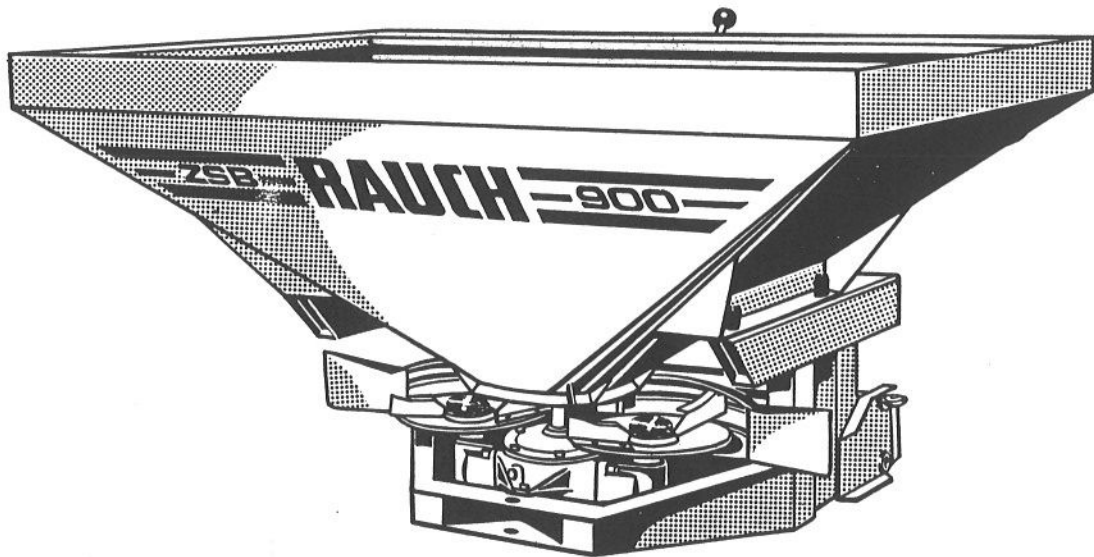


# RAUCH

## OPERATORS MANUAL



## FERTILISER SPREADER ZSB

PLEASE READ CAREFULLY  
BEFORE USING THE MACHINE

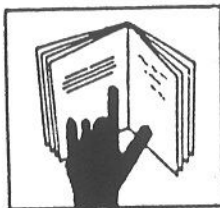


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Dear customer!

We are confident that your RAUCH fertiliser spreader, with its many outstanding features, will justify the trust which, by your purchase you have shown in the machine. We have made every effort to provide you with a high performance, reliable, precision machine.



It is very important that you read and thoroughly understand these instructions taking careful note of the safety information BEFORE operating the machine. This manual provides a comprehensive guide to the machine controls and all the information necessary for the efficient and safe operation, maintenance and care of your machine.

**PLEASE NOTE:** Any damage resulting from operator errors and/or mis-use is excluded from our guarantee.

**TYPE:**

**MACHINE No.:**

We recommend that you make a note of the machine type and serial number of your fertiliser spreader in the space above. You will find both in the type plate fixed to the frame of the machine.

Please quote this information when ordering spare parts, optional equipment and accessories or making any claims under the guarantee.

#### **TECHNICAL IMPROVEMENTS**

We are committed to a policy of constant improvement of all RAUCH products. We therefore reserve the right to carry out, without prior notice, any improvements or changes which we feel will benefit our products without any obligation, on our part, to carry out such improvements or changes to machines which have already been sold.

If you have any questions about these, or any of our products, please do not hesitate to contact us.

With kind regards

**RAUCH**  
**Farm Machinery**

## NOTE: MACHINE DELIVERY

Please check your machine thoroughly for any transport damage or missing parts. Claims can only be accepted if we are notified at the time of delivery. Please ask the haulier to acknowledge any transport damage. In case of doubt contact your dealer or the factory direct.

### ATTENTION!!!



When this symbol appears in the manual, it means that the safety of the operator, assistants, bystanders, or normal operation of the machine could be in danger. It is essential that you strictly observe all safety instructions. It is vitally important that you make sure that all users have the opportunity to read and thoroughly understand these instructions.



## ACCIDENT PREVENTION AND SAFETY ISSUES



Most accidents connected with these machines happen because someone ignores the most elementary safety rules during operation, maintenance or transport operation. It is vital that every person who comes into contact with this machine - be it the purchaser himself, a member of his family, an employee or bystander - must strictly obey the following main safety rules. Other safety instructions are to be found on the decals which are placed on various prominent parts of the machine. Only persons who are completely familiar with the machine and who have been instructed in the dangers associated with it should be allowed to maintain or repair the machine.

1. Please observe the safety notes contained in these operating instructions and all current statutory safety and accident prevention regulations!
2. Warning and instruction decals provide essential information concerning safe operation - observe them for your own safety!
3. Please check all nuts, bolt and other fixings for tightness, especially those on discs and disc blades.
4. Before using the machine, operators must familiarise themselves with all parts of the equipment and the function of all controls and adjustments. Finding out during operation may be too late!
5. Before using the spreader for the first time check that the tractor/spreader combination is road worthy and in a safe operating condition.
6. Before filling the hopper with fertiliser make sure the working slide is in the closed position.

7. Before adjusting, lubricating, cleaning or carrying out any operation on the machine, switch off the PTO drive, switch off the tractor engine and wait until all moving parts have come to a complete stop. Disconnect PTO shaft.
8. Keep hands feet and clothing well away from moving parts. Do not put your hands into the hopper. It contains a rotating auger! Do not wear loose clothing!
9. Keep the hopper free of any foreign matter.
10. Before starting the machine, ensure that no person is present in the danger area around the fertiliser spreader. Make sure you have a good view all round! (Watch out for children!)
11. Only start the fertiliser spreader when all safety devices and guards have been properly fitted.

**ATTENTION !!**


**SOME COMPONENTS CONTINUE RUNNING  
AFTER SWITCH OFF !!**

**FERTILISER IS THROWN FROM THE OUTLETS  
AT HIGH SPEED AND CAN BE DANGEROUS**

**MAKE SURE THAT ALL PERSONS LEAVE THE  
SPREADING ZONE BEFORE STARTING THE SPREADER.**



12. Never leave the fertiliser spreader running unattended.
13. It is illegal to carry passengers when transporting or using the fertiliser spreader.
14. When checking, adjusting or repairing the machine, always ensure that the spreader cannot be switched on by mistake.
15. Before taking the fertiliser spreader onto public roads, ensure that the spreader conforms to Road Traffic regulations (check with the authorities what protective equipment, lights and warning signs are required).
16. Before leaving the tractor unattended, lower the spreader to the ground, switch off engine and remove ignition key.
17. Never allow anyone to enter the space between tractor and implement without preventing the vehicle from rolling away unintentionally. Apply the parking brake and/or chock the wheels!
18. Make sure that the weight of the spreader does not make the tractor unstable. In many cases it will be necessary to add suitable weights to the front of the tractor so that tractor/spreader stability steering and safety (and braking and traction for 4WD tractors) is not affected by the weight of the fully laden spreader. Observe maximum axle weight and permissible gross laden weight of the tractor.

