



Instruction Manual

Trailed sprayer

AMAZONE UG

UG 2000 Special

UG 2200 Power


UG 3000 Power

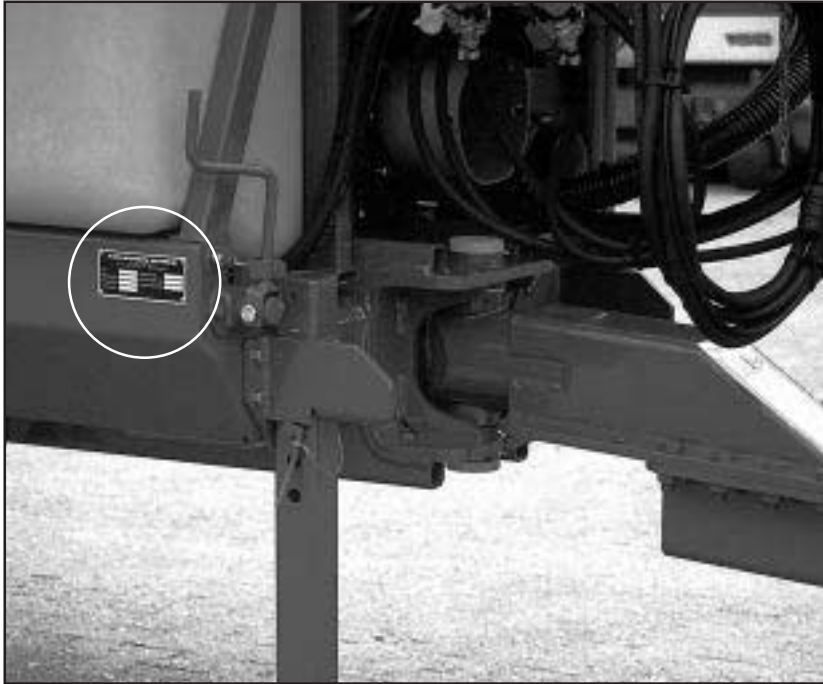
UG 4500 Magna



MG 371
SB 230.1 12.97
Printed in Germany



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



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D-49202 Hasbergen-Gaste

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The trailed sprayers of the types AMAZONE UG Special and UG Power are yet another product from the large range of AMAZONE farm machinery.

We congratulate you on the purchase of your new AMAZONE UG field sprayer. You have made a good choice.

Please study these instructions carefully and by adhering to them make fullest use of your machine. You will then enjoy trouble-free and accurate spraying with your new AMAZONE sprayer.

No responsibility can be accepted by us if complaints and breakages are due to incorrect operation of lack of maintenance. Never put to operation your AMAZONE sprayer before having read carefully chapter 2.0 so to 2.6 including General Safety and Accident Prevention Advice. Your sprayer complies only with the regulations of the Agricultural Health and Safety Authorities when in case of repair original spare parts from AMAZONE are used for replacement.

Please enter here the serial number of your sprayer. The number is punched into the right hand front part of the main chassis, seen in direction of travel.

Please always quote the **machine type** and **serial number** when ordering spare parts or making enquiries.

Trailed sprayer: AMAZONE UG	_____
Serial-No.:	_____
Drawbar:	_____
Chassis:	_____
Control chest:	_____
Pump equipment:	_____
Sprayer boom:	_____

The following instruction manual applies to all models of the UG Special, UG Power and UG Magna trailed field sprayers. In order you may save reading long descriptions for equipments which you did not choose for your sprayer, you only have to read those chapters applying to your sprayer equipment (please take from the delivery note). This is especially valid for the chapters control units and sprayer booms.



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1.0 Details about the machine

1.1 Manufacturer

AMAZONEN-WERKE, H. Dreyer GmbH & Co. KG, Postfach 51, D-49202 Hasbergen-Gaste, Germany

1.2 Review of possible execution combinations

Basic implement	UG 2000 Special				UG 2200 Power				UG 3000 Power				UG 4500 Magna			
Actual volume	2000 l				2400 l				3200 l				4750 l			
Sprayer boom incl. swing compensation and hydraulic height adjustment																
Q-boom up to 15 m																
12 / 12,5 / 15 m - 5-fold	x				x				x		x					
H-boom up to 16 m																
15/ 16 m - 5 fold	x				x				x		x					
Super-S-boom up to 24 m																
15 m - 5 fold	x				x				x		x					
18/ 20/ 21 m - 5 fold	x				x	x			x		x					
21 m - 7 fold		x					x		x		x		x			
24 m - 7 fold		x					x			x		x	x			
L-boom up to 36 m																
24/ 27/ 28/ 30 m - 7 fold								x		x		x				
36 m - 9 fold														x		
Available pump sizes																
210 l/min.	x	x			x		x									
250 l/min.					x		x		x		x					
350 l/min.						x	x	x	x	x	x	x				
420 l/min.														x	x	
Available control units																
manual control																
BG - 5 fold	x															
electrically remote controlled																
NG - 5 fold	x															
NG - 7 fold		x														
DG - 5fold / FG - 5 fold					x	x			x		x					
FG - 7 fold							x	x		x		x				
electrically remote controlled for AMACHECK, SPRAYCONTROL II A and AMATRON II A																
KG - 5 fold					x	x			x		x					
EG - 5 fold / GG - 5 fold					x	x			x		x					
GG - 7 fold							x	x		x			x	x		
GG - 9 fold															x	
Drawbar																
Track follow drawbar	x	x			x	x	x		x	x						
Universal drawbar					x	x	x		x	x						
Universal drawbar in rigid transport position					x	x	x	x			x	x				
Straight drawbar														x	x	
Hitch drawbar														x	x	
Running gear: Types of tyres																
Tyres for unbraked axle	x	x			x	x	x	x			x	x				
Tyres with hydraulic brakes					x	x	x	x	x	x	x	x	x	x	x	
Hydraulic brake system					x	x	x	x	x	x	x	x	x	x	x	

- Change of specifications without prior notice reserved -



Fig. 2.1

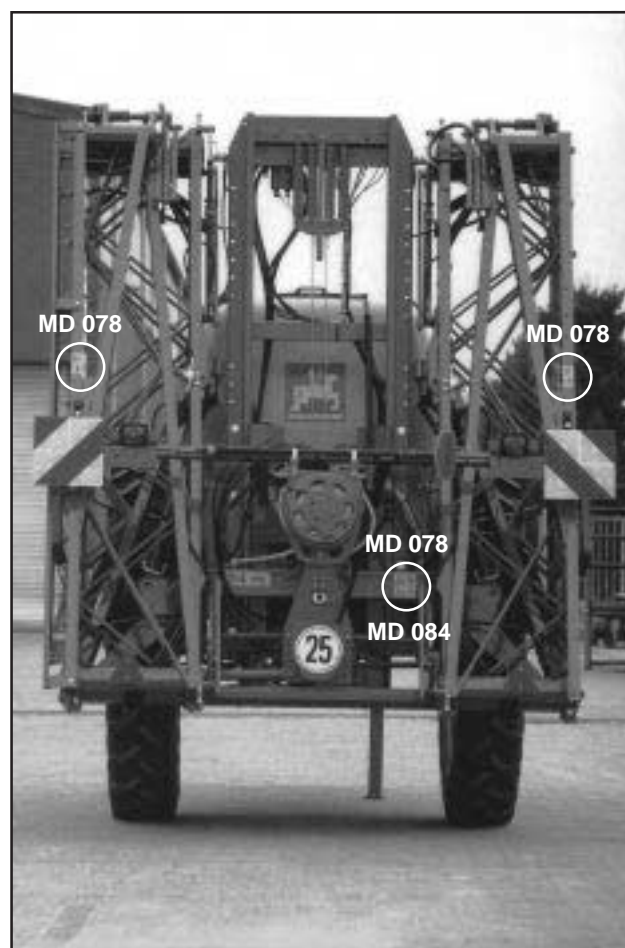


Fig. 2.2

2.0 Important Informations

2.1 Safety-/Warning-Symbol



In this operator instruction this symbol is used with all operator safety hints at which life or health of persons is in danger. Please adhere to these hints and be especially careful in such cases. Please pass on all operator safety hints also to other users of this machine. Besides the hints in this operator instruction also the general safety and accident preventive advice should be adhered to.

2.2 Attention Symbol



This symbol will always be found in such places of this instruction book which should especially be adhered to in order to comply with rules, advice, hints and the correct procedure of the operation as well as to prevent damage to the implement.

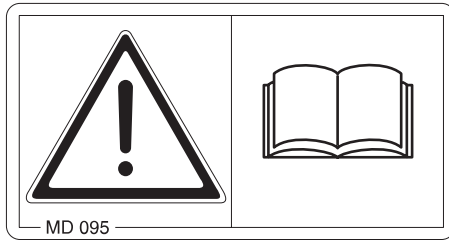
2.3 Hint Symbol



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

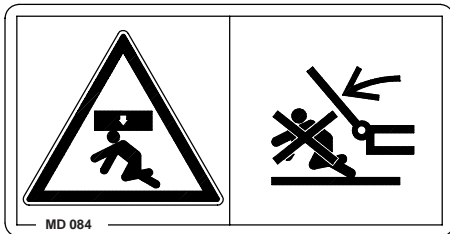
2.4 "Attention" pictographs and "hint" pictographs on the machine

- Attention pictographs indicate dangerous points on the machine. Observing these pictographs means safety for all persons using this machine. The attention pictographs always come together with safety/warning symbols.
- The hint pictographs mark machine's specific points which have to be observed to ensure a correct spraying operation.
- Strictly observe all warning and hint pictographs.
- Please pass on all safety advice also to other users.
- Please always keep all attention and hint signs clean and in well readable condition. Please ask for replacement of damaged or missing stickers from your dealer and attach to relevant place (picture-No.: = Order-No.)
- Fig. 2.1 and Fig. 2.2 show the fixing points of attention signs and hint signs. Please refer to the following pages for relevant explanations.

Picture No.: **MD 095**

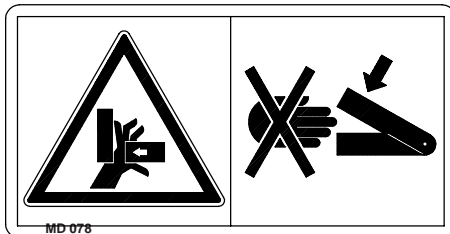
Explanation:

Before commencing operation read thoroughly operation manual and safety advice!

Picture No.: **MD 084**

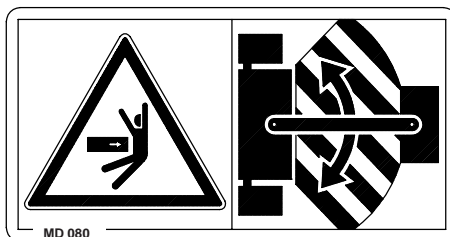
Explanation:

Never stay within the swivel area of the sprayer booms. Advise people to leave the danger area.

Picture No.: **MD 078**

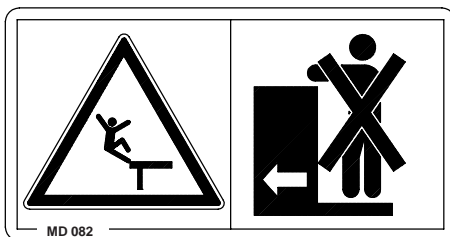
Explanation:

Never reach into the zone of danger of bruising as long as parts can still move there!

Picture No.: **MC 080**

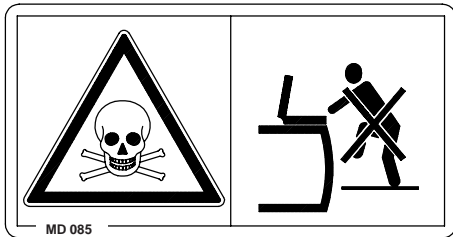
Explanation:

Do not stay within the kinking area when motor is running.

Picture No.: **MD 082**

Explanation:

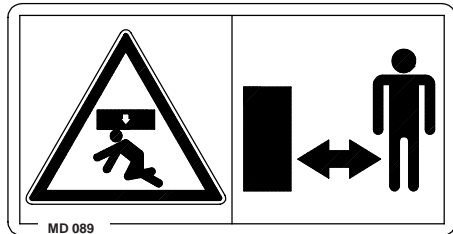
Sitting or standing on the implement during operation or road transport is not permissible.



Picture No.: **MD 085**

Explanation:

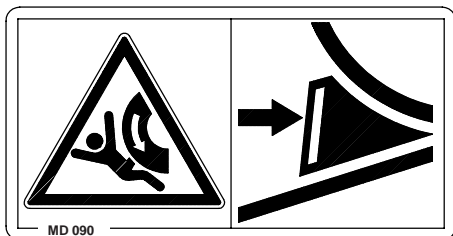
Never climb into the tank.



Picture No.: **MD 089**

Explanation:

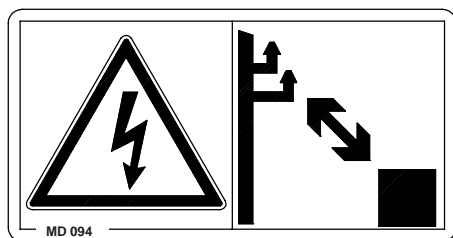
Never stay under a lifted, unsecured load.



Picture No.: **MD 090**

Explanation:

Use stop wedge before uncoupling and parking the machine.



Picture No.: **MD 094**

Explanation:

Observe sufficient clearance distance to high voltage lines.



2.5 On receipt of the machine

When receiving 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. Any claim must be made within 3 days of receipt of machine.

2.6 Operation advice (designed use of the machine)

The AMAZONE trailed field sprayer UG has exclusively been designed for the usual operation in agriculture (designed use of the machine).

Operating on slopes is possible under following conditions:

- **When operating horizontally (contour-line)**
 max. angle of machine when looking in direction
 of operation and tilting either to r.h. or l.h.: 20 %
- **When operating hill up or down:**
 max. angle of machine when operating hill up 16 %
 max. angle of machine when operating hill down 20 %

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

Under "designed use" also the adhering to the manufacturer's prescribed operation maintenance and repair conditions as well as the exclusive use of original AMAZONE spareparts is to be understood.

The AMAZONE trailed sprayer UG may only be operated, maintained and repaired by such persons who have been made acquainted with it and who have been advised about the dangers. Any damages or injuries resulting from arbitrary changes on the machine rule out the responsibility of the manufacturer.

All applicable accident preventive advice as well as any further generally accepted safety-, working-, medical- and road-traffic rules should be adhered to. Furthermore any existing law regarding the protection of crops as well as any safety advice on the machines' labels should also be adhered to.

Please pass on all safety advice also to other users of this machine.

2.7 Attention when using specific crop protection agents!

At the time of manufacturing this machine only a few crop protective agents are known which may cause damage to the materials used on the field sprayer. We like to point out that e. g. crop protective agents known to us such as Lasso, Betanal and Tramat, Stomp, Iloxan, Mudecan, Elancolan and Teridox may cause damage to pump diaphragm, hoses, tubes and tank if exposed for a longer time (20 hours) to such agents. The mentioned examples of crop protective agents may not be taken as complete. In particular it must be warned against unpermissible mixtures of two or more varying crop protective agents. Materials which tend to freeze or glue may not be used for spraying.

In case of having to spray out such aggressive crop protective agents it is recommended to immediately after the mixing with water to apply them onto the field and to carefully clean the entire system with water. There are Viton diaphragms available as a spare for the pumps which are resistant against solvent containing crop protective agents. The longevity of these diaphragms, however, is limited when they are used at low temperatures (e. g. AUS at frost temperatures).

All materials and components used in AMAZONE field sprayers are liquid fertiliser proof.



3.0 General safety and accident prevention advice



Basic principle: Always check traffic and operation safety before putting the machine to operation.

1. Adhere to the general rules of health- and safety precautions besides the advice in this instruction manual.
2. The fitted warning- and advising plates give important hints for a safe operation; adhering to them protects your own safety.
3. When making use of public roads adhere to applicable traffic rules.
4. Become acquainted with all installations and controlling devices as well as with their function before beginning with the operation. Doing this during operation would be too late.
5. The clothing of the operator should fit well. Avoid wearing any loose clothing.
6. To avoid danger of fire keep your machine clean.
7. Before beginning to drive, check surrounding area (children etc.). Ensure sufficient visibility.
8. Sitting or standing on the implement during operation or during transport is not permissible.
9. Attach implements as advised and only to the advised devices.
10. Special care should be taken when the implement is coupled to or off the tractor.
11. When attaching or removing the machine bring the supporting devices into the corresponding position (standing safety).
12. Fit weights always as advised to the fixing points provided for that purpose.
13. Adhere to the maximum permissible axle loads, total weights and transport measurements.
14. Fit and check transport gear, traffic lights, warnings and guards.
15. The release ropes for quick coupler should hang freely and in the lowered position must not release by themselves.
16. During driving never leave the operator's seat.
17. Mount the implement as prescribed. Moving behaviour, steerability and braking are influenced by mounted implements, trailers and ballast weights. Check sufficient steerability and braking.
18. When lifting a three-point-implement the front axle load of the tractor is reduced depending on its size. The sufficient front axle load (20 % of the tractor net weight) has to be observed.
19. When driving round bends note the width of the machine and/or the changing centre of gravity of the implement.
20. Put implement into operation only when all guards are fixed in position.
21. Never stay or allow anyone to stay within the operating area.

22. Never stay or allow anyone to stay within the operating area!
23. On all pivoting parts actuated by external powers (e. g. hydraulics) exists danger of injury by bruising and crushing.
25. Before leaving the tractor lower the machine to the ground. Actuate the parking brake, stop the engine and remove ignition key.
26. Allow nobody to stand between tractor and implement if the tractor is not secured against rolling away by the parking brake and/or by the supplied chocks.
27. Secure sprayer booms in transport position.
28. When filling the tank do not exceed the nominal volume.
29. Use the platform only for filling. During use riding on the platform is not permissible.

3.1 Means for traffic safety

1. Before starting to travel on public roads check function of brakes.
2. Before travelling down hill put tractor in lower gear.
3. Stop tractor immediately if any distortion in the function of the brakes is noticed. Repair faults without delay.

3.2 Tractor/trailed implements

1. When fitting the machine to the three point linkage of the tractor bring all control levers into such a position that unintended lifting or lowering is impossible.
2. When fitting to the three-point linkage the mounting categories at the tractor and the implement must be comparable or must be made comparable.
3. There is danger of injury when mounting implements.
4. Secure trailers against rolling away (use parking brakes, stopping wedges).
5. In the area of the three point linkage there is danger of injury by its squeezing and shearing places.
6. Never allow anyone to stay between tractor and implement without having secured by stop wedges against rolling away.
7. Implements and trailers should only be fitted to the provided devices.
8. Consider the max. permissible load of trailer draw bars, hitches or tool bars and tyres.
9. When fitting draw bars sufficient manoeuvrability on the hitching point should be provided.
10. Hitch up trailers according to the law. Check the function of the brakes of the trailed implement. Adhere to the manufacturer's advice.
11. Whenever travelling with trailers the tractor brake pedals must be locked together.



12. For travelling on public roads bring all devices into transport position.
13. When driving in bends with trailed or mounted implements mind the wide protrusions and the dynamic forces of the implement.
14. Before travelling in public roads secure all swivelable components against endangering change of their position.
15. When operating the supporting devices danger by squeezing or shearing may occur.
16. The adjustment of loaded drawbars should always be conducted by a suited workshop.
17. At one axle trailers mind the unloading of the tractor front axle and the influence to the steerability of the tractor by the rear load.
18. Park implement/trailer safely (prevent tipping over or rolling away).
19. As a matter of principle always remove ignition key before conducting any repair, maintenance and cleaning operation.
20. Keep all guards fitted and always in serviceable condition.

3.3 Operating with PTO shafts

1. Use only PTO shafts which are designed for the implement and which are equipped with all legally requested guardings (CE marked).
2. Guard tubes and cones of the PTO shaft as well as a tractor and implement side PTO guard must be fitted and kept in a proper condition.
3. At PTO shafts always see the advised tube is overlapping in transport- and operating position.
4. Fit and remove the PTO shaft only when engine is stopped and ignition key is removed.
5. Ascertain correct fitting and securing of the PTO support.
6. Prevent PTO guard from spinning by fixing the provided chain to a nearby static part.
7. Before switching on the PTO shaft ensure that the chosen PTO speed of the tractor corresponds to the allowable implement input speed.
8. When using the ground-related PTO take into account that the PTO speed depends on the driving speed and that the turning direction is reversed when driving backwards.
9. Before switching on the PTO shaft take care that no one stays in the danger zone of the implement.
10. Never switch on the tractor PTO while engine is stopped.
11. When operating with a switched-on PTO shaft allow no one to stay near to the spinning PTO- or universal joint shaft.
12. Always stop PTO when it is not needed or when the shaft is in an adverse position.

13. Attention: After switching off the PTO the mounted implement may continue to run by its dynamic mass. During this period never come too close to the implement. Begin to work on the implement only after it has come to a full standstill.
14. 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 pulled out.
15. Place the uncoupled PTO shaft on the retaining device provided.
16. When travelling in curves mind the permissible angling and length of sliding of the PTO-shaft.
17. After removal of PTO shaft apply guard cap onto PTO stub.
18. Immediately repair any damages before operation to avoid consequential problems.

3.4 Hydraulic system

1. The hydraulic system is under high pressure (please also refer to 3.4 / 07).
2. Connect hydraulic hoses to the hydraulic rams and motors according to the advice in the instructions.
3. When fitting the hydraulic hoses to the tractor hydraulic sockets always ensure that the hydraulic system at the tractor's as well as at the implement side is without pressure.
4. To avoid wrong hydraulic connection, sockets and plugs should be marked (e. g. colour coded). This helps to prevent contrary function (lifting instead of lowering or vice versa) and reduces the danger of accident.
5. Regularly check hydraulic hoses and pipe lines and exchange if found defective. The replacement hoses and pipe lines must meet with the implement manufacturer's technical standards.
6. When searching for leaks appropriate aids should be used because of the danger of injury.
7. Liquids leaking under high pressure (Diesel fuel, hydraulic oil) can penetrate the skin and cause severe injury. When injured see a doctor immediately! Danger of infection!
8. Before starting to do repair work to the hydraulic system relieve it from pressure by actuating the control lever accordingly, lower machine to the ground and stop tractor engine.
9. The period of use of any hose circuit should not exceed six years including a possible storing period of two years maximum. Also when stored and used properly hoses and hose circuits do age. Therefore their longevity and period of use is limited. Deviations from the above may be accepted by the Health- and Safety Authorities depending on the experience they have had and the danger potential. For hoses and hose circuits made of thermoplasts other guide lines may prevail.



3.5 Brakes

1. Check functions of brake before travelling on public roads.
2. Brake systems should regularly be carefully checked.
3. Setting and repair work at the braking device must only be conducted by specialists, workshops or approved services.
4. When travelling on public roads single wheel braking on the attached tractor should be excluded (lock both pedals).

3.6 Bolted connections, tyres

1. Repair work to the tyres may only be conducted by trained personnel and with special mounting tools.
2. When working on the wheels make sure that the trailed sprayer is safely parked and secured against rolling away (stop wedges).
3. Excessive air pressure may cause the tyre to explode.
4. Check air pressure regularly.
5. All fixing bolts and nuts should be retightened as advised by the manufacturer.
6. This retightening should be conducted after every change of the wheels.

3.7 Electric outfit

1. When work is conducted at the electric outfit always disconnect the battery (negative pole).
2. Use prescribed fuses only. When using too strong fuses the electric outfit may be damaged - danger of fire.
3. Make sure the polarity is correctly fitted. First connect positive pole and then negative pole. When disconnecting vice versa.
4. Always provide plus pole with supplied cover. At accidental earth contact there is danger of explosion.
5. Avoid sparks and open fire near the battery.

3.8 General safety and accident prevention advice for maintenance, repair and cleaning

1. Repair-, maintenance- and cleaning operations as well as remedy of function faults should principally be conducted with a stopped drive and engine. Remove ignition key.
2. Check nuts and bolts for tightness and retighten if necessary.
3. Before conducting electric welding operations on tractor or on the mounted implement, remove cable from generator and battery.
4. Any spare parts fitted must, in minimum meet with the implement manufacturers' fixed technical standards. This is, for example, ensured by using original **AMAZONE** spareparts. Non original parts invalidate warranty and contravene these documentation for safe use.

3.9 Basic safety rules, crop protection equipment

1. Adhere to the recommendations of the crop agent manufacturer.
 - Protective clothing,
 - Warning hints,
 - Metering-, using- and cleaning advice.
2. **Adhere to advice of the crop protection law.**
3. Never open hoses or tubes which are pressurized.
4. If spare hoses are to be fitted, use only original AMAZONE-hoses (hydraulic hoses 290 bar) which resist the chemical, mechanical and thermal strain. Principly use only hose clamps made of stainless steel when fitting hoses or tubings (refer to health- and safety advice regarding fitting of hoses).
5. Repair work inside the sprayer tank may only be started after thorough cleaning and by wearing a breath protective mask. For safety reasons a second person should watch the sork from outside the tank.
6. The following should be noted when repairing sprayers which have been used for liquid fertiliser with Ammonium Nitrate Urea solutions:

Residue of Ammonium-Nitrate-Urea solutions can produce on top or inside the implement a salt by evaporation of the water. Hereby pure Ammonium Nitrate and urea is developed. In pure form Ammonium Nitrate in conjunction with organic material, e. g. urea react explosively if during repair operations (e. g. welding, grinding, filing) the critical temperatures are reached. The salt of the Ammonium Nitrate Urea solution is water dilutable, i. e. by thorough washing with water of the implement or the part to be repaired this danger is removed. Therefore, before starting to repair conduct a thorough cleaning of the implement with water.
7. When filling the tank do not exceed the nominal volume.



When handling spray agent always wear the correct protective clothing as e. g. gloves, overall, protective glasses etc.



In tractor cabs with ventilation fans exchange filter for fresh air delivery by active carbon filters.



Cosider the compatibility of spray agents and materials of the implement



Do not spray any materials which tend to glue or to grow stiff.



Crop sprayers for safe guarding man, naimal and environmental must never be filled from open sources.



From the public water net work crop sprayers may only be filled in free fall.

UG 2000 Special

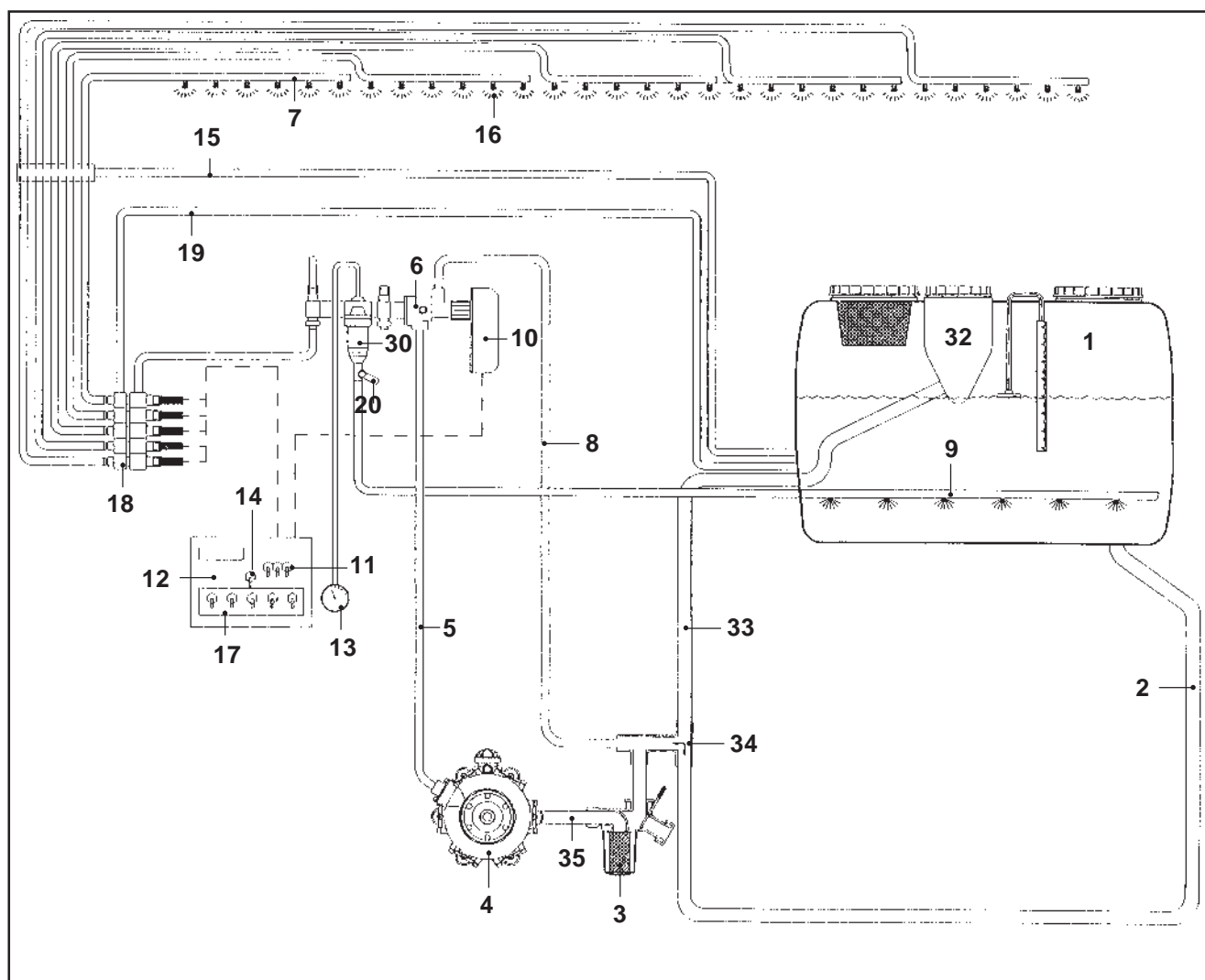


Fig. 4.1

4.0 Product description trailed field sprayers AMAZONE UG

The trailed sprayers AMAZONE UG consist of the assembly groups base implement, travel gear, draw bar, control chest, pump unit and sprayer boom.

4.1 AMAZONE UG 2000 Special / Pump capacity 210 l/min

The main pump (Fig. 4.1/4) sucks the spray liquid from the tank (Fig. 4.1/1) via the suction hose (Fig. 4.1/2) and filter tap (Fig. 4.1/3) and pressurises (Fig. 4.1/5) to the automatic metering control (Fig. 4.1/6). The automatic metering control splits up the pressurized stream of liquid (pressure depends on the pump speed) always in an equally preset ratio (depending on the preset spray pressure and chosen agitation intensity) to the sprayer boom (Fig. 4.1/7), return flow (Fig. 4.1/8) and perhaps to the hydraulic intensive agitator (Fig. 4.1/9).

The required spray rate (l/ha) will be set by the spray pressure. To do this the electrically remote controlled electric motor (Fig. 4.1/10) controls the resetting of the automatic metering device. The electric motor is activated by the \pm key (Fig. 4.1/11) of the SKS switch box (Fig. 4.1/12). The preset spray pressure can be read off the liquid fertiliser proof manometer (Fig. 4.1/13) for on the digital pressure display at the switch box.

Switching on or off the liquid supply to the sprayer booms is controlled at the switch box by the central boom feed control (fig. 4.1/14). Any residual pressure remaining in the sprayer boom after switching off the feed shall be depressurized via the boom part section return flow (fig. 4.1/15). The spray liquid is returned into the tank via the boom part section return flow. This results in a drip free switching off the jets (Fig. 4.1/16) with the aid of the built-in diaphragms (see chapter 11.0).

When actuating the boom part section switch (Fig. 4.1/17) at the switch box the on- or off control of individual feed to boom sections functions via the equal pressure control unit (Fig. 4.1/18). There is one each equal pressure unit for every boom part section. These equal pressure units are connected with the equal pressure control unit return flow (Fig. 4.1/19). When switching off one boom part section supply the liquid which is normally used for this boom part section is led into the corresponding equal pressure unit and via the equal pressure control chest return flow into the tank without increasing the spray pressure.

The hydraulic intensive agitation (Fig. 4.1/9) brings a uniform concentration of the spray liquid inside the tank. The agitation intensity can be adjusted by the step tap (Fig. 4.1/20) (please refer to chapter 7.2).

The self cleaning pressure filter (Fig. 4.1/30) of the control chest filters the spray liquid on its way to the sprayer boom (please refer to chapter 7.5).

The cleaning of the spray system is conducted with fresh water from the rinsing water tank (Fig. 4.1/32). For this purpose the hose (Fig. 4.1/33) is connectable to the suction hose (fig. 4.1/35) via the direction tap (Fig. 4.1/34) (please refer to chapter 7.3).

UG 2200 Power

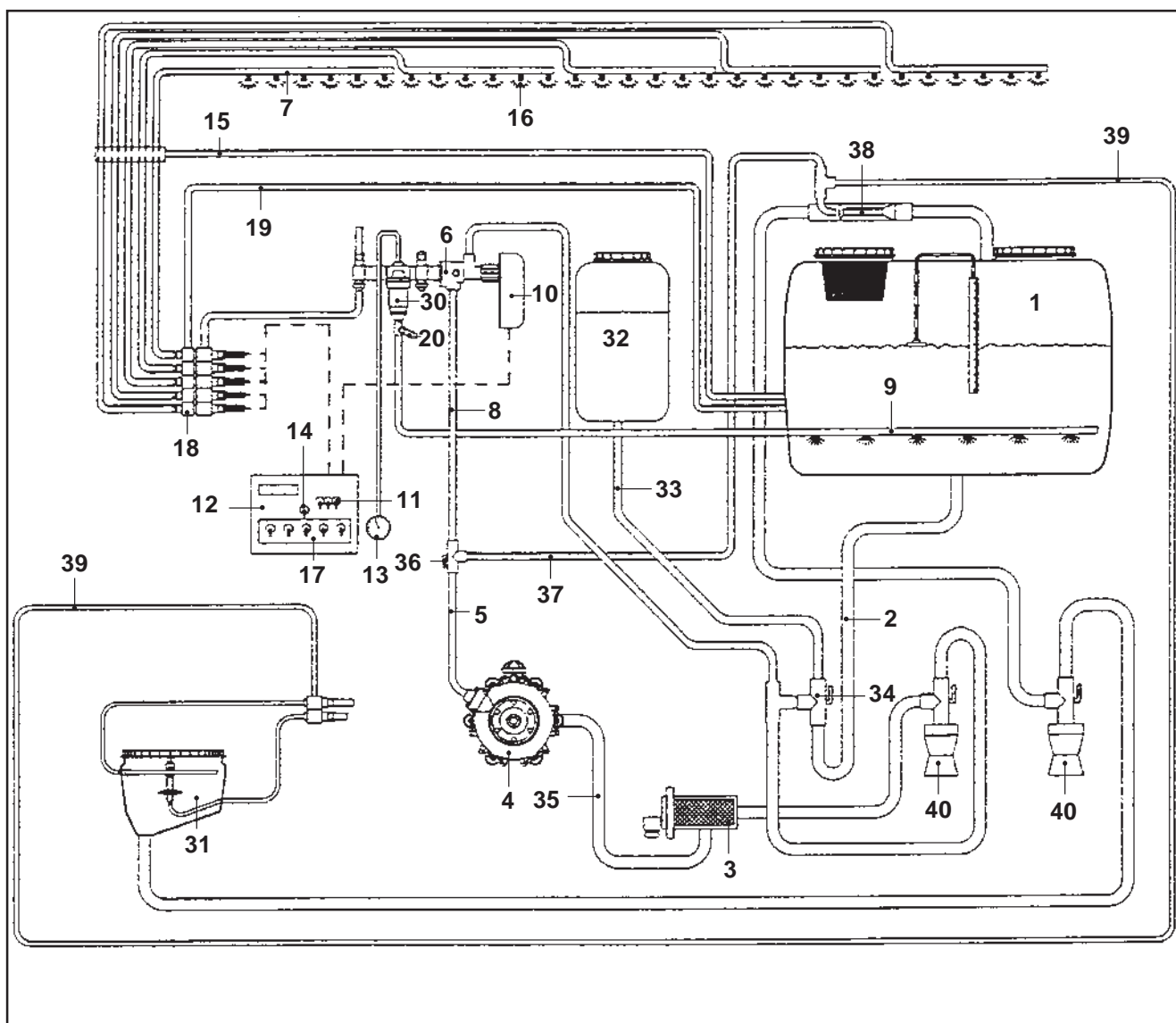


Fig. 4.2

4.2 AMAZONE UG 2200 Power, UG 3000 / Pump capacity 210 and 250 l/min.

The main pump (Fig. 4.2/4) sucks the spray liquid from the tank (Fig. 4.2/1) via the suction hose (Fig. 4.2/2) and filter tap (Fig. 4.2/3) and pressurises (Fig. 4.2/5) to the automatic metering control (Fig. 4.2/6). The automatic metering control splits up the pressurized stream of liquid (pressure depends on the pump speed) always in an equally preset ratio (depending on the preset spray pressure and chosen agitation intensity) to the sprayer boom (Fig. 4.2/7), return flow (Fig. 4.2/8) and perhaps to the hydraulic intensive agitator (Fig. 4.2/9).

The required spray rate (l/ha) will be set by the spray pressure. To do this the electrically remote controlled electric motor (Fig. 4.2/10) controls the resetting of the automatic metering device. The electric motor is activated by the \pm key (Fig. 4.2/11) of the SKS switch box (Fig. 4.2/12). The preset spray pressure can be read off the liquid fertiliser proof manometer (Fig. 4.2/13) for on the digital pressure display at the switch box.

Switching on or off the liquid supply to the sprayer booms is controlled at the switch box by the central boom feed control (fig. 4.2/14). Any residual pressure remaining in the sprayer boom after switching off the feed shall be depressurized via the boom part section return flow (fig. 4.2/15). The spray liquid is returned into the tank via the boom part section return flow. This results in a drip free switching off the jets (Fig. 4.2/16) with the aid of the built-in diaphragms (see chapter 11.0).

When actuating the boom part section switch (Fig. 4.2/17) at the switch box the on- or off control of individual feed to boom sections functions via the equal pressure control chest (Fig. 4.2/18). There is one each equal pressure unit for every boom part section. These equal pressure units are connected with the equal pressure control chest return flow (Fig. 4.2/19). When switching off one boom part section supply the liquid which is normally used for this boom part section is led into the corresponding equal pressure unit and via the equal pressure control chest return flow into the tank without increasing the spray pressure.

The hydraulic intensive agitation (Fig. 4.2/9) brings a uniform concentration of the spray liquid inside the tank. The agitation intensity can be adjusted by the step tap (Fig. 4.2/20) (please refer to chapter 7.2).

The self cleaning pressure filter (Fig. 4.2/30) of the control chest filters the spray liquid on its way to the sprayer boom (please refer to chapter 7.5).

For preparing the spray cocktail the required spray agents are filled into the provided induction bowl (Fig. 4.1/31) to be sucked up into the sprayer tank. Filling in water can also be done via the supply hose for the induction bowl (Fig. 4.2/39).

The cleaning of the spray system is conducted with fresh water from the rinsing water tank (Fig. 4.1/32). For this purpose the hose (Fig. 4.2/33) is connectable to the suction hose (Fig. 4.2/35) via the direction tap (Fig. 4.2/34) (please refer to chapter 7.3). The connection may also be conducted via the two suction-joints (camlock) (Fig. 4.2/40).

The filling of the tank can also be done via the injector hose (Fig. 4.2/37) and the injector (Fig. 4.2/38) when the direction tap (Fig. 4.2/36) is switched to the positions "inducting" or to "sucking in" (please see para. 6.0).

UG 3000 Power

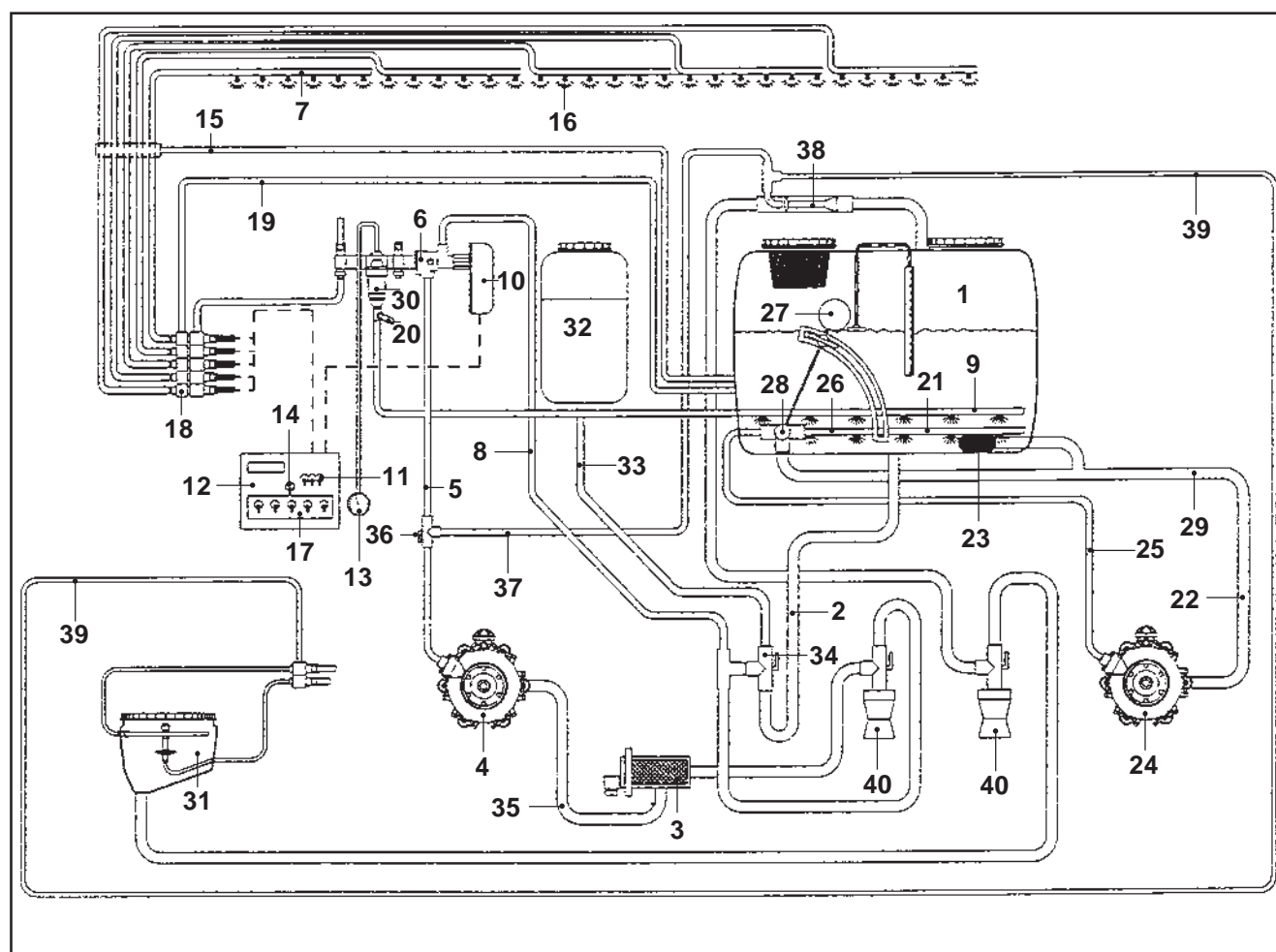


Fig. 4.3

4.3 AMAZONE UG 2200 Power, UG 3000 Power, UG 4500 Magna / Pump capacity 350 and 420 l/min.

The main pump (Fig. 4.3/4) sucks the spray liquid from the tank (Fig. 4.3/1) via the suction hose (Fig. 4.3/2) and filter tap (Fig. 4.3/3) and pressurises (Fig. 4.3/5) to the automatic metering control (Fig. 4.3/6). The automatic metering control splits up the pressurized stream of liquid (pressure depends on the pump speed) always in an equally preset ratio (depending on the preset spray pressure and chosen agitation intensity) to the sprayer boom (Fig. 4.3/7), return flow (Fig. 4.3/8) and perhaps to the hydraulic intensive agitator (Fig. 4.3/9).

The required spray rate (l/ha) will be set by the spray pressure. To do this the electrically remote controlled electric motor (Fig. 4.3/10) controls the resetting of the automatic metering device. The electric motor is activated by the \pm key (Fig. 4.3/11) of the SKS switch box (Fig. 4.3/12). The preset spray pressure can be read off the liquid fertiliser proof manometer (Fig. 4.3/13) for on the digital pressure display at the switch box.

Switching on or off the liquid supply to the sprayer booms is controlled at the switch box by the central boom feed control (fig. 4.3/14). Any residual pressure remaining in the sprayer boom after switching off the feed shall be depressurized via the boom part section return flow (Fig. 4.3/15). The spray liquid is returned into the tank via the boom part section return flow. This results in a drip free switching off the jets (Fig. 4.3/16) with the aid of the built-in diaphragms (see chapter 11.0).

When actuating the boom part section switch (Fig. 4.3/17) at the switch box the on- or off control of individual feed to boom sections functions via the equal pressure control chest (Fig. 4.3/18). There is one each equal pressure unit for every boom part section. These equal pressure units are connected with the equal pressure control chest return flow (Fig. 4.3/19). When switching off one boom part section supply the liquid which is normally used for this boom part section is led into the corresponding equal pressure unit and via the equal pressure control chest return flow into the tank without increasing the spray pressure.

The hydraulic intensive agitation (Fig. 4.3/9) brings a uniform concentration of the spray liquid inside the tank. The agitation intensity can be adjusted by the step tap (Fig. 4.3/20) (please refer to chapter 7.2).

When two pumps are fitted the second agitator (Fig. 4.3/21) with its automatic tank level agitation results additionally in homogenous spray mixture. The spray cocktail will be sucked in via the suction hose (Fig. 4.3/22) and the filter tap (Fig. 4.3/23) by the agitation pump (Fig. 4.3/24). The sucked in spray liquid is pressurised through the pressure hose (Fig. 4.1/25) to the agitator tube (Fig. 4.3/26). Depending on the tank level the setting valve (Fig. 4.3/28) which is controlled by the floatation body (Fig. 4.3/27) brings about more or less strongly the regulation between the agitator tube (Fig. 4.3/26) and the return flow tube (Fig. 4.3/29). This way an automatic setting of the agitation intensity is achieved (please refer to chapter 7.2).

The self cleaning pressure filter (Fig. 4.3/30) of the control chest filters the spray liquid on its way to the sprayer boom (please refer to chapter 7.5).

For preparing the spray cocktail the required spray agents are filled into the provided induction bowl (Fig. 4.2/31) to be sucked up into the sprayer tank. Filling in water can also be done via the supply hose for the induction bowl (Fig. 4.3/39).

The cleaning of the spray system is conducted with fresh water from the rinsing water tank (Fig. 4.3/32). For this purpose the hose (Fig. 4.3/33) is connectable to the suction hose (Fig. 4.3/35) via the direction tap (Fig. 4.3/34) (please refer to chapter 7.3). The connection may also be conducted via the two suction-joints (camlock) (Fig. 4.3/40).

The filling of the tank can also be done via the injector hose (Fig. 4.3/37) and the injector (Fig. 4.3/38) when the direction tap (Fig. 4.3/36) is switched to the positions "inducting" or to "suckung-in" (please see para. 6.0).

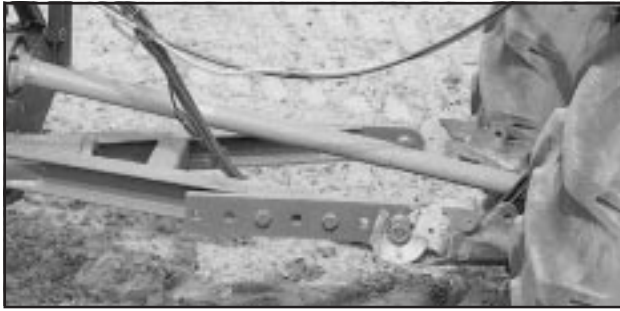


Fig. 5.1



Fig. 5.2

5.0 Drawbar, Chassis, Hitching up or off the trailed sprayer



When hitching on or off adhere to the safety advice.



When linking up with the drawbar make sure sufficient manoeuvrability is available at the hitching point.



When coupling up the trailed sprayer and driving with it on public roads or ways adhere to the applicable traffic law.

5.1 Drawbar

- Attach the drawbar in the tool bar fitted to the tractor's hydraulic lower links. When first fitting adjust joint geometry if necessary.



Mount trailed sprayer about horizontally to the tractor, i. e. the frame staying parallel with the ground.



Consider maximum permissible supporting load of trailer draw bars, pulling pendulums or hitches.



Always fit wide angle joint of PTO shaft to the pivoting side of the drawbar.

Fitting

- Attach track follow drawbar and universal drawbar to the lower links of the three-point hydraulics of the tractor. When first fitting adjust joint geometry if necessary.
- Attach straight drawbar and hitch drawbar to the tractor coupling or on the hitch-suspension.
- Turn upwards drawbar jack (straight drawbar and hitch drawbar) by the crank, unlock, slide upwards and lock with fixing pin.
- Secure fixing pin with clip pin.
- At hydraulic drawbar steering (Version I) connect the hydraulic hoses (double acting control valve).

Detaching

- Lower drawbar jack, at straight drawbar or hitch drawbar additionally move downwards by the crank and lock with clip pin.
- Secure fixing pin with clip pin.
- At hydraulic drawbar steering (Version I) disconnect hydraulic hoses.
- Uncouple machine.

5.1.1 Track follow drawbar and Universal drawbar



On UG 3000 the use of track follow drawbar and universal drawbar (in track follow position) are only permissible in conjunction with a chassis equipped with an air assisted brake system.



Adjust steering geometry of drawbar to pulling tractor.



Lower links of tractor three point hydraulics must be stabilised with stabiliser bars or chains. Lower links of tractors must be braced to prevent a to and fro movement of the trailed sprayer.

Fig. 5.1 Track follow drawbar

Fig. 5.2 Universal drawbar

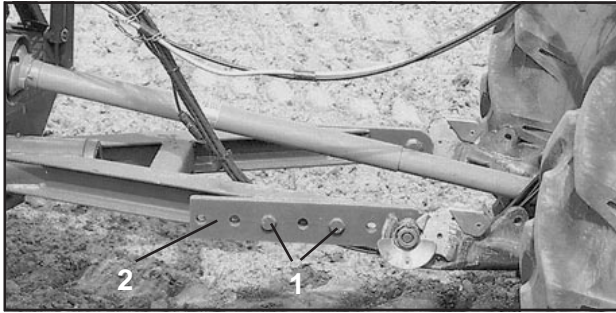


Fig. 5.1

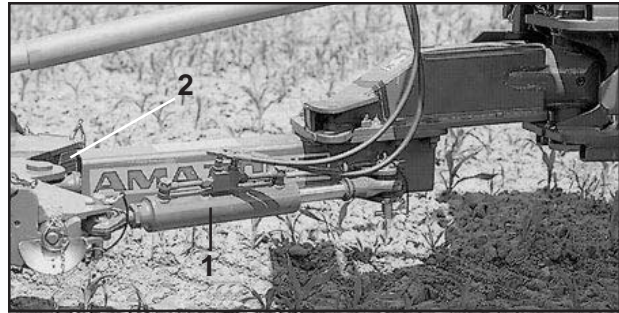


Fig. 5.3

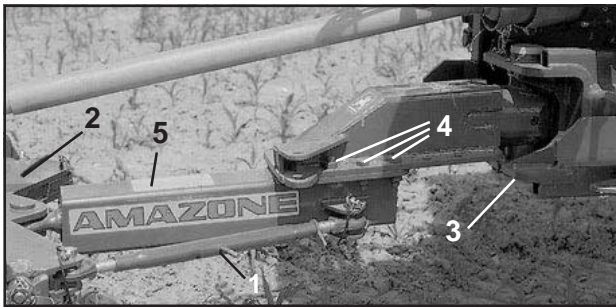


Fig. 5.2



Fig. 5.4

Track follow drawbar

The **track follow drawbar** is a drawbar with **true track follow effect**, i. e. the sprayer wheels automatically follow the wheels of the tractor.

Universal drawbar

The **universal drawbar** can be used as drawbar **with or without track follow effect** and **with or without hydraulic drawbar steering / slope steering** (special option). As standard this drawbar comes with a fixing rod.

For the hydraulic drawbar control (5.3/1) which can be retrofitted at any time, the fixing rod is replaced by a hydraulic ram. For maintaining the track follow effect when **working on steep hill sides** (sprayer may tend to slide down) the steering of the trailed sprayer can be corrected manually on the control unit (Version I) or by the control box SKS 50/70/90 (Version II) from the tractor cab.

In row crops (e. g. potatoes or vegetable) the hydraulic drawbar control and the manual steering correction ensure that crop damage caused by driving or manoeuvring into and out of the rows is reduced.

The hydraulic drawbar control / slope steering is offered in 2 versions:

- **Version I** via double acting control valve.
- **Version II via switch box** SKS 50/70/90 – only possible with Profi-folding in conjunction with control units FG and GG.

The following versions of operation are possible:



Under no circumstances fixing and rod and hydraulic control may fitted simultaneously.

1. With track follow effect

The blocking rod (Fig. 5.2/1) is fitted to the front of the tool bar (Fig. 5.2/2). In this case the pivoting point is in the middle (Fig. 5.2/3) between the axle of the trailed sprayer and the tractor rear axle. Hereby the wheels of the trailed sprayer automatically follow the wheels of the tractor in the tramlines.

When fitting

- the fixing rod a counterweight (5.2/4) has to be fitted to the drawbar
- the hydraulic drawbar steering two counterweights (5.3/4) have to be fitted to the drawbar.

2. Without track follow effect

Attach fixing rod (5.4/1) or the hydraulic ram (5.3/1) at the rear of the basic implement. In this case the pivoting point (5.4/2) is between the lower links of the tractor. Hereby the steerability at road transport at higher speeds is improved.

