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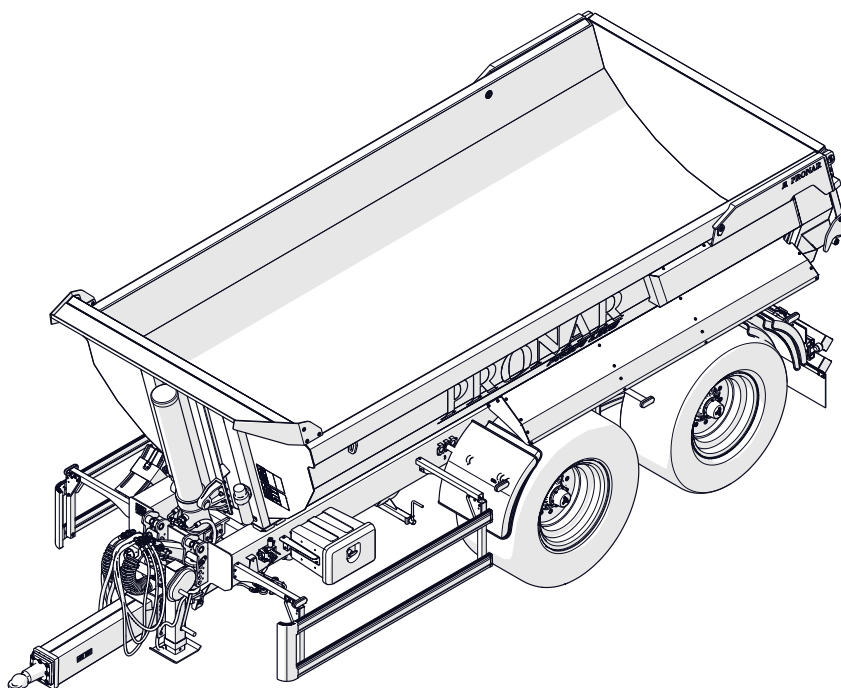
[www.pronar.pl](http://www.pronar.pl)

# **OPERATOR'S MANUAL**

## **AGRICULTURAL TRAILER**

### **PRONAR T701HP**

TRANSLATION OF THE ORIGINAL COPY OF THE MANUAL



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EN







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# INTRODUCTION



## INTRODUCTION

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

This Operator's Manual is an integral part of the machine's documentation. Before using the machine, the user must carefully

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

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

It is recommended that the serial number of the machine is inscribed in the spaces below after purchase of the machine.

Machine serial number

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## SYMBOLS APPEARING IN THIS OPERATOR'S MANUAL

### **DANGER**

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



**DANGER**

### **ATTENTION**

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



**ATTENTION**

### **TIP**

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



**TIP**



## DIRECTIONS USED IN THIS OPERATOR'S MANUAL

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

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

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

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

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## CHECKING THE TRAILER AFTER DELIVERY

The manufacturer guarantees that the trailer is fully operational and has been checked according to quality control procedures and is ready for use. This does not release the user from an obligation to check the trailer's condition after delivery and before the first use. The trailer is delivered to the user completely assembled. After delivery of the machine to the buyer, the user is obliged to check technical condition of the trailer. While buying the machine, the user must be informed by the seller about the method of use of the machine, risks resulting from the use for purposes other than intended, the method of the machine hitching and the principles of the machine construction and design. Detailed information concerning the machine hand-over are included in the WARRANTY BOOK.

### SCOPE OF ACTIVITIES

- Check completeness of the machine according to order (standard and optional equipment).
- Check technical condition of shields and protection devices.
- Check condition of paint coating; check the machine for traces of corrosion.
- Inspect the trailer's individual



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

components for mechanical damage resulting from, among others, incorrect transport (dents, piercing, bent or broken components).

- Check technical condition of tyres and tyre pressure.
- Check if the nuts and bolts fixing the wheels are properly tightened.
- Check technical condition of drawbar eye and if correctly installed.
- Check technical condition of pneumatic conduits.
- Check technical condition of elastic hydraulic conduits.
- Check that there are no hydraulic oil leaks.
- Check tipping cylinder, tailgate cylinders and support cylinder for hydraulic oil leaks.
- Check electrical system and lighting system of the trailer.

If non-conformities are found, do not hitch and start using the trailer. Discovered



defects should be notified directly to the seller in order to remove them.

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## FIRST USE OF THE TRAILER



### ATTENTION

During the first use, the trailer is checked in the presence of the Seller.

The Seller is obliged to conduct the training in safe and correct operation of the trailer.

The user trained by the seller is not released from the obligation to carefully read this Operator's Manual and adhere to the recommendations contained in it.

### SCOPE OF ACTIVITIES

- The user must read this OPERATOR'S MANUAL and observe all the recommendations contained in it.
- Adjust the height of the drawbar eye to the tractor hitch
- Check all the trailer's lubrication points, lubricate the machine as needed according to recommendations provided in SECTION 5.17.
- Check if the nuts and bolts fixing the wheels are properly tightened.
- Visually inspect the trailer before driving off according to the guidelines presented in SECTION 5.8.
- Drain the air tank in the braking system (SECTION 5.5).
- Ensure that pneumatic, hydraulic and electrical connections in agricultural tractor are according to the requirements, if not the trailer should not be

hitched to the tractor.

If all the above checks have been performed and there is no doubt as to the trailer's good technical condition, it can be connected to tractor. Start the tractor, check all systems and conduct test run of trailer without load (no load in load box).



### TIP

Operating activities: hitching to/unhitching from tractor, adjustment of draw bar position, tipping of load box etc. are described in detail in further parts of the Operator's Manual in SECTION 4.

It is recommended that the inspection is conducted by two people, one of which should always remain in the tractor cab. Test start should be conducted according to the sequence shown below.

- Connect the trailer to appropriate hitch on agricultural tractor.
- Connect conduits of braking, electrical and hydraulic systems.
- Switch on individual lights, check correct operation of electrical system.
- Conduct test tipping of load box.
- Actuate and check if tailgate control system operates correctly.
- When moving off check if the main brakes operate correctly.
- Perform test drive.



If during test run worrying symptoms occur such as:

- noise and abnormal sounds originating from the abrasion of moving elements of the trailer structure,
- brake system leak,
- hydraulic oil leak,
- incorrect operation of hydraulic and/

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

After completion of test drive check tightness of wheel nuts.

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## EC DECLARATION OF CONFORMITY OF THE MACHINERY

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

Description and identification of the machinery	
Generic denomination and function:	<b>AGRICULTURAL TRAILER</b>
Type:	<b>T701HP</b>
Model:	-----
Serial number:	
Commercial name:	<b>AGRICULTURAL TRAILER PRONAR T701HP</b>

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

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

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

Narew, the 2018-06-26

Place and date

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Z-CIA DYREKTORA  
d/s technicznych  
członek zarządu

*Roman Szadliński*

Full name of the empowered person  
position, signature







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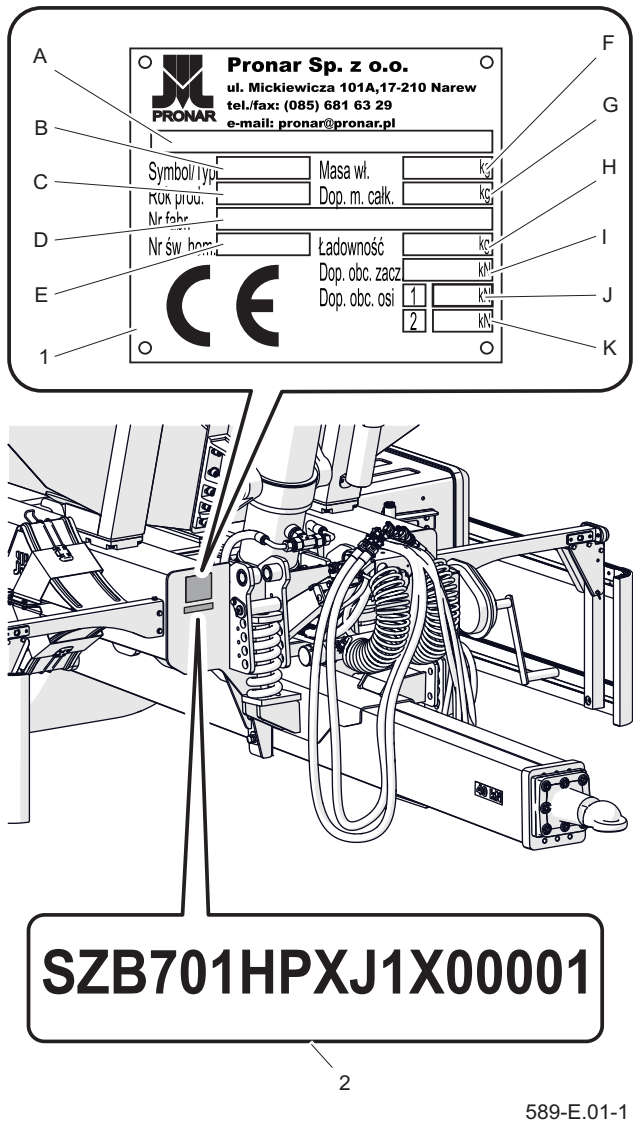
# SECTION 1

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## BASIC INFORMATION



1.1 TRAILER IDENTIFICATION



**Figure 1.1** Trailer marking  
(1) data plate (2) serial number

The trailer is marked with a data a plate (1) and a serial number (2) (FIGURE 1.1). Additional information on the trailer's

**Table 1.1** Markings on data plate

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

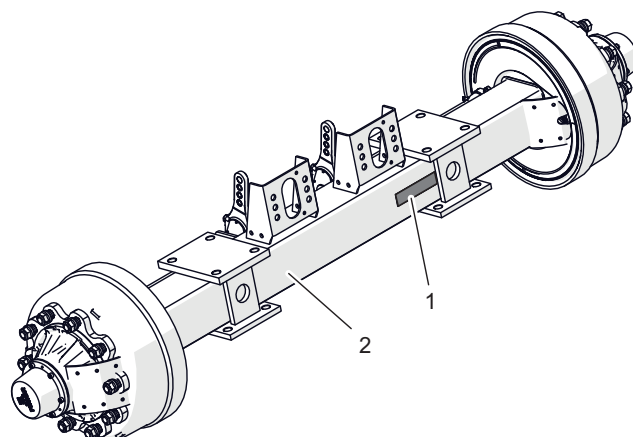
dimensions, weights and axle loads is given on the plate (1) (FIGURE 1.2). The serial number and data plate are located on the front beam of the lower frame (FIGURE 1.1). When buying the trailer, check that the serial numbers on the machine agree with the number written in the *Warranty Book*, in the sales documents and in the *Operator's Manual*.

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## 1.2 AXLE IDENTIFICATION

The factory number of the axle and its type are stamped onto the data plate (1) secured to the axle beam (2) (FIGURE 1.2). It is recommended that the serial number of the axle is inscribed in the space below after purchase of the machine.



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In order to contact the Service Department, the user must provide the trailer's serial number and, sometimes, the axle serial numbers. That is why, these numbers must be inscribed in the Operator's Manual and easily available.

**Figure 1.2** Location of the axle data plate  
(1) data plate (2) wheel axle

Axle 1 factory number

Axle 2 factory number

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## 1.3 PROPER USE

The trailer is designed for transporting and unloading heavy building materials such as: debris, stones, rubble, gravel, used during construction, earthworks, demolition, on the farm and on public roads. The maximum design speed of the trailer is 40 km/h.

The brake system and the light and indicator system meet the requirements of road traffic regulations.

During the use of the machine comply with all road traffic regulations and transport regulations in force in the given country, and any breach of these regulations is regarded by the Manufacturer as use contrary to its intended purpose.

Using it as intended 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 T701HP trailer, *the Warranty Book* of the trailer, the content of technical documentation, the terms of subcontractors' warranty and comply with the recommendations contained in these documents,
- understand the principles of the trailer operation and of its safe and proper use,



### ATTENTION

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

- transport people, animals, hazardous materials, chemically aggressive loads that will corrode the construction elements of the trailer (causing corrosion of steel, destruction of paint coat, dissolving plastic elements and destruction of rubber elements etc.),
- transport any materials other than those specified in the Operator's Manual
- transport incorrectly secured load, which during travel may contaminate the road and natural environment,
- transport incorrectly secured load, which during travel may change its position in the load box,
- transport a load which may destabilise the trailer due to incorrect location of its centre of gravity,
- transport loads which unevenly burden and/or overload axles and suspension components.

- perform the scheduled periodic technical inspections,
- comply with general safety regulations while working,
- prevent accidents,
- comply with the road traffic regulations and transport regulations in force in a given country, in which the trailer is used,
- carefully read the Operator's Manual



- and comply with its recommendations,
- only hitch the trailer to an agricultural tractor which meets all the

requirements specified by the Manufacturer (Table 1.2).

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**Table 1.2** Requirements for agricultural tractor

Contents	Unit	Requirements
<b>Brake system - sockets</b>		
Single conduit pneumatic system	—	according to A DIN 74 294
Double conduit pneumatic system	—	according to ISO 1728
Hydraulic system	—	according to ISO 7421-1
<b>Nominal pressure of the system</b>		
Single conduit pneumatic system	bar	5.8 – 6.5
Double conduit pneumatic system	bar	6.5
Hydraulic system	bar	150
<b>Hydraulic system</b>		
Hydraulic oil	—	L HL 32 Lotos <sup>(1)</sup>
Maximum system pressure	bar	200
Oil demand:	l	41
<b>Electrical system</b>		
Supply voltage	V	12
Connection socket	—	7-pole socket compliant with ISO 1724
<b>Hitching device</b>		
Type of hitch	—	upper or lower transport hitch
<b>Other requirements</b>		
Min. tractor power	hp/kW	125 / 92
Minimum vertical load capacity of hitch	kg	4,000

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



## 1.4 EQUIPMENT

**Table 1.3** Trailer's equipment.

Equipment	Standard	Additional	Optional
Operator's Manual	•		
Warranty Book	•		
Connection lead for the electrical system	•		
Wheel chocks	•		
Complete drawbar - spring shock absorbers	•		
Complete drawbar - hydraulic shock absorbers			•
Rear mudguards	•		
Front mudguards		•	
Toolbox		•	
Side shields		•	
Slow-moving vehicle warning sign		•	
Warning reflective triangle		•	
Document holder		•	
Double conduit pneumatic brake system	•		
Double conduit pneumatic brake system with ALB.			•
Single conduit pneumatic brake system			•
Hydraulic brake system			•
Ball drawbar eye K80.			•
Telescopic drawbar support with two-stage gear	•		
Hydraulic folding drawbar support			•

Some standard equipment components, which are 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 tyres is provided at the end of this manual, in CHAPTER 7.

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## 1.5 TERMS & CONDITIONS OF WARRANTY

PRONAR Sp. z o.o. Narew guarantees reliable operation of the machine provided that it is used as intended, as described in the *Operator's Manual*. The repair period is specified in the *Warranty Book*.

The warranty does not cover those parts



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.

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,
- seals,
- bearings,
- bulbs and LED lamps,
- brake shoes.

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

In the event of damage arising from:

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

the user will lose the right to warranty service.

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

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

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## 1.6 TRANSPORT

The machine is prepared for sale completely assembled and does not require packing. Packing is only required for the machine's technical documentation and some additional equipment components. 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).

### TRANSPORT ON VEHICLE

Loading and unloading of trailer from ve-



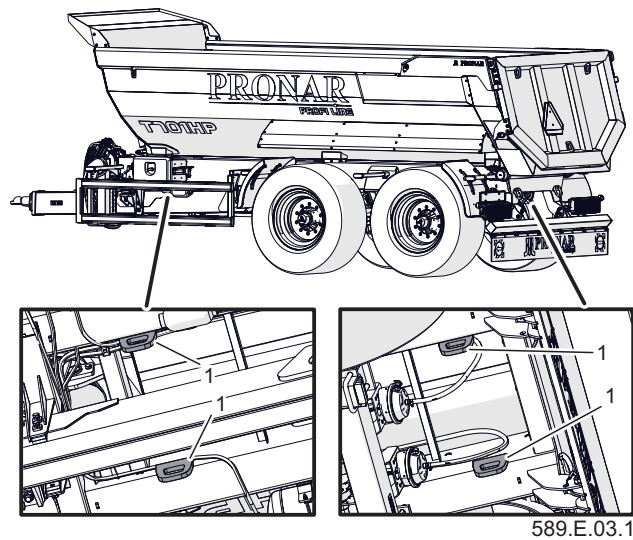
#### **DANGER**

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

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

Use only certified and technically reliable securing measures. Carefully read the manufacturer's instructions for the securing measures.

hicle shall be conducted using loading ramp with the aid of an agricultural tractor. During work, adhere to the general principles of occupational health and safety (OHS) applicable to reloading work. Persons operating reloading equipment must have the qualifications required to operate these machines. The trailer must



589.E.03.1

**Figure 1.3** Positioning of transport lugs  
(1) - transport lug

be properly hitched to the tractor according to the requirements specified in this Operator's Manual. The trailer braking system must be started and checked before driving off or onto ramp.

The trailer should be attached firmly to the platform of the transport vehicle using straps, chains, stays or other securing measures fitted with a tightening mechanism. Securing elements should be attached to the transport catches designed for this purpose (FIGURE 1.3).

Use only certified and technically reliable securing measures. Worn straps, cracked securing catches, bent or corroded hooks as well as elements damaged in a different way may be unsuitable for use. Carefully read the information in the Operator's



**DANGER**

Incorrect use of securing measures may cause an accident.

Manual for the given securing measure. Chocks or other objects without sharp edges should be placed under the wheels of the trailer to prevent it from rolling. Trailer wheel chocks must be secured to the load platform of the vehicle in a manner preventing their movement. The quantity of securing elements (cables, straps, chains, stays, etc.) and the force necessary for their tensioning depends on a number of things, including weight of the trailer, the design of the transport vehicle, speed of travel and other conditions. 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

**ATTENTION**

Do NOT secure lifting slings or any types of load securing elements to hydraulic and electrical system components and fragile elements of the machine (e.g. shields, conduits)

the securing straps from breaking during transport.

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

### **TRAILER TRANSPORTED BY THE USER**

If a purchased trailer is transported by the user, the user must read the *Operator's Manual* of the trailer and adhere to the recommendations contained therein. Transport of the trailer by the user involves towing the trailer with own agricultural tractor to destination. During transport adjust travel speed to the prevailing road conditions, but do not exceed the maximum design speed.

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## 1.7 ENVIRONMENTAL HAZARDS

A hydraulic oil leak constitutes a direct threat to the natural environment owing to its limited biodegradability. 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 contaminations, once gathered up, should be kept in a sealed, marked, hydrocarbon resistant container, and then passed on to the appropriate oil waste recycling centre. The container should be kept away from heat



### **DANGER**

Do not store oil waste in containers for food.  
Used oil should be stored in containers resistant to action of hydrocarbons.

sources, flammable materials and food.

Oil which has been used up or is unsuitable for further use owing to loss of its properties should be stored in its original packaging in the conditions described above. Waste code: 13 01 10 (hydraulic oil). Detailed information on hydraulic oils can be found in the Material Safety Data Sheets.



### **ATTENTION**

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

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## 1.8 WITHDRAWAL FROM USE

In the event of decision by the user to withdraw the machine from use, comply with the regulations in force in the given country concerning withdrawal from use and recycling of machines withdrawn from use.

Before proceeding to dismantle machine, oil shall be completely removed from hydraulic system.

When spare parts are changed, worn out or damaged parts should be taken to a collection point for recyclable raw materials.

Used oil and also rubber and plastic elements should be taken to the appropriate facilities dealing with the recycling of this type of waste.



### **DANGER**

During dismantling, use the appropriate tools and equipment (overhead travelling cranes, cranes or hoists, etc.) and use personal protective equipment, i.e. protective clothing, safety shoes, safety gloves and goggles, etc.

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# SECTION 2

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SAFETY ADVICE



## 2.1 BASIC SAFETY RULES

- The trailer must not be used for purposes other than those for which it is intended. Anyone who uses the trailer for purposes other than those for which it is intended takes full responsibility for any consequences of this potentially incorrect use. Use of the machine for purposes other than those for which it is intended by the Manufacturer may invalidate the guarantee.
- Before using the machine, the user must carefully read this Operator's Manual and the WARRANTY BOOK. When operating the machine, the operator must comply with all recommendations contained in the Operator's Manual.
- The trailer may only be used and operated by persons qualified to drive agricultural tractors and agricultural machines and trained in the use of the machine.
- The user is obliged to know the functions of all control elements of the machine. Do NOT start the machine without the knowledge of its functions.
- The user is obliged to know the construction, action and the principles of safe use of the machine.
- Before using the trailer always check whether it is properly prepared for work, especially in terms of safety.
- If the information contained in the Operator's Manual is difficult to understand, contact the seller who runs the authorised technical service on behalf of the Manufacturer, or contact the Manufacturer directly.
- Entering the trailer is only allowed when the machine is absolutely motionless. Stop the tractor, remove the key from the ignition and secure the tractor and trailer against rolling by placing chocks under the wheels. Immobilise tractor and trailer with parking brake. When entering the trailer load box, use platforms or ladders with proper height and load capacity.
- Careless and improper use and operation of the trailer and also non-observance of the recommendations contained in this Operator's Manual endanger health and life of third persons and/or machine operators.
- The trailer may only be used when all safety guards and other protective elements are technically sound and correctly mounted.



- Pronar Sp. z o.o. warns about the existence of residual risk, and for this reason the fundamental basis for using this trailer should be the application of safety rules. Follow the “Safety First” principle.
- The trailer must not be used by persons who are not authorised and not able to operate it, in particular children and persons under the influence of alcohol, drugs or other abusive substances, etc.
- Any modification to the trailer frees Pronar from any responsibility for damage or detriment to health which may arise as a result.

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## 2.2 SAFETY WHEN HITCHING THE MACHINE

- Be especially careful when hitching the machine.
- When hitching, there must be nobody between the trailer and the tractor.
- Do NOT hitch the trailer to agricultural tractor, if the tractor does not meet the minimum requirements specified by the Manufacturer
- Before hitching the trailer, make certain that oil in external hydraulic system of the tractor is allowed to be mixed with hydraulic oil in the trailer.
- Before hitching the trailer check that both machines are in good technical condition.
- Use the proper tractor's hitch for hitching the trailer. After completed hitching of the machines check that the hitch is properly secured. If necessary, read applicable sections in the tractor Operator's Manual.
- If the tractor is equipped with an automatic hitch, make certain that the hitching is completed.
- Do NOT proceed with unhitching the trailer from the tractor when load box is raised.
- Hitching and unhitching the trailer may only take place when the machine is immobilised with the parking brake.

F.3.2.589.02.1.EN



## 2.3 SAFETY RULES WHEN MAINTAINING HYDRAULIC SYSTEM AND PNEUMATIC SYSTEM

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



### ATTENTION

Do not store hydraulic oil in packaging designed for storing food or foodstuffs.

F.3.2.589.03.1.EN



## 2.4 SAFE MAINTENANCE PRINCIPLES

- During the warranty period, any repairs may only be carried out by the Warranty Service authorised by the Manufacturer. After the expiry of the warranty period it is recommended that possible repairs to the trailer be performed by specialised workshops.
- In the event of any fault or damage, do not use the trailer until the fault has been fixed.
- While performing maintenance work, use proper, close-fitting protective clothing, gloves, protective shoes, protective goggles and appropriate tools.
- Any modification to the trailer frees the trailer Manufacturer from any responsibility for damage or detriment to health which may arise as a result.
- The trailer or its load box can only be stood on when the trailer is absolutely motionless and the tractor engine is switched off. Tractor and trailer should be immobilized with parking brake and chocks should be placed under the trailer wheels. Ensure that unauthorised persons do not have access to the tractor cab.
- Regularly check the condition of nut and bolt connections, in particular connections of drawbar eye with drawbar and wheel nuts. The control of nut tightening is described in section *Maintenance*.
- Service inspections should be carried out according to the schedule in this Operator's Manual.
- Before beginning work that require the load box to be raised, the load box must be emptied and secured by supports to prevent it from accidental falling. At this time, the trailer must be hitched to the tractor and secured with chocks and parking brake.
- Before beginning repair work on hydraulic or pneumatic systems, reduce oil or air pressure completely.
- Servicing and repair work should be carried out in line with the general principles of workplace health and safety. In the event of injury, the wound must be immediately cleaned and disinfected. In the event of more serious injuries, seek a doctor's advice.
- Repair, maintenance and cleaning work should be carried out with the tractor engine turned off and the ignition key removed. Tractor and trailer must be immobilized with parking brake and chocks should be placed



under the trailer wheels. Close the tractor cab and ensure that unauthorised persons do not have access to the cab.

- During maintenance or repair work, the trailer may be unhitched from tractor, but it must be secured with chocks and parking brake. During this work the load box may not be raised.
- Should it be necessary to change individual parts, use only those parts indicated by the Manufacturer. Non-adherence to these requirements may put the user and other people's health and life at risk, and also damage the machine and invalidate the guarantee.
- Before welding or electrical work, the trailer should be disconnected from the power supply. The paint coating should be cleaned. Burning paint fumes are poisonous for people and animals. Welding work should be carried out in a well lit and well ventilated space.
- During welding work, pay attention to flammable or fusible elements (parts of the pneumatic, electric and hydraulic systems, plastic parts). If there is a risk that they will catch fire or be damaged, they should be removed or covered with non-flammable material

before commencing welding work. Before beginning work, prepare a CO<sub>2</sub> or foam extinguisher.

