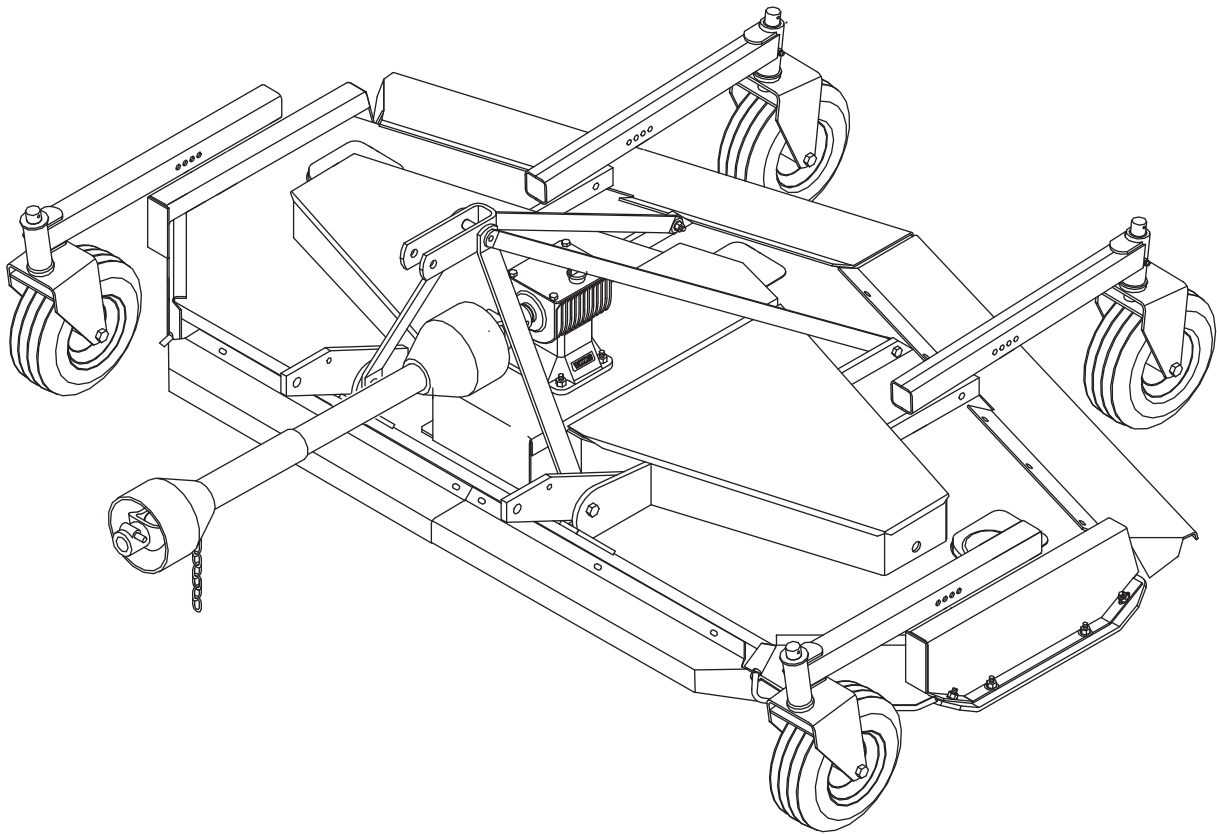


WOODS REARMOUNT MOWERS

RM990-3

P990-3



20944

Rev. 3/14/2008

WOODS[®]

Tested. Proven. Unbeatable.

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 Check Lists in the Operator's Manual are completed before releasing equipment to the owner.

The dealer must complete the Product Registration online at the Woods Dealer Website or complete the mail-in form included with the Operator's Manual. If using the mail-in form, the dealer is to return the prepaid postage portion to Woods, give one copy to the customer, and retain one copy. **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 locate your nearest dealer, check the Dealer Locator at 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 personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



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



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



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

IMPORTANT
or **NOTICE**

Is used to address practices not related to personal injury.

NOTE

Indicates helpful information.

WOODS®

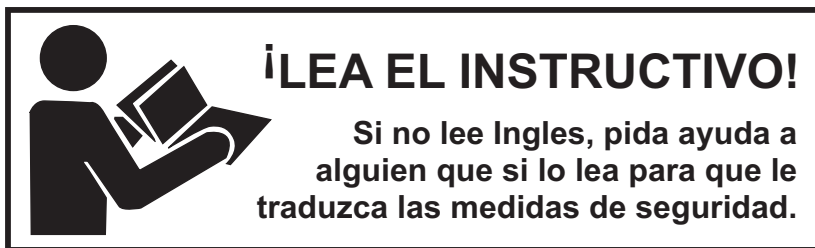
ALITEC™
BMP®
CENTRAL FABRICATORS®
GANNON®
GILL®
WAIN-ROY®
WOODS®

2 Introduction

Gen'l (Rev. 2/19/2008)

TABLE OF CONTENTS

INTRODUCTION	2
SPECIFICATIONS	4
GENERAL INFORMATION	4
SAFETY RULES	5
SAFETY DECALS	7
OPERATION	10
OWNER SERVICE	16
TROUBLESHOOTING	20
DEALER SERVICE	22
ASSEMBLY	31
DEALER CHECK LISTS	40
PARTS LISTS	41
BOLT TORQUE CHART	64
BOLT SIZE CHART & ABBREVIATIONS	65
INDEX	66
REPLACEMENT PARTS WARRANTY	INSIDE BACK COVER
PRODUCT WARRANTY	BACK COVER



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

<u>MODEL</u>	<u>RM990-3 MOUNTED</u>	<u>P990-3 TOWED</u>
Hitch	Three Point, Category 1	Towed
Cutting Width	90"	90"
Cutting Height Range	1" - 8"	1" - 8-1/2"
Shipping Weight	930 lbs.	1,000 lbs.
Blade Speed (feet per minute)	15,569	15,569
Blade Speed (RPM)	1,926	1,926
Blade Spindles	3	3
Number of Blades	6	6
Universal Drive Series	ASAE Cat. 4	ASAE Cat. 3
Caster Wheels	13 x 5 x 10 Solid Rib Tire or 18 x 19.5 x 8 Pneumatic Tires	-----
Wheels	-----	18 x 19.5 x 8 Rib Pneumatic Tires
Tractor PTO Speed RPM	540	540
Recommended Maximum Tractor Horsepower	50	50
Mower Frame Thickness	7 GA	7 GA

GENERAL INFORMATION

The purpose of this manual is to assist you in operating and maintaining your mower. 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. However, 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 tractor facing the direction of forward travel. Blade rotation is counter-clockwise as viewed from the top of the mower.

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.

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, 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 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.**

■ **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.**

■ **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.**

■ **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.**

■ **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, tractor could tip over, causing personal injury or death. The weight may be attained with front wheel weights, ballast in tires or front tractor weights. 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

■ **Keep bystanders away from equipment.**

■ **Never direct discharge toward people, animals, or property.**

■ **Full chain or rubber shielding must be installed when operating in populated areas or other areas where thrown objects could injure people or damage property.**

- **If this machine is not equipped with full chain or rubber shielding, operation must be stopped when anyone comes within 300 feet (92 m).**

- **This shielding is designed to reduce the risk of thrown objects. The mower deck and protective devices cannot prevent all objects from escaping the blade enclosure in every mowing condition. It is possible for objects to ricochet and escape, traveling as much as 300 feet (92 m).**

■ **Do not operate or transport equipment while under the influence of alcohol or drugs.**

■ **Always comply with all state and local lighting and marking requirements.**

■ **Operate only in daylight or good artificial light.**

SAFETY RULES



ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!



- Never allow riders on power unit or attachment.
- Keep hands, feet, hair, and clothing away from equipment while engine is running. Stay clear of all moving parts.
- 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.
- Look down and to the rear and make sure area is clear before operating in reverse.
- 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, remove key, inspect, and repair any damage before resuming operation.

TRANSPORTATION

- 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.
- Never exceed 20 mph (32.2 km/h) during transport.
- Always comply with all state and local lighting and marking requirements.
- Never allow riders on power unit or attachment.
- Do not operate PTO during transport.
- Look down and to the rear and make sure area is clear before operating in reverse.
- Do not operate or transport on steep slopes.
- Do not operate or transport equipment while under the influence of alcohol or drugs.

MAINTENANCE

- 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.
- Before performing any service or maintenance, lower equipment to ground or block securely, turn off engine, remove key, and disconnect driveline from tractor PTO.
- Do not modify or alter or permit anyone else to modify or alter the equipment or any of its components in any way.
- Make sure attachment is properly secured, adjusted, and in good operating condition.
- Keep all persons away from operator control area while performing adjustments, service, or maintenance.
- Make certain all movement of equipment components has stopped before approaching for service.
- Frequently check blades. They should be sharp, free of nicks and cracks, and securely fastened.
- Use a new Nylok blade bolt and cup washers when you replace the blade. Do not substitute any bolt for the special blade bolt. It is self-locking, meeting the non-loosening requirements for this application.
- Do not handle blades with bare hands. Careless or improper handling may result in serious injury.
- Your dealer can supply genuine replacement blades. Substitute blades may not meet original equipment specifications and may be dangerous.
- 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.

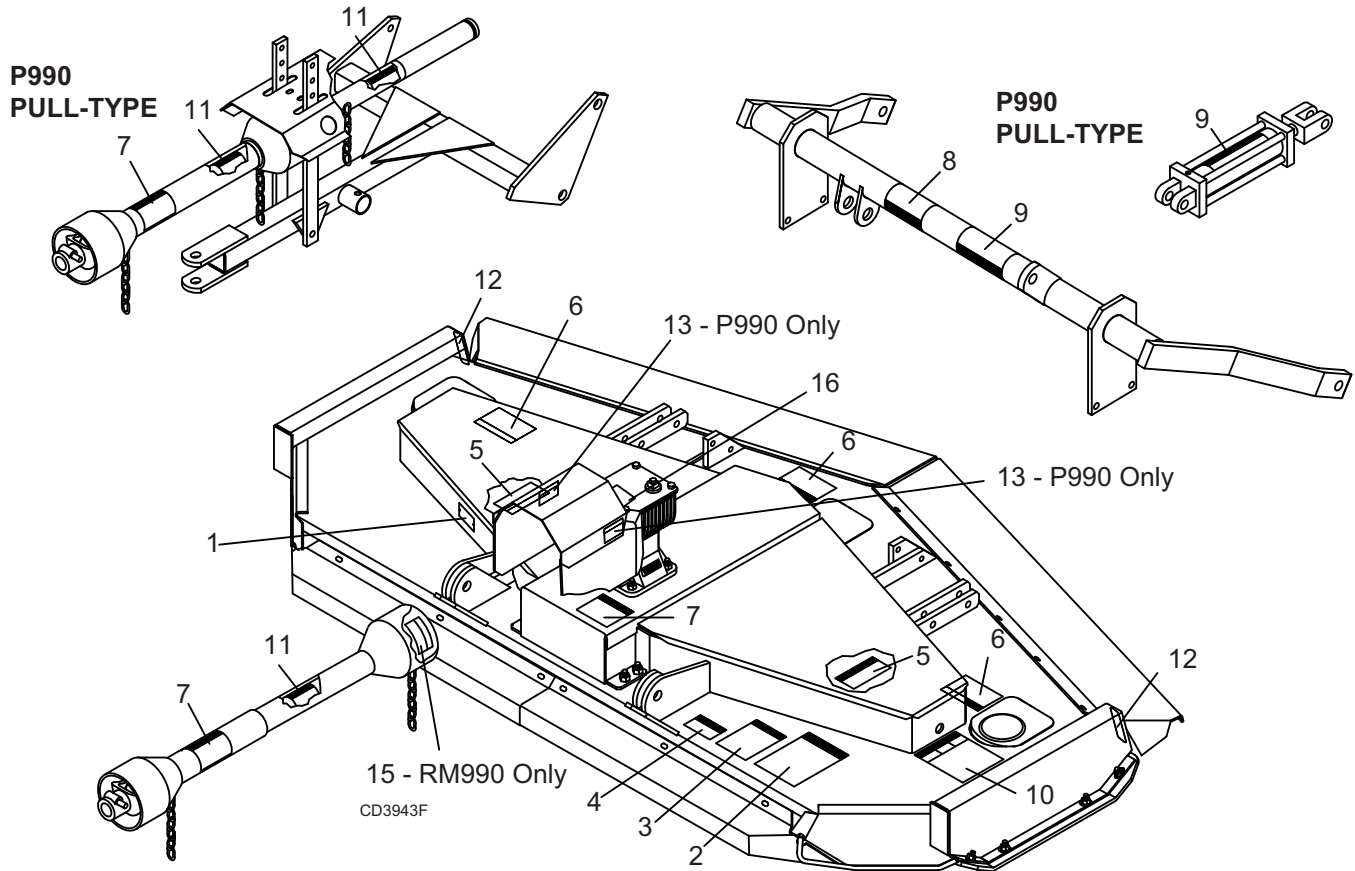
STORAGE

- Block equipment securely for storage.
- Keep children and bystanders away from storage area.



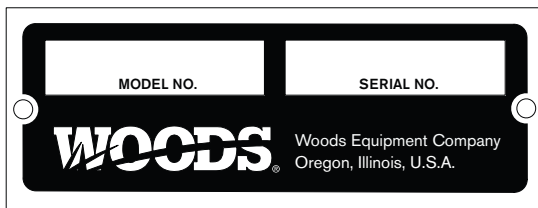
SAFETY & INSTRUCTIONAL DECALS

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



12 - 20106 Red Rear Reflector

1 - Serial Number Plate



4 - 18866



2 - 18865

WARNING	
<p>FALLING OFF CAN RESULT IN BEING RUN OVER.</p> <ul style="list-style-type: none"> 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. 	
<p>RAISED EQUIPMENT CAN DROP AND CRUSH.</p> <ul style="list-style-type: none"> Before working underneath, follow all instructions and safety rules in operator's manual and securely block up all corners of equipment with jack stands. Securely blocking prevents equipment dropping from hydraulic leak-down, hydraulic system failures or mechanical component failures. 	
<p>FALLING OFF OR FAILING TO BLOCK SECURELY CAN RESULT IN SERIOUS INJURY OR DEATH.</p> <p style="text-align: right;"><small>18865-C</small></p>	



SAFETY & INSTRUCTIONAL DECALS

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



3 - 18877

WARNING
<p>TO AVOID SERIOUS INJURY OR DEATH:</p> <ul style="list-style-type: none"> ■ Read Operator's Manual (available from dealer) and follow all safety precautions. ■ Keep all shields in place and in good condition. ■ Operate mower from tractor seat only. ■ Lower mower, stop engine and remove key before dismounting tractor. ■ Allow no children or untrained persons to operate equipment. ■ Do not transport towed or semi-mounted units over 20 mph. <p style="text-align: center;">FAILURE TO OPERATE SAFELY CAN RESULT IN INJURY OR DEATH.</p>
<small>18877-C</small>

7 - 18864

DANGER
<p>ROTATING DRIVELINE CONTACT CAN CAUSE DEATH KEEP AWAY!</p> <p>DO NOT OPERATE WITHOUT -</p> <ul style="list-style-type: none"> ■ All driveline guards, tractor and equipment shields in place ■ Drivelines securely attached at both ends ■ Driveline guards that turn freely on driveline
<small>18864-C</small>

5 - 18867

DANGER
<p>SHIELD MISSING</p> <p>DO NOT OPERATE PUT SHIELD ON</p>
<small>18867-B</small>

6 - 15502

WARNING
<p>ROTATING COMPONENTS</p> <p>Do not operate without cover in place. Look and listen for rotation. Do not open cover until all components have stopped.</p> <p style="text-align: center;">CONTACT WITH ROTATING PARTS CAN CAUSE SERIOUS INJURY.</p>
<small>15502-B</small>

13 - 18868

DANGER
<p>SHIELD MISSING</p> <p>Do not operate. Put shield on.</p>
<small>18868-B</small>

15 - 18869

DANGER
<p>SHIELD MISSING</p> <p>DO NOT OPERATE - PUT SHIELD ON</p>
<small>18869-B</small>

8 - 19924

	<p style="text-align: center;"> WARNING</p> <p>HIGH-PRESSURE HYDRAULIC OIL LEAKS CAN PENETRATE SKIN RESULTING IN SERIOUS INJURY, GANGRENE OR DEATH.</p> <ul style="list-style-type: none"> ■ Check for leaks with cardboard; never use hand. ■ Before loosening fittings: lower load, release pressure, and be sure oil is cool. ■ Consult physician immediately if skin penetration occurs.
<small>19924-B</small>	


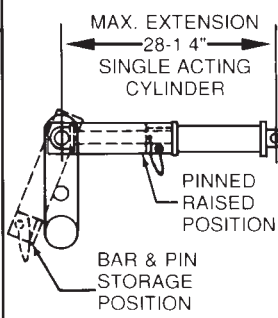


SAFETY & INSTRUCTIONAL DECALS

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



9 - 19782

	<p>⚠ WARNING</p> <p>A RAISED CUTTER CAN DROP AND CRUSH</p> <ul style="list-style-type: none"> ■ USE ORIGINAL MANUFACTURER'S RATCHET JACK OR TRANSPORT BAR WITH HYDRAULIC CYLINDER. ■ BEFORE WORKING UNDERNEATH, RAISE CUTTER, (WHEN USING TRANSPORT BAR, LOCK IN PINNED RAISED POSITION AS ILLUSTRATED), AND SECURELY BLOCK UP CUTTER. ■ BLOCKING UP PREVENTS CUTTER DROPPING FROM HYDRAULIC LEAK DOWN, HYDRAULIC SYSTEM FAILURES OR MECHANICAL COMPONENT FAILURES. <p>FAILURE TO FOLLOW INSTRUCTIONS CAN RESULT IN SERIOUS INJURY OR DEATH</p>	
		19782

10 - 15503

⚠ DANGER





**ROTATING BLADES AND
THROWN OBJECTS**

- Do not put hands or feet under or into mower when engine is running.
- Before mowing, clear area of objects that may be thrown by blade.
- Keep bystanders away.
- Keep guards in place and in good condition.