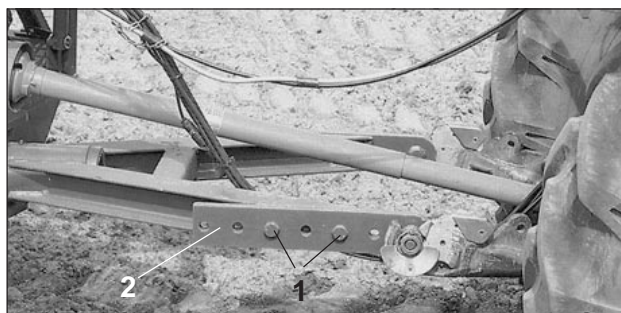


Fig. 5.1



Fig. 5.3

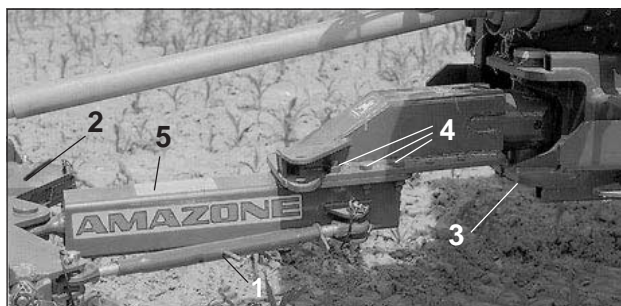


Fig. 5.2



Fig. 5.4

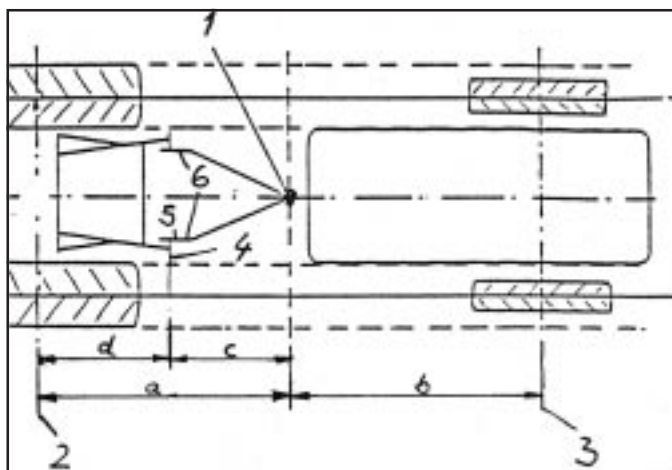


Fig. 5.5



Fig. 5.6

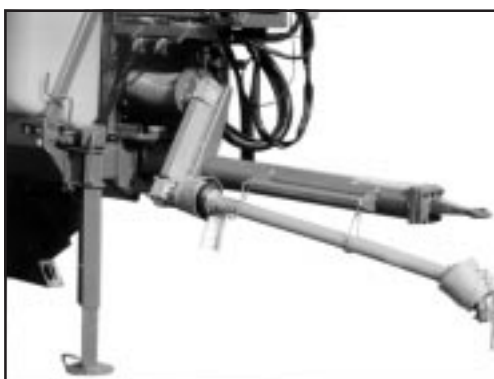


Fig. 5.7

First fitting or setting up of the track follow draw bar to obtain a true track following

A true track following of the trailed sprayer is achieved when the pivoting point (Fig. 5.5/1) of the track follow draw bar lies exactly in the centre between the tractor rear axle (Fig. 5.5/2) and the axle (Fig. 5.5/3) of the trailed sprayer "**a = b**".

To achieve this the distance "**c**" between the pivoting point (fig. 5.5/1) and the lower link connections (Fig. 5.5/4)

- of the track follow draw (Fig. 5.1) bar is adjustable from 1020 to 1260 mm (4 times in steps of 80 mm).
- of the universal drawbar (Fig. 5.2) bar is adjustable from 1100 to 1260 mm (3 times in steps of 80 mm).

Setting the lower link connections when the trailed sprayer is not connected:

- Determine the measure "**c**" between the pivoting point and the lower link connection of the track follow drawbar:

$$c = a - d$$

- a, b: Spacing between the tractor rear axle and the axle of the trailed sprayer.
- c: Spacing between the pivoting point and the lower link connection of the track follow drawbar.
- d: Spacing centre rear axle and lower link connection of tractor.
- Undoing and removing the fastening bolts (Fig. 5.1/1 resp. 5.2/4) off lower link arm.
- Bolt the lower link arms (Fig. 5.1/2) resp. the drawbar (Fig. 5.2/5) according to measurement "**c**".
- Retightening the fixing bolts with a torque of **540 Nm**.

5.1.2 Straight drawbar and hitch drawbar

Fig. 5.6 Hitch drawbar

Fig. 5.7 Straight drawbar

The **straight drawbar** and the **hitch drawbar** can be used as **drawbar with or without the true track following / slope steering**. As standard the drawbars are equipped with a fixing rod.

For the **true track following /slope steering** the fixing rod is replaced by the hydraulic drawbar steering which can be retrofitted at any time. When **working at the headlands** (no truck track following of the trailed sprayer), **and/or when working on steep hills** (sprayer tends to slide down) this allows a **manual steering** adjustment on the control unit (Version I) or via the switch box SKS 50/70/90 (Version II) from the tractor cab.

In row crops (e. g. potatoes or vegetable) the hydraulic drawbar control and the manual steering correction ensure that crop damage caused by driving or manoeuvring into and out of the rows is reduced.

The hydraulic drawbar control / slope steering is offered in 2 versions:

- **Version I** via double acting control valve.
- **Version II via switch box** SKS 50/70/90 – only possible with Profi-folding in conjunction with control units FG and GG.

For the **straight drawbar** a **trail-control-regulating unit** (chapter 12.10) is available as option and can be retrofitted at any time. By this regulating unit an **automatic true track following** is achieved. Additionally, when **working on steep hills** (sprayer tends to slide down) to achieve a **true track following** by a manual adjustment on the trail-control-regulating unit from the tractor cab (please also refer to chapter 12.10).



5.2 Running gear

5.2.1 Running gear with unbraked axle

The following restrictions have to be observed for UG 2000 Special, UG 2200 Power and UG 3000 Power with unbraked axle:

- permissible max. driving speed: 25 k.p.h.
- permissible total weight : 3500 kgs
(3000 kg axle load and 500 kg hitch load).
- Payload on public roads: 3500 kg minus net weight of the individual components
(depending on execution, please also refer to para.15.3)
- Payload on non-public roads: for husbandry operations (smaller or 10 k.p.h.)
unrestricted filling with any type of tyre..

5.2.2 Running gear with dual circuit air brake system or hydraulic brake system

For UG 2200 Power, UG 3000 Power and UG 4500 Magna with air brake system or hydraulic brake system observe the following restrictions:

- permissible max. speed: **25 km/h**

Hitch load [kg]	Tyres	Permissible total weight (depending on execution)			Payload (permissible total weight minus empty weight, depending on execution)		
		Power		Magna	Power		Magna
		UG 2200	UG 3000	UG 4500	UG 2200	UG 3000	UG 4500
500	9.5 R44	ca. 5,4	ca. 5,4		ca. 2,8	ca. 3,0	
	11.2 R42	ca. 5,5	ca. 6,1		ca. 2,8	ca. 3,9	
	11.2 R48	ca. 5,5	ca. 6,5		ca. 2,8	ca. 3,9	
	12.4 R46	ca. 5,5	ca. 6,5		ca. 2,8	ca. 3,9	
	16.9 R38	ca. 5,5	ca. 6,5		ca. 2,8	ca. 3,9	
	480/70 R38	ca. 5,5	ca. 6,5		ca. 2,8	ca. 3,9	
1500	13.6 R48			ca. 8,5			ca. 5,0
	18.4 R38			ca. 8,2			ca. 4,8
	20.8 R38			ca. 10,1			ca. 5,8



A complete filling of the sprayer with liquid fertiliser is not allowed when the UG 3000 Power is equipped with tyres 9.5 R 44 and the UG 4500 Magna with tyres 13.6 R 48 or 18.4 R 38, due to reduced bearing capacity of these tyres.



Fig. 5.8



Fig. 5.9

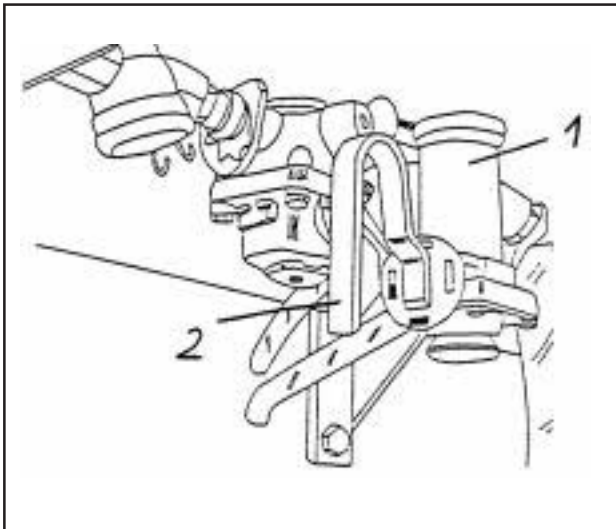


Fig. 5.10

5.2.2.1 Dual circuit air brake system Coupling up or Uncoupling

Coupling up

- **Coupling of airbrake system (Fig. 5.6) (if available) to tractor:**

- Coupling claw - yellow - to brake hose
- Coupling claw - red - to second hose






Before coupling check cleanness of coupling claws and ensure correct catching.



Check guidance of hoses. Hoses must never rub on strange parts.

- Before starting to travel the brake pressure regulator (Fig. 5.10/1) on the hand lever (Fig. 5.10/2) has to be adjusted manually according to the load of the implement.

Sprayer filled	-	full load	
Sprayer partly filled	-	half load	
Sprayer empty	-	empty	

- Release parking brake (Fig. 5.8/1)
 - Turn hand crank located at the side of the chassis to the left until stop.



To ensure the proper function of the parking brake check whether the brake cable is tightly tensioned when the parking brake has been released. If this not the case, readjust the brake cable at the hollow plate (please also refer to para. 13.2)



After any adjustment of the brakes conduct a brake test.

- Remove stop wedges, affix them in the pockets (Fig. 5.8/2) at the frame side and secure.

Uncoupling



The trailed sprayer may only be uncoupled and parked with empty tank on level ground (otherwise danger of tipping over!).

- Before uncoupling the trailed sprayer secure against unintended rolling with the two stop wedges (Fig. 5.9/1)
- Apply parking brake (Fig. 5.8/1).
 - Turn hand crank on the side of the chassis to the right until stop.
- Uncouple hydraulic joint

Manœuvring the uncoupled sprayer

- For manœuvring the uncoupled sprayer release the parking brake.



After manœuvring apply parking brake.

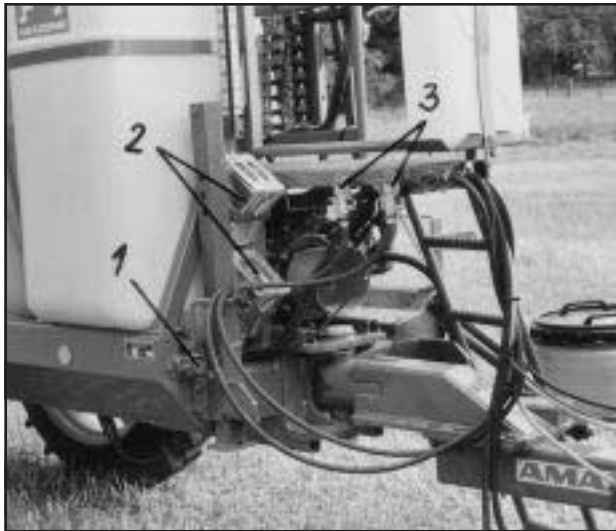


Fig. 5.8



Fig. 5.9

5.2.2.2 Hydraulic brake system with parking brake

A hydraulic brake on the tractor is required which controls the hydraulic brake system of the field sprayer (not permitted in Germany).

Coupling

- Connect hydraulic joint of the hydraulic brake of the trailed sprayer to the hydraulic joint of the hydraulic tractor brake.



Before coupling ensure that the hydraulic joint is clean and tighten by hand!



Check guidance of hoses. Hoses must never rub on strange parts.

- Release parking brake (Fig. 5.8/1)
 - Turn hand crank located at the side of the chassis to the left until stop.



To ensure the proper function of the parking brake check whether the brake cable is tightly tensioned when the parking brake has been released. If this not the case, readjust the brake cable at the hollow plate (please also refer to para. 13.2)



After any adjustment of the brakes conduct a brake test.

- Remove stop wedges, affix them in the pockets (Fig. 5.8/2) at the frame side and secure.

Uncoupling



The trailed sprayer may only be uncoupled and parked with empty tank on level ground (otherwise danger of tipping over!).

- Before uncoupling the trailed sprayer secure against unintended rolling with the two stop wedges (Fig. 5.9/1)
- Apply parking brake (Fig. 5.8/1).
 - Turn hand crank on the
- Uncouple hydraulic joint

Manœuvring the uncoupled sprayer

For manœuvring the uncoupled sprayer release the parking brake.



After manœuvring apply parking brake.

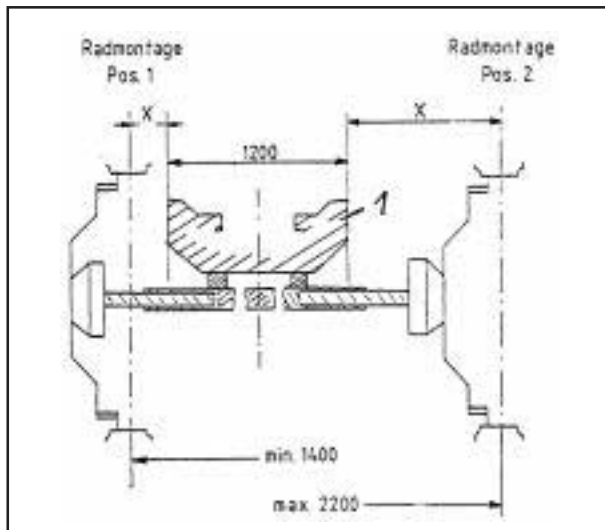


Fig. 5.11

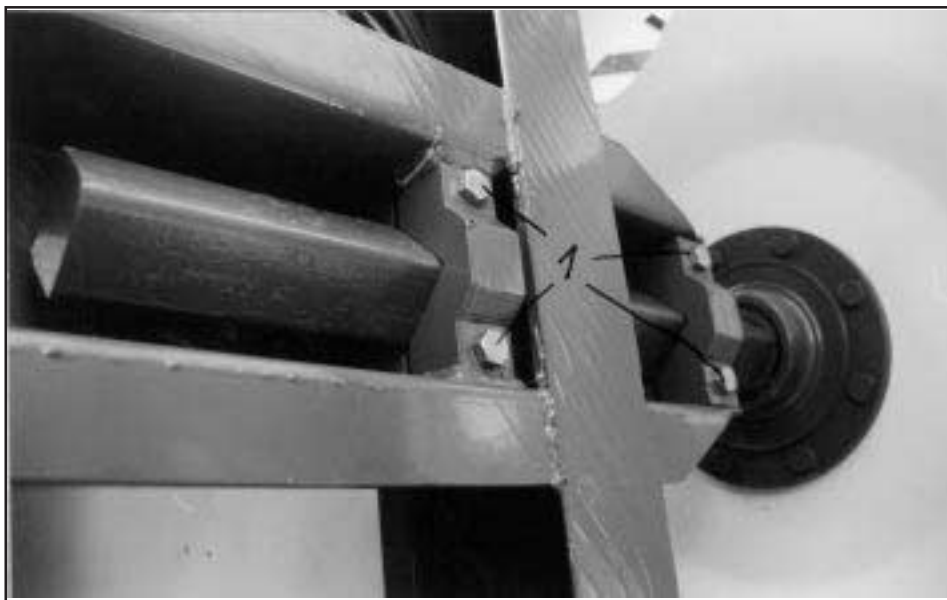


Fig. 5.12

5.3 Setting the track

Set track of sprayer so that the sprayer wheels run in the centre of the tractor's wheel marks.

The track width is stepless settable (with tyres 9.5 x 44") from 1400 mm to 2200 mm (UG 2200 only) or 1400 mm to 2000 mm (UG 3000). The settable track widths are depending on the way of fitting the rims:

Stepless from 1400 mm to 1960 mm if rims are fitted according to Pos. 1 (Fig. 5.11).

Stepless from 1700 mm to 2200 mm if rims are fitted according to Pos. 2 (Fig. 5.11).

As standard the track width is set on 1500 mm.



The torque for the wheel nuts is 350 Nm

The track width adjustment is conducted as follows:

- Hook up sprayer to the tractor.
- Pull parking brake of the tractor.
- Secure sprayer against rolling away by stop wedges.
- Lift one side of the sprayer with a jack until the corresponding wheel is raised off the ground.



Place a jack under the sprayer frame, not under the axle!

- Loosen the clamping bolts (Fig. 5.11/1).
- Slide in or out the axle half until the desired position is reached. For this determine the measure "x" from outer edge of main frame (Fig. 5.10/1) to centre of sprayer wheel and slide in or out axle half accordingly.

$$x = \frac{\text{desired track width [mm]} - 1200 \text{ [mm]}}{2}$$

- Retighten the clamping bolts with a torque of **180 Nm**.
- Proceed with the other axle half in the same manner for sliding out or in.

At the UG 4500 Magna the track width can be adjusted by wheel mounting (Fig. 5.11)

Position 1: 1800 mm,

Position 2: 2250 mm (Fig. 5.11)

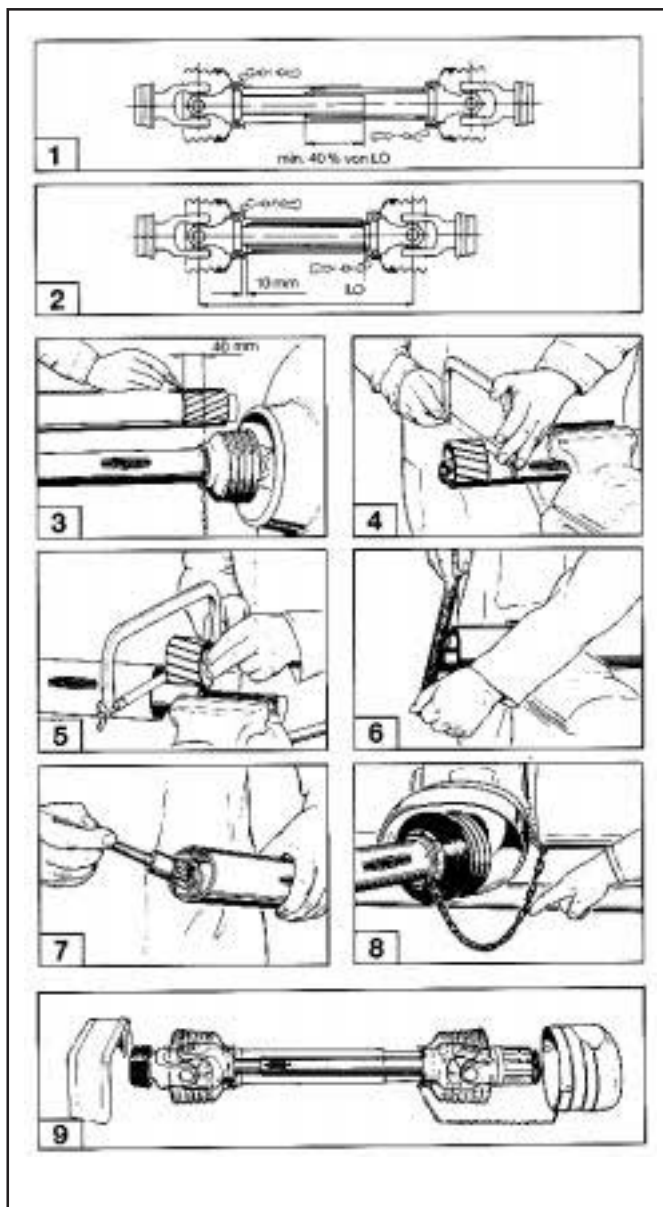


Fig. 5.13

5.4 PTO-shaft



Only use the provided PTO shaft type Walterscheid WWE 2280. The PTO shaft is suited for driving curves in the field when spraying operation shall not be interrupted (please observe max. PTO-angling instructions of manufacturer).

- Clean and grease the tractor PTO-shaft.
- Slide the tractor pto shaft halves onto the pto and the pump input shaft in the prescribed fitting direction. **When fitting first resp. when changing the tractor the PTO should be matched up (please see chapter 5.4).**



If the trailed sprayer is equipped with a track follow drawbar the wide angle universal joint of the pto shaft should be fitted on the implement side to the pump.



If the trailed sprayer is equipped with a universal draw bar the wide angle universal joint of the pto shaft should be fitted to the pivoting point of the drawbar.



Never exceed the permissible PTO-speed of 540 R.P.M.



To avoid damage to the pto shaft engage it only at low tractor engine speed.



Operate always with all guards completely fitted! PTO shaft with complete pto and additional guards on tractor and implement. Replace any guards immediately if damaged.



Pay attention to the fitting and maintenance advice of the pto manufacturer tied to the pto shaft.



Secure pto guard against spinning by hooking the chain provided to the chassis.



Before engaging PTO shaft, please read safety advice according to para. 3.3 thoroughly.

5.4.1 First fitting and matching up the PTO shaft

Slide the corresponding universal joint shaft halves of either the tractor's PTO shaft or the pump's PTO shaft in the correct ordinary direction.

When first linking up with the sprayer match the universal joint shaft to the tractor according to Fig. 5.13. Any matching up refers to only this one type of tractor, when changing the tractor type matching up of the universal joint shaft should be repeated.

1. Check whether the **overlapping** of the universal joint shaft's profile tube is in **any position** of the universal sprayer behind the tractor at **minimum 40 % of LO** (length in the totally immersed position) by holding the two mounted pto shaft tubes next to one another.
2. In shortest position the universal joint shaft tubes must never hit the universal yokes. Allow a safety spacing of **at least 10 mm**.
3. To match the universal joint shaft halves lengths hold them in shortest operational position next to one another and mark them.
4. Shorten inner and outer guard tube equally.
5. Shorten inner and outer profile tube for the same amount.
6. Round off the cutting edges and carefully remove any cutting debris.
7. Apply grease to the sliding profiles and slide them into each other.
8. Affix the stop chain in such a way that a sufficient manoeuvrability of the PTO shaft is ensured in normal operational positions.
9. Operate only with all PTO shaft guards fitted:
Universal joint shaft with complete guard tubes and cones as well as guards around the tractor PTO shaft and the implement input shaft.



Engage slowly the PTO shaft at low tractor engine rev's.



5.5 Traffic lights

- Connect power cable of electric traffic lights on tractor and check function of the traffic lights before every use.

5.6 Hydraulic boom height adjustment



Shut off block tap before the plug of the hydraulic height adjustment is coupled to or from the tractor's hydraulic socket.

Q-boom, manually folded

- Connect the hydraulic hose of height adjustment to a **single acting control valve** of the tractor (please also refer to para. 10.1).

Q-boom, hydraulically foldable (please also refer to para. 10.1.3)

1. Fully hydraulic boom control "I" (one-sided folding in driving direction to the left hand side is possible).

- Connect hydraulic hoses of height adjustment to a **single acting control valve** of tractor.
- Connect hydraulic hoses for boom folding to a **double acting control valve** of the tractor.

2. Fully hydraulic boom control "II" (one-sided folding in driving direction to the right and left hand side is possible).

- Connect hydraulic hoses of height adjustment to a **single acting control valve** of tractor.
- Connect hydraulic hoses (green) for boom folding of r. h. boom to a **double acting control valve** of the tractor.
- Connect hydraulic hoses (red) for boom folding of l. h. boom to a **double acting control valve** on the tractor.

H-, DAM- and Super-S-Boom, fully hydraulically foldable

- Connect hydraulic hoses of height adjustment to a **single acting control valve** of tractor.
- Connect hydraulic hoses for boom folding to a **double acting control valve** of the tractor.

Super-S-Boom with Profi-Folding

- Connect one hydraulic hose to a **single acting control valve**, the other hydraulic hose to a **pressure-free return flow** hose of the tractor.

5.7 Electric switch box SKS

- Fit the switch box to the tractor (when first fitting refer also to para. 8.2.1).



Make sure the on/off switch for the power supply of the switch box is in position "0" (AUS = OFF) for inserting the plug to the socket.

- Connect the power supply cables with the socket of the battery connecting cable.
- **SKS 5:** Connect the implement plug to the socket of the control unit.
- **SKS 50, SKS 70 and SKS 90:** Connect dash board cable and hydraulic cable to switch box.
- Connect the manometer by quick coupling to the pressure socket of the control unit.

5.8 "AMACHECK II A"

- Connect „AMACHECK II A“ and switch box by implement plug.



When connecting „AMACHECK II A“ with the switch box the power supply of „AMACHECK II A“ remains switched off.



Enter the machinery data before "AMACHECK II A" is put to use.

5.9 "Spraycontrol II A" or "AMATRON II A"

- Connect the plugs of "Spraycontrol II" or "AMATRON II" to the switch box.



Ensure that the on/off switch for the power supply of "Spraycontrol II A" or "AMATRON II A" is in position "0" before connecting the machinery plug of "Spraycontrol II A" or AMATRON II A" to the switch box.



Enter the machinery data before "AMATRON" resp. "Spraycontrol" is put to use.

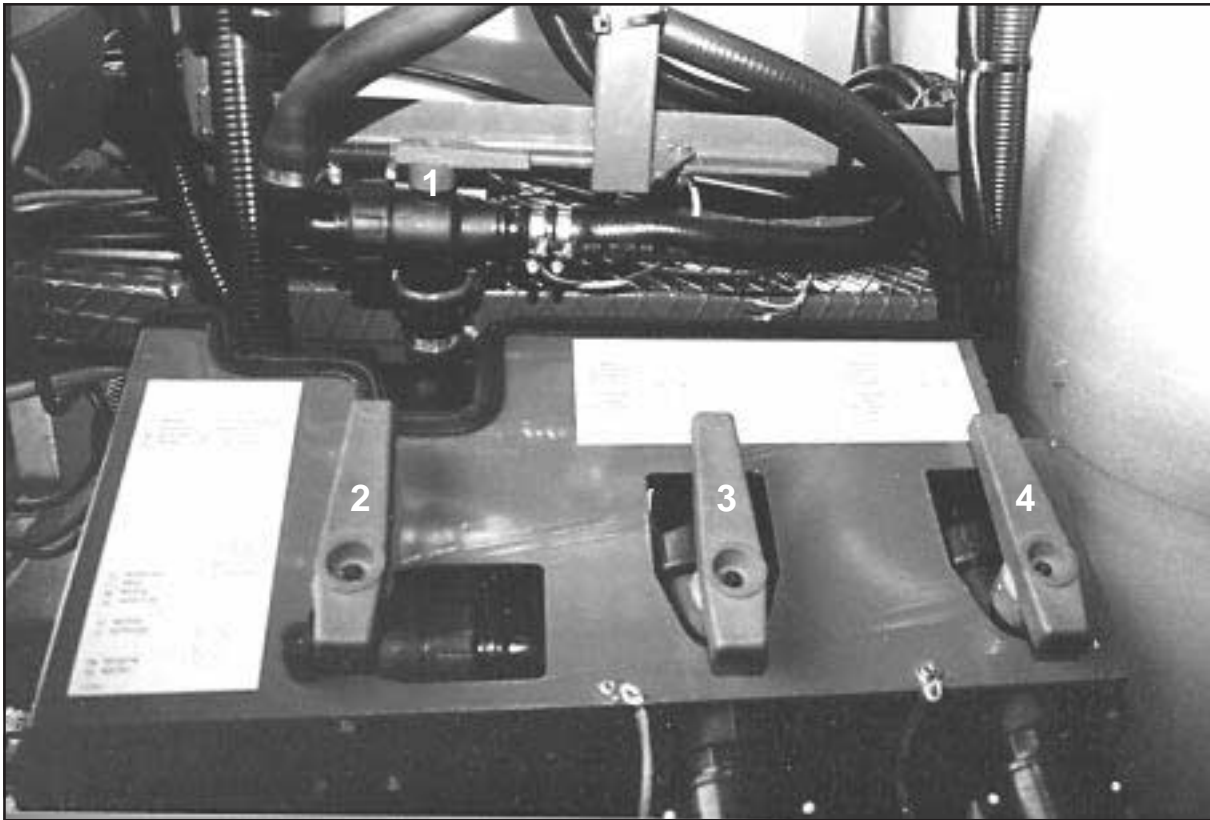


Fig. 6.0

6.0 Putting into operation



Before the first operation set the equal pressure control unit (refer to para. 6.1.3.1.1.).



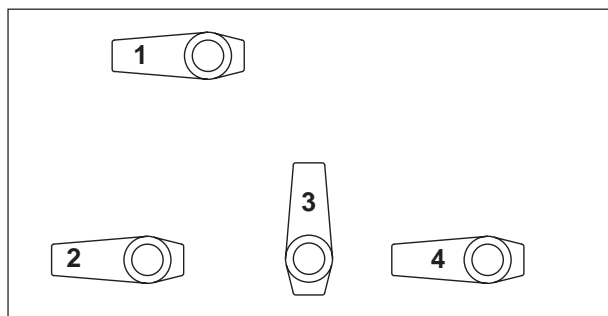
Condition for an appropriate application of plant protective agents is a trouble-free operation of the field sprayer. Therefore have your field sprayer checked on the test rig regularly and immediately remedy faults if necessary.



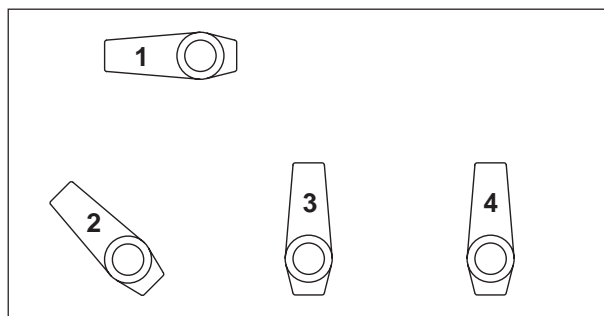
Only if the spray mixture is thoroughly filtered, a trouble-free operation of the field sprayer is ensured. Therefore, make use of all filters provided and ensure their proper function by a regular maintenance (refer to para. 7.5).

Positions of the 3-way taps (Fig. 6.0) depending on the actual operational situation

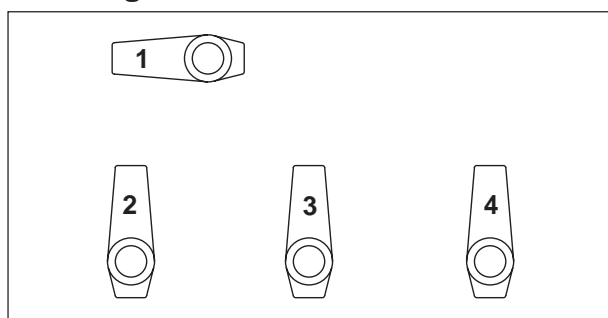
Spraying



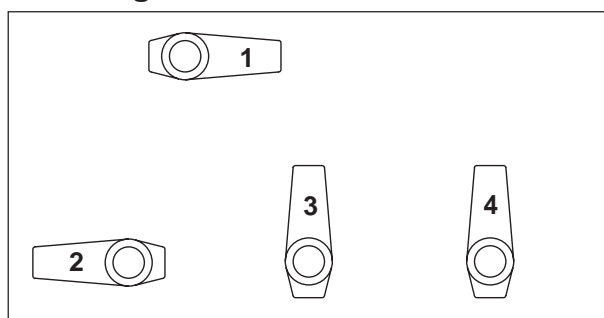
Diluting



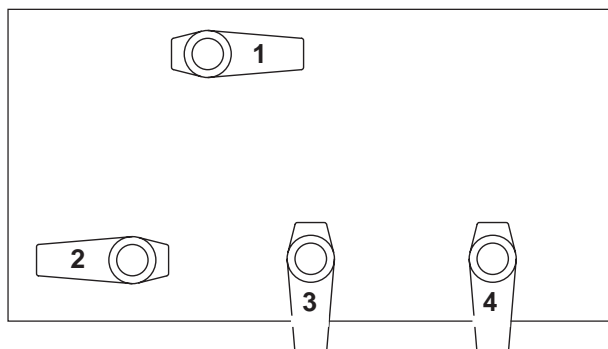
Cleaning



Inducting



Sucking in via suction hose





6.1 Mixing and spraying the spray mixture

Please pay attention to the operating advice mentioned herein, also such product specific procedures as described in the instructions of the spray agents.

The instructions of the spray agents provide you with the necessary information about the rates of water and spray agent quantities.

6.1.1 Mixing the spray mixture



Read the instructions of the spray agent and adhere to the listed safety advice.



The highest risk to be contaminated by the spray agent prevails when mixing the spray mixture. Therefore always wear protective gloves and the corresponding protective clothing!



Rinse carefully emptied spray agent containers (e. g. by the canister rinsing device) and pour the rinsing water into the spray mixture!



The more accurately the required filling or refilling rates are determined the smaller the rest of spray mixture will be.



Try to reduce the excessive residual quantity for the last tank filling to a minimum as an environment saving disposal of residual quantities is difficult. Careful calculating and metering the required refilling charge should be conducted before spraying the remaining areas for the last tank filling. To achieve this deduct the technically undiluted quantity of the sprayer boom from the calculated refilling quantity (please refer to para. 6.1.4, para. 15.3.1 and para. 16.6).



When agitating the spray mixture adhere to the advice by the spray agent manufacturers.

- Determine the necessary water and spray agent rates from the instructions of the crop protective agents.
- Calculate the filling quantities for the area to be treated (refer to para 6.1.1 and 16.6).
- Fill sprayer tank half full with water (refer to para 6.1.1).
- Switch on the agitation (see para. 7.2).
- Add the calculated quantity of the spray agent (refer to para. 6.1.1).
- Fill up with the remaining amount of water.
- Agitate the spray mixture according to the spray agent manufacturers advice before spraying.

6.1.1.1 Calculating the filling or refilling quantities

Example 1:

Known data: Nominal tank volume 2000 l
Residual quantity in tank 0 l
Required amount of water 400 l/ha

Spray agent requirement per ha

Agent A 1.5 kg
Agent B 1,0 l

Question: How many litres of water, how many kgs of agent A and how many litres of agent B are to be used for an area to be sprayed of 5 ha?

Reply: Water: 400 l/ha x 5 ha = 2000 l
Agent A: 1,5 kg/ha x 5 ha = 7,5 kgs
Agent B: 1,0 l/ha x 5 ha = 5 l

Example 2:

Known data: Nominal tank volume 2000 l
Residual amount in tank 200 l
Required rate of water 500 l/ha
Recommended concentration 0,15 %

Question 1: How many litres or kgs spray agent must be used for one tank filling?

Question 2: For how many ha one new tank filling will last if the tank can be emptied to a remaining quantity of 20 l?

Calculation formular and reply to question 1:

$$\frac{\text{Water refilling quantity (l) x concentration (\%)}}{100} = \text{necessary spray agent (l or kg)}$$

$$\frac{(2000 \text{ l} - 200 \text{ l}) \times 0,15 \%}{100} = 2,7 \text{ l or kg}$$

Calculation formula and reply to question 2:

$$\frac{\text{available spray cocktail quantity (l) - residue quantity (l)}}{\text{required amount of water (l/ha)}} = \text{area to be treated (ha)}$$

$$\frac{2000 \text{ l (nominal tank volume)} - 20 \text{ l (residue quantity)}}{500 \text{ l/ha (required water)}} = 3,96 \text{ ha}$$

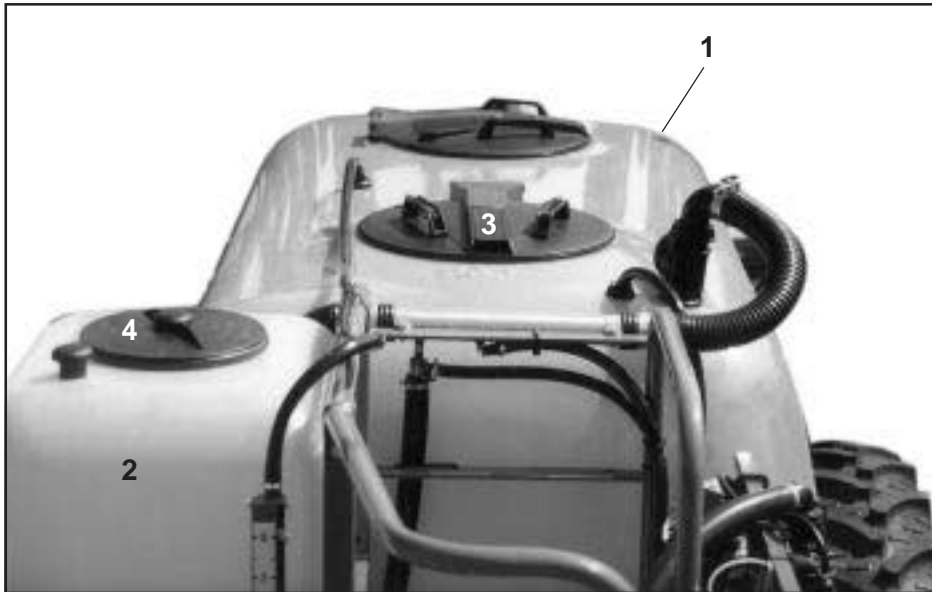


Fig. 6.1

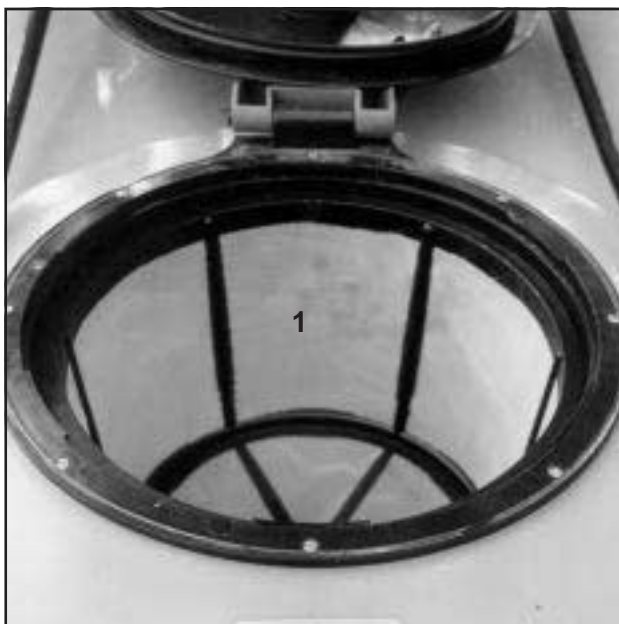


Fig. 6.2

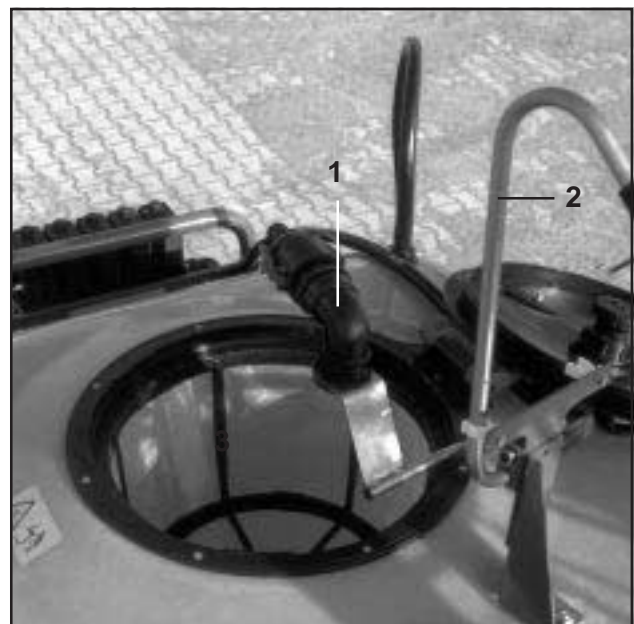


Fig. 6.3

6.1.1.2 Filling with water



Before any refilling check the implement for damages as e. g. leaking tank and hoses as well as to check the correct position of all controls.



Never leave the implement unattended when filling. Irrespective of the chosen or available filling method every user should follow this principle.



Ensure that there is never a direct connection between the filling hose and the spray mixture inside the tank so that a back suction of spray mixture into the water supply network is prevented. Highest safety against the back running of spray mixture provides the free flow when the end of the filling hose is fixed at minimum 20 cm above the filling opening of the sprayer tank.



Avoid formation of foam. When filling do not allow foam to escape from the tank. To avoid the formation of foam use a hopper with a large diameter which reaches down to the bottom of the tank.

The preferred method of filling is on the field's edge from a bowser (if possible make use of natural height differences). Depending on the spray agent used this kind of filling may not be permitted in water protection zones. In any case check with appropriate authorities.

- Accurate determination of the water filling amount (refer to para. 6.1).
- **Filling** the spray mixture tank (Fig. 6.1/1) and flushing water tank (Fig. 6.1/ 2) of the **UG 2200 Power** and of the **UG 3000 Power** is always conducted **via the filling opening** (fig. 6.1/ 3) or (Fig. 6.1/ 4) **by a water pipe in "free flow"**. Close the filling opening by means of a folding of screw lid (Fig. 6.1/ 5) or (Fig. 6.1/6).



For filling a suction hose and filling tap (see para. 12.2 and 12.3) are available as option.

- **Filling** the spray mixture tank of the **UG 2000 Special** (Fig. 6.3) is conducted via the **external water filling** (Fig. 6.3/1) into the **filling opening** in **"free flow"**. Depending on the way of operation it is also possible to swivel the canister-cleaning device over the filling opening.



For filling the spray tank the filling filter screen (Fig. 6.2/1) should always be in place.

- Read off the tank content

$\text{Tank contents (l)} = \text{displayed scale figure} \times 100$



Fig. 6.4

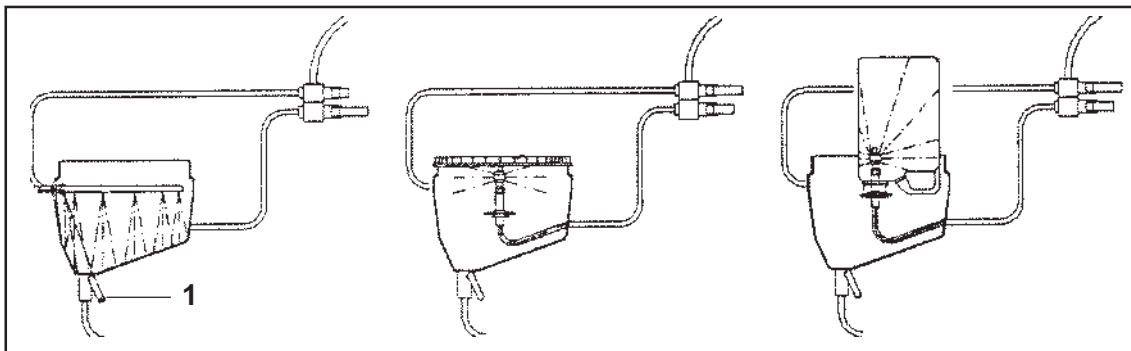


Fig. 6.5

6.1.1.3 Adding the agents

For preparing the spray mixture the **spray agent is inducted** via the **induction bowl** (Fig. 6.4/1) into the water of the sprayer tank (please also refer to para. 7.4). Thereby **liquid and powdery spray agents**, e. g. urea, **have to be handled differently**. If the urea filter (option) is placed into the tank sump the quantity of urea needed for one tank filling will be pulled directly into the tank opening. **Water diluting foil bags** may be placed directly into the tank while the agitator is running.



Empty agent containers should be flushed carefully, made unsuable and collected so that they can be disposed according to advice and so that they cannot be used for other purposes again.



Remove residual spray mixture from the tank by pre-cleaning until water only is available. Then flush tank carefully.

1. Inducting spray agents

- Fill sprayer tank to half.
- Check whether the single tap (Fig. 6.4/2) at the tank bottom is closed.
- Fill in calculated and metered agent amount into the induction bowl (max. 34 l).
- Bring central sprayer boom feed control at the switch box into "0"-position.
- Both pumps if fitted should be driven at 400 R.P.M. and both agitation devices be switched on. If necessary increase agitation intensity (pls. also refer to para 7.2.).
- Open the single tap (Fig. 6.4/2) at the tank bottom and suck off the amount of spray agent necessary for one tank filling.
- Fill up the mixing amount of water.
- From the moment of filling until end of spraying operation the agitators normally should be kept switched on. However, always check the instructions of the spray agent manufacturers.



Fig. 6.4

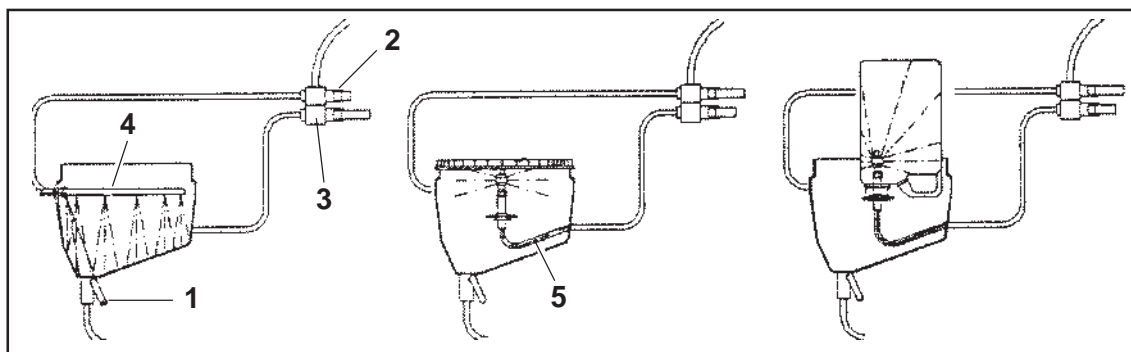


Fig. 6.5

2. Inducting of powdery spray agents and urea

- Fill sprayer tank half with water.
- Switch the central spray boom feed control at the switch box into position "0".
- Drive both pumps if fitted with approx. 400 R.P.M. and switch on both agitators. If necessary the agitation intensity may be increased (ref. also to para. 7.2).
- Open the single taps (Fig. 6.4/ 2 and Fig. 6.5/ 1) at the tank bottom and at the control chest.
- Open the single tap (Fig. 6.5/2) for the circular tube at the tap group (Fig. 6.4/4 or Fig. 6.5/3).
- Pour in the calculated and metered spray agent quantity or the urea quantity necessary for one tank filling to the sprayer tank.
- Pump liquid through the induction bowl until the content is fully diluted.
- Shut off the single tap (Fig. 6.5/2) for the circular tube at the tap group.
- Suck empty the induction bowl. Flush the induction bowl once again with the circular tube (Fig. 6.5/4) or the canister flushing jet (Fig. 6.5/5) with a closed induction bowl opening.
- Shut off the single tap (Fig. 6.4/2) at the tank bottom after sucking empty the induction bowl.
- Fill up full amount of water required.
- Both agitation devices should normally be kept switched on from the moment of filling until the end of spraying operation. Relevant, however, are always the instructions of the spray agent manufacturers.



Before starting spraying operation dilute urea completely by pumping the spray cocktail back into the tank. When diluting larger amounts of urea the spray cocktail's temperature will be drastically lowered so that the urea is diluting slower. The warmer the water is the faster and better urea is diluting.



Fig. 6.6

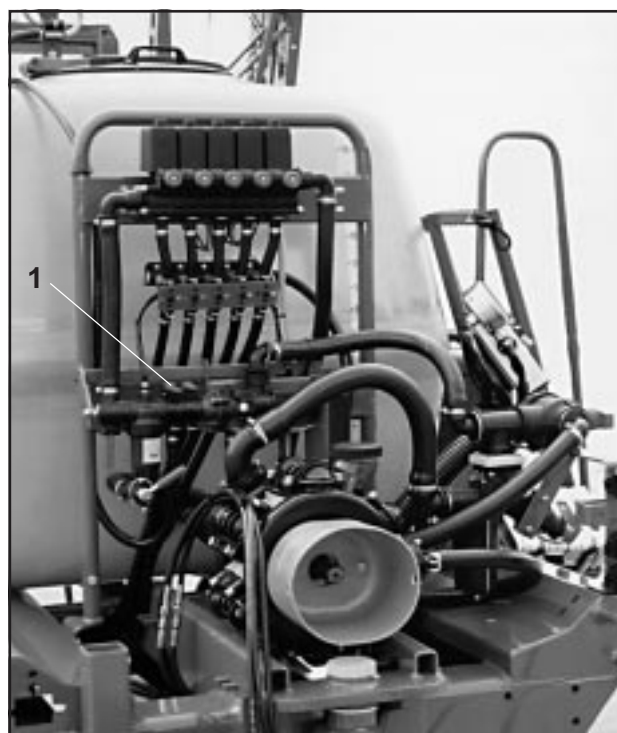


Fig. 6.7

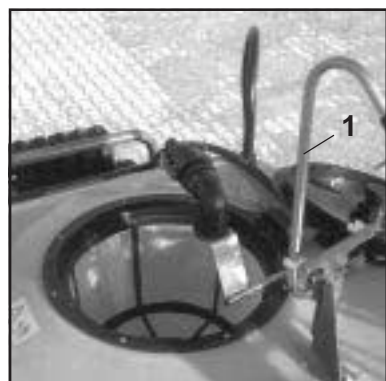


Fig. 6.8

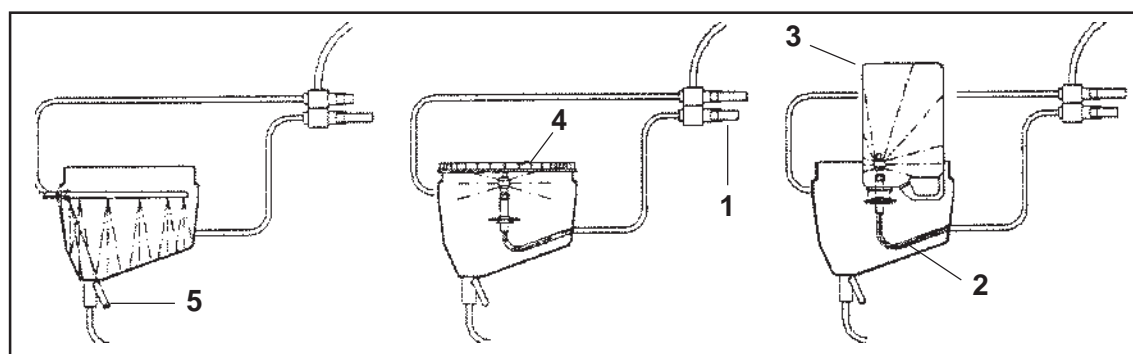


Fig. 6.9

6.1.1.4 Flushing agent containers with the canister flushing jet

- Switch off the boom feed control and the single tap (Fig. 6.6/ 1) for the induction bowl at the control unit.
- Drive both pumps if fitted with a speed of approx. **400 R.P.M.**
- Set the spray pressure at **3 bar**.
- Open the single tap (Fig. 6.6/ 2) of the tap group for the canister flushing jet (Fig. 6.6/ 3 or 6.9/ 2).
- Open the single tap (Fig. 6.6/ 1) for the induction bowl at the control chest.
- Push canister (Fig. 6.4/6) or other containers via the canister flushing jet and hold it down for at **least 30 sec**. The canister is flushed by the rotating canister flushing jet.
- For flushing the induction bowl close its opening with the screw-on lid (Fig. 6.5/7) and flush the rinsing-in container via the ring circuit or the canister flushing jet.
- Open the single tap (Fig. 6.5/8) at the bottom of the induction bowl when the induction bowl is filled with liquid. The agitation pump now sucks the flushing liquid from the induction bowl and pumps it into the spray mixture tank.
- Shut the single taps at the control chest at the tap block, and at the induction bowl bottom.



6.1.2 Spraying the spray liquid



Before the spray season begins and at any change of the nozzles the proper spraying ability of the sprayer should be checked by calibration test (please see para. 6.2).



If wind speeds above 3 m/sec. prevail conduct additional measures to avoid spray drifts (refer to para. 6.1.2). Discontinue the spraying operation at average wind speeds of above 5 m/sec. (leaves and thin branches are moving).



Do not choose forward speed higher than 8 k.p.h. First of all not to mechanically over stress the boom but second also not to endanger the uniformity of application by a too strong a driving wind.



Avoid over application (caused by overlappings if not driving the following bouts properly and/or when driving into bends at the head lands with switched on boom feed).



The advised spray agent rate (litre or kg/ha) according to the instructions of the spray agent manufacturer can only then be achieved when the user accurately attains the advised spray rate (l/ha) during the spring operation (refer to para. 6.1.3).



Switch the boom feed on or off only while moving.



Maintain the pre-selected tractor gear necessary for keeping the spray pressure setting and the agitation intensity during the spraying operation as otherwise deviations from the desired spray rate may occur (refer also to para. 6.1 and para. 7.2).



During the spraying operation continuously check the spray liquid consumption in relation to the treated area.



If the spray pressure clearly drops the tank is empty. If the spray pressure drops, otherwise check either the suction or the pressure filter (see para. 7.5).



All mentioned spray rates in l/ha for nozzles in the spraying table refer to water. The corresponding figures should be multiplied by 0.88 for AUS and by 0.85 for NP solutions.

- Mix up the spray mixture according to instructions and stirr - according to instructions of the spray agent manufacturer.
- Fold down the spray booms.
- Set the height of the spray boom (height between the nozzles and the crop) according to the spraying table in dependance of the used nozzles (refer also to para. 16.0).
- Set the desired agitation in position required for the spraying operation at the step tap (refer to para. 7.2).
- Read off the tractor meter which tractor gear allows a forward speed of between 6 and max. 8 k.p.m. Set the tractor engine rev's by the hand throttle constantly under consideration of the pump drive speed (min. 350 R.P.M., max. 550 R.P.M.).
- Set the advised liquid rate via the spray pressure at the switch box (refer to para. 6.1.3).
- Shift the suitable tractor gear and start moving. **Maintain accurately the forward speed during spraying operation.**
- Switch on the boom feed via the switch box (see para. 8.2).

6.1.2.1 Hints for automatic metering with the control chest when spraying

When operating at a preset speed, a speed depending metering is achieved, i. e. if the tractor engine speed drops, e. g. due to driving hill up, besides the forward speed also the tractor pto speed is also reduced and thus also the pump drive speed in the same proportion. This way also the delivery volume of the pump is changing in the same ratio and the wanted spray rate (l/ha) remains - within the same tractor gear - constant. At the same time also the pre-set spray pressure changes.



For achieving an optimum effect of the spray liquid to be sprayed and for avoiding unnecessary ecological stress the deviation of the pre-set spray pressure may not be more than ± 25 %. These pressure deviations of ± 25 % occur when forward speed changes of ± 12 % within one tractor gear occur.

At forward speed deviations of more than ± 12 % - within one tractor gear - spray pressure deviations of more than ± 25 % prevail. this results in an unwanted change of the droplet size of the spray mixture.

Example: In case the spray pressure has been set to **3.2 bar**, spray pressures between **2.4** and **4.0** bar are permissible. By no means, however, the maximum permissible pressure range of the fitted nozzles must be deviated from (see para. 11 or para. 16).



Never exceed the maximum pump speed of 550 R.P.M. when increasing the forward speed.

6.1.2.2 Measures to avoid spray drift

- Choose for time of treatment the early morning or the evening hours (usually less wind).
- Choose larger nozzles and higher water rates.
- Decrease spray pressure.
- Keep accurately boom operation height as with increased nozzle spacing the danger of drift increases.
- Reduce the forward speed (to below 8 k.p.h.).
- Fit nozzles with a high proportion of coarse droplets, so-called anti drift (AD)-nozzles.

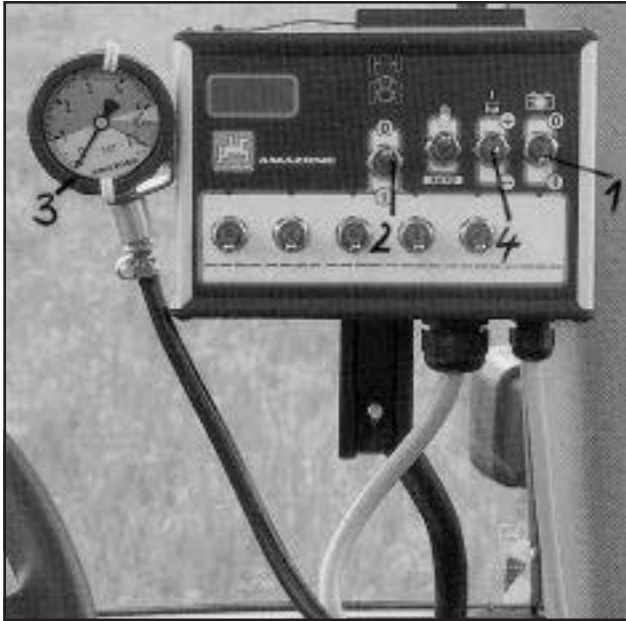


Fig. 6.10

6.1.3 Setting the spray rate (l/ha)

The liquid amount depends on:

- The **liquid delivery of the nozzles (l/min.)**. The liquid delivery is influenced by the nozzle size and the spray pressure. For the later use the spray pressure to be set is taken from the spray table depending on the type of nozzle and size.



