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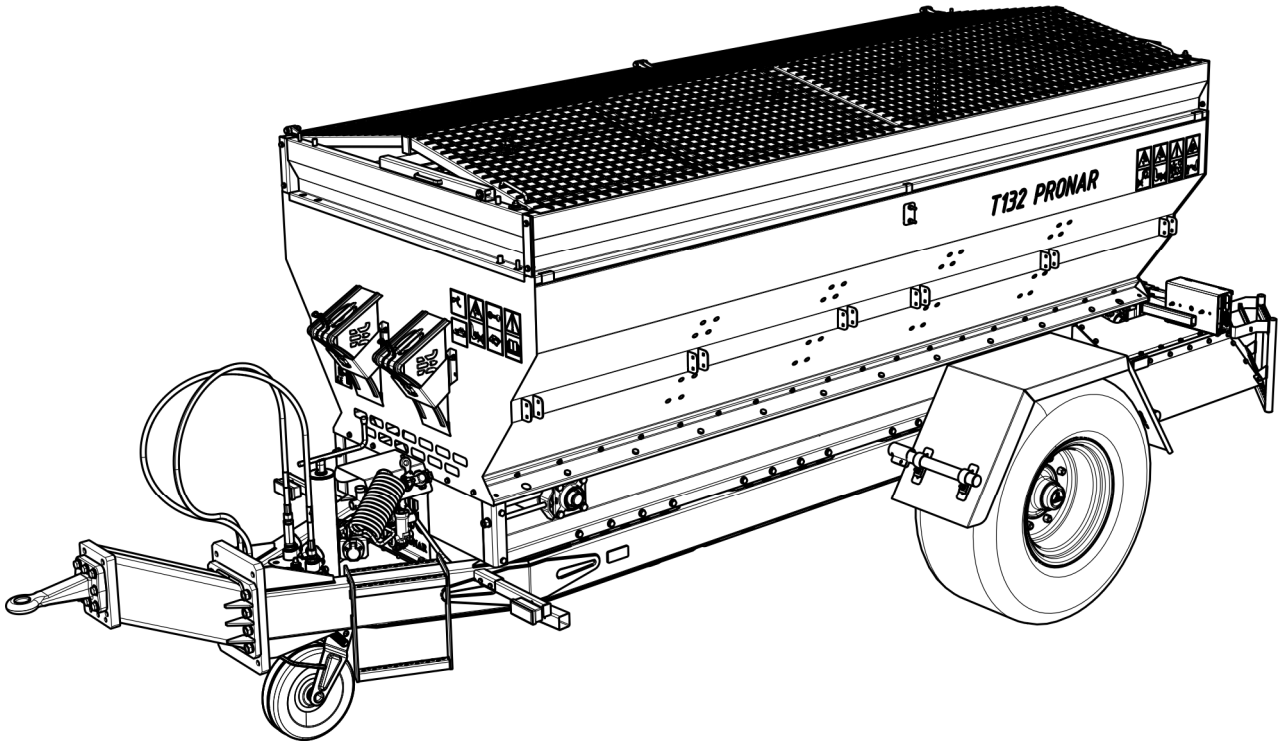
OPERATING MANUAL

PRONAR T132

SPREADER

TRANSLATION OF THE ORIGINAL COPY OF THE MANUAL



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INTRODUCTION

The information included in this document is current as at the date of preparation. Due to improvements, some of the sizes and images included in this text may not correspond to the current condition of the machine supplied to the user. The manufacturer reserves the right to introduce structural changes in the machines to facilitate its use and improve the quality of their operation, without modifying the contents of this publication. This operating manual constitutes the basic equipment of the machine. Before operation, the user must read the contents of this manual and follow all provided recommendations. This will ensure safe handling and trouble-free operation. The machine was designed in accordance with the applicable standards, documents, and current regulations.

This manual describes general rules for the safe operation and handling of the Pronar T132 one axle spreader.

Should the information provided in this manual be incomprehensible, please visit the point of sale where the machine was purchased or contact the manufacturer directly.

MANUFACTURER'S ADDRESS

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

CONTACT TELEPHONE NUMBERS

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SYMBOLS USED IN THE MANUAL

Information, descriptions of hazards, safety precautions, recommendations and orders related to safety operation in this manual are indicated by the following sign:

and preceded by the word **"DANGER".** Failure to follow these recommendations poses a risk to the health or life of the persons or third parties handling the machine.

The information and recommendations of particular importance that must be followed at all times are indicated by the following sign:

and preceded by the word **"NOTICE".** Failure to follow the described recommendations may cause damages to the machine due to improper service, adjustments or operation.

In order to advice the user about the need to perform temporary maintenance the text in this manual is indicated by the following sign:

Additional guidelines and handling instructions provided in the manual are indicated by the following sign:

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

DEFINITION OF DIRECTIONS

Left side – left-hand side of the observer facing the direction in which the machine is moving forward.
Right side – right-hand side of the observer facing the direction in which the machine is moving forward

SCOPE OF HANDLING OPERATIONS

Handling operation described in this manual are indicated by the following symbol: ➡

Handling / adjustment operation results or comments related to the performed activities are indicated by the following symbol: ⇨

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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:	**Sand Spreader**
Type:	**T132**
Model:	–
Serial number:	
Commercial name:	**Sand Spreader PRONAR T132**

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 18 PAŹ. 2012

Place and date

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

Full name of the empowered person position, signature

TABLE OF CONTENTS

CHAPTER

1

GENERAL INFORMATION

1.1 IDENTIFICATION

1.1.1 SPREADER ID PLATE

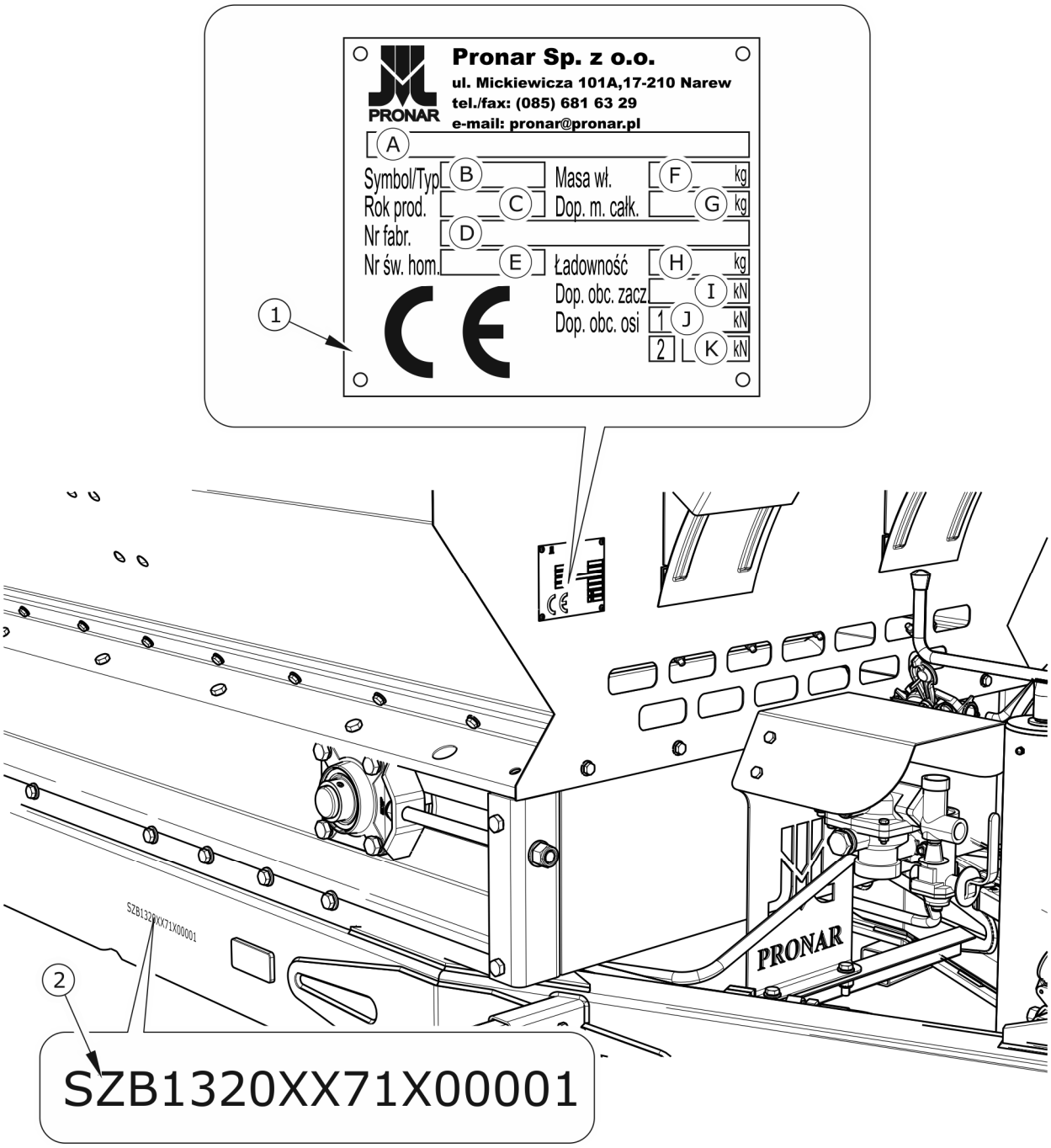


FIGURE 1.1 Rating plate and serial number locations

(1) rating plate, (2) sample serial number

Pronar T132 is marked with a rating plate (1) and serial number (2) applied over a rectangular section in gold color. The serial number is applied on the right side member – see Figure (*1.1*), and the rating plate is applied on the front wall of the cargo box. While purchasing the machine, makes sure that the serial numbers on the machine match the number in the *WARRANTY CARD* and sale documents. The table below shows the meaning of specific rating plate sections.

TABLE 1.1 Rating plate description

NO.	MEANING
A	General definition and function
B	Symbol / machine type
C	Year of manufacture
D	17-digit serial number (VIN)
E	Approval number
F	Curb weight
G	Gross operating weight
H	Load capacity
I	Permissible coupling device load
J	Permissible front axle load
K	Permissible rear axle load (not applicable)

1.1.2 DRIVE AXLE ID

Serial number and axle type are impressed on the rating place (1) fixed to the drive axle beam (2) – see Figure (*1.2*).

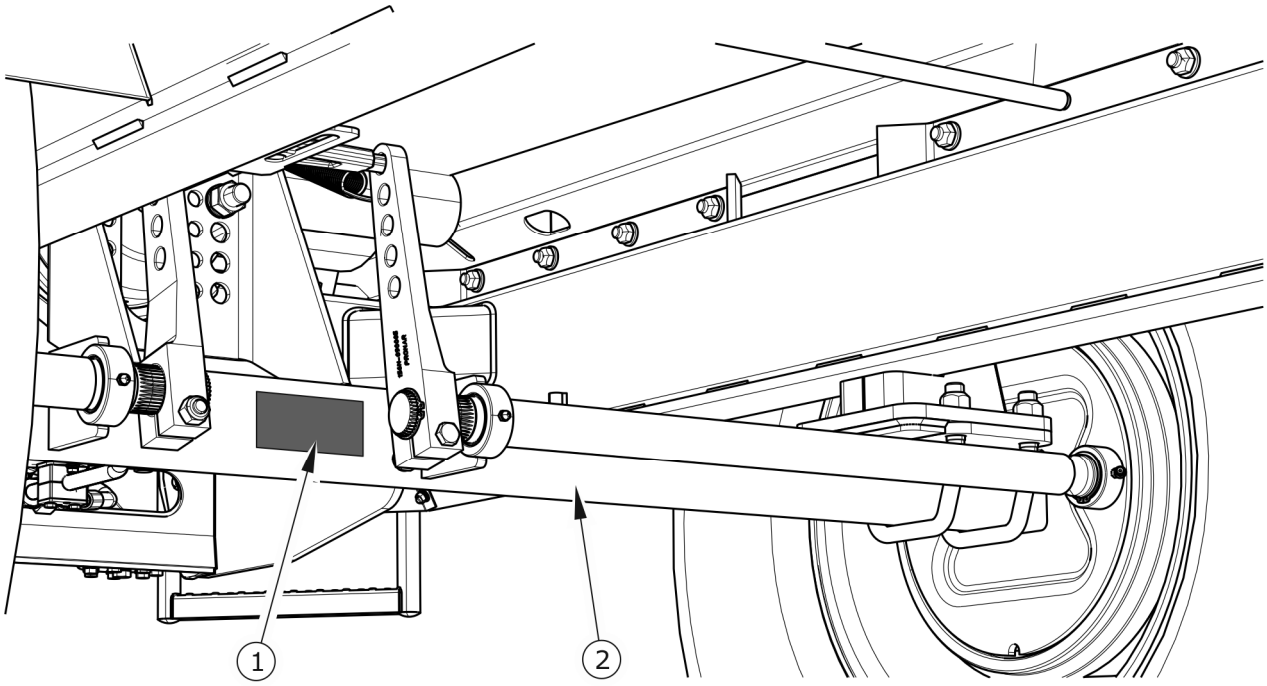


FIGURE 1.2 Location of the drive axle rating plate

(1) rating plate, (2) driving axle

1.1.3 LIST OF SERIAL NUMBERS

HINT

Should it become necessary to order replaceable parts or in case of problems, it is often necessary to provide the spreader's front axle or driving axle serial number. It is recommended that you should enter these numbers in Table 1.2.

TABLE 1.2 List of serial numbers

VIN NUMBER																
S	**Z**	**B**	**1**	**3**	**2**	**0**	**X**	**X**			**X**					
DRIVING AXLE SERIAL NUMBER																

1.2 INTENDED USE

The spreader is designed to spread the surface of the public roads, streets, and sidewalks with the use of:

- Non-chemical agents;
  - ø 0.1 – 1 mm particle sand;
  - Natural or artificial aggregate: granulation up to 4 mm;
- Solid chemical agents:
  - Sodium chloride (NaCl);
  - Calcium chloride ($CaCl_2$);
  - Magnesium chloride ($MgCl_2$);
- Chemical solid and non-chemical agent mixtures.

Chemical agents are designed to remove glazes, ice, and to prevent icing and sludge. The chemical agents are applied exclusively following the mechanical removal of ice (pursuant to the Ordinance of the Minister of the Environment, Journal of Laws no. 230, item 1960).

Using the spreader in any other way as described above is prohibited. The intended use includes all operations related to the correct and safe handling and maintenance of the machine. The user is obliged to:

- Read the *OPERATING MANUAL* and follow the recommendations:
- Understand machine operating instructions to correctly handle the machine;
- Follow general OHS regulations at work;
- Prevent incidents;
- Follow traffic regulations.

Pronar T132 is neither designed nor adapted for the transportation of people or animals.

The braking system and lighting and alert system meet the requirements resulting from traffic regulations. Pursuant to Article 20 of the Polish Law on Road Traffic of June 20, 1997, the permissible spreader's speed is 30 km/h. In countries where the spreader is operated the

user should follow the limits related to the road traffic law applicable in a given country. However, the spreader's speed should not exceed the permissible design speed of 40 km/h.

NOTICE!

The spreader should not be used contrary to its intended use and in particular to:

- **Transport humans and animals;**
- **Transport material of any type;**
- **Use any agents as defined otherwise in the manual.**

TABLE 1.2 Tractor requirements

CONTENTS	MU	REQUIREMENTS
Braking system connection sockets		
Pneumatic 1-line	-	as per z A DIN 74 294
Pneumatic 2-line	-	as per z ISO 1728
Hydraulic	-	as per z ISO 7421-1
Rated braking system pressure		
Pneumatic 1-line	bar	5.8 – 6.5
Pneumatic 2-line	bar	5.8
Hydraulic	bar	150
Hydraulic drive system		
Hydraulic system pressure	MPa	16
Minimum hydraulic pump performance	l/min	32
Power system		
Power system voltage	V	12
Connection socket	-	7-pole as per ISO 1724
Tractor couplings		
Coupling type	-	upper transport coupling lower coupling
Minimum coupling device load capacity (vertical load)	kg	1 100

CONTENTS	MU	REQUIREMENTS
Other requirements		
Minimum tractor power	KM/kW	70/51

NOTICE!

The use of other type of oil is permissible, provided that it can be mixed with oil applied in the spreader. Detailed information available on product data sheet.

HINT

Information related to gear oils is provided in Chapter 5.

1.3 EQUIPMENT

TABLE 1.3 Spreader equipment

EQUIPMENT	STANDARD	ADDITIONAL	OPTIONAL
OPERATING MANUAL	•		
WARRANTY CARD	•		
Rigid tie rod ø40	•		
Rotary tie rod ø50			•
2-line pneumatic braking system	•		

EQUIPMENT	STANDARD	ADDITIONAL	OPTIONAL
1-line pneumatic & braking system			•
Breaking hydraulic system			•
Low-speed vehicle table		•	
Wheel chock	•		
Emergency triangle		•	
Side service platform		•	
Power grid connection cable	•		

Information concerning tires is provided at the end of *ATTACHMENT A*.

1.4 WARRANTY TERMS & CONDITIONS

PRONAR Sp. z o.o. headquartered in Narwia guarantees the machine to operate as intended and in accordance with technical and operational conditions as described in the *OPERATING MANUAL*. The repair completion date is specified in the *WARRANTY*.

Notwithstanding the warranty period, the warranty does not cover parts and components that wear out under standard operating conditions. The warranty covers, without limitation, the following components/parts:

- Shaft connector;
- Pneumatic system connection filters;
- Tires;
- Breaking pads;
- Conveyor belt;
- Stretcher springs;
- Gaskets;

- Bearings.

Warranty terms apply to the following cases: mechanical damages not resulting from user's fault, factory faults, etc.

Any damages arising due to:

- Mechanical damages caused by the user, road incidents;
- Improper operation, adjustments or maintenance, use of the spreader contrary to its intended use;
- Operation of a damaged machine;
- Repairs carried out by unauthorized persons, improper repairs;
- Unauthorized machine structure modifications;

will cause the user to lose the warranty.

HINT

Request the seller to fill the *WARRANTY,* including the claim coupons. A missing date of sale or retail stamp may cause the user to lose his right to be entitled to future claims.

The user undertakes to immediately report all observed paint defects or traces of corrosion, as well as fault removal requests, whether or not covered by the warranty. Available warranty terms and conditions are provided in the *WARRANTY CARD* attached to your newly purchased machine.

No modifications are to be made in the machine without the manufacturer's written consent. This particularly includes welding, drilling, cutting, and heating the main structural elements of the machine that directly affect the operational safety.

1.5 TRANSPORT

Pronar T132 is prepared to be sold in a fully assembled condition without packaging. The packaging process shall cover the operation & maintenance documentation, machines, and potentially the additional components only. The product is to be delivered to the user only by road transport or by means of autonomic transport (towing of the spreader by means of a tractor).

1.5.1 ROAD TRANSPORT

Loading and unloading the spreader from a car should be carried out with the use of a loading dock by means of an tractor, crane or crane. While performing the said works, please follow the general OHS for loading operations. Persons in charge of handling reloading the reloading devices must hold required certifications to use the devices.

The spreader is to be relocated only with the use of fixed structural elements of the machine. This primarily includes the frame, shaft, and the driving axle.

NOTICE!

No shafts, loading boxes or other structural elements inadequately fitted to carry out operations of this type are to be used to fix and couple the spreader.

Pronar T132 should be mounted firmly on the platform with the help of belts, chains, guys, or other fixing devices fitted with a tensioning mechanism. The driving axles, members and possibly the tow bar should be looped around in order to properly fasten the machine. Moreover, a wooden support high enough to allow the spreader frame to be set parallel to the loading platform should be placed under the tow bar. Wedges, wooden beams or other elements without sharp edges should be placed under the machine wheels to protect the spreader against rolling. Wheel locks must be nailed or fixed to the vehicle's loading platform boards to enable them to prevent them against sliding.

Certified and operational fixing elements should be used. Worn belts, cracked mounting brackets, bent or corroded hooks or any other damages may disqualify a particular agent for use. Read the information provided in the manufacturer's operating manual for the given fixing element. The quantity of the fastening elements (ropes, belts, chains, guys, etc.) and the force required to tighten these elements depends, inter alia, on the machine gross weight, vehicle structure, driving speed, and on other conditions. Due to this reason, it is not possible to define in detail the fixing plan.

A correctly mounted machine will not change its location relative to the transporting vehicle. The fastening elements must be selected in accordance with the guidelines of the manufacturer of the elements. If in doubt, use a bigger number of safety fastening points for the machine. If necessary, protect the spreader's sharp edges while protecting the fastening elements against damage during transport.

DANGER!

The improper use of the fastening elements may cause an incident.

During reloading works, pay particular attention not to damage the machine equipment elements or powder coating. The curb weight of the machine is specified in Table 3.1.

NOTICE!

During road transport, the spreader must be mounted on the transport platform in accordance with safety requirements and regulations.

While driving, the driver should exercise extreme caution. This is due to the fact that the center of gravity of the loaded vehicle shifts upwards.

Use only approved and technically operational fastening elements. Read the operating instructions of the manufacturer of the fastening elements.

1.5.2 INDEPENDENT TRANSPORT BY THE USER

In case of independent transport by the user, read the *OPERATING MANUAL* and follow the provided recommendations. Independent transport involves towing the machine with the user's own tractor to the place of destination. While driving, adjust the speed to the existing road conditions; however, it must not be greater than the maximum design speed.

NOTICE!

For independent transport, the tractor operator should read this manual and follow the provided recommendations.

1.6 ENVIRONMENTAL HAZARDS

A hydraulic or gear oil leak constitutes a direct threat to the natural environment due to limited biodegradability of this substance. The low solubility rate of hydraulic oil in water does not cause acute toxicity to organisms in the aquatic environment. An oil spill created on water can be directly affect organisms, it can cause changes to oxygen content in water due to the

lack of direct contact of air with water. However, an oil leak in water reservoirs can lead to a reduced amount of oxygen.

Maintenance and repair works posing a risk of leakage should be carried out in rooms with an oil resistant surface. In case of oil leaks into the environment, first of all protect the source of the leak and then collect the leaked oil with the use of available means. Use sorbents or mix the oil with sand, sawdust or other absorbent materials to collect oil residues. Collected oil contaminants should be stored in an airtight and labeled container resistant to hydrocarbons. The container should be kept away from sources of heat, flammable materials, and food.

DANGER!

Used hydraulic or gear oil or collected residue mixed with absorption material should be kept in clearly labelled container. Do not use food packaging for this purpose.

Oil that is used or unusable due to the loss of its properties should be stored in its original packaging in the same conditions as previously described. Oil waste should be disposed of at an oil disposal or regeneration center. Waste code (hydraulic oil L-HL 32 Lotos): 13 01 10. Detailed information concerning oils is available in product safety sheets.

HINT

The spreader's hydraulic system is filled with L-HL 32 Lotos oil. Information concerning the applied oil are provided in Chapter 5.

NOTICE!

Oil waste may be disposed of only at an oil disposal and regeneration center. Disposal or removal of oil into the sewage system or water reservoirs is prohibited.

1.7 WITHDRAWAL FROM USE

Should the user decide to withdraw the spreader from use, the provisions in force in a given country regarding withdrawal from use and recycling of machines withdrawn from use should

be followed. Before dismantling, the oil must be completely removed from the hydraulic and transmission systems.

DANGER!

During dismantling, use appropriate tools and equipment (overhead cranes, lifts, hoists, etc.), wear personal protective equipment, i.e. protective clothing, footwear, gloves, glasses, etc.

Avoid oil contact with skin. Do not allow oil to leak.

Worn out or damaged elements that cannot be regenerated or repaired should be transferred to a recycling center. Hydraulic and gear oil should be transferred to an appropriate facility authorized to dispose of this type of waste.

CHAPTER

2

OPERATIONAL SAFETY

2.1 GENERAL SAFETY RULES

2.1.1 GENERAL SAFETY RULES

- Before using the spreader, the user should carefully read this operating manual. During operation all the recommendations contained in it should be observed. It is prohibited to start the spreader without being familiar with the machine functions.
- The user undertakes to familiarize himself with the construction, operating and principles for the safe operation of the machine.
- Before each spreader start-up, check that it is ready for operation, especially in terms of safety.
- Should you become unable to understand the information included in the Operating Manual, contact the seller who runs an authorized technical service center on behalf of the manufacturer, or contact the manufacturer directly.
- Careless and improper operation and handling of the spreader and failure to follow the recommendations included in these Operating Manual poses a threat to the health and life of third parties and/or the machine's operator.
- Be aware of the existing residual risks. For this reason the application of safe handling principles should be the general principle for using the spreader.
- The machine should not be used by persons who are not authorized to drive heavy-duty tractors and by persons not trained in safe handling of the machine, including children and people under the influence of alcohol or other drugs.
- It is forbidden to use the spreader contrary to its intended use. Everyone operating the machine in a way that is inconsistent with its intended use, takes full responsibility for all consequences arising from such machine operation. Use of the machine for purposes other than as provided by the Manufacturer is considered as use that contrary to the intended use of the machine and may void the warranty. Spilling other material than those recommended by the spreader's manufacturer shall also be considered an act that is contrary to the intended use.

- Any modifications to the spreader are prohibited and release PRONAR Narew company from its liability for any damages or injuries.
- Each time before operating the spreader, always check its technical condition, particularly the technical condition of the coupling system, traction system, brake system and traffic lights, spreading adapter, feeding mechanism, and a set of protective covers.
- The user undertakes to become familiar with the principles for the safe operation of the machine, methods and control points and with hazards arising from machine operation and maintenance.
- It is prohibited to transport humans, animals and any other objects.
- The spreader may only be operated by one person.
- The spreader may only be used when all the safety guards and other protective elements are technically operational and correctly situated. Damaged or lost covers must be replaced with new covers.