**BLADE CONTACT OR THROWN OBJECTS CAN
CAUSE SERIOUS INJURY OR DEATH.**

15503-C

11 - 33347

⚠ DANGER



**GUARD MISSING.
DO NOT OPERATE.**

⚠ DANGER



**GUARD MISSING.
DO NOT OPERATE.**

33347E

⚠ DANGER

16 - 1004114

⚠ DANGER

If shaft connection is visible, shield is missing. Replace shield before operating equipment.

1004114

OPERATION

The operator is responsible for the safe operation of the mower. The operator must be properly trained. Operators should be familiar with the mower, the tractor, and all safety practices before starting operation. Read the safety rules and safety decals on page 5 to page 10. This mower is designed for light brush shredding and grass mowing. It is especially useful in cane, berry, grape and vegetable crops for mowing and shredding prunings. Recommended mowing speed for most conditions is from two to five mph.

DANGER

■ Full chain or rubber shielding must be installed when operating in populated areas or other areas where thrown objects could injure people or damage property.

- If this machine is not equipped with full chain or rubber shielding, operation must be stopped when anyone comes within 300 feet (92 m).
- This shielding is designed to reduce the risk of thrown objects. The mower deck and protective devices cannot prevent all objects from escaping the blade enclosure in every mowing condition. It is possible for objects to ricochet and escape, traveling as much as 300 feet (92 m).

WARNING

- Never allow children or untrained persons to operate equipment.
- Keep bystanders away from equipment.
- Before servicing, adjusting, repairing or unplugging, stop tractor engine, place all controls in neutral, set park brake, remove ignition key, and wait for all moving parts to stop.
- Keep all persons away from operator control area while performing adjustments, service, or maintenance.

CAUTION

- Stop power unit and equipment immediately upon striking an obstruction. Turn off engine, remove key, inspect, and repair any damage before resuming operation.
- 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.

ATTACHING RM990-3 MOUNTED MOWER TO TRACTOR

Hitch Point Distance and PTO Clearance

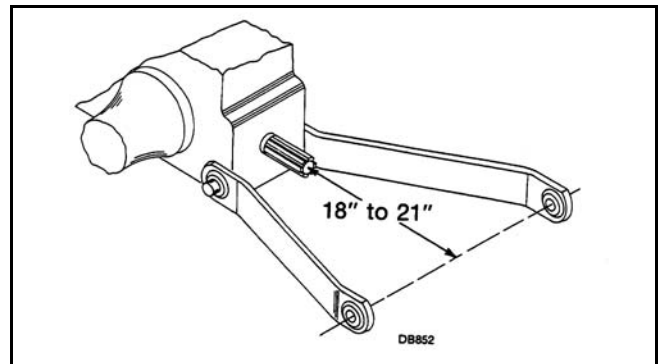


Figure 1. PTO to Mounting Point Distance - RM990-3

The standard drive is intended for use with tractors that have 18" to 21" between the end of the tractor PTO shaft and the mounting pin holes on the lower lift arms when they are horizontal (refer to Figure 1). If the distance is less than 18", the slip tubes of the PTO shaft can bottom out. If the distance exceeds 21", there may not be sufficient engagement when operating on uneven terrain. Shorter or longer drives are available. Contact your WOODS dealer for assistance.

Standard Category 1 mounting pins are used when attaching the mower to the tractor. Check to be sure the mounting pins are properly torqued to 300 lbs-ft.

Attach the mower hitch pins to the lower tractor lift arms and secure.

Attach the tractor top link to mower top clevis. Connect driveline to tractor PTO shaft. A standard 1-3/8" 6B spline driveline with a QD yoke is used to connect mower to tractor. Adjust top link. (See page 12.)

Attach the front driveline shield tether chain to the tractor to prevent driveline shield rotation.

Carefully raise mower and check for driveline clearance between drive shielding and front of mower frame; a minimum of 1/2" clearance is required. Adjustment to tractor upper lift stop may be required to prevent driveline from coming in contact with mower frame.

WARNING

- Make sure spring-activated locking pin or collar slides freely and is seated firmly in tractor PTO spline groove.

Cutting Height Adjustment

WARNING

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

NOTICE

■ Avoid very low cutting heights. Blades striking the ground produces one of the most damaging shock loads a mower can encounter. Allowing blades to contact ground repeatedly, will cause damage to mower and drive.

Before leveling unit that is equipped with pneumatic tires, check air pressure. Follow manufacturer's guidelines on tire sidewall.

Level mower from side to side. Check by measuring from mower frame to the ground at each front corner. Adjust, using tractor 3-point arm leveling device. See page 12.

Adjust cutting height with tractor 3-point arms and rear caster wheel adjustment. The cutting height will be the distance between the blade and the ground. The blades are approximately 5" below the top of the mower frame. To check cutting height, place a straight edge along top edge of mower frame as shown in Figure 2. Measure from bottom of straightedge to the ground at locations (A) and (B). Subtract 5" from measurement (B) to determine cutting height.

For best mowing results adjust the front of the mower slightly lower than the rear. Measurement at location

(A) should be at least 1/4" greater than location (B), and not more than 1/2" greater than location (B).

Adjust the check chains, tailwheel and/or lower tractor lift arms to maintain desired cutting height.

NOTE: Optional check chains and front gauge wheels are available.

WARNING

■ Before working underneath, raise mower to highest position and block securely. Blocking up prevents mower dropping due to hydraulic leak down, hydraulic system failures, or mechanical component failures.

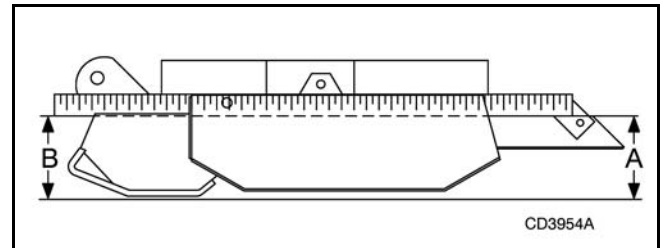


Figure 2. Cutting Height Adjustment on RM990-3 Mounted Mower

Cutting Height Adjustment with Front & Rear Caster Wheel

Place the front and rear adjustment in corresponding lettered holes. Refer to the chart for approximate cutting height.

Hole No.	Approximate Cutting Height
A	1.00"
B	1.50"
C	2.00"
D	2.50"
E	3.00"
F	3.5"

Hole No.	Approximate Cutting Height
G	4.00"
H	4.50"
I	5.00"
J	6.00"
K	7.00"
L	8.00"

Figure 3. RM990-3 Cutting Height Adjustment with Front Caster Wheel

Top Link Adjustment

When the cutting height is adjusted, adjust tractor top link until mower top link attachment point (A) is aligned vertically with mower hitch pin (B).

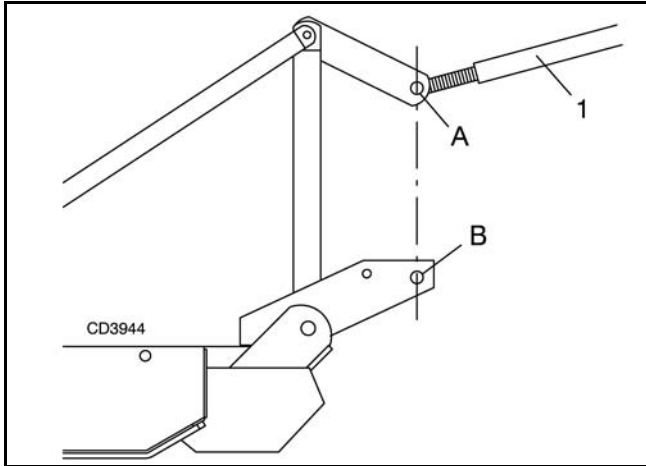


Figure 4. Top Link Adjustment - RM990-3

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 front wheel weights, ballast in tires or front tractor weights. Weigh the tractor and equipment. Do not estimate.

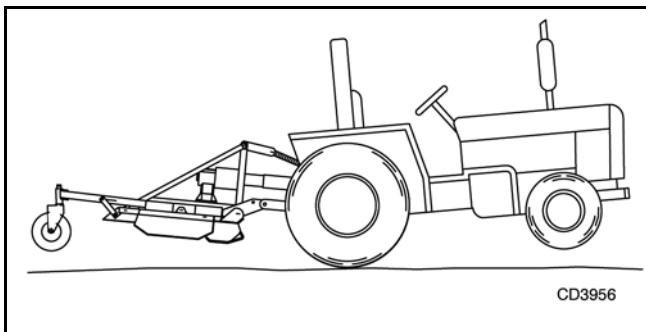


Figure 5. Tractor Stability - RM990-3

ATTACHING P990-3 PULL-TYPE MOWER TO TRACTOR

Drawbar to Hitch Point Distance

Connect mower tongue to tractor drawbar. The mower is shipped with a 1-3/8" PTO spline. The horizontal distance between the end of the tractor PTO shaft and the drawbar hitch point should be 14". This distance must not vary more or less than 1" or the drive may be damaged when turning.

Adjust the tractor drawbar to obtain the desired drawbar to hitch point distance. On some tractors, a drawbar kit must be used to obtain the required dimension. Check with your tractor dealer if you encounter problems.

⚠ WARNING

■ When attaching a pull-type unit to the tractor drawbar, always use a high-strength drawbar pin. The drawbar pin must have a device that will lock it into position. Secure safety chain to attachment and tractor.

Raise mower tongue to tractor drawbar height with jack provided and attach with a 3/4" or larger high-strength drawbar pin. Retain pin to keep it in place.

Connect mower driveline to tractor PTO shaft, making sure spring-activated locking pin slides freely and is seated firmly in tractor PTO spline groove.

When driveline is attached to tractor, attach front driveline shield tether chain to the tractor to prevent driveline shield rotation.

⚠ WARNING

■ Make sure spring-activated locking pin or collar slides freely and is seated firmly in tractor PTO spline groove.

Adjust drive shaft carrier bearing vertically in H-frame until driveline is as straight as possible between tractor PTO and mower gearbox.

Remove parking jack from tongue. Attach to storage bracket on deck. Always attach jack to tongue to hold it up when disconnecting it from tractor.

Cutting Height Adjustment

Place tractor and mower on a level surface. Check to make sure tire pressure is correct and equal on tractor and mower. The correct pressure for mower pneumatic tires is 36 psi.

NOTICE

■ Avoid very low cutting heights. Blades striking the ground one of the most damaging shock loads a mower can encounter. Allowing blades to contact ground repeatedly, will cause damage to mower and drive.

Adjust the mower front to back with an attitude rod. Raise the mower front by turning the attitude rod nut in; lower it by turning nut out. Run front of mower level with rear, or no more than 1/2" lower than rear. Mower cutting height is raised, lowered, and maintained with a

manual ratchet adjustment link or optional hydraulic cylinder.

An optional stroke control kit is available for use with the optional hydraulic cylinder. When a desired cutting height is pre-set and the stroke control kit is placed on the cylinder rod, you can raise the mower and return easily to the pre-set height.

PRE-OPERATION CHECKLIST

(Owner Responsibility)

- ___ Review and follow all safety rules and safety decal instructions on page 5 through page 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 and cotter pins are properly installed and secured.
- ___ Check to ensure blades are sharp, in good condition, and installed correctly. Replace if damaged.
- ___ Check that equipment is properly and securely attached to tractor.
- ___ Make sure driveline spring-activated locking pin or collar slides freely and is seated firmly in tractor PTO spline groove.
- ___ 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.
- ___ Make sure the driveline guards and tether chains are in good condition. Guards must rotate freely on driveline. Fasten tether chains as instructed to the tractor and the equipment.
- ___ Inspect area and remove stones, branches or other hard objects that might be thrown, causing injury or damage.
- ___ Do not allow riders.
- ___ Check all lubrication points and grease as instructed in "Service, Lubrication Information". Make sure the PTO slip joint is lubricated and that the gearbox fluid levels are correct.
- ___ Set tractor PTO at 540 rpm.
- ___ Check that all hydraulic hoses and fittings are in good condition and not leaking before starting tractor. Check that hoses are not twisted, bent sharply, kinked, frayed or pulled tight. Replace any damaged hoses immediately.

- ___ Raise and lower equipment to make sure air is purged from hydraulic cylinders and hoses.
- ___ Make sure tractor ROPS or ROPS CAB and seat belt are in good condition. Keep seat belt securely fastened during operation.
- ___ Before starting engine, operator must be in tractor seat with seat belt fastened. Place transmission in neutral or park, engage brake and disengage tractor PTO.

STARTING AND STOPPING MOWER

Power for operating the mower is supplied by tractor PTO. Do not exceed tractor manufacturer's rated PTO speed of 540 rpm maximum. Know how to stop tractor and mower quickly in case of an emergency.

Should mower become plugged, causing belt to slip, immediately maneuver equipment into a previously cut area and allow mower to clear accumulated material. Continue running at least two minutes, allowing pulleys to cool. Stopping the mower with belt in contact with a very hot pulley will bake and ruin belt.



■ **Stop power unit and equipment immediately upon striking an obstruction. Turn off engine, remove key, inspect, and repair any damage before resuming operation.**

OPERATING TECHNIQUE

Proper ground speed will depend upon the terrain and the height, type and density of material to be cut. Normally, ground speed will range from two to five mph. Tall dense material should be cut at a low speed, while thin medium-height material can be cut at a higher ground speed.

Always operate tractor PTO at 540 rpm; this is necessary to maintain proper blade speed and produce a clean cut.

Under certain conditions, tractor tires may roll some grass down and prevent it from being cut at the same height as the surrounding area. When this occurs, reduce tractor ground speed but maintain 540 rpm PTO speed. The lower ground speed will permit grass to at least partially rebound.

Under some conditions, grass will not rebound enough to be cut evenly. In general, lower cutting heights give a more even cut with less tendency to leave tire tracks. However, it is better to cut grass frequently rather than too short. Short grass deteriorates rapidly in hot weather and invites weed growth during growing seasons. Follow local recommendations for the suitable cutting height in your area.

Tips

WARNING

- Inspect and clear area of stones, branches, or other hard objects that might be thrown, causing injury or damage.

Extremely tall material should be cut twice. Cut material higher the first pass. Then cut at desired height, at 90° to first pass.

Remember, sharp blades produce cleaner cuts and require less power.

Analyze area to be cut to determine best procedure. Consider height and type of material and terrain type: hilly, level or rough.

Plan your mowing pattern to travel straight forward whenever possible.

Optional Blade

The mower is equipped with free-swinging suction type blades as standard equipment when shipped from the factory. If you are operating in a sandy area or where high abrasive wear occurs and causes damage to the fin of the standard suction type blade, an optional low suction type blade is available.

Optional Front Roller

The tailwheels and side skids effectively reduce scalping in most cases. However, you may encounter areas where the tailwheels and/or side skids drop into depressions and allow center of mower to contact ground and scalp. An optional front roller may be installed to minimize scalping.

Uneven Terrain

WARNING

- Do not operate or transport on steep slopes.
- Do not stop, start, or change directions suddenly on slopes.

WARNING

- Use extreme care and reduce ground speed on slopes and rough terrain.
- Watch for hidden hazards on the terrain during operation.

Pass diagonally through sharp dips and avoid sharp drops to prevent “hanging up” tractor and mower.

TRANSPORTING P990-3 MOWER

Either the standard ratchet adjustment link or optional hydraulic cylinder and transport bar must be installed when transporting mower.

