Rock Rake

RR4300

Operator's Manual

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Highline MANUFACTURING

A DIVISION OF BOURGAULT INDUSTRIES LTD.

E20346_B

Rock Rake

RR4300

Operator Manual

Original Instructions

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Highline Team Message

Congratulations on your purchase of a Rock Rake 4300 manufactured by Highline Manufacturing.

This Operator Manual has been prepared to provide information necessary for the safe and efficient operation of your Rock Rake. In the manual you will find safety procedures, maintenance routines and detailed operational instructions.

If you find that you require information not covered in this manual, please feel free to consult your local dealer. Your dealer is always able to contact Highline for this technical information.

Highline Manufacturing thanks and congratulates you for selecting a Rock Rake 4300 as your machine of choice.

Highline Manufacturing

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GENERAL DESCRIPTION OF THE ROCK RAKE

The Rock Rake is designed to move rocks into a windrow while driving in a cultivated field to ease in the picking up of rocks with a rock picking machine.

The Rock Rake hitch is hydraulically operated to move from the transport position to the working position. When in working position, the Rock Rake is moved to be at an angle so that the rotor rotation moves the rocks into a windrow.

When the raking procedure is done, the operator moves the machine to the transport position where the Rock Rake follows the tractor.

The Rock Rake rotor angle is controlled by the operator depending on the size of rocks and number of rocks to be moved. The amount of rotor teeth engagement is controlled by the operator for the desired level of ground contact. The rotor assembly has a frame mounted spring to allow for ground following.

When the Rock Rake is moving rocks it uses hydraulic power from the tractor to set the height of the rotor from the ground and to provide power to rotate the raking rotor. When the Rock Rake is moving from transport position to working position, a hydraulic cylinder is activated to move the machine.

The operator of the Rock Rake is located in the tractor cab where they drive the tractor, control the speed of driving, the operation of the hitch position, the angle of the rock rotor and the speed of rotating rock rotor.

The Rock Rake is transported on the wheels of the Rock Rake.

INTENDED USE OF THE ROCK RAKE

- The Rock Rake is designed to move rocks that are on the surface or near the surface of a cultivated field into a row for pickup with a rock picking machine.
- The Rock Rake can be used for field conditioning.
- The Rock Rake is intended for use in field applications.
- The Rock Rake is intended for use in locations that are not near people or animals.

Any uses of the Rock Rake other than the above stated Intended Use shall be considered misuse of the Rock Rake. This misuse shall include (but not limited to):

- Using the Rock Rake around people or in public places or near animals.
- Moving materials other than rocks.

Always use the Rock Rake according to the instructions contained in this Operator Manual and the safety and instruction decals on the machine.

Perform regular maintenance and repair to ensure that the Rock Rake operates safely and efficiently.

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SERIAL NUMBER

Your serial number is found on the serial number plate (1) attached to the Rock Rake on the front bar near the hitch cylinder

Serial Plate Location 220202C

It is important to record the serial number for proof of ownership and for any service or maintenance assistance.

Serial Number _____

Owner _____

Model _____

Date of Purchase _____

SAFETY SIGN-OFF FORM

Highline Manufacturing Ltd. follows the general Safety Standards specified by the American Society of Agricultural Engineers (ASAE) and the Occupational Safety and Health Administration (OSHA). Anyone who will be operating and/or maintaining the Highline Rock Rake should read and clearly understand all Safety, Operating and Maintenance information presented in this manual.

Do not operate or allow someone to operate this equipment until this information has been reviewed. This information should be reviewed by all operators before the start-up of the season.

This sign-off sheet is provided for record keeping to indicate that the person working with the equipment has read and understood the information in the Operator Manual and has been instructed in the safe operation of the equipment.

Date	Employee's Signature	Employer's Signature

SAFETY ALERT SYMBOL

The Safety Alert Symbol means:

ATTENTION!
BECOME ALERT!
YOUR SAFETY IS INVOLVED!

The Safety Alert Symbol combined with a Signal Word alert to the presence of a hazard and the degree of possible injury.

DANGER

Indicates an imminently hazardous situation that, if not avoided, WILL result in DEATH OR SERIOUS INJURY. The color is Red with White lettering.

WARNING

Indicates a potentially hazardous situation that, if not avoided, COULD result in DEATH OR SERIOUS INJURY, and includes hazards that are exposed when guards are removed or unsafe practices. The color is Orange with Black lettering.

CAUTION

Indicates a potentially hazardous situation that, if not avoided, MAY result in MINOR INJURY. The color is Yellow with Black lettering.

GENERAL SAFETY

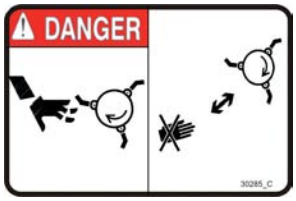
1. Ensure that anyone who is going to operate, maintain or work near the Rock Rake is familiar with the recommended operating, maintenance procedures and safety information contained in this manual and follows all the safety precautions.

2. In addition to the design and configuration of the equipment, hazard control and accident prevention are dependant upon the awareness, concern, prudence and proper training of personnel involved in the operation, transport, maintenance and storage of the Rock Rake.

3. The Rock Rake shall not be operated without all the guards in place.

SAFETY DECALS

1. Keep decals and signs clean and legible at all times.
2. Replace decals and signs that are damaged, missing or have become illegible.
3. Replaced parts that displayed a decal should also display the current decal.
4. Decals are available from the Highline Parts Department.
5. Be familiar with the decals, the type of warning and the area or function(s) related to the area(s) that requires your awareness.



DO NOT ENTER THE ROTOR AREA WHILE IT IS ROTATING.

Contact with the rotating rotor will cause serious injury or death.
Keep away from the rotor.

Contact with the rotating rotor will result in entrapment causing serious injury or death

Before servicing or adjusting, disengage power take off, shut of the tractor, remove key, set park brake.
Before servicing or adjusting, wait for all parts to stop rotating.
Keep guards in place and in good condition.

DO NOT RIDE ON ROCK RAKE

Riders can fall from the machine which will cause serious injury or death.

Riding on the Rock Rake while operating will result in serious injury or death from rocks being thrown.

STAY BACK FROM ROCK RAKE WHILE IN OPERATION

Rotating teeth may throw rocks causing injury or death.

Keep clear of the machine as rocks may bounce in an unpredictable manner.

KEEP PERSONS BACK WHEN MOVING THE FRAME

The frame can move quickly.
Contact with a moving frame can cause serious injury or death.

THE ROCK RAKE IS DESIGNED FOR OFF-ROAD USE ONLY

To transport on public roads consult with local traffic regulations.

DO NOT PLACE HANDS OR FEET UNDER THE ROTOR

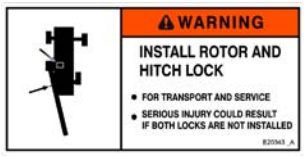
Serious injury could result if hands or feet are clamped in this area.

DO NOT PLACE HANDS IN THIS AREA WHEN RAISING OR LOWERING THE ROTOR

Serious injury could result if hands are place in this clamping area.

USE PAPER OR CARDBOARD TO CHECK FOR HYDRAULIC LEAKS

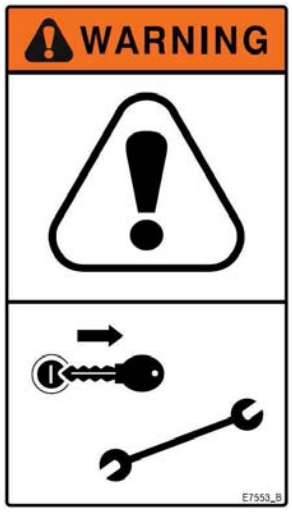
To prevent serious injury or death:
Relieve pressure on hydraulic system before repairing, adjusting or disconnecting.
Wear proper hand and eye protection when searching for leaks.
Use wood or cardboard instead of hands.
Keep all components in good repair.



INSTALL ROTOR AND HITCH LOCKS

Install the rotor and transport lock when transporting or when servicing the Rock Rake.

