FFC

PALADIN LIGHT CONSTRUCTION GROUP
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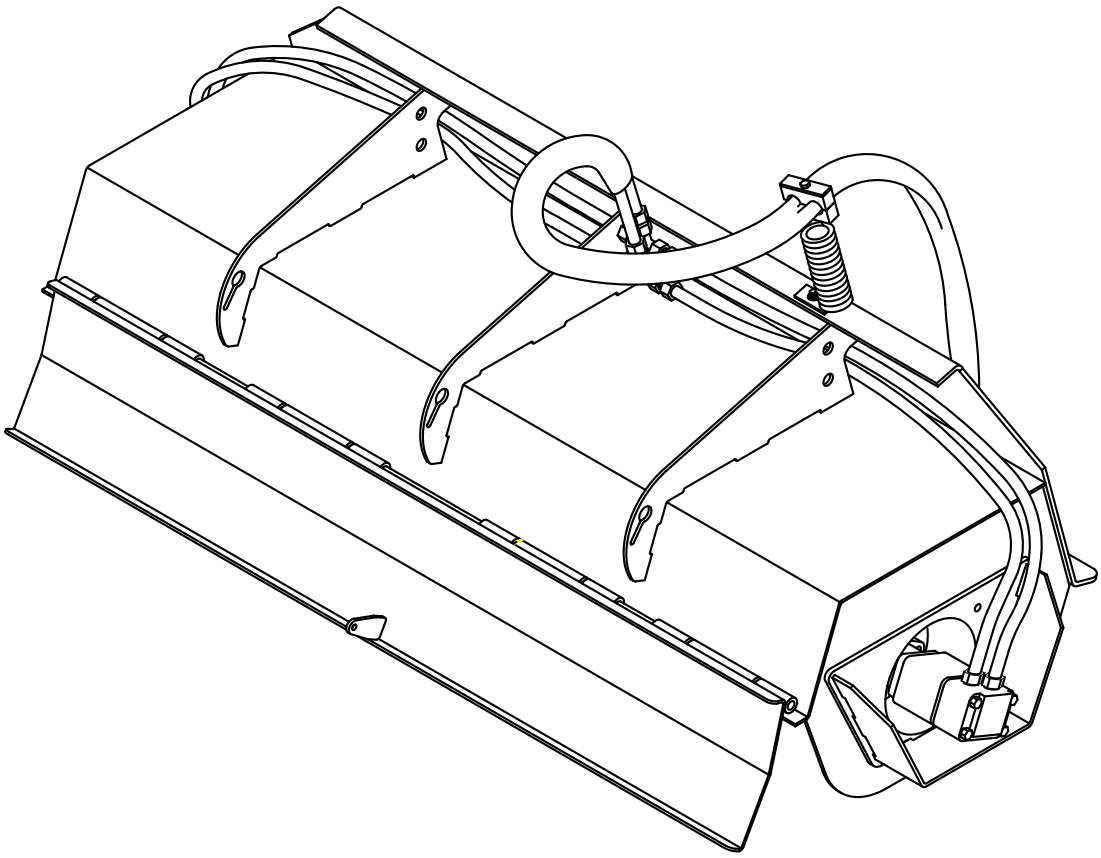
*The Power of Combined Excellence*

# OPERATOR'S AND PARTS MANUAL

# ROTO-TILLER



**SERIAL NUMBER: _____**

**MODEL NUMBER: _____**

**Manual Number: MR15639**
**Part Number: LAF3438, LAF3452 & LAF3468**
**Rev. 2**

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2/11/09

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# INTRODUCTION

Congratulations on your purchase of a new **FFC Roto-Tiller**. This product has been designed and built to till and loosen soil. This product can also be used for aeration purposes such as reconditioning of contaminated soil. You or any other person who will be assembling, operating, maintaining, or working with this product are required to read and completely understand the information and instructions contained in this manual. If anyone does not fully understand every part of this manual, please obtain further assistance by contacting the dealer from which this product was purchased or by contacting **FFC** at the telephone number or address listed on the cover of this manual. Keep this manual available for reference whenever this product is being handled or used. Provide this manual to any new owners and/or operators.
This manual covers model(s): **LAF3438, LAF3452** and **LAF3468**. The difference between the models is the width and hydraulic flow capacity of the product, details of which are covered on the parts list and specifications page(s).

# GENERAL INFORMATION

The purpose of this manual is to assist in assembling, mounting, operating, and maintaining your **Hydraulic Roto-Tiller**. Read this manual carefully to obtain valuable information and instructions that will help you achieve years of safe and dependable service.
The illustrations and data used in this manual were current at the time of printing, but due to possible engineering and/or production changes, this product may vary slightly in detail. **FFC** reserves the right to redesign and/or change components as may be necessary without notification to anyone. Throughout this manual, references may be made to:

| | |
|---|---|
| Prime Mover | The engine-driven machine to which this product must be attached. |
| Right, Left, Front, Rear | Directions that are determined in relation to the operator of the equipment when seated in the normal operation position. |
| **IMPORTANT** | Precautions that must be followed to prevent substandard performance. |

# SERIAL NUMBER LOCATION

Always refer to the model and serial number when ordering parts or requesting information from your dealer. The serial number plate for this product is located on the top left surface of the loader attachment plate of your **Hydraulic Roto-Tiller**.

| Reference Information | |
|---|---|
| Model Number | Loader Make |
| Serial Number | Loader Model |
| Date Purchased | Loader Serial Number |

# SAFETY STATEMENTS

**THIS SYMBOL BY ITSELF OR WITH A WARNING WORD THROUGHOUT THIS MANUAL IS USED TO CALL YOUR ATTENTION TO INSTRUCTIONS INVOLVING YOUR PERSONAL SAFETY OR THE SAFETY OF OTHERS. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH.**

**DANGER** **THIS SIGNAL WORD IS USED WHERE SERIOUS INJURY OR DEATH WILL RESULT IF THE INSTRUCTIONS ARE NOT FOLLOWED PROPERLY.**

**WARNING** **THIS SIGNAL WORD IS USED WHERE SERIOUS INJURY OR DEATH COULD RESULT IF THE INSTRUCTIONS ARE NOT FOLLOWED PROPERLY.**

**CAUTION** **THIS SIGNAL WORD IS USED WHERE MINOR INJURY COULD RESULT IF THE INSTRUCTIONS ARE NOT FOLLOWED PROPERLY.**

**NOTICE** **NOTICE INDICATES A PROPERTY DAMAGE MESSAGE.**

# GENERAL SAFETY PRECAUTIONS

**WARNING!** **READ MANUAL PRIOR TO INSTALLATION**

Improper installation, operation, or maintenance of this equipment could result in serious injury or death. Operators and maintenance personnel should read this manual, as well as all manuals related to this equipment and the prime mover thoroughly before beginning installation, operation, or maintenance. **FOLLOW ALL SAFETY INSTRUCTIONS IN THIS MANUAL AND THE PRIME MOVER'S MANUAL(S).**

**READ AND UNDERSTAND ALL SAFETY STATEMENTS**

Read all safety decals and safety statements in all manuals prior to operating or working on this equipment. Know and obey all OSHA regulations, local laws, and other professional guidelines for your operation. Know and follow good work practices when assembling, maintaining, repairing, mounting, removing, or operating this equipment.

