CynkoMet Sp. z o.o.
ul. Fabryczna 7W
16-020 Czarna Białostocka
phone (85) 710 24 56

MANURE SPREADER

N-221/3, N-221/3 EU
N-221/3-1, N-221/3-1 EU
N-221/3-3, N-221/3-3 EU
N-221/3-4, N-221/3-4 EU
N-221/4, N-221/4 EU
N-221/4-3, N-221/4-3 EU
N-221/4-4, N-221/4-4 EU

INSTRUCTIONS FOR USE AND OPERATION

Identification of the machine

Symbol/Type:.....
Version: .....
Variant: .....
VIN: .....

The factory number is punched on the rating plate and on the front beam of the spreader's top frame The rating plate is riveted to the front beam of the top frame.

When buying the machine, check the conformity of the serial numbers stamped on the spreader with the serial number written in the warranty card, in the sales documents and in the instruction manual.

NOTE!

The manufacturer reserves the right to introduce, in the manufactured machines, structural alterations facilitating servicing and improving the quality of their work. The information on significant design changes are communicated to the user by means of enclosed information (annexes).

Comments and observations about the design and operation of the machine should be sent to the manufacturer. This information will allow objective evaluation of the machine, and serve as guidelines in their further modernization.

 NOTE!	NOTE! Before the operation, the user should be familiar with this manual and follow all recommendations. This will ensure safe maintenance and trouble-free operation of the machine.

According to the Regulation of the Minister of Infrastructure of 31 December 2002 on the technical conditions of vehicles and obligatory equipment, the Manufacturer announces that the agricultural tractors and low-speed vehicles, and trailers designed to connect with these vehicles should be marked with a distinctive plate (Section 3.6, fig. 4). The plates are not required when the vehicle is included in the kit and is the last vehicle in the set.

In accordance with the above Regulation, the Manufacturer has equipped the spreader with a plate holder.

The N-221 series spreader complies with the rules of moving on public roads by machines with a speed of up to 30km/h (Act on Road Traffic Law of 20 June 1997). The manufacturer also claims that the supplied spreader cannot be moved faster on public roads than the above-indicated speed.

If the information contained in the manual will prove to be insufficient or not fully understandable, it is advisable to seek help at the sales point in which the machine was purchased or go directly to the Manufacturer.

Manufacturer's Address:

CynkoMet Sp. z o.o.
ul. Fabryczna 7W
16-020 Czarna Białostocka
phone . (85) 710 24 56

INSTRUCTIONS FOR USE AND SERVICE CONSTITUTES BASIC EQUIPMENT OF THE MACHINE!

The machine is designed in accordance with the applicable standards, documents and legal regulations currently in force.

DETERMINATION OF DIRECTIONS IN THE MANUAL

Left side - side to the left hand of the observer facing in the forward direction of travel of the machine.

Right side - the right-hand side of the observer facing in the direction of travel of the machine forward.

Rear - behind the back of the observer facing in the direction of forward travel of the machine.

Front - in front of the observer facing in the direction of forward travel of the machine.

CynkoMet sp z o.o.
16-020 Czarna Białostocka ul. Fabryczna 7W Poland

acting as the manufacturer, declares with full responsibility that the machine:

MANURE SPREADER

Type / Model:_____

Year of production:_____

Serial number: _____

BRIEF DESCRIPTION OF THE MACHINE AND ITS FUNCTIONS:

The spreader is a universal machine intended for spreading manure of any kind, lime, peat and compost. After mounting extensions and the replacement of the adapter with a rear wall it can be used as a volumetric dump trailer. The spreader consists of a box, drawbar, interior wall and adapter.

TO WHICH THIS DECLARATION RELATES, COMPLIES WITH THE REQUIREMENTS OF:

– Directive 2006/42 / EC of the European Parliament and the Council of 17 May 2006 on machinery, and amending Directive 95/16 / EC (OJ L157 of 09.06.2006, pages 24-86)
– Regulations of the Minister of Economy of 21 October 2008. On essential requirements for machines (Journal of Laws of 2008, no. 199, item 1228)
– Journal of Laws 2015 item 305 announcement of the Minister of Infrastructure and Development of 30 January 2015 on the uniform text of the Regulation of the Minister of Infrastructure on technical conditions of vehicles and the range of their necessary equipment.

THE FOLLOWING HARMONIZED STANDARDS HAVE BEEN USED FOR CONFORMITY ASSESSMENT:

– PN-EN ISO 4254-1 Farm Equipment - Safety - Part 1: General requirements of 2014.
– PN- EN 690 Agricultural machinery - Manure spreaders - Safety
– PN-ISO 11684:1998P Tractors, machinery for agriculture and forestry, powered lawn and garden equipment – Safety signs and hazard pictorials – General principles of 1998.
– PN-EN ISO 12100-1:2012 Safety of machinery - General principles for design-Risk Assessment and reducing the risk of 2012.
– PN-EN ISO 13857:2010 Safety of machinery – Safety distances to prevent hazard zones being reached by upper and lower limbs, dated 2010

Person authorized to prepare technical documentation:
Manager of the Designing and Process Engineering Department
Address: Fabryczna 7W, 16-020 Czarna Białostocka , Poland

THE DECLARATION LOSES ITS VALIDITY IF THE MACHINE IS MODIFIED OR REBUILT WITHOUT THE MANUFACTURER'S CONSENT.

Czarna Białostocka Place and date of declaration	Identity and signature of the person authorized to make declarations

Table of contents

1. Introduction

This manual describes the basic principles of safe use and operation of manure spreader.

 NOTE!	NOTE! Before using the spreader, you should carefully read the content of the user's manual. Before each running of the spreader, it must be checked in terms of operational safety.

If the information contained herein will prove to be not fully understood, seek help from the manufacturer of the machine or the sales point where it was purchased.

Particularly important information and recommendations, the observance of which is absolutely necessary in the text are highlighted in bold or preceded by the word **"CAUTION!".**

Information, descriptions of danger and precautions, as well as commands and orders "related to the safety of use are highlighted in the user's manual with a sign  and furthermore mentioned in the chapter **"SAFETY OF USE"**.

 NOTE!	NOTE! The operating instructions must absolutely be passed at the moment of delivering the machine to another user, allowing him to get acquainted with its content. It is recommended that the transfer of the instruction is done against a confirmation.

1.1 Identification of the machine

The manure spreader is marked with the use of a nameplate (1) and a serial number (2). The serial number is located on the front beam of the lower frame, and the nameplate is located on the front beam of the upper frame - figure *1*.

When buying the spreader, check the compatibility of the serial numbers on the machine with the number written in *the WARRANTY CARD* , in the sales documents and in the *USER'S MANUAL*.

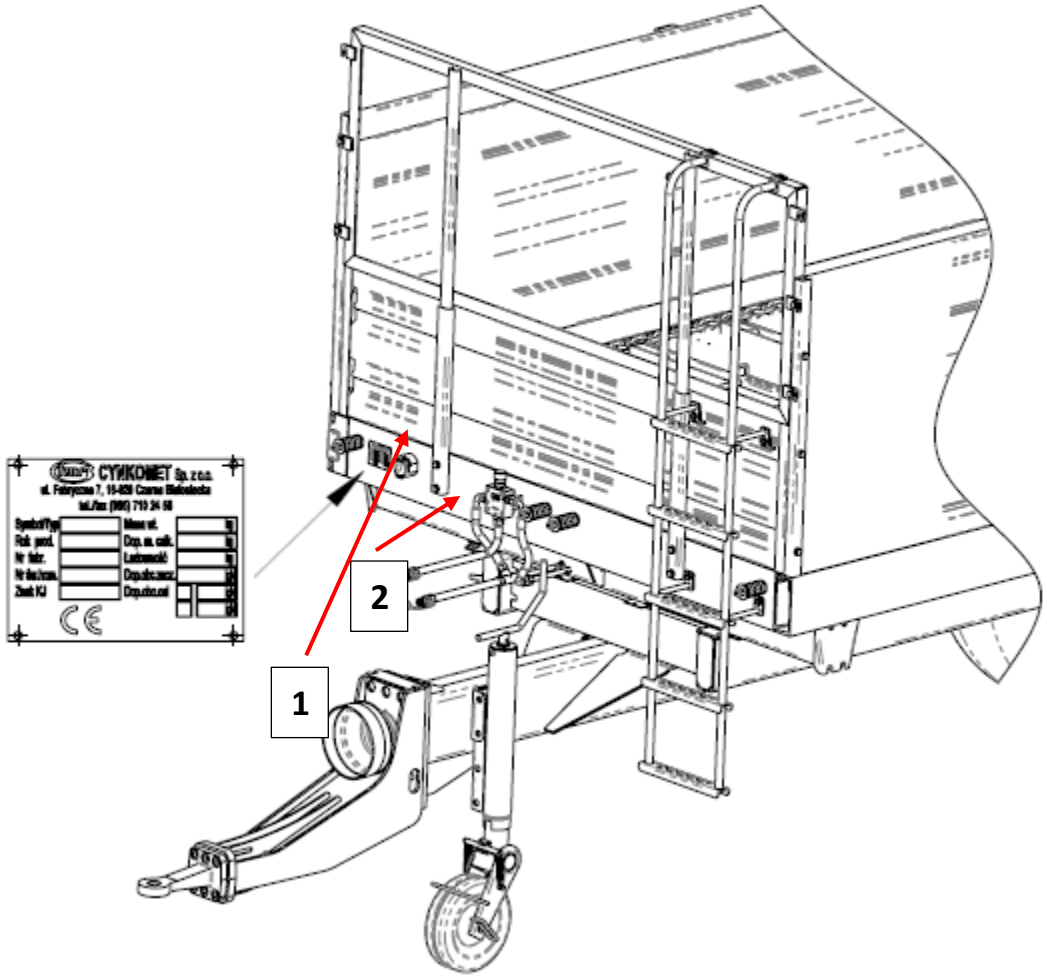


Figure 1. Location of the nameplate and issue of the serial number (Version PL)

1 - nameplate, 2 - serial number

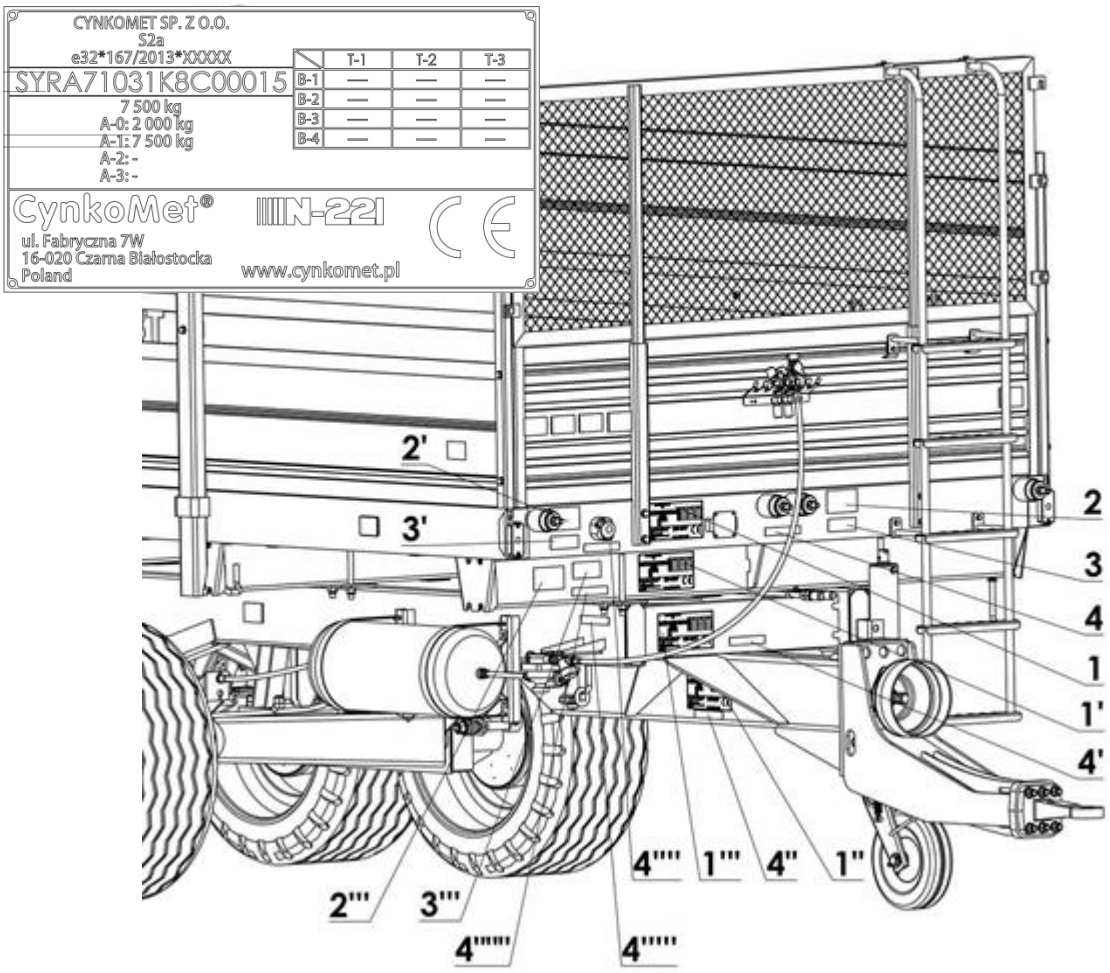


Figure 2. Potential location of the rating plate and issue of the serial number (EU homologation)
1 - rating plate, 2 - serial number, 3 - rating plate of brake system,

NOTE!	NOTE! It is forbidden to use the spreader when the nameplate is illegible or has been removed from the machine.

2. Purpose of the spreader

The spreader is a universal agricultural machine designed for spreading manure of any kind, lime, peat and compost, after mounting extensions (the mounting method is further in the manual - Section 4,2,7 Extensions, Conveyor) and replacing the rear wall adapter it can be used as a volumetric dump trailer. The spring suspension on 2 axles (N-221/3-4, N-221-3-3, N-221/4-3) or wheel set on rocker (N-221/3, N-221/4), or the suspension on 1 axle (N-221/3-1, N-221/4-4) ensures optimal driving properties. The adapter with 4 vertical shafts (N-221/3, N-221/3-4, N-221/3-1, N-

221/3-3) or 2 horizontal shafts (N-221/4, N-221/4-4, N-221/4-3) ensures precise fertilizer application. The machine is also equipped with a hydraulic wall, which allows you to adjust the dosage of the material located on the loading box. The spreader is comprised of a support frame and a floor with a 4mm thickness, as well as walls that are 0.8 or 1 meter high (depending on the model), all constructed from 2mm thick sheet metal. Spreaders with a 4-drum vertical adapter can be fitted with a deflector (also known as a spread limiter), which allows for a wide array of potential work settings, ensuring precise fertilizer application and the deflector itself serves as a guard for the adapters.

The brake system and lighting and signaling system meet the requirements arising from the "Regulation of the Minister of Infrastructure of 31 December 2002 on technical conditions of vehicles and the range of their necessary equipment".

Failure to follow the transport and loading of goods specifications described by the Manufacturer and the rules on road transport in force in the country in which the spreader is used, will void the warranty service and is regarded as use of the machine incompatibly with its purpose.

The spreader is designed for use with agricultural tractors that have an external hydraulic system and a lower towing hitch with a minimum capacity of 2000 kg.

The spreader IS NOT SUITABLE and cannot be used to transport people and / or animals and other materials identified in the following pages.

 NOTE!	NOTE! The spreader must not be incompatibly with its purpose, and in particular: • for transporting people and animals, • for transporting bulk hazardous toxic materials when there is a possibility of causing environmental contamination, • to transport machinery and equipment, • with removed security guards, and use without its covers • spreading manure, peat, lime, where in those materials there are stones, pieces of wood or other solid materials that can damage the adapter and threaten the safety of users and bystanders • to carry stones, gravel and other building materials.

Use in accordance with the product's destination also includes all activities related to correct and safe operation and maintenance of the machine. Therefore, the user is obliged to:

- read the content of the USER'S MANUAL of the spreader and the WARRANTY CARD and adhere to the recommendations contained in these elaborations,
- comply with the established maintenance plans and regulations,
- comply with general safety regulations while working
- Prevent accidents,
- comply with the road traffic regulations and transport regulations in force in the country in which the spreader is exploited,
- read the instructions for operating the agricultural tractor and comply with its recommendations, in combination with the spreader.

The spreader can be handled and operated only by persons of full age who:

- Are familiar with ALL THE CONTENT of the spreader's manual,
- have the required authorization to drive and are familiar with the road traffic regulations and transport regulations.

 NOTE!	NOTE! The operation and exploitation of the machine not in accordance with the Instruction Manual releases the Manufacturer from liability for the consequences resulting from non-compliance with the provisions contained therein. At the same time, it causes a loss of warranty.

 NOTE!	NOTE! The manufacturer is not responsible for changes made by the user in the design of the spreader, and such changes will void the warranty.

3. Safety in use

3.1 General safety and accident prevention regulations

- Before using the spreader, you should carefully read the contents of the manual. During operation, observe all instructions contained in the manual.
- Before each use, check the spreader for operational safety (completeness of all screens, tightness of all the screws (table..) if there are no cracks on the structure or visible damage, state of the tension of the chain "if it is not too loose")
- The spreader should be combined with tractors recommended by the manufacturer accordingly to table 2.
- Pay attention to the warnings in places of crushing and shearing when starting the machine and all the pictograms placed on the spreader.

- During transport, check the condition of preheat of the tires, brake drums and wheel bearings. In the case of detecting an excessively heating element, stop the machine from operating until determining the cause and rectifying the fault.

 NOTE!	NOTE! Before driving with the spreader in a place where there are flammable materials you should imperatively check the status of the heating elements of the spreader, especially the brake drums and driving wheel bearings, due to the risk of fire.

- The speed of driving must always be adapted to the environmental conditions. Caution should be exercised
- When switching and disconnecting the machine from the tractor, you must be careful.
- Exceeding the permissible load can cause accidents on the road and damage to the machine.
- When cornering, you should take into account the inertia of the machine.
- Before you start, check if the spreader has any loose parts.
- Within additional elements which are force operated (e.g. by hand), there are places of crushing and shearing.

 NOTE!	NOTE! Malfunctioning of the spreader should be removed only during absolute motionlessness of the machine and disconnection of the PTO from the tractor.

-
- No one can stay between the tractor and the spreader before the vehicle is not protected against self-running off through the parking brake (hand brake) and wedges under the wheels.
- The permissible transport speed 30 km / h cannot be exceeded.
- It is forbidden to transport people or animals on the spreader.
- It is forbidden to enter into the loading platform during operation and when coupling the tractor with the spreader.
- The machine is designed to work on slopes up to 8 °.
- Disconnecting the spreader from the tractor is not allowed with the engine running and key not removed.
- Modifications can be made only with the permission of the manufacturer. The basic condition for safety are original spare parts and components. Using other parts may result in exclusion of liability of the manufacturer for resulting consequences.
- Careless operation and use of the spreader can injure the operator or third parties and damage the tractor-spreader set.
- It is forbidden to use the machine by persons not qualified to drive agricultural tractors, including under aged persons and persons under the influence of alcohol.
- It is forbidden to use the spreader in non-compliance to its purposes. The staff operating the machine should strictly observe basic safety rules
- Prior to each spreader's use, check its technical condition, especially the condition of the coupling system, drive

system, brakes and signaling lights.

- The machine is marked with information and warning inscriptions in the form of stickers as specified in Table 1. The user is obliged to constantly take care of the readability of signs and warning symbols on the machine. In the event of damage or destruction replace them with new ones.
- Labels with inscriptions and symbols are available from the manufacturer.

3.2 Attaching and detaching the machine to the tractor

- Before attaching the spreader, make sure that the tractor and spreader are technically efficient.
- Remove the chain protecting against unauthorized use from the eye of the drawbar (fig. 3) (applies to EU homologation).
- When connecting the spreader, use only the intended trailer hitch in accordance with the instruction manual of the tractor. After completion of the machine coupling, check the security of the hitch. Read the whole manual for the tractor's use If the tractor is equipped with an automatic hitch, make sure the coupling operation has been completed correctly.
- Be very careful when you connect the machine.
- During coupling, nobody is allowed to be between the spreader and the tractor; it is imperative to use the adjustable drawbar support.
- Coupling and uncoupling of the spreader may only take place when the machine is immobilized with the parking brake.
- Before uncoupling the machine, lower the drawbar's support foot by resting it on the ground in a stable manner.
- After uncoupling the machine, mount the chain back on the drawbar's eye and secure it with a padlock (applies to EU homologation).

