



## Operator's Manual for Attachment



### Power rake

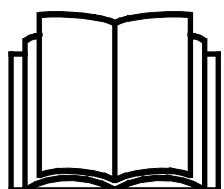
Product number

Manual slewing

A434016

Hydraulic slewing

A439234



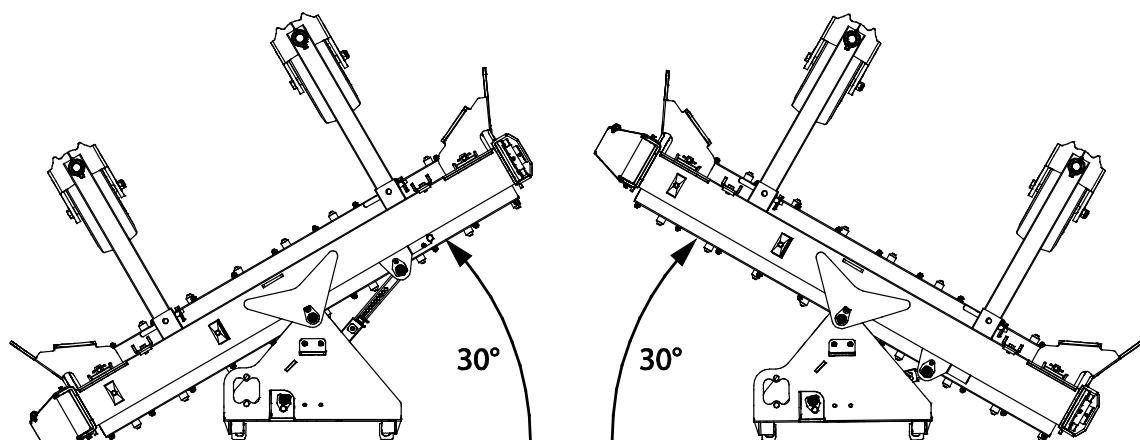
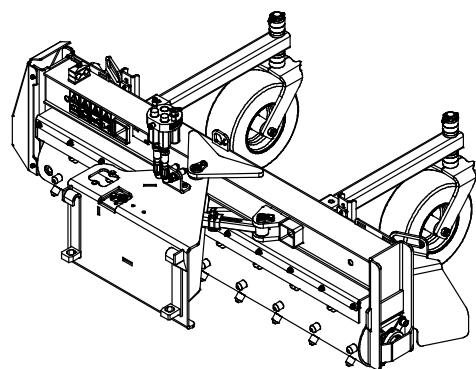
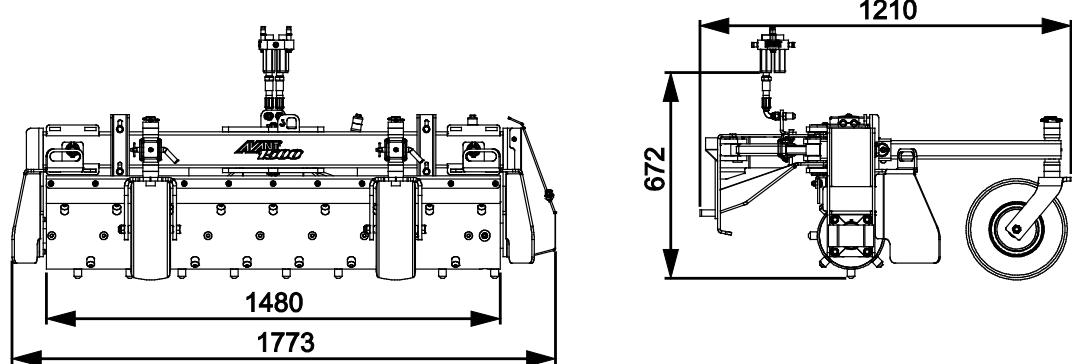
Please read this manual carefully before using the equipment,  
and follow all instructions.

Keep this manual for later reference.

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## I. Foreword

Avant Tecno Oy would like to thank you for your purchase of this attachment for your Avant loader. It has been designed and manufactured based on years of experience on product development and manufacturing. By familiarizing yourself with this manual and following the instructions, you ascertain your safety and ensure the reliable operation and long service life of the equipment. Read the instructions carefully before starting to use the equipment or performing maintenance.

The purpose of this manual is to help you to:

- operate the equipment in a safe and efficient manner
- observe and prevent any hazardous situations
- keep the equipment intact and ensure a long service life

With these instructions, even an inexperienced user can use the attachment and loader safely. The manual includes important instructions for experienced AVANT operators as well. Ensure that all persons using the loader have received proper guidance and familiarised themselves with the manual of the loader, each attachment that are used, and all safety instructions before using the equipment. Using the equipment for other purposes or use in any other way than described in this manual is prohibited. Keep this manual at hand throughout the service life of the equipment. If you sell or transfer the equipment, be sure to hand over this manual to the new owner. If the manual is lost or damaged, you can request a new one from your Avant dealer or from the manufacturer.

In addition to the safety instructions included in this manual, you must observe all occupational safety regulations, local laws, and other regulations concerning the use of the equipment. Particularly the regulations concerning the use of the equipment on public road areas must be observed. Contact your Avant dealer for more information about local requirements before you operate the loader on road areas.

Contact your local AVANT dealer for any questions, service, spare parts or about any problems that may occur with the operation of your machine.

This manual contains the original instructions in English. Due to continuous product development some of the details shown in this manual may differ from your equipment. Pictures may also depict optional equipment or features that are not currently available. We reserve the right to change the contents of the manual without notification. Copyright © 2020 Avant Tecno Oy. All rights reserved.

## Warning symbols used in this manual

The following warning symbols are used throughout this manual. They indicate factors that must be taken into account to reduce the risk of personal injury or damage to property:



### **WARNING SAFETY ALERT SYMBOL**

This symbol means: "**Warning, be alert! Your safety is involved!**"

Carefully read the message that follows, it warns of an immediate hazard that could cause serious personal injury.

The safety alert symbol by itself and with related safety statement indicates important safety messages throughout this Manual. It is used to draw attention to instructions involving your personal safety or the safety of others. When you see this symbol, be alert, your safety is involved, carefully read the message that follows, and inform other operators.

#### **DANGER**

This signal word indicates a hazardous situation which, if not avoided, will cause death or serious injury.

#### **WARNING**

This signal word indicates a potentially hazardous situation which, if not avoided, could cause serious injury or death.

#### **CAUTION**

This signal word is used when minor injury could result if the instructions are not followed properly.

#### **NOTICE**

This signal word indicates information about the correct operation and maintenance of the equipment.

Failure to observe the instructions accompanying the symbol can lead to equipment breakdown or other property damage.

## 2. Designed purpose of use

The AVANT Power rake is an attachment that is suitable for use with AVANT multi purpose loaders that are shown in Table 1. The Power rake is intended to be used for soil grading, levelling, and removing of debris from ground surfaces. It can be used, for example, for preparing seedbeds, grading dirt and gravel roads, and cleaning up and grading different types of ground surfaces. The hydraulically driven milling drum of the power rake transforms rough terrain into a planting surface. The robust drum also compacts the ground during cultivation. The Power rake mills the soil up to 65 mm depth.

The power rake drum is equipped with steel teeth. The power rake is intended to be operated by driving forward with the loader, while the drum rotates against the driving direction. The removable side plates make moving of soil and directing it easier. The attachment can be turned by 30 degrees to the left or to the right. This makes it possible to choose the side to which the excessive loose soil will be pushed while operating the attachment. The Power rake is available as a manually turnable model and a hydraulically turnable model.

The Power rake is not designed for any other use than what is specified in this manual and must not be used for any other purposes than what is intended for.

The attachment has been designed to require as little maintenance as possible. The operator can perform regular maintenance tasks. All repair work can't be performed by the operator, and demanding repair and maintenance operations are to be left for professional maintenance. All maintenance work must be done using proper safety equipment. Spare parts must be identical with original specifications, which can be ensured by using only original spare parts. A separate spare parts catalogue may be available, consult your Avant dealer.

Familiarise yourself with the manual's instructions regarding service and maintenance. Please contact your AVANT retailer if you have additional questions about the operation or maintenance of the equipment, or if you require spare parts or maintenance services.

