

DSC

User Manual

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From machine number	1001
Serial number	From VN247
Reference number	A138580840-1

Machine identification

In order to provide you with good service various details about your machine may sometimes be required. Please complete these details here in order to have them at hand when they are requested.

Type of machine	DSC
Serial number	
Options	
Address dealer	
Address manufacturer	Kverneland Group Nieuw-Vennep B.V. Hoofdweg 1278 NL-2153 LR Nieuw-Vennep The Netherlands

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Table of contents

Target group of this manual

This manual is intended for agrarians and others trained in working in the field of agriculture, people that are competent to operate these machine, as required by national legislation, and who have knowledge of assembly activities.

For your safety

Ensure that you are familiar with the contents of this manual before you start using or assembling the implement. This will ensure that you obtain an optimum result and are working safely.

→ See paragraph »Safety requirements« on page 11.

Should you have any questions or if anything is unclear, please contact the manufacturer.

Make sure that this manual is available to all persons who will be working with this machine. In this way, you will:

- avoid accidents,
- respect the warranty conditions,
- always have a good functioning machine in perfect working order.

For the employer

- All personnel who operate this machine must be authorised to do so in terms of the applicable national legislation.
- All personnel are to be trained in the use of the machine regularly (at least once a year) in accordance with employers' liability insurance association guidelines. Untrained or unauthorised individuals are not permitted to use the machinery.
- You are responsible for the safe operation and maintenance of your machine. You must ensure that you and anyone else who is going to operate, maintain or work around the unit be familiar with the operating and maintenance procedures and related safety information as mentioned in this manual.
- You are responsible for providing personal protective gear to personnel who use the machine or who are performing maintenance or repairs on it. This includes: safety goggles, safety shoes, safety gloves, etc.

Meaning of symbols

Various symbols are used to provide a clear understanding of the text. These are explained below.

- A dot is placed before lists.
- ▸ A triangle marks tasks you have to perform.
- → An arrow refers to a different place in the text.

In addition, we use pictograms to help you easily find certain text sections.

INDICATION The words “Tip“ and “Hint” are followed by tips or hints for operation.



The warning triangle indicates important safety instructions. Failing to comply with these may result in:

- serious operating malfunctions of the machine;
- damage to the machine;
- injuries or accidents.



The spanner indicates tips for assembly or adjustment work.



A star indicates that examples will follow that are intended to clarify the text.

All directional rotations are to be interpreted when facing in direction of travel.

For your safety

In this chapter you will find general safety instructions. In every next chapter you will find more specific safety instructions not described here.



Do not risk injury or death by ignoring good safety instructions.

Many risks can happen when working with agricultural machines. Avoid accidents! Do not take risks! Be alert!
Think **safety!** Work in **safety!**

Disregard of the 'Safety instructions', inadequate maintenance, use of the machine other than for its intended purpose, overloading or unauthorised modification of the machine, renders the manufacturer's warranty and responsibility void.

Familiarise yourself with the function of all machine controls and the safety instructions, prior to any usage of the machine.

Incorrect use of the machine may lead to dangerous situations. For this reason, you should always work carefully and never under high time pressure.

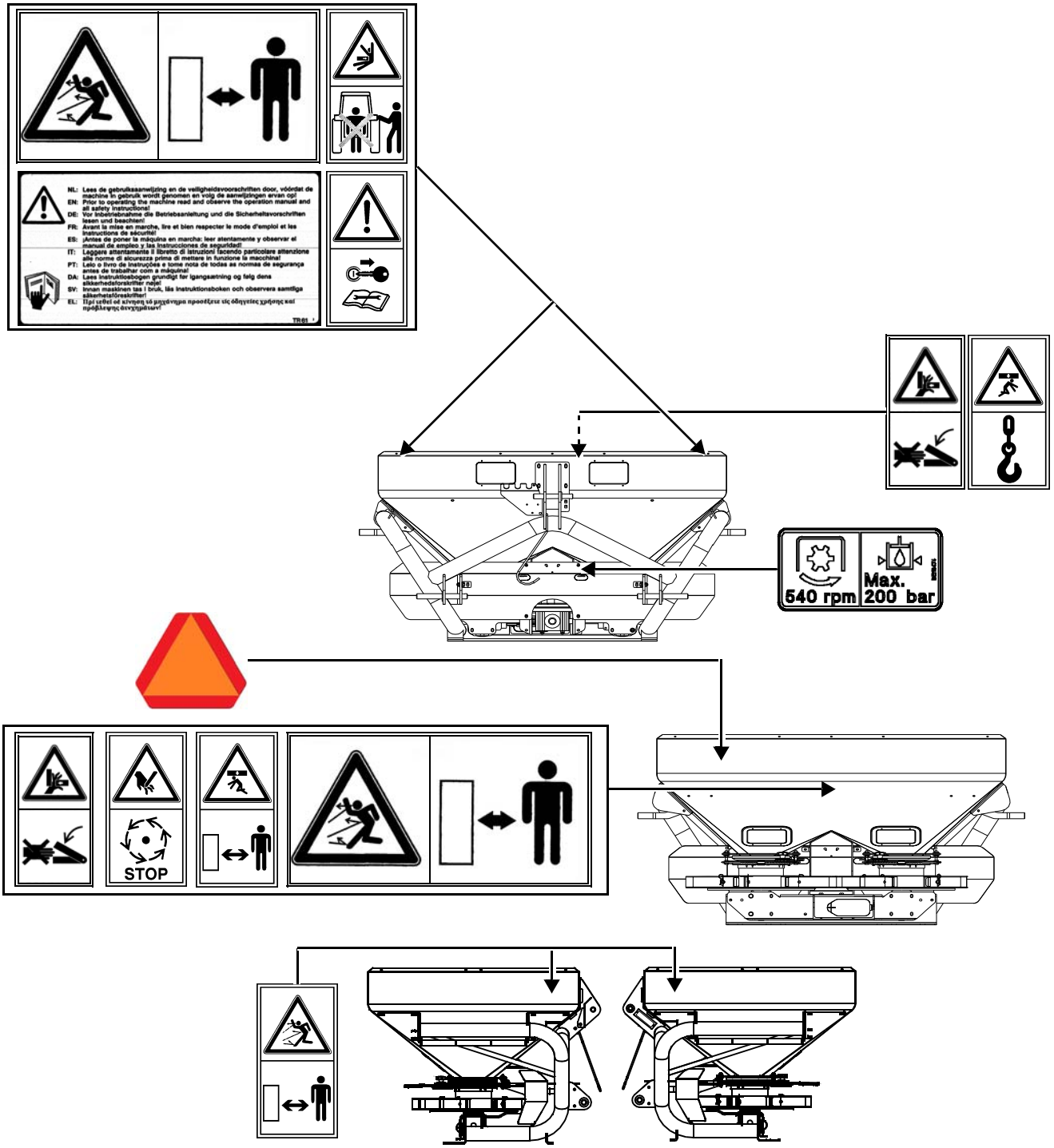
Other guidelines

Comply with the rules
In addition to the instructions above you should comply with the following:

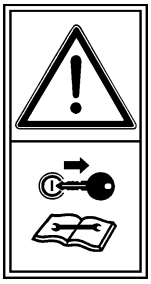
- measures to prevent accidents;
- general safety instructions, occupational health requirements and road traffic regulations;
- instructions in this manual.
- Rules regarding use, maintenance and repairs.

Warning stickers

Various warning stickers have been affixed to the machine for safety reasons. Do not remove them! Always follow the instructions supplied and be alert to possible dangers.
Always keep the safety stickers and symbols clean and clearly legible. Replace safety decals that are missing, damaged or have become illegible. If original parts on which a safety decal or sign was installed are replaced, be sure that the replacement part also displays the current decal or sign.



Explanation for warning stickers



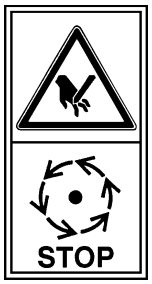
Stop the engine and remove the keys from the ignition
Switch the engine off as soon as you leave the tractor. Remove the key from the ignition to prevent the tractor from being started unintentionally while you are in the danger zone. This especially applies when changing the settings or while maintenance and repairs are carried out.



Keep clear from a running machine
Fertiliser is spread over a great distance during operation. Ensure that nobody comes within working reach of the machine during operation. Do not come into the working area before all parts of the machine are standing still.



The power lift must only be operated outside of the danger zone
In the area between the tractor and the machine, there is a danger of being pinned down by the power lift. The power lift must therefore only be engaged from beyond the danger zone. Secure the tractor with the handbrake and wheel chocks to ensure it would not roll away.



Do not approach the machine until it has come to a complete standstill
The rotating parts of the machine never come to an immediate halt, they always wind down. The moving parts of a machine are not always visible. Do not approach the machine until all moving parts have come to a complete halt.



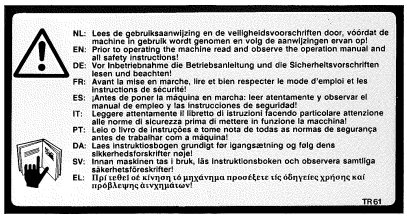
Never go underneath an elevated, unsecured machine
The machine or parts of the machine could accidentally fall due to waning pressure, for instance. Always place the machine on proper supports if you have to work under the machine!



Only lift the machine at the lifting points
If a machine is being elevated, only attach it to the indicated lifting points. Never go underneath an elevated machine. Allow for any possible movements of the elevated machine, whether wanted or not.



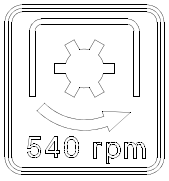
Be careful of getting jammed or pinched
If the machine is engaged or operated unintentionally you could get struck in moving parts, which could lead to injury. Be extra alert when working in the vicinity of moving parts. Always keep in mind that the motor or parts of the machine could still be retaining some energy.



Read the user's manual
The instruction manual contains procedures for working correctly to ensure safe work, as well as dangers one could possibly encounter. Keep to these procedures as described and give due consideration to the safety measures in place!



Do not exceed the maximum hydraulic pressure of 200 bars
Prevent the pressure in the hydraulic system from exceeding 200 bars! Working with higher pressure may damage your machine and result in dangerous situations.



Do not exceed the maximum PTO shaft rpm
Prevent the PTO shaft rpm from exceeding the given values!



Motor vehicles with limited speed (<40 km/h), agricultural and forestry tractors and their
trailers, as well as other vehicles, must be provided with a red reflector at the rear in the form of a truncated triangle.

Safety requirements

This part contains all the requirements, everything that is not permitted and requirements for each form of usage, maintenance and reparation of the machine.
The chapters in the manual contain additional safety measures.

Knowledge of the safety regulations forms the basis for safety and proper usage of the machine.
Always follow the safety instructions. most accidents are avoidable. Do not run the risk of serious or fatal accidents through ignorance of these safety instructions.

Intended use

This machine is exclusively intended to spread granular products, specifically fertiliser types and seeds.
Any other application would be considered to be irregular. The manufacturer is not responsible for damage that may result from such usage; risks are taken exclusively by the user.
The instructions, maintenance requirements and reparation stipulations as indicated by the manufacturer must be adhered to at all times.

Person

Responsibility of the user
The user may only operate the machine if he/she:

- is familiar with the basic safety requirements and the working conditions requirements,
- is familiar with current traffic regulations,
- has been duly instructed on how to work on/with the machine and the related dangers,
- has read and understood this manual,
- is familiar with all the systems and operating elements and their functions,
- is familiar with the requirements for using, maintaining and repairing machines.

It will be too late for that once you are working!
Irresponsible usage could lead to injury to the user or third parties and could lead to damage to the machine.

Authorisation

Only to be used by an authorised person
The machine may be used by authorised people only. A person is authorised if he/she:

- received training as required by the national authorities,
- has taken responsibility as described in

  → paragraph »Person« on page 11.

Maintenance and repairs by experts
Maintenance, replacement of parts and repairs to the machine may only be performed by experts.
A person is considered to be an expert if he/she has sufficient knowledge in the fields of safety, maintenance, production and repairs as a result of training and experience.
Maintenance or repairs performed by such a person could lead to injury and damage to the machine.

Clothes/protection

Wear close-fitting clothing
Avoid wearing loose fitting clothing. Loose clothing could become entangled with moving parts, which could lead to serious consequences.

Ensure personal protection
Ensure your personal protection. Outfit:

- safety goggles,
- safety shoes,
- safety gloves.

Prevent hearing damage
Your hearing could be damaged when working with the tractor and machine with noise levels in excess of 80 dB. Use the appropriate ear protection in order to prevent hearing damage. Remaining in an area with high noise levels for a long period of time could lead to serious damage to your hearing.

What to do in the event of injury
In the event of injury and if you suspect that you made contact with materials you should:

- clean the point of contact with a lot of water,
- contact your physician immediately!



Workplace

To be used and operated by 1 person
The machine may only be operated by one person, from the tractor. Operating the machine from the tractor will keep you out of harm's way. Other people should not be in the direct vicinity of the machine and the tractor. Those who are within the working area and the danger zone could be injured.

Check the direct surroundings
Check the immediate environment and keep a constant eye on it at the start, as well as while you are working with the machine. Familiarise yourself with the immediate vicinity. Do not start working until all people and obstacles within the working area and danger zone of the tractor and machine have been removed.
Never stay or allow anyone to stay within the danger area while the machine is running! If there are people within the working area and the danger zone it could lead to injury.

Tractor

Check the state of the tractor and machine
Only work with the tractor and machine if they are in good condition. Always check that:

- all lights, safety and warning provisions must be mounted correctly and be in good working condition,
- the lifting and pulling capabilities must be sufficient,
  → see »Calculate the axle load with tractor-mounted machines« on page 14,
- the tractor must be suitable for the machine, such as in the area of stability, engine capability, axle load and total weight,
- it is sufficient for the working with the machine and for transport.

Adhere to maximum permissible axle loads, total weights and transport dimensions! Using a tractor which is not proper can cause serious or deadly injuries or machine damage.
→ See the tractor’s technical details.

Put a fire extinguisher in place
Carry a fire extinguisher at all times, especially when operating in dry crop materials. This should be a multipurpose ABC rated extinguisher with a 5 kg capacity, approved by the appropriate authority. Mount this on the tractor and/or on the machine. Fire could damage the machine and cause injury.

Use active carbon filters
Harmful gasses and mists could enter the air duct of the tractor while it is in use. An active carbon filter should therefore be mounted in the air ventilation of the tractor. Harmful materials could cause serious personal injury.

Ensure the tractor is safe when leaving it
Never leave the tractor without:

- switching off the PTO shaft,
- releasing the pressure from the hydraulic system,
- switching off the tractor engine,
- the key must be removed from the ignition,
- engage the handbrake of the tractor.

Leaving the tractor unsafe could create dangerous situations that could lead to injury.

Responding to problems
In the event of operational problems you should:

- stop immediately,
- switch the tractor and machine off,
- attend to the problem or call in the assistance of an expert.

Never use the tractor in a closed area
The tractor must never be used in a closed area. Exhaust fumes collect without being noticed. Exhaust fumes can cause serious or deadly injuries.

Calculate the axle load with tractor-mounted machines

The following is of importance with the loading machine to ensure safe operation:

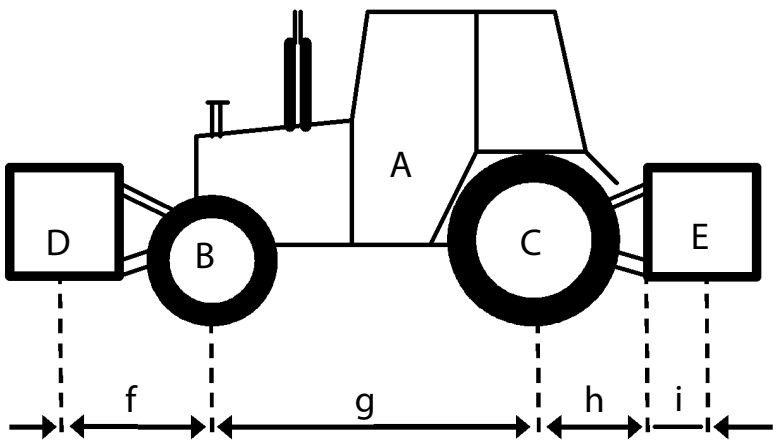
- the maximum load of the machine,
- the maximum axle load of the tractor,
- weight distribution over the axles,
- and the carry load per wheel.

At least 20% own weight from the tractor must rest on the front axle and 45% on the rear axle in order to maintain good manoeuvrability. Check if these conditions are adhered to before purchasing a machine! Adhere to maximum permissible axle loads, total weights and transport dimensions! Using a tractor which is not proper can cause serious or deadly injuries or tractor and machine damage.

Required details

The following details are necessary in order to calculate the minimum requirements and actual axle load, as well as the actual and maximum total weight. The details of the tractor should be given in the tractor manual. The details of the tyres should be supplied by the manufacturer. The details of the machine are in this manual.
→ in paragraph »Technical specifications« on page 29.

Letter	Description	Unit
A	The basic weight of the tractor without the machine (1)	Kg
B	The weight on the front axle of the tractor without the machine (1)	Kg
C	The weight on the rear axle of the tractor without the machine (1)	Kg
D	The total weight of the forward end hooked machine or weights	Kg
E	The total weight of the rear-end hooked machine or weights	Kg
f	The distance between the centre of gravity of the machine and the middle point of the axle	m
g	Wheel base of the tractor	m
h	The distance between the centre of the rear axle and the centre point of attachment of the lifting arm	m
i	The distance between the centre of gravity of the machine and the middle of the point of attachment of the lifting arm (2)	m
(1) Also include the weight of the accessories and the weight of the water in the tyres		
(2) If unknown, suppose i = half the machine length		



Calculations

The calculations can be made with the values given in the above chart.

Actual total weight
The actual total weight must not exceed the permitted total weight. The actual total weight (in kg) is calculated as follows:

Actual total weight (kg) = A + D + E

Actual front axle load
The actual front axle load must not exceed the permitted maximum load. The actual total front axle load (in kg) is calculated as follows:

$$\text{Actual front axle load} = \frac{D \times (f + g) + (B + g) - E \times (h + i)}{g}$$

Actual rear axle load
The actual rear axle load must not exceed the permitted maximum load. The actual total rear axle load (in kg) is calculated as follows:

Actual rear axle load (kg) = actual total weight (kg) - actual front axle load (kg) =

Ballast required in the front
The minimum load on the front axle must be 20% of the basic weight of the tractor. With a mounted machine in the power lift behind the tractor the minimum required ballast (in kg) in front of the tractor is calculated as follows:

$$\text{Front ballast required (kg)} = \frac{E \times (h + i) - (B + g) + (0.2 \times A \times g)}{f + g}$$

If the calculated value is negative no additional ballast is required.

Ballast required in the rear

The minimum load on the rear axle must be 45% of the basic weight of the tractor. With a machine mounted in the front power lift the minimum required ballast (in kg) in the power lift behind the tractor is calculated as follows:

$$\text{Rear ballast required (kg)} = \frac{(D \times f) - (C + g) + (0.45 \times A \times g)}{g + h + i}$$

If the calculated value is negative no additional ballast is required.

	Actual calculated value		Value permitted in the manual		Load capacity of 2 wheels
Front/rear axle minimum load	/ Kg		--		--
Total weight	Kg	≤	Kg		--
Front axle load	Kg	≤	Kg	≤	Kg
Rear axle load	Kg	≤	Kg	≤	Kg

The calculated value must be less or equal to (≤) the permitted values. The front and rear loads must be greater than the minimum load of the front and rear axles respectively.

TIP If you have access to a weigh bridge with sufficient measuring range the total weight and the front and rear axle load can also be determined by weighing them.

Machine

Check the condition of the machine before use
Check the following before using the machine:

- is the machine in a proper, functioning condition?
- are all lights, safety and warning provisions correctly mounted and in good working condition?
- are the brakes of the machine working properly and have they been adjusted to the correct position?

Using an unsafe machine could result in personal injury and damage to the machine.

The machine should only carry, not pull!
It is not permitted to use the machine for pulling as this would have detrimental consequences to its construction. This could lead to dangerous situations for bystanders, unsafe operation or damage to crops.

Do not stand on the machine
Being on the machine during activities and transport is prohibited. You may only be on the parts of the machine intended for the purpose if it is standing still and prevented from rolling by means of hand brake and wheel chocks. Being on the machine while in any other state could lead to serious injury.

Never work on a running machine
Never work on the machine while it is running. A running machine has several moving parts which can not be seen. Wait until all parts have come to a complete halt. Moving parts can cause serious injuries.

Safety decals

Follow the instructions on the stickers
The safety decals on the machine give important advice for a risk free operation. Respect them to ensure your safety.

Replace any safety decals and safety signs missing or illegible
When parts with a safety or warning decal are replaced, the replacement part must be provided with the same safety or warning decal. Stickers that are not legible must be replaced so that they would be clearly legible at all times.

Coupling shaft

Use the correct coupling shaft
Only use coupling shafts complying with the manufacturer’s specification for that specific use! In order to ensure protection of both man and machine exercise extreme caution when working at a coupling shaft other then described in this manual and/or on the instruction at the coupling shaft.
Modification of, and other special jobs on coupling shafts, require written explicit order and procedure of both machine and coupling shaft manufacturer is available! Use the correct tools and original parts to ensure a good performance and maximum safety. The use of an incorrect coupling shaft can cause damage to the machine.

Mount the appropriate protection
Externally accessible coupling shafts, the tractor's PTO shafts and machine input-axle must be equipped with appropriate guards and tubes. Working without guarding can cause serious or deadly injuries.

Replace the protection sleeves of the coupling shaft in time
Replace the coupling shaft protection sleeves at the first sign of wear and tear. Protection sleeves can wear without being noticed.
Worn or damaged protection sleeves can cause serious or deadly injuries.

Protect the PTO shaft stumps well
Slide the protection sleeve over the PTO shaft as soon as the coupling shaft has been removed. Clothing could become entangled into an unprotected PTO shaft end that could lead to serious injury.

Hydraulic system

Hydraulic oil is under high pressure
Never try to stop a leak with your fingers. Never try to locate a hydraulic leak or try to contain it by hand! When inspecting always use appropriate aid (e.g. a piece of wood or sheet metal) and wear safety goggles, safety gloves and gloves! High pressure fluid easily penetrates skin and clothes, causing severe injuries. In the event of injury, contact your physician immediately!



Do not exceed the maximum hydraulic pressure of 200 bars
Prevent the pressure in the hydraulic system from exceeding 200 bars! Working with higher pressure may damage your machine and result in dangerous situations.

Use

Only use after training
The machine may not be operated before the user has been properly instructed by the dealer or an authorised representative of the manufacturer.
Ensure that you are familiar with all systems and control machines and their functions prior to working with them! It will be too late for that once you are working! Careless usage could lead to injury and damage to the machine.

To be used and operated by 1 person
The machine may only be operated by one person, from the tractor. Operating the machine from the tractor will keep you out of harm's way.
Other people should not be in the direct vicinity of the machine and the tractor. Those who are within the working area and the danger zone could be injured.

Check the direct surroundings
Check the immediate environment and keep a constant eye on it at the start, as well as while you are working with the machine. Familiarise yourself with the immediate vicinity. Do not start working until all people and obstacles within the working area and danger zone of the tractor and machine have been removed.
Never stay or allow anyone to stay within the danger area while the machine is running! If there are people within the working area and the danger zone it could lead to injury.

Do not stand on the machine
Being on the machine during activities and transport is prohibited. You may only be on the parts of the machine intended for the purpose if it is standing still and prevented from rolling. Being on the machine while in any other state could lead to serious injury.

Keep the protection intact
The protection of the machine, e.g. shields and guards, protects from penetrating into danger areas! Therefore all protection must be kept in optimal condition and moved into the right position prior to starting to work!
The absence of protective gear could lead to injury.



Transport

Check the decoupling ropes of the quick coupling
The decoupling ropes must never be tense and must provide sufficient freedom for movement, even with the power lift in the lowest position as it could otherwise accidentally disconnect the quick coupling.

Drive carefully
Moving behaviour, manoeuvrability and braking performance are influenced by a trailed machine. When taking turns, pay attention to the extended width/length (turning circle) and/or large mass (sluggishness) of the machine. Ensure sufficient braking effect and safe manageability!
Careless driving could lead to serious injury and damage to the machine

Adjust the driving speed
High driving speeds and uneven surfaces on the road or field can put considerable strain on the machine and cause the tractor or machine to be overstrained, which could lead to damage. Always adjust the driving speed to the conditions of the environment and the terrain! When driving up and down hills and across slopes, do not make any sudden turns!

On the field

Do not leave the driving cabin
Never leave the operator's seat during operation or transport. The driver can be in the danger zone of the tractor or the machine and could not have a proper view of the immediate vicinity. This could lead to injury to the driver or third parties.

Do not allow the machine to tilt
When driving up and down hills and across slopes, do not make any sudden turns! Do not drive transverse on a slope with a steep angle. Tilting can cause serious machine damage.

Blockage of a security device
In case a security device blocks or is activated, never work on the machine without:

- switching off the PTO shaft,
- releasing the pressure from the hydraulic system,
- switching off the tractor engine,
- the key must be removed from the ignition,
- engage the parking brake of the tractor.

PTO shaft rotates after disengaging
After switching off the PTO shaft, the machine will continue running because of inertia. Keep a safe distance to the machine until the moving parts have come to a complete stop. Approaching the machine while it is rotating can cause serious or deadly injuries.

Maintenance

Always keep to the prescribed maintenance intervals
Take the machine for inspection and maintenance at the intervals as prescribed in this manual. All of the manufacturer's responsibility and the guarantee will become null and void if the prescribed intervals are not adhered to.

Performed by an authorised person
Always have an authorised expert perform maintenance and repairs as prescribed in, as prescribed in
→ paragraph »Authorisation« on page 12.
Maintenance performed in an inexpert manner could lead to unsafe work situations or damage to the machine or crops.

Never use the tractor in a closed area
The tractor must never be used in a closed area. Exhaust fumes collect without being noticed. Exhaust fumes can cause serious or deadly injuries.

Protect the machine
Fertiliser and other salts have a great influence on the rate of corrosion. Empty the hopper at the end of activities. Protect the machine by always cleaning it after using such material and patch breaks in the paint. Corrosion affects the strength of the construction and the operation of the machine, which could lead to a shortened lifespan.

Only use original parts when replacing
Using other non-genuine parts could lead to problems and unsafe situations when using the machine.
You can use the supplied parts manual (either as a printout or as a PDF in the included memory card) to locate the correct part number.

Never work on the machine while it is running
Never work on the machine while it is running. A running machine has several moving parts which can not be seen. These can cause serious injuries.

Do not change the machine
Do not modify the machine in any way. Unauthorised modifications may impair the function and/or safety and affect the life of the machine.



Avoid contact with materials
You should only come into contact with the materials when cleaning the machine. Always wear protective clothing, such as safety gloves, shoes and goggles. Read and adhere to the additional safety instructions and the of the material producer. Contact with the materials could lead to injury. Contact your physician in such an event!

Explosion danger because of nitrate
Fertilisers hat contain nitrate can create an explosion danger if they come into contact with fire.
All fertiliser remnants should therefore be removed from voids, corners, tubes and tubing before welding, cutting or grinding on the machine.
Explosions could cause damage to the machine and lead to personal injury.

Prevent unintentional operation
Render all parts that could contain residual energy safe, as well as all parts that conduct energy such as compressed air, hydraulics and electricity. Release all pressure from the system and disconnect the pipes and cables. Unintended operation could lead to injury.

Applications of the machine

This PTO shaft driven machine is suited for spreading granular fertiliser on the field and grazing land.
It is attached

- to the three-point power lift of the tractor (Cat. II), or
- to the trailer supplied for this purpose.

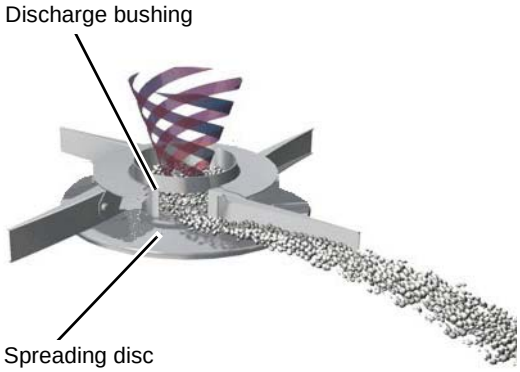
Border spreading is possible by using the following:

- border spreading plate,
- tramline cylinder.

Environment

This fertiliser spreader is equipped with a calibration and border spreading set that comply with environmental standard **EN 13739-2**.

RotaFlow spreading system

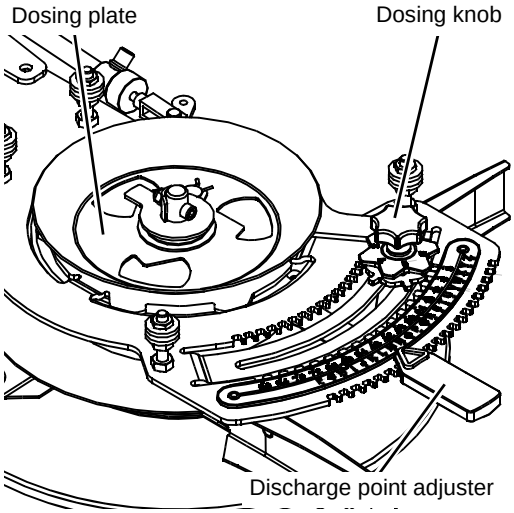


This rotary type spreader has two spreading discs, each with four exchangeable vanes. They are mounted level so that the fertiliser is spread over the land in a constant horizontal flow. The spreading quantity is regulated by a dosing plate on top of the spreading disc. Both of the dosing plates are located right on top of the discharge bushings.
The fertiliser falls on the turning spreading disc. The discharge point is determined by the opening in the discharge bushing behind the vanes. This means that the fertiliser granules are already turning before they come into contact with the vanes on the spreading disc. This prevents granules from breaking apart and becoming powdery.
The agitator mounted below in the hopper provides for a constant stream of fertiliser dust, seeds or granules to the dosing opening(s). Moreover, the agitator prevents the chunks of fertiliser from blocking one or more dosing openings.

Adjust carefully

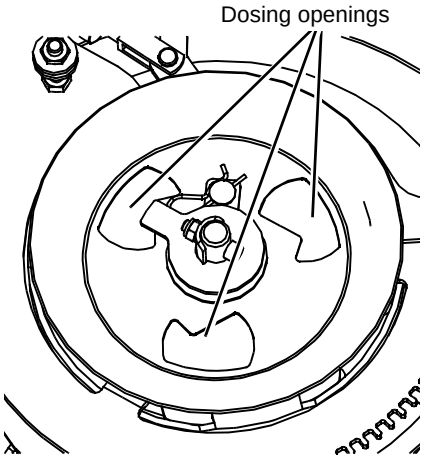
The spreader enables you to set the application rate and working width independently of each other. Moreover, it is possible to shut 2 of the 3 dosing openings so that the application rate can also be set precisely with a low flowrate, while the risk of blockages remains limited.

Application rate



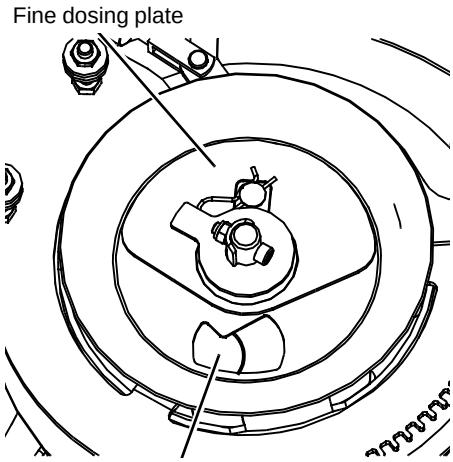
The machine is equipped with two dosing knobs at the back, which service a dosing plate each, in order to provide accurate adjustment of dosing quantities. The dosing knob can be adjusted to six different levels for a reach from 0 - 90.
The intermediate values can be adjusted by switching the dosing knob between values 0 - 5.
→ See paragraph »Application rate« on page 56.
It is possible to open and close the plates from the tractor with a double-acting hydraulic control valve.
One-sided closing of the dosing unit for border spreading is an accessory. The spreader can also be set to “0+0” on the one side for a manual solution without this accessory.

Fine dosing



Normal dosing

Normal dosing
For precise dosing over a wide range of settings, a dosing unit with 3 openings is applied per disc.

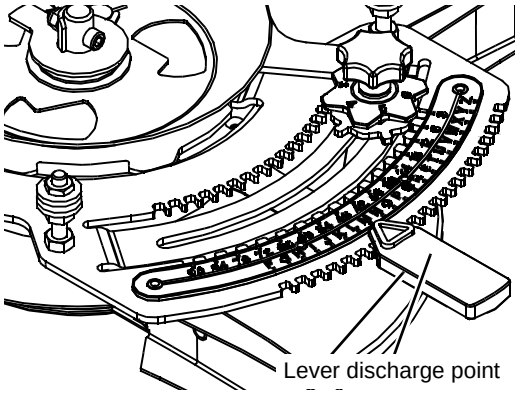


Fine application from each opening

Fine application
Low application rates require small dosing openings.
The spreader should be changed to the fine application kit for spreading low quantities.
Fine spreading is accomplished by covering two of the three holes on each dosing unit, use the fine dosing set (accessories).for this purpose.
The material is now spread through one large opening which stays open, bringing about:

- accurate and reliable spreading of very low quantities,
- refinement of the setting,
- fewer blockages.

Transverse distribution



Lever discharge point

The spreading pattern is determined by the transverse distribution. This is done through the adjustable discharge point.
There is a lever on both dosing units for adjusting the discharge point. This determines the point where the fertiliser granules come into touch with the vanes of the spreading disc. This 'discharge point' setting depends on the type of fertiliser used and the flowrate in kg/min. This should be adjusted in accordance with the values given in the (online) spreading charts in order to achieve good transverse distribution.

The spreading pattern is normally a triangle that completely overlaps. A trapezoidal spreading pattern can be achieved, depending on the application rate and the working width.
This spreading pattern has an overlapping area of less than 100%.

INDICATION Check the accuracy of the discharge point by conducting spreading pattern tests (tray test).

→ See paragraph »Check the spreading pattern (tray test)« on page 71.

INDICATION Take note of the exact driving distance and make sure there are tramlines.

If you want to change the application rate or pass to a different fertiliser type (with similar working width and driving speed) you only have to change the dosing knobs and possibly also adjust the 'discharge point'.

Attachment for sieve opening

This tool, standard supplied with the machine, can be used to open the sieves.

