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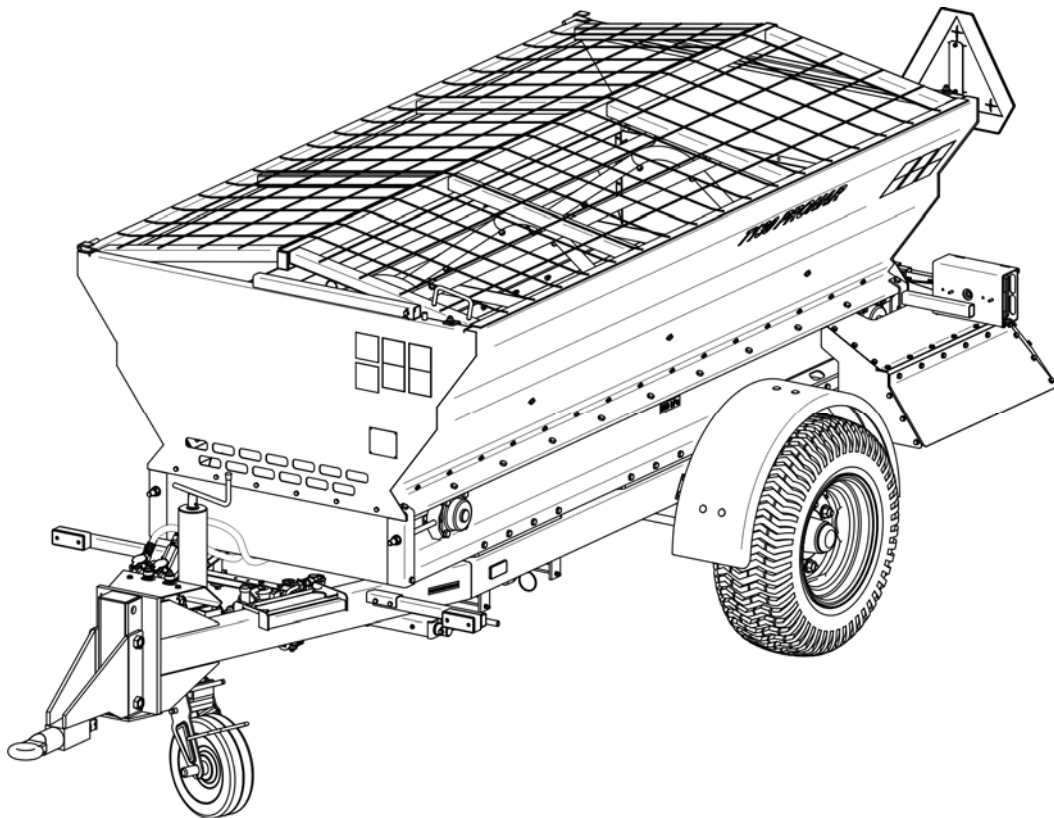
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OPERATOR'S MANUAL

SAND SPREADER

PRONAR T130

TRANSLATION OF THE ORIGINAL COPY OF THE MANUAL



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INTRODUCTION

Information contained herein is current at date of publication. As a result of improvements, some numerical values and illustrations contained in this publication may not correspond to the factual specification of the machine supplied to the user. The manufacturer reserves the right to introduce design changes in machines produced that facilitate operation and improve the quality of their work, without making minor amendments to this Operator's Manual. Please send your comments and proposals on the design and operation of the machine to the Manufacturer. This information enables objective evaluation of the machines produced and provides indications for their further improvement. Information on significant design changes is passed on to users on information inserts attached to this Operator's Manual (annexes).

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

The manual describes the basic safety rules and operation of Pronar T130 single axle sand spreader. If the information contained in the Operator's Manual needs clarification then the user should refer for assistance to the sale point where the machine was purchased or to the Manufacturer.

Manufacturer's address:

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Information, descriptions of danger and precautions and also recommendations and prohibitions associated with user safety instructions are marked:



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

Particularly important information and instructions, the observance of which is essential, are distinguished in the text by the sign:



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

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





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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:	T130
Model:	-----
Serial number:	
Commercial name:	SAND SPREADER PRONAR T130

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 29 GRU. 2012

Place and date

Z-CIA DYREKTORA
d/s technicznych
członek zarządu

Roman Omstaniuk

*Full name of the empowered person
position, signature*

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SECTION

1

BASIC INFORMATION

IDENTIFICATION

PROPER USE

EQUIPMENT

WARRANTY TERMS

TRANSPORT

ENVIRONMENTAL HAZARDS

WITHDRAWAL FROM USE

1.1 IDENTIFICATION

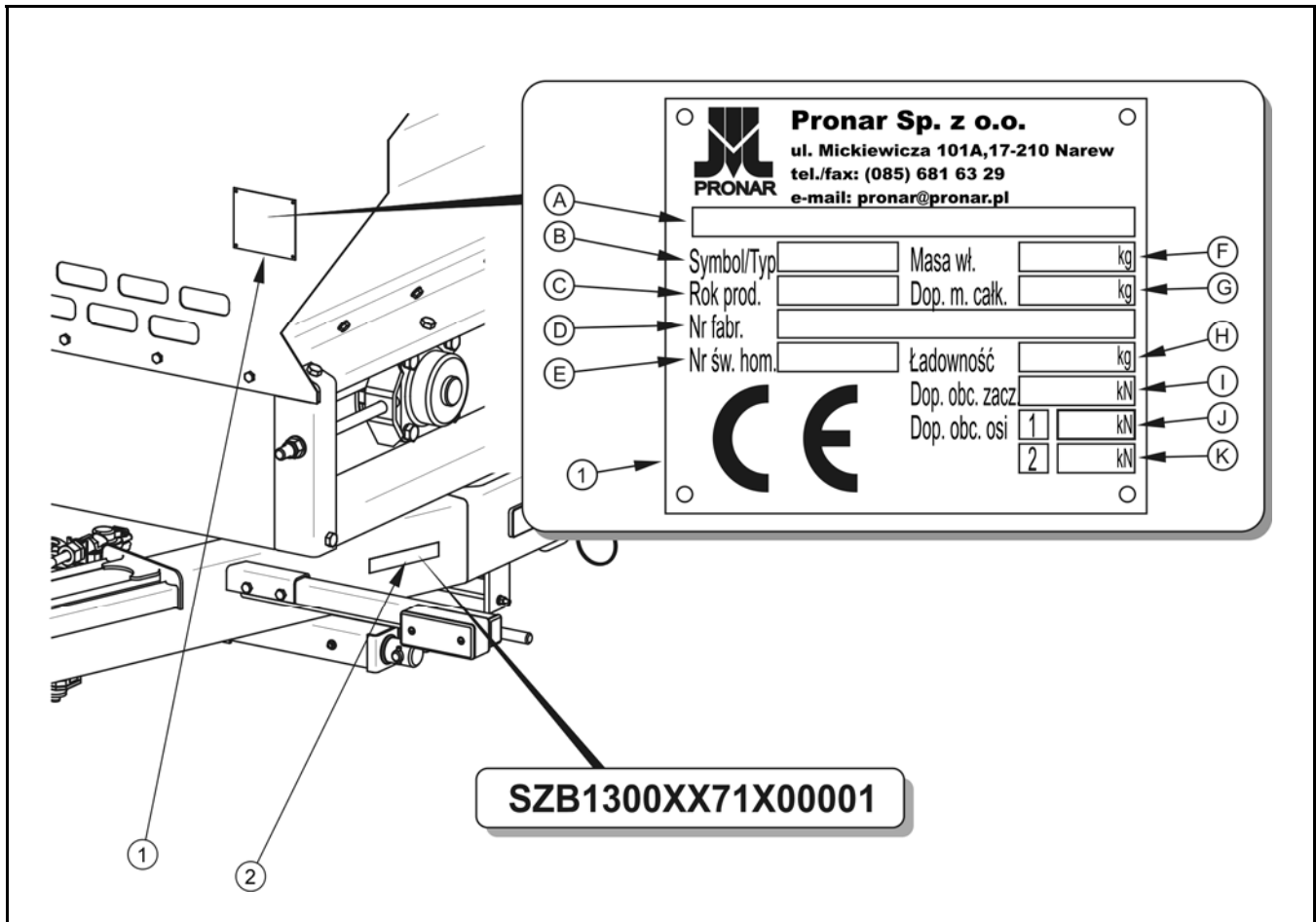


FIG. 1.1A Location of the data plate and serial number

(1) data plate, (2) serial number

T130 sand spreader is marked with a data plate (1) placed on the front wall of the load box and with serial number (2) stamped into the left longitudinal rail of lower frame, on a rectangle area painted silver. When buying the sand spreader check that the serial numbers on the machine agree with the number written in the *WARRANTY BOOK, IN THE SALES DOCUMENTS AND IN THE Operator's Manual*.

The meanings of the individual fields found on the data plate are presented in the table below:

A – general description and purpose,

B - machine symbol/type,

- C - year of manufacture,
- D – identification number VIN,
- E - official certificate number,
- F - tare weight,
- G – maximum gross weight,
- H – carrying capacity,
- I - permissible hitching system loading,
- J - permissible front axle load
- K - permissible rear axle load

The serial number and type of the axle is stamped on the data plate riveted to the beam of the axle.

1.2 PROPER USE

The sand spreader is designed for surface spreading of the following materials on public roads, streets and pavements:

- non-chemical agents,
 - sand of grain size from 0.1 to 1 mm,
 - natural or artificial crushed stone of grain size up to 4 mm,
- solid chemical agents:
 - sodium chloride (NaCl),
 - calcium chloride (CaCl₂),
 - magnesium chloride (MgCl₂),
- mixture of solid chemical agents and non-chemical agents.

Chemical agents are applied in order to eliminate black ice and icing as well as to prevent icing and slippery conditions after snowfall. Chemical agents are applied only after mechanical snow clearing (based on the Ordinance of the Minister of the Environment, Journal of Laws No. 230 item 1960).

The sand spreader must not be used in any way other than that described above. Using it as intended also involves all actions connected with the safe and proper operation and maintenance of the machine. Due to the above, the user is obliged to:

- and comply with it,
- understand the machine's operating principle and how to operate it safely and correctly,
- comply with general safety regulations while working,
- prevent accidents,
- comply with road traffic regulations.

The sand spreader is not intended or designed for transporting people or animals.

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

TAB. 1.1 AGRICULTURAL TRACTOR'S REQUIREMENTS

CONTENTS	UNIT	REQUIREMENTS
Brake system		
Pneumatic system 1 - conduit	-	sockets compliant with PN-ISO 1728:2007
Pneumatic system 2 - conduit	-	sockets compliant with PN-ISO 1728:2007
Pressure rating of the pneumatic system	kPa	600
Hydraulic system		
Hydraulic oil	-	HL 32
Maximum system pressure	MPa	16
Hydraulic pump capacity (min)	l/min	32
Electrical system		
Electrical system voltage	V	12

Attachment socket	-	7 polar compliant with ISO 1724
Tractor hitches	-	
Minimum vertical load capacity of hitch	kN / kg	4.90 / 500
Other requirements		
Minimum power demand	kW / Horsepower	47.6 / 35

IMPORTANT!



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

- for transporting people and animals
- for transporting whatever materials
- spreading other materials than those specified in the Operator's Manual

1.3 EQUIPMENT

Standard accessories as well as special fittings and optional equipment available on order are given in table (1.2).

TAB. 1.2 T130 SAND SPREADER EQUIPMENT

EQUIPMENT	T130
<i>OPERATOR'S MANUAL</i>	SD
<i>WARRANTY BOOK</i>	SD
Connection lead for the electrical system	SD
Drawbar with rotating drawbar eye Ø50 mm	SD
Warning reflective triangle	OP
Slow-moving vehicle warning sign	OP
Wheel chocks	OP

SD – standard equipment, OP – optional equipment available at the customer's request

1.4 WARRANTY TERMS

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

The repair period is specified in the *WARRANTY BOOK*.

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

- tyres,
- brake shoes,
- conveyor belt,
- bulbs,
- tensioners springs.

In the event of damage arising from:

- mechanical damage which is the user's fault, caused by road accidents,
- by inappropriate use, adjustment or maintenance, use of the sand spreader for purposes other than those for which it is intended,
- use of damaged sand spreader,
- repairs carried out by unauthorised persons, improperly carried out repairs,
- arbitrary and wilful adjustments to the sand spreader's structure,

the user may lose the right to warranty service.

The user is obliged to report immediately on noticing any wear in the paint coating or traces of corrosion, and to have the faults rectified whether they are covered by the guarantee or not. Detailed guarantee regulations are contained in the *WARRANTY BOOK* attached to each machine.



ATTENTION!

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

1.5 TRANSPORT

The sand spreader is ready for sale completely assembled and does not require packing. Packing is only required for the machine's technical documentation, connection lead for the electrical system and possible additional equipment (warning reflective triangle, slow-moving vehicle warning sign).



ATTENTION!

When transporting independently, the user must carefully read this operator's manual and observe its recommendations. When being transported on a motor vehicle the sand spreader must be mounted on the vehicle's platform in accordance with the transport safety requirements. The driver of the vehicle should take particular care while driving. This is due to the vehicle's centre of gravity shifting upwards when loaded with the machine.

The sand spreader is delivered to the user either transported on a vehicle or, independently (towed), after being attached to a tractor. In the case of independent (towed) delivery, the "slow moving vehicle" plaque should be attached. The towing speed should be adapted to the current road conditions, but must not be greater than the maximum design speed. The machine may sway when being towed. Should this happen, the driving speed should be decreased.

When loading and unloading the sand spreader, comply with the general principles of workplace health and safety for reloading work. Persons operating reloading equipment must have the qualifications required to operate these machines.

The sand spreader should be attached firmly to the platform of the vehicle using straps or chains fitted with a tightening mechanism. The fastening equipment used must have a valid safety certificate. Chocks or other objects without sharp edges should be placed under the sand spreader wheels to prevent it from rolling. The chocks must be fixed to the platform of

the vehicle. During reloading work, particular care should be taken not to damage parts of the sand spreader's fittings or the lacquer coating.

1.6 ENVIRONMENTAL HAZARDS

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

Oil, which has been used up or is unsuitable for further use owing to a loss of its properties should be stored in its original packaging in the conditions described above.

1.7 WITHDRAWAL FROM USE

Should the user decide to withdraw the machine from use, the entire sand spreader should be taken to a scrap yard. When spare parts are changed, worn out or damaged parts should be taken to a collection point for recyclable raw materials. Hydraulic oil should be taken to the appropriate facility dealing with the re-use of this type of waste.

SECTION

2

SAFETY ADVICE

BASIC SAFETY RULES

DRIVING ON PUBLIC ROADS

DESCRIPTION OF MINIMAL RISK

INFORMATION AND WARNING DECALS

2.1 BASIC SAFETY RULES

- Before using the sand spreader, the user must carefully read this operator's manual. When operating the machine, the operator must comply with the recommendations. The sand spreader may only be used and operated by persons qualified to drive agricultural tractors and trained in the use of the machine.
- If the information contained in the Operator's Manual is difficult to understand, contact a seller who runs an authorised technical service on behalf of the Manufacturer, or contact the Manufacturer directly.
- Careless and improper use and operation
- Be aware of the existence of a minimal risk, and for this reason the fundamental basis for using this machine should be the application of safety rules and sensible behaviour.
- The sand spreader must never be used by persons, who are not authorised to drive agricultural tractors, including children and people under the influence of alcohol or other drugs.
- Non-compliance with the safety rules of this Operator's Manual can be dangerous to the health and life of the operator and others.
- The sand spreader must not be used for purposes other than those for which it is intended. Anyone who uses the machine other than the way intended takes full responsibility for himself for any consequences of this use. Use other than intended means using the sand spreader in any way other than that specified in the Operator's Manual including also spreading of other agents than those recommended by the Manufacturer.
- Any modification to the sand spreader frees the manufacturer from any responsibility for damage or detriment to health which may arise as a result.
- Before using the sand spreader always check its technical condition. In particular, check the technical condition of the hitch system, axle system, brake system, indicator lights, spreading adapter, feeding mechanism and set of safety guards.

- The sand spreader can only be stood on when it is absolutely motionless and the tractor engine is switched off. Agricultural tractor and sand spreader must be immobilised with parking brake. Before entering the sand spreader, ensure that unauthorised persons do not have access to the tractor and remove key from ignition.
- The sand spreader unhitched from tractor must be immobilised with parking brake. If the sand spreader is positioned on a slope or elevation it shall be additionally secured against moving by placing chocks or other objects without sharp edges under the trailer's wheels.
- People or animals must not be carried.
- The sand spreader may only be used when all the safety guards and other protective elements are technically sound and correctly positioned. In the event of loss or destruction of the safety guards, they must be replaced with new ones.
- The machine must not be used when not in working order.
- Do NOT exceed the sand spreader's maximum carrying capacity. Exceeding the carrying capacity may lead to damage to the machine, loss of stability while driving, scattering of the load and danger while working or driving.
- While reversing, the sand spreader drive must be disengaged.
- Do NOT leave the tractor cab, when the spreading adapter drive and the feeding mechanism drive are engaged.
- Prior to attaching the sand spreader, check the technical condition of the sand spreader's and tractor's hitch system and connection elements of the hydraulic, electrical and braking systems.
- Be especially careful when hitching the machine to tractor.
- When hitching, there must be nobody between the sand spreader and the tractor.
- The sand spreader and tractor must not be attached if the hydraulic oil in the two machines is of different types.

- While connecting the sand spreader to the tractor, use only the lower hitch designed for single axle trailers. After mounting the machine, check the safeguards.
- When spreading is completed, disengage the hydraulic drive of the feeding mechanism and discs.
- Before loading make certain that there are no stones, tools or other objects in the load box and on the adapter's discs.
- Do NOT exceed permissible load weight of sand spreader because this may cause danger to road traffic and cause damage to the machine.
- The load in the sand spreader's load box must be distributed uniformly.
- The sand spreader drive may be started only when there are no bystanders or animals within the radius of approximately 3 metres from the machine.
- Spreading agents must be prepared in accordance with the regulations concerning winter road maintenance in force in the country in which the sand spreader is used. Spreading agents other than those recommended by the Manufacturer must not be used.
- The hydraulic system is under high pressure when operating.
- Regularly check the technical condition of the connections and the hydraulic and pneumatic leads.
- In the event of malfunction of the hydraulic or pneumatic system, do not use the sand spreader until the malfunction is corrected. There must not be any leaks of hydraulic oil.
- When connecting the hydraulic conduits to the tractor, make sure that the tractor and sand spreader hydraulic system are not under pressure.
- Reduce the oil or air pressure in the sand spreader before dismantling the hydraulic or pneumatic elements.
- In the event of injuries being caused by pressurised hydraulic oil, contact a doctor immediately. Hydraulic oil may find its way under the skin and cause infections.

- Use the hydraulic oil recommended by the Manufacturer. Never mix two types of oil.
- After changing the hydraulic oil, the used oil should be properly disposed of.
- When working on the tyres, chocks or other objects without sharp edges should be placed under the wheels of the sand spreader to prevent it from rolling.
- Repair work on the wheels or tyres should be carried out by persons trained and entitled to do so. This work should be carried out using appropriate tools.
- After removing a wheel, always check how firmly the nuts are screwed in. Individual checks should be made after the first use, after the first journey with a load, after travelling 1000 km and then every 6 months. The above actions should be repeated individually if a wheel has been removed from the wheel axle.
- In the event of work requiring the sand spreader to be raised, use properly certified hydraulic or mechanical lifts for this purpose. After lifting the sand spreader, stable and durable supports must also be used. Do NOT carry out work under a machine, which has only been raised with the lift jack.
- The sand spreader must not be supported using fragile elements (bricks or concrete blocks).
- Check the tyre pressure regularly. Owing to the large temperature differences in winter, it is recommended that the air pressure be checked more often.
- In the event of any fault or damage whatsoever, do not use the sand spreader until the fault has been corrected. The sand spreader must not be used when not in working order.
- When operating the machine wear protective gloves and use the appropriate tools.
- Servicing and repair work should be carried out in line with the general principles of workplace health and safety. In the event of injury, the wound must be immediately cleaned and disinfected. In the event of more serious injuries, seek a doctor's advice.

- Repair, maintenance and cleaning work should be carried out with the tractor's engine switched off and the ignition key removed.
- Regularly check the condition of the bolt and nut connections.
- Before welding or electrical work, the sand spreader should be disconnected from the power supply. The paint coating should be cleaned. Burning paint fumes are poisonous for people and animals. Welding work should be carried out in a well lit and well ventilated space.
- During welding work pay attention to flammable or fusible elements (parts of the pneumatic, electric and hydraulic systems, plastic parts). If there is a risk that they will catch fire or be damaged, they should be removed or covered with non-flammable material before commencing welding work.
- During the warranty period, any repairs may only be carried out by Warranty Service authorised by the manufacturer.
- Should it be necessary to change individual parts, use only those parts indicated by the Manufacturer. Non-adherence to these requirements may put the user and other people's health and life at risk, and also damage the machine.
- After completing work associated with lubrication, remove excess oil or grease.

2.2 DRIVING ON PUBLIC ROADS

- When driving on public roads, comply with the road traffic regulations.
- Exceeding the maximum load capacity of the sand spreader may damage it, and also threaten the safety of traffic.
- Do not exceed the maximum speed limit. Adjust your speed to the road conditions.
- The sand spreader must NOT be left unsecured. Engage the parking brake to secure the trailer against rolling.
- Place the slow-moving vehicle warning sign on the back wall.

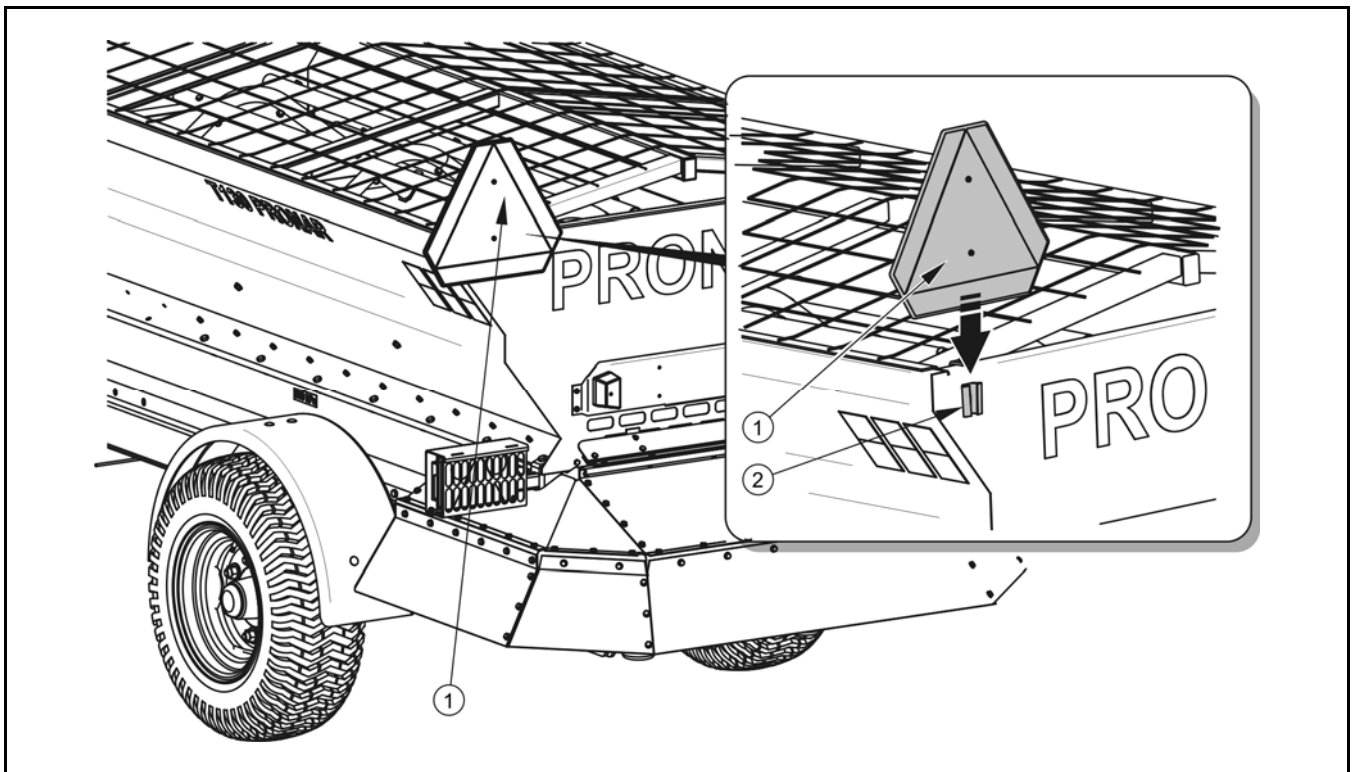


FIG. 2.1A Positioning the warning sign

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

- While driving on public roads the sand spreader must be fitted with a certified or authorised reflective warning triangle.
- During sand spreader operation, the tractor must be equipped with the yellow beacon light.

