

VS 220/ 400/ 400-VITI
VS600/ 750

User's manual

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Machine identification

Your supplier needs your machine’s particulars in order to assist you as soon as possible.
Please enter this information here.

Name	VS 220/ 400/ 400-VITI VS600/ 750
Working width	m
Weight	_____ kg
Machine number	VN_ _ _ _
Accessories	
Address of the supplier	
Manufacturer's address	Kverneland Group Nieuw-Vennep B.V. Hoofdweg 1278 NL-2153 LR Nieuw-Vennep The Netherlands

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Target group of this manual

This manual is intended for:

- people trained in working in the field of agriculture,
- people that are competent to operate this 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 regulations« 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. This will help you to:

- 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 machine.
- You are responsible for the safe operation and maintenance of your machine.
- You should ensure that users of this machine know and understand the operating and maintenance procedures and the related safety instructions.
- It is your responsibility to provide personal protective equipment to anyone using, maintaining or repairing the machine.

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 refers to tips for assembly or adjustment work.



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

All directional indications are always intended to be interpreted as in the direction of travel.

For your safety

In this chapter you will find general safety instructions . In each chapter you will find additional, specific, safety instructions.



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

Many risks can happen when working with agricultural machines. Avoid accidents by:

- not taking risks,
- being alert at all times,
- keeping your safety in mind,
- working safely,
- avoiding time pressure

The manufacturer's liability for the resulting consequences will lapse:

- if the safety instructions are not adhered to
- in the event of insufficient maintenance
- if the machine is used for purposes other than those for which it was intended,
- in the event of overload of the machine.
- in case of unauthorised modifications to the machine

Other guidelines

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

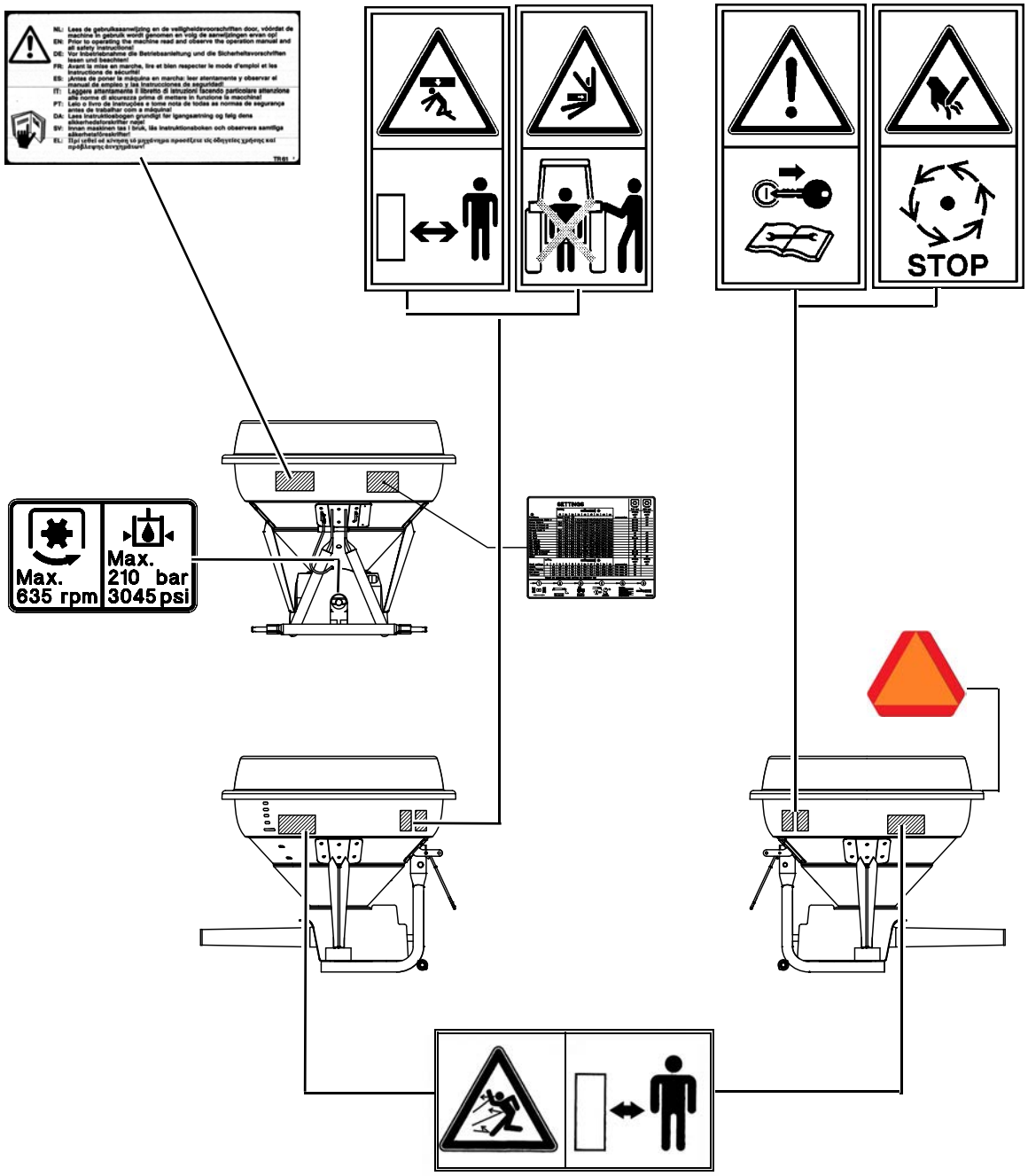
- measures to prevent accidents,
- in the case of applicable safety guidelines,
- in the case of occupational health requirements
- in accordance with the applicable traffic regulations,
- Rules regarding use, maintenance and repairs.

Warning stickers

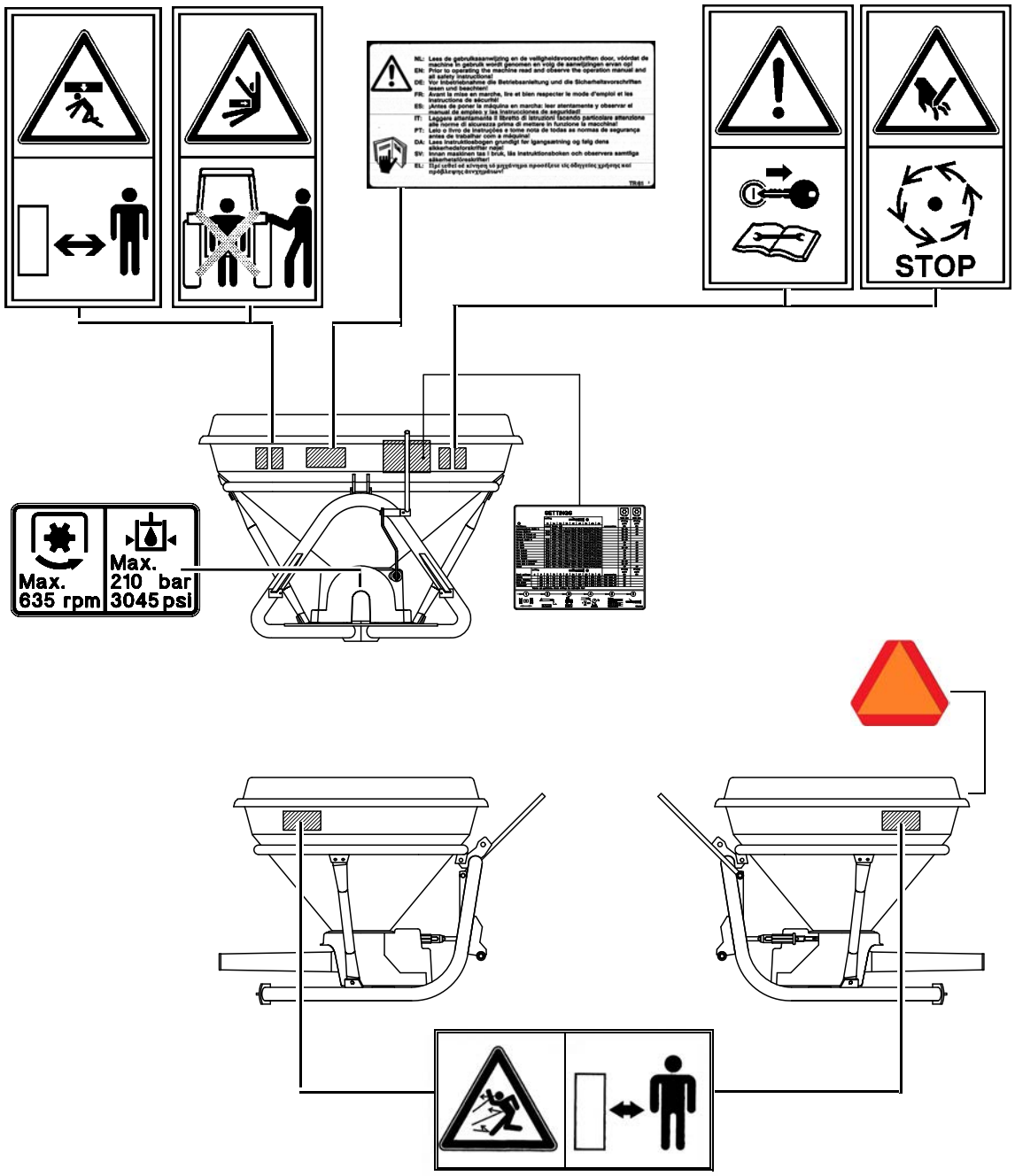
Various warning decals are affixed to the machine. Do not remove them! Always follow the instructions supplied and be alert to possible dangers.

- Please keep the warning stickers and warning symbols clean and legible.
- Replace the decals that are missing, damaged or have become illegible.
- When replacing parts on which a warning decal or symbol was affixed, it is important to ensure that the warning decal is also affixed to the replacement part.

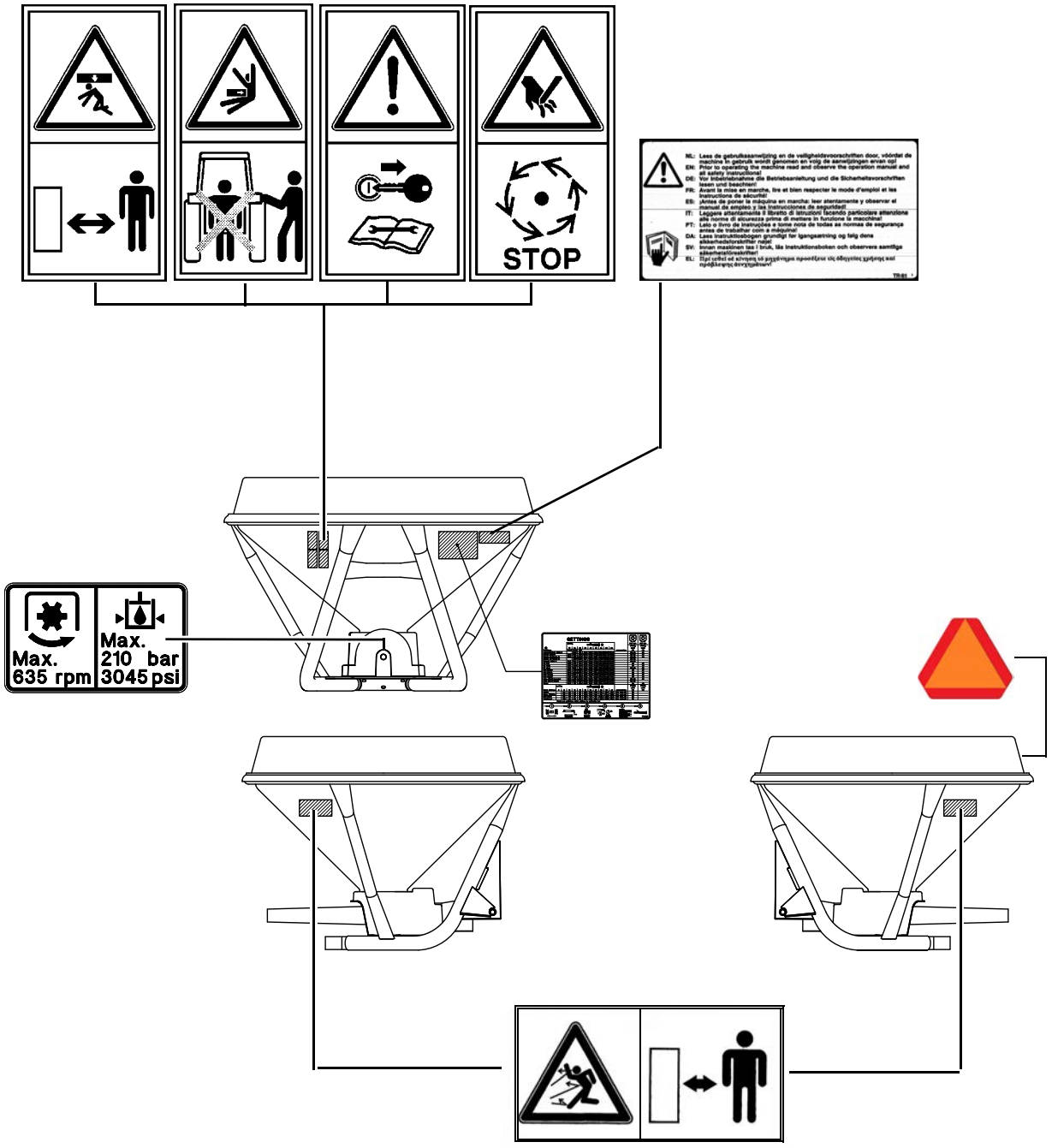
VS 220 - 330



VS 400 - 500



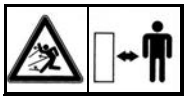
VS 600 - 1650



Explanation for warning decals



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!



Do not exceed the maximum hydraulic pressure of 210 bars
Prevent the pressure in the hydraulic system from exceeding 210 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, must be fitted with a red reflector at the rear in the form of a truncated triangle.
This reflector should then be placed at the back of your implement if the implement hides the reflector from your tractor.



safety regulations

This part contains all the requirements, prohibitions and instructions that should always be followed during 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.

Intended use

The machine is exclusively intended for spreading:

- granules and powdery types of fertiliser,
- sand and fine split,
- grains 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 regulations 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,
- takes 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.

Clothes/protection

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

Ensure personal protection

- 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,
- consult a 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 kept away from the danger zone of the machine and the tractor. Those who are within the danger zone could be injured.

Check the direct surroundings

- Check the immediate surrounding area while working with the machine.
- Familiarise yourself with the immediate vicinity.
- Do not start work until all persons and obstacles have been removed from the danger area of the tractor and the machine.
- Make sure that nobody is in the danger area when the machine is in operation.

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 lighting, safety and warning devices must be in good working condition,
- the lifting and pulling capacity must be sufficient,
  → See »Calculate the axle load with tractor-mounted machines« on page 14,
- the tractor category is appropriate for the machine
- 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 multi-purpose 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,
- switching off the electronic control system,
- 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 of 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.

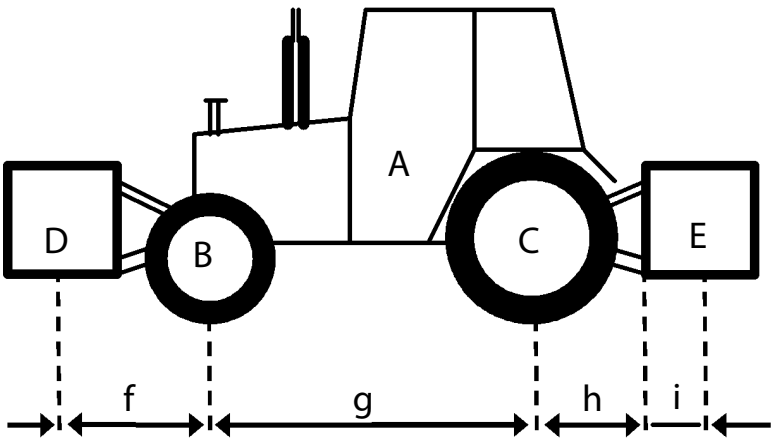
Required details

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 30.

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-mentioned 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 may 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.

The calculated value must be less or equal to ($\leq$) the permitted values. The front and rear axle 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 instructions for a risk-free operation. Respect them to ensure your safety.

Replace any missing or illegible safety or warning decals
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.

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.

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 end 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! During inspection always use appropriate aid (e.g. a piece of wood or sheet metal) and wear safety goggles, and gloves! High pressure fluid easily penetrates skin and clothes, causing severe injuries. In the event of injury, contact your physician immediately!

Electric control system

Disconnect the control box
Disconnect the control box of the electrical system as soon as it does not perform any functions anymore in order to prevent unintentional operation. Keeping the control box connect can be dangerous and can damage the machine
as well as cause bodily injury.

Battery cables must be connected properly
Always disconnect the battery cable (negative pole) from the electric system when working on the machine. Connect the battery cables correctly: Positive pole first, followed by the negative pole. Always equip the positive pole with the appropriate protective cap to avoid a short circuit as
this could lead to damage to the tractor and machine.

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. plating and guards, prevents access to 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.

Blockade of a security device
In case of blockade or operation of a security device, never work on the machine without:

- switching off the PTO shaft,
- switching off the electric control system,
- 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 activities

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 described 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.

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 suitable for amongst others spreading granular and powdery fertiliser types on the field and grazing land. The machines can also be used as salt, sand and fine split spreader in road construction and maintenance.

It is attached in the three-point linkage of the tractor:

- Cat. II for the VS 600-1650
- Cat. I/II for the VS 400 / 500 and VITI
- Cat. I for the VS 220 / 330

Border spreading is possible by using the following:

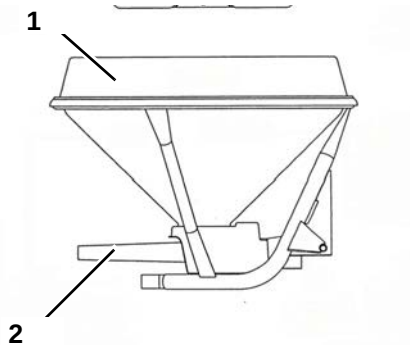
- tramline cylinder.
- the spreading spout

Other fields of use
Powder, salt and gravel spreading is possible with type 220-330,600-800-1000.
A choice of accessories and modifications to the machine is available.
→ See chapter »Accessories« on page 99 for possibilities.

Environment

This fertiliser spreader conforms to the **EN 13739-2** environmental standard.

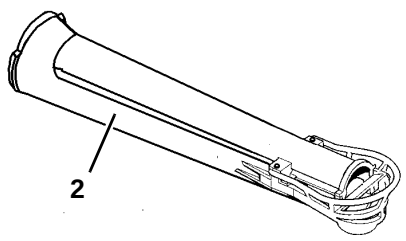
SuperFlow spreading system



The pendulum spreader spreads fertilisers, powders, grains, seeds, salts, etc. with a spreading spout **(2)**. The movement of the spreading spout is symmetrical, and therefore the spreading pattern is also symmetrical. The spreading quantity is regulated by a dosing plate under the hopper **(1)**. Both of the dosing plates are located right on top of the middle of the discharge opening to the spreading spout.
At the beginning of the spreading spout, the movement speed of the granules is low. The speed increases towards the end of the spreading spout.

Less dust and grain breakage
Grain breakage and powder formation are prevented by gradual speed change in the spreading spout.
The agitator mounted below in the hopper provides for a steady, constant stream of fertiliser, powders, seeds, etc. to the spreading spout. Moreover, the agitator prevents the chunks of fertiliser from blocking one or more dosing openings.

