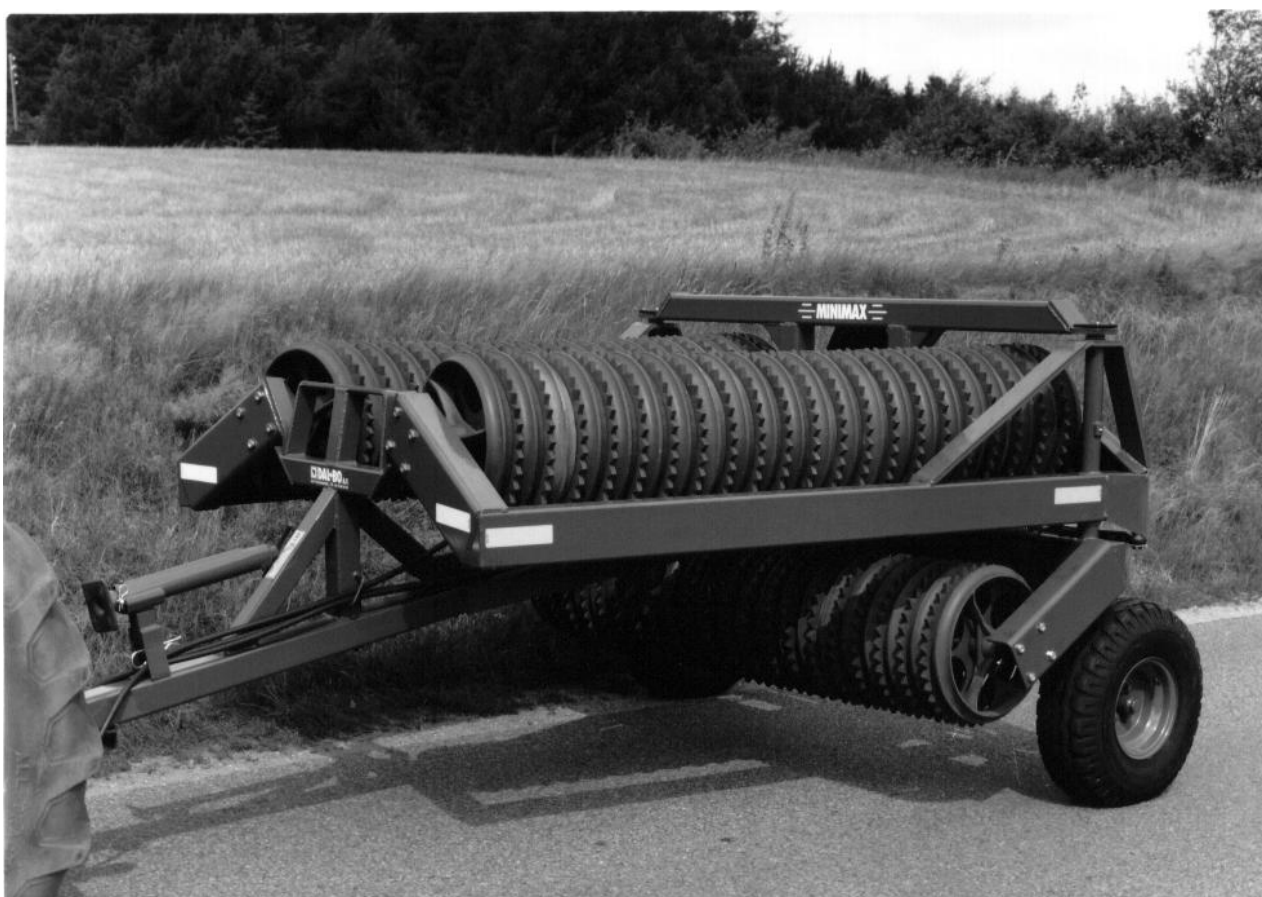




# MINIMAX Standard



**DK - 530/630 CM**

## DAL-BO COMPACT 530/630 cm

Congratulations on your new COMPACT. For **safety reasons** and in order to obtain the optimum use from the machine, you should read through the following instructions **before** putting the machine into operation.

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Items which are essential from a safety point of view are preceded by a bold exclamation mark **∇**.

- ∇ Tighten all nuts after a few hours' use.
- ∇ The hydraulic system must not be operated unless the roller is securely connected to a tractor.
- ∇ The machine may be operated only when the driver is seated on the tractor, and there must be no-one in the vicinity of the tractor or machine.
- ∇ The machine must not be operated by children.

### Your COMPACT has:

Serial number: \_\_\_\_\_ Type description: \_\_\_\_\_  
 Month of manufacture: \_\_\_\_\_ Net weight kg: \_\_\_\_\_

In the event of inquiries regarding spare parts or service, please always quote the serial number.

