

DALBO®

RATOON XL



EN
Fixed tines or NSH
Serial no.: 100-XXX

MADE IN **D**ENMARK

RATOON XL

Type Fixed tines/NSH

Congratulations on the purchase of your new RATOON XL. For **safety reasons** and to achieve optimum service from the product, please read the User Guide **before use**.

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This product has:

Type no.: _____ Serial no.: _____
Month of manufacture: _____ Net weight kg: _____

If contacting the manufacturer regarding spare parts or service, please state type and serial number. A spare parts list is included at the back of this manual.

EU DECLARATION OF CONFORMITY

DALBO A/S
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declares herewith that the above machine is manufactured in accordance with the provisions of directive 2006/42 EC, which replaced directive 98/37/CC and change directives 91/368/ECC, 93/44/ECC and 93/68/ECC on harmonisation of member state legislation concerning health and safety requirements related to the construction and manufacture of machines.



This machine corresponds to the safety requirements in the European Safety Guidelines.

DALBO A/S

Date: _____

Managing Director Carsten Jensen

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Safety



This symbol appears in the instruction manual each time there is a safety warning concerning your safety, the safety of others or functionality of the machine. All safety instructions must be observed and made available to all users of the machine.

General

- Ensure you are familiar with all aspects of the machine before use
- There are safety stickers on the machine containing important instructions for the safety of yourself and others, and correct use of the machine.
- Do not carry passengers during operation or transport.
- Ensure there are no personnel within the machine's working radius before operating. Operate machine only from inside the tractor.
- Before leaving the tractor or making adjustments, performing maintenance or repairs on the machine, fully lower to ground, or maintain in transport position, apply tractor handbrake, switch engine off and remove ignition key to secure the machine against accidental operation.
- Remember to secure the support leg and pins with split rings.
- Never leave driver's seat whilst machine is moving.
- Always adapt speed to conditions.
- Do not use machine unless all safety devices are in place. Defective safety devices must be replaced immediately.

Hydraulics

- Lower machine fully for any repair work on the hydraulic system. Relieve hydraulic pressure, switch engine off and remove ignition key.
- Clean hydraulic connections thoroughly before reconnecting. When connecting hydraulic hoses to tractor hydraulics, ensure they are not under pressure.
- Bleed the hydraulic system thoroughly after any repairs.
- Check hydraulic hoses regularly for defects such as cracks, splits, crimps, wear or breaks. Defective hoses must be replaced immediately.
- Avoid spilling oil on the ground. If oil is spilt, collect and deliver to a destruction point.
- Clean hands thoroughly after contact with oil and grease. Change oil-stained clothing immediately. Hydraulic oil can be harmful to the skin.
- Hydraulic oil released under high pressure can penetrate the skin and cause severe injury. In the event of injury, seek medical help immediately.

Assembly

- Danger of crushing! Ensure no personnel are between implement and tractor, or between the parts to be connected.

Maintenance and repair

- Ensure machine is adequately supported for all repair and maintenance work. Ensure tractor and machine are properly braked, engine stopped and ignition key removed.
- Tighten all screw connections after a few hours use. Check all screw connections regularly and tighten as required. Check all split pins and bolts to avoid mechanical failure.
- Dispose of oil, grease and filters in accordance with local environmental protection rules.

Road transport

- All safety and warning precautions mandatory by law must be fitted and tested before transporting the machine on public roads. The driver is responsible for fitting the correct lighting and number plate required in accordance with applicable legislation.
- Check with local traffic authorities whether transport on public roads is allowed given the machine's dimensions.
- When transporting, ensure permitted total weight for tractor is not exceeded and that loading on tractor front axle is not less than 20% of tractor net weight. If this is the case, use weights on tractor front

Correct use

- Correct use of the machine includes observing the manufacturer's operating, maintenance and repair instructions, and that original spare parts are always used.
- The machine may only be used, maintained or repaired by personnel familiar with it and who are aware of the risks that can be involved.
- The manufacturer cannot be held liable for injury or damage arising from modifications made to the machine performed without prior permission from the manufacturer. Neither can the manufacturer be held liable for injury or damage arising from incorrect use. Such liability rests solely with the user.
- Do not add extra weight to the machine