A transport bar, to be used in conjunction with the hydraulic cylinder, is furnished with each P990-3 mower. It must be installed when the optional hydraulic cylinder is used to control cutting height.

Transport Bar Storage Position (Figure 6)

When not in use, the transport bar (3) should be pivoted to the rear, away from the cylinder, and the lock pin should be installed in the hole and secured with hairpin cotter (5).

Engaging Transport Bar (Figure 7)

Raise mower with hydraulic cylinder and pivot transport bar (4) forward over cylinder rod (6). Install lock pin (3) through hole in transport lock (7) and secure with hairpin cotter (2).

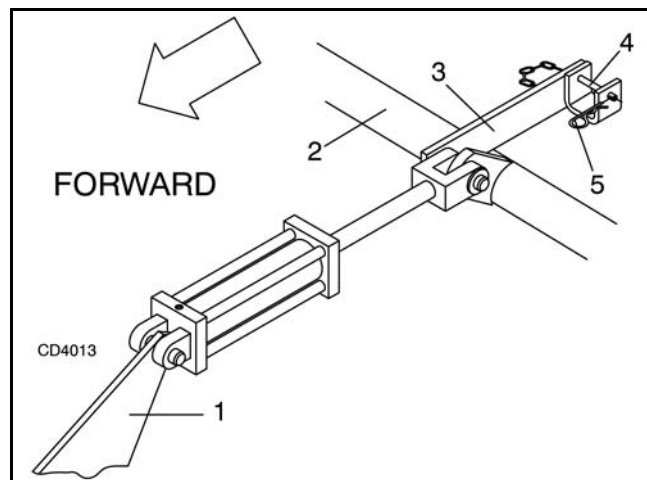


Figure 6. P990-3 Transport Bar - Operating Position

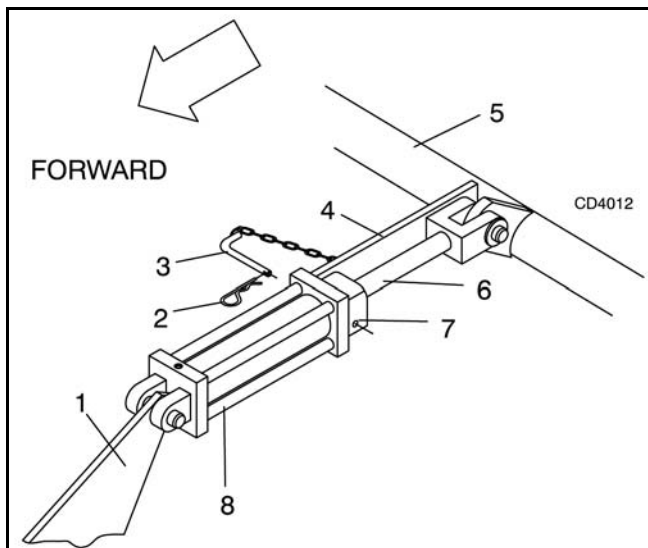


Figure 7. P990-3 Transport Bar -
Raised Transport Position

Removing Mower from Tractor

Place tractor and mower on a solid level surface. Raise mower and block securely.

Disengage PTO, set parking brake, stop engine and remove key.

On pull-type units, place the jack on the tongue for parking. Secure driveline up off the ground.

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 by your Woods dealer). See Safety Decals section for location drawing.

OWNER SERVICE

WARNING

- Before servicing, adjusting, repairing or unplugging, stop tractor engine, place all controls in neutral, set park brake, remove ignition key, and wait for all moving parts to stop.
- Keep all persons away from operator control area while performing adjustments, service, or maintenance.

CAUTION

- 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 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.

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

BLOCKING METHODS

Jack stands, with a load rating of 1,000 pounds or more, are the only approved blocking device for this mower. A minimum of four jack stands, located under the mower as shown in Figure 8, must be installed before working underneath this unit. Do not position jack stands under wheels, axles, or wheel supports because these components can rotate.

Do not work underneath unless it is properly attached to tractor (see Operation Section), the brakes set, key removed, and the mower blocked securely. The mounted unit will be anchored to minimize side to side and front to rear movement. The pull-type unit will be anchored front to rear.

For the mounted unit, tighten tractor lower 3-point arm anti-sway mechanisms to prevent side to side movement.

For the pull-type unit, raise mower with the standard ratchet adjustment link or the optional hydraulic cylinder. When the optional hydraulic cylinder is installed the standard equipment transport bar must be pinned in the raised position. With either the ratchet adjustment link or the optional hydraulic cylinder, lower

mower to transfer its weight to the jack stands, but do not raise the rear wheels off of the ground.

When blocking, you must consider overall stability of the unit. Just placing jack stands under the unit will not ensure your safety. The working surface must be level and solid to support the weight on the jack stands. Ensure jack stands are stable both top and bottom, and mower is approximately level. With full mower weight lowered on jack stands, test blocking stability before working underneath mower.

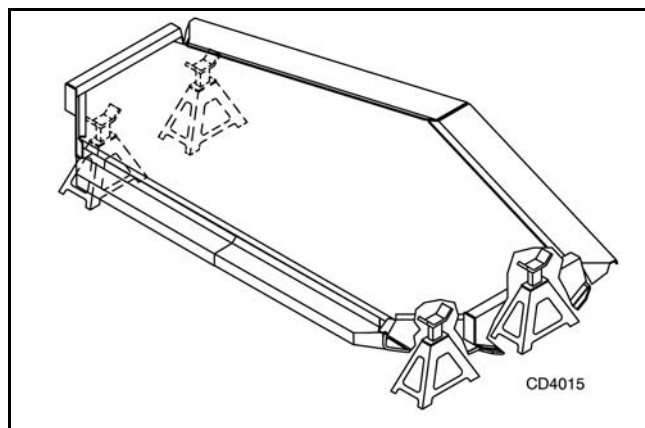


Figure 8. Jack Stand Placement
(Tractor and Connection Not Shown)

LUBRICATION INFORMATION (FIGURE 9)

Figure 9 shows the lubrication points. The accompanying chart gives the frequency of lubrication in operating hours, based on normal conditions. Severe or unusual conditions may require more frequent lubrication.

Do not let excess grease collect on or around parts, particularly when operating in sandy areas.

Use SAE 90W gear lube in gearbox. Check gearbox daily for evidence of leakage at both seals and the gasket between the housing and cover. If leakage is noted, repair immediately. There may be a small amount of lube emitted from the vent plug; this is not considered leakage. Check the gearbox every day using the dipstick. Oil level is to be up to the ring but not over. Overfilling the gearbox will cause the excess gear lube to blow out vent plug. The gear lube could then ruin the belt.

Use a lithium grease of No. 2 consistency with a MOLY (molybdenum disulfide) additive for all locations. Be sure to clean fittings thoroughly before attaching grease gun. When applied according to the lubrication chart, one good pump of most guns is sufficient. Do not overgrease.

Daily lubrication of the driveline slip joint is necessary. Failure to maintain proper lubrication can result in

damage to U-joints, gearbox, tractor PTO and/or the mower driveline. Disconnect driveline from the tractor.

To lubricate driveline slip joint, insert a grease gun through shield slots (keep fingers out of slots to prevent injury) and apply grease to grease fitting. Move drive-

line in and out to distribute grease over the entire working area. Connect driveline to tractor.

Driveline shield bearings (12) must be greased every eight hours. This operation requires a needle point adapter for a grease gun. Insert the needle point into the bearing hole and apply one good pump.

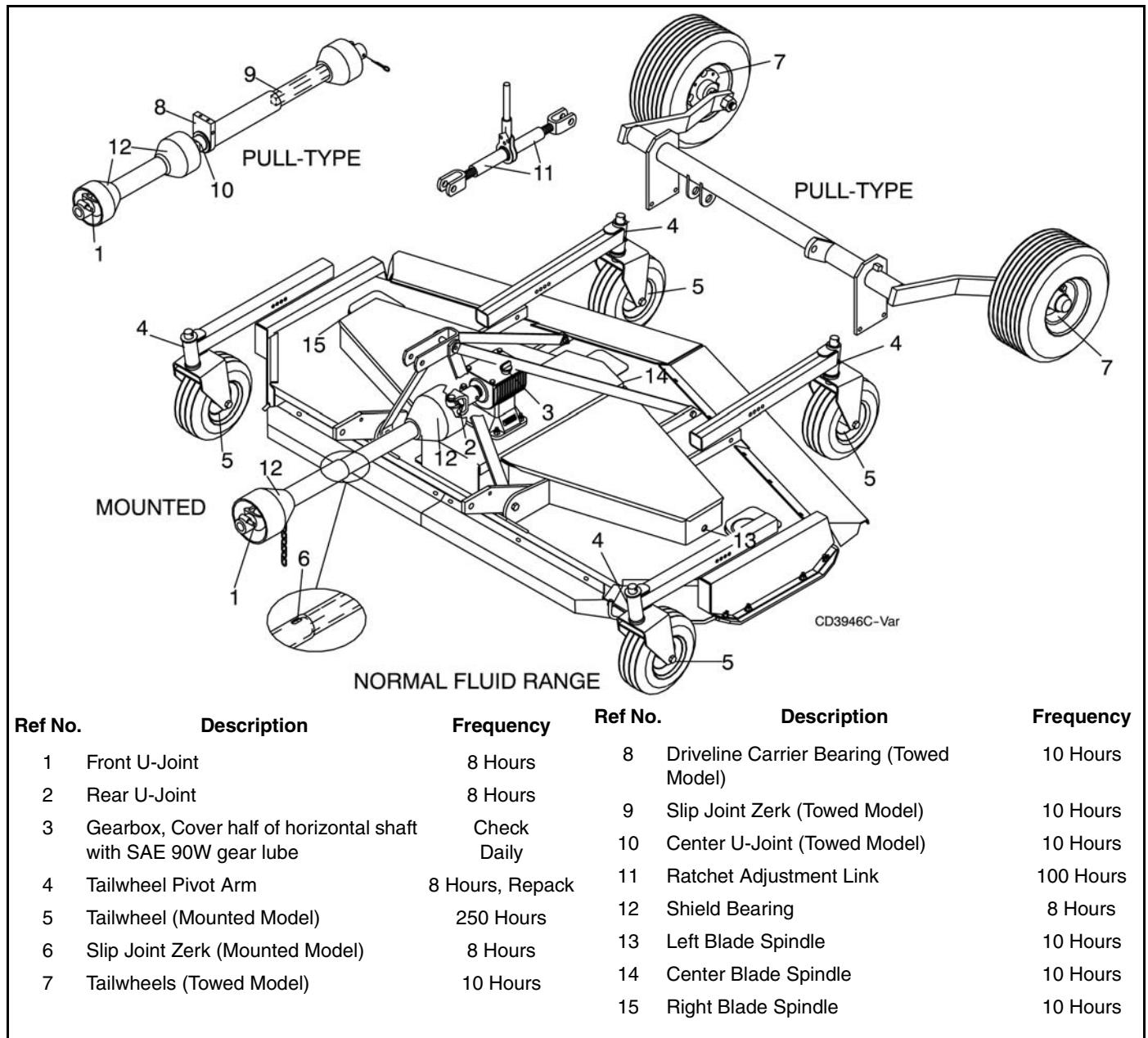


Figure 9. Lubrication Points

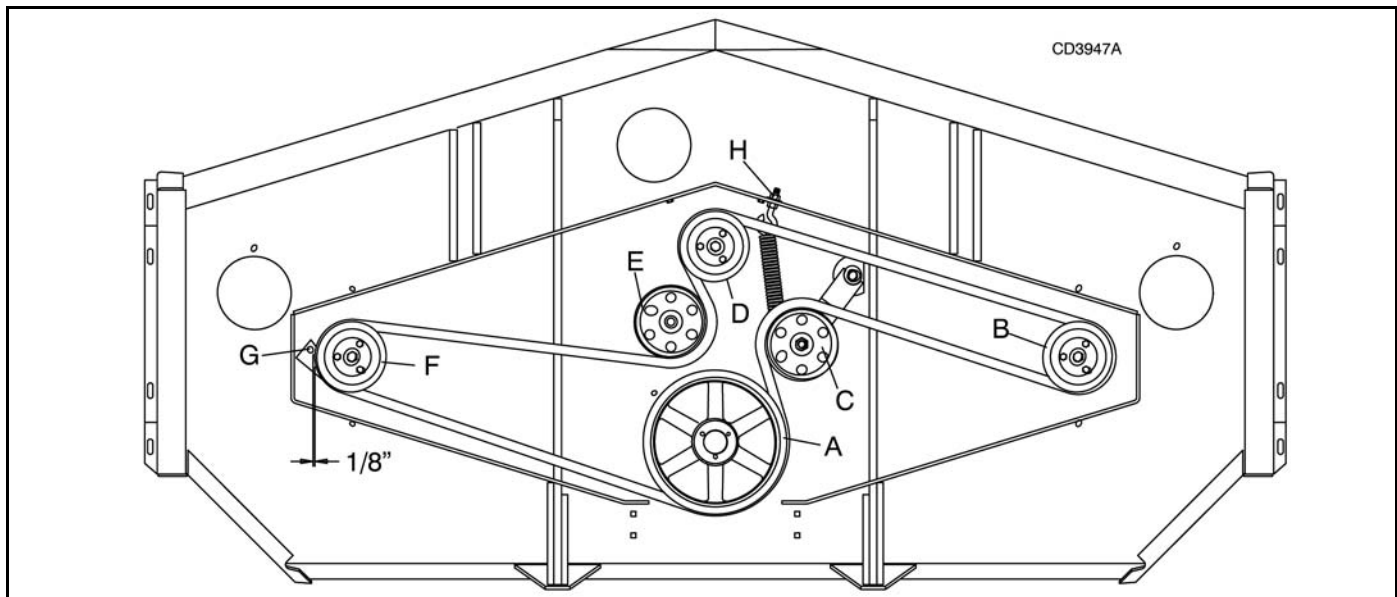


Figure 10. Belt Installation

BELT REPLACEMENT (FIGURE 10)

One of the major causes of belt failure is improper installation. Before a new belt is installed, check pulley shafts and bearings for wear. Check pulley grooves for cleanliness. Make sure spindles turn freely and without wobble. If grooves require cleaning, use a cloth moistened with a non-flammable, non-toxic degreasing agent or commercial detergent and water.

Avoid excessive force during installation. Do not use tools to pry belt into pulley groove. Do not roll belt over pulleys to install. This can cause hidden damage and premature belt failure.

NOTICE

■ Use care when installing or removing belt from spring-loaded idler in step 6. Springs store energy when extended and, if released suddenly, can cause personal injury.

Belt replacement is accomplished in these steps:

1. Loosen nut and swing belt guide (G) away from pulley (F).
2. Loosen nut on eyebolt (H) to relax tension in spring.
3. Slide belt under and around drive pulley (A).
4. Route belt around pulley (F), idler (E) and pulley (D) as shown.
5. Make sure belt is on drive pulley (A) and route belt around spring-loaded idler (C).
6. Grasp belt between spindle pulley (B), spring-loaded idler (C) and spindle pulley (D). Pull spring-loaded idler with belt and route belt over pulley (B).

7. Tighten nut on eyebolt (H). Make sure spring-loaded idler arm pivots freely with belt installed.
8. Set belt guide (G) 1/8" away from belt. Tighten to 85 lbs-ft.

SHEAR BOLT REPLACEMENT ***NOTICE***

■ Always use approved 1/2" NC x 3" grade 2 shear bolt as a replacement part. Using a hardened bolt or shear pin may result in damage to driveline or gearbox.

Rotate driveline to align holes in yoke and shaft. Install shear bolt and secure with lock nut.

CHAIN OR RUBBER SHIELDING REPAIR



■ Full chain or rubber shielding must be installed when operating in populated areas or other areas where thrown objects could injure people or damage property.

- If this machine is not equipped with full chain or rubber shielding, operation must be stopped when anyone comes within 300 feet (92 m).
- This shielding is designed to reduce the risk of thrown objects. The mower deck and protective devices cannot prevent all objects from escaping the blade enclosure in every mowing condition. It is possible for objects to ricochet and escape, traveling as much as 300 feet (92 m).

Chain Shielding Repair

Inspect chain shielding each day of operation and replace any broken or missing chains as required.

SIDE SKID REPAIR

Side skids are replaceable. Check them periodically and replace as necessary.