At the end you will find a list of parts which will help you when ordering and provides a clear picture of the machine's components.

## EU COMPLIANCE DECLARATION

**Maskinfabriken DAL-BO A/S**  
**DK-7183 Randbøl**

hereby declares that the above machine has been manufactured in conformity with the provisions of the Council's directive of 14 June 1989 regarding harmonisation of Member States' machinery legislation (89/392/EEC), as amended on 20 June 1991 (91/368/EEC), with special reference to appendix 1 of the directive, concerning essential health and safety requirements for the design and manufacture of machinery.

Maskinfabriken DAL-BO A/S \_\_\_\_\_

Kaj Pedersen, Director

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**Application:**

The Compact is used before and after sowing to break up clods and press down stones; it also improves germination. The Compact can be equipped with a hydraulically controlled levelling bar, as an optional extra. It makes the machine very effective on rough-ploughed land.

It is also used with advantage after stubble cultivation, to expedite the rotting of straw and stubble remains and also the germination of waste- and weed-seeds. For rolling very loose soil, it must be fitted with at least 50 cm rings.

The Compact is also used for rolling grasslands in the spring. This should be done as soon as the land can be driven over. Rolling eliminates stones and lumps of earth from the surface, so that they do not cause obstruction later when the grass is mowed. At the same time, the Compact breaks up the surface of the soil, allowing air to reach the roots.



The Compact must **not** be used as a transport vehicle, pile driver, hydraulic press or the like. If you are in any doubt, ask your dealer or DAL-BO.



The Compact must **not** be used to roll areas of road or similar hard surfaces.



When using the roller the operator must sit in the driver's seat on the tractor, and there must be **no** other people either on or in the immediate vicinity of the roller.

**Noise:**

The roller may make some noise when rolling with worn Cambridge rings, but this will be far below the danger limit for tractor drivers.

**Dust:**

A lot of dust can be raised during rolling under very dry conditions. It is recommended that either the tractor doors and windows be closed or a dust mask worn.

**Handling:**

The Compact is delivered ready for use. If necessary, the wheels can be removed for transport; they should be refitted immediately after delivery. The support leg must be screwed right up for transport by road vehicle, etc., so that the roller rests on its nose.

The maximum width of the machine is 250 cm.

- ▽ Three yellow labels showing a lifting hook indicate where hooks must be attached in order to lift the Compact safely. The machine's total weight is given on page 1. Do not use slings that are too short.

**Start-up:**

No adjustments or similar action is necessary before starting to use the Compact. The roller is drawn by the pickup-hitch of the tractor; which should be about 40 cm above the ground.

- ▽ Remember to secure the draw bolt with a split pin or similar device. Connect the hydraulic hose (marked white) to a single-acting valve. Connect the other two hoses (marked red) to a double-acting valve.

All the hoses are fitted with 1/2" connectors. If the tractor is not equipped for these, your dealer can help. A maximum pump pressure of 160 bar is required.

- ▽ Defective hoses must be repaired or replaced immediately. A broken hose can in bad cases cause personal injury or mechanical damage to the roller.

**Operation:**

All operation must take place from the driver's seat and there must be no-one else in the vicinity of the machine. The change from transport to operational mode, and vice versa, must be made while stationary on more or less level ground, with the tractor almost idling. To unfold, operate first the single-acting valve, so that the side sections are lifted clear of their transport bearings; use the double-acting valve to unfold the side sections completely. Then lower the pressure from the single-acting valve, so that the roller tilts down to the ground. It is advantageous to allow the valves to float freely during rolling, if possible.

To raise the roller, apply the pressure first with the double-acting valve, so that the long cylinder across the roller is completely compressed. Then lift the roller completely vertical with the single-acting valve. Fold the side sections in by means of the double-acting valve. Lastly, lower them into their transport bearings using the single-acting valve.

The roller must be raised only for transport. It is not necessary to raise it when turning. It can also run backwards in the operating position.

**Recommended speed of travel:** 4-5 mph. Move slowly over stony ground.

## Maintenance:

Tighten **all the screws**, and also **hub nuts**, after the first working day.

Chassis - 3 lubrication points - lubricate daily.

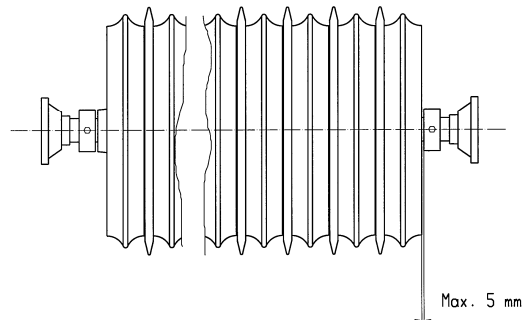
Roller bearings - 6 units - lubricate every 50 operating hours.

Lubricate the wheel bearings once per season.

