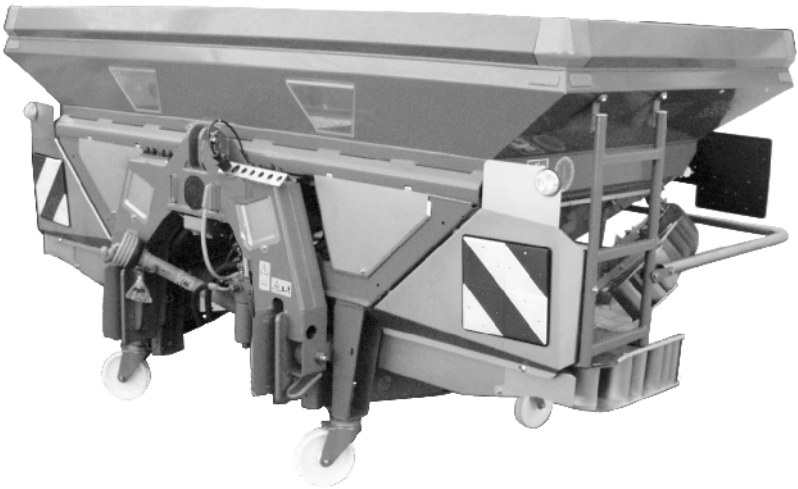
AMAZONE

Operation Manual
Centrifugal Broadcaster

ZA-M Ultra 1800
ZA-M Ultra 3000
ZA-M Ultra 1800 *profiS*
ZA-M Ultra 3000 *profiS*



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CE

Before starting to operate, please carefully read and adhere to this operation manual and safety advice.

Preface

Dear Customer,

The centrifugal broadcasters ZA-M are machines from the comprehensive range of agricultural machinery of AMAZONEN-WERKE H. Dreyer GmbH & Co. KG.

To make full use of your newly purchased centrifugal broadcaster, please carefully read and adhere to this operation manual before starting to operate with your machine.

Please ensure that all operators read this operation manual before they start to operate with the machine.

This operation manual is valid for all centrifugal broadcasters of the type

ZA-M Ultra 1800 and ZA-M Ultra 3000.

ZA-M Ultra 1800 *profiS* und ZA-M Ultra 3000 *profiS*

AMAZONEN-WERKE
H.DREYER GmbH & Co. KG

Contents ..... page

1. Details about the machine 6

1.1 Range of application 6
1.2 Manufacturer 6
1.3 Conformity declaration 6
1.4 Details when making enquiries and ordering 6
1.5 Type plate 6
1.6 Technical data 7
1.6.1 Standard of the hydraulic system on the tractor 7
1.6.2 Details about noise level 8
1.7 Designated use of the machine 8

2. Safety 9

2.1 Dangers when not adhering to the safety advice 9
2.2 Qualification of operator 9
2.3 Symbols in this instruction manual 9
2.3.1 General danger symbol 9
2.3.2 Attention symbol 9
2.3.3 Hint symbol 9
2.4 Safety-/warning and hint symbols 10
2.5 Safety conscious operation 18
2.6 General safety and accident preventive advice 18
2.7 General safety and accident preventive laws for mounted implements 20
2.7.1 Safety advice for the hydraulic system 20
2.7.2 General safety and accident preventive advice for maintenance, repair and cleaning 21
2.8 Universal joint shaft (pto-shaft) 22
2.9 Safety advice for retrofitting electric and electronic devices and/or components 23

3. Description of product 24

3.1 Assembly 24
3.2 Safety facilities 24
3.3 Function 26
3.4 Remarks on the weighing technique 29
3.5 Guard screen inside the hopper 31
3.6 Danger zones 33

4. On receipt of the machine 34

5. Mounting and dismounting 35

5.1 Mounting data 36
5.2 Mounting 39
5.2.1 PTO shaft 40
5.2.2 Centre gearbox with giving-way safety 43
5.3 Hydraulic connections 44
5.3.1 ZA-M with Comfort Package 45
5.4 Connecting AMATRON+ 48
5.5 Fitting the traffic lights 48
5.6 Dismounting 48

6. Transport on public roads and ways 49

6.1 Adjustments on tractor and fertilizer spreader for transport on public road 50

7. Settings 51

7.1 Setting the mounting height 53
7.1.1 Normal fertilising 53
7.1.2 Late top dressing 54
7.2 Setting the spread rate with AMATRON+ 55
7.3 Checking the spread rate with AMATRON+ 55
7.4 Setting the spread rate with setting levers 56
7.4.1 Take the shutter slide position from the setting chart 58
7.4.2 Determine the shutter slide position with the aid of the calculating disc rule 59
7.5 Checking the spread rate 61
7.5.1 Arrangements for the spread rate check 62
7.5.2 Spread rate check by driving a test distance 63
7.5.3 Stationary spread rate check 65
7.6 Setting the working width 67
7.6.1 Swivelling the spreading vanes 68
7.6.2 Checking the working width with the mobile test kit (option)) 70
7.7 Eco-border and normal-border spreading 71
7.7.1 "Eco" border spreading and border spreading with Limiter XL 73
7.7.2 Table for border spreading and "eco" border spreading with Limiter XL 75

8. Operation 77

8.1 Filling the fertilizer spreader 78
8.2 Spreading operation 79
8.3 Recommendations for broadcasting on the headlands 80

8.4 Advice for spreading slug pellets (e.g. Mesurol) 81
8.4.1 Combination matrix for centrifugal broadcasters for spreading slug pellets 82

9. Cleaning, maintenance and repair 83

9.1 Maintenance PTO shaft with friction clutch 86
9.2 Setting and maintenance of the weighing technique 87
9.2.1 Check the horizontal position of leaf springs and bearing bracket 87
9.2.2 Setting the clearance on the limiting bolts 88
9.2.3 Calibrating the Broad-caster 89
9.2.4 Counterbalancing the spreader 89
9.3 Shear off safety agitator shaft drive 89
9.4 Exchanging the spreading discs 90
9.5 Exchanging spreading vanes 91
9.6 Check of the hydraulic oil filter 92
9.7 Cleaning the solenoid valves 92
9.8 Hydraulic hoses 93
9.8.1 Exchange intervals 93
9.8.2 Marking 93
9.8.3 Please observe when fitting and removing 93

10. Faults 94

10.1 Faults, causes and remedy 94
10.2 Fault, Causes and Remedy for ZA-M Comfort 95
10.3 Operation in the event of electrical failure 96

11. Options 97

11.1 Boundary spreading device, left hand side – Limiter XL 97
11.1.1 Border spread deflector, left side 97
11.2 Transport- and parking device 98
11.3 Swivelable hopper cover XL 99
11.4 Extension S 600 99
11.5 Mobile fertilizer test kit for checking the working width 99
11.6 Traffic light kit Ultra 100

1. Details about the machine

1.1 Range of application

The fertilizer spreader **ZA-M Ultra 1800** and **ZA-M Ultra 3000** has been designed for the application of dry, granule, prilled and crystalline fertilizers, slug pellets and seeds.

1.2 Manufacturer

AMAZONEN-WERKE

H. DREYER GmbH & Co. KG

P. O. Box 51,
D-49202 Hasbergen-Gaste / Germany

1.3 Conformity declaration

The fertilizer spreader fulfils the requirements of the EC-guide line Machine 98/37/EG and the corresponding additional guide lines.

1.4 Details when making enquiries and ordering

When ordering options and spare parts indicate the spreader type and the serial number.

The safety requirements are only fulfilled when in the event of repair original AMAZONE spare parts are used. Using other parts may rule out the liability for resulting damage

1.5 Type plate

Type plate on the machine

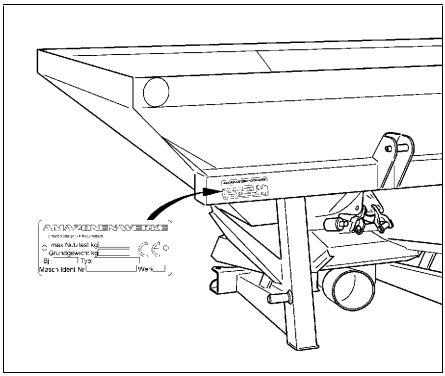


Fig. 1

The type plate is of documentary value and may not be changed or disguised.

1.6 Technical data

Type ZA-M Ultra	Hopper capacity (litres)	Payload (kg)	Weight (kg)	Filling height (m)	Filling width (m)	Total width (m)	Total length (m)
1800	1800	3000	660	1,23	2,70	2,95	1,75
+S 600	2400	3000	660	1,37	2,70	2,95	1,75
3000	3000	3600	690	1,49	2,70	2,95	1,75
+S600	3600	3600	690	1,63	2,70	2,95	1,75

1.6.1 Standard of the hydraulic system on the tractor

Required for **mounting the spreader** on to the hydraulic system of the tractor.

- 3 double acting spool valves.

The maximum permissible pressure on the tractor hydraulic's is: **200 bar**.

ZA-M with Comfort Package:

The hydraulic system of the tractor must be equipped with an **oil filter**.

Ensure that the oil filter is properly maintained and observe the prescribed filter change intervals.

- 1 single acting spool valve
- pressure free oil return flow.
- 1 control cable (only on tractors with a load-sensing hydraulic system and direct pump connection)..

The pressure free return flow must go through the provided female coupling sleeve.

The back pressure inside the pressure free oil return flow must not exceed 8 bar.

Do not allow the hydraulic oil to heat up excessively during operation!

1.6.2 Details about noise level

The tractor operator seat related emission value is 74 dB (A), measured when operating with shut tractor cab at the ear of the tractor operator.

Measuring implement: OPTAC SLM 5.

The noise level depends on the type of tractor used.

1.7 Designated use of the machine

The **AMAZONE** fertilizer spreader **ZA-M** has exclusively been designed for the usual operation in agriculture for spreading dry, granular, prilled and crystalline fertilizers, slug pellets and seeds.

The machine is designed to spread on slopes of up to 20 % inclination. Steeper slopes will cause an uneven spread pattern.

Any use beyond the one stipulated above is no longer considered as designated use. The manufacturer does not accept any responsibility for damage resulting from this; therefore the operator himself carries the full risk.

Under designated use also the adhering to the manufacturer's prescribed operation-, maintenance- and repair conditions as well as the exclusive use of **original-AMAZONE-spare parts** is to be understood.

Any damage resulting from arbitrary change on the machine will rule out the responsibility of the manufacturer.

Though our machines having been manufactured with great care deviations when spreading cannot totally be excluded even at a designated use. These deviations may be caused, e.g. by:

Varying composition of fertilizer and seed (e.g. granule size distribution, specific density, granule shape, dressing, sealing).

- Drifting,
- Blocking up or bridging (e.g. by foreign particles, bag residue, damp fertilizer etc.),
- Undulated terrain
- Wear of wearing parts (e.g. spreading vanes, V-belts, etc.),
- Damage by external influence,
- Wrong drive-R.P.M. and travelling speeds,
- Fitting wrong spreading discs (e.g. mixing them up),
- Wrong setting of the machine (incorrect mounting, not adhering to the spreading chart).

Claims regarding damage not having occurred on the **AMAZONE** fertilizer spreader itself will be rejected. This also applies to damage due to spreading errors.

2. Safety

This instruction manual contains basic advice which must be adhered to when mounting, operating and maintaining the machine. Ensure that this instruction manual has been read by the user/operator before starting to operate the implement and that it is made readily available at all times to the user.

Please strictly observe and adhere to all safety advice given in this instruction manual.

2.1 Dangers when not adhering to the safety advice

Not adhering to the safety advice given

- may result in endangering the user or other persons, the environment and/or the machine itself.
- may result in the loss of any claim for damages.

Not paying attention to the safety advice may cause the following risks:

- Danger for persons by not secured operational range.
- Failure of important functions of the machine.
- Failure of prescribed measures for maintenance and repair.
- Danger for persons by mechanical or chemical affects.
- Dangers to persons or to the environment by leaking hydraulic oil.

2.2 Qualification of operator

The implement may only be operated, maintained and repaired by persons, who are acquainted with it and have been informed of the relevant dangers.

2.3 Symbols in this instruction manual

2.3.1 General danger symbol

Not adhering to the safety advice in this instruction manual may cause danger to health and life of persons. They are identified by the general danger symbol (safety symbol according to DIN 4844-W9)

2.3.2 Attention symbol

Attention symbols which may cause dangers for the machine and it's function when not being adhered to are identified with the attention symbol:

2.3.3 Hint symbol

This symbol marks machine's specific points which should be observed to ensure the correct operation

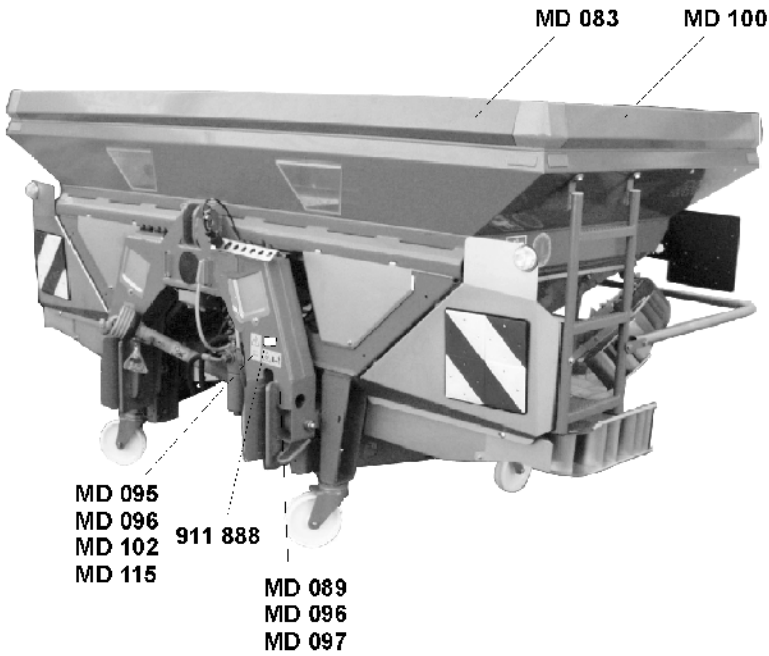
2.4 Safety-/warning and hint symbols

The safety/warning symbols in this instruction manual are for all users working with this machine.

The following warning signs warn about remaining danger which cannot be remedied by design..

The danger and the fixing points for the safety-/warning and hint symbols are set off. Please find the explanations for the pictographs on the following pages.

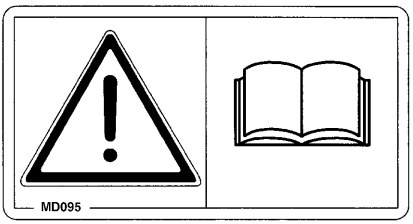
1. **Strictly observe all warning pictographs and hint symbols.**
2. **Please pass on all safety advice also to other users.**
3. **Please always keep all warning pictographs and hint signs clean and in well readable condition. Please ask for replacement of damaged or missing signs from your dealer and attach to relevant place (picture-No.: =order-No.)**



Picture No.: MD 095

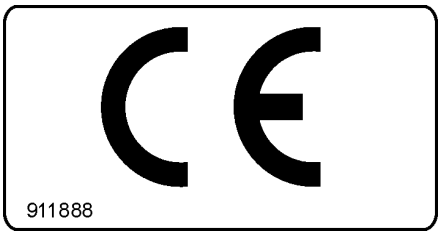
Explanation:

Before commencing operation read thoroughly this operation manual an all safety advice.



Picture No.: 911888

Explanation: The CE-sign on the machine indicates the compliance with the valid EC guide lines.



Picture No.: MD 075

Explanation:

Danger from cutting or cutting off!

Will cause severe injury on finger or hand.

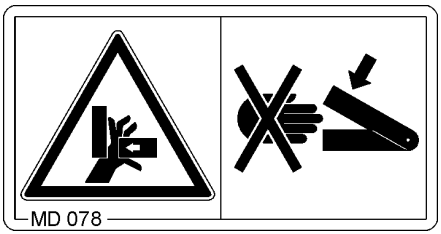
Touch machine parts only then when they have come to a full standstill

Picture No.: MD 078

Explanation:

Danger of squeezing!

Will cause severe injury on finger or hand.



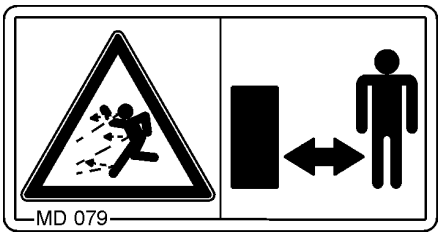
Picture No.: MD 079

Explanation:

Danger from flinging particles!

Will cause severe injury on the entire body.

Observe sufficient clearance to the machine as long as the tractor engine is running.