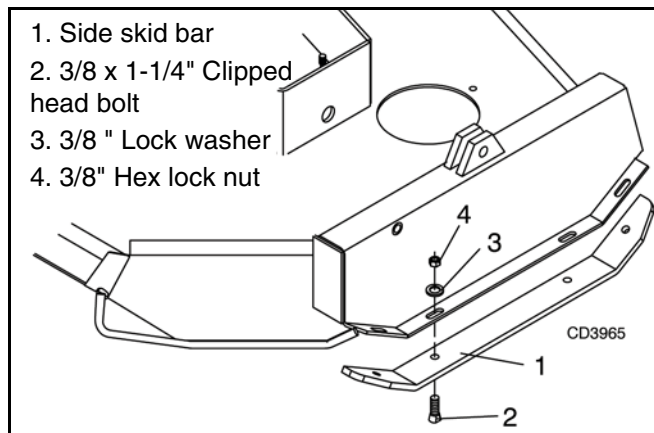


Figure 11. Side Skid Repair

BLADE SERVICING

CAUTION

■ Your dealer can supply genuine replacement blades. Substitute blades may not meet original equipment specifications and may be dangerous.

■ Make certain all movement of equipment components has stopped before approaching for service.

Low suction and general purpose suction blades are available. Use low suction blades in sandy areas where abrasive action could cause excessive blade wear. General purpose suction blades are recommended for all other applications.

Inspect blades before operation for condition and ensure they are securely fastened. Replace blades that are bent, excessively nicked, worn or have any other damage. Small nicks may be ground out when sharpening.

Replace blades on a spindle in pairs; an old blade and a new blade may vary excessively in weight and cause vibration. Never mix blade types.

Blade Sharpening

Follow the original sharpening pattern. Make an effort to maintain balance on both blades from a spindle by grinding the same amount from them. Blades that vary excessively in weight can cause vibration.

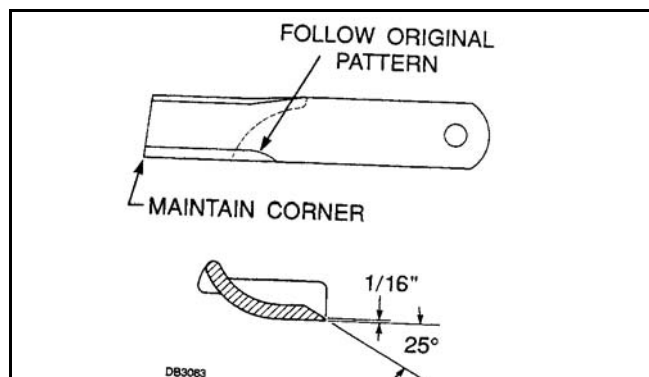


Figure 12. Blade Sharpening

Blade Removal

This mower is equipped with quick change blades. Open blade access cover, loosen bolt (5) and rotate blade lock (4) to allow for removal of blade pin (3). Remove blade (2). Rotate spindle and remove opposite blade in same manner.

Blade Installation

Make sure to position blade so the cutting edge leads in a counter-clockwise rotation. Install blade (2), then place blade pin (3) in hole and rotate blade lock (4) to secure blade. Tighten bolt (5). Rotate spindle and install opposite blade in same manner. Repeat for remaining spindles.

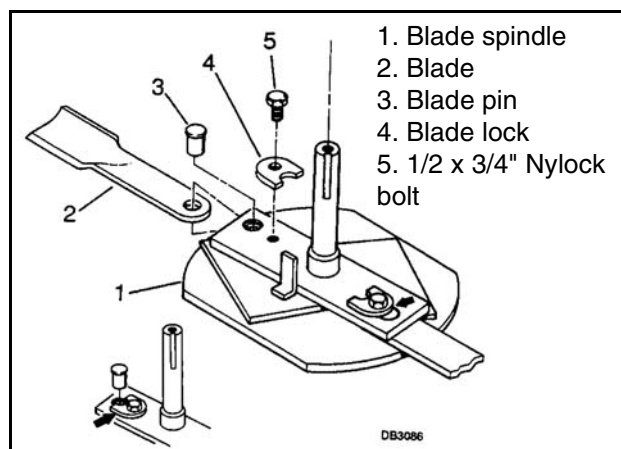


Figure 13. Blade Installation and Lock

WHEEL BEARING MAINTENANCE RM990-3 ONLY

At least once each mowing season or 250 hours of operation, whichever occurs first, the bearings in the tailwheel should be removed, cleaned and repacked. Replace bearings and cones if broken or worn excessively.

Install the wheel in the wheel yoke and tighten the inner nut until there is a slight bearing drag (similar to automobile wheels). Hold the inner nut and tighten the lock nut against it to maintain bearing adjustment.

TROUBLESHOOTING

MOWING CONDITIONS

PROBLEM	POSSIBLE CAUSE	SOLUTION
Grass cut higher in center of swath than at edge	Height of mower higher at rear than at front	Adjust mower height and attitude so that mower rear and front are within 1/2" of same height.
Grass cut lower in center swath than at edge	Height of mower lower at rear than at front	Adjust mower height and attitude so that mower rear and front are 1/2" of same height.
Streaking conditions in swath	<p>Conditions too wet for mowing</p> <p>Blades unable to cut that part of grass pressed down by path of tractor tires</p> <p>Dull blades</p>	<p>Allow grass to dry before mowing.</p> <p>Slow ground speed of tractor but keep engine running at full PTO rpm.</p> <p>Sharpen or replace blades.</p>
Material discharge from mower unevenly; bunches of material along swath	<p>Material too high and too much material</p> <p>Grass wet</p> <p>Rear of mower too low, trapping material under mower</p>	<p>Reduce ground speed but maintain 540 rpm at tractor PTO, or make two passes over material. Raise mower for the first pass and lower to desired height for the second and cut at 90° to first pass. Raise rear of mower high enough to permit material to discharge, but not so high that conditions listed above occur.</p> <p>Allow grass to dry before mowing. Slow ground speed of tractor but keep engine running at full PTO rpm.</p> <p>Adjust mower height and attitude.</p>

TROUBLESHOOTING

BELT CONDITIONS

PROBLEM	POSSIBLE CAUSE	SOLUTION
Belt slippage	Mower overloading; material too tall or heavy	Reduce tractor ground speed but maintain full PTO rpm. Cut material twice, one high pass and then mow at desired height. Cut a partial swath.
	Oil on belt from over lubrication	Be careful not to over lubricate, clean lubricant from belt and pulleys with clean rag, replace oil-soaked belt.
	Belt hung up or rubbing	Check belt for free travel in pulleys and belt guides, check under mower and around blade spindle shafts for wire, rags, or other foreign materials; clean all materials from under mower.
Frayed edges on cover	Belt misaligned or belt rubbing guide	Re-align belt or guide, be sure belt does not rub any other part while running.
	Pulley misalignment	Inspect to ensure belt is running in center of backside idler, shim idler as necessary to align.
Belt rollover	Pulley misalignment	Re-align.
	Damaged belt	*Replace belt.
	Foreign object in pulley grooves	Inspect all pulley grooves for rust, paint or weld spots and remove.
	Worn pulley groove	Replace pulley.
Damaged belt	Rollover, high shock loads or installation damage	*Replace belt.
Belt breakage	High shock loads	Avoid abusive mowing, avoid hitting the ground or large obstructions.
	Belt came off drive	Check drive pulley for foreign material in grooves, avoid hitting solid objects or ground.
* Check belt for damage by laying it flat on the floor. If belt does not lie flat (has humps or twists), which indicates broken or stretched cords, it must be replaced.		

DEALER SERVICE

The information in this section is written for dealer service personnel. The repairs described require 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 servicing, adjusting, repairing or unplugging, stop tractor engine, place all controls in neutral, set park brake, remove ignition key, and wait for all moving parts to stop.**

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

⚠ CAUTION

■ **Make certain all movement of equipment components has stopped before approaching for service.**

■ **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.**

BLOCKING METHODS

Jack stands, with a load rating of 1,000 pounds or more, are the only approved blocking device for this mower. A minimum of four jack stands, located under the mower as shown in Figure 14, must be installed before working underneath this unit. Do not position jack stands under wheels, axles, or wheel supports because these components can rotate.

Do not work underneath unless it is properly attached to tractor (see Operation Section), the brakes set, key removed, and the mower blocked securely. The mounted unit will be anchored to minimize side to side and front to rear movement. The pull-type unit will be anchored front to rear.

For the mounted unit, tighten tractor lower 3-point arm anti-sway mechanisms to prevent side to side movement.

For the pull-type unit, raise mower with the standard ratchet adjustment link or the optional hydraulic cylinder. When the optional hydraulic cylinder is installed the standard equipment transport bar must be pinned in the raised position. With either the ratchet adjustment link or the optional hydraulic cylinder, lower the

mower to transfer its weight to the jack stands, but do not raise the rear wheels off of the ground.

When blocking, you must consider overall stability of the unit. Just placing jack stands under the unit will not ensure your safety. The working surface must be level and solid to support the weight on the jacks stands. Ensure jack stands are stable both top and bottom, and mower is approximately level. With full mower weight lowered on jack stands, test blocking stability before working underneath mower.

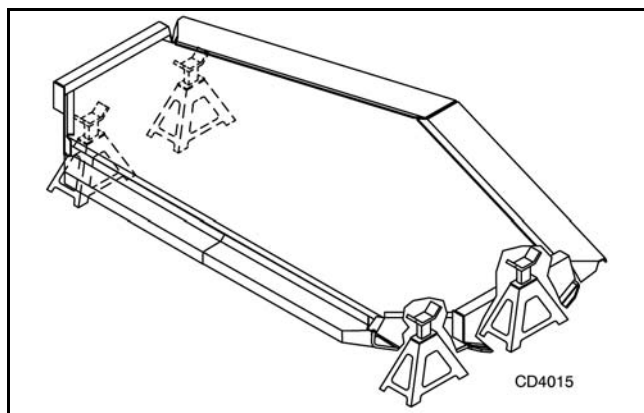


Figure 14. Jack Stand Placement
(Tractor and Connection Not Shown)

BLADE SPINDLE

Blade Spindle Repair Tips

As a reference point, the grease fitting is in the top portion of the spindle housing.

To minimize wear, the bearing cups, cones and sleeves are press fit to the shaft and will require a press or similar device for removal.

When disassembling, support housing casting to prevent damage.

Remove bearing cups by placing a punch in housing slots and driving cup out. Alternate punch positions from side to side. Use care to prevent housing damage.

Permatex 3-D Aviation Form-A-Gasket[®] or equivalent is recommended as a sealant for spindle repair.

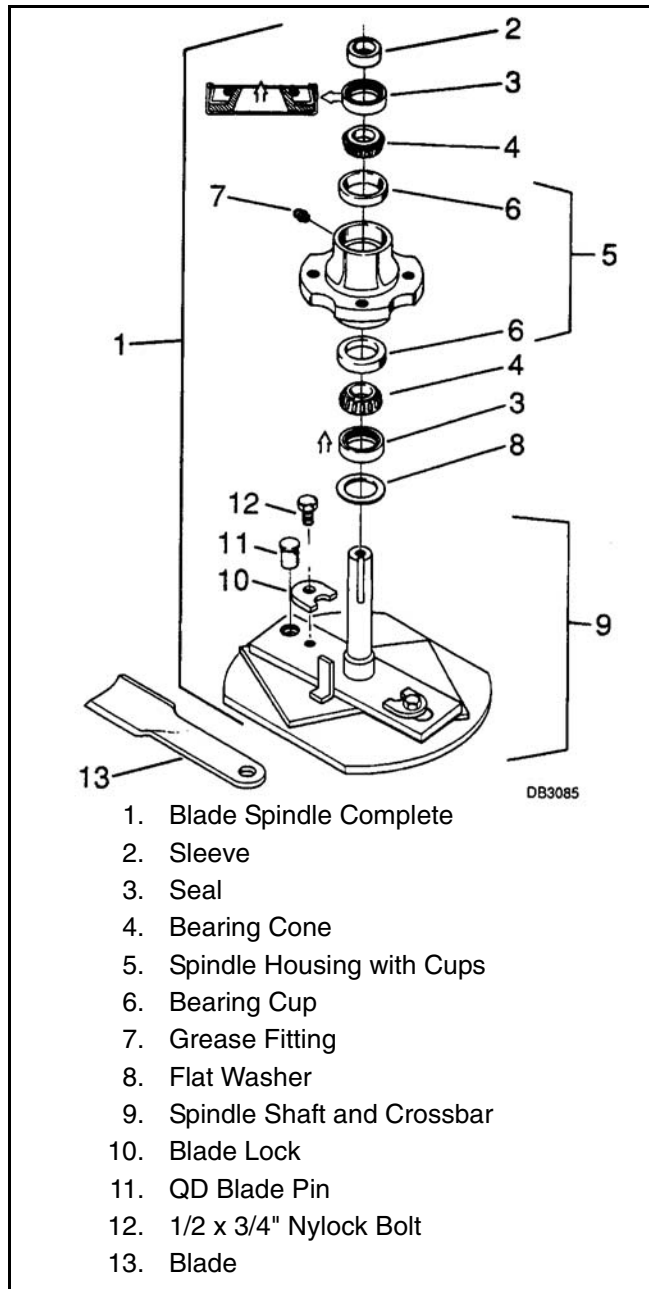
Blade Spindle Removal

Remove belt. Remove blades from spindle. Remove bolt and washer from top of spindle shaft.

Remove split taper bushing (located on top of pulley) by removing the two bolts and inserting them into the threaded holes in bushing flange. Tighten alternately to remove split taper bushing.

Remove key and pulley. Remove the four bolts and nuts attaching spindle to mower frame and remove spindle.

Store bushing, pulley and all hardware for reinstallation.



1. Blade Spindle Complete
2. Sleeve
3. Seal
4. Bearing Cone
5. Spindle Housing with Cups
6. Bearing Cup
7. Grease Fitting
8. Flat Washer
9. Spindle Shaft and Crossbar
10. Blade Lock
11. QD Blade Pin
12. 1/2 x 3/4" Nylock Bolt
13. Blade

Figure 15. Blade Spindle Assembly

Blade Spindle Disassembly

Support housing and press blade carrier and shaft (9) out. Remove seals, bearing cones and cups from housing. See Figure 15.

Blade Spindle Assembly

Bearing cups and cones are designed to work together. It is important to position them so bearing cone taper mates with bearing cup taper. See Figure 15.

Lubricate new cups (6) with a light oil. Place them in spindle housing (5) so they will mate with cones (4). Seat cups (6) against machined shoulder of housing with a press or by placing a large soft drift on the flat lip and driving them into housing.

Pack bottom bearing cone (4) with grease and place it into housing against bearing cup (6).

NOTICE

■ **Bearing failure is often a result of improper seal installation and positioning. Follow instructions carefully.**

Lightly coat housing area where seals seat with Permatex or equivalent.

Lightly lubricate seal, locate spring and place seal squarely on housing with spring toward housing center. Select a pipe or tubing with an outside diameter that will set on outside seal edge. One that is too small will bow seal cage.

Carefully press seal into housing, preventing distortion to metal seal cage. Seal should seat firmly and squarely against machined housing shoulder.

Make sure seal lip did not roll under.

Distortion to seal cage or seal lip damage will cause leakage. Damaged seals must be replaced.

Place housing assembly over shaft and blade center (9) and carefully guide over shaft while pressing shaft into bearing cup and cone. Assembly should seat firmly against step in shaft.

Fill housing cavity with a lithium grease of No. 2 consistency with a MOLY (molybdenum disulfide) additive.

Pack top bearing cone (4) with grease and place it (taper down) on shaft. Place sleeve (2) on shaft and press bearing onto shaft until free play is removed and there is a slight drag (similar to adjusting automobile wheel bearings). Check by turning housing on shaft; it should turn freely.

NOTICE

■ **Bearing adjustment is set by pressing sleeve against bearing until proper adjustment is attained. Adjustment is maintained by seating split taper bushing against sleeve.**

Adjusting bearings too tightly will shorten their life. Should you overtighten them, hold housing and rap top of shaft with a lead hammer to loosen bearings. Adjust to obtain proper setting.

Proper bearing adjustment is essential to good bearing life.

Lightly lubricate top seal, locate spring and place seal squarely on housing with spring up away from housing. Follow installation instructions given for bottom seal. Top seal should be flush with, to 1/16" above, housing.

Blade Spindle Installation

Insert spindle through bottom of mower, positioning grease fitting outward on outer spindles and to the rear on center spindle. Secure to deck with four bolts and flange lock nuts.

Place belt pulley over spindle shaft and seat split taper bushing against spindle sleeve. Place flat washer and bolt into threads of spindle shaft and torque to 35 lbs-ft. Place split taper bushing bolts into threaded holes of pulley and tighten alternately to 12 lbs-ft., securing pulley to bushing.

Reinstall blades and belt.

WHEEL SPINDLE REPAIR

(For Pull-Type Mowers Only)

Wheel spindle repair is accomplished in a manner similar to blade spindle repair. Refer to the wheel spindle parts list and apply the repair techniques outlined in Blade Spindle Disassembly and Assembly (page 23). Adjustment is set and maintained with the slotted hex nut and cotter key.

