

User manual



MULTIVATOR 1800



Translation of the original user manual



2444 English 915.120.210 EN



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to which this declaration refers, complies with stipulation of:

2006/42/EC Machinery Directive

and with the standards:

- **ISO 12100-1:2010** Safety of machinery - General principles for design - Risk assessment and risk reduction
- **ISO 13857:2019** Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs
- **ISO 4254-1:2015** Agricultural machinery - Safety - Part 1: General requirements
- **ISO 4254-5:2018** Agricultural machinery - Safety - Part 5: Power-driven soil-working machines

Zeist, 03-01-2022



C.H.G. de Bree

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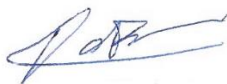
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Zeist, 03-01-2022

A handwritten signature in blue ink, appearing to read 'C.H.G. de Bree'.

C.H.G. de Bree

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FOREWORD

Congratulations on your Multivator purchase. In order to work safely and in a sustainable manner with this machine, this user manual must first be read and understood. Without full knowledge of the contents, it is not possible to work safely with this machine.

This machine is not a stand-alone machine. It is the user's responsibility to use the correct tractor or other towing vehicle. The user must check the combination of towing vehicle and machine for various aspects, such as noise level and safety risk. In addition, user instructions for the vehicle and parts to be used must be observed.

All the information and technical specifications provided are the latest at the time of publication of this document. Design specifications are subject to change without notice.

If after reading this manual you still have questions or anything is unclear, please contact your point of sale or dealer.

WARRANTY CONDITIONS

THIS MACHINE IS COVERED BY A WARRANTY AGAINST DEFECTS IN MATERIALS.

THIS WARRANTY IS VALID FOR A PERIOD OF 12 MONTHS FROM THE DATE OF PURCHASE.

REDEXIM WARRANTIES ARE SUBJECT TO THE 'GENERAL CONDITIONS FOR SUPPLY OF PLANT AND MACHINERY FOR EXPORT, NUMBER 188', PUBLISHED UNDER THE AUSPICES OF THE UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE.

REGISTRATION CARD

For your own information, fill in the table below:

Machine's serial number	
Dealer's name	
Date of purchase	
Notes	

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1. SAFETY INSTRUCTIONS

This machine is designed for safe use. Safe use is only possible if the safety instructions described in this manual are fully adhered to.

Read and understand the manual before you start using this machine.
Failure to use the machine as described in the manual may result in personal injury and/or damage to the machine.

This user manual provides instructions that are numbered sequentially. These must be performed in the specified order. If a  is shown, this indicates safety instructions. If a  is used, this means that a tip and/or note follows.

1.1. User's obligations

The machine is exclusively intended for processing turf fields or areas where grass should grow. Any other use is considered improper use. The manufacturer accepts no responsibility for any damage resulting from such use, and the user is solely responsible for all associated risks.

Anyone the owner authorises to operate, maintain or repair the machine must have read and fully understood the operating manual and, in particular, the 'Safety instructions' chapter.

Changes to the machine that adversely affect safety must be rectified immediately.

Before using the machine, the user is obliged to inspect it for visible damage and defects.

Making modifications or additions to the machine (except those approved by the manufacturer) is not allowed, for safety reasons. If modifications have been made to the machine, the current CE mark is no longer valid, and the person who made the modifications must provide a new CE mark themselves.

Judicious use also includes adhering to the operating, maintenance and repair instructions prescribed by the manufacturer.

The user is responsible for a safe combination of machine and towing vehicle, which meets the requirements defined in the technical data (**see chapter 2**). This combination must be tested for noise, safety, risk and ease of use. Instructions for use must also be drawn up.

Dress appropriately before working with the machine. Wear sturdy steel-toed shoes and long trousers, tie up long hair and do not wear any loose-fitting garments.

In addition to the instructions in this user manual, the generally applicable occupational health and safety regulations must be followed.

When used on public roads, the relevant provisions of the traffic regulations apply.

1.2. Maintenance, repair and adjustment

Maintain a log of repairs.

Use, maintenance or repair of the machine by incompetent persons may result in a risk of injury to both the user and third parties. This must be prevented!

Use only original Redexim replacement parts for maintenance or repair, in the interest of the safety of the machine and user.

Repair work on the machine may only be carried out by authorised technical personnel.

During maintenance, adjustment and repairs, it is necessary to block the machine to prevent it from lowering, rolling and/or sliding.

If present, the hydraulic system must always be depressurised before any work is carried out on it.

Waste oil/grease is harmful to the environment; dispose of it in accordance with applicable regulations.

1.3. Use of the machine

Connect the machine to the towing vehicle as prescribed. Beware of danger of injury when doing this!

In the absence of protective covers and safety stickers, the machine must not be used.

Before each use, check the machine for loose bolts, nuts and parts.

Before setting off, check that you have a good field of view, both near and far.

Before starting the work, all persons operating the machine must be familiar with all its functions and controls.

Never crawl under the machine. If necessary, tilt the machine to work on the underside.

Check hydraulic lines regularly, if present, and replace them if they are damaged or show signs of ageing.

2. TECHNICAL DATA

Model	Multivator 1800			
Working width	1.80 m (70.9")			
Working depth	Max 140 mm (5.5")			
PTO speed	540 rpm			
Machine weight	1050 kg (2315 lbs)(base machine) 1225 kg (2700 lbs) (base machine plus hydraulic rearbrush)			
Number of blades	36			
Blade thickness	10 mm (0.4")			
Working speed	Maximal 3,0 km/h (1.86mph) Depending on field conditions			
Maximum field capacity	Dependent on conditions and desired result 2700 m ² /h (29062 ft ² /h)			
Recommended vehicle	60/150hp			
Lifting capacity vehicle	minimum lifting capacity 610 mm behind the lifting eyes of 1276kg (2814lbs) (base machine) lifting capacity 1901kg (4191lbs) (base machine plus hydraulic rearbrush)			
Power/ speed chart (theoretical)	Dept (mm)	60hp Speed (kmh)	100hp Speed (kmh)	150hp Speed (kmh)
	140	1.7	2.6	3.0 (max)
	120	2.0	3.0 (max)	3.0 (max)
	100	2.4	3.0 (max)	3.0 (max)
	80	3.0		
Slip clutch setting	set to 1250 Nm (11,063 lbf·in)			
Transport dimensions (L x W x H)	2350 x 950 x 1,250 mm (92.5" x 37.4" x 49.2")			
Three-point linkage	Cat. 1 & 2			
Oil, gearbox	80W90 (2.3 litres) (0.61 gal)			
Grease, bearings	EP 2			
Grease, drive unit	EP 0 (2.2 litres)(0.58 gal)			
Standard components	- Set of cutting blades - PTO with slip clutch			
Options	- Hydraulic rear brush - Front roller with cutting blades			

3. GENERAL DESCRIPTION

The Multivator is a machine intended for aerating turf fields. The Multivator is a three-point machine, which means that a tractor is required to operate the Multivator.