Adjust the wheel bearings once a year, following the instructions for replacement of bearings, points 1, 2, 8, 9, 10 and 11.

After the first season the surface of the rings will have worn smooth and they will therefore take up slightly less space. Adjust the resulting clearance down to max. 5 mm by moving the stop rings (see fig. 1). Remember to tighten the stop ring screws well. It is advisable to slacken and retighten the screws a couple of times so that they grip better.

Fig. 1:



Check the **air pressure in the tyres** before the season. It should be 5.2 bar.

**If the Compact is parked outdoors for a prolonged period it should be left in the operating position** in order to avoid rust damage to the piston rods.

For prolonged indoor parking in the transport position, the piston rods should be lubricated with oil or grease.

## REPAIRS:

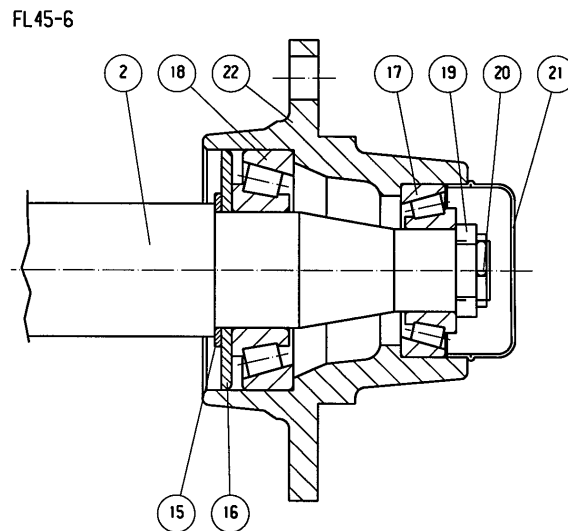
### Wheels:

For changing wheels owing to punctures, etc., set the machine in the operating position. This enables the wheel to be removed without using a jack.

Changing the wheel bearings, see fig. 2.

1. Unscrew the hub cap, pos. 21.
2. Release the castle nut, pos. 19, and unscrew it.
3. The axle, pos. 2, can now be knocked out.
4. The bearings, pos. 17 and 18, can now be removed.
5. Fit the outer races for the bearings, pos. 17 and 18, in the hub housing, pos. 8.
6. Mount the inner ring for the bearing, pos. 18, on the axle, pos. 2, and fit the axle in the hub housing.
7. Mount the inner ring for the bearing, pos. 17, on the axle, pos. 2.
8. Fit the castle nut, pos. 19, and screw the nut onto the axle, pos. 2, rotating the hub housing, pos. 22, at the same time. Tighten the lock nut until it is difficult to rotate the hub housing, pos. 22. Then loosen the lock nut until the hub housing, can again be rotated freely.
9. Secure the castle nut with the split pin, pos. 20.
10. Fit the hub cap, pos. 21.
11. Lubricate the hub with ball bearing grease.

Fig. 2:



### **Bearings, rings and shafts:**

**Dismounting roller shaft** with rings for replacement of bearings, rings or shaft. This should be done in the workshop.



### **Side section - DISMOUNTING:**

For this, an approved crane capable of lifting at least 800 kg is required.

The roller should be positioned with the appropriate section beneath the crane - preferably coupled to a tractor, otherwise, a hydraulic pump with a single-acting and a double-acting valve is needed. It must be able to deliver a pressure of at least 170 bar. Connect the opposite section to the guide over the transport bearing so that it can still be moved up and down. Using the single-acting valve, lift the side sections clear of the transport bearing. Use the double-acting valve to swing the side section concerned about 1 m out from the side.

Start carefully with two chains/slugs around the rings about 1 m apart. Lift until the chains/slugs are taut. Thoroughly loosen the bearing nuts. Lift with the crane until the screws are loose. Remove them and the whole shaft can be manoeuvred out.

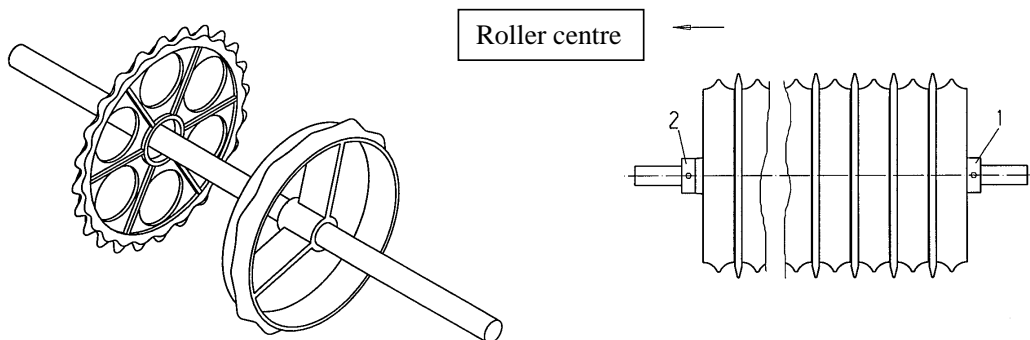
Clear all grease from the bearing housings. Remove any burrs on the protruding shaft end with a file. Loosen the pointed screws in the bearings; the bearings can then be pulled out.