UNIVERSAL JOINT REPAIR

Two different style driveline U-joints are used. The repair procedure is basically the same. One has internal snap rings (Figure 16); the other has external snap rings (Figure 17). Determine which type you are repairing and remove all four snap rings.

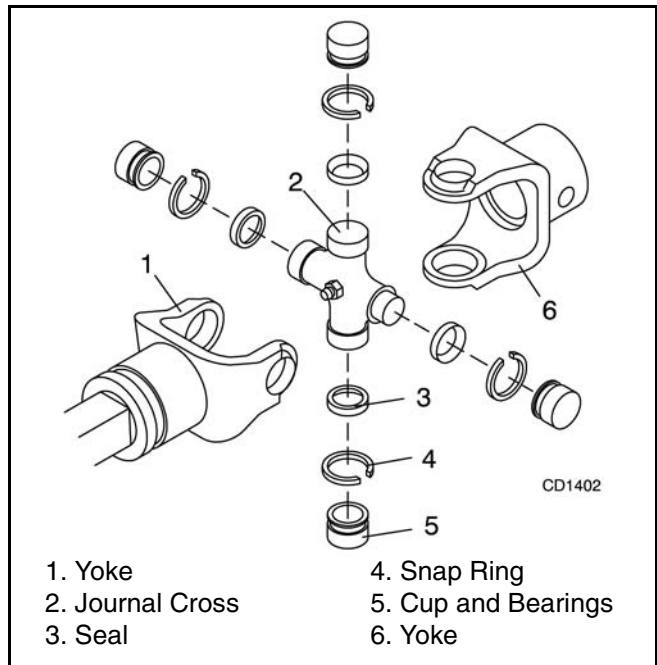


Figure 16. U-Joint Exploded View with Internal Snap Rings

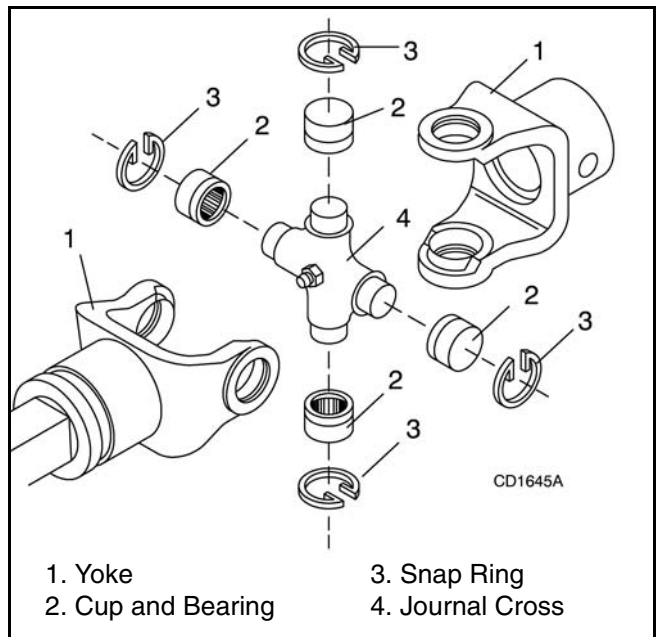


Figure 17. U-Joint Exploded View with External Snap Rings

U-Joint Disassembly

1. Remove snap rings from inside or outside of yokes in four locations. (Figure 18 only shows the style with internal snap rings.)

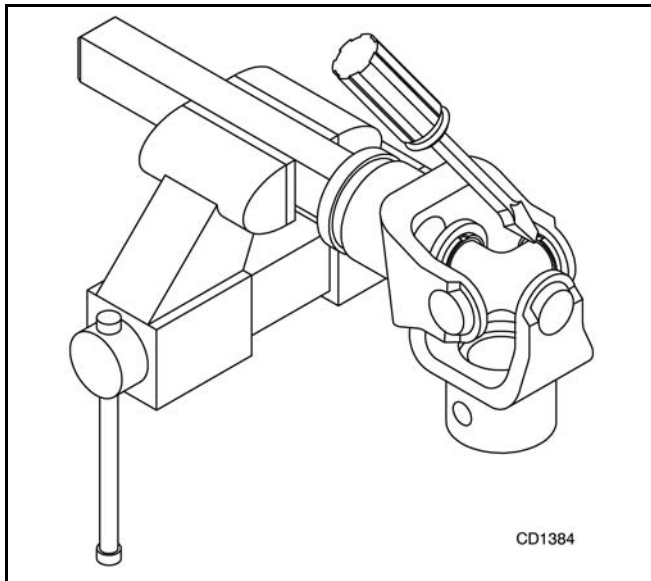


Figure 18.

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.

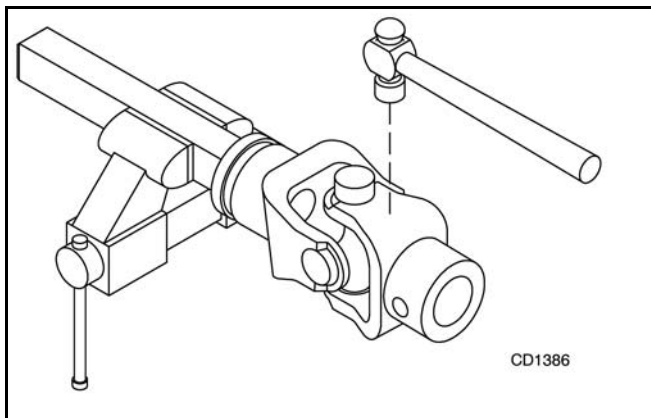


Figure 19

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

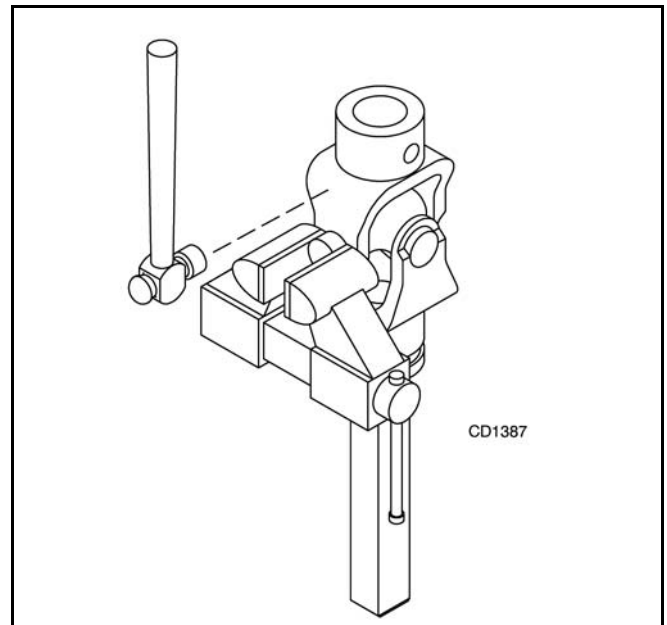


Figure 20.

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

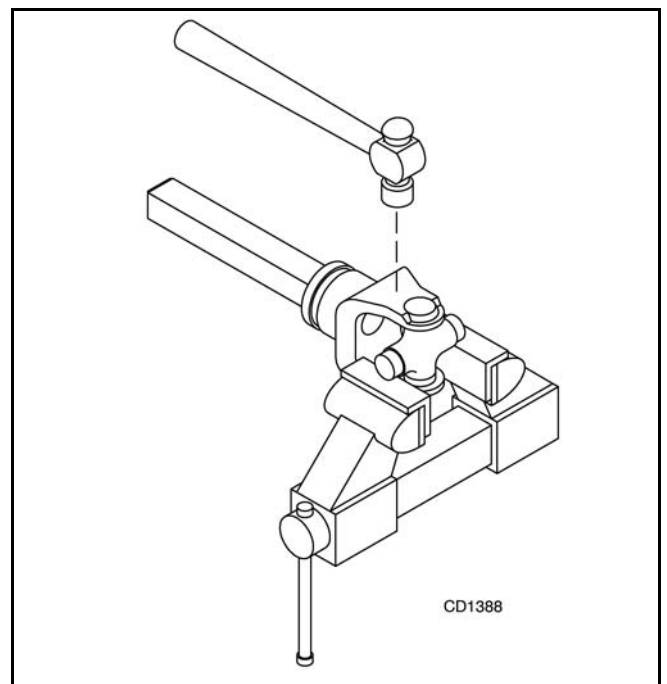


Figure 21.

U-Joint Assembly

1. Place seals securely on bearing cups (on internal snap ring style only).

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.

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. Tap yoke to aid in process.

2. Seat cups by placing a drift or socket (slightly smaller than the cup) on cup and rapping with a hammer. See Figure 22. Install snap ring and repeat on opposite cup.
3. Repeat steps one and two to install remaining cups in remaining yoke.

Move both yokes in all directions to check for free movement. Should movement be restricted, rap on yokes sharply with a hammer to relieve any tension. Repeat until both yokes move in all directions without restriction.

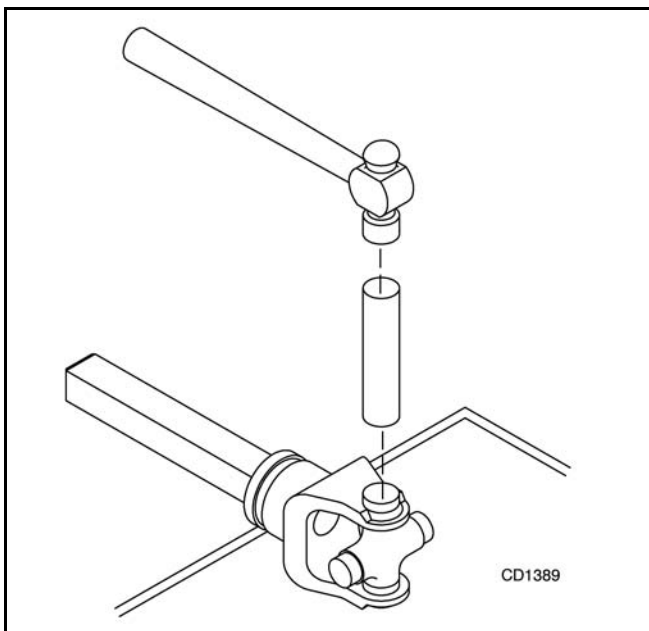


Figure 22.

GEARBOX MAINTENANCE

Read all of this section before starting any repair. Many steps are dependent on each other.

Check gearbox for leakage and shaft side and end play. If excessive shaft play is found, disassemble gearbox and inspect bearings and shafts.

Leakage can occur at top cover and at shaft seals. Leakage problems should be corrected immediately to prevent damage to drive belt from gearbox oil.

Always clean any spilled lubricant with a cloth moistened with a non-flammable, non-toxic degreasing agent or commercial detergent and water. Be sure to clean pulley grooves.

The sealants recommended for gearbox repair are Permatex Aviation 3D Form-A-Gasket[®] or Loctite 515 Gasket Eliminator[®].

Leakage Repair

To repair top cover leakage, clean top cover and housing sides, then remove cover. Remove old sealant from cover and housing.

Apply sealant to top cover and replace. Retorque housing bolts.

Horizontal seal leakage should be repaired by replacing the seal. The gearbox should be removed from the mower to accomplish this. Remove old seal with care to prevent damage to seal bore and shaft. Sealant should be applied to the seal bore before installing the new seal. The new seal should be seated squarely in the bore against snap ring. Press seal into place with a piece of pipe or tubing that sets against the outside edge of the seal. Tubing with an outside diameter that is too small will bow seal cage and ruin the seal.

Removing Gearbox from Mower

Remove belt and driveline shields.

Remove rear driveline shield bearings and remove shield. Remove snap ring from gearbox shaft. Remove shear bolt from end yoke and remove driveline.

Remove drive belt from drive sheave.

Remove gear stand from mower.

Remove drive sheave from mower by removing bolts from split taper bushing and turning them into threaded holes on bushing flange. Tighten evenly, forcing the bushing and drive sheave apart.

Remove gearbox from gear stand.

Gearbox Disassembly

(S/N 788882 and prior, Figure 23)

NOTE: A five ton press will be required for vertical gear shaft removal.

Remove top cover (12) and drain all gear lube.

Clamp gearbox upside-down in a large vise. Place a long 1/2" rod or punch through the horizontal shaft shear bolt hole to prevent shaft rotation. Remove stake

nut (19). If nut is too tight to remove with a spanner wrench, loosen with a punch and hammer.

Carefully remove vertical shaft seal (18) to prevent damage to shaft threads and seal bore.

Remove gearbox from vise. Use care when removing horizontal shaft seal (1) and retaining ring (2) to prevent damage to shaft seal surface and housing bore.

Place puller (20) over horizontal shaft (6) and insert a 1/2" bolt or rod through horizontal shaft shear bolt hole. Tighten puller bolts evenly to remove shaft from housing.

Place housing upside-down in a press and remove vertical shaft (14) by pressing through the top of the housing. Remove bearing cone (15) from vertical shaft (14) with a spreader. Remove all cups from housing with a puller or by carefully driving them out with a punch.

Inspect gears for excessive wear. Gears are forged and surfaces will appear rough, even when new. Some wear is normal. Gears will show more wear on the loaded side and the pattern should be smooth.

Inspect both gear shafts and stake nut for grooves, nicks or bumps where seals seat. Replace if damage cannot be repaired by resurfacing with emery cloth.

Clean gearbox housing and inspect for damage. Replace if cracks are found.

Gearbox Assembly

(S/N 788882 and prior, Figure 23)

Press cups (8 & 16) into housing until they seat tightly against machined shoulders.

Press bearing cone (15) onto vertical gear shaft (14) and seat it against gear.

Insert vertical gear shaft into housing. Invert housing in a press and place supports under gear to hold bearing cone (15) against cup (16). Press bottom bearing cone (15) onto shaft until all free play is removed and there is a slight drag when rotating housing on shaft (similar to setting automobile front wheel bearings). If bearings are too tight, loosen by holding housing and rapping on

end of vertical gear shaft (14) with a shot hammer or equivalent.

Install O-ring (17) into groove on vertical gear shaft (14) next to bearing cone (15). Place a small bead of gasket sealer on top of O-ring.

Use the proper size tubing to press against the outside edge of seal to prevent seal damage. Apply gasket sealant to seal bore and press output shaft seal (18) into housing until it seats against housing shoulder. Coat inner portion of seal with grease.

Thread stake nut (19) onto shaft (14) in through seal (18). Tighten until nut is snug against bearing cone (15). Use a punch to stake the lip of stake nut (19) into shaft (14) keyway.

Insert shaft (6) through top of housing out through horizontal hole, then set bearing (7) into cup (8). Press bearing (5) onto gear shaft (6). Do not use excessive force to seat bearing.

Place bearing cup (4) over horizontal shaft (6) and press into housing until there is a slight drag on bearings when shaft is rotated (similar to setting automobile front wheel bearings). When you have bearings adjusted, select shims from shim kit (3) and place on top of bearing cup (4) until they are flush with bottom of snap ring groove in horizontal shaft (6), then install snap ring (2).

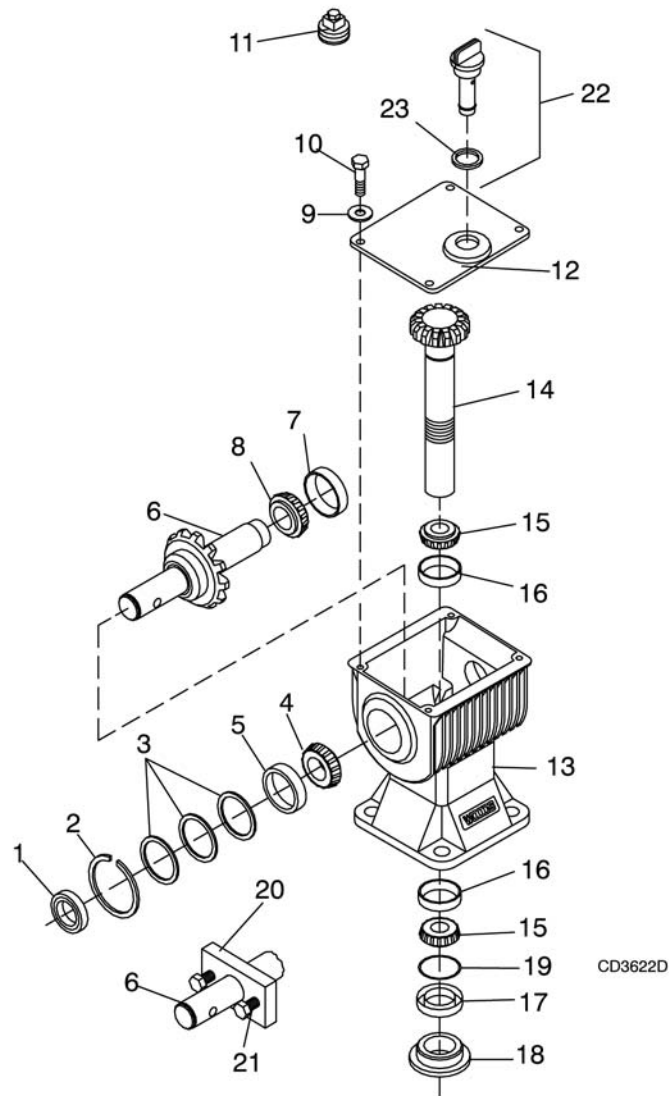
Apply gasket sealant to housing seal bore and press seal (1) into housing until it seats against snap ring or is flush with housing.