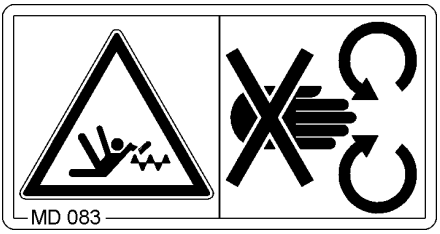
Picture No.: MD 083

Explanation:

Danger from being drawn in or caught.

Will cause severe injury on the arm or upper part of the body.

Never open or remove guards on worm augers as long as the tractor engine is running with the PTO shaft engaged / hydraulic drive coupled.



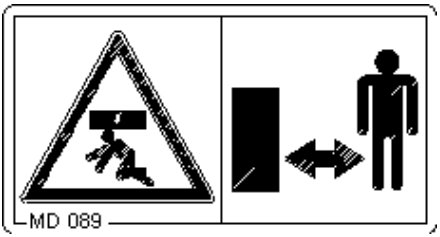
Picture No.: MD089

Explanation:

Danger of squeezing!

Will cause severe injury to the whole body or fatal injury.

Observe sufficient clearance to lifted, unsecured machines-



Picture No.: MD 093

Explanation:

Danger from being caught or winding up!

Will cause severe injury to the whole body or fatal injury.

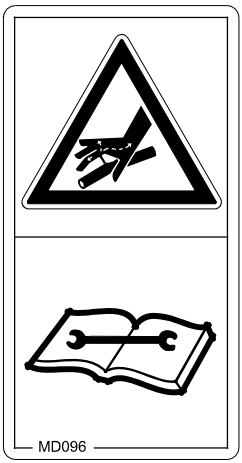
Observe sufficient clearance to the PTO shaft as long as the tractor engine is running with engaged PTO shaft.

Never open or remove guards on drive shafts as long as the tractor engine is running with the PTO shaft engaged / hydraulic drive coupled.

Picture No.: MD 096

Danger from liquids leaking under high pressure (hydraulic oil)!

Liquids leaking under high pressure will penetrate the skin and the body and will cause severe injury. Read and adhere to the advice given in the technical manual before carrying out any maintenance and repair work.



Picture No.: MD 097

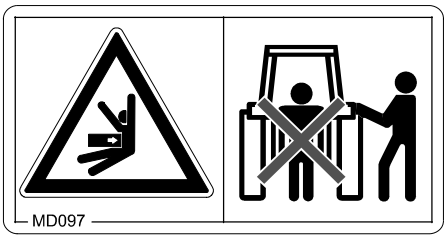
Erläuterung:

Danger of squeezing!

Will cause severe injury to the whole body or fatal injury.

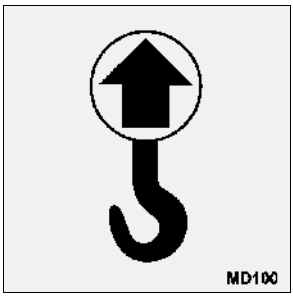
Never stay in the lifting range of the three point linkage when the power lifting device is activated.

Standing of persons within the lifting range of the three point linkage is prohibited when the three point lifting device is activated.



Picture No.: MD 100

Fixing tools for fitting hoisting facilities.

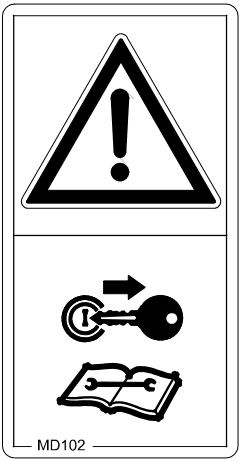


Picture No.: MD 102

Danger from unintended starting the machine.

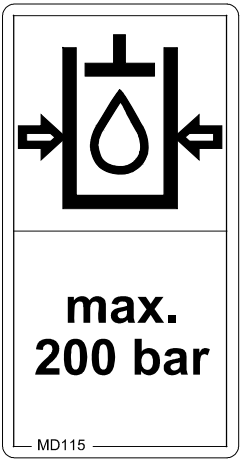
Will cause severe injury to the whole body or fatal injury.

- Before carrying out any maintenance and repair work stop the tractor engine and remove the ignition key.
- Before carrying out any maintenance and repair work read and adhere to the advice given in the technical manual..



Picture No.: MD 115

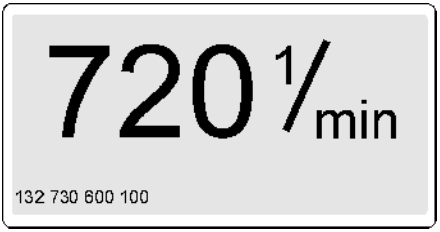
Maximum hydraulic oil working pressure 200 bar.



Picture No.: MD 117

Explanation:

Max. PTO shaft speed 720 R.P.M..



Picture No.: 912 297

D Beim Scheibenwechsel Scheibenloch ø 8 zur Maschinenmitte

F En changeant les disques, orientez le trou pré-percé vers la centre de la machine.

GB Disc change: Hole on disc must face the machine's centre line.

NL Bij omwisselen van de schijven het got naar het midden van de machine draaien

912 297

Picture No.: 912 304

D Gelenkwellenlänge beachten (sonst Getriebeschaden). Siehe Betriebsanleitung.

F Veiller impérativement à la longueur de la transmission (risque d'endommagement du boîtier). Voir le manuel d'utilisation.

GB Check correct p.t.o. shaft length (otherwise gearbox damage will result). – see instruction book.

NL Geeft aandacht aan de lengte van de aftakas zoals de gebruikshandleiding aangeeft, anders kan de aandrijfkast beschadigen.

912 304

Picture No.: **912 312**

D

1. **Vorderachsentlastung des Schleppers beachten.**
2. **Rührfinger, Auslauföffnungen und Streuschaufeln sauber und funktionsfähig halten.**

F

1. **Veiller à la bonne adhérence de l'essieu avant.**
2. **Maintenir propres et opérationnels les agitateurs, les orifices d'alimentation et les aubes.**

GB

1. **Bear in mind front axle weight reduction.**
2. **Always keep agitator fingers, outlets and vanes clean and replace when worn or damaged.**

NL

1. **Op de vooras ontlasting van de traktor letten.**
2. **Roerdervingers, uitloop-openingen en strooischoepen schoon en bedrijfsgereed houden.**

912 312

Picture No.: 912 336

D

Zapfwelle nur bei niedriger Motordrehzahl einkuppeln.
Bei Überlastung schert die Sicherungsschraube ab.
Bei häufigem Abscheren Gelenkwelle mit Reibkupplung einsetzen.

F

La prise de force ne doit être enclenchée qu'à régime moteur réduit.
En cas de surcharge, la vis de sécurité se casse.
En cas de cisaillement fréquent, utiliser une transmission avec limiteur de couple à friction.

GB

Engage pto-shaft only at low engine speed.
In case of overstrain the shear bolt shears off.
If shear bolt shears off too frequently we recommend the use of a pto shaft with friction clutch.

NL

Aftakas alleen bij laag motortoerental inkoppelen.
Bij overbelasting breekt de breekbout af.
Bij dikwijls breken een aftakas met slipkoppeling toepassen.

912 336

2.5 Safety conscious operation

Besides the safety advice in this operation manual the national, and generally valid operation safety and accident preventive descriptions of the authorised trade association are binding, especially VSG 1.1 and VSG 3.1

The safety advice indicated on the machine stickers must be observed.

When travelling on public roads observe the traffic regulations in force in your country.

2.6 General safety and accident preventive advice

Basic principle:

Always check traffic and operational safety before putting the machine into any operation.

1. In conjunction with the recommendations in the operator's manual, observe any general safety and accident preventive laws in force.
2. The hazard and warning signs provide important information to ensure safe operation. They are intended for your safety.
3. Follow traffic regulations when using public roads.
4. Before starting work familiarise yourself with all the operating elements and their uses. It will be too late to do this whilst you are operating the machine.
5. The operator should wear close-fitting clothes. Avoid wearing loose-fitting clothes.
6. To avoid the risk of fire, keep the machine clean.
7. Before starting up and handling the machine check the immediate vicinity for clearance (children)! Make sure you have a clear view.
8. Carrying passengers whilst driving or operating the machine is not permitted.
9. Connect the units correctly and secure them only to the proper mounting devices.
10. Exercise special care when coupling and uncoupling units to or from the tractor.
11. Ensure that the landing gear is in the correct position when mounting and dismounting (stability).
12. Always attach weights correctly to the mounting points provided.
13. Check maximum permissible axle loads of the tractor (see vehicle documents).
14. Do not exceed maximum transport measurements of the traffic department.
15. Check and fit equipment for road transport, e.g. traffic lights, warning plates and guards.
16. The release ropes for quick coupler should hang freely and in the low position must not release the quick coupling by themselves.!
17. Never leave the tractor seat during driving.
18. Moving characteristics, steering and braking ability are affected by mounted implements, trailers and ballast weights. Therefore, take account to these affects and allow sufficient steering and braking.

19. When lifting the fertilizer spreader the front axle load of the tractor is relieved by different amounts depending on the size of the tractor. Always check that the necessary front axle load of the tractor (20 % of the tractor's net weight) is maintained.
20. When driving around corners take into account the clear radius and/or the rotating mass of the machine. To avoid sideways swing of the spreader during operation stabilise the lower link arms of the three-point-hydraulic.
21. Take implement only into operation when all guards are fixed in position.
22. **Never stay or let anyone stay within the operation area. Danger by fertilizer particles being thrown around. Before starting to operate the spreading discs make sure that nobody is staying in the spreading zone. Do not approach rotating spreading discs.**
23. Filling the fertilizer spreader may only be done with a stopped tractor engine, removed ignition key and closed shutters.
24. Do not stay in the rotating- and swivelling range of the implement.
25. Hydraulic folding frames must only be activated after making sure no one is standing near the machine.
26. Squeeze and shear points are found on externally activated components (e.g. hydraulics).
27. Before leaving the tractor lower the implement to the ground. Actuate the parking brakes, stop the engine and remove ignition key.
28. Nobody should stay between tractor and implement if the tractor is not secured against rolling away by the parking brake and/or by chocks.
29. Note the maximum permissible filling loads. Bear in mind the fertilizer bulk density [kg/l]. The fertilizer bulk densities can be read off the spreading table or have to be determined. Please refer to para. 1.2.
30. Do not place any foreign objects inside the hopper.
31. During the calibration test watch out for danger zones due to rotating parts of the machine.
32. Never park or move the fertilizer broadcaster with filled hopper (danger of tipping over).
33. If the implement is transported over longer distances with filled hopper, closed shutters and out of function (en route to the field), open the shutter slides entirely before starting the spreading operation, e.g. before engaging the PTO shaft. Then **slowly engage the PTO shaft** and carry out a short stationary spreading. Only now, after having set the shutters on to the desired spreading rate start spreading.
34. If spreading on field borders, waters or roads use the border spreading device.
35. Before any operation check perfect seat of fixing parts, especially for spreading disc and spreading vane fixing.

2.7 General safety and accident preventive laws for mounted implements

1. Before mounting- and dismounting implements to the three-point-linkage bring all control levers in such a position that an unintended lifting or lowering is impossible.
2. When fitting to the three-point-linkage the mounting categories on the tractor and the implement must coincide.
3. Within the range of the three-point-linkage danger of bruising and shearing.
4. When actuating the control levers for the three-point linkage never step between tractor and implement.
5. In transport position always take care for a sufficient lateral locking of the tractor's three point.
6. When driving on public roads with lifted implement the control lever has to be locked against unintended lowering.
7. Mount and dismount implements as prescribed. Check braking systems for function. Mind manufacturer advice.
8. Working implements should only be transported and driven on tractors which are designed to do this..

2.7.1 Safety advice for the hydraulic system

1. The hydraulic system is under high pressure.
2. When connecting hydraulic cylinders and motors make sure hydraulics hoses are connected as prescribed.
3. When connecting the hydraulic hoses to the tractor hydraulic system ensure that the hydraulics and the tractor is at zero pressure.
4. When carrying out hydraulic operations between the tractor and the unit coupling sleeves and connectors should be identified to prevent any operating errors. If connections are mixed up reversed operations, e.g. lifting instead of lowering, may cause accidents.
5. Check hydraulic hoses in regular intervals and exchange in case of wearing or ageing. The exchange hoses must correspond to the technical requirements of the manufacturer.
6. When searching for leaks appropriate aids should be used due to danger of injury.
7. Under high pressure any fluids (such as hydraulic oil) may penetrate the skin and cause serious injury.!

In the event of injury call for a doctor immediately. There is a danger of infection!

8. Before starting work on the hydraulic system, lower the units, turn the system to zero pressure and switch off the engine.
9. The service life of the hose assemblies should not exceed six years including a possible storage time of 2 years. Even during proper storage and permissible stress, hoses and hose connections are subject to natural ageing which limits their storage and service life. By way of exception, the service life may be determined according to empirical values taking into account the risk of danger. Other standard values may be applied to hoses and hose connections made of thermoplastic material

2.7.2 General safety and accident preventive advice for maintenance, repair and cleaning

1. Maintenance, repair and cleaning operations together with rectification of operating defects should only be carried out when the drive and the engine have been disconnected. Remove the ignition key.
2. Check nuts and bolts regularly for tightness and re-tighten if necessary.
3. When servicing a raised unit always ensure it is secured by suitable supports.
4. Remove oil, grease and filters correctly!
5. Always disconnect power before starting work on the electrical system.
6. Disconnect cable to the tractor generator and battery when carrying out electric welding work on the tractor and the mounted units.
7. Any spare parts fitted must in minimum meet with the implement manufacturer's fixed technical standards. This is, for example, ensured by using original AMAZONE spare parts.

2.8 Universal joint shaft (pto-shaft)

1. Use only pto shafts which are designed for the implement and which are equipped with all legally requested guards!
2. Guard tubes and cones of the PTO shaft as well as a tractor and implement PTO guard must be fitted and kept in the correct place.
3. Note the prescribed PTO-shaft tube guards in transport- and operating position (refer to operation instruction of the PTO shaft manufacturer).
4. Mounting and dismounting PTO shaft only with disengaged PTO shaft, stopped motor and removed ignition key!
5. Always care for correct fitting and securing of PTO shaft!
6. Prevent PTO guard from spinning by fixing the provided
7. Before engaging the PTO shat ensure that the chosen PTO-speed of the tractor corresponds to the allowable implement input speed. Usually the PTO shaft speed is 720 R.P.M. (please refer to details in the spreading chart) chains.
8. Slow engagement of the PTO shaft protects tractor and spreader.
9. When using the ground speed related PTO shaft note that the speed is related to the forward speed and that the sense of rotation reverses when backing up.
10. Before switching on the PTO shaft nobody is allowed to stay in the area of the spinning PTO- or universal joint shaft.!
11. Never switch on the tractor PTO while the engine is stopped!
12. When operating with the PTO shaft nobody is allowed to stay in the area of the spinning PTO- or universal joint shaft!
13. Always switch off PTO shaft when it is in an adverse position or not needed. Switch off PTO shaft as soon as the machine's outlet openings have been shut off.
14. Attention! After switching off the PTO shaft the mounted implement may still continue to run by its dynamic masses. During this period never come too close to the implement. Begin work only after the implement has come to a full standstill.
15. Clean and grease the universal joint shaft and the PTO-driven implement only after the PTO shaft and engine have been stopped and ignition key removed.
16. Deposit removed PTO shaft on the provided carrier.!
17. After removal of the PTO shaft replace protective cap over the tractor's PTO.
18. Remedy of damages is to be undertaken before starting to operate with the implement.

2.9 Safety advice for retrofitting electric and electronic devices and/or components

The function of the implement's electronic components and parts may be affected by the electric-magnetic transmittance of other devices. Such affects may endanger people when the following safety advice will not be adhered to.

When retrofitting electric and electronic devices and/or components to the implement with connection to the on-board-electric circuit, the user must ensure by himself that the installation will not cause any disturbance to the tractor electronic or other components.

Special attention must be paid that the retrofitted electric and electronic parts correspond to the EMV-guide 89/336/EWG in the relevant valid edition and that they bear the CE-sign.

For retrofitting mobile communication systems (e.g. radio, telephone) the following requirements must be fulfilled: Only install devices which have officially been authorised in your country.

Firmly install the device.

The use of portable or mobile devices inside the tractor cab is only permissible with a connection to a firmly installed external antenna.

Install the transmitter spaced apart from the tractor's electronic.

When installing the antenna ensure an appropriate installation with proper earth connection between antenna and tractor earth.

For cabling and installation as well as for the maximum permissible current supply in addition adhere to the fitting instructions of the implement manufacturer

3. Description of product

3.1 Assembly

- Frame (Fig. 3/1)
- Hopper (Fig. 3/2)
- Weighing frame (Fig. 3/3)
- Omnia-Set spreading discs (Fig. 2/4)
- Boundary spreading device Limiter (Fig. 3/5)
- PTO shaft (Fig. 3/6)
- On-board-computer Amatron+ (Fig. 3/7) (Option).

