Ausgabe 304 00 900/1
Best. Nr. ??? ??? ???

Operating instructions

Universal manure spreaders

VS 8 E / VS 8 TD

VS 10 E / VS 10 TD / VS 12 TD

VS 12 E-L / VS 16 / VS 18

09.03

Operating Instructions

B. Strautmann & Söhne GmbH & Co. • Agricultural Engineers • Bielefelder Straße 53 • D-49196 Bad Laer
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EC Declaration of Conformity

according to EC guideline 89/392/EWG

We, the company B. Strautmann & Söhne GmbH & Co

Bielefelder Straße 53

D-49196 Bad Laer

declare in sole responsibility that the product

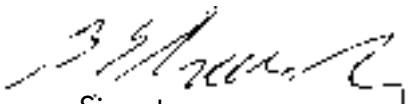
Universal spreader
VS 8 E / VS 8 TD
VS 10 E / VS 10 TD / VS 12 TD
VS 12 E-L / VS 16 / VS 18

to which this declaration refers, complies with the safety regulations level known at the time and the relevant basic safety and health requirements of the EC guideline 89/392/EWG.

For proper implementation of the safety and health requirements referred to in the EC guidelines the following standard(s) and/or technical specification(s) were used.

EN 292 / EN 690

Bad Laer, 09.2003



Signature
Managing Director
Sgd. B. Strautmann

Operating Instructions

Universal spreader VS 8 E - VS 18

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1. Foreword

Dear customer

we thank you for the confidence you have shown in us.
You have purchased a top-quality technical product which will enable you to improve your operating results.
Strautmann's decades of experience will guarantee you optimum output, quality and ease of operation.

Safety

Before putting the machine into operation, please read these operating instructions and observe the safety instructions.

In these operating instructions, we have marked all paragraphs concerning your safety by a warning triangle. Please pass all safety instructions on to other users.

The warning and information signs fixed to the vehicle give important information about safe operation. Please observe these signs for your own safety.
Due to the various machine models and optional equipment not all described alternatives exist on your machine.
In case of any unclarified points, please contact either your Strautmann representative or the factory.

Machine specifications: These specifications should always be available. Please always quote them when ordering spare parts.

Please copy the machine specifications of your new stall manure spreader from the type plate into this manual.

Vehicle Ident. No.: **Type** **Year of manufacture**

2. Correct use

The Strautmann stall manure spreader will enable you to spread all kinds of manure and compost. The corresponding equipment being available, even lime fertilizers, carbo-limes, thick sludge and dry chicken dung can be distributed.

ATTENTION:
Any use beyond this will be regarded as incorrect. The manufacturer will not be responsible for any damage resulting therefrom.
The user will solely bear the risk.

The observance of the operating, maintenance and repair conditions specified by the manufacturer will also be part of the correct use.

The stall manure spreader should only be operated, maintained and repaired by people who are acquainted with the equipment and have been informed about the dangers.

Any unauthorized modifications carried out on the machine will invalidate the product liability and the manufacturer's liability for any damage resulting therefrom.

Any costs caused by modifications or malfunctions due to special features of the tractor or carelessness of the operator, will not be paid by Strautmann.

Only original Strautmann spare parts are to be used.

It is forbidden to use the stall manure spreader for transporting animals and people.

3. Accident prevention information

For safety and accident prevention

Most accidents are caused by non-observance of the simplest safety rules. May the careful observance of the following suggestions help to prevent any accidents from the beginning.

3.1 General

Please observe the general accident prevention regulations in addition to the information included in these operating instructions; any other generally accepted safety, industrial medicine and traffic law rules (e.g. German Safety Regulations, German Motor Vehicle Construction and Use Regulation) have to be kept to.
Acquaint yourself with all mechanisms and operator control elements and their function before starting this machine.

During operation it will be too late!

The machine has been designed for **one-man operation**. The operator will only be allowed to operate and let the machine work if no other people are in the danger area (pay special attention to children)!

Attention! Solid and heavy components in the spreading material and other components might be thrown out a long way by the spreading unit. Therefore ensure a sufficient distance from endangered people.

Switch off the motor and pull out the ignition key before opening or removing safety guards (e.g. for maintenance and repair work).

Do not enter the machine when the spreading unit is working.
All safety guards must always be duly mounted.

3.2 Operation – Travel operation

Couple the stall manure spreader to the tractor according to the instructions. Special attention is required during coupling and uncoupling!

Before putting the machine into operation, make sure that the braking system and the lighting have been connected and are working properly and correspond to the traffic regulations.

Braking system of stall manure spreader
The stall manure spreader can be equipped with different kinds of braking systems (depending on the national setting):
a) Overrunning brake
b) Air brake (twin-circuit braking system)
c) Hydraulic brake
The braking system of the tractor and the respective braking system of the stall manure spreader must be compatible.

Before putting the machine into operation and before each trip, always make sure that no people are in the danger area. Pay special attention to children.

Make sure that there is a good view, e.g. when reversing. A guide may be necessary.

Pay attention to sufficient stability of the supporting device when uncoupling and secure the trailer against rolling (parking brake, chocks).

Park the vehicle only when it is empty.

Put the supporting device into the required position and secure it after each coupling or uncoupling.

Pay attention to the permissible axle loads, tongue loads and gross vehicle weights, in particular to the maximum tongue load absorption of the coupling device of the tractor (see technical data page 18).

The driving speed must always be adapted to the surrounding circumstances. Avoid sudden changes of direction when going uphill and downhill or traversing hills.

Ensure that the vehicle can be sufficiently steered and braked.

In case of central axle trailers (single axle and tandem axle vehicles with tongue load), pay attention to the danger of tipping over when the vehicle has been loaded unevenly, especially during uncoupling and after having been uncoupled.
Minimum tongue load when uncoupled 200 kg.

3.3 Countershaft drive

The operating instructions of the drive shaft manufacturer are to be followed.
Only drive shafts specified by the trailer manufacturer are to be used.

The drive shaft is only to be mounted and dismounted after the tractor motor has been switched off and the ignition key has been pulled out.

Use the drive shaft only with the correct safety cover and in proper condition and secure the protection tube against twisting.

Ensure sufficient tube overlapping of the drive shaft.
Pay attention to a sufficient pushing path of the drive shaft when cornering.

Before switching on the countershaft, ensure that the selected speed and sense of rotation of the trailer countershaft have been adjusted to the permissible speed and sense of rotation of the machine.

When using the distance control countershaft pay attention to the number of revolutions depending on speed and change of sense of rotation in case of reversing.

Do not use a distance control countershaft when reversing.

Never switch the countershaft on when the motor has been switched off.

In case of drive shafts with overload or free engine clutch, this clutch is to be mounted on the trailer's side.

After the countershaft has been switched off, the driven unit may still be running. Stay away from the danger zone until the machine has completely stopped.

3.4 Wheels, tyres, brakes

In order to ensure operational safety, the wheels, tyres and brakes are subject to special attention.

Retighten the wheel nuts after a short period of use and check them approx. every 50 operating hours.

Regularly check the air pressure. (see Tyre pressure chart).

Regularly check the wheels, tyres and brakes for wear and damage.

Connect the braking system properly before putting the vehicle into operation.

Adjustments and repairs of the braking system are only to be carried out by authorised workshops for brake services or qualified personnel.

The mounting of tyres and wheels requires sufficient knowledge and proper mounting tools.

The use of another tyre size is only allowed on consultation with the vehicle manufacturer.

Attention!
The swivel steering axle is to be always locked when travelling on roads or along hillsides!

3.5 Hydraulic system

Regularly check the hydraulic pipes and hoses, fittings and parts for damage and leaking.

Hydraulic hoses are to be replaced every 6 years. Ensure that the hydraulic hoses never bend or rub.

Only use spare parts that meet the manufacturer's requirements.

During connection to the tractor ensure that the hydraulic system has been depressurized both on the tractor's and on the machine's side and that the connectors are not mixed up (accident risk due to reversed function).

Attention: The hydraulic system is under high pressure, therefore always depressurize before carrying out any maintenance and repair work.

Liquids (hydraulic oil) squirting out under pressure can penetrate the skin and cause serious injuries and infections.

Never try to block leaks with your fingers. If injuries occur, immediately contact the medical services.

3.6 Maintenance

Any repair, maintenance and cleaning work and the elimination of functional defects are only to be carried out with the drive system switched off, the hydraulic system depressurized, the electrical system de-energized and the tractor motor stopped!

Pull out the ignition key!

Regularly check nuts and bolts for tightness and retighten, if necessary. Observe and keep to the torque settings! (Torque setting of the wheel nuts see page 30).

Check and mount the safety guards.

Dispose of oils, greases and filters properly.

Ensure sufficient and safe support and stability.

Very high accident risk!

3.7 Repair work

Repairs on the spreader must only be carried out by a specialist supplier. Please directly contact the factory or our representatives for the address.

3.8 Road traffic regulations

Regulations for the Federal Republic of Germany

a) The vehicle is subject to an operating licence registered for use on public roads and paths.
b) Vehicles travelling at a speed of more than 25 km/h require registration (own number plate).
c) Vehicles for commercial use require registration (up to and above 25 km/h).

When exporting, the road traffic regulations valid at the time in the individual countries are to be observed.

3.9 Statistical tipping angle

The statistical tipping angle of the vehicle is approx. 25° (basic equipment).
This value can differ according to the model and equipment.

3.10 Noise level

The noise level of the vehicle in action (measured with Case tractor model MX 170) is
75.1 dBA when the cabin is closed
84.6 dBA when the cabin is open

3.11 Gravel

Due to different loading heights in front of the spreading drums gravel can be flung to the front. It is imperative that the supplied protective grating is fixed to the spreader during spreading operation.

3.12 Surrounding circumstances

When switching on the machine, an increased power consumption may arise due to frozen components.

3.13 Safety instructions and warning signs (pictograms)

Illegible or lost stickers have to be replaced.
Normally, the order number of the respective sticker can be seen at the bottom edge of the sticker.

X = Tightening points
Y = Stop points

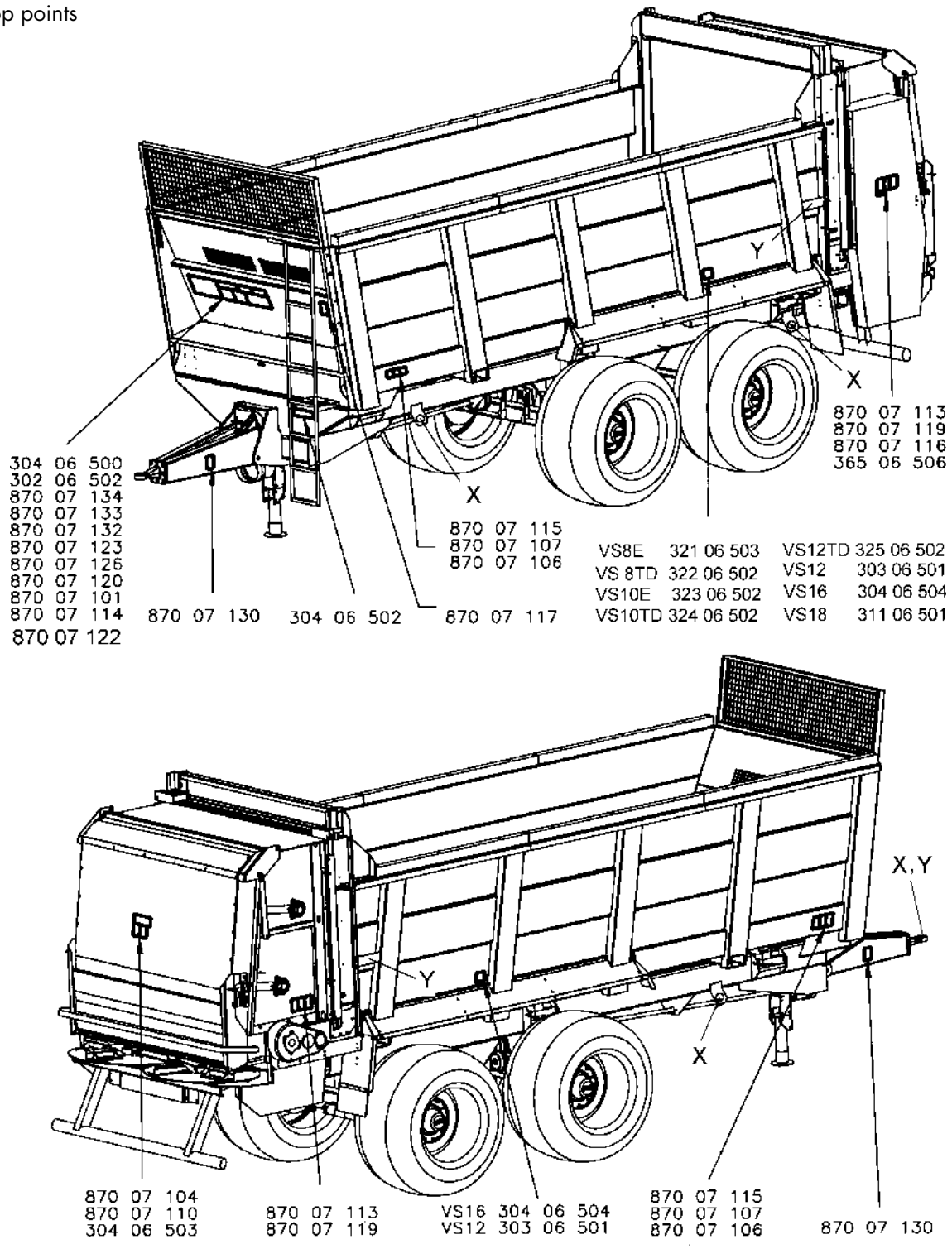
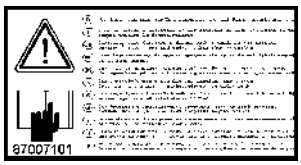


Fig. 1

870 07 101



Read and observe the operating instructions.