**KNOW YOUR EQUIPMENT**

Know your equipment's capabilities, dimensions and operations before operating. Visually inspect your equipment before you start, and never operate equipment that is not in proper working order with all safety devices intact. Check all hardware to ensure it is tight. Make certain that all locking pins, latches, and connection devices are properly installed and secured. Remove and replace any damaged, fatigued, or excessively worn parts. Make certain all safety decals are in place and are legible. Keep decals clean, and replace them if they become worn and hard to read.

# GENERAL SAFETY PRECAUTIONS

**WARNING! PROTECT AGAINST FLYING DEBRIS**

Always wear proper safety glasses, goggles or a face shield when driving pins in or out, or when any operation causes dust, flying debris, or any other hazardous material.

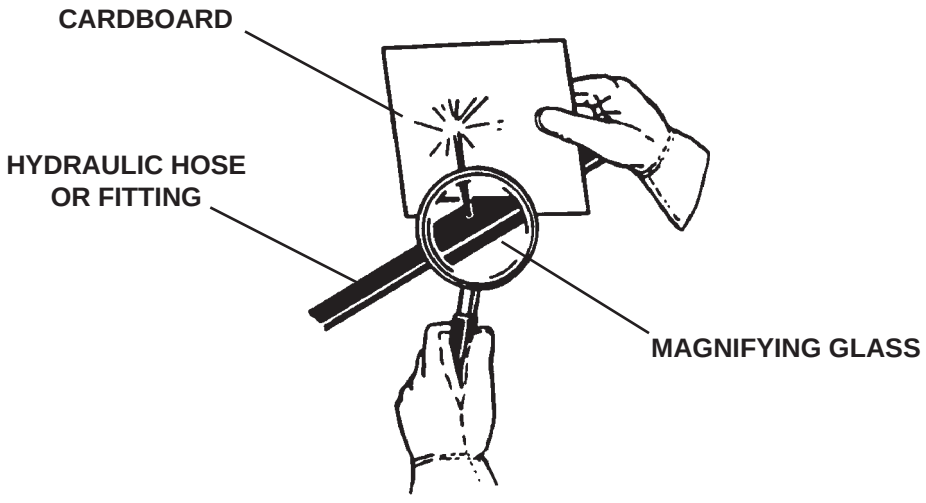
**WARNING! LOWER OR SUPPORT RAISED EQUIPMENT**

Do not work under raised booms without supporting them. Do not use support material made of concrete blocks, logs, buckets, barrels or any other material that could suddenly collapse or shift positions. Make sure support material is solid, not decayed, warped, twisted, or tapered. Lower booms to ground level or onto blocks. Lower booms and attachments to the ground before leaving the cab or operator's station.

**WARNING! USE CARE WITH HYDRAULIC FLUID PRESSURE**

Hydraulic fluid under pressure can penetrate the skin and cause serious injury or death. Hydraulic leaks under pressure may not be visible. Before connecting or disconnecting hydraulic hoses, read your prime movers operator's manual for detailed instructions on connecting and disconnecting hydraulic hoses or fittings.

- Keep unprotected body parts, such as face, eyes, and arms as far away as possible from a suspected leak. Flesh injected with hydraulic fluid may develop gangrene or other permanent disabilities.
- If injured by injected fluid, see a doctor at once. If your doctor is not familiar with this type of injury, ask him to research immediately to determine proper treatment.
- Wear safety glasses, protective clothing, and use a sound piece of cardboard or wood when searching for hydraulic leaks. **DO NOT USE YOUR HANDS! SEE ILLUSTRATION.**



# GENERAL SAFETY PRECAUTIONS

**WARNING! DO NOT MODIFY MACHINE OR ATTACHMENTS**

Modifications may weaken the integrity of the attachment and may impair the function, safety, life, and performance of the attachment. When making repairs, use only the manufacturer's genuine parts, following authorized instructions. Other parts may be substandard in fit and quality. Never modify any ROPS (Roll Over Protection Structure) or FOPS (Falling Object Protective Structure) equipment or device. Any modifications must be authorized in writing by the manufacturer.

**WARNING! SAFELY MAINTAIN AND REPAIR EQUIPMENT**

- Do not wear loose clothing, or any accessories that can catch in moving parts. If you have long hair, cover or secure it so that it does not become entangled in the equipment.
- Work on a level surface in a well-lit area.
- Use properly grounded electrical outlets and tools.
- Use the correct tool for the job at hand. Make sure they are in good condition for the task required.
- Wear the protective equipment specified by the tool manufacturer.

**WARNING! SAFELY OPERATE EQUIPMENT**

Do not operate equipment until you are completely trained by a qualified operator in how to use the controls, know its capabilities, dimensions, and all safety requirements. See your machine's manual for these instructions.

- Keep all step plates, grab bars, pedals, and controls free of dirt, grease, debris, and oil.
- Never allow anyone to be around the equipment when it is operating.
- Do not allow riders on the attachment or the prime mover.
- Do not operate the equipment from anywhere other than the correct operators position.
- Never leave equipment unattended with the engine running or with this attachment in a raised position.
- Do not alter or remove any safety feature from the prime mover or this attachment.
- Know your work site safety rules as well as traffic rules and flow. When in doubt on any safety issue, contact your supervisor or safety coordinator for an explanation.

**WARNING! KNOW WHERE UTILITIES ARE**

Observe overhead electrical and other utility lines. Be sure equipment will clear them. When digging, call your local utilities for location of buried utility lines, gas, water, and sewer, as well as any other hazard you may encounter.

# EQUIPMENT SAFETY PRECAUTIONS

**DANGER! ROTATING TINES HAZARD!**

**To prevent serious injury or death from rotating tines:**

- Stay clear of roto-tiller when engine is running. Keep others away. Keep hands, feet and clothing away from moving parts.
- Never allow anyone to reach into, kick into, or otherwise come in contact with the rotating tines or with non-rotating clogged tines. The tines can crush and/or dismember. Keep everyone clear of the tines until the prime mover engine if off and the hydraulic pressure has been relieved.

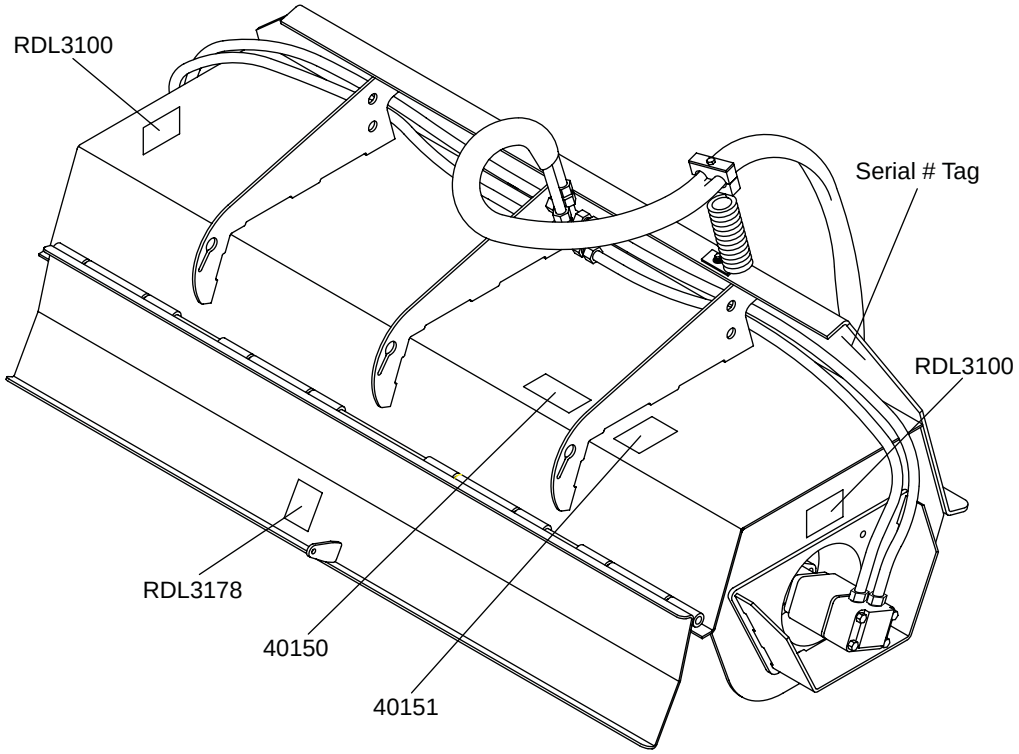
**DANGER! THROWN OBJECT HAZARD!**

**To prevent serious injury or death from thrown objects:**

- Stay away from discharge area during operation. Keep others away.