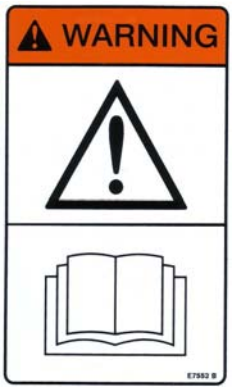
Serious injury could result if locks are not installed.



SHUTDOWN THE TRACTOR BEFORE DISMOUNTING TRACTOR

Shut down the tractor and remove the key before repairing, servicing, lubricating or cleaning the Rock rake.

Relieve all hydraulic pressure in the hoses before going near the Rock Rake. Leave the hydraulics in the “float” position.



READ, UNDERSTAND, AND FOLLOW SAFETY INSTRUCTIONS

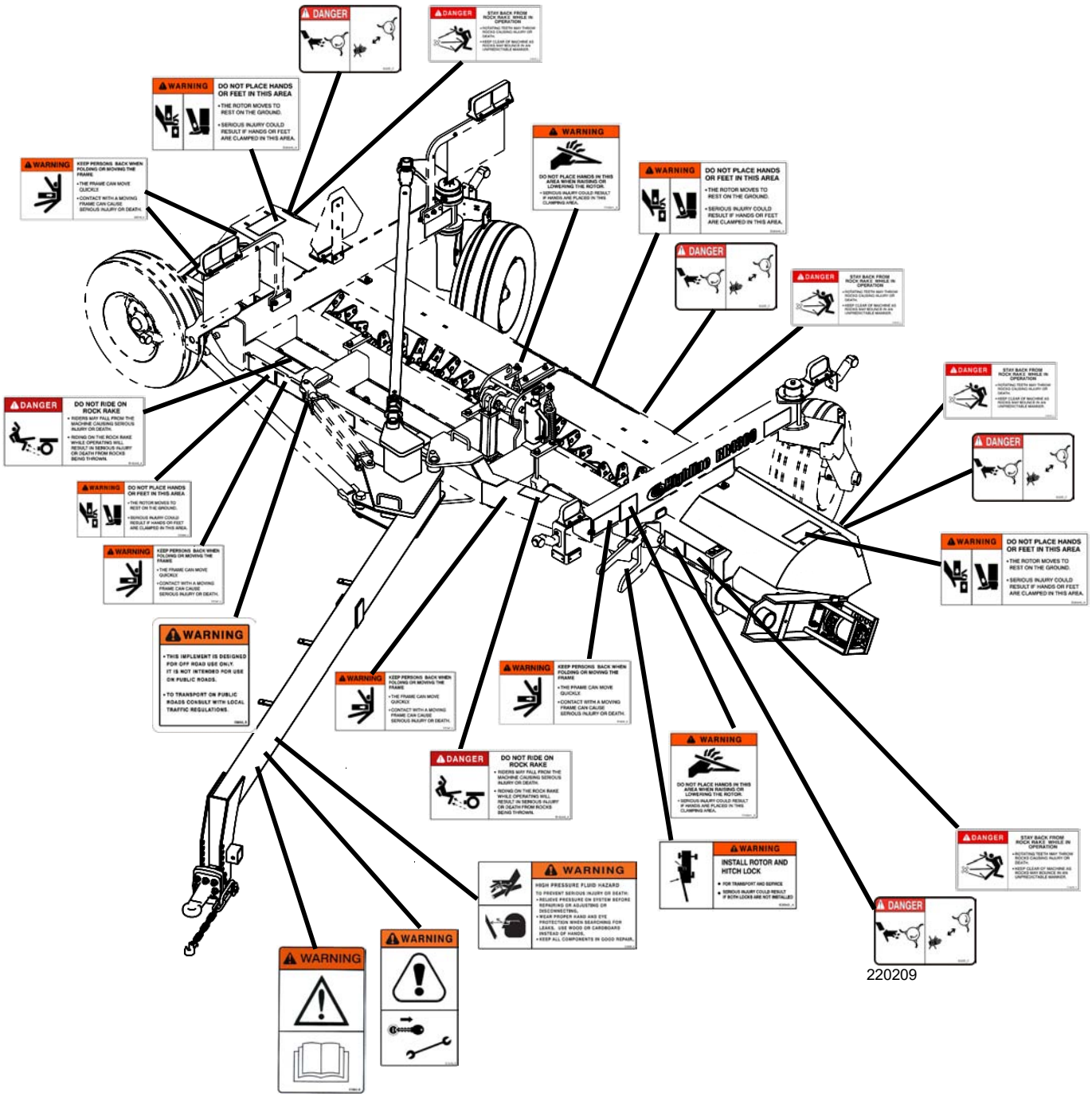
Read, understand and follow all instructions and safety messages included in this manual and on decals attached to the machine. These instructions and safety messages contain important information.

Allow only responsible, properly instructed individuals to operate and service the machine.

Failure to follow the instructions and safety messages in this manual and on the decals attached to the machine could result in serious injury or death.

Keep all safety and instruction decals in good condition. Replace any missing or damaged decals

SAFETY DECAL LOCATIONS



220209

Transporting

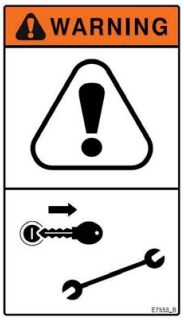
Only tow the rock rake on public roads behind a properly sized and equipped tractor or vehicle that weighs more than 6,663 lbs (3022 kg). Transport at a maximum speed of 40 km/h (25 mph).

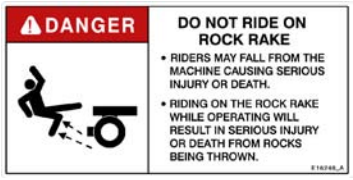
To transport on public roads consult with local traffic regulations.

Shut off tractor before attaching the Rock Rake or hydraulics.

Do not allow children or other people to ride on the tractor or Rock Rake. Falling off can result in serious injury or death. Impact from thrown rocks can result in serious injury or death.

The Rock Rake is designed for off road use only.





1. Lift the hitch with the jack

   - The hitch is heavy. Do not attempt to lift the hitch without using the jack.

2. Connect the hitch to the tractor drawbar.

   - Use a 1 1/4" (31.75 mm) pin.

   - Use a clevis to attach the hitch.

Lift the Hitch with the Jack 220154

3. Adjust the position of the tongue for the Rock Rake.

   - Level the Rock Rake using the hitch jack.

   - Remove the bolts (1) and move the clevis tongue.

   - Position the tongue so that the Rock Rake has all the wheels contacting the ground.

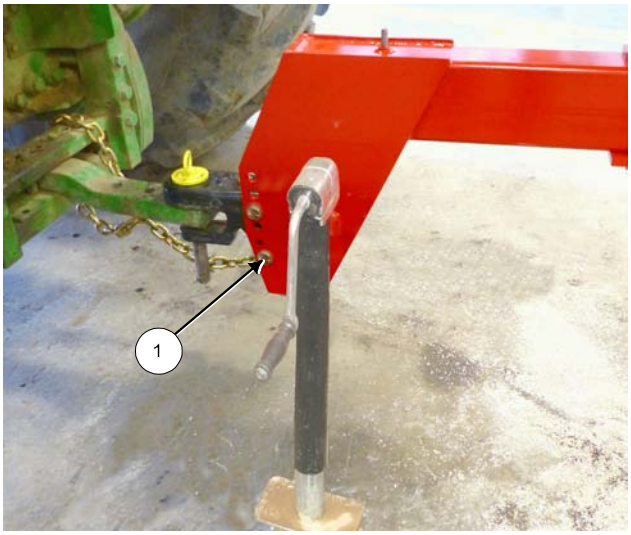
     - Fasten in place.

Note: If the clevis hitch is not being used, install the 3 in 1 hitch components. See the installation diagram below.

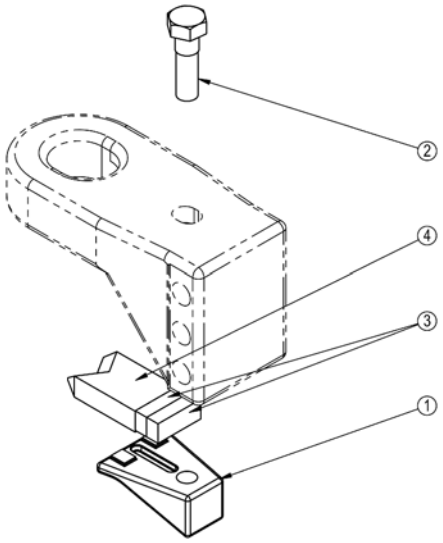
   - Install the 3 in 1 hitch using the following components if not using the clevis hitch.

