



METAL-FACH



**MANURE SPREADER
N274 & N275**

**INSTRUCTIONS MANUAL
TRANSLATION OF THE ORIGINAL INSTRUCTIONS MANUAL
REVISION I
MAY 2018**



EC DECLARATION OF CONFORMITY

The undersigned,	Jacek Kucharewicz, Chairman of the Board,	
hereby declares, with full responsibility, that the complete machine		
MANURE SPREADER		
1.1.	Brand (trading name of the manufacturer)	Metal-Fach
1.2.	Type	N274, N275
1.2.1.	Variant	-
1.2.2.	Version	-
1.2.3.	Product name(s) (if any)	Manure Spreader
1.3.	Category, Subcategory and Vehicle-Speed Indicator	R
1.4.	Company name and manufacturer's address	Metal-Fach sp. z o.o. ul. Kresowa 62 16-100 Sokółka, Poland
1.4.2.	Name and address of the authorised representative of the manufacturer (if applicable)	-
1.5.1.	Location of the rating plate of the manufacturer	On the front wall of the spreader structure
1.5.2.	Method used to fix the rating plate of the manufacturer	Riveted, glued
1.6.1.	Location of the vehicle-identification number on the chassis	On the front wall of the spreader structure
2.	Machine-identification number	
<p>complies with all the relevant regulations of Directive 2006/42/EC and the Regulation of the Minister of the Economy dated 21 October 2008 on the principal requirements for machines (Journal of Laws of 2008, No. 199, item 1228, as amended)</p> <p>The following harmonised standards were applied to assess the compliance <u>PN-EN 690:2014-02, PN-EN ISO 12100:2012, PN-EN ISO 4254-1:2016-02,</u> <u>PN-EN ISO 13857:2010</u></p> <p>and standards PN-ISO 3600:2015, PN-ISO 11684:1998, and the Regulation of the Minister of the Infrastructure dated 31 December 2002 on the technical conditions of vehicles and the range of their essential equipment (Journal of Laws of 2003, No. 32, item 262, as amended).</p> <p style="text-align: center;">Safety Testing Report No. LBC/11/12</p> <p style="text-align: center;">This declaration of conformity EC becomes null and void if the machine is modified or reconstructed without the manufacturer's consent</p>		

Sokółka
(Place)

01/08/2012
(Date)

Jacek Kucharewicz
(Signature)

Chairman of the Board
(Position)

Machine data

Type of machine	Manure Spreader
Type designation	N274/N275
Serial Number ⁽¹⁾	_____
Machine manufacturer	METAL-FACH Sp. z o.o. ul. Kresowa 62 16-100 Sokółka Phone (0-85) 711 98 40 Fax (0-85) 711 90 65
Seller	_____
Address	_____ _____
Phone/Fax	_____ _____
Delivery date	_____
Owner or User	Name _____
Address	_____ _____
Phone/Fax	_____

⁽¹⁾ The data is located on the machine rating plate located on the front part of the machine's main frame

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INTRODUCTION

The information included in the Instructions Manual is valid as of the date of issue. The manufacturer reserves its right to make design changes to machines, and, due to this fact, some values or illustrations might not correspond to the actual state of the machine supplied to the user. The manufacturer reserves its right to make design changes without changing these instructions. The Instructions Manual is included as the basic equipment of the machine. The user is obliged to read the contents of this manual before commencing operation and to meet the recommendations included in it. It will ensure safe working.

The machine was constructed in compliance with the standards in force, and the current legal provisions. This instructions manual describes the basic safety and operational principles of the Manure Spreader made by Metal-Fach, types N274 and N275.

The material obligations of the manufacturer are presented in the Guarantee Certificate, which includes the complete regulations currently in force in the guarantee coverage.

If the information included in the instructions manual proves to be incomprehensible, you should address the seller from whom the machine was purchased, or the manufacturer directly, for assistance.

The spare-parts catalogue functions as a separate list, and is attached in the form of a CD during the machine purchase, and is also available on the manufacturer's website www.metalfach.com.pl.

This Instructions Manual, according to the Act of 4 February 1994 on copyrights and the related Laws (Journal of Laws of 2017, item 880), is protected by copyright. It is prohibited to copy and distribute the contents and Figures without the consent of the proprietor of the copyright.

The warranty card, together with the warranty terms, is attached to this Instructions Manual as a separate document.

The manufacturer's address

Metal-Fach sp. z o.o.

ul. Kresowa 62

16-100 Sokółka

Telephone

Phone (0-85) 711 98 40

Fax (0-85) 711 90 65

The symbols used in the instructions**DANGER**

Hazard warning symbol - points to the occurrence of a serious hazard condition, which, if not avoided, can result in death or serious injury. The symbol warns against the most-dangerous situations.

**NOTE**

The symbol pointing to especially important information and recommendations. Non-compliance with the described recommendations threatens serious damage to the machine due to its incorrect operation.

**WARNING**

The symbol indicating the possibility of the occurrence of a hazard, which, if not avoided, can result in death or serious injury. This symbol indicates a smaller level of risk of injury than the symbol including the word "DANGER".



The symbol indicating useful information.



The symbol indicating service operations which should be performed periodically.

1. General description

1.1 Introduction

THIS USER MANUAL IS PART OF THE BASIC ACCESSORIES OF THE MANURE SPREADER

The machine may be operated only by persons who have read this Instructions Manual, know the design and functioning of the Manure Spreader, and the functioning of the tractor it works with.

To operate the machine safely, adhere to and follow all the Instructions set out in this Instructions Manual. Adhering to the guidelines of the Instructions Manual ensures the User works safely and the machine's service life is longer.

1.2 Identifying the N274 and N275 Manure Spreaders

The Manure Spreader should be identified using the nameplate, which is permanently attached to the loading box.

The data on the rating plate of the manure spreader are shown in Figure 1. The positions of the rating plate and serial number are shown in Figure 2.

METAL-FACH [®]		CE	
ul. Koszowa 62, 16-100 Sokołka, Poland tel.: +48 (85) 711 98 40-45, fax: +48 (85) 711 90 65			
Rozrzutnik obornika			
Typ/Wariant	N275	Masa własna	5870 kg
Data prod.	2018	Nacisk na zaczep	30 kN
Nr fabr.	XXXXXXXXXX	KJ	
Dopuszczalna masa całkowita	13000	kg	
Dopuszczalne obciążenie osi	98,1	kN	
Dopuszczalna techniczna masa całkowita	19870	kg	
Dopuszczalne techniczne obciążenie osi	164,9	kN	
www.metalfach.com.pl			

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ul. Koszowa 62, 16-100 Sokołka, Poland tel.: +48 (85) 711 98 40-45, fax: +48 (85) 711 90 65			
Rozrzutnik obornika			
Typ/Wariant	N274	Masa własna	5620 kg
Data prod.	2018	Nacisk na zaczep	30 kN
Nr fabr.	XXXXXXXXXX	KJ	
Dopuszczalna masa całkowita	13000	kg	
Dopuszczalne obciążenie osi	98,1	kN	
Dopuszczalna techniczna masa całkowita	15620	kg	
Dopuszczalne techniczne obciążenie osi	123,2	kN	
www.metalfach.com.pl			

Figure 1 The rating plate

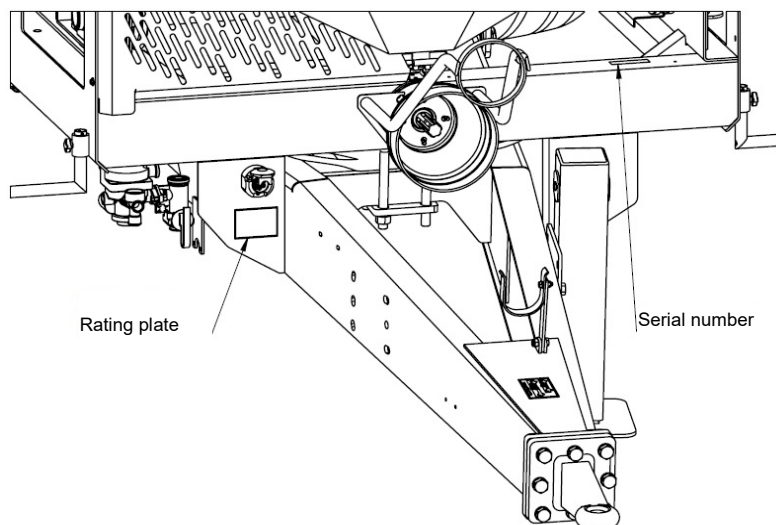


Figure 2 The positions of the rating plate and serial number



NOTE

NOTE!

Entering public roads without a rating plate or with an illegible rating plate is prohibited.



During the purchase, check the compliance of the factory number located on the machine-rating plate with the number written in the Instructions Manual and Guarantee Certificate - this is crucial for recognising the guarantee. In the event of user contact with the service, seller, or manufacturer, the user is obliged to quote the information included on the machine-rating plate.



The Instructions Manual is provided as part of the basic equipment of each Manure Spreader.

In the event of selling on the Spreader to another user, it is obligatory to provide the Instructions Manual. It is recommended for the Spreader supplier to keep a record of the Instructions Manual's receipt confirmation of receipt by the purchaser, to be submitted with the machine to the new user.

Please read the Instructions Manual carefully!

Applying its recommendations will allow you to avoid hazards, efficiently and productively operate the machine, and secure the guarantee for the duration period granted by the manufacturer.



NOTE

NOTE!

It is prohibited for persons who have not read this Instructions Manual to use the Spreader.

1.3 The intended use of the Manure Spreader

The manure spreader is designed for the even spreading of manure, peat, compost, etc., and for the transporting of agricultural products on farms and on public roads. It is not permitted to use the spreader in any other way than as described above.

The operator must use the machine in accordance with its intended use by carrying out activities involving the correct and safe operation and maintenance of the spreader, which should include

- reading and understanding the spreader's principles of operation
- the safe and correct operation of the machine
- the timely and regular maintenance of the machine
- compliance with the general safety regulations
- compliance with the provisions of the Road Traffic regulations.


 DANGER	<p>DANGER!</p> <p>The Spreader must not be used contrarily to its intended purpose, in particular to</p> <ul style="list-style-type: none"> • carry people and/or animals • operate it with exceeded payloads • spread and transport toxic and flammable materials • distribute liquids, sand, or fibrous substances • carry goods, machinery, and equipment not secured, which, while driving, can shift their position, or affect the stability of the spreader • carry out the transporting of building materials, individual objects, or any materials which are not included in its intended use <p>Unauthorised structural changes to the spreader voids the manufacturer's liability for consequential damage.</p>
--	--

Table 1 The requirements for agricultural tractors

Description	Requirements	SU
Braking system Two-line braking system System rated pressure	Sockets acc. to PN-ISO-17282007 min. 650	kPa
Hydraulic system Hydraulic oil Nominal pressure Oil cleanness	HL 46 16 20/18/15 acc. to ISO 4406-1996	MPa
Electrical system Electrical-installation voltage Connection socket	12 7-pole acc. to ISO 1724	V
Tractor hitch Minimum vertical load-bearing capacity of the hitch	3000	Kg
Minimum power demand of the tractor	N274 - 90 N275 - 100	KM
Minimum turning radius	6	m

1.4 Basic equipment

The basic equipment of each spreader includes

- The Instructions Manual
- Guarantee Certificate and warranty conditions
- Bracket for the plate indicating slow-moving vehicles
- Two-line pneumatic brakes with brake-force control (double-line pneumatic ALB (Anti-Lock Brakes), hydraulic, pneumatic-hydraulic, pneumatic-hydraulic ALB - optional)
- Parking brake
- Lighting system

1.5 Transport

The spreader is ready for sale fully assembled and does not require further assembly. Delivery to the user takes place by road transport or after coupling with a tractor for independent transport.



NOTE

NOTE!

The general health and safety regulations must be observed when loading and unloading the spreader. The persons operating the loading and unloading equipment must have the required authorisation to use the equipment.



NOTE

NOTE!

It is forbidden to attach slings of lifting devices to the upper mounting brackets of the structure and the beater unit to lift, load or unload a complete spreader.

Fasten the spreader to be transported onto a platform by means of tie-down straps or chains, thus providing a tensioning mechanism. The fasteners must have a valid safety certificate. Place chocks or other parts without sharp edges under the wheels of the spreader to prevent the machine from rolling. The wedges must be attached to the platform of the means of transport. Special attention must be paid during loading and unloading so as not to damage the equipment of the spreader and its paint coating. Attach the fastening straps or chains to the lifting points/shipping brackets welded to the lower frame. The horizontal sections or other strong frame parts can also be used for this purpose.

Before loading onto the platform, connect it to the tractor's hitch and connect the brake-system lines. Loading onto a low-floor trailer must be done using unfolded ramps



DANGER

DANGER!

The improper use of fasteners can cause an accident.



NOTE

NOTE!

Pay particular attention to the angle of inclination of the ramps of a low-loading platform. It may not exceed 10°. The excessive inclination of the ramps can lead to damage to both the spreader and the transport trailer.

The spreader may be driven on public roads as a machine attached to the **farming tractor lower hitch**.

Before merging with the traffic on public roads, make sure the traffic is fully manoeuvrable. The front-axle load of the tractor must be at least 20% of the tractor's weight, which also applies during transporting and loaded-spreader operation. If this condition is not met the front axle of the tractor must be loaded.

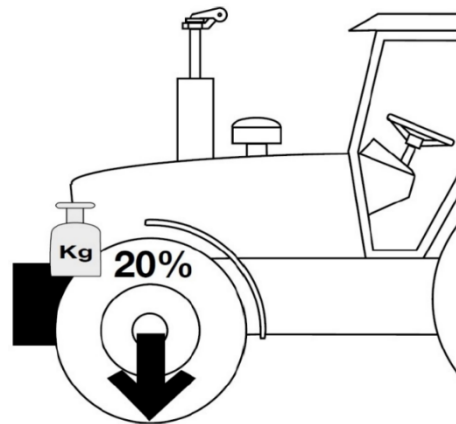


Figure 3 The minimum front-axle load of the tractor



NOTE

NOTE!

During the transport of the machine on public roads adapt the speed to the traffic conditions and do not exceed the speed of 40km/h.

Prior to spreader transportation make sure that

- the spreader is properly coupled to the tractor and the hitch device is secured against accidental disconnection
- both the spreader's and the tractor's braking systems are functioning correctly
- both the spreader's and the tractor's lighting are working correctly and the front-the spreader are in transport setting
- the ladder is folded in the transport position
- the beater guards are closed
- the structure gate is in its lowest position
- the hydraulic and pneumatic hoses are arranged in such a way that they are protected from damage during travel
- the support leg is lifted to its maximum setting and the hydraulic valve of the support leg is closed
- the parking brake is released

During the transporting of the spreader on public roads, adhere to the road-traffic regulations.

During an emergency pulling over of the tractor with the machine attached the driver must

- ensure that any hazard to safety on the road is avoided when stopping the vehicle
- park the vehicle as close to the edge of the road as possible, parallel to the road's centre line
- stop the tractor's engine, remove the key from the key switch, engage the auxiliary brake, and place chocks under a spreader wheel
- outside built-up areas, place a warning triangle between 30 and 50 metres behind the vehicle and switch on the hazard lights
- in built-up areas, switch on the hazard lights and place a warning triangle behind the vehicle (if it is not mounted on a bracket on the rear of the machine) and always ensure that other road users can see it clearly
- in the event of a breakdown, take the appropriate steps to secure the area where the breakdown has occurred.

1.6 Environmental hazards

Direct causes of environmental hazard include hydraulic and gear-oil leakage. When oil-leakage risks occur, carry out all maintenance and repairs rooms with an oil-resistant surface. If oil is leaking, close off the source of the leakage and collect the spilled oil. Use absorbent materials to mop up the oil residues. Store all pollutants thus collected in tightly closed, oil-resistant, and marked, containers.



DANGER

DANGER!

Store used hydraulic and gear oil or any collected residues mixed with absorbent materials in tightly sealed containers. Do not use food containers for this purpose.



NOTE

NOTE!

Send all waste oil for disposal in accordance with the applicable regulations.

It is forbidden to dispose of oil into drains or water reservoirs.