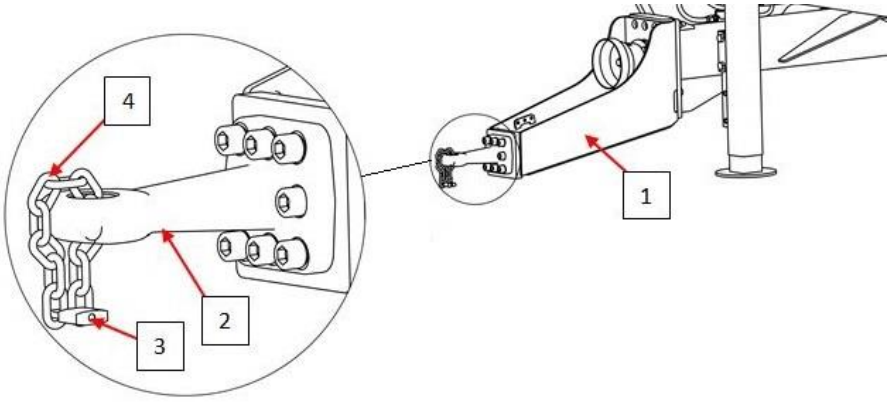


Figure 3. Securing the machine against unauthorized use (EU homologation).
1 - drawbar, 2 – drawbar eye, 3 – padlock, 4 – chain

3.3 Wheels

- When working with the wheels, secure the spreader, in case of self-launching of movement, using the parking brake and planting chocks under the wheels.
- Replacement of wheels should be carried out on a stable ground, which prevents collapse of the wheel on which the spreader stands or the lift.

- Repair work on the wheels should be carried out in accordance with the wheel point exchange and using appropriate tools.
- After each installation of a wheel, tighten the nuts after the first 10 working hours, then every 50 working hours to check their tightening.
- The air pressure is to be checked regularly. Observe the recommended air pressure.
- Dismantling the wheels can be carried out only in the case when the spreader is not loaded.
- Avoid damaged road surface, quick and variable maneuvers and high speed during turns.
- Tire valves are to be protected with caps to prevent penetration of impurities.

3.4 The pneumatic and hydraulic system

- The hydraulic and pneumatic installations during operation are under high pressure.
- Regularly check the technical condition of the connections and the hydraulic and pneumatic systems. Oil leaks and air leaks are unacceptable.
- In case of failure of the hydraulic or pneumatic installation, the spreader should be out of operation until failure removal.
- When connecting the hydraulic hoses to the tractor, pay attention that the hydraulic system of the tractor and the spreader are not under pressure. If necessary, reduce the residual pressure system.
- In the case of injury with a strong jet of hydraulic oil should, immediately consult a doctor. The hydraulic oil can penetrate the skin and cause an infection. If the oil gets into your eyes, rinse with plenty of water and consult a doctor.
- In the event of contact of oil with skin, wash the dirty spot with soap and water. Do not use organic solvents (petrol, kerosene).
- Use the hydraulic oil recommended by the Manufacturer.
- After replacing the hydraulic oil, the used oil must be disposed of Used oil or one that has lost its properties should be stored in its original containers or in substitute packages which are hydrocarbon-resistant. Replacement containers must be carefully described and stored properly.
- It is forbidden to store hydraulic oil in packaging designed for food storage.
- Rubber hydraulic couplings must be replaced every 4 years regardless of their technical condition. Hose replacement must comply with the technical requirements of the manufacturer.

3.5 Maintenance.

- Repair, maintenance and cleaning operations and the removal of function faults can be performed only by disconnecting the spreader from the tractor by disconnecting the PTO.
- During maintenance and repair jobs use appropriate tools and protective clothing.
- Oils and lubricants are to be carefully removed. The used oil and grease is to be disposed of.
- Before electrical, welding and working works on the electrical system, separate the continuous supply of power to the electrical system of the tractor.
- Use the spare parts according to the catalog of spare parts.
- Modifications can be made only with the permission of the manufacturer. The basic condition for

safety are original spare parts and components. Using other parts may result in exclusion of liability of the manufacturer for resulting consequences.

- Maintenance operations of the spreader should be carried out on a stable surface and with securing the spreader against uncontrolled rolling off (through planting chocks under the wheels, using the handbrake)
- It is forbidden to weld galvanized elements because of the harmful vapors.

3.6 The principles of movement on public roads.

- When driving on public roads you must adapt to the road traffic regulations and transport regulations in force in the country in which the spreader is operated.
- Do not exceed the speed limit.
- Adapt the speed to the prevailing road conditions and the degree of loading of the spreader.
- While driving on public roads, the spreader should be equipped with a certified or approved warning triangle. A triangular plate should be placed on the rear wall for slow-moving vehicles (1) as shown below (Fig. 4). The triangle is to be fastened to the holder on the adapter's guard.

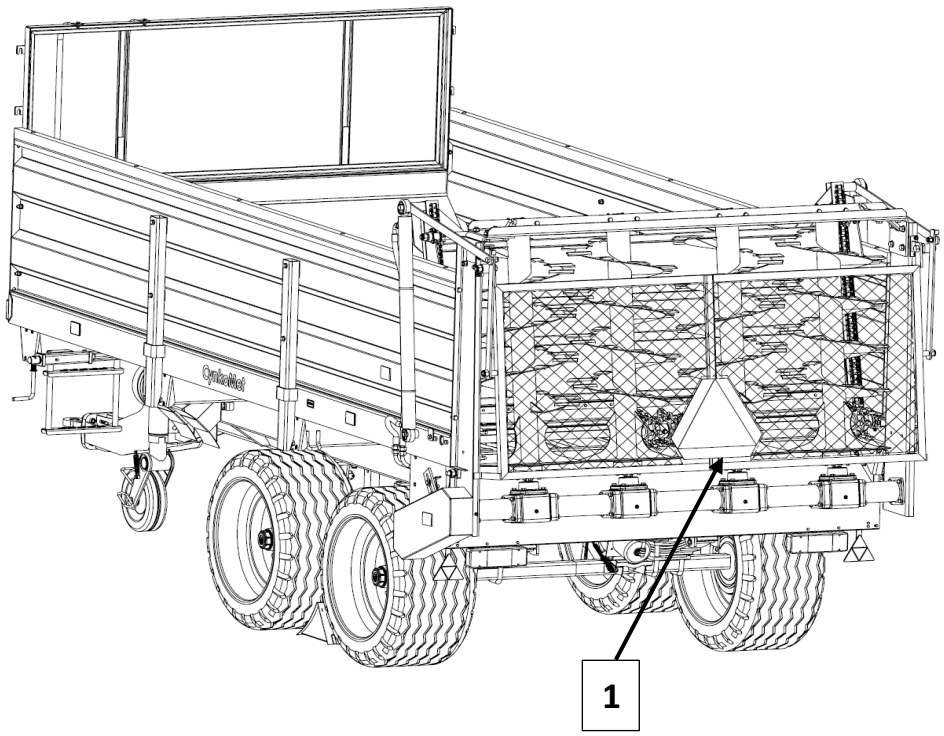


Figure 4. The location of the placement of the plate distinguishing slow-moving vehicles.

The presence and transport of people in the load crate of the spreader is prohibited.

- Before driving, make sure that the spreader is properly connected to the tractor (in particular, check the link pin hook).
- It is forbidden to park on the slopes with a loaded and unsecured machine. Securing is based on stopping with the service brake, parking brake and planting chocks under the wheels. The chocks (1) should be planted only under one wheel (2) (one front wheel and one on the back - Fig. 5).

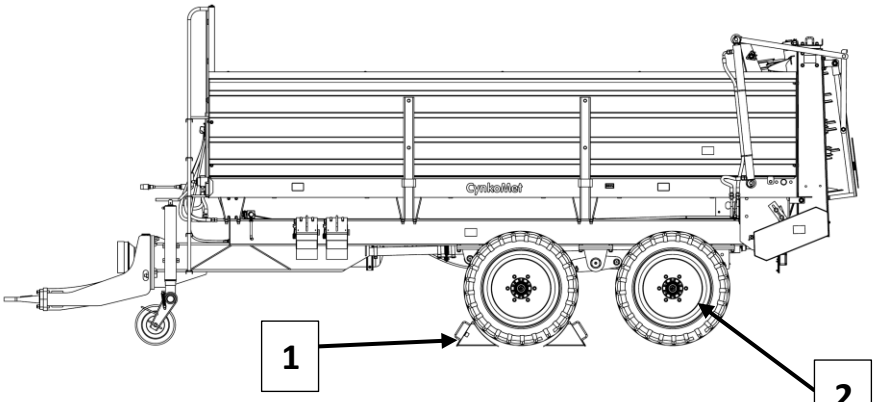


Figure 5. The way of placing the chocks.

- Prior to each spreader's use, check its technical condition, especially in terms of safety. In particular, check the technical condition of the coupling system, drive system, brakes and signaling lights and hydraulic, pneumatic and electrical connection elements.
- Before driving, check that the parking brake is released and the braking force regulator is set to the correct position (concerns pneumatic systems with a manual, three-position regulation).
- The spreader is adapted for driving on slopes up to 8°. Moving the spreader on an area with steeper slopes may cause the spreader to tip over as a result of loss of stability.
- Each time, after finished work, drain the air reservoir in the pneumatic installation. During frosts, freezing water may cause damage to pneumatic system components.
- It is prohibited to exceed the admissible spreader load. Exceeding the carrying capacity may lead to equipment damage, loss of stability while driving, scattering of the load and cause a hazard to third parties during driving. The brake system of the machine has been adapted to the total weight of the spreader, which if exceeded will result in a drastic reduction in the effectiveness of the brake system.
- The load on the spreader should be distributed evenly and must not impede driving the set.
- When reversing, it is recommended to use the assistance of another person. During maneuvering, the person helping must keep a safe distance from the danger zones and at all times be visible to the operator of the tractor.
- If during reversing we are not using the help of a second person, before commencing the maneuver, make sure that nobody is in the danger zone.

NOTE!	NOTE! Before each maneuver of reversing and start of spreading the material loaded on the load box, use of the beep signal 2 times is recommended in the tractor in order to inform bystanders about the threat.

3.7 Description of residual risk.

Although the "CYNKOMET" Czarna Białostocka company takes responsibility for the design and construction in order to eliminate the danger, and has made every effort to eliminate the risk of an accident, some elements of risk during operation of the spreader are unavoidable. The residual risk stems from the wrong behavior of the machine operator.

The greatest danger occurs when you do the following:

- use the spreader for purposes other than those described in the manual,
- being between the spreader and the tractor during work of the engine connecting the spreader to the tractor, or just being between machines during maneuvers, reversing, turning, or aggregation of the spreader to the tractor.
- operating the machine by unauthorized persons, under aged persons or under the influence of alcohol or other drugs,
- being on the machine during operation (without disconnecting the PTO of the tractor),
- cleaning / maintenance of the machine during operation (without disconnecting the PTO of the tractor),
- not keeping a safe distance of bystanders when operating the machine including (reversing, driving, spreading materials to which the spreader has been designed)
- introduce structural changes without the consent of the manufacturer,
- clean, carry out maintenance and technical checks of the spreader,
- the presence of people or animals in areas invisible from the operator's position
- inserting arms, legs, or other items such as tools into rotating parts of the adapter, or the conveyor elements.

When presenting the residual risk, the spreader is treated as a machine, which until the start of production was designed and manufactured according to the current "state of the art".

3.8 Residual risk assessment.

When observing such recommendations as:

- A careful reading of the operating instructions and strict adherence to its provisions,
- prohibition of placing hands and other parts of the body in inaccessible and forbidden places,
- prohibition of being on the machine during operation of the tractor, spreader
- Maintenance and repair of the machine according to instructions
- To work with the components and elements with sharp edges you must use suitable protective clothing (gloves, boots, etc.)
- securing the machine against the access of children and animals,
- use of the observations and recommendations contained in the operating instructions.
- keeping a safe distance from forbidden or dangerous places during unloading, loading and coupling of the spreader,
- Performing maintenance and repair jobs in accordance with the rules of maintenance security,

- Prohibition on being on the machine during driving, working, loading or unloading.

The residual risk can be with the use of the machine without risk to humans and the environment.

NOTE!	NOTE! There is residual risk in the event of failure to comply with the set-out recommendations and guidelines.

3.9 Information and warning stickers.

The spreader is marked with information and warning labels listed in table *1*. The user of the machine is obliged to take care of the readability of the inscriptions, warning symbols, and informational signs placed on the spreader throughout the entire period of its use. In the case of destruction, replace them with new ones. Labels with inscriptions and symbols are available from the manufacturer or the place where the machine was purchased. New components,
replaced during repairs must be re-marked with appropriate safety signs. When cleaning the spreader, do not use solvents that can damage the coating of labels and do not direct a strong stream of water.

Table 1. Information and warning stickers.

Item no.	The symbol (sign) of safety or the content of the inscription	Meaning of the symbol (sign)	The placement on the machine
1.		Note **Before starting work, please read the User's Manual.**	Front wall
2.		Note **Turn off the engine and remove the key before starting maintenance or repair**	Front wall
3.	Sticker "marking hoses..."	Information on the color of covers for individual hydraulic installations	Front wall
4.	**350 kPa**	Pressure in the tires [1]	On the side walls above the wheels

5.	CynkoMet	Informational note	The right-side wall, left side wall
6.	N-221/3 N-221/4 N-221/3-4 N-221/3-3 N-221/3-1 N-221/4-3 N-221/4-4	Model designation	The right-side wall, left side wall
7.	540 min $^{-1}$	PTO revolutions	Front wall
8, 9		Pulling in of hand or upper trunk Maintain a safe distance from the spreader. Ejected objects. Risk to whole body. Maintain a safe distance from the spreader.	Right side wall
10.	General safety mark and note: "It is prohibited to enter the trailer while the drive is engaged"	-	Front wall
11.	Note: "Machine coupling only with hitch for single-axle trailers."	-	Front wall
12.	Note "Maximum load capacity 6000/ 8000kg"(2)	Loading capacity varies depending on the model	Right wall
13.		Designation of lifting points for lifts	On spreader's load-carrying beam
14.		Direction of chainwheel revolutions	Drive guards
15.		Adapter's hitching point	Adapter's top beam
16.	Note: "450kg"(3)	Adapter weight	Adapter drive guard (N-221/3-4, N-221/3, N-221/3-3, N-221/3-1)
17	Note: "280kg"(3)	Adapter weight	Adapter drive guard (N-221/4, N-221/4-3, N-4-4)

18.		Take special caution when working near power lines	Front wall
19.		Marking of conveyor chain tensioning points	Front wall
20.		Note Hazard of pulling in by chain, transmission or belt.	Side walls, near bottom edge
21.		Hazard of torso crushing. Do not occupy the space in the area of the articulated joints of hitches while the engine is running.	Front wall
22.		Do not open or dismount safety guards when the engine is running.	Chain guards
23.		Do not touch components of the machine prior to stopping of all its units.	Front wall
24.		Do not occupy the space under a raised cover prior to fastening of the safeguarding device.	Adapter side wall (4)

(1) – pressure dependent on the used tire
(2) – value dependent on spreader model
(3) – value dependent on adapter model
(4) models equipped with guard, absent in models with deflector

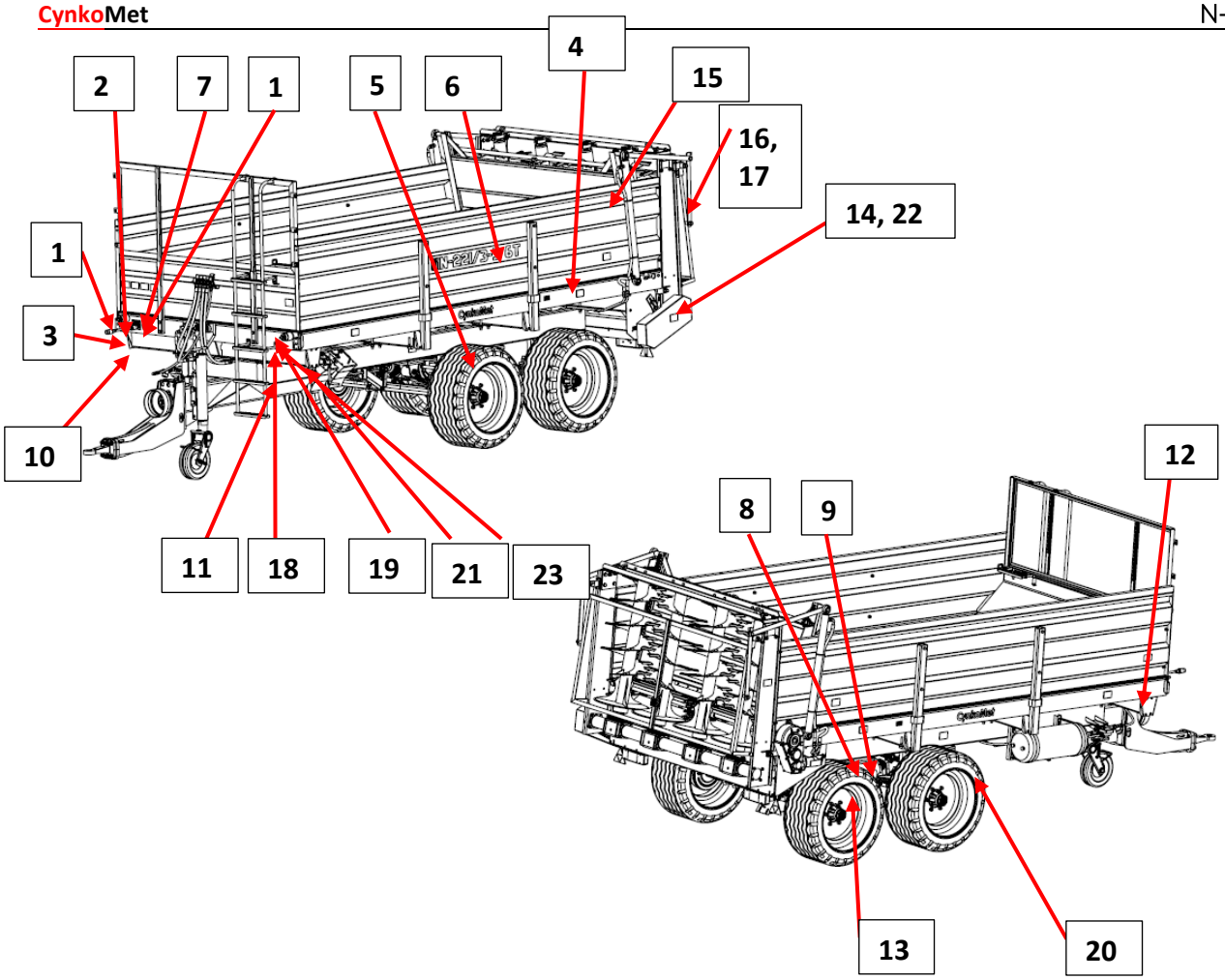


Figure 6. Distribution of stickers.

4. Information regarding use

4.1 Technical characteristics.

Table 2. Technical specifications of the N-221 spreader

NO.	Content	Unit of measure	N-221/4	N-221/3	N-221/3-4	N-221/3-1	N-221/4-4	N-221/3-3	N-221/4-3
1.	Total length	mm	6480	6530	6530	6530	6646	6530	6650
2.	Total width	mm	2426	2426	2426	2426	2426	2426	2426
3.	Total height	mm	2780	2780	2810	2650	2650	2750	2750
4.	Track of wheels	mm	1700	1700	1700	1800	1800	1700	1700
5.	Dimensions of the loading crate: • Length • width • height	mm	4220 2070 1000	4220 2084 1000	4220 2084 1000	4220 2070 800	4220 2070 800	4220 2070 800	4220 2070 800
6.	cargo capacity	m^3	8.2	8.2	8.2	6.7	6.7	8.2	6.7
7.	Loading surface	m^2	8.8	8.8	8.8	8.8	8.8	8.8	8.8
8.	Height of the loading surface	mm	1320	1320	1360	1340	1340	1300	1300
9.	The ground clearance of the vehicle	mm	320	320	430	9140	9140	400	400
10.	Vehicle weight	kg	3210 (1)	3210 (1)	3210(1)	3140(1)	3140(1)	3210(1)	3210(1)
11.	Allowed payload of the vehicle	kg	8000 (1)	8000 (1)	8000 (1)	6000 (1)	6000 (1)	6000 (1)	6000 (1)
	Maximum axle load					7500	7500		
	Tires Speed Index					min. A8 (40km/h) (2)	min. A8 (40km/h) (2)		
	Tires Load Index					min. 154 (3750kg)	min. 154 (3750kg)		
14.	Tire size		400/60-15.5	400/60-15.5	500/50 - 17	550/50-17	550/50-17	400/60-15.5	400/60-15.5
14.3	The maximum tire pressure	bar/kPa	350	350	350	350 (1)	350 (1)	350	350
15.	Rated voltage	V	12 V	12 V	12 V	12 V	12 V	12 V	12 V
16.	Permissible design speed	km/h	30(2)	30(2)	30(2)	30(2)	30(2)	30(2)	30(2)
17.	Power requirement	kW/KM	66/90	66/90	66/90	57/80	57/80	57/80	57/80
18.	The level emitted of noise	dB	68	68	68	68	68	68	68
19.	Working speed of PTO	rpm	540	540	540	540	540	540	540
20.	Max. vertical drawbar eye load	kg	2500	2500	2500	2500	2500	2500	2500

(1) – load capacity and self-weight depends on the equipment of the spreader

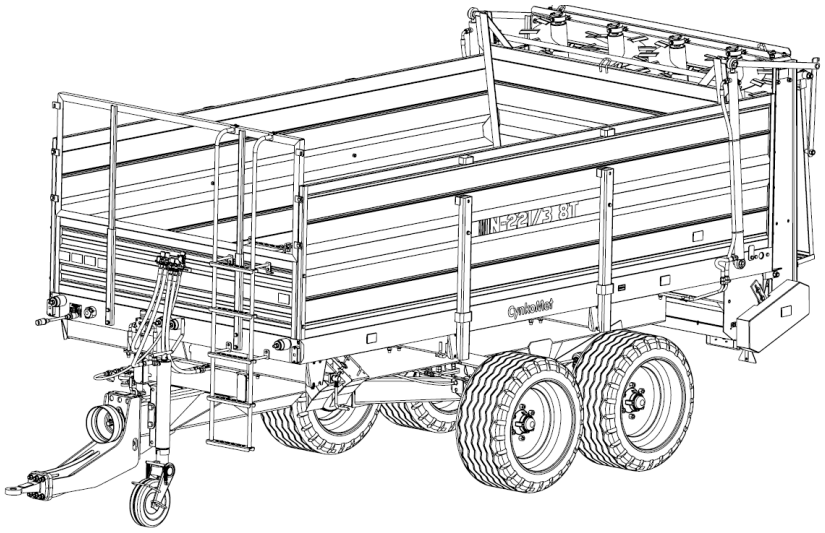
(2) - The permitted speed of the spreader moving on public roads in Poland is 30 km / h (according to the Law dated 20 June 1997, "the Road Traffic Law", art. 20). In countries where the spreader is operated, observe the restrictions associated with the relevant national law on road traffic.