**Table 1 - Power rake - Compatibility with Avant loaders**

Model	220 225 225LPG	313S 320S 420 423	520 523 525LPG	R20 R28	630 R35 635 640	745 750 755i 760i	850 860i	e5 e6
A434016	-	-	(•)	(•)	•	•	•	(•)
A439234	-	-	(•)	(•)	•	•	•	(•)

It is recommended to use the attachment only with loaders marked with • in Table 1. When using with models marked with (•), full performance may not be achieved. Additional counterweights may also be required. For compatibility with a model not shown in table, contact your Avant dealer.

Compatibility recommendations are based on the mass of the attachment, the recommended input of hydraulic energy, and the distance of the center of gravity of the attachment from the quick coupling plate of the loader.

### 3. Safety instructions for using the attachment

Please bear in mind that safety is the result of several factors. The loader-attachment combination is highly powerful and improper or careless use or maintenance may cause serious personal injury or property damage. Due to this, all operators must carefully familiarise themselves about correct use and the operator's manuals of both the loader and the attachment before starting operation. Do not use the attachment if you have not completely familiarised yourself with its operation and the related hazards.



**DANGER**

**Misuse, careless use, or using an attachment that is in poor condition, may cause risk of serious injuries.** Familiarise yourself with the controls of the loader, correct coupling procedure, and the correct way to operate the attachment at a safe area. Study especially how to stop the equipment in a safe manner. Read all safety precautions carefully.

**Read all safety instructions carefully before handling the attachment**



**WARNING**

- When attaching an attachment to the loader, **ensure that the locking pins of the loader's quick attach plate are in the lower position and that they have locked the attachment to the loader.** Never lift or move an unlocked attachment.
- The Power rake is designed to be used by one operator at a time. Do not let others near the danger area of the equipment when it is in use.
- Always transport the attachment as low as possible to keep the centre of gravity low, and keep the telescopic boom retracted during driving.
- **Impact hazard - Thrown objects.** Do not let bystanders stand closer than the safety distance of 2 metres from the machine. Stop the attachment if others get within the safety distance.
- **Risk of thrown objects - Keep a safety distance of at least 2 metres between a power rake that is running and any person in vicinity.** Keep in mind that the Power rake will throw stones and any other objects entering the attachment at high speed. The Power rake can throw small objects, such as stones, for example, up to 30 metres forward from the rake. Stop the attachment if there are persons or fragile objects at the direction of the discharge of the Power rake.
- **Hazard of entanglement - Rotating parts.** Never leave the driver's seat when the attachment is running or if the auxiliary hydraulics control is locked on. Always keep a safe distance between persons and machinery that may start or move. Stop the equipment following the safe stopping procedure and lower the attachment firmly on the ground before leaving the driver's seat, or when other persons are present at the working area.
- **Risk of crushing under the attachment or the loader boom - Lower the attachment firmly on the ground before leaving the driver's seat.** Make sure that the attachment is properly supported during any maintenance or inspections. Do not leave the driver's seat when the loader boom is lifted. Going under a raised attachment or loader boom is dangerous, as the boom may lower due to loss of stability, mechanical fault, or if another person operates the controls of the loader.
- Pay attention to the surroundings and any other persons and machines moving in the vicinity. Pay attention to the contours of the terrain and other hazards, such as branches and trees that can reach to the driver's area, loose rocks, and slippery surfaces.



- Find out if there are buried electric cables, water lines or other similar obstacles laid less than one meter deep from the ground surface. Hitting such obstacle may lead to electric shock, fire, gas explosion or other serious hazards.
- The attachment is to be used by one operator at a time. Do not approach or allow others to approach the operating area when another person is operating the controls of the loader.
- Never use the attachment to lift or to transport persons or as any kind of work platform even temporarily.
- Make sure to use only an attachment that is in good condition. Check the attachment thoroughly in regular intervals. Do not modify the attachment in a manner that would affect its safety. It is prohibited to drill holes on the attachment, and welding or other means of fixing hooks or other objects on the attachment is strictly prohibited.
- Shut down the loader and place the attachment to a safe position as shown in Safe stopping procedure before any cleaning, maintenance, or adjustments.
- Use the attachment only for its intended purpose. Other use may create unnecessary safety risks, and the equipment may get damaged.
- Make sure that the loader is equipped with necessary safety components, and that they are in working condition. Seat belt must be used. If there are specific hazards related to the operating area, use appropriate safety equipment.
- Also read the safety instructions and correct use of the loader from the operator's manual of the loader.



**Risk of crushing - Going under the loader boom or an attachment can cause serious injury or death.** Never go under the loader boom and prevent others from getting near lifted boom or attachment. Going under a raised attachment or loader boom is dangerous, as the boom may lower due to loss of stability, mechanical fault or when other person operates the controls of the loader. Lower the attachment firmly on the ground before leaving the driver's seat.



**Beware of entanglement and crushing hazards especially when removing blockages.** If a blockage is cleared without first turning off the auxiliary hydraulics of the loader, the rake drum will start immediately and potentially cause severe injuries. Always stop the attachment by following the safe stopping procedure before leaving the driver's seat.



**Risk of serious personal injuries - Improper or careless use of the attachment may cause hazardous situations.** Use the attachment only for its intended use. Familiarise yourself with the loader controls in a safe area. Pay particular attention to the safe stopping of the attachment and the loader.



**Entanglement hazard - Do not use loose clothing during operation.** Never wear loose clothing, long scarves, jewellery, or other items that might become entangled with rotating parts while operating the attachment. If needed, wear a hat to prevent long hair from coming into contact with the rotating parts.

***Remember to wear proper personal protective equipment:***



- The noise level at the driver's seat may exceed 85 dB(A) depending on loader model and operating cycle. Extended exposure to loud noise can cause hearing impairment. Wear hearing protection while working with the loader.
- Wear protective gloves.
- Wear safety boots whenever working with the loader.
- Wear safety glasses e.g. when handling hydraulic components.
- Wear respirator mask when operating in dusty conditions.

***Safe stopping of the attachment, before going near the attachment:***



**Always stop the attachment following safe stopping procedure before leaving the driver's seat.** Safe stopping procedure prevents all unintentional movements of the attachment. Note that the loader boom can move down even if the engine of the loader is turned off. Safe stopping procedure:

- Lower the boom and the attachment on the ground.
- Shut down the loader engine and lock the parking brake.
- Release residual pressure from the hydraulic system; move all hydraulic control levers to their extreme positions a couple of times.
- Prevent starting of the machine, remove ignition key.

## 4. Technical specifications

**Table 2 - Power rake - Specifications**

<b>Product number</b>	A434016	A439234
Working width:	1500 mm	
Total width:	1773 mm	
Length:	1210 mm	
Fixed teeth:	70 pcs	
Weight:	290 kg	300 kg
Slewing angle:	± 30°	
Recommended input of hydraulic energy:	40-60 l/min	
Maximum input of hydraulic energy:	70 l/min / 22,5 MPa (225 Bar)	
Compatible AVANT loader models:	See Table 1	

### 4.1 Safety labels and main components of the attachment

Listed below are the labels and markings on the attachment. They must be visible and readable on the equipment. Replace any unclear or missing label. New labels are available via your retailer or contact information provided on the cover.



**WARNING**

**Make sure all warning decals are readable.** The warning labels contain important safety information and they help to identify and remember the hazards related to the equipment. Replace damaged or missing warning labels with new ones.