2.1.2 COUPLING AND UNCOUPLING FROM THE TRACTOR

- Use extra caution when coupling or uncoupling the machine.
- Couple the spreader only with an agricultural tractor equipped with side mirrors ensuring visibility on both sides of the machine.
- When coupling the spreader, use the appropriate tractor hitch. Following the coupling procedure, check the safety of the hitch. Read the tractor operating manual. If the tractor is equipped with an automatic hitch, make sure that the coupling operation has been completed.
- While coupling, no persons should be present between the tractor and the spreader.
- It is forbidden to couple the machine if the tractor fails to meet the manufacturer's requirements (minimum power, improper connections, etc.) - compare Table 1.3 *REQUIREMENTS FOR THE TRACTOR*. Before coupling the machine, check if the oil in the external hydraulic system of the tractor can be mixed with the oil in the hydraulic system of the spreader.

- While connecting the hydraulic lines to the tractor, make sure that the tractor hydraulic system and the spreader are not pressurized. If necessary, reduce the residual pressure of the system.
- Before coupling the spreader, make sure both machines are technically operational. In particular, check the condition of the coupling system, plugs and sockets of the hydraulic, power and pneumatic systems in the tractor and the spreader.
- The machine uncoupled from the tractor must stand on leveled ground, be supported with a support beam and protected against rolling with the help of wedges and parking brake. Cable terminations should be protected against dirt.

2.1.3 HYDRAULIC AND PNEUMATIC SYSTEMS

- The hydraulic system is under high pressure during spreader operation.
- Check the condition of the hydraulic and pneumatic connections on a regular basis. Hydraulic oil leaks are not allowed.
- For hydraulic or pneumatic system failure, the spreader should be put out of service until the failure has been removed.
- Coupling and towing a spreader out of service (e.g., to deliver it to a service center) is only allowed if the chassis, coupling system and the braking system are operational.
- Before maintenance and repair works, make sure that the hydraulic system is not pressurized.
- Rubber hydraulic lines must be replaced every 4 years regardless their technical condition.
- Use only the hydraulic oil recommended by the manufacturer.
- After changing the hydraulic, the used oil must be disposed of. The used oil or oil that has lost its properties should be stored in original containers or replacement packaging resistant to hydrocarbons. Replacement containers must be accurately labeled and properly stored.
- It is prohibited to store hydraulic oil in packaging intended for storing food products.

2.1.4 CLEANING, MAINTENANCE AND ADJUSTMENTS

- Maintenance and repair works may be carried out once the spreader has been coupled with the tractor. In this case, turn off the tractor engine, remove the ignition

key and immobilize the tractor and the spreader with the parking brake. Secure the tractor cab against unauthorized access. The machine must be secured against rolling away by placing chocks underneath the wheels. For works not requiring coupling with the tractor, the spreader should be placed on leveled, hard ground, supported with the help of parking support beam and protected by wedges against rolling. The workplace should be dry, clean and well lit.

- Check the condition of the screw connections on a regular basis.
- Under the warranty period, any repairs may only be carried out by a Warranty Service authorized by the manufacturer. After the warranty period, it is recommended that any machine repairs should be carried out by specialized workshops.
- During work, use appropriate, well-fitted protective clothing, gloves, boots, glasses, and the appropriate tools.
- Reduce oil or air pressure in the spreader before removing hydraulic or pneumatic components.
- If any faults or damages are observed, the machine must be put out of service until it has been repaired.
- Maintenance and repair works should be carry out by following general OHS rules. In case of cuts, the wound should be taken immediately rinsed and disinfected. For more serious injuries seek medical advice.
- Spreader inspections should be carried out in accordance at time intervals as specified in this operating manual.
- Welding works may only be carried out by persons having appropriate qualifications to carry out this type of work.
- Before welding or electrical works, the spreader should be disconnected from the power supply, if the machine is connected to the tractor (disconnect the ground (-) pole from the tractor battery and unplug the connection cable). Clean the paint coating. Burning paint fumes are poisonous to humans and animals. The welding works should be carried out in a well-lit and ventilated room.
- Use extra caution while welding and be careful about flammable or fusible elements (hydraulic system lines, power system cables, and other structural components made of plastic). For any ignition or damage risks these components must be removed or covered with non-flammable material before welding. Before starting your work, it is recommended that a CO_2 or foam extinguisher should be prepared.

- For works requiring the spreader to be lifted, hydraulic or mechanical lifts with suitable certifications should be used for this purpose. After lifting the machine, use stable and durable supports should also be used. It is prohibited to carry out any works underneath the machine lifted only with the help of a jack.
- It is prohibited to support the machine with fragile elements (bricks, hollow bricks, concrete blocks, etc.).
- After completing the lubrication related works, remove excess grease or oil. The machine should be kept clean.
- It is prohibited to independently repair the hydraulic and pneumatic cylinders, valves, etc. Any damages to these elements should be removed or replaced by authorized service centers only.
- It is prohibited to repair the tow bar and towing eye (straighten, weld, etc.). A damaged tow bar or towing eye must be replaced.
- It is prohibited to install additional devices or accessories that do not meet the specifications specified by the Manufacturer.
- Should it become necessary to replace specific elements, use only original parts or parts indicated by the manufacturer. Failure to comply with these requirements may be hazardous to the health of third parties or spreader operators, and may damage the machine.
- For injuries resulting from pressurized hydraulic oil, seek immediate medical attention. Hydraulic oil can penetrate the skin and cause infection. For eye contact with oil, rinse the eyes with plenty of water and in case of irritation seek medical attention. For skin contact with oil, rinse the contact area with water and soap. Do not use organic solvents (petrol, kerosene).
- Upon completing your work, make sure that no tools are left inside the load box, on the conveyor belt, adapter discs, etc.
- Climbing the spreader should take place only by using the side service platform and with the machine standing still and the tractor engine turned off. The tractor and spreader must be immobilized with the use of the parking brake. Before climbing, secure the tractor against unauthorized access and remove the key from the ignition.

- Each time after finishing operation, the spreader should be cleaned of any residue. Check the degree of contamination of the rear adapter shields and clean if necessary. Use the side service platform.

2.1.5 LOADING AND SPREADING

- It is prohibited to exceed the permissible loading capacity of the spreader. Failure to observe this requirement may cause the machine to be damaged, lose its balance while driving, spill the load or generate risks while in operating or driving modes.
- Before loading, make sure that there are no stones, tools or other objects on top of the load box and adapter discs.
- While driving backwards, the spreader drive must be turned off.
- It is prohibited to leave the tractor cabin when the adapter and loading mechanism drives are activated.
- Once the spreading has been completed, turn off the hydraulic drive of the loading mechanism and discs.
- The load in the load box must be evenly distributed.
- The spreader drive can only be started up when there are no bystanders or animals within a an approx. 3-meter radius around the machine.
- Materials must be prepared for spreading in accordance with the recommendations for winter road maintenance and with regulations applicable in the spreader's country of use. However, it is prohibited to use other materials than those recommended by the Manufacturer.
- Should the load become clogged, fix the problem by using the side service platform.
- Due to the risk of freezing in the spreader load box, remove the load from the machine at a storage location.
- Use safety support to lift the spreader sieve. Use the side service platform for this purpose.

2.1.6 PUBLIC ROAD TRAFFIC RULES

- Obey traffic regulations while driving the spreader on public roads.
- Exceeding the maximum load capacity of the spreader may damage it and pose traffic threats.

- A triangular plate designed to indicate slow moving vehicles should be attached to the rear side of the spreader..

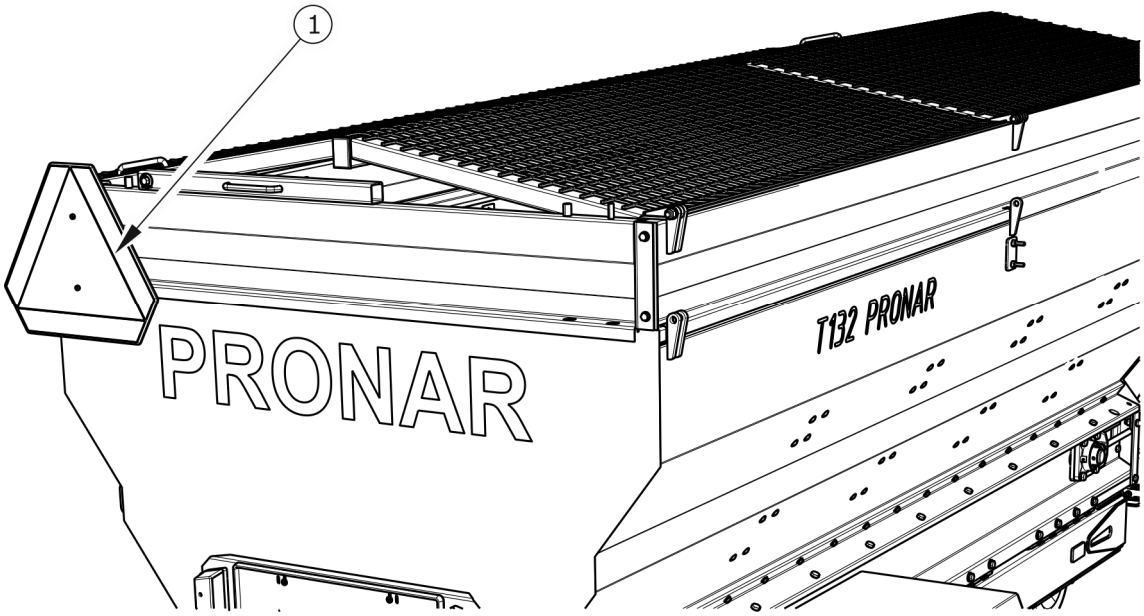


FIGURE 2.1 Location of the sign indicating slow moving vehicles

(1) warning sign

- The spreader must be equipped with an approved or tested reflective warning triangle while driving on public roads.
- While operating the spreader, the tractor must be equipped with a yellow flashing light.
- It is prohibited to leave an unprotected spreader. Protection procedure consists in applying the parking brake and placing wedges underneath one of the wheels to protect the machine against rolling.
- Do not exceed the maximum speed limit. Adjust the speed to road conditions.

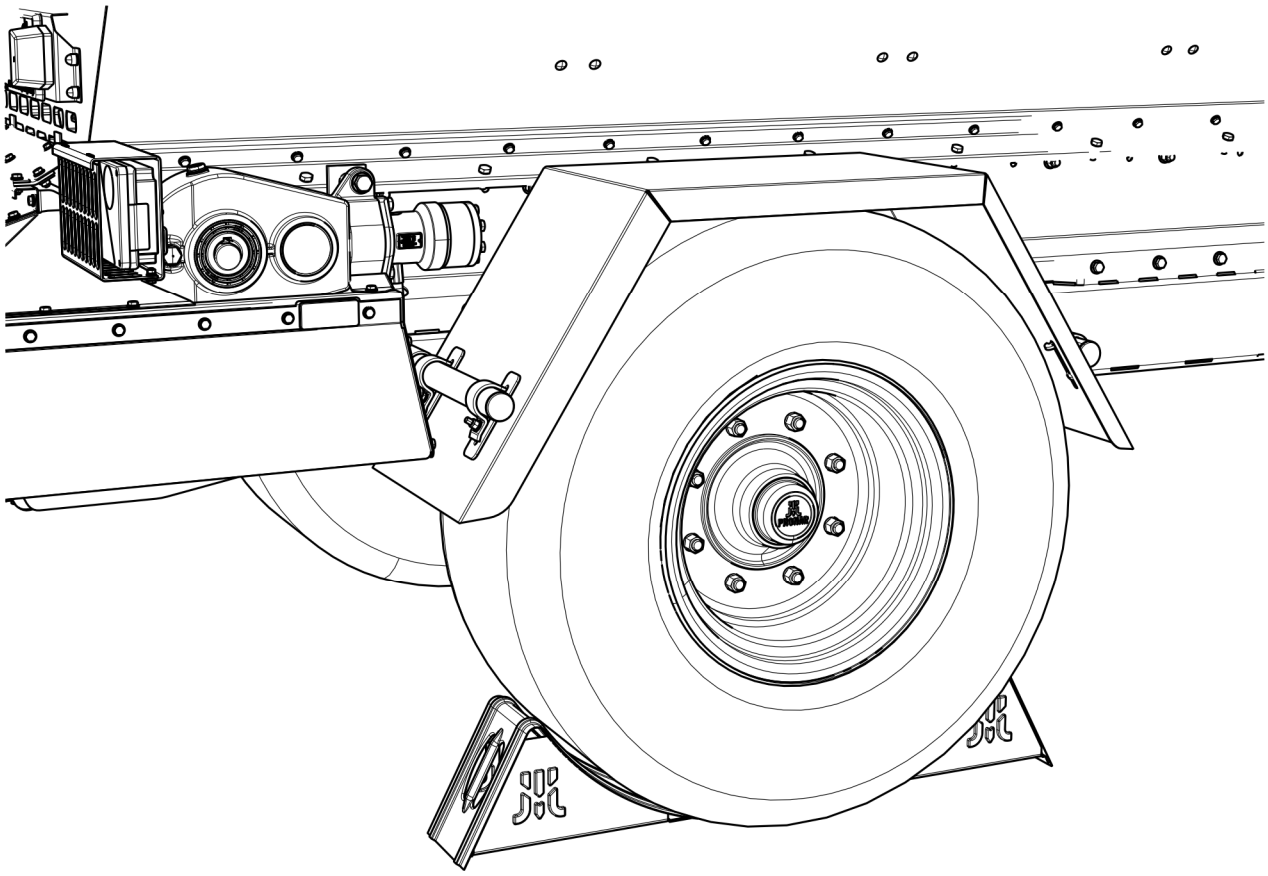


FIGURE 2.2 Wedge application method

2.1.7 TIRES

- While performing tire related works, the spreader should be protected against rolling with the help of wedges placed underneath a wheel. The wheel can be disassembled only when the machine is not loaded.
- Tire repair works should be carried out by persons with suitable training and authorizations. The works should be carried out with the use of appropriately selected tools.
- After mounting a wheel, check the tightness of the nuts. Carry out an inspection every time following the initial use, journey with a load, after travelling 1,000 km and every 6 months after that. Repeat these operations upon taking the wheel off the axle.
- While turning, avoid damaged pavements, sudden and variable maneuvers, and excessive speed.

- Regularly check tire pressure. Due to large temperature differences in winter season, air pressure should be checked more frequently.
- Tire valves should be protected with the help of suitable caps to avoid penetration of dirt.

2.1.8 DESCRIPTION OF RESIDUAL RISK

Pronar Sp. z o. o. o in Narew made every effort to eliminate the risk of an accident. However, there is some residual risk that can lead to an accident and is primarily associated with the following activities:

- Use of the machine contrary to its intended use;
- Staying between the tractor and the machine during engine operation and coupling;
- Staying on the machine while the engine is running;
- Operating the machine with removed or broken covers;
- Failure to maintain a safe distance during machine operation and loading;
- Use of the machine by unauthorized personnel or persons under the influence of alcohol;
- Cleaning, maintenance and technical inspection of the machine;
- Operating the machine on unstable and inclined ground.

Residual risk can be reduced to a minimum by following these recommendations:

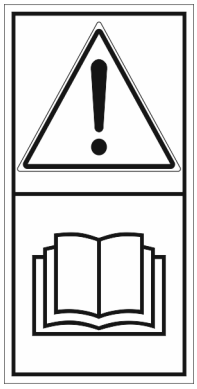
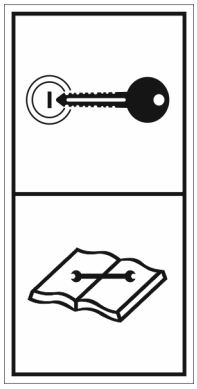
- Operate the machine in a careful and unhurried manner;
- Follow the comments and recommendations in the *OPERATING MANUAL*;
- Maintain a safe distance from prohibited or hazardous areas;
- Prohibit to remain on the machine being on the machine while it is working,
- Maintenance and repair works should be carried out by trained personnel in accordance with safety and operating rules;
- Use properly fitted protective clothing;
- Protect the machine against access by unauthorized persons and particularly the children.

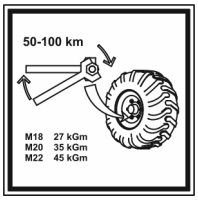
2.2 INFORMATION AND WARNING LABELS

The machine is marked with the information and warning labels listed in Table 2.1. The layout of the symbols is presented in Figures 2.3 and 2.4. The user undertakes to ensure that the

inscriptions, warning and information symbols affixed on the spreader are legible throughout the entire period of use. Damaged labels and symbols must be replaced. Descriptive labels and symbols are available from the manufacturer or retailer. New components replaced during repair must be re-labelled with appropriate safety signs. When cleaning the spreader, do not use solvents that may damage the labels and do not use a strong water jet to clean them.

TABLE 2.1 Information and warning labels

NO.	SAFETY SYMBOL	DESCRIPTION
1		NOTICE! Before commencing work, read the *OPERATING MANUAL.*
2		Before carrying out service or repair work, turn off the engine and remove the key from the ignition.
3		Keep hands away from the working elements of the feeder.

NO.	SAFETY SYMBOL	DESCRIPTION
4		Keep away from and do not touch the rotating discs of the spreading adapter.
5		NOTICE! Do not stand on the moving feeder.
6		Risk of personal injury from splinters. Keep safe distance from working spreading adapter.
7		Inspect driving axle screw connections on a regular basis.
8		Apply lubricants in accordance with the *OPERATING MANUAL.*

NO.	SAFETY SYMBOL	DESCRIPTION
9	**T132 PRONAR**	Machine type.

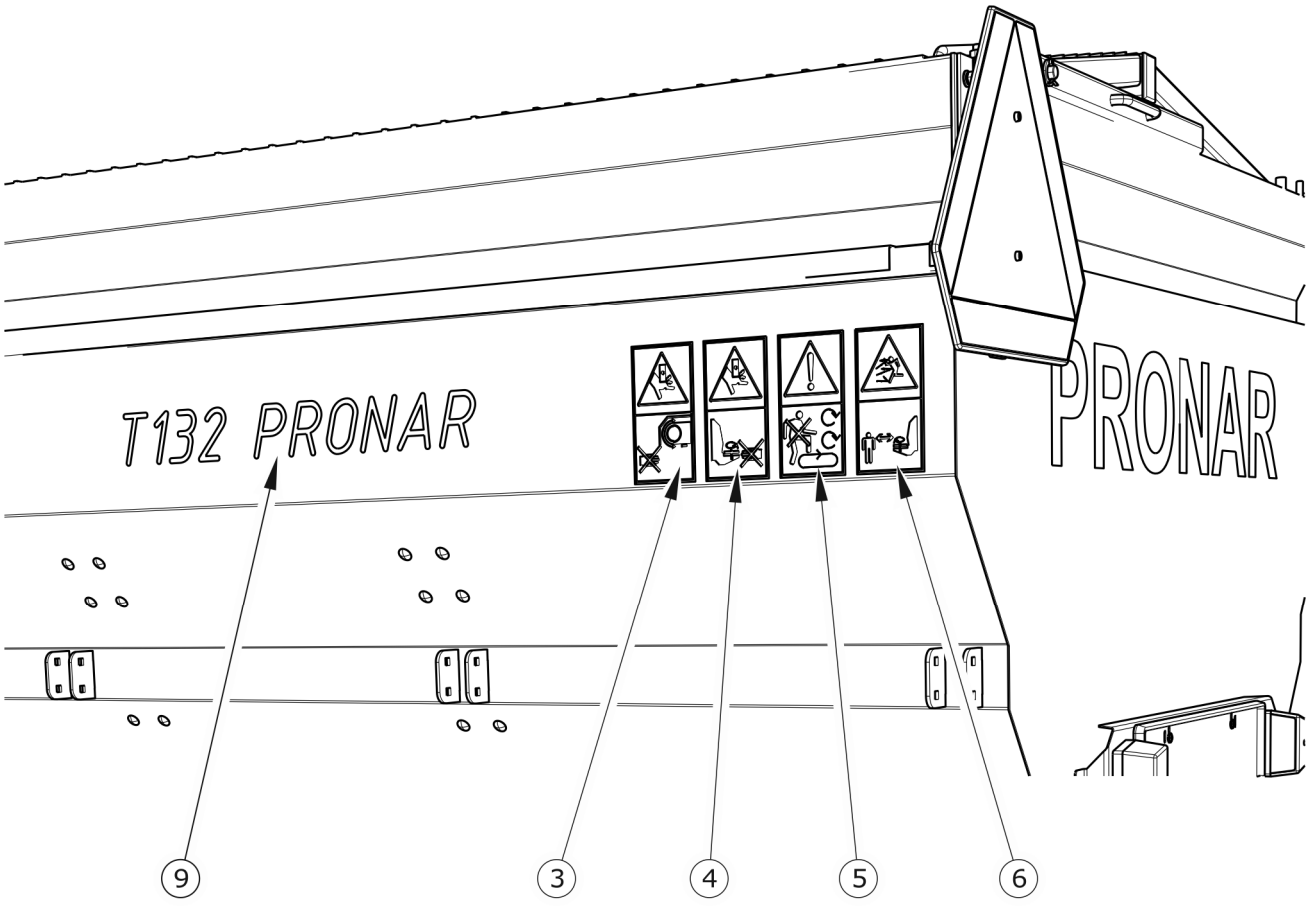


FIGURE 2.3 Information and warning label layout

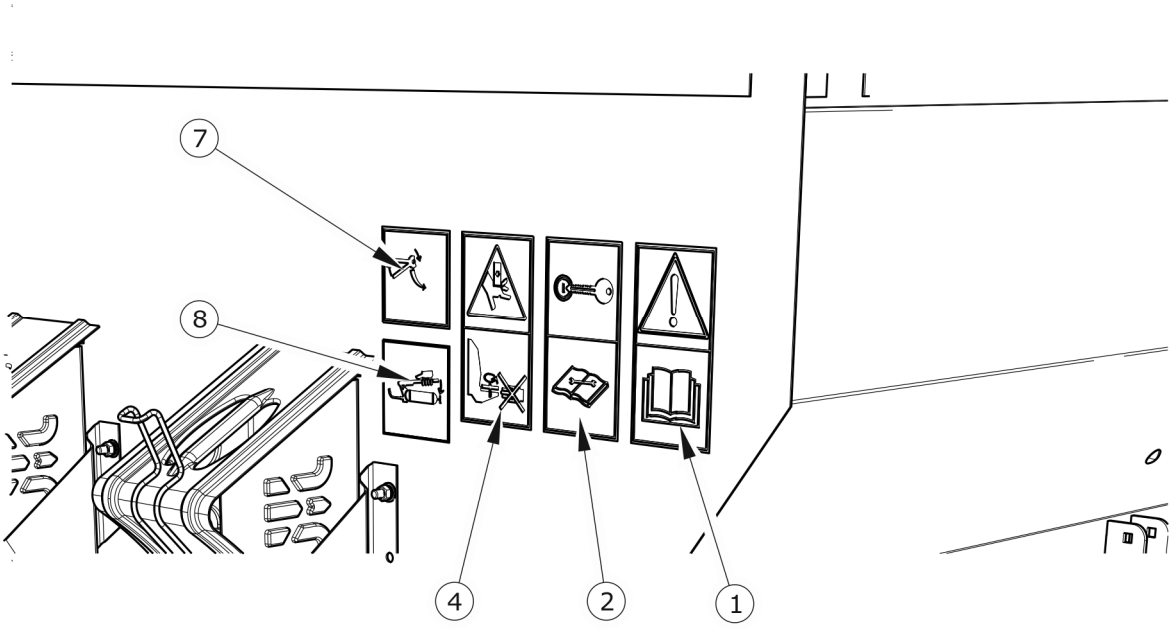


FIGURE 2.4 Information and warning label layout

CHAPTER

3

STRUCTURE AND OPERATING PRINCIPLES

3.1 TECHNICAL SPECIFICATION

TABLE 3.1 General technical data

DESCRIPTION	MU	DATA
Dimensions		
Total length	mm	5 508 – 5 558
Total width	mm	1 950
Total height	mm	2 160
Internal dimensions – Load Box		
Length	mm	3 300
Width	mm	1 386
Height	mm	815
Operating parameters		
Allowable total weight	kg	7 100
Allowable structural load capacity	kg	5 500
Curb weight (spreader)	kg	1 600
Load capacity	m^3	4
Charging area height	mm	2 270
Hydraulic drive system		
Capacity	l	6
Rated pressure	MPa	16
Min. tractor pump performance	l/min	32
Hydraulic oil	-	L HL32 Lotos
Feeding mechanism and spreading adapter		
Feeding mechanism belt width	mm	800
Number of adapter discs	-	2
Max. adapter disc rpm (1)	obr/min	150
Other information		
Power system voltage	V	12
Axle track	mm	1 500
Allowable structural speed	km/h	40
Allowable vertical load (tow bar)	kg	1 100

DESCRIPTION	MU	DATA
Recommended operating speed (spreader)	km/h	4 - 10
Acoustic sound power	dB	below 70
Spreading width	mm	1 800 – 2 800
Min. power demand (tractor)	KM (kW)	70 (51)

(1) – for tractor's hydraulic pump performance of 32 l/min.