By increasing the spray pressure the nozzle output is increased by decreasing the pressure is reduced.



The selection for the suited nozzle depends on the desired spray rate (see para. 11 and para 16.).

- **The forward speed (kph)**. The actual forward speed should be first checked on a pre measured distance as the forward speed display on the tractor meter may only be a guide (see para.6 .2).

The spray tables (para. 16) provide full settings according to which the nozzles can be chosen and the spray pressure setting be conducted. **Check in any case the data given in the spray table by metering the sprayer with water (see para. 6.2)**

6.1.3.1. Setting the spray pressure

- Find the correct spray table - under consideration of the kind of nozzle and -size.
- Find the prescribed spray rate and spray pressure from the spray rate setting chart. At a given jet size the spray rate again is depending on the spray pressure and the forward speed.



To avoid losses by drift choose slower forward speed and lower spray pressure.



The higher the spray pressure the smaller the droplet diameter gets. The smaller the droplets get the more they are subject to unwanted effects of drift.

6.1.3.2 Set the spray pressure at the switch box as follows



Condition for a correct spray pressure setting is a correctly set equal pressure control chest (please refer to para. 6.1.3.3).

- Bring on-/off-switch (Fig. 6.10/ 1) for electric power supply into position "I" (EIN/ON).
- Bring Switch (Fig. 6.10/ 2) for the central sprayer boom feed supply into position "0" (AUS/OFF).
- Set the wanted agitation intensity of the hydraulic agitation via the step tap (please refer to para. 7.2).
- Engage the tractor PTO shaft.
- Read off the tractor meter which tractor gear should be chosen for a forward speed of 6 to max. 8 k.p.h. Set the tractor engine speed under consideration of the pump drive speed (350 to max. 550 R.P.M.) by hand throttle lever to stay constant.
- Set the spray pressure taken from the spray setting chart at the spray pressure display (Fig. 6.10/ 4) by the \pm tip switch (Fig. 6.10/ 3).
- To actually spray the intended spray rate (litre/ha) at the predetermined forward speed the jet delivery (l/min) must be determined and in case of deviations be corrected by changing the spray pressure (please refer to para. 6.1.3 or para. 6.2).



If the spray pressure drops for no apparent reason, the suction or pressure filter should be cleaned (please refer to para 7.5).

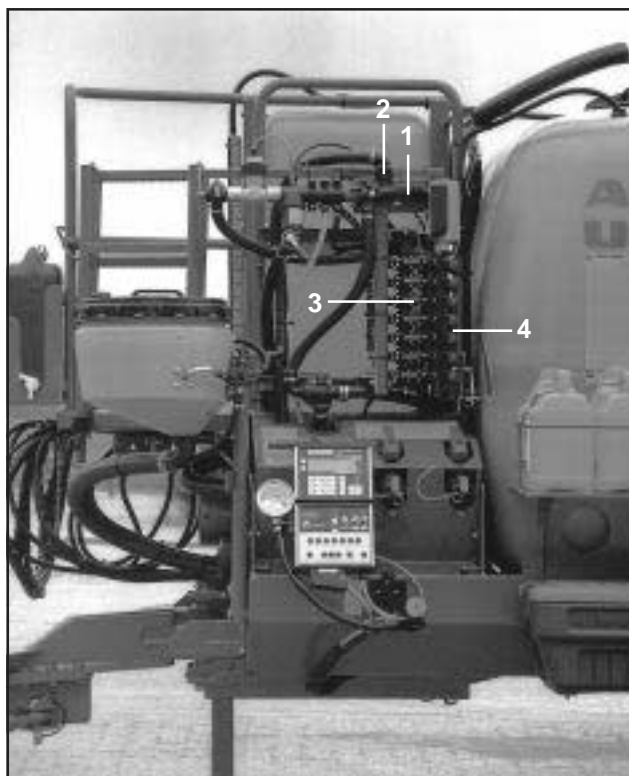


Fig. 6.11

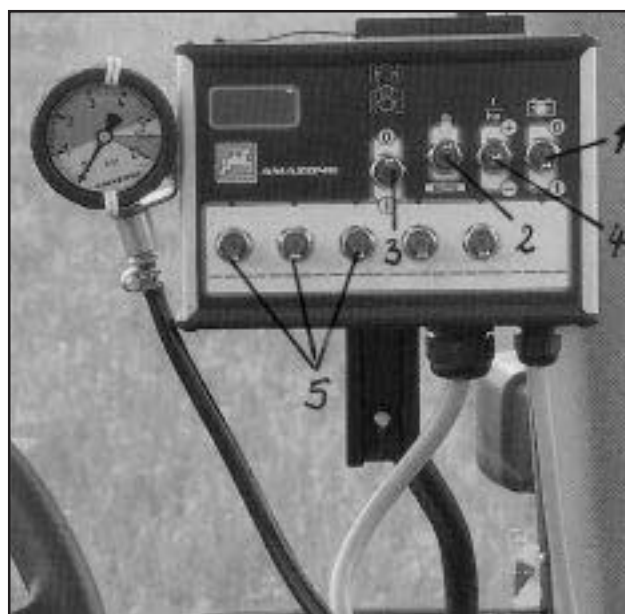


Fig. 6.12

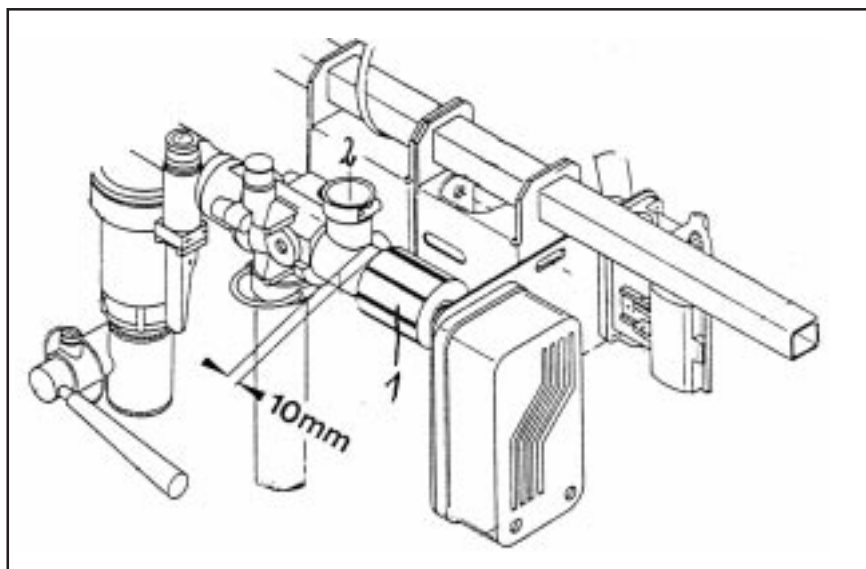


Fig. 6.13

6.1.3.3 Setting the equal pressure control chest before the first operation and at every change of jets

- Set the pressure relief valve. For this the adjustment nut (Fig. 6.11/ 1 or 6.13/ 1) of the automatic metering unit should be turned until a spacing of 10 mm is achieved between the edge of the adjustment nut and the return flow hose joint (Fig. 6.11/ 2 or 6.13/ 2). This way the relief valve has been set to approx. 7 bar.
- Fill the coupled trailed sprayer with approx. 400 l water.
- Unfold booms and drive the pump with operating rev's of e. g. 450 R.P.M.
- Bring on/off-switch (Fig. 6.12/ 1) for the electric power supply of the switch box into position "I". The red control lamp lights up and the switch box is ready for operation.
- Set the programme switch (Fig. 6.12/ 2) into position "manual operation".
- Bring switch (Fig. 6.12/ 3) for the central boom feed on-/off switch into position I. The solenoid valves (Fig. 6.11/ 3) of the equal pressure control chest open and water runs out of the jets. **The agitator remains switched off.**
- Set the spray pressure of 4 bar via the \pm tip switch (Fig. 6.12/ 4). Read off the pre-set spray pressure at the spray pressure display.
- Stop the boom part section feed by switching the boom part section control switch (Fig. 6.12/ 5) which actuates the solenoid valve. Now the spray pressure is changed as can be noticed at the spray pressure display.
- Turn the set screw (Fig. 6.11/ 4) of the equal pressure device belonging to this solenoid valve until the spray pressure of exactly 4 bar is displayed. Thereafter open the boom part section feed again.
- Set the equal pressure devices of the other solenoid valves in the same manner.
- After having set all solenoid valves shut all boom part section feed controls by the switch (Fig. 6.12/ 3). Now the displayed pressure should read exactly 4 bar. If this is not the case repeat the setting procedure.



Fig. 6.14



Fig. 6.15

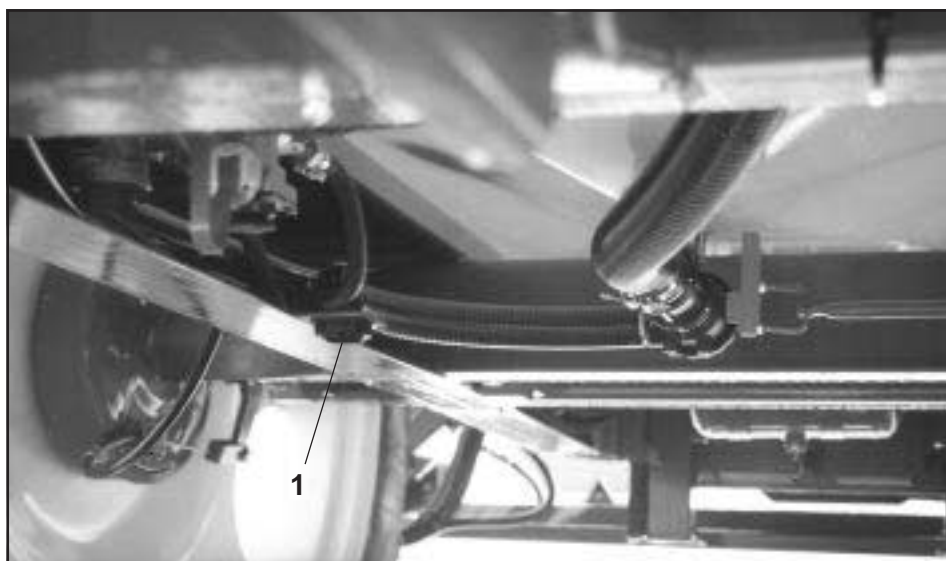


Fig. 6.16

6.1.4 Surplus amounts

You may encounter two kinds of surplus amounts of spray mixture:

1. Surplus remaining in the tank after termination of the spraying operation (please refer to para. 6.1.1).
2. Technical surplus amount which remains after a considerable spray pressure drop in the tank, filter tap, pump, suction- and pressure hose, control chest and nozzle tubes. The surplus amounts of the individual components may be taken from the technical data (para. 15) and have to be added.

Removal of surplus amounts

Proceed as follows:

- Bring central boom feed on- and off-switch into position "0".
- Start the hydraulic agitation.
- Bring the switch over tap (Fig. 6.14/ 1) to position "diluting" (please refer to para. 6.0).
- Switch on the PTO-shaft.
- Dilute the surplus amount remaining in the tank with at least a 10-fold amount of water from the rinsing water tank.
- Bring the switch over tap (Fig. 6.14/ 1) to position "spraying" (please refer to para. 6.0).
- **Spray the diluted surplus amount or the already treated field at increased forward speed by choosing the next higher tractor gear.**



The surplus amount of the sprayer boom will still be rejected in undiluted concentration. This surplus amount must by all means applied to an untreated area. The distance necessary for spraying this undiluted surplus amount can be taken from para. 15.3.6.

- Drain off into a suitable collecting bucket the diluted technical surplus amount via the drain valve in the tank bottom (Fig. 6.16/ 1).
- The drain valve is actuated via a mechanical remote control (6.15/ 1) at the side.
- Clean by rinsing with water: pump, suction- and pressure hose, control unit and nozzle tubes.



When emptying surplus amounts note measures for operator safety. Follow the instructions of the spray agent manufacturer and wear suitable protective clothing. Dispose of the collected surplus spray mixture according to the applying legal advice, e. g. suitable containers for the advised removal of waste material.

6.1.5 Cleaning the sprayer

Life span and reliability of the AMAZONE sprayer depend considerably on the period of reaction of the spray agent with the materials of the implement. Therefore let these materials react as short as possible, e. g. by only cleaning after termination of spraying operation. The spray mixture should not be left unnecessarily for a longer period in the sprayer tank, e. g. not over night.

As a matter of principle always clean the sprayer before another spray agent has to be sprayed.

Conduct a precleaning on the field before the actual cleaning procedure of the sprayer. For this purpose the surplus amount still left in the sprayer tank should be diluted with a 10-fold amount of water from the rinsing water tank. Thereafter spray this diluted surplus amount as mentioned in para. 6.1.4).

Conduct the cleaning as follows:

- Flush the empty sprayer tank with a sharp jet of water. Fill the tank with approx. 400 l water.
- After having switched off the boom section feed on/off-control start the agitators, drive the pumps with approx. 400 r.P.M. to let the water flush in a circle several times.
- Conduct several switching procedures on boom feed controls, hydraulic agitator and central boom feed on and off control switch. This way all parts of the implement are rinsed with clean water.
- Finally spray the contents of the tank through the sprayer jets.
- Dismantle filter taps and clean filter inserts (see para. 7.5).
- Remove all jets after every season, flush all sprayer tubes, check nozzles for dirt and clean if necessary with a soft brush (ref. para. 11.5).



Before changing or fitting nozzles flush all spray circuits..



After every cleaning the sprayer dispose of any cleaning residues environmentally correctly.

6.1.5.1 Cleaning the sprayer with a filled tank

If due to poor weather conditions the spraying operation has to be interrupted the filter tap, pumps, control chests and spray liquid circuits should be cleaned.

Cleaning on the field

The cleaning with clear water from the rinsing water tank is conducted as follows:

- Switch off the boom feed supply.
- Switch off the hydraulic agitation.
- Bring switch over tap into position "flushing".
- Drive pumps with a nominal speed of e. g. 450 R.P.M.
- Shift into the next higher tractor gear - for increasing the forward speed - and start.
- Switch on the boom feed supply. By the flushing water now being sucked the spray cocktail in the filter tap, suction hose, pump, pressure hose, control chest and return hose is diluted.

Spray this diluted spray mixture onto an already treated crop with increased forward speed.



The surplus amount inside the sprayer boom will still be sprayed in undiluted concentration. This surplus amount should by all means be sprayed onto an untreated area of the field. The driving distance required for spraying this undiluted surplus amount can be taken from para. 16.6.

6.1.6 Storing over winter

- Clean the sprayer before discontinuation of the spraying operation according to para. 6.1.5.
- After termination of the flushing and cleaning operations and when no further liquid leaves the sprayer nozzles, let the pumps "pump air" at a pto speed of 300 R.P.M.
- Switch all possible functions of the control unit so that any spray agent containing hoses can empty.
- Dismantle one diaphragm valve from one nozzle carrier per boom part section so that the spray tubes of the sprayer boom can drain off.
- Disengage tractor PTO shaft if after several times switching through the functions of the control chests no liquid comes through the sprayer booms.
- Dismantle and clean filter cup, filter insert and centering ring of both filter taps.



Do not reinstall filter taps after cleaning but place them into the filling sieve of the sprayer till next operational season.

- Take pressure hose off main pump so that any remaining water may drain from pressure hose and control chest.
- Once again switch on and off all functions of the control unit.
- Take off pressure hose from agitator pump.
- Engage PTO shaft and drive pump for approx. ½ minute till no liquid is draining from the pressure side outlet of the pumps.



Leave the pressure hoses off until next operation.

- Cover the pressure outlets of the pumps to prevent becoming dirty.
- Grease the universal joints of the pto shaft and apply grease to the profile tubes before storing for a longer time.
- Before storing the pumps over winter conduct an oil change.



When putting the piston diaphragm pumps into operation at temperatures of below 0° C, drive pumps by hand first to prevent any remainings of ice from damaging the piston diaphragm.



Store switch box, pressure meter and further electronic options in a frost free dry room.

6.2 Calibrating the sprayer

Always calibrate the sprayer with the spray pressure set according to the spray rate table:

- before beginning of seasonal operation.
- at any change of nozzles.
- when not achieving the desired spray rate (l/ha).

Any differences (actual and wanted spray rate (l/ha) may be caused by differences between the actual driven forward speed and the forward speed shown on the tractor meter and/or by the natural wear of the spray nozzles.

For calibrating the following accessories are needed:

- Suited collecting containers, e. g. buckets.
- Calibrating cup or metering cylinder..
- Stop watch.



6.2.1 Determining the liquid rate (l/ha)

6.2.1.1 Determining by driving a measured distance

- Filling the sprayer tank with water.
- Ensure that all nozzles are operating correctly.
- Take the spray pressure for the desired spray rate (l/ha) from the spray table and set accordingly.
- Switch off the boom feed and fill the tank with water up to an existing or to a self applied filling mark on both sides.
- Calibrate in the field a distance of exactly of 100 m. Mark the start and stop point.
- Read off the tractor meter which tractor gear if required for a forward speed of 6 to max. 8 k.p.h. Set the tractor engine speed to stay constant under consideration of the pump drive speed being in min. 350 R.P.M. and in max. 550 R.P.M.
- Drive the measured distance with flying start from the start to the stop point in the preselected constant forward speed read off the tractor meter. For this the spray boom feed should be accurately switched on at the calibrating distance start and switched off at the end point (please see also para. 6.2.2).
- Determine the sprayed volume of water by refilling the tank
 - with the aid of a measuring container,
 - by weighing or
 - by a water meter.

$$\frac{\text{Water consumption on calibrating distance (l)} \times 10\,000}{\text{Working width (m)} \times \text{calibrating distance (m)}} = \text{liquid rate (l/ha)}$$

$$\frac{80 \text{ l (volume of water brought out)} \times 10\,000}{20 \text{ m (working width)} \times 100 \text{ m (calibrating distance)}} = 400 \text{ l/ha}$$

6.2.1.2 Stationary calibrating from single nozzle output

The calibrating can also be conducted by measuring the single nozzle output (l/min) with water when the forward speed of the tractor on the field is exactly known (please refer to para. 6.1.4.2). This then allows the calculation of the liquid rate (l/ha) or to read it directly off the spray table.

Sensibly the nozzle output should be checked at least on three different nozzles. Always check one nozzle at the left hand and right hand boom as well as in the centre of the sprayer boom as follows:

- Fill up tank with water.
- Ensure that all nozzles are operating correctly.
- Take the required spray rate (l/ha) from the spray table and set it.
- Determine the spray rate, e. g. by a stop watch, metering cylinder, measuring cup at several nozzles and calculate the average single nozzle output (l/min).

Example:

Nozzle size:	'06'
Intended or measured forward speed:	6.5 kph
Nozzle output at the left hand boom:	2.8 l/min.
Nozzle output in the centre:	2.9 l/min.
Nozzle output at the right hand boom:	2.7 l/min.
Calculated mean rate:	2.8 l/min.

1. Calculating the spray rate (l/ha)

$$\frac{\text{Single nozzle output (l/min)} \times 1200}{\text{Forward speed (km/h)}} = \text{liquid rate (l/ha)}$$

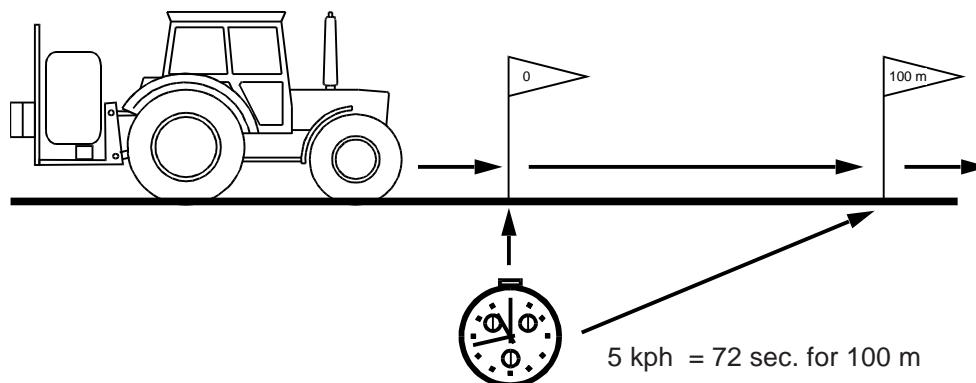
$$\frac{2,8 \text{ l/min (nozzle output)} \times 1200}{6,5 \text{ km/h (forward speed)}} = 517 \text{ l/ha}$$

2. Reading off the spray rate (l/ha) from the spray table for nozzle size '06' collected nozzle output (2.8 l/min) and the intended forward speed (6.5 kph):

Spray rate: 517 l/ha

- If now the determined spray rate from the collected nozzle output does not correspond with the desired spray rate it should be corrected to the desired data by changing the spray pressure.
- By increasing the spray pressure the nozzle output is increased, by reducing the spray pressure it will be lowered. Thereafter recheck the nozzle output until the determined and desired figures correspond.

6.2.2 Determining the actual operation speed



- Measure on the field accurately a distance of 100 m. Mark the starting and end point.
- Read off the tractor meter which tractor gear is responsible for a forward speed of 6 to max. 8 kph. Set with the hand throttle lever a constant tractor engine speed under consideration of the max. allowable pump drive speed of max. 550 R.P.M.
- Drive over the premeasured distance with a flying sart from the start till the end point with the preselected constant forward speed read off the tractor meter. The time required to cover the distance should be determined by a stop watch.
- By the determined time for covering the calibration distance (100 m) read off the following table the actual forward speed:

Table for determining the actual forward speed according to the time needed to cover the calibrating distance in the field:

kph	sec/100 m	kph	sec./100 m	kph	sec./100 m
4,0	90,0	6,1	59,0	8,1	44,4
4,1	87,8	6,2	58,1	8,2	43,9
4,2	85,7	6,3	57,1	8,3	43,3
4,3	83,7	6,4	56,3	8,4	42,9
4,4	81,8	6,5	55,4	8,5	42,4
4,5	80,0	6,6	54,5	8,6	41,9
4,6	78,3	6,7	53,7	8,7	41,4
4,7	76,6	6,8	52,9	8,8	40,9
4,8	75,0	6,9	52,2	8,9	40,4
4,9	73,5	7,0	51,4	9,0	40,0
5,0	72,0	7,1	50,7	9,1	39,6
5,1	70,6	7,2	50,0	9,2	39,1
5,2	69,2	7,3	49,3	9,3	38,7
5,3	67,9	7,4	48,6	9,4	38,3
5,4	66,7	7,5	48,0	9,5	37,9
5,5	65,5	7,6	47,4	9,6	37,5
5,6	64,3	7,7	46,8	9,7	37,1
5,7	63,2	7,8	46,2	9,8	36,7
5,8	62,1	7,9	45,6	9,9	36,4
5,9	61,0	8,0	45,0	10,0	36,0
6,0	60,0				

6.3 Calibrating the flow meter (only control chests "EG, GG and KG")

Always redetermine the impulse figure (Imp./l) received from the flow meter by a calibration test:

- After dismantling the control chest and/or the flow meter.
- After a long period of operation - whereby residue of spray agent rests can build up in the flow meter.
- When differences occur between the desired and the actual spray rate.



Calibrate the flow meter at least once a year.

6.3.1 Calibrating the flow meter with "AMACHECK II A"

- Fill the tank of the sprayer with water (approx. 600 l) up to an existing or self applied filling mark on both sides.
- Simultaneously press **key "Imp./l" and key "C"**. (When engaging the PTO shaft the display returns to "0").
- Engage PTO and drive it with a nominal speed of 540 R.P.M. and let approx. 500 l of water be sprayed out over the sprayer booms (according to liquid level indicator). The display shows constantly the determined impulse figure.
- Determine the applied volume of water by refilling the tank.
 - with the aid of a calibration container,
 - by weighing or
 - by a water meter.
- After having determined the amount of water applied, e. g. 480 l, dial this figure on the display by the keys **"Arrow plus" or "Arrow minus"**.
- Press **key "Entry"** and then **"AMACHECK II A"** calculated automatically the figure for **"Imp./l"** which then will be displayed and memorized.
- Press once again **key "Imp./l"** and check the memorized figure. Now the display should show the figure calculated by **"AMACHECK II A"** in **"Imp./l"**.

6.3.2 Calibrating the flow meter with "AMATRON II A"

- Fill the tank of the sprayer with approx. 600 l water up to an existing or self applied filling mark on both sides.
- Switch on the "AMATRON II A" and the SKS-switch box.
- Dial "data block machine".
- Acutate **key "T4"** until the display shows "Impulses/l".
- By **key "T3"** the calibration procedure is dialed.
- Engage PTO shaft and let it run with a nominal speed of 540 R.P.M. and spray out approx. 500 l water via the sprayer booms (as per filling indicator). The display will show continuously the determined impulse figure.
- After disengaging the PTO shaft the impulse figure will be shown on the display which corresponds to the delivered rate of water.



The displayed impulse figure will extinguish when transporting the sprayer. Therefore never drive away from the field before having written down the determined impulse figure shown on the display.

- Determine the volume of water sprayed by refilling the tank
 - with the aid of a calibration container,
 - by weighing or
 - by a water meter.
- After having determined the sprayed volume of water, e. g. 480 l, enter this figure via the ten-digit keys.
- Press **key "Entry"** and **"AMATRON II A"** will automatically calculate the figure **"Imp./l"** which is then displayed and memorized.



Fig. 7.1



Fig. 7.2

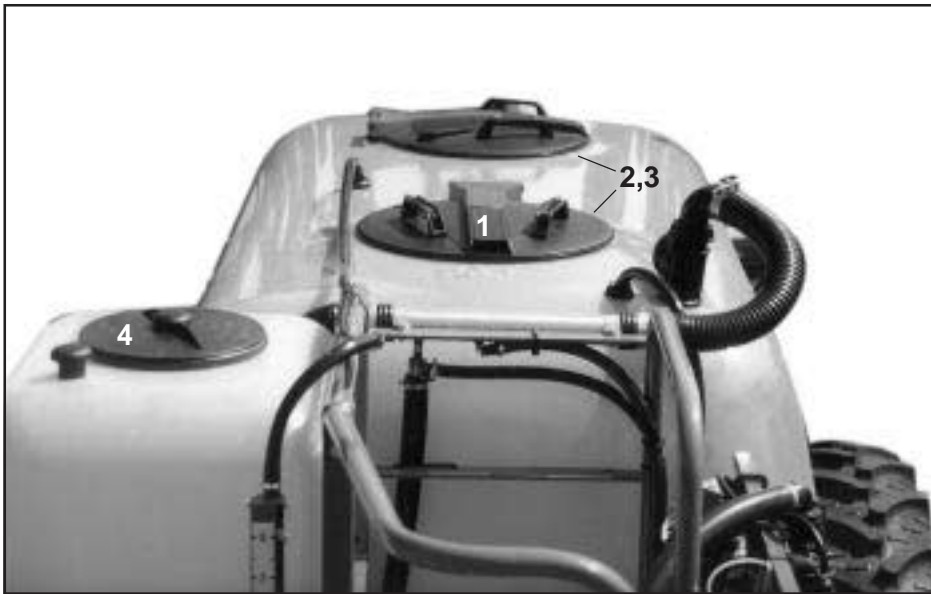


Fig. 7.3

7.0 Basic implement and filter execution

7.1 Tank with liquid level indicator

The tanks of the trailed sprayers type **AMAZONE UG** are made from fibre glass reinforced Polyester with a low positioned drainage point. The careful cleaning of the tank after the operation will have a positive effect on its longevity (please refer to para. 6.1.5).

Fig. 7.1/ . . .

- 1 - Scale for reading off the tank contents.

Tank contents (l) = displayed scale figure x 100

- 2 - Pointer.
- 3 - Bolt to adjust the filling level indicator (in case of deviations between the displayed and the actual filled amount of water).

Adjusting the liquid level indicator

Fill exactly 200 l of water into the tank. The pointer should show the filling level of 200 l on the scale (Fig. 7.1/ 1), i. e., scale figure "2". In case the shown filling level deviates from the amount of water filled in:

- Adjust pointer (Fig. 7.1/ 2) by turning bolt (Fig. 7.1/ 3) exactly to scale figure "2".

Tank openings for filling, cleaning and emptying

Fig. 7.2/ . . .

- 1 - Opening for filling the sprayer tank (please refer to para. 6.1.1). The tank should always be only filled through the filling sieve.
- 2 - Folding screw-on lid for closing the hopper tank opening. For opening and closing spin lid in direction of arrow "open" or "close".
- 3 - Opening for cleaning the tank.
- 4 - Opening with screw-on lid for filling the flushing water tank.

Fig. 7.3/ . . .

- 1 - Drain tap for emptying the tank (shown in "shut" position).



Fig. 7.4

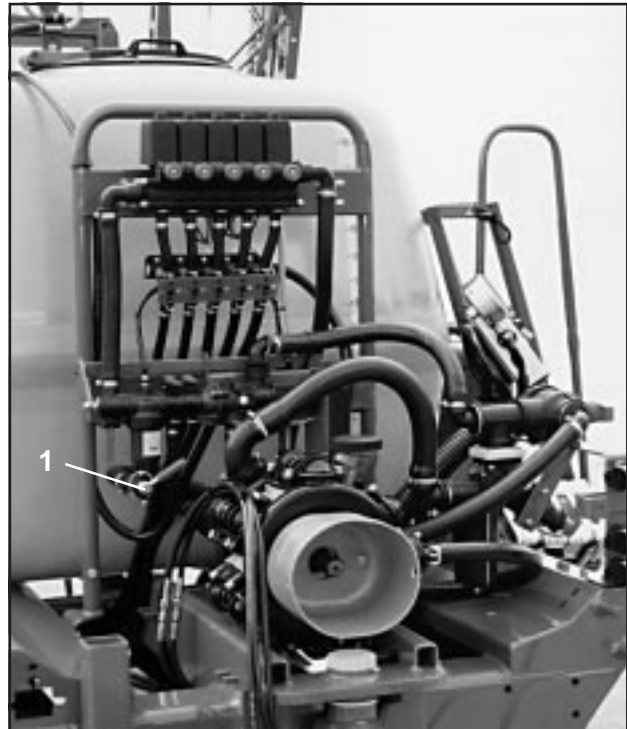


Fig. 7.4a

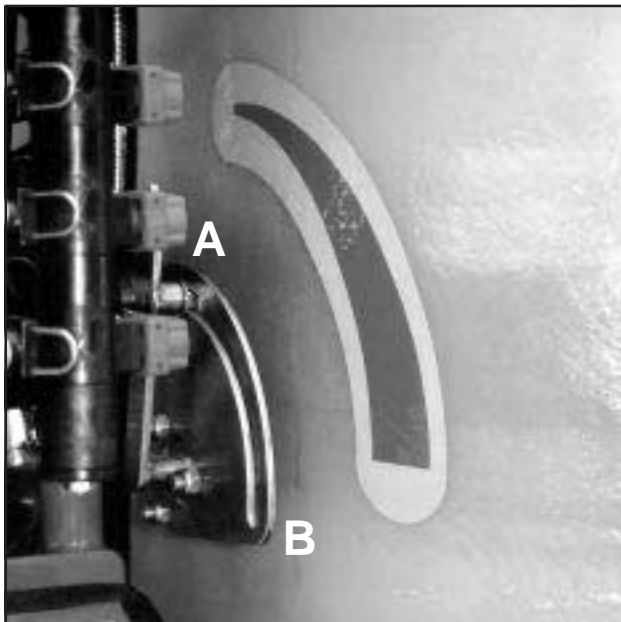


Fig. 7.5

7.2 Agitators

1. Hydraulic intensive agitator

Fig. 7.4/ . . . resp. 7.4a/...

- 1 - Step tap for the hydraulic intensive agitator. 6 Agitation steps "0, 1, 2, 3, 4, 5" can be set. In agitation position "0" the agitation is stopped. The highest agitation intensity is received in agitation step "5". In general agitation step "2" is recommended.



While spraying never change the agitation step which was used for setting the spray pressure. If during spraying operation the agitation step is changed also the preset spray pressure and thus the spray rate (l/ha) will be altered. If you find it necessary to change the agitation step during spraying operation, you should also readjust spraying pressure correspondingly.

If it is intended to let the agitator run during the travel to the field the boom feed control should be switched off and the PTO should be engaged as well as the desired agitation step be set. **If this agitation step deviates from that one which was used for setting the spraying pressure, do not forget to reset the agitation step before beginning the spraying operation.**



While agitation of the spray mixture adhere to the advice by the spray agent manufacturer!

2. Liquid level dependent automatic agitation (only when 350 l/min-pumps are fitted)

The agitation intensity of the second agitator with its liquid level depending automatic agitation is automatically switched on when a certain liquid level in the tank has been reached, i. e. low liquid level = lower agitation intensity and high liquid level = higher agitation intensity. This way it is operated with a matched agitation intensity and the development of foam is avoided.



If it is desirable to increase the agitation intensity even when the tank is not completely filled pull up the floatation body by the rope and fix in this position "B" (Fig. 7.5).



If it is desirable to switch off the Liquid level dependent automatic agitation pull up the floatation body by the rope and fix in this position "A" (Fig. 7.5).



Fig. 7.6

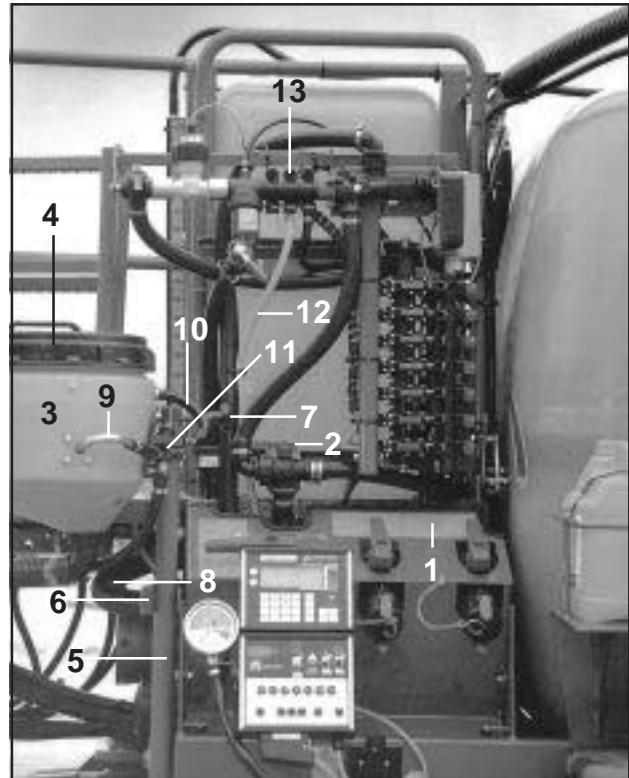


Fig. 7.7



Fig. 7.8

7.3 Flushing water tank with integrated Vario-control

The water for the flushing water tank is used for diluting surplus amounts (please refer to para 6.1.4) and for cleaning (flushing) the spray system (please refer to para. 6.1.5).

Fig. 7.6/ . . .

- 1 - Flushing water tank.
- 2 - Filling opening with screw-on lid.
- 3 - Venting valve.

Fig. 7.7/1 Sticker showing the possible positions of the switch over tap.

Switch over tap (Fig. 7.7/2) in Position "spraying": For filling the flushing water tank via the filling opening and for spray operation.

Switch over tap (Fig. 7.7/2) in position "flushing": For cleaning suction and pressure hose, filter tap, pump, control chest and spray hoses. The water carried in the flushing water tank is sucked off into the spray system (please refer to para. 6.1.5.1).

Switch over tap (Fig. 7.7/2) in position "diluting": For diluting the surplus amount still left over in the sprayer tank after ending the spraying operation (please refer to para. 6.1.4).

7.4 Induction bowl with canister flushing

Fig. 7.7/ . . .

- 3 - Induction bowl for inducing spray agents of any kind including urea.
- 4 - Screw-on lid.
- 5 - Parallel arm for swivelling the induction bowl from transport into filling position.
- 6 - Positioning spring for arresting the induction bowl in transport position. For swivelling the induction bowl into filling position
 - Pull the star grip
 - Push the return spring side ways
 - Swivel over the parallel arms
- 7 - Star grip
- 8 - Suction hose.
- 9 - Supply hose for the rotating canister flushing jet.
- 10 - Supply hose for the ring flushing hose of the induction bowl.
- 11 - Tap group for on and off switching of the canister rinsing jet or ring flushing pipes.
- 12 - Supply hose for tap group; connected to the single tap (18) of the control unit.
- 13 - Single tap. Supplies the induction bowl via the tap group with liquid from the spray liquid tank when single tap is in opened position.

Fig. 7.8/ . . .

- 1 - Bottom sieve; prevents the sucking in of lumps or foreign particles.
- 2 - Canister flushing jet (rotating jet). For flushing out canisters or other containers. Place canister upside down above canister flushing jet and press downwards. For flushing the induction bowl close it with the screw-on lid and open tap for canister flushing jet at the tap group (Fig. 7.7/13).
- 3 - Pressure plate.
- 4 - Ring pipe.



Fig. 7.9

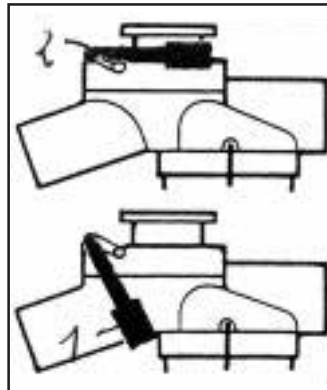


Fig. 7.10

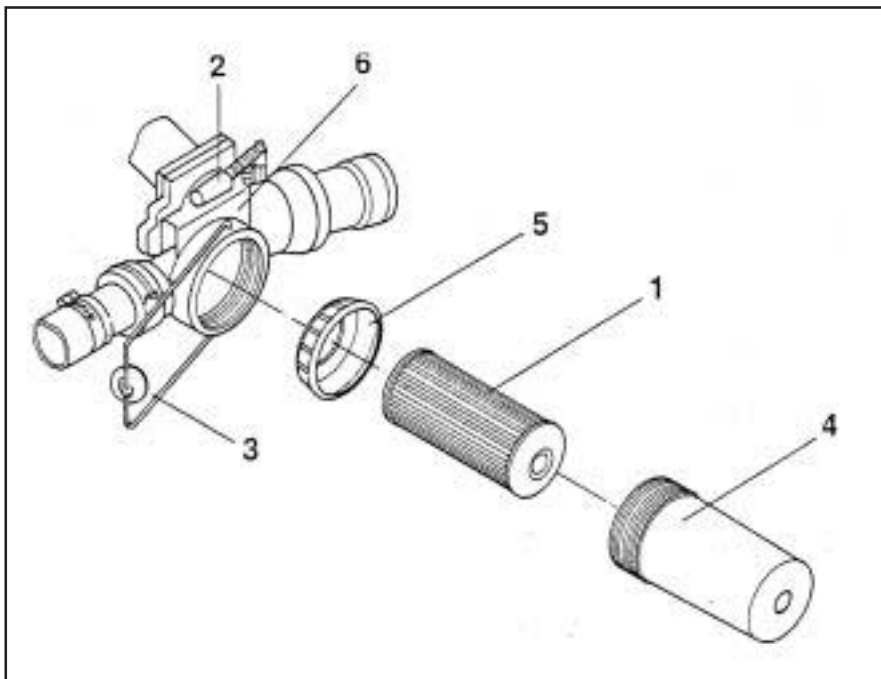


Fig. 7.11

7.5 Filter execution

Only if the spray mixture is thoroughly filtered a trouble free operation of the sprayer, especially of the nozzles is ensured and thus it influences considerably the success of the treatment. Therefore always use all filters provided and check their function by a regular maintenance.



Mesh width of pressure and nozzle filter (please refer to para. 7.5 or 11.0) must always be smaller than the liquid flow cross section of the used nozzles.



Permissible combinations of filters or their mesh width and any deviating statements by the crop protective agents manufacturers should be adhered to (please refer to para. 12.6).

Filter taps of main and agitator pump

The filter taps are designed as two way taps.

Fig. 7.9/ . . .

- 1 - Filter tap of the main pump.
- 2 - Suction inlet for the suction hose (special execution).
- 3 - Operating lever swivelable into positions "spraying" and "filling".
- 4 - Sticker with the possible operating lever position ("spraying") and ("filling").

Position **"Spraying"**:
(Fig. 7.10/ 1)

The pump (main and agitator pump) sucks the spray liquid off the sprayer tank.

Position **"Filling"**:
(Fig. 7.10/ 2)

When filling the sprayer tank by the suction hose (option) the pump (main and/or agitator pump) sucks in water via the suction inlet connection

Cleaning the filter tap



Clean the filter tap (Fig. 7.11/ 1) after termination of the daily spray operations.

Filter tap should be cleaned as follows:

- Drive pump (300 R.P.M.)
- Bring the operation lever (Fig. 7.11/ 2) into position "filling".
- Swivel sideways the spring bracket (7.11/ 3).
- Pull off the filter cup (fig. 7.11/ 4) by light turning to the right and left hand side.
- Now the filter inserts (Fig. 7.11/ 1) are freely accessible and the centering cone (Fig. 7.11/ 5).
- Filter cup, filter insert and centering cone should be cleaned with water.
- Reassembling the parts is done in reverse order.



The open side of the filter insert shows towards the filter tap housing (Fig. 7.11/ 6).

- Swivel the operation lever (Fig. 7.11/ 2) into position "spraying" and check filter tap for leaks.



Fig. 7.12

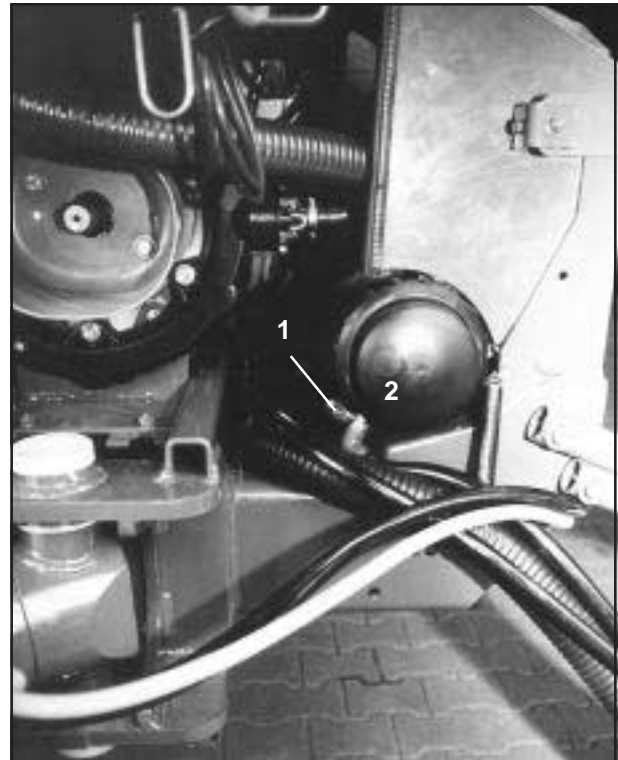


Fig. 7.13

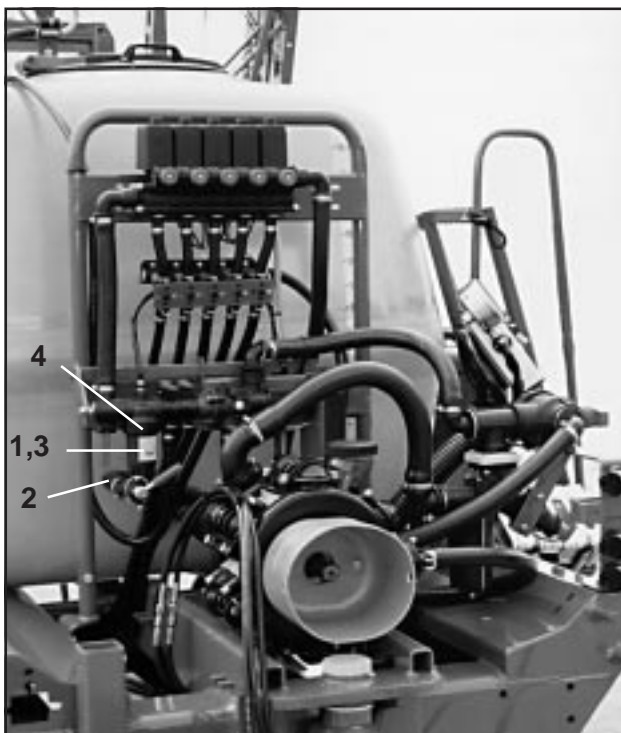


Fig. 7.14

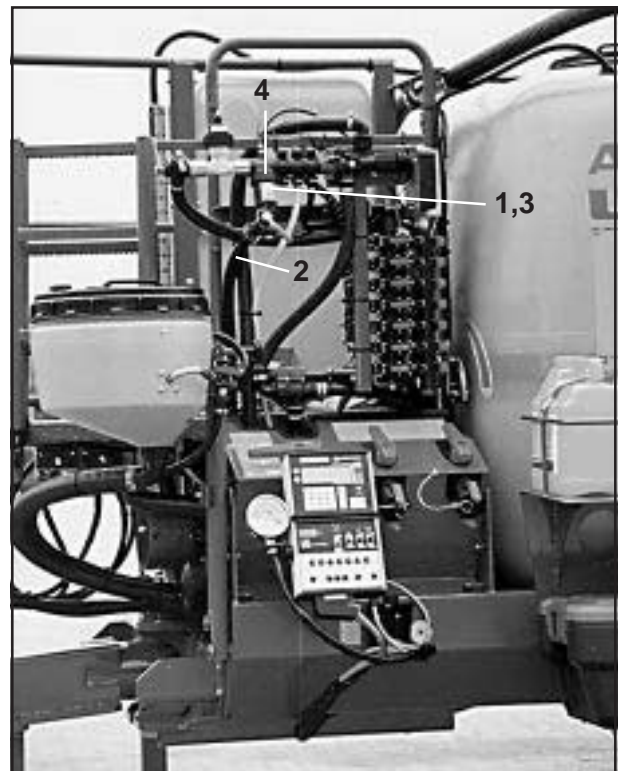


Fig. 7.15

Cleaning filter on a filled sprayer (please refer also to para. 6.1.5) for UG 2200 Power and UG 3000 Power

- Disengage pto shaft.
- Fold down induction bowl.
- Tap (Fig. 7.12/ 1 and 7.12/ 2) in position "sucking in" ("Ansaugen")
- Open shut-off tap (Fig. 7.13/ 1) and drain contents of filter into enclosed calibration bucket.
- Unscrew filter cover (Fig. 7.13/ 2) .
- Remove filter insert, clean and reinstall.
- Shut again shut-off tap (Fig. 7.13/ 1) .
- Bring tap (Fig. 7.12/ 1 und 7.12/ 3) again into position "spraying" ("Spritzen").
- Engage pto shaft.
- Fold upwards induction bowl.

Self cleaning the pressure filter of the control chest

The pressure filter (Fig. 7.14/ 1 resp. 7.15/ 1) filters the spray liquid which is delivered to the nozzles. It has a larger number of meshes per inch than the suction filter insert of the filter tap. this way the unpermissible large particles which still remained in the spray liquid are filtered off for the protection of the spray nozzles.

When the hydraulic agitation is switched on the inner surface of the filter insert is continuously flushed and not diluted spray agent or dirt particles are guided back into the tank.



The standardly fitted filter insert has a mesh width of 0.3 mm at a number of meshes of 65 meshes/inch. This pressure filter insert is suited for nozzle sizes from "03".

For the nozzle size "02" the pressure filter insert with 80 meshes/inch is required (option).

For the nozzle size "015" ad "01" the pressure filter insert with 100 meshes/inch is required (option).



When using the pressure filter inserts with 80 or 100 meshes/inch it is possible with some spraying agents that some agents are filtered off. Therefore in such individual cases try to obtain corresponding information from the crop protective agent manufacturer.



Should the pre set spray pressure drop at otherwise unchanged conditions either the suction and/or the pressure filter are blocked - clean filter.

Cleaning the filter insert of the pressure filter

- Remove the hose (Fig. 7.14/ 2 resp. 7.15/2) from step-tap.
- Unscrew the filter cup (Fig. 7.14/ 3 resp. 7.15/ 3) off the filter head (Fig. 7.14/ 4 resp. 7.15/ 4).
- Remove filter insert and flush.
- Fitting is done in reverse order.



When assembling the collar of the filter insert is showing in direction of the filter head.

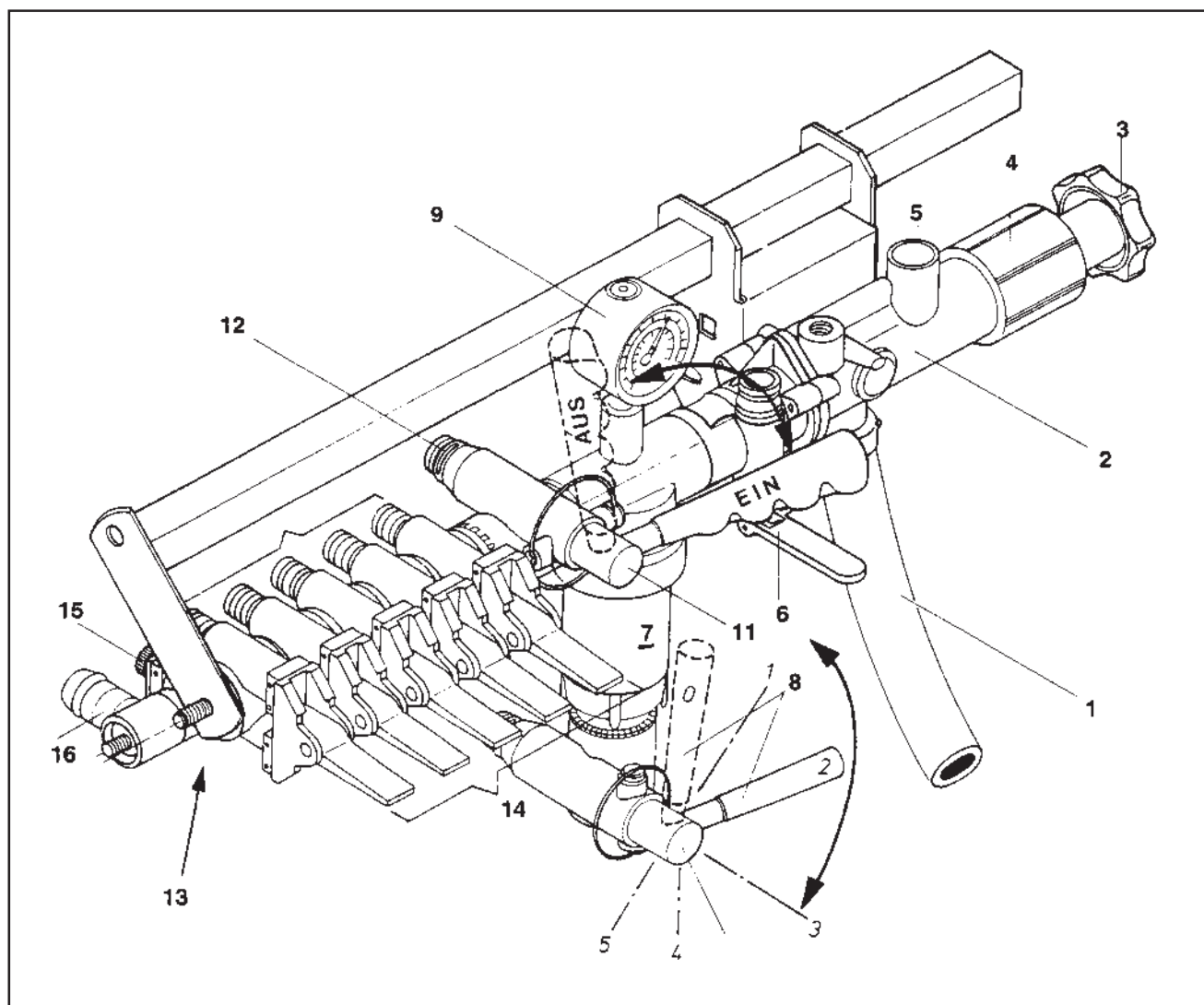


Fig. 8.0

8.0 Control units

8.1 Remarks about the control units

8.1.1 Control unit "BG" manually controlled, (Fig. 8.0)

Fig. 8.0/...

- 1 - Connection for pressure hose from pump.
- 2 - Automatic metering.
- 3 - Star knob for setting resp. resetting spray pressure (please see para. 6.1.3). Turning the star knob clockwise the spraying pressure is increased.
- 4 - Setting nut for setting the pressure relief valve inside the automatic metering unit (please see para. 6.1.3).
- 5 - Return-flow. Directly above this return flow the surplus stream of liquid coming from the pump is guided back into the suction hose.
- 6 - Single tap for options.
- 7 - Self-cleaning pressure filter (see para. 7.5).



The pressure filter prevents blockage of the nozzle filters in the spray jets. Whenever spray pressure drops slowly while otherwise unchanged conditions prevail, the pressure filter must be cleaned (see para. 7.5).

- 8 - Step tap for the hydraulic agitation (see para. 7.2). The drawing shows the corresponding positions of the step tap for the agitation steps "0, 1, 2, 3, 4 and 5".
- 9 - Liquid fertiliser proof manometer for indicating the spray pressure.
- 10 - Liquid flow meter for determining the application rate (l/ha). The impulses received from the liquid flow meter per litre (Imp./l) have already been determined in the factory and have been written on the housing of the liquid flow meter (approx. 200 - 300 Imp./l). If the "Imp./l" are unknown, the liquid flow meter should be calibrated (see para. 6.3).



Deposit of surplus spray agent in flow meter can cause deviations when determining spray rates. Therefore, it is recommended to calibrate the flow meter (Imp./l) every 1000 hectares of operation - however, at least once a year.

- 11 - Central tap for the central liquid flow control to the booms:
Position "ON" ("EIN") - liquid supply to the booms is switched on.
Position "OFF" ("AUS") - liquid supply to the booms is switched off.
- 12 - Boom part section return flow. Functions as a pressure relief in the equal pressure control unit. When the boom feed is switched off, the pressure in the remaining spray liquid in the booms is being reduced by this return flow and in this way in conjunction with the diaphragm valve in the nozzles provided drip-free switching off of the jet (see para. 11).
- 13 - Equal pressure unit.
- 14 - Supply taps for the individual switching on or off of the boom part sections.
- 15 - Setting screw for setting the equal pressure control unit.



Set up the equal pressure control unit by the setting screw for the first operation and at every change of nozzles (please refer to para. 6.1.3).

- 16 - Equal pressure control unit return flow. When switching off the feed to one boom part section the amount of spray liquid which otherwise would have been allocated to the corresponding boom part section is guided via its related solenoid valve with attached equal pressure device through the return flow hose back into the tank without causing the spraying pressure to increase.

