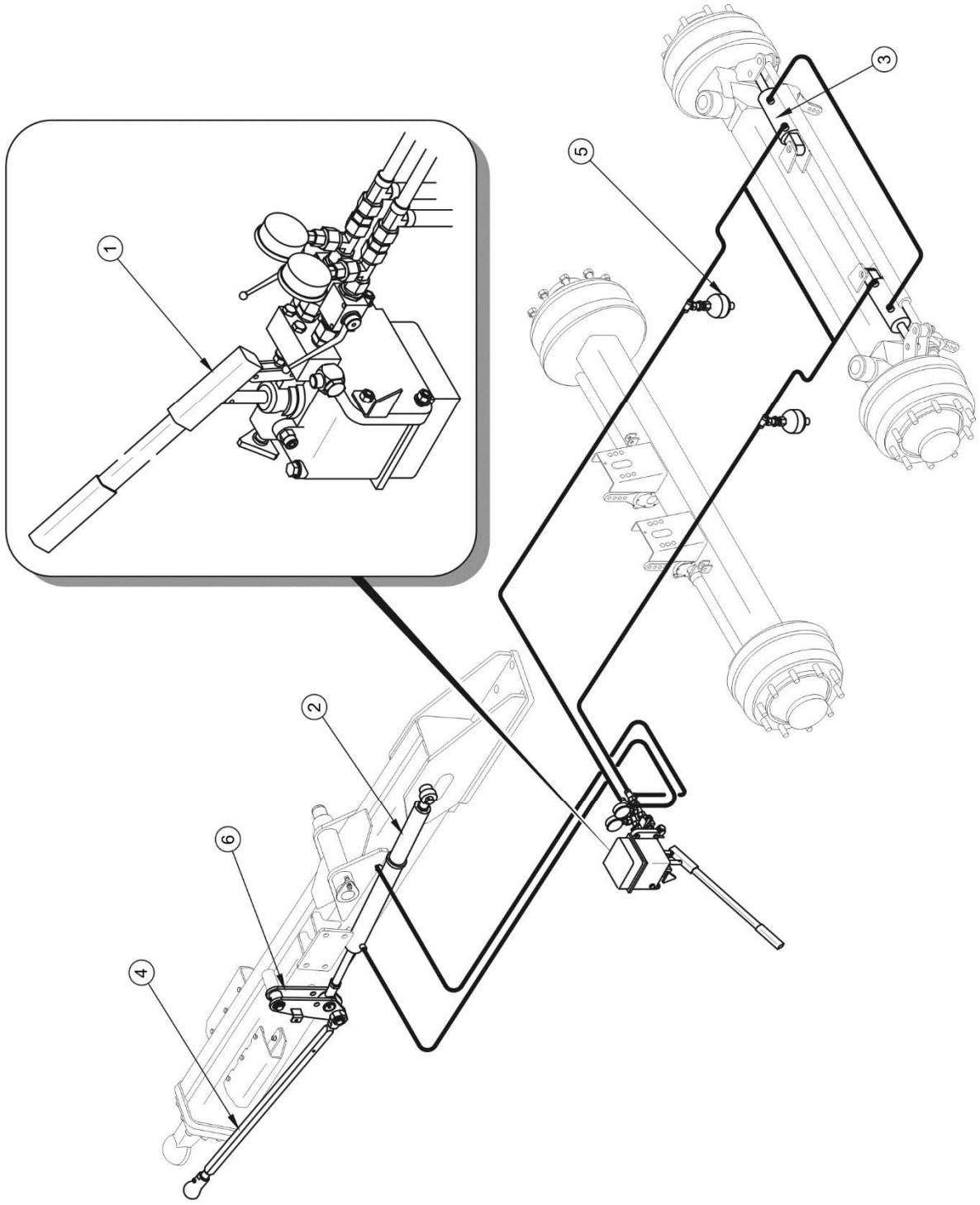


FIGURE 3.8 Design of the hydraulic steering system

(1) pump, (2) cylinder, (3) axle steering cylinder, (4) string, (5) hydraulic accumulator, (6) steering mechanism lever

Hydraulic accumulators (6) are used in order to eliminate minimal swing of axle steering cylinders and reduce load applied to the system during turning.

Diagram of the hydraulic steering system is shown in figure *(3.7)*.

3.7 HYDRAULIC SYSTEM OF THE HINGED WALL

Standard version of Pronar T902 trailer is equipped with the load box with two fixed side walls. Three optional versions of the load box are also available: with the left hinged wall, with the right hinged wall or with both hinged walls.

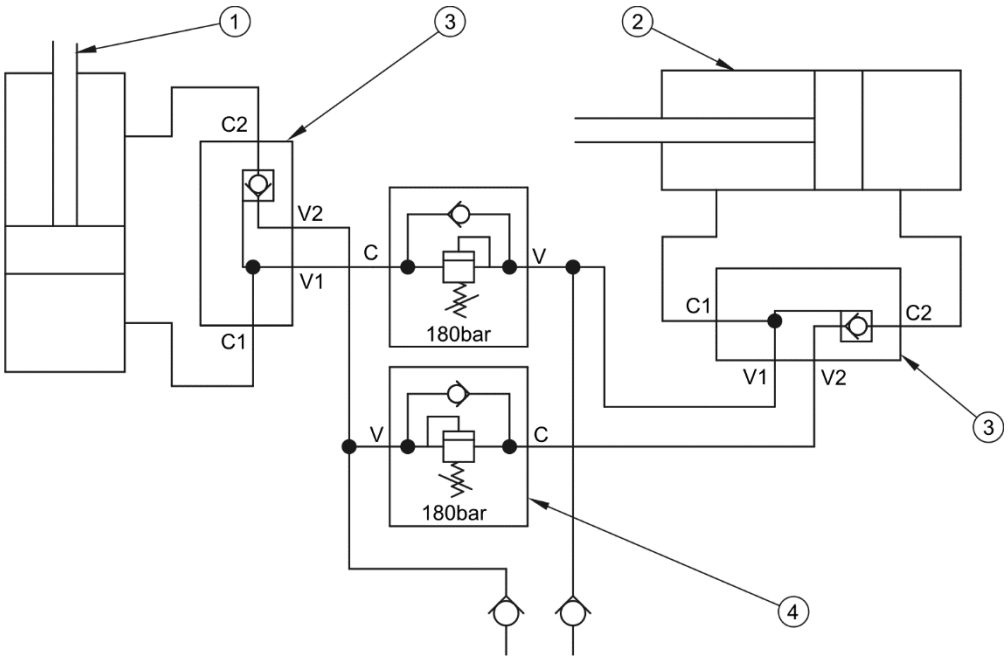


FIGURE 3.9 Concept diagram of the hydraulic system of the hinged wall

(1) opening/closing cylinder, (2) interlocking cylinder, (3) hydraulic lock, (4) sequence valve

The hydraulic system – figure *(3.10)* is supplied with oil from the tractor's hydraulic system. The system is controlled by means of the lever of the oil manifold of the tractor's external hydraulic system. Connections are made using hydraulic conduits (7) equipped with quick-couplers marked with green plugs. Oil pumped from the tractor's hydraulic system is supplied first to the sequence valve (5) and is distributed to cylinders (2) and (3) - consequently, the wall (1) is unlocked and tilted. When the setting of the manifold lever in the tractor is changed, oil is supplied through the other circuit to the second sequence valve - consequently, the hinged wall is closed and locked.

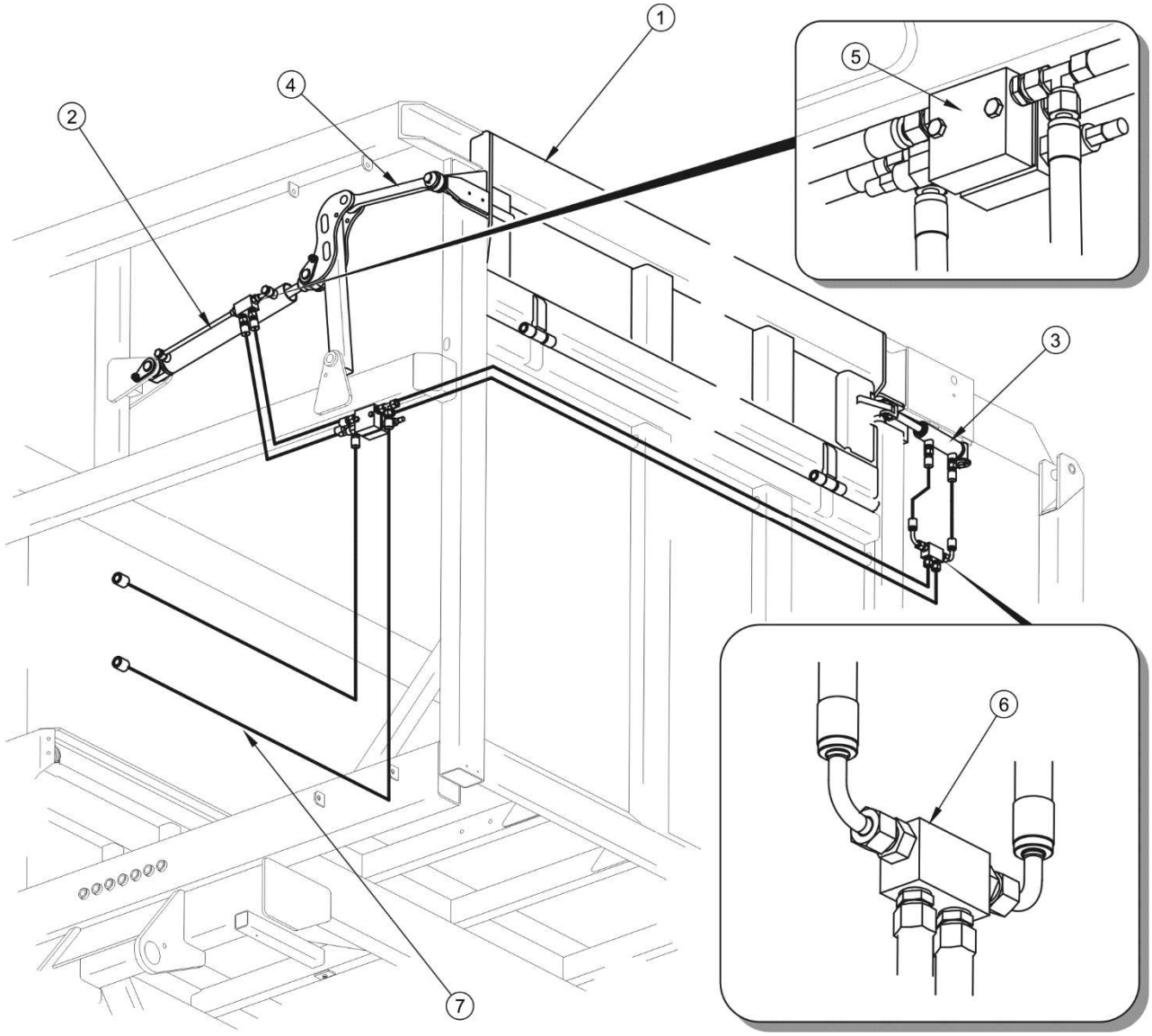


FIGURE 3.10 Design of the hydraulic system of the hinged wall

(1) left hinged wall, (2) opening/closing cylinder, (3) interlocking cylinder, (4) opening/closing mechanism, (5) sequence valve, (6) hydraulic lock, (7) connecting conduits,

3.8 PNEUMATIC BRAKING SYSTEM

T902 trailer is equipped with one of the two types of main braking systems (pneumatic brakes):

- double conduit pneumatic braking system with automatic braking force regulator, figure (*3.11*) – standard,

- double conduit pneumatic braking system with automatic braking force regulator - figure (*3.13*) – option.

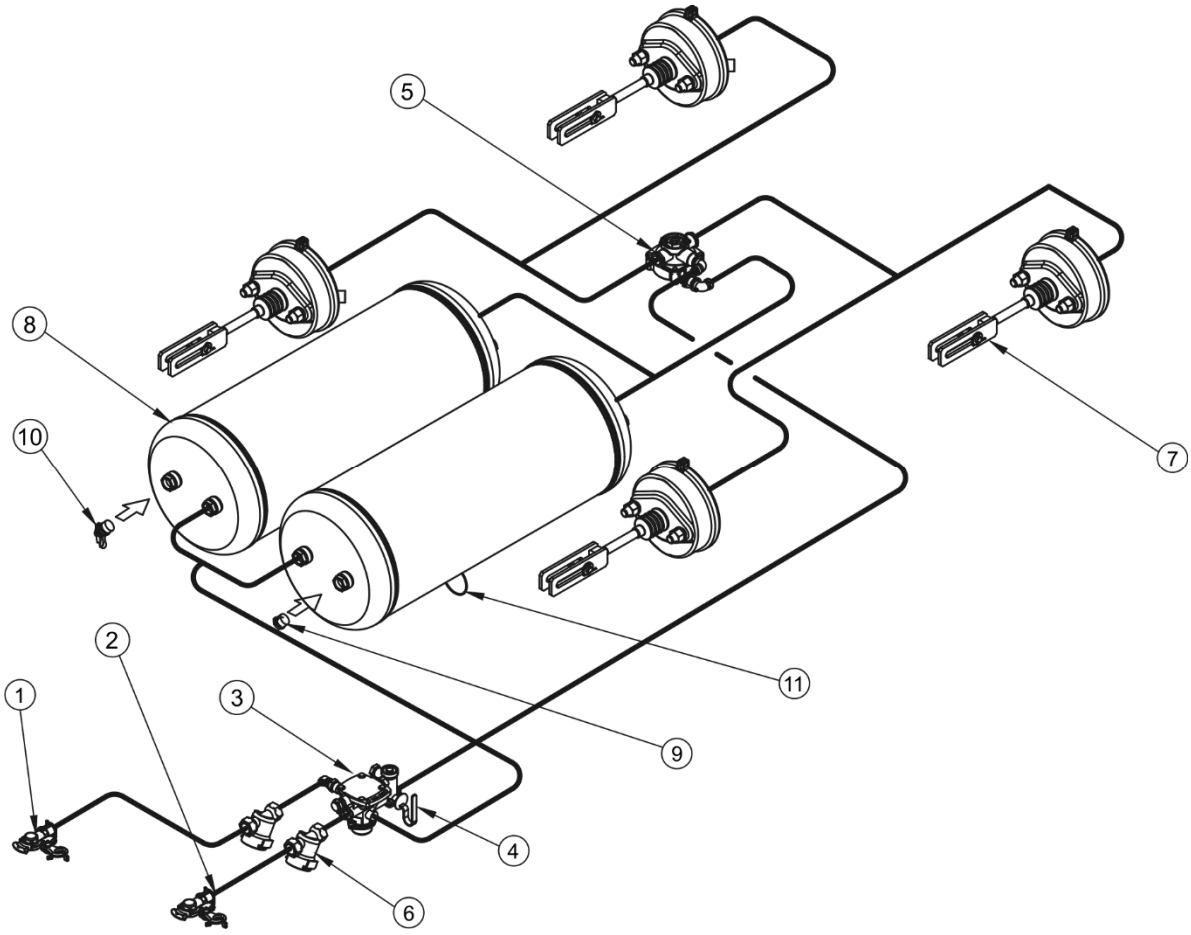


FIGURE 3.11 Design of the braking system with manual braking force regulator

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

Working brake is activated from the tractor driver's seat by pressing on the brake pedal in the tractor. The control valve activates the trailer brakes when the brake pedal is pressed in the tractor. Furthermore, in case of an inadvertent disconnection of the conduit between the trailer and the tractor, the control valve (3) will automatically activate trailer's brake. Valves used in the system are equipped with a circuit causing the brakes to be applied which is used when trailer is disconnected from the tractor. When compressed air line is connected to the tractor, the device automatically applying the brakes now changes its position to allow normal brake operation.

Brake pneumatic cylinders applied in the systems are mounted on specially prepared brackets welded to the axle. They are membrane cylinders. Air supplied to cylinder exerts pressure on membrane which in turn moves cylinder piston and rotates to axle expander lever. Return of cylinder to neutral position is assisted by draw back springs.

In double conduit braking system, with automatic braking force regulator, an additional relay valve is mounted (5), the function of which is to significantly increase the speed of aeration of cylinders during braking.

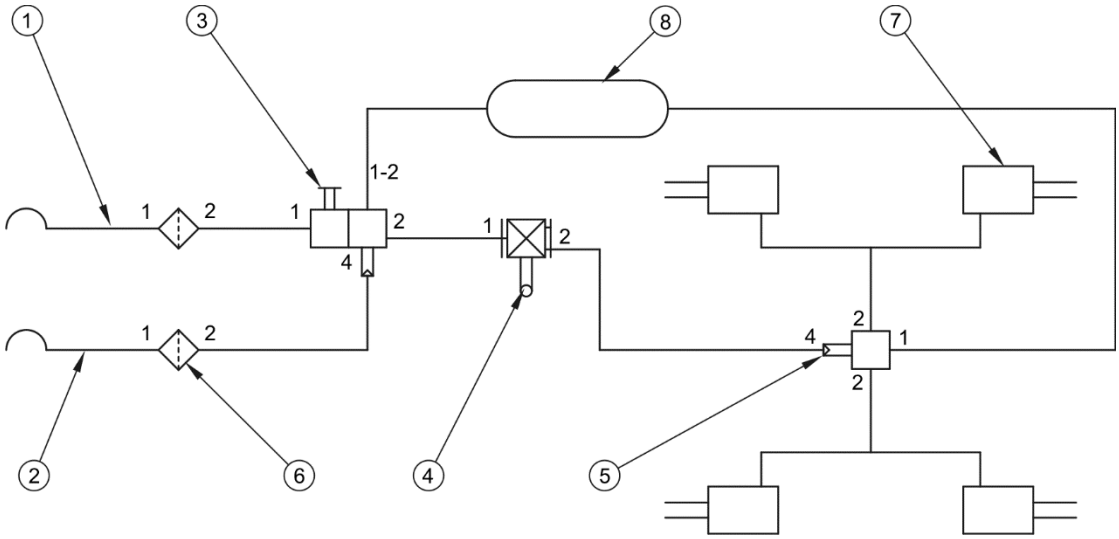


FIGURE 3.12 Concept diagram of braking system with manual regulator

(1), (2) conduit connection, (3) control valve, (4) manual braking force regulator, (5) relay valve, (6) air filter, (7) pneumatic cylinder, (8) air tank

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

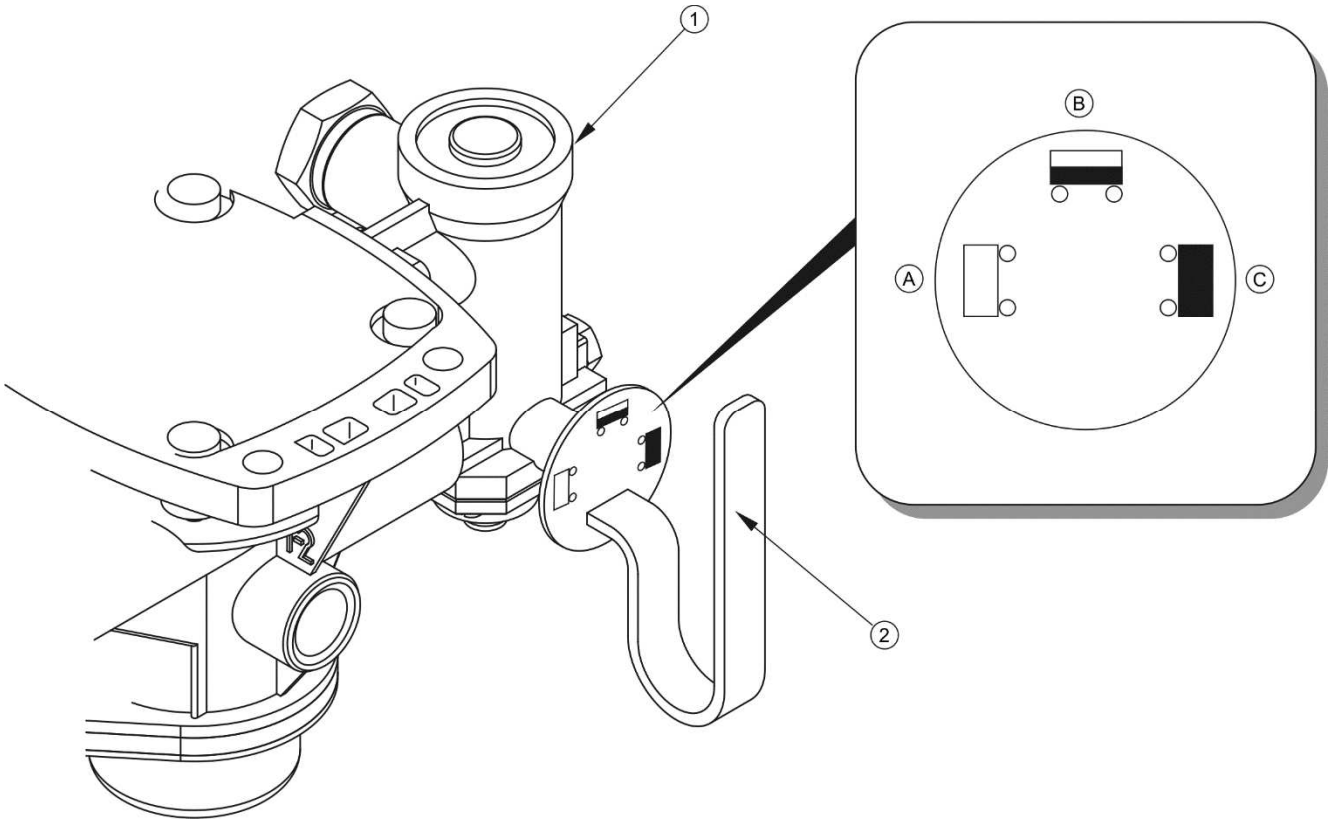


FIGURE 3.13 Three position manual regulator

(1) three-step brake force regulator, (2) regulator setting control lever, (A), (B), (C) regulator operation position

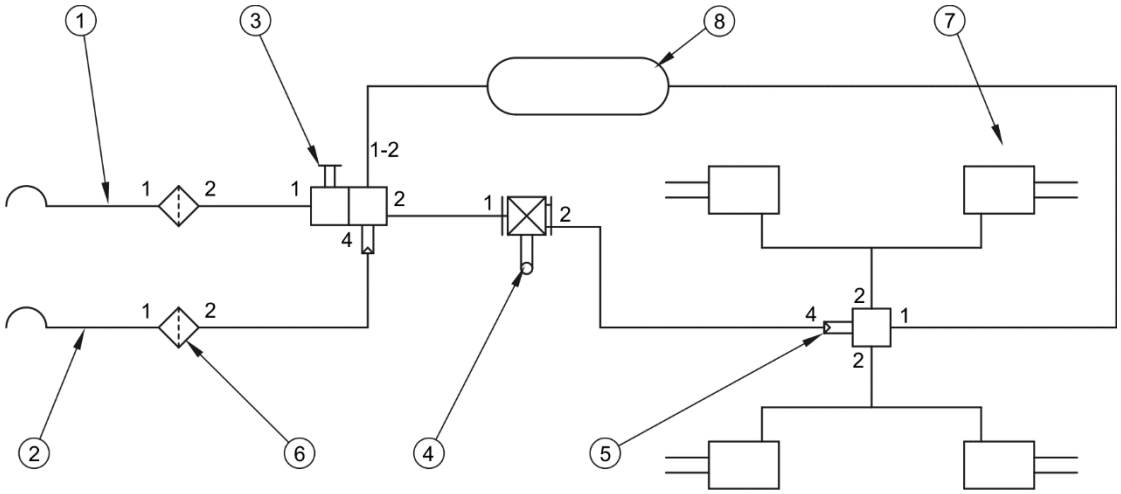


FIGURE 3.14 Concept diagram of braking system with manual regulator

(1), (2) conduit connection, (3) control valve, (4) automatic braking force regulator, (5) relay valve, (6) air filter, (7) pneumatic cylinder, (8) air tank

Automatic braking force regulator (4) adapts braking pressure depending on the trailer load. During normal work it does not require service.

The system is equipped with two pneumatic connections. They are marked with coloured safety covers, which enable identification of individual connections:

- red – supply connection,
- yellow - control connection.

Additionally, each pneumatic connection is equipped with a cut-off valve, which automatically cuts off outflow of air from pneumatic conduit in the event of disconnection from agricultural tractor socket.

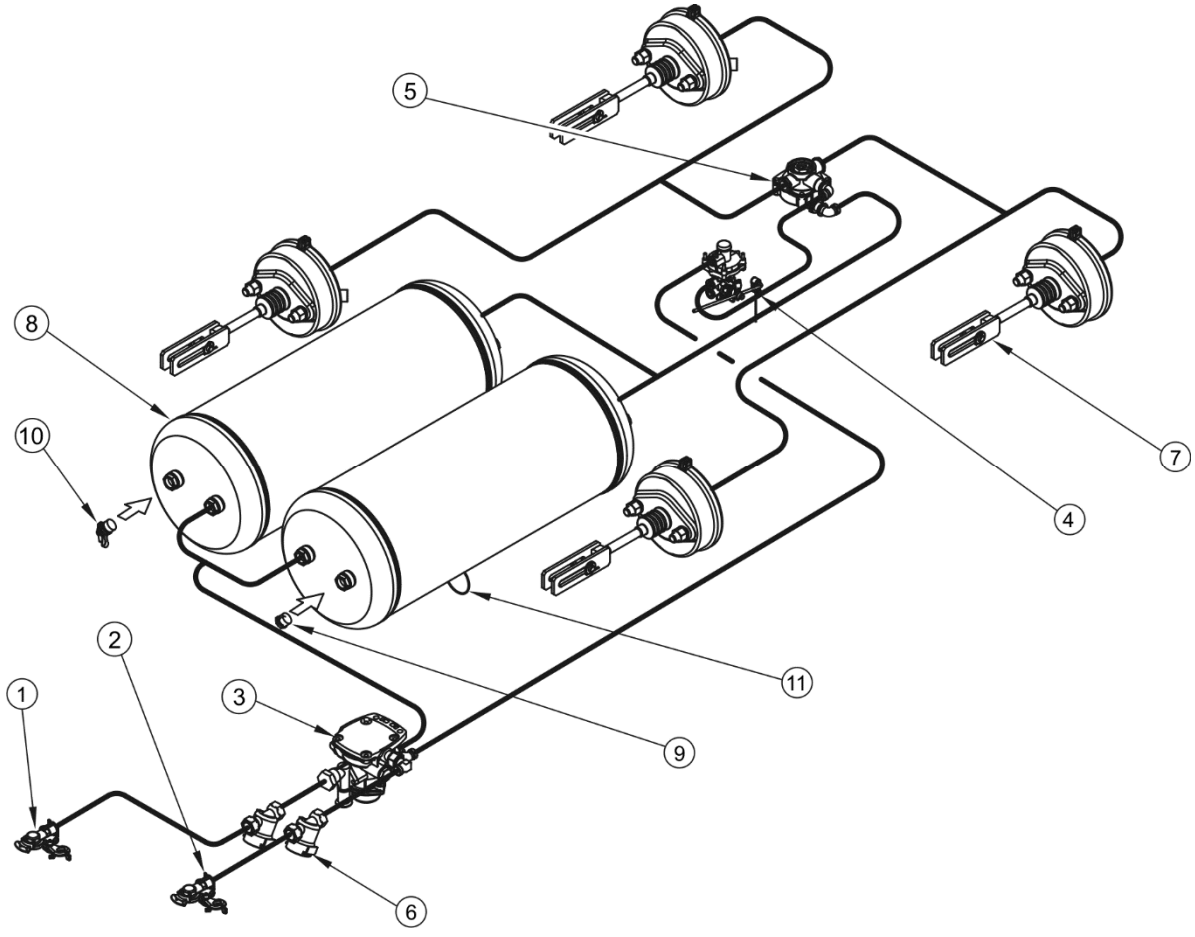


FIGURE 3.15 Design of braking system with automatic regulator

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

3.9 PARKING BRAKE

The parking brake is used for immobilising trailer while standing motionless. The brake crank mechanism (1) is mounted on the left side of the front beam. Steel cable (4) is connected to axle expander lever (2) with crank mechanism. Tightening the cable causes tilting of the expander arms, which part the brake shoes immobilising the trailer while standing motionless.

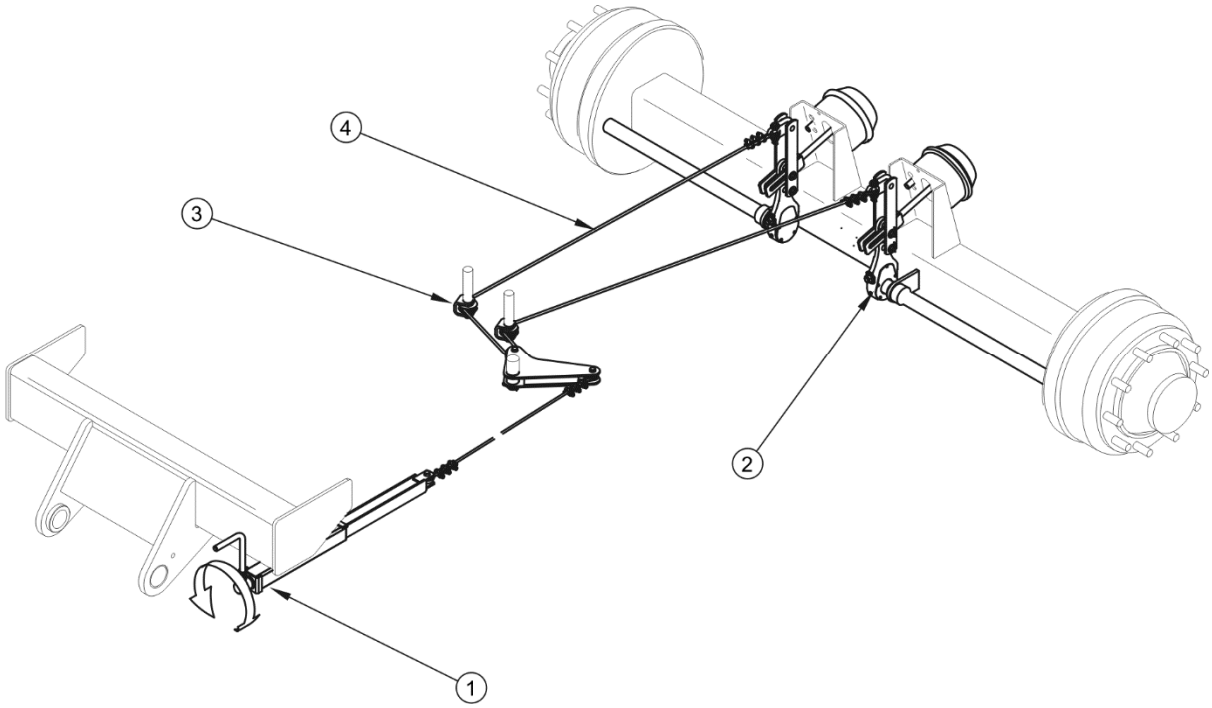


FIGURE 3.16 Parking brake

(1) brake crank mechanism, (2) expander arm, (3) handle with wheel, (4) cable

3.10 ELECTRIC LIGHTING SYSTEM

The trailer's electric lighting system is designed for 12 V DC supply. The system is connected using two leads with 7-pin plugs, in compliance with ISO 1724 standard.

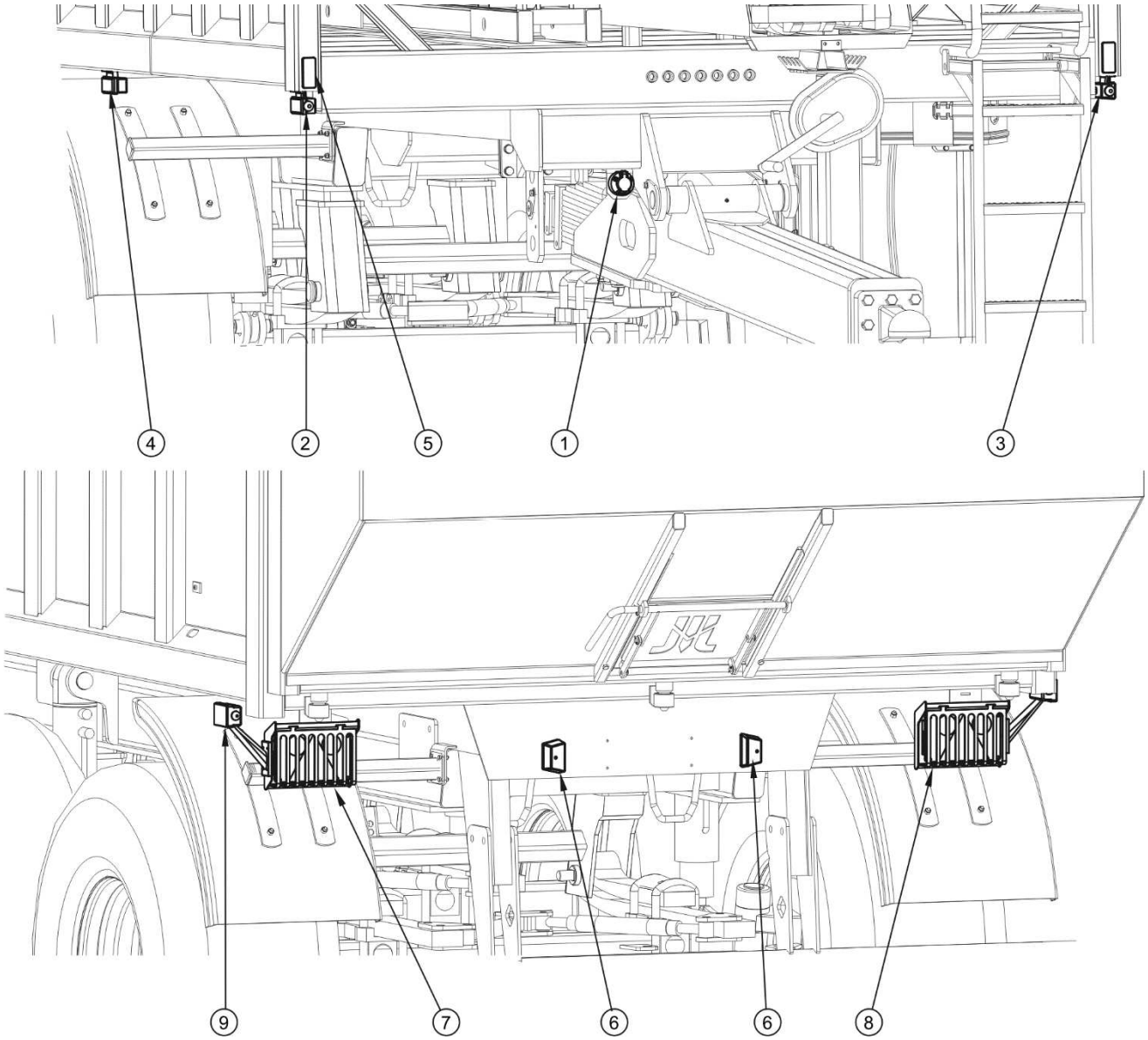


FIGURE 3.17 Lighting system components

(1) 7-pin socket, (2), (3) front clearance lamps (white), (4) side lamp (orange), (5) reflector (white), (6) license plate light, (7) rear left lamp assembly, (8) rear right lamp assembly, (9) rear clearance lamp

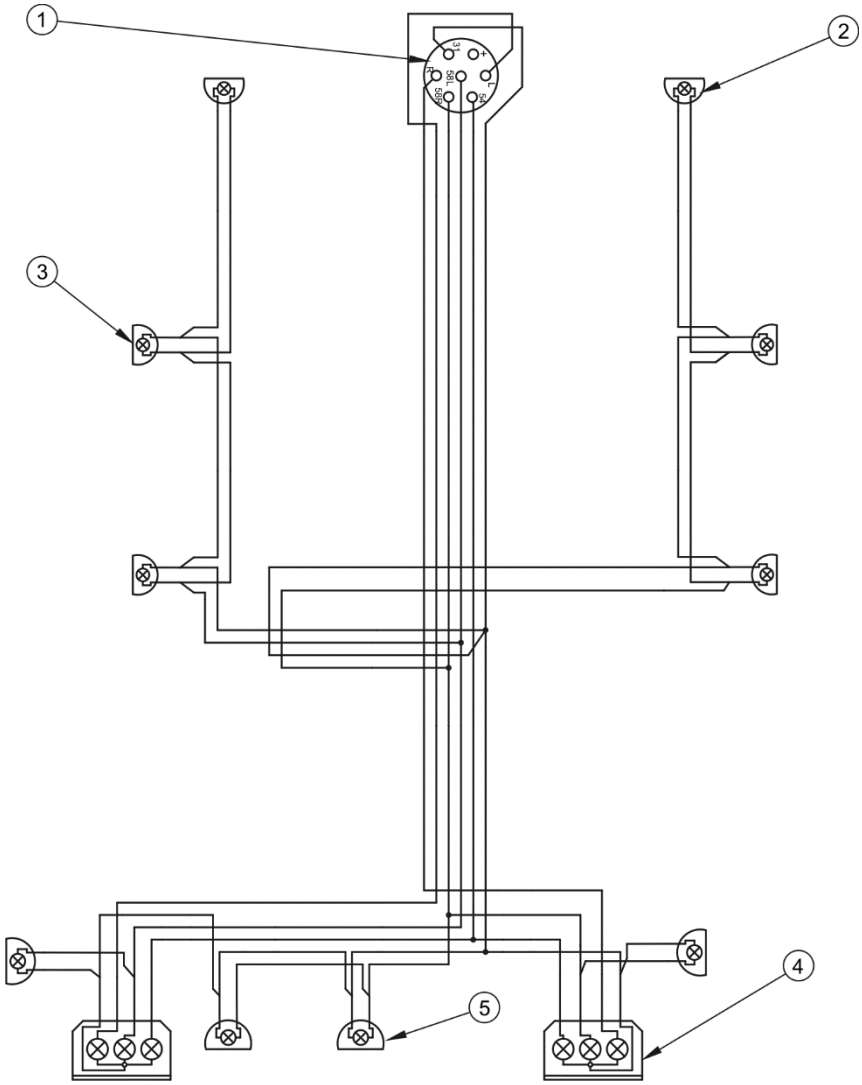


FIGURE 3.18 Electric lighting system diagram

(1) socket, (2) front parking light (white), (3) side clearance lamp (orange), (4) rear lamp assembly, (5) licence plate light

TABLE 3.2 PLUG-TYPE CONNECTORS ACCORDING TO ISO 1724

PIN	MARKING DIN	COLOUR	FUNCTION
1	31	BLACK	Ground
2	58L	ORANGE	Left parking lights
3	L	BLUE	Left indicator
4	54	GREEN	STOP lights
5	R	BLACK AND GREEN	Right indicator
6	58R	BROWN	Right parking lights

SECTION

4

CORRECT USE

4.1 PREPARING FOR WORK BEFORE FIRST USE

The manufacturer guarantees that PRONAR T902 trailer is fully operational and has been checked according to quality control procedures and is ready for use. This does not release the user from an obligation to check the machine's condition after delivery and before the first use. The machine is delivered to the user completely assembled.

Prior to connecting to the tractor, machine operator must verify the trailer's technical condition, prepare it for the first use and configure as needed. In order to do this:

- the user must carefully read this Operator's Manual and observe all recommendations, understand the design and the principle of machine operation
- check the condition of protective paint coat,
- inspect trailer's individual components for mechanical damage resulting from incorrect transport (dents, piercing, bent or broken components),
- check all the trailer's lubrication points, lubricate the machine as needed according to recommendations provided in section 5,
- check technical condition of tyres and tyre pressure.
- check technical condition of pneumatic lines,
- drain the air tanks in the braking system and the pneumatic suspension system,
- adapt the height of the trailer drawbar to the tractor hitch,
- check if the nuts and bolts fixing the wheels, drawbar, load box and other components are properly tightened,
- make sure that there is nothing and nobody inside the load box.
- ensure that the hitch, pneumatic and electric connections in the tractor are according to the requirements; otherwise, the trailer should not be hitched to the tractor.
- check completeness and technical condition of additional equipment,

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 test the trailer without load (without 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. Inspection should involve the following actions:

- after hitching the trailer, raise the drawbar support,
- check correct operation of the lighting system by turning on individual lights of the trailer,
- when moving off, check if the main brakes operate correctly,
- check tightness of individual hydraulic systems,
- ensure that the pneumatic system does not have any leaks.

IMPORTANT!

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

Before using the trailer always check its technical condition. In particular, check technical condition of hitch system, axle system, braking system, lighting system and wall sliding mechanism. Check completeness of protective shields.

DANGER

Before using the trailer, the user must carefully read this operator's manual.

Careless and improper 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.

Keep a safe distance from the danger zones when starting the hydraulic drive.

If any faults are detected they must be identified and rectified. If a fault cannot be rectified or the repair could void the warranty, please contact retailer for additional clarifications.

4.2 CHECKING THE TRAILER'S TECHNICAL CONDITION

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

TABLE 4.1 TECHNICAL INSPECTION SCHEDULE

DESCRIPTION	SERVICE OPERATION	FREQUENCY OF INSPECTIONS
Operation of brake system	Hitch the trailer to the tractor and test the brakes after moving off.	Daily inspection
Correct operation of lights and indicators.	After connecting trailer to the tractor activate in sequence individual lights, check if all reflectors are installed, check if slow-moving vehicle warning sign is in place.	
Operation of hydraulic system	Check operation and tightness of the hydraulic system during work.	
Check technical condition of tyres and tyre pressure,	Visually inspect the tyres and if they are properly inflated.	
Check technical condition of tyres and tyre pressure,	Check technical condition of tyres (tyre tread, lateral surfaces, wheel rim), check air pressure in tyres.	Every month
Tightening of all main nut and bolt connections	Tightening torque values should be according to table (*5.4*)	Every six months
Lubrication	Lubricate elements according to guidelines presented in section "Lubrication".	According to table *(5.3)*
Degree of tightening of road wheel nuts	Tightening torque values should be according to table (*5.4*)	According to section *(5.11)*

IMPORTANT!

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

Prior to connecting hydraulic system lines the user must carefully read the tractor operator's manual and observe all recommendations of the Manufacturer.

4.3 HITCHING TO TRACTOR

The trailer may be hitched to the tractor only if all connections and the hitch are according to the requirements of the trailer's Manufacturer.

Hitching to tractor is allowed only if the tractor is equipped with proper ball hitches. In standard configuration, the trailer is equipped with hydraulic steering system. The rear axle turning is controlled using the string installed in the additional ball hitch of the tractor.

IMPORTANT!

Prior to attaching the trailer, check the technical condition of the trailer's and tractor's hitch system and connection elements of the hydraulic, electrical and pneumatic systems.

Trailer may only be hitched to a tractor equipped with a hitch capable of carrying vertical load of at least 3 000 kg. The tractor should have at least two hydraulic sections.

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 brake 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 warranty, please contact retailer for additional clarifications or to perform repair.

DANGER

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

Prior to hitching the trailer, check technical condition of the trailer's and tractor's hitch system and connection elements of the electrical, hydraulic and pneumatic systems.

Be especially careful when hitching the machine.

Trailer's conduit connectors and the tractor's connection sockets must be free from any contamination. Pneumatic system conduit connectors are equipped with rubber seals which must not be damaged or soiled.

During connection of braking system lines the correct sequence of conduit connection is very important. First in sequence, connect yellow coloured plug to yellow socket in tractor, and then, the red coloured plug to the red socket in tractor. Once the 2nd conduit is connected, the brake release system will switch to normal operation mode (disconnection or interruption of the air conduits causes the trailer's control valve to automatically apply the spring (parking) brake).

In order to hitch the trailer to the tractor perform the actions below in the sequence presented. The trailer must be immobilised with parking brake.

Hitching the trailer

- ➡ Position the agricultural tractor in front of the trailer's drawbar eye.
- ➡ With the aid of the support adjust the height of the drawbar with regard to the hitch of the tractor.
- ➡ Reverse the tractor, hitch the drawbar eye.
- ➡ Hitch the trailer steering mechanism string.
- ➡ Check the hitch lock protecting the trailer against accidental unhitching.
- ➡ Turn off tractor ignition.
- ➡ Lift support leg.
- ➡ Connect pneumatic conduit marked yellow.
- ➡ Connect pneumatic conduit marked red.

- ➡ Connect the electric lead of the lighting and signalling system.
- ➡ Connect the hydraulic conduits of the tailgate (marked black).
- ➡ Connect the hydraulic conduits of the sliding wall (marked blue).
- ➡ Connect the hydraulic conduits of the side hinged wall (marked green).

IMPORTANT!

Trailer may be attached exclusively to a tractor which meets the requirements for a minimum power demand, is equipped with suitable braking and hydraulic systems connection sockets, hydraulic oil in both machines is of the same type and the tractor's hitch is capable of withstanding vertical loads of loaded trailer drawbar.

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.

After hitching the trailer to tractor, secure the ball connections.

4.3.1 TRAILER SUPPORT OPERATION

Setting proper height of drawbar eye in relation to tractor hitch is achieved by the aid of support with mechanical gearing - figure (*4.1*).

In order to reduce the force necessary to raise trailer drawbar, place support crank (3) in position (B). In this position there is greater mechanical gearing leverage, support foot (2) moves slowly, but little force is necessary to raise the front of the machine.

Raising the support

- ➡ Remove safety pin (5).
- ➡ Move support crank (3) from neutral position (A) to position (B).
- ➡ Turn the crank anticlockwise to raise support foot (2) maximally.
- ➡ Place safety pin in position.
- ➡ Place crank in neutral position (A).

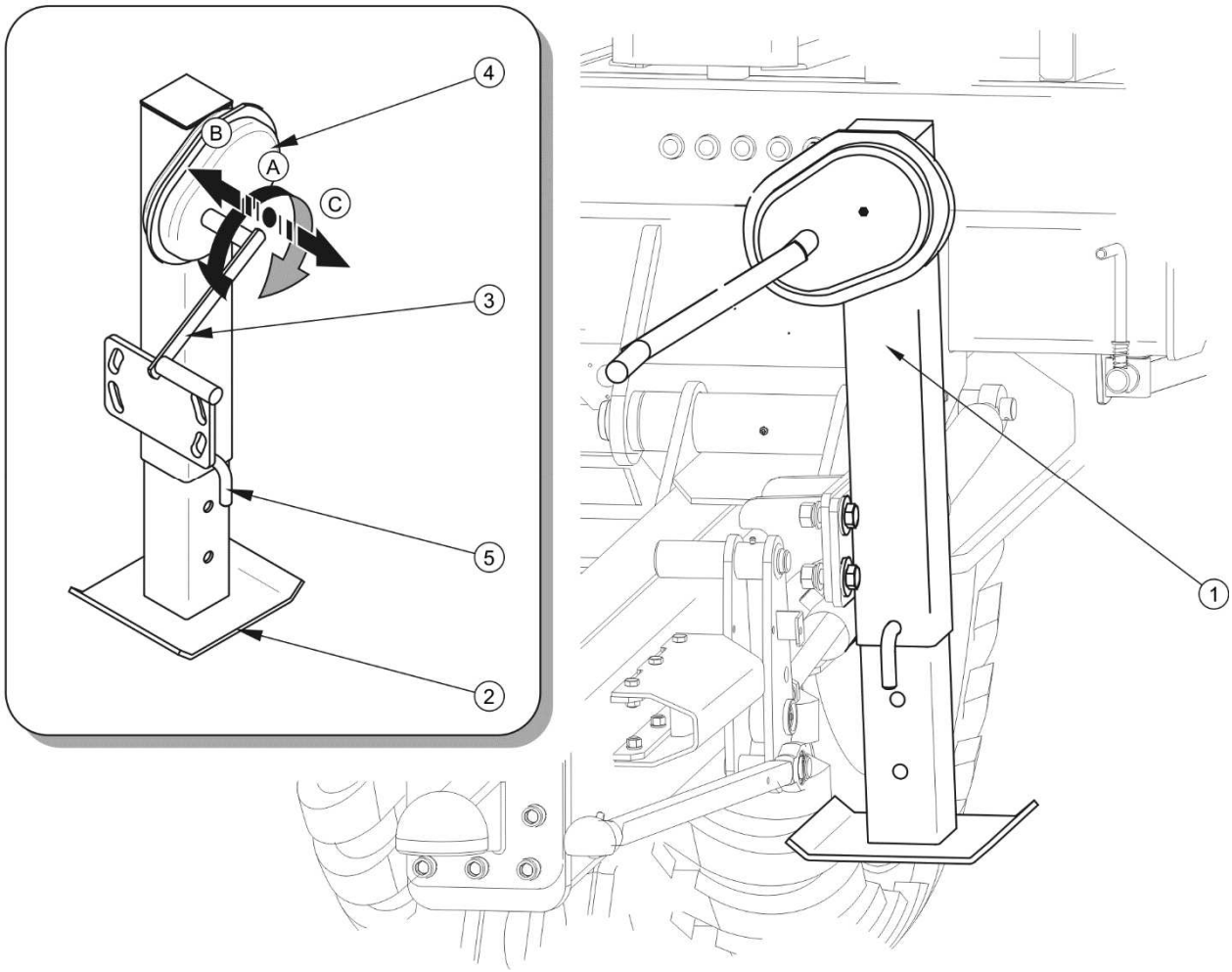


FIGURE 4.1 Support leg

(1) support (2) support foot, (3) crank of mechanism, (4) gear, (5) securing pin, (A) neutral position, (B) I gear position, (C) II gear position

Lowering the support

- ➡ Remove safety pin.
- ➡ Set crank in position (B) or (C).
- ➡ Turn the crank clockwise to lower the support to the ground, if necessary, adjust the drawbar height in relation to the hitch (if the trailer is to be hitched to the tractor).

IMPORTANT!

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

Before moving off, make sure that the support is folded and locked in transport position.

4.4 LOADING

Load box can be loaded only when the trailer is connected to the tractor and positioned horizontally. Always aim at distributing the load uniformly in the load box. This will ensure stability when travelling and correct axle and drawbar loads. When loading the load box, it is recommended to use a loader or belt conveyor. When loading silage directly from a self-propelled forage harvester or combine harvester, the load can be compacted by pressing with the sliding wall - consequently, much more silage can be transported. When compacting the load, the sliding wall should be moved very slowly so as not to apply excessive pressure to the tailgate.

Before loading, check that the tailgate and chute slide gate are closed. Check that there are no objects in the load box and that the sliding wall is located in the front section of the load box. Avoid throwing material into the load box from a great height because the trailer may be damaged. Loading of materials other than those recommended by the Manufacturer is forbidden.

In order to facilitate loading by reducing the trailer's side wall height, it is recommended to open the hinged wall or both walls, depending on the load box version. Various versions of side hinged walls are included in the trailer's optional equipment.

IMPORTANT!

Do NOT exceed the permissible load weight of trailer because this may cause danger to road traffic and cause damage to the machine.

Load must be uniformly distributed in the load box and it must not hinder driving. Loading and unloading work should be carried out by someone experienced in this type of work.

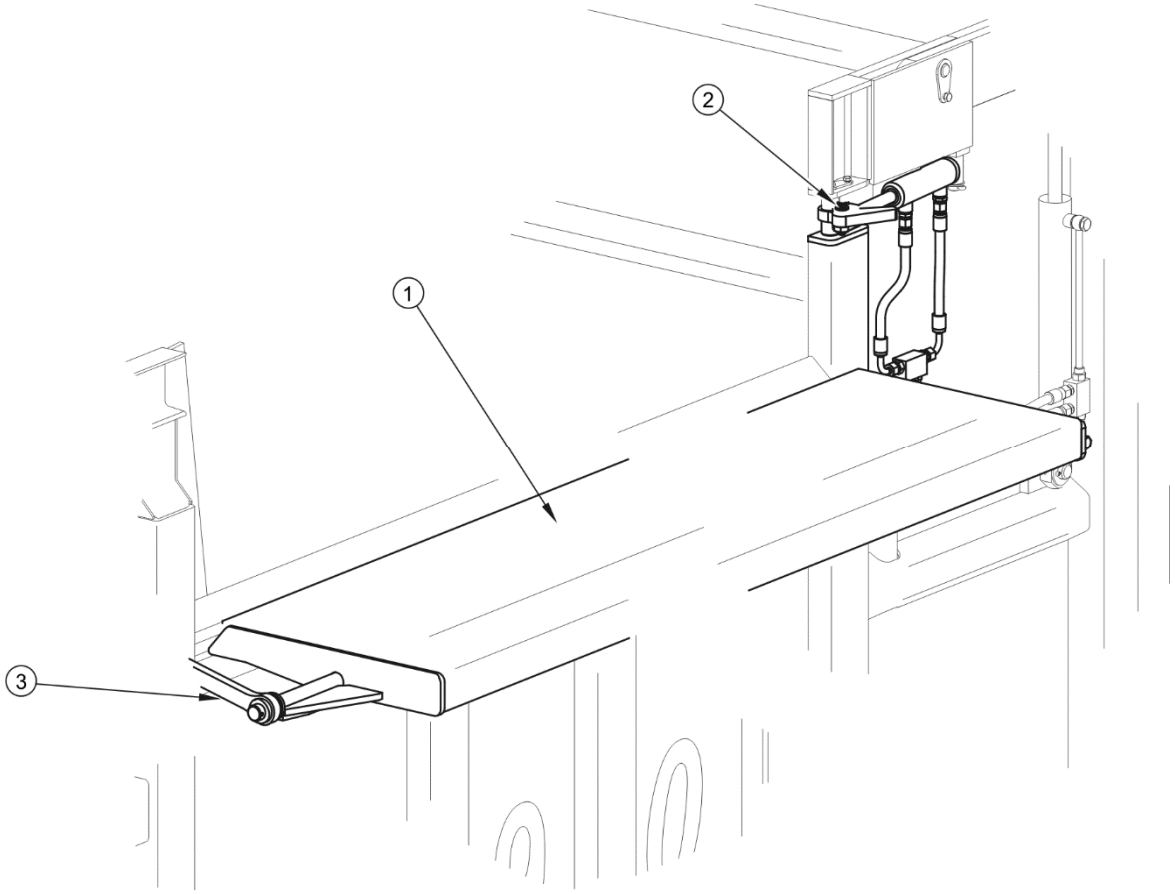


FIGURE 4.2 Side hinged wall

(1) left hinged wall, (2) locking mechanism, (3) opening/closing mechanism

Due to the various density of materials, using the total load box capacity may cause exceeding permissible carrying capacity of the trailer. Guideline specific weight of selected materials is shown in table *(4.2).* Take care not to overload the trailer.

DANGER

People or animals must not be carried on the trailer.

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

Loading work should be conducted by persons experienced in this type of work.

During loading harvested grain on the move, maintain a constant distance between the machines and synchronise travelling speed with the combine harvester.

TABLE 4.2 GUIDELINE WEIGHTS BY VOLUME OF SELECTED LOADS

TYPE OF MATERIAL	VOLUME WEIGHT 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
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
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
soft wood	300 - 450
hard sawn timber	500 - 600
impregnated timber	600 - 800
milled burnt lime	700 - 800
gravel	1,600 – 1,800

TYPE OF MATERIAL	VOLUME WEIGHT KG/M^3
straw litter and bulk feeds	
meadow hay dried in the swath	10 - 18
hay wilted in the swath	15 - 25
hay in gathering trailer (dry wilted)	50 - 80
wilted cut hay	60 - 70
dry baled hay	120 - 150
wilted baled hay	200 - 290
stored dry hay	50 - 90
stored cut hay	90 - 150
clover (lucerne) wilted in the swath	20 - 25
clover (lucerne) cut wilted on trailer	110 - 160
clover (lucerne) wilted on gathering trailer	60 – 100
dry stored clover	40 - 60
cut dry stored clover	80 - 140
dry straw in round bales	8 - 15
damp straw in round bales	15 - 20
cut damp straw in bulk trailer	50 - 80
cut dry straw in bulk trailer	20 - 40
cut dry straw in gathering trailer	50 - 90
cut dry straw in stack	40 - 100
baled straw (lightly crushed)	80 - 90
baled straw (heavily crushed)	110 - 150
cereal mass in round bales	20 - 25
cut cereal mass in bulk trailer	35 - 75
cut cereal mass in gathering trailer	60 - 100
green fodder in swath	28 - 35
cut green fodder in bulk trailer	150 - 400
green fodder in gathering trailer	120 - 270
fresh beet leaves	140 - 160
cut fresh beet leaves	350 - 400
beet leaves in gathering trailer	180 - 250

TYPE OF MATERIAL	VOLUME WEIGHT KG/M^3
Concentrated feeds and mixed feeds:	
stored chaff	200 - 225
pressed cake	880 – 1,000
milled dry feed	170 - 185
mixed feeds	450 - 650
mineral mixtures	1,100 – 1,300
ground oats	380 - 410
wet sugar beet pulp	830-1 000
pressed sugar beet pulp	750 - 800
dry sugar beet pulp	350 - 400
bran	320 - 600
bone meal	700 – 1,000
pasture salt	1,100 – 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

TYPE OF MATERIAL	VOLUME WEIGHT KG/M^3
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

4.5 UNLOADING

The load box of Pronar T902 trailer is unloaded by shifting the front sliding wall backwards. The hydraulic mechanism of the sliding wall is used for automatic unloading of the trailer. This system enables unloading in difficult conditions, for example in low ceiling buildings, on steep slopes or in strong wind. In the last stage of unloading, the wall is hydraulically raised in order to thoroughly remove the remains of transported material from the load surface.

The trailer should be unloaded by performing the below-specified activities in the following sequence:

- During unloading, the trailer should be positioned on stable surface.
- Tractor must be placed to drive forward.
- Open the tailgate (3) maximally by manipulating the proper lever of the tractor's hydraulic manifold.
- Move the sliding wall (2) by controlling the lever of the tractor's hydraulic manifold.
    - The sliding wall will move backwards until the manifold lever is released or until it reaches its maximum position.
    - In its maximum position, the wall will tilt by the angle of 55^{O}.
- After unloading, lower and withdraw the wall to its initial position by manipulating the proper lever of the tractor's hydraulic manifold.
- Close the tailgate by controlling the suitable hydraulic circuit.

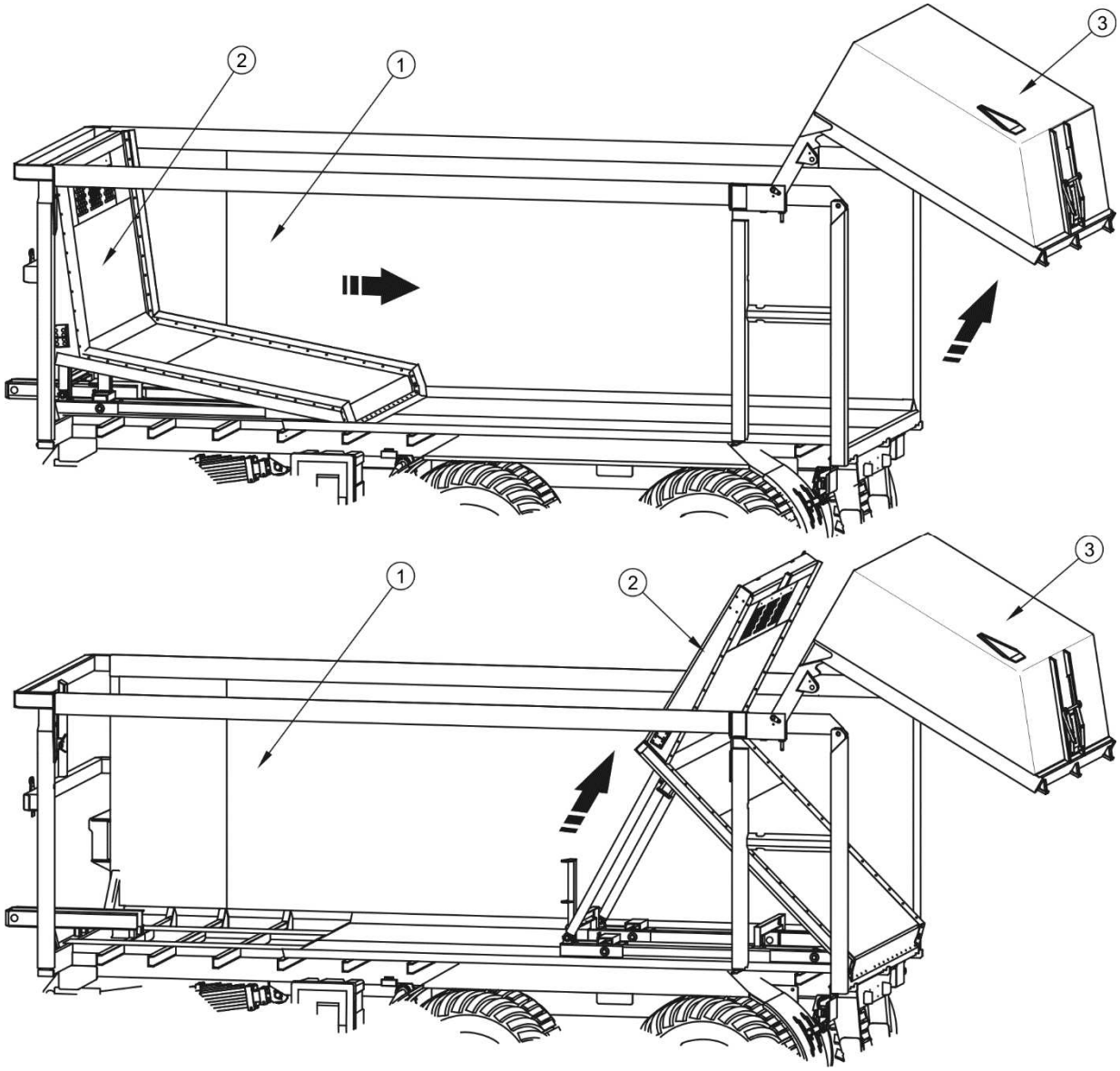


FIGURE 4.3 Unloading the load box

(1) load box, (2) sliding wall, (3) tailgate

DANGER

DO NOT unload the trailer on unstable surface.

When closing the tailgate, take particular care as there is a risk of sustaining a serious injury.

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

The load box tailgate is equipped with the grain chute – figure *(4.4)* for unloading loose materials. The width of the grain chute opening (1) can be adjusted during unloading. The nut on the securing clamp (3) must be loosened in order to open the grain chute gate.

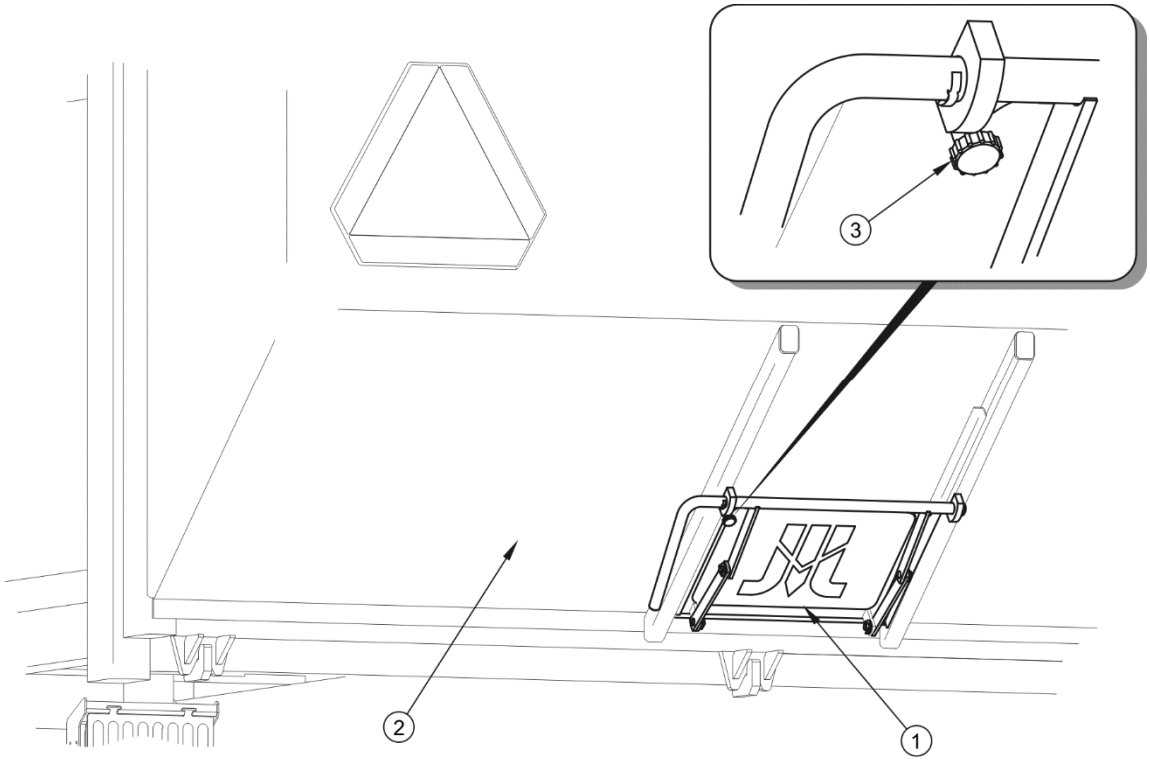


FIGURE 4.4 Grain chute

(1) grain chute, (2) tailgate, (3) securing clamp nut

4.6 TRANSPORTING THE MACHINE

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

- Before moving off make sure that there are no bystanders, especially children, near the trailer or the tractor. Take care that the driver has sufficient visibility.
- Make sure that the trailer is correctly attached to the tractor and tractor's hitch is properly secured.
- Do NOT drive on public roads with the side hinged wall lowered.
- The trailer must not be overloaded, loads must be uniformly distributed so that the maximum permissible axle and drawbar loads are not exceeded. The trailer's

maximum carrying capacity must not be exceeded as this can damage the machine 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.
- 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 trailer malfunction, pull over on the hard shoulder avoiding any risk to other road users and position reflective warning triangle according to traffic regulations.
- 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.

IMPORTANT!

Do NOT drive on public roads with the side hinged wall lowered.

DO NOT drive with the lower links of the tractor's three-point linkage raised because the links may damage the steering cylinder when manoeuvring.

- Avoid ruts, depressions, ditches or driving on roadside slopes. Driving across such obstacles could cause the machine or the tractor to suddenly tilt. This is of special importance because loaded trailer's centre of gravity is higher, which reduces safety. Driving near ditches or canals is dangerous as there is a risk of the wheels sliding down the slope or the slope collapsing.
- When driving on public roads the machine must be marked with a slow-moving vehicle warning sign attached to the rear wall of load box.
- Please note that the braking distance of the tractor and trailer combination is substantially increased at higher speeds and loads.

- Speed must be sufficiently reduced before making a turn or driving on an uneven road or a slope.

4.7 DISCONNECTING FROM TRACTOR

In order to disconnect the trailer from the tractor proceed as follows:

- ➡ Once the tractor is stopped, immobilise the trailer using parking brake. The brake is activated by means of the crank mechanism - see figure *(3.14)*.
- ➡ Using the support, set the drawbar eye at a proper height.
- ➡ Disconnect from the tractor all electrical leads as well as hydraulic and braking system conduits. Protect terminals of the leads and conduits against soiling. Protect the plugs of the hydraulic system conduits with the aid of caps and place the conduits on the conduit hanger. Protect the pneumatic system plugs with shields.
- ➡ Disconnect the wheel steering system cylinder from the tractor hitch.
- ➡ Disconnect drawbar from the tractor's hitch and move the tractor forward.
- ➡ When disconnecting the pneumatic system conduits, first disconnect the conduit with red plug and only then disconnect the conduit with yellow plug.

IMPORTANT!

Immobilize the trailer unhitched from the tractor with the parking brake. Place chocks under the fixed axle wheel.

4.8 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 every100 km. The inspection should be repeated individually if a wheel has been removed from the wheel axle.
- Regularly check and maintain correct pressure in tyres according to Operator's Manual (especially if trailer is not used for a longer period).
- Pressure and tyres should be also checked during the whole day of intensive work. Please note that higher temperatures could raise tyre pressure by as much as 1 bar. At high temperatures and pressure, reduce load or speed.
- Do not release air from warm tyres to adjust the pressure or the tyres will be underinflated when temperatures return to normal.
- Tyre valves should be protected with the appropriate caps to avoid soiling.
- Do not exceed the trailer's maximum design speed.
- Avoid potholes, sudden manoeuvres or high speeds when turning.
- When the trailer is operated all day, stop working for a minimum of one hour at noon.
- Adhere to 30 minutes rest for cooling tyres after driving 75 km or after 150 minutes continuous travel depending on which occurs first.

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 SERVICING 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,
- adjusting toe-in of rear axle wheels,
- 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 unreliable.

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 5.2.7 and 5.3.2.

5.2.3 CHECKING WHEEL AXLE BEARINGS FOR SLACKNESS:

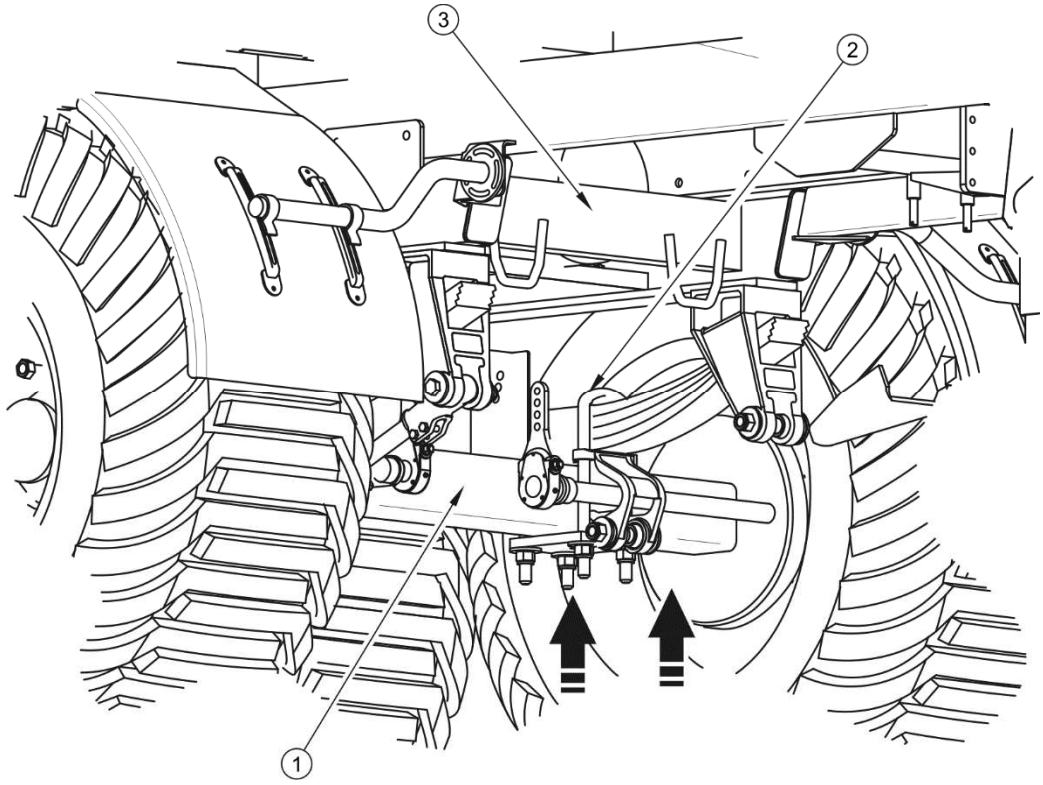


FIGURE 5.1 Lifting jack support point

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

Preparation procedures

- Hitch trailer to tractor, immobilize 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 under the axle between U bolts (2) - figure (*5.1*) securing axle (1) to lower frame (3), or as near as possible to leaf spring mounting. Recommended support points are marked with arrows. Lifting jack must be suited to 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 on the floor.
- ➡ Repeat the inspection procedure on the other wheels.

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.**

If slackness is felt, adjust bearings. Unusual sounds coming from bearing may be symptoms of excess 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 bearing and hub seals.

Bearing life is dependent on working conditions of trailer, loading, speed of travel and lubrication conditions.

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 by 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 new cover. Inspection of bearing slackness may only be conducted, when the trailer is hitched to a tractor, and the load box is empty.

5.2.4 ADJUSTMENT OF SLACKNESS OF WHEEL AXLE BEARINGS

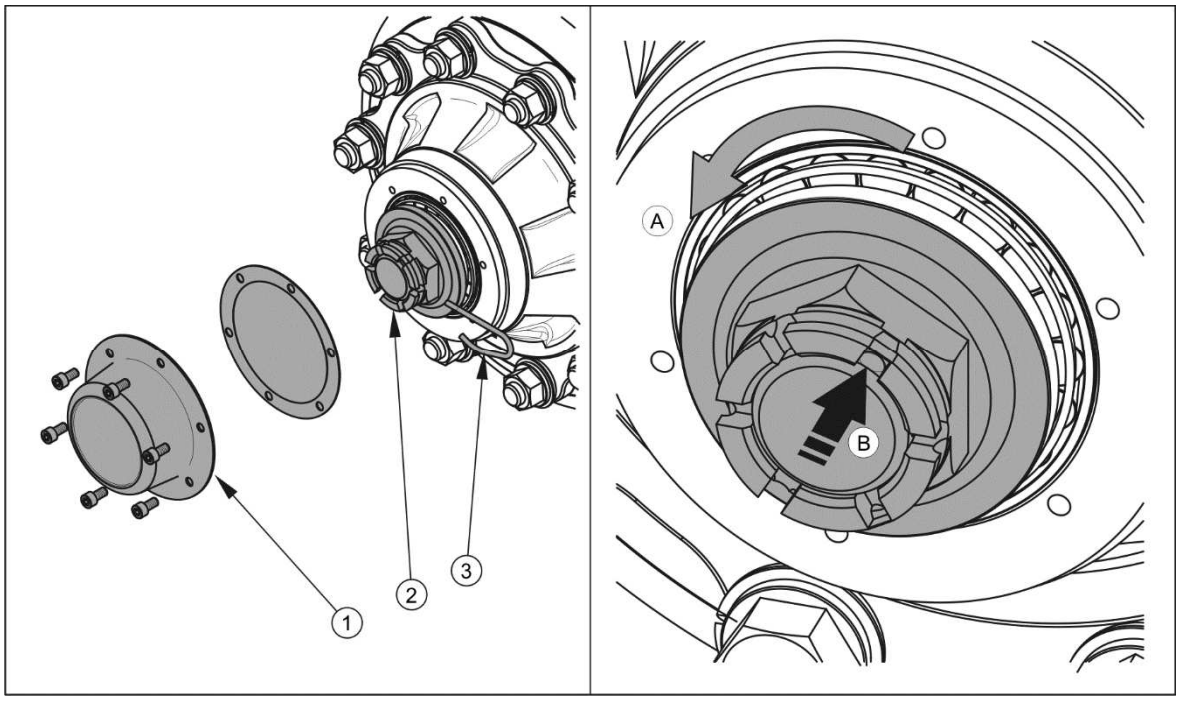


FIGURE 5.2 Adjustment of wheel axle bearings

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

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 split cotter pin (3) securing castellated nut (2).

➡ Tighten castellated nut in order to eliminate looseness.

⇨ Wheel should rotate with insignificant resistance.

- ➡ Unscrew nut (not less than 1/3 rotation) to align the nearest thread groove with the opening in wheel axle pin. Wheel should rotate with insignificant resistance.
  - ⇨ Nut may 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 hub cap.
- ➡ Delicately tap hub cap with rubber or wooden hammer.

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 a tractor and the load box is empty.

TIP

If the wheel is dismounted, bearing slackness is easy to check and adjust.

5.2.5 MOUNTING AND DISMOUNTING WHEEL, INSPECTION OF WHEEL NUT TIGHTENING.

Wheel removal

- ➡ Immobilise trailer with parking brake.
- ➡ Place chocks under wheel that will not be dismounted.
- ➡ Ensure that trailer shall not move during wheel dismounting.
- ➡ Loosen wheel nuts according to sequence given in figure (*5.3*).
- ➡ Place lifting jack and lift trailer.
- ➡ Dismount wheel.

Wheel installation

- ➡ Clean axle pins and nuts of dirt contamination.
  - ⇨ Do not grease thread of nuts and pins.
- ➡ Check condition of pins and nuts, if necessary replace.

➡ Place wheel on hub, tighten nuts so that wheel rim tightly fits the hub.

➡ Lower trailer, tighten nuts according to recommended torque and given sequence.

TIP

Wheel nuts should be tightened using a torque of 570 Nm - nuts M22x1.5.

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.

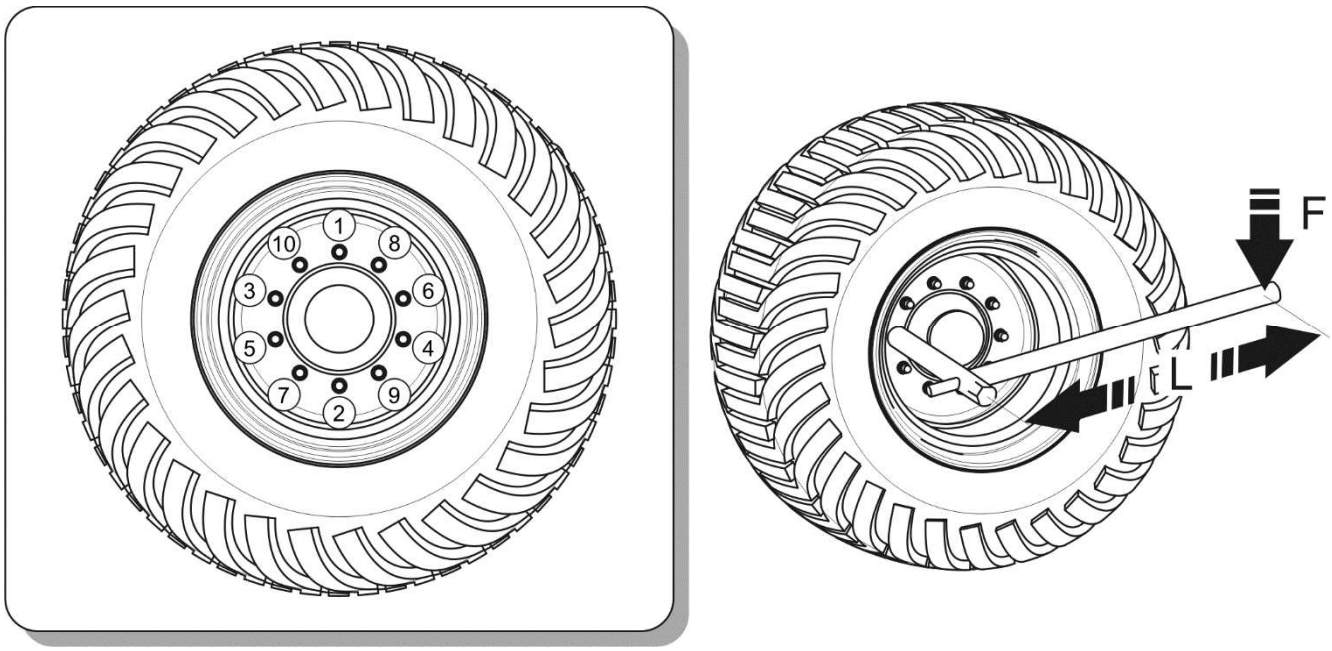


FIGURE 5.3 Sequence of nut tightening

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

IMPORTANT!

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

Checking wheel 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 100 km.

TABLE 5.1 Spanner arm

WHEEL TIGHTENING TORQUE	BODY WEIGHT (F)	ARM LENGTH (L)
[NM]	[KG]	[M]
570	90	0.65
	75	0.75
	65	0.88
	60	0.95

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 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 tyre pressure and steel rims:

- **every month of use,**
- **if needed.**

5.2.7 MECHANICAL BRAKES ADJUSTMENT

During trailer operation drum brake linings are subjected to wear. Piston stroke extends; after exceeding the limit value, the braking force declines.

Brakes adjustment is necessary when:

- as a result of wear of brake shoe linings between lining and drum there is excessive slack and reduced braking effectiveness.
- wheel brakes do not brake evenly or simultaneously.
- repairs are made to braking system

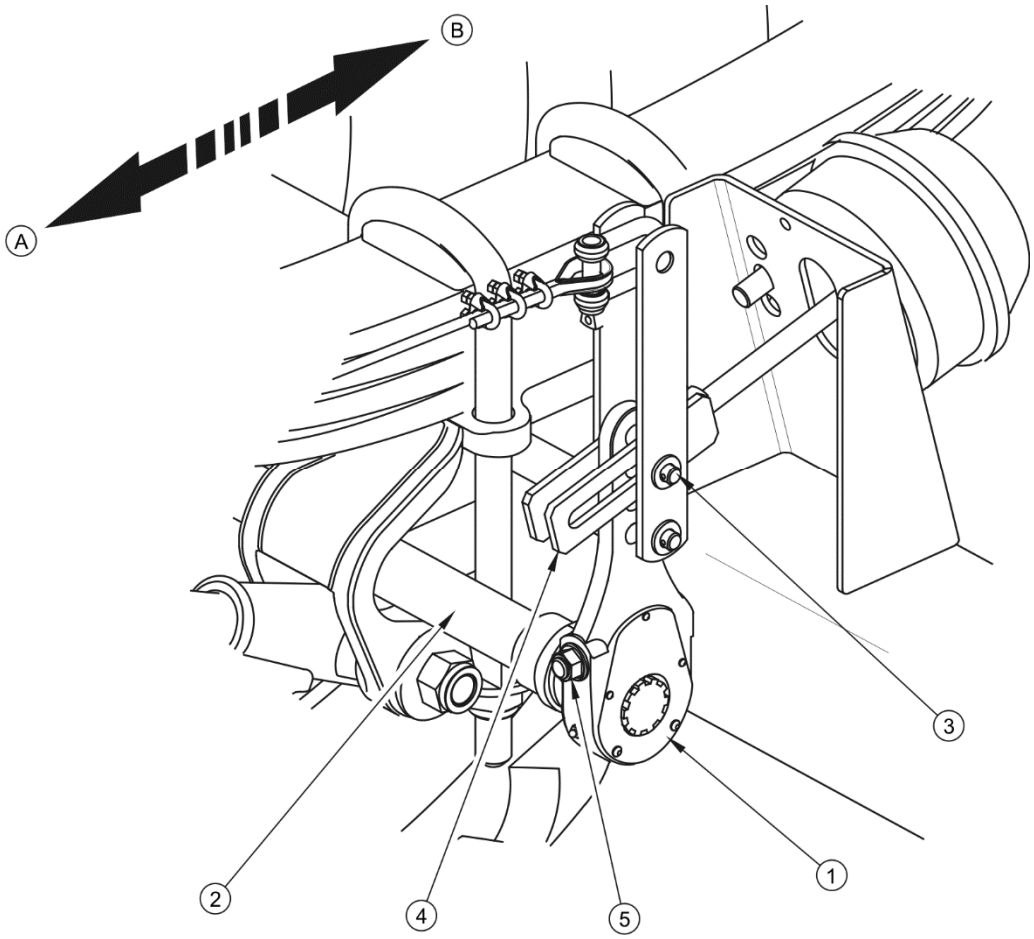


FIGURE 5.4 Adjustment of axle mechanical brakes

(1) expander arm, (2) expander shaft, (3) pin, (4) cylinder fork, (5) adjustment bolt

If brakes are correctly adjusted, braking of trailer wheels takes place simultaneously. Brakes adjustment involves changing setting of axle shaft expander arm (1) in relation to expander shaft (2). To do this adjust the shaft position (1) with the aid of retaining bolt (5) in appropriate direction:

- in direction A, if braking is too early,
- in direction B, if breaking is too late.

Adjustment should be conducted separately for each wheel. After proper brake adjustment, at full braking, the expander arms should create the angle of 90° with the cylinder piston, and the stroke should amount to approximately half the length of the total stroke of the piston. After the brake is released, expander arms may not be supported on any structural elements, because insufficient withdrawal of a piston ram may cause abrasion of brake shoes in drum and result in overheating trailer brakes. Expander arms, placed on one axle, 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.

Checking and adjustment of main brake:

- **every 12 months,**
- **if needed.**

Brake repairs, changes of brake linings etc. may be only undertaken in authorised service points. Making unauthorised repairs and modifications by the user voids the warranty. Among the service operations which may be performed by the trailer user there is only brake adjustment by changing the setting of expander arms.

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

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

Replacing the parking brake cable

- ➡ Hitch trailer to tractor. Park trailer and tractor on level surface.
- ➡ Place wheel chocks under trailer wheel.
- ➡ Loosen nuts (6) of cable clamps (5).
- ➡ Dismantle cable (4).
- ➡ Lubricate parking brake mechanism (1) and pins of cable guide rollers (3).
- ➡ Install new cable, adjust cable tension.

Adjustment of parking brake cable tension

- ➡ Hitch trailer to tractor. Park trailer and tractor on level surface.
- ➡ Place chocks under trailer wheel.
- ➡ Unscrew maximally the brake mechanism bolt (1), (anticlockwise),
- ➡ Loosen nuts (6) of handbrake cable clamps (5).

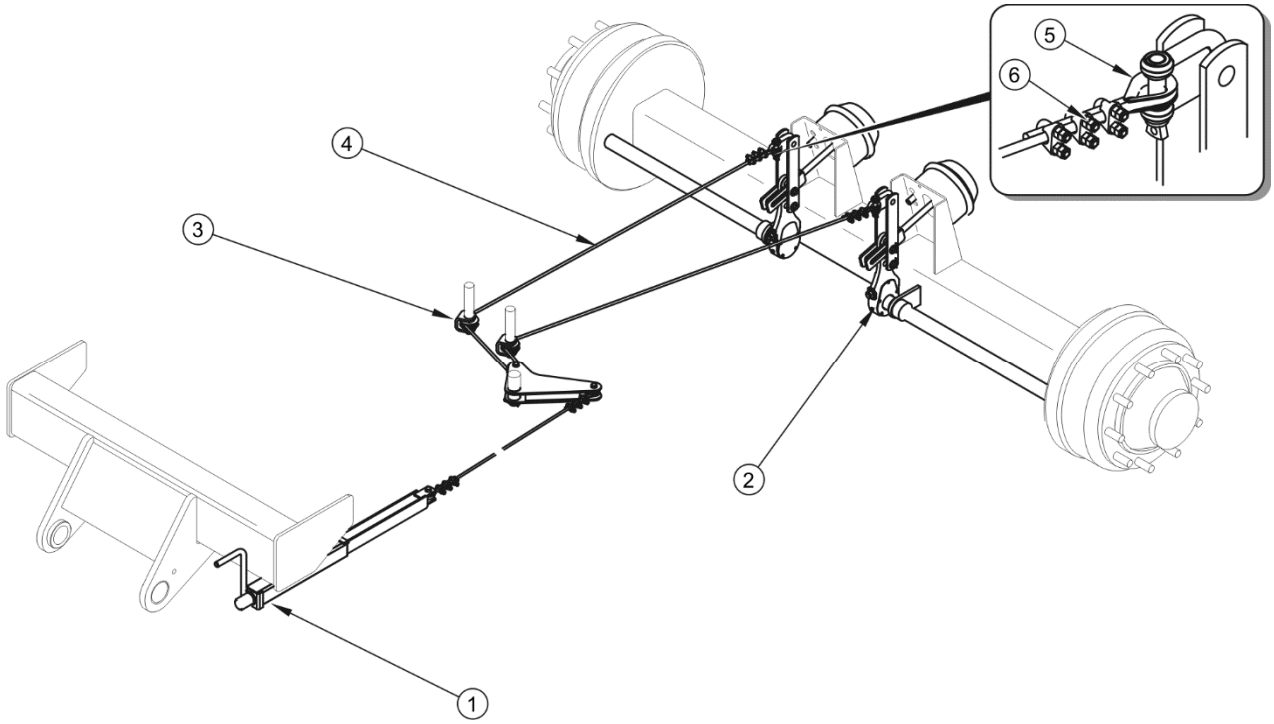


FIGURE 5.5 Adjustment of parking brake cable tension

(1) brake crank mechanism, (2) expander lever, (3) handle with wheel, (4) handbrake cable, (5) U-bolt clamp, (6) nuts of clamp

➡ Tighten cable (4) 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.

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 to axle brake system,
- after repairs in parking brake system.

Before commencing the adjustment make certain that the wheel axle brakes are correctly regulated and are functioning properly.

Checking and/or adjustment of parking brake:

- **every 12 months,**
- **if needed.**

5.3 PNEUMATIC SYSTEM MAINTENANCE

5.3.1 PRELIMINARY INFORMATION

Work connected with the repair, change or regeneration of system components (brake cylinders, lines, 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 include:

- checking tightness and visual inspection of the system,
- cleaning the air 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 unreliable.

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 double conduit systems air pressure should amount to approx. 8 bar.

➡ Turn off tractor engine.

➡ Check system components by releasing brake pedal in tractor.

⇨ Give 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 exposed by covering checked elements with washing fluid or other foaming preparations, which will not react aggressively with system components. It is recommended to supply 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 component or seal.

Check system tightness

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

Visual assessment of system:

Visual assessment of system:

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

IMPORTANT!

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

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.

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 inserts, which are located in pneumatic system connection conduits. Inserts are used many times and are not subject to changing unless they are mechanically damaged.

DANGER

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

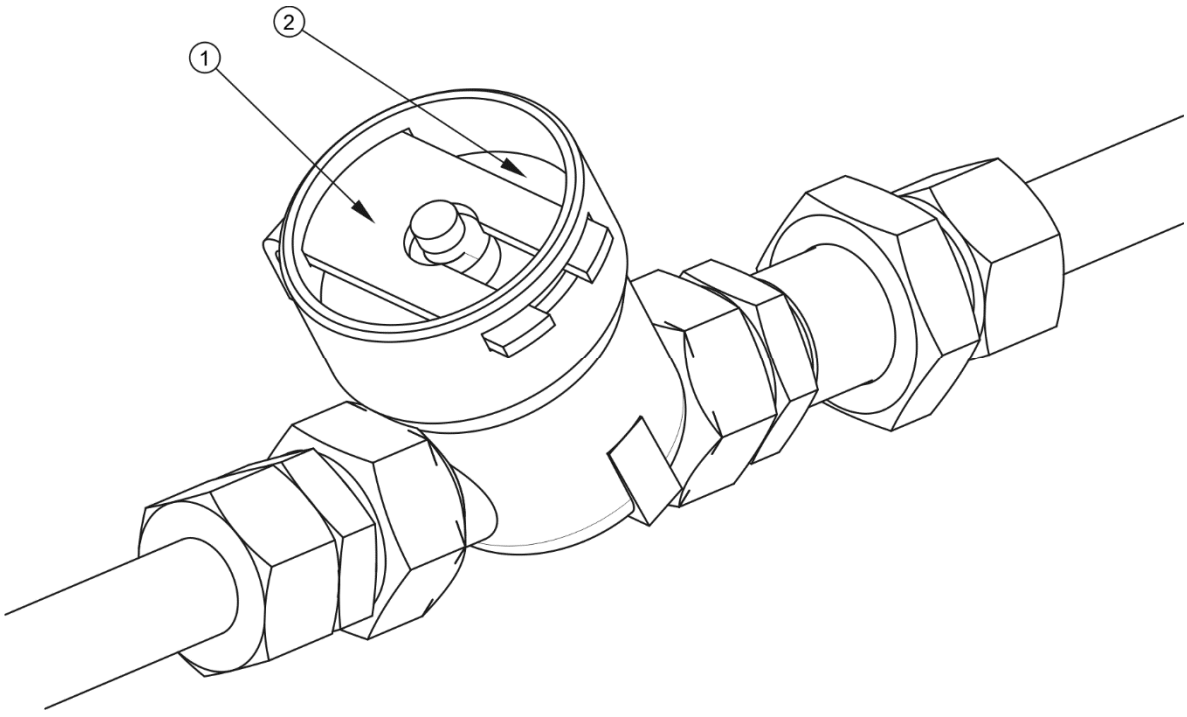


FIGURE 5.6 Air filter

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

Required 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.

➡ Remove securing slide (1) – figure (*5.6*).

⇨ Hold the filter cover (2) with the other hand. After removing slide lock, the cover is pushed off by the spring, in the filter housing.

➡ The insert and the filter body should be carefully washed with clean 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

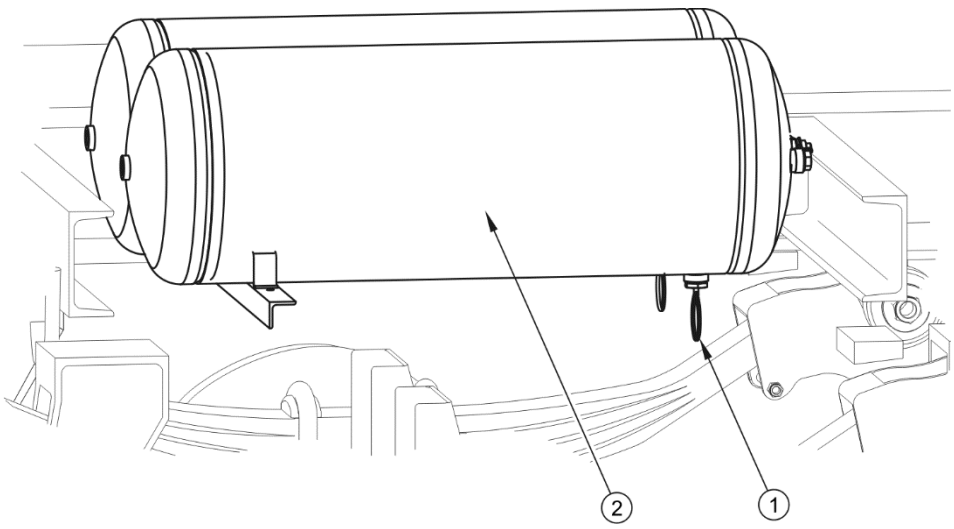


FIGURE 5.7 Draining water from air tank

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

Required maintenance activities:

- ➡ Tilt the stem of drain valve (1) located in the lower part of tank (2) – the tank is located on brackets between longitudinal members of the lower frame.
  - ⇨ The compressed air in the tank causes the removal of water to the exterior.
- ➡ Released valve stem should automatically close and stop flow of air from the tank.
  - ⇨ In the event, that the valve stem resists returning to its setting, then the whole drain valve must be unscrewed and cleaned, or replaced (if it is damaged) - see section 5.3.5.
- ➡ Repeat the above steps for the other tank.

Draining water from air tank:

- **every seven days of use.**

5.3.5 CLEANING THE DRAIN VALVES

DANGER

Release air from tank before dismantling drain valve.

Required maintenance activities:

- ➡ Completely reduce pressure in air tanks.
  - ⇨ Reduction of pressure in the tanks can be achieved by tilting the stems of drain valves.
- ➡ Unscrew the valves.
- ➡ Clean the valves, blow them through with compressed air.
- ➡ Change copper seals.
- ➡ Screw in the valves, fill the tanks with air and check their tightness.

Cleaning valves:

- **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 body 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 period it is recommended to preserve the seal with special preparations (e.g. silicon grease for rubber elements).

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

Inspecting trailer connections:

- **connection should be inspected every time before connecting trailer to tractor or second trailer.**

5.4 HYDRAULIC SYSTEM MAINTENANCE

5.4.1 PRELIMINARY INFORMATION

Work connected with the repair, change or regeneration of hydraulic system components (shifting cylinders, tipping cylinders, 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 use the trailer if the hydraulic system is out of order.

5.4.2 CHECKING HYDRAULIC SYSTEM TIGHTNESS

Required maintenance activities:

- ➡ Hitch trailer to tractor.
- ➡ Connect all hydraulic system and pneumatic system conduits according to the maintenance instructions.
- ➡ Clean connectors and cylinders.
- ➡ Open and close the tailgate several times.
- ➡ Shift the sliding wall maximally to the rear and tip it – repeat the actions several times.
- ➡ Perform test drive while observing the operation of the hydraulic steering system.
    - ⇨ The help of a second person is required.
- ➡ Open and close the side hinged wall several times.
    - ⇨ If the trailer is equipped with the side hinged wall.

➡ Check cylinders and hydraulic conduits for tightness.

In oil is found on hydraulic cylinder bodies 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.

Checking tightness:

- **After the first week of use,**
- **every 12 months of use.**

5.4.3 CHECKING TECHNICAL CONDITION OF HYDRAULIC CONNECTIONS AND SOCKETS.

Hydraulic connections must be technically reliable and kept in clean. Each time before connecting, check if sockets in tractor 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 connections 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 entrusted to 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.

TIP

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

The responsibilities of the user are limited to:

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

Required maintenance activities:

➡ Hitch 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.

Checking technical condition of electrical system:

- **each time while connecting the trailer.**

➡ Check completeness of all reflectors.

➡ Check correct mounting of the slow-moving vehicle warning sign.

➡ Before driving on to public road check that the tractor is equipped with a warning reflective triangle.

IMPORTANT!

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 reflective lights must be replaced.

5.5.2 CHANGING 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 5.2 List of bulbs

LAMP	LAMP TYPE	BULB / QUANTITY IN 1 LAMP	NUMBER OF LAMPS
Rear left lamp assembly	WE 549L	R10W / 1 unit P21W / 2 units	1
Rear right lamp assembly	WE 549P	R10W / 1 unit P21W / 2 units	1
Licence plate light	LT-120	C5W / 1 unit	2
Front parking light	LO-110PP	C5W / 1 unit	2

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, which should be lubricated with machine oil, should be wiped with dry cleaning cloth and then a small quantity of oil should be applied to surfaces (with 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 5.3 TRAILER LUBRICATION SCHEDULE

ITEM	LUBRICATION POINTS	NUMBER OF LUBRICATION POINTS	TYPE OF GREASE	FREQUENCY
1	Wheel bearings	4	A	24M
2	Drawbar eye	1	B	14D
3	Hinges of the hinged wall	6	A	1M
4	Drawbar pin	1	B	1M
5	Drawbar rocker arm sleeve	1	B	1M
6	Rocker arm pin of drawbar II	1	B	1M
7	Drawbar spring	1	B	6M
8	Mounting pin of hinged wall closing cylinder	2	A	3M
9	Pin of hinged wall closing arm	1	A	3M
10	Closing string pin	2	A	3M
11	Pin of press down arm	1	A	3M

ITEM	LUBRICATION POINTS	NUMBER OF LUBRICATION POINTS	TYPE OF GREASE	FREQUENCY
12	Pin of press down cylinder	1	A	3M
13	Bearings of tailgate rising cylinder	4	B	3M
14	Pins of conduit arm	2	A	6M
15	Lever and string of chute	2	C	1M
16	Chute slide gate guides	2	C	1M
17	Telescopic support	2	A	6M
18	Steering mechanism string	2	B	14D
19	Steering mechanism pin	1	A	3M
20	Bearing of steering mechanism cylinder	1	B	3M
21	Bearings of wall sliding cylinder	2	B	3M
22	Bearings of wall lifting cylinder	4	B	3M
23	Pins of sliding wall rollers	4	B	3M
24	Axle expander shaft sleeves	8	A	3M
25	Expander arm	4	A	3M
26	Pin fixing the steerign cylinder on axle	2	B	1M

ITEM	LUBRICATION POINTS	NUMBER OF LUBRICATION POINTS	TYPE OF GREASE	FREQUENCY
27	Connection pin	2	A	3M
28	Leaf spring sliding surface	4	B	6M
29	Leaf spring shock absorber	4	B	6M
30	Stub axle pin	4	B	3M

Lubrication periods – M months, D – days

Recommended lubricants:

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

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.

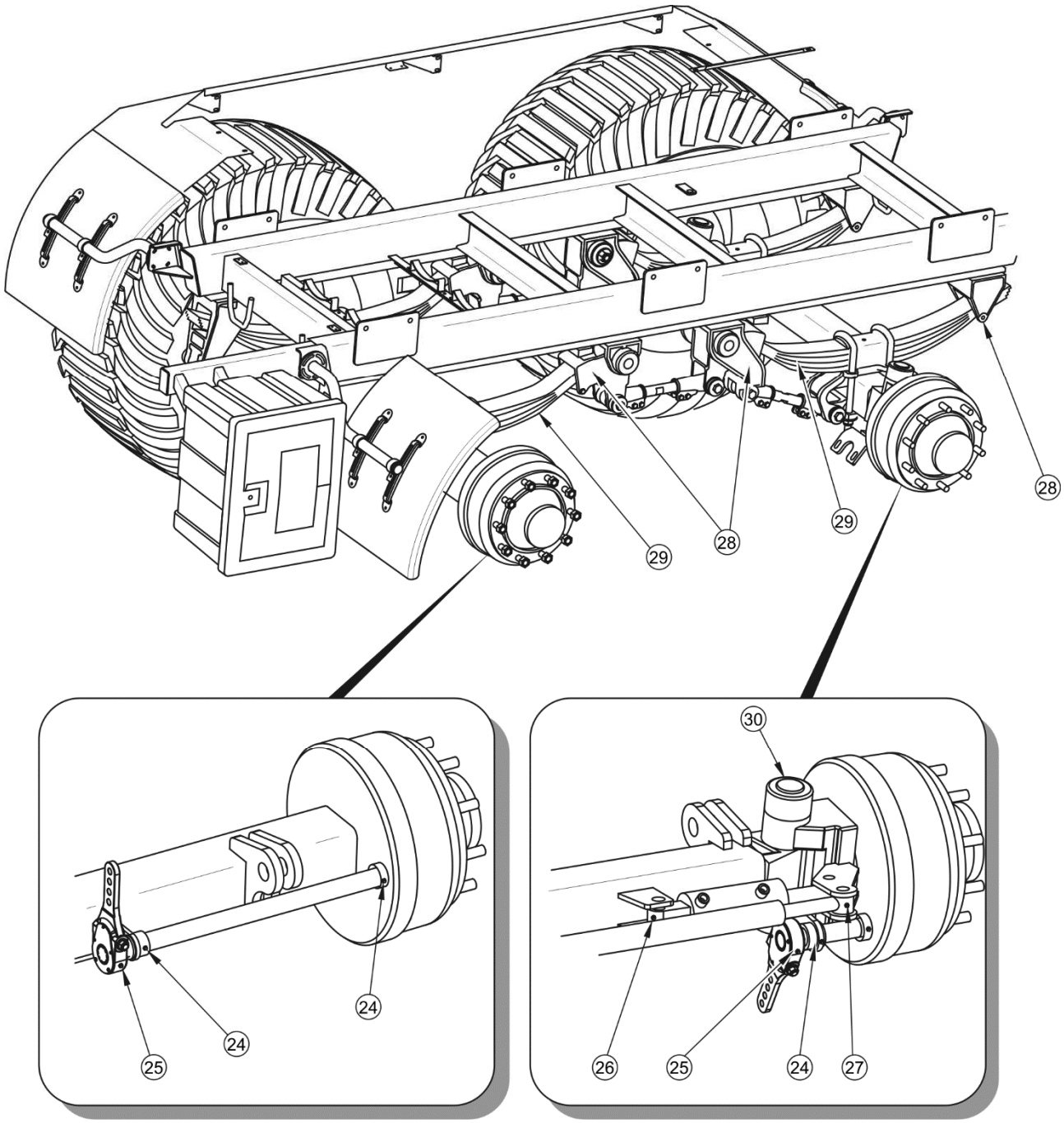


FIGURE 5.8 Lubrication points - chassis

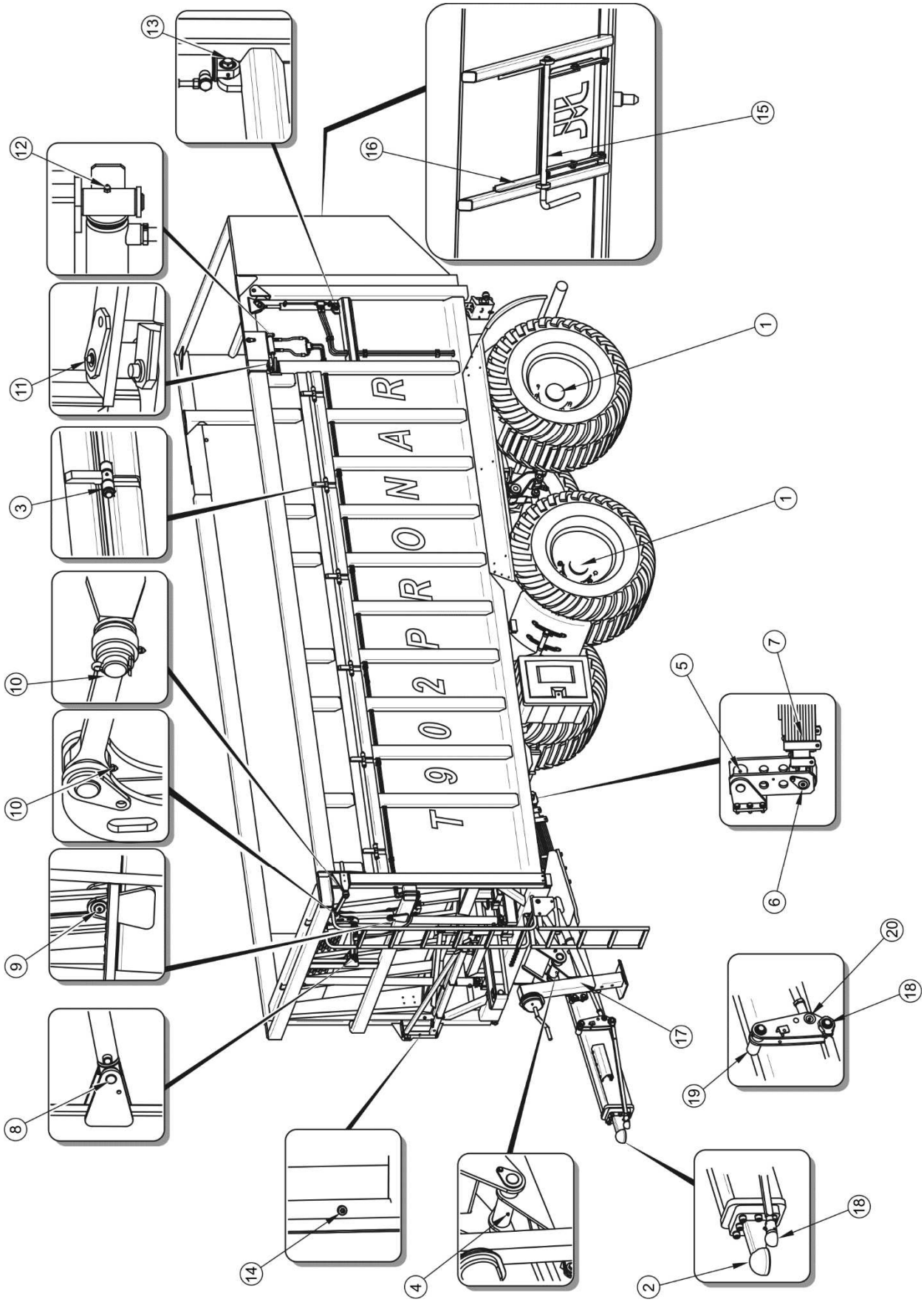


FIGURE 5.9 Trailer's lubrication points

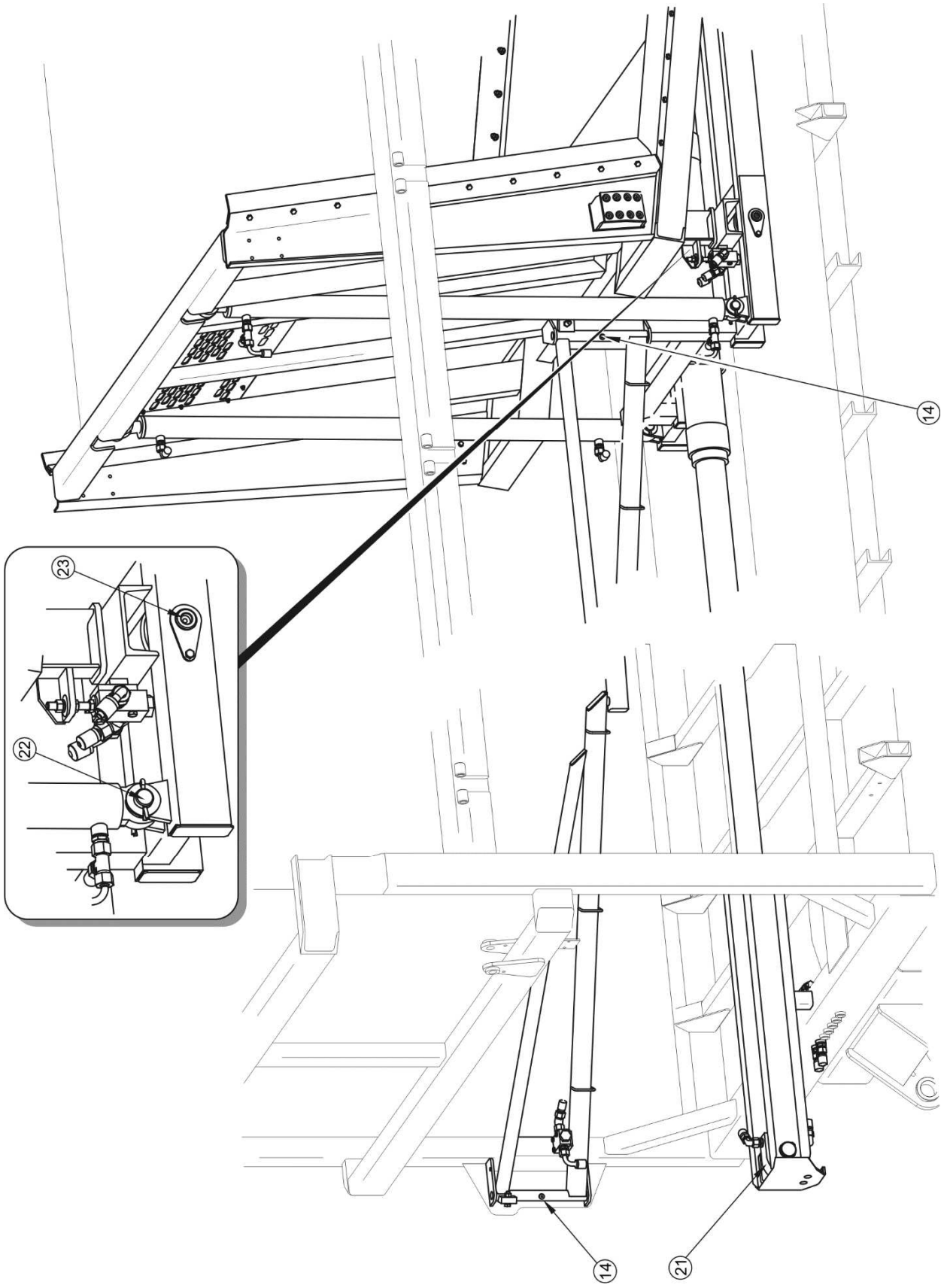


FIGURE 5.10 Lubrication points – sliding wall

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 5.4 L-HL 32 Lotos hydraulic oil characteristics

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

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

Because of its composition the oil applied is not classified as a dangerous substance, however long-term action on the skin or eyes may cause irritation. In the event of contact of oil with skin wash the place of contact with water and soap. Do NOT apply organic solvents (petrol, kerosene). Contaminated clothing should be changed to prevent access of oil to skin. In the event of contact of oil with eye, rinse with large quantity of water and in the event of the occurrence of irritation consult a doctor. Hydraulic oil in normal conditions is not harmful to the respiratory 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 extinguisher steam. Do not use water to quench oil fires.

5.7.2 LUBRICANTS

For parts under great load it is recommended to apply lithium grease with molybdenum disulphide (MOS_2) or graphite additive. In the case of less loaded sub-assemblies the application of general purpose machine greases is recommended, which contain anticorrosion additive and have significant resistance to being washed away by water. Aerosol preparations (silicon greases and anticorrosive-lubricating substances) should have similar characteristics.

Before starting to use greases acquaint oneself with the content off the information leaflet for the chosen product. Particularly relevant are safety rules and handling procedures for given lubricant product and waste utilisation (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 walls and extensions. Carefully clean load remains from the load box (sweep out or blow out with compressed air), especially where walls and extensions join.
- To clean trailer only use 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 shall 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.
- Washing detergent should be kept in original containers, optionally in replacement containers, but very clearly marked. Preparations may not be stored in food and drink containers.

DANGER

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

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

- Unsure 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 finishing washing wait until 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 trailer must take place at temperatures above 0°C.
- After washing and drying, trailer should be greased at all control points regardless of last lubrication period.

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 prolonged work stoppage, it is essential to lubricate all elements regardless of the period of the last lubrication process.
- 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 tyre pressure 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

Unless other tightening parameters are given, during maintenance repair work apply appropriate torque to tightening nut and bolt connections. Recommended tightening torque of most frequently applied nut and bolt connections are given in table below. Given values apply to non-lubricated steel bolts.

TABLE 5.5 Tightening torque for nut and bolt connections

THREAD METRIC	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) – resistance class according to DIN ISO 898 standard

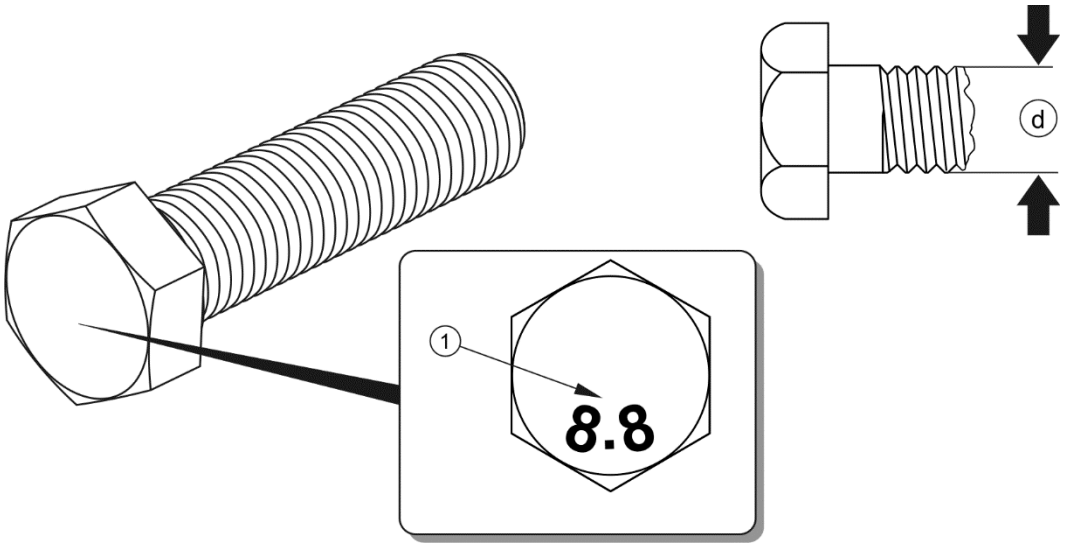


FIGURE 5.11 Bolt with metric thread

(1) resistance class, (d) thread diameter

TIP

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

5.11 SETTING AND ADJUSTING THE LIMIT VALVES

Pronar T900 trailer is equipped with two limit valves. Position of these valves in the front wall sliding system is shown in figure *(3.3)*.

The adjustment of limit valve (1) is performed by means of bolt (2) when the sliding wall is maximally extended. The valve lifter must be extended to 1.5-2 mm. After the adjustment, secure bolt (3) with counternut (4).

The adjustment of limit valve (2) is performed when the wall is maximally lowered. The valve lifter must be extended to 1.5-2 mm. After the adjustment, secure bolt (3) with counternut (4).

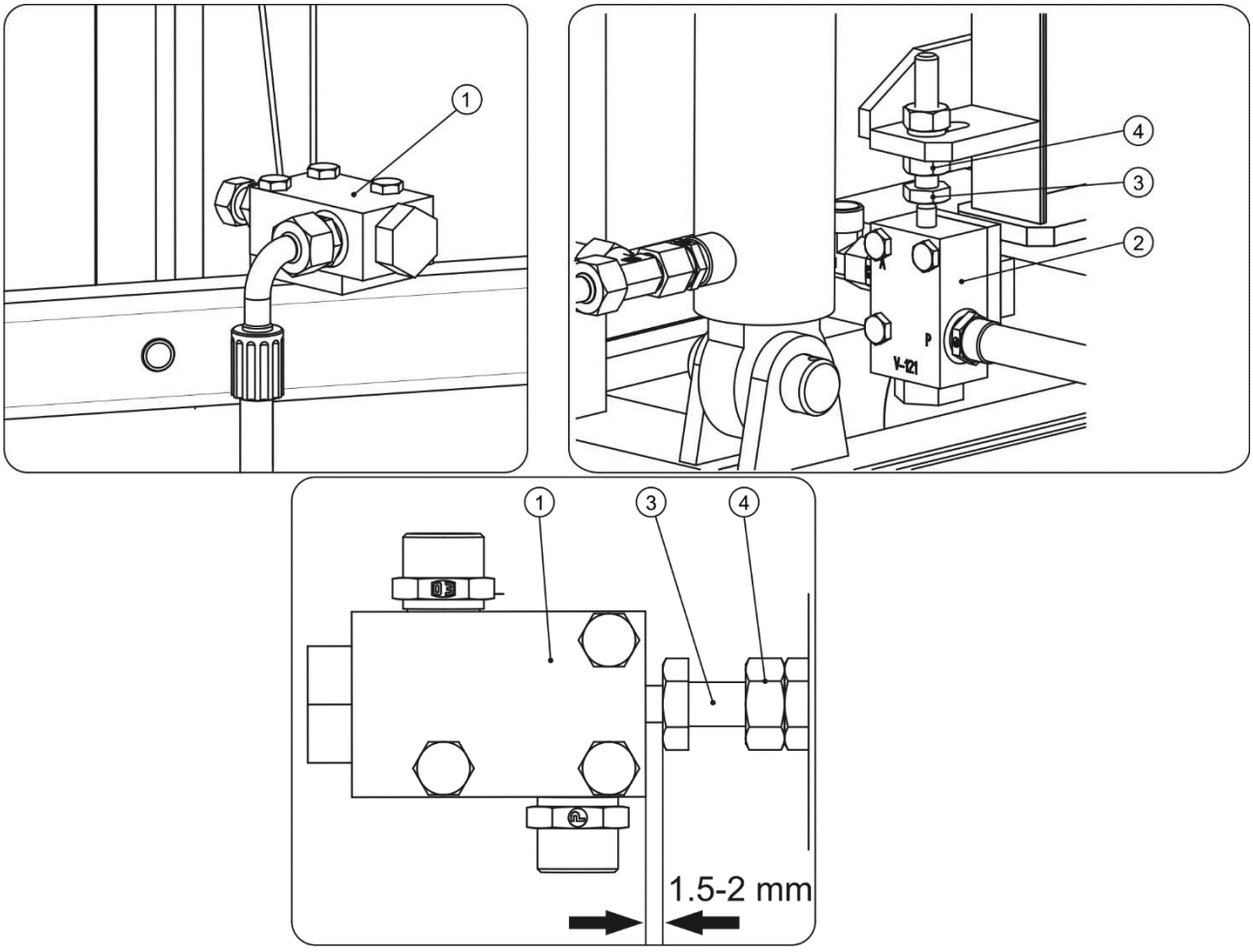


FIGURE 5.12 Setting of limit valves

(1) limit valve I, (2) limit valve II, (3) adjustment bolt (4) counter nut

5.12 ADJUSTMENT OF DRAWBAR POSITION

Drawbar position can be adjusted by changing the position of the rocker arm lug (5) with regard to drawbar fixing plate (3) to a proper height. To do this, proceed as follows:

Adjustment of drawbar height

- ➡ Immobilise trailer with parking brake.
- ➡ Prevent the trailer from rolling by placing chocks under the wheels.
- ➡ Support the front beam (2) of the trailer on both sides of the drawbar (in the places indicated by arrows) using supports of a proper height.

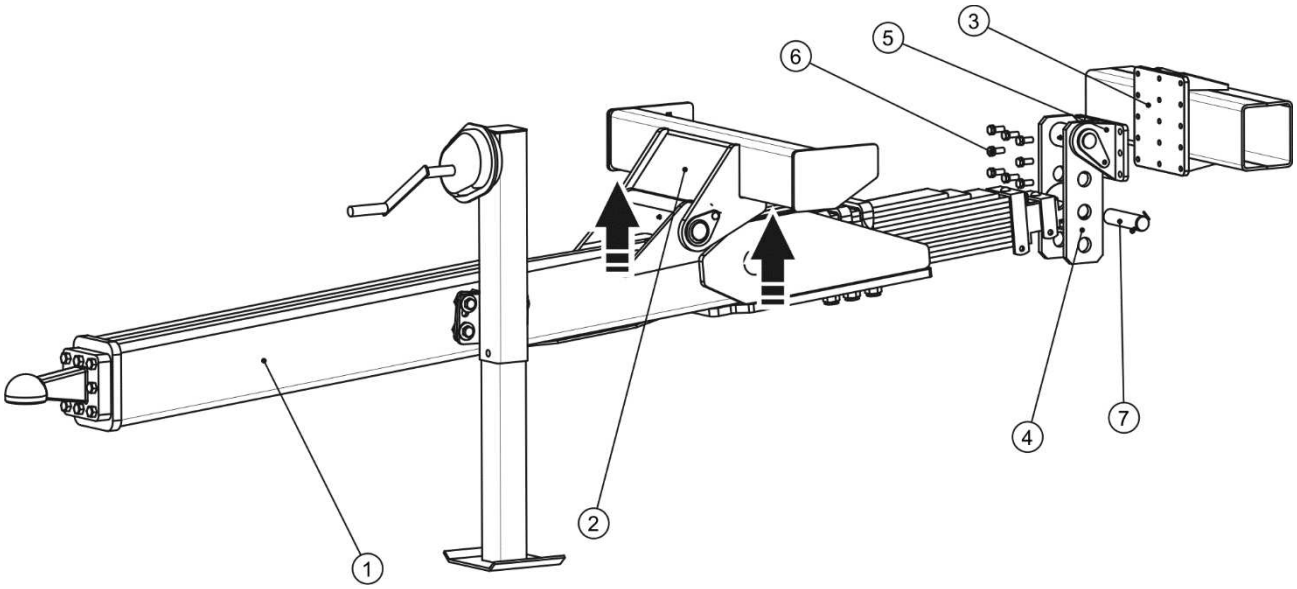


FIGURE 5.13 Drawbar components

(1) drawbar, (2) front beam, (3) drawbar mounting plate, (4) leaf spring rocker arm, (5) rocker arm lug, (6) securing bolts, (7) rocker arm pin

- ➡ Support the drawbar (1) with a jack.
- ➡ Dismantle rocker arm lug (5) by unscrewing bolts (6).
- ➡ Adjust the jack in order to set rocker arm lug (5) at a proper height (there are 3 possible positions).
- ➡ Screw down rocker arm lug (5) to plate (3) using bolts (6).
- ➡ Remove the supports from under the front beam (2).

- ➡ Lower the lifting jack.
- ➡ Check degree of drawbar tightening after first travel under load.

Drawbar position can be also adjusted by relocating the rocker arm pin (7) to one of the three openings in leaf spring rocker arm (4) in order to achieve various height settings. The mounting height and position of the drawbar should be individually matched to tractor hitch.

IMPORTANT!

Do NOT adjust the drawbar length when the trailer is loaded.

The adjusting activities should be performed by at least two persons.

DANGER

Exercise particular caution during the adjustment to avoid the risk of crushing of limbs.

5.12.1 WHEEL STEERING SYSTEM

During the first hitching of the trailer to the tractor, check correctness of operation of the wheel steering system - figure *(5.13)*.

If system operation is found to be incorrect, follow these steps:

- ➡ Connect drawbar hitching eye (1) with Ø80 ball hitch in the tractor.
- ➡ Connect the wheel steering system string (2) with Ø50 hitch ball attachment.
- ➡ Secure both hitches.
- ➡ Open two valves (7) located near the hand pump (6) by shifting the lever to position (A)
- ➡ Drive the tractor with the trailer attached at such a distance as to position the trailer wheels for forward driving.
- ➡ Fill the hydraulic system of the wheel steering system by means of pump (6) using lever (9) for this purpose.
- ➡ Stop filling the system when pressure gauges (8) indicate pressure of 80 bar.

➡ Close valves (7) by shifting the lever to position (B) and set pump lever (9) aside.

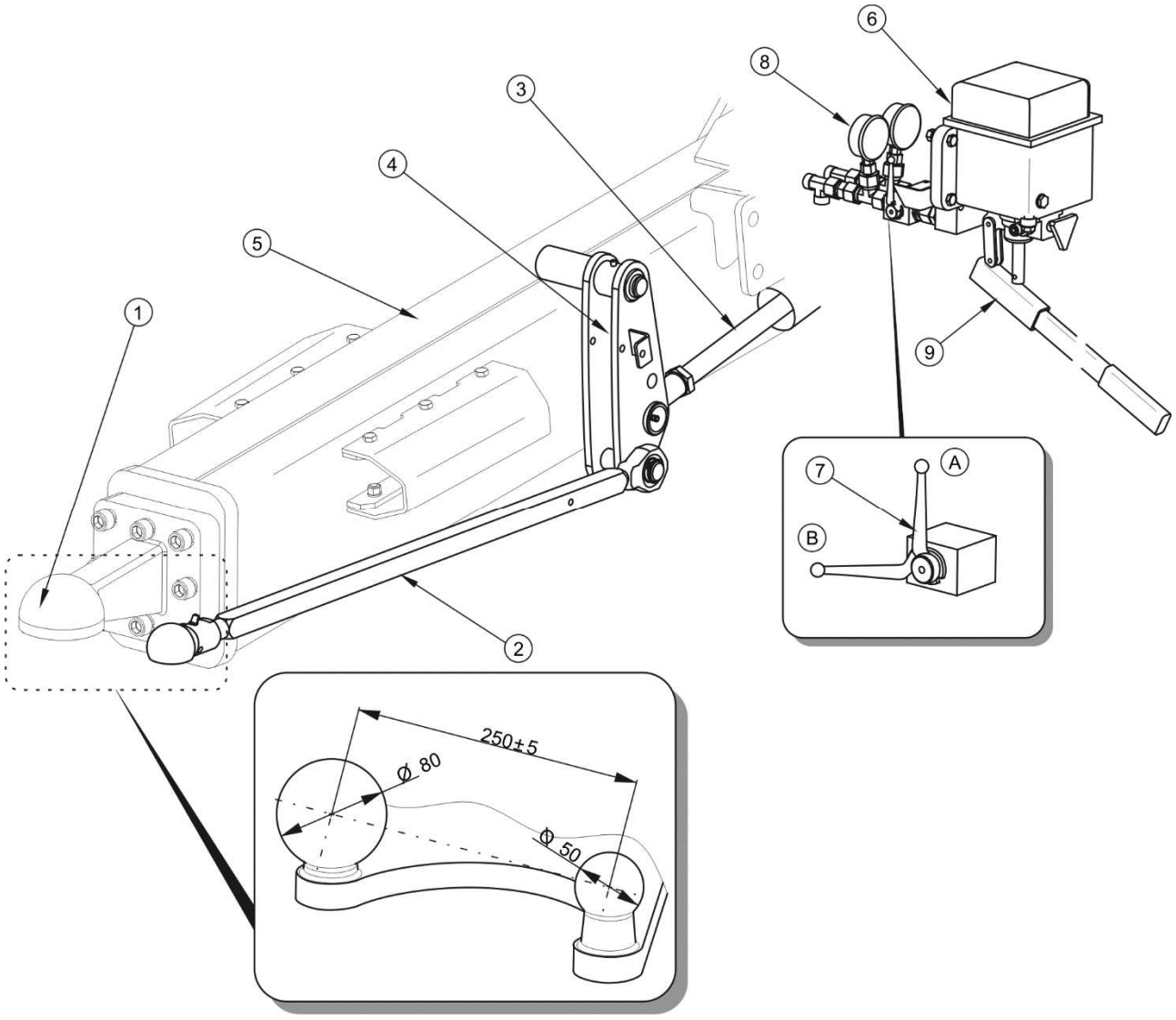


FIGURE 5.14 Wheel steering system components

(1) drawbar hitching eye, (2) string, (3) cylinder, (4) mechanism lever, (5) drawbar, (6) hydraulic pump, (7) valve, (8) pressure gauge, (9) pump lever, (A) closed position, (B) opened position

In order to ensure proper operation of the hydraulic steering system and safe use of Pronar T902 trailer, suitable and certified tractor hitches with dimensions shown in figure *(5.14)* according to ISO 26402:2008 should be used.

5.13 TROUBLESHOOTING

TABLE 5.6 Troubleshooting

FAULT	CAUSE	REMEDY
Problem with moving off	Brake system pneumatic conduit not connected	Connect brake conduits.
	Damaged pneumatic system connection conduits	Replace conduits with new ones.
	Leaking connections	Tighten, replace washers or seal set.
	Parking brake applied	Release parking brake.
	Damaged control valve or relay valve	Check the valves. Repair or replace any damaged components
	Insufficient pressure in breaking system	Check pressure on tractor pressure gauge, wait till compressor fills tank to required pressure. Damaged air compressor in tractor Repair or replace. Damaged pressure regulator in tractor. Repair or replace. Leaking system conduits or connections.
Noise in axle hubs	Excessive bearing slackness	Check slackness and adjust if needed
	Damaged bearing	Change bearing together with sealing ring.
Excessive heating of axle hubs	Incorrectly adjusted main brake	Regulate setting of expander arms
	Worn brake linings	Change brake shoes
The front wall can not be shifted or raised	Incorrectly connected hydraulic system conduits	Check and possibly correct.

FAULT	CAUSE	REMEDY
	Damaged quick couplers of hydraulic system lines	Replace quick couplers.
	Damaged or non-adjusted limit valve of hydraulic system	Check, adjust or possibly replace.
	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, tractor hydraulic pump is damaged	Check tractor hydraulic pump.
	Damaged or contaminated cylinder	Check cylinder rod (bending, corrosion), check cylinder for tightness (cylinder rod seal), if necessary, repair or replace the cylinder.
	Excessive cylinder loading	Reduce load weight. Comply with recommendations of the Operator's Manual
Jerking, uneven trailer braking.	Incorrectly adjusted brakes	Adjust brakes.
	Worn brake linings	Replace brake linings with new ones.

NOTES

ANNEX A

Tire sizes

TRAILER VERSION	FRONT/REAR AXLE
T902	550/60 – 22.5 171 A8 (1) 600/55 – 22.5 16P R (2) 700/50 – 26.5 174 A8 (3)

(1) - disc wheel 16x22.5” ET=0

(2) - disc wheel 16x22.5” ET=-20

(3) - disc wheel 24x26.5 ET=-50