2.3 DESCRIPTION OF MINIMAL RISK

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

- using the sand spreader for purposes other than those for which it is intended,
- being between the tractor and the sand spreader while the engine is working and when the machine is being attached,
- being on the machine while the engine is working,
- operating the sand spreader with removed or faulty safety guards,

- not maintaining safe distance while the sand spreader is in operation,
- not maintaining safe distance during loading work,
- operation of the sand spreader by persons under the influence of alcohol,
- cleaning, maintenance and technical checks of the sand spreader,


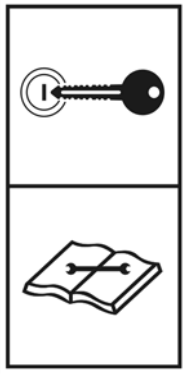


The minimal risk may be kept to a minimum by following the recommendations below:






- prudent and unhurried operation of the machine,
- sensible application of the remarks and recommendations contained in the Operator's Manual,
- maintaining safe distance from forbidden or dangerous places,
- a ban on being on the machine when it is operating,
- carrying out repair and maintenance work in line with operating safety rules,
- carrying out repair and maintenance work by persons trained to do so,
- using close fitting protective clothing,
- ensuring unauthorised persons have no access to the machine, especially children.


2.4 INFORMATION AND WARNING DECALS

The sand spreader is labelled with the information and warning decals mentioned in table (2.1). The symbols are positioned as presented in figure (2.2A). Throughout the time it is in use, the user of the machine is obliged to take care that notices and warning and information symbols located on the sand spreader are clear and legible. In the event of their destruction, they must be replaced with new ones. Safety decals can be purchased from the Manufacturer or your PRONAR dealer. New assemblies, changed during repair, must be labelled once again with the appropriate safety signs.

TAB. 2.1 INFORMATION AND WARNING DECALS

ITEM	SAFETY SYMBOL	DESCRIPTION
1		<p>Before starting work, carefully read the Operator's Manual.</p>
2		<p>Before beginning servicing or repairs, switch off engine and remove key from ignition</p>
3		<p>In the event of work requiring the sieve to be raised, use a support</p>
4		<p>Do not approach and do not place hands near working elements of the feeding mechanism</p>

ITEM	SAFETY SYMBOL	DESCRIPTION
5		<p>Do not approach and do not touch rotating discs of the spreading adapter.</p>
6		<p>Do not climb the feeding mechanism while it is working and while tractor engine is working</p>
7		<p>Keep a safe distance from the spreading adapter while it is working</p>
8		<p>Check the condition of the screw and nut connections of the wheel axles</p>
9		<p>Grease according to the recommendations in the Operator's Manual</p>

ITEM	SAFETY SYMBOL	DESCRIPTION
10	550 kPa	Air pressure in the tyres★
11	T130 PRONAR	Type of sand spreader
12		Hydraulic oil flow direction

★ tyre pressure in standard fittings, pressure levels may be subject to change depending on the tyres used

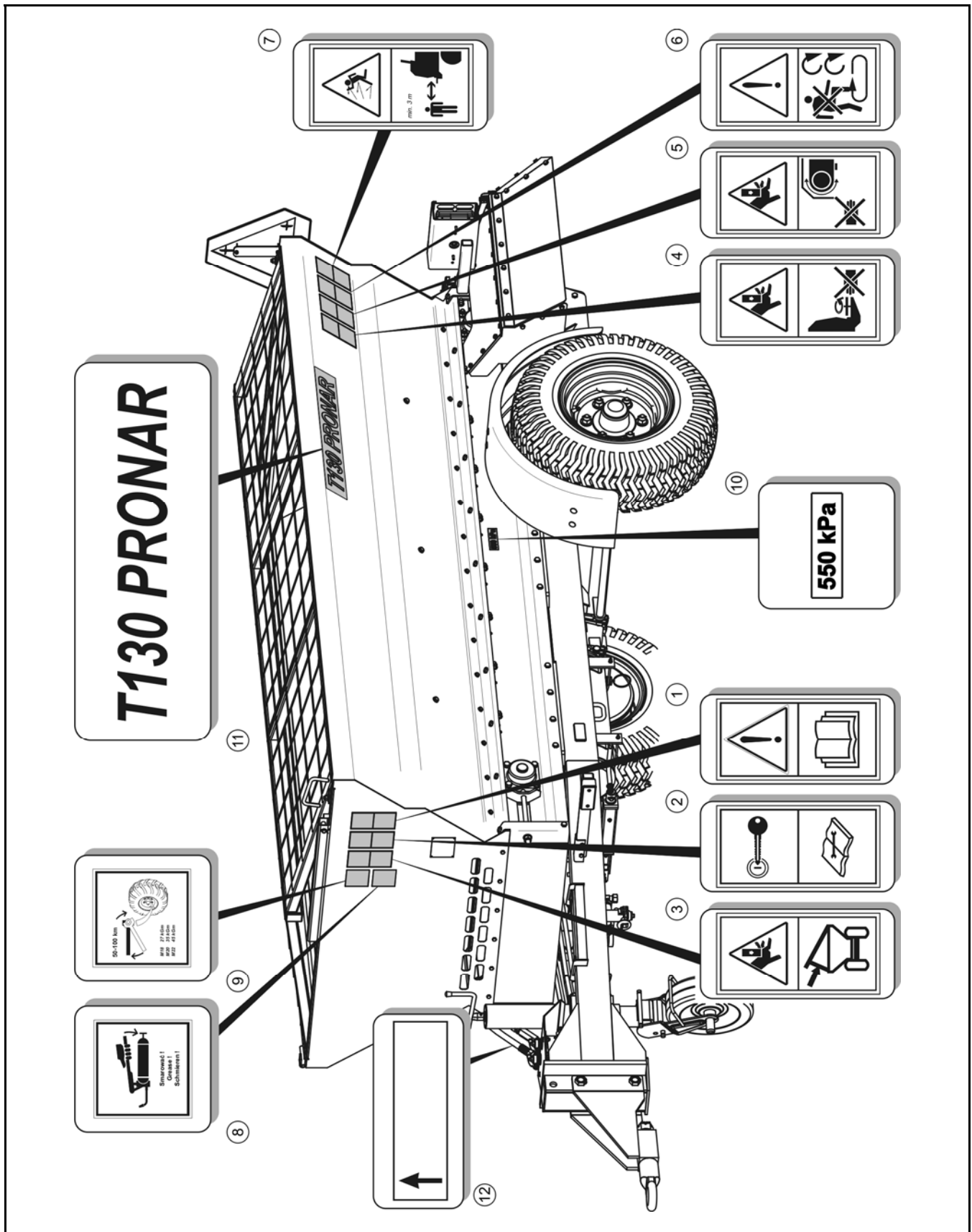


FIG. 2.2A Decal locations

Labelling according to table 2.1 „Information and warning decals”

SECTION

3

DESIGN AND OPERATION

TECHNICAL SPECIFICATION

CHASSIS

LOAD BOX

FEEDING MECHANISM

SPREADING ADAPTER

HYDRAULIC SYSTEM

PNEUMATIC BRAKE SYSTEM

PARKING BRAKE

ELECTRICAL SYSTEM, WARNING SIGNS AND INDICATORS

3.1 TECHNICAL SPECIFICATION

TAB. 3.1 TECHNICAL SPECIFICATION OF STANDARD FITTINGS

CONTENTS	UNIT	T130
Dimensions		
Total length	mm	4,950
Width	mm	1,770
Height	mm	1,670
Technical specification		
Cargo capacity	m ³	2
Maximum design carrying capacity	kg	2,520
Sand spreader tare weight	kg	980
Minimum tractor power demand	kW	35
Hydraulic system		
Maximum pressure in the tractor's hydraulic system	MPa	16
Minimum output of the tractor's hydraulic system	l/min	32
Hydraulic oil	-	HL32
Tyres		
Tyre	-	10.0/75-15.3
Wheel rim	-	9.00x15.3"
Air pressure in the tyres	kPa	550
Feeding mechanism and spreading adapter		
Width of the feeding mechanism conveyor	mm	800
Quantity of adapter discs	-	2
Maximum rotation speed of adapter discs	min ⁻¹	150★
Other information		
Electrical system voltage	V	12
Axle track	mm	1,500
Maximum design speed	km/h	40
Maximum vertical hitch load	kg	500
Sand spreader working speed	km/h	4 – 10
Spreading width	mm	1,700 – 3,000

★ - for oil delivery of 32 l/min

3.2 CHASSIS

Sand spreader chassis consists of subassemblies indicated on figure (3.1A). Lower frame (1) of the sand spreader is a structure welded from steel sections. The main support elements of the frame are two longitudinal members connected with crossbars.

In the rear section of the frame there are elements for securing the wheel axle. Wheel axle (2) consists of square bar terminated with a pin, on which on cone bearings are mounted wheel hubs. The wheels are single, equipped with brake shoes activated through mechanical expander cams.

Sand spreader is equipped with drawbar (4) secured to the front plate of the frame. Depending on requirements, drawbar position can be changed by the sand spreader operator. In the front section of the frame there is support with wheel (5) bolted to the left longitudinal member. The bolt mechanism of the parking brake (6) is welded underneath, on the left side of the frame. Elements of electrical lighting system, hydraulic system, pneumatic system and load box are mounted to the frame structure. In the rear section of the frame the following elements are mounted: shields and spreading adapter.

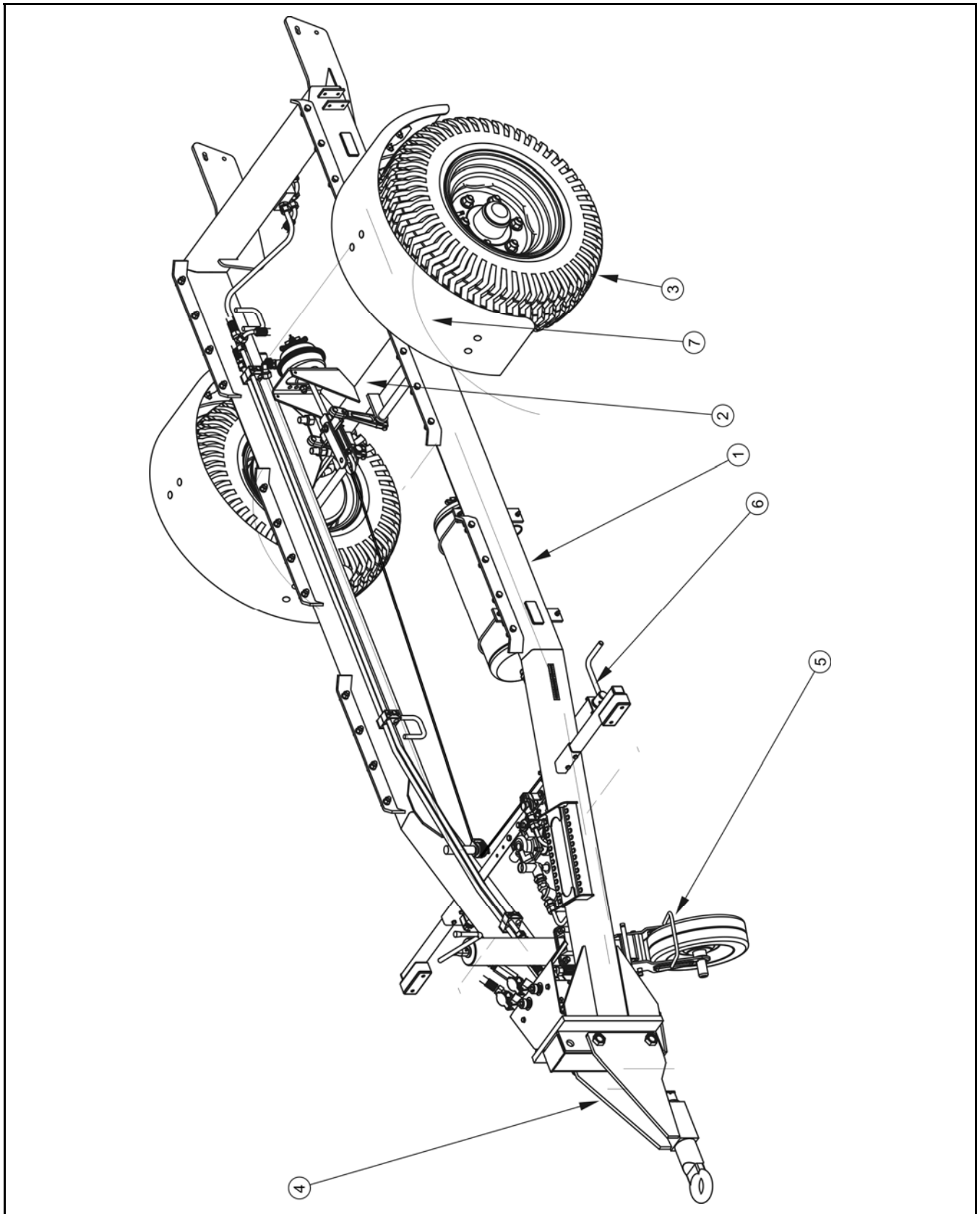


FIG. 3.1A **Sand spreader chassis**

(1) lower frame, (2) wheel axle, (3) wheel, (4) drawbar, (5) support, (6) parking brake mechanism, (7) mudguard

3.3 LOAD BOX

Sand spreader load box (1) has a monocoque construction. The load box interior is equipped with bows (6) fixed to the load box walls. Pipes (3), which lighten the feeding mechanism during sand spreader operation, are bolted to the bows.

On the upper part of the load box there is sieve (2) which can be raised and propped with support (4), if needed. Beam (5) with license plate light is bolted to the rear wall of the load box. The load box is mounted on sand spreader frame. In the lower section of the load box there are rubber shields fixed to the side walls edges, front wall and rear wall. These shields prevent loss of load during travel and operation of sand spreader.

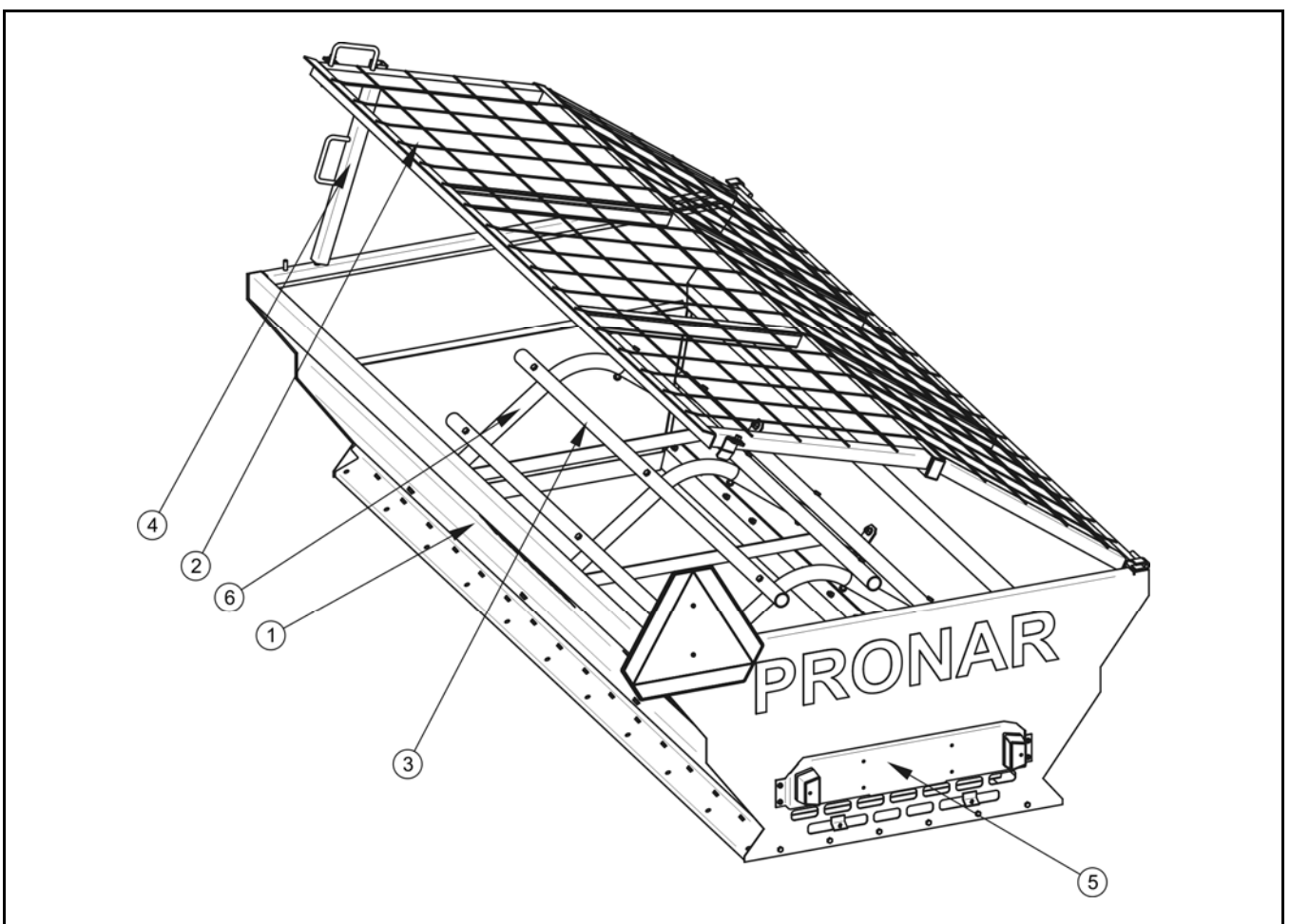


FIG. 3.2A **Load box**

(1) load box, (2) sieve, (3) pipe, (4) sieve support, (5) lights support beam, (6) bow

3.4 FEEDING MECHANISM

Design of feeding mechanism is shown on figure (3.3A). Feeding table (1) is a support structure for individual elements of feeding mechanism. Between longitudinal members there are 16 guide rollers (5) installed on which conveyor belt (4) moves. In the front section of the mechanism there is front roller (2) connected with belt tensioner (10).

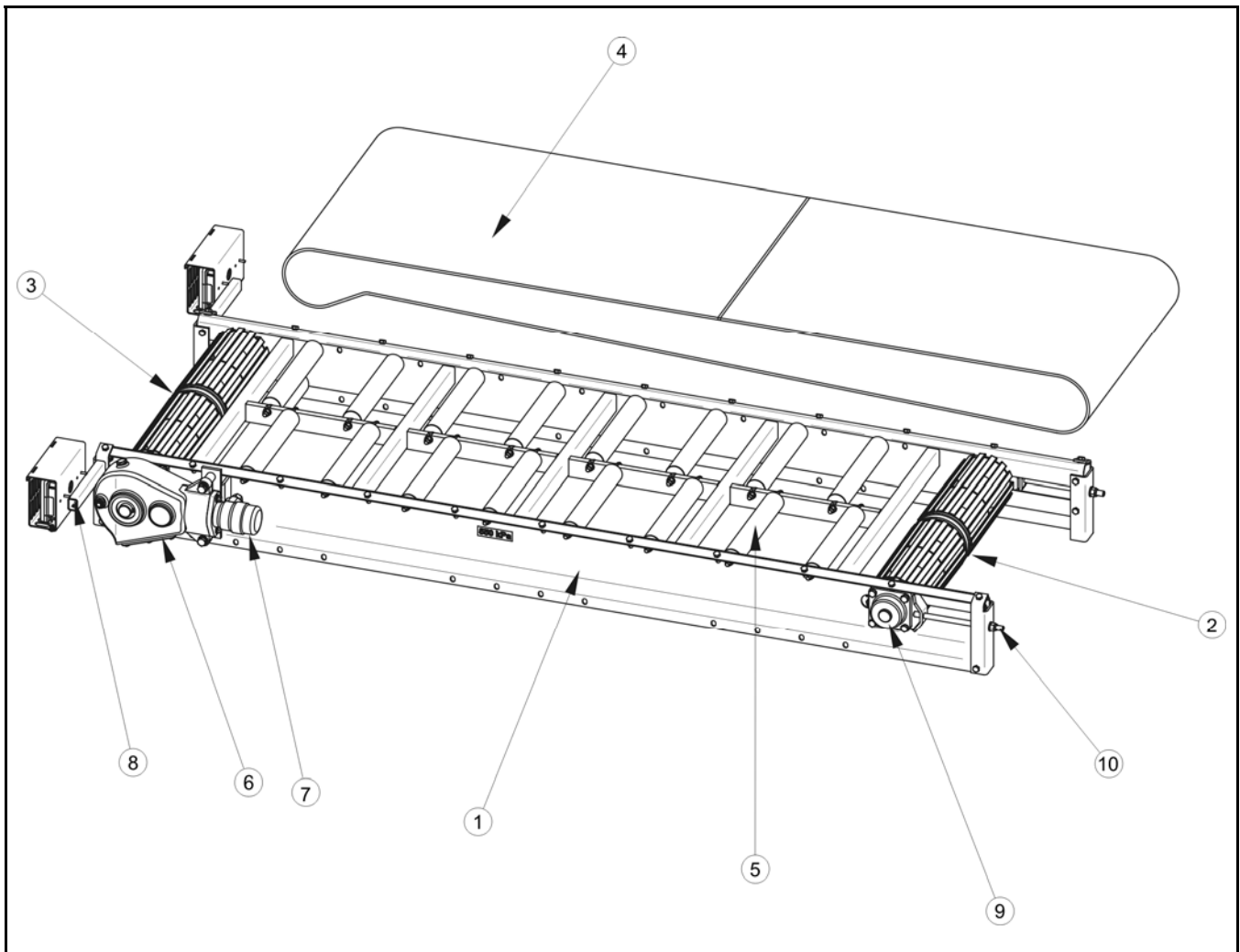


FIG. 3.3A Feeding mechanism

(1) feeding table, (2) front roller, (3) rear drive roller, (4) conveyor belt, (5) guide roller, (6) reduction gear, (7) hydraulic motor, (8) light bracket, (9) bearing assembly, (10) belt tensioner

In the rear section of the mechanism there is rear drive roller (3) to which reduction gear (6) is fixed (on the right side). Thanks to the design of rollers (2) and (3), the conveyor belt can work without slipping. The roller is driven by hydraulic motor (7). Rear light brackets (8) are bolted to the longitudinal members of the feeding table, on the left and right side of the feeding mechanism.

3.5 SPREADING ADAPTER

Spreading adapter base (3) is secured to the sand spreader frame brackets located in the rear section of the machine. Hydraulic motors (4) are bolted to the frame. Right spreading disc (1) and left spreading disc (2) are mounted on the hydraulic motors.

Position of both spreading discs can be adjusted. Spreading disc blades can be adjusted depending on requirements. Spreading agent is transported on conveyor belt and fed to spreading adapter discs.

