AMAZONE

Operation Manual
ZA-M 900, 1200, 1500

MG 898
DB 567 (GB) 08.03
Printed in Germany

GB IRL

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 900, ZA-M 1200, ZA-M 1500.

AMAZONEN-WERKE
H.DREYER GmbH & Co. KG

1. Details about the machine

1.1 Range of application

The fertilizer spreader **ZA-M** has been designed for the application of dry, granule, prilled and crystalline fertilizer s 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

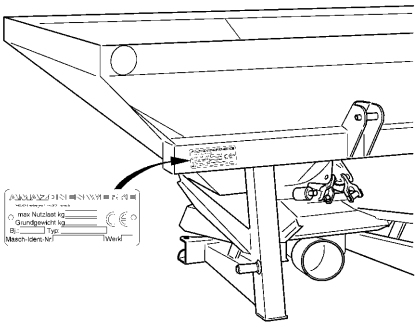


Fig. 1

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

1.6 Technical data

Type	Hopper capacity (litres)	Payload (kg)	Weight (kg)	Filling height (m)	Filling width (m)	Total width (m)	Total length (m)
ZA-M 900	900	1800	260	0,98	1,91	2,02	1,30
+S 350	1250	1800	280	1,12	1,88	2,07	1,35
+2x S 350	1600	1800	300	1,26	1,88	2,07	1,35
ZA-M 1200	1200	2200	284	1,05	2,15	2,30	1,35
+ S 500	1700	2200	312	1,19	2,06	2,35	1,40
+2x S 500	2200	2200	340	1,34	2,06	2,35	1,40
ZA-M 1500	1500	2500	289	1,12	2,15	2,30	1,35
+S500	2000	2500	317	1,26	2,06	2,35	1,40
+2xS500	2500	2500	345	1,40	2,06	2,35	1,40
+ L1000	2500	2500	351	1,39	2,75	2,89	1,40
+ S 500 + L 1000	3000	3000	373	1,53	2,75	2,89	1,40

Typ	Working width (m)	
ZA-M 900	10-24	depending on spreading discs used and kind of fertiliser
ZA-M 1200, ZA-M 1500	18-36	

1.6.1 Standard of the hydraulic system on the tractor

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

- 2 single acting spool valves.

The maximum permissible pressure on the tractor hydraulic's is: **230 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.

Requirements for connecting the spreader **to the hydraulic system of the tractor:**

- 1 single acting spool valve.
- 1 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 7 bar.

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

Large volume flows in conjunction with a small oil reservoir will lead to hydraulic oil heating. The capacity of the oil tank should at least be double as much as the volume flow. In case of excessive oil temperatures an oil cooler may need to be installed from a competent source.

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 f**ertilizer spreader **ZA-M** has exclusively been designed for the usual operation in agriculture for spreading dry, granular, prilled and crystalline fertilizer s 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.

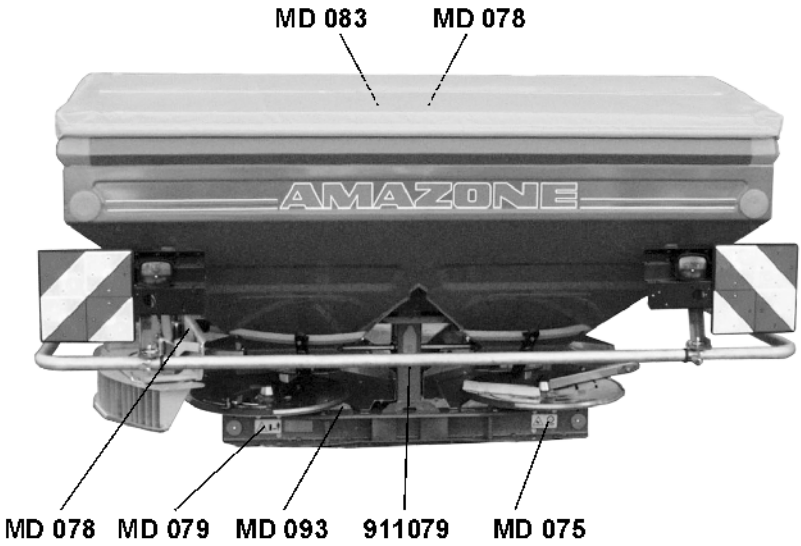
2.4 Safety-/warning and hint symbols

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.)**

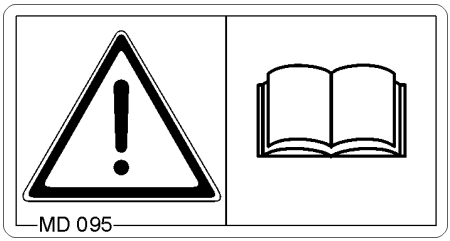

MD 083
MD 078
AMAZONE
MD 078
MD 079
MD 093
911079
MD 075


MD 078
MD 078
MD 095
922059
911888
MD 089

Picture No.: MD 095

Explanation:

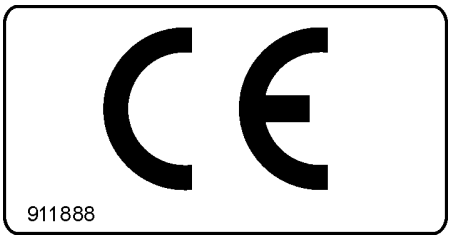
Before commencing operation read thoroughly this operation manual an all safety advice



Picture No.: 911888

Explanation:

The CE-mark indicates, that the machines fulfills the requirements of the EC-guide lines Machine 89/392/EWG and the corresponding additional guide lines.



Picture No.: 922059

Explanation:

Max. PTO shaft speed 540 R.P.M

Picture No.: MD 075

Explanation:

Do not stay within the zone of spinning spreading discs!

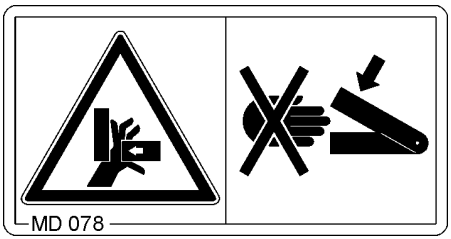
Do not touch moving implement parts. Await their absolute standstill.

Disengage PTO shaft, stop the engine, and remove the ignition key before exchanging the spreading discs.

Picture No.: MD 078

Explanation:

Never reach into the zone of danger of bruising (e.g. shutter slides and shutter openings) as long as parts can still move there.

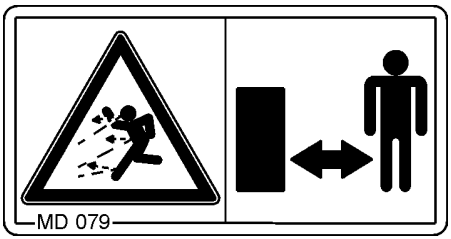


Picture No.: MD 079

Explanation:

Danger because of flinging fertilizer particles.

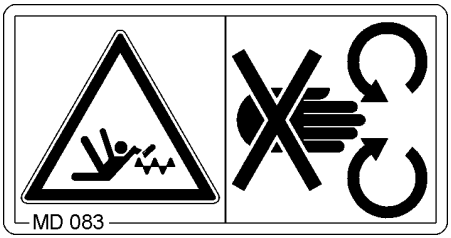
Advise people to leave the danger area.



Picture No.: MD 083

Explanation:

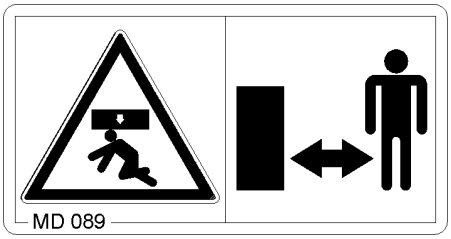
Never reach into the rotating agitator spiral.



Picture No.: MD 089

Explanation:

Never stay under a lifted fertilizer spreader (unsecured load).

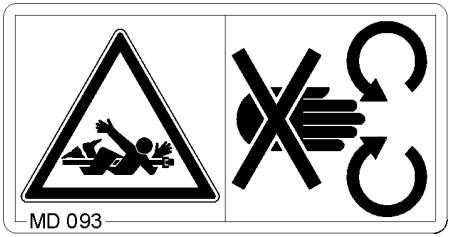


Picture No.: MD 093

Explanation:

Danger from rotating machine parts.

Never touch rotating shafts, spreading discs, etc.



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.**

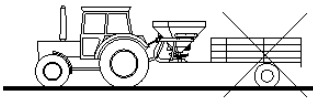
F **Veiller impérativement à la longueur de la transmission (risque d'endommagement du boîtier). Voir le manuel d'utilisation.**

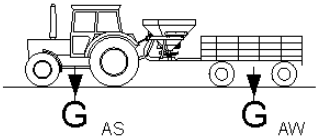
GB **Check correct p.t.o. shaft length (otherwise gearbox damage will result). – see instruction book.**

NL **Geeft aandacht aan de lengte van de aftakas zoals de gebruiks-handleiding aangeeft, anders kan de aandrijfkast beschadigen.**

912 304

Picture No.: **912 308**





1) V_{max} = 25 km/h

2) G_{AW} = max.1,25 x G_{AS} ; G_{AWmax} = 5t

D **Nur zulässig bei Anhängern mit Auflauf- oder Seilzugbremse.**

F **Autorisé seulement sur remorque disposant de son propre système de freinage**

GB **Only permissible with trailers which are equipped with over-run or with Bowden cable brakes.**

NL **Uitsluitend toegestaan bij aanhangers met oploop-of-kabel-trekrem**

912 308

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

Bild Nr.: **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. If a trailer hitch is provided it must only be used for towing suitable implements or twin axle trailers if:
    - the maximum speed of 25 km/h is not exceeded,
    - the trailer has a run-on brake or a brake which can be actuated from the tractor operator,
    - the permissible total weight of the trailer is not more than 1.25 times the permissible total weight of the tractor, however, 5 tons in maximum.

Single axle trailers must not be towed by tractor mounted machinery under any circumstances.

31. Do not place any foreign objects inside the hopper.
32. During the calibration test watch out for danger zones due to rotating parts of the machine.
33. Never park or move the fertilizer broadcaster with filled hopper (danger of tipping over).
34. 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.
35. If spreading on field borders, waters or roads use the border spreading device.
36. **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 chains.
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 540 R.P.M. (please refer to details in the spreading chart).
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)
- Omnia-Set spreading discs (Fig. 2/3)
- Setting lever for shutter (Fig. 2/4)
- Boundary spreading device Limiter (Fig. 2/5)
- PTO shaft (Fig. 3/6)

3.2 Safety facilities

- Chain guard of agitator shaft drive (Fig. 2/7)
- Guard for shaft between centre and angular gearbox (Fig. 3/8)
- PTO shaft guard (Fig. 3/9)
- Guard tube for operation with the spreading discs OM 24-36 (Fig. 2/10)
- Guard screen in hopper (Fig. 2/11)
- Safety symbols (warning signs) (Fig. 3/12)