3.2 Safety facilities

- Chain guard of agitator shaft drive (Fig. 2/8)
- Guard for shaft between centre and angular gearbox (Fig. 2/9)
- Guard tube (Fig. 2/10)
- Guard screen in hopper (Fig. 2/11)
- PTO shaft guard (Fig. 3/12)
- Safety symbols (warning signs)

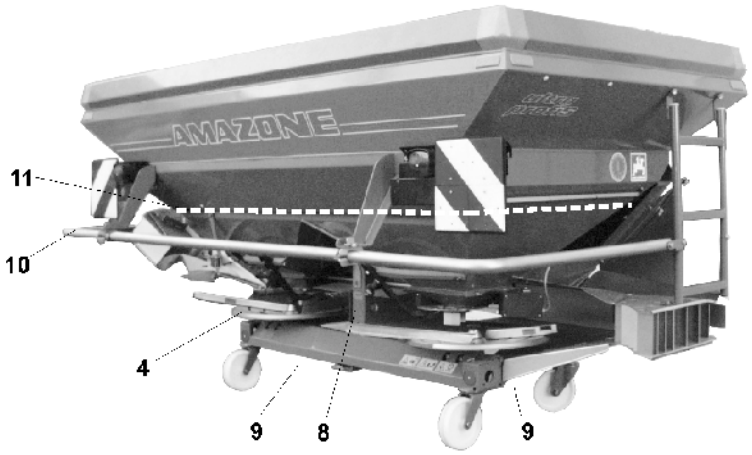


Fig. 2

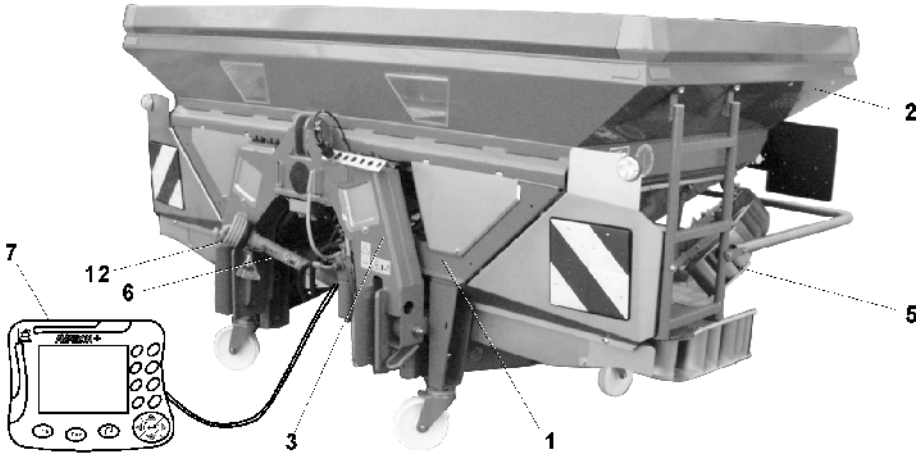


Fig. 3

3.3 Function

The fertilizer spreader **AMAZONE ZA-M Ultra** with its two hopper tips can be equipped with exchangeable spreading discs (Fig. 4/1) which are driven contrary to the operating direction rotating adverse from inside to outside. They are equipped with a short (Fig. 4/2) and a long spreading vane (Fig. 4/3).

The infinitely variable setting of the different working widths (24 – 48 m) is achieved by swivelling the spreading vanes on the spreading discs. For these settings, please follow the data given in the setting chart. The mobile fertilizer test kit (special option) allows an easy checking of the working width.

Spiral agitators in the hopper tips provide an even fertilizer flow onto the spreading discs. The slowly rotating spiral shaped segments of the agitator guide the fertilizer evenly to the corresponding outlet opening.

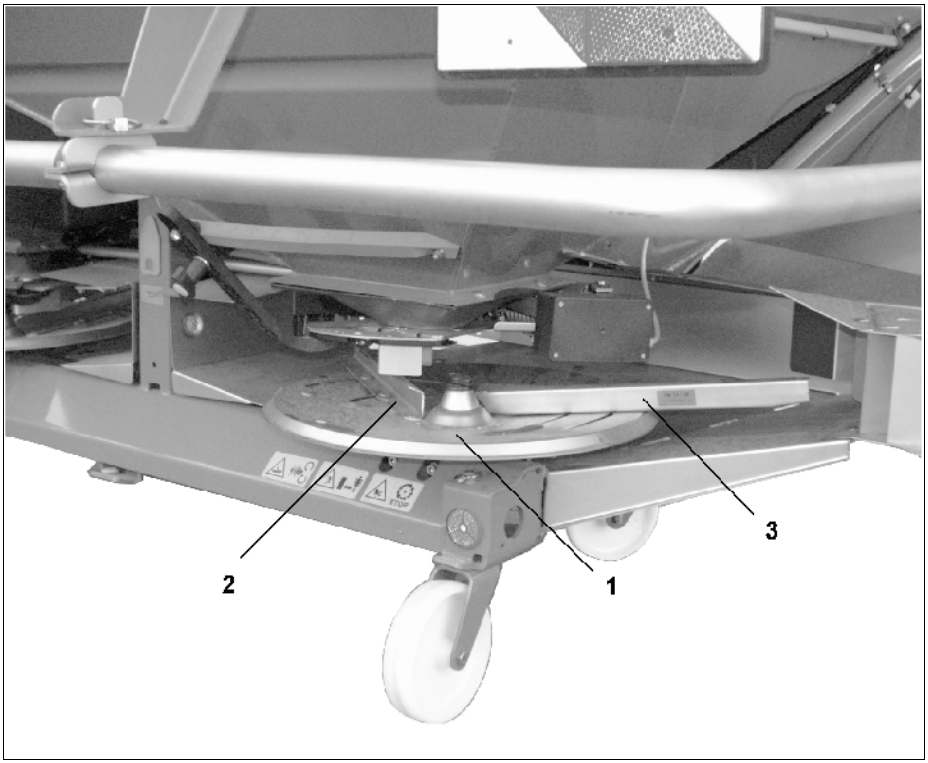


Fig. 4

Spread rate setting

- electronic via the AMATRON+ (Fig. 6) in relation to the forward speed.
- mechanic via the setting levers

Hereby the shutter slides (Fig. 7/2) set various shutter opening widths (Fig. 7/4).

ZA-M profiS: The shutter slide position which is required for the desired spread rate is determined by driving a test distance.

The opening and closing of the outlet openings is achieved by two additional shutters (Fig. 7/3) hydraulically (closing) (Fig. 7/5) or by a tensioning spring (Fig. 7/6) (opening).

With the **Comfort-package** (option) wer- the hydraulic functions are achieved via the **Amatron**+

- Opening and closing of shutters.
- Switching on and off the Limiter.

As the spreading properties of the fertilizer may heavily vary we recommend that you carry out a calibration test with the fertilizer you intend to spread before starting to operate.

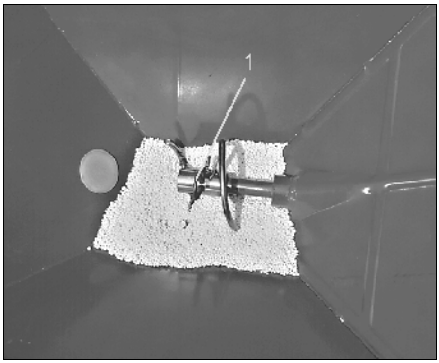


Fig. 5

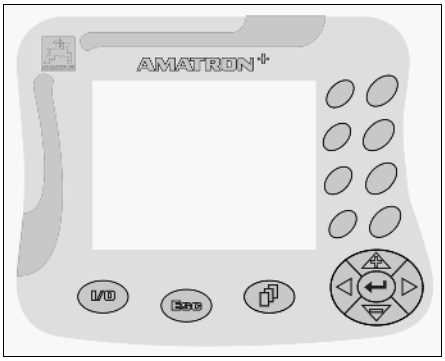


Fig. 6

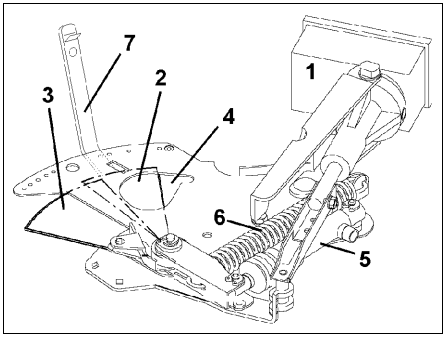


Fig. 7

The integrated guide system consisting of limiter (Fig. 8/1) and trimmer (Fig. 8/2) provides an optimum limiting of the spread fan. The trimmer is moved into the front area of the spreading fan providing a permanent front limiting of the fan. The limiter is engaged for border- and field side spreading if the first tramline has been created half the working width from the field's border

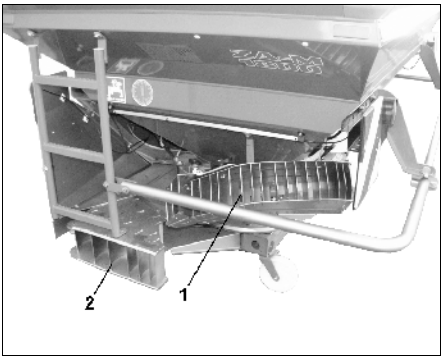


Fig. 8

3.4 Remarks on the weighing technique

In addition to the proven ZA-M technology the centrifugal broadcaster ZA-M Ultra *profiS* offers the possibility to achieve accurate details regarding the spread rate with the aid of the weighing technique.

Further more the ZA-M Ultra *profiS* allows an accurate spread rate without any calibration test.

The ZA-M Ultra *profiS* features an additional frame (Fig. 9/1), fitted in front of the spreader which retains the weigh cell (Fig. 9/2) .

The weigh cell frame holds the spreader by two leaf springs(Fig. 9/3) and by two bearing flanges (Fig. 9/4) in parallel design.

The horizontal position of the leaf springs and the bracing straps is of great importance for the accurate weight determination.

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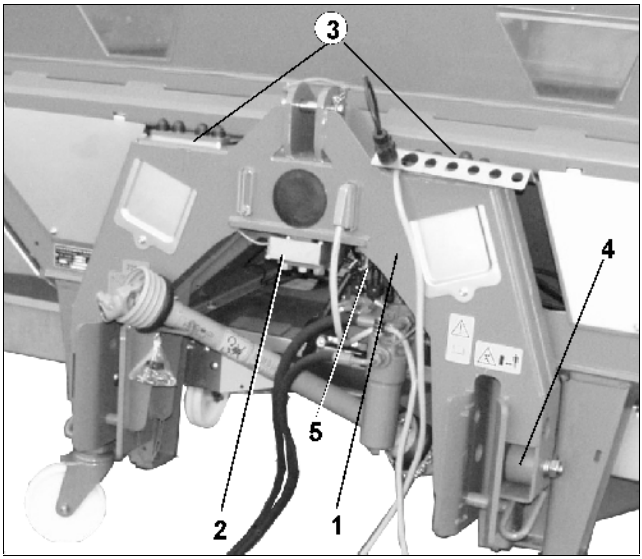

Fig. 9

The leaf springs (Fig. 11/1) and the bearing flanges (Fig. 11/2) take in all horizontal forces, whereby the vertical force (the weight of the spreader) is taken in by the micrometer (Fig. 10/2 and Fig. 11/2) in the weigh cell (Fig. 10/1).

Before starting to operate enter a calibration factor for the kind of fertilizer which you intend to spread. In case of an unknown fertilizer in addition a stationary calibration test can be carried out.

After having entered the calibration factor the calibration test drive may be started. For this start the calibration procedure on the on-board computer **AMATRON**$^{+}$ with stationary implement in the field. After having spread at least 200 kg of fertilizer the calibration procedure is terminated on the **AMATRON**$^{+}$ have now calculated a new calibration factor with which the desired fertilizer rate can be accurately spread.

For varying fertilizers different calibration factors must be determined.

Each one check is fitted on the left hand and right hand side of the frame of the fertilizer spreader **ZA-M Ultra *profiS*** (Fig. 9/5) .The check screws are set with a clearance of 2 mm towards the weighing frame. (see para.9.2.2).
This prevents the spreader from being taken off the weighing frame in case of ground undulations

If the bolts have been set without any play the weighing result will be corrupted.

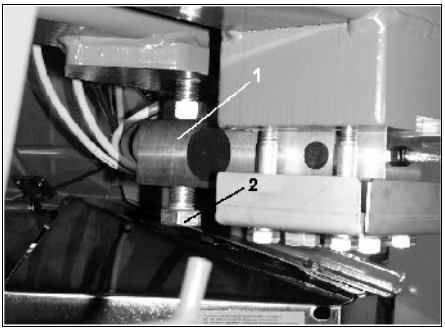

Fig. 10

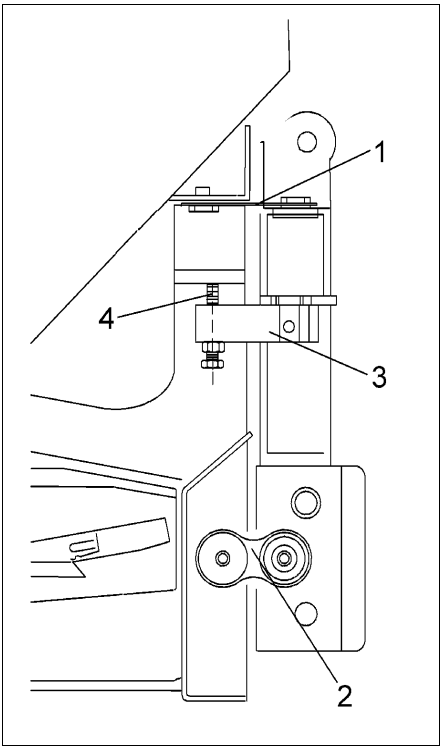

Fig. 11

3.5 Guard screen inside the hopper

The foldable guard screens cover the entire hopper and serve as

- protection against touching the rotating agitator spiral.
- protection against foreign particles during the filling procedure.

Fig. 12/...

(1) Guard screen

(2) Grip with guard screen locking device

(3) Lock for open guard screen

(4) Unlocking tool

For cleaning, maintenance or repair work the guard screen in the hopper can be unlocked with a tool and folded upwards.

Unlocking tool in:

(Fig. 13/1) parking position (standard position)

(Fig. 14/1) Unlocking position to swivel the guard screen upwards

Opening the guard screen:

1. Re-insert the unlocking tool from the parking position into the unlocking position.
2. Take hold of the grip and turn the unlocking tool in direction of the grip (Fig. 14).

→ Guard screen locking device unlocked.

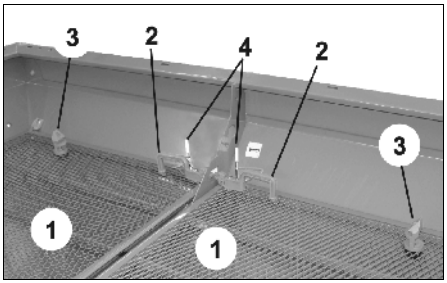

Fig. 12

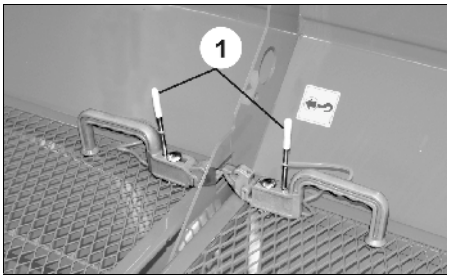

Fig. 13

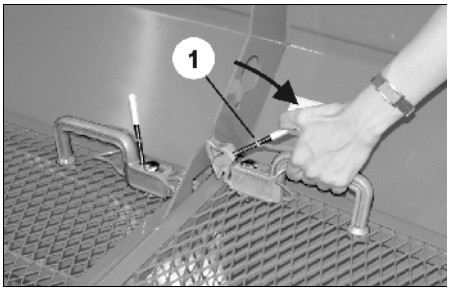

Fig. 14

3. Fold the guard screen upwards until the locking device catches.
4. Get the unlocking tool into the parking position.

Only take the tool off the parking position in order to open the hopper.

- Prior to closing the guard screen press down the locking device (Fig. 15).
- During the closing procedure the guard screen locks automatically.

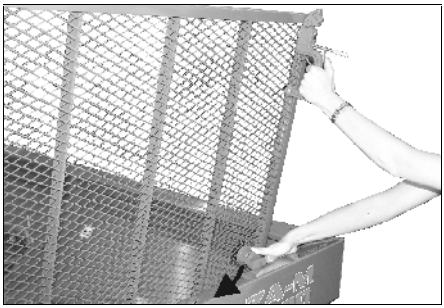

Fig. 15

3.6 Danger zones

Danger zones exist:

- between tractor and machine, especially while coupling and uncoupling. ,
- In the area of moving parts:
  - Rotating spreading discs with spreading vanes
  - Rotating agitator shaft and agitator shaft drive
  - Hydraulic actuation of the shutters
  - Electronic actuation of shutter slide
- When climbing on to the machine.
- Underneath a lifted, not secured machine or machine parts
- During spreading operation within the spread fan range by fertilizer grains.