4.2 Description of construction and operation.

4.2.1 General Description

The spreader is an agricultural machine designed for spreading manure of any kind, lime, peat and compost, after mounting extensions and the replacement of the adapter with a rear wall it can be used as a volumetric dump trailer. The spreader is constructed from a lower frame with a drawbar, the upper frame on which vertical side walls of 1m height are mounted and a moving conveyor chain. On the upper frame, there is tightened and riveted sheet metal (floor) with a thickness of 4mm. Cargo box is made form side walls, the front wall with a safety net and a hydraulic rear wall (also called a hydraulic shutter), which is finished with wide rubber. moves on guides located on the side walls. The loading crate is finished with an adapter. It consists of a bolted frame with profiled sheets on which are mounted 4 vertical drums (N-221/3, N-221/3-4, N-221/3-3, N-221/3-4) or 2 horizontal drums (N-221/4, N-221/4-3). N-221/4-4). The adapter drums are driven by a horizontal transmission shaft and a gear. There are blades welded to the conveyor drums, designed for grinding material during dispersion.

a)



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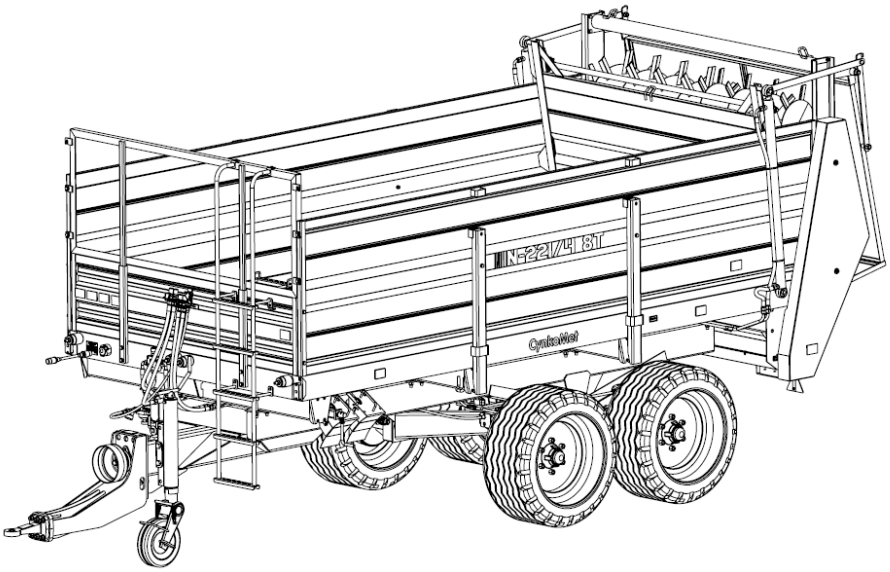

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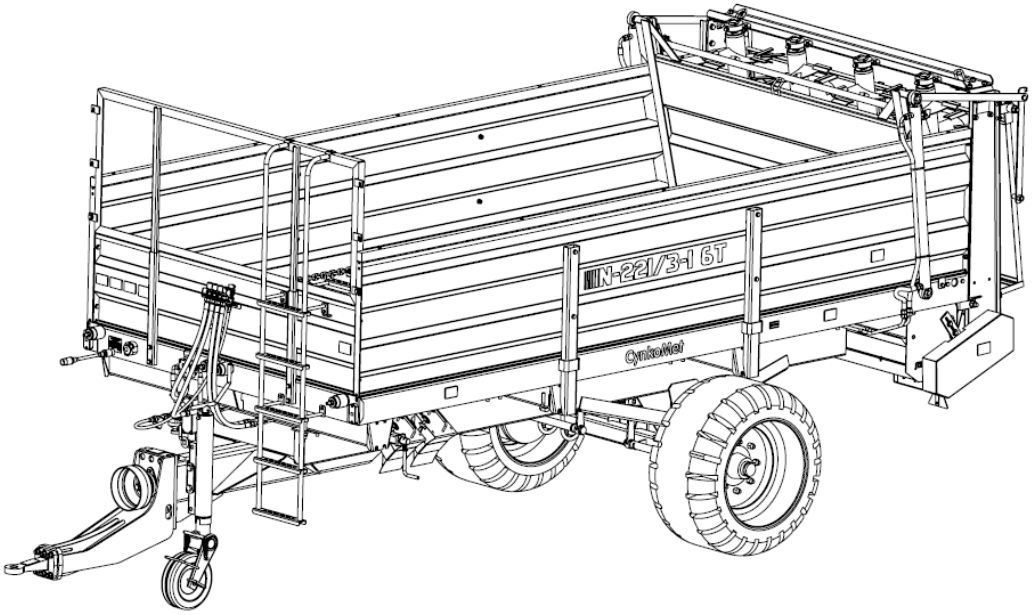

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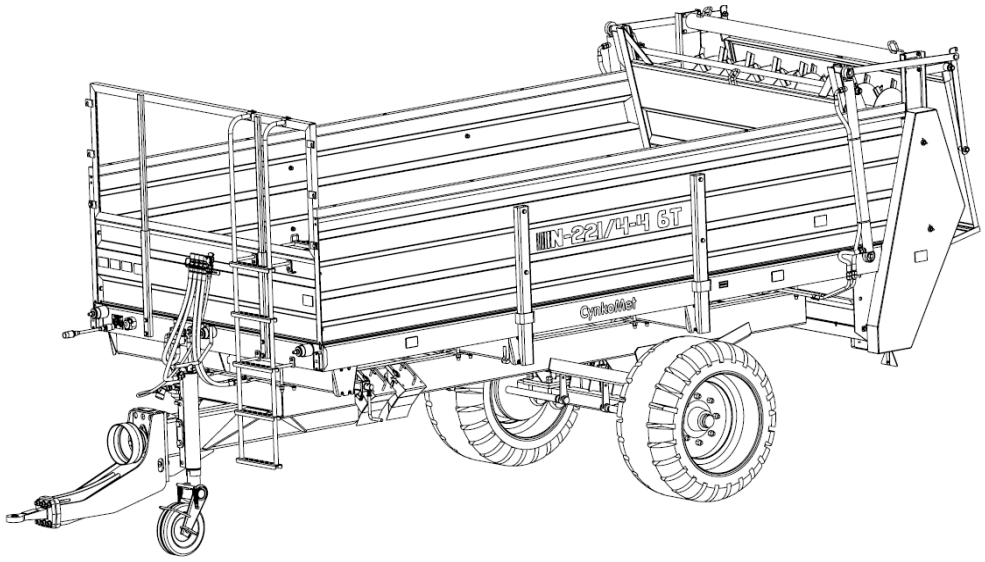


Figure 7. Spreader - general view

a) N-224/3-4, N-221/3-3, , N-221/3
b) N-221/4, N-221/43
c) N-221/3-1
d) N-221/4-4,

4.2.2 Chassis

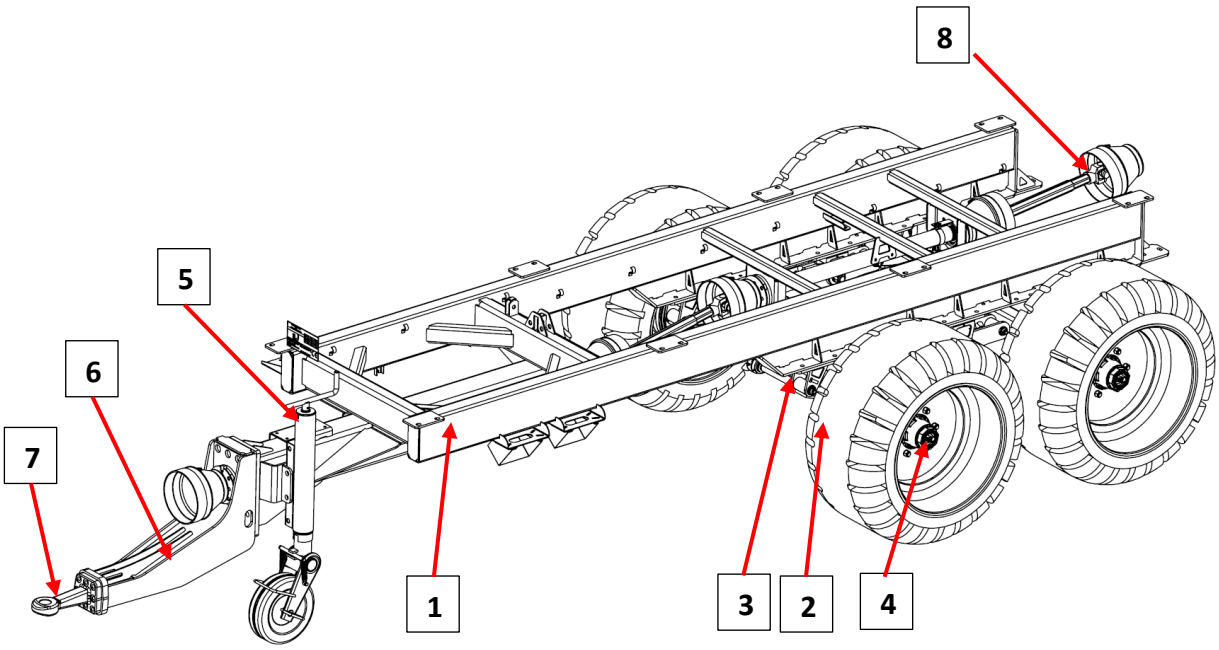


Fig. 8 Spreader chassis

1 – bottom frame, 2 – wheel, 3 – spring, 4 – axle, 5 – support,
6– drawbar, 7 – drawbar tension member, 8 – drive

The bottom frame (fig. 8, item 1) is a welded construction consisting of two stringers joined by cross-bars, and the drawbar beam.

The spreader's driving system is found in the rear part of the chassis, and it consists of: axles (4) and tandem spring suspension (3). Driving axles are made of square bars ending with pivots on which on the tapered roller bearings, wheel hubs are mounted (2). The axles are equipped with shoe brakes channeled with mechanical cam expanders. The running gear suspension consists of 4 steel parabolic springs attached to the bottom frame with pins and sliders. The wheel sets are attached to the springs with glomerular bolts.

Drawbar (6), being a welded sheet construction with fastened tension member (7), is fastened to frame (1). Drawbar height can be adjusted by changing the extension of the hydraulic support (5).

The drive (8), consisting of rigid and articulated shafts, runs along the bottom frame (1) and through the drawbar (6). It is tasked with transmitting, via the power take-off shaft, revolutions from the output in the tractor to the adapter's gearbox, powering drums.

 NOTE!	NOTE! Use PTO shafts with appropriate and complete guards protecting against direct contact with spinning parts. Guard chains must be fastened to fixed elements, e.g. frame/grips of fixed guards. The shape and size of a guard may limit the tolerable inclination of the shaft. The edge of a guard may not come into contact with the shaft, and no gap larger than 30 mm should form.

4.2.3 The upper frame / loading crate

The upper frame consists of longitudinal stringers and crossbars. On the upper frame, a floor panel of sheet metal having a thickness of 4 mm is attached by means of screws and rivets Side walls with a height of 0.8m or 1m

(depending on the model) are bolted to the frame. In this type of spreader, there is the possibility, after the adapter is dismounted and a rear wall (hydraulically opened) is added, to attach extensions with a height of 0.75m or 0.8m (depending on the model). The basic loading crate, without extensions is finished with a hydraulic wall (stringer) moving along the tracks located on the side walls. One end of the lock is equipped with thick rubber with notches shaped to accommodate the conveyor chain, which stops semi-fluid material found in the cargo box during operation.

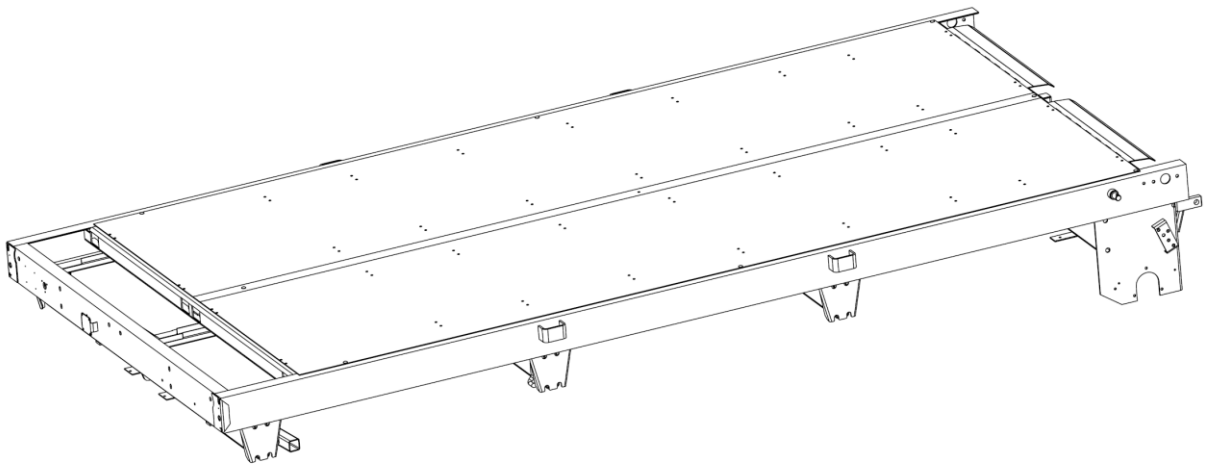
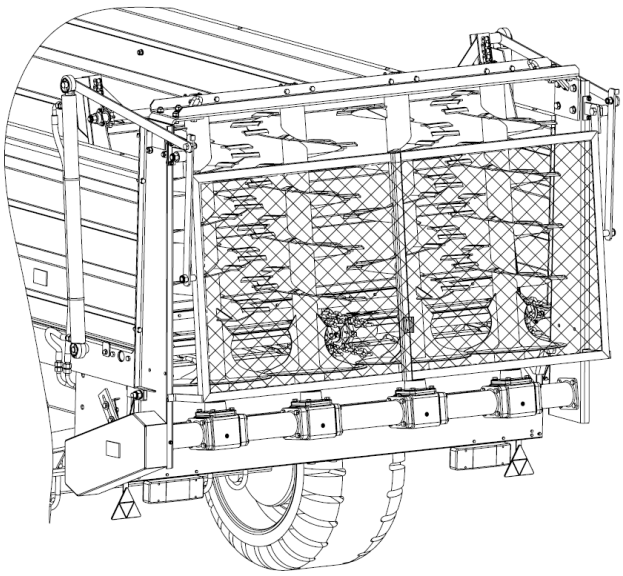


Figure 8. Upper frame

4.2.4 Adapter

The adapter consists of a frame bolted from the profiled sheets. In the frame, there are 2 or 4 drums with a diameter of 450 mm, on which cutting knives are welded to the worms. The drums are moved by the drive of the gearbox. The adapter is also equipped with a protective guard, raised simultaneously with the rear hydraulic wall.

a)



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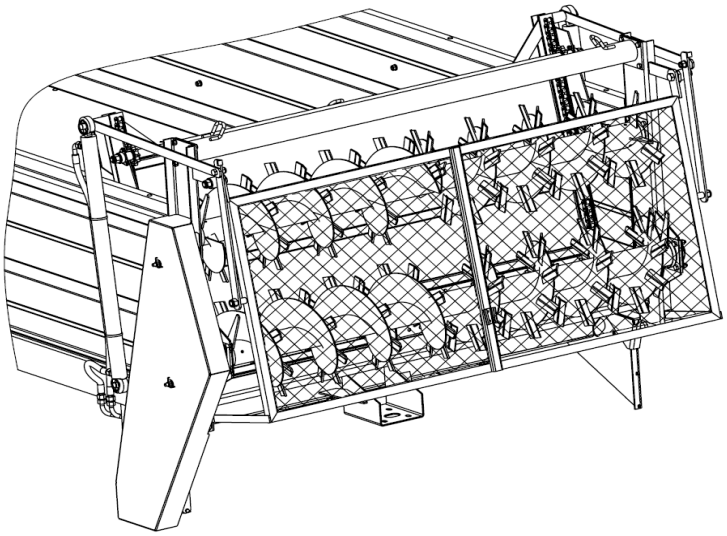

Figure 10. Spreader adapter

a) vertical, b) horizontal.

4.2.5 The hydraulic / pneumatic installation

Table 3. Characteristics of Agrol U oil

Item no.	Requirements	Research method based on	Unit	Value
1.	kinematic viscosity at 100˚C	ASTM D 445	mm^2 / s	10.0-11.5
2.	flow temperature	ASTM D 97	˚C	<-24
3.	flash point	ASTM D 92	˚C	>230
4.	base number	ASTM D 2896	mgKOH/g	9.9
5.	viscosity index	ASTM D 2270		>95
6.	CCS structural viscosity at -18˚C	ASTM D 5293	mPa*s	<9000

Equivalents of Agrol U oil:

- API GL-4
- DIN HLP
- ISO VG 100
- John Deere J20C
- MF CMS M1145
- Volvo WB101
- ZF TE-ML-03E, ZF TE-ML-05F

4.2.5.1. Hydraulic system of conveyor

The conveyor's hydraulic installation (Fig. 11) powers an engine (2) driving a transmission (1) located on the right side of the spreader. This makes it possible to move material inside the box in the direction of the adapter. A regulator with a knob (3) enabling stepless regulation of the conveyor's feed rate is found on the front of the machine. This makes it possible to control the intensity of spreading. Next to the regulator, a cross valve (4) is placed to protect the transmissions from overloading in case of jamming or excessive load. By changing the input of the feed, it is possible to retract material for the purpose of removing jamming of the mechanism.