**A46771**



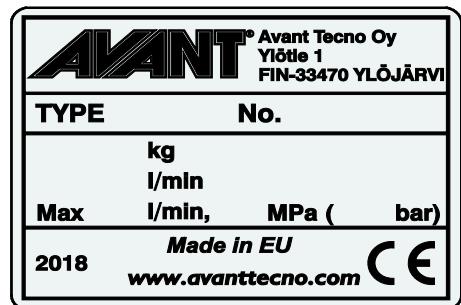
**A46772**



**A46799**



**A46803**

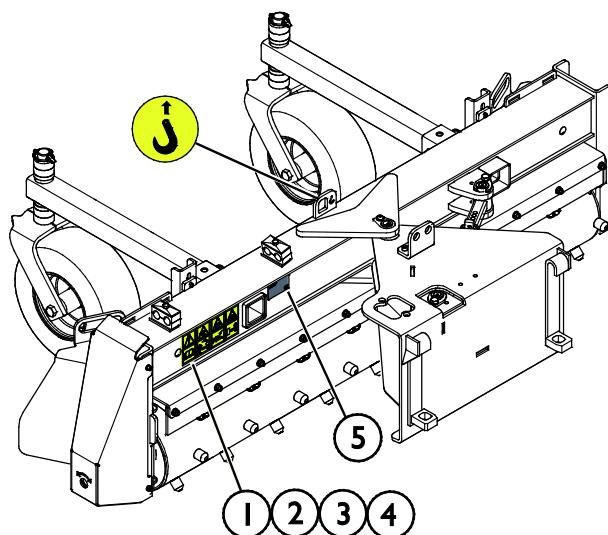


Attachment identification plate A435996

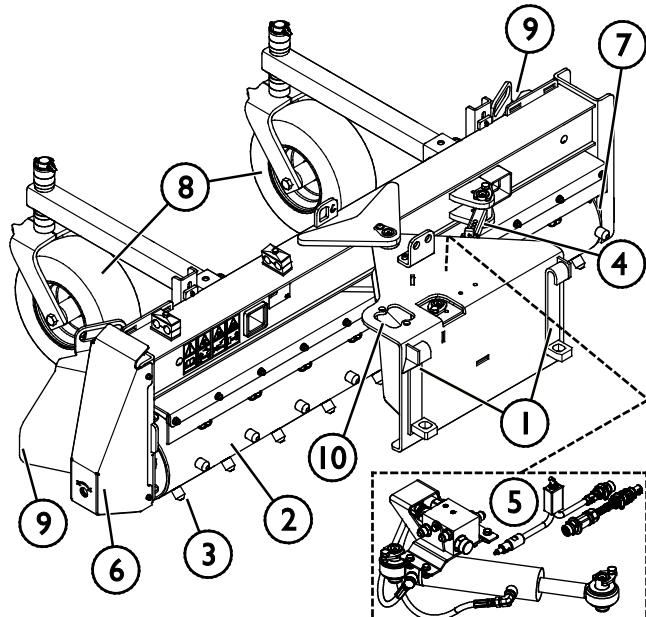
**To apply a new label:** Clean the surface thoroughly to remove all grease. Allow it to dry completely. Peel off the protective film of the label and press firmly to apply. Take care not to touch the glue of the label.

**Table 3 - Decal locations and warning messages**

<b>Decal</b>	<b>Warning message</b>
1 A46771	Misuse hazard - Read instructions before use.
2 A46772	Crushing hazard - Do not go under a raised attachment; stay away from raised equipment.
3 A46799	Beware of thrown objects; keep a safe distance from the equipment (2 m minimum, up to 30 m).
4 A46803	Crushing and pinching hazard, floating attachment bracket. Keep clear of moving components.
5 A435996	Attachment identification plate


**Table 4 - Power rake - Main components**

1	Frame with Avant quick coupling brackets
2	Power rake drum
3	Tooth (70 pcs)
4	Mechanical slewing, adjustable
5	Hydraulic slewing (optional extra)
6	Hydraulic motor
7	Bearing
8	Support wheel, adjustable (2 pcs)
9	Guide plate (2 pcs)
10	Multiconnector holder



## 5. Assembling the attachment

Attaching the attachment to the loader is quick and easy, but it must be done carefully. The attachment is mounted to the loader boom by using the quick attach plate on the loader boom and the counterpart on the attachment.

If the attachment is not locked to the loader, it may detach from the loader and cause a hazardous situation. The loader must not be driven and the boom must never be lifted when the attachment has not been locked. To prevent hazardous situations, always follow the coupling procedure shown below. Also remember the safety instructions shown in this manual. The attachment is mounted to the loader as follows:



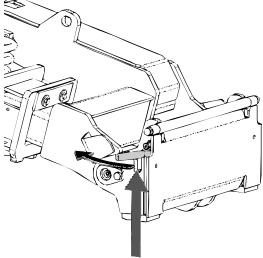
**Crushing risk - Make sure that an unlocked attachment will not move or fall over.**

Do not stay in the area between the attachment and the loader. Mount the attachment only on level surface.

Never move or lift an attachment that has not been locked.

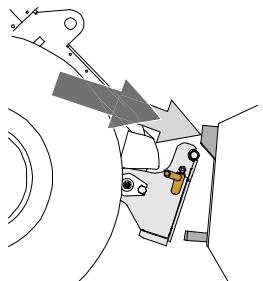
**Avant quick coupling system:**

**Step 1:**



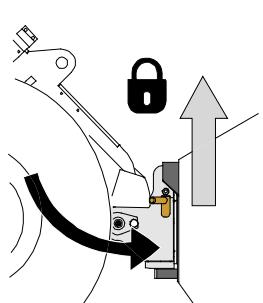
- Lift the quick attach plate locking pins up and turn them backwards into the slot so that they are locked in the upper position.
- If your loader is equipped with a hydraulic attachment locking system, see additional instructions about the use of the locking system from the relevant manuals.
- Ensure that the hydraulic hoses are not in the way during installation.

**Step 2:**



- Turn the quick attach plate hydraulically to an obliquely forward position.
- Drive the loader onto the attachment. If your loader is equipped with a telescopic boom, you can utilise this.
- Align the upper pins of the loader's quick coupling plate so that they are under the corresponding brackets of the attachment.

**Step 3:**



- Lift the boom slightly – pull the boom control lever backward to raise the attachment off the ground.
- Turn the boom control lever left to turn the bottom section of the quick attach plate onto the attachment.
- Lock the locking pins manually or lock the hydraulic locking.
- **Always check the locking of both locking pins.**



WARNING

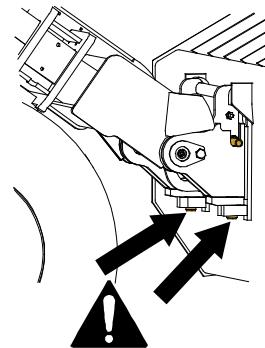
**Risk of crushing - Avoid tipping over the attachment.** Excessive tilting or lifting of an unlocked attachment increases the risk of tipping the attachment over. Do not use the automatic locking of the locking pins when the attachment is lifted more than one meter from the ground. If the locking pins do not return to the normal position when tilting, do not tilt or raise the attachment any more. Lower the attachment on the ground and secure the locking manually.



WARNING

**Risk of falling objects - Prevent dropping of attachment.**

An attachment that has not been completely locked to the loader may fall on the boom or towards the operator, or fall under the loader during driving, causing loss of control of the loader. Never move or lift an attachment that has not been locked. Before moving or lifting the attachment, make sure that the locking pins are in the lower position and come through the fasteners on the attachment on both sides.



WARNING

**Make sure the loader is compatible with the attachment.** Stability of the loader, possible overload of the attachment, and compatibility of loader control systems must be ensured in addition to mechanical compatibility of the attachment. If you use the attachment with a loader that is not fit to be used with the attachment model you have, risks include tipping over, damage to attachment due to overload, and risks related to uncontrolled motion of attachment and its parts. If your loader is not listed in Table 1 on page 6, ask your Avant dealer before using this attachment.

## 5.1 Connecting and disconnecting hydraulic hoses

On Avant loaders the hydraulic hoses are connected using the multi connector system. If you have an Avant 300-700 series loader with the conventional quick couplers and wish to change to the multi connector system, contact your Avant dealer or service point for instructions or installation services.



WARNING

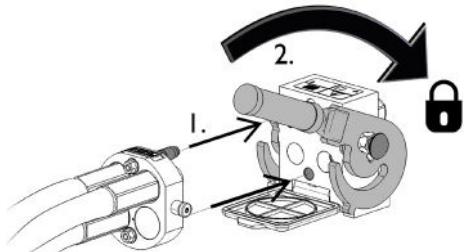
**Risk of movement of the attachment and ejection of hydraulic oil - Never connect or disconnect quick couplings or other hydraulic components while the control lever of the auxiliary hydraulics control lever is locked on or if the system is pressurized.** Connecting or disconnecting the hydraulic couplings while the system is pressurized may lead to unintended movements of the attachment, or ejection of high-pressure fluid, which can cause serious injuries or burns. Follow safe stopping procedure before disconnecting hydraulics.