Technical data

RATOON XL

	Fixed tines				Spring bolt		Hydraulic stone protection (NSH)			
	3	5	5	7	3	5	3	5	7	9
Number of tines	3	5	5	7	3	5	3	5	7	9
Width [cm]	190	230	330	330	300	300	165	275	330	430
Max. depth [cm]	60	60	70	70	330	330	50	50	50	50
HP (recommended)	75	125	175	175	75	125	75	125	175	225
Weight in kg:										
Without follower	375	575	1100	1100	775	975	450	900	1130	1350
Weight of follower	200	240	360	360	200	240	190	350	430	510
Hydraulic requirements:										
Double-acting	-	-	-	-	-		-	-	-	-
Single-acting	-	-	-	-	-		1	1	1	1
Transport:										
Transport width [cm]	160	200	300	300	300	300	150	240	300	400

How to use this manual

The sequence of subject matter in this manual can seem illogical. Please refer to the table of contents for page numbers for individual items.

The manual is divided into main sections:

- Safety
- Description of the machine, including settings
- Starting routine and running
- Accessories
- Maintenance
- Repairs

The following symbols represent:



Points which are important to functionality and service life.



Points relevant to safety.

Delivery

The machine is delivered complete on a trailer.

If lifting the machine, we recommend the use of straps on the mid-section and drawbar to maintain balance.

Limitations to use

The following describes what the machine can and cannot be used for:

- Can only be used for breaking down agricultural land under cultivation. Fields on which the machine is used must be in a good state of agricultural maintenance, i.e. without major unevenness, rocks or potholes.
- The machine can only be used when drawn by a tractor, attached to the tractor three point lift.
- Max. speed when in use is 10 km/h. Speed must always be adapted to suit the terrain.

Any other use of the machine which does not meet the above conditions will be considered as unauthorised use, and invalidate the guarantee.

The tractor used to pull the machine must not be significantly bigger than indicated in the table under "Technical Data". This applies in particular to machines which are not fitted with a spring bolt or NSH.

Description of the machine

RATOON XL is a heavy-duty grubber. It is ideal for loosening and working soil which has been over-compacted, e.g. in plough troughs and forage. The machine has a V-shaped main frame on which the tines are mounted. It is available in 3 different variants: one with fixed tines, one with tines fitted with spring bolts and one with hydraulic stone protection NSH (Non-Stop-Hydraulic).



Important! The tractor used for machines with no stone protection (spring bolts or NSH) must NOT be significantly bigger than stated in the "Technical Data" table. I.e.: 25 HP per tine must not be exceeded by too much. The machine is heavy-duty, but can still be damaged if an oversize tractor is used.

The machine is available with a steel wheel mounted at the front for easy adjustment of depth as an optional extra. All variants are available with a packing roller to break down and pack the soil respectively, and ensure stable depth.

Fig. 1



RATOON XL with toothed packing roller.



For use only on soil which has already been cultivated. I.e. not suitable for use on former forestry areas, quarries etc.

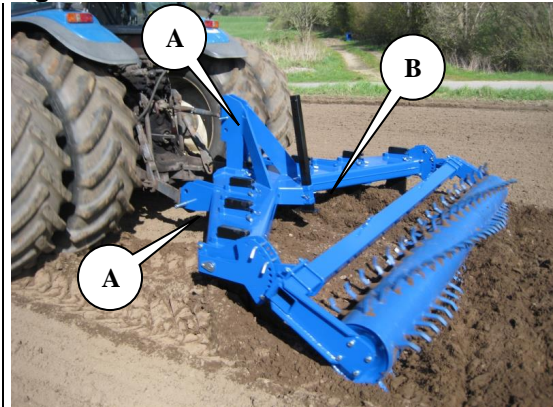
Working speed - 6-8 kph.

Connecting and disconnecting

Connecting

Attach to the tractor's lifting arms and secure using balls and split pins (A). Raise the support leg (B) and secure with a pin.

Fig.2



Remember to secure all pins with split rings.



Important! Keep area between tractor and machine clear of all personnel during connection.



The top bar (and its claw in particular) must be absolutely straight and in good condition. The top bar is subjected to heavy strain when the machine is in use.



Hydraulics

Fit the tractor lift arms in the oblong holes to allow free independent movement up and down. This protects the tractor and machine if the ground is uneven.

The NSH version of the RATOON XL requires a single-acting hydraulic outlet connected to the hydraulic stone protection system.