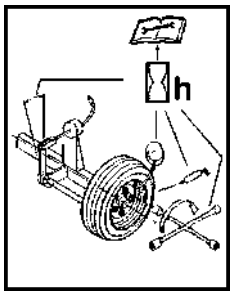
870 07 120

Before carrying out any maintenance and repair work, switch off the motor and pull out the key.

870 07 130

Do not stay within the swivelling range with the motor running.

870 07 133



Maintenance: Braking axles

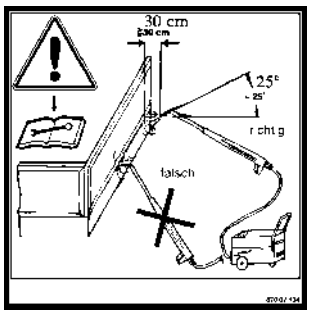
870 07 126

When leaving or uncoupling the vehicle, secure it against rolling (parking brake, chocks).

870 07 123

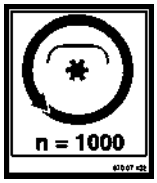
Liquids (hydraulic oil) squirting out under high pressure can penetrate the skin and cause serious injuries. In this case, immediately contact the medical services, as otherwise serious infections may occur.

870 07 134



Cleaning instructions

870 07 132



Countershaft sense of rotation on the trailer's side with number of revolutions u = 1000 RPM.

870 07 119

It is forbidden to stay within the spreading range of the vehicle. Risk of gravel being flung by spreading unit (tractor cabin).

870 07 116

Do not open or remove the safety guards when the motor is running.

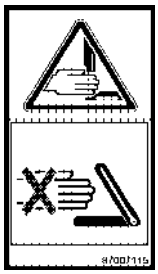
870 07 107

Never reach into the deflection rolls of the scraper floor chain.

870 07 113

Danger due to rotating spreading drums (or spreading plates). Never try to eliminate blockages when the machine is running.

870 07 115



Never touch moving scraper floor cross bars (risk of crushing).

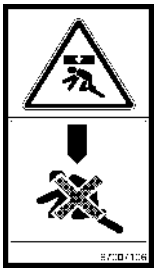
870 07 117

Do not step onto the loading surface with the countershaft / hydraulic system connected and the motor running.

870 07 104

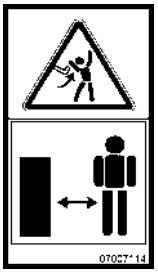
Do not stay within the swivelling range of the spreading drum protecting device when the tractor motor is running.

870 07 106



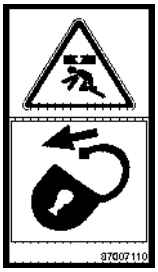
It is forbidden to stay under the lifted unsecured retaining slide.

870 07 114



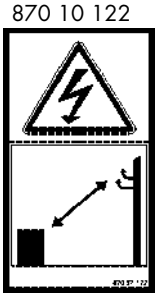
Before putting the machine into operation make sure that no people **(in particular no children)** are within the close-range zone. Pay attention to sufficient view, e.g. when reversing!

870 07 110



Carry out any repair and maintenance work with the cover of the two-plate wide-angle spreading unit open only when the stopcock of the hydraulic pipe is closed (see 7.4, page 29).

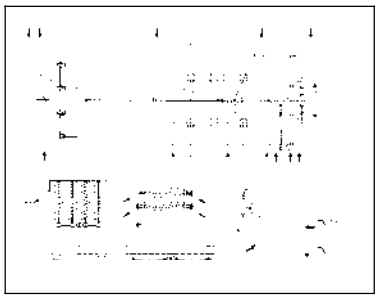
870 10 122



Attention: With the retaining slide extended, the height can exceed 3.5 m. Pay attention to overhead lines and the bridge passthrough heights.

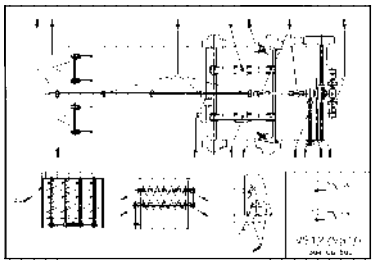
Nominal voltage	Safe distance to overhead lines
up to 1 KV	1 m
more than 1 up to 110 KV	3 m
more than 110 up to 220 KV	4 m
more than 220 up to 380 KV	6 m

301 06 502



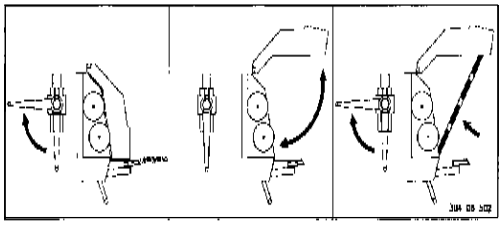
Lubrication chart for VS 8 E, VS 8 TD, VS 10 E, VS 10 TD, VS 12 TD

304 06 500



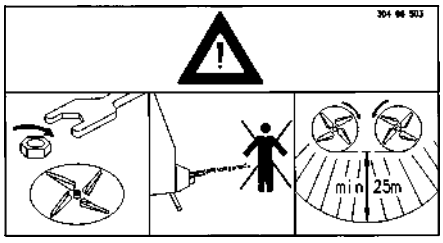
Lubrication chart for VS 12 E-L, VS 16, VS 18.

304 06 502



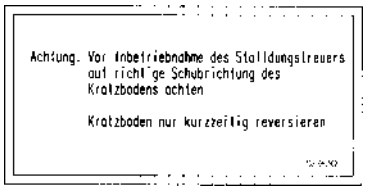
Close the stopcock in the hydraulic pipe for the spreading unit cover when carrying out repair and maintenance work and during spreading operation.

304 06 503



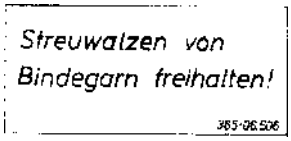
It is forbidden to stay within the spreading range of the vehicle. Minimum distance 25 m.
Before putting the machine into operation, check the spreading plates and spreading blades for tightness, retighten the fixing bolts, if necessary.

302 06 502



Attention: Before putting the stall manure spreader into operation, make sure that the scraper floor works in the right pushing direction.
Reverse the scraper floor only for a short time.

365 06 506



Keep the spreading drums free from binding twine!

Furthermore please pay attention to the following:

- **Never climb onto a moving vehicle!**
- **Keep in mind the fact that during the working process the danger zone can be up to 25 m!**
- **Use your protective clothing (e.g. wear gloves when cleaning the spreading tines).**

Residual risks

Attention:
Risk of crushing when lifting the hydr. supporting leg, when lowering the spreading door, when closing the safety guards, due to the reduction of the clearance between the wheels and the platform in the open fields and at the scraper floor chain and its deflection wheels.

4. Technical data

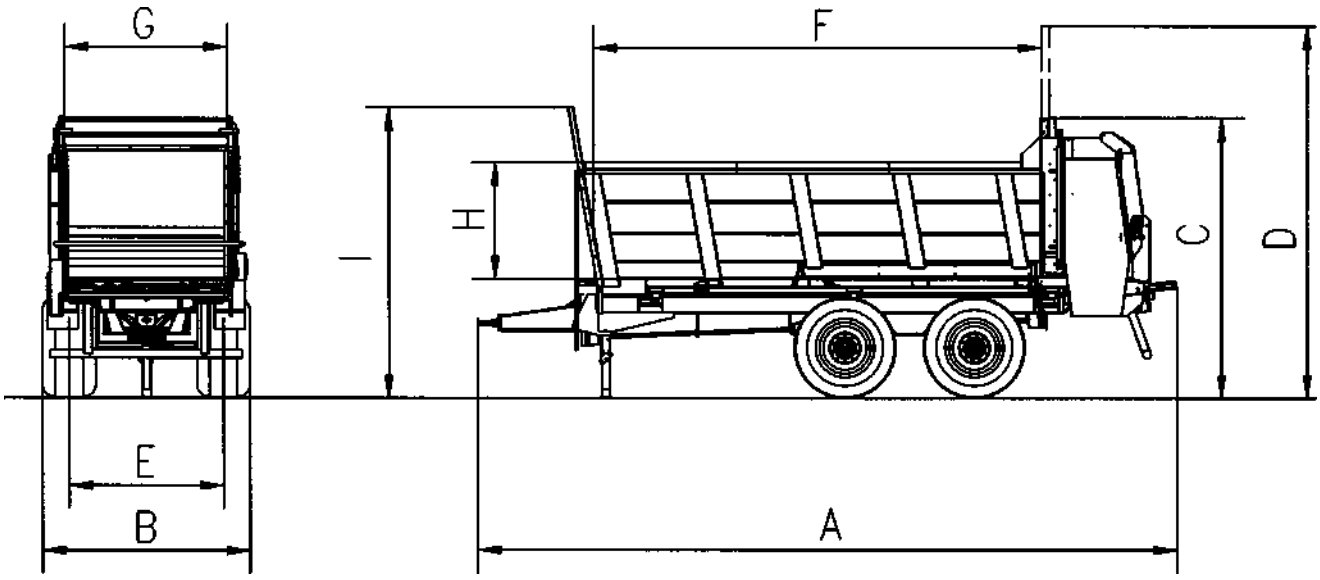


Fig. 2

Model		VS8E	VS8TD	VS10E	VS10TD	VS12TD	VS12	VS16	VS 18
Perm. gross vehicle weight	kg	8.000	8.000	10.000	10.000	12.000	12.000	16.000	18.000
Perm. axle weight	kg	7.000	7.000	8.700	9.000	10.800	10.000	14.000	16.000
Perm. tongue load	kg	1.000	1.000	1.800	1.600	2.000	2.000	2.000	2.000
Tare weight 2-drum spreading unit	kg	4.100	4.200	4.150	4.300	4.400			
Tare weight 4-drum spreading unit	kg	4.600	4.700	4.650	4.800	4.900	5.200	6.000	6.300
Tare weight 2-plate spreading unit	kg	5.300	5.400	5.350	5.500	5.600	5.900	6.700	7.000
A=Total length 2-plate spreading unit	m	7,61					8,14		8,64
Total length 2-drum spreading unit	m	7,10							
Total length 4-drum spreading unit	m	7,40					7,93		8,43
B=Total width	m	2,41					2,50	2,45	2,65
C=Total height	m	3,21	3,13	3,25	3,18	3,21	3,27	3,17	3,28
D=Tetaining slide extended	m	4,12	4,04	4,16	4,09	4,12	4,36	4,26	4,37
E=Track	m	1,80	1,80	1,85	1,80	1,80	1,90	1,95-2,13	2,03
F=Length of leading space up to retaining slide	m	4,32					4,85		5,35
Length of leading space up to 2-drum spr. unit	m	4,90					5,43		5,93
Length of leading space up to 4-drum spr. unit	m	5,00					5,53		6,03
G=Width of loading space	m	1,93							
H=Height of loading space	m	1,06							
I=Total height with spreading protecting device	m	3,39	3,31	3,43	3,36	3,39	3,45	3,35	3,46
Overhead clearance of spreading unit 2 drums	m	1,40							
Overhead clearance of spreading unit 4 drums	m	1,46							
Retaining slide overhead clearance	m	1,25							
Laading height	m	2,41	2,33	2,45	2,38	2,41	2,47	2,38	2,48
Loading capacity 2-plate spreading	m^3	11,5					13,0		14,5
Loading capacity 2-drum spreading	m^3	13,0					14,5		16,0
Loading capacity 4-drum spreading	m^3	14,0					15,5		17,0
Max. hydraulik pressure	bar	210							
Oil flow rate	l/min	min. 30 - max. 70							
Power requirement	kW(HP)	59(80)	59(80)	66(90)	66(90)	74(100)	88(120)	88(120)	110(150
Minimum weight of tractor	kg	3 000	3 000	3 500	3 500	4 000	5 000	5 000	5 500
Countershaft speed	RPM	1.000							
Power supply	Volt	12 VDC							
Sound pressure level		84,6 dBA							

4.1 Overinflation charts

321 06 503

321 06 503 VS8E		Overinflation in bar 25 km/h	40 km/h	max.
500/55-20	12PR	2,0	2,9	3,0
500/60-22,5	12PR	2,0	2,0	3,3
600/50-22,5	12PR	1,5	1,5	2,6
700/40-22,5	12PR	1,3	1,3	2,3
700/45-22,5	12PR	1,0	1,5	2,2

325 06 502

325 06 502 VS12TD		Overinflation in bar 25 km/h	40 km/h	max.
16.0/70-20	10PR	1,8	2,7	3,2
500/55-20	12PR	1,3	1,9	3,0
550/45-22,5	12PR	1,2	1,5	2,9
600/50-22,5	12PR	1,5	1,5	2,6
700/40-22,5	12PR	1,3	1,3	2,3

322 06 502

322 06 502 VS8TD		Overinflation in bar 25 km/h	40 km/h	max.
13.0/75-16	10PR	1,9	2,8	4,0
16.0/70-20	10PR	1,0	1,5	3,2
500/50-17	10PR	1,0	1,5	2,7
500/55-20	12PR	1,0	1,5	3,0
550/45-22,5	12PR	1,0	1,5	2,9

303 06 501

303 06 501 VS12E-L	Overinflation in bar 25 km/h	40 km/h
550/60-22,5	2,3	-
600/55-22,5	2,1	2,6
600/55-26,5	1,8	2,1
700/50-22,5	1,5	1,7
700/50-26,5	1,4	1,6

323 06 502

323 06 502 VS10E		Overinflation in bar 25 km/h	40 km/h	max.
500/60-22,5	12PR	2,0	2,6	3,3
600/50-22,5	12PR	1,7	2,0	2,6
700/40-22,5	12PR	1,3	1,7	2,3
700/45-22,5	12PR	1,2	1,8	2,2
700/50-26,5	8PR	1,0	1,2	1,6

304 06 504

304 06 504 VS16	Overinflation in bar 25 km/h	40 km/h
550/60-22,5	-	1,8
500/60-22,5	2,0	2,4
600/50-22,5	1,6	1,8
600/55-22,5	-	1,7
700/40-22,5	-	1,5
700/45-22,5	-	1,7

324 06 502

324 06 502 VS10TD		Overinflation in bar 25 km/h	40 km/h	max.
15.0/70-18	10PR	1,7	2,7	3,5
16.0/70-20	10PR	1,4	1,9	3,2
500/50-17	10PR	1,3	1,9	2,7
500/55-20	12PR	1,0	1,5	3,0
550/45-22,5	12PR	1,0	1,5	2,9

311 06 501

311 06 501 VS18	Overinflation in bar 40 km/h
600/55-22,5	1,5
600/55-26,5	1,4
700/45-22,5	1,6
700/50-22,5	1,2
700/50-26,5	1,1
24 R 20.5 XS	1,8

5. Functioning of the machine

The 2-drum spreading unit is equipped with segmental spreading drums.