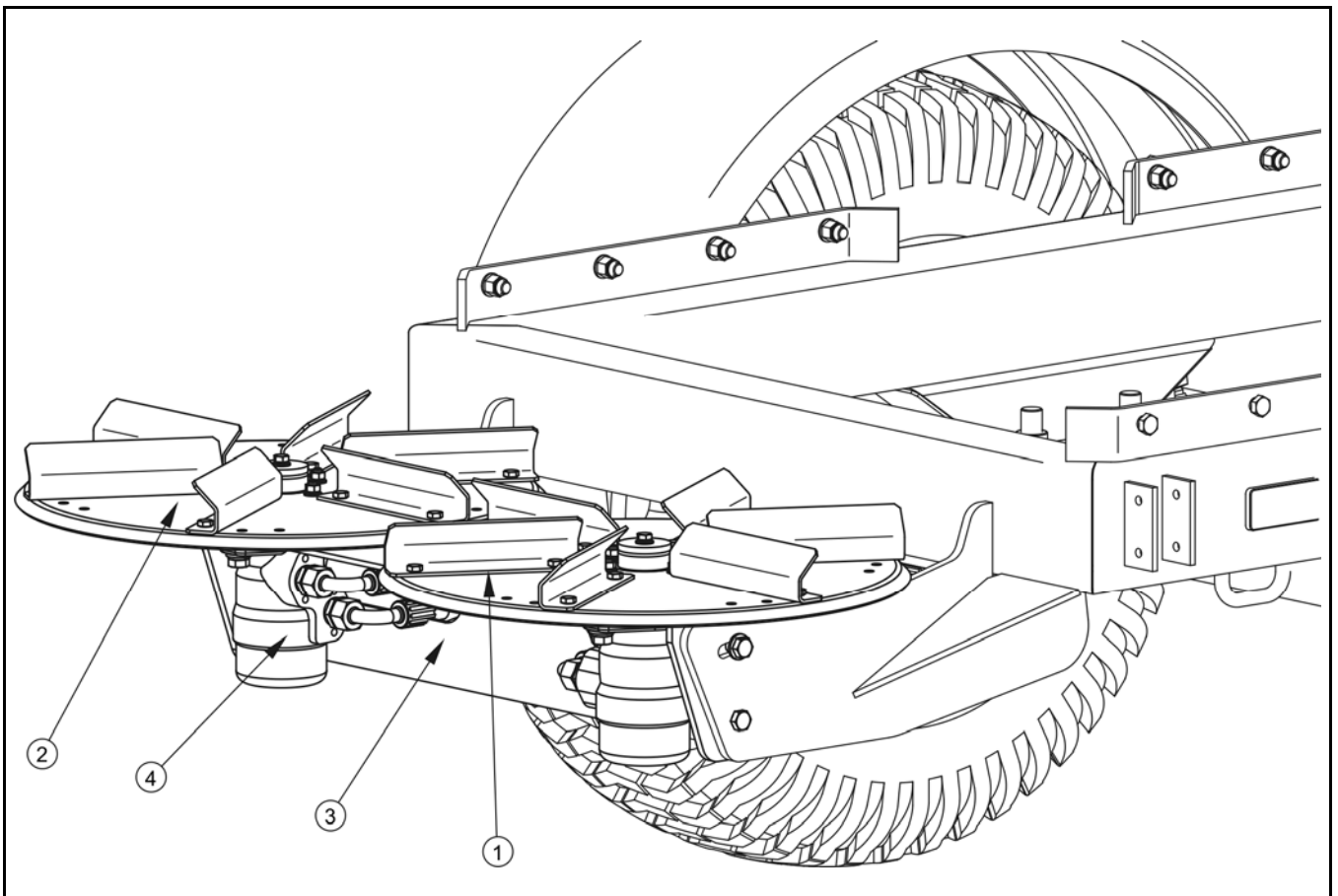


FIG. 3.4A **Spreading adapter**

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

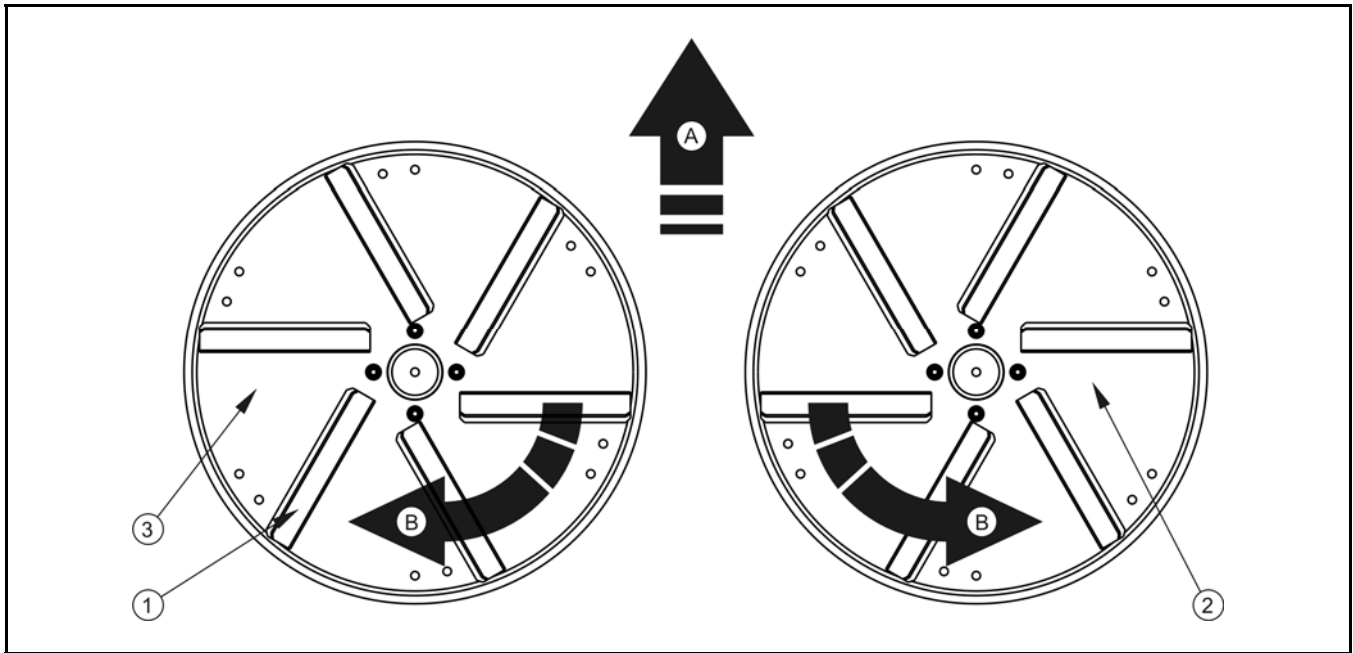


FIG. 3.5A Spreading adapter discs

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

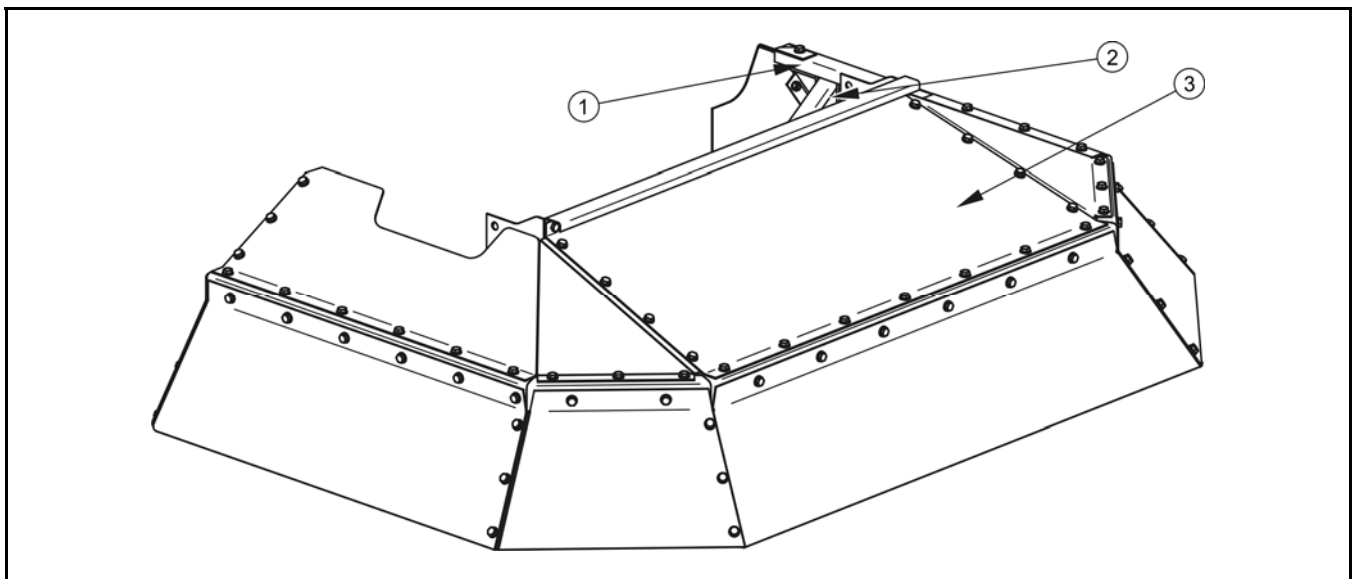


FIG. 3.6A Spreading adapter shields

(1) shield frame, (2) bracket, (3) set of rear shields

Spreading adapter is located under shields made of steel sheet (3) – figure (3.6A). Shields are connected together with bolts and fixed to shield frame (1). Complete unit is installed in appropriate seats on the sand spreader frame by means of brackets (2) .

3.6 HYDRAULIC SYSTEM

Hydraulic system of the sand spreader drives the spreading adapter and feeding mechanism. This hydraulic system is supplied from the external hydraulic system of the tractor. Hydraulic oil flows through supply connection (1) and gets to flow regulator (4) - to connection (P). Hydraulic oil flows out of outlet (A) and supplies hydraulic motor (3) which drives reduction gear (9) and next, conveyor belt.

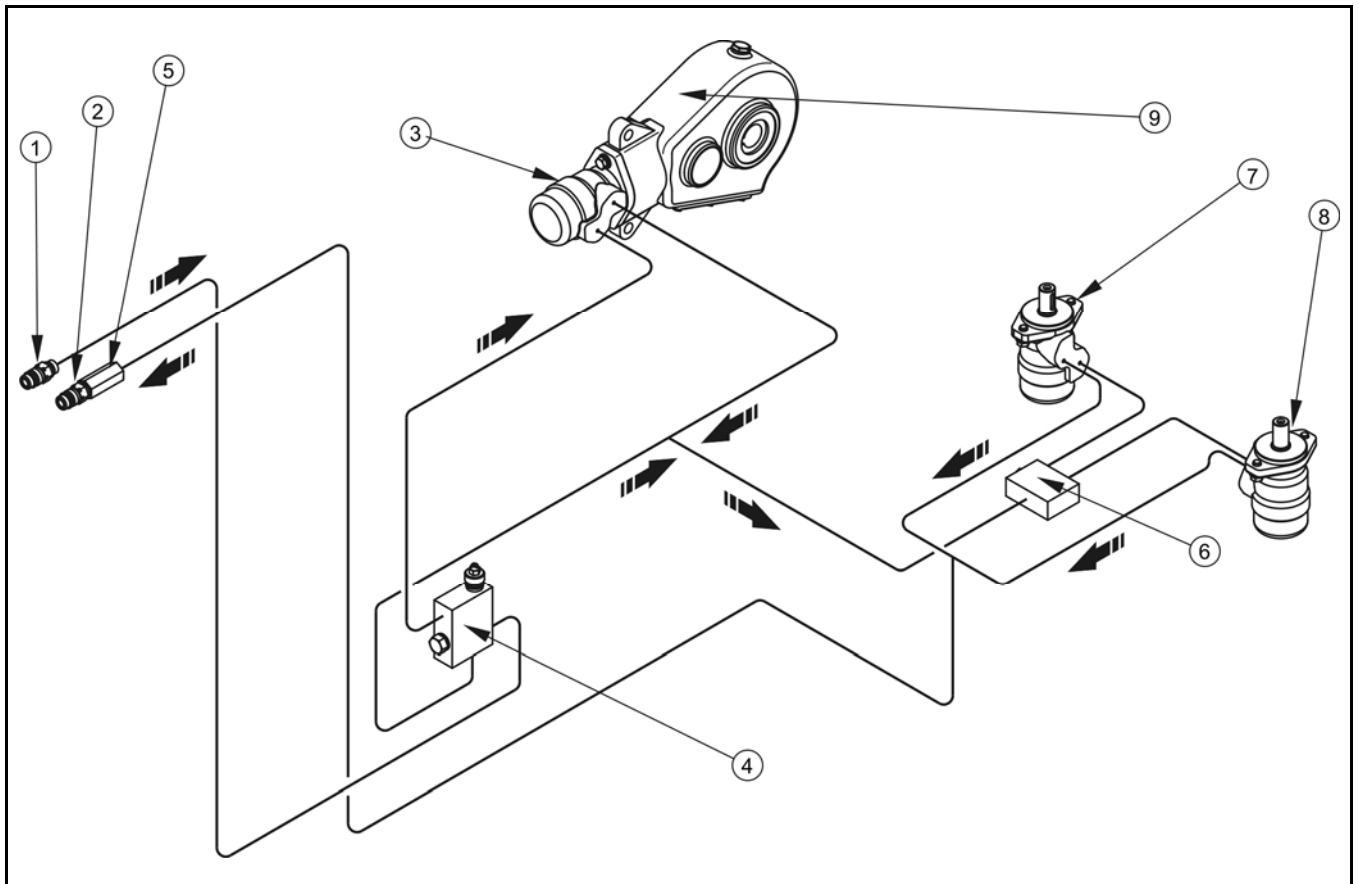


FIG. 3.7A Hydraulic system

(1) supply connection, (2) return connection, (3) hydraulic motor, (4) flow regulator, (5) check valve, (6) flow divider, (7) hydraulic motor of right spreading disc, (8) hydraulic motor of left spreading disc, (9) reduction gear

Hydraulic motors (7) and (8) are supplied with oil returning from hydraulic motor (3) and oil stream from flow regulator, from connection (T), flowing first through flow divider (6). Finally, hydraulic oil returns to the tractor hydraulic system through check valve (5) located in front of return connection (2).

Flow regulator is equipped with a knob adjusting oil output on the receiver's connection. Flow regulator setting determines conveyor belt speed and consequently, density of spreading material. Flow regulator is located in the front section of the sand spreader, under shield, behind the machine drawbar. Flow regulator setting determines only conveyor belt speed. If flow regulator setting is changed, rotation speed of spreading adapter discs is only insignificantly changed. If flow regulator setting is 0, conveyor belt should stop. If the setting is increased above 6, conveyor belt speed will not be further increased. Check valve (5) precludes movement of the feeding mechanism conveyor in the opposite direction (i.e. towards the front wall of the load box).

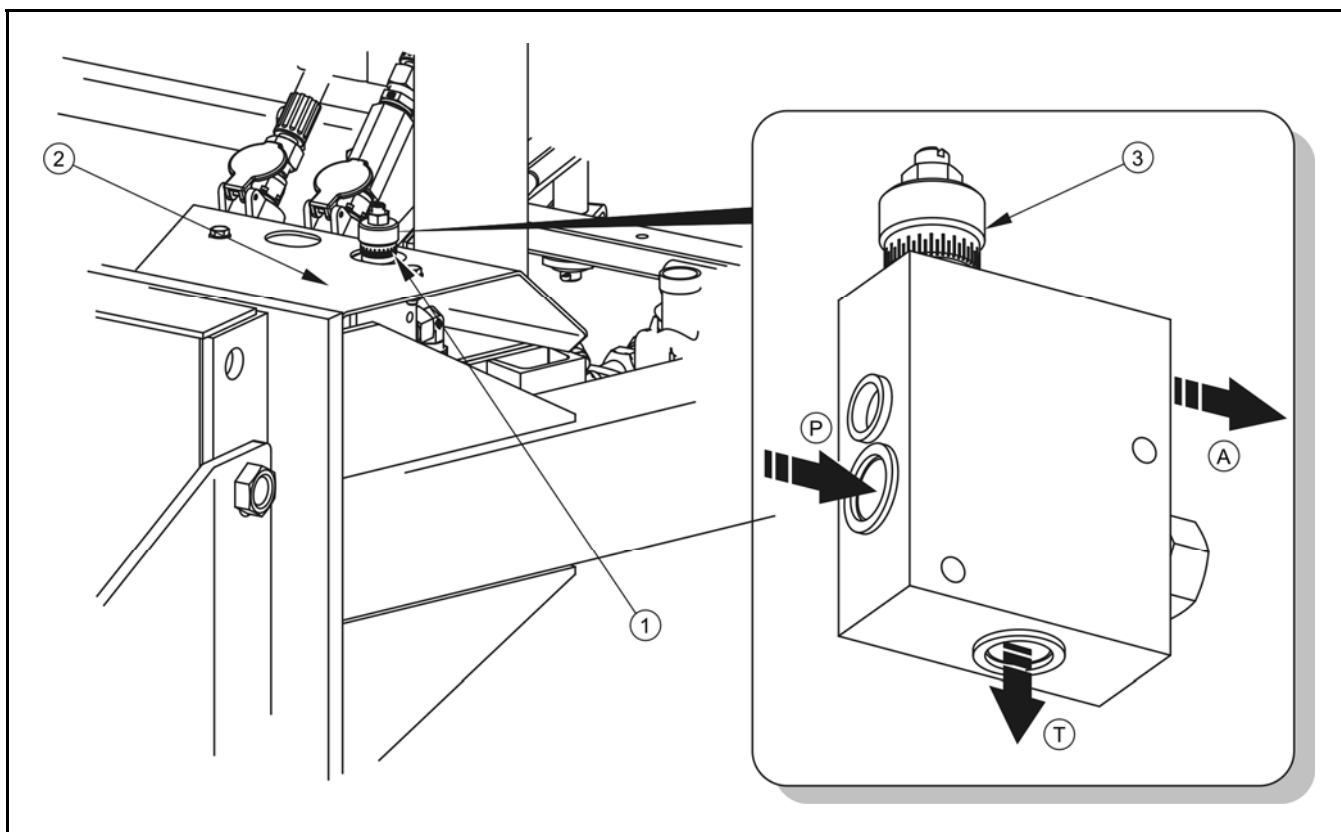


FIG. 3.8A **Flow regulator**

(1) flow regulator, (2) shield, (3) adjusting knob with scale, (P) supply, (A) receiver, (T) return

3.7 PNEUMATIC BRAKE SYSTEM

Depending on the version, the sand spreader is equipped with one of the two types of working brake system:

- single conduit pneumatic system with three position regulator, figure (3.9A),
- double conduit pneumatic system with three position regulator, figure (3.10A),

Working brake is activated from the tractor driver's seat by pressing on the brake pedal in the tractor. The control valve activates the sand spreader brakes when the brake pedal is pressed in the tractor. Furthermore, in case of an inadvertent disconnection of the conduit between the sand spreader and the tractor, the control valve will automatically activate sand spreader's brakes.

Valve used in the system is equipped with a circuit causing the brakes to be applied when sand spreader is disconnected from the tractor. When compressed air conduit is connected to the tractor, the device automatically applying the brakes now changes its position to allow normal brake operation.

Three-step brake force regulator in pneumatic system adjusts braking force depending on the regulator's setting. Switching to a suitable working mode is done manually by sand spreader operator using the regulator lever prior to moving off. The regulator has 3 working positions: "no load", "half load", "full load".

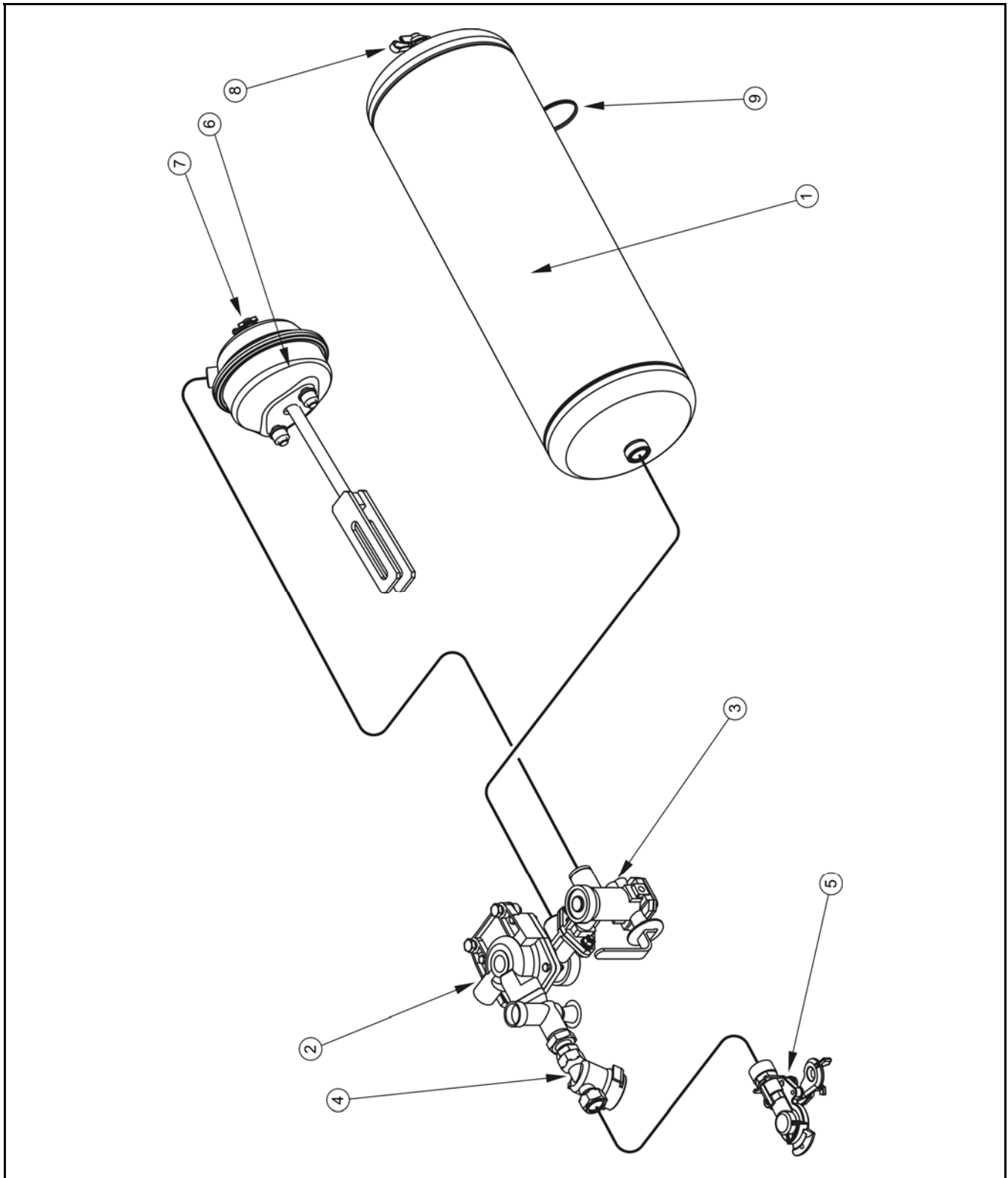


FIG. 3.9A Single conduit pneumatic system

(1) air tank, (2) control valve, (3) brake force regulator, (4) air filter, (5) conduit connection, (6) diaphragm pneumatic cylinder, (7) cylinder control connection, (8) air tank control connection, (9) drain valve