19. The maximum payload of the ZSB fertiliser spreader is 1800kg. For easy reference the densities (weight per litre) of different fertiliser types are listed in the calibration charts.
20. We recommend that you arrange for your dealer to check the condition of your spreader at the end of every season. He will pay special attention to disc speeds, hydraulic equipment and all fixings.
21. In the event of a mechanical hydraulic or electrical breakdown during operation, switch off the spreader immediately. Stop tractor engine and remove the ignition key before checking and repairing damage.
22. Any defects on the PTO shaft/guards must be repaired before the fertiliser spreader is used.
23.  **ATTENTION! DANGER FROM FERTILISER!**  
Improper selection and use of fertilisers can have serious effects on people, animals, plants and on the environment in general.  
Always select the correct fertiliser for your application. Always handle with care. Obey the fertiliser manufacturer's instructions to the letter.

## PROPER USE

ZSB twin-disc fertiliser spreaders are designed to spread dry prilled and granular fertilisers. Different discs are used depending on working width, type of fertiliser and spreading task (basic spreading, late-top dressing).

Any other use is inappropriate. Any defects arising therefrom will invalidate the manufacturers guarantee; any risk associated therewith is borne entirely by the user.

"Proper use" also entails full compliance with all operating, maintenance and repair instructions issued by the manufacturer.

Your ZSB twin-disc fertiliser spreader should only be used, maintained and repaired by persons who are familiar with the machine and who have received instructions with regards to potential dangers.

All current, appropriate, accident prevention requirements, and all other generally recognised safety, technological, work-related and road traffic legislation must be observed.

Any guarantee claims against the manufacture, for damage resulting from unauthorised alterations to the machine will be ruled invalid.

## TRANSPORTING THE ZSB TWIN-DISC FERTILISER SPREADER ON PUBLIC ROADS.

When driving on public roads and paths, ensure that the tractor/spreader combination complies with all relevant Road Traffic and Construction & Use regulations (overall permissible weight, overall permissible axle weight, lighting, warning signs etc.).

### Lighting

The following notes apply in Germany. Please check the road traffic regulation in your country and carry out the necessary modifications before transporting the machine on public roads. If in doubt consult your dealer for advice.

If the tractor lights or number-plate are obstructed by the spreader, they must be repeated on the rear of the fertiliser spreader, even during daytime use. I

### *Watch the weight on the front axle!*

Even with the fertiliser spreader fully loaded the steering, braking and stability of the tractor/spreader combination must not be affected. The steered axle is sufficiently weighted when the load carried by the front axle amounts to at least 20% of the unladen weight of the vehicle. Never exceed the permissible axle weight or the permissible overall weight of the tractor unit.



# WARNING AND INFORMATION DECALS ON THE ZSB TWIN-DISC FERTILISER SPREADER

- The decals on the machine are designed and positioned to increase the safety of all persons working with the machine.
- Please instruct anyone who works with the machine to obey all the warning and instruction information on these decals.
- Replacement decals are available through your dealer. Damaged or missing decals should be replaced in their original location immediately.
- All warning decals must be kept clean and readable at all times.

**1**

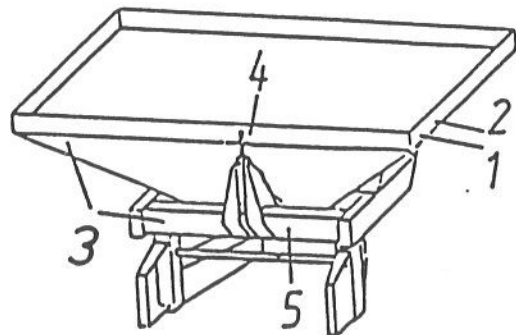
**CAUTION! THINK SAFETY!**

- Read and understand operators manual before operating the machine. Follow all service and operating safety instructions.
- Learn to operate this machine safely. Machine can be hazardous in hands of an untrained or complacent operator.
- The operator must make absolutely sure that no person or animal is in the projection zone of the machine before starting it and during its operation.
- Each time before using the machine, verify that all safety devices (locks, bolts etc.) are sufficiently tightened.
- Before carrying out adjustments, greasing or debugging the machine, turn off the tractor and disconnect P.T.O. -unit.
- Wait for all moving parts to completely stop before approaching the machine.
- Always keep hands, feet and clothing away from moving parts.
- Do not permit anyone to ride on the machine.
- Tires can be P.T.O. locked protected and by the protection tube chain in a single point.
- Always stop engine before leaving operator position, never allow the machine to run unattended in any case. Make sure precautions are taken.
- Always stand between tractor and implement when engine is running.
- Make certain everyone is clear of machine before starting engine or operation.
- Never work on top or inside the hopper unless tractor engine is shut off.
- Before driving in a public area, the driver must ensure that the machine is equipped with lights and safety reflective conforming in the highway code. Use a flashing warning light when transporting on highway except where prohibited by law.
- Attention - Safety! Match tractor ballast to combine sprayer and fertilizer weight.
- If you do not have a operators manual, please order one immediately from your dealer.

**2**

Max. Nutzlast:  
Charge utile max.:  
Max. payload:  
Max. inhoud:  
Max. nyttelast:

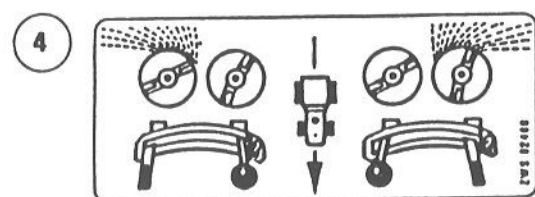
**1800 kg**



**3**

**← ACHTUNG! IMPORTANTI LET OPI**

Die Seriennummern des Rahmens und des Behälters müssen identisch sein!  
Chassis must only be fitted with hopper having corresponding serial number!  
Les numéros de chassis et de trémie doivent être identiques!  
Het serienummer op het frame en op de trechter moeten precies gelijk zijn!