- In the event of work requiring the trailer to be raised, use properly certified hydraulic or mechanical lifts for this purpose. After lifting the machine, stable and durable supports must also be used. Work must not be carried out under a trailer, which has only been raised with a lift or jack.
- The lifting jack should have sufficient lifting capacity and should be technically reliable. The lifting jack must be positioned on a level and hard surface so as to prevent sinking into the ground or relocating the jack during lifting. If necessary, use proper backing plates in order to reduce unit pressure of the jack's base on the ground and prevent its sinking into the ground.
- The trailer must not be supported using fragile elements (bricks or concrete blocks).
- After completing work associated with lubrication, remove excess oil or grease. The trailer should be kept clean and tidy.
- The user must not repair by himself the components of the hydraulic or pneumatic system i.e. control valves,



cylinders and regulators. In the event of damage to these elements, repair should be entrusted to an authorised service point or elements should be replaced with new ones.

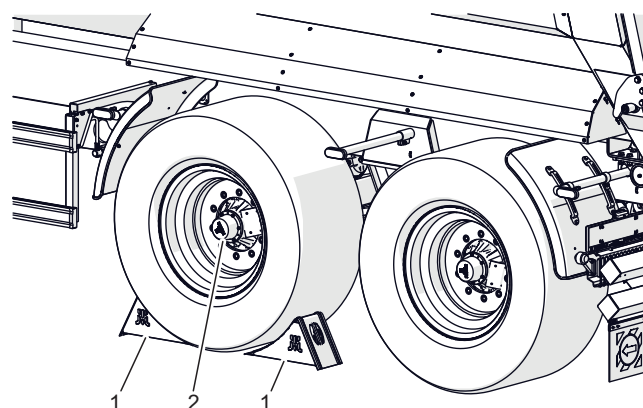
- Do NOT install additional appliances or fittings not according to the specifications defined by the Manufacturer.
- The trailer may only be towed when axles and wheels, lighting system and brakes are reliable.
- Do NOT make repairs to drawbar and drawbar eye (straightening, pad welding or welding). Damaged drawbar or drawbar eye must be replaced with a new one.

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## 2.5 SAFE DRIVING

- During travel on public roads, comply with the road traffic regulations and transport regulations in force in a given country, in which the trailer is used.
- Adjust travelling speed to prevailing road conditions, trailer load and road traffic regulations limits. Excessive speed may cause loss of control over the tractor-trailer combination and damage to the trailer and/or tractor and may limit braking efficiency of the tractor-trailer combination
- The machine must NOT be left unsecured. The trailer unhitched from the tractor must be secured against rolling away by means of parking brake and wheel chocks placed under the wheel. The wheel chocks should be placed under one axle, in front and behind the wheel (FIGURE 2.1).
- Before driving off make certain that the machine is correctly hitched to the tractor.
- Before using the trailer always check its technical condition, especially in terms of safety. In particular, check the technical condition of the hitch



**Figure 2.1** Method of placing chocks  
(1) chocks (2) axle wheel

589-F.01-1

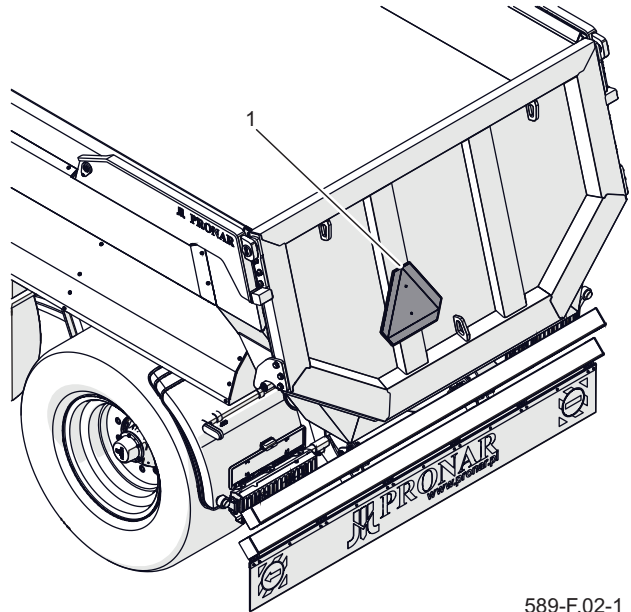
system, the axle system, the brake system, indicator lights and the connection elements of the hydraulic, pneumatic and electrical systems.

- Before driving off, check that the parking brake is released and the braking force regulator is positioned in the proper position.
- Prolonged driving across steep ground may lead to loss of braking efficiency.
- Reckless driving and excessive speed are the most frequent causes of accidents.
- A load protruding beyond the edge of the trailer should be marked according to the road traffic regulations. Do NOT transport loads forbidden by the Manufacturer.
- Load must be uniformly distributed and it must not obstruct visibility or



hinder driving. The load must be secured so that it cannot move or fall over.

- If possible avoid travelling on uneven terrain and unexpected turning.
- The trailer is designed to operate on slopes up to 8°. Driving trailer across ground with steeper slopes may cause the trailer to tip over as a result of loss of stability.
- Periodically drain water from the air tank in pneumatic system. During frosts, freezing water may cause damage to pneumatic system components.
- Do NOT attempt to board trailer while travelling.
- While driving on public roads the trailer and the tractor must be fitted with a certified or authorised reflective warning triangle.
- If the trailer is the last vehicle in the line of vehicles, a slow-moving vehicle warning sign should be placed on the trailer's rear load box wall. The warning sign (1) (FIGURE 2.2) should be attached using the special holder.
- Exceeding the carrying capacity may lead to damage to the machine, loss of stability while driving, scattering of the load and danger while driving.
- The brake system is adjusted to the gross weight of the trailer, exceeding the weight limit causes drastic reduction of basic braking effectiveness.
- During reversing (especially in limited



**Figure 2.2** 589-F.02-1  
Mounting place for the slow-moving vehicle warning sign

(1) warning sign

visibility conditions) one should use the assistance of another person. During manoeuvring the assistant must stay at a safe distance from the danger zone and be visible all the time to the tractor driver.

- Do not allow unauthorized people to approach the place where the trailer is operated.
- Take particular care while driving near overhead electrical power lines.
- Do not drive when the trailer's load box is raised.



- Before driving off make sure the tailgate is securely closed.
- Do NOT park the trailer on a slope.

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## 2.6 LOADING AND UNLOADING



### ATTENTION

The trailer is not intended for transporting people, animals or hazardous materials.

- Unloading the trailer is done only by tipping the load box to the rear.
- Unloading and loading of trailer may only take place when the machine is positioned on level and hard surface and connected to tractor. Tractor and trailer must be placed to drive forwards.
- Loading and unloading work should be carried out by persons experienced in this type of work.
- The load must be arranged in such a way that it does not threaten the stability of the trailer and does not hinder driving.
- Ensure that during unloading / loading or raising the load box nobody is near the trailer.
- Before tipping the load box ensure proper visibility and make certain that there are no bystanders near the trailer.
- Keep a safe distance from overhead electrical power lines when rising the load box.
- The arrangement of the load may not cause an overload on the axle of the trailer.
- Do NOT tip of the load box in windy conditions.
- When closing and opening the tailgate take particular care to avoid crushing fingers.
- Do NOT go or place hand between open tailgate and load box.
- Incorrect load distribution and overloading the machine may cause the trailer to tip over or cause damage to its components.
- If the load does not pour from the raised load box immediately cease unloading. The trailer may only be tipped again after removing the problem (sticking, wedging), which prevented the load from pouring.
- During winter, particular attention must be paid to loads which may freeze during transport. When tipping the load box with frozen load the trailer may become unstable and tip over.
- Do NOT raise the load box if there is any danger whatsoever that the box will tip over.
- Do NOT jerk the trailer forwards if load is bulky or reluctant to pour and



- does not unload.
- Do NOT climb on the load box during loading and unloading.
- After completed unloading, ensure that the load box is empty.

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## 2.7 TYRES

- When working with tyres, the trailer should be secured against rolling by placing chocks under the wheels. Wheels can be taken off the trailer axle only when the trailer is not loaded.
- Repair work on the wheels or tyres should be carried out by persons trained and entitled to do so. This work should be carried out using appropriate tools.
- Check if the wheel nuts are properly tightened, according to the specified frequency.
- Avoid potholes, sudden manoeuvres or high speeds when turning.
- Check the tyre pressure regularly. Air pressure in tyres should be also checked during the whole day of intensive work. Please note that higher tyre temperatures could raise air pressure in tyres. 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.

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## 2.8 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 machine with removed or faulty safety guards,
- not maintaining a safe distance from the danger zone or being within the zones while the machine is operating,
- operation of the trailer by unauthorised persons or persons under the influence of alcohol or other intoxicating substances,
- cleaning, maintenance and technical

checks of the trailer.

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

- operate the trailer in a prudent and unhurried manner,
- sensibly adhere to the remarks and recommendations contained in the OPERATOR'S MANUAL,
- carry out repairs and maintenance work in line with operating safety rules,
- repair and maintenance work should be carried out by persons trained to do so,
- use close fitting protective clothing,
- ensure unauthorised persons have no access to the machine, especially children.
- maintain a safe distance from prohibited or dangerous places
- do not climb on the machine when it is operating

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## 2.9 INFORMATION AND WARNING DECALS

The machine is labelled with the information and warning decals mentioned in Table 2.1. 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 machine are clear and legible. In the event of their destruction, they must be replaced with new ones. Information and warning decals

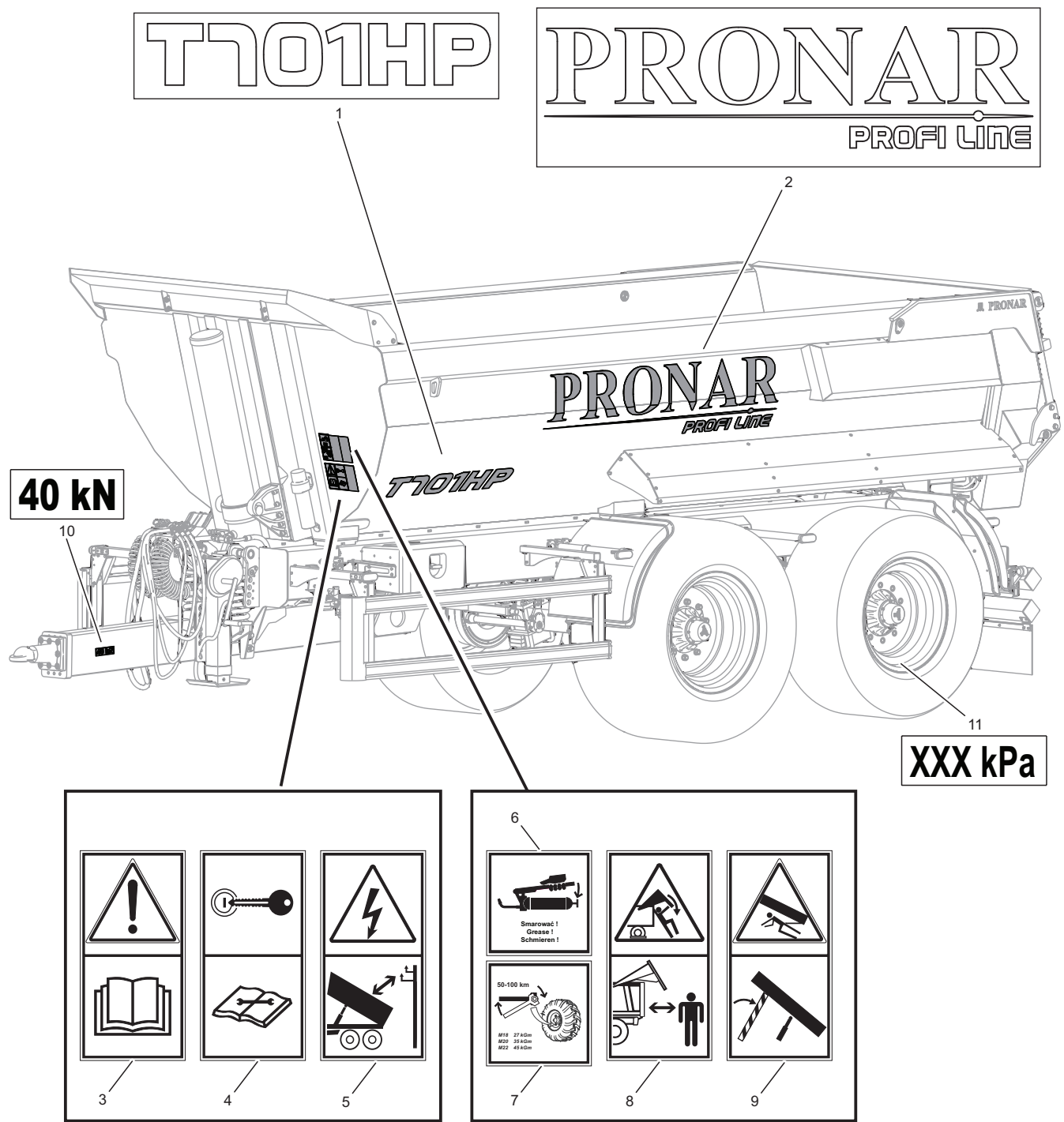
can be purchased from the Manufacturer of the machine or your PRONAR dealer. New assemblies, changed during repair, must be labelled once again with the appropriate safety signs. During machine cleaning do not use solvents which may damage the coating of information label stickers and do not subject them to strong water jets.

**Table 2.1** Information and warning decals

Item	Description	Part number
1	Machine type label ("T701HP"),	589N-00000001
2	"PRONAR profi line" label	589N-00000002
3	Caution! Before starting work, carefully read the Operator's Manual.	70RPN-00000004
4	Before repairs, maintenance activities or other servicing activities, turn off engine and remove key from ignition	70RPN-00000005
5	Caution! Danger of electric shock. Keep a safe distance from electric power lines during unloading.	58RPN-0000020
6	Regularly lubricate the trailer according to the lubrication schedule.	104N-00000004
7	Regularly check the tightening of wheel nuts and other bolt connections.	104N-00000006
8	Danger of crushing Maintain a safe distance when opening and closing the tailgate.	58RPN-0000013
9	Danger of crushing Do NOT perform any maintenance or repairs on the load box that is loaded, raised or not supported.	58RPN-0000012
10	Maximum drawbar load 40kN	544N-00000003
11	Air pressure in tyres*	

\* - Air pressure in tyres depends on tyres used





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**Figure 2.3** Locations of information and warning decals  
Numbering is according to Item column in Table 2.1

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# SECTION 3

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DESIGN AND OPERATION



## 3.1 TECHNICAL SPECIFICATION

**Table 3.1** Basic technical specification\*

Contents	Unit	T701HP
Dimensions		
Length	mm	7570
Width	mm	2550
Height	mm	2840
Load box dimensions		
Internal load box height	mm	1250
Internal load box length	mm	5300
Internal load box width (front/rear)	mm	2250/2300
Wall/floor thickness:	mm	6/6
Load box tipping angle (backwards)	°	55
Technical specification		
Carrying capacity	kg	16100*
Maximum gross weight	kg	22000*
Tare weight	kg	5900
Loading height	mm	2480
Cargo capacity	m <sup>3</sup>	12,5
Other information		
Maximum design speed:	km/h	40
Wheel track	mm	1960
Drawbar eye load	kg	4000
Tractor power demand	hp/kW	125/92
Telescopic cylinder		
Stroke	mm	4670
Oil demand:	L	41
Pressure	bar	200
Tipping System	-	one-sided, telescopic cylinder, front

\*- depending on the trailer version and legal limitations in a country of sale, the actual technical specification may differ from the above specification.



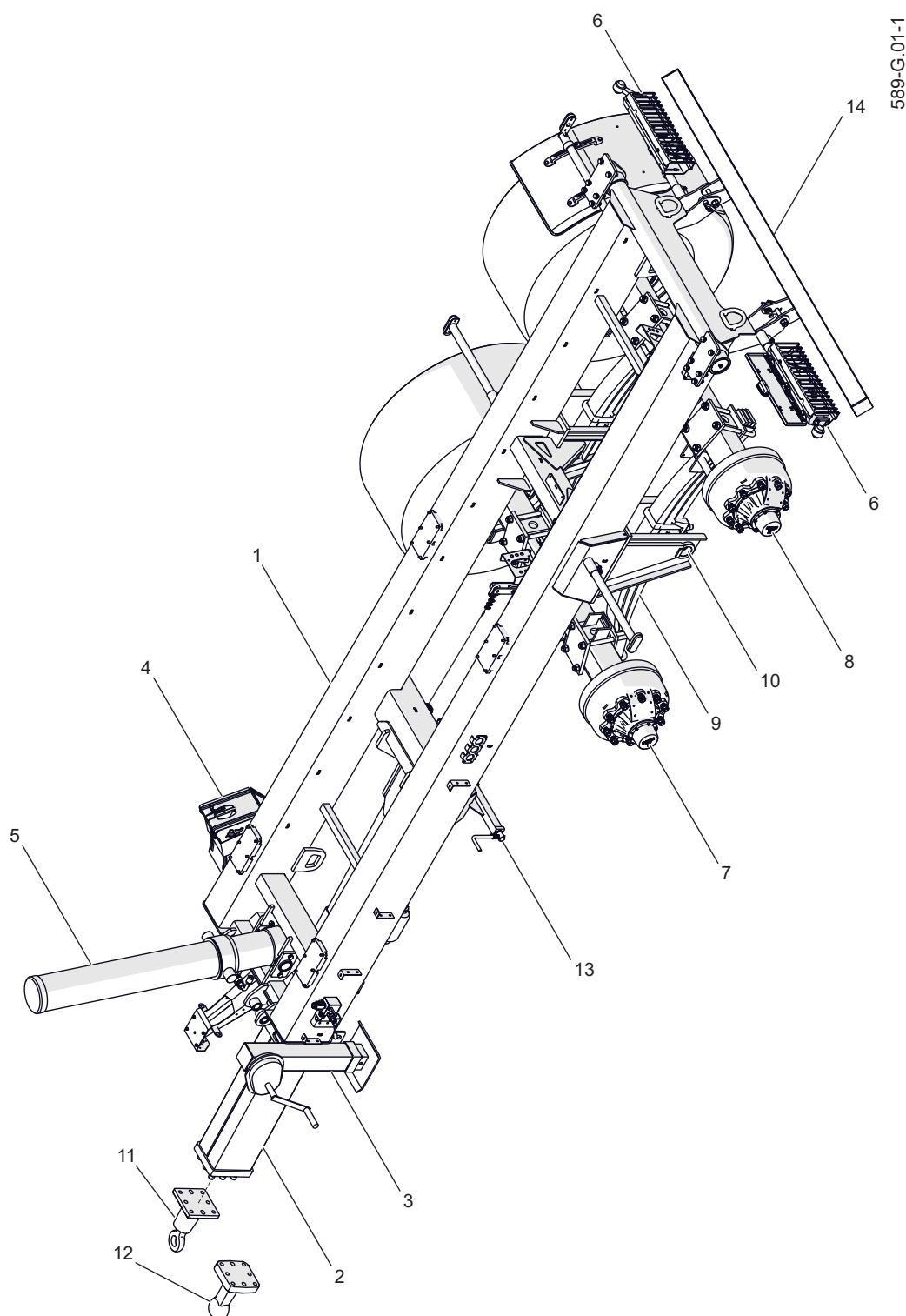
### TIP

Some technical parameters may vary depending on additional equipment of the trailer.

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## 3.2 CHASSIS



**Figure 3.1** Trailer chassis

- |                      |                                      |                                |
|----------------------|--------------------------------------|--------------------------------|
| (1) lower frame      | (6) lights support beam (left/right) | (11) (12) drawbar hitching eye |
| (2) drawbar          | (7) front axle                       | (13) parking brake mechanism   |
| (3) parking stand    | (8) rear axle                        | (14) rear fender               |
| (4) wheel chocks     | (9) leaf spring                      |                                |
| (5) tipping cylinder | (10) leaf spring rocker              |                                |



The chassis of T701HP trailer has a bogie suspension (FIGURE 3.1). Lower frame (1) is a structure welded from steel sections. The main support elements of the frame are two longitudinal members connected with crossbars. Parking brake crank mechanism (13) is located on the left longitudinal member.

At the front of the frame there is a socket used for mounting the load box tipping cylinder (5). At the rear of the frame there is a tipping axle serving as a swivel point when tipping the load box to the rear. Below there is a fender (14). Lights support beams (6) are mounted on both sides at the rear of the frame.

At the rear of the frame there is a bogie wheel combination.

Bogie leaf spring suspension consists of a leaf spring (9) installed in a rocker (10) with the use of a pin. Two wheel axles, front axle (7) and rear axle (8), are attached to

the leaf spring with fixing bolts and leaf spring plates.

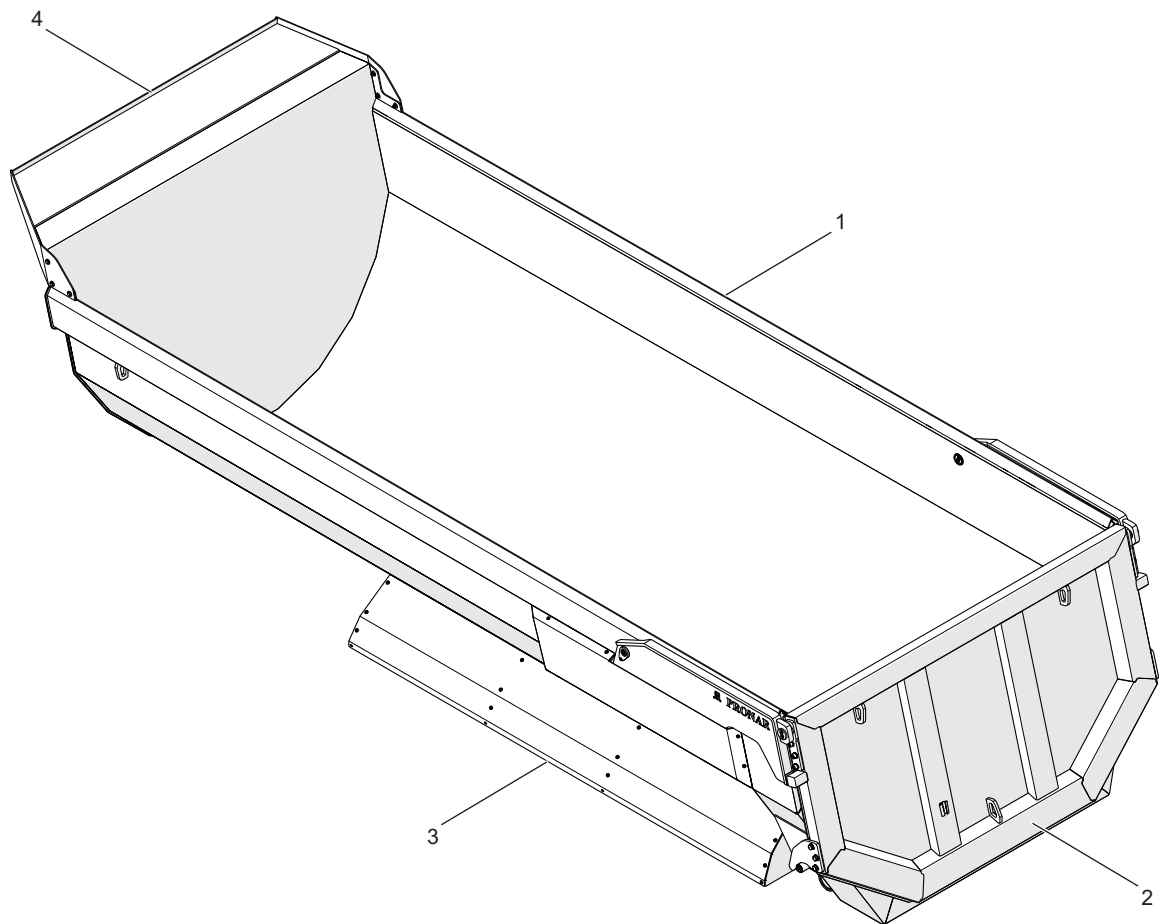
The axles are made from square bars terminated with a pin, where wheel hubs are mounted on cone bearings. The wheels are single and equipped with shoe brakes activated by mechanical cam expanders.

At the front of the chassis frame, there is a drawbar with shock absorber (2) to which a drawbar eye is mounted (to choose from: rotating drawbar eye  $\varnothing 50$  (11) or ball drawbar eye K80 (12)). The parking support with two-stage gear (3) is attached to the side of the drawbar. The support is used for supporting the trailer unhitched from the tractor. On customer request, the trailer can be equipped with a hydraulic folding support.

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### 3.3 LOAD BOX



103-G.02-1

**Figure 3.2** Load box

(1) load box (2) tailgate (3) metal mudguard (4) canopy

The trailer's load box (1) (FIGURE 3.2) is a monocoque half-pipe without longitudinal members. The load box is made of wear resistant steel plates. A canopy (4) is installed on the front wall of the load box. In the rear part of the load box there is tailgate (2) which is opened and closed using hydraulic cylinders.