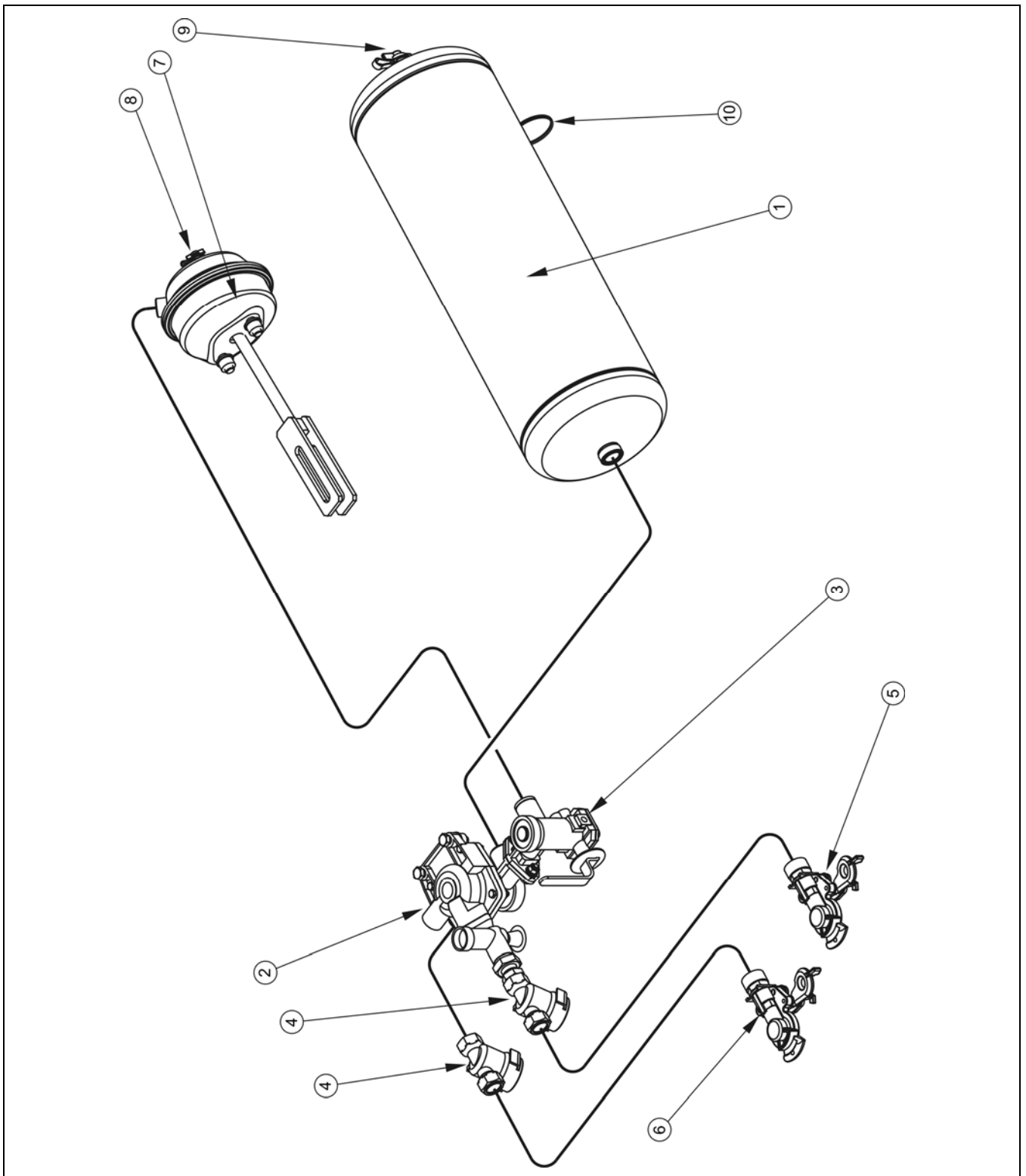


FIG. 3.10A Double conduit pneumatic system

(1) air tank, (2) control valve, (3) brake force regulator, (4) air filter, (5) red conduit connection
 (6) yellow conduit connection, (7) diaphragm pneumatic cylinder, (8) cylinder control connection, (9) air tank control connectors, (10) drain valve

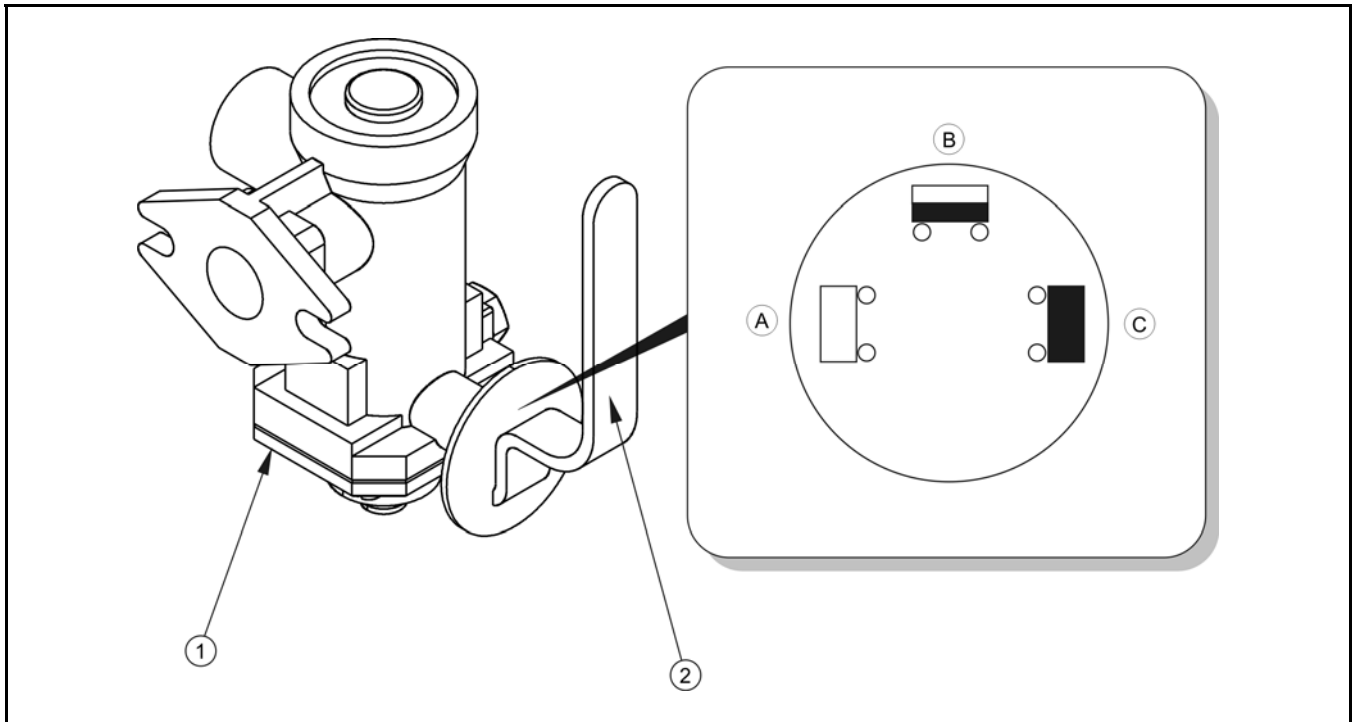


FIG. 3.11A Three-step brake force regulator

(1) air tank, (2) control valve, (3) brake force regulator, (4) air filter, (5) red conduit connection (6) yellow conduit connection, (7) diaphragm pneumatic cylinder, (8) cylinder control connection, (9) air tank control connectors, (10) drain valve

3.8 PARKING BRAKE

The parking brake is for immobilising sand spreader while standing motionless. The brake crank mechanism (1) – located on the left side of chassis frame - is connected with axle rudder bar using a steel cable (3). Rotation of the crank increases tension of the steel cable. Expander arms exert pressure on brake shoes and cause the axle to brake. Prior to moving off, handbrake must be released - steel cable must hang loose.

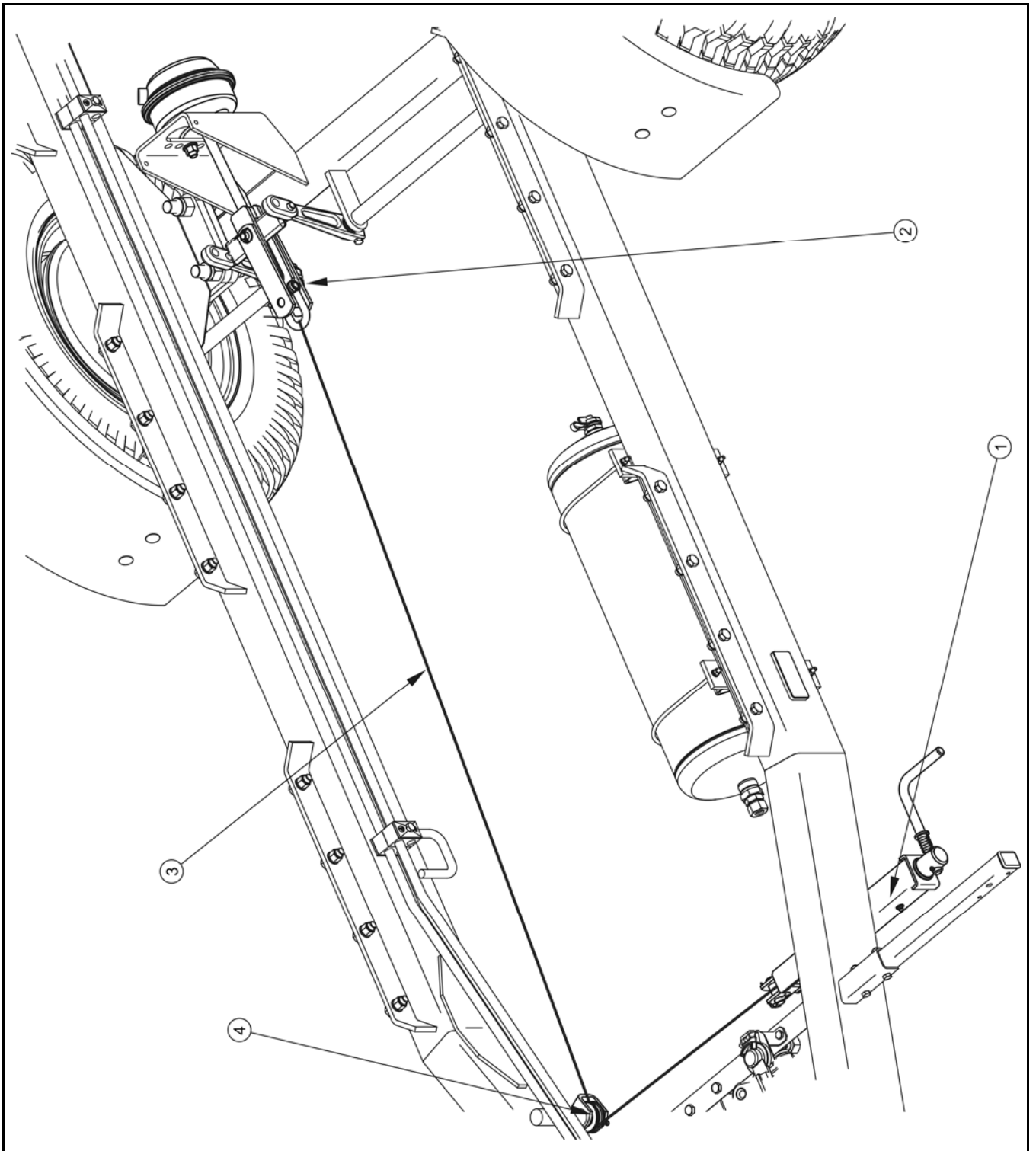


FIG. 3.12A **Parking brake of sand spreader**

(1) brake crank mechanism, (2) handbrake release, (3) steel cable, (4) guide roller

3.9 ELECTRICAL SYSTEM, WARNING SIGNS AND INDICATORS

The sand spreader electrical system is designed for supply from direct current source of 12 V. Connection of the sand spreader electrical system with the tractor should be made through an appropriate connection lead delivered with the machine. The sand spreader is also equipped with orange lateral reflectors. The machine is connected to electrical system of the tractor with electrical conduit included in standard equipment of the sand spreader.

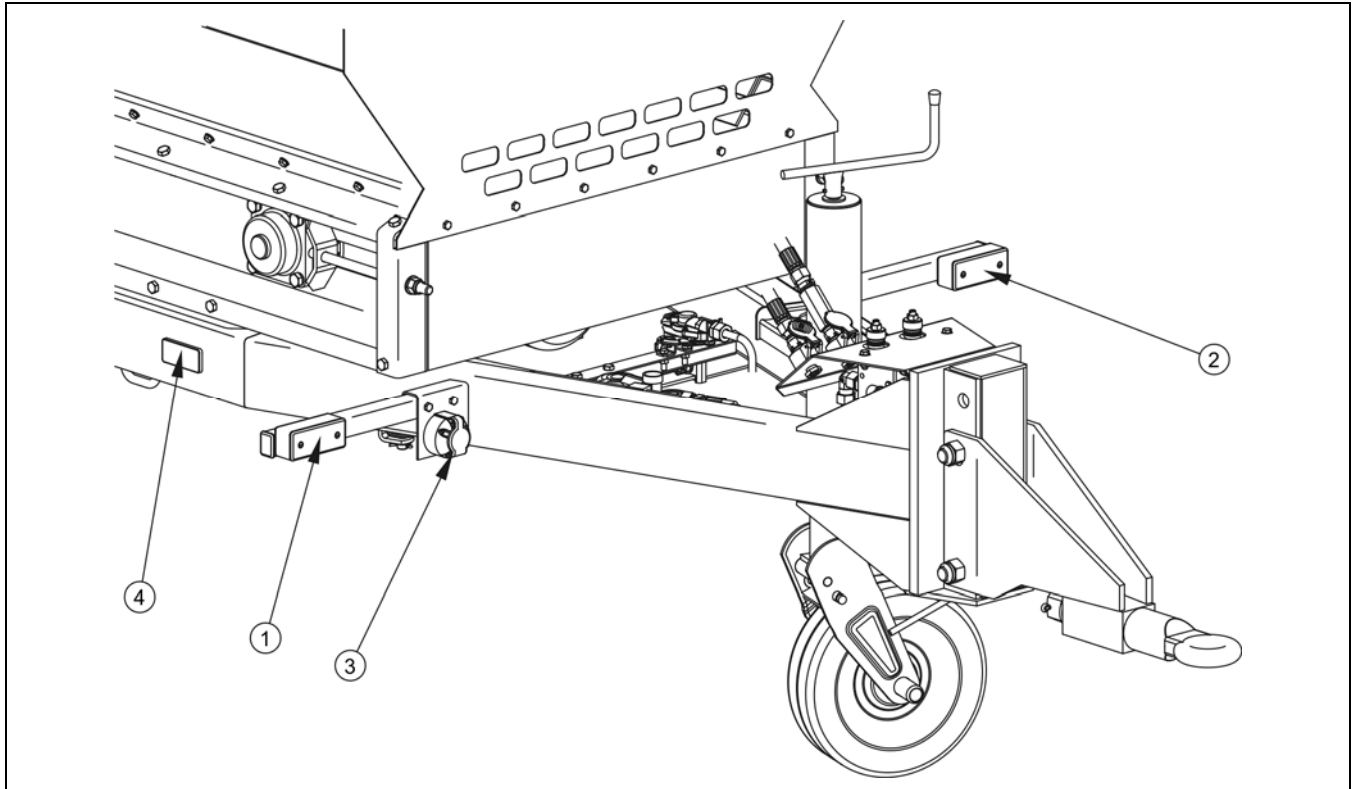


FIG. 3.13A Positioning of electrical components and reflective lights, front view

(1) front right parking light, (2) front left parking light, (3) 7-pole connection socket, (4) orange lateral reflector

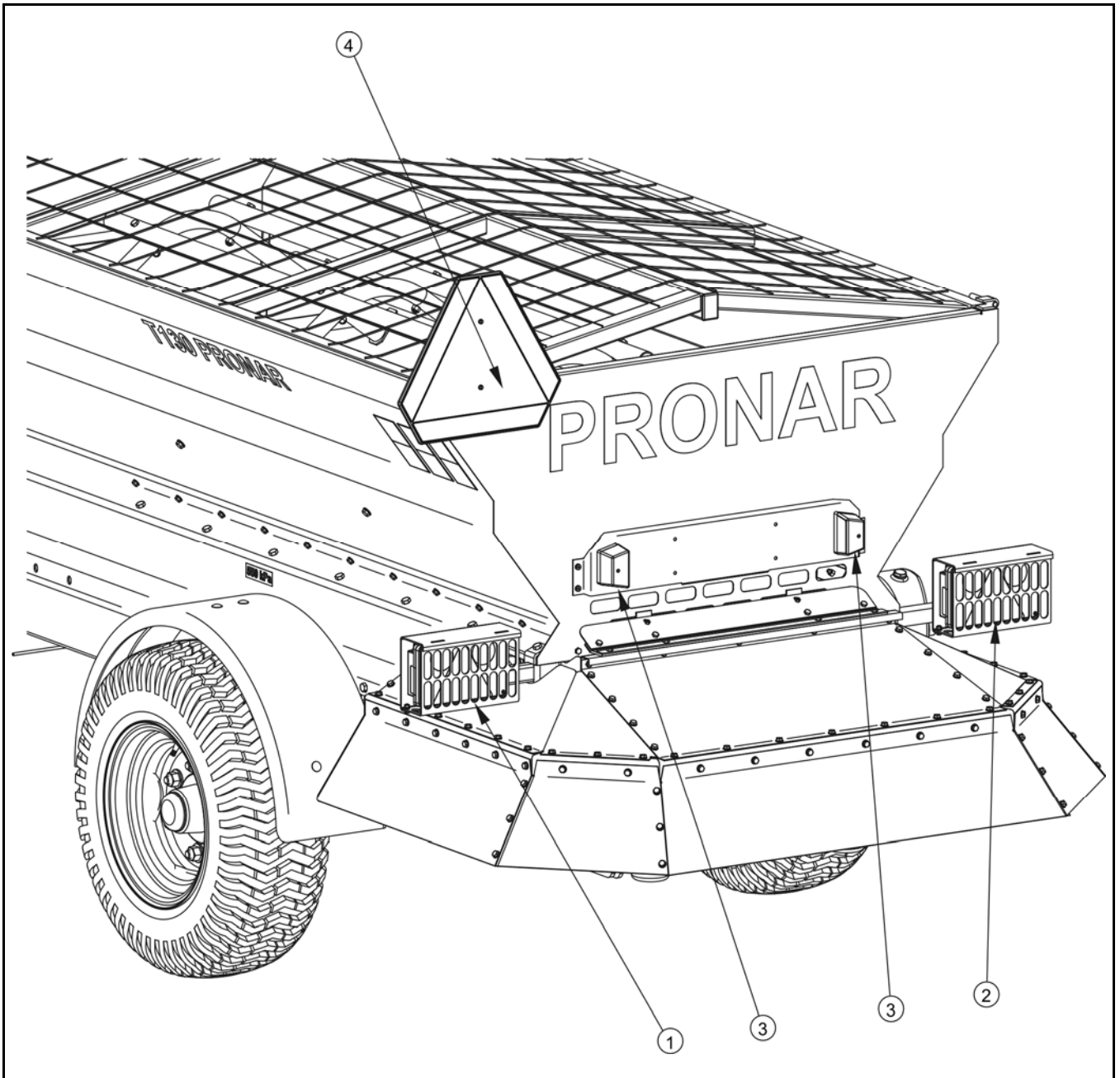


FIG. 3.14A Positioning of electrical components and reflective lights, rear view

(1) left rear lamp assembly, (2) right rear lamp assembly, (3) license plate light, (4) slow-moving vehicle warning sign

SECTION

4

CORRECT USE

PREPARING FOR WORK BEFORE FIRST USE

CHECKING THE SAND SPREADER'S TECHNICAL CONDITION

HITCHING TO TRACTOR

LOADING

SPREADING AND ADJUSTMENT OF SPREADING MATERIAL DENSITY

DRIVING ON PUBLIC ROADS

DISCONNECTING FROM TRACTOR

PROPER USE AND MAINTENANCE OF TYRES

4.1 PREPARING FOR WORK BEFORE FIRST USE

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

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

- the user must carefully read this Operator's Manual and observe all recommendations, understand the design and the principle of machine operation
- check the condition of protective paint coat,
- Inspect sand spreader's individual components for mechanical damage resulting from incorrect transport (dents, piercing, bent or broken components),
- Check all the sand spreader's lubrication points, lubricate the machine as needed according to recommendations provided in section 5,
- Check technical condition of tyres and tyre pressure,
- check if the nuts and bolts fixing the wheels, drawbar, load box and other components are properly tightened,
- check if adapter discs and blades are correctly installed,
- check tension of conveyor belt.

If all the above checks have been performed and there is no doubt as to the sand spreader's good technical condition, it can be connected to tractor. Start the tractor's engine, check all systems and perform a test run of the sand spreader without load (with empty load box). The inspection should be conducted by two people, one of which should always remain in the tractor cab. Inspection should involve the following actions:

- check correct operation of lights and indicators by turning on individual lights of the sand spreader,
- When moving off check if the main brakes operate correctly,
- check if the parking brake of sand spreader operates correctly,

- check if the hydraulic system operates correctly (with empty load box) by activating the drive of the feeding mechanism and spreading adapter discs,
- Ensure that hydraulic system does not have any leaks.

Engage the hydraulic drive for three minutes, and check the following:

- that there is no knocking or noise in the drive system arising from scraping or grinding of metal elements,
- check if flow regulator operates correctly (if flow regulator setting is 0, conveyor belt should stop; if flow regulator setting is increased, conveyor belt speed should also increase),
- correct rotation of adapter discs,
- check if conveyor belt moves smoothly (belt seizure, falling of the belt off the rollers and rubbing of belt connector against the feeding table walls are not allowed).

ATTENTION!



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

Before using the sand spreader always check its technical condition. In particular, check the technical condition of the hitch system, axle system, brake system, indicator lights, spreading adapter, feeding mechanism and set of safety guards.

Rubbing of conveyor belt and adapter discs against sand spreader body, shaking of discs and complete machine, changed noise and vibrations coming from loose nut and bolt connections are not acceptable. Check conveyor belt connector when the belt is motionless and the connector is located at the front, on the front driving roller. Deflect front rubber shield and check condition of belt connector. The connector must not slide out of the belt stitch elements.

The technical condition of the sand spreader's main brake can only be checked after removing off. Make sure that the parking brake is released and the brake force regulator is in NO LOAD serving.

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

DANGER



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

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

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

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

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

4.2 CHECKING THE SAND SPREADER'S TECHNICAL CONDITION

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

TAB. 4.1 TECHNICAL INSPECTION SCHEDULE

DESCRIPTION	SERVICE OPERATION	FREQUENCY
Condition of safety guards	check the technical condition of safety guards, if complete and correctly mounted.	Before each use
Operation of brake system	Attach sand spreader to the tractor and test the brakes after moving off.	
Correct operation of lights and indicators.	After connecting sand spreader to the tractor activate in sequence individual lights, check if all reflectors are installed, check if slow-moving vehicle warning sign is in place	
Operation of hydraulic system	Check tightness and operation of the hydraulic system during operation of the feeding mechanism and spreading discs.	

DESCRIPTION	SERVICE OPERATION	FREQUENCY
Check technical condition of tyres and tyre pressure,	Visually inspect the tyres and if they are properly inflated.	
Check technical condition of tyres and tyre pressure,	Check the condition of tyre tread, lateral surfaces, wheel rim and if necessary inflate the tyres up to recommend pressure	Every month
Check of all main nut and bolt connections are properly tightened	Torque values should be according to table (5.6)	Every six months
Lubrication	Lubricate elements according to guidelines presented in section "lubrication points".	According to table (5.6)
Degree of tightening of road wheel nuts	Torque values should be according to table (5.8)	According to section 4.8



ATTENTION!

The sand spreader must not be used when not in working order.

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

4.3 HITCHING TO TRACTOR

Prior to attempting to link the sand spreader to a tractor verify that the sand spreader is immobilised with a parking brake. The sand spreader may only be hitched to tractor equipped with a hitch with permissible vertical load of more than 500 kg.