Transverse distribution



The movement of the spreading spout **(2)** brings about a strong distribution to both sides without ejecting far behind. This prevents irregularity of the distribution due to and strongly sloping fields.

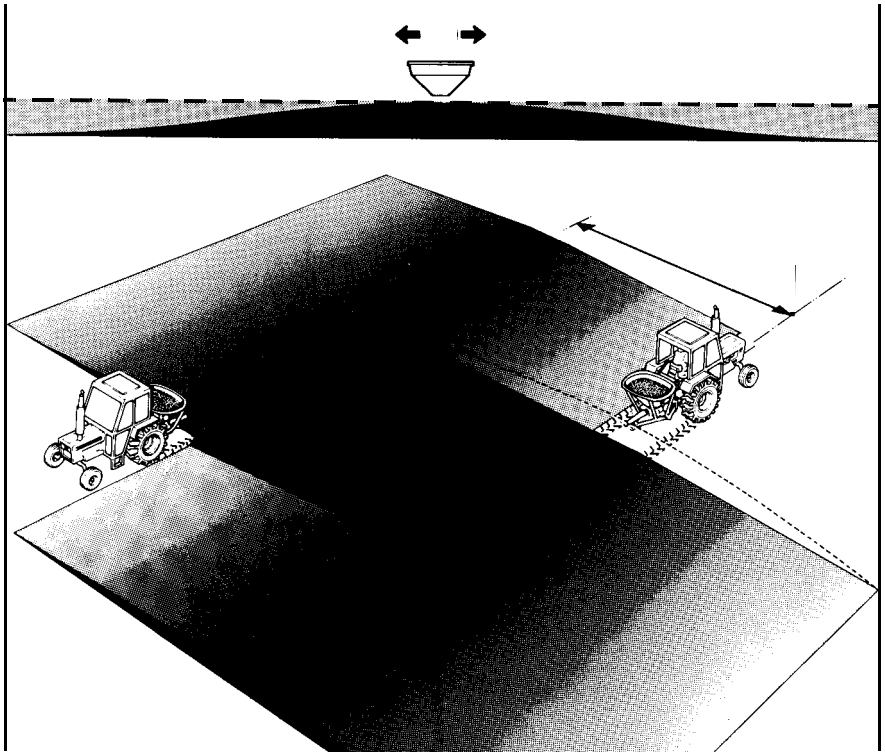
Spreading pattern

The quality of the spread fertiliser and a well-set machine are essential for a good spreading pattern.
The spreading pattern is also determined by:

- the working width,
- the type of spreading spout,
- the set angle of the turn of the spreading spout
- the PTO shaft rpm,
- the use of the border spreading plate or the tramline cylinder.

Depending on the above, a working width of 1.5 - 15 metres is possible.

Full overlap
The spreading pattern is a triangle with full overlap with all working widths up to 15 metres.



PTO shaft RPM
With working widths up to 12 metres, the PTO shaft rpm is as a rule 540 rpm.

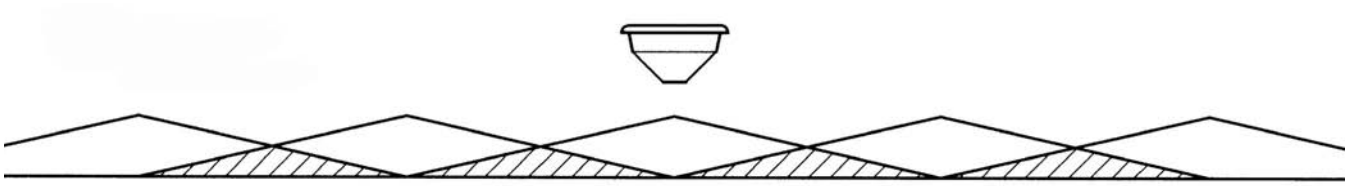
Larger working widths (12-15 metres)
A higher rpm is recommended for larger working widths.
NOTE **Set only 620 rpm where the spreading chart indicates this!**

Spreading pattern

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

Full field spreading pattern

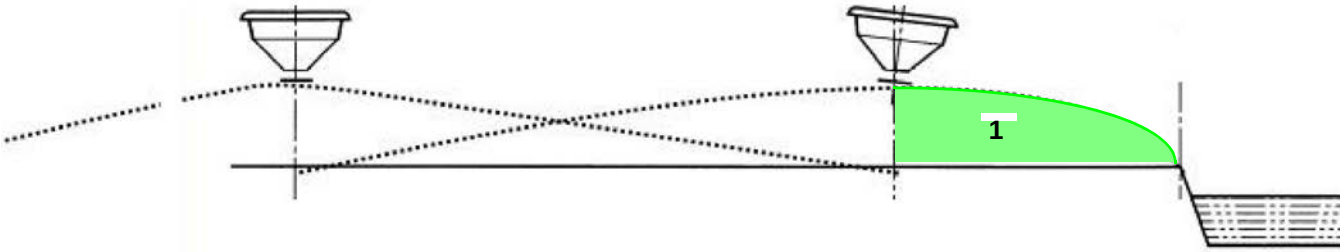
The full-field spreading pattern with triangular spreading pattern



Boundary track spreading with tramline cylinder

It is possible to spread right up to the edge from the first sprayer tramline with the hydraulic tramline cylinder (boundary track spreading).

Border-spreading pattern (1)
You can adjust the spreading pattern and the supplement to the edge by inclining the spreader more or less.



Adjust carefully

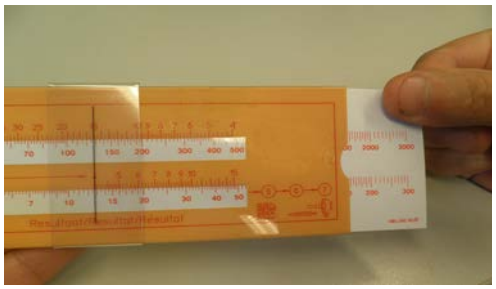
You can set the application rate and working width independently of each other. Moreover, it is possible to shut 2 of the 3 dosing openings so that the application rate can also be set precisely with a low flowrate, while the risk of blockages remains limited.

Set the application rate (kg/ha)



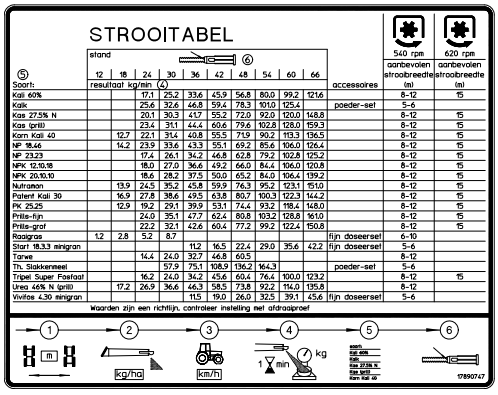
For accurate adjustment of the dosing quantities, the machine is standard equipped with a regulating rod **(1)** which determines the opening of the dosing plate. The dosing **(2)** can be set between 0 - 90 by means of the regulating rod.

Calculating or querying the setting data



Slide rule and spreading chart
The mode to be set is determined by using the slide rule and spreading chart decal.
→ See paragraph »Use a slide rule and spreading chart decal« on page 45.

Slide rule


STROOITABEL

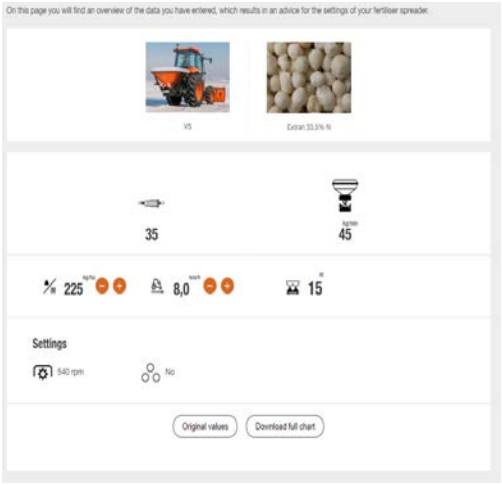
⑤ Soort:	stand ⑥ 12	18	24	30	36	42	48	54	60	66	accessoires	540 rpm aanbevolen strooibreedte (m)	620 rpm aanbevolen strooibreedte (m)
resultaat kg/min ④													
Kali 60%			17.1	25.2	33.6	45.9	56.8	80.0	99.2	121.6		8-12	15
Kalk			25.6	32.6	46.8	59.4	78.3	101.0	125.4		poeder-set	5-6	
Kas 27.5% N			20.1	30.3	41.7	55.2	72.0	92.0	120.0	148.8		8-12	15
Kas (prill)			23.4	31.1	44.4	60.6	79.6	102.8	128.0	159.3		8-12	15
Korn Kali 40		12.7	22.1	31.4	40.8	55.5	71.9	90.2	113.3	136.5		8-12	15
NP 18.46		14.2	23.9	33.6	43.3	55.1	69.2	85.6	106.0	126.4		8-12	15
NP 23.23			17.4	26.1	34.2	46.8	62.8	79.2	102.8	125.2		8-12	15
NPK 12.10.18			18.0	27.0	36.6	49.2	66.0	84.4	106.0	120.8		8-12	15
NPK 20.10.10			18.6	28.2	37.5	50.0	65.2	84.0	106.4	139.2		8-12	15
Nutrason		13.9	24.5	35.2	45.8	59.9	76.3	95.2	123.1	151.0		8-12	15
Patent Kali 30		16.9	27.8	38.6	49.5	63.8	80.7	100.3	122.3	144.2		8-12	15
PK 25.25		12.9	19.2	29.1	39.9	53.1	74.4	93.2	118.4	148.0		8-12	15
Prills-fijn			24.0	35.1	47.7	62.4	80.8	113.2	128.8	161.0		8-12	15
Prills-grof			22.2	32.1	42.6	60.4	77.2	99.2	122.4	150.8		8-12	15
Raaigras	1.2	2.8	5.2	8.7							fijn doseerset	6-10	
Start 18.3.3 minigran					11.2	16.5	22.4	29.0	35.6	42.2	fijn doseerset	5-6	
Tarwe			14.4	24.0	32.7	46.8	60.5					8-12	
Th. Slakkenmeel				57.9	75.1	108.9	136.2	164.3			poeder-set	5-6	
Tripel Super Fosfaat			16.2	24.0	34.2	45.6	60.4	76.4	100.0	123.2		8-12	15
Urea 46% N (prill)		17.2	26.9	36.6	46.3	58.5	73.8	92.2	114.0	135.8		8-12	
Wintex 4.30 minigran					11.5	19.0	26.0	32.5	39.1	45.6	fijn doseerset	5-6	

Waarden zijn een richtlijn, controleer instelling met afdraaiproef

1 m 2 kg/ha 3 km/h 4 1 min kg 5 6

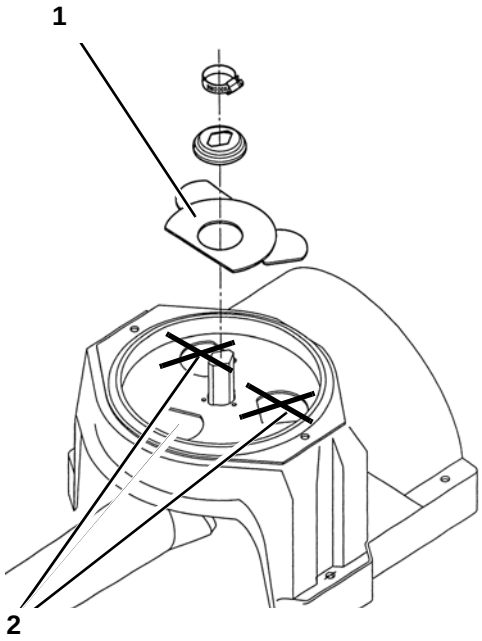
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Spreading chart decal



Online spreading charts on www.kubotaspreadingcharts.com
Through the website, it is possible to call up the setting of your spreader in your own language. If necessary in (English) imperial units.
Fill in the data and an extensive spreading recommendation will be calculated.

Fine application (accessory)



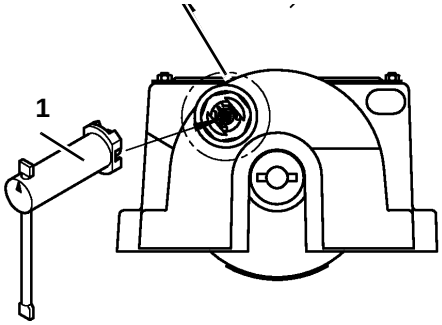
Normal dosing
A dosing unit with 3 holes is applied to adjust the application rate accurately over a large adjustment range.

Fine application
You can adjust the spreader to spread low application rates with a fine application kit. This fine application kit contains a hopper sheet **(1)** which drops into the 2 frontal dosing openings **(2)**.

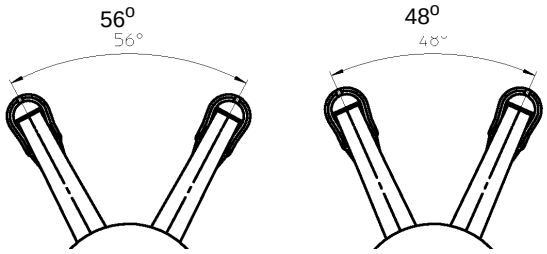
In order to tune the setting and to prevent blockages, it is desirable to have one opening, which is then further open.

2 dosing openings are closed off by the hopper sheet.
The granules will now pass through one large opening. This gives a more accurate and reliable flow at very low application rates.

Spreading spout turn adjustment (accessory)



Working widths vary with the angle of the spreading spout
The back and forth turn of the spreading spout can be set to a smaller angle with an optional key **(1)**.
This enables you to reduce the working width by approx. 25%.
The standard spreading spout spreads with the small angle of approx. 9-metre working width instead of 12 metres with the larger angle.

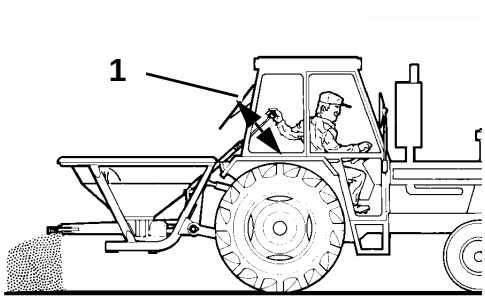


Operating the spreader

Manual, hydraulic or electronic operation
Dosing opening and closing is carried out with:

Manual operation

- a manual lever **(1)** from the tractor seat,



Hydraulic operation (accessory)

A single-acting hydraulic tractor valve **(2)** opens and closes the dosing from the closed cabin.

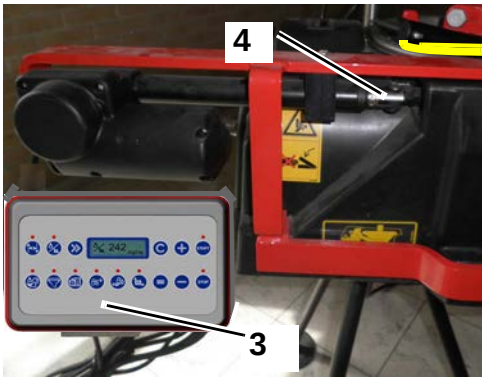


ED II electronic dosing (accessory)

- or via the control panel of the ED II electronic dosing device.**(3)** An actuator **(4)** controls the dosing from the closed cabin.

ED II spreading computer functions
The ED II also has several useful remote-controlled functions.

- With the preset working width, driving speed and selected application rate the ED II calculates the expected flowrate for the calibration test and carries it out.
- The ED II adjusts the dosing to the actual driving speed. This makes the set application rate constant when the driving speed is changed.
- The ED II provides information about driving speed, driven distance, PTO shaft rpm and also hectare count.



Technical specifications

Model	Hopper capacity [litres]	Maximum loading weight [kg]	Hopper width [cm]	Hopper length [cm]	Filling height [cm]	Empty weight* [kg]	Confirmation [category]	Maximum working width [m]
220	220	330	106	105	77	83	I	12
330	330	330	106	105	99	85	I	12
400	400	500	145	113	89	125	I / II	12
500	500	500	145	113	101	130	I / II	12
400 VITI	400	500	115	144	89	125	I / II	12
500 VITI	500	500	115	144	101	130	I / II	12
600	600	1650	174	154	96	130	II	15**
750	750	1650	174	154	96	151	II	15**
800	800	1650	174	154	106	155	II	15**
950	950	1650	174	154	106	158	II	15**
1000	1000	1650	174	154	116	165	II	15**
1150	1150	1650	174	154	116	171	II	15**
1350	1350	1650	174	154	125	178	II	15**
1650	1650	1650	174	154	141	184	II	15**

* Including spreading spout and coupling shaft.
** Standard up to 14 metres working width,

- for 15 metres: with adjusted tractor rpm.

Sound level	Closed cabin	Rear window opened
Tractor at 540 rpm. (dB)	69,2	71,8
Tractor + operating, empty spreader (dB)	77,9	80,1
Tractor + spreading spreader (Kali 60) (dB)	80,5	83,0

Lubrication	
Grease type	EP 00/000
Number of grease nipples VS 220 - 330	5 (manually and hydraulically operated); 6 (with EDII)
Number of grease nipples VS 400 - 1650	6
Coupling shaft lubricating points (grease) (oil)	5 (4 nipples and the contact surfaces of the profiled tubes) 1
Miscellaneous	
Number of hydraulic valves on the tractor	0 = Standard manual operation 1 single for hydraulic operation of the application handle (accessory) 1 single for hydraulic tramline cylinder (accessory)

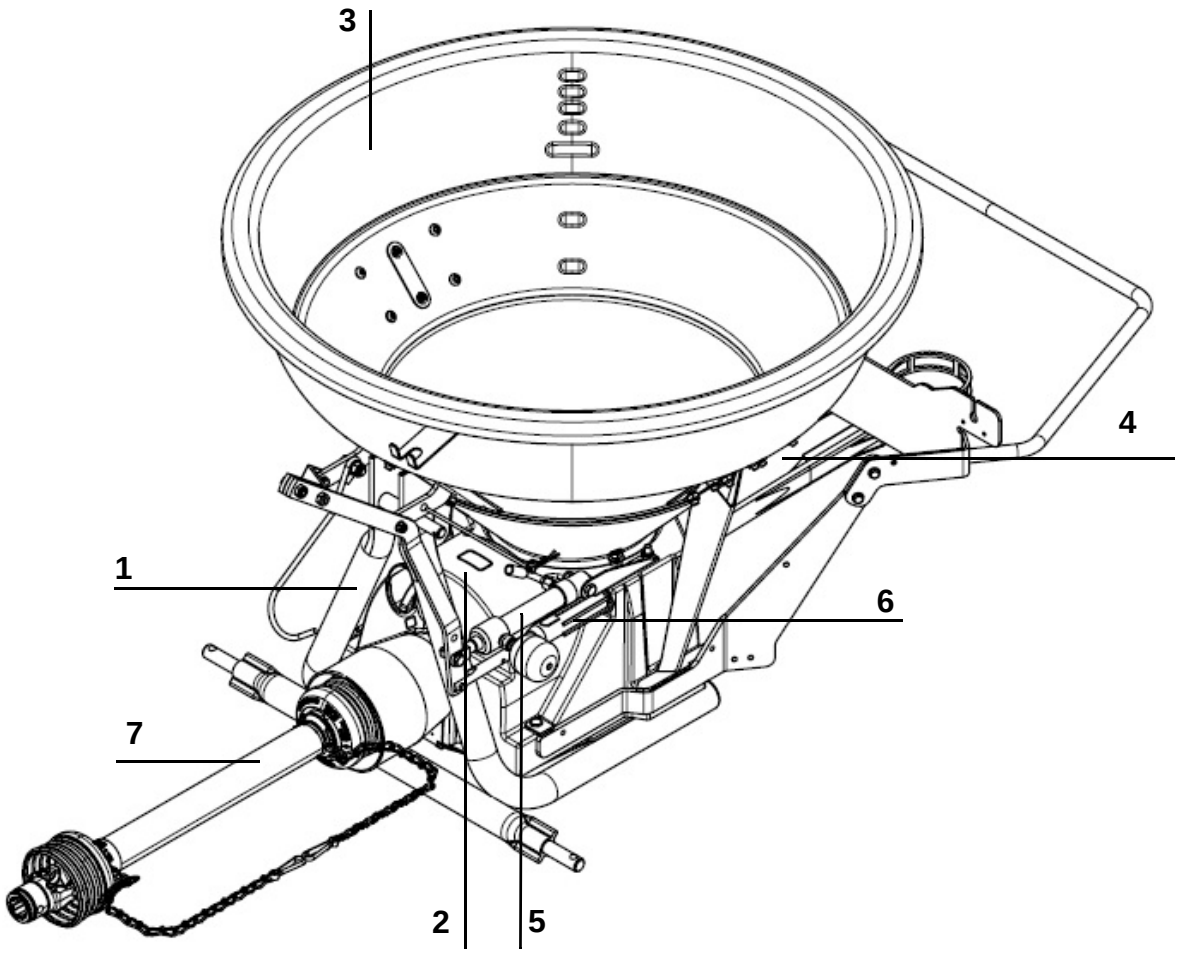
Inspection of the supplied machine

Your spreader may not be the same as the one shown. However, all Pendulum spreaders are equipped with the following main components:

1. the frame,
2. the spreading unit,
3. the hopper and possibly a hopper extension,
4. the spreading spout,
5. the control lever or the hydraulic / electronic operation,
6. the regulating rod,
7. the coupling shaft,

- chosen accessories,

→ see chapter »Accessories« from page 99.