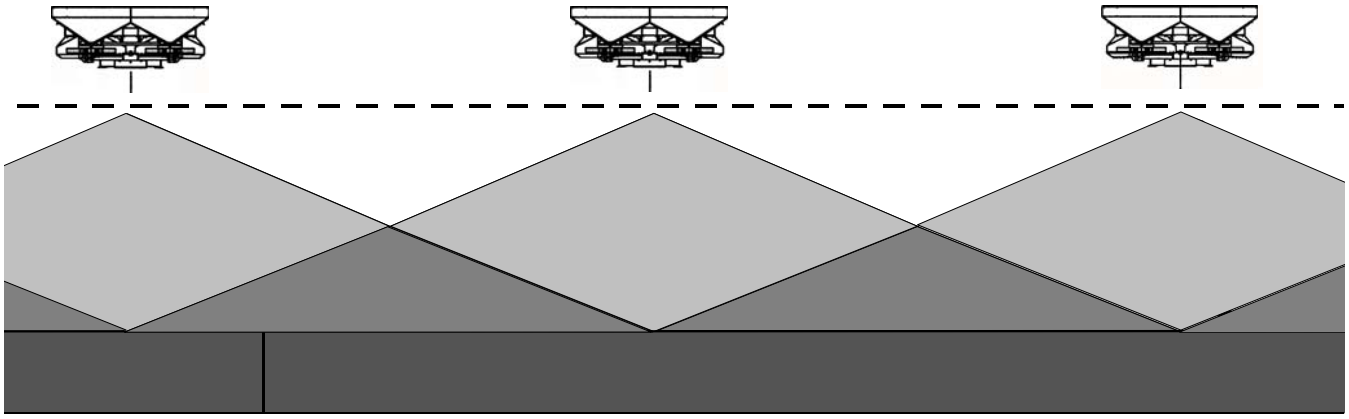


Spreading pattern

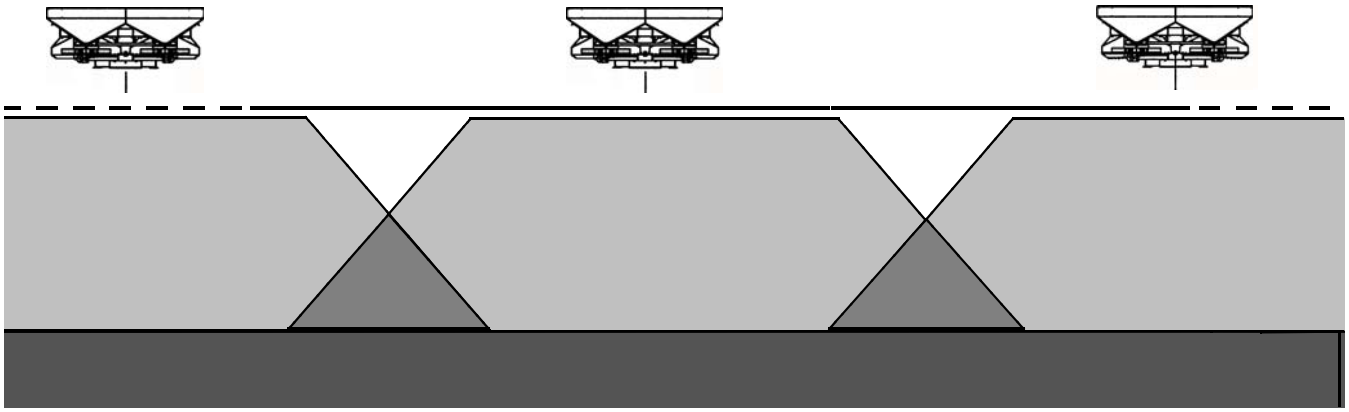
Optimum distribution of the fertiliser with minimum impact on the environment can be achieved through the settings and tools described.

Full field spreading pattern

The full field spreading pattern overlaps 100%
A triangular spreading pattern that completely overlaps can be expected with most fertiliser types with an average working width.

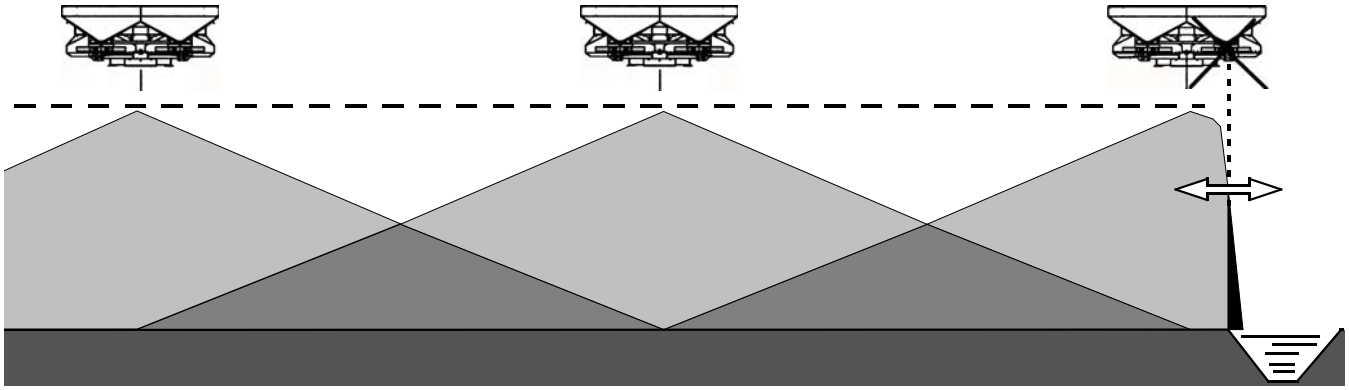


The full field spreading pattern with a trapezoidal spreading pattern
A trapezoidal spreading pattern could come about on a great working width. The spreading pattern does not completely overlap.



One-sided boundary spreading with border spreading plate

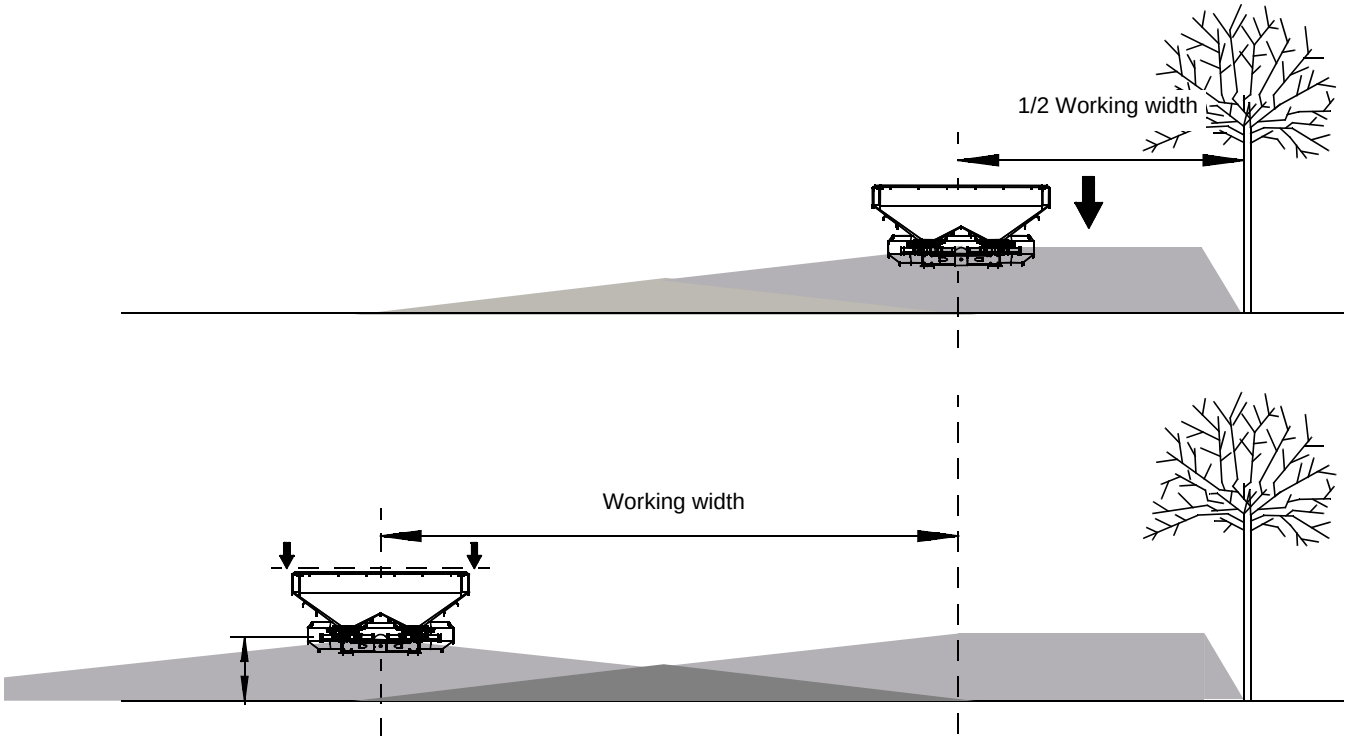
You can drive along the field edge with a half spreading pattern filled to 100% with the border spreading plate and one closed dosing unit. You have to optimise the spreading pattern and thereby overcome environmental pollution when adjusting the border spreading plate.



Boundary track spreading with tramline cylinder

It is possible with the tramline cylinder (boundary track spreading) to spread right up to the edge from the first sprayer tramline.
The inclination angle is hydraulically controlled and does not need any further adjustment.

The boundary spreading pattern
It is not possible to completely cover the field border at the application rate and not have anything go beyond the border. Current environmental standards only allow for minimal loss over the field edge.
The spread pattern with the tramline cylinder extends closer to the field boundary than with the previously described boundary spreading method.



Technical specifications

Type: DSC	700	900	1400
General			
Content of the hopper (l)	700	900	1400
Filling level (cm)	96	108	118
Filling width (cm)	148	148	170
Hopper's width (cm)	154	154	176
Weight (kg)	250	270	290
Maximum load capacity (kg)	1400	1400	1400
Type of linkage pins	Cat. II		
Maximum total weight (kg)	1751		
Spreading			
Working width (m)	9, 10, 12, 15/16, 18, 21 *****		
Fertiliser application rate (kg/min)	10-230		
Rotational speed of PTO shaft (rpm)	540		
Number of vanes per disc	4 (2x 135 mm, 2x 185 mm of 2x 235 mm *****)		
	***** See spreading chart		
Lubrication			
Grease type	EP 00/000		
Content of central gear box (cm^3)	200		
Content of spreading disc gearbox (cm^3)	180		

Sound level	Closed cabin	Rear window opened
Tractor at 540 rpm (dB)	70.4	75.7
Tractor + operating, empty spreader (dB)	71.4	81.0
Tractor + spreading spreader (Kali 60) (dB)	72.7	84.2
Miscellaneous		
Tractor power (kW)	>40	
Electrical supplies required	1 trailer socket for equipment with lighting set	
Number of hydraulic control valves on the tractor	minimum 1 1 (additional) valve with equipment with tramline cylinder	

Inspection of the supplied machine

The machine would generally be assembled and delivered ready-for-use by the dealer. The dealer is also responsible for providing instructions for use and maintenance. He/she must also ensure that the required documents are provided, such as:

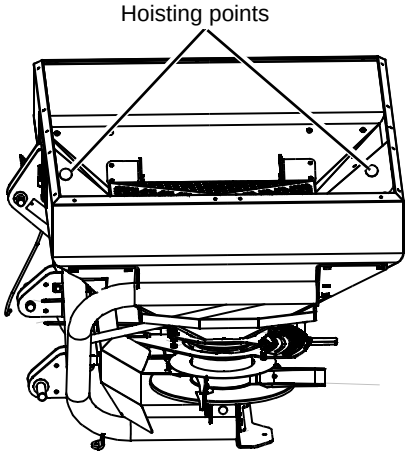
- manual,
- spare parts manual
- spreading chart book,
- testing and approval documents where required.

If parts are missing or have been damaged during transport, you should report that to your dealer directly on delivery.

Mounting instructions

Before the machine can be used, various parts and supplied accessories must be unpacked and assembled.

TIP In addition to these assembly instructions, use the parts book to locate the parts and their positions on the machine.



Use sturdy hoisting equipment
Use the hoisting points on the machine to hook up your approved slings or hoisting chains.
If the machine is hoisted incorrectly or with inferior equipment it could fall from the sling, resulting in material damage and possible physical injury.

Work on a clean surface
Before you start mounting, you should clean the surface and the directly surrounding area where you place the machine.
A machine that is placed on pieces of packaging or parts, may slide away during mounting with material damage and possibly physical injury as a result.

Accessories and parts must be correctly mounted
Assemble accessories and parts according to specifications and attach them only for their designated purpose; ensure that it is locked correctly. Accessories and parts which are not fastened securely could lead to personal injury and damage to the crop and machine.

Tighten all bolts and nuts
Check that all the nuts and bolts are well set. Check this again after one hour of use

- after delivery and
- after maintenance or repairs have been carried out.

Never check holes to be lined up by inserting your fingers
Use a pin. Movement of the machine or parts may cause severe physical injury.

Be careful that nothing gets jammed
It is easy for parts to get jammed while mounting the spreader.
Work carefully:

- place the machine on adequate supports,

- switching off the PTO shaft,
- releasing the pressure from the hydraulic system,
- switch the tractor off and remove the key from the ignition,
- engage the parking brake of the tractor,
- wear protective clothing, such as safety gloves and shoes,
- carefully follow the instructions given,

Friction with these materials could cause physical injury.



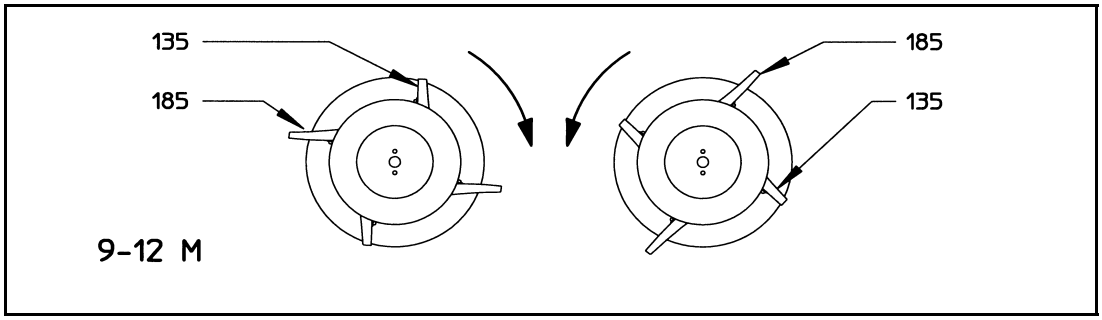
In addition to these assembly instructions, use the parts book to locate the parts and their positions on the machine or the tractor.

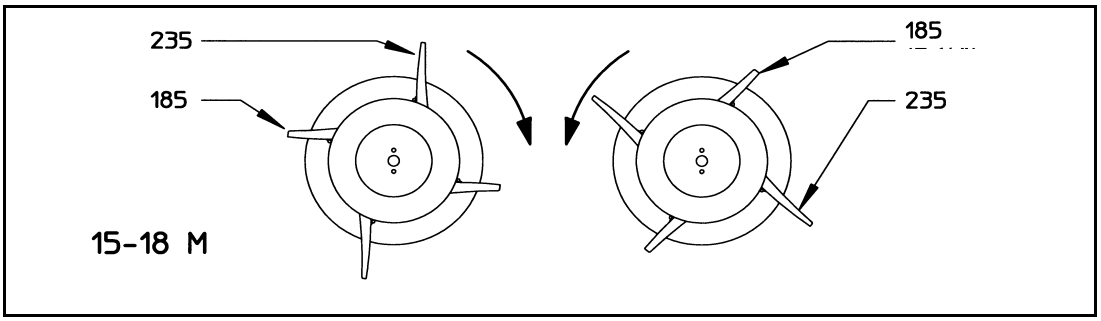
Vanes

Two vane combinations, as illustrated in the diagram, must be used for different working widths.

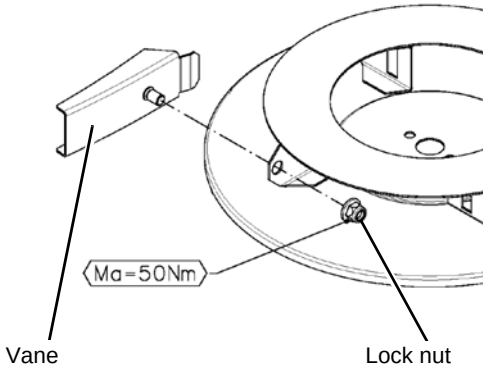
Working width (m)	Vane combination
9-12	135-185
15-18	185-235
20-21	See (online) spreading chart

Vane position on the disc

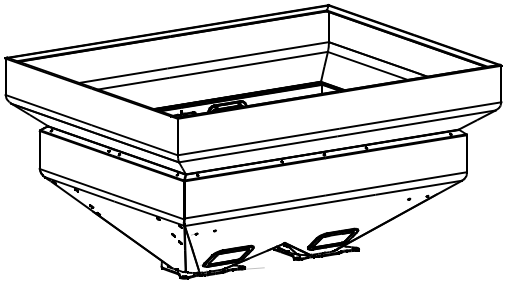




- Grease the threaded rods of the vanes.
- Hook the small vanes in the first and third positions. See the illustration above.
- Next install the medium-size and largest vanes.
- Press the vanes in well and put the lock nut in position.
- Mount the vanes on the other side of the spreading disc and on the other spreading disc in the same manner. Place vanes of equal length across from each other. See the illustration given above.
- Fasten the lock nuts (50NM).



Hopper extension

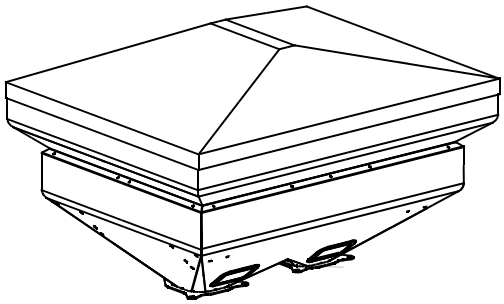


A hopper extension increases the load capacity of the spreading hopper. All edges consist of:

- 2 long sides,
- 2 short sides,
- fixing material.

→ For the correct use of fastening materials, see the components manual and enclosed installation instructions.

Hopper cover



The hopper cover must be mounted on top of the hopper or hopper extension to protect the content against weather or spray. Only for DSC 1400

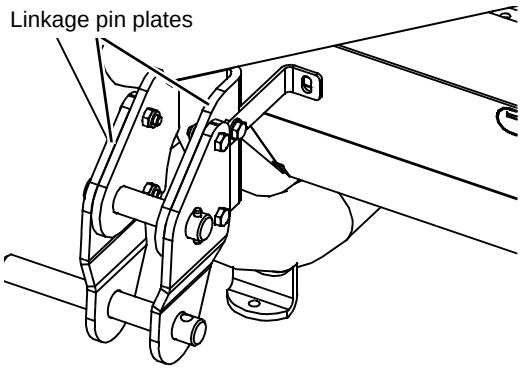
→ For the correct use of fastening materials, see the components manual and enclosed installation instructions.

Reflector



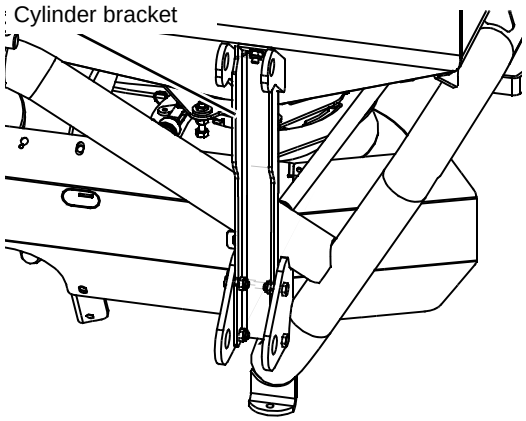
Motor vehicles with limited speed (<40 km/h), agricultural and forestry tractors and their trailers, as well as other vehicles, must be provided with a red reflector at the rear in the form of a truncated triangle.

tramline cylinder

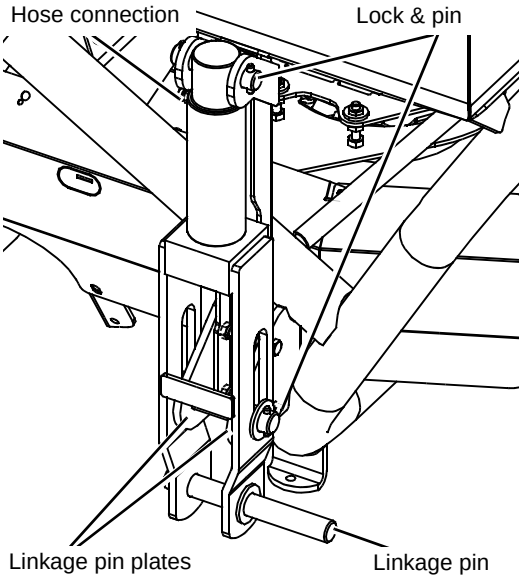


The tramline cylinder is a simple solution to obtain reasonable border spreading.

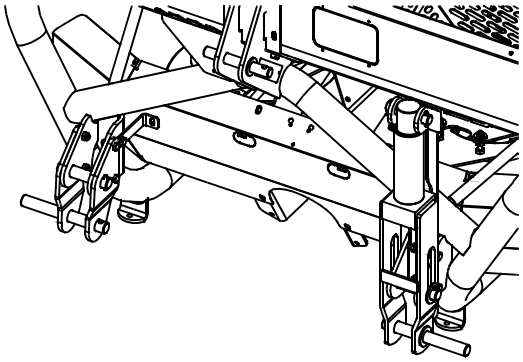
- Mount the tramline cylinder on the left linkage pin plates:
- Mount the topdressing set on the right linkage pin plates.



- Mount the cylinder bracket between the left linkage pin plates, on the hopper.



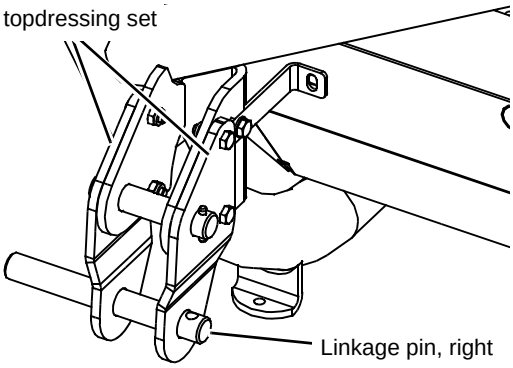
- Locate the cylinder above the plates on the frame bushing, with the hose connection pointing inwards.
- Slide the fork over the linkage pin plates.
- Push the linkage pins with a mounted lock through the fork and linkage pin plates, and through the cylinder bracket and cylinder.
- Lock the pins to the other side.
- Put the linkage pin through the fork and the slot holes in the loop in the linkage pin plates.
- Secure the linkage pin with the lock clip.
- Place the hydraulic hose in such a way that it cannot get pinched or damaged during use.
- Hang the end of the hose in the hose support.



The tramline cylinder is now ready for work as:

- border spreading system and
- topdressing set.

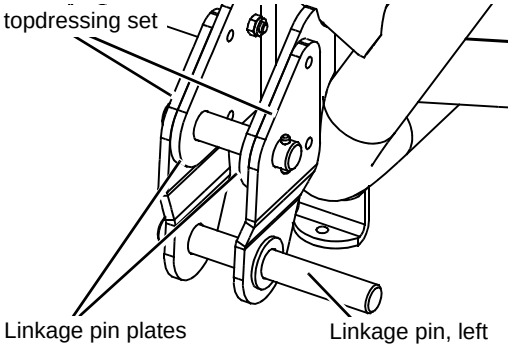
Topdressing set



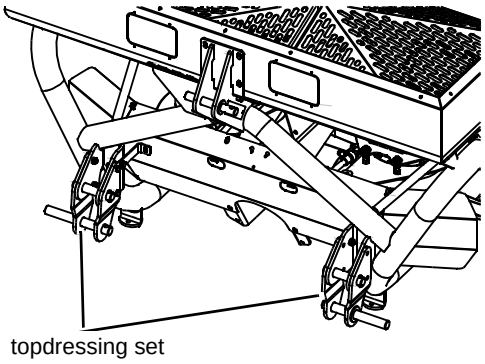
The topdressing set enables the spreader to lift higher.
Mount the topdressing set on the two linkage pin plates:

- Mount the topdressing set to the left of the linkage pin plates.
- Push the pin with ring and lock through the plates on one side
- Lock the other side of the pin
- Install the linkage pin

TIP Only mount the topdressing set if you do not have a tramline cylinder. The tramline cylinder also functions as a topdressing set.

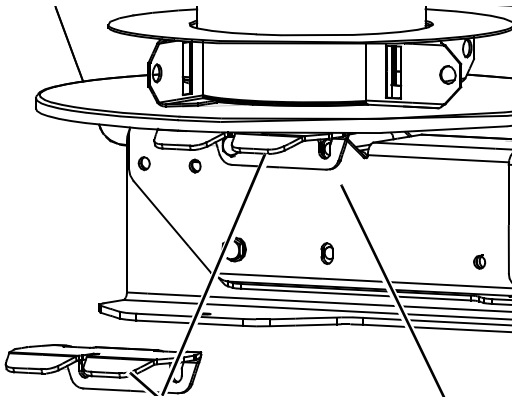


- Mount the topdressing set on the right linkage pin plates.
- Push the pin with ring and lock through the plates on one side
- Lock the other side of the pin
- Install the linkage pin



Calibration container

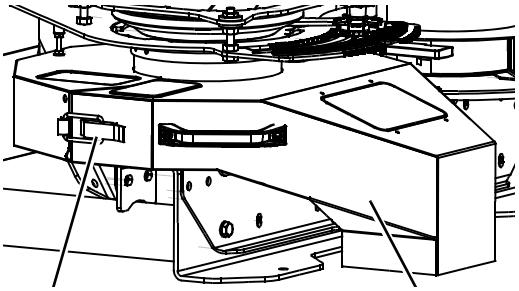
The calibration container is used to control the dosing setting of the machine.



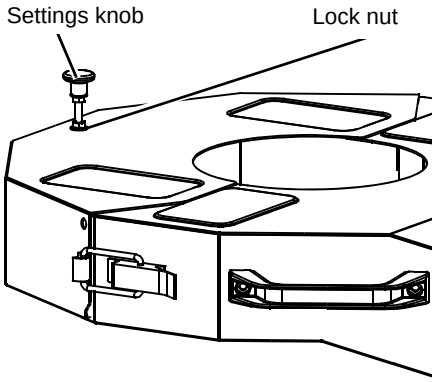
The calibration container must be mounted on the left spreading disc for the calibration test.

- Remove the vanes.
- Turn the nuts on the bolts on which the gearbox is mounted to the turning rod back 5 mm.
- Push the bolts back as far as possible.
- Hook the support behind the heads of the bolts.
- Adjust the height of the support. The top end of the support must be on the same height as the top end of the turning rod.
- Fasten the nuts on the bolts again.

NOTE Mount the support carefully so that the position of the gearbox would not be changed!



- Place the calibration container.
- Fix the locks between the two halves.
- Turn the other spreading disc by hand and listen if the spreading disc in the calibration container is making contact with the container.



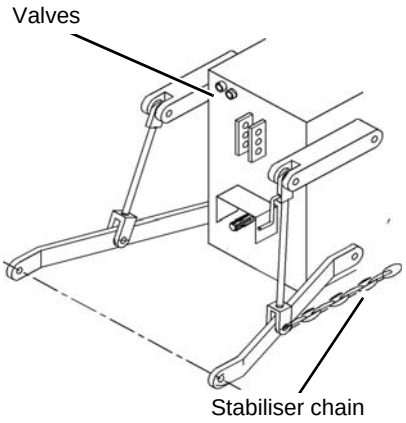
- Turn the lock nut upwards.
- Turn the settings knob upwards or downwards until you can hear that the spreading disc is no longer touching the calibration container.
- Turn the lock nut again.

Tractor provisions

Working with the machine requires a tractor that at least meets the following requirements:

- Sufficient carrying and lifting capacity and engine power.
  → see paragraph »Technical specifications« on page 29,
- Correct type of properly adjustable power lift,
- adequate number of hydraulic control valves,
  → See paragraph »Required hydraulic control valves« on page 37.

power lift



The tractor must be equipped with a Cat. II three-point power lift. Easy control of top link and lower link adjustment is important. This system is used for several machine settings.

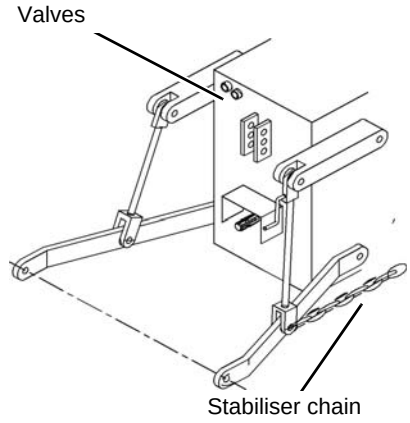
The tractor must be equipped with stabiliser rods or chains for:

- preventing lateral machine movements and
- being able to select the correct position of the machine relative to the tractor.

Electrical installation

Lighting
A socket is required for the lights.

Hydraulic system of the tractor



The tractor must at least have a double acting valve to operate the machine without accessories.
This number can increase, depending on the accessories selected:

Required hydraulic control valves

Function	Single	Double
Standard spreader	-	1
Spreader with single sided locks with a set of valves	-	1
Spreader with single sided locks with a set of hoses	-	2
Accessories		
tramline cylinder	1	-

Mounting the coupling shaft

The coupling shaft provided is too long for most types of tractors
The coupling shaft must be cut to the correct length before connecting it to the tractor. A coupling shaft that is too long could lead to serious damage to the machine and the tractor.
→ See the paragraph below »Checking the coupling shaft length«
→ the paragraph below »Shortening the coupling shaft«.

During lifting and lowering of the power lift, the coupling shaft requires adequate space for

- sliding in and out,
- sufficient overlap between the profiled tubes when driving the machine in the extreme operating angle of the coupling shaft.

Checking the coupling shaft length

Put the machine on a supporting beam before moving in between the tractor and machine
This will ensure that the machine cannot drop if the power lift should inadvertently be operated while you are between the tractor and machine. Without the support, a power lift that drops could wedge you in, resulting in possible serious physical injury.

The length of the coupling shaft and the shortening thereof must be done after the power lift has been connected, but before the coupling shaft has been connected.

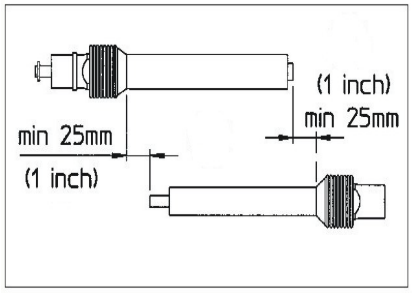
- ▸ Lift the machine with the power lift until the PTO shaft and the machine drive axle are level.

This is the shortest possible length between the two shafts.



- ▸ Place the machine on a supporting beam.
- ▸ Switch the tractor engine off and remove the keys from the ignition.
- ▸ Engage the parking brake of the tractor.
- ▸ Disconnect the coupling shaft for it to be two halves.
- ▸ Mount the loose tractor section of the coupling shaft to the tractor PTO shaft.
- ▸ Attach the loose machine component of the coupling shaft to the drive axle.
- ▸ Manually move the two coupling shaft halves next to each other.
- ▸ Check the length and adjust it as described below.

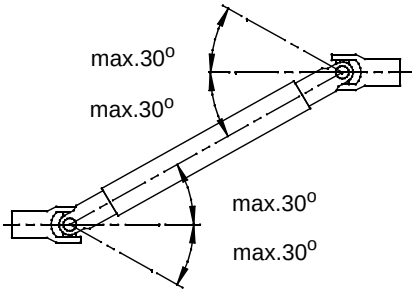
Shortening the coupling shaft



The profiled tubes must overlap as far as possible, with a minimum of **150 mm.**
The profiled tubes must however have at least **25 mm** free clearance at the outer edges when the tractor PTO shaft and the machine drive axle are level.

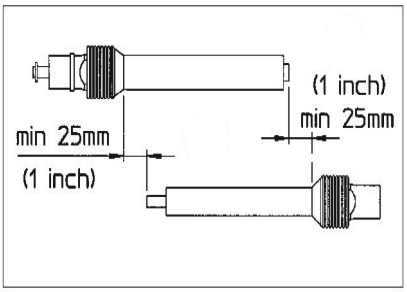
- Cut off the two profiled tubes to achieve the 25 mm clearance.
- Deburr both ends.
- Clean the coupling shaft.
- Shorten the protection sleeves by the same length.
- Slide the coupling shaft halves into each other.
- Connect the coupling shaft of the machine and the tractor.
- Lift the machine with the power lift in the highest operating position.

Put the machine on a supporting beam before moving in between the tractor and machine
This will ensure that the machine cannot drop if the power lift should inadvertently be operated while you are between the tractor and machine. Switch the tractor motor off. Without the support, a power lift that drops could wedge you in, resulting in possible serious physical injury.



The maximum operating angle of the coupling shaft is 30° when lifted and 30° when lowered.This is the maximum length between the PTO shaft and the machine drive axle.

- Place the machine on a supporting beam wit the power lift in the highest position.
- Switch the tractor off and remove the keys from the ignition.
- Engage the parking brake of the tractor.
- Check if the furthest working angle is less than 30°.
- Check that the overlap of the profiled tubes is still at least 150 mm.
- Remove the tractor section.
- Apply grease to the profiled tubes.
- Attach the protection sleeves.
- Slide the coupling shaft halves into each other.
- Mount the coupling shaft to the machine.



Always mount the check chains of the protection sleeves
The check chains prevent the protection sleeves from rotating with the coupling shaft. Crop or pieces of clothing can be wound around rotating protection sleeves and cause material damage and possibly severe physical injury.

- Fit the check chains to both ends of the coupling shaft protection sleeves.
- Mount the other ends of the chains to a fixed point of the tractor, respectively the machine.



Neutralise the controls
Control devices, e.g. ropes, hoses, etc. for remote actuation of devices such as cylinders, shall be guided and positioned in a way they never inadvertently release nor block desired movements/actuations! Unintentional movements can lead to serious injury.

Connecting and disconnecting safely
There are risks of injury involved in connecting and disconnecting the machine. Work carefully:

- engage the parking brake of the tractor,
- a mobile machine must also be protected from rolling away while being connected,
- the machine should only be connected and disconnected from the tractor on a firm, dry and flat surface so that the machine would not tilt and/or sink into the ground,
- ensure no other people are in the direct vicinity of the tractor or the machine,
- work in accordance with the guidelines provided in this user's manual,
- a power lift that conforms with the regulations must be used,
- never stand between the tractor and machine while the power lift is operated externally while connecting or disconnecting the machine,
- the machine must only be connected to the points intended for that purpose,
- the machine must only be connected or disconnected while the PTO shaft is off,
- check the state of the machine in order to ensure that it can safely be operated and transported.

Connecting or disconnecting the machine in an unsafe manner could lead to serious personal injury and damage to the machine.

Always mount the check chains of the protection sleeves
The check chains prevent the protection sleeves from rotating with the coupling shaft. Crop or pieces of clothing can be wound around rotating protection sleeves and cause material damage and possibly severe physical injury.

Check the coupling shaft
Check the following points before the PTO shaft is attached. Has the coupling shaft:

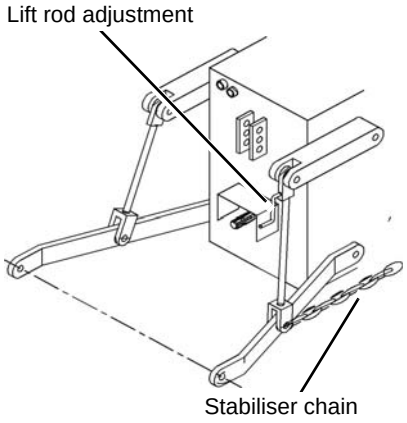
- no damage, including the protection sleeves?
- are there sufficient lubricants as prescribed?
- is the prescribed overlap of the coupling shaft halves and protection sleeves, both in transport and in operating position?
- Are the protection sleeves attached with chains to a fixed point to guard against turning?