4. SAFETY STICKERS

Safety stickers are present on both sides of the machine. These safety stickers must always be clearly visible and legible and, if damaged, must be replaced (Fig. 1)

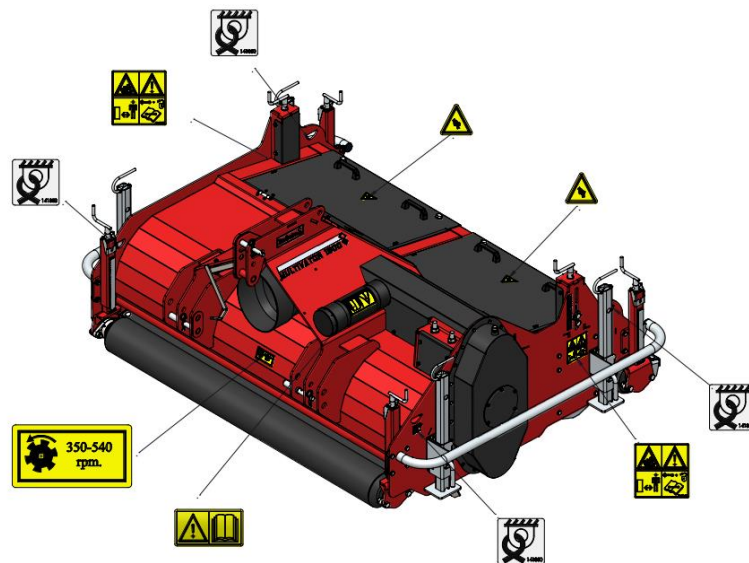


Fig. 1

921.280.402	- During maintenance, adjustment and repairs, the engine of the towing vehicle and the PTO must ALWAYS be switched off. Block the combination to prevent rolling/sliding away. - With the exception of the user seated in the towing vehicle, all persons must stay at least four metres from the machine when it is in operation. - During operation, NO persons may be in the machine's danger zone, as there is a risk of personal injury from moving parts.
900.280.402	- Users of the machine must have carefully read the user manual before using the machine.
900.280.404	Beware of entrapment of body parts when opening the rear covers, and make sure the machine has come to a complete stop before opening them.

 900.260.426	- The safe working range of the machine is up to a maximum 540 rpm PTO speed.
 922.340.008	- Fixation point for securing the machine, during transport on a trailer, for example.

5. FIRST INSTALLATION



Ensure that the cable/crane/lift can lift at least 2x the weight of the machine.
For the weight, see chapter 2 'Technical data'.
Carry out this work on a flat, firm surface with sufficient free space.

The machine must be prepared for use as follows: (Fig. 2 and 3)

1. Fit the blades (1) as explained in 12.2.
2. Extend the support legs (2) and lock them in place.
3. Attach lifting equipment to the lifting points (3).



!! Stay at a safe distance. During lifting, the machine may twist/slide!!



!! Never crawl under the machine!!

4. Carefully raise the machine with the pallet until it is just above the ground.
5. Place the machine on the support legs (2) on a flat, firm surface.
6. Detach the lifting equipment and attach it to the pallet, lift the pallet a few millimetres to take the load off the bolts.
7. Detach the pallet (5) by removing the bolts (4).

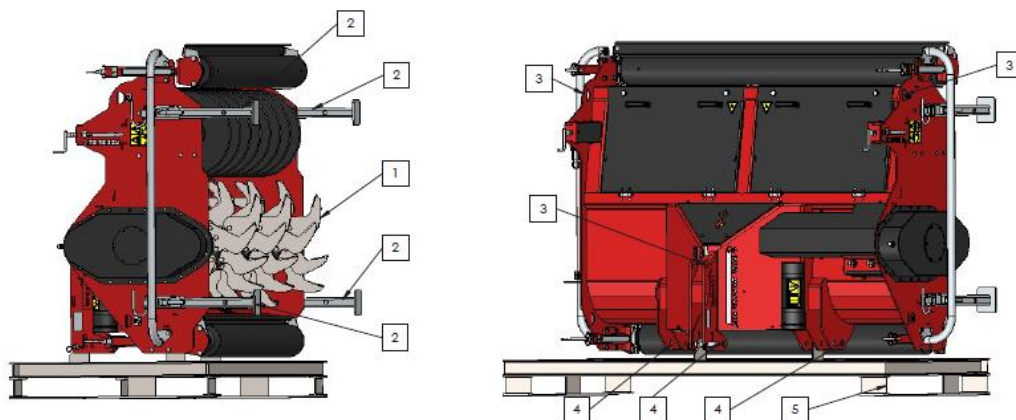


Fig. 2

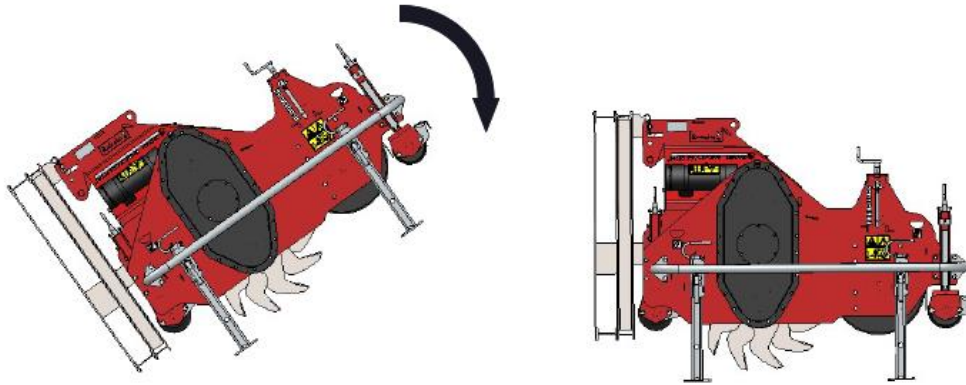


Fig. 3

6. THE PTO SHAFT

The PTO shaft is a very important part. It provides the drive from the tractor to the machine. The PTO shaft, when properly maintained and installed, ensures safe operation of the machine. The PTO shaft has its own CE certification and manual. These are found with the PTO shaft.

For specific adjustments, see the details given on the PTO page in the parts manual.

Do not exceed the specified values. Failure to heed this instruction may lead to an unsafe situation and overload the machine, resulting in damage.

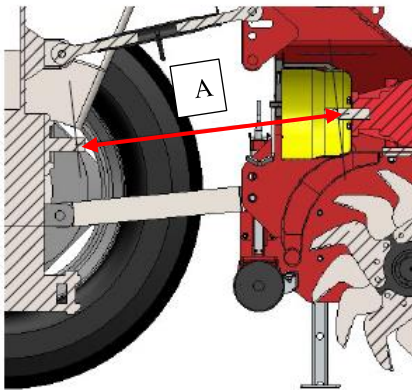


Fig. 4

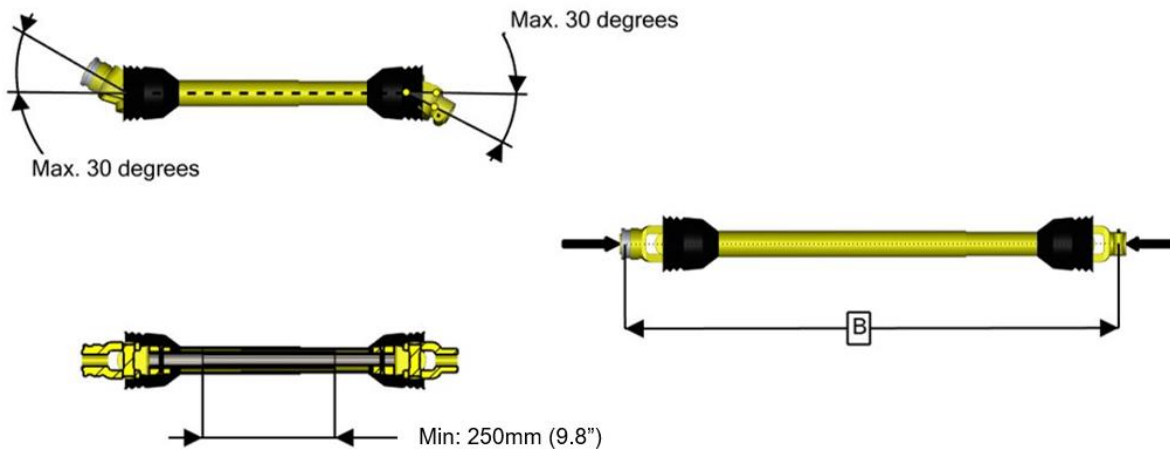


Fig. 5

6.1. Length of the PTO shaft

The length of the PTO shaft is very important. If it is too long, the tractor's drive system and/or the machine may be damaged. If the overlapping length of the yokes is reduced to less than 250 mm (9.8") at any time, the PTO shaft may be damaged. The required length changes when the machine is lifted or when a different towing vehicle is used. When the machine is purchased new, or when using a different towing vehicle, the length of the PTO shaft must be checked and shortened if necessary:

1. Measure distance 'A' (from groove to groove) between the tractor's PTO and the machine's connection while the machine is standing horizontal on its support legs on the ground and is connected to the tractor.
2. Measure distance 'B' of the PTO shaft in its shortest position, from locking pin to locking bolt.
3. Split the PTO shaft in two and remove the safety shield from both ends.
4. Both the ends of the yokes and the halves of the safety shield must be shortened: $(B - A) + 125 \text{ mm (4.9")}$.
5. Deburr all the parts and reassemble. Apply grease during assembly.
6. Fit the PTO shaft with the slip clutch on the machine end.
7. Connect the other end of the PTO shaft to the tractor.
8. Check the overlap of the yokes.