The dealer will provide instructions for use and maintenance. You receive from the dealer:

- the installation manual,
- the user manual
- the spare parts manual
- the spreading chart decal
- the slide ruler.

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

General

The machine must be assembled before use.

INDICATION When assembling the spreader, use:

- the installation instructions that are included.
- the spare part manual for the name and location of parts.



Use the correct bolts and nuts
These are calculated on the forces on site. Using other bolts and nuts could result in damage to the machine and possible physical injury.

Use sturdy hoisting equipment
Only use approved straps or hoisting chains to lift the machine or parts of the machine. Carefully choose the fastening bolts on the machine. 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
- carrying out maintenance or repair activities.

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:

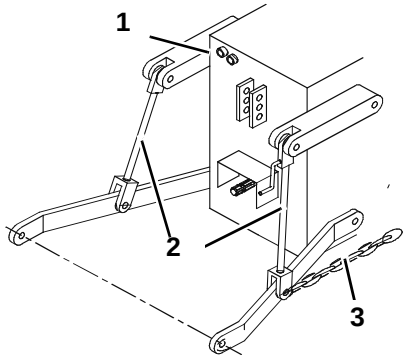
- place the machine on adequate supports,
- switching off the PTO shaft,
- releasing the pressure from the hydraulic system,
- switch the tractor off and remove the key from the ignition,
- engage the parking brake of the tractor,
- wearing protective gear, carrying out the described operation alone and with care

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 30,
- correct type of properly adjustable power lift,
- adequate number of hydraulic valves **(1)**,
  → See paragraph »Required hydraulic valves« on page 33.

power lift



The tractor must be equipped with a cat.I (VS 220/330), cat.I/II (VS 400/500) or cat.II (VS 600-1650)three-point power lift.
Light operation of top link and lift rod adjustment **(2)** is important. This system is used for several machine settings.

The tractor must be equipped with stabiliser rods or chains **(3)** for:

- to limit the sideways movements of the machine to 2-5 cm and
- being able to select the correct position of the machine relative to the tractor.

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 valves

Function	Single	Double
Standard spreader	-	-
Accessories		
Hydraulic operation dosing	1	-
Tramline cylinder	1	-

Electrical installation

Lighting
A socket is required for the lights.

ED II
The ED II has its own connection to the tractor battery with fuse.

Mounting the coupling shaft

The coupling shaft provided is too long for most types of tractors
The coupling shaft must be made 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 »Checking the coupling shaft length«, and
→ the paragraph »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.

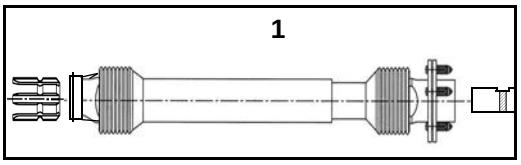
▸ Connect the machine to the tractor but keep the coupling shaft loose!

→ See chapter »Hitching to the tractor« on page 37.

Checking the coupling shaft length

Put the machine on a supporting beam before moving in between the tractor and machine
The machine is now unable to lower if the power lift is operated unintentionally. Without the support, a power lift that drops could wedge you in, resulting in possible serious physical injury.

NOTE! 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.

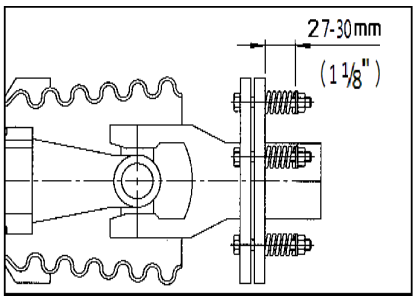


▸ Lift the machine with the power lift until the PTO shaft and the machine drive axle are level **(1)**.

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.
▸ Remove the protection sleeves
▸ Mount the loose tractor section of the coupling shaft to the tractor PTO shaft.

Setting the safety clutch



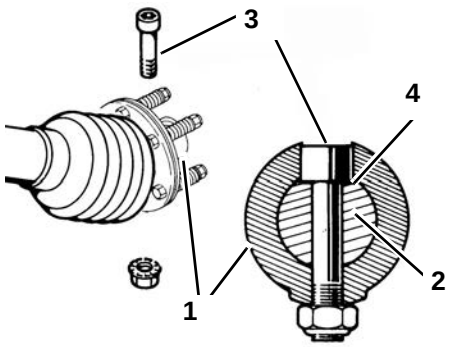
There is a safety clutch on the machine side of the coupling shaft. This safety clutch protects the machine against overloading

.

- First check the setting of the pressure springs in the safety clutch. The spring length must be 27< x < 30 mm.

NOTE! **This is a guideline for the control at 300Nm with the torque wrench.**

- Set the torque wrench to 300 Nm. Friction should occur as soon as it is turned.



assembly

- Attach the loose machine component of the coupling shaft **(1)** to the drive axle **(2)** of the machine.

At the side of the machine the coupling shaft is secured with a bolt (3).

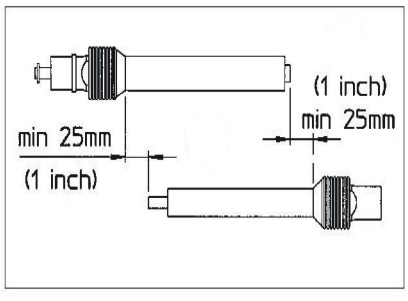
- Shift the coupling shaft onto the drive axle of the machine.
- Take care that the large hole in the coupling shaft hub is above the chamber **(4)** in the hole of the drive axle.
- Push the bolt through the coupling shaft and drive axle. Don't tighten the nut yet, you still have to adjust the length of the coupling shaft and put back the protection sleeves.

→ See paragraph »Checking the coupling shaft length« on page 34.

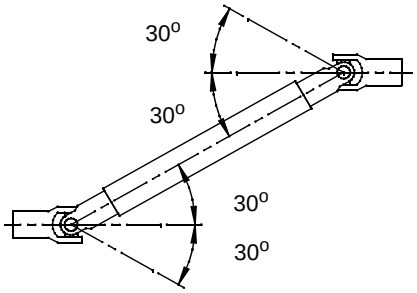
- Manually align the two coupling shaft halves.
- Check the length and set it as described in paragraph »Shortening the coupling shaft« on page 35.
- After shortening and assembling the coupling shaft, tighten the nut at 70 Nm.

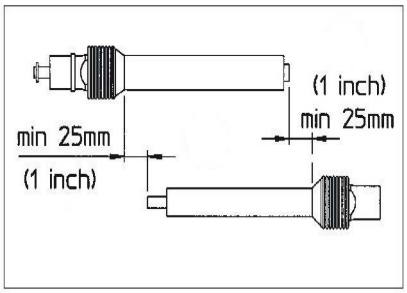
Shortening the coupling shaft

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

The machine is now unable to lower if the power lift is operated. Switch off the tractor engine as well.

Extreme working angle of the coupling shaft

The maximum deflection of the coupling shaft is 30° up and 30° down. 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
Make sure that parts such as ropes and hoses that activate for example cylinders are positioned in such a way that they can never inadvertently be activated or blocked!
.

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

- a tractor with sufficient carrying capacity and stability must be used,
  → See paragraph »Calculate the axle load with tractor-mounted machines« on page 14.
- engage the parking brake of the tractor,
- a mobile machine must also be protected from rolling away while being connected,
- the machine must only be connected and disconnected from the tractor on a firm, dry and flat surface so that the machine cannot 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.

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

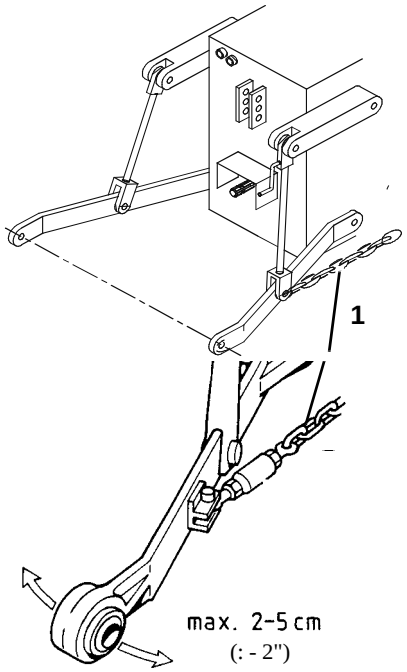
- no damage, including the protection sleeves?
- are there sufficient lubricants as prescribed?
- is there the prescribed overlap of the coupling shaft halves and protection sleeves, both in transport and in working position?
- Are the protection sleeves attached with chains to a fixed point to guard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

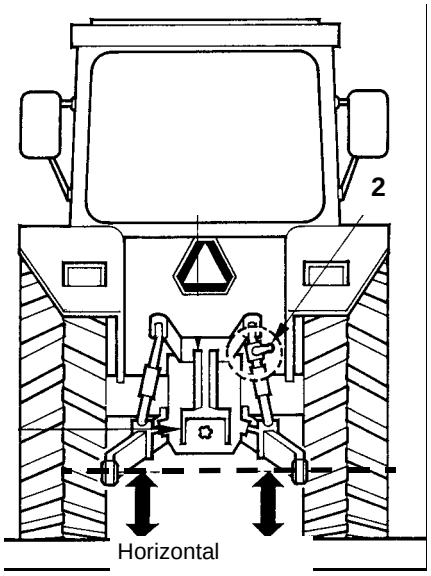
The space between the spreader and the tractor is limited as far as possible in order to keep the centre of gravity as closely to the tractor as possible. This promotes stability and the road behaviour of the tractor. As a result the coupling shaft, hydraulic hoses and electric plugs must be connected 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).
- Bring the lower links of a tractor with fixed eyes to the same height as the linkage pins of the machine.
- 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.

- Set the stabiliser chains **(1)** in such a way that the sideways movements of the machine are no more than 2-5 cm.



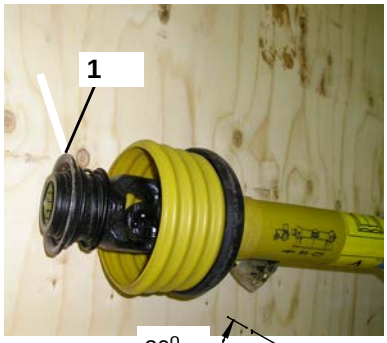
- Compensate for any height difference with the lift rod adjustment **(2)** of the power lift.
- Mount the appropriate ball bearings to the linkage pins and the top pin.
- Secure the linkage pins and top pin again.

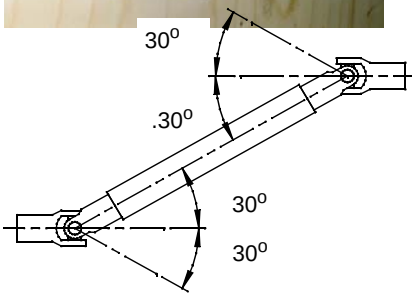
Front power lift

Only connect the machine to the front power lift if:

- it has sufficient lifting power,
- it is within the same linkage pin 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.

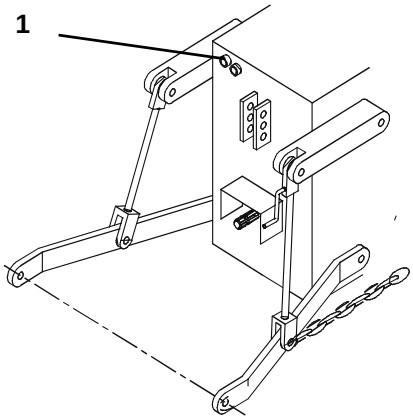
→ See paragraph »Checking the coupling shaft length« on page 34 and
→ paragraph »Shortening the coupling shaft« on page 35.

- Check the PTO shaft and the connector for dirt or damage.
- Press the safety plate **(1)** into the connector.
- Slide the connector on the PTO shaft.
- Let go of the safety plate.
- 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 the lifting and lowering of the power lift, the coupling shaft must be sufficiently able to:

- be extended or retracted,
- overlap between the profiled tubes in the extreme working angle of 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 oil direction on the machine and the tractor (+ and - or P and T).
Incorrect connection of the hydraulic hoses could lead to the functions working the other way around (such as lifting instead of lowering). This could lead to dangerous situations and damage the crops.

- Remove the hose from the hose support and check the quick coupling for dirt.
- Clean the quick coupling if required.
- Put the quick couplings in the correct valve connection point **(1)** of the tractor. Keep the flow direction of the oil in mind (+ and – or P and T).

  → See paragraph »Required hydraulic valves« on page 33.
- 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 94.

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, so that the quick couplings can never be unintentionally disconnected.

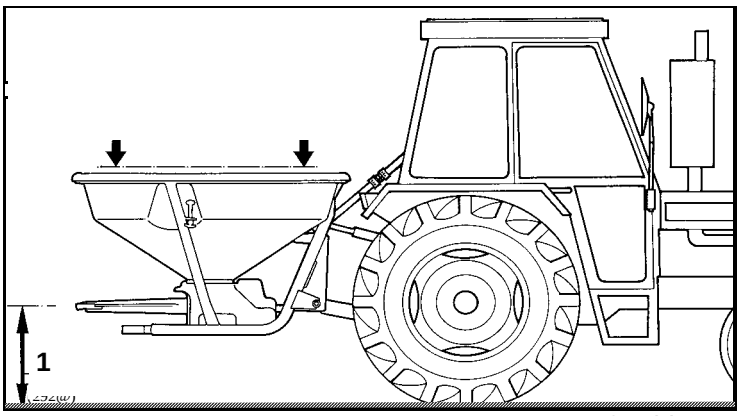
This is also essential with the lifting device in the lowest position. Accidental disconnection could cause damage to the machine and may lead to personal injury.

- 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 pin and close the quick coupling.
- Check if the catch hook is correctly secured by pushing and pulling the machine.

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.

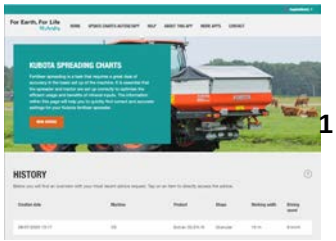


- Preferably set the machine at working height: centre spreading spout 75 cm **(1)** above the ground or crop.

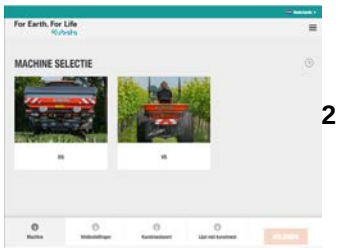
NOTE!

- Take care that the hopper or control lever does not touch the tractor during lifting.
- 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.
- Set the machine laterally 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.
- Check the stabiliser chains:
  - Chains may not be taut.
  - The sideways movements of the machine may not be more than 2-5 cm.
- Check the fastening of the spreading spout.
- Check the spreading spout and spreading bracket for wear and tear, damage and hairline cracks. Replace them if necessary.

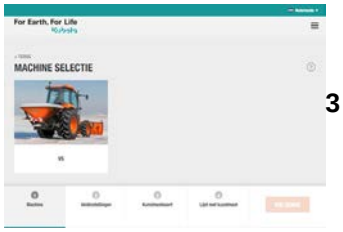
Online spreading chart service



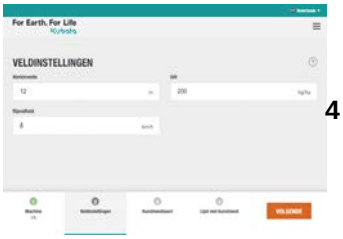
1



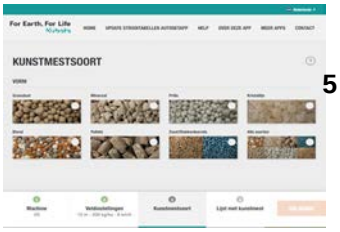
2



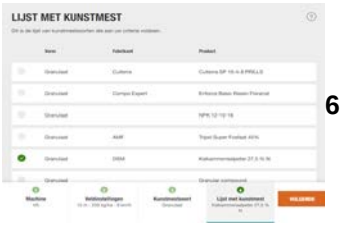
3



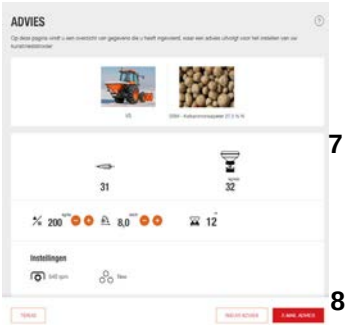
4



5



6



7
8

Setting dosing via the Internet
You can find the spreader settings on the spreading chart sticker, but also via the online spreading chart service. This will also provide information about additional types of fertiliser that have been tested recently.

Enter the requested data on the ***website www.kubotaspreadingharts.com*** and you will receive advice on the spreader settings for your type of fertiliser.

Procedure:
1. First select your language in the top right corner and then select “New advice”.
2. Select your machine type and click “Next”.
3. Select your machine type again and click “Next”.
4. Enter your field settings and click “Next”.
5. Select your fertiliser type and click “Next”.
6. Select “the fertiliser” from the list and click “Next”.
7. Take note of the advice given.
8. Or select “New advice”.

Setting the dosing without the website
Do you not have an Internet connection?

- Follow the steps as described in:

  → »Finding the correct setting for your spreading work« on page 44.

Methods for setting the spreader can be found at:
→ chapter »Setting the spreader« on page 49.

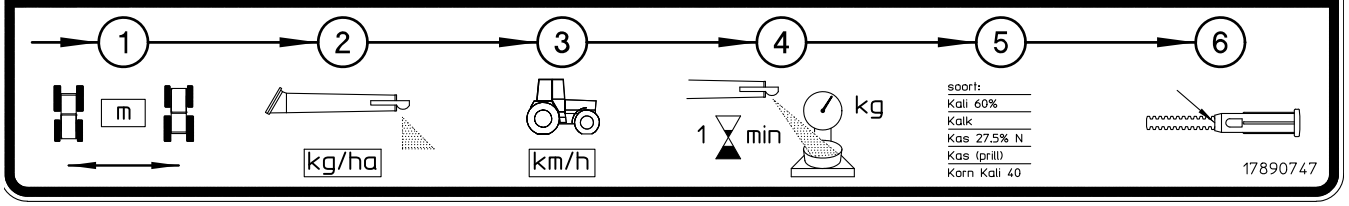
Make sure you check the instructions given on the online spreading chart service. Do a calibration test to check the dosing setting. Then check the spreading pattern with a tray test.
→ See paragraph »Calibration test« on page 59 and
→ paragraph »Check the spreading pattern (tray test)« on page 62.