The spreading drums chop the spreading material which is then cut off as desired and taken up by the 2-plate wide-angle spreading unit. This unit can then discharge the spreading material up to a max. spreading width of 20 m.
A vertical retaining / and metering slide ensures a precise metering adjustment for fine crumbled spreading material.

The scraper floor advance is adjusted by means of the rotary switch at the switch box or, in case of the VS 8 – VS 12 TD models, by means of the control knob at the current regulator.
Here the advance is continuously variable.

The standard direct activation of the hydraulic functions is done via control units at the tractor. As an optional extra, an electromagnetic remote control can operate these (comfort hydraulics). In case of the VS 12, VS 16, VS 18 models, the scraper floor advance function is activated by a standard electromagnetic remote control.

The universal spreader can alternatively be equipped with a 4-drum spreading unit (4 vertical spreading drums).

The spreading units are driven by means of the tractor countershaft, 1000 RPM.

6. Working with the stall manure spreader

Before putting the machine into operation, all lubrication points have to be lubricated.

6.1 Coupling to the tractor

Couple the stall manure spreader in horizontal position or rather slightly inclined to the front to the tractor. Make sure to secure the vehicle against rolling (high accident risk).

The clearance between the bumper and the road must not exceed 550 mm (see Fig. 4). Adjust, if necessary.

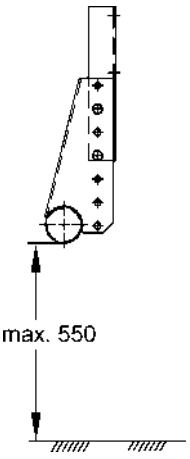


Fig. 4

Connect the hydraulic pipes (do not mix up advance and return, **red** = advance, **blue** = return), the e-hydraulics, the lights and the braking system.

Lift the hydraulic supporting leg (optional extra) which is directly connected to the tractor control valve.

Before starting a trip, check the braking system and the lights for correct functioning (indicators according to the tractor's) and make sure that all safety guards have been mounted and closed.

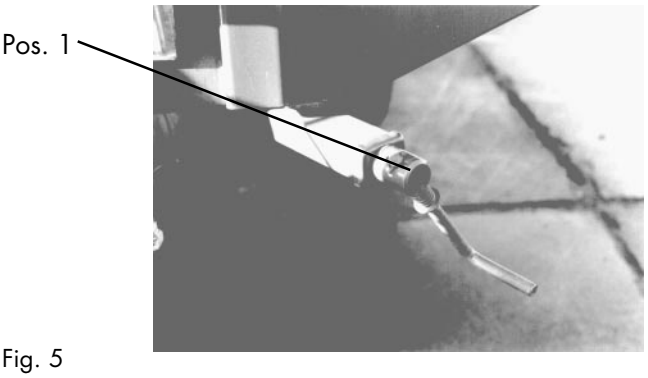


Fig. 5

Attention: Apply the parking brake when uncoupling the spreader!

6.1.1 Hydraulic connection

The hydraulic block has been built in modular design. In case of a later adding of optional extras, the hydraulic block can be simply extended. The current regulator for the neutral cycle and the speed adjustment of the small consumers are situated in the pump inlet plate.
The speed for the consumers, except from the scraper floor, is set at the adjusting screw 1 fig. 3 attached to the pump inlet plate. The flow rate of the consumers is 1 – 16 l/minute.

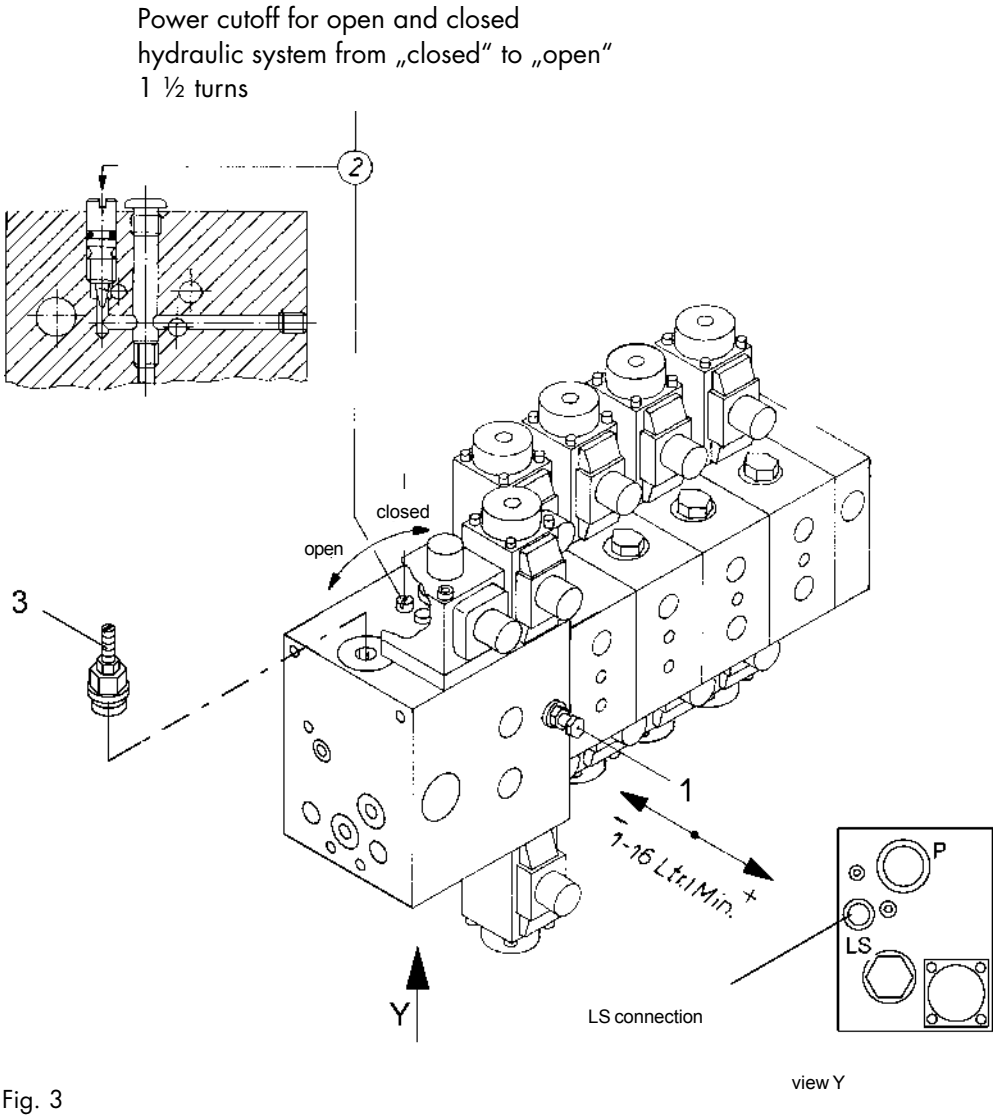


Fig. 3

Open and closed hydraulic system

The hydraulic system can be operated at a maximum rate of 70 l/min. as open or closed system. The switching over to closed system (e.g. older John Deere tractors) is effected by means of the adjusting screw 2 fig. 3 attached to the pump inlet regulator.

LS connection

The hydraulic system can be controlled via the LS system of the tractor. (Pressure and delivery rate of the hydraulic pump are adapted to the present requirements). For this purpose, the LS connection at the tractor and the LS connection at the control valve, fig. 3, are joined to each other.
The advance is directly connected to the hydraulic pump. (Not via the tractor control valve).

Attention: Never use the power take-off without LS connection.
The pressure balance must be blocked by screwing in the spindle 3. The control current cutoff must be set to open system.

Attention: In case of a connection via the tractor control valve, the spindle must be unscrewed again as far as it will go.

Hydraulic connection

For the hydraulic connection, the tractor requires a double-acting or a single-acting control valve with free return (red = advance; blue (thick hose) = return).
The direct free return to the hydraulic oil reservoir is to be preferred as in this case the backpressure will be lower.

6.2 Hydraulic retaining slide

The hydr. retaining slide is operated via the tractor control valve or the control panel of the electromagnetic control.
In case of flowing and trickling spreading material, the spreading quantity can be controlled by means of the opening width of the retaining and metering slide in conjunction with the advance speed of the transport floor.
In case of solid spreading material (stall manure, trodden dung), the retaining and metering slide should always be completely open.
The retaining slide must not be closed as long as there is any material underneath it. If the retaining slide is closed with an uneven load, a bending of the guide rails due to a tilting of the retaining slide cannot be excluded.

Attention: Risk of breakage in case of non-observance!

Ensure that there is no free space between the load and the retaining slide. If so, the spreading drums might throw foreign objects to the front.

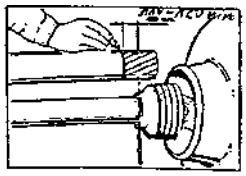
Attention: The retaining slide being extended, the height may exceed 3.5 m.
Pay attention to overhead lines and bridge passthrough heights!

6.3 Drive shaft adjustment

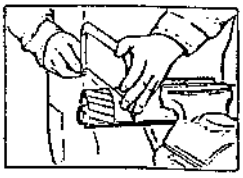
Read and observe the operating instructions of the drive shaft manufacturer.
Due to the differing lengths of the countershaft at the individual tractors, it is often necessary to adjust the length.

If the drive shaft is equipped with an overload clutch, this must be mounted on the trailer's side.

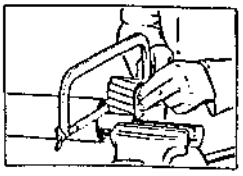
The length adjustment is to be carried out as follows:
Take into account possibly occurring shortenings during travel operation.



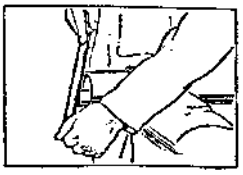
For length adjustment slip on drive shaft halves on both sides in the shortest operating position, hold them side by side and mark them.



Shorten the inner and outer protection tube equally.



Shorten both inner and outer sliding profile by the same length as the protection tube.



Debur the cutting edges and remove the filings carefully.
Grease the sliding profiles.

Fig. 7

Attention!

A minimum overlapping of the sliding profiles of 350 mm must be guaranteed in all cases.
Please observe the operating instructions of the drive shaft manufacturer.

6.4 Electrical connection

The electrical connection of the lighting system is a standard 7-pole connector for 12 V connection. You can see the terminal markings from fig. 8.

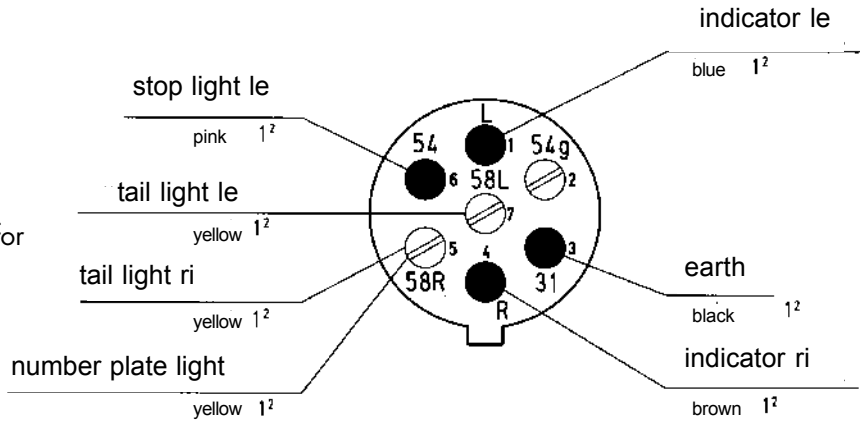


Fig. 8

6.5 Operation

The standard activation of the individual functions is directly done via the tractor control valves. The scraper floor advance is continuously adjustable via a rotary switch. As an optional extra, all functions can be activated via an electromagnetic remote control.