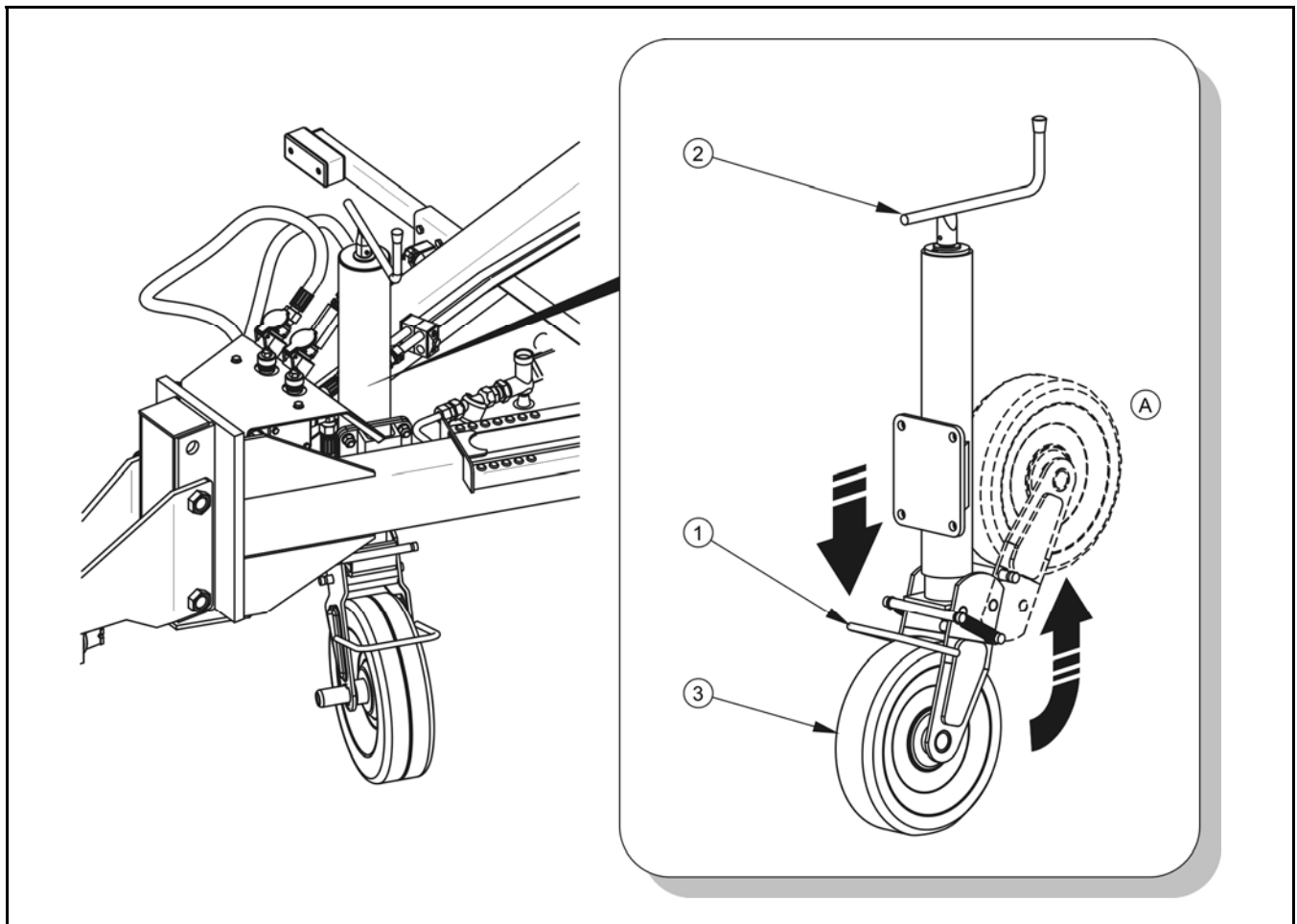


FIG. 4.1A **Folding of support**

(1) support pedal, (2) handle, (3) wheel, (A) transport position

In order to attach the sand spreader to tractor, proceed as follows:

- Position drawbar eye at the correct height.
- Support can be used to precisely adjust drawbar eye height. To do this, turn support handle (2) – figure (4.1A) in order to adjust the drawbar height to the

hitch. If the sand spreader is hitched to tractor for the first time, choose proper drawbar working position – see chapter 5.

- While tractor is in reverse, connect drawbar eye to the tractor's hitch and check if the connection is secure.

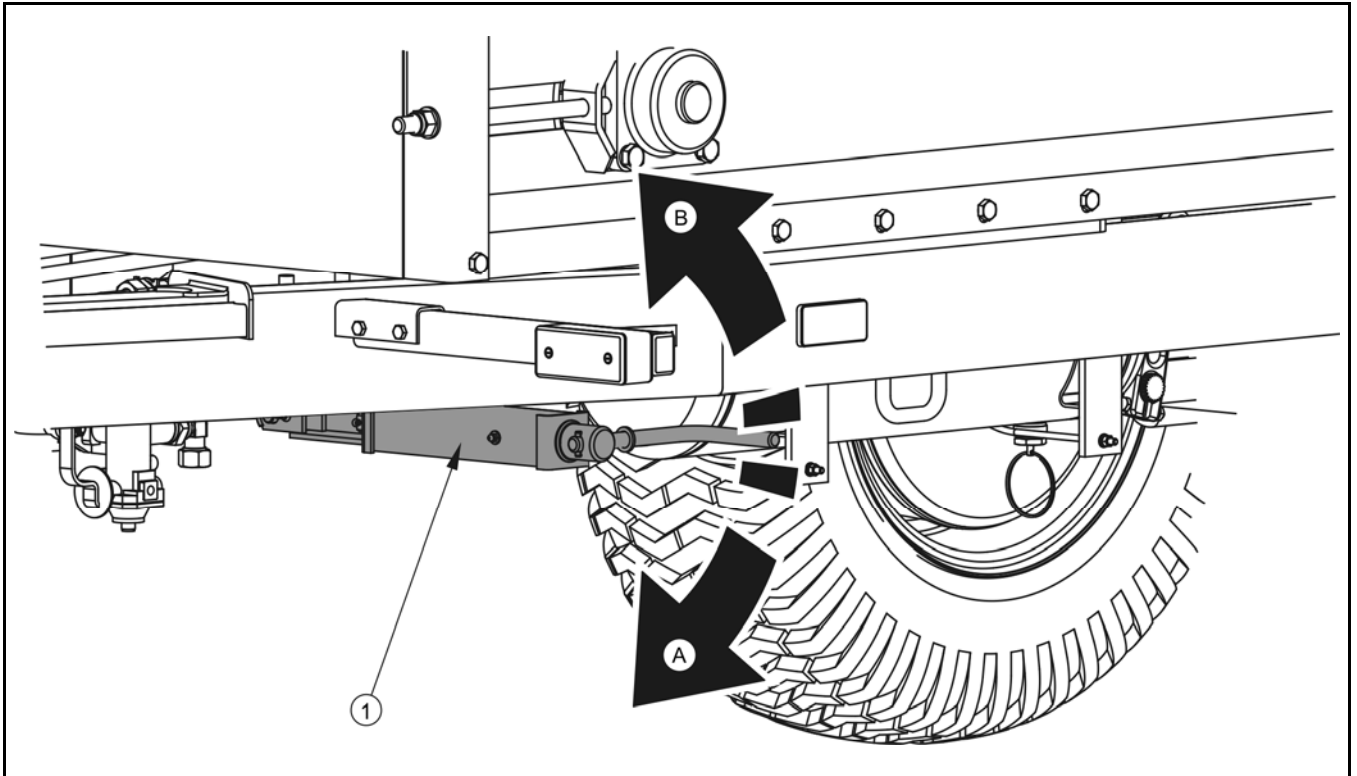


FIG. 4.2A Parking brake mechanism

(1) parking brake mechanism, (A) sand spreader braking, (B) releasing handbrake

- Raise support wheel maximally upwards using knob (2). Press pedal (1), causing the release of wheel, which must be placed by hand in transport position (A).
- Connect electrical leads to the tractor as well as hydraulic and braking system conduits,
- Release parking brake of the sand spreader by turning the crank of the mechanism (1) - figure (4.2A) in direction (B).
- Place a slow-moving vehicle warning sign on the rear wall of the load box.

DANGER



When hitching, there must be nobody between the sand spreader and the tractor. when hitching the machine, tractors driver must exercise caution and make sure that no body is present in the hazard zone.

Be especially careful when hitching the machine to tractor.

When hitching, there must be nobody between the sand spreader and the tractor.

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

Hydraulic system conduits are marked by stickers (12) – table (2.1) which indicate correct direction of hydraulic oil flow.

When connecting braking system conduits (this refers to double-conduit pneumatic system), first connect the yellow conduit to yellow socket in the tractor and only then connect the red conduit to the red socket in the tractor. Once the 2nd conduit is connected, the braking system will switch to normal mode of operation (disconnection or interruption of the conduits causes the sand spreader's braking system control valve to automatically apply brakes). Prior to moving off, set the brake force regulator to a suitable setting (depending on the load carried in the load box).

ATTENTION!



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

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

ATTENTION!



The sand spreader must not be moved when the parking stand is extended and rests on the ground. While the machine is moving there is a risk that the support wheel may fold.

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

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

4.4 LOADING

Load box can be loaded only when the sand spreader is connected to the tractor and positioned horizontally. Always aim at distributing the load uniformly in the load box. This will ensure stability of the sand spreader when travelling and correct axle and drawbar hitching eye loads. When loading the load box, it is recommended to use a loader or belt conveyor.

ATTENTION!



Do NOT exceed the sand spreader's maximum carrying capacity.

People or animals must not be carried.

Before loading make certain that there are no stones, tools or other objects in the load box and on the adapter's discs.

The load in the sand spreader's load box must be distributed uniformly.

Before loading check that there are no objects (tools, stones) in the load box. Avoid throwing material into the load box from a great height during loading because the feeding mechanism may be damaged. Loading of materials other than those recommended by the Manufacturer is forbidden. During loading, the sieve should be closed and properly attached to the load box rim.



ATTENTION!

Spreading agents must be prepared in accordance with the regulations concerning winter road maintenance in force in the country in which the sand spreader is used. Spreading agents other than those recommended by the Manufacturer must not be used.

4.5 SPREADING AND ADJUSTMENT OF SPREADING MATERIAL DENSITY

Amount of spread material depends on the regulator setting and humidity of the material. If humidity of sand or sand-chemicals mixture is higher, the spread material may slip on the conveyor surface and a reduced amount of material may be fed to the spreading adapter discs.

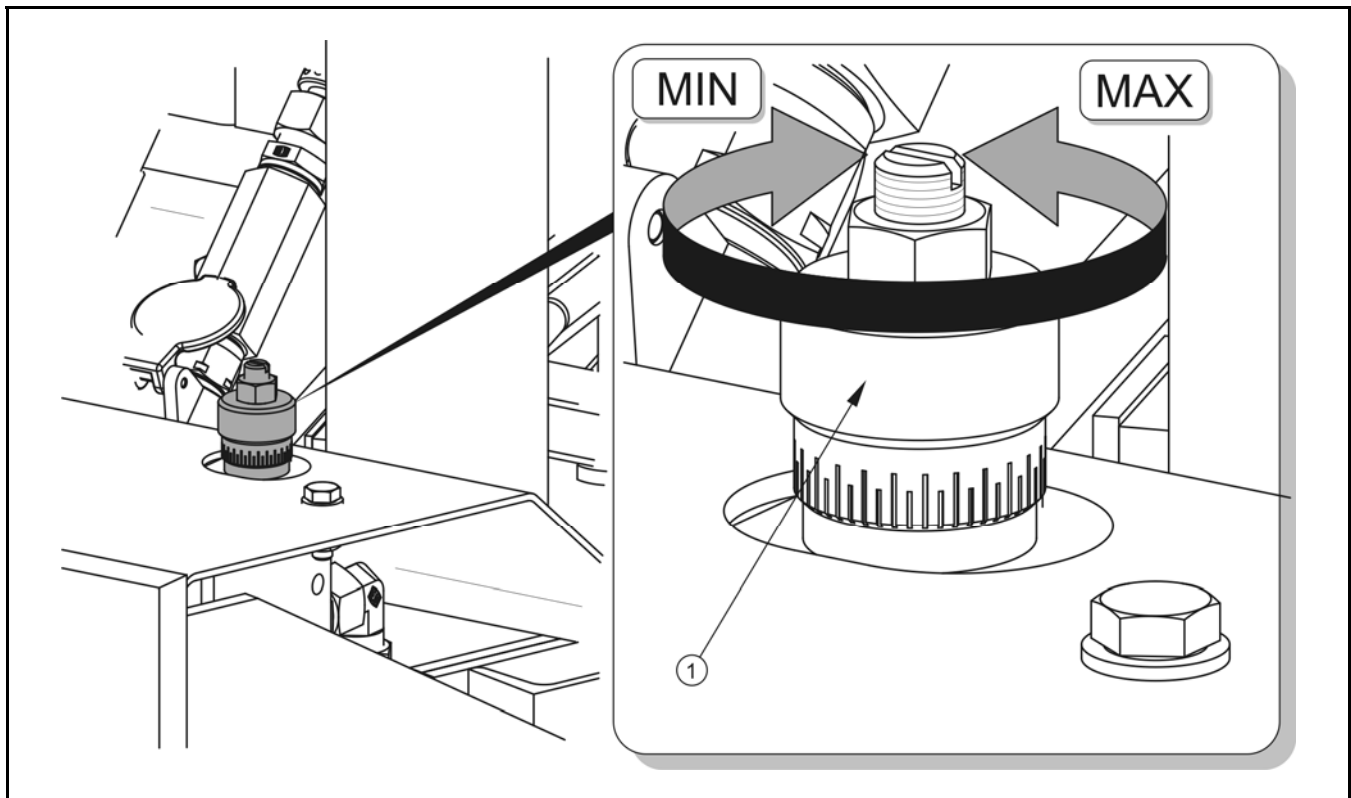


FIG. 4.3A Adjustment of conveyor belt speed

(1) flow regulator knob

Speed of the feeding mechanism conveyor depends on the regulator setting. Proper working position is selected with knob (1). In order to do this, turn the knob completely clockwise to setting 0; then, turn the knob in the opposite direction (anticlockwise) and select proper

working position (1...6). The maximum setting is 6. If the setting is increased above 6, the feeding conveyor speed will not be further increased.

Density of spread material depends on numerous factors: conveyor speed (regulator setting), blades setting (spread width), travelling speed of the sand spreader, composition of spread material mixture and its physical properties such as weight, humidity and other. Spreading density can not be adjusted precisely. This is caused mainly by difficulty in maintaining constant humidity of spread material as well as various grain size and degree of mixing of sand-chemicals mixtures.

Figures (4.4A), (4.5A) and (4.6A) show the diagrams presenting relation between spread material density and the sand spreader speed and setting of spreading adapter blades.

ATTENTION!



While reversing, the sand spreader drive must be disengaged.

Do NOT leave the tractor cab, when the spreading adapter drive and the feeding mechanism drive are engaged.

Use of the sand spreader with damaged shields is forbidden.

Proper density of spread material can be determined on the basis of presented diagrams. For example, when blades are set in position (I) – figure (4.4A), in order to achieve spreading capacity of 200 g/m², set the regulator in position (3). Travel speed of the sand spreader must be 10 km/h. With such settings of blades and regulator, spreading width will be 2.6 m.

If you want to achieve the maximum spreading width, e.g. 3.8 m with the same output (spreading density) – 200 g/m², set the blades in position (II) - figure (4.5A). Change the flow regulator setting to position (6) and increase the sand spreader travel speed to approximately 14 km/h.

Measurements of spreading density were made by Pronar personnel during tests of the sand spreader and they are the basis for determining operating efficiency of the machine. Results given should be treated as approximate ones and settings should be selected on the basis of experience of sand spreader user, taking into account type of spread material and its properties. Fine sand of medium humidity, without chemicals, was used during the tests.

Switch on the orange beacon light in the tractor before you start spreading. Conveyor belt and adapter discs are started from the tractor driver's cab, with the aid of the manifold lever.

Check valve in the sand spreader's hydraulic system precludes movement of the conveyor belt towards the front wall of the load box.

Spreading is recommended to be started during travel of the sand spreader. When the sand spreader is stopped (e.g. at the traffic lights) or after emptying the load box, the sand spreader's drive should be disengaged.

ATTENTION!



Use of the sand spreader with damaged shields is forbidden.

When driving on public roads, comply with the road traffic regulations.

Do not exceed the maximum speed limit. Adjust your speed to the road conditions. If spreading with the sand spreader is done on pavements special attention should be paid to the bystanders and animals near the machine.

During sand spreader operation, the tractor must be equipped with the orange beacon light.

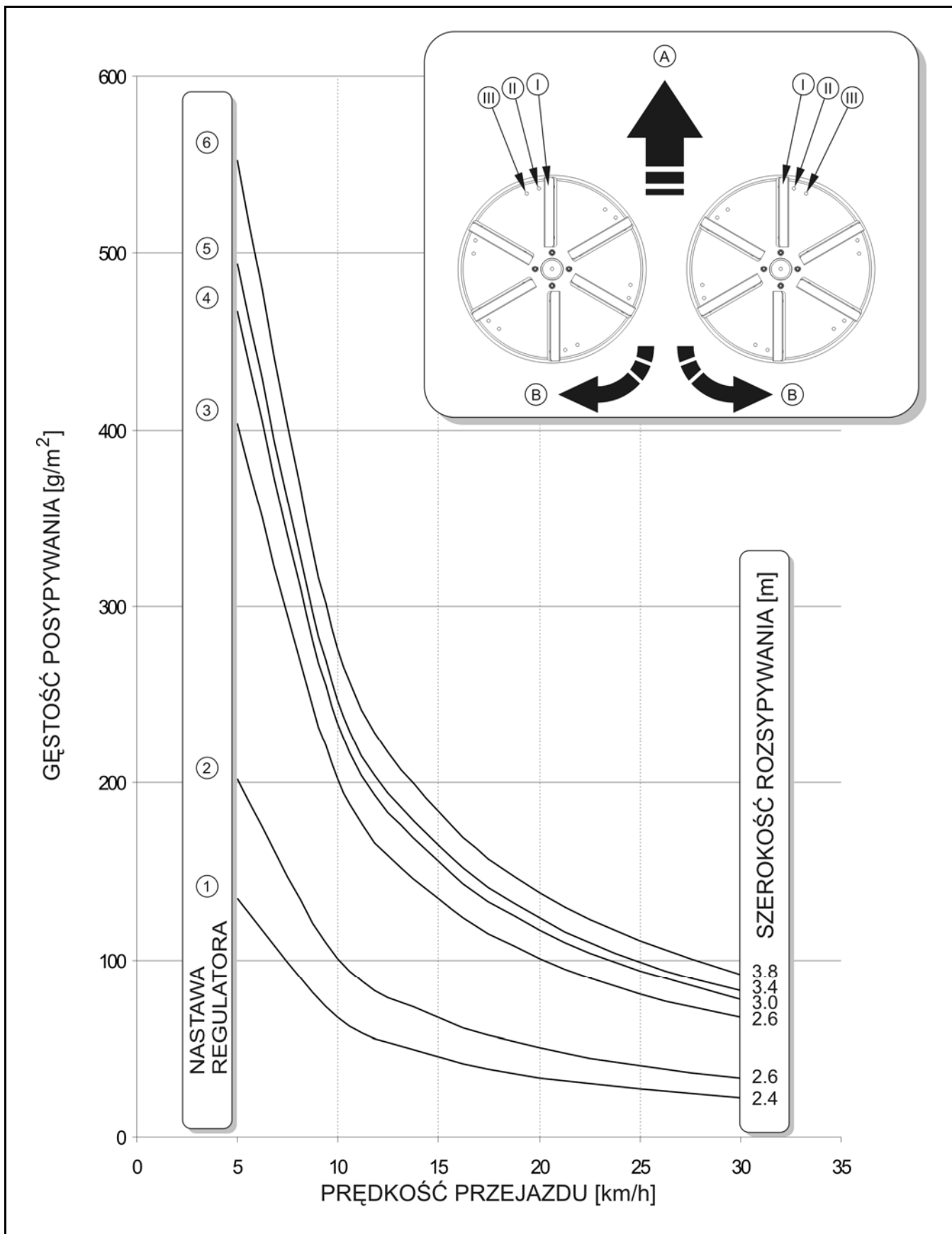


FIG. 4.4A Spreading density, diagram 1

(A) front of sand spreader, (B) rotation direction of discs, (I), (II), (III) positions of blades

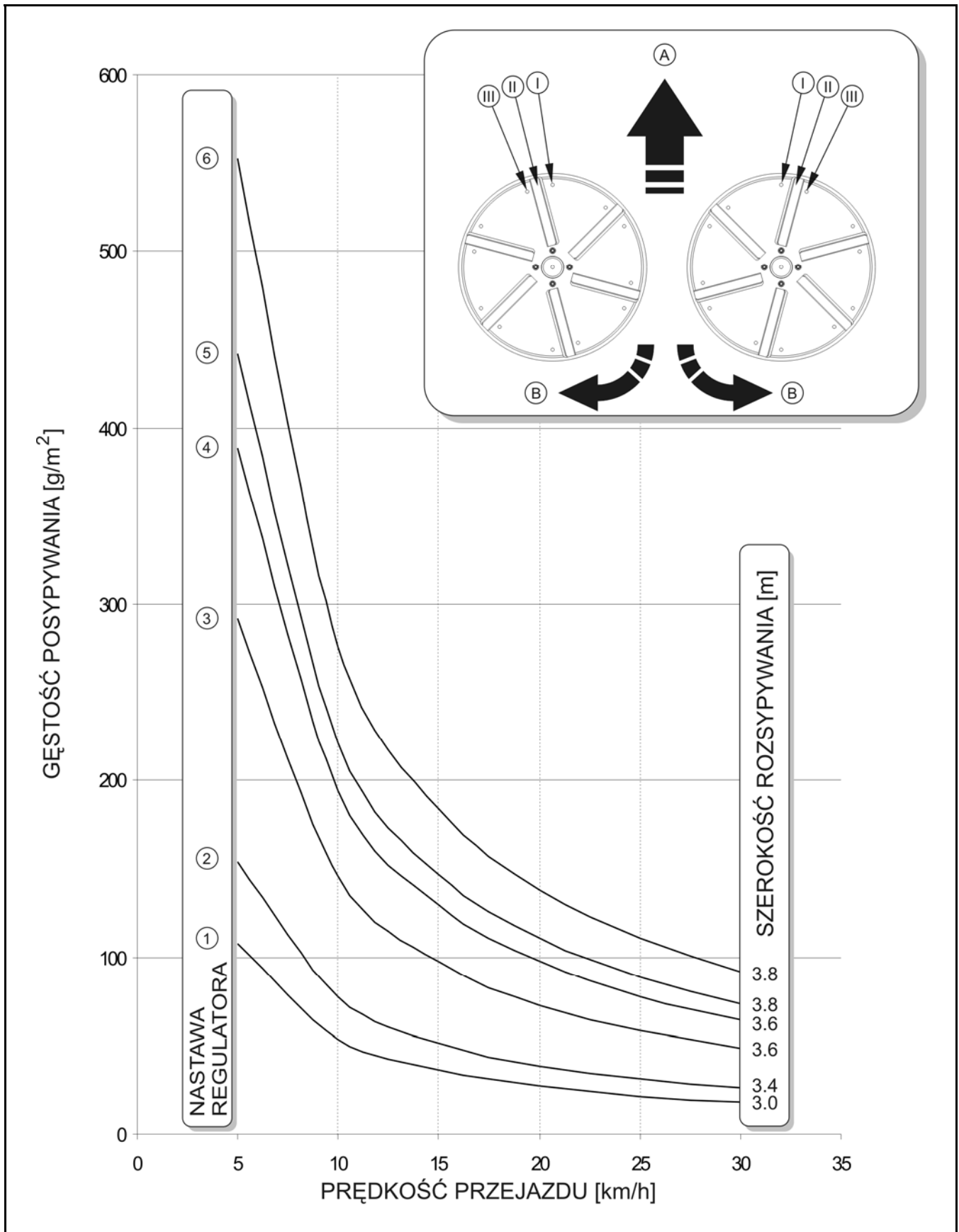


FIG. 4.5A Spreading density, diagram 2

(A) front of sand spreader, (B) rotation direction of discs, (I), (II), (III) positions of blades

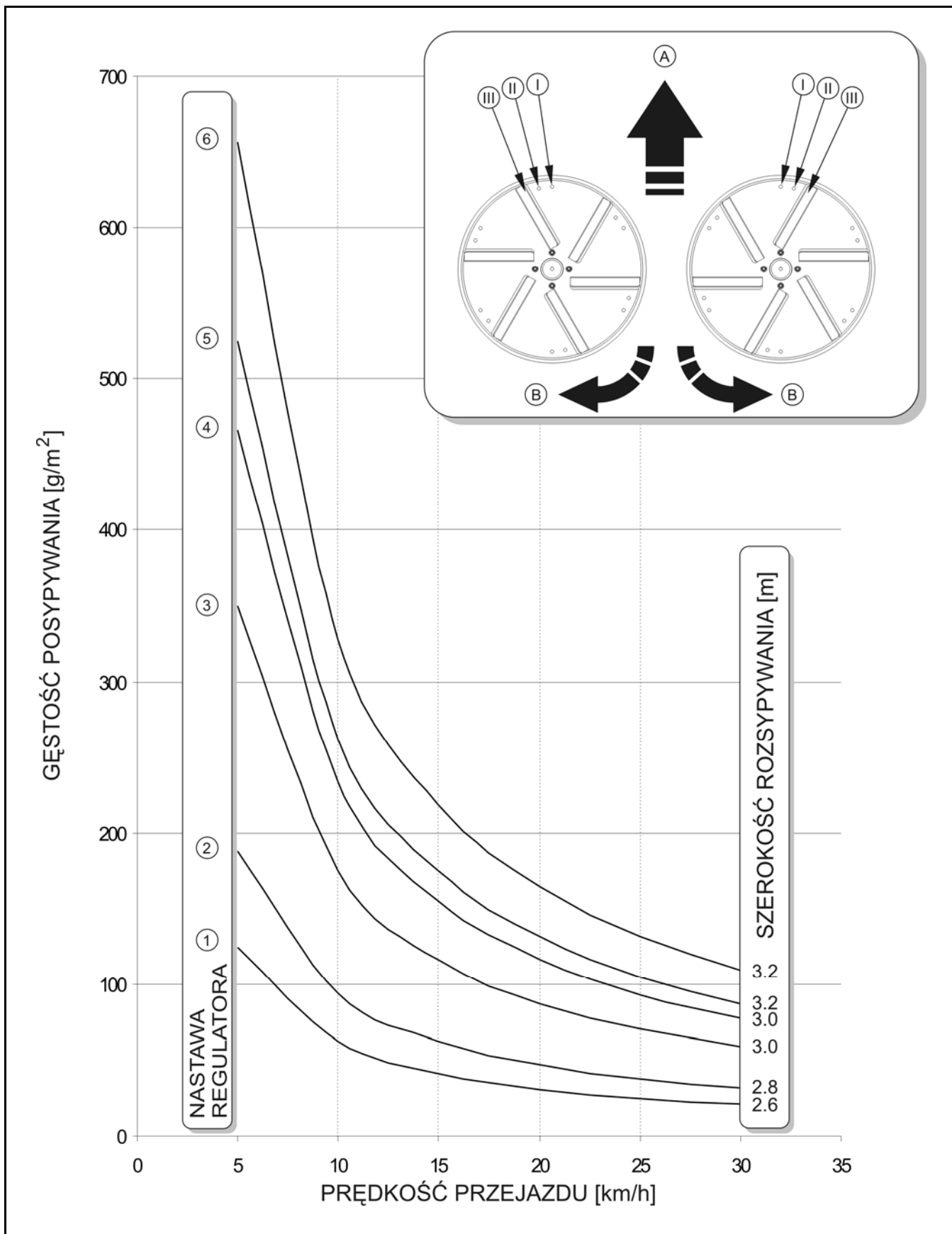


FIG. 4.6A Spreading density, diagram 3

(A) front of sand spreader, (B) rotation direction of discs, (I), (II), (III) positions of blades

4.6 DRIVING ON PUBLIC ROADS

When driving on public roads, respect the road traffic regulations, exercise caution and prudence. If the spreading is done on pavements special attention should be paid to the bystanders likely to be near the working sand spreader. Listed below are the key guidelines for driving the tractor and trailer combination.