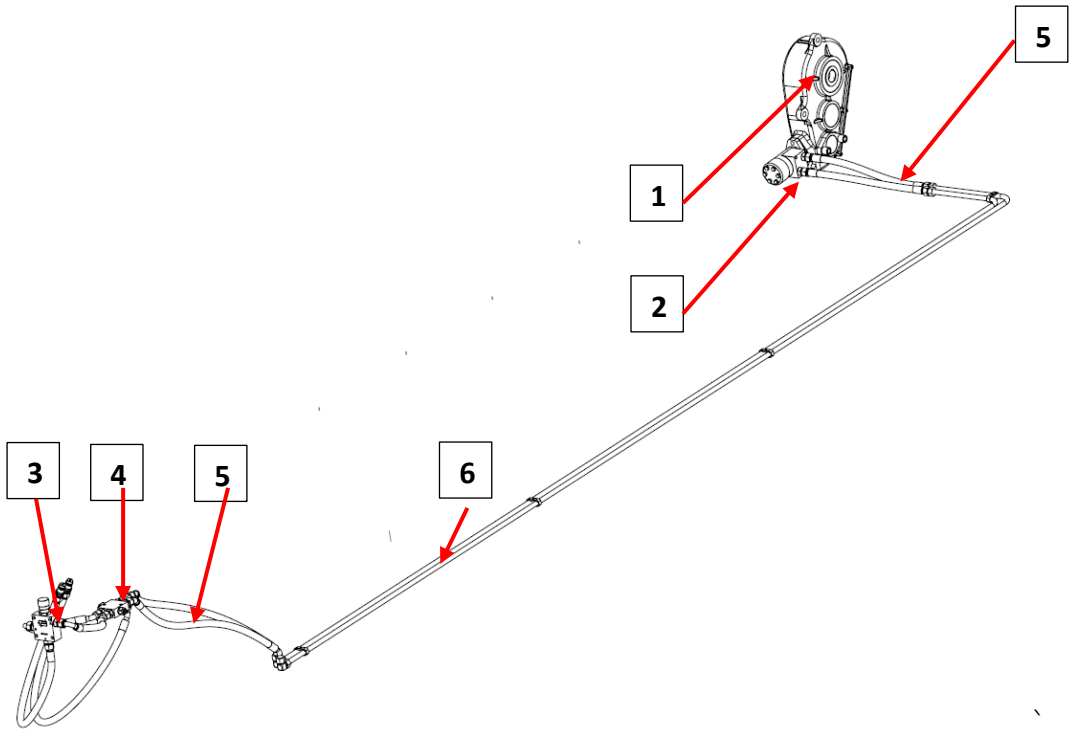

Figure 11. Design of conveyor drive

1 – Transmission; 2 – Hydraulic motor; 3 – Flow regulator; 4 – Cross-flow valve; 5 – Flexible hoses; 6 – Rigid tubes;

4.2.5.2. Hydraulic system of the rear wall

The real wall's hydraulic system serves for raising and lowering it by means of two hydraulic actuators. The wall is tasked with enabling or preventing penetration of material from inside the box into the adapter.

Figure 12. Hydraulic system of the rear wall.

NOTE!	NOTE! The factory-made hydraulic system of the machine is filled with Agrol U oil. It is possible to fill the hydraulic system with a

	different oil with similar specifications. The system must be thoroughly flushed out beforehand. The hydraulic oil change operation is to be performed by authorized service stations

4.2.5 Brake system/ parking brake

The spreader is equipped with a brake system, consisting of a working brake and parking brake. The standard brake system is controlled by means of a single-circuit pneumatic system. At the customer's request, a double-circuit pneumatic system or hydraulic brake system can be installed. In the EU version, the braking system is equipped with an automatic brake force regulator that regulates the braking force depending on the axle load of the spreader. In the PL version, the automatic brake force regulator is available as optional equipment.

 NOTE!	NOTE! **In the event of disconnection of the spreader's and tractor's pneumatic systems during driving, the brake system ensures self-braking of wheels.**

Brake system/ handbrake

The spreader is equipped with a braking system consisting of:

- a pneumatically or hydraulically controlled service brake, acting on four wheels of both axles,
- a parking brake actuated manually by means of a crank mechanism on the side of the spreader, acting on the two front wheels.
- Brake valve 2 (fig. 13, 14, 15) of the pneumatic installation has a system releasing the brake, which is used in the case when the spreader is disconnected from the tractor.

Two types of braking force regulators can be used in the pneumatic brake installation:

1. Braking force regulator 3 located in the pneumatic system (fig.13, fig. 14) is controlled manually. Depending on the load of the spreader with cargo, the control lever must be set in one of three positions:

- position "0"– for an unladen spreader,
- position "1/2" - for the spreader partially loaded,
- Position "1" - for the spreader fully loaded.

2. The braking force regulator 3 (fig. 13) in the pneumatic system is automatically controlled depending on the axle load of the spreader.

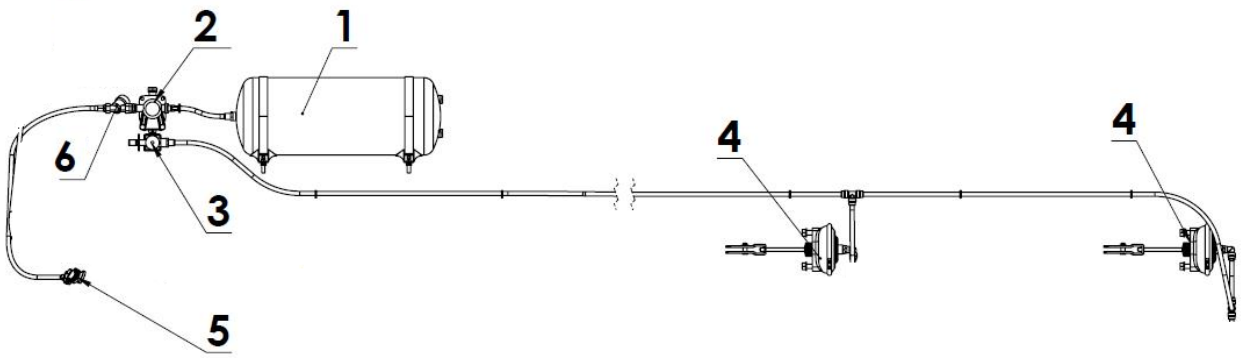

Figure 13. Diagram of the pneumatic single-line brake system with a manual braking force regulator.

1 – air tank; 2 – control valve; 3 – brake force regulator; 4 - pneumatic cylinder; 5 – hose connector (black); 6 – air filter;

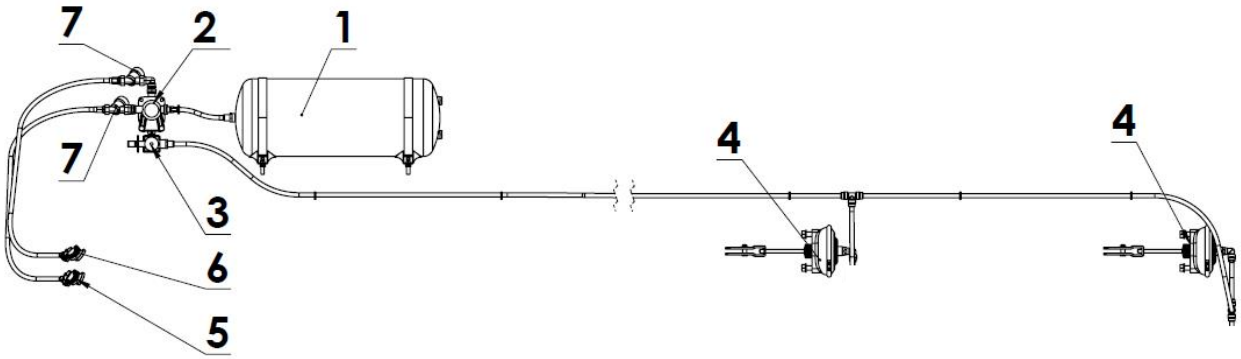

Figure 14. Diagram of the pneumatic double-circuit brake system with a manual braking force regulator.

1 - air tank, 2 - control valve, 3 - automatic braking force regulator, 4 - front axle pneumatic cylinder, 5- rear axle pneumatic cylinders, 6 - filter hose connector (yellow), 7- filter hose connector (red), 8 - relay valve.

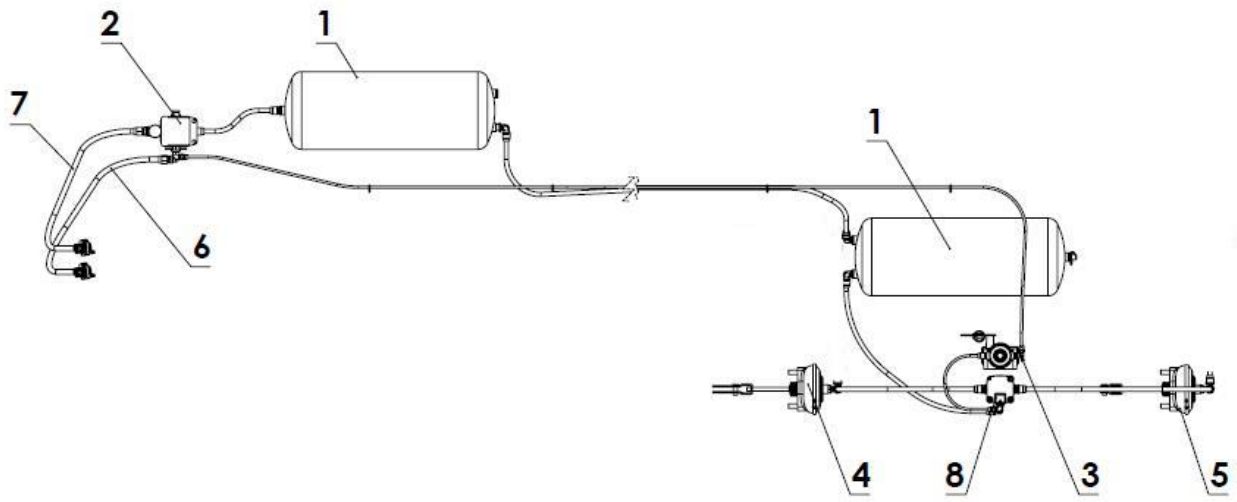

Figure 15. Diagram of the pneumatic double-circuit brake system with automatic braking force adjustment.

1 - air tank, 2 - control valve, 3 - automatic braking force regulator, 4 - front axle pneumatic cylinder, 5- rear axle pneumatic cylinders, 6 - filter hose connector (yellow), 7- filter hose connector (red), 8 - relay valve.

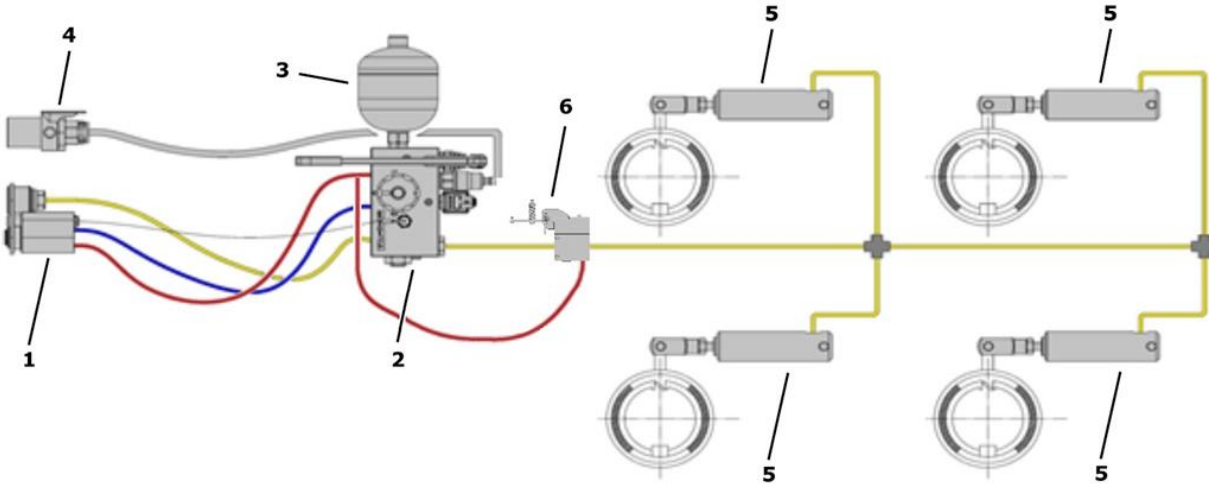

Figure 16. Diagram of a hydraulic brake system.

1 – double brake coupling (compliant with ISO 5676 and ISO 16028); 2 – brake valve; 3 - accumulator; 4 – electrical connector (ISO 7638-2); 5 – brake cylinders; 6 – automatic braking force regulator;

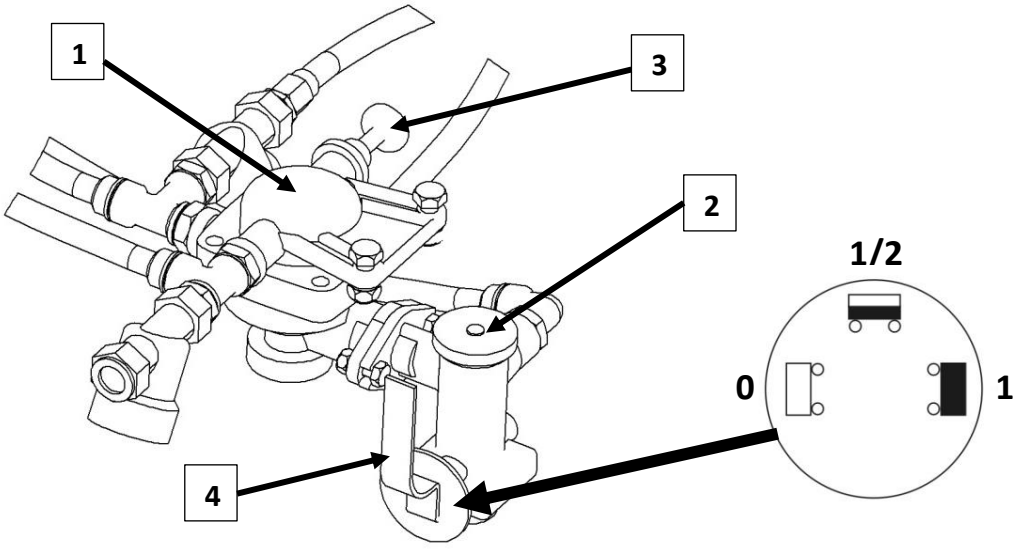

Fig. 17. Pneumatic braking force regulator.

1 – control valve, 2 - braking force regulator, 3 - a button releasing the spreader's brake at standstill, 4 - the lever of the regulator's work selection, 0 - „UNLADEN" position, 1/2 - „HALF LOADED" position , 1 - „FULL LOAD" position

The parking brake is used to immobilize the spreader when stationary. The brake's crank mechanism (fig. 18) is fastened to the bracket near the top frame. Steel cords 3 connect the levers of the front driving axle's expander to the crank mechanism. Tightening the string (rotation of the crank mechanism in the direction of the clock's rotation) causes a shift of the lever spreader that, when parting the brake linkage, immobilize the spreader.

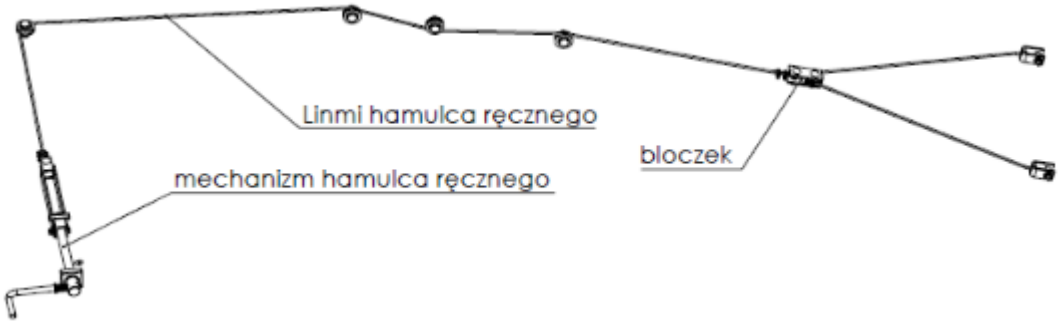

Figure 18. Parking brake diagram

Table 4

Ite	Nominal pressure in the brake system	Unit	Value
1.	Single-cable pneumatic installation	Bar (kPa)	5,8-6.5 (580-650)
2.	Two-wire pneumatic installation	Bar (kPa)	6,5-8 (650-800)
3.	Hydraulic installation	Bar (kPa)	150 (15000)

NOTE!	NOTE! Before connecting the spreader, check whether the nominal pressure given in table 5 is reached on the brake lines. If the pressure is lower than specified, it is PROHIBITED to use the spreader with such a tractor.

NOTE!	NOTE! In the event of pressure drop below 4.5 bar in the pneumatic double-hose brake system, the spreader's brake system may be blocked.

4.2.6 Electrical installation, lighting and signaling.

Electrical installation of the spreader (fig. 19) is adapted to be powered from a DC voltage source of 12V. Joining the electrical installation of the spreader with the tractor's installation should be made with a suitable connecting line. The installation has quick couplings.

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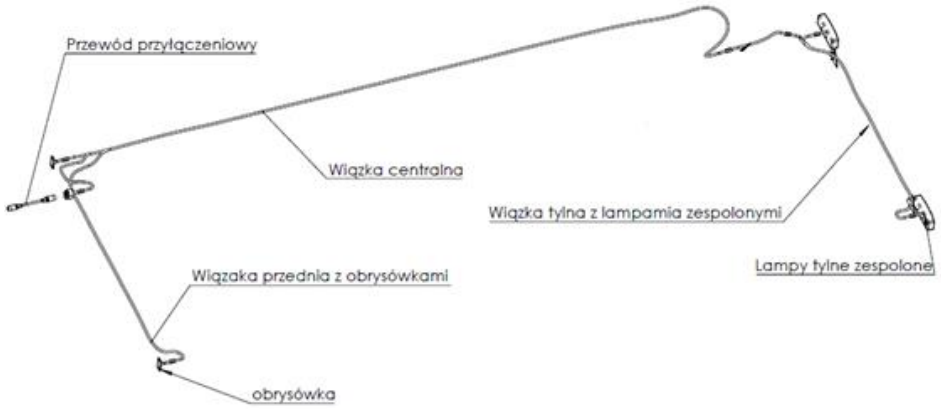

Fig. 19. Wiring diagram of the spreader.

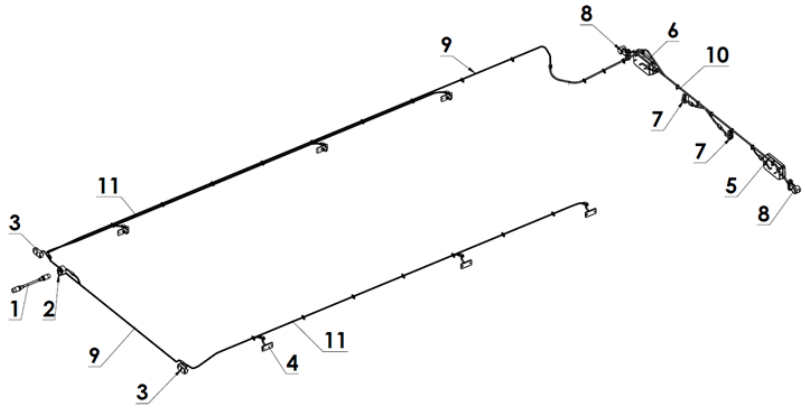

Figure 20 Diagram of the electrical installation of the spreader with illuminated side marker lamps (optional)

1 - complete connector cable; 2 - plug-in socket; 3 - front position lamp with reflector; 4 - side perimeter light (OPTIONAL); 5 - rear left cluster lamp; 6 - rear right cluster lamp; 7 - registration plate lighting lamp; 8 – side perimeter lamp (rear), 9 – front position lights harness; 10 - rear harness; 11 - side perimeter lights harness (OPTIONAL), 12– Insert

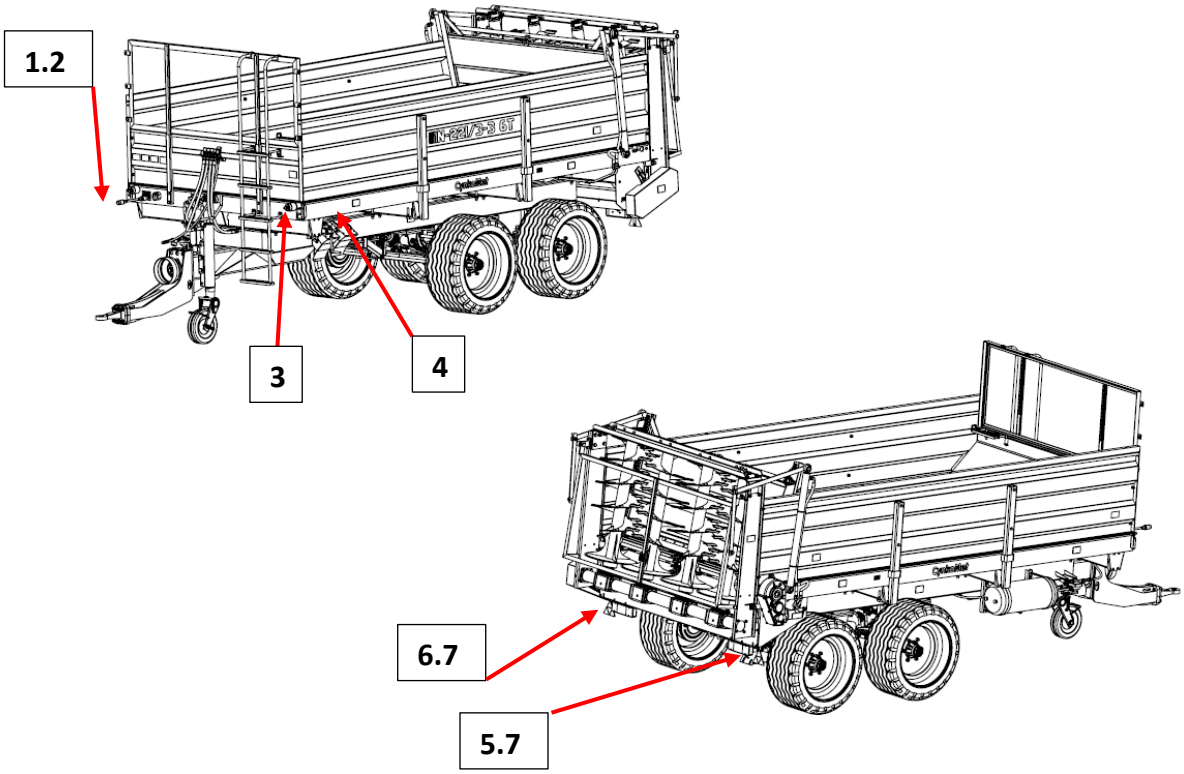

Fig. 21 Lighting and signaling diagram

1- complete connecting cable; 2 – jack plug connector; 3 - front position lamp with a reflector; 4 - reflective yellow device (side marker lamp - optional); 5 - rear right cluster lamp; 6 - rear left cluster lamp; 7 - red triangle reflective device;

4.2.7 Extensions, conveyor

Extensions to the spreader are sold as additional accessories. They comprise of: a right wall and a left wall mounted on the existing walls by means of brackets and an inner hydraulic wall mounted in the place of the adapter, after having removing the inner wall (slider) and that adapter. The extension is fastened at the top with a fastening string in order to prevent the "spreading" of the walls under the pressure of the transported material.