Advance adjustment

VS 8E
VS 8TD
VS 10E
VS 10TD
VS 12TD

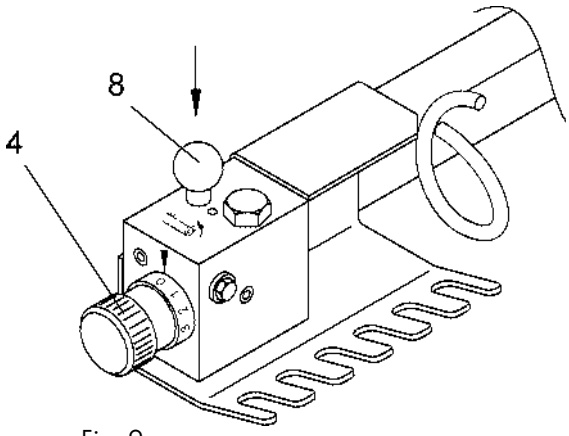


Fig. 9

Electrical switch box (optional extra VS 8 E – VS 8 TD)

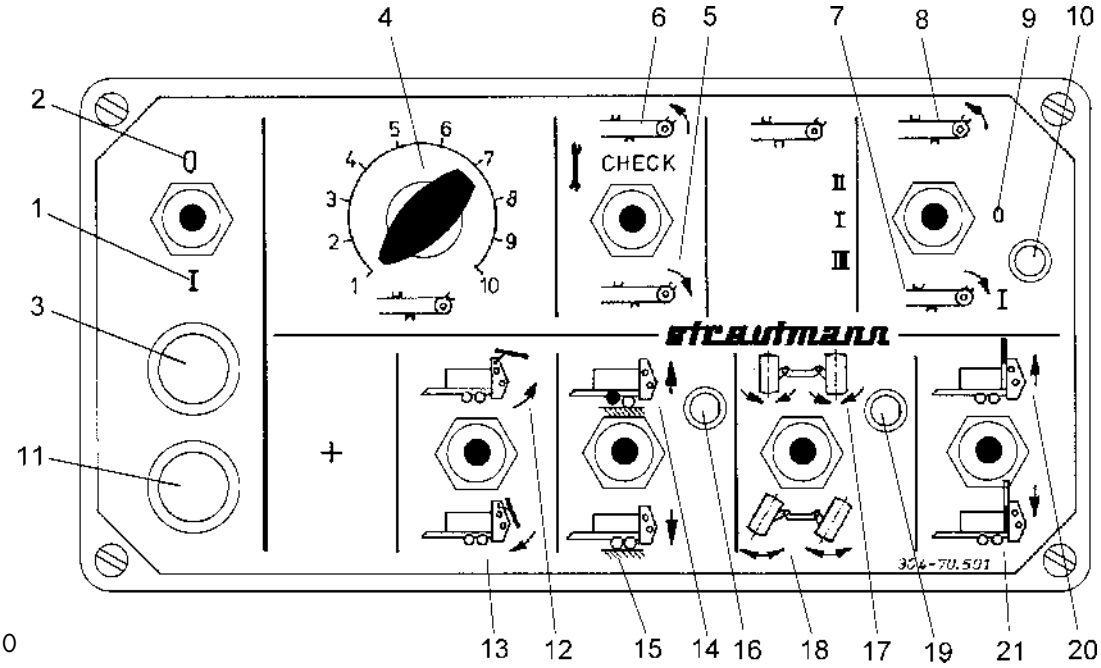
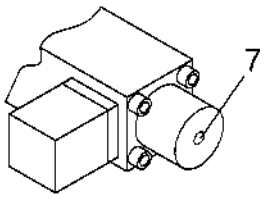


Fig. 10

1) Control: on
2) Control: off
3) Indicator light: control on
4) Scraper floor speed
5) Scraper floor: advance
(with spreading unit stopped)
6) Scraper floor: reserve
7) Scraper floor: advance
8) Scraper floor: reserve
9) Scraper floor: off
10) Indicator light: scraper floor advance
11) Indicator light red: scraper floor stop speed monitoring
12) Spreading unit cover: open
13) Spreading unit cover: closed
14) Lifting axle: up
15) Lifting axle: down
16) Indicator light: lifting axle up
17) Steering axle: blocked
18) Steering axle: clear
19) Indicator light: lifting axle blocked
20) Retaining slide: up
21) Retaining slide: down



In case of a power failure, the control valve can be directly activated by pressing the anchor it. *7* at the lifting solenoid.

Fig. 11

6.6 Speed monitoring

The operating status of the 2-drum spreading unit and the wide-angle spreading unit is indicated by means of a visual and acoustic speed monitor display in the control panel.
In case of a speed drop of one of these units indicated by a responding overload clutch, the display is activated.

In this case, the scraper floor advance is automatically stopped.

Attention! For functional checking of the speed monitoring, the warning device gives a short acoustic and visual signal when switching on the transport floor advance.

The scraper floor advance or return can be operated even with the speed monitoring activated (acoustic and visual display) by means of the scraper floor CHECK switch in the control panel.

6.7 Practical use

Set the tractor control valve (three-way or one-way valve with free return) to flow and lock the lever so that it will not be necessary to hold the latter all the time.

Switch on the tractor countershaft **1000 RPM.**

Set the main switch at the switch box to position 1.
(The green indicator light lights up.)

Lift the retaining slide to the required height:
a) via three-way tractor control valve, if equipped with direct connection
b) by means of switch pos. 20, if equipped with electrohydraulic system

After the start switch on the scraper floor advance via switch position 7 and select the corresponding scraper floor speed by means of switch 4.
Make sure to have chosen the correct advance direction.

Set the switch position 8 to „Scraper floor return" to reverse the advance direction

Attention: (Reverse only for a short time).

The scraper floor is to be switched off at the end of a spreading distance or at the turning point (switch position 9).

In case of longer road trips, the tractor valve should be switched off in order to avoid an unnecessary heating up of the hydraulic system.

Attention: Only one function can be operated at a time.

6.8 Steering axle (optional extra)

The steering axle is operated:
a) via three-way tractor control valve, if equipped with direct connection
b) by means of switch positions 17 and 18, if equipped with electrohydraulic system

When travelling along hillsides or when reversing, the steering axle has to be blocked.

When the lifting axle (optional extra, see 6.9) has been lifted, it is imperative that the steering axle is blocked.

6.9 Hydraulic lifting axle (optional extra)

Due to the hydr. lifting axle, the centre of gravity of the universal spreader is shifted to the front thus increasing the tongue load. This prevents the tractor drive wheels from spinning early with the vehicle being half empty.

Attention: The hydr. lifting axle is only allowed to be used:
a) in the fields with the vehicle having been emptied by half
b) in the fields and on the road with the vehicle empty
c) only with blocked steering axle (optional extra)

The operation is carried out
a) via three-way tractor control valve, if equipped with direct connection
b) by means of switch positions 14 and 15, if equipped with electrohydraulic system

Note:
In case of operation via the electrohydraulic system, the steering axle (optional extra) is automatically blocked when the lifting axle is activated. In this case, the blocked steering axle can only be unblocked again via switch position 18.

Attention: Clean the centering shells (fig. 12) on the rear axle regularly.

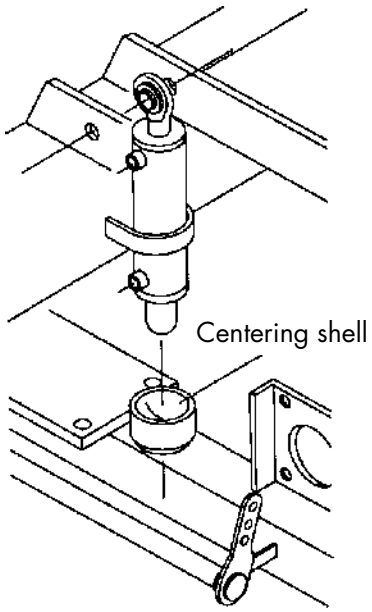


Fig. 12

6.10 Segmental drum spreading unit

The spreading tines have been fixed by means of special screws (property class 10.9). The hole pattern in the spreading tine is symmetrical and can be turned in case of wear. Please check the screws and tines regularly for wear.
Tightening torque of the screws **150 Nm**.

6.11 Operation of segmental drum spreading unit

- **It is not allowed to operate the universal spreader without the spreading unit.**

In case of large foreign objects in the spreading material the safety clutch may switch off.
The speed monitoring is activated.

- **Measures in case of spreading unit blockage**

  - switch off scraper floor
  - switch off tractor countershaft
  - reverse scraper floor
  - remove foreign object
  - switch on again spreading unit and advance

6.12 Two-plate spreading unit

As spreading materials show very different spreading properties, a spreading test before starting the spreading operation is absolutely necessary.
8 holes are provided on the plate for each spreading blade in order to adapt to the spreading properties of the manure. According to the kind of manure a differing setting can be appropriate.

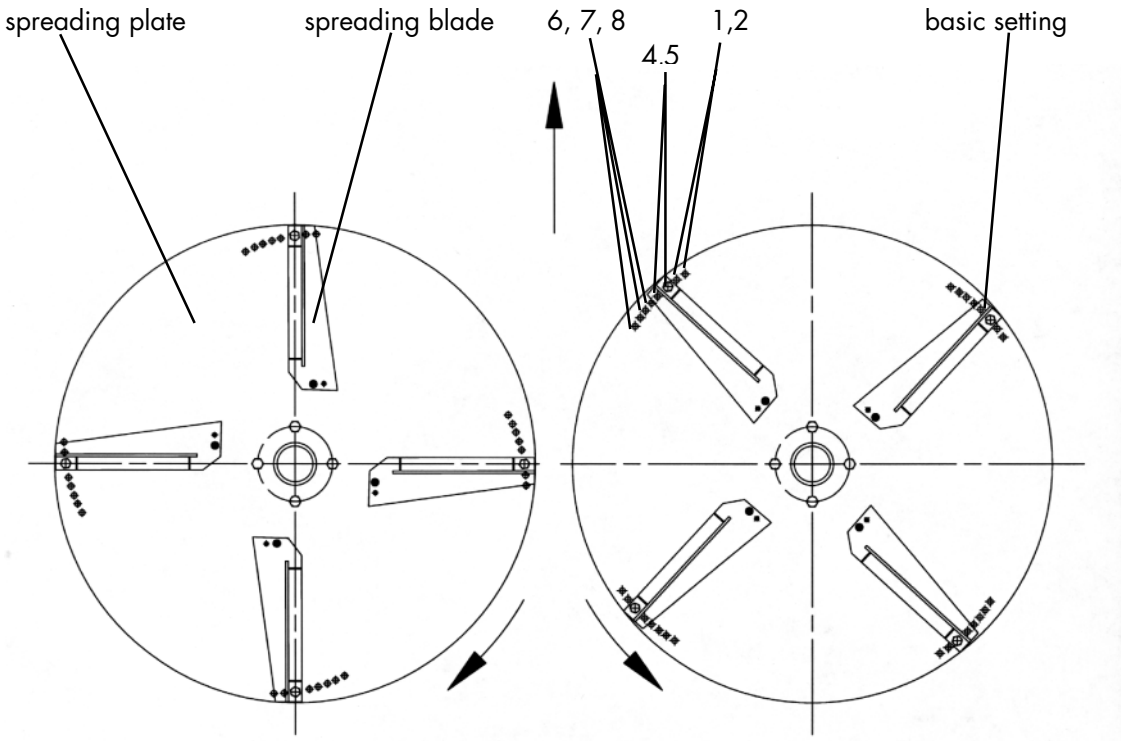


Fig. 13

Spreading blade setting

Manure property	Kind of manure	Spreading blade setting
very light, high straw content, long straw	Turkey manure	6, 7, 8
normal weight, chopped straw, normal manure humidity, matured up to intermixed or trickling	Cattle manure matured Compost, chicken manure Dry chicken dung	Basic setting 4, 5
heavy, strongly soaked, sticky	Deep stall manure, matured manure	1,2

Attention:
- **check spreading blades regularly for wear. High accident risk due to components being thrown a long way. Replace immediately in case of clearly visible wear.**
- **The throwing width and distributing precision decrease due to worn spreading blades. Check the wearing sheets at the spreading table regularly and replace them in good time.**

6.13 Spreading door (in case of 2-plate spreading unit)

The height of the spreading door can be varied. In principle, it should be set as low as possible. This ensures a better lateral distribution.
In case of long straw manure, the spreading door can be set higher in order to prevent the spreading material from getting blocked on the spreading plates. Furthermore, the throughput rate can be increased this way.
The point where the spreading material is served onto the spreading plates should be as far ahead as possible. It can be varied by means of the adjusting screws. If the point where the spreading material is served is shifted to the back, the throughput rate will be increased. If the shifting is too great, the lateral distribution will worsen.

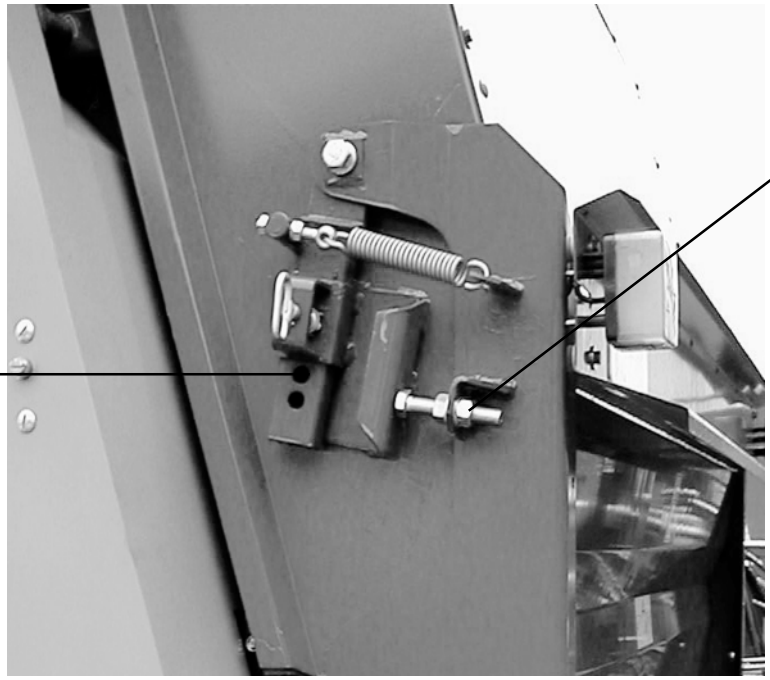


Fig. 14

6.14 Weighing device (optional extra for VS 12, VS 16, VS 18)

A calibrated weighing device is available as an optional extra. By means of 6 weighing cells mounted between the frame and the platform the actually loaded weight is indicated and even stored if the corresponding hardware is available.
You will receive separate operating instructions.

Attention: When carrying out welding work on the vehicle, fix the earth connection near the weld seam. Otherwise the electronics of the weighing device or the weighing cells will run the risk of being damaged.