 **Never use the machine with a damaged PTO safety shield. Replace it first.**

6.2. Use of the PTO shaft

For correct use of the PTO shaft, the following items must be checked:

1. During the work, the angle of the pivot points must never exceed 30 degrees.
2. The tractor's PTO shaft must be parallel to the machine's PTO shaft.
3. The yokes must always overlap by at least 250 mm (9.8").
4. Never use the machine with a damaged PTO safety shield.
5. For lubrication, see the PTO manual.

7. CONNECTING AND DISCONNECTING THE MACHINE

Proceed with care when connecting and disconnecting the machine. Follow the instructions below:



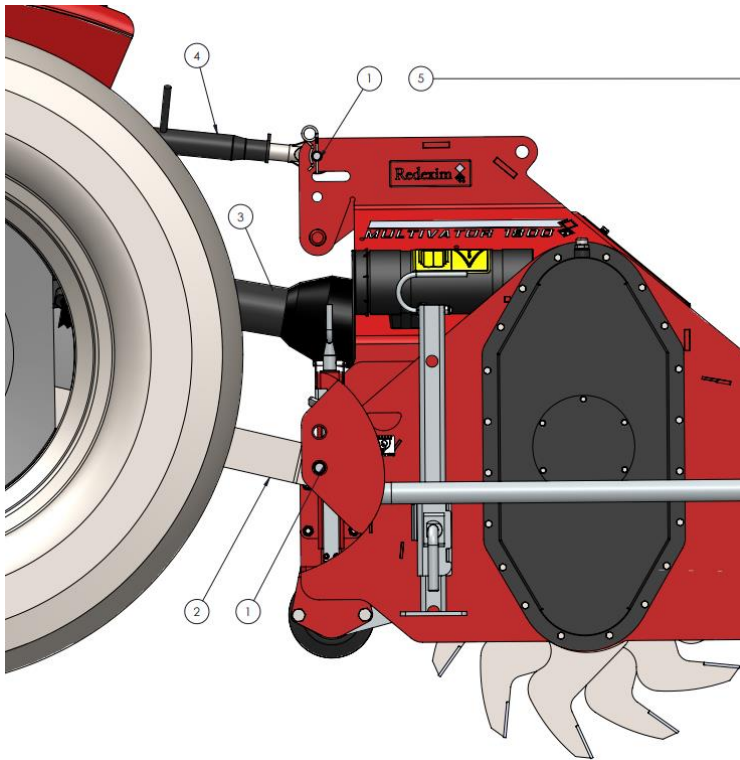


Fig. 7

7.1. Connecting the machine

Before connecting, check the machine as follows:

- Check that the machine is not damaged and that it can be safely connected and used.
- Check for loose parts and secure them firmly again.
- Check that all safety stickers are present on the machine and that they are undamaged and clearly legible. Never use the machine with damaged or illegible stickers.

The machine must be connected to the tractor as follows: **(Fig. 7)**

1. Remove the three-point hitch pins **(1)** from the machine.
2. Carefully drive the tractor backwards until the lift arms **(2)** can be connected to the machine.



!! Make sure the tractor and the machine cannot move during the connection process!!



!! Shut off the tractor's engine before connecting the machine!!

3. Connect the lifting arms **(2)** to the machine, using the 3-point hitch pins. Secure the hitch pins with the lynch pins.
4. Set the stabiliser for the lift arms **(2)** to 100 mm lateral play.
5. Fit the top link **(4)** to the tractor and connect it to the machine.



Use the round top link holes only for flat fields and the slotted hole for rolling fields.

6. Adjust the top link **(4)** so that the machine is parallel to the ground in the operating position.



If the machine is not correctly mounted behind the tractor, some angles of the PTO shaft may cause vibrations in the machine's driveline. These vibrations may damage the machine.

7. Connect the PTO **(3)** to the tractor (slip clutch at machine end) and flip the bracket **(5)** in the holder.



Make sure the three-point hitch pins are secured with the lynch pins!!

8. Start the tractor and lift the machine.

7.2. Disconnecting the machine

The machine must be disconnected as follows: (Fig. 7)

1. Drive to the location where you want to disconnect the machine.
Lift the machine high enough so you can lower the support legs.
2. Lower the support legs.



Make sure the storage area has a stable surface and that the machine cannot sink in.



Make sure the machine and tractor cannot move during the disconnection process!!!



Shut off the tractor's engine before disconnecting the machine!!

3. Carefully place the machine on the ground.



Check again that the machine is standing stably on the ground.

4. Disconnect the top link **(4)** and remove it.
5. Disconnect the link arms **(2)** from the machine.
6. Disconnect the PTO **(3)** at the tractor end and support it with the bracket **(5)**.
7. Start the tractor and drive it away.

8. TRANSPORT

The user is responsible for the transport of the machine on public roads. Check national legislation for applicable regulations. Given the weight of the machine, it is not recommended to drive faster than 20 km/h (12.4 mph) with a lifted machine. Higher speeds can lead to dangerous situations and damage to machine and tractor.



When the machine is raised off the ground, at least 20% of the tractor's weight must remain on the front axle.

When not transported behind the tractor, the machine may be secured/lifted at the following points: (Fig. 8)

- 1: Lift point for lifting the machine.
- 2: Lashing points (4x) on the machine.
- 3: Support for the front half of the PTO shaft.
- 4: Front half of the PTO shaft.