Finding the correct setting for your spreading work

STROOITABEL

⑤ Soort:	stand ⑥ 12	18	24	30	36	42	48	54	60	66	accessoires	540 rpm aanbevolen strooibreedte (m)	620 rpm aanbevolen strooibreedte (m)
	resultaat kg/min ④												
Kali 60%			17.1	25.2	33.6	45.9	56.8	80.0	99.2	121.6		8-12	15
Kalk			25.6	32.6	46.8	59.4	78.3	101.0	125.4		poeder-set	5-6	
Kas 27.5% N			20.1	30.3	41.7	55.2	72.0	92.0	120.0	148.8		8-12	15
Kas (prill)			23.4	31.1	44.4	60.6	79.6	102.8	128.0	159.3		8-12	15
Korn Kali 40		12.7	22.1	31.4	40.8	55.5	71.9	90.2	113.3	136.5		8-12	15
NP 18.46		14.2	23.9	33.6	43.3	55.1	69.2	85.6	106.0	126.4		8-12	15
NP 23.23			17.4	26.1	34.2	46.8	62.8	79.2	102.8	125.2		8-12	15
NPK 12.10.18			18.0	27.0	36.6	49.2	66.0	84.4	106.0	120.8		8-12	15
NPK 20.10.10			18.6	28.2	37.5	50.0	65.2	84.0	106.4	139.2		8-12	15
Nutramon		13.9	24.5	35.2	45.8	59.9	76.3	95.2	123.1	151.0		8-12	15
Patent Kali 30		16.9	27.8	38.6	49.5	63.8	80.7	100.3	122.3	144.2		8-12	15
PK 25.25		12.9	19.2	29.1	39.9	53.1	74.4	93.2	118.4	148.0		8-12	15
Prills-fijn			24.0	35.1	47.7	62.4	80.8	103.2	128.8	161.0		8-12	15
Prills-grof			22.2	32.1	42.6	60.4	77.2	99.2	122.4	150.8		8-12	15
Raaigras	1.2	2.8	5.2	8.7							fijn doseerset	6-10	
Start 18.3.3 minigran					11.2	16.5	22.4	29.0	35.6	42.2	fijn doseerset	5-6	
Tarwe			14.4	24.0	32.7	46.8	60.5					8-12	
Th. Slakkenmeel				57.9	75.1	108.9	136.2	164.3			poeder-set	5-6	
Tripel Super Fosfaat			16.2	24.0	34.2	45.6	60.4	76.4	100.0	123.2		8-12	15
Urea 46% N (prill)		17.2	26.9	36.6	46.3	58.5	73.8	92.2	114.0	135.8		8-12	
Vivifos 4.30 minigran					11.5	19.0	26.0	32.5	39.1	45.6	fijn doseerset	5-6	

Waarden zijn een richtlijn, controleer instelling met afdraaiproef



At the bottom of the spreading chart decal there is an illustration that explains how to determine the setting in 6 steps:

6-step method:

Explanation of the 6-step method:

1 ▸ Determine the working width you are going to drive in metres.

2 ▸ Determine the application rate you want to spread in kg/hectare.

3 ▸ Determine your driving speed in km/hour.

4 ▸ Calculate the flowrate in kg/minute.

5 ▸ Search for the setting data of the fertiliser type on the spreading chart decal.

6 ▸ Set the regulating rod and fit the recommended accessories.

- The right column next to the positions gives instructions on the accessories you use during the spreading work.
- The columns on the extreme right display the PTO shaft rpm at the working width.

Use a slide rule and spreading chart decal

Now that the fertilizer type has been determined, the other data are processed for the correct setting of the spreader.

Calculation of the flowrate (kg/min)

If you do not have access to the Internet, first calculate the dosing in kg/min that applies to your application rate, working width and driving speed.

- For this use
  - the discharge formula kg/m.
  - or the slide rule.

Example 2:
You are going to spread with the following values:

Desired application rate (kg/ha)	200
Desired working width (m)	15
Desired driving speed (km/h)	8
Type of fertiliser (-)	granular

Flowrate calculation formula (kg/min)

The calculation of the flowrate of fertiliser per minute in formula form is:

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

$$\text{Flowrate (kg/min)} = \frac{200 \times 8 \times 15}{600}$$

The flowrate becomes 40 kg/min.

- Use this value for finding the correct setting value for your fertiliser type on the spreading chart decal.

The machine has been supplied with a slide rule with which you can easily determine the flowrate in kg/min.

→ See paragraph »Determining the flowrate (kg/min.) with the slide rule« on page 46.

The slide rule

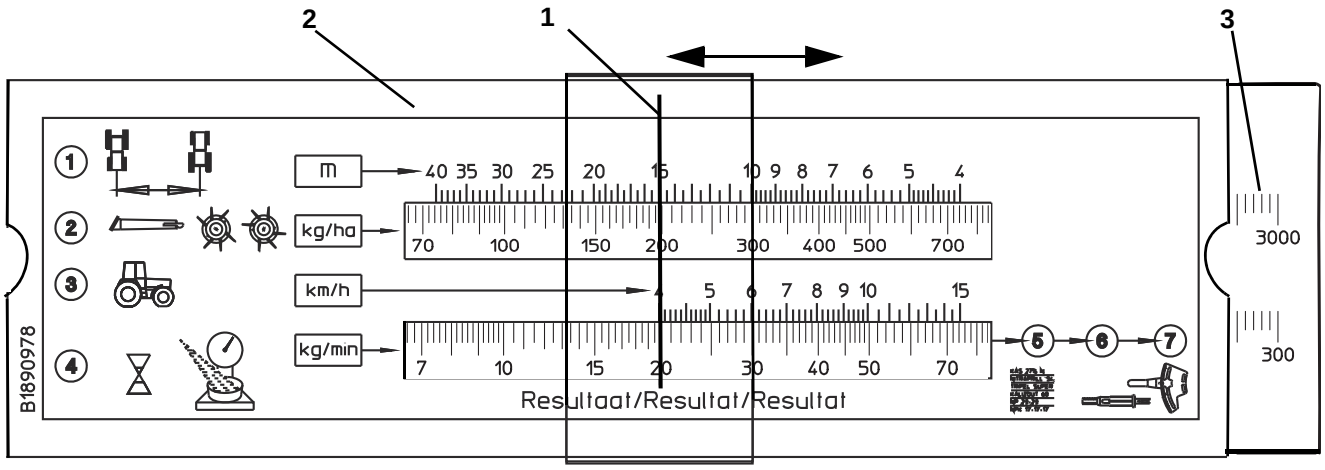
The slide rule that has been supplied with your spreader is used for determining the flowrate in kg per minute (step 1-4).
You use it for:

- finding the setting of the regulating rod on the spreading chart decal (steps 5 and 6).
- and for conducting a calibration test.

  (step 7 is for the disc spreaders)

Metric and Imperial

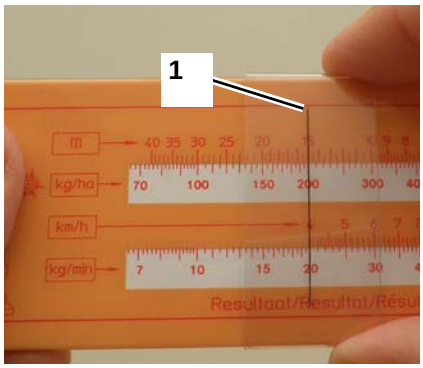
On the front of the slide rule are metric units and on the back imperial units.



The slide rule consists of three parts:

- Transparent glass **(1)** with hairline; can slide along outer case.
- Outer case **(2)** with 6 steps to determine the setting.
- Sliding ruler **(3)** with the values kg/ha and kg/min on the metric side; can slide to the left or right.

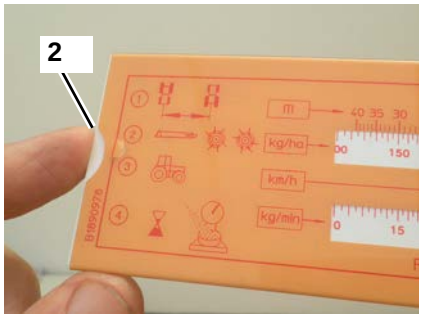
Determining the flowrate (kg/min.) with the slide rule



Select step for step the following values on the slide rule:

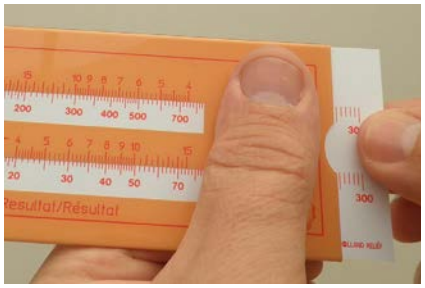
1. Working width (m)

▸ Set the hairline **(1)** of the ruler on your working width; in this example 15 metres.



2. Application rate (kg/ha)

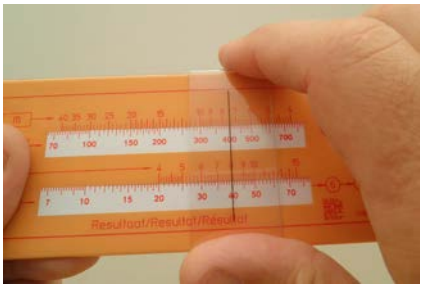
▸ Push the ruler at the left slot **(2)** to the right



- Pull the ruler further to the right until the application rate of 200 kg/ha is level with the hairline and the 15-m working width.



- Grasp the outer case between the left thumb and the forefinger.
  Now the ruler cannot move in the outer case



3. Driving speed (km/h)

- Move the hairline onto the driving speed with which you are going to spread; 8 km/hour.



4. Flowrate (kg/min.)

- Read the flowrate given under the 8 km/hour:

In this example, *40 kg/min*.

With this flowrate you can find all the settings on the spreading chart decal for the fertiliser to be used.

Spreading chart decal

The spreading chart indicates what type of fertiliser is best suited to achieving a good distribution.
The construction of the chart is based on the result of the steps 1 to 4 with which you have determined the flowrate

.

→ See paragraph »Determining the flowrate (kg/min.) with the slide rule« on page 46.

Finding the correct spreading chart

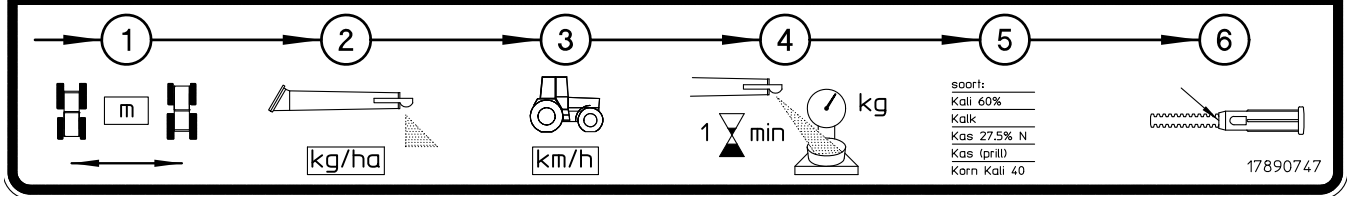
With the flowrate in kg/min. you search for the dosing setting on the spreading chart decal for the fertiliser to be used.

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STROOITABEL

⑤ Soort:	stand ⑥ 12	18	24	30	36	42	48	54	60	66	accessoires	540 rpm aanbevolen strooibreedte (m)	620 rpm aanbevolen strooibreedte (m)
	resultaat kg/min ④												
Kali 60%			17.1	25.2	33.6	45.9	56.8	80.0	99.2	121.6		8-12	15
Kalk			25.6	32.6	40.8	59.4	78.3	101.0	125.4		poeder-set	5-6	
Kas 27.5% N			20.1	30.3	41.7	55.2	72.0	92.0	120.0	148.8		8-12	15
Kas (prill)			23.4	31.1	44.4	60.6	79.6	102.8	128.0	159.3		8-12	15
Korn Kali 40		12.7	22.1	31.4	40.8	55.5	71.9	90.2	113.3	136.5		8-12	15
NP 18.46		14.2	23.9	33.6	43.3	55.1	69.2	85.6	106.0	126.4		8-12	15
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NPK 20.10.10			18.6	28.2	37.5	50.0	65.2	84.0	106.4	139.2		8-12	15
Nutramon		13.9	24.5	35.2	45.8	59.9	76.3	95.2	123.1	151.0		8-12	15
Patent Kali 30		16.9	27.8	38.6	49.5	63.8	80.7	100.3	122.3	144.2		8-12	15
PK 25.25		12.9	19.2	[illegible]	39.9	53.1	74.4	93.2	118.4	148.0		8-12	15
Prills-fijn			24.0	35.1	47.7	62.4	80.8	103.2	128.8	161.0		8-12	15
Prills-grof			22.2	32.1	42.6	60.4	77.2	99.2	122.4	150.8		8-12	15
Raaigras	1.2	2.8	5.2	8.7							fijn doseerset	6-10	
Start 18.3.3 minigran					11.2	16.5	22.4	29.0	35.6	42.2	fijn doseerset	5-6	
Tarwe			14.4	24.0	32.7	46.8	60.5					8-12	
Th. Slakkenmeel				57.9	75.1	108.9	136.2	164.3			poeder-set	5-6	
Tripel Super Fosfaat			16.2	24.0	34.2	45.6	60.4	76.4	100.0	123.2		8-12	15
Urea 46% N (prill)		17.2	26.9	36.6	46.3	58.5	73.8	92.2	114.0	135.8		8-12	
Vivifos 4.30 minigran					11.5	19.0	26.0	32.5	39.1	45.6	fijn doseerset	5-6	

Waarden zijn een richtlijn, controleer instelling met afdraaiproef



In this example, PK 25.25 with the flowrate of 40 kg/min. is used.

- **5. Select the fertiliser type, PK 25.25, which you are going to spread, from the left column.**
  - As a rule search for the correct flowrate; **here 39.9 kg/min**.
- **6. Read off the setting of the adjusting nut above the column found.**

The position found is 36.

→ See further paragraph »Setting the spreader« on page 49.

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 adjusting the spreader.
Work carefully, while adjusting the spreader while there is an abandoned tractor:

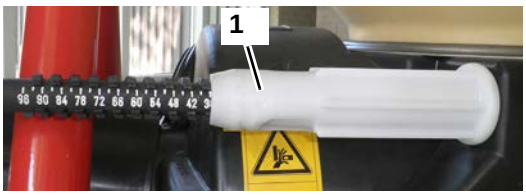
- switch it off and remove the key from the ignition,
- engage the parking brake,
- wait for all machine parts to come to a standstill before you start with filling, adjusting or testing,
- never go underneath an unsecured, elevated spreader,
- carefully follow the instructions given.

Friction with these materials could cause physical injury.

Protecting the environment
Spreading a too high dose of materials outside of the perimeter, 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.

Spreader settings for full-field spreading



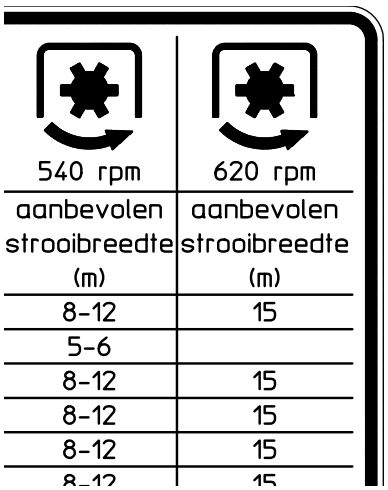
On the basis of the example's data you can now set the spreader.

- **Setting regulating rod for correct application rate**

The spreader application rate is set on the regulating rod with the number found on the spreader chart decal or the website, in the example position 36.

▸ Turn the adjusting nut **(1)** on the regulating rod to position **36**.

→ See also paragraph »Use a slide rule and spreading chart decal« on page 45 and the paragraph »Online spreading chart service« on page 43.



540 rpm	620 rpm
aanbevolen strooibreedte (m)	aanbevolen strooibreedte (m)
8-12	15
5-6	
8-12	15
8-12	15
8-12	15
8-12	15

- **Setting PTO shaft rpm (1)**

Working widths up to 12 metres are spread with 540 rpm.
Type depends on the PTO shaft revolutions of 620 rpm for working with larger working width.

It is only possible if it is stated on the spreading chart website or the spreading chart decal!

- Set the PTO shaft rpm on 620 rpm for the 15-metre working width as per example.
- Check if the spreading spout turn is in the correct position (min. or max.)

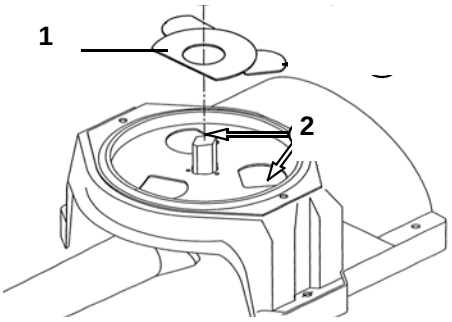
  → See »Spreading spout turn adjustment (accessory)« on page 28.

Use of optional extras

Use of the powder kit
For powdery fertiliser such as lime and basic slag you must

- use a 225 or 600-litre hopper with a steep funnel shape,
- an agitator crown
- and sieve.

For the type in the example no accessory is recommended.

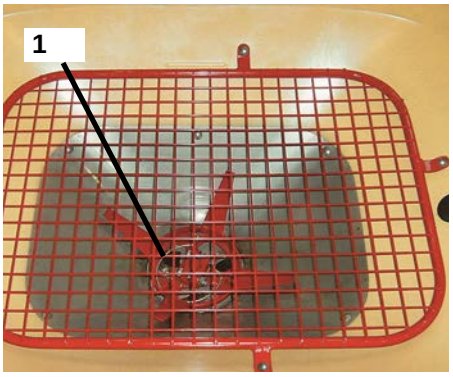


Use fine application under 20 kg/min.
With outflow values below 20 kg/min the inlet of the three dosing holes is small.

- Mount the fine dosing **(1)** on the spreading plate.
- The accessory seals 2 holes **(2)**. With a larger opening the setting is more accurate and blockage is prevented.

→
See paragraph »Fine application« on page 53.
The calculated flowrate in the example is 40 kg/min.

- Do not use the fine application.



- **Whether or not to use the agitator crown**

  Some types of fertiliser can quickly cause larger chunks and cause bridge formation. An agitator crown **(1)** and a sieve prevent this.

Always mount the sieve on top of the agitator crown.
The sieve will prevent direct contact with the strongly moving agitator crown.
Removing the sieve may result in serious personal injury.

TIP Remove the agitator crown in well-flowing fertiliser. The agitator crown can cause crushing and dust formation. This has a detrimental effect on the quality of the spreading.

Dosing setting with a different driving speed

If your tractor is not able to drive at the given PTO shaft rpm at the speed displayed in the spreading chart, you have to determine the dosing setting again via the online spreading chart, the slide rule or the formula.

- Enter the correct driving speed again on the online spreading chart.

Or

- Use the slide rule.

Or

- Calculate the flowrate required with your driving speed.