In these zones always danger prevails or unexpected danger may occur. Safety symbols mark these danger zones (see para.2.4).

4. On receipt of the machine

Check that no damage has been caused in transit and all parts are present. Otherwise no responsibility can be accepted by us or the carrier.

Check whether all parts (including options) listed up in the delivery note are present.

- One pair of spreading discs "Omnia-Set" (OM) 24-48 with swivelling spreading vanes.
- Guard screen / Filling sieve against foreign particles,
- Calibration tray for the spread rate check,
- Instruction manual,
- Setting chart,
- Calculating disc rule,
- Jop Computer AMATRON^{+},
- Sample container for fertilizer service,
- Hopper,
- Construction kit Ultra

Before commencing work, remove all packing material, wire etc.!

Before commencing work it is necessary to fit the following groups in order to the ZA-M Ultra:

- **spreading discs,**
- **hopper cover,**
- **construction kit Ultra**
  - **trimmers (right/left),**
  - **mud guards (right/left),**
  - **ladder (2 pieces),**
  - **guard tube,**
- **limiter,**
- **traffic light.**

Please check the correct fitting of the spreading discs. Looking into driving direction: left hand spreading disc decal "left hand" ("links") and right hand spreading disc decal "right hand" ("rechts").

Check the correct fitting of the scales on the spreading discs. The scales on the left hand spreading disc are marked with "left hand" [links] and on the right hand one with "right hand" [rechts]. The scales with the figures of 5 to 28 belong to the shorter spreading vanes and the scales with the figures of 35 - 55 to the longer spreading vanes.

5. Mounting and dismounting

Danger of tipping over!

When mounting or dismounting park the spreader on level ground. Do not lift in the front.

Danger of tipping over!

Mount and dismount the spreader only with empty hopper.

Any maintenance work on the spreader may only be carried out with a stopped engine and a pressure free hydraulic system!

Remove ignition key. Secure the implement against unintended operation and rolling away.

Danger of tipping over!

Advise people to leave the danger area behind or underneath the machine

Danger of tipping over!

When coupling ensure sufficient free space for the lower link arms.

Danger of tipping over!

Only lift the implement with fitted upper link.

5.1 Mounting data

Before starting to operate determine the total weight, the axle loads and the load capacity of the tyres as well as the necessary minimum ballast of the combination tractor/mounted implement.

The distance "a" results from the sum of the distances a_1 and a_2.

a_1 = Spacing between centre of front axle and lower tractor linking point. Please take this value from the instruction book of your tractor.

a_2 = Spacing between centre of lower tractor linking point and point of of gravity front mounted imple ment.

d = 800 mm

For calculation the following data are required:

T_L [kg]: Net weight of the tractor❶

T_V [kg]: Front axle load of the empty tractor❶

T_H [kg]: Rear axle load of the empty tractor❶

G_H [kg]: Total weight rear mounted im plement / rear ballast❷

G_V [kg]: Total weight front mounted im plement / front ballast❷

a [m]: Spacing between point of gravity front mounted implement/ front ballast and centre front axle ❷❸

b [m]: Wheel base of tractor❶❸

c [m]: Spacing between centre of rear axle and centre of lower link ball ❶❸

d [m]: Spacing between lower link ball and point of gravity rear mounted implement / rear ballast

❶ Pls refer to instruction manual of tractor

❷ See price list

❸ Dimensions!

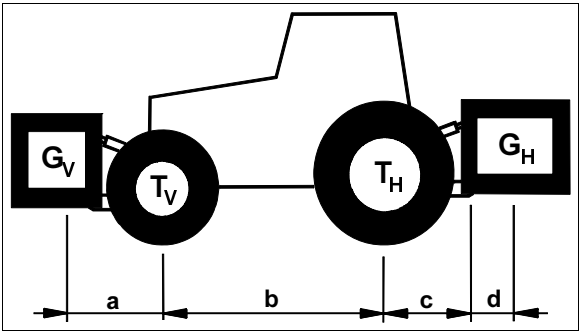

Fig. 16

Rear mounted implement or front-rear mount combinations:

1) Calculation of the minimum ballast front $G_{V\,min}$:

$$G_{V\,min} = \frac{G_H \bullet (c+d) - T_V \bullet b + 0{,}2 \bullet T_L \bullet b}{a+b}$$

Enter into the table the minimum ballast required for the tractor front.

2) Calculation of the front axle load tv tat:

(If the necessary minimum ballast front ($G_{V\,min}$) is not achieved with the front mounted implement (G_V), increase the weight of the front mounted implement up to the weight of the minimum ballast front.)

$$T_{V\,tat} = \frac{G_V \bullet (a+b) + T_V \bullet b - G_H \bullet (c+d)}{b}$$

Enter into the table the calculated actual front axle load and the permissible axle load indicated in the instruction manual of the tractor.

3) Calculation of the actual total weight G_{tat}

(If the minimum rear ballast ($G_{H\,min}$) is not achieved with the rear mounted implement (G_H), increase the weight of the rear mounted implement up to the minimum ballast.)

$$G_{tat} = G_V + T_L + G_H$$

Enter into the table the calculated actual total weight and the total weight indicated in the instruction manual of the tractor.

4) Calculation of the actual rear axle load $T_{H\,tat}$

$$T_{H\,tat} = G_{tat} - T_{V\,tat}$$

Enter into the table the calculated actual rear axle load and the rear axle load indicated in the instruction manual of the tractor.

5) Tyre load capacity

Enter into the table on the next page double the value (two tyres) of the permissible tyre load capacity (please refer, e.g. to the files of the tyre manufacturer)..

TABLE	Actual value according to calculation		Permissible value according to instruction manual		**Double** permissible tyre load capacity (two tyres)
Minimum ballast Front / rear	/ kg		---		---
Total weight	kg	≤	kg		---
Front axle load	kg	≤	kg	≤	kg
Rear axle load	kg	≤	kg	≤	kg

The minimum ballast must be attached to the tractor by means of a mounted implement or a ballast weight.

The calculated values should be smaller than /equal (≤) the permissible values

5.2 Mounting

Mount the centrifugal broadcaster to the rear hydraulic three point linkage of the tractor (please note para.2.7).

- Fix lower link of tractor on lower link pin (cat. II) (Fig. 17/1) and secure by using a clip pin. Insert the pin into the upper hole of the lower link console.
- Fix upper link with link pin (cat. II) (Fig. 17/2) and secure by using a clip pin.

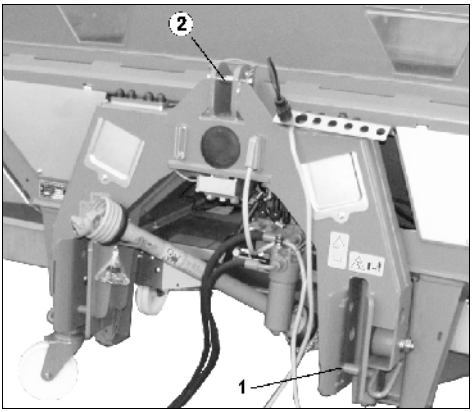

Fig. 17

In lifted position the lower link arms of the tractor must only have little play to the sides, so that the machine does not swing to and fro during spreading operation. Secure lower link arms of the tractor with stabilising bars of chains.

Advise people to leave the danger area behind or underneath the machine, as it may swing to the rear and down if the upper link halves erroneously are twisted apart or tear off.

The speed of lowering a filled spreader must never be faster than 2 seconds. If available set the throttle valve accordingly.

5.2.1 PTO shaft

Only use the PTO shaft prescribed by the manufacturer

The fertilizer spreader is fitted with a Walterscheid-PTO-shaft with friction clutch W2102 ultra.

Short-time torque peaks of above **approx. 400 Nm**, as they might occur for example when engaging the PTO shaft, are limited by the friction clutch. The friction clutch prevents damage on PTO shaft and gearbox elements..

The PTO shaft must be fitted when the spreader is empty and has been parked.

Fitting the PTO shaft:

- Remove fixing bolt (Fig. 18/1).
- Twist the funnel (Fig. 18/1) in fitting position.
- Pull off guard cone (Fig. 18/3).

Before fitting the PTO shaft clean and grease the gearbox input shaft.

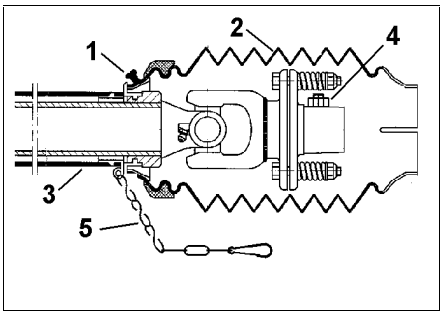

Fig. 18

- Push on the PTO shaft.
- Fix the bolt for axial safeguard (Fig. 18/4).
- Push on guard cone (Fig. 18/1) and twist guard funnel (Fig. 18/3) into fitting position.
- Insert locking bolt (Fig. 18/1).
- Fix the cordon for safeguard (Fig. 18/5 and Fig. 19/1) to avoid rotation.

Matching the PTO shaft when initially fitted.

When first mounting match PTO shaft to the tractor. As this matching only applies for this specific type of tractor check PTO shaft matching when changing the tractor type or repeat it if necessary.

Before the first operation and longer periods of stand still "air" the friction clutch.

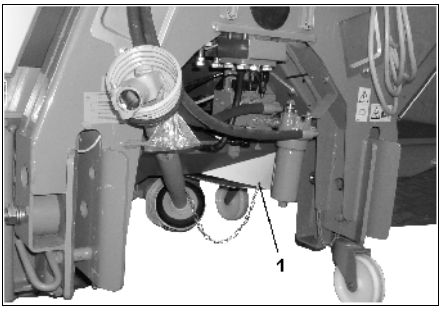

Fig. 19

When first mounting fix other PTO shaft halt to the universal joint shaft profile of the tractor without inserting the PTO shaft tubes into one another.

1. By holding the two PTO shaft tubes side by side, check whether an **overlap** of the PTO shaft tubes of **at least 40 % of LO** (LO = length in inserted condition) is guarantied as well on the lowered as on the lifted broadcaster.
2. In inserted position the PTO shaft tubes may not tough the yokes of the universal joint. A **safety margin of at least 10 mm** should be ensured.
3. For matching the length of the PTO shaft halves hold them side by side in the closest operating position of the machine and mark.
4. Shorten inner and outer guard tube by the same amount.
5. Shorten inner and outer profile tube in the same length as the guard tube.
6. Round off the cut edges and carefully remove any metal filings.
7. Apply grease to the profile tubes and insert.
8. Hook in chains into the hole of the bracing of the upper link pocket so that a sufficient swivel range of the PTO shaft in all operating positions is guaranteed and the PTO shaft guard is prevented from rotating during operation.
9. Only operate with entirely guarded drive

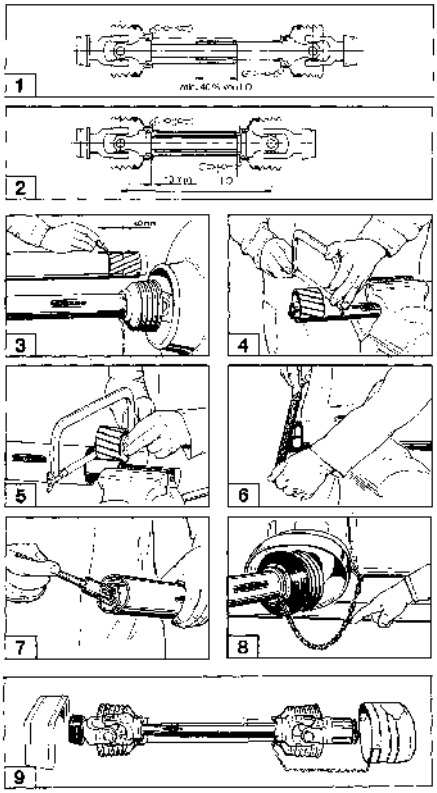

Fig. 20

On tractor and implement only use PTO shaft with complete guard and additional guard. Replace guards immediately once they have been damaged

The maximum PTO shaft angle must never exceed 25 °.

Also note the fitting- and maintenance advice of the PTO shaft manufacturer

To avoid damage engage PTO shaft slowly at low tractor engine speed.

5.2.2 Centre gearbox with giving-way safety

To prevent damage (at the first fitting) (e.g. because of a not properly matched PTO shaft) the fertilizer spreader is provided with a centre gearbox with giving-way safety (Fig. 21/1).

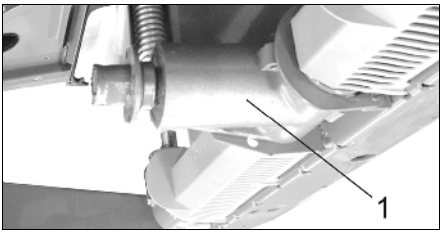

Fig. 21

5.3 Hydraulic connections

In order to avoid damage on the fertilizer spreader the pressure in the tractor hydraulic system must not exceed 230 bar.

Warning - The hydraulic system is under high pressure!

When connecting the hydraulic hoses to the tractor hydraulic system take care that both the tractor and broadcaster hydraulic system are pressure free!

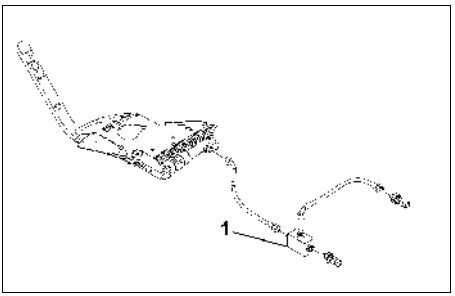

Fig. 22

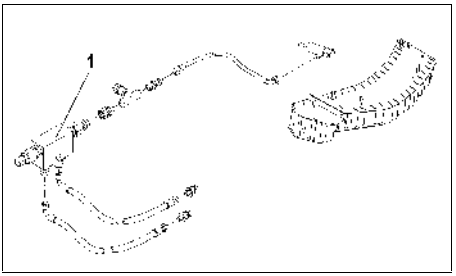

Fig. 23

Connections ZA-M Ultra:

- 3 double acting control spool valves
  → shutter slide
  → Limiter

An unintended opening of the shutters is avoided by using two locking blocks (Fig. 22/1 and Fig. 23/1) even in case of leaking spool valves on the tractor.

5.3.1 ZA-M with Comfort Package

- 1 single acting spool valve

  → (smaller plug)

- 1 pressure free oil return flow

  → (larger plug)

Pressure free oil return flow:

To protect the hydraulic motors of the spreader from damage the back pressure in the return flow must not exceed l 8 bar.

Therefore do not connect the return flow with the control spool valve but with a pressure free oil return flow with large plug coupling..

For the oil return flow only use hoses DN 16 and ensure short return flow.

Only pressurise the hydraulic system when the free return flow has been correctly coupled.

Install the supplied coupling sleeve on the pressure less oil return flow.

5.3.1.1 Setting the system converting bolt on the broadcaster valve block

The setting of the converting bolt (Fig. 24/1) on the spreader valve block depends on the tractor's hydraulic system. Depending on the hydraulic system:

- **unscrew the system converting bolt until its stop (factory setting) on tractors with**
  - Open-Centre-hydraulic system (stabilised **power supply** system, gear pump hydraulic).
  - Load-Sensing-hydraulic system (pressure- and current controlled setting pump) – oil decrease via control unit
- **screw in the system converting bolt until its stop (contrary to the factory setting) on tractors with**
  - Closed-Centre-hydraulic system (constant pressure system, pressure controlled setting pump).
  - Load-sensing-hydraulic-system (pressure- and flow controlled setting pump) with direct load-sensing pump connection. With the aid of the flow regulation valve of the tractor adjust the flow to the correct setting which is required for normal fertilizing.

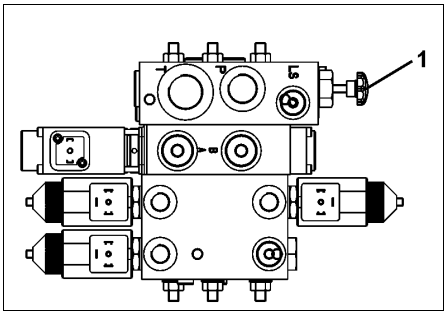

Fig. 24

Setting the system converting bolt:

- Slacken counter nut.
- Unscrew the system converting bolt by using a screw driver until the Stopp (factory setting) or screw in.
- Retighten counter nut.

5.4 Connecting AMATRON+

- Connect the machine plug with tractor base equipment of **AMATRON+** .

5.5 Fitting the traffic lights

- Connect light cable with plug with the 12 V-tractor plug.

5.6 Dismounting

Before dismounting the broadcaster ensure that the linkage points (top- and lower link) are loose.

