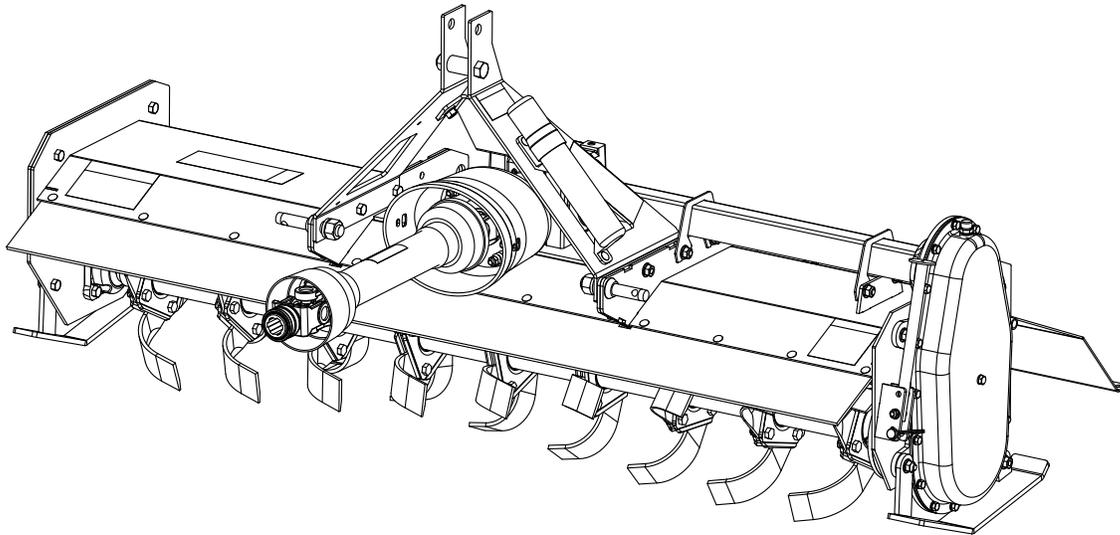


# ROTARY TILLERS

RT42.30  
RT48.30  
RT60.40  
RT72.40  
RTR42.30  
RTR48.30  
RTR60.40  
RTR72.40



**MAN1177**  
(Rev 11/07/2023)

**WOODS**<sup>®</sup>

OPERATOR'S MANUAL

## TO THE DEALER:

Assembly and proper installation of this product is the responsibility of the Woods® dealer. Read manual instructions and safety rules. Make sure all items on the Dealer's Pre-Delivery and Delivery Checklists in the Operator's Manual are completed before releasing equipment to the owner.

**The dealer must complete the online Product Registration form at the Woods Dealer Website** which certifies that all Dealer Checklist items have been completed. Dealers can register all Woods product at [dealer.WoodsEquipment.com](http://dealer.WoodsEquipment.com) under Product Registration.

**Failure to register the product does not diminish customer's warranty rights.**

## TO THE OWNER:

Read this manual before operating your Woods equipment. The information presented will prepare you to do a better and safer job. Keep this manual handy for ready reference. Require all operators to read this manual carefully and become acquainted with all adjustment and operating procedures before attempting to operate. Replacement manuals can be obtained from your dealer. To obtain complete warranty details, visit [WoodsEquipment.com/warranty](http://WoodsEquipment.com/warranty). You may also request a hard copy by calling 1-800-319-6637 or mail your request to: Woods Equipment Company, Attn: Warranty Dept. 2606 South Illinois Route 2, Oregon, IL 61061. To locate your nearest dealer, check the Dealer Locator at [www.WoodsEquipment.com](http://www.WoodsEquipment.com), or in the United States and Canada call 1-800-319-6637.

The equipment you have purchased has been carefully engineered and manufactured to provide dependable and satisfactory use. Like all mechanical products, it will require cleaning and upkeep. Lubricate the unit as specified. Observe all safety information in this manual and safety decals on the equipment.

For service, your authorized Woods dealer has trained mechanics, genuine Woods service parts, and the necessary tools and equipment to handle all your needs.

Use only genuine Woods service parts. Substitute parts will void the warranty and may not meet standards required for safe and satisfactory operation. Record the model number and serial number of your equipment in the spaces provided:

**Model:** \_\_\_\_\_ **Date of Purchase:** \_\_\_\_\_

**Serial Number:** (see Safety Decal section for location) \_\_\_\_\_

Provide this information to your dealer to obtain correct repair parts.

Throughout this manual, the term **NOTICE** is used to indicate that failure to observe can cause damage to equipment. The terms **CAUTION**, **WARNING**, and **DANGER** are used in conjunction with the Safety-Alert Symbol (a triangle with an exclamation mark) to indicate the degree of hazard for items of personal safety.



This is the safety alert symbol. It is used to alert you to potential physical injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



Indicates a hazardous situation that, if not avoided, will result in death or serious injury.



Indicates a hazardous situation that, if not avoided, could result in death or serious injury.



Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

**IMPORTANT  
or NOTICE**

Is used to address practices not related to physical injury.

**NOTE**

Indicates helpful information.

## 2 Introduction

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**This Operator's Manual should be regarded as part of the machine. Suppliers of both new and second-hand machines must make sure that this manual is provided with the machine.**

# SPECIFICATIONS

|                             | RT42.30/RTR42.30                | RT48.30/RTR48.30  | RT60.40/RTR60.40  | RT72.40/RTR72.40  |
|-----------------------------|---------------------------------|-------------------|-------------------|-------------------|
| Tilling Width               | 41"                             | 47"               | 59"               | 71"               |
| Maximum Tilling Depth       | 7"                              | 7"                | 7"                | 7"                |
| Operating Weight            | 478 lbs / 483 lbs               | 502 lbs / 507 lbs | 570 lbs / 578 lbs | 628 lbs / 636 lbs |
| Rotor Swing Diameter        | 15"                             | 15"               | 15"               | 15"               |
| Number of Blade Flanges     | 5                               | 6                 | 7                 | 9                 |
| Number of Blades            | 20                              | 24                | 28                | 36                |
| Drive Type                  | Gear                            | Gear              | Gear              | Gear              |
| Tractor PTO Speed           | 540 RPM                         |                   |                   |                   |
| Rotor Speed                 | 210 RPM                         |                   |                   |                   |
| Tractor Hitch               | Limited Category 1 & Category 1 |                   | Category 1        |                   |
| Tractor Horsepower          | 12 - 30 HP                      | 15 - 35 HP        | 18 - 40 HP        | 20 - 50 HP        |
| Skid Shoe Adjustments       | 5 x 1"                          | 5 x 1"            | 5 x 1"            | 5 x 1"            |
| Offset                      | 3"                              | 3"                | 2.3"              | 2.3"              |
| Gearbox Oil Capacity        | 1.2 Qt SAE 80W-90               |                   |                   |                   |
| Side Drive Oil Capacity     | 3 QT SAE 80W-90                 |                   |                   |                   |
| Operating Temperature Range | -20° to 110° F                  |                   |                   |                   |

## GENERAL INFORMATION

### WARNING

- Some illustrations in this manual show the mower with safety shields removed to provide a better view. The mower should never be operated with any safety shielding removed.

The purpose of this manual is to assist you in operating and maintaining your cutter. Read it carefully. It furnishes information and instructions that will help you achieve years of dependable performance. These instructions have been compiled from extensive field experience and engineering data. 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 illustrations and data used in this manual were current at the time of printing but, due to possible inline production changes, your machine may vary slightly in detail. We reserve the right to redesign and change the machines as may be necessary without notification.

Throughout this manual, references are made to right and left directions. These are determined by standing behind the equipment facing the direction of forward travel. Blade rotation is clockwise (left wing) and counterclockwise (right wing and center section) as viewed from the top of the cutter.



### ¡LEA EL INSTRUCTIVO!

Si no lee Ingles, pida ayuda a alguien que si lo lee para que le traduzca las medidas de seguridad.

## 4 Introduction

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# SAFETY RULES



**ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**



Safety is a primary concern in the design and manufacture of our products. Unfortunately, our efforts to provide safe equipment can be wiped out by an operator's single careless act.

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

It has been said, "The best safety device is an informed, careful operator." We ask you to be that kind of operator.

## TRAINING

- **Safety instructions are important! Read all attachment and power unit manuals; follow all safety rules and safety decal information. (Replacement manuals and safety decals are available from your dealer. To locate your nearest dealer, check the Dealer Locator at [www.WoodsEquipment.com](http://www.WoodsEquipment.com), or in the United States and Canada call 1-800-319-6637.) Failure to follow instructions or safety rules can result in serious injury or death.**
- **If you do not understand any part of this manual and need assistance, see your dealer.**
- **Know your controls and how to stop engine and attachment quickly in an emergency.**
- **Operators must be instructed in and be capable of the safe operation of the equipment, its attachments, and all controls. Do not allow anyone to operate this equipment without proper instructions.**
- **Never allow children or untrained persons to operate equipment.**

## PREPARATION

- **Check that all hardware is properly installed. Always tighten to torque chart specifications unless instructed otherwise in this manual.**
- **Always wear relatively tight and belted clothing to avoid getting caught in moving parts. Wear sturdy, rough-soled work shoes and protective equipment for eyes, hair, hands, hearing, and head; and respirator or filter mask where appropriate.**
- **Make sure attachment is properly secured, adjusted, and in good operating condition.**

- **Make sure spring-activated locking pin or collar slides freely and is seated firmly in tractor PTO spline groove.**
- **Before putting equipment into service, check and adjust driveline length as instructed in Operator's Manual. Driveline must not bottom out or pull apart throughout the full range of the tractor hitch. Do not operate until driveline length is correct.**
- **Before starting power unit, check all equipment driveline guards for damage. Replace any damaged guards. Make sure all guards rotate freely on all drivelines. If guards do not rotate freely on drive-lines, repair and replace bearings before putting equipment into service.**
- **Power unit must be equipped with ROPS or ROPS cab and seat belt. Keep seat belt securely fastened. Falling off power unit can result in death from being run over or crushed. Keep foldable ROPS systems in "locked up" position at all times.**
- **Remove accumulated debris from this equipment, power unit, and engine to avoid fire hazard.**
- **Make sure all safety decals are installed. Replace if damaged. (See Safety Decals section for location.)**
- **Make sure shields and guards are properly installed and in good condition. Replace if damaged.**
- **A minimum 20% of tractor and equipment weight must be on the tractor front wheels when attachments are in transport position. Without this weight, front tractor wheels could raise up resulting in loss of steering. The weight may be attained with front wheel weights, ballast in tires, front tractor weights or front loader. Weigh the tractor and equipment. Do not estimate.**
- **Inspect and clear area of stones, branches, or other hard objects that might be thrown, causing injury or damage.**

## OPERATION

- **Only engage power when equipment is at ground operating level. Always disengage power when equipment is raised off the ground.**
- **Do not allow bystanders in the area when operating, attaching, removing, assembling, or servicing equipment.**
- **Keep bystanders away from equipment.**
- **Never direct discharge toward people, animals, or property.**

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*Safety 5*

# SAFETY RULES



**ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**



- Do not operate equipment while under the influence of alcohol or drugs.
- Operate only in daylight or good artificial light.
- Keep hands, feet, hair, and clothing away from equipment while engine is running. Stay clear of all moving parts.
- Always comply with all state and local lighting and marking requirements.
- Never allow riders on power unit or attachment.
- Power unit must be equipped with ROPS or ROPS cab and seat belt. Keep seat belt securely fastened. Falling off power unit can result in death from being run over or crushed. Keep foldable ROPS systems in “locked up” position at all times.
- Always sit in power unit seat when operating controls or starting engine. Securely fasten seat belt, place transmission in neutral, engage brake, and ensure all other controls are disengaged before starting power unit engine.
- Operate tractor PTO at 540 RPM. Do not exceed.
- Do not operate PTO during transport.
- Connect PTO driveline directly to power unit PTO shaft. Never use adapter sleeves or adapter shafts. Adapters can cause driveline failures due to incorrect spline or incorrect operating length and can result in personal injury or death.
- Look down and to the rear and make sure area is clear before operating in reverse.
- Use extreme care when working close to fences, ditches, other obstructions, or on hillsides.
- Do not operate or transport on steep slopes.
- Do not stop, start, or change directions suddenly on slopes.
- Use extreme care and reduce ground speed on slopes and rough terrain.
- Watch for hidden hazards on the terrain during operation.
- Stop power unit and equipment immediately upon striking an obstruction. Turn off engine, set parking brake, remove key, inspect, and repair any damage before resuming operation.
- Before performing any service or maintenance, disconnect driveline from tractor PTO.
- Before dismounting power unit or performing any service or maintenance, follow these steps: disengage power to equipment, lower the 3-point hitch and all raised components to the ground, operate valve levers to release any hydraulic pressure, set parking brake, stop engine, remove key, and unfasten seat belt.
- Never go underneath equipment (lowered to the ground or raised) unless it is properly blocked and secured. Never place any part of the body underneath equipment or between moveable parts even when the engine has been turned off. Hydraulic system leak down, hydraulic system failures, mechanical failures, or movement of control levers can cause equipment to drop or rotate unexpectedly and cause severe injury or death. Follow Operator’s Manual instructions for working underneath and blocking requirements or have work done by a qualified dealer.

## MAINTENANCE

- Service and maintenance work not covered in OWNER SERVICE must be done by a qualified dealership. Special skills, tools, and safety procedures may be required. Failure to follow these instructions can result in serious injury or death.
- Before performing any service or maintenance, disconnect driveline from tractor PTO.
- Before dismounting power unit or performing any service or maintenance, follow these steps: disengage power to equipment, lower the 3-point hitch and all raised components to the ground, operate valve levers to release any hydraulic pressure, set parking brake, stop engine, remove key, and unfasten seat belt.
- Never go underneath equipment (lowered to the ground or raised) unless it is properly blocked and secured. Never place any part of the body underneath equipment or between moveable parts even when the engine has been turned off. Hydraulic system leak down, hydraulic system failures, mechanical failures, or movement of control levers can cause equipment to drop or rotate unexpectedly and cause severe injury or death. Follow Operator’s Manual instructions for working underneath and blocking requirements or have work done by a qualified dealer.

# SAFETY RULES



**ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**



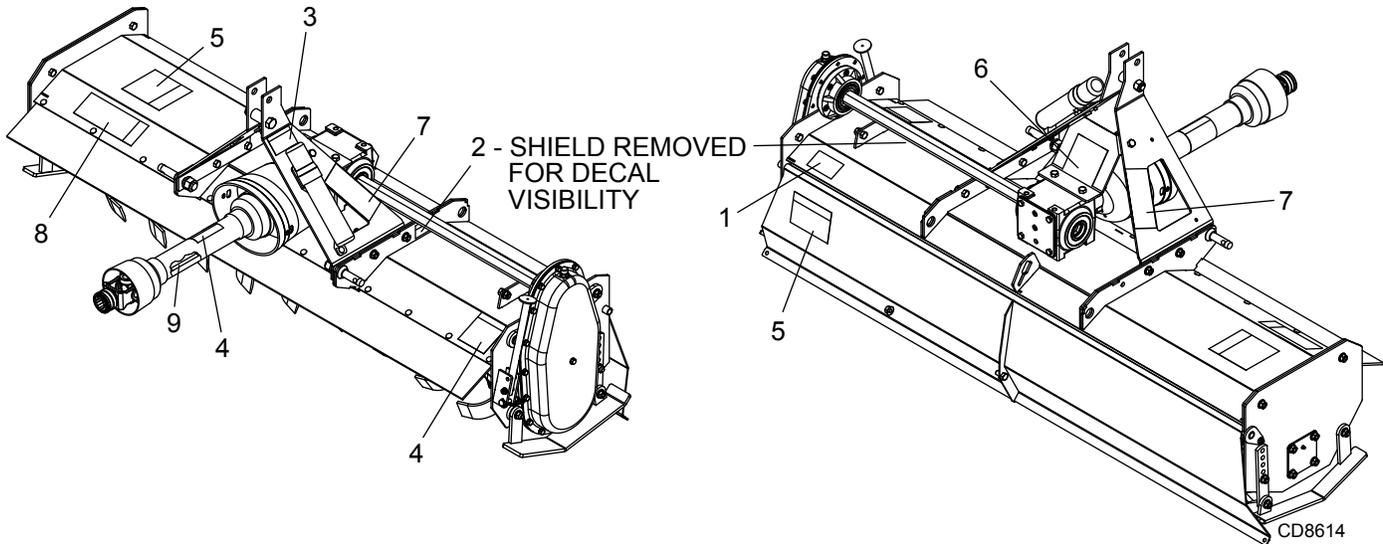
- Do not modify or alter or permit anyone else to modify or alter the equipment or any of its components in any way.
- Your dealer can supply original equipment hydraulic accessories and repair parts. Substitute parts may not meet original equipment specifications and may be dangerous.
- Always wear relatively tight and belted clothing to avoid entanglement in moving parts. Wear sturdy, rough-soled work shoes and protective equipment for eyes, hair, hands, hearing, and head.
- Do not allow bystanders in the area when operating, attaching, removing, assembling, or servicing equipment.
- Make sure attachment is properly secured, adjusted, and in good operating condition.
- Never perform service or maintenance with engine running.
- Keep all persons away from operator control area while performing adjustments, service, or maintenance.
- Tighten all bolts, nuts, and screws to torque chart specifications. Check that all cotter pins are installed securely to ensure equipment is in a safe condition before putting unit into service.
- Make sure all safety decals are installed. Replace if damaged. (See Safety Decals section for location.)
- Make sure shields and guards are properly installed and in good condition. Replace if damaged.
- Use a suitable lifting device of sufficient capacity. Use adequate personnel to handle heavy components.