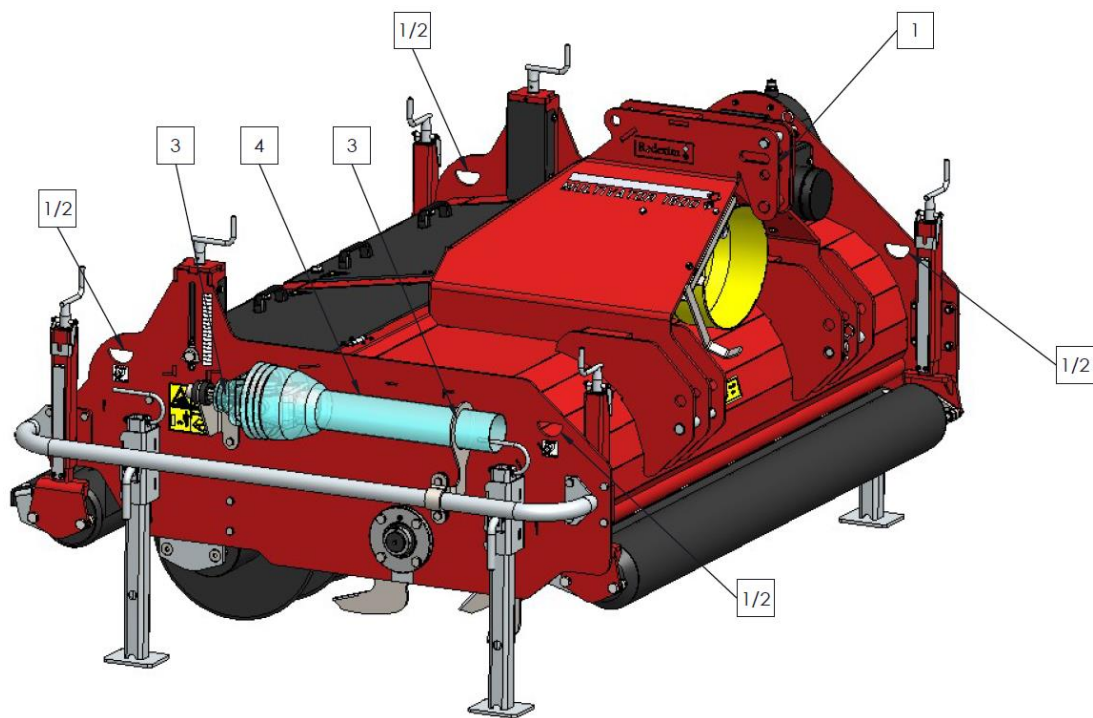


Fig. 8

9. PUTTING THE MACHINE INTO OPERATION

9.1. Safety

Check the following before using the machine:

1. Are there loose objects in the field? Remove them first.
2. Are there inclines? The maximum incline on which work may be performed with this machine is 20 degrees. Always work from bottom to top.
3. Are there cables/pipes in the ground? If so, determine their depth and set the working depth of the machine to 60% of this depth.
4. Are there hard objects in the ground? If so, use the machine at an appropriate speed and adjust the working depth.
5. Is there any danger of situations that may distract the driver's attention? If so, the machine may **NOT** be used.
6. Is there a danger of sinking or slipping? If so, postpone the operations.
7. If the soil is frozen or very wet, postpone the work until conditions improve.
8. Do **not** make any turns during the operations.

9.2. Working speed

The maximum working speed of the machine depends on soil conditions, working depth, gearbox settings and the desired result.

The maximum working speed is limited to 3 km/h (1.9 mph). Faster speeds are not recommended due to excessive wear and potential damage to the machine.



If hard objects are to be expected, the working speed must be reduced.

9.3. Start/Stop procedure

The start procedure is **VERY** important. Failure to carry out this procedure as described below may result in severe damage to the machine.

The start procedure is as follows:

1. Check the machine carefully for loose parts, and make sure all parts are working properly.



If loose parts are found or parts do not work properly, the problems must be corrected before the machine is used.

2. Drive to the location where the operations are to be performed.
3. Check that the set working depth is correct.
4. Lower the machine to just above the ground.
5. Set the tractor engine speed to approximately 1200 rpm.
6. Engage the PTO.
7. Increase the PTO speed to the maximum allowable value of 540 rpm.
8. **At a standstill, while the machine is rotating**, carefully lower it into the ground.
9. Select the proper gear in the tractor and start driving forward slowly.
10. Work a section of ground and assess whether the machine's settings are producing the desired result.

Stopping is done as follows:

1. Bring the tractor to a standstill.
2. Reduce the PTO speed.
3. Disengage the PTO and raise the machine out of the ground.



Only raise the machine out of the ground in an area that is flat side to side, to prevent the machine from swinging and scalping the turf.

4. Go to the next location and start again as described.

10. TECHNICAL INFORMATION

Generally speaking, the Multivator is not a complicated machine. A number of technical matters will be explained. If you still have questions thereafter, contact your dealer, who will be happy to assist you.

10.1. Adjusting the working depth of the rotor

The working depth can be adjusted by adjusting the support rollers, as follows:
(Fig.)

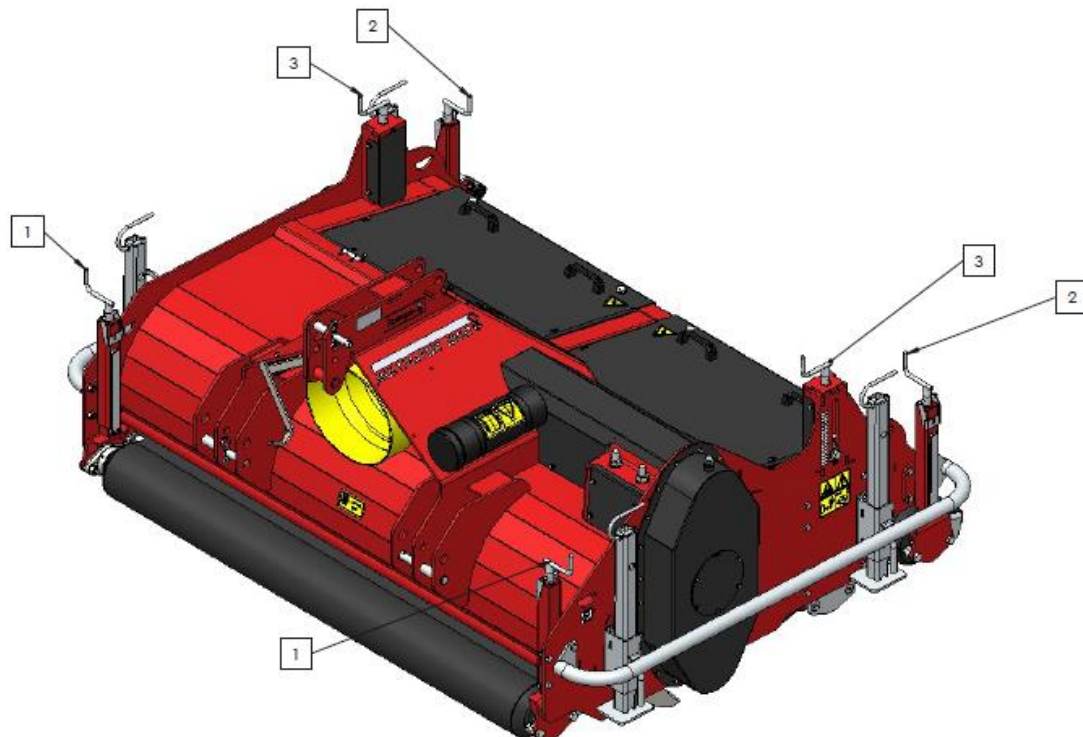


Fig. 9



!! Shut off the tractor's engine and disengage the PTO before stepping out!!



!! Make sure the tractor and machine cannot move unintentionally!!

1. Use the spindles **(1 and 2)** (both sides of the machine) to set the roller to the desired working depth.
2. Use the indicators **(1 and 2)** on both sides of the machine to adjust the machine equally on both sides.



Use the round top link holes only for flat fields and the slotted hole for rolling fields.



On flat fields, use only the front roller for working depth and raise the rear roller a few centimetres above the ground for a looser soil layer after the operations.

10.2. Adjusting the working depth of the blade roller

The cutting roller depth can be adjusted independently of the rotor, but the cutting roller depth depends on how the support rollers are set. If these are adjusted, the cutting roller depth will change too.



!! Shut off the tractor's engine and disengage the PTO before stepping out!!



!! Make sure the tractor and machine cannot move unintentionally!!

First loosen the nuts **(4)** of the spindles **(3)** (**fig. 10**) one turn (both sides of the machine).

2. Use the spindles **(3)** (both sides of the machine) to set the roller to the desired working depth.



The maximum adjustment is 10 cm (4") difference between the two sides!!

3. Use the indicators **(5)** on both sides of the machine to adjust the machine equally on both sides.

4. Tighten the nuts **(4)** of the spindles again.



Initially, set the depth of cut shallow in wet and hard soils and assess the operation after a few metres. If the ground is wet, check for damage to the turf as a result of adhesion to the blades. In hard soil, check whether the working depth of the blade roller affects the working depth of the rotor.