ITEM	DESCRIPTION	QTY
1	PLATE,TOP,CAST	1
2	BOLT,HEX,3/4X2-1/2,UNC,GR5,ZP	1
3	CUSHION,POLYURETHANE,90	2
4	BLOCK,V,CAST,80-55-06	1

Note: If the Rock Rake is going to be towed behind a truck it will need to be equipped a Class V hitch to handle the vertical load of the Rock Rake tongue weight.



Adjust the Tongue of the Rock Rake 220154C

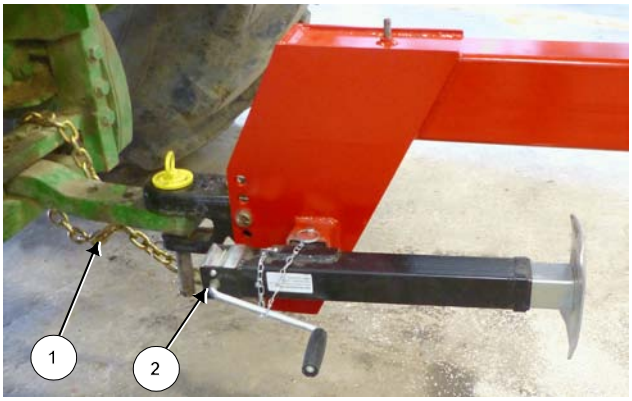


3 in 1 Hitch 42890_A

4. Connect the safety chain (1) to the tractor.

5. Rotate the hitch jack (2) into the storage position.

   - Remove all weight from the jack.
   - Remove the locking pin holding the jack onto the hitch.
   - Rotate the jack to the storage position.
   - Fasten the jack in place with the lock pin.



Connect Safety Chain. Jack in Storage Position.220155C

6. Connect the hydraulic hoses.

   - One set of hydraulic hoses is used for adjusting the rotor height.
   - The second set of hoses is used to drive the rotor motor.
   - The third set is for the hitch hydraulic cylinder.


Connect Hydraulic Hoses 108008

7. Connect the electrical connection for the signal lights.

8. Raise the rotor all the way.
   - Fully extend the height cylinder to raise the rotor.

Raise the Rotor all the Way 2200243-2

9. Install the transport lock on the height cylinder.

   - Install the cylinder lock (2) over the cylinder rod.

   - Fasten in place with the lock pin (3).

10. Extend the hitch cylinder to move the machine into the transport position.

Keep persons back when moving the towing arm. The towing arm can move quickly.
Contact with a moving tow arm can cause serious injury or death.

While the hitch cylinder is extending the following will also happen:

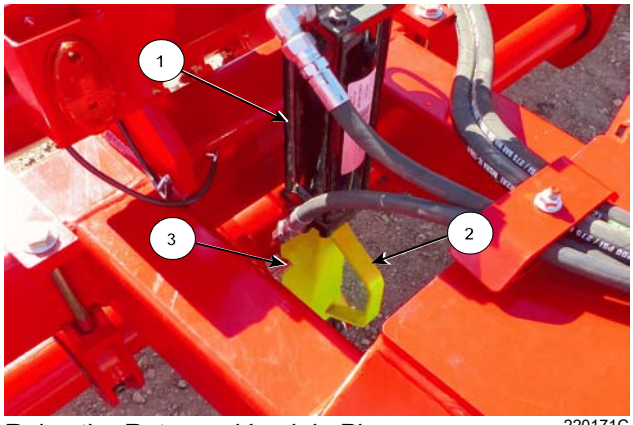
- The rotor assembly will move towards the hitch.
- The right rear wheel will lower to contact the ground.
- The right front tire will move into the transport position.

11. Lower the hitch transport lock (1) over the hitch arm.

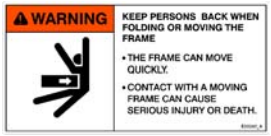
   - Ensure the hitch lock (1) is engaged over the hitch before transporting.

   - Fasten the hitch transport lock with the pin (2).

Install the rotor and transport lock when transporting or when servicing the Rock Rake.
Serious injury could result if locks are not installed.



Raise the Rotor and Lock in Place 220171C




Machine In Transport Position 220239-2

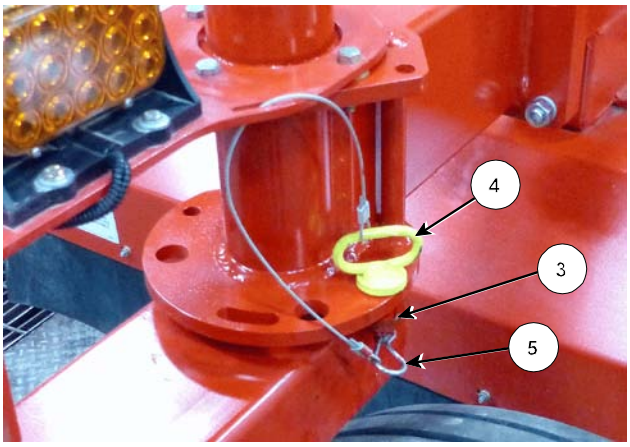
Lower the Hitch Transport Lock 220187C

12. The front wheel can be locked with a pin (4) to prevent it from rotating if traveling long distances or at higher speeds.

    Note: Install the castor lock pin (4) if the front wheel is not contacting the ground because an adjustment has been made for the side to side angle of the rotor. (See Section 5 for more information.)
    - Installing the lock pin (4) will prevent the castor from potential swinging into oncoming traffic while transporting.

    - Align the castor tab (3) with the hole in the wheel plate.

    - Place the pin (4) into the holes and secure with the spring pin (5).



Lock the Front Castor for Transport
(CE Model Shown)
220206C

13. Check the condition of the tires.

14. Check the air pressure in the tires.
    - Bias ply tire to 60 psi (414 Kpa).
    - Radial tires to 44 psi (303 kPa).


Check Condition of the Tires
220170

15. Transport speed of the rock rake on public roads.

    - Do not exceed 25 mph (40 km/h).
    - Use a tractor/vehicle that weighs more than 6,663 lbs (3022 kg).

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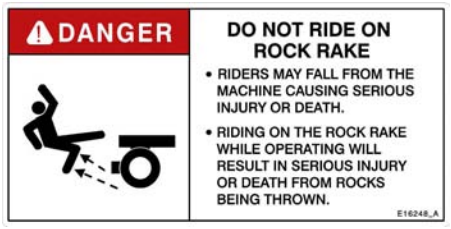
Preparing the Rock Rake

Do not ride on the Rock Rake.

Riders can fall from the machine which will cause serious injury or death.

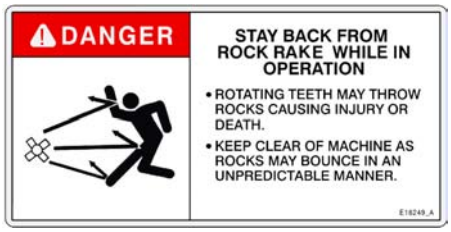
Riding on the Rock Rake while operating will result in serious injury or death from rocks being thrown.



Stay back from the Rock Rake while in operation.

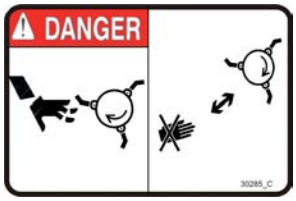
Rotating teeth may throw rocks causing injury or death.

Keep clear of the machine as rocks may bounce in an unpredictable manner.



Do not enter the rotor area while it is rotating.

Contact with the moving teeth will cause serious injury or death.



Do not contact the rotating rock rotor.