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

The following will be achieved with the fertiliser and spreading chart from the example:
→ Refer to »Example 2:« on page 45.
Suppose you want to spread with a working width of 15 metres and an application rate of 200 kg/ha, but your tractor drives 8.9 km/h at a PTO shaft rpm of 540, instead of 8 km/h.

- The required flowrate is obtained from the formula:

$$\text{Flowrate (kg/min)} = \frac{200\ (\text{kg/ha}) \times 15\ (\text{m}) \times 8.9\ (\text{km/h})}{600}$$

- Flowrate: 44.5 kg/min.

STROOITABEL

⑤ Soort:	stand ⑥ 12	18	24	30	36	42	48	54	60	66	accessoires	540 rpm aanbevolen strooibreedte (m)	620 rpm aanbevolen strooibreedte (m)
	resultaat kg/min ④												
Kali 60%			17.1	25.2	33.6	45.9	56.8	80.0	99.2	121.6		8-12	15
Kalk			25.6	32.6	46.8	59.4	78.3	101.0	125.4		poeder-set	5-6	
Kas 27.5% N			20.1	30.3	41.7	55.2	72.0	92.0	120.0	148.8		8-12	15
Kas (prill)			23.4	31.1	44.4	60.6	79.6	102.8	128.0	159.3		8-12	15
Korn Kali 40		12.7	22.1	31.4	40.8	55.5	71.9	90.2	113.3	136.5		8-12	15
NP 18.46		14.2	23.9	33.6	43.3	55.1	69.2	85.6	106.0	126.4		8-12	15
NP 23.23			17.4	26.1	34.2	46.8	62.8	79.2	102.8	125.2		8-12	15
NPK 12.10.18			18.0	27.0	36.6	49.2	66.0	84.4	106.0	120.8		8-12	15
NPK 20.10.10			18.6	28.2	37.5	50.0	65.2	84.0	106.4	139.2		8-12	15
Nutramon		13.9	24.5	35.2	45.8	59.9	76.3	95.2	123.1	151.0		8-12	15
Patent Kali 30		16.9	27.8	38.6	49.5	63.8	80.7	100.3	122.3	144.2		8-12	15
PK 25.25		12.9	19.2	31.1	39.9	53.1	74.4	93.2	118.4	148.0		8-12	15
Prills-fijn			24.0	35.1	47.7	62.4	80.8	103.2	128.8	161.0		8-12	15

Determining an intermediate dosing setting

The calculated value cannot be read directly on the rule.
The calculated value of 44.5 kg/min. lies between the 39.9 and 53.1 kg/min.
It follows from the spreading chart that the dosing setting is between 36 and 42.
This translates to 6 steps or clicks of the adjusting nut.
The adjusting nut has 6 positions or “clicks” per rotation.

Per click the flowrate increases by $\frac{53,1 - 39,9}{6}$ 2.2 kg/min.

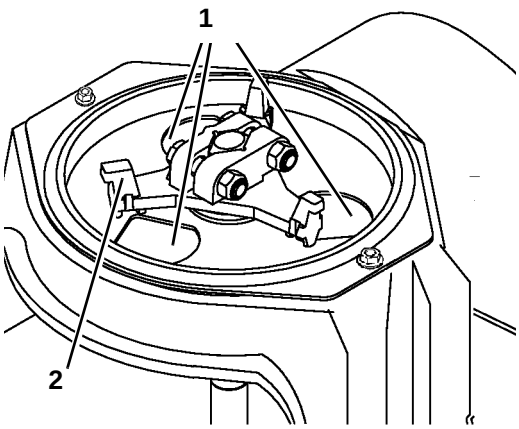
Positions 36 to 42 increase as shown in the chart below

Dosing setting	Discharge (kg/min)
36	39,9
37	42,1
38	44,3
39	46,5
40	48,7
41	50,9
42	53,1

Position 38 corresponds to the calculated flowrate.

- Set the nut of the regulating rod on position 38.
  This is 2 “clicks” further than position 36.
- Do a calibration test to check the setting.
  → See »Carrying out calibration test« on page 60.

Fine application



All three dosing openings normally open **(1)** uniformly with the dosing set by you.
In the case of a low application rate and/or low driving speed, the dosing openings are only slightly open, causing blockages, which can lead to a poor spreading pattern and damage to the crop.

Kverneland therefore advise that you make use of the fine application kit if the flowrate is **less than 20 kg/min**.

Close 2 of the 3 dosing openings to prevent blockages. The remaining opening will then open further.
In order to close 2 of the 3 dosing openings, the fine application kit is fitted at the location of the agitator **(2)**.

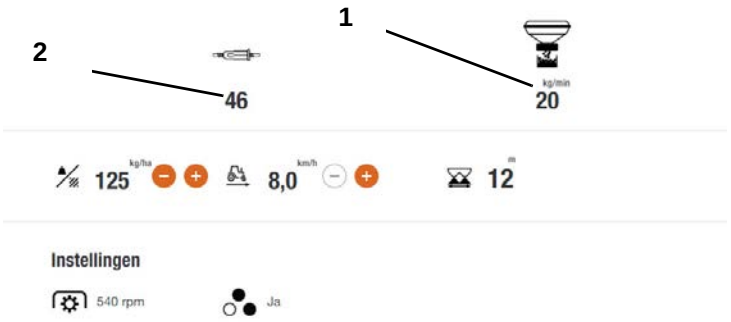
When you apply the fine application kit you must use the dosing setting of a 3 times higher flowrate, see Kverneland's website.

- Adjust the dosing with
- the online spreading chart. (choice of fine application or not).
- with slide ruler and spreading chart decal.

The chart below indicates under the heading “settings” that fine application is applied. The shown dosing setting has then already been converted.



(1) = flowrate
(2) = Position on the regulating rod



Calculating and adjusting dosing setting with fine application

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

With the fertiliser type and spreading chart from the example, you want to come to an application rate of 125 kg/ha at a working width of 12 metres and a driving speed of 8 km/h.

- Determine the flowrate with the slide rule or the formula.

The calculated flowrate is 20 kg/min.
Therefore you use fine application and set the dosing setting on the position where 20 x3 = 60 kg/min. is spread with 3 holes open.

STROOITABEL

⑤ Soort:	stand ⑥ 12	18	24	30	36	42	48	54	60	66	accessoires	540 rpm aanbevolen strooibreedte (m)	620 rpm aanbevolen strooibreedte (m)
	resultaat kg/min ④												
Kali 60%			17.1	25.2	33.6	45.9	56.8	80.0	99.2	121.6		8-12	15
Kalk			25.6	32.6	46.8	59.4	78.3	101.0	125.4		poeder-set	5-6	
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Kas (prill)			23.4	31.1	44.4	60.6	79.6	102.8	128.0	159.3		8-12	15
Korn Kali 40		12.7	22.1	31.4	40.8	55.5	71.9	90.2	113.3	136.5		8-12	15
NP 18.46		14.2	23.9	33.6	43.3	55.1	69.2	85.6	106.0	126.4		8-12	15
NP 23.23			17.4	26.1	34.2	46.8	62.8	79.2	102.8	125.2		8-12	15
NPK 12.10.18			18.0	27.0	36.6	49.2	66.0	84.4	106.0	120.8		8-12	15
NPK 20.10.10			18.6	28.2	37.5	50.0	65.2	84.0	106.4	139.2		8-12	15
Nutramon		13.9	24.5	35.2	45.8	59.9	76.3	95.2	123.1	151.0		8-12	15
Patent Kali 30		16.9	27.8	38.6	49.5	63.8	80.7	100.3	122.3	144.2		8-12	15
PK 25.25		12.9	19.2	29.4	[illegible]	53.1	74.4	93.2	118.4	148.0		8-12	15
Prills-fijn			24.0	35.1	47.7	62.4	80.8	103.2	128.8	161.0		8-12	15

As a rule PK 25.25 is 60 kg/min. between position 42 and 48.

The difference per position is $\frac{74,4 - 53,1}{6}$ = 3.55 kg/min.

Position 42 gives a flowrate of 53.1 kg/min.
This is 60 - 53.1= 6.9 kg/min. too low.
The position in which there is a flowrate of 60 kg/min. is:

$$42+ \frac{6,9}{3,55} = 42+2 = 44.$$

- Check the set position with a calibration test.

→ See paragraph »Calibration test« on page 59.

Correcting the dosing setting with fine application

The result of the calibration test may require a corrective action. See the example below.

For example:
The expected result is 20 kg/min.
In 1 minute you have collected 21.2 kg of fertiliser.
That is 1.2 x 3 = 3.6 kg/min too much with all the dosing holes open.

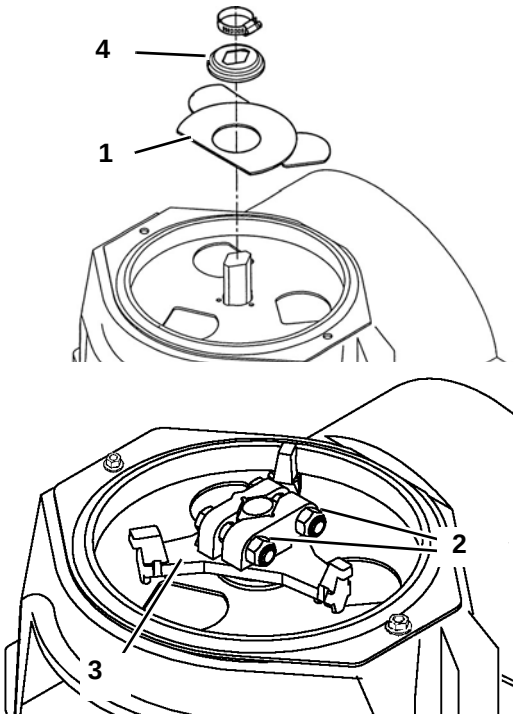
This value differs too much from the expected value, so the dosing setting must be adjusted.

- Multiply the actual flowrate with a factor of 3 so that you will know what the flowrate would be with all 3 dosing openings opened: 21.2 x 3 = 63.6 kg/min.

Per click of the adjusting nut the reduction in this area is calculated at 3.55 kg/min.

- Set the correct setting: 44- 1 = 43.
- Perform another calibration test.

Fitting the fine application kit



The fine application kit **(1)** has two plates that drop into the front dosing openings. By means of this two openings are closed off.

- Dismantle the hopper.
- Loosen the locking bolts **(2)** of the agitator.
- Remove the agitator.
- Place the fine application kit in the two front dosing openings.
- Place the seal ring over the centre areas
- Fit the hose clamp in such a way that the seal ring lightly presses the fine application.
- Mount the hopper back into its place.
- Secure the hopper with the rubber fasteners.

Ending fine application

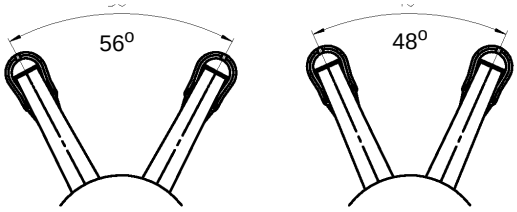
NOTE: During a next spreading operation the application rate can again require normal dosing.

- Disassemble the fine application kit
- and fit the agitator **(3)** and the seal ring **(4)**.
- Tighten the two locking bolts of the agitator to 120 Nm

Other settings

Spreading spout turn adjustment (accessory)

If during the reduction of the working width the PTO shaft rpm becomes too low it is optional to adjust the spreading spout turn.



Working widths vary with the angle of the spreading spout
This enables you to reduce the working width by approx. 25%.
The standard spreading spout spreads with the small angle of approx. 9-metre working width instead of 12 metres with the large angle.

Setting the spreading spout with the key
The back and forth turn of the spreading spout can be set to a smaller angle with an (optional) key.
The turn adjustment can be reached through a covered opening in the protective cover of the spreading unit.

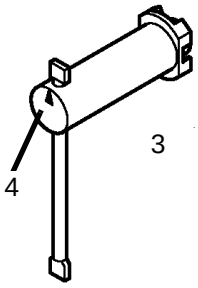


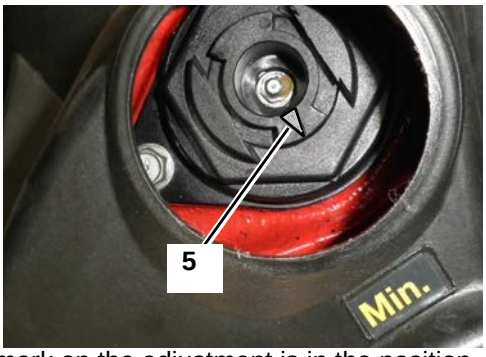
- Remove the cap **(1)** in the protective cover.

Spreading spout turn adjustment in maximum position. The arrow points to Max.

- Put the key **(3)** with the arrow **(4)** upwards in the adjustment.
- Press the key, against the spring pressure, into the adjustment.
- Now turn the key until the arrow points to the Min. position **(5)**.
- Let the key spring back.







- Check if the identifying mark on the adjustment is in the position you desire.
  → See also the illustration on the left.

- Close the opening with the cap.

NOTE: Set the turn adjustment back again on the maximum turn prior to standard spreading work!

Filling



Avoid contact with the fertiliser and other material
Wear protective clothing, gloves, safety shoes and goggles.
Contact with the materials could lead to injury. Contact your physician in such an event

Chemical reactions resulting from the mixing of 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!
- Only mix fertiliser types if the combination is permitted by the manufacturer(s).
- 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.

Use proper tools
Use proper hoisting tools, when transporting the equipment and when filling the machine.
Observe the legislation on working conditions.

Work with a closed cabin
Fertiliser dust can blow indoors through open windows, doors or other openings. The noise level is also higher in an open cab.
Preferably work in a closed cabin with active carbon filters in the air inlets.

INDICATION Most types of fertiliser attract water, forming large chunks that clog the spreader or disrupt the spreading pattern.

- Do not spread without a hopper cover under moist conditions.
- When working under moist conditions, use a hopper cover that closes well
- Never leave the fertiliser for a long period of time in the spreader.
- 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. 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 30.

Working method

- 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.
- Ensure that the dosing unit is closed and close it, if necessary.
- 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.
- Open the hopper cover.
- Fill the machine to the desired level with the correct tools.

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.

Do not exceed the maximum recommended weight!
→ See also paragraph »Technical specifications« on page 30.

Consideration must be given to:

- the permissible axle load,
- the load capacity of the tyres,
- the total weight of the tractor and the machine.
- the minimum axle load of the tractor.

→ See also paragraph »Calculate the axle load with tractor-mounted machines« on page 14.

TIP 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 adjusting 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
Protect the environment by applying a correct application rate in a correct working manner.

PTO shaft rotates after disengaging
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.

Calibration test necessity

The spreading charts are based on good fertiliser and modern equipment.
It is however necessary to verify the dosing setting with a calibration test; your circumstances and fertiliser may differ from the test situation in which the spreading charts have been compiled.
Check the set flowrate with the calibration test.

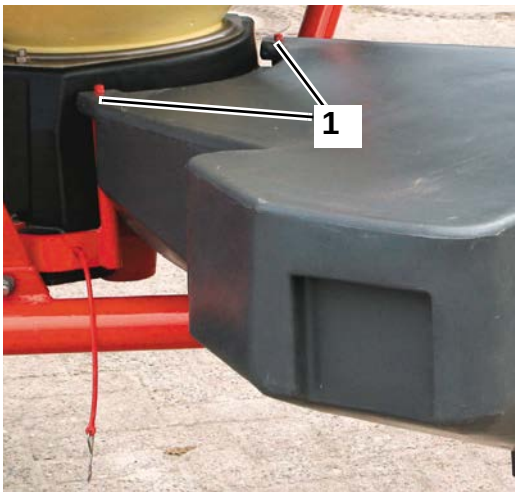
Spreading pattern test necessity

After the calibration test you must check the spreading pattern on the field by means of a tray test.
This is great importance for the result in the case of:

- large working widths (12-15 metres) with an unknown type of fertiliser.
- border spreading to check the correct setting and to work environmentally friendly.

→ See paragraph »Check the spreading pattern (tray test)« on page 62 and »Border spreading« on page 76.

Carrying out calibration test



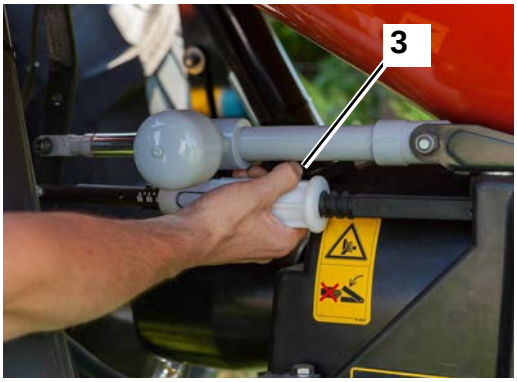


Generally speaking you ought to carry out the calibration test on the grounds.
With the optional ED II follow the procedure as described in the ED II user manual. Below follows the procedure for spreaders of manual and hydraulic operation.

Work carefully to arrive at an optimal result!

- Switch the tractor off, remove the key from the ignition and engage the parking brake of the tractor.
- Set the dosing setting for your spreading work.
  → see instructions in paragraph »Finding the correct setting for your spreading work« on page 44.
- Fit the calibration container on the spreading spout.
- Attach the two lock clips (**1**).
- Fill the spreader up to at least half with fertiliser.
- Weigh a large trough (**2**) and place it under the discharging point of the calibration container.
- Start the tractor, engage the pto shaft and set a PTO shaft rpm to 540 or 620 rpm.
- Open the dosing unit for 5 seconds to “flush” the calibration container.
- Switch the PTO shaft and the tractor off and remove the keys 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 or 620 rpm.
- Open the dosing unit for 1 minute.
- Close the dosing after exactly 60 seconds.

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 empty trough from the total weight.
- Compare the flowrate determined by you with the calculated value.
- Set the dosing setting (3) one “click” higher or lower if the calibration result is lower or higher than expected.
- Or calculate another dosing setting with the method described in:
  → paragraph »Adjusting the dosing setting« on page 61 or paragraph »Calculating and adjusting dosing setting with fine application« on page 54.

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 2:« on page 45.

You will have an application rate of about 200 kg/ha with a working width of 15 meters at a driving speed of 8 km/h. The expected flowrate is 40 kg/min with the dosing setting at 36.

For example:
In 30 seconds you have collected 17.45 kg of fertiliser.
The flowrate per minute becomes 17.45 x 2 = 34.9 kg/min.
This value differs too much from the expected 40 kg/min, so the dosing setting must be adjusted.

- Determine the value of the spreading chart that is closest to the measured value: 34.9 kg/min.

Patent Kali 30		16.9	27.8	38.6	49.5	63.8	80.7	100.3	122.3	144.2		8-12	15
PK 25.25		12.9		29.1	39.9	53.1	74.4	93.2	118.4	148.0		8-12	15
Prills-fijn			24.0	35.1	47.7	62.4	80.8	103.2	128.8	161.0		8-12	15

The value is between 29.1 and 39.9 kg/min.

- Calculate how much the flowrate will increase with this application rate if the dosing setting is 1 position higher.
  - Difference in flowrate: 39.9 - 29.1 = 10.8 kg/min.
  - The difference per "click" of the adjusting nut is 10.8: 6 = 1.7kg/min.
- Calculate the difference between the measured and the required discharge volumes: 40 - 34.9 = 5.1 kg/min.
- Calculate the number of positions by which the dosing setting must be increased 5.1: 1.7 = 3 positions.
- Set the correct setting: 36+ 3 = setting 39.
- Perform another calibration test until you have reached the required flowrate of 40 kg/min.
- Remove the calibration container.

Check the spreading pattern (tray test)



Avoid contact with the fertiliser and other material
Wear protective clothing and gloves, read the safety instructions provided by the supplier and follow their directions.