**5**



## 1. MACHINE SPECIFICATION

### 1.1 TECHNICAL DATA FOR THE ZSB SERIES

	Hopper size cm	Filling height cm	Filling width cm	Capacity		Working width m	Power requirement approx. kW	Weight approx. kg
				approx. litres	approx.kg maximum payload			
<b>ZSB</b>	190 x 120	99	180	900	1800	12/15/16/ 18 m de- pending on ferti- lizer (see cali- bration chart)	35	230
Hopper extension 1100	190 x 120	99	174	1100	1800		40	20
extension 1300	190 x 120	109	174	1300	1800		45	30
extension 1500 I	190 x 120	134	170	1500	1800		50	40
extension 1500 III	240 x 120	115	230	1500	1800		50	50
extension 1800 III	240 x 120	125	230	1800	1800		60	60

## 2. NOTES ON THE DELIVERY OF THE MACHINE

### 2.1 DELIVERY

Before signing for the machine check that the machine serial number on the frame (front right when looking in the direction of travel) and Hopper (top right when looking in the direction of travel) are identical.

#### **ATTENTION!**



Please check that the spreading discs are correctly installed: The discs are stamped with L (left-hand) and R (right hand) when viewed in the direction of travel.

Check that all fixings are seated properly and tightened correctly, especially the discs and blades.

Please check your machine thoroughly for any transport damage or missing parts. Claims can only be considered if we are notified at the time of delivery. Please ask the haulier to acknowledge any transport damage. In case of doubt contact your dealer or the factory direct.

### 2.2 STANDARD EQUIPMENT

The following are part of the standard machine:

1 Agitator, 2 lower-link pins, 1 top-link pin, 1 PTO drive shaft, 1 double acting hydraulic cylinder FHD 1 B and one pair of discs as per your order.

### 2.3 OPTIONAL EQUIPMENT

- Various hopper extensions are available which increase capacity to 1100 l/1500 l/1800 l. The frame on the ZSB series is designed for a maximum payload of 1800 kg.
- Boundary spread limiter GHB (this limit the throw of material to approx. 75 cm from the tractor track centre enabling accurate spreading right up to the field boundary.
- Border discs for use with tramlines
  - DEB 6                    6m from track centre to field boundary (12m tramline)
  - DEB 7.5/8                7.5/8m from track centre to field boundary (15/16m tramline)
  - DEB 9                    9m from track centre to field boundary (18m tramline)
- Row spreading attachment RFZ    for 4 or 6 rows
- Hopper sieve
- Calibration check set  
(slide, bucket, calibration slide rule)
- Hopper-cover - state spreader type when ordering
- Hydraulic remote control

For one-sided spreading to the left :

- FH 1 KB - with stop valve, 1 single-acting spoolvalve required on tractor.

For one-sided spreading to the right or left:

- FH 2 KB - 2 single-acting spool valves required.
- FHD 2 B - 2 double-acting spool valves required

- ZSB Sub frame for plug-in lighting system
- Complete lighting kit, 3-section lights/holders
- RAUCH-Control - electronic monitor for tractor speed and PTO-shaft speed, warnings for PTO-over/under speed and area-meter.
- PTO-shaft with slip clutch
- Châssis FGS 2500

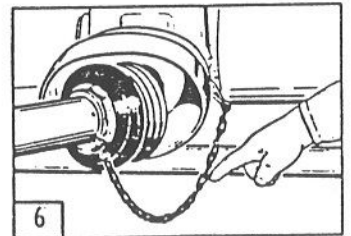
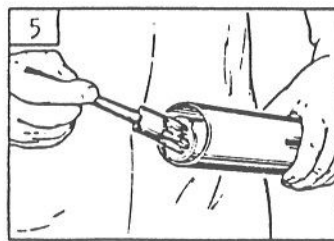
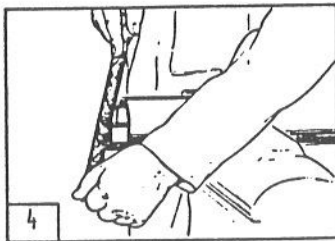
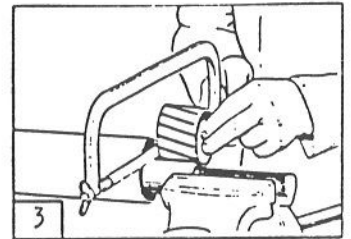
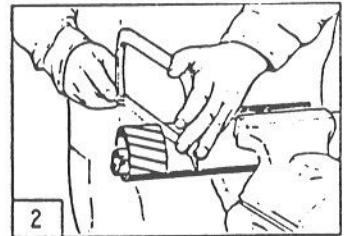
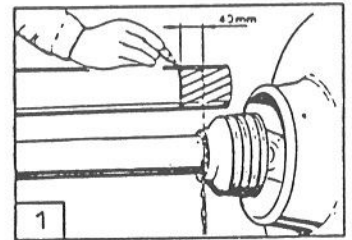
### 3. OPERATING INSTRUCTIONS

#### 3.1 FITTING THE PTO SHAFT

Only use drive shafts approved by the manufacturer.

When first attaching the spreader to the tractor, the length of the shaft must be matched to your tractor. If the shaft is too long, the PTO drive and the spreader will be damaged when the spreader is raised.

1. When at maximum extension, the PTO-shaft sections should overlap by at least 100 mm.
2. When pushed together the PTO-shaft must not bottom out. There should be a minimum clearance of 1 cm. (Fig.1)
3. If necessary, shorten inner and outer shaft by the same length on both halves (Fig. 2 and 3).
4. Chamfer edges and carefully remove all burs and swarf (Fig. 4).
5. Grease inside of outer tube (Fig. 5).
6. Fit PTO Shaft and connect securing chains on the free end (Fig. 6).  
Make sure the shaft is free to move!

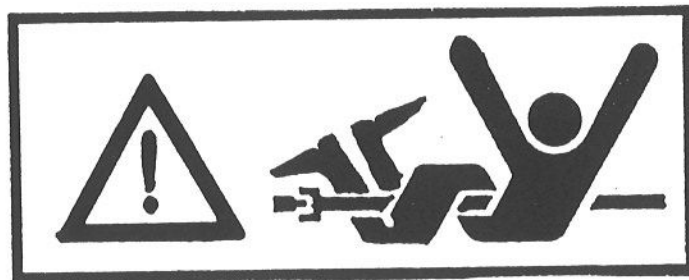


#### ATTENTION:



During work the angle of the standard PTO shaft must not exceed 25°. For greater angle settings (eg. late-top dressing), use a wide-angle PTO shaft. Ensure these checks are always carried out otherwise the PTO shaft will be subjected to excessive wear and early failure.