**NOTICE**

Keep all fittings as clean as possible; use the protective caps on both the attachment and the loader. Dirt, ice, etc. may make using the fittings significantly more difficult. Never leave the hoses hanging on the ground; place the couplings onto the holder on the attachment.

***Connecting the multiconnector system:***

1. Align the pins of the attachment connector with corresponding holes of the loader connector. The multiconnector will not connect if the attachment connector is upside down.
2. Connect and lock the multiconnector by turning the lever towards the loader.

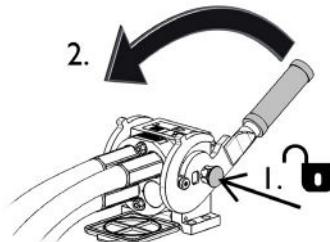


The lever should move easily all the way to its locking position. If the lever does not slide smoothly, check the alignment and position of the connector and clean the connectors. Also shut down the loader and release the residual hydraulic pressure.

***To disconnect the multiconnector system:***

Before disconnecting put the attachment down on a solid and even surface.

1. Switch off the auxiliary hydraulics of the loader.
2. While pushing unlock button, turn the lever to disconnect the connector.
3. After ending operation put the multiconnector on its holder on the attachment.

***Disconnecting hydraulic hoses:***

Before disconnecting the fittings, lower the attachment to safe position on solid and level surface. Turn the control lever of the auxiliary hydraulics to its neutral position.

**NOTICE**

When uncoupling the attachment, always disconnect the hydraulic couplings before unlocking the quick coupling plate, to prevent hose damage and any oil spills. Reinstall the protective caps on the fittings to prevent impurities from entering the hydraulic system.

***Releasing residual hydraulic pressure:***

In case residual pressure is left in the hydraulic system of the attachment, it is often possible to disconnect the hydraulic couplings, but it may be difficult to connect them the next time. If the fittings will not connect, the residual pressure must be released by turning the auxiliary hydraulics control lever of the loader, when the engine is turned off. To make sure that there will not be residual pressure in the hydraulic system of the attachment, shut down the loader engine and move the auxiliary hydraulics control lever of the loader back and forth before disconnecting the couplings.

## 5.2 Electric connection

To control the slewing of the hydraulically controlled Power rake model A439234, its electric harness must be connected to the loader.

There are two options for the electrical connection:

1. A cable harness that is equipped with a switch is delivered with the attachment, and it is connected to the power plug on the loader.
2. Alternatively, the Attachment control switch pack can be used (optional equipment for loaders).

### 5.2.1 To connect the electric harness of the attachment to the loader

Starting from year 2016, there is an integrated electric plug in the multiconnector of all attachments that have electric functions. However, a separate electric harness is also supplied with the attachment, to make it possible to connect and use it with loaders that are not equipped with Attachment control switch pack.

There are three ways to connect the electric connector, depending on the installed options of the loader:

#### 1. If your loader is not equipped with the attachment control switch pack:

Use the separate cable kit with a switch that is supplied with the attachment. Connect this cable to the 12 V electric socket near the operator's seat of the loader, and to the electric plug of the attachment.

1. Electric plug, connects to the 12 V electric socket near the operator's seat of the loader.

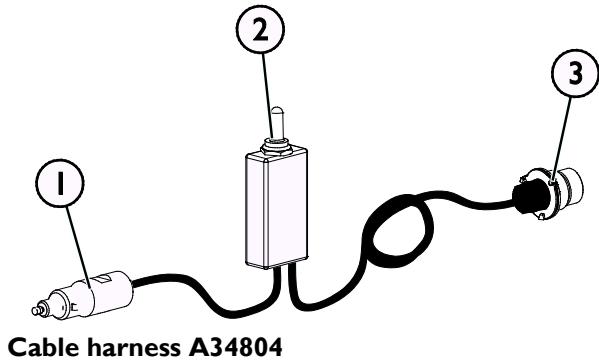
More information about the power outlet of the loader can be found in the operator's manual of the loader.

2. 2-way switch, returns to middle position

Select the location of the switch in the cab so that it is easily accessible but will not be used inadvertently.

3. Connect to the electric plug of the attachment.

If the attachment is equipped with a electric plug that is integrated to the multiconnector of the attachment, disconnect the electric cable from the multiconnector.



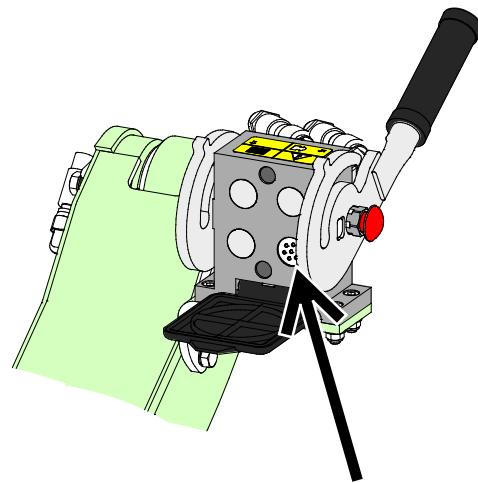
## 2. If your loader is

- equipped with the attachment control switch pack, and
- the loader is manufactured in **2016 or later**:

The electric socket is integrated in the multiconnector. The electric harness of the attachment is connected when the multiconnector is coupled.

Clean both multiconnectors before connecting the multiconnector.

The separate cable harness A34804 is not needed when the loader is equipped with the Attachment control switch pack.



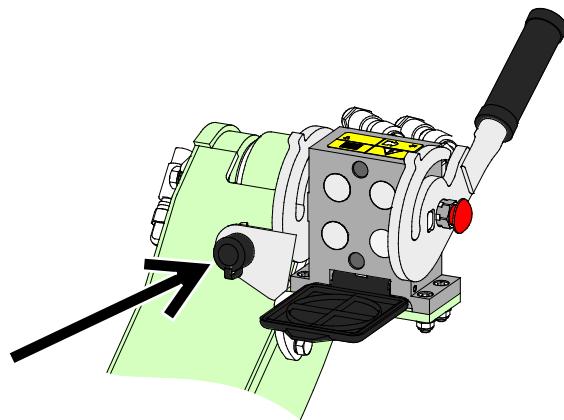
**Attachment control switch pack, loader manufactured in 2016 or later**

## 3. If your loader is

- equipped with the attachment control switch pack, and
- the loader is manufactured in **2015 or before**:

There is an electric socket near the multiconnector of the loader. Connect the electric plug of the attachment to the socket of the loader.

The separate cable harness A34804 is not needed when the loader is equipped with the Attachment control switch pack.



**Attachment control switch pack, loader manufactured in 2015 or before**

### **NOTICE**

Make sure that electric cables will not get stuck, squeezed, or stretched when the equipment moves.

With the help of the attachment control switch pack available for the loader, the attachment control switches are easily accessible at the end of the boom control lever.

More information about the power outlet of the loader can be found in the operator's manual of the loader.

## 6. Operating the attachment

Check the attachment and the operating environment once more before starting to work, and that all obstacles have been removed from the operating area. Quick inspection of the equipment and the operating area before use are parts of ensuring safety and the best performance of the equipment.



**WARNING**

**Thrown objects - impact hazard.** Before using the equipment, check that the attachment and the loader are intact and that all protective covers are in place. Note that regardless of the protective housing of the box rake, rocks, pieces of wood, or other objects found at the operating area, may be ejected by the rake. Stop the box rake if there are others at a distance of less than 2 meters from the work site.



**WARNING**

**Entanglement hazard - Never leave the driver's seat when the box rake is running.** Keep a safe distance between the attachment and other persons, and stop the attachment following the safe stopping procedure whenever others get close to the attachment. Never perform any maintenance or adjustments if the box rake can start by accident. Always follow the safe stopping procedure.



**WARNING**

**Risk of crushing - Never allow anyone to get under a lifted attachment or loader boom.** Keep in mind that the loader boom can be lowered or tilted even if the engine has been shut down (crushing hazard). The loader is not intended to be left to keep a load elevated for longer periods. Always lower the attachment to a safe position before leaving the driver's seat.