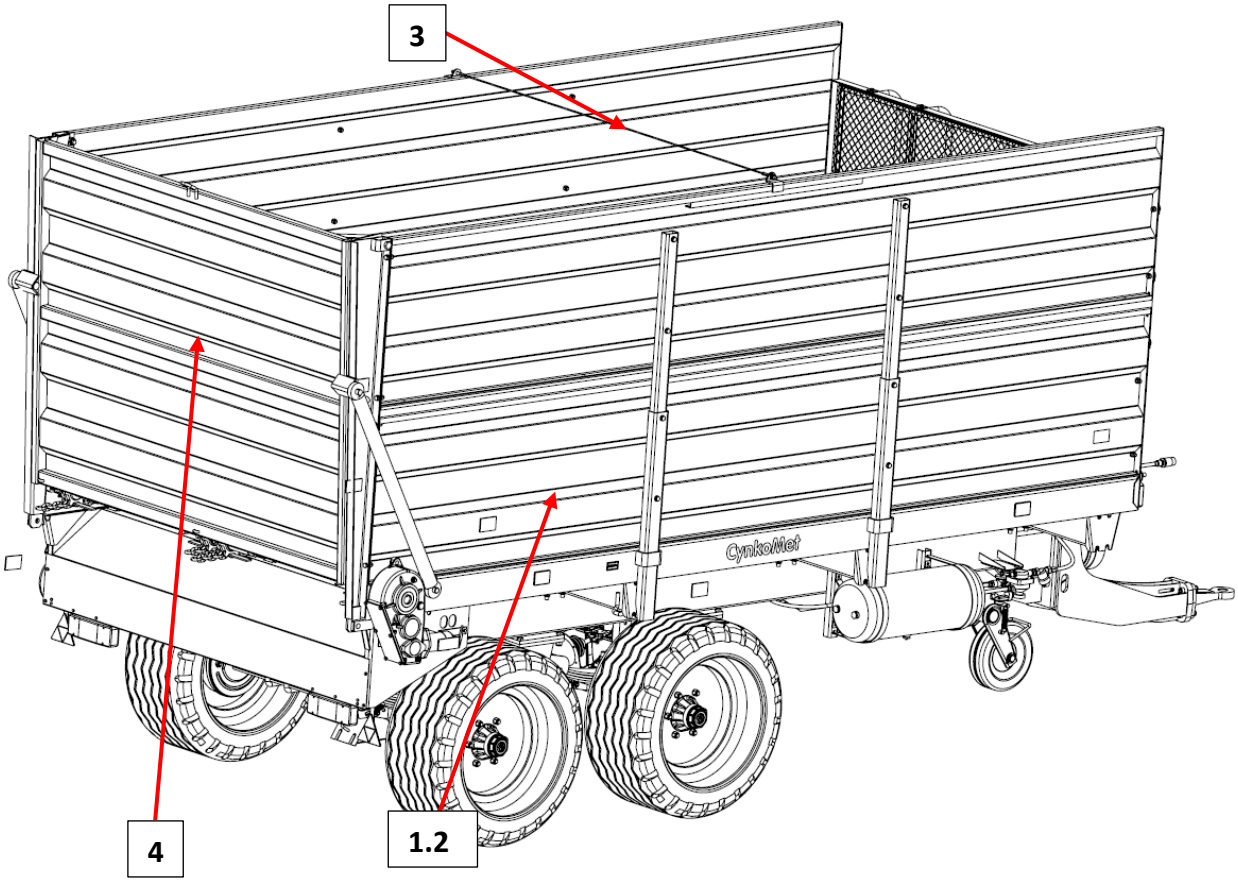

Fig. 22. Manure spread with extensions.
1,2 - right wall and left wall of the extension; 3 - fastening string; 4 - hydraulic rear wall

4.3 Rules of proper use of the spreader.

4.3.1 Preparation before running for the first time.

4.3.1.1 Control of the spreader after delivery

The manufacturer guarantees that the spreader is fully operational and complete, and has been checked according to quality control procedures on site and is approved for use. However, this does not relieve the user from the obligation of checking the vehicle after delivery and before first use.

Before starting work, the operator of the spreader must carry out an inspection of the technical condition of the spreader and prepare it for the first run. Please refer to the content of this manual supplied with the spreader and apply the recommendations contained in it, take a look at the design and understand the principle of operation of the machine.

 NOTE!	NOTE! Before connecting and before starting the spreader, read this manual and follow the instructions contained therein.

External visual inspection:

- Check the completion of the machine (standard and optional equipment).
- Check the condition of the anti-corrosion coatings.
- Perform a visual inspection of the individual components of the spreader for mechanical damage resulting inter alia due to improper transport of the machine (dents, piercing, bending or broken components).
- Check the condition of tires of the driving wheels and the air pressure in the tires.
- Inspect the technical state of the flexible hydraulic hoses.
- Check the technical condition of pneumatic cables.
- Make sure that there are no leaks of hydraulic oil.
- Check the electric lamps of lighting.
- Check the markings on the machine according to the table and figure

4.3.1.2 Preparing the spreader for the first connection.

Preparation

- Check all lubrication points of the spreader, if necessary, lubricate the machine.
- Check for proper tightening of nuts fixing the driving wheels.
- Dehydrate the air tank in the brake installation.
- Make sure that the pneumatic, hydraulic and electrical connections in the agricultural tractor comply with the requirements, otherwise do not connect the spreader.
- Adjust the height of the shaft location in the spreader or the position of the lower transport hitch on the tractor through a regulated bracket.

Trial drive / start

If all the above steps have been performed and the technical condition of the spreader does not raise any objections, connect the machine to the tractor in compliance with the following sequence.

- Secure the spreader against uncontrolled rolling of through the use of a handbrake and placing wheel chocks under the wheels.
- Set the spreader shaft at a suitable height of the hitch in the tractor using the adjustable support.
- Perform the maneuver of reversing.
- Extinguish the tractor (turn the key in the desired position and remove the key from the ignition), set the brake on the tractor.
- Connect the spreader
- Check the correctness of the connection of the drawbar to the hitch in accordance with the instruction manual of the tractor

- Connect the PTO shaft and fasten guard chains.

 NOTE!	NOTE! Use PTO shafts with appropriate and complete guards protecting against direct contact with spinning parts. Guard chains must be fastened to fixed elements, e.g. frame/grips of fixed guards. The shape and size of a guard may limit the tolerable inclination of the shaft. The edge of a guard may not come into contact with the shaft, and no gap larger than 30 mm should form.

 NOTE!	NOTE! Take caution when coupling and decoupling the PTO shaft. This activity must be performed while the tractor's engine is switched off and the key is not present in the ignition switch.

- Connect the hoses of the brake, hydraulic and electrical installations according to the instructions of the tractor and spreader.
- Connect all installations according to the instructions of the tractor and spreader.
- Raise the adjustable bracket and set the wheel of the bracket up (so that during driving it is not entangled with the ground).

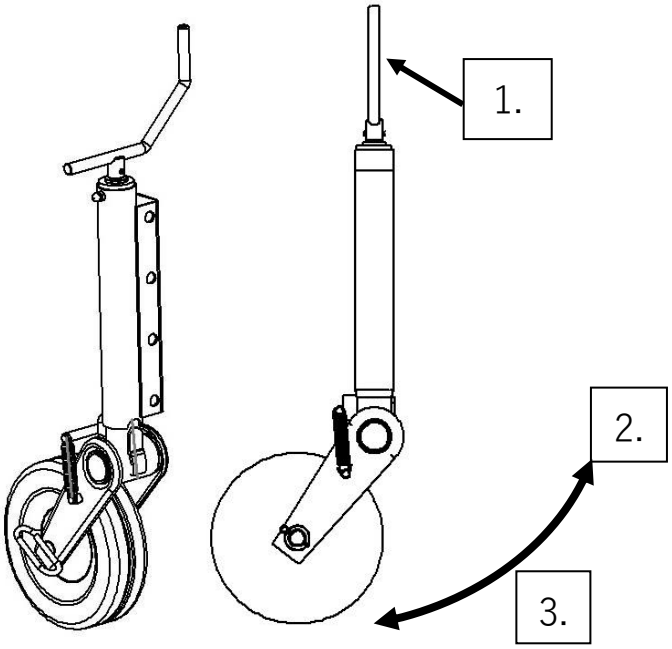

Figure 23. Adjustable support (from the left: isometry, side projection).

1. Lever for lifting support; 2 - Top wheel position – "drive"; 3 - Bottom wheel position – "park";

- Pull the wedges from under the wheels of the spreader.
- Release the hand brake in the spreader.
- Check that the deflector / guard is in a closed and secured position.

- Set the feed speed.
- Start the tractor.
- Move the whole set by a few meters.
- Open the hydraulic wall (check the proper up / down operation), leave in an open position.
- Turn on the drums rotation gradually increasing the speed from min (1) to max (10)
- Switch on the conveyor feed - test the operation of the feed in both directions
- In the event of bad feed, repeat the steps

If during the test drive/start up, you experience disturbing symptoms such as:

- Noise and unnatural noises coming from the rubbing of moving parts on the construction of the spreader.
- Leakage of hydraulic oil,
- pressure drop in the brake system,
- Incorrect operation of the hydraulic and / or pneumatic actuator

or other failures, diagnose the problem. If a fault cannot be removed or removing it will invalidate the warranty, please contact your dealer to resolve the problem or repair.

 NOTE!	NOTE! Before each maneuver of reversing and start of spreading the material loaded on the load box, use of the beep signal 2 times is recommended in the tractor in order to inform bystanders about the threat.

 NOTE!	NOTE! Presence of third parties between machines is absolutely prohibited at the time of aggregation of the spreader to the tractor. Failure to follow these instructions and perform the maneuver correctly can lead, in extreme cases, to death of the person who are between the spreader and the tractor

 NOTE!	NOTE! It is absolutely forbidden to leave the tractor cab by the operator with the engine running and the key inserted in the ignition.

 NOTE!	NOTE! If it is possible, it is recommended that the inspection before the trial run is performed by 2 persons, and the operator of the tractor must always see the other person.

 NOTE!	NOTE! Take special care in the case of inspections by two people, do not make attempts of regulation and insertion of limbs in dangerous places marked with pictograms.

After completion of the test drive / start-up, check the tightness of the nuts of the driving wheels, with the engine switched off (key removed from the ignition), handbrake secured in the spreader and tractor.

 NOTE!	NOTE! Careless and improper use and operation of the spreader, and non-compliance with the recommendations contained in this manual poses a threat to the health. It is forbidden to use the spreader by persons not authorized, not qualified to drive agricultural tractors, including under aged persons and persons under the influence of alcohol. Failure to observe the rules of safe use poses a threat to the health and life of the operator or third parties.

4.3.2 Preparation for the spreader's work.

In preparation for the spreader's work, the following should be checked:

- the wear of the tires and driving wheels,
- Air pressure in the tires,
- springs condition, and in particular the completeness of the feathers
- tightening the nuts fixing the discs of the driving wheels to wheel hubs and the condition of other screw connections.

In addition, after combining the machine with the tractor check:

- the efficiency of the electrical system and lighting system and spreader signaling,
- the effectiveness of the brake system,
- the correctness of operation of hydraulic systems by raising the rear wall, starting the conveyor in both directions and stopping it, raising and lowering the adapter guard, lowering the rear wall.
- the operation of the adapter by test-starting the drums.

 NOTE!	NOTE! Prior to every start-up of the adapter's drums (also during test start-up without load), make sure that no third parties are found in the danger zone.

4.3.3 Preparation for running, spreader as the transporter.

Preparation of the spreader to work as a transporter is started by dismantling the rod ends of the swivels of the inner wall. After taking off the ends of the wall swivels, secure the hydraulic cylinders against uncontrolled sliding off and damage to both the coating and

galvanizing of the spreader, as well as damage to the face of the piston rod.

Then we dismount the inner wall by pushing it upwards until it is outside the guides. You should pay particular attention to the fact that the wall has not advanced rapidly and that there was no occurrence of loose rotation of the wall on the sling. To take out the walls, use the front loader, telescopic boom or other device with a lifting capacity of min. 100 kg.

After demounting the inner wall, proceed to the demounting of the adapter with the guard. It is advisable to come from the back with a front loader (telescopic system) with a capacity of at least 1000 kg and wear belts / slings in handles located in the upper beam of the adapter (protection of the adapter against uncontrolled fall). The adapter's drive chain, found on the machine's left side, is to be unlatched.

As soon as we have the adapter secured from falling and the drive is disconnected proceed to unscrew the screws connecting the adapter structures with walls and the frame of the spreader. After removing the screws, safely take off the adapter and leave in the destination place.

Installation of the rear hydraulic wall is to be started by screwing the brackets to the side walls, then mount brackets on the wall and unblock with the swivels which we secure with pins. Check the correct assembly of the details and then mount the cylinder rod on the swivels of the rear wall and secure with pins.

4.3.3 Loading and unloading the spreader

Loading of the spreader should take place after proper connection to the tractor, with the tractor engine off and the handbrake used in both the tractor and the spreader. The loading should be carried out when the spreader stands on a horizontal plane and stable ground. Then, the loading itself may be carried out with additional machines (e.g. a tractor with a front loader), and the loader itself must be carried out in such a way that the material loaded on the loading crate is spread in an even way. The goal of the uniform loading is to optimize the dispersion of the material during operation of the spreader.

 NOTE!	NOTE! **Before loading, check the correctness of the connection of the drawbar to the hitch in accordance with the tractor's instruction manual.** **It is absolutely required from the user to verify whether the material loaded on the spreaders are not solids such as stones, pieces of wood, metal parts, wires, etc .. Failure to do so may result in permanent damage to the structure of the machine and void the warranty, and what is worse impact of such elements on bystanders or animals.**

If all the above steps have been performed and the technical condition of the spreader does not raise any objections, connect the machine to the tractor in compliance with the following sequence.

- Connect the PTO shaft and in guard chains
- Connect all installations according to the instructions of the tractor and spreader.
- Raise the adjustable bracket and set the wheel of the bracket up (so that during driving it is not entangled with the ground).
- Release the hand brake in the spreader.
- Check that the deflector / guard is in a closed and secured position.

After going to the unloading site, perform the following steps in the following order:

- Set the feed speed.
- Start the tractor.
- Move the whole set by a few meters.
- Open the hydraulic wall (check the proper up / down operation), leave in an open position.
- Turn on the rotation of the drums by gradually increasing the speed from min to max - do not exceed 540 rpm.
- Switch on the conveyor feed
- In the event of bad feed, repeat the steps

If during the working drive, disturbing symptoms such as:

- Noise and unnatural noises coming from the rubbing of moving parts on the construction of the spreader.
- Leakage of hydraulic oil,
- pressure drop in the brake system,
- Incorrect operation of the hydraulic and / or pneumatic actuator

or other failures, diagnose the problem. If a fault cannot be removed or removing it will invalidate the warranty, please contact your dealer to resolve the problem or repair.

4.3.4 Connecting and disconnecting with the tractor.

The spreader can be connected to the agricultural tractor, if all connections (electrical, pneumatic, hydraulic), and the hook in the agricultural tractor comply with the requirements of the Manufacturer of the spreader and the tractor.

In order to connect the spreader to the tractor, perform the following steps:

- Prior to coupling the spreader with the tractor, check if the spreader is braked with the parking brake.
- Set the drawbar hitch anchorage on the height of the transport hitch of the tractor (this can be achieved by adjusting the drawbar spring tension).
- Reversing the tractor, connect the drawbar end with the upper transport hitch of the tractor (if in the agricultural tractor, an automatic coupler is used, ensure that the aggregate operation has been completed correctly and the drawbar anchorage is secured).
- Stop the tractor engine and remove the key from the ignition.
- Install and secure the hitch swivel from falling out or check the hook clasp automatically.

- Connect with the electric, hydraulic and brake installation wiring with the trailer.
- Release the parking brake of the machine.

 NOTE!	NOTE! At the time of the coupling, unauthorized people cannot be between the spreader and the tractor. The operator of the tractor, when connecting the machine should be particularly careful when working and make sure that in the course of coupling, other people are not in the danger zone. When connecting the hydraulic hoses to the tractor, pay attention that the hydraulic system of the tractor and the spreader are not under pressure. When coupling ensure adequate visibility. If the case of restricting visibility, use the sound signal from the tractor or use the help of another person. Connecting the spreader with another transport hitch is unacceptable because it threatens the safety of road traffic and to third parties. After completion of the machine coupling, check the security of the hitch.

When connecting the braking system (two-wire pneumatic), the correct sequence of connecting cables is important The first thing to do is connect the plug marked yellow to the yellow socket in the tractor, and then the plug marked in red to the red socket in the tractor. When you connect the second cable, the brake release system will switch to the normal mode of operation (disconnection or interruption of the air duct causes the spreader control valve to automatically switches to the position of actuating the brakes of the machine). The cables are marked with colored protective caps that identify the correct cable installation

In order to disconnect the spreader from the tractor, perform the following steps:

- Use the hand brake in the tractor
- After stopping the tractor, brake the spreader with a parking brake.
- Use the parking brake in the tractor securing the possibility of the tractor driving off.
- Switch off the engine and remove the keys from the ignition.
- If the spreader with the cargo is located on a steep slope or an elevation, it should be protected additionally against rolling by planting chocks under rear wheels.
- Disconnect the hydraulic, electrical and brake system cables of the trailer from the spreader.
- When removing the pin, disconnect the drawbar from the transport hitch of the tractor and drive the tractor away.

 NOTE!	NOTE! When disconnecting the spreader from the tractor, keep particular caution. Provide yourself a good visibility. Before disconnecting the hoses and rods, the cabin of the tractor must be closed to prevent it from unauthorized access. The tractor engine is to be turned off and remove the key from the ignition.

 NOTE!	NOTE! Pay attention to the compatibility of oils in the tractor hydraulic system and the hydraulic system of the spreader.

4.3.5 Loading the cargo box.


NOTE!

NOTE!

Loading of the crate can take place only when the spreader is connected to the tractor, set on level ground with the drawbar directed to drive forward and handbrake used on the tractor and spreader.

You should aim for even distribution of the load in the loading crate which has a significant impact on the uniformity of dispersion of the material located on the spreader. When loading or unloading the spreader, it is recommended to use a crane, loader or a conveyor according to general safety rules. Before loading, check that all the moving parts are closed (locks, guards, etc.)

Lightweight, volumetric materials may be loaded even above the crate extension <4013 **however, up to 5cm** of the loading, with particular attention to the stability of the spreader.

Regardless of the type of the load carried, the user is required to secure it in such a way that the load is not able to move freely and cause contamination of the road. If this is not possible, it is prohibited to transport such cargo.

Due to the varied density of the materials, the use of the total capacity of the container may result in exceeding the permissible load of the spreader.

The approximate permissible heights of loading layers of various materials and their bulk weights are given in Table 5.