- Before moving off make sure that there are no bystanders, especially children, near the sand spreader or the tractor. Take care that the driver has sufficient visibility.
- Make sure that the sand spreader is correctly attached to the tractor and tractor's hitch is properly secured.
- The sand spreader must not be overloaded, loads must be uniformly distributed so that the maximum permissible axle and drawbar loads are not exceeded. The sand spreader's maximum carrying capacity must not be exceeded as this can damage the machine and pose a risk to the operator or other road users.
- Permissible design speed and maximum speed allowed by road traffic law must not be exceeded. The towing speed should be adapted to the current road conditions, load carried by the sand spreader, road surface conditions and other relevant conditions.
- When not connected to the tractor, the sand spreader must be immobilised using parking brake and possibly also with chocks or other objects without sharp edges placed under the front and back wheels. Do NOT leave unsecured sand spreader. In the event of sand spreader malfunction, pull over on the hard shoulder avoiding any risk to other road users and position reflective warning triangle according to traffic regulations.
- While driving on public roads the sand spreader must be fitted with a certified or authorised reflective warning triangle. When driving, comply with all road traffic regulations, indicate an intention to turn using indicator lamps, keep all road lights and indicator lights clean at all times and ensure they are in good condition. Any damaged or lost lamps or indicator lights must be immediately repaired or replaced.
- The yellow beacon light should be turned on during sand spreader operation.
- The conveyor belt and the spreading adapter drive should be engaged only during travel of the tractor and sand spreader. When the sand spreader is stopped (e.g. at the traffic lights), after emptying the load box or while reversing, the sand spreader's drive should be disengaged.

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

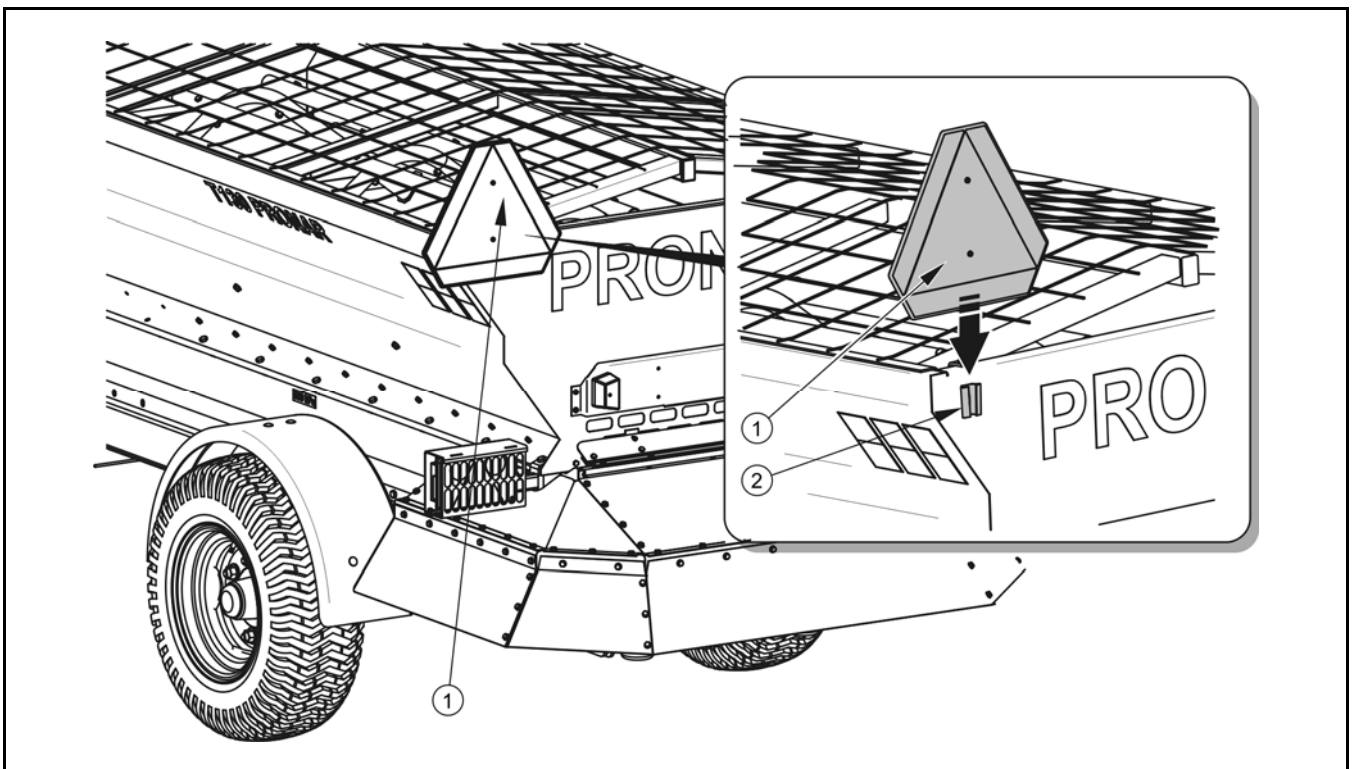


FIG. 4.7A Attaching a slow-moving vehicle warning sign

(1) warning sign, (2) attachment point

- When driving, avoid sharp turns especially on slopes.
- Please note that the braking distance of tractor and trailer combination is substantially increased at higher speeds and loads carried in the trailer.
- Speed must be sufficiently reduced before making a turn or driving on an uneven road or a slope.

4.7 DISCONNECTING FROM TRACTOR

In order to disconnect the sand spreader from the tractor, proceed as follows:

- Once the tractor is stopped, immobilise the sand spreader using parking brake by turning the brake mechanism crank in direction (A) – figure (4.2A).
- Turn the support wheel from transport position, extend the support using the knob until the drawbar hitching eye does not rest on the lower elements of the tractor hitch.
- Disconnect from the tractor all electrical leads as well as hydraulic and braking system conduits. Protect terminals of the leads and conduits against soiling. Insert hydraulic conduit plugs in sockets on the drawbar and protect pneumatic system conduit connectors with plastic shields.
- Disconnect sand spreader drawbar from the tractor's hitch and move the tractor forward.



DANGER

When disconnecting the sand spreader maintain safe distance from the drawbar, which can suddenly move upwards, especially when the load box is partially or unevenly loaded.

When disconnecting pneumatic system conduits (this refers to double-conduit pneumatic system), first disconnect the red connector and only then disconnect the yellow connector.

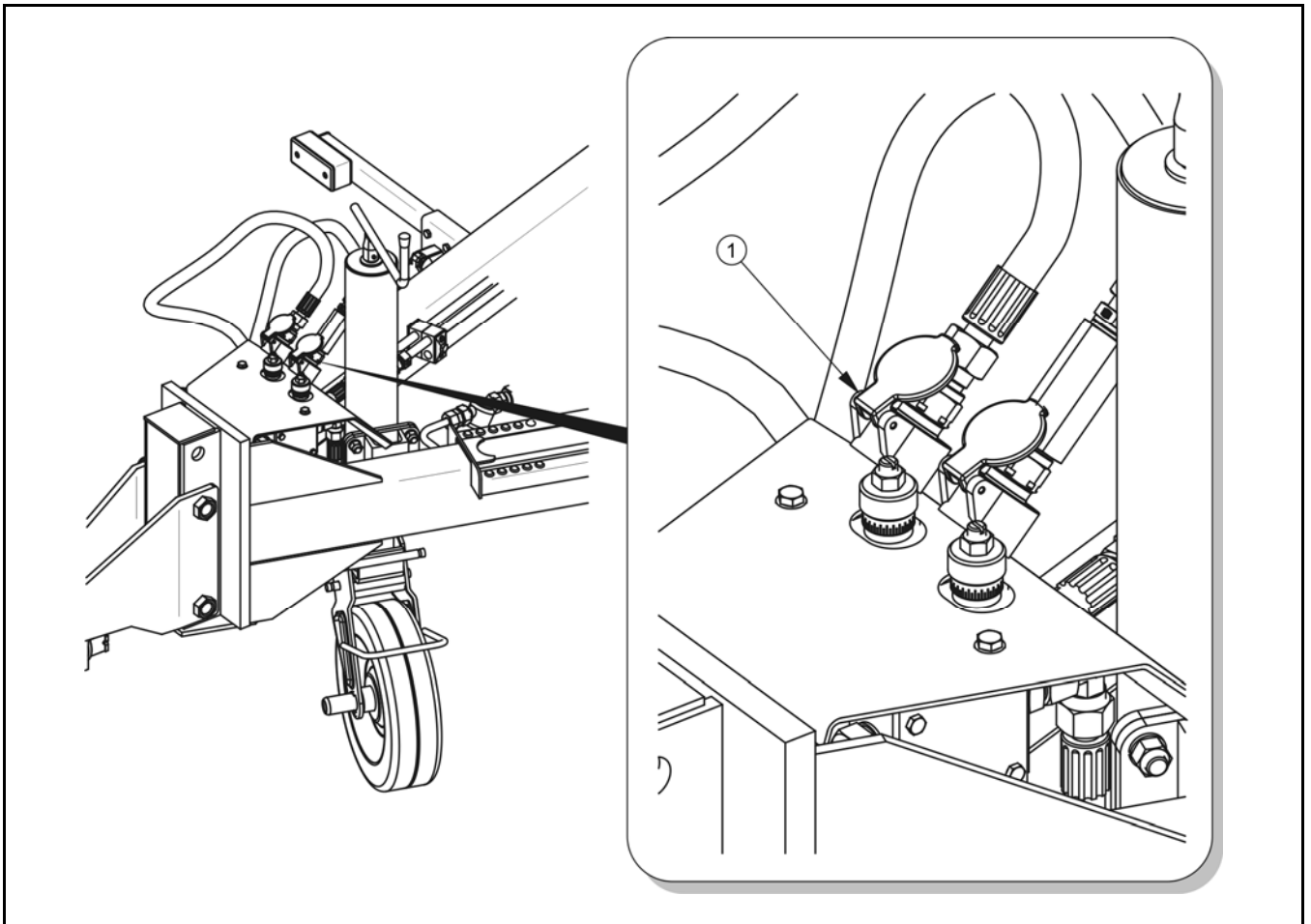


FIG. 4.8A Sockets for hydraulic conduit plugs

(1) socket for hydraulic conduit plugs

ATTENTION!



Extended parking of loaded sand spreader, which is disconnected from the tractor and resting on the support with wheel, is forbidden.

If the sand spreader is partially loaded, make certain that the load in the load box is evenly distributed. Otherwise, the support wheel may be dangerously overloaded or the sand spreader tilted backwards.

The sand spreader unhitched from tractor must be immobilised with parking brake. If the sand spreader is positioned on a slope or elevation it shall be additionally secured against moving by placing chocks or other objects without sharp edges under the trailer's wheels.

If the sand spreader's load box is not completely emptied after finished work and extended parking of the sand spreader is planned, unload the load box near the place where the machine is going to be parked. Load remained in the load box may freeze and cause faster

wear or damage to the sand spreader. The best way is to keep the machine in a roofed building with air temperature above 0° C.

4.8 PROPER USE AND MAINTENANCE OF TYRES

- When working on the tyres, chocks or other objects without sharp edges should be placed under the wheels of the sand spreader to prevent it from rolling. Wheels can be taken off the sand spreader axle only when the sand spreader is not loaded.
- Repair work on the wheels or tyres should be carried out by persons trained and entitled to do so. This work should be carried out using appropriate tools.
- After removing a wheel, always check how firmly the nuts are screwed in. Individual checks should be made after the first use, after the first journey with a load, after travelling 1000 km and then every 6 months. The above actions should be repeated individually if a wheel has been removed from the wheel axle.
- Regularly check and maintain correct pressure in tyres according to Operator's Manual (especially if sand spreader is not used for a longer period).
- Pressure and tyres should be also checked after the whole day of intensive work. Please note that higher temperatures could raise tire pressure by as much as 1 bar. At high temperatures and pressure, reduce load or speed.
- Do not release air from warm tyres to adjust the pressure or the tyres will be underinflated when temperatures return to normal.
- Protect tyre valves using suitable caps to avoid soiling.
- Do not exceed the sand spreader's maximum design speed.
- When trailer is operated all day, stop working for a minimum of one hour in the afternoon.
- Avoid potholes, sudden manoeuvres or high speeds when turning.

SECTION

5

MAINTENANCE

SETTING WORKING POSITION OF DRAWBAR

CHECKING WHEEL AXLE BEARINGS

ADJUSTMENT OF MAIN BRAKES

ADJUSTMENT OF MAIN BRAKES

PNEUMATIC SYSTEM OPERATION

HYDRAULIC SYSTEM OPERATION

ADJUSTMENT OF CONVEYOR BELT TENSION

ADJUSTMENT OF SPREADING DISC BLADES

STORAGE

LUBRICATION

TIGHTENING TORQUE FOR NUT AND BOLT CONNECTIONS

TROUBLESHOOTING

LIST OF BULBS

5.1 SETTING WORKING POSITION OF DRAWBAR

In new sand spreader, adjust the position of drawbar to the tractor hitch. Changing height of drawbar should be performed by two persons. In order to do this:

- position the sand spreader on a flat surface, put chocks under the wheels,
- using the knob, pull out or retract the support to such a height so that the sand spreader frame is positioned parallel to the ground,
- undo nuts (1) and remove bolts (2) securing the drawbar to the faceplate,
- adjust the height of drawbar (I) or (II),
- install bolts and nuts, tighten the elements using suitable torque.

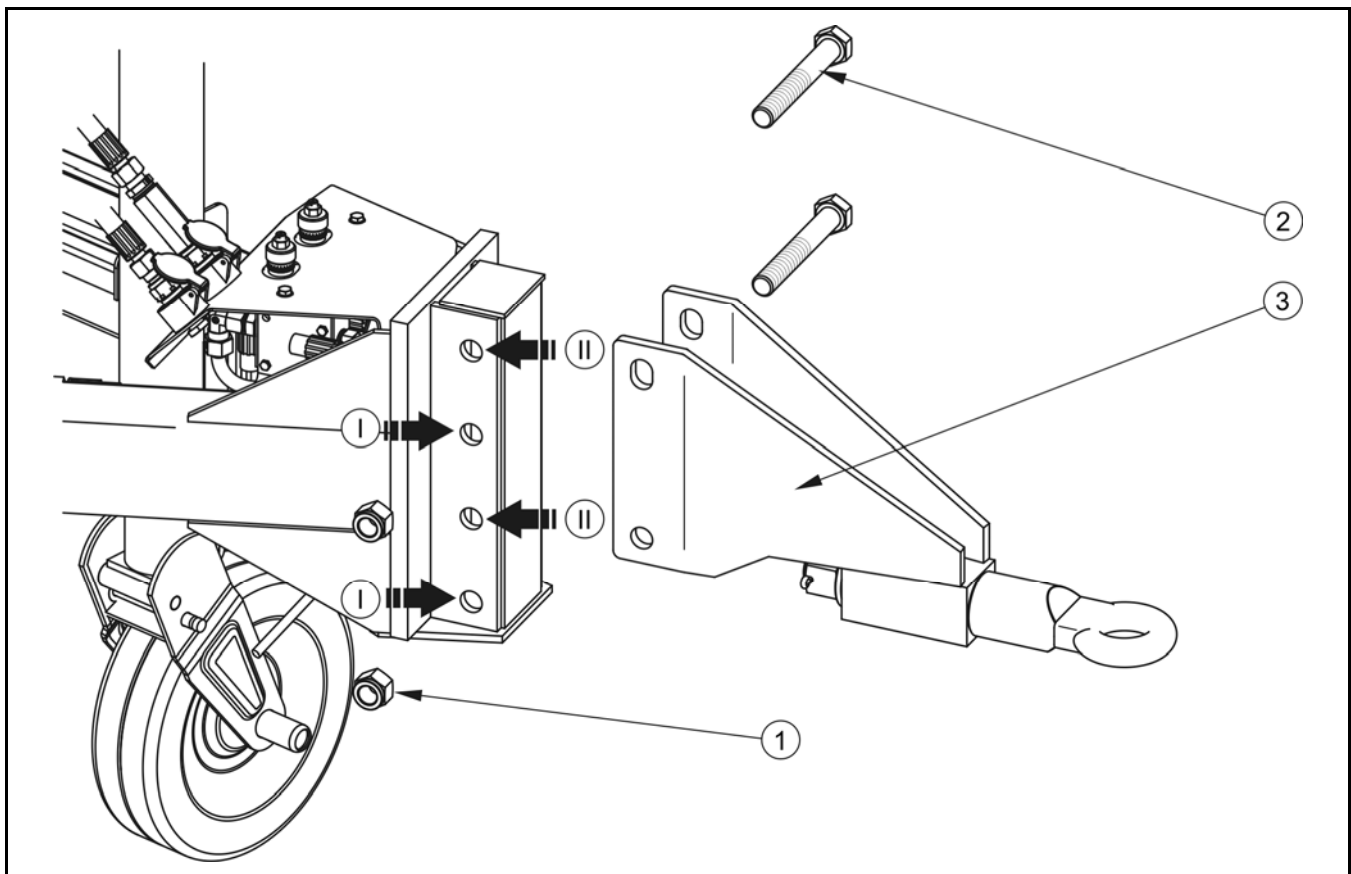


FIG. 5.1A Adjustment of drawbar position

(1) self locking nut, (2) bolt, (3) drawbar with rotating drawbar eye

TAB. 5.1 INFORMATION ON INSTALLATION

CONNECTION OF DRAWBAR TO THE FACEPLATE	
BOLT	M24x170-8.8-B
NUT	M24-8-B
TIGHTENING TORQUE	470 Nm
WEIGHT	
DRAWBAR	approx. 25 kg

The mounting height and position of the drawbar should be individually matched to tractor hitch.



DANGER

Changing height of drawbar should be performed by two persons. Take special care when removing the bolts because of the risk of crushing feet.

5.2 CHECKING WHEEL AXLE BEARINGS

In newly purchased sand spreader, after the first month of use or covering a distance of 100 km, while during further use – after 6 months of vehicle use check and adjust wheel axle bearings when needed. Worn or damaged bearing should be replaced.

- Hitch sand spreader to tractor, braking tractor with parking brake. Place blocking chocks or other objects without sharp edges under sand spreader wheels and raise wheels in succession using the appropriate lifting jack. The lifting jack should be placed under the axle between U bolts fixing the axle to the frame. Make certain that the sand spreader will not move during inspection of the bearing.
- Turning the wheel slowly in both directions check that movement is smooth and that the wheel rotates without excessive resistance.
- Turn the wheel so that it rotates very quickly, check that the bearing does not make any unusual sounds.

- Grasp wheel above and below and try to feel any slack play, this may equally be checked with the aid of a jack placed under the wheel supported on the floor/ground.

If slack is felt, adjust bearing. Unusual sounds coming from bearing may be symptoms of excess wear, dirt or damage. In such an event the bearing, together with sealing ring, should be replaced with new parts.

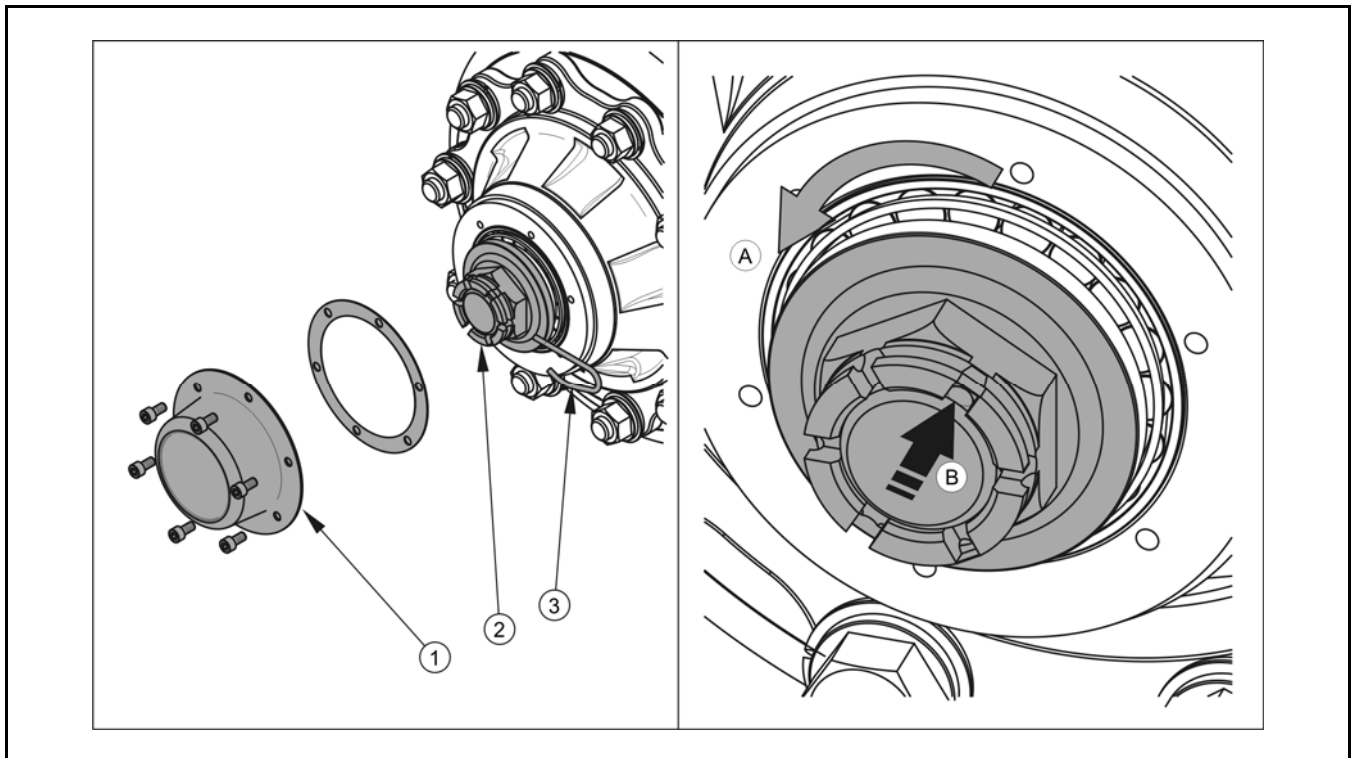


FIG. 5.2A Adjustment of road wheel axle bearings

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

Bearing adjustment should be performed according to the following instructions – figure (5.2A):

- take off hub cover (1),
- take out split cotter pin (3) securing castellated nut (2)
- turning the wheel simultaneously tighten castellated nut until the wheel comes to a stop.
- Unscrew nut (not less than 1/3 rotation) to cover the nearest thread groove with alignment to opening in wheel stub axle.
- secure castellated nut with cotter pin and mount hub cap.