An unsafe or improperly mounted coupling shaft could lead to serious or deadly injury.
If the coupling shaft does not comply with the points mentioned above, it must be replaced before using the machine.

Connecting the machine

The space between the spreader and the tractor is limited as far as possible in order to keep the centre of gravity as closely to the tractor as possible. This promotes stability and the road behaviour of the tractor. As a result the coupling shaft, hydraulic hoses and electric plugs must be connected first, followed by the power lift.

Preparation



- Move the tractor to the front of the spreader so that the catch hooks of the power lift are around 200 mm from the spreader (the maximum distance depends on the reach of the coupling shaft; the halves must always overlap each other).
- Take the pressure off the hydraulic system of the tractor.
- Switch the tractor off, remove the key from the ignition and engage the parking brake of the tractor.
- Put the lower links of the tractor level with the machine linkage pins.
- Compensate for any height difference with the lift rod adjustment of the power lift.
- Adjust the stabiliser chains to make lateral movement of the lower links impossible.
- Mount the appropriate ball bearings to the linkage pins and the top.
- Secure the linkage pins and top again.

Front power lift

Only connect the machine to the front power lift if:

- it has sufficient lifting power,
- it falls within the same fixing category as the machine,
- the minimum and maximum load of the front and rear weight would not be exceeded,
- the tractor has a closed cabin and proper air filters (active carbon filters).

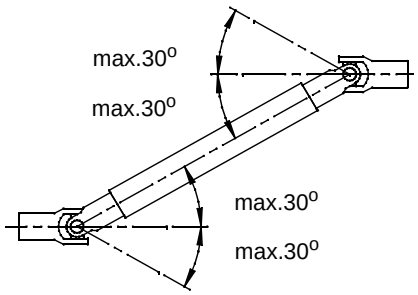
Connecting the coupling shaft

The coupling shaft provided is too long for most types of tractors
The coupling shaft must be cut to the correct length before connecting it to the tractor.
A coupling shaft that is too long could lead to serious damage to the machine and the tractor.
→ See paragraph »Checking the coupling shaft length« on page 38 and
→ paragraph »Shortening the coupling shaft« on page 39.

- Check the PTO shaft and the connector for dirt or damage.
- Press the lock into the connector.
- Slide the connector on the PTO shaft.
- Release the lock.
- Check if the safety plate latches by moving the connector.
- Attach the check chains to both outer edges of the coupling shaft protection sleeves.
- Mount the other ends of the chains to a fixed point of the tractor, respectively the machine.

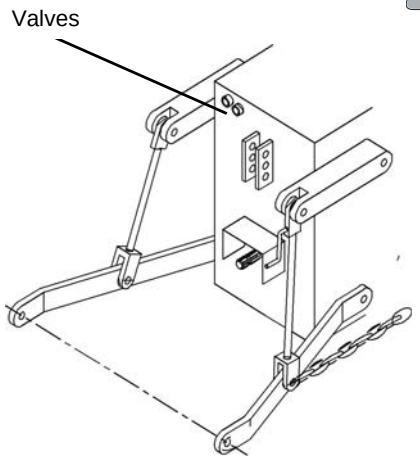
During lifting and lowering of the power lift, the coupling shaft requires adequate space for

- sliding in and out,
- sufficient overlap between the profiled tubes when driving the machine in the extreme operating angle of the coupling shaft.



TIP The maximum operating angle of the coupling shaft is 30° when lifted and 30° when lowered. The maximum distance allowed between the PTO shaft of the tractor and the driving axle of the machine is reached in this position. A greater working angle could damage the coupling shaft.

Connecting hydraulic hoses



Colour codes of the hydraulic connections
Prevent interference and errors in the controls by marking the connectors with colours and the oil direction on the machine and the tractor (+ and - or P and T or red and blue). Incorrect connection of the hydraulic hose could lead to the functions working the other way around (such as lifting instead of lowering). This could lead to dangerous situations and could damage the crops.
If the machine is equipped with a tramline cylinder (accessory) the hydraulic hose must be connected for operation.

- Take the pressure off the hydraulic system of the tractor.
- Switch the tractor engine off and remove the keys from the ignition.
- Engage the handbrake of the tractor.
- Remove the hose from the hose support and check the quick coupling for dirt.
- Clean the quick coupling if required.
- Put the quick coupling in the correct valve connection point of the tractor. Keep the flow direction of the oil in mind (+ and - or P and T or red and blue).

  → See paragraph »Required hydraulic control valves« on page 37.
- Place the hose so that it would not pinch or damage.

Checking the hydraulic system

High pressure in the hydraulic system
Keep your distance from the hydraulics during inspecting and test running. The hydraulic system is under high pressure. Oil jets or hoses that snap back may cause serious physical injury and fire due to the prevailing pressure and temperature. High pressure fluid easily penetrates skin and clothes, causing severe injuries. In the event of injury, contact your physician immediately!

- Regularly inspect the hydraulic system.

→ See also paragraph »Checking the hydraulic system« on page 115.

Connecting electric plugs

Connect electric plugs safely
Connect the electric plugs and cables only after the machine has been attached. Place the electric plugs and cables in such a way that they would not get pinched or damaged.
Only use the electric stream as intended. Do not use the cigarette lighter.

- Check the plugs and the connections on the tractor for dirt. Clean if necessary.
- Connect the electric plugs.
- Place the cables so that they would not get pinched during working activities.

Connecting the power lift



Check the decoupling ropes of the quick coupling
The decoupling ropes must never be tense and must provide sufficient freedom for movement, even with the power lift in the lowest position as it could otherwise accidentally disconnect the quick coupling. Accidental disconnection could cause damage to the machine and may lead to personal injury.

- Start the tractor again.
- Reverse carefully so that the catch hooks of the lower links are exactly under the ball bearings.
- Open the quick coupling of the catch hooks with the release ropes.
- Engage the power lift until the ball bearings are correctly located in the catch hooks and close the quick coupling.
- Check if the catch hooks have locked correctly by lowering the power lift carefully.
- Turn the top link to the appropriate length and secure if possible.
- Open the quick coupling of the catch hook with the release rope.
- Let the catch hook fall over the ball bearing at the top and close the quick coupling.
- Check if the catch hook is correctly secured by pushing and pulling it.

Checking and setting the machine

Always check the machine after connection and set it horizontally if required.

- Lift the spreader until it is lifted from the ground or ramp.
- Switch the tractor off, remove the key from the ignition and engage the parking brake of the tractor.
- Check the locking system of the catch hooks of the lower links and the top link.
- Make sure that the electric cables and hydraulic hoses do not get jammed. Lead them or tie them up in order to prevent dangerous situations. Make sure that there is sufficient space for movement when lifting or lowering the machine.
- Adjust the machine so that it is level with the lift rod adjustment.
- Turn the top link until the machine is standing horizontally.
- Lock the top link when that is possible.

Find the correct settings of the spreader and set it accordingly



Avoid contact with the fertiliser and other material
You will most likely get into contact with the fertiliser and other material you may wish to spread while filling, adjusting and testing the spreader. Wear protective clothing and gloves, read the safety instructions provided by the supplier and follow their directions. Contact with these materials could cause physical harm.

The data for the correct setting of your spreader can be found in the spreading charts in the spreading chart book, the online spreading chart service on the website or via the free application (App) for mobile phones.
See also paragraph »Online spreading chart service« on page 49.

The spreading charts indicate what type of fertiliser is best suited to achieving a good distribution. Correct adjustment depends on the characteristics of the fertiliser, not the brand! Determine the characteristics of the fertiliser, therefore, and find the spreading chart with similar features. Use the chart, even if the brand of the fertiliser differs from the nearest comparable fertiliser!
Select the spreading chart based on the characteristics of the fertiliser, not on the basis of the name!

Characteristics of the fertiliser

In order to find the correct spreading chart in the spreading chart book, online spreading chart service on the website, or via the free application (App) on your mobile phones, you must collect the following physical properties of the fertiliser

- type and pattern of the granules
  → see the paragraph below,»Determine the type and pattern of the granules«
- distribution (= composition of granules of various sizes),
  → see paragraph »Determining distribution« on page 47,
- similar weight,
  → See paragraph »Determining similar weight« on page 48.

Distribution is the most vital characteristic of the fertiliser when it comes to spreading. You can make the first selection from the (online) spreading charts based on the distribution. Never use a spreading chart for another type of fertiliser, even if the distribution is very similar! You can determine which spreading chart compares the best to the fertiliser you are using based on similar weight.

Determine the type and pattern of the granules

Select the type of fertiliser from the (online) spreading chart that is closest to the type of fertiliser that you are using.

INDICATION The characteristics of the various types of fertiliser are so far reaching that using a spreading chart for another type of fertiliser, even if the distribution is the same, could provide a bad spreading pattern and could harm the crop!

Determine the type of fertiliser based on the shape and surface:

Type	Operation	pattern	Surface
Granular	rough	roughly round, sometimes slightly angular, no sharp corners or edges	rough
	smooth	roughly round, not angular, no sharp corners or edges	relatively smooth
mineral		angular, with sharp angles and edges	very rough
prills		perfectly round, hollow on the inside, some holes in the surface	very smooth
Crystalline		oblong, cylindrical, some round patterns, hollow on the inside, some holes on the surface	smooth
Blend		blend of granules with various patterns, different from above descriptions	blend of granules with various surfaces, different from above descriptions
Pellets		Pellets of organic material	
Seed Slug pellets		A seed can vary from species to species. A seed can have different characteristics.	


Smooth granular


mineral


prills


Crystalline

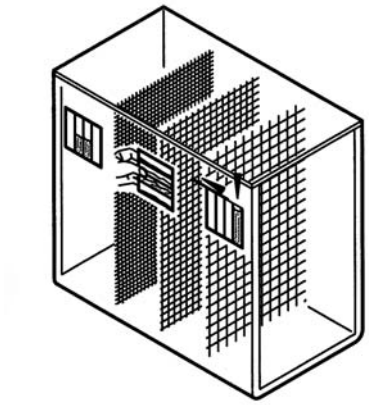

Blend

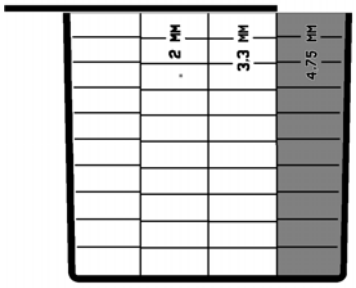

Pellets

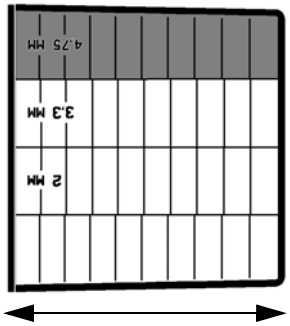

Seed

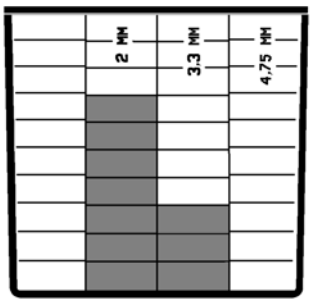

Slug pellets

Determining distribution









The distribution is the ratio of granules with different diametres. A distribution metre comes with every spreader. This metre has 4 sections, with seven parts. The seven have different mesh width that divide the fertiliser granules, based on their diametres.

Distribution of 0-70-30-0 indicates none of the granules has a diametre of less than 2.0 mm, 70% have a diametre between 2.0 - 3.3 mm, 30% have a diametre between 3.3 - 4.75 mm and none is larger than 4.75 mm.

You should therefore do the following to determine the distribution of the fertiliser with the distribution metre:

- Fill the slot that reads 4.75 mm and close the other openings with the cover.
- Close the distribution metre with the cover and keep it on its side.
- Shake it for as long as no more smaller granules are falling through the sieves.
- Turn the distribution metre back up and read the content of each slot. The given percentages should add up to 100%. It could be necessary to round the readings off with small and round granules.
- Repeat the steps above three times and then determine the average distribution.

TIP Fill the fraction metre from another part of the hopper in order to obtain a good average as the larger granules tend to roll to the outer part of the hopper.

TIP Clean the seven parts regularly in order to prevent them from getting blocked.

The last figure indicates how you can read the following distribution: 0-70-30-0

Indication with regard to the distribution:

- If the diametre of 10% or more of the fertiliser granules is smaller than 2.0 mm the fertiliser type would be difficult to spread, especially with large working widths. This could result in a less than optimal distribution and could damage the crops.
- If the diametre of 80 - 100% of the fertiliser granules is between 2.0 and 4.75 mm, the fertiliser would be good to spread, irrespective of the size of the remaining granules.
- If the diametre of 20% or more of the fertiliser granules is greater than 4.75 mm it would be difficult for optimum distribution. This could lead to damage to the crops as the granules could make holes in the leaves of the crop.

Determining similar weight

The density is the weight (kg) of 1 litre of fertiliser and it is expressed as kg/litre or ton/m3.
The following material is required to determine the density:

- a measuring cup of minimum 1 litre with a correct scale division,
- a scale that can accurately indicate a difference of 10 grams or less.

TIP Use 10 litres if you are using a less sensitive scale.

Working method to determine similar weight:

- Weigh the dry, empty measuring beaker.
- Fill the measuring beaker up to the 1 litre mark.
- Knock the measuring beaker 5 times on firm ground.
- Fill the measuring beaker up to the 1 litre mark.
- Weigh the measuring beaker with the fertiliser.
- Subtract the weight of the empty measuring beaker from the weight of the full one.
- Repeat the steps above three times in order to determine the average weight.

Density of at least 1 kg/l is desirable for a good distribution of the fertiliser. Lighter types of fertiliser would be more difficult to spread and the maximum working width would be limited.

Finding the correct spreading chart

On the basis of the data you collected about your fertiliser, for the spreading chart of fertiliser with the best comparable properties and desired working width in the table of contents of your spreading chart book, or fill in the data through the online spreading chart service on the website or via the free application (App) for mobile phones.
see paragraph »Online spreading chart service« on the following page.
You can find the settings for the spreader, based on the application rate and the driving speed.
→ See then paragraph »Setting the spreader« on page 50.

TIP the page indicated in the table of index of the spreading chart book indicates the settings for the smallest desirable working width. The spreading charts for larger working widths are on the pages that follow those.

Online spreading chart service

Information about the settings of the spreader can be found in the spreading chart book, but also via the online spreading chart service on the website or via the free application for mobile phones with an iOs and/or Android operating system. This will also provide information about additional types of fertiliser that have been tested recently.
You can make use of the online spreading chart service as an alternative to the spreading chart book. You must enter the characteristics of the fertiliser, your working width, application rate, driving speed and the type of fertiliser. You will then receive advice from the website for setting your spreader: dosing setting, discharge point, flowrate, angle of the spreader and the vane combination.

Procedures for setting the spreader can be found at:
→ chapter »Setting the spreader« on page 50.
Also check the advice given on the online spreading chart service. Do a calibration test to check the dosing setting. Then check the spreading pattern with a tray test.
→ See paragraph »Calibration test« on page 66 and
→ paragraph »Check the spreading pattern (tray test)« on page 71.

You can reach the spreading chart service as follows:

- Go to the website of the KUBOTA: http://www.kubotaspreadingcharts.com.
- The various languages are given at the top of the page.
- Start the spreading chart service and complete the details required.
- The spreading chart service will then request that you select a product with comparable characteristics.
- The spreading chart service will then indicate the settings for your spreader. Follow the procedures as described in
  → paragraph »Setting the spreader« on page 50.

Telephone App



Using the KUBOTA spreading charts application, you can easily find the right settings for your spreader.
The spreading charts application gives you immediate access to the most up-to-date test results of fertiliser.
In just a few steps, the application will lead you to the correct settings for your spreader, anytime of the day, wherever you want for almost any type of fertiliser.
The spreading chart application (App) can be downloaded free of charge through the Apple App Store and/or through the Google Play Store.

Setting the spreader



Avoid contact with the fertiliser and other material
You will most likely get into contact with the fertiliser and other material you may wish to spread while filling, adjusting and testing the spreader. Wear protective clothing and safety gloves, read the safety instructions provided by the supplier and follow their directions. Contact with the materials could lead to personal injury.

Be careful that nothing gets jammed
It is easy for parts to get jammed while setting the spreader.
Work carefully, while adjusting the spreader while there is an abandoned tractor:

- switch it off and remove the key from the ignition,
- engage the parking brake,
- wait for all machine parts to come to a standstill before you start with filling, adjusting or testing,
- never go underneath an unsecured, elevated spreader,
- carefully follow the instructions given.

Friction with these materials could cause physical injury.

Protecting the environment
Spreading a too high dose of materials outside of the field edge, especially on water surface, creates a heavy burden on the environment. Protect the environment by applying a correct dosing setting in a correct working method.

Work with a closed cabin
Fertiliser dust can blow indoors through open windows, doors or other openings. Moreover, the sound level is higher in an open cabin. It is therefore recommended to always work with a closed cabin with active carbon filters in the air inlets. Fertiliser dust and a high sound level can cause physical damage.

Select spreading chart

Based on spreading details:

- Type of fertiliser
- working width
- the desired application rate (kg/ha)
- and driving speed (km/h)
- select the correct (online) spreading chart.

You can find the methods for determining the correct spreading chart in

→ chapter »Find the correct settings of the spreader and set it accordingly« on page 45 and further.

Procedure

The spreading chart page contains information about the fertiliser to which this chart relates. Here you will find the settings you need to perform in respect of your spreader:

- ▸ Select the correct working width,
  → See paragraph »Vane combination« on page 53.
- ▸ Mount the correct vane combination,
  → See paragraph »Vane combination« on page 53.

- Set the correct dosing setting,
  → See paragraph »Application rate« on page 56.
- Set the correct discharge point,
  → See paragraph »Discharge point« on page 55.
- Set the spreader horizontally or diagonally,
  → See paragraph »Inclination« on page 63.
- Set the correct pto shaft rpm,
  → See paragraph »PTO shaft RPM« on page 63.

After setting the spreader:

- Do a calibration test to check the application rate,
  → see instructions in paragraph »Calibration test« on page 66.
- Do a check on the spreading pattern (tray test),
  → see instructions in paragraph »Check the spreading pattern (tray test)« on page 71.

Example

Examples are always given to assist in setting the spreader. The example is based on the following details:

Desired application rate (kg/ha)	300
Desired working width (m)	18
Desired driving speed (km/h)	8
Type of fertiliser (-)	granular
Distribution (-)	0-20-80-0
Specific gravity (kg/l)	0,98

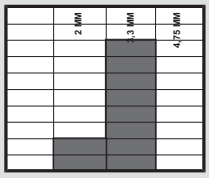
The spreading chart that is most similar to the fertiliser given in the example can be found on the following page. The values that should be used when setting the spreader can be found in the spreading chart indicated.
The composition of the fertiliser you would want to spread may differ, as well as the desired application rate and the driving speed. The procedure to be applied for the adjustments will remain the same, however.

Dosing setting icon at top of column



5The dosing setting is given in a note in the first column of the (online) spreading chart, based on the spreader without electric operation. With an electric operated spreader the given values must be added, e.g. dosing setting 42+3 = 45.

The spreading chart from the example looks as follows:



0 - 20 - 80 - 0



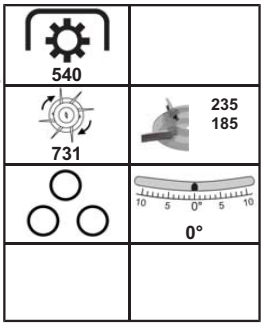
Granulaat

0,98 kg/l

NPK 17 - 17 - 17
GRANDE PAROISSE (AZF)

18 m





	kg/min		kg/min	kg/ha						
				6 km/u	8 km/u	9 km/u	10 km/u	11 km/u	12 km/u	14 km/u
18+3	7	L	16	89	66	59	53	48	44	38
24+0	10	L	22	122	91	81	73	67	61	52
24+3	13	L	28	155	117	104	93	85	78	67
30+0	16	L	34	189	142	126	113	103	94	81
30+3	19	L	40	222	167	148	133	121	111	95
36+0	22	M	46	256	192	170	153	139	128	110
36+3	26	M	55	303	227	202	182	165	152	130
42+0	30	M	63	351	263	234	210	191	175	150
42+3	34	M	72	398	299	265	239	217	199	171
48+0	38	M	80	446	334	297	267	243	223	191
48+3	42	M	89	493	370	329	296	269	247	211
54+0	47	M	98	546	409	364	327	298	273	234
54+3	52	M	108	601	451	401	361	328	301	258
60+0	57	M	118	656	492	438	394	358	328	281
60+3	62	M	128	712	534	474	427	388	356	305
66+0	67	M	138	767	575	511	460	418	384	329
66+3	72	M	148	822	616	548	493	448	411	352
72+0	77	M	158	876	657	584	526	478	438	376
72+3	81	M	167	931	698	620	558	508	465	399
78+0	85	N	177	985	739	657	591	537	492	422
78+3	89	N	187	1039	779	693	623	567	520	445
84+0	95	N	197	1093	820	729	656	596	547	469
84+3	98	N	202	1123	842	749	674	613	562	481
90+0	102	N	208	1153	865	769	692	629	577	494

Working width

The working width must be selected to set the spreader. This could for instance be the distance between the sprayer tramlines.
In the spreading chart book, via the online spreading chart service on the website or via the free application (App) for mobile phones with an iOs and/or Android operating system, look for the page that shows the desired working width of the fertiliser type with the most similar properties.

INDICATION Various types of fertiliser have a limited maximum working width. This is due to their physical qualities whereby they do not spread evenly over large working widths. If a working width is not given in the (online) spreading chart the relevant type of fertiliser cannot be spread evenly over that width.

INDICATION If you want to spread with a working width not given in the spreading chart book, use the settings for the working width closest to the selected working width. For example: the settings given in the spreading chart for a required working width of 20 metres could, for instance, be approximated to 21 metres.
The working width is adjusted with:

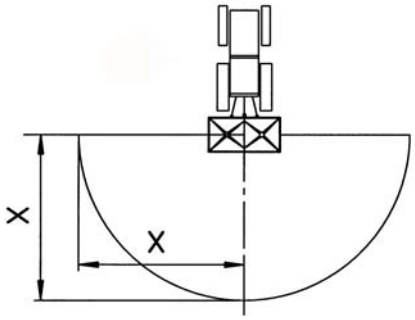
- the vanes in combination with the PTO shaft revolutions (RPM) and
- the discharge point.

Vane combination

The working width of the spreader is determined by the length of the vanes. When the machine is delivered, you will find 2 sets of vanes in lengths 135 mm, 185 mm, and 235 mm. The spreading chart or the online spreading chart indicates which vanes should be used, depending on the desired working width.

Working width* (m)	Vane combination* (mm)
9-12	135-185
15 - 18	185 - 235
20 - 21	See spreading chart

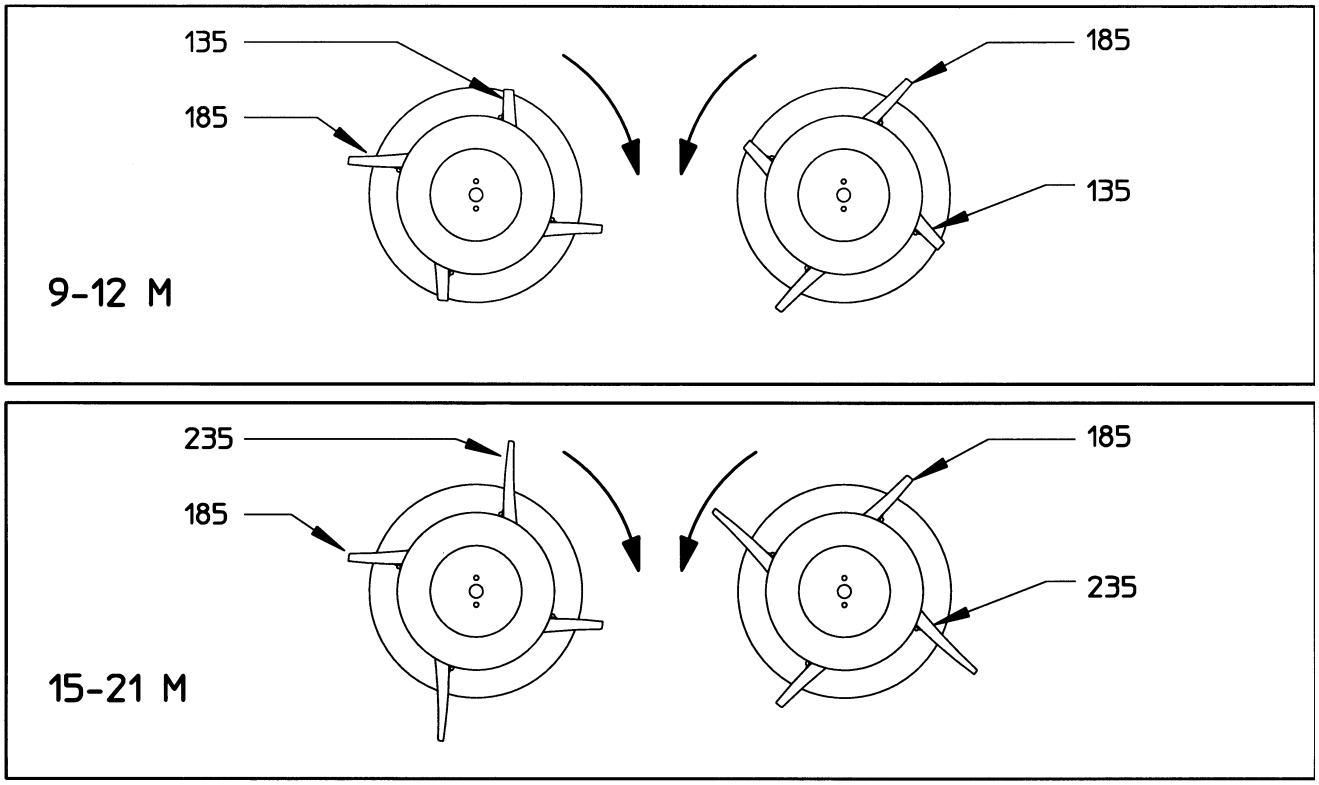
The order of assembly is shown in the following illustration.
→ See also paragraph »Vanes« on page 32.



INDICATION The working width (X) is also a measure for the distance the spreader has to spread to the left, the right and to the back.
→ See also paragraph »Working method on the headland« on page 90.

INDICATION If the (online) spreading chart describes another vane combination or another PTO shaft rpm, use the values from the PTO shaft and spreading disc revolutions chart.

The following will be achieved with the fertiliser and spreading chart from the example:
→ See paragraph »Example« on page 51.
The advised vane combination with an application rate of 300 kg/ha, a working width of 18 metres and a driving speed of 8 km/h is: 185 / 235.



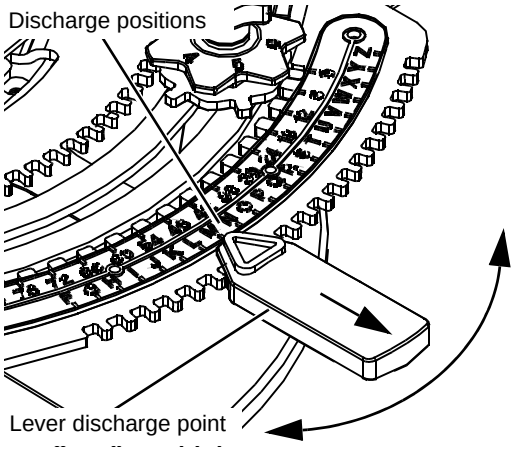
Discharge point

It is necessary to correctly set the discharge point in order to obtain a good spreading pattern and the correct working width. The point at which the granules or seeds come onto the spreading disc can be changed by setting the discharge point. The position of the discharge point, in combination with the vane combination, PTO shaft revolutions (RPM) and the flowrate determine the spreading pattern.
The discharge point can be set between positions **F** to **Z**.

Discharge point icon above the column



The correct settings are determined on the basis of the selected application rate and the required driving speed. The position that would most likely provide the best spreading pattern is given in the third column, *Discharge Point*, of the spreading chart.
Always check the accuracy of the discharge point by conducting spreading pattern tests (tray test).
→ see instructions in paragraph »Check the spreading pattern (tray test)« on page 71.

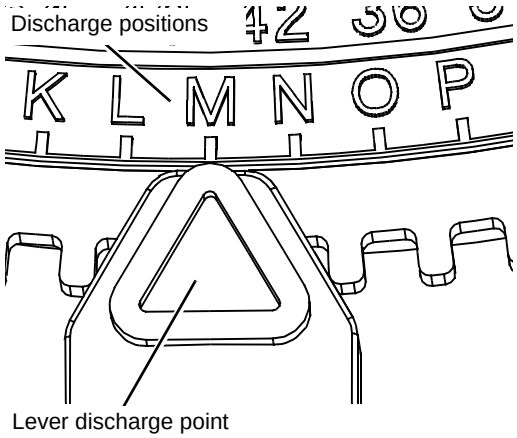


The lever for adjusting the discharge point is located on the rear of the dosing mechanism.

- Switch the tractor off, remove the key from the ignition and engage the parking brake of the tractor.
- Pull the hand-grip of the lever out.
- Adjust the lever until the arrow on the hand-grip indicates the desired position.
- Let go of the hand-grip and check if the lever is locked.
- Set the lever on the other spreading disc in the same way to the same position.

The following will be achieved with the fertiliser and spreading chart from the example:
→ See paragraph »Example« on page 51.
The advised discharge point with an application rate of 300 kg/ha with a working width of 18 meters and a driving speed of 8 km/h: M.

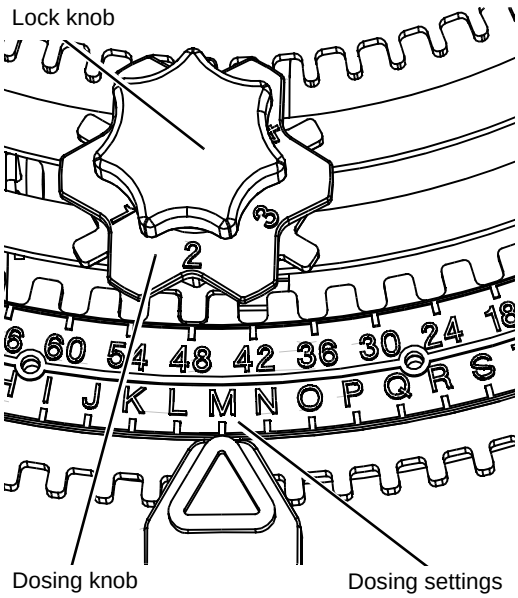
- Pull the hand-grip of the lever out.
- Set the hand-grip on the handle so the arrow points to **M**.
- Let go of the hand-grip and check if the lever is locked.



Application rate

Dosing setting icon at top of column





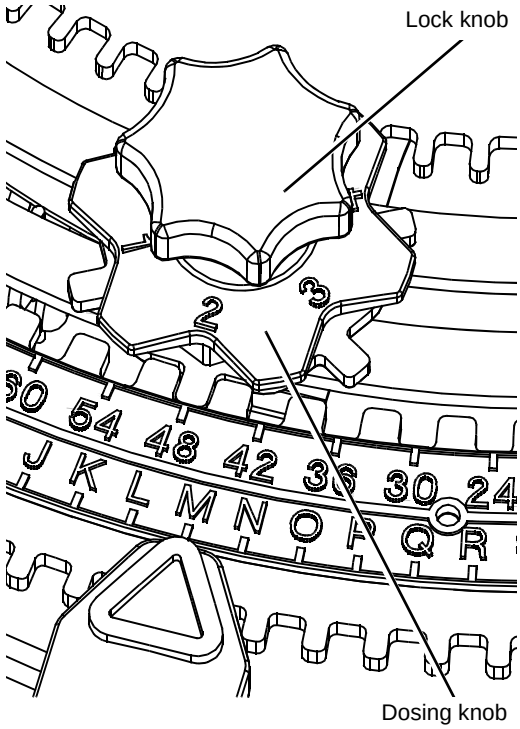
The dosing setting can be seen in the column marked *Dosing Setting* in the spreading chart, which should be set to achieve the desired application rate at the desired driving speed. You have to set the dosing setting with both of the dosing knobs, whereby you can select a value between 0 – 90. The dosing knob can be set in steps of 6 over the adjustment range. The intermediate values can be adjusted by switching the dosing knob between values 0 - 5. The *Dosing setting* column in the spreading chart indicates the first position to which the dosing knob has to be set and after the slash the halfway position to which the dosing knob has to be turned.

- Swing open the lock knob.
- Place the dosing knob on the correct number.
- Turn the knob until the desired number is facing that number.
- Push the knob into the notch at that number.
- Turn the lock knob again.
- Set the left and right dosing knobs to the same position to ensure that the application rate will be the same on both sides.
- Check the dosing setting by performing a calibration test,
  → see instructions in paragraph »Calibration test« on page 66.

Flowrate icon above the column



There is a danger that the dosing openings could become clogged with low application rates. You can close 2 of the 3 dosing openings to prevent this and open the remaining dosing opening further.
→ See paragraph »Fine application« on page 59.
Use fine application if the flow rate is less than 50 kg/min.
The flowrate values are shown in the fourth column of the spreading chart.



The following will be achieved with the fertiliser and spreading chart from the example:
→ See paragraph »Example« on page 51.
You will have an application rate of about 300 kg/ha with a working width of 18 metres and a driving speed of 8 km/h with the dosing setting at 42+3.

- Swing open the lock knob.
- Place the dosing knob on mark 42.
- Turn the dosing knob until the 3 points to mark 42.
- Turn the lock knob again.

Dosing settings for application rate not shown

The (online) spreading chart is calculated based on the working width and dosing settings. You will note that the dosing setting is often increased by 3 positions, after which the discharge point, the flowrate and the corresponding application rate is indicated with the varying driving speeds.

When setting your spreader, select the setting for your dosing setting that would provide the desired application rate and driving speed. This way you would not end up trying to find the correct settings for an application rate that is not given in the spreading chart. The following should be done in order to obtain the best setting for the desired application rate.

- Find an entry in the spreading chart that displays the settings with the desired driving speed that would achieve a somewhat lower application rate. The following line should indicate the settings with an application rate that is slightly higher than desired.
- Calculate the difference in the application rates: subtract the values from each other.
- Divide the sum by the number of dosing settings between the lines (always 3 in the spreading chart).

This should provide you with a good estimate of the application rate if you should increase the dosing setting by one position.
You can now determine which dosing setting would provide you with the desired application rate.

- Check the dosing setting by performing a calibration test,
  → see instructions in paragraph »Calibration test« on page 66.



The following will be achieved with the fertiliser and spreading chart from the example:
→ See paragraph »Example« on page 51.
Take for instance you want to spread 345 kg/ha at a driving speed of 8 km/h.