# SAFETY SIGN LOCATIONS

The diagram on this page shows the location of the decals used on the FFC Roto-Tiller. The decals are identified by their part numbers, with reductions of the actual decals located on the following page. Use this information to order replacements for lost or damaged decals. Be sure to read all decals before operating the attachment. They contain information you need to know for both safety and product longevity.



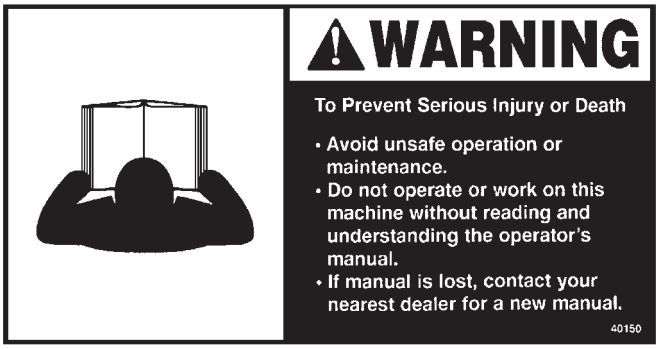

## INSTRUCTIONS

- Keep all safety signs clean and legible.
- Replace all missing, illegible, or damaged safety signs.
- Replacement parts for parts with safety signs attached must also have safety signs attached.
- Safety signs are available, free of charge, from your dealer or from FFC.

## PLACEMENT OR REPLACEMENT OF SAFETY SIGNS

1. Clean the area of application with non-flammable solvent, and then wash the same area with soap and water.
2. Allow the surface to fully dry.
3. Remove the backing from the safety sign, exposing the adhesive surface.
4. Apply the safety sign to the position shown in the diagram above and smooth out any bubbles.

# SAFETY SIGNS




**PART #40150**
**WARNING! READ MANUAL**


**PART #40151**
**WARNING! HIGH PRESSURE FLUID**


**PART #RDL3100**
**WARNING! STAND CLEAR**


**PART #RDL3178**
**CAUTION! NOT A STEP**

# PRIME MOVER SPECIFICATIONS

**IMPORTANT** Exceeding any of the maximum recommended prime mover specifications **CAN** result in damage to this product and **WILL** void all FFC warranties.

| DESCRIPTION | SPECIFICATIONS |
|---|---|
| Rated net Engine Horsepower of Prime Mover | 110 hp. maximum |
| Weight of Prime Mover without Roto-Tiller | 11,000 lbs. maximum |
| Operating Capacity of Prime Mover's loader | 3,600 lbs. maximum |
| Lift Capacity of Prime Mover's loader | 7,200 lbs. maximum |
| Hydraulic Pressure Output | 3,500 psi maximum |
| Rear Ballast | As required to maintain full prime mover stability. (Note the Shipping Weight on the specifications page, then see the operator's manual(s) for your prime mover, loader, and quick-attach for ballasting needs.) |

# ROTO-TILLER SPECIFICATIONS

| Model Number | Overall Width | Overall Height | Overall Depth | Offset to Right | Torque @ 2,500 psi | Shipping Weight |
|---|---|---|---|---|---|---|
| LAF3438 | 53" | 27" | 27" | varies | 469 ft. lbs | 450 lbs. |
| LAF3452 | 67.81" | 27" | 33.5" | 12.5" | 939 ft. lbs. | 600 lbs. |
| LAF3468 | 78.25" | 27" | 33.5" | 4.75" | 939 ft. lbs. | 695 lbs. |
| | | | | | | |
| All replacement hydraulic hoses must have a minimum rated working pressure of 4,000 psi. | | | | | | |

# BOLT TORQUE

BOLT TORQUE SPECIFICATIONS

## GENERAL TORQUE SPECIFICATION TABLES

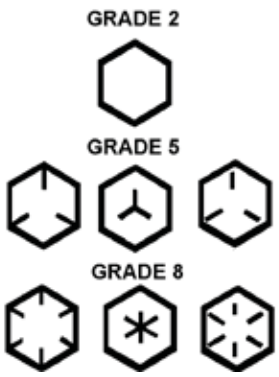
**Use the following charts when determining bolt torque specifications when special torques are not given. Always use grade 5 or better when replacing bolts.**

## SAE BOLT TORQUE SPECIFICATIONS

**NOTE: The following torque values are for use with extreme pressure lubricants, plating or hard washer applications Increase torque 15% when using hardware that is unplated and either dry or lubricated with engine oil.**

| Bolt Size | | SAE GRADE 5 TORQUE | | | | SAE GRADE 8 TORQUE | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Pounds Feet | | Newton-Meters | | Pounds Feet | | Newton-Meters | |
| Inches | Millimeters | UNC | UNF | UNC | UNF | UNC | UNF | UNC | UNF |
| 1/4 | 6.35 | 8 | 9 | 11 | 12 | 10 | 13 | 14 | 18 |
| 5/16 | 7.94 | 14 | 19 | 19 | 23 | 20 | 25 | 27 | 34 |
| 3/8 | 9.53 | 30 | 36 | 41 | 49 | 38 | 46 | 52 | 62 |
| 7/16 | 11.11 | 46 | 54 | 62 | 73 | 60 | 71 | 81 | 96 |
| 1/2 | 12.70 | 68 | 82 | 92 | 111 | 94 | 112 | 127 | 152 |
| 9/16 | 14.29 | 94 | 112 | 127 | 152 | 136 | 163 | 184 | 221 |
| 5/8 | 15.88 | 128 | 153 | 174 | 207 | 187 | 224 | 254 | 304 |
| 3/4 | 19.05 | 230 | 275 | 312 | 373 | 323 | 395 | 438 | 536 |
| 7/8 | 22.23 | 340 | 408 | 461 | 553 | 510 | 612 | 691 | 830 |
| 1 | 25.40 | 493 | 592 | 668 | 803 | 765 | 918 | 1037 | 1245 |
| 1-1/8 | 25.58 | 680 | 748 | 922 | 1014 | 1088 | 1224 | 1475 | 1660 |
| 1-1/4 | 31.75 | 952 | 1054 | 1291 | 1429 | 1547 | 1700 | 2097 | 2305 |
| 1-3/8 | 34.93 | 1241 | 1428 | 1683 | 1936 | 2023 | 2312 | 2743 | 3135 |
| 1-1/2 | 38.10 | 1649 | 1870 | 2236 | 2535 | 2686 | 3026 | 3642 | 4103 |