7. Upkeep and maintenance

Attention! Any maintenance and repair work is only to be carried out by trained staff or authorised qualified workshops in consideration of the safety regulations. Regularly check all nuts and bolts for tightness and retighten, if necessary.

7.1 Transport floor chain tightening device (Fig. 15)

The transport floor chains are to be retightened by means of the clamp bolt 1. For this purpose, loosen the counter screw 2 and retighten the scraper floor chains equally.

Attention! Check the transport floor regularly for sufficient tension.
While doing this, it should be only possible to press the scraper floor cross bar running below the loading surface in the middle part against the cross-members at the most.

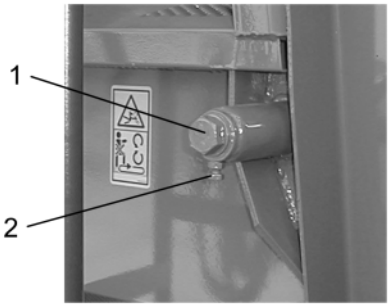


Fig.15

7.2 Shortening of scraper floor chains

To shorten the scraper floor chains, proceed as follows:

1. Let the scraper floor run so far that the chain joints are in the upper part of the platform.
2. Completely loosen the locking screws 2 and clamp bolts 1 (see fig. 15).
3. Detach 2 chain links each from the chain strips.
4. Replace chain joints.
5. Retighten transport floor, as described in 7.1.

For dismantling the flat link chain (optional extra) remove the interlocking bow 1, fig. 15a.

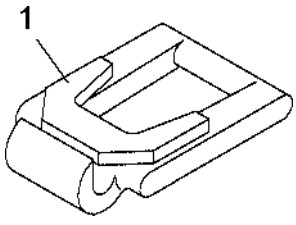


Fig.15 a

7.3 Driving chains of spreading unit

Attention! Open the protection flap of the spreading unit drive only with the tractor switched off.

The driving chains of the spreading unit are equipped with an automatic chain tightening device. In order to prevent the chain tightener from returning too violently in case of load alteration fluctuations, the locking screw must be retightened, if necessary. The setting angles of the chain tighteners should be checked at regular intervals. If these differ too much, the spring tension will decrease and sufficient chain tension will no longer be guaranteed. The driving chains are to be shortened immediately.

Max. clearance between bolt and disc 5 mm

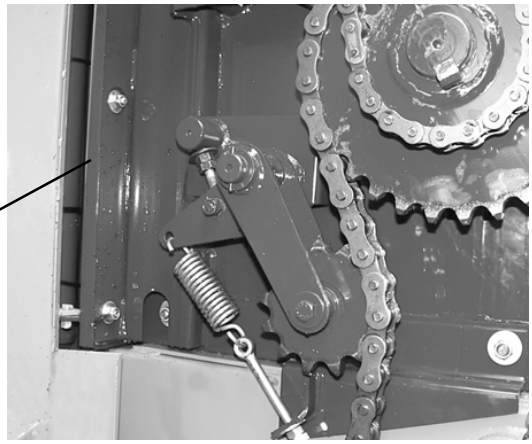


Fig. 16

7.4 Cover of spreading unit

The 2-plate wide-angle spreading unit is equipped with a hydr. swivelling cover for cleaning and maintenance work.

Attention! **Make absolutely sure that this cover is secured against lowering by means of a hydr. stopcock when in open position. Facing the front, the stopcock is mounted on the left front wall near the drawbar. It is imperative that the stopcock is closed during spreading, too.**

Stopcock for spreading unit cover, blocked position

Fig. 17

7.5 Spreading unit blockage

Any blockage in the spreading unit can be eliminated by reversing the scraper floor.
If a blockage should continue to exist, the motor will have to be switched off and the ignition key will have to be pulled out. The spreading units can then be cleaned by means of an appropriate object.

Attention! Reverse the scraper floor only for a short time!

7.6 Axles – Wheels – Brakes

Axles should not be overloaded. Overloading shortens the service life of the bearings and causes damage to the axles.

Furthermore, the following mistakes may cause overloading and are to be avoided:

Driving up kerbs, high speeds, mounting of wheels with wrong inserting depth, mounting of oversized wheels and tyres.

In order to keep up operational safety, the wheel brakes must be correctly adjusted at all times.

Any maintenance and repair work on the axles and the braking system must only be carried out by qualified workshops or authorized skilled staff.

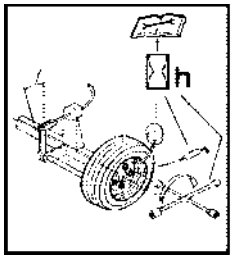
Maintenance schedule: Axles

After the first working trips:	Check seat of wheel nuts. Retighten wheel nuts, if necessary. Check float of wheel hub bearing.
After 50 service hours:	Check float of wheel hub bearing.
Every 100 service hours:	Lubricate brake camshaft (not reqd with nylon bushings), check brake lever setting and adjust, if necessary.
Every 500 service hours:	Adjust float of wheel hub bearing: Remove dust cap and split pin, tighten axle nut until the hub is lightly stopped and loosen again up to the next split pin hole. Fix the nut by split pin and check run.
Every 1000 service hours:	Relubricate wheel hub bearing with rolling bearing grease. Check the brake linings for wear. Reline brakes, if necessary.

The maintenance schedule is based on a medium axle loading and brake wear. In case of a greater load, especially a greater wear of the brakes, the maintenance intervals must be shortened accordingly.

When changing the wheels, park the vehicle on a solid surface. Apply the parking brake for protection against rolling and put the chocks in front of or behind the wheels. Put the jack on one side under the axle and lift up the vehicle.

Attention: It is forbidden to stay under the lifted vehicle.



The air pressure is to be checked regularly.
(see page 22).
Torque settings for the wheel nuts:
M18 x 1.5 310 Nm
M22 x 1.5 630 Nm

7.7 Tyres

A good tyre efficiency is a question of regular checks and travelling at correct tyre pressure. If you take the following advice, you will gain the best benefit from your investment.

1. Check the tyre pressure every 2 weeks at least. If the machine has not been used for a longer period, check the tyre pressure before putting the machine into operation again. Always make sure that the tyre pressure is correctly set to the load and kind of work the respective machine will be carrying out in general.
2. Never overstrain the tyres.
3. Make sure that the caps are on the valves and have been tightened.
4. Check the tyres preferably during operation for „folds" or other abnormal deformations. Remove any stones, gravel, nails and other foreign objects collected in the tyre, as otherwise they will further penetrate into the tyre. Deeper cuts should be repaired as soon as possible.

If the tyres are intended to not be used for a longer period, remove the load in order to avoid any deformation. „Loose" tyres should be stored in a dark place, free of oil and other chemicals. Do not store the tyres near electric motors as the ozone generated by the equipment will lead to a slow desiccation of the rubber.

Effect of different tyre pressures on farm and meadow land

The power required to draw a wheel across a field is called rolling resistance. It will considerably be increased if the tyre carves or sinks into the ground. Low tyre pressure enlarges the contact surface of the tyre compared to an operation at high pressure. When using wide tyres with low tyre pressure, the tyre remains more on the surface and the rolling resistance decreases. The drawing of the machine or the equipment will require less power, the fuel consumption will decrease and it will save time. At the same time, the wheel tracks left will be less thus avoiding destructive soil compaction. The larger contact surface also allows a more effective power transmission. Unnecessary damages to the soil structure will be avoided. Furthermore, the fuel consumption will be reduced. The load is carried by the air contained in the tyre. This is why it is very important to choose the right tyre size and the right tyre pressure for the respective machine or work to be carried out. A tyre moved at a low pressure is softer and therefore more gentle to the surface. The softness will also improve the driving comfort. The tyre wear varies according to the tyre pressure and the kind of surface. It is a simple rule to use soft tyres for soft surfaces and harder ones for hard surfaces. A look at the tyre will tell you how the tyres are being used. If the tyres are mainly worn at the shoulders, they have probably been used at a too low tyre pressure – the side walls of the tyre carry too much of the load. If the tyres are mainly worn in the middle of the tread, they have probably been used at a too high pressure.

Effect of different tyre pressures on the road

If the vehicle is mainly moved on tarred roads and yard surfaces, it will be possible to increase the air pressure to the max. admissible value. Thus the tyre wear will be the lowest at this kind of use.

7.8 Air brake system

The most important components of the twin-circuit air brake system see fig.19.

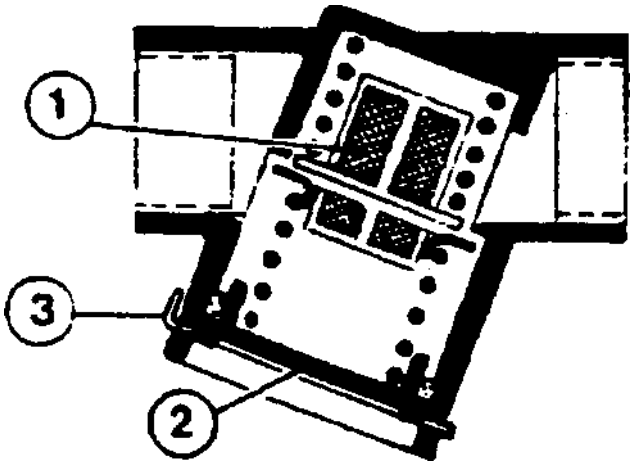


Fig. 18

1. Connector (supply) red
2. Connector (brake) yellow
3. Air filter
4. Trailer brake valve with brake pressure regulator
5. Trailer brake valve with release valve (ALB)
6. Membrane brake cylinder
7. Compressed air vessel (30 litres)
8. Condensation valve
9. Test connection Compressed air vessel
10. Test connection Front axle
11. Test connection Rear axle
12. Test connection ALB
13. Anti-wheel-lock regulator
14. Proportioning pressure regulator
15. Parking brake

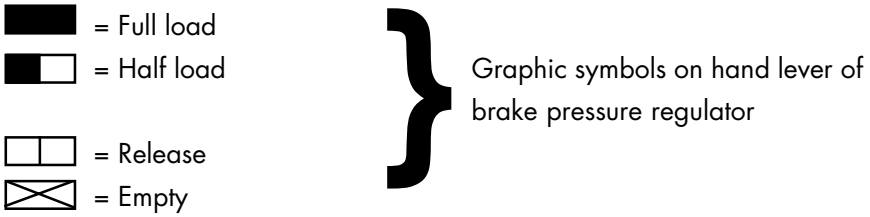
Coupling to the tractor

- the air brake system of the tractor must be compatible with the one of the loading vehicle.
- couple the two connectors to the tractor
- red connector = supply
- yellow connector = braking
- pay attention to the position of the hoses and correct fitting of the connectors
- stopcock for air brake system at the tractor must be open
- carry out a brake test

Braking system components

- The two connectors must be correctly connected and close tightly.
- The air filters, i.e. the filter elements 1 fig. 18, in the two pipes must be cleaned at regular intervals. Upon non-observance the function of the following devices (valves) is not protected. The pipes must have been depressurized when cleaning the air filters. The bottom cover 2 having been pushed in and the sliding element 3 having been released, the filter element can be removed and cleaned. The system remains in working condition even in case of a clogged filter element.
- The trailer brake valve 5 is protected against impurities by means of the air filter and does not require any special maintenance.
- By means of the regulated pressure of the trailer control valve mounted on the tractor's side the trailer brake valve is controlled via the brake line (yellow connector) and the compressed air vessel 8 of the trailer is filled via the supply line (red connector). The brake pressure regulator 4 flanged to the trailer brake valve can be manually adjusted to the respective loading condition of the trailer.
  The adjusting data of the ALB regulator 14 can be found next to the type plate at the front on the right of the vehicle.

The brake pressure regulator can be set to Full Load, Half Load, Empty and Release. The Release position allows to manoeuver the uncoupled vehicle.



In case of vehicles with ALB regulator, the brake is released by pressing the release valve 17 fig. 19.
The **compressed air vessel** 8 (capacity 30 ltr.) is design-tested. It is not allowed to carry out any modification or welding work on it. The **condensation valve** 9 on the bottom side of the vessel should be activated every day.
The piston of the **brake cylinder** 7 must return completely with the brakes released, i.e. the piston rod must fit tightly to the piston head.

Adjust the brakes when the brake cylinder has reached max. 2/3 of its total stroke at the latest.
Total stroke in case of membrane cylinders 12" = 45 mm, 16" = 57 mm, 20" = 57 mm

Check the braking system regularly for function, leaks and brake lining wear.