7. The shaft guards must always be properly fitted to the shaft, and the tractor PTO guards must be fitted and in perfect condition!
8. Pay special attention to the overlap of the PTO shaft sections when in transport and working positions!
9. Before fitting/removing the drive shaft, always switch off the tractor PTO, switch off the tractor engine and remove the ignition key!
10. Always fit the shaft the correct way round! The end of the PTO shaft marked with the tractor symbol fits onto the tractor.
11. To prevent the PTO guard from turning, connect up the safety chains!
12. Before switching on the PTO drive, make sure that the correct tractor PTO speed is selected to match the implement.
13. Before switching on the PTO drive, make sure that all bystanders are standing clear!
14. Never turn on the PTO without the tractor engine running!
15. Never let anyone get close to any rotating shaft!



16. Before cleaning, lubricating, or adjusting any PTO driven implement or PTO shaft, always switch off PTO drive, switch off engine and remove ignition key!
17. When detaching drive shaft from the tractor PTO, place in the holder provided!
18. After detaching the drive-shaft make sure you refit the cover on the tractor PTO shaft



**ENGAGE PTO DRIVE AT LOW TRACTOR ENGINE SPEED ONLY!**

## PTO-SHAFT FITTED WITH SAFETY SLIP CLUTCH - ADDITIONAL INSTRUCTIONS (OPTIONAL EQUIPMENT)

The safety-clutch must be fitted on the implement side. Installation on the tractor side is only allowed when the clutch is protected by a safety guard on the tractor side. Correct function of the friction coupling should be checked at the end of each season by your dealer workshop.

- Slide PTO-shaft with safety clutch onto the spreader shaft until the set screw is located precisely above the key way.
- Tighten set screw and secure with lock nut.

**IMPORTANT!** Regularly check set screw for tightness. Additional instructions relating to the PTO-shaft/clutch are supplied with the PTO-shaft.

### 3.2 INSTALLATION - 3-POINT LINKAGE

- Refer to the tractor operator's manual to determine the correct 3 point linkage attachment points to use.
- Before fitting or removing the implement to/from the 3-point linkage ALWAYS make sure that the controls are set in such a way that it is impossible to lift or lower the implement by accident.
- When using 3-point linkage, the linkage category of the tractor and of the implement must be the same - if not then you should obtain the proper conversion kit from your dealer.
- The 3-point linkage geometry gives rise to dangerous areas which can cause cutting or crushing injuries.
- If using external controls for raising/lowering the 3-point linkage, never get between tractor and implement!
- Adjust the 3-point linkage stabilisers/sway blocks/check-chains so that when the implement is in the transport position, sideways movement is eliminated.
- When travelling on public roads with a raised implement, ensure the linkage height control lever is locked to prevent accidental lowering of the implement!

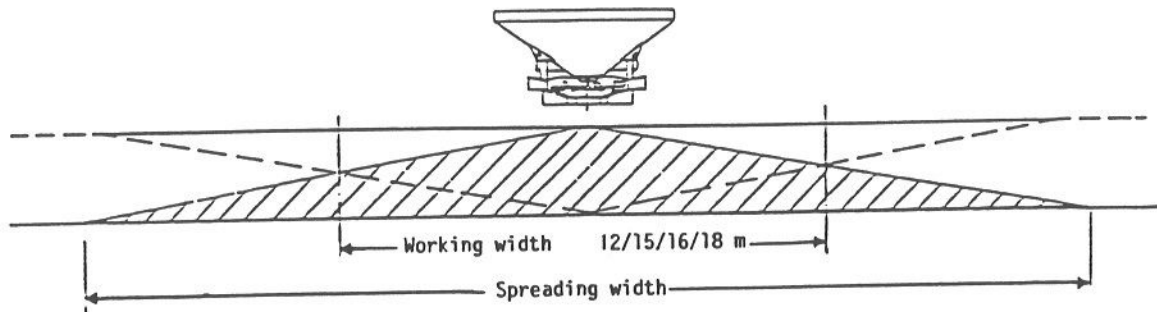
The ZSB fertiliser spreader is designed to couple to a category II 3-point linkage.

A second lower link pin position is provided as standard. This gives an extra 140 mm mounting height - useful for late top-dressing.

Adjust the 3 point linkage so that the spreader is level when viewed from the rear, and adjust the tractor linkage check-chains/struts to limit any sideways movement of the implement (ie. brace lower links).

In order to achieve precision spreading it is very important that the working height of the spreader is adjusted to the exact measurements given in the calibration charts (Points A & B). Final adjustment should be carried out to the spreader in the field.

Select the implement mounting height depending on the required working width (distance between tracks).

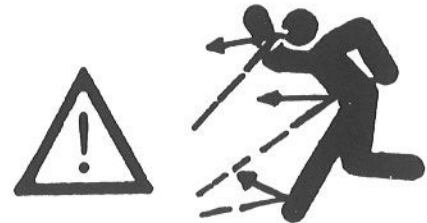


**ATTENTION!**

**COMPONENTS CONTINUE TO SPIN AFTER THE TRACTOR/DRIVE HAS BEEN SWITCHED OFF!**

**DANGER FROM FERTILISER BEING THROWN AT HIGH SPEED!**

**KEEP BYSTANDERS WELL CLEAR OF THE WORKING AREA!**



### 3.3 HYDRAULIC REMOTE CONTROL WITH 1 RAM (OPTIONAL EQUIPMENT) (Installation tips: see separate installation instructions)

FH 1 KB (Single acting)

#### Function

This hydraulic remote control works with a single acting control valve. Pressurizing the cylinder closes the slide. When the control valve is in the 'floating' position, the spring pushes the setting lever against the previously set adjusting stop.

Oil pressure closes - spring tension opens.

#### Operation

If the adjusting lever is disconnected, single sided spreading is possible. However this only allows for spreading to the left-hand side. For manual operation the hydraulic ram can be removed.

Since oil leaks out of the control valve (particularly in older tractors), it is possible that the slide lever may slowly open, especially on longer transport journeys. For this reason, single-acting remote controls are provided with a stop-valve which should be closed before starting the journey - thereby avoiding any chance of the slide lever opening unintentionally.

When the spreader is to be stored for long periods, open the slide lever in order to relieve the spring tension.

FHD 1 B (standard equipment)

#### Function

This hydraulic remote control works with a double acting control valve. The slide is opened and closed under hydraulic pressure.

#### Operation

If the adjusting lever is disconnected, single sided spreading is possible. However this only allows for spreading to the left-hand side. For manual operation the hydraulic ram can be removed.

FH 2 KB (2 single acting control valves are required).