- The application rate indicated as too low: 334 kg/ha with the dosing setting at 48+0
- The application rate indicated as too high: 370 kg/ha with the dosing setting at 48+3.
- The difference: 370 - 334 = 36 kg/ha.
- Number of dosing settings between the lines: 48+3 - 48+0 = 51 - 48 = 3.
- 36 kg/ha / 3 settings = 12 kg/ha per dosing setting.

Dosing setting	Application rate (kg/ha)
48+0	334
48+1	346
48+2	358
48+3	370

A dosing setting of 48+1 would be closest to the desired application rate of 345 kg/ha.

- Check the dosing setting by performing a calibration test,
  → see instructions in paragraph »Calibration test« on page 66.

Dosing setting with a different driving speed

If your tractor does not drive at the speed as indicated on the spreading chart with the PTO shaft rpm as indicated, the dosing and discharge point settings must be adjusted.

- Calculate the flow rate required for the entire spreader with your driving speed.

$$\text{Flowrate (kg/min)} = \frac{\text{application rate (kg/ha) x working width (m) x speed (km/h)}}{600}$$

Flowrate icon above the column



- Select the value in the flow rate column for the entire spreader that most closely corresponds with the calculated value.
- If the required value for the flowrate is not indicated, apply the calculation methods as described in the previous paragraph with the flowrate instead of the application rate.
- Adjust the spreader as per the recommended dosing and discharge point settings.
- Check the dosing setting by performing a calibration test,
  → see instructions in paragraph »Calibration test« on page 66.

The following will be achieved with the fertiliser and spreading chart from the example:
→ See paragraph »Example« on page 51.
Suppose you want to work with a width of 18 metres and an application rate of 350 kg/ha, but your tractor drives 8.5 km/h at 540 rpm, instead of 8 km/h.

- The required flowrate is obtained from the formula:

$$\text{Flowrate (kg/min)} = \frac{350\ \text{(kg/ha)} \times 18\ \text{(m)} \times 8.5\ \text{(km/h)}}{600}$$

- Flow rate for the entire spreader: 89.25 kg/min.

Flowrate icon above the column



- Look for the line in the spreading chart with the calculated flow rate for the entire spreader in the column: 89 kg/min.
- Read the settings from the line:

Dosing setting icon at top of column



- Dosing setting: 48+3

Calibration value icon at top of column



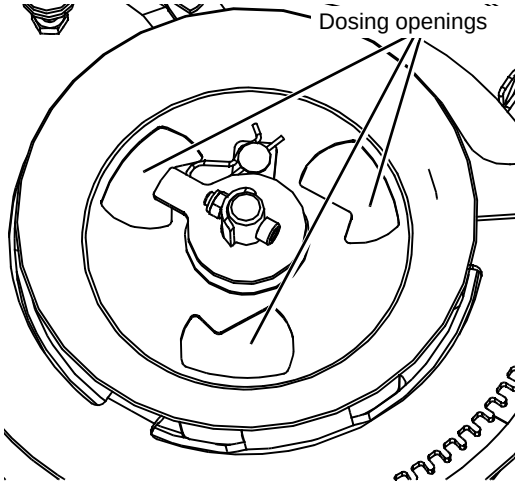
- Calibration test value for one disc: 42 kg/min

Discharge point icon above the column



- and discharge point M.

Fine application



Normal dosing

All three dosing openings normally open uniformly with the dosing setting you set. With a low application rate and/or a low driving speed the dosing openings are only opened a slight bit so that very little fertiliser would stream through the dosing openings of the spreader. This could easily cause blockage, which would lead to a bad spreading pattern and possible damage the crops.
It is therefore recommend that fine application be used if the flow rate is **less than 50 kg/min** for the entire spreader.

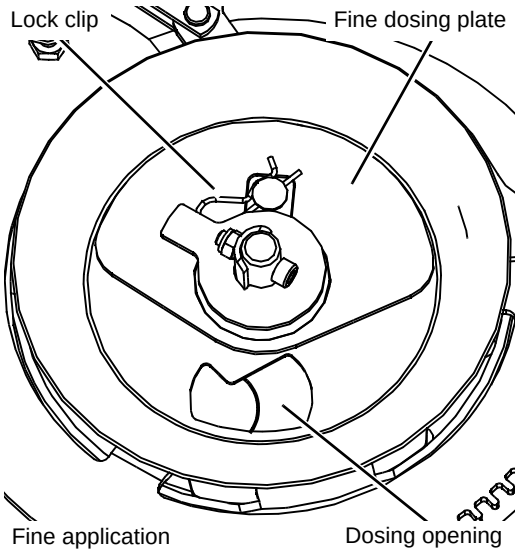
Flowrate icon above the column



The flow rate with a specific working width, application rate and driving speed is given in the fourth column of the spreading chart.

Close 2 of the 3 dosing openings to prevent blockages. The remaining opening will be further opened as the flowrate with the constant flowrate would be three times as much.
The fine dosing plate (accessories) is placed on the dosing plate and fastened with a lock clip in order to close 2 of the 3 dosing openings.

TIP Transport the fine application plate to and from the machine in an empty hopper!

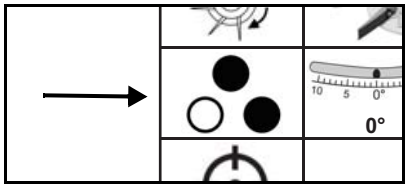


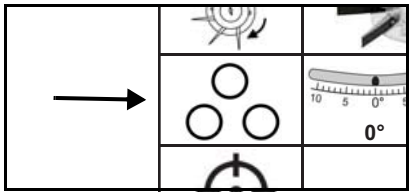
Fine application

Dosing opening

- Remove the lock clip
- Place the fine dosing plate notch down above the lock pin.
- Pass the clip through the lock pin, with the opening facing the rear of the machine.
- Place the fine dosing plate on the other spreading disc in the same way.

Dosing setting





The dosing setting to be set can be:

- Read from the relevant spreading chart when you want to spread at a lower application rate using the fine application kit (optional extras) and the symbol of the *Fine application kit* is indicated in the spreading chart. This is indicated by means of 1 open hole (dosing opening).
- Determine an application rate not given as described in paragraph »Application rate«from page 56.
- Calculate using the relevant spreading chart when spreading at a lower application rate with the fine application kit (optional extras) and the symbol of the *Fine application kit* is indicated in the spreading chart. This is indicated by means of 3 open holes (dosing openings).

Calculation

As 2 of the 3 dosing openings are closed the flowrate of the remaining dosing opening should be three times as much in order to obtain an even application rate.





- Read the *Dosing Setting, Discharge Point and kg/min* (flowrate) from the spreading chart. Calculate the flowrate with the formula given below.

If the selected application rate or driving speed is not indicated in the spreading chart the required flowrate can also be calculated as follows:

$$\text{flowrate required (kg/min)} = \frac{\text{application rate (kg/ha) x working width (m) x speed (km/h)}}{600}$$

Use the letter given for setting the discharge point in the line of the spreading chart that most closely resembling the calculated flowrate.

- Multiply the flowrate (given in the *Kg/min* column or calculated) with a factor of 3.
- Search in the *Kg/min* column for the most comparable flowrate and read the relevant dosing setting or estimate it as closely as possible. Do not use the discharge point indicated there!

Flowrate icon above the column

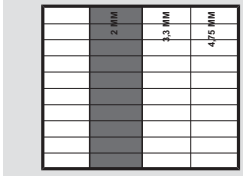


Setting the spreader

- Set the given discharge point as per the prescribed method
  → in paragraph »Discharge point« on page 55.
- Set the given or calculated dosing setting as appropriate.
  → see instructions in paragraph »Application rate« from page 56.
- Do a calibration test to check the dosing setting,
  → see instructions in paragraph »Calibration test« on page 66.

Suppose you would want to spread slug pellets with the characteristics given in the spreading chart below:
With a working width of 12 metres, a driving speed of 8 km/h and a selected application rate of 14 kg/ha.

- the recommended discharge point: H,
- the recommended dosing setting is 6+5,
- the relevant flowrate is 2.24 kg/min,
- the fine application kit must be used because the *Fine application kit* symbol is indicated.
- The settings given are based on using a fine application kit, which you do not need to calculate yourself.



0 -100- 0 - 0



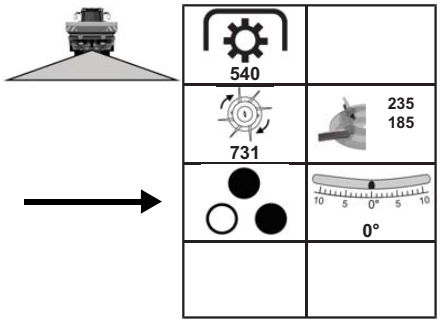
Slakkenkorrels

0,80 kg/l

TDS Premium
Metarex

12 m

kg/min		kg/min	kg/ha 6 km/u	8 km/u	9 km/u	10 km/u	11 km/u	12 km/u	14 km/u
0,23	H	0,52	4,3	3,2	2,9	2,6	2,4	2,2	1,9
0,27	H	0,61	5,1	3,8	3,4	3,1	2,8	2,5	2,2
0,31	H	0,70	5,8	4,4	3,9	3,5	3,2	2,9	2,5
0,35	H	0,79	6,6	4,9	4,4	4,0	3,6	3,3	2,8
0,39	H	0,88	7,3	5,5	4,9	4,4	4,0	3,7	3,1
0,52	H	1,19	9,9	7,4	6,6	6,0	5,4	5,0	4,3
0,66	H	1,50	12,5	9,4	8,3	7,5	6,8	6,3	5,4
0,79	H	1,86	15,5	11,6	10,3	9,3	8,5	7,8	6,6
0,95	H	2,20	19,1	14,3	12,7	11,4	10,4	9,5	8,2
1,00	H	2,48	20,7	15,5	13,8	12,4	11,3	10,3	8,9
1,10	H	2,75	22,9	17,2	15,3	13,8	12,5	11,5	9,8
1,30	H	3,27	27,2	20,4	18,2	16,3	14,9	13,6	11,7
1,50	H	3,80	31,7	23,7	21,1	19,0	17,3	15,8	13,6
1,70	H	4,33	36,1	27,1	24,1	21,6	19,7	18,0	15,5



The following will be achieved with the fertiliser and spreading chart from the example:
The advised discharge point with a working width of 18 metres and a driving speed of 8 km/h, but with an application rate of 165 kg/ha is: L.
Because the flow rate of 40 kg/min is below 50 kg/min., it is better to use fine application.

- Set the levers for the discharge point for both spreading discs to L,
  → see instructions in paragraph »Discharge point« on page 55.
- Install both fine application plates,
  → See instructions on page 59.
- Multiply the flowrate of 40 kg/min with a factor of 3. Result: 40 x 3 = 120 kg/min.

Flowrate icon above the column

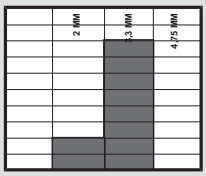


- Find the line in the spreading chart with the nearest flowrate. Result: the line with the flowrate of 118 kg/min.
- Read the relevant dosing setting. Result: dosing setting 60+0.

Dosing setting icon at top of column



- Set the value for both spreading discs as per instructions. Do not change the setting for the discharge point!
  → see instructions in paragraph »Application rate« on page 56.
- Do a calibration test to check the dosing setting,
  → see instructions in paragraph »Calibration test« on page 66.



0 - 20 - 80 - 0



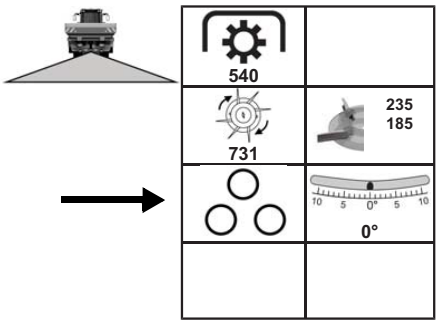
Granulaat



0,98 kg/l

NPK 17 - 17 - 17
GRANDE PAROISSE (AZF)

18 m



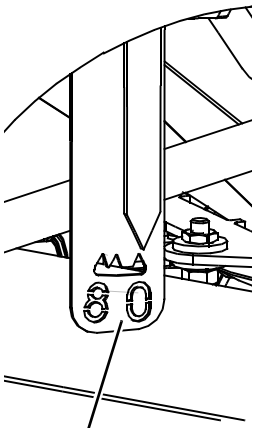
	kg/min		kg/min	kg/ha 6 km/u	8 km/u	9 km/u	10 km/u	11 km/u	12 km/u	14 km/u
18+3	7	L	16	89	66	59	53	48	44	38
24+0	10	L	22	122	91	81	73	67	61	52
24+3	13	L	28	155	117	104	93	85	78	67
30+0	16	L	34	189	142	126	113	103	94	81
~~30+3~~	19	L	40	~~222~~	167	148	133	121	111	95
36+0	22	M	46	256	192	170	153	139	128	110
36+3	26	M	55	303	227	202	182	165	152	130
42+0	30	M	63	351	263	234	210	191	175	150
42+3	34	M	72	398	299	265	239	217	199	171
48+0	38	M	80	446	334	297	267	243	223	191
48+3	42	M	89	493	370	329	296	269	247	211
54+0	47	M	98	546	409	364	327	298	273	234
54+3	52	M	108	601	451	401	361	328	301	258
60+0	~~57~~		118	656	492	438	394	358	328	281
60+3	62	M	128	712	534	474	427	388	356	305
66+0	67	M	138	767	575	511	460	418	384	329
66+3	72	M	148	822	616	548	493	448	411	352
72+0	77	M	158	876	657	584	526	478	438	376
72+3	81	M	167	931	698	620	558	508	465	399
78+0	85	N	177	985	739	657	591	537	492	422
78+3	89	N	187	1039	779	693	623	567	520	445
84+0	95	N	197	1093	820	729	656	596	547	469
84+3	98	N	202	1123	842	749	674	613	562	481
90+0	102	N	208	1153	865	769	692	629	577	494

Inclination



In the (online) spreading chart, look for the *Angle spreader* symbol to get advice on the angle of your spreader. The spreader is normally in the horizontal position. It may be necessary to adjust the angle of the spreader with large working widths or with top dressing.

You can set the precise angle by turning the top link.
An angle indicator can be mounted on the spreader to display the angle of the spreader.



Angle indicator

TIP Set the spreader angle before you fill the hopper. It is easier to turn the top link if the hopper is empty.
Check the position again after the hopper has been filled!

INDICATION This can prevent the recommendations for setting the spreader at an inclination differing from recommendations given in the spreading chart with top dressing in
→ paragraph »Spreading height« on page 86,
differs from the recommendations given in the spreading chart. Follow the instructions from chapter »Spreading height« in this event.

PTO shaft RPM



The PTO shaft rpm is indicated in the (online) spreading chart. The rpm is always the same, namely 540 rpm.
→ See paragraph »Spreading« on page 90.

The PTO shaft rpm often have to be adjusted with border spreading. Follow the direction for the PTO shaft RPM for border spreading as given in
→ paragraph »Border spreading« from page 93.

Filling



Avoid contact with the fertiliser and other material
You could come into contact with materials when filling the machine. Always wear protective clothing, such as safety gloves, shoes and goggles. Read and adhere to the additional safety instructions and the of the material producer. Contact with the materials could lead to injury. Contact your physician in such an event!

Chemical reactions caused by mixing fertilisers
Mixing different types of fertiliser could lead to a chemical reaction whereby poisonous vapours, liquids or other materials could come about. Possible danger of explosion! This could lead to personal injury and damage to the crop and machine.
Only mix different types of fertiliser if the manufacturer(s) indicated that this can be done.
Chemical reactions could lead to damage to the machines and personal injury.

Read the safety instructions provided by the supplier
Read the safety instructions provided by the supplier and apply that. Protective clothing should be worn when necessary.
Disregarding the safety instructions could result in personal injury and damage to the machine.

Use proper tools
Great volumes of material is often handled during the filling process. Use proper tools such as lifting devices when moving and filling the machine. Keep legislation concerning working conditions in mind. Work carefully and responsibly. Inferior tools can cause serious injuries.

Only fill mounted machines
Never place a machine in the ground while filling it. Always keep it in the power lift of the tractor. The machine is designed to be loaded while in a suspended state. Never park a filled machine on the ground. Filling the machine while it is on the ground could lead to damage.

Work with a closed cabin
Fertiliser dust can blow indoors through open windows, doors or other openings. Moreover, the sound level is higher in an open cabin. It is therefore recommended to always work with a closed cabin with active carbon filters in the air inlets. Fertiliser dust and a high sound level can cause physical damage.

INDICATION Most types of fertiliser attract water and can thereby form large chunks. These chunks can block the spreader or distort the spreading pattern.

- When working under moist conditions, use a hopper cover that closes well (DSC 1400).
- Do not spread without a hopper cover under moist conditions.
- Never leave the fertiliser for a long period of time in the spreader. Chunks can also be formed through moisture in the air.
- Always clean the spreader well after use, including the dosing openings and the discharge bushings.

Loading height

You can fill the spreader to the desired levels after it has been put in place. It is recommended that the machine be loaded while it is lifted 10 cm above the soil. If no activities need to be performed on top of the hopper, the height can be adjusted with the automatic filling system.

A load platform must be used if the distance between the hopper rim and the ground is more than 1250 mm while filling manually or with large bags. The filling height is given in
→ paragraph »Technical specifications« on page 29.

Procedure

- If a fixed loading platform is used, drive the machine to the platform. The distance between the machine and the platform must be a maximum of 200 mm.
- Lower the machine at the desired level. The machine must not rest on the ground, but rather be lifted a minimum distance of 10 cm!
- Ensure that the dosing units are closed.
- Switch the tractor off and remove the keys from the ignition.
- Engage the parking brake of the tractor.
- Close all the doors and windows in the cabin.
- Place wheel chocks in front of the wheels of the tractor.
- If a mobile loading platform is being used, place the loading platform at the spreader so that there would be a maximum distance of 200 mm between the two.
- Open the hopper cover (DSC 1400).
- Check that the fine application plates are installed with their lock clips and removed for normal spreading.
- Check if the sieve is closed and secured.
- Fill the machine to the desired level with the correct tools. Fill the hopper halves to the same level so that the both of them would run empty at the same time.

INDICATION Work carefully while filling and take the regulations that apply to working conditions into consideration! Make sure no objects or tools fall into the hopper as it could block or damage the spreader!

- Close the hopper cover (DSC 1400).

Do not exceed the maximum total weight of **1751** kg!
→ See also paragraph »Technical specifications« on page 29.
The machine has not been constructed to carry the additional weight. Keep the axle load, load capacity of the wheels and the total weight of the tractor, as well as the minimum axle load of the tractor, in mind.
→ See also paragraph »Calculate the axle load with tractor-mounted machines« on page 14.

INDICATION If the weight should increase the filled spreader could fall backwards!

- Set the spreader level length wise after it has been filled.

Calibration test

Avoid contact with the fertiliser and other material
You will most likely get into contact with the fertiliser and other material you may wish to spread while filling, adjusting and testing the spreader. Wear protective clothing and gloves, read the safety instructions provided by the supplier and follow their directions. Contact with these materials could cause physical harm.

Be careful that nothing gets jammed
It is easy for parts to get jammed while setting the spreader.
Work carefully:

- switch the tractor off and remove the key from the ignition,
- engage the parking brake of the tractor,
- wait for all machine parts to come to a standstill before you start with the adjustments,
- carefully follow the instructions given.

Friction with these materials could cause physical injury.

The test should be performed on your own. Operate the machine on your own!
Dangerous situations for other people could easily occur when the machine is turning and the test conducted. Contact with these materials could cause physical injury.

Protecting the environment
Spreading a too high dose of materials outside of the field edge, especially on water surface, creates a heavy burden on the environment. Protect the environment by applying a correct application rate in a correct working manner.

PTO shaft rotates after disengaging
After switching off the PTO shaft, danger could arise as the machine will continue running because of inertia. Keep a safe distance to the machine until the moving parts have come to a complete stop. Approaching the machine while it is rotating can cause serious or deadly injuries.

The (online) spreading charts are compiled for good fertiliser and modern equipment. It may nevertheless be necessary to check the dosing settings with a calibration test. This is necessary because your circumstances and fertiliser will always differ from the test situation used to compile the spreading charts.

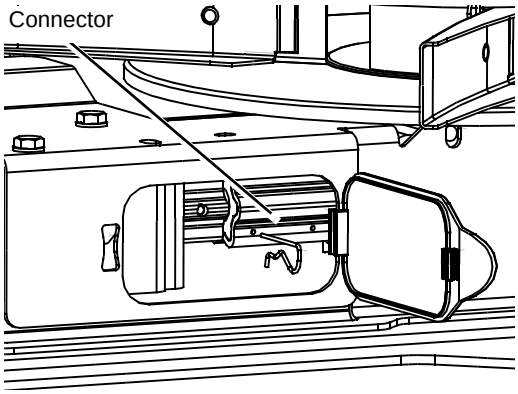
Use the correct flow rate from the chart with the calibration test
The calibration test is used to determine the flowrate of a spreading disc. The expected flow rate in kg/min differs from the flow rate during full field spreading. During the calibration test the vanes are removed and a calibration container is attached.
The (corrected) calibration value is provided in the second column.

Calibration value icon at top of column



You should also test the discharge point with a tray test.
→ See paragraph »Check the spreading pattern (tray test)« on page 71.

Performing a calibration test

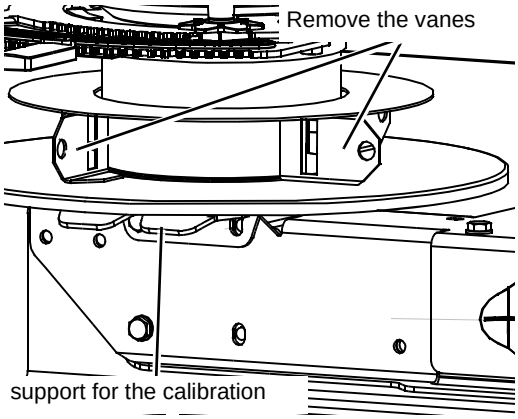


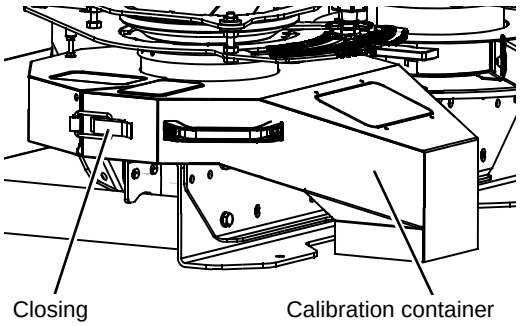
Dosing setting icon at top of column

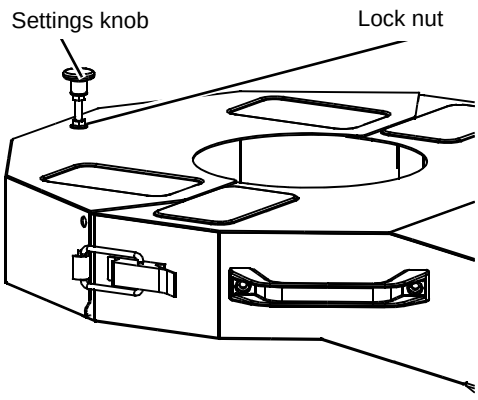


Calibration value icon at top of column









The calibration test is normally performed on the left spreading disc.

- Switch the tractor off, remove the key from the ignition and engage the parking brake of the tractor.
- Disconnect the right spreading disc by sliding the connector to the right. Secure the connector with a lock clip.
- Set the right disc's dosing setting to 0+0.
  → see instructions in paragraph »Application rate« on page 56.
- Remove the vanes from the left spreading disc.
- Mount the calibration container carefully on the left spreading disc.
- Set the calibration container with the settings knob so that the spreading disc does not touch the calibration container.

- Find a similar fertiliser type and working width in the *Dosing setting* column of the spreading chart, based on the desired application rate and working width.
- Also check the relevant flow rate in the column.

→ see instructions in paragraph »Find the correct settings of the spreader and set it accordingly« on page 45.

- Set the recommended dosing setting of the left spreading disc.
  → see instructions in paragraph »Application rate« on page 56.
- Fill the spreader minimum halfway with fertiliser, covering the seven.
- Weigh a large trough and place it under the discharging point of the calibration container.
- Start the tractor, engage the PTO shaft and open the dosing unit for 5 seconds to 'rinse' the calibration container.
- Switch the PTO shaft and the tractor off, remove the key from the ignition, empty the trough and place it back under the discharge point of the calibration container.
- Start the tractor, engage the PTO shaft and set it to 540 rpm.
- Open the dosing unit for 20 to 30 seconds, or for 1 minute with smaller application rates.

INDICATION If you set a high dosing setting or if you are using a small trough, open the dosing unit for 30 seconds and multiply the weight of the collected fertiliser by 2 when weighing it.

- Switch the tractor and the PTO shaft off, remove the key from the ignition and engage the parking brake of the tractor.
- Weigh the trough with the fertiliser. Subtract the weight of the trough from the total weight.
- Multiply the weight of the collected fertiliser with 2 (reason being that you spread with 2 spreading discs). This will provide you with the flowrate of both spreading discs (kg/min).
- Compare this with the stipulated flowrate given in the spreading chart with the desired application rate and driving speed.
- Calculate another dosing setting as follows:

  → paragraph »Adjusting the dosing setting« on page 69 or paragraph »Adjusting the dosing setting with fine application« on page 70.
- Set the new dosing setting and do another calibration test until the desired flowrate has been obtained.
- Mount the correct vane combination again.
- Reconnect the drive of the right spreading disc and lock it.

The following will be achieved with the fertiliser and spreading chart from the example:
→ See paragraph »Example« on page 51.
You will have an application rate of about 370 kg/ha with a working width of 18 metres at a driving speed of 8 km/h.
The expected flow rate per disk during the calibration test is 42 kg/min as shown in the spreading chart with dosing setting 48+3.

For example:
If you caught 21 kg of fertiliser in 30 seconds at the left spreading disc. This value corresponds with the expected value of 42 kg/min.

Adjusting the dosing setting

If the actual flowrate differs from the desired flowrate the dosing settings will have to be adjusted. The example below illustrates the steps for fine application.

The following will be achieved with the fertiliser and spreading chart from the example:
→ See paragraph »Example« on page 51.
You will have an application rate of about 370 kg/ha with a working width of 18 metres at a driving speed of 8 km/h. The expected flowrate is 42 kg/min with the dosing setting at 48+3.

For example:
If you caught 18.3 kg of fertiliser in 30 seconds at the left spreading disc. This means: 18.3 x 2 = 36.6 kg/min per disc. This value differs too much from the expected value, so the dosing setting must be adjusted.

- Determine the value of the spreading chart that is closest to the measured value: 38 kg/ha with the dosing setting at 48+0.
- Calculate how much the flowrate will increase with this application rate if the dosing setting is 1 position higher.
  Difference in the flowrate: 42 - 38 = 4 kg/min
  Difference in the dosing setting: 48+3 - 48+0 = 51 - 48 = 3 positions
  Change in the flowrate per dosing setting: 4 / 3 = 1.33 kg/min.
- Calculate the difference between the measured and the desired discharge volumes:
  42 - 36.6 = 5.4 kg/min.
- Calculate the number of positions the dosing setting must be increased
  5.4 / 1.33 = 4 positions.
- Set the correct setting: 48+3 + 4 = 55 = setting 54+1.
- Perform another calibration test.

Adjusting the dosing setting with fine application

If the actual flowrate differs from the desired flowrate the dosing settings will have to be adjusted. The example below illustrates the steps for fine application.

The following will be achieved with the fertiliser and spreading chart from the example:
→ See paragraph »Example« on page 51.
You will have an application rate of about 165 kg/ha with a working width of 18 metres at a driving speed of 8 km/h. The expected flowrate is 40 kg/min. So, you change to fine application and set the dosing setting to (40 x 3 = 120 kg/min), position 60+0 and the discharge point to letter L.
→ See paragraph »Fine application« on page 59.

For example:
if you caught 17.25 kg of fertiliser in 1 minute at the left spreading disc. The chart indicates the flowrate for the calibration test as: 19 kg/min. This value deviates too much from the expected value, so the dosing setting must be adjusted.

- Multiply the actual flowrate with 3 so that you will know what the flowrate would be with all 3 dosing openings opened: 17.25 x 3 = 51.75 kg/min.
- Determine the value of the spreading chart that is closest to the calculated value: 52 kg/min with dosing setting 54+3.
- Calculate how much the flow rate will increase with this application rate if the dosing setting is set 1 position higher (position 60+1).
  In position 60+0 is the flowrate 57 kg/min
  Difference in the flowrate: 57 - 52 = 5 kg/min
  Difference in the dosing setting: 60+0 - 54+3 = 60 - 57 = 3
  Change in the flowrate per dosing setting: 5 / 3 = 1.66 kg/min.
- Calculate the difference between the measured and the desired discharge volumes:
  19- 17.25= 1.75 kg/min.
- Calculate the number of positions the dosing setting must be increased
  1.75 / 1.66 = 1 positions.
- Set the correct setting: 60+0 + 1 = 60+1.
- Perform another calibration test.

Check the spreading pattern (tray test)



Avoid contact with the fertiliser and other material
You will most likely get into contact with the fertiliser and other material you may wish to spread while filling, adjusting and testing the spreader. Wear protective clothing and gloves, read the safety instructions provided by the supplier and follow their directions. Contact with these materials could cause physical harm.

Be careful that nothing gets jammed
It is easy for parts to get jammed while setting the spreader.
Work carefully:

- switch the tractor off and remove the key from the ignition,
- engage the parking brake of the tractor,
- wait for all machine parts to come to a standstill before you start with the adjustments,
- carefully follow the instructions given.

Friction with these materials could cause physical injury.

The test should be performed on your own. Operate the machine on your own!
Dangerous situations for other people could easily occur when the machine is turning and the test conducted. Contact with these materials could cause physical injury.

Protecting the environment
Spreading a too high dose of materials outside of the field edge, especially on water surface, creates a heavy burden on the environment. Protect the environment by applying a correct application rate in a correct working manner.

PTO shaft rotates after disengaging
After switching off the PTO shaft, danger could arise as the machine will continue running because of inertia. Keep a safe distance to the machine until the moving parts have come to a complete stop. Approaching the machine while it is rotating can cause serious or deadly injuries.

Work with a closed cabin
Fertiliser dust can blow indoors through open windows, doors or other openings. Moreover, the sound level is higher in an open cabin. It is therefore recommended to always work with a closed cabin with active carbon filters in the air inlets. Fertiliser dust and a high sound level can cause physical damage.

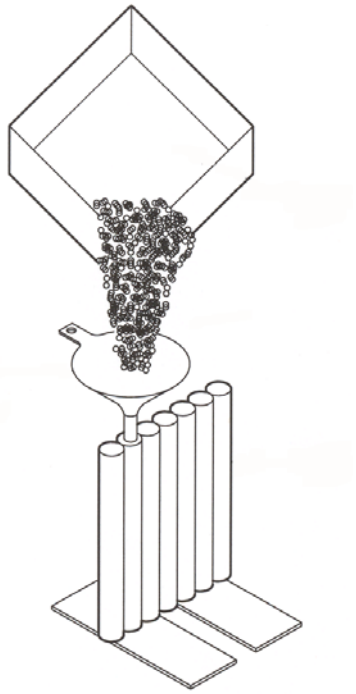
A tray test checks the distribution of the fertiliser as the spreader distributes it. The results of this test will indicate if you can improve the settings of the spreader, thereby improving the distribution of fertiliser and limiting loss.
Tray tests can be performed by specialised companies, but it is also possible to perform this test on your own. You will have to purchase some materials for it, however.
We recommend that you request a specialist company to perform the tray test as they can also provide you with advice and answer your questions.

When to perform the tray test:

- When using a fertiliser type that is not in the spreading chart book, via the online spreading chart service on the website or via the free application (App) for mobile phones with an iOs and/or Android operating system.
- When using a fertiliser type of which the distribution and density deviate from the values indicated in the spreading chart book, via the online spreading chart service on the website or via the free application (App) for mobile phones with an iOs and/or Android operating system.
- When using fertiliser of moderate quality.
- Test should be carried out annually on the left and the right side to check the equal distribution of both spreading discs.
- After each change to the spreading mechanism of the spreader or when parts are replaced.

INDICATION Always perform a calibration test first and determine the correct dosing setting before checking the spreading pattern. Changes to the dosing setting will also have an influence on the spreading pattern!
→ See paragraph »Calibration test« on page 66.

INDICATION Weather conditions have a great influence on the spreading pattern while spreading, as well as while performing the tray test. The tray test should be performed with dry weather, low humidity and with a maximum wind speed of 3 m/s (wind force of 2).



Material required

- measuring tape or ruler,
- spirit level to set the troughs horizontal,
- 7 troughs,
- 7 graduated tubes,
- 1 funnel,
- notebook, pen and calculator,
- this manual.

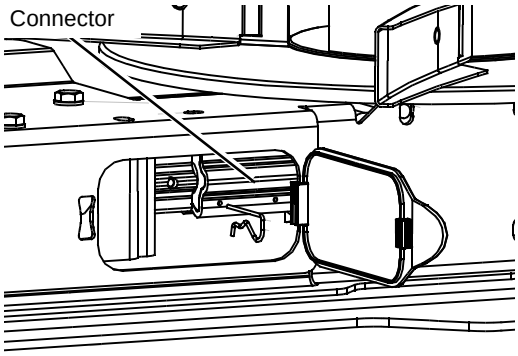
General instructions

- Check the position of the dosing setting and the discharge point.
- Check the height **(75 cm above the troughs)** and the position (angle) of the spreader.
- Check the rpm of the PTO shaft and the spreader discs.
- Always place the buckets **horizontally** on the floor.
- Place the buckets at a maximum distance of 4 metres. Make sure you have additional buckets for testing working width of more than 24 metres.
- Do not use the spreader while it is raining or with high humidity. This will cause the fertiliser to cling to the troughs, which would not provide the desired results.
- Do not spread with wind speeds of more than 3 m/s (wind force of 2).

Test the left and right spreading patterns

The left and right spreading discs must spread the same volumes of fertiliser to ensure good distribution. Check this every year!

INDICATION This test describes a working width of 18 metres. You are of course free to run the test for a different working width. Divide the buckets at equal distances along the working width.



Operation

- Switch the tractor off and remove the key from the ignition and engage the parking brake of the tractor.
- Disconnect the left spreading disc by sliding the connector to he left. Secure the connector with a lock clip.
- Set the dosing unit of the left spreading disc to 0+0.
- Find the fertiliser type with the correct discharge position in the (online) spreading chart to spread over 18 metres and set the lever accordingly.