## 6.1 Checks before use

- Remove all obstacles from the operating area, such as large tree branches or rocks, before starting the operation. Remember correct working methods and avoid leaving the driver's seat unnecessarily. Remove or mark also all hidden obstacles that could cause damages or risks of injuries, and make sure that there are no electric cables, water or gas pipes at the reach depth of the equipment.
- Use only when all pins are locked and secured in place.
- Before each use, check the general condition of the attachment and the loader. Ensure that the rake drum and its teeth are intact and can rotate freely, and that there is no string or other foreign material coiled around the drum of the box rake.
- Check that there are no broken components in the Power rake.
- Check regularly to ensure there are no hydraulic leaks. Refer to chapter 7 for maintenance instructions.
- Ensure that bystanders are at a safe distance when operating the equipment. Do not let anyone to enter danger area of the boom or to stay directly in front of the loader. Also make sure that it is safe to reverse with the loader. Never assume that bystanders will remain where you last saw them; especially children are often attracted to the moving equipment.
- Operate the attachment and the controls of the loader only when seated on the driver's seat. Ensure that the loader and the attachment are used in a safe manner and as intended. Do not allow children to operate the equipment.
- Never operate the loader or attachments while under the influence of alcohol, drugs, medication that may impair judgement or cause drowsiness, or if not otherwise medically fit to operate the equipment.
- Remember correct working methods and avoid leaving the driver's seat unnecessarily. Practise the use of the attachment and the controls of the loader in a safe area. If you are unfamiliar with the particular loader model, it is recommended to practise its use without any attachments.

## 6.2 Use

### ***Using the Power rake:***

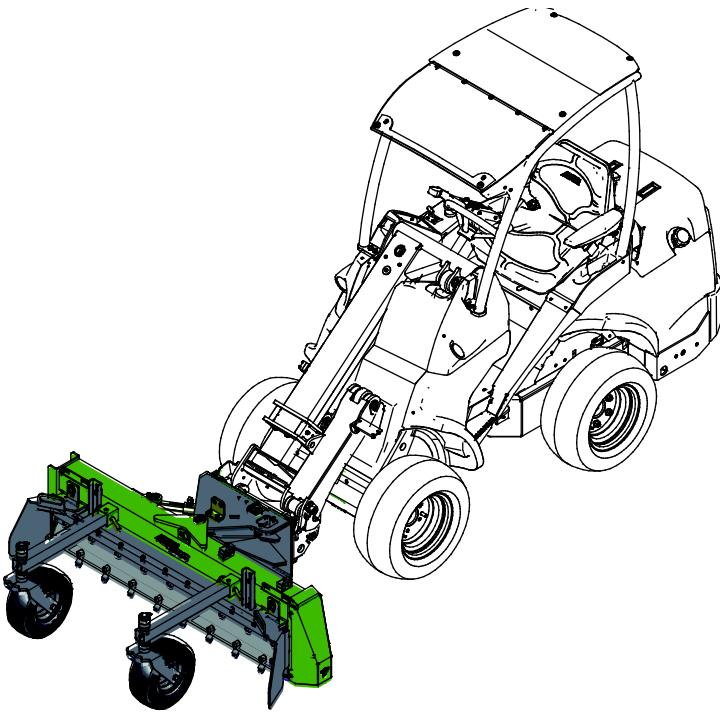
1. Set the attachment to working position parallel on the ground, as shown in the adjacent figure.

If your loader is equipped with a telescopic boom, you can utilize it for a better view to the working area.

2. Start the Power rake by turning the auxiliary hydraulics control lever to its locking position, or by using the buttons of the joystick.
3. Set the loader engine rpm according to the operating conditions.

The Power rake should typically be used with high engine rpm, and depending on the model of the loader, one or two auxiliary hydraulic pumps are used (where applicable).

4. The drum of the power rake should rotate against the driving direction when driving forwards with the loader.



***The performance of the attachment and work with it are influenced by the following factors, among others:***

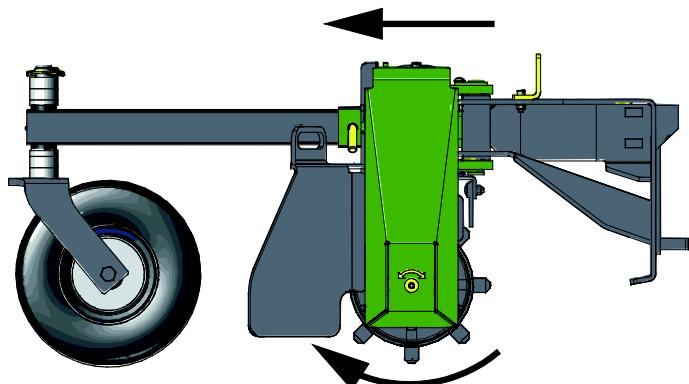
- Driving speed
- Loader engine rpm, loader model, and auxiliary hydraulics oil flow
- The type of soil being milled, its compactness, and dampness
- Slewing angle

The denser the soil, the more power the attachment requires from the loader. If the soil is loose, slightly higher driving speed may be used, but on stiff and compact soil high loader engine engine rpm must be used (high hydraulic oil output) and the driving speed must be relatively low. In some cases it may be beneficial to break the surface of the soil first, and then till the soil more thoroughly with a second run.

### 6.2.1 Direction of rotation

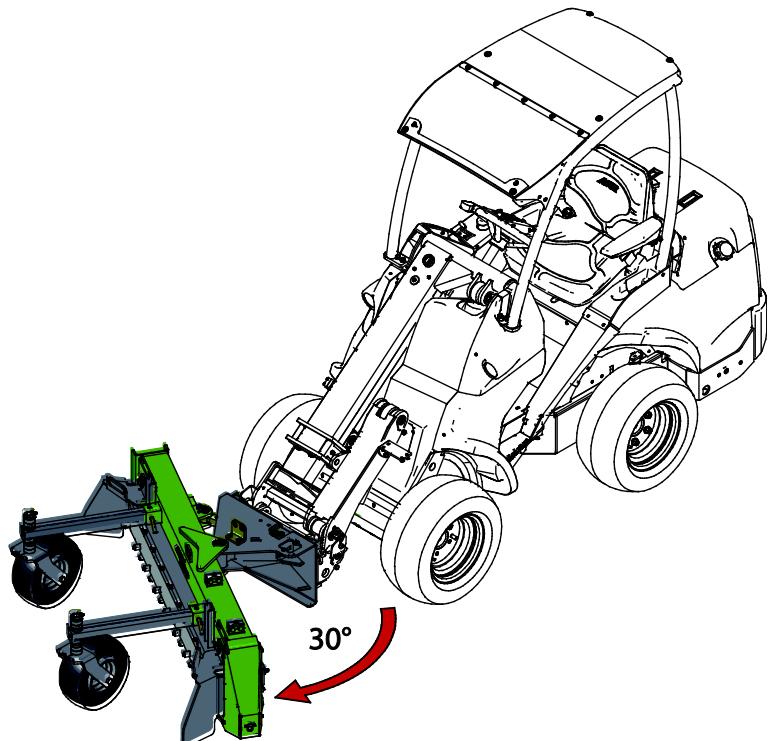
Check the rotating direction of the rake drum. The teeth should rotate clockwise when seen from the left side of the machine.

The attachment should be used while driving forward with the loader.



It is possible to turn the rake 30 degrees to the left or to the right. This enables choosing the side to which the excessive loose soil will be pushed during using the power rake.

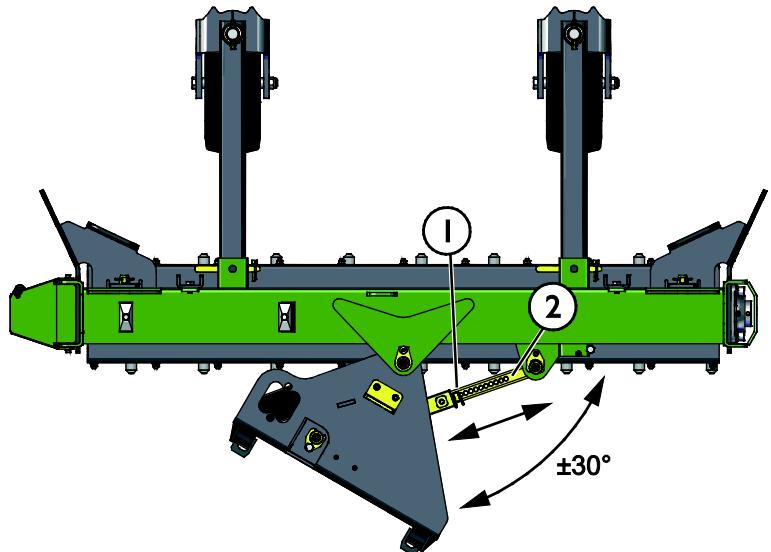
The removable side plates make soil moving and directing even more efficient. For removing the side plates see page 22.