Apply gasket sealant to top of housing flange, replace top cover and secure with bolts (10) and washers (9).

Attach gearbox to gear stand and torque mounting bolts.

Remove the dipstick and pour in one quart of gear lube. Wait five minutes and add an additional pint and one half. Allow an additional five minutes for the lube to flow through the bearings, then check to make sure half of the horizontal gear shaft is covered. Replace the dipstick.

1. 1.38 x 2.56 x .38" Seal
2. Retaining ring
3. Shim washer kit
4. Bearing cup
5. Bearing cone
6. 30-Tooth gear and horizontal shaft
7. Bearing cone
8. Bearing cup
9. 3/8" Lock washer
10. 3/8 x 3/4" Bolt
11. 1" Vented pipe plug (used prior to S/N 2000)
12. Gearbox cover
13. Housing
14. 17-Tooth gear and vertical shaft
15. Bearing cone
16. Bearing cup
17. O-Ring
18. Double lip seal
19. Stake nut
20. Puller
21. Puller bolts
22. Dipstick (used on SN 2000-788882)
23. O-Ring (used on SN 2000-788882)



CD3622D

Figure 23. Gearbox Assembly (SN 788882 and Prior)

Gearbox Disassembly

(Units after S/N 788882, Figure 24)

Remove gearbox from cutter as follows: Disconnect and remove the rear driveline from the gearbox. Remove vent plug (27) and siphon gear lube from housing through this opening. Remove cotter pin, washer, and nut from vertical shaft and remove cross-bar. Remove the four bolts that hold the gearbox on the cutter.

Remove 3/8" plug from side of gearbox and pour out gear oil.

Remove oil cap (23) (to be replaced), snap ring (12), and shim (15) from input shaft (3).

Support gearbox in hand press and push on the input shaft (3) to remove bearing (9) and spacer (14).

Remove top cover (25) from housing and gear (1) from inside housing.

Remove oil seal (22) from front of housing (to be replaced). Remove snap ring (12) and shim (15) from front of housing.

Support housing in vise in a horizontal position. The castle nut (17), cotter pin (28), washer (18), and hub (24) are already removed with the stump jumper/cross-bar. Remove the snap ring (10), washer (19), and seal (21).

Remove cotter pin (11), castle nut (16), and washer (20) from output shaft (4). Remove output shaft by using a punch and hammer; tap on the top to drive down.

Remove gear (5) and shim (15) from inside housing. Remove bearing (7) by using a punch and hammer

from the top, outside the housing. Support housing upside down (top cover surface) and remove bearing (6) by using a punch and hammer from the bottom side of the housing.

Inspect gears for broken teeth and wear. Some wear is normal and will show on loaded side. Forged gear sur-

faces are rough when new. Check that wear pattern is smooth.

Inspect vertical and horizontal shafts for grooves, nicks, or bumps in the areas where the seals seat. Resurface any damage with emery cloth. Inspect housing and caps for cracks or other damage.

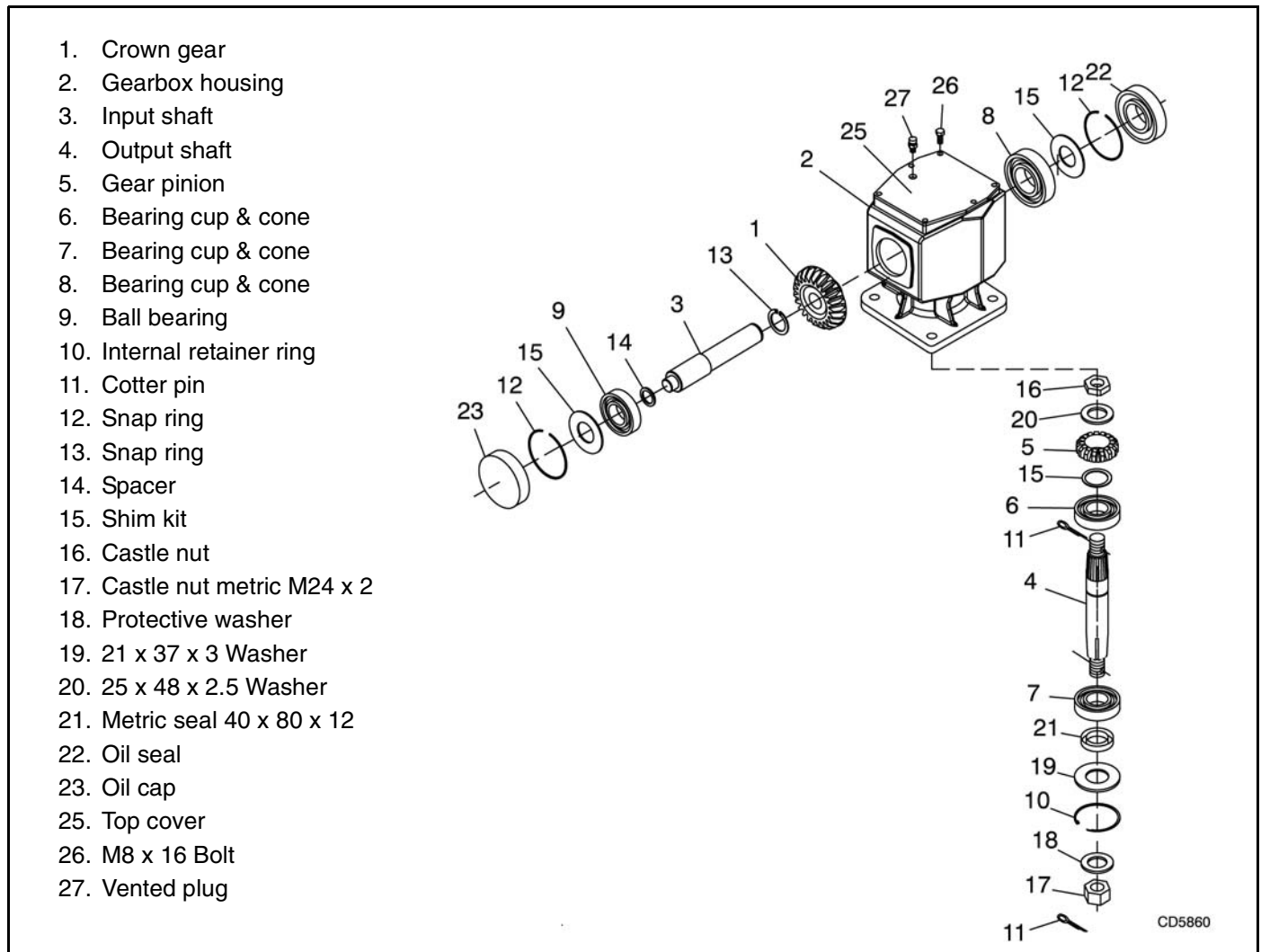


Figure 24. Gearbox Assembly (After SN 788882)

Gearbox Assembly

(Units after SN 788882, Figure 24)

NOTE: Repair of 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.

Clean housing, paying specific attention to the areas where gaskets will be installed. Wash housing and all components thoroughly. Select a clean area for gearbox assembly. Replace all seals, bearings, and gaskets. All parts must be clean and lightly oiled before reassembling.

Insert output bearings (6 & 7) in the housing, using a round tube of the correct diameter and a hand press.

Slide output shaft (4) through both bearings (6 & 7) until it rests against bearing (6). Slide shim (15) over output shaft (4). Press gear (5) onto output shaft (4) and secure with washer (20), castle nut (16), and cotter pin (11).

Apply grease to lower seal lips (21) and press seal (21) over output shaft (4), using a tube of the correct diameter. Be sure not to damage the seal lip. Press in housing so that seal is recessed. Insert protective washer (19) by hand. Install snap ring (10) and position it

together with dual lip seal (21) by pressing into position. Verify that snap ring is seated correctly.

Press bearing (8) into the housing, using a round tube of the correct diameter and a hand press. Secure with shim (15) and snap ring (12). Secure snap ring (13) on input shaft (3) if not already secure.

Place gear (1) through top of housing and align gear (1) and gear (5) so that gear teeth are a match. While holding gear (1) in place, slide input shaft (3) through gear (1) and bearing (8). Align splines on shaft (3) and gear (1).

Slide spacer (14) over input shaft (3) and press bearing onto input shaft (3), using a round tube of the correct diameter and a hand press. Slide shim (15) over input shaft (3) and secure with snap ring (12).

Check input shaft end float by moving the input shaft (3) by hand. If end float is higher than 0.012", insert shim between input shaft (3) and rear bearing (8). Repeat until end float is less than 0.012". Check rotational torque by hand. The torque should be less than 2.2 lbs.-inch. Check that the gear backlash is between 0.006" and 0.016". You should not have to adjust the backlash.

Press in input oil seal (22), using a tube of the correct diameter. Be careful not to damage the seal lip. Press oil cap (23) on to cover the rear of housing, using a tube of the correct diameter.

Check gearbox housing for leaks by plugging all holes except one. Apply 4 psi compressed air and immerse the gearbox in water to verify that there are no leaks.

Remove gearbox from water and dry off with compressed air. Add SAE 80W or 90W EP oil until it runs out of side level hole. Tighten all plugs.

Drive Pulley Installation

Invert gear stand.

Install drive pulley and split taper bushing with key on gearbox vertical shaft.

The distance between the centerline of the lower pulley and the bottom of the gear stand is critical. Place a straightedge along the bottom of the gear stand and measure from it to the centerline of the pulley. This measurement should be 2.35", plus or minus .03". Variation from this dimension could cause belt misalignment and premature belt failure. See Figure 25.

Tighten the bolts in the split taper bushing alternately until they are torqued to 12 lbs-ft. Check the dimension when tightening is complete; remove and realign if the dimension was not held.

Install the gear stand on the mower frame.

Install the belts, driveline and driveline shielding.

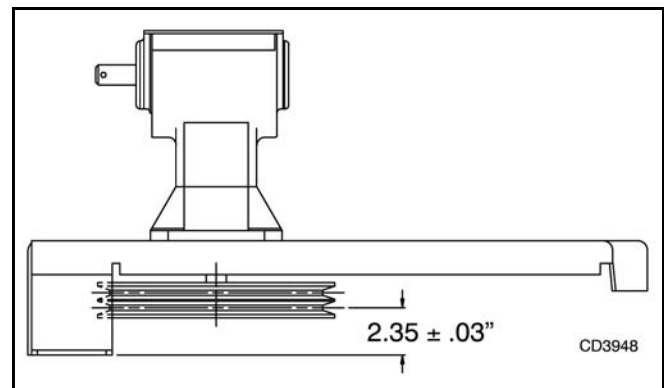


Figure 25. Drive Pulley Installation

ASSEMBLY

NOTICE

WARNING

■ Before working underneath, raise mower to highest position and block securely. Blocking up prevents mower dropping due to hydraulic leak down, hydraulic system failures, or mechanical component failures.

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

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

The following instructions apply to the assembly of both the RM990-3 and the P990-3, unless otherwise noted.

Complete the checklists on page 40 when assembly is complete.

■ Gearbox was not filled at factory. It must be serviced before operating mower. Failure to service will result in damage to the gearbox. See page 16.

The mower is shipped partially assembled. Assembly will be easier if the components are aligned and loosely assembled before tightening hardware. Recommended torque values for hardware are located on page 67.

Select a suitable working area. Open parts boxes and lay out parts and hardware to make location easy. Refer to illustrations, accompanying text, parts lists and exploded view drawings.

Rear Driveline Installation

RM990 Only

Attach counter-cone shield (6) over gearbox output shield (7) using four 5/16" cap screws (3) OR M8 cap screws (4) and lock washers (5). See Figure 26.

Attach implement end of driveline (1) to gearbox output shield (7).

Fasten tether chain to bracket (8) as shown, securing with left front gearbox mounting bolt. Chain must be loose enough to allow full joint articulation.

1. Driveline
2. Shield Retainer
3. Screw, HHCS 5/16" x 3/4
4. Screw, HHCS M8 x 1.25 x 20
5. Washer, 5/16" Standard
6. Counter-Cone Shield
7. Gearbox Output Shield
8. Tether Chain Bracket

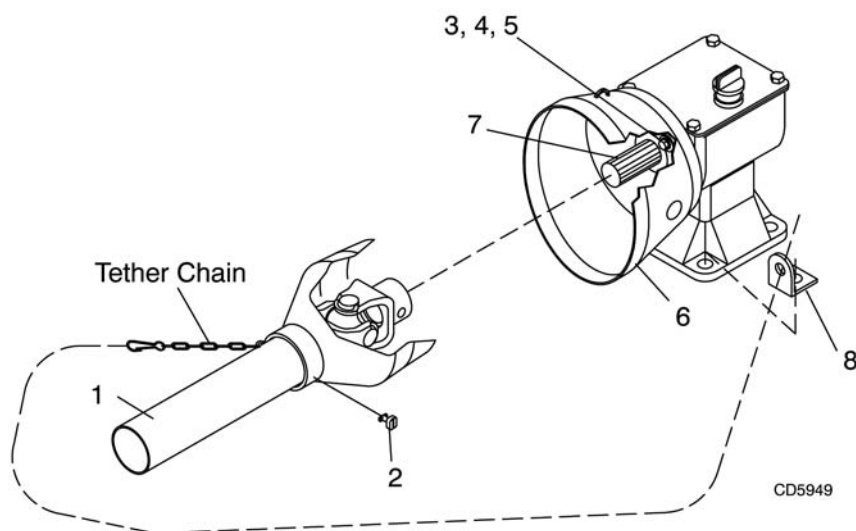


Figure 26. Rear Driveline Installation - RM990

1. Rear drive shield
2. Driveline
3. Retaining ring (SN 788882 and prior)
4. 1/2" Hex lock nut (SN 788882 and prior)
5. 1/2 x 3" Shear bolt (SN 788882 and prior)
6. Gearbox input shaft
7. Left drive shield bracket
8. Gearbox shield
9. Right drive shield bracket
10. 3/8 x 1" Bolt (SN 788882 and prior)
10. M8 x 1.25 x 25 Bolt (after SN 788882)
11. 3/8" Lock washer
12. 3/8" Flanged nut
13. Tether chain
14. Tether chain bracket

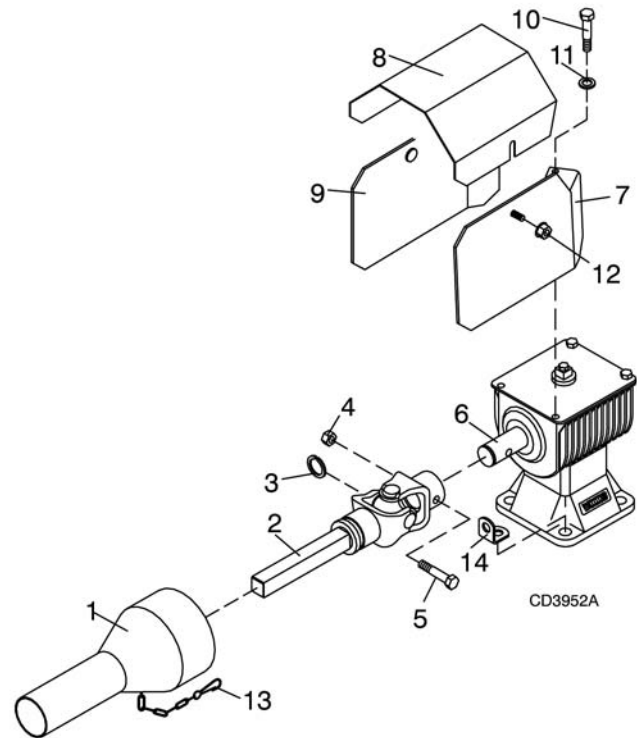


Figure 27. Rear Driveline Installation - P990

P990 Only

Remove drive shield (1) from the driveline. Place the yoke horizontally in a vise. Firmly pull shield backward while pushing each of the three bearing tabs down to release them. See Figure 27.