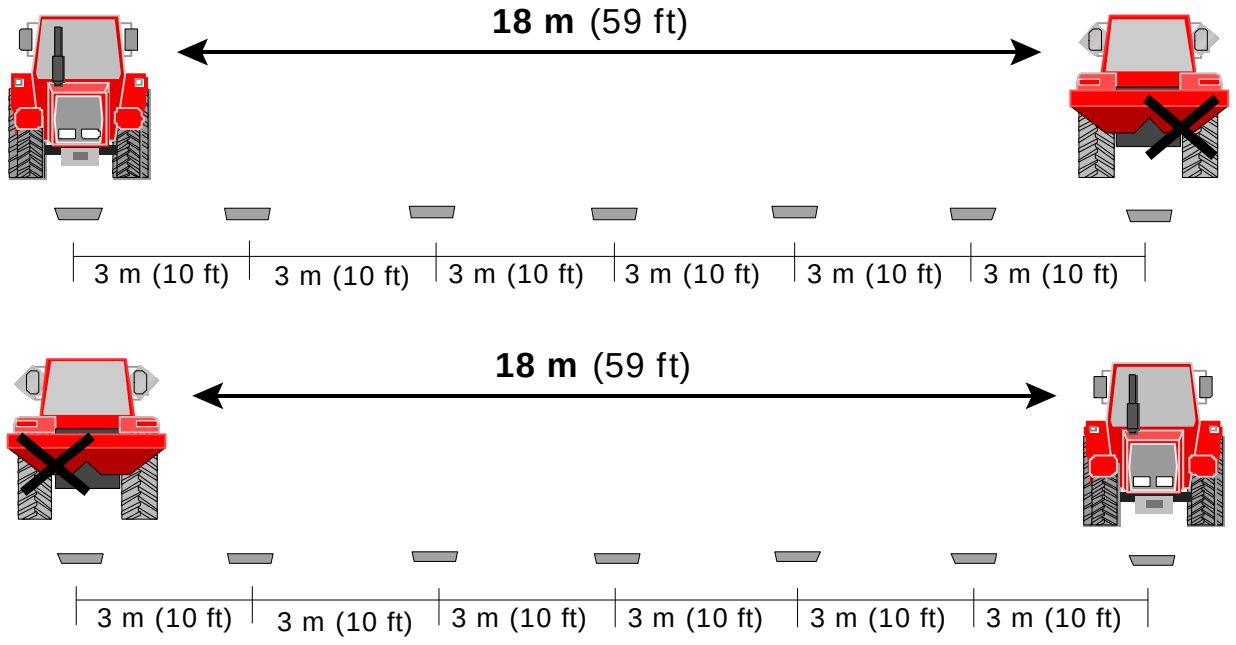
  → See paragraph »Discharge point« on page 55 and the foreword of the spreading chart book.
- Set the dosing setting of the right spreading disc so that spreading would be done at the desired driving speed with an application rate of at least 250 kg/ha. We recommend that you select a low driving speed.
- Mount the vane combination given in the appropriate spreading chart.

  → See paragraph »Vanes« on page 32.

Check the height of the spreader **(height of the spreading disc = 75 cm above the troughs).**

- Place the grids in the troughs.
- Place trough 1 in the middle of the tractor tracks.
- Place the other troughs 3 metres to the right of the tractor tracks.

Indication Position the troughs horizontally with a spirit level!



- Start the tractor, engage the PTO shaft and set it to 540 rpm.
- Open the dosing unit.
- Drive over the first trough and stop only after you have driven at least 20 metres past this trough.
- Empty the trough with a funnel into the graduated tubes and record the reading in your notebook.

Repeat the procedure, but this time disconnect the right spreading disc and switch the dosing unit of the right spreading disc to 0+0. Put the troughs on the left side of the tractor track.
Drive with the same speed and with the same PTO shaft rpm as with the first time!

Assessment

- Record the values you find in the graduated tubes for the left and right spreading discs.
- Compare the values, calculate the percentage differences between the measuring tubes on the left and the right.

Adaptation

If the spreading patterns on the left and right spreading discs are not the same and the difference is greater than 3% you will have to do the following, or request your dealer to do so:

- Check if the machine is hanging horizontally and vertically behind the tractor in length and width.
- Perform the »Check the settings of the dosing mechanism« as described on page 117 and repeat the test.
- Perform the »Check setting mechanism of the discharge point« as described on page 123 and repeat the test.

If the difference in the spreading pattern is too great, contact your dealer.

Full field spreading pattern test

If the spreader is correctly set and the tramlines are set at the correct distance from each other you would achieve a good distribution of fertiliser over the land. This will only be achieved if the spreader spreads with the correct spreading pattern.
This is then the reason why you have to test the spreading pattern and adjust it as required.
→ See also paragraph »Full field spreading pattern« on page 27.

INDICATION Always perform a calibration test first and determine the correct dosing setting before checking the spreading pattern. Changes to the dosing setting will also have an influence on the spreading pattern!
→ See paragraph »Calibration test« on page 66.

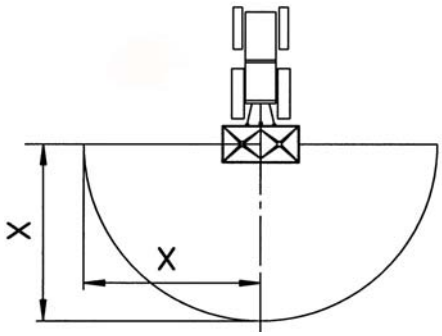
Operation

- Switch the tractor off, remove the key from the ignition and engage the parking brake of the tractor.
- Set the spreader in accordance with the spreading chart for the desired working width (X metre) **(height of the spreading disc = 75 cm above the troughs)**.
- Place the grids in the troughs.
- Place trough 1 in the middle of the tractor tracks.

INDICATION Position the troughs horizontally with a spirit level!

- Divide the additional 6 buckets on the one side of the track over the actual working width of the spreader.

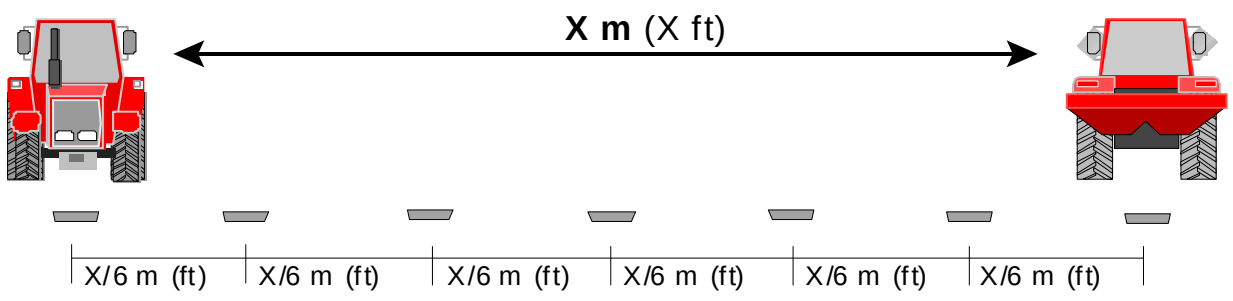
The actual width is twice the size of the effective working width!



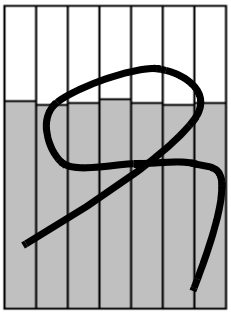
If you want to spread over a working width of 18 metres, place the buckets at 18/6 metres = 3 metres.

- Set the PTO shaft to 540 rpm
- Drive along the tracks and open the dosing units a few metres before you drive over the first bucket in the middle.
- Only stop spreading after you have driven at least one working width over the troughs (e.g. 18 or 21 metres). This is because the spreader distributes roughly even to the back, front and to the side.
- Drive back in the next track, over trough 7. Maintain the same distance with opening and closing the dosing units. Keep to the same driving speed and PTO shaft rpm!

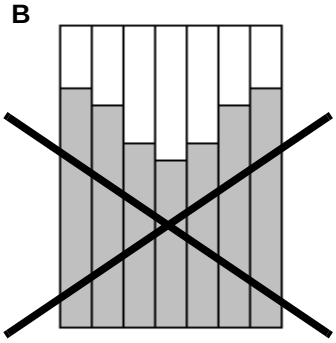
If you set an application rate of less than 250 kg/ha, drive to and from over the same tracks in order to collect sufficient fertiliser in the troughs for a good comparison. Maintain the same distance with opening and closing the dosing units.
Keep to the same driving speed and PTO shaft rpm!



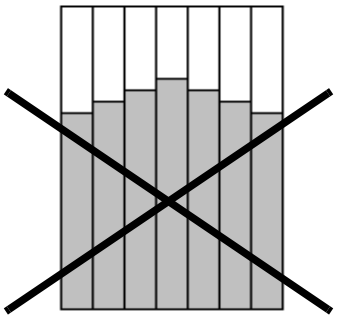
A



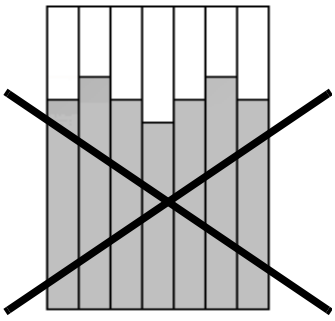
B



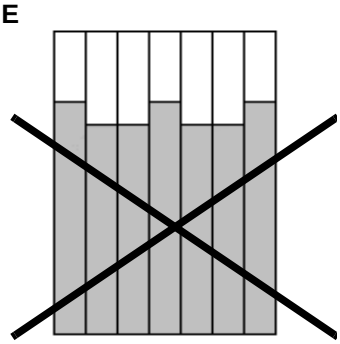
C



D



E



Review and adaptation
The content of the separate tubes can differ 15% at most from the average:

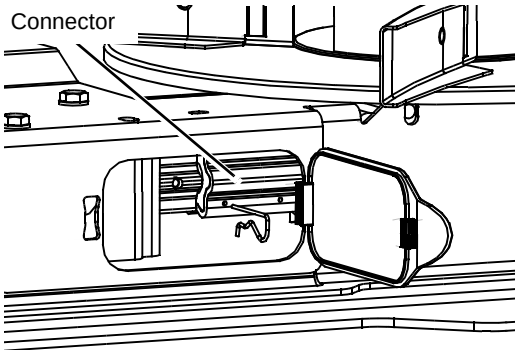
INDICATION If the correction seems to be 2 characters too strong after repeating the test, set the discharge point back by one character.

A	Good spreading pattern, the spreader has been adjusted well.
B	The spreader is not spreading wide enough. ▸ Adjust the discharge opening 2 letters towards F ▸ Repeat the test
C	The spreader is spreading too wide. ▸ Adjust the discharge opening 2 letters towards Z ▸ Repeat the test
D	The spreader is not spreading wide enough (trapezium spreading pattern): ▸ Adjust the discharge opening 2 letters towards F ▸ Repeat the test
E	The spreader is spreading too wide (trapezium spreading pattern): ▸ Adjust the discharge opening 2 letters towards Z ▸ Repeat the test

Testing the spreading pattern of the border spreading plate

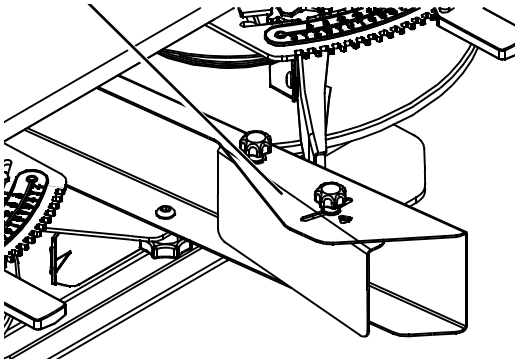
Always perform a calibration test first and determine the correct dosing setting before checking the spreading pattern. Changes to the dosing setting will also have an influence on the spreading pattern!
→ See paragraph »Calibration test« on page 66.

When using the border spreading plate the aim is to obtain maximum distribution to the border with minimum loss in the ditch.
This is then why the border spreading plate has to be tested. Do not perform this test next to the ditch, rather mark a line behind which the fictive ditch will be.



Operation

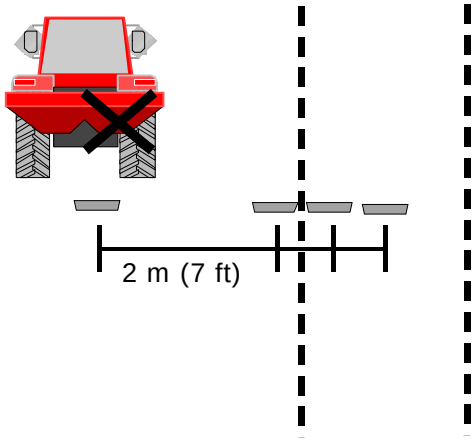
- Switch the tractor off and remove the key from the ignition and engage the parking brake of the tractor.
- Disconnect the right spreading disc by sliding the connector to the right. Secure the connector with a lock clip.
- Close the dosing unit of the right spreading disc by setting the dosing knob to 0+0.
- Attach the border spreading plate. We recommend that the border spreading plate should be mounted with the triangle on the fixing plate.

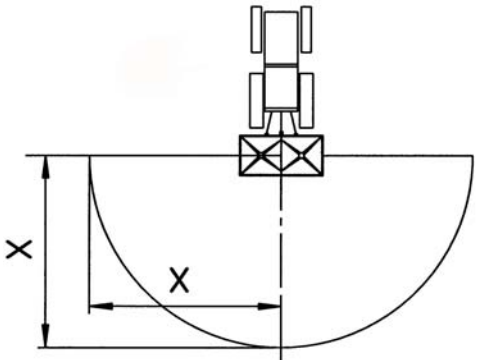


INDICATION Check that the vanes do not touch the border spreading plate!

- Set the spreader in accordance with the spreading chart for the desired working width and the instructions given in the “One-sided boundary spreading" chapter **(height of the spreading disc = 75 cm above the troughs).**
- Place 1 trough in the middle of the tractor tracks. The centre of the driving track must be 2 metres from the line behind which the fictive ditch is located.

INDICATION Position the troughs horizontally with a spirit level!

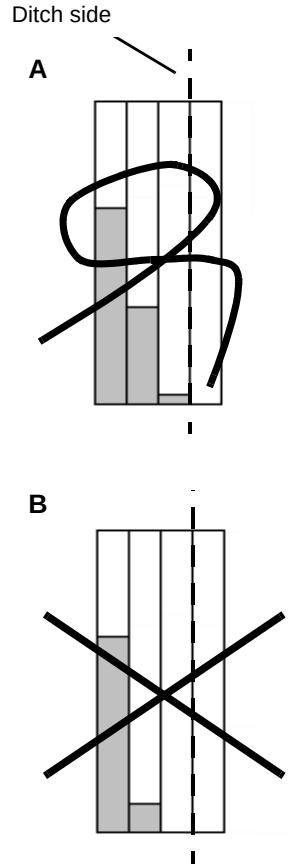




- Place 1 trough on the land next to the fictive border ditch and 2 troughs next to each other in the fictive ditch.
- Start the tractor and engage the PTO shaft. The correct PTO shaft rpm is the standard value of 540 rpm.
- Start driving along the field edge. The distance between the border and the middle of the tractor must be 2 metres. Open the dosing unit a few metres before you get to the middle bucket.
- Only stop spreading after you have driven at least one working width over the troughs (e.g. 18 or 21 metres). This is because the spreader distributes roughly even to the back, front and to the side.
- If you set an application rate of less than 250 kg/ha, drive over the same tracks in order to collect sufficient fertiliser in the troughs for a good comparison.

Maintain the same distance with opening and closing the dosing unit.
Keep to the same driving speed and PTO shaft rpm!

- Empty the troughs with a funnel into the graduated tubes.

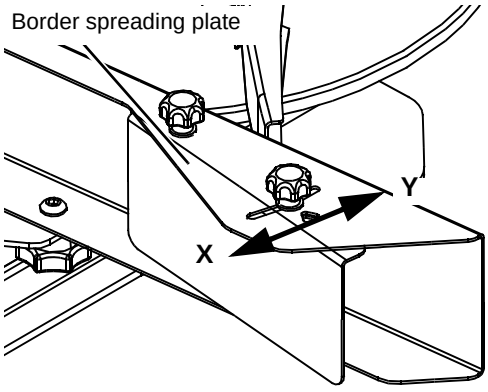


Review and adaptation
The maximum acceptable loss in the ditch is determined by environment standards (EN 13739-2). In order to comply with the standards the quantity of fertiliser in the 1st trough, standing in the imaginative ditch, must be a maximum of 10% of the quantity collected in the trough in the middle of the track (= 100%).

The trough on the land next to the fictive ditch provides an insight into the topping. It will never be 100%.

A	Good spreading pattern, the border spreading plate has been adjusted well.
B	The border spreading plate is not spreading wide enough. ▸ Set this small part a bit to the right in the direction of Y ▸ Repeat the test
C	The border spreading plate is spreading too wide. ▸ Set this small part a bit to the left in the direction of X ▸ Repeat the test

▸ Test the full field spreading pattern next as described in the following paragraph.



Testing the full field spreading pattern with the border spreading plate

Reducing the PTO shaft rpm and closing the right spreading disc also have an influence on the spreading pattern on the left side of the spreader. The full field spreading pattern should therefore be tested when using the border spreading plate.
Follow the instructions, adjusted for border spreading, as described in
→ paragraph »Full field spreading pattern test« on page 75.

Operation

- Do not change the position of the border spreading plate and disconnect the right spreading disc.

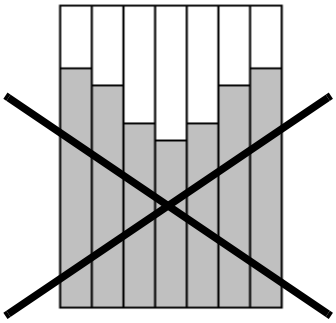
With the first time:

- Do not change the settings of the spreader, the PTO shaft rpm or the driving speed as these should be the same as settings for border spreading.

With the second time:

- Remove the border spreading plate.
- Set the dosing unit of the right spreading disc to the same position as the left spreading disc.
- Set the spreader for full field spreading,
- Set the PTO shaft to 540 rpm
- Adjust the speed of the tractor so that you drive at the same speed as with the first time, or change the application rate proportional to the driving speed.

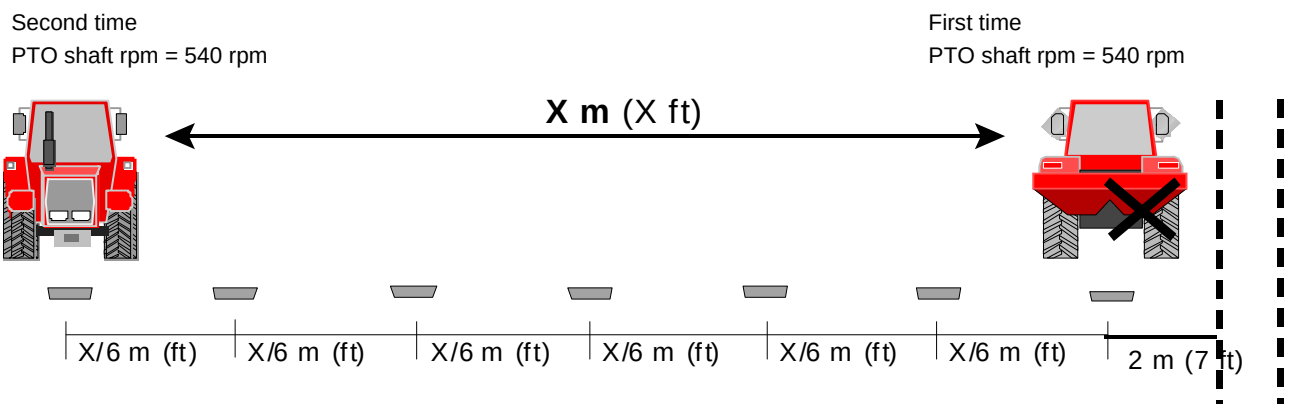
B



Assessment
The middle buckets could contain less application rate. The pattern on illustration B from
→ paragraph »Full field spreading pattern test« on page 75.
This is because of the lower PTO shaft rpm.
The level of the middle measuring tube in border spreading could be 25% lower than with the outer graduated tubes.

Adaptation
If the difference is more than 25%:

- Increase the PTO shaft rpm with 50 rpm.
- Adjust the speed of the tractor so that you drive at the same speed as with the previous test or increase the application rate by 10%.
- Perform the full field spreading pattern test with the adjustments for border spreading again until the deviation is less than 25%.
- Perform the spreading pattern test of the border spreading plate again until the loss is below the legal requirements.

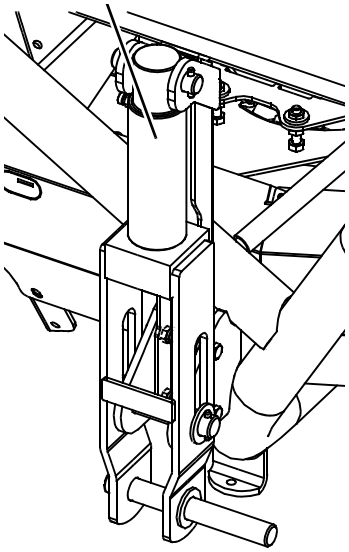


Testing the spreading pattern with the tramline cylinder

When using the tramline cylinder the aim is to obtain maximum distribution to the border with minimum loss in the ditch.
This is then why the tramline cylinder has to be tested. Do not perform this test next to the ditch, rather mark a line behind which the fictive ditch will be.

INDICATION Always perform a calibration test first and determine the correct dosing setting before checking the spreading pattern. Changes to the dosing setting will also have an influence on the spreading pattern!
→ See paragraph »Calibration test« on page 66.

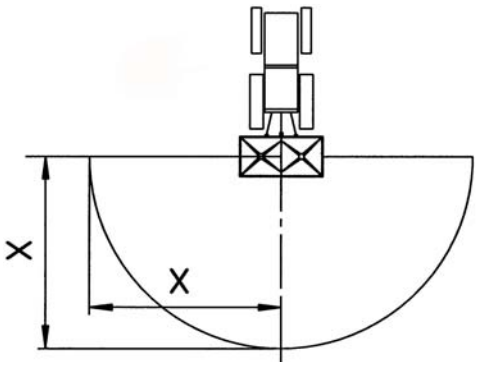
tramline cylinder



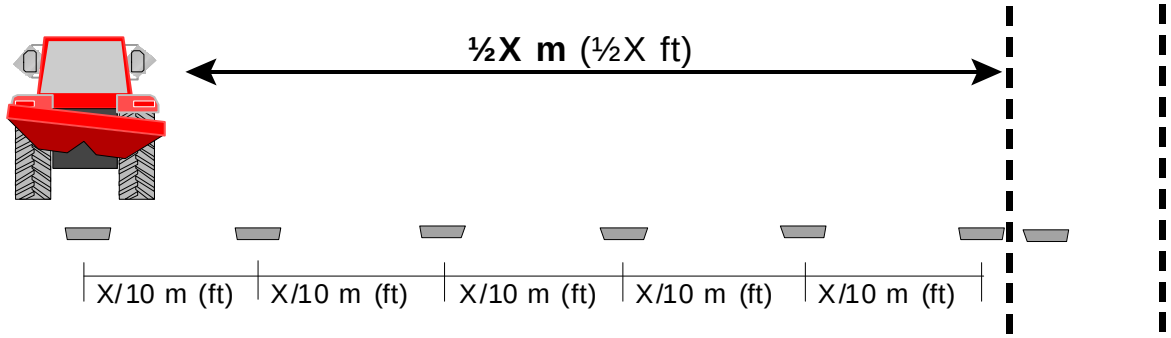
Operation

- Run the hydraulic control valve for a few seconds to activate the tramline cylinder.
- Set the spreader in accordance with the spreading chart for the desired working width **(height of the spreading disc = 75** cm above the troughs) and the instructions given in
  → paragraph »Border spreading with the tramline cylinder« on page 97.
- Switch the tractor off, remove the key from the ignition and engage the parking brake of the tractor.
- Place 1 trough on the land next to the fictive border ditch and 1 trough next to each other in the fictive ditch.

INDICATION Position the troughs horizontally with a spirit level!

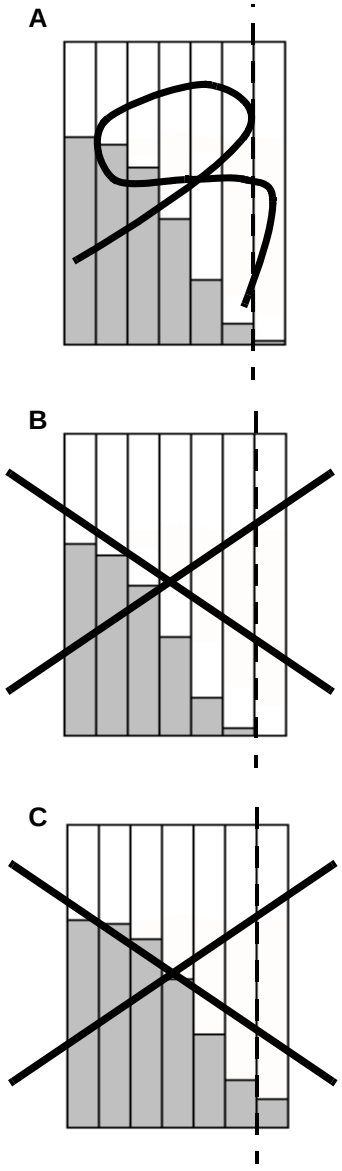


- Place 1 trough in the middle of the tractor tracks. The driving track must be half a working width from the fictive ditch. Divide the additional buckets between the track and the fictive ditch.
- Start the tractor, engage the PTO shaft and set it to 400 rpm. Select a gear that would ensure that you drive at the same speed as with the normal PTO shaft, or reduce the application rate proportionally with the driving speed.
- Drive along the tracks and open the dosing unit a few metres before you drive over the first bucket in the middle.
- Only stop spreading after you have driven at least one working width over the troughs (e.g. 18 or 21 metres). This is because the spreader distributes roughly even to the back, front and to the side.
- If you set an application rate of less than 250 kg/ha, drive over the same tracks in order to collect sufficient fertiliser in the troughs for a good comparison.



Maintain the same distance with opening and closing the dosing units.
Keep to the same driving speed and PTO shaft rpm!

- Empty the troughs with a funnel into the graduated tubes.

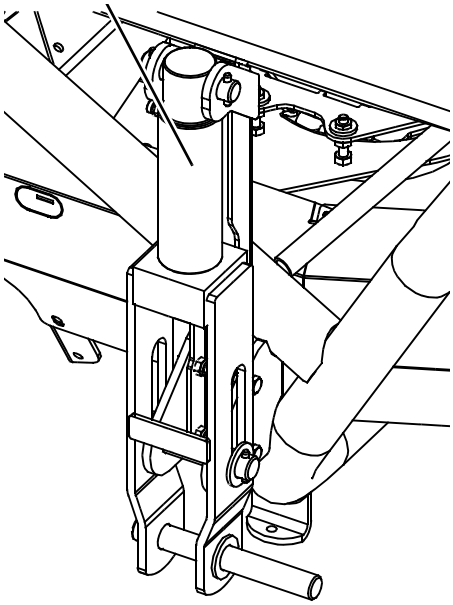


Review and adaptation
The maximum acceptable loss in the ditch is determined by environment standards (EN 13739-2). In order to comply with the standards the quantity of fertiliser in the 1st trough, standing in the imaginative ditch, must be a maximum of 10% of the quantity collected in the trough in the middle of the track (= 100%).

The trough on the land next to the fictive ditch provides an insight into the topping. It will never be 100%.

A	Good spreading pattern, the tramline cylinder has been adjusted well.
B	The spreader is not spreading wide enough. ▸ Let the tramline cylinder slide in a few centimetres before opening the hydraulic control valve. Do not increase the PTO shaft rpm! ▸ Repeat the test
C	The spreader is spreading too wide. ▸ Decrease the PTO shaft rpm by 50 rpm. ▸ Repeat the test

tramline cylinder



Before taking to the road



Observe the permissible and safe height with regard to

- prescribed maximum height for vehicles in the road traffic regulations,
- high-voltage cables or other cables over the road;
- anticipated maximum headroom.

Pay close attention to these aspects to prevent dangerous situations that could lead to major material damage and possibly to serious physical injury.

Before leaving the tractor:

- switch the PTO shaft off,
- release the pressure from the hydraulic system,
- switch the tractor off,
- remove the key from the ignition,
- engage the parking brake of the tractor.

That way you make sure that the tractor cannot be started when you are working on the machine and that the machine cannot move, which could cause severe physical injury.

Before travelling on a public road with your tractor and machine, you should do the following:

- Check whether tractor and implement are roadworthy.
- check that the lights, warning indicators, protectors and brakes are attached properly and are working.
- Check whether the reflector, motor vehicle with limited speed (<40km/h) on your tractor, is hidden by the implement.
  - Then fit an additional reflector at the back of the implement.
- Check the run of the quick coupling ropes of the power lift.

Preparing the machine to be transported

Before travelling on a public road with your tractor and machine, you should do the following:

- Check if the tractor and machine are roadworthy.
- check that the lights, warning indicators, protectors and brakes are attached properly and are working.
- Check the run of the quick coupling ropes of the power lift.
- Mount lighting and warning signs, if applicable.
- Check all folding parts and their locking devices:
  - hopper cover (DSC 1400),
  - border spreading plate.
  - tramline cylinder
- Set all parts of the machine and the tractor, especially the PTO shaft, the hydraulics, the wheels and the electric system, to transport mode.
- Check the weight distribution between front and rear axles.
- Mount front weights, if necessary.
- Check the headroom of the combination.
- Lower the power lift, if necessary.
- Lock the control lever of the power lift while moving so that the machine is not lowered by accident.
- Check whether the dosing units are closed.
- Remove dirt that could fall off while on the road. A dirty road could be hazardous for other drivers.
- Control devices, e.g. ropes, hoses, etc. for remote actuation of devices such as cylinders, shall be guided and positioned in a way they never inadvertently release nor block desired movements/actuations!
- Always ensure adequate lateral securing of a mounted machine in transport position.



Friction between moving parts
Be careful of moving parts making contact with each other while working. You could accidentally touch control levers and cause the machine to move.
Only start working once all machine parts have stopped and the control lever have been secured. Wear safety shoes and gloves. Contact with these materials could cause physical injury.

Check the direct surroundings
Check the immediate environment and keep a constant eye on it at the start, as well as while you are working with the machine. Familiarise yourself with the immediate vicinity. Do not start working until all people and obstacles within the working area and danger zone of the tractor and machine have been removed.
Never stay or allow anyone to stay within the danger area! If there are people within the working area and the danger zone it could lead to injury.

Before leaving the tractor:

- switch the PTO shaft off,
- release the pressure from the hydraulic system,
- switch the tractor off,
- remove the key from the ignition,
- engage the parking brake of the tractor.

That way you make sure that the tractor cannot be started when you are working on the machine and that the machine cannot move, which could cause severe physical injury.

PTO shaft rotates after disengaging
After switching off the PTO shaft, danger could arise as the machine will continue running because of inertia. Keep a safe distance to the machine until the moving parts have come to a complete stop. Approaching the machine while it is rotating can cause serious or deadly injuries.

Protecting the environment
Spreading a too high dose of materials outside of the field edge, especially on water surface, creates a heavy burden on the environment. Protect the environment by applying a correct application rate in a correct working manner.

Work with a closed cabin
Fertiliser dust can blow indoors through open windows, doors or other openings. Moreover, the sound level is higher in an open cabin. It is therefore recommended to always work with a closed cabin with active carbon filters in the air inlets. Fertiliser dust and a high sound level can cause physical damage.

INDICATION Most types of fertiliser attract water and can thereby form large chunks. These chunks can block the spreader or distort the spreading pattern.

- When working under moist conditions, use a hopper cover that closes well (DSC 1400).
- Do not spread without a hopper cover under moist conditions.
- Never leave the fertiliser for a long period of time in the spreader. Chunks can also be formed through moisture in the air.
- Always clean the spreader well after use, including the dosing openings and the discharge bushings.

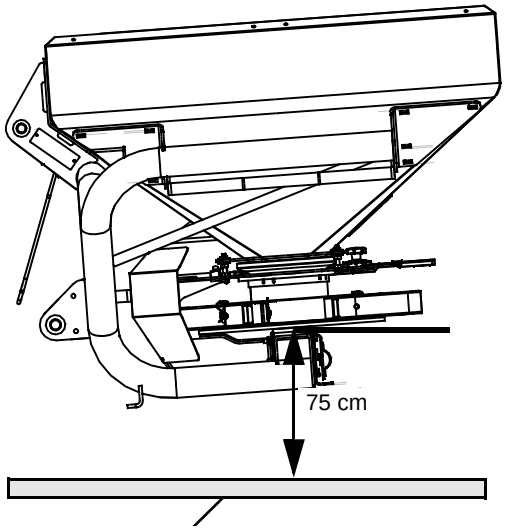
Adjusting the machine

Before you can make the first pass, you must make adjustments in the field to:

Spreading height

The following is important to ensure that the spreader works properly

- set it to the correct height from the ground or above the crop and
- by levelling it with the lift rod adjustment and top link.



▸ Use the power lift to lift the machine to the correct height.

Measured from the bottom of the vanes, the distance to the ground or the crop must be 75 cm.

▸ Set the spreader horizontally with the lift rod adjustment and the top link.

▸ Lock the lift limiter in this position.

Height correction with top dressing

If the required height of 75 cm above the crop is not possible with your power lift

- the tramline cylinder, topdressing set (accessory) and/or
  → See paragraph »Connecting the machine« on page 41.
- the spreader must be set forward.

Two different options for the forward setting are given in the chart below.

Height of the spreading disc above the crops	**Tilt inclination (forward) with working widths**	
	up to 18 m.	**18-21 m.**
Equal to or less than 55 cm	4°*	4°*
55 cm or higher	Follow the instructions given in the spreading chart	4°*
* If the spreading chart prescribes a greater inclination, use this value		

Last setting check

To ensure good spreading results, follow this last check as indicated below.

Are you working with the correct settings from the correct spreading chart, based on:

- distribution,
- similar weight,
- type of fertiliser,
- desired working width,
- desired driving speed?

Did you set the spreader in the correct way?
Did you:

- set the height over the ground or crops to 75 cm?
- is the spreader set horizontally at 5º or 8º?
- are the correct length vanes mounted?
- are the correct number of dosing openings opened (fine application)?
- is the correct discharge point set?
- is the correct dosing set?
- is the border spreading plate of the tramline cylinder in the transport setting (or working setting)?

Did you check the following settings:
Did you:

- check the dosing setting with a calibration test?
- perform a tray test to check the spreading pattern?

Work in the correct manner:

- Did you set the correct pto shaft rpm?
- Are you driving at the correct driving speed?
- Did you set the tramlines at the correct distance?
- Wind speed too high?

Set tramlines

Prevent driving mistakes
It is important that the spreading patterns overlap well to ensure good distribution.
A difference in the overlapping is less vital with average working widths, using a triangular spreading pattern.
Differences in the spreading pattern would easily be noticed with a trapezium pattern on large working widths, however. The overlap of the spreading pattern is then much smaller and therefore more sensitive to mistakes.
This can be prevented by setting tramlines before hand. You can do this by marking the tramlines at the headlands with:

- sticks with empty bags,
- pickets,
- special display boards.

Visibility of the from headland to headland is very important. Place additional markers in the field if necessary to ensure that the track is clearly visible.