## STORAGE

- Follow manual instructions for storage.
- Keep children, bystanders and animals away from equipment and storage area.

# SAFETY & INSTRUCTIONAL DECALS

**⚠ ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED! ⚠**  
**Replace Immediately If Damaged!**



1 - SERIAL NUMBER PLATE



2 - PN 18868



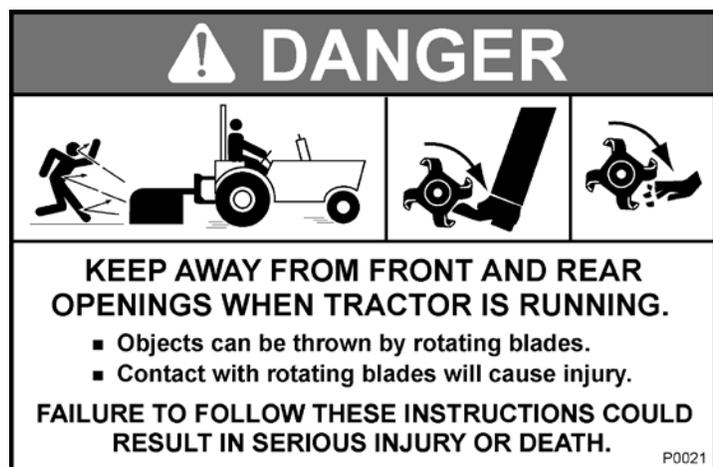
3 - PN 18866



4 - PN 18864



5 - PN P0021



# SAFETY & INSTRUCTIONAL DECALS



**ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**



**Replace Immediately If Damaged!**

6 - PN 55122

**⚠ WARNING**

**TO AVOID SERIOUS INJURY OR DEATH:**

- Read Operator's Manual before operating, servicing or repairing equipment. Follow all safety rules and instructions. (Manuals are available from dealer or call 1-800-319-6637.)
- Operate from tractor seat only.
- Lower equipment to ground, stop engine, remove key and set brake before dismounting tractor.
- Never allow children or untrained persons to operate equipment.
- Never allow riders.
- Keep bystanders away from equipment during operation.
- Keep all shields in place and in good condition.
- Do not transport towed or semi-mounted units over 20 mph (30 km/h).

**FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH.** 55122 AE

7 - PN 1002941

**⚠ WARNING**

**CRUSHING AND PINCHING HAZARD**

- Be extremely careful handling various parts of the machine. They are heavy and hands, fingers, feet, and other body parts could be crushed or pinched between tractor and implement.
- Operate tractor controls from tractor seat only.
- Do not stand between tractor and implement when tractor is in gear.
- Make sure parking brake is engaged before going between tractor and implement.
- Stand clear of machine while in operation or when it is being raised or lowered.

**FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS INJURY OR DEATH.** 1002941-A

8 - PN 1004299

**⚠ WARNING**

**FALLING OFF CAN RESULT IN BEING RUN OVER.**

- Tractor must be equipped with ROPS (or ROPS CAB) and seat belt. Keep foldable ROPS systems in "locked up" position at all times.
- Buckle Up! Keep seat belt securely fastened.
- Allow no riders.

**RAISED IMPLEMENT CAN DROP AND CRUSH.**

- Never go underneath raised implement which can drop from equipment or tractor 3-point hitch hydraulic leak down, hydraulic system failures, movement of control levers, or mechanical linkage failures.
- Service work does not require going underneath implement. Read manual instructions.

**FALLING OFF OR GOING UNDERNEATH IMPLEMENT CAN RESULT IN SERIOUS INJURY OR DEATH.** 1004299

9 - PN 33347

**⚠ DANGER**

**GUARD MISSING. DO NOT OPERATE.**

**⚠ DANGER**

**GUARD MISSING. DO NOT OPERATE.**

33347

**⚠ DANGER**

## BE CAREFUL!

Keep safety decals clean and visible.

Use a clean, damp cloth to clean safety decals.

Avoid spraying too close to decals when using a pressure washer; high-pressure water can enter through very small scratches or under edges of decals causing them to peel or come off.

Replace safety decals if they are missing or illegible.

Replacement safety decals can be ordered free from your Woods dealer, or in the United States and Canada call 1-800-319-6637.

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Safety 9

# OPERATION

The RT rotary tiller is designed for completion of plowing operations and seedbed preparation. It breaks up clods, levels the soil surface, destroys weeds, and mixes in fertilizer. Refer to the information in this manual for the specifications, parts, assemblies, and adjustments.

The operator is responsible for the safe operation of this rotary tiller. The operator must be properly trained. Operators should be familiar with the tractor, tiller, and all safety practices before starting operation. Read the safety rules and safety decals on page 5 through page 9.

## WARNING

- **Safety instructions are important! Read all attachment and power unit manuals; follow all safety rules and safety decal information. (Replacement manuals and safety decals are available from your dealer. To locate your nearest dealer, check the Dealer Locator at [www.WoodsEquipment.com](http://www.WoodsEquipment.com), or in the United States and Canada call 1-800-319-6637.) Failure to follow instructions or safety rules can result in serious injury or death.**
- **Power unit must be equipped with ROPS or ROPS cab and seat belt. Keep seat belt securely fastened. Falling off power unit can result in death from being run over or crushed. Keep foldable ROPS system in “locked up” position at all times.**
- **Do not allow bystanders in the area when operating, attaching, removing, assembling, or servicing equipment.**
- **Never allow children or untrained persons to operate equipment.**
- **Never go underneath equipment (lowered to the ground or raised) unless it is properly blocked and secured. Never place any part of the body underneath equipment or between moveable parts even when the engine has been turned off. Hydraulic system leak down, hydraulic system failures, mechanical failures, or movement of control levers can cause equipment to drop or rotate unexpectedly and cause severe injury or death. Follow Operator’s Manual instructions for working underneath and blocking requirements or have work done by a qualified dealer.**
- **Before dismounting power unit or performing any service or maintenance, follow these steps: disengage power to equipment, lower the 3-point hitch and all raised components to the ground, operate valve levers to release any hydraulic pressure, set parking brake, stop engine, remove key, and unfasten seat belt.**

- **Make sure spring-activated locking pin or collar slides freely and is seated firmly in tractor PTO spline groove.**
- **Operate tractor PTO at 540 RPM. Do not exceed.**
- **Make sure attachment is properly secured, adjusted, and in good operating condition.**

## ATTACHING ROTARY TILLER TO TRACTOR

1. Move the tractor into position in front of the tiller. Move back slowly and carefully, not allowing anyone to be between the tractor and the tiller.
2. Turn off tractor engine.
3. Place the two lower arms of the 3-point hitch over outer hitch pins. Secure with klik pin. (not provided).
4. Attach the tractor center link to the upper hitch point of the rotary tiller. Adjust the length of the center link until the tops of the frame ends are parallel to the ground.
5. Adjust the tractor lower 3-point arm anti-sway devices to prevent tiller from swinging side to side during transport.
6. Attach the front PTO driveline from the rotary tiller to the tractor. (Slide the front section of the PTO driveline into the back section. Slide the PTO shaft onto the rear PTO output of the tractor).

## **NOTICE**

- **If the PTO driveline is too long, severe driveline and gearbox damage is possible when hooking up the PTO driveline from the rotary tiller to the tractor. The front PTO driveline is long enough to fit a variety of tractors. It is possible that the front PTO driveline will need to be cut. There will be NO benefit by cutting only one telescoping section. Both sections of the driveline must be cut. DO NOT FORCE THE PTO TO FIT.**
- **WARRANTY IS VOID IF THE PTO DRIVELINE IS TOO LONG, resulting in gearbox, PTO, yoke or cross bearing damage.**

**NOTE:** The PTO driveline, when attached to the tractor and gearbox, must not extend so there is less than four inches of overlap within the PTO driveline.

7. Raise park stand and secure in operating position.



**Figure 1.** Park Stand - Operating Position



**Figure 2.** Park Stand - Storage Position

## **DRIVELINE ATTACHMENT**

Attach the rotary tiller to the tractor 3-point hitch (or quick hitch if available). Do not attach driveline. Raise and lower the tiller to determine maximum and minimum distance between the tractor PTO shaft and the gearbox input shaft. If the distance is too large, the driveline will be too short for proper engagement. If the distance is too small, the driveline may bottom out in operation and damage the tiller or tractor.

If the driveline is too short, please call your Woods dealer for a longer driveline.

If the driveline is too long, please follow the instructions for shortening the driveline.

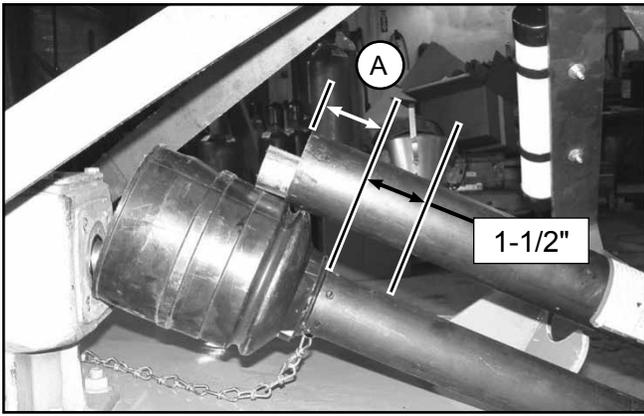
## **SHORTENING DRIVELINE**

1. Move the tiller up and down to get the shortest possible distance between tractor PTO shaft and gearbox input shaft. Leave the tiller in the minimum distance position. Install jack stands under the tiller for support.
2. Separate the driveline into two halves and connect them to the tractor and the gearbox.
3. Place driveline halves parallel to one another to determine how much to shorten the driveline.



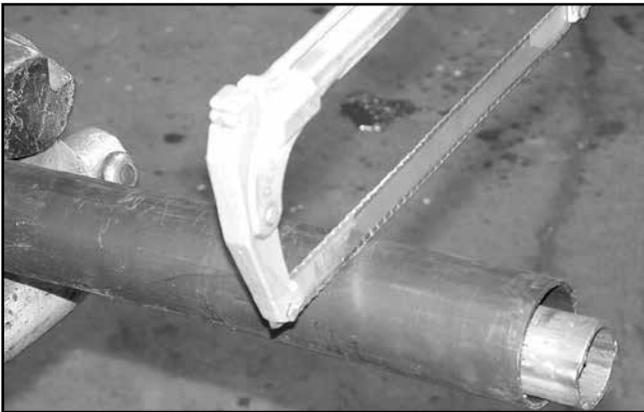
**Figure 3.** Drive Halves Placed Parallel

4. Measure from end of the upper shield to the base of the bell on the lower shield (A). Add 1-1/2" to dimension (A).



**Figure 4.** Determine Shield Length

- Cut the upper shield to this overall dimension.



**Figure 5.** Cut Shield

- Place the cut portion of the shield against the end of the shaft and use as a guide. Mark and cut the shaft.



**Figure 6.** Cut Shaft to Length

- Repeat step 6 for the other half of the drive.
- File and clean the cut ends of both drive halves. Ensure the drive halves slide smoothly together.

Do not run the tractor if proper driveline engagement cannot be obtained through these methods.

Connect the driveline to tractor PTO shaft, making sure the spring-activated locking collar slides freely and locks driveline to PTO shaft.

## NOTICE

- If attaching with quick hitch, the distance between the tractor PTO and gearbox input shaft will increase. Please follow the steps as you would for a 3-point hitch to insure proper engagement.

## WORKING DEPTH ADJUSTMENT

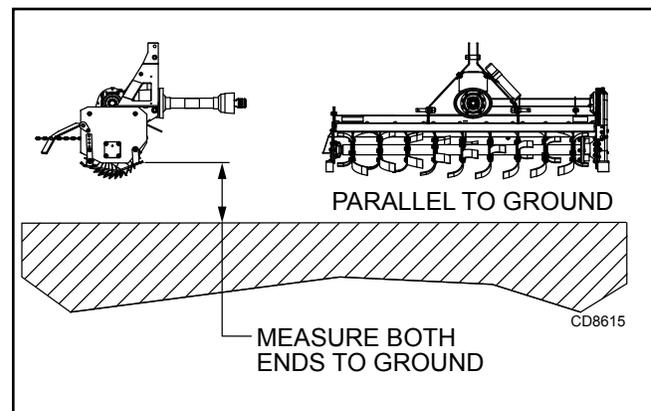
### ⚠ WARNING

- Keep all persons away from operator control area while performing adjustments, service, or maintenance.

- Raise the tiller off the ground.
- Level tiller side to side. Check by measuring from the forward skid shoe pivot to the ground on each side. (Figure 7)
- Adjust, using tractor 3-point arm leveling device.

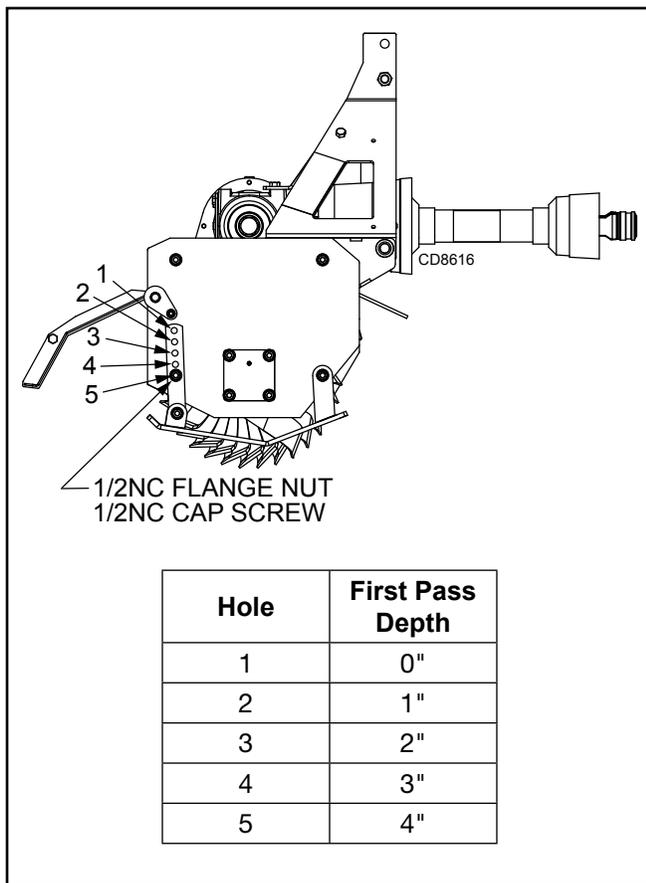
**NOTE:** Keep the front of the tiller parallel to the ground.

- Place two jack-stands under the tiller rotor shaft.



**Figure 7.** Leveling the Tiller

- Loosen the 1/2" cap screws that act as the front pivots to the skid shoes. Remove the 1/2" cap-screws (46) that hold the rear of the skid shoes to the tiller frame.
- Adjust the skid shoe to the desired tilling depth (Figure 8). Reinstall the cap screws in the rear of the skid shoe and tighten all cap screws.



**Figure 8.** Tiller Depth Adjustment

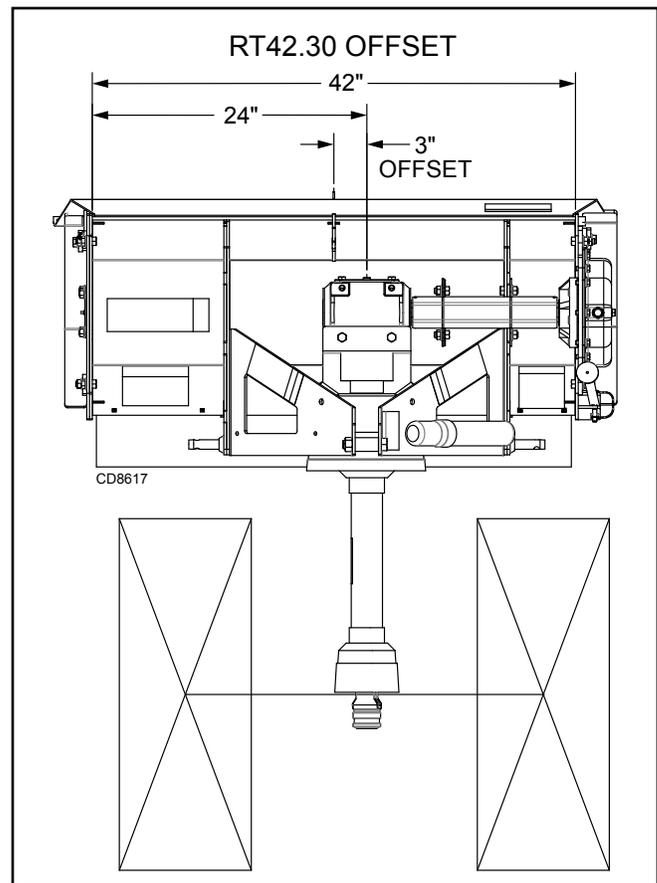
**NOTE:** Tillage depth is dependent on ground hardness, tractor speed, skid shoe setting, and tractor hitch adjustment. Multiple passes may be necessary to achieve tillage depth.