Be careful that nothing gets jammed
It is easy for parts to get jammed while adjusting 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
Excessive doses and dispersal of resources, particularly in the case of surface water, place a heavy burden on the environment.

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.

Purpose of the spreading pattern check

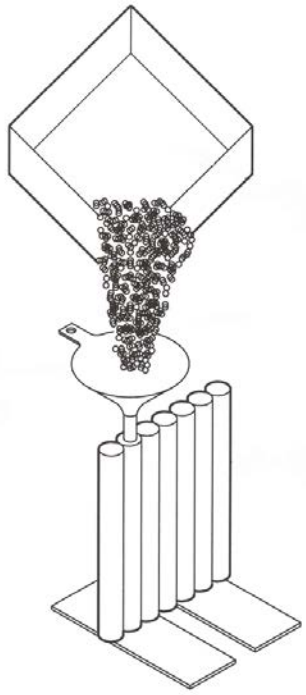
A tray test checks the distribution of the fertiliser as the spreader distributes it. The results of this test will indicate if you can improve the settings of the spreader, thereby improving the distribution of fertiliser and limiting loss.

We recommend that you have the test carried out by an approved company. as they can also provide you with advice and answer your questions.

When to perform the tray test:

- With larger working widths (12-15 metres).
- With border spreading;
- When using a fertiliser type not indicated in the spreading chart.
- When using fertiliser of moderate quality.
- After every modification to the machine.

INDICATION Weather conditions affect the spreading pattern during spreading and when performing a tray test. The tray test should be performed in dry weather, with low humidity and at 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 adjustment of the dosing setting.
- Always place the buckets **horizontally** on the floor.

INDICATION

- Use a spirit level!

- Place the grids in the troughs.
- Place trough 1 in the middle of the tractor tracks.
- Place the other troughs 4 metres from the tractor tracks.
- Check the height of the spreading spout **(75 cm above the troughs).**
- Check the horizontal position of the spreader.

→ See »Checking and setting the machine« on page 42.

INDICATION

- 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).

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 26.

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 59.

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 meter) **(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.

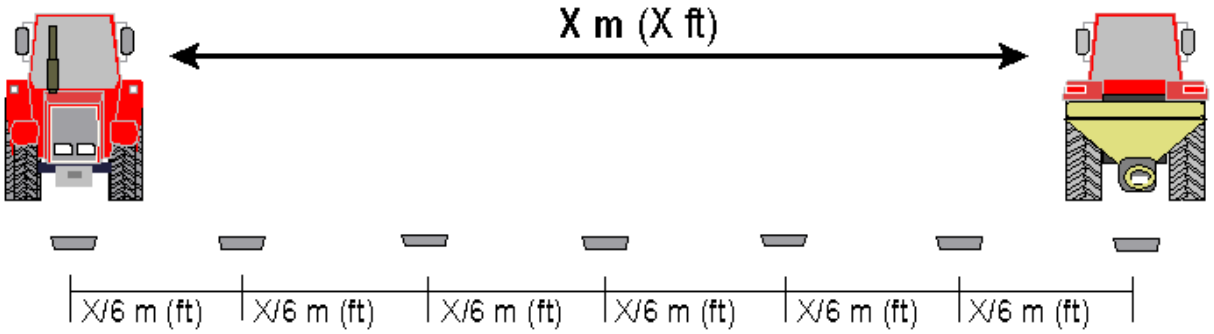
INDICATION Position the troughs horizontally with a spirit level!

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

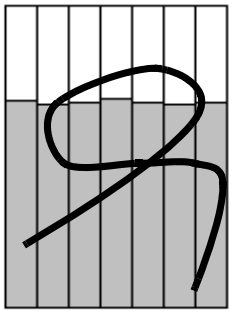
The actual working width is twice the size of the effective working width!

If you want to spread over a working width of 12 metres, place the buckets at 12/6 metres = 2 metres. With a working width of 15 metres, place the buckets at 15/6 metres = 2.5 metres.

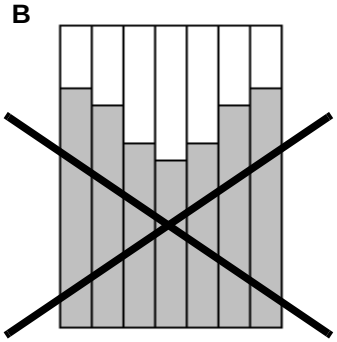
- Set the PTO shaft rpm at 540 or 620 rpm.
- Drive along the track and open the dosing unit at half working width before you drive over the first trough in the middle.



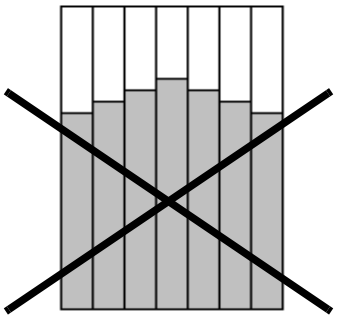
A



B



C



- Only stop spreading after you have driven at least half a working width over the troughs.
- Drive back in the next track, in the middle over trough 7. Maintain the same distance with opening and closing the dosing. Keep to the same driving speed and PTO shaft rpm!

If you have set a small application rate, drive to and fro over the same track in order to collect sufficient fertiliser in the troughs for a good comparison. Maintain the same distance with opening and closing the dosing. Keep to the same driving speed and PTO shaft rpm!

Review and adaptation

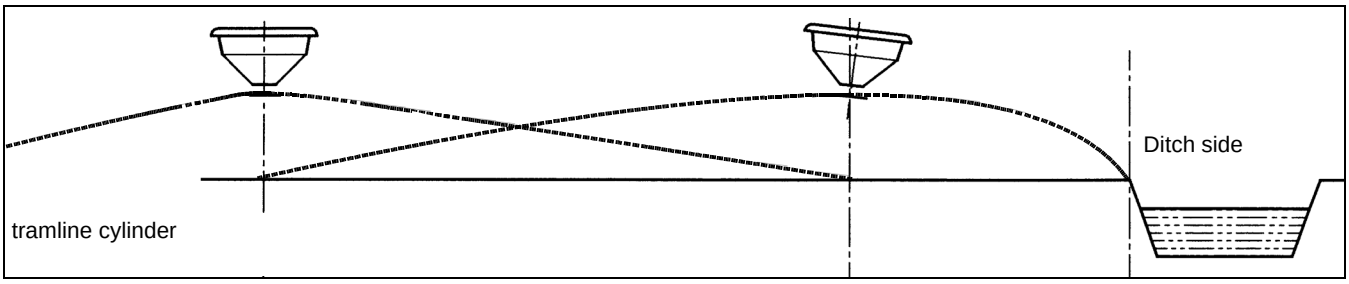
The content of the separate tubes can differ 15% at most from the average:

A	Good spreading pattern, the spreader has been adjusted well.
B	The spreader is not spreading wide enough. ▸ Adjust the rpm or the turn of the spreading spout. ▸ Repeat the test.
C	The spreader is spreading too wide. ▸ Adjust the rpm or the turn of the spreading spout. ▸ Repeat the test.

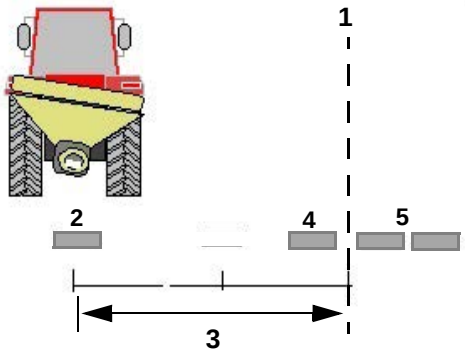
Testing the border-spreading pattern

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 59.

With border spreading you want a maximum addition to the edge but a minimum loss in the ditch. .



→ See also paragraph »Border spreading« on page 76.

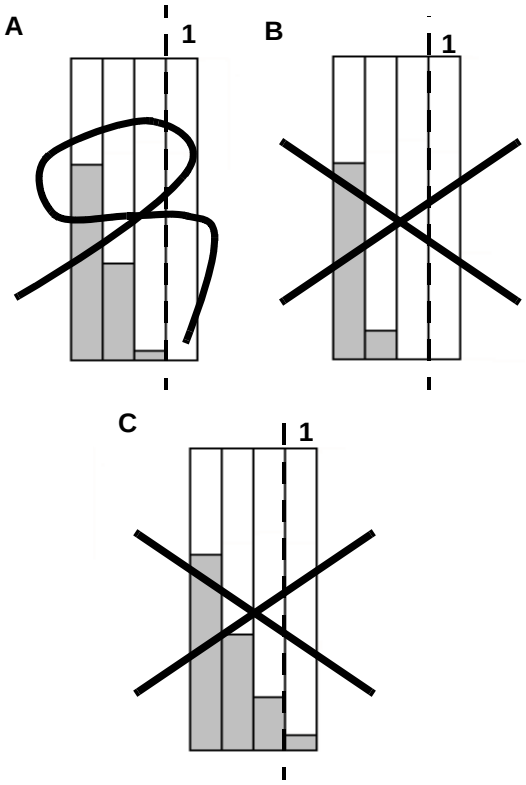


Performing the boundary spreading test with the boundary spreading cylinder

- Do not perform the test from the ditch side but on land.
- Mark a line behind which the imaginary ditch **(1)** is located.
- Switch the tractor off, remove the key from the ignition and engage the parking brake of the tractor.
- Set the spreader based on the data given in the spreading chart for the required working width and the instruction in chapter »Border spreading« from page 76.
- Place 1 trough **(2)** in the middle of the tractor tracks. The middle of the track is at half the working width **(3)** from the line behind which the fictitious ditch is located.
- Place 1 trough **(4)** on the land next to the fictive border ditch and 2 troughs **(5)** next to each other in the fictive ditch.
- Start the tractor and engage the PTO shaft.
- Choose the correct PTO shaft rpm with the method used.
- Select a gear that allows you to drive at the same speed as with the normal PTO shaft rpm, or reduce the application rate.
- Drive along the field edge. The distance from the field edge to the centre of the tractor is equal to the 1/2 working width.
- Open the dosing a few metres before you get to the middle trough.
- Stop spreading when you have passed the troughs by half a working width.
- 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

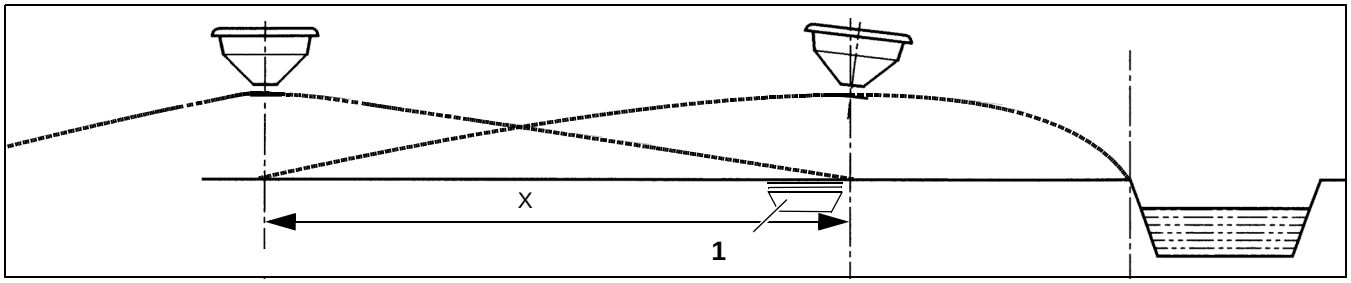
The maximum acceptable loss in the ditch is determined by environmental standards. In order to comply with the standards, the quantity of fertiliser in the trough, standing in the imaginative **(1)** ditch, must be a maximum of 10% of the quantity collected in the trough in the middle of the track (= 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 has been adjusted well.
B	You are spreading too narrowly: ▸ Increase the PTO shaft rpm (standard spreader) ▸ Or reduce the inclination of the tramline cylinder ▸ Repeat the test
C	You are spreading too wide: ▸ Reduce the PTO shaft rpm (standard spreader) ▸ Or increase the inclination of the tramline cylinder. If this is already maximum: increase the PTO shaft rpm ▸ Repeat the test

Test the connecting spreading pattern with tramline cylinder

The subsequent spreading pattern test is carried out after the border spreading test.



- Place the troughs lengthwise **(1)** on the driven border spreading tractor track.
- Spread the first full-field handling and check whether there are any granules in the troughs **(1)**.
- Increase the rpm when there are no granules in the troughs.
- Keep the driving speed constant at the value with which you calculated the application rate!

INDICATION When using the ED II, the dosing adjusts automatically to the driving speed.

Before taking 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.

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 machine 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.

  → See »Reflector« on page 103.
- Check the run of the quick coupling ropes of the power lift.

Preparing the machine to be transported

- Mount lighting and warning signs, if applicable.
- Check all folding parts and their locking devices.
  - hopper cover,
  - 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 mounted machine is not lowered by accident.
- Check if the lights are in good working order.
- Check if the dosing unit is 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 perimeter, 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 weather conditions, use a hopper cover that closes well.
- 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 spreading spout.

INDICATION

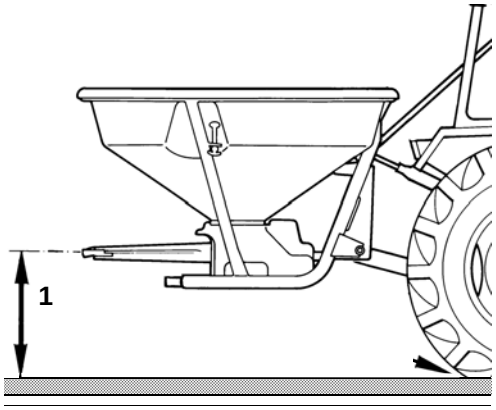
▸ Take note of the exact driving distance and make sure there are tramlines.

- If you want to change the application rate or switch to a different fertiliser type (with similar working width and driving speed) you only have to adjust the setting of the regulating rod.
- Always check the set dosing setting with a calibration test
  → as described in paragraph »Calibration test« on page 59.

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 centre of the spreading spout 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.

Last setting check

A safety check list is printed below.
Do this last check to ensure good spreading results.

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

- type of fertiliser,
- desired working width,
- desired driving speed?

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

- is the spreading spout height set above the ground or crop 75 cm?
- fine application yes/no?
- is the correct dosing set?
- is the tramline cylinder in the correct position?
- is the spreading spout turn set correctly?
- is the spreading spout mounted correctly?

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

It is important that the spreading patterns overlap well to ensure good distribution of the fertiliser.
A deviation in overlap is less serious with average working widths.
With large working widths, deviations in overlap can be visible. 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,
- picket sticks,
- special display boards.

Visibility of the from point to point on the field is very important. If necessary, place additional markers in the field to ensure that the track is clearly visible.

Tramline patterns

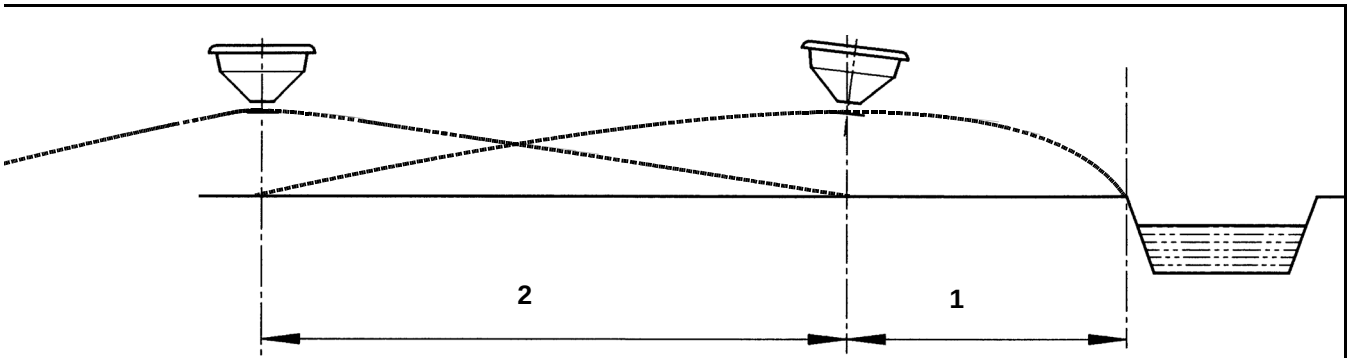
You determine the tramline pattern based on the width of the field, the presence of sprayer tramlines and the equipment of the spreader.

Using the tramline cylinder with tramlines

Drive half the working width from the field edge (1/2 X metres) when doing boundary track spreading with tramline cylinder.

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

→ See paragraph »IBorder spreading with the tramline cylinder« on page 76.



Spreading

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

→ See »Check the spreading pattern (tray test)« on page 62.

- 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 73.
- Engage the PTO shaft and set the correct rpm.

INDICATION Do not allow the PTO shaft to run for longer than is necessary while the dosing unit is closed. This will prevent the agitator from grinding the fertiliser.

- Open the dosing units while driving and keep the PTO shaft rpm 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 working method and corresponding distances on the headland in

→ the next paragraph »Working method on the headland« and paragraph »Set tramlines« from page 73.

- 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 78.

INDICATION There can be an increase or a decrease in traction due to different soil conditions. This will affect the driving speed and therefore also the application rate in kg/ha.

Working method on the headland

Spreading headland when using the tramline cylinder

- Spread the field edges all around with the tramline cylinder.

→ See paragraph »Border spreading« on page 76.

- Stop the spreading by closing the dosing unit of the machine when the tractor's front wheel reaches the inside headland track.
- Do not switch off the PTO shaft.
- After turning at a distance of a half to 3/4 working width of a headland track open the dosing units again.

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!**

Border spreading

Spreading fertiliser up to the border of the property requires concentration.
The spreader has 2 different functions and accessories to cater for border spreading.

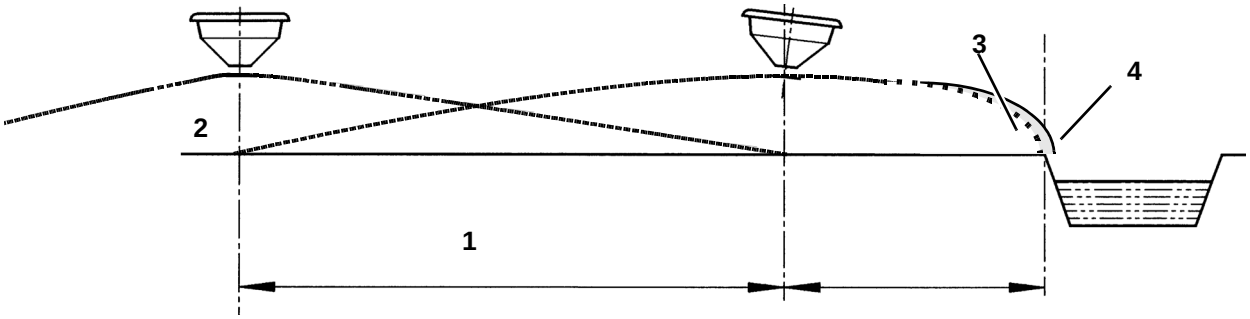
- boundary track spreading with the tramline cylinder,
- Border spreading with the tramline pipe.
-

lBorder spreading with the tramline cylinder

Operation

When doing boundary track spreading with tramline cylinder (optional extra), you drive half a working width **(1)** from the edge of the field. 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.

Other settings remain the same as for full-field spreading **(2)**.



Choice for environment or yield with border spreading

- Environmental setting **(3)**: is maximum inclination and low rpm, no granules in the ditch
- Yield position **(4)**: cylinder not fully extended and higher rpm, the maximum permitted number of granules in the ditch.

→ see also paragraph »Testing the border-spreading pattern« on page 66.