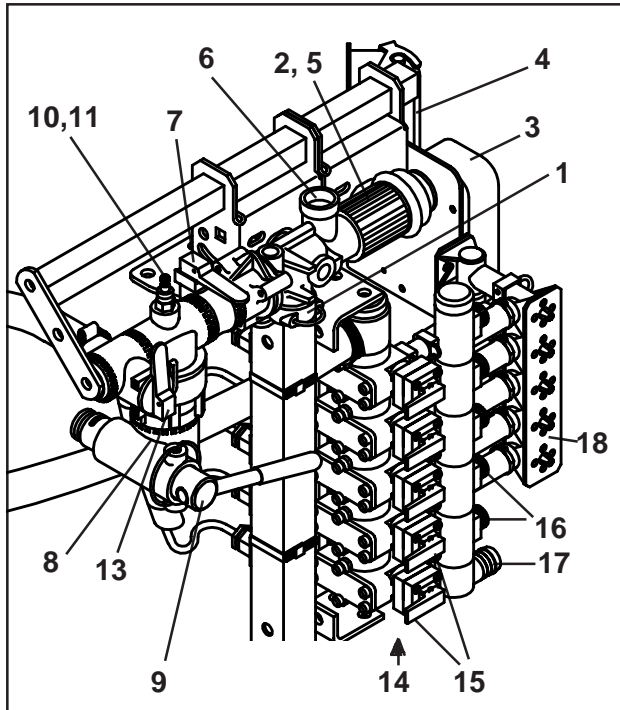


Fig. 8.1

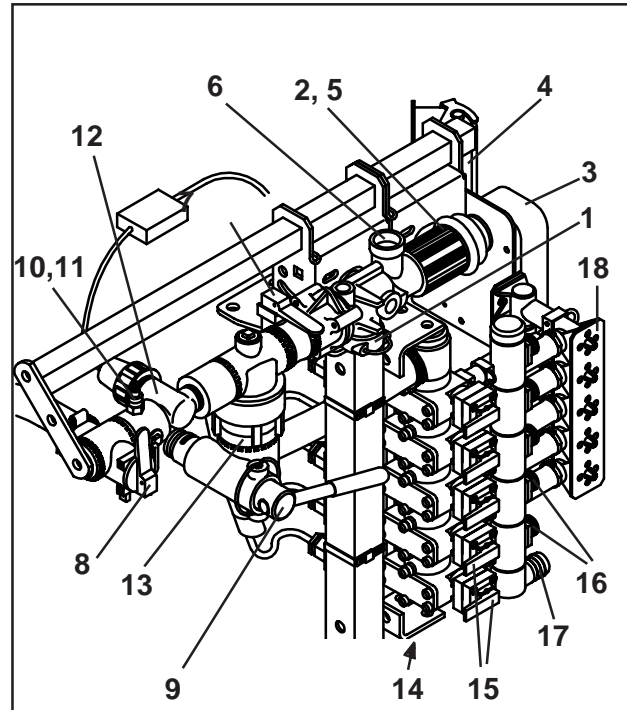


Fig. 8.2

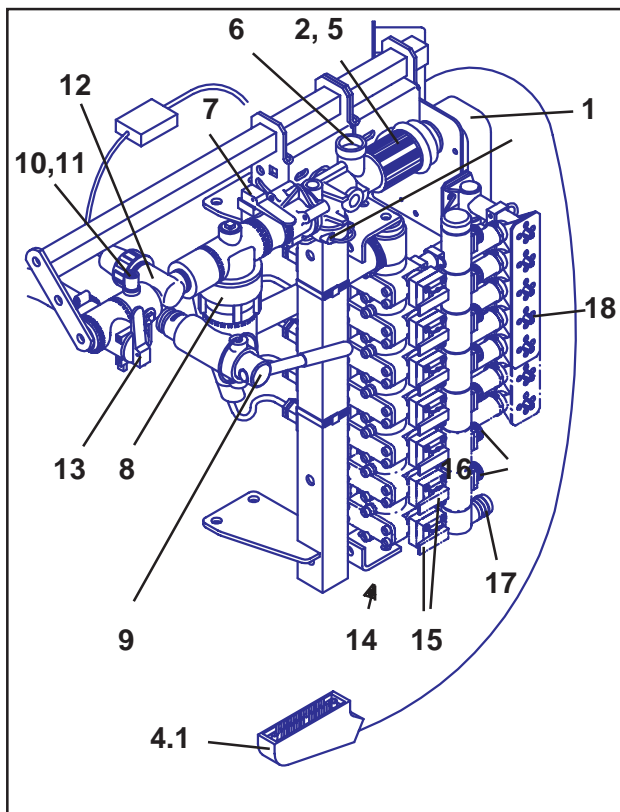


Fig. 8.3

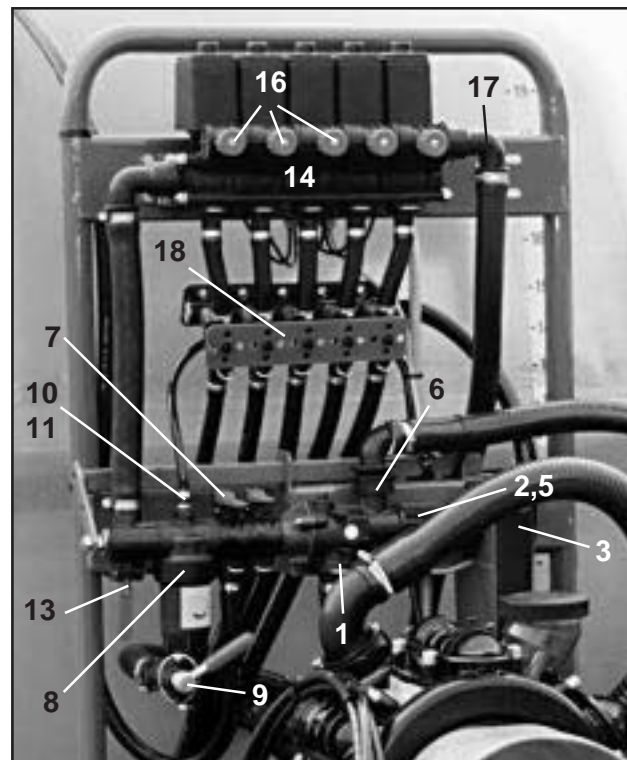


Fig. 8.3a

8.1.2 Control units "Electrically remote controlled with switch boxes SKS 5, SKS 50, SKS 70 or SKS 90"

Control units "DG" (Fig. 8.1) (SKS 5) , "FG" and "NG" ((SKS 50 resp. 70) (electric remote control). Control units "KG" (Fig. 8.2) (SKS 5) and "GG" (Fig. 8.3) (SKS 50, 70 or 90) (electric remote control suited for the use of "AMACHECK II A", "SPRAYCONTROL II A" and "AMATRON II A").

Fig. 8.1/ . . . or Fig. 8.2/ . . . resp. Fig. 8.3/ . . .

- 1 - Connection for pressure hose from pump.
- 2 - Automatic metering.
- 3 - Electric motor for spray pressure setting or resetting via the switch box (see para. 6.1.3).
- 4 - Implement socket for implement plug from switch box.
- 4.1- Implement cable with implement plug for switch box SKS 50 resp. 70.
- 5 - Regulating nut for setting the pressure relief valve in the automatic metering (see para. 6.1.3).
- 6 - Return flow. The surplus pump volume stream is directly guided back into the suction hose via this return flow.
- 7 - Single tap for supply hose of the rinsing-in tank.
- 8 - Self cleaning pressure filter (refer to para. 7.5).



The pressure filter prevents blockage of the nozzle filters in the spray jets. Whenever the spray pressure drops slowly while otherwise unchanged conditions prevail, the pressure filter must be cleaned (see para. 7.5.2.1).

- 9 - Tap for the hydraulic agitation (please refer to para. 7.2).
- 10 - Determination of the spray pressure
- 11 - Pressure joint for the quick coupling of the liquid fertiliser proof pressure meter (only control unit "DG", "EG" , "KG" and "NG").
- 12 - Flow meter for determining the rate (l/ha) (only control units "EG", "GG" and "KG"). The impulses (Imp./l) measured by the flow meter per litre were already determined by the factory and written on the housing of the flow meter. If Impl./l are unknown the flow meter needs to be calibrated (please refer to para. 6.3).



Deposit of surplus spray agent in flow meter can cause deviations when determining spray rates. Therefore it is recommended to calibrate the flow meter (Imp./l) every 1000 ha - however, at least once a year.

- 13 - Switch tap for the supply of the equal pressure control unit. The switch tap is only shut when the agitation intensity of the hydraulic agitator has to be increased while mixing up the spray mixture (please refer also to para. 7.2).
- 14 - Equal pressure control unit.
- 15 - Solenoid valves are responsible for the on/off feed control of individual boom parts. The solenoid valves are either actuated by the boom feed part section control or mutually via the central boom feed on/off-control of the switch box.
- 16 - Manual screw for setting the equal pressure control unit.



Set up the equal pressure control unit by the setting screw for first operation and at every change of the nozzles (please refer to para. 6.1.3).

- 17 - Equal pressure control unit return flow. When switching off the feed to one boom part section the amount of spray liquid which otherwise would have been allocated to the corresponding boom part section is guided via its related solenoid valve with attached equal pressure device through the return flow hose back into the tank without causing the spraying pressure to increase.
- 18 - Return flow from boom part sections functions as pressure relief of the equal pressure control unit. When the boom feed is switched off the pressure in the remaining spray liquid in the booms is being reduced by this return flow and in this way in conjunction with the diaphragm valve in the nozzles provides drip-free switching off of the jets (please refer to para. 11.0).

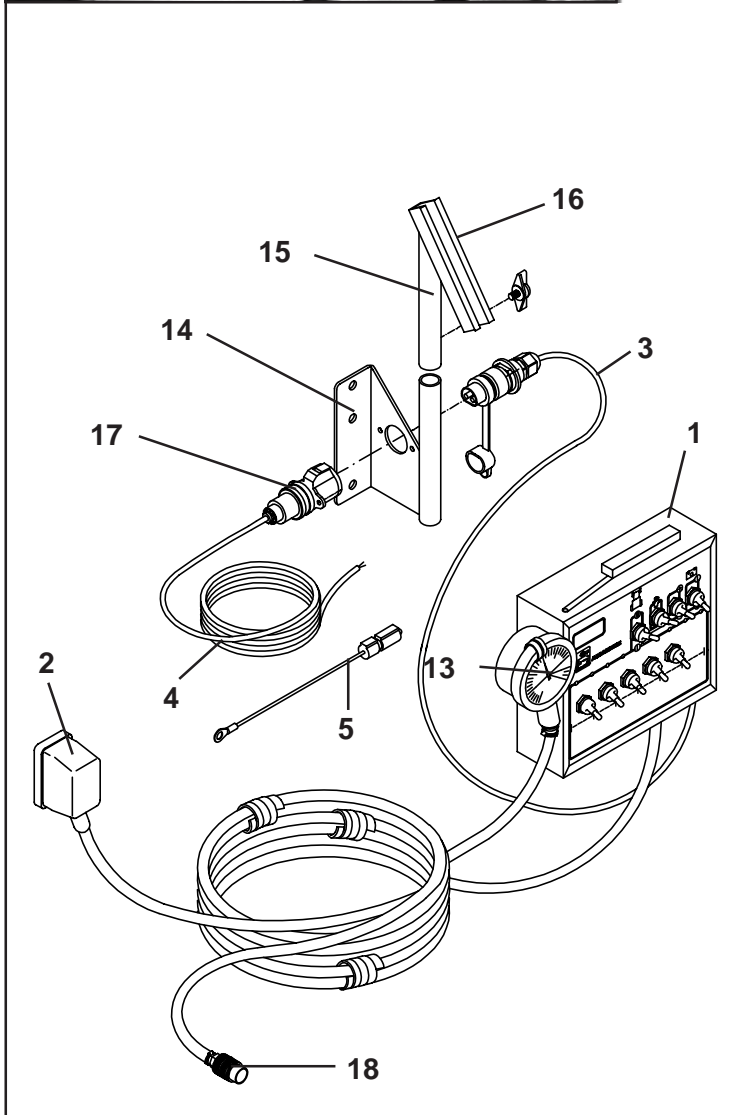
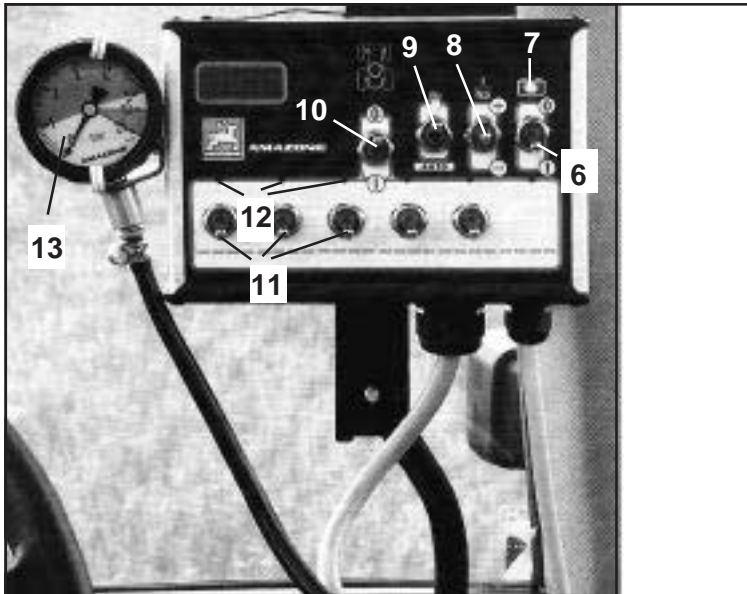


Fig. 8.4

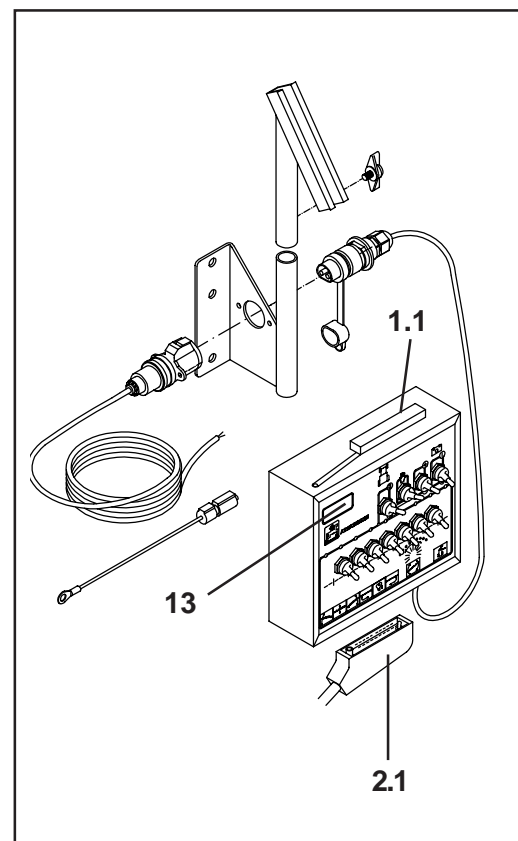


Fig. 8.5

8.1.3 Operating range of the control units "BG", "FG", "EG", "GG"; "KG" and "NG"

Pressure:	1 - 8 bar
Delivery rate:	6 l/min. to 220 l/min.
PTO-speed:	300 R.P.M. to 540 R.P.M.
Forward speed:	4 k.p.h to 10 k.p.h
Max. deviation from the preset rate:	± 5 %
Permissible deviation in the forward speed within one tractor gear:	± 12 %
Permissible pressure deviations from the pre-set spray pressure:	± 25 %

8.2 Remarks on the switch boxes SKS 5, SKS 50 and SKS 70

Control unit "DG", "EG" and "KG", 5-fold boom feed, switch box SKS 5 (Fig. 8.4).


Control unit "FG" and "GG", 5-fold boom feed, control chest SKS 50.

Control unit "FG" and "GG", 7-fold boom feed, switch box SKS 70 (Fig. 8.5).

Control unit "GG", 9-fold boom feed, switch box SKS 90.

For initial fitting of the switch box please refer to para. 8.2

Fig. 8.4/ . . . or Fig. 8.5/ . . .

- 1 - Switch box SKS 5.
 - 1.1- Switch box SKS 70.
 - 2 - Implement plug, connect with machinery plug of the control unit (only SKS 5).
 - 2.1- Implement cable for hydraulic and electronic (only SKS 50 and 70).
 - 3 - Power supply cable, connect with battery cable.
 - 4 - Battery cable with power connector (5).
 - 5 - Power connector with fuse **(16 A)**.
 - 6 - On/off switch for power supply. In position "I" the sprayer is ready for operation and the red control lamp (7) lights up.
 - 7 - Control lamp (red).
 - 8 - ± switch for setting the spray pressure.
 - 9 - Program switch "auto / manual control".
-  **Only switch program switch into position "AUTO" when the switch box is connected to "Spraycontrol II A" or "AMATRON II A". For all other operation conditions the program switch should be set to position "manual operation".**
- 10 - Central boom feed on/off control. Position "I" ((ON/EIN), Position "0" (OFF/AUS).
 - 11 - Boom part section feed control switch. For on/off switching individual boom part section feeds.
 - 12 - Control lamps (green). When a boom part feed is switched on the corresponding control lamp lights up.
 - 13 - Spray pressure display.
 - Liquid fertiliser proof pressure meter (standard execution with SKS 5, SKS 50/70 (Fig. 8.4).
 - Digital pressure display (optional equipment only SKS 50 resp. SKS 70) (Fig. 8.5).

Initial fitting of the switch box

1. Basic console mounting and hat profile bar

The mounting console (Fig. 8.4/14) is fitted to the tractor cab and serves as carrier (Fig. 8.4/15) with guide brackets (Fig. 8.4/16) and battery link-up cable (Fig. 8.4/ 4). The mounting console has to be fixed on the tractor cab so that the switch box is within view and reach of the operator.

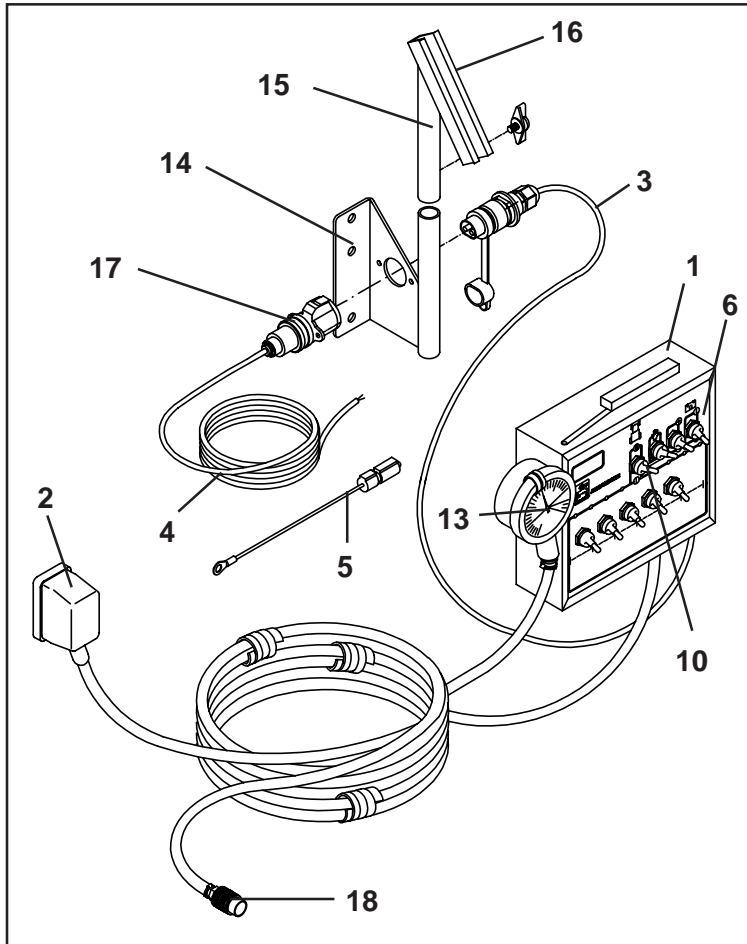


Fig. 8.4

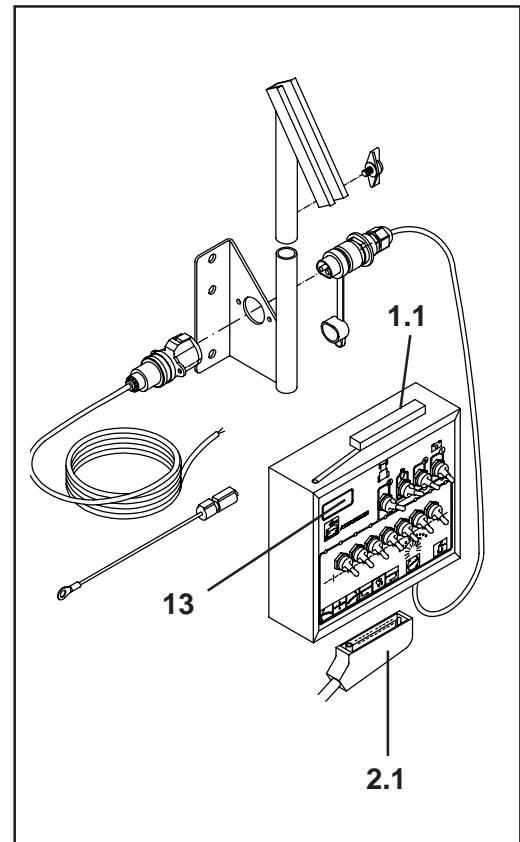


Fig. 8.5

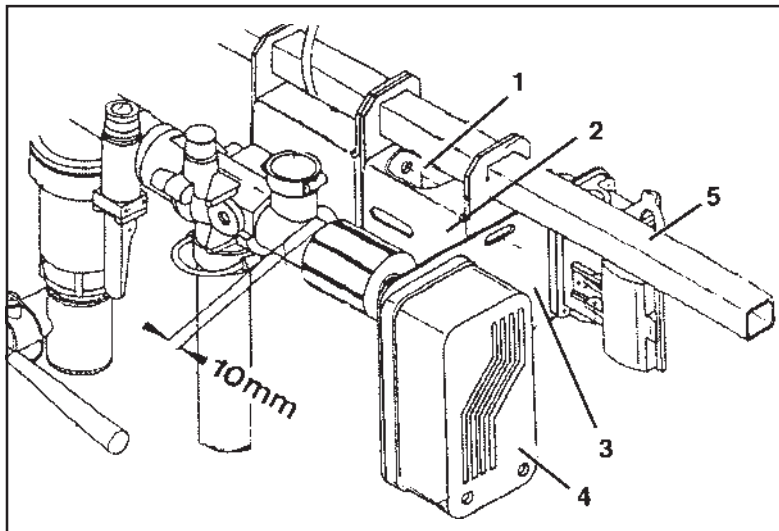


Fig. 8.6

2. Battery link up cable

- Connect battery cable (Fig. 8.4/ 4) directly to the tractor battery (12 V) and install cable.
- Connect plug (Fig. 8.4 /5) with fuse (16 A) to the brown wire and connect to plus pole of the tractor battery.
- Connect blue wire to minus pole (earth).



When connecting to battery fit first plus cable to plus pole. Thereafter fit mass cable to minus pole. When removing do it vice versa..



Minus pole from battery must be connect to the tractor chassis. When tractors have a switch in the earth cable of the battery (e. g. Zetor 8011, 8045), connect the blue earth cable directly to the tractor chassis.

- Fit 3-pole plug socket (Fig. 8.4/ 17) to console (Fig. 8.4/ 14).

3. Switch box

Slide the SKS-switch box from below into the guide key way of the hat profile rails and fix by clamping screws.



When assembling the following plug-up connections the on/off switch (Fig. 8.4/6) for the electric power supply of the switch box should be in position "0" (OFF/AUS).

- Connect the electric power supply cable (Fig. 8.4/ 3) with the socket (Fig. 8.4/ 17) of the battery connecting cable.
- Connect the implement plug (Fig. 8.4/ 2) to the implement socket (Fig. 8.1/ 4) of the control chest (only switch box SKS 5).
- Connect implement cable (Fig. 8.5/2.1) to switch box (Fig. 8.5/1.1) (only switch box SKS 50 and 70).
- Connect pressure meter (Fig. 8.4/13) by quick coupling (Fig. 8.4/18) to the pressurised connection (Fig. 8.1/11) of the control chest (only switch box SKS 5).
- Fix pressure meter to switch box (only switch box SKS 50 and 70).

8.2.1 Continuing the field operation with defective switch box

When the electric remote control via the switch box fails the field operation may be continued and finished, depending on the cause, as follows:

1st Trouble : It is impossible to set the spray pressure via the \pm switch.

Remedy: Starting and resetting the spray pressure by turning the metering screw by hand.

Procedure

- Remove the bolts (Fig. 8.6/ 1) from the governor carrier (Fig. 8.6/ 2).
- Slide to the right the governor carrier with the flange plate (Fig. 8.6/ 3) for the electric motor (Fig. 8.6/ 4) on the counter bracket (Fig. 8.6/ 5) until the electric motor and the metering screw of the automatic metering are no longer connected with one another.
- Set the metering screw by hand.

2nd Trouble: It is impossible to actuate the central boom feed on/off control via the switch (Fig. 8.4/ 10).

Remedy: On/off switching of the sprayer booms by the pto drive of the tractor.

3rd Trouble: It is impossible to switch on the feed to individual boom part sections.

Remedy: Switch on or off the feed to individual boom part sections by manually actuating the solenoid valve.

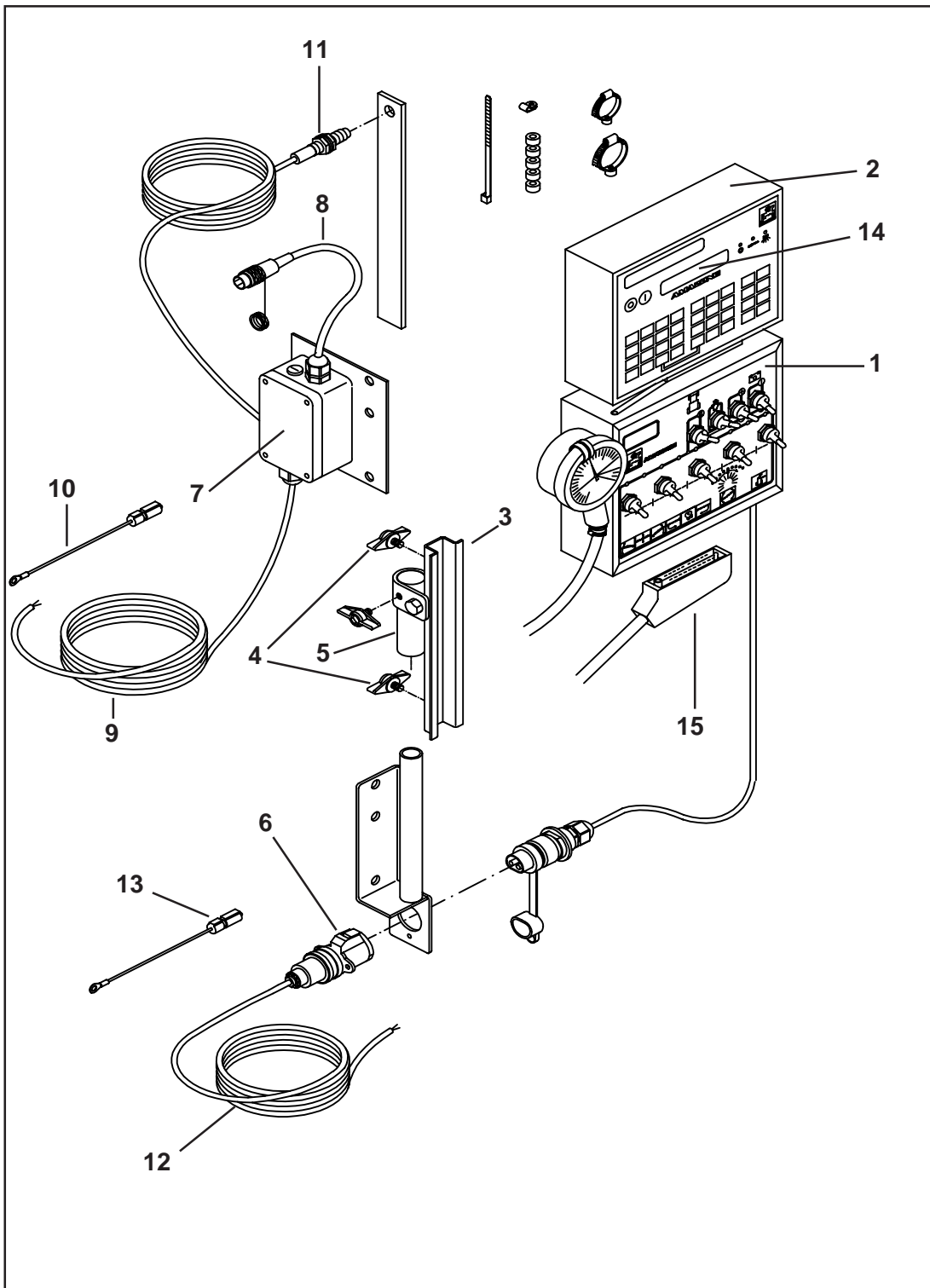


Fig. 8.7

8.3 Control unit "KG", "EG" or "GG" with "AMACHECK"

"AMACHECK" is a pure information and monitor device and contains the following functions:

- Displaying the momentaneous operation speed [k.p.h.] and momentaneous spray rate [l/ha].
- Determining the area and the total area in hectare (e. g. within one season).
- Determining the applied amount and the applied total amount in litres (e. g. within a season).
- Determining the working time in hours.
- Display of the spray rate in [ha/h].
- Display of the spray rate in [l/min].
- Matching the feed to boom part sections (not automatic).
- Monitoring the pump speed.

Fig. 8.7/ . . .

- 1 - Switch box (SKS 5, SKS 50 or SKS 70).
- 2 - "AMATRON II" to be connected via the 48-pole plug with the switch box (details about this may be found in the fitting and operating instructions "AMATRON II A").
- 3 - Hat profile rail for the mutual fixing of switch box and "AMATRON II".
- 4 - Bolting on part for hat profile rail for "AMATRON II A" and switch box.
- 5 - Carrier for hat profile rail.
- 6 - Base console fitted in tractor cab (please also refer to para. 8.2.1). Carrier of console and battery connecting cable for switch box.



During the fitting to the tractor the distance between "Spraycontrol II" resp. "AMATRON II" and a possibly existing radio transmitter as well as the aerial should be in minimum 1 m.

- 7 - Tractor distributor. Mount to bolt-on part.
- 8 - Connecting cable to "AMATRON II".
- 9 - Battery cable and plug (10) for electric power supply of the tractor distributor. Connect directly to the tractor battery (12 V).
- 10 - Power connector with fuse (**5 A**).
- 11 - Sensor to determine the distance travelled (fitted to tractor).



The sensor for determining the travelled distance is fitted to the wheel of the sprayer. "Spraycontrol II" resp. "AMATRON II" have a priority switch. This enables the use of the Imp./100 m determined from the sprayer for the spray rate controlling.

- 12 - Battery cable and plug (13) for the electric power supply of the switch box (1).
- 13 - Power connector with fuse (**16 A**).
- 14 - Display. During spraying operation
 - the actual forward speed,
 - the actual spray rate.
- 15 - Implement cable for hydraulics and electronics (only SKS 50/ 70/ 90). Implement plug of the switch box SKS 5; to be connected with the machinery socket of the control unit.

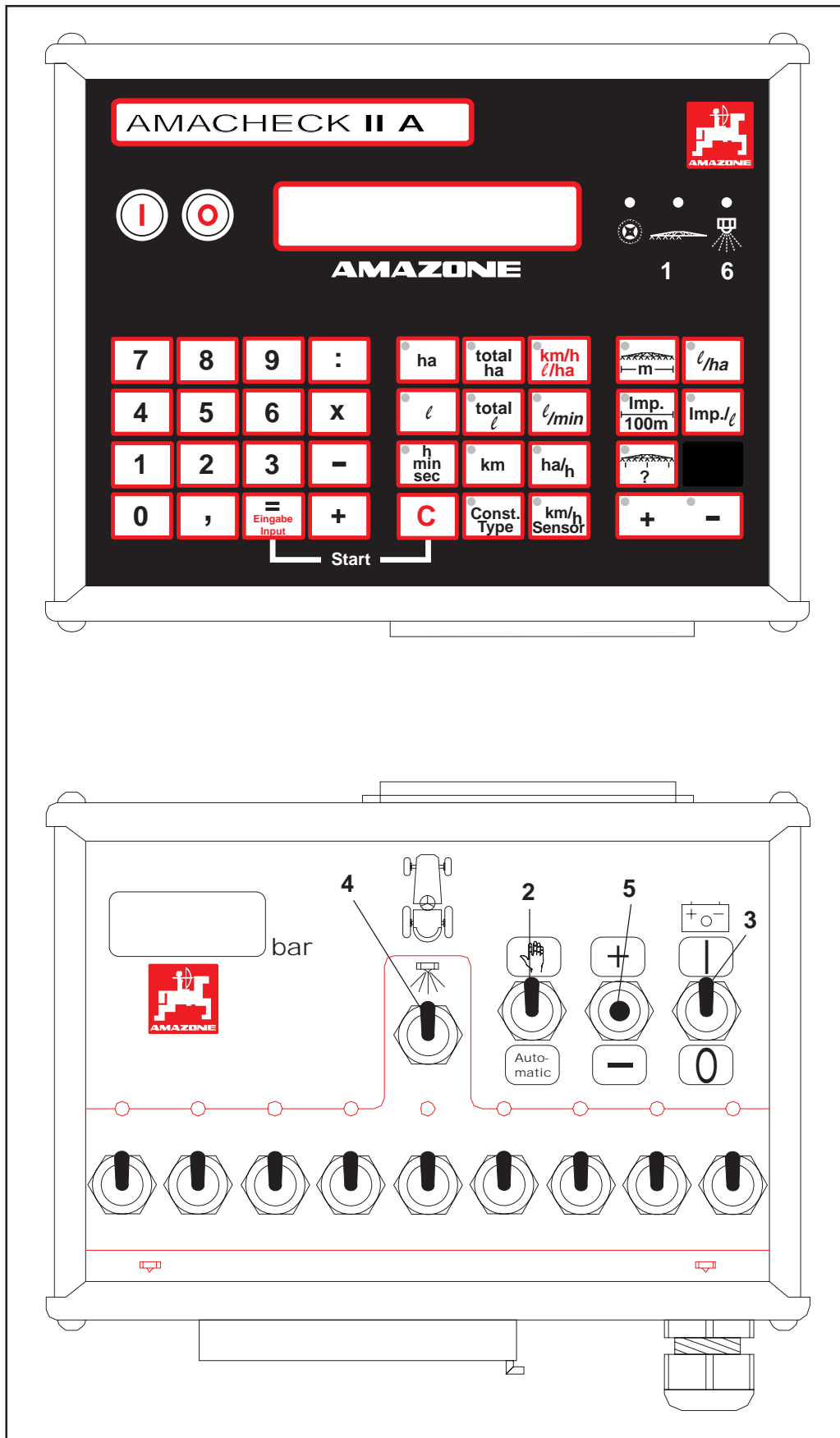


Fig. 8.8

8.3.1 Practical operation with "AMACHECK"

The control units are supplied ready for operation. For starting the field operation program "AMACHECK" according to the mounting and operation instructions "AMACHECK".

- Attach sprayer to tractor, connect "AMACHECK" by its connecting unit to the switch box.



Keep power supply of "AMACHECK" in "off" position.

- Switch on "AMACHECK II A"

Before operating the "AMACHECK" program the following machinery data:

- Imp./100 m
- Imp./l. The required figure lies between **200 - 300 Imp./l.** After this input the computer automatically runs on program "field sprayer".
- Working width in m.
- Number of boom part section feed controls.



When changing the present working width by switching on or off individual boom part section feed the diode above the boom symbol (8.8/ 1) lights up. At the same time an automatic information about this working width change is given to „AMACHECK II A“. In maximum 12 boom part sections are considered.

- Program switch (Fig. 8.8/ 2) in position "manual".
- Initiate start function by simultaneously pressing key "C" and "input". At the same time the memory for worked area, operating time and sprayed liquid is set to "0".
- On/off switch (Fig. 8.8/ 3) for power supply of switch box in position "I" (ON/EIN).
- Switch for the central boom feed on/off switch (Fig. 8.8/ 4) on the switch box in position "0" (OFF/ AUS).
- Set the desired agitation rate of the hydraulic agitation (for this please refer also to para. 7.2).
- Read off the tractor meter which tractor gear will allow a forward speed of 6 to max. 8 kph. Also set tractor engine speed under consideration of the allowable pump drive speed of min. 350 R.P.M. and max. 550 R.P.M. by the hand throttle lever.
- Set the prescribed spray rate by the \pm switch (Fig. 8.8/ 5). (Please refer to para. 6.1.3).



When deviations are noticed between the displayed spray rate and the nominal spray rate change the spray pressure accordingly by the \pm switch (Fig. 8.8/ 5) of the switch box until the displayed spray rate and the nominal rate coincide.



When the boom feed supply is switched on an arrow appears on the right hand side of the display, i. e. the sprayer is ready to operate

8.3.2 Continuing the field operation with defective electrics or defect "AMACHECK II A"

Any failure of "AMACHECK" means no loss of function of the sprayer and the field operation can be continued without restrictions.

If the electric remote control via the switch box fails to function see para. 8.2.

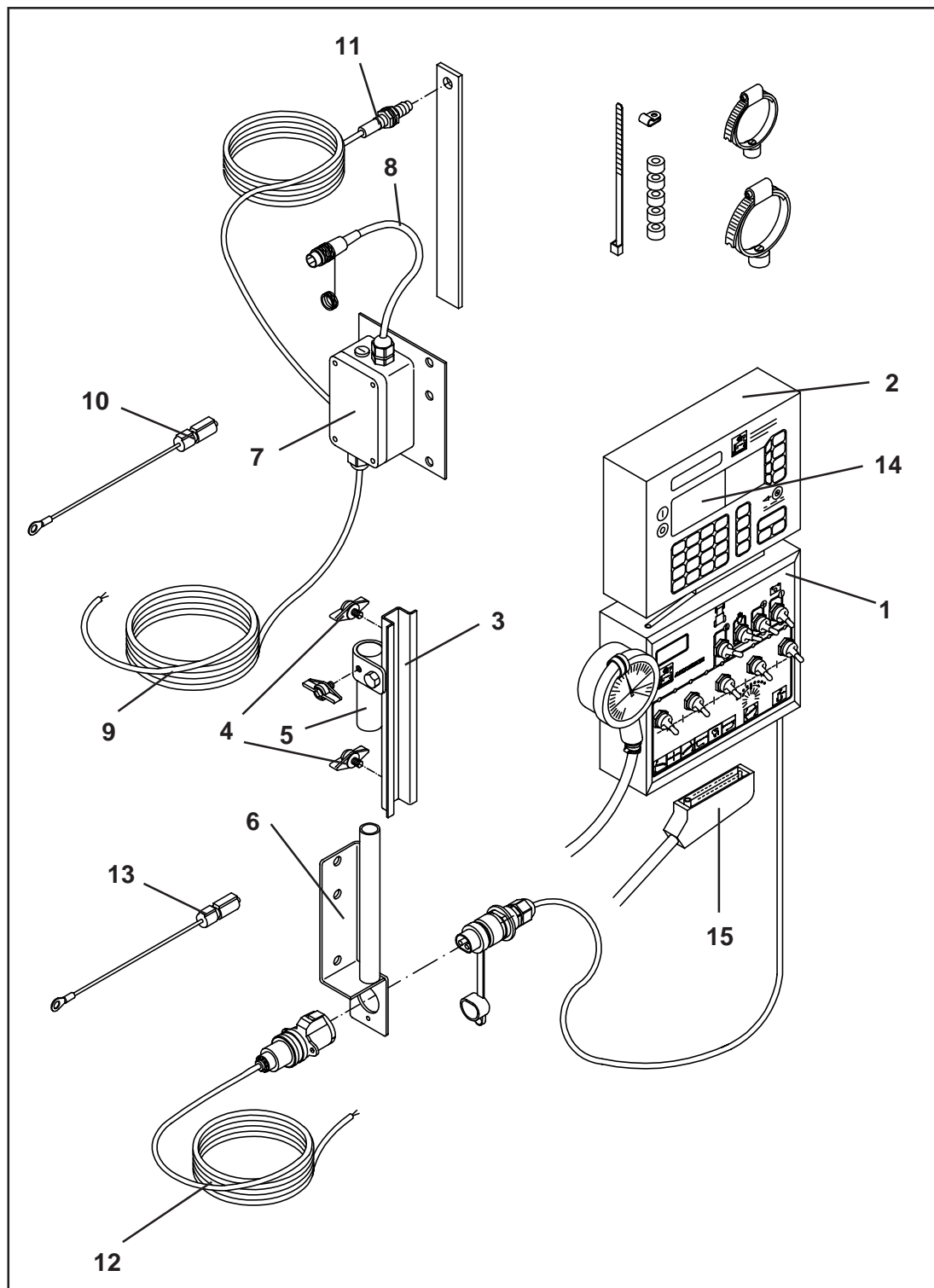


Fig. 8.9

8.4 Control unit "EG", "GG" or "KG" with "Spraycontrol II A" or "AMATRON II A"



It is impossible to use an already existing "AMATRON II A" with a program installation date before the 8th January, 1992 (is displayed in routine when switching on). In such a case return the "AMATRON II A" to the importer for amendment of the program.

"Spraycontrol II A" or "AMATRON II A" is directly connected with the switch box (Fig. 8.9/ 1) and conducts the area related governing of the spray rate (l/ha) in conjunction with the preset nominal spray rate and present forward speed. To achieve this, an electric motor (Fig. 8.1/ 3) automatically re-sets the spraying pressure. The electric motor is activated by the control unit via the switch box.

Determined and respectively stored are:

- Actual forward speed in [k.p.h].
- Actual spray rate in l/ha or [l/min].
- Sprayed quantity as well as total quantity in [l].
- Worked area in ha, total area in [ha].
- Travelled distance in [km].
- Working time of tractor, working time of sprayer and working time of operator in [h].
- Average operation output in [ha/h].

Fig. 8.9/ . . .

- 1 - Switch box (SKS 5, SKS 50/ 70/ 90).
- 2 - "AMATRON II A" to be connected via the 48-pole plug with the switch box (details about this may be found in the fitting and operating instructions "AMATRON II A").
- 3 - Hat profile rail for the mutual fixing of switch box and "AMATRON II A".
- 4 - Bolting on part for hat profile rail for "AMATRON II A" and switch box.
- 5 - Carrier for hat profile rail.
- 6 - Base console fitted in tractor cab (please also refer to para. 8.2.1). Carrier of console and battery connecting cable for switch box.



During the fitting to the tractor the distance between "Spraycontrol II" resp. "AMATRON II" and a possibly existing radio transmitter as well as the aerial should be in minimum 1 m.

- 7 - Tractor distributor. Mount to bolt-on part.
- 8 - Connecting cable to "AMATRON II A".
- 9 - Battery cable and plug (10) for electric power supply of the tractor distributor. Connect directly to the tractor battery (12 V).
- 10 - Power connector with fuse **(5 A)**.
- 11 - Sensor to determine the distance travelled (fitted to tractor).



The sensor for determining the travelled distance is fitted to the wheel of the sprayer. "Spraycontrol II" resp. "AMATRON II A" have a priority switch. This enables the use of the Imp./100 m determined from the sprayer for the spray rate controlling.

- 12 - Battery cable and plug (13) for the electric power supply of the switch box (1).
- 13 - Power connector with fuse **(16 A)**.
- 14 - Display. During the spraying operation:
 - the actual forward speed,
 - the present nominal spray rate,
 - the set deviation, e. g. 10 % from the entered nominal spray rate and at the boom part section feed control the remaining working width are displayed.
- 15 - Implement cable for hydraulics and electronics (only SKS 50/ 70/ 90). Implement plug of the switch box SKS 5; to be connected with the machinery socket of the control unit.

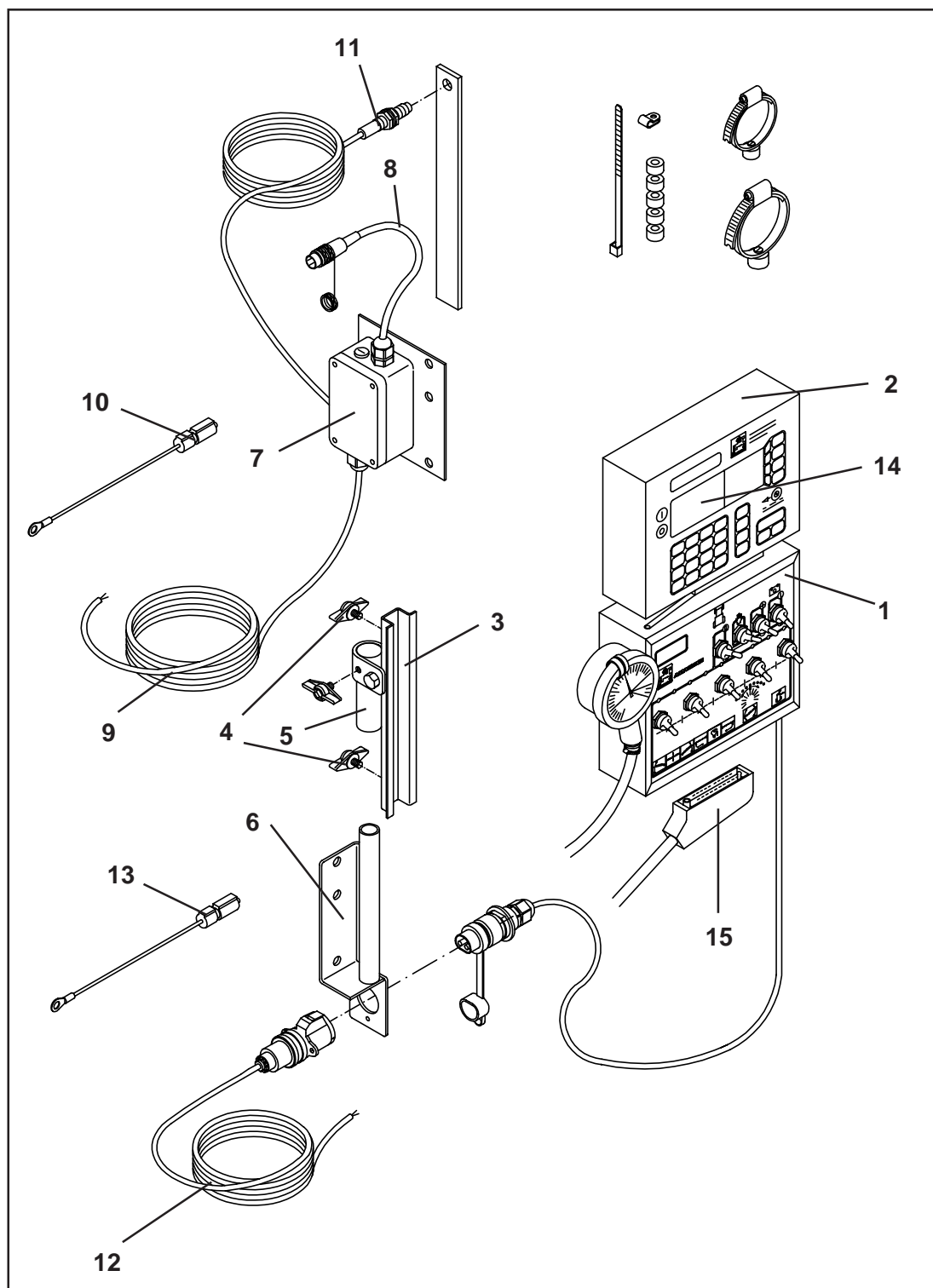


Fig. 8.9

8.4.1 Practical operation with control units "EG", "GG" and "KG" with "Spraycontrol II A" resp. "AMATRON II A"

The control units "EG" "GG" resp. "KG" are supplied ready for operation. Before starting the field operation the "Spraycontrol II A" resp. "AMATRON II A" must be programmed according to the fitting and operating instructions of the units. The manufacturer has already determined the data Imp./l of **(at control units "EG" and "GG" the value is between 150 - 200 Imp./l, at control unit "KG" between 600 and 700 Imp./l) of the flow meter** and has stored it in the computer (in addition the figure Imp./l has been written on the outside of the flow meter housing). If the figure Imp./l is unknown it should be determined by recalibrating the flow meter (please refer to para. 6.3).

After having installed the measuring-, controlling-, regulating and monitoring unit "Spraycontrol II" resp. "AMATRON" and the machinery specific data have been entered into the data block **"implement"** it is ready for operation (please also see fitting- and operating instructions "Spraycontrol II A" resp. "AMATRON II A").



Choose information displays "machine control unit" in data block "implement" and confirm question "with equal pressure device" by key "T2" (Yes). In the next display confirm question "with return flow calibration?" by Key "T2" (Yes) as well.

The following operating procedure results:

- Hook up sprayer to tractor.
- Connect the implement plug to the machinery socket of the control unit **(only SKS 5)**.
- Connect implement cable to switch box **(only SKS 50/ 70/ 90)**.
- Plug "Spraycontrol II A" resp. "AMATRON II A" onto the switch box.



When plugging the "Spraycontrol II A" resp. "AMATRON II A" onto the switch box the on/off switch for the electric power supply of the "Spraycontrol II A" resp. "AMATRON II A" should be in position "0".

- Switch on the "Spraycontrol II A" resp. "AMATRON II A". The kind of machinery is automatically recognized. Automatically the programme "Fieldsprayer" is dialed with the machinery data of the field sprayer once entered in the data block **"machine"**.
- Enter the order related data into the data block **"order"**.
 - Enter name (field plot name, name of customer)
 - Enter and check "spray rate and nominal spray rate"



Commentary and name need not necessarily be entered. However, the figure "nominal spray rate" should be checked and changed in any case.

- Move from data block **"order"** via key "T2" directly into data block **"operation"**.
- Start the order in the "data block **"operation"** via key "T2".
- During the spraying operation all functions of the key board as well as such of the calculators can be dialed. The spray rate is changeable via the keys " ± 10 " in 10 % steps, related to the entered nominal spray rate.
- The order will be terminated by pressing the key "T2" (End/Ende) and by the following confirmation. This way all data determined for this order such as area, working powers, sprayed quantity etc. are stored. The storage capacity for these data is automatically returned to "0". Also automatically a new order number is allocated and the operation procedure begins again.



8.4.2 Special hints for practical operation

Due to the automatic area related spray rate control forward speed and pump drive speed can freely be chosen in a wide range.

The pump capacity depends on its drive speed. Choose the pump drive speed (between 350 and 550 R.P.M.) in such a way that always sufficient spray volume is available for the sprayer boom and the function of the hydraulic agitation. That means that at high forward speed and a big spray rate more spray liquid must be supplied than at a lower forward speed and with a smaller spray rate.

However, before starting the spraying operation choose from the spray rate table the closer forward speed- and spray pressure range (para. 16.0) - under consideration of the nozzle size and the desired nominal spray rate.

If at a higher forward speed and lower pump drive speed the nominal spray rate is not achieved an alarm sign is shown on the display (Fig. 8.9/ 14). Simultaneously an alarm signal can be heard. Remedy by reducing the forward speed and increasing the pump drive speed.



When spraying please pay attention that the spray pressure by no means deviates by more than 25 % from the wanted spray pressure (depending on nozzle size, forward speed and nominal spray rate)..

Example: If the desired spray pressure is e. g. 3.2 bar, all spray pressures between 2.4 and 4.0 bar are permissible.



For ensuring an optimum crop treatment and for reducing environment endangering never exceed the permissible pressure range corresponding to the nozzles fitted to the sprayer boom. For example the pressure range for the nozzle size "05" ranges from 1.0 to 5.0 bar.

At the **control units „EG“, „GG“ and „KG“** the permissible spray pressure of the nozzles fitted to the sprayer boom should be manually monitored on the pressure gage.

At the **control unit "GG"** with the special equipment "**digital pressure monitoring**" the permissible pressure range for the nozzles fitted to the sprayer boom is automatically monitored. To obtain this the permissible pressure range should be entered into the "data block machine". An audible and visible alarm signal will be produced as soon as the entered pressure range is left.



8.4.1.2 Continuing the field operation with defective "Spraycontrol II A" or "AMATRON II A"

When "Spraycontrol II A" or "AMATRON II A" fail, operate the control unit manually via the switch box.

For this:

- reset the program switch into position "manual operation" at the switch box.

In case of failure of the electric remote control via the switch box refer to para. 8.2.1.