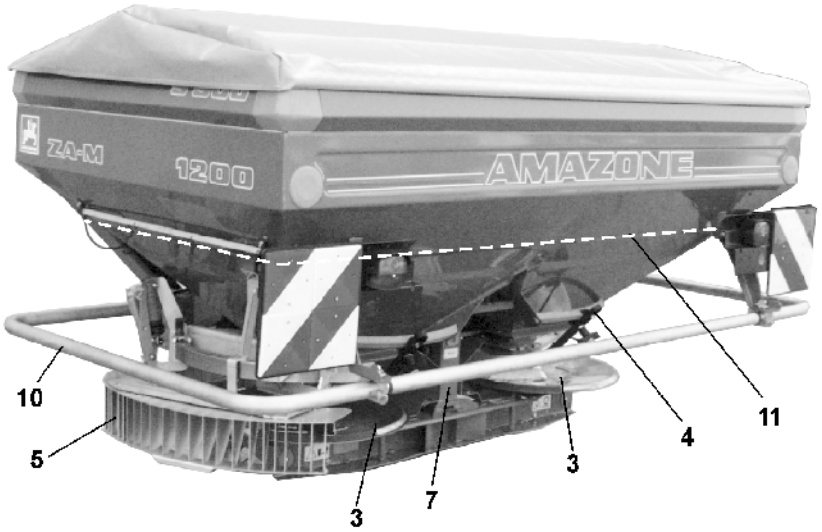


Fig. 2

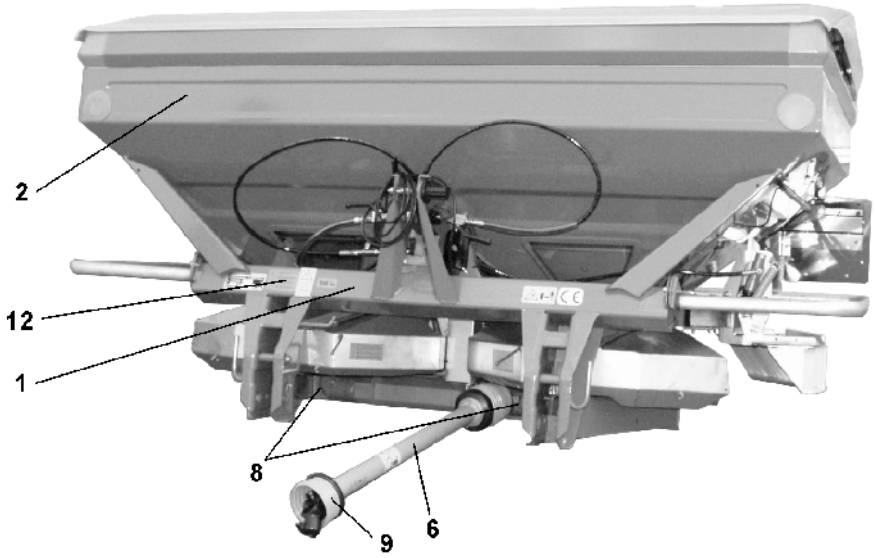


Fig. 3

3.3 Function

The fertilizer spreader **AMAZONE ZA-M** 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 is achieved by swivelling the spreading vanes on the spreading discs which are available for working widths of 10m-12m; 10m-16m; 18m-24m or 24m-36m. 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.

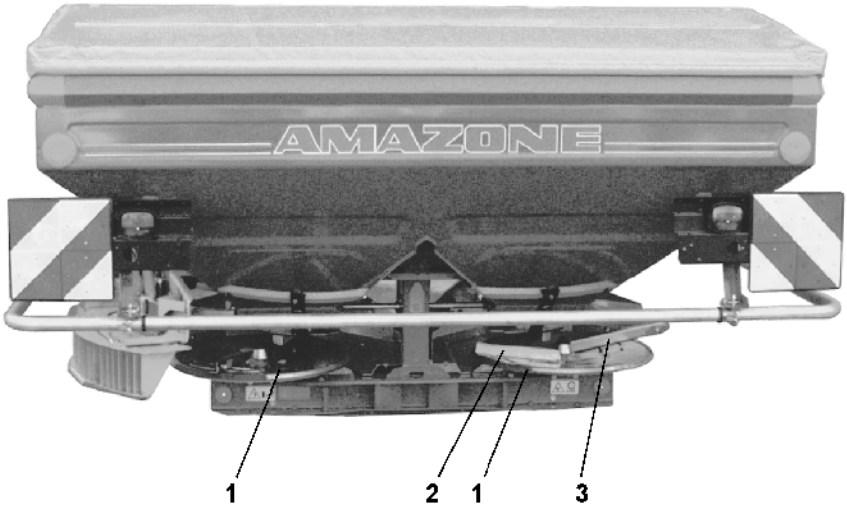


Fig. 4

The spread rate is set by setting levers (Fig. 6/1) by setting various shutter openings widths. The required shutter position is determined either following the indications in the **setting** chart or with the aid of the **calculating disc rule.** The opening and closing of the outlet openings is achieved by two additional shutters hydraulically (closing) or by a tensioning spring (opening).

The shutter is opened when the shutter rod (Fig. 7/1) is extended.

As the spreading properties of the fertiliser may heavily deviate we recommend that you to recheck the chosen shutter position for the desired spread rate by a spread rate check.

When spreading with OM 24-36 your fertilizer spreader has to be equipped with guard tube (accident prevention).

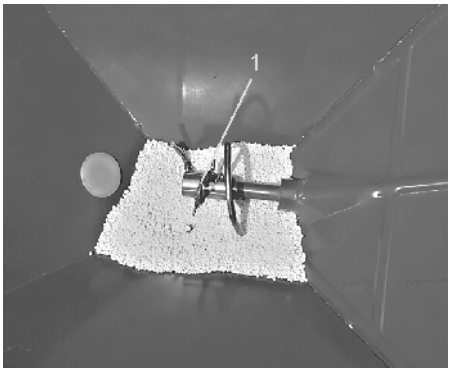


Fig. 5

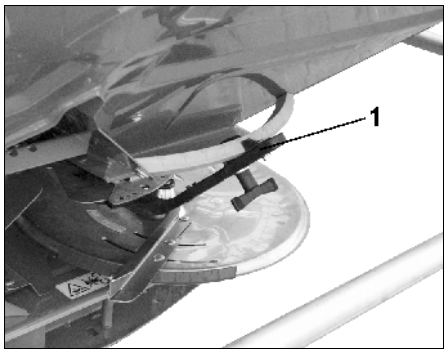


Fig. 6

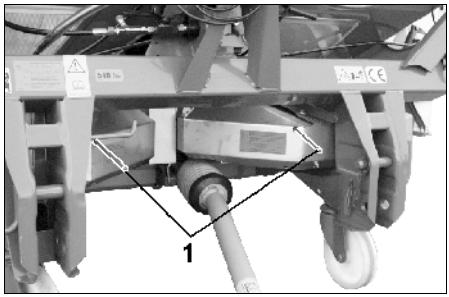


Fig. 7

Boundary / side spreading

- **Limiter M (special option):** If the first tramline has been created on half the working width from the field's side, the border can be spread remote controlled with the aid of the Limiter M.

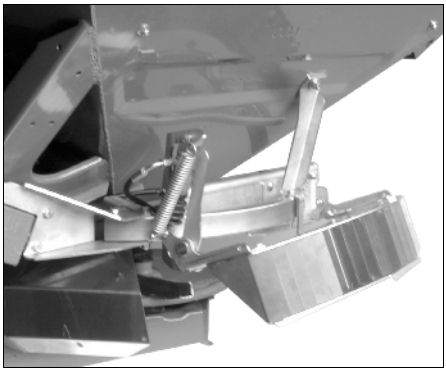


Fig. 8

- Border spread discs **"Tele-Set"** (option): enables a fertilizing alongside the field's boundary as prescribed by the draft of a fertilizer decree.

TS 5-9 → for distances from 5 to 9 m to field's boundary

TS 10-14 → for distances from 10 to 14 m to field's boundary

TS 15-18 → for distances from 15 to 18 m to field's boundary

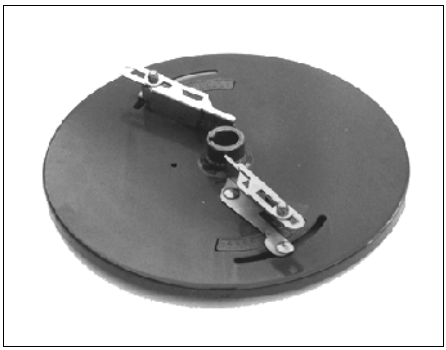


Fig. 9

- If the first tramline has been created directly on the field's side, the boundary spread limiter (special option) for one-sided spreading to the field's border is used.

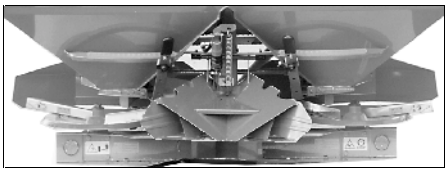


Fig. 10

3.4 On board computer

With the aid of the on board computer (option) **AMATRON** or **AMADOS II D** the **ZA-M** fertiliser broadcaster can conveniently be accessed, controlled and monitored.

The spread rate setting is done electronically. The shutter slides which are actuated by the setting motors free different opening widths of the outlet openings.. The shutter position which is required for a specific spread rate is determined by a fertiliser calibration.

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

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

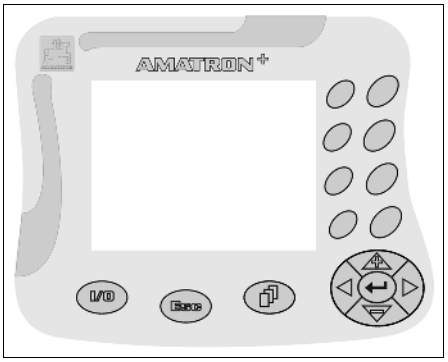


Fig. 11

Fig. 12

3.5 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
  - Rotating PTO shaft
  - Hydraulic actuation of Limiter
  - Hydraulic actuation of the shutter slides
  - Electric actuation of shutters
- By climbing on to the machine.
- Underneath a lifted, not secured machine or machine parts
- During spreading operation within the spread fan range by fertiliser grains.

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

3.6 Comments on spreading discs OM 10-12 and OM 10-16

The spreading disc OM 10-12 has been developed for customers who

- intend to create tramlines in bout widths of 10 or 12 m (Fig. 13and Fig. 14).
- have problems with border spreading.
- reject a multiple overlapping with the OM 10-16.

The spreading width of the OM10-12 is approx. 24 m, i.e. double overlapping at 12 m.

The OM 10-16 has got a spread width of approx. 36 m (see Fig. 14). This way large overlapping zones result for 15 and 16 m which are of advantage for an even fertiliser application. At 10 and 12 m working width this large spreading width may be disadvantageous, especially when using the boundary spread deflector.

Border spreading (with border spread deflector) at a spacing of 1.5 m with 16 m tramlines is recommended as no fertiliser is thrown beyond the field's border. If, however, one travels with 12 m or 10 m bout width, the OM 10-16 with the same vane position (with some kinds of fertiliser, e.g. CAN, it is possible to achieve with the same vane position an optimum lateral distribution at working widths of 10 – 16 m) throw considerable amounts of fertiliser beyond the border (approx. 4.5 or 6.5 m) when driving back (see Fig. 13)

As according to the fertilicer decree fertilising beyond the field's border is not allowed, the decree can only be followed for the above mentioned operational

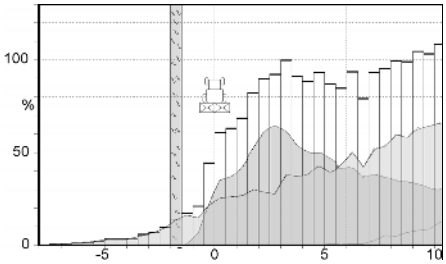


Fig. 13

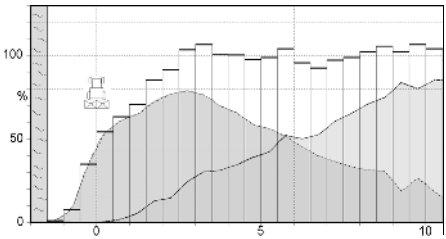


Fig. 14

ranges by using OM 10-12 (see Fig. 13). When operating with the border spreading disc TS 5-9 with 5 m distance towards the border the OM 10-16 also throws apüprox. 3 m beyond the field's border, so that also here the use of OM10-12 will be necessary.

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) with swivelling spreading vanes for the working width you have indicated.
- Guard screen / Filling sieve against foreign particles,
- Calibration tray for the spread rate check,
- Instruction manual,
- Setting chart,
- Calculating disc rule,
- Sample container for fertilizer service
- Guard tube (when using the spreading discs OM 24-36),
- Limiter (special option).