Tramline patterns

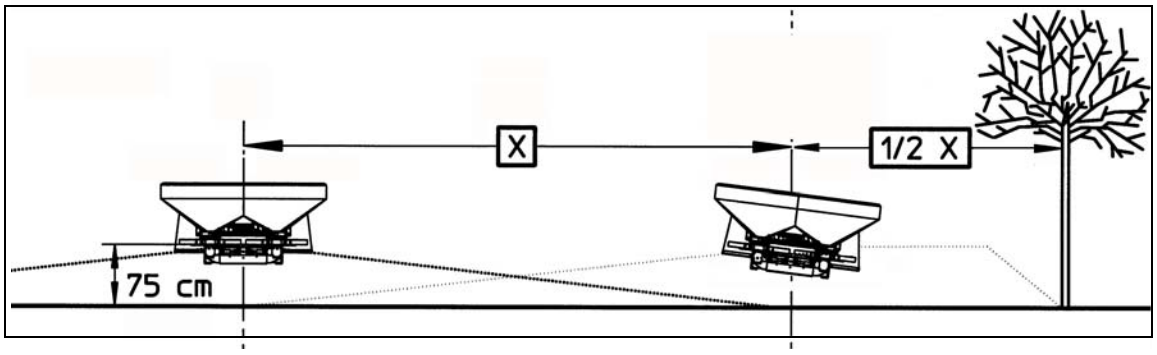
Your preferred border spreading method determines the tramline pattern.
Select on the basis of the site width, the presence of the spreader tramlines and the spreader's equipment.

Using the tramline cylinder with tramlines

Drive half the working width from the border (1/2 X meters) when doing boundary track spreading with tramline cylinder (optional extra).

- ▸ Set the first way at half the working width (1/2 X metre) from the field edge (in the first sprayer tramline).
- ▸ The paths that follow are set at the full working width.

→ See paragraph »Border spreading with the tramline cylinder« on page 97.



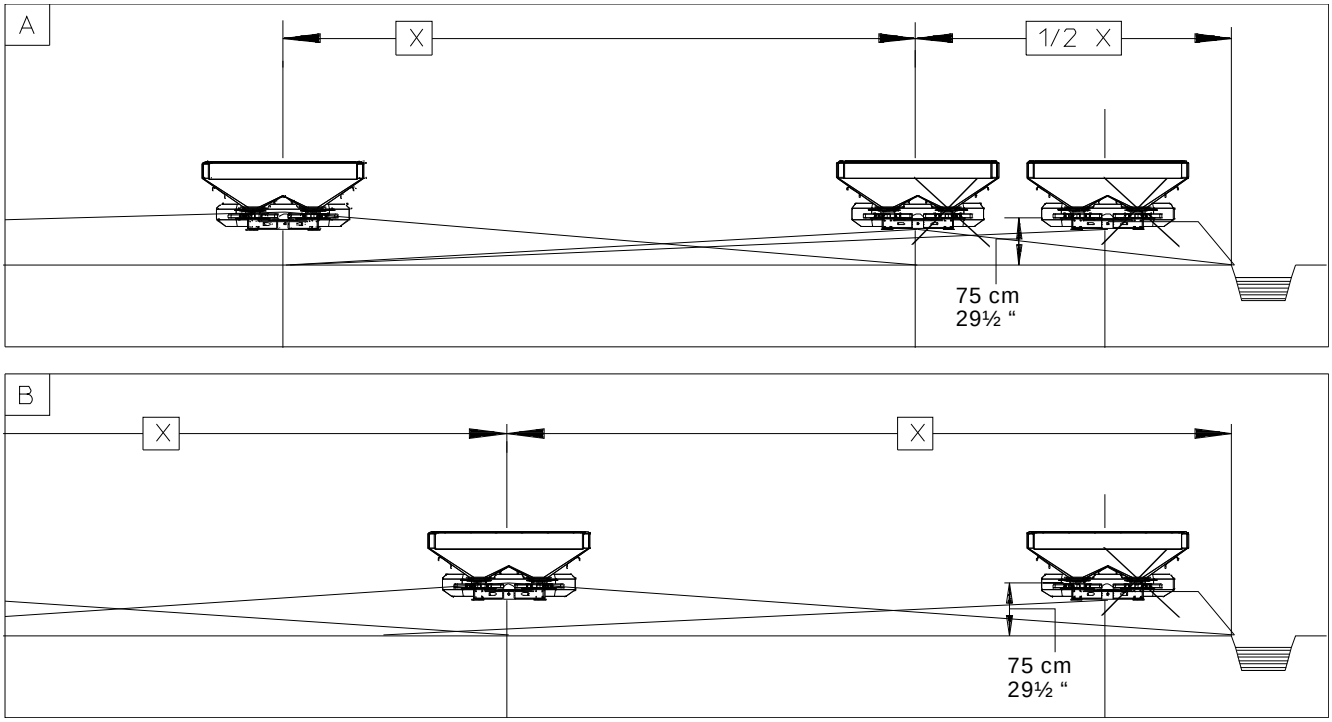
Using the border spreading plate with tramlines

During one-sided boundary spreading with border spreading plate, you drive along the outermost work area on the field edge and control the fertiliser granule stream by means of the border spreading plate (accessory).

The paths that follow are set at:

- half the working width of Situation A (the first sprayer tramline),
- the complete working width Situation B.

→ See paragraph »One-sided boundary spreading with the border spreading plate« on page 94.



Spreading

Once all the preparations have been made you can begin to spread or perform a spreading pattern test.

- Close all the doors and windows in the cabin.
- Drive the tractor to the first tramline, depending on the driving pattern required, which may be recognised by the marker in place.

  → See paragraph »Set tramlines« on page 88.
- Engage the PTO shaft and set the correct rpm.

INDICATION Do not allow the spreading disc to run for longer than is necessary while the dosing units are closed. This will prevent the agitator from grinding the fertiliser.

- Open the dosing units while driving and keep the rpm of the spreading discs constant.
- Close the dosing units for the turn. The PTO shaft can keep running if you intend to start spreading immediately again.

You will find the correct procedure and corresponding distances on the headland in

→ the next paragraph »Working method on the headland« and paragraph »Set tramlines« from page 88.

- Drive to the next tramline and re-open the dosing units at the right time, as displayed in the next paragraph »Working method on the headland«.

In the event of spreader failure or stoppage:

- Stop spreading immediately!
- Disconnect the PTO shaft immediately!

→ See then paragraph »Failure and stoppage« on page 99.

INDICATION There can be an increase or a decrease in traction due to different soil conditions. This will have an influence on the driving speed and therefore also the application rate (kg/ha).
The rpm of the tractor engine (therefore also of the PTO shaft) must remain constant while spreading (with regards to distributing fertiliser along the width).
The driving speed can only be adjusted by selecting another speed!

Working method on the headland

The way you have to stop and turn at the headland depends on the way you spread the border

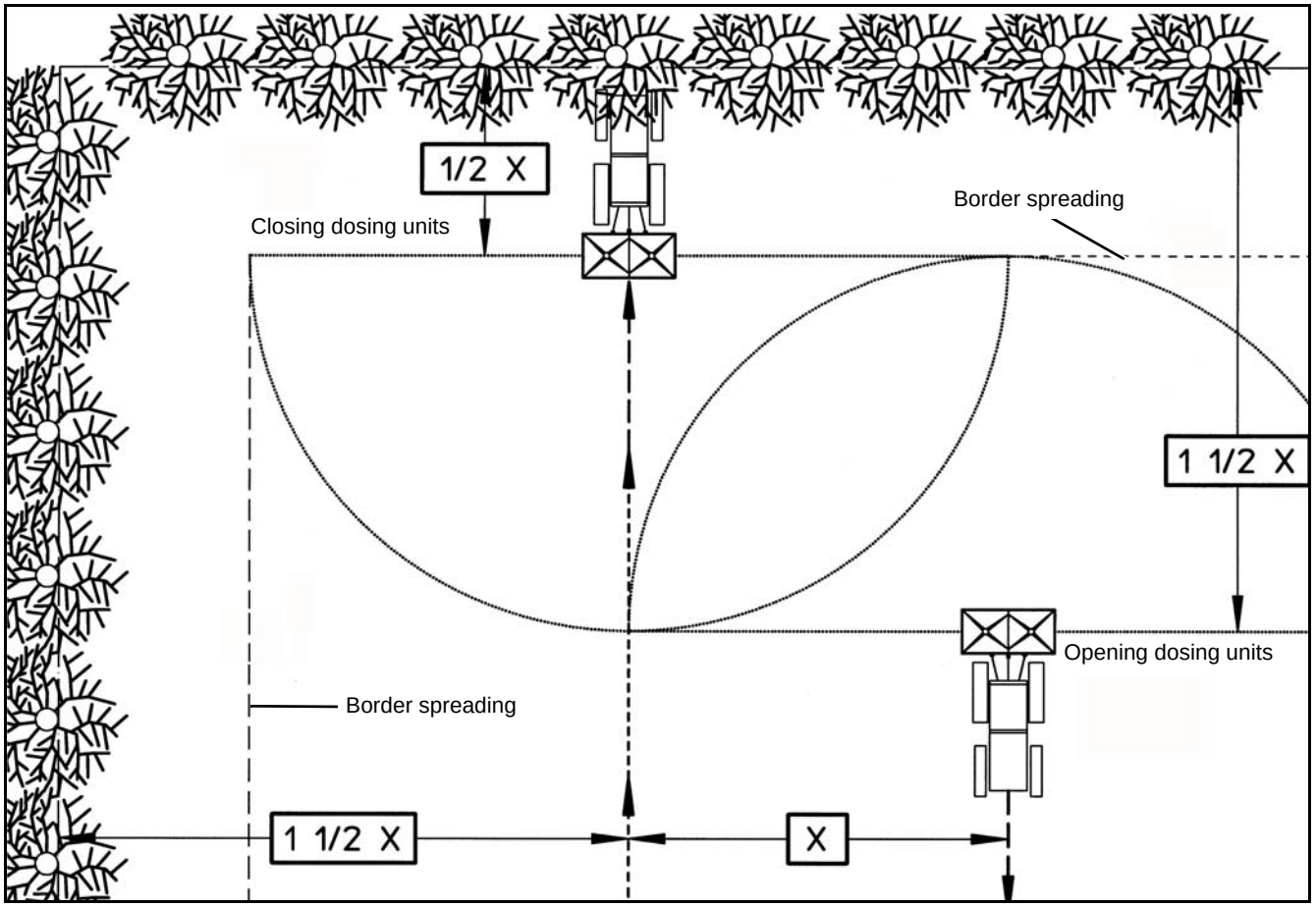
- boundary track spreading from the sprayer tramline (with tramline cylinder) and one-sided boundary spreading with extra gait, or
- one-sided boundary spreading by closing off one disc and using the border spreading plate.

Do the following when spreading the headland:

Spreading headland when using the tramline cylinder

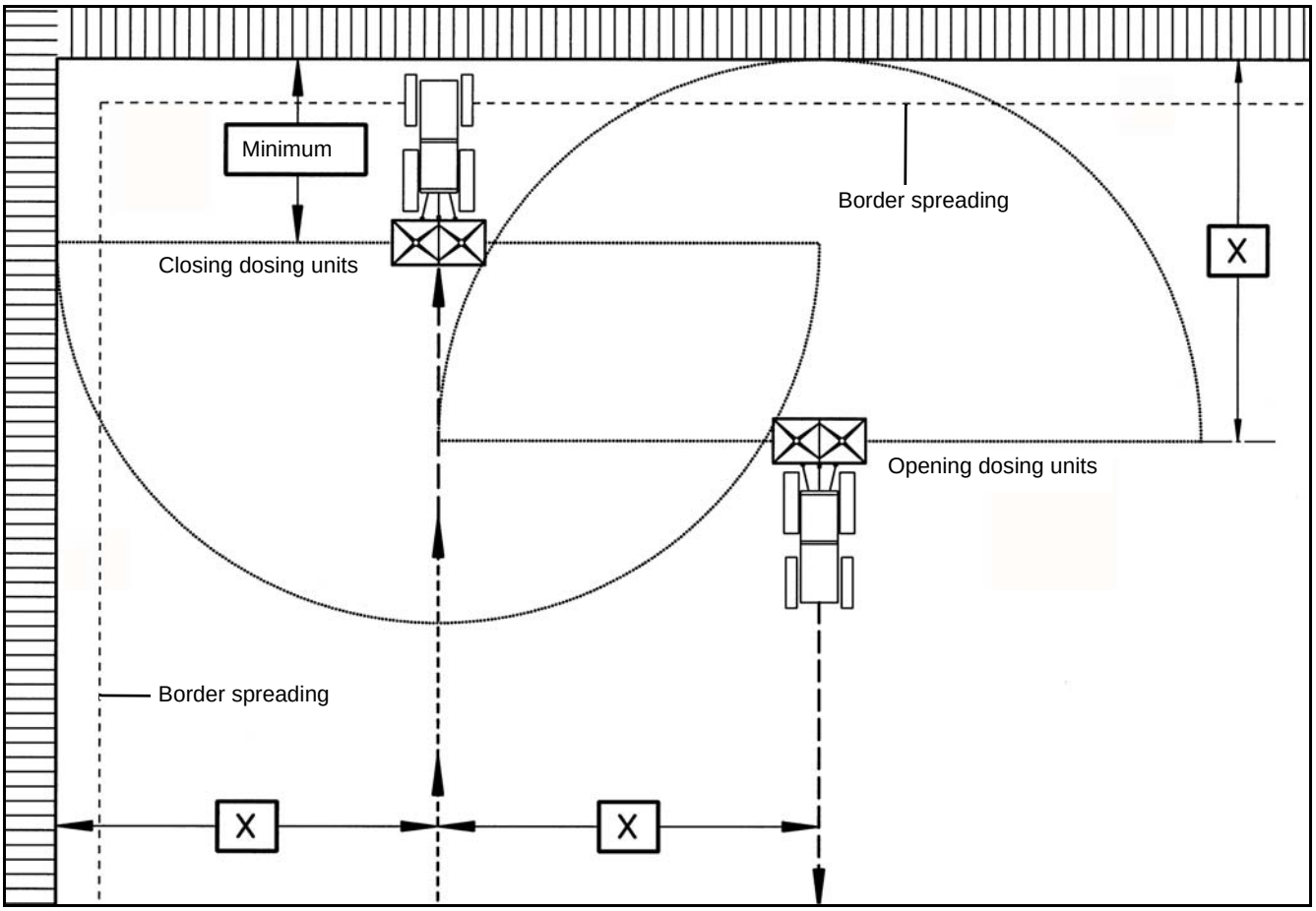
- Stop spreading by closing the dosing units of the machine when you are half the working width from the end of the land.
- Let the spreading discs turns and do not switch off the PTO shaft.
- Open the dosing units again at one and a half the working width of the field edge.
- Finally spread the site edges with the tramline cylinder.

→ See paragraph »Border spreading« on page 93.



Spreading headland when using the border spreading plate

- Drive as closely as possible to the end of the property and stop spreading by closing the dosing units before you turn.
- Let the spreading discs turns and do not switch off the PTO shaft.
- Open the dosing units again when you are a full working width down from the end of the land.
- Spread up to the field edge as described in the following paragraph »Border spreading«.



Over and underdosing

Depending on soil or crop composition, it is preferable to spread more or less fertiliser locally. This could for instance be where experience has shown that certain parts of the field need more or less fertiliser than others.

It is possible to over or underdose by

- driving faster whereby the spreading quantity per hectare is reduced,
- drive slower, which will increase the spreading volume per hectare.

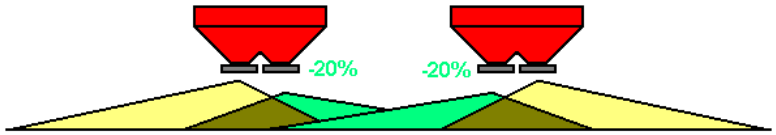
INDICATION The rpm of the tractor engine (therefore also of the PTO shaft) must remain constant (concerning distributing fertiliser along the width). **The driving speed can only be adjusted by selecting another speed!**

Results of one-sided over- or underdosing

The spreading pattern of both spreading discs overlap partially, especially in the middle behind the spreader. The effect of over or underdosing would be greatest in the middle and rear of the spreader. You will see the effect especially with narrow working widths because that is when the spreading patterns overlap the most.

With small working widths in which you spread in a triangular spreading pattern, the first and second passes of the spreading patterns overlap each other completely.
→ See also paragraph »Spreading pattern« on page 27.
To distribute an adjusted application rate you must therefore over- or underdose on the first as well as the second pass in the following tramline.





Border spreading

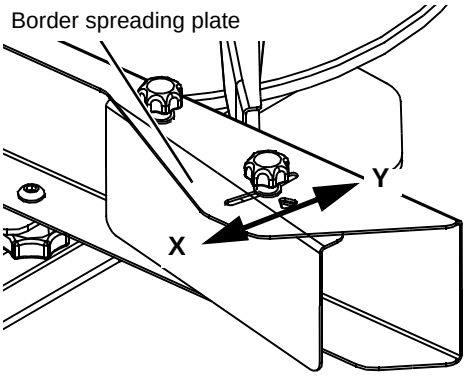
Spreading fertiliser up to the border of the property requires concentration. On the one hand you want to achieve maximum cover to the field edge to ensure a good crop, while on the other hand you want to minimise the loss over the field edge.
The spreader has 2 different functions and accessories to cater for border spreading.

- one-sided boundary spreading with the border spreading plate,
- boundary track spreading with the tramline cylinder.

When one-sided boundary spreading, drive with the tractor along the field edge and spread from the border inwards. With boundary track spreading, drive down the first sprayer tramline from the field edge and spray in the direction of the border.

One-sided boundary spreading with the border spreading plate

Border spreading plate



Operation
Drive along the field edge when one-sided boundary spreading and send the flow of fertiliser granules with a border spreading plate (optional extra). The working width on the side of the field edge can be adjusted by changing the border spreading plate (optional extra).

Direction **X** (environmental approach)	Spread less to the field edge. This will decrease the loss over the field edge, but the cover will not be as good
Direction **Y** (profit approach)	Spread more to the field edge. Cover is better, but the loss is greater

Application rate correction with border spreading

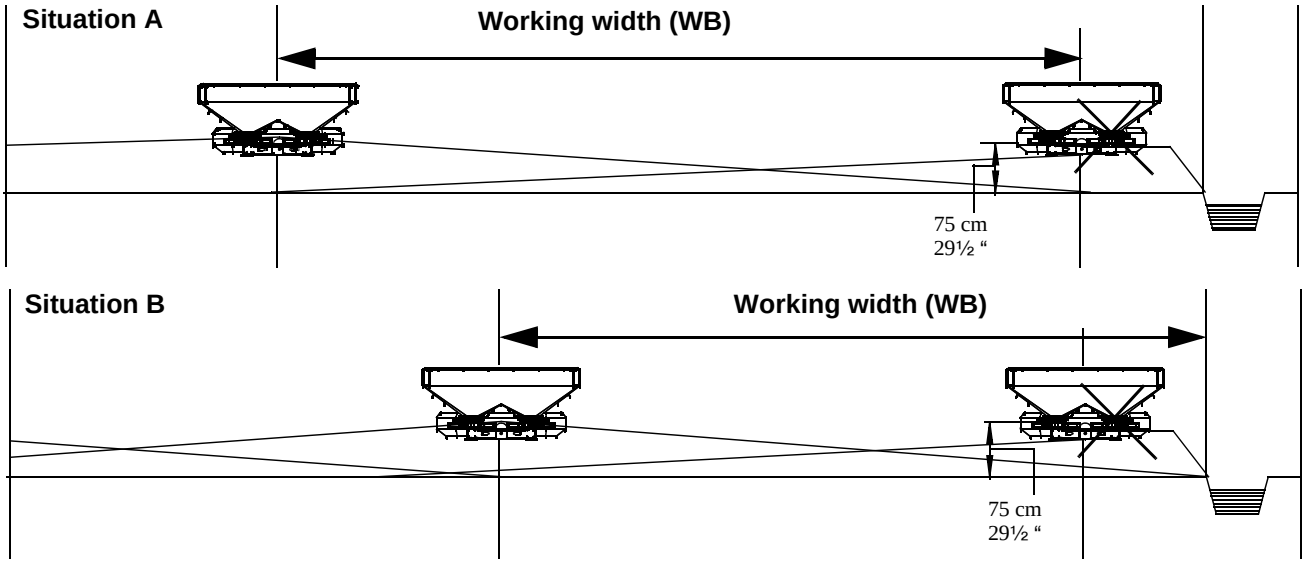
WW (m)	Rpm PTO	Situation A	Situation B
10	540	+40%	0%
12	540	+35%	0%
15	540	+30%	0%
18	540	+25%	0%
21*	**450***	**+15%**	**0%**

It should be possible to adjust the set application rate while busy with border spreading using the border spreading plate, depending on the method of fertilization:

Situation A meadow fertilizing with full adjoining working width:
Adjust the application rate as per the chart given here.
→ See also paragraph »Application rate« on page 56.

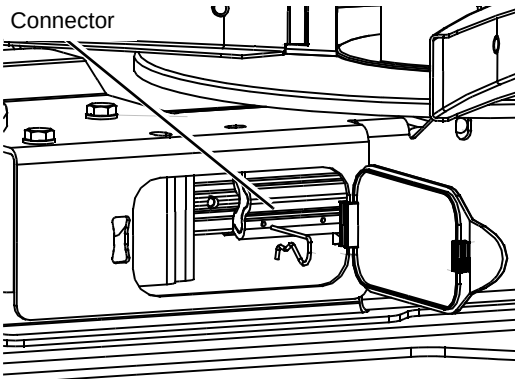
Situation B Fertilizing along tramlines:
Application rate as set for full field spreading.

*** Select higher acceleration with 450 rpm in order to maintain the driving speed or adjust the application rate (-15%) when decelerating. It is therefore not necessary to adjust the application rate when decelerating (+15% -15%=0).**



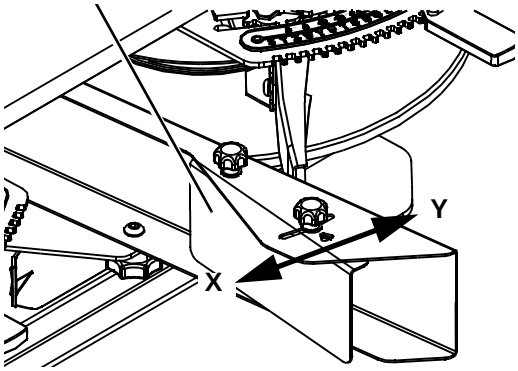
The maximum acceptable loss over the parcel border is determined by environment standards (EN 13739-2). In order to comply with the standard the quantity of fertiliser spread beyond the parcel border must be a maximum of 10% of the quantity distributed in the centre behind the spreader (= 100%). Test if the border spreading plate (optional extra) door de test therefore always before hand as described in
→ paragraph »Testing the spreading pattern of the border spreading plate« on page 77.

Procedure



- Switch the tractor off and remove the keys from the ignition.
- Engage the parking brake of the tractor.
- Disconnect the right spreading disc by sliding the connector to the right. Secure the connector with a lock clip.
- Close the dosing unit of the right spreading disc by setting the dosing knob to 0+0.
- Attach the border spreading plate. We recommend that the border spreading plate should be mounted with the triangle on the fixing plate.
- Check that the vanes do not touch the border spreading plate!
- Adjust the spreader based on the details given in the spreading chart for the desired working width. Use the same settings as with full field spreading,

  → See also paragraph »Setting the spreader« on page 50.
- Start the tractor and engage the PTO shaft. The correct PTO shaft rpm is the standard value of 540 rpm.



In the event of spreader failure or stoppage:

- Stop spreading immediately!
- Disconnect the PTO shaft immediately!

→ See then paragraph »Failure and stoppage« on page 99.

After border spreading:

- Remove the border spreading plate,
- Reconnect the drive of the right spreading disc and
- Set the dosing knob to the same position as the left spreading disc.

Driving pattern

Two different driving patterns can be used, depending on the situation on your land.

INDICATION Only drive counter-clockwise (to the left) when using the border spreading plate.

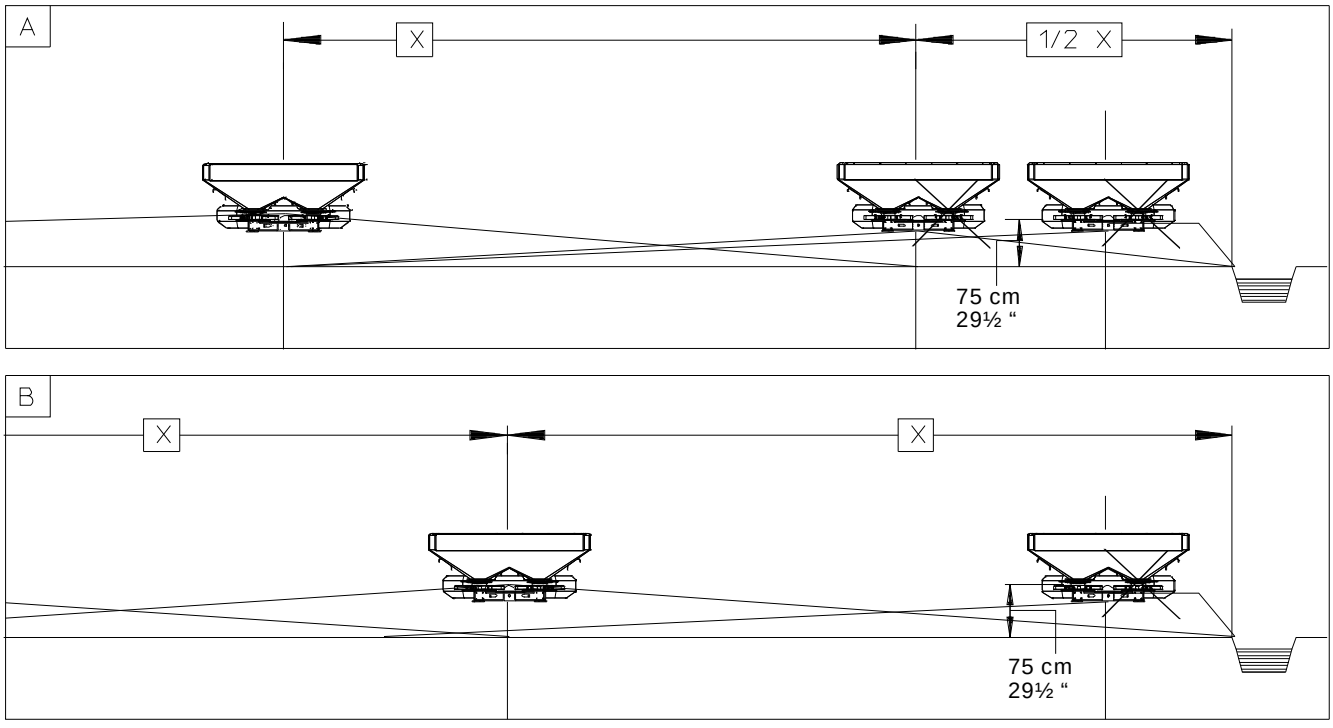
Working from the sprayer tramlines (situation A):

- Drive the first path with the middle of the tractor about 2 metres from the field edge.
- Remove the border spreading plate at the end of the first path, but leave the right spreading disc disconnected and the dosing unit closed.

  → see the methods above.
- Increase (with 21 m working width) the PTO shaft rpm to 540 rpm.
- Drive down the second path in the first sprayer tramline.
- After the second operation, link up the right spreading disc drive again and
- Set the dosing unit to the same position as the left spreading disc.

Working without sprayer tramlines (situation B):

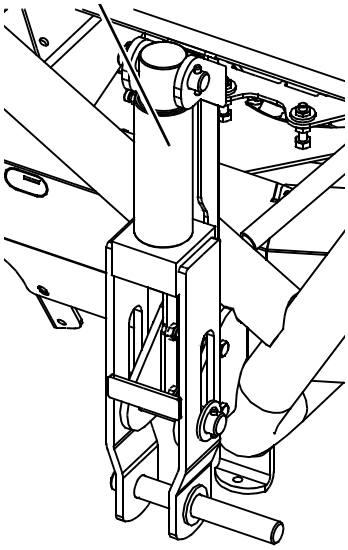
- Drive the first path with the middle of the tractor about 2 metres from the field edge.
- Remove the border spreading plate after the first operation,
- Reconnect the drive of the right spreading disc and
- Set the dosing unit to the same position as the left spreading disc.
- Drive up the second line 1 working width from the field edge (X metres).
- Maintain the distance with the field edge carefully by using pickets, for instance.



Border spreading with the tramline cylinder

Operation

tramline cylinder



Drive half the working width from the border (1/2 X meters) when doing boundary track spreading with tramline cylinder (optional extras). The working width on the side of the field edge can be adjusted by changing the position of the tramline cylinder and/or by changing the PTO shaft rpm.

The maximum acceptable loss over the parcel border is determined by environment standards (EN 13739-2). In order to comply with the standard the quantity of fertiliser spread beyond the parcel border must be a maximum of 10% of the quantity distributed in the centre behind the spreader (= 100%). Test the inclination cylinder therefore always in advance as described in

→ paragraph »Testing the spreading pattern with the tramline cylinder« on page 81.

INDICATION The chances of damage to the crops greatly increase as the granules will be hitting the crop from another angle.

Procedure

- Run the relevant hydraulic control valve for a few seconds to activate the tramline cylinder.
- Do not change the settings of the spreader.

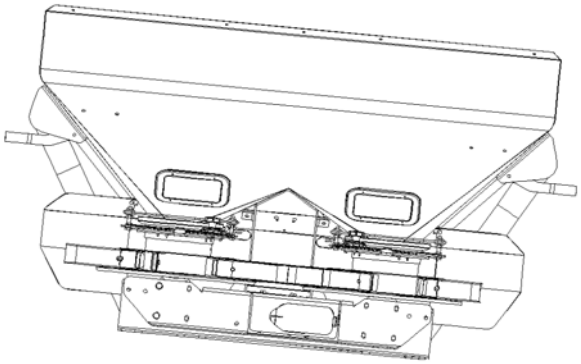
  → See paragraph »Setting the spreader« on page 50.
- Engage the PTO shaft and set it to 400 rpm. Select a gear that would ensure that you drive at the same speed as with the normal PTO shaft, or reduce the application rate proportionally with the driving speed.
- Adjust the tramline cylinder and the PTO shaft rpm as described in the test in

  → paragraph »Testing the spreading pattern with the tramline cylinder« on page 81.
- Set the spreader back to horizontal after completing the border spreading by engaging the relevant hydraulic control valve for a few seconds. Set the standard PTO shaft back to 540 rpm.

In the event of spreader failure or stoppage:

- Stop spreading immediately!
- Disconnect the PTO shaft immediately!

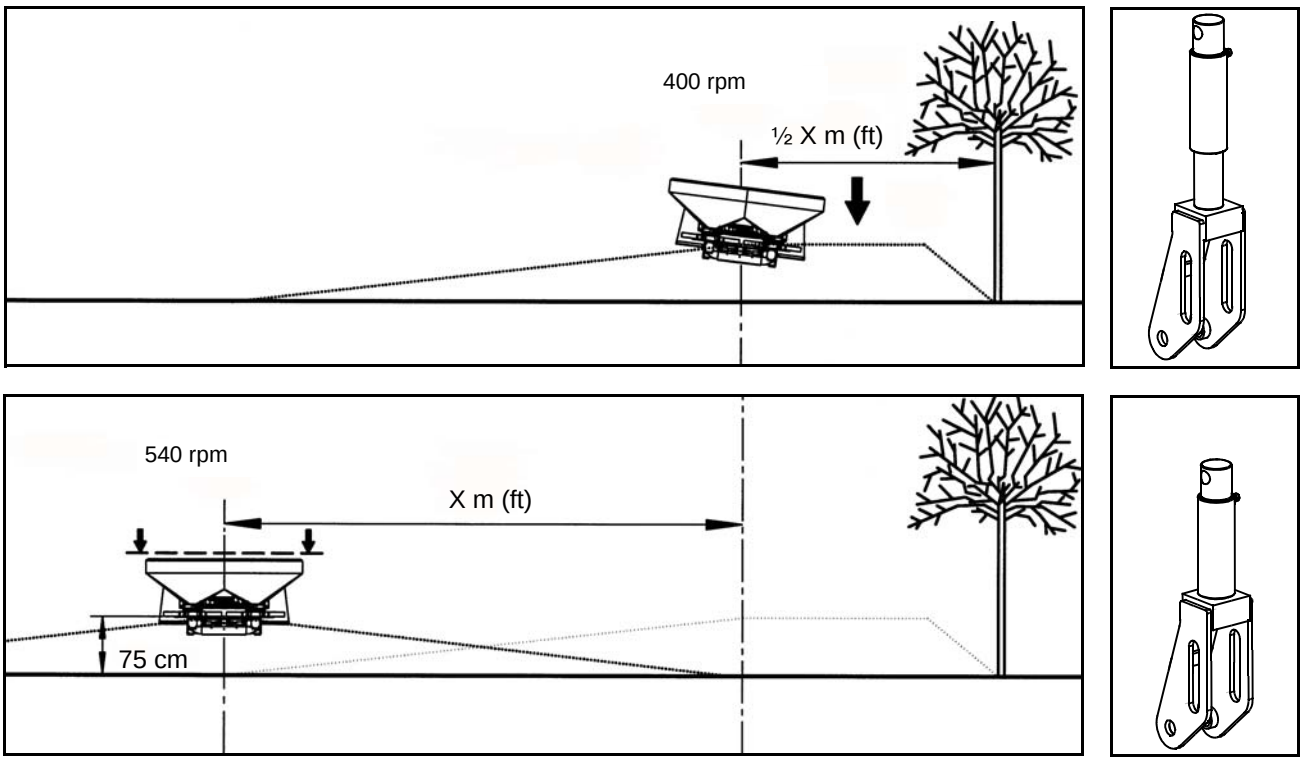
→ See then paragraph »Failure and stoppage« on page 99.



Driving pattern

When using the tramline cylinder, drive in the first sprayer tramline or half the working width (1/2 X meter) from the field edge.

INDICATION Only drive counter-clockwise (to the left) when using the tramline cylinder.



Stopping work

Directly after working with the machine and before travelling on the road, it is important to:

- Close the dosing units.
- Switch off the pto shaft.
- Switch the tractor off and remove the keys from the ignition.
- Engage the parking brake of the tractor.
- Remove crop rests, dirt and stones from the machine.
- Fasten the hopper cover (DSC 1400).
- Take all appropriate measures for road transport.

→ See paragraph »Preparing the machine to be transported« on page 84.

Failure and stoppage



Be careful that nothing gets jammed
It is also easy to get injured while working with the spreader.
Work safely with the machine:

- releasing the pressure from the hydraulic system,
- switch the tractor off and remove the key from the ignition,
- engage the parking brake of the tractor,
- wait for all machine parts to come to a standstill before you approach it,
- wear protective clothing, such as safety gloves and shoes,
- carefully follow the instructions given.

Friction with these materials could cause physical injury.

Avoid contact with the fertiliser and other material
While working with the spreader, you might come into contact with fertiliser or other substances that you want to spread. Wear protective clothing and gloves, read the safety instructions provided by the supplier and follow their directions. Contact with these materials could cause physical harm.

Causes

During spreading, if you:

- see that a spreading disc is spreading irregularly or not at all while the dosing units are open,
- hear a loud noise,
- become aware that the machine is vibrating seriously,
- hear or see that PTO shaft is turning and the safety clutch starts operating,

Stop spreading immediately!
Disconnect the PTO shaft immediately!