3.2 CHASSIS

The spreader chassis is made up of the components listed in Figure 3.1. The lower frame (1) is a welded structure made of steel sections with basic load-bearing elements in the form of two longitudinal members connected with crossbars.

The rear section of the frame includes drive axle fixing elements. The drive axle (2) is made of a square bar terminated with pins where wheel hubs are mounted on the tapered roller bearings. These are single wheels fitted with caliper brakes activated by mechanical cam expanders.

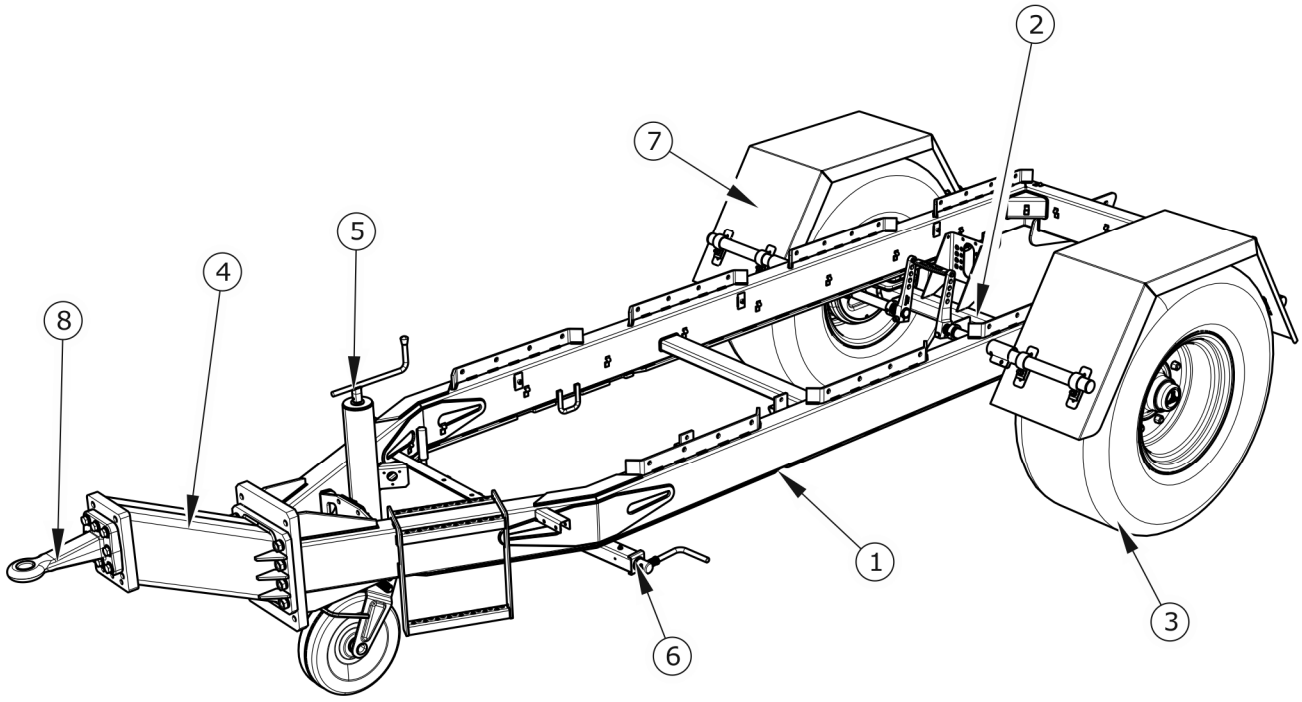


FIGURE 3.1 Spreader chassis

(1) lower frame, (2) drive axle, (3) wheel, (4) tow bar, (5) support, (6) parking brake mechanism, (7) mudguard, (8) towing eye

The spreader is equipped with a tow bar (4) fixed to the front frame sheet.

Depending on demand, the operation can change the location of the tow bar. In the front section of the frame, a support with a wheel (5) is screwed to the left member. On the lower left side of the frame a parking brake mechanism (6) is welded. Lighting, hydraulic, and pneumatic system accessories, load box and spreading adapter are fixed to the structure of the frame on the rear section.

3.3 LOAD BOX

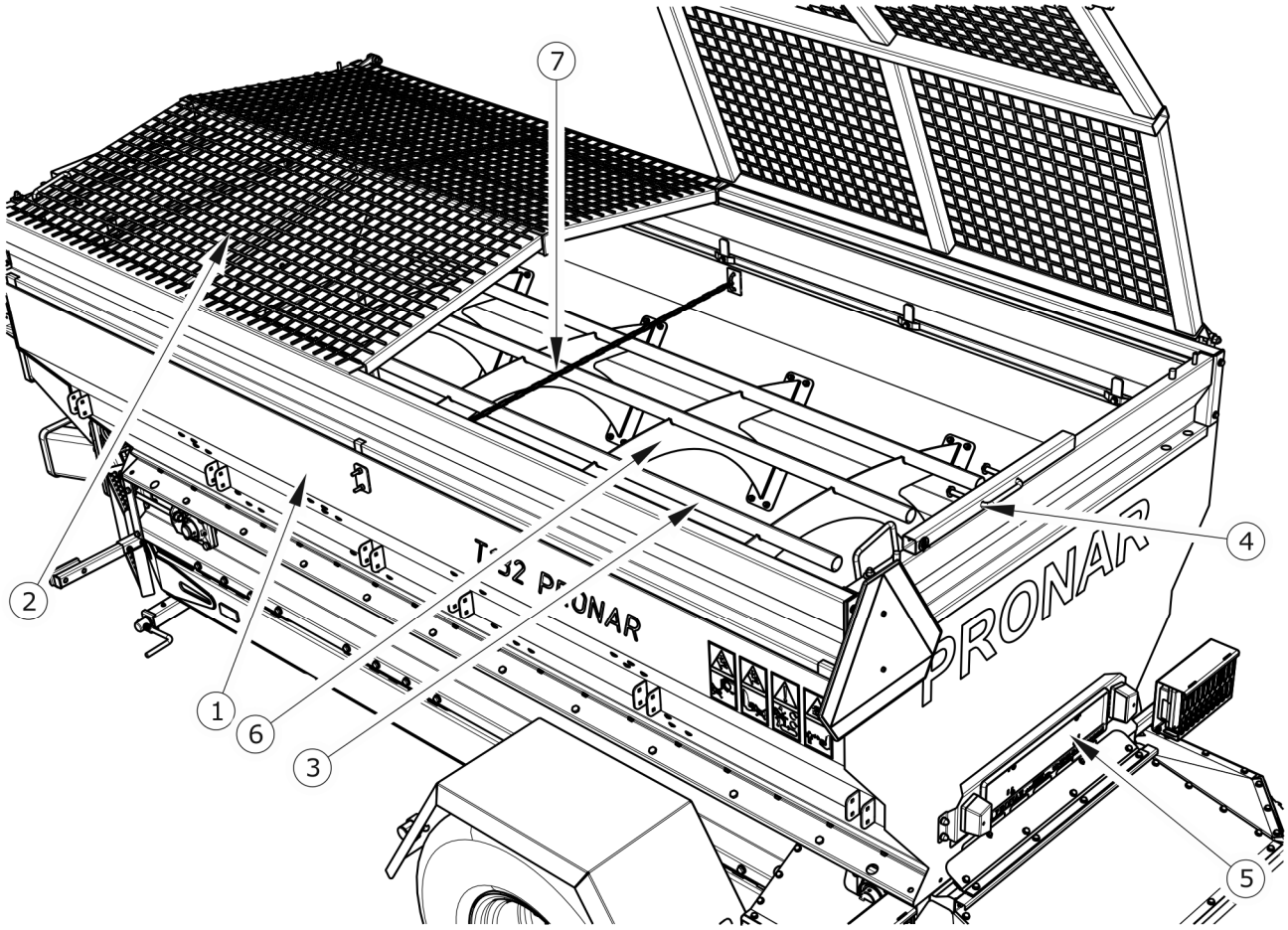


FIGURE 3.2 Load box

(1) load box, (2) sieve, (3) pipe, (4) sieve support, (5) lighting beam, (6) bow, (7) fastening chain

The load box (1) is a shell structure. The internal part of the box is fitted with bows (6), fixed to the load box walls, to which pipes (3) are screwed, designed to take the load of the feeding

mechanism during spreader operation. The side walls are additionally secured with the help of fastening chain.

In the upper section of the box, there are two sieves (2), which can be lifted and supported with support (4) if necessary. On the rear wall of the load box, there is a beam (5) with number plate light. The load box is installed on the frame of the feeding mechanism. In the lower section of the load box, there are rubber covers fixed to the side wall, front wall and rear wall edges. The covers are designed to prevent the loss the of load during travel and spreader operation.

To the left wall of the load box, a platform can be fixed which is included in the additional equipment set.

3.4 FEEDING MECHANISM (FEEDER)

The structure of the feeding mechanism is presented in Figure (3.3). The feeding table (1) provides a bear loading structure of the individual elements of the mechanism. 20 guide rollers (5) are installed between the members to support the conveyor belt (4). The front section of the mechanism is fitted with a front roller (2) which is connected to the belt tensioner.

In the rear section, the rear drive roller (3) is installed, to the right side of which, the reduction gear (6) is fixed. The structure of the rollers (2) and (3) ensures that the conveyor belt operates without slipping. The roller drive is forced by the hydraulic motor (7). Rear lamp brackets (8) are screwed to the feeding table side members (left and right) of the mechanism.

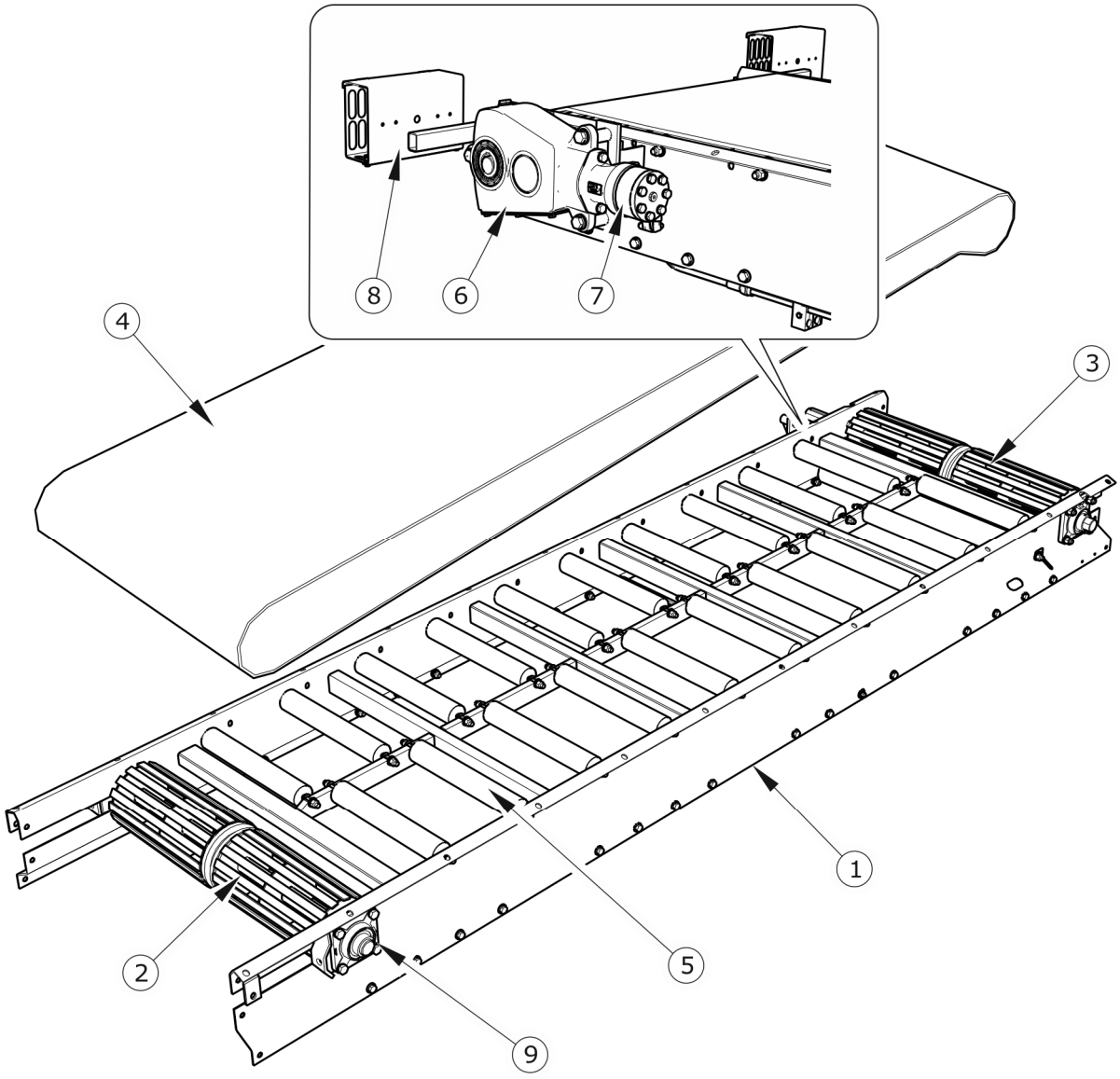


FIGURE 3.3 Feeding mechanism

(1) *feeding table, (2) front roller, (3) rear drive roller, (4) conveyor belt, (5) guide roller, (6) reduction gear, (7) hydraulic engine, (8) lights support, (9) bearing assembly*

3.5 SPREADING ADAPTER

The spreading adapter base (3) is fixed to the spreader frame brackets located in the rear section of the machine – see Figure 3.4. Screwed to the frame are the hydraulic motors (4), on which the right (1) and left (2) spreading discs are installed.

The entire system allows the operator to adjust the position of both discs. The spreading disc blades can be adjusted as required. The spreading material travelling on the conveyor belt is dosed onto the adapter discs.

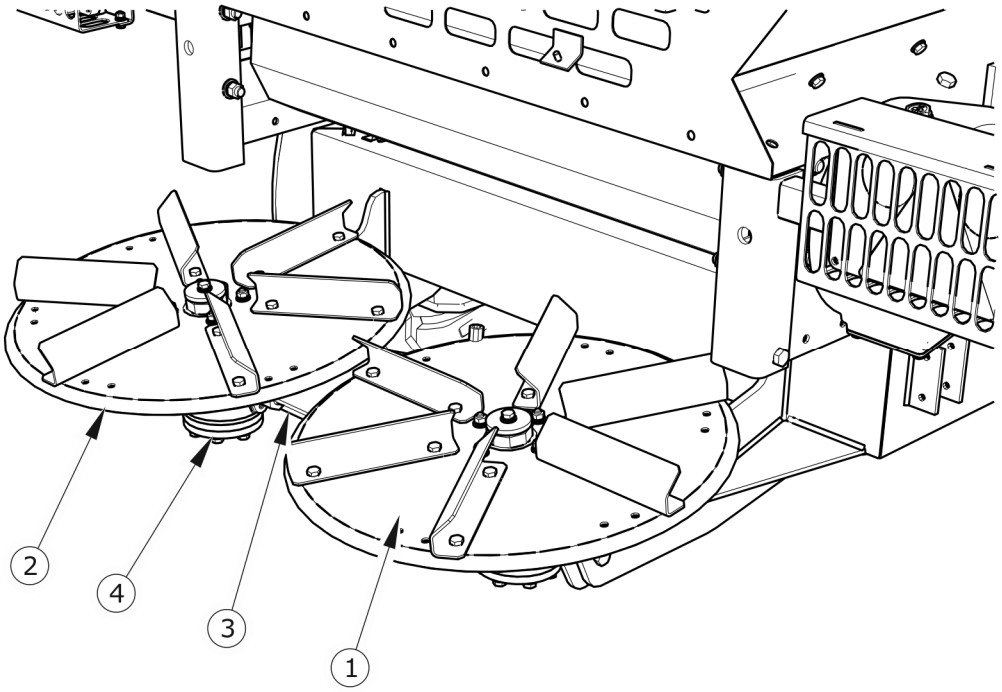


FIGURE 3.4 Spreading adapter

(1) right spreading disc, (2) left spreading disc, (3) adapter base, (4) hydraulic engine

The spreading adapter is fitted under the covers (1) made of sheet steel – see Figure 3.6. The covers are interconnected with the help of screws and fixed to the cover frame. The entire section is installed in appropriate slots of the spreader frame with the help of brackets.

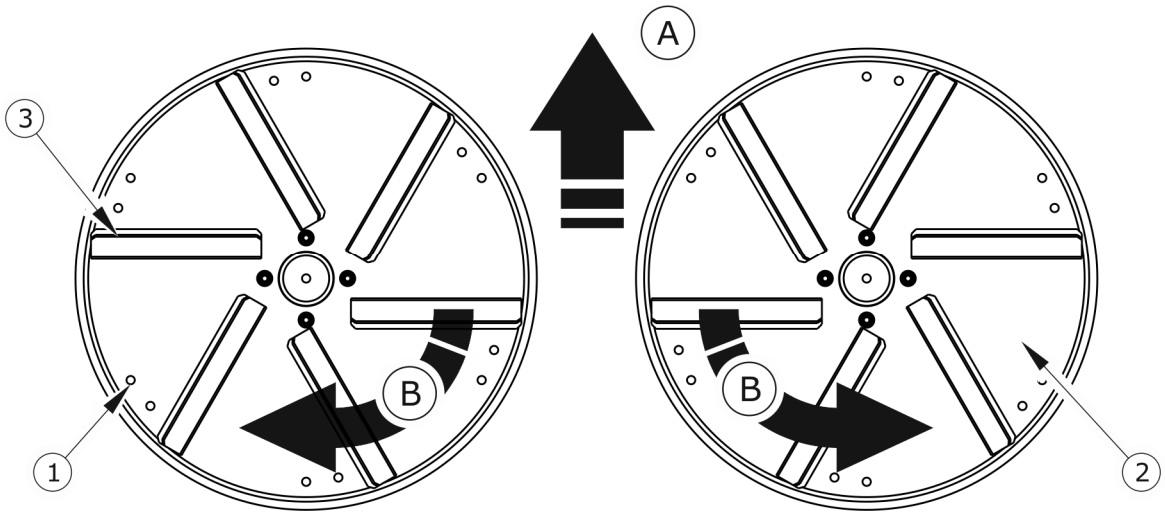


FIGURE 3.5 Adapter discs

(1) left spreading disc, (2) right spreading disc, (3) spreading blades, (A) spreader front section, (B) adapter disc rotation direction

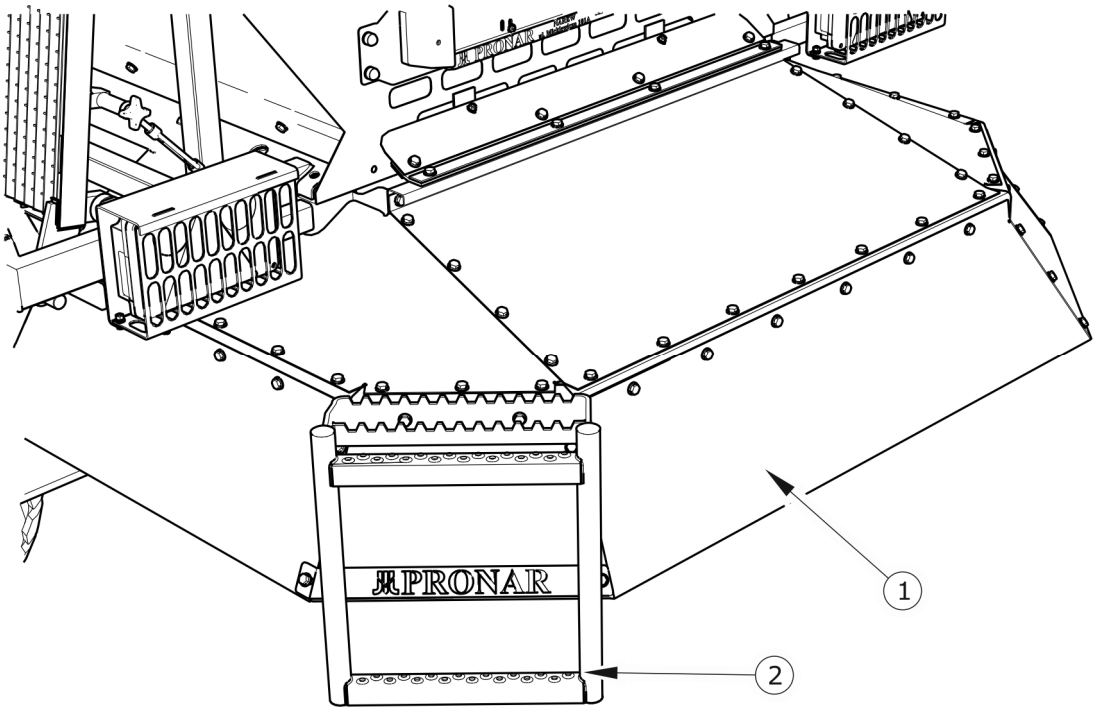


FIGURE 3.6 Spreading adapter covers

(1) rear cover set, (2) ladder

3.6 HYDRAULIC SYSTEM

The hydraulic system of the spreader is designed to drive the spreading adapter and feeding mechanism. The system is fed from the external hydraulic system of the tractor. Hydraulic oil flowing through the feeding connection (1) reaches the flow controller (4) - to the connection (P). The hydraulic oil flowing out of the outlet (A) feeds the hydraulic engine (3) which drives the reduction gear (9) and then the conveyor belt.

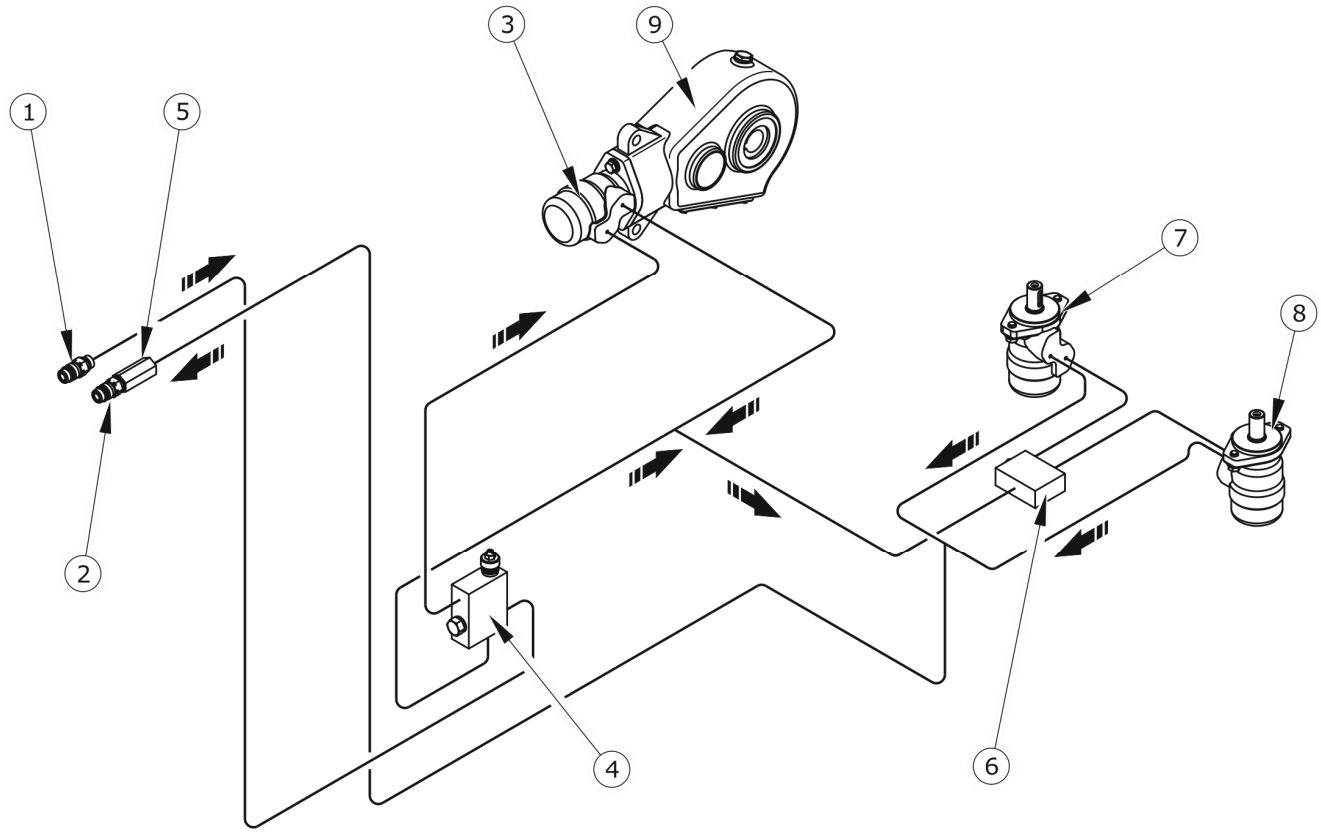


FIGURE 3.7 Hydraulic system

(1) feeding connection, (2) return connection, (3) hydraulic engine, (4) flow controller, (5) check valve, (6) jet distributor, (7) hydraulic engine – right disc, (8) hydraulic engine – left disc, (9) reduction gear

Oil returning from the hydraulic engine (3) and oil jet from the regulator connection (T) feeds the hydraulic engines (7) and (8) by flowing first through the flow distributor (6). Ultimately, the oil returns to the tractor via the check valve (5) located upstream the return connection (2).