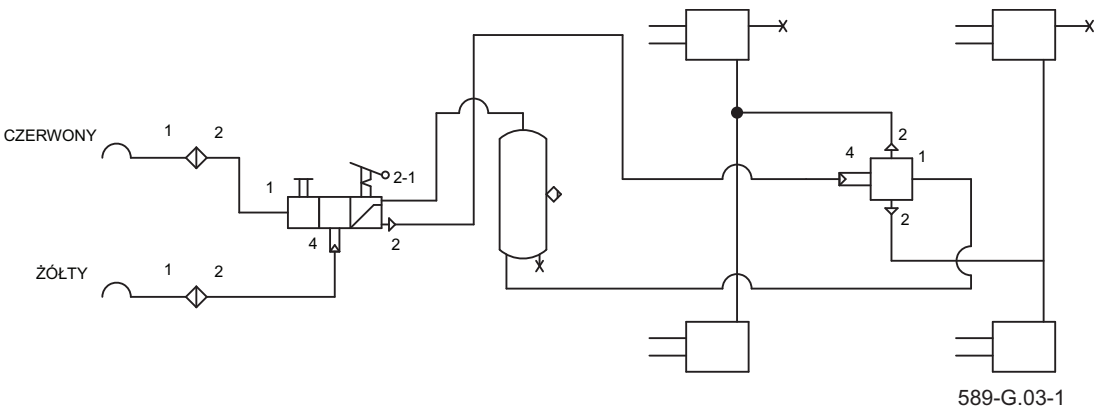
Metal mudguards (3) protecting wheels are installed on the load box sides.

The load box is mounted on the lower frame (1) (FIGURE 3.1). The axis of rotation of the load box tilted to the rear is formed by two hinges located at the back of the load box.

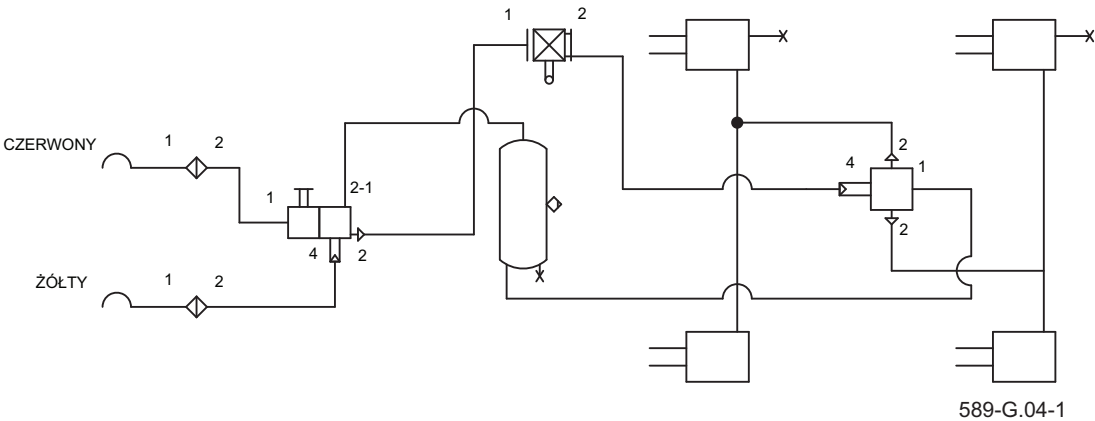
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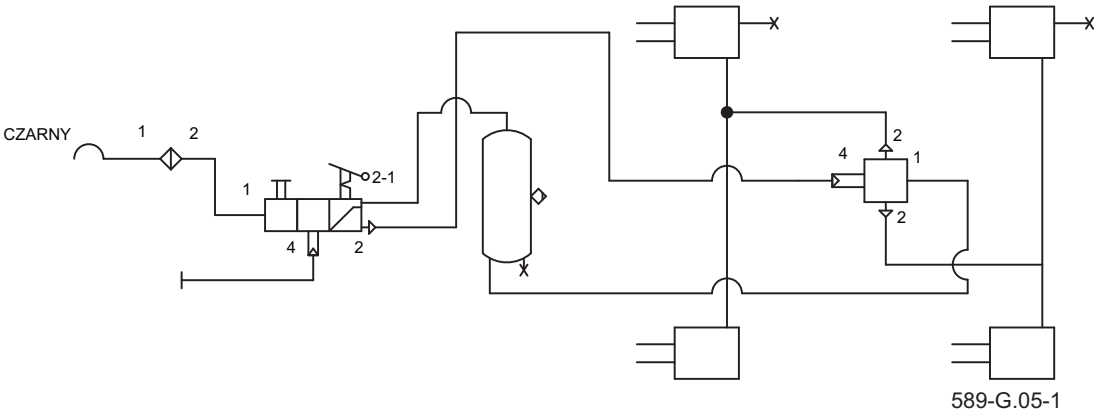
3.4 MAIN BRAKE



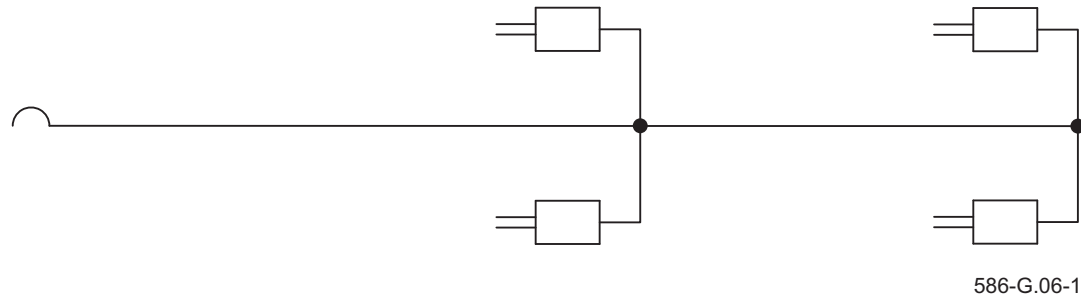
**Figure 3.3** Diagram of double conduit pneumatic brake system



**Figure 3.4** Diagram of double conduit pneumatic brake system with automatic braking force regulator ALB (option)






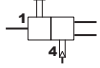




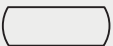



**Figure 3.5** Diagram of single conduit pneumatic brake system (option)



**Figure 3.6** Diagram of hydraulic brake system (option)



**Table 3.2** List of symbols used on the diagrams

Symbol	Description
	Pneumatic connection, plug
	Pneumatic connection, socket
	Drain valve
	Main control valve
	Relay valve
	Automatic regulator of braking force
	Manual regulator of braking force
	Conduit connection
	Air tank
	Brake cylinder
	Valve - control connection
	Air filter

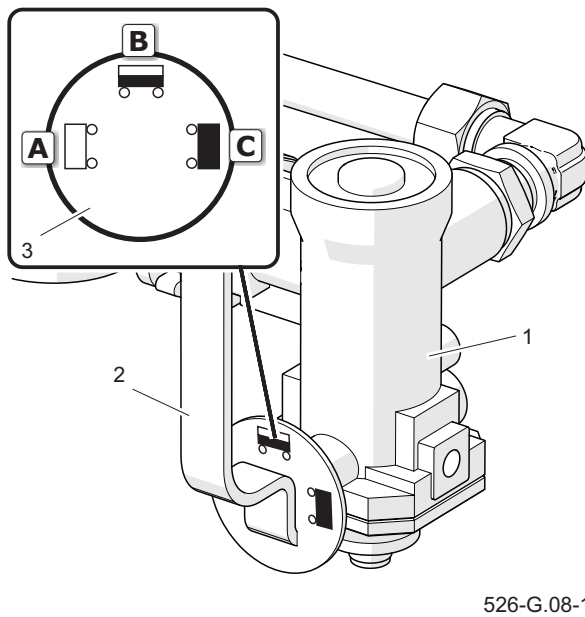
Depending on the version, the trailer is equipped with one of the four types of main brake:

- double conduit pneumatic brake system (FIGURE 3.3).
- double conduit pneumatic brake system with an automatic braking force regulator ALB (FIGURE 3.4),
- single conduit pneumatic brake system (FIGURE 3.5),

- hydraulic brake system (FIGURE 3.6).

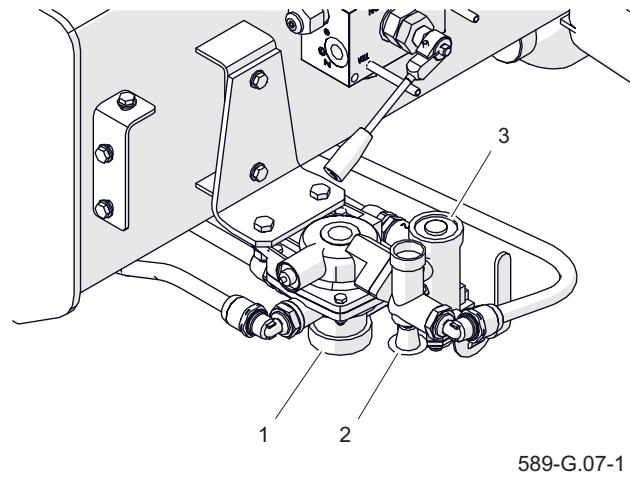
The main brake (pneumatic or hydraulic brake) is activated from the tractor driver's cab by depressing the brake pedal. The function of the control valve (1), (FIGURE 3.8), is to activate the trailer's brakes simultaneously with the tractor's brakes. Furthermore, in case of an inadvertent disconnection of the conduit between the





**Figure 3.7** Three-step braking force regulator  
 (1) regulator (2) lever  
 (3) disc (A) (B) (C) settings

trailer and the tractor, the control valve will automatically activate trailer's brakes - applies only to pneumatic systems. The valve used in the system is equipped with a button (2) causing the brake to be applied when the trailer is disconnected from the tractor. When compressed air conduit is connected to the tractor, the device automatically applying the brakes changes its position to allow normal brake



**Figure 3.8** Control valve  
 (1) control valve (2) brake release button  
 (3) braking force regulator

operation. Three-step braking force regulator (FIGURE 3.7), used in pneumatic systems, adjusts braking force depending on setting. Switching to a suitable working mode is done manually by the machine operator using the lever (2) prior to moving off. Three working positions are available:

- A - "No load"
- B - "Half Load"
- C - "Full load".



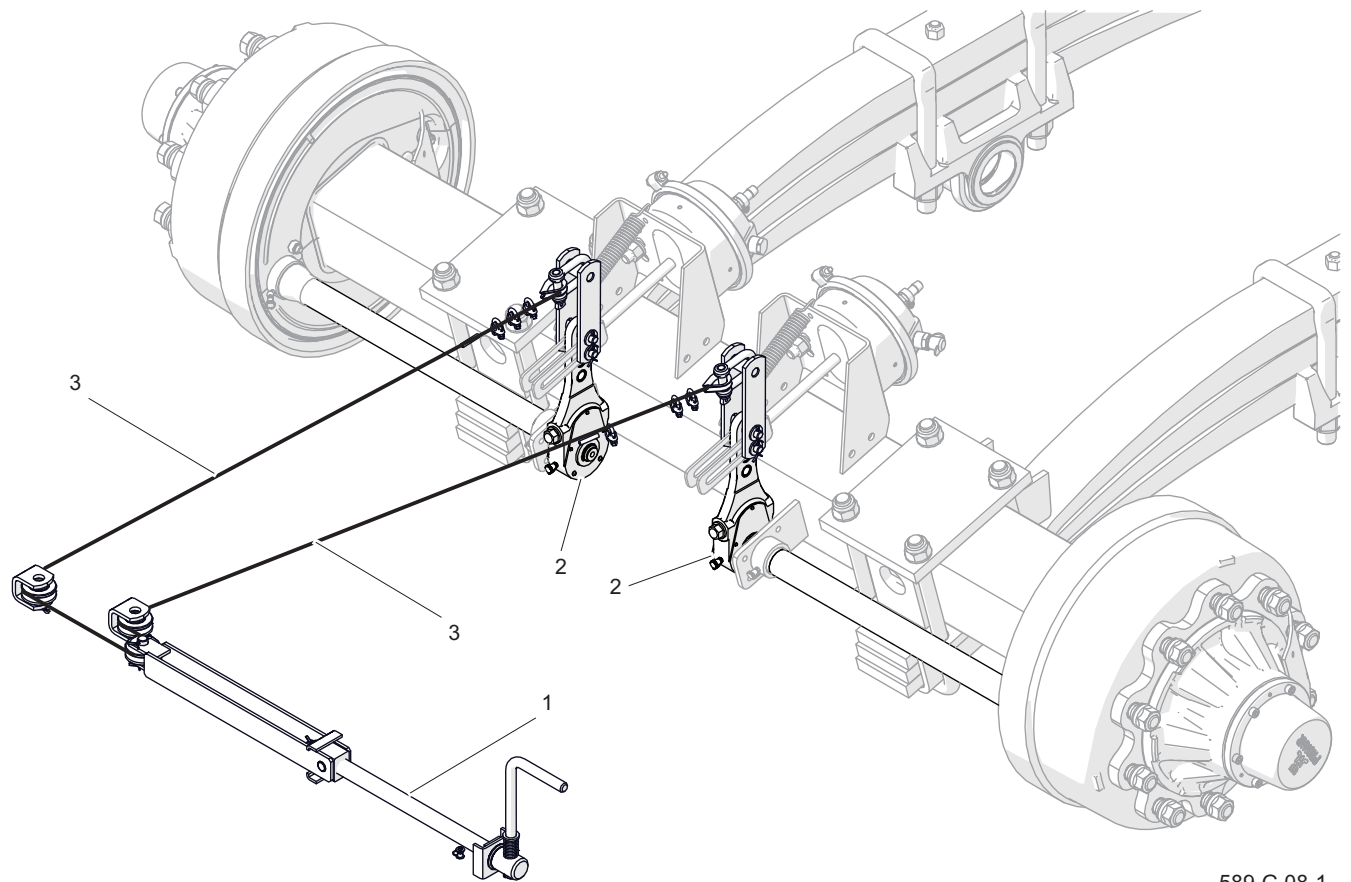
#### TIP

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

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### 3.5 PARKING BRAKE



**Figure 3.9** Parking brake design  
(1) brake mechanism, (2) expander lever, (3) brake cable

The parking brake (FIGURE 3.9) is used for immobilising the trailer while standing motionless. The brake crank mechanism (1), located at the front, on the left side of the frame, is connected with the axle expander levers (2) using a steel cable (3). Clockwise rotation of the mechanism crank (1) increases the tension of the steel cable. Consequently, the brake expanders

levers tilt and expand the brake shoes immobilising the trailer. Prior to moving off, handbrake must be released - steel cable must hang loose.



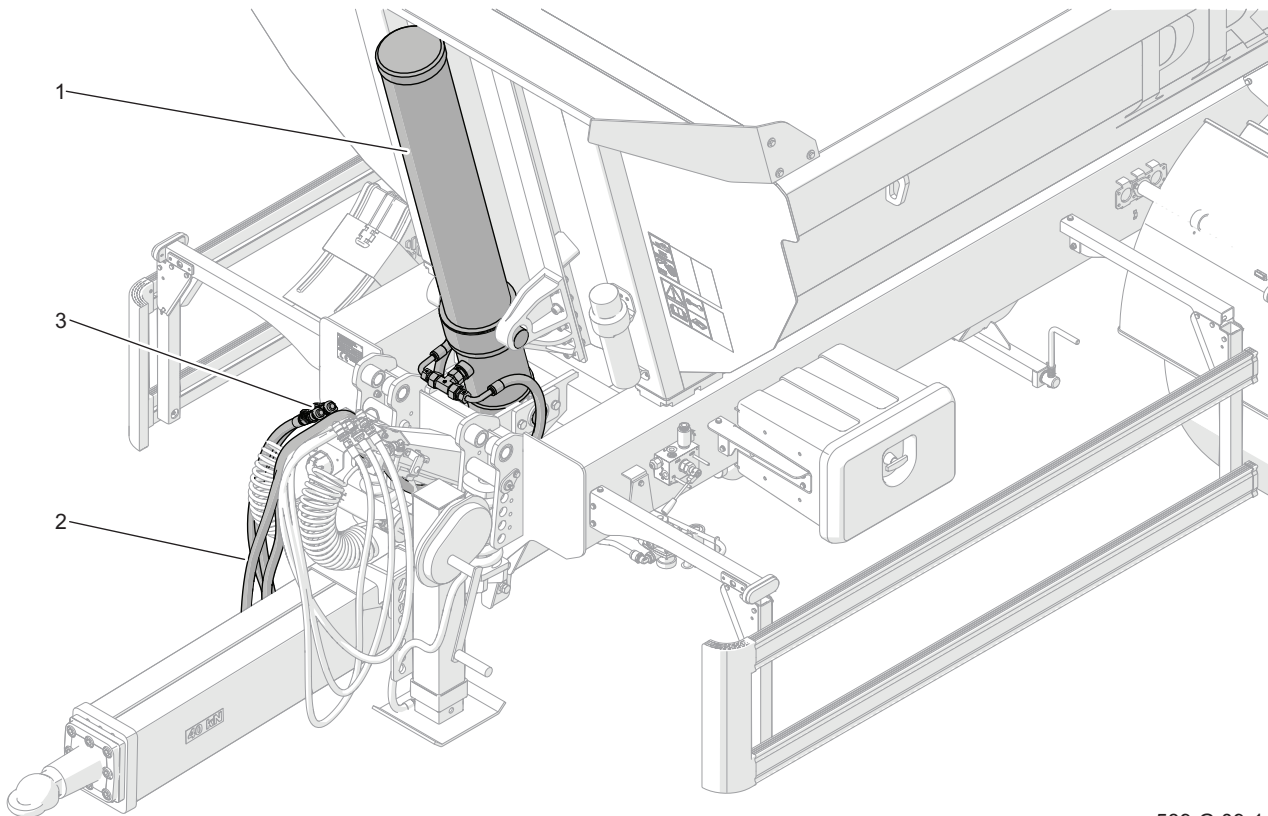
#### ATTENTION

Before driving off, make sure that the parking brake is released.

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## 3.6 HYDRAULIC TIPPING SYSTEM



589-G.09-1

**Figure 3.10** Hydraulic tipper system

(1) hydraulic tipping cylinder, (2) hydraulic conduits, (3) quick couplers

Hydraulic tipping system (FIGURE 3.10) ensures automatic unloading of the trailer by tipping the load box to the rear. The hydraulic tipping system is supplied with oil from the tractor's hydraulic system. Hydraulic oil manifold of the tractor's external

hydraulic system is used to control the load box tipping mechanism.

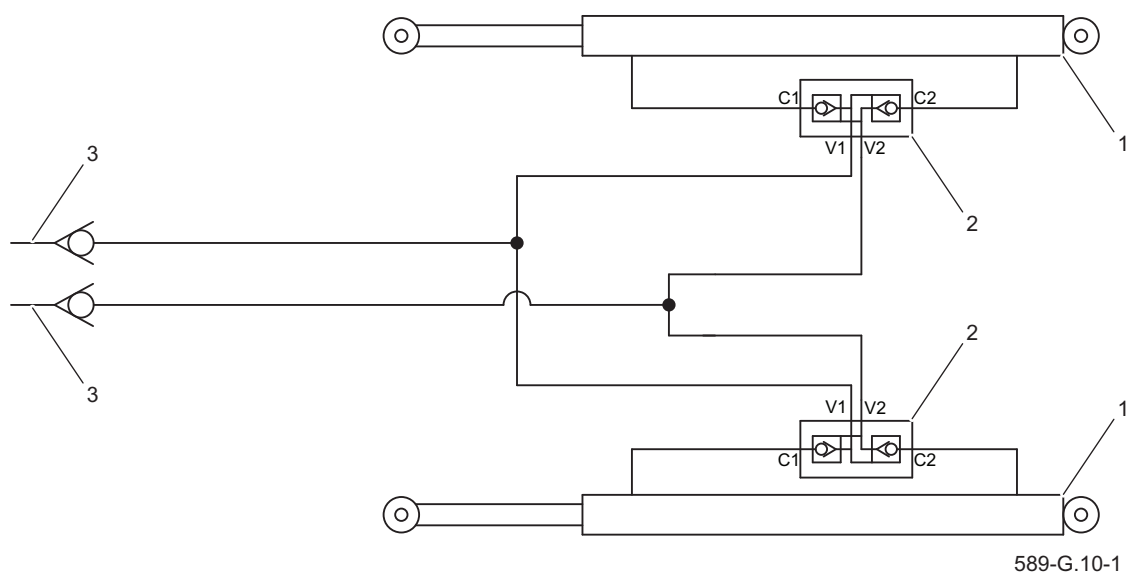


The hydraulic tipping system of the trailer is filled with L-HL32 Lotos hydraulic oil.

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### 3.7 TAILGATE HYDRAULIC SYSTEM



**Figure 3.11** Diagram of the hydraulic system of the tailgate  
 (1) hydraulic cylinder, (2) two-sided hydraulic lock, (3) hydraulic quick couplers

The hydraulic system of the tailgate (FIGURE 3.11) is used for raising and lowering the tailgate. The tailgate can be kept in any position by means of the tractor's hydraulic manifold lever. Hydraulic cylinder is connected using conduits terminated with quick couplers. Plugs should be placed in proper sockets of the tractor's hydraulic manifold. The system is supplied

with oil from the tractor's hydraulic system. Hydraulic oil manifold of the tractor's external hydraulic system is used to control the tailgate rising.



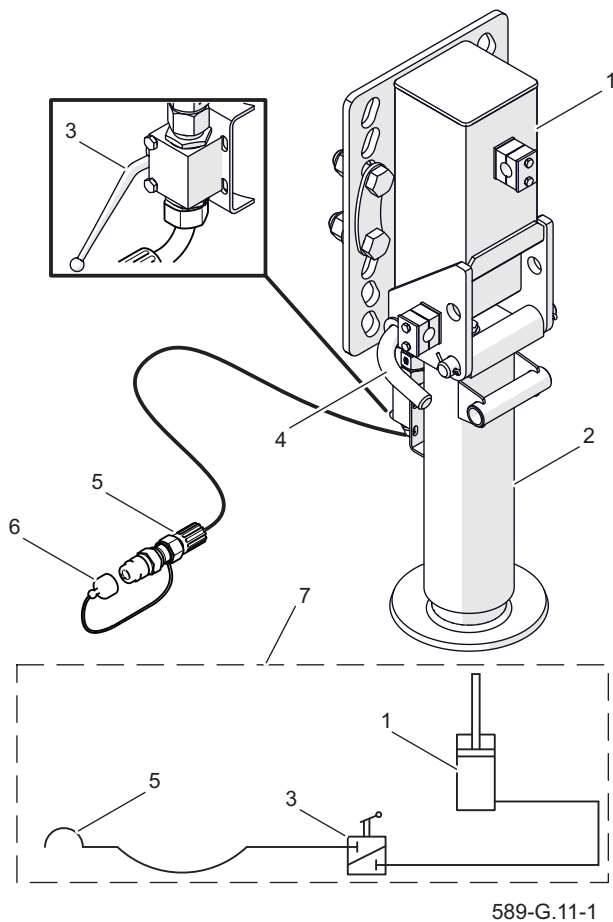
#### TIP

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

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### 3.8 HYDRAULIC SYSTEM OF FOLDING SUPPORT (OPTION)



**Figure 3.12** Hydraulic system of folding support

(1) body, (2) hydraulic cylinder, (3) valve, (4) interlock pin, (5) quick coupler - plug, (6) plug cap, (7) diagram of hydraulic system of support

The hydraulic system of the support (FIGURE 3.12) is used for positioning the support in order to support the trailer disconnected from the tractor or when the trailer is parked in the garage after use. Using the parking stand hydraulic system, the drawbar height can be adjusted when

hitching and unhitching the trailer. The parking stand is supplied with oil by the tractor's hydraulic system. The parking stand is extended or withdrawn by extending or withdrawing the hydraulic cylinder piston rod (2).

Hydraulic oil manifold of the tractor's external hydraulic system is used for controlling the support's hydraulic cylinder. If the valve handle (3) is shifted perpendicularly to the valve body, the support is locked in fixed position. The support is lowered by shifting the valve handle (3) to open position, i.e. along the valve body. After the pressure in hydraulic conduit is reduced, the withdrawal of the support to transport position is forced by the spring inside the cylinder sleeve (2). The hydraulic conduit for controlling the support is terminated with a quick coupler (5) and protected using a cap (6).

The support is locked in transport position or in parking position with an interlock pin (4).

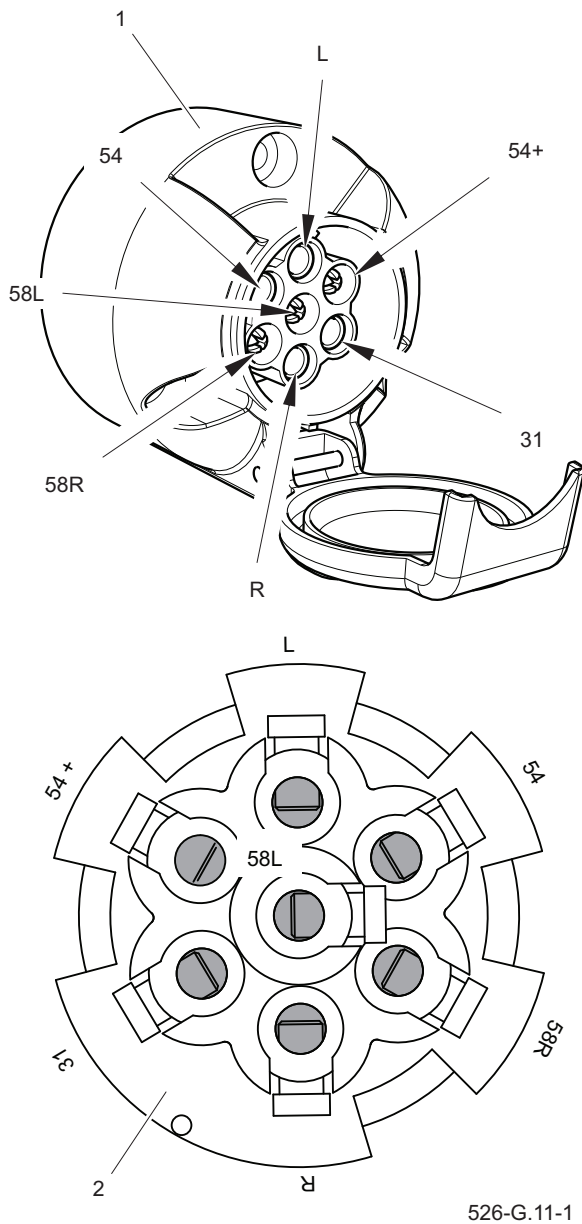


The hydraulic system of the trailer's support is filled with L-HL32 Lotos hydraulic oil.