- For dismounting park the broadcaster on a level ground.
- All cables and hoses should be placed in their plugs or holders.
  - Cable of the Job Computer AMATRON+.
  - The hydraulic hoses into the holder of hoses.
  - Light cable in the holder of the plugs.
- PTO-shaft should be placed into catching hooks provided.

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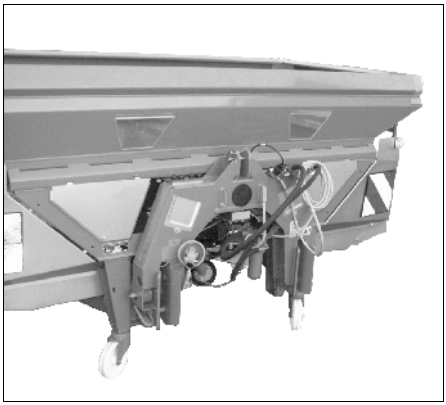

Fig. 25

6. Transport on public roads and ways

When travelling on public roads and ways observe the traffic regulations in force in your country.

The traffic light kit must correspond to your national traffic law.

Vehicle owner as well as the operator are responsible for adhering to the legal traffic regulations.

According to the harmonised European traffic regulations traffic light units and warning plates are required on agricultural and forestry implements mounted to tractors. The regulations are (slight national differences may be possible):

- If the prescribed rear lights, the indicators or the registration number are hidden by the broadcaster they will have to be repeated on the mounted implement. If the sides of the mounted implements protrude more than 400 mm the outer edge of the light emitting source of the limiting or rear lights of the tractor, extra parking warning plates and side lights are required. If the mounted implement protrudes more than 1 m beyond the rear lights of the tractor, parking warning plates, rear light units and rear reflectors are required.
- The light units and possibly required parking warning plates and –foils according to DIN 11030 can be obtained from the manufacturer of the implement or from your dealer. As always the latest edition of the national traffic regulations is valid, please verify them at your local traffic office.

Note maximum permissible filling loads of the spreader and axle loads of the tractor; if necessary drive on public roads with only half filled hopper.

6.1 Adjustments on tractor and fertilizer spreader for transport on public road

Do not exceed the maximum permissible transport width (in Europe 3 m) (e.g. with mounted row spreading attachment [option] according to the traffic law of your country.

When the centrifugal broadcaster is lifted for road transport, the distance between the upper edge of the rear lights and the road surface must never exceed 900 mm.

When driving on public roads with lifted implement lock the control lever against unintended lowering!

When lifting the fertilizer broadcaster the front axle load of the tractor is relieved by different amounts depending on the size of the tractor. Always check that the necessary front axle load of the tractor (20 % of the tractor's net weight) is maintained!

7. Settings

All settings on the centrifugal broadcaster **AMAZONE ZA-M Ultra prof*iS*** follow the indications of the **setting chart**.

All common fertilizers are test-spread in the **AMAZONE**-test hall and the hereby determined setting figures are entered into the setting chart. All fertilizers mentioned in the setting chart were in excellent condition when determining the setting values.

Due to varying fertilizer characteristics because of

- weather influence and/or unfavourable storing conditions,
- deviations of the physical properties of the fertilizer – also within the same kind and brand –,
- the spreading behaviour of the fertilizer,

may change and thus deviations from the figures for setting the desired spread rate or working width in the setting chart may become necessary.

No guarantee can be given that your fertilizer – even with the same name and from the same manufacturer – has the same spreading behaviour as the fertilizer tested by us.

We strictly point out that no compensation will be accepted for damage resulting from spreading errors.

Carry out all settings with great care. Deviations from the optimum setting may change the spread pattern in a negative way.

The figures in the setting chart can only be taken as standard data as the spreading properties of the fertilizer may change and thus require other settings.

The indicated setting recommendations for the lateral distribution (working width) only correspond to the weight distribution and not to the nutritious distribution

Settings or other work on the centrifugal broadcaster must only be carried out with the motor switched off and pressure less hydraulic system. Remove the ignition key. Secure the vehicle against unintended putting to operation and rolling away!

Before carrying out any settings or other work on the implement, wait until all moving machine parts have come to a full stand still!

With unknown kinds of fertilizer or for a checking of the working width set, a working width check can easily be carried out with the mobile test kit (option).

If the fertilizer cannot distinctly be associated with a certain kind in the **setting chart**, the **AMAZONE- fertilizer service** will give you **recommendations** for the setting, either immediately on the phone or after sending a small fertilizer sample **(3 kg)**.

AMAZONE-fertilizer service

☎ **Germany: 0049 5405 - 501 111 or 501 164 Fax: 5405/501134**

Monday - Friday

🕗 **8.00 till 13.00 o' clock.**

7.1 Setting the mounting height

Ask people to leave the danger zone behind or underneath the machine, as it may swing to the rear and down if the upper link halves erroneously are twisted apart resp. tear off.

Set the mounting height of the filled broadcaster in the field exactly according to the figures given in the setting chart . Measure the distance between soil surface and the spreading disc front- and rear side (Fig. 26).

7.1.1 Normal fertilising

The indicated mounting height, normally level 80/80 cm, are valid for the normal fertilising.

For the spring spreading season, when the crop has grown up to a height of 10 – 40 cm, one half of the crop height should be added to the stated mounting heights (e.g. 80/80). Thus set a mounting height of 95/95 when the crop is 30 cm tall. If the crop stands taller follow the instructions for late top dressing (Kap.0). If the crop stands very dense (rape) the fertilizer broadcaster should be set with the indicated mounting height (e.g. 80/80) above the crop. If that is no longer possible due to taller crop, then please also follow the instructions for late top dressing.

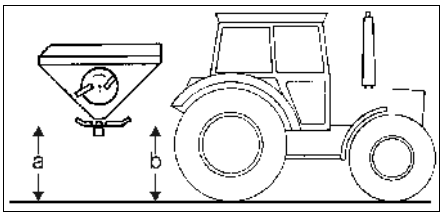

Fig. 26

7.1.2 Late top dressing

The spreading discs are supplied as standard with spreading vanes by which besides the normal spreading procedure also late top dressing in crops to growth height of 1 m may be conducted..

Set the mounting height of the spreader with the aid of the tractor's three-point hydraulic that high that the distance between the top of the grain and the spreading discs is approx.. **5 cm** (Fig. 27). If necessary insert the lower link pins into the lower link pin connections.

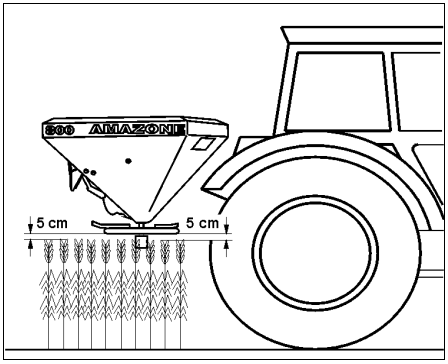

Fig. 27

In case the PTO shaft universal joint exceeds angles of 25° use a wide angle PTO shaft.

7.2 Setting the spread rate with AMATRON+

See operation manual AMATRON+.

The **shutter slide position** for the desired **spread rate** is set with the aid of the two setting levers.

After having entered the desired spread rate on **AMATRON+** [required rate in kg/ha] determine the fertilizer calibration factor (spread rate check). It determines the control behaviour of **AMATRON+**.

7.3 Checking the spread rate with AMATRON+

Check the spread rate:

- with every change of fertilizer,
- alteration of the spread rate,.
- alteration of the working widths

The **spread rate check** (calibration test) can be carried out with switched on hydraulic drive with a **normal spreading disc speed** for both spreading discs (see operation manual **AMATRON+ / para fertilizer calibration -** Fig. 28/1.

Arrangements for the spread rate check for ZA-M without weighing technique para Kap.7.7.1.

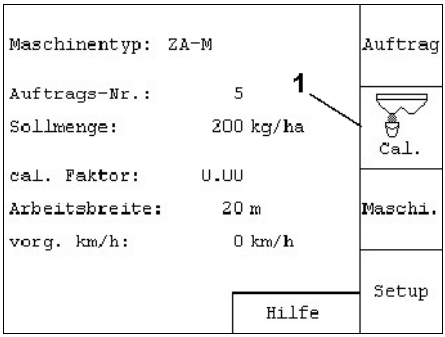

Fig. 28

7.4 Setting the spread rate with setting levers

For ZA-M with onboard computer, please refer to the instruction manual for the on-board computer.

The **shutter slide position** for the desired **spread rate** is set with the aid of the two setting levers (Fig. 29/1).

Take the **required shutter slide position either directly from the setting chart or determine with the aid of the calculating disc rule.**

The setting figures of the setting chart may only be considered as standard data. The flowing properties of the fertilizer may change and thus require other settings. Therefore always carry out a spread rate check before commencing the spreading work.

The determination of the shutter slide position with the aid of the calculating disc rule is carried out after a spread rate check. This way the varying flowing properties of the fertilizer are already considered when determining the shutter slide position.

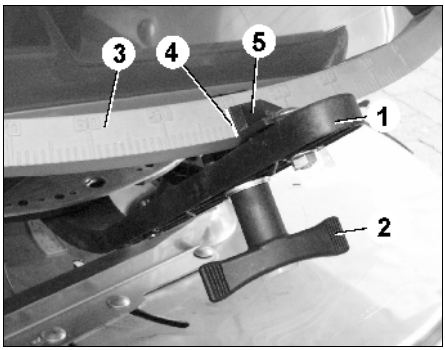

Fig. 29

- Close the shutter slides.
- Slacken the thumb nut (Fig. 29/2).
- Find the required shutter slide position on scale (Fig. 29/3)
- Set the read off edge (Fig. 29/4) of the setting lever pointer (Fig. 29/5) on to the scale figure.
- Firmly retighten the thumb nut (Fig. 29/2).

Choose the same shutter slide positions for the right hand and the left hand shutter!

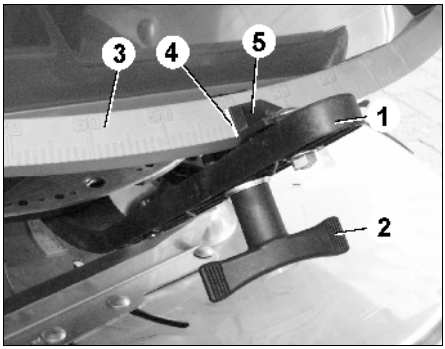

Fig. 25

7.4.1 Take the shutter slide position from the setting chart

The shutter slide position depends on:

- the kind of fertilizer to be spread.
- the working width [m].
- the speed of operation [km/h].
- the desired spread rate [kg/ha].

Example:

Kind of fertilizer: **CAN 27 % N prilled BASF**

Working width: **24 m**

Speed of operation: **10 km/h**

Desired spread rate: **350 kg/ha**

Shutter slide position: **?**

- Find in the setting chart the pages **Shutter slide position for the spread rates for mineral fertilizer CAN**
- Find among the columns with the working width **24 m** the column **10 km/h**.
- Find in column **10 km/h** the spread rate **358 kg/ha**.
- In the same line read off the shutter **slide position 43** for **358 kg/ha**.
- Set the shutter slide position with the aid of the setting levers on to the scale figure **43** as described.

We recommend to carry out a spread rate check with this shutter slide position.

KAS 27 % N	BASF; PCK; Hydro; DSM; Kemira; Agrolinz	1,02 kg/l
KAS 27 % N	SCHZ; NET; Landor	1,04 kg/l
NP- und NPK-Sorten	BASF; Agrolinz; SCHZ	1,10 kg/l
NPK-Sorten	Kemira	1,04 kg/l
NPK 15-7-11+10 / 10-8-17+3+9+0,3	TIMAC	1,00 kg/l
Patador; Ceral Agroline		1,06 kg/l
Nitroplus; Polyvalent	Landor	1,03 kg/l
Korn-Kali ® mit 6 % MgO	KAMEX 'gran.' 40/6 K+S	1,12 kg/l

m

Schieberstellung	20 km/h			21 km/h			24 km/h			27 km/h			28 km/h		
	8	10	12	8	10	12	8	10	12	8	10	12	8	10	12
25	135	108	90	128	103	86	112	90	75	100	80	67	96	77	64
26	150	120	100	143	115	95	125	100	84	111	89	74	107	86	72
27	167	133	111	159	127	106	139	111	93	124	99	82	119	95	79
28	184	147	123	175	140	117	154	123	102	136	109	91	132	105	88
29	203	162	135	193	154	129	169	135	113	150	120	100	145	116	96
30	222	176	148	211	169	141	185		123	164	131	110	158	127	106
31	242	194	161	231	184	154	202		134	179	143	120	173	138	115
32	263	210	175	251	200	167	219		146	195	156	130	188	150	125
33	285	228	190	271	217	181	237		158	211	169	141	203	163	136
34	307	246	205	293	234	195	256		171	228	182	152	220	176	146
35	331	265	220	315	252	210	276		184	245	196	163	236	189	157
36	355	284	236	338	270	225	296	236	197	263	210	175	253	203	169
37	379	303	253	361	289	241	316	253	211	281	225	187	271	217	181
38	404	323	270	385	308	257	337	270	225	299	240	200	289	231	193
39	430	344	287	409	328	273	358	287	239	318	255	212	307	246	205
40	456	365	304	434	348	290	380	304	253	338	270	225	326	261	217
41	483	386	322	460	368	306	402	322	268	358	286	238	345	276	230
42	510	408	340	486	389	324	425	340	283	377	302	252	364	291	243
43	537	429	35				447	358	298	398	318	265	383	307	256
44	564	451	376	537	430	358	470	376	313	418	334	279	403	322	269
45	592	473	395	564	451	376	493	395	329	438	351	292	423	338	282
46	620	496	413	590	472	393	516	413	344	459	367	306	443	354	295
47	647	518	432	617	493	411	540	432	360	480	384	320	462	370	308
48	675	540	450	643	514	429	563	450	375	500	400	333	482	386	322
49	703	562	469	670	536	446	586	469	391	521	417	347	502	402	335
50	731	584	487	696	557	464	609	487	406	541	433	361	522	417	348
51	758	606	505	722	578	481	632	505	421	561	449	374	541	433	361
52	785	628	523	748	598	498	654	523	436	582	465	388	561	449	374
53	812	650	541	773	619	515	677	541	451	601	481	401	580	464	387
54	838	671	559	798	639	532	699	559	466	621	497	414	599	479	399

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69

7.4.2 Determine the shutter slide position with the aid of the calculating disc rule

The calculating disc rule consists of:

1. The outer white scale with the spread rates [kg/ha] (spread rate).
2. The inner white scale for the amount of fertilizer [kg] collected during the calibration test (collected amount) (Fig. 30/2).
3. The center coloured scale with the shutter slide positions (Position). (Fig. 30/3).

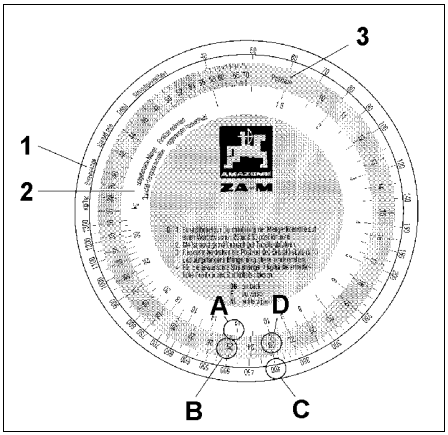


Fig. 30

4. The table for determining the required test distance [m]. (Fig. 31).

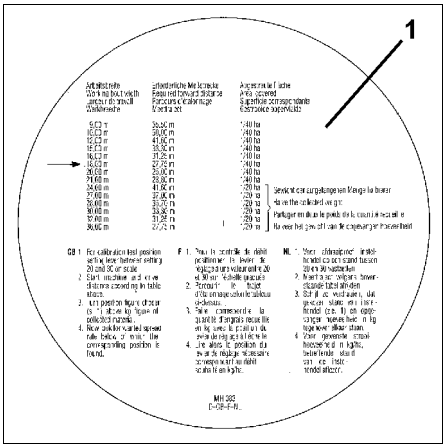


Fig. 31

Example:

Working width:	**18 m**
Spread rate:	**400 kg/ha**
Speed of operation:	**10 km/h**
Shutter slide position:	**?**

- Set on the left hand setting lever a mean shutter slide position, e. g. **25**.
- For the desired working width **18 m** read off table (Fig. 31/1) the required test distance **27,75 m**.

At the spread rate check the area spread is

- **for working widths up to 23 m 1/40 ha.**
- **for working widths up to 24 m 1/20 ha.**

- Carefully measure a test distance in the field. Mark beginning and end of the test distance.
- Convert the broadcaster to the spread rate check.
- Carry out a calibration test.
  - Carefully drive test distance from beginning to end mark under field conditions, e. g. with the intended constant forward speed of **10 km/h** and a PTO shaft speed of **540 min^{-1}** (unless otherwise stated for the working width setting in the setting chart). Open the left hand shutter exactly on the beginning of the test distance and shut it at the end point.
- Weigh the collected amount of fertilizer, e. g. **12,5 kg**.