1.7 Scrapping the machine

If you decide to scrap the machine, you must comply with the national regulations for the destruction and recycling of end-of-life machines. Before dismantling, remove all oil from the hydraulic system and gearboxes. Reduce the air pressure in the braking system to a minimum.



DANGER

DANGER!

When dismantling, use suitable tools, lifting equipment and personal protective equipment such as gloves, shoes, protective clothing, goggles, etc.

Avoid skin contact with oil. Do not allow oil leaks.

Send all waste oil for disposal in accordance with the applicable regulations.

When replacing worn, damaged, or unrepairable parts and components, send them to recyclable material sites.

2. Safety of use

2.1 General safety principles

2.1.1 The obligation to provide information



NOTE

NOTE!

If the spreader is sold to further users, attach the Instructions Manual, and ensure the purchaser of the spreader undergoes training as indicated in the Manual.

2.1.2 General safety and use regulations

Before each commissioning, the spreader must be checked for safe operation.

- Observe the generally applicable safety and accident-prevention regulations and follow the information in this Instructions Manual
- Observe all the safety symbols, warnings, and information notices affixed to the spreader which provide important guidelines for safe operation
- Operate the spreader only if all the required devices are connected and protected against unintentional disconnection or opening (e.g. hitch and drawbar, couplings, PTO shaft)
- Before starting work, learn how to operate all devices and controls and their functions, as it will be too late to do this during the operation
- Persons under the influence of alcohol or other stimulants, and those who are not trained and do not hold proper driving licences, are forbidden to operate the spreader

2.1.3 Operational safety

- 1) Before using the product, the user must read and understand the contents of this Instructions Manual. Observe all Instructions in this Manual during operations.
- 2) If the information contained in this Manual is unclear, please contact the distributor running an authorised technical service on behalf of the manufacturer, or contact the manufacturer directly.
- 3) Careless and improper use and operation of the spreader, as well as failure to observe the recommendations contained in this Manual pose health risks.
- 4) Failure to observe the safety rules use poses a threat to the health and life of the operators and third parties.
- 5) Please note that during spreader operations some residual risks occur, so practising the safety rules must be a priority.
- 6) All safety-related information must also be passed on to all other spreader users and operators.
- 7) Any structural and functional modifications of the spreader release Metal-Fach Sp. z o.o. from liability for damage to property and/or health.
- 8) For power PTO transmission use only recommended PTO shafts with the correct parameters.
- 9) The use of PTO shafts without guards for power PTO transmission is prohibited.

- 10) Before starting to drive, check that the parking brake is released, and that the brake-force control is in the correct setting for the load status (this applies to a dual-line pneumatic system with manual brake-force control).
- 11) Check the immediate vicinity (children, bystanders) before starting. Pay particular attention in the event of reduced visibility.
- 12) After you have finished spreading, lower the gate completely, switch off the PTO drive, switch off the floor-conveyor drive, and close the beater shields. Never leave the spreader with the gate open, the PTO shaft drive switched on, the floor-conveyor drive switched on, or the beater shields open without supervision.
- 13) Mount the structure only when the spreader has come to a complete stop, the PTO shaft disengaged, the tractor's engine switched off, and the machine protected against unauthorised access.
- 14) Always regulate the switching on and off of the PTO shaft and hydraulically controlled components from the driver's seat.
- 15) Couple the spreader as prescribed, and only connect it to the recommended equipment, and secure the drawbar eye, with the tractor's transport hitch.
- 16) Special care must be observed when coupling and uncoupling the spreader to and from the tractor.
- 17) When installing and removing any support and safety devices and ladders, always position them so as to ensure safe operation.
- 18) Observe the acceptable axle loads, total mass, and transporting dimensions.
- 19) Check for the transporting equipment's connection, and inspect the brakes and lights, the vehicle's marking plate, and other protective devices.
- 20) Before driving, check the functioning of the lights and brakes and prepare the spreader in accordance with the Instructions provided in "Driving on public roads".
- 21) Ensure that the spreader is loaded in such a way that the material does not contaminate surfaces when travelling on public roads.
- 22) After you complete your work, and before you drive on public roads, remove any spreading material from the external parts of the machine to prevent it from being dropped and contaminating the road.
- 23) Note all changes in vehicle behaviour, steering, and braking performance, due to the loaded spreader's being coupled to it.
- 24) When driving with a coupled-up spreader, note how the load and/or inertia forces are distributed, especially if the load distribution is asymmetrical.
- 25) Do not stand within the range of the material being spread.
- 26) The spreading of manure is allowed only if
 - the spreader is coupled to the tractor
 - the tractor and spreader unit are standing on solid ground
 - the front axle load of the tractor is at least 20% of the tractor weight
 - no persons are standing in the spreading area
 - the tractor is aligned with the centre line of the spreader
 - a safe distance from power lines is kept
 - no strong gusts of wind are occurring, which can cause the spreading material to drift outside the permitted spreading area
- 27) If it is necessary to continue the final stage of spreading on a slope, drive the tractor and trailer down the slope. When spreading on sloping terrain, the ground slope should not exceed 10°.
- 28) Take care to avoid your fingers' and hands' being crushed when opening the shields.

- 29) Observe the signs warning against crushing, dragging, and snatching points when starting the spreader. There is a risk of crushing and injury when coupling and uncoupling the spreader to the tractor.
- 30) No person may stand between the tractor and the spreader unless the vehicle is protected against rolling with the use of a parking brake and/or wheel chocks.
- 31) Secure the spreader and the tractor against rolling when stationary.
- 32) Transporting the spreader with the structure gate raised, beater shields open, and ladder unfolded, are not allowed.
- 33) Keep a safe distance from power lines when lifting the structure gate.
- 34) When carrying out repair and maintenance work which requires that you enter the spreader structure, the tractor must be stationary and protected against the risk of the engine's starting and/or the unauthorised use of control components.
- 35) Always adapt your driving speed to the ambient conditions. Avoid sudden up or downhill turns on sloping terrain.
- 36) Maintain a sufficient safety clearance within the turning area of the unit.
- 37) When reversing, ensure that you have sufficient visibility (opt for another person's assistance).
- 38) When cornering, take into account the inertia of the spreader.
- 39) Observe a minimum turning radius of approx. 6 m when turning and reversing.
- 40) Remove any functional faults in the attached devices only with the engine switched off and the ignition key removed.
- 41) In the event of a failure of the hydraulic or pneumatic system, the spreader must be taken out of service until the failure has been remedied.
- 42) It is forbidden to carry out maintenance or repair work when the spreader structure is loaded.
- 43) Before carrying out repair work on the hydraulic or pneumatic systems, the oil and/or air pressure must be reduced.
- 44) In the event of injuries sustained from a strong hydraulic oil jet, consult a physician immediately. Hydraulic oil can penetrate under the skin or into the eyes and cause infections.
- 45) Use the hydraulic oil recommended by the manufacturer. Never mix two types of oil.
- 46) Use the gearbox oil recommended by the manufacturer. Never mix two types of oil.
- 47) Switch off the engine and remove the ignition key before leaving the tractor. Engage the parking brake and secure the spreader with a chock.
- 48) When driving on public roads, do not exceed the 10-tonne maximum-permissible axle load for the N274 and N275.
- 49) Exceeding the permissible technical payload volume of the spreader can lead to damage to the machine, loss of stability while driving, and spillage of the load, as well as compromising the road safety. The braking system has been adapted to the maximum-permissible weight of the spreader, which, if exceeded, will considerably reduce the main brake performance.
- 50) It is forbidden to exceed the permissible driving speed.
- 51) The maximum allowable pressure in the hydraulic system is 16 MPa.
- 52) The maximum allowable pressure in a double-line pneumatic system is 0.80 MPa, and the minimum is 0.65 MPa.
- 53) Preparing the spreader for operation (connecting hydraulic hoses, pneumatic systems, PTO shaft, etc.) must be made with the tractor's engine switched off and the ignition key removed.
- 54) The Manufacturer provides the spreader fully assembled.

55) Replace the hydraulic (rubber) lines every 4 years.

56) Noise – the equivalent A-weighted emission sound pressure level (LpA) should not be above 75 dB. The peak C-weighted instantaneous sound-pressure value (LCpeak) is 82±1 dB.

57) Keep the spreader clean.



WARNING

WARNING!

The risk of lightning strikes during the spreader's operations.

2.1.4 Machine operation

- While working, make sure no people or animals are in the vicinity of the spreading area.
- It is forbidden to stand in the spreading area, because of the risk that the spreading material contains stones, wood fragments, or other objects.
- Before starting work, check the condition of the beater blades and their fasteners.
- Check the tension of the floor-conveyor chains before loading. Regularly check the tension of the conveyor chains.
- When working next to roads, drainage ditches, plot boundaries, and water bodies, do not work beyond the designated spreading zone.

2.1.5 The pneumatic and hydraulic systems



NOTE

NOTE!

The pneumatic braking system is under high pressure.

Before starting work on the system, switch off the tractor's engine, secure the spreader with the parking brake and support chocks and depressurise it.

- When connecting pneumatic lines to the tractor's pneumatic system, ensure that the valves on the tractor's and spreader's sides are not under pressure.
- Check the pneumatic connection on a regular basis, and replace damage and ageing parts. The replacement of lines must comply with the manufacturer's technical requirements. Replace flexible pneumatic lines every 5 years, unless damage has been found earlier.
- Air leaks from the pneumatic braking system are not permitted.
- The hydraulic system is under high pressure during operation.
- Use the hydraulic oil recommended by the Manufacturer. Never mix two types of oil.
- Regularly check the technical condition of the hydraulic hose lines and connections.
- When connecting the hydraulic hoses to the tractor, ensure that the hydraulic system of the tractor and spreader is not under negative pressure. If necessary, reduce the residual pressure of the system.
- In the event of injuries sustained from a strong hydraulic oil jet, consult a physician immediately. Hydraulic oil can penetrate the skin and cause infections.
- Repair work on the pneumatic or hydraulic systems may only be carried out by an authorised representative of the spreader manufacturer.
- In the event of a failure of the hydraulic or pneumatic system, the spreader must be taken out of service until the failure has been remedied.



Replace flexible pneumatic lines every 5 years, unless damage is found earlier.

Replace rubber hydraulic hoses every 4 years, regardless of their technical condition, unless a fault is found earlier.



NOTE

NOTE!

Maintain the required cleanness of the 20/18/15 hydraulic oil according to ISO 4406-1996.

2.1.6 PTO (Power Take Off) operation

- The spreader may only be connected to the tractor by means of an appropriately selected PTO shaft recommended by the manufacturer.
- Before starting work, read and follow the Instructions Manual for the drive shaft.
- Connect and disconnect the PTO shaft only when
 - the spreader is coupled to the tractor hitch
 - the tractor's engine is switched off
 - the key is removed from the ignition
 - when the parking brake is applied
 - the PTO shaft is switched off
- Before starting the tractor with the spreader hitched, make sure the PTO shaft drive in the tractor is switched off
- The PTO shaft must be fitted with guards
- It is forbidden to use the PTO without guards or with damaged components

- Mount the PTO shaft in accordance with the Operating Instructions provided by the manufacturer of the shaft
- Secure the PTO shaft sheaths against rotating, using chains; fasten the shaft chains to the fixed components of the spreader and the tractor
- The PTO sheath is marked indicating which end of the shaft to mount on the machine side and which on the tractor side; the protective couplings must always be fitted on the machine side
- After installing the PTO, make sure it is correctly and safely connected to the tractor and spreader
- Each time you start the spreader, make sure the PTO sheaths are in good working order and that they are correctly positioned; replace damaged or faulty components
- It is forbidden to wear loose clothing which can be caught by the rotating parts of the PTO shaft; contact with the rotating PTO shaft can result in serious injury or death
- When working in conditions of reduced visibility, use the tractor's service lights to ensure adequate sight of the working PTO shaft and its immediate area
- Transport and store the PTO shaft horizontally with chains fastened to prevent damage to sheaths and other components
- It is forbidden to overload the PTO shaft and the drive system of the spreader beaters; rapid starting of the tractor's PTO shaft is not permitted; before starting the PTO shaft, check that the direction of rotation is correct.

- **Run the PTO shaft at a speed of 1000 rpm during operation** - working at different speeds can damage the machine or its components
- Switch off the PTO shaft drive whenever there is no need to drive the machine, or when the tractor and spreader are in an unfavourable angular position
- Do not exceed the maximum-permissible operating length of the PTO shaft
- When uncoupling the PTO shaft from the tractor, place it in the specially designed holder
- It is forbidden to use chains for suspending or supporting the PTO shaft while the spreader is parked or transported.

2.2 Residual Risk

2.2.1 Forms of residual risk

Although METAL-FACH, with its office in Sokółka, assumes responsibility for the machine design and structure in order to eliminate hazards, some risks ensuing during the spreader's operation are inevitable.

Residual risk can occur due to the incorrect behaviour of the spreader operator, e.g. his or her carelessness, ignorance or improper behaviour. The following prohibited actions create the highest level of risk.

- 1) Operation of the spreader by minors and persons without a tractor driving licence, as well as persons who have failed to read the Instructions Manual.
- 2) Operation of the spreader by persons who are sick or under the influence of alcohol or other intoxicating substances.
- 3) Using the spreader for purposes other than those described in this Instructions Manual.
- 4) Standing between the tractor and the spreader while the tractor's engine is running.
- 5) Oil leakage and sudden movement of components caused by breakage of hydraulic hoses.
- 6) Standing on the machine during operation or transport.
- 7) Bystanders, children in particular, standing close to the running spreader.
- 8) The presence of persons or animals in areas not visible from the operator's position.
- 9) Cleaning, maintaining and inspecting the spreader assemblies connected to the PTO shaft while the tractor's engine is running.
- 10) Checking the technical condition of the trailer during operation.
- 11) Operating defective power take-off shafts.
- 12) Exceeding the permitted speed and payload.
- 13) Making changes to the machine without the manufacturer's consent.

When specifying the residual risks, we assume that the spreader is a machine which was designed and manufactured state-of-the-art in the year of its manufacture.

2.2.2 Residual-Risk Assessment

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

- 1) Adhere to the safety rules described in this instructions manual.
- 2) Use common sense when operating the machine.
- 3) Do not hurry when operating the machine.
- 4) Maintain a safe distance from prohibited and dangerous places.
- 5) Reaching into dangerous and prohibited places with your hands is forbidden.
- 6) It is forbidden to stand on the machine while it is in operation.
- 7) Have repair and maintenance work performed by trained personnel.
- 8) Wear the appropriate safety clothing.
- 9) Prevent unauthorised access, especially by children, to the machine.
- 10) Make sure no one is in the blind spot (especially when reversing and coupling).



NOTE





NOTE!









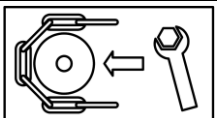
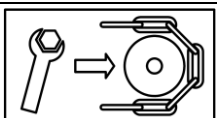
Failure to comply with the Instructions and guidance provided herein can result in residual risks!


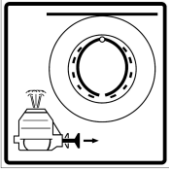


2.3 Warning and information stickers

The manure spreader is marked with information and warning stickers. The user is obliged to ensure that the inscriptions, and warning and information pictograms on the spreader, are legible throughout the life of the spreader. If any information or warning sticker has been damaged or removed, place an order with the manufacturer or the distributor from whom the machine was purchased. Re-attach stickers to any new components which have been fitted during repair work. When cleaning, do not point a strong jet of water at the labels and do not use solvents.