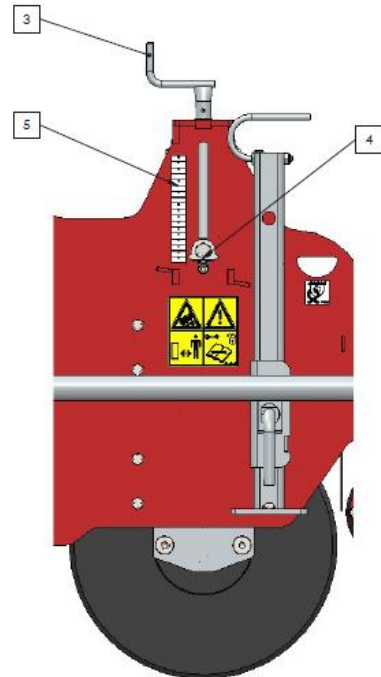


Fig. 10

10.3. Opening machine access hatches

The Multivator is fitted with access hatches for access to the inside of the machine, for cleaning and replacing blades, etc.

These hatches must be opened as shown below (fig. 11):



!! Shut off the tractor's engine and disengage the PTO before stepping out!!



!! Make sure the tractor and machine cannot move unintentionally!!

1. Use a tool to loosen all the bolts **(1)** of the hatches one turn.
2. Then loosen them the rest of the way by hand, alternating back and forth between them.
The bolts are fitted with retainer rings to prevent them from falling out of the hatches.
3. Open the hatches; the gas struts **(2)** will hold them open while you perform the necessary tasks.
4. Wipe away any dirt from the various surfaces before closing the hatches again.
5. Tighten the bolts **(1)** of the hatches again in the reverse order.

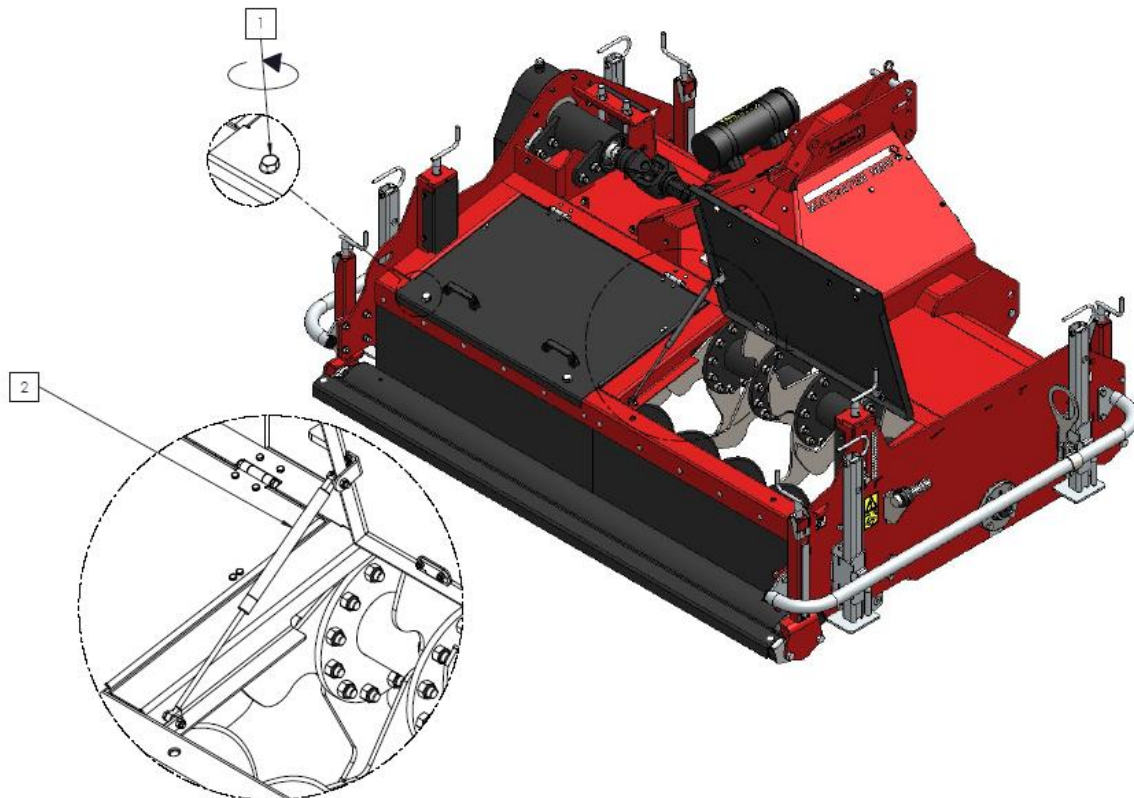


Fig. 11

11. OPTIONS

The following options are available for the Multivator:

11.1. Hydraulic rear brush

A hydraulic rear roller is available for aerating the loosened soil for faster drying.

Part number: 215,180,002

The set includes all necessary materials. See parts manual for the contents.

The rear brush is hydraulically driven and hydraulically liftable and is mounted on the inside of the rear roller for depth adjustment.

The brush height is adjusted in the same way as the working depth of the base machine.

During transport, the brush must **always** be raised, i.e. with the lift cylinder retracted.

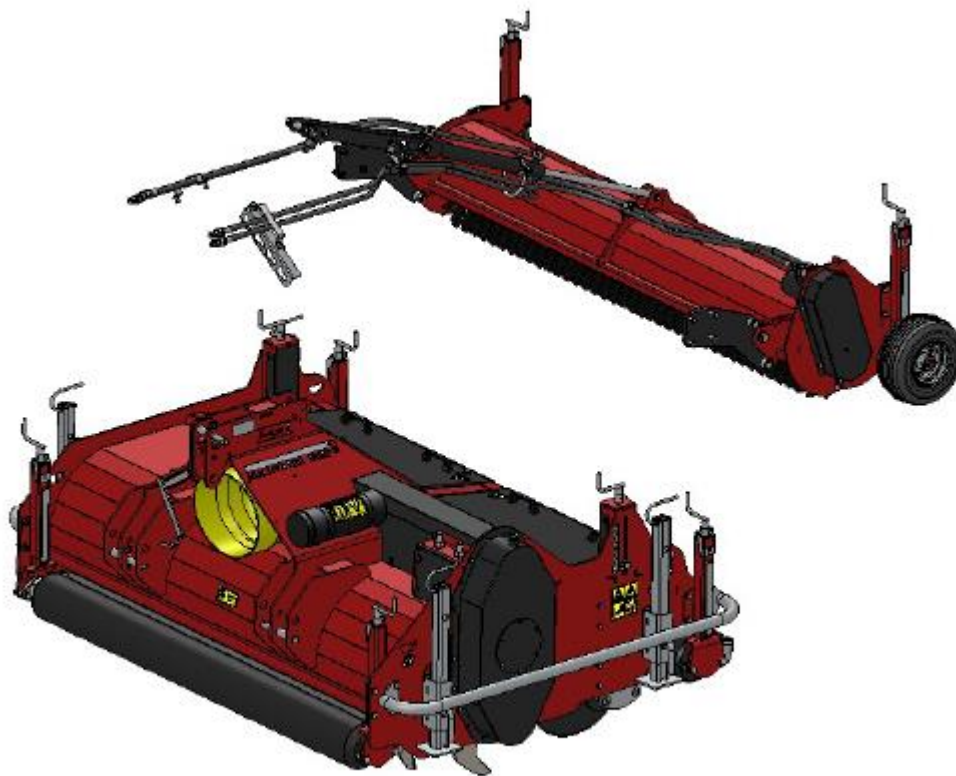


Fig. 12

11.2. Pre-cutting roller

In some circumstances it is better to pre-cut the turf prior to slicing the trenches; a pre-cutting roller is available for this purpose.