Hose markings

Cylinder name	Colour	Outlet	Function
NSH cylinder	black	Single-acting	Sets pressure in the NSH system



Connect snap coupling to a single-acting outlet on the tractor. Clean the snap coupling thoroughly with a cloth before connection to the tractor.

Disconnection

- Lower support leg to parking position and lower machine to the ground.
- Check the machine is resting safely on its tines and support leg before disconnecting the tractor 3 point lift.
- Set the hydraulic system to flow position to reduce pressure in the system to zero.
- Disconnect hydraulic hoses



Always disconnect the machine on a flat surface to ensure maximum stability.



Important! Keep area between tractor and machine clear of all personnel during disconnection.



Remember to depressurise hoses before disconnecting them.

Setting up

The RATOON XL is very simple to work with. The machine's design makes it very easy to set up.

Always check frame angle before use to ensure optimum use of the machine.

Adjusting main frame

To achieve uniform soil cultivation, the main frame must be horizontal longitudinally and latitudinally.

RATOON XL at work. The main frame is horizontal. The photo shows a RATOON XL with fixed tines.

Fig. 3



Adjusting depth

Standard machine

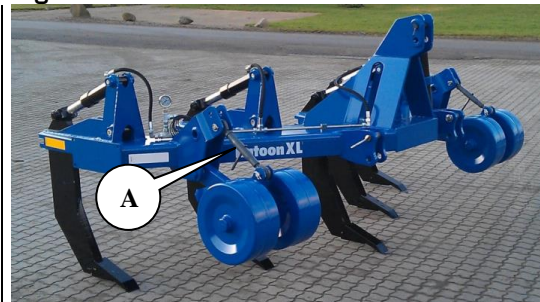
The machine is supplied without support wheels and packing roller as standard. Depth adjustment is therefore controlled by the tractor lift arms. To ensure a reasonable constant depth, it is therefore important that the tractor lift arms are set up for maximum position control and minimum weight transfer. This is a compromise. The more position control used, the less traction power the tractor has to pull the machine through difficult terrain.

Machine with support wheels

If the machine is fitted with support wheels at the front, depth is easier to maintain accurately. The wheel bracket has a shaft fitted. This can be used for setting the depth. With the support wheels fitted, it is possible to use a greater degree of the tractor's lift whilst maintaining constant depth.

RATOON XL with support wheels fitted. (A) indicates the top bar used to adjust depth.

Fig. 4



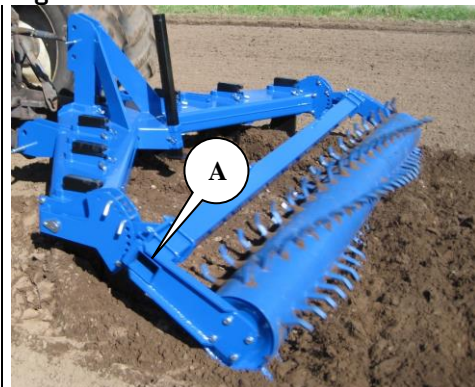
Machine with packing roller

Alternatively, the machine can be fitted with a rear-mounted packing roller. This ensures highly stable depth. The spokes also ensure fine crushing of large clods brought to the surface by the tines. Depth can be adjusted by moving a pin (A) to one of the holes in the roller bracket above the roller arm. There are 2 pins for each side. The second pin can be placed in a hole under the roller arm. This fixes the packing roller into place. This is a feature for working very hard soil where it can be difficult to keep the machine working at full depth. The full weight of the packing roller and its bracket are now brought to bear to keep the machine in the soil. A greater degree of weight can be used compared to machines with no packing roller or support wheels, maintaining constant depth.

The teeth on the packing roller can be used aggressively or passively.

RATOON XL with packing roller mounted. Depth can be adjusted by moving a pin (A) to one of the holes in the roller bracket.

Fig. 5



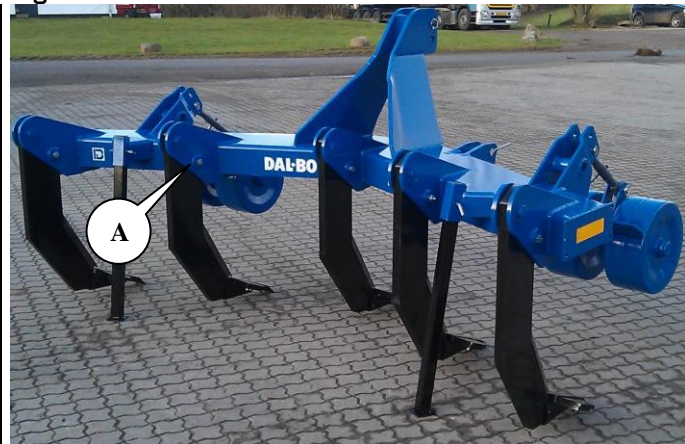
Operation

When working with the RATOON XL the tines can hit stones.