Table 5

Item no.	Material type	Volume weight [kg / m3]	Loading height* [m]	
			From	to
1	Root:			
2	raw potatoes	700 - 820	1.4	> 1.5
3	steamed mashed potatoes	850 - 950	1.2	1.3
4	dried potatoes	130 - 150	> 1.5	> 1.5
5	sugar beet - roots	560 - 720	> 1.5	> 1.5
6	fodder beet - roots	500 - 700	> 1.5	> 1.5
7	Organic fertilizers:			
8	Old manure	700 - 800	1.4	> 1.5
9	Long laying manure	800 - 900	1.2	1.4
10	Fresh manure	700 - 750	1.5	> 1.5

11	compost	950 – 1 100	1.0	1.2
12	dry peat	500 - 600	> 1.5	> 1.5
13	Mineral fertilizers:			
14	ammonium sulfate	800 - 850	1.3	1.4
15	potassium salt	1 100 – 1 200	0.9	1.0
16	superphosphate	850 – 1 440	0.8	1.3
17	basic phosphate	2 000 – 2 300	0.5	0.6
18	potassium sulphate	1 200 – 1 300	0.9	0.9
19	kainite	1,050 – 1 440	0.8	1.1
20	lime-rich ground fertilizer	1,250 - 1,300	0.9	0.9
21	Building Materials:			
22	cement	1 200 – 1 300	0.9	0.9
23	dry sand	1 350 – 1 650	0.7	0.8
24	wet sand	1 700 – 2 050	0.5	0.7
25	Full bricks	1 500 – 2 100	0.5	0.7
26	hollow bricks	1 000 – 1 200	0.9	1.1
27	stone	1 500 – 2 200	0.5	0.7
28	Soft wood	300 - 450	> 1.5	> 1.5
29	Hard timber	500 - 600	> 1.5	> 1.5
30	impregnated timber	600 - 800	1.4	> 1.5
31	steel structures	700 – 7 000	0.2	> 1.5
32	roasted ground lime	700 - 800	1.4	> 1.5
33	Slag	650 - 750	1.5	> 1.5
34	Gravel	1 600 – 1 800	0.6	0.7
35	plant litter and roughage:			

36	dry meadow hay for swath	10 - 18	> 1.5	> 1.5
37	hay wilted for swath	15 - 25	> 1.5	> 1.5
38	hay in a collective trailer (dry withered)	50 - 80	> 1.5	> 1.5
39	cut wilted hay	60 - 70	> 1.5	> 1.5
40	compressed dry hay	120 - 150	> 1.5	> 1.5
41	pressed wilted hay	200 - 290	> 1.5	> 1.5
42	stored dry hay	50 - 90	> 1.5	> 1.5
43	stored cut hay	90 - 150	> 1.5	> 1.5
44	clover (Lucerne), wilted for swath	20 - 25	> 1.5	> 1.5
45	clover (Lucerne), wilted cut on the trailer	110 - 160	> 1.5	> 1.5
46	clover (Lucerne), wilted on the collective trailer	60 - 100	> 1.5	> 1.5
47	stored dry clover	40 - 60	> 1.5	> 1.5
48	cut stored dry clover	80 - 140	> 1.5	> 1.5
49	dry straw in rolls	8 - 15	> 1.5	> 1.5
50	moist straw in rolls	15 - 20	> 1.5	> 1.5
51	damp straw cut on a volumetric trailer	50 - 80	> 1.5	> 1.5
52	dry straw cut on a volumetric trailer	20 - 40	> 1.5	> 1.5
53	dry straw on a collective trailer	50 - 90	> 1.5	> 1.5
54	Dry straw cut in a haystack	40 - 100	> 1.5	> 1.5
55	compressed straw (low degree of deformation)	80 - 90	> 1.5	> 1.5
56	compressed straw (high degree of deformation)	110 - 150	> 1.5	> 1.5
57	grain mass in rolls	20 - 25	> 1.5	> 1.5
58	grain mass cut on a volumetric trailer	35 - 75	> 1.5	> 1.5
59	grain mass on a collective trailer	60 - 100	> 1.5	> 1.5
60	green forage for swath	28 - 35	> 1.5	> 1.5

61	green forage cut on a volumetric trailer	150 - 400	> 1.5	> 1.5
62	green forage on a collective trailer	120 - 270	> 1.5	> 1.5
63	Fresh beet leaves	140 - 160	> 1.5	> 1.5
64	Freshly cut beet leaves	350 - 400	> 1.5	> 1.5
65	beet leaves on a collective trailer	180 - 250	> 1.5	> 1.5
66	Concentrated feed and compound feed:			
67	stored husks	200 - 225	> 1.5	> 1.5
68	oilcake	880 – 1 000	1.1	1.3
69	Ground fascine	170 - 185	> 1.5	> 1.5
70	Compound feed	450 - 650	> 1.5	> 1.5
71	Mineral feedingstuffs	1 100 – 1 300	0.9	1.0
72	Oat middling	380 - 410	> 1.5	> 1.5
73	wet beet skins	830 - 1,000	1.1	1.4
74	Extruded beet skins	750 - 800	1.4	1.5
75	Dry beet skins	350 - 400	> 1.5	> 1.5
76	bran	320 - 600	> 1.5	> 1.5
77	bone meal	700 – 1 000	1.1	> 1.5
78	Fodder salt	1 100 – 1 200	0.9	1.0
79	molasses	1 350 – 1 450	0.8	0.8
80	Silage (lower silo)	650 – 1 050	1.1	> 1.5
81	hay silage (tower silo)	550 - 750	1.5	> 1.5
82	Seeds:			
83	Vicia faba	750 - 850	1.3	1.5
84	charlock	600 - 700	> 1.5	> 1.5
85	pea	650 - 750	1.5	> 1.5

86	lentil	750 - 860	1.3	1.5
87	bean	780 - 870	1.3	1.4
88	barley	600 - 750	1.5	> 1.5
89	clover	700 - 800	1.4	> 1.5
90	grass	360 - 500	> 1.5	> 1.5
91	corn	700 - 850	1.3	> 1.5
92	wheat	720 - 830	1.4	> 1.5
93	rape	600 - 750	1.5	> 1.5
94	flax	640 - 750	1.5	> 1.5
95	lupine	700 - 800	1.4	> 1.5
96	oat	400 - 530	> 1.5	> 1.5
97	Lucerne	760 - 800	1.4	1.5
98	rye	640 - 760	1.5	> 1.5
99	Other:			
100	dry soil	1 300 – 1 400	0.8	0.9
101	Wet soil	1 900 – 2 100	0.5	0.6
102	fresh peat	700 - 850	> 1.5	1.3
103	Gardening soil	250 - 350	> 1.5	> 1.5

Source: "The technology of machine works in agriculture", PWN, Warsaw 1985

* - the loading height no higher than 5 cm above the height of the walls

* - Material is to be charged according to the table of the goods mass

NOTE!

NOTE!

It is advised to aim at an even distribution of the load in the loading crate.

NOTE!

NOTE!

It is prohibited to exceed the admissible spreader load, because it threatens the safety of road traffic and might cause damage to the machine.

 NOTE!	NOTE! Overloading the spreader, incompetent loading are the most common causes of accidents during transport. The load must be arranged so as not to threaten the stability of the spreader and not obstruct driving the set. The distribution of the load cannot cause an overload of the chassis, and the spreader's hitching system.

 NOTE!	NOTE! Observe strictly that there are no bystanders in the loading zone and when turning on the adapter. Before commencing the loading of the spreader and during its work, ensure that there is proper visibility and make sure that there are no bystanders nearby.

4.3.6 Load transport

When driving on roads (public and private) you must adapt to the road traffic regulations in force in the given country, be guided by prudence and reasonable conduct. Below are the most important tips to drive the tractor with an attached spreader.

- Before starting, make sure that in the vicinity of the spreader and the tractor there are no bystanders. Ensure sufficient visibility.

 NOTE!	NOTE! Before driving, make sure that: • the spreader braking system is connected to the tractor and works properly • the spreader hydraulic system is connected to the tractor and works properly • the spreader's electric installation is connected to the tractor and works properly • all the elements of the spreader are in good general condition (no mechanical defects)

- Do not exceed the maximum construction speed and speed limitations resulting from road traffic law. The travel speed must be adapted to the prevailing road conditions, spreader load, type of cargo and other conditions.
- During travel on public roads the spreader must be marked with a plate distinguishing slow-moving vehicles, placed on the guard.
- The operator of the tractor is obliged to equip the spreader with a certified or approved warning sign in accordance with applicable regulations of the country in which it is driven.
- When driving, observe the traffic rules, signal the change of direction with the help of indication,
- The lighting and signaling installation should be kept clean and it is advised to take care of its technical condition.
- Damaged or lost lighting and signaling elements are to be immediately repaired or replaced.
- Avoid ruts, depressions, ditches or driving on slopes of the road. Driving through such obstacles can cause sudden tilting of the spreader and tractor. This is particularly important because the center of gravity of the spreader with the load (especially with a volumetric load), adversely affects the safety.

Driving near the edge of ditches or canals is dangerous because of the risk of landslides under the wheels of the spreader or tractor.

- The driving speed must be reduced early enough before driving to the corners, when driving on uneven or sloping terrain.
- When driving avoid sharp corners, especially on slopes.
- Please note that the braking system increases significantly with increasing mass of the traffic load and increase in speed.
- Control the behavior of the spreader while driving on uneven terrain, and adjust the speed to terrain and traffic conditions.
- The spreader is adapted for driving on slopes of maximally up to 8°. Moving the spreader through the grounds of steeper slopes may cause the spreader to tip over as a result of loss of stability. Prolonged moving on an incline poses a risk of loss of braking efficiency.

4.3.7 Adjustment of fertilizer dose and manure spreading

Factors affecting the amount of material spread over a specific area:

- driving speed,
- cargo box loading height,
- floor conveyor belt advance speed,
- effective spreading width.

 NOTE!	NOTE! The conveyor's speed should be adjusted to the spread material. In the case where the floor conveyor's speed is not adjusted to the type of spread manure, the spreading adapter may become clogged and jammed/stopped, which may result in decoupling of or damage to the clutch securing the adapter's transmission.

The advance rate of the floor conveyor should be selected experimentally and adjusted using the flow regulator knob. The regulator is found on the front of the cargo box.

Floor conveyor speed regulation:

- turning the regulator knob clockwise to the "0" setting – reduces conveyor speed;
- turning the regulator knob counterclockwise to the "10" setting – increases conveyor speed.

Starting manure spreading:

- set the spreader and tractor to drive forward at the location where manure spreading is to be performed,
- open the adapter's deflector,

- set the tractor's PTO to the proper range of revolutions,
- turn on the tractor's PTO at low engine revolutions, then increase revolutions until the proper revolutions of the adapter's rotors are obtained,
- raise the rear wall (lock) of the cargo box to its maximum height,
- start the floor conveyor's drive, pay attention to the direction of movement,
- start moving the tractor when sufficient manure is supplied to the adapter's rotors.

Ending manure spreading:

- at the end of spreading, lower the rear wall to the height of the moving material,
- in order to spread the material evenly in the final phase of spreading, reduce the speed of the set or change the conveyor's advance speed,
- turn off the conveyor's drive after the spreader's cargo box is completely empty,
- lower the rear wall (lock) of the cargo box,
- reduce the engine's revolutions and turn off the PTO,
- close the adapter's deflector, when driving on public roads, the deflector should be collapsed in the transport position,
- after every spreading, when driving on public roads, the spreader must be cleaned in order to avoid polluting the road.

4.3.7 Unloading of the crate serving as a transporter.

Before unloading the loading crate of the spreader / transporter you should:
- Check that the area around the spreader / transporter is safe
- Before raising / opening the rear wall you must absolutely use the beep twice (honk)
- Open the rear wall
- Turn on the conveyor feed
- after unloading turn off the conveyor feed
- using the beep signal twice, signal the willingness to close the wall
- Close the rear wall

 NOTE!	NOTE! Be extremely careful when opening and closing the walls and dump windows because of the risk of crushing the fingers or hands.

4.3.8 Adjustment of fertilizer dose and manure spreading

Factors affecting the amount of material spread over a specific area:

- driving speed,

- cargo box loading height,
- floor conveyor belt advance speed,
- effective spreading width.

NOTE!	NOTE! The conveyor's speed should be adjusted to the spread material. In the case where the floor conveyor's speed is not adjusted to the type of spread manure, the spreading adapter may become clogged and jammed/stopped, which may result in decoupling of or damage to the clutch securing the adapter's transmission.

The advance rate of the floor conveyor should be selected experimentally and adjusted using the flow regulator knob. The regulator is found on the front of the cargo box.

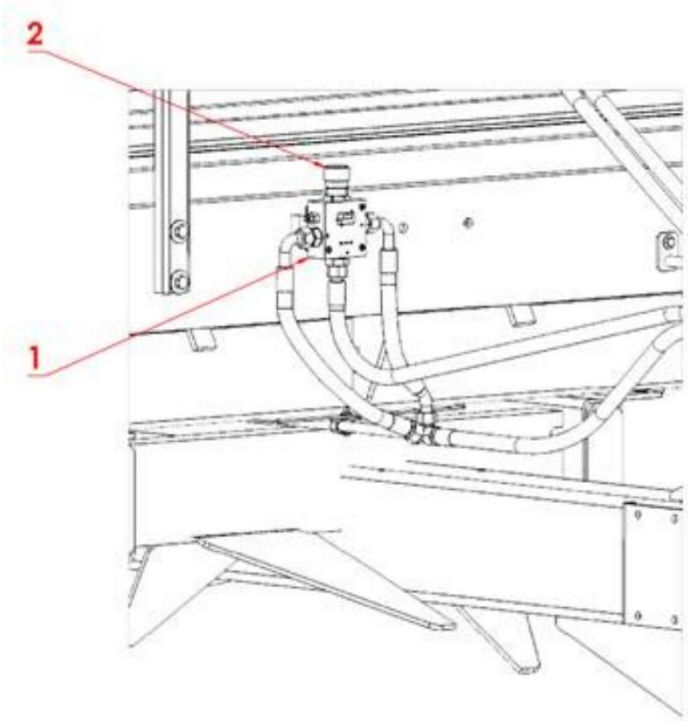

Figure 24. Floor conveyor speed adjustment
1 – flow regulator, 2 – regulator knob

Floor conveyor speed regulation:

- turning the regulator knob clockwise to the "0" setting – reduces conveyor speed;

- turning the regulator knob counterclockwise to the "10" setting – increases conveyor speed.

Starting manure spreading:

- set the spreader and tractor to drive forward at the location where manure spreading is to be performed,
- open the adapter's deflector,
- set the tractor's PTO to the proper range of revolutions,
- turn on the tractor's PTO at low engine revolutions, then increase revolutions until the proper revolutions of the adapter's rotors are obtained,
- raise the rear wall (lock) of the cargo box to its maximum height,
- start the floor conveyor's drive, pay attention to the direction of movement,
- start moving the tractor when sufficient manure is supplied to the adapter's rotors.

Ending manure spreading:

- at the end of spreading, lower the rear wall to the height of the moving material,
- in order to spread the material evenly in the final phase of spreading, reduce the speed of the set or change the conveyor's advance speed,
- turn off the conveyor's drive after the spreader's cargo box is completely empty,
- lower the rear wall (lock) of the cargo box,
- reduce the engine's revolutions and turn off the PTO,
- close the adapter's deflector, when driving on public roads, the deflector should be collapsed in the transport position,
- after every spreading, when driving on public roads, the spreader must be cleaned in order to avoid polluting the road.

5. Equipment and accessories

Table 6 Spreader equipment

Equipment	Standard	Option
User manual	•	
Warranty Card	•	
Connecting cable of the electrical system	•	
Chocks under wheels	•	
Two-wire pneumatic installation		•
Extensions of the loading crate		•
Electrical installation with LED lamps		•
Toolbox		•
Signboard distinguishing slow-moving vehicles		•
PTO		•
Warning triangle		•
Distinguishing table		•

6. Technical Support

When using the spreader, constant monitoring of the technical condition and the execution of maintenance procedures that will keep the machine in good condition is needed
Technical condition. Therefore, the user of the spreader is obliged to perform all maintenance and regulatory tasks specified by the Manufacturer.

In order to function properly and to avoid serious failure of the spreader, it must be kept in good technical condition, repaired on time and reasonably exploited (operation within the technical parameters of the spreader).

An important element of the operation is the daily maintenance of the spreader (before commencing work), it foresees:

- Control of tightening the screw connections and securing them against unauthorized untightening (table of screw tightening torques),
- Checking the tightness of the hydraulic system
- Checking the tightness of the pneumatic system,
- Checking the correct operation of mechanisms (conveyor feed).
- Check the functioning of the brake system,
- Check the functioning of the electrical system,
- Checking and performance of lubrication, as indicated by the instructions,
- Checking the tire pressure,
- checking the wall and extensions lock - whether they are properly closed and secured and there is no risk of spontaneous opening

Any faults detected should be removed on a regular basis, use of the spreader even with a slight failure could have serious consequences.

 NOTE!	NOTE! If you need to lift the wheels of the spreader, observe the following rules: The spreader attached to the tractor is to be set in the direction for driving straight ahead on a flat, paved ground and then tractor should be braked. Under the wheels, which will not be lifted, plant securing chocks. Place a lift under the axle close to the lifted wheel and raise the axle so that the wheel does not touch the ground. Protect the spreader from collapsing to the ground by placing a platform of the right height under the axis

 NOTE!	NOTE! In the case of noting any irregularities in the operation or damage to systems or assemblies of the spreader, the machine must be taken out of use until repair and removal of defects. It is forbidden to carry out service and repair work under a burdened loading

	crate and with the tractor engine running. All maintenance and repair tasks should be performed with the general principles of health and safety. In the case of injury, the wound should immediately be washed and disinfected. In the case of serious injuries, consult a physician. All maintenance work performed after disconnecting the PTO.

Table 7: Orientational tightening torques for screws

Metric thread	Screw class		
	5.8	8.8	10.9
	Nm		
M6	5	7	11
M8	12	18	26
M10	23	35	52
M12	40	60	89
M14	64	98	144
M16	95	145	213
M18	133	209	297
M20	186	292	416
M22	247	389	553
M24	320	502	715
M27	464	729	1039
M30	634	997	1420

6.1 Regulation of driving wheel bearings backlash.

In a newly purchased machine, after the first 100 km, while during further use - after driving another 1500-2000 km - check and if necessary adjust the backlash of the wheel bearings. To do this you need to:

- Connect the spreader to the tractor, set such a set on a hard surface in the direction of driving straight ahead...
- Brake the trailer.
- Place the blocking wedges under the wheels of a spreader, raise the spreader wheel on the opposite side of the wedges so that the wheel does not touch the ground and secure it from falling.

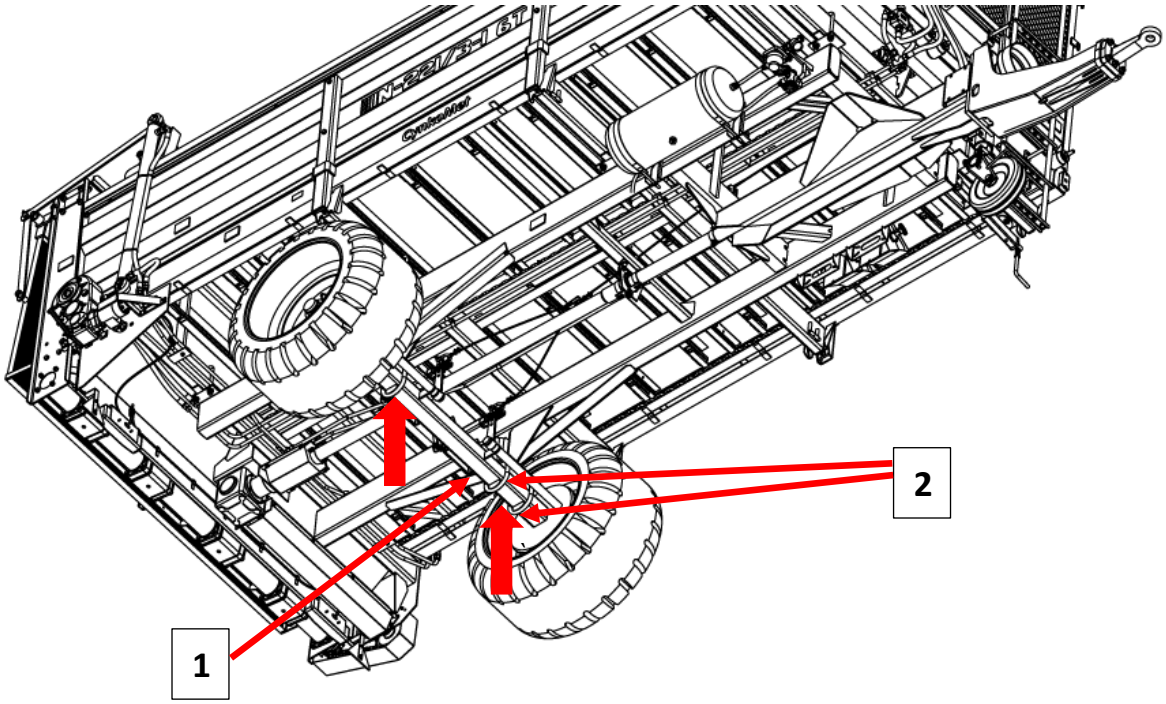

Figure 25. Conveyor support point
1 – axle, 2 – glomerular bolts

- Check the backlash:
- By turning the wheel slowly in both directions, check that movement is smooth, and if the wheel rotates without excessive resistance and jams
- Spinning the wheel so that rotates very quickly, check that the bearings do not make unnatural sounds.
- Moving the wheel, try to feel the backlash.
- Repeat for each wheel individually, remembering that the lift must be on the opposite side of the wedges
- If the wheel shows excessive backlash, a regulation should be carried out:
- remove the hub cap by prying it out with a screwdriver in several places around the circumference and remove the cotter pin of the castellated nut.
- Turning the wheel, simultaneously tighten the castellated nut until the wheel stops completely.
- Unscrew the nut by 1/6 -1/3 turn, until covering the next groove on the pin with a hole in the pivot. The wheel should turn without excessive resistance, the nut cannot be tightened too much. It is not recommended to use too strong pressure due to the deterioration of the working conditions of bearings.
- Secure the nut with a new cotter pin, and firmly press the hub cap.
- The mentioned steps should be repeated checking the remaining wheels.