For working widths of more than 24 m halve the collected amount of fertilizer (e.g. 25 kg = 25 kg/2 = 12,5 kg) and determine the shutter slide position with this figure.

- Take the calculating disc rule. On scale (Fig. 30/2) for collected quantity [kg] look for figure **12,5** (Fig. 30/A) and align with the chosen shutter slide position (Position) **25** (Fig. 30/B) on the coloured scale (Fig. 30/3).
- Look for desired spread rate **400 kg/ha** (Fig. 30/C) and read off the required shutter slide position (Position) **23** (Fig. 30/D).
- Set the shutter slide position (Position) **23**.

We recommend to carry out a fresh spread rate check with this shutter slide position.

7.5 Checking the spread rate

A spread rate check is recommended with every change of fertilizer.

Carry out the **spread rate check** (calibration test) with the PTO shaft engaged by **driving down a test distance** or **stationary**.

Driving a test distance is the more accurate method, because hereby the actual forward speed of the tractor is directly considered.

If the forward speed of the tractor in the field is exactly known, the spread rate check can also be carried out stationary.

The multiplier for the total quantity considers the one-sided spread rate check.

At high fertilizer application rates per hectare halve the test distance and double the multiplier because the capacity of the collecting bucket is limited.

Carry out spread rate checks with approximately half filled hopper.

7.5.1 Arrangements for the spread rate check

- Swivel downwards the guard tube center part.
- Set the required shutter slide position for the desired spread rate on the left hand side hopper tip.
- Remove the left hand spreading disc.
  - Unscrew the thumb nut for fixing the left hand spreading disc and pull the spreading disc off the gear box shaft.
  - Screw thumb nut again in gear box shaft (to avoid any fertilizer dropping into the threaded hole).
- Hang the outlet chute (Fig. 32/1) on the frame.
- Hang the calibration bucket with its handle (Fig. 33/1) into the rear retainer and the front on the frame.

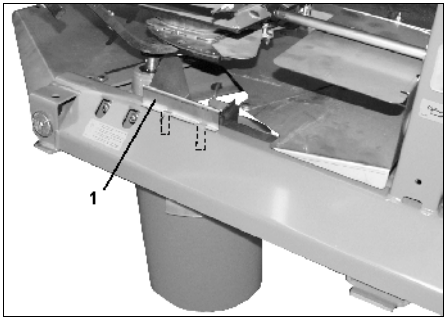


Fig. 32

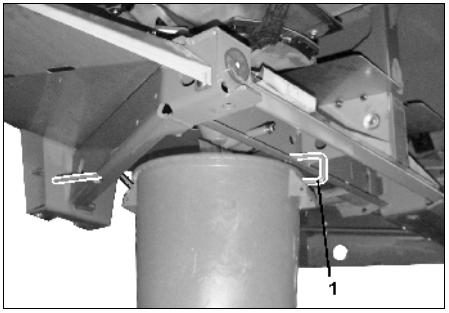


Fig. 33

7.5.2 Spread rate check by driving a test distance

Example:

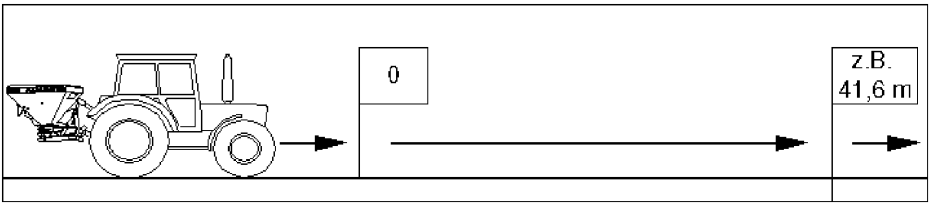
Kind of fertilizer: CAN 27 %
BASF (white)

Working width: 24 m
Speed of operation: 10 km/h
Spread rate: 350 kg/ha
Shutter slide position
according to setting chart: 43

- From the following table you may take the required test distance **41.6 m** and the multiplier **20** for the desired working width **24 m**.

Calculate test distances for working widths not shown in the table accordingly.

Working width [m]	Required forward distance [m]	Area covered [ha]	Multiplier for the total spread rate
24,00	41,60	1/20	20
27,00	37,00	1/20	20
28,00	35,70	1/20	20
30,00	33,30	1/20	20
32,00	31,25	1/20	20
36,00	27,75	1/20	20
40,00	25,00	1/20	20
42,00	23,80	1/20	20
48,00	20,80	1/20	20



- Carefully measure the test distance in the field. Mark beginning and end of the test distance (Fig. 7.15).
- Set shutter slide position **43**.
- Hang in collecting bucket.
- Set the Pto shaft speed **720 min^{-1}** (unless otherwise stated for working width setting in the setting chart).
- Carefully drive test distance from beginning to end under field conditions, e. g.
  - with half filled hopper,
  - intended constant operational speed **10 km/h** and
  - the pto shaft speed required for the working width.
- Open the left hand shutter exactly on the beginning of the test distance and shut at the end point.
- Weigh the collected fertilizer [kg] **e.g. 17,5 kg**.
- From the collected amount of fertilizer [kg] the actual set spread rate [kg/ha] can be calculated.

$$\text{Spread rate} = \frac{\text{Collected fertilizer quantity [17,5kg] x multiplier 20}}{\text{ha}} = 350\text{kg/ha}$$

In case the actual and the desired spread rate deviate, correct the shutter slide position accordingly. If necessary, repeat the calibration test.

After having determined the exact shutter slide position for the left hand hopper tip, set the right hand setting lever on the same shutter position.

7.5.2.1 Conversion of the required test distance for working widths not shown in the setting table

Working widths from 24 m
Multiplier 20

Required test distance at desired working width [m] =	$\frac{1000}{\text{working width [m]}}$

7.5.3 Stationary spread rate check

Example:

Kind of fertilizer: CAN 27 % BASF (white)

Working width: 24 m

Speed of operation: 10 km/h

Spread rate: 350 kg/ha

Shutter slide position

according to setting table: 43

- Please take from the following table the required time **14.98 sec.** which is necessary to drive the required test distance **41.6 m** for the desired working width **24 m** and the desired forward speed **10 km/h** as well as the multiplier **20** for the spread rate conversion.

Convert times for working widths or forward speeds not mentioned in the table

Working width [m]	Required test distance	Multiplier for the total spread rate	Required time [sec.]to drive the test distance at working speed of [k.p.h.]		
			8	10	12
24,00	41,60	20	18,72	14,98	12,48
27,00	37,00	20	16,65	13,32	11,1
28,00	35,70	20	16,06	12,85	10,71
30,00	33,30	20	14,98	11,99	9,99
32,00	31,25	20	14,06	11,25	9,37
36,00	27,75	20	12,49	9,99	8,32
40,00	25,00	20	11,25	9	7,5
42,00	23,80	20	10,71	8,57	7,14
48,00	20,80	20	9,36	7,49	6,24

- Set shutter slide position **43**.
- Hag in collecting bucket.
- Set the pto shaft speed of **540 R.P.M.** (unless otherwise stated for the working width setting in the setting table).
- Open the left hand shutter for exactly **14.98 sec**.
- Weigh the collected amount of fertilizer [kg] **e.g. 17,5 kg**.
- Calculate the actually set spread rate [kg/ha] from the collected fertilizer amount [kg].

$$\text{Spread rate} = \frac{\text{Collected fertilizer [17,5kg] x multiplier 20}}{\text{ha}} = 350\text{kg/ha}$$

In case the actual and the desired spread rate deviate, correct the shutter position accordingly. If necessary, repeat the calibration test.

- After having determined the exact shutter position for the left hand hopper tip, set the right hand setting lever on the same setting figure.

Conversion of the required measuring time for working widths (measuring distances) or speeds of operation not shown in the table.

$$\text{Required calibration time [sec.] at desired working width} = \frac{\text{Test distance [m]}}{\text{Working speed [km/h]}} \times 3{,}6$$

7.6 Setting the working width

For all working widths the lateral distribution is rechecked by using the mobile fertilizer test kit..

The working width is influenced by the spreading properties of the fertilizer. The main influence factors regarding the spreading properties are:

- grain size,
- bulk density,
- surface condition,
- humidity.

Depending in the kind of fertilizer the **"Omnia-Set"** spreading discs (Fig. 34) allow the setting of varying working widths.

To set the various working widths (distance between the tramlines) the spreading vanes can infinitely variably be swivelled round the pivoting point (Fig. 34/1) (para.7.6.1).

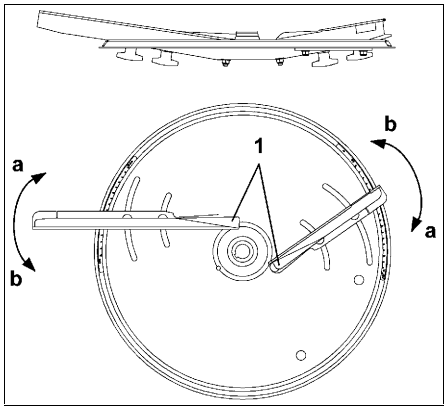


Fig. 34

7.6.1 Swivelling the spreading vanes

The spreading vane position depends on

- the working width and
- the kind of fertilizer.

For the accurate tool less setting of the individual spreading vane position two different unmistakable scales (Fig. 35/2 and Fig. 35/6) are arranged on every individual spreading disc.

By swivelling the spreading vanes in direction of rotation (Fig. 34/a) of the spreading discs (on to a higher figure on the scale) the working width is increased. When swivelling them against the direction of rotation (Fig. 34/b the working width is reduced. The shorter spreading vane distributes the fertilizer mainly in the spread pattern centre, while the longer vane mainly spreads onto the outer range.

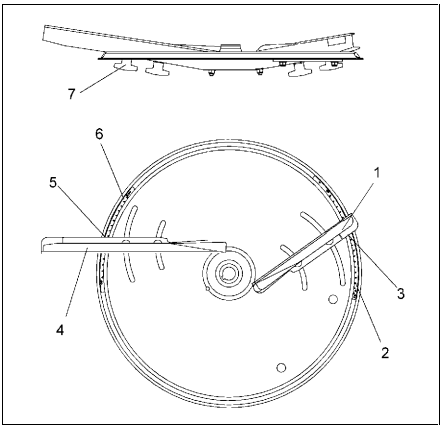


Fig. 35

Example:

Fertilizer: CAN 27%N gran. Hydro Rostock

Spreading disc: OM 24-48

Working width: 27m

- **For fertilizer or trade name, please refer to the setting chart (Fig. 36).**
- **Read off group of fertilizer (Fig. 36).**
- **For spreading vane position please refer to the right hand side of the table (Fig. 37):**
  - **group 1; Working width 27 m**
    Short vane position: **14**

    Long vane position: **47**

Fertil-izer	Trade name / type	spread-ing see page	Quantity factor	Group of fer-tilizer
CAN	CAN 27%N gran. fertiva GmbH	22-24	0.92	**1**
	CAN 27%N gran. Nitramoncal Agrolinz	22-24	0.92	**1**
	CAN 27%N gran. Hydro Rostock	22-24	0.92	**1**
	CAN 27%N gran. Hydro Sluiskil (NL)	22-24	0.92	**1**
	Nutramon® 27%N gran. DSM (NL)	22-24	0.92	**1**
	CAN 27%N gran. SCHZ Lovosice (CZ)	22-24	0.92	**1**
	CAN 27%N gran. Anwil (PL)	22-24	0.92	**1**
	CAN 27,5%N gran. ZAK (PL)	22-24	0.92	**1**

Fig. 36

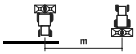
Group of fer-tilizer	 m										
	24	27	28	30	32	36	40	42	44	45	48
1	14/47	14/47	14/47	16/48	16/48	18/49	19/49	19/49	19/52	19/53	↗ 19/54
2	14/47	14/47	14/47	16/47	16/47	18/47	20/49	22/52	↗ 23/55	↗ 23/55	—
3	14/47	14/47	14/47	15/47	15/47	16/47	18/49	19/52	19/53	19/53	↗ 20/55

Fig. 37

Set spreading vanes on spreading discs as follows:

- Slacken both thumb nuts (Fig. 38/7) beneath the spreading vanes.

For slackening thumb nut turn the spreading disc until the nut is located at the side and can be slackened without any problem.

- Swivel read off edge (Fig. 38/3) of the short vane (Fig. 38/1) on figure "14" of scale (Fig. 38/2 and retighten thumb nut firmly.
- Swivel read off edge (Fig. 38/5) of the long vane (Fig. 38/4) on figure "47" of scale (Fig. 38/6) and re-tighten thumb nut firmly.

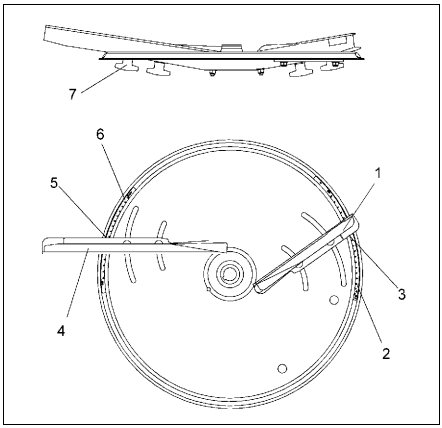


Fig. 38

7.6.2 Checking the working width with the mobile test kit (option))

The setting values of the setting chart have to be considered as **guide values** only, as the spreading properties of the kinds of fertilizer vary. It is recommended to check the set working widths of the fertilizer broadcaster with the **mobile test kit** (Fig. 39) (option).

For further details, please refer to the instruction manual "Mobile test kit" .

Fig. 39

7.7 Eco-border and normal-border spreading

Eco-border spreading according to fertilizer application decree (Fig. 40):

The adjacent area is a road or a water.

According to fertilizer decree

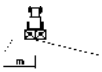
- no fertilizer may be thrown beyond the border.
- eroding and washing off (e. g. in surface water) must be prevented.

In order to avoid an over-fertilizing inside the field, the spread rate thrown towards the boundary must be reduced. This results in only a little over-fertilizing in front the field's boundary.

- electric shutter actuation: Press key  –10% on the on-board computer.

The eco-border spreading corresponds to the requirements of the fertilizer application decree.

Symbol for eco-border spreading.



(no fertilizer may be thrown beyond the boundary)

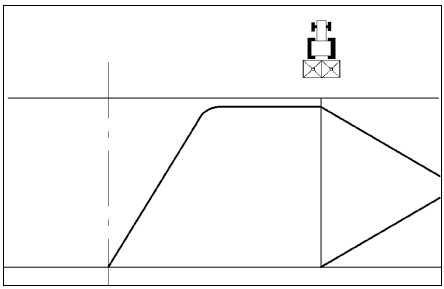


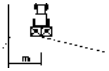
Fig. 40

Normal-border spreading (**Fig. 41**):

The adjacent area is an arable field. A small amount of fertilizer being thrown beyond the field's border may be tolerated.

The fertilizer distribution inside the field is still near the rated quantity at the field's border. A small amount of fertilizer will be thrown beyond the field's border.

Symbol for normal-border spreading:



(at least 80 % of the spread rate set until the field's border).

The spread patterns might deviate from the illustrated spread patterns.

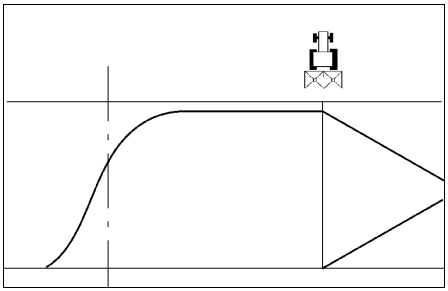


Fig. 41

7.7.1 "Eco" border spreading and border spreading with Limiter XL

If the first tramline is created in a distance of half the working width of the fertilizer spreader to the field side, operate with Limiter XL as follows:

- Before starting border spreading operation adjust the border spread deflector on Limiter Ultra. The setting depends on the kind of fertilizer, the distance from the border or whether it is intended to do border- or "Eco"-border spreading and can be taken from the table (para.7.7.2).
- The following settings have to be carried out:
  - Scale figure (0-15)
  - Symbol“▲” or “◆” (Fig. 42/3)
  - Additional deflector fitted/removed
- For setting the scale (0-15) loosen the handles (Fig. 42/1) do the setting following the table and tighten the handles again.
- In order to swivel the border spread deflector in- or outwards, loosen the handle (Fig. 42/2) and turn the deflector until the pointer (Fig. 42/3) pointer has moved to the“▲” or “◆” symbol. Retighten handles.