When the stop ring with the two pointed screws has been removed, the roller rings can be pulled off the shaft.

#### MOUNTING:

**Cambridge rings.** Start with a smooth ring with the “nose” pointing inwards (see fig. 3). This is followed by a serrated ring with the smooth side facing outwards. This must be pushed right over the boss (“nose”) of the smooth ring. Fill the shaft up in this way until a space of about 12 cm remains. Omit the last serrated ring. Ensure that the rings are packed tight together.

Fig. 3:

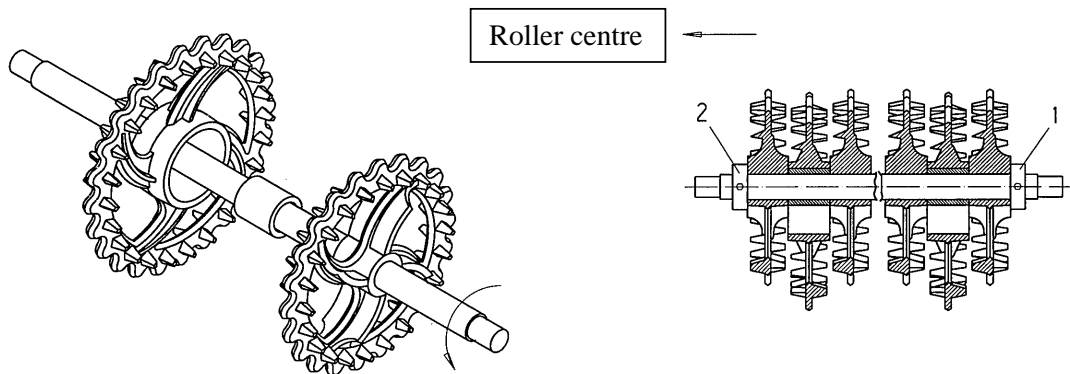


**Crosskill rings.** Note the direction of rotation of the shaft.



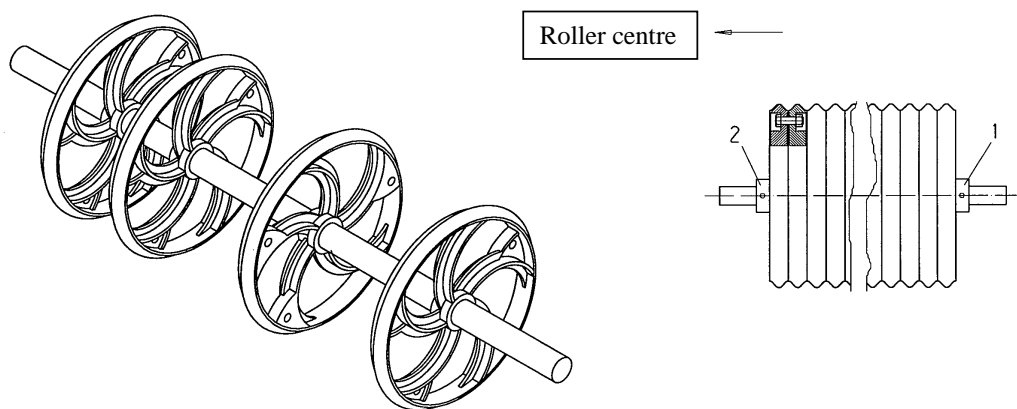
Start with a small ring, which must face the direction shown in fig. 4. Then fit a bush, and a large ring above this, facing the direction shown in fig. 4. Finish with a small ring. Ensure that the rings fit tightly together.

Fig. 4:



**Welded rings.** Start with two rings, screwed together as shown in fig. 5. Fill the shaft until a gap of about 22 cm is left. Close off the shaft with two rings bolted together. Ensure that the rings are packed tightly together.

Fig. 5:



Insert the stop ring, fig. 3-5, pos.2, and tighten well. It is recommended that the screws be tightened and loosened a few times to ensure that they grip better.

Then insert the bearings on the shaft.