Part number: 215,180,204

This pre-cutting roller replaces the normal front roller; a matching scraper is supplied in the set. See parts manual for the contents.

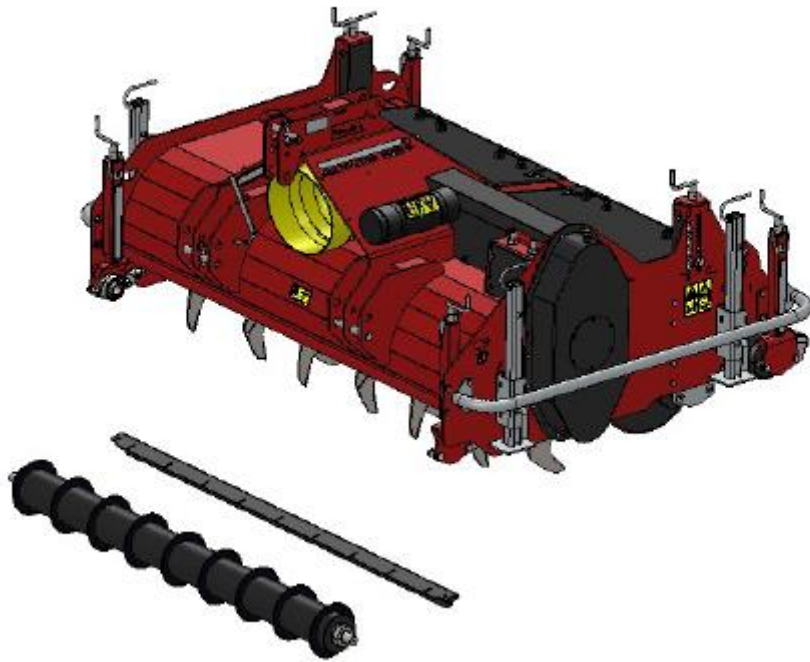


Fig. 13

12. MAINTENANCE

12.1. Maintenance schedule

Time schedule	Check point	Work activities
Before each use	Check for loose parts.	Secure the loose parts in the proper manner.
	General inspection	Connect the machine to the tractor and let the machine run for five minutes. Look and listen for abnormal movements and noises.
	Check for oil leaks and check the oil level in the gearbox.	Repair any leaks and, if necessary, top up with SAE 80W90.
	Safety stickers	Presence and legibility of safety stickers. Replace them if damaged or missing.
	Loose hanging parts around PTO.	Secure the parts so they cannot come near the PTO.
After the first 20 hours of operation (new or repaired)	Grease PTO shaft, roller bearings	Use two shots of EP 2 lubricating grease. See section 12.4 for location of grease points.
	Check for loose parts.	Secure the loose parts in the proper manner.
	General inspection	Connect the machine to the tractor and let the machine run for five minutes. Look and listen for abnormal movements and noises.
	Check for oil leaks and check the oil level in the gearbox.	Repair any leaks and, if necessary, top up with SAE 80W90.
	Loose hanging parts around PTO.	Secure the parts so they cannot come near the PTO.
After the first 50 hours of operation (new or repaired)	Replace the oil in the gearbox.	use SAE 80W90 2.3 L (0.6 gal.)
	Check grease level in drive unit	The grease level must be above the middle of the rotor shaft. Top up, if necessary, with EP 0 lubricating grease.
	Grease bearing on drive side of rotor in drive unit	Use two shots of EP 2 lubricating grease. See section 12.4 for location of grease points.
	Check the chain tension in the gearbox.	See section 12.6
After every 50 hours of operation	Grease PTO shaft, roller bearings	Use two shots of EP 2 lubricating grease. See section 12.4 for location of grease points.
	Check for loose parts.	Secure the loose parts in the proper manner.
	General inspection	Connect the machine to the tractor and let the machine run for five minutes. Look and listen for abnormal movements and noises.
After every 500 hours of operation or 1 year	Replace the oil in the gearbox.	Use SAE 80W90 2.2 L (0.58 gal.)
	Replace grease in drive unit.	Remove accessible grease and fill until the rotor shaft is covered (see section 12.3).

12.2. Fitting or replacing the blades

The machine comes new with a set of unmounted blades.

To fit or replace the blades, proceed as follows: **(Fig. 14)**

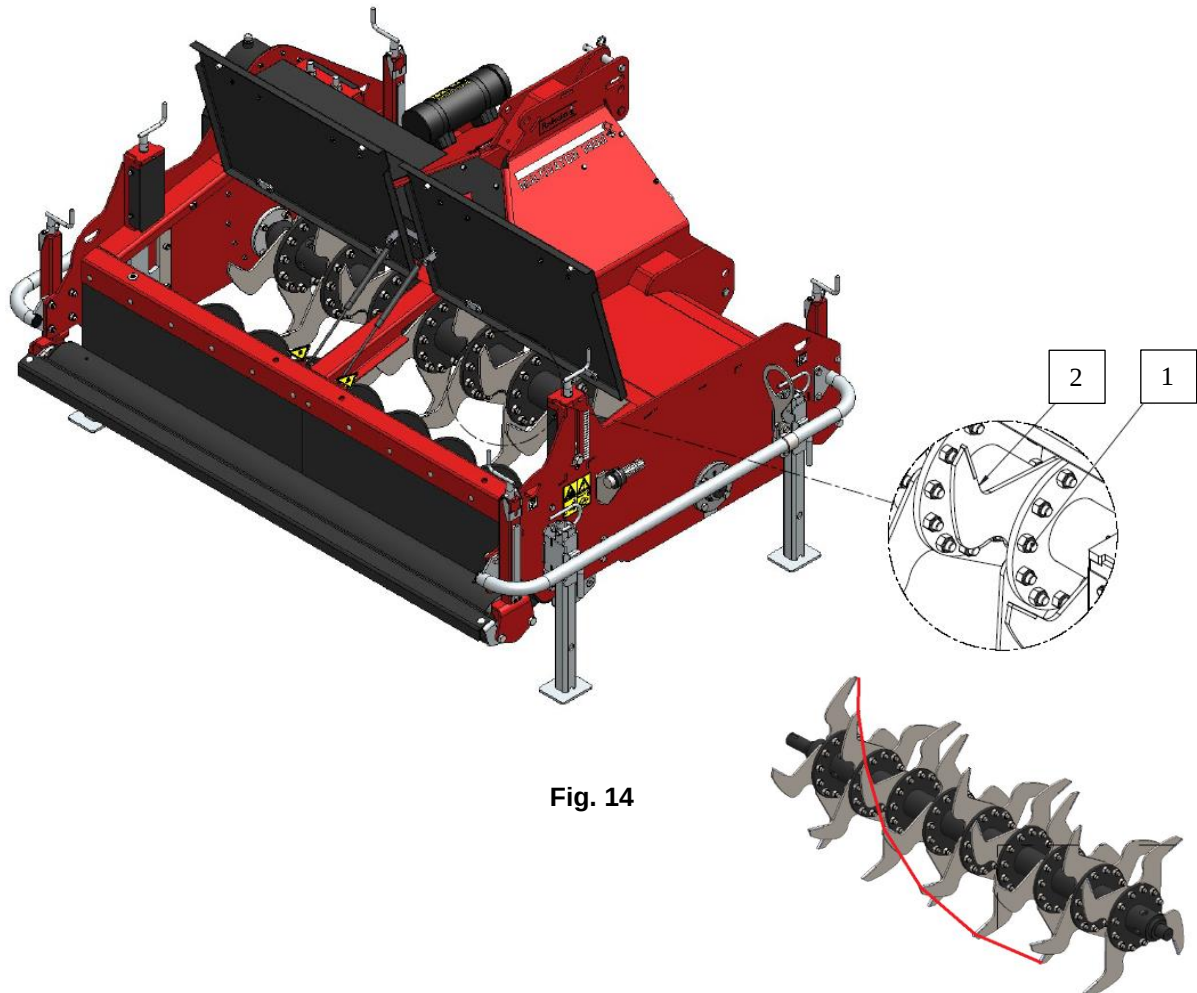


Fig. 14

1. Disconnect the machine from the tractor as described in section 7.2.
2. Open the access hatches as described in section 10.3.