### 6.2.2 Adjusting slewing angle, manual slewing

The Power rake does not need to be disconnected from the loader while adjusting the angle. To adjust the angle manually:

1. Lift the attachment slightly off the ground with the loader and shut down the engine.
2. Remove the cotter pin (1) from the adjustment lever (2) and turn the attachment to the desired direction manually.
3. Lock the slewing angle of the attachment by reinstalling the cotter pin (1).



### 6.2.3 Adjusting slewing angle, hydraulic slewing (model A439234 only)

It is possible to control the slewing hydraulically from the driver's seat.

Use either the separate 2-way switch to control the hydraulic slewing, or use the switches of the attachment control switch pack.

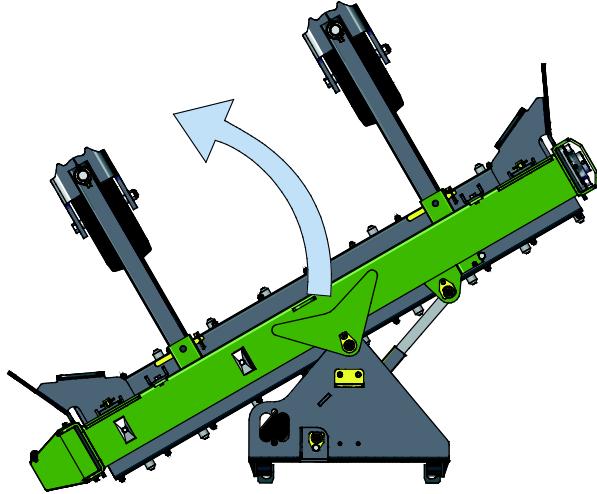
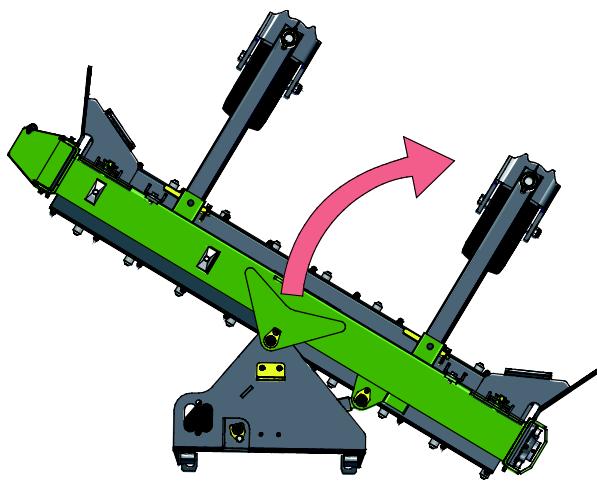
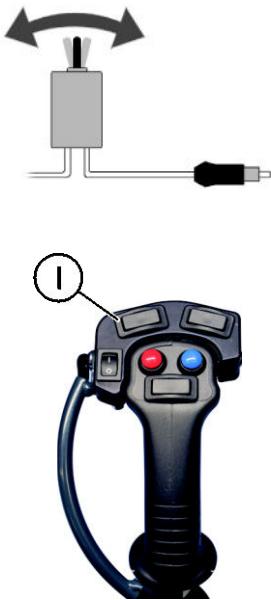
**Slewing controls:**

- Choose the side where to turn the power rake with the separate electric switch or with the switch of the attachment control switch pack.

If using the attachment control switch pack, use the 2-way control switch (1) of the joystick to turn the attachment to desired direction.

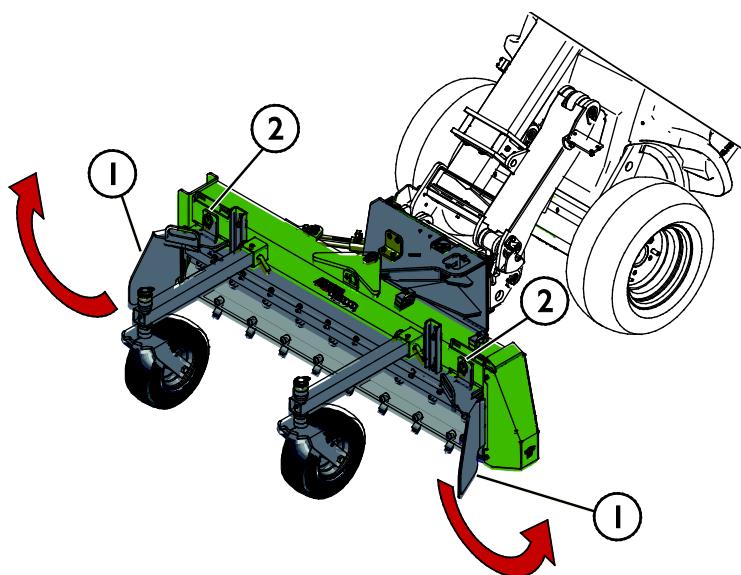
- Use the auxiliary hydraulics of the loader to operate the hydraulic cylinder.

It is possible to use the electric controls for turning the attachment also while the attachment is running.



### 6.3 Side plates

When there is no need for the side plates (1), they can be turned aside as shown in the adjacent figure. Lock the plates with cotter pins (2).



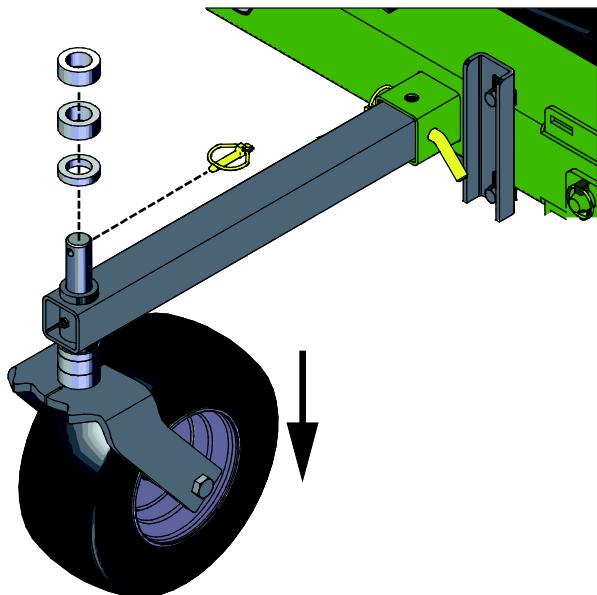
### 6.4 Adjusting the grinding depth

The grinding depth can be adjusted by using the plastic sleeves on the vertical axles of the bearing wheels. It is not necessary to uncouple the attachment from the loader while adjusting the height. To adjust the height:

1. Lift the attachment slightly off the ground with the loader and shut down the engine.
2. Remove the cotter pin from the vertical axle of the bearing wheel. Pull the wheel off its holder.
3. Move some plastic sleeves from above the bracket to below it or vice versa, depending on whether you wish to raise or lower the mower.
4. Push the axle back in through the bracket and reinstall the cotter pin.
5. Repeat steps 2–4 for each wheel. Ensure that all wheels are adjusted to the same height.