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### 3.9 ELECTRIC LIGHTING SYSTEM



526-G.11-1

**Figure 3.13** Connection socket  
 (1) socket harness side  
 (2) view from the wiring

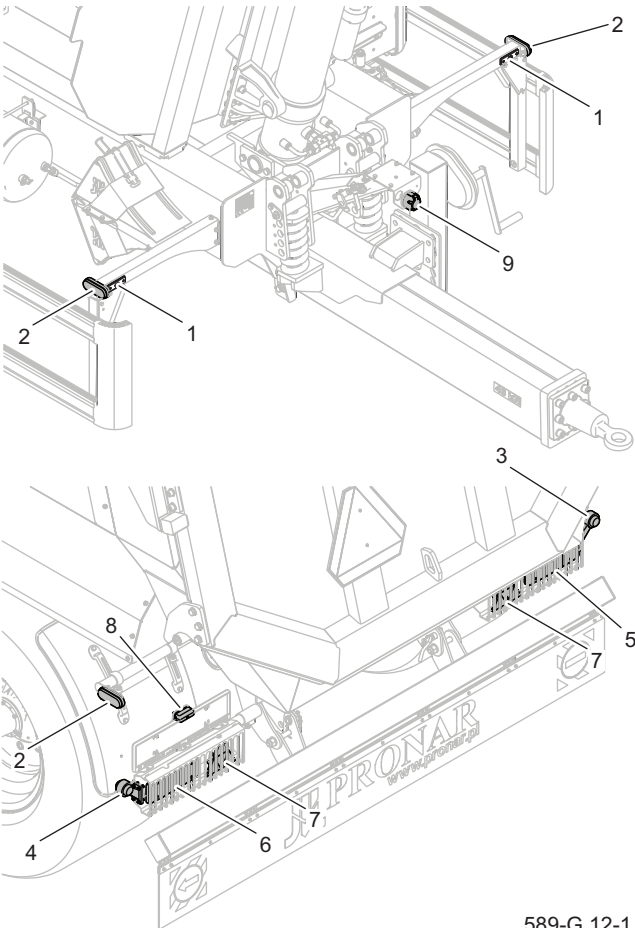
**Table 3.3** Markings of connection socket's connections

Marking	Function
31	Ground
54+	Power supply +12V
L	Left indicator
R	Right indicator
54	STOP light
58L	Rear left parking light
58R	Rear right parking light
R	Right indicator

The trailer's electrical system is designed for supply of 12V DC. Connection of the trailer electrical system with the tractor should be made using an appropriate connection lead.

The arrangement of the electrical system components and the trailer's signalling reflectors is shown in FIGURE 3.14.





589-G.12-1

**Figure 3.14** Arrangement of electrical system components and reflectors  
(1) front parking light, right/left; (2) side clearance lamp, orange; (3) rear right clearance lamp; (4) rear left clearance lamp; (5) rear right lamp assembly; (6) rear left lamp assembly; (7) reflective warning triangle; (8) licence plate light; (9) seven pin socket.

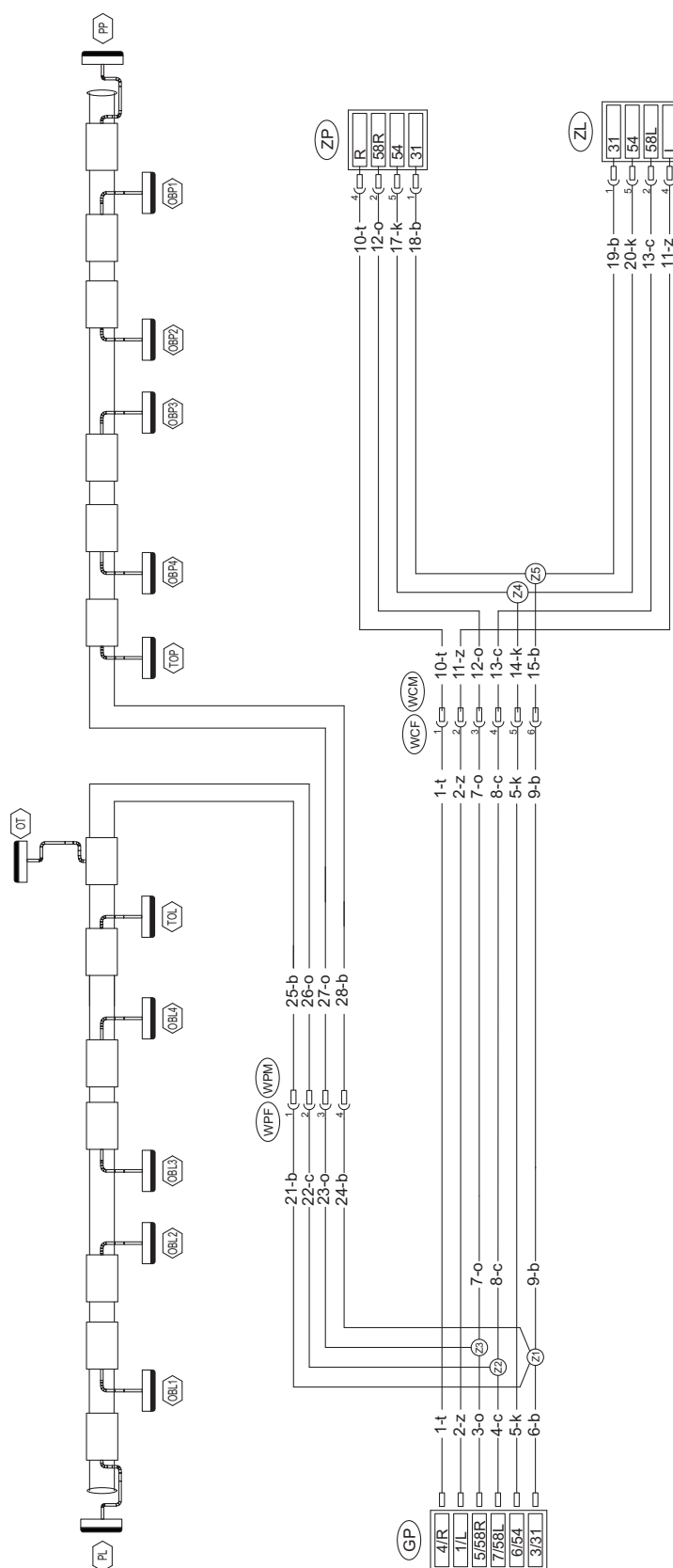
**Table 3.4** Electrical system diagram markings

Symbol	Function
GP	7-pin socket, front
PP	Front right parking light
PL	Front left parking light
ZP	Rear right lamp assembly
ZL	Rear left lamp assembly
OT	License plate light
TOP	Rear right clearance lamp
TOL	Rear left clearance lamp
OBP	Right clearance lamp
OBL	Left clearance lamp

**Table 3.5** Conduit colour marking.

Symbol	Colour
B	White
C	Black
K	Red
N	Blue
P	Orange
T	Green
C/T	Black and green
R	Pink
O	Brown
Z	Yellow





589-G.13-1

**Figure 3.15** Trailer's electrical system diagram

Marking according to Table 3.4 and Table 3.5.







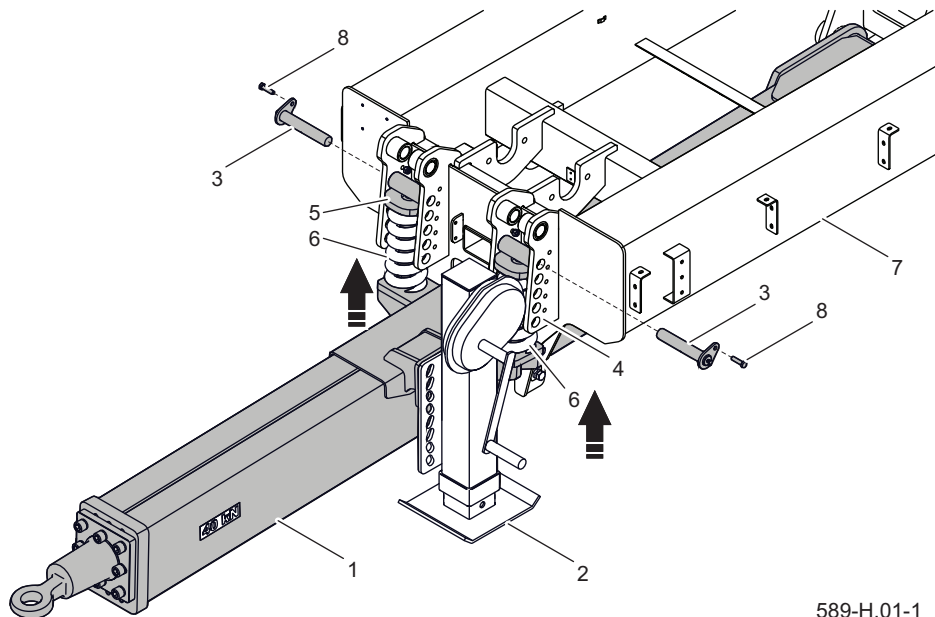
# SECTION 4

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CORRECT USE



## 4.1 ADJUSTMENT OF DRAWBAR POSITION



589-H.01-1

**Figure 4.1** Height setting of the drawbar with spring shock absorbers.

(1) drawbar, (2) support, (3) spring pin, (4) spring guide, (5) spring mounting, (6) spring, (7) trailer lower frame, (8) bolt

Location of the drawbar should be selected individually depending on the height of trailer tyres and the height of the tractor hitch to which the trailer will be coupled. The height should be set in such a manner as to ensure that the trailer hitched to the tractor is level. Empty trailer may be slightly tilted forwards from the level (about 50mm).

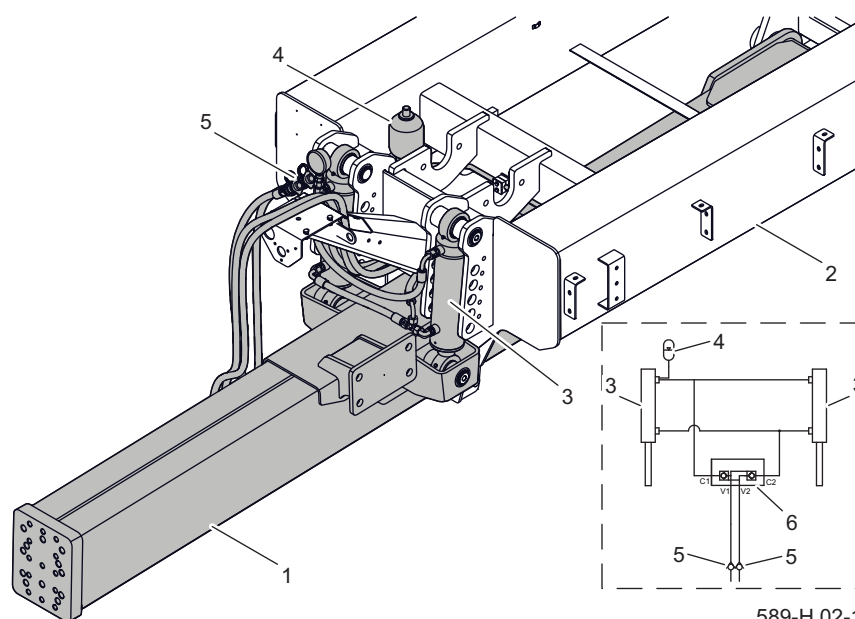
In order to adjust the drawbar position, perform the following activities (FIGURE 4.1):

- immobilise trailer with parking brake,
- prevent the trailer from rolling by placing chocks under the wheels,
- support the trailer on both sides of the drawbar under the front beam of the

lower frame (7) by means of supports of a suitable height and strength.

- the drawbar (1) should be supported with telescopic support (2) or hydraulic support,
- dismount the connection of the drawbar (1) with the lower frame (7) by unscrewing the bolts (8) and pulling the pins (3) out of the spring (6) fixing sleeve (5),
- position the drawbar with regard to the lower frame by means of the crank of the telescopic support (2) or, when the hydraulic support is used, using the appropriate manifold lever in the tractor cab. Set the drawbar height in such a manner as to align





589-H.02-1

**Figure 4.2** Height setting of the drawbar with hydraulic shock absorbers (option).

(1) drawbar, (2) trailer lower frame, (3) hydraulic cylinder,  
(4) hydraulic accumulator, (5) hydraulic quick couplers, (6) hydraulic lock

the openings in the spring guide (4) with the openings in the spring fixing sleeve (5). The trailer design makes it possible to set the drawbar in 5 different heights.

- When the drawbar height is set, install the pins (3) and tighten the bolts (8) using the tightening torque specified in Table 5.7.

Optionally, the trailer can be equipped

with the drawbar with hydraulic shock absorbers (FIGURE 4.2). After hitching the trailer to tractor, connect the hydraulic quick couplers (5) of the drawbar's hydraulic shock absorber system (1) to one section of the tractor's hydraulic manifold. If it is necessary to adjust the drawbar position, set the position of the hydraulic cylinders (3) using the manifold lever in the tractor so as to level the trailer.



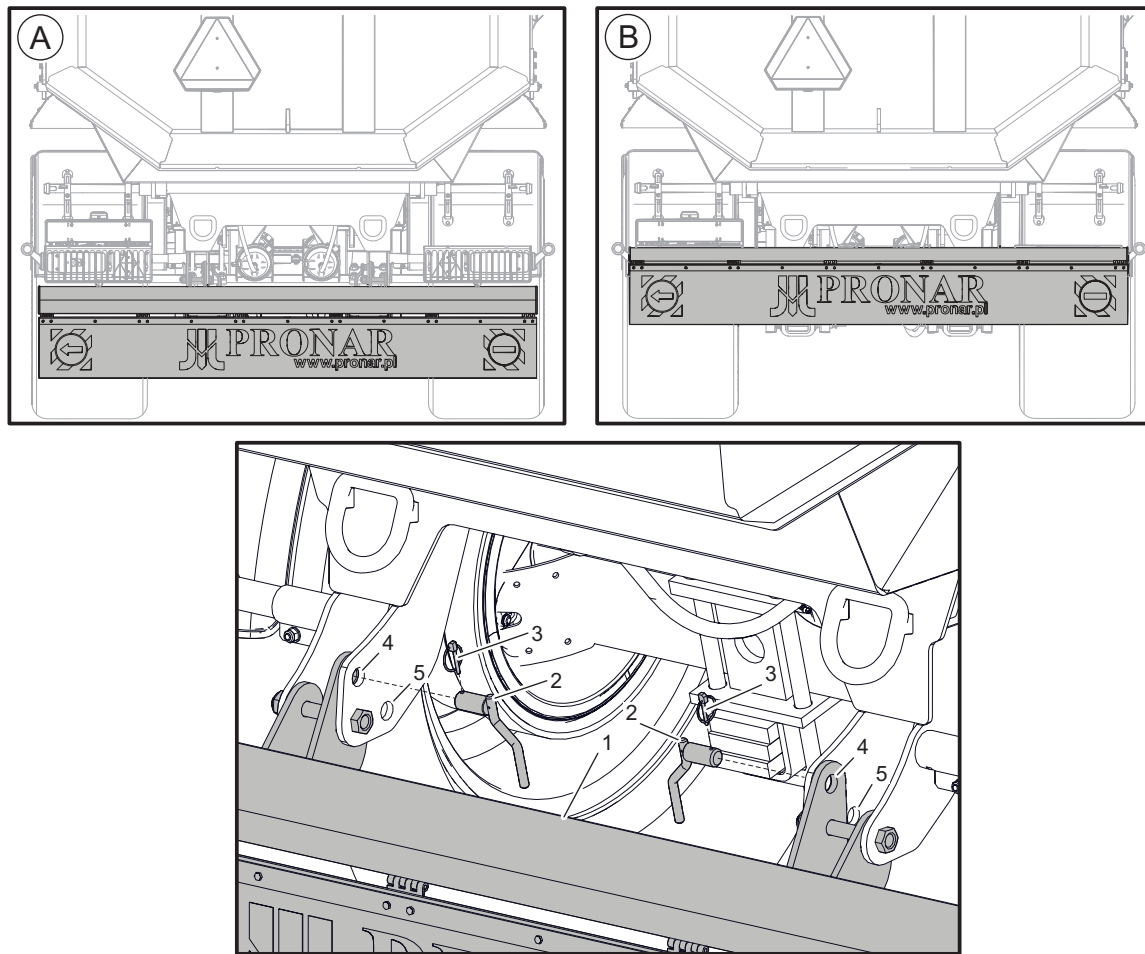
### ATTENTION

The tension of drawbar springs is selected and set by the Manufacturer and must not be changed.

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## 4.2 OPERATION OF REAR FENDER



589-H.03-1

**Figure 4.3** Rear fender positions.

(A) rear fender in lowered position, (B) rear fender in raised position, (1) rear fender, (2) pin, (3) cotter pin, (4) pin position when the fender is lowered, (5) pin position when the fender is raised.

Rear fender protects rear lights against damage. When loading and unloading the trailer, the fender should be raised (B) (FIGURE 4.3). On public roads, the fender should be lowered (A) so as not to obscure the rear lights.

In order to raise or lower the fender:

- unlock the fender (1) by removing two pins (2).
- raise or lower the fender so that the openings (4) or (5) in the trailer's lower frame bracket align with the openings in the fender brackets.
- lock the fender in a selected position using the pins (2).
- secure the pins (2) with cotter pins (3).

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## 4.3 HITCHING THE TRAILER



### DANGER

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

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

Ensure sufficient visibility during hitching.

After completed hitching, check that the hitch pin is properly secured.



### ATTENTION

The trailer may be hitched only to a fully operational agricultural tractor with the electric, pneumatic and hydraulic connections and the tractor's hitch conforming to the trailer Manufacturer's requirements. Ensure compatibility of oils in the tractor hydraulic system and in the trailer hydraulic system.

In order to hitch the trailer to the tractor, perform the actions below in the sequence presented.

- Visually inspect the technical condition of the trailer.
- Immobilise trailer with parking brake.

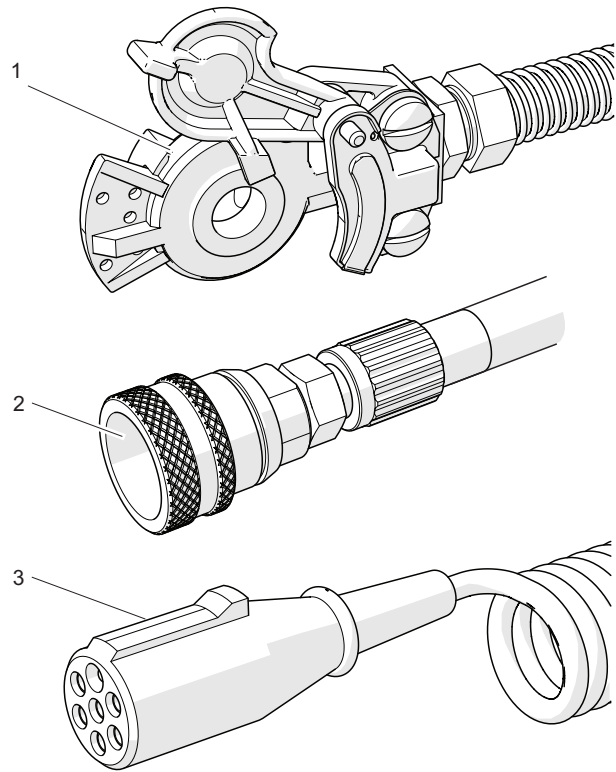
*Pull brake mechanism clockwise until resistance is felt. Make certain that chocks are placed under one trailer wheel.*

- Position agricultural tractor directly in front of the trailer's drawbar eye.
- Using the support, set the drawbar at such a height as to make it possible to hitch the trailer.
- If the telescopic support is used, adjust the drawbar height by rotating the crank in proper direction (section 4.5).
- If the folding hydraulic support is used (FIGURE 3.12), reverse the tractor and connect the hydraulic conduit of the support to the tractor. Then, release the valve (3) of the support and operate the manifold in tractor to set the drawbar eye at a proper height. When the drawbar eye height is set, set the manifold lever in tractor to "neutral" position.
- Reverse tractor, hitch trailer to appropriate hitch on tractor, check hitch lock protecting machine against accidental unhitching. If the agricultural tractor is equipped with an automatic coupler, ensure that the hitching operation is completed and that drawbar eye is secured.
- Fold the support and secure it properly. If the telescopic support is used, raise the support and secure it



with securing pin (5) (FIGURE 4.6). After folding the hydraulic support, close the support valve (3) (FIGURE 3.12) and set the manifold lever in the tractor in "neutral" position. When the trailer is hitched, the hydraulic folding support must be folded to transport position and secured with lock pin (4).

- Turn off tractor engine and remove key from ignition. Close the tractor cab to ensure that unauthorised persons do not have access to the tractor cab. Immobilise the tractor with parking brake.
- The trailer hitched to the tractor must be level. Empty trailer may be slightly tilted forwards from the level (about 50mm). If the trailer is not level, adjust the position of the trailer drawbar (SECTION 4.1) or the tractor hitch.
- Connect pneumatic brake system conduits (applies to double conduit system).
- Connect pneumatic brake system conduit (applies to single conduit pneumatic system).
- Connect hydraulic brake system conduit (applies to hydraulic brake system). The connection socket is different than in other systems (female socket).
- Connect hydraulic tipping system



589-H.04-1

**Figure 4.4** Brake connections and electrical connections

(1) *pneumatic brake plug*, (2) *hydraulic brake socket*, (3) *electric lead*



#### ATTENTION

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



#### TIP

Hydraulic and pneumatic conduits are marked with coloured protective covers, which identify the appropriate system conduit.

conduits. Hydraulic conduits of tipping cylinder should be connected to two sections of the tractor's hydraulic manifold in order to increase the load



box lowering speed. However, such connection does not increase the load box rising speed.

- Connect conduits of the tailgate hydraulic system. Connect the conduits to the same section of the tractor hydraulic manifold.
- Connect main lead supplying electrical lighting system.
- Conduct daily inspection of the trailer.
- If the trailer is fully operational, one may commence work.

**TIP**

Do not connect two conduits of the hydraulic tipping system to one section of the tractor's hydraulic manifold. Otherwise, when trying to raise the load box, all oil will be directed to the return conduit (drain).

**ATTENTION**

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.

- Immediately before driving remove wheel chocks and release the parking brake.

**DANGER**

Do NOT use out of order trailer.

*Turn the brake mechanism crank anticlockwise until resistance is felt.*

**ATTENTION**

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

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## 4.4 UNHITCHING THE TRAILER

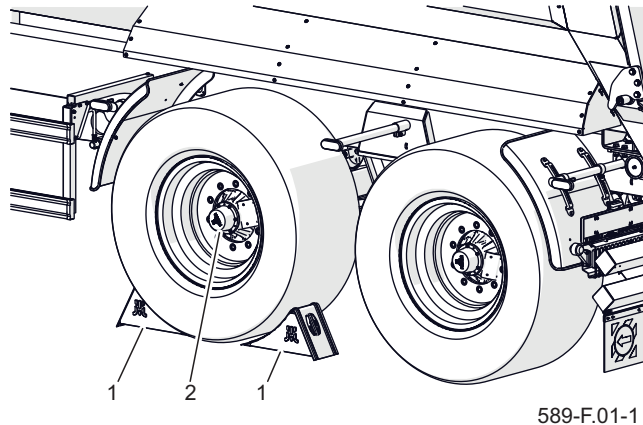


### DANGER

Do NOT unhitch the trailer when the load box is raised.

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

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



589-F.01-1

**Figure 4.5** Proper position of chocks  
(1) wheel chocks, (2) axle wheel

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

- Park the trailer on hard and level ground.
- Immobilise tractor with parking brake, turn off tractor engine
- Ensure that unauthorised persons do not have access to the tractor cab.
- Place chocks under the trailer's wheels in order to prevent the machine from rolling (FIGURE 4.5).
- Lower the trailer's telescopic support as described in Section 4.5 and secure it with securing pin (5) (FIGURE 4.6).
- If the folding hydraulic support is used (FIGURE 3.12), unfold it to parking position and lock with lock pin (4). Then, open the valve (3) of the support and operate the manifold in tractor in the proper direction to extend the support's cylinder piston

rod. When the support is lowered, set the manifold lever in tractor to "neutral" position. Close the valve (3) located next to the support to lock the support in a fixed position.

- Turn off tractor engine. Ensure that unauthorised persons do not have access to the tractor cab.
- Disconnect hydraulic conduits of tailgate, support and tipping system from the tractor. Protect conduit ends with caps and place them on the hanger.
- Disconnect electric lead.
- Disconnect pneumatic system conduits and place them in the suitable place on the trailer.
- Disconnect hydraulic brake system conduit and place it on the hanger (applies to trailer version with hydraulic brake system).



- Unlock tractor hitch and disconnect trailer drawbar from tractor hitch and drive tractor away.

**ATTENTION**

If the trailer is equipped with a double conduit pneumatic system, first disconnect the red conduit and then disconnect the yellow conduit.  
The trailer must not be disconnected when loaded.