!! Make sure the machine cannot move unintentionally!!



!! Never crawl under the machine!!

3. Remove the bolts/nuts **(1)** and the blades to be replaced.
4. Fit the new blades **(2)** with the sharp edge facing forward and attach them with the bolts/nuts **(1)**.

Place the blades on the drive side of the rotor flanges in a spiral pattern around the rotor with each blade starting one hole further along. **(Fig. 14)**

12.3. Cleaning

When using a pressure washer to clean the machine, observe the following rules:

- Do not use aggressive cleaning products that may damage the machine.
- Maximum water pressure: 70 bar (1015 psi)
- Maximum water temperature: 50 °C (122 °F)
- Do not aim the jet of the pressure washer directly at bearings, oil seals, lubrication points or stickers.
- Maintain a minimum distance of 0.5 m (1.6 ft) between the tip of the pressure washer and the surface to be cleaned.



Lubricate the bearing points after cleaning the machine.

12.4. Lubrication points

To ensure proper operation of the machine, all lubrication points on both sides of the machine must be lubricated periodically, with the exception of the bearing housing of the rotor mounting point (**no. 3, Fig. 15**). Lubricate the points according to the maintenance schedule (section 12.1).

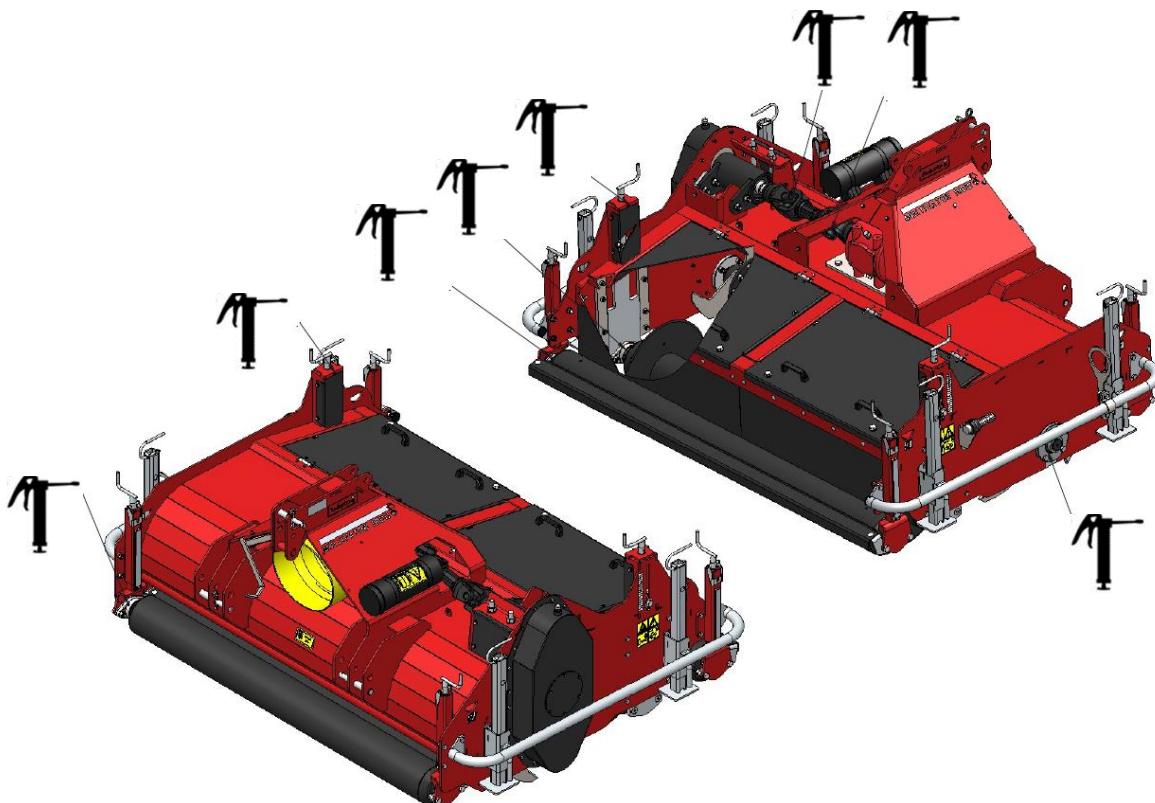


Fig. 15

12.5. Replacing grease in drive unit

1. Place the machine on the support legs on a flat, stable surface.

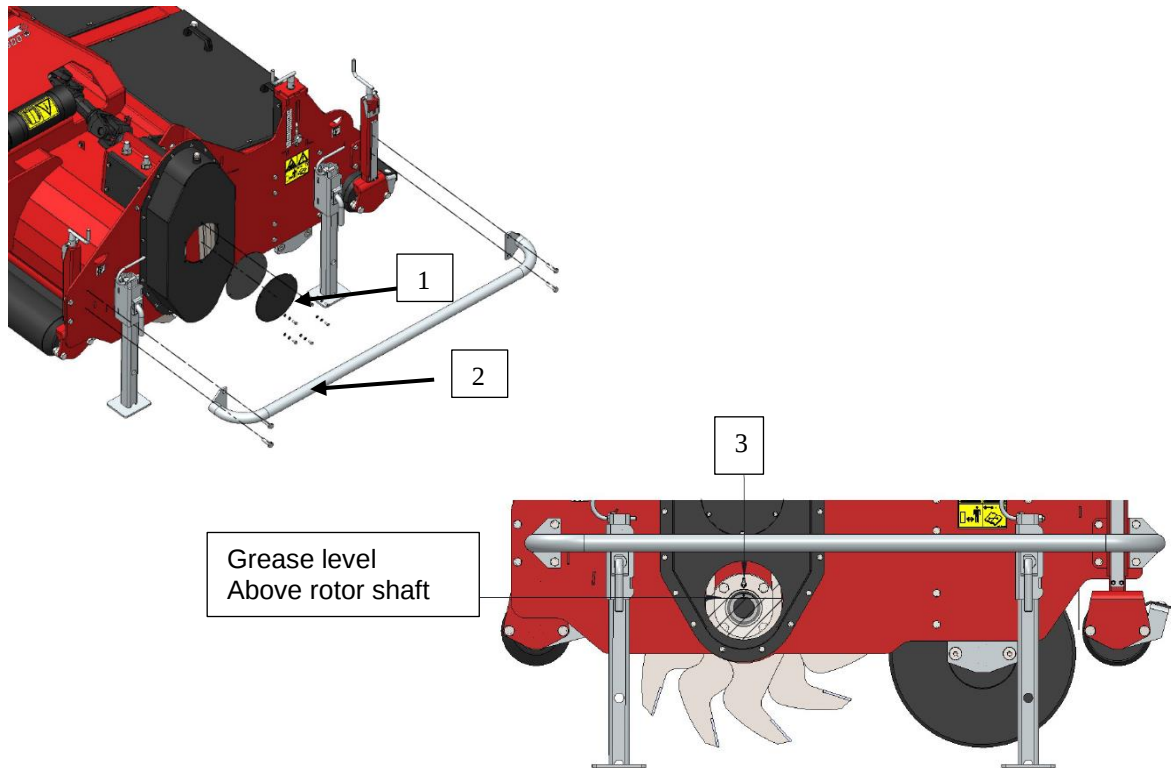


Fig. 16



!! Shut off the tractor's engine and PTO before stepping out!!