**NOTICE**

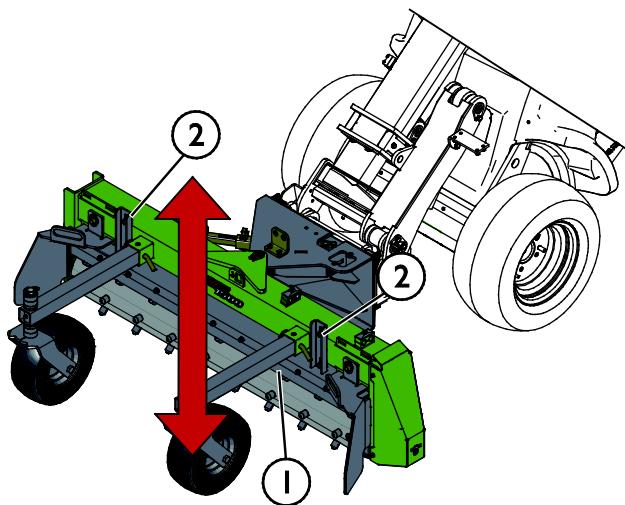
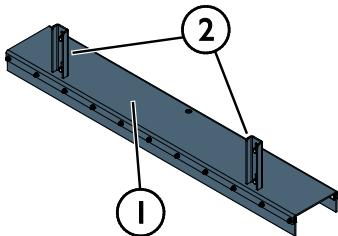
There are two thicknesses of plastic sleeves (10 & 20 mm) for more accurate adjustment of the operating height. Adjust all wheels to the same height.



## 6.5 Mud shield

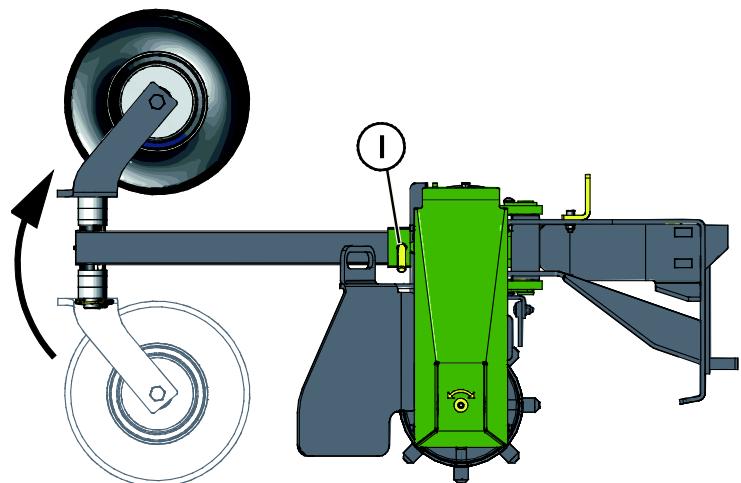
The power rake is equipped with a mud shield. The mud shield limits the amount of soil, debris, and other objects that could get thrown by the Power rake.

It is possible to adjust the position of the mud shield (1) by setting the brackets (2) to correct height equally on both sides.



## 6.6 Support wheels

When there is no need for the support wheels, they can be turned upside down as shown in the adjacent figure. Lock the wheel assemblies with cotter pins (1).



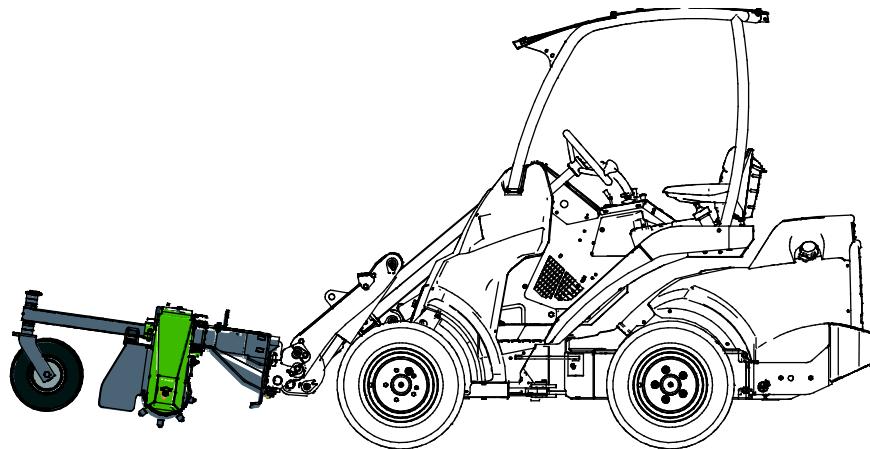
## 6.7 Operating on slopes

Using the equipment on inclined terrain and slopes requires extra caution. Watch for holes, bumps, rocks and other possible hidden obstacles. Uneven terrain could overturn the machine. Use low speed and do not make sudden changes in speed or direction. Try to use the Power rake by driving straight up or down the hill, not across, to avoid excessive side tilting. If the loader stops while driving up a steep slope, first stop the attachment and then reverse slightly. Exercise extreme caution when moving near ditches or embankments as the machine could suddenly turn over in case an edge caves in.

## 6.8 Transport position



Keep the loader stable. Always transport the attachment as low and close to the ground as possible. Keep the telescopic boom retracted during transport drive.

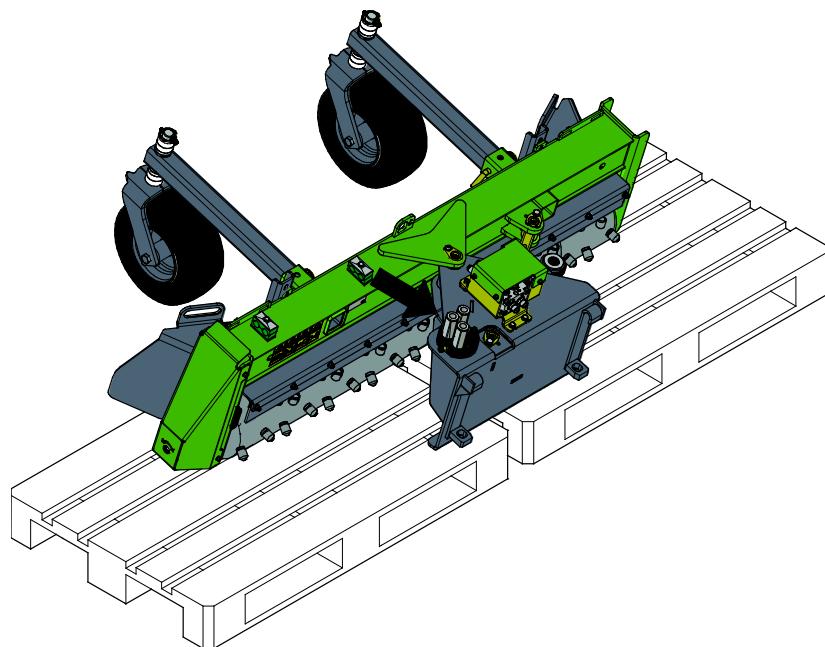


## 6.9 Storing the attachment

Uncouple and store the attachment on level ground. The best way to store the attachment is a place where it is protected from direct sunlight, rain, and extreme temperatures.

- Avoid leaving the attachment laying directly on the ground. Place it on blocks of wood or on a pallet, for example.
- Place the multiconnector on to its holder as indicated with an arrow in the figure below. Never leave the hydraulic connector on the ground.
- Make sure that the attachment is secured against all movements during storage.

Never climb on the attachment.



For longer storage periods clean the attachment thoroughly, touch up the paint where needed and grease the lubrication points in order to prevent rust damage.

## 7. Maintenance and Service

The attachment has been designed to be as maintenance free as possible. Continuous maintenance includes regular cleaning and lubrication, and monitoring the condition of the attachment. Because of the crushing hazard caused by lowering machine parts, all maintenance work must be done when moving parts have been lowered down completely and the attachment is lowered flat against the ground.



DANGER

**Risk of crushing - Never go under lifted attachment.** Make sure the attachment is properly supported during all maintenance work. Never go under a lifted attachment. The loader boom may lower unexpectedly during maintenance causing serious injuries from crushing or impact even when the loader engine is not running. All maintenance and service must be performed when the attachment has been lowered down to a safe position.



DANGER

**Risk of cutting and severing - Sharp edges and severing points on work tools.** Beware of the sharp blades and risk of crushing especially during maintenance or when removing blockages. Always stop the attachment by following the safe stopping procedure. To make sure that the attachment will not rotate, disconnect the multiconnector (or hydraulic quick couplings) before going near it. Note that the loader boom moves down and may be tilted even if the engine has been stopped. Never go under a raised boom or any component of the attachment. Keep away from the moving linkage.



WARNING

**Entanglement hazard - Risk of entanglement also persist during maintenance.** Always follow the safe stopping procedure before any cleaning, maintenance, or service operation.