### **TILLER OFFSET**

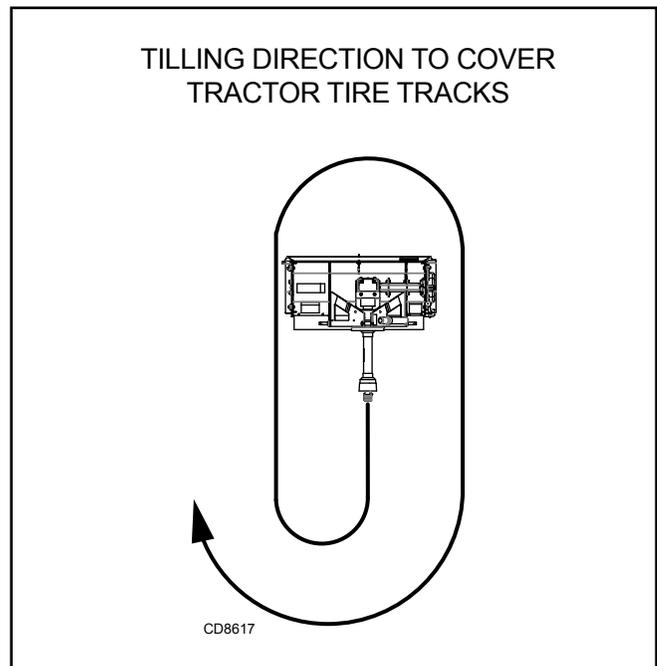
The RT tillers come with a fixed gearbox offset, so that the tiller can cover a tractor tire width larger than its width. The offset is to the right as sitting in the tractor seat. By tilling in a clockwise rotation, tire tracks can be reduced or eliminated. Below is a chart which outlines the tractor width that can be paired with a tiller.

| Tiller Model | Offset | Covered Width |
|--------------|--------|---------------|
| RT42.30      | 3"     | 48"           |
| RT48.30      | 3"     | 54"           |
| RT60.40      | 2.25"  | 64.5"         |
| RT72.40      | 2.25"  | 76.5"         |

**Figure 9.** Tiller Offset Chart



**Figure 10.** Tiller Offset



**Figure 11.** Tilling Direction

## OPERATING PROCEDURE

### **⚠ WARNING**

- **Only engage power when equipment is at ground operating level. Always disengage power when equipment is raised off the ground.**

Read and understand the rotary tiller and tractor operator's manuals before operating the tiller. Failure to do so may result in death, serious personal injury or property damage.

Never raise the tiller more than a few inches off the ground when traveling from job site to job site.

Shut off the engine, set brake, remove key and remove seat belt. Dismount the tractor.

### Tractor Stability

### **⚠ WARNING**

- **A minimum 20% of tractor and equipment weight must be on the tractor front wheels when attachments are in transport position. Without this weight, tractor could tip over, causing personal injury or death. The weight may be attained with a loader or front tractor weights. Weigh the tractor and equipment. Do not estimate.**

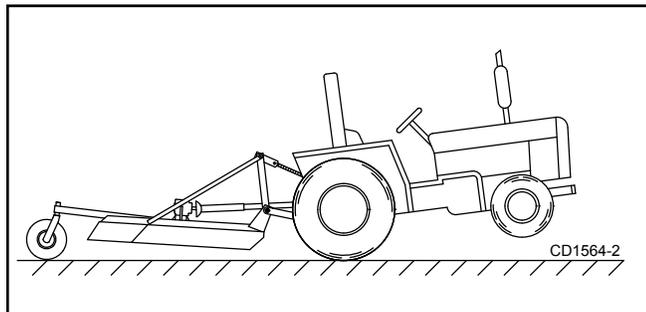


Figure 12. Tractor Stability (Typical)

### Clutch Run-In

Clutch run-in must be done prior to initial use and before each season or whenever tiller has been setting idle for more than two months. See Slip Clutch Adjustment page 18 for the run-in procedure.

After you have completed the run-in of the clutch, return to the operating instructions and proceed with start-up. Failure to run the clutch in could result in premature driveline failure and warranty will be voided.

### Start-Up Sequence

1. Start tractor engine.
2. Lower tiller slowly, nearly to the ground.
3. Engage tractor PTO.
4. Lower the tiller completely to the ground.
5. Increase engine rpm to normal operating speed of 540 rpm.
6. Move tractor forward. Select a slow tractor speed and increase slightly until operation is satisfactory.

### Rear Shield Adjustment

The rotary tiller tailgate can be adjusted to control the tith of the soil. The finest finish is achieved with the tailgate at the lowest adjustment. As the tailgate is raised, or adjusted up, the finish of the soil will become more coarse. Raising the tailgate reduces the amount of recirculation that occurs to the soil inside the tiller housing. If the soil conditions are very rocky, the tailgate should be run in a raised position so rocks may pass through the tiller more quickly.

### **NOTICE**

- **Do not drop tiller to the ground with the rotor turning. Sudden high speed jolts multiply stress to the driveline and can cause extreme damage.**

## OPERATING TECHNIQUES

### Tilling Sod and Untilled Ground

For tearing up untilled sod or conditioning compacted soils, several shallow passes will be most productive. Set the skid shoes to one of the two most shallow positions. A gear should be selected on the tractor for a slow travel speed. Progressive passes can be done at progressively faster speeds.

### **NOTICE**

- **After tilling for the first half hour, check for loose blades and retighten any loose hardware. Follow the shutdown procedure and blocking method before checking blades.**

### Previously Tilled Ground

To pulverize the topsoil and prepare a good seedbed, set the skid shoes for a tilling depth equivalent to your deepest roots. Adjust the tailgate to the fully lowered position. A tractor gear should be selected such that the tiller does not lug the engine.

## **PRE-OPERATION CHECKLIST**

### **(OWNER'S RESPONSIBILITY)**

- \_\_\_\_\_ Review and follow all safety rules and safety decal instructions on pages 5 through 9.
- \_\_\_\_\_ Check that all safety decals are installed and in good condition. Replace if damaged.
- \_\_\_\_\_ Check that all shields and guards are properly installed and in good condition. Replace if damaged.
- \_\_\_\_\_ Check that all hardware is properly installed and secured.
- \_\_\_\_\_ Check that equipment is properly and securely attached to tractor.
- \_\_\_\_\_ Before starting tractor, check all equipment driveline guards for damage and make sure they rotate freely on all drivelines. Replace any damaged guards. If guards do not rotate freely on drivelines, repair and replace bearings before operating.
- \_\_\_\_\_ Do not allow riders.
- \_\_\_\_\_ Make sure driveline spring-activated locking collar slides freely and is seated firmly in tractor PTO spline groove.
- \_\_\_\_\_ Keep all bystanders away from equipment working area.
- \_\_\_\_\_ Check all lubrication points and grease as instructed in the Lubrication Maintenance illustration, page 17.
- \_\_\_\_\_ Make sure tractor ROPS or ROPS CAB and seat belt are in good condition. Keep foldable ROPS systems in "locked up" position at all times. Keep seat belt securely fastened during operation.
- \_\_\_\_\_ Check to be sure gear lube runs out of the small check plug on the side of each gearbox.
- \_\_\_\_\_ Check the condition of the tiller blades. Replace any blades that are broken or excessively worn.
- \_\_\_\_\_ Check for objects that may be wound around the tiller rotor shaft. Objects like wire, string, tall grass and weeds can build up on the rotor shaft and affect tiller operation.

# OWNER SERVICE

The information in this section is written for operators who possess basic mechanical skills. If you need help, your dealer has trained service technicians available. For your protection, read and follow the safety information in this manual.

## WARNING

- Keep all persons away from operator control area while performing adjustments, service, or maintenance.
- Make sure shields and guards are properly installed and in good condition. Replace if damaged.
- Make sure all safety decals are installed. Replace if damaged. (See Safety Decals section for location.)

## CAUTION

- If you do not understand any part of this manual and need assistance, see your dealer.
- Always wear relatively tight and belted clothing to avoid entanglement in moving parts. Wear sturdy, rough-soled work shoes and protective equipment for eyes, hair, hands, hearing, and head; and respirator or filter mask where appropriate.

## BLOCKING METHOD

## WARNING

- Before performing any service or maintenance, disconnect driveline from tractor PTO.
- Before dismounting power unit or performing any service or maintenance, follow these steps: disengage power to equipment, lower the 3-point hitch and all raised components to the ground, operate valve levers to release any hydraulic pressure, set parking brake, stop engine, remove key, and unfasten seat belt.
- Do not allow bystanders in the area when operating, attaching, removing, assembling, or servicing equipment.
- Never perform service or maintenance with engine running.
- Do not modify or alter or permit anyone else to modify or alter the equipment or any of its components in any way.

- Never go underneath equipment (lowered to the ground or raised) unless it is properly blocked and secured. Never place any part of the body underneath equipment or between moveable parts even when the engine has been turned off. Hydraulic system leak down, hydraulic system failures, mechanical failures, or movement of control levers can cause equipment to drop or rotate unexpectedly and cause severe injury or death. Follow Operator's Manual instructions for working underneath and blocking requirements or have work done by a qualified dealer.

To minimize the potential hazards of working underneath the tiller, follow these procedures.

1. Jack stands with a load rating of 500 lbs or more are the only approved blocking device for this tiller. Install a minimum of two jack stands under the tiller, while tiller is still attached to tractor 3-point hitch, before working underneath it.
2. Consider the overall stability of the blocked unit. Just placing jack stands underneath will not ensure your safety. The working surface must be level and solid to support the weight on the jack stands. Make sure the jack stands are stable, both top and bottom. Make sure the tiller is approximately level.
3. With the full weight of the tiller on the jack stands, test blocking stability before working underneath.
4. Set the brakes and remove key before working underneath.
5. Securely block rear tractor wheels, in front and behind. Tighten tractor lower 3-point arm anti-sway devices to prevent side-to-side movement.

Regular preventive maintenance and immediate repair of broken or worn parts will ensure maximum efficiency and long life.

Because of the nature of the jobs the rotary tiller does, the tiller is constantly vibrating and shaking. Parts may become loose during use. One of the most important functions an operator can perform is observing and inspecting the equipment for loose or worn parts to prevent further damage or excessive downtime.

## LUBRICATION INFORMATION

1. Do not let excess grease collect on or around parts, particularly when operating in sandy areas.
2. See Figure 13 for lubrication points and frequency of lubrication based on normal operating conditions. Severe or unusual conditions may require more frequent lubrication.
3. Use a lithium grease of #2 consistency with a MOLY (molybdenum disulfide) additive for all locations unless otherwise noted. Be sure to clean fittings thoroughly before attaching grease gun. Two good pumps of most guns is sufficient when the lubrication schedule is followed.

## PTO DRIVE LINES

Periodically check the yokes on front PTO. Make sure the bolts and nuts are tight and the yoke is not moving on the shaft. PTO shafts and U-joints should be sparingly lubricated monthly.

## QUALIFIED TECHNICIAN MAINTENANCE

### **Gearbox Lubrication**

The gearboxes should be checked quarterly to be sure that the oil level is maintained at half full. Use plug located halfway up back face of gearbox to check/fill oil. A high quality gear oil with a viscosity index of 80W or 90W and an API service rating of GL-4 or -5 is recommended for use in the gearboxes. Oil should be changed after the first 30 hours or 30 days of operating; then checked regularly for leakage. In the case of seasonal usage, it is best to change the oil at the end of the season to remove moisture and corrosive contaminants.

Use a 5/16" Allen wrench to remove fill plug.

### **Bearing Lubrication**

Lubrication of the bearings will vary considerably with conditions. As a rule, bearings should be under-lubricated rather than over-lubricated. Over-lubrication can cause seals to blow out.

## **NOTICE**

- **Replacement bearings should be only high quality original equipment bearings for longer life.**

Install new complete bearing housing if needed or just replace the bearing insert. The shafts should be straight, free of burrs, and up to size. If shaft is worn, replace it prior to completing assembly.

## **Bearing and Shaft Service**

1. Place tiller on level, dry surface and block tiller. (See Blocking Method).
2. Support rotor shaft with blocking or strap so that bearing assembly does not support weight of rotor.
3. Remove 1/2" flange lock nuts from bearing cover, gasket and external snap ring from shaft.
4. End plate may be removed from frame to repair or replace bearing assembly by removing top two 1/2" flange lock nuts and bolts.
5. Replace inside gasket, bearing assembly, bearing, internal snap ring, or double lip seal as needed.
6. Install bearing assembly on shaft locking into place with external snap ring.
7. Install inside gasket and end plate onto bearing and main frame with top two 1/2" bolts and nuts and bolts in bearing assembly.
8. Place outside gasket and bearing cover over end-plate and bolts with 1/2" flange lock nuts tightened into place.
9. Add grease into bearing cavity so that it is half filled. (Approximately 40 pumps)

## **Driveline Lubrication**

1. Lubricate the driveline slip joint every 8 hours of operation. Failure to maintain proper lubrication could result in damage to u-joints, gearbox, and driveline.
2. Lower tiller to ground, disconnect driveline from tractor PTO shaft, and slide halves apart. Do not disconnect the halves from each other.
3. Apply a bead of grease completely around male half where it meets female half. Slide drive halves over each other several times to distribute grease.
4. Apply one pump of grease to each driveline u-joint grease fitting.
5. Apply one pump of grease to each of the plastic driveline shield bearings.

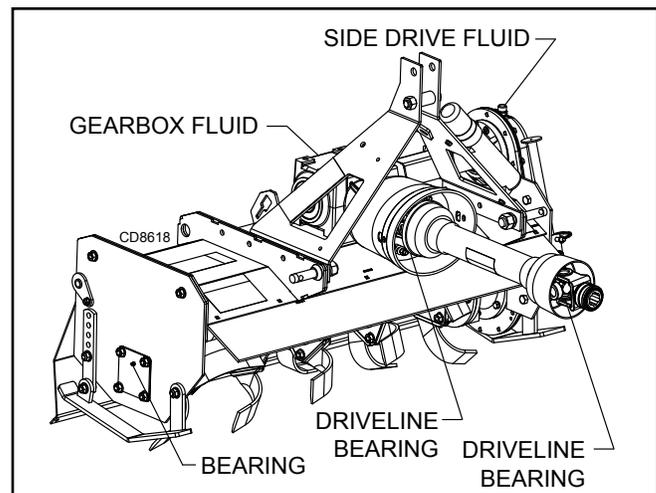


Figure 13. Lubrication Points

## Slip Clutch Adjustment

1. Turn off tractor engine and remove key.
2. Loosen nuts on springs until the springs can rotate freely, yet remain secure on the bolts.
3. Mark outer plates of slip-disc clutch as shown in Figure 14.
4. Securely attach implement to the tractor and start the tractor.
5. Engage PTO for several seconds then quickly disengage it.
6. Turn tractor off and remove key.
7. The friction lining plates should have "slipped", or moved. Check the marks placed on the outer plates of the slip-disc clutch in step 3 to make sure this is the case.
8. If clutch does not slip, check assembly for oil, grease and debris. Clean if necessary.
9. Reassemble clutch and tighten bolts no more than 1/8 of a turn at a time until desired compressed spring length.
10. If excessive slippage continues, check lining plates for excessive wear. They are .12" thick for the 42 and 48 inch tillers and .14 thick for the 60 and 72 inch tillers. They should be replaced when there is only .05" thickness left to ensure proper operation.