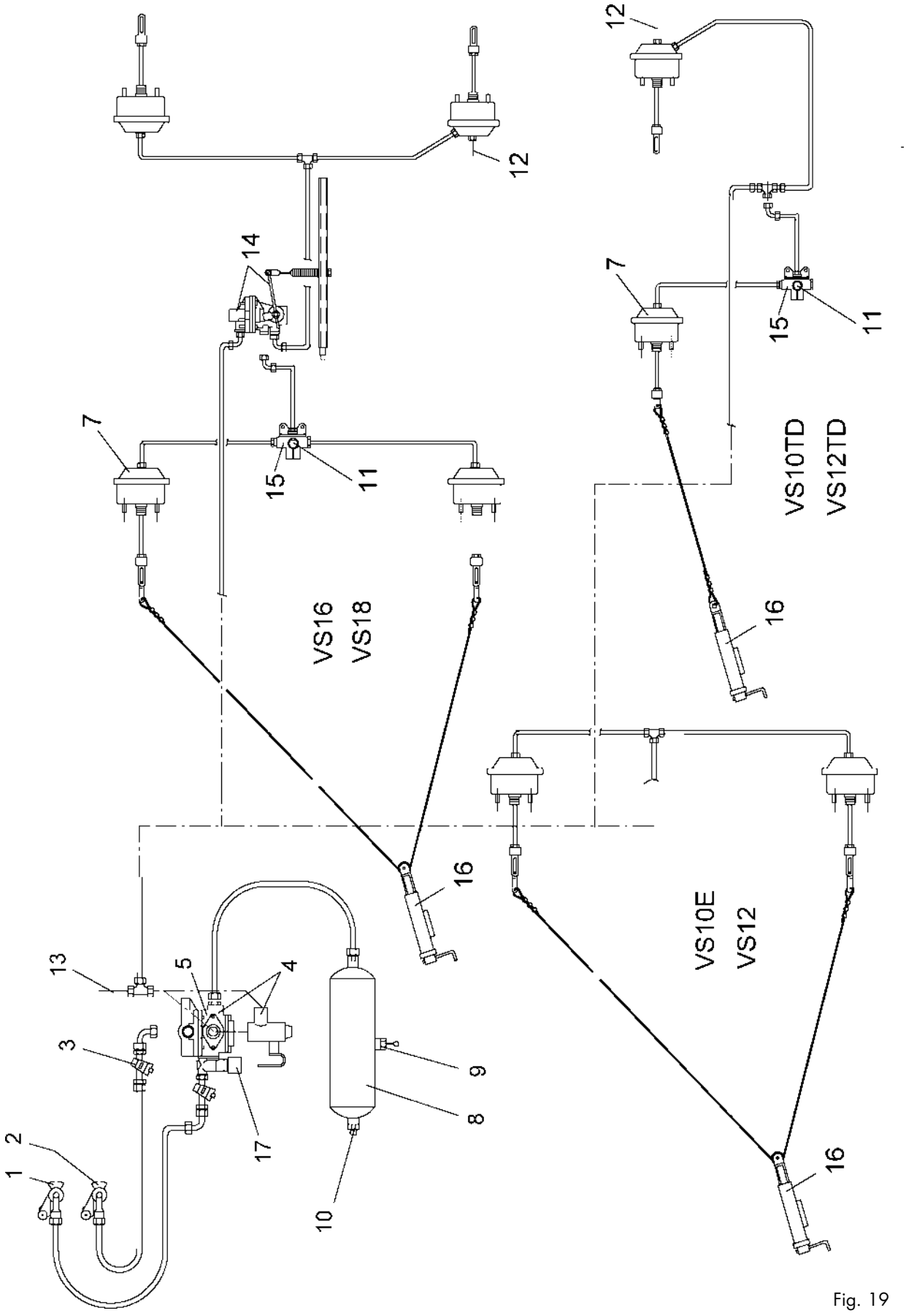

12
14
7
15
11
VS16
VS18
16
VS10TD
VS12TD
VS10E
VS12
13
5
4
3
9
8
17
10
1
2

Fig. 19

7.9 Oil levels of gearboxes

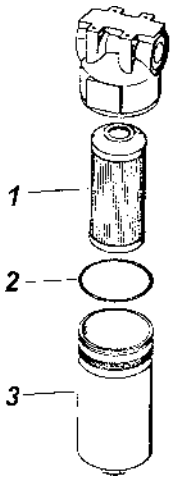
	Gearbox	Oliesoort	Hoeveelheid	max. bedrijfsuren
	Scraper floor feedgear mechanism	SAE 90	6,5 litres	2000 h
Universal spreader Plate spreading unit	Main gearbox Distributing gearbox Plate-type gearbox	ISO VG 320 ISO VG 320 ISO VG 320	2,3 litres 1,4 litres 1,2 litres	500 h 500 h 500 h
4-drum spreading unit	Spr. drum main gearbox Spr. drum gearbox inside Spr. drum gearbox outside	ISO VG 320 ISO VG 320 ISO VG 320	2,2 litres 1,6 litres 1,6 litres	500 h 500 h 500 h
2-drum spreading unit	Main gearbox	ISO VG 320	1,2 litres	500 h

Recommendation of gearbox manufacturers: The oil should be changed for the first time after 50 service hours.

Attention! Where lubricants threaten to penetrate the fodder or the soil, only use environmentally friendly, biodegradable oils and greases. Your local dealer should be able to provide information.

Please make sure that the lubricants are disposed of in a professional way.

7.10 Hydraulic oil filter VS 12/ VS 16/ VS 18

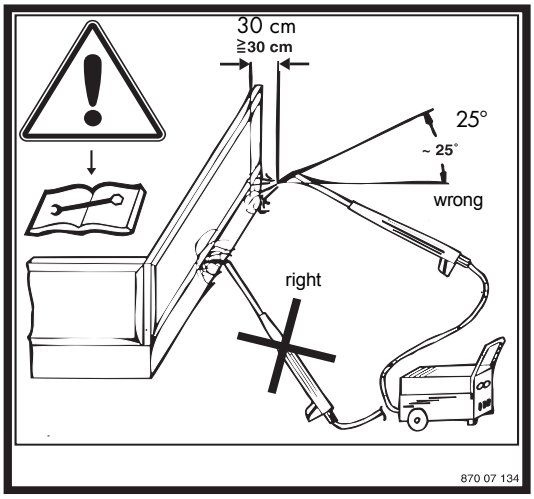


The filter element 1 is to be replaced after approx. 250 service hours.
Then as required, but every 1000 service hours at least.
Check the O-ring 2 for damage.
Clean the filter receiver 3. It is not possible to clean the filter element.
Soiled filters will cause a stronger heating up of the oil.
Filter element order no. 870 01 773 (for filter HD 069 – 168)
O-ring DR 53.6 x 3.5 order no. 870 08 702

7.11 Cleaning work and longer downtimes

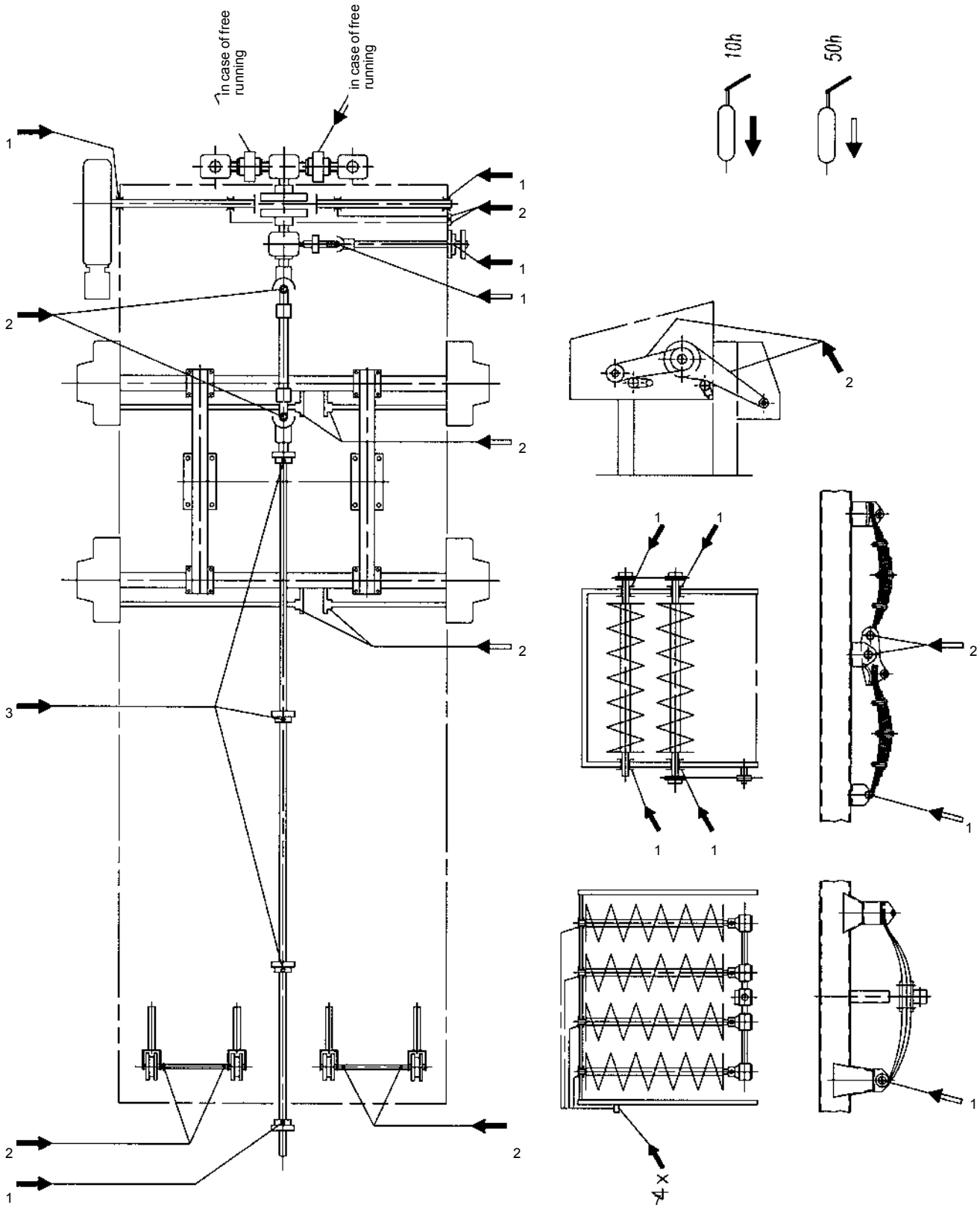
In case of longer downtimes:
Clean the equipment thoroughly, lubricate, oil and grease. Touch up damaged paintwork.

Attention when using a high-pressure water diffuser.

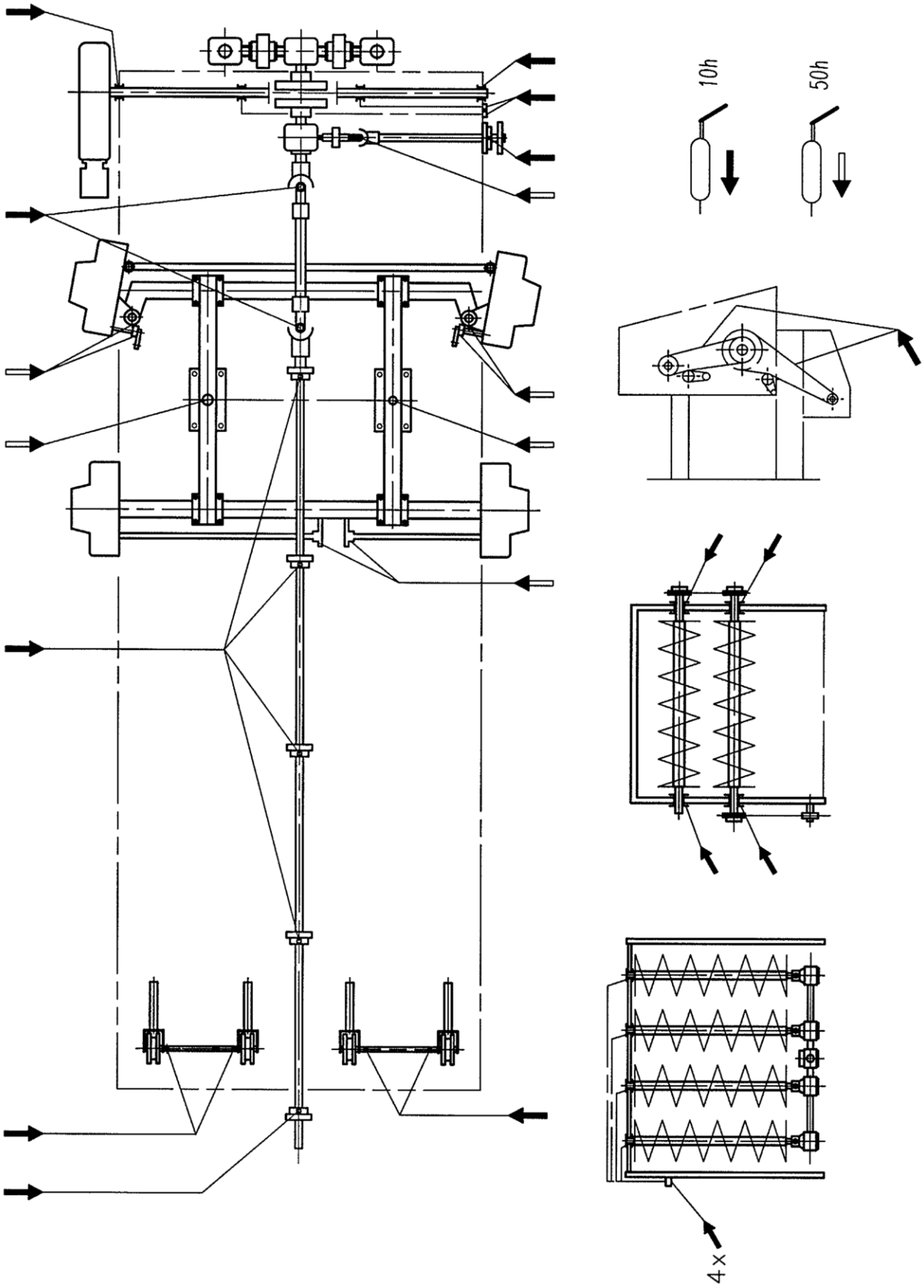


1. Minimum distance between spraying nozzle and vehicle 30 cm
2. Minimum spraying angle between nozzle and vehicle 25°
3. Max. spraying pressure 80 bars
4. Max. water temperature 60° C
5. Do not use any chemical additives
6. Do not use for cleaning bearing and hydraulic parts