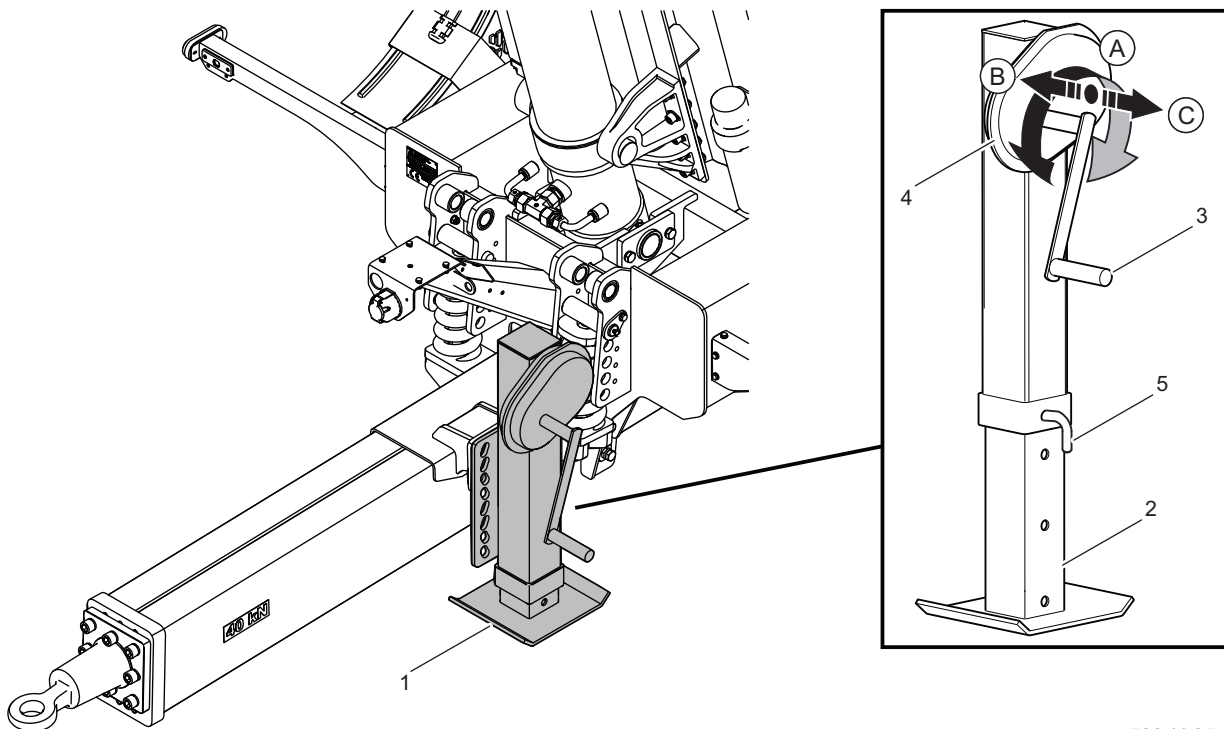
**ATTENTION**

If the ball hitch is used, first unlock the tractor hitch and then raise the drawbar by means of the support and drive the tractor away from the machine.

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## 4.5 TELESCOPIC SUPPORT OPERATION



589-H.05-1

**Figure 4.6** Adjusting the drawbar height

(1) telescopic support, (2) support foot, (3) crank, (4) gear, (5) securing pin, (A) neutral position, (B) position – I gear (speed under load), (C) position – II gear (high speed)

Proper height of drawbar eye in relation to tractor hitch can be set using the telescopic support with mechanical gear (FIGURE 4.6).

Position (C) is used for fast rising and lowering the support foot in order to reduce the distance between the support foot and the ground. Position (B) is used for lowering and rising the drawbar of unloaded trailer. In position (B), the support foot (2) moves slowly and a large force is not required to raise the machine drawbar.

### Raising the support

- Remove safety pin (5).
- Move support crank (3) from neutral position (A) to position (B).
- Turn the crank in proper direction in order to raise the support foot (2) maximally upwards.
- Install securing pin.
- Set the crank in neutral position (A).

### Lowering the support

- Remove safety pin.
- Move crank (3) to position (B) or (C).
- Turn the crank in proper direction in order to lower the support to the



ground or adjust the drawbar eye  
height in relation to the hitch (if the

trailer is to be hitched to tractor)

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## 4.6 LOADING AND SECURING LOAD

The trailer is designed for transporting and unloading heavy materials such as: debris, stones, rubble, gravel, used during construction, earthworks, demolition work. The trailer may be used for transporting materials on the farm and on public roads. Before loading, the trailer must be posi-



### ATTENTION

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

During work, keep a safe distance from overhead electric power lines.

When loading or unloading the trailer, bystanders must exercise caution and keep a safe distance from danger zones.

tioned to drive forwards, on a level surface, and hitched to the tractor. Before loading the trailer, make certain that the tailgate is properly closed and secured.

Also, check the technical condition of hydraulic and pneumatic systems. Pay particular attention to the brake cylinder leaks. Do NOT load or drive the trailer with damaged tailgate system, braking system or hydraulic tipping system. Keep a safe distance during loading and unloading. Do not allow unauthorized people to approach the place where the trailer is operated.

Load should be uniformly distributed along the length and width of the load box in

order to ensure proper distribution of axle loads and proper stability of the trailer. Load must not extend beyond the outline of the load box. The permissible loading height defined by the road traffic regulations and permissible design load of the trailer must not be exceeded.

Due to the various density of materials, using the total load box capacity may lead to exceeding permissible carrying capacity of the trailer. Guideline specific weight of selected materials is shown in Table 4.1. Take care not to overload the trailer.

Loading should be carried out by a person having appropriate authorisation for operating the equipment (if required).

Regardless of the type of load carried,



### ATTENTION

Do NOT exceed the trailer's maximum carrying capacity.

Load placed on the load platform must be uniformly distributed and properly secured.

While driving on public roads, the hydraulic tailgate must be closed.

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

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



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

Type of material	Weight by volume kg/m <sup>3</sup>
<b>Building materials:</b>	
cement	1 200 – 1 300
dry sand	1 350 – 1 650
wet sand	1 700 – 2 050
solid bricks	1 500 – 2 100
hollow bricks	1 000 – 1 200
stones	1 500 – 2 200
soft wood	300 - 450
hard sawn timber	500 - 600
impregnated timber	600 - 800
steel structures	700 – 7 000
milled burnt lime	700 - 800
cinders	650 - 750
gravel	1 600 – 1 800
rubble	1 050 – 1 200
<b>Root crops:</b>	
raw potatoes	700 - 820
steamed crushed potatoes	850 - 950
dried potatoes	130 - 150
sugar beet - roots	560 - 720
fodder beet - roots	500 - 700
<b>Mineral fertilisers:</b>	
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
<b>Concentrated feeds and mixed feeds:</b>	
stored chaff	200 - 225
pressed cake	880 – 1 000
milled dry feed	170 - 185
mixed feeds	450 - 650
mineral mixtures	1 100 – 1 300
ground oats	380 - 410
wet sugar beet pulp	830 - 1 000
pressed sugar beet pulp	750 - 800
dry sugar beet pulp	350 - 400
bran	320 - 600
bone meal	700 – 1 000
pasture salt	1 100 – 1 200
molasses	1 350 – 1 450
silage (pit silo)	650 – 1 050
hay silage (tower silo)	550 - 750



Type of material	Weight by volume kg/m <sup>3</sup>
<b>Seeds and grains:</b>	
beans	750 - 850
mustard	600 - 700
peas	650 - 750
lentils	750 - 860
runner beans	780 - 870
barley	600 - 750
clover	700 - 800
grass	360 - 500
maize	700 - 850
wheat	720 - 830
oil seed rape	600 - 750
linseed	640 - 750
lupins	700 - 800
oats	400 - 530
lucerne	760 - 800
rye	640 - 760
<b>Others:</b>	
dry soil	1 300 – 1 400
wet soil	1 900 – 2 100
fresh peat	700 - 850
garden soil	250 - 350

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

The extent of protection depends on loading method, type of load and size of load. If load is to be transported on slopes and/or in strong gusty winds conditions, limit the load height according to existing conditions.

Before driving on public roads, remove remaining material (aggregate) from horizontal components of the trailer, such as drawbar, wall edges. Prior to moving off,

check if the tailgate's protection is closed properly.

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

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## 4.7 LOAD TRANSPORT

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

- Before moving off, make sure that there are no bystanders, especially children, near the trailer or the tractor. Ensure that the driver has sufficient visibility.
- Make sure that the trailer is correctly attached to the tractor and tractor's hitch is properly secured.
- Set the proper operating mode of the braking force regulator (FIGURE 3.7)
- Vertical load borne by the trailer drawbar eye affects the steering of the agricultural tractor.
- The trailer must not be overloaded, loads must be uniformly distributed so that the maximum permissible axle loads are not exceeded. The trailer's maximum carrying capacity must not be exceeded as this can damage the trailer and pose a risk to the operator or other road users.
- Permissible design speed and maximum speed allowed by road traffic law must not be exceeded. The driving speed should be suitable for



### **DANGER**

People or animals must not be carried on the trailer. Overloading the trailer, erroneous loading and securing of the load is the most frequent cause of accidents during transport.

During work, keep a safe distance from overhead electric power lines.

the current road conditions, the trailer load, type of load carried and other conditions relevant for driving performance of the trailer.

- When not connected to the tractor, the trailer must be immobilised using parking brake and with chocks placed under the wheels. Do NOT leave unsecured trailer. In the event of machine malfunction, pull over on the hard shoulder avoiding any risk to other road users and position reflective warning triangle according to traffic regulations.
- When driving on public roads, the trailer must be marked with a slow-moving vehicle warning sign attached to the rear wall of load box, if the trailer is the last vehicle in the group.
- While driving on public roads the trailer must be fitted with a certified or authorised reflective warning triangle.
- When driving, comply with all road traffic regulations, indicate an intention



to turn using indicator lamps, keep all road lights and indicator lights clean at all times and ensure they are in good condition. Any damaged or lost lamps or indicator lights must be immediately repaired or replaced.

- Avoid ruts, depressions, ditches or driving on roadside slopes. Driving across such obstacles could cause the trailer or the tractor to suddenly tilt. This is of special importance because loaded trailer's centre of gravity is higher (especially a high volume load), which reduces safety. Driving near ditches or channels is dangerous as there is a risk of the wheels sliding down the slope or the slope collapsing.
- Speed must be sufficiently reduced before making a turn or driving on an uneven road or a slope.
- When driving, avoid sharp turns especially on slopes.
- While driving on public roads, the

hydraulic tailgate must be closed and secured.

- Please note that the braking distance of the tractor and trailer combination is substantially increased at higher speeds and loads.

**ATTENTION**

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

- Monitor trailer's behaviour when travelling on an uneven terrain, and adjust driving speed to road conditions, slow down early enough when turning.
- Prolonged driving across steep ground may lead to loss of braking efficiency.
- The trailer is designed to operate on slopes up to 8°. Driving trailer across ground with steeper slopes may cause the trailer to tip over as a result of loss of stability.

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## 4.8 UNLOADING



### DANGER

Ensure that during unloading nobody is in the vicinity of the unloading zone.  
During work, keep a safe distance from overhead electric power lines.

The trailer is equipped with hydraulic tipping system and suitable frame structure and the load box allowing tipping to the rear. Tipping of the load box is controlled from driver's cab using external tractor hydraulic system manifold. The trailer must be positioned to travel forwards and be hitched to the tractor. Unloading should only take place when the trailer is placed on level and stable surface.

During work, ensure good visibility and exercise due caution. Immobilise tractor and trailer with parking brake. Remove all load fastening devices immediately before unloading. Unloading the trailer should be carried out in accordance with the general principles of workplace health and safety.

Unloading of the trailer is performed in the following sequence:

- tractor and trailer must be placed to drive forwards on flat and hard ground,
- immobilise tractor with parking

brake,

- open the hydraulic tailgate by means of hydraulic cylinders, by operating the hydraulic manifold lever in the tractor,
- using the manifold lever in the operator cab, tip the load box with a telescopic cylinder,
- after unloading, lower the load box and clean the floor edges,
- close the hydraulic tailgate by operating the suitable hydraulic circuit from the tractor,
- before moving off make sure that the hydraulic tailgate or hinged hatch is properly locked.

During unloading through hinged hatch, load box must be raised slowly and smoothly. Raising the load box quickly will exert large pressure on the rear part



### ATTENTION

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

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

Do NOT tip load box in strong gusty winds conditions.

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

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



of the load box due to displacement of the trailer's stability.  
carried material and could compromise

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## 4.9 PROPER USE AND MAINTENANCE OF TYRES

- When working with tyres, the trailer should be secured against rolling by placing chocks under the wheels. Wheels can be taken off the trailer axle only when the trailer is not loaded.
- Repair work on the wheels or tyres should be carried out by persons trained and entitled to do so. This work should be carried out using appropriate tools.
- Regularly check if the nuts fixing the wheels are properly tightened.
- Air pressure in tyres should be also checked during the whole day of intensive work. Please note that higher temperatures could raise tyre pressure by as much as 1 bar. At high temperatures and pressure, reduce load or speed.
- Do not release air from warm tyres to adjust the pressure or the tyres will be underinflated when temperatures return to normal.
- Tyre valves should be protected with the appropriate caps to avoid soiling.
- Do not exceed the trailer's maximum design speed.
- When the trailer is operated all day, stop working for a minimum of one hour in the afternoon.
- Take breaks during driving in order to cool down tyres.
- Avoid potholes, sudden manoeuvres or high speeds when turning.

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## 4.10 TRAILER CLEANING

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.

### SCOPE OF ACTIVITIES

- Before cleaning the trailer open the tailgate. Carefully clean load remains from the load box (sweep out or blow out with compressed air), especially where tailgate and extensions join together.
- To clean the trailer, use only clean running water or water with a cleaning detergent additive with neutral pH.
- Using pressure washer increases washing effectiveness, but particular care must be taken during work. During washing, washer nozzle may not be closer than 50 cm from the surface being cleaned.
- Water temperature should not exceed 55°C.
- Do not direct water stream directly at system and equipment elements of trailer i.e. control valve, braking force regulator, brake cylinders, hydraulic cylinders, pneumatic, electric and hydraulic plugs, lights, electrical connections, information and warning decals, identification plates, conduit connections, spring leaves and lubrication points etc. Great water jet pressure may cause mechanical damage to these elements.
- For cleaning and maintenance of plastic coated surfaces it is recommended to use clean water or special preparations designed for this purpose.
- Do not apply organic solvents, preparations of unknown origin or other substances, which may cause damage to lacquered, rubber or plastic surfaces. In the event of doubt it is recommended to make a test on an unseen surface area.
- Surfaces smeared with oil or grease should be cleaned by application of benzene or other degreasing agents and then washed with clean water with added detergent. Comply with recommendations of the Manufacturer of cleaning agents.
- Detergents should be kept in original containers, optionally in replacement containers, but very clearly marked. Preparations may not be stored in



food and drink containers.

- Ensure cleanliness of elastic conduits and seals. The plastic from which these elements are made may be susceptible to organic substances and some detergents. As a result

**DANGER**

Carefully read the instructions for application of detergents and maintenance preparations. While washing with detergents wear appropriate protective clothing and goggles protecting against splashing.

of long-term reaction of some substances, the ageing process may be accelerated and risk of damage increased. Rubber elements should be maintained with the aid of special

preparations after previous thorough washing.

- After completed washing wait until the trailer is dry and then grease all inspection points according to recommendations. Remove excess oil or grease with a dry cloth.
- Observe environmental protection principles and wash trailer in a place designed for this purpose.
- Washing and drying of the trailer must take place at ambient temperatures above 0°C.
- After washing and drying, trailer should be greased at all control points regardless of previous date of lubrication.

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## 4.11 STORAGE

Trailer should be kept in closed or roofed building. If the machine will not be used for a long time, it is essential to protect it from adverse weather conditions (sunlight and rain), which cause corrosion and accelerate ageing of tyres. The protection should be made according to the below instructions.

- The machine must be unloaded, placed on hard ground, on its wheels and secured against rolling away with wheel chocks.
- Carefully remove all remains of plant materials because such materials can absorb moisture and stimulate corrosion.
- 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 topcoat paint according to colour scheme.

- In the event of a prolonged work stoppage, it is essential to lubricate all components regardless of the date of the last lubrication.
- Wheel rims and tyres should be carefully washed and dried.
- Shield the tyres if they may be exposed to solar radiation.
- During a longer storage of unused trailer it is recommended that the machine should be moved a bit once every 2-3 weeks in order to change the place of contact of tyres with the ground. The tyres will not be deformed and maintain proper geometry. Also, air pressure in tyres should be inspected from time to time and, if necessary, pressure should be increased to appropriate value.

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# SECTION 5

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## TECHNICAL INSPECTION SCHEDULE



## 5.1 BASIC INFORMATION

This section describes all periodic inspection activities which must be carried out by the user according to the specified schedule. Regular inspections of technical condition and performance of maintenance procedures are essential for keeping the trailer in good technical condition. The maintenance activities which the user may perform by himself are described in section *Maintenance*.

Repairs during the warranty period may only be performed by the Authorised Points of Sale and Service (APSS). In the event of unauthorised repairs, changes to factory settings or other actions which



### ATTENTION

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

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

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

are not regarded as possible for the trailer operator to perform (not described in this Operator's Manual), the manufacturer's warranty becomes void.

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

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## 5.2 PERIODIC INSPECTIONS OF THE TRAILER

**Table 5.1** Inspection categories

Category	Description	Carried out by	Frequency
A	Daily inspection	Operator	Inspection conducted daily before the first start or every 10 hours of continuous operation in shift mode.
B	Maintenance inspection	Operator	Inspection carried out periodically every 1000 km or every month of trailer use, whichever occurs first. Daily inspection should be carried out each time before this inspection.
C	Maintenance inspection	Operator	Inspection carried out periodically every 3 months. Daily inspection and monthly inspection should be carried out each time before this inspection.
D	Maintenance inspection	Operator	Inspection made periodically every 6 months. Daily inspection, monthly inspection and 3-monthly inspection should be carried out each time before this inspection.
E	Maintenance inspection	Operator	Inspection made periodically every 12 months. Daily inspection, monthly inspection and 3-monthly inspection should be carried out each time before this inspection.
F	Maintenance inspection	Service <sup>(1)</sup>	Inspection carried out every 4 years of the trailer use

(1) - post-warranty service



**Table 5.2** Inspection schedule

Description of activities	A	B	C	D	E	F	Page
Air pressure measurement	•						5.7
Draining water from air tank	•						5.8
Inspection of connection plugs and sockets	•						5.9
Inspection of shields	•						5.10
Inspection of trailer prior to moving off	•						5.11
Air pressure measurement, inspection of tyres and wheels		•					5.7
Cleaning the air filters			•				5.12
Checking brake shoe linings for wear				•			5.13
Checking wheel axle bearings for slackness				•			5.14
Inspection of mechanical brakes				•			5.16
Cleaning the drain valve				•			5.17
Inspection of parking brake cable tension					•		5.18
Inspection of hydraulic system					•		5.20
Inspection of pneumatic system					•		5.21
Maintenance of suspension system	See section: <i>Maintenance of suspension system</i>						5.22
Lubrication	See table: <i>Trailer lubrication schedule</i>						5.24
Inspection of nut and bolt connections	See table: <i>Tightening schedule for important bolt and nut connections</i>						5.28
Replacement of hydraulic conduits						•	



**Table 5.3** Adjustment parameters and settings

Description	Value	Remarks
<b>Brake system</b>		
Cylinder rod stroke in pneumatic systems	25 - 45 mm	
Cylinder rod stroke in hydraulic systems	25 - 45 mm	
Cylinder rod stroke in pneumatic-hydraulic systems	25 - 45 mm	
Minimum thickness of brake linings	5 mm	
Angle between expander axle and fork	90°	With depressed brake pedal
<b>Parking brake</b>		
Maximum slackness of parking brake cable	20 mm	

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## 5.3 PREPARING THE TRAILER

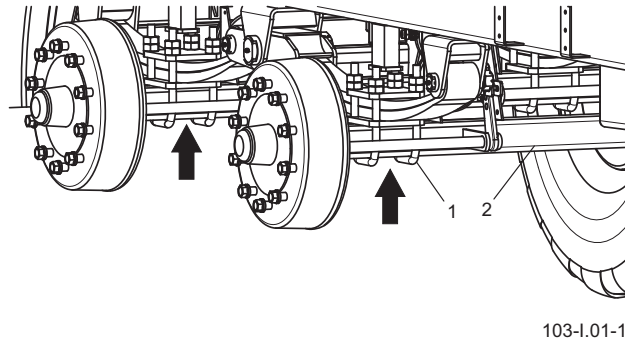


### DANGER

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

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

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



**Figure 5.1** Recommended trailer support points

(1) U bolts of suspension system, (2) axle

### SCOPE OF ACTIVITIES

- Hitch trailer to tractor.
- Position the tractor and trailer to drive forwards, on a hard and level surface.
- Engage the tractor's parking brake.
- Turn off tractor engine and remove key from ignition. Close the tractor cab to ensure that unauthorised persons do not have access to the tractor cab.
- Place securing chocks under one trailer wheel. Ensure that the trailer will not move during inspection.
- If it is necessary to raise a trailer

wheel during inspection, place chocks under the rigid axle wheel on the opposite side. Lifting jack should be positioned in the places indicated by the arrow. Lifting jack must be supported on hard and stable ground.

- Lifting jack must be suitable for the weight of trailer.
- In exceptional cases, release the trailer's parking brake, for example when measuring half axle bearing slackness. Exercise particular caution in such situations.

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## 5.4 AIR PRESSURE MEASUREMENT, INSPECTION OF TYRES AND WHEELS

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



### TIP

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

### SCOPE OF ACTIVITIES

- Connect a manometer to tyre valve and check air pressure. If necessary, inflate the tyre up to the recommended pressure.



### TIP

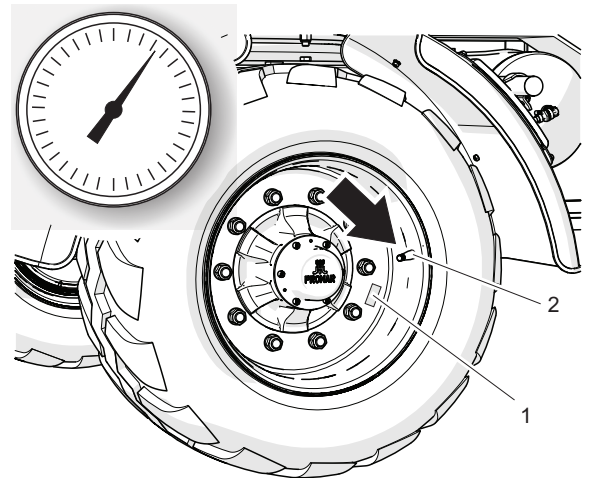
Tyre pressure value is specified on information decal placed on wheel rim. (FIGURE 5.2).

- Check technical condition of tyres (tyre tread depth, tyre side wall).
- Check tyre for mechanical defects such as loss, cut, deformation or bulging. In case of mechanical damage consult the nearest tyre



### DANGER

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



526-I.07-1

**Figure 5.2** Trailer wheel  
(1) information decal (2) valve



### ATTENTION

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

service and check whether the tyre defect requires tyre replacement.

- Check that tyre is correctly installed on rim.
- Check tyre age.

While checking pressure, pay attention to technical condition of wheels. 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.



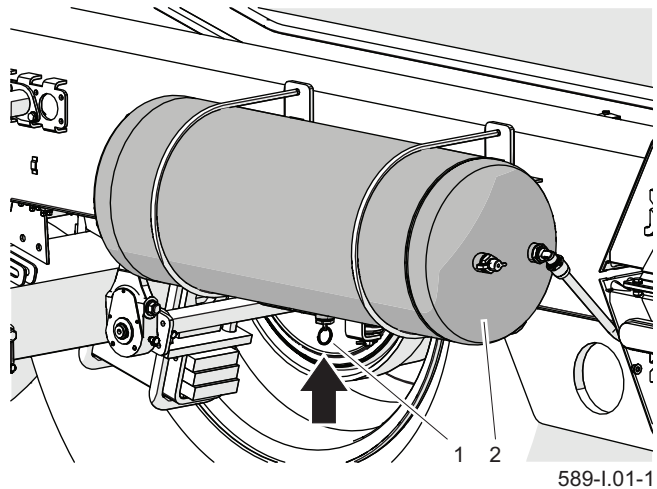
## 5.5 DRAINING WATER FROM AIR TANK

### SCOPE OF ACTIVITIES

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

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

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



**Figure 5.3** Air tank  
(1) drain valve (2) air tank

the valve.

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## 5.6 INSPECTION OF CONNECTION PLUGS AND SOCKETS

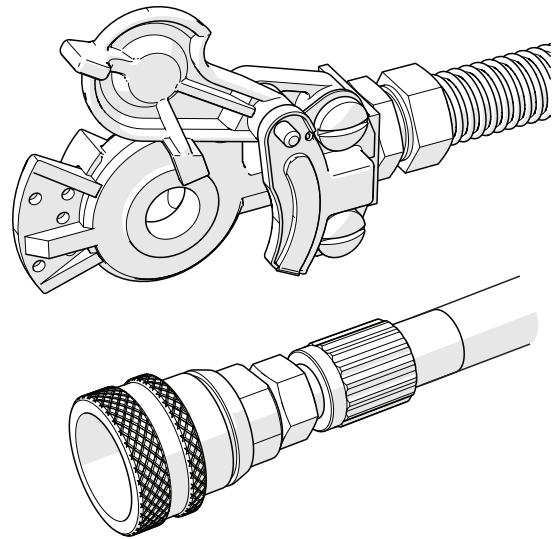


### DANGER

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

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

If the trailer is unhitched from the tractor, connections should be protected by covers or placed in their designated sockets. Before the winter, it is recommended to preserve the seal with special preparations



526-I.04-1

**Figure 5.4** Trailer connections

(e.g. silicon grease for rubber elements). Each time before hitching the machine, inspect technical condition and cleanness of connectors and sockets in tractor. If necessary, clean or repair tractor sockets.