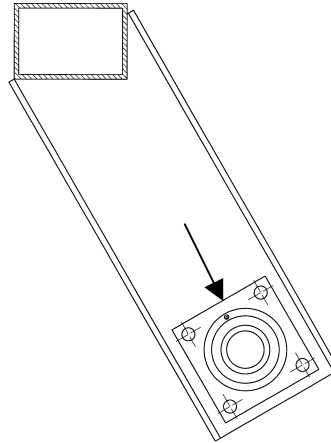


Unfold the roller frame as described above. Attach two slings/chains to the frame. Lift the complete shaft with rings, using an approved crane (min. lifting capacity 800 kg) and lower it into the roller frame. The end with the

last mounted stop ring (fig. 3-5, pos. 2) must point inwards on the roller.

Fit the bearings and tighten. Remember to turn the lubrication nipples to allow for lubrication (fig. 6). Use Locktite no. 270 on the pointed screws and tighten well. Close up the roller as described under “Operation”.

Fig. 6:



#### **Center section - DISMANTLING:**

If possible, attach the roller to a tractor; if not, a hydraulic pump with a single-acting and a double-acting valve will be required. The pump must be able to deliver a pressure of at least 170 bar.

Use the single-acting valve to lift the side sections clear of the transport bearings and use the double-acting valve to swing them right out.



If the roller is not attached to a tractor, **it must be opened up gently to ensure that it does not tip over backwards.**

Use the single-acting valve to lower the roller until the roller rings are resting on the ground.



The double-acting valve **MUST NOT BE OPERATED** in this situation.



Secure the roller mechanically in this position, as a safeguard against the possibility of hose rupture.



The bolts holding the ball bearings can now be removed. Take care not to injure your fingers.

Next, using the single-acting valve carefully tilt the roller upwards, ensure that the roller shaft stays down on the ground.

#### **ASSEMBLY:**

**Cambridge rings.** Fit a stop ring about 12 cm in along the shaft (see fig. 3).

Then start with a smooth ring with the “nose” pointing outwards (see fig. 3), and follow with a serrated ring with the smooth side facing inwards. This must be pushed right in on the boss (“nose”) of the smooth ring. Fill the shaft up in this way until a space of about 12 cm is left. Omit the last serrated ring and finish with a stop ring.

**Crosskill rings.** Fit a stop ring about 12 cm in along the shaft (see fig. 4). Start with a small ring, then fit a bush, and a large ring above this, the spokes of which run the same way as on the first ..... And so on, finishing with a small ring and a stop ring.

**Welled rings.** Fit a stop ring about 12 cm into the shaft. Start with two rings, screwed together as shown in fig. 5. Fill the shaft until a space of about 22 cm is left. Close off the shaft with two rings bolted together and a stop ring.

Loosen the stop ring screws. The projecting shaft ends must be of equal length. This is achieved by striking the shaft. Make sure that the rings are very tightly packed. Tighten the stop rings well. It is recommended that the screws be tightened and loosened a few times to ensure that they grip well. Then push the bearings in along the shaft ends.

Open up the roller frame as described above under ‘Dismantling’. Push the whole shaft into the frame. If it is a crosskill roller, ensure that the direction of rotation is the same as shown in fig. 4. Mount the bearings and tighten securely. Remember to turn the grease nipples so as to allow for lubrication (fig. 6).

Raise the roller to the vertical position, using the single-acting valve.

∇

The **DOUBLE-ACTING VALVE MUST NOT OPERATED** until the single-acting valve is fully extended.

**Rams:**

**Folding ram:**

This can be done with the roller in either the transport or the operating position, where the ram is in both instances pressureless; but the operating position is recommended.

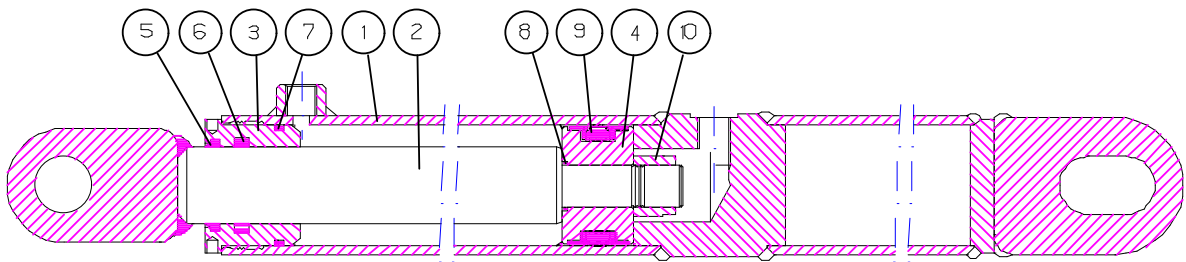
Remove the hoses. It is recommended that a bucket be placed underneath to catch any oil. Remove split pins and washers. The ram, weighing 28 kg, can be dismantled also.

Assembly is done in reverse order. After assembly, carefully swing the side sections out and in a couple of times (see under operation) to force out unwanted air.

Check that the hoses can move sufficiently not to get jammed, and that the connections are tight.