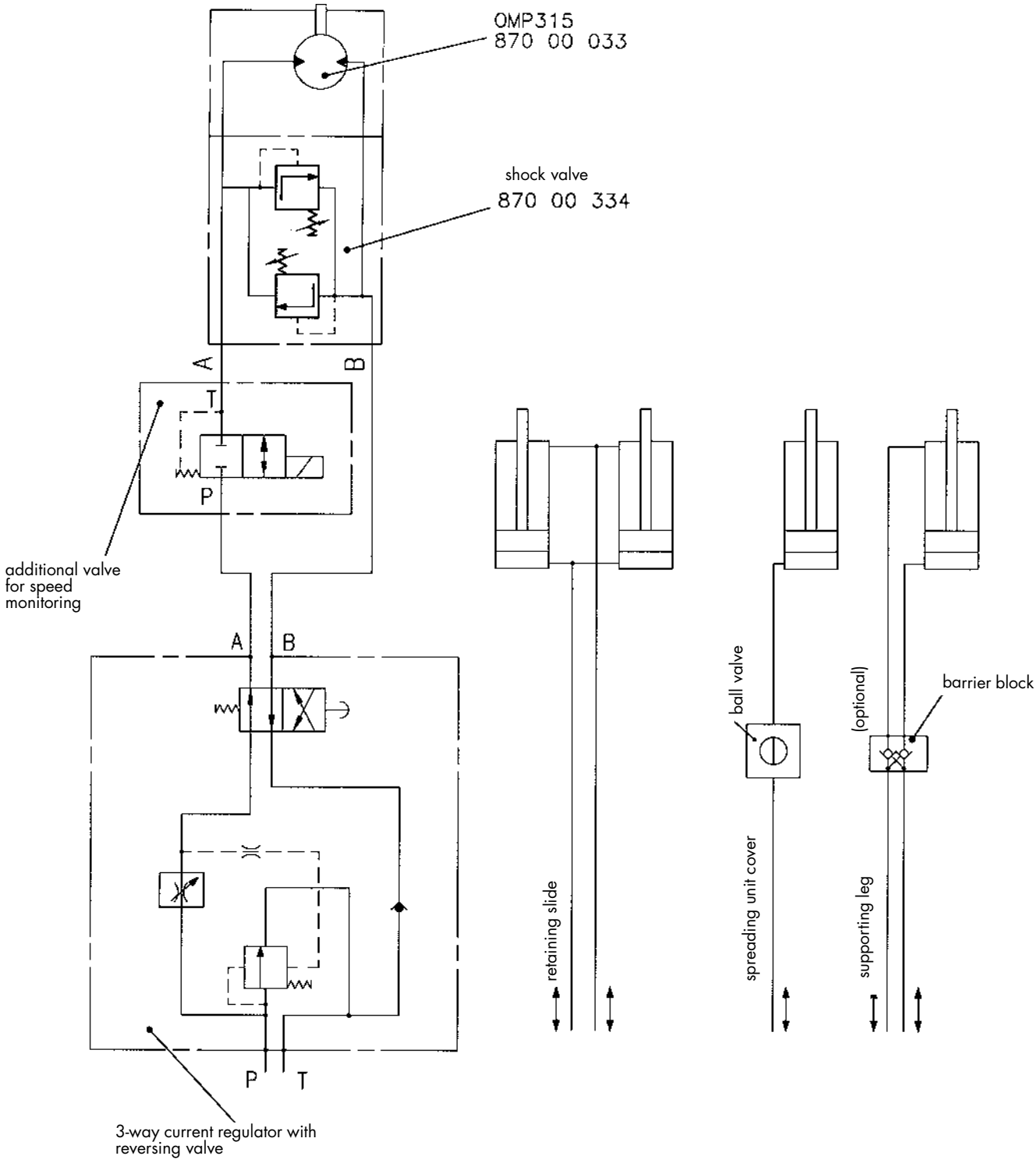
7.12 Lubrication chart VS 8E/ VS 8TD/ VS 10E/ VS 10TD/ VS 12TD



7.13 Lubrication chart VS 12/ VS 16/ VS 18

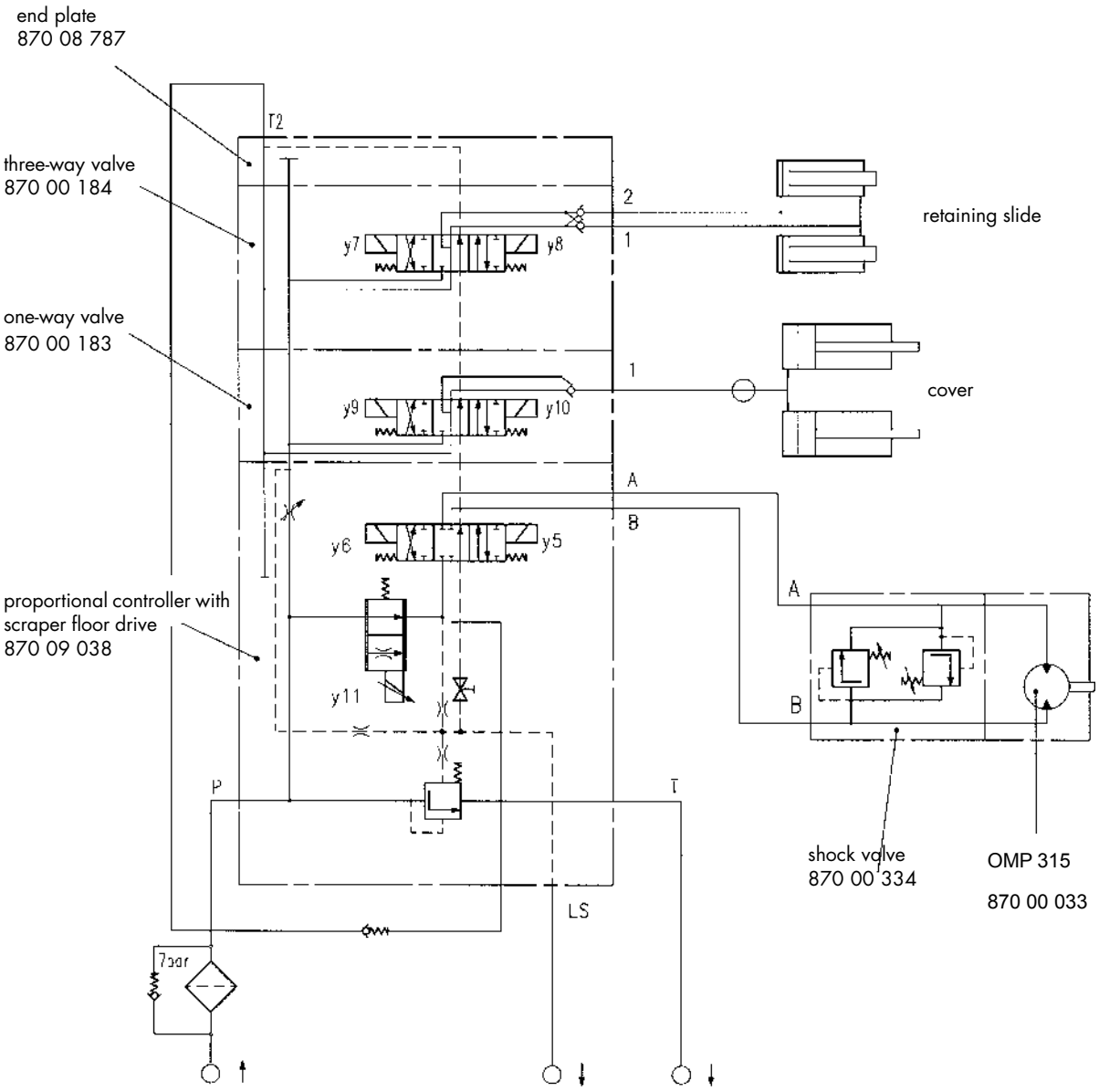


8.1 Hydraulics diagram VS 8 E - VS 12 TD



Hydraulics with additional valve for speed monitoring

8.2 Electro-hydraulic diagram VS 8 E – VS 12 TD

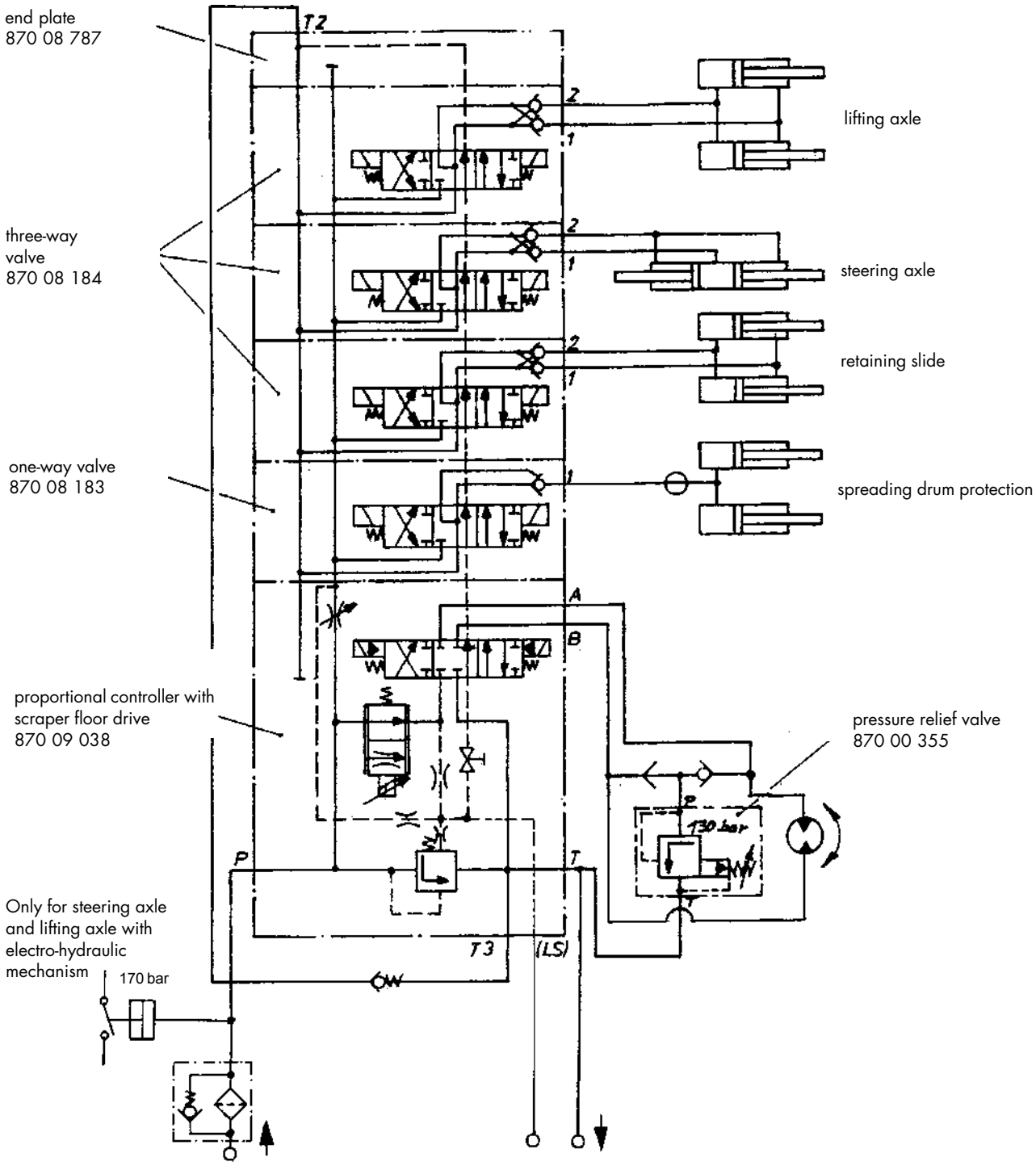


Note:

- The basic block for the scraper floor advance is always used as standard equipment.
- The consumers with one-way or three-way valves are only flanged as optional equipment.

(As standard equipment these consumers are directly connected to the tractor control valve.)

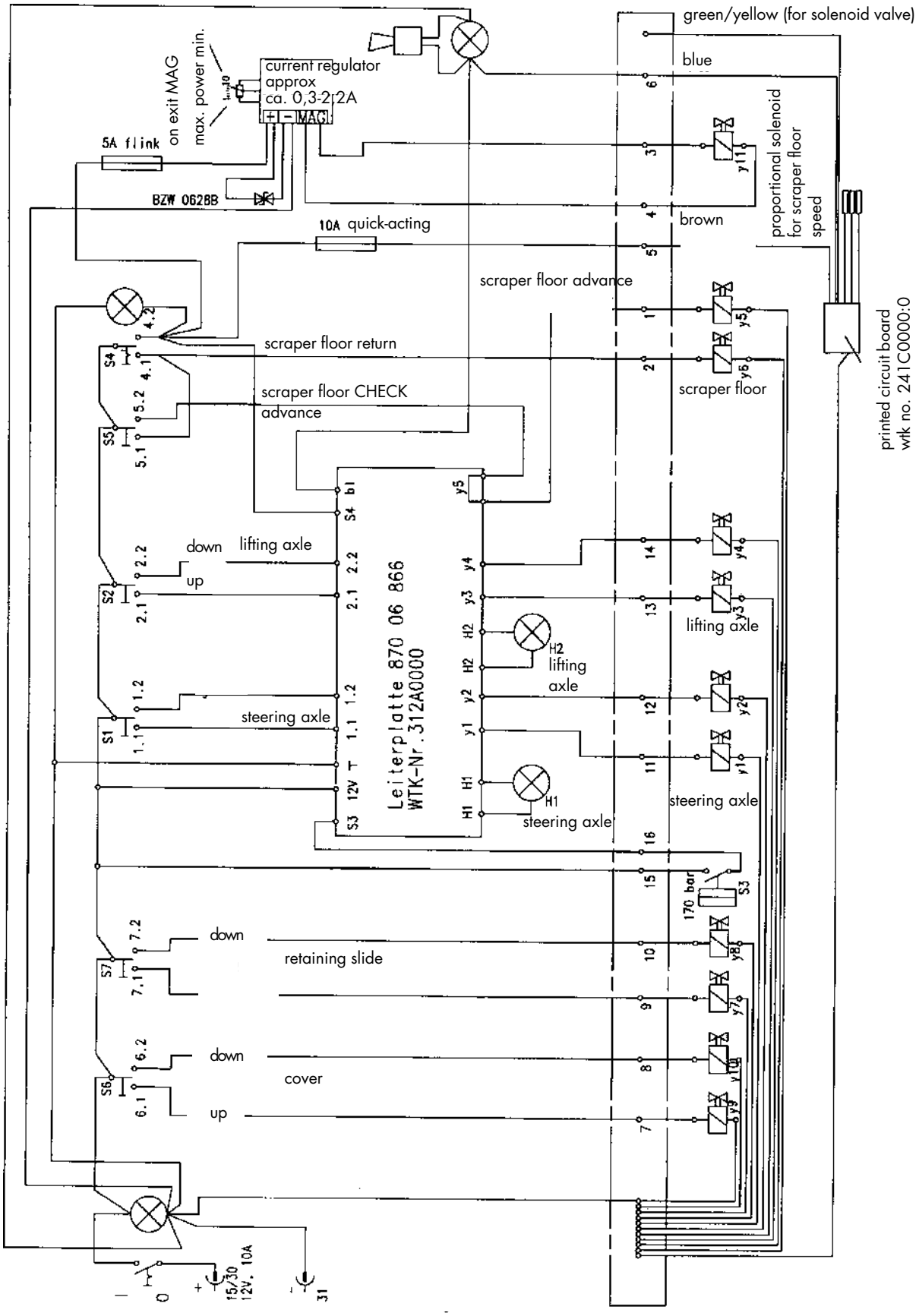
8.3 Hydraulics diagram VS 12 / VS 16 / VS 18



Note:

- The basic block for the scraper floor advance is always used as standard equipment.
- The consumers with one-way or three-way valves are only flanged as optional equipment.
- (As standard equipment these consumers are directly connected to the tractor control valve.)