#### Function and operation

Connect both hydraulic lines to both hydraulic connections on the tractor. The slide is closed when the respective control valve for the slide is pressurised. When the control valve is in the float position the spring pushes the setting lever up to the previously set adjusting stop.

When oil leaks past the control valve (particularly in older tractors) it is possible that the slide lever may slowly open, especially on longer journeys or during filling. For this reason each hose-end is provided with a stop-valve which should be closed before start of journey or similar thereby avoiding unintentional opening of the slide lever.

When storing the spreader for a long period, open the slide lever in order to relieve the spring tension.



FHD 2 B (2 double acting control valves are required).

#### Function and operation

Connect the four hydraulic lines to the hydraulic connections on the tractor. The slide is closed/opened when the respective control valve for this slide is pressurised. We recommend that you connect the hydraulic lines in a logical manner, i.e. control valve forward = open, valve backwards = close, so you can actuate both control valve levers with one hand and open both slides together.

#### EFFECT ON THE CALIBRATION CHART (1 & 2 RAM REMOTE CONTROL))

When compiling the calibration charts for the ZSB, the adjusting lever was manually operated. The hydraulic ram, due to its lower starting point, tends to open the slide slightly further. To compensate we recommend that when working with 1 hydraulic ram, select 1 index position less, e.g. if the calibration charts give the value 16, select 15 instead.

For hydraulic remote controls with 2 rams select 2 index positions less than the value given in the calibration chart, e.g. 14 instead of 16.

We recommend that the slide, lever and joints are regularly greased in order to ensure that the remote control works properly. It may be advisable in special circumstances to remove the two leaf springs which grip on to the adjusting components, by removing the rivets.

Attention! The power driven components (adjusting lever, slide) can be dangerous. Injuries may result from squashing and cutting.

#### ATTENTION! IMPORTANT INSTALLATION INSTRUCTIONS - ALL REMOTE CONTROLS!!



Before fitting the hydraulic ram onto the adjusting levers check the installation length (with closed slide and extended ram). The installation length can be adjusted by slackening the lock-nut and turning the clevis. Incorrect adjustment of installation length leads to damage of adjusting levers or bearing bolts.

Important for remote controls with 2 rams.



To avoid damage to the adjusting mechanism remove the round operating handle so that the two levers are permanently disconnected.

This is important as otherwise the hydraulic rams may bend the adjusting levers.

### 3.4 SETTING THE SPREADER

The values given in the calibration chart are derived from practical tests in the test hall. The spreader settings were achieved with fertiliser in perfect condition from each respective manufacturer.

We would particularly like to emphasize the fact that physical characteristics of fertilisers can vary - even within the same type and brand - due to differences in quality of granules, density, size of particles, texture of particles etc.



These variations in the fertiliser can influence the spreading characteristics quite markedly and, as a result, you may find that the fertiliser application rate may differ slightly from the rates predicted by the calibration charts.

The data provided in the calibration chart cannot be totally relied upon and, therefore, to ensure accuracy the machine should be recalibrated for application rate and spread pattern in every case.

We cannot guarantee that your fertiliser has the same spreading characteristics as the fertiliser tested in our plant even if it is from the same manufacturer and of the same type. In order to achieve the desired spread pattern it may therefore be necessary to change to a different setting if flow characteristics of the fertiliser being applied vary from that of the fertilisers we have tested. Careful calibration of the settings on long test runs is always more accurate than guess work.

We therefore recommend you to use only granular fertilisers from well known manufacturers and if possible only those fertilisers listed in our calibration charts. Should some types of fertilisers be missing from the charts please let us know.



**SPREADING UREA:** This highly concentrated nitrogen fertiliser is, due to its importation from various sources, extremely variable in quality. Different spreader settings to those given in our charts may therefore be required. Please also note the higher wind sensitivity of urea.

Be especially careful when setting the machine. Even minor adjustment errors can result in a substantial deterioration of the spread pattern. We would particularly like to point out that no liability for consequential losses due to spreading errors can be accepted (see point 6.1).



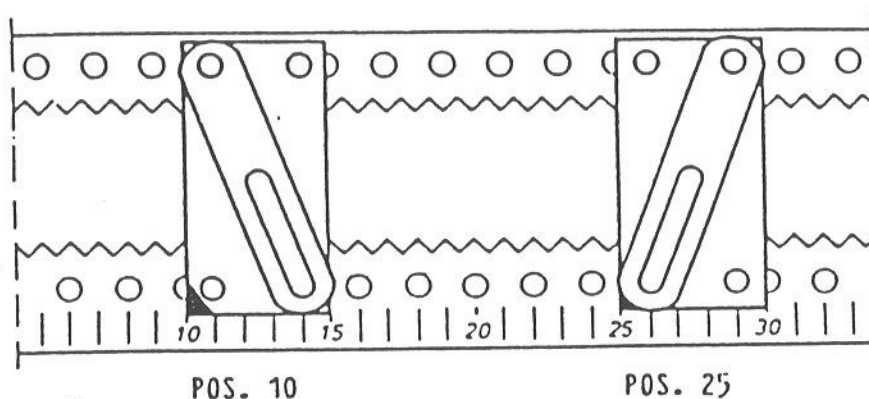
Before any adjustments or other work is undertaken - such as lubricating or cleaning of the machine - always first switch off PTO, switch off tractor engine and remove ignition key.

Always wait until all moving components have come to a complete standstill before undertaking any work on the equipment.

Setting the output on the ZSB spreader is made easy and safe by using the large scale.

Using the calibration chart select the scale setting corresponding to the required tractor speed and application rate. Set the end-stop on the adjuster segment to this value (grey edge on one of the 39 setting points).

When adjusting the end-stop by 1 hole, the stop position changes by 2 scale points. To adjust by 1 scale point only, turn the pull handle on the end-stop and lock into the offset holes (see fig.).



**ATTENTION:**

Rate setting using remote control with



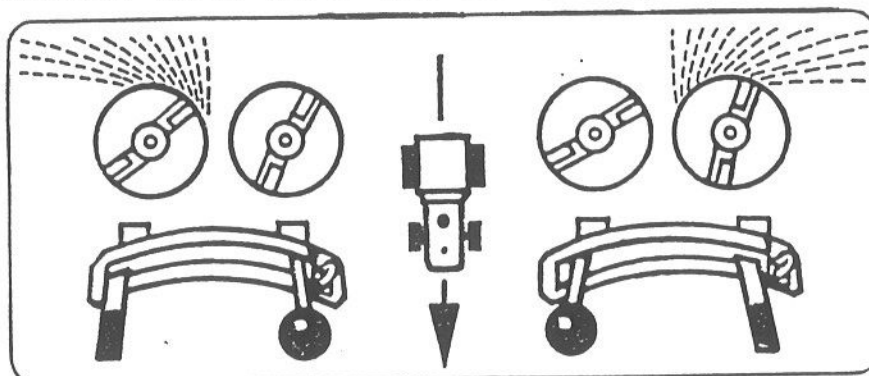
- a) 1 ram: set 1 position less
- b) 2 rams: set 2 positions less

than figure given in the calibration chart.

