



Order-No. 9900.01.33GB02

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Serial number

Operating Instruction

Seed Drill

Front hopper, Toolbar



Read and follow safety instructions



Operating Instruction

Seed Drill Front hopper, Toolbar

Read carefully through these operating instructions and safety precautions (“For your safety”) before operating the device for the first time, and ensure that they are observed at all times.

The person operating the machine must be properly qualified to do so, trained in its use and everyday maintenance, and familiar with the potential hazards and accident-prevention regulations involved. Ensure that all other users are also supplied with the safety instructions.

Ensure that all relevant local accident-prevention regulations are observed, along with generally accepted safety procedures and any legislation that may apply with respect to health and safety in the workplace.

Observe all warning notices. (DIN 4844-W9)

Instructions in this manual accompanied by this symbol and a warning notice indicate DANGER. (For a key to warning symbols, see the appendix.)



IMPORTANT: This symbol indicates safety precautions which, if not observed, may lead to hazard to the machine.



This symbol indicates machine-specific precautions that must be observed to ensure the correct functioning of the machine.



Voiding of warranty

The drilling machine is designed and built exclusively for normal agricultural use. Use for any other purpose counts as unauthorised operation, and no liability whatsoever will be accepted for any loss, damage or injury so caused.

This concept of intended use also covers the full observance of all operating, maintenance and servicing specifications, along with the exclusive use of original spare parts.

The use of non-original accessories, spares and/or consumables that do not carry specific approval from Rabe shall void all warranty liabilities.

We can accept no liability whatsoever for damage, loss or injury resulting from the carrying out of unauthorised repairs and/or modifications to the device, or negligence in its operation.

Claims for missing or damaged items detected at the moment of delivery (transit damage, missing parts) should be made immediately and in writing.

Guarantee claim conditions and our liability exclusions are based on our general terms and conditions.



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Attachment of heavy implements

Important additional information on the combination of tractor and attached implements

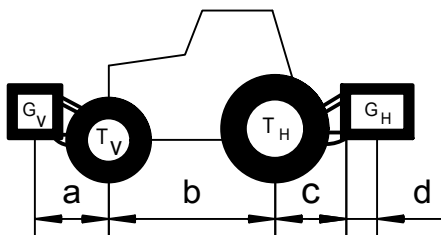
The attachment of front and rear-end implements to the corresponding three-point linkage must not cause the maximum permitted total weight to be exceeded with respect to the axle loads of the tractor and/or weight-bearing capacity of its tyres. The front axle of the tractor must always bear at least 20% of the tractor's unladen weight.

Before attaching the device, carry out the following calculations or weigh the tractor-implement combination to ensure that it fulfils these specifications.

Determining the total weight, axle loads and weight-bearing capacity of tyres, along with the minimum amount of ballast required.

The following data are required to carry out the calculation:

TL(kg) unladen weight of tractor	①
TV(kg) front-axle load of unladen tractor	①
TH(kg) rear-axle load of unladen tractor	①
TG(kg) permitted total weight of tractor	①
GH(kg) total weight of rear-mounted implement/ rear-end ballast	②
GV(kg) total weight of front-mounted implement/ front-end ballast	②
a(m) distance between centre of gravity of front-mounted device / front-end ballast and centre of front axle	② ③
b(m) wheel base of tractor	① ③
c(m) distance between centre of rear axle and centre of lower-arm ball	① ③
d(m) distance between centre of lower-arm ball and centre of gravity of rear-mounted implement/ rear-end ballast	②



Rear-mounted implement or front/rear combination

1) CALCULATING THE MINIMUM AMOUNT OF FRONT-END BALLAST GV min

$$GV_{min} = \frac{GH \cdot (c+d) - TV \cdot 0.2 \cdot TL \cdot b}{a + b}$$

Enter in the table the calculated minimum amount of front-ballast required by the tractor.

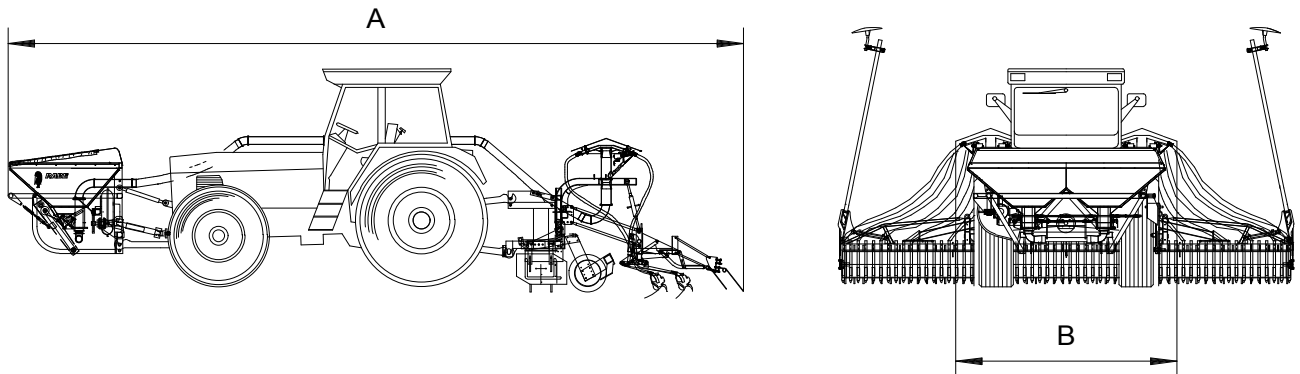
Front-mounted implement

2) CALCULATING THE MINIMUM AMOUNT OF REAR-END BALLAST GH min

$$GH_{min} = \frac{GV \cdot a - TH \cdot b + 0.45 \cdot TL \cdot b}{b + c + d}$$

- ① See operating instructions supplied with tractor
- ② See operating instructions supplied with the implement and/or determine its weight.
- ③ Take measurements

Machine data



Front hopper					
Basic type	T 401 F, T 401 K2	T 451 F, T 451 K2	T 501 F, T 501 K2	T 502 F, T 502 K2	T 602 F, T 602 K2
Weight of front tank when empty, in kg (approx.)	420	420	420	450	450
Weight of folding sowing rail when empty, in kg (approx.)	608	642	652	678	735
Operating width, in mm (approx.)	4000	4500	5000	5000	6000
Lengths A, in mm (approx.)					
Transport width B, in mm (approx.)	3000				
Transport height, in mm (approx.)	3750				
Seed-hopper contents (l) without / with top	1800	1800	1800	1600 / 2300	1600 / 2300
Number of rows (space between rows: 125mm)	30 / 40	30 / 40	40	40 / 48	40 / 48 / 60
Seed distribution	pneumatic				
Dosing, drive	electronically-controlled electric motor				
Blower, drive	Paddle-blade fan with hydraulic motor				
Hydraulic pressure	max. 200 bar				
Control / monitoring	electronic				
Operating speed	up to 15 km/h				

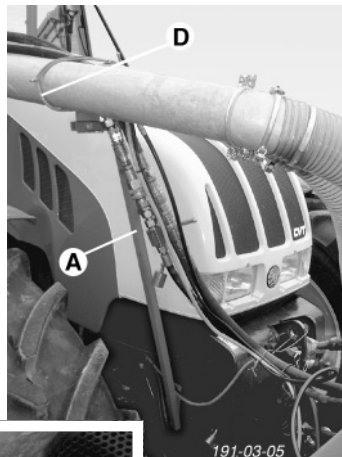
Dimensions and weights refer to basic configuration.
Increased noise level perceived by tractor driver (during operation) < "70 dB(A)".

Tractor attachment points

- Use the hoop clips (supplied) to attach the hoses to the tractor.
- The stays (A, B, C) used to attach the hose clip (D) to the tractor are not supplied. Attachment brackets must be adapted onsite according to the type of tractor.



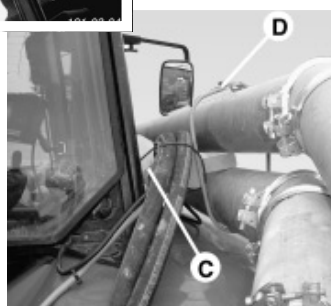
- Example of front-end attachment:
- Adapt stay (A) and fit clip (D).



- Example of mid-point attachment:
- Fix hose clamp (B) to the cab-mounted clip and fit the stay (D).



- Example of rear-end attachment:
- Attach stay (C) to cab and fit clip (D).



Connection of hoses

Cutting hoses to length

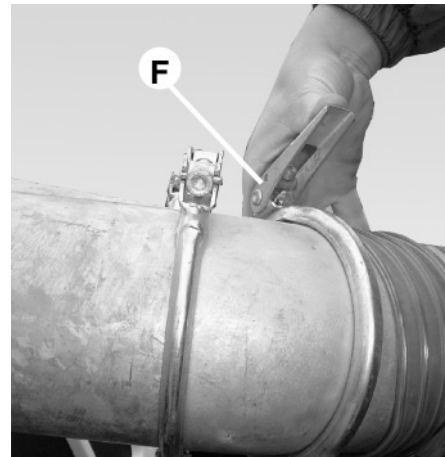
- Machine in lowered position (front and back)
- Cut hoses to correct length
- Fit the hose connectors

Connection of hose and pipe

- Fit the seal (E) to the pipe and push the ends together

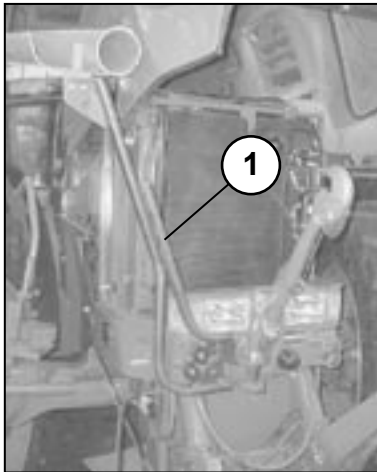


- Secure with pipe connector (F).