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

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 implement.

d = 0,62 m

For calculation the following data are required:

TL [kg]: Net weight of the tractor❶

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

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

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

GV [kg]: Total weight front mounted implement / 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

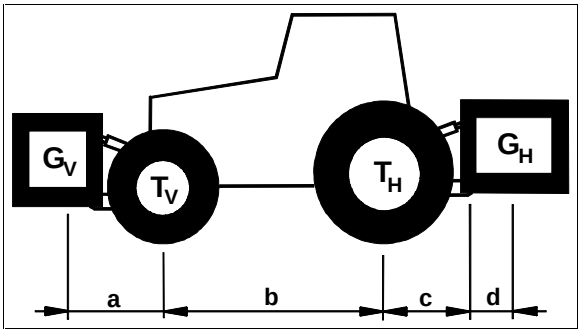


Fig. 15

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 (GV min) is not achieved with the front mounted implement (GV), 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 (GH min) is not achieved with the rear mounted implement (GH), 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. 2.8).

- Fix lower link of tractor on lower link pin (cat. II) (Fig. 16/1) and secure by using a clip pin.
- ZA-M 1200, 1500: Insert the pin into the upper hole of the lower link console. As standard this lower link console is equipped with a second lower link connection and allows a 120 mm higher mounting to the tractor (e.g. for late top dressing).
- Fix upper link with link pin (cat. II) (Fig. 16/2) and secure by using a clip pin.

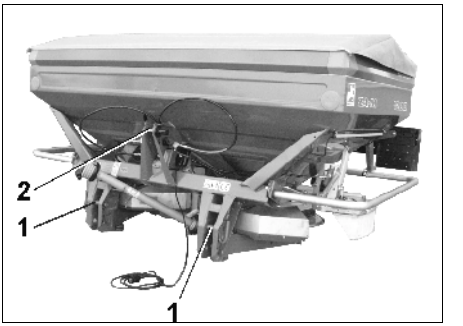


Fig. 16

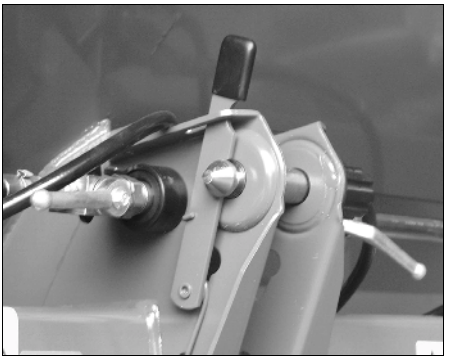


Fig. 17

Locking lever must catch (Fig. 17)

In the 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.

5.3 Hydraulic connections

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!

Connections ZA-M

- 2 single acting control spool valves
  → shutter slide
- 1 single acting control spool valve
  → Limiter (Option)
- alternatively each 1 double acting control spool valve
  → max.3 locking blocks (option) for both shutter slides and Limiter

In case of leaking control spool valves and/or a prolonged standstill, e.g. during road transport, shutting the lock taps prevent the closed shutters from opening by themselves.

Lock tap closed (Fig. 18/A).
Lock tap opened (Fig. 18/B).

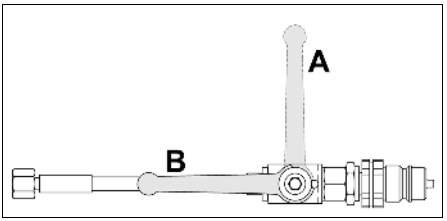


Fig. 18

5.3.1 ZA-M with Comfort package

- one single acting control spool valve

  ⟶ (smaller plug)

- one pressure-free return flow

  ⟶ (larger plug)

Pressure free oil return flow

To protect the hydraulic motors of the broadcaster from being damaged, the pressure in the return flow must not exceed 10 bar.

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

Only use DN16 hoses for the oil return flow and ensure a 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. 19/1) 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 current controlled setting pump) with direct load-sensing pump connection. Adapt the provided volume current to the required volume current via the volume current valve of the tractor.

Setting the system converting bolt:

- Slacken the counter nut.
- Unscrew the system converting bolt with the aid of a screw driver until its stop (factory setting) or screw in.
- Tighten the counter nut.

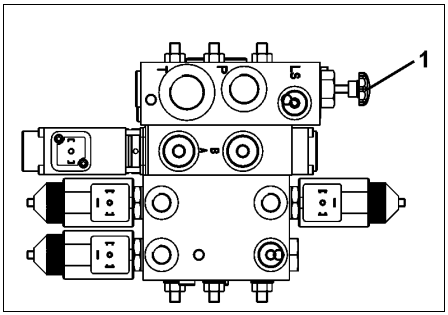


Fig. 19

5.3.2 PTO shaft

Only use the PTO shaft prescribed by the manufacturer.

In case the shear bolt between connecting yoke and drive input shaft flange continue to fail and on tractors with a hydraulically actuated universal joint shaft, the Walterscheid PTO shaft with friction clutch (K94/1) is recommended (option).

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

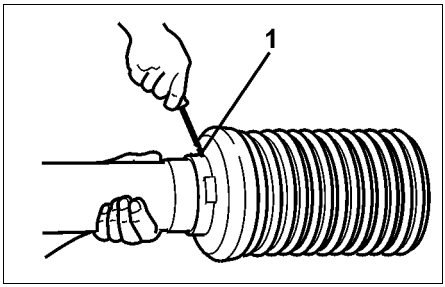


Fig. 20

Fitting the PTO shaft:

- Remove fixing bolt (Fig. 20/1)
- Twist the funnel (Fig. 21/1) in fitting position (Fig. 21./2).
- Pull off guard cone (Fig. 21/3)
- Tilt machine to the rear.

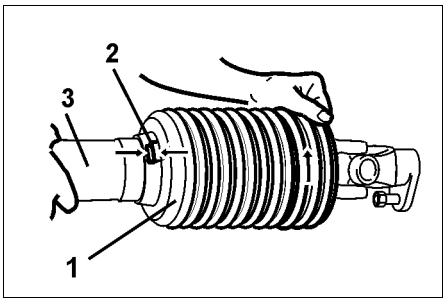


Fig. 21

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

- Slacken grease nipples (Fig. 22/1) and push on the PTO shaft (Fig. 22/2)
- Affix connecting yoke (Fig. 22/3) by using a shear bolt (Fig. 22/4).
- Insert grease nipples (Fig. 22/1).
- Push on guard cone (Fig. 23/1) and twist guard funnel (Fig. 23/2) into fitting position.
- Insert locking bolt (Fig. 23/3).
- Tilt machine to the front.

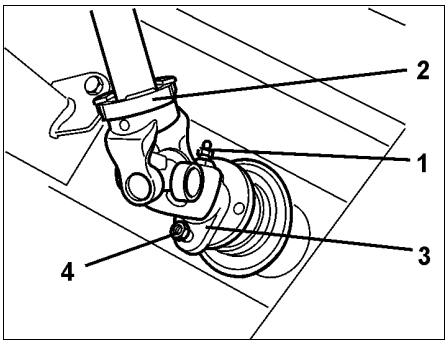


Fig. 22

Matching the PTO shaft when initially fitted.

When first mounting match PTO shaft to the tractor according to Fig. 24/6. 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.

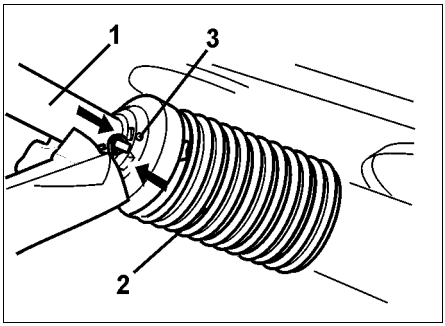


Fig. 23

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

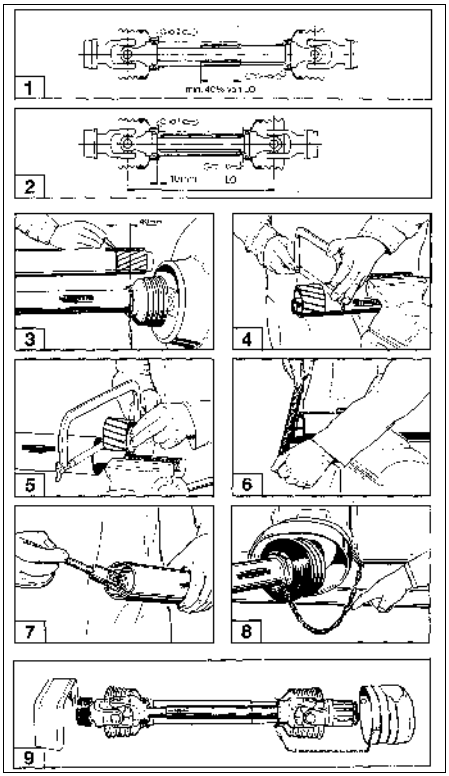


Fig. 24

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.

When parking the fertilizer spreader, the PTO shaft should be placed into catching hooks provided (Fig. 24/3).

5.3.3 Center 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. 25/1).

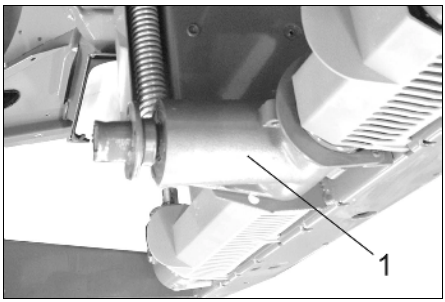


Fig. 25

5.4 Fitting the traffic lights

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

5.5 Uncoupling the spreader from tractor

Before uncoupling the spreader from the tractor ensure that the coupling points (upper- and lower links) are relieved.

- Park the centrifugal broadcaster on level ground

6. Transport on public roads and ways.

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

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.

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

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 fertiliser 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** 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 fertilizer s 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

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

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).

When spreading with your fertilizer spreader use the folding filling sieve against foreign particles.

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/ 501111or 501164 - Fax: 5405/501134

or for the UK and Rep. of Ireland:
(UK: 0044) 01302-751200

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).

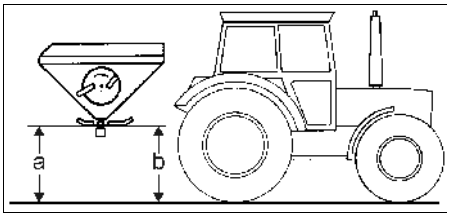


Fig. 26

The indicated mounting height, normally level 80/80 cm, are valid for the normal fertilising. **For normal fertilising the swivel blades of the spreading discs are normally in the lowered position.** (Please adhere to advice in the setting chart).

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 (para. 7.2). If the crop stands very dense (rape) the fertilizer broadcaster should be set at 80/80 above the crop. If that is no longer possible, then please also follow the instructions for late top dressing.

7.2 Late top dressing

Swivel the swivel blades (Fig. 27/1) of the spreading discs without slackening the nuts (without any tools) into the upper position.

This way the fertilizer spread fan is raised. Thus, besides the normal fertilising also late top dressing in grain up to a crop height of 1 m is possible without any further option..

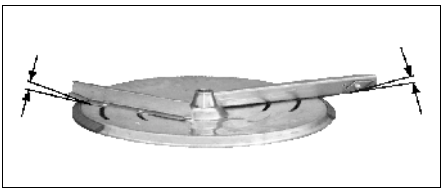


Fig. 27

Set the mounting height of the spreader with the aid of the tractors three-point hydraulic that high that the distance between the top of the grain and the spreading discs is **approx. 5 cm**. If necessary insert the lower link pins into the lower hole of the lower link console (Fig. 28).

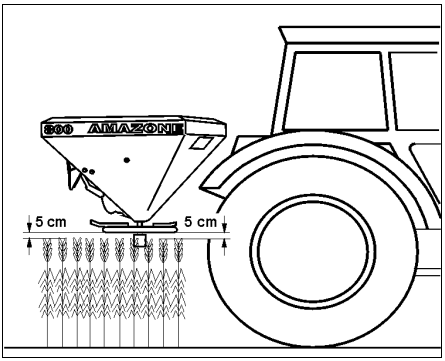


Fig. 28

In case the pto-shaft universal joint exceeds angles of 25° use a wide angle pto shaft (option).