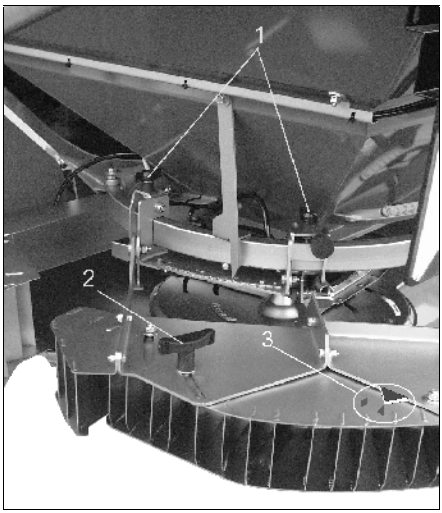


Fig. 42

- For dismantling slacken the thumb bolt (Fig. 43/2) land unhook the deflector. Retighten the thumb nut and with the aid of the clamping plate affix the deflector in the parking position.
- Secure the additional deflector (Fig. 43/1) with the clamping plate (Fig. 44/1) and take along in parking position (Fig. 44).
- For fitting hook in the additional deflector again and secure with the aid of the thumb bolt.

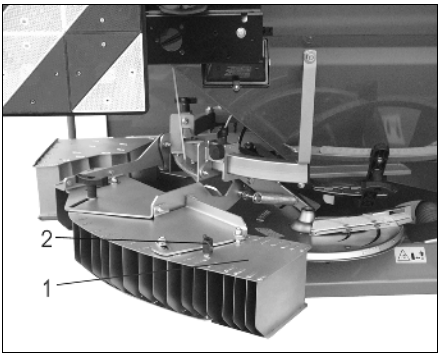


Fig. 43

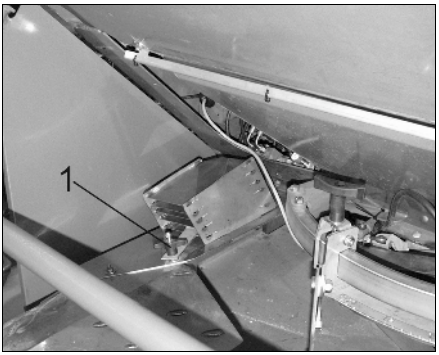


Fig. 44

- For operation hydraulically fold down the border spread deflector into operational position (Fig. 45).

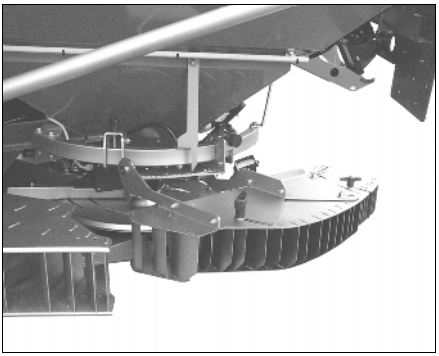


Fig. 45

For boundary spreading the pre-set fertilizer spread rate should be reduced by 10 %.

After having spread the border hydraulically swivel the border spread deflector upwards (Fig. 46) and continue the normal spreading operation.

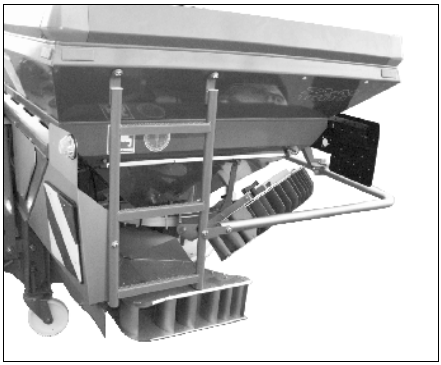


Fig. 46

7.7.2 Table for border spreading and "eco" border spreading with Limiter XL

	½ distance		attach additional deflector
	"Eco" border spreading	Δ	swivelled inwards
	Border spreading	♦	swivelled outwards
X	limiter for side spreading not operating (swivelled upwards)		

Limiter Ultra XL		OM 24- 48											925307
		12	13,5	14	15	16	18	20	21	22	22,5	24	
KAS / CAN AN NPK NP DAP / MAP		♦11	♦9	♦8	Δ15	Δ13	Δ8	Δ8	Δ7	Δ7	Δ7	Δ6	
		Δ7	Δ5	Δ4	Δ1	Δ0	Δ0	Δ0	Δ0	Δ0	Δ0	Δ0	
Harnstoff gran. Urea gran.		♦9	♦6	♦4	♦4	♦2	♦0	♦0	♦0				
		Δ1	Δ1	Δ0	Δ0	Δ0	Δ0	Δ0	Δ0				
Harnstoff geprillt Urea prills		Δ6	Δ6	Δ4	Δ0	Δ0	Δ0						
		X	X	X	X	X	X						
P K PK MgO		Δ15	Δ14	Δ14	Δ12	Δ9	Δ5	Δ4	Δ3				
		Δ4	Δ3	Δ3	Δ1	Δ1	Δ1	Δ0	Δ0				

Fig. 47

8. Operation

Before starting with the spreading operation:

- **Job data (Fig. 48/1)**
- **Machine data (Fig. 48/2)**

enter on AMATRON+ and re-check.

Never reach into the rotating agitator spiral!

Under no circumstances poke about the fertilizer with any aids into the rotating agitator spiral!

Never ever climb onto the hopper whilst the agitator spiral is spinning.

At new machines after 3 – 4 hopper fillings check nuts and bolts regularly for tightness and retighten if necessary.

Only use well granular fertilizer s and kinds mentioned in the setting chart. In case of insufficient knowledge about the fertilizer check the fertilizer lateral distribution for the set working width by using the mobile test kit.

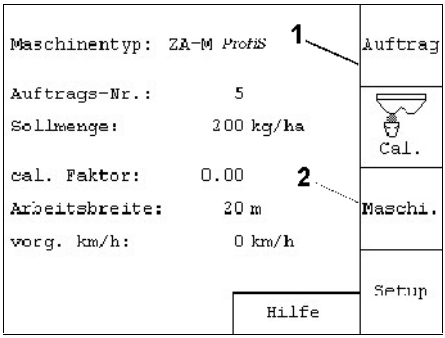


Fig. 48

When spreading mixed fertilizer s mind that

- **the individual kinds may have different spreading properties.**
- **a demixing of the individual kinds may occur.**

After every operation remove fertilizer which may still be sticking on the spreading vanes.

8.1 Filling the fertilizer spreader

Before filling ensure that there are no residue or foreign particles in the hopper.

Before filling the spreader attach the guard screen to sort out foreign particles.

When filling the spreader ensure that there are no foreign particles in the fertilizer .

Observe the permissible payload of the spreader (please refer to technical data) and the axle loads of the tractor.

When lifting the fertilizer broadcaster the front axle load of the tractor is relieved by different amounts depending on the size of the tractor.

When filling the centrifugal broadcaster always check that the necessary front axle load of the tractor (20 % of the tractor's net weight, please also refer to the instruction manual of the vehicle manufacturer) is maintained. If necessary apply front weights.

Before filling the hopper the shutters must be closed!

Strictly follow the safety advice of the fertilizer manufacturer.

Entering refilled fertilizer amounts on AMATRON^{+} n. Please refer to the instruction manual for the AMATRON^{+}.

8.2 Spreading operation

1. The fertilizer spreader has been coupled onto the tractor.
2. The hydraulic hoses are connected.
3. All settings are made
4. ZA-M Ultra with **AMATRON+, AMATRON^{+}** is connected.

ZA-M Ultra with AMATRON+, see operation manual of AMATRON^{+}.

5. Engage the universal joint shaft at low tractor engine speed

Only open the shutter when the prescribed universal joint shaft speed has been reached.

6. Open shutter slide hydraulically and start driving.
7. For border spreading lower Limiter hydraulically into work or fit border spreading disc Tele-Set.
8. After spreading operation has been finished:
   - Close shutters
   - Disengage unviersal joint shaft at low tractor engine speed.

The universal joint shaft speed is 720 $^{U}/_{min}$, if there is no other speed given in the spread rate table.

Maintain a constant spreading disc rev. speed and forward speed!

Do not approach rotating spreading discs. Danger of injury. Danger from fertilizer particles being thrown around. Advice people to leave the danger area!

If the implement is transported over longer distances with filled hopper, ensure a correct spread rate when starting the spreading operation!

If in spite of an equal shutter position an uneven emptying of the two hopper tips is noted, check the main shutter position.

The technical condition of the spreading vanes essentially influences the even lateral fertilizer distribution in the field (creation of stripes).

The life span of the spreading vanes depends on the kinds of fertilizer used, the operation times and quantities spread.

Before commencing any operation with the fertilizer spreader ensure that all safeguards are present and fitted in the correct position (para.3.2).

8.3 Recommendations for broadcasting on the headlands

Precondition for an accurate broadcasting at field borders or field sides is the correct creating of tramlines. By using the deflector **Limiter XL** the first tramline (Fig. 49/T1) is usually always created in a distance of half the tramline spacing to the field side (see para.7.7). In the same way, such a tramline is created on the headlands. As a check a further tramline (broken line) on the headlands is very helpful – with full spacing of one working width.

Following the advice given in para. 7.7 drive along the field in the first tramline in clockwise direction (right hand turn). After this course round the field disengage Limiter (fold upwards).

As centrifugal broadcasters also throw the fertilizer to the rear, the following has strictly to be noted for an accurate distribution on the headlands:

Open and close shutter in different distance to the field's side when driving up (tramlines T1, T2 etc.) and down (tramline T3, etc.).

Open the shutter when "driving up" approx. **on point P1** (Fig. 50), when the spreader is in line with the 2nd tramline on the headlands (broken line).

Close the shutter when "driving down" **on point P2** (Fig. 50), when the spreader is in line with the 1st tramline on the headlands.

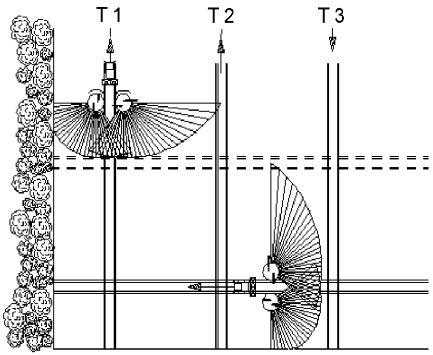


Fig. 49

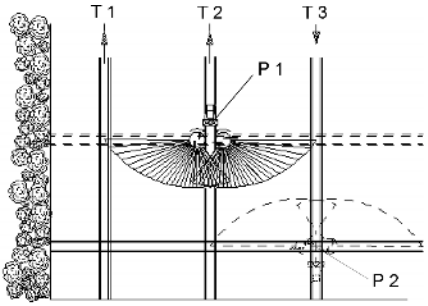


Fig. 50

Proceeding as described above prevents fertilizer losses, over- or under fertilising and thus is an environment friendly working method.

8.4 Advice for spreading slug pellets (e.g. Mesurol)

- In standard execution the fertilizer spreader **ZA-M** can also be used for wide spreading of slug pellets. Slug pellets (e. g. Mesurol) have a granular shape or similar and is spread in relatively small rates (e. g. 3 kg/ha).

When filling the centrifugal broadcaster avoid inhaling the dust and direct contact with your hands (wear protective gloves). After application clean your hands and all parts of the skin having been in contact with the dust thoroughly with water and soap.

For spreading slug pellets proceed in AMATRON$^+$ menu :

Calibration of slug pellets

See operation manual of AMATRON$^+$.

Before spreading slug pellets implicitly carry out a spread rate check for both outlet openings.

When spreading slug pellets take care that the shutter openings are always covered with spreading material and that the spreading discs are driven with a constant speed. A residue of approx. 0.7 kg per hopper tip cannot be spread as declined. For emptying the spreader open shutter and collect spreading material dropping out (e. g. on a canvass).

Slug pellets must not be mixed with fertilizer or other materials in order to possibly work with the spreader in another setting range

- In general regarding handling slug pellets, we refer to the advice of the manufacturer and to the general protective measures for handling pesticides (code of practice by the health and safety board).

8.4.1 Combination matrix for centrifugal broadcasters for spreading slug pellets

Type AMAZONE ZA-M Ultra

	ZA-M Ultra 1800	ZA-M Ultra 1800 ProfiS	ZA-M Ultra 3000	ZA-M Ultra 3000 ProfiS	Hopper extension S 600
1	X				X
2			X		X
3		X			X
4				X	X

9. Cleaning, maintenance and repair

Clean, grease or adjust the centrifugal broadcaster or the universal joint shaft only after the PTO shaft and engine have been stopped and the ignition key is removed

After disengaging the PTO shaft the mounted implement may still continue to run by its dynamic masses. Begin any work only when the implement has come to a full standstill.

Grease shutter guides after every operation.

- After use clean the machine with a normal jet of water (greased implements only on washing bays with oil traps).
- Clean outlet openings and shutters especially carefully.
- Treat dry machine with an anticorrosive agent. (Only use biologically degradable protective agents).
- Park machines with opened shutters..

Cleaning and maintenance of the hopper:

- Climb up the ladder of the fertilizer spreader,
- open the first guard screen,
- clean the hopper,
- close the first guard screen.
- Clean the second guard screen in order to the other one.

Also grease the threads of the T-bolts for the shutter lever locking as well as their washers, so that the clamping connection remains functioning.

- Clean and grease agitator shaft and drive chain.(Fig. 52/1).
- When parking the machine deposit the PTO shaft in the catching hook.
- The technical condition of the spreading vanes essentially influences the even lateral fertilizer distribution in the field (creation of stripes). The spreading vanes have been manufactured from especially wear resistant and non corrosive steel. However, it is indicated that the spreading vanes are wearing parts. Exchange spreading vanes as soon as breakage by wear are noticeable. The life span of the spreading vanes depends on the kinds of fertilizer used, on the operation times and quantities spread.
- Under normal conditions input- and angular gearbox are maintenance-free. The gearboxes are supplied with sufficient gear oil by the manufacturer. A refilling of oil usually is not necessary. External symptoms, e. g. fresh oil spots on the parking place or on machine parts and/or loud noise development, however, indicate an oil leakage of the gearbox housing. Search for reason, care for remedy and fill in oil.

Oil quantity:

Input gearbox: 0,4 l SAE 90 gear oil

Angular gearbox each 0,15 l SAE 90

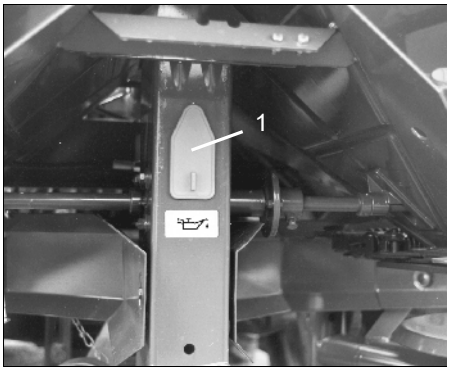


Fig. 51

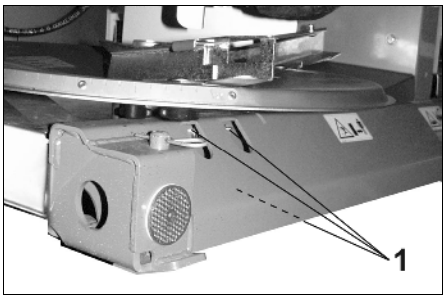


Fig. 52

The bolts (Fig. 52/1) on the angular gearbox are safeguarded with Loctite.

- For cleaning, maintenance or repair work the guard screen in the hopper can be fold upwards. Proceed as follows:
  - Climb up the ladder.
  - Fold one part of the guard screen (Fig. 53) upwards until the guard screen (Fig. 54/1) catch is released.
  - Clean the opened hopper from the safety guard, which is turned down.
  - Before closing the safety guard press down the point of the sieve (Fig. 54/2)
  - Proceed on the second hopper.

Open the guard screen only when the fertilizer spreader isn´t working!

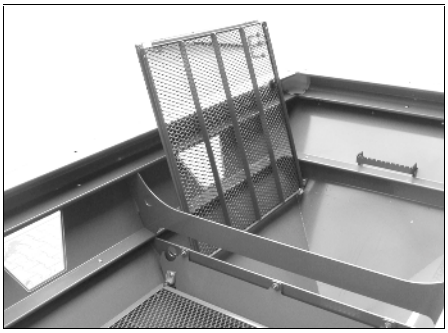


Fig. 53

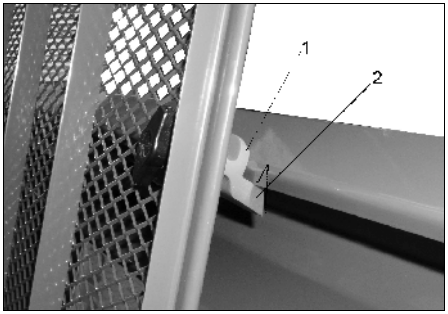


Fig. 54

9.1 Maintenance PTO shaft with friction clutch

The function of the friction clutch has always to be safeguarded. Clots of the linings avoid to start the friction clutch.