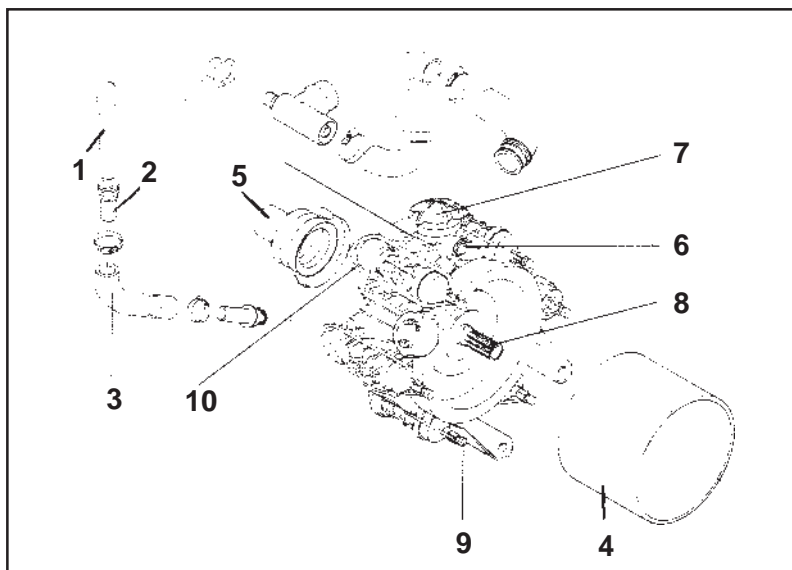


Fig. 9.1

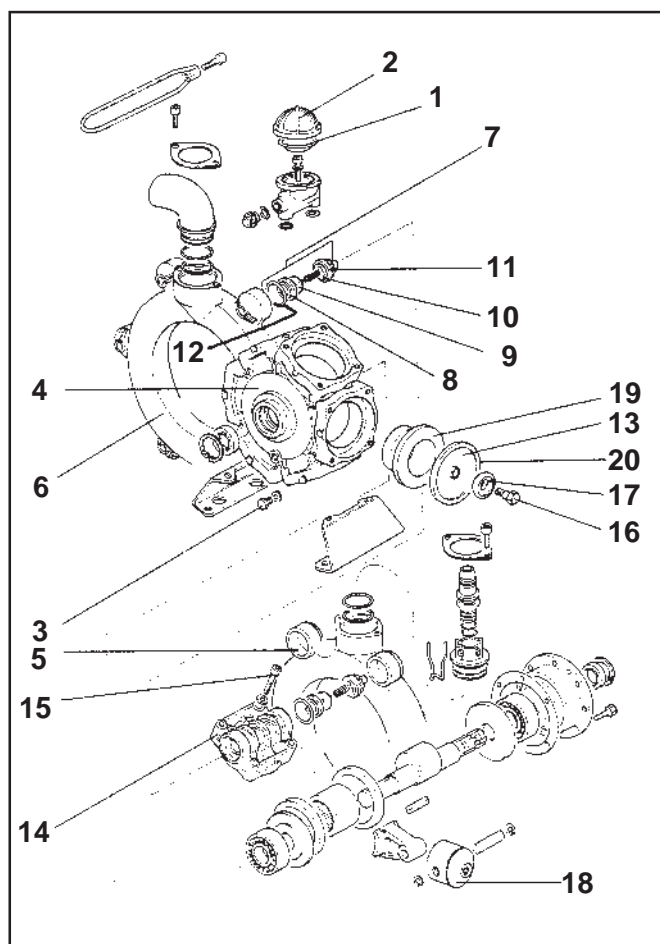


Fig. 9.2

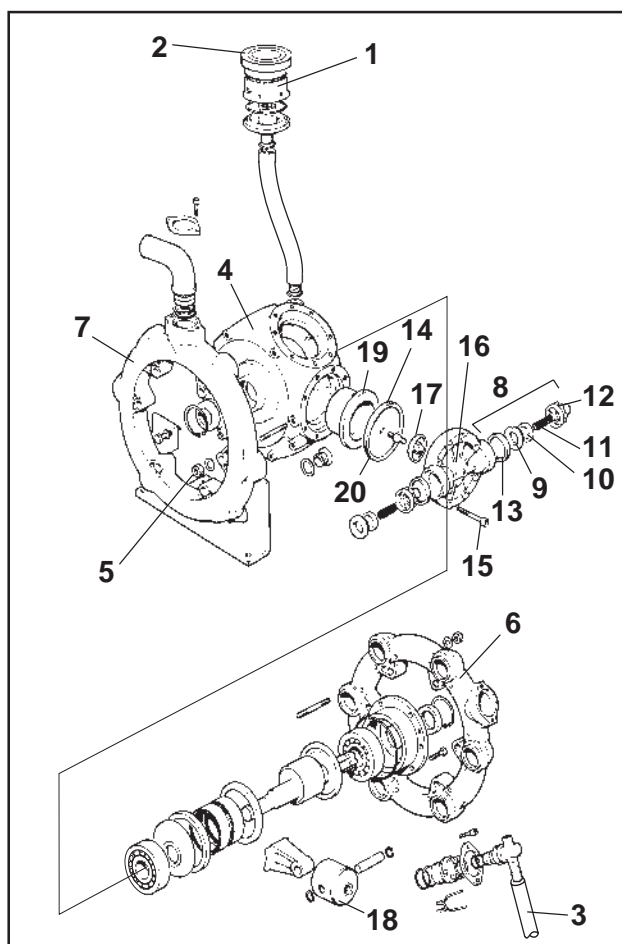


Fig.9.3

9.0 Pump outfit. Piston diaphragm pump 210, 250, 350 and 420 l/min.

The AMAZONE UG 2000 Special is equipped with a piston-diaphragm pump BP 210/20, the AMAZONE UG 2200 Power with either a piston diaphragm pump BP 210/20 or BP 250/20 and the AMAZONE UG 3000 Power and UG 4500 Magna with a piston diaphragm pump BP 250/20 resp. when using the automatic agitator with each a piston diaphragm pump BP 250/20 and BP 151/20. or two piston diaphragm pump BP 210/20. The operation pump supplies the control unit for the spraying operation. At the AMAZONE UG 3000 Power the agitator pump supplies the liquid-level dependent automatic agitator.



Insert the divisor plate (Fig. 9.1/ 3) into the hose joint (Fig. 9.1/ 1) when fitting the pressure hose (Fig. 9.1/ 2) to the control unit.



Check the oil level of the pumps before starting!

The pumps are piston-diaphragm pumps providing a delivery of each 140, 210 resp. 250. All components being in direct contact with the spray agents are made from aluminum die cast with plastic covering or from plastics. According to the present state of knowledge these pumps are suited for spraying commercially available plant protective agents and liquid fertiliser.



Never exceed the maximum permissible pump drive speed of 550 R.P.M. at operational pressure (10 bar). Before starting to drive the pumps ensure that all guards are in place (Fig. 9.1/ 4, Fig. 9.1/ 5).

9.1 Checking oil level

The oil level is correct when it is visible in the oil level window (Fig. 9.1/ 6) resp. on the markings (Fig. 9.3/ 1), **provided the pump is stopped and placed horizontally.**

For refilling the oil open the lid (Fig. 9.1/ 7) and the diaphragm (Fig. 9.2/ 1) resp. the lid (Fig. 9.3/ 2) positioned below.



Always use only quality oil 20W30 or multi range oil 15W40!



Always pay attention to a correct oil level which must be maintained. Harmful is a too low or a too high an oil level.

The oil reserve inside the pump housing (Fig. 9.2/4 resp. 9.3/4) functions simultaneously for the necessary pressure balance of the peak pressures and thus dampening the pulsation effect during liquid delivery by the stroke movements of the pump's pistons.



Maintaining the correct oil level is required for ensuring a constant volume by the pumps.

9.2 Oil change



Conduct an oil change every 400 to 500 hours of operation, at least, however once a year!

- Remove the pump from the sprayer.
- Remove the pump lid (Fig. 9.2/ 2 resp. 9.3/ 2) and the diaphragm (Fig. 9.2/ 1).
- Drain off oil.
- Turn pump upside down.
- Spin drive shaft (Fig. 9.1/ 8) by hand until all old oil is fully drained off.
It is possible to drain the oil at the drain screw (Fig. 9.2/ 3). However, oil can remain in the pump for which reason we recommend the procedure mentioned above.
- Place the pump on a level surface.
- Turn drive shaft alternately clockwise and counter clockwise and slowly fill in new oil until the oil is visible at the oil window. Do not overfill.



Check the oil level after a few hours of operation and refill oil if necessary.

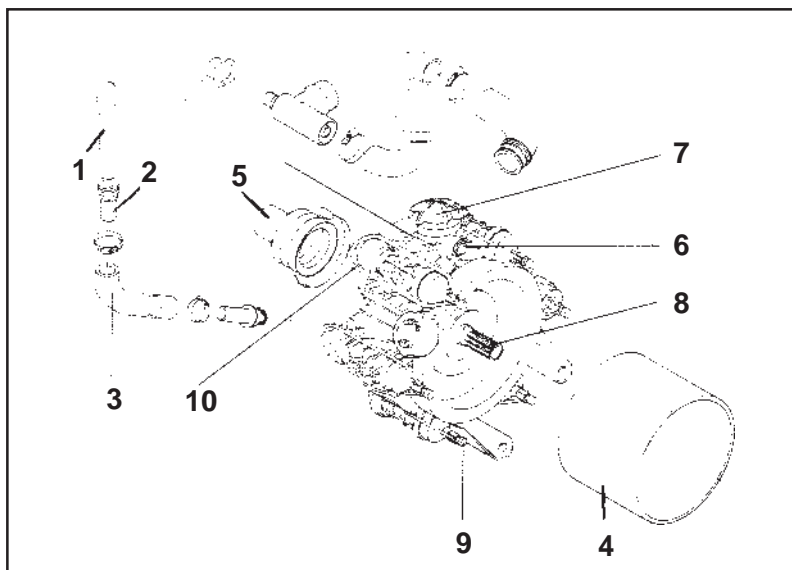


Fig. 9.1

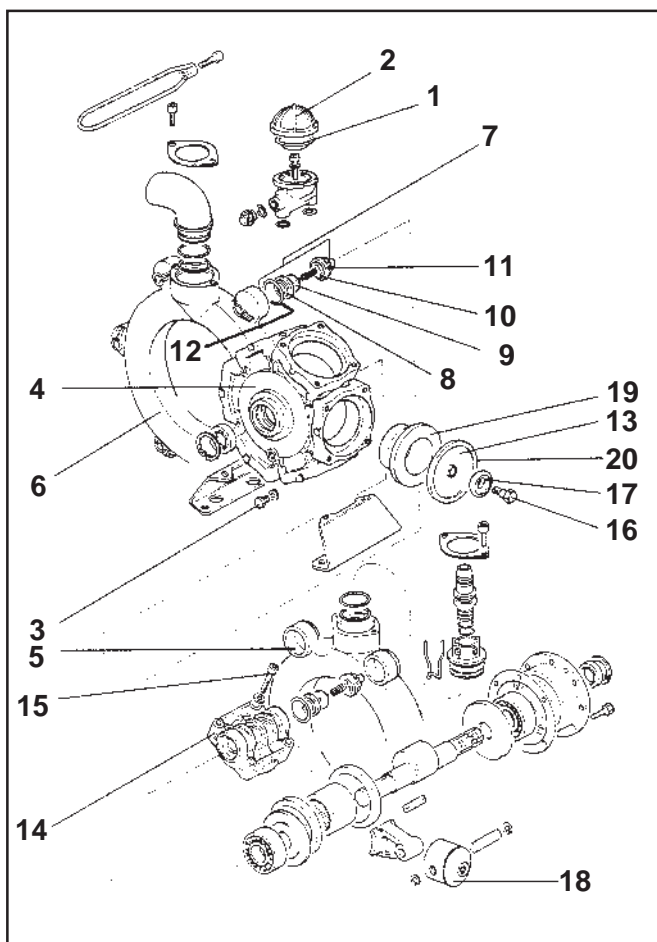


Fig. 9.2

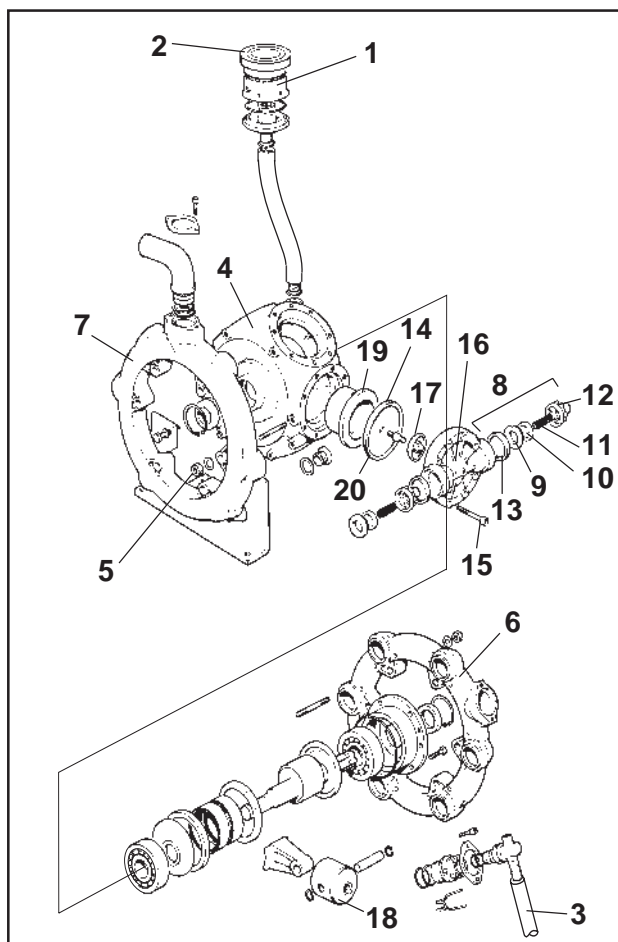


Fig.9.3

9.3 Cleaning and storing over winter

Cleaning

Thorough cleaning of the pump after every operation by letting it pump clear water for a few minutes.

Storing over winter

- To avoid freezing up drain off any spray liquid residue from the pump. To do this:
 - take off the pressure hose (Fig. 9.1/3) from the pump.
 - take off filter cup (Fig. 7.9/4) from filter tap.
- Let pump run for about ½ minute until no water leaves the pump's pressure side outlet.



Do not refit pressure hose and filter cup before the next use of the sprayer.

- Close the pump opening (pressure hose joint) to prevent penetration of dirt.

Control units should be stored in a normal temperature indoors.

9.4 Faults at the pump

When the pump pressure hose (Fig. 9.1/ 3) and the spray pressure display fluctuates

Checking the suction- and pressure side valves

- Take off pump.
- Slacken bolt (Fig. 9.1/ 9) and remove tensioning clamp (Fig. 9.1/ 10 [at BP 250 inexistend]), suction- and pressure-tube (Fig. 9.2/ 5, 9.2/ 6).



Note and remember before removing the valves the individual mounting position.

- Take out the valve groups (Fig. 9.2/ 7).
- Check for damage respectively wear of the valve seat (Fig. 9.2/ 8), valve (Fig. 9.2/ 9), valve spring (Fig. 9.2/ 10) and valve guide (Fig. 9.2/ 11) and "O"-ring (Fig. 9.2/ 12).
- Exchange any faulty parts.
- Mount the valve groups after checking and cleaning.



When refitting watch that the valve guide (Fig. 9.2/ 11) will not be damaged. Damages could lead to blockage of valves.

- Fit new O-rings.
- Re-install pressure- (Fig. 9.2/ 6) and suction-tube (Fig. 9.2/ 5) to the pump housing and refit the tensioning clamp.
- Tighten the bolts (Fig. 9.1/9) always diagonally with a torque of **11 Nm resp. 18 Nm (BP 250)**.



Tighten bolts diagonally with the torque stated. Unaccurately tightened bolts will cause tensioning and thus leakages.

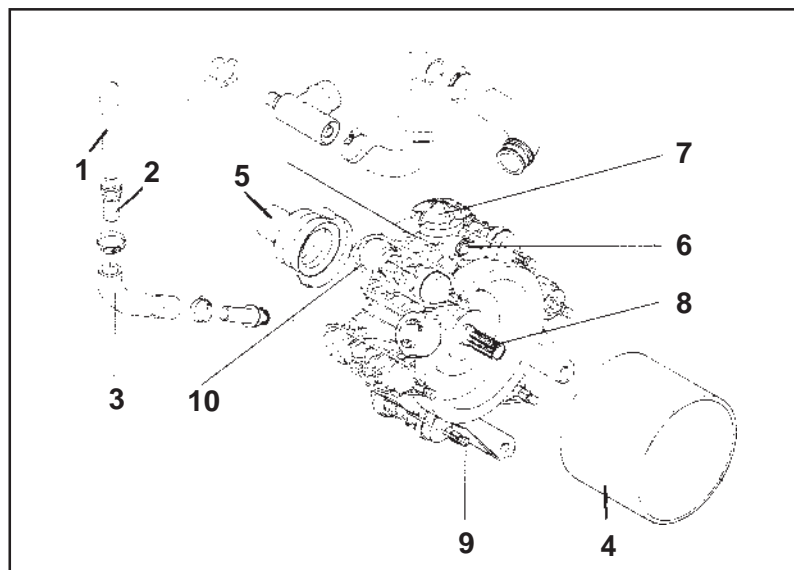


Fig. 9.1

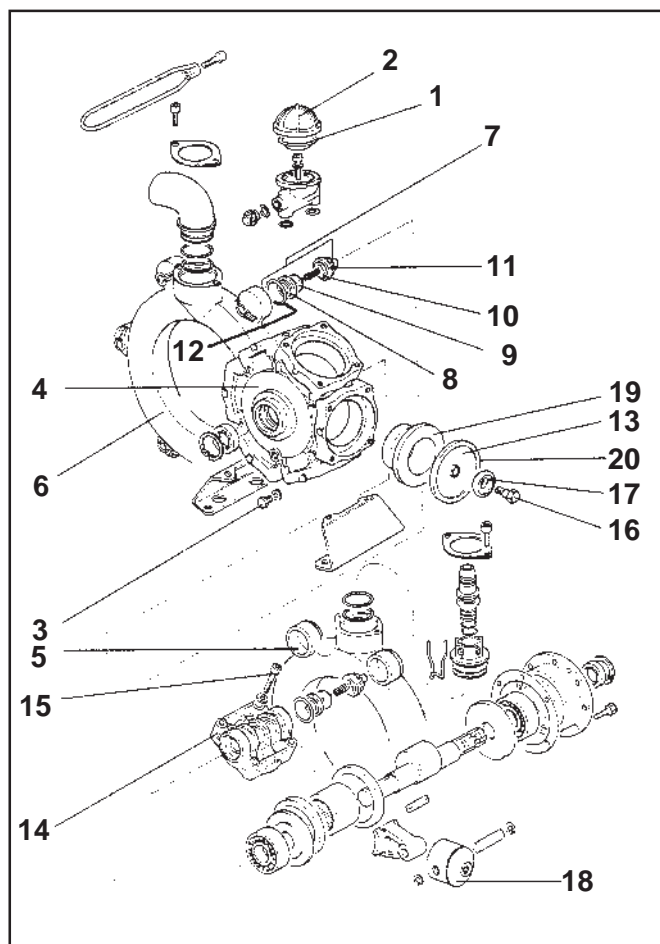


Fig. 9.2

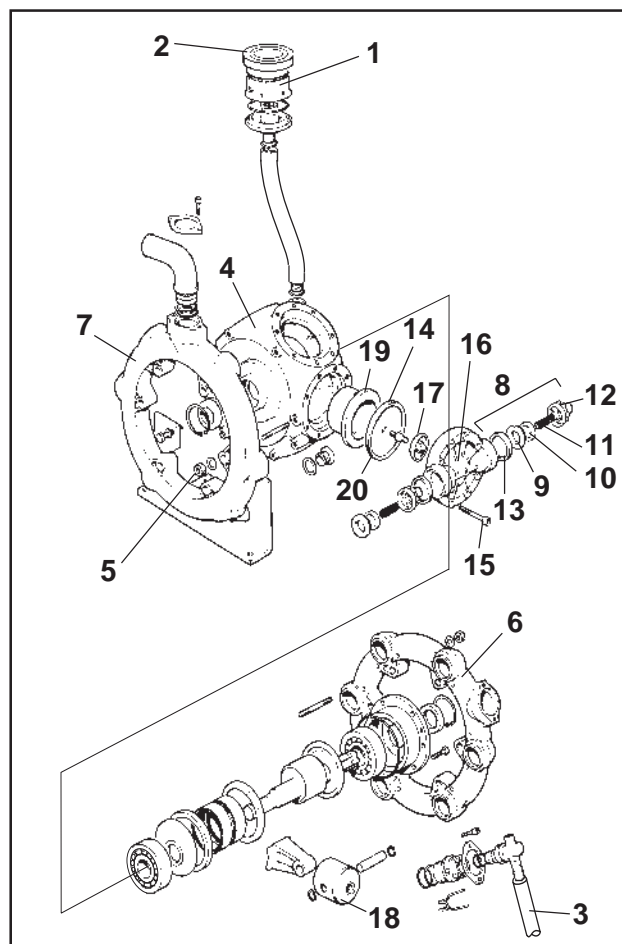


Fig. 9.3

Drop of spray pressure in conjunction with mixture of oil and spray liquid in the oil filling plug or clearly noticeable consumption of oil

An oil spray liquid-mixture in the oil filling plug or a clearly noticeable oil consumption is a safe sign of a piston diaphragm defect. In such a case all 6 piston diaphragms (fig. 9.2/ 13) should be exchanged.

Checking and exchanging the piston diaphragm

Check the piston diaphragm (Fig. 9.2/ 13) at least one a year by dismantling.



In case of checking and exchanging the piston diaphragm it is recommended to conduct this work for each piston individually. Start to dismantle the next piston only after having completely reassembled the checked one.

Checking the piston diaphragm

- Take off pump.



Always bring the piston to be checked in the upper position so that any oil inside the pump housing is not draining out.

- Slacken the bolts (Fig. 9.1/ 9 resp. 9.3/ 5).
- Remove the tensioning clamp (Fig. 9.1/ 10) as well as the suction- and pressure-tube (Fig. 9.2/ 5, 9.2/ 6 resp. 9.3/ 6, 9.3/ 7) including the valve groups (Fig. 9.2/ 7 resp. 9.3/ 8). **Pay attention to the fitting position of the suction- and pressure-side valves!**
- Take off the cylinder head (Fig. 9.2/ 14) after removal of the bolts (Fig. 9.2/ 15).
- Check the piston diaphragm (Fig. 9.2/ 13).



Even if only one of the piston diaphragms is swollen or porous, exchange all diaphragms.

Exchange the piston diaphragm

- Slacken the bolt (Fig. 9.2/ 16) and remove the piston diaphragm (Fig. 9.2/ 13) together with the retaining disc (Fig. 9.2/ 17) of the piston (Fig. 9.2/ 18).
- If the piston diaphragm is broken so that spray liquid and oil are mixed in the pump housing:
 - Drain off the oil spray liquid mixture from the pump housing.
 - Remove the cylinder (Fig. 9.2/ 19) from the pump housing.
 - Flush pump housing thoroughly. Use Diesel-oil or Paraffin for flushing. Regard health and safety advice.
 - Clean all sealing surfaces.
 - Insert cylinder into pump housing.



Take care for the correct position of the cut outs.

- Fit the piston diaphragm (Fig. 9.2/ 13).



Fasten the piston diaphragm in such a way with the retaining disc and bolt to the piston that the edge (Fig. 9.2/ 20) shows towards the cylinder head side (Fig. 9.2/ 14).

- Fit cylinder head to pump housing and tighten bolts cross wise and equally.
- Fit valves and the suction- and pressure-tube (please refer to para. 9.4.1).

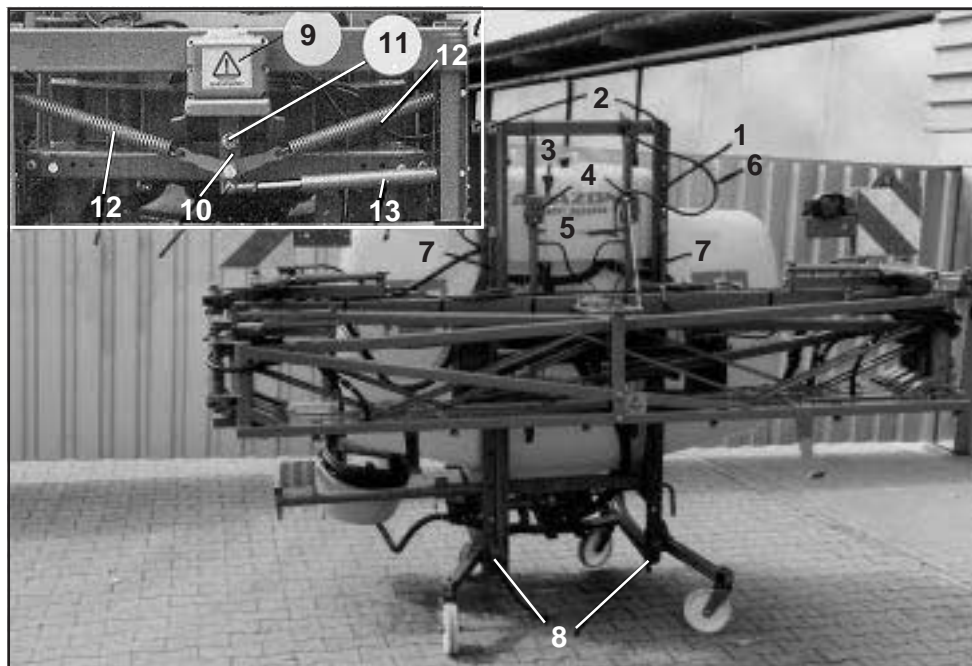


Fig. 10.1

10.0 Sprayer booms

The distribution accuracy of the spray liquid is considerably influenced by the proper condition of the sprayer boom as well as its mounting. The booms nozzles are fitted in a spacing of 50 cm. By correctly setting up the spray boom height towards the crop a perfect overlapping is achieved.



Set up the spray boom height (distance between the nozzles and the crop) according to the spray table (please refer to para. 16.0).



The advised height of the spray boom will only be achieved on each nozzle if the spray boom is fitted parallel to the ground.



Read carefully the following instructions for your spray boom execution. Any set-up operations if required should be conducted carefully.



Always lock the boom sway compensation in transport position
- for transport travel!
- before folding out or in the booms!

10.1 Q-booms with lateral folding technique up to 15 m working width (incl. boom swing compensation and hydraulic boom height adjustment)

The manually folded and the hydraulically folded booms are identical except for the hydraulic components necessary for folding up.

For the hydraulic boom height adjustment a single acting control valve is required on the tractor side.

Fig. 10.1/ . . .

- 1 - Boom mounting frame.
- 2 - Upper stop elements - function as stop for the square profiles (7) when unlocking the boom swing compensation (9= (do only exist on the hydraulically foldable booms).
- 3 - Hydraulic height adjustment - for setting the spray boom height above the ground.
- 4 - Single acting hydraulic rams of the height adjustment.
- 5 - Throttle valve - for setting the lifting- or lowering speed of the height adjustment.
- 6 - Hydraulic hose with block tap for the hydraulic height adjustment. The hydraulic height adjustment is lockable by the block tap in any height of the boom.



Before coupling/uncoupling the plug of the hydraulic hose with/from the hydraulic socket of the tractor shut block tap.

- 7 - Square profiles for locking the boom swing compensation.
- 8 - Lower stop elements - will have to be fitted on the boom mounting frame in various heights and function as stop for the square profiles (7) when locking the boom swing compensation.
- 9 - Boom swing compensation - maintenance free and cares for a stable boom guidance.
- 10 - Swivelling arm - for a horizontal positioning of the boom.
- 11 - Bolt with self-locking nut for arresting the swivelling arm at horizontally positioned boom.
- 12 - Coil springs for horizontal boom positioning.
- 13 - Shock absorber.

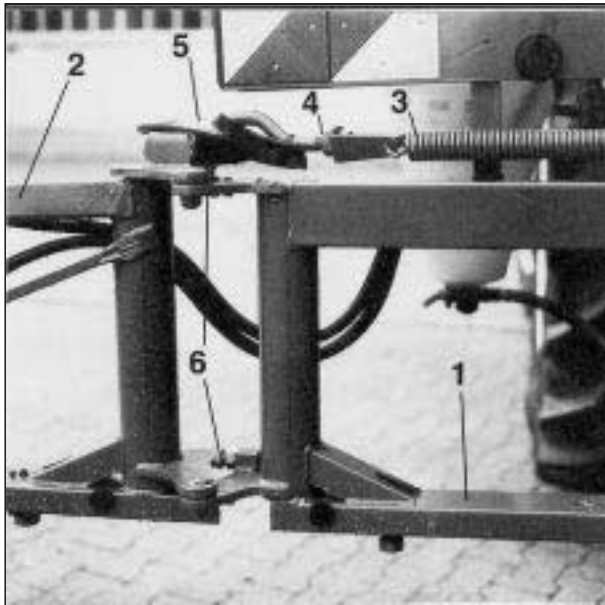


Fig. 10.2

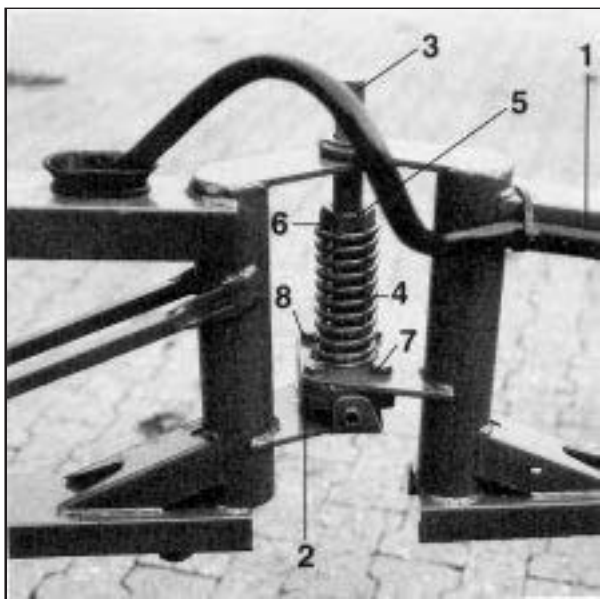


Fig. 10.3

Setting the lifting and lowering speed of the height adjustment

The lifting and lowering speed can be set at the check valves (Fig. 10.1/5) by screwing in or out the Allen key bolt.

- Lower the folding speed = drive-in Allen key bolt.
- Increase folding speed = drive out Allen key bolt.

10.1.1 Q-booms - manually folded

Fig. 10.2/ . . .

- 1 - Central boom section.
- 2 - Inner boom (L.H.).
- 3 - Coil springs; keep the booms in the corresponding end positions (transport- and operation position) automatically in the folded in or out position.
- 4 - Threaded rod for changing the coil spring pre-tensioning. Hereby the force can be set which is necessary for releasing the boom ends when hitting an obstacle and when folding down or in the boom sections.
- 5 - Guarding device.



Never operate without guard (5) mounted! Danger of squeezing at the outer hinging point of the coil spring.

- 6 - For horizontal set up of the booms in driving direction.

Fig. 10.3/ . . .

- 1 - Outer boom section (R. H.).
- 2 - Plastic trip. Keeps the outer boom sections in the fold-in or out position in the corresponding end positions (transport- and operation-position).
- 3 - Hinge shaft.
- 4 - Pressure spring. The required power needed for pushing the outer boom sections outwards can be set.
- 5 - Pin screw for securing the nut (6) from unintentional loosening.
- 6 - Nut for changing the spring pretensioning.
- 7 - Fixing bracket with slotted holes. Is used for the horizontal alignment of the outer booms after having slackened the bolts (8).
- 8 - Bolts for fixing the plastic trip.

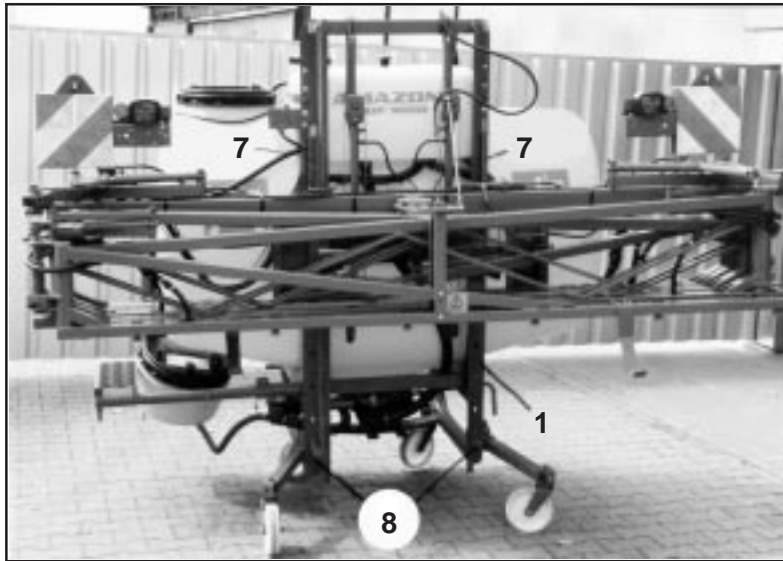


Fig. 10.1

10.1.1.1. Out- and in folding of the manually folded Q-booms



Squeezing danger when folding out or in the boom ends. Place your hands only on the yellow marked places of the booms when folding out or in the boom ends.



Lock the boom swing compensation in transport position

- for transport travel
- or when folding in and out the booms.

Folding out

The booms in the locked transport position.

- Open the block tap.
- Fold out the right hand boom side.
- Fold out the left hand boom side.
- Setting the boomheight above the ground by the height adjustment. (Distance between nozzles and crop in respect of the nozzle type according to spray table). The boom swing compensation is now also automatically unlocked.
- Shut block tap. Hereby the height adjustment is locked and the set spraying height will be accurately maintained.

Folding in

- Open the block tap.
- Lock the boom swing compensation by lowering the boom into the lowest most position (square profiles rest on the lower stop-elements).
- Folding in the left hand boom side.
- Folding in the right hand boom side.
- Close block tap.

10.1.1.2 Operating with asymmetrically folded side sections.



Lock the boom swing compensation in the pre-set respectively desired boom height before the side arms of the boom are folded out or in unsymmetrically.

The boom in symmetrically folded out position.

- **Lock the boom in the set boom height.**
 - Push up the two square profiles (Fig. 10.1/ 7) by hand as far as possible and lock in this position by raising the stop elements (fig. 10.1/ 8) at the boom carrying bracket (Fig. 10.1/ 1).
 - Folding in the corresponding boom side in the desired way (hereby the boom may get to a slightly tilted position).
 - Open block tap.
 - Lower the boom via the height adjustment until it is horizontally aligned. Hereby the two square profiles rest on the raised stop elements.
 - Close block tap.

If you want to operate with the symmetrically folded out boom:

- Slightly lift the boom by the height adjustment.
- Fold out boom side.
- Lower stop elements (Fig. 10.1/ 8) on the boom carrying frame (Fig. 10.1/ 1).
- Set the boom height off the ground.

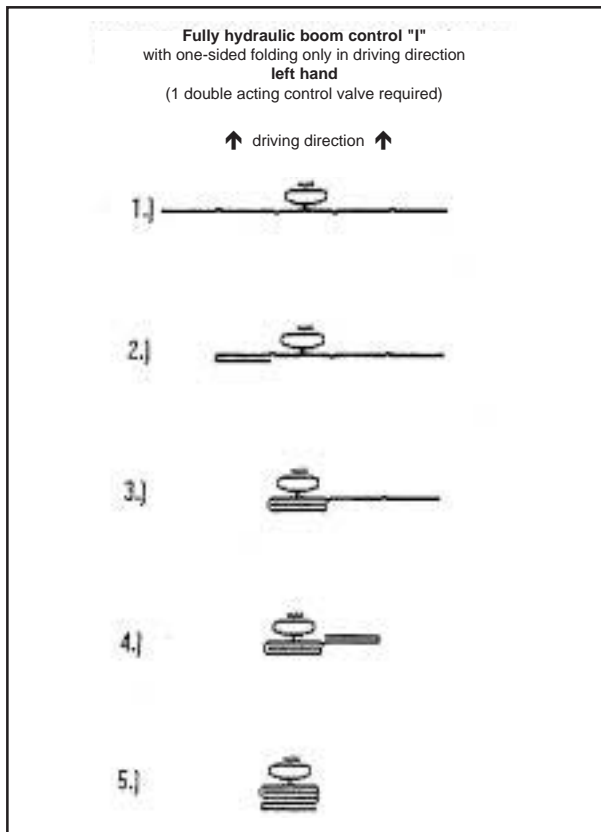


Fig. 10.4

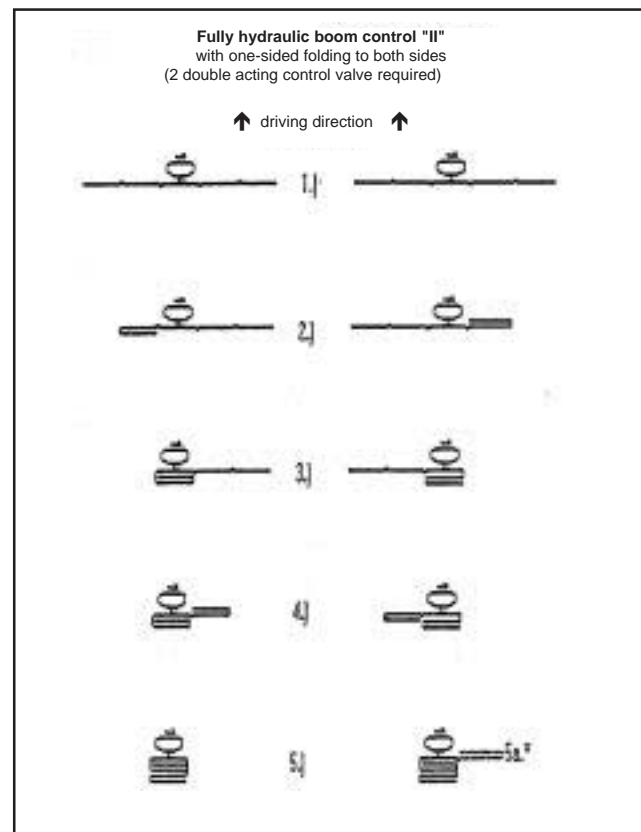


Fig. 10.5

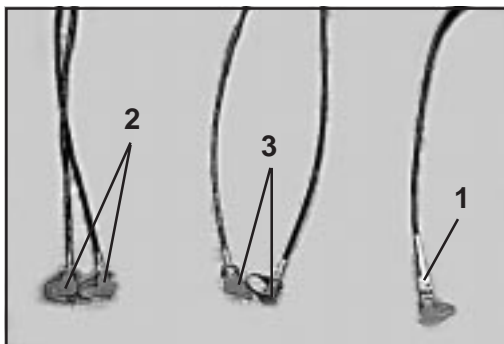


Fig. 10.6

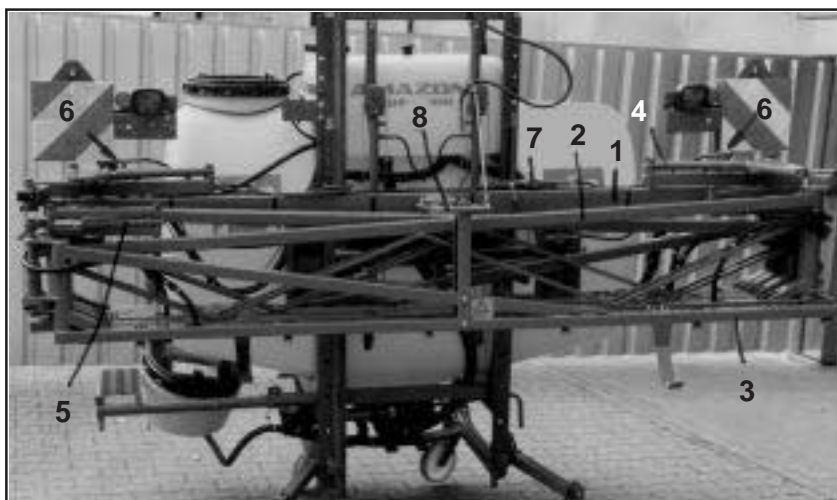


Fig. 10.7

10.1.2 Q-boom, hydraulically folding

The hydraulically foldable sprayer booms are available in two versions:

1. **Fully hydraulic boom actuation "I"**, with the possibility to fold the left hand side in driving direction (Fig. 10.4) (required 1 single acting and 1 double acting control valve on the tractor).
2. **Fully hydraulic boom actuation "II"** enables the one sided folding either left hand or right hand in driving position (Fig. 10.5) (1 single acting control valve and two double acting control valves required on the tractor).

Fig. 10.6/ . . .

- 1 - Hydraulic coupling (single acting) for height adjustment with block tap.
- 2 - Hydraulic connection green (double acting) for out- and in-folding of the right hand boom side (only fully hydraulic boom actuation "II").
- 3 - Hydraulic connections red (double acting) for out- and in-folding of the left hand boom side (only fully hydraulic boom actuation "II").



Close block tap before uncoupling or coupling the plug with/from the hydraulic socket of the tractor for the boom height adjustment.

Fig. 10.7/ . . .

- 1 - Central boom unit.
- 2 - Inner boom side.
- 3 - Outer boom side.
- 4 - Hydraulic ram (inner).
- 5 - Hydraulic ram (outer).
- 6 - Check valves for setting the folding speed of the boom.
- 7 - Unlockable return valve; cooperates with the hydraulic rams for the boom folding and provides the lock-up of the boom in folded in or out position in the corresponding end positions (transport- and operation position).
- 8 - Automatic boom transport locking; locks the folded booms automatically when lowering into the lowest position.

Setting the folding speed of the boom

The folding speed has been set by the manufacturer. Depending on tractor type a correction of this set folding speed might become necessary. The folding speed of the boom is settable at the check valves (Fig. 10.7/ 6) by screwing in or out the Allen key bolt.

- Slow up the folding speed, screw in Allen key bolt.
- Increase folding speed, screw out Allen key bolt.

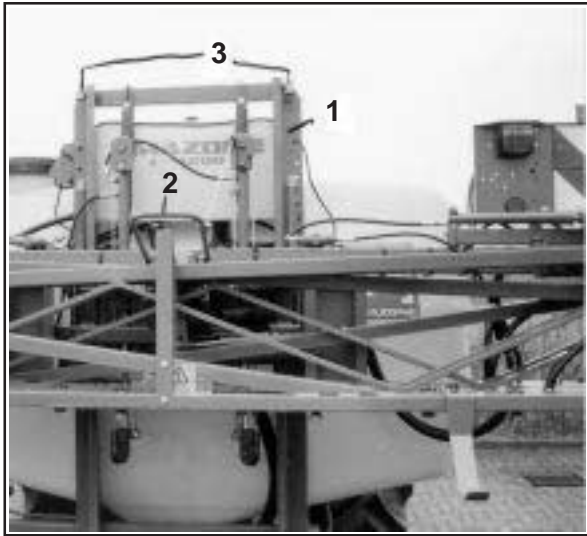


Fig. 10.8

10.1.2.1 Folding the Q-boom hydraulically in or out



Before folding out or in the booms have persons leave the swivelling area of the boom!



At all hydraulically actuated folding parts are shearing and squeezing points!



Never fold in or out the boom while driving!



By the check valves (Fig. 10.7/ 6) the folding speed of the boom can be changed.



The hydraulic rams for the boom folding retain the corresponding end positions (transport- and operation position) in the folded in or out position.



Never switch the double acting control valve for the boom actuation in the position for the third position for pressure free return flow.

Folding down

The boom is in the locked transport position.

- Open the block tap.
- Lift the folded in boom until the automatic transport locking (Fig. 10.8/ 2) releases (height position about 2/3 of the boom mounting frame length).
- Sprayer boom with **hydraulic boom actuation "I"**
 - Actuate the control valve on tractor and the boom folds automatically out.
- Sprayer boom with **hydraulic boom actuation "II"**
 - Fold out the right hand boom section by actuating the control valve at the tractor.
 - Fold out the left hand boom section by actuating the control valve on the tractor.
- Unlock the boom swing compensation from the transport position by lifting the boom up to its upper stops (Fig. 10.8/ 3) (please refer to para. 10.1.2.3).
- Set the boom height by the height adjustment.
- Shut block tap. Hereby the height adjustment of the boom is locked and the spraying height will be accurately maintained.

Folding in

- Open the block tap.
- Lock the boom swing compensation into transport position by lowering the boom into the lowest position (please refer to para. 10.1.2.3).
- Sprayer boom with **hydraulic boom actuation "I"**
 - Actuate the control valve on the tractor and the boom folds in predestined order automatically into the transport position.
- Sprayer boom with **hydraulic boom actuation "II"**
 - Folding in the left hand boom side by actuating the control valve on the tractor.
 - Folding in the right hand boom side by actuating the control valve on the tractor.
- Close block tap and lock height adjustment.

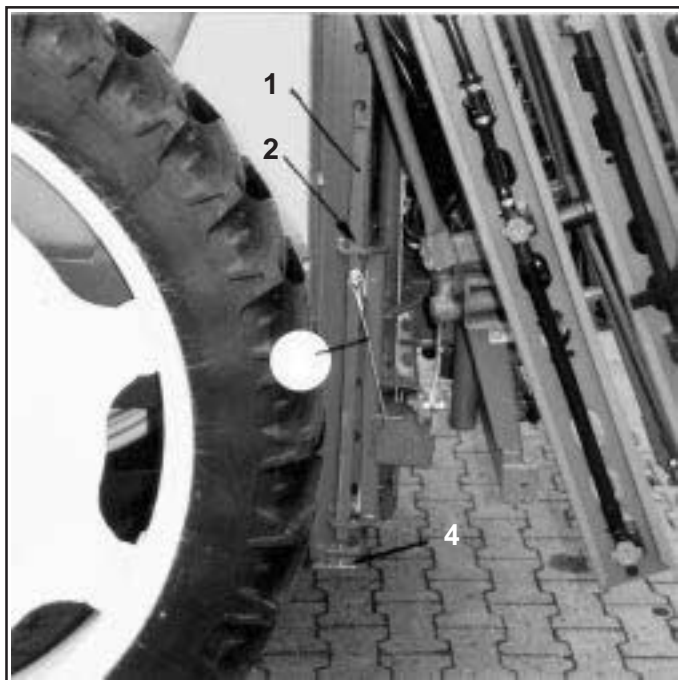


Fig. 10.9



Fig. 10.10

10.1.2.2 Operating with unsymmetrically folded side sections



Lock the boom swing compensation in preset or desired boom height before the boom sides are folded out or in unsymmetrically.

The boom is in a symmetrically folded out position.

- Open block tap.
- Lock the boom swing compensation in transport position (please refer to para. 10.1.2.3).
- Set the boom height by the height adjustment.
- Shut block tap.
- Sprayer boom with **hydraulic boom actuation "I"**
 - Folding the left hand boom side as desired (only the folding in of the left hand boom side is possible).
- Sprayer boom with **hydraulic boom actuation "II"**
 - Folding in the boom side as desired.

For operating with symmetrically folded booms:

- Unfold again boom side.
- Open block tap.
- Unlock the boom swing compensation (please refer to para. 10.1.2.3).
- Set the boom height by the height adjustment.
- Shut block tap.

10.1.2.3 Locking and unlocking swing compensation

Locking the swing compensation in transport position

- **Lower the booms in the lowest position** by the height adjustment, **so that both square profiles rest on the stop elements and trips are locking**. Now the boom swing compensation is automatically locked and prevents the boom from bouncing off to one side when folding respectively when transported. The automatic locking and resting of the square profiles is done by tensioning the steel cables (Fig. 10.9/1) when the square profiles rest on the lower stop elements (Fig. 10.9/ 2).



When the locks for the square profiles rest in a locking sound can clearly be heard!

- Shut block tap.

Unlocking the swing compensation from transport position

- Open block tap.
- Lift the booms by the height adjustment up to the upper most stop. The unlocking is now done automatically when the square profiles are pushed against the stops and hereby are slid over the trips (Fig. 10.10).



Fig. 10.11

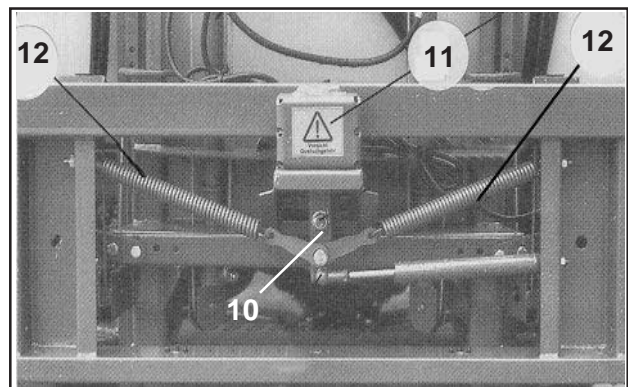


Fig. 10.1

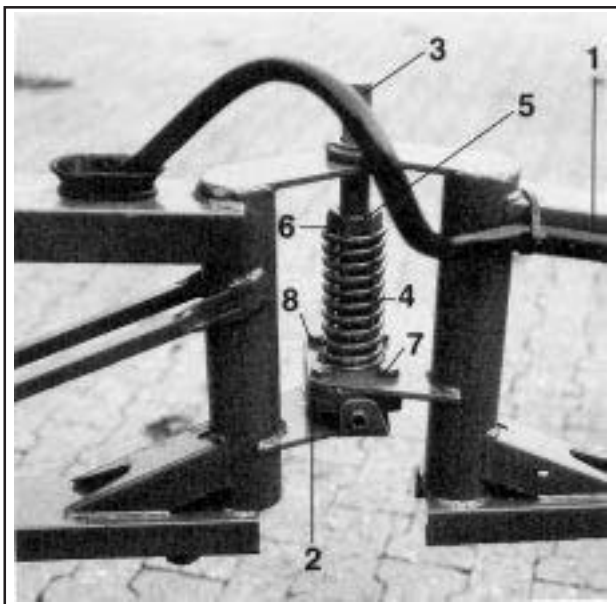


Fig. 10.3

10.1.2.4 Locking the boom in transport position



For transport travel always lower the booms into the lowest position (see para. 10.1.2.3). This way automatic locking of swing compensation and automatic transport locking of boom occurs (Fig. 10/11).

10.1.2.5 Boom safety release at obstacles

The plastic trips (10.3/ 2) allow giving way of the outer boom sections up to 80° into or against the driving direction pivoting around the hinge point (Fig. 10.3/ 3) whereby booms will automatically return to the operating position.

10.1.2.6 Alignment of the boom parallel to the ground

All nozzles must have a parallel spacing to the ground when the boom is correctly set up.

The alignment of the booms parallel to the ground is done via the **unlocked** swing compensation (Fig. 10.1/ 10):

- Slacken the self locking nut on the bolt (Fig. 10.1/ 11).
- Push over the swivel arm until the boom has reached the ground parallel position. The coil springs (Fig. 10.1/ 12) provide the alignment of the boom.
- Retighten the nut (Fig. 10.1/ 11).

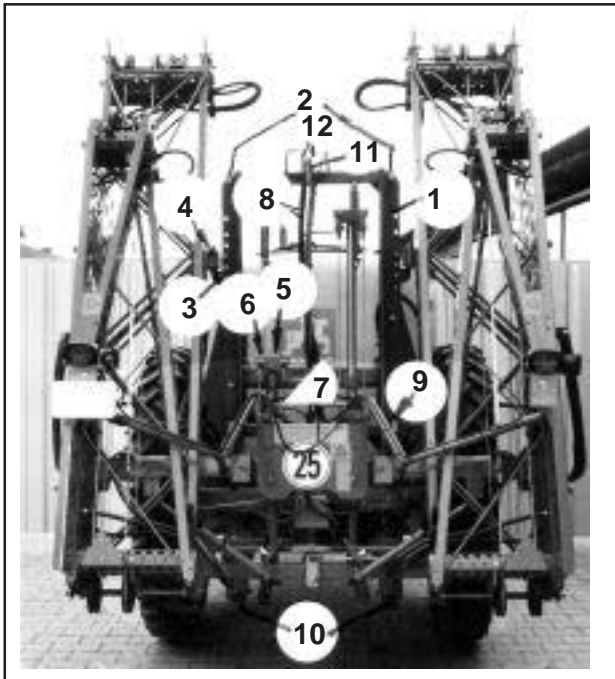


Fig. 10.12

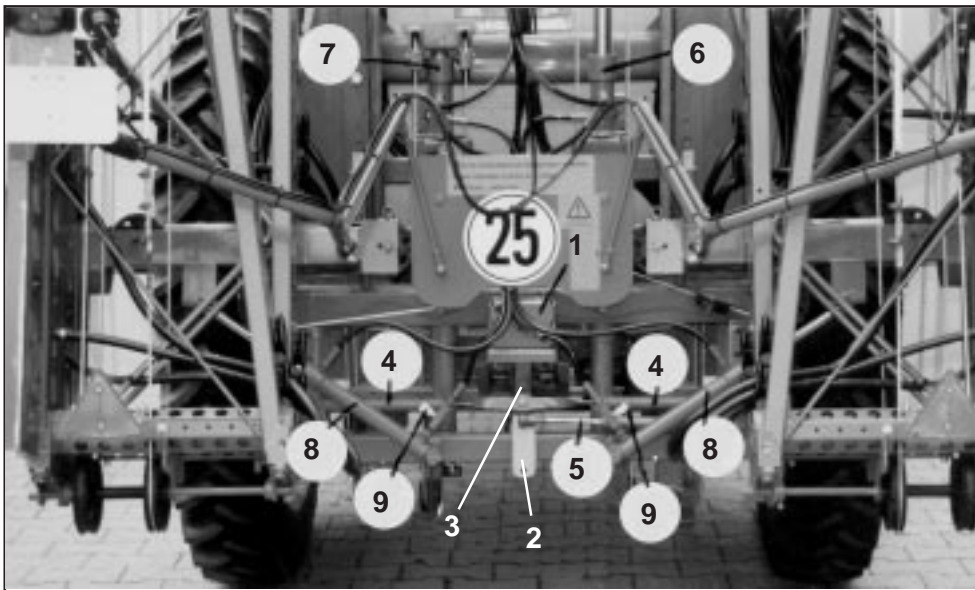


Fig. 10.13

10.2 H-booms in vertical folding technique, fully hydraulic foldable up to 15/ 16 m working width (including boom swing compensation and hydraulic height adjustment)

Required on the tractor.

- 1 single acting control valve for the height adjustment.
- 1 double acting control valve for the boom out and in folding.



Shut block tap before coupling or uncoupling plug of hydraulic link up for the height adjustment with the hydraulic socket from the tractor.

Fig. 10.12/ . . .

- 1 - Boom carrier frame.
- 2 - Upper stop elements; function as stop for the square profile (9) when unlocking the boom swing compensation.
- 3 - Catch for locking the boom section package in transport position.
- 4 - Catching sockets.
- 5 - Hydraulic height adjustment for setting the boom height above the ground.
- 6 - Single acting hydraulic ram of height adjustment.
- 7 - Check valve for setting the lifting- and lowering speed of the height adjustment.
- 8 - Hydraulic hose with block tap for the hydraulic height adjustment. The hydraulic height adjustment is lockable in any height position by the block tap.
- 9 - Square profiles for locking the boom swing compensation (Fig. 10.13/ 1).
- 10 - Lower stop elements. They should be fixed to the boom carrying frame in varying heights and function as stop for the square profiles (9) when locking the boom swing compensation.
- 11 - Unlockable return valve. It co-operates with the hydraulic rams for the boom folding and provides the locking of the booms in folded in- and out position at the corresponding end positions (transport- and operating position).
- 12 - Check valves for setting the folding speed of the booms.

Fig. 10.13/ . . .

- 1 - Boom swing compensation lockable.
It is maintenance free and provides a stable boom guidance.
- 2 - Swing arm for the horizontal alignment of the boom.
- 3 - Bolt for arresting the swivel arm at horizontally aligned booms.
- 4 - Coil spring for horizontal boom alignment.
- 5 - Shock absorber.
- 6 - Hydraulic ram for folding in the boom.
- 7 - Hydraulic ram for folding out the boom.
- 8 - Hydraulic ram for folding upwards the folded boom sections.
- 9 - Check valves for setting the folding up speed of the folded boom sections.

Setting the lifting and lowering speed of the height adjustment, the boom folding speed and boom lifting speed

The height and lowering speed, the boom folding speed and the boom section folding speed are settable at the check valves (Fig. 10.12/ 7), (Fig. 10.12/ 12) or (Fig. 10.13/ 9) by screwing in or out the Allen key bolt.

- Slowing down the lifting and lowering respectively folding speed by screwing in the Allen key bolt.
- Speeding up the lifting and lowering respectively folding speed by screwing out the Allen key bolt.



Always reset the throttle valves (Fig. 10.12/ 12 resp. Fig. 10.13/ 9) pair-wise for correcting the boom-folding- and boom-section-lifting speed.