- The wheel, after correct adjustment of the bearings should turn smoothly without stops and perceptible resistance.
- The correctness of the bearings' backlash adjustment must be finally checked after the spreader has driven a few kilometers, by manually checking the degree of the hubs' heating.
- The cause of the occurrence of significant resistance when turning the wheel, and strong heating of the hubs apart from improper adjustment of the bearings backlash can be contaminants in the lubricant or bearing damage. The above symptoms require dismantling the wheel hub and removing the fault (replacement of grease or bearings).

6.2 Mounting and removal of the wheel and inspection of nut tightening.

In order to remove the wheel, perform the following steps:

- Immobilize the spreader with a parking brake.
- Place locking chocks on the side of the spreader opposite to the wheel to be removed (Fig. 4).
- Make sure that the spreader has been correctly immobilized and that there is no risk of rolling during wheel removal.
- Loosen the nut of the wheel to be removed.
- Place a jack under the axle near the wheel to be dismantled and raise the spreader to the height required in order for the wheel to turn freely.

 NOTE!	NOTE! The jack must: • Have suitable capacity. • Be operable. • Be set on a hard, level surface.

- Loosen the wheel nuts.
- Remove the wheel.

Follow these steps to mount the wheel:

- Clean the pins and nuts and check their condition. If necessary, replace them with new ones. DO NOT USE lubricants on wheel nuts and pins.
- Mount the wheel on the hub and tighten the nuts so that the rim tightly adheres to the hub.
- Lower the spreader.
- Tighten the nuts using suitable torque.

 NOTE!	NOTE! Wheel nuts should be tightened with the following torque: - nuts with M18x1.5 thread – 270–290 Nm - nuts with M20x1.5 thread – 350–380 Nm - nuts with M22x1.5 thread – 450–510 Nm.

Wheel nuts should be tightened gradually and diagonally until suitable torque is reached. Use a torque wrench to tighten the wheel nuts.

If you do not have a torque wrench, use a regular wrench with a suitable adapter. Table 9 indicates the approximate weight to be applied at the end of the adapter depending on its length to achieve suitable torque. This method is not as accurate as using the torque wrench.

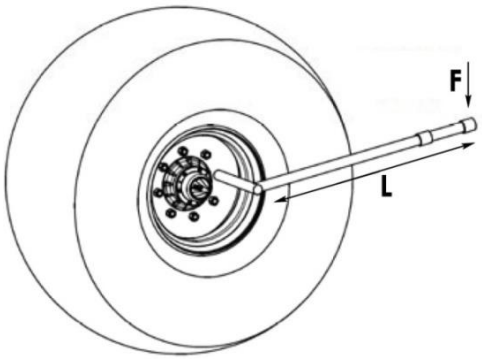

Figure 26. Wheel nut tightening.

Table 8. Data for key extension

Nut tightening torque	Wrench adapter length	Weight at the end of the adapter
[Nm]	[mm]	[kg]
360	600	60
	510	70
	350	80
	400	90
	360	100

NOTE!	NOTE! Wheel nuts cannot be tightened with an impact wrench because this could result in exceeding the permissible torque and damage the nut and/or pin.

NOTE!	NOTE! Check wheel nut tightening in the following situations: 1. After spreader purchase 2. After the test drive 3. After the first 5 km of driving with the loaded spreader 4. After every 50 hours of spreader driving or once a week. Repeat items 2–3 every time the wheel is removed and mounted.

6.3 Brake inspection after spreader purchase.

After purchasing the spreader, the user is obliged to conduct a general inspection of the spreader's brakes.

Assistance of a second person will be required to conduct the inspection in order to activate the spreader's brakes from the tractor:

- Connect the spreader to the tractor and place chocks under the wheels (Fig. 5).
- Check if the driving axles are complete. In particular, check the visible brake components (clip pins in the castellated nuts, expansion rings, etc.).
- Check the brake cylinders for leaks.
- Check the method of installation of brake cylinders.
- Engage and release the service brake and the parking brake. The expander arm (3) should move and return without any significant resistance and jamming.

 NOTE!	NOTE! Do not use the spreader with an inoperable brake system.

6.4 Brake adjustment.

Brakes regulation should be carried out if:

- brakes of both wheels brake unevenly and / or non-simultaneously.
- expander levers are not parallel to each other during braking.
- a repair of the brake system was carried out.

With properly adjusted brakes, complete braking of both wheels should take place at the same time.

- Version I:

Brakes adjustment involves changing the position of expander arm 1 (fig. 27) with respect to the expander roller 2. To do this, remove the retaining ring 3 of roller 2, and then remove arm 1 of shaft 2. Then move the expander arm on the conjunction with the roller by one or more teeth in the right direction, namely:

- back - if the brake is too late;
- forward - if the brake is too early.

Once the proper position of the arm 1 is achieved relative to expander roller 2, you must insert the retaining ring 3.

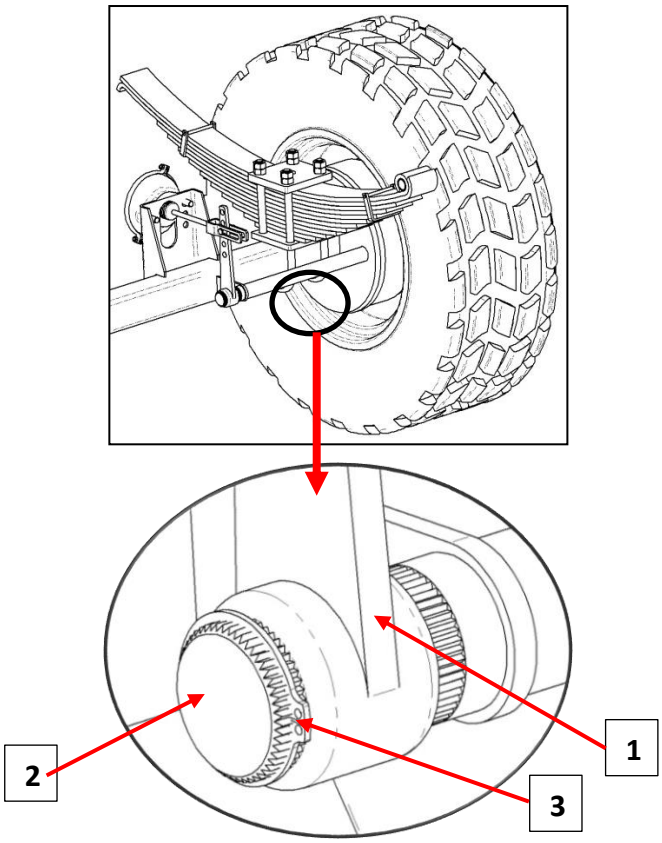

Figure 27. Brakes regulation

1 – expander arm, 2 – expander roller, 3 - retaining ring (Seger), 4 - hand brake cable, 5 – brake cylinder

- Version II:

Brake adjustment involves changing the position of the expander's lever (3) (Fig. 16) with respect to the expander roller (4). To do so, turn the adjusting screw (1) until you hear two clicks in the adjusting mechanism.

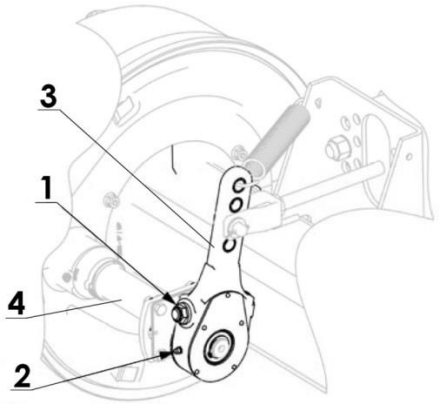

Figure 28. Brakes regulation

1 – adjusting screw; 2 – lubricating point; 3 – expander arm.

The adjustment should be conducted separately for each spreader wheel. After proper brake adjustment, at full braking, the expander arms should form an angle of about 90° with the piston rod of the actuator, and the spring should be about half the length of

the spring of the total piston rod. After releasing the brake, the expander arms may not be based on any structural elements, because too little withdrawal of the piston rod can cause friction of the jaws against the drum and result in overheating of the spreader's brakes. The expander arms arranged on one axis must be parallel to each other at full braking. If not, adjust the position of the lever, which has a longer spring. When removing, the actuator fork you must remember or mark the original setting of the swivel of the actuator fork. The mounting position is chosen by the manufacturer and cannot be changed.

6.5 Handling the break system.

As part of routine maintenance, check the tightness of the pneumatic system (pay most attention to places of all connections). If the conduits, seals or other components are damaged, compressed air will penetrate outside with a typical hiss. The damaged seals or conduits causing leaks should be replaced.

Periodically, remove the condensate gathering in the water from the air tank. For this purpose, pull out the mandrel of the drain valve at the bottom of the tank to the side The compressed air in the tank will push the water out. After releasing the mandrel, the valve should automatically close and stop the airflow from the tank.

Once a year, before the winter, unscrew the drain valve and clean off the accumulated dirt.

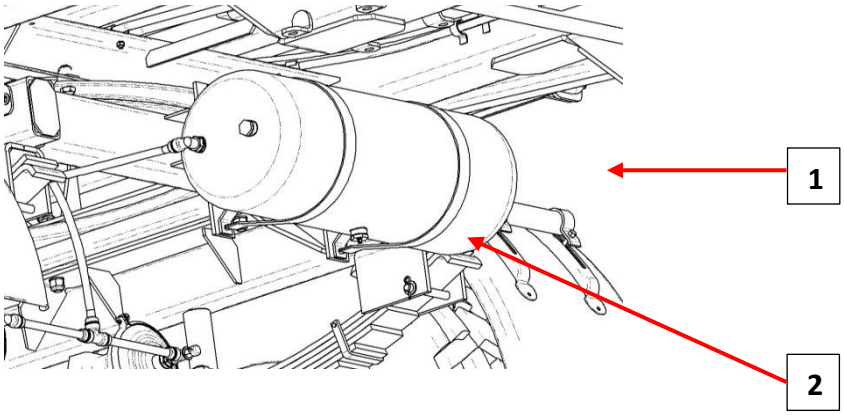

Fig. 29. Draining the air tank

1 - air tank, 2 drain valve

NOTE!	NOTE! Before dismantling the drain valve, reduce the pressure in the air tank.

Depending on the operating conditions of the spreader, but not less frequently than once every three months, remove and clean the air filter inserts, which are located on the connection cables of the pneumatic system. The inserts are reusable and cannot be replaced unless they are damaged by mechanical means.

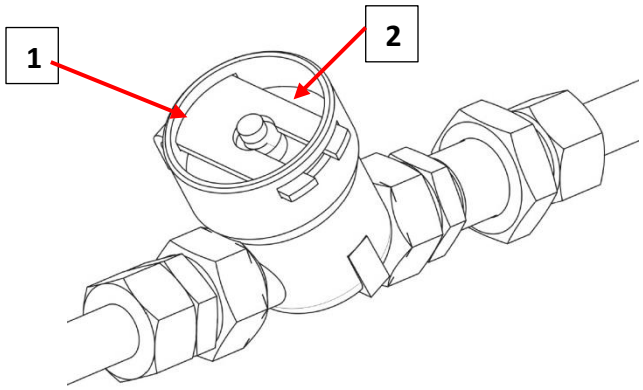

Fig. 30. Wired air filter

1 - filter cover protection, 2 - filter lid

NOTE!	NOTE! Before demounting the air filters, reduce the pressure in the brake system.

6.6 Hydraulic installation maintenance.

Always follow the principle that the oil in the spreader hydraulic system and the oil in the external hydraulic system of the tractor are to be of the same type. The use of different types of oil is not permitted.

The hydraulic system of the spreader should be completely tight. Checking the tightness of the hydraulic system consists of connecting the spreader to the tractor, running the hydraulic cylinder and storing it in the position of the maximum extension of the cylinder with the loading crate tilted for 30 seconds.

In the case of noticing oil leaks on connections of hydraulic conduits, you must tighten the connector, if this does not rectify the fault, replace the conduit or the connector with a new one. If the oil leak occurs beyond the connection, the leaking conduit system should be replaced. Exchange of a component to a new one is also required for any damage of mechanical nature.

Hydraulic hoses should be replaced at least every four to six years from their date of manufacture, unless previously found to be damaged and replaced.

In the case of noting oiling on the body of the hydraulic cylinder, check the nature of the leak. When fully taking out the cylinder actuator, check all sealing places. Minor leaks with symptoms of "sweating" are acceptable, but if you see a leak of a "drip" type, you must stop the spreader's operation and repair the failure.

NOTE!	NOTE! The state of the hydraulic system should be controlled up to date during its use. Using a spreader with a leaking hydraulic system is unacceptable.

6.7 Adapter maintenance

Use of the adapter is based on controlling the current state of the elements cooperating

directly with the spread material (knives, scattering strips), and used to cover the drums adapter (guards)

6.8 Operation of the floor conveyor

The work associated with operating the conveyor consists of checking the technical conditions: front and rear socket wheels, the state of the chain, tearing points and bearing elements of the conveyor. Check that the socket wheels are not damaged, cracked. Check that the scrapers mounted on the back beam are not damaged, if the bolts that secure them are not loose.

Checking the condition of the chain to see if it is not extended is based on lifting it in the middle part of its length from the top side (on the floor panel) to the top. Is this amount not too large and does not exceed 50 mm. If this height does not exceed 50 mm and the tensioner is able to move forward (gut of the tensioner), adjust the chain tension by screwing the nut on the tensioner.

In the case of exceeding the height by 50 mm and lack of space for the possibility of tensioning the chain with a tensioner, it is advisable to shorten the conveyor chain by 2 links.

Shortening the chain consists of releasing the connecting links of the chain, cutting 2 links so that the final link is in a horizontal position (with the hole up) and again, connecting the chain with the connecting link. In case of insufficient effect of tension, this action should be repeated shortening the chain by another 2 links. The chains must be shortened in pairs by the same number of links.

Shortening should be done with extreme care with maintaining compliance with the basic safety rules and using personal protective equipment.

 NOTE!	NOTE! It is essential before each use to check the state of tension of the chains and their technical condition (the thickness of the cells, whether the cells are not kneaded)

 NOTE!	NOTE! Is absolutely forbidden to start the conveyor loaded with material (e.g. manure, peat, lime, etc.) with the power adapter on and a closed rear wall. Failure to do so may cause irreparable damage to the adapter and your warranty.

6.9 Handling electrical equipment.

The work connected with the repair, replacement or regeneration of electrical components should be entrusted to specialized workshops, which have the appropriate technology and qualifications for this type of work.

The duties of the user include only:

- Technical inspection of electrical installations and reflectors,
- Replacing light bulbs.

NOTE!	NOTE! Driving with a faulty lighting system is prohibited. Damaged shades, and burned-out bulbs must be replaced immediately before driving. Lost or damaged reflective lights must be replaced with new ones.

6.10 Lubrication.

Lubrication of the spreader should be carried out in the points specified in figures 31, 32, 33 and listed in tables 8, 9, 10.

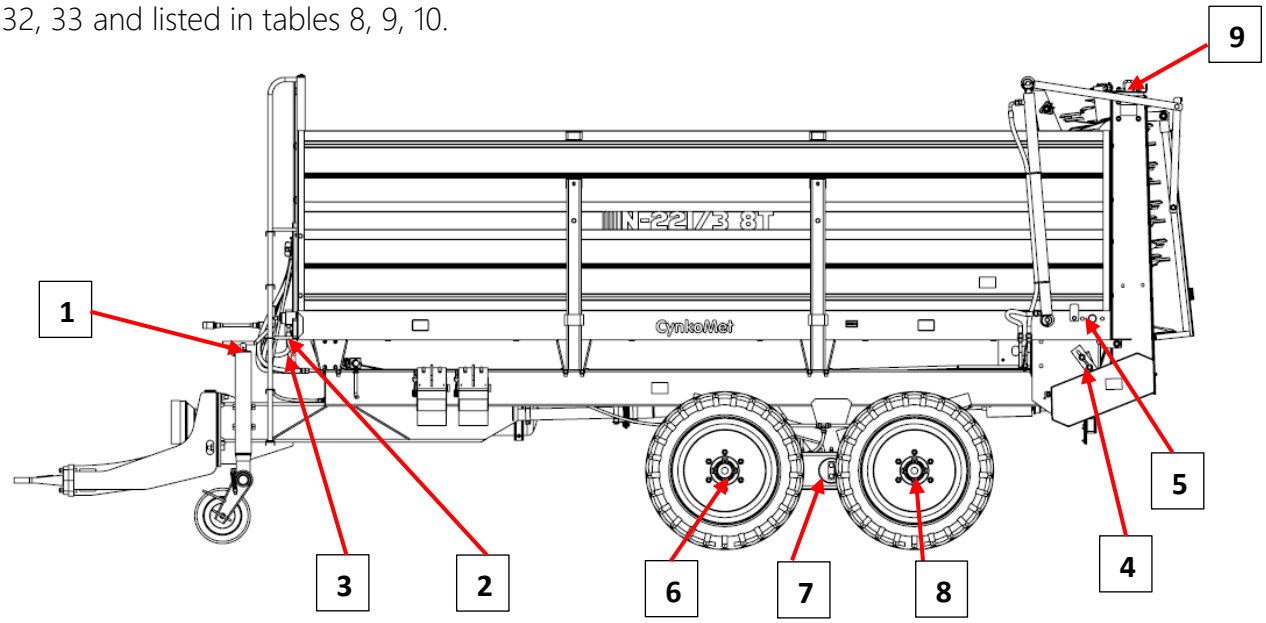

Fig. 31. Lubrication points of N-221/3 spreader

1 – Support screw, 2 – Hand brake crank screw, 3 – Tensioner pin for the floor conveyor, 4 – Tensioner pulley, 5 – Rear shaft bearings, 6 – Wheel bearings, 7 – Rocker axle, 8 – Expander rods, 9 – Upper adapter bearings.

Table 9. The frequency and method of lubrication of the N-221/3 spreader

No. in fig.31	Place of lubrication	Number of lubrication points	Grease type	The frequency and method of lubrication
1	Support screw	1	Solid grease	Every 3-4 months.
2	Screw of the parking brake crank	1	Solid grease	Every 3-4 months.
3	Tensioner pin for the floor conveyor,	4	Solid grease	Every 8h of work
4	Tensioner pulley	1	Solid	Every 8h of operation

			grease	(lubricated version)
5	Rear shaft bearings	3	Solid grease	Every 8 hours of work
6	Wheel bearings	4	Solid grease	Fill the grease every 6 months.
7	Rocker axle	2	Solid grease	Every 24 hours of work.
8	Expanders bars	2	Solid grease	Fill the grease every 6 months.
9	Upper adapter bearings	4	Solid grease	Every 24 hours of work.