When the tractor has reached the required PTO speed open both slide levers to their end-stops to start spreading.

### 3.4.1 SINGLE SIDED SPREADING

When spreading to the right or left, disconnect the operating levers by pulling on the round control lever and then fully open the appropriate slide lever for the side you wish to spread.



1. Operate round control lever: spreading to the right only.
2. Operate rectangular control lever: spreading to the left only.

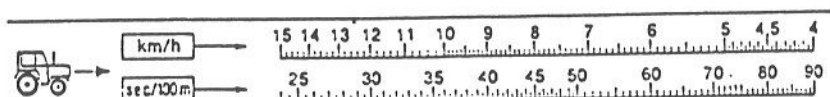
### 3.5 CALIBRATION CHECK

To ensure an accurate application rate we recommend that a new static calibration test is carried out each time a new type or batch of fertiliser is used. The calibration check is carried out with PTO operating and tractor standing still.

#### Calculation of exact tractor speed:

To calculate the tractor speed precisely, drive along a measured 100m on a field with the hopper half full and measure the time taken.

#### Tractor speed



Tractor speeds not shown on the above scale can be calculated using the following formula:

$$\text{Tractor speed} = \frac{360}{\text{measured time for 100m}}$$

Example:  $\frac{360}{36\text{sec}} = 10\text{km per hr.}$

#### To determine the required output per minute:

The calibration check is usually only carried out on the left hand outlet. However the fertiliser quantity required is calculated for both outlets (total working width), ie. calculated quantities must be halved.

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

Imperial calculation:

lbs/min =

$$\frac{\text{Tractor speed (mph)} \times \text{working width (ft)} \times \text{appl. rate (lbs/acre)}}{495}$$

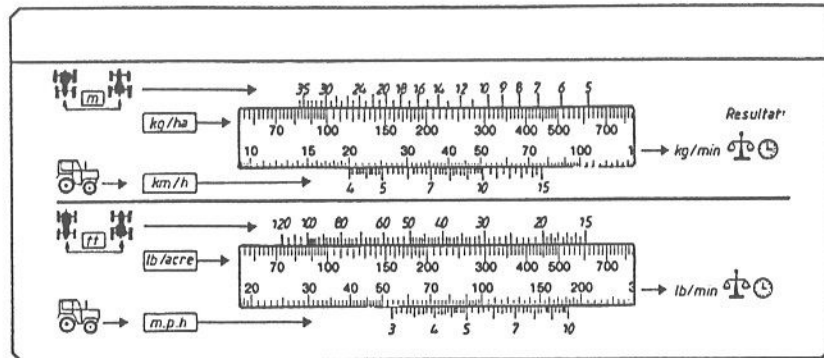
Example:  $\frac{7.5\text{km/h} \times 18\text{m} \times 360\text{kg/ha}}{600} = 81 \text{ kg/min}$

Therefore 40,5 kg of fertiliser must be deposited through one outlet in one minute. Several attempts may be necessary before you find the correct aperture setting (use values provided in the charts as a guideline).

Application rate figures for a selection of outputs and tractor speeds are provided in the calibration chart.

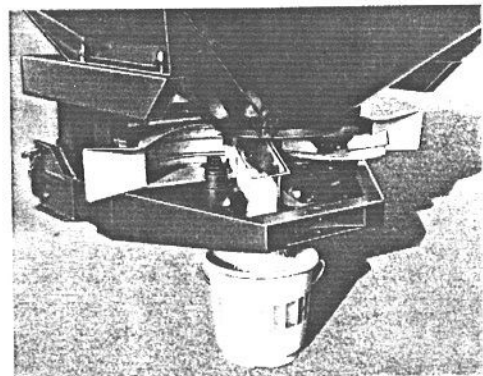
This calculation can also be carried out using a calibration slide rule (optional equipment).

For instance, if you position the 200kg/ha mark against 15m on the working width scale and then read the value for kg/min off above 8km/ha on the speed scale you get 40kg/min as the required fertiliser flow rate from both outlets.



Be aware of the danger areas near the rotating components when carrying out the calibration check.

Installation instruction - calibration chute (optional equipment)  
 Remove the left hand (in direction of travel) disc, hook up chute and place bucket underneath (see fig.). Before using for the first time, stick PVC profile of chute to the l.h. half of the opening. Determine the scale position for the output required using the calibration chart and set end-stop on adjuster segment accordingly. Set PTO-shaft speed according to the calibration chart and open the l.h. slide to its end-stop.



### 3.6 LATE-TOP DRESSING

Special discs for late-top dressing are offered as optional equipment. These have been specially developed for this type of work and the type of fertiliser used.



Do not confuse left and right discs. (in the direction of travel) The marks L (left) and R (right) are stamped on the bottom of the discs and corresponding blades. Also note the designations NA, NB, SA, SB, etc.

Precise centering of disc on hubs is essential.

Place plastic cap nuts onto disc and turn counter clockwise in order to locate the thread. Then tighten clockwise. Do not cross thread! Lightly tighten plastic cap nuts using screw driver or steel strip. Do not overtighten!



Replace defective plastic cap nuts immediately (damaged thread, cracks, breakages).

**ATTENTION!** Discs are fast rotating components - hence **DANGER!**

The nut is prevented from working loose by means of a lock-nut. Check plastic cap nut after the first hour of operation for tightness. We recommend that the thread of the steel hub is lightly greased occasionally.

Mount the fertiliser spreader on the tractor as per measurements given in the calibration chart. Obtain application rate from calibration chart for normal spreading.

If the spreader cannot be set to the height stated, the lower 3-point link pins can be set in the lower positions thereby giving 140 mm additional height.

#### **IMPORTANT:**



If the setting of linkage results in PTO shaft angle exceeding 25°, use a wide angle PTO shaft. Obtain application rate from calibration chart for normal spreading.