8.4 Electric circuit diagram VS 12 / VS 16 / VS 18 (VS (E – VS 12 TD optional equipment)



9. Spreading charts

9.1 General, spec. weights

Spec. weights of different discharge materials:

Material	100 kg / m^3
Cattle stall manure, fresh	7,0 - 8,0
Cattle stall manure, rotted	8,0 - 10,0
Pig manure	7,5 - 8,5
Biodegradable rubbish compost	approx. 5.0
Sieve fraction 0 – 24 mm	approx. 35% dry matter
Sludge	10,0
Dry turkey dung / poultry dung	approx. 5.0

The discharge quantity on a given surface depends on:

1. Loading height + loading space width of the stall manure spreader
2. Advance speed of the scraper floor
3. Working width
4. Travelling speed

Formula for calculating the discharge quantity in m^3/ha

Discharge quantity m^3/ha =

$$\frac{\textbf{Loading width (m) x Loading height (m) x advance (m/min) x 600}}{\textbf{Working width (m) x travelling speed (km/h)}}$$

The values specified in the charts 9.2 and 9.3 for the advance speed of the scraper floor for the different advance settings have been determined with an empty vehicle. For normally damp, well rotted solid manure, the values can be taken directly from the chart, as in case of this material, practically no „slipping away“ has been determined. For soaked and/or badly rotted dung, you should tend to set the advance speed of the scraper floor a little higher at the same travelling speed in order to obtain the desired discharge chart values.

For the transport and discharge of flowing or trickling spreading materials (e.g. sludge or sieved compost) the stall manure spreaders are equipped with a hydraulic retaining slide which in case of discharge in the open field can be excellently used as a metering slide, thus avoiding any soiling of the road during transport to the greatest possible extent.

Attention! Use metering slide only for trickling materials (risk of breakage)

Notes concerning the spreading charts:

1. An optimal spreading result can only be achieved with a spreader being loaded exactly and evenly. In order to achieve a good spreading result in longitudinal distribution (facing the engine) as well, it is recommended to never empty the spreader completely. Skilled operators will compensate for the lower spreading quantities at the beginning and the end of the load spreading process by setting the scraper floor advance to a correspondingly higher speed.

2. The working width can be determined best by means of a visual and measuring check in the field. (Working width depends on the discharge material.) **Attention:** Working width is not identical to the spreading width!

3. The settings of the 3-way current regulator for the advance speed of the hydraulic scraper floor drive has been determined by means of a tractor with a hydraulic capacity of 50 l/min. and 170 bars.

4. The spreading charts set forth here have neither been determined by a certain agricultural engineering testing institute nor in a testing laboratory, but they have been calculated by members of the Strautmann staff and verified by random tests in the field. Thus the practical applicability is ensured in any case. Nevertheless, we point out that these values are guide values and that other values are possible in any individual case under other circumstances with other settings.

9.2 Spreading charts for VS 8 E – VS 12 TD without electro-hydraulic system
Spreading chart for 2-plate wide-angle spreading unit

Loading space width in m: 1,93
Loading height in m: 1,25 (Retaining slide output)

$$\frac{\text{Loading space width x loading hight x advance speed x 600}}{\text{working width x travelling speed}}$$

Working width			12					15					18					20				
Travelling speed			4	6	8	10	12	4	6	8	10	12	4	6	8	10	12	4	6	8	10	12
Advance speed in m/min.																						
Scraper floor setting			**Spreading volume m³/ha at loading height 1.25 m**																			
3	0,2		6,1	4,1	3,1	2,5	2,1	4,9	3,3	2,5	1,9	1,7	4,1	2,7	2,1	1,7	1,3	3,7	2,5	1,9	1,5	1,2
4	0,5		15,6	10,4	7,8	6,3	5,2	12,5	8,3	6,3	5,0	4,2	10,4	6,9	5,2	4,2	3,5	9,4	6,3	4,7	3,8	3,1
5	1,0		31,0	20,6	15,5	12,4	10,4	24,8	16,5	12,4	9,9	8,5	20,6	13,8	10,4	8,3	6,9	18,6	12,4	9,3	7,4	6,2
6	1,8		55,2	36,9	27,6	22,1	18,4	44,2	29,5	22,1	17,7	14,7	36,9	24,5	18,4	14,7	12,3	33,2	22,1	16,5	13,3	11,1
7	3,0		91,9	61,3	46,0	36,8	30,6	73,5	49,0	36,8	29,4	24,5	61,3	40,8	30,6	24,5	20,5	55,2	36,8	27,5	22,1	18,4
8	3,8		114,2	76,2	57,1	45,7	38,1	91,4	60,9	45,7	36,6	30,5	76,2	50,8	38,1	30,5	24,5	68,6	45,7	34,3	27,5	22,9
9	4,3		129,2	86,2	64,6	51,7	43,1	103,4	68,9	51,7	41,4	34,5	86,2	57,4	43,1	34,5	28,8	77,5	51,7	38,8	31,0	25,9
10	4,8		143,5	95,7	71,7	57,4	47,8	114,8	76,5	57,4	45,9	38,3	95,7	63,7	47,8	38,3	31,9	86,1	57,4	43,0	34,5	28,7

Spreading chart with 4-drum spreading unit

Breedte laadvloer in m: 1,93
Laadhoogte in m: 1,50 (doorlaat doseerschuif)

$$\frac{\text{Loading space width x loading hight x advance speed x 600}}{\text{working width x travelling speed}}$$

Working width			6				
Travelling speed			4	6	8	10	12
Advance speed in m/min.							
Scraper floor setting			**Spreading volume m³/ha at loading height 1.50 m**				
3	0,2		14,7	9,8	7,3	5,9	4,9
4	0,5		37,5	25,0	18,8	15,0	12,5
5	1,0		74,4	49,6	37,2	29,8	24,8
6	1,8		132,6	88,4	66,3	53,1	44,2
7	3,0		220,5	147,0	110,3	88,2	73,5
8	3,8		274,3	182,8	137,1	109,7	91,4
9	4,3		310,2	206,8	155,1	124,1	103,4
10	4,8		344,3	229,5	172,1	137,7	114,8

9.3 Spreading charts for VS 12/ VS 16/ VS 18
Spreading chart with 2-plate wide-angle spreading unit

Loading space width in m: 1,93
Loading height in m: 1,25 (Retaining slide output)

$$\frac{\text{Loading space width x loading hight x advance speed x 600}}{\text{working width x travelling speed}}$$

Working width			12					15					18					20				
Travelling speed			4	6	8	10	12	4	6	8	10	12	4	6	8	10	12	4	6	8	10	12
Advance speed in m/min.			Spreading volume m³/ha at loading height 1.25 m																			
Scraper floor setting																						
	3	0,3	9,2	6,1	4,6	3,7	3,1	7,4	4,9	3,7	2,9	2,5	6,1	4,1	3,1	2,5	2,0	5,5	3,7	2,8	2,2	1,8
	4	0,8	25,0	16,7	12,5	10,0	8,3	20,0	13,3	10,0	8,0	6,7	16,7	11,1	8,3	6,7	5,6	15,0	10,0	7,5	6,0	5,0
	5	1,4	43,4	28,9	21,7	17,4	14,5	34,7	23,1	17,4	13,9	11,6	28,9	19,3	14,5	11,6	9,6	26,0	17,4	13,0	10,4	8,7
	6	2,1	64,4	43,0	32,2	25,8	21,5	51,6	34,4	25,8	20,6	17,2	43,0	28,6	21,5	17,2	14,3	38,7	25,8	19,3	15,5	12,9
	7	2,8	85,8	57,2	42,9	34,3	28,6	68,6	45,7	34,3	27,4	22,9	57,2	38,1	28,6	22,9	19,1	51,5	34,3	25,7	20,6	17,2
	8	3,5	105,2	70,2	52,6	42,1	35,1	84,2	56,1	42,1	33,7	28,1	70,2	46,8	35,1	28,1	23,4	63,2	42,1	31,6	25,3	21,1
	9	4,2	126,2	84,2	63,1	50,5	42,1	101,0	67,3	50,5	40,4	33,7	84,2	56,1	42,1	33,7	28,1	75,7	50,5	37,9	30,3	25,3
	10	4,4	131,5	87,7	65,7	52,6	43,8	105,2	70,1	52,6	42,1	35,1	87,7	58,4	43,8	35,1	29,2	78,9	52,6	39,4	31,6	26,3

Spreading chart with 4-drum spreading unit

Breedte laadvloer in m: 1,93
Laadhoogte in m: 1,50 (doorlaat doseerschuif)

$$\frac{\text{Loading space width x loading hight x advance speed x 600}}{\text{working width x travelling speed}}$$

Working width			6				
Travelling speed			4	6	8	10	12
Advance speed in m/min.			Spreading volume m³/ha at loading height 1.50 m				
Scraper floor setting							
	3	0,3	22,1	14,7	11,0	8,8	7,4
	4	0,8	60,0	40,0	30,0	24,0	20,0
	5	1,4	104,2	69,4	52,1	41,7	34,7
	6	2,1	154,7	103,1	77,3	61,9	51,6
	7	2,8	205,8	137,2	102,9	82,3	68,6
	8	3,5	252,6	168,4	126,3	101,0	84,2
	9	4,2	303,0	202,0	151,5	121,2	101,0
	10	4,4	315,6	210,4	157,8	126,2	105,2

10. Troubleshooting and repair of faults

10.1 Faults list electrical system

Fault	Cause	Remedy	
		By user	**By skilled staff or qualified workshop**
No function is working	No 12 volt voltage at the switch box	Provide for 12 volt voltage at the switch box	
	Switch On/Off not switched	Set switch to On	
	Tractor fuse defective		Replace fuse
	Loose connection in socket		Eliminate loose connection
Tractor fuse often defective	Fused too weakly		Install a 10 A fuse
Tractor fuse constantly defective	Cable damaged		Replace or insulate cable
	Switch defective Terminal strip defective		Replace switch Replace terminal strip
Indicator lights on switch box do not light up	Bulb defective		Replace bulb
	Bulb is not correctly installed in the socket		Press bulb into socket
	No 12 volt voltage	Provide for 12 volt voltage on switch box	
	Tractor fuse defective		Replace fuse
Acoustic signal transmitter or red indicator light of speed monitoring not working	10 A fuse in switch box defective		Replace fuse
	Plus-Minus at the tractor connection mixed up		Connect plus to terminal 15/30, minus to terminal 31
	Bulb or signal transmitter defective		Replace bulb or signal transmitter
	Speed monitoring component or sensors defective		Check components and replace, if necessary
Acoustic signal transmitter and red indicator light of speed monitoring const. lighting up	Distance between sensors and solenoid on spreading drum (1x) or plate spreading unit (2x) not set correctly		Set distance between sensors and solenoid to approx. 5 – 8 mm

Fault	Cause qualified workshop	Remedy	
		By user	By skilled staff or
Indicator lights of steering axle or lifting axle not working	Bulb defective		Replace bulb
Hydr. pressure switch not set correctly		Set hydr. pressure switch to switching point at 170 bars +/- 5	
Hydr. cylinder not put to end position	Put hydr. cylinder to end position		
Advance cannot be adjusted	Plus-Minus at tractor connection mixed up		Connect plus to terminal 15/30, minus to terminal
5 A fuse of current regulator in switch box defective		Replace fuse	31
No 12 volt voltage		Provide for 12 volt voltage	
Current regulator defective		Replace current regulator	
Solenoids of hydr. valve defective		Replace solenoids	
2 or more functions work at the same time	Cable damaged, 2 solenoids are supplied with current at the same time		Replace cable
	Terminal strip defective		Replace terminal strip
Function does not work although 12 V voltage has been applied to the solenoid	Solenoid defective		Replace solenoid

10.2 Faults list hydraulic system

Fault	Cause	Remedy	
		By user	By skilled staff or qualified workshop
Spreader does not work	Oil flow interrupted	Check coupler plug for wear Set tractor control valve to pressure	
	Advance and return mixed up	Exchange coupler plug	
Advance only works temporarily	Piston of advance valve stuck		Clean piston and check for easy running
	Pilot piston of advance valve stuck		Clean pilot piston and check for easy running
Cover of spreading drums does not open	Stopcock closed	Open stopcock on front wall	
Cover of spreading drum slowly opens during spreading process	Stopcock not closed	Close stopcock on front wall	