Table 2 Information and warning stickers

No.	Safety symbol (mark)	Meaning of the symbol (mark) or content of the inscription	Location on the machine
1.		<p>Attention!</p> <p>Before you start operating the machine, read the Instructions Manual.</p>	On the front wall of the load-carrying structure
2.		<p>Attention!</p> <p>Switch off the engine and remove the key before maintenance or repair.</p>	On the front wall of the load-carrying structure
3.		<p>Attention!</p> <p>Risk of electric shock.</p> <p>Keep a safe distance from power lines.</p>	On the front wall of the load-carrying structure
4.		<p>Attention!</p> <p>Torso-crushing hazard.</p> <p>Do not stand near the motion zone of the articulated coupling joints if the engine is running.</p>	On the front wall of the load-carrying structure

5.		<p>Attention!</p> <p>Danger of being dragged in by the drive train. Do not reach into the area of rotating parts.</p>	On the front wall of the spreader structure and at the rear on the right-hand side of the spreader structure
6.		<p>Attention!</p> <p>Ejected or dropped objects. Risk to the entire structure. Keep a safe distance from the machine.</p>	On the beater frame
7.		<p>Attention!</p> <p>Hand-crushing hazard. Maintain a safe distance from moving parts.</p>	On the beater frame
8.		<p>Attention!</p> <p>Danger of hand or upper torso's being dragged in by the augers of the beaters. Do not reach into the area of rotating parts.</p>	At the rear on the spreader-structure wall. Near the beater unit.
9.		<p>Attention!</p> <p>Risk of falling. Do not ride on platforms and ladders.</p>	On the right wall of the spreader structure. Next to the ladder
10.		<p>Attention!</p> <p>Danger of crushing toes or feet. Keep a safe distance from the support leg and drawbar.</p>	Next to the support leg
11.		Attachment points of the transport tie-down straps	Next to the attachment points
12.		Lubrication points	Front and rear of the floor feeder
13.		Tensioning the floor-conveyor chain	On the left wall of the spreader structure
14.		Tensioning the floor-conveyor chain	On the right wall of the spreader structure

15.		Speed limit km/h	At the rear, on the right beater-unit shield
16.		Pneumatic brake-release mechanism	On the front wall of the load-carrying structure
17.		PTO rotational speed	On the front sheath
18.		Jack-attachment point	
	Warning inscriptions	Meaning of the symbol (mark) or content of the inscription	Location on the machine
19		Check chain tension regularly	On the right and left sides of the spreader structure
20		Do not enter the spreader structure when the drive is enabled	On the right wall of the spreader structure, next to the ladder
21		Tighten the wheel nuts after a few kilometres, and then periodically	Above the ground wheels
22		Beater unit weight 920 kg	On the beater frame
23		Payload capacity	On the front wall of the load-carrying structure
24		CE marking	On the front wall of the load-carrying structure
25		Switch off the PTO shaft drive when cornering.	On the front wall of the load-carrying structure
26		Use a hitch for single axle trailers to couple a trailer.	On the front wall of the load-carrying structure



NOTE

NOTE!

The user of the spreader must maintain the legibility of all warning inscriptions and signs attached to the trailer over the whole period of operation. If they are damaged or destroyed, replace them with new ones.

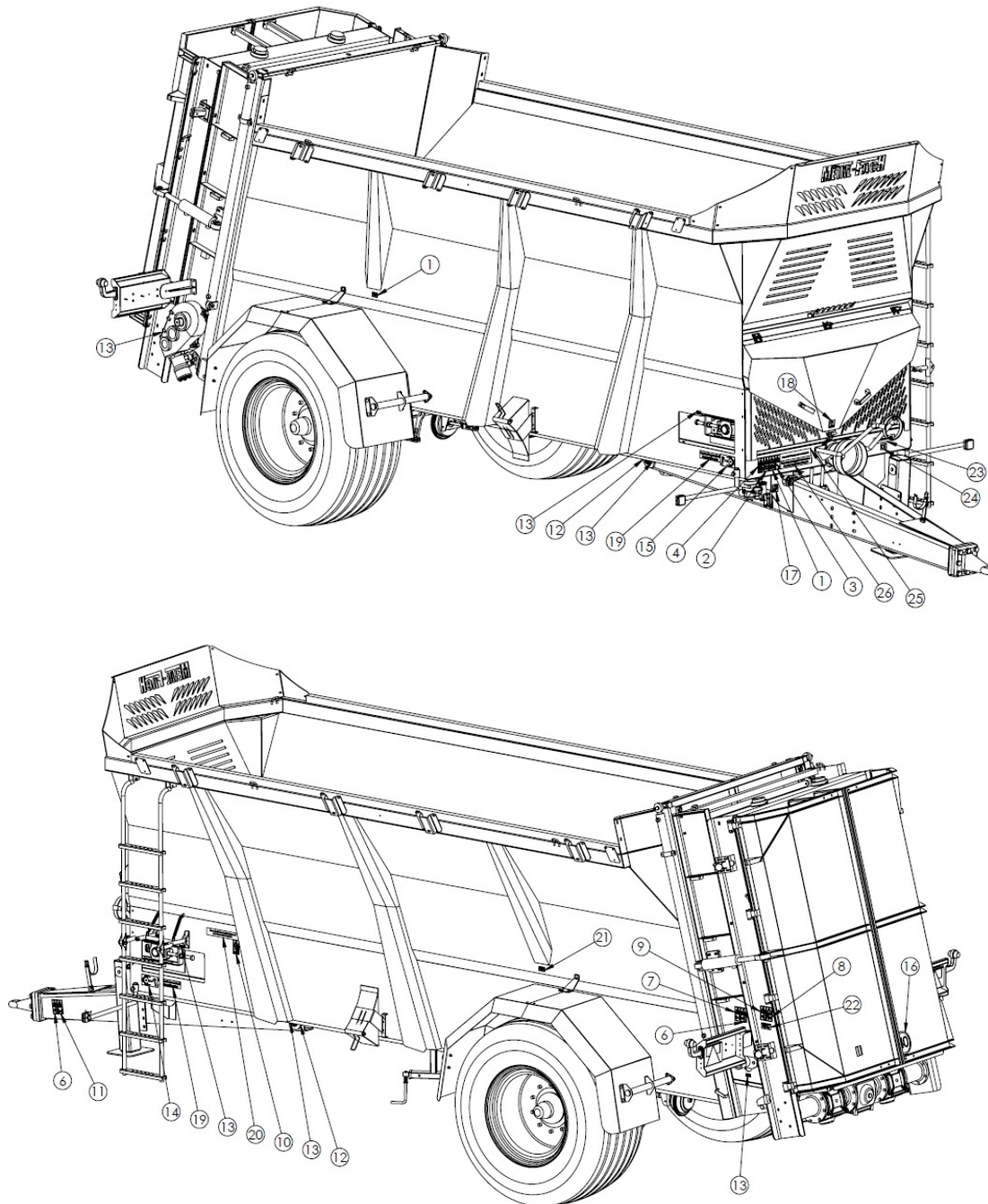


Figure 4 The location of warning and notice stickers

3. The design and principles of operation

3.1 Main technical data

Table 3 Main technical data

No.	General information				
1.	Type of vehicle	Manure Spreader			
2.	Manufacturer	METAL-FACH Sp. z o.o., ul. Kresowa 62, 16-100 Sokółka			
3.	Type (Model)	N274, N275			
4.	Type of structurework	Monocoque			
5.	Nameplate Location	Front-structure beam			
Dimensions					
		UOM	N274	N275	
6.	Length	mm	7810	8610	
7.	Width	mm	max. 2850	2850	
8.	Height without extensions	Wheels 600/55-26.5	2960	-	
		Wheels 650/65-30.5	3125	3125	
	Height with 0.5 m extensions	Wheels 600/55-26.5	3080	-	
		Wheels 650/65-30.5	3240	3240	
10.	Wheel track	Wheels 600/55-26.5	2200	-	
		Wheels 650/65-30.5	2250	2250	
Internal dimensions of the spreader structure					
11.	Length	mm	5700	6500	
12.	Width (top/bottom)	mm	1500/1950	1500/1950	
13.	Height	mm	1400	1400	
Operating Parameters					
14.	Permissible total weight	Design	kg	15620	19870
		Gross		13000*	13000*
15.	Load capacity	Design	kg	10000	14000
		Gross		7380*	7130*
16.	Permissible axle load	Design	kg	14000**	18200**
		Gross		10000	10000
17.	Kerb weight (max.)	kg	5620	5870	
18.	PTO rotational speed	rpm	1000	1000	
19.	Tractor power demand (min.)	HP/kW	min. 90/66.2	min. 100/73.5	
20.	Payload volume	m ³	10.6	12.1	
21.	Maximum spreading width	m	8-12	8-12	
22.	Maximum transport speed	km/h	40	40	

23.	Working speed		km/h	4-10	4-10
Other data					
24.	Loading height	Wheels 600/55-26.5	mm	2575	-
		Wheels 650/65-30.5		2740	2740
25.	Pressure in the hydraulic system (max.)		MPa	16	16
26.	Maximum pressure in the 2-line pneumatic braking system		MPa	0.80	0.80
27.	Electrical installation voltage		V	12	12
28.	Drawbar eye load (max.)		kg	3000	3000
29.	Wheelset (suspension)		-	Single-axis, rigid	
30.	Service brake		-	Mechanical, drum, pneumatically or hydraulically controlled	
31.	Parking brake		-	Mechanical, drum, hand-operated, via a worm gear	
32.	Tyre size	Standard	-	600/55-26.5	650/65-30.5
		Optional		650/65-30.5	-
33.	Beater-unit type		-	2-auger, vertical	
34.	Beater-unit weight		kg	920	920
35.	Effective spreading width		m	8	8
36.	Spreading-strip width		m	12-15	12-15
37.	Spreader-structure gate		-	Hydraulic control	
38.	Parking support		-	Hydraulic control	
39.	External ladder		-	Folded for transport	
40.	Floor conveyor		-	Hydraulic drive	
41.	Connecting with the Tractor		-	Lower hitch	
42.	Hydraulic oil (HL-46)		L	6	6.5
43.	Gearbox oil for floor feeder (gearbox 80W90)		L	3	3
44.	Gearbox oil for beater unit (gearbox 80W90)		L	12	12

* - The (gross) permissible maximum weight and the permissible load capacity given for a load on the hitch of 3,000 kg.

** The values for the permissible design axle load depend on the load capacity of the tyres and their permissible speeds given in Table 4.


Table 4 Data on the load rating of FL-648 BKT tyres depend on speed and pressure

Tyre, 600/55-26.5 16PR FL-648			
Speed [km/h]	Pressure (bar)		
	2.20	2.40	2.60
	Maximum permitted load [kg]		
10	7615	8015	8400
20*	6855	7215	7560
30	6095	6410	6720
40	5440	5725	6000
Tyre, 650/65-30.5 16PR FL-648			
Speed [km/h]	Pressure (bar)		
	1.80	2.00	2.20
	Maximum permitted load [kg]		
10	9645	10260	10850
20*	8680	9235	9765
30	7715	8210	8680
40	6890	7330	7750

* - The maximum transport speed for the permissible design payload of the spreader, taking into account the required tyre pressure.

The user must observe the permissible transport speeds for the maximum design payload of the spreader.

If another brand of tyre is used, observe its parameters.



DANGER!
Failure to adhere to the permissible speed, tyre, and axle loads, can result in a serious accident.

DANGER

3.2 The design and principles of operation

The components of the spreader are shown in Figure 5. The main structural components include a monocoque structure (10) with a rigid single-axle wheelset (5). A sprung hitch equipped with a fixed drawbar eye (1) is used for connection with the tractor's lower hitch. It is also possible to mount the eye for a rotary and ball drawbar. A hydraulic support foot (3) is attached to the drawbar to support the spreader when it is not connected to the tractor, and to adjust the height of the drawbar during coupling.

A foldable ladder (13) is installed on the right-hand side of the structure wall to inspect the load compartment and enter the inside of the structure during cleaning or maintenance works. There is a hydraulically controlled gate (12) at the rear of the structure, to separate the loaded material from the beaters and prevent it from falling out during transport.

The main operation component is the beater unit (6) with two vertical augers. The loaded material is moved towards the beater unit by the chain feeder (17) fitted to the floor of the

spreader structure. The beater unit is fitted with hydraulically controlled protective shields (11) to be used as spreading limiters (deflectors) during operation.

After installing the side-wall extensions (14) and removing the beater unit (6), the spreader can be used as a tipping manure conveyor.

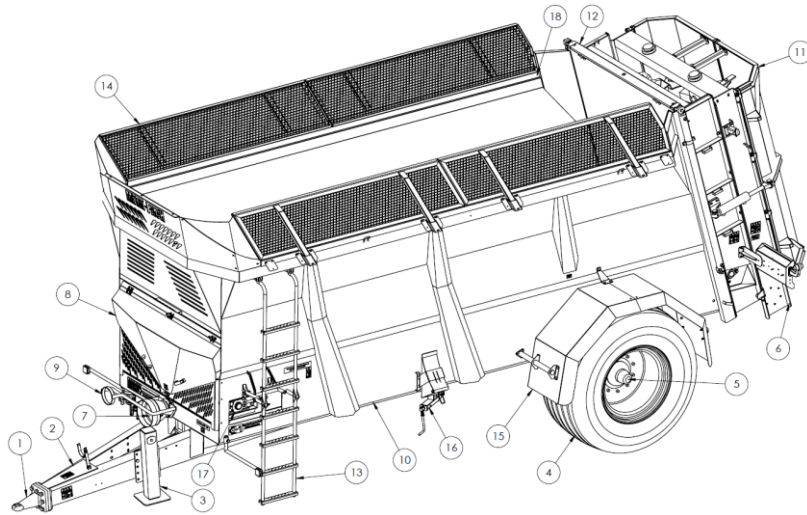


Figure 5 The main components of the manure spreader

- 1 - drawbar eye, 2 - sprung hitch, 3 - support leg, 4 - wheels, 5 - suspension, 6 - beater unit, 7 – beater-unit drive, 8 - front guard, 9 - lighting beam, 10 - spreader structure, 11- beater-unit shields, 12- structure gate, 13 - ladder, 14* - side extensions, 15* - mudguards, 16 - hand brake, 17 - chain feeder, 18 - structure wall finishing edge,
* - optional equipment

3.2.1 The feeding unit

The feeding unit consists of a floor conveyor a feeder roller set and a tensioning system. The entire unit is driven by the tractor's hydraulic system.

The floor conveyor consists of a pair of chains connected by scraper bars. The chains are driven by sprockets mounted on the feeder roller. The roller is supplied by a speed reducer and hydraulic motor. In the front part of the spreader there is a tensioning system for the chains of the feeder. The conveyor sprockets are fitted with scrapers to prevent sprocket clogging.

The floor-conveyor is protected against damage by an overload hydraulic valve on the hydraulic motor. The conveyor is paused as soon as it is overloaded (or mechanically blocked).

3.2.2 The beater-drive unit

The drive unit of the beaters consists of a tractor's connection articulated shaft with a nominal torque of 900 Nm with a shear-bolt clutch, and a split-cage roller, which transmits the drive from the front part to the rear of the spreader, and an articulated shaft which transmits the drive to the beater unit. Optionally (*) a wide-angle driveshaft (homokinetic) can be installed to enable work on headlands.

Table 5 The articulated telescopic shafts

Shaft marking	Nominal torque	Nominal length	Output power	Shear-bolt clutch
	Nm	mm	kW	Nm
68R-802-7-HA-K68-1	900	1420	51	2700
*680060/S802.K68-1/5NW	900	1530	51	2700
8R-804-3-HA-804	1200	795	68	-

3.2.3 The 2-auger vertical beater unit

The 2-auger vertical beater unit is used for shredding and scattering material supplied by the floor-conveyor. The beater unit is mounted on the rear of the spreader. The beater unit is supplied by the drive unit and the PTO of the tractor.

The beater unit consists of a left beam (1), a right beam (2), and an upper beam (3) to form the beater unit's frame. In its lower part there is a gearbox (4), on which the vertical augers (5) and (6) are mounted. The main work tools are replaceable blades (7) fastened to the auger segments. The augers turn and shred the feed material to eject it backwards and sideways. The end of the lower part of the augers is fitted with discs with blades, which increase the material-spreading width.