The wheel should turn smoothly without stiffness or detectable resistance not originating from abrasion of brake shoes in brake drum.

TAB. 5.2 HYDRAULIC LIFT REQUIREMENTS

PARAMETER	UNIT	VALUE
Lift capacity	kg	2,000
Height of lift ram in retracted state	mm	200

Inspection and adjustment of bearings may only be conducted, when the sand spreader is hitched to a tractor and trailer load box is empty.

Bearings replacement, lubrication and repairs connected with brake system and wheel axle should be entrusted to specialist service provider. For axle technical service, the user may only inspect the technical condition of the axle system, inspect bearing slack and their adjustment.



Inspection of slack and technical condition of wheel axle bearings must be performed after the first month of use or 100km of travel, and then every 6 months of sand spreader use.

5.3 ADJUSTMENT OF MAIN BRAKES

Brakes adjustment is necessary when:

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

If brakes are correctly adjusted, braking of sand spreader wheels takes place simultaneously. Brakes adjustment involves changing setting of axle shaft expander arms (1) in relation to expander shafts (2). In order to do that loosen clamp bolts (3), dismantle expander levers and set them in the correct direction i.e.:

- backwards - if brake brakes too late (A)
- forward - if brake brakes too early (B)

Adjustment should be conducted separately for each wheel. After proper brake adjustment, at full braking the axle shaft expander arm should create an angle of 90° with pneumatic ram piston. Axle shaft expander arms must make the same movement and braking process must take place simultaneously on both wheels. After the brake is released, expander arms may not be supported on any structural elements, because insufficient withdrawal of a piston ram may cause abrasion of brake shoes in drum and result in overheating sand spreader brakes.

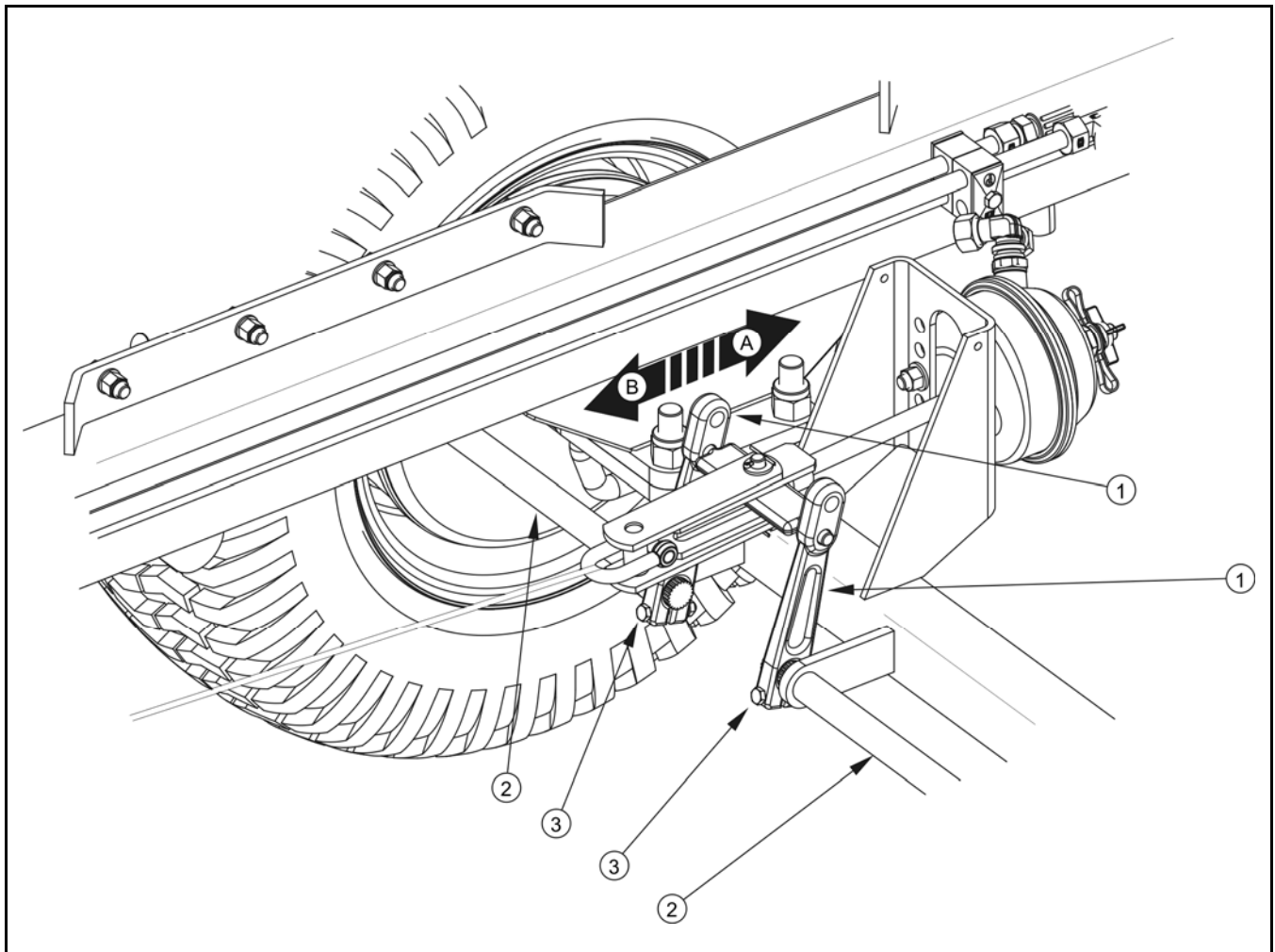


FIG. 5.3A Adjustment of main brakes

(1) expander arm, (2) expander shaft, (3) clamp bolt with nut

TAB. 5.3 MAIN BRAKE BRAKING FORCE

PARAMETER	UNIT	VALUE
Main brake braking force	kN	18

With properly adjusted brakes, sand spreader main brake braking force should reach a value not less than that given in table 5.3.



The main brake system should be inspected annually and in case of need should be adjusted.

Difference in braking force of left and right wheel may not be greater than 30%, considering that 100% constitutes greater force.



ATTENTION!

Main brake braking force, is the braking force of all sand spreader wheels.

5.4 PARKING BRAKE ADJUSTMENT

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

- stretching of cable,
- loosening of parking brake cable clamps
- after adjustment of main brake,
- after repairs in main brake system,
- after repairs in parking brake system.

Before commencing adjustment make certain that the main break is functioning properly.

Brake adjustment must be performed according to the following sequence:

- park sand spreader on a level surface,
- chocks or other objects without sharp edges should be placed under the wheels,
- Unscrew maximally the brake mechanism bolt (anticlockwise),
- loosen brake cable clamps,
- tighten cable and tighten clamps.

Length of parking brake cable should be so selected that at total release of working and parking brake the cable would be loose and hanging by 1 - 2 cm.

With properly adjusted brakes, trailer parking brake braking force should reach a value not less than that given in table (5.4).

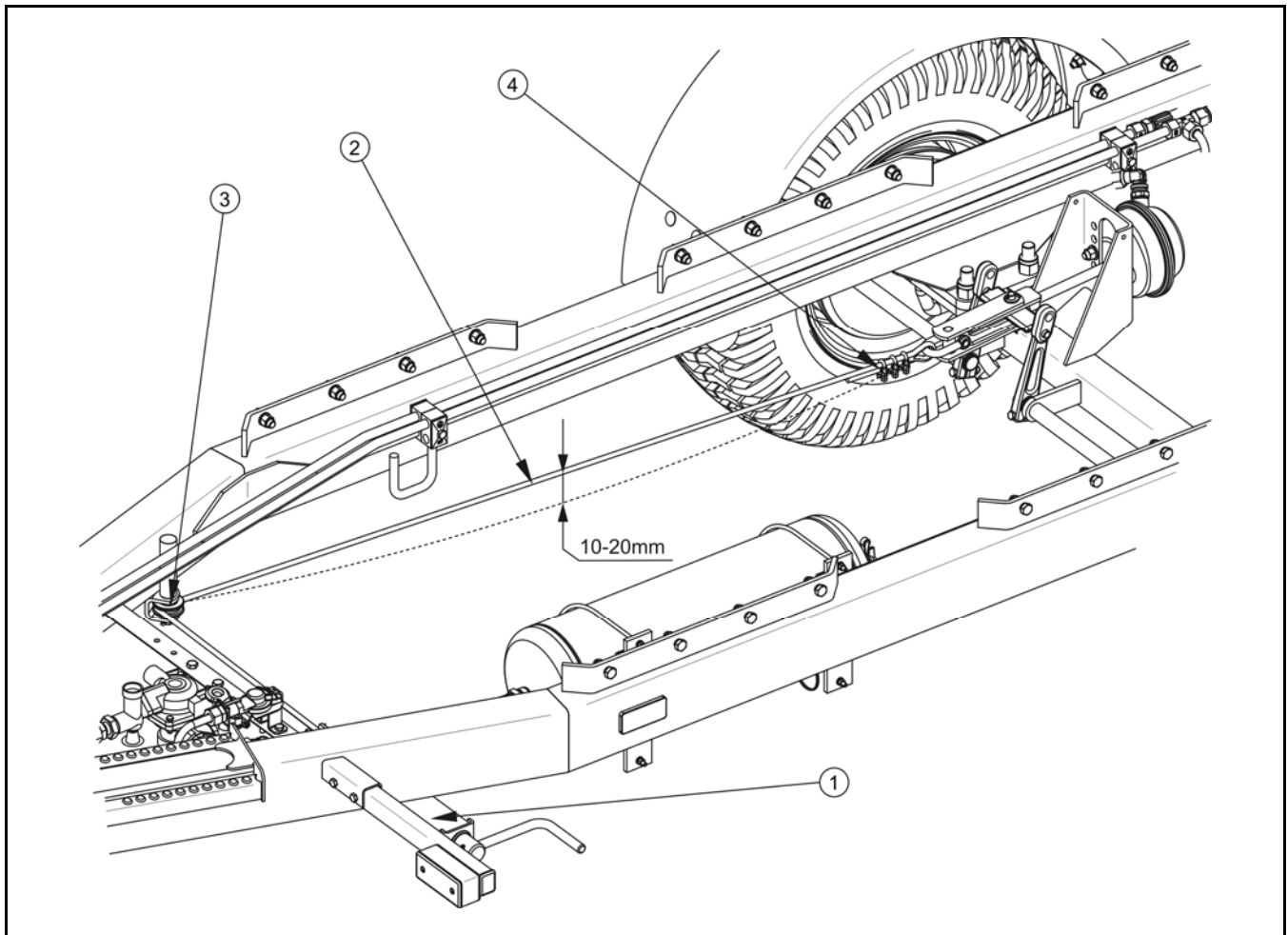


FIG. 5.4A **Parking brake adjustment**

(1) brake mechanism, (2) steel cable, (3) guide roller, (4) brake cable clamps



The parking brake system should be inspected annually and in case of need should be adjusted.

Difference in braking force of left and right wheel may not be greater than 30%, considering that 100% constitutes greater force.

TAB. 5.4 PARKING BRAKE BRAKING FORCE

PARAMETER	UNIT	VALUE
Parking brake braking force	kN	6.5



ATTENTION!

Parking brake braking force, is the braking force of all sand spreader wheels.

5.5 PNEUMATIC SYSTEM OPERATION

As a part of sand spreader maintenance, conduct inspection of pneumatic system leaktightness, paying particular attention to all places of connection. Tightness of the system should be checked at nominal pressure in system of approximately 600 kPa (6.0 kg/cm²).

If conduits, seals or other system elements are damaged, compressed air will escape in these damaged places with a characteristic hiss. Lack of system tightness may be exposed by covering checked elements with washing fluid or other foaming preparations, which will not react aggressively with system elements. Damaged seals or conduits, causing leaks should be replaced. If the cause of the system leak is the outflow from a piston, control valve body or braking force regulator should be taken to authorised repair provider for repair or replacement of parts. Condensation collecting as water should be removed from air tank periodically. In order to do this open out drain valve (2) placed in lower part of tank - figure (5.5A). The compressed air in the tank causes the removal of water to the exterior. After release of the valve stem, the valve should automatically close and stop airflow from the tank. Annually before the winter period unscrew drain valve and clean off accumulated dirt. Replace copper seal.

Contact of pneumatic leads with oils, greases, petrol etc. may cause damage and accelerate ageing process. Bent conduits, permanently deformed, cut or worn should be replaced.

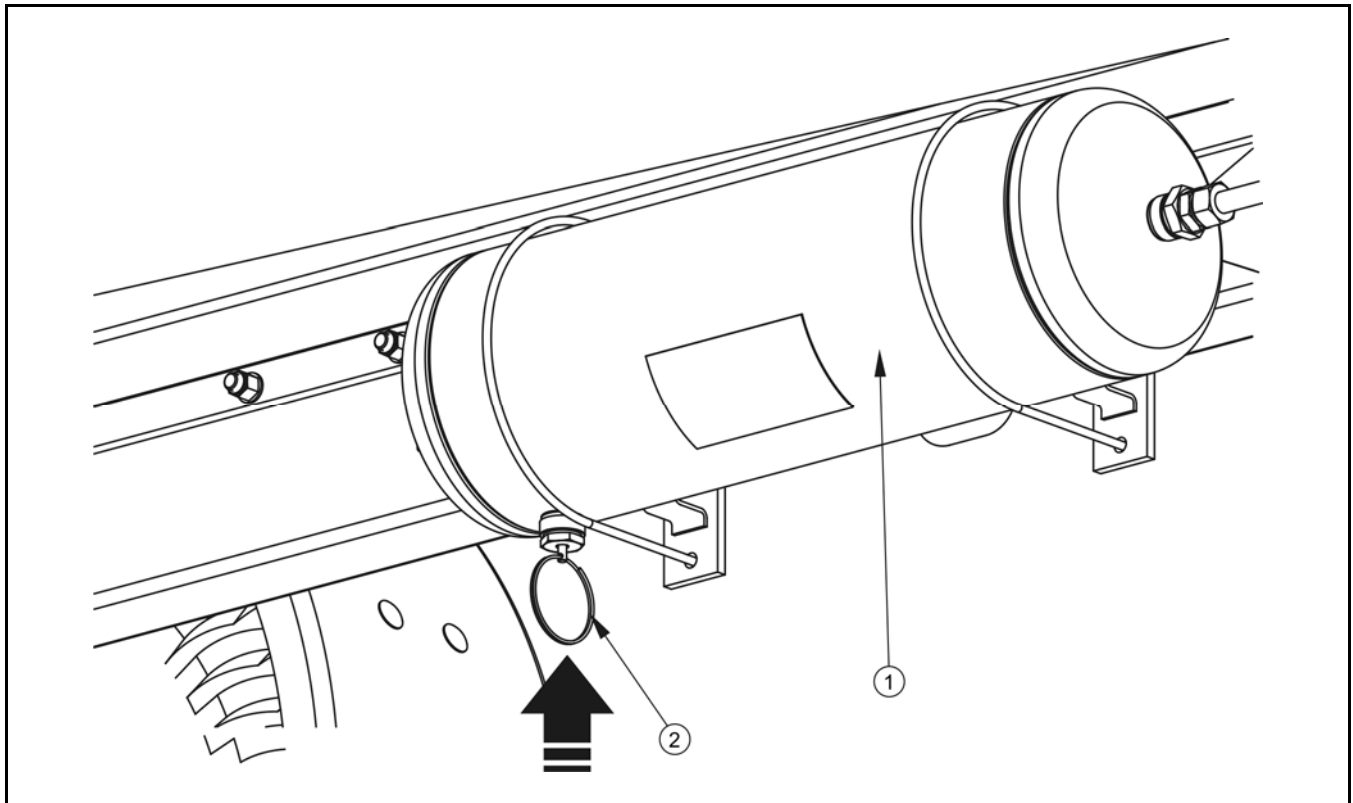



FIG. 5.5A **Air tank**

(1) air tank, (2) drain valve

	<p>Annually before the winter period unscrew and clean drain valve.</p> <p>Inspection of tightness and inspection of pneumatic braking systems in detail should be conducted at least annually and after repairs associated with this system.</p>
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Depending on sand spreader working conditions, but not less than once in three months, take out and clean air filter inserts, which are located in pneumatic system connection conduits. Inserts are used many times and are not subject to changing unless they are mechanically damaged. In order to clean insert first reduce pressure in supply conduit. Next remove securing slide (1) – figure (5.6A). Hold the filter cover (2) with the other hand. After removing slide lock, the cover is pushed off by the spring, in the filter housing. The insert and the filter body should be carefully washed out and blown through with compressed air. Assembly should be done in reverse order.



The insert and the air filter body should be cleaned at least every 3 months of sand spreader use.

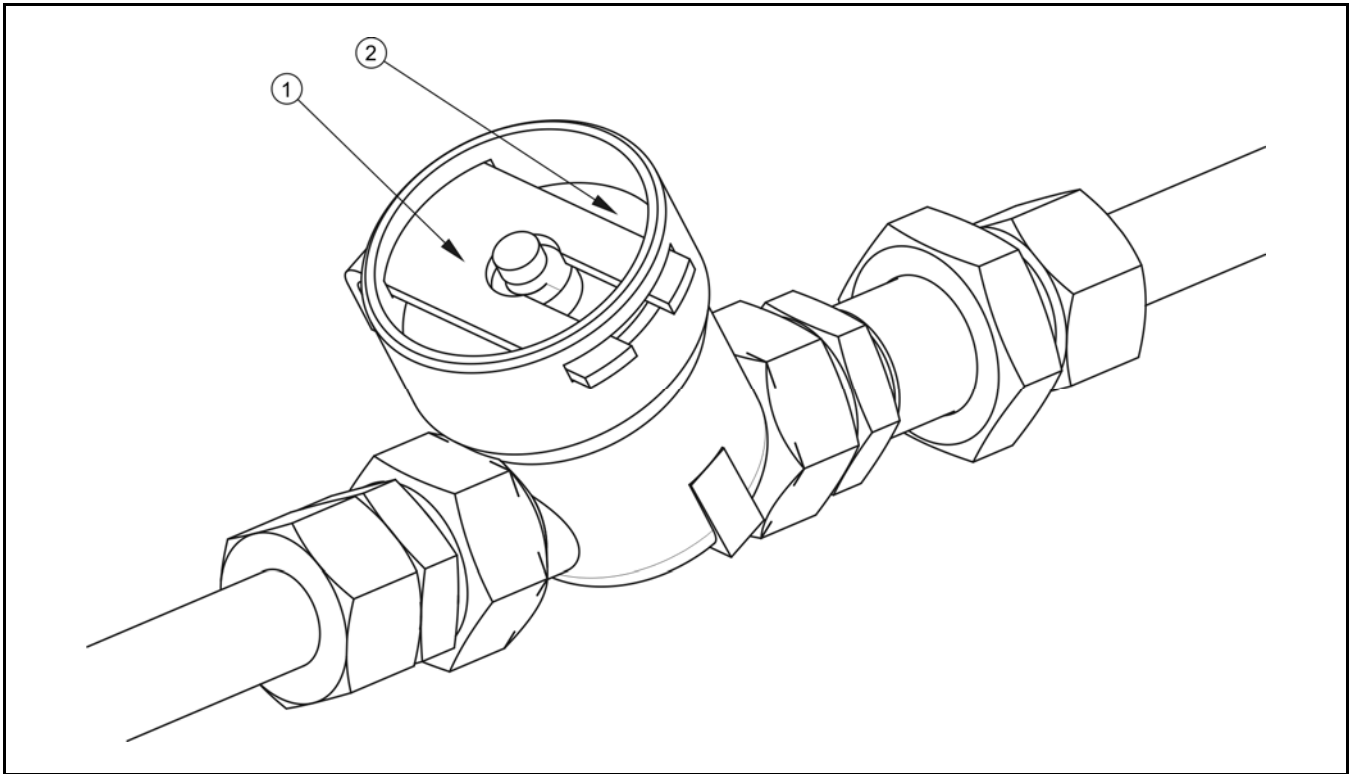


FIG. 5.6A **Air filter**

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



DANGER

Before proceeding to dismantle filter, reduce pressure in supply conduit.

While disengaging filter slide gate, hold cover with other hand. Stand away from filter cover vertical direction.

Pneumatic system connection must be inspected on regularly during use of sand spreader and if necessary cleaned of all contamination. Particular attention should be paid to the technical condition of security covers and rubber seals. If these elements are damaged they should be replaced. It is recommended that seals are preserved with silicon preparation, specified for rubber elements every six months. Contact of the seals with fuel, lubricants

being petroleum derivatives, paints etc., causes rapid ageing of the material from which they are made.



Connection should be inspected every time before connecting sand spreader to tractor. During connection make sure that tractor socket is not damaged and is maintained in the due cleanliness.

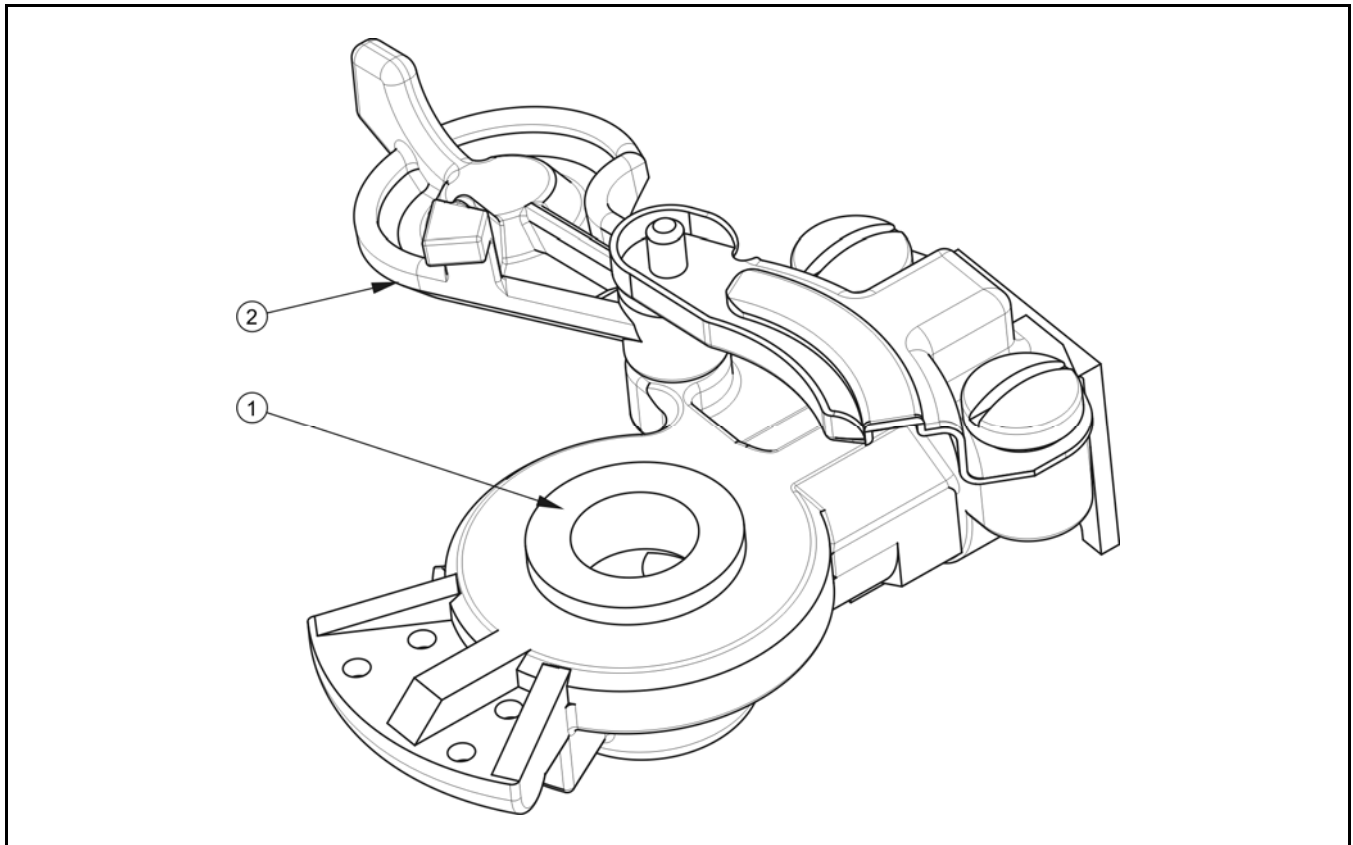


FIG. 5.7A Conduit connections

(1) rubber seal, (2) security cover

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

- cleaning or changing air filter,
- cleaning and maintaining conduit connections,
- draining water from a tank, cleaning drain valve,
- checking air tightness of pneumatic system.