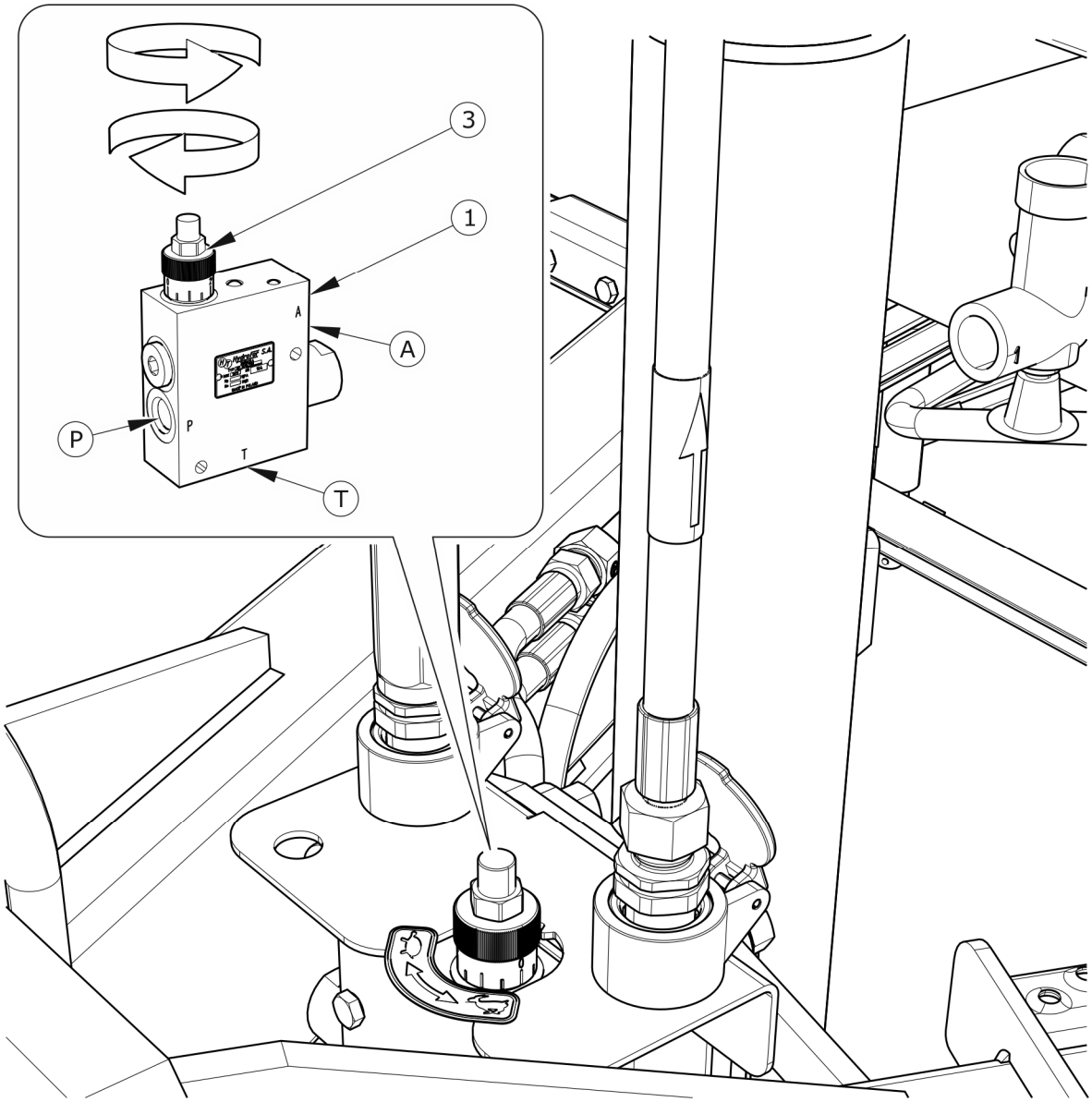


FIGURE 3.8 Flow controller

(1) flow controller, (2) cover, (3) control knob with scale, (P) power supply, (A) receiver, (T) return

The flow controller is equipped with a knob designed to control the oil output at the receiver connection. The controller setpoint determines the speed of the conveyor belt, and therefore, the compaction level of the spread material. The flow controller is located in the front section of the spreader underneath the cover and behind the tow bar. Upon modification, the setpoint only determines the feeder belt speed. The rotation speed of the adapter discs changes in a slight way. At setpoint 1, the belt should stop. Increasing the range above 4 will not increase

the speed. Due to the application of the check valve (5), the feeder cannot operate in the opposite direction (i.e. towards the front wall of the load box).

3.7 PNEUMATIC BREAK SYSTEM

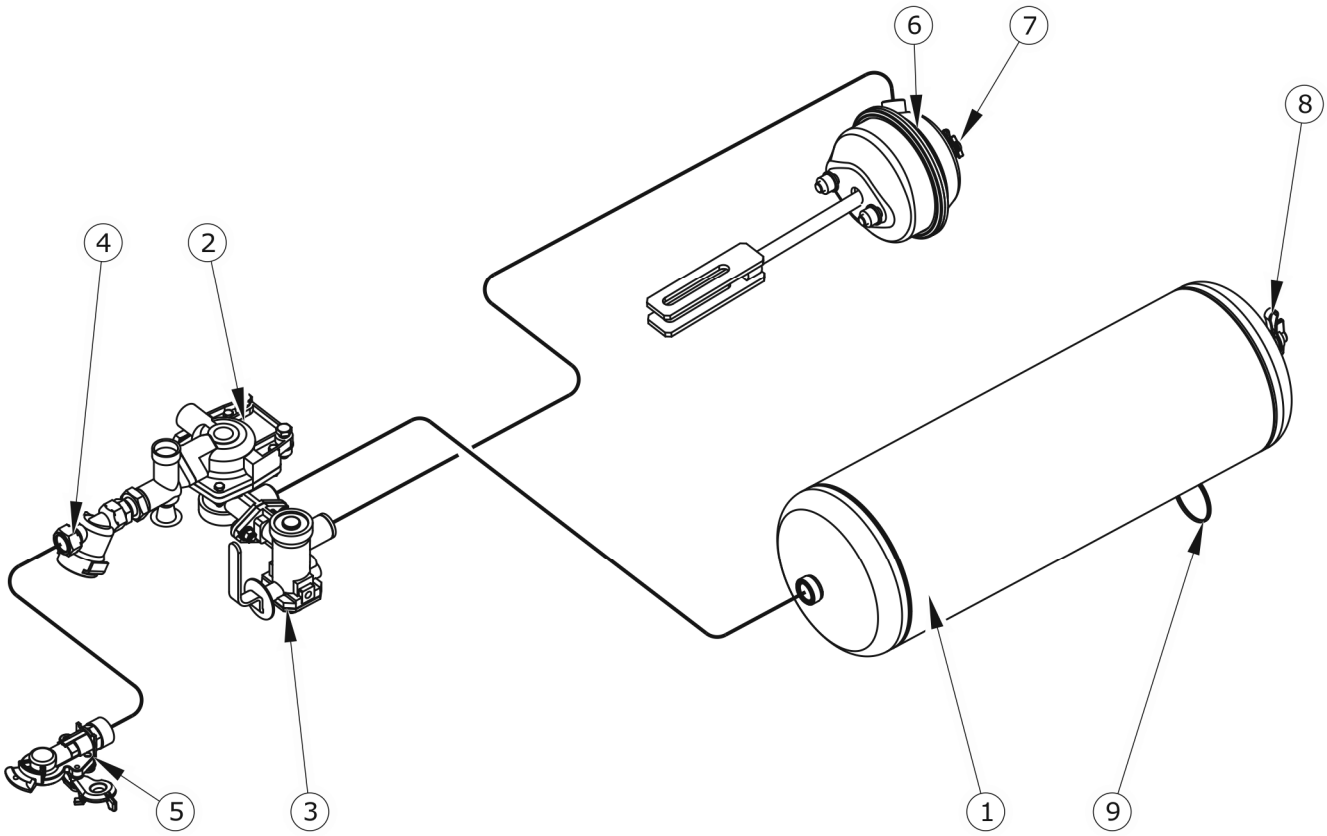


FIGURE 3.9 1-line pneumatic system

(1) air reservoir, (2) control valve, (3) braking force controller, (4) air filter, (5) line connector, (6) pneumatic membrane actuator, (7) actuator control connection, (8) air reservoir control connection, (9) drainage valve

Depending on the version, the spreader is equipped with one of three types of service brake systems:

- Single line pneumatic system with 3-position controller - Figure 3.9;
- Double line pneumatic system with 3-position controller - Figure 3.10;
- Hydraulic brake system - Figure 3.11.

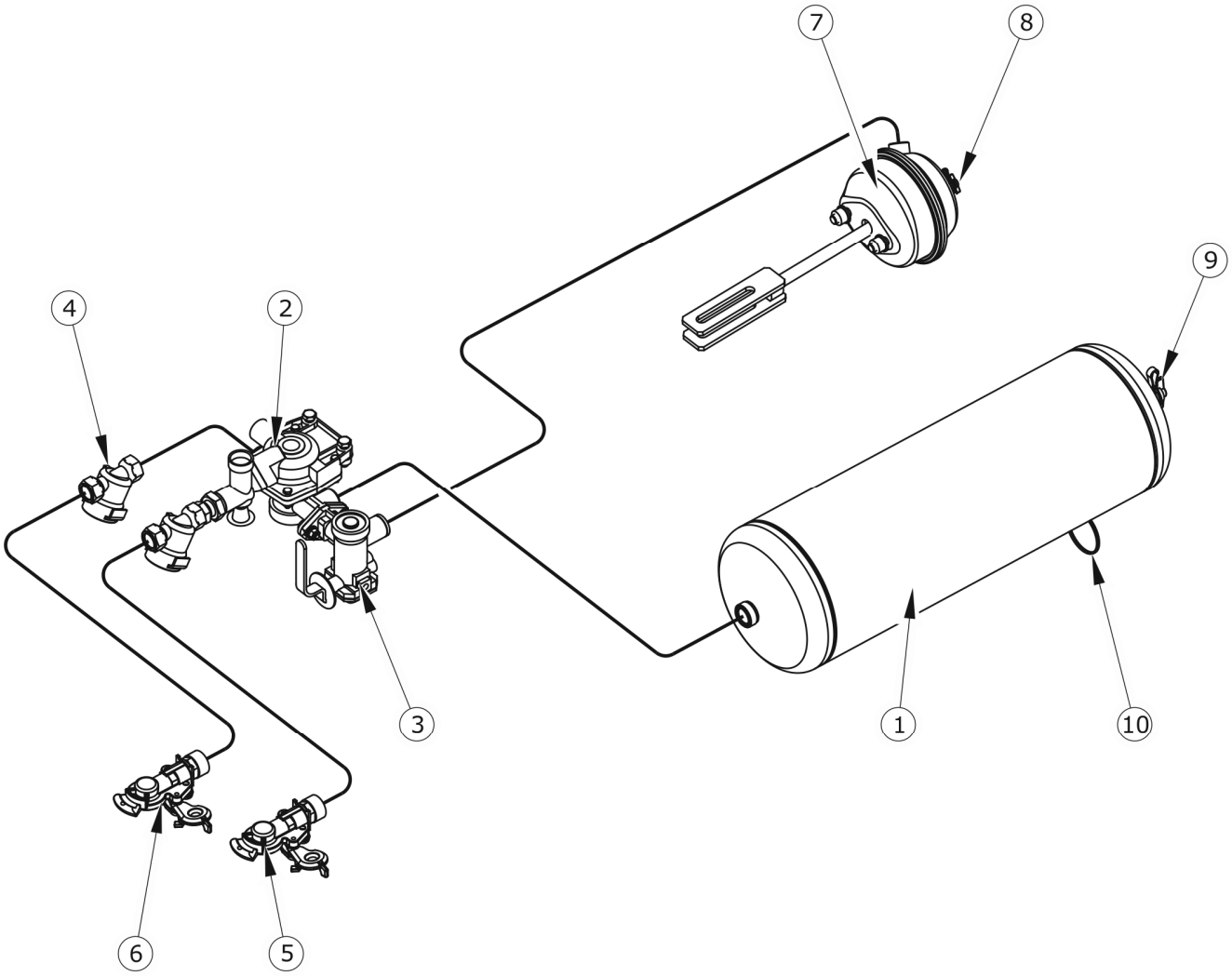


FIGURE 3.10 2-line pneumatic system

(1) air reservoir, (2) control valve, (3) braking force controller, (4) air filter, (5) lines connector – red, (6) lines connector – yellow, (7) pneumatic membrane actuator, (8) actuator control connection, (9) air reservoir control connection, (10) drainage valve

The service brake is activated from the tractor driver's position by pressing the tractor brake pedal. The control valve activates simultaneously the spreader brakes and the tractor brake. Moreover, if the line between the spreader and the tractor gets unpredictably disconnected, the control valve automatically activates the spreader brake.

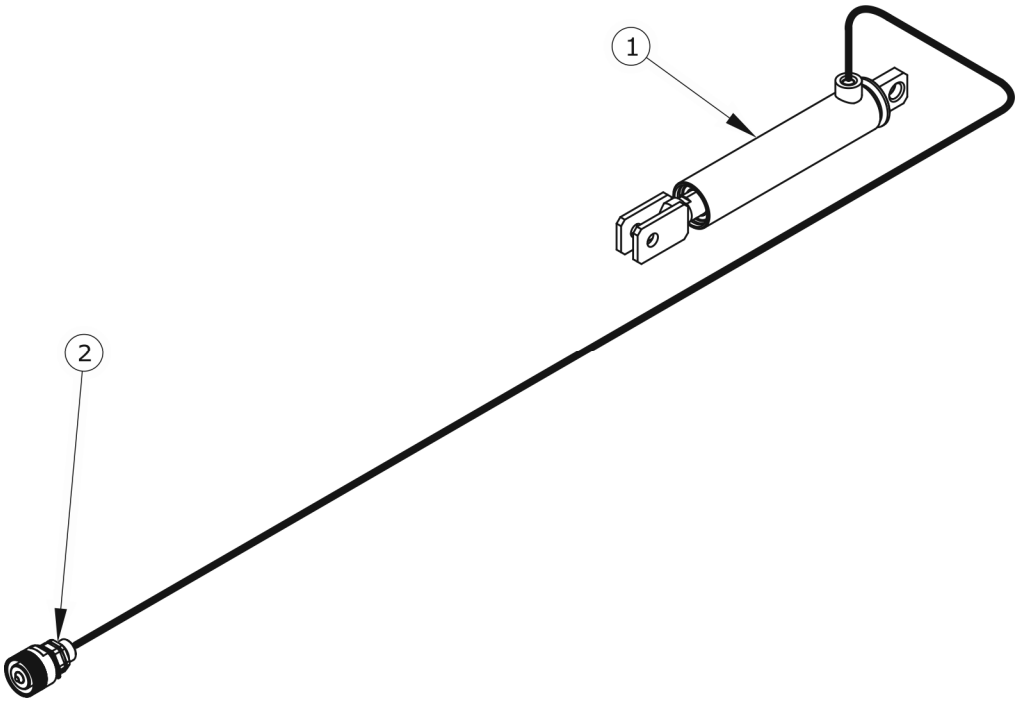


FIGURE 3.11 3-position brake force controller

(1) hydraulic actuator, (2) quick coupler

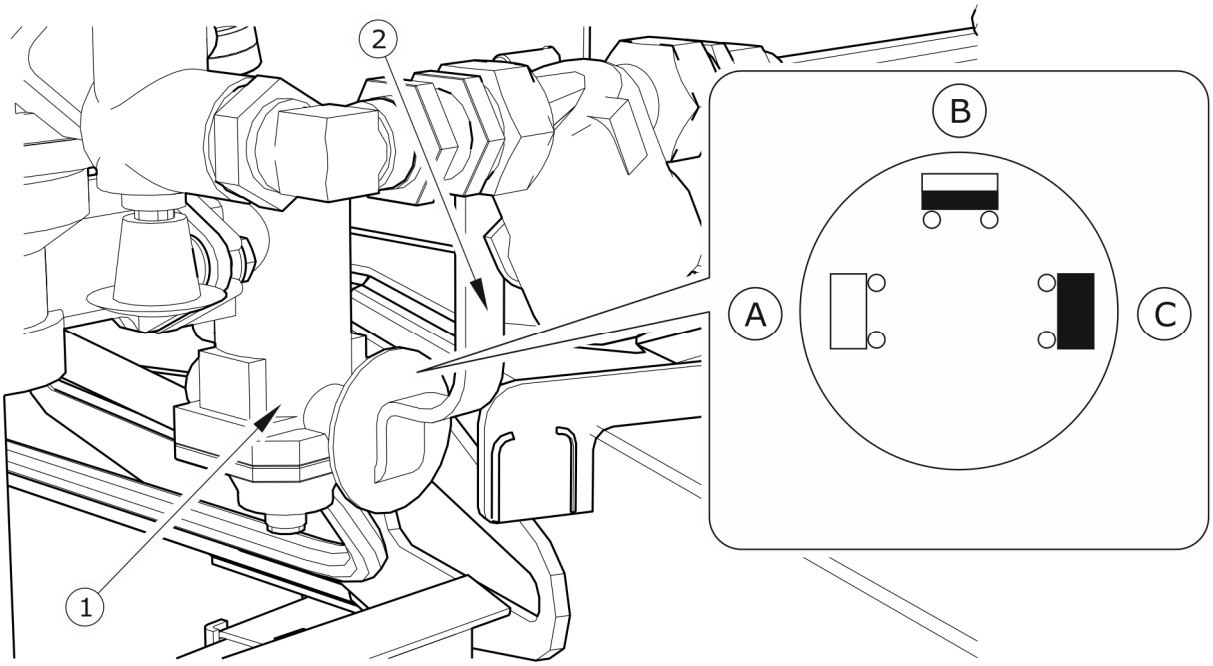


FIGURE 3.12 3-position brake force controller

(1) braking force controller, (2) setpoint lever, (A) "no load" setpoint, (B) "half load" setpoint, (C) "full load" setpoint

The applied valve has a brake release system, used when the spreader is disconnected from the tractor. Upon connecting the air hose to the tractor, the release device automatically switches to the position enabling normal operation of the brakes.

The three-position braking force controller of the pneumatic system adjusts the braking force depending on the controller setpoint. Switching to the appropriate operating mode is done manually before driving by the spreader operator with the help of the controller lever. The controller has three working positions: "No load", "Half load", "Full load".

3.8 PARKING BRAKE

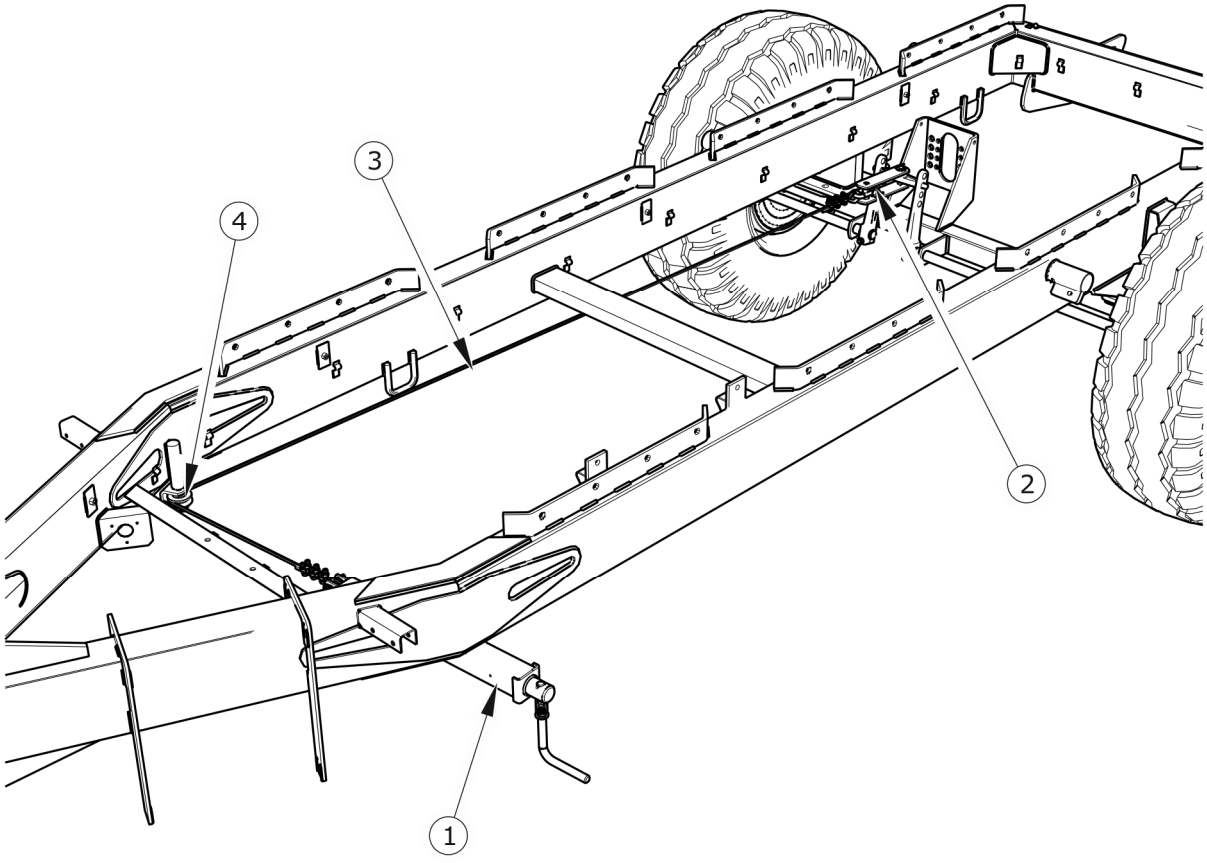


FIGURE 3.13 Spreader parking brake

(1) brake crank mechanism, (2) hand brake retractor, (3) steel rope, (4) guide roller

Parking brake is used to immobilize the spreader during parking. The brake crank mechanism (1) - located on the left side of the chassis frame - is connected by a steel rope (3) to the drive axle bar. Cranking tightens the steel rope. By applying pressure on the shoes,

the expander arms brake the axle. The parking brake should be released before driving - the steel rope must hang loosely.

3.9 POWER SYSTEM, WARNING ELEMENTS

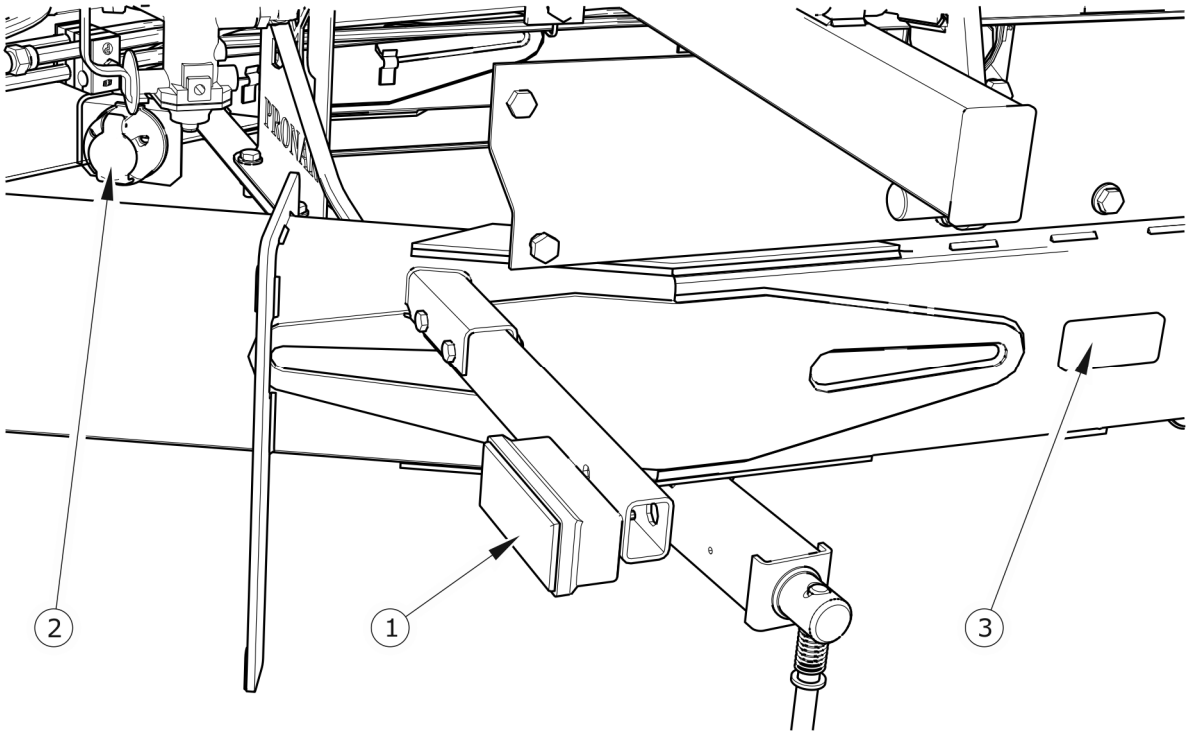


FIGURE 3.14 Power elements and reflectors layout – Front view

(1) front left position lamp, (2) 7-pole connection socket, (3) orange side reflector

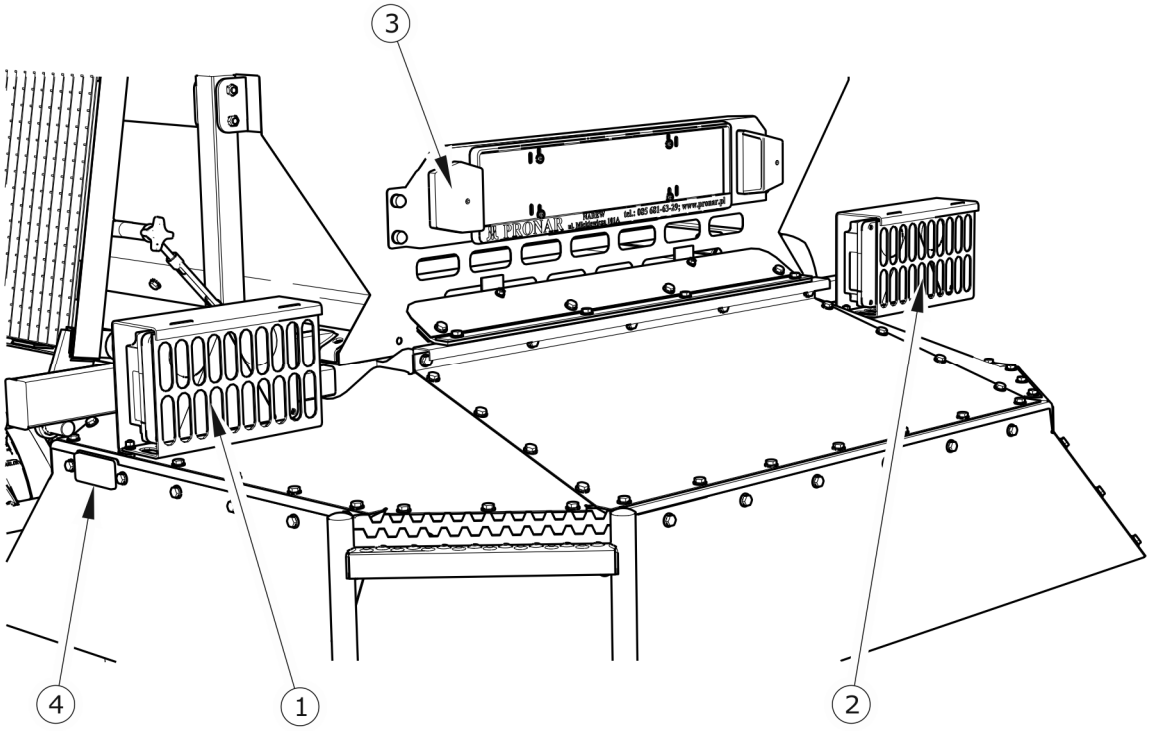


FIGURE 3.15 Power elements and reflectors layout – Rear view

(1) rear left assembly lamp, (2) rear right assembly lamp, (3) license plate light, (4) orange side reflector light

The spreader power installation is adapted to power supplied from a 12 V DC power source. Spreader-tractor power connections should be completed using an appropriate connection cable supplied with the machine. The spreader is also equipped with orange side reflectors. The machine should be connected to the tractor with the help of an power cable provided as standard spreader equipment.