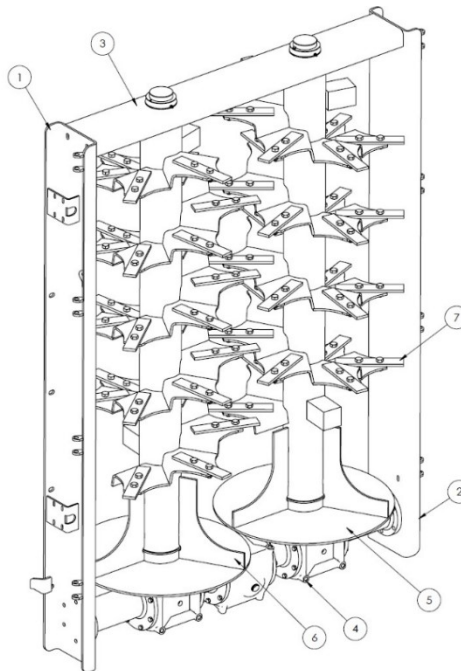


Figure 6 The 2-auger vertical beater unit

The beater unit is fixed to the spreader structure with M16 bolts. To disassemble the beater unit

- disconnect the PTO shaft from the beater-unit gearbox
- remove the beater shields
- remove the bottom beater shields
- remove the bolts fastening the beater unit to the structure
- use a lifting device with a lifting capacity of min. 1,200 kg to remove the beater unit
- after removing the beater unit, place it on a solid surface and secure it against tipping over.

3.2.4 The beater-unit shields

The beater-unit shields with vertical augers are attached to the beater unit by means of pins, and are opened or closed by means of hydraulic cylinders. They are controlled directly from the tractor cab via the lever of the external valve block. The right shield is additionally equipped with a shut-off valve so that it can be locked in any position. A partially opened shield can be used as a deflector to limit the spreading width of the material.

3.2.5 The spreader-structure gate

The N274 and N275 spreaders are fitted with a structure gate as standard. It separates the material to be transported from the beater unit. It is contained in the side guides, which seal and protect the material against falling outside the spreader structure. The bottom section of the gate is reinforced, which, as a result, prevents its damage by excess manure's pressing on it. At the bottom of the gate (as at the front of the structure) a rubber sealing belt is fixed, matching the shape of the conveyor chains.

The gate is opened by hydraulic cylinders, controlled by the tractor's external hydraulic system, to move it upwards.

3.2.6 The main braking system

The spreader can be equipped with one of three types of service braking system

- two-line pneumatic system (Figure 7)
- single-line hydraulic braking system (Figure 9)
- pneumatic hydraulic braking system (Figure 10)

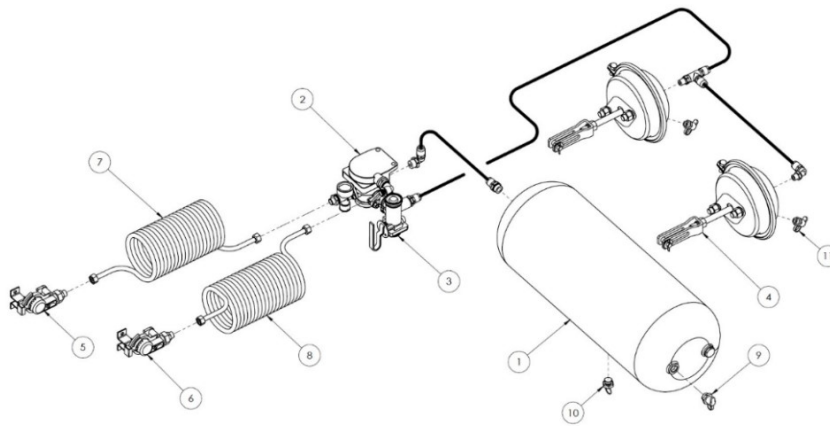


Figure 7 The 2-Line pneumatic braking system

1 - air tank, 2 - control valve, 3 – brake-force control, 4 - pneumatic cylinder, 5 - hose fitting (red), 6 - hose fitting (yellow), 7 - helical pipe (red), 8 - helical pipe (yellow), 9 – air-tank-control fitting, 10 - drain valve, 11 – air-cylinder-control fitting

The service brake is activated from the driver's seat by pressing the tractor's brake pedal. The pneumatic control valve (2) used in the pneumatic system enables the spreader's brakes simultaneously with the tractor's brakes.

In the event of accidental line disconnection [(5) and (6)], the control valve automatically applies the brakes of the machine.

The braking-force-control system (2) in Figure 8 is used in the pneumatic braking system to adjust the braking force according to the degree of the structure load. Switching to the correct operation mode is done manually by shifting the position of the lever (4). It is operated by machine operators before they start driving. Three work settings are available - (A) "UNLADEN", (B) "HALF LOAD", (C) "FULL LOAD".

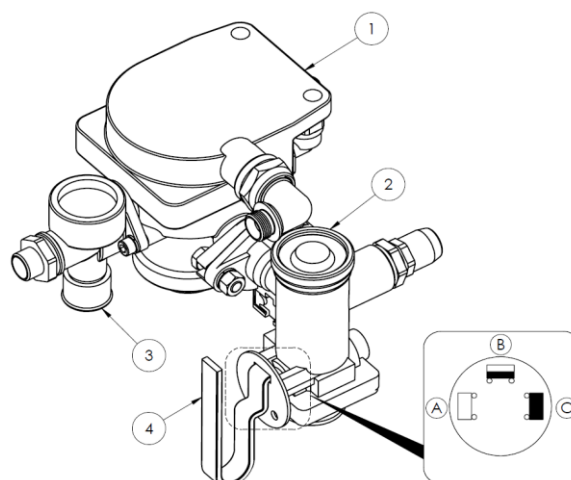


Figure 8 The control valve and brake-force-control system for 2-line pneumatic brakes

1 - control valve, 2 – brake-force control, 3 - brake release key for a parked spreader, 4 – control-mode-selection lever (A) "UNLADEN", (B) "HALF LOAD", (C) "FULL LOAD"



NOTE

NOTE!

The following work modes of the brake-force control are not allowed when driving with full load (A) “UNLADEN”, (B) “HALF LOAD”. Failure to follow this guidance can result in an accident.

Optionally, the spreader can be equipped with a hydraulic single-line braking system - Figure 9. The brake is activated from the driver's seat by pressing the tractor's brake pedal. The spreader brake is supplied and activated directly from the tractor's hydraulic braking system. In the event of an unforeseen disconnection of the spreader from the tractor coupling, the emergency valve (1) uses the chain (5) to apply the brakes of the machine.

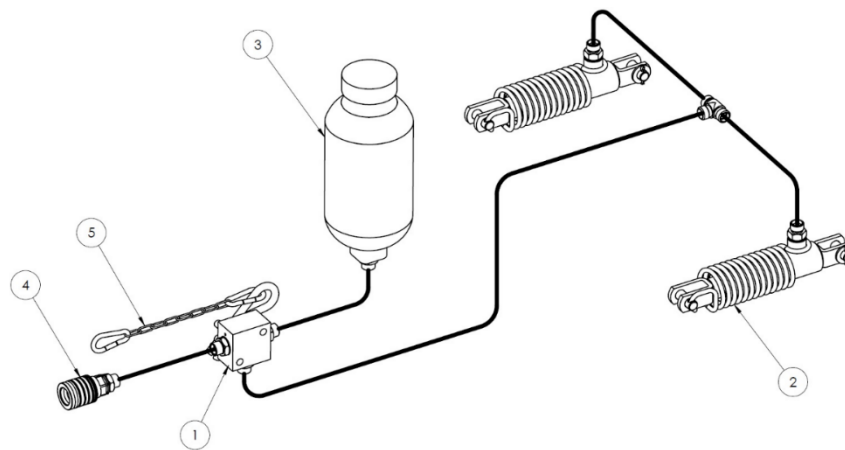


Figure 9 The 1-line hydraulic braking system

1 - emergency valve, 2 - brake cylinder, 3 - hydraulic accumulator, 4 - hydraulic quick coupling, 5 - activation chain for emergency valve

Another option for the braking system is the hydraulic pneumatic braking system. This system is a combination of hydraulic and pneumatic 2-line braking systems. Whether you can connect the hydraulic or pneumatic braking system depends on the type of trailer brakes the tractor is equipped with – Figure 10.

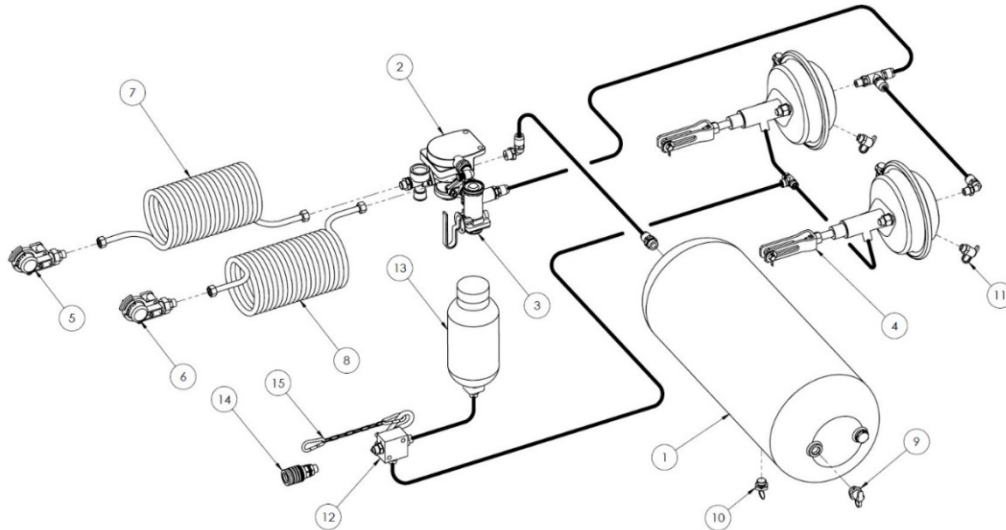


Figure 10 The hydraulic pneumatic braking system

(1) air tank, (2) - control valve, (3) - brake-force control, (4) - hydraulic pneumatic cylinder, (5) - hose fitting (red), (6) - hose fitting (yellow), (7) - helical pipe (red), (8) - helical pipe (yellow), (9) – air-tank-control fitting, (10) - drainage valve, (11) – air-cylinder-control fitting, (12) - emergency valve, (13) hydraulic accumulator, (14) hydraulic quick coupling (15) emergency valve-activation chain

3.2.7 The parking brake

The parking brake is used to immobilise the spreader while it is parked. The components of the system are shown in Figure 11. The tension assembly (2) is mounted on the left-hand side of the structure. The expander levers (1) of the axle are connected to the crank device by means of a steel cable (3). Turning the crank of the tension assembly pulls the cable (3) and swivels the expander lever to activate the spreader brakes. The brake is released by turning the crank of the tension assembly to the left.

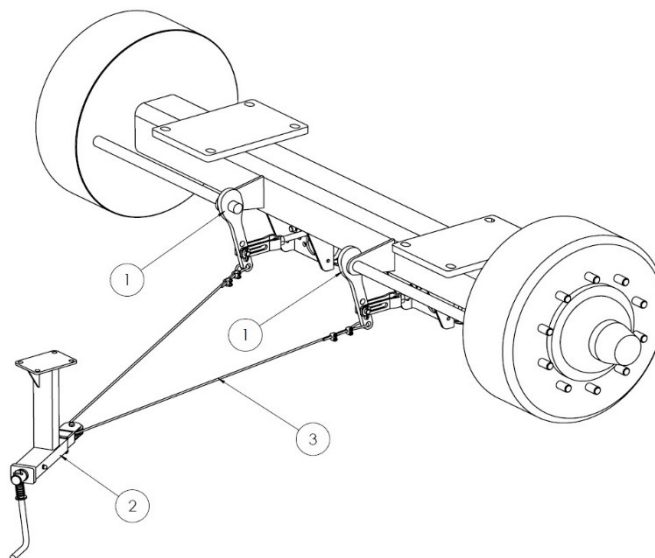


Figure 11 The parking brake

1 - expander lever, 2 - brake tension, 3 - steel cable L=5000 mm

3.2.8 The electrical and lighting system

The electrical system of the spreader can supply power from a 12V DC power source from the tractor electrical system. Connect the electrical system of the spreader to the tractor system using the connecting cable supplied with the machine. The wiring diagram is shown in Figure 12 and the arrangement of the lights in Figure 13.

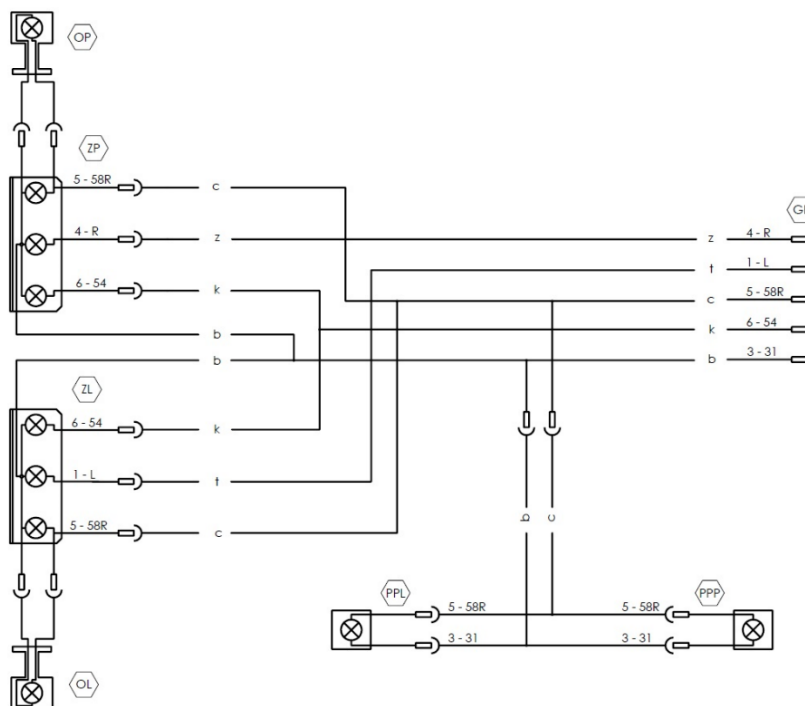


Figure 12 The wiring diagram

The colour codes for wires, electrical parts, and connections are given in Tables 6, 7, and 8.

Table 6 Cable colour codes

Code	Colour
c	Black
b	White
k	Red
t	Green
z	Yellow

Table 7 Electrical-part codes

Code	Name
ZP	Rear-lamp cluster, right
ZL	Rear-lamp cluster, left
GP	Connection socket
OP	Marker light, right
OL	Marker light, left
PPP	Front running light, right
PPL	Front running light, left

Table 8 GT socket-connection marking

Code	Function
1 - L	Indicator lamp, left
3 - 31	Weight
4 - R	Indicator lamp, right
5 - 58R	Running lights
6 - 54	Brake light

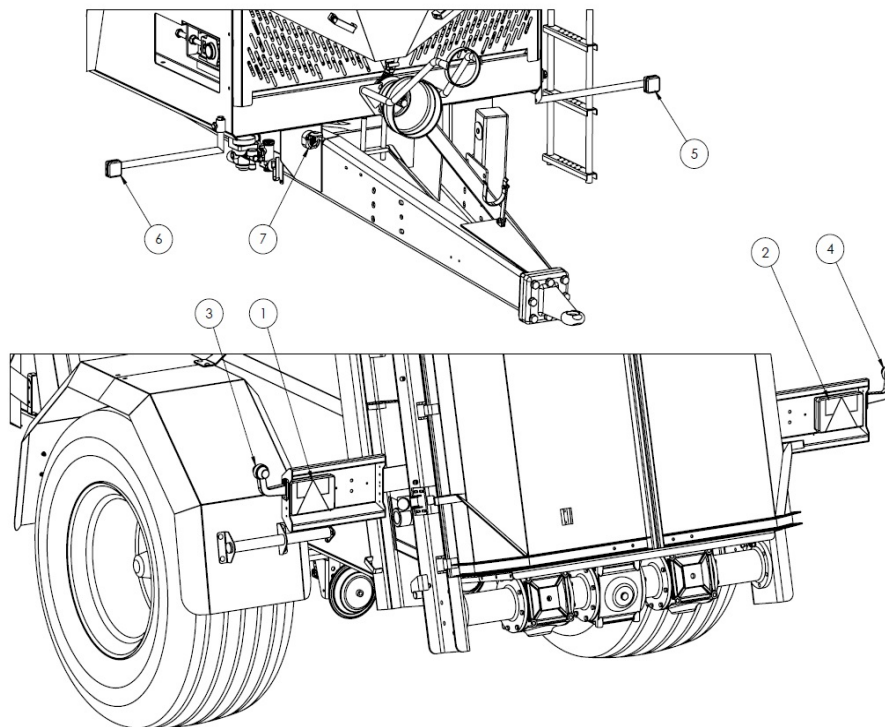


Figure 13 The arrangement of the electrical-system components
 1 – rear-left lamp cluster, 2 – rear-right lamp cluster, 3 - left marker light, 4 - right marker light,
 5 – front-left running light, 6 – front-right running light, 7 - connection socket

4. Instructions for use

4.1 Preparing the machine for operation

4.1.1 Checking the spreader after delivery

The spreader delivered to the user is completely assembled and does not require any additional assembly. However, this does not release the user from the obligation to check the machine before purchasing and commissioning it.