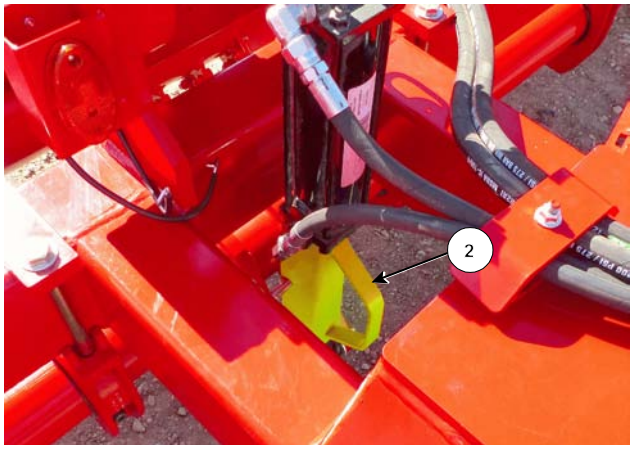
Contact with the rotating rotor will cause serious injury or death. Keep away from the rotor.

1. Raise the rotor to the maximum height.

2. Install the transport cylinder lock (2).

3. Shut down the tractor and remove the key

Relieve all hydraulic pressure in the hoses before going near the machine.



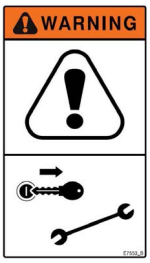
Raise the Rotor and Lock in Place 220171C2

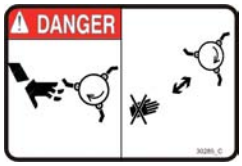
4. Check the condition of the rotor.

Do not enter the rotor area while it is rotating.

Do not try to remove rocks that are lodged between the teeth while the tractor is running or while the rotor drive hydraulics are engaged.

Contact with the moving rotor will cause serious injury or death.

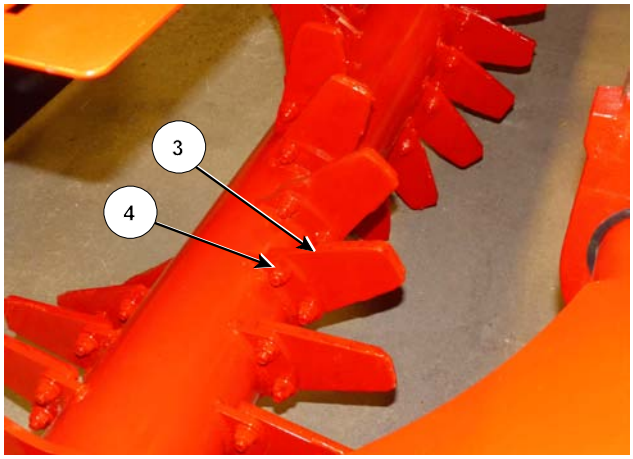




5. Check the condition of the rotor teeth and the connecting fasteners.

   - Replace any teeth (3) that are damaged.
     - The teeth can be reversed to increase their life.

   - Tighten any connecting fasteners (4) that are loose.



Check Condition of Rotor Teeth 220172C

6. Check the condition of the rotor spring (5) and the spring connector.

   - Check that the spring eye bolt connectors (6) are tight.

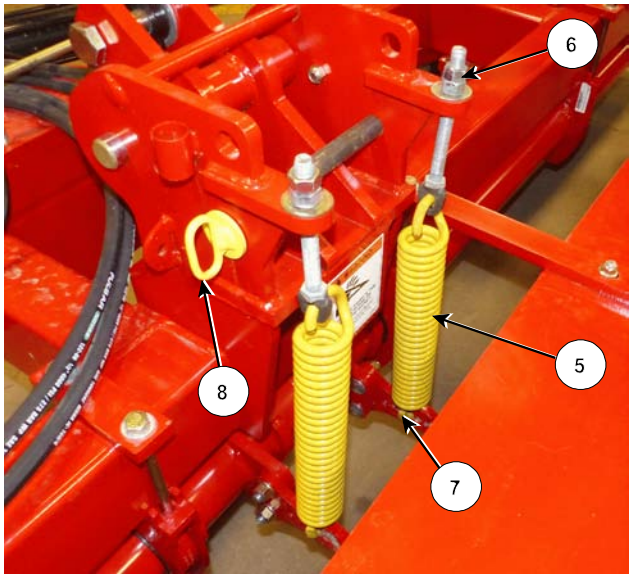
   - Check that the springs are connected to the bar with the holes (7).

7. The rotor is suspended by the spring (5) to allow for vertical motion as the ground contour changes.

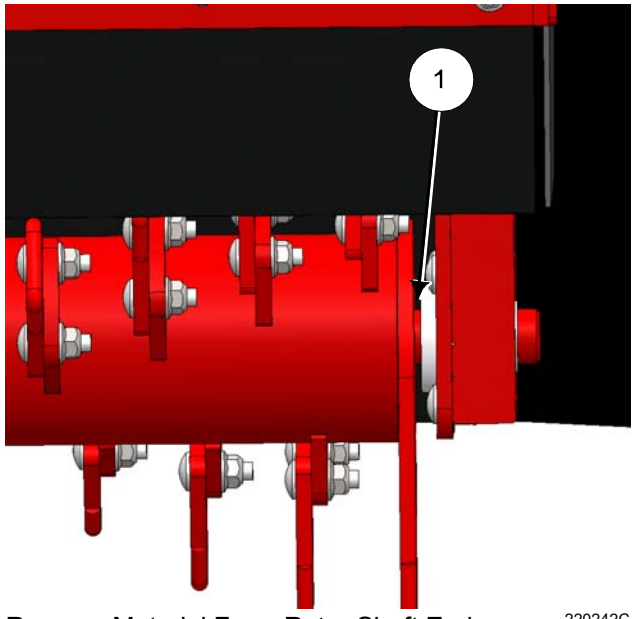
   - The amount of rotor ground engagement can be changed by adjusting the eye bolt connectors (6).
     - Loosen the eye bolt connectors (6) to lower the rotor.
     - Tighten the eye bolt connectors (6) to raise the rotor.

8. If it is desired to not have any ground following, install the pin (8) in the holes near the spring eye bolt connectors.
   - With the pin (8) installed the machine can also used for ground conditioning.
     - The rotor can be pushed down by the height cylinder to determine the amount of ground engagement.

9. Remove any material that is wrapped around both ends of the rotor shaft (1) near the rotor bearings.



Check Condition of Springs and Connectors 220189C



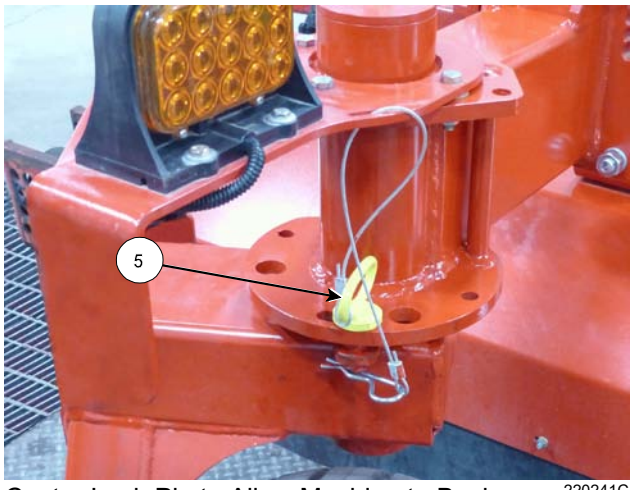
Remove Material From Rotor Shaft Ends 220242C

10. Move the front rubber guide (3) to assist in moving the rocks into a windrow.

    - Remove the pin (4) on the top rail of the rubber guide.
    - Slide the guide further out.
    - Place the pin (4) back into the top rail and secure the pin.

Front Rubber Guide Can Be Moved 220243C

11. Check that the castor lock pin (5) is in the slot to prevent the castor from rotating to allow the machine to backup.



Castor Lock Pin to Allow Machine to Backup 220241C
(CE Model Shown)

12. Check the side to side angle of the rotor while in the working position .

    - If the left side of the rotor is not contacting the ground, an adjustment to the left castor can be made.
    - See Section 5 for information on adjusting the castor for the side to side angle of the rotor.