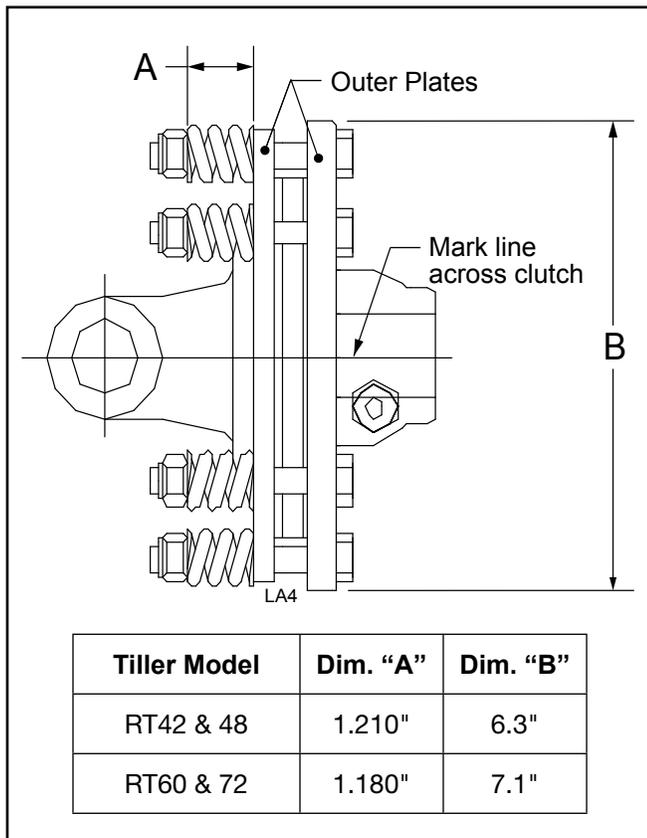


Figure 14. Slip Clutch Adjustment

## CLEANING

### After Each Use

- Remove large debris such as clumps of dirt, grass, crop residue, etc. from machine.
- Inspect machine and replace worn or damaged parts.
- Replace any safety decals that are missing or not readable.

### Periodically or Before Extended Storage

- Clean large debris such as clumps of dirt, grass, crop residue, etc. from machine.
- Remove the remainder using a low-pressure water spray.
  1. Be careful when spraying near scratched or torn safety decals or near edges of decals as water spray can peel decal off surface.
  2. Be careful when spraying near chipped or scratched paint as water spray can lift paint.
  3. If a pressure washer is used, follow the advice of the pressure washer manufacturer.
- Inspect machine and replace worn or damaged parts.
- Sand down scratches and the edges of areas of missing paint and coat with Woods spray paint of matching color (purchase from your Woods dealer).
- Replace any safety decals that are missing or not readable (supplied free through your Woods dealer). See Safety Decals section for location drawing.
- See Safety Decals section for location drawing.

## **BLADE INSTALLATION**

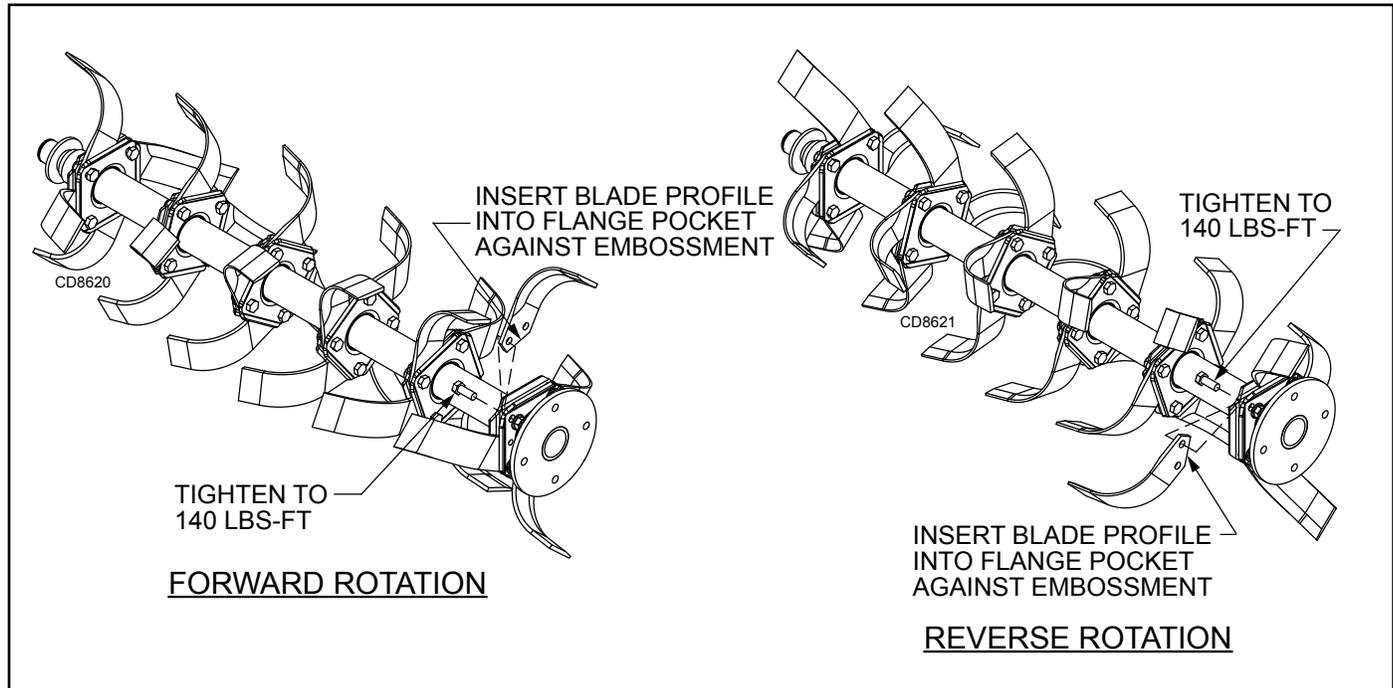
### **Four Blade Installation**

1. Remove any burrs on flanges generated from blades that have slipped.
2. Start blade assembly with first blade installed next to rotor shaft flange.

**NOTE:** Blade cutting edges should face the direction of rotation.

3. Install blade inside flange pocket with blade hole closest to end matching holes in flanges.

4. Install bolt through flange, blade, flange, and nut but do not tighten completely.
5. Rotate blade backwards until blade profile is seated on flange embossments in the flange pockets.
6. Tighten bolted joint to 140 lbs-ft.
7. Proceed by installing next blade of the same part number in next flange.
8. Repeat steps 2-7 installing opposite hand blade in next flange hole until all four rows of blades are installed.



**Figure 15.** Four Blade Forward & Reverse Rotation Blade Installation

# TROUBLESHOOTING

| PROBLEM                         | POSSIBLE CAUSE  | SOLUTION  |
|---------------------------------|---|---|
| Rotor will not turn.            | Tractor PTO not engaged.<br><br>Clutch friction discs worn.<br><br>Obstruction between rotor and frame.<br><br>Gearbox damaged.                                 | Check control lever or tractor manual for resetting PTO.<br><br>Check and replace.<br><br>Check and clear obstruction.<br><br>Check that output shaft rotates.  |
| Tiller won't cut.               | Skid shoes set too shallow.<br><br>Blade orientation does not match tiller rotation.  | Raise skid shoes one hole.<br><br>Reverse all blades.   |
| Tiller stalls when tilling.     | Skid shoes set too deep.  | Lower skid shoes one hole.  |
| Tilled soil is too fine.        | Too much regrinding.  | Raise tailgate or increase travel speed.  |
| Tilled soil is too coarse.      | Too little regrinding.  | Lower tailgate or decrease travel speed.  |
| Grass and Weeds wrapping rotor. | Grass too tall.<br><br>Tiller not level.  | Mow grass before tilling.<br><br>Adjust top link of 3-point hitch.  |
| Oil leaks.                      | Worn or damaged seal.<br><br>Loose or damaged hoses or connections.<br><br>Worn or damaged housing.<br><br>Breather leaking<br><br>Wrong type of oil installed. | Inspect and replace.<br><br>Check for leaks and repair or replace.<br><br>Inspect and replace if required.<br><br>Turn breather hole, check oil level.<br><br>Check specification chart for proper oil grade. |
| Excessive Noise                 | Rotor blade hardware is loose or missing<br><br>Hex shaft shield  | Tighten loose blade hardware.<br>Replace missing blade hardware.<br><br>Check for axial clearance between gearboxes and hex shield ends.  |

# DEALER SERVICE

The information in this section is written for dealer service personnel. The repair described here requires special skills and tools. If your shop is not properly equipped or your mechanics are not properly trained in this type of repair, you may be time and money ahead to replace complete assemblies.

## ⚠ WARNING

- Before working underneath, disconnect drive-line, raise cutter, lock in transport position, and block cutter securely. Hydraulic system leak down and failure of mechanical or hydraulic system can cause equipment to drop.
- Keep all persons away from operator control area while performing adjustments, service, or maintenance.

## ⚠ CAUTION

- Always wear relatively tight and belted clothing to avoid getting caught in moving parts. Wear sturdy, rough-soled work shoes and protective equipment for eyes, hair, hands, hearing, and head; and respirator or filter mask where appropriate.

## GEARBOX MAINTENANCE

**NOTE:** Read this entire section before starting any repair. Many steps are dependent on each other.

1. Fill gearbox with SAE 80W or 90W gear lube until it runs out the side level plug.

**NOTE:** Repair to this gearbox is limited to replacing bearings, seals, and gaskets. Replacing gears, shafts, and a housing is not cost effective. Purchasing a complete gearbox is more economical.

2. Inspect gearbox for leakage and bad bearings. Leakage is a very serious problem and must be corrected immediately. Bearing failure is indicated by excessive noise and side-to-side or end-play in gear shafts.

## Seal Replacement

Recommended sealant for gearbox repair is Permatex® Aviation 3D Form-A-Gasket or equivalent.

Leakage can occur at the horizontal gaskets and shaft seals. These can be repaired without removing the gearbox from the tiller.

## Seal Installation

**NOTE:** Proper seal installation is important. An improperly installed seal will leak.

1. Clean area in housing where seal outer diameter (OD) seats. Apply a thin coat of Permatex.
2. Inspect area of shaft where seal seats. Remove any burrs or nicks with an emery cloth.
3. Lubricate gear shaft and seal lips.
4. Place seal squarely on housing, spring-loaded lip toward housing. Select a piece of pipe or tubing with an OD that will sit on the outside edge of the seal but will clear the housing. Tubing with an OD that is too small will bow seal cage and ruin seal.
5. Carefully press seal into housing, avoiding distortion to the metal seal cage.

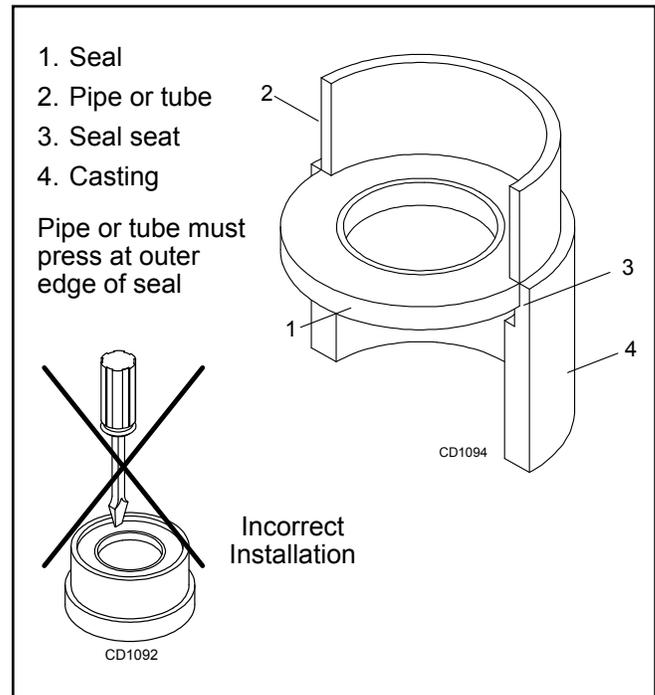


Figure 16. Seal Installation

## Input Shaft Repair

1. Disconnect and remove the driveline and driveline shield from the gearbox.
2. Remove drain plug and drain gear lube from the gearbox.
3. Remove mast plates from the tiller frame.
4. Remove shaft seal. Replace with new seal (see Seal Installation, page 21).

**NOTE:** Distortion to seal cage or damage to seal lip will cause seal to leak.

5. Reinstall drain plug and remove fill plug. Fill gearbox with SAE 80W or 90W gear lube until it runs out the level plug.
6. Follow the instructions 1-3 in reverse order for assembly.

## Output (Hollow) Shaft Repair

1. Disconnect and remove the driveline from the gearbox.
2. Remove drain plug and drain gear lube from the gearbox.
3. Remove the gearbox hex drive shield.
4. Remove internal snap ring and washer from gearbox end.
5. With the snap ring removed, the hex drive shaft can be removed through the side of the tiller gearbox.
6. The faulty shaft seal can be removed and replaced with a new seal (refer to Seal Installation, page 21).
7. Follow the instructions 1 through 5 in reverse order for reassembly.

## Side Drive Repair

1. Place tiller on jack stands and turn off tractor.
2. Remove top 1/2" breather.
3. Place oil catch basin underneath side drive and remove 16 - 3/8" bolts and washers.
4. Remove cover pan and retain gasket, inspecting it for cracks or tears.
5. Repair and replace as needed.
6. Follow the instructions 1 through 4 in reverse order for reassembly.

## UNIVERSAL JOINT REPAIR

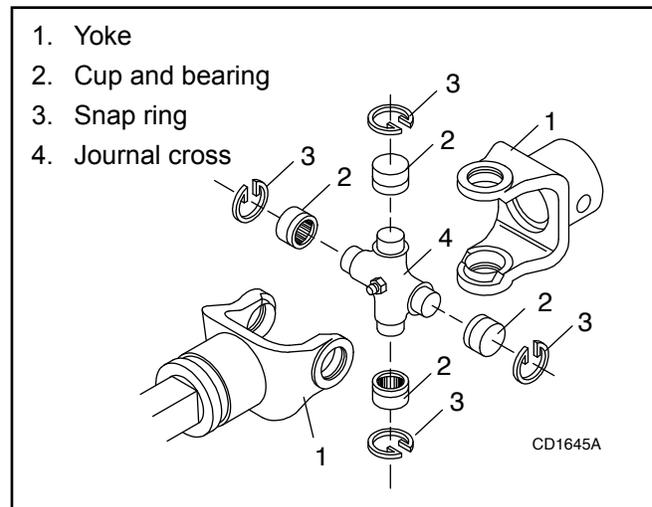


Figure 17. Universal Joint Parts Breakdown

## U-Joint Disassembly

1. Remove external snap rings from yokes in four locations as shown in Figure 18.

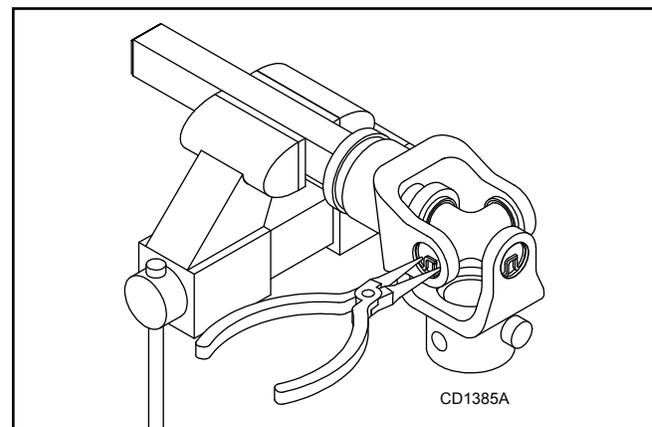


Figure 18. Remove Snap Ring

2. With snap rings removed, support drive in vise, hold yoke in hand and tap on yoke to drive cup up out of yoke. See Figure 19.