**Replacing the hydraulic sealings:****REMOVAL:**

1. Empty the oil from the ram, compressed air can be used to move the piston rod back and forth, to press the oil out.
2. Place the piston rod in the middle position. Unscrew the gland (pos. 3) 30 mm out. If the gland can't be unscrewed, it may be necessary to warm it up to 300°C. Let it cool off slowly. With the gland screwed out, pull the piston rod out towards the gland. Screw the gland all the way off, and the piston rod can now be removed.
3. Remove the self-locking nut (pos. 10).
4. Remove the sleeve (pos. 4).
5. Pull the gland off the piston rod (pos. 2).
6. The sealings above the sleeve are now removed, (pos. 5,6,7,8,9), use either a awl or a screwdriver.
7. Clean all the parts. Check for filings and shavings, make sure that there is no rust in the gland. If this is the case, it must be removed.



91800 - 63/40x500long

**ASSEMBLING:**

1. Assemble the new sealings in the gland and sleeve. The scraper ring pos. 5 is mounted with the help of a pipe, that fits around the outside of the lip. The sleeve (pos. 98) is mounted with a round iron bar or screwdriver
2. The threads on the gland and ram housing should be greased before assembling, (rust protection).
3. The gland pos. 3 is now mounted over the piston rod.
4. The sleeve pos. 4 is mounted and the self-locking nut pos. 10 is screwed on with "loctite". Make sure that the threads are clean, no oil or grease.  
**With use of loctite, you must not fill the ram with oil the first 12 hours.**
5. Oil the sleeve and the top end of the ram housing, and press the piston rod into the middle position.
6. Screw the gland down tight.

**Tilting ram:**

This is done with the roller in the transport position. Remove the hose. It is recommended that a bucket be placed underneath to catch any oil. Remove split rings and pins, and the ram, weighing 26 kg, can be removed.

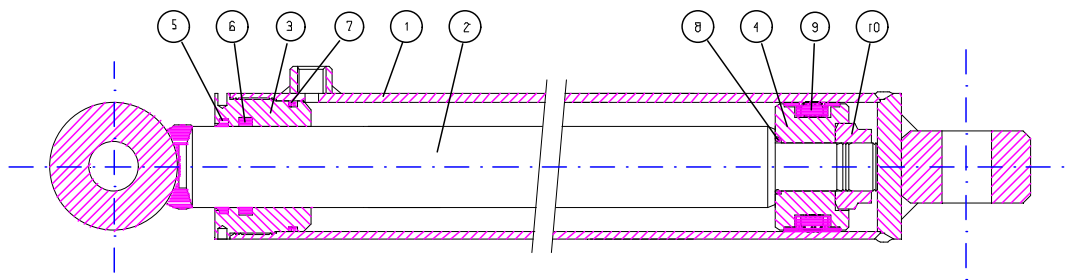
Assembly is done in the reverse order.



There **must** be an air plug in the top connection. After assembly, lift the side sections clear of the transport bearings a couple of times (see under operation). Check that the oil connections are tight.

**Replacing the hydraulic sealings:****REMOVAL:**

1. Empty the oil from the ram, compressed air can be used to move the piston rod back and forth, to press the oil out.
2. Place the piston rod in the middle position. Unscrew the gland (pos. 3) 30 mm out. If the gland can't be unscrewed, it may be necessary to warm it up to 300°C. Let it cool off slowly. With the gland screwed out, pull the piston rod out towards the gland. Screw the gland all the way off, and the piston rod can now be removed.
3. Remove the self-locking nut (pos. 10).
4. Remove the sleeve (pos. 4).
5. Pull the gland off the piston rod (pos. 3).
6. The sealings above the sleeve are now removed, (pos. 5,6,7,8,9), use either a awl or a screwdriver.
7. Clean all the parts. Check for filings and shavings, make sure that their is no rust in the gland. If this is the case, it must be removed.

**ASSEMBLING:**

1. Assemble the new sealings in the gland and sleeve. The scraper ring pos. 5 is mounted with the help of a pipe, that fits around the outside of the lip. The sleeve (pos. 9) is mounted with a round iron bar or screwdriver
2. The threads on the gland and ram housing should be greased before assembling, (rust protection).
3. The gland pos. 3 is now mounted over the piston rod.

4. The sleeve pos. 4 is mounted and the self-locking nut pos. 10 is screwed on with "loctite". Make sure that the threads are clean, no oil or grease.  
**With use of loctite, you must not fill the ram with oil the first 12 hours.**
5. Oil the sleeve and the top end of the ram housing, and press the piston rod into the middle position.
6. Screw the gland down tight.

**Side sections:**

Removal of side sections should be done in the workshop.

First dismount the shaft with roller rings as described on page 5. Then support the side section with slings on a crane (max. weight: 200 kg). Unscrew the two locking screws, position 36 in fig. 11, and pull out the pin, using a crowbar or similar tool.