Check the Left to Right Angle 220203

13. Inspect the motor, hydraulic cylinders and hoses.

Use a piece of cardboard or heavy paper to check for leaks. Do not use your hand. Wear proper hand and eye protection when searching for leaks.

Relieve pressure on hydraulic system before repairing, adjusting or disconnecting.

Note: If fluid is injected under the skin, it must be removed immediately by a surgeon familiar with this type of injury.

- Visually inspect all the hydraulic hoses and fittings.
  - See Section 5 "Maintaining the Rock Rake" for conditions indicating that replacement is needed.
- Ensure the proper size cylinder pins are in place and secured.

14. Check the condition of the tires.

- Replace any tires that have cuts or bubbles.
- Replace any damaged rims.

15. Torque wheel bolts to 135 lbf (183 Nm).

16. Check and adjust the tire air pressure
  - Bias ply tire to 60 psi (414 Kpa).
  - Radial tires - 44 psi (303 kPa).

Check and Adjust Tire Pressure and Wheel Bolt Torque 220170

- Do not inflate tire above recommended pressure.

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Operating The Rock Rake

Do not ride on the rock rake.

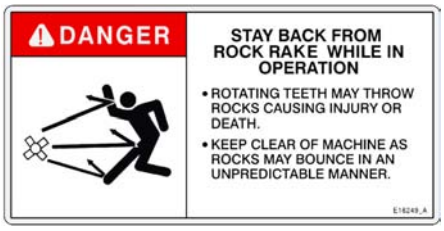
Riders can fall from the machine which will cause serious injury or death.

Riding on the rock rake while operating will result in serious injury or death from rocks being thrown.

Stay back from the rock rake while in operation.

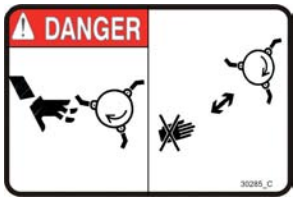
Rotating teeth may throw rocks causing injury or death.

Keep clear of the machine as rocks may bounce in an unpredictable manner.



Do not contact the rotating rotor.

Contact with the moving rotor or teeth will cause serious injury or death. Keep away from the moving pickup reel.



Field Preparation

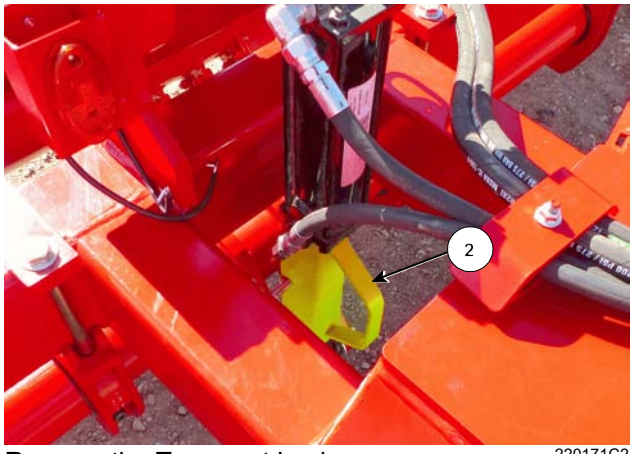
Field preparation plays a major role in the performance of the rock rake.

- For best picking conditions, the field should be cultivated prior to raking.
  - Cultivating brings rocks to the surface and buries field residues.
- Raking works best when the field is dry to prevent mud buildup.

Prepared Field With Rocks Exposed 108184

Note: Right/left hand is determined by sitting in the tractor seat looking forward when the Rock Rake is in operating position.

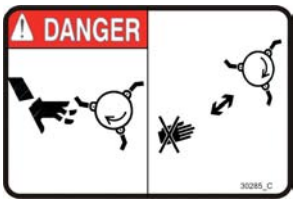
1. Remove the transport lock from the height control cylinder (2).



Remove the Transport Lock 220171C2

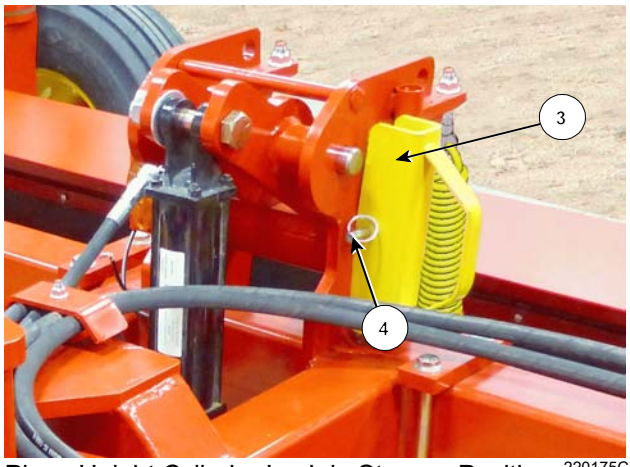
Do not enter the rotor area while it is rotating.

Contact with the moving rotor will cause serious injury or death.



2. Place the height cylinder lock into the storage position (3).

   - Fasten in place with the pin (4).



Place Height Cylinder Lock in Storage Position 220175C

3. Raise the hitch transport lock (1) from the hitch arm to allow the rock rake to move into working position.

   - Place the pin (2) to keep the lock raised.
   - Fasten with the spring pin.

Raise the Hitch Transport Lock 220188C

4. Fully raise the rotor to be clear of the ground while moving the rake into the working position.

5. Retract the hitch cylinder to move the machine into the working position.

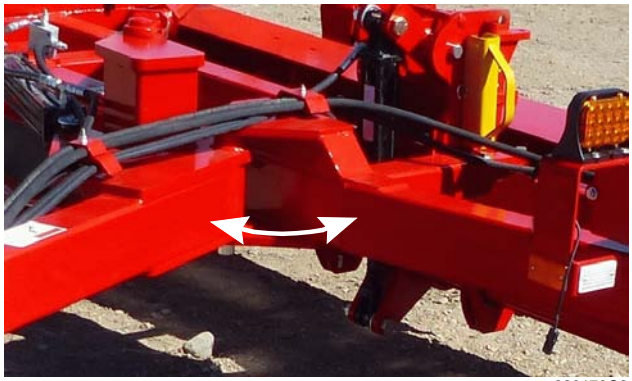
Keep persons back when moving the frame. The frame can move quickly.
Contact with a moving frame can cause serious injury or death.

While the cylinder is moving the following will also happen:

- The rotor assembly and frame will move away from the hitch.
- The front wheel will raise to clear the ground.
- The left rear tire will move into the working position.


Rake in Working Position 220190-2

6. Set the angle of the rake.
   - The angle is adjustable within the limits of the hitch cylinder travel.
   - The greater the rake angle the more the rocks are moved to the side while being moved ahead.
   - The less the angle the rocks tend to be moved ahead and less to the side.


Adjustable Rake Angle 220178C2

   - Cylinder stops are used to determine and maintain the rake angle.

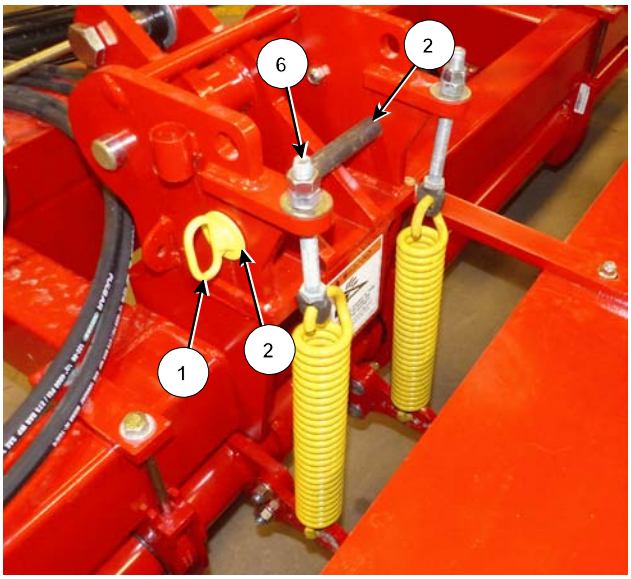
Cylinder Stops	Rake Angle
No Stops	10
1-1/4"	15
1"+ 1-1/4"	20
¾" +1" +1-1/2"	25
¾" +1" +1-1/4"+1-1/2"	30

Note: The counterbalance valve on the hitch cylinder keeps the cylinder from moving to maintain the working angle.