Bolt head identification marks as per grade.
NOTE: Manufacturing Marks Will Vary




## METRIC BOLT TORQUE SPECIFICATIONS

**NOTE: The following torque values are for use with metric hardware that is unplated and either dry or lubricated with engine oil. Reduce torque 15% when using hardware that has extreme pressure lubricants, plating or hard washer applications.**

Bolt head identification marks as per grade.


| Size of Bolt | Grade No. | Pitch (mm) | Pounds Feet | Newton-Meters | Pitch (mm) | Pounds Feet | Newton-Meters |
|---|---|---|---|---|---|---|---|
| M6 | 5.6 | 1.0 | 3.6-5.8 | 4.9-7.9 | - | - | - |
| | 8.8 | | 5.8-.4 | 7.9-12.7 | | - | - |
| | 10.9 | | 7.2-10 | 9.8-13.6 | | - | - |
| M8 | 5.6 | 1.25 | 7.2-14 | 9.8-19 | 1.0 | 12-17 | 16.3-23 |
| | 8.8 | | 17-22 | 23-29.8 | | 19-27 | 25.7-36.6 |
| | 10.9 | | 20-26 | 27.1-35.2 | | 22-31 | 29.8-42 |
| M10 | 5.6 | 1.5 | 20-25 | 27.1-33.9 | 1.25 | 20-29 | 27.1-39.3 |
| | 8.8 | | 34-40 | 46.1-54.2 | | 35-47 | 47.4-63.7 |
| | 10.9 | | 38-46 | 51.5-62.3 | | 40-52 | 54.2-70.5 |
| M12 | 5.6 | 1.75 | 28-34 | 37.9-46.1 | 1.25 | 31-41 | 42-55.6 |
| | 8.8 | | 51-59 | 69.1-79.9 | | 56-68 | 75.9-92.1 |
| | 10.9 | | 57-66 | 77.2-89.4 | | 62-75 | 84-101.6 |
| M14 | 5.6 | 2.0 | 49-56 | 66.4-75.9 | 1.5 | 52-64 | 70.5-86.7 |
| | 8.8 | | 81-93 | 109.8-126 | | 90-106 | 122-143.6 |
| | 10.9 | | 96-109 | 130.1-147.7 | | 107-124 | 145-168 |
| M16 | 5.6 | 2.0 | 67-77 | 90.8-104.3 | 1.5 | 69-83 | 93.5-112.5 |
| | 8.8 | | 116-130 | 157.2-176.2 | | 120-138 | 162.6-187 |
| | 10.9 | | 129-145 | 174.8-196.5 | | 140-158 | 189.7-214.1 |
| M18 | 5.6 | 2.0 | 88-100 | 119.2-136 | 1.5 | 100-117 | 136-158.5 |
| | 8.8 | | 150-168 | 203.3-227.6 | | 177-199 | 239.8-269.6 |
| | 10.9 | | 175-194 | 237.1-262.9 | | 202-231 | 273.7-313 |
| M20 | 5.6 | 2.5 | 108-130 | 146.3-176.2 | 1.5 | 132-150 | 178.9-203.3 |
| | 8.8 | | 186-205 | 252-277.8 | | 206-242 | 279.1-327.9 |
| | 10.9 | | 213-249 | 288.6-337.4 | | 246-289 | 333.3-391.6 |

# ROTO-TILLER MOUNTING

**WARNING! READ MANUAL PRIOR TO INSTALLATION**

Improper installation, operation, or maintenance of this equipment could result in serious injury or death. Operators and maintenance personnel should read this manual, as well as all manuals related to this equipment and the prime mover thoroughly before beginning installation, operation, or maintenance. **FOLLOW ALL SAFETY INSTRUCTIONS IN THIS MANUAL AND THE PRIME MOVER'S MANUAL(S).**

1. Place this product on a firm, level surface that is large enough to safely accommodate this product, your prime mover and all workers involved in the mounting process.

2. Refer to the operator's manual(s) for your prime mover, loader, and quick-attach and follow the mounting instructions contained therein.

**NOTE: It is important to make sure the locking mechanism on your quick attach is engaged, therefore locking the attachment onto the loader.**

**IMPORTANT: Make sure all foreign matter is cleaned from hydraulic connectors before making connections.**

3. With the auxiliary hydraulic system turned off, route the hydraulic hoses over roto-tiller housing in such as fashion as to avoid pinching and chafing of the hoses and connect them to their proper auxiliary couplers on the loader.

4. Carefully raise the loader and cycle the tilt cylinders to check clearances and to verify that all mounting procedures have been successfully completed.

# ROTO-TILLER HYDRAULIC CONNECTION

**READ AND UNDERSTAND ALL SAFETY STATEMENTS**

Read all safety decals and safety statements in all manuals before beginning any Snow Blower hydraulic connection. Know and obey all OSHA regulations, local laws, and other professional guidelines for your operation. Know and follow good work practices when assembling, maintaining, repairing, mounting, removing, or operating this equipment.

1. Disconnect the hydraulic hose quick couplers from one another and attach the quick couplers to your prime mover as per the instructions in your prime mover's operator's manual. (Also see Hydraulic Hose Connections in the SERVICE section.)
2. Carefully raise the loader and cycle the tilt cylinders to check hose clearances and to check for any interference.
3. Cycle the hydraulic cylinder(s) on this product several times from fully retracted to fully extended until all air has been completely removed from the cylinder(s).

**WARNING! Do not lock the auxiliary hydraulics of your prime mover in the "ON" position. Failure to obey this warning could result in death or serious injury.**

# ROTO-TILLER OPERATION

## GENERAL INFORMATION

The FFC Roto-Tiller is perfect for home gardening, landscaping and vegetable farming just to mention a few. It turns up hard packed ground and leaves the perfect seedbed for gardens or lawns.

Simplicity of operation is one of the key features of the FFC Roto-Tiller. It is important, however, to be familiar with and know the controls and adjustments on both the Roto-Tiller and the prime mover. Such knowledge is crucial for safe, efficient operation of the equipment.

Some information may be general in nature due to unknown and varying operating conditions. However, through experience and these instructions, you should be able to develop procedures suitable to your particular situation.

## THE PRIME MOVER

The Roto-Tiller mounts to the attachment mechanism of your prime mover. Due to this arrangement thorough knowledge of the prime mover controls is necessary for Roto-Tiller operation. Read your prime movers operator's manual for information regarding operation before attempting to use the attachment.

## BEFORE OPERATING THE ROTO-TILLER

- Clear the work area of all bystanders, pets and livestock.
- Be sure all Roto-Tiller tines, bolts and nuts are tight and chain guards are in place.
- Clear the area of rocks, branches and other foreign objects.
- Tall grass and weeds may need to be mowed before tilling to avoid wrapping around the tine assembly, therefore reducing the Roto-Tiller performance.

**DANGER!**  **ROTATING TINES HAZARD! To prevent serious injury or death from rotating tines: Stay clear of Roto-Tiller when engine is running. Keep others away. Keep hands, feet and clothing away from moving parts. Follow Safety Shutdown Procedure whenever leaving operator's station.**

**DANGER!**  **THROWN OBJECT HAZARD! To prevent serious injury or death from thrown objects stay away from discharge area during operation. Keep others away.**

## OPERATING THE ROTO-TILLER

The main purpose of the FFC Roto-Tiller is to cultivate soil. The Roto-Tiller is bi-directional; it will operate with the tines rotating in either direction.

After thoroughly checking the Roto-Tiller and preparing the work area you are ready to begin tilling.