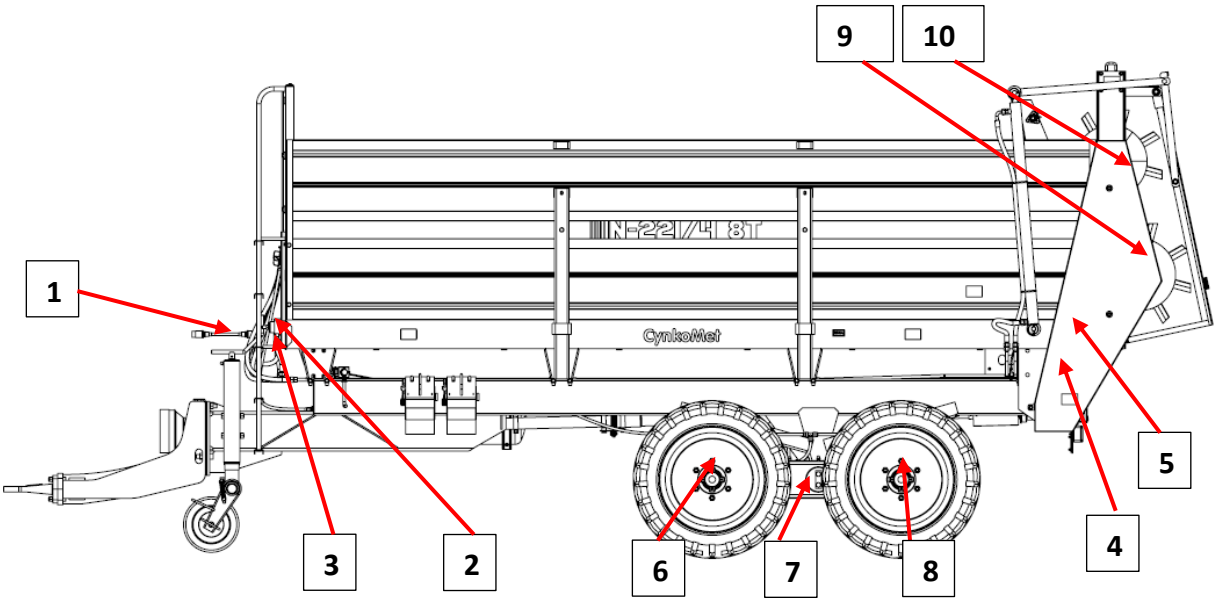

Fig. 32. Lubrication points of N-221/4 spreader

1 – Support screw, 2 – Hand brake crank screw, 3 – Tensioner pin for the floor conveyor, 4 – Tensioner pulley, 5 – Rear shaft bearings, 6 – Wheel bearings, 7 – Rocker axle, 8 – Expander dowels, 9 – Bearings of the lower drum, 10 – Bearings of the upper drum

Table 10. The frequency and method of lubrication of the N-221/4 spreader

No. on fig.32	Place of lubrication	Number of lubrication points	Grease type	The frequency and method of lubrication
1	Support screw	1	Solid grease	Every 3-4 months.

2	Screw of the parking brake crank	1	Solid grease	Every 3-4 months.
3	Tensioner pin for the floor conveyor,	4	Solid grease	Every 8h of work
4	Tensioner pulley	1	Solid grease	Every 8h of operation (lubricated version)
5	Rear shaft bearings	3	Solid grease	Every 8 hours of work
6	Wheel bearings	4	Solid grease	Fill the grease every 6 months.
7	Rocker axle	2	Solid grease	Every 24 hours of work.
8	Expanders bars	8	Solid grease	Fill the grease every 6 months.
9	Lower drum bearings	2	Solid grease	Every 24 hours of work
10	Upper drum bearings	2	Solid grease	Every 24 hours of work

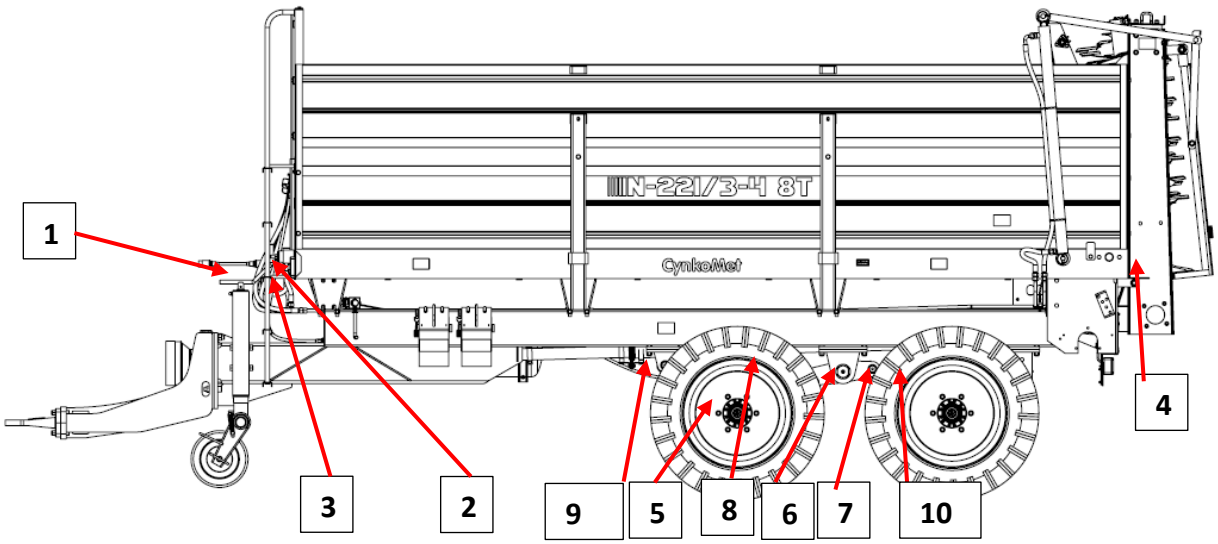

Fig. 33. Lubrication points of N-221/3-4 spreader

1 – Support screw, 2 – Hand brake crank screw, 3 – Tensioner pin for the floor conveyor, 4 – Rear shaft bearings, 5 – Wheel bearings, 6 – Rocker axle, 7 – Suspension spring pins, 8 - Spring leafs, 9 – spring bearing plates, 10 – Expander dowels

Table 11. The frequency and method of lubrication of the N-221/3-4 spreader

No. in fig.33	Place of lubrication	Number of lubrication	Grease type	The frequency and method of

		points		lubrication
1	Support screw	1	Solid grease	Every 3-4 months.
2	Screw of the parking brake crank	1	Solid grease	Every 3-4 months.
3	Tensioner pin for the floor conveyor,	4	Solid grease	Every 8h of work
4	Rear shaft bearings	3	Solid grease	Every 8 hours of work
5	Wheel bearings	4	Solid grease	Fill the grease every 6 months.
6	Rocker axle	2	Solid grease	Every 24 hours of work.
7	Spring leaves swivels	4	Solid grease	Every 24 hours of work
8	Spring feathers	4	Solid grease	Every 6-8 months
9	Leaf spring sliders	4	Graphite grease	Every 3-4 months spread grease on the surface of the slider with a loaded leaf spring
10	Expanders bars	2	Solid grease	Fill the grease every 6 months.

Table 12. The frequency and method of lubrication of the spreader's mechanisms

No. in fig.34	Place of lubrication	Number of lubrication points	Grease type	The frequency and method of lubrication
1	Support screw	1	Solid grease	Every 3-4 months.
2	Screw of the parking brake crank	1	Solid grease	Every 3-4 months.
3	Tensioner pin for the floor conveyor,	4	Solid grease	Every 8h of work
4	Tensioner pulley	1	Solid grease	Every 8h of operation (lubricated version)
5	Rear shaft bearings	3	Solid grease	Every 8 hours of work
6	Wheel bearings	2	Solid grease	Every 3-4 months.
7	Expanders bars	2	Solid grease	Fill the grease every 6 months.
9	Upper adapter bearings (N-221/3-1)	4	Solid grease	Every 24 hours of work.

10	Lower drum bearings (N	2	Solid grease	Every 24 hours of work
11	Upper drum bearings	2	Solid grease	Every 24 hours of work

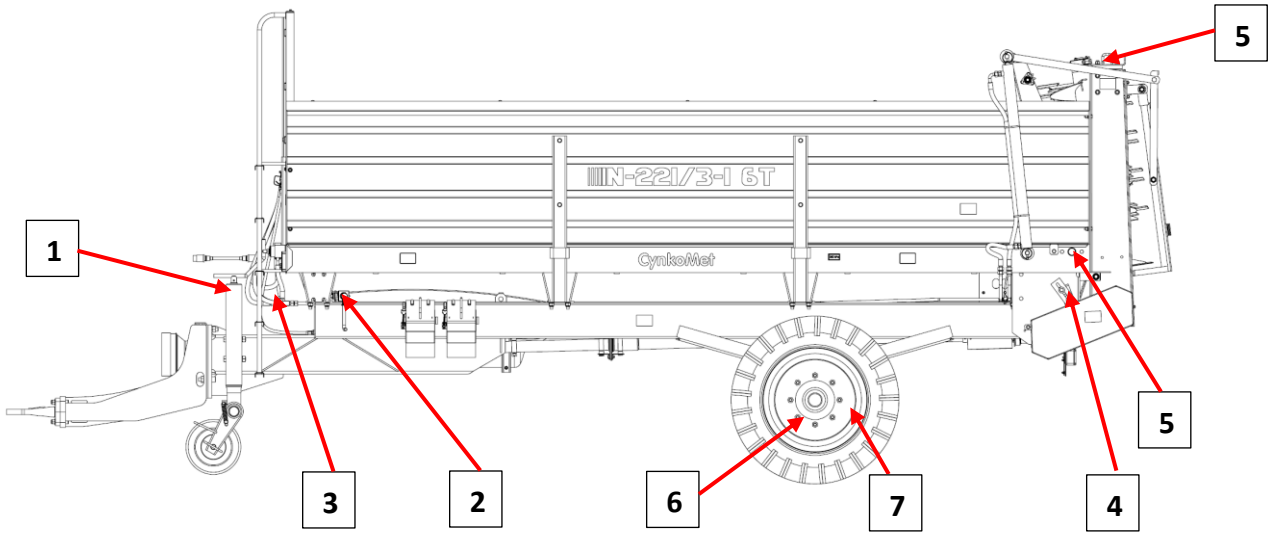

Figure 34. Lubrication points N-221/3-1

1 – Support screw, 2 – Hand brake crank screw, 3 – Tensioner pin for the floor conveyor, 4 – Tensioner pulley, 5 – Rear shaft bearings, 6 – Wheel bearings, 7 – Expander dowels

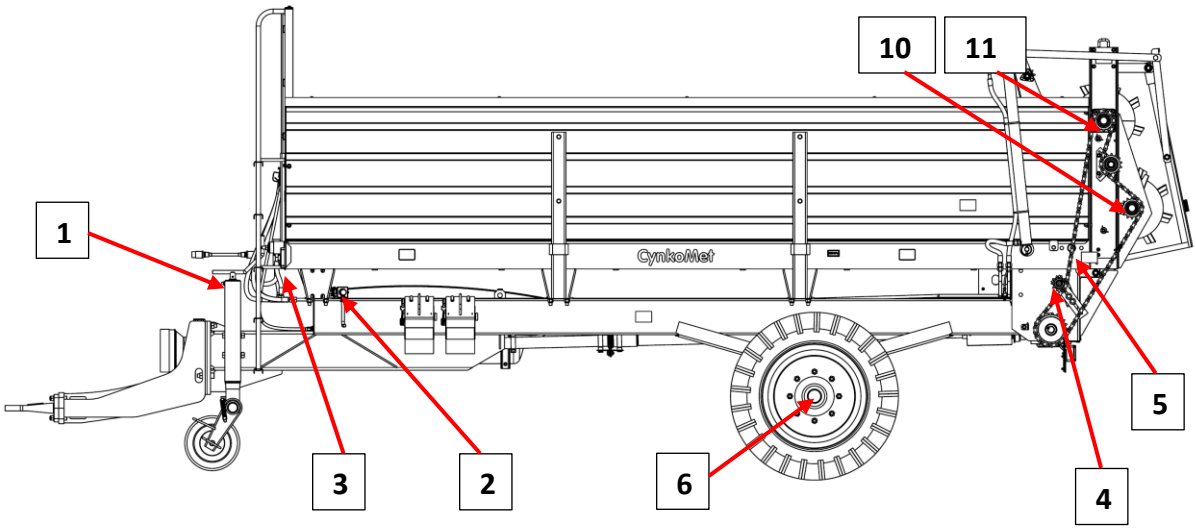

Figure 35. Lubrication points N-221/4-4

1 – Support screw, 2 – Hand brake crank screw, 3 – Tensioner pin for the floor conveyor, 4 – Tensioner pulley, 5 – Rear shaft bearings, 6 – Wheel bearings

Before commencing the lubrication of the grease fitting, the greased surfaces and places nearby lubrication points must be thoroughly cleaned of mud and dust. The grease should be injected in the grease fitting until release of fresh grease in the gaps between the mating parts.

6.11 Storage and maintenance.

After ending operation, the spreader must be carefully cleaned and washed with a stream of water, and then left it in a dry and ventilated area. In the event of failure of these actions on the zinc coating, dark and light gray areas (spots) may occur, which do not constitute grounds for complaint if the zinc coating still has the required minimum thickness (PN-EN ISO 1461: 2000). In the case of damage of the external paint coating, the damaged areas must be cleaned of rust and dust, degreased, and painted retaining the same color and uniform thickness of the protective coating. Until painting, the damaged areas should be covered with a thin layer of grease or anticorrosion preparation.

During a long break in the use of the spreader, it is desirable to place it indoors or in a covered, ventilated place. It is also advisable that the metal parts not coated with paint are secured with an anti-corrosion preparation of temporary protection or a layer of grease. During a long break in the use of the spreader, it cannot be loaded.

6.12 Troubleshooting.

Table 13. Faults and remedies

Failure	Reason	Way of removal
Problems with moving	Unconnected hoses Of the brake installation	Connect the brake hoses
	launched parking Brake	Release the parking brake.
	Damaged connection cables of the pneumatic system	Replace.
	Connections leakage	Tighten, replace washers or seal sets, replace the cables.
	Damaged control valve or brake force regulator	Check the valve, repair or replace it.
Noise in the hub of the driving Axle	Excessive clearance on the bearings	Check the neutral gear level and if necessary Regulate
	defective bearings	replace bearings
	damaged items	Replace
Low efficiency of the braking system Excessive heating of the driving axle hub	Pressure too low in the system	Check the pressure gauge on the tractor, wait till the compressor fills the tank to the required pressure.
	Improperly adjusted essential or parking brake	Adjust the position of the spreader arms
	Worn out brake linings	Replace the brake shoes
	Installation leakage.	Check the installation for leaks.
	Damaged air compressor in the tractor.	Repair or replace.
	Damaged brake valve in the	Repair or replace.

	tractor.	
Uneven feed	Damaged flow regulator	Replace
	Damage of the conveyor elements	Remove the damaged element, clean the socket wheel
Uneven spreading of the material on the box	No spreading element (the knife, scattering strip) or their damage	Replacement of the damaged item with a new one
Clogging adapter	Mismatched conveyor feed to the spread material	Adjust the feed conveyor in accordance with the spread material
	Mismatched conveyor feed to the spreader driving speed	Adjust the feed conveyor according to the vehicle speed
Improper operation of the hydraulic system	Improper hydraulic oil viscosity	Check the quality of oil, make sure that the oil in both machines is of the same type. If necessary, replace the oil in the tractor and / or spreader
	Insufficient efficiency of the tractor hydraulic pump, damaged tractor hydraulic pump.	Check the hydraulic pump on the tractor.
	Damaged or contaminated actuator	Check the cylinder piston (bending, corrosion), check the cylinder for tightness (piston rod sealing), if necessary, repair or replace the actuator.
	Too much actuator load	Check and, if necessary, reduce the load on the actuator
	Damaged hoses	Check to make sure that the hydraulic hoses are tight, not refracted and properly looped. If necessary, replace or tighten.

7. Transport

The spreader is prepared for sale in a complete state and does not require packing. The instruction manual of the machine and the cable connecting the electrical system, the PTO shaft only undergo packaging.

The supply of the spreader to the user is done by independent transport after connecting with the tractor or automobile (in this case, the spreader because of the height can be mounted on the platform of the transport mean on the hubs - with unscrewed and taken off wheels or on wheels, but with disassembled and folded upper extensions.

Loading and unloading of a spreader from a car should be carried out using the loading ramp with an agricultural tractor or using a crane, lever. During operation, observe the general safety rules with handling operations. Persons operating the reloading equipment must have the required permissions to use these devices.

When loading / unloading using the tractor, the spreader must be properly connected with the tractor according to the requirements contained in this manual. The spreader braking system must be running and tested before running off or driving on the ramp.

When loading / unloading using a crane or a lever, the spreader is to be lifted with the help of approved fasteners designed to carry the load with sufficient capacity. The belts must be in good condition, they cannot show any signs of damage.

The belts should be placed under the lower frame of the spreader in such places that when lifting the machine the belts do not have the possibility of moving, and the spreader when moving is not tilting. If there is a possibility of damage or frayed belts against components of the machine, put washers in sensitive areas.

In order to avoid compression of the walls to the inside the spreader, when loading with the use of a crane, use a special traverse, where the places of hooking the belts will be spaced wider than the total width of the machine.

The spreader should be attached firmly to the platform of the transport mean with belts, chains, lashing or other fastening means equipped with a tightening mechanism. The fasteners elements should be hooked in the designated transportation eyebolts (fig. 36) or permanent structural elements of the spreader (cross-braces, crossbars, etc.). Transport handles are welded to the chassis of the top frame, one pair on each side of the spreader. Use certified and technically efficient fastening means. Frayed belts, cracked mounting brackets, opened or corroded hooks or other damage may disqualify the given mean for use.

Under the wheels of the spreader chocks, it is advisable to put wooden beams or other elements without sharp edges, preventing the machine from rolling. The spreader wheels chocks must be attached to the loading platform of the car so as to prevent their shifting.

 NOTE!	NOTE! During car transport, the parking brake should be used in the spreader (parking brake action is described in section 4.2.4).

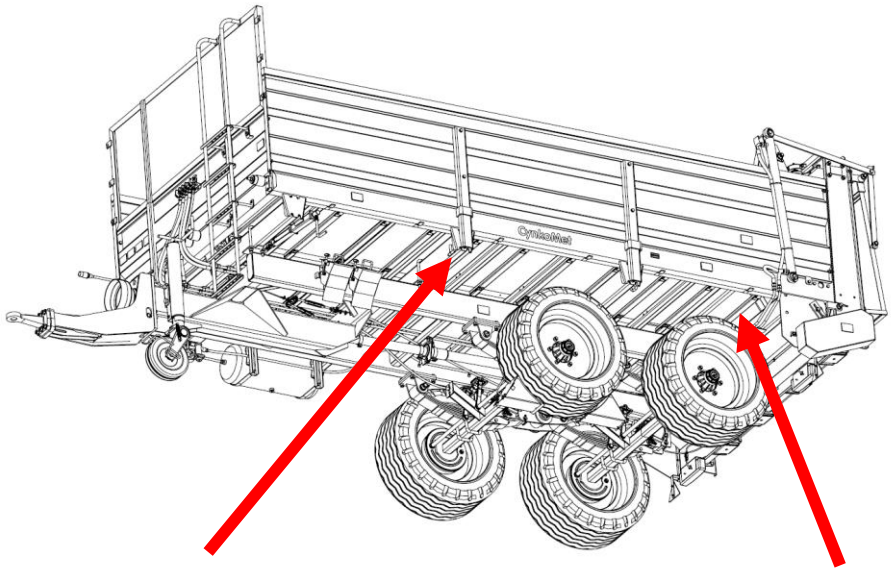

Fig. 36. Transport handles

	CAUTION! During independent transport, the trailer operator should be familiar with the contents of this manual and follow the recommendations contained in it. During road transport, the spreader is mounted on a platform of the transport mean in accordance with the manufacturer's technology. The driver of the car, while transporting the machine, should take extra caution. This is due to the upward movement of the vehicle's center of gravity with a loaded machine.

8. Spreader cassation

Should the user make a decision on cassation of the machine, he must pass the entire spreader to the scrap depot designated by the Governor or a Starost.

The dismounted parts remaining after repair of the spreader must be submitted to the collection point of recyclable materials.

9. Guarantee

"CYNKOMET" Sp. z o.o. in Czarna Białostocka ensures the smooth operation of the machine according to the technical-operational terms described in the operating manual. The condition of accepting a complaint is to follow all the recommendations contained in the General Warranty Terms and in the Operating and Use Manual.

10. Environmental hazard

Hydraulic oil leakage is a direct threat to the environment because of the limited biodegradability of the substance.

The created layer of oil on the water can a result of direct physical action on organisms, can cause change in the oxygen content in the water due to absence of direct contact of the air with water.

Maintenance - repair work at the time of which there is a risk of leakage should be performed in rooms with oil resistant surface.

In the event of an oil spill, you must first secure the source of the leak, and then collect the spilled oil using available means. Collect the oil residues using sorbents, or mix the oil with sand, sawdust or other absorbent materials. The collected oil waste should be kept in a sealed and marked container, resistant to hydrocarbons. The container should be kept away from heat sources, flammable materials and food.

 NOTE!	NOTE! Used hydraulic oil or gathered remains mixed with absorbent material should be stored in a carefully marked container. For this purpose, do not use food containers.

Used oil or unsuitable for reuse due to the loss of its properties should be stored in its original packaging in the same conditions as previously described. Oil waste must be transferred to a point taking care of recycling or oils regeneration. Waste code: 13 01 10. Detailed information concerning hydraulic oil can be found in the safety data sheet.

 NOTE!	NOTE! Oil waste can be delivered only to the point taking care of disposal or oils regeneration. It is forbidden to throw or pour oil into drains or water.

 NOTE!	NOTE! Is absolutely forbidden to start the conveyor loaded with material (e.g. manure, peat, lime, etc.) with the power adapter on and a closed rear wall. Failure to do so may cause irreparable damage to the adapter and your warranty.

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