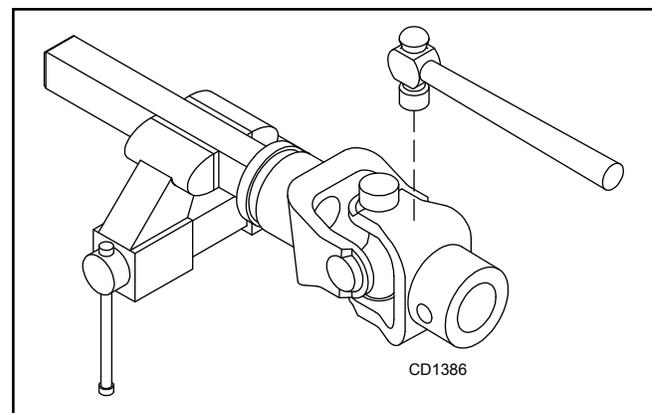
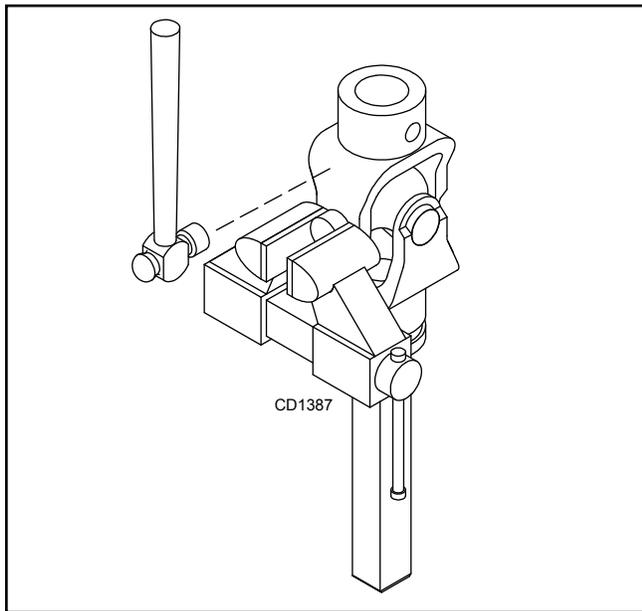


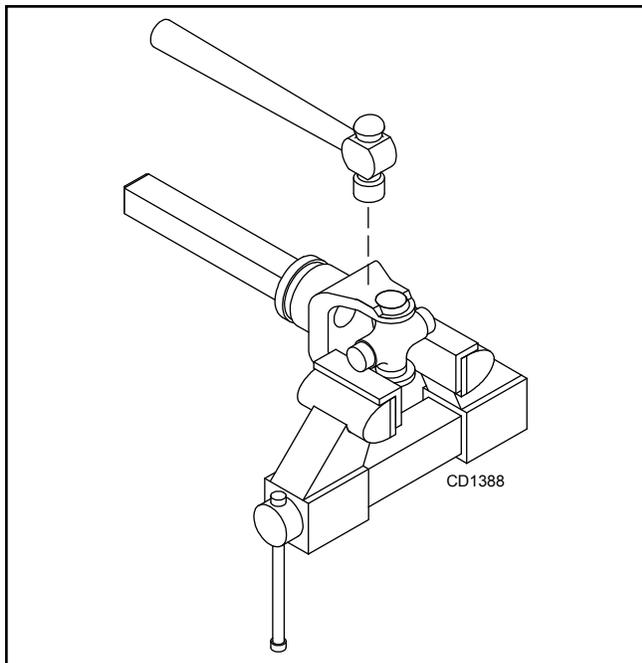
Figure 19. Remove Cups

3. Clamp cup in vise as shown in Figure 20 and tap on yoke to completely remove cup from yoke. Repeat Step 2 and Step 3 for opposite cup.



**Figure 20.** Remove Cups

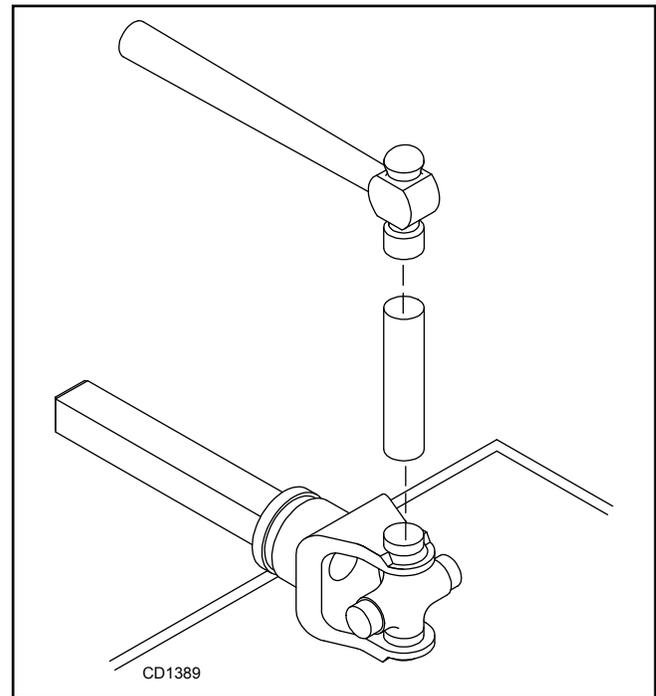
4. Place universal cross in vise as shown in Figure 21 and tap on yoke to remove cup. Repeat Step 3 for final removal. Drive remaining cup out with a drift and hammer.



**Figure 21.** Remove Cups

## U-Joint Assembly

1. Place seals securely on bearing cups. Insert cup into yoke from outside and press in with hand pressure as far as possible. Insert journal cross into bearing cup with grease fitting away from shaft. Be careful not to disturb needle bearings. Insert another bearing cup directly across from first cup and press in as far as possible with hand pressure.
2. Trap cups in vise and apply pressure. Be sure journal cross is started into bearings and continue pressure with vise, squeezing in as far as possible. Tapping the yoke will help.
3. Seat cups by placing a drift or socket (slightly smaller than the cup) on cup and rap with a hammer. See Figure 22. Install snap ring and repeat on opposite cup.
4. Repeat Step 1 and Step 2 to install remaining cups in remaining yoke.
5. Move both yokes in all directions to check for free movement. If movement is restricted, rap on yokes sharply with a hammer to relieve any tension. Repeat until both yokes move in all directions without restriction.



**Figure 22.** Install Cups

# ASSEMBLY

Assembly of this rotary tiller is the responsibility of the WOODS dealer. It should be delivered to the owner completely assembled, lubricated and adjusted for normal conditions.

## **⚠ WARNING**

- Do not allow bystanders in the area when operating, attaching, removing, assembling, or servicing equipment.
- Do not modify or alter or permit anyone else to modify or alter the equipment or any of its components in any way.

## **⚠ CAUTION**

- Always wear relatively tight and belted clothing to avoid getting caught in moving parts. Wear sturdy, rough-soled work shoes and protective equipment for eyes, hair, hands, hearing, and head; and respirator or filter mask where appropriate.

## **DEALER SET-UP INSTRUCTIONS**

The rotary tiller is shipped partially assembled. Assembly will be easier if components are aligned and loosely assembled before tightening hardware. See "Bolt Torque Chart" on page 38 for recommended torque values.

Complete the Pre-Delivery and Delivery Check Lists on page 26 when assembly is complete.

Select a suitable working area. Refer to illustrations, accompanying text, parts lists, and exploded view drawings.

For reference, front, back, left, and right directions are determined by sitting in the tractor operator's seat.

## **DISASSEMBLE SHIPPING UNIT**

It is advisable to have a mechanical lifting device to facilitate uncrating.

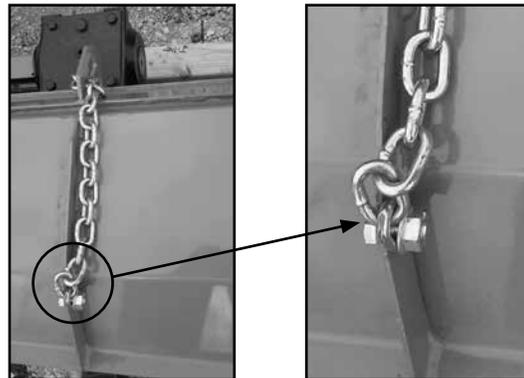
Be careful of nails in boards when uncrating.

1. Remove all parts that are wired and strapped to tiller and/or crate.
2. Remove top, sides, and ends of crate.
3. Remove front rubber shield from the bottom of the crate (reverse rotation models only).
4. Remove lag screws from L-shaped shipping brackets. Remove L-brackets from the tiller.
5. Remove tiller assembly from crate base.
6. Remove loose nails from boards and dispose of crate according to local codes.

## **ASSEMBLY PROCEDURES**

Required tools: 1/2", 9/16", 3/4", 1-1/8", and 13 mm combination wrenches, sockets, torque wrench, and jack stands.

1. Lower skid shoes to lowest position and stand tiller upright.
2. Lower park stand to support the front of the tiller with tiller sitting on the ground.
3. Install driveline shield (18) to gearbox input shaft using 8 mm bolts (38), 5/16 flat washers (39) and lock washers (40).
4. Install driveline (19) to gearbox input shaft. (Refer to page 11 for driveline attachment to tractor).
5. Attach mast plates (6 & 7) to tiller frame using 1/2 x 1-1/4 and 1/2 x 1-1/2 cap screws (45 & 46), and flange lock nuts (48). Attach gearbox mount (22) to gearbox with 1/2 x 1 cap screws (47). Secure to mast plates with 1/2 x 1 cap screws and 1/2 flange lock nuts.
6. Assemble Cat 1 quick hitch sleeve (56) between mast plates in lower hole in the top of mast plates. Secure with 3/4 x 3-1/2 cap screw (55) and lock nut (57).
7. Attach tailgate chain to tailgate using 1/2 x 1 cap screw (47) and flange lock nut (48). Thread the chain through the keyhole slot on the top of tiller frame. Secure the chain by sliding the desired link into the narrow portion of the keyhole slot.



**Figure 23.** Attaching Tailgate Chain

8. Attach front rubber shielding and clamp bars using 5/16 x 1 carriage bolts (52) and flange whiz nuts (42).
9. Fill both gearboxes with SAE 80W or 90W gear lube until it runs out the side level plug.
10. Use a 5/16" Allen wrench to remove the fill plug.

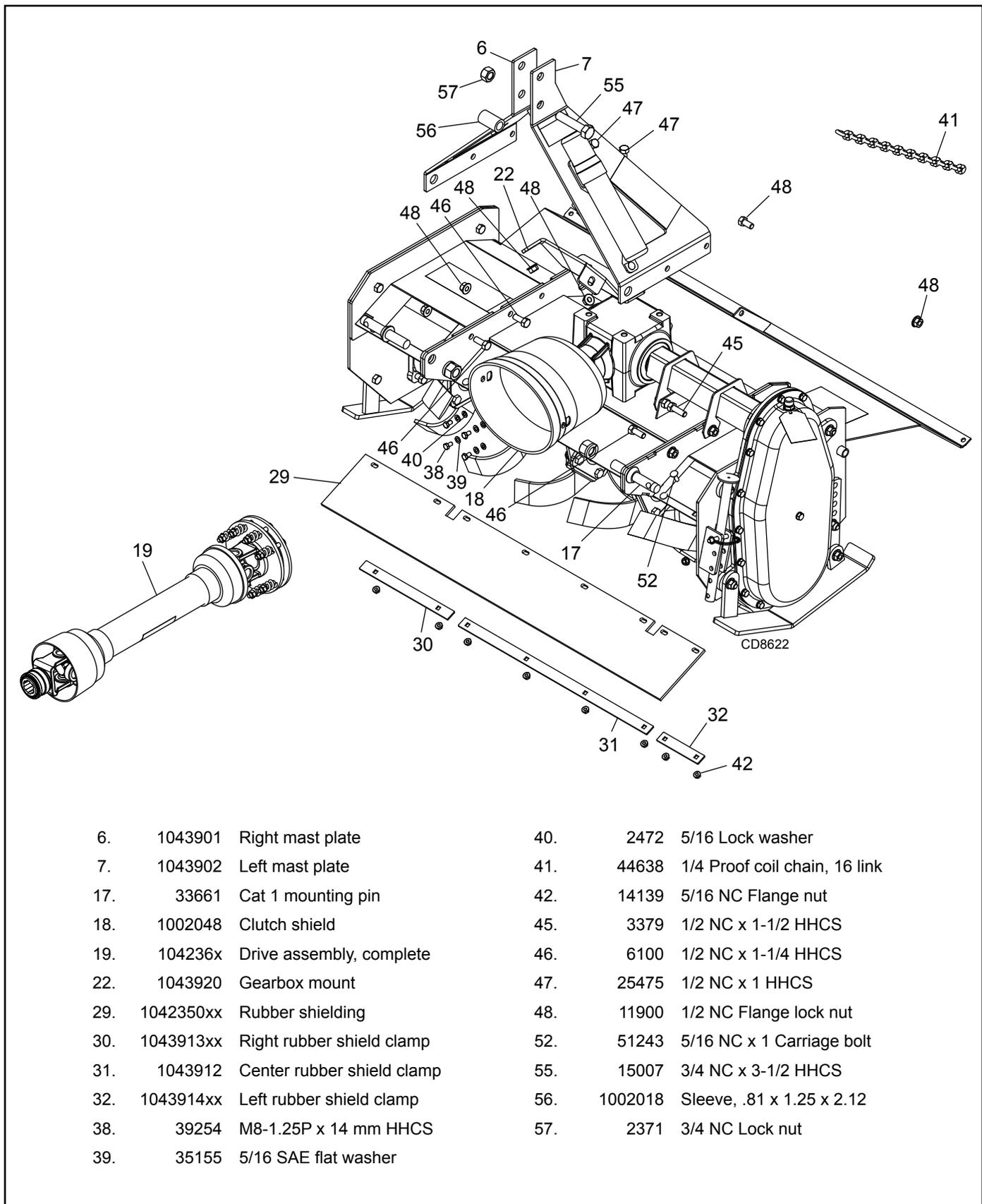


Figure 24 . Crate Assembly

# DEALER CHECKLISTS

## DEALER PRE-DELIVERY CHECKLIST

### (DEALER'S RESPONSIBILITY)

Inspect the equipment thoroughly after assembly to make sure it is set up properly before delivering it to the customer.

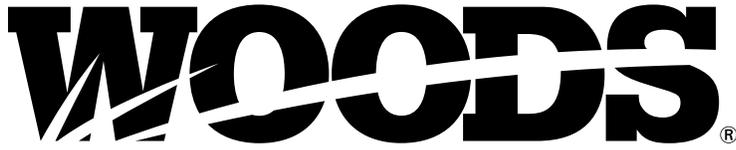
The following check list is a reminder of points to inspect. Check off each item as it is found satisfactory, corrections are made, or services are performed.

- \_\_\_\_\_ Check that all safety decals are installed and in good condition. Replace if damaged.
- \_\_\_\_\_ Check that all shields and guards are properly installed and in good condition. Replace if damaged.
- \_\_\_\_\_ Check all bolts to be sure they are properly torqued.
- \_\_\_\_\_ Check and grease all lubrication points as identified in the Lubrication Maintenance illustration, page 17.
- \_\_\_\_\_ Check the level of gearbox fluids before delivery. Service, if required, as specified on page 17.
- \_\_\_\_\_ Check that blades have been properly installed.

## DELIVERY CHECKLIST

### (DEALER'S RESPONSIBILITY)

- \_\_\_\_\_ Show customer how to make adjustments and select proper PTO speed.
- \_\_\_\_\_ Instruct customer how to lubricate and explain importance of lubrication.
- \_\_\_\_\_ Point out the safety decals. Explain their meaning and the need to keep them in place and in good condition. Emphasize the increased safety hazards when instructions are not followed.
- \_\_\_\_\_ Point out all guards and shields. Explain their importance and the safety hazards that exist when not kept in place and in good condition.
- \_\_\_\_\_ Present Operator's Manual and request that customer and all operators read it before operating equipment. Point out the manual safety rules, explain their meanings, and emphasize the increased safety hazards that exist when safety rules are not followed.
- \_\_\_\_\_ Explain to customer the potential crushing hazards of going underneath raised equipment. Instruct customer that service work does not require going underneath unit and never to do so.
- \_\_\_\_\_ Explain to customer that when equipment is transported on a road or highway, safety devices should be used to give adequate warning to operators of other vehicles.
- \_\_\_\_\_ Inform customer to operate PTO at 540 rpm maximum.
- \_\_\_\_\_ Explain to customer the importance of having the correct PTO driveline length so that it does not bottom out or come apart. Explain that it must be checked as instructed in the manual whenever using a different tractor.
- \_\_\_\_\_ Show customer the safe, proper procedures to be used when mounting, dismounting, and storing equipment.