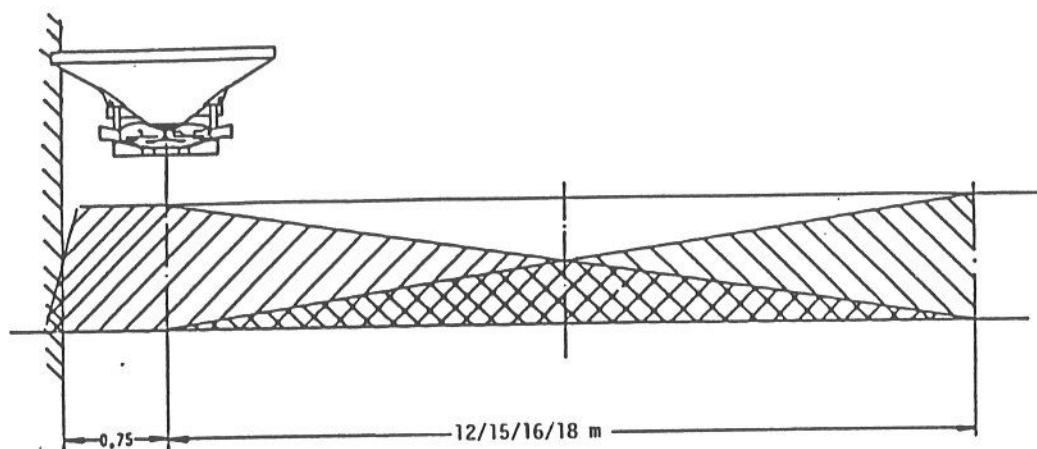


### 3.7 SPREADING ON HEADLANDS

In order to allow precise spreading on field headlands and boundaries, RAUCH offers boundary spreading equipment or headland discs as optional equipment. These avoid spreading fertiliser into hedgerows or under-application on field edges.

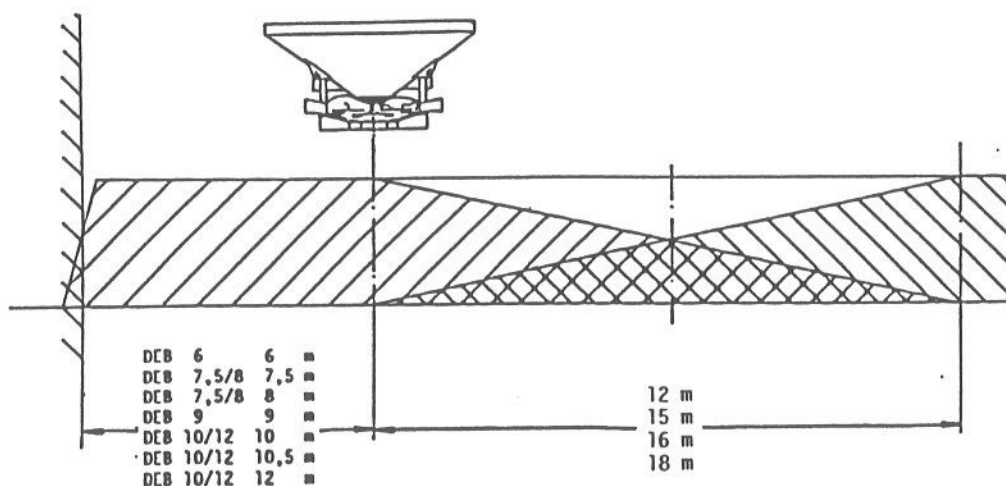
#### 3.7.1 BOUNDARY SPREADING WITH BOUNDARY SPREAD LIMITER GHB (1 slide open)

Limitation of spread width (select r.h. or l.h. side) to 75 cm from tractor centre to field edge. Not for use with tramlines.



#### 3.7.2 BOUNDARY SPREADING WITH BOUNDARY DISC "DEB" (both slides open)

For use with tramlines.





#### 4. CLEANING and MAINTENANCE

- As a general rule carry out maintenance, fault diagnosis, repairs and cleaning operations with drive and engine switched off! Remove ignition key!
- When carrying out maintenance work with a spreader in the raised position, always secure with suitable jacks or blocks!
- All spare parts must meet the technical requirements set by the equipment manufacturer! This can only be ensured by using original spare parts.
- Regularly check fixing components for tightness and retighten where necessary.
- Safety guards which are removed during repair, maintenance and cleaning operations must be refitted in their original position before using the fertiliser spreader again.
- Dispose of oils and greases according to environmental regulations.



Cleaning or washing of the fertiliser spreader immediately after use ensures a long service life (clean lubricated only at locations where the oil can be separated from the wash water).

In order to thoroughly clean the spreader, the hopper can be removed after slackening the cap nuts and removing the auger from its bayonet fixing.

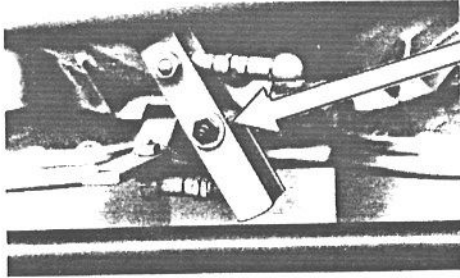
We recommend that, after cleaning, you treat the spreader with corrosion protection. (Only use biologically degradable protection).

The gearbox is permanently lubricated and under normal circumstances should not require any maintenance. The gearbox is factory filled with sufficient oil making topping up unnecessary. Change the gearbox oil after 2-ter repeated use of a pressure washer and where fertiliser with a high dust content has been spread. The drain plug is also the filler (Capacity: 2 litres Gearbox oil SAE 140). The drain plug is not an oil level plug.



It is extremely important that you keep the spreading components (disc blades, slide apertures and outlets) clean and any damaged component must be replaced immediately.

In order to guarantee correct flow of fertiliser to each spreading disc, the metering slide aperture was factory set at position 2 (third position on scale) using a setting pin of 1 mm dia. Should any faults occur check the slide opening and readjust if necessary.



Lubricate this grease nipple after every cleaning operation.



## 5. SPECIAL NOTES

5.1 Check all screw connections for tightness after the first 20 hours of operation.

5.2 The maximum payload of the ZSB spreader is 1800 kg. Any load greater than that voids your guarantee cover.

The load can be determined without a weighbridge by calculation using the density of the fertiliser. Weigh precisely 1 litre of fertiliser, giving the density in kg/litre.

Check the density of your fertiliser before loading the hopper.

The following guidelines may help:

- approx. 0,8 urea
- approx. 1,0 KAS
- approx. 1,2 NPK, Kali-fertiliser
- approx. 1,4 Kieserit, phosphate-fertiliser

The density of those fertilisers listed in the calibration chart can be found in the top field of the chart.