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## 5.7 INSPECTION OF SHIELDS



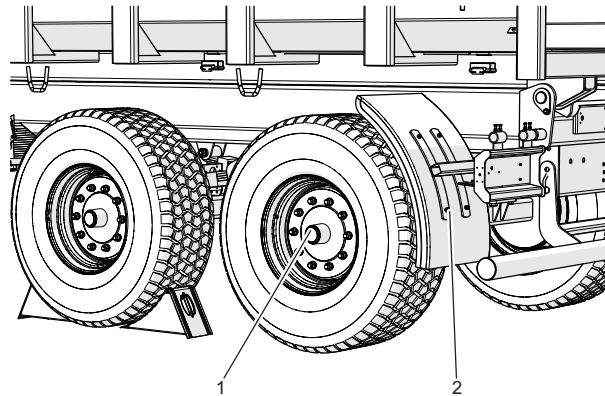
### DANGER

Do NOT use the trailer with damaged or incomplete shields.

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

### SCOPE OF ACTIVITIES

- Check completeness of protective shields.
- Check if shields are correctly installed, check technical condition of



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**Figure 5.5** Trailer shields

(1) axle caps

(2) plastic mudguard

mudguards.

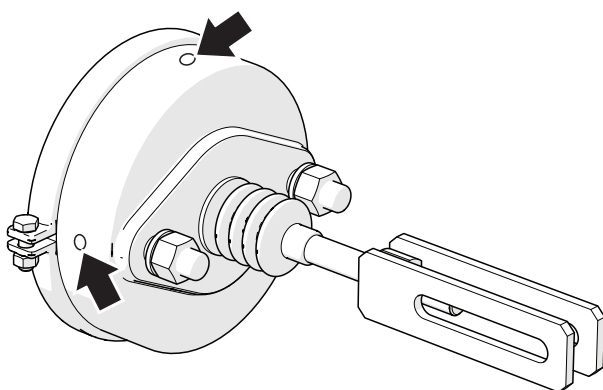
- Check if caps are complete.
- If necessary, tighten the bolt connections fixing the shields.

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## 5.8 INSPECTION OF TRAILER PRIOR TO MOVING OFF

- Before hitching the trailer to tractor, make certain that electrical leads and hydraulic and pneumatic conduits are not damaged.
- Check completeness, technical condition and functioning of trailer lights (SECTION 6.5).
- Check if all lights and reflectors are clean.
- Check correct mounting of the slow-moving vehicle warning sign holder and the sign itself.
- Make certain that the tractor is equipped with a warning reflective triangle.
- Check if the brake cylinder vent



**Figure 5.6** Brake cylinder

holes (FIGURE 5.6) are not blocked with impurities and that there is no

water or ice inside the brake cylinder. Check if the brake cylinder is correctly installed.

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

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



### **DANGER**

Do NOT use the trailer with out of order lighting system or brake system.  
Do not use out of order trailer until it is repaired.

should be checked regularly during operation of the trailer.

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## 5.9 CLEANING THE AIR FILTERS



### DANGER

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

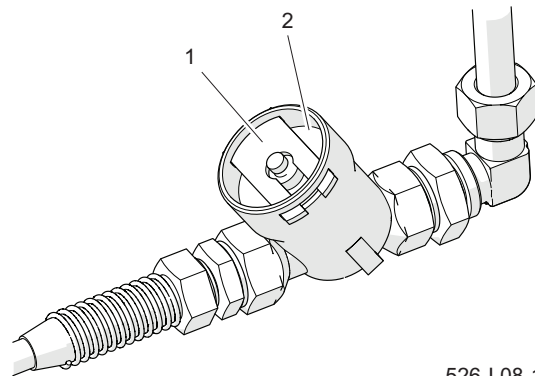
Air filter elements are installed on the connection conduits of the pneumatic system. Filter elements are reusable and are not subject to change unless they are mechanically damaged.

### SCOPE OF ACTIVITIES

- Reduce pressure in supply conduit.

*Pressure in conduit can be reduced by pressing the head of the pneumatic connection until resistance is felt.*

- Slide out the filter slide gate (1).
- Hold the filter cover (2).



526-I.08-1

**Figure 5.7** Air filter

(1) filter slide gate

(2) cover

- Hold the filter cover (2) with the other hand. After removing slide lock, the cover is pushed off by the spring located in the filter housing.
- The filter element and the filter body should be carefully cleaned and blown through with compressed air. Assembly should be done in reverse order.

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## 5.10 CHECKING BRAKE SHOE LININGS FOR WEAR

During use of trailer, friction lining of brake drums is subject to wear. In such a case, the complete brake shoes should be replaced with new ones. Excessive wear of brake shoes is the condition in which the thickness of linings which are glued or riveted to steel structures of brake shoes is smaller than the minimum value.



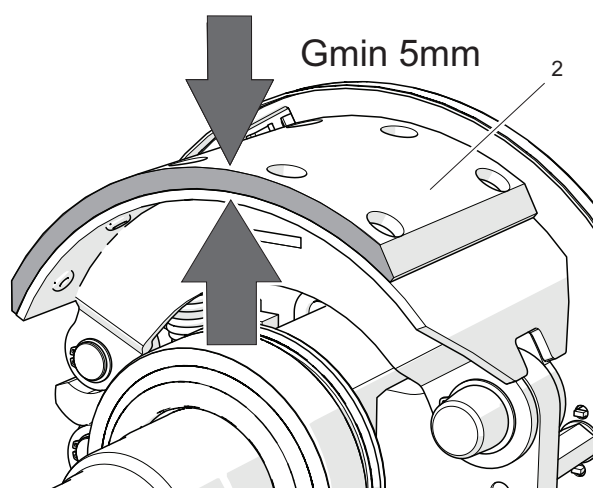
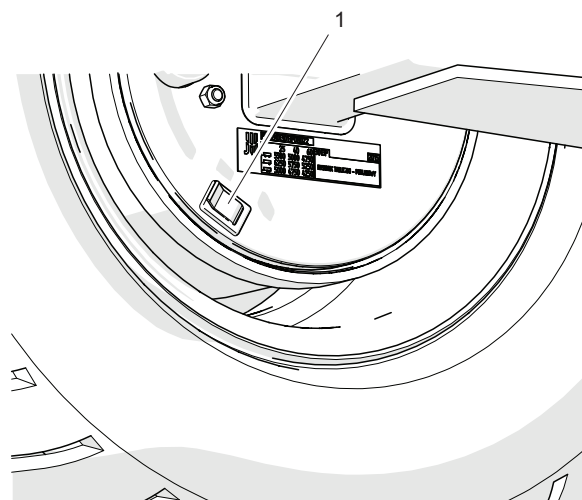
### TIP

Check brake shoe linings for wear:

- according to the inspection schedule,
- if brakes overheat,
- if brake cylinder piston stroke is significantly longer,
- if there are unusual sounds originating from the wheel axle drum area.

### SCOPE OF ACTIVITIES

- Find the inspection opening (depending on the axle version, the inspection opening may be located elsewhere than in the place indicated in the figure; however, it is always located on the brake shield disc).
- Remove the upper plug and lower plug and check the brake shoe lining thickness.



526-I.09-1

**Figure 5.8** Checking thickness of brake shoe linings

(1) plug

(2) brake shoe lining

- Brake shoes should be replaced when the lining thickness is less than 5 mm.
- Check the other linings for wear.

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## 5.11 CHECKING WHEEL AXLE BEARINGS FOR SLACKNESS



### DANGER

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

The lifting jack must be stably supported on the ground and absorber plate.

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

Inspection of bearing slackness may only be conducted when the trailer is hitched to tractor and the load box is empty and not raised.



526-I.10-1

**Figure 5.9** Checking slackness

### SCOPE OF ACTIVITIES

- Hitch trailer to tractor, immobilize tractor with parking brake.
- Position the tractor and trailer to drive forwards, on a hard and level surface.
- Place the wheel chocks under the wheel opposite to the lifted 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 absorber plate fixing the axle to the leaf spring (FIGURE 5.1). Lifting jack must be suitable for the weight of trailer.
- Turn the wheel slowly in both directions. Check that movement is smooth and that the wheel rotates without excessive resistance and jamming (FIGURE 5.9).
- Turn the wheel so that it rotates very quickly, check that the bearing does not make any unusual sounds.
- Moving the wheel try to detect slackness.
- Repeat the procedure for each wheel individually, remembering that the jack must be on the side opposite to the chocks.
- If slackness is felt, adjust bearings (FIGURE 6.3). Unusual sounds coming from bearing may be symptoms of excessive wear, dirt or damage. In such an event the bearing, together with sealing ring, should be replaced with new parts, or cleaned and greased again. During inspection of bearings, ensure that possibly detected slackness comes from the bearing and not from the



suspension system (e.g. slackness of leaf spring pins).

- Check technical condition of hub cover, if necessary replace it with a new one.



If hub cover is damaged or missing, contamination and dampness enter the hub, which causes significantly faster wear of bearings and hub seals. Life of bearings is dependent on working conditions of the trailer, loading, speed of travel and lubrication conditions.

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## 5.12 INSPECTION OF MECHANICAL BRAKES

### **i** TIP

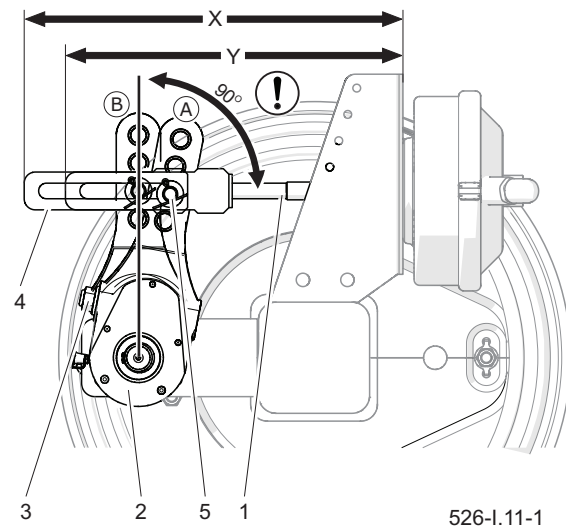
Check technical condition of brakes:

- according to the inspection schedule,
- before the period of intensive use.
- after repair of braking system.
- in case of uneven trailer wheels braking.

If the brake is correctly adjusted, the brake cylinder rod stroke (X-Y) (FIGURE 5.10) should be within the range specified in Table 5.3 and it depends on the cylinder type. At full braking, the optimum angle between the expander lever and the cylinder rod should be about 90°. This setting ensures the best possible braking force. The inspection of brakes consists in measuring this angle and the brake cylinder rod stroke for each wheel.

### SCOPE OF ACTIVITIES

- Measure the X distance when the tractor brake pedal is released.
- Measure the Y distance when the tractor brake pedal is depressed.



**Figure 5.10** Inspection of brake

- (1) cylinder piston rod      (2) expander arm  
 (3) adjusting bolt          (4) cylinder fork  
 (5) pin position  
 (A) position of arm at brake release position  
 (B) position of arm at braking position

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

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## 5.13 CLEANING THE DRAIN VALVE



### DANGER

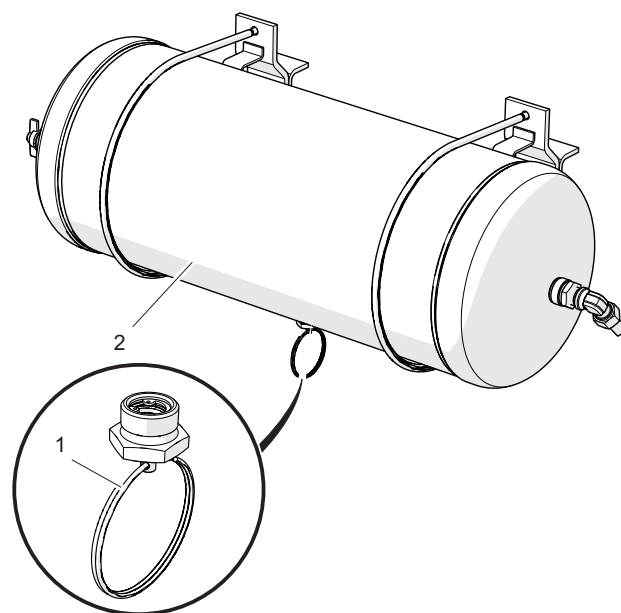
Release air from the air tank before dismantling drain valve.

### SCOPE OF ACTIVITIES

- Completely reduce pressure in air tank (2).

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

- Unscrew valve (1).
- Clean the valve, blow it with compressed air.
- Replace the seal.



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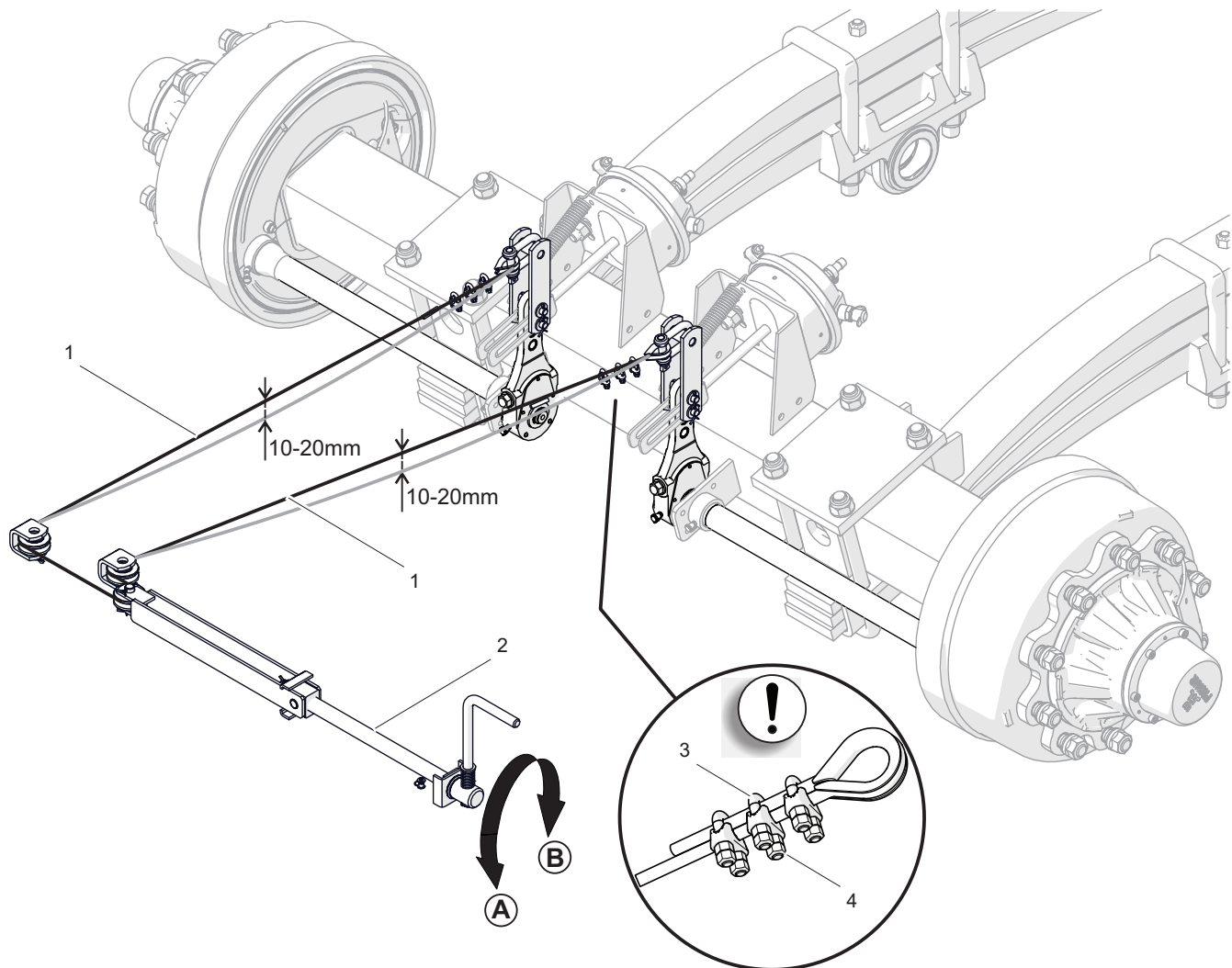
**Figure 5.11** Air tank  
(1) drain valve (2) tank

- Screw in valve, fill tank with air and check tank tightness.

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## 5.14 INSPECTION OF PARKING BRAKE CABLE TENSION



589-I.02-1

**Figure 5.12** Inspection of cable tension  
(1) cable (2) brake mechanism (3) U-shaped clamp (4) clamp nut



### DANGER

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

### INSPECTION OF TENSION

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

- Hitch trailer to tractor. Park trailer and

tractor on level surface.

- Place securing chocks under one trailer wheel.
- Turn the brake mechanism crank (2) in direction (B) to engage the parking brake (FIGURE 5.12).
- Check tension of the cable (1).
- When the brake mechanism bolt is maximally unscrewed, the cable



should be loose and hanging by approximately 10 to 20 mm.

### **ADJUSTMENT OF CABLE TENSION**

- Unscrew the brake mechanism bolt maximally (2) by turning the crank in direction (A).
- Loosen nuts (4) of U-bolt clamps (3) on handbrake cable (1).
- Tighten cable (1) and tighten nuts (4) of the clamps
- Engage the parking brake and

release it. Check (approximate) cable slackness. When the working brake and parking brake are fully released, the cable should be loose and hanging by approximately 10-20 mm.

The axle expander levers should be in their rest position.

Should it be necessary to replace the brake cable, follow the instructions in SECTION 6.2 *Replacement of parking brake cable*.

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## 5.15 INSPECTION OF HYDRAULIC SYSTEM

**DANGER**

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

### **CHECKING HYDRAULIC SYSTEM TIGHTNESS**

- Hitch trailer to tractor. Connect all hydraulic system conduits according to maintenance instructions.
- Clean conduit connections, hydraulic cylinders and connectors.
- Start all hydraulic systems in turn by extending and withdrawing the cylinder piston rods. Repeat the above actions 3-4 times.
- Leave the hydraulic cylinders in the maximally extended position. Check all hydraulic circuits for tightness.
- After completed inspection, fold all cylinders to their rest position.

If oil is found on hydraulic cylinder body, check origin of leak. Inspect seals when hydraulic cylinder is completely extended. Minimum leaks are permissible with symptoms of "sweating", however in the event of noticing leaks in the form of

"droplets" stop using the trailer until faults are remedied. If unreliability is evident in brake cylinders, do NOT use trailer with damaged system until faults are remedied. If leaks appear at conduit connections then tighten the connections using the specified torque and recheck the connections. If the problem still exists, replace the leaky component. Rubber hydraulic conduits must be replaced every 4 years regardless of their technical condition. This should be done in specialised workshops.

### **CHECKING TECHNICAL CONDITION OF HYDRAULIC CONNECTIONS**

Hydraulic connections for connecting the trailer to tractor must be technically reliable and kept 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 (jamming of hydraulic valves, scratching of cylinder surfaces etc.)

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## 5.16 INSPECTION OF PNEUMATIC SYSTEM

**DANGER**

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

### SCOPE OF ACTIVITIES

- Hitch trailer to tractor.
- Immobilise tractor and trailer with parking brake. Place chocks under trailer rear wheel.
- Start tractor in order to supplement air in trailer brake system tank.
- Turn off tractor engine.
- Check system components by releasing brake pedal in tractor.
- Pay particular attention to conduit connections and brake cylinders.
- Repeat the system check with depressed tractor brake pedal.

In the event of the appearance of leaks, compressed air will escape at the places of damage, with a characteristic hiss. Lack of system tightness may be detected by covering elements to be checked with

washing fluid or other foaming preparations, which will not react aggressively with the system components. Damaged components should be replaced or repaired. If leaks appear at connections then tighten the connections. If air continues to escape, replace connection components or seals with new ones.

During tightness inspection attention should additionally be given to technical condition and degree of cleanness of the system components. Contact of pneumatic conduits, 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.

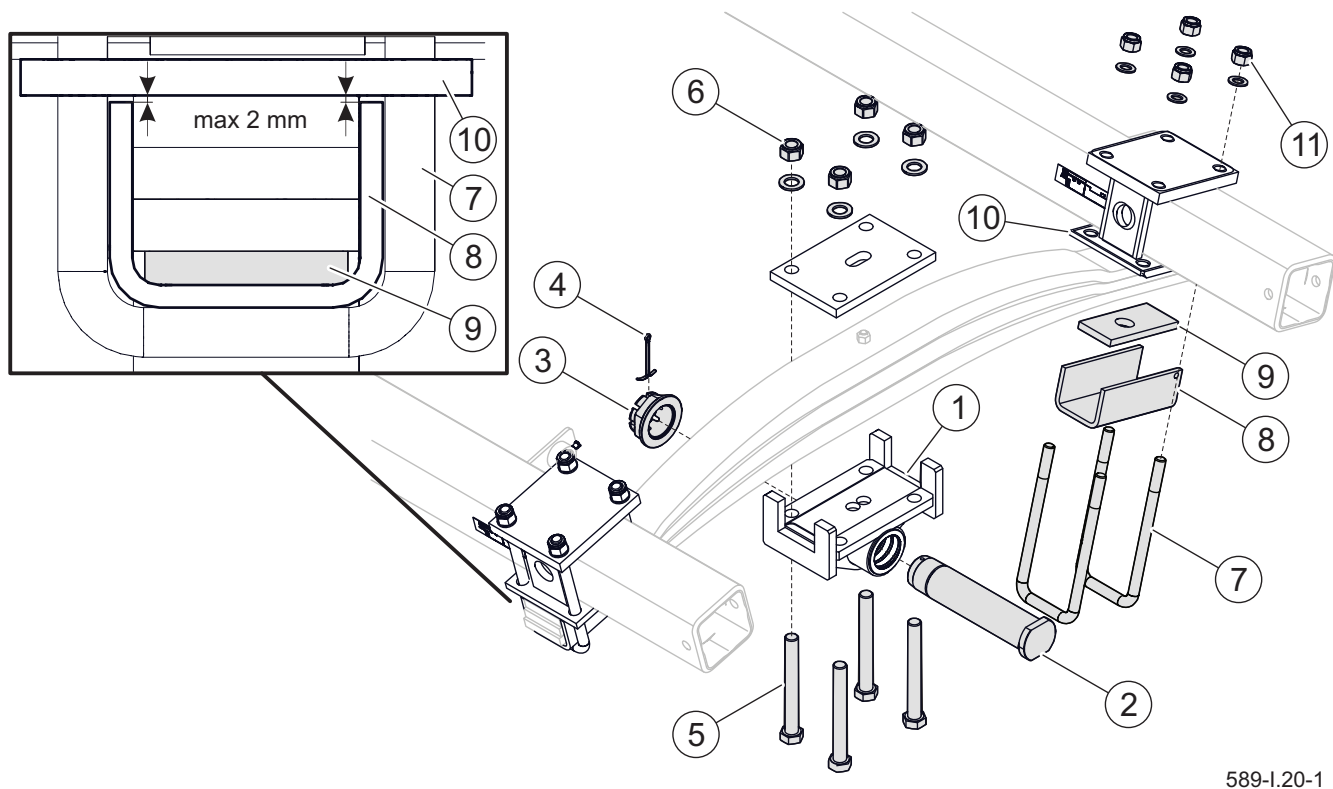
**DANGER**

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

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## 5.17 MAINTENANCE OF SUSPENSION SYSTEM



589-I.20-1

**Figure 5.13** Mechanical suspension system maintenance

(1) leaf spring bracket (2) pin (3) pin nut (4) securing cotter pin (5) leaf spring bracket bolts (6) nut (7) U bolt (8) leaf spring clamping ring (9) rubber pad (10) absorber plate (11) U bolt nut



### ATTENTION

Bolt and nut connections of the trailer's suspension system should be tightened under load.

### INSPECTION OF TIGHTENING OF U BOLT NUTS OF WHEEL AXLES

Tightening of nuts (11) (FIGURE 5.13) of U bolts (7) of wheel axles should be checked using a torque wrench with a set torque of 550 Nm. The inspection should be carried out cyclically: the first inspection after traveling 50 km with a load or after 500 working hours, the next inspection after 5000 km or after 1500 working hours, then once a year.

### INSPECTION OF TIGHTENING OF LEAF SPRING BRACKET NUTS

Tightening of nuts (6) of bolts (5) of leaf spring bracket (1) should be checked using a torque wrench with a set torque of 725 Nm. The inspection should be carried out cyclically: the first inspection after traveling 50 km with a load or after 500 working hours, the next inspection after 5000 km or after 1500 working hours, then once a year.



**INSPECTION OF NUTS OF ROCKER ARM PINS**

Nuts (3) of rocker arm pins (2) should be checked cyclically once a year. The inspection consists in checking the condition of the securing cotter pin (4).