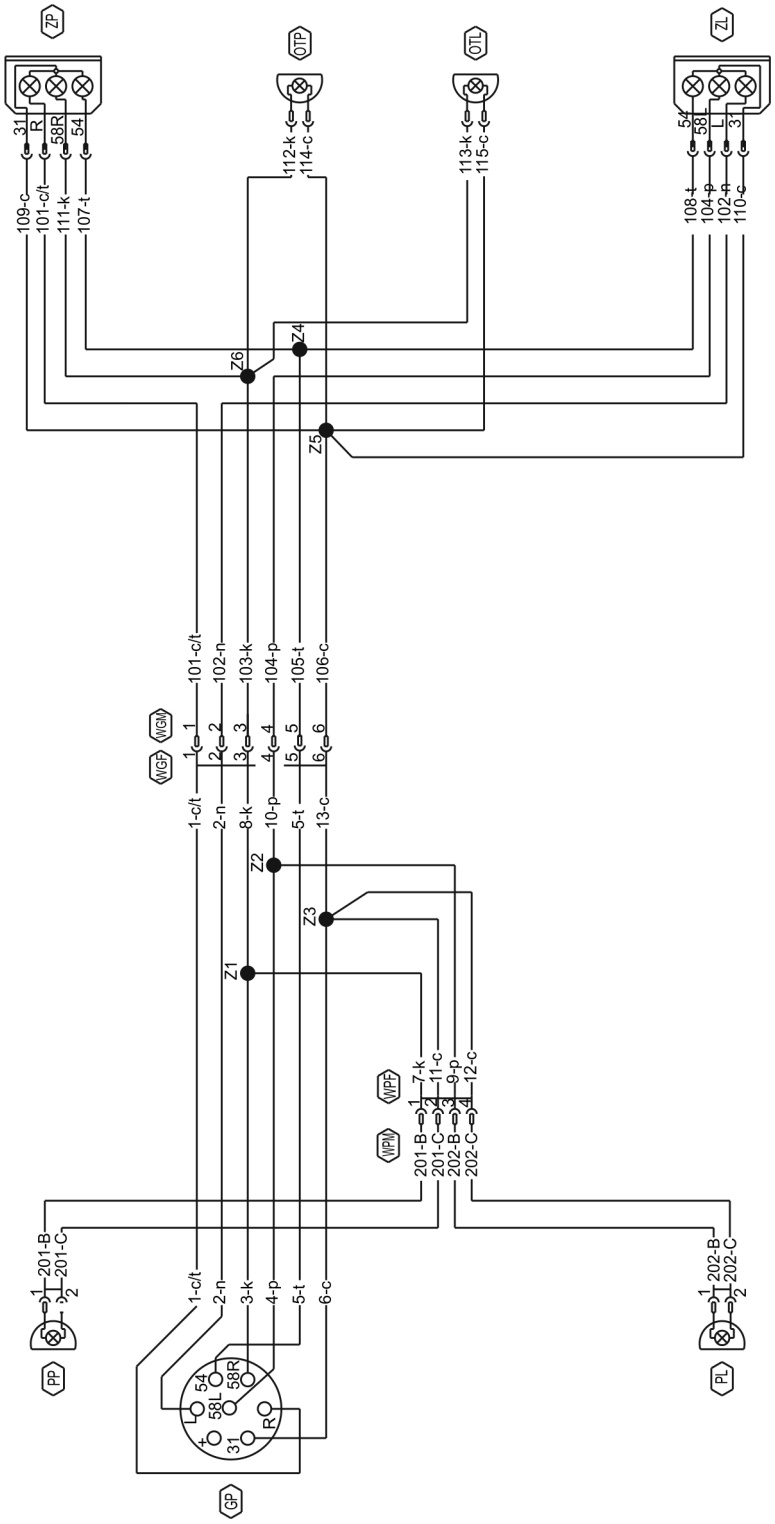


FIGURE 3.16 Power system diagram

(GP) 7-contact socket (PP), (PL) right/left front position lamp, (ZP), (ZL) right/left rear position lamp, (OTP)/(OTL) right/left license plate light

CHAPTER

4

OPERATING PRINCIPLES

4.1 BEFORE USE

4.1.1 INTRODUCTION

The spreader is delivered to the user as fully assembled condition and does not require any additional component assembly operations. The manufacturer guarantees that the machine is fully operational, has been checked in accordance with control procedures and has been authorized. However, this shall not relieve the user from the obligation to check the machine before purchase and initial use.

4.1.2 COMMISSIONING AND POST-DELIVERY INSPECTION

Upon delivery of the machine to the recipient, the user undertakes to check the technical condition of the spreader (one-time inspection). During the purchase, the seller must inform the user about the way the machine should be operated, the hazards arising from operating the machine contrary to its intended use, about aggregation methods, operating principles and the structure. Detailed information on commissioning can be found in the *WARRANTY CARD*.

Post-delivery inspection

- Check completeness of the spreader against the order.
- Check technical condition of protection covers.
- Check the paint coating for corrosion.
- Check the machine for damages (dents, punctures, bends, or fractures in details, etc.) resulting from incorrect transport to the place of destination.
- Check technical condition of the feeder rubber belt.
- Check tire pressure and correct wheel nut tightening.
- Check technical condition of the tow bar, towing eye and their correct fixing.
- Check the condition of the screw connections of the adapter covers and if the adapter disc blades are correctly fixed.

If any irregularities are found, do not aggregate or start the spreader. The observed faults should be directly reported to the seller in order to have them removed.

NOTICE!

The seller undertakes to commission the spreader in the user's presence.

Training conducted by the seller shall not relieve the user from the obligation to read this manual.

4.1.3 BEFORE START-UP, TEST START-UP

HINT

All service related operations are described in detail in the following sections of this manual.

Before start-up

- Read this *OPERATING MANUAL* and follow the instructions provided inside.
- Inspect visually the spreader by following the guidelines included in PREPARING THE SPREADER FOR EVERYDAY OPERATION.
- Connect the spreader to the tractor. Immobilize the tractor with the parking brake.
- Release the spreader parking brake.

Test start-up

- Check that no objects or living creatures are in the load box.
- Start the tractor, check the efficiency of the lighting and signaling system by turning on individual lights.
- Start the feeder drive and adapter discs. While changing the flow controller setpoint, check if the feeder belt speed changes depending on the set value. Turn off the drive.
- Release the tractor parking brake. Carry out a test drive.
- Test the performance of the service brake while driving.

➡ Upon stopping the tractor, turn off the engine, immobilize the spreader and the tractor using the parking brake. Check the tightness of the hydraulic system.

In case of any the following symptoms

- Noise and untypical moving part rubbing sounds;
- Hydraulic oil leakage;
- Improper operation of the hydraulic, electric or pneumatic system;
- Other suspected faults;

immediately stop the tractor and shut off the feeder. Should it be impossible to remove the faults or their removal would void the warranty, please contact the point of sale to discuss the problem or report a completed repair.

4.1.4 PREPARING THE SPREADER FOR EVERYDAY OPERATION

Scope of inspections

➡ Visually inspect the inflation level of the road wheels. If in doubt, carefully check the air pressure.

➡ Check technical condition of towing eye.

➡ Assess technical condition and completeness of the protection covers.

➡ Check if adapter blades are correctly secured .

➡ Check (from the inside) cleanliness of the rear covers.

➡ Check if the load in the load box is not frozen.

NOTICE!

After operating the spreader, the remaining load should be spread at the storage location. While starting to operate the spreader, the user should check the load box, particularly if the machine is used by several people. The remaining frozen load may cause serious damage to the feeder.

DANGER!

Careless and improper use and operation of the spreader, as well as failure to comply with the recommendations contained in this manual pose a threat to health. The spreader may not be used by persons unauthorized to drive agricultural tractors, including children and people under the influence of alcohol or other drugs. Failure to comply with the principles of safe use poses a threat to the health of operators and third parties.

4.2 COUPLING AND UNCOUPLING THE SPREADER

The spreader can be coupled with a tractor, if all connections (electrical, pneumatic, hydraulic) and the tractor hitch meet the machine requirements of the manufacturer.

In order to couple the spreader with the tractor, do the following in the correct order:

Coupling

- ➡ Position the tractor directly in front of the spreader towing eye.
- ➡ Use the support to set the towing eye at a height enabling to couple both machines.
- ➡ Back up the tractor, connect the spreader to the hitch, check the coupling device designed to protect the machine against accidental uncoupling.
    - ⇨ If the tractor has an automatic coupling, the user should make sure that the coupling operation is completed and the towing eye is secured.

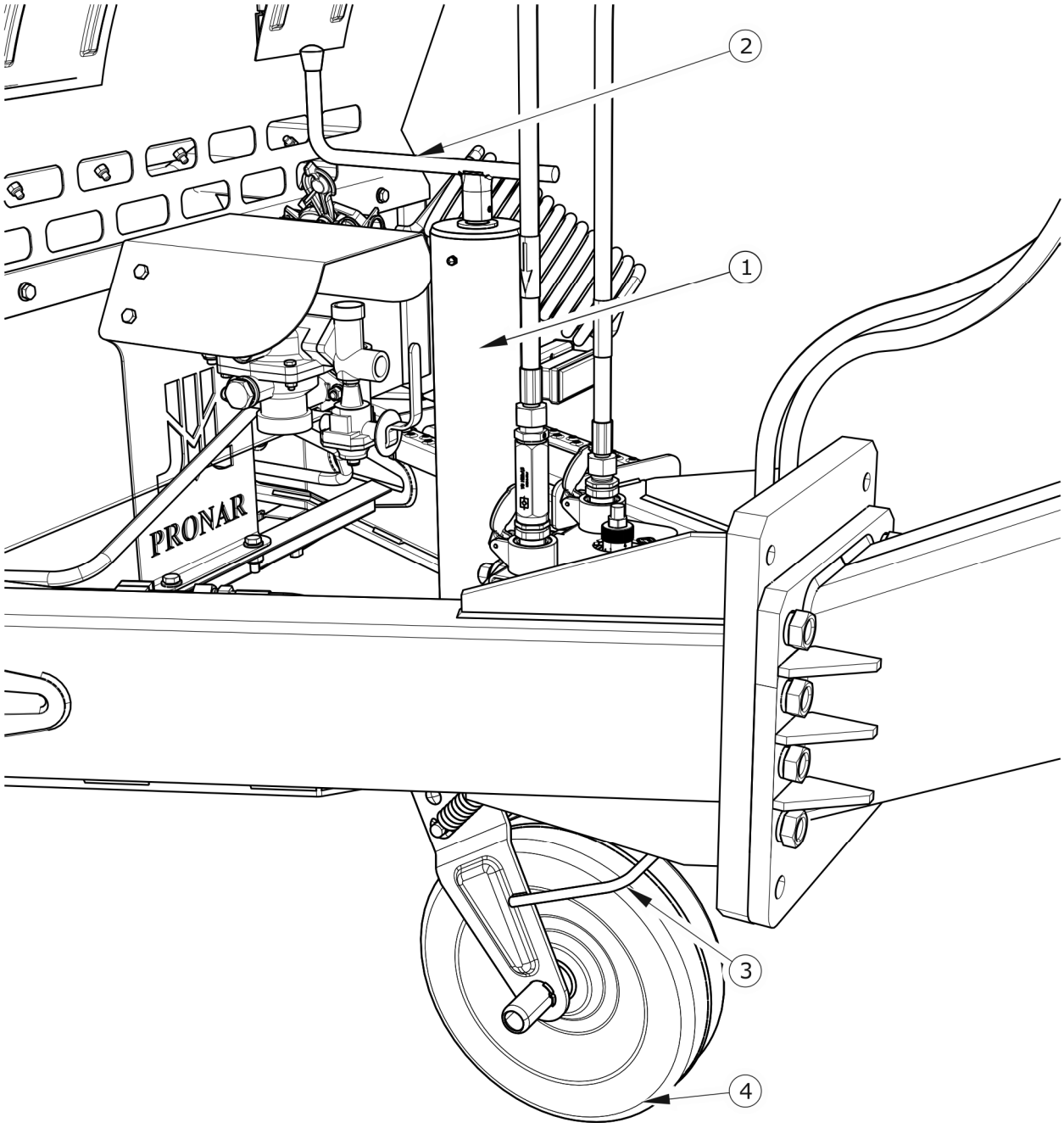


FIGURE 4.1 Spreader support

(1) support, (2) crank, (3) wheel, (4) pedal

- Turn off the tractor engine. Close the tractor cab to protect it against unauthorized access.
- Connect the pneumatic system lines (applies to 2-line systems):
  - Connect the yellow pneumatic line to the yellow socket on the tractor.

- ⇨ Connect the red pneumatic line marked to the red socket on the tractor.

➡ Connect the pneumatic system lines (applies to 1-line pneumatic system):

- ⇨ Connect the black pneumatic lines to the black socket on the tractor.

➡ Connect the hydraulic brake system line.

➡ Connect the hydraulic drive system lines.

- ⇨ The lines are marked with arrows indicating the direction of the hydraulic oil flow.

➡ Connect the lighting system power supply cable.

➡ Turn the crank (2) (Figure 4.1) to raise the support wheel.

➡ Press the support pedal (4) and, while holding the wheel (3), place it in the driving position.

➡ Immediately before driving, remove the wedges and release the spreader parking brake.

DANGER!

When carrying the coupling operation, no unauthorized persons should be present between the spreader and the tractor. The tractor operator should exercise particular care and make sure that unauthorized persons are not present in the danger zone. When connecting the hydraulic lines to the tractor, make sure that the hydraulic systems of the tractor and the spreader are not pressurized. Ensure good visibility during coupling.

DANGER!

Extra care should be taken while folding the support - danger of limbs getting trapped.

Following the coupling operation, check the pin coupling protection.

While connecting the braking system cables (2-cable pneumatic system), it is important to follow the correct cable connection sequence. First, connect the yellow plug to the yellow socket on the tractor, next connect the red plug to the red socket on the tractor. Upon connecting the second cable, the brake release system will switch to normal operation mode

(disconnection or breaking of the air hoses will cause the spreader control valve to automatically switch the machine to braking position). The cables are marked with colored protective covers to identify the appropriate installation line.

NOTICE!

Pay attention to the compatibility of oils with the tractor and spreader hydraulic systems. The spreader may only be coupled with a tractor having a suitable hitch, necessary braking, hydraulic and electrical system connection sockets. The hydraulic oil in both machines can be mixed.

Upon completing the coupling operation, secure the hydraulic, braking and electrical lines so that they don't get caught in the moving parts of the tractor during travel and are not exposed to kinking or cutting while making a turn.

Uncoupling the spreader

To uncouple the spreader from the tractor, do the following in the correct order:

- Immobilize the tractor and spreader using the parking brake.
- Turn off the tractor engine. Close the tractor cab to protect it against unauthorized access.
- Shift the support wheel in the parking position.
- Rotate the crank to set the towing eye at such a height allowing the spreader to be released and disconnected.
- Disconnect the hydraulic system lines from the tractor.
- Disconnect the power cable.
- Disconnect the pneumatic system lines (applies to 2-line pneumatic system).
    - Disconnect the red pneumatic line.
    - Disconnect the yellow pneumatic line.
- Disconnect the pneumatic system lines (applies to 1-line pneumatic systems).
    - Disconnect the black pneumatic line.
- Secure cable terminations with covers. Insert the plugs into their respective sockets.
- Place safety wedges underneath the spreader wheel.

➡ Uncouple the tractor hitch, disconnect the spreader towing eye from the tractor hitch, drive the tractor away.

DANGER!

While uncoupling the spreader from the tractor, extra care should be exercised. Ensure good visibility. Until it's absolutely necessary, do not remain between the spreader and the tractor.

Before disconnecting the lines and towing eye, close the tractor cab to protect it against unauthorized access. The tractor engine must be turned off.

NOTICE!

It is prohibited to leave a loaded spreader which uncouple from the tractor and supported with the help of a wheel support.

4.3 LOADING

The box can only be loaded when the spreader is coupled with the tractor and placed on leveled ground. The load should be evenly distributed in the load box. This will ensure proper spreader stability while driving and correct load on the axle and towing eye. It is recommended that a loader or conveyor should be used for loading.

NOTICE!

It is prohibited to exceed the maximum load capacity of the spreader.

It is prohibited to transport people and animals.
Before loading, make sure that there are no stones, tools or other objects in the load box and on adapter discs.

The load in the spreader load box must be evenly distributed.

Before loading, check that there are no objects (tools, stones) in the load box. Avoid dropping loads from a great height, as this may damage the feeder. It is prohibited to use loads other than those recommended by the manufacturer. While loading, the sieves should be closed and properly fixed on the rim of the crate.

NOTICE!

Materials for spreading must be prepared in accordance with the regulations concerning winter road maintenance and requirements applicable in the country in which the spreader is used. However, it is forbidden to use materials other than those recommended by the manufacturer.

4.4 SPREADING AND DENSITY ADJUSTMENT

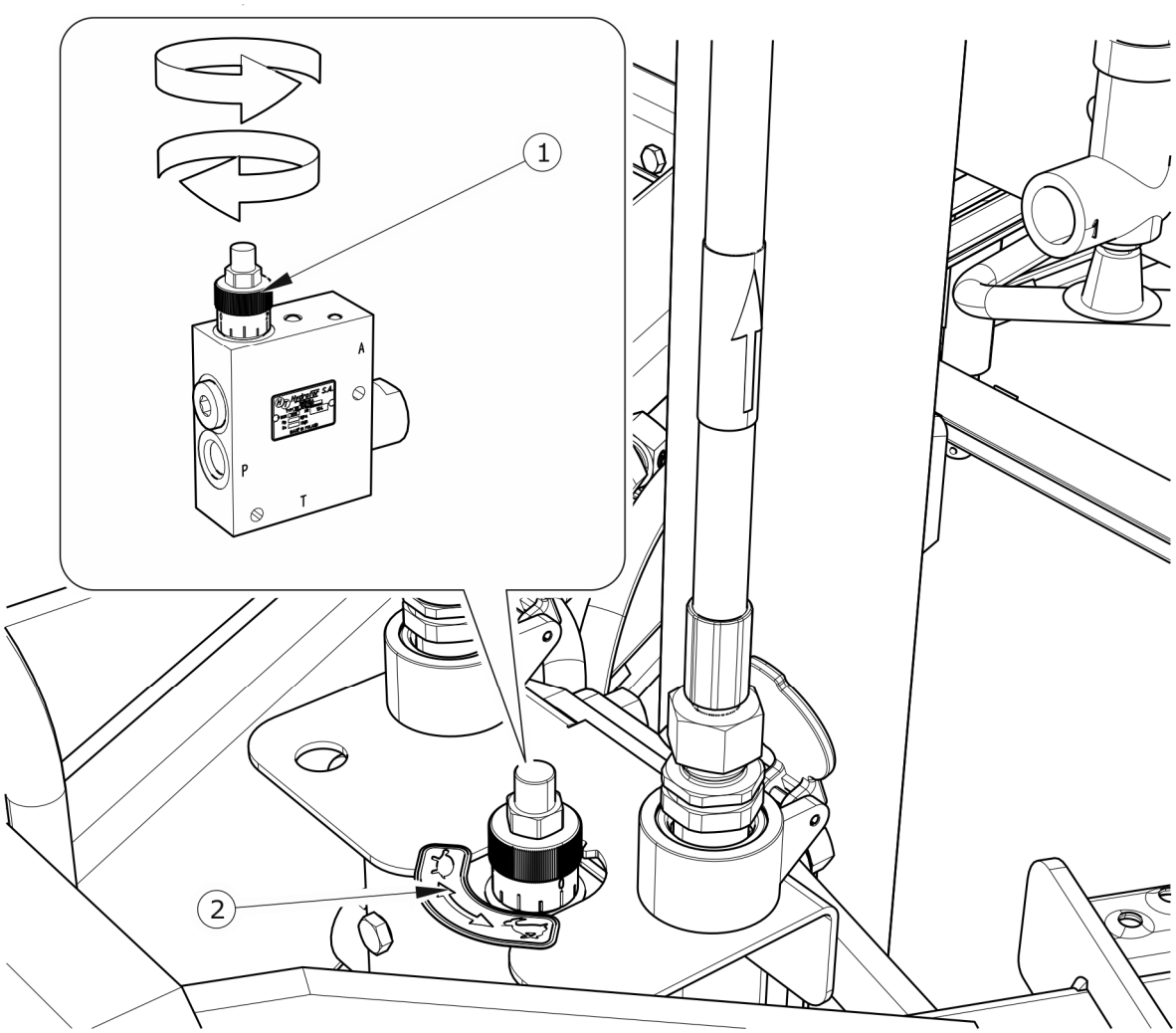


FIGURE 4.2 Feeder belt speed adjustment

(1) controller knob, (2) information label

The amount of the spread material depends on the controller setting and the moisture content of the material. In the case of sand of higher moisture level or sand mixed with

chemical agents, the material may slightly slide on the surface of the feeding belt, thus reducing the amount of the material fed onto the adapter discs.

Feeder belt speed depends on controller settings. Use knob (1) to adjust the required operating position. To do this, turn the knob all the way clockwise to the 0 setting, and then turn it counterclockwise to select the appropriate position (recommended setpoints: 2 - 4). The maximum setpoint is 4 and further increase does not affect the feeding belt speed.

Density of the sprinkled material depends on numerous factors: belt speed (controller setpoint), blade settings (spreading width), spreader speed, composition and physical properties of the material mix (i.e. weight, humidity, and others). It is impossible for the user to set a precise spreading density. This is mainly due to the difficulty in maintaining a constant humidity level of the spread material, and in the case of mixtures of sand and chemicals – it's a different granularity of the material, degree of mixing, etc.

Figures 4.3, 4.4 and 4.5 show graphs defining the dependence of the density of spread sand on the spreading speed and the adapter blade settings.

NOTICE!

When driving backwards, the spreader drive must be turned off.
It is prohibited to leave the tractor cab when the spreading adapter and feeder drives are on.

It is prohibited to use the spreader with damaged covers.

Spreading density measurements were made by Pronar employees during spreader tests and are a determinant for defining the machine operation efficiency. The provided results should be treated as approximations and the selection of setpoints should be made on the basis of the spreader user's experience, taking into account the type of spreading material and its properties. Medium humidity fine sand without any chemicals was used to carry out the tests.

Before spreading, turn on the tractor orange flashing lamp. The conveyor belt and adapter discs are started from the tractor driver's cab with the help of the distributor lever. Due to the use of check valve in the spreader hydraulic system, it is impossible to move the belt towards the front wall of the spreader.

It is recommended that the spreading operation should be initiated while driving. In case of a stopover (traffic lights, etc.) or after emptying the load box, the spreader drive must be turned off.

If clogged, remove the problem using the side service platform.