7.3 Setting the spread rate

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

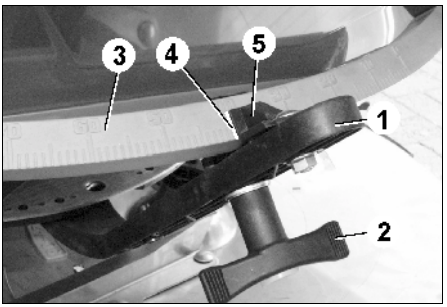


Fig. 29

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.

7.3.1.1 Setting the shutter slide position with the aid of the setting levers

- Close the shutter slides.
- Slacken the thumb nut (Fig. 30/2).
- Find the required shutter slide position on scale (Fig. 30/3)
- Set the read off edge (Fig. 30/4) of the setting lever pointer (Fig. 30/5) on to the scale figure.
- Firmly retighten the thumb nut (Fig. 30/2).

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

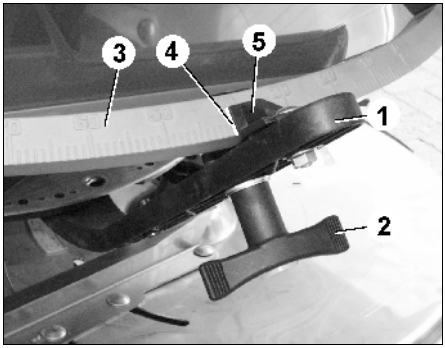


Fig. 30

7.3.1.2 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

Schieberstellung	20			21			24			27			28		
	km/h			km/h			km/h			km/h			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	178	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	34[illegible]	[illegible]	[illegible]	[illegible]	425	340	283	377	302	252	364	291	243
43	537	429	35[illegible]	[illegible]	[illegible]	[illegible]	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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7.3.1.3 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. 31/2).
3. The center coloured scale with the shutter slide positions (Position). (Fig. 31/3).

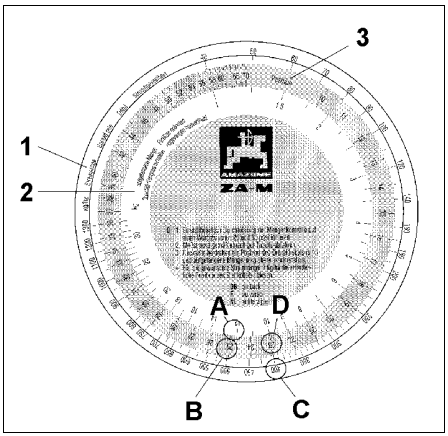


Fig. 31

4. The table for determining the required test distance [m]. (Fig. 32).

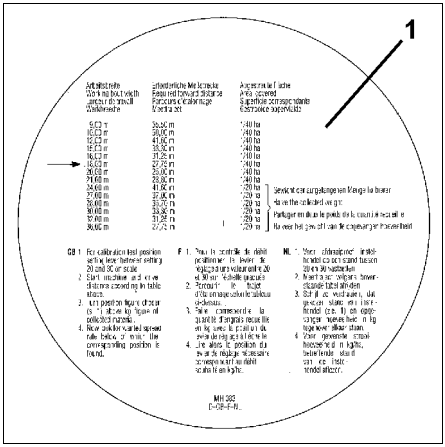


Fig. 32

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. 32/1)** 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. 31/2) for collected quantity [kg] look for figure **12,5** (Fig. 31/A) and align with the chosen shutter slide position (Position) **25** (Fig. 31/B) on the coloured scale (Fig. 31/3).
- Look for desired spread rate **400 kg/ha** (Fig. 31/C) and read off the required shutter slide position (Position) **23** (Fig. 31/D).
- Set the shutter slide position (Position) **23**.

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

7.3.2 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.

7.3.2.1 Arrangements for the spread rate check

- Swivel downwards the guard tube center part (if guard tube installed).
- 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 (Fig. 33/1) 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 calibration bucket (Fig. 33/2) with its handle (Fig. 33/3) into the rear retainer and the front retainer (Fig. 33/4 und Fig. 33/5) on the frame.

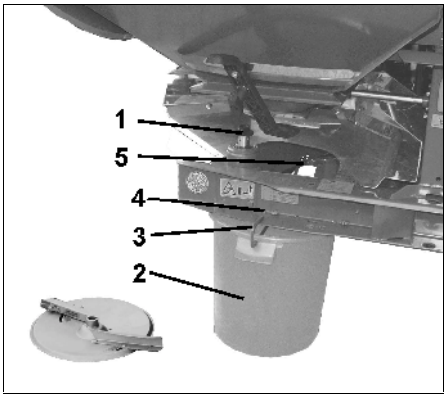


Fig. 33

7.3.2.2 Spread rate check by driving a test distance

Example:

Kind of fertilizer: CAN 27 %
BASF (white)

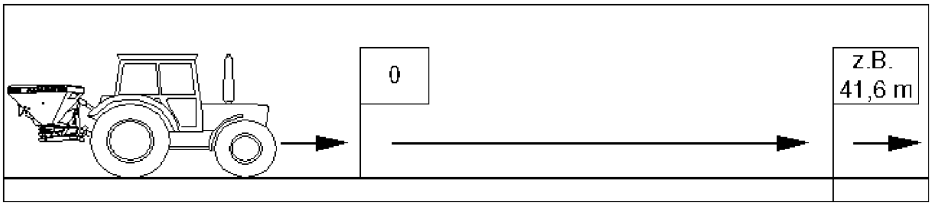
Working width: 24 m
Speed of operation: 10 km/h
Spread rate: 350 kg/ha
Shutter slide position

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
9,00	55,50	1/40	40
10,00	50,00	1/40	40
12,00	41,60	1/40	40
15,00	33,30	1/40	40
16,00	31,25	1/40	40
18,00	27,75	1/40	40
20,00	25,00	1/40	40
21,00	23,80	1/40	40
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



- 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 **540 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.

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

Working widths up to 21 m
Multiplier 40

Required test distance at desired working width [m] =	500 / working width [m]

Working widths from 24 m
Multiplier 20

Required test distance at desired working width [m] =	1000 / working width [m]

7.3.2.3 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
9,00	55,50	40	24,97	19,98	16,65
10,00	50,00	40	22,5	18	15
12,00	41,60	40	18,72	14,98	12,48
15,00	33,30	40	14,98	11,99	9,99
16,00	31,25	40	14,06	11,25	9,37
18,00	27,75	40	12,49	9,99	8,32
20,00	25,00	40	11,25	9	7,5
21,00	23,80	40	10,71	8,57	7,14
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

- 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

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

7.3.3 Setting the shutter slide position with the aid of the calibration device (special option)

When determining the shutter slide position with the aid of the calibration device, make use of the calculation disc rule provided with this special option (7.19)! (On the centre, coloured scale you will find position „K“.)

Working width: **18 m**

Desired spread rate: **400 kg/ha**

Desired forward speed: **10 km/h**

Shutter slide position: **?**

When determining the shutter slide position, both shutters of the opening should be closed and the PTO shaft disengaged!

- By using the handle (Fig. 35/1) hook the collecting bucket (Fig. 35/2) on to the outlet chute (Fig. 35/3). Let the collecting bucket catch into the clamping device (Fig. 35/4 u. Fig. 34/1).
- Entirely open the side shutters (Fig. 35/5) of the outlet chute for approx. 5 sec. by using the rope (Fig. 35/6) (to ensure an even fertilizer flow). Then pour the collected fertilizer back into the spreader.
- Take from table (Fig. 36/1) for the desired working width **18 m** the required test distance of **27,75 m** for **1/40 ha** area to be spread.
- Carefully measure the test distance in the field. Mark beginning and end of the test distance.

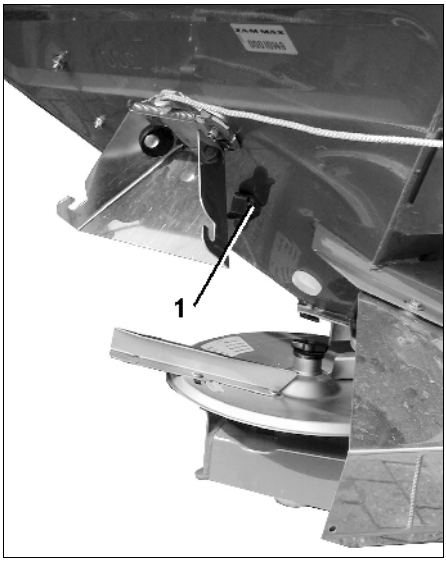


Fig. 34

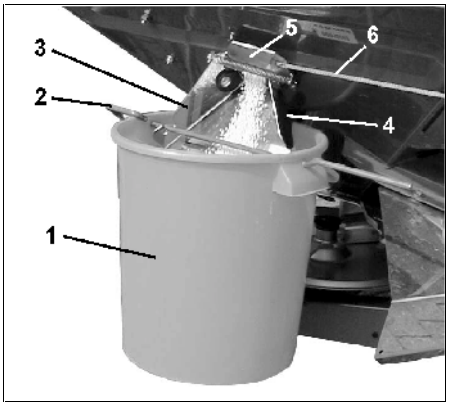


Fig. 35

- Carefully drive test distance from beginning- to end mark under field conditions, e.g. with half filled hopper, intended constant operational speed **(10 km/h)** and a PTO shaft speed of **540 R.P.M.** (unless otherwise stated for the working width setting in the setting chart). When doing so, entirely open at the measure distance starting point the side shutters of the outlet chute from the tractor cab with the aid of the rope (pull until stop) and close the shutters on the measure distance end.
- Weigh collected fertilizer quantity, e. g. **17,5 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 **for the calibration device.** Find on the scale (Fig. 37/2) for the collected material [kg] the figure "**17,5**" (Fig. 37/A) and align with position "**K**" (Fig. 37/B) on the coloured scale (Fig. 37/3).
- Look for the wanted spread rate **(400 kg/ha)** (Fig. 37/C) on the scale for the spread rate (Fig. 37/1) and read off the required shutter slide position "**23**" (Fig. 37/D).
- Set shutter slide position "23".

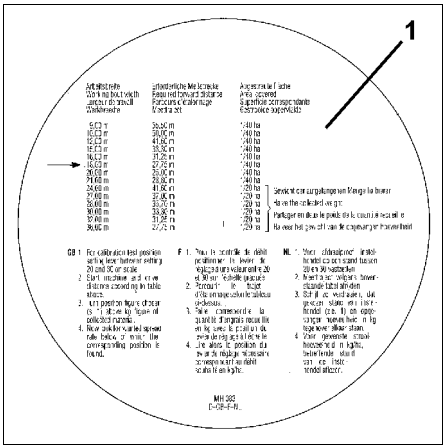


Fig. 36

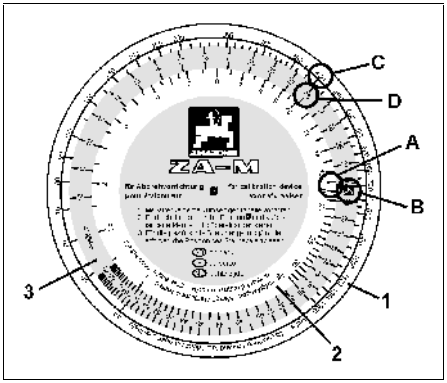


Fig. 37

7.4 Setting the working width

The working width (distance between the tramlines) are adjustable within the working widths of the relevant Omnia-Set (OM) spreading disc pairs (when spreading urea, however, deviations might occur).

Choose the suitable spreading disc for the desired working width.

Working width:	Spreading discs
10 – 12m	OM 10 – 12
10 – 16m	OM 10 – 16
18 – 24m	OM 18 – 24
24 – 36m	OM 24 - 36

The **working width** (distance between the tramlines) for **normal fertilising** is set with the aid of varying **spreading vane** positions.

The spreading properties of the fertiliser have a great influence on the working width and the fertiliser lateral distribution.

The main influences on the spreading behaviour of the fertiliser are:

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

We therefore recommend to use well granulated fertilisers of renown fertiliser manufacturers and the checking of the pre-set working width with the mobile fertiliser test kit.