These failures are probably caused by one of the following:

- a hard object blocks the agitator,
- a hard object or a large piece of fertiliser is (partially) blocking the supply from flowing to the agitator,
- a hard object or a large piece of fertiliser is (partially) blocking fertiliser from flowing through the dosing opening or discharge bushing,
- crushed and/or damp fertiliser forms an encrusted layer beneath the agitator and blocks the flow through the dosing openings,
- a lump of damp fertiliser has formed in the discharge bushing and is blocking flow from the discharge bushing opening. This happens especially when the spreader has not been thoroughly cleaned after it was last used.

INDICATION Most types of fertiliser attract water and can thereby form large chunks. These chunks can block the spreader or distort the spreading pattern.

- When working under moist conditions, use a hopper cover that closes well (DSC 1400).
- Do not spread without a hopper cover under moist conditions.
- Never leave the fertiliser for a long period of time in the spreader. Chunks can also be formed through moisture in the air.
- Always clean the spreader well after use, including the dosing openings and the discharge bushings.

Procedure



Handle with care
Cautiously approach the machine and handle with care. There could be hot or live parts! Contact with these materials could cause physical injury.

To find the cause of the failure or stoppage and solve it as far as possible, proceed as follows.

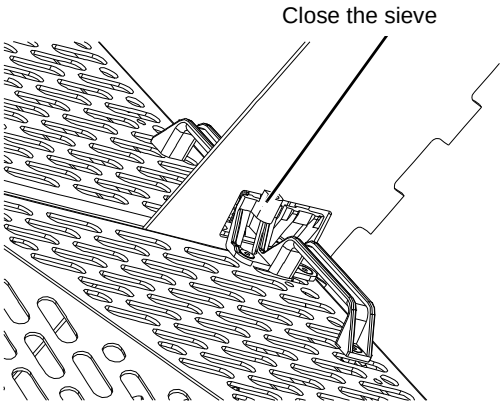
- ▸ Disconnect the PTO shaft immediately!
- ▸ Switch the tractor off, remove the key from the ignition and engage the handbrake of the tractor.

INDICATION Do not place the machine on the ground. Placing a filled machine on the ground damages the structure!

- ▸ Examine the spreading discs and the discharge opening to see what the cause of the failure/stoppage is.
- ▸ Adapt the discharge point as needed for easier access.
- ▸ If you still cannot see the cause, carefully remove the vanes to see better into the discharge opening of the discharge bushing.
- ▸ Pass an object such as a screwdriver through the discharge opening and carefully feel if you can find an object in, or damage to, the dosing openings or agitator.

Damage

If you see damage to the vanes, spreading disc or discharge bushing, the failure is most likely caused by a hard object. The agitator is probably damaged too. You must first repair the damage or have it repaired before continuing with spreading.



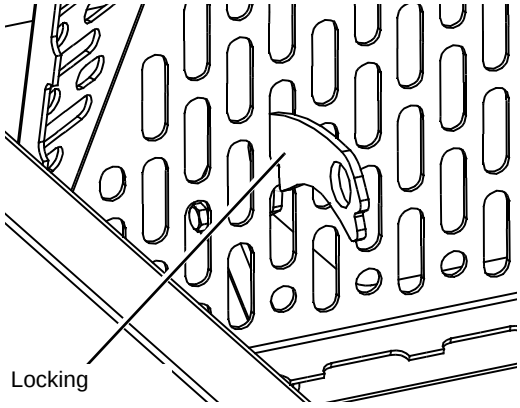
- Place an object, for example a cloth or bag, in the discharge opening of the discharge bushing on the damaged side. . This will prevent you from wasting fertiliser during transport.
- Start the tractor and close the dosing units.
- Take all appropriate measures for road transport.

  → See paragraph »Preparing the machine to be transported« on page 84.

On the site of a lockable storage depot:

- Empty the hopper without positioning the machine on the ground.
- Open the sieve closure with the attachment supplied with the machine.

Lock the sieve in the open position
If you open the sieves, you should lock them to prevent unwanted closing. Accidental closure could lead to serious injury.



- Remove the object that caused the damage.
- Repair the machine or have your dealer do it.

stoppage

If you have not found any damage, the failure is probably due to stoppage from an encrusted layer of fertiliser.

- Try to reduce the size of the lump or encrusted layer with an object such as a stick, screwdriver or vane.

INDICATION If you open the filters to reduce the lump or encrusted layer from the top side, you should block them to prevent unwanted closing.

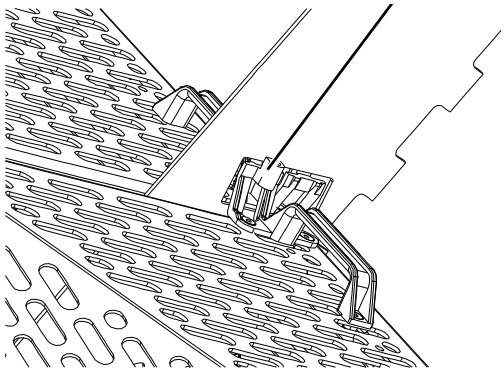
If you can reduce the lump or encrusted layer in this way:

- Inspect the hopper contents for other lumps and reduce them.
- Fit the vanes and secure them with the lock nut.
- Check the discharge point setting.
- Close the hopper cover (DSC 1400).
- Continue spreading.

If you have not managed to reduce the lump or encrusted layer because it is out of reach or there is no tool at your disposal:

- Close the hopper cover (DSC 1400).
- Follow the procedure as described in the previous paragraph »Damage« until emptying the hopper.
- Remove or reduce the lump or encrusted layer.
- If necessary, dry the hopper and the dosing mechanism.

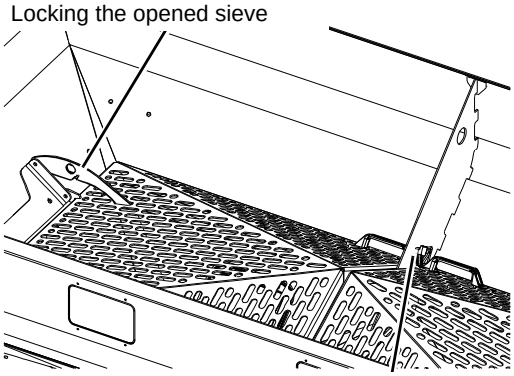
Close the sieve



Opening the sieve clip

- Open the sieve closure with the attachment supplied with the machine.
- Lock the sieve to prevent it from closing accidentally.
- Close the sieves and check the lock.
- Refill the spreader.
- Check the fertiliser for lumps before and after filling.
- Close the hopper cover (DSC 1400).

Locking the opened sieve



Sieve clip locked



Avoid contact with the fertiliser and other material
It is easy to come into contact with the materials when putting away the machine. Always wear protective clothing, such as safety gloves, shoes and goggles. Read and adhere to the additional safety instructions and the of the material producer. Contact with the materials could lead to injury. Contact your physician in such an event!

Be careful that nothing gets jammed
It is also easy to get injured while working with the spreader.
Work safely with the machine:

- release the pressure from the hydraulic system,
- switch the tractor off and remove the key from the ignition,
- engage the parking brake of the tractor,
- wait for all machine parts to come to a standstill before you approach it,
- wear protective clothing, such as safety gloves and shoes,
- carefully follow the instructions given.

Friction with these materials could cause physical injury.

Protect the machine
Fertiliser and other salts have a great influence on the rate of corrosion. Empty the hopper at the end of activities. Protect the machine by always cleaning it after using such material and patch breaks in the paint. Corrosion affects the strength of the construction and the operation of the machine, which could lead to a shortened lifespan.
After cleaning, inject the (white) metal parts of the machine with the supplied Dinitrol 1000 bus for protection against corrosion of the machine, read the instructions before use.

Be careful while cleaning with high pressure cleaners
You can clean the machine with water or steam, possibly using only suitable cleaning tools. Also read here and adhere to the safety instructions of the material manufacturer.

- Only use low pressure and temperature; 80 bar and maximum 40°C.
- Keep the nozzle more than 30 cm clear of turning parts, sensors, parts of the electric system, hydraulic hoses, stickers and plastic parts.
- Only spray perpendicular to sticker edges.

Waste storage and disposal
The waste water from cleaning the machine is contaminated with fertiliser and possibly also with lubrications. Collect the waste and dispose of it in terms of national regulations.

Cleaning

It is advisable to first lubricate, clean and again lubricate the machine before storing it for a short or longer period of time. If it is lubricated first you will prevent dirt, fertiliser and water from entering the bearings. After cleaning, grease and oil all items once again for conservation.

The advantages of this method of working are:

- additional checks on the machine right after work,
- ensuring the longevity of the machine,
- less delays due to problems while working with the machine.

- ▸ Lower the spreader until it is 10 cm above the ground.
- ▸ Open the dosing units.
- ▸ Switch the tractor off, remove the key from the ignition and engage the parking brake of the tractor.
- ▸ Lubricate the machine grease nipples.
  → See paragraph »Maintenance« on page 108.
- ▸ Clean the machine.
- ▸ Lubricate the machine grease nipples once again.

TIP When using a high-pressure cleaner, do not aim it at the seals and the breathers. That way you will prevent dirt and moisture from entering the gearboxes. Furthermore, do not set up electrical components. Water can cause electrical failures.

Disconnecting the machine



Disconnect safely
You may only disconnect the machine when:

- all parts are in a safe condition,
- your immediate surroundings are safe,
- the hopper is empty.

Work carefully:

- check the environment (children!) and ensure that nobody is in the vicinity of the tractor or the machine,
- wear safety gloves and shoes,
- the machine or parking support must only be placed on a straight, firm surface,
- never stand between the tractor and machine while the power lift is operated externally while disconnecting the machine . Using the power lift entails the risk of accidents by crushing or jack-knifing,
- operate the power lift slowly and carefully,
- the power lift during disconnection must be placed in such a position that accidental release or lowering would be eliminated,
- sufficient distance must be maintained between parts (e.g. parking support) that rest on the ground.

Working unsafely could cause serious injuries.

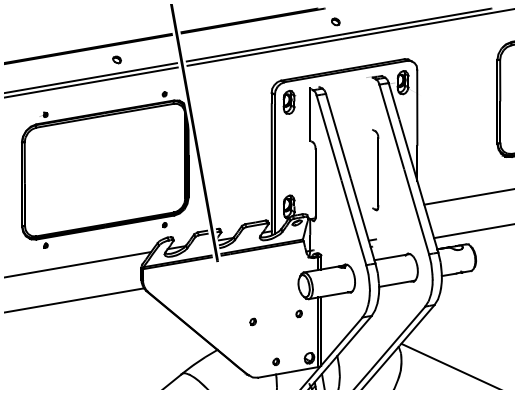
Proceed as follows to store the machine in stable condition for a shorter or longer period.

- ▸ Switch off the pto shaft.
- ▸ Take the pressure off the hydraulic system.
- ▸ Place the machine on a stable, level base.
- ▸ Switch the tractor off and remove the keys from the ignition.
- ▸ Engage the parking brake of the tractor.
- ▸ Adjust the length of the top link in such a way that it is no longer live.
- ▸ Release the top link by undoing the release rope from the catch hooks and pulling the top link up.
- ▸ Release the lower links by undoing the release ropes from the catch hooks and lowering the power lift as far as possible.

TIP If you cannot lower the power lift far enough to release the catch hooks, we advise you to place the spreader on a firm, stable ramp, for example a pawl.

- Drive the tractor about 200 mm forward (maximum distance depends on the range of the coupling shaft; the halves must always overlap each other).
- Switch the tractor off, remove the key from the ignition and engage the parking brake of the tractor.
- Disconnect the electric plugs and hang them in the container.
- Disconnect the hydraulic hoses.
- Place the protective caps on the hydraulic hose connections.
- Hang the hydraulic hoses in the hose coupling support.
- Disconnect the coupling shaft and hook it up.

Container for electrical plugs and hydraulic hoses



Preparation for winter storage

At the end of the season the machine must be prepared for winter storage.

It is advisable to first lubricate, clean and again lubricate the machine before storing it for a short or longer period of time. If it is lubricated first you will prevent dirt, fertiliser and water from entering the bearings. After cleaning, grease and oil all items once again for conservation.

The advantages of this method of working are:

- additional checks on the machine right after work,
- ensuring the longevity of the machine,
- less delays due to problems while working with the machine.

TIP When using a high-pressure cleaner, do not aim it at the seals and the breathers. That way you will prevent dirt and moisture from entering the gearboxes. Furthermore, do not set up electrical components. Water can cause electrical failures.

→ See »Be careful while cleaning with high pressure cleaners« on page 103,

- Clean the machine.
- Let the machine dry.
- Paint any damaged paintwork.
- Lubricate and oil all points once again to ensure conservation.
  → See paragraph »Maintenance intervals« on page 110.
- Provide white parts such as piston rods of hydraulic cylinders with preservative grease or inject the (white) metal parts of the machine with Dinitrol 1000 (supplied) for protection against corrosion.

TIP Only use grease that would not harden or dry. That will prevent damage to cylinder oil seals.



Repair damage safely and without delay
Repair the machine safely before you continue with work:

- place the tractor and machine on a firm, straight surface,
- switching off the PTO shaft,
- releasing the pressure from the hydraulic system,
- switch the tractor off and remove the key from the ignition,
- engage the parking brake of the tractor,
- disconnect the tractor if possible,
- wait until all parts have stopped moving. The mass (inertia) could keep the machine running for a bit!
- wear protective clothing, such as safety gloves and shoes,
- carefully follow the instructions given,
- use the correct tools,
- bigger or heavier parts must be locked and secured to lifting gear when being replaced,
- parts that could move unintentionally must be supported and secured,
- do not climb on parts of the machine that are not in use. Only use stepladders, ladders or other tools intended for this purpose.
- disconnect the feed while working on the electric system.
- disconnect the cables from the battery and the dynamo before arc welding on the tractor or the connected machine!

Performed by an authorised person
Always have an authorised expert perform maintenance and repairs as prescribed in, as prescribed in
→ paragraph »Authorisation« on page 12.
All forms of responsibility of the manufacturer become null and void and the guarantee lapses if maintenance and repair work are performed by an unauthorised person.

Do not modify the machine
Do not modify the machine in any way. Unauthorised modifications may impair the function and/or safety and affect the life of the machine.

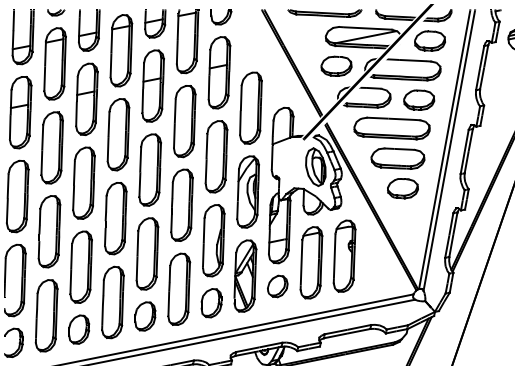
Only use original parts when replacing
Using other non-genuine parts could lead to problems and unsafe situations when using the machine.

Accessories and parts must be correctly mounted
Assemble accessories and parts according to specifications and attach them only for their designated purpose; ensure that it is locked correctly. Accessories and parts which are not fastened securely could lead to personal injury and damage to the crop and machine.

Tighten all bolts and nuts
Check that all the nuts and bolts are well set. Check this again after one hour of use

- after delivery and
- after maintenance or repairs have been carried out.

Locking



Avoid jamming under the sieves
There is a risk that parts of your body may get jammed in the hopper during maintenance activities or when closing the sieves. Secure the sieve in an open position and unlock the sieves on the outside. Jamming could cause injury.

Avoid contact with materials
You should only come into contact with the materials when cleaning the machine. Always wear protective clothing, such as safety gloves, shoes and goggles. Read and adhere to the additional safety instructions and the of the material producer. Contact with the materials could lead to injury. Contact your physician in such an event!

Explosion danger because of nitrate
Fertilisers hat contain nitrate can create an explosion danger if they come into contact with fire. All fertiliser remnants should therefore be removed from voids, corners, tubes and tubing before welding, cutting or grinding on the machine.

Adhere to all the safety precautions as described in
→ paragraph »Safety requirements« from page 11.

Maintenance intervals

	daily	after the first 10 hours	weekly	every 100 hours min. 1x per year	As recommended	If worn	Page
Inspection							
»Checking bolts and nuts«		•	•				114
»Checking the hydraulic system«	•	•					115
Condition of the agitator and the agitator axle	•						
Condition of the vanes	•						
»Check the settings of the dosing mechanism«		•		•			117
»Check setting mechanism of the discharge point«		•		•			123
»Set the height of the discharge bushings«		•		•			119
Lubrication							
»Coupling shaft with quick lock«	•						112
»Cylinder dosing system«	•						112
Replacing oil/grease							
Coupling shafts profiled tubes				•	•		113
Central gearbox					•		113
Spreading discs gearboxes					•		113
Applying oil							
Connectors in spreading disc drives		•		•			113
Replace							
Hydraulic hoses and connectors					•	•	115
Vanes						•	
agitator						•	
agitator seal				•		•	125

Oil and grease content



Never use more oil or grease than prescribed
A too high oil level may result in an overheated machine and damaged seals.

Waste storage and disposal
Waste from performing maintenance on the machine could be contaminated with fertiliser, oil and grease. Collect the waste and dispose of it in terms of national regulations.

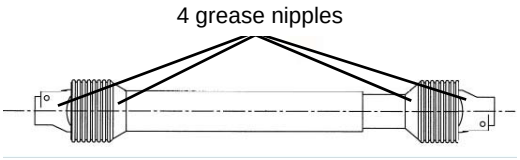
Part / action	Quantity	Specifications
Central gearbox	0.18 + 0.02 litre	gear box grease EP00/000
gearboxes of the spreading discs	0.20 + 0.02 litre	gear box grease EP00/000
Lubricate with grease	1 to 2 times	Shell Rodina 2, Castrol GS2 or equivalent
Lubricate with oil		SAE 80W-90 MIL-L-2105C

Lubricating points

All lubricating nipples of the machine can be filled with a universal grease type.

→ See the paragraph above »Oil and grease content«.
→ See paragraph »Maintenance intervals« on page 110.

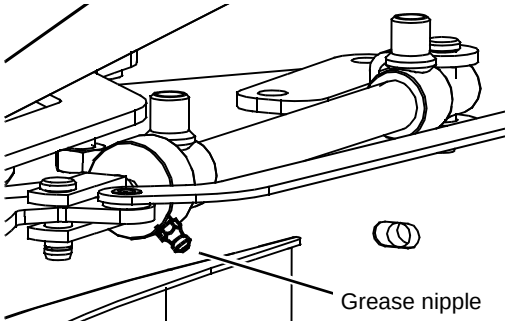
Coupling shaft with quick lock



The coupling shaft is provided with grease nipples.

- Lubricate the 4 nipples.
- Check the condition of the protection sleeves and the check chains.
- Replace them if damaged.

Cylinder dosing system

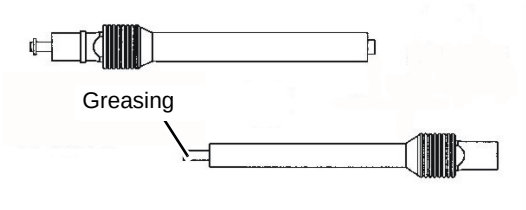


The hydraulic cylinders on both dosing units have 1 grease nipple each.

- Inject grease into the nipples on both hydraulic cylinders.

Applying or adding grease

Coupling shaft profiled tubes



Grease the contact surfaces of the two profiled tubes.

- Detach the coupling shaft on the one side.
- Pull the shaft halves away from each another.
- Grease the running surface of the inner profiled tube.
- Slide the coupling shaft halves into each other.
- Attach the coupling shaft.
- Hook the check chains to the tractor side.

Gear boxes

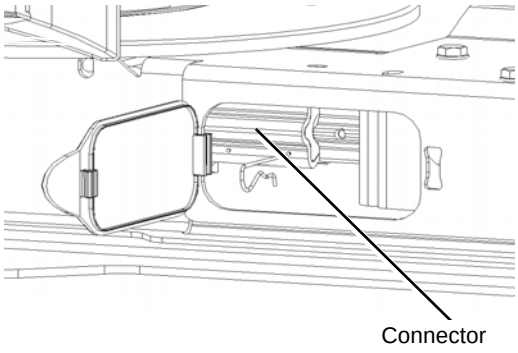
The gear boxes under the spreading discs and the central gear box contain grease. The gear boxes are in principle maintenance free. The grease only needs to be replaced if you opened the gear boxes for any reason whatsoever. Replace the grease with new grease.

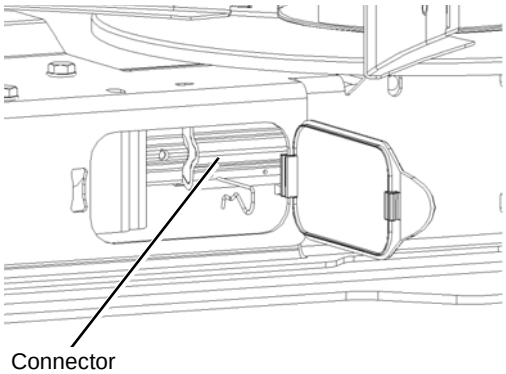
- Place all the parts in one half of the gear box.
- add the required volume of grease,
  → See paragraph »Oil and grease content« on page 111.
- Mount the other half of the gear box.

Replacing or applying oil

The following parts only function well if they are provided with sufficient oil. Check this regularly.

Connectors





The connectors between the central gear box and the spreading disc gear boxes are used with border spreading and when checking the spreading pattern with the tray test. Disconnect one of the connectors from the spreading discs.

- Apply a suitable lubricant to the drive axles and connectors.

Oiling the connectors will prevent them from corroding and becoming difficult to use.

Torques

Guidelines for torques (in Nm) for self-locking nuts, hexagon bolts and nuts.

	Torques							
Quality	**4.6**		**8.8**		**10.9**		**12.9**	
Friction*	0,10	0,13	0,10	0,13	0,10	0,13	0,10	0,13
Thread								
M5	1,7	2	5	6	7	8	9	10
M6	3	4	9	10	13	15	15	18
M8	8	9	21	25	31	36	36	42
M10	16	19	40	50	60	70	70	85
M12	27	32	70	85	105	120	120	145
M14	42	50	115	135	165	195	195	230
M16	65	76	175	210	260	300	300	350
M18	90	110	250	290	350	420	410	490
M20	125	150	350	420	500	600	580	700
M22	170	200	470	560	670	800	780	930
M24	210	250	600	710	860	1020	1000	1180

***** The friction coefficient of 0.10 applies to oiled sheets, cast iron, hardened surfaces, greased threads, etc. The higher value of 0.13 applies to dry sheets.

Torques for bolts and nuts with serrated lower edges 10% extra, such as:

- Tensilock (K100)
- Whizlock.

Exceptions to this table are listed in the parts and/or instruction manual.

Checking bolts and nuts

Nuts and bolts could become loose through vibrations. Check the nuts and bolts regularly to prevent damage to the machine and possible injury, especially after maintenance.



- Check all bolt and nut connections:
- Turn all nut and bolt connections up to the point as given in the chart below:
  - after the first operating hour,
  - regularly (at least weekly).

Checking the hydraulic system

Hydraulic oil is under high pressure
Never try to stop a leak with your fingers. Never try to locate a hydraulic leak or try to contain it by hand! When inspecting always use appropriate aid (e.g. a piece of wood or sheet metal) and wear safety goggles, safety gloves and gloves! High pressure fluid easily penetrates skin and clothes, causing severe injuries. In the event of injury, contact your physician immediately!



Do not exceed the maximum hydraulic pressure of 200 bars
Prevent the pressure in the hydraulic system from exceeding 200 bars! Working above the permitted pressure may damage your machine and result in dangerous situations.

Keep your distance from the hydraulics during inspecting and test running
Use a stick to bend the hydraulic hoses when checking them for leakage. That way you will keep at sufficient distance.
Oil jets or hoses that snap back may cause serious physical injury due to the prevailing pressure and temperature.

Work safely on the hydraulic system
The hydraulic system could be under high pressure. Do not work on the hydraulic system without:

- releasing the pressure from the hydraulic system,
- switching the tractor off,
- the key must be removed from the ignition,
- engage the parking brake of the tractor,
- using the proper tools,
- wear safety glasses, gloves and shoes.

Working in an unsafe manner on the hydraulic system could lead to injury and damage to the machine. In the event of injury, contact your physician immediately! There is also the risk of infection!

Before operating the hydraulic system, check all connections and hoses for damage and leakage.

Replacement intervals

Regularly inspect the hydraulic system (hoses, pipes, connections). All hoses, piping and connecting points must be checked regularly, but at least once a year, by an expert for leakages or visible damage! The lifetime of a hose should be 6 years maximum (see the production date on the hoses).
Damaged or old parts must be replaced with new ones that comply with the technical specifications of the manufacturer of the machine. Damage to the hydraulic system could lead to injury.

Inspection criteria

It is not permitted to carry out repairs on hydraulic hoses!
Replace hoses if the following is detected during inspection:

- damage to the exterior up to the armouring (such as abrasion marks, cuts and tears),
- the exterior becoming brittle (tears in the hose),
- distortion not normal for the pattern of the hose while under pressure, as well as without pressure or with bends, e.g. layers pealing off and blisters forming,
- leakages,
- not mounted as per requirements,
- damage or distortion of the hose block, which would compromise the strength of the block or the connection between the hose and the regulating block,
- hose coming out of the connectors,
- corrosion of the connector which would compromise the function and strength,
- exceeding the storage and the operating limits.

Only use original parts when replacing hoses. Hoses must be placed and mounted in the proper way. Be careful not to change the connections. Replaced hoses must be suitable to the permitted work pressure and be resistant to chemical, mechanical and thermal loads. Only use hose clamps made from stainless steel.

Replacing

- Run the hydraulic control valves until all the cylinders are engaged.
- Place the machine on the ground or on firm supports on a firm, level ground.
- Take the pressure off the hydraulic system.
- Switch the tractor off and remove the key from the ignition and engage the parking brake of the tractor.
- Disengage the machine,
  → See paragraph »Disconnecting the machine« on page 105.
- Demount the connectors with the proper tools.
- Collect the oil that drips from the cylinders and the hoses.
- Mount new hoses and put them so that they would not get pinched.
- Dispose of the collected oil as required by national legislation.

Operate the hydraulic control valves of the tractor very carefully at first after replacing the hoses as there could still be pockets of air in the pipes! Open and close all the hydraulic control valves a few times before you start working.

Check the settings of the dosing mechanism



Avoid contact with the fertiliser and other material
You will most likely get into contact with the fertiliser and other material you may wish to spread while filling, adjusting and testing the spreader. Wear protective clothing and safety gloves, read the safety instructions provided by the supplier and follow their directions. Contact with these materials could cause physical harm.

Be careful that nothing gets jammed
It is easy for parts to get jammed while adjusting and checking the spreader.
Work safely while checking and adjusting:

- switch the tractor off and remove the key from the ignition,
- engage the parking brake of the tractor,
- wait for all machine parts to come to a standstill before you start with the adjustments,
- wear protective clothing, such as safety gloves and shoes,
- carefully follow the instructions given.

Friction with these materials could cause physical injury.

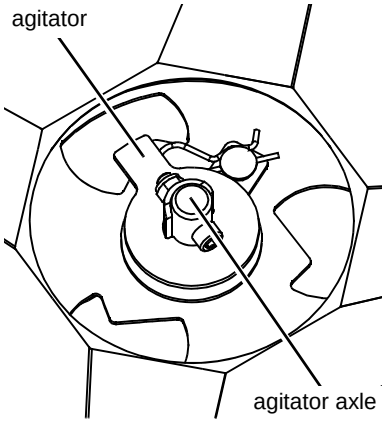
Therefore, check adjustment of the net guides:

- after the first 10 running hours,
- for each season,
- after every 100 operational hours,
- if the spreading pattern between the left and right spreading discs differs more than 3%.

→ See paragraph »Test the left and right spreading patterns« on page 73.

Set the position of the dosing mechanism

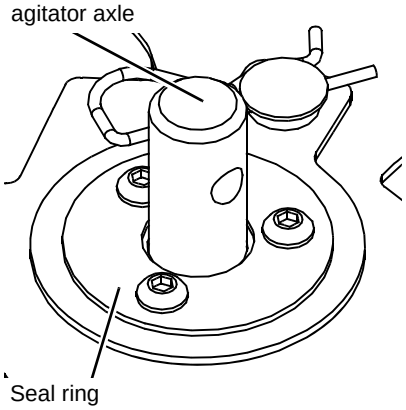
The dosing mechanism must be mounted exactly in the middle above the spreading discs. The agitator axle must turn freely from the seal ring.



INDICATION If you open the filters, you should block them to prevent unwanted closing.

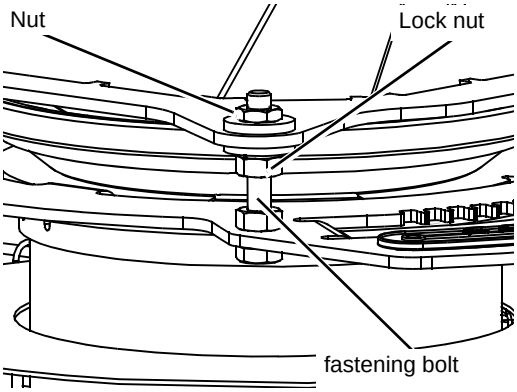
- Place the machine on the ground or on firm supports on a firm, level ground.
- switch tractor off, remove the key from the ignition and engage the parking brake of the tractor.
- Open the sieves with the included attachment and deposit it.
- Remove the agitator from the agitator axle.
- Check if the distance between the agitator axle and the seal ring is the same on all sides.

If the distance is not equal all over the position of the dosing plate can be changed with regards to the agitator axle.



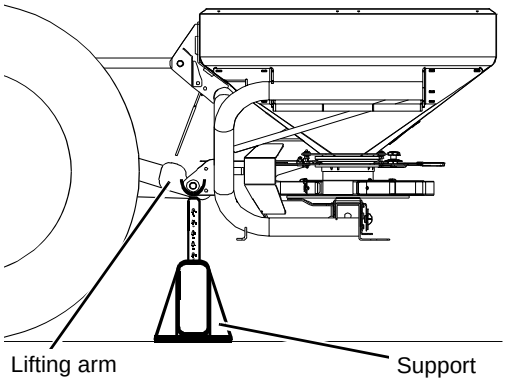
- Turn the nuts on the 4 fastening bolts with which the dosing mechanism is attached to the hopper a few times to loosen them.
- Move the dosing plate so that the distance between the agitator axle and the seal ring is the same on all sides.
- Fasten the nuts on the 4 fastening bolts again without moving the dosing plates again.
- Put the agitator back on.
- Reattach the dashboard with the three fixing knobs.
- Check the connections as described in

  → paragraph »Check setting mechanism of the discharge point« on page 123.



Set the height of the discharge bushings

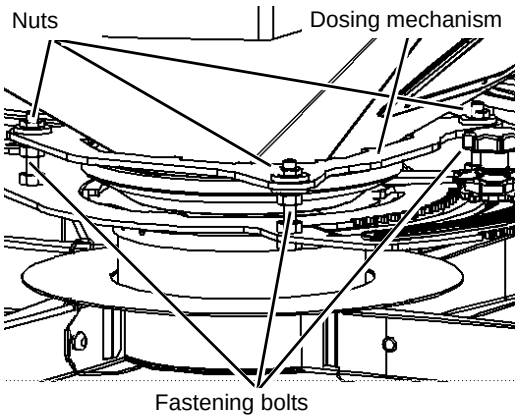
Avoid contact with the fertiliser and other material
You will most likely get into contact with the fertiliser and other material you may wish to spread while filling, adjusting and testing the spreader. Wear protective clothing and safety gloves, read the safety instructions provided by the supplier and follow their directions. Contact with these materials could cause physical harm.



Be careful that nothing gets jammed
It is easy for parts to get jammed while adjusting and checking the spreader.
Work safely while checking and adjusting:

- switch the tractor off and remove the key from the ignition,
- engage the parking brake of the tractor,
- wait for all machine parts to come to a standstill before you start with the adjustments,
- wear protective clothing, such as safety gloves and shoes,
- carefully follow the instructions given.

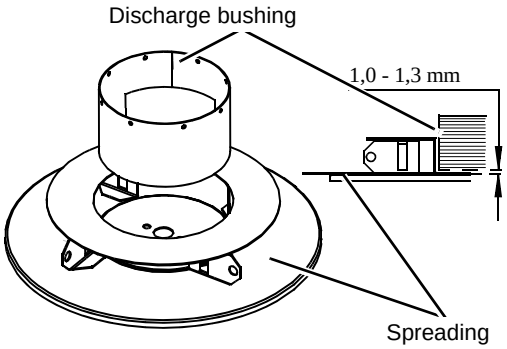
Friction with these materials could cause physical injury.



The distance between the discharge bushing and the spreading disc should be **1.0 – 1.3 mm.**
If the distance is too great, the fertiliser does not flow through the discharge point opening onto the spreading disc but onto a random point below the discharge bushing. This results in a disrupted spreading pattern.
If the distance is too short, a full hopper may rest partly on the spreading disc, which seriously damages the machine as a result.

- Attach the empty machine and raise it to working height (75 cm).
- Switch the tractor off, remove the key from the ignition and engage the parking brake of the tractor.
- Place heavy, stable supports under the ends of the lifting arms.
- Lower the arms onto the supports. Now the machine cannot drop accidentally.
- Switch the tractor off, remove the key from the ignition and engage the parking brake of the tractor.
- Measure the distance between the discharge bushing and the spreading disc.

TIP Measure the distance with a feeler gauge.

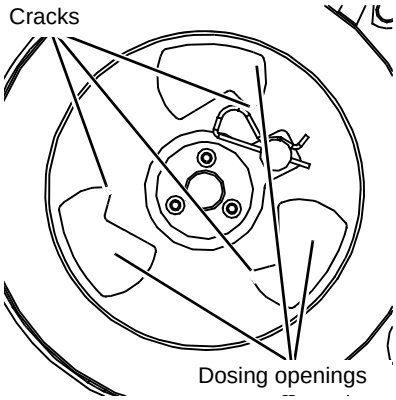


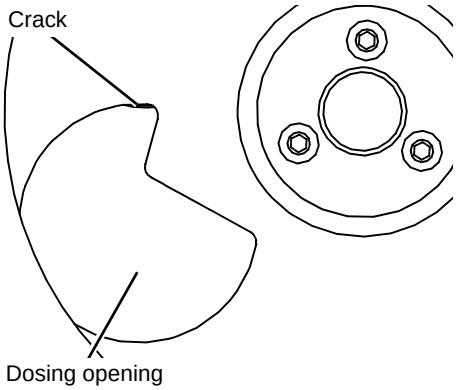
If the distance between the discharge bushing and the spreading disc is too much or too little, change the position of the discharge bushing.