### 7.1 Inspection of hydraulic components

Check the condition of the hydraulic hoses and components when the engine has been turned off, system has cooled down, and the pressure has been relieved. Do not use the equipment, if you have discovered a leak in the hydraulic system of the attachment or the loader. Leaking hydraulic fluid may penetrate skin and cause serious injuries. Seek medical attention immediately in case hydraulic fluid penetrates the skin. Wash any part of body that has been in contact with hydraulic oil carefully with water and soap. Hydraulic fluid is also harmful to the environment and any leak to the environment must be prevented. Repair all leaks immediately after detecting them; a small leak can quickly grow into a big one. Operate the attachment only with type of hydraulic oil that is accepted for use in Avant loaders.

**DANGER**

Risk of high pressure fluid injection through skin - **Release residual pressure before maintenance.** Never handle hydraulic components when the hydraulic system is pressurised, since a fitting may break or become loose and the released oil may cause serious injuries. Do not use the equipment, if you have discovered a fault in the hydraulic system.



Check hoses visually for cracks or abrasions. If there are signs of leaks, to check a component, hold up a piece of cardboard in the area where a leak is suspected. Do not use hands to search for leaks. Monitor the wearing of the hoses and stop the use, if the surface layer of any hose has worn off. Check the routing of the hoses; adjust the hose clamps to avoid abrasion to the hoses. The hoses have limited service life. Depending on operating conditions all hoses must be inspected thoroughly no later than after 3 to 5 years of use, and if required, they must be replaced with new ones.

Finding any fault means that the hydraulic hose or component must be replaced and the equipment must not be used until it is repaired. Spare parts are available from your nearest AVANT retailer or authorised service point. Leave the repair work to professional service technicians, if you don't have adequate knowledge and experience about hydraulic assemblies and how to perform the repairing safely.

## 7.2 Inspection of metal structures

Also the metal structures of the attachment must be inspected regularly. Check visually for damages and inspect the quick attach brackets and their surrounding area carefully. The attachment must not be used if it is deformed, cracked, or torn.

Welding repairs are only allowed to be carried out by professional welders. When welding, only methods and additives suited for steel used in attachment must be used. For more information about repairs contact your nearest service point.

## 7.3 Cleaning the attachment

Clean the Power rake as soon as possible after use, since this makes cleaning easier. Right after use, lift the box rake off the ground and rotate it on the air, starting slowly, to remove the largest lumps of soil from the rake drum. Do not hit the power rake hard against the ground. A pressure washer and mild detergent can be used for cleaning. Do not use strong solvents, and do not spray directly at the hydraulic components, or at the labels on the attachment. After washing lubricate the lubrication points.

Clean the attachment regularly to prevent accumulation of dirt which is more difficult to remove.

## 7.4 Lubrication

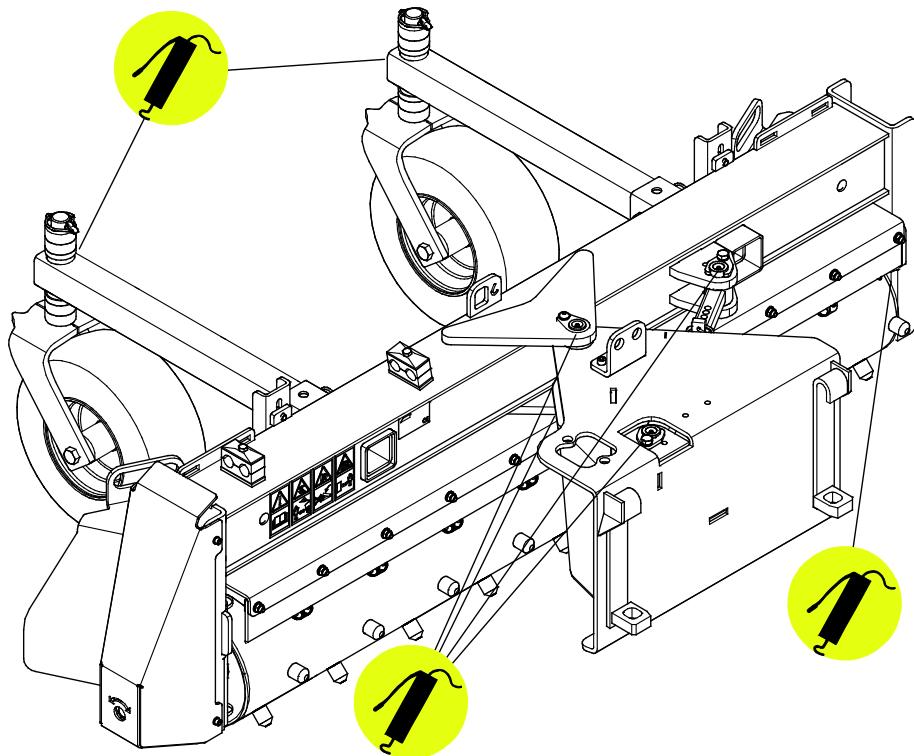
The Power rake has seven lubrication points, located at the bearing end of the drum, at the ends of the adjustment lever, at the swivel joints and on the wheel support brackets. A small amount of lubricant should be added to the lubrication points at the bearings regularly.

Correct lubrication interval depends heavily on operating conditions but lubricant must be added at least after every 10 hours of use. Sufficient lubrication of the joints must be ensured, and if the joints have become dirty, lubricant must be added; added lubricant will push out dirt from joints.

Clean the end of the nipple before greasing and add only a small amount of grease at a time. All lubrication nipples are standard R1/8" nipples. Replace any damaged nipples.

Correct lubrication interval depends heavily on operating conditions but lubricant must be added at least after every 5-10 hours of use.

Clean the end of the nipple before greasing and add only a small amount of grease at a time. The lubrication nipple is a standard R1/8" nipple. Replace it, if damaged.

**NOTICE**

Lubricant must be added approximately every 5 to 10 operating hours. Clean the end of the nipple before greasing. Only add the grease amount of a couple of grease press pushes at a time.

## **8. Warranty terms**

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Avant Tecno Oy grants a warranty of one year (12 months) from the date of purchase for the attachment it manufactures.

**The warranty covers repair costs as follows:**

- Work costs are covered, if the repair is not performed at the factory.
- The factory replaces any defective components or consumables.

The factory may reimburse the price of components purchased by the customer in special cases that have been agreed in advance.

**The warranty does not cover:**

- Normal maintenance work or parts and consumables required for it.
- Damages caused by unusual operating conditions or ways of use, negligence, structural changes made without the consent of Avant Tecno Oy, use of non-original parts or lack of maintenance.
- Consequences of a defect, such as interruption of work or other possible additional damages.
- Travel and/or freight costs caused by the repair.

**FI EY-vaatimustenmukaisuusvakuutus**  
**SE EG-försäkran om överensstämmelse**  
**EN EC Declaration of Conformity**

Alkuperäinen kieliversio  
Originalversion  
Original language



Valmistaja / Tillverkare / Manufacturer  
Osoite / Adress / Address

AVANT TECNO OY  
Ylötie 1  
33470 YLÖJÄRVI, FINLAND

Vakuutamme täten, että alla mainitut tuotteet täyttävät konedirektiivin turvallisuus- ja terveysvaatimukset (direktiivi 2006/42/EY muutoksineen). Seuraavia yhdenmukaistettuja standardeja on sovellettu /

Vi försäkrar härmed att nedan beskrivna produkter överensstämmer med hälso- och säkerhetskrav i EG-maskindirektiv (EG-direktiv 2006/42/EG som ändrat). Följande harmoniserade standarder har tillämpats /

We hereby declare that the products listed below are in conformity with the provisions of the Machinery Directive (directive 2006/42/EC as amended). The following harmonized standards have been applied:

SFS-EN ISO 12100, SFS-EN ISO 4413

Mallit / Modeller / Models

Avant	
Hydraulitoiminen maankunnostaja; Avant-kuormaajan työlaite Hydraulisk jordfräs; arbetsredskap för Avant lastare Hydraulic power rake; attachment for Avant loaders	A434016

CE

30.10.2019 Ylöjärvi, Finland

Risto Käkelä,  
Toimitusjohtaja / Verkställande direktör /  
Managing Director





**AVANT**<sup>®</sup>