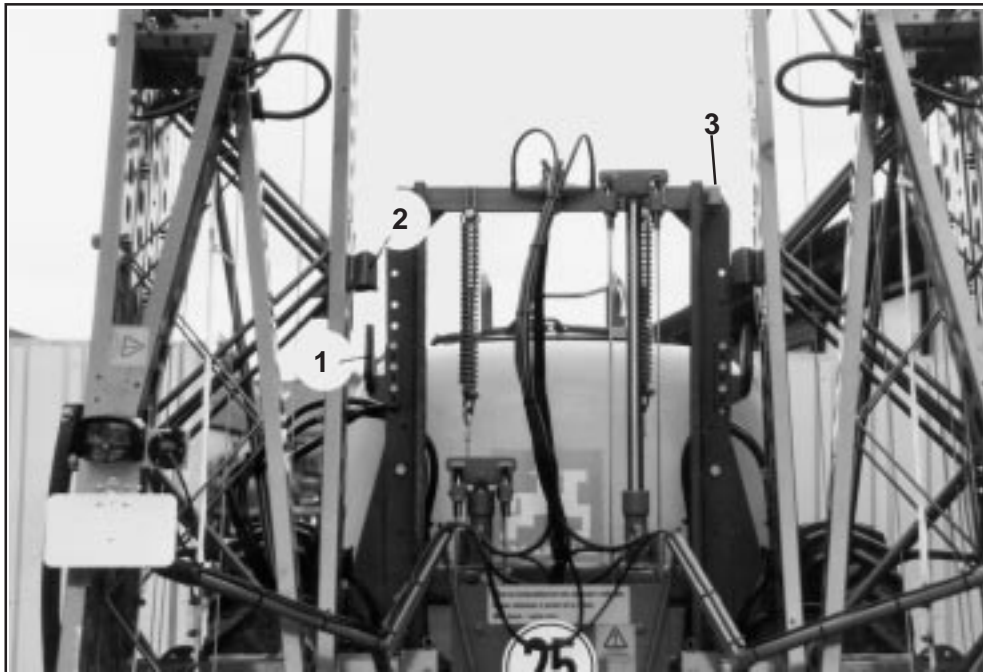


Fig. 10.14



Fig. 10.15

10.2.1 Folding the H-boom



When folding out or in the booms no persons may stay in the swivel area of the sprayer boom!



At all hydraulically actuated folding parts of the boom there are shearing and squeezing places!



Never fold in or out the boom during travel!



The boom folding or up folding speed can be altered by the check valves (Fig. 10.14/ 3 resp. 10.15/ 3).



The lifting and lowering speed of the boom height adjustment can be altered by the check valves (Fig. 10.14/ 4).



The hydraulic rams for the boom folding keep the end positions (transport- and operating position) in the folded in or out position.



Never switch the double acting control valve for the boom folding into the third position for the pressureless return flow.

The boom is in the locked transport position.

Folding down

- Open the block tap.
- Unlock the boom from transport position by lifting the boom above the height adjustment until the catch carrier (Fig. 10.14/ 1) release the catching pockets (Fig. 10.14/ 2).
- Fully fold down the boom by the double acting control valve. When folding down first the two boom sections come down and thereafter the individual sections.



Folding down does not always happen symmetrically.

- Unlock the boom swing compensation by lifting the boom up against the upper stop (please refer to para 10.1.2).
- Set the boom height via the height adjustment.
- Shut block tap. Hereby the height adjustment is locked and the set boom spraying height maintained accurately.

Folding in

- Open the block tap.
- Lock the boom swing compensation into transport position by lowering the boom into the lowest position (please refer to para. 10.1.2.3).
- Lift the boom into a medium height via the height adjustment.
- Fold in completely the boom via the double acting control valve. Folding in occurs first with the individual sections and thereafter with the twin sections.
- Lock the boom in transport position by fully lowering it via the height adjustment until the catch carriers (Fig. 10.15/ 1) take up the catching sockets (Fig. 10.15/ 2).
- Shut block tap.

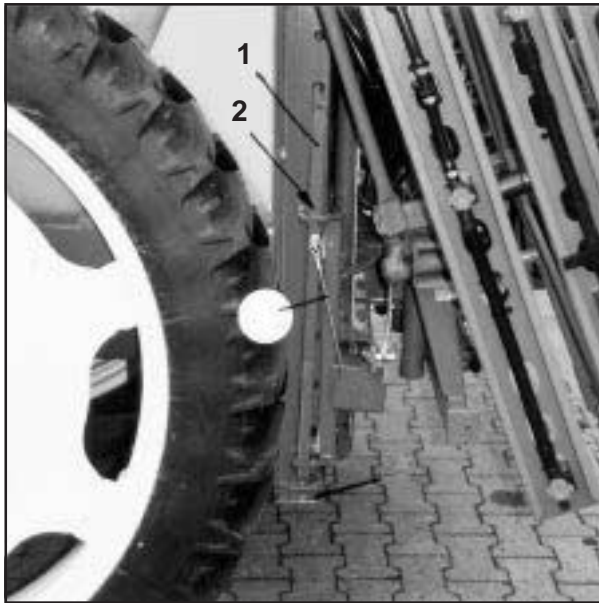


Fig. 10.9



Fig. 10.10

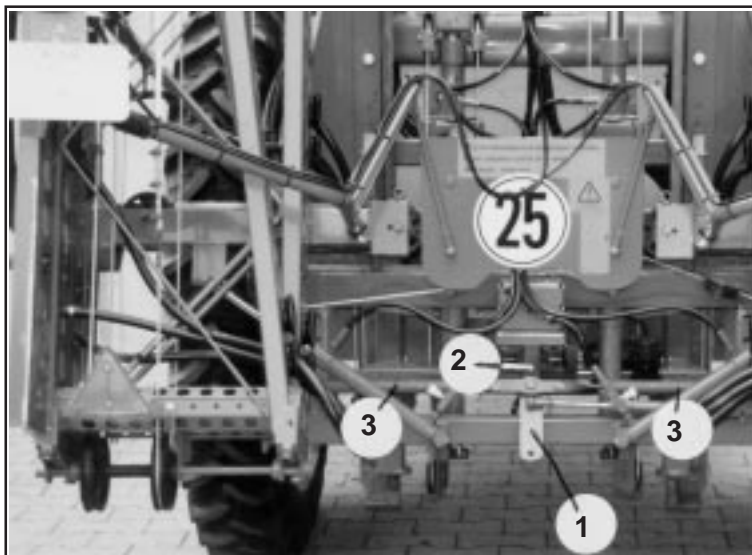


Fig. 10.16

10.2.1 Locking and unlocking swing compensation

Locking the swing compensation in transport position

- **Lower the booms in the lowest position** by the height adjustment, **so that both square profiles rest on the stop elements and trips are locking**. Now the boom swing compensation is automatically locked and prevents the boom from bouncing off to one side when folding respectively when transported. The automatic locking and resting of the square profiles is done by tensioning the steel cables when the square profiles (Fig. 10.9/1) rest on the lower stop elements (Fig. 10.9/4).



When the locks for the square profiles rest in a locking sound can clearly be heard!

- Shut block tap.

Unlocking the swing compensation from transport position

- Open block tap.
- Lift the booms by the height adjustment up to the upper most stop. The unlocking is now done automatically when the square profiles are pushed against the stops and hereby are slid over the trips (Fig. 10.10).

10.2.2 Locking the boom in transport position

The boom **is locked** in transport position by completely lowering via the height adjustment until the catch carriers take up the catch sockets (Fig. 10.15).

The boom **is unlocked** from the transport position by lifting it via the height adjustment until the catch carriers release the catch sockets (10.14).

10.2.3 Collision safeties

The sprayer boom is equipped with several collision safeties. When hitting firm obstacles in travelling direction the centre sprayer boom section with it's outer boom section gives way to the rear. After having passed the obstacle it returns in its earlier position. In case the outer boom section hits a firm obstacle while travelling to the rear, the outer boom section gives way to the front and then returns in it's earlier position.

10.2.4 Alignment of the unfolded boom parallel to the ground

All spraying nozzles should have the same parallel distance to the ground when the boom is folded down and set correctly.

The alignment of the folded down boom parallel to the ground is done by the **unlocked** swing compensation (Fig. 10.16/ 1):

- Slacken the self locking nut of the bolt (Fig. 10.16/ 2).
- Move the swivelling arm until the boom has reached the ground parallel position. The coill springs (Fig. 10.16/ 3) assist the alignment of the boom.
- Retighten the nut (Fig. 10.16/ 2).

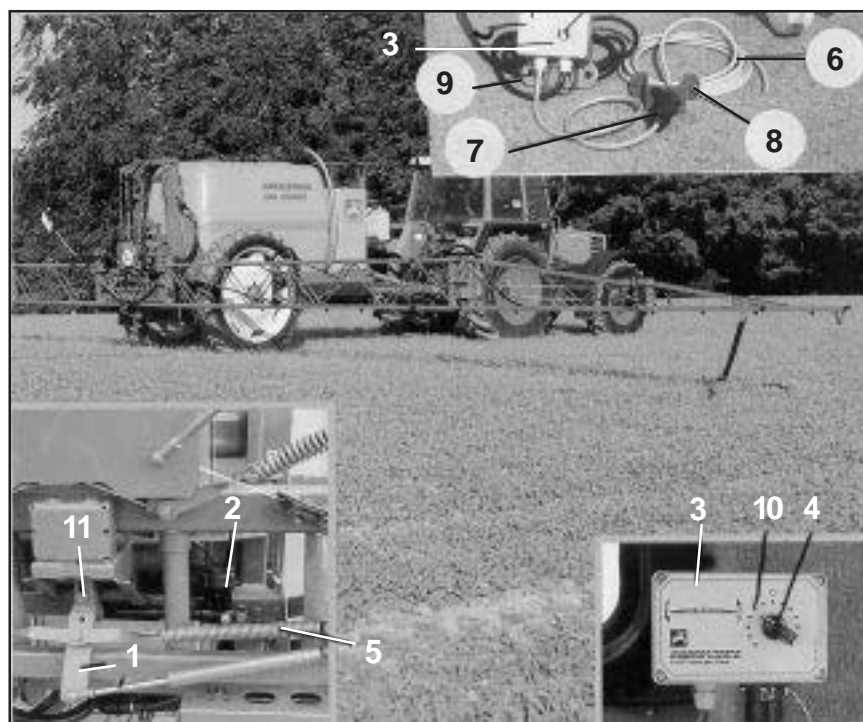


Fig. 10.17

10.3 Electric boom tilting; Version I for Q- and H-Booms Order No. 723 500 (special option)

In unfavourable conditions of terrain the position of the sprayer booms towards the area to be treated can be corrected by the electric boom tilting - without influencing the swing compensation. This way, the sprayer boom can be guided parallel with the ground, e. g. in case of differently deep wheel marks respectively one sided driving in a furrow.

For tilting the swivel arm (Fig. 10.17/ 1) is moved by the electric lift spindle motor (Fig. 10.17/ 2). The electric lift spindle motor is activated by the switch box (Fig. 10.17/ 3) when turning the setting knob (Fig. 10.17/ 4). By moving the swivel arm differing spring pre-tensioning of both springs (Fig. 10.17/ 5) is achieved. This brings the boom into the desired position.

Fig. 10.17/ . . .

- 1 - Swivel arm
- 2 - Lift spindle motor
- 3 - Switch box; place inside the pocket
- 4 - Setting knob
- 5 - Springs
- 6 - Electric power supply cable; connect directly to the tractor battery. To provide electric power to the switch box plug in the socket (7).
- 7 - Socket.
- 8 - Carrier for electric socket of the power supply cable - fit to a suitable place on the tractor.
- 9 - Pocket for switch box (3) - fix to a suited position on the tractor.
- 10 - Scale; arranged around setting knob (4)
- 11 - Nut of swivel arm

Alignment of the sprayer boom by boom tilt adjustment



A readjustment of the boom tilting can only be conducted with slackened nut (Fig. 10.17/11) of the swivel arm and when the swing compensation is unlocked.

- Turn the setting knob (10.17/ 4) of the boom tilt adjustment with the boom fully folded down. The individual points on the scale represent each a determined boom tilting angle. This way a simple boom tilt adjustment is possible.
The horizontal position of the boom can be set from any boom tilting position by resetting the setting knob to "0".



When the setting knob is in „0“ position the sprayer boom has to be aligned horizontally. Is this not the case, readjust the „0-position“ of the setting knob.



Before folding the sprayer boom repeatedly observe that it is aligned parallel to the sprayer frame (tilt adjustment „0“), as otherwise difficulties when locking the boom in transport position may occur (catching pockets are not caught by the catch carriers).

Readjustment of "0-Position" of setting knob of the switch box

- Align booms in horizontal position (please refer to para. 10.2).
- Slacken the setting knob fixing screw.
- Set the pointer of setting knob exactly on scale figure "0" and tighten fixing screw in this position of the knob.



Only swivel pointer by max. ± 1 point. If more than ± 1 point has to be swiveled for aligning the boom, alignment has to be executed by a professional workshop.



Fig. 10.18

10.4 DAM-boom in length folding technique, fully hydraulically foldable up to 36 m working width (including boom swing compensation and hydraulic height adjustment)

Required on the tractor:

- 1 single acting control valve for the height adjustment.
- 1 double acting control valve for the boom out- or in folding

10.4.1 Folding in or out the DAM-boom



When folding out or in the booms no persons may stay in the swivel area of the sprayer boom!



At all hydraulically actuated folding parts of the boom there are shearing and squeezing places!



Never fold in or out the boom during travel!



When turning at the headlands with booms folded out reduce forward speed!

The boom is in the arrested transport position (Fig. 10.18).

Folding out

- **Unlock the boom from transport position by lifting the boom above the height adjustment until it hits the upper stops in the lifting tower.** In this position the boom is being brought automatically parallel to the vehicle. This results in a possibility to fold or unfold the booms also on sloping terrain. Also the automatic locking of the boom swing compensation will simultaneously be released.
- The boom will be fully folded down via the double acting control valve.
- The boom spraying height is set via the height adjustment.

Folding in

- **Locking the boom swing compensation by lifting the boom via the height adjustment until it hits the upper stops in the lifting tower.**
- Fold in the boom completely via the double acting control valve.
- Lock the boom in transport position by lowering it via the height adjustment.

10.4.2 Electric boom angle adjustment

Please see para. 10.5.2

10.4.3 Align unfolded booms parallel to the ground (only with electric tilting).

The unfolded booms are correctly set when the spraying nozzles all have the same distance parallel to the ground.

If this is not the case, the unfolded booms have to be aligned via the piston rod of the tilting with **locked** swing compensation.

- Release piston rod.
- For aligning the booms turn piston rod in or out.



Turn piston rod in or out only by max. ± 20 mm. If this dimension has to be exceeded the boom alignment has to be executed by a professional workshop.

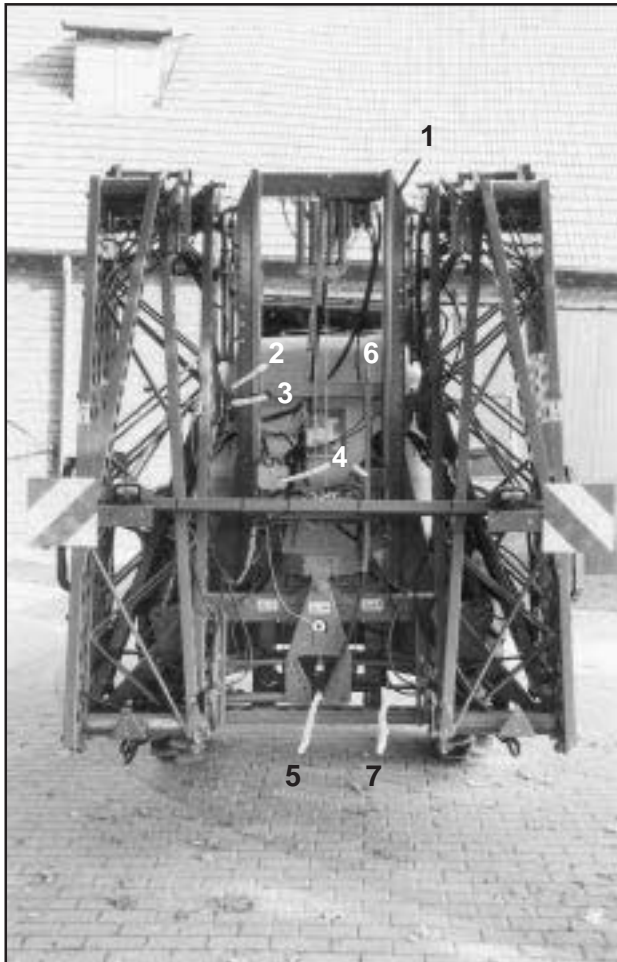


Fig. 10.19

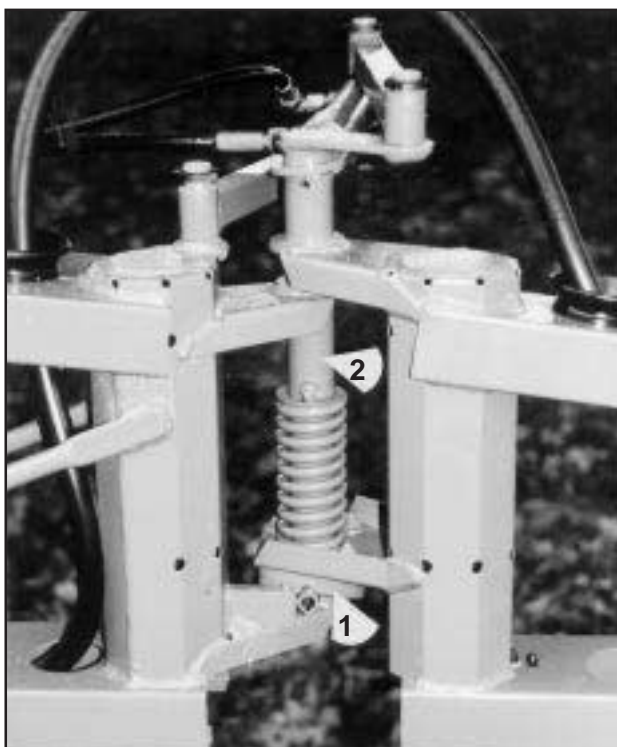


Fig. 10.20

10.5 Super S-boom, fully hydraulically foldable for 15, 18, 20, 21 and 24 m working width (including boom swing compensation and hydraulic height adjustment)

Fig. 10.19/ . . .

- 1 - Boom frame.
- 2 - Catching carrier for locking boom sections in transport position.
- 3 - Catching sockets.
- 4 - Single acting hydraulic rams of height adjustment; for setting the spraying height of the sprayer boom.
- 5 - Lockable and unlockable swing compensation; maintenance free, takes care a steady boom guidance.
- 6 - Locking and unlocking indication for swing compensation.
- 7 - Tensioning springs for parallel boom alignment.
- 8 - Shock absorber.

Boom safety release at obstacles

The plastic trips (10.20/ 1) allow giving way of the outer boom sections into or against the driving direction pivoting around the hinge point (Fig. 10.20/ 2) whereby booms will automatically return to the operating position.

10.5.1 Super S-Boom, fully hydraulically foldable (without Profi-Folding)

Required on tractor:

- 1 single acting control valve for the height adjustment.
- 1 dual acting control valve for folding booms up or down.



Shut block tap before either coupling or uncoupling the plug from the hydraulic socket for height adjustment of the tractor.

10.5.1.1 Folding the boom in or out



When folding down or in the booms no persons may stay in the swivel area of the sprayer boom!



At all hydraulically actuated folding parts of the boom there are shearing and squeezing places!



Never fold in or down the boom during travel!



The hydraulic rams for the boom folding keep the boom in its corresponding end positions (either in transport or working position in either the down fold or up fold position).



Never switch the dual acting control valve for the boom folding into the third position for the pressureless return flow.

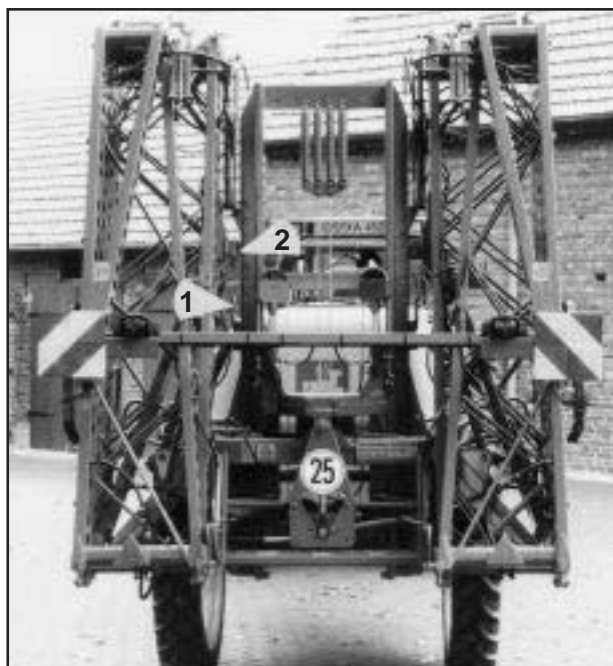


Fig. 10.21

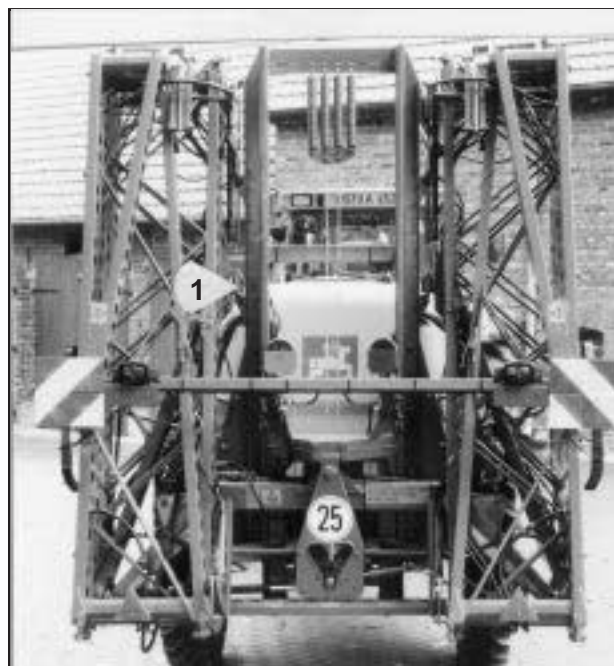


Fig. 10.22



Fig. 10.23



Fig. 10.24

Folding out

- Open the block tap.
- Unlock the boom from the transport position by lifting the boom via the height adjustment until the catch carrier (Fig. 10.17/1) release the catching sockets (Fig. 10.17/2).
- Hold the control lever of the dual acting control valve in position "folding out" until the boom is completely folded out and the boom swing compensation is unlocked (please refer to para. 10.5.1.3). When folding out first the two boom sections come down and thereafter the individual sections are folded out. The corresponding hydraulic rams conduct the locking of the boom in operation position.



The booms do not always fold down symmetrically.

- Setting the sprayer boom height is done via the height adjustment.
- Shut block tap. Hereby the height adjustment is locked and the set sprayer boom height accurately maintained.

Folding in

- Open the block tap.
- Lift boom into a medium height via the height adjustment.
- Set boom tilt adjustment in pos. "0" (if existing).
- Hold the control lever of the dual acting control valve in position "folding in" until all boom sections are fully folded in and the two boom section packages are fully raised.
- Lock the boom into transport position by fully lowering it (please refer to para. 10.5.1.2).



Travel always only with the booms in locked transport position.

- Shut block tap.

10.5.1.2 Unlocking and locking the sprayer boom from transport position**Unlock sprayer boom from transport position**

Lift the sprayer boom via height adjustment until the catch carriers (10.21/ 1) release the catching pockets.

Locking sprayer boom in transport position

Fully lower the sprayer boom via the height adjustment until the catch carriers (10.22/ 1) pick up the catching pockets (10.22/ 2).



If on a sprayer equipped with a boom tilting option, the catch carriers do not pick up the catching sockets, align the booms via the tilting device accordingly.



Only travel with the booms locked in transport position.

10.5.1.3 Unlocking and locking the swing compensation

For **unlocking** the swing compensation hold the lever of the double acting control device for another 5 seconds in position "Ausklappen" (fold out). When the **green** section of the **unlocking** and locking scale (Fig. 10.19/ 6) can be seen, the swing compensation is **unlocked**. **Fig. 10.23 illustrates the unlocked swing compensation.**

The swing compensation is automatically **locked** before folding in the booms. When the red section of the unlocking and locking scale (Fig. 10.19/ 6) can only be seen for approx. 1/3 the swing compensation is **locked**. **Fig. 10.24 illustrates the locked swing compensation.**

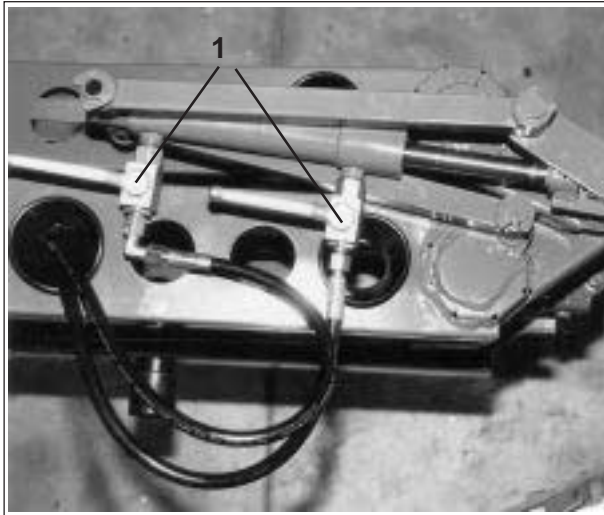


Fig. 10.25

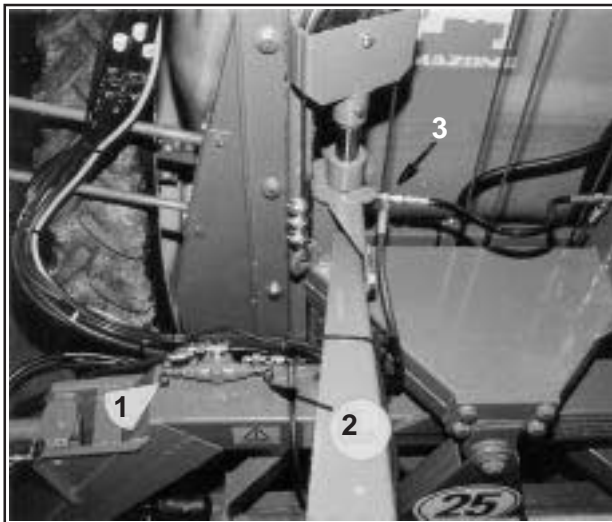


Fig. 10.26

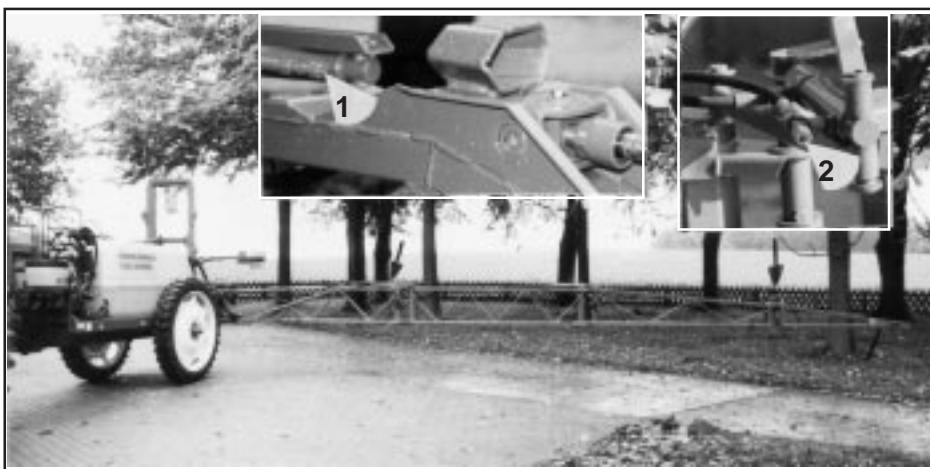


Fig. 10.27

10.5.1.4 Operating with boom ends asymmetrically folded out



When operating with asymmetrically folded in boom ends the special option "manual control for permanent reducing the working width of the Super-S-boom" is required. Each folding out ram has to be actuated by 2 block ball taps.

- Before folding out the booms, shut ball taps (10.25/ 1) on the outer joints, e. g. for reducing the working width from 24 m to 18 m, or the ball taps (10.25/ 2) on the inner boom section elements for reducing the working width to 12 m.

10.5.1.5 Correcting the lifting and lowering speed of the height adjustment

The speed has already been set by the manufacturer. However, depending on the tractor type, it may be necessary to correct this setting. The lowering or lifting speed of the height adjustment is settable at the check valve (Fig. 10.26/ 3) by screwing in or out the Allen key bolt.

- Reducing the lifting or lowering speed = screw in Allen key bolt.
- Increasing the lifting- or lowering speed = screw out Allen key bolt.

10.5.1.6 Correcting the boom folding speed

These speeds have already been set by the manufacturer. However, depending on the tractor type, it might be necessary to correct this setting. The boom folding speed is settable at the check valves (Fig. 10.26/ 1, 10.26/ 2 and 10.27/ 1 and 10.27/ 2) by equally screwing in or out the corresponding Allen key bolt as follows:

- Lowering the folding speed = screw in Allen key bolt.
- Increasing the folding speed = screw out Allen key bolt.

1. Up and down folding speed of folded boom section packages.

The boom folding up and down- speed of the individual sections may again be changed by the **check valves (Fig. 10.26/ 1 and 10.26/ 2)**.



In case of need adjust both check valves.

2. Folding- in and - out speed of folded boom section packages.

The **boom folding- out and -in speed** of the folded left hand boom section package may be changed by the **check valves (Fig. 10.27/ 1 und 10.27/ 2)**.



In case of need adjust both check valves.

The setting for the r. h. boom section package is to be conducted in the same way.

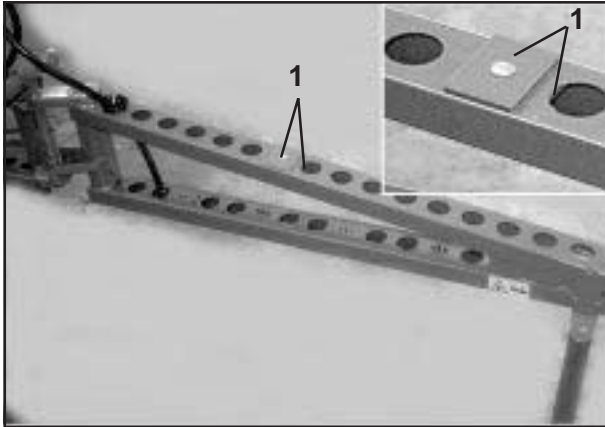


Fig. 10.27a

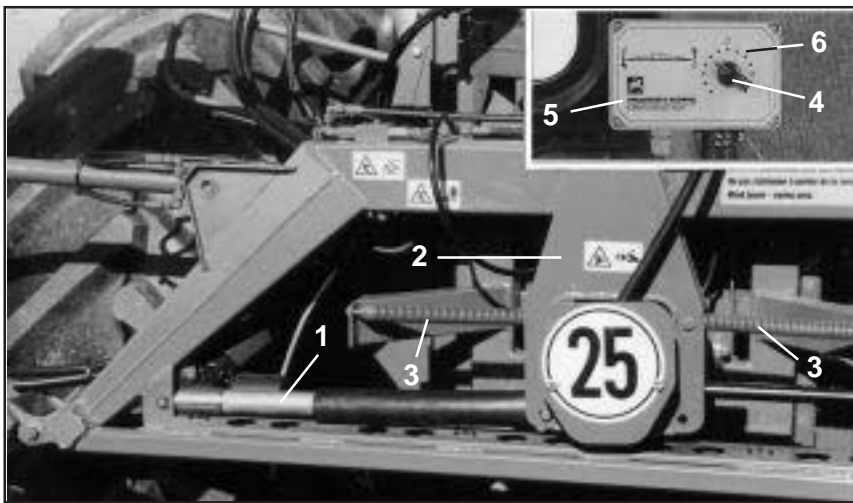


Fig. 10.28

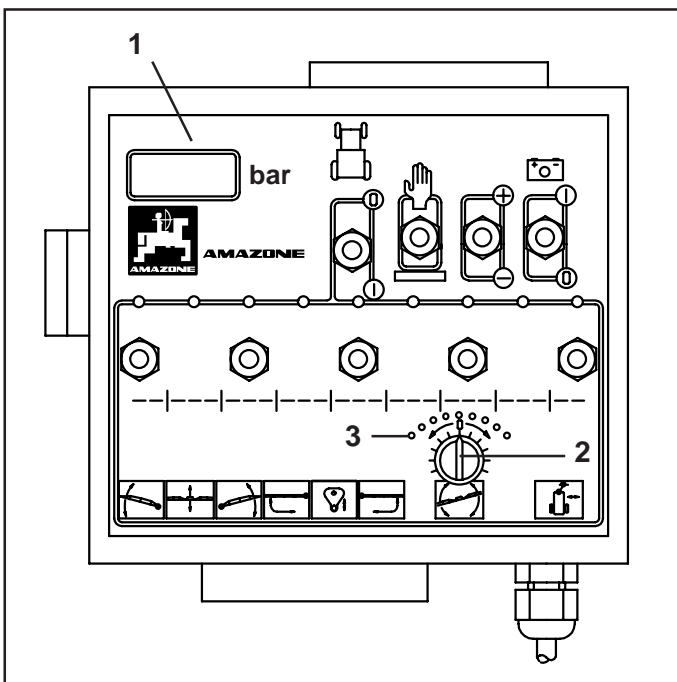


Fig. 10.29

10.5.1.7 Alignment of the unfolded boom parallel with the ground level

All spraying nozzles should have the same parallel distance to the ground when the boom is folded down and set correctly.

If this is not the case, align the boom folded down at unlocked boom swing compensation via the counter weights (10.27a/ 1). Fix the counterweights correspondingly to the sprayer boom.

10.5.1.8 Electric boom tilting - special option for L- and Super S-booms

Version II for DAM and Super S-boom, Order-No. 910 921

Operated via separate switch box (Fig. 10.28)

Version III for Super S-boom, Order-No. 911 811

Operated directly via the switch box SKS 50/ 70/ 90 N (Fig. 10.29).

In unfavourable conditions of terrain the position of the sprayer booms towards the area to be treated can be corrected by the electric boom tilting - without influencing the swing compensation. This way, the sprayer boom can be guided parallel with the ground, e. g. in case of differently deep wheel marks respectively one sided driving in a furrow.

For tilting the swivel arm (Fig. 10.28/ 1) is moved by the electric lift spindle motor (Fig. 10.28/ 2). The electric lift spindle motor is activated by the switch box (Fig. 10.28/ 4) when turning the setting knob (Fig. 10.28/ 3). By moving the swivel arm differing spring pre-tensioning of both springs (Fig. 10.28/ 5) is achieved. This brings the boom into the desired position.

Fig. 10.28/ . . .

- 1 - Swivel arm
- 2 - Electric lift spindle motor
- 3 - setting knob
- 5 - Switch box
- 5 - Springs
- 6 - Scale; arranged around setting knob

Fig. 10.29/ . . .

- 1 - Switch box SKS 50 N.
- 2 - setting knob
- 3 - Scale; arranged around the setting knob

Alignment of the sprayer boom by tilting

- For tilting the unfolded booms turn the setting knob (Fig. 10.28/ 3 or 10.29/ 2). The individual points on the scale represent each a determined boom tilting angle. This way a simple repeatable boom tilt adjustment is possible. The horizontal position of the boom can be set from any boom tilting position by resetting the setting knob to "0".



Before folding the boom always repeat to align it parallel with the sprayer frame (boom tilting on pos. "0") as otherwise difficulties may occur when locking the boom in transport position (catching pockets will not be taken up by the catch brackets).

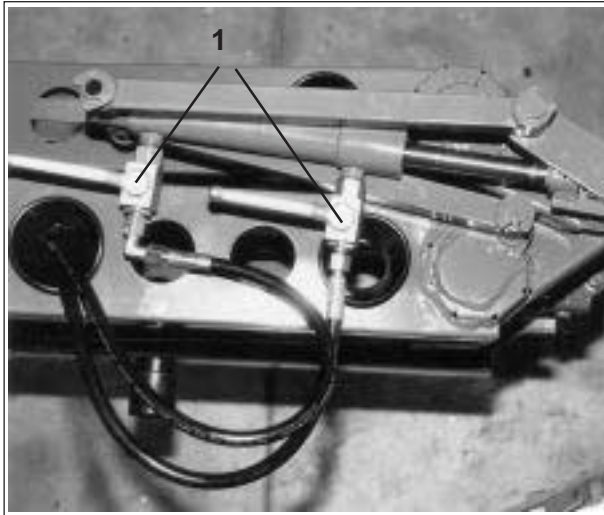


Fig. 10.25

10.5.1.9 Permanent working width reducing with the Super-S-boom (option)

For a permanent working width reducing of the sprayer boom shut the ball type (10.25/ 1 and 10.25/ 2) by hand:

- on the outer joints (10.25/ 1), e. g. for reducing the boom from 24 m to 18 m working width, **Order-No.: 911 814**
- on the inner boom section elements for reducing the working width to 12 m (10.25/ 2) (please also refer to chapter 10.5.1), **Order-No. 914 380**.

10.5.1.10 Boom carrier frame for Super-S-booms, Order-No. 911 813

For individual fitting to spraying implements.

10.5.1.11 Washing equipment for outer cleaning of Super-S-booms, Order-No. 911 069

Incl. hose reel, 20 m pressure hose, spraying lance and washing brush.

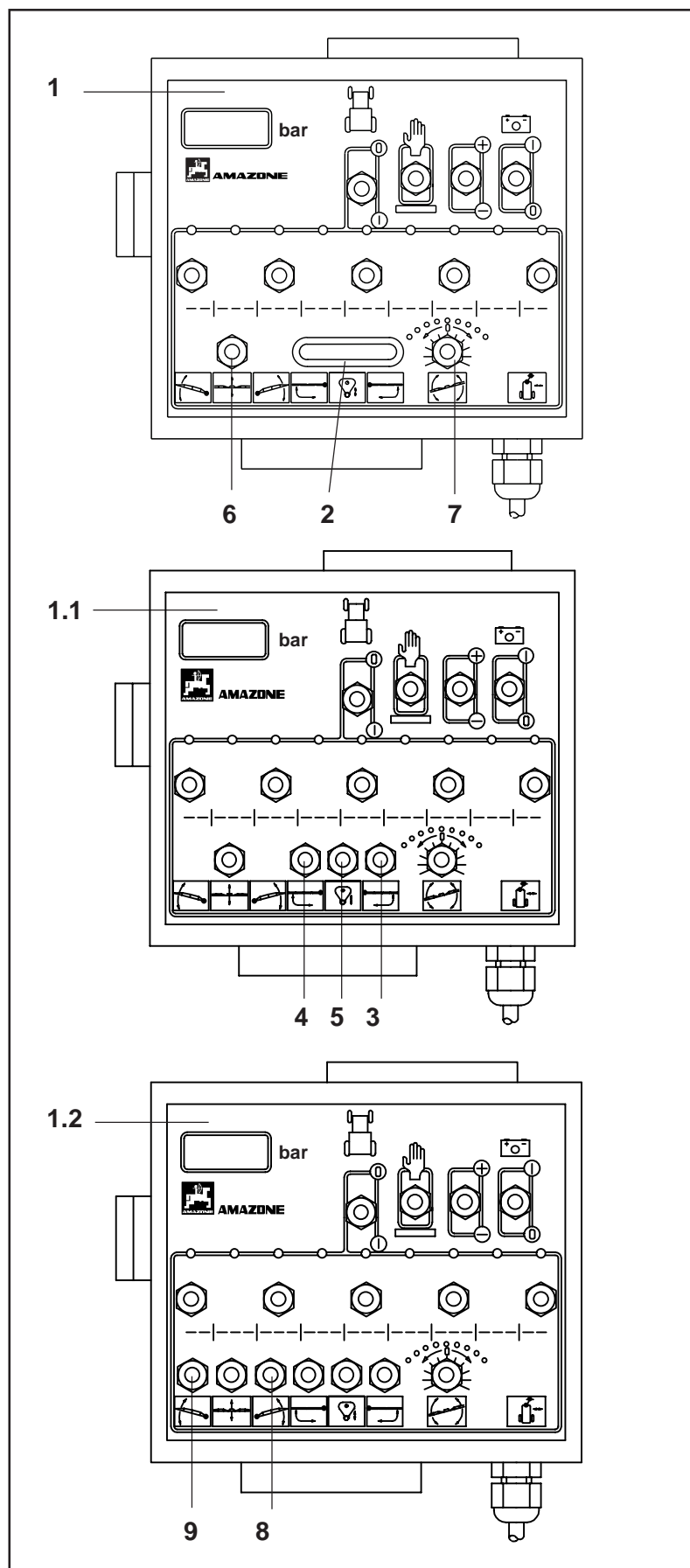


Fig. 10.30

10.5.2 Super S-booms with Profi-Folding (0, I and II) (Special Optinal Equipment)

The profi-folding offers the following functions:

- Folding in / folding out
- One sided boom folding (only profi-folding I and II)
- Hydraulic height adjustment
- Hydr. boom tilting
- One-sided, independent angling of booms (only profi-folding II).

All hydr. functions are controlled by solenoid valves via the switch box (SKS 50 / 70 / 90 H (HA)) from tractor cab. While the controlling device is in operation it has to be fixed on the tractor.

Required on tractor:

- 1 single acting control valve for connecting to the pressure hose.
- 1 pressureless return flow for connecting to the return flow hose.



At tractors with constant pump drive out setting screw at the hydraulic block until it is in line with the edge of the body (set by the factory).



At John Deere tractors with constant pressure-hydraulic system drive in the "John Deere screw" into the hydraulic block until the stop.



At tractors with "load sensing system" reduce the circulating oil volume to 25 l/min. and drive out setting screw at the hydraulic block until it is in line with the edge of the body (set by the factory).

Explanations for switch box

Fig. 10.30/ . . .

- 1 - Switch box SKS 50 H (profi-folding "0")
- 1.1- Switch box SKS 50 H (profi-folding "I")
- 1.2- Switch box SKS 50 HA (profi-folding "II")
- 2 - Folding in/folding out of right hand boom
- 3 - Folding in/folding out of left hand boom
- 4 - Unlocking / locking of swing compensation
- 5 - Hydraulic height adjustment
- 6 - Hydraulic boom tilting
- 7 - Angling right hand boom (only profi-folding "II")
- 8 - Angling right hand boom (only profi-folding "II")

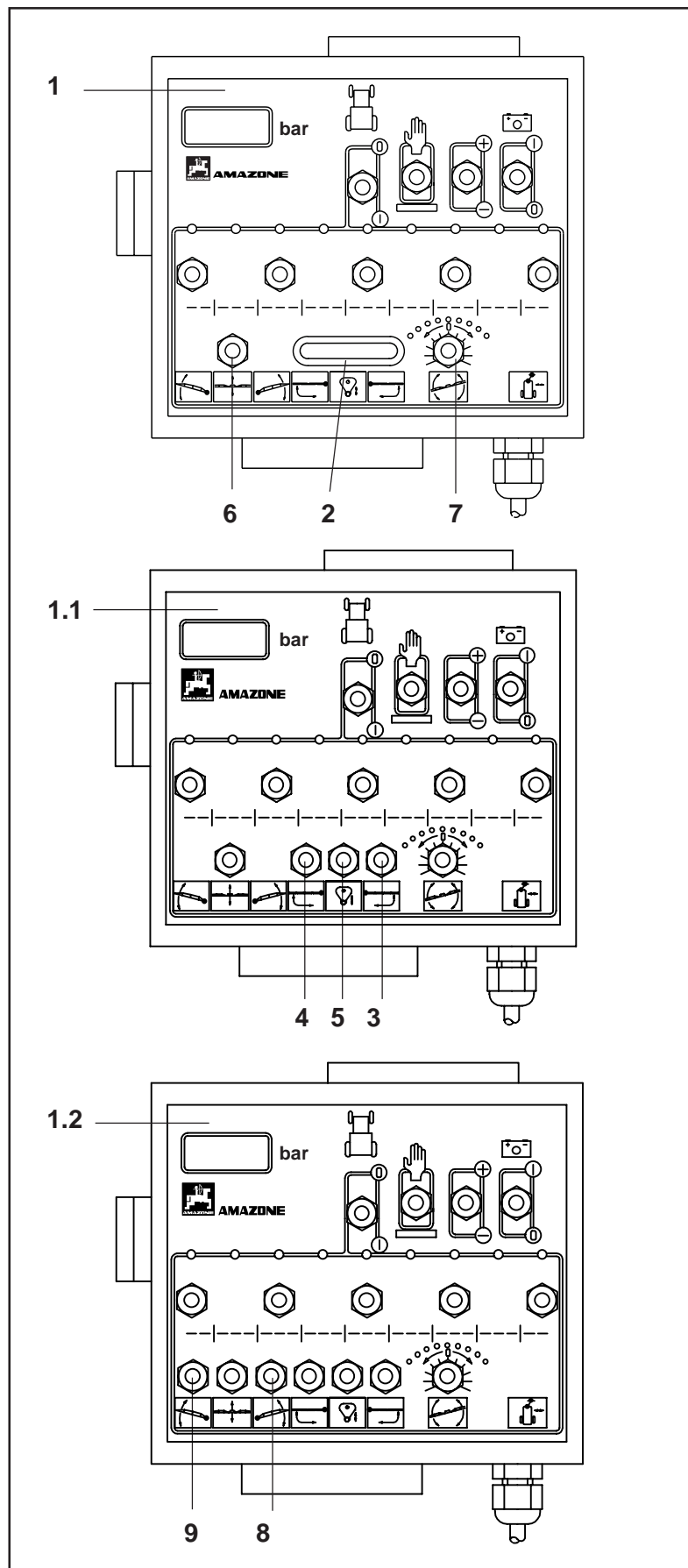


Fig. 10.30

10.5.2.1 Folding the boom in or out



When folding out or in the booms no persons may stay in the swivel area of the sprayer boom!



At all hydraulically actuated folding parts of the boom there are shearing and squeezing places!



Never fold in or out the boom during travel!



The hydraulic rams for the boom folding keep the boom in its corresponding end positions (either in transport or working position in either the down fold or up fold position).

Folding out

- Unlock boom from transport position (please see para. 10.5.2.2).
- Lift boom to a medium height by pressing key (Fig. 10.30/ 5) of hydr. height adjustment.
- **Profi-folding "0"**
 - Hold the keys (Fig. 10.30/ 2) in position "folding out" until the two boom halves are completely folded down. The corresponding hydraulic rams conduct the locking of the boom into operation position.
- **Profi-folding "I"**
 - Hold the keys (Fig. 10.30/ 3 and 10.30/ 4) in position "folding out" until the two boom halves are completely folded down. The corresponding hydraulic rams conduct the locking of the boom into operation position.
- **Profi-folding "II"**
 - Hold the keys (Fig. 10.30/ 8 and 10.30/ 9) in position "angling" (Abwinkeln) until the two boom sections are completely folded out.
 - Hold the keys (Fig. 10.30/ 3 and 10.30/ 4) in position "folding out" (Ausklappen) until the two boom sections are completely folded out. The corresponding hydraulic rams conduct the locking of the boom in operation position.
- Unlock swing compensation (please see para. 10.5.2.4).
- Set height of boom by key (Fig. 10.30/ 6) of the hydraulic height adjustment.

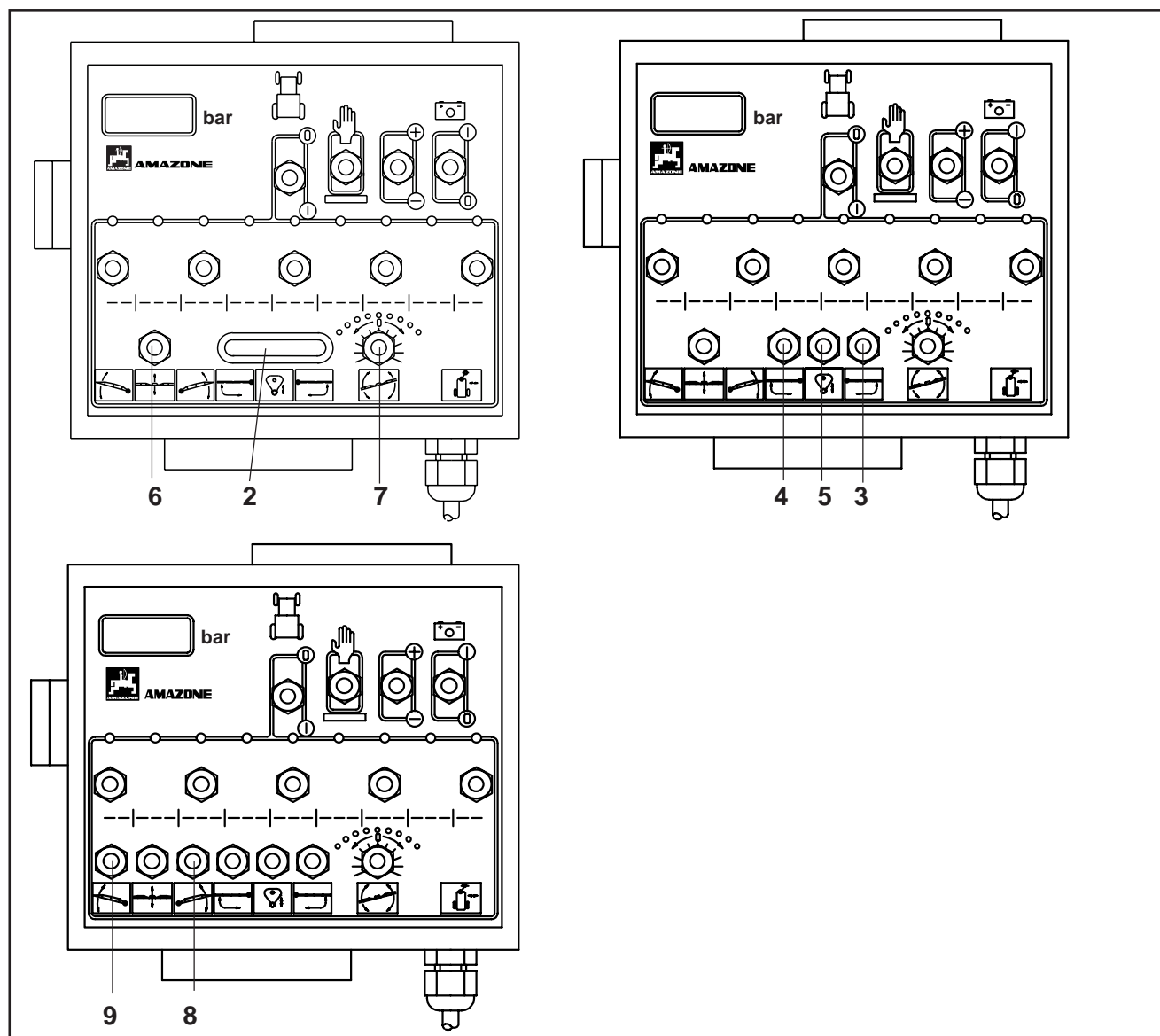


Fig. 10.30

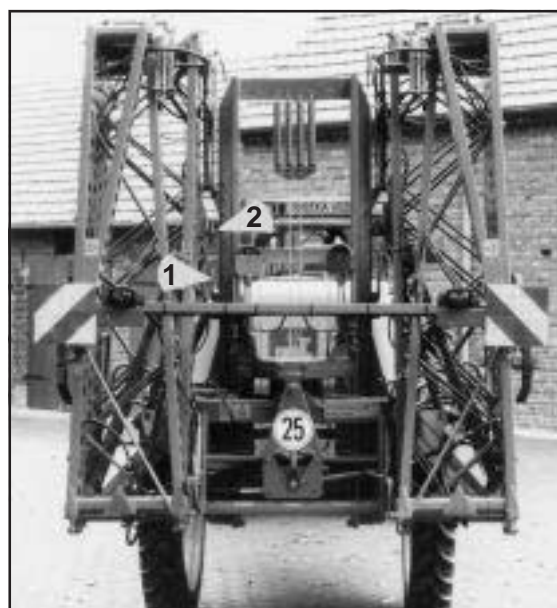


Fig. 10.31

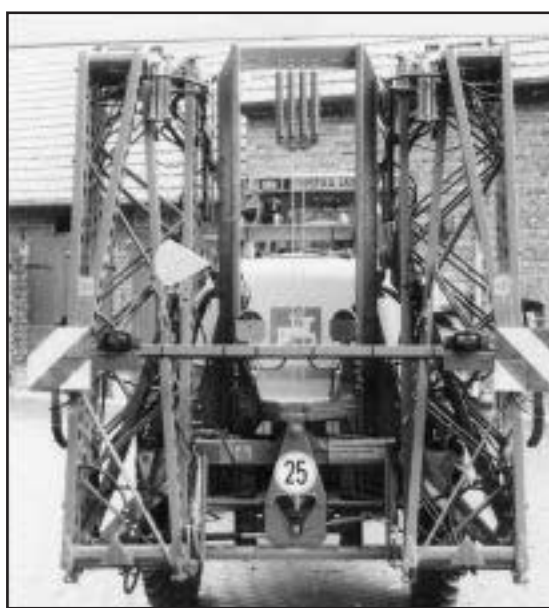


Fig. 10.32

Folding in

- Lift the boom into a medium height by pressing key (Fig. 10.30/ 6).
- Set boom tilting and independent boom angling (Profi folding II) to "0".
- Lock swing compensation (please see para. 10.5.2.4).



Before folding in align booms in a parallel position towards the sprayer frame as otherwise you might get difficulties when locking the boom in transport position (catching pockets are not picked up by the catch brackets).

- **Profi Folding "0"**
 - Keep key (Fig. 10.30/ 2) in position "folding in" until the individual sections have been **completely** folded and the two folded boom packages have been folded upwards.
- **Profi Folding "I"**
 - Keep key (Fig. 10.30/ 3 and 10.30/ 4) in position "folding in" until the individual sections have been **completely** folded and the two folded boom packages have been folded upwards.
- **Profi-Folding "II"**
 - Keep keys (Fig. 10.30/ 3 and 10.30/ 4) in position "folding in" until the individual sections have **entirely** been folded.
 - Keep keys (Fig. 10.30/ 8 and 10.30/ 9) in Position "angling" until the two folded boom packages have been folded upwards.
- Lock boom in transport position by lowering (please refer to para. 10.5.2.2).

10.5.2.2 Locking and unlocking sprayer boom in transport position

Unlocking the booms from transport position

The boom will be **unlocked** from the transport position by lifting it via the height adjustment until the catch carriers release the catching sockets (Fig. 10.31). To do this press key (Fig. 10.30/ 6).

Locking the booms in transport position

The boom will be **locked** in transport position by fully lowering it via the height adjustment until the catch carriers pick up the catching sockets (Fig. 10.32). To do this press key (Fig. 10.30/ 6).



If the catch carriers do not pick up the catching sockets, align the booms in parallel position to the sprayer frame by key (Fig. 10.30/ 7) of the tilting device.