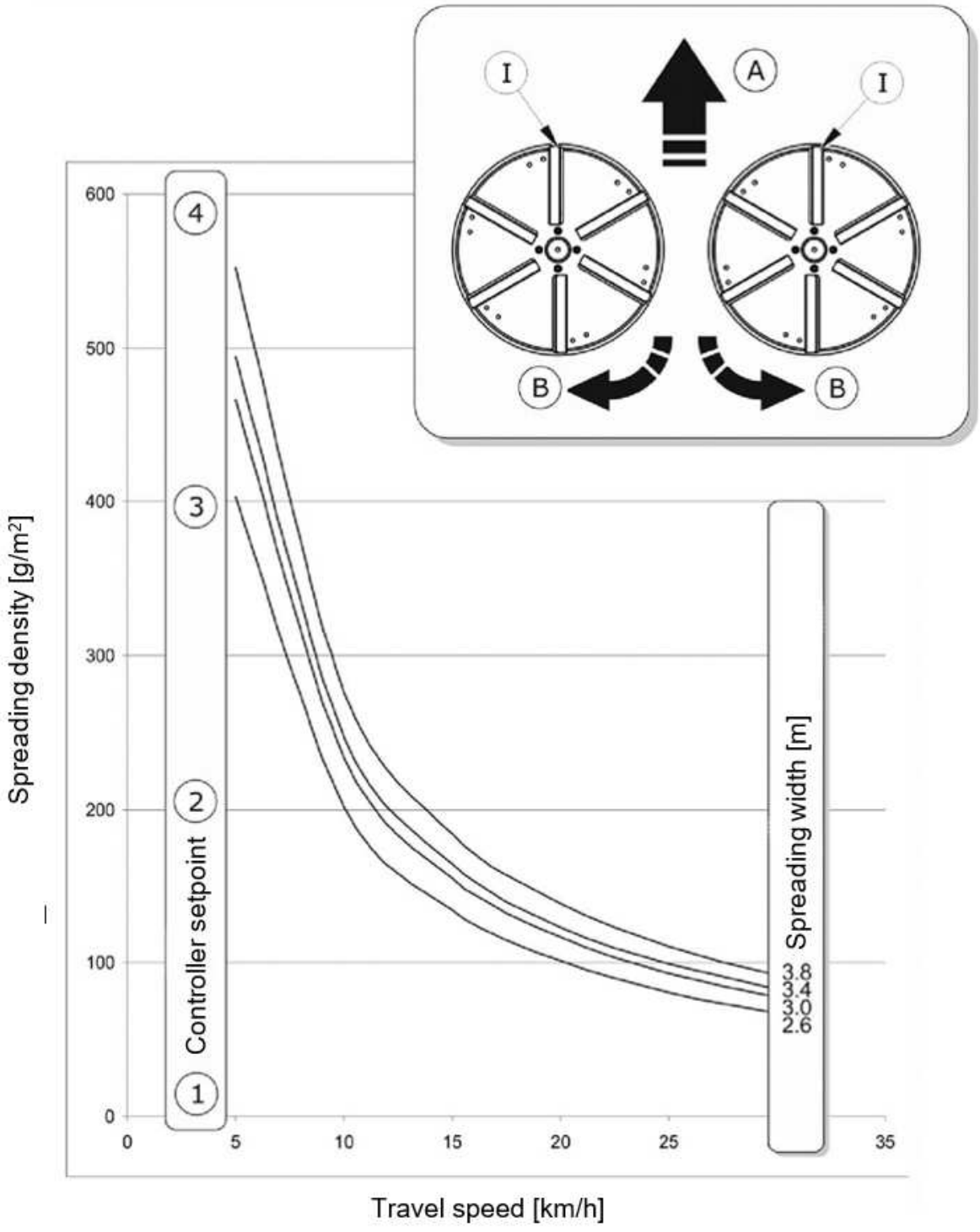


FIGURE 4.3 Spreading density – Chart 1

(A) spreader front section, (B) disk rotation direction, (I), (II), (III) blade locations

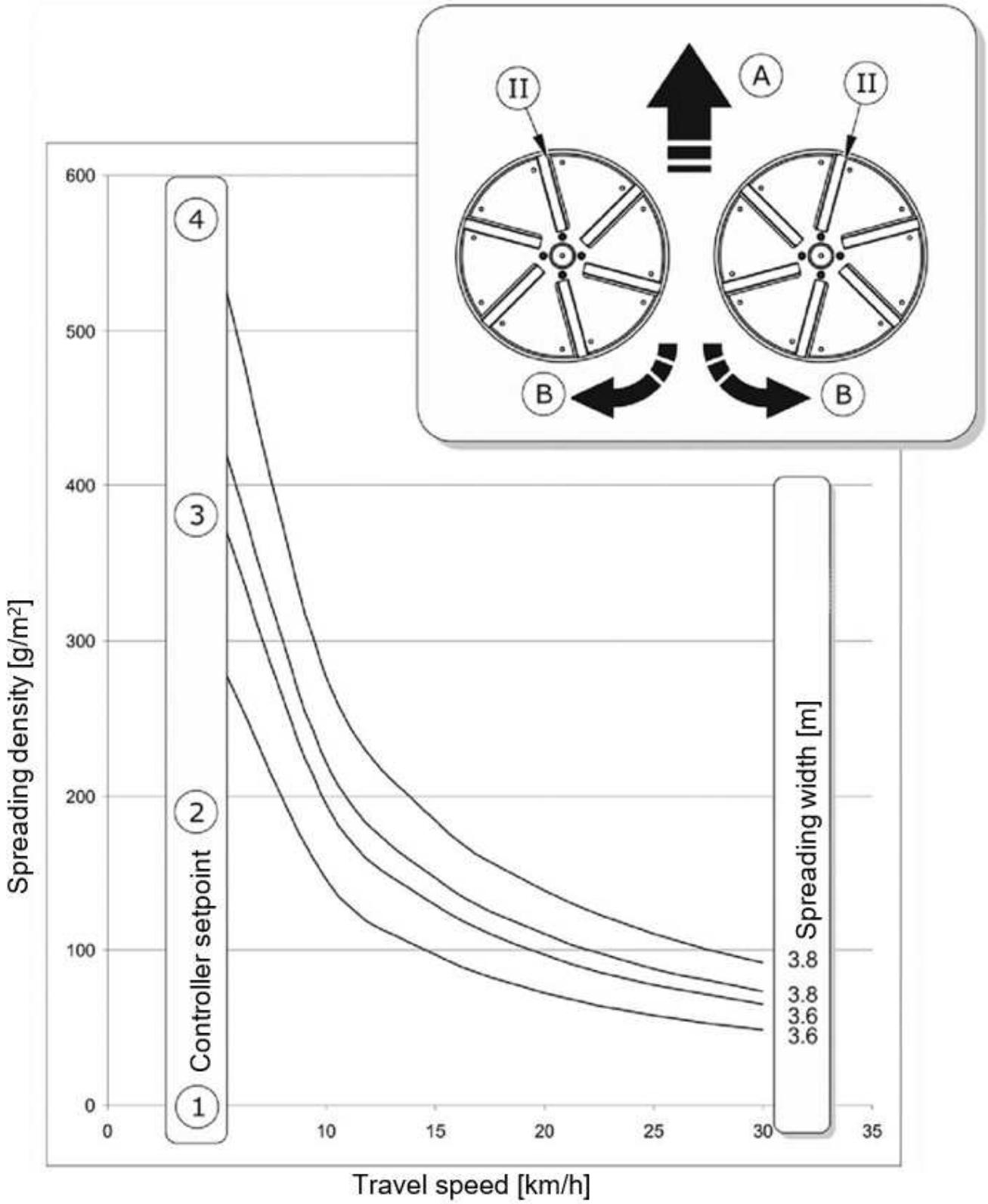


FIGURE 4.4 Spreading density – Chart 2

(A) spreader front section, (B) disc rotation direction, (I), (II), (III) blade positions

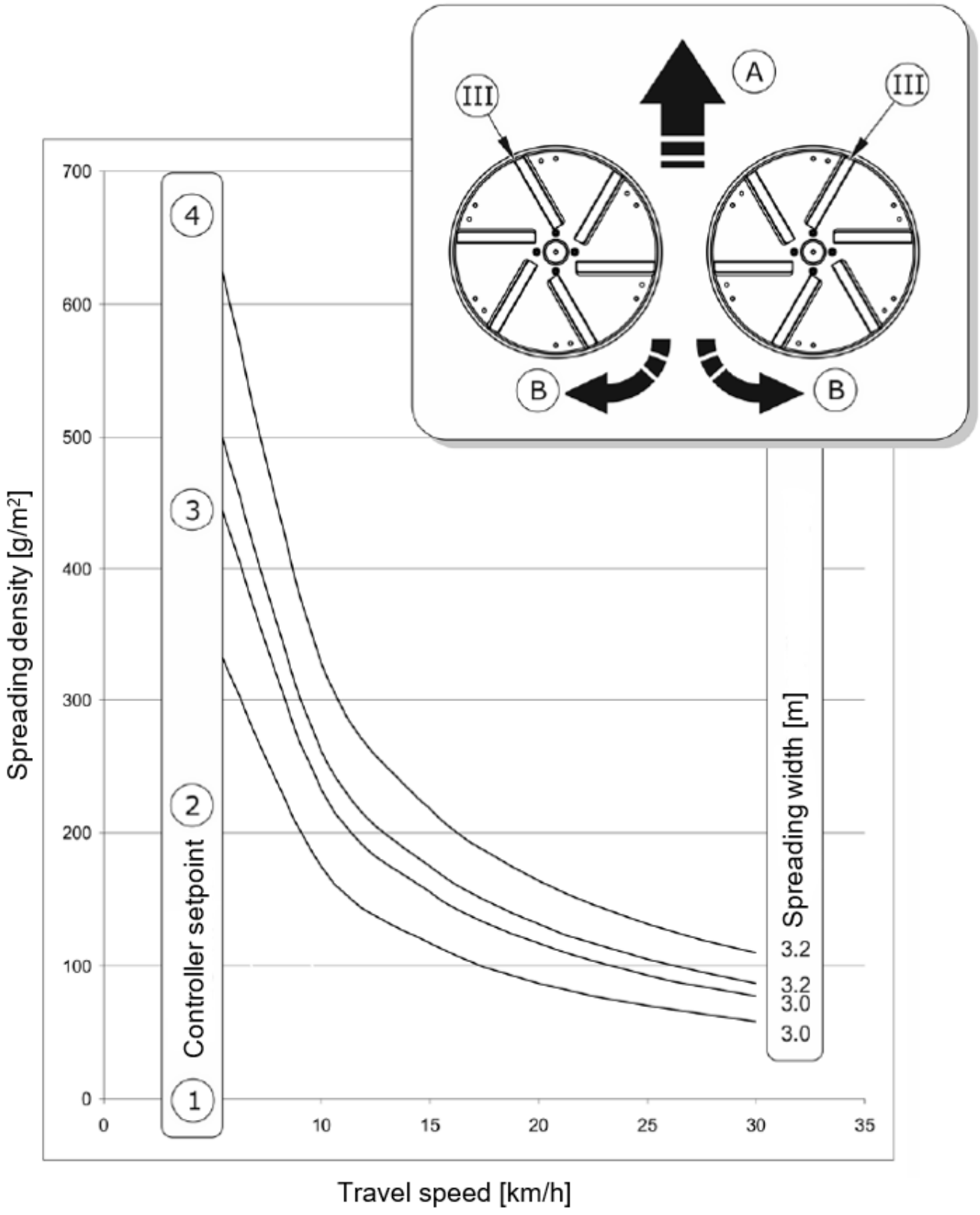


FIGURE 4.5 Spreading density – Chart 3

(A) spreader front section, (B) disc rotation direction, (I), (II), (III) blade positions

DANGER!

It is prohibited to use the spreader with damaged covers.

While driving on public roads, traffic regulations should be followed.

The speed limit should not be exceeded. Adjust the speed to road conditions. While operating on sidewalks, the spreader, special attention should be paid to bystanders and animals in the vicinity.

While operating the spreader, the tractor must be equipped with an orange flashing light..

4.5 PUBLIC ROAD TRAFFIC RULES

While driving, follow road traffic regulations, use caution and exercise reasonable conduct. If spreading pavements, pay extra attention to bystanders who may be near the working spreader. Following are the key set driving tips.

- Before starting to drive, make sure that there are no bystanders, especially children, near the spreader and tractor. Ensure proper visibility.
- Make sure the spreader is correctly coupled to the tractor and the tractor hitch is properly secured.
- Do not overload the spreader, the load must be evenly distributed not to exceed the permissible axle loads or towing eye. It is prohibited to exceed the maximum capacity of the spreader as it may damage the machine and pose threats to the operator or other road users while driving.
- The allowable design speed and speed resulting from road traffic restrictions should not be exceeded. The travel speed should be adapted to the existing road conditions, spreader load capacity, pavement condition and to other conditions.
- The spreader uncoupled from the tractor must be immobilized by applying the parking brake and possibly by placing wedges or other elements without sharp edges underneath the wheels. Leaving the spreader unsecured is prohibited. In case of failure, pull over without posing threats to other road users and mark the place of your stopover in accordance with road traffic regulations.
- Tractor operator undertakes to equip the spreader with an approved or tested warning reflective triangle. While driving, follow public traffic rules, signal the change of direction with the help of blinkers, keep the spreader clean and lighting

and signaling systems in good technical condition. Damaged or lost lighting and signaling system elements must be immediately repaired or replaced.

- While operating the spreader, a yellow flashing light should be turned on.
- Start the conveyor belt and adapter drive only when the tractor and spreader are in motion. During a stopover (traffic lights, etc.), upon emptying the load box or while driving backwards, the spreader drive should be turned off.
- Avoid ruts, depressions, ditches, or driving along roadside slopes. Driving over these types of obstacles can cause the machine and tractor to tilt suddenly. This is of particular importance as the center of gravity of a loaded spreader has a negative impact on safe driving. Driving near the ditch or canal edges is dangerous due to the risk of land sliding underneath the wheels of vehicles.
- When traveling on public roads, the spreader must be designated with the help of a slow-moving vehicle plate located on the rear load box wall.
- While driving, avoid sharp turns, particularly those located on sloping terrain.
- Keep in mind that the braking distance of the set increases significantly with increased speed and weight of transported load.
- Reduce your driving speed early enough before approaching turns, while driving over bumps or sloping terrain.

4.6 USING THE TIRES

- While carrying out tire related works, protect the spreader against rolling by placing wedges or other elements without sharp edges under the wheels. Disassemble the wheel only when the spreader is not loaded.
- Repair work on wheels or tires should be carried out by trained and authorized personnel. The works should be carried out with the use of properly selected tools.
- Upon mounting each wheel, check the tightness of the nuts. The inspection should take place every time after the first use, after the first ride with a loaded spreader, after travelling 1,000 km and every 6 months after that. These operations should be repeated each time when the wheel is disassembled from the drive axle.
- Regularly check and maintain the correct tire pressure in accordance with instructions (particularly following long downtime periods).

- Tire pressure should also be checked during all-day intensive operation. Keep in mind that the tire temperature can increase the pressure by up to 1 bar. When this happens, reduce load or speed.
- Never use venting to decrease the pressure increased due to high temperature.
- Valves must be protected with suitable caps to avoid contamination.
- Do not exceed the maximum spreader speed limit.
- During an all-day operating cycle, take an hour-long break at noon.
- Avoid potholes, sudden and varying maneuvers, and speeding while turning.

CHAPTER

5

TECHNICAL SERVICE

5.1 INTRODUCTION

While operating the spreader, it is necessary to constantly check the technical condition and carry out maintenance procedures that will allow the machine to be kept in good technical condition. Therefore, the user should perform all maintenance and adjustment operations specified by the manufacturer.

Repairs under the warranty period may only be carried out by authorized service centers.

This chapter describes in detail the procedures and scope of activities that the user can perform on his own. Unauthorized repairs, changes to factory settings or activities otherwise not considered possible to be carried out by the spreader operator will render the warranty void.

5.2 SERVICING THE DRIVE AXLE

5.2.1 INTRODUCTION

Works related to repair, replacement or regeneration of the axle components should be entrusted to specialized workshops with appropriate technologies and qualifications to perform this type of work.

The user is obliged only to:

- Control and adjust the axle bearings slack;
- Assemble/disassemble the wheels, control wheel tightening;
- Control air pressure, assess technical condition of the wheels and tires;
- Adjust mechanical brakes;
- Replace parking brake cables and adjust cable tension.

Activities relate to:

- Replacement of axle bearings lubricant;
- Replacement of bearings, hub seals;
- Drive axle repair;

may be carried out by specialized workshops.

5.2.2 CONTROLLING DRIVE AXLE BEARING SLACK

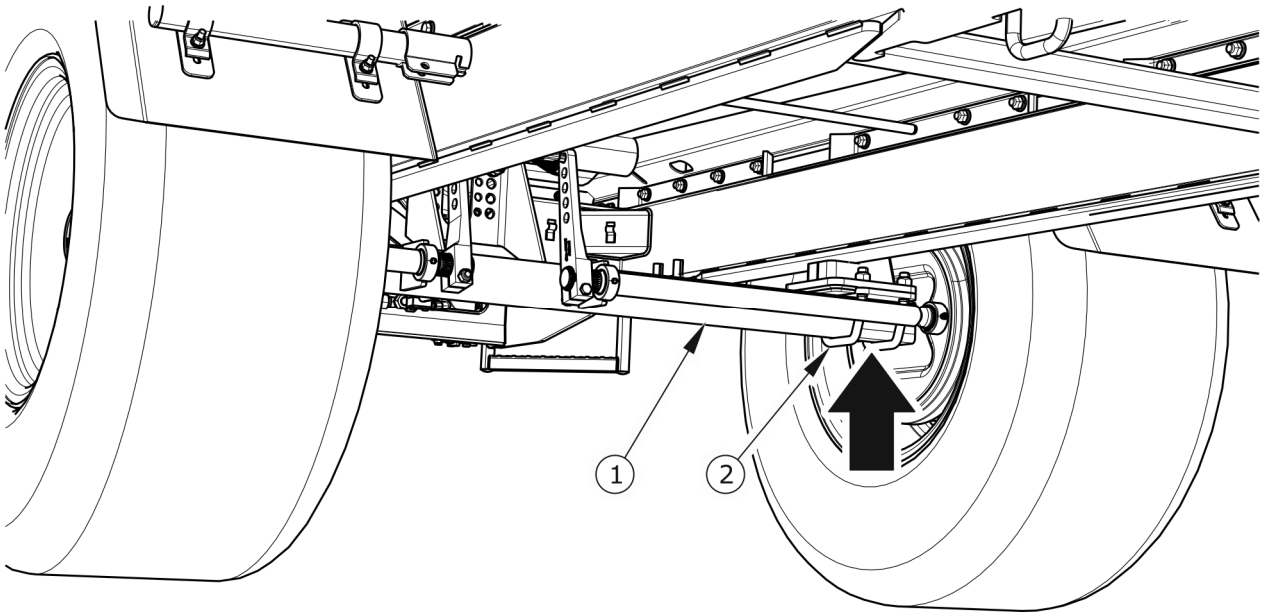


FIGURE 5.1 Jacking point

(1) drive axle, (2) U-bolt

Preparatory activities

- ➡ Couple the spreader with the tractor, immobilize the tractor with the parking brake.
- ➡ Place the tractor and spreader on firm and level ground.
  - ⇨ Position the tractor for straight-ahead travel.
- ➡ Place the wedges underneath the spreader wheel. Make sure the machine will not roll during inspection.
- ➡ Lift the wheel (on the opposite side of the applied wedges).
  - ⇨ The jack should be placed in the spot indicated by the arrow in Figure 5.1. The jack must be adjusted to the spreader's curb weight.

Controlling drive axle bearing slack

- ➡ Turn the wheel slowly in both directions to check that the movement is smooth and the wheel rotates without excessive resistance or jamming.

➡ Turn the wheel to make it rotate very quickly and check if the bearing makes any unusual sounds.

➡ Grab the wheel on top and bottom and check if there is any slack.

⇨ Use the lever applied set underneath the wheel while resting the other end on the ground.

➡ Lower the jack, rearrange the wedges and repeat the checks for the other wheel.

HINT

A damaged or missing wheel hub will cause penetration of impurities humidity to enter the hub, thus causing the bearings and hub sealing to wear faster.

Life cycle of the bearings depends on spreader's operating conditions, loads, vehicle speed, and lubrication conditions.

If slack can be felt, adjust the bearings. Untypical sounds coming from the bearing may be symptoms of excessive wear, dirt or damage. In this case, the bearing, including the sealing rings, should be replaced or cleaned and re-lubricated.

Drive axle bearing slack should be controlled:

- **Following the first month of use;**
- **Every 6 months of operation.**

Check the technical condition of the hub cover and replace if necessary. You may check bearing slack only when the spreader is coupled with the tractor. The machine cannot be loaded.

DANGER!

Before starting to work, read the spreader operating manual and follow the recommendations of the manufacturer.

The jack must rest steadily on the ground and drive axle.

Make sure that the spreader will not roll while inspecting the bearings or the drive axle.

5.2.3 ADJUSTING DRIVE AXLE BEARING SLACK

Preparatory activities

➡ Prepare the tractor and spreader for adjustment activities in accordance with the description included in section 5.2.2.

Adjusting drive axle bearing slack

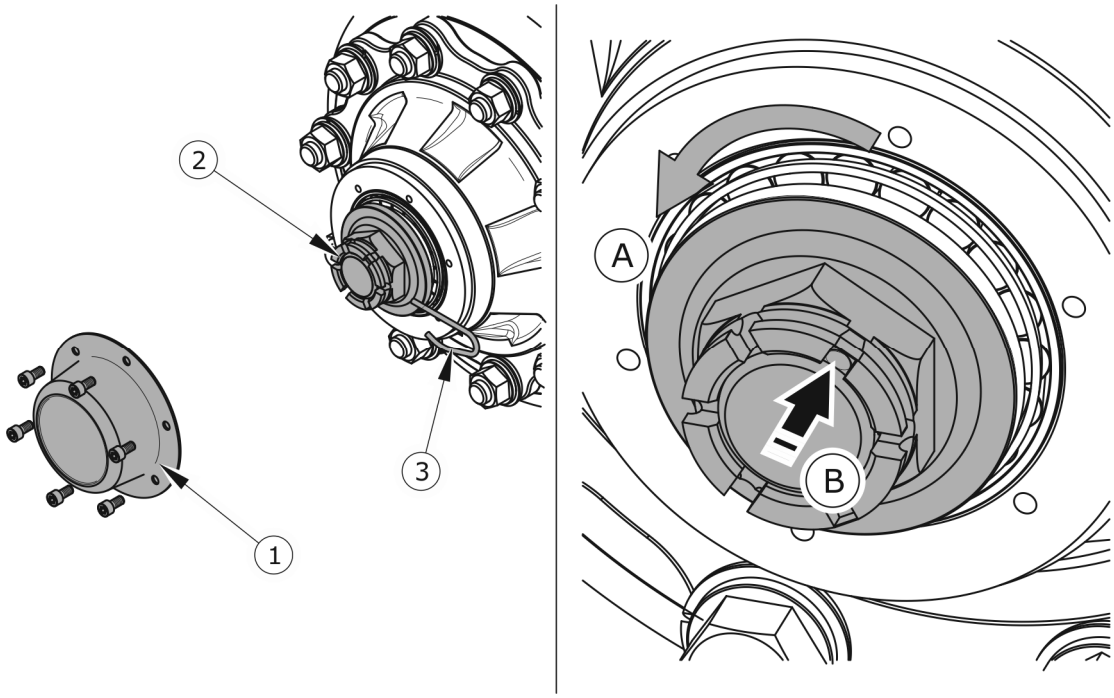


FIGURE 5.2 Drive axle bearing slack adjustment

(1) hub cover, (2) crown nut, (3) pin

➡ Disassemble the hub cover (1) – Figure 5.2.

➡ Remove the pin (3) securing the crown nut (2).

➡ Tighten the crown nut to remove the slack.

⇨ The wheel should rotate with slight resistance.

➡ Unscrew the nut (apply a min. 1/3 turn) so that it's in line with the nearest row of the nut with a hole in the drive axle plug. The wheel should turn without excessive resistance.

⇨ The nut should not be overtightened. Do not use an excessive torque as this will deteriorate the operating conditions of the bearings.

➡ Secure the crown nut with a flexible pin and install the hub cover.

➡ Gently tap the hub with a rubber or wooden hammer.

The wheel should turn smoothly, without any jams or noticeable resistance. Bearing slack can be adjusted only when the spreader is coupled to the tractor and the load box is empty.

HINT

It is easier to inspect and adjust slacks when the wheel is disassembled.

5.2.4 ASSEMBLING AND DISASSEMBLING THE WHEEL, NUT TIGHTENING CONTROL

Disassembling the wheel

➡ Place wedges underneath the wheel that will not be dismantled.

➡ Ensure that the spreader is properly secured and will not roll while disassembling the wheel.

➡ Loosen the wheel nuts following the sequence of operation provided in Figure 5.3.

➡ Apply the jack and lift the spreader.

➡ Disassemble the wheel.

Assembling the wheel

➡ Remove impurities from drive axle pins and nuts.

⇨ Do not lubricate the nut thread and pin.

➡ Check technical condition of pins and nuts and replace if necessary.

➡ Put the wheel on the hub, tighten the nuts so that the rim sits flush with the hub.

➡ Lower the spreader, tighten the nuts while applying the recommended torque and in the specified order.