When fitting the feed conduit pipes, ensure that the implement can be raised and lowered and the tank cover opened!

Pipe installation at tractor end

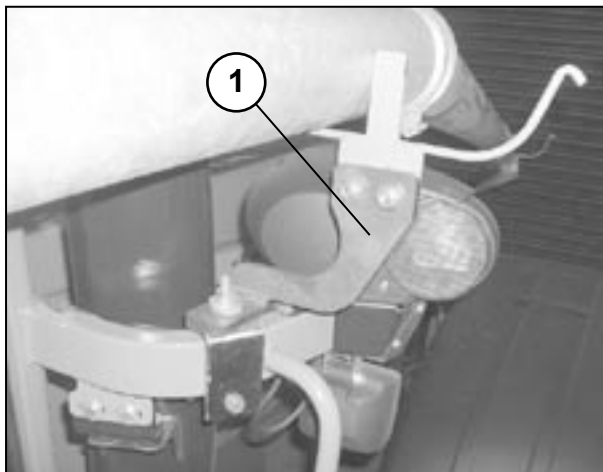


1

Hoop clips and stays are used to secure the pipe to the tractor. Attachment brackets must be adapted onsite according to the type of tractor.

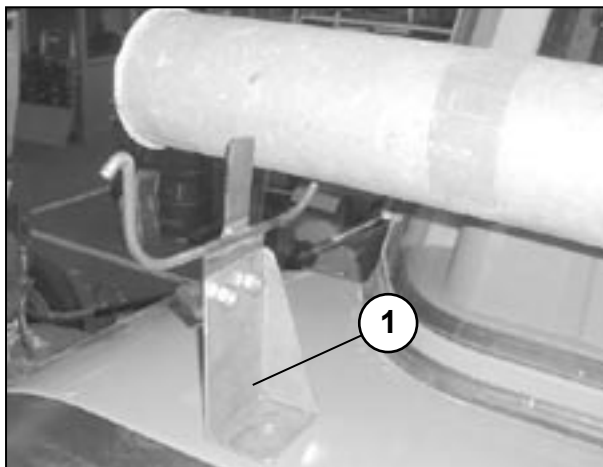
Example of attachment to Fendt Vario 916

Front-end attachment: Fit the stay (1/1) with clip to the tractor and turn the screw to adjust the pivoting range.



2

Mid-point attachment: Secure the stay (2/1) to the cabin-mounted clip.



3

Rear-end attachment: Drill through wing and secure stay (3/1) with hex bolt / hexagon nut.

Cutting hoses to length

- Machine in lowered position (front and back)
- Cut hoses to correct length
- Fit the hose connectors

Connection of hose and pipe

- Fit the seal to the pipe and push the ends together
- Secure with pipe connector



When fitting the feed conduit pipe, ensure that the implement can be raised and lowered and the tank cover opened!

Front-tank attachment

Attach tank to front three-point hydraulic connection

- Cat. II or three-way coupling;
- Attach securely!

Fit front power take-off shaft for blower drive

- 1000 rpm, rotates clockwise relative to direction of travel

- Adapt/attach propeller shaft (see “propeller shaft” in appendix)

Take into account the length of the propeller shaft in horizontal and lowered position!



The front tank and propeller shaft should lie horizontal during operation

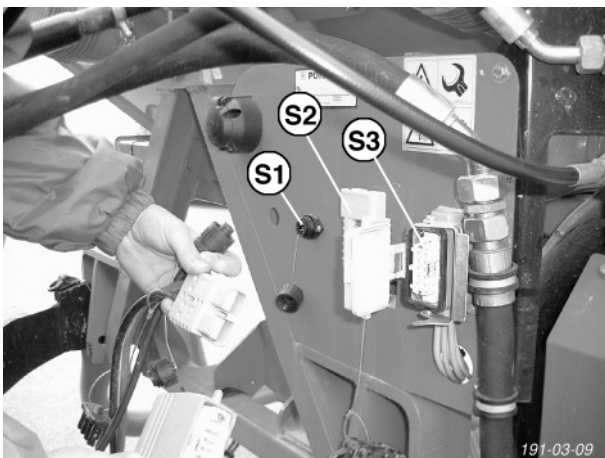
- Adjust by means of upper-arm length and lifting height

Connect the spiral feed hoses

(see description in “Connection of hoses”)

Connect the front cable loom

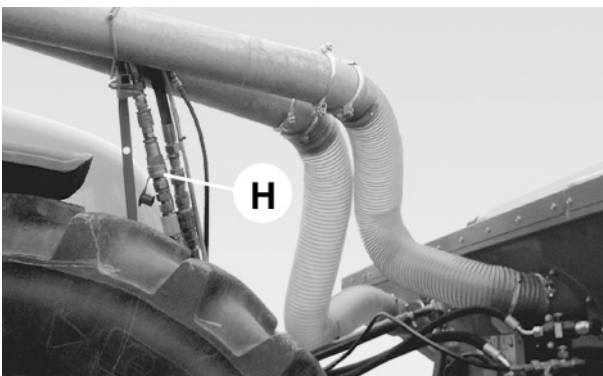
- Insert the plugs (S1, S2, S3) into their corresponding sockets.



Connect the hydraulic conduits

- If a hydraulic blower drive is fitted, connect the conduits at point (H).

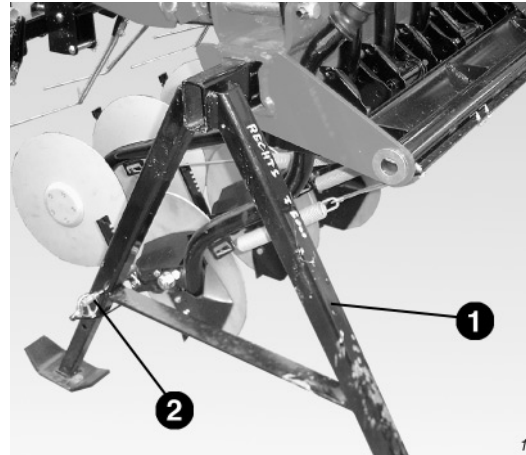
For details of adjustment, see section entitled “Hydraulic blower drive”



Attachment of sowing rail

Fitting the sowing rail

- Attach the sowing rail, supported on stands (1) to a soil tillage implement.
- Attach securely!



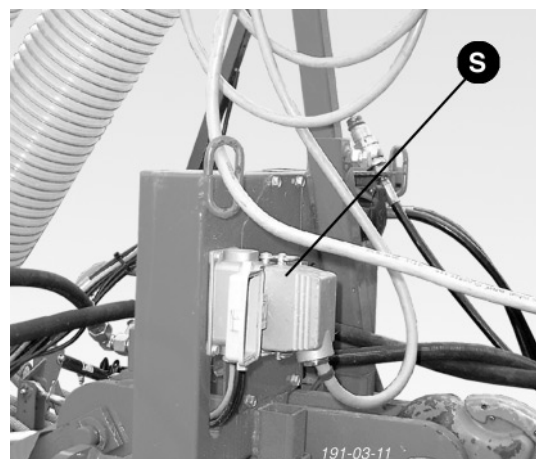
- After raising the implement, pull out the safety pin (2) and remove the support stand (A).

Connect the spiral feed hoses

(see description in “Connection of hoses”)

Connect the front cable loom

- Insert the plug (S) into its corresponding socket.