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

5.6 HYDRAULIC SYSTEM OPERATION

Always adhere to the principle that the oil in the sand spreader hydraulic system and in the tractor hydraulic system are of the same type. Application of different types of oil is not permitted. In a new sand spreader, the hydraulic system is filled with HL32 hydraulic oil.

TAB. 5.5 HL32 HYDRAULIC OIL CHARACTERISTICS

ITEM	NAME	VALUE
1	ISO 3448VG viscosity classification	32
2	Kinematic viscosity at 40°C	28.8 – 35.2 mm ² /s
3	ISO 6743/99 quality classification	HL
4	DIN 51502 quality classification	HL
5	Flash-point	above 210° C

The sand spreader's hydraulic system should be completely tight sealed. Checking tightness of the hydraulic system involves connecting the machine with the tractor and engaging the drive of conveyor belt and adapter discs. In the event of confirmation of an oil leak on hydraulic conduit connections, tighten connections, and if this does not remedy faults then change conduit or connection elements. If oil leak occurs beyond connection, the leaking conduit system should be changed. Change of sub assemblies is equally required in each instance of mechanical damage. In the event of confirmation of damage of hydraulic motors they must be replaced or repaired.

Contact of pneumatic leads with oils, greases, petrol etc. may cause damage and accelerate ageing process. Bent conduits, permanently deformed, cut or worn should be replaced. In the event of intensive use of the hydraulic system, the hydraulic conduits should be replaced every 4 years regardless of their technical condition.

ATTENTION!



Sand spreader with a leaking hydraulic system must NOT be used.

The condition of hydraulic systems should be inspected regularly while using the sand spreader.

The hydraulic system is under high pressure when operating.

Regularly check the technical condition of the connections and the hydraulic conduits.

Use the hydraulic oil recommended by the Manufacturer. Never mix two types of oil.

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

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



Hydraulic conduits should be replaced after 4 years of sand spreader use.

Detailed tightness and technical condition inspection of hydraulic system should be made at least annually.

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

- checking tightness of hydraulic connections,
- checking technical condition of conduits,

Work connected with the repair, change or regeneration of system elements (hydraulic motors, conduit connections, check valve, flow regulator, hydraulic conduits etc.) should be entrusted to specialist establishments, having the appropriate technology and qualifications for this type of work.

5.7 ADJUSTMENT OF CONVEYOR BELT TENSION

Adjustment of conveyor belt tension should be performed if decrease in spreading mechanism efficiency is noticeable when flow regulator setting is unchanged. In such cases the conveyor belt slips considerably while moving over driving roller of the drive mechanism. Consequently, the conveyor belt wears faster and may be completely broken.

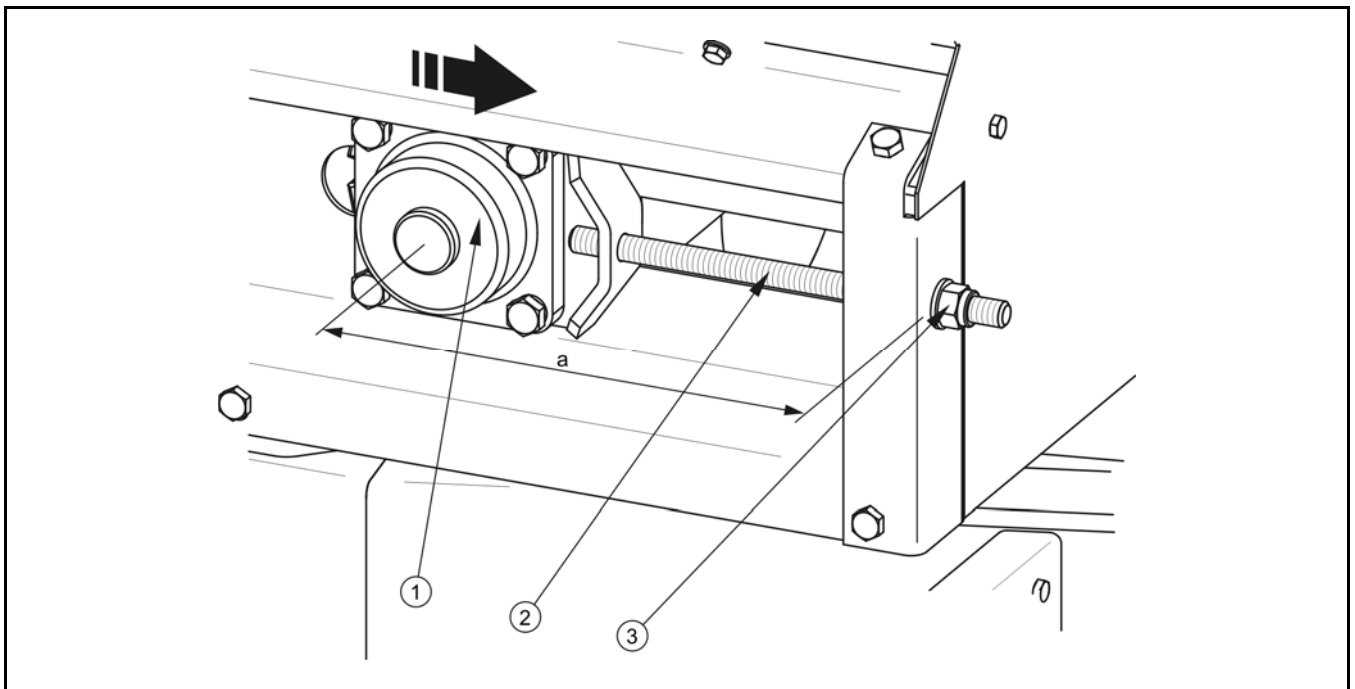


FIG. 5.8A Adjustment of conveyor belt tension

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

The conveyor belt should be tensioned symmetrically in such a manner as to ensure that difference between distances (a) measured from the roller axis to the front part of bracket, on both sides of the sand spreader, is not larger than 5 mm. Nuts (3) of the tightening mechanism are located on the front wall of the load box. When the nut is turned clockwise, bearing assembly (1) moves towards the front wall and tightens the conveyor belt. The length of protruding end of tensioning bolt (2) should be the same on the left and right side of the sand spreader. Equal lengths of protruding bolt ends indicate that the conveyor belt is tightened symmetrically.

Conveyor belt tightening should be performed only when the load box is empty. Adjustment is recommended to be carried out in the same conditions (the same ambient temperature).

5.8 ADJUSTMENT OF SPREADING DISC BLADES

Setting of rake angle of the adapter disc blades and adjustment of flow regulator setting have influence on spread width. Blades are factory set in position (A).

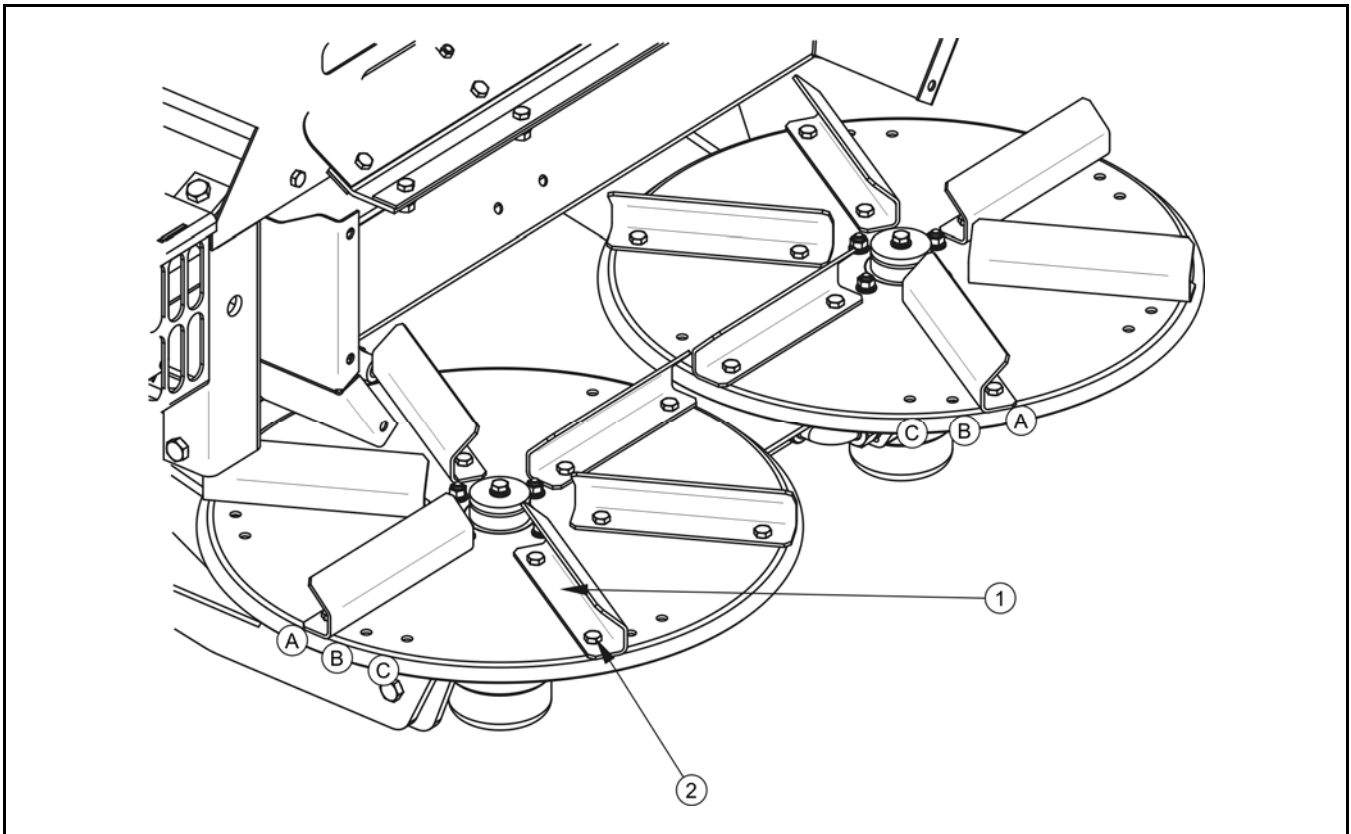


FIG. 5.9A Changing rake angle of blades

(1) blade, (2) securing bolts, (A), (B), (C) allowable working positions of blades

In order to change rake angle:

- loosen nuts located closer to the centre of disc,
- undo the nuts and remove bolts from the external side of the disc,
- set blades to selected position (A), (B) or (C),
- install bolts and nuts, tighten all connections,
- repeat the process for the second disc.

Blades in the left disc and right disc do not have to be set symmetrically. Variable spread width is achieved in this way. For example, if blades in the right disc are set to position (C) and blades in the left disc to position (A), the spread width on the right side of the sand spreader will be larger.



ATTENTION!

After change of blades position, check tightening of bolt connections after 8 hours of sand spreader operation.

5.9 STORAGE

After finishing work, sand spreader should be thoroughly cleaned and washed with water jet. In the event of damage to the paint coat, clean rust and dust from damaged area, degrease and then paint with undercoat and after it is dry paint with surface coat paint retaining colour uniformity and even thickness of protective coating. Until the time of touch-up painting, the damaged place may be covered with a thin layer of grease or anticorrosion preparation. Sand spreader should be kept in closed or roofed building at temperature above 0°C.

If the sand spreader will not be used for a long time, it is essential to protect it from adverse weather, especially rust and accelerated tyre deterioration. During this time trailer must be unloaded.

Sand spreader should be very carefully washed and dried. While washing do not direct a strong water or steam jet at information and warning decals, bearings of the feeding table rollers and bearings of the tightening mechanism, electrical equipment elements, and hydraulic and pneumatic systems. Nozzle of pressure or steam washer should be kept at a distance of not less than 30 cm from cleaned surface. Corroded areas should be protected as described above.

Lubricate the sand spreader according to the instructions provided. In the event of prolonged work stoppage, it is essential to lubricate all elements regardless of the period of the last lubrication process.

Tyres should undergo conservation maintenance at least twice a year using the appropriate preparations designed for this purpose. Wheels and tyres should be previously carefully washed and dried. During longer storage of unused sand spreader it is recommended that every 2 to 3 weeks the machine may be moved a bit so that the place of contact of tyres with

ground is changed. The tyres will not be deformed and maintain proper geometry. Also tyre pressure should be inspected from time to time, and if necessary pressure should be increased to appropriate value.

5.10 LUBRICATION

Sand spreader lubrication shall be performed where indicated on figure (5.10A) as stipulated in table (5.6).

TAB. 5.6 LUBRICATION POINTS

ITEM	NAME	NUMBER OF LUBRICATION POINTS	TYPE OF GREASE	LUBRICATION FREQUENCY
1	Handbrake crank mechanism	1	PERMANENT	3 months
2	Wheel bearings	2	PERMANENT	24 months
3	Pin of cable roller of parking brake	1	PERMANENT	6 months
4	Socket of equalising bar and expander arms	2	PERMANENT	3 months
5	Support screw	1	PERMANENT	6 months
6	Reducer	1	OIL	24 months
7	Rotating drawbar eye	1	PERMANENT	3 months

IMPORTANT! Marking description in Item column in table (5.6) conforms with numbering shown in figure (5.10A).

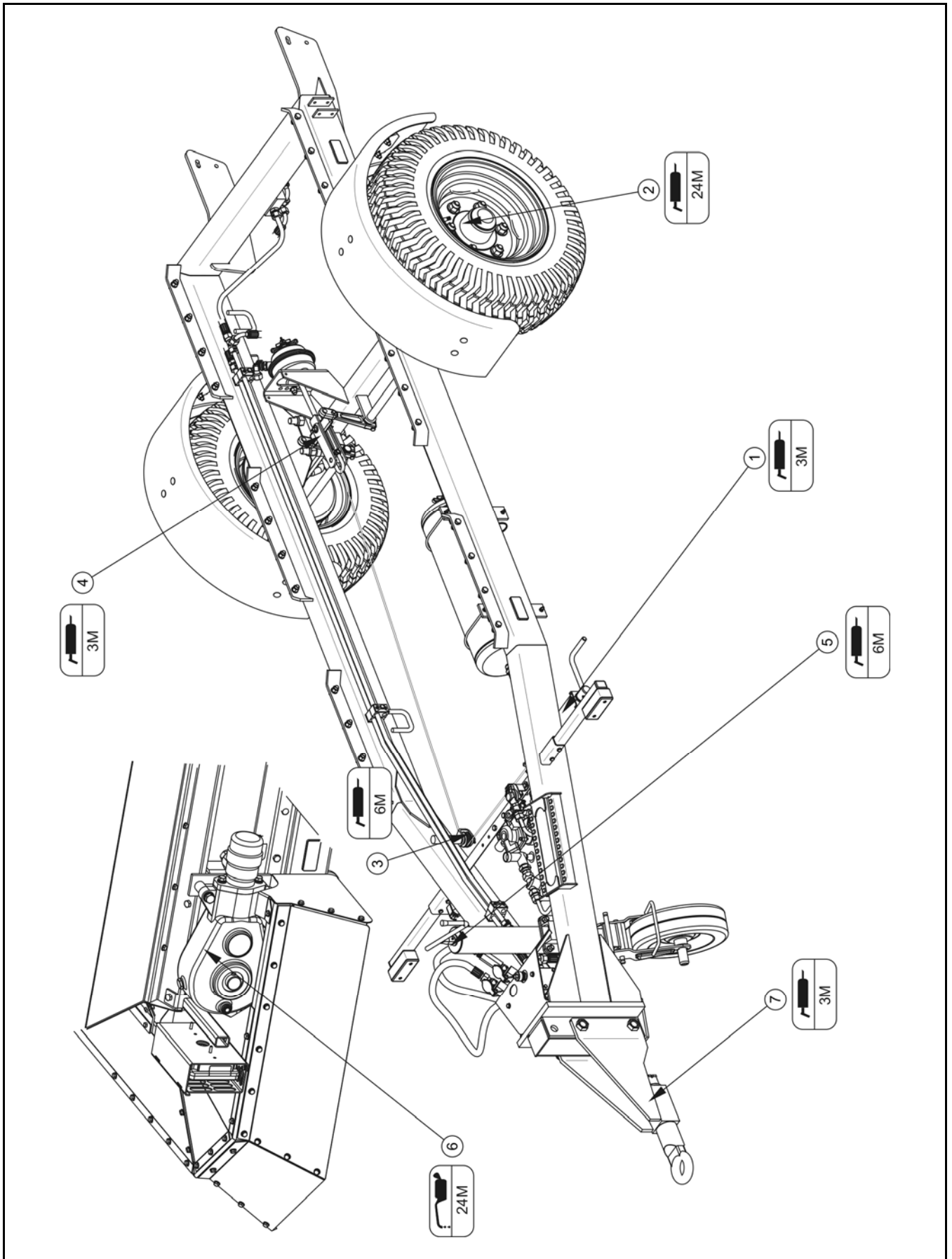


FIG. 5.10A **Lubrication points on the sand spreader**

TAB. 5.7 GEAR OIL SPECIFICATION

ITEM	NAME	VALUE
1	SAE viscosity classification	80W/90
2	Kinematic viscosity at 100 ⁰ C	14.0 – 20.0 mm ² /s
3	Viscosity index, min	95
4	API quality class	GL4

Sand spreader lubrication should be performed with the aid of a manually or foot operated grease gun, filled with generally available permanent grease. Before lubricating, insofar as is possible remove old grease and other contamination. After lubricating the machine according to instructions, wipe off excess grease or oil.

Replace oil in reduction gear every 24 months or add in case of oil carry-over. Oil level should be checked regularly, because in case of larger oil loss, repair of reduction gear seals may be necessary. Before fresh oil is added, read the instructions of Manufacturer and make sure that rinsing of reducer is not required. Supplement oil to required level (oil level indicator is located under inspection glass on the reduction gear body).



When using the sand spreader the user is obliged to observe lubrication instructions according to attached schedule. Excess lubrication substance causes depositing additional contaminants in places requiring lubrication, therefore it is essential to keep individual machine elements clean.

5.11 TIGHTENING TORQUE FOR NUT AND BOLT CONNECTIONS

Unless other tightening parameters are given, during maintenance repair work apply appropriate torque to tightening nut and bolt connections. Recommended tightening torque of most frequently applied nut and bolt connections are given in table (5.8). Given values apply to non-lubricated steel bolts.

TAB. 5.8 TIGHTENING TORQUE FOR NUT AND BOLT CONNECTIONS

THREAD (d) [mm]	5.8	8.8	10.9
	M_D [Nm]		
M6	8	10	15
M8	18	25	36
M10	37	49	72
M12	64	85	125
M14	100	135	200
M16	160	210	310
M20	300	425	610
M24	530	730	1,050
M27	820	1,150	1,650
M30	1,050	1,450	2,100

(M_D) – tightening torque, (d) thread diameter

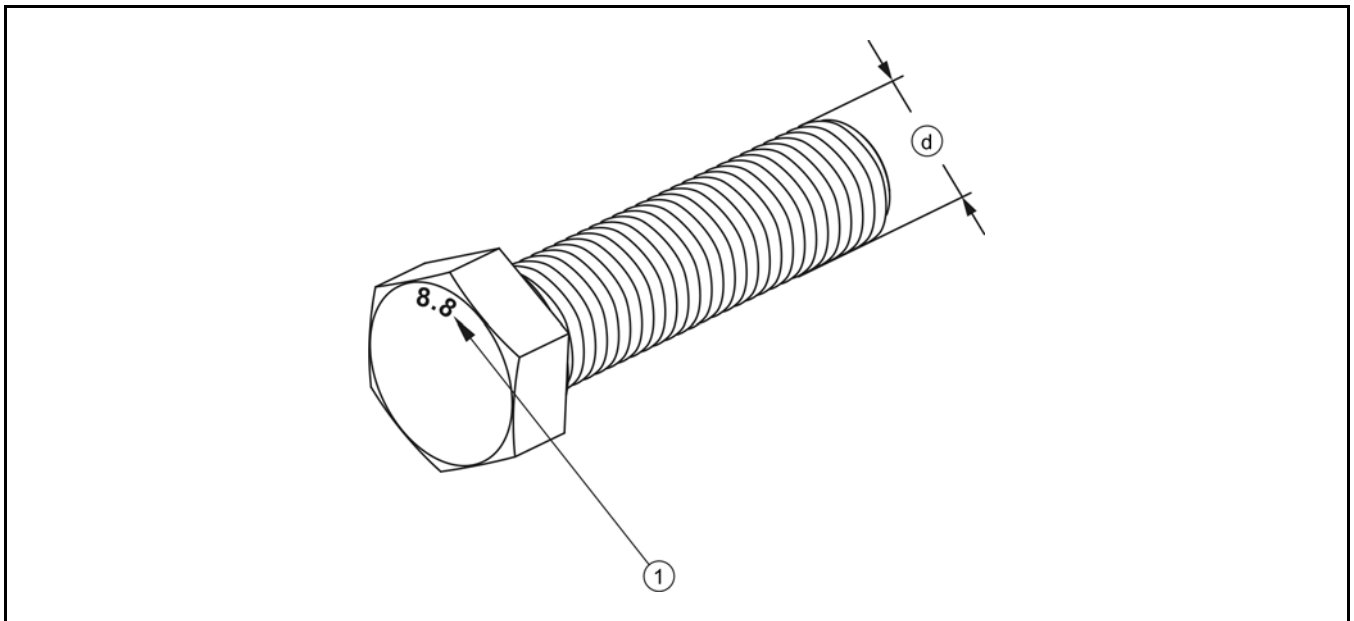


FIG. 5.11A Bolt with metric thread

(1) bolt strength class, (d) thread diameter

5.12 TROUBLESHOOTING

TAB. 5.9 FAULTS AND MEANS OF REMEDYING THEM

FAULT	CAUSE	REMEDY
Problem with moving off	Brake system pneumatic conduit not connected	Connect brake conduit.
	Damaged pneumatic system connection conduits	Replace
	Leaking connections	Tighten, replace washers or seal set
	Parking brake applied	Release parking brake
	Damage control valve or brake force regulator	Check valve, check brake force regulator, replace in the event of damage to whichever elements
Noise in axle hubs	Excessive slack in bearings	Check slack and regulate if needed
	Damaged bearing	Change bearing together with sealing ring
Excessive heating of axle hubs	Incorrectly adjusted main brake	Regulate setting of expander arms
	Incorrectly adjusted parking brake	Adjust tension of parking brake cables
	Worn brake linings	Change brake shoes
Conveyor belt does not move	Flow regulator setting is 0	Increase setting
	Conveyor belt is too slack	Tighten the belt, possibly replace
	Incorrectly connected hydraulic system conduits	Check and possibly correct
	Damaged quick couplers of hydraulic system conduits	Replace quick couplers
	Damaged check valve in hydraulic system	Check and possibly replace

FAULT	CAUSE	REMEDY
	Damaged flow regulator	Check and possibly replace

5.13 LIST OF BULBS

TAB. 5.10 LIST OF BULBS

LAMP	BULB
License plate light LT - 120	C5W-SV8.5
Rear lamp assembly: left W21L, right W21P	indicator light: P21W brake light: P21W parking light: R10W

NOTES

A series of horizontal dotted lines for writing notes.