7.4.1 Setting the spreading vane positions

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. 38/1 and Fig. 38/2) are arranged on every individual spreading disc

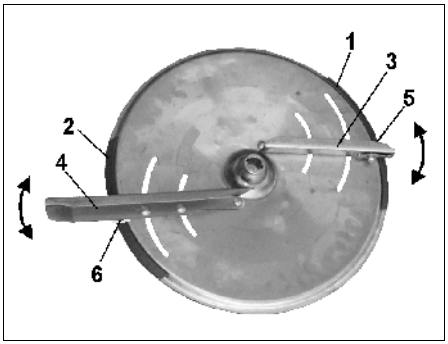


Fig. 38

The scale (Fig. 38/1) with the figure from 5 to 28 refers to the shorter spreading vane (Fig. 38/3) and the scale (Fig. 38/2) with the figures from 35 to 55 refers to the longer spreading vane(Fig. 38/4).

Swivelling the spreading vanes to a higher figure on the scale (Fig. 38/1 or Fig. 38/2)) results in an increase of the working width.

The shorter spreading vane distributes the fertilizer mainly in the spread pattern center, while the longer vane mainly spreads onto the outer range.

Set spreading vanes on spreading discs as follows:

- Slacken thumb nut beneath the spreading disc.

For slackening the thumb nut turn the spreading disc until the thumb nut can be slackened without any difficulty..

- Read off the setting chart the required **spreading vane position**.
- Look for the scale figure for the position of the **short spreading vane** on scale (Fig. 38/1).
- Swivel the read off edge (Fig. 38/5) of the **short** vane (Fig. 38/3) on to the scale figure and **retighten the thumb nut firmly**.
- Look for the scale figure for the position of the **long** spreading vane on scale (Fig. 38/2).
- Swivel the read off edge (Fig. 38/6) of the **long** vane (Fig. 38/4) on to the scale figure and **retighten the thumb nut firmly.**

Kind of fertilizer	Blade position at working width of			
	10m	**12m**	**15m**	**16m**
KAS 27%N granular, BASF (white); Hydro; DSM; Kemira, Agrolinz	20/50	20/50	20/50	20/50

Example:

Kind of fertilizer: **KAS 27%N granular, BASF (white);**

Desired working width: **12m**

Spreading vane position:
20 (short spreading vane)
50 (long spreading vane).

7.4.2 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 spreader with the mobile test kit (Fig. 39) (option).

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

Fig. 39

7.5 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.

- manual shutter actuation: Reduce the shutter position at the border side by the positions indicated in the setting chart (graduation marks)..
- 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)

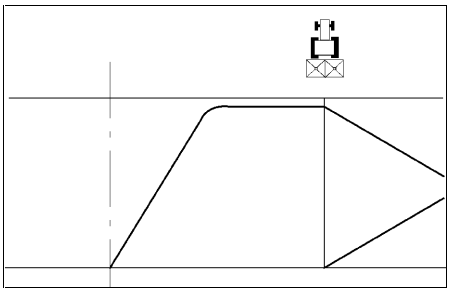


Fig. 40

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.

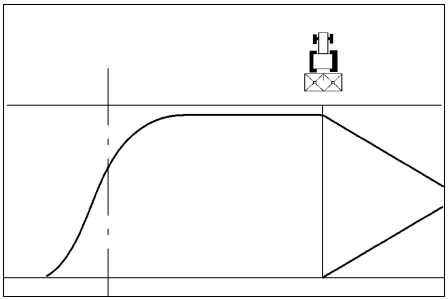
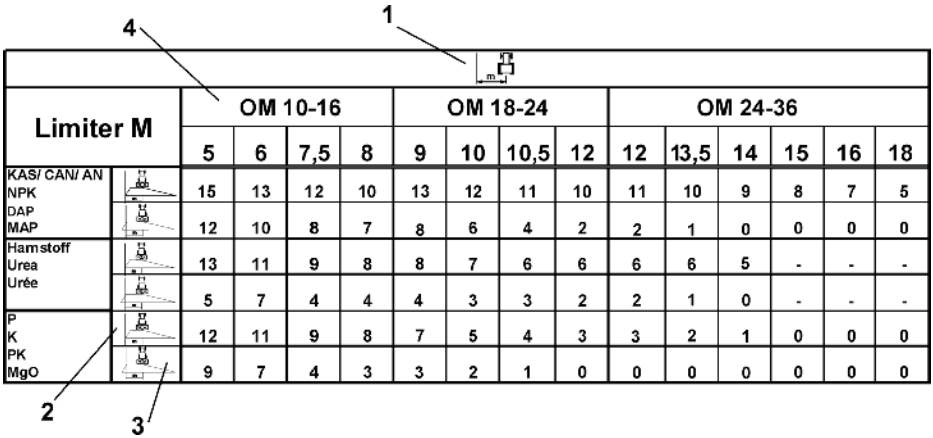


Fig. 41

7.5.1 Boundary and side spreading with border spreading system Limiter

The setting of the limiter depends on the track width of the tractor, the type of fertilizer and whether it is intended to carry out normal-border or eco-border spreading. Read off the figure to be set from the spread rate table (Fig. 42).

The figures given in the spread rate table are standard values depending on the spreading behaviour of the fertilizer to be spread. If necessary, re-adjust the Limiter.



Limiter M		OM 10-16				OM 18-24				OM 24-36					
		5	6	7,5	8	9	10	10,5	12	12	13,5	14	15	16	18
KAS/ CAN/ AN NPK		15	13	12	10	13	12	11	10	11	10	9	8	7	5
DAP MAP		12	10	8	7	8	6	4	2	2	1	0	0	0	0
Harnstoff Urea Urée		13	11	9	8	8	7	6	6	6	6	5	-	-	-
		5	7	4	4	4	3	3	2	2	1	0	-	-	-
P K PK MgO		12	11	9	8	7	5	4	3	3	2	1	0	0	0
		9	7	4	3	3	2	1	0	0	0	0	0	0	0

Fig. 42

1. Boundary/side spacing (half the working widthe)
2. Boundary spreading
3. Side spreading
4. used spreading discs.

For setting the figures move the border spread deflector on the guide bracket.

- To do this, slacken the clamping lever (Fig. 43/1).
- If the pivoting range of the clamping handle is not sufficient, lift the handle, turn the handle backwards and lower it again.
- Move the boundary spread deflector on the guide rail (Fig. 44/1) until the pointer (Fig. 44/2) shows the value to be set following the spread rate table (Fig. 42).
- Arrest the clamping lever again.

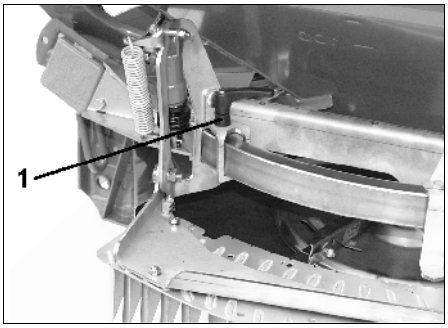


Fig. 43

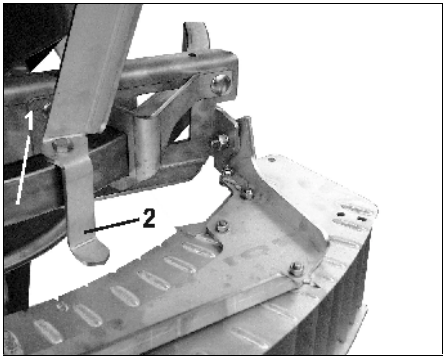


Fig. 44

For late top dressing the boundary spread deflector is brought into a medium high position (Fig. 45).

To do this, lower the border spread deflector.

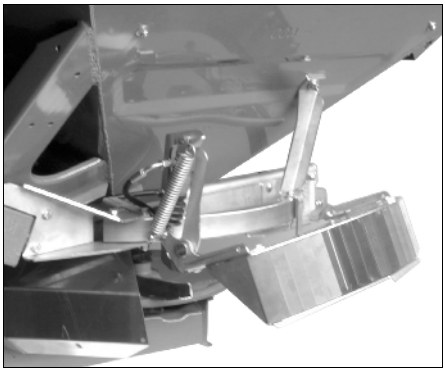


Fig. 45

You will find each one setting bar (Fig. 46/1) on the left hand and right hand edge on the upper side of the boundary spread deflector.

- Slacken the nuts of the setting bar.
- Lift the deflector by hand.
- Shift the setting bars until the stop and tighten the bars firmly.
- Lower the deflector.

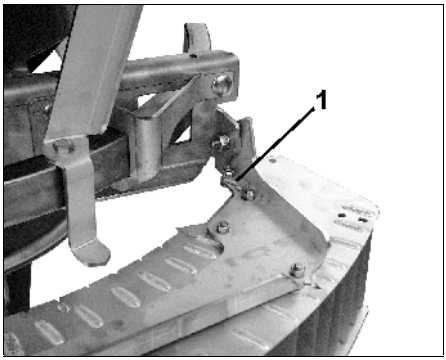


Fig. 46

7.5.2 Boundary and side spreading with border spreading disc Tele-Set

For boundary spreading (according to the draft of fertilizer application decree) (Fig. 40) or. **spreading to field sides** (beside owned, equally to be treated areas) (Fig. 41) **exchange** the **left hand "Omnia-Set"** spreading disc (left hand side border spreading - normal case), seen in driving direction, **for** the corresponding border spreading disc **"Tele-Set"**. For right hand border spreading a special border spreading disc is available on request.

The border spreading disc "Tele-Set" creates a spread pattern with a spreading fan steeply dropping off towards the fields' side. When not in use the border spreading disc "Tele-Set" or the spreading disc "Omnia-Set" should be fixed to the side of the machine (Fig. 47).

The swivelable telescopi vanes allow to adjust the throwing width of the fertiliser towards the "field border".

Distance to the border	Border spreading disc
5 - 9 m	TS 5 – 9
10 - 14 m	TS 10 – 14
15 - 18 m	TS 15 – 18

Fig. 47

7.5.3 Setting the border spreading disc according to fertilizer decree

Setting the border spreading discs

- TS 5 – 9
- TS 10 – 14
- TS 15 – 18

is done by the telescopic vanes (Fig. 48/1) according to the data given in the setting chart, depending on kind of fertilizer to be spread and the distance of the first track from the field's side as follows:

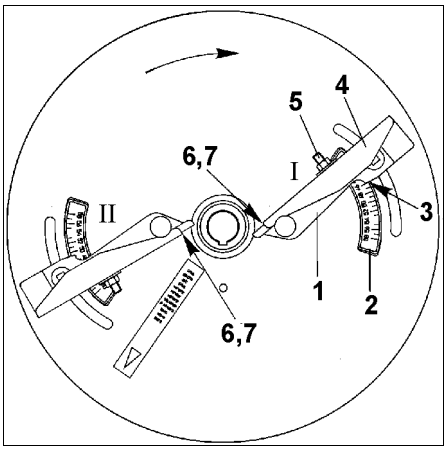


Fig. 48

- After having slackened the corresponding thumb nut, swivel the telescopic blades (Fig. 48/1) on the spreading within the range of the scale (Fig. 48/2) Read off figure on the reading line (Fig. 48/3) and retighten thumb nut.

  - **Function:** Swiveling telescopic vane on higher setting figure on the scale: Spreading width wider, steeper drop off at the side.

- After slackening the nut (Fig. 48/5) set outer vane part (Fig. 48/4) on a higher letter value on the scale (Fig. 48/6) Read off the position of the vane outer part on the reading line (Fig. 48/7) on the scale.

  - **Function:** Setting vane outer part in direction of a higher value on the scale: **Spreading width wider, shallower drop off at the sides.**

For setting the telescopic vanes the kinds of fertilizer can be divided into 6 groups:

Group I:

granular material with good flowing properties with a bulk density of approx.1,0 kg/l, e.g. CAN, NP- and NPK-types.

Group II:

prilled material with good flowing properties with a bulk density up to approx. 1,0 kg/l, e. g. CAN, NP- and NPK-types.