Cylinder Stops on Hitch Cylinder 220193

7. Adjust the rotor height to engage the rocks and move them.
   - The amount of rotor ground engagement can be changed by adjusting the eye bolt connectors (6).
     - Loosen the eye bolt connectors (6) to lower the rotor.
     - Tighten the eye bolt connectors (6) to raise the rotor.

   Note: If it is desired to manually control the rotor height or to do soil conditioning:
     - Place the pin (1) into the holes (2) to hold the rotor and over-ride the spring action.
     - Adjust the height cylinder for rotor height or for the amount of soil conditioning.



Insert Pin if Desired to Over-ride the Springs
Insert Pin if Desired to do Soil Conditioning
220189C2

8. Start the hydraulic motor to rotate the rock rotor.

9. Drive at a field speed of 2 -3 mph (3.2 - 4.8 km/h) or a speed suitable to the field conditions.

Stay back from the rock rake while in operation.
Rotating teeth may throw rocks causing injury or death.

Keep clear of the machine as rocks may bounce in an unpredictable manner.

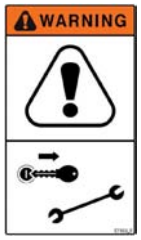
Rake Moving Rocks into a Row
220179

   - When picking large rocks, the field speed should be decreased to reduce possible damage.

10. If a larger rock gets lodged, try raising and lowering the height of the rake while having the rotor turning to free the rock.

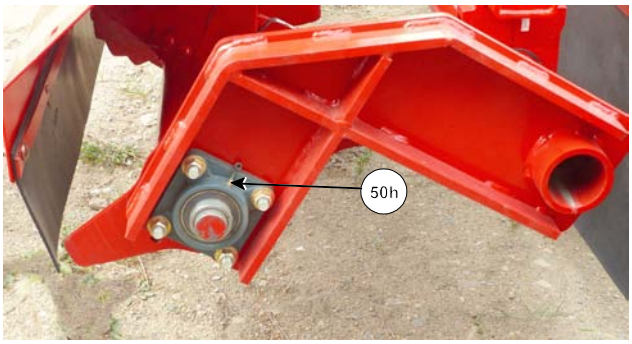
Shut down the tractor and remove the key before repairing, servicing, lubricating or cleaning the machine.

Relieve all hydraulic pressure in the hoses. Disconnect the hydraulic hoses from the tractor before going near the machine.



Lubrication

Lubricate all grease fittings with a lithium soap compatible E.P. grease meeting the N.L.G.I. #2 specifications and containing no more than 1% molybdenum disulfide.



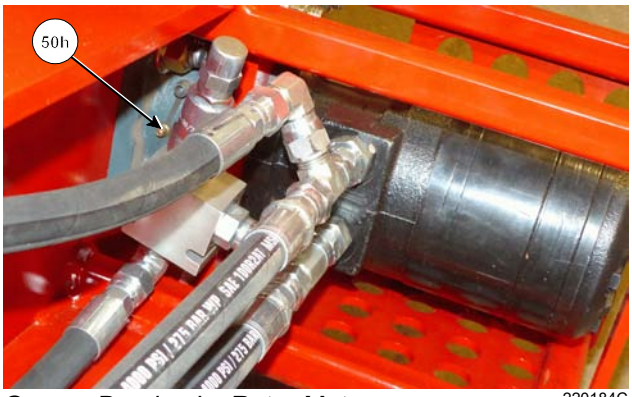
Grease Rotor Bearing at End of Rotor
(End Rubber Piece Shown Removed for Clarity Only) 220191C

Every 100 Hours

- Lubricate the rotor bearings

  Note: Lower the rotor to the ground for easier access to the bearings.

  - 1 point at bearing on end of rotor.
  - 1 point at bearing by motor.



Grease Bearing by Rotor Motor 220184C

- Lubricate the wheel hubs
  - 1 point on each hub

Grease Wheel Hubs 220185C

Check and Adjust Tire Air Pressure and Wheel Bolt Torque

Maintain tire pressure to avoid damage to the tire.

Check and adjust the tire air pressure.

- Bias ply tire to 60 psi (414 Kpa).
- Radial tires - 44 psi (303 kPa).

Torque wheel bolts to 135 lbf (183 Nm).

Check and Adjust Tire Pressure and Wheel Bolt Torque 220170

Check the Condition of the Rotor Teeth

Install the height cylinder lock when servicing the rock rake. Serious injury from the rotor lowering could result if the lock is not installed.

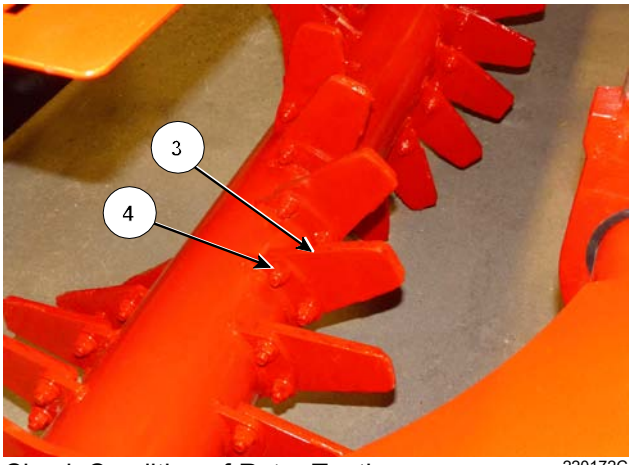
Check that the teeth (3) are not damaged or bent.

- The teeth can be reversed if a side is worn.

Replace any teeth (3) that are damaged.

- The teeth can be reversed to increase their life.

Tighten any connecting fasteners (4) that are loose. Replace any that are missing.



Check Condition of Rotor Teeth 220172C

Adjusting the Rotor Side to Side Angle

- If the left side of the rotor is not contacting the ground the same amount as the right side of the rotor, adjust the left castor to change the left rotor ground contact.

1. Remove the castor lift bracket (3) from the storage position.

2. Attach the hitch jack (4) to the castor lift bracket (3).
   - Fasten the jack with the jack pin.

3. Place the lift bracket (3) under the castor arm (5).

4. Lift the jack (4) to hold the weight of the castor and arm when the plate fasteners are loosened.
   - Do not place upward pressure on the castor arm at this point.

5. Loosen the fasteners (1) in the straight slots of the plate.
   - Do not remove the fasteners.

6. Remove the fasteners (2) from the top and bottom "slotted" holes in the plate.

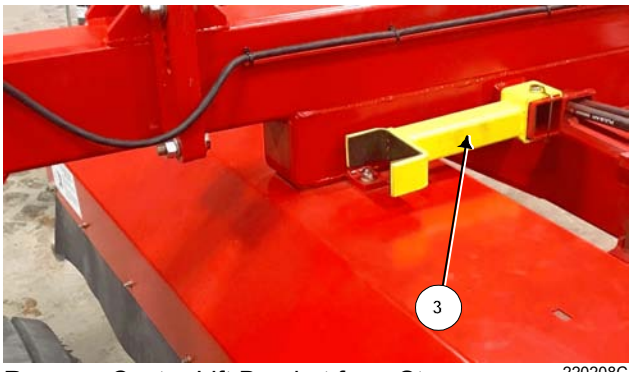
7. Use the jack to move the castor up.
   - The upward relocation of the castor will lower left side of rotor.
   - Each "slotted" hole position moves the castor 5/8" (16 mm).