Replacing spring bolt

If the spring bolt (A) breaks, drive the remains of the bolt out of the holes and fit a new one.

Fig. 6



Spring to be used: M18x110 quality 8.8.

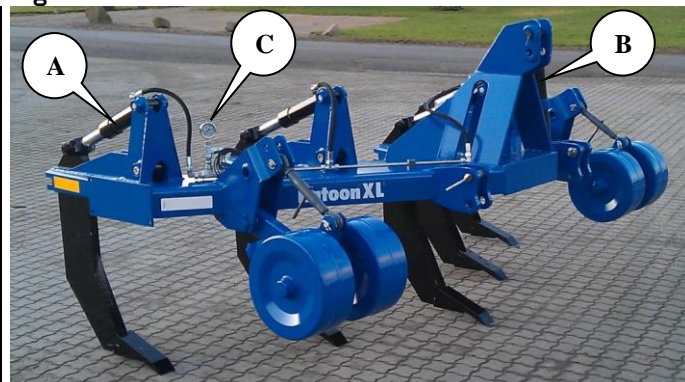
Available by order from DALBO A/S using item number:

92596

Non-Stop-Hydraulic stone protection (NSH)

The photo shows a RATOON XL NSH. The hydraulic cylinders (A) are single-acting, and linked to an accumulator (B). A tine hitting a stone in the soil can thus flex and return to its working position when past the stone. System pressure can be read off the manometer (C).

Fig. 7



Setting up the NHS system

Disconnect from the tractor, as described in "Connection and disconnection". Activate the hydraulic handle until the pressure on the manometer shows 150 bar.



Important! The NSH system pressure must NOT exceed 150 bar. If it does, the accumulator will fill up with too much oil, reducing its ability to take oil from a cylinder. This will cause the entire system to lose power to some degree, and pressure in the system will rise. This can increase the risk of damage to the system.



Check all the accumulators on the machine **at least once a year for leaks and to ensure that the precharge pressure is set correctly**. Contact an authorized DALBO dealer for more information.

Troubleshooting

Fault	Cause	Remedy
Uneven working depth	<ul style="list-style-type: none">• Frame is not horizontal	<ul style="list-style-type: none">• Adjust the frame using the top bar.
	<ul style="list-style-type: none">• Tines not uniformly adjusted	<ul style="list-style-type: none">• Adjust tines uniformly

Maintenance

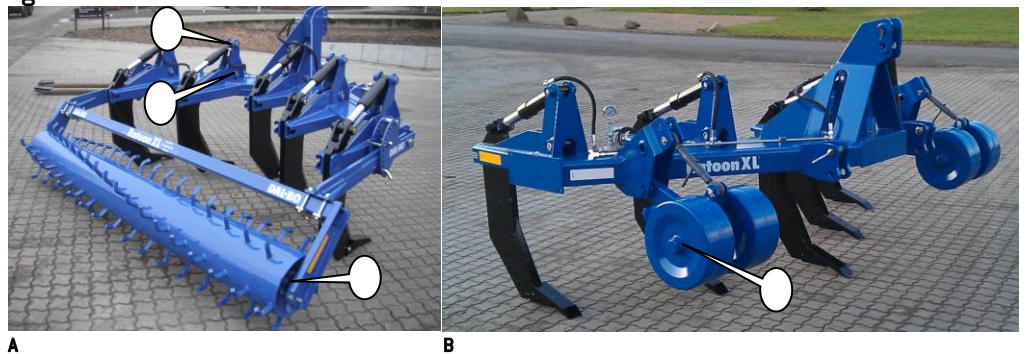
Good maintenance ensures long service life and optimum use. Grease nipples are fitted where wear is heaviest.



Tighten all screw connections after first working day. Check all split pins and bolts to avoid mechanical failure. Check hydraulic system for leaks.