Tightening the nuts

The nuts should be tightened diagonally (in several steps until the required tightening torque is obtained), using a torque wrench. When no torque wrench is available, a standard wrench can be used. The wrench arm (L) in Figure (5.3) should be selected in accordance to the weight of the person (F) tightening the nut. Keep in mind that this tightening method is not as accurate as when a torque wrench is used.

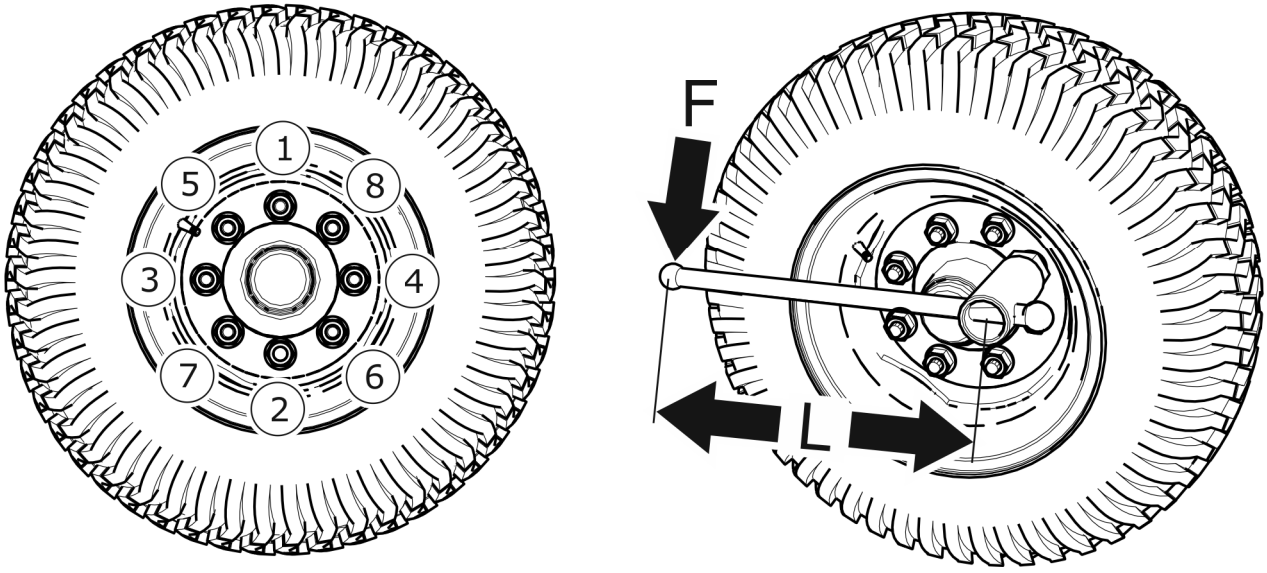


FIGURE 5.3 Nut tightening sequence

(1) - (6) nut tightening sequence, (L) wrench length, (F) user's weight

HINT

Wheel nuts should be tightened to the recommended torque of 270 Nm – M18x1.5 nuts

Control drive axle wheel tightening:

- **After the initial use of the spreader;**
- **After driving a loaded spreader;**
- **Each month of operation.**

In case of dismantling the wheel, all operations should be repeated

TABLE 5.1 Wrench arm selection

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

NOTICE!

The wheel nuts should not be tightened with impact wrenches, because of the risk of exceeding the allowable torque, which may result in breaking the thread or hub pin.

The highest tightening accuracy is obtained with a torque wrench. Before starting work, make sure that the correct torque value is set.

5.2.5 CHECKING AIR PRESSURE, ASSESSING TECHNICAL CONDITION OF TIRES AND STEEL RIMS

Tire pressure should be checked after each wheel change and at least once a month. In case of intensive use, it is recommended that the air pressure should be checked more often. The spreader must be unloaded. The inspection should be carried out before driving, when the tires are not warm, or following long downtime periods.

HINT

The tire pressure value is provided on the information label affixed on the rim or over the machine wheel.

DANGER!

Damages tires or rims may cause serious accidents.

While checking pressure, pay attention to technical condition of rims and tires.
Perform a detailed visual inspection of the side surfaces of the tires and check the condition of the tread.
For mechanical damages, consult your nearest tire service center and ensure that your tire defect qualifies for replacement.
The rims should be checked for deformations, material cracks, weld cracks, corrosion, particularly around welds and tire contact surfaces.
Technical condition and appropriate maintenance of wheels significantly extends the life cycle of these elements and ensures an appropriate level of safety for spreader users.

Check pressure and steel rims:

- **Every month of operation;**
- **Every week in case of intensive use;**
- **On an as-needed basis.**

5.2.6 ADJUSTING THE MECHANICAL BRAKES

Operating the spreader causes drum brake linings to wear. The piston stroke increases, and after exceeding the limit, the braking force tends to decrease.

Make adjustments when:

- Actuator piston stroke is 2/3 of the maximum stroke;
- Expander levers are not parallel to each other during braking;
- Braking system has been repaired.

The spreader wheels must brake simultaneously. Brake adjustments consist in changing the location of the expander arm (1) – Figure 5.4 in relation to the expander shaft (2).

Scope of service activities

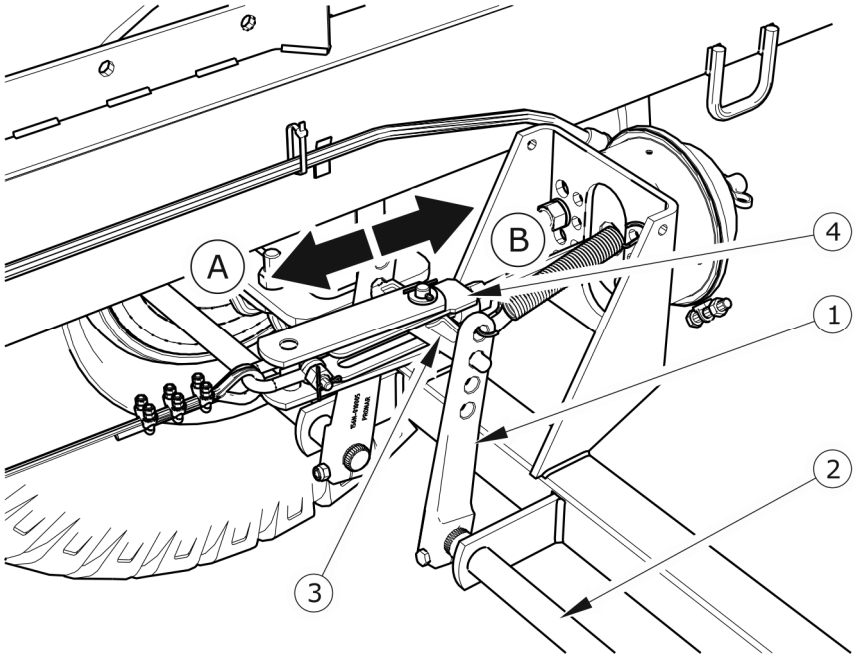


FIGURE 5.4 Drive axle mechanical brakes adjustment

(1) expander arm, (2) expander shaft, (3) T-bar, (4) actuator fork

- ➡ Disassemble the bolt that secures the actuator fork (4) with the T-bar (3).
- ➡ Mark the position of the expander arm (1) in relation to the shaft (2).
- ➡ Disassemble the arm and shift it to the appropriate position.
  - ⇨ In direction (A) if braking is too early;
  - ⇨ In direction (B) if the braking is too late.
- ➡ Repeat this operation for the other arm.
- ➡ Reassemble the bolt that secures the cylinder fork with the T-bar.

This adjustment should be made separately for each wheel. Expander arm (1) should be moved one notch in a desired direction. If the actuator's operating range is still incorrect, shift the lever again. After the brakes have been properly adjusted at full brake, the expander arms should make a 90-degree angle with the actuator piston and the stroke should be approximately half of the length of the entire piston stroke.

After releasing the brake, the expander arms should not rest on any structural elements, as an inadequate retraction of the piston rod may cause the jaws to rub against the drum and to

the spreader brakes to overheat as a result. The expander arms should be parallel to each other at full brake. If not, adjust the position of the lever with a longer stroke.

If it is necessary to disassemble the T-bar, memorize or mark its original position between the spreader arms. The fastening location is selected by the manufacturer and cannot be changed.

5.2.7 REPLACING AND ADJUSTING THE PARKING BRAKE CABLE

The correct functioning of the parking brake depends on the performance of the axle brakes and the correct brake cable tension.

To replace the parking brake cable:

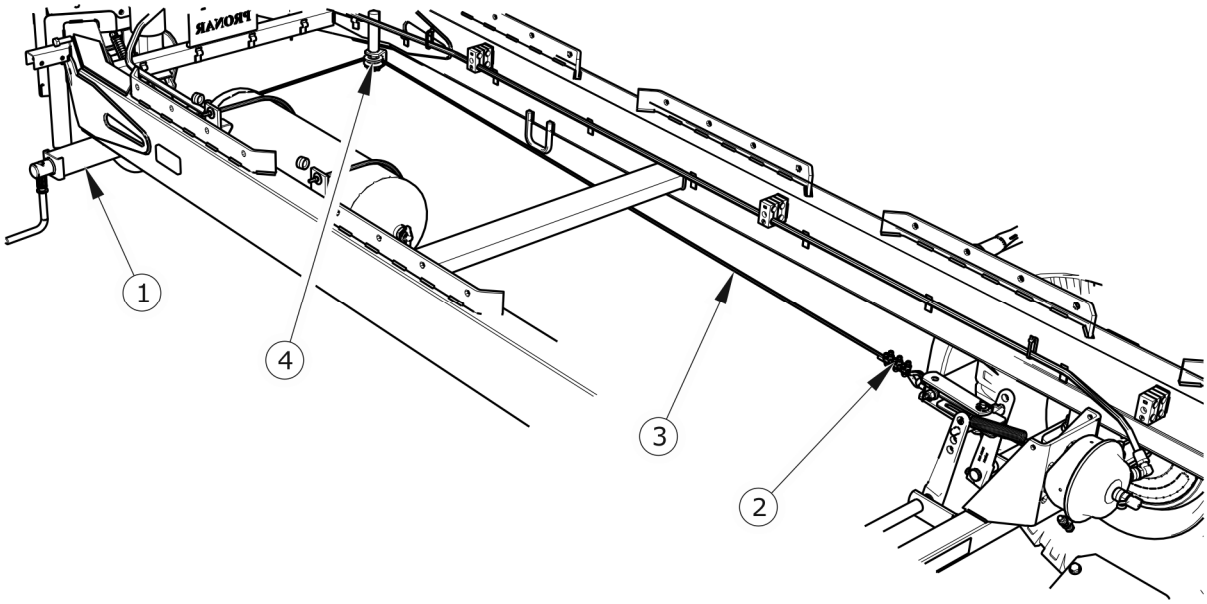


FIGURE 5.5 Parking brake cable tension adjustment

(1) brake crank, (2) cable clamp nuts, (3) hand brake cable, (4) guide roller

- ➡ Couple the spreader with the tractor. Place the spreader and tractor on a leveled surface.
- ➡ Place wedges underneath the spreader wheel.
- ➡ Loosen the cable clamp nuts (2).
- ➡ Disassemble the cable (3).
- ➡ Lubricate the parking brake mechanism (1) and the cable roller pins (4).

➡ Apply a new cable and adjust cable tension.

To adjust the parking brake cable tension:

➡ Couple the spreader with the tractor. Place the spreader and tractor on a leveled surface.

➡ Place wedges underneath the spreader wheel.

➡ Unscrew (counterclockwise) the brake mechanism screw (1) to its maximum - Figure 5.5.

➡ Loosen the nuts (2) of the hand brake cable clamps.

➡ Tighten the cable and tighten the clamps.

⇨ The length of the parking brake cable should be selected so that when the service and parking brake are completely released, the cable is loose and hangs by approx. 1-2 cm.

Adjust the parking brake cable tension when:

- Cable is overstretched;
- Parking brake cable clamps are loose;
- Drive axle brake has been adjusted;
- Drive axle brake system has been repaired;
- Parking brake system has been repaired.

Before adjustments, make sure that the drive axle brake is correctly adjusted and operating.

Check and/or adjust the parking brake:

- **Every 12 months;**
- **On an as-needed basis.**

5.3 SERVICING THE PNEUMATIC SYSTEM

5.3.1 INTRODUCTION

Works related to repair, replacement or regeneration of the system components (brake actuators, cables, check valve, braking force controller, etc.) should be entrusted to specialized workshops with appropriate technologies and qualifications to perform this type of work.

For the pneumatic system, the user is obliged only to:

- Check the tightness of the system and inspect it visually;
- Clean the air filter(s);
- Drain the air reservoir;
- Clean the drainage valve;
- Clean and maintain the pneumatic cable connections.

DANGER!

It is prohibited to use the spreader with a faulty brake system.

5.3.2 TIGHTNESS CONTROL AND VISUAL INSPECTION OF THE SYSTEM

Checking the tightness of pneumatic systems

➡ Couple the spreader with the tractor.

➡ Immobilize the tractor and spreader using the parking brake. Apply wedges underneath the spreader wheel.

➡ Start the tractor to refill air in the spreader braking system reservoir.

⇨ 1-line systems: air pressure should be approx. 5.8 bar;

⇨ 2-line systems: air pressure should be approx. 8 bar.

➡ Turn off the tractor engine.

➡ Check system components with tractor brake pedal released.

⇨ Pay special attention to cable connection points and brake actuators.

➡ Repeat the system check with the tractor brake pedal applied.

⇨ Assistance of another person is required.

Check system tightness:

- **After driving the first 1 000 km;**
- **Each time after completing a repair or replacing system elements;**
- **Once a year.**

In case of a leak, the compressed air will leak out in places of damage while generating a characteristic hissing sound. System leaks can also be detected by coating the checked components with a washing liquid or other foaming agent that will not aggressively affect system components. It is recommended that commercially available preparations designed to detect leaks should be used. Damaged elements should be replaced or sent for repair. If a leak appears near the connections, the user can tighten the connection by himself. If air keeps leaking, replace the connection elements or seals.

Visual inspection of the system

While checking tightness, pay extra attention to the technical condition and level of cleanliness of the system components. Pneumatic conduits, seals etc. coming into contact with oil, grease, gasoline etc. may be damaged or accelerate the aging process. Only bent, permanently deformed, cut or frayed wires qualify for replacement.

Carry out a visual inspection:

- **Simultaneously with the tightness check.**

NOTICE!

Pneumatic system elements may be repaired, replaced or regenerated only in a specialized workshop.

5.3.3 CLEANING THE AIR FILTERS

Depending on the operating condition of the spreader, but at least once every three months, remove and clean the air filter cartridges located on the pneumatic system connection hoses. The cartridges are designed for multiple use and cannot be replaced unless they are mechanically damaged.

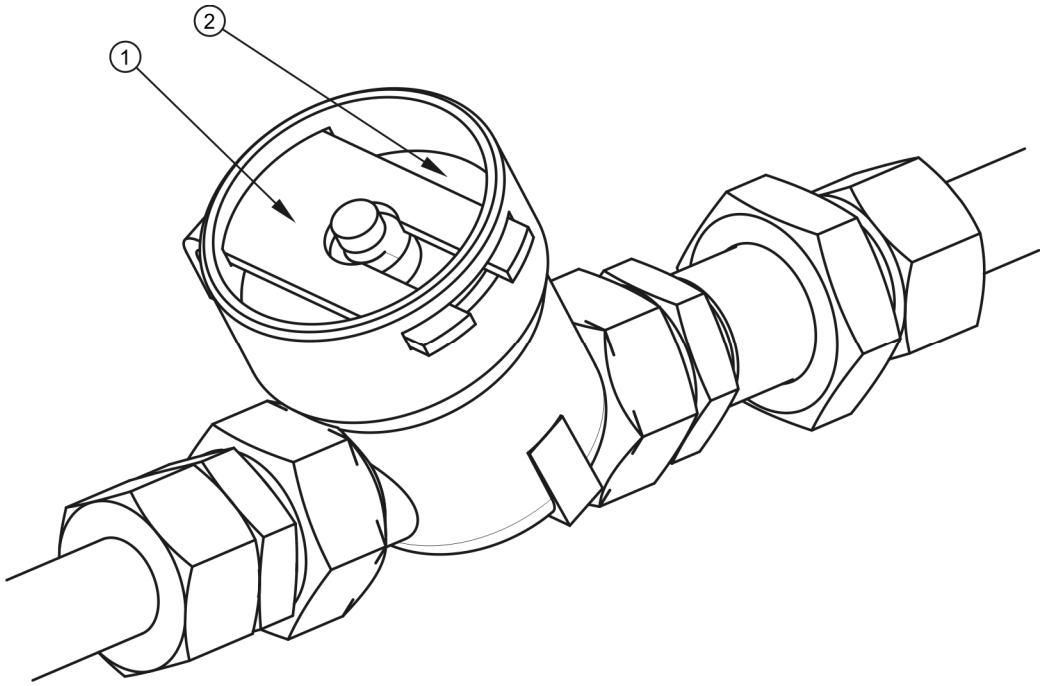


FIGURE 5.6 Air filter

(1) protection slider, (2) filter cover

DANGER!

Before disassembling the filter, reduce the pressure in the supply line. While removing the filter slide, hold the cover with your other hand. Point the filter cover away from you.

Scope of service activities

- ➡ Reduce pressure in the supply line.
  - ⇨ The pressure in the line can be reduced by pushing the pneumatic connection plug to a maximum.
- ➡ Push out the safety slide (1).

⇨ Hold the filter cover (2) with your other hand. After removing the slide, the cover will be pushed out by the spring located in the filter housing.

➡ The filter cartridge and housing should be thoroughly washed and blown with compressed air. Reassemble the elements in reverse order.

Clean the air filter(s):

- **Every 3 months of use.**

5.3.4 DRAINING THE AIR RESERVOIR

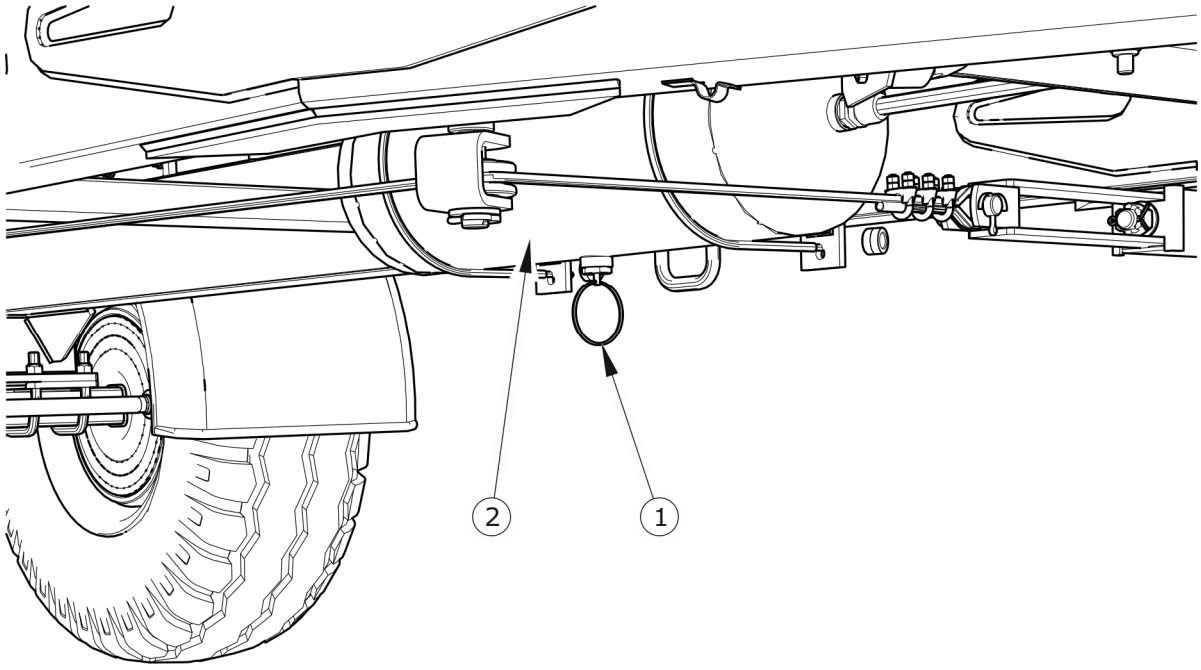


FIGURE 5.7 Draining the air reservoir

(1) draining valve, (2) air reservoir

Scope of service activities

➡ Push out the drainage valve stem (1) located at the bottom of the reservoir (2) - the reservoir is located on the left lower frame member.

⇨ The compressed air in the reservoir will remove force the water outside.

➡ After releasing the stem, the valve should close automatically and stop the outflow of air from the reservoir.

⇨ If the valve stem fails to return to its position, the entire drainage valve must be unscrewed and cleaned, or replaced (if damaged).

Drain the air reservoir:

- **Every 7 days of use.**

5.3.5 CLEANING THE DRAINAGE VALVE

DANGER!

Before disassembling the drainage valve, remove air from the air reservoir.

Scope of service activities

➡ Depressurize the air reservoir.

⇨ The pressure in the reservoir can be reduced by rocking the drainage valve stem.

➡ Unscrew the valve.

➡ Clean the valve and blow out with compressed air.

➡ Replace the copper gasket.

➡ Screw in the valve, fill the tank with air, check the tank for tightness.

Clean the valve:

- **Every 12 months (before the winter season).**

5.3.6 CLEANING AND MAINTAINING THE LINE CONNECTIONS AND PNEUMATIC SOCKETS

DANGER!

Faulty and dirty spreader connections may cause the brake system to malfunction.

A damaged connector housing should be replaced. Damaged caps or gaskets should also be replaced. Pneumatic connection seals coming into contact with oils, grease, gasoline etc. may be damaged and accelerate the aging process.

If the spreader is uncoupled from the tractor, connections should be protected with covers or placed in their designated sockets. Before the winter period, it is recommended that the seals should be preserved using the preparations designed for this purpose (e.g. silicone lubricants for rubber elements).

Each time before coupling the machine, check the technical condition and level of cleanliness of tractor connections and sockets. If necessary, clean or repair the tractor sockets.

Check the spreader connections:

- **Each time before coupling with tractor.**

5.4 SERVICING THE HYDRAULIC SYSTEM

5.4.1 INTRODUCTION

Works related to the repair, replacement or regeneration of the hydraulic system components should be entrusted to specialized workshops with appropriate technologies and qualifications to perform this type of work.

HINT

The hydraulic system does not require to be depressurized during normal operation of the spreader.

For the hydraulic system, the user is obliged only to:

- Check the tightness of the system and visually inspect the system;
- Inspect the technical condition of the hydraulic connections.

5.4.2 HYDRAULIC SYSTEM TIGHTNESS INSPECTION

Scope of service activities

- ➡ Couple the spreader with the tractor.
- ➡ Connect all hydraulic system lines in accordance with the operating manual.
- ➡ Clean hydraulic connectors and actuators.
- ➡ Start the spreader hydraulic system for 5 minutes.
- ➡ Inspect system components for tightness.

If a leak occurs at a connection, tighten the connection.

Inspect tightness:

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

5.4.3 INSPECTING TECHNICAL CONDITION OF THE HYDRAULIC CONNECTORS AND SOCKETS

Hydraulic connections must be technically sound and kept clean. Each time before connecting, make sure that tractor sockets are maintained in good condition. Tractor and spreader hydraulic systems and are sensitive to the presence of solid dirt that can damage the precision components of the system.

Inspect the hydraulic connections and sockets:

- **Each time before coupling the spreader with the tractor.**

5.4.4 REPLACING THE HYDRAULIC LINES

Rubber hydraulic lines should be replaced every 4 years, regardless their technical condition. This operation should be entrusted to specialized workshops.

Replace the hydraulic lines:

- **Every 4 years.**

5.5 LUBRICATING THE SPREADER

The spreader should be lubricated using a hand or foot operated grease gun, filled with a recommended lubricant. If possible, remove old grease and other contaminants before starting work. After finishing the work, wipe off the excess grease.

Parts that should be lubricated using a machine oil should be wiped with a dry, clean cloth. Next, apply a small amount of oil to the lubricated surfaces (with an oiler or a brush). Wipe off the excess oil.

The lubricant in drive axle hub bearings should be entrusted to specialized service points equipped with appropriate tools. The entire hub must be disassembled, the bearings and individual sealing rings removed in accordance to the instructions of the axle manufacturer. After thorough cleaning and inspection, install the lubricated components. If necessary, the bearings and seals should be replaced. Lubrication of axle bearings should be carried out at least once every 2 years.

Empty lubrication or oil packaging should be disposed of in accordance with the lubricant manufacturer.