In order to comply with the standard the quantity of fertiliser spread beyond the field edge must be a maximum of 10% of the quantity distributed in the centre behind the spreader (= 100%).
→ the paragraph »Testing the border-spreading pattern« on page 66.

Setting options
Set the boundary at the field edge by:

- setting the inclination of the spreader,
- adjusting the PTO shaft rpm until the required field boundary is obtained.

Working method

- Start the tractor and engage the PTO shaft.
- Run the relevant hydraulic valve for a few seconds to activate the tramline cylinder.
  - Change the inclination of the spreader according to the angle you found during the border-spreading pattern test.
  - → See »Testing the border-spreading pattern« on page 66.
- Do not change the other settings of the spreader.
- Switch the PTO shaft on and set the PTO shaft rpm according to the spreading chart or the value from the border-spreading pattern test.

INDICATION **Maintain the driving speed at the original value!**
By adjusting the PTO shaft rpm you must engage one or two gears higher in order to drive at the original driving speed.

- Choose, possibly, such a gear that you drive at the same speed as at the normal PTO shaft rpm.

TIP When border spreading with EDII the driving speed is cleared and the new entered application rate is adjusted automatically to the driving speed.

- Drive counterclockwise at half working width, here 12: 2 = 6 metres, from the field boundary or ditch.
- Spread a round in the field.

In the event of spreader failure or stoppage:

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

→ See then paragraph »Failure and stoppage« on page 78.

After border spreading with the tramline cylinder:

- Set the spreader back to horizontal after completing the border spreading by engaging the relevant hydraulic valve for a few seconds.
- Set the PTO shaft rpm back to standard.

Stopping work

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

- The dosing unit closes. (possibly the valve with the hydraulic operation).
- 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.
- Fix the hopper cover.
- Take all appropriate measures for road transport.
  - → See paragraph »Preparing the machine to be transported« on page 69.

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 the machine is spreading irregularly or not at all while the dosing unit is 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 (and agitator crown),
- a hard object or a large piece of fertiliser is (partially) blocking the supply of fertiliser due to bridge formation.
- a hard object or a large piece of fertiliser is (partially) blocking the flow of fertiliser through the dosing opening(s),
- crushed and/or damp fertiliser forms an encrusted layer around the agitator crown and blocks the flow through the dosing openings,
- damp fertiliser under the dosing plate has formed a lump blocking the flow through the spreading spout. 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.
- Do not spread without hopper cover in damp weather 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 spreading spout.

Working method



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.
- Examine the spreading spout and the discharge opening to see what the cause of the failure/stoppage is.
- If necessary, disassemble the spreading spout for better accessibility.
- 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.

Damage

If you see damage to the spreading bracket, then the malfunction is most likely caused by a hard object. The spreading spout is probably damaged too. You should first repair the damage or have it repaired before continuing with spreading.

- Start the tractor and close the dosing unit.
- Take all appropriate measures for road transport.
  → See paragraph »Preparing the machine to be transported« on page 69.

On the site of a lockable storage depot:

- Empty the hopper.
- Remove the object that caused the damage.
- Repair the machine or have your dealer do it.
- Also check the safety clutch setting as described
  → in paragraph »Setting the safety clutch« on page 35.

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 or screwdriver.

INDICATION In case you have to disassemble the sieve from the top to reduce the lump or encrusted layer, you need to refit it immediately.

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

- Inspect the hopper contents for other lumps and reduce them.
- Close the hopper cover.
- 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.
- Follow the working method 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.
- Fit the sieve.
- Refill the spreader.
- Check the fertiliser for lumps before and after filling.
- Apply the hopper cover.



Avoid contact with the fertiliser and other material
Therefore, wear protective gear. Read and follow the safety instructions of the manufacturer of the products. 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:

- 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
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.

Be careful while cleaning with high pressure cleaners
The machine can be cleaned with water or steam. Use low pressure with turning parts, sensors, parts of the electric system, hydraulic hoses and plastic parts.

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

If the machine is being put away for a short or longer period of time it is recommended that you lubricate and clean it first. If it is lubricated first you will prevent dirt, fertiliser and water from entering the bearings.
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.
- Open the dosing unit.
- Switch the tractor off, remove the key from the ignition and engage the parking brake of the tractor.
- Clean old grease from the grease nipples with a cloth.
- Lubricate the machine grease nipples.
  → See paragraph »Maintenance« on page 85.
- Clean the machine.

TIP When using a high-pressure cleaner, do not aim it at the seals. That way you will prevent dirt and moisture from entering.

- Give each grease nipple a bit of grease after hosing off.

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 surroundings and ensure that nobody is within the reach 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 that rest on the ground.

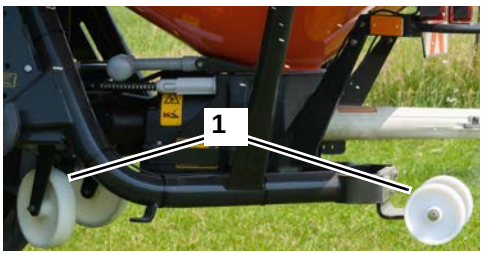
Working unsafely could cause serious injuries.

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

- switch off the pto shaft;
- Check if the tap in the hydraulic hose is closed.
- Take the pressure off the hydraulic system.
- 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.

TIP For the VS600/750 models, it is easy to disconnect and put away the empty spreader with a set of parking wheels **(1)**.



- 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.

Preparation for winter storage

If the machine is being put away for a short or longer period of time it is recommended that you lubricate and clean it first. If it is lubricated first you will prevent dirt, fertiliser and water from entering the bearings.
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. That way you will prevent dirt and moisture from entering.

- 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 87.
- Coat blank parts such as piston rods of hydraulic cylinders with preserving grease.

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

TIP The red colour of the polyester hopper of your Kubota VS is sensitive to UV radiation from sunlight. Discolouration of the hopper may occur. We therefore advice against leaving your machine in direct sunlight.

- Store the ED II control box in a place where it cannot be damaged and is not exposed to temperatures below -20°C.

Repair damage without delay



Repairs can be conducted safely on the machine by doing the following:

- 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.
→ paragraph »Authorisation« on page 12.

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.

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
- carrying out maintenance or repair activities.

Avoid contact with materials
Wear protective gear. Read and adhere to the safety instructions of the material manufacturer. 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 regulations« 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«		•	•				93
»Checking the hydraulic system«	•	•					94
»Agitator and agitator crown«	•			•			97
»Spreading spout check«	•			•			98
»Control of the pendulum mechanism«		•		•			96
»Protective covers«		•	•	•			97
coupling shaft		•		•			35
Lubrication							
»Coupling shaft«	•						88
»Spreading unit«	•						89
»Manual or hydraulic operation pin joint«			•				89
ED II actuator			•				
Add oil							
»Tractor side quick lock« of the coupling shaft		•		•			88
»Dosing plate«					•		91
Replace							
Hydraulic hoses and connectors					•	•	94
Spreading bracket						•	98
Agitator crown						•	97
Spreading spout				•		•	98

Lubricate with oil and grease

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

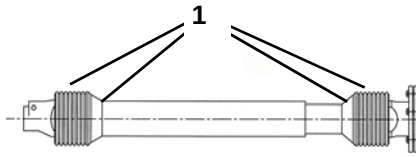
Waste storage and disposal
Waste from performing maintenance on the machine could be contaminated with fertiliser, oil and grease. Collect the waste and dispose of it in terms of national regulations.

Part / action	Quantity	Specifications
Lubricate with grease	1 to 2 times	Vicon Polyurea or equivalent
Lubricate with oil		SAE 80W-90 MIL-L-2105C

Coupling shaft

All lubricating nipples of the coupling shaft can be filled with a universal grease type.
→ See the paragraph above »Lubricate with oil and grease«.
→ See paragraph »Maintenance intervals« on page 87.

Coupling shaft with quick lock

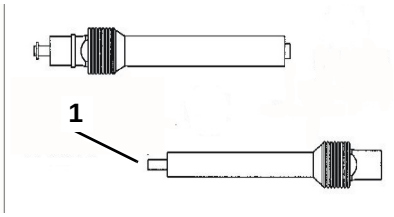


- Lubricate the 4 nipples **(1)**.
- Check the condition of the protection sleeves and the check chains.
- Replace them if damaged.

Tractor side quick lock

- Lubricate with oil the slider of the coupling on the tractor side.

Coupling shaft profiled tubes



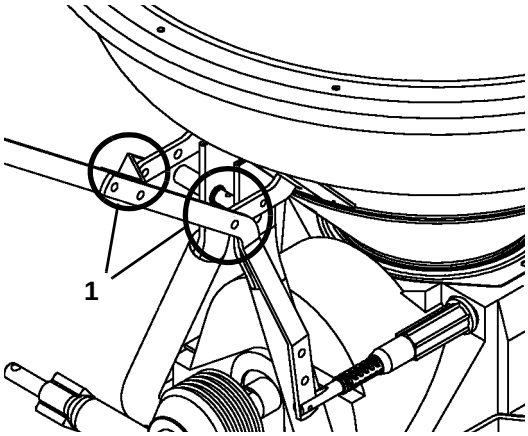
Grease the contact surfaces of the two profiled tubes.

- Detach the coupling shaft on the one side.
- Pull the shaft halves away from each another.
- Grease **(1)** the running surface of the inner profiled tube.
- Slide the shaft halves into each other.
- Attach the coupling shaft.
- Hook the check chains to the tractor side.

Manual or hydraulic operation pin joint

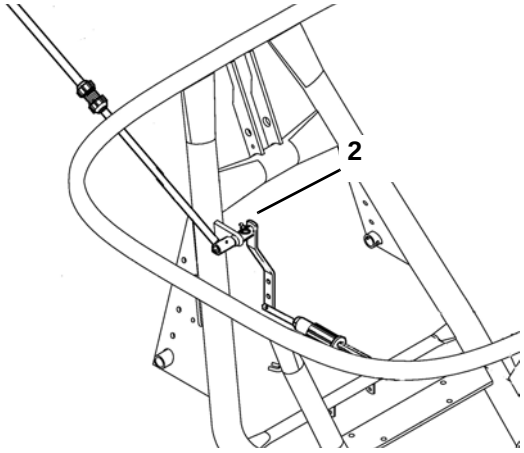
The operation of the dosing has, manually and hydraulically operated, an articulating arm which opens the dosing through the regulating rod.

The hinge point must be lubricated daily



VS 220/330

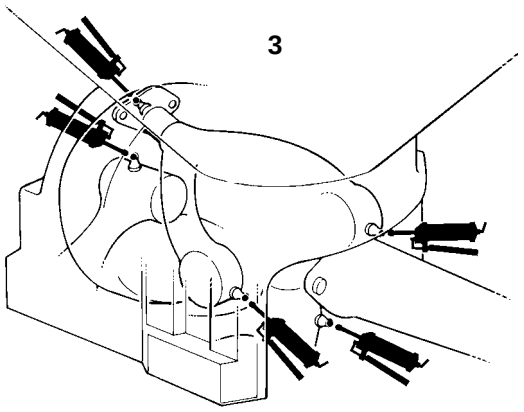
- Lubricate the pin joints **(1)** of the VS220/330 with oil.



VS400-1650

- Lubricate the grease nipple **(2)** on the hinge bushing of the VS400/500 (VITI) and the VS600-1650 manual or hydraulic operation with grease.

Spreading unit

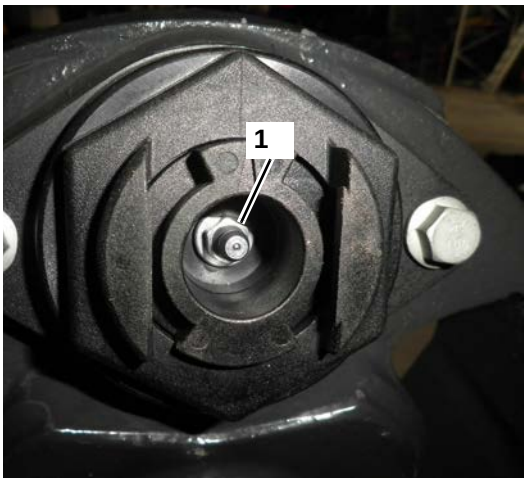


The spreading unit has 5 grease nipples (3):

- Lubricate them daily.

  → See the following paragraph on page 90 on how to reach the grease nipples.

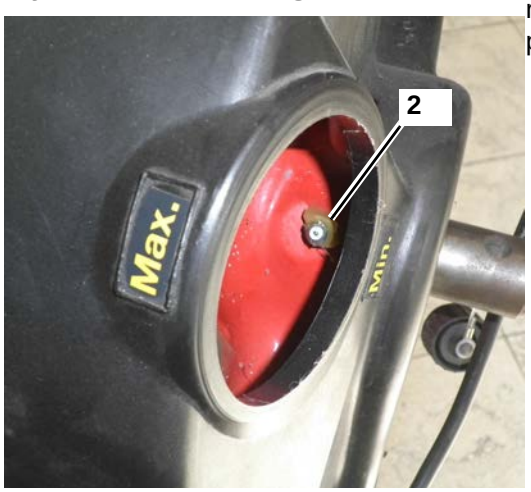
Set piece bearing



You will find the set piece behind the cap in the protective cover of the spreading unit. **(1)**

- Remove the cap in the protective cover
- Turn the flywheel manually until the set piece is in front of the hole.

Flywheel bearings



The grease nipple **(2)** on the flywheel bearing housing can also be reached through the hole in the protective cover in front of the set piece.

- Grease the grease nipple on the flywheel bearing housing.

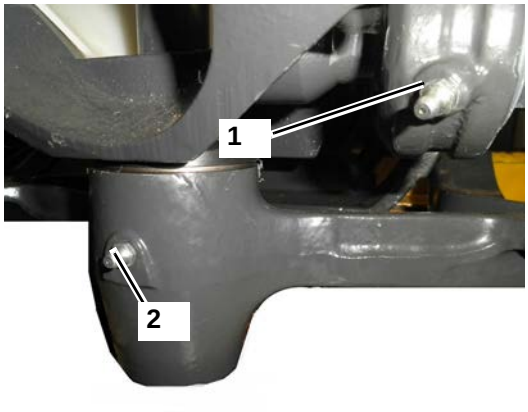


- Close the hole in the protective cover off again with the cap **(3)**.

Pendulum axis and fork bearings

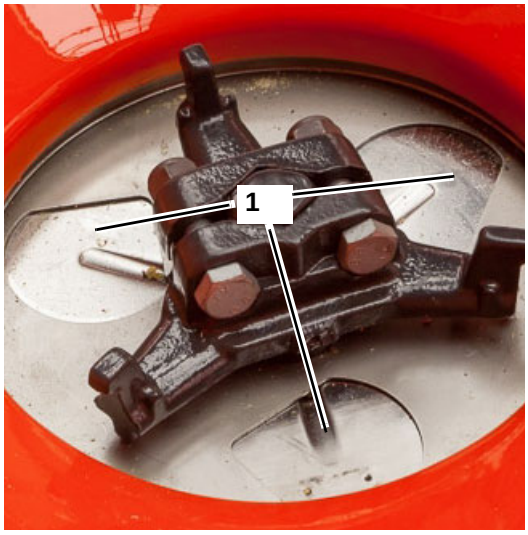
On the spreading spout side of the spreading unit there are:

- 2 grease nipples **(1)** on the fork bearing housings; left and right next to the spreading spout mounting flange.



- and 1 grease nipple **(2)** on the bearing housing of the central pendulum axis.

Dosing plate



The dosing openings are opened and closed through a dosing plate situated below that rotates.

- Grease the dosing plate after every cleaning:
  - Close the dosing
  - Apply the oil to the dosing plate **(1)** through the 3 holes in the spreading plate.
  - subsequently open and close the dosing repeatedly.

  The oil is distributed over the plate surface.

Steel tightening 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.

Stainless steel tightening torques

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

	Torques					
Quality	**70 (A2)**			**80 (A4)**		
Friction*	0.10	0.20	0.30	0.10	0.20	0.30
Thread						
M5	3.6	5.7	7	4.8	7.6	9.4
M6	6.3	9.9	12.2	8.4	13.2	16.3
M8	15.2	24.1	29.9	20.3	32.1	39.9
M10	29.9	47.7	59.3	39	63	79
M12	51	82	102	68	109	136
M14	82	131	163	109	175	217
M16	126	204	255	168	272	340
M18	176	282	352	235	376	469
M20	247	401	501	330	534	669
M22	337	551	692	450	735	923
M24	426	690	863	568	920	1151

***** The friction coefficient of 0.10 applies to oiled sheets, cast iron, hardened surfaces, greased threads, etc. The higher value of 0.30 applies to dry sheets.

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!

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 off the electric control 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),
- deformation which is not in accordance with the natural shape of the hose,
  - both in de-pressurized and in pressurized state
  - or with bends, for example detaching layers,
  - blister formation,
- leakages,
- not mounted as per requirements,
- hose coming out of the connectors,
- corrosion of the connector reduces the working 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.

Replacing

▶ Run the hydraulic valves until all the cylinders are engaged.

▶ 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 83.

▶ 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 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 valves a few times before you start working.

Control of the pendulum mechanism

Avoid contact with the fertiliser and other material
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.

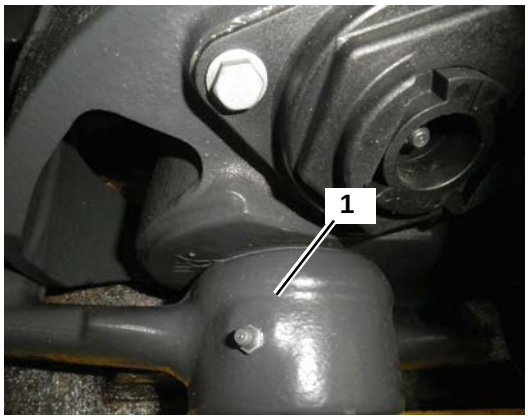
Friction with these materials could cause physical injury.



- ▸ Check the condition of the set piece **(1)** and the bearing for play and free rotation.
- ▸ Possibly disassemble the turn adjustment as a check.
  This can possibly be done without disassembling the unit cover.
  - ▸ Turn the two bolts out of the turn adjustment cap.
  - ▸ Remove the cap, the plastic adjustment and the spring.
- ▸ Check the free rotation and the fit of the aluminium set piece.

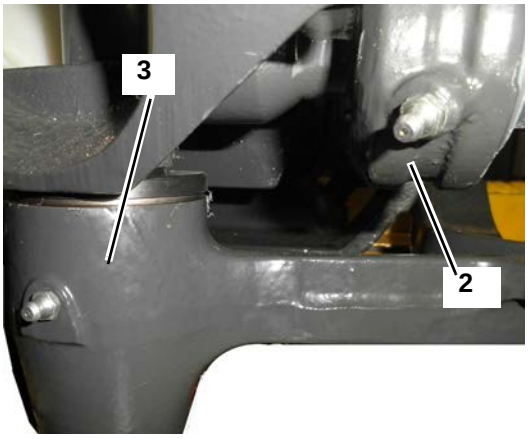
- ▸ Mount the whole with the notch in the aluminium set piece pointing to the top (max.).

NOTE The plastic adjustment also has an arrow that must point to the notch in the set piece and max. on the cap during the assembly.
→ See the top photo.



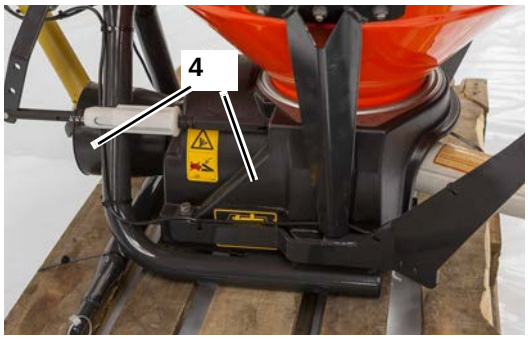
Other bearings

- Check the bearing of the flywheel **(1)**,
- The bearing must be replaced if there is clearance in the bearing.