Take care, when the pin has been removed, as the frame can then rotate.

Assemble in the reverse order.

**Drawbar:**

Changing the drawbar. This must be done in a workshop with a crane available. Max. weight 180 kg.

Place the roller on a level surface in the operating position without the tractor. Lift the front end and remove the support leg. Lift just in front of the roller main frame until the main pin is loose. Remove the ram; this can be done without detaching the hose.



Knock out or pull out the main pin. Take care and ensure that the drawbar does not rotate.

Assemble in the reverse order.

**Scrapping:**

Dismantle the roller in the following sequence:

1. Side shaft with races, see page 6.
2. Middle shaft with races see page 8.
3. Side sections, see page 13.
4. wheels, see page 5.
5. Drawbar, see page 13.

Send hydraulic hoses, oil and tyres to be destroyed.

Use the roller rings as recycled metal for casting and the rest for recycled metal.

# ACCESSORY

## HYDRAULIC LEVELLING BAR

### Application:

Your Compact can be fitted with a hydraulic levelling bar in front of the roller rings. This makes a very effective implement for breaking up clods and levelling and packing the soil after ploughing.

### Assembly:

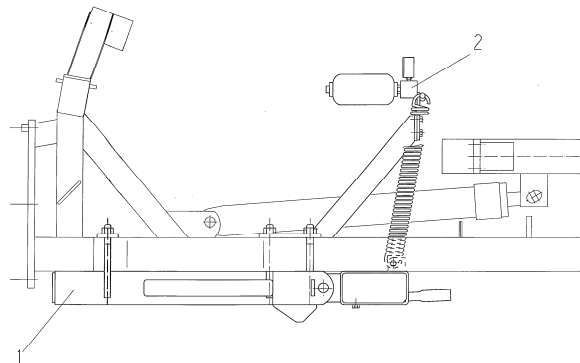
Hitch the roller to a tractor and park it in the transport position on firm, level ground. An approved lifting tackle must be available. Maximum weight 250 kg.

See fig. 7.

Raise the bracket (position 1) for the central section under the drawbar and secure it with the three clamp plates. Weight 65 kg. Tighten them only slightly.

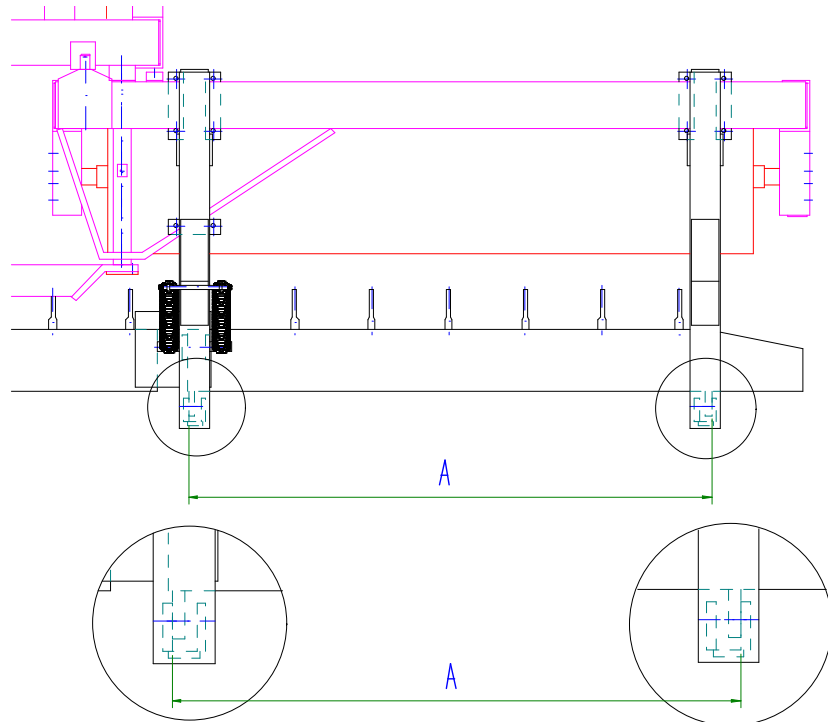
Bolt on and clamp the hydraulic unit (position 2).