For this reason **"air" the friction clutch after a longer period of standstill or before the first operation:**

Remove friction clutch from gearbox input shaft.

- Relief springs (Fig. 55/1) by slackening the nuts (Fig. 55/2).
- Fully turn the clutch by hand. Hereby any baking by rust or humidity between the friction linings will be loosened.
- Tighten nuts that much that the pressure springs have the prescribed fitting length of **a = 26,5 mm**.
- Push friction clutch on to gearbox input shaft and fix. The friction clutch is now ready for operation again.

High air humidity, strong pollution or cleaning the machine with a high pressure cleaner increase the danger of baking of the friction linings.

Fig. 55

9.2 Setting and maintenance of the weighing technique

9.2.1 Check the horizontal position of leaf springs and bearing bracket

The leaf springs (Fig. 56/1) and bearing brackets (Fig. 56/2) should be in horizontal position as otherwise the measuring result would be distorted.

In the factory the leaf springs and bearing brackets have been installed in horizontal position.

After a spread fertilizer quantity of approx. 10 000 kg the micrometer gauge (Fig. 56/4) might have set or worked into the rest block (Fig. 56/3). This may cause the leaf springs to dislocate from the horizontal position.

In this case readjust the micrometer gauge until the leaf springs and bearing brackets are in an horizontal alignment again.

Align leaf springs and bearing brackets only when the hopper is empty!

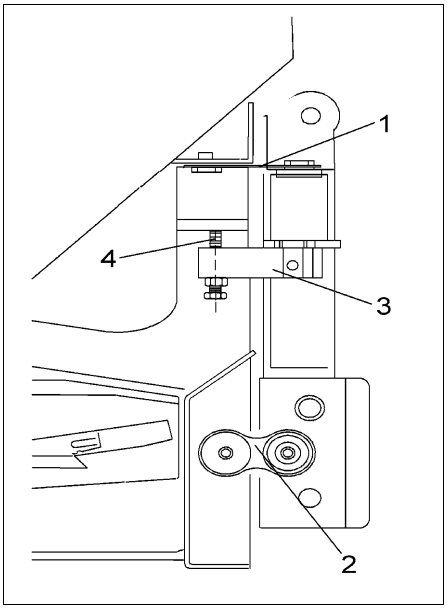


Fig. 56

You will find the micrometer gauge (Fig. 57/1) in the centre underneath the frame of the spreader in the weigh cell.

For this:

- Slacken counter nut (Fig. 57/2)
- Readjust micrometer gauge (Fig. 57/1).
- Retighten counter nut (Fig. 57/2).

After settings on the micrometer gauge of the weigh cell calibrate the spreader again (please refer to instruction manual of AMATRON+).

Then please note para.9.2.2.

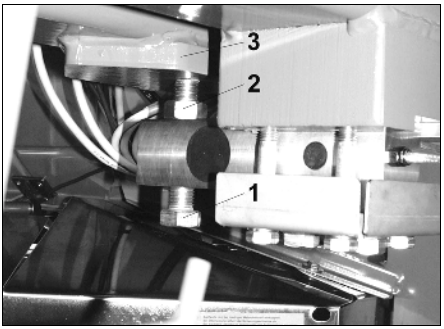


Fig. 57

9.2.2 Setting the clearance on the limiting bolts

Set the limiting bolts (Fig. 58/1) with a clearance of 2 mm according to illustration

They are located on the left and right hand side of the spreader frame.

For this:

- Slacken counter nut (Fig. 58/2).
- Set the limiting bolts (Fig. 58/1).
- Retighten counter nut (Fig. 58/2).

This setting should be carried out when the spreader is empty.

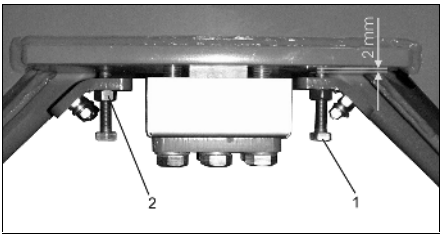


Fig. 58

9.2.3 Calibrating the Broadcaster

When the broadcaster is empty and **AMATRON**$^{+}$ does not show 0 kg (+/- 5 kg) filling weight, the broadcaster must be calibrated again (please refer to instruction manual for **AMATRON**$^{+}$).

This might, for example, be the case when options have been fitted to the broadcaster.

9.2.4 Counterbalancing the spreader

In case that after filling with fertilizer the freshly counterbalanced spreader will not indicate the correct filling weight, carry out a new calibration test (please refer to the instruction manual for **AMATRON**$^{+}$).

9.3 Shear off safety agitator shaft drive

- Agitator spiral clip (Fig. 59/1) serve as shear off safety for the agitator shaft.

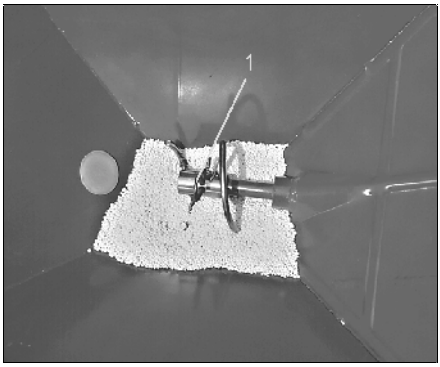


Fig. 59

9.4 Exchanging the spreading discs

- Fold upwards the guard tube (Fig. 60).
- Remove the thumb nut (Fig. 61/1).
- Turn the spreading disc until the disc hole ø 8 mm faces to the implement centre.
- Pull off the spreading disc from the gearbox shaft.
- Set up other spreading disc.
- Fix spreading disc by tightening the thumb nut..

When setting up spreading discs do not mix up "left hand" and "right hand". The spreading discs are labelled accordingly.

The right hand side gearbox shaft is provided with a shear pin: Here always set up the right hand spreading disc with the two keys.

On broadcasters with job computer control the shutter slides should be fully opened for changing the spreading discs.

Fig. 60

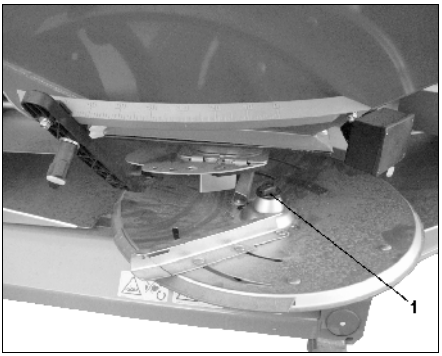


Fig. 61

9.5 Exchanging spreading vanes

- Slacken self-locking nut (Fig. 62/1).
- Remove washer and flat mushroom head bolt (Fig. 62/2,3).
- Slacken thumb nut (Fig. 62/4) and exchange spreading vanes.
- Fitting the spreading vanes is done in vice versa order.
- Tighten the self locking nut (Fig. 62/1) in such a way, that the spreading vane can be swivelled by hand.

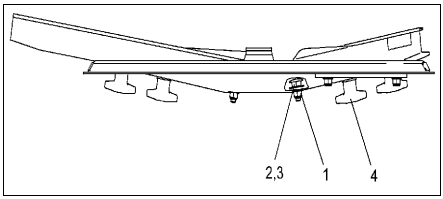


Fig. 62

Note the correct fitting of the spreading vanes. The open side of the U-shaped spreading vane shows into sense of rotation.

Change out the spreading vanes, if there is wear and tear recognizable (e.g.gap).

Risk of injury about hurling things of the spreading vane!

9.6 Check of the hydraulic oil filter

For ZA-M with Comfort-package:

During operation the function of the hydraulic oil filter (Fig. 63/1 can be checked on the control block.

Indication in the check window (Fig. 63/2):

Green filter functions properly

Red exchange filter / clean

For removal of the filter twist off the filter cover and take out filter.

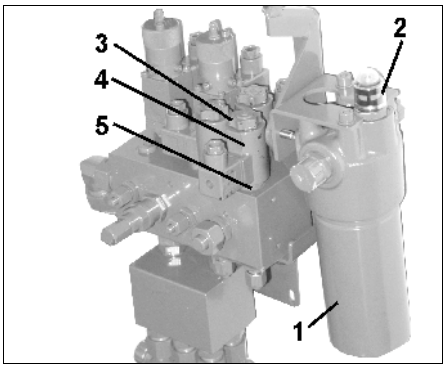


Fig. 63

9.7 Cleaning the solenoid valves

For ZA-M with Comfort-package:

Flush the solenoid valve to clean them from pollution. This might become necessary when deposits prevent an entire opening or closing of the shutters.

- Unscrew solenoid cap (Fig. 63/3).
- Remove magnet coil (Fig. 63/4).
- Screw out the valve rod (Fig. 63/5) with valve seat and clean with compressed air or hydraulic oil.

9.8 Hydraulic hoses

When starting and during operation the ordinary condition of the hoses should be checked by a skilled person.

If hoses are found defective in any way, exchange them immediately.

The maintenance of the checking intervals should be recorded by the operator.

Checking intervals

- For the first time when putting to operation

Thereafter at least once a year

Checking points

- Check hose casing for damage (kinks, cuts and abrasion, trapping, rubbing points)
- Check whether the hose casing is brittle
- Check hose for deformation (bubbles, buckling, squeezing, separation of layers)
- Check for leakages
- Check the appropriate fitting of the hoses
- Check the hose for firm seating in the armature
- Check connecting armature for damage and deformation
- Check for corrosion between connecting armature and hose

Do not exceed the permissible period of use.

9.8.1 Exchange intervals

- The period of use of any hydraulic hose circuit should not exceed 6 years (including a possible storing period of two years maximum).

9.8.2 Marking

Hydraulic hoses are marked as follows:

- Name of the manufacturer
- Date of production

Maximum dynamic operational pressure

9.8.3 Please observe when fitting and removing

Affix the hydraulic hoses on the fixing points given by the manufacturer.

- Always ensure that hydraulic parts and connections are clean.
- The hoses have to be fitted in such a way that their natural placement and movement are not hindered.
- During operation the hoses should not be under tension, twisted or strained by external forces.
- The permissible bending radius must be observed.
- The hoses should not be painted

.

10. Faults

10.1 Faults, causes and remedy

Fault	Cause	Remedy
Uneven lateral fertilizer distribution	Fertilizer is sticking to the spreading discs and spreading vanes	Clean spreading discs and spreading vanes.
	Shutters do not open entirely.	
Too much fertilizer behind the spreader	Prescribed spreading disc speed is not achieved	Increase tractor engine speed
	Spreading discs or outlets defect or worn.	Check spreading vanes and outlets. Immediately replace defect or worn parts.
	The spreading properties of your fertilizer deviate from the properties of the fertilizer that has been tested when creating the setting chart.	Call the AMAZONE fertilizer service department. ☎ +49 5405-501111 or +49 5405-501164 Mondays till Fridays 🕗 8.00 until 13.00 o' clock
Too much fertilizer is in the overlapping area	Prescribed spreading disc speed is exceeded	Reduce the tractor engine speed.
	The spreading properties of your fertilizer deviate from the properties of the fertilizer which we have tested when creating the setting chart.	Call the AMAZONE fertilizer service department. ☎ +49 5405-501111 oder +49 5405-501164 Mondays till Fridays 🕗 8.00 until 13.00 o' clock

Fault	Cause	Remedy
Uneven emptying of the two hopper sides at the same shutter position	Bridging of fertilizer	Clean spreading discs and spreading vanes
	Clip pin in the agitator spiral sheared off due to overload	Replace the “R“-clip
	Shutter basic position different	Check the shutter basic setting

10.2 Fault, Causes and Remedy for ZA-M Comfort

Fault	Cause	Remedy
Hydraulic arms do not open and shut	Oil supply on the tractor has not been switched on	Switch on oil supply on the tractor
	Power supply for the valve block has been interrupted	Check cable, plug and contacts
	Öil filter is dirty..	Exchange/clean filter. (See para.0).
	The solenoid valves is dirty.	Flush the solenoid valve to clean them from pollution. (See para.0).
On a tractor with constant current system (gear pump) the hydraulic oil is getting too hot	System converting bolt on the spreader valve block has not been screwed out to the stop (factory setting)	Screw out the system converting bolt on the spreader valve block to the stop (See para.0)
	Defective plug couplings	Check plug couplings. If necessary repair or replace
	Defective tractor control unit	Check tractor control unit, repair if necessary or replace
On a tractor with a constant pressure system (possibly on older John Deere tractors) the hydraulic oil is getting too hot	System converting bolt on the spreader valve block has not been screwed in to the stop (contrary to the factory setting)	Screw in the system converting bolt on the spreader valve block to the stop. (See para.0)

Fault	Cause	Remedy
On a tractor with a constant pressure system (possibly on older John Deere tractors) the hydraulic oil is getting too hot	Defective plug couplings.	Check plug couplings. If necessary repair or replace.
	Defective tractor control unit.	Check tractor control unit, repair if necessary or replace.
On a tractor with load-sensing system and oil decrease via the tractor control unit the hydraulic oil is getting too hot	System converting bolt on the spreader valve block has not been screwed out to the stop (factory setting)	Screw out the system converting bolt on the spreader valve block to the stop. (See para.0).
	Oil volume on the tractor control unit has not been sufficiently reduced	Reduce the oil volume on the tractor control unit
	Defective plug couplings	Check plug couplings. If necessary repair or replace
	Defective tractor control unit	Check tractor control unit, repair if necessary or replace
On a tractor with load-sensing system and a direct oil reduction and control cable the hydraulic oil is getting too hot	System converting bolt on the spreader valve block has not been screwed in to the stop (contrary to the factory setting)	Screw in the system converting bolt on the spreader valve block to the stop. (See para.0).
	Defective plug couplings	Check plug couplings. If necessary repair or replace

10.3 Operation in the event of electrical failure

In the event of electrical faults occurring on job computer or the electric servo- motors, the operation can be continued even if the fault cannot be remedied straight away (please refer to the instruction manual for job computer).

11. Options

11.1 Boundary spreading device, left hand side – Limiter XL

For boundary spreading and border spreading, if the first tramline has been created on half the working width of the fertilizer spreader.

Hydraulically remote controlled, no need to leave the tractor cab or to stop the tractor.

Locking device and sensor of position supplied as standard.

Product No.: 924 615

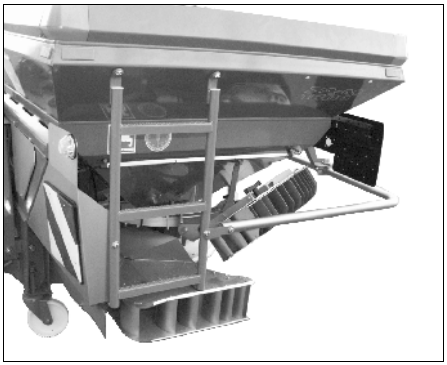


Fig. 64

11.1.1 Border spread deflector, left side

For border spreading, if the first tramline centre has been created 1,5 bis 2,0 m from the field's border.

Product No.: 926 271

11.2 Transport- and parking device

The detachable transport- and parking device (Fig. 65) allows a comfortable coupling to the three-point hydraulic of the tractor and an easy manoeuvring in the yard and inside buildings.

Product No.: 914 193

Do not park or roll your broadcaster with filled hopper (danger of tipping over).

For a direct filling from a tipping trailer remove roll kit.

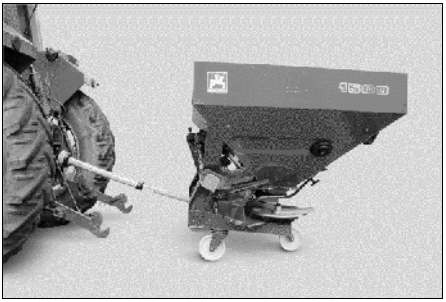


Fig. 65

11.3 Swivelable hopper cover XL

Also in wet weather conditions, the swivelable hopper cover(Fig. 66/1) guarantees dry spreading material. For filling the swivelable hopper cover is simply swivelled upward.

Product No.: **924 297**

Fig. 66

11.4 Extension S 600

Extension for the base hopper with a capacity of 600l.

Product No.: 924 294

11.5 Mobile fertilizer test kit for checking the working width

Please refer to para. 7.6.2- checking the working width with the aid of the mobile fertilizer test kit.

Product No.: 928 703

11.6 Traffic light kit Ultra

It consists of: Light combination right hand and left hand; parking warning plates according to DIN standards11030; registration plate, limiting lights right hand and left hand and connecting cable (Fig. 67 and Fig. 68).

Product No.: 928 907

Fig. 67

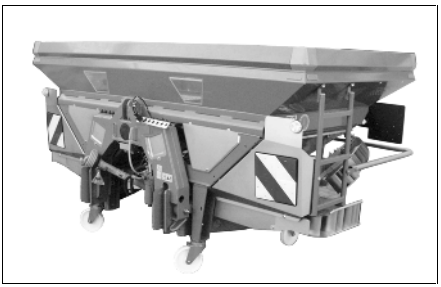


Fig. 68

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