Connect the hydraulic conduits

- Twin-action lane marker
- Single-action coulter-pressure adjustment

Fitting of electronic control system

- Connect the 7-pin electrical cable to the front tank (item S1)
- Install the control panel in the tractor cab

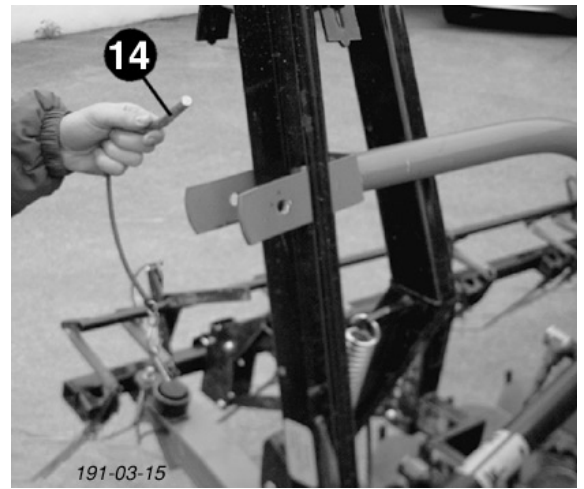


Transport position / working position

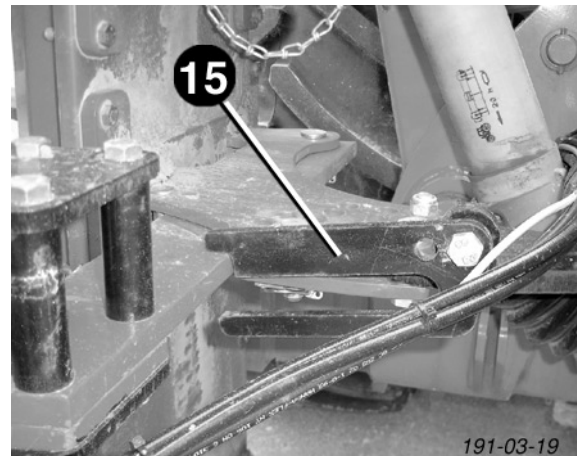
Changeover to transport position

Actuate the hydraulic control valve on the tractor

- The lane markers are swung inwards
- Secure lane marker with pin (14)



The locking flaps (15) must engage in position



Changeover to working position:

Release the lane-marker fixing element

- Remove pin (14) from stay

For further information

- See the section on usage

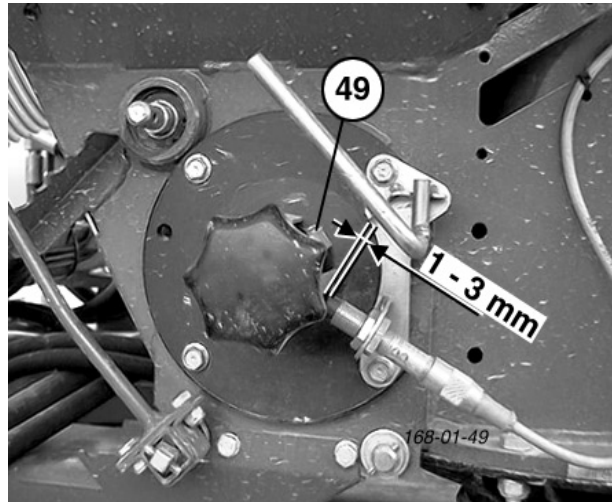
Description of a dosing unit

General points

The dosing-shaft monitoring system sends the driver a warning signal whenever the dosing shaft stops during operation (due to drive fault).

Note that the two transmitter elements (40) run synchronously.

- If the left-hand sensor detects a gap, its right-hand counterpart must also stop.
- Sensor clearance with respect to the transmitter element: 1 -3 mm

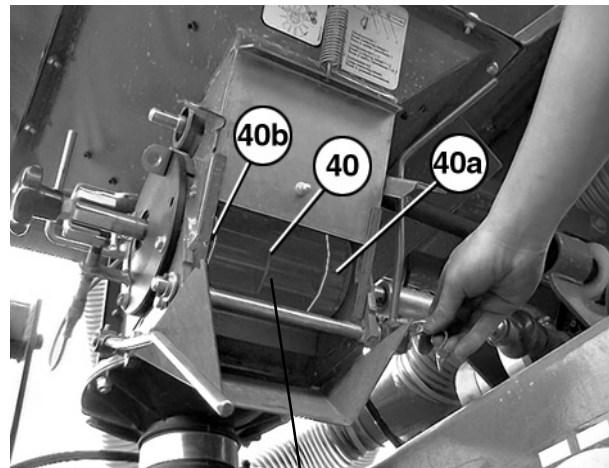


Standard equipment

- One coarse-dosing wheel (item 40)
- Two fine-dosing wheels (items 40a, 40b)

Optional equipment

- One coarse-dosing wheel (item 48b)
 - For large-sized seed, such as peas and beans
 - For seed quantities of 250 kg/ha +
- One coarse-dosing wheel (item 48c)
 - For hybrid seeds, such as linseed, grass, sunflowers
 - For reduced seed quantities of 30 - 40 kg/ha



Adjustment of seed quantity per hectare

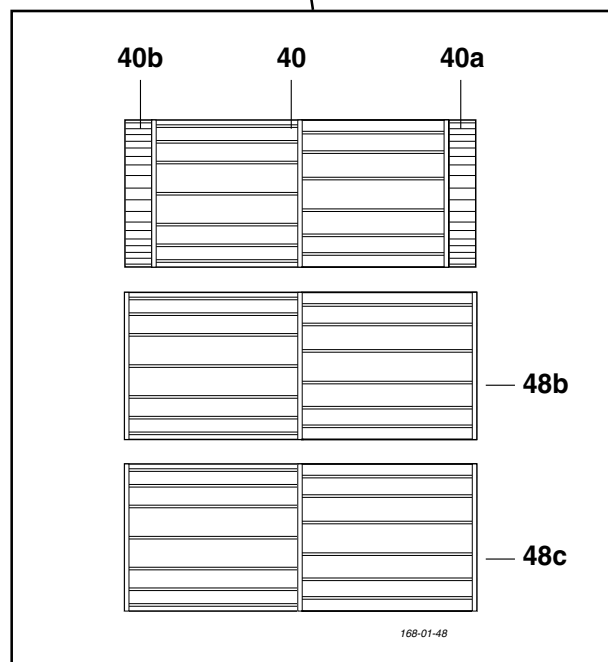
Rotation (calibrated)

The "rotation" procedure determines the quantity of seed (in kg) to be used per hectare, with respect to the current adjustment settings of the dosing unit. The dosing unit of the drilling machine can thus be adapted accurately to the desired seed quantity.

For a more detailed description, please refer to the operating instructions of the drilling machine's "Artemis" control system (in the appendix to these operating instructions).



- Before starting the "rotation" procedure, you should however observe the instructions on the following pages.
- Always carry out "rotation" with both dosing units at the same time. This permits immediate detection of any differences in sowing quantities.



Points to observe when adjusting the dosing units



- Note that the adjustments must be carried out on BOTH front-tank dosing units!

1. Selection of dosing wheels (I, II, III)

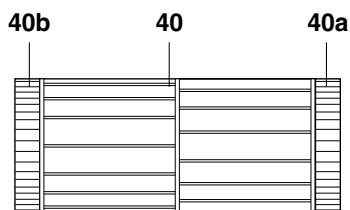
- Remove the safety pin (39)

- To secure the shaft in position, insert the safety pin (39) in the corresponding hole (I, II, III). Gently turn the star grip back and forth to displace the shaft.

Pos. III Coarse-dosing wheel (40)

Pos. II Fine-dosing wheels (40a, 40b)

Pos. I One fine-dosing wheel (40a)



In position I and II (fine-sowing), the coarse-dosing wheel must be locked in place

- Lever 45 in position B

In position III (coarse seed), the coarse-dosing wheel must turn synchronously

- Lever 45 in Position **A**

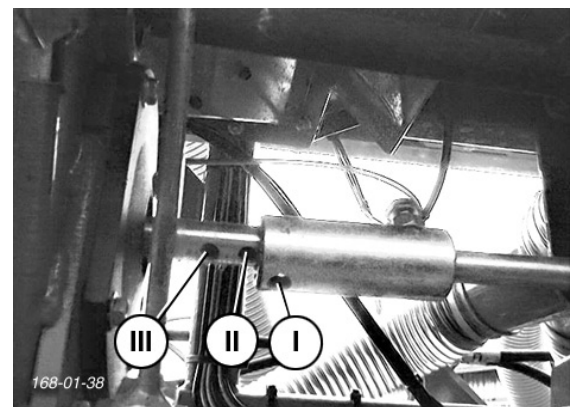
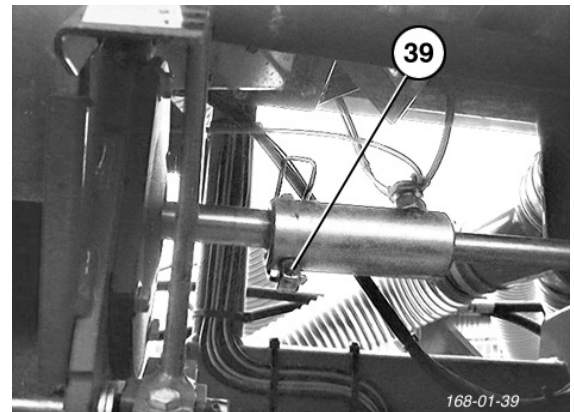
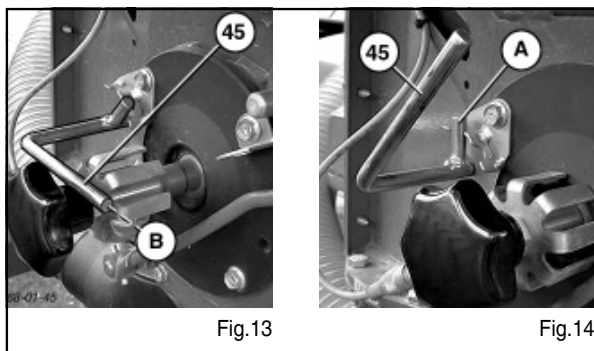


Fig.11

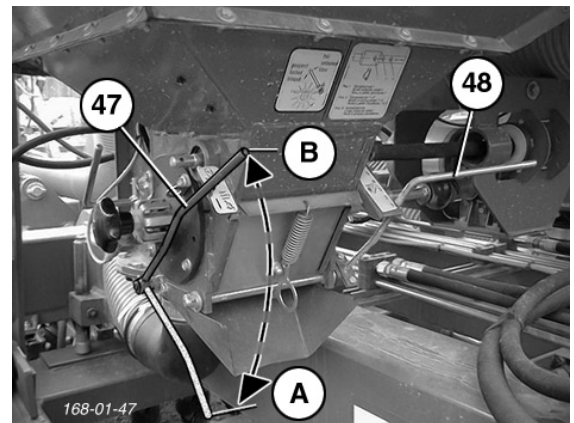


Fig.12

2. Position of rotation flaps (lever 47)

Always actuate both rotation flaps together, even if only one dosing device is being used.

- Rotation: Lever (47) in position B
- During operation: Lever (47) in position A

3. Position of the bottom flap (lever 48)

1 - 6 ratchet positions (see seed table)

The bottom flap of the dosing unit is spring-mounted in order to separate out foreign bodies in the seed. Open the bottom flap by one ratchet position if broken grains are detected during the rotation procedure.

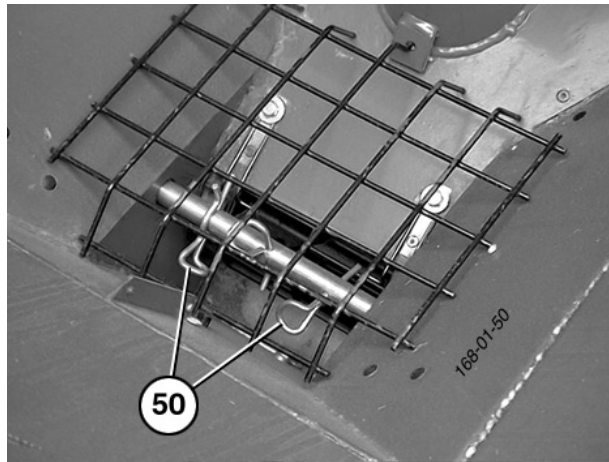
4. Fitting agitator fingers to the agitator shaft

The agitator shaft with finger elements ensures that the seed is fed smoothly and uniformly to the dosing wheels.

- The outermost agitator fingers (50) should be set to point inwards
- Remove the agitator fingers when handling
 - smooth-rolling peas and beans
 - oleaginous seed-types (the grains might otherwise be pulverised)
 - rapeseed

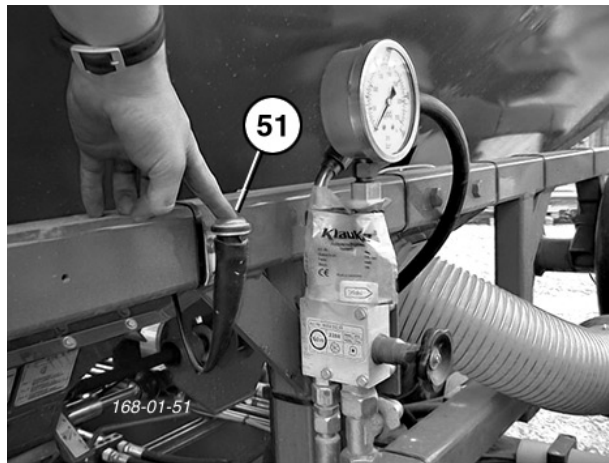
Button for short-term activation of dosing system

Press this button to rotate the agitator shafts and dosing wheels. This causes the dosing wheels to be filled with equal amounts of seed. This procedure must be carried out before the actual "rotation" process can begin.



Steps required before the "rotation" procedure

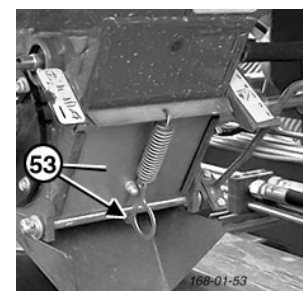
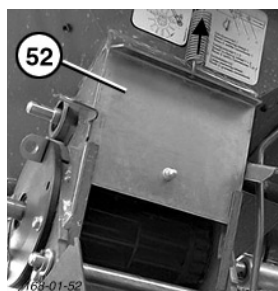
- Select dosing wheels (fig.11)
- Close both sliding elements (item 53)
- Adjust bottom flaps
- Fit agitator fingers (50) to agitator shaft (if required)
- Fill the tank with seed
- Place suitable containers (e.g. buckets) under the outlet points
- Open both rotation flaps (fig.12, item B)
- Keep the button (51) pressed until the seed begins to flow smoothly into the containers (after about 2 to 3 turns of the dosing wheels)
- Release the button, and tip back into the tank the seed that has been collected in the containers
- The preparations are now complete, and the "rotation" procedure can begin.



For a more detailed description, please refer to the operating instructions of the drilling machine's "Artemis" control system (in the appendix to these operating instructions).

Steps carried out after the "rotation" procedure

- Close both rotation flaps (fig.12, item A)
- Set the blower to the correct speed (fine seed / coarse seed)
- See appendix entitled "Adjusting the hydraulic blower drive"



Removal of remaining seed

- Place suitable containers (e.g. buckets) under the outlet points
- Open both sliding elements (item 52)
- Close both sliding elements (item 53) during operation

Lane markers

The disc lane markers are adjustable with respect to the centre of the tractor (fig. 10).

B = operating width

A = half operating width

R = space between rows

Adjusting the lane markers (fig. 15)

Clearance relative to coulter rail:

A = half operating width

Clearance relative to outer coulter:

$$\frac{A1 = \text{operating width} + \text{space between rows}}{2}$$

Twist the disc shaft (29) to increase and decrease the amount of grip in accordance with the heavy or light nature of the soil being worked.

Overload protection:

Use only M 10 x 35 DIN 601 4.6 shearing pin!

Using lane markers

- See also "Changeover to working position" in the section entitled "Attachment to the tractor"

The lane marker is lowered for operation in the field

- Automatic alternation (left and right)
- In "lower" position after each "raise" function

The relay impulse is emitted whenever both lane markers are folded against the end stop.

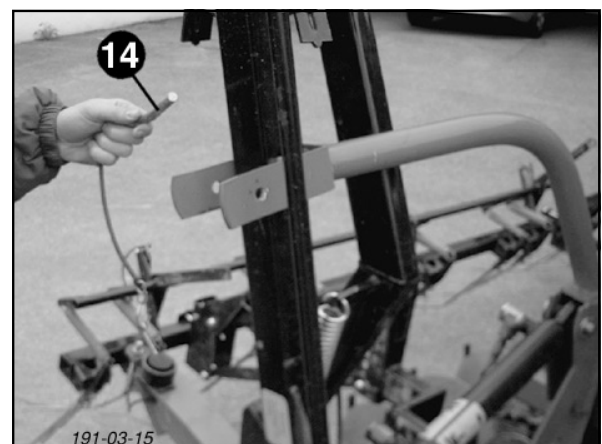
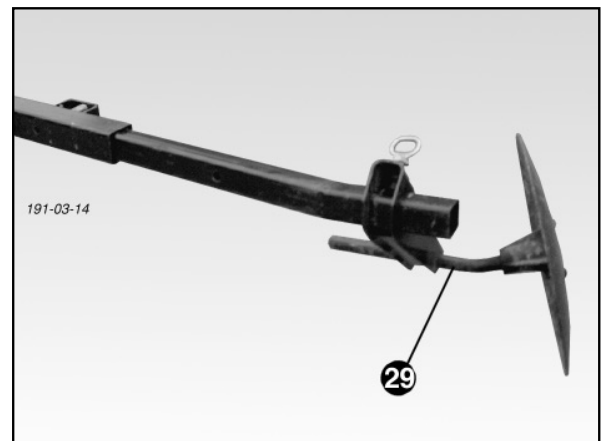
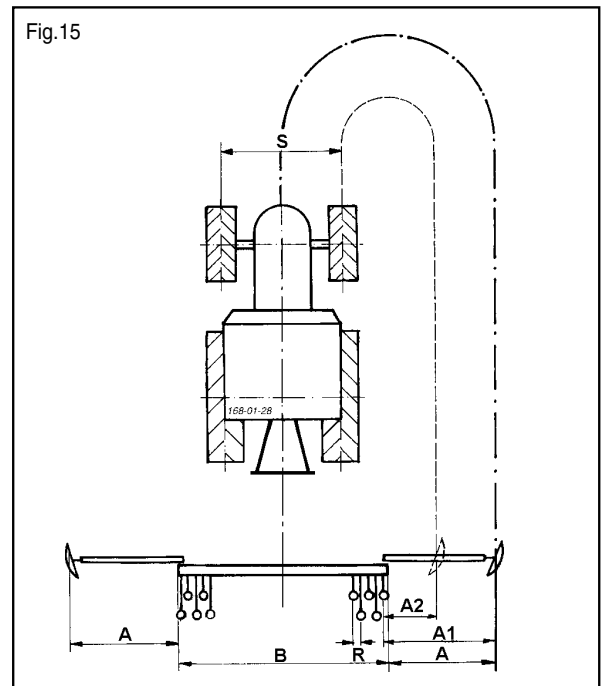
- During operation, if the lane marker has to be folded in to avoid obstacles
- Do not fold the lane marker right up to the end stop, but sufficiently to make it lie approximately vertical: this prevents the emission of a relay impulse; or fold the lane marker fully in and reduce the tramline rate.

When lowering the lane marker

- Switch the hydraulic control device to "float" whenever the "dead centre" position is exceeded.
- The hydraulic control device should also be left in its "float" position during the drilling process.

When transporting the unit

- Fold the lane markers fully inwards and insert pins to secure.



Distributor

The dosed seed is evenly allocated by the distributor according to the number of coulters, and fed to the coulters via the spiral hoses.

- Note that the hoses should slope downward towards the outer coulters

- DO NOT allow them to sag!



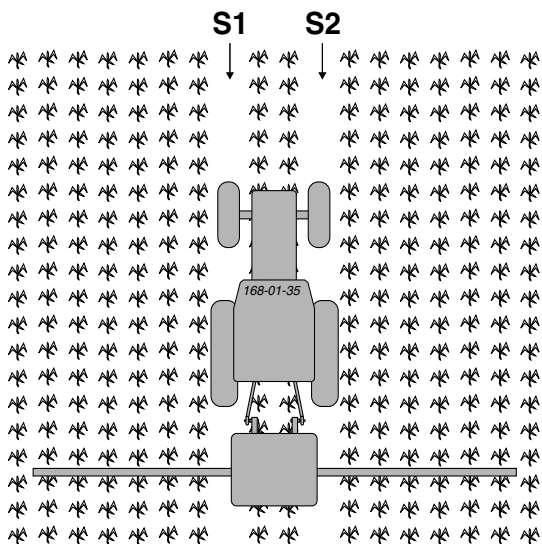
Tramlines

- The distances between tramlines are to be adapted to the operating width of the following implement (e.g. field sprayer).

When making tramlines, the areas around the wheel tracks (S1, S2) are left free of seed.

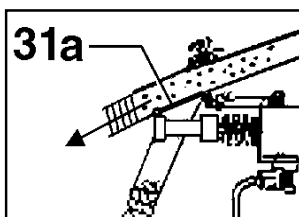
This is done by blocking the corresponding outlets (those nearest to the wheel tracks) for seed (31) and feeding the seed back into the main pipe conduit (31 b).

This seed is however not fed into the other rows as extra seed. The feed quantity of seed for drill operation (normal outlets) is reduced electronically.

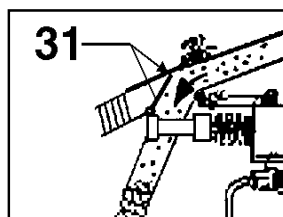


Making tramlines

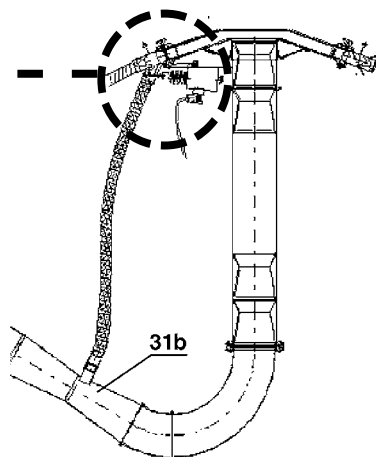
- Attach the grey connection elements (hoses) to the corresponding drill levers (lane width).
- One tramline outlet is the location of the lower lever used to adjust the flap (31, 31a), connected via a screw to the switch magnet.
- Set the screw length of the switch magnet so that the flap lies up against the outlet wall when the outlet is blocked (31).



Tramline outlet (31a) open, the seed drops onto the ground.

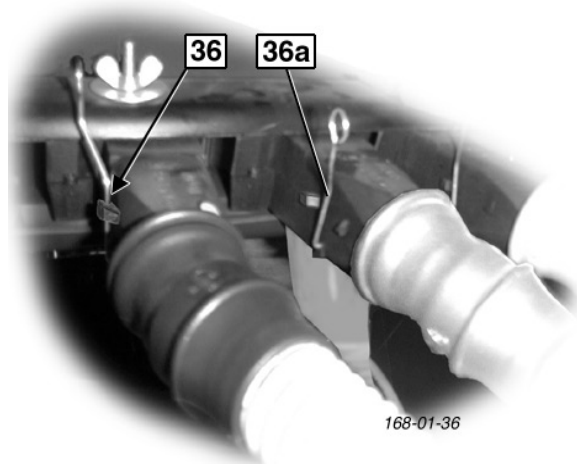


Tramline outlet (31) blocked, the seed does not drop onto the ground.



- DO NOT lock the upper flap lever on the tramline outlets (36a)!

The upper flap lever should be locked (36) on the normal outlets (open outlets without switch magnet).



Tail wheel and pulse generator

The tail wheel (31) drives a pulse generator. This supplies the electronic control unit with readings for a return traverse during the drilling process.

The electronic control unit constantly calculates the required quantity of seed for each section of the traverse if, for example, the drive-speed varies.

This traverse detection is highly accurate and free of fluctuations (drift), as no mechanical force is transferred.

Note:

- The blower must run at a high enough speed.

If the running speed of the blower is too low, no seed is released from the container (blockage prevention).

- Raise the tail wheel and lock it in place when transporting the unit.

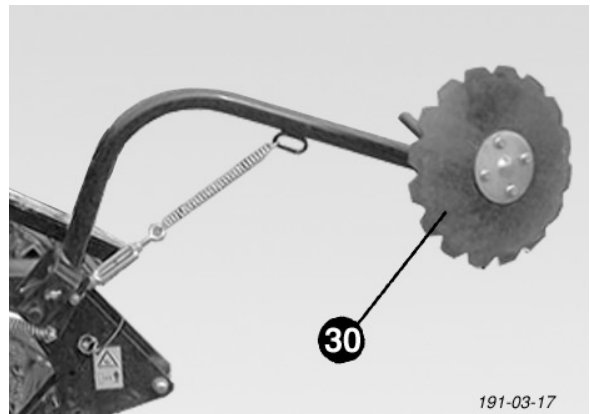


Tramline marking ¹⁾

If the seed has not yet sprouted (i.e. if no plants are visible yet), the tramline is normally not detectable. This makes further work on the field – such as crop-spraying – difficult.

It is therefore advisable to use both tramline-markers (30) during the drilling process. These discs mark the course of the tramline.

- Adjust the discs to match the distance between tram lines.
- This adjustment should match the operating width of the next implement to be used (e.g. field sprayer).
- Both disc arms
 - should be swivelled upwards and locked in place when transporting the unit
 - should be released from the upper rest position for operation.



Adjustment of coulter pressure / seed depth

- Hydraulically adjustable by means of single-action control device
- Can also be adjusted by changing the position of the spring on the drill lever arm
- The adjustment range is limited by the hole pattern

Adjusting the coulter rail

- In order to ensure that the coulters have an optimum upward and downward range of movement, the sowing rail must be set to a height of 38 to 40 cm.
- Adjust the sowing rail so that the rising pipe lies vertical in relation to the distributor head.

Coulter-changeover system

With „front hopper“ operation, the trailing coulters and wide sowing coulters can be replaced without the use of tools.

- Unhook the spring (33/1) and pull on the spring retention pin (33/2).
- Re-secure the pin after assembling.

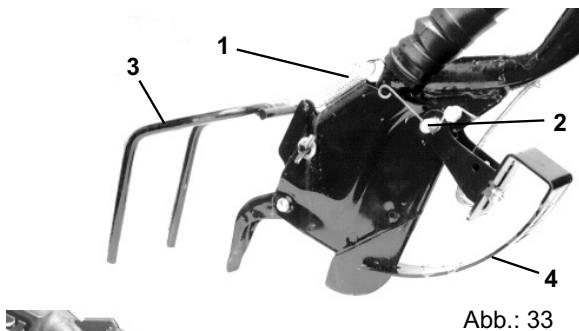


Abb.: 33

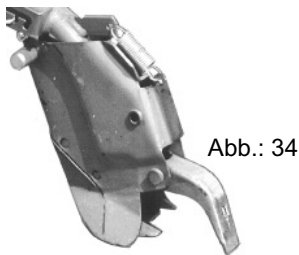


Abb.: 34

Trailing coulters (fig. 33) – normal coulters.

Adjustable depth-limiters can be fitted to the trailing coulters for surface seed distribution (33/4). This operation can also be carried out after the machine has entered service.

Wide sowing coulters (fig. 34)

Width setting approx. 8.5 cm, for wide-area, increased seed distribution; suitable for use on clean, fine, crumbly soil.

Trailing and wide sowing coulters are equipped with a blockage-prevention support; and can also be spring-loaded to make them fold forwards to prevent buckling when the machine is lowered.

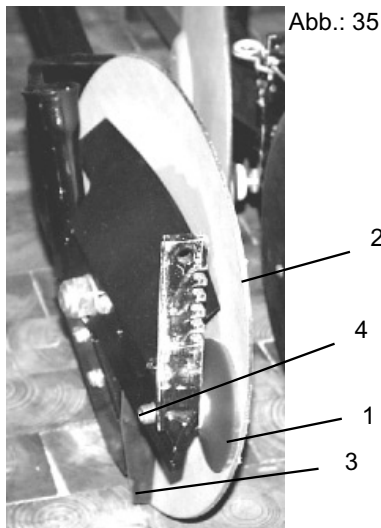


Abb.: 35

Single-disc coulters (fig. 35) – useful when dealing with long-stemmed organic residues.

The rotating scraper (35/1) cleans the inner face of the tilling coulter (35/2) to remove accumulations of soil. The convex shape of the outer surface creates a self-cleaning effect.

The rubber flaps (35/3) prevent seed in the channel from jumping out.

Screw the threaded adjuster (35/4) in or out to change the pressure setting of the rotating scraper. Re-secure the threaded adjuster with the locknut.



Ensure that the plastic disc of the rotating scraper is not also aligned towards the front, as this would have a braking effect on the tilling coulter.

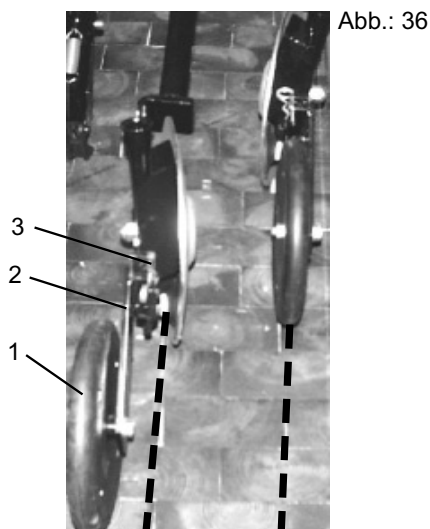


Abb.: 36

Pressure roller (fig. 36) (optional item)

The pressure roller (36/1) can be used to push the grains of seed inside the channel, or the seed channel can be shut off by the rollers.

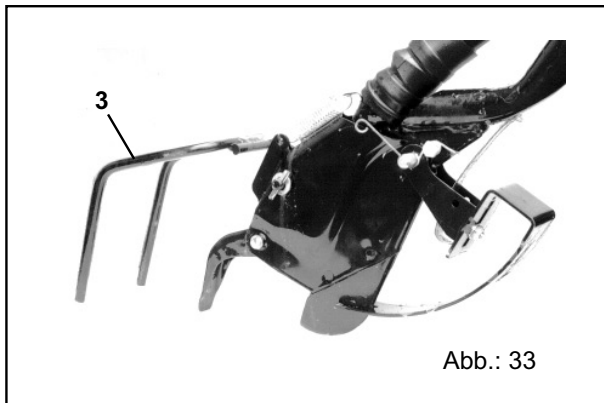
The seed channel is factory-configured to ensure that the seed is pushed down into the channel.

If the pressure roller is allowed to run next to the seed channel, this is shut off by the roller.

The roller (36/1) can be bolted to its holder (36/2) in a different position for this purpose.

The pressure roller also increases the working depth of the single-disc sowing coulters.

The depth setting can be adjusted by removing the spring retention pin (36/3) and reinserting it at adjustment intervals of 1 cm.

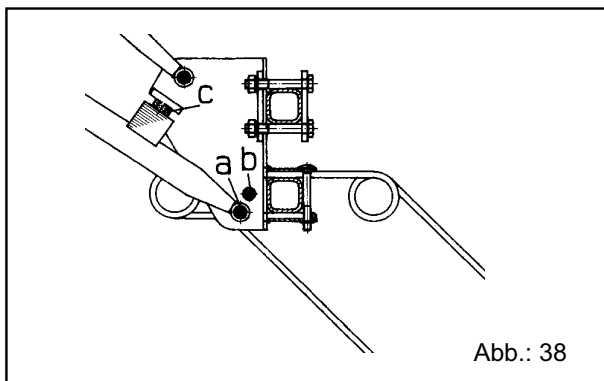


Types of rake

Coultter rake (fig. 33): For use with trailing coulters only

— Designed for sprung attachment to the coulters of the back row

— For use on light to medium soil without crop residues.

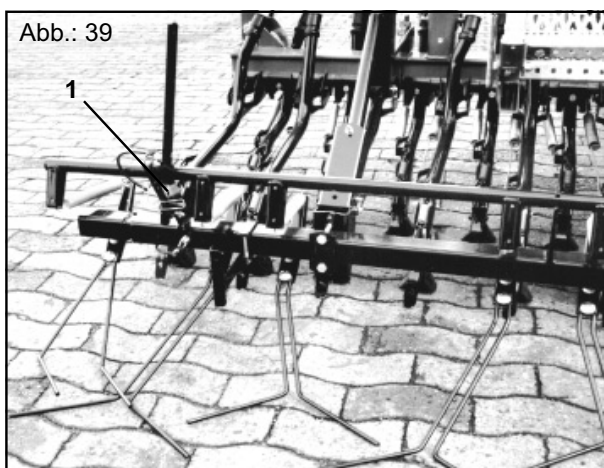


Weeder (fig. 38): two-part

- Double-row, with trailing tines

- For medium and heavy soils

Tine pressure can be varied by pulling out and reinserting the lower rake struts (38/a+b) and adjusting or removing the nut (38/c) on the buffer.



Grader rake (fig. 39):

- Suitable for all types of soil and operating conditions

The individually-sprung tine elements are centrally adjustable. Select pressure (intensity) by inserting the pin into a hole in the bar (39/1).

Remember to fit the tine protector! (optional item, fig. 40).



Usage tips (quick startup guide)

Preparing the implement for work

- Rut loosener
- Soil preparation tools
- Tail wheel
- Lane markers
- Tramline switching
- Tramline marker
- Blower speed

Check adjustment settings (see „Rotation“)

- Dosing-wheel position
- coarse-dosing wheels locked in place when handling fine seed
- Bottom flaps
- Agitator shafts
- Remove agitator fingers when handling rapeseed
- Rotation flaps

- Switch on the electronic system

- Check tramline rate

Correct turning speed

- Apply at least half-throttle from startup
- Then maintain a constant speed

Observe start of sowing process

- The seed normally takes some time to get from

the dosing unit to the sowing coulters (approx. 1 s / 2 m).

However, the patented pre-dosing process used in the front tank F means that there is no need to take this into account. Seed is planted in the soil right from the start.

This is also an advantage during breaks in operation.

Adjust the pre-dosing mechanism

- See section 4.2.3 of „Artemis“ operating instructions

Carry out checks a short time after sowing begins to ensure

- that all coulters are performing their sowing function
- the seed depth is correct
- During operation
- Check the coulters at regular intervals for possible signs of blockage

Adapt driving speed to operating conditions

- so that the seed is evenly spread.

always leave the hydraulic control device for the lane markers in “float” mode during operation.

When filling the seed hopper, ensure that

no foreign bodies (paper litter, labels) get into the hopper.

the hopper cover remains closed during operation.

the filling level of the hopper is monitored (automatic low-level alarm).

Empty the seed hopper completely whenever possible

- particularly before long periods of inactivity
- given the moisture-absorbent characteristics of seed

so as not to attract rodents and other pests

IMPORTANT: Seed dressing agent is a toxic irritant!

Remove remains of seed from the dosing wheels

- Lower the drilling machine
- Place a collecting container under the discharge hopper
- Open slider
- Rotate dosing wheels slightly (with star grip)
- Briefly activate the blower to remove any remains of seed

Adjusting the hydraulic blower drive

Home position - initial adjustment:

Drilling machines with hydraulic blower drive must be set to the tractor-specific rated drive speed before initial startup.

The following speed ratings apply to drilling machines.

Device type	Blower-speed rating corresponds to power take-off shaft 1000 rpm	
	Coarse seed minimum	Fine seed speed range
T401 K2 - T501 K2	3500	2300
T502 K2 - T602 K2	3500	2800 - 3200

All machines are delivered factory-adjusted, and normally operate within the correct turning-speed range.

Reliable and precise adjustment is however only possible after taking into account the tractor used to tow the implement, making this procedure vital for correct operation.



Correct adjustment is vital to prevent possible sowing errors due to insufficient turning speed, or blower damage caused by excess speed.

The adjustment (checking) procedure is to be carried out in accordance with the following description.

I. Pre-adjustment checks

11. The tractor must fulfil the following basic requirements.
 - a. Oil circuit operating independently of the lifting-mechanism hydraulics, with minimum oil feed rate of 35 l/min (e.g. Fendt Favorit 600 with second hydraulic circuit).
 - b. or closed-circuit / Load Sensing hydraulic system with adjustable oil feed rate (e.g. John Deere, Fendt Favorit 800 or Case Magnum with hydraulic system pressure of at least 150 bar)

- c. Free return to hydraulic-oil tank via hydraulic coupling (supplied), size 4, min. pipe diameter: 22 mm.
 - Connect according to indications of tractor manufacturer.

(RABE service engineers are not responsible for the installation on the tractor of the plug-in hydraulic coupling for the return conduit.)

- d. Ask the tractor manufacturer if the hydraulic system is suitable for use with hydraulic motors.

- e. Hydraulic-oil cooler

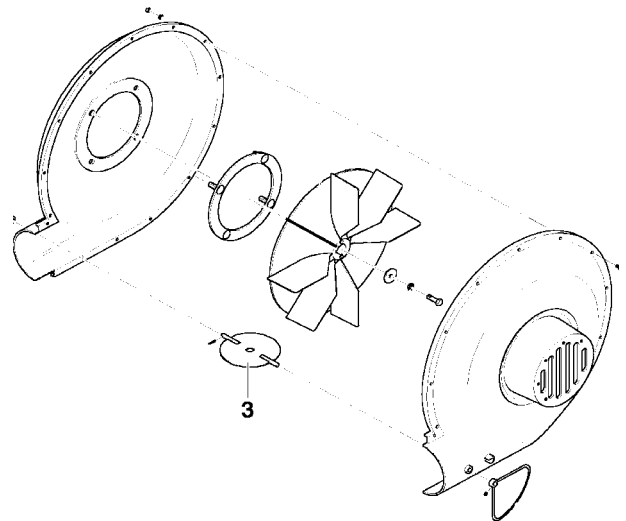
I.2. Wait for the hydraulic oil to warm up before adjusting the turning speed.

I.3. Connect the hydraulic system to the tractor's highest-priority control device if possible.

II. Adjustment procedure



IMPORTANT: When operating drilling machines with hydraulic blower drive, the butterfly valve should be kept open when working with either coarse or fine seed.



The butterfly valve (3) should be removed or fixed in position.

II. 1 Adjustment process for coarse seed

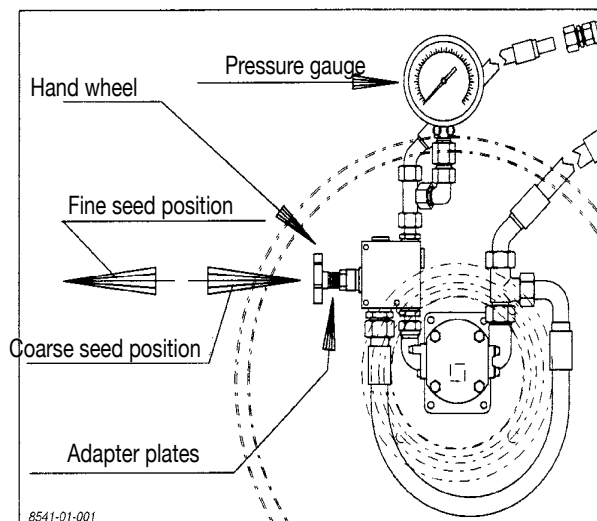


Fig. 1

Mounted machine

1. Completely turn the hand wheel inwards (on the stop) to the control valve.
2. Set the oil volume lever on the tractor to the lowest flow amount – ca. 1/3
3. Set the fan in operation (motor speed for power take-off $n = 1000$ U/min)
4. Check the fan speed with non-contacting speed measure
For nominal speed see table 1.
Checking to be done only in operation heated conditions.
For measuring point see Fig. 2

Speed measurement – pressure measurement

5. Gradually increase the oil volume to the tractor if the fan nominal speed is not reached.

If the required nominal speed is not reached in this way a further increase in the nominal speed can be reached only by removing individual adapter plates under the hand wheel of the control valve (Fig. 1).

6. Lower the motor speed to power take-off $n = 850$ U/min.

At this speed the fan control (sound + light) may not respond; if it does then increase the oil volume to the tractor slightly (warning out)

Watch the adjustment!!

1. Position of the oil volume operating handle
2. Oil pressure display on the seed drill

(Marking on the pressure gauge by marking arrow delivered at the same time)

GROB

Warning!

Adjustment only valid for the tractor being used.

When the tractor is changed make a new adjustment.

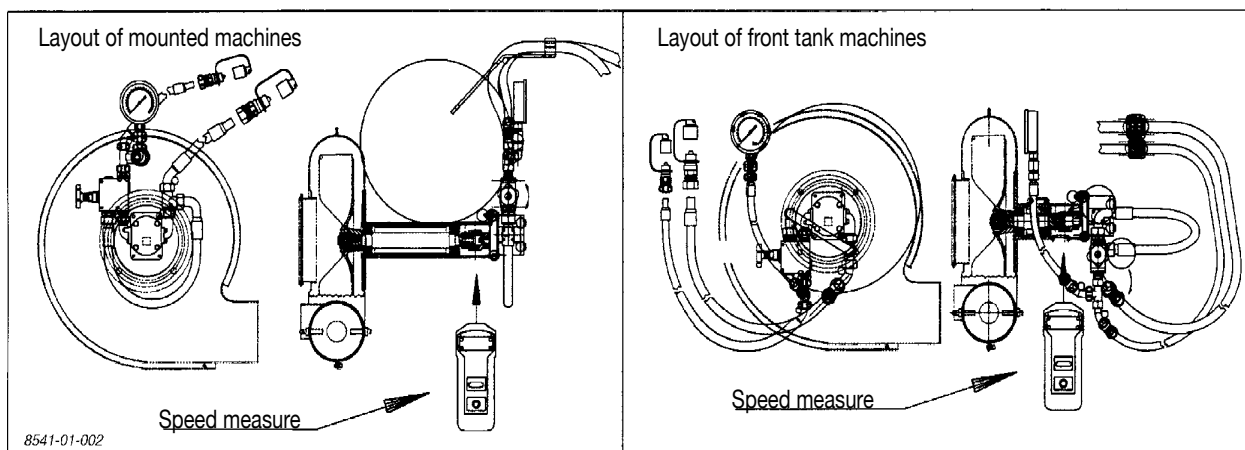


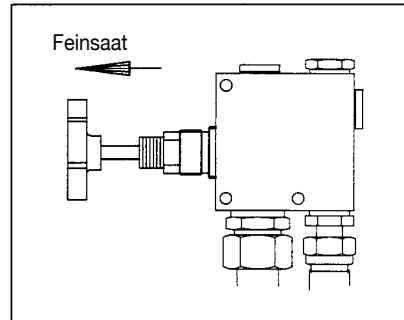
Fig. 2

II.2 Adjustment process for fine seed

For seed drills with hydraulic fan drives reduced air volume is not reached by regulating the butterfly valve, but by reducing the speed of the fan.

Adjustment if carried out as follows:

1. Turn the hand wheel on the control valve completely outwards (on the stop) Fig 3.
2. The oil volume adjustment on the tractor remains unchanged as already mentioned.
3. The required reduced fan speed is then automatically reached by the valve. Should the fan speed for fine seed be too low, the fan speed can be increased by turning the hand wheel as shown in table 1.



Watch the adjustments!!

1. Position of the oil volume operating handle
2. Oil pressure display on the seed drill
(Marking on the pressure gauge by marking arrow delivered at the same time)



A correctly adjusted hydraulic fan drive works in the following pressure ranges

Operating position	Pressure gauge	
	up to 3 m	4m to 6 m
Coarse seed	70 - 90 bar	80 - 100 bar
Fine seed	30 - 40 bar	30 - 50 bar

Warning !!!

In order to reach a **constant fan speed** in tractors with a load sensing system all further users (blade pressure – gauge marking – preover running marking) should be **reduced to the lowest oil amount** for each application (adjustment according to the tractor)

Important!!

For hydraulic fan drives the seed drill must be fitted with a fan monitor and the monitored speed adjusted to 2300 U/min (see Multitronic II operating manual).

It should be checked if the hydraulic drive is expanded.

How to adjust

Note the following before starting up for the first time:

- The adjustment screw on the regulating valve must be set to "0" on the scale (minimum feed quantity).

Hydraulic blower drive with Load Sensing control

To operate the hydraulic blower drive

- a tractor with at least 35 l/min capacity is necessary.

Because of the priority switching of the hydraulic system, tractors with a lower hydraulic oil flow rate could suffer speed drop when lifting and turning the machine.

Priority 1: steering, priority 2: lifting gear, etc)

Speed drop can

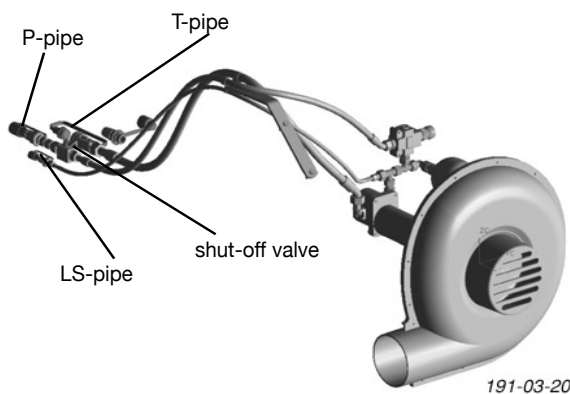
- block seed lines (lifting the machine during travel is necessary)
- subject the tail wheel to an unwanted speed variation.

This problem can be remedied if a **Load Sensing System** operates the blower drive

Note: Tractor must have an LS System available).

Technical details

- Condition: tractor with LS hydraulic system
- Drilling machine with blower monitoring (Multitronic b or c)
- To that the LS drive is fitted with an additional line (control line). This line regulates a constant pressure difference between the LS and the P lines. This will constantly keep the flow rate for this cycle and therefore the speed independent of other cycles. Furthermore, only the amount necessary for the hydraulic motor is delivered. A bypass line that conducts the oil in a circle and consequent unnecessary heating is no longer required.



Max. oil flow rate	35 l/min
Max. blower speed	4250 rpm
Min. blower speed	1200 rpm

Hydraulic connections

P line (pressure line)	Plug BG 4
T line (tank line)	Coupler BG 4 (factory fitted)
	Plug BG 4 (enclosed)
.S line	Plug BG 2

After initial startup:

- Use this screw to adjust the turning speed.

Reliable and precise adjustment is only possible after taking into account the tractor used to tow the implement.

IMPORTANT:



Correct adjustment is vital to prevent possible sowing errors due to insufficient turning speed, or blower damage caused by excess speed.

Blower-speed rating	
Coarse seed minimum	Fine seed speed range
3500	2800 -3200

The following speed ratings apply to standard machines:

Shutdown of LS drives when operating hydraulic motors is normally only possible by:

- Pulling out the P-conduit.
- Shutdown of the tractor

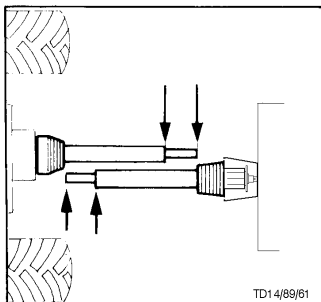
To avoid this situation, the P-conduit is fitted (at the tractor end) with a shutoff tap. The system should therefore only ever be turned off at the shutoff tap.

DRIVESHAFT

Important! Only use the indicated or accompanying drive shaft, otherwise the right to claim under guarantee for any possible damage does not exist.

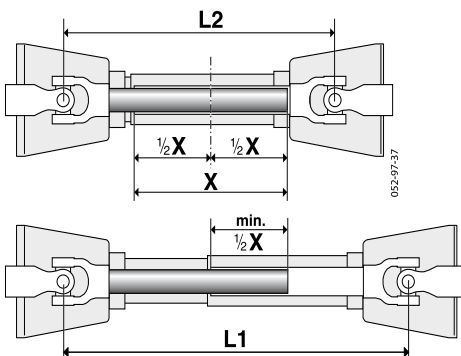
Matching driveshaft to tractor

To determine the actual length required, hold the two halves of the driveshaft side by side.



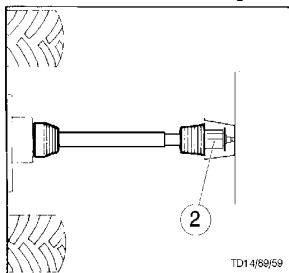
Procedure for cutting to length

- To determine length required, set implement in closest working position (L2) to tractor, hold driveshaft halves side by side and mark off.



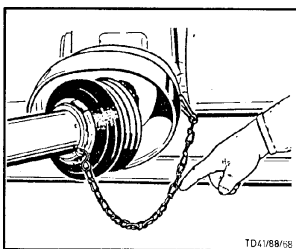
Important!

- Note the maximum operating length (L1)
 - Try to attain the greatest possible shaft overlap (min. $\frac{1}{2} X$)!
- Shorten inside and outside tube guard by the same amount.
- Fit torque limiter (2) of drive shaft to implement end of driveshaft!
- Always check that drive shaft locks are securely engaged before starting work.



Retaining chain

- Use chain to prevent tube guard from rotating. Take care that chain does not impede driveshaft pivoting.



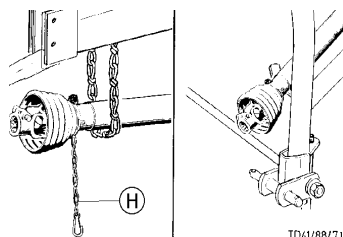
Rules for working

Never exceed the maximum p. t. o. speed when using the implement.

- When the p.t.o. is switched off, the implement hitched up may not stop at once.

Do not go close to the implement until all motion has stopped; only then may work be done on it.

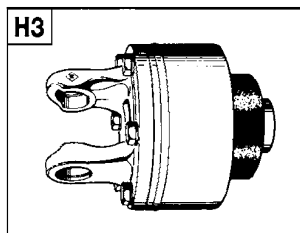
- When the implement is parked, either remove the driveshaft and store it, or secure it with a chain. (Do not use retaining chain (H) for this).



1) How a cam type cut out safety clutch works:

This overload clutch switches the torque transmitted to zero if overloaded. To revert to normal operation, stop the p.t.o. drive briefly.

The clutch reengages at a speed below 200 rpm.



IMPORTANT !

The overload clutch on the driveshaft is not a "Full up" indicator. It is purely a torque limiter designed to protect the implement against damage.

Driving the right way will avoid triggering the clutch too often, and thus causing unnecessary wear on it and the implement.

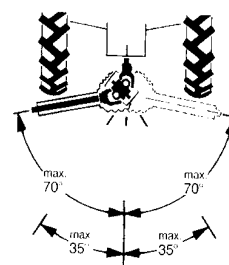
2) Wide-angle joint :

Maximum angle of deflection when working/stationary : 70°

3) Standard joint :

Maximum angle of deflection when stationary: 90°

Maximum angle of deflection when working: 35°

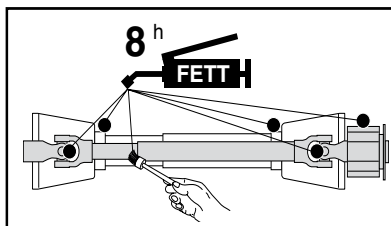


Maintenance

Replace worn-out covers/guards at once.

- Lubricate with a brand-name grease before starting work and every 8 hours worked.
- Before any extended period of non-use, clean and lubricate driveshaft.

For winter working, grease the tube guards, to avoid them freezing together.



- Important for driveshafts with friction clutch

Prior to initial operation and after long periods out of use, check friction clutch for proper function.

a.) Measure dimension „L“ at compression spring of K90, K90/4 and K94/1 or at set screw of K92E and K92/4E.

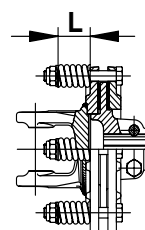
b.) Loosen screws to release the pressure on the friction disk.

Slip the clutch.

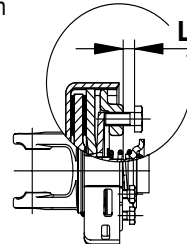
c.) Tighten set screws to dimension „L“.

Clutch is ready for use.

K90, K90/4, K94/1



K92E, K92/4E



Safety precautions

Do not allow anyone to stand between the tractor and the implement during coupling or uncoupling, even if this is to allow operation of the external hydraulic controls.

Danger of injury:

Always set the tractor's hydraulic mechanism to "attitude control" before coupling or uncoupling.

Check the tractor and implement before each startup to ensure that they are in perfect working order for driving and operation. Observe the maximum axle loads (with full storage tank) and maximum permitted total weight. Ensure that all safety devices are present and fitted before the machine is transported!

Before starting or operating the implement, always check to ensure that no one is standing within its turning circle or operating area. (This also applies to the lane markers!)

DO NOT stand or ride on the implement or remain within its turning circle or operating area.

When leaving the tractor unattended, and before carrying out adjustments or maintenance work, lower the implement at front and back, switch off the engine and remove the ignition key.

Note that there is a danger of crushing and cutting injuries occurring in the area of the three-point attachment and the hydraulic lifting and folding mechanism, and during lane marker operation.

Beware of after-running of some of the coulters and rollers when the implement is lifted at the end of a fast run. Do not approach until these moving parts have come to a complete stop.

Handle hydraulic components and conduits with care, as they become hot during operation.

If the blower begins to rattle or vibrate, shut down the hydraulic system immediately and check the blade wheel of the blower for correct dynamic balancing.

Note that incorrect balancing is dangerous, and can result in irreparable damage to the blower. Before carrying out maintenance or adjustment work on the dosing devices – or driving on public roads – switch off the electronic system (position "0") and disconnect the system from the power supply (by pulling out the plug-in connection for the power supply -/ implement cable loom).

Disable the tractor's hydraulic control system to prevent accidental operation while the implement is being towed along public roads.

Always lower the implement at both front and back BEFORE carrying out adjustment or any other work.

When filling with treated seed and cleaning the machine with compressed air, note that seed dressing agent is a toxic irritant. Keep sensitive body parts well protected. (e.g. goggles, face mask and gloves). Before operating for the first time – or after a long period out of use – check all screws and bolts for tightness, make sure that all bearings are sufficiently greased, examine the hydraulic system for leaks and check tyre pressures.

- Maximum length of combination (tractor + implement): 18m

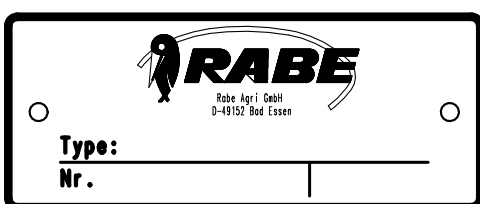
- Maximum width: 3m

- Maximum height 4 m

- Maximum total weight of combination 16t, of which 20% on front axle.

The operating pressure of the hydraulic system must not exceed 200 bar.


The machine identification plate (9.1) contains certification details, and must not be altered or made illegible.





9.1


Arrangement of warning signs on the device

For key to symbols, see following warning signs.

- 

A Rotating-flap adjustment
Order-No. 9998.01.24
- 

B Bottom-flap adjustment
Order-No. 9998.01.23
- 

C Dosing-wheel adjustment
Order-No. 9998.01.18
- 

D Dosing-wheel locking
Order-No. 9998.01.67