8. Place the fasteners (2) in the top and bottom "slotted" holes of the plate.

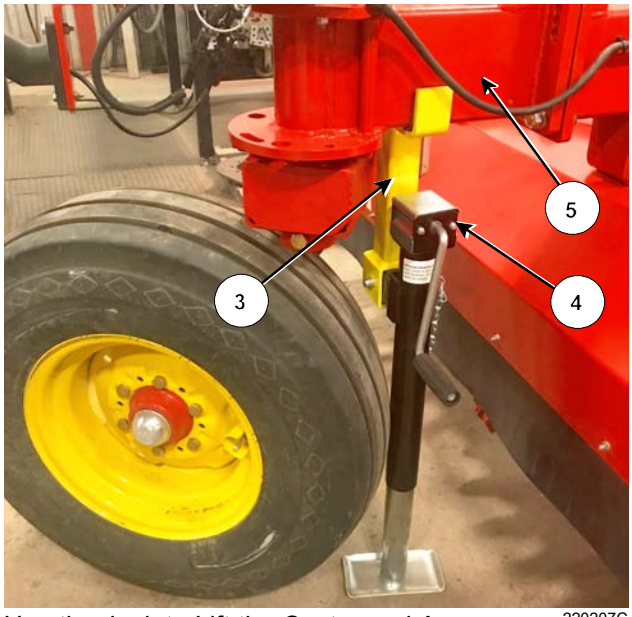
9. Tighten the fasteners (1) in the straight slots.

10. Lower the jack (4).

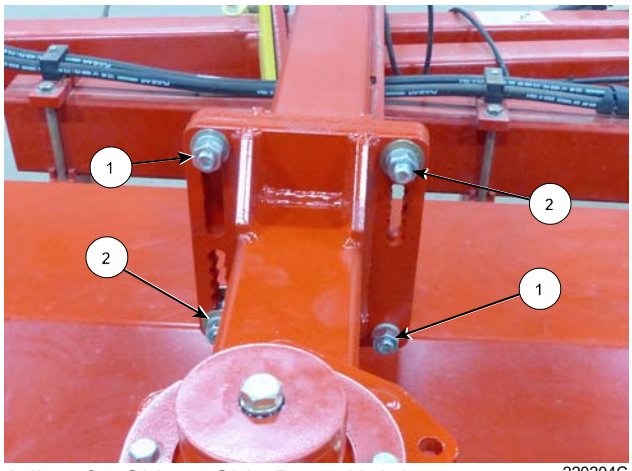
11. Remove the bracket from the jack.
12. Place the bracket and jack into storage.



Remove Castor Lift Bracket from Storage 220208C



Use the Jack to Lift the Castor and Arm 220207C



Adjust for Side to Side Rotor Height 220204C

Visually Inspect Hydraulic Hoses/Fittings

Shut down the machine and replace the hydraulic hose assembly if any of the following conditions exist:

- Fitting slippage on hose.
- Damaged, cracked, cut or abraded cover (any reinforcement exposed).
- Hard, stiff, heat cracked or charred hose.
- Cracked, damaged or badly corroded fittings.
- Leaks at fitting or in hose.
- Kinked, crushed, flattened or twisted hose.
- Blistered, soft, degraded or loose cover

Storing the Rock Rake

Instructions for storing longer than a week:

1. Park the Rock Rake on level ground.

Park the Rock Rake on Level Ground 221085-2

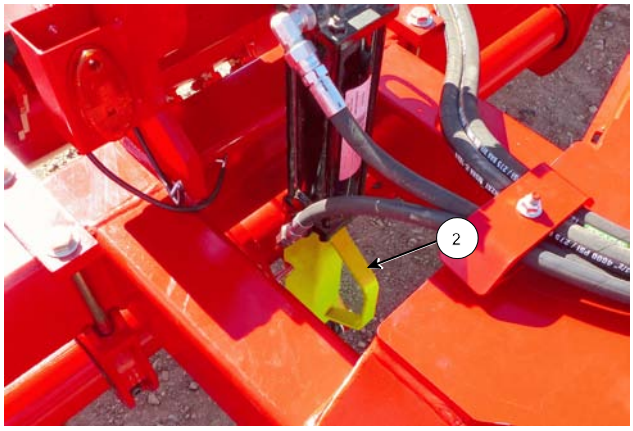
2. Clean all the debris from the rotor area and off the Rock Rake.

Clean Debris from the Rotor and the Rake 220174

3. Raise the Rock Rake to the highest position with the height cylinder.

Raise the Rake to the Highest Position 220243-2

4. Install the height cylinder lock (2) onto the cylinder rod.
   - Fasten in place with the locking pin.



Install the Height Cylinder Lock 220171C2

5. Move the Rock Rake to the transport position with the hitch cylinder completely extended.


Rock Rake in Transport Position 220239-2

Keep Persons Back When Moving the Frame.
The frame can move quickly.
Contact with a moving frame can cause serious injury or death.

6. Lower the hitch lock (1) onto the hitch.

   - Fasten in place with the locking pin (2).

Lower the Hitch Lock onto the Hitch 220187C

7. Place the jack onto the hitch.

   - Rotate the jack from the storage position.
   - Pin the jack in place on the hitch.
   - Ensure that the jack is resting on solid level ground or resting on a wood block.
   - Raise the hitch until the weight is supported by the jack.


Lift the Hitch with the Jack 220154

8. Disconnect the hydraulic hoses from the tractor.

   - Relieve the pressure on the hydraulic hoses and disconnect them.


Disconnect Hydraulic Hoses & Electrical 108008

9. Secure the hydraulic hoses to the hose holder on the hitch to keep them off the ground and clean.

10. Disconnect the hitch from the tractor.

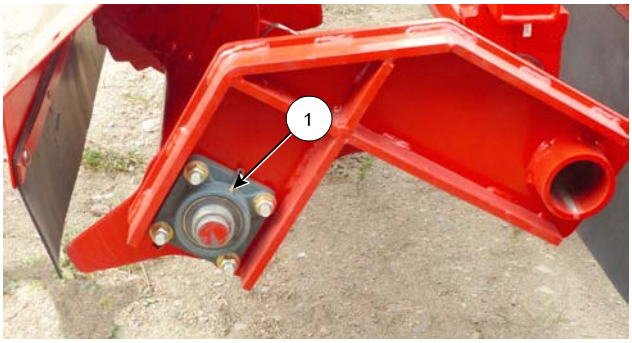
    - Disconnect the safety chain.

    - Remove the hitch pin.

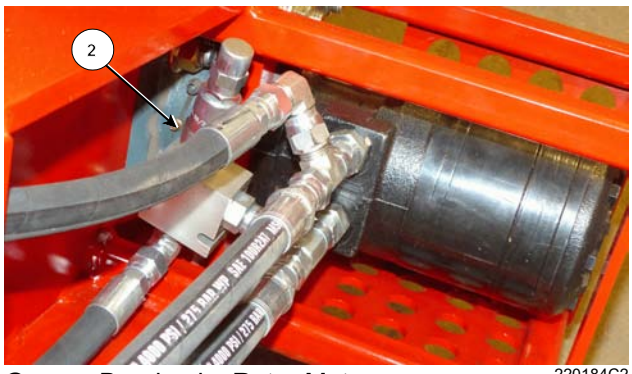
Disconnect Chain and Hitch, Store Hoses 221001

11. Lubricate the right (1) and left (2) rotor bearings.

    Note: Lower the rotor to the ground for easier access to the bearings.



Grease Rotor Bearing at End of Rotor
(End Rubber Piece Shown Removed for Clarity Only) 220191C



Grease Bearing by Rotor Motor 220184C2

12. Check the Rock Rake for worn and damaged parts. Replace as needed.

13. Touch-up the paint to prevent rusting

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7.0 Troubleshooting

Hitch

Symptom	Problem	Solution
Hitch not moving into working position	Hitch transport lock engaged	Lift hitch transport lock and pin in the upward position.
	Hydraulic cylinder	Check hydraulic connections and lines. Check hydraulic cylinder is working
Hitch not moving into transport position	Hydraulic cylinder	Check hydraulic connections and lines. Check hydraulic cylinder is working
	Rotor lowered	Raise the rotor to not engage the ground
Hitch does not stay in transport position when moving the rock rake	Transport lock not engaged	Ensure transport lock is positioned over the hitch and pinned in place

Rock Rotor

Symptom	Problem	Solution
Rotor not turning	Hydraulic motor	Check hydraulic connections and lines
	Rock is lodged between rotor and frame	Disconnect the hydraulics. Remove the lodged rock
Rock tooth is flopping	Loose fasteners on tooth	Check for loose fasteners. Tighten fasteners
	Missing fasteners on tooth	Replace missing fasteners