TABLE 5.2 Spreader lubrication schedule

NO.	LUBRICATION POINT	NUMBER OF LUBRICATION POINTS	TYPE OF LUBRICANT	FREQUENCY
1	Hand brake crank	1	A	3M
2	Drive wheel bearings	2	A	23M
3	Pulley pivot	1	A	6M
4	Support screw	1	A	6M
5	Reducer	1	B	24M
6	Towing eye	1	C	3M

lubrication periods: M – month, D – day, H – hour

TABLE 5.3 Recommended lubricants

DESIGNATION FROM TABLE (5.2)	DESCRIPTION
A	Permanent general purpose machine lubricant (lithium, calcium based)
B	Transmission oil
C	Permanent lubricant for heavy duty elements with MOS_2 and graphite

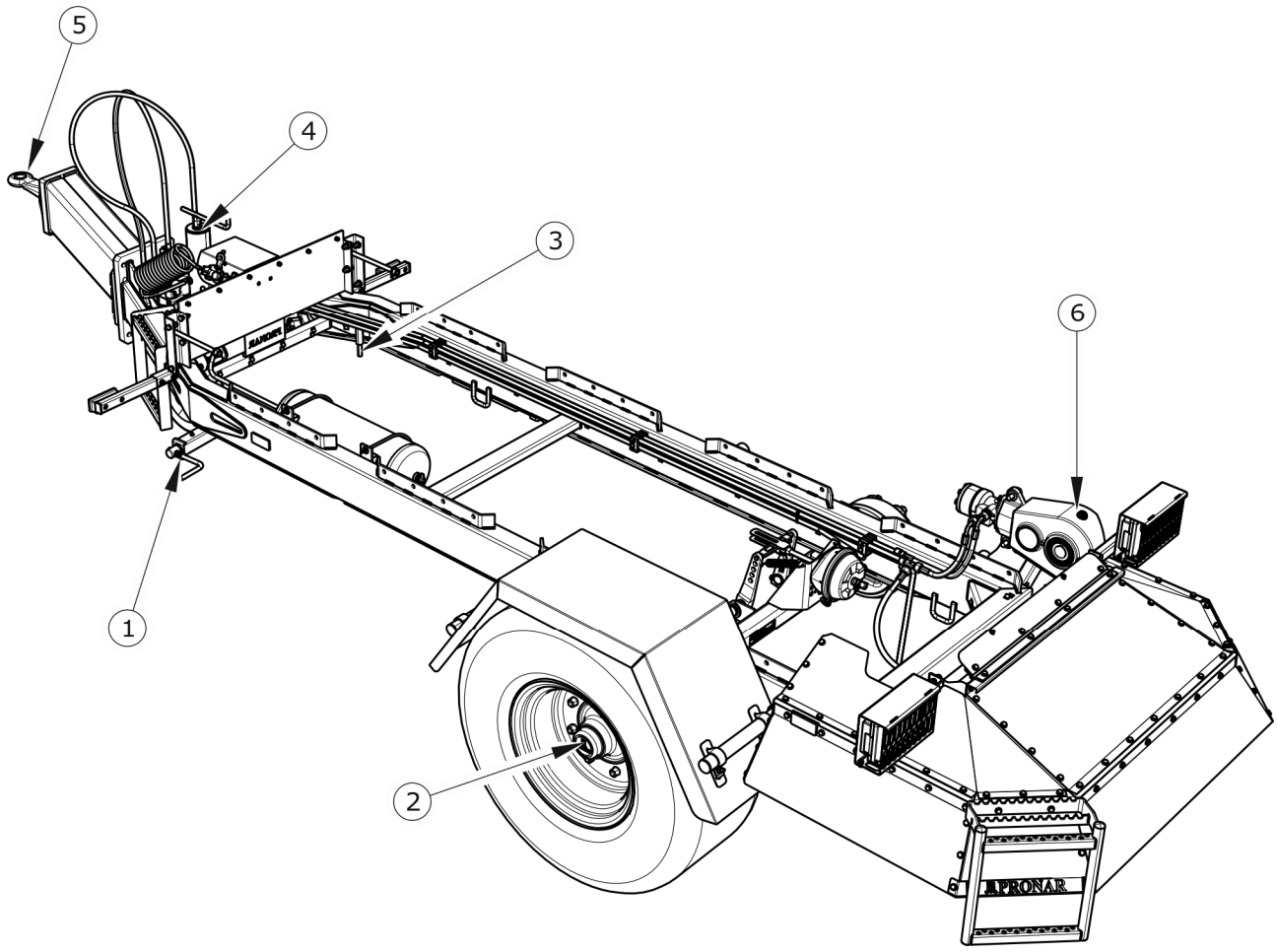


FIGURE 5.8 Spreader lubrication points

While operating the spreader, the user must lubricate the machine in accordance with **lubrication schedule.**

5.6 CONSUMABLES

5.6.1 HYDRAULIC OIL

It is absolutely necessary to follow the rule that the oil used in the spreader and tractor hydraulic systems is of the same grade. If different types of oil are used, make sure that both hydraulic agents can be mixed together. The use of different types of oil may damage the spreader or tractor. In a new machine, the system is filled with the L HL23 Lotos hydraulic oil.

TABLE 5.4 L-HL 32 Lotos hydraulic oil specification

NO.	NAME	MU	VALUE
1	Viscosity classification as per ISO 3448VG	-	32
2	Kinematic viscosity at 40 °C	mm^2/s	28.8 – 35.2
3	Qualitative classification as per ISO 6743/99	-	HL
4	Qualitative classification as per DIN 51502	-	HL
5	Flash point	C	230

Should it become necessary to change the hydraulic oil for another oil, read carefully the oil manufacturer's instructions. If he recommends flushing the system with an appropriate preparation, follow these recommendations. It is important to ensure that chemicals used for this purpose are not aggressive to hydraulic system materials. During normal spreader operation, it is not necessary to change the hydraulic oil. However, in such a case, this operation should be entrusted to specialist service centers.

DANGER!

Extinguish the oil with the help of CO_2, foam, or extinguishing gas. Do not use water to extinguish fire.

Due to its composition, the applied oil is not classified as a dangerous substance. However, long-term exposure to skin or eyes may cause irritation. On contact with skin, wash the affected area with water and soap. Do not use organic solvents (gasoline, kerosene). Contaminated clothing should be removed to prevent oil from getting on skin. On contact with eyes, flush your eyes with plenty of water and if irritation occurs, seek medical attention. Under standard conditions, the hydraulic oil is not harmful to the respiratory tract. The hazard occurs only when the oil is heavily sprayed (oil mist), or in the case of a fire during which toxic compounds may be released.

5.6.2 LUBRICANTS

For heavily loaded parts, it is recommended that a lithium grease should be used with a molybdenum bisulfide (MOS2) or graphite additive. For less loaded components, general-purpose machine lubricants containing anti-corrosive additives and highly resistant to water

should be used. Aerosol preparations (silicone and anti-corrosive lubricants) should feature similar properties.

Before using lubricants, read the information leaflet for the selected product. This is particularly important in terms of safety rules and handling and disposal methods for a given lubricant (used containers, contaminated rags, etc.). The information leaflet (product sheet) should be kept together with the lubricant.

5.7 SERVICING THE GEAR

NOTICE!

If the amount of gear oil that needs to be added is greater than 1.5 l after 100 hours of operation, this means an oil leak in the gearbox. Contact a service center for repair.

TABLE 5.5 Gear oil requirements

NO.	NAME	VALUE
1	SAE viscosity classification	80W/90
2	Kinematic viscosity at 1000 °C	14.0 – 20.0 mm2/s
3	Min. viscosity index	95
4	API quality class	GL4

The first oil change must be carried out after operating the machine for the initial 100 hours. The reduction gear oil should be changed every 24 months or filled in case of deficiencies. In case of extensive oil losses, it may be necessary to replace the gear seals. Check oil level on a regular basis. Before pouring a fresh oil, read the manufacturer's instructions and check if the reducer does not require flushing. The oil should be filled to the required level (indicated on the sight glass on the gear housing). While changing the oil, the washers under the plugs should also be replaced.

Check the oil level in the gearbox before each start-up. In case of deficiencies, replenish the missing amount.

NOTICE!

The gearbox casing temperature must not exceed 800 °C. If the casing is too hot, contact a service center.

5.8 CLEANING THE SPREADER

The spreader should be cleaned on an as-needed basis and before a long downtime period. The spreader should be thoroughly washed after each unloading operation, if carrying a load that may be corrosive to machine elements. Before using a pressure washer, the user must read the operating principles and recommendations to ensure the safe operation of the device.

Cleaning guidelines

- Clean the load box using the side service platform.
- Before cleaning the spreader, it is recommended that you should clean the load box of any cargo residues (sweep or blow with compressed air).
- To clean the spreader, use only clean tap water or water with a neutral pH cleaning detergent.
- The use of pressure washers increases the efficiency of cleaning, but take special care when using devices of this type. During washing, the nozzle of the cleaning unit must be at a minimum distance of 50 cm from the surface being cleaned.
- Water temperature should not exceed 55 °C.
- Do not aim the water jet directly at the spreader system components and equipment, i.e. control valve, braking force controller, brake actuators, pneumatic, electric and hydraulic plugs, lights, electrical connectors, information and warning labels, rating plate, cable connectors, lubrication points, etc. High-pressure water jet may cause mechanical damage to these components.
- For cleaning and maintaining plastic surfaces, it is recommended that clean water or specialized preparations designed for this purpose should be used.

- Do not use organic solvents, preparations of unknown origin, or other substances that may damage the varnish, rubber or plastic surfaces. In case of doubt, inspect invisible surfaces.
- Oily or greasy areas should be cleaned using benzene or degreasing agents, and then washed with clean water and detergent. Follow the cleaning agent manufacturer's instructions.

DANGER!

Clean the inside of the load box using the side service platform.

Refer to the instructions for use of cleaning detergents and preservatives.

While carrying out washing operations with the help of detergents, wear suitable protective clothing and eye protection.

- Washing detergents should be stored in their original containers or replacement containers, but these must be clearly marked. The preparations cannot be stored in containers intended for storing food and beverages.
- Keep flexible lines and gaskets clean. Materials from which these elements are made may be susceptible to organic substances and some detergents. Long-term exposure to various substances may accelerate the aging process and increase the risk of damage. It is recommended that elements made of rubber should be preserved with the help of specialized preparations after thorough washing.
- After washing, wait until the spreader dries and then lubricate all control points as recommended. Wipe off the excess lubricant or oil with a dry cloth.
- Follow environmental protection principles, wash the spreader in designated areas.
- Washing and drying the spreader must take place at an ambient temperature above 0 °C.
- After washing and drying the spreader, lubricate all control points, regardless of the time of the last treatment.

5.9 STORAGE

After completing work, the spreader should be thoroughly cleaned and washed suing a water jet. In case of damages to the paint coating, the damaged areas should be cleaned of rust and dust, degreased and painted with a primer paint. When the paint has dried, apply a layer of top paint to maintain a uniform color and thickness of the protective coating. Before painting, the damaged areas can be coated with a thin layer of lubricant or anti-corrosive preparation. The spreader should be stored in a closed or roofed room at a temperature above 0 °C.

If the spreader is not be used for a long period of time, it should be protected against weather conditions, particularly the ones that cause corrosion of steel and accelerate the aging of tires. The machine must be unloaded for that period of time.

The spreader should be thoroughly washed and dried. While washing, do not direct a strong jet of water or steam at information and warning labels, feed table and tensioning mechanism bearings, electrical equipment, as well as hydraulic and pneumatic system components. The pressure or steam cleaner nozzle should be kept at a minimum distance of 30 cm from the surface being cleaned. Corroded areas should be protected as described above.

The spreader should be lubricated as recommended. In case of long downtimes, it is necessary to lubricate all components, regardless of the time of the last treatment.

Tires should be maintained at least twice a year with the help of appropriate preparations intended for this purpose. Disc wheels and tires should be thoroughly washed and dried in advance. During prolonged storage of unused spreader, it is recommended that the machine should be moved once every 2-3 weeks such that the area where the tire is in contact with the ground is in a different position. The tires will not deform and will maintain proper geometry. If necessary, check tire pressure on a temporary basis and inflate the wheels to the correct value.

5.10 SETTING THE TOW BAR IN WORKING POSITION

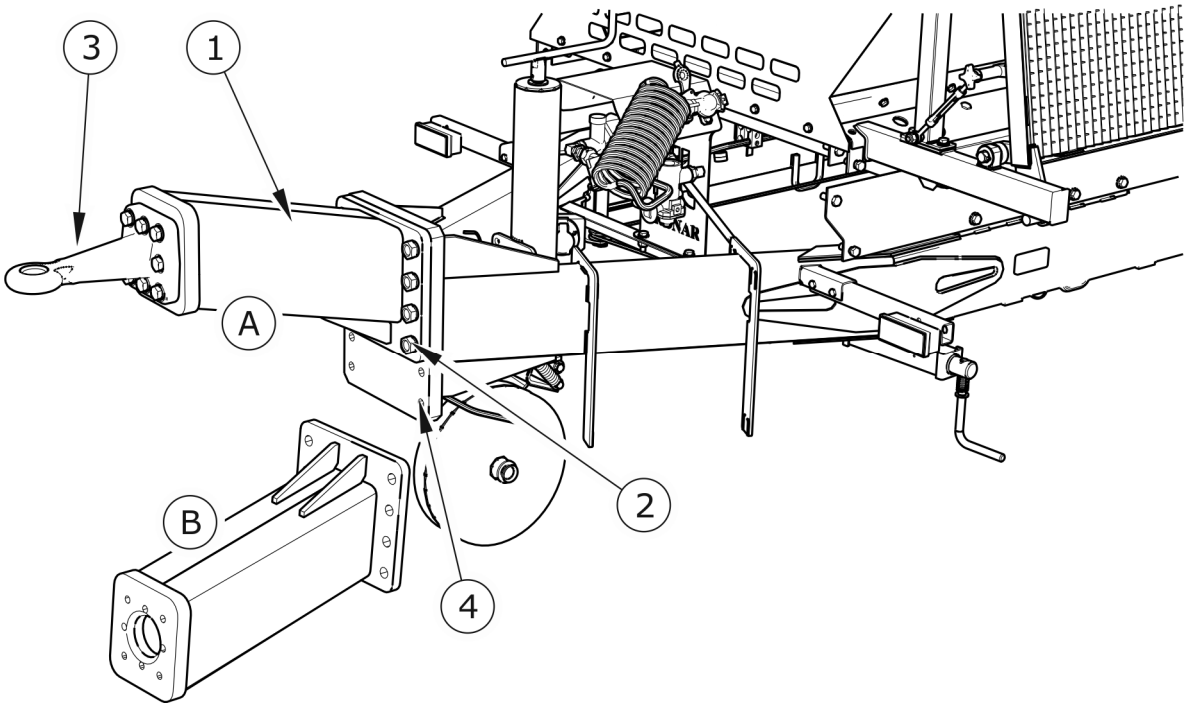


FIGURE 5.9 Tow bar position adjustment

(1) tow bar, (2) bolt, (3) towing eye, (4) front plate, (A), (B) allowable tow bar positions

In the new spreader, it will be necessary to adjust the position of the tow bar in relation to the tractor's hitch. This operation should be carried out by two persons. To change the position of the tow bar:

- Set the spreader on a flat ground, apply blocking wedges underneath the wheels;
- Use the handwheel to extend or retract the support to a height so that the spreader frame is parallel to the ground;
- Unscrew the screws (2) and remove the tow bar (1);
- Adjust the mounting height of the tow bar by screwing it to the front plate (4) at the selected height.

The mounting height and tow bar positions must be selected individually depending on the hitch mounted in the tractor.

DANGER!

The mounting height of the tow bar should be changed by two people. Due to a risk of crushing your feet, take extra caution while removing the screws.

5.11 CONVEYOR BELT TENSION ADJUSTMENT

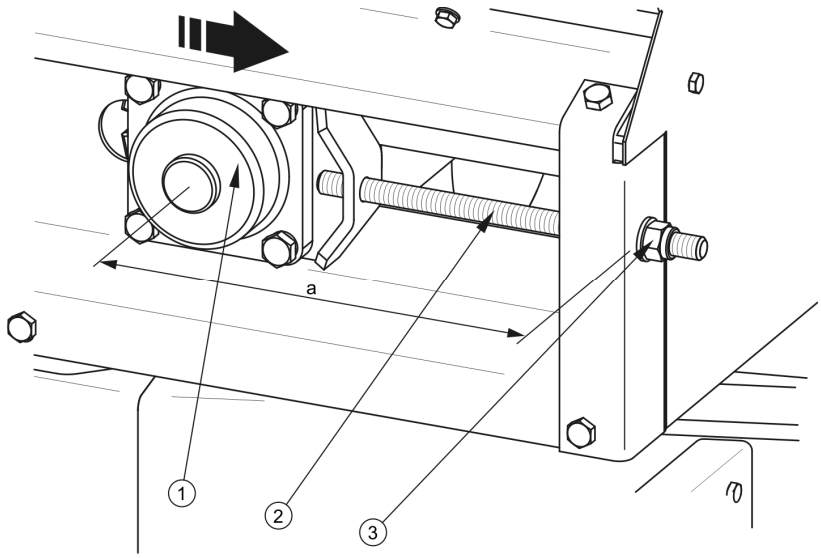


FIGURE 5.10 Conveyor belt tension adjustment

(1) bearing mechanism, (2) tensioning screw, (3) adjustment nut

Conveyor belt tension adjustment should be carried out when there is a noticeable decrease in the efficiency of the spreading mechanism when flow controller settings are the same. The belt then moves with a large slip on the drive roller of the drive mechanism. This speeds up its wear and may ultimately lead to a complete failure.

The conveyor belt should be tensioned symmetrically such that the difference in distance (a) measured from the shaft axis to the front section of the support, on both sides of the spreader, is not greater than 5 mm. The tension mechanism nuts (3) are located on the front wall of the load box. By turning the nut clockwise, the bearing assembly (1) moves towards the front wall and tightens the conveyor belt. The length of the protruding end of the tensioning screw (2) on the left and right side of the spreader should be equal and indicates symmetrical belt tension.

The conveyor belt should only be tensioned when the load box is empty. It is recommended that the adjustment should be carried out under the same conditions (at the same ambient temperature).

5.12 SPREADING DISC BLADE ADJUSTMENT

Setting the adapter blade pitch and selecting flow controller set points affect the material spreading width. The blades are factory set in position (A).

To change the pitch:

- Loosen the nuts located closer to the center of the disc;
- Unscrew the nuts and remove the screws from the outer side of the disc;
- Rearrange the blades to the desired position (A), (B), or (C);
- Install screws and nuts, tighten all connections;
- Repeat the operation for the second disc.

The left and right disc blades do not have to be set symmetrically. As a result, a variable spreading width is obtained. For example, changing the blades in the right disc to position (C), and to position (A) in the left disc will result in a greater spreading width on the right side of the spreader.

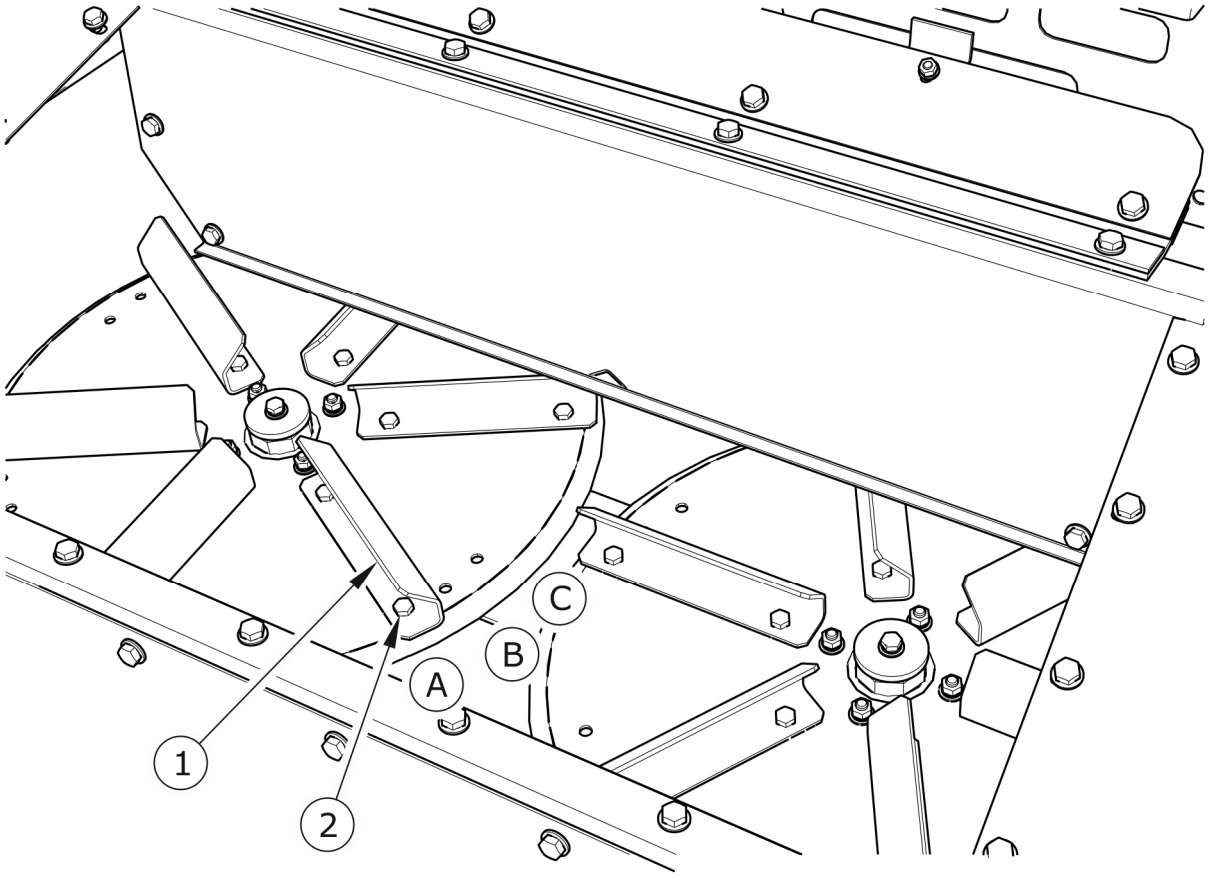


FIGURE 5.11 Changing the blade pitch

(1) blade, (2) fixing screws, (A), (B), (C) available blade operation positions

NOTICE!

After changing the position of the blades, check the tightness of the screw connections after 8 hours of operating the spreader.

5.13 SCREW CONNECTION TORQUES

Unless other tightening parameters are specified, apply appropriate tightening torques to screw connections during maintenance and repair works. The recommended tightening torques for the most common screw connections are shown in the table below. The provided values apply to non-lubricated steel screws.

TABLE 5.6 Screw connection torques

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

(1) – durability class as per DIN ISO 898

HINT

Hydraulic lines should be tighten to the recommended torque of 50 – 70 Nm.

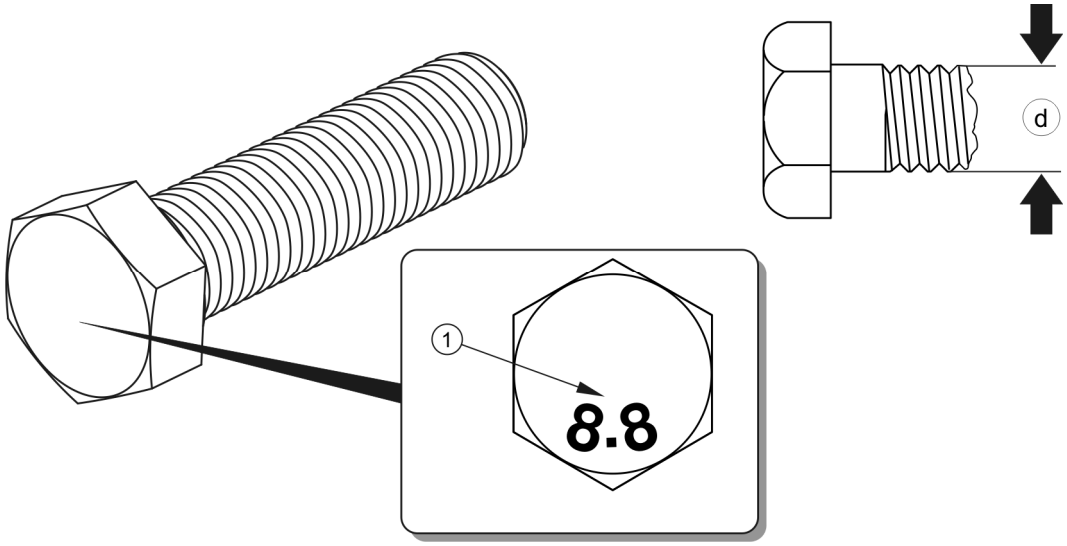


FIGURE 5.12 Metric thread screw

(1) durability class, (d) thread diameter

5.14 TROUBLESHOOTING

TABLE 5.7 Faults and troubleshooting methods

FAULT	CAUSE	REMEDY
Problem with starting	Pneumatic brake system lines not connected	Connect the brake lines
	Damaged pneumatic system connection lines	Replace
	Leaky connections	Tighten, replace the gaskets or sealing assemblies
	Spreader immobilized with parking brake	Release the parking brake
	Damaged control valve or braking force controller	Check the valve, braking force controller; replace damaged element(s)
Noisy drive axle hub	Too much slack in bearings	Check the slack and adjust if necessary
	Damaged bearings	Replace the bearings together with the sealing rings
Overheated drive axle hub	Incorrectly adjusted main brake	Adjust position of the expander arms
	Incorrectly adjusted parking brake	Adjust the parking brake cable tension
	Worn brake linings	Replace the brake shoes
Feeder belt not moving	Flow controller set point is set to 0	Increase the set point
	Too much slack in feeder belt	Increase tension or remove the belt
	Incorrectly connected hydraulic system lines	Check and correct if necessary
	Damaged hydraulic system quick couplers	Replace the couplers

FAULT	CAUSE	REMEDY
	Damaged hydraulic system check valve	Check and replace if necessary
	Damaged flow controller	Check and replace if necessary

NOTES

ATTACHMENT A

Tire assembly

TIRE	DISC WHEEL
15.0/70-18 16PR	13.0x18
385/55 R22.5	11.75x22.5