Group III:

granular, coarse material with mean flowing properties with a bulk density above 1.5 kg/l, e. g. phosphate- and potash-types.

Group IV:

granular, coarse material with mean flowing properties with a bulk density less than 1.5 kg/l, e. g. DAP-, MAP-types.

Group V:

Urea granular with a bulk density of up to approx. 0,8 kg/l.

Group VI:

Urea prilled with a bulk density of up to approx. 0,8 kg/l.

Kind of fertilizer	Vane	m 5	6	7,5	8	9
CAN - and NPK-types granular material	I	400 B47	400 C48	C49	C49	D50
	II	400 D45	400 E45	E42	E42	F46

Excerpt from the setting chart TS 5-9

1. Example:

Distance of the first tramline to the field's border: 9 m **(TS 5-9)**

Kind of fertilizer : CAN 27 % N granular, BASF (white), (Group I)

Taken from setting chart resp. table above: **D 50/ F 46**

- Set reading line (Fig. 49/7) of vane "I" to letter value **"D"** and fix outer vane part. Swivel vane "I" to figure **"50"** and fix.
- Set reading line (Fig. 49/7) of vane "II" to figure value **"F"** and fix outer vane part. Swivel vane "II" to figure **"46"** and fix.

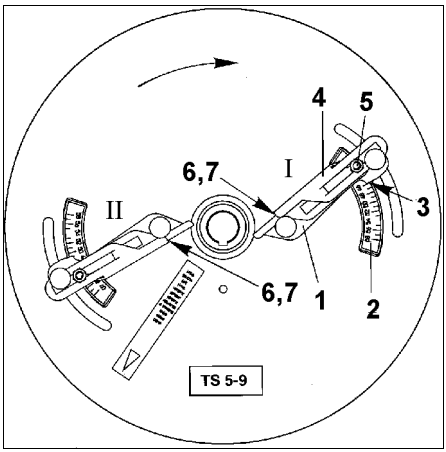


Fig. 49

Kind of fertilizer	Vane	m		
		15	**16**	**18**
CAN - and NPK-types granular material	I	B 51	C 52	C 53
	II	E 42	F 42	H 42

Excerpt from the setting chart TS 5-9

2. Example:

Distance from first tramline to the field's border: 15 m **(TS 15-18)**

Kind of fertilizer : **CAN 27 % N granular, BASF (white), (Group I)**

Taken from setting chart or table above: **B 51/ E 42**

Set reading line (Fig. 50/7) of blade "I" to letter value **"B"** and fix outer vane part. Swivel vane "I" to figure **"51"** and fix.

Set reading line (Fig. 50/7) of blade "II" to figure value **"E"** and fix outer vane part. Swivel vane "II" to figure **"42"** and fix.

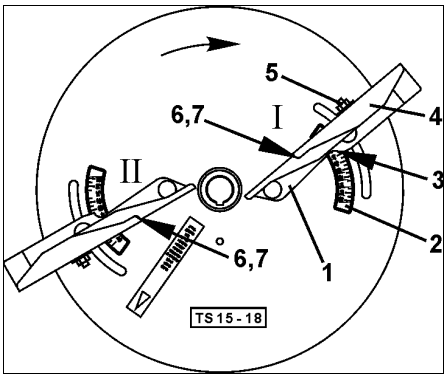


Fig. 50

7.5.4 Characteristic features at border spreading with 5 or 6 m distance of the first tramline to the field's border

(please also refer to para 3.6)

At some kinds of fertilizer reduce the PTO-shaft speed from 540 min^{-1} to 400 min^{-1}, as otherwise the "Omnia-Set" disc fitted on the broadcaster's field side will throw approx. 8 m beyond the tractor center towards the field's side (i.e. 2 to 3 m beyond the field's border) (please note relevant hints in the setting chart).

7.5.5 Exceptions at border spreading (tramline center does not correspond to half the working width from the field's side)

Here choose shutter position (setting lever position) for setting the spread rate in dependence of the various working widths (tramline distances). At the field's side also swivel backwards the shutter position for 2 to 6 scale lines.

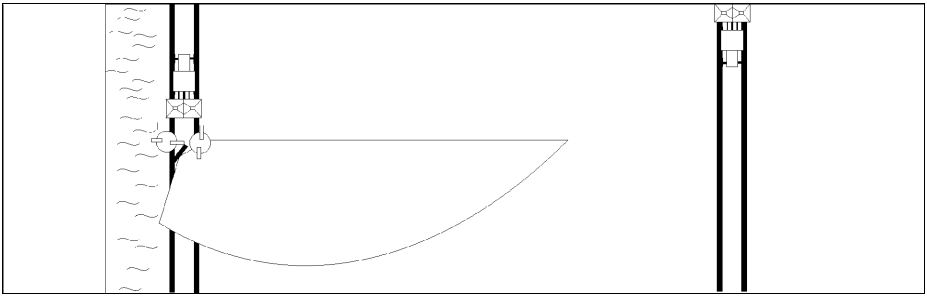


Fig. 51

Example:

Spacing between the tramlines: **24 m** (corresponds to 24 m working width)

Distance of the first tramline
from the left hand field side: **8 m** (corresponds to 16 m working width)

Kind of fertilizer : CAN 27 % N granular, BASF

Forward speed: 10 k.p.h.

Desired spread rate: 300 kg/ha

Determine the shutter position for the desired spread rate according to the setting chart and consider the various working widths.

Shutter position:
right hand (24 m working width) = 41
(310 kg/ha)

left hand (16 m working width) = 34
(300 kg/ha) - 3 = 31

Vane position:
right hand OM 18-24 from setting chart: **24 m** working width**: 68/87**

left hand TS 5 - 9 from setting chart **8 m** distance of the first tramline to the field's side: **C 49/ E 42**

8. Operation

If a trailer hitch is provided it must only be used for towing suitable implements or twin axle trailers if:

- **the maximum speed of 25 km/h is not exceeded,**
- **the trailer has a run-on brake or a brake which can be actuated from the tractor operator,**
- **the permissible total weight of the trailer is not more than 1.25 times the permissible total weight of the tractor, however, 5 tons in maximum**

Never reach into the rotating agitator spiral.

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

In case of leaking control spool valves and/or a prolonged standstill, e.g. during road transport, shutting the lock taps prevent the closed shutters from opening by themselves. (please also refer to para. 5)

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.

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.

8.2 Spreading operation

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

- The fertiliser spreader has been coupled on to the tractor and the hydraulic hoses are connected.
- The settings have been carried out.
- Engage the universal joint shaft at low tractor engine speed.

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

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

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

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.

With some spreading materials, as Kieserite, Excello-granules and magnesium sulphate an increased wear on the spreading blades may occur (more wear resistant spreading vanes are available as an option).

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

8.3 Exchanging the spreading discs

- Fold upwards the guard tube (Fig. 52).
- Remove the thumb nut (Fig. 53/1).
- Turn the spreading disc until the disc hole ø 8 mm faces to the implement centre. (Fig. 54/1).
- 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.

When fitting the spreading discs OM 24-36 provide the spreader with the guard tube (accident prevention).

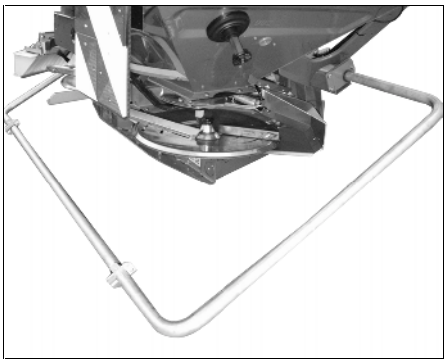


Fig. 52

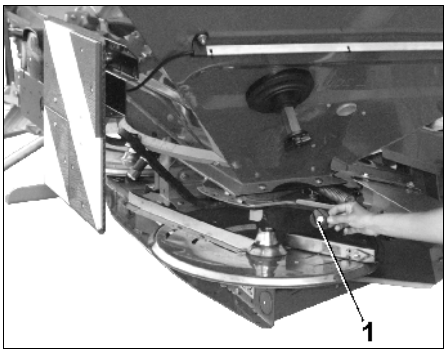


Fig. 53

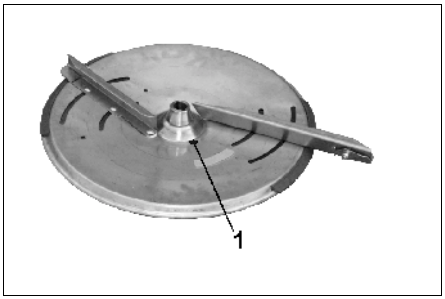


Fig. 54

8.4 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** or **border spreading disc** the first tramline (Fig. 55/T1) is usually always created in a distance of half the tramline spacing to the field side (see para.7.5). 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.

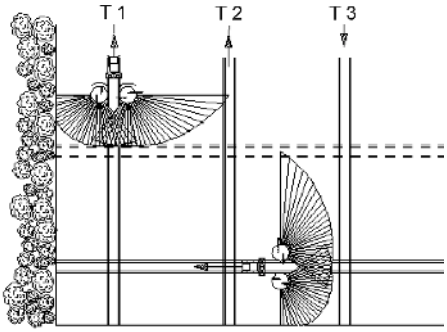


Fig. 55

Following the advice given in para. 7.5 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:

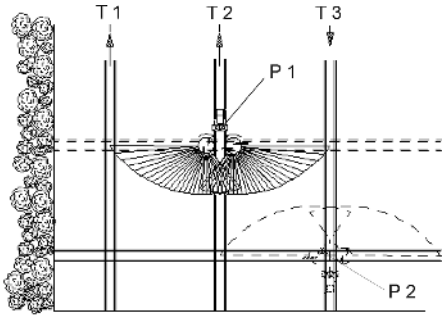


Fig. 56

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. 56) , 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. 56), when the spreader is in line with the 1st tramline on the headlands.

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

8.5 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.

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).

- 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).
- For green manure seed, grain and slug pellets (option) take the details for setting your spreader from the specific setting chart. These values may only be considered as guide values. Before starting to operate conduct a spread rate check.

Because of the small spreading rate it is recommended to at least triple the required test distance. Hereby the multiplier reduces on a third of the indicated value (e. g. for the working width 9 m: multiplier 40 : 3 = 13.3).

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

8.5.1 Combination matrix for centrifugal broadcasters for spreading slug pellets

Type AMAZONE ZA-M

	Execution			Discs				Choise of matching options			
	ZA-M 900	ZA-M 1200	ZA-M 1500	OM 10-12	OM 10-16	OM 18-24	OM 24-36	S 350	S 500	L 1000	Amatron+
24	X			X				X			X
25	X				X			X			X
26	X					X		X			X
27		X				X			X	X	X
28		X					X		X	X	X
29			X			X			X	X	X
30			X				X		X	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.

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. 57/1).
- 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**

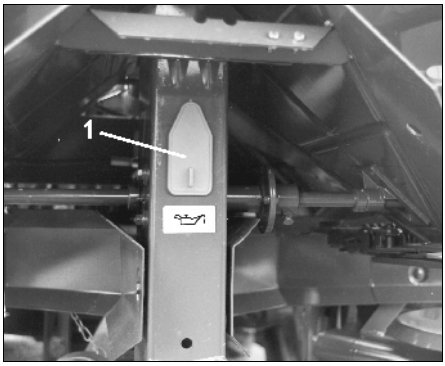


Fig. 57

- For cleaning, maintenance or repair work the guard screen in the hopper can be unlocked with a suited tool (screw driver / round nose tool D=10) and folded upwards.
  Proceed as follows:
  - Twist locking (Fig. 58/1) with suited tool (Fig. 59/1) by 90°.
  - Fold guard screen upwards until the guard screen catch is released..
  - When folding down the guard screen is locked automatically..
  - Re-check locking of guard screen.