To prevent gearbox seal damage, carefully push driveline yoke onto gearbox input shaft until it contacts the housing. Install retaining ring (3) and pull driveline forward.

Align driveline yoke and gearbox input shaft holes and install shear bolt (5). Then install and tighten nut (4).

Install drive shield (1) by aligning the three shield holes with the three bearing tabs and pushing shield on firmly to ensure the bearing tabs all engage.

Remove both front gearbox top cover bolts and lock washers (10 & 11). Place left and right drive shield brackets (7 & 9) on gearbox top cover and secure with bolts and lock washers (10 & 11). Attach gearbox shield (8) to shield brackets with flanged nuts (12).

Fasten tether chain (13) loosely (allowing greatest joint articulation) to bracket (14) on left front gearbox mounting bolt.

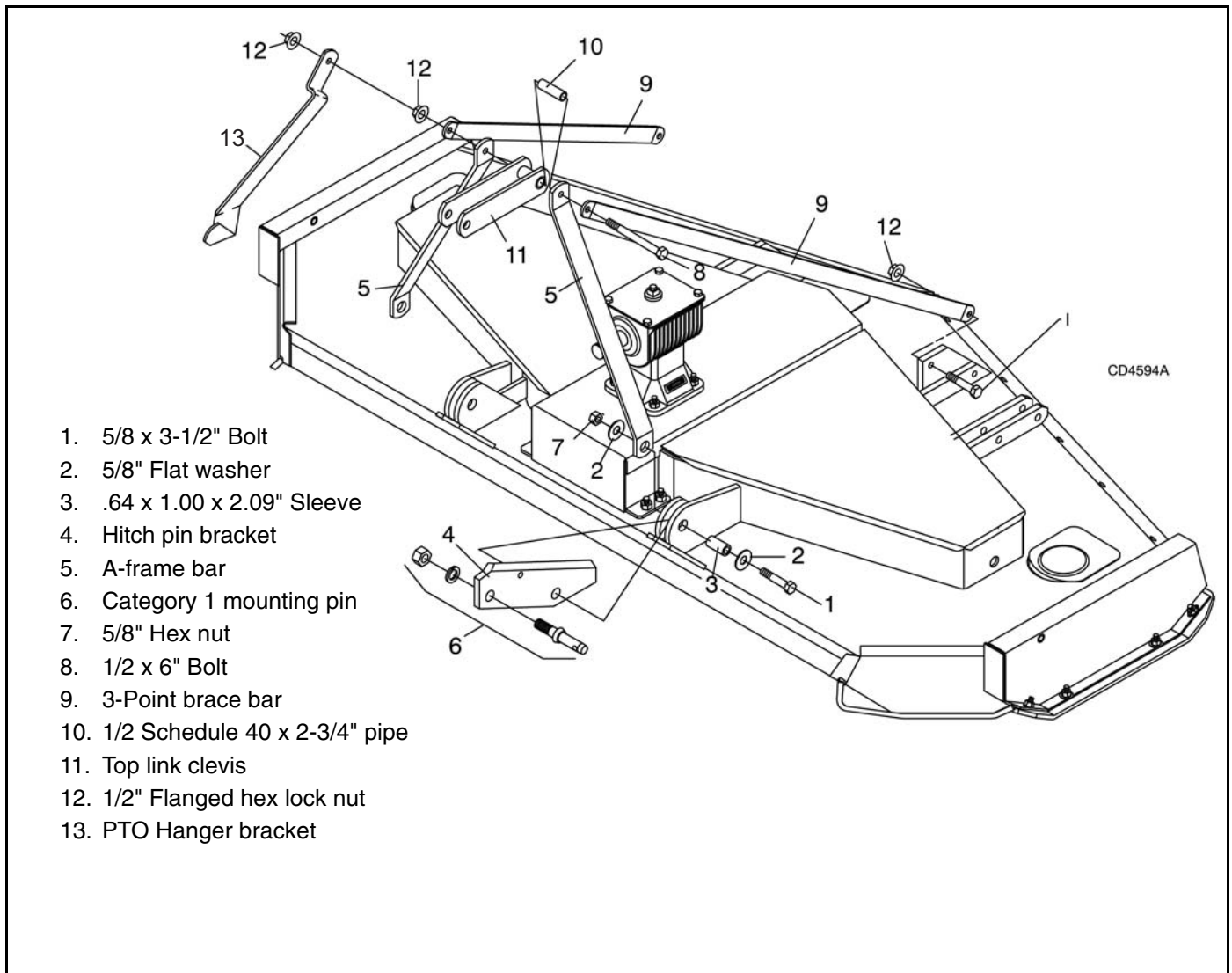


Figure 28. RM990-3 Hitch Installation

RM990-3 HITCH INSTALLATION

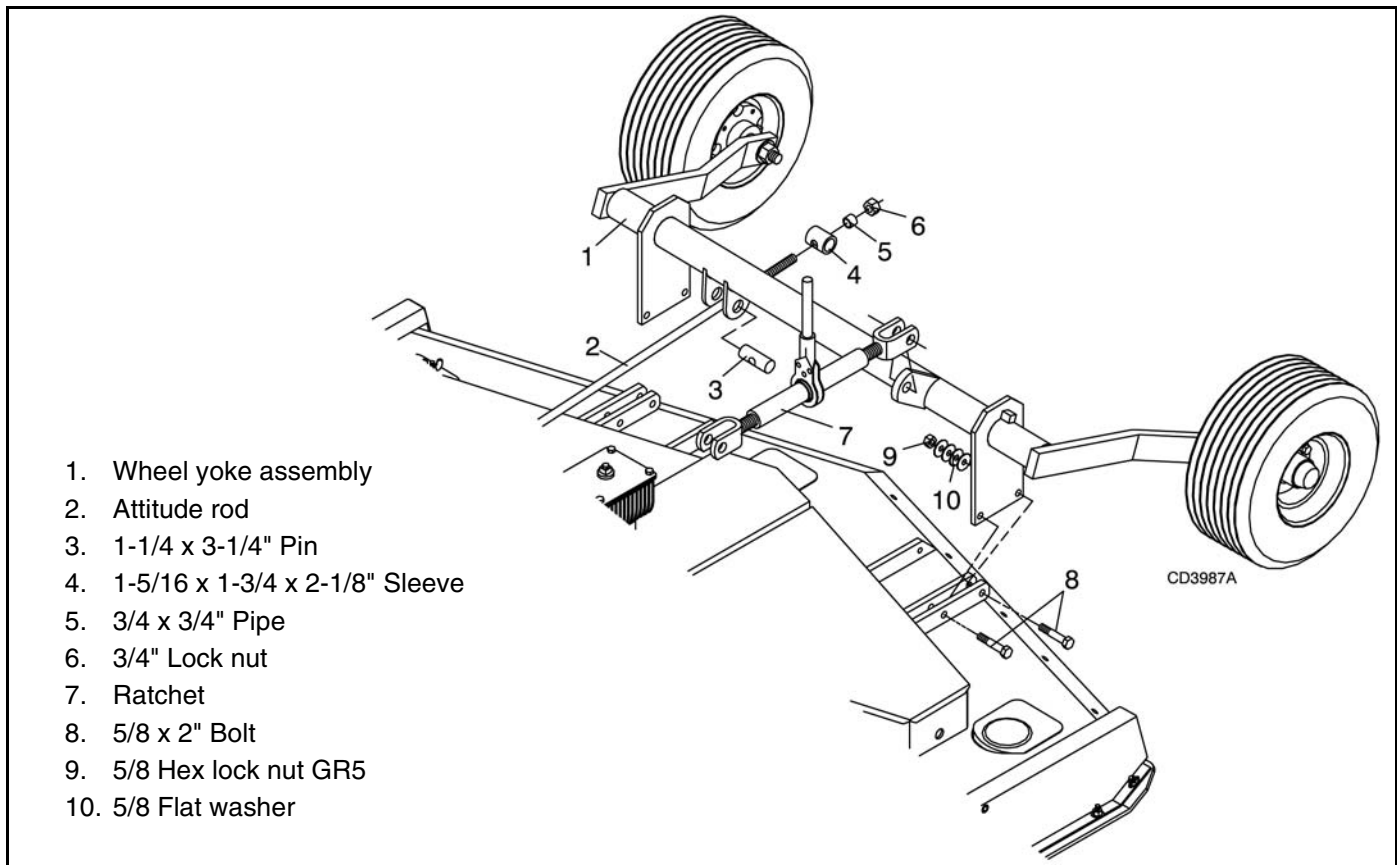
(Figure 28)

The RM990-3 is shipped with Category 1 hitch pins in the shipping location. Remove bolt (1) and hitch pin bracket (4). Remove the hitch pin (6) from the shipping location and place it in the end hole. Insert the hitch pin bracket (4) into the mast plate as shown. Slide sleeve (3) through holes flush with outside of mast plate and secure with bolt (1), washers (2), and hex lock nut. Repeat for other side.

Remove bolt (8) and assemble 3-point brace bars (9) on outside of A-frame bars (5). Re-install bolt (8) through bars, spacer and top-link clevis (11).

Tighten all hitch assembly hardware. (See torque chart in Operator's Manual.)

Install PTO hanger bracket (13) to upper mast assembly. Secure with flange lock nut (12). Do not over-tighten lock nut. PTO hanger bracket should be able to rotate freely out of the way when the mower is in operation.



1. Wheel yoke assembly
2. Attitude rod
3. 1-1/4 x 3-1/4" Pin
4. 1-5/16 x 1-3/4 x 2-1/8" Sleeve
5. 3/4 x 3/4" Pipe
6. 3/4" Lock nut
7. Ratchet
8. 5/8 x 2" Bolt
9. 5/8 Hex lock nut GR5
10. 5/8 Flat washer

Figure 29. P990-3 Wheel Yoke Installation

P990-3 Wheel Yoke Installation

Remove tongue from wheel yoke. See Figure 29.

Loosen the nuts on bolts (8) and pivot the wheel yoke (1) to the rear. Install bolt (8) in each mounting bracket and flat washers (10), secure nut (9). Tighten the hardware.

P990-3 Attitude Rod and Height Adj. Installation

Place sleeve (4) between attitude rod lugs on wheel yoke. Insert pin (3) through sleeve (4) and align the holes. Insert attitude rod (2) through these holes. See Figure 29.

Place pipe spacer (5) over attitude rod (2) and start lock nut (6) on rod.

P990-3 Tongue & H-Frame Installation

Place washer (17) and sleeve (18) on bolt (16). See Figure 30.

Place tongue assembly (1) into mast plates on mower frame and insert bolt, washer and sleeve assembly to hold in place. Repeat for opposite side.

Place an additional washer (17) on bolt (16), then a lock washer (19) and nut (20). Repeat for opposite side and tighten hardware.

Attach parking jack (21) to tongue (1) as shown.

Install ratchet adjustment link (7) between the tongue and height adjustment post on wheel yoke using pins provided with adjustment link. The optional hydraulic cylinder may be installed in place of the adjustment link (7).

Connect attitude rod (5) to tongue (1), as shown, with clevis pin (15) and cotter pin (6).

Attach H-frame (2) to tongue (1), as shown, with clevis pin (7) and two cotter pins (6).

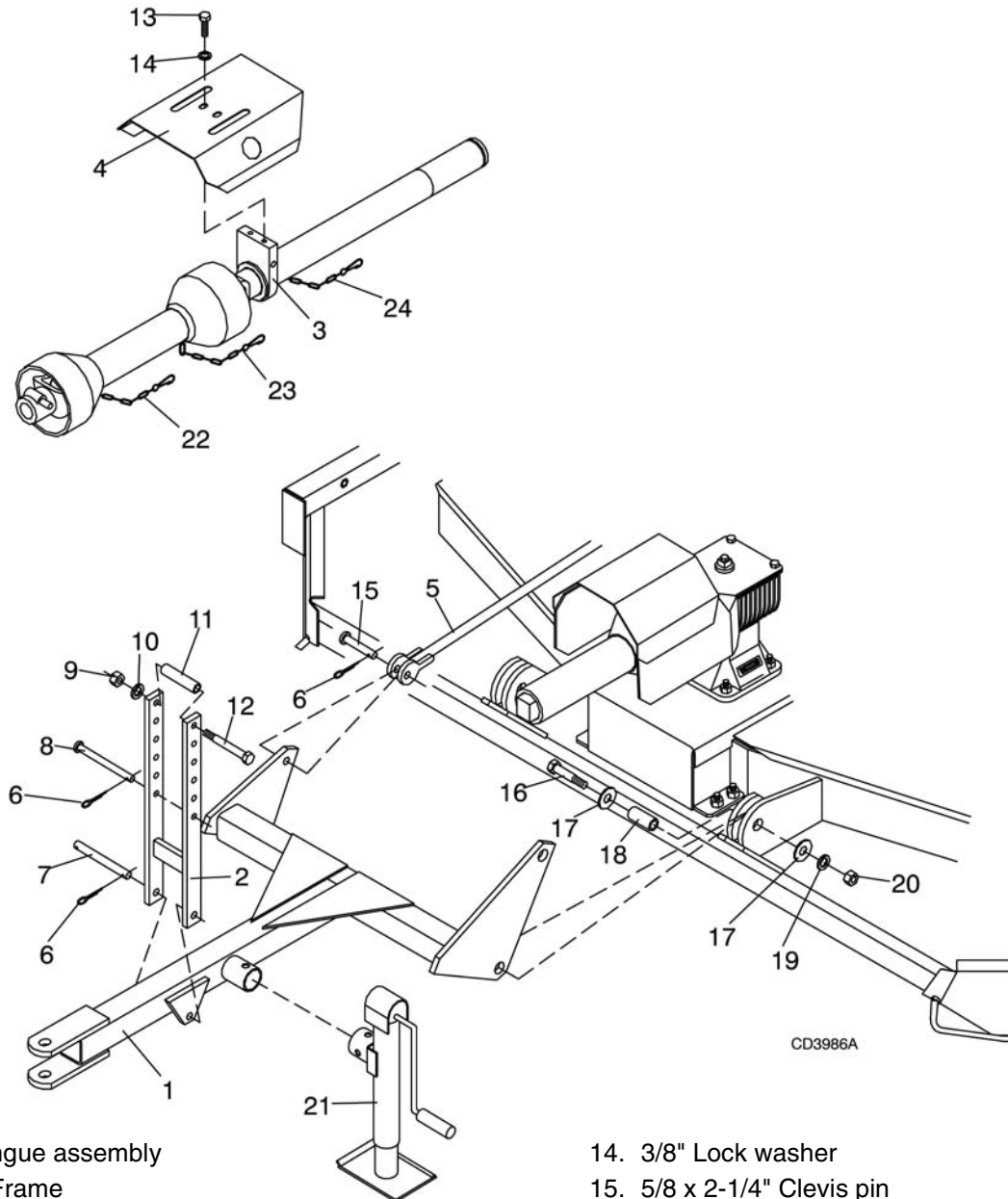
Apply grease to all sides of rear driveline and slide the rear portion of the front driveline (25) onto it.

Attach carrier bearing housing (3) into a set of H-frame adjustment holes with clevis pin (8) and cotter pin (6). Final adjustment will be required when mower is attached to tractor.

Attach front drive shield (4) to carrier bearing housing (3) with bolts (13) and lock washers (14).

Place spacer (11) between H-frame as shown and secure with bolt (12), lock washer (10) and nut (9).

Attach driveline shield tether chains (23 & 24) to H-frame (2). Front tether chain (22) will be attached to tractor.