**INSPECTION OF THE ROCKER ARM PIN SEAT AND THE LEAF SPRING BRACKET SLEEVE**

Inspection of the rocker arm pin seat (2) should be carried out every 5000 km or every quarter. The inspection involves visual assessment of the wear of the securing seats in the sleeves welded in the brackets (1) of the leaf spring. Wear on the seats indicates improper lubrication of the

pin (2). In this case, dismount the rocker arm pin and the rocker arm, assess the wear of the pin and the slide sleeves, and replace them if necessary.

**INSPECTION OF RUBBER PADS OF LEAF SPRING**

Rubber pads (9) should be checked once a year. The inspection involves visual assessment of the adhesion of the leaf spring clamping ring (8) to the absorber plate (10). If there is a gap of more than 2 mm between the leaf spring clamping ring and the absorber plate, the rubber pad (9) must be replaced.

**TIP**

If the trailer is operated in severe conditions or is operated intensively, the maintenance activities should be performed more frequently.

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## 5.18 LUBRICATION



### ATTENTION

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

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

Parts to be lubricated with machine oil should be wiped with dry clean cloth. Apply oil to their surfaces using a brush or oil can. Wipe off excess oil.

Change of grease in hub bearings should be made at specialised service points, equipped with the appropriate tools. In order to conduct this lubrication, the complete hub should be disassembled as well as bearings and individual sealing rings should be removed. After careful washing and inspection, mount lubricated elements. If necessary, bearing and seals should be replaced with new ones.

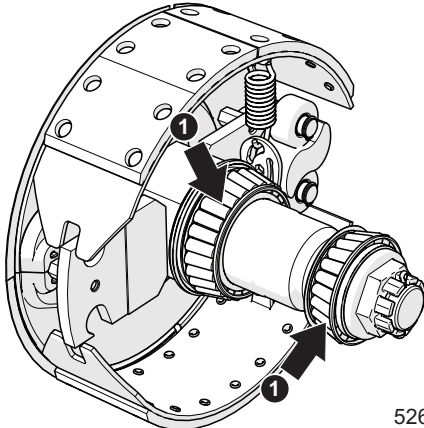
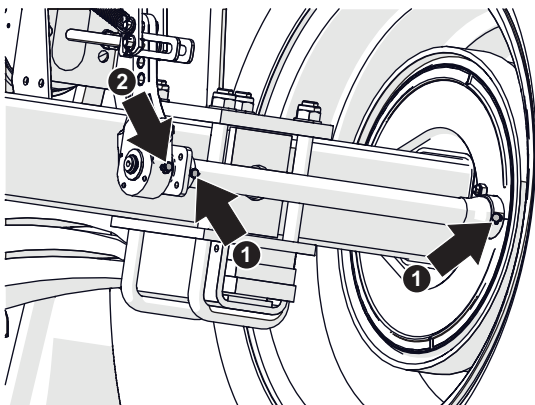
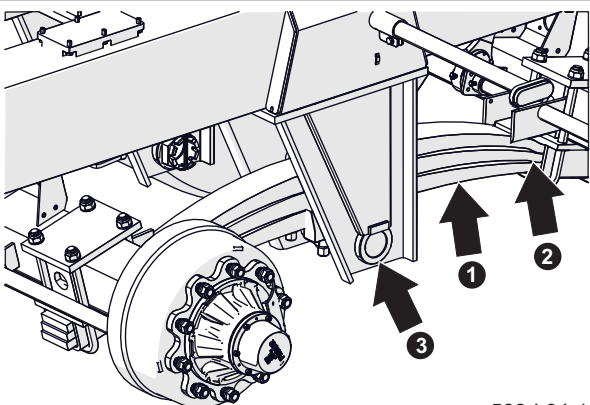
Before beginning to grease leaf springs remove contamination, wash with water and leave to dry. Do not use pressure washers, which may cause moisture

penetration between individual leaf spring plates. Absorber plates should be lubricated using an agent having both anticorrosion and lubricating properties, it is recommended to apply on outer leaf spring surfaces very thin layer of lithium or lime alkali grease. For this purpose, silicone spray (for lubricating guides, locks, etc.) can be used. Sliding surface of leaf spring and leaf spring pin should be lubricated according to recommendations contained in Table 5.4.

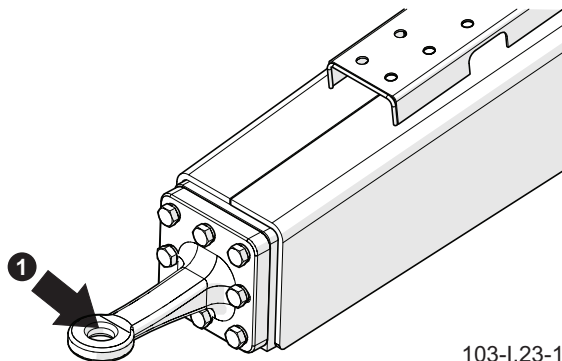
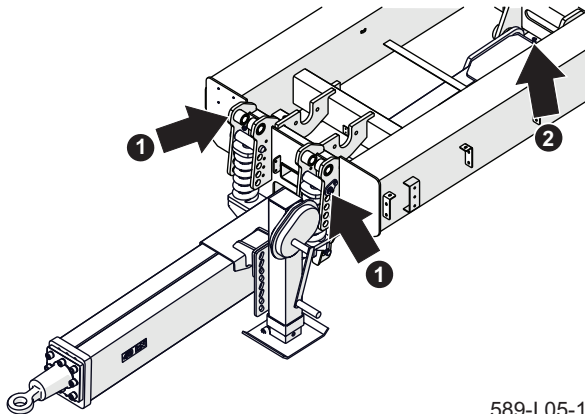
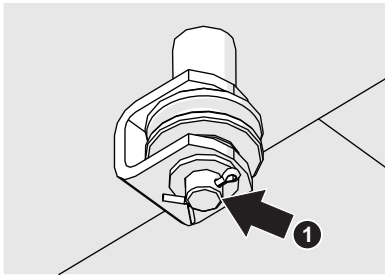
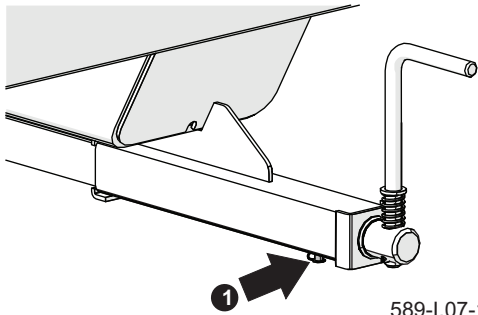
Empty grease or oil containers should be disposed of according to the recommendations of the lubricant Manufacturer.



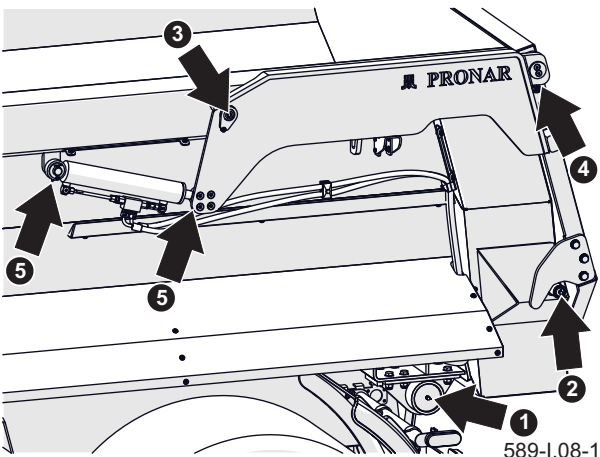
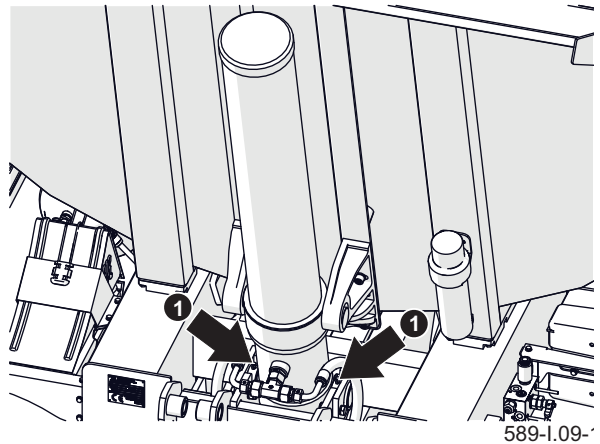
**Table 5.4** Trailer lubrication schedule

Name	Number of lubrication points	Type of grease	Frequency	
Hub bearings (1) (2 bearings in each hub)	4	A	24M	 526-I.19-1
Expander shaft sleeves (1)	8	A	3M	 589-I.03-1
Expander arm (2)	4	A	3M	
Leaf springs (1)	4	C	3M	 589-I.04-1
Leaf spring sliding surface (2)	4	B	1M	
Leaf spring pin (3)	2	B	1M	



Name	Number of lubrication points	Type of grease	Frequency	
Drawbar hitching eye (1)	1	A	14D	 <p>103-I.23-1</p>
Spring securing pin (1)	2	B	3M	 <p>589-I.05-1</p>
Drawbar pin (2)	1	B	3M	
Brake cable guide wheel axle (1)	3	A	6M	 <p>589-I.06-1</p>
Handbrake mechanism (1)	1	A	6M	 <p>589-I.07-1</p>



Name	Number of lubrication points	Type of grease	Frequency	
Load box tipping axle (1)	2	B	3M	
Pins of tailgate hooks lock (2)	2	B	3M	
Tailgate wings swing pins (3)	2	B	3M	
Pins of tailgate hinges (4)	2	B	3M	
Bearings of tailgate cylinders (5)	4	B	3M	
Cylinder fixing sleeves (1)	2	B	6M	

**Table 5.5** Meaning of symbols in Table 5.4

Symbol	
<b>Type of grease</b>	
A	machine general-purpose grease (lithium, calcium grease),
B	permanent grease for heavily loaded elements with addition of MoS <sub>2</sub> or graphite
C	anticorrosion preparation in aerosol
<b>Frequency</b>	
D	working day (8 hours of trailer use)
M	month



5.19 INSPECTION OF NUT AND BOLT CONNECTIONS

TIGHTENING TORQUE FOR NUT AND BOLT CONNECTIONS

Unless other tightening parameters are given, during maintenance repair work apply appropriate torque to tighten nut and bolt connections. Recommended tightening torque values for the most frequently used bolt and nut connections are given in Table 5.6. Given values apply to non-lubricated steel bolts.

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

Tightening torque should be checked using a torque wrench according to instructions

Table 5.6 Tightening torque values

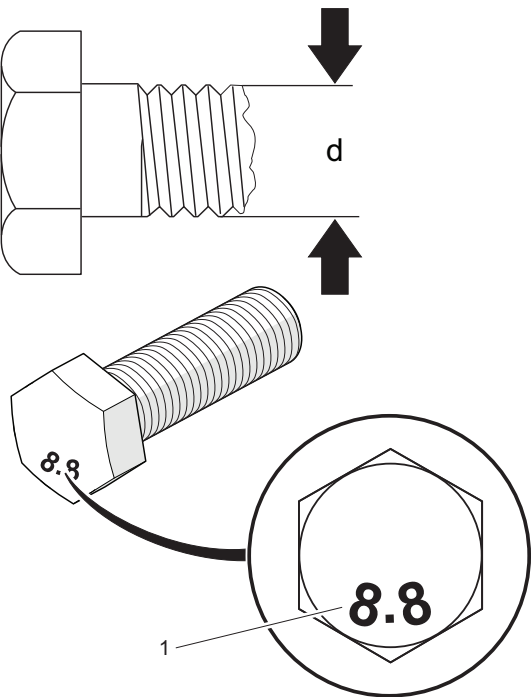
Thread	Tightening torque		
	5.8(*)	8.8(*)	10.9(*)
M8	18	25	36
M10	37	49	72
M12	64	85	125
M14	100	135	200
M16	160	210	310
M20	300	425	610
M24	530	730	1 050
M27	820	1 150	1 650
M30	1 050	1 450	2 100

(\*) – resistance class according to DIN ISO 898 standard

in section *Tightening of wheel nuts* and Table 5.7 *Inspection schedule for bolt and nut connections*. During daily inspection of the trailer, pay attention to loosen connections and tighten them, if necessary. Lost components must be replaced with new ones.

TIGHTENING OF WHEEL NUTS

Wheel nuts should be tightened gradually and diagonally (in several stages, until the required tightening torque is obtained) using a torque wrench. See FIGURE 5.15 for the recommended nut tightening sequence and tightening torque value.



589-I.10-1

Figure 5.14 Bolt with metric thread.  
(1) resistance class, (d) thread diameter

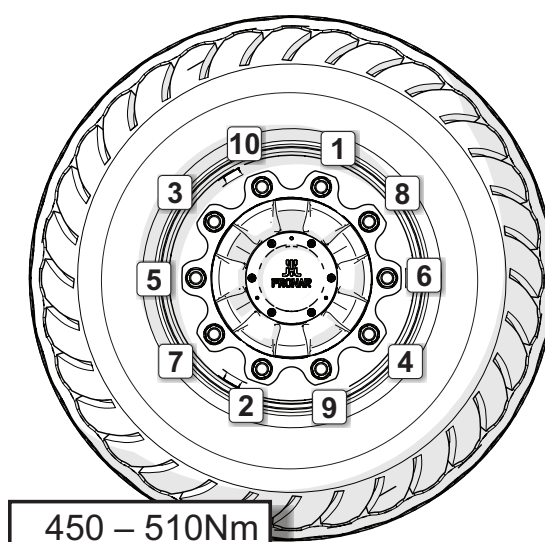


Wheel nuts must not be tightened with impact wrench because of danger of exceeding permissible tightening torque, the consequence of which may be breaking the connection thread or breaking off the hub pin.

Wheel nuts should be tightened:

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

The above activities should be repeated if

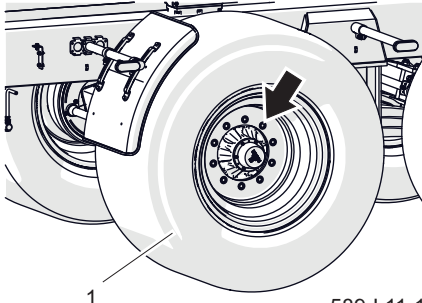
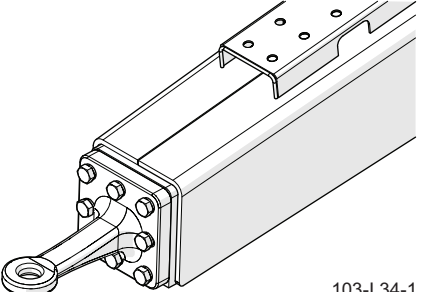


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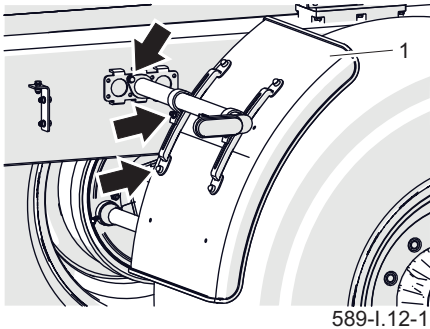
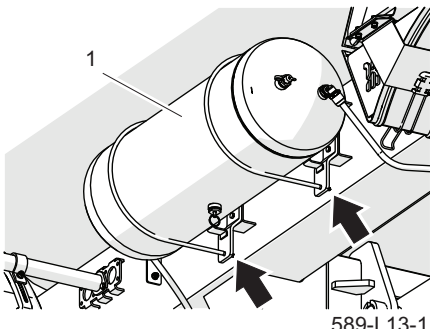
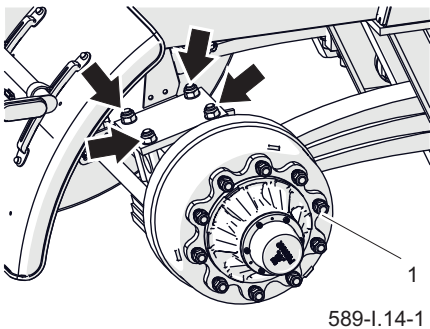
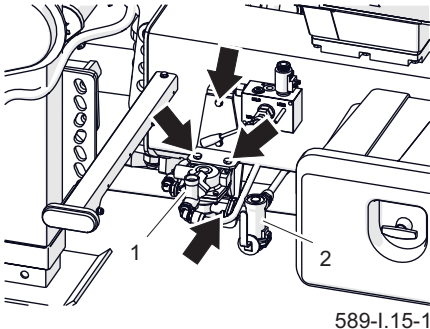
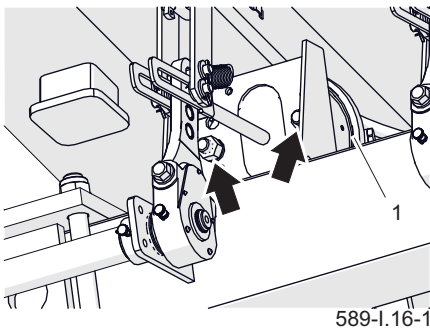
**Figure 5.15** Sequence of nut tightening

a wheel has been removed from the wheel axle.

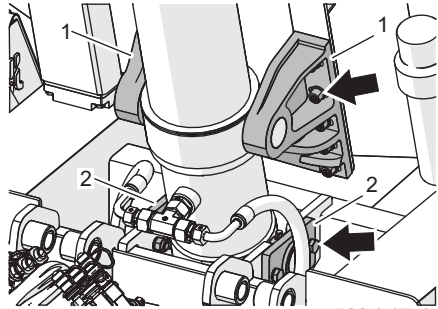
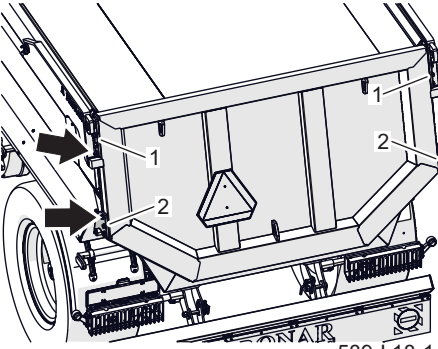
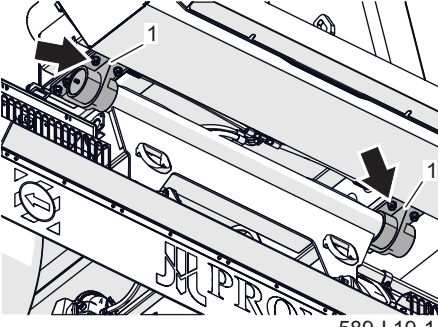
**Table 5.7** Inspection schedule for bolt and nut connections

System / part name	Frequency	
Wheel nuts (1)	acc. to section <i>Tightening of wheel nuts</i>	 589-I.11-1
Connection of hitch with drawbar	3M	 103-I.34-1



System / part name	Frequency	
Mudguards (1)	6M	
Tank	6M	
Wheel axle (1), (fixing of wheel axle with U bolts)	See section: <i>Maintenance of suspension system</i>	
Control valve (1), braking force regulator (2)	6M	
Brake cylinder (1)	3M	



System / part name	Frequency	
Fixing of brackets (1) and sleeve (2) of tipping cylinder	3M	 <p>589-I.17-1</p>
Fixing of hinges (1) and hooks (2) of tailgate	3M	 <p>589-I.18-1</p>
Fixing of hinges (1) of load box	3M	 <p>589-I.19-1</p>

Frequency: M - month

I.3.2.589.18.1.EN







# SECTION 6

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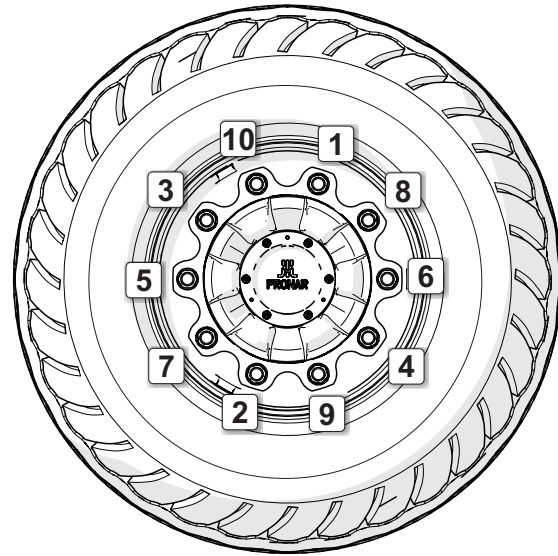
MAINTENANCE



## 6.1 WHEEL MOUNTING AND DISMOUNTING

### WHEEL DISMOUNTING

- Immobilise trailer with parking brake.
- Place the wheel chocks under the wheel opposite to the dismantled wheel.
- Ensure that trailer shall not move during wheel dismantling.
- Loosen wheel nuts according to the sequence shown in FIGURE 6.1.
- Place a lifting jack and raise the trailer to a sufficient height so that the wheel to be replaced does not touch the ground. The lifting jack should have sufficient lifting capacity and should be technically reliable. The lifting jack must be positioned on a level and hard surface so as to prevent sinking into the ground or relocating the jack during lifting. If necessary, use proper backing plates in order to reduce unit pressure of the jack's base on the ground and prevent its sinking into the ground.
- Dismount wheel.



526-I.14-1

**Figure 6.1** Sequence of undoing and tightening nuts

### WHEEL MOUNTING

- Clean axle pins and nuts of contamination.

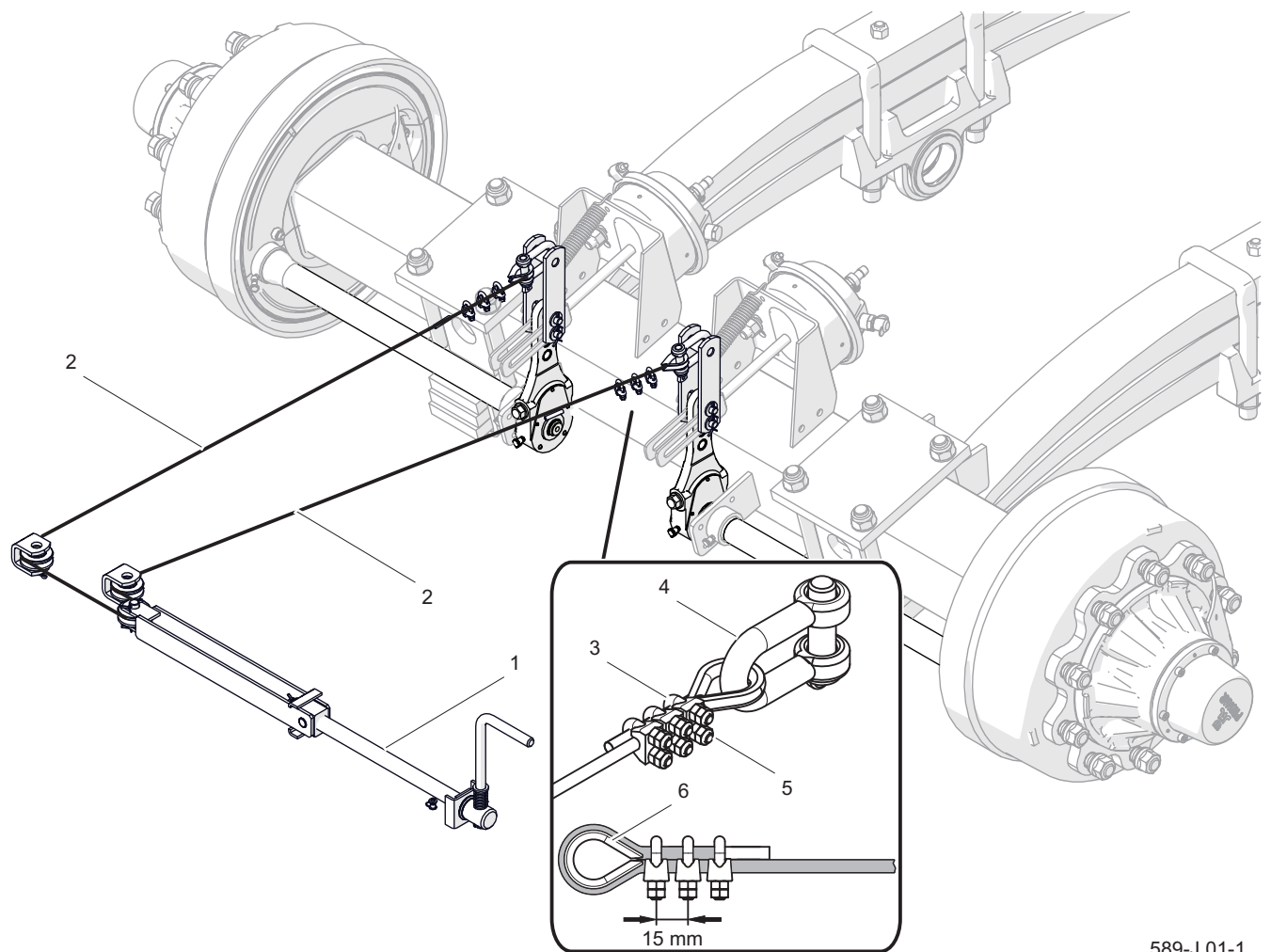
*Do not grease the thread of nuts and pins.*

- Check condition of pins and nuts, if necessary replace them.
- Place wheel on hub, tighten nuts so that wheel rim tightly fits the hub.
- Lower the trailer, tighten nuts according to recommended torque and given sequence (SECTION 5.18).