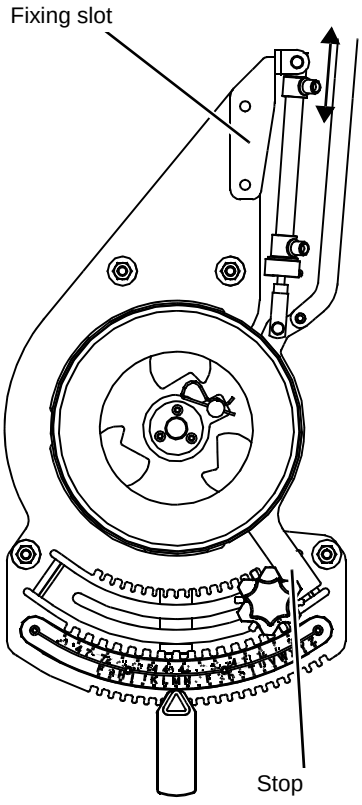
- Remove the dashboard by loosening the 3 fixing knobs.
- Turn the lock nuts on the 4 fastening bolts with which the dosing mechanism is attached to the hopper a few times to loosen them.
- Turn the nuts on the 4 fastening bolts in the desired direction until the distance between the discharge bushing and the spreading disc is 1.0 – 1.3 mm on all sides. Turn the 4 nuts the same distance so that the discharge bushing would remain parallel with the spreading disc!
- Check the position of the dosing mechanism with regards to the agitator axle (see the previous paragraph). The distance between the agitator axle and the ring must be the same on all sides.
- Fasten the lock nuts without moving the dosing baffles again.
- Reattach the dashboard with the three fixing knobs.
- Check the connections as described in

  → paragraph »Check setting mechanism of the discharge point« on page 123.

Adjust dosing plates (hydraulically operated)







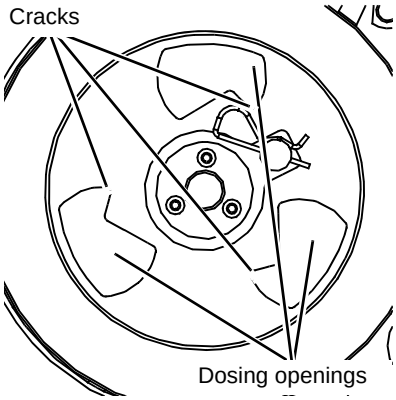
It is necessary to set the dosing baffles to the correct positions to each other to ensure a correct dosing setting. If the dosing openings do not close well you will loose unnecessary fertiliser and the application rate will be higher than intended with a specific dosing setting. If the baffles slide far over each other the application rate will be much lower than expected.
If the dosing plates are mounted in the correct positions, you will see a small crack of light when the dosing openings are closed.

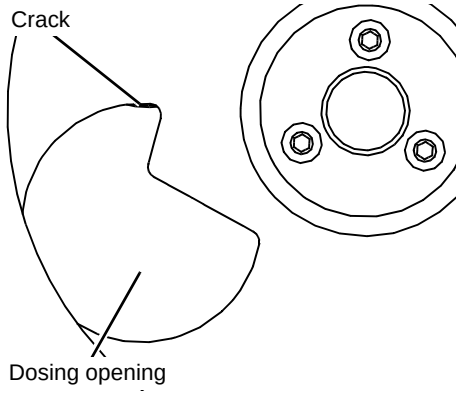
- Engage the relevant hydraulic control valve to close the dosing units completely. The cylinders must be closed properly.
- Switch the tractor off, remove the key from the ignition and engage the parking brake of the tractor.
- Open the sieves with the included attachment and deposit it.
- Check if you can see a small crack between the dosing baffles.
- If not, place the dosing knob to 0+0.
- Move the fixing point of the cylinder on the dosing mechanism so that the reading of the dosing plate against the dosing knob would be 0+0.
- Start the tractor and close the dosing units a few times with the relevant hydraulic control valve.
- Switch the tractor off and remove the keys from the ignition.
- Check if you can see a small crack between the dosing baffles.

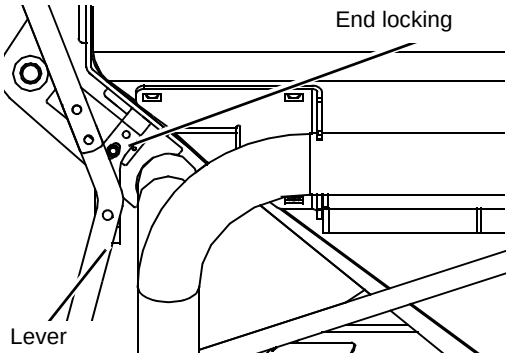
Finally, do the following checks:

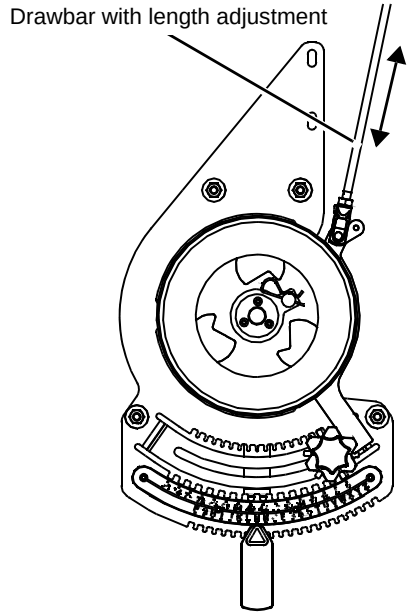
- Put the dosing knob to 36+0.
- Start the tractor and open the dosing units with the relevant hydraulic control valve.
- Switch the tractor off and remove the keys from the ignition.
- Measure the size of the opening. The difference between the left and the right should be a maximum of 0.5 mm.

Adjust dosing plates (mechanically operated)









It is necessary to set the dosing baffles to the correct positions to each other to ensure a correct dosing setting. If the dosing openings do not close well you will loose unnecessary fertiliser and the application rate will be higher than intended with a specific dosing setting. If the baffles slide far over each other the application rate will be much lower than expected.
If the dosing plates are mounted in the correct positions, you will see a small crack of light when the dosing openings are closed.

- Switch the tractor off, remove the key from the ignition and engage the parking brake of the tractor.
- Place the dosing knobs in position 0+0.
- Use the relevant levers to close the dosing units completely.
- Check that both levers are in the same position and are resting against the bolt head on the end block.
- Correct the position of the levers if necessary by moving the bolt in the slotted hole.
- Open the sieves with the included attachment and deposit it.
- Check if you can see a small crack between the dosing baffles.
- Adjust the length of the drawbars so the stop on the dosing plate is resting against the dosing knob in position 0+0.
- Check if you can see a small crack between the dosing baffles.

Finally, do the following checks:

- Put the dosing knob to 36+0.
- Open the dosing units with the lever.
- Measure the size of the opening. The difference between the left and the right should be a maximum of 0.5 mm.

Check setting mechanism of the discharge point

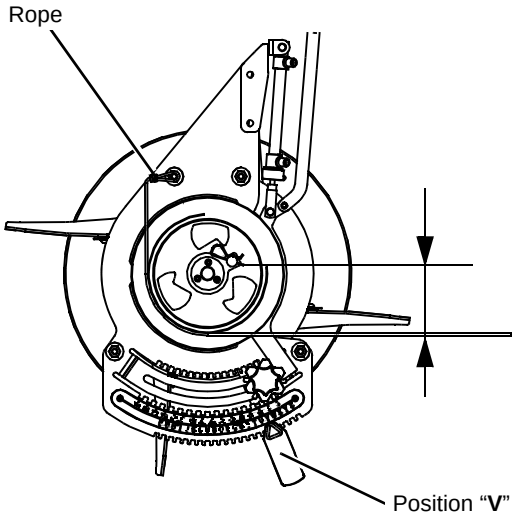
Avoid contact with the fertiliser and other material
You will most likely get into contact with the fertiliser and other material you may wish to spread while filling, adjusting and testing the spreader. Wear protective clothing and safety gloves, read the safety instructions provided by the supplier and follow their directions. Contact with these materials could cause physical harm.

Be careful that nothing gets jammed
It is easy for parts to get jammed while adjusting and checking the spreader.
Work safely while checking and adjusting:

- switch the tractor off and remove the key from the ignition,
- engage the parking brake of the tractor,
- wait for all machine parts to come to a standstill before you start with the adjustments,
- wear protective clothing, such as safety gloves and shoes,
- carefully follow the instructions given.

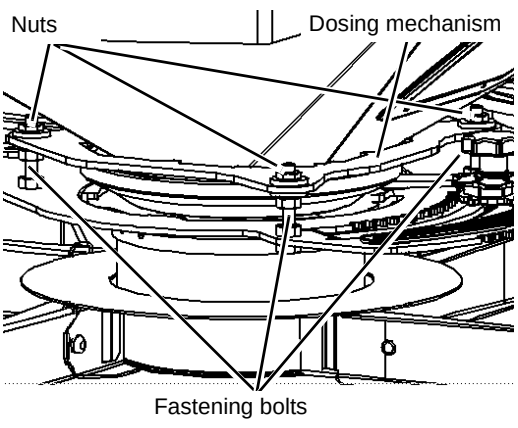
Friction with these materials could cause physical injury.

If the form of the spreading pattern is not the same on the left and on the right and the difference in the application rate is more than 3% it could be caused by a difference in position of the discharge point with regards to the spreading disc between the left and right sides. The distance between the inside of the rope and the opening of the discharge bushing must be **109 mm.**



- ▸ Place the machine on the ground or on firm supports on a firm, level ground.
- ▸ Perform the first checks as described in
  → paragraph »Check the settings of the dosing mechanism« on page 117.
- ▸ Switch the tractor off, remove the key from the ignition and engage the parking brake of the tractor.
- ▸ Set the lever with which the discharge point is set for the arrow to point to **V**.
- ▸ Attach the rope as per the illustration on the following page.
- ▸ Measure the distance between the inside of the rope and the opening of the discharge bushing carefully.

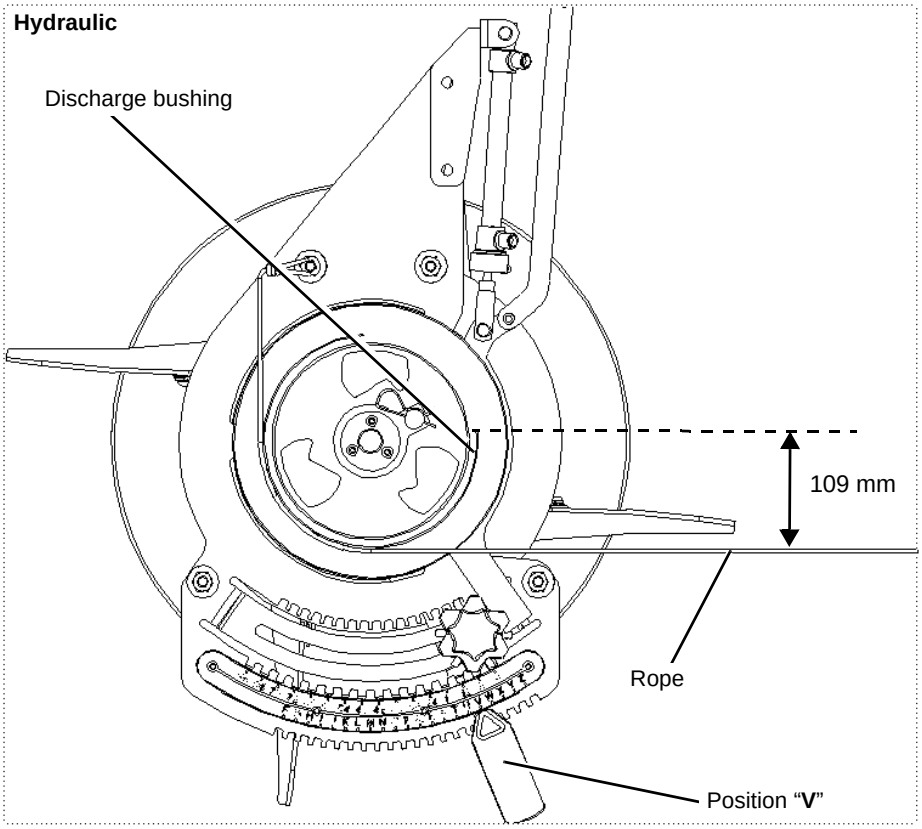
If the measured distance is more or less than 109 mm, do the following:

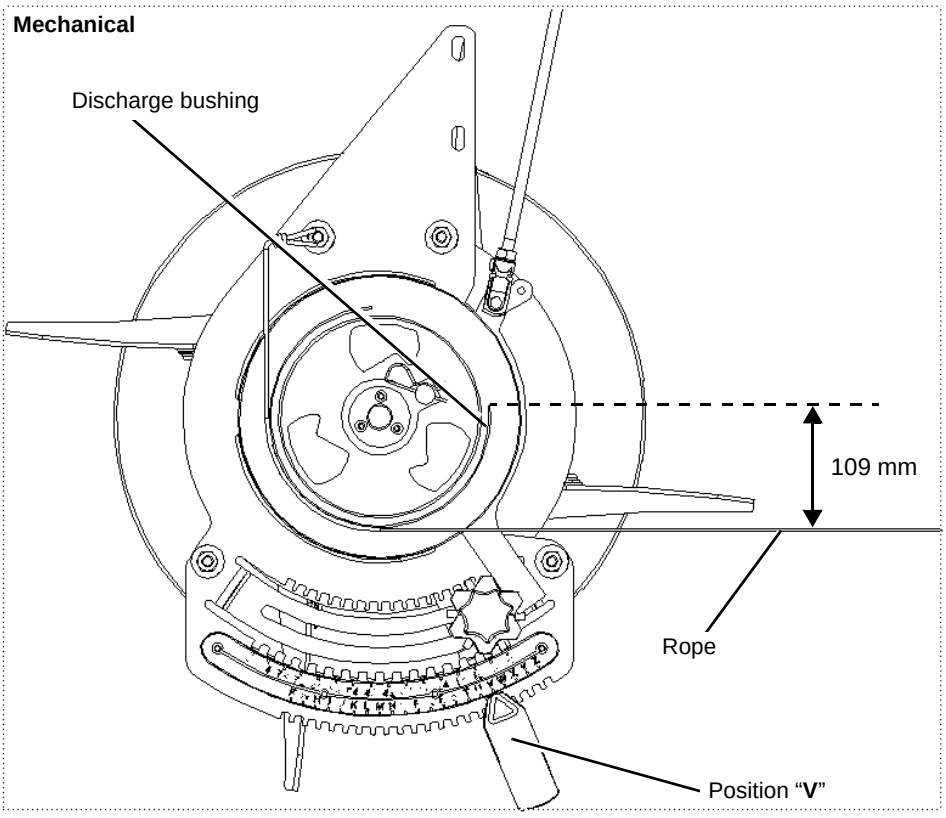


- ▸ Turn the top nuts on the 4 fastening bolts with which the dosing mechanism is attached to the hopper a few times to loosen them.
- ▸ Turn the dosing mechanism until the distance between the inside of the rope and the opening of the discharge bushing is 109 mm.
- ▸ Check the position of the dosing mechanism with regards to the agitator axle (see the previous paragraph). The distance between the agitator axle and the ring must be the same on all sides.
- ▸ Fasten the nuts on the 4 fastening bolts again without moving the dosing plates again.

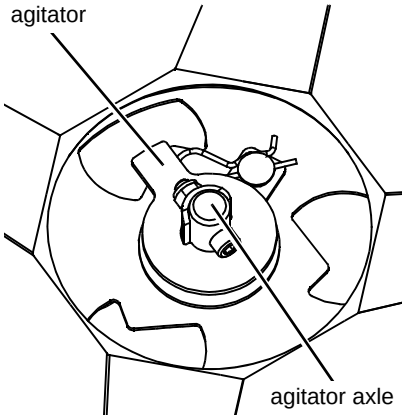
- Perform the check on the other side as well.
- Finally, check the position of the dosing mechanism, the height of the discharge bushing and the position of the dosing baffle as described in

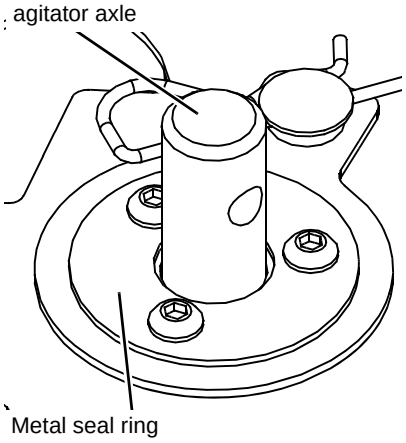
  → paragraph »Check the settings of the dosing mechanism« on page 117.

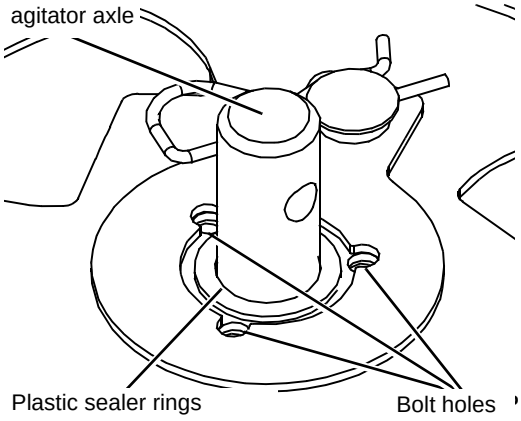




Replacing agitator axle seal







Avoid contact with the fertiliser and other material
You will most likely get into contact with the fertiliser and other material you may wish to spread while filling, adjusting and testing the spreader. Wear protective clothing and safety gloves, read the safety instructions provided by the supplier and follow their directions. Contact with these materials could cause physical harm.

Be careful that nothing gets jammed
It is easy for parts to get jammed while adjusting and checking the spreader.
Work safely while checking and adjusting:

- switch the tractor off and remove the key from the ignition,
- engage the parking brake of the tractor,
- wait for all machine parts to come to a standstill before you start with the adjustments,
- wear protective clothing, such as safety gloves and shoes,
- carefully follow the instructions given.

Friction with these materials could cause physical injury.

The agitator axle is equipped with a plastic seal to prevent fertiliser granule loss along the agitator axle. The seal must be replaced every season, as well as after every 100 hours of operational hours. Only work on a clean machine with an empty hopper.

- Put the dosing knob to 90+5.
- Set the fine application lever to the normal dosing setting.
- Start the tractor and open the dosing units completely.
- Release all the pressure from the hydraulic system, switch the tractor off and remove the key from the ignition.
- Open the sieves with the included attachment and lock them.
- Remove the agitator from the agitator axle.

- Put hand through a dosing opening and support the fertiliser bearing ring so that it will not drop.
- Remove the 3 fastening bolts from the seal rings.
- Remove the metal seal rings.
- Replace the fertiliser seal.
- Put the metal seal rings back in position.
- Put the 3 fastening bolts back in place.

You can let go of the bearing ring after the first fastening bolt has been put back in place.

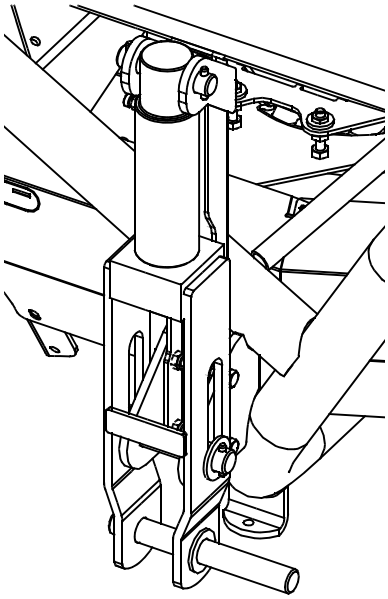
- Put the agitator back into the agitator axle.

Check the connections as described in
→ paragraph »Check the settings of the dosing mechanism« on page 117.

General

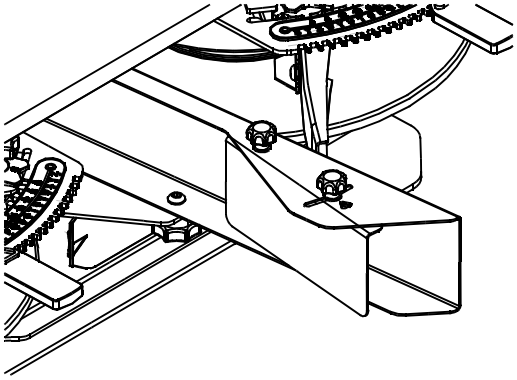
The following accessories for your machine are available to adapt it to your tractor and/or are working conditions.
All of the responsibilities of the manufacturer lapse and the guarantee becomes null and void if non-genuine parts are used.

tramline cylinder



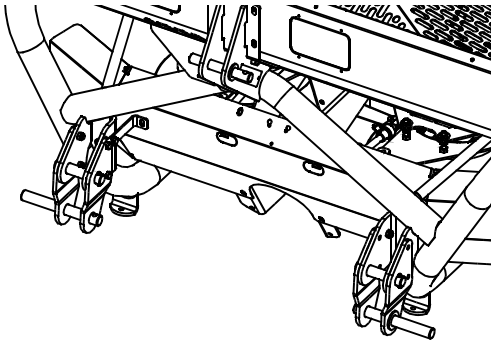
The tramline cylinder is a simple solution to obtain reasonable border spreading. This solution is simple to set and requires minimum effort. The tramline cylinder also functions as a topdressing set.
→ See paragraph »Border spreading with the tramline cylinder« on page 97.

Border spreading plate



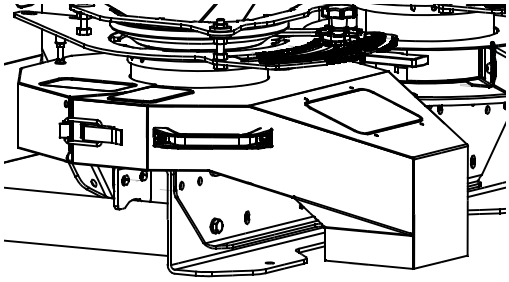
The border spreading plate enables you to spread at a one-side boundary, as well as to do border spreading from the sprayer tramline.
→ See paragraph »One-sided boundary spreading with the border spreading plate« on page 94.

Topdressing set



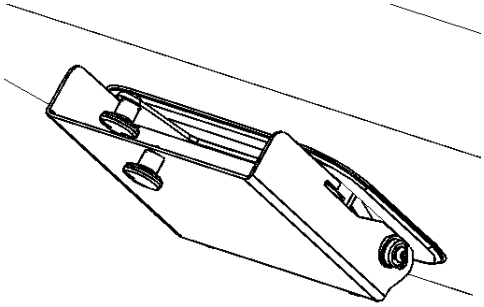
The topdressing set enables the spreader to lift higher. This provides the correct distance between the spreading disc and the crop with over-fertlilising. Only mount the topdressing set if you do not have a tramline cylinder. The tramline cylinder also functions as a topdressing set.
→ See paragraph »Connecting the machine« on page 41.

Calibration container



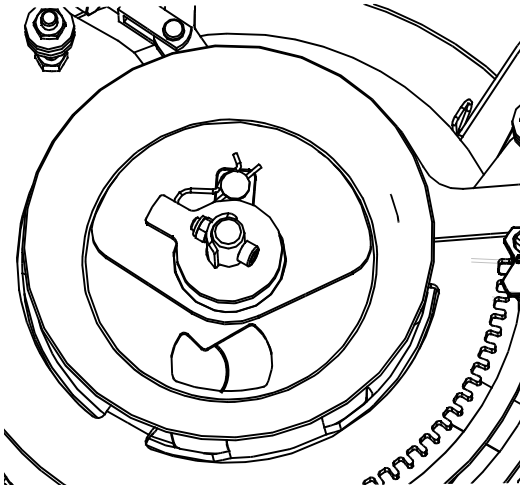
A calibration test is essential to obtain accurate settings for the application rate. The calibration container is an indispensable tool for this.
→ See paragraph »Calibration test« on page 66.

Drain kit



A drain kit is available for emptying the hopper quickly.

Fine application kit



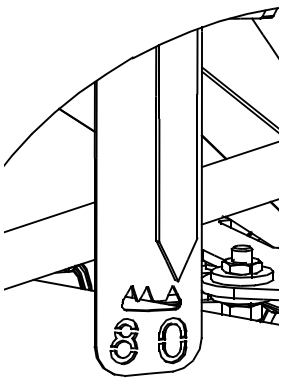
Seeds, slug pellets and small amounts of fertiliser are scattered using small openings in the spreader.
If the flow rate is less than 50 kg/min.,

- to avoid blockages and
- to achieve accurate spreading

it is desirable to use one opening.

The fine application plate closes two openings so one larger opening can work without problems and more accurately.

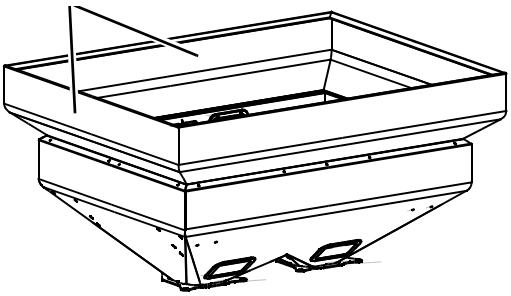
Angle indicator



An angle indicator is available to quickly set the spreader forward.

Hopper extension

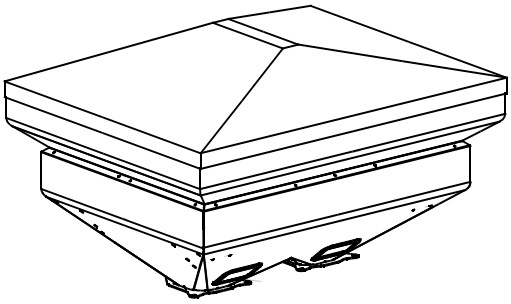
Hopper extensions



The loading volume of the spreader can be increased by putting a narrow and/or wide hopper extension in place.
→ See paragraph »Technical specifications« on page 29.

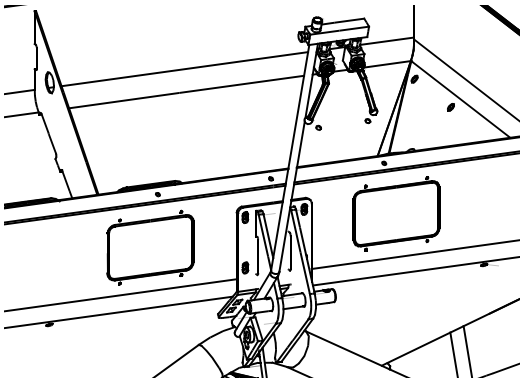
Take the increase in the filling height, the width and the weight of the machine into account.
→ see paragraph »Calculate the axle load with tractor-mounted machines« on page 14,

Hopper cover



The hopper cover protects the fertiliser in the hopper against humidity and dirt. The sail can be folded back for a larger filler opening.
The hopper cover is only available for the DSC 1400.

Hydraulic 2 x 2 direction tap set



The dosing units can be locked with this set for border spreading with the border spreading plate.
This can be used on tractors with only one free double-acting hydraulic control unit.
→ See paragraph »Hydraulic system of the tractor« on page 37.

Hose set for one-sided closure of the dosing units

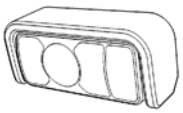
This set is sufficient for tractors with enough double action valves to keep the left or right dosing units closed.
→ see paragraph »Hydraulic system of the tractor« on page 37,

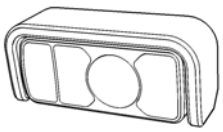
Reflector



Motor vehicles with limited speed (<40 km/h), agricultural and forestry tractors and their trailers, as well as other vehicles, must be provided with a red reflector at the rear in the form of a truncated triangle.

Lights





If you are transporting on a public road there are lights available in order to comply with legal requirements.
→ See chapter »Driving on the road« on page 83.

Troubleshooting table

Problem	Possible cause	Solution	Page
Incorrect application rates (kg per hectare)	Dosing setting incorrectly set	Set the dosing setting as per the instructions	56
	Dosing setting not checked with a calibration test	Do a calibration test	66
	Dosing setting from the left and right spreading discs are not the same	Check the dosing setting of the spreading discs	73
	Incorrect setting for fine dosage	Set the dosing setting for fine application as per the instructions	59
	Driving speed too high or too low	Adjust the driving speed or the application rate	56
	Incorrect distance between the driving tracks	Always set the driving tracks before spreading	88
	New type of fertiliser spread with the same settings as the previous type. Quality varies greatly between types.	Determine the characteristics of the fertiliser, look for the relevant spreading chart and set the spreader again	45, 50
	The flow of the fertiliser is blocked	Clean the machine well after each use. Replace the agitator if it is worn out	104
Difference between the discharge on the left and the right spreading disc	Dosing setting or discharge points are not set the same	Check settings	50
	The stop of one or both of the dosing mechanisms have been moved	Check the stops and set them anew	121
	Discharge is blocked on the one side	Clean the machine well after each use. Replace the agitator if it is worn out	104
Great amounts of dust while spreading	Average quality fertiliser (too soft, broken, mixed types) or incorrect storage	Contact your supplier. Update the storage area. Spread with smaller working widths as far as possible	45
	Rpm on the spreading discs too high	Check the PTO shaft rpm	63
	agitator grinds. Dosing units closed for too long with the PTO shaft running	Switch the PTO shaft off after closing the dosing units. Check the agitator for damage	
	Right agitator grinds	Spreading disc not disconnected while border spreading with the border spreading plate	94

Problem	Possible cause	Solution	Page
Spreading tracks visible among the crops	Average quality fertiliser. 80% of the granules with a diametre between 2.0 - 4.75 mm	Determine the distribution and spread with small working widths if possible	47
	Blend of fertiliser types used. A blend can become unmixed again or types of fertiliser could contain varying spreading qualities	Check the type, pattern and distribution. Spread with smaller working widths as far as possible	45, 47
	New type of fertiliser spread with the same settings as the previous type. Quality varies greatly between types.	Determine the characteristics of the fertiliser, look for the relevant spreading chart and set the spreader again	45, 50
	Use of wrong spreading chart	Determine the characteristics of the fertiliser and select the correct spreading chart	45, 48
	Working with unfavourable weather conditions: high levels of humidity, rain, heat or high wind speeds (> 5 m/sec)	Only work under good weather conditions	
	Incorrect overlapping of the spreading pattern	Always set the driving tracks before spreading	88
	Horizontal/vertical settings of the machine not correct	Check if the machine is standing level horizontally and vertically, unless the spreading chart indicates otherwise	41, 63, 85
	Spreader not set to the correct height	Check and set to the correct working height (75 cm above the crops or soil) and inclination	85, 63
	Working width incorrect	Check the discharge points (left and right) and the PTO shaft rpm	55, 63
	Worn or missing vanes	Check the vanes	53
	Tyre pressure on the left and right not the same	Check the tyre pressure	
	The setting mechanism of the discharge point is not set well	Perform the »Check setting mechanism of the discharge point«	123
	The dosing mechanism is not set well	Perform the »Check the settings of the dosing mechanism«	117
Machine makes a noise while running	Discharge bushing makes contact with the spreading disc	Adjust the discharge bushing	117
	Spreader put down with filled hopper	Repair the machine. Set dosing mechanism and discharge point again	117, 123
	Spreading disc hidden/ out of balance	Check the spreading discs for damage and for the presence of all the vanes	53
	Build-up of fertiliser at the agitator and/or spreading discs	Remove the fertiliser. Clean the machine well after each use.	104

Problem	Possible cause	Solution	Page
Powerful vibrations perceptible	**Shut down the PTO shaft immediately!**	Attend to the problem to prevent damage	
	Great imbalance in the spreading discs	Check the vanes and spreading discs	53
	Bent agitator axle or damaged agitator	Replace the agitator axle or the agitator	
	PTO shaft working angle out of working reach	Limit the working angle to a maximum of 30º	39

When the lifespan of the machine has finished, its separate parts must be properly disposed of. Keep local legislation in mind with this!

Metal parts
You must deliver all metal parts to a metal recycling company.

Plastic parts
All plastic parts can be disposed of as unwanted garbage.

Oil
the hydraulic oil must be disposed of at a used-oil recycling company.

Rubber
Rubber parts such as tyres and hoses must be disposed of at a rubber processing company.

Fertiliser
Remaining fertiliser must be stored or disposed of in accordance with the regulations for chemicals.

Liability

Without prejudice to the other stipulations of these General Conditions and the stipulations of the act on product responsibility, the seller is only responsible for damage caused by culpable breach of contract and by unlawful actions in the framework of the regulations below:

1. He/she is completely responsible for damage that result from gross neglect due to his/her own actions or due to gross negligence of his/her legal representatives or supervising employees.

2. He/she can be held responsible for not abiding to the main contractual requirements and to the other requirements of the contract insofar as that is of vital importance for the purpose of the agreement (cardinal requirements) in principle, through each of his/her own culpable acts or through each culpable act of his/her legal representatives or those under his/her supervision, insofar as responsibility is not already indicated under point 1.

3. The seller is also responsible for intentional and gross neglect caused by him/her or by someone under his/her supervision for so far as responsibility has not been determined under point 1 yet. Liability for his/her own neglect in terms of simple neglect by his/her legal representatives or on his behalf by people under his/her supervision excluded, will the requirements of point 2 remain valid.

4. Insofar as there is liability in terms of points 2 and 3, the extent thereof is limited to normal remuneration for damage incurred.

5. The above regulations under 1 to 4 can be applied to any liability with the conclusion of the agreement. These stipulations are limited with retroactive effect to damages based on this legal title.

Complaints

The following stipulations apply, along with national legislation:

- The buyer must check the equipment, accessories and spare parts upon delivery for transport damage and completeness. Any possible shortcomings must be reported without delay.
- The seller will only consider complaints if the buyer reports that in writing within fourteen days after delivery by the seller.
- The buyer must report hidden damage as soon as it becomes visible, but no later than six months after delivery of the equipment. The legal period of limitation remains valid.

Guarantee

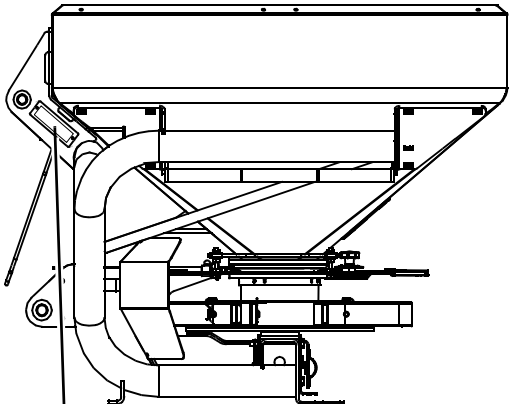
You can obtain the applicable guarantee conditions for your machine from your dealer. He is also responsible for the first settlement of guarantee cases.

EC declaration of conformity

In accordance with EU Directive 2006/42/EC

We

Kverneland Group Nieuw-Vennep BV
Hoofdweg 1278
NL-2153 LR Nieuw-Vennep
The Netherlands



Type plate

declare fully under own responsibility that the product

Spreader DSC
in all variants
and its accessories

Type: VN247

Valid from machine number:
VN2470001001

to which this declaration relates, conforms to the relevant basic safety and health requirements of EU Directive 2006/42/EC.

For the relevant implementation of the safety and health requirements mentioned in the EU directive, the following standards are taken into account:

- EN ISO 12100 :2010
- EN ISO 4254-1 :2013
- EN ISO 4254-8 :2009
- EN ISO 11783-10 :2015
- EN 13739-2 :2011
- EMC 2014/30/EG

Kverneland Group Nieuw-Vennep BV
Nieuw-Vennep, 01.02.2018

H. Kesek.
Managing Director
Authorised Representative*

* Person residing in the community who is authorised to compile the technical documents. Address, see above.

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