The following load limits must be adhered to for all ZSB spreaders:

ZSB 900:	900 l - 1800 kg	Normal loading of hopper.
ZSB 1100:	1100 l - 1800 kg	Normal loading of hopper.
	0.8 kg/l - 1.3 kg/l	Normal loading of hopper.
	1,6 kg/l	Load hopper to only 85 %.
ZSB 1500:	1500 l - 1800 kg	
	0.8 kg/l - 1.2 kg/l	Normal loading of hopper.
	1.3 kg/l	Load hopper to just under filling edge.
	1.6 kg/l	Load hopper to only 75%.
ZSB 1800:	1800 l - 1800 kg	
	0.8 kg/l - 1.0 kg/l	Normal loading of hopper.
	1.3 kg/l	Load hopper to only 75%.
	1.6 kg/l	Load hopper to only 65%.

5.3 Engage PTO-Shaft only at low revs.

5.4 **ATTENTION!** Keep away from rotating discs - **DANGER** of personal injury!

5.5 Changing discs:

**Disc removal:**

Slacken plastic cap nuts (steel strip) and remove discs.

**Disc installation:**

Set disc precisely onto the centering hub. Place plastic cap nuts onto disc and turn counter clockwise in order to locate the thread. Then tighten clockwise. Do not cross thread! Lightly tighten plastic cap nuts using a screw driver or a steel strip. Do not overtighten!. The nut is stopped from working itself loose by a lock-nut.

Check screw fixings for tightness after the first hour of operation. We recommend that you occasionally lightly grease the thread of the steel hub.



Do not confuse left and right discs. (in the direction of travel) The marks L (left) and R (right) are stamped on the bottom of the discs and corresponding blades. Also note the designations NA, NB, SA, SB, etc.

Precise centering of disc on hubs is essential.



Replace defective plastic cap nuts immediately (damaged thread, cracks, breakages).

**ATTENTION!** Discs are fast rotating objects - hence **DANGER!**

## 6. ESSENTIAL TIPS ON SPREADING

### 6.1 AVOIDING SPREADING ERRORS!

The modern design and quality construction of RAUCH fertiliser spreaders, together with extensive and continuous testing in our own factory test facility, we have created the pre-requisites for perfect, precision spread patterns.

Despite the careful production of our spreaders, and even with proper use, the possibility of variations in flow rate, and even total blockages, cannot be totally excluded. Such circumstances can, for instance, be caused by the following:

- Variable consistency of fertiliser and seeds (eg. distribution of particle sizes, densities, granule shape)
- lumpy and damp fertiliser
- wind-drift
- blockage or bridging (eg. foreign material, pieces of bag, moist fertiliser....)
- humps and dips in the field
- wear of wearing components (eg. auger, agitators, disc blades, outlets).
- accident damage
- lack of cleaning or corrosion prevention
- incorrect PTO speed or tractor forward speed
- fitting of incorrect discs (or mistaking l.h. and r.h. discs)
- missing out the calibration check
- incorrect fertiliser spreader height settings (not setting spreader pitch as per calibration chart)
- loose linkage check chains or spreader not level when viewed from rear

Therefore it is very important that you check that your fertiliser spreader is functioning correctly and accurately before every job and even during the job.

All claims for consequential losses, which have not been caused to the fertiliser spreader itself, are excluded from the manufacturer's liability. This includes any liability for consequential losses due to spreading errors. Any unauthorised alterations to the spreader may result in consequential losses which are excluded from the liability of the supplier.

In case of deliberate action or gross negligence of the owner or one of his employees, and in cases where the fault of the object of supply is covered by product liability for personal or physical loss, the liability exclusion of the supplier does not apply. The exclusion does also not apply in the absence of characteristics which have been expressly assured, and when these assurances were given precisely for the purpose of assuring the user against losses which have not been caused on the object of supply itself.

## 6.2 FAULT DIAGNOSIS AND TROUBLE SHOOTING

- Uneven distribution of fertiliser
  - Remove any fertiliser build up from discs, disc blades and outlet channels.
  - Check correct disc selection according to calibration chart. Check discs are correctly seated (note l.h. and r.h. side).
- Too much fertiliser deposited around tractor tracks
  - Check disc blades and outlet. Replace all defective components immediately.
- Excessive fertiliser in overlapping zone
  - The fertiliser has a coarser surface than the fertiliser tested for the calibration chart.
  - PTO speed is higher than that shown on the tractor tachometer. Have PTO shaft speed checked.
- Spreader applies different amount on left hand and right hand sides.
  - Check slide openings (see point 4.).
- Fertiliser trickles from hopper with slide closed
  - Check clearance between lower edge of agitator and hopper floor. If greater than 1 mm, shim hopper supports to compensate.
- Chattering discs
  - Check tightness and threads of plastic cap nuts and possibly replace.

## FAULTS IN HYDRAULIC SLIDE OPERATION

- Lift ram fails to open.
  - Slides too tight. Free slide, lever and joints. If necessary free leaf springs on adjusting levers through removal of rivets.
- Lift ram opens too slowly.
  - Oil is too thick. Drill out flow limiter to 1 mm or exchange (request to factory). In order to gain access to the flow limiter, unscrew fixing nut of pressure hose on ram inlet port (top connection in double acting rams).

## WARRANTY CONDITIONS

RAUCH fertiliser spreaders are manufactured according to modern manufacturing methods, using the greatest care, and are subjected to numerous controls.

Therefore RAUCH offers a guarantee for 12 months subject to the following conditions:

1. The warranty period commences with the date of purchase.
2. The warranty covers all material and manufacturing defects. For bought-in items (hydraulics, electronics), our warranty is limited to the warranty of the respective manufacturer. During the warranty period, all manufacturing and machinery defects are remedied free of charge by replacement or repair of the component concerned. All other claims which go beyond those stated, such as claims for change, cost reduction or replacement of damaged parts which have not actually been incurred on the object of our supply, are expressly excluded.

Work under warranty is carried out by authorised workshops, by RAUCH representatives or the factory.

3. The warranty excludes all consequences of normal wear and tear, corrosion or defects which have arisen from inappropriate handling or outside influences. In the case of unauthorised repair or alterations to the original condition, the warranty becomes void. The warranty also becomes void when non-original spare parts are used.

Please, therefore, observe the operating instructions. If in any doubt, please contact your authorised agent or the factory direct.

Warranty claims must be made to the factory no later than 30 days after defects are discovered. Please include date of purchase and machine number on any claim.

Repairs under warranty may only be carried out by authorised workshops after clearance from RAUCH or its official representative.

The warranty period is not extended through warranty work.

Transport damage is not a manufacturing defect and is therefore not covered by the manufacturer's warranty.