**NOTE: Although the performance of the Roto-Tiller can vary significantly depending upon the way it is used, we recommend the following operating procedure for maximum productivity.**

1. Following the prime mover manuals operating and safety procedures, start the prime mover and position the Roto-Tiller at the starting location.
2. With the prime mover at idle speed and the arms fully back and lowered, Roto-Tiller will be slightly off of the ground, engage the auxiliary hydraulic to begin Roto-Tiller rotation.

# ROTO-TILLER OPERATION

**NOTE: Be sure tines are rotating in the desired direction for prime mover travel.**

3. Position the Roto-Tiller parallel to the ground and increase engine RPM. (Tines will cut better at full RPM).
4. Carefully lower the Roto-Tiller to the ground and begin to slowly travel in the desired direction. Gradually increase speed until the desired results are achieved.

**NOTE: It is recommended after the first 50 feet to stop and check to Roto-Tiller depth.**

**CAUTION! Be prepared for sudden prime mover movement when lowering Roto-Tiller into the ground. Rotating tines are capable of pulling or pushing the prime mover, depending on tine rotation.**

For finish tilling operation, it is recommended the Roto-Tiller be operated while driving in reverse with the tines rotating in a clockwise direction when viewed from the left side of the machine. Due to the offset mounting configuration this will allow the right tracks to be covered as the prime mover moves in reverse, finishing the tilling operation.

Tilling should not be done in wet conditions as soil will stick to the tines.

There are several conditions that will cause the Roto-Tiller to "walk up" onto the top of the ground and push/pull the prime mover. The most common is traveling too fast and low engine RPM (tines moving to slowly for ground conditions). If you have increased the engine RPM and decreased travel speed and the Roto-Tiller continues to "walk up" check the tines. Make sure the cutting edge is still sharp and all tines are intact.

## TINE ROTATION

The FFC Roto-Tiller can be operated while traveling in forward or reverse and the tines rotating in either direction. Although standard direction of rotation is for the tines to rotate in the same direction the prime-mover is traveling, reversing the tine rotation has been noted to bury debris better.

The auxiliary hydraulics must be engaged so that:

- the tines rotate down into the untilled area in the direction of travel to achieve the fastest tilling speeds and the most efficient use of power, or
- the tines rotate up from under the untilled area in the direction of travel to achieve greatest conditioning of the soil.

**IMPORTANT** Tilling while moving forward with the hinged shroud panel fully down
**CAN** result in damage to this product and
**WILL** void all FFC warranties.

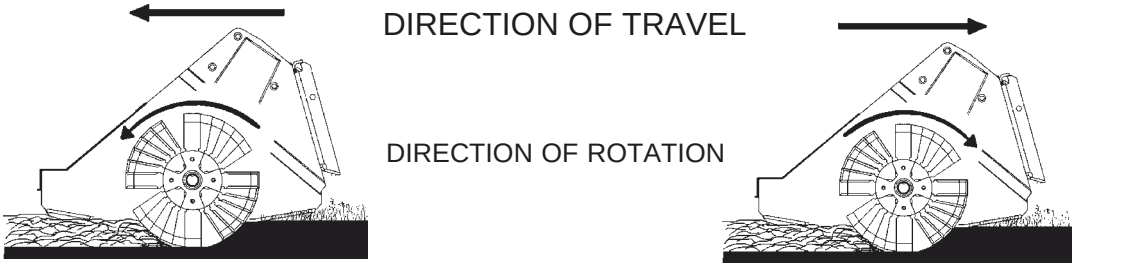
- When tilling while moving forward, the hinged shroud panel must be chained up in a horizontal position to avoid damaging the panel. The hinged shroud panel is not designed to push any soil or other materials.
- Your prime mover should be operating at full throttle with the auxiliary hydraulics fully engaged. The speed of the movement of your prime mover should be varied as required to pulverize the soil to extent desired.
- The maximum tilling depth is 6". This depth is attained when the motor guard is about 1" below the surface of the soil. Compacted soils may require two passes to reach this depth.

# ROTO-TILLER OPERATION

**IMPORTANT** Attempting to grind stumps or dig into rigid or frozen materials **CAN** result in damage to this product and **WILL** void all FFC warranties.

## STANDARD TILLING

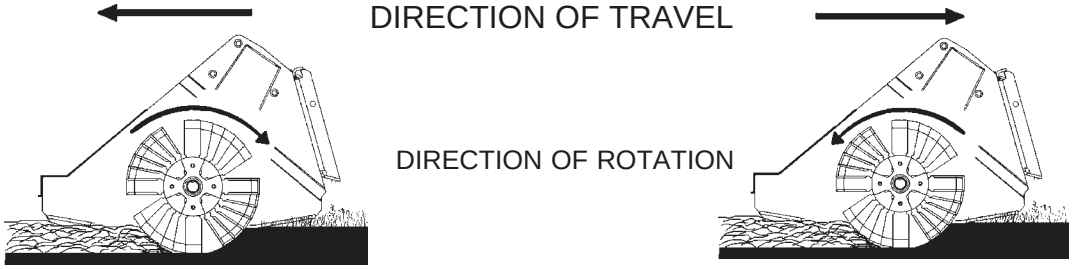
**STANDARD TILLING IS WHEN YOU ARE TRAVELING IN THE SAME DIRECTION THAT THE TINES ARE ROTATING.**




RECOMMENDED FOR FINISH TILLING

## REVERSE TILLING

**REVERSE TILLING IS WHEN YOU ARE TRAVELING IN THE OPPOSITE DIRECTION THAT THE TINES ARE ROTATING.**



# ROTO-TILLER MAINTENANCE

## GENERAL INFORMATION

Regular maintenance is the key to long equipment life and safe operation. Maintenance requirements have been reduced to the absolute minimum. However, it is very important that these maintenance functions be performed as described below.

### DAILY

- Check all tines, bolts and nuts for tightness.
- Replace any missing tines, bolts or nuts with approved replacement parts.
- Check that chain guard is securely in place.
- Check hydraulic system for hydraulic oil leaks.
- Visually inspect the machine for worn parts or cracked welds and repair as necessary.

### AFTER EVERY 10 HOURS OF USE

- Oil the hinge at the top of the hinged shroud panel.

### AFTER EVERY 40 HOURS OF USE

- Make sure the taper lock adapter assemblies are tight by turning the bearing locknut by hand. If the bearing locknut moves by hand, retighten the taper lock adapter assembly as specified on following page.

# ROTO-TILLER SERVICE

**IMPORTANT: When replacing parts use only factory approved replacement parts. Manufacturer will not claim responsibility for use of unapproved parts or accessories and/or other damages as a result of their use.**

**Removing Wire, Twine, Weeds, etc. that are Wrapped Around the Roller**

1. Park your prime mover on a level surface with this product properly attached.
2. Place your prime mover's transmission in "Park" and engage the parking brake.
3. Lower this product onto preplaced blocking that will support the motor guards of this product so that the tines are not in contact with the ground.

**WARNING! Failure to obey the following procedures could result in death or serious injury.**

- **Do not use blocking made of concrete blocks, logs, buckets, barrels or any other material that could suddenly collapse or shift positions. Do not use wood or steel blocking that shows any signs of material decay. Do not use blocking that is warped, twisted, or tapered.**

4. Shut off your power unit's engine, remove the starter key, wait for all moving parts to come to a stop, and relieve all pressure in the hydraulic lines.
5. Disconnect the hydraulic lines from your power unit and connect the two ends to each other. This should permit the tines to rotate freely.
6. Pull the material from the tine shaft while allowing the shaft to rotate.