!! Make sure the tractor and machine cannot move unintentionally!!



!! Never crawl under the machine!!

2. Remove the protection bar (2) and access hatch (1) (fig. 16).



!! The parts and oil may be hot, and the oil is harmful to the skin!!

3. Empty the drive unit using an oil pump or scraper.
4. Grease the bearing of the rotor with EP 2 grease, two shots.
5. Check how contaminated the removed grease is. Metal particles can indicate a problem in the right-angle drive. The presence of water in the drive unit can also be a problem over time. However, it is normal for some moisture to remain in the grease due to condensation.



!! Waste oil/grease is harmful to the environment; dispose of it in accordance with applicable regulations.

6. Fill the drive unit with EP 0 grease through the opening, up to the middle of the rotor shaft (total approx. 2.2 litres / 0.58 gal.) (fig. 16).
7. Refit the access hatch and rubber gasket (1).
8. Refit the protection bar (2).

12.6. Tensioning chain

Wear causes the chain to stretch, and therefore it must be re-tensioned. Preferably, do this in combination with refilling/replacing the grease in the drive unit (**section 12.5**). Proceed as follows:



!! Never crawl under the machine!!



Check the grease level in the drive unit and, if necessary, remove some of the grease prior to tensioning. Top up with new grease afterwards.

1. Remove the protection bar **(2)** and access hatch **(1)** (**fig. 16**).
2. Test the slack in the chain: distance 'A' should be between 10 and 25 mm.
3. If the chain is too slack, it must be tensioned. First remove the protective guards **(3 and 4)** (**fig. 17**).
4. Then loosen the nuts **(5, 6 and 7)** a full turn, but no more than that.
5. Turn both of the lower nuts **(7)** a few turns further from the retaining plate and the upper nuts **(7)** an equal number of turns tighter so that the tensioner twists. This reduces the slack in the chain.
6. When the slack has reached the smallest value, tighten the lower nuts **(7)** against the retaining plate and tighten the upper nuts **(7)** against the retaining plate; the tensioner is now no longer adjustable. Check that both threaded rods extend equally.
7. Tighten the nuts **(5)** and check the chain tension again.
8. If the chain slack is not correct, repeat steps 4 to 7.
9. If the chain slack is correct, tighten the nuts **(6)**.
(If desired, the PTO intermediate shaft can be lubricated now.)
10. Refit the protective guards **(3 and 4)**.
11. Refit the access hatch and rubber gasket **(1)** (**fig. 16**).
12. Refit the protection bar **(2)** (**fig. 16**).

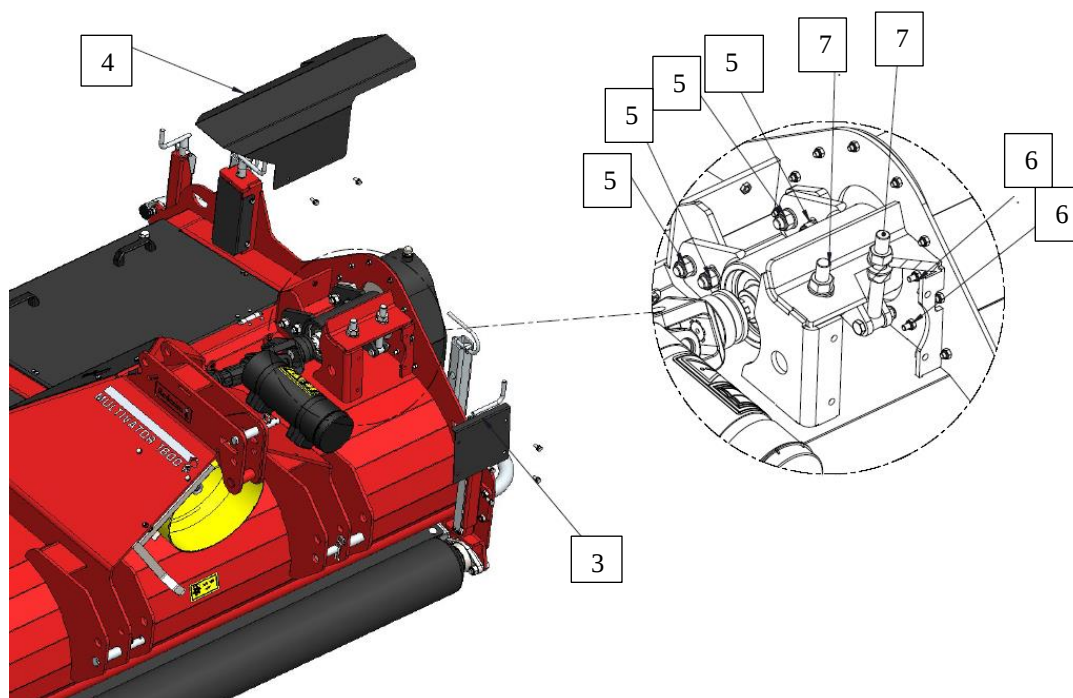
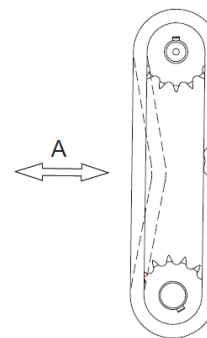


Fig. 17

13. TROUBLESHOOTING

Problem	Possible cause	Solution
Machine vibrates	- Obstacles in the ground. - Obstacle between the blades. - Angles of PTO universal joints differ. - Blades not fitted in a spiral pattern. - Blades incorrectly fitted so that the blunt edge contacts the ground first. - Worn or broken blades. - Rotor is bent. - Wear in the drive.	- Lift the machine to above the depth at which they are located and, after driving further, lower it to the desired working depth again. - Remove the obstacle. - Twist the top link until the machine is horizontal. - Fit the blades in a spiral pattern. - Replace blades or fit with sharp edge facing forward. - Replace the blades. - Straighten or replace the rotor. - Check the drive.
Working depth is not reached.	- Depth setting not set correctly. - Ground too hard. - Blades worn too far.	- Set working depth correctly. - Set the cutting roller less deep. - Reduce the driving speed. - Check and replace blades.
Machine makes too much noise.	- Parts have vibrated loose.	- Check for loose parts and secure them.
Too much damage to the ground that is being processed.	- Blades are too dull or damaged. - There is too much grass on the heel of the blade. - Ground is too soft.	- Replace the blades. - Reduce working depth. - Pre-cut. - Continue the work after mowing and removing the clippings. - Postpone the work until the weather conditions improve.
PTO slip clutch is slipping.	- Machine requires too much power. - Problem in drive.	- Reduce the driving speed. - Set the working depth shallower. - Postpone the work.
Machine is trying to rise on its own.	- Driving speed too high. - Ground too hard. - PTO speed too low.	- Reduce driving speed. - Set the working depth shallower. - Postpone the work until conditions improve. - Increase PTO speed.

Problem	Possible cause	Solution
Rotor shaft does not turn with PTO engaged.	- Gearbox output shaft does not turn. - Chain broken. - Gears slipping on shafts. - Other cause.	- Repair or replace gearbox. - Replace chain. - Check entire driveline and replace parts as necessary. - Check entire driveline and replace parts as necessary.
Oil leak.	- Gearbox leaks oil. - Rotor seal leaks. - Drive unit leaks - Drive shaft seal leaks.	- Replace gasket(s). - Replace seal ring. - Replace seal (Loctite 5970) between frame and seal ring in housing. - Replace seal (Loctite 5970) between drive unit and frame. - Replace rubber gasket for cover plate. - Check drive unit for cracks, and repair or replace it. - Replace seal (Loctite 5970) between cover plate and bearing housing. - Tighten the nuts of the clamp (fig. 17, no. 6). - Apply/replace seal (Loctite 5970) between cover plate and bearing housing or cover plate and frame.