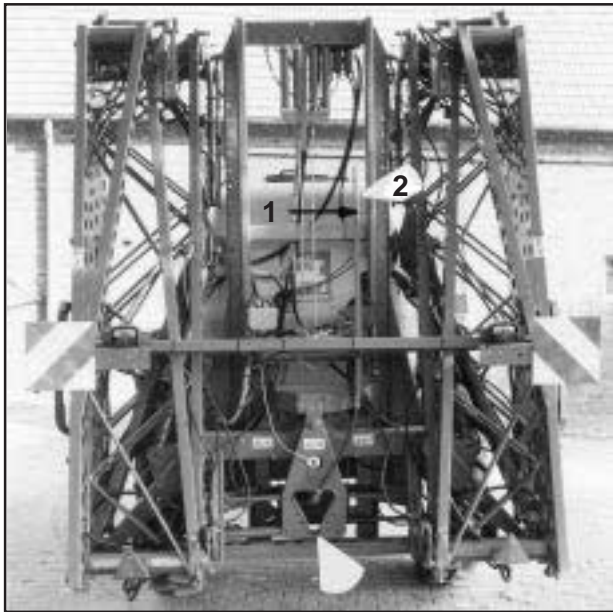


Fig. 10.33

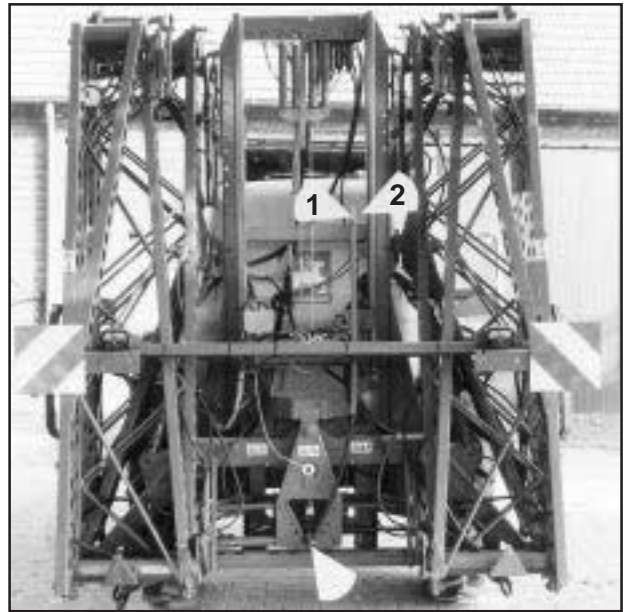


Fig. 10.34

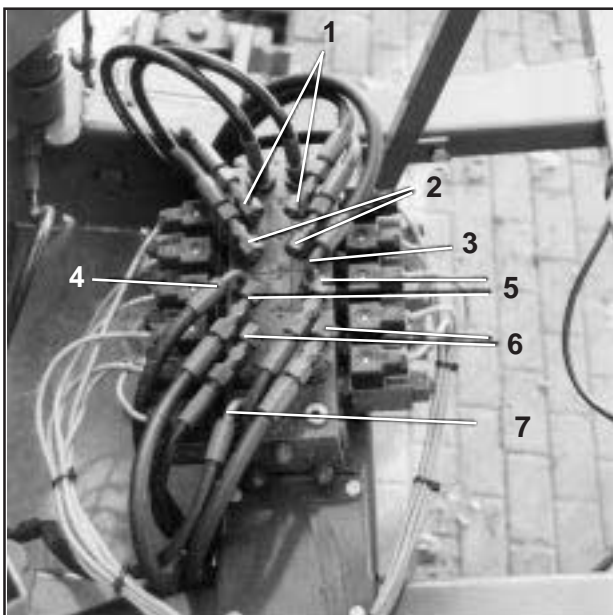


Fig. 10.35

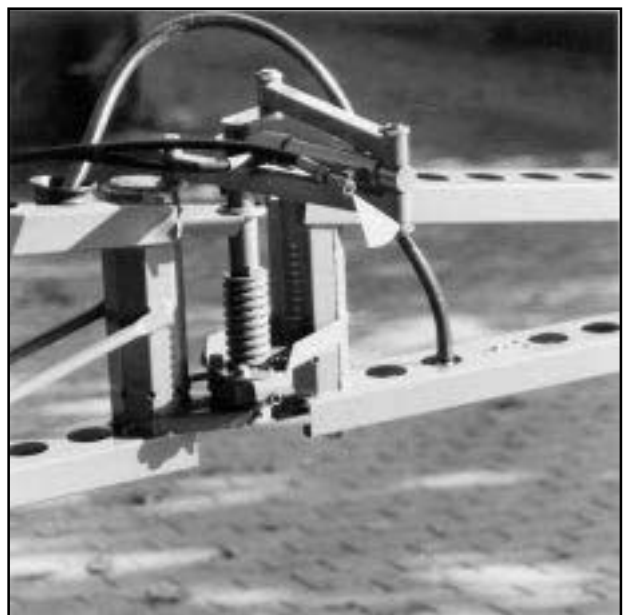


Fig. 10.36

10.5.2.3 Unlocking and locking of swing compensation

Unlocking and locking of swing compensation is actuated by key see Fig. 10.30/ 4.

The swing compensation is unlocked when the green section (Fig. 10.33/ 1) of the unlocking and locking scale (Fig. 10.33/ 2) can be noticed. Fig. 10.33 illustrates the locked swing compensation.

The swing compensation is locked when only 1/3 of the red section of the unlocking and locking scale (Fig. 10.34/ 2) can be seen. Fig. 10.34 illustrates the locked swing compensation.

10.5.2.4 Operating with boom ends unsymmetrically folded out



For operating with unsymmetrically folded out boom ends first lock the swing compensation. Thereafter fold in or out the boom ends asymmetrically.

10.5.2.5 Correcting the hydraulic throttle valves

The speed of the individual hydraulic functions (lifting and lowering folded boom sections, fold in and out booms, lock and unlock swing compensation etc.) **of the relevant hydraulic check valves of the valve block (Fig. 10.35) has already been set by the manufacturer.** However, depending on the tractor type, it may be necessary to correct this setting. By screwing in or out the Allen key bolt of each check valve the speed for actuating the hydraulic function allocated to the relevant pair of check valves can be altered.

- Reducing the actuating speed = screw in Allen key bolt.
- Increasing the actuating speed = screw out Allen key bolt.



For correcting the actuating speed of a hydraulic function always alter both throttles of a pair of check valves equally.

Fig. 10.35/ . . .

- 1 - Check valves for setting the speed for folding down or up the right hand folded in boom package and with "Profi-folding II" the speed of angling the right hand boom package folded out.
- 2 - Check valves for setting the speed of folding in and out of the right hand boom sections.
- 3 - Hydraulic connection for locking and unlocking swing compensation (the check valves are placed on the hydraulic ram of the locking device)
- 4 - Hydraulic connection of boom tilting (the check valve is situated on the hydraulic ram of the boom tilting device).
- 5 - Check valves for setting the speed of folding in and out of the left hand boom sections.
- 6 - Check valves for setting the speed for folding up and down the left hand folded boom packages and at "Profi-folding II" the speed for angling the left hand boom sections folded out.
- 7 - Hydraulic connection for height adjustment (the check valves are situated on the left hand hydraulic ram of the height adjustment).

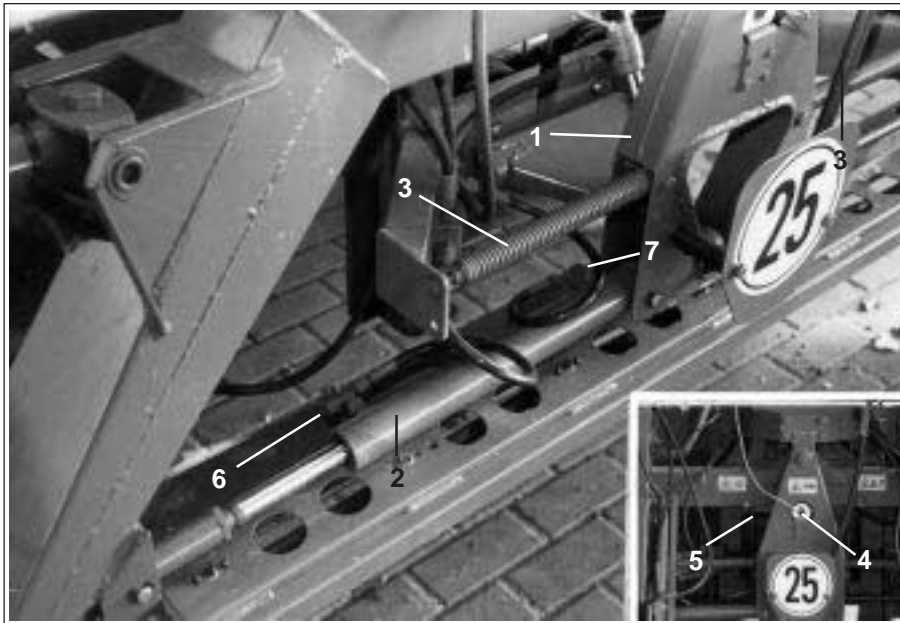


Fig. 10.37

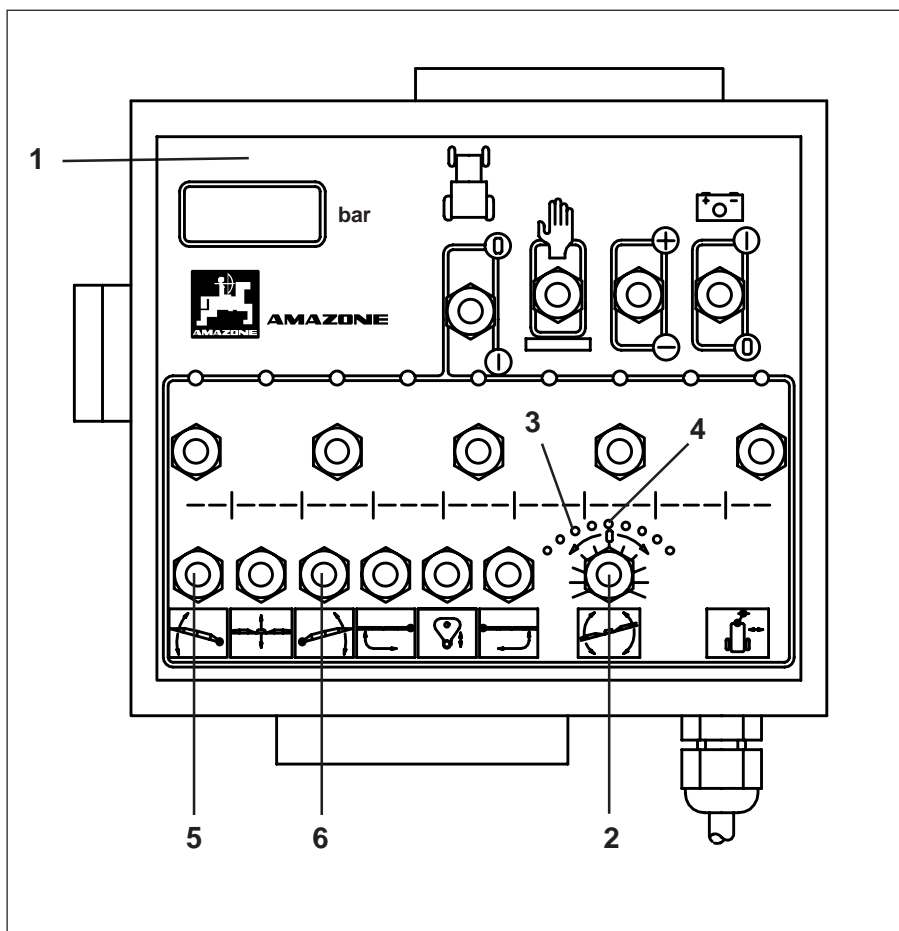


Fig. 10.38

10.5.2.6 Hydraulic boom tilting (only with Profi-folding "I" and "II")

In difficult terrain the position of the sprayer booms in relation to the area to be sprayed is correctable via the hydraulic boom tilting - without affecting the swing compensation. Thus sprayer boom can be guided parallel to the ground, e. g. with varying track depths or one side driving in a furrow.

For setting the boom tilting the swivel arm (Fig. 10.37/1) is moved via the hydraulic ram (Fig. 10.37/2). The hydraulic ram is actuated via the switch box (Fig. 10.38/1) by pressing the key (Fig. 10.38/2). By moving the swivel arm a differing spring pre-tensioning of both springs (Fig. 10.37/3) is achieved. Hereby the boom is brought into the wanted position.

Fig. 10.38/ . . .

- 1 - Switch box (SKS 50 HA or 70 HA)
- 2 - Key for boom tilting
- 3 - Scale, consisting of luminous diodes; arranged around key (2).
- 4 - "0"-position. If the boom is in "0" position (parallel to sprayer frame) the diode lights up under position "0".

Alignment of sprayer boom via boom tilting

- For tilting the unfolded booms press key (Fig. 10.38/2). Thus an easy tilt adjustment of the booms is possible which can be repeated without any faults.



The height on the boom ends varies by approx. 10 - 15 cm per diode spacing. If the hydraulic ram is driven out further than to its stop position, the outer left hand or right hand diode is still lighting up.

The central diode (Fig. 10.38/4) represents the "0"-Position" of the boom. When the boom is set parallel to the sprayer frame and another than the central diode lightens, a readjustment of the "0-position" becomes necessary.

Readjustment of „0-Position“

- Unfold both booms completely and lock the swing compensation.
- Align booms parallel to the sprayer frame by pressing key (Fig. 10.38/2).
- Turn by hand the potentiometer (Fig. 10.37/4) on the roller around which the thread (Fig. 10.37/5) is guided until the central diode (Fig. 10.38/4) lights up.



Only turn potentiometer by max. $\pm 20^\circ$ If this figure is exceeded boom alignment has to be executed by a professional workshop.



Before folding the boom always repeat to align it parallel with the sprayer frame (boom tilting on pos. "0") as otherwise difficulties may occur when locking the boom in transport position (catching pockets will not be taken up by the catch brackets).

10.5.2.7 Angling the boom (only profi-folding „II“)

If in very unfavourable terrain conditions the boom can no longer be aligned with the ground by the height- and tilt adjustment, it is possible to angle up or down the boom halves via keys (Fig. 10.38/5 and 10.38/ 6) .



Never angle the booms folded down for more than 20° !



The indications on the sticker on the hydraulic ram for lifting and lowering the sprayer booms facilitates aligning the angled or not angled booms parallel to the ground again.



Before folding in the sprayer boom elements align them horizontally (angling set to „0“).

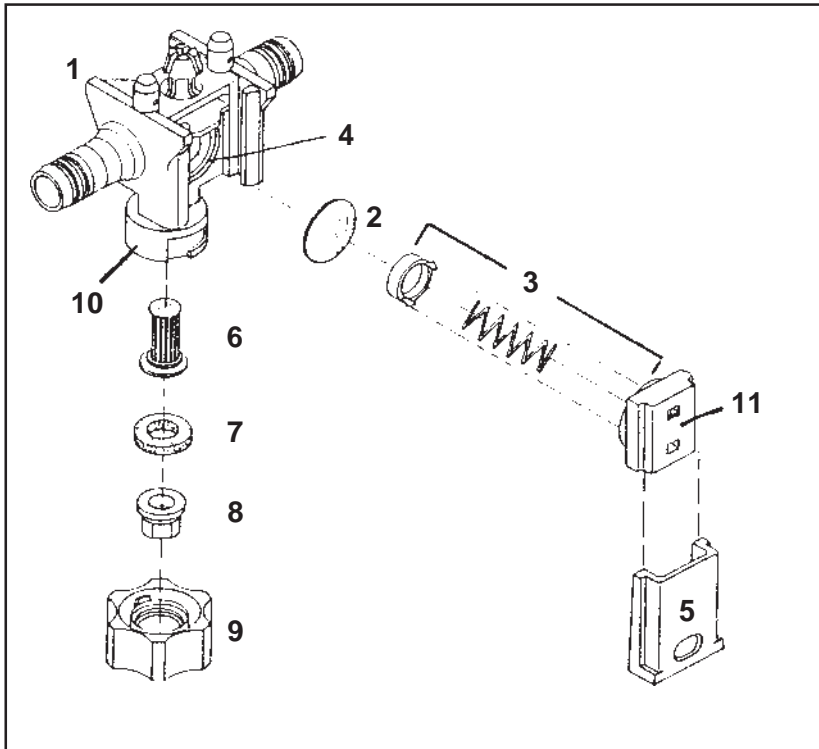


Fig. 11.1

11.0 Nozzles / Jets



Setting the equal pressure control unit at any change of the nozzles (para. 6.1.3.1).

Fig. 11.1 / . . .

- 1 - Nozzle carrier for bayonet nut locking (standard execution).
- 2 - Diaphragm. If the pressure in the sprayer tubes drops below approx. 0.5 bar the spring element (3) presses the diaphragm onto the valve seat (4) inside the nozzle carrier. This results in a drop free shutting off the jets after having stopped the boom feed.
- 3 - Spring element.
- 4 - Diaphragm seat.
- 5 - Slide. It keeps the complete valve inside the nozzle carrier.



Check the seating of the slide from time to time. To do this push the slide into the nozzle carrier as much as it is possible with moderate pressure by the thumb. In new condition it must by no means be pushed up to the stop.

- 6 - Nozzle filter. **Standard 24 meshes**, is set into the nozzle carrier from below.
- 7 - Rubber seal.
- 8 - Jet; **standard LU-K 120-'5'**.
- 9 - Bayonet nut coloured; **standard red**.
- 10 - Bayonet connection.
- 11 - Housing of spring element.



Spray pressure and diameter of the jet opening influence the droplet size and the sprayed liquid volume. The higher the spray pressure the smaller the droplet diameter. The smaller droplets are increasingly susceptible to unwanted drifting.

Fitting the nozzles

- The nozzle filter (Fig. 11.1/6) is placed from below into the nozzle carrier (Fig. 11.1/1).
- Place the nozzle (Fig. 11.1/8) inside the bayonet nut (fig. 11.1/9).



For quick identification of the various nozzles a variety of coloured bayonet nuts is available.

- Place the rubber seal ring (Fig. 11.1/7) above the nozzle.
- Press the rubber sealing ring into the seating of the bayonet nut.
- Place the bayonet nut onto the take up of the nozzle carrier.
- Twist the bayonet nut until the stop.

Dismantling the diaphragm valve in case of dripping nozzles

Cause for dripping of the nozzles at a shut off boom feed are residues on the diaphragm seating (Fig. 11.1/4). Therefore the corresponding diaphragm should be cleaned as follows:

- Pull out the slide (fig. 11.1/5) from the nozzle carrier (Fig. 11.1/1) in direction of the bayonet nut.
- Remove the spring element (Fig. 11.1/3) and the diaphragm (Fig. 11.1/2).
- Clean the diaphragm seating (Fig. 11.1/4).
- The assembly is done in vice versa order.



Pay attention to the correct fitting directions of the spring elements. The right and left interrupted inclined edges on the housing of the spring element (Fig. 11.1/11) should incline in direction of the boom profile.



11.1 XR/LU-flat fan nozzles

Pressure range of the XR/LU-nozzles:

Nozzle size	Pressure range
'015'	1 - 1,5 bar
'02'	1 - 2,5 bar
'03'	1 - 3,0 bar
from '04'	1 - 5,0 bar

The nozzles are made from:

1. Plastic: LU - Nozzles
2. Plastic housing with stainless steel-core: LU - Nozzles; XR - Nozzles

Colour of the bayonet nuts to be used with XR/LU-nozzles:

- red (standard)
- yellow
- blue
- white

Droplet spectrums, stated by the MVD-value (Mean Value Droplet)

Type	Pressure (bar)	rate l/ha		MVD (µm)	required nozzle filter (number of meshes)
		6 k.p.h.	8 k.p.h.		
XR/LU '015'	1,5	84,0	63,0	238	50
XR/LU '02'	1,5	112,0	84,0	264	50
XR/LU '03'	1,5	168,0	126,0	296	50
	3,0	236,0	177,0	241	
XR/LU '04'	1,5	224,0	168,0	326	50
	3,0	316,0	237,0	269	
XR/LU '05'	1,5	273,0	204,0	370	24
	3,0	388,0	291,0	308	
XR/LU '06'	1,5	326,0	245,0	402	24
	3,0	465,0	348,0	335	
XR/LU '08'	1,5	433,0	325,0	442	24
	3,0	616,0	462,0	368	

MVD has been determined by the Laser-Doppler-process.

11.2 AD/DG anti-drift flat fan nozzles

Pressure range of the AD/DG-nozzles:

Nozzle size	Pressure range
'02', '03', '04'	1,5 - 5,0 bar

The nozzles are made from:

1. Plastic: AD - Nozzles
2. Plastic housing with ceramic-core: AD - Nozzles
3. Plastic housing with stainless steel-core DG - Nozzles

The colour of the bayonet nuts to be used with AD/DG nozzles:

- red
- yellow
- blue
- white

Droplet spectrums, stated by the MVD-value (Mean Value Droplet)

Type	Pressure (bar)	rate l/ha		MVD (µm)	required nozzle filter (number of meshes)
		6 km/h	8 km/h		
AD/DG '02'	1,5 3	112,0 158,0	84,0 119,0	403 320	50
AD/DG '03'	1,5 3	168,0 236,0	126,0 177,0	414 339	50
AD/DG '04'	1,5 3	224,0 316,0	168,0 237,0	447 357	50

MVD has been determined by the Laser-Doppler-process.



11.3 ID-flat fan nozzles

Pressure range of the ID-nozzles:

Nozzle size	Pressure range
'015', '02', '025', '04'	3 - 7 bar

The nozzles are made from:

1. Polyethylene:

ID- nozzles

Colour of the bayonet nuts to be used with ID-nozzles:
Green

Droplet spectrums, stated by the MVD-value (Mean Value Droplet)

Type	pressure (bar)	rate l/ha		MVD µm	required nozzle filter (number of meshes)
		6 k.p.h.	8 k.p.h.		
ID '015'	3	117	88	437	100
	5	152	114	370	
ID '02'	3	156	117	320	50
	5	203	152	304	
ID '025'	3	198	149	360	50
	5	256	192	343	
ID '03'	3	234	175	386	50
	5	303	227	359	
ID '04'	3	311	233	407	50
	5	403	302	389	

MVD has been determined by the Laser-Doppler-process.

11.4 TJ/DF-Double flat fan nozzles

Pressure range of the AD/DG-nozzles:

Nozzle size	Pressure range
TJ '04', '06'	2.0 - 4.0 bar
DF '04', '06'	2,5 - 5,0 bar

The nozzles are made from:

- | | |
|-------------------|------------|
| 1. Brass: | TJ-nozzles |
| 2. Nickle plated: | DF-nozzles |

Colour of the bayonet nuts to be used with TJ nozzles: Black

Colour of the bayonet nuts to be used with DF nozzles: Green

The double flat fan nozzles are mainly used for spraying fungicides in fields with tall crop.

The double flat fan nozzle produces a spray fan in driving direction forward and to the rear.

The spraying angle towards the vertical position is 30°. The angle of the spray fan produced is also 110° same as with the standard flat fan nozzles. The use of the double flat fan nozzles results in a better penetration of the crop in the upper area due to the contra directed spray fans.

Droplet spectrums, stated by the MVD-value (Mean Value Droplet)

Type	pressure (bar)	rate l/ha		MVD µm	required nozzle filter (number of meshes)
		6 k.p.h.	8 k.p.h.		
TJ/DF '04'	3	316	237	382	50
TJ/DR '06'	3	465	348	412	50

MVD has been determined by the Laser-Doppler-process.

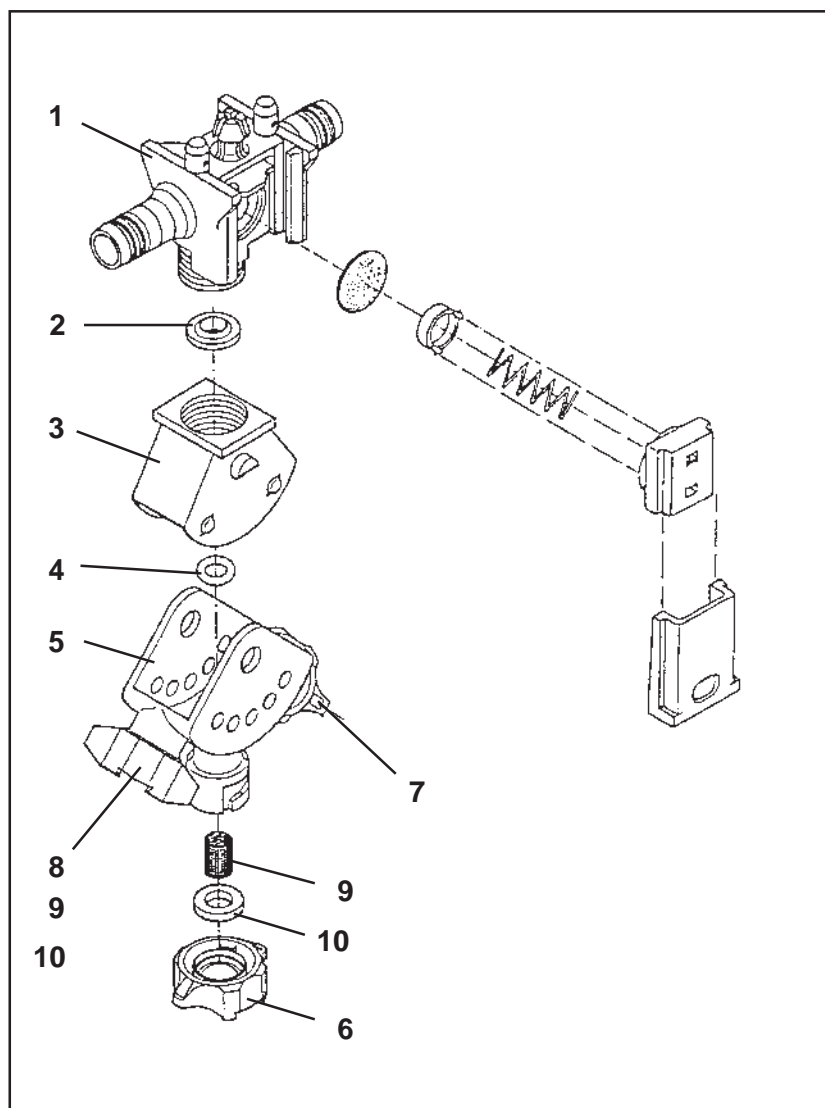


Fig. 11.2

11.5 Triple nozzle heads

The use of the triple nozzle heads (Fig. 11.2) has advantages when frequently using various nozzles. Always the vertically positioned nozzle of the triple nozzle head will be fed with the spray liquid. By swivelling the triple nozzle head to the right hand or left hand another nozzle will be brought into operational position. The delivery of the triple nozzle head can be stopped by switching it into the intermediate positions thus giving the possibility to reduce the working width of the boom.



Before swivelling the triple nozzle head onto another nozzle flush the nozzle used before!

Fig. 11.2/...

- 1 - Nozzle body
- 2 - Disc seal ring
- 3 - Head piece
- 4 - O-Ring.
- 5 - Swivel piece
- 6 - Bayonet nut: red
- 7 - Bayonet nut: yellow
- 8 - Bayonet nut: green
- 9 - Nozzle filter; standard 50 meshes
- 10 - Sealing



At every change of the nozzles the equal pressure control unit should be set (please refer to para. 6.1.3.)

Maintenance of the nozzles

- Rinse nozzles thoroughly with water.
 - daily after termination of the spraying operations (please refer to para. 6.1.5).
 - at interruptions of spraying operation in case of poor weather conditions (please refer to para. 6.1.5.1).
- Remove and clean the nozzles and nozzle filters after every spraying season.



Soak in rinsing water nozzles and nozzle filters before cleaning. The cleaning should only be done with a soft brush, preferably made from plastics.

The nozzle jets are subject to wear. This wear depends on the nozzle material, the used spraying liquid and the set pressure. Therefore it is impossible to state any generally valid maintenance or exchange intervals for the nozzles. The nozzle condition can be exactly determined by checking the lateral distribution as it is offered by authorised dealers, importers and the manufacturer.

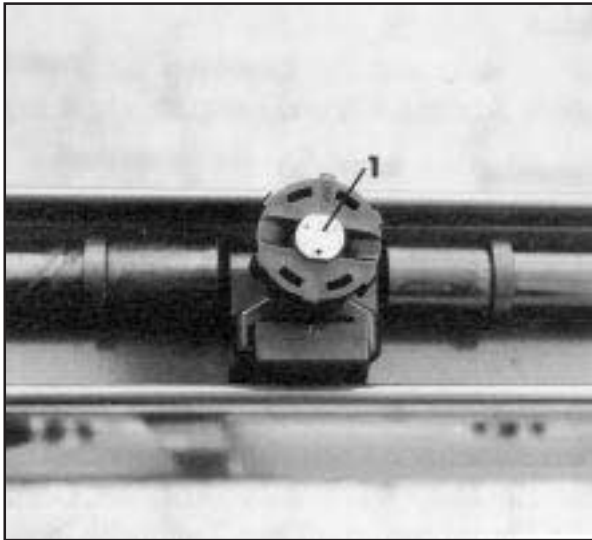


Fig. 12.1

12.0 Available options

12.1 Options for the application of liquid fertilisers

At present in the main there are two different kinds of liquid fertiliser available:

1. Ammonium Nitrate-Urea-Solvents (AUS) with 28 kg N per 100 kg AUS.
2. A NP-solution 10-34-0 with 10 kg N and 34 kg P₂O₅ per 100 kg NP-solution.



If the liquid fertilizer is applied by flat fan nozzles, multiply the corresponding values from the spraying chart for the rate l/ha at AUS with 0.88 and at NP-solutions with 0.85 as the mentioned rates in l/ha are only valid for pure water.

The following principle applies:

Apply liquid fertilisers only in coarse droplets to avoid crocheting of plants. If the droplets are too large they will roll off the leaf and too small droplets would enforce the magnifying glass effect. Also too high application rates may cause crocheting of the leaves - due to the salt concentration of the fertiliser. Basically no higher rates of liquid fertiliser should be applied as e. g. 40 kg/N (please refer also to "conversion table for the spraying of liquid fertilisers" para. 16.6). Re-fertilising of AUS with nozzles should in any case be terminated in the EC-stadium 39 as otherwise crocheting the ears would result in considerable damage.

12.1.1 3-ray nozzles

Should the liquid fertiliser predominantly be absorbed by the roots instead by the leaves of the plant the use of the 3-ray-nozzles is of advantage for liquid fertiliser application. An integrated metering aperture inside the nozzle produces a nearly pressureless, coarse droplet distribution of the liquid fertiliser via three openings (Fig. 12.1/1). This helps to prevent the production of an undesirable spraying fog and the production of small droplets. The coarse droplets produced by the 3-ray nozzle hit with low energy the plants and roll off its surface. Even though in this way etching damages are avoided as far as possible the use of the 3-ray nozzles should be renounced for late top dressing and instead drag hoses should be used.

For the following listed 3-ray nozzles the black bayonet nuts should be used exclusively.

Various 3-ray nozzles and their spray rate:

3-ray-yellow	50	- 105 l AUS/ha,	Order-No. 798 900
3-ray-red	80	- 170 l AUS/ha,	Order-No. 779 900
3-ray-blue	115	- 240 l AUS/ha,	Order-No. 780 900
3-ray-white	155	- 355 l AUS/ha,	Order-No. 781 900

Refer to para 16.2 for spray tables for 3-ray nozzles.

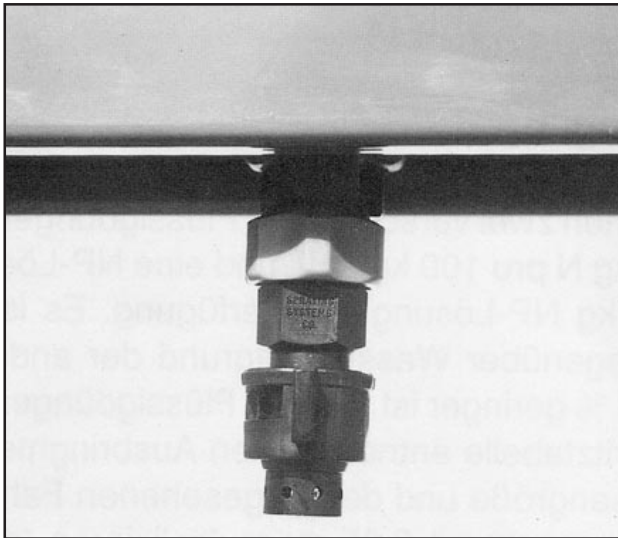


Fig. 12.2



Fig. 12.3

12.1.2 5-hole nozzle cpl. (with metering washer No. 4916-45), Order-No. 911 517 5-hole nozzle cpl. (with metering washer No. 4916-55), Order-No. 911 518 8-hole nozzle cpl. (with metering washer No. 4916-44), Order-No. 749 901

Preconditions for the use of the 5- and 8-ray nozzles are the same as for the 3-ray nozzles (see para. 12.1.1.). Contrary to the 3-ray nozzles the jet openings at the 5- and 8-hole nozzle (Fig. 12.2) are not directed downwards but sideways. This results in the production of very large droplets at very small collision forces on the plants.



The metering washers determine the spray rates (l/ha).

Metering washers available for 5- and 8-hole:

4916-39	60	Ø 1.0	60 - 115 l AUS/ha,	Order-No. 722 901
4616-45	75	Ø 1.2	75 - 140 l AUS/ha,	Order-No. 723 901
4916-55	110	Ø 1.4	100 - 210 l AUS/ha,	Order-No. 724 901
4916-63	145	Ø 1.6	145 - 280 l AUS/ha,	Order-No. 725 901
4916-72	190	Ø 1.8	190 - 360 l AUS/ha,	Order-No. 726 901
4916-80	240	Ø 2.0	240 - 450 l AUS/ha,	Order-No. 729 901

Spraying tables for 5- and 8-hole nozzles (see para. 16.3)

12.1.3 Drag hose kit, cpl. (with metering washers No. 4916-39) for late top dressing of liquid fertiliser

Fig. 12.3/ . . .

- 1 - The drag hose sections have a 25 cm nozzle and hose spacing. The drag hose sections are numbered whereby No. 1 is placed to the outer left hand if looking in driving direction, No. 2 next etc.
- 2 - Wing nuts are used for fixing the drag hose kit.
- 3 - For coupling the drag hoses sleeve plug connections are used.
- 4 - Metal weights for stabilising the position during operation



The metering washers determine the spray rates (l/ha).

The following metering washers are available:

4916-26	Ø 0.65	50 - 135 l AUS/ha,	Order-No. 720 901
4916-32	80 Ø 0.80	80 - 210 l AUS/ha,	Order-No. 721 901
4916-39	115 Ø 1,00	115 - 300 l AUS/ha,	Order-No. 722 901 (standard)
4916-45	150 Ø 1,20	150 - 395 l AUS/ha,	Order-No. 723 901
4916-55	225 Ø 1,40	225 - 590 l AUS/ha,	Order-No. 724 901

Refer to para 16.4 for spray tables for the drag hose.

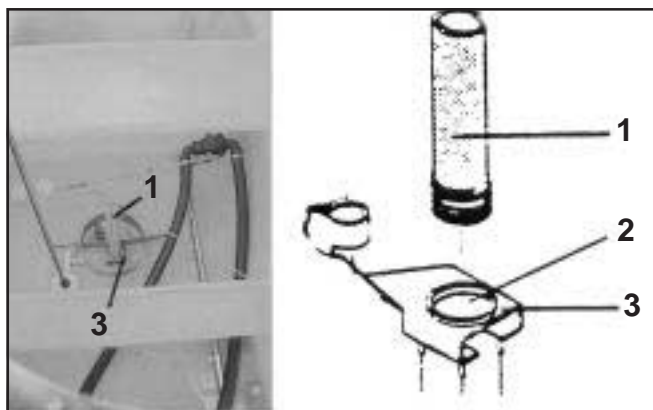


Fig. 12.4

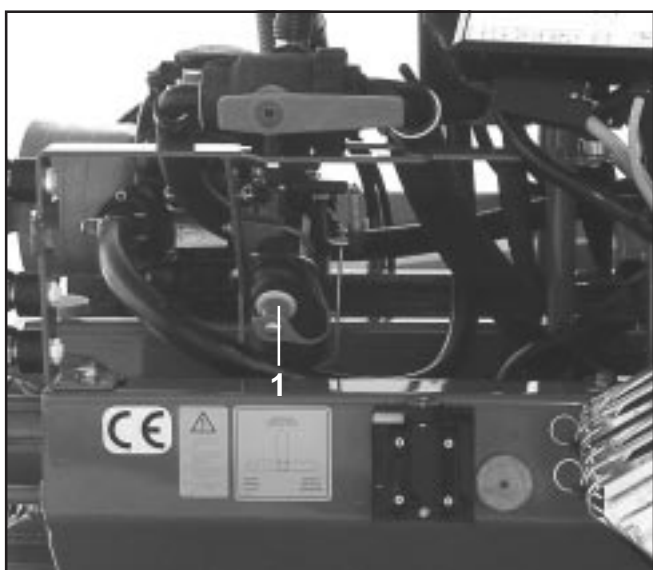


Fig. 12.6 a

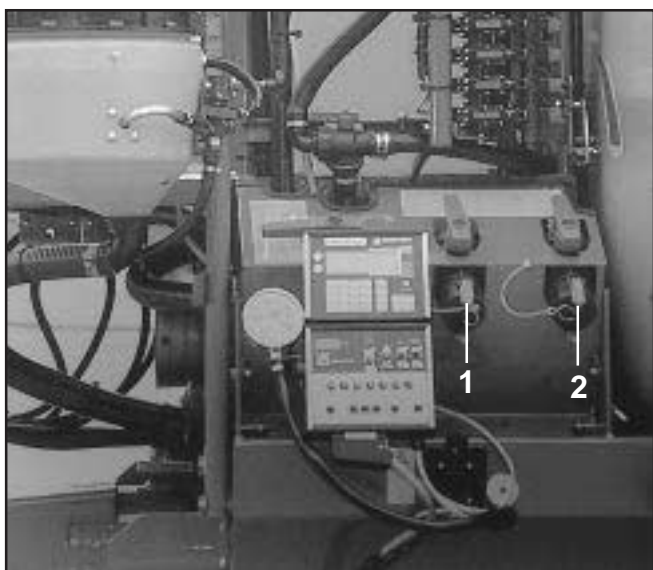


Fig. 12.6 b

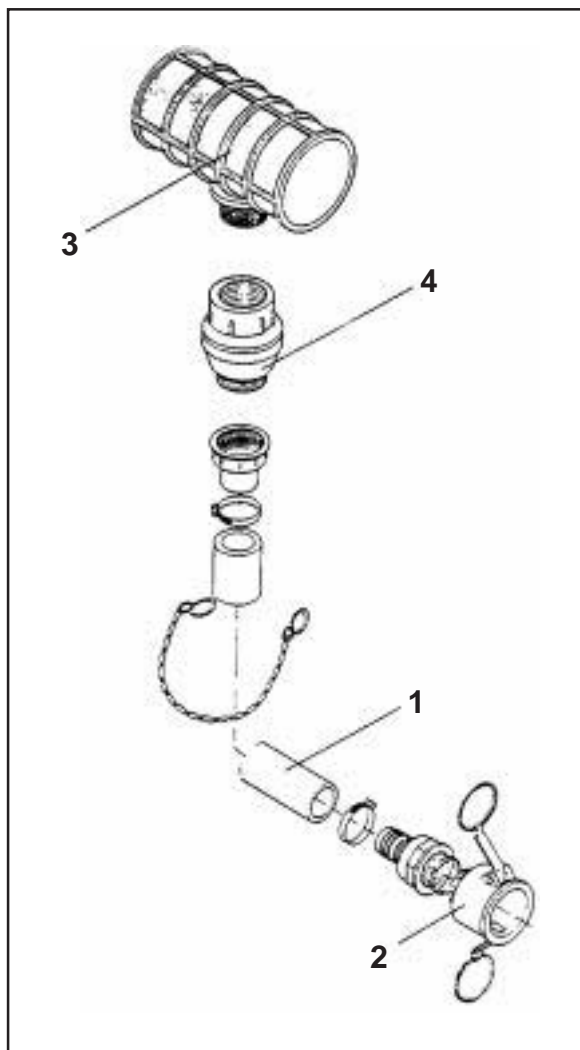


Fig. 12.5



Fig. 12.7

12.1.4 Urea filter, Order-No. 707 400

The use of the urea filter (Fig. 12.4/1) is recommended when filling with urea to avoid undiluted particles to reach into the suction area and to block the filter tap (Fig. 12.4/2).

12.1.4.1 Fitting the urea filter

- Remove the plug of the screw-in opening (Fig. 12.4/2) in the tank sump.
- Screw in the urea filter by spinning it clock-wise into the bottom (Fig. 12.4/3).



It is not necessary to remove the urea filter for the following spraying operation.

12.2 Suction hose for filling the tank

1. Suction hose (5 m), Order-No. 717 100
2. Suction hose (8 m), Order-No. 718 100

Fig. 12.5/ . . .

- 1 - Suction hose.
- 2 - Quick coupler. Fits to suction pipe socket (Fig. 12.6/1) of filter tap.
- 3 - Suction filter. Filters the sucked-on water.
- 4 - Check valve. prevents the return of any liquid already inside the tank when at the filling procedure there is a complete pressure break down.



During the tank filling via the suction hose from open water sources adhere to the applicable advice (see also para. 6.1.1).

12.2.1 Operational order when filling the tank via the suction hose

- Switch off the central boom feed control.
- Engage pto.
- At **UG Special** place lever (Fig. 12.6a/2) in position "**filling**".
- At **UG Power und Magna** place lever (Fig. 12.6b/3) in position "**sucking in**".
- Place end of suction hose (Fig. 12.7) with the suction filter into the liquid to be sucked in.
- As soon as tank is full:
 - remove suction hose from liquid to be sucked so that the hose is completely emptied by the pump.
 - bring the control lever at the filter tap into position "spraying" and switch off pto shaft.



If it is not intended to continuously remove the suction hose from the water source, first bring control lever on filter tap into position "spraying" and thereafter unscrew the suction hose from the suction pipe socket.



During the filling operation do not leave the implement unattended.



For obtaining a maximum sucking-in power with the trailed sprayer types UG 2200 Power and UG 3000 Power it is recommended to use two suction hoses (Fig. 12.7) simultaneously (See Fig. 12.6 b/ 1 and Fig. 12.6 b/ 2 for joints).

12.3 Filling pipe socket with quick coupling 2", Product-No. 7571000.

Fig. 12.6 a/ 1 (UG 2000 Special only)

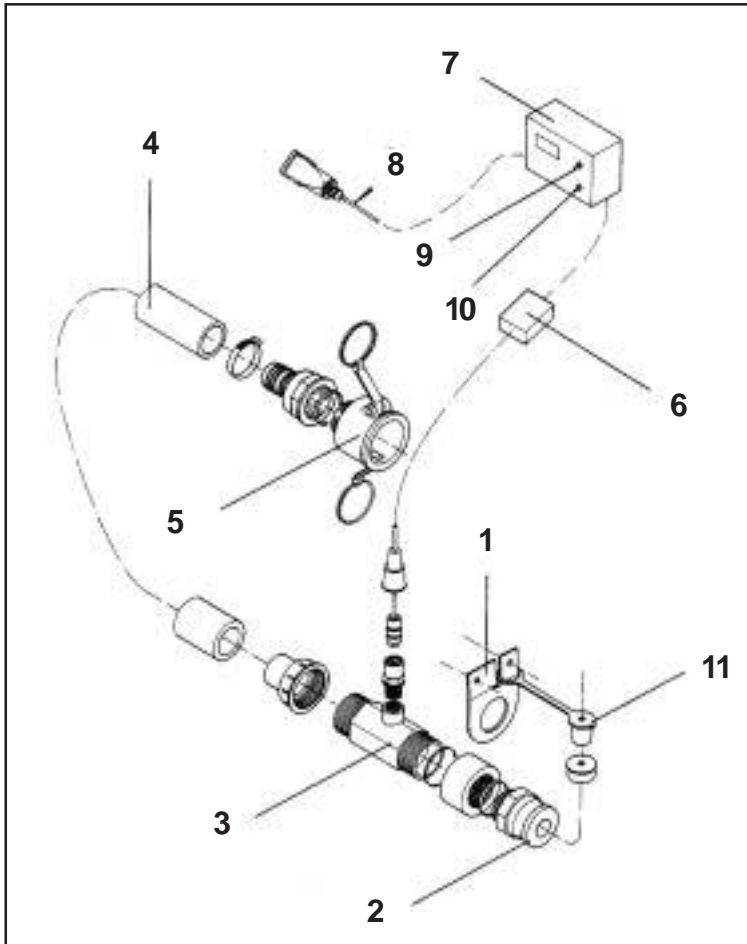


Fig. 12.8

12.4 Tank meter for electronically monitoring the filling, Order-No. 720 400

Suited only for the control units "GG" with "AMATRON II A".

The tank meter (Fig. 12.8) determines the amount of water filled into the sprayer tank and conveys its impulses for further processing into the "AMATRON II A". The display of the tank meter shows the actual amount of water fill in litres (l).

Fig. 12.8 / . . .

- 1 - Bracket for fixing the liquid flow meter.
- 2 - Pipe socket for the filling hose (e. g. suction hose [option]).
- 3 - Liquid flow meter.
- 4 - Hose piece.
- 5 - Quick coupler. Fits to suction pipe socket of filter tap.
- 6 - Amplifier.
- 7 - Display.
- 8 - Connecting cable with plug. Plugs into the socket (next to implement socket) on the flange plate for the electric motor.
- 9 - On-/off-switch.
- 10 - Knob-switch.



Bring the switch briefly into "clear" position before starting a new filling and the counter in the display returns to "0". If the switch is set on "light", the display is illuminated.

- 11 - Protective cap. Closes off the plug opening (2) if not in use.

12.4.1 Filling by liquid flow meter

- Fix quick coupler (Fig. 12.8/5) to suction joint of filter tap.
- Bring control lever of filter tap into position "filling" (please refer to para. 7.5).
- Connect the filling hose. (Fig. 12.8/2).

The tank meter determines the amount of water filled into the tank and the resulting impulses are conveyed to further processing directly into the "AMATRON II A". For this type into the "data block machine" the number of "impulses/l" for the liquid flow meter (approx. 92 impulses/l).

- Dial the display "machine tank filling" in the "data block machine" of the "AMATRON II A"
- Insert the Imp./l for the liquid flow meter (approx. 92 impl./l).
- Set switch knob to "clear". Automatically the counter in the display of the tank meter returns to "0".
- Fill the tank via the liquid flow meter. On the display of the tank meter the actual amount of water in litres which has been filled can be read off.



For an exact determination of the amount of water filled in it should be watched that the liquid is free of any air bubbles.

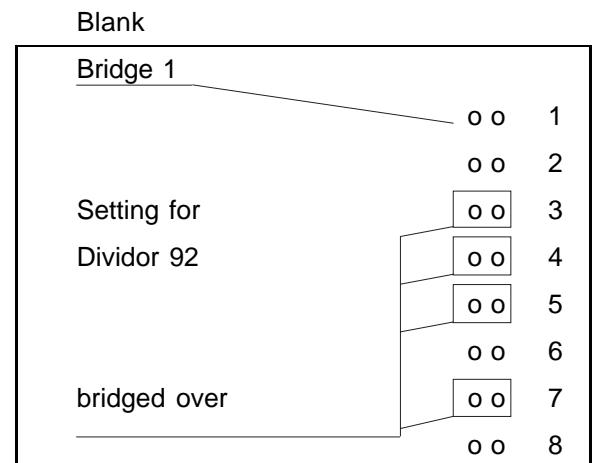
- The impulses counted by the tank meter for determining the amount of water filled is directly transferred into the "AMATRON II A" (please also refer to the operating instructions "AMATRON II A").
- The amount of water added respectively filled into the spray tank is shown on the display on the tank meter.
- "AMATRON II A" determines the total actual contents of spray liquid, i. e. the unused amount of liquid still in the tank prior to filling plus the additionally filled amount of water (see also instructions "AMATRON II A").

12.4.2 Deviations between the determined and the actually filled quantity of water

Recalibrate tank meter when differences occur between the actual amount of water filled in and the amount of water determined by the flow meter.

- Unscrew the lid of the display. On the lid back side there is a blank with a double row of bridge pins. These bridge pins can be connected by short cut bridges so that various bridging combinations result. The information "Imp./l" (divider) necessary for determining the quantity of filling water by the liquid flow meter can be set and corrected by linking up various bridge combinations. The liquid flow meter sense of approx. 92 impulses per litre of water (92 Imp./l). For the divisor 92 link up bridge combinations 3, 4, 5 and 7.
- In case of differentials take from the following table the corresponding divider and the corresponding pitch over combination for correction of "Imp./l" (divider). From divider to divider the measured value is changed by approx. 1 %.

Dividor	Bridge							
	1	2	3	4	5	6	7	8
8 5	x		x		x		x	
8 6		x	x		x		x	
8 7	x	x	x		x		x	
8 8				x	x		x	
8 9	x			x	x		x	
9 0		x		x	x		x	
9 1	x	x		x	x		x	
9 2			x	x	x		x	
9 3	x		x	x	x		x	
9 4		x	x	x	x		x	
9 5	x	x	x	x	x		x	
9 6						x	x	
9 7	x					x	x	
9 8		x				x	x	
9 9	x	x				x	x	



Example:

The amount of water actually filled in is 4 % more than the one determined by the tank meter. The setting shows the divider 92 (bridge combinations 3, 4, 5 and 7) as the liquid flow meter delivers approx. 92 Imp./l, i. e. change the divider from 92 to 88 (4 %) and set the corresponding bridge combinations 4, 5 and 7. Surplus short cut bridges can be stored loosely inside the housing.

12.5 Spray pistol with 0.9 m long spray tube, without hose, Order-No. 715 800

Pressure hose up to 10 bar, e. g. for spray pistol, order-No. 738 900

Fiber enforced PVC (Nominal width/inside: 13 mm, outside: 20 mm; wall gauge: 3.5 mm).

Connect the pressure hose of the spray pistol to the single tap of the control chest. Set the spray pressure as usual.



The spray pistol should only be used for cleaning purposes. It is not possible to spray accurately crop protective agents because of the individual handling.

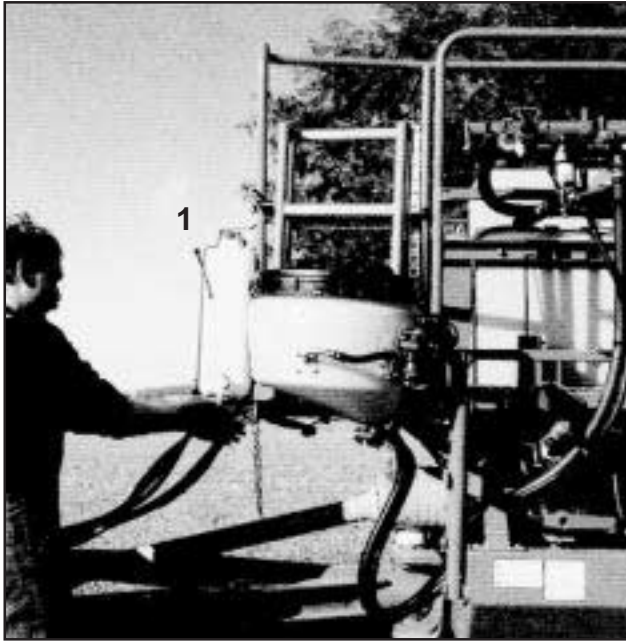


Fig. 12.9



Fig. 12.10



Fig. 12.11

12.6 Pressure filter insert

1. Pressure filter with 65 meshes/inch (standard), Order-No. 708 901
2. Pressure filter insert with 80 meshes/inch (for nozzle size '02'), Order-No. 730 901
3. Pressure filter insert with 100 meshes/inch (for nozzle size '015' and '01'), Order-No. 709 901

12.7 Single tap for connection of further users to the control chest, Order-No. 717 500

12.8 Hand washing water tank for UG (20 litres), Order-No. 735 500

The hand washing water tank is fixed on the operation platform above the hitch (Fig. 12.9/1).

12.9 Traffic options

The traffic regulations advise the use of lighting units on agricultural and forest tractor mounted implements. Responsible for this are driving unit's owner as well as the operator for adhering to the legal rules and regulations of the traffic law.

All tractor mounted and trailed implements must be equipped:

- to the front and to the rear with warning plates and limiting respectively tail lights if they protrude sideways more than 400 mm over the utmost point of the illuminated areas of the tractor's limiting lamps.
- with warning plates and illumination units if the tail lights of the tractor are covered respectively their outer end protrudes more than 1000 mm beyond the tail lights of the tractor to the rear.

12.9.1 Traffic lights for Q-booms and Super S-booms

1. Rear lights (Fig. 12.10/1), Order-No. 431 400 (Q- and Super S-boom)
Consisting of:
Light combination R. H. and L. H., parking warning plates, licence plate carrier and connecting cable.
2. Position lights to the front, Order-No. 158 301 (required for Q-boom only)
Consisting of:
Parking warning plates with position lights R. H. and L. H. and connecting cable.

12.9.2 Traffic lights for H-booms and L-booms

1. Rear lights (R. H. and L. H.) (Fig. 12.11/1), Product No. 105 9000
2. 2 warning plates, reflecting, red-white striped (Fig. 12.11/2), Product No. 718 4000

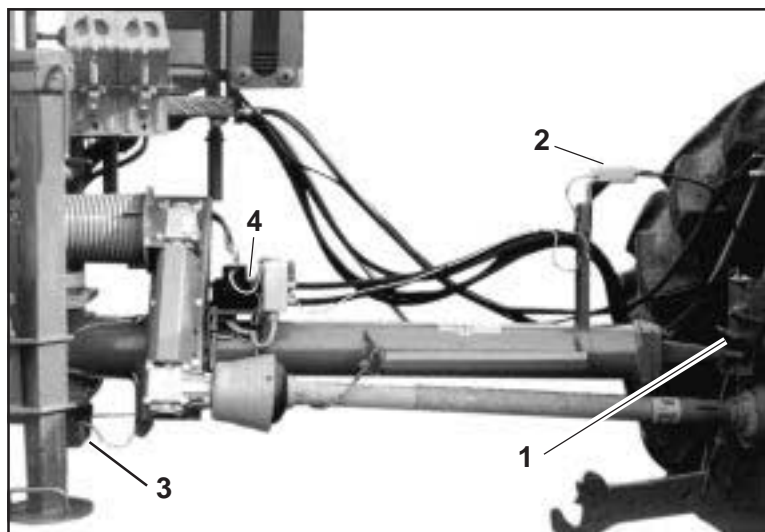


Fig. 12.12

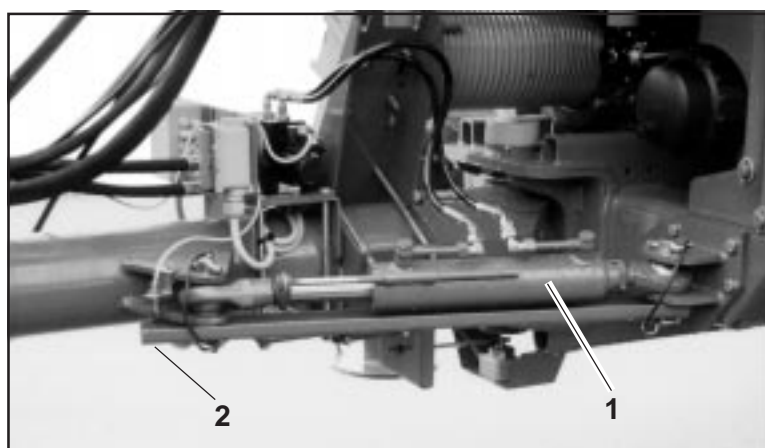


Fig. 12.13

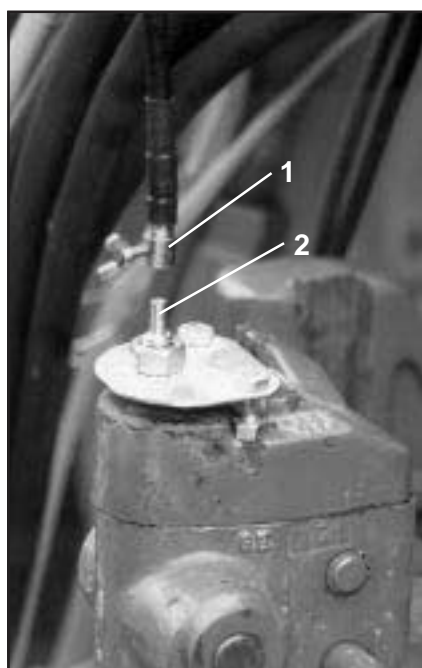


Fig. 12.14

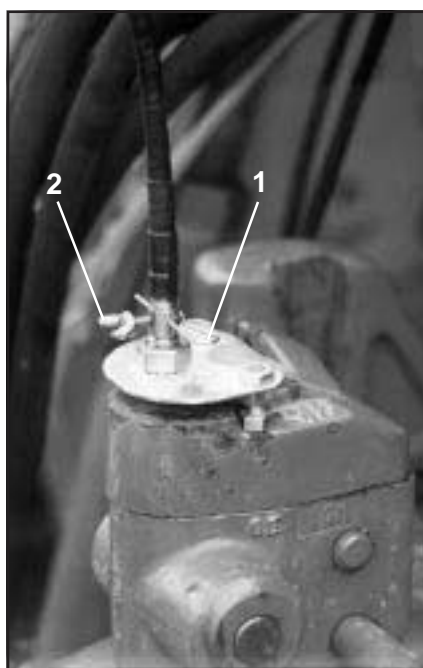


Fig. 12.15

12.10 Trail-Control

For the straight drawbar the trail control regulation unit (12.12) which can be retrofitted at any time is available as option. The straight drawbar come as standard with a fixing rod. By replacing the rigid system (fixing rod) by the trail-control-regulation unit an automatic true track following of the trailed sprayer is achieved. For maintaining the track follow effect when working on steep hill sides (sprayer may tend to slide down) the steering of the trailed sprayer can be corrected manually on trail-control-regulating unit from the tractor cab.