Lubrication

Fig. 8



Lubrication points	Number of nipples	Lubrication intervals, hours	Illustration
Bearing in cylinder, per tine	1	50	A
Bearing tine per tine.	1	50	A
Bearings in packing roller	2	50	A
Bearings in wheel (no grease nipple)	0	200	B



Lubricate all lubrication points at least once annually.

Replacement and repairs



Safety is vital for **all** repair work on the machine. Always observe the following points, plus those under Safety First in the instruction manual.



All maintenance and repair work can only be performed when the machine is lowered to the ground or locked in transport position, tractor is braked, engine stopped and ignition key removed to prevent accidental start.



Particular attention must be paid to safety when repairing hydraulics. Before commencing work, depressurise hydraulic system and support part being worked on.



Always ensure hydraulic system is bled after repairs and before use to prevent mechanical breakdown and injury to person.

Replacing gaskets on NSH system cylinder

1. Support the machine so that the tines are clear of the ground.
2. Depressurise the NSH system.
3. Disconnect hoses and pins, and remove cylinder.
4. Fit new cylinder, replace pins and split pins.



Bleed the system by applying pressure up to 150 bar and then depressurising to 0 bar again. Repeat several times.



NEVER try to dismantle the accumulator in the system. It is charged with nitrogen gas under high pressure. This unit must be serviced by an authorised DALBO service engineer only.

Replacing wear parts

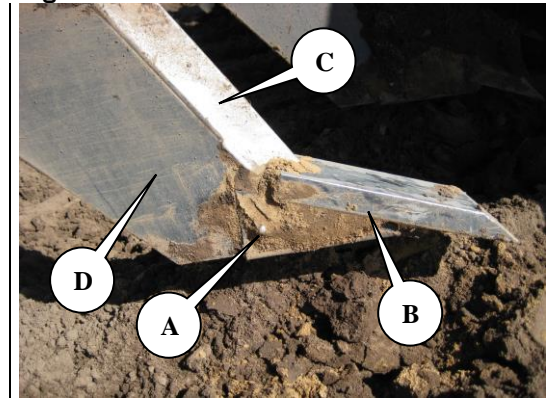
Replace on a level surface with the machine connected to a tractor and suspended from the lift. Support the machine properly, and do not walk beneath it.



Do not walk under the machine unless it is properly supported.

1. Remove bolt (A) and tip (B).
2. The tip (C) is welded on to the foot (D). Cut the tip off the foot, and weld a new one into place.

Fig. 9



Why replace tips?

Replace the tips as required, and before the foot (D) is damaged.



Disconnect the negative cable from the tractor's battery before welding anything on the machine. Failure to do so can damage the tractor's electronic system.

Scrapping



Stand the machine on a firm surface. It is essential that **all** cylinders are removed.



Beware of the weight of any given part when removing or disassembling. All parts **must** be supported or lifted to avoid danger of falling.

Disconnect hydraulic hoses and cylinders and drain oil. Collect oil in container to avoid pollution. Send oil and hoses for destruction.

All iron used in the machine can be recycled.

Spare parts

Guarantee

DALBO A/S provides a 1 year guarantee on all new machines sold by an authorised DALBO A/S dealer. The guarantee applies for 1 year from the date of delivery to the end-user.

The guarantee covers the remedying of material or manufacturing defects.

The guarantee will lapse in the following instances:

- **The machine is used for purposes other than those described in the user guide**
- **The machine is abused or treated with neglect**
- **Lack of maintenance**
- **Accidental circumstances such as weather, falling objects etc.**
- **Transport damage**
- **Unauthorised repair**
- **Modifications without the written consent of DALBO A/S**
- **Non-original spare parts used.**

DALBO A/S cannot be held liable for consequential damage, loss of earnings or production as a result of defects. DALBO A/S cannot be held liable for labour costs other than those reasonably incurred for repairs or the replacement of parts covered by the guarantee.

DALBO A/S cannot be held liable for the following costs:

- **Setting up the machine**
- **The costs of normal maintenance, washing, lubrication or replacement of wearing parts**
- **Transport of the machine to and from a repair workshop**
- **The dealer's costs, such as transport of personnel or parts to and from the machine and/or the repair workshop.**

The following aspects have decisive influence on the guarantee:

- **The guarantee will lapse if the dealer has not prepared the machine, and instructed the user in its use.**