Before coupling the spreader, check if the tractor is suitable for this purpose. The spreader may only be coupled with a tractor that meets the requirements listed in Table 1.



NOTE

NOTE!

Before coupling and putting the spreader into operation for the first time, it is mandatory to learn the design of the spreader, the layout of individual components, as well as read and follow the contents of this Instructions Manual and the PTO shaft manual supplied with the machine.

The spreader may only be coupled to an agricultural tractor which has a hitching device suitable for connection to single-axle trailers, as well as suitable sockets for the brake, hydraulic, and electrical systems.

The oil in the tractor's external hydraulic system must be compatible or miscible with the spreader oil.

Before connecting the machine to the tractor, the operator must check the technical condition of the spreader and prepare it for the start-up. The inspection includes

- machine completeness
- the condition of the paint coating and any mechanical damage to individual components
- protective guards and shields for their technical condition and the correctness of their installation
- hydraulic and pneumatic hoses for their technical condition
- articulated telescopic shafts with guards for their technical condition
- hydraulic system and transmissions for leaks

4.1.2 Preparing the spreader for start-up

Before starting the trailer for the first time, check

- the lubrication points and lubricate the components, if necessary
- the correct tightening of screw connections (ground wheels, drawbar, spreading beater parts)
- the oil level in the gearboxes of the beater unit and floor feeder
- the floor feeder for chain tension
- that the PTO shaft transmitting the tractor's drive is of sufficient length when connected in all possible positions of the tractor in relation to the machine (Figure 14);
- the tractor's PTO shaft speed setting is compatible with the required spreader drive speed



NOTE

NOTE!

The PTO shaft tubular profiles should work overlapped by 1/2 a shaft length under normal operating conditions, and 1/3 a shaft length under extreme operating conditions.

Observe the instructions of the shaft manufacturer when fitting the PTO shaft.

Due to the incorrect adjustment of the PTO shaft which transmits the drive from the tractor it can be damaged or destroyed when driving on uneven terrain, and when cornering.



The adjusted compatibility of the PTO shaft applies to only one type of tractor which works with the spreader. If the machine is coupled with another tractor, check that the shaft fit is correct again.

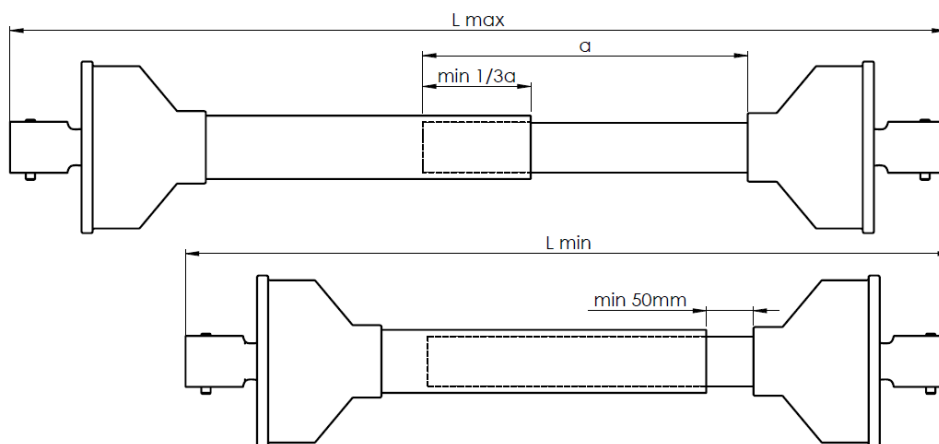


Figure 14 Adjusting the length of the shaft when the spreader is connected to the tractor

4.1.3 Start-up

If the preparatory work has been completed and the spreader is in good working order, couple it with the tractor. After starting the tractor, check the function of the individual systems when parked and without a load. For the start-up follow the procedure below.

- 1) Couple the spreader with a compatible tractor hitch
- 2) Connect the power take-off shaft and secure it correctly
- 3) Connect the braking, hydraulic and electrical hoses
- 4) Lift the support leg
- 5) Check the proper operation of the lighting system
- 6) Release the parking brake of the spreader
- 7) Start the tractor
- 8) After you have moved off check the function of the service brake.
- 9) Check the operation of the floor conveyor
 - on the flow controller mounted on the right wall of the structure, select the feed rate from "3" to "10"
 - use a corresponding tractor valve-block lever to activate the floor conveyor

- look through the openings in the front shields to observe the movement of the conveyor bars and verify their correctness of movement direction; reverse the conveyor direction by switching the position of the valve-block lever on the tractor
- 10) check the proper operation of the beater-unit shields
 - open and close the beater-unit shields using a corresponding tractor valve block lever
 - 11) start the PTO shaft drive at low engine speed (start the beater auger drive)
 - 12) allow the beaters run at low engine speed for a few minutes and ensure that
 - the beater drive system and the beater unit do not generate any knocks or other disturbing noises
 - the beater augers rotate smoothly without jamming
 - 13) Switch off the PTO shaft drive, switch off the tractor's engine and uncouple the spreader from the tractor.



NOTE

NOTE!

The PTO shaft speeds must correspond to those specified in Table 3.

If all preparatory work has been completed successfully, the spreader may be approved for use. If any malfunction or faults of individual systems are found during the start-up, report them to the distributor or directly to the manufacturer to solve the problem or to carry out repairs.



NOTE

NOTE!

Failure to follow the recommendations in the Instructions Manual or starting up the machine incorrectly can result in damage.

Ensure that there are no reservations as to the technical condition of the spreader before it is put into operation.

4.2 Coupling and decoupling the spreader

The machine may only be coupled with a farming tractor which is in good working order, and fitted with all the necessary connections (braking, pneumatic, hydraulic and electric) and a tractor hitch, according to the requirements of the spreader manufacturer.

Before coupling the spreader to the tractor, use the parking brake to make sure the spreader is not moving.



NOTE

NOTE!

Before coupling the machine, check the technical condition of the tractor and spreader hitch, as well as the connective parts of the braking, hydraulic, and electrical systems.



NOTE

NOTE!

Use particular caution when coupling the spreader.

The hydraulic oil in the tractor and spreader must be miscible.

After coupling the spreader to the tractor, secure the braking, hydraulic, and electrical lines in such a way that they cannot be broken, worn, bent, crushed, or accidentally disconnected while driving.

For travel and operation, raise the support leg to its uppermost position, and close the hydraulic valve retaining the leg.

Coupling the spreader

To couple the spreader, follow the procedure below

- 1) Use the parking brake to make sure the spreader is not moving, and put the safety chocks underneath the wheels.
- 2) Align the tractor straight in front of the spreader hitch.
- 3) Set the drawbar eye to a height which enables the machine to be coupled,
 - Connect the hydraulic lines of the support leg to the hydraulic sockets of the tractor's external hydraulic system
 - Open the locking valve of the hydraulic support leg (located close to the leg)
 - Use the valve-block lever on the tractor to raise or lower the eye of the drawbar to a height which enables it to be coupled to the tractor's hitch
- 4) Reverse the tractor, connect the spreader to the tractor's hitch.
 - Check the securing pin of the coupling, which prevents accidental disconnection of the machine
 - If the tractor is fitted with an automatic hitch, make sure the coupling is completed and the drawbar eye is secured



DANGER

DANGER!

Bystanders are not allowed to stand between the spreader and the tractor during the coupling procedure.

When coupling the machine, the operator of the tractor should exercise particular caution, and make sure no unauthorised persons are in the danger zone.

When connecting the hydraulic lines, make sure the hydraulic systems of the tractor and spreader are not pressurised.

- 5) Use the valve-block lever on the tractor to lift the support leg to its uppermost position.
- 6) Apply the tractor's parking brake, switch off the tractor's engine, remove the ignition keys, and secure the tractor against unauthorised access.
- 7) Close the support leg's locking valve. If the tractor has too-few hydraulic sockets for the connection of other hydraulic systems, the hydraulic lines of the support leg can be disconnected for travel and operation. When disconnecting the hydraulic lines, make sure the pressure in the lines is reduced.
- 8) Connect the pneumatic braking system hoses of the 2-line braking system - the yellow pneumatic hose to the yellow pneumatic socket of the tractor, the red pneumatic hose to the red pneumatic socket of the tractor.
 - If the spreader is fitted with hydraulic brakes, connect the hydraulic hose for the spreader's brakes to the plug of the tractor's hydraulic braking system. Then connect the activation chain of the emergency brake valve to a permanent part on the tractor.
 - If the spreader is equipped with hydraulic-pneumatic brakes, connect the pneumatic or hydraulic braking system, depending on which machine brake-control system the tractor is equipped with.
- 9) Connect the hydraulic hoses of the floor-conveyor driving system
- 10) Connect the hydraulic lines of the gate system
- 11) Connect the hydraulic hoses of the beater-shield control system
- 12) Fit the PTO shaft and secure the sheaths against rotation
- 13) Release the parking brake of the spreader

Uncoupling the spreader

To uncouple the spreader, follow the procedure below.

- 1) Use the tractor's valve-block lever to extend the support leg so that the drawbar eye is in a suitable position to safely uncouple the tractor.
- 2) Apply the tractor parking brake, switch off the tractor's engine, remove the ignition keys, and secure the tractor against unauthorised access.

- 3) Close the locking valve of the hydraulic support leg (located close to the leg)
- 4) Release the pressure in the individual hydraulic systems of the tractor.
- 5) Secure the spreader using the parking brake and place the safety chocks under the wheel.
- 6) Uncouple the hydraulic hoses of the systems for the hydraulic leg, the floor conveyor and the gate and beater-unit shields, then put covers over them and hang the plugs on the holder on the front wall.
- 7) Disconnect the braking-system hoses
- 8) Uncouple the hydraulic hoses of the floor-conveyor driving system
- 9) Disassemble the power take-off shaft and secure it correctly
- 10) Uncouple the spreader from the tractor hitch and pull away with the tractor.



NOTE

NOTE!

Use particular caution when uncoupling the spreader from the tractor. Uncoupling the loaded machine from the tractor and leaving the loaded spreader parked and supported on the support leg are not allowed.

Dismantling the support leg and supporting the machine on temporary stands are not allowed.

4.3 Loading the spreader structure

Before loading, drive and park the correctly coupled tractor and spreader to stable, horizontal, ground. Park both machines in the straight-ahead position and apply the parking brake on both of them.

Before loading, make sure there are no persons, objects (stones, pieces of wood, etc.), inside the spreader's structure, that the structure's gate is fully lowered, and the floor conveyor is not damaged.



NOTE

NOTE!

For transporting and operating the laden spreader, the front-axle load of the tractor must be at least 20% of the tractor weight.


Use suitable loaders, front-end loaders or conveyors for loading. Start manure loading at the rear of the spreader structure and keep loading in layers. During the loading, empty the bucket smoothly from the lowest possible height. Do not try compacting the manure.

Ensure an even distribution of the load to achieve optimum spreading conditions. Due to the differences in the density of the spreading material, using the entire structure capacity can result in exceeding the spreader's permissible design payload capacity. Therefore, both the design and (gross) permissible vehicle weights must be observed. The approximate density of the selected materials is shown in Table 9.

Table 9 The approximate density of selected materials

Material type	Density [kg/m³]
Fermented manure	700-800
Composted manure	800-950
Fresh manure	700-750
Compost	950-1100
Peat	330-650
Agricultural lime	2700-3400

Regardless of the type of material carried, the user is obliged to secure it in such a way that it cannot move freely and pollute the road. If this condition cannot be met, carrying such materials is prohibited.

 <p>NOTE</p>	<p>NOTE!</p> <p>It is forbidden to exceed the design and permissible gross weights.</p> <p>An unevenly distributed load causes uneven spreading of the material in the field.</p>
--	--


4.3.1 Loading and spreading lime

The spreading of loose agricultural lime and derivatives is permitted. Failure to observe the following guidance can result in damage to the spreader.

General recommendations for spreading agricultural lime.

- 1) The maximum weight of a lime-loaded spreader must not exceed 5t for the N274, and 6t for the N275, i.e. 1/3 of the height of the spreader's structure (0.45m from the spreader-structure floor)
- 2) Spread lime immediately after loading, as it can set permanently on the floor of the spreader after a long period of time, and can immobilise the chains and bars
- 3) Prevent any contact of the lime-loaded spreader with moisture, and switching the floor-conveyor drive on during any precipitation is not allowed (unload manually if water gets inside the lime-loaded spreader)
- 4) Due to its compaction properties, lime can accumulate in chain links and sprockets, so inspect the condition of all floor-conveyor components regularly (preferably after each pass)
- 5) Chains, feeder bars, and sprockets must be thoroughly cleaned after each lime-spreading work session (a pressure washer using clean water or appropriate products is recommended for this purpose), while washing and drying must be carried out at a temperature above zero
- 6) Degrease greasy or oily surfaces with petroleum ether or degreasers, and then wash with clean water and detergent

Manure spreaders are not typically designed for spreading lime and its derivatives. When spreading lime from the spreaders, the optimum spreading parameters will not be achieved in comparison to lime spreading from machines specifically designed for this purpose.

	<p>NOTE!</p> <p>Strictly adhere to the recommendations provided for lime spreading. Failure to adhere to the rules for lime spreading with the spreader can result in damage to the machine.</p> <p>When spreading lime or derived fertilisers, use suitable protective clothing and PPE, and observe the general regulations for fertiliser application.</p>
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4.4 Fertiliser application-rate control and manure spreading

4.4.1 Fertiliser application-rate control

The spreading dosage over a certain area of the field depends on the following factors.

- 1) Feeding speed of the floor conveyor
- 2) Driving speed
- 3) Loading heights of the structure
- 4) Effective spreading width, depending on the type of spreading material

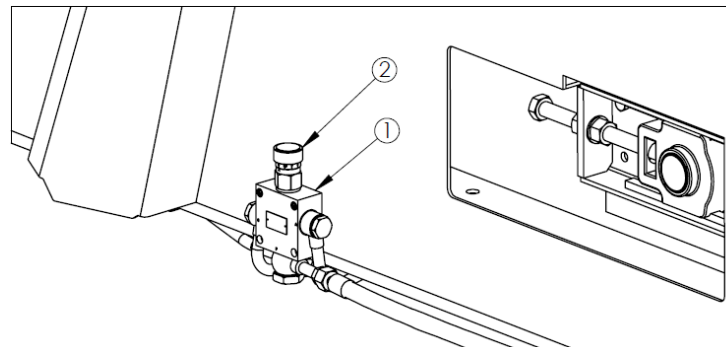


Figure 15 Adjusting the feeding speed of the floor conveyor
1 – oil-flow controller, 2 - controller knob

Select the feeding speed of the floor conveyor by trial and error, and adjust it with the knob on the flow controller, on the right wall of the spreader structure.

Adjusting the feeding speed of the floor conveyor.

- Turn the controller knob clockwise towards “0” to decrease the feeding speed of the conveyor
- Turn the controller knob counter-clockwise towards “10” to increase the feeding speed of the conveyor



Low travel speed and high load-feeding speed result in a high fertiliser-application rate.

High travel speed and low load-feeding speed result in a low fertiliser application rate.