**ALTERNATE METHOD**

If your power unit is equipped with safety stops for the lift arms of the loader that can be activated from the operator's position or if the safety stops must be activated from outside the operator's position and a second person is present, then Step 3 above may be replaced with these steps:

a) Fully raise the lift arms and fully extend the tilt cylinders to the fully dumped position.
b) Activate the safety stops for the lift arms. Test the stops to verify that no downward movement of the lift arms can occur.
c) Continue with Step 4 above.

**Replacing Tines**

1. Perform steps 1 through 5 above.
2. Remove the clip and pin that secure the strip; then slide the tine out.
   a) If most of the tilling is done in one direction, the tine may be reversed and reinstalled.

**NOTICE** To achieve the best tilling results, all the tines should be reversed at one time, not just one or two tines at a time.

   b) If the tine is worn out or damaged, properly dispose of the tine and install a new tine.
3. Replace the pin and clip.
4. Repeat the process for all other tines.

**Bearing Lock Adjustment**

1. Bend the locking tang of the bearing lock washer out to free the bearing lock nut.
2. Loosen the bearing lock nut.
3. Retighten the bearing lock nut until finger - tight.
4. Tighten the lock nut an additional 1-1/4 turns and, if necessary, continue tightening until the first time one tang of the bearing lock washer is aligned with a notch on the locknut.
5. Bend that tang of the bearing lock washer back into the notch on the lock nut.

# ROTO-TILLER REMOVAL & STORAGE

## GENERAL INFORMATION

The following procedure will help you to keep your unit in top condition. It will also help you get off to a good start the next time your Roto-Tiller is needed. We therefore strongly recommend that you take the extra time to follow these procedures whenever your Roto-Tiller will not be used for an extended period of time.

## REMOVAL

***NOTE: When detaching attachments it is recommended you follow the detaching instructions in your loader operator's manual.***

1. Remove and store the Roto-Tiller in a dry and protected place. Leaving the Roto-Tiller outside will materially shorten its life.
2. Set the attachment on the ground and follow the standard shut down procedure in your loader operator's manual.
3. With the loader engine OFF, disengage the attachment lock pins. Release hydraulic pressure from the auxiliary hydraulic system and disconnect the hydraulic couplers from the loader.
4. Start the loader engine and make sure that the lift arm is lowered and in contact with the loader frame.
5. Roll the attachment mechanism forward and slowly back up until the attachment is free from the loader.

## PREPARATION FOR STORAGE

1. Clean the unit thoroughly, removing all mud, dirt and grease.
2. Inspect for visible signs of wear, breakage or damage. Inspect tines for wear. Order any parts required and make the necessary repairs to avoid delays when starting next season. **NOTE: When replacing tines it is recommended you replace mounting hardware also.**
3. Tighten all loose nuts, capscrews and hydraulic connections.
4. Cap the hydraulic couplers to protect the hydraulic system from contaminates.
5. Touch up all unpainted and exposed areas with paint to prevent rust.
6. Replace decals if damaged or in unreadable condition.
7. Store the unit in a dry and protected place. Leaving the machine outside will materially shorten its life.