- | | |
|------------------------------|-----------------------------|
| 1. Tongue assembly | 14. 3/8" Lock washer |
| 2. H-Frame | 15. 5/8 x 2-1/4" Clevis pin |
| 3. Carrier bearing housing | 16. 5/8 x 3-1/2" Bolt |
| 4. Drive shield | 17. 5/8" Flat washer |
| 5. Attitude rod | 18. .64 x 1 x 2" Sleeve |
| 6. 3/16 x 1" Cotter pin | 19. 5/8" Lock washer |
| 7. 5/8 x 5-21/32" Clevis pin | 20. 5/8" Hex nut |
| 8. 1/2 x 5-3/4" Clevis pin | 21. Parking jack |
| 9. 1/2" Heavy hex nut | 22. Front tether chain |
| 10. 1/2" Heavy lock washer | 23. Middle tether chain |
| 11. 1/2 x 3-9/16" Pipe | 24. Rear tether chain |
| 12. 1/2 x 5-1/2" Bolt | 25. Driveline |
| 13. 3/8 x 1" Bolt | |

Figure 30. P990-3 Tongue & H-Frame Installation

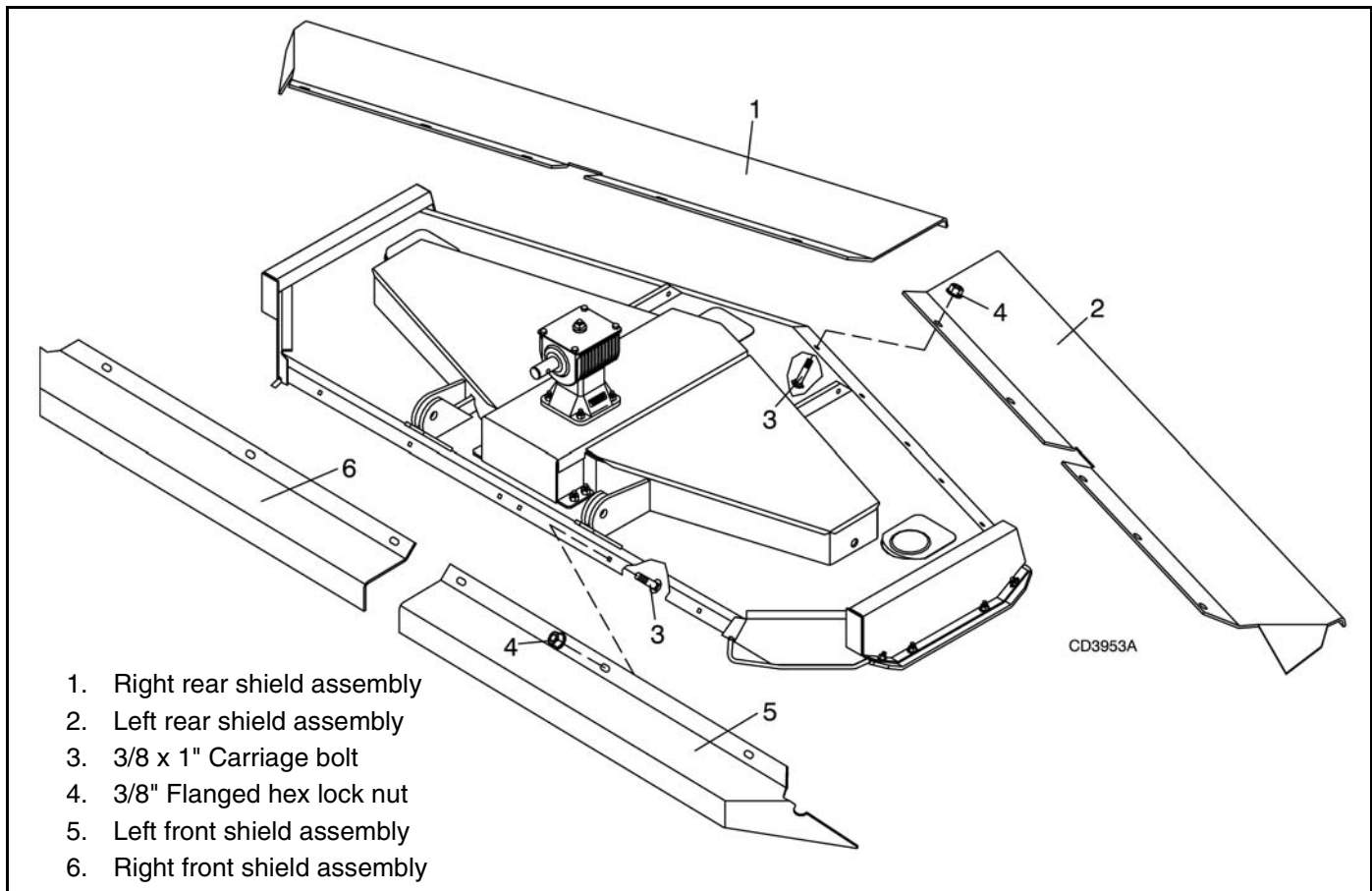


Figure 31. Chain Shielding Installation

Chain Shielding Installation

Chain shielding is assembled. Attach to mower as shown. See Figure 31.

OPTIONAL EQUIPMENT INSTALLATION

Optional Hydraulic Cylinder and Standard Transport Bar Installation for P990-3



■ **Your dealer can supply original equipment hydraulic accessories and repair parts. Substitute parts may not meet original equipment specifications and may be dangerous.**

The transport bar, which is shipped as standard equipment, must be installed when the optional hydraulic cyl-

inder is used to replace the ratchet adjustment link. Do not operate mower unless either the ratchet adjustment link or the optional hydraulic cylinder and transport bar is installed.

Install cylinder rod clevis over wheel yoke height adjustment lug and insert clevis pin (3). Place a flat washer (5) over each end of clevis pin. Place transport bar (2) over clevis pin (3) on right side of cylinder clevis, then place another flat washer (5) over pin and secure with cotter pins (4) in each end of clevis pin.

Attach butt end of cylinder to tongue with clevis pin and retainer clips provided with cylinder.

To engage transport bar, raise mower to the highest position and pivot the transport bar over the hydraulic cylinder rod. Install lock pin through transport bar clevis, beneath hydraulic cylinder rod.

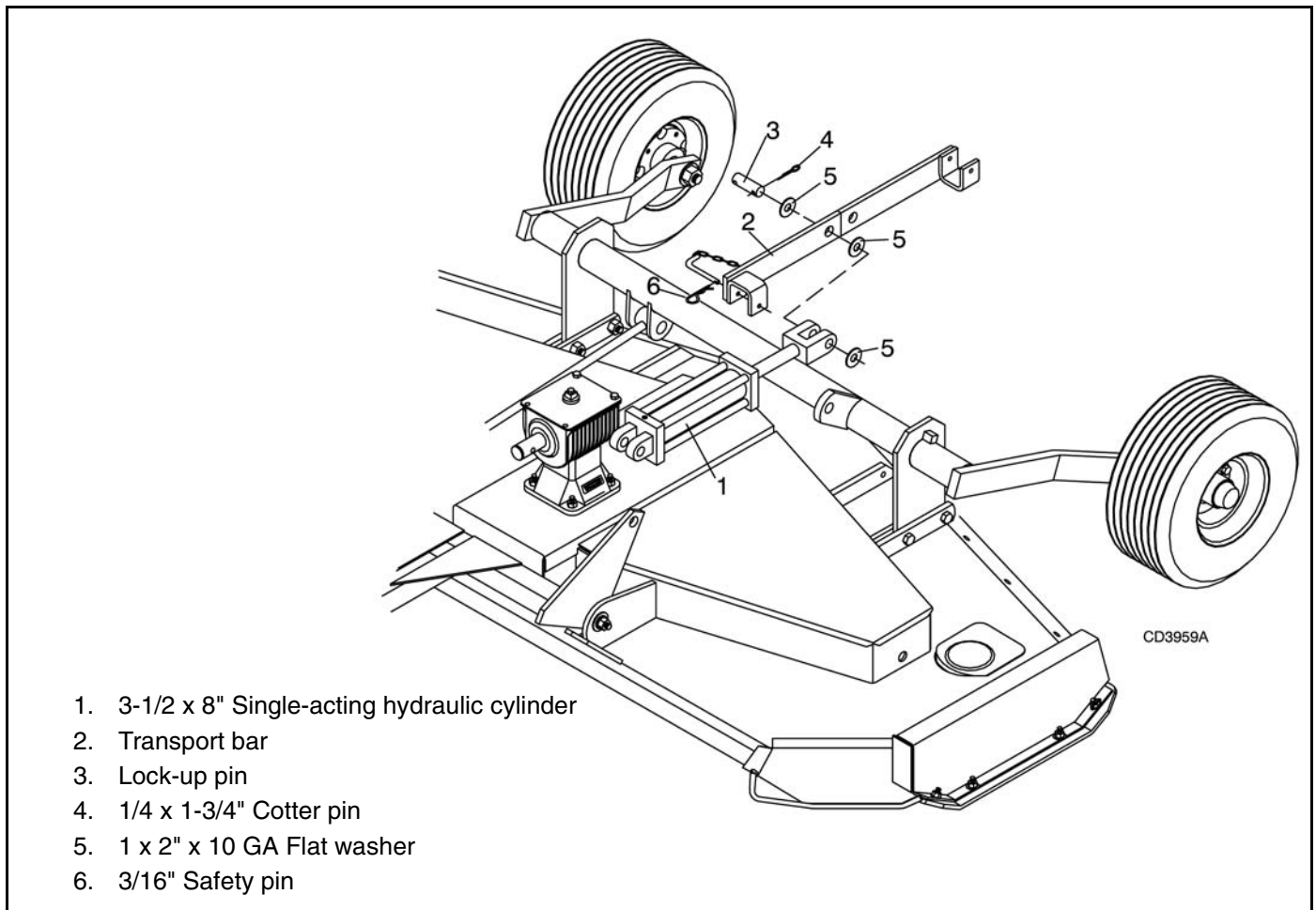


Figure 32. Optional Hydraulic Cylinder Installation for P990-3

Front Gauge Roller Installation for RM990-3 and P990-3 (Figure 33)

Optional front gauge rollers are designed to carry front corners of the mower over uneven ground, minimizing gouging and scalping.

Front gauge roller mounting points are provided on both front mower frame corners. The gauge roller and mounting bracket are pre-assembled.

Attach the gauge roller assembly (1) to corner of mower frame by installing carriage bolts (3) from inside the mower frame as shown. Secure with flange lock nuts (2).

Repeat for opposite gauge roller.

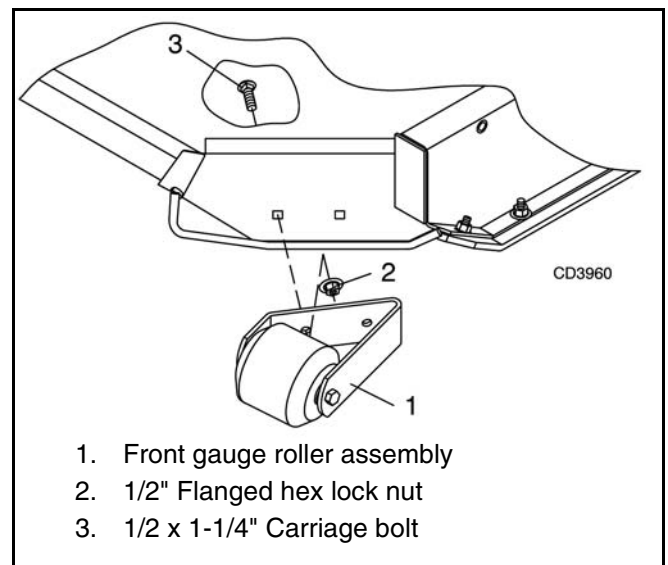


Figure 33. Optional Front Gauge Roller Installation

Optional Front Roller Installation for RM990-3 and P990-3

The optional front roller is designed to carry the center of the mower over uneven ground, minimizing scalping.

Front roller mounting brackets use the four mounting bolts of the gear stand.

Remove the gear stand front mounting bolts. Hole patterns in the mounting brackets (1 & 2) determine right and left. Position these brackets with the highest hole to the rear, the middle hole forward, and the bracket angle outward as shown.

Attach brackets with the carriage bolts (3) and flange lock nuts (7) provided with the front roller kit.

Place roller (5) between the brackets and insert rod (6) through brackets and roller, securing with cotter pins (4).

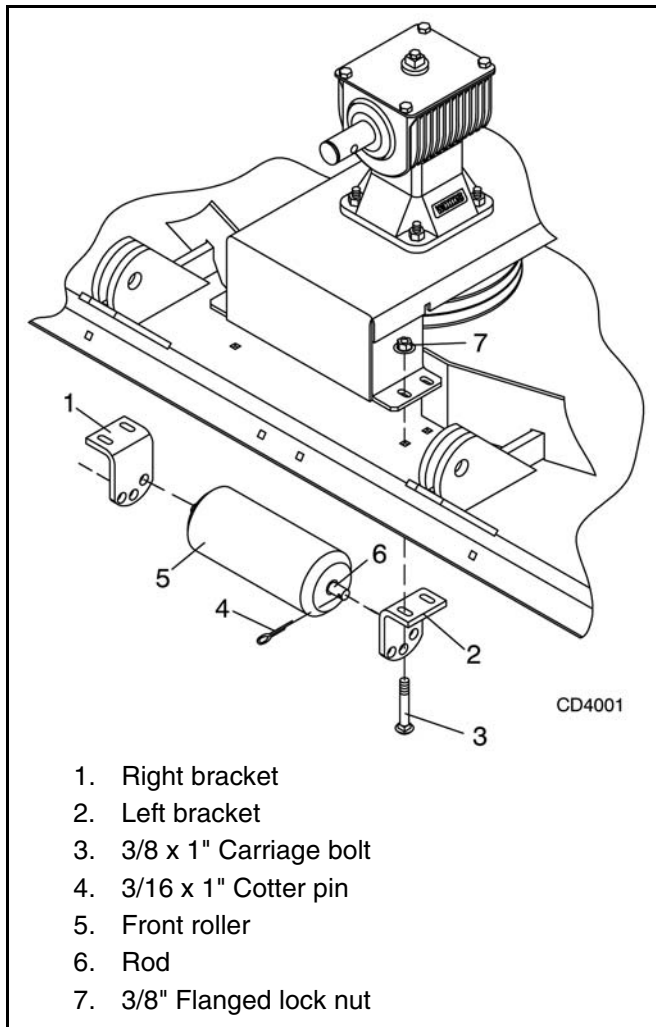


Figure 34. Optional Front Roller Installation

Quick Hitch Kit Installation (Optional)

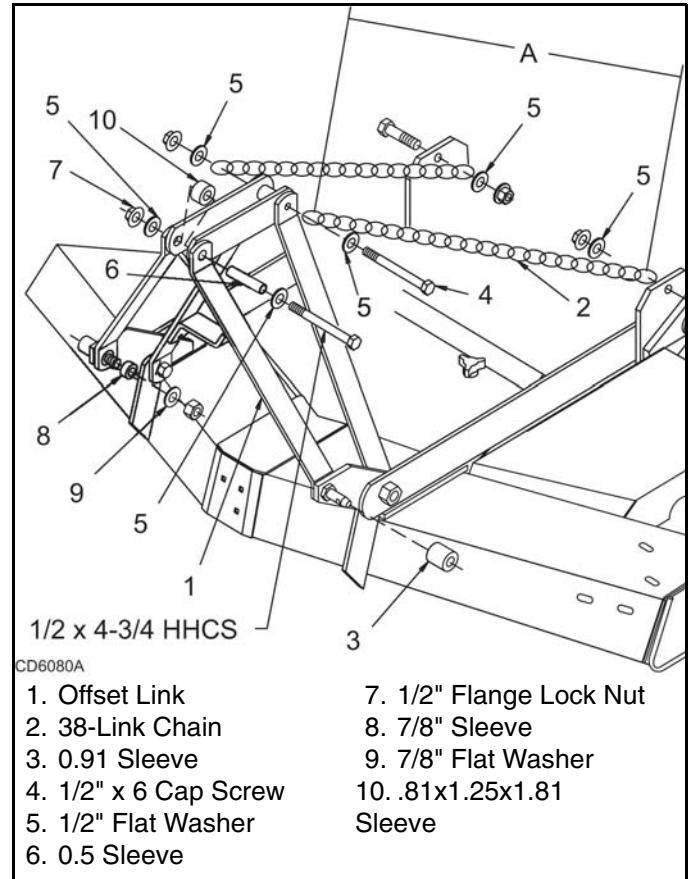


Figure 35. Quick Hitch Kit Assembly

(RM660 Shown; Other units use same instructions)

Note: This kit allows mower to fit only Cat. 1 standard ASAE quick hitch.

Attach offset link (1) to mounting pins, using 7/8 sleeve (8) and flat washer (9). Attach upper end of offset link to pivot link, using 1/2 flat washer (5), sleeves (6 & 10), flange lock nut (7), and 1/2 x 4-3/4 cap screw.

Remove rear offset links and replace with chains (2). Cut to required length. Attach chain to top of A-frame as shown, using 1/2 x 6 cap screw (4), 1/2 flat washer (5), and nut.

Attach opposite end of chain (2) to rear mower frame as shown. Cut chain to 45 inches in length. Vary length slightly as desired. Twist chain to make finite adjustments in length until unit lifts level. Do not bottom out the drive on front of deck.

NOTICE

■ Failure to follow instructions may result in damage.

Install sleeve (3) on mounting pins and retain with Klik pin.

Front Caster Wheel Installation for RM990-3

Remove the front caster wheel and arm assemblies from shipping location along the outer deck rails.

Attach adjustment lugs to frame with bolts (16) and nuts (18). Attach caster wheel arm to frame with bolt (20) and nut (22).

The wheel comes assembled with bearings and cups installed.

Adjust mower cutting height by using chart (page 11) and nut (18). Tighten all hardware (see Bolt Torque Chart).

Repeat for opposite front caster wheel.