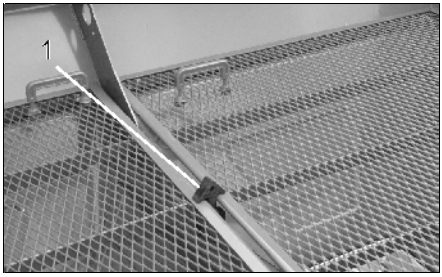


Fig. 58

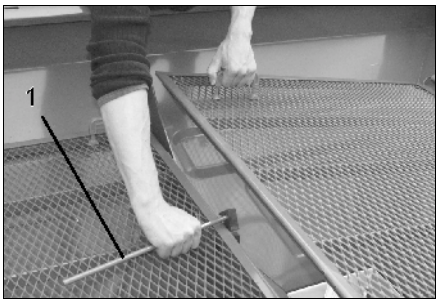


Fig. 59

9.1 Shear off safety for PTO shafts and agitator shaft drive

- The separately supplied **bolts 8 x 30**, DIN 931, 8.8 are **exchange bolts** (Fig. 60/4) **for fixing the PTO shaft yoke on the flange** of the gearbox input shaft. Always apply grease when fitting the PTO shaft to the gearbox input shaft.
- Agitator spiral clip (Fig. 61/1) serve as shear off safety for the agitator shaft.

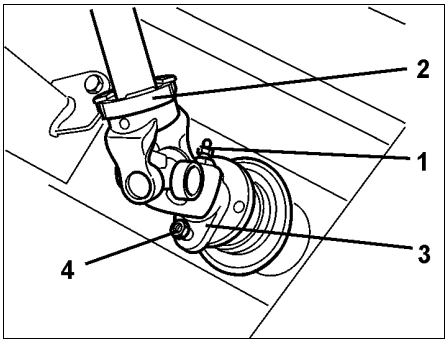


Fig. 60

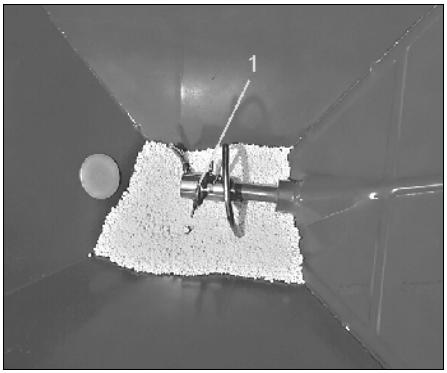


Fig. 61

9.2 Check of the hydraulic oil filter

During operation the function of the hydraulic oil filter (Fig. 62/1) can be checked on the control block. Indication in the check window (Fig. 62/2):

Green filter functions properly

Red exchange filter / clean

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

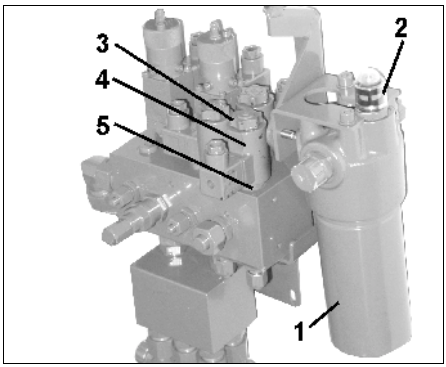


Fig. 62

9.3 Cleaning the solenoid valves

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. 62/3)
- Remove magnet coil (Fig. 62/4)
- Screw out the valve rod (Fig. 62/5) with valve seat and clean with compressed air or hydraulic oil.

9.4 Exchanging of the spreading vanes and swivel blades

The technical condition of the spreading vanes incl. their swivel blades 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 and their swivel blades are wearing parts.

Exchange spreading vanes or swivel blades immediately when breakage due to wear is noticeable.

9.4.1 Exchanging spreading vanes

- Slacken self-locking nut (Fig. 63/1).
- Remove washer (Fig. 63/2) and flat mushroom head bolt (Fig. 63/3).
- Slacken thumb nut (Fig. 63/4) and exchange spreading vanes.
- Fitting the spreading vanes is done in vice versa order.
- Tighten the self locking nut (Fig. 63/1) in such a way, that the spreading vane can be swivelled by hand.

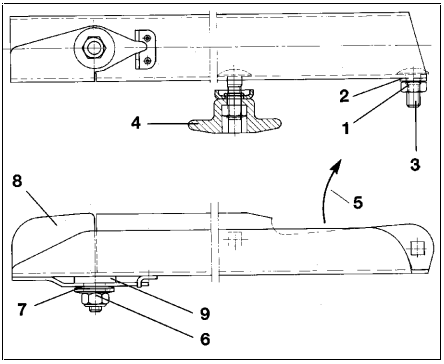


Fig. 63

Note the correct fitting of the spreading vanes. The open side of the U-shaped spreading vane shows into sense of rotation (Fig. 63/5).

9.4.2 Exchange of swivel blades

- Slacken self locking nut (brass CuZn) (Fig. 64/6) and remove together with spring washers (Fig. 64/7).
- Exchange swivel blades (Fig. 64/8).

Mind plastic washer (Fig. 64/9) between spreading vane and swivel blade.

- **Heap up** spring washers **reciprocally** (do not stack).
- Tighten self locking nut (Fig. 64/6) with a torque of **6 - 7 Nm**, so that the swivel blade can still be swivelled upwards by hand, however does not swivel up by itself during operation.

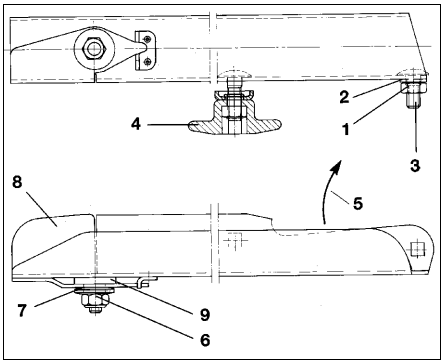


Fig. 64

9.5 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.

9.5.1 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).

9.5.2 Marking

Hydraulic hoses are marked as follows:

- Name of the manufacturer
- Date of production

Maximum dynamic operational pressure

9.5.3 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.

9.6 Checking the basic setting of the shutter slides

ZA-M with job computer; please refer to the instruction manual AMATRON+

The space opened in the outlet opening (Fig. 65/1) by the shutters in shutter position „8“ has been set by the factory with a dead mandril (pin Ø 12 mm).

This setting represents the basic setting of the shutter.

If at equal shutter slide position an uneven emptying of the two hopper tips is noticed, check shutter slide basic position as follows:

When actuating the shutters do not reach into the hopper outlet opening!

- Hydraulically open the shutter slide.
- Open the spread rate shutter with the aid of the setting lever (Fig. 66/1).
- Insert a pin of 12 mm Ø (shaft of a 12 mm drill) into the opening.
- Swivel the setting lever on the scale (Fig. 66/2) until the stop on the pins.
- Arrest the setting lever with the star knob (Fig. 66/3).
- Slacken the hex. bolt (Fig. 66/4) Align the pointer (Fig. 66/5) with the scale figure „**8**“ and fix with the hex. bolt. The read-off edge of the pointer is (Fig. 66/6).
- Remove pin.

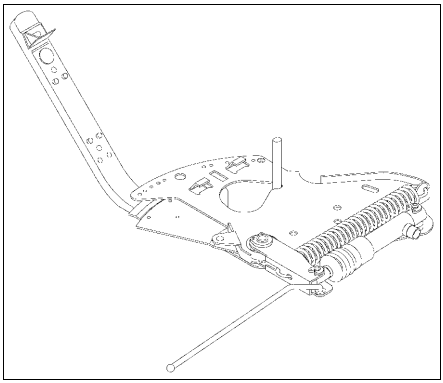


Fig. 65

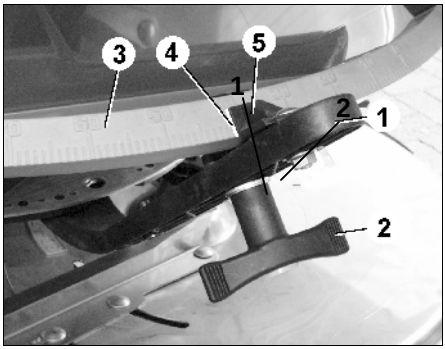
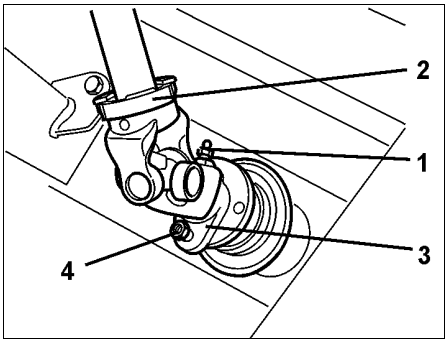


Fig. 66

9.7 Dismantling PTO shaft

- Slacken tapered grease nipple in the connecting yoke of the PTO shaft – by opening under side of the protective cone.
- Remove shear bolt between yoke flange and PTO shaft and flange of the gearbox input shaft.
- With the aid of a flat bar push the connecting yoke off the gearbox input shaft from the rear through the slit in the protective cone rear wall (on the hopper under side).

When pushing the connecting yoke off the gearbox input shaft repeatedly slightly twist the PTO shaft.



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
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
	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
	Defective plug couplings	Check plug couplings. If necessary repair or replace
	Defective tractor control unit	Check tractor control unit, repair if necessary or replace

Fault	Cause	Remedy
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
	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
	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 Spreading discs "Omnia-Set"

11.1.1 Pair of spreading discs "Omnia-Set" OM 10-12

For working widths or tramline spacings of 10 to 12 m.
Product No.: 927870**.**

11.1.2 Pair of spreading discs "Omnia-Set" OM 10-16

For working widths or tramline spacings of 10 to 16 m.
Product No.: 92777

11.1.3 Pair of spreading discs "Omnia-Set" OM 18-24

For working widths or tramline spacings of 18 to 24 m (Fig. 10.2).
Product No.: 927777

11.1.4 Pair of spreading discs "Omnia-Set" OM 24-36

As standard with hard metal coated vanes (HP) for a longer lifespan..

For working widths or tramline spacings of 30 to 36 m
Product No.: 927778

11.2 Border spreading discs "Tele-Set"

11.2.1 Border spreading disc "Tele-Set" TS 5-9

For distances of 5 to 9 m towards field border (measured from tractor centre), settable for different tramline systems and varying kinds of fertilizer .

left hand fitted - **normal case**,
Product No.: 912717

right hand fitted - **special case**,
Product No.: 912725

11.2.2 Border spreading disc "Tele-Set" TS 10-14

For distances of 10-14m towards field border (measured from tractor centre), settable for different tramline systems and varying kinds of fertilizer .

left hand fitted - **normal case**,
Product No.: 912732

right hand fitted - **special case**,
Product No.: 912739

11.2.3 Border spreading disc "Tele-Set" TS 15-18

For distances of 15-18m towards field border (measured from tractor centre), settable for different tramline systems and varying kinds of fertilizer .

left hand fitted - **normal case**,
Product No.: 912744

right hand fitted - **special case**,
Product No.: 912749

11.3 Boundary spreading device, left hand side Limiter M

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.

Product No.: 921 290

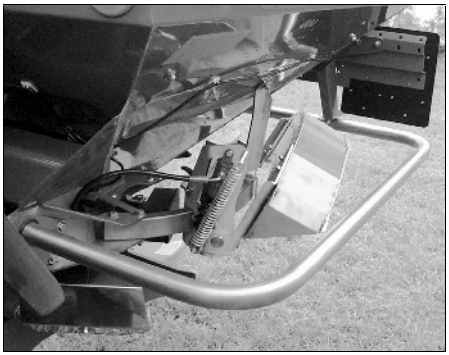


Fig. 67

11.3.1 Locking device for Limiter M

For a comfortable operating the Limiter, against unintended lowering the boundary spread deflector in case of leaking tractor valves (separate double acting control valve required).