Trail-control can only be used in conjunction with a self-catching drawbar coupling and an additional double acting control valve or profi-folding.



Before putting trail-control to operation carefully read and strictly observe the attached instruction manual.



For road transport apply the safety rail (12.3/2). This rail prevents an unwanted position changing of the implement.

Fig. 12.12/...

- 1 - self catching drawbar coupling
- 2 - Wanted value transmitter
- 3 - Actual value transmitter
- 4 - Trail-control regulating unit

Fitting

- Attach straight drawbar to the self catching drawbar coupling of the tractor.
- Push sleeve of the wanted value transmitter (12.14/1) on the device on the self catching drawbar coupling (12.14/2).
- Secure connection with clip pin (12.15/1) and tighten with the thumb bolt (12.15/2) against unwanted pivoting movements.

12.11 Distance Control



The control unit distance-control can only be used for Super-S- and DAM-booms in conjunction with profi-folding O or 1.

The sprayer boom control device distance-control automatically maintains the sprayer boom parallel and in the wanted distance to the target area.

Two ultrasonic sensors measure the distance between the boom and the ground respectively the crop. At a one-sided deviation from the desired height distance control actuates the boom tilting for matching the height. In case the terrain rises to both sides. the height adjustment raises the entire sprayer boom.

When switching off the field sprayer at the headlands the sprayer boom is automatically lifted for about 50 cm. When switching on the sprayer boom lowers to the calibrated height.



Before putting to operation distance-control, please carefully read and adhere to the attached instruction manual.



For maintenance work switch off switch box.

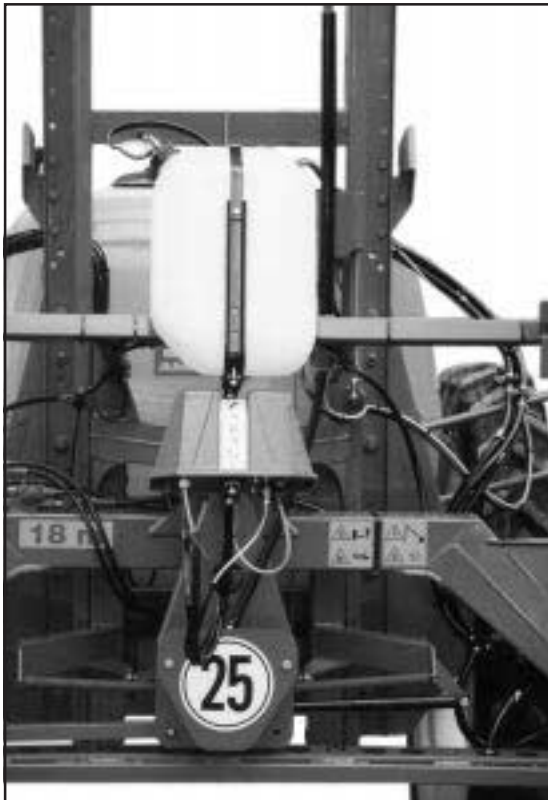


Fig. 12.16

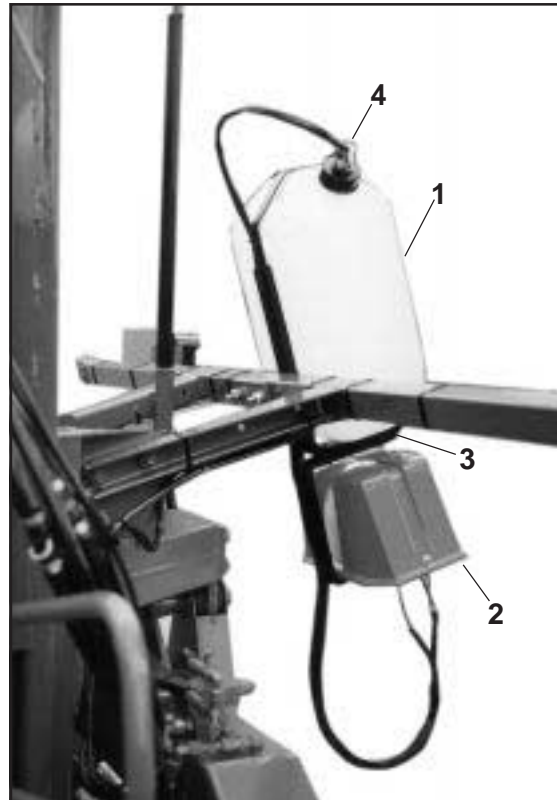


Fig. 12.17

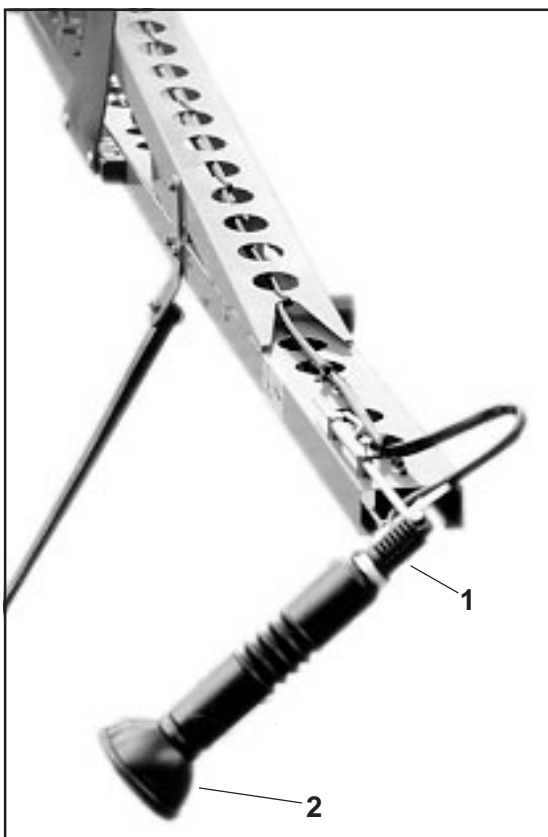


Fig. 12.18

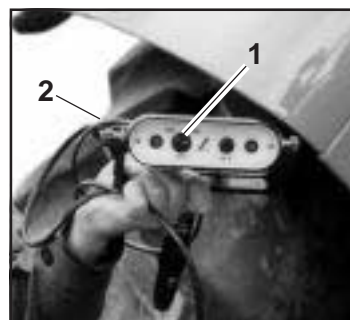


Fig. 12.19

12.12 Foam marker

The **foam marker** (12.6/1) allows an **exact driving of the next bout** when spraying on fields **without marked tramlines**. The marking is done by foam bubbles which are produced by pressurised air being added to a certain liquid. The foam marker lays down foam bubbles in settable distances of between 10 – 15 m so that a **clear orientation line can be seen**. After a certain time the foam bubbles dissolve without residue. The foam marker can be retrofitted at any time.

Fig. 12.17/

- 1 – Container
- 2 – Compressor
- 3 – fixing bracket
- 4 – slotted head bolt

Fig. 12.18/...

- 1 – air- and liquid mixer
- 2 – flexible plastic nozzles

Fig. 12.19/...

- 1 – switch
- 2 – control unit

Switch in centre **position „Aus“ (off)**.

Switch moved to the **left** onto **position „An“ (on)**, foam bubbles are created on the left hand sprayer boom side in travelling direction.

Switch moves to the **right** onto **position „An“ (on)**, foam bubbles are created on the right hand sprayer boom side in travelling direction.

Set the spacing between the individual foam bubbles on the slotted head bolt as follows:

- turn right – spacing is getting larger
- turn to the left – spacing is getting smaller

12.13 Tank-Control

The **filling level measuring device tank-control** allows an **exact quantity determination (litres)** in tanks of different design. The tank contents is shown in litres (l) on the **digital display** of the tank-control.

When the tank filling level has been pre-selected, the filling is automatically switched off via an electro motor ball tap.



Before putting the tank-control to operation, please carefully read and adhere to the attached instruction manual.

12.14 Digital pressure display with liquid fertiliser proof pressure sensor on switch box SKS 50 and SKS 70, Order-No. 911 827

12.15 Wide throw nozzles

For the use of the wide throw nozzles two additional single taps are required on the control unit. These single taps cannot be remote controlled via solenoid valves. The switching on and off of the spray liquid feed for the wide throw nozzles is done by engaging and disengaging of the tractor PTO shaft. The wide throw nozzles must in any case be matched with the nozzles used on the sprayer boom.



In any case The wide throw nozzles have to be matched with the spraying nozzles used in the sprayer boom.

1. 2 nozzles A0C 60, Order-No. 701 700

suitable for nozzle sizes: '05' at 2 x 6 m additional working width
'06' at 2 x 5 m additional working width

2. 2 nozzles A0C 80, Order-No. 702 700

suitable for nozzle size: '06' at 2 x 6 m additional working width
'08' at 2 x 5 m additional working width

The total working width can be increased by approx. 6 m with each one of the wide throwing nozzles. Please determine the actual spraying width of the wide throwing nozzle with water on a suitable surface for starting the spraying operation. For this first check the setting of the wide throwing nozzle carrier. There should be a height difference between the wide throwing nozzles and the standard spraying nozzles of 350 - 400 mm.



The use of the wide throwing nozzle is only permissible for the particular use in spraying rape in full blossom (with fungicides and insecticides) as the lateral distribution does not come near the accuracy of a flat fan nozzle arranged on a sprayer boom.

13.0 Maintenance and care

Before any repair work the sprayer should thoroughly be cleaned with water.

Repair work should be conducted with the pump stopped.

If spare hoses are needed use only original AMAZONE hoses. When fixing use only hose clamps made of stainless steel.

Repair work inside the sprayer tank may only be conducted after a thorough cleaning. The sprayer tank should never be entered by any one.

13.1 Check list for maintenance work

Daily maintenance

Pump	- Check oil level
Tank	Cleaning resp. flushing
Suction filter	
Pressure filter	
Pump	
Control chest	
Nozzles	
Track following drawbar	- Grease
Straight drawbar	- Grease
Wheels	- Check wheel nuts for firm seating
	- Check air pressure

Monthly maintenance

Pressure compensator - check pressure (only pump BP 151/20)

Please use the torques of the following bolted connections:

- Axle
 - M 16 Ma = 195 Nm
- Hinge at the frame
 - M 20 Ma = 395 Nm
 - M 20 x 1.5 Ma = 440 Nm
- Wheel nuts
 - M 20 x 1.5 Ma = 340 Nm
- Track follow drawbar
 - M 22 Ma = 540 Nm



Annually minimum maintenance

Pump	-	Check piston diaphragm and exchange if necessary
	-	Check valves, change if necessary
Control chest	-	Check pressure meter
Nozzles	-	Check lateral distribution and drip free operation, exchange if necessary

After hours of operation

Pump, BP 180/210	-	Oil change every 400 to 450 hours of operation
------------------	---	--

13.2 Maintenance- and hints for air assisted brake systems and Hydraulic brake system

Conduct a braking test after any servicing of the brakes!

13.2.1 Air assisted brake systems

Daily maintenance and check-ups before starting to operate

1. Open shut off valve on tractor.
2. Check cleanliness of coupling heads before coupling and pay attention to a proper fitting.
3. Hoses may not touch other parts. Check guidance of hoses.
4. Check hand brake position of braking power governor.
5. Dehydrate the air tank if necessary.
6. Conduct a braking test.
7. Check the stroke of the braking ram pistons. At full braking readjust approx. 1 / 3 to 1 / 2 of the total ram piston stroke, at least when reaching 2/3 of the total stroke readjust wheel brake. Release brake and check whether the piston of the ram returns entirely! Replace damaged bellows.



Conduct a brake test after every brake servicing.

Weekly maintenance

1. Check and clean the inserts of the tube filters.
2. Check the braking circuit for leaks. The pointer of the pressure meter should stay unchanged in the same position within 3 minutes after stopping tractor engine at an air tank pressure of 5.3 bar. In case of any loss of air pressure within the above mentioned time limit remedy should be made by a licenced workshop.
3. Check brake hoses for faultless condition. If necessary exchange damaged brake hoses.
4. Never weld or solder on control chests and pipes. Exchange damaged parts.
5. Greasing. For greasing only use grey-special grease for air assisted implements.

13.2.2 Hydraulic brake system

Before any travelling, please check:

1. Hydraulic socket and hydraulic plug for cleanness before coupling and observe proper fitting!
2. Hoses may not touch other parts. Check guidance of hoses.



Conduct a brake test after every braking servicing.

Weekly maintenance

1. Check hydraulic joints for leaks!
2. Check hydraulic hoses for faultless condition! Exchange damaged hydraulic hoses!
3. Never weld or solder on pipes. Exchange damaged parts!
4. At the general greasing apply oil to the pin on the yoke head of the piston cylinder.

13.3 Troubleshooting pumps (please also refer to para. 9.0)

1. Pump does not suck up

- Remove the blockage in the suction system (filter tap, suction hose).
- Filter insert of the filter tap had been installed 180° wrong.
- Pump sucks in air, hose joint of suction hose (option) should be checked for leaks at the filter tap.

2. Pump does not bring any pressure

- Clamped in or damaged valves: exchange the valves.
- Pump sucks in air, recognisable by air bubbles inside the tank. Check the joints of the suction hose for leakages.
- Clean the filter tap.

3. Variations of the pressure meter needle and oscillating of the spray cone

- Irregular pump delivery (please refer to para. 9.4).

4. Oil-water-mixture inside the oil filling opening

- Pump diaphragm defect - exchange diaphragm.

13.4 Maintenance of Electronic options

Computer (AMATRON II A, Spraycontrol II A)

The computer is maintenance-free. It has an internal electrical fuse. During winter it should be stored at room temperature. If neither a switch box nor a machine plug is connected, the 48-pin plug on the computer should always be covered with the protective cap.

Switch box (SKS) / machine plug

The switch box and machine plug are also maintenance-free.

The boxes should be protected against moisture. If the 48-pin plug is pulled out, it should be covered by the cap provided.

Note when welding on the sprayer

When welding is being carried out the computer and switch box must be removed from the machine.



14.0 Hints for checking the field sprayer

Adhere to the legally advised intervals for sprayer checking by authorised institutions.

Test pressure meter connector (option), Product No. 710 7000

The test pressure meter consists of:

- a plug socket - to be connected at the control chest on the joint of one boom feed section.
- 1/4 inch threaded connection for screwing in the test pressure meter.

Connection for pump checking

For checking the pump power (delivery, pressure):

- Take off pressure hose with the plug socket from the control chest after having removed the fixing clamp.
- Connect the pressure hose with the plug socket to the test pressure meter.
- Close the pressure joint on the control chest with plugs (option), Product-No.. 730 6000.



15.0 Technical data of the sprayer

15.1 Type

Trailed sprayer AMAZONE UG

15.2 Comments about noise development

The working place related emission value is 74 dB (A), measured in operational condition at closed tractor cap at the ear of the tractor operator with the implement OPTAC SLM 5.

15.3 Technical data

The technical data for the individual sprayer components as basic implement, sprayer boom, pumps and control chest 12 - 112 - 1s can be taken from the following tables. As many model varieties are possible, for example the individual weights of the various components would have to be added. All mentioned weights and length measurements should therefore be understood as "+-measurements".



15.3.1 Technical data basic implement

All data relate to the basic implement without sprayer boom, without draw bar, without control unit and without pump.

TYPE UG		2000 Special	2200 Power	3000 Power	4500 Magna
Tank volume					
Actual	[l]	2150	2400	3200	4750
Nominal		2000	2200	3000	4500
Filling height					
from ground	[mm]	2080	2080	2430	2430
from operator's platform		650	650	1000	1000
Total length*		3600	3600	3600	4600
Total width	[mm]	1880	1880	1880	1880
Total height		2550	3160	3160	3400
Net weight	[kg]	599	643	693	855
Three-point-linkage	cat.	II	II	II	-
Technical surplus amount incl. inside tap		0 % 6 l	0 % 6 l	0 % 21 l	0 % 28 l
Tank level line**					
in driving direction to the left hand					
in driving direction to the right hand		20 % 15 l	20 % 15 l	20 % 30 l	20 % 38 l
		20 % 15 l	20 % 15 l	20 % 30 l	20 % 38 l
Dropping line **					
hill up		16 % 45 l	16 % 45 l	16 % 60 l	16 % 72 l
hill down		20 % 47 l	20 % 47 l	20 % 62 l	20 % 74 l

* measurement from tractor lower links

** percent figure relates to the angle in the mentioned line

Recommendation:

For spraying the tank empty switch off agitator inside tank at the rest amount of 100 litres and correct the spraying pressure (spray rate). If the agitator still is kept running the technical surplus amount will increase compared with the stated amounts.

15.3.2 Technical data - Draw bars

Kind of drawbar	Trackfollowdrawbar	Universaldrawbar	Straightdrawbar	Hitchdrawbar
Weight [kg]	138	170	180	150
Adjustment range longitudinal	240 mm in 4 steps from 80 mm	160 mm in 3 steps from 80 mm	-	-
Length [mm] (protuding beyond platform)	600	600	1350	1350

15.3.3 Technical data travelling gear

Description of the travelling gear		Weight [kg]		
		UG 2000 UG 2200	UG 3000	UG 4500
Travelling gear with tyres 9,5 x 44"	with unbraked axle	418	418	-
	with brake axle, two-circuit air brake and parking brake	490	498	-
	* with brake axle, hydraulic brake and parking brake	460	460	-
Travelling gear with tyres 9,5 x 48"	with unbraked axle	425	425	-
	with brake axle, two-circuit air brake and parking brake	497	505	-
	* with brake axle, hydraulic brake and parking brake	467	467	-
Travelling gear with tyres 11,2 x 42"	mit ungebremster Achse	447	447	-
	with brake axle, two-circuit air brake and parking brake	519	527	-
	* with brake axle, hydraulic brake and parking brake	489	489	-
Travelling gear with tyres 12,4 x 46"	with unbraked axle	524	524	-
	with brake axle, two-circuit air brake and parking brake	596	604	-
	* with brake axle, hydraulic brake and parking brake	566	566	-
Travelling gear with tyres 16,9 x 38"	with unbraked axle	574	574	-
	with brake axle, two-circuit air brake and parking brake	612	620	-
	* with brake axle, hydraulic brake and parking brake	582	582	-
Travelling gear with tyres 20,8 x 38"	with brake axle, two-circuit air brake and parking brake	-	-	1024
	* with brake axle, hydraulic brake and parking brake	-	-	985
Travelling gear with tyres 13,6 x 48"	with brake axle, two-circuit air brake and parking brake	-	-	867
	* with brake axle, hydraulic brake and parking brake	-	-	825



15.3.4 Technical data control units

Control unit	BG	DG	NG	FG	KG	EG	GG
Central control	x	x	x	x	x	x	x
Equal pressure control (boom sections)	5	5	5	5 / 7	5	5	5 / 7 / 9
Pressure adjustment	manual.	electric.	electric.	electric.	electric.	electric.	electric.
Pressure range [bar]	0,8 - 10	0,8 - 10	0,8 - 10	0,8 - 10	0,8 - 10	0,8 - 10	0,8 - 10
Agitation (hydraulic)	x	x	x	x	x	x	x
Pressure meter 0-5/25bar ø 75 mm, spread liquid fertiliser proof	x	x	x	x	x	x	x
Pressure filter (65 meshes)	x	x	x	x	x	x	x
Return flow device	x	x	x	x	x	x	x
Automatic metering	x	x	x	x	x	x	x
Net weight [kg]	20	20	20	20 / 22	22	22	22 / 24 / 26
Surplus amount [l]	2,9	2,9	2,9	2,9 / 3,6	3,1	3,1	3,1 / 3,8 / 4,5
AMACHECK	-	-	-	-	x	x	x
SPRAYCONTROL II A	-	-	-	-	x	x	x
AMATRON II A	-	-	-	-	x	x	x
Liquid flow meter	-	-	-	-	x	x	x

15.3.5 Technical data pump outfit

Pump outfit			210 l/min *	250 l/min	350 l/min (210+140) or 420 l/min (210+210)	
					210 l/min	140 l/min
Type of pump			BP 210/20	BP 250/20	BP 210/20	BP 151/20
Delivery at 540 R.P.M.	[l/min]	2 bar 20 bar	208 202	240 225	208 202	142 138
Power requirement	[KW]		8,4	9,5	8,4	5,8
Net weight	[kg]		30	35	30	2 x 30 = 60
Pump design			6-piston actuated diaphragm pump	6-piston actuated diaphragm pump	6-piston actuated diaphragm pump	4-piston actuated diaphragm pump
Pulsing dampening			Oil dampening	Oil dampening	Oil dampening	Pressure reservoir
Surplus quantity						
Pump	[l]		1,7	2	1,7	1,6
Suction hose	[l]		0,9	1,2	0,9	0,9
Pressure hose	[l]		0,8	1,1	0,8	0,8
Pump equipment total	[l]		3,4	4,3	3,4	3,3
Pump equipment total wt.	[kg]		32	37	32	26



15.3.6 Technical Data - Sprayer Booms

15.3.6.1 Q-Booms, manually folded (including hydr. height adjustment and boom swing compensation)

Working width	[m]	12	12,5	15
Number of boom sections		5	5	5
Number of nozzles per boom section (from l.h. to r.h. looking in driving direction)		5-4-6-4-5	5-5-5-5-5	6-6-6-6-6
Transport width	[mm]	2560	2560	2998
Length (+ measure)	[mm]	640	640	640
Height of machine placed on the ground	[mm]	-	-	-
Nozzle height from / to	[mm]	480/1980	480/1980	480/1980
Weight *	[kg]	172	174	198
Surplus liquid	[l]	4,0	4,0	5,2

* net weight increased by 5 kg if the optional electric boom tilt adjustment is fitted.
net weight increased by 38 kg if the fully hydraulic boom control "I and II" is fitted.

Required distance in m for spraying the undiluted surplus liquid irrespective of boom widths:

	Rate	Distance	Rate	Distance
For all working widths:	100 l/ha	45 m	250 l/ha	18 m
	150 l/ha	30 m	300 l/ha	15 m
	200 l/ha	23 m	400 l/ha	11 m

Example:

At a spray rate of 200 l/ha the travel distance for emptying the boom corresponds to a distance of approx. 23 m

**15.3.6.2 H-Booms, hydraulically foldable (incl. hydr. height adjustment and boom swing compensation)**

Working width	[m]	15	16
Number of boom sections		5	5
Number of nozzles per boom section (from l.h. to r.h. looking in driving direction)		6-6-6-6-6	7-6-6-6-7
Transport width	[mm]	2150	2150
Length (+ measure)	[mm]	700	700
Height of machine placed on the ground	[mm]	2750	2900
Nozzle height from / to	[mm]	480 / 1930	480 / 1930
Weight *	[kg]	286	288
Surplus liquid	[l]	6,2	6,2

* net weight increased by 5 kg if the optional electric boom tilt adjustment is fitted.

Required distance in m for spraying the undiluted surplus liquid irrespective of boom widths:

For all working widths:	Rate	Distance	Rate	Distance
	100 l/ha	45 m	250 l/ha	18 m
	150 l/ha	30 m	300 l/ha	15 m
	200 l/ha	23 m	400 l/ha	11 m

Example:

At a spray rate of 200 l/ha the travel distance for emptying the boom corresponds to a distance of approx. 23 m



15.3.6.3 DAM - boom, hydraulically foldable (incl. hydr. height adjustment and boom swing compensation)

Working width	[m]	24	27	28	30	36
Number of boom sections		7	7	7	7	9
Number of nozzles per boom section (from l.h. to r.h. looking in driving direction)		6-6-8-8-8-6-6	7-8-8-8-8-7	8-8-8-8-8-8	9-9-8-8-8-9-9	8-8-8-8-8-8-8-8-8
Transport width	[mm]	2450	2450	2450	2450	2950
Length (+ measure)	[mm]	5800	6300	6800	7300	6000
Height of machine placed on the ground	[mm]	2350	2750	2900	2750	3300
Nozzle height from / to	[mm]	500/ 2250	500/ 2250	500/ 2250	500/ 2250	500/ 2250
Weight *	[kg]	680	710	730	770	860
Surplus liquid	[l]	9,7	10,9	11,3	12,1	16,5

* net weight increased by 7 kg if the optional electric boom tilt adjustment is fitted.

Required distance in m for spraying the undiluted surplus liquid irrespective of boom widths:

	Rate	Distance	Rate	Distance
For all working widths:	100 l/ha	45 m	250 l/ha	18 m
	150 l/ha	30 m	300 l/ha	15 m
	200 l/ha	23 m	400 l/ha	11 m

Example:

At a spray rate of 200 l/ha the travel distance for emptying the boom corresponds to a distance of approx. 23 m.

15.3.6.4 Super-S-booms, fully hydraulically foldable (incl. height adjustment and swing compensation)



Working width	[m]	15	16	18	20	21	21	24
Number of boom sections		5	5	5	5	5	7	7
Number of nozzles per boom section (from l. h. to r. h. looking in driving direction)		6-6-6-6-6	7-6-6-6-7	6-8-8-8-6	8-8-8-8-8	9-8-8-8-9	6-6-6-6-6-6-6	6-6-8-8-8-6-6
Transport width	[mm]	2400	2400	2400	2400	2400	2400	2400
Length (+ measure)	[mm]	800	800	800	900	900	900	900
Height of machine placed on the ground	[mm]	3200	3200	3200	3200	3200	3200	3200
Nozzle height from/to	[mm]	500/2000	500/2000	500/2000	500/2000	500/2000	500/2000	500/2000
Net weight *	[kg]	442	450	456	538	541	544	558
Surplus liquid	[l]	6,2	7,2	7,6	7,9	7,9	9,2	10,8

* net weight increased by 7 kg if the optional electric boom tilt adjustment is fitted.

net weight increased by 26 kg if Profi-Folding I is fitted resp. by 35 kg if Profi-Folding II is fitted.

Required distance in m for spraying the undiluted surplus liquid irrespective of boom widths:

	Rate	Distance	Rate	Distance
For all working widths:	100 l/ha	45 m	250 l/ha	18 m
	150 l/ha	30 m	300 l/ha	15 m
	200 l/ha	23 m	400 l/ha	11 m

Example:

At a spray rate of 200 l/ha the travel distance for emptying the boom is about 23 m

15.3.7 Technical data of filling sieve and filter

	Aera cm ²	Mesh width mm	Number of meshes	Type
Påfyldningssien	3750	1,00		
Filterindsats fra filterhanen	415	0,32		UG 2000
	660	0,6		UG 2200 UG 3000 UG 4500
- ekstraudstyr	216	0,30	65	
Dysefilter	216	0,20	80	
	216	0,15	100	
Ureafilter op til '015 (ekstraudstyr op til '04' fra '05'	5,07	0,15	100	
	5,07	0,35	50	
	5,00	0,50	24	
Urea filter (special execution)	760	1,00		





16.0 Spray rate tables

16.1 Spray rate tables for flat fan nozzles, spraying height above ground: 50 cm

All rates (l/ha) were determined with water. At AUS the corresponding figures will have to be multiplied by 0.88 and at NP-solvents by 0.85.

AMAZONE - Spray rate table for nozzle size ...015 (green)

permissible pressure ranges	AD/DG		Pressure	Nozzle ejection	Spray rate (l/ha)									(k.p.h.)
			(bar)	Water (l/min)	5	5,5	6	6,5	7	7,5	8	8,5	9	
		XR/LU	1,0	0,34		81,6	74,2	68,2	62,8	58,3	54,4	51,0	47,9	45,3
			1,2	0,37		89,0	80,9	74,4	68,5	63,6	59,4	55,6	52,3	49,4
			1,5	0,42		101	91,6	84,0	77,5	72,0	67,2	63,0	59,3	56,0
			1,8	0,46		110	99,9	91,6	84,5	78,6	73,3	68,7	64,7	61,1
			2,0	0,48		115	105	96,0	88,6	82,3	76,8	72,0	67,7	64,0
			2,2	0,50		120	110	100	92,7	86,1	80,3	75,3	70,9	66,9
			2,5	0,54		130	118	108	100	92,6	86,4	81,0	76,2	72,0
		ID	2,8	0,57		137	125	114	106	97,8	91,2	85,5	80,5	76,0
			3,0	0,59		142	129	118	109	101	94,4	88,5	83,3	78,7
			3,5	0,63		152	138	127	117	109	102	95,0	89,0	84,0
			4,0	0,68		163	148	136	126	116	108	102	96,0	91,0
			5,0	0,76		182	165	152	140	130	121	114	107	101
6,0	0,84			199	181	167	154	142	133	125	118	112		
7,0	0,90			216	196	180	166	154	144	135	127	120		

AMAZONE - Spray rate table for nozzle size ...02 (yellow)

		Pressure Nozzle ejection		Spray rate (l/ha)									(k.p.h.)
		Water (l/min)	5	5,5	6	6,5	7	7,5	8	8,5	9		
permissible pressure ranges AD/DG	XR/LU	1,0	0,46	110	100	92,0	84,9	78,9	73,6	69,0	65,0	61,3	
		1,2	0,50	120	109	100	92,6	86,0	80,3	75,0	71,0	66,9	
		1,5	0,56	134	122	112	103	96,0	89,6	84,0	79,0	74,7	
		1,8	0,61	146	133	122	112	105	97,7	91,6	86,3	81,5	
		2,0	0,65	156	142	130	120	111	104	97,5	91,8	86,7	
		2,2	0,68	163	148	136	126	116	109	102	96,0	90,7	
		2,5	0,72	173	157	144	133	123	115	108	102	96,0	
	ID	2,8	0,76	183	166	152	140	130	121	114	107	101	
		3,0	0,79	190	172	158	146	135	126	119	111	105	
		3,5	0,85	204	185	170	157	146	136	128	120	113	
		4,0	0,91	218	199	182	168	156	146	137	128	121	
		5,0	1,02	245	223	204	188	175	163	153	144	136	
		6,0	1,11	266	242	222	205	191	178	167	157	148	
		7,0	1,19	286	260	238	220	204	190	179	168	159	

AMAZONE - Spray rate table for nozzle size ...025 (lilac)

ID	Pressure Nozzle ejection		spray rate (l/ha)							
	Water (bar)	(l/min)	5	5,5	6	6,5	7	7,5	8	8,5 9 (k.p.h.)
	3,0	0,99	283	216	198	183	170	159	149	140 132
	3,5	1,07	257	233	214	197	183	172	161	151 143
	4,0	1,15	276	251	230	212	197	184	173	163 153
	5,0	1,28	307	279	256	236	219	205	192	180 171
	6,0	1,40	336	305	280	258	240	224	210	198 187
	7,0	1,52	365	332	304	280	261	243	228	214 203

AMAZONE - Spray rate table for nozzle size ...03 (blue)

AD/DG	XR/LU	ID	Pressure Nozzle ejection		spray rate (l/ha)							
			Water (bar)	(l/min)	5	5,5	6	6,5	7	7,5	8	8,5 9 (k.p.h.)
			1,0	0,68	163	148	136	126	117	109	102	96.0 90.7
			1,2	0,74	178	161	148	138	127	119	111	99.0
			1,5	0,84	202	183	168	155	144	134	126	119 112
			1,8	0,92	220	200	183	169	157	146	138	129 122
			2,0	0,97	233	212	194	179	166	155	146	137 129
			2,2	1,01	244	222	203	187	174	162	153	143 135
			2,5	1,08	259	236	216	199	185	173	162	153 144
			2,8	1,14	274	249	228	210	195	183	171	161 152
			3,0	1,18	283	257	236	218	202	189	177	166 157
			3,5	1,28	307	279	256	236	219	205	192	181 171
			4,0	1,37	329	299	274	253	235	219	206	194 183
			5,0	1,51	362	329	302	279	259	242	227	213 201
			6,0	1,64	395	359	329	304	282	263	246	232 219
			7,0	1,79	430	391	358	330	307	287	269	253 239

AMAZONE - Spray rate table for nozzle size ...04 (red)

AD/DG	XR/LU	ID	Pressure Nozzle ejection		spray rate (l/ha)							
			Water (bar)	(l/min)	5	5,5	6	6,5	7	7,5	8	8,5 9 (k.p.h.)
			1,0	0,91	218	199	182	168	156	146	137	128 121
			1,2	0,99	238	217	199	183	170	159	149	140 132
			1,5	1,12	269	244	224	207	192	179	168	158 149
			1,8	1,22	293	266	244	226	209	195	183	172 163
			2,0	1,29	310	281	258	238	221	206	194	182 172
			2,2	1,35	324	294	270	249	231	215	203	190 180
			2,5	1,44	346	314	288	266	247	230	216	203 192
			2,8	1,52	365	332	304	281	261	243	228	214 203
			3,0	1,58	379	345	316	292	271	253	237	223 211
			3,5	1,70	408	371	340	314	291	272	255	240 227
			4,0	1,82	437	397	364	336	312	291	273	257 243
			5,0	2,00	480	436	400	369	343	320	300	283 267
			6,0	2,21	530	482	441	407	379	354	331	312 295
			7,0	2,37	569	517	474	438	406	379	356	335 316


AMAZONE - Spray rate table for nozzle size ...05 (brown)

Pressure (bar)	Nozzle ejection Water (l/min)	spray rate (l/ha)									(k.p.h.)
		5	5,5	6	6,5	7	7,5	8	8,5	9	
1,0	1,11	267	243	223	205	191	177	167	157	148	
1,2	1,34	291	265	243	224	208	193	182	171	162	
1,5	1,36	327	297	273	251	234	217	204	192	181	
1,8	1,48	357	324	298	274	255	237	222	209	197	
2,0	1,57	378	343	315	290	270	251	236	222	210	
2,2	1,64	395	359	329	303	282	262	246	232	219	
2,5	1,77	424	386	353	327	303	283	265	249	236	
2,8	1,87	448	407	373	345	320	299	280	263	249	
3,0	1,94	466	423	388	358	333	310	291	274	259	
3,5	2,10	504	458	420	388	360	336	315	296	280	
4,0	2,25	539	491	449	415	385	360	337	317	299	
5,0	2,48	595	540	493	455	423	395	370	348	329	

AMAZONE - Spray rate table for nozzle size ...06 (grey)

Pressure (bar)	Nozzle ejection Water (l/min)	spray rate (l/ha)									(k.p.h.)
		5	5,5	6	6,5	7	7,5	8	8,5	9	
1,0	1,33	320	290	266	245	228	213	200	188	178	
1,2	1,45	349	316	290	267	249	232	218	205	194	
1,5	1,63	391	355	326	301	280	261	245	230	218	
1,8	1,78	427	387	356	328	305	285	267	251	238	
2,0	1,88	452	410	377	347	323	301	283	266	252	
2,2	1,97	473	429	394	363	338	315	296	278	264	
2,5	2,11	508	460	423	389	363	338	317	298	282	
2,8	2,23	536	486	447	411	383	357	335	315	298	
3,0	2,32	557	506	465	428	398	371	348	328	309	
3,5	2,51	603	548	503	463	431	402	377	354	335	
4,0	2,69	646	587	538	497	461	430	404	380	359	
5,0	3,01	723	657	603	556	517	482	452	425	402	

AMAZONE - Spray rate table for nozzle size ...08 (white)

Pressure (bar)	Nozzle ejection Water (l/min)	spray rate (l/ha)									(k.p.h.)
		5	5,5	6	6,5	7	7,5	8	8,5	9	
1,0	1,77	424	385	354	327	302	283	265	249	236	
1,2	1,93	463	420	386	357	329	309	289	272	257	
1,5	2,17	520	472	433	400	371	346	325	306	289	
1,8	2,37	567	515	472	436	405	377	355	334	315	
2,0	2,50	600	545	500	462	428	400	375	353	333	
2,2	2,62	628	570	523	483	448	418	392	369	348	
2,5	2,81	673	613	561	519	481	450	421	396	374	
2,8	2,96	711	647	592	548	508	475	446	418	395	
3,0	3,08	739	670	616	569	528	493	462	435	410	
3,5	3,33	800	727	667	615	572	533	500	471	444	
4,0	3,57	857	779	714	659	612	571	535	504	476	
5,0	4,00	960	873	800	738	685	640	600	565	533	

16.2 Spray rate table for 3-ray nozzles - spraying height above ground 120 cm

AMAZONE - Spray rate table for 3-ray nozzles yellow

Pressure (bar)	Nozzle ejection		spray rate AUS (l/ha)									(k.p.h.)
	Water (l/min)	AUS (l/min.)	5	5,5	6	6,5	7	7,5	8	8,5	9	
1,0	0,36	0,32	77	70	64	59	55	51	48	45	43	
1,2	0,39	0,35	83	75	69	64	60	55	52	49	47	
1,5	0,44	0,39	94	85	78	72	67	62	59	56	53	
1,8	0,48	0,42	102	93	85	78	73	67	64	60	57	
2,0	0,50	0,44	106	96	88	81	75	70	66	62	59	
2,2	0,52	0,46	110	100	92	85	78	73	69	65	62	
2,5	0,55	0,49	118	107	98	91	84	78	74	70	66	
2,8	0,58	0,52	124	112	103	95	88	82	77	73	69	
3,0	0,60	0,53	127	115	106	98	91	85	80	75	71	

AMAZONE - Spray rate table for 3-ray nozzles red

Pressure (bar)	Nozzle ejection		spray rate AUS (l/ha)									(k.p.h.)
	Water (l/min)	AUS l/min.	5	5,5	6	6,5	7	7,5	8	8,5	9	
1,0	0,61	0,54	129	118	108	100	93	86	81	76	72	
1,2	0,67	0,59	140	128	118	109	101	94	88	83	78	
1,5	0,75	0,66	158	144	132	122	114	105	99	93	88	
1,8	0,79	0,69	165	151	138	127	119	110	104	97	92	
2,0	0,81	0,71	170	155	142	131	122	114	107	100	95	
2,2	0,84	0,74	176	160	147	136	126	118	111	104	98	
2,5	0,89	0,78	186	169	155	143	133	124	117	109	104	
2,8	0,93	0,82	196	177	163	150	140	130	122	114	109	
3,0	0,96	0,84	202	183	168	155	144	134	126	118	112	

AMAZONE - Spray rate table for 3-ray nozzles blue

Pressure (bar)	Nozzle ejection		spray rate AUS (l/ha)									(k.p.h.)
	Water (l/min)	AUS l/min.	5	5,5	6	6,5	7	7,5	8	8,5	9	
1,0	0,86	0,76	182	166	152	140	130	122	114	107	101	
1,2	0,94	0,83	198	181	166	152	142	133	124	117	110	
1,5	1,05	0,93	223	203	186	171	159	149	140	132	124	
1,8	1,11	0,98	234	213	196	180	167	177	147	139	131	
2,0	1,15	1,01	242	220	202	186	173	162	152	143	135	
2,2	1,20	1,06	254	231	212	196	182	170	159	150	141	
2,5	1,26	1,12	269	244	224	207	192	179	168	158	149	
2,8	1,32	1,17	281	255	234	216	201	187	176	165	156	
3,0	1,36	1,20	288	262	240	222	206	192	180	169	160	



AMAZONE - Spray rate table for 3-ray nozzles - white

Pressure (bar)	Nozzle ejection		spray rate AUS (l/ha)									
	Water (l/min)	AUS (l/min)	5	5,5	6	6,5	7	7,5	8	8,5	9	(k.p.h.)
1,0	1,16	1,03	247	225	206	190	177	165	155	145	137	
1,2	1,27	1,12	267	244	224	207	192	179	168	158	149	
1,5	1,42	1,26	302	275	252	233	217	202	190	178	168	
1,8	1,56	1,38	331	301	277	255	237	221	207	194	184	
2,0	1,64	1,45	348	316	290	268	249	232	217	204	193	
2,2	1,73	1,54	369	335	307	284	263	246	230	216	204	
2,5	1,84	1,62	390	355	325	301	279	260	244	229	216	
2,8	1,93	1,71	410	373	342	316	293	274	256	241	228	
3,0	2,01	1,78	427	388	356	329	305	285	267	251	237	

16.3 Spray rate table for 5- and 8 hole nozzles (permissible pressure range 1-2 bar)

AMAZONE Spray rate table for metering washer 4916-39, (ø 1,0 mm) spraying height above ground 100 cm

Pressure (bar)	Nozzle ejection per metering washer		Spray rate AUS (l/ha)									
	water (l/min)	AUS (l/min)	5	5,5	6	6,5	7	7,5	8	8,5	9	(k.p.h.)
1,0	0,43	0,38	91	83	76	70	65	61	57	54	51	
1,2	0,47	0,42	100	91	83	77	71	67	62	59	55	
1,5	0,53	0,47	113	102	94	87	80	75	70	66	63	
1,8	0,58	0,51	123	112	103	95	88	82	77	72	68	
2,0	0,61	0,54	130	118	108	100	93	86	81	76	72	

AMAZONE Spray rate table for metering washer 4916-45, (ø 1,2 mm) spraying height above ground 100 cm

Pressure (bar)	Nozzle ejection per metering washer		Spray rate AUS (l/ha)									
	water (l/min)	AUS (l/min)	5	5,5	6	6,5	7	7,5	8	8,5	9	(k.p.h.)
1,0	0,56	0,50	120	109	100	92	86	80	75	71	67	
1,2	0,62	0,55	132	120	110	102	94	88	83	78	73	
1,5	0,70	0,62	149	135	124	114	106	99	93	88	83	
1,8	0,77	0,68	163	148	136	126	117	109	102	96	91	
2,0	0,80	1,71	170	155	142	131	122	114	106	100	95	

AMAZONE Spray rate table for metering washer 4916-55, (ø 1,4 mm) spraying height above ground 100 cm

Pressure (bar)	Nozzle ejection per metering washer		Spray rate AUS (l/ha)									
	water (l/min)	AUS (l/min)	5	5,5	6	6,5	7	7,5	8	8,5	9	(k.p.h.)
1,0	0,86	0,76	182	166	152	140	130	122	114	107	101	
1,2	0,94	0,83	199	181	166	153	142	133	124	117	111	
1,5	1,04	0,92	221	201	184	170	158	147	138	130	123	
1,8	1,14	1,01	242	220	202	186	173	162	152	143	135	
2,0	1,21	1,07	257	233	214	198	183	171	161	151	143	

AMAZONE Spray rate table for metering washer 4916-63, (ø 1,6 mm) Spraying height above ground 75 cm

Pressure (bar)	Nozzle ejection per metering washer		Spray rate AUS (l/ha)									(k.p.h.)
	Water (l/min)	AUS (l/min)	5	5,5	6	6,5	7	7,5	8	8,5	9	
1,0	1,10	0,98	235	214	196	181	168	157	147	138	131	
1,2	1,21	1,07	257	233	214	198	183	171	161	151	143	
1,5	1,36	1,20	288	262	240	222	206	192	180	169	160	
1,8	1,49	1,32	317	288	264	244	226	211	198	186	176	
2,0	1,57	1,39	334	303	278	257	238	222	208	196	185	

AMAZONE Spray rate table for metering washer 4916-72, (ø 1,8 mm) Spraying height above ground 75 cm

Pressure (bar)	Nozzle ejection per metering washer		Spray rate AUS (l/ha)									(k.p.h.)
	Water (l/min)	AUS (l/min)	5	5,5	6	6,5	7	7,5	8	8,5	9	
1,0	1,45	1,28	307	279	256	236	219	205	192	181	171	
1,2	1,60	1,42	341	310	284	262	243	227	213	200	189	
1,5	1,77	1,57	377	343	314	290	269	251	236	222	209	
1,8	1,94	1,72	413	375	344	318	295	275	258	243	229	
2,0	2,05	1,81	434	395	362	334	310	290	272	256	241	

AMAZONE Spray rate table for metering washer 4916-80, (ø 2,0 mm) Spraying height above ground 75 cm

Pressure (bar)	Nozzle ejection per metering washer		Spray rate AUS (l/ha)									(k.p.h.)
	Water (l/min)	AUS (l/min)	5	5,5	6	6,5	7	7,5	8	8,5	9	
1,0	1,80	1,59	382	347	318	294	273	254	239	224	212	
1,2	1,92	1,70	408	371	340	314	291	272	255	240	227	
1,5	2,19	1,94	466	423	388	358	333	310	291	274	259	
1,8	2,43	2,15	516	469	430	397	369	344	323	304	287	
2,0	2,54	2,25	540	491	450	415	386	360	337	318	300	

16.4 Spray rate for drag hose kit (permissible pressure range 1-4 bar)

AMAZONE Spray rate table for metering washer 4916-26, (ø 0,65 mm)

Pressure (bar)	Nozzle ejection		spray rate AUS (l/ha)									(k.p.h.)
	Water (l/min)	AUS l/min.	5	5,5	6	6,5	7	7,5	8	8,5	9	
1,0	0,20	0,18	85	77	71	65	61	57	53	50	47	
1,2	0,22	0,19	93	85	78	72	67	62	58	55	52	
1,5	0,24	0,21	102	93	85	78	73	68	64	60	57	
1,8	0,26	0,23	110	100	92	85	79	74	69	65	61	
2,0	0,28	0,25	119	108	99	91	85	79	74	70	66	
2,2	0,29	0,26	123	112	103	95	88	82	77	72	68	
2,5	0,31	0,27	132	120	110	101	94	88	82	77	73	
2,8	0,32	0,28	136	124	113	105	97	91	85	80	76	
3,0	0,34	0,30	144	131	120	111	103	96	90	85	80	
3,5	0,36	0,32	153	139	127	118	109	102	96	90	85	
4.0	0.39	0.35	166	151	138	127	118	110	104	97	92	

AMAZONE Spray rate table for metering washer 4916-32, (ø 0,8 mm)

Pressure (bar)	Nozzle ejection		spray rate AUS (l/ha)										(k.p.h.)
	Water (l/min)	AUS l/min.	5	5,5	6	6,5	7	7,5	8	8,5	9		
1,0	0,31	0,27	132	120	110	101	94	88	82	77	73		
1,2	0,34	0,30	144	131	120	111	103	96	90	85	80		
1,5	0,38	0,34	161	147	135	124	115	108	101	95	90		
1,8	0,41	0,36	174	158	145	134	124	116	109	102	97		
2,0	0,43	0,38	183	166	152	141	130	122	114	107	101		
2,2	0,45	0,40	191	174	159	147	137	127	119	112	106		
2,5	0,48	0,42	204	185	170	157	146	136	127	120	113		
2,8	0,51	0,45	217	197	181	167	155	144	135	127	120		
3,0	0,53	0,47	225	205	188	173	161	150	141	132	125		
3,5	0,57	0,50	242	220	202	186	173	161	151	142	135		
4,0	0,61	0,54	259	236	216	199	185	173	162	152	144		

AMAZONE Spray rate table for metering washer 4916-39, (ø 1,0 mm) (standard execution)

Pressure (bar)	Nozzle ejection		spray rate AUS (l/ha)									(k.p.h.)
	Water (l/min)	AUS l/min.	5	5,5	6	6,5	7	7,5	8	8,5	9	
1,0	0,43	0,38	183	167	153	141	131	123	114	107	101	
1,2	0,47	0,41	200	182	167	154	143	134	124	117	110	
1,5	0,53	0,47	224	204	187	172	160	150	141	132	126	
1,8	0,58	0,51	244	223	204	188	175	164	154	144	137	
2,0	0,61	0,53	259	236	216	200	185	172	162	152	144	
2,2	0,64	0,56	272	248	227	210	194	181	170	160	151	
2,5	0,68	0,59	288	263	240	222	206	191	180	169	160	
2,8	0,71	0,62	302	274	251	232	215	201	189	177	168	
3,0	0,74	0,64	315	286	262	243	224	209	197	185	175	
3,5	0,79	0,69	336	305	280	258	236	224	210	197	186	
4,0	0,85	0,74	362	329	302	280	259	240	226	212	201	

AMAZONE Spray rate table for metering washer 4916-45, (ø 1,2 mm)

Pressure (bar)	Nozzle ejection		spray rate AUS (l/ha)									(k.p.h.)
	Water (l/min)	AUS l/min.	5	5,5	6	6,5	7	7,5	8	8,5	9	
1,0	0,57	0,50	242	220	202	186	173	161	151	142	135	
1,2	0,62	0,55	263	239	219	203	188	176	165	155	146	
1,5	0,70	0,62	297	270	248	229	212	198	186	175	165	
1,8	0,77	0,68	327	297	273	252	234	218	204	192	182	
2,0	0,81	0,72	344	313	287	265	246	229	215	202	192	
2,2	0,86	0,76	365	332	304	281	261	244	228	215	203	
2,5	0,92	0,81	391	355	326	301	279	261	244	230	217	
2,8	0,96	0,85	408	371	340	314	291	272	255	240	227	
3,0	1,00	0,89	425	386	354	327	303	283	266	250	236	
3,5	1,10	0,97	467	425	389	359	334	312	292	275	260	
4,0	1,16	1,03	492	448	411	379	352	329	308	290	274	

AMAZONE Spray rate table for metering washer 4916-55, (ø 1,4 mm)

Pressure (bar)	Nozzle ejection		spray rate AUS (l/ha)									(k.p.h.)
	Water (l/min)	AUS l/min.	5	5,5	6	6,5	7	7,5	8	8,5	9	
1,0	0,86	0,76	365	332	304	281	261	244	228	215	203	
1,2	0,93	0,82	395	359	329	304	282	263	247	232	219	
1,5	1,05	0,93	446	405	372	343	319	297	278	262	248	
1,8	1,15	1,02	489	444	407	376	349	326	305	287	271	
2,0	1,22	1,08	518	471	432	399	370	346	324	305	288	
2,2	1,27	1,12	539	490	450	415	385	360	337	317	300	
2,5	1,35	1,19	573	521	478	441	410	382	358	337	319	
2,8	1,43	1,27	607	552	506	467	434	405	380	357	337	
3,0	1,47	1,30	624	568	520	480	446	416	390	367	347	
3,5	1,59	1,41	675	614	563	520	482	450	422	397	375	
4,0	1,69	1,50	718	653	598	552	513	479	449	422	399	



16.5 Conversion table for spraying liquid fertilizer (AUS)
(Density approx. 1.28 kg/l approx. 28 Gen. % N, approx. 36 Vol. % N at 5 - 10° C)

N in kgs - AUS in litres - AUS in kgs											
N kgs	AUS l	AUS kgs	N kgs	AUS l	AUS kgs	N kgs	AUS l	AUS kgs	N kgs	AUS l	AUS kgs
10	27,8	35,8	52	144,6	186,0	94	261,2	335,8	136	378,0	485,0
12	33,3	42,9	54	150,0	193,0	96	266,7	342,7	138	384,0	493,0
14	38,9	50,0	56	155,7	200,0	98	272,0	350,0	140	389,0	500,0
16	44,5	57,1	58	161,1	207,3	100	278,0	357,4	142	394,0	507,0
18	50,0	64,3	60	166,7	214,2	102	283,7	364,2	144	400,0	515,0
20	55,5	71,5	62	172,3	221,7	104	285,5	371,8	146	406,0	521,0
22	61,6	78,5	64	177,9	228,3	106	294,2	378,3	148	411,0	529,0
24	66,7	85,6	66	183,4	235,9	108	300,0	386,0	150	417,0	535,0
26	75,0	92,9	68	188,9	243,0	110	305,6	393,0	155	431,0	554,0
28	77,8	100,0	70	194,5	250,0	112	311,1	400,0	160	445,0	572,0
30	83,4	107,1	72	200,0	257,2	114	316,5	407,5	165	458,0	589,0
32	89,0	114,2	74	204,9	264,2	116	322,1	414,3	170	472,0	607,0
34	94,5	121,4	76	211,6	271,8	118	328,0	421,0	175	486,0	625,0
36	100,0	128,7	78	216,5	278,3	120	333,0	428,0	180	500,0	643,0
38	105,6	135,9	80	222,1	285,8	122	339,0	436,0	185	514,0	660,0
40	111,0	143,0	82	227,9	292,8	124	344,0	443,0	190	527,0	679,0
42	116,8	150,0	84	233,3	300,0	126	350,0	450,0	195	541,0	696,0
44	122,2	157,1	86	238,6	307,5	128	356,0	457,0	200	556,0	714,0
46	127,9	164,3	88	242,2	314,1	130	361,0	465,0			
48	133,3	171,5	90	250,0	321,7	132	367,0	471,0			
50	139,0	178,6	92	255,7	328,3	134	372,0	478,0			

16.6 Filling table for finishing areas

Travelling distance		Spray rate: 100 l/ha with boom/working width beitsbreite [m]						
[m]	10	12	15	16	18	20	21	24
10	1	1	2	2	2	2	2	2
20	2	2	3	3	4	4	4	5
30	3	4	5	5	5	6	6	7
40	4	5	6	6	7	8	8	10
50	5	6	8	8	9	10	11	12
60	6	7	9	10	11	12	13	14
70	7	8	11	11	13	14	15	17
80	8	10	12	13	14	16	17	19
90	9	11	14	14	16	18	19	22
100	10	12	15	16	18	20	21	24
200	20	24	30	32	36	40	42	48
300	30	36	45	48	54	60	63	72
400	40	48	60	64	72	80	84	96
500	50	60	75	80	90	100	105	120

For all other spray rates the refilling quantity has to be increased by a multiple.

Example:

Remaining left over distance: 100 m
 Spray rate: 100 l/ha
 Boom/working width: 12 m

12 l would be the amount of spray cocktail to be refilled.

If the sprayer is equipped with a rinsing water tank which would allow to dilute the surplus amount inside the sprayer tank the undiluted surplus amount inside the sprayer boom would have to be deducted from the refilling amount of 12 litres. This surplus amount inside the boom is at a 12 m boom with 5-fold boom feed = 4 litres so that the refilling quantity would only be 8 litres.



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