Symptom	Problem	Solution
Rotor does not lower	Rotor transport lock	Remove the rotor transport lock and place in the storage location
	Height cylinder	Check hydraulic connections and lines. Check the hydraulic cylinder is working
		Retract the height cylinder to lower the rotor
	Rotor spring	Rotor spring is too tight. Loosen the spring fasteners until the rotor is at the desired working height.
	Rocks or debris lodged between rotor and frame tube	Extend the height cylinder to release pressure against the frame tube. Remove the rocks or debris
Rotor does not raise	Height cylinder	Check hydraulic connections and lines. Check the hydraulic cylinder is working
	Hitch tongue is set to low	Raise the hitch tongue to allow for more effect from cylinder movement
Rotor does not follow the ground	Rotor springs	Rotor springs are too tight. Loosen the spring fasteners to remove tension on the springs
	Spring over-ride pin	Remove the pin that over-rides the springs that allow the rotor to follow the ground

Symptom	Problem	Solution
Rotor digging into ground too much	Rotor springs	Rotor springs are too loose. Tighten the spring fasteners to place more tension on the springs
	Height cylinder	Extend the height cylinder to raise the rotor. Set the amount of ground engagement if using the spring for ground following
	Spring over-ride pin	If the spring over-ride pin is installed, extend the height cylinder to raise the rotor. Control the amount of ground engagement using the height cylinder
Rotor lowers while transporting	Rotor transport lock not installed	Fully raise the rotor by extending the height cylinder. Fasten the transport lock around the cylinder rod

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Rock Rake Model	**4300**	
	inch	m
Raking Width (at 20° working position)	160 1/4"	4.07
Rotor Length	171"	4.34
Rake Angle - 20 ° recommended	10 ° minimum	30 ° maximum
Max. Rotor RPM	154	
Transport Width	97 3/4"	2.48
Working Width- 20 °	160"	4.06
Transport Length	239 1/4"	6.07
Operating Length - 20 °	252 5/8"	6.42
Height	72 1/4"	1.84
	lbs	kg
Weight	3990	1810
Tongue Weight:		
Transport	1256	570
Working	1036	470
Tire Size:	Bias Ply - 11L-15FI LR D	Radial -IF280/70R15 13
Tire Pressure		
Bias Ply	60 psi (max)	413.7 kPa (max)
Radial	44 psi	303 kPa
Required Horsepower:	HP	KW
Minimum	65	48.5

Recommended	75	56
Hydraulic Outlets Required	3	
Hydraulic Pressure (max. relieved)	3000 psi	207 bar
Hydraulic Flow Required	20 gpm	76 l/min
Hydraulic Hitch:	Yes	
Hydraulic Drive:	Yes	
Raking Style:	Rotor	
Number of Replaceable Teeth:	100	
Replaceable and Reversible Teeth	Yes	
Hard Surfacing:	Rotor Teeth	

Note: Right/left hand is determined by sitting in the tractor seat looking forward

Highline New Equipment Limited Warranty Policy

One (1) Year / 12 Months - Parts and Labour

Highline Mfg. (hereinafter "Highline") warrants this new product of Highline's manufacturer to be free from defects in material and workmanship, under normal use and service for one (1) full year after initial purchase/retail sale. Highline will warrant its product for one (1) year parts and labour, if performed by a qualified Dealer. This Limited Warranty shall apply only to complete machines of Highline's manufacture. Parts are covered by a separate Limited Warranty.

EQUIPMENT AND ACCESSORIES NOT OF HIGHLINE'S MANUFACTURE ARE WARRANTED ONLY TO THE EXTENT OF THE ORIGINAL MANUFACTURER'S WARRANTY AND SUBJECT TO THEIR ALLOWANCE TO HIGHLINE ONLY IF FOUND DEFECTIVE BY SUCH MANUFACTURER.

During the Limited Warranty period specified above, any defect in material or workmanship in any warranted item of Highline Equipment not excluded below shall be repaired or replaced at Highline's option without charge by any authorized independent Highline Dealer. An authorized Dealer must make the warranty repair or replacement. Labour in accordance with Highline's labour reimbursement policy. Highline reserves the right to supply remanufactured replacement parts as it deems appropriate.

RETAIL PURCHASER RESPONSIBILITY

This Limited Warranty requires proper maintenance and periodic inspections of the Equipment as indicated in the Operator's Manual furnished with each new Equipment. The cost of routine or required maintenance and services is the responsibility of the retail purchaser. The retail purchaser is required to keep documented evidence that these services were performed. This Highline New Equipment Limited Warranty may be subject to cancellation if the above requirements are not performed.

EXCLUSIONS AND LIMITATIONS

The warranties contained herein shall NOT APPLY TO:

1. Any defect which was caused (in Highline's sole judgement) by other than normal use and service of the Equipment, or by any of the following:
    a. accident
    b. misuse or negligence
    c. overloading
    d. of reasonable and proper maintenance
    e. improper repair or installation
    f. unsuitable storage
    g. non-Highline approved alteration or modification
    h. natural calamities
    i. vandalism
    j. parts or accessories installed on Equipment which were not manufactured or installed by Highline authorized Dealers
    k. the elements
    l. collision or other accident
2. Any Equipment whose identification numbers or marks have been altered or removed.
3. Any Equipment which any of the required or recommended periodic inspection or services have been performed using parts not manufactured or supplied by Highline or meeting Highline Specifications including, but without limitation, lubricants (oil, grease), belt lacings, and hydraulic fluids.
4. Any Equipment used in demonstrations not performed by a Highline Dealer. Warranty will be at the discretion of Highline for all other demonstration warranty.
5. New Equipment delivered to the retail purchaser in which the warranty registration has not been completed and returned to Highline within thirty (30) days from the date of purchase.
6. Any defect that was caused (in Highline's sole judgement) by operation of the Equipment not abiding by standard operating procedures outlined in the Operator's Manual.
7. Tire Limited Warranties and support are the responsibility of the respective product's manufacturer.
8. Transportation costs, if any, of transporting to the Highline Dealer.
9. In no event shall Highline's liability exceed the purchase price of the product.
10. Highline shall not be liable to any person under any circumstances for any incidental or consequential damages (including but not limited to, loss of profits, out of service time and damage to equipment which this equipment may be attached) occurring for any reason at any time.

11. Diagnostic and overtime labour premiums are not covered under this Limited Warranty Policy.
12. Depreciation damage caused by normal wear, lack of reasonable and proper maintenance, failure to follow operating instructions, misuse, and/or lack of proper protection during storage.
13. Accessory systems and electronics not of Highline's manufacture are warranted only to the extent of such manufacturer's respective Limited Warranty if any.
14. Wear items which are listed by product group below:

COMMON WEAR ITEMS

Roller chain, sprockets, clutches, shear bolts, clutch components, chains, gearbox housings bolts/torqued parts, flails, feed roller belting, coupler chain, DRV couplers, bogie wheels, apron tines and hoses, blades and blade pans, blade bolts and nuts, skid shoes, chain guards, clutches and clutch components.

PARTS WARRANTY

Parts replaced in the warranty period will receive the balance of the one year New Equipment Limited Warranty. Replacement parts after the original machine warranty are warranted to be free from defects of material for ninety (90) days or the part will be repaired or replaced, without labour coverage for removal and reinstallation.

EXCLUSION OF WARRANTIES

UNLESS OTHERWISE REQUIRED BY LAW, AND EXCEPT FOR THE WARRANTIES EXPRESSLY AND SPECIFICALLY MADE HEREIN, HIGHLINE MAKES NO OTHER WARRANTIES, AND ANY POSSIBLE LIABILITY OF HIGHLINE HEREIN UNDER IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED, OR STATUTORY, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANT ABILITY OR FITNESS FOR A PARTICULAR PURPOSE. HIGHLINE RESERVES THE RIGHT TO MODIFY, ALTER AND IMPROVE ANY PRODUCT WITHOUT INCURRING ANY OBLIGATION TO REPLACE ANY PRODUCT PREVIOUSLY SOLD WITH SUCH MODIFICATION. NO PERSON IS AUTHORIZED TO GIVE ANY OTHER WARRANTY, OR TO ASSUME ANY ADDITIONAL OBLIGATION ON HIGHLINE'S BEHALF.