Table 10 Floor-conveyor capacity

Setting No.	Conveyor capacity [kg/s]
1	0.0
2	4.2
3	6.4
4	14.3
5	25.7
6	38.4
7	50.1
8	64.7
9	76.8
10	99.5

Table 11 The manure-application rate (with a density of 950kg/m³) depending on the feeding speed of the floor conveyor and the actual work speed

Setting No.	Conveyor capacity [kg/s]	Spreader work speed [km/h]						
		4	5	6	7	8	9	10
		Dose of manure [t/ha]						
2	4.2	5.5	4.9	4.1	3.6	2.8	2.3	1.8
3	6.4	7.2	5.8	4.8	4.1	3.6	3.2	2.9
4	14.3	16.1	12.9	10.7	9.2	8.0	7.2	6.5
5	25.7	29.0	23.2	19.3	16.5	14.5	12.9	11.6
6	38.4	43.2	34.6	28.8	24.7	21.6	19.2	17.3
7	50.1	56.4	45.1	37.6	32.2	28.2	25.1	22.6
8	64.7	72.8	58.2	48.5	41.6	36.4	32.3	29.1
9	76.8	86.4	69.2	57.6	49.4	43.2	38.4	34.6
10	99.5	112.0	89.6	74.6	64.0	56.0	49.8	44.8

4.4.2 Spreading manure

Before starting to spread manure, recheck the condition of the hydraulic connections and safety guards.

To limit the spreading action and achieve precise fertilisation of the field at the boundaries, set and lock the right-hand shield of the beater unit in a desired position. Use a hydraulic valve to lock it - Figure 16. The degree of opening of the left-hand shield of the beater unit can be adjusted from the driver's position using the valve-block lever after the right-hand shield has been locked.

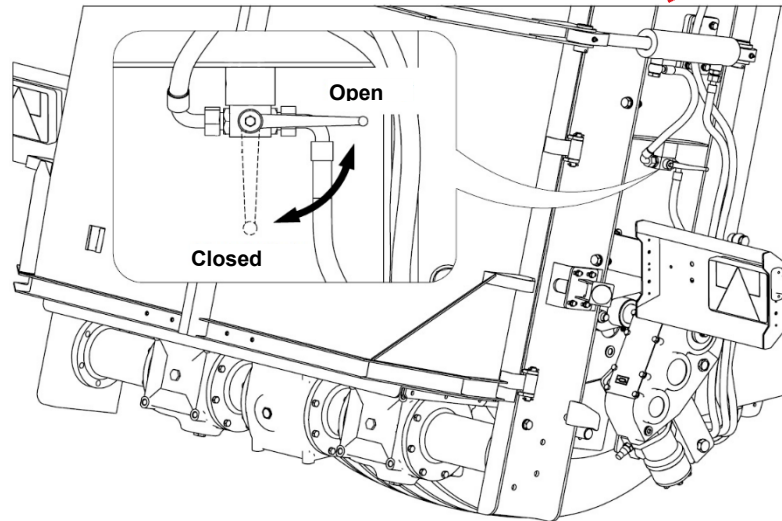


Figure 16 The hydraulic valve for locking the beater-unit shield



DANGER

DANGER!

Operating the spreader with safety guards removed or a damaged telescopic articulated shaft poses a direct risk to the life and health of the operator.

Bystanders or animals are not allowed to stand in the spreading zone.

Keep a safe distance from power lines, especially when working with the spreader structure gate raised.

The PTO shaft speeds must correspond to those specified in Table 3. Using different PTO speeds can damage the beater unit or its drive.

The procedure for starting manure spreading

- 1) Align the tractor and spreader combination directly straight with the point where fertilisation is to be started
- 2) Use proper valve-block lever on the tractor to open the beater shields
 - If the lock valve of the right beater shield is closed. only the left shield will open
 - To limit the spread, open the right-hand beater shield to the required position and then lock it with the hydraulic valve Open the left shield fully or move it other required position
- 3) Check that the PTO shaft of the tractor is set within the correct speed range
- 4) At low engine speeds, switch on the tractor's PTO shaft, increase engine speed until the beater augers reach optimum speed and keep it within this range
- 5) Raise the spreader structure gate fully
- 6) Use a correct valve-block lever to start the floor-conveyor drive and ensure that the correct direction of drive has been selected
- 7) Engage the tractor gear and start working as soon as sufficient manure volume has been fed onto the augers.

Completing the spreading procedure

- 1) In the final spreading phase, it is advisable to shift the structure gate down to the height of the fed material

- 2) In order to obtain the same spread rate in the final stage of spreading, reduce the travel speed or increase the feeding speed of the floor conveyor using the knob on the flow controller
- 3) Switch off the floor-conveyor drive after the spreader structure is completely empty
- 4) Lower the spreader structure gate fully
- 5) Reduce the engine speed and switch off the PTO shaft drive
- 6) Close the beater-unit shields fully
- 7) Clean the spreader after every spreading work if you are to drive on public roads to avoid surface contamination

**NOTE****NOTE!**

Strictly observe the sequence specified for starting the spreader. Following any different sequence can damage the spreader and endanger the health or life of the operator.

At headlands, after switching off the floor-conveyor drive, switch off the tractor's PTO shaft.

The direction of movement of the floor conveyor can only be reversed if the augers of the beater unit are locked. When moving the load towards the front, any contact by the load with the front wall of the spreader structure is not allowed.

4.4.3 Clogged-spreader beater unit

When spreading manure, the spreader beater unit can get clogged, and the augers of the beater unit can be blocked due to the safety pin's being broken in the PTO shaft which transmits the drive from the tractor to the spreader. If the beater-unit augers come to a stop during spreading, immediately switch off both the floor-conveyor drive and the tractor PTO shaft drive.

Causes of the clogged beater unit can include:

- objects such as stones, wood, etc. get into the unit together with the manure
- the feeding speed of the floor conveyor too high
- maintaining low PTO-shaft speed
- insufficient PTO shaft-speed
- high load density

Unblocking the spreader's beater unit

- 1) Switch off the PTO shaft drive and uncouple the PTO shaft from the tractor.
- 2) Reverse the floor conveyor by switching the valve-block lever on the tractor in the direction opposite to the normal feeder operation;
 - Perform this action gradually
 - Reverse the conveyor only to such an extent that the material does not press on the augers
 - It is not permitted to move the conveyor forward when the load is in contact with the front wall of the spreader structure
- 3) Switch off the tractor's engine, apply the parking brake to stop the tractor and spreader, remove the ignition keys, and secure the tractor against unauthorised access
- 4) Use the appropriate tools to remove any objects which block the augers
- 5) Mount the screw of the PTO shaft clutch and connect it to the tractor
- 6) Start the tractor's engine and switch on the PTO shaft to clean the augers of the beater unit of any remaining material

5. Technical-service activities

5.1 Checking and adjusting the tension of the floor-conveyor chains

The tension of the floor-conveyor chains during operation must be checked daily, especially during the initial period of operation. Carry out the tensioning of the conveyor chains by adjusting the screws at the front of the spreader structure side walls - Figure 17. To increase chain tension, loosen the nut (2) while holding the nut (3) with a wrench and use the bolt (1) to move the bearing unit (4) forward. Follow the tensioning procedure on both sides of the spreader, ensuring that the chain tensions are equal.

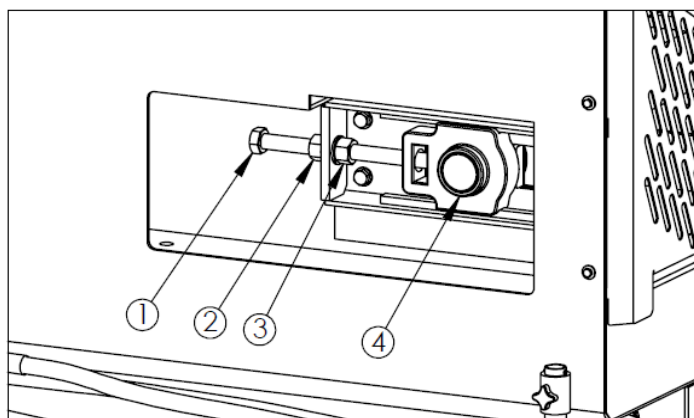


Figure 17 Tensioning the floor-conveyor chain
1 - adjusting screw, 2-3 - nuts, 4 - tensioner bearing unit

A chain with the correct tension can be moved to a height of 40-80 mm if a force of 50 kg is applied to the chain halfway along the length of the spreader structure.

Should the range of chain-tensioning adjustment not be enough, the conveyor chain can be shortened by removing 2 chain links. An overly extended chain can be caused by incorrect chain tension adjustment and the clogging of the chain sprockets in the floor-conveyor. Chain-wheel clogging is caused by damaged or worn chain-sprocket scrapers, so check them regularly for working condition and replace if necessary.



NOTE

NOTE!

All conveyor chains must be adjusted to equal tension.

Too-weak tension in the chains can lead to damage to the spreader and pose a direct risk to bystanders or operators.

5.2 Hydraulic-system maintenance

The hydraulic system of the spreader must be leak-proof. Operating the spreader with a leaking hydraulic system is not permitted. Checking the tightness involves activating individual circuits of the hydraulic system several times. If an oil leakage is found, the connection must be sealed or the leaking line replaced.

Table 12 HL-46 hydraulic-oil specification

No.	Name	Value
1	Viscosity class as per ISO 34448VG	46
2	Kinematic viscosity	41.4 - 50.6 mm ² /s (40°C)
3	Quality class as per ISO 11158	HL

A new spreader is fitted with a hydraulic system filled with HL-46 oil. The oil in the tractor's hydraulic system should be of the same type as the oil in the spreader's hydraulic system. Mixing oils of the same type is permitted provided that it is approved by the oil manufacturer. The hydraulic system of the spreader is not equipped with a filter, so the cleanness of the oil in the system depends on the condition of the filters in the hydraulic system of the tractor. The correct and trouble-free operation of the hydraulic system depends on the cleanness of the hydraulic oil.

Keep clean both the hydraulic quick couplings of the spreader hydraulic hoses and the hydraulic sockets of the tractor. After disconnecting the hoses from the tractor, wipe the plugs with a clean and dry cloth and cover them with protective caps.



Replace the rubber hydraulic hoses every 4 years, regardless of their technical condition, unless a fault has been found earlier.

Replace the filters and oil in the tractor's hydraulic system regularly to ensure the reliable and the durable operation of the spreader's hydraulic system.



NOTE

NOTE!

The hydraulic system is under high pressure during operation.

Check the tightness of the hydraulic system and the technical condition of the hoses regularly, and remove any leaks on an ongoing basis.

Use the hydraulic oil recommended by the manufacturer.

Never mix two types of oil.

Contaminated oil can cause the failure of hydraulic components.

The oil used in the hydraulic system is not listed as a hazardous substance, but prolonged skin exposure can cause irritation. Use soap and water to wash the skin which has come into contact with oil.

5.3 Gearbox maintenance

Spreader-gearbox maintenance involves checking the level of, topping up, and changing, the gear oil.

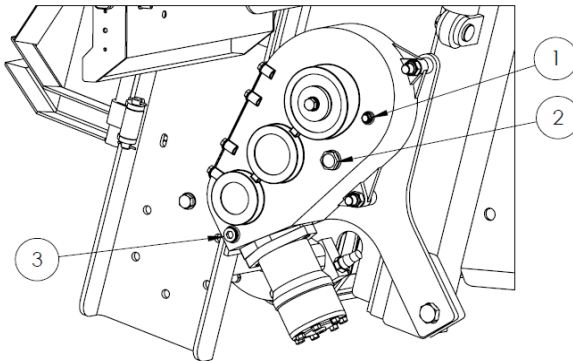


Figure 18 The oil-level check points of the floor-conveyor gearbox
1 - oil inlet (vent), 2 - oil level sight glass, 3 - drain plug

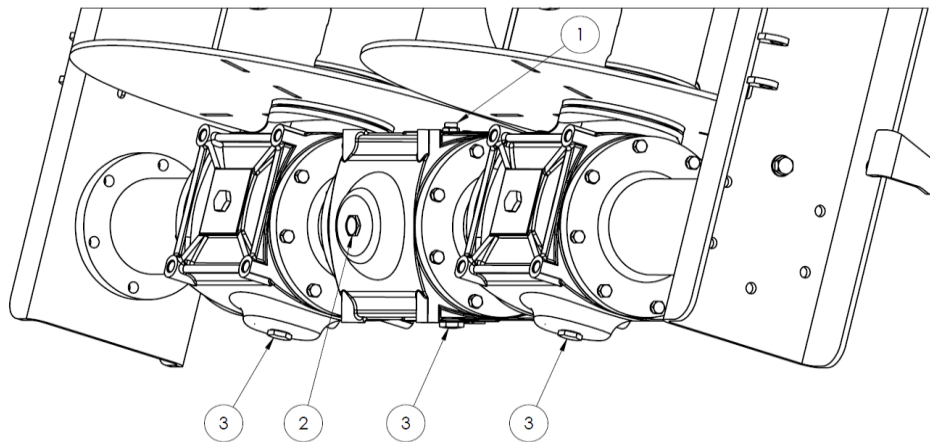


Figure 19 The oil-level check points of the beater-unit gearbox
1 - oil inlet (vent), 2 - oil level sight glass, 3 - drain plugs

Change the oil at operating temperature immediately after an operation is completed, when the oil is still hot. Carry out the work by driving the spreader on hard, horizontal, ground. Wear suitable protective clothing, and use water and the appropriate tools and tanks during replacement. Store the waste oil in appropriately marked tanks, and send it for disposal in accordance with the applicable regulations.

To drain the oil from the gear unit (Figs. 18, 19), and unscrew the drain plugs (3). Fill the gearboxes with new oil via the oil filler (1) until oil becomes visible in the sight glass (2). The correct oil level is reached when the oil is visible in the middle of the sight glass.

All the gearbox housings are interconnected in the beater-unit gearbox, so it is enough to use only the filler and a level sight glass of the central housing to top up and check oil level of the entire unit.



Check the oil level in the beater-unit gearbox and the floor-conveyor gearbox via a sight glass each time before you start the machine.



Change the oil in the beater-unit gearbox and the floor-conveyor gearbox after the first 50 operating hours, and then every 700 operating hours.

Table 13 Oil volume in N274 and N275 spreader gearboxes

Name	Type of oil	Volume
Beater-unit gearbox	Hipol GL 4 80/W90	12 L
Floor-conveyor gearbox	Hipol GL 4 80/W90	3 L



DANGER

DANGER!

During oil changes, use the appropriate personal protective equipment such as safety clothing, gloves, goggles, and footwear.

Avoid contact with skin.

Oil can cause an allergic skin reaction.

The oil has a harmful long-term effect on aquatic species.

5.4 Lubrication

Proper lubrication is one of the most-important factors which determine the efficient operation of individual spreader assemblies and mechanisms.

Compliance with the manufacturer's lubrication recommendations significantly reduces the possibility of damage or the early wear and tear of individual parts. Lubrication points are indicated in Figures 20, 21 and the lubrication schedule in Table 14.