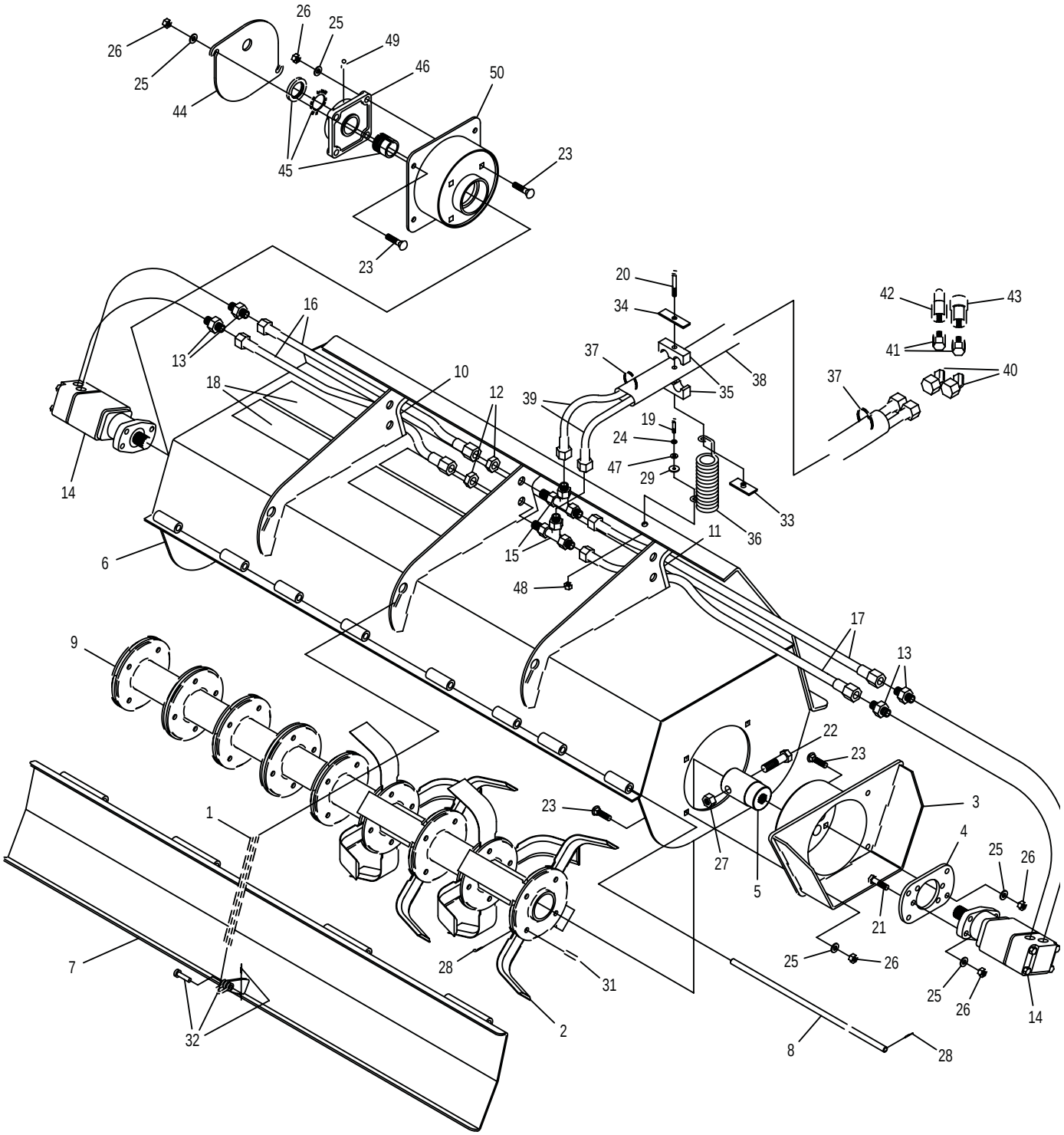
## REMOVING FROM STORAGE

1. Remove all protective coverings.
2. Check hydraulic hoses for deterioration and replace if necessary.

# ROTO-TILLER TROUBLESHOOTING

| PROBLEM | POSSIBLE CAUSE | POSSIBLE REMEDY |
|---|---|---|
| Roto-Tiller is not rotating. | Loader auxiliary hydraulics not engaged. | Refer to loader operator's manual. |
| | Inadequate hydraulic flow from loader. | Check hydraulic flow to Roto-Tiller. |
| | Low oil supply. | Add oil. |
| | Couplers not engaged. | Engage couplers. |
| | Air in hydraulic lines. | Activate system until air is purged from system. |
| | Broken hose. | Replace damaged hose. |
| | Obstruction in hydraulic lines. | Remove obstruction and replace if necessary. |
| | Loose or damaged hydraulic connection. | Tighten or replace fittings. |
| | Obstruction between Roto-Tiller and housing. | Remove obstruction. |
| | Hydraulic motor damaged or seal blown. | Call FFC service department for instructions. |
| | Key sheared or missing. | Check and replace motor key or drive shaft key as required. |
| | Roto-Tiller carried by loader. | Lower loader arms. |
| Tillage depth insufficient. | Insufficient power. | Increase engine RPM. |
| | Worn or bent tines. | Replace as necessary. |
| | Obstacles entangled in tine assembly. | Clear obstacles from tine assembly. |
| Roto-Tiller making excessive noise and/or vibrating. | Bearings worn or damaged. | Replace as needed. |
| Roto-Tiller skips or leaves grass residue. | Badly worn tines. | Replace as needed. |
| | Ground speed too fast for soil conditions. | Reduce ground speed. |
| Soil texture too coarse. | Roto-Tiller RPM too slow. | Increase RPM. |
| | Ground speed too fast. | Reduce ground speed. |
| Roto-Tiller bumping on ground. | Obstacles entangled in tine assembly | Clear obstacles from tine assembly. |
| Tines balling up with soil. | Soil too wet. | Delay tilling until soil dries. |
| | Worn or bent tines. | Replace as needed. |
| | Ground speed too fast for soil conditions. | Reduce ground speed. |