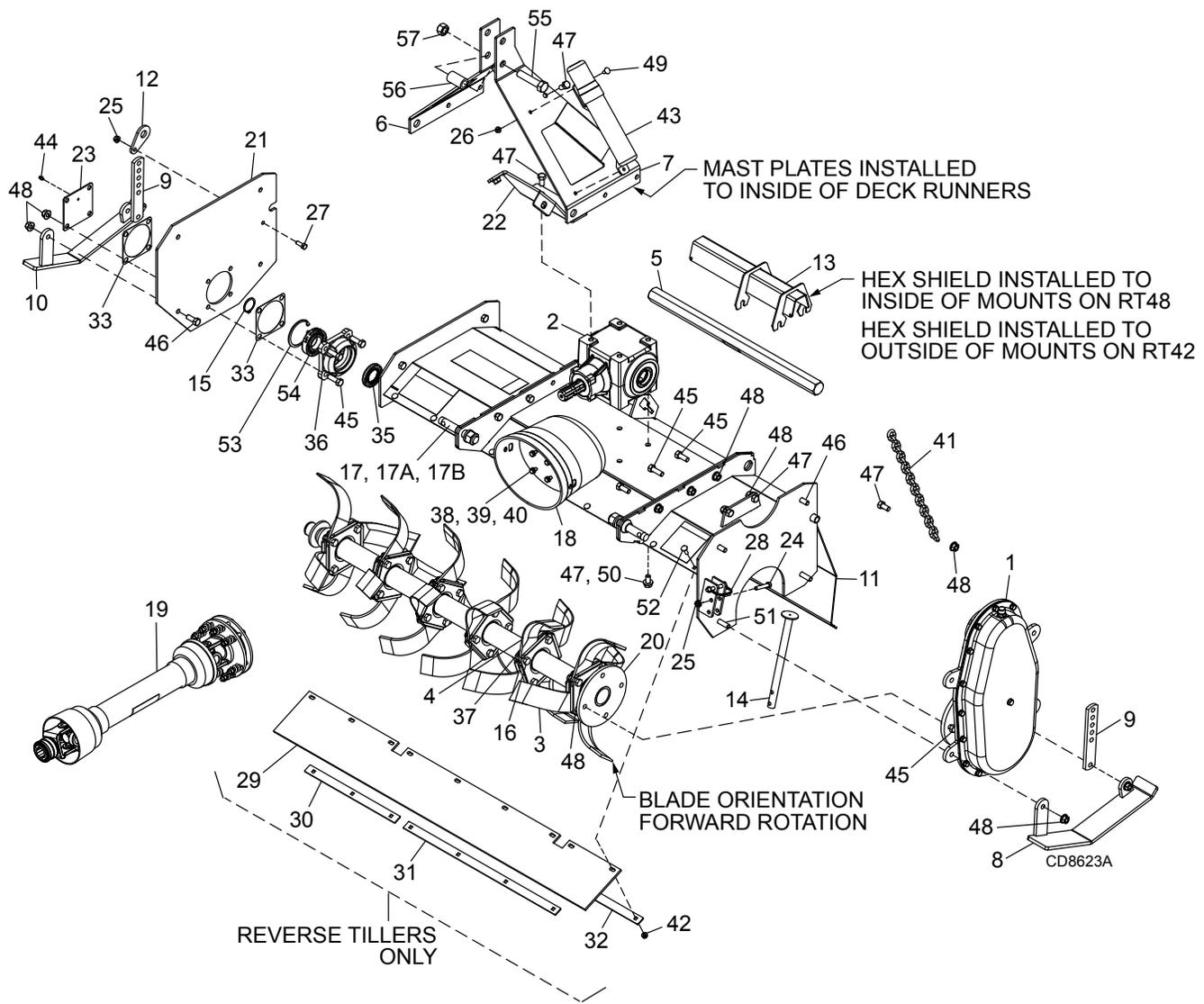


# Rotary Cutters

|                |                 |
|----------------|-----------------|
| <b>RT42.30</b> | <b>RTR42.30</b> |
| <b>RT48.30</b> | <b>RTR48.30</b> |
| <b>RT60.40</b> | <b>RTR60.40</b> |
| <b>RT72.40</b> | <b>RTR72.40</b> |

|  |         |
|--|---------|
| RT42.30/RTR42.30 & RT48.30/RTR48.30 ROTARY TILLER ASSEMBLY . . . . .                           | 28 - 29 |
| RT/RTR60.40 & RT/RTR72.40 ROTARY TILLER ASSEMBLY . . . . .                                     | 30 - 31 |
| 1042364 SLIP CLUTCH DRIVE ASSEMBLY<br>RT42.30 / RTR42.30 / RT48.30 / RTR48.30 TILLERS. . . . . | 32      |
| 1042365 SLIP CLUTCH DRIVE ASSEMBLY<br>RT60.40 / RTR60.40 / RT72.40 / RTR72.40 TILLERS. . . . . | 33      |
| TILLER SIDE DRIVE ASSEMBLY . . . . .   | 34      |
| 1042304 GEARBOX ASSEMBLY . . . . .   | 35      |

# RT42.30/RTR42.30 & RT48.30/RTR48.30 ROTARY TILLER ASSEMBLY



| REF | RT/RTR42.30 PART | RT/RTR48.30 PART | QTY | DESCRIPTION                                     |
|-----|------------------|------------------|-----|---|
| 1   | 1042319          | 1042319          | 1   | Side drive assembly (see page 34)               |
| 2   | 1042304          | 1042304          | 1   | Gearbox assembly, 1.46:1 1.50 hex (see page 35) |
| 3   | 1031934 (10)     | 1031934 (12)     |     | Speed blade, RH                                 |
| 4   | 1031935 (10)     | 1031935 (12)     |     | Speed blade, LH                                 |
| 5   | 104391142        | 104391148        | 1   | Hex shaft - 1.50                                |
| 6   | 1043901          | 1043901          | 1   | Mast plate, right                               |
| 7   | 1043902          | 1043902          | 1   | Mast plate, left                                |
| 8   | 1043903          | 1043903          | 1   | Skid shoe, left                                 |
| 9   | 1043904          | 1043904          | 2   | Link, bolt on                                   |
| 10  | 1043905          | 1043905          | 1   | Skid shoe, right                                |
| 11  | 104390642        | 104390648        | 1   | Tailgate  |
| 12  | 1043919          | 1043919          | 1   | Link, tailgate mount                            |
| 13  | 104390842        | 104390848        | 1   | Shield, hex shaft                               |
| 14  | 1043910          | 1043910          | 1   | Parking stand                                   |

**28 Parts**

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## RT42.30/RTR42.30 & RT48.30/RTR48.30 ROTARY TILLER ASSEMBLY

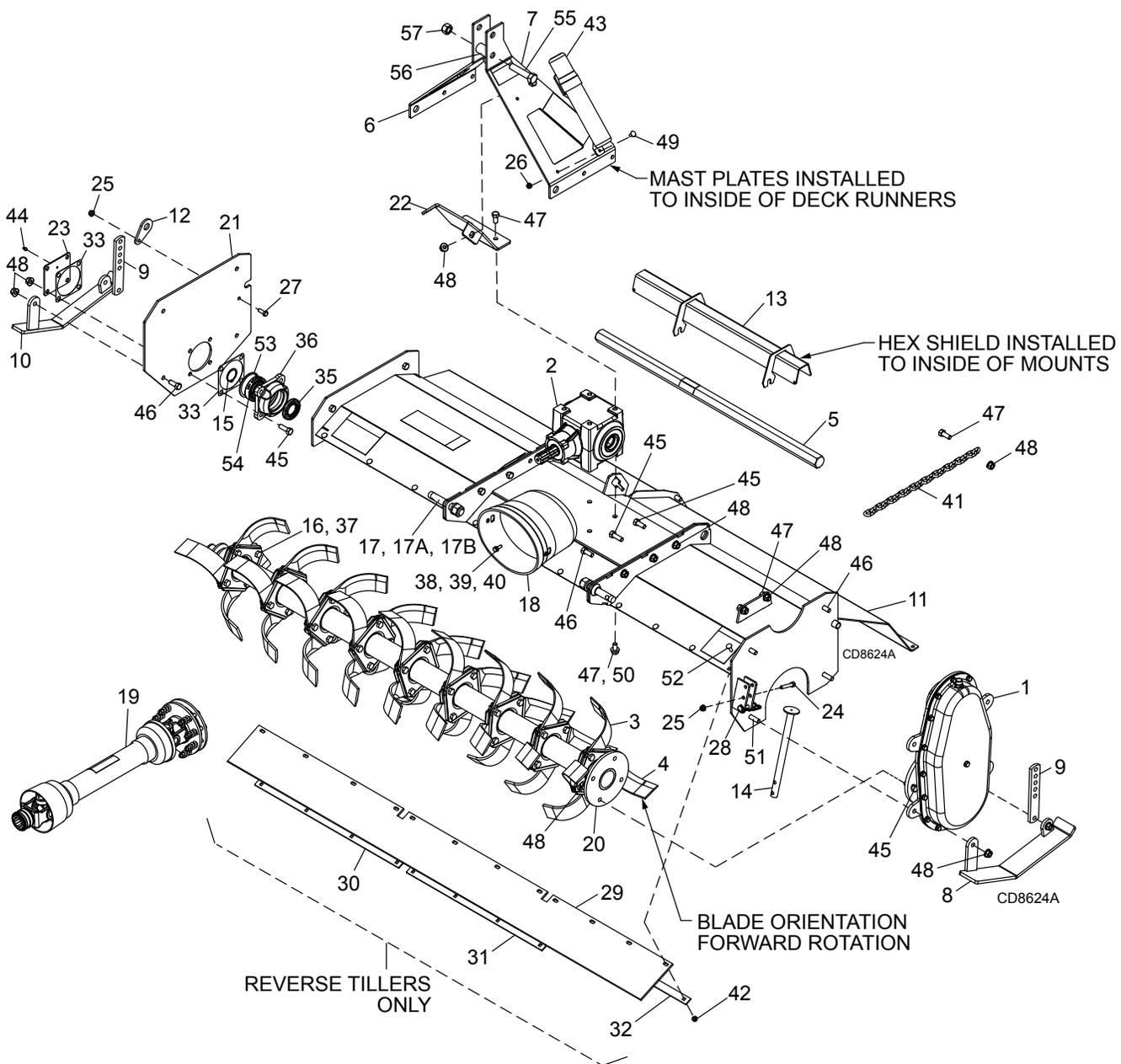
| REF | RT/RTR42.30<br>PART | RT/RTR48.30<br>PART | QTY | DESCRIPTION  |
|-----|---------------------|---------------------|-----|--|
| 15  | 1034983             | 1034983             | 1   | Snap ring, external, 40 mm                             |
| 16  | 1031925 (20)        | 1031925 (24)        |     | 1/2 NC x 1-1/4 HHCS, GR8 w/ shank                      |
| 17  | 33661               | 33661               | 2   | Category 1 mounting pin, w/ nut & lock washer          |
| 17A | 30007               | 30007               | 2   | Nut, hex 7/8 NF  |
| 17B | 30008               | 30008               | 2   | Washer, lock 7/8                                       |
| 18  | 1002048             | 1002048             | 1   | Clutch shield  |
| 19  | 1042364             | 1042364             | 1   | Drive assembly, complete (see page 32)                 |
| 20  | 104391542           | 104391548           | 1   | Rotor shaft  |
| 21  | 1043917             | 1043917             | 1   | End plate  |
| 22  | 1043920             | 1043920             | 1   | Gearbox mount  |
| 23  | 1043918             | 1043918             | 1   | Bearing cover  |
| 24  | 3231                | 3231 *              | 1   | 3/8 NC x 2 HHCS, GR5                                   |
| 25  | 14350               | 14350 *             | 2   | 3/8 NC flange lock nut                                 |
| 26  | W73163              | W73163 *            | 2   | 5/16 NC flange whiz nut                                |
| 27  | 839                 | 839 *               | 1   | 3/8 NC x 1 HHCS, GR5                                   |
| 28  | H019                | H019                | 1   | Lock pin, 3/8 x 2-1/4                                  |
| 29  | 104235042           | 104235048           | 1   | Shield, rubber (Reverse Tillers only)                  |
| 30  | 104391342           | 104391348           | 1   | Clamp, rubber shield, right<br>(Reverse Tillers only)  |
| 31  | 1043912             | 1043912             | 1   | Clamp, rubber shield, center<br>(Reverse Tillers only) |
| 32  | 104391442           | 104391448           | 1   | Clamp, rubber shield, left (Reverse Tillers only)      |
| 33  | 1043088             | 1043088             | 2   | Gasket   |
| 35  | S1042303            | 1042303             | 1   | Seal, 40 x 70 x 10                                     |
| 36  | 1042352             | 1042352             | 1   | Bearing asy, 6208 w/ seal                              |
| 37  | 1031226 (20)        | 1031226 (24)        |     | 1/2 NC flange spiralock                                |
| 38  | 39254               | 39254               | 4   | M8-1.25P x 14 mm HHCS, CL8.8                           |
| 39  | 35155               | 35155 *             | 4   | 5/16 SAE flat washer                                   |
| 40  | 2472                | 2472 *              | 4   | 5/16 lock washer                                       |
| 41  | 44638               | 44638               | 1   | Chain, 1/4 proof coil, 16 link                         |
| 42  | 14139               | 14139 *             | 8   | 5/16 NC flange lock nut                                |
| 43  | 1026530             | 1026530             | 1   | Manual storage tube                                    |
| 44  | 1972                | 1972 *              | 1   | 1/4-28 tapered thread grease fitting                   |
| 45  | 3379                | 3379 *              | 10  | 1/2 NC x 1-1/2 HHCS, GR5                               |
| 46  | 6100                | 6100 *              | 6   | 1/2 NC x 1-1/4 HHCS, GR5                               |
| 47  | 25475               | 25475 *             | 10  | 1/2 NC x 1 HHCS, GR5, full thread                      |
| 48  | 11900               | 11900 *             | 22  | 1/2 NC flange lock nut                                 |
| 49  | 16148               | 16148 *             | 2   | 5/16 NC x 3/4 carriage bolt, GR5                       |
| 50  | 57816               | 57816               | 4   | 1/2 SAE flat washer, hardened                          |
| 51  | 24576               | 24576 *             | 2   | 1/2 NC x 1-3/4 HHCS, GR5                               |
| 52  | 51243               | 51243 *             | 9   | 5/16 NC x 1 carriage bolt, GR5                         |
| 53  | 1034984             | 1034984             | 1   | Snap ring, internal, 80 mm                             |
| 54  | 20891               | 20891               | 1   | Ball bearing, 6208                                     |
| 55  | 15007               | 15007 *             | 1   | 3/4 NC x 3-1/2 HHCS, GR5                               |
| 56  | 1002018             | 1002018             | 1   | Sleeve, .81 x 1.25 x 2.12                              |
| 57  | 2371                | 2371 *              | 1   | 3/4 NC hex lock nut                                    |
| NS  | 1043108             | 1043110             |     | Decal, Model RT Tiller                                 |
| NS  | 1043109             | 1043111             |     | Decal, Model RTR Tiller                                |

HHCS Hex Head Cap Screw

\* Standard hardware; obtain locally

**NOTE:** For safety decals, see pages 8 and 9. Order decals separately.

# RT/RTR60.40 & RT/RTR72.40 ROTARY TILLER ASSEMBLY



| REF | RT/RTR60.40 PART | RT/RTR72.40 PART | QTY | DESCRIPTION                                     |
|-----|------------------|------------------|-----|---|
| 1   | 1042319          | 1042319          | 1   | Side drive assembly (see page 34)               |
| 2   | 1042304          | 1042304          | 1   | Gearbox assembly, 1.46:1 1.50 hex (see page 35) |
| 3   | 1031934 (14)     | 1031934 (18)     |     | Speed blade, RH                                 |
| 4   | 1031935 (14)     | 1031935 (18)     |     | Speed blade, LH                                 |
| 5   | 104391160        | 104391172        | 1   | Hex shaft - 1.50                                |
| 6   | 1043901          | 1043901          | 1   | Mast plate, right                               |
| 7   | 1043902          | 1043902          | 1   | Mast plate, left                                |
| 8   | 1043903          | 1043903          | 1   | Skid shoe, left                                 |
| 9   | 1043904          | 1043904          | 2   | Link, bolt on                                   |
| 10  | 1043905          | 1043905          | 1   | Skid shoe, right                                |
| 11  | 104390660        | 104390672        | 1   | Tailgate  |
| 12  | 1043919          | 1043919          | 1   | Link, tailgate mount                            |

**30 Parts**

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## RT/RTR60.40 & RT/RTR72.40 ROSARY TILLER ASSEMBLY