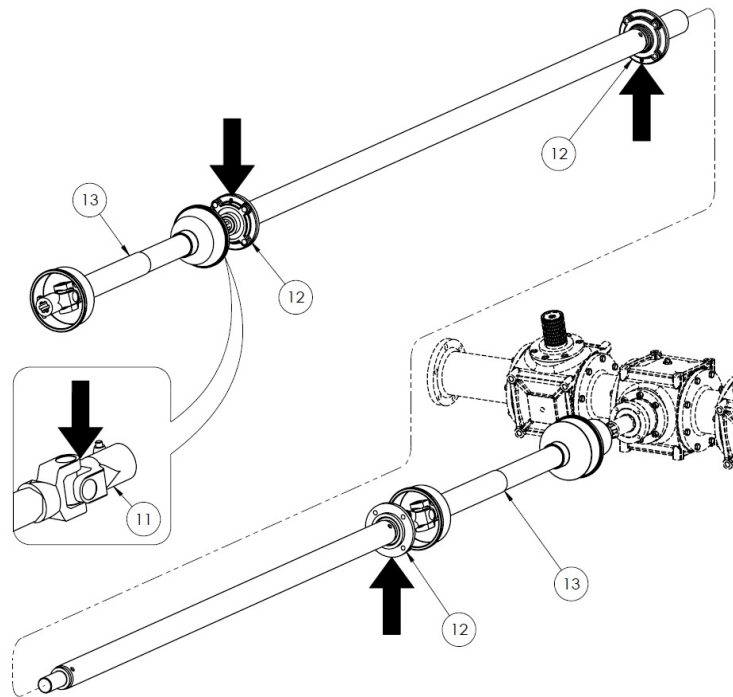
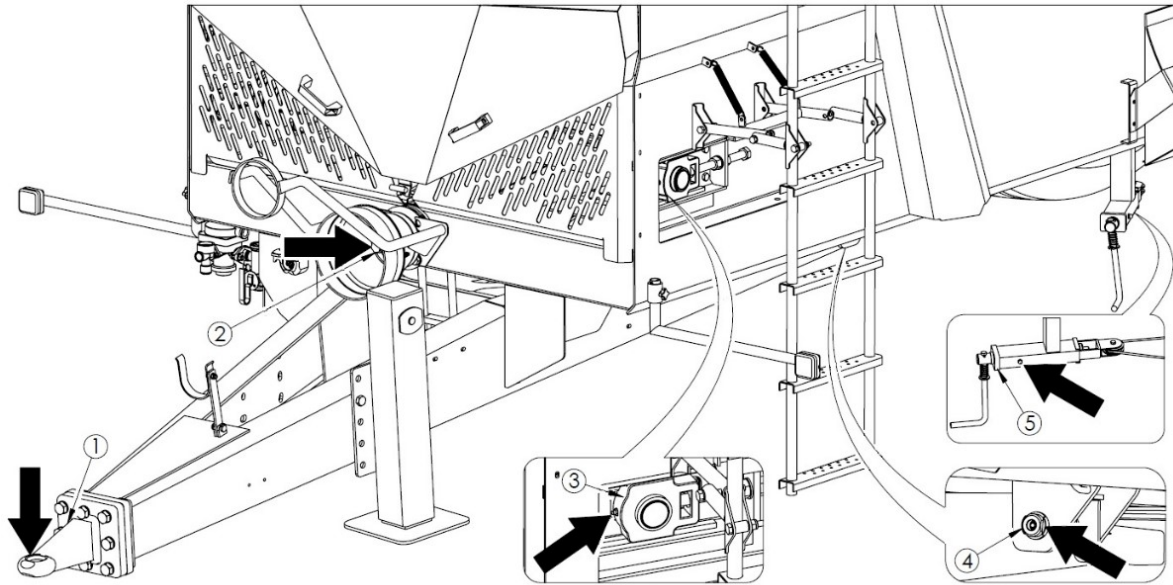


Figure 20 The spreader-lubrication points

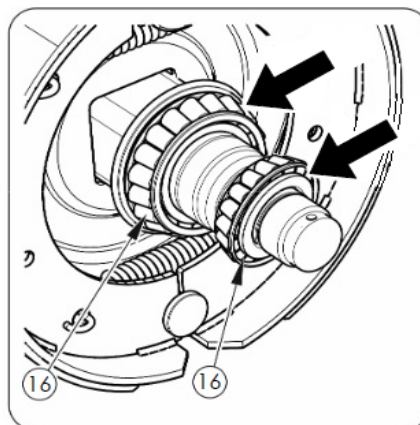
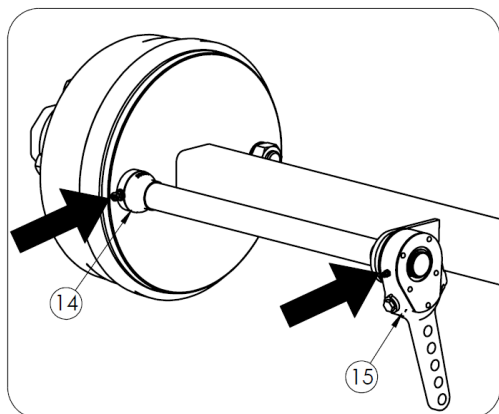
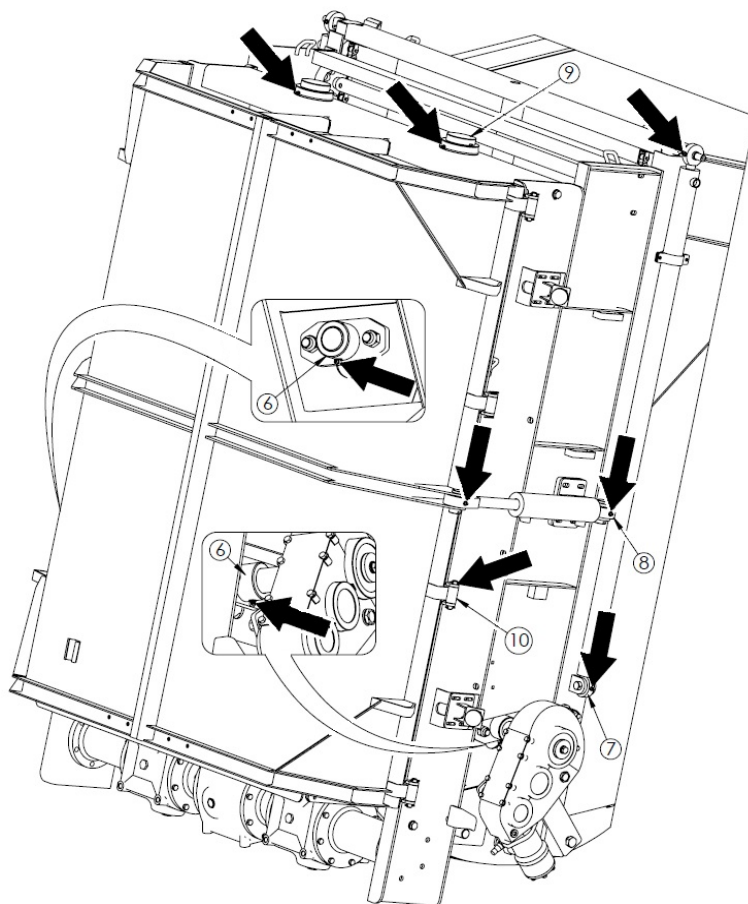


Figure 21 The other spreader lubrication points

Follow the guidelines below during lubrication

- Clean the grease nipple before starting to pump the grease
- Pump the grease until fresh grease appears in the slots through which the used grease is squeezed out during pumping; after the lubrication completed leave some grease on the nipple head

Table 14 Lubrication schedule

No.	Name of assembly	Number of lubrication points	Grease type	Interval
1.	Drawbar hitch	1	ŁT	2D
2.	Spline of the drive shaft	1	ŁT	6M
3.	Tension-bearing housing	2	ŁT	6M
4.	Drawbar pins	2	ŁT	6M
5.	Parking-brake assembly	1	ŁT	6M
6.	Feeder shaft sleeves	2	ŁT	8H
7.	Spherical plain bearings of the gate cylinder	4	ŁT	6M
8.	Spherical plain bearings of the beater-unit shield cylinder	4	ŁT	6M
9.	Beater-unit top bearings	2	ŁT	8H
10.	Beater-shield hinges	8	OM	6M
11.	Shaft universal joints	4	ŁT	24H
12.	Drive-bearing housings	3	ŁT	6M
13.	Articulated telescopic shafts	*	*	*
14.	Expander-shaft sleeves	2	ŁT	6M
15.	Brake-expander lever	2	ŁT	6M
16.	Wheel-hub bearings	2	ŁT	24M

* - Observe the guidelines in the Instructions Manual supplied with the PTO shaft

Lubrication interval code H - working hour, D - working day, M - month

Table 15 Lubrication products

Code from Table 10	Description
ŁT	ŁT-42, ŁT-43 General-purpose grease
OM	Machine oil

Wipe the parts to be lubricated with machine oil with a clean cloth, and then apply a small amount of oil to the lubricated parts. Wipe off excess oil.

Lubricate the wheel hub bearings by applying fresh grease after removing the hub and removing used grease. Each time grease is replaced, assess the condition of the bearings and replace them if necessary. After mounting the hub, adjust the bearing play.



NOTE

NOTE!

Driving the spreader without hub caps is not allowed. Dirt entering the wheel bearings causes damage to the wheel bearings.

5.5 Pneumatic-system maintenance

Have the air-braking system components repaired, replaced and regenerated by professional workshops with all the appropriate qualifications and tools to perform this type of work.

The pneumatic system maintenance by the user involves

1. checking the system tightness and visual inspection
2. air-filter cleaning
3. draining the air tank and cleaning the drain valve
4. replacing the flexible connection lines
5. cleaning and maintaining the pneumatic-hose fittings



NOTE

NOTE!

It is not allowed to operate the spreader if the braking system is faulty.

5.5.1 System tightness and visual inspection of the pneumatic-braking system



System tightness and visual inspection

- At start-up
- After the first 1,000 km
- Each time system components are repaired or replaced
- Annually

Checking the tightness of the pneumatic system

- Couple the tractor with the spreader
- Use the parking brake to immobilise the tractor and spreader, and put a chock under a spreader wheel
- Start the tractor's engine to supply air to the braking system of the spreader
- Switch off the tractor's engine,
- Check the air tightness of the pneumatic components after the tractor's brake pedal is released
- Check the air tightness of the pneumatic components after the tractor's brake pedal is pressed (another person is required)

If leaky, air will escape outside with characteristic hissing at the damaged places. Minor leaks can be detected by putting a layer of a foaming agent onto an inspected part (washing-up liquid, soap).

Replace the damaged parts or have them repaired. Remove any leaks in the joints by tightening the joint or replacing the fitting or sealing.

Carry out a visual check of the air braking system at the same time as the tightness check. Pay particular attention to the condition of the pneumatic hoses, the way they are fixed, and the cleanness and completeness of the components. Do not leave worn, permanently deformed, partially cut, and/or bent hoses. Contaminating the system components with oil and grease is not allowed.



NOTE

NOTE!

Have the pneumatic system components repaired, replaced, and regenerated by professional workshops only.

5.5.2 Air-filter cleaning



DANGER

DANGER!

Depressurise the spreader's braking system before dismantling the filters.

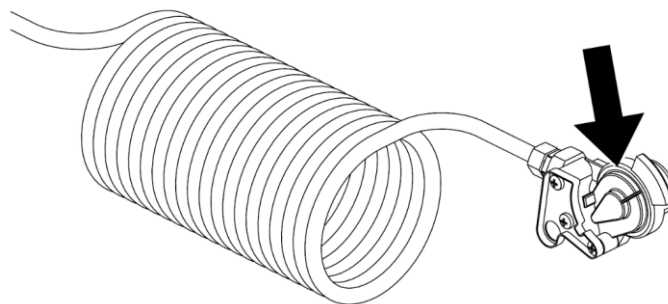


Figure 22 Haldex braking-system air filters

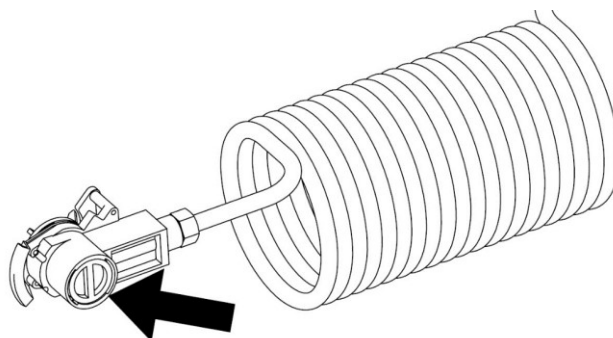


Figure 23 Knorr-Bremse braking-system air filters

Clean the air-filter inserts according to the operating conditions, but at least every 6 months. The filters in pneumatic hose fittings - Figures 22, 23. The air-filter inserts are reusable and need not be replaced unless damaged.

5.5.3 Draining the air tank

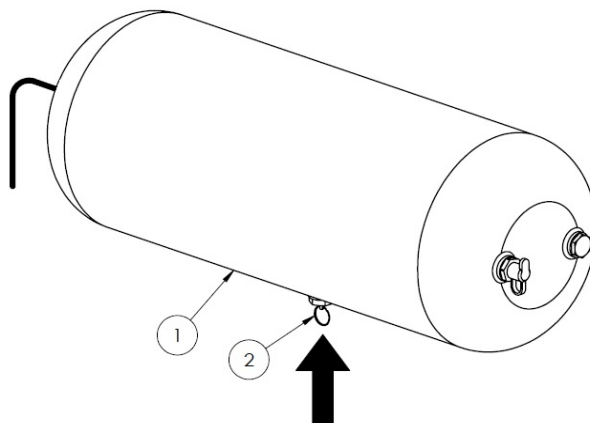


Figure 24 Draining the air tank
1 - air tank, 2 - drain valve



Drain the air tank every 7 days of use.

To drain the air tank

- pull the drain valve (2) to let water escape (compressed air will make water escape outside)
- release the drain valve (the valve will close automatically and cut off the airflow).

If the drain valve is leaking, it must be dismantled and cleaned or replaced if necessary.

5.5.4 The replacement of the flexible connection hoses

Replace all flexible connecting hoses every 5 years unless damage (permanent deformation, wear or splits) has been found earlier.

To replace the hoses follow this procedure

- Depressurise the system
- Unscrew the pneumatic fittings from the hoses
- Unscrew the hoses from the brake valve
- Fit new hoses
- Check the tightness of the connections

5.5.5 Cleaning and maintaining the pneumatic hose fittings



DANGER

DANGER!

Faulty, damaged or dirty air hose fittings can cause a malfunction of the braking system.

If any damage to the hose fittings is found, replace them with hose fittings in good working order. The exposure of fitting gaskets to oils, petrol, greases, etc. can cause them damage or accelerate the ageing process.

If the spreader is uncoupled from the tractor, the connections must always be protected with caps and placed in the appropriate holders. Preserving the fitting gaskets with a suitable product is recommended for the post-season period, using e.g. silicone spray for rubber parts.

Check the technical condition of the pneumatic fittings of the spreader and the tractor before connecting the machine. Keeping the fittings clean ensures an extended service life and the correct functioning of the entire braking system.



Always check the technical condition of the pneumatic connections before connecting the spreader to the tractor.

5.6 Driving-axle and brake maintenance

5.6.1 Driving-axle maintenance

Regular checks of the driving axle bearings for play are recommended - Figure 25. Carry out such a check on a newly purchased machine after the first 100 km. From then on, during operation, recheck after driving about 1,500-2,000 km and adjust if necessary.

To adjust the bearing play, follow the procedure below.

1. Couple the spreader with the tractor and engage the parking brake of the tractor
2. Lift one side of the spreader so that the wheel does not touch the ground, and secure it against dropping
3. If the wheel shows excessive play, remove the hub cap and the securing pin to prevent the castellated nut from unscrewing

4. Turn the wheel while simultaneously tightening the castellated nut until the wheel is stopped completely
5. Loosen the nut by 1/6-1/3 of a turn until the nearest groove overlaps the pin with the hole on the hub spigot
6. Secure the nut with a new pin, replace and fasten the hub cap

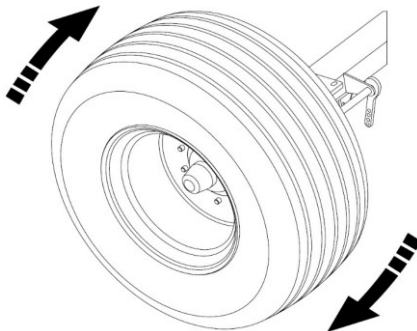


Figure 25 Checking wheel-bearing play

If the bearing play is adjusted correctly, the wheel should rotate freely, without stoppage or evident resistance (other than friction of the brake shoes against the drum). Slight friction of the shoes against the drum, particularly in a new trailer, or after their replacement, is a typical occurrence. Check the degree to which the hubs are heated to ultimately verify the correct adjustment of the bearing play after driving a few kilometres. In addition to the improper adjustment of the bearing play, considerable resistance to wheel rotation and hub heating can be caused by impurities in the lubricant, or by bearing damage. The above symptoms require disassembly of the wheel hub and rectifying the malfunction.

5.6.2 Brake maintenance

Once you have purchased the spreader, carry out a general check of the braking system on the driving axle; repeat the check according to the set schedule.

Have the brake components repaired, replaced, and regenerated by professional workshops with all the appropriate qualifications and tools to perform this type of work.

The operator is responsible for the following maintenance works of the driving axle brake.