# ROTO-TILLER PARTS ILLUSTRATION

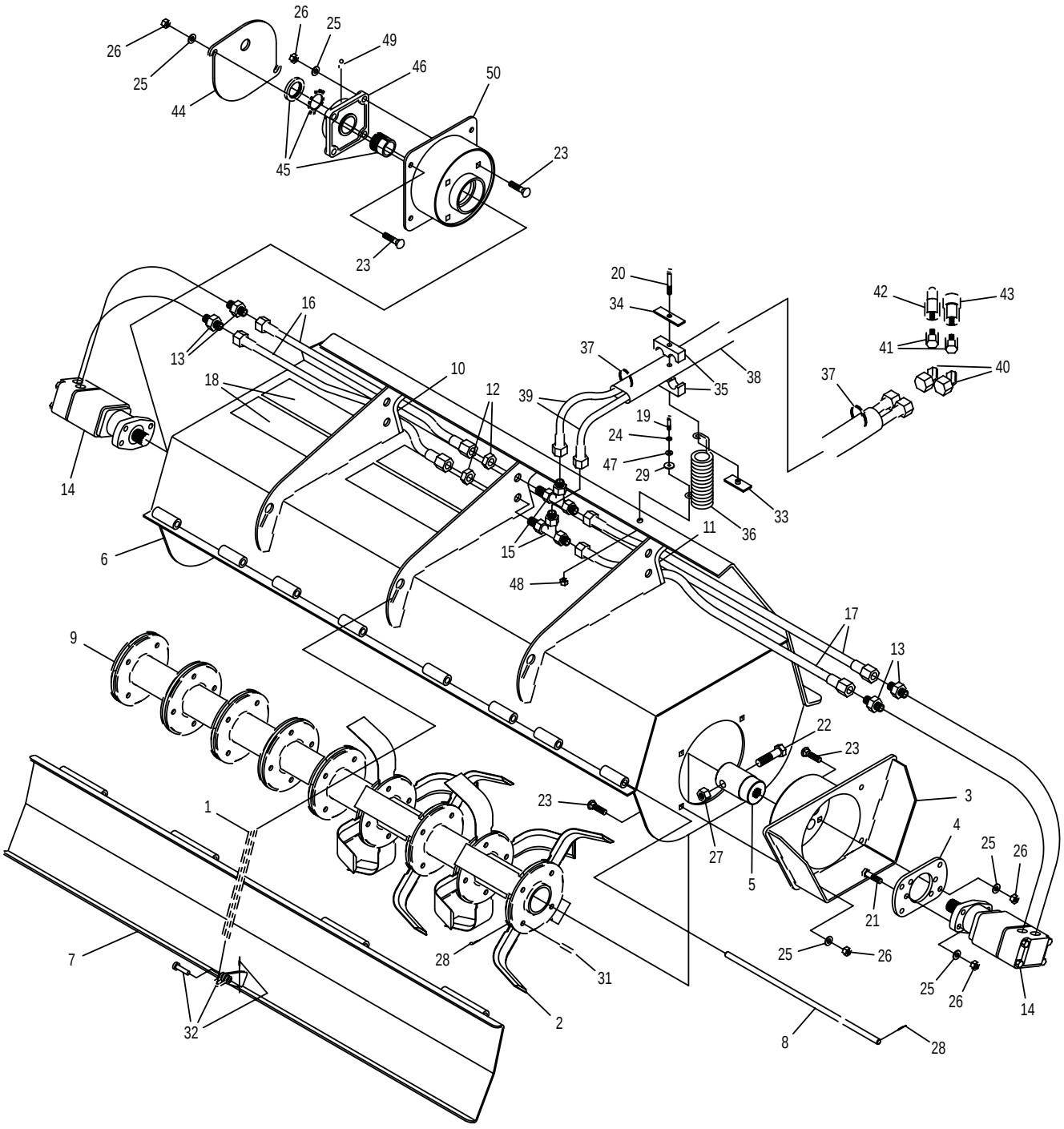


# ROTO-TILLER PARTS LIST

| | | LAF3438 | LAF3452 | LAF3468 | |
|---|---|---|---|---|---|
| **ITEM** | **QTY.** | **38"** | **52"** | **68"** | **DESCRIPTION** |
| 1 | 1 | | | DHF2021 | Chain 18 links |
| 2 | varies | (20) | (28) | (36) LAF3400 | Tine |
| 3 | varies | (1) | (2) | (2) LAF3401 | Motor Guard |
| 4 | varies | (1) | (2) | (2) LAF3402 | Motor Mounting Plate |
| 5 | varies | (1) | (2) | (2) LAF3403 | Motor-Tine Shaft Coupler |
| 6 | 1 | LAF3416 | LAF3404 | LAF3408 | Shroud |
| 7 | 1 | LAF3414 | LAF3405 | LAF3409 | Hinged Shroud Panel |
| 8 | 1 | LAF3415 | LAF3406 | LAF3411 | Hinge Pin |
| 9 | 1 | LAF3413 | LAF3407 | LAF3410 | Tine Shaft Weldment |
| 10 | 1 | Not Used | | 34114 | Rubber Metal Edge 5" |
| 11 | 1 | Not Used | Not Used | 34114 | Rubber Metal Edge 5" |
| 12 | 2 | | | 3219 | Jamb Nut #10 |
| 13 | varies | (2) | (4) | (4) 3431 | Hydraulic Fitting 10MB-10MJ Straight |
| 14 | varies | (1) | (2) | (2) 21956 | Hydraulic Motor |
| 15 | 2 | Not Used | | 30430 | Bulkhead Run Tee 10MJ-10MJ-10MJ |
| 16 | 2 | Not Used | | LAF4657 | Hydraulic Hose .5" x 48" 10FJ-10FJ |
| 17 | 2 | LAF4552 (84") | LAF4659 (32") | LAF4657 (48") | Hydraulic Hose .5" x (length noted) 10FJ-10FJ |
| 18 | 4 | | | LAF9447 | Anti-Slip Abrasive Tape 4" x 12" |
| 19 | 1 | | | 1024 | Grade 5 Hex Head Cap Screw .31" x 1.5" |
| 20 | 1 | | | 1031 | Grade 5 Hex Head Cap Screw .31" x 3.25" |
| 21 | varies | (4) | (8) | (8) RHW1406 | Grade 5 Hex Head Cap Screw .5" x 1.75" |
| 22 | varies | (1) | (2) | (2) 1148 | Grade 5 Hex Head Cap Screw .75" x 4.5" |
| 23 | 16 | | | 1872 | Grade 5 Carriage Bolt .5" x 1.5" |
| 24 | varies | (2) | (1) | (1) 1502 | Grade 5 Lock Washer .31" |
| 25 | varies | (20) | (24) | (24) 1505 | Grade 5 Lock Washer .5" |
| 26 | varies | (20) | (24) | (24) 1228 | Grade 5 Hex Nut .5" 13 tpi |
| 27 | varies | (1) | (2) | (2) 1936 | Grade 5 Lock Nut .75" |
| 28 | varies | (22) | (30) | (38) RHW8011 | Grade 2 Cotter Pin .13" x 1.25" |
| 29 | 2 | | | 105840 | Fender Washer .34" x 1.5" OD x 10 GA |
| 31 | varies | (20) | (28) | (36) RHW8134 | Grade 8 Clevis Pin .5" x 1.25" |
| 32 | 1 | | | RHW8317 | D-Shackle with .31" Dia. Round Pin & Cotter Pin, Galvanized |
| 33 | 1 | | | 22315 | Hose Clamp Plate |
| 34 | 1 | | | 22315 | Hose Clamp Plate |
| 35 | 2 | | | 22316 | Hose Clamp Cradle |
| 36 | 1 | | | RHW8618 | Spring 1.5" x 11.63" with 7.25" Coil |

**NOTE: All parts are the same as the LAF3468 except for those parts numbered under the other models.**
***ITEM may vary per Prime Mover -- Contact FFC for correct item.**

# ROTO-TILLER PARTS ILLUSTRATION



# ROTO-TILLER PARTS LIST

| | | LAF3438 | LAF3452 | LAF3468 | |
|---|---|---|---|---|---|
| **ITEM** | **QTY.** | **38"** | **52"** | **68"** | **DESCRIPTION** |
| 37 | 2 | | | 7104 | Tie Strap .3" x 15.25" Plastic |
| *38 | 1 | Contact FFC to obtain correct item. | | | Hydraulic Hose Protector |
| 39 | 2 | Not Used | | 03-10025 | Hydraulic Hose .63" x 78" 10FJ-12MB Sheathed |
| *40 | 2 | Contact FFC to obtain correct item. | | | Hydraulic Elbow (not required on all models) |
| *41 | 2 | Contact FFC to obtain correct item. | | | Hydraulic Adapter (not required on all models) |
| *42 | 1 | | | 19632 | Hydraulic Hose Quick Coupler: Male Connection |
| *43 | 1 | | | 22518 | Hydraulic Hose Quick Coupler: Female Connection |
| 44 | 1 | LAF3418 | Not Used | Not Used | Dust Guard |
| 45 | 1 | LAF3512 | Not Used | Not Used | Bearing Taper Lock Adapter |
| 46 | 1 | LAF3513 | Not Used | Not Used | Rotor Bearing |
| 47 | 1 | | | 1513 | Grade 5 Flat Washer .31" USS |
| 48 | 1 | | | 1926 | Grade 5 Hex Nut .31" |
| 49 | 1 | 53031 | Not Used | Not Used | Grease Zerk .25", 90°, Self-tapping, 28 tpi |
| 50 | 1 | LAF3417 | Not Used | Not Used | Bearing Mount |

**NOTE: All parts are the same as the LAF3468 except for those parts numbered under the other models.**
***ITEM may vary per Prime Mover -- Contact FFC for correct item.**

# Limited Warranty

Except for the Excluded Products as described below, all new products are warranted to be free from defects in material and/or workmanship during the Warranty Period, in accordance with and subject to the terms and conditions of this Limited Warranty.

1. Excluded Products. The following products are excluded from this Limited Warranty:

(a) Any cable, part that engages with the ground (i.e. sprockets), digging chain, bearing, teeth, tamping and/or demolition head, blade cutting edge, pilot bit, auger teeth and broom brush that either constitutes or is part of a product.

(b) Any product, merchandise or component that, in the opinion of Paladin Light Construction[1], has been (i) misused; (ii) modified in any unauthorized manner; (iii) altered; (iv) damaged; (v) involved in an accident; or (vi) repaired using parts not obtained through Paladin Light Construction.

2. Warranty Period. The Limited Warranty is provided only to those defects that occur during the Warranty Period, which is the period that begins on the first to occur of: (i) the date of initial purchase by an end-user, (ii) the date the product is first leased or rented, or (iii) the date that is six (6) months after the date of shipment by Paladin Light Construction as evidenced by the invoiced shipment date (the "Commencement Date") and ends on the date that is twelve (12) months after the Commencement Date.

3. Terms and Conditions of Limited Warranty. The following terms and conditions apply to the Limited Warranty hereby provided:

(a) Option to Repair or Replace. Paladin Light Construction shall have the option to repair or replace the product.

(b) Timely Repair and Notice. In order to obtain the Limited Warranty, (i) the product must be repaired within thirty (30) days from the date of failure, and (ii) a claim under the warranty must be submitted to Paladin Light Construction in writing within thirty (30) days from the date of repair.

(c) Return of Defective Part or Product. If requested by Paladin Light Construction, the alleged defective part or product shall be shipped to Paladin Light Construction at its manufacturing facility or other location specified by Paladin Light Construction, with freight PRE-PAID by the claimant, to allow Paladin Light Construction to inspect the part or product.

Claims that fail to comply with any of the above terms and conditions shall be denied.

## LIMITATIONS AND EXCLUSIONS.

**THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND ANY WARRANTY BASED ON A COURSE OF DEALING OR USAGE OF TRADE.**

**IN NO EVENT SHALL PALADIN LIGHT CONSTRUCTION BE LIABLE FOR CONSEQUENTIAL OR SPECIAL DAMAGES.**

**IN NO EVENT SHALL PALADIN LIGHT CONSTRUCTION BE LIABLE FOR ANY LOSS OR CLAIM IN AN AMOUNT IN EXCESS OF THE PURCHASE PRICE, OR, AT THE OPTION OF PALADIN LIGHT CONSTRUCTION, THE REPAIR OR REPLACEMENT, OF THE PARTICULAR PRODUCT ON WHICH ANY CLAIM OF LOSS OR DAMAGE IS BASED. THIS LIMITATION OF LIABILITY APPLIES IRRESPECTIVE OF WHETHER THE CLAIM IS BASED ON BREACH OF CONTRACT, BREACH OF WARRANTY, NEGLIGENCE OR OTHER CAUSE AND WHETHER THE ALLEGED DEFECT IS DISCOVERABLE OR LATENT.**

*[1]Attachment Technologies Inc., a subsidiary of Paladin Brands Holding, Inc. (PBHI) is referred to herein as Paladin Light Construction.*

*February 10, 2010*