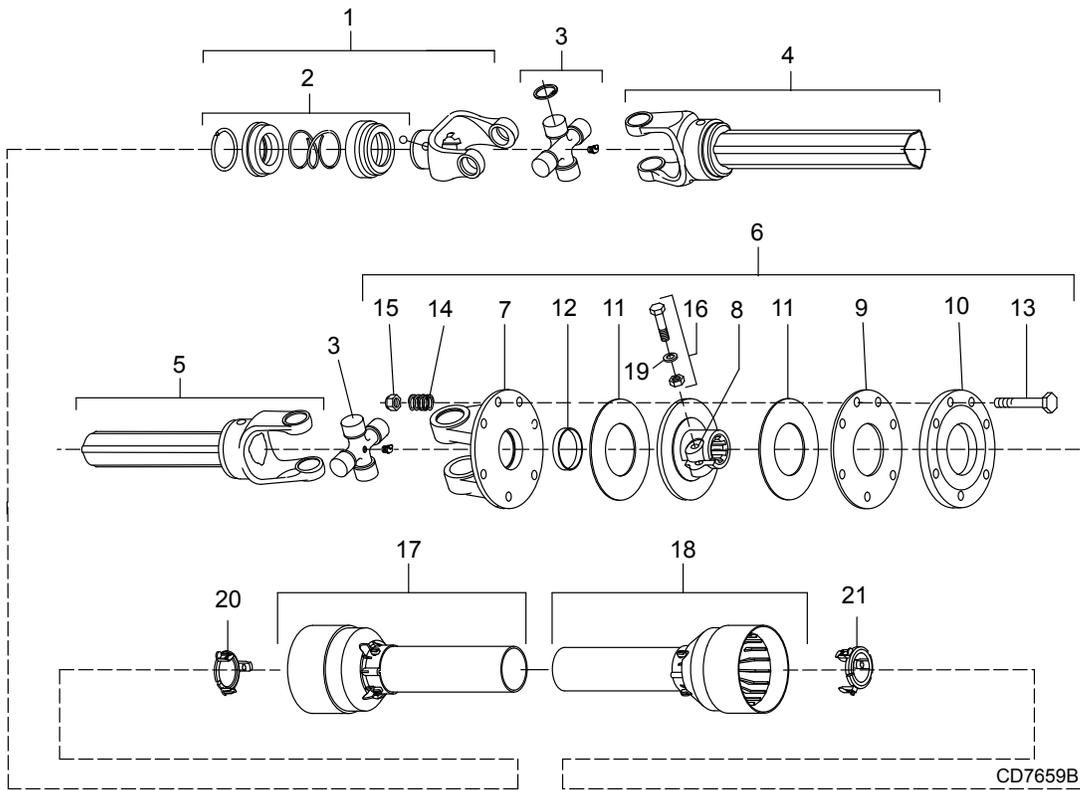
| REF | RT/RTR60.40<br>PART | RT/RTR72.40<br>PART | QTY | DESCRIPTION   |
|-----|---------------------|---------------------|-----|---|
| 13  | 104390860           | 104390872           | 1   | Shield, hex shaft                                   |
| 14  | 1043910             | 1043910             | 1   | Parking stand                                       |
| 15  | 1034983             | 1034983             | 1   | Snap ring, external, 40 mm                          |
| 16  | 1031925 (28)        | 1031925 (36)        |     | 1/2 NC x 1-1/4 HHCS, GR8 w/ shank                   |
| 17  | 33661RP             | 33661RP             | 2   | Category 1 mounting pin, w/ nut & lock washer       |
| 17A | 30007               | 30007               | 2   | Nut, hex 7/8 NF                                     |
| 17B | 30008               | 30008               | 2   | Washer, lock 7/8                                    |
| 18  | 1002048             | 1002048             | 1   | Clutch shield                                       |
| 19  | 1042365             | 1042365             | 1   | Drive assembly, complete (see page 33)              |
| 20  | 104391560           | 104391572           | 1   | Rotor shaft   |
| 21  | 1043917             | 1043917             | 1   | End plate   |
| 22  | 1043920             | 1043920             | 1   | Gearbox mount                                       |
| 23  | 1043918             | 1043918             | 1   | Bearing cover                                       |
| 24  | 3231                | 3231 *              | 1   | 3/8 NC x 2 HHCS, GR5                                |
| 25  | 14350               | 14350 *             | 2   | 3/8 NC flange lock nut                              |
| 26  | W73163              | W73163 *            | 2   | 5/16 NC flange whiz nut                             |
| 27  | 839                 | 839 *               | 1   | 3/8 NC x 1 HHCS, GR5                                |
| 28  | H019                | H019                | 1   | Lock pin, 3/8 x 2-1/4                               |
| 29  | 104235060           | 104235072           | 1   | Shield, rubber (Reverse Tillers only)               |
| 30  | 104391360           | 104391372           | 1   | Clamp, rubber shield, right (Reverse Tillers only)  |
| 31  | 1043912             | 1043912             | 1   | Clamp, rubber shield, center (Reverse Tillers only) |
| 32  | 104391460           | 104391472           | 1   | Clamp, rubber shield, left (Reverse Tillers only)   |
| 33  | 1043088             | 1043088             | 2   | Gasket  |
| 35  | 1042303             | 1042303             | 1   | Seal, 40 x 70 x 10                                  |
| 36  | 1042352             | 1042352             | 1   | Bearing asy, 6208 w/ seal                           |
| 37  | 1031226 (28)        | 1031226 (36)        |     | 1/2 NC flange spiralock                             |
| 38  | 39254               | 39254               | 4   | M8-1.25P x 14 mm HHCS, CL8.8                        |
| 39  | 35155               | 35155 *             | 4   | 5/16 SAE flat washer                                |
| 40  | 2472                | 2472 *              | 4   | 5/16 lock washer                                    |
| 41  | 44638               | 44638               | 1   | Chain, 1/4 proof coil, 16 link                      |
| 42  | 14139               | 14139 *             | 8   | 5/16 NC flange lock nut                             |
| 43  | 1026530             | 1026530             | 1   | Manual storage tube                                 |
| 44  | 1972                | 1972 *              | 1   | 1/4-28 tapered thread grease fitting                |
| 45  | 3379                | 3379 *              | 10  | 1/2 NC x 1-1/2 HHCS, GR5                            |
| 46  | 6100                | 6100 *              | 6   | 1/2 NC x 1-1/4 HHCS, GR5                            |
| 47  | 25475               | 25475 *             | 10  | 1/2 NC x 1 HHCS, GR5, full thread                   |
| 48  | 11900               | 11900 *             | 22  | 1/2 NC flange lock nut                              |
| 49  | 16148               | 16148 *             | 2   | 5/16 NC x 3/4 carriage bolt, GR5                    |
| 50  | 57816               | 57816               | 4   | 1/2 SAE flat washer, hardened                       |
| 51  | 24576               | 24576 *             | 2   | 1/2 NC x 1-3/4 HHCS, GR5                            |
| 52  | 51243               | 51243 *             | 12  | 5/16 NC x 1 carriage bolt, GR5                      |
| 53  | 1034984             | 1034984             | 1   | Snap ring, internal, 80 mm                          |
| 54  | 20891               | 20891               | 1   | Ball bearing, 6208                                  |
| 55  | 15007               | 15007 *             | 1   | 3/4 NC x 3-1/2 HHCS, GR5                            |
| 56  | 1002018             | 1002018             | 1   | Sleeve, .81 x 1.25 x 2.12                           |
| 57  | 2371                | 2371 *              | 1   | 3/4 NC hex lock nut                                 |
| NS  | 1043112             | 1043114             |     | Decal, Model RT Tiller                              |
| NS  | 1043113             | 1043115             |     | Decal, Model RTR Tiller                             |

HHCS Hex Head Cap Screw

\* Standard hardware; obtain locally

**NOTE:** For safety decals, see pages 8 and 9. Order decals separately.

# 1042364 SLIP CLUTCH DRIVE ASSEMBLY RT42.30 / RTR42.30 / RT48.30 / RTR48.30 TILLERS



| REF | PART    | QTY | DESCRIPTION                                |
|-----|---------|-----|--|
| A   | 1042364 | 1   | Complete 540 driveline and clutch assembly |
| 1   | ----    | 1   | Complete collar yoke 1-3/8-6 spline        |
| 2   | 1044063 | 1   | Lock collar repair kit                     |
| 3   | 1044065 | 2   | U-Joint cross & bearing kit                |
| 4   | ----    | 1   | Outer profile tube & yoke                  |
| 5   | ----    | 1   | Inner profile tube & yoke                  |
| 6   | ----    | 1   | Friction clutch assembly                   |
| 7   | ----    | 1   | Flange yoke                                |
| 8   | ----    | 1   | Clutch hub                                 |
| 9   | ----    | 1   | Internal disc                              |
| 10  | ----    | 1   | Pressure plate                             |
| 11  | 1044055 | 2   | Friction disc                              |
| 12  | 1043994 | 1   | Bushing                                    |
| 13  | ----    | 8*  | M10 x 1.5P x 85, HHCS                      |
| 14  | ----    | 8   | Clutch spring                              |
| 15  | 57260   | 8*  | M10 x 1.5P nylon lock nut                  |
| 16  | 1001315 | 1*  | Bolt & nut, M12 x 65                       |
| 17  | 1043998 | 1   | Outer shield kit, T2 (includes item 20)    |
| 18  | 1043999 | 1   | Inner shield kit, T2 (includes item 21)    |
| 19  | ----    | 1   | M12 spring washer                          |
| 20  | ----    | 1   | Bearing, outer                             |
| 21  | ----    | 1   | Bearing, inner                             |

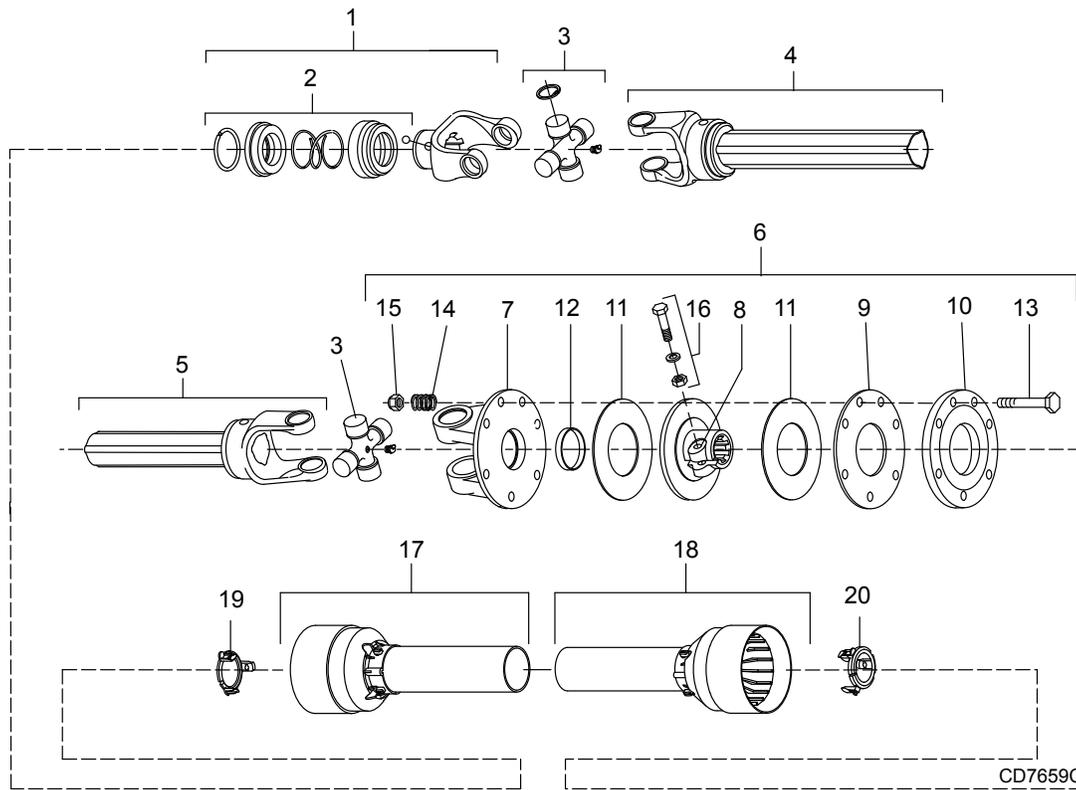
HHCS Hex Head Cap Screw

\* Standard Hardware, obtain locally

## 32 Parts

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# 1042365 SLIP CLUTCH DRIVE ASSEMBLY RT60.40 / RTR60.40 / RT72.40 / RTR72.40 TILLERS

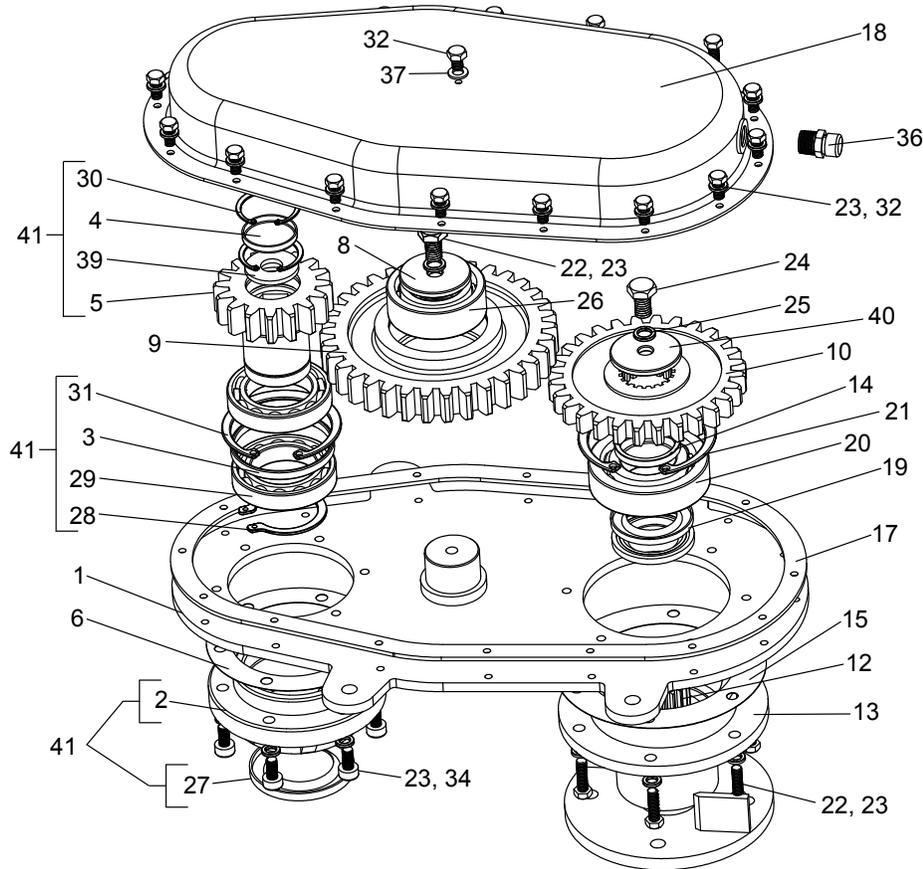


| REF | PART    | QTY | DESCRIPTION                                |
|-----|---------|-----|--|
| A   | 1042365 | 1   | Complete 540 driveline and clutch assembly |
| 1   | ----    | 1   | Complete collar yoke 1-3/8-6 spline        |
| 2   | 1044050 | 1   | Lock collar repair kit                     |
| 3   | 1044052 | 2   | U-joint cross & bearing kit                |
| 4   | ----    | 1   | Outer profile tube & yoke                  |
| 5   | ----    | 1   | Inner profile tube & yoke                  |
| 6   | ----    | 1   | Friction clutch assembly                   |
| 7   | ----    | 1   | Flanged yoke                               |
| 8   | ----    | 1   | Clutch hub                                 |
| 9   | ----    | 1   | Internal disc                              |
| 10  | ----    | 1   | Pressure plate                             |
| 11  | 1044083 | 2   | Friction disc                              |
| 12  | 1043994 | 1   | Bushing                                    |
| 13  | W307208 | 8*  | M10 x 1.5P x 85, HHCS                      |
| 14  | ----    | 8   | Clutch spring                              |
| 15  | 57260   | 8*  | M10 x 1.5P nylon lock nut                  |
| 16  | 1044091 | 1   | Tapered pin & nut                          |
| 17  | 1044061 | 1   | Outer shield kit, T40                      |
| 18  | 1044062 | 1   | Inner shield kit, T40                      |
| 19  | ----    | 1   | Bearing, outer                             |
| 20  | ----    | 1   | Bearing, inner                             |