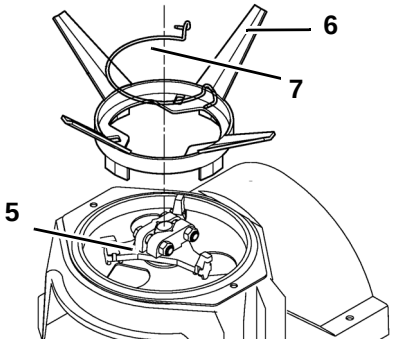
- Fork **(2)** and pendulum link **(3)** for clearance.
- The bearing must be replaced if there is clearance in the bearing.
-

Other check points



Protective covers

- Check the protective covers **(4)** of spreading unit and PTO shaft.
  - Replace damaged protection immediately!



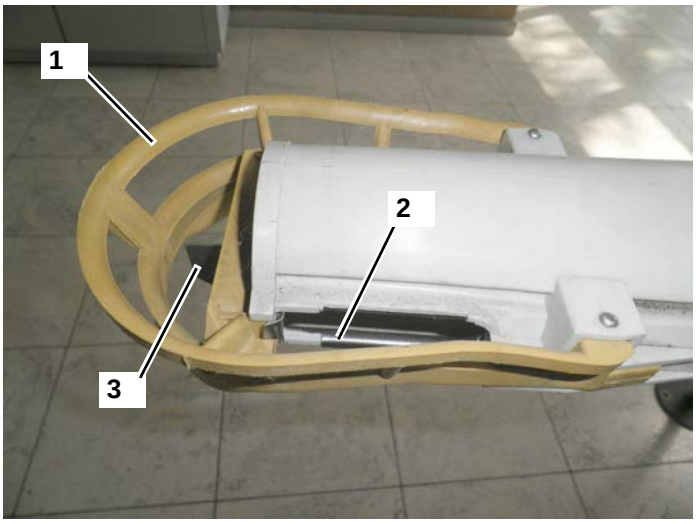
Agitator and agitator crown

- Check the condition of the agitator and the agitator crown
  - Check the points of the agitator **(5)** and agitator crown **(6)** for breakage and wear and tear.
  - Check lock clip **(7)** for correct assembly.
- Replace worn-out parts immediately!

  These parts determine the good working order of your machine.

Spreading spout check

- Check the condition of the spreading spout for:
- Damage, wear and tear or cracks in the spout and spreading bracket **(1)**.
- State of the steel linings **(2)** in the left and right discharge opening.
- Presence of the plate **(3)** in the middle of the pipe mouth.



- Replace the spreading bracket or the entire spreading spout in the case of severe wear and tear or the lack of the said parts.

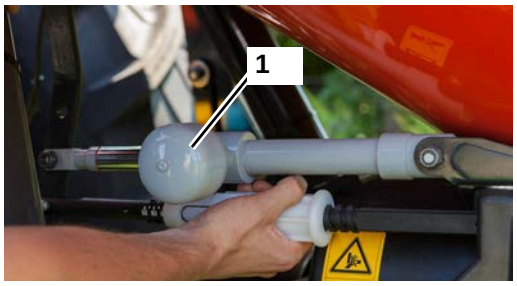
NOTE! Replace the parts on time!
The spreading result is highly dependent on the state of the spreading spout and spreading unit.

General

The following optional extras are available for adapting to your tractor and/or working conditions.
→ see also the accessory pages of the spare parts manual.

All of the responsibilities of the manufacturer lapse and the guarantee becomes null and void if non-genuine parts are used.

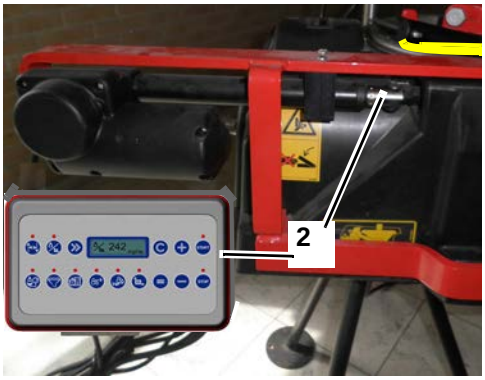
Hydraulic operation



In the case of hydraulic operation, the dosing mechanism can be operated with a single-acting hydraulic valve **(1)** from the tractor. The tractor cabin may remain closed, with the advantage of:

- lower noise level,
- no granules, seeds, powders, etc. in the cabin,
- dust from spread products cannot blow inside.

PS-ED II electronic dosing system



The PS-ED II **(2)** is an electronic remote control that also adjusts the dosing to the driven speed.

You work with:

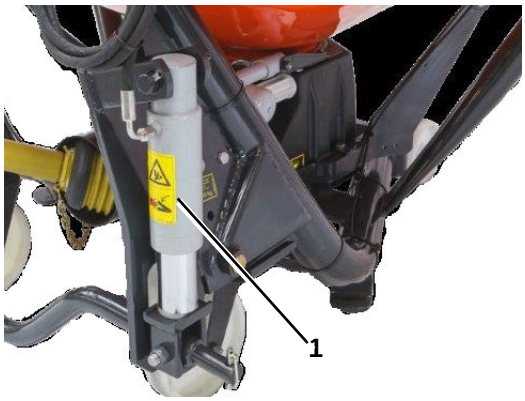
- correct application rate by adjusting to your driving speed,
- simple processing of your calibration test,
- hectare counter and measurement of the way covered,
- a closed cabin.

Calibration container



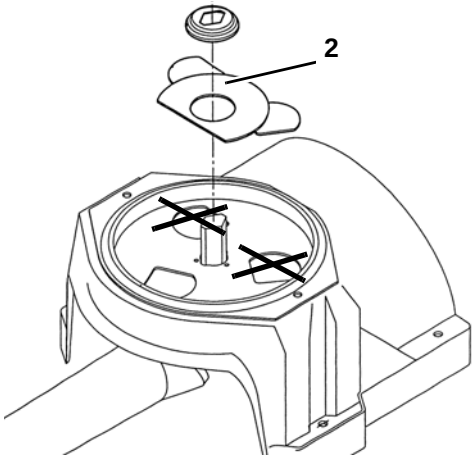
A calibration test is essential to obtain accurate settings for the application rate. The calibration container **(3)** is an indispensable tool for this. The spreading spout can remain mounted.
→ See paragraph »Calibration test« on page 59.

tramline cylinder



The tramline cylinder **(1)** 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 extension set in short lower links of the power lift of your tractor.
→ See paragraph »IBorder spreading with the tramline cylinder« on page 76.

Fine application kit

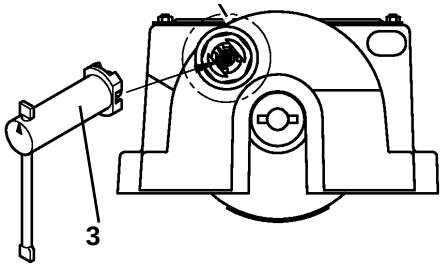


Spreading of small application rates
With a low application rate and/or low driving speed the 3 dosing openings are only slightly open. Blockages and dosing of insufficient accuracy can be the result.

We therefore advise that you make use of the fine application kit **(2)** if the flowrate is **less than 20 kg/min**.

If the 2 dosing openings are closed off the opening in use is still open.

Spreading spout turn adjustment

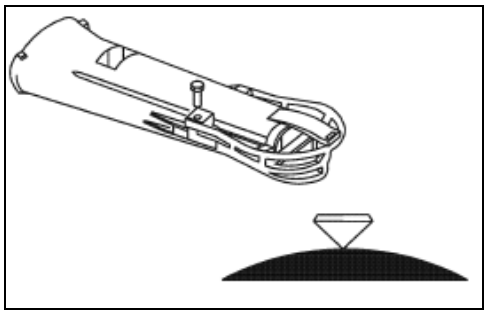


The pendulum stroke of the spreading spout can be set to a smaller angle with a key **(3)**.

This enables you to reduce the working width by roughly 25%.
The standard spreading spout spreads with the small angle of approx. 9-metre working width instead of 12 metres with the larger angle.

Spreading spouts for miscellaneous activities

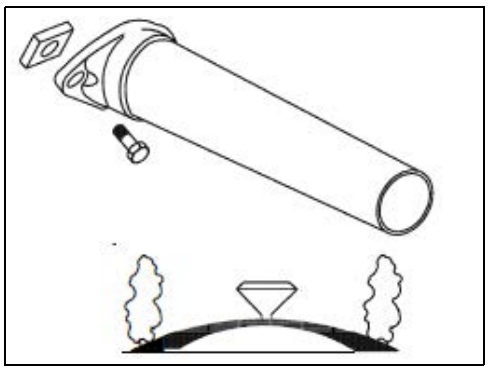
Various spreading spouts are available for applications for fruit farming, fish farms, road construction and gritting.



Short spreading spout

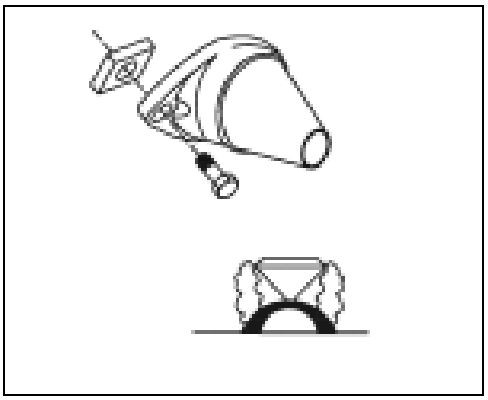
For spreading, where the angle of impact must be kept as high as possible due to the fertiliser used to ensure good agitator performance.

Working width 4 < X < 8 mt.



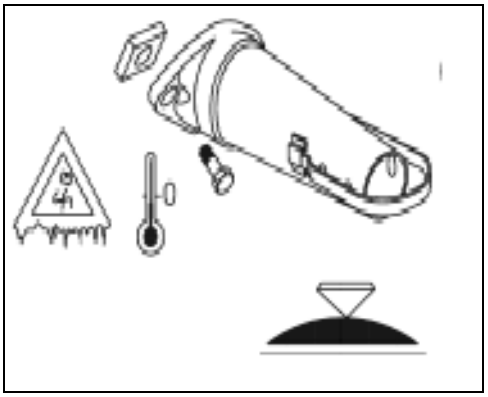
Wide row fertilisation pipe
Orchard spreading with greater distance between the rows of trees

Working width 2 < X < 8 m.



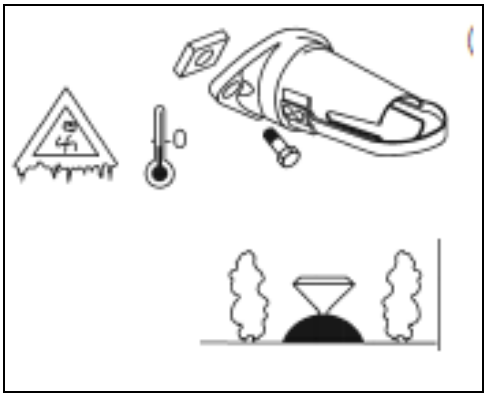
Narrow strip fertilisation pipe
Fertilising or spreading of herbicides between very small planted strips at 1.5 to 2 metres' row distance.

Working width 2.5 < X < 8 m.



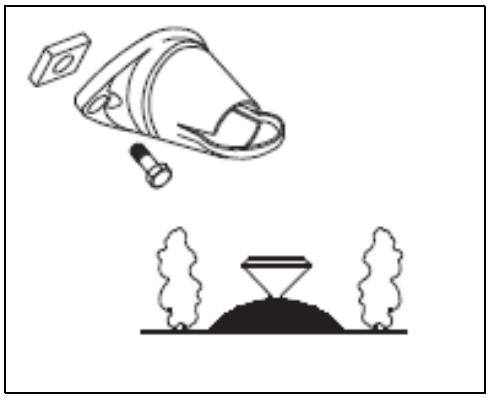
Wide salt and grit-spreading pipe
For sand, salt and grit-spreading for winter maintenance and road construction

.Working width 5 < X < 6 m.



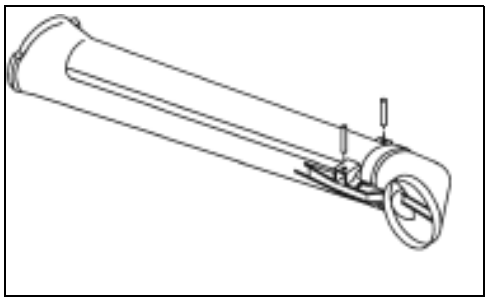
Narrow salt and grit-spreading pipe
For sand, salt and grit-spreading in winter maintenance and road construction on narrow roads and paths

Working width 2 < X < 4 m.

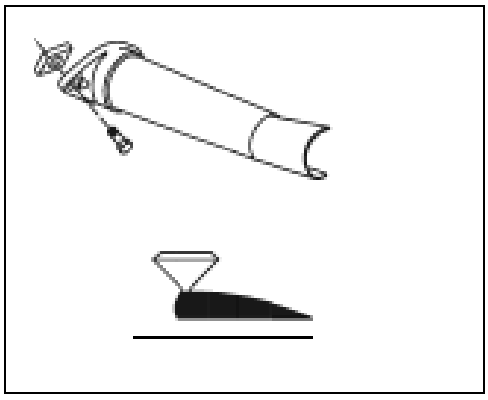


Narrow spreading spout
Spreading on very small working widths on tramlines in orchards and greenbelts.

Working width 1.5 < X < 2 m.



Tramline pipe
One-sided boundary spreading with the tramline pipe. Driving clockwise the last full-field pass is completed.



A-symmetric spreading spout (right)
For proper release of fishmeal for breeding ponds and dike fertilisation

Hopper extensions



The loading volume of the spreader can be increased by fitting a hopper extension.
→ See paragraph »Technical specifications« on page 30.
→

Hopper cover



The hopper cover protects the fertiliser in the hopper against humidity and dirt.

Lights

If you are transporting on a public road there are lights available in order to comply with legal requirements.

Parking wheels set



A set of parking wheels is available for storing the machine manually.

Reflector



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

This reflector should then be placed behind your implement if it hides the reflector from your tractor.

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	45
	Dosing setting not checked with a calibration test	Do a calibration test	59
	Incorrect setting for fine dosage	Set the dosing setting for fine application as per the instructions	53
	Driving speed too high or too low	Adjust the driving speed or the application rate	45
	Incorrect distance between the driving tracks	Always set the driving tracks before spreading	73
	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	44 44
	The flow of the fertiliser is blocked	Clean the machine well after each use. Replace the agitator if it is worn out	82
	Average quality fertiliser (too soft, broken, mixed types) or incorrect storage	Contact your supplier. Update the storage area. Spread with smaller widths as far as possible	45
Great amounts of dust while spreading	PTO shaft rpm too high	Check the PTO shaft rpm	45
	Agitator grinds. Dosing closed for too long with the PTO shaft running	Switch the PTO shaft off after closing the dosing. Check the agitator for damage	
	Average quality fertiliser. 80% of the granules with a diameter between 2.0 - 4.75 mm	Determine the distribution and spread with small working widths if possible	45

Problem	Possible cause	Solution	Page
Spreading tracks visible among the crops	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 widths as far as possible	48, 45
	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	44 44
	Use of wrong spreading chart	Determine the characteristics of the fertiliser and select the correct spreading chart	44, 44
	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	73
	Horizontal/vertical settings of the machine not correct	Check if the machine is standing level horizontally and vertically, unless the spreading chart indicates otherwise	42
	Spreader not set to the correct height	Check and set to the correct working height (75 cm above the crops or soil) and inclination	42
	Working width incorrect	Check the settings on the spreading chart or website and the PTO shaft rpm	44, 43
	Worn or incomplete spreading spout	Check the spreading spout	98
	Tyre pressure on the left and right not the same	Check the tyre pressure	
	Reduced rpm of the spreading mechanism through the loss at the safety clutch	Make sure that the spreading mechanism is running smoothly. Check the safety clutch	96, 35
Powerful vibrations perceptible	**Shut down the PTO shaft immediately!**	Attend to the problem to prevent damage	
	Stoppage due to hard object	Remove the object	
	Bridge formation due to wet fertiliser	Break the growth or replace the fertiliser altogether	
	PTO shaft working angle out of working reach	Limit the working angle to a maximum of 30º	36

Falling into disuse

When the lifespan of the machine has finished, its separate parts must be properly disposed of. Keep local legislations 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.

Electronic waste
Electronic waste, such as the electronic control box and the machine boxes must be disposed of at specialist companies.

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.

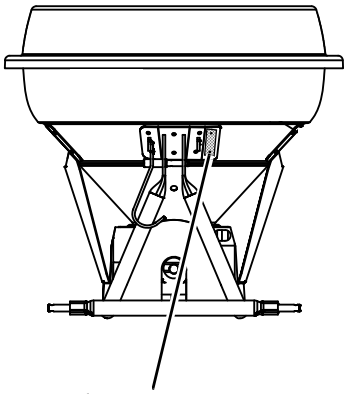
EGC declaration of conformity

In accordance with EU Directive 2006/42/EC

We

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

declare fully under own responsibility that the product

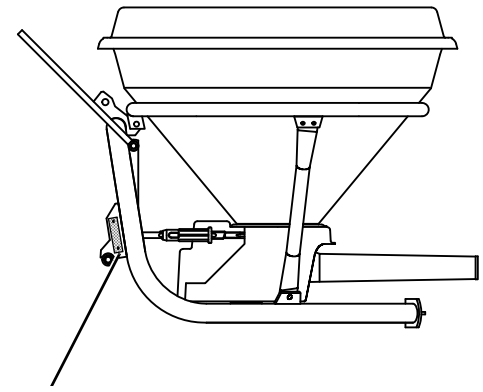


VS 220/330

VS220 / VS400 / VS400VITI / VS600/ VS750 and accessories

Type: VN223/ VN224/ VN225/ VN226

Valid from machine number: VN2230001001 / VN2240001001 / VN2250001001 / VN2260001001

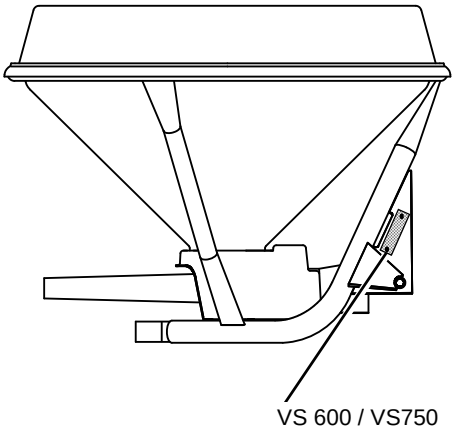


VS 400 / VS400VITI

to which this declaration refers, complies with the basic safety and health requirements under the EU Directive, 2006/42/EEC.

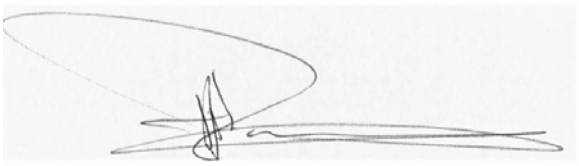
For the relevant implementation of the safety and health requirements mentioned in the EC directive, the following standards are taken into account:

- 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/EC



VS 600 / VS750

Kverneland Group Nieuw-Vennep BV
Nieuw-Vennep, 14.07.2020



R. H. F. Harmsen
Managing Director
Authorised Representative*

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

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