Product No.: 921 793

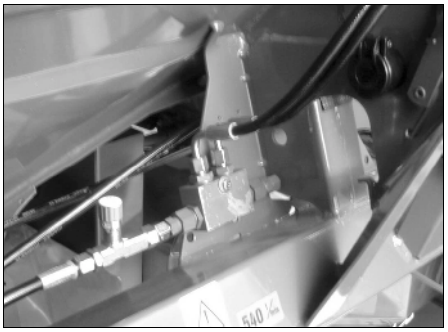


Fig. 68

11.4 Boundary spread deflector, to one side

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

left hand - for left hand boundary spreading

Product No.: 173 3010

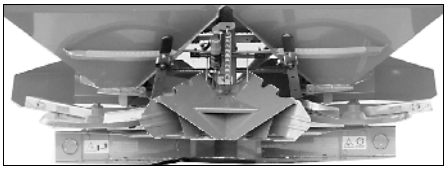


Fig. 69

11.5 Swivelable guard tube

Required as guard when using the spreading discs OM 24-36 (collision guard, prevents accidents when spreading discs are spinning, swivelable for a comfortable spreading disc exchange).

Product No.: 921 777

Fig. 70

11.6 Lateral calibration device

For an easier spread rate control without spreading disc removal, right hand side.

Product No.:922 911

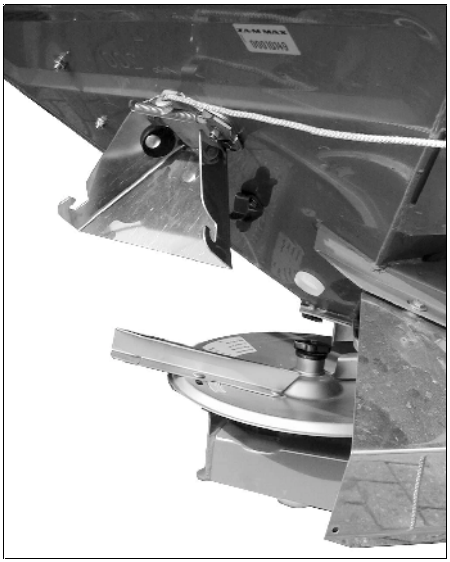


Fig. 71

11.7 Transport- and parking device

The detachable transport- and parking device (Fig. 72) 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.

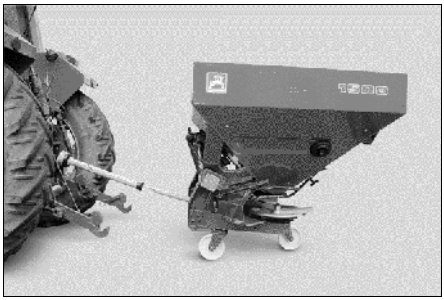


Fig. 72

11.8 Hopper extensions

The fertilizer broadcasters ZA-M can be provided with a narrow hopper extension with a capacity of 350 l (S 350) or 500l (S500) or a wide hopper extension with a capacity of 1000 l (L 1000). The wide hopper extension „**L**“ has an upper hopper width of **2,90 m** and allows a quick and comfortable filling, e. g. with a wide industrial loading shovel. The hopper extensions **S350 for ZA-M 900 and S500 for ZA-M 1200/1500 have the same filling width as the corresponding base hopper.**

In addition the extensions (para 1.6 Technical Data) may be combined in various versions, so that a hopper capacity of up to 3000 l (ZA-M 1500)can be obtained.

11.8.1 Hopper extension S 350

For ZA-M 900

Product No.: 924181

11.8.2 Hopper extension S 500

For ZA-M 1200 and 1500 (Fig. 73/1)

Product No.: 922 782

Fig. 73

11.8.3 Hopper extension L 1000

For ZA-M 1500 (Fig. 73/2)

Product No.: 922 786

When increasing the hopper capacity of the ZA-M 1500 to 3000 litres a top link re-inforcement must be used (Product No.: 922 908).

11.8.4 Top link reinforcement

Product No.: 922 908.

11.9 Swivelable hopper cover

Also in wet weather conditions, the swivelable hopper cover guarantees dry spreading material. For filling the swivelable hopper cover is simply swivelled upward.

Fig. 74

11.9.1 Swivelable hopper cover N

For ZA-M 900 hopper extension S 350.

Product No.: 927782

11.9.2 Swivelable hopper cover S

For ZA-M 1200 / 1500 and hopper extension S 500.

Product No.: 927784

11.9.3 Swivelable hopper cover L

For ZA-M 1500 with hopper extension L 1000.

Product No.: 927785

11.10 Traffic light kit for AMAZONE-mounted implements

The traffic light kit can be retrofitted and adjusted to various implement widths (up to 3 m).

11.10.1 Traffic light kit "rear"

The traffic light kit "rear" (Fig. 75) is bolted onto the guard tube retainer of the hopper rear wall. It consists of: Light combination right hand and left hand; parking warning plates according to DIN standards11030; registration plate and connecting cable.

Product No.: 916 253

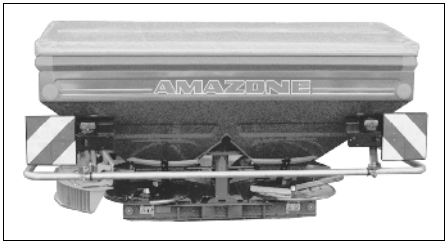


Fig. 75

11.10.2 Traffic light kit "front"

The traffic light kit "front" is necessary for all spreader types with a wide hopper extension "L 1000" and is fixed to the traffic light kit "rear". It consists of parking warning plates according to DIN standards 11030 with limiting lights right hand and left hand and connecting cable.

Product No.: 917 649

11.11 Two-way-valve unit

The two-way-valve is required for the hydraulic single shutter control on tractors with only **one** single acting hydraulic connection.

Product No.: 145 6000

Fig. 77 → Block ball taps closed

Fig. 78 → Block ball taps opened

Half sided spreading with two-way valve unit:

For the independent closing or opening the shutters, the following actuations have to be conducted at half-sided spreading or spreading of arable fields.

a) One-side opening of the right hand shutter, e. g. for left hand border spreading with the boundary spread deflector:

- Close both shutters.
- Shut block ball tap for the hydraulic ram of the left hand hopper tip.

When actuated by the control valve, now only the right hand shutter is opened or closed, the left hand one remains closed.

b) One-sided closing of the right hand shutter when spreading:

- Both shutters are open.
- Shut block ball tap for the hydraulic ram of the left hand hopper tip.
- Set control valve on **"lifting"** and hereby close the right hand shutter.

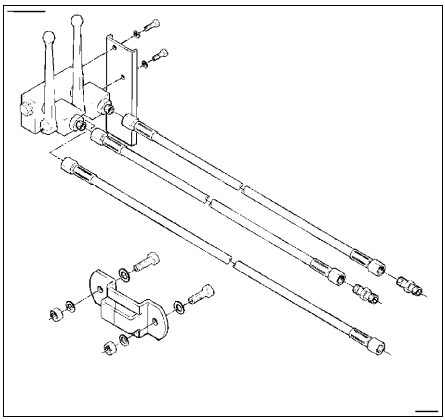


Fig. 76

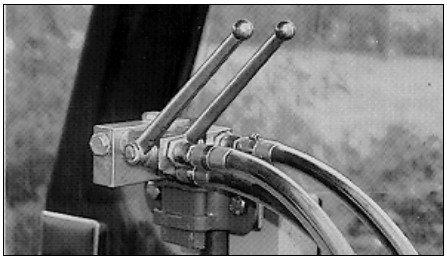


Fig. 77

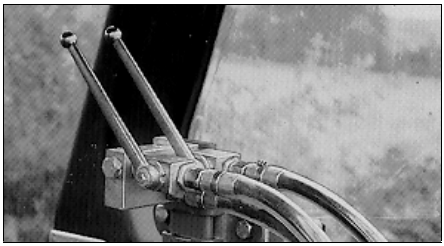


Fig. 78

c) Change from one-sided spreading to spreading to both sides, e. g. additional actuation of left hand shutter:

- Right hand shutter opened (left hand shutter closed via block ball tap).
- Open block ball tap for hydraulic ram of the left hand hopper tip.

Set control valve on **"lowering"** and hereby open both shutters.

11.12 Three way valve

The three way valve is required for the hydraulic single shutter control and use of the Limiter M on tractors with only one single acting hydraulic control valve.

Product No.: 922 320

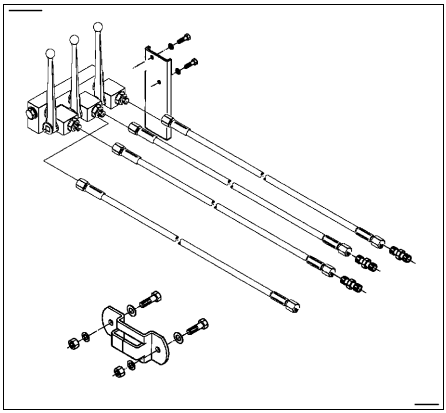


Fig. 79

11.13 Mobile fertilizer test kit for checking the working width

Please refer to para 7.4.2.
Product No.:125 900

11.14 Pto shaft with friction clutch

If the shear bolt between connecting yoke- and gearbox input shaft repeatedly shears off and on tractors with roughly engaging tractor PTO the Walterscheid PTO shaft with friction clutch is recommended (Fig. 80).

Product No.: EJ 281

Fitting:

- Remove pto shaft supplied as standard.
- Loosen and pull off the fitted protective cone from the gearbox neck.
- Lift up twisting securing.
- Twist and pull off the protective cone.

Replace the protective cone by the supplied longer protective cone (accident prevention)!

- Detach yoke flange from gearbox input shaft.
- Clean gearbox input shaft.
- Slacken counter nut (Fig. 80/1) inside connecting yoke from friction clutch (until the grub screw does not protrude the counter nut outside any longer). Unbolt inner hex. grub screw (Fig. 80/2) and check whether the connecting yoke can easily be pushed onto the PTO shaft.
- Pull connecting yoke off the gearbox input shaft again.
- Set protective cone on the gearbox extension and arrest by twisting.

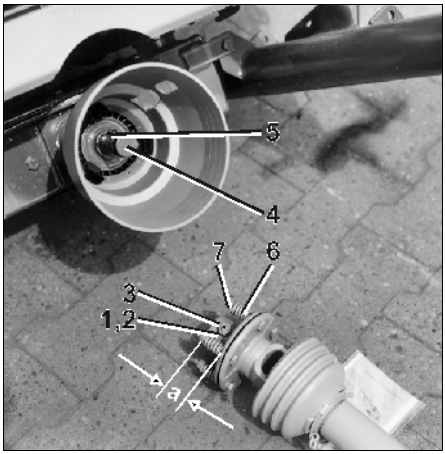


Fig. 80

Push connecting yoke (Fig. 80//3) with grease applied until the stop of the gearbox input shaft (Fig. 80//4).

Take care for a complete covering of the key (Fig. 80//5)!

- Secure special PTO shaft against axial shifting. For this firmly tighten grub screw with Allen key and secure with nut (Fig. 80/1).

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

Dismounting

- Slacken counter nut (Fig. 80/1) in connecting yoke from friction clutch. Drive out grub screw
- With the aid of a flat bar push the connecting yoke off the gearbox input shaft from the rear through the slit in the protective cone rear wall (on hopper lower side).

Functioning and maintenance of friction clutch

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 damages on PTO-shaft and gearbox elements. Therefore, the function of the friction clutch has always to be assured. A baking of the friction linings by corrosion prevent an actuation of the friction clutch.

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

1. Dismantle friction clutch from gearbox input shaft.
2. Relief springs (Fig. 80/6) by slackening the nuts (Fig. 80/7).
3. Fully turn the clutch by hand. Hereby any baking by rust or humidity between the friction linings will be loosened.
4. Tighten nuts that much, that the pressure springs have the indicated fitting length of **a = 26,5 mm**.
5. Push friction clutch onto 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.

11.15 Pto shaft W 100E-810

(PTO shaft supplied as standard)
Product No Best.-Nr.: EJ 280

11.16 Pto shaft W TS 100 E-810

Telespace telescopic.
Product No.: EJ 296

11.17 Rubber mud guard

If the tractor's rear wheels throw clods of soil into the area of the spinning spreading discs when spreading fertilizer , mud guards should be fitted to the front side of the spreader.

Product No.: 918 844

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