HHCS Hex Head Cap Screw

\* Standard Hardware, obtain locally

## TILLER SIDE DRIVE ASSEMBLY



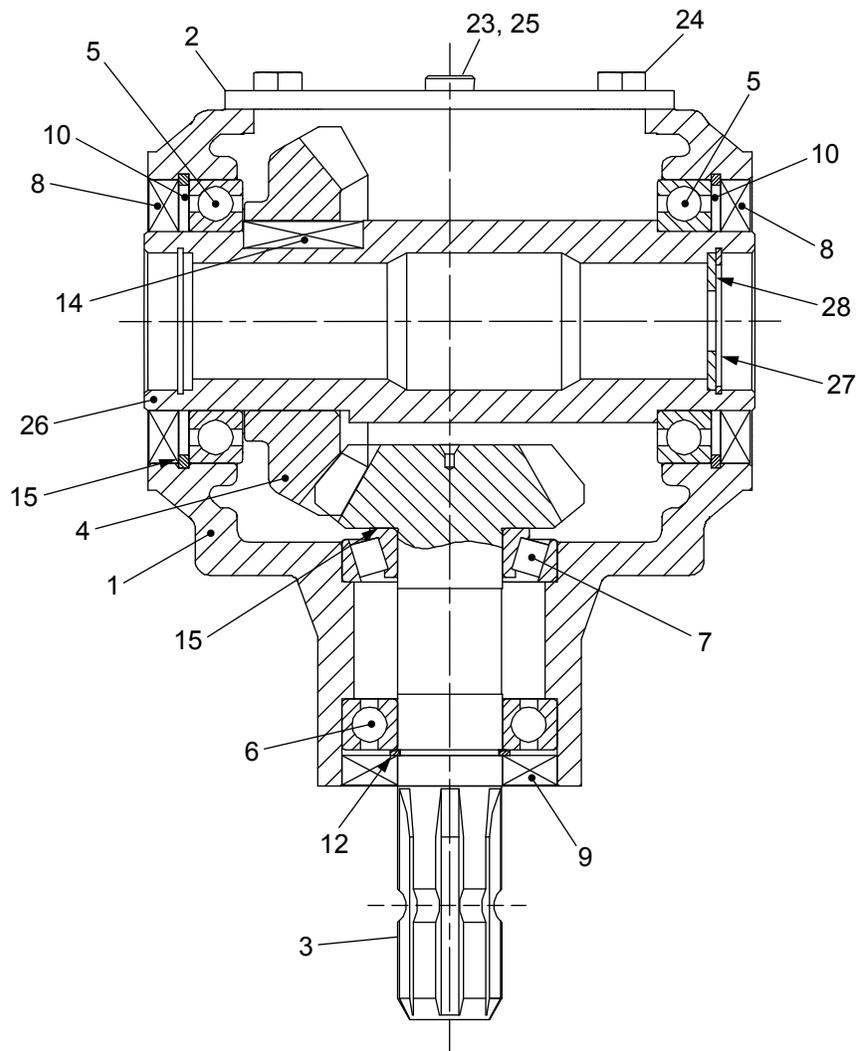
| REF | PART    | QTY | DESCRIPTION   | REF | PART      | QTY | DESCRIPTION  |
|-----|---------|-----|---|-----|-----------|-----|--|
| 1   | 1043927 | 1   | Plate, side drive                                     | 25  | 855 *     | 1   | 1/2 lock washer  |
| 2   | 1043928 | 1   | Housing, bearing, input                               | 26  | 1043950   | 1   | Bearing, 5210, no shield   |
| 3   | 1043929 | 1   | Spacer, 88 x 94.5 x 9.2                               | 27  | 1043951   | 1   | Seal, 60 x 95 x 12   |
| 4   | -----   | 1   | Oil cover (included with WDS1043931)                  | 28  | 1043952   | 1   | Retaining ring, external, 2 x 60 mm                                |
| 5   | 1043931 | 1   | Shaft, input gear, 16T (includes items 4, 5, 30 & 39) | 29  | 1032445   | 2   | Bearing, ball, 6012  |
| 6   | 1043932 | A/R | Gasket, .5 mm, input                                  | 30  | 1043954   | 2   | Retaining ring, internal, 3 x 50 mm                                |
| 8   | 1043933 | 1   | Washer, 10.5 x 60 x 6                                 | 31  | 1032408   | 1   | Retaining ring, internal, 3 x 95 mm                                |
| 9   | 1043934 | 1   | Gear, middle, 34T                                     | 32  | 1043956 * | 17  | 3/8 NC x .67 HHCS  |
| 10  | 1043935 | 1   | Gear, output, 28T                                     | 34  | 300176 *  | 6   | 3/8 NC x 1 SHCS  |
| 10  | 1043935 | 1   | Gear, output, 28T                                     | 36  | 11975     | 1   | 1/2 NPT vent plug  |
| 12  | 1043937 | 1   | Weldment, shaft & flange output                       | 37  | 1043959   | 1   | Seal, M10  |
| 13  | 1043938 | 1   | Housing, bearing, output                              | 39  | 1043961   | 1   | Washer, 20 x 49 mm   |
| 14  | 1043939 | 1   | Spacer, 51 x 60 x 7.5                                 | 40  | 1043962   | 1   | Washer, 13.5 x 60 x 6  |
| 15  | 1043940 | A/R | Gasket, .5 mm, output                                 | 41  | 1044782   | 1   | Asy, top gear (includes items 2, 3, 4, 5, 27, 28, 29, 30, 31 & 39) |
| 17  | 1043941 | 1   | Seal ring   |     |           |     |  |
| 18  | 1043942 | 1   | Cover   |     |           |     |  |
| 19  | 1043943 | 2   | Seal, 55 x 75 x 12                                    |     |           |     |  |
| 20  | 1043944 | 1   | Bearing, 6310, no shield                              |     |           |     |  |
| 21  | 1043945 | 1   | Retaining ring, internal, 3.2 x 110 mm                |     |           |     |  |
| 22  | 1263 *  | 7   | 3/8 NC x 1 HHCS, GR5                                  |     |           |     |  |
| 23  | 838 *   | 29  | 3/8 lock washer REF                                   |     |           |     |  |
| 24  | 6100 *  | 1   | 1/2 NC x 1-1/4 HHCS, GR5                              |     |           |     |  |

HHCS Hex Head Cap Screw  
 SHCS Socket Head Cap Screw  
 \* Standard hardware, obtain locally

# 34 Parts

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(11/07/2023)

# 1042304 GEARBOX ASSEMBLY



| REF | PART    | QTY | DESCRIPTION                         | REF | PART    | QTY | DESCRIPTION                      |
|-----|---------|-----|-------------------------------------|-----|---------|-----|----------------------------------|
| A   | 1042304 | 1   | Gearbox assembly<br>1.46:1 1.50 hex | 14  | 1043992 | 1   | Key, 14 x 9 x 33 mm              |
| 1   | NSS     | 1   | Gearbox housing                     | 15  | 1043976 | A/R | Shim kit, 85.3 x 94.7; 35.5 x 48 |
| 2   | 1043970 | 1   | Cap                                 | 23  | 39325   | 1   | 3/8 vent plug                    |
| 3   | NSS     | 1   | Input shaft & gear                  | 24  | 63716   | 4   | M10-1.50P x 20 HHCS              |
| 4   | NSS     | 1   | Bevel gear                          | 25  | 27326   | 2   | Plug, pipe 3/8 NPT               |
| 5   | 1032445 | 2   | Ball bearing, 6012                  | 26  | NSS     | 1   | Output shaft                     |
| 6   | 438     | 1   | Ball bearing, 6207                  | 27  | 1043986 | 1   | Snap ring, 1.5 x 45 mm internal  |
| 7   | 1032448 | 1   | Tapered roller bearing, 30207       | 28  | 1044758 | 1   | 7/8 SAE flat washer              |
| 8   | 1032437 | 2   | Oil seal, 60 x 95 x 10              |     |         |     | HHCS Not Serviced Separately     |
| 9   | 1032401 | 1   | Oil seal, 35 x 72 x 10              |     |         |     | NSS Socket Head Cap Screw        |
| 10  | 1032408 | 2   | Snap ring, 95 x 3 mm                |     |         |     |                                  |
| 12  | 1007859 | 1   | Snap ring, 35 x 1.5 mm              |     |         |     |                                  |

# NOTES

**36** *Parts*

MAN1177  
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# BOLT TORQUE CHART

Always tighten hardware to these values unless a different torque value or tightening procedure is listed for a specific application.

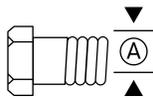
Fasteners must always be replaced with the same grade as specified in the manual parts list.

Always use the proper tool for tightening hardware: SAE for SAE hardware and Metric for metric hardware. Make sure fastener threads are clean and you start thread engagement properly.

All torque values are given to specifications used on hardware defined by SAE J1701 MAR 99 & J1701M JUL 96.

## SAE SERIES TORQUE CHART

SAE Bolt Head Identification



SAE Grade 2  
(No Dashes)



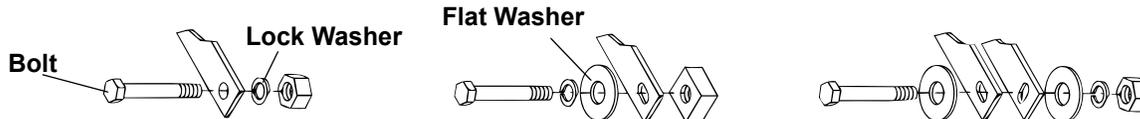
SAE Grade 5  
(3 Radial Dashes)



SAE Grade 8  
(6 Radial Dashes)

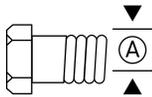
| Ⓐ     | Diameter (Inches) | Wrench Size | Marking on Head |     |        |      |        |     |
|-------|-------------------|-------------|-----------------|-----|--------|------|--------|-----|
|       |                   |             | SAE 2           |     | SAE 5  |      | SAE 8  |     |
|       |                   |             | lbs-ft          | N-m | lbs-ft | N-m  | lbs-ft | N-m |
| 1/4"  | 7/16"             | 6           | 8               | 10  | 13     | 14   | 18     |     |
| 5/16" | 1/2"              | 12          | 17              | 19  | 26     | 27   | 37     |     |
| 3/8"  | 9/16"             | 23          | 31              | 35  | 47     | 49   | 67     |     |
| 7/16" | 5/8"              | 36          | 48              | 55  | 75     | 78   | 106    |     |
| 1/2"  | 3/4"              | 55          | 75              | 85  | 115    | 120  | 163    |     |
| 9/16" | 13/16"            | 78          | 106             | 121 | 164    | 171  | 232    |     |
| 5/8"  | 15/16"            | 110         | 149             | 170 | 230    | 240  | 325    |     |
| 3/4"  | 1-1/8"            | 192         | 261             | 297 | 403    | 420  | 569    |     |
| 7/8"  | 1-5/16"           | 306         | 416             | 474 | 642    | 669  | 907    |     |
| 1"    | 1-1/2"            | 467         | 634             | 722 | 979    | 1020 | 1383   |     |

## TYPICAL WASHER INSTALLATIONS



## METRIC SERIES TORQUE CHART

Metric Bolt Head Identification



Metric  
Grade 8.8



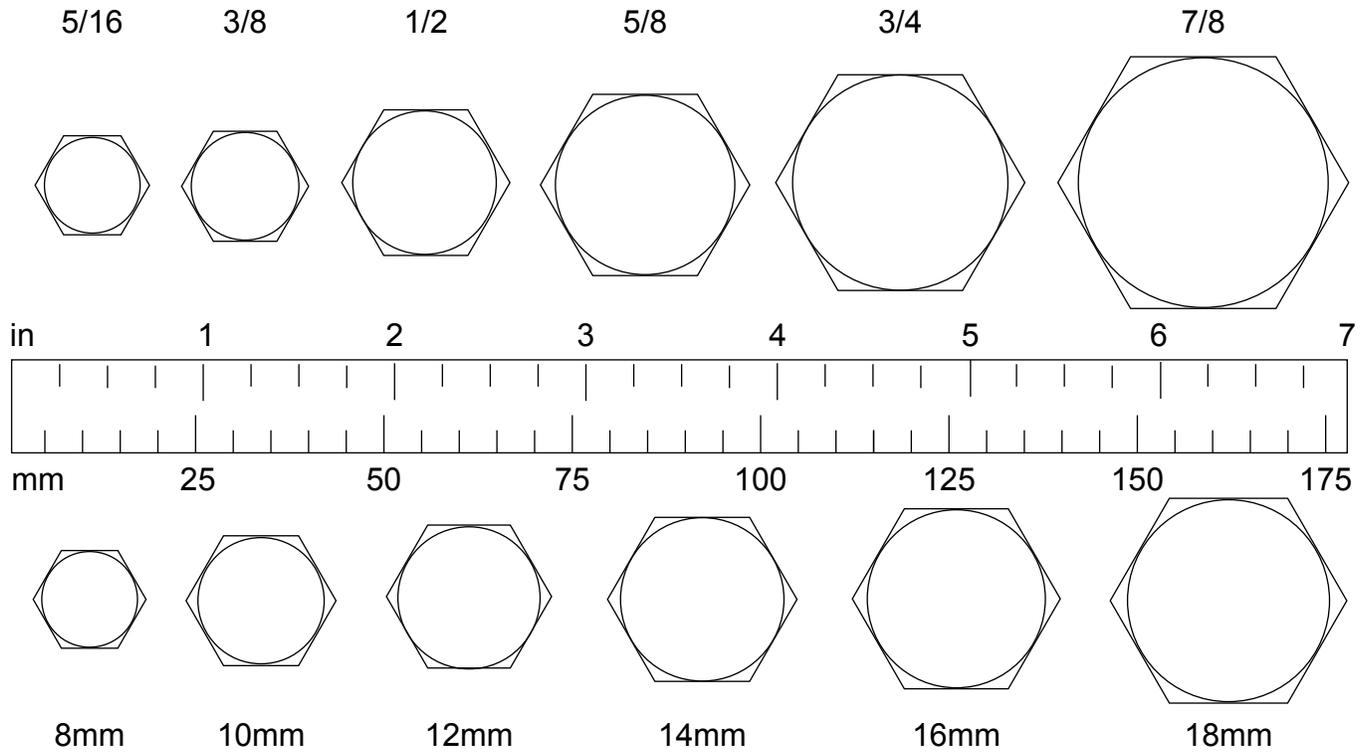
Metric  
Grade 10.9

| Ⓐ         | Diameter & Thread Pitch (Millimeters) | Wrench Size | Coarse Thread   |        |             |        | Fine Thread |        |             |           | Ⓐ |
|-----------|---------------------------------------|-------------|-----------------|--------|-------------|--------|-------------|--------|-------------|-----------|---|
|           |                                       |             | Marking on Head |        |             |        |             |        |             |           |   |
|           |                                       |             | Metric 8.8      |        | Metric 10.9 |        | Metric 8.8  |        | Metric 10.9 |           |   |
|           |                                       |             | N-m             | lbs-ft | N-m         | lbs-ft | N-m         | lbs-ft | N-m         | lbs-ft    |   |
| 6 x 1.0   | 10 mm                                 | 8           | 6               | 11     | 8           | 8      | 6           | 11     | 8           | 6 x 1.0   |   |
| 8 x 1.25  | 13 mm                                 | 20          | 15              | 27     | 20          | 21     | 16          | 29     | 22          | 8 x 1.0   |   |
| 10 x 1.5  | 16 mm                                 | 39          | 29              | 54     | 40          | 41     | 30          | 57     | 42          | 10 x 1.25 |   |
| 12 x 1.75 | 18 mm                                 | 68          | 50              | 94     | 70          | 75     | 55          | 103    | 76          | 12 x 1.25 |   |
| 14 x 2.0  | 21 mm                                 | 109         | 80              | 151    | 111         | 118    | 87          | 163    | 120         | 14 x 1.5  |   |
| 16 x 2.0  | 24 mm                                 | 169         | 125             | 234    | 173         | 181    | 133         | 250    | 184         | 16 x 1.5  |   |
| 18 x 2.5  | 27 mm                                 | 234         | 172             | 323    | 239         | 263    | 194         | 363    | 268         | 18 x 1.5  |   |
| 20 x 2.5  | 30 mm                                 | 330         | 244             | 457    | 337         | 367    | 270         | 507    | 374         | 20 x 1.5  |   |
| 22 x 2.5  | 34 mm                                 | 451         | 332             | 623    | 460         | 495    | 365         | 684    | 505         | 22 x 1.5  |   |
| 24 x 3.0  | 36 mm                                 | 571         | 421             | 790    | 583         | 623    | 459         | 861    | 635         | 24 x 2.0  |   |
| 30 x 3.0  | 46 mm                                 | 1175        | 867             | 1626   | 1199        | 1258   | 928         | 1740   | 1283        | 30 x 2.0  |   |

# BOLT SIZE CHART

**Notice:** Chart shows bolt thread sizes and corresponding head (wrench) sizes for standard SAE and metric bolts.

## SAE BOLT THREAD SIZES



## METRIC BOLT THREAD SIZES

## ABBREVIATIONS

|   |   |   |
|---|---|---|
| AG . . . . . Agriculture  | HT . . . . . Heat-Treated                             | ORBM . . . . . O-Ring Boss - Male             |
| ASABE . . . . . American Society of Agricultural & Biological Engineers (formerly ASAE) | JIC . . . . . Joint Industry Council 37° Degree Flare | P . . . . . Pitch                             |
| ASAE . . . . . American Society of Agricultural Engineers                               | LH . . . . . Left Hand                                | PBY . . . . . Power-Beyond                    |
| ATF . . . . . Automatic Transmission Fluid  | LT . . . . . Left                                     | psi . . . . . Pounds per Square Inch          |
| BSPP . . . . . British Standard Pipe Parallel   | m . . . . . Meter                                     | PTO . . . . . Power Take Off                  |
| BSPTM . . . . . British Standard Pipe Tapered Male                                      | mm . . . . . Millimeter                               | QD . . . . . Quick Disconnect                 |
| CV . . . . . Constant Velocity  | M . . . . . Male                                      | RH . . . . . Right Hand                       |
| CCW . . . . . Counter-Clockwise   | MPa . . . . . Mega Pascal                             | ROPS . . . . . Roll-Over Protective Structure |
| CW . . . . . Clockwise  | N . . . . . Newton                                    | RPM . . . . . Revolutions Per Minute          |
| F . . . . . Female  | NC . . . . . National Coarse                          | RT . . . . . Right                            |
| FT . . . . . Full Thread  | NF . . . . . National Fine                            | SAE . . . . . Society of Automotive Engineers |
| GA . . . . . Gauge  | NPSM . . . . . National Pipe Straight Mechanical      | UNC . . . . . Unified Coarse                  |
| GR (5, etc.) . . . . . Grade (5, etc.)  | NPT . . . . . National Pipe Tapered                   | UNF . . . . . Unified Fine                    |
| HHCS . . . . . Hex Head Cap Screw   | NPT SWF . . . . . National Pipe Tapered Swivel Female | UNS . . . . . Unified Special                 |

**PART NO.**  
**MAN1177**

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