- Function check of the brakes
- Inspection of the brake lining for wear
- Service-brake adjustment
- Function check of the parking brake
- Replacement of the parking-brake cable and adjustment of its tension

Brake-function check

- Couple the spreader with the tractor, place chocks underneath the tractor wheel
- Check the way the pneumatic cylinder and its forks are mounted on the brake-lever arm
- Check the axle-brake components (pins, lynch pins, nuts, etc.)
- For completeness apply and release the service brake and repeat with the parking brake (the action of the brakes should be smooth and with retraction without resistance or pausing)
- Check the cylinder piston-rod stroke
- Check the pneumatic cylinders for tightness
- Carry out an unladen test run and apply the service brake several times to check its function

Brake-lining wear check

Look through the inspection windows in the brake-drum cover to check the brake linings for wear - Figure 26. Replace the brake jaws when the brake-lining thickness drops below the minimum value specified by the manufacturer.

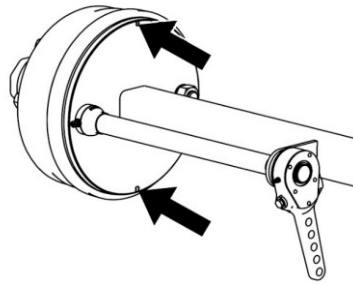


Figure 26 Brake-lining wear check



The minimum brake-lining thickness is 5 mm.



Check brake linings for wear:

- Every 3 months of use
- If the cylinder piston-rod stroke is significantly longer
- If any strange noises are heard in the brake-drum area

Service-brake adjustment

As the brake linings wear, the work stroke of the pneumatic cylinder piston rod increases. Excessive strokes can reduce the effectiveness of the brakes; therefore check, and adjust if necessary, the work stroke of the brake to keep it within the specified operating range. In a brake which is adjusted correctly, the angle between the piston rod and the expander lever in the braking position shall be 90° - Figure 27.

The brake-function check involves the measurement of the stroke length of the piston rod of each of the pneumatic cylinders. If the piston-rod stroke is longer than the maximum value (45 mm), the system must be adjusted.

Adjust the stroke of the cylinder piston rod and the angle of the expander lever by correctly setting the cylinder forks (3) and adjusting the stroke with the adjustment screw (7). During the adjustment maintain uniform settings for both cylinder and expander lever.



The correct stroke of the piston rod should be in the range 25-45 mm.

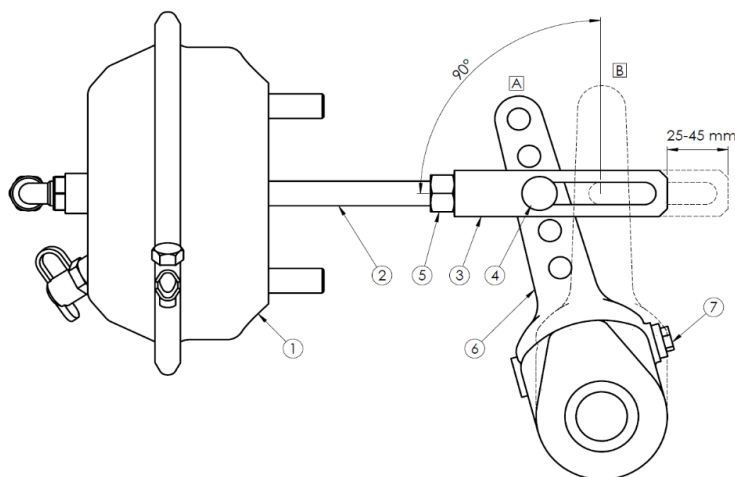


Figure 27 The adjustment of the service brake

1 - pneumatic cylinder, 2 – cylinder-piston rod, 3 - cylinder forks, 4 - fork pin, 5 - fork lock nut, 6 - expander lever, 7 - adjusting screw

(A) lever position for the released brake, (B) lever position for the applied brake



Checking the technical condition of the brake:

- After the first 100 km
- Every 6 months
- After each repair of the braking system
- If the braking action of the spreader wheels is uneven



NOTE

NOTE!

An improperly adjusted brake can cause the brake shoes to rub against the drum, which can result in faster wear of the brake linings and/or overheating of the brake.



NOTE

NOTE!

The mounting positions of the pneumatic brake cylinder in the holes of the bracket and fork pin of the cylinder in the holes of the expander lever are set by the manufacturer, and any change to their position is prohibited.

Parking-brake adjustment

The correct functioning of the parking brake depends on the effectiveness of the driving-axle brakes and the correct tension of the brake cables.



Checking and/or adjusting the parking brake:

- Every 12 months
- If required

Carry out the adjustment of the hand brake cable if

- the cable is stretched
- the cable is damaged
- the cable clamps are loose
- the driving-axle brake has been adjusted
- the mechanism in the driving-axle brake has been repaired
- the mechanism in the parking brake has been repaired

If the parking brake needs adjusting, make sure the brake on the driving axle is correctly adjusted and functions correctly.

Adjust the parking-brake cable tension by setting the appropriate length of the loop at its ends to pre-tension the cable. Carry out this adjustment when the brake of the driving axle is released and the parking brake crank mechanism is fully loosened.

5.6.3 Tyre maintenance- wheel changing

Secure the machine with the parking brake and the wheels with chocks when maintaining the tyres. Changing the wheel is only permitted if the spreader structure has been emptied. Use suitable tools for repairing the wheels. Due to the risks associated with the maintenance and repair works of tyres, the repairer should be trained for this purpose. Before the start-up, after the first laden drive and after each intensive use of the machine, and/or every 100 kilometres, it is advisable to check the tightening of the nuts. Repeat the checks after each time you change the wheels.

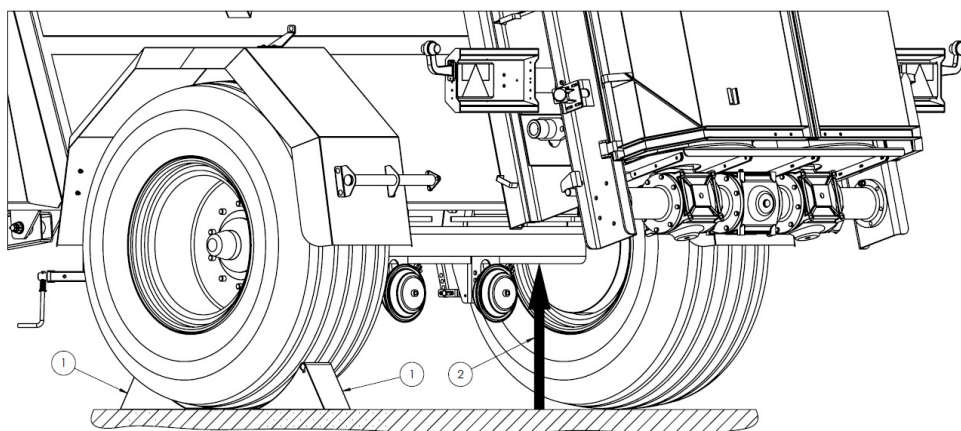


Figure 28 The jacking points
1 - chocks, 2 - jack

If the wheel needs to be lifted off, use the jacking points (2) under the axle. The lifting point is shown in Figure 28. Place the safety chocks (1) under one wheel only.



The air pressure must be checked regularly. Maintain the recommended air pressure. The correct pressure is indicated on the tyre or as a sticker on the spreader.



NOTE

NOTE!

Inspect the tightening of the wheel nuts regularly.

M18x1.5 = 270 Nm, M20x1.5 = 350 Nm, M22x1.5 = 475 Nm.

- Regularly check and maintain the correct tyre pressures, as recommended in the Instructions Manual and/or information on the tyre.
- Do not exceed the permissible load capacity of the tyres according to the Instructions Manual and/or information on the tyre.
- Do not exceed the speed limit according to the Instructions Manual and/or information on the tyre.
- Tyre valves must be fitted with protective caps.
- During the whole day's work, regularly check the temperature of the tyres, and, if they are heating up, take 30 minutes breaks to cool them down.
- Avoid excessive bumps, inconsistent manoeuvres and high speeds when cornering.
- Regularly check the condition of the tyres and replace them if cut or damaged.



NOTE

NOTE!

Do not exceed the permitted transport speed, working speed, or the gross and design payload capacities of the spreader.

5.7 Maintaining the electrical system and warning devices



NOTE


NOTE!

The electric system of the spreader is supplied with 12V voltage.

The user's responsibilities related to maintaining the electric system include

- technical inspection of the electrical system and retro-reflectors
- replacement of light bulbs

Have the electrical system components repaired or regenerated by professional workshops with all with appropriate qualifications and tools to perform this type of work.



NOTE

NOTE!

It is not allowed to drive when the lighting system is in an unusable condition. Damaged lamp covers and burnt-out bulbs must be immediately replaced before starting to drive. Replace damaged or lost retro-reflectors.


Before driving on a public road, make sure the lighting and retro-reflectors are not blurred.

Maintenance work

- Check the condition of the electrical connection cable and the socket in the spreader
- Verify the lighting for completeness, technical condition, and correctness
- Verify all retro-reflectors for completeness and technical condition
- Verify the correct fixing in the bracket of the indicating plate for slow-moving vehicles
- Before driving on a public road, make sure the tractor is equipped with a retro-reflective warning triangle
- Before driving on a public road, make sure the lighting and retro-reflectors are not blurred

Table 16 Light bulb list

Lamp	Lamp type	Bulb identification/quantity	Number of lamps
Rear-lamp cluster, right	HOR45-LZT 478	C5W / 1 pcs. P21W / 2 pcs.	1
Rear-lamp cluster, left	HOR45-LZT 471	C5W / 1 pcs. P21W / 2 pcs.	1
Marker lamp, right	LO 355	C5W / 1 szt.	1
Marker lamp, left	LO 355	C5W / 1 szt.	1
Front running light, right	LO 093	W5W / 1 szt.	1
Front running light, left	LO 093	W5W / 1 szt.	1



Check the electrical system each time the spreader is coupled

The spreader lights are equipped with replaceable bulbs. Replace the bulbs if necessary, remove the covers, and replace the bulbs with ones of the same power and marking as the original ones. A list of bulbs used in spreader lamps is given in Table 16.

5.8 Cleaning, maintenance, and storage

It is recommended that the spreader be thoroughly cleaned of any residual manure every day after the completion of work.

After each “seasonal” manure spreading, thoroughly wash the spreader with clean water, dry it, and carry out maintenance work. It is recommended to use pressure washers for this cleaning. Particular caution should be exercised during cleaning.

Cleaning guidelines

- Do not let the water jet to be closer than 40 cm from the surface to be cleaned; washing surfaces with a strong jet of water from a short distance can damage coated surfaces
- The water temperature must not exceed 50°C
- Do not point the water jet directly at electrical components, hydraulic and pneumatic components (cylinders, valves, fittings), warning and information stickers, rating plates, lubrication points, and the like
- If the use of cleaning agents is necessary, carry out a trial surface wash in an inconspicuous place
- Use petroleum ether or a degreaser to degrease and wash any greased parts with clean water
- Do not use organic solvents or substances of unknown origin
- Use suitable cleaning products to clean plastic or rubber surfaces
- Wash the spreader in the designated areas according to the environmental-protection regulations
- Clean and dry the spreader at a temperature above 0°C



DANGER

DANGER!

Clean with the drive off, the PTO shaft disconnected, and the tractor’s engine stopped. Remove the key from the ignition switch. Secure the tractor against unauthorised access.

Entering the spreader structure is only permitted when the machine is stationary.



NOTE

NOTE!

Wash with the appropriate safety clothing on and use personal protective equipment.

Refer to the Instructions for use for cleaning products and the Instructions for use for the pressure washer.

After the thorough cleaning and drying of the spreader, carry out proper maintenance works, fill in missing coats, and lubricate the machine. After the lubrication of the lubrication points, turn on all the mechanisms of the spreader to distribute the grease.

Apply a small amount of oil or anti-corrosive products at sites where the coat has rubbed off naturally as a result of the friction of the moving material or the friction between the abrasive parts.

Store the spreader in a roofed area, adequately protected against unauthorised access. Storing the spreader outdoors exposes the spreader to corrosion and UV radiation, which can cause the coat’s ageing.

5.9 Tightening the torques of bolt connections

The optimum tightening torques for bolts with metric threads are shown in Table 17.

Table 17 Metric bolt-tightening torques

Bolt		Tightening torques for bolts with metric threads [Nm]					
Diameter d [mm]	Lead of thread [mm]	Bolt-strength classes					Wheel nuts, wheel bolts
		4.8	5.8	8.8	10.9	12.9	
3	0.50	0.9	1.1	1.8	2.6	3.0	
4	0.70	1.6	2.0	3.1	4.5	5.3	
5	0.80	3.2	4.0	6.1	8.9	10.4	
6	1.00	5.5	6.8	10.4	15.3	17.9	
7	1.00	9.3	11.5	17.2	25	30	
8	1.25	13.6	16.8	25	37	44	
8	1.00	14.5	18	27	40	47	
10	1.50	26.6	33	50	73	86	45
10	1.25	28	35	53	78	91	
12	1.75	46	56	86	127	148	
12	1.50						80
12	1.25	50	62	95	139	163	
14	2.00	73	90	137	201	235	
14	1.50	79	96	150	220	257	140
16	2.00	113	141	214	314	369	
16	1.50	121	150	229	336	393	220
18	2.50	157	194	306	435	509	
18	1.50	178	220	345	491	575	300
20	2.50	222	275	432	615	719	
20	1.50	248	307	482	687	804	400
22	2.50	305	376	502	843	987	
22	2.00						450
22	1.50	337	416	654	932	1090	500
24	3.00	383	474	744	1080	1240	
24	2.00	420	519	814	1160	1360	
24	1.50						550
27	3.00	568	703	100	1570	1840	
27	2.00	615	760	1200	1700	1990	
30	3.50	772	995	1500	2130	2500	
30	2.00	850	1060	1670	2370	2380	

5.10 Faults and troubleshooting

Table 18 Faults and troubleshooting

Fault	Cause	Way to rectify
Impacts on the conveyor	Improper adjustment of conveyor chain tension. Excessive length of conveyor chains	Check and adjust the tensioning of chains
Spreader-beater unit blocked in places	Feeding speed of the floor conveyor too high	Reverse the floor conveyor to unblock the beater unit and reduce the feeding speed
	Blocking objects have entered the spreading assembly together with the manure	Remove the cause of stopping the augers in the beater unit
	Rotational speed of tractor's PTO not correct	Change the rotational speed of the tractor's PTO
	Operation at low-speed PTO	Maintain an adequate tractor's engine speed
Floor feeder does not distribute the loaded material towards the beater unit	The knob on the flow controller is set to "0-1"	Increase the setting value on the flow controller
	Excessive load weight results in overloaded floor feeder	Unload part of the load
	Low pressure in the tractor hydraulic system	Check the pressure in the tractor's hydraulic system. The minimum-required hydraulic pressure of the tractor, measured with hot oil 14 MPa, (140 bar)
	Engine overload valve of the hydraulic floor conveyor dirty and non-functional	Replace the overload valve. Check the condition of the hydraulic filters on the tractor - replace both filters and oil if necessary
	Interrupted oil supply to the hydraulic motor of the conveyor	Check the connection and tightness of the hydraulic system
Spread width too small	Rotational speed of tractor's PTO not correctly selected	Change the rotational speed of tractor's PTO
	Operation at low-speed PTO	Maintain an adequate tractor-engine speed

NAME AND ABBREVIATION INDEX

dB (A) – scale-A decibel, sound-pressure unit

kg – kilogram, weight unit

km – kilometre, a commonly used multiple measure of the metre, a basic unit of length in the SI system

kPa – kilopascal, pressure unit

m – metre, length unit

mm – millimetre, an auxiliary length unit equal to 0.001m

MPa – megapascal, pressure unit

N – newton – an SI force unit

Nm - Newton metre, a unit for moment of force in the SI system

Pictogram – an information plate

t – tonne, a unit of mass

Rating plate - a manufacturer's plate unambiguously identifying the machine

V – Volt, voltage unit

UV – ultraviolet radiation, invisible electromagnetic, invisible electromagnetic radiation with a negative effect on human health; UV radiation has a negative effect on rubber parts

Transport hitch – hitch components of an agricultural tractor (see the tractor's instructions manual).

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NOTES

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