Fig. 7:



Open up the roller into the operating position (see above). Run it forwards and backwards a few metres until the side sections are properly positioned. Fit the innermost suspension for the side sections (weight 38 kg), then attach the outermost suspension (weight 35 kg). **Note the distance A between the suspensions in fig. 8, (A=120 cm). The sidesection of the levelling bar must be fitted tightly, not allowing it to move from side to side in the suspensions.**

Fig. 8:



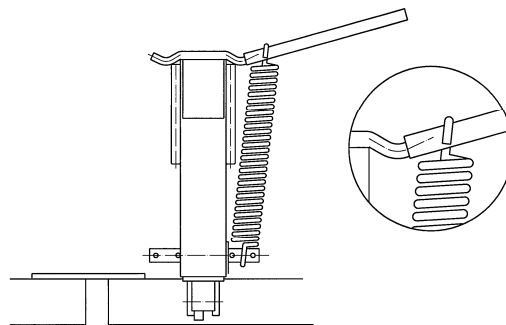
The six holes for suspension of the leveling bars must now be aligned; if they are not, adjust the suspension of the centre board a little forwards or backwards. It is important that the roller drawbar should be horizontal.

Mount the middle levelling bar (weight 105 kg) with the pins and suspend it in the springs.

mount the side bars first (weight 95 kg). Suspend them first in the pins. Then the rams with hoses at the rear, on the side sections.

Mount the springs first at the bottom. Hook them on the hooks at the top with the aid of a tube as shown in fig. 9.

Fig. 9



### Adjustment:

Check that the distance B between the ends of the levelling bars (fig. 8) is **4-5 cm**. If it is not, the side section-suspensions must be moved. Lastly, tighten



all the nuts fully.

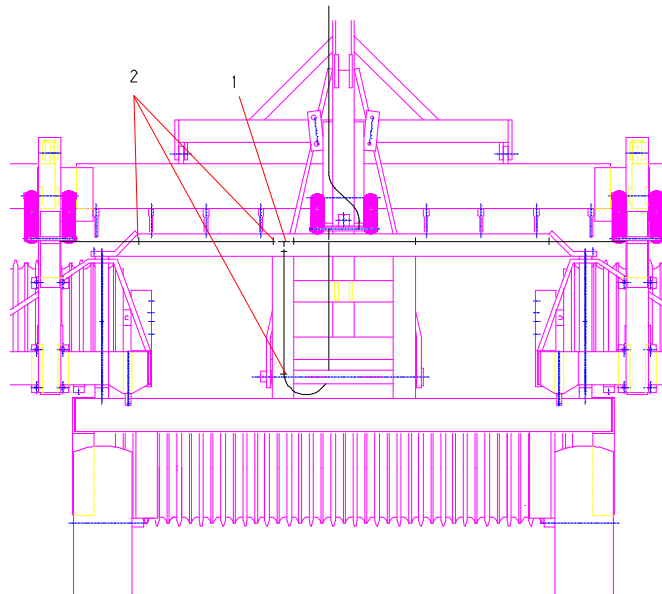
### Hydraulics:

See fig. 10. Attach the T-piece (pos. 1) to the front cross tube of the main frame straight in front of the left-hand longitudinal tube. Run the hoses out to the rams and attach them with the self-tapping screws and hose clamps (pos.2). Use a 4,4 mm drill to drill the screw holes.

Take the middle hose along the left-hand tube, use clamps pos. 2.

Take it further in a neat arc and fasten it to the drawbar. It ends at the left-hand connection on the hydraulic block. Attach the connecting hose to the right-hand connection and bring it, together with the other hoses, to the tractor.

Fig. 10:



### Connection:

Connect the green connecting hoses to a single-acting valve on the tractor. Two single-acting and one double-acting take-off are normally required to operate the complete roller with levelling bar. The job can be done with two double-acting valves, one of which must have a floating setting. If this method is used, the white and green hoses must be connected to the valve with the float setting. The green hose must be positioned so that the levelling bar moves when the operating handle on the tractor is moved towards the float setting in order to raise the levelling bar without actuating the roller lifting cylinder.

### Testing:

Fold up the roller carefully, ensure that the hoses are not squeezed or stretched while the roller is being closed up.

With the roller opened out, lower the levelling bar until the ram is fully extended.

Check that the pressure gauge is registering. With the levelling bar in this

position, it should show the tractor's maximum pumping pressure. Check also for loose connections/leaks in the hydraulic system. The gas accumulator may have worked loose owing to vibration during transport and it must then be tightened with oil filter pliers or the like.

**Operation:**

In order to be effective, the levelling bar must always draw a little soil. Where the soil is heavy, the bar must be pressed down hard. The gauge will show how hard it is being pressed down. In most instances, a pressure of 40-50 bar will be appropriate.

**Maintenance:**

**Tighten all the nuts** and check for oil leaks after the first day's operation. When the tines become worn down about 5 cm, they can be fitted in the lowest hole.

When the board is not in use, it must be fully raised in order to avoid rust damage to the piston rods.

**Dismantling:**

The levelling bar must not normally be dismantled. It should be removed only for repairs or to be scrapped. Disassemble in the reverse sequence to assembly.

**Scrapping:**

Discard hoses, accumulator and oil, to be taken away and destroyed; the rest can be recycled as scrap.

**SPARE-PARTS:**