J.3.2.589.01.1.EN



## 6.2 REPLACING THE PARKING BRAKE CABLE



589-J.01-1

**Figure 6.2** Replacing the parking brake cable

(1) brake mechanism, (2) brake cable, (3) clamp, (4) shackle, (5) clamp nut, (6) thimble

### SCOPE OF ACTIVITIES

- Hitch trailer to tractor. Park trailer and tractor on level surface.
- Place securing chocks under one trailer wheel.
- Fully unscrew the bolt of the brake crank mechanism (1) (FIGURE 6.2).
- Loosen the nuts (5) of U-shaped clamps (3).
- Dismantle shackles (6), clamps and cable (2).
- Clean the parking brake components.
- Lubricate parking brake crank mechanism (1) and pins of cable guide rollers.
- Install shackle and U-shaped clamps on one end of cable (2). Make certain that clamps are correctly installed.
- Attach one end of cable, install shackle pin and secure it with new cotter pins.
- Pass the other end of the cable



through guide rollers and attach the

**ATTENTION**

Clamp jaws must be placed at the load bearing cable side (FIGURE 6.2).

Protect the cable ends using a heat shrink tubing.

The distance between the clamps should be 15 mm. The first clamp must be located as close as possible to the thimble.

other end of the cable in the same way.

- Adjust tension of the cable (SECTION 5.14).
- Tighten the nuts.
- Tighten the crank mechanism cable and then loosen it. If necessary, correct the brake cable tension.

J.3.2.589.02.1.EN



## 6.3 ADJUSTMENT OF AXLE BEARING SLACKNESS



### ATTENTION

Adjustment of bearing slackness may only be conducted when the trailer is hitched to tractor and the load box is empty.

### SCOPE OF ACTIVITIES

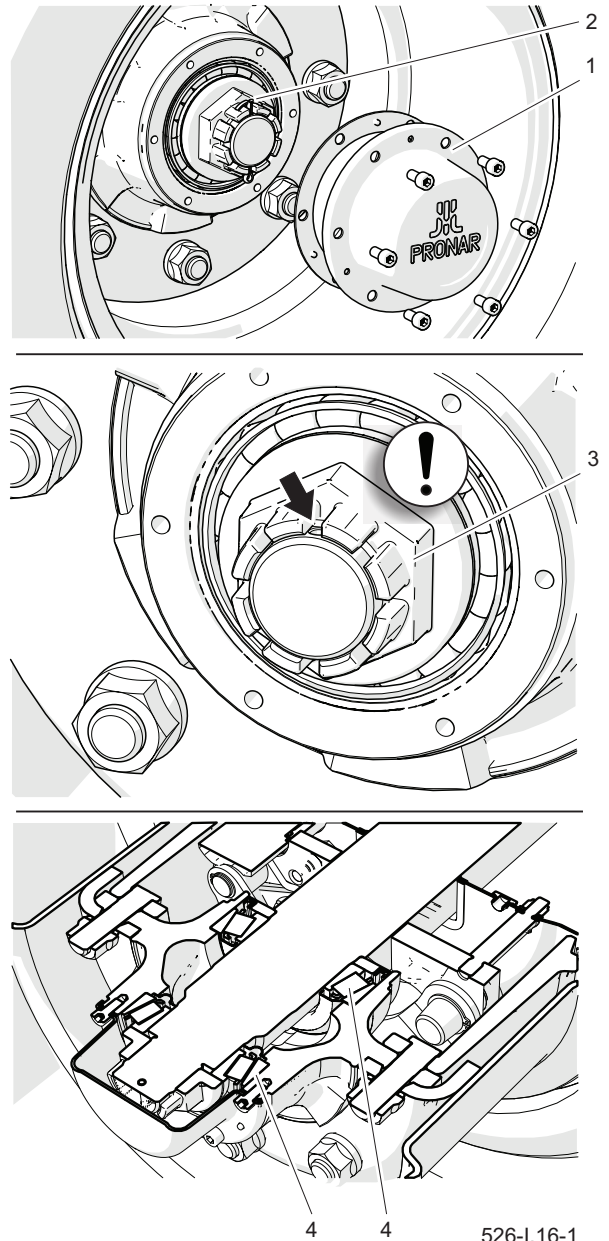
- Prepare tractor and trailer for adjustment procedures according to description in SECTION 5.11.
- Take off hub cover (1).
- Take out cotter pin (2) securing castellated nut (3).
- Tighten castellated nut in order to eliminate slackness.

*Wheel should rotate with insignificant resistance.*

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

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

- Secure castellated nut with cotter pin



**Figure 6.3** Bearing slackness adjustment principle

(1) hub cover

(2) cotter pin

(3) nut

(4) cone bearing

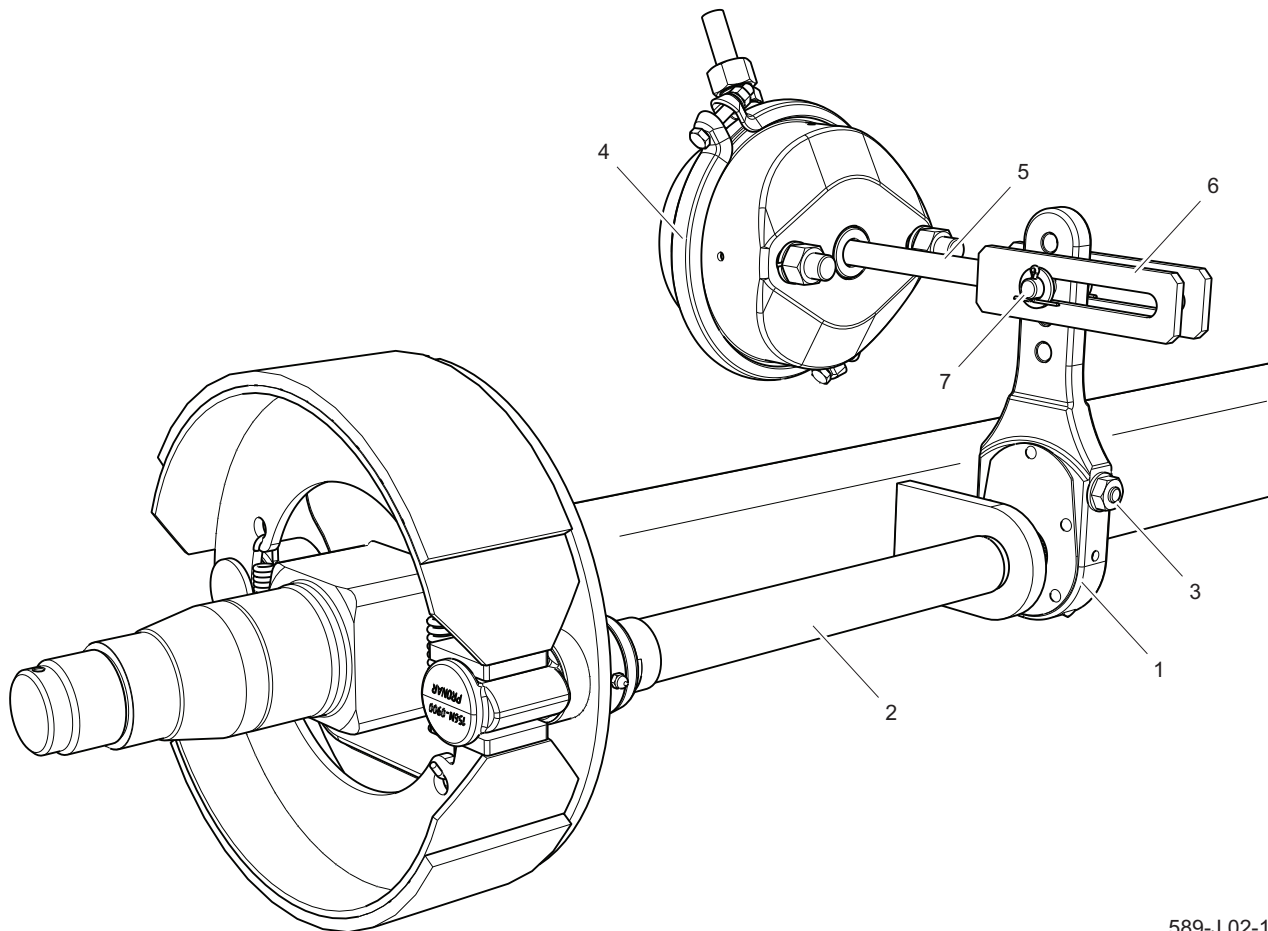
and mount hub cover (1).

- Delicately tap the hub cap with rubber or wooden mallet.

J.3.2.589.03.1.EN



## 6.4 BRAKE ADJUSTMENT



589-J.02-1

**Figure 6.4** Design of pneumatic wheel axle brake

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

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

During braking, the brake cylinder piston



### TIP

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

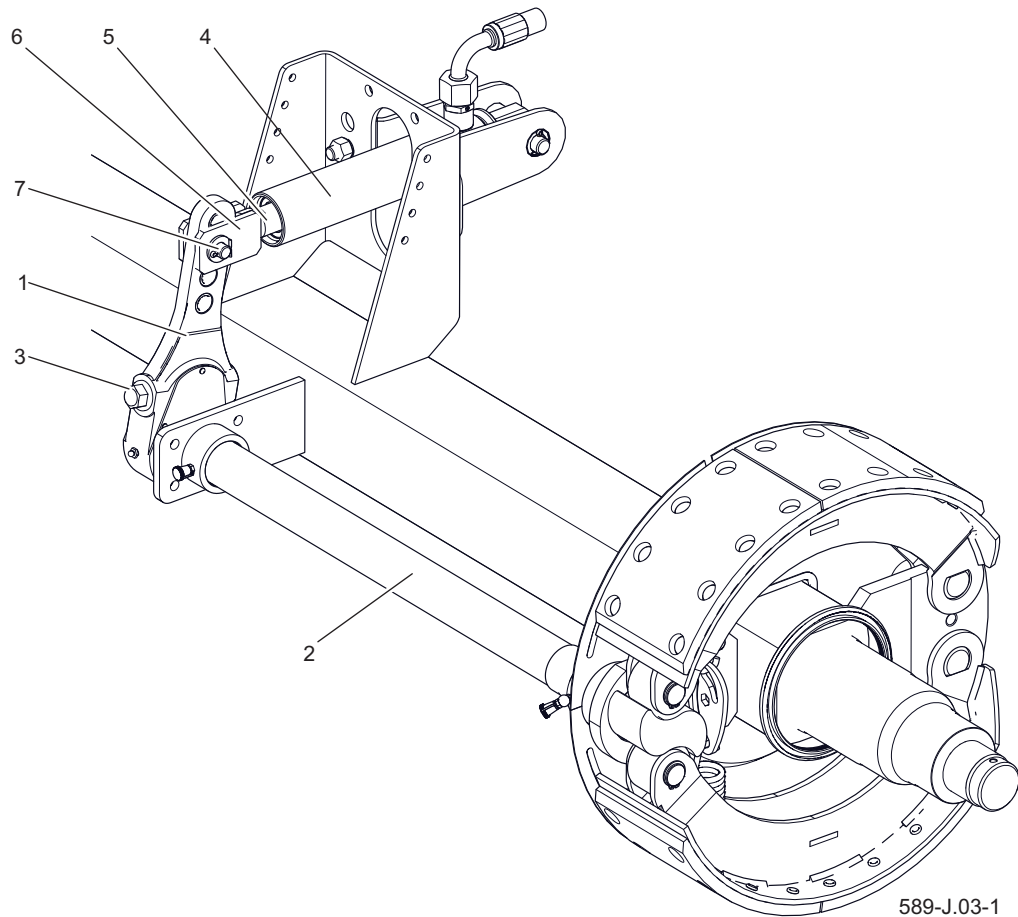
stroke should be within the specified operating range and the angle between brake cylinder piston (1) and expander arm (3) should be about 90° (FIGURE 6.6,

FIGURE 6.7). Trailer wheels must brake simultaneously.

Braking force decreases also when the operating angle of brake cylinder rod (5) (FIGURE 6.4, FIGURE 6.5) in relation to expander arm (1) is wrong. In order to obtain the optimum mechanical operating angle, the cylinder piston fork (6) must be installed on the expander arm (1) in such a manner as to ensure that the operating angle at full braking is about 90°.

The inspection involves measuring the





**Figure 6.5** Design of hydraulic wheel axle brake

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



#### ATTENTION

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

and size of the trailer tires. It is selected by the manufacturer and cannot be changed.

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

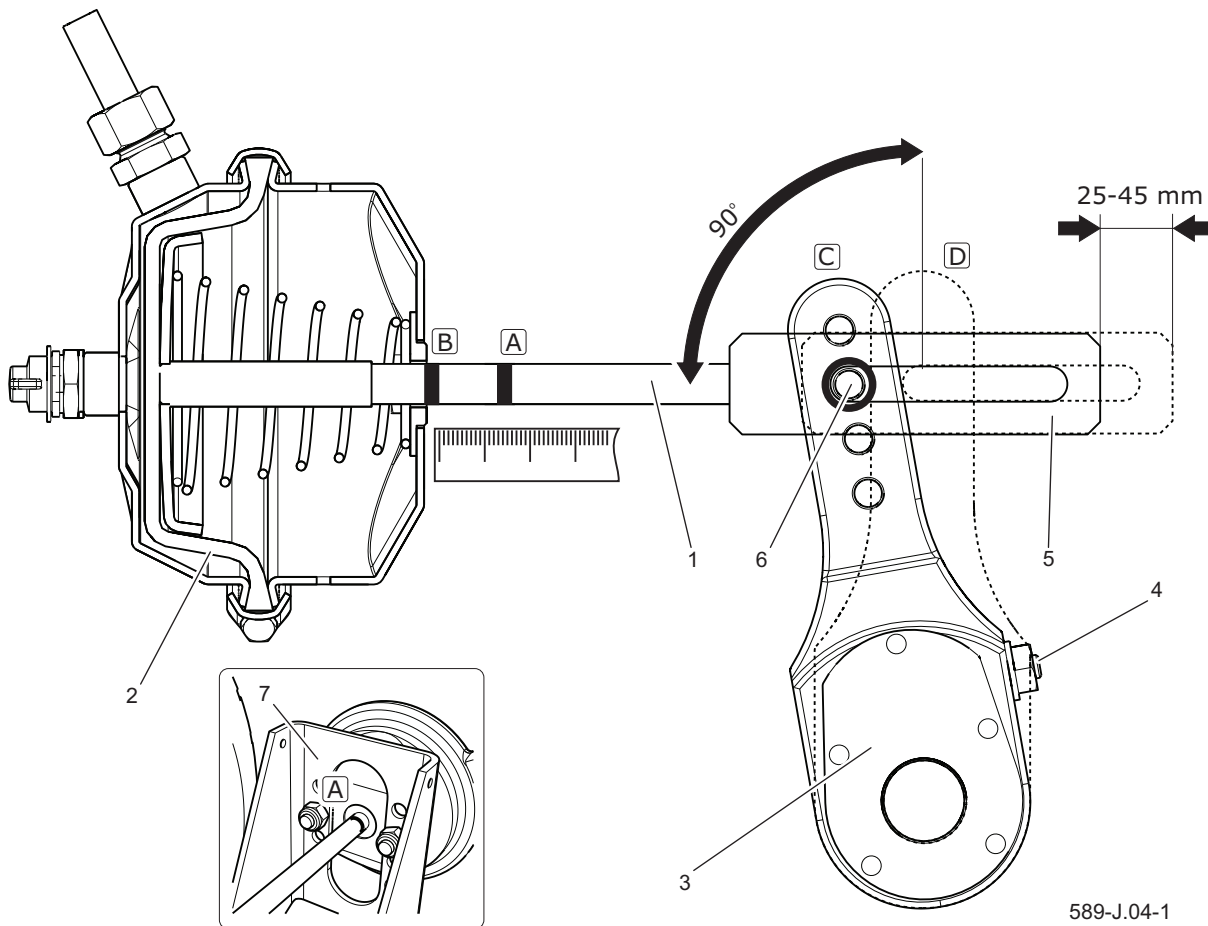
During dismantling of cylinder fork (6), remember or mark the original position of cylinder fork pin (7) Mounting position depends on the type of the braking system



#### ATTENTION

The positions for fixing the brake cylinder in the bracket openings and the brake cylinder pin in the expander arm are determined by the Manufacturer and must not be changed. Each time when dismantling the pin or brake cylinder, the original fixing position should be marked.





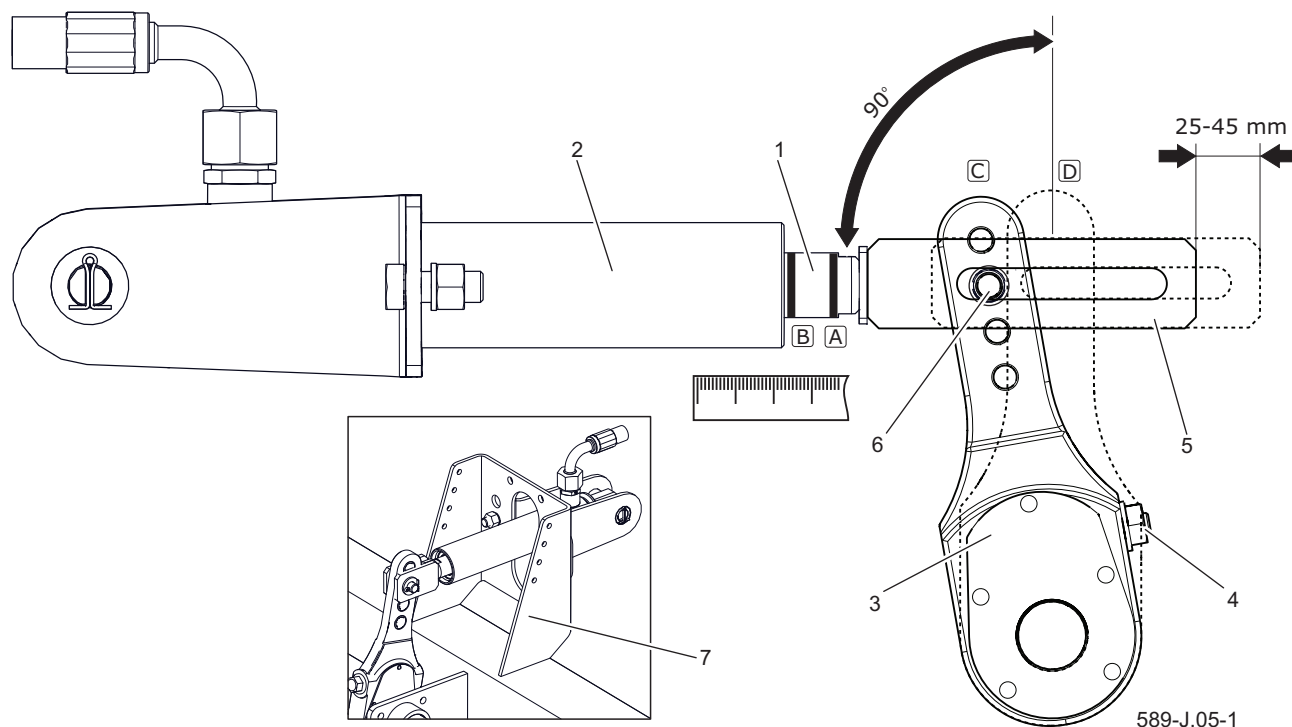
**Figure 6.6** Principle of pneumatic brake adjustment

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

## SCOPE OF ACTIVITIES

- Hitch trailer to tractor.
- Turn off tractor engine and remove key from ignition.
- Immobilise the tractor with parking brake.
- Make sure that the trailer's brakes are not engaged.
- Secure the trailer against moving by placing wheel chocks.
- Make a line (A) on brake cylinder piston (1) (FIGURE 6.6, FIGURE 6.7) to indicate the position of the maximum withdrawal of brake cylinder piston rod when the trailer's brakes are released.
- Press the tractor brake pedal and mark the position of the maximum extension of the brake cylinder piston rod with a line (B).
- Measure the distance between lines (A) and (B). If the stroke of the brake cylinder piston rod is outside the proper operating range (25-45mm), adjust the expander arm.
- Dismantle brake cylinder fork pin (6).





**Figure 6.7** Principle of hydraulic brake adjustment

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

- Remember or mark the original position of pin (6) in expander arm opening (3).
- Check if the brake cylinder piston rod moves freely and within the whole nominal range.
- Check if the brake cylinder vent holes are not blocked with impurities and that there is no water or ice inside the brake cylinder (pneumatic cylinder). Check if the brake cylinder is correctly installed.
- Clean the brake cylinder. If necessary, defrost the brake cylinder and drain water through the unblocked vent holes. (pneumatic cylinder). Replace damaged brake cylinder with a new one. When installing the brake cylinder, maintain its original position with regard to bracket (7).
- Rotate adjustment bolt (4) to align the marked expander arm opening with the brake cylinder fork opening.



#### ATTENTION

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

*During the adjustment, membrane (2) must rest on the rear wall of the brake cylinder (FIGURE 6.6) - (pneumatic cylinder).*



- Install the brake cylinder fork pin and washers and secure the pin with cotter pins.
- Rotate adjustment bolt (4) to the right until one or two clicking sounds are heard in the expander arm regulating mechanism.
- Repeat adjustment activities for the other brake cylinder on the same axle.
- Engage the brake.
- Remove previous marks and measure the brake cylinder piston rod stroke again.

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

### **CHECKING THE BRAKE OPERATION**

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

J.3.2.589.04.1.EN



## 6.5 MAINTENANCE OF ELECTRICAL SYSTEM AND WARNING ELEMENTS



### ATTENTION

Do NOT travel with out of order lighting system. Damaged lamp lenses must be replaced immediately before travelling. Lost or damaged reflectors must be replaced.  
Before driving off, make certain that all lamps and reflectors are clean.

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

The duties of the user include only technical inspection of electrical system and reflectors.

### SCOPE OF ACTIVITIES

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



### TIP

Light-emitting diodes (LED) are used as the source of light. Damaged lights can be replaced only as complete units. It is impossible to repair or regenerate them.

J.3.2.589.05.1.EN



6.6 CONSUMABLES

HYDRAULIC OIL

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

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

is not necessary, but if required, this operation should be entrusted to a specialist service point.

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

Table 6.1 L-HL 32 Lotos oil characteristics

Item	Name	Unit	
1	ISO 3448VG viscosity classification	-	32
2	Kinematic viscosity at 40°C	mm²/s	28.8 – 35.2
3	ISO 6743/99 quality classification	-	HL
4	DIN 51502 quality classification	-	HL
5	Flash-point	C	230



of carbon dioxide, foam or steam extinguishers. Do not use water to quench oil fires.

### **LUBRICANTS**

For heavily loaded parts it is recommended to apply lithium greases with addition of molybdenum disulphide ( $\text{MoS}_2$ ) or graphite. In the case of less loaded sub-assemblies, the application of general purpose machine greases is recommended which contain anticorrosive additives and have significant resistance

to being washed away by water. Aerosol preparations (silicon greases and anti-corrosive-lubricating substances) should have similar characteristics.

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

J.3.2.589.06.1.EN



## 6.7 TROUBLESHOOTING

**Table 6.2** Troubleshooting

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



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



Side crack.	Prolonged use of tyre with low air pressure. Excessive loading of the trailer.	Regularly check air pressure in tyres. Check weight of load while loading.
Abrasions on external side edge of tyre.	Too frequent driving over sharp or high obstacles (e.g. curbs).	Control driving technique.
Damaged rim (hardening and cracking near rim), brittleness of tyre.	Incorrect braking technique. Too frequent violent braking. Damaged brake system.	Check brake system. Control braking technique. Damage occurs due to excessive heating of hub which leads to heating of wheel.

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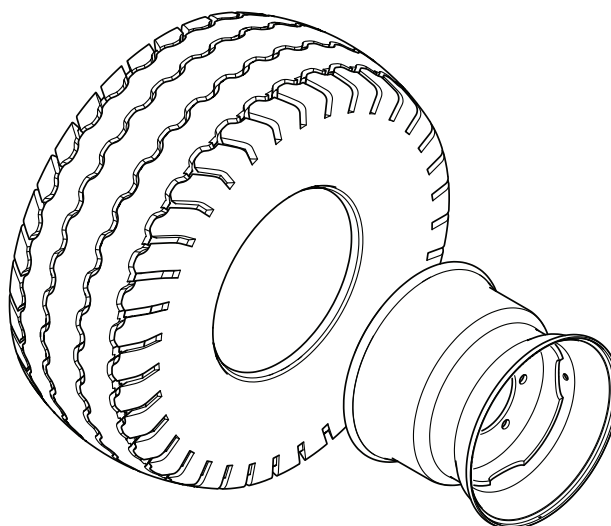


# SECTION 7

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TYRE SYSTEM



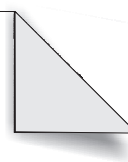


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**Table 7.1** Trailer tyres

Item	Tyre dimensions	Wheel rim size	Tyre pressure
1	550/60- 22,5 171A8	16.00x22.5H2; ET=-30	340 kPa
2	445/65 R22,5 168K TL 445/65 R22,5 169J TL 445/65 R22,5 169K TL 445/65 R22,5 169F TL	14.00x22.5; ET=-30	550 kPa
3	600/55R26,5 176A8 (165D) 600/55R26,5 175A8 (165D)	20.00x26.5H2; ET=0	320 kPa
4	560/60 R22,5 161D 560/60 R22,5 164D	16.00x22.5H2; ET=-30	400 kPa
5	600/50R22,5 170A8	20.00x22.5; ET=0	400 kPa
6	600/55R22,5 175A8 (162E) 600/55R22,5 172A8 (162D)	20.00x22.5; ET=-20	400 kPa
7	620/50R22,5 172A8 (161D)	20.00x22.5H2; ET=-40	400 kPa
8	650/50R22,5 163E (175A8)	20.00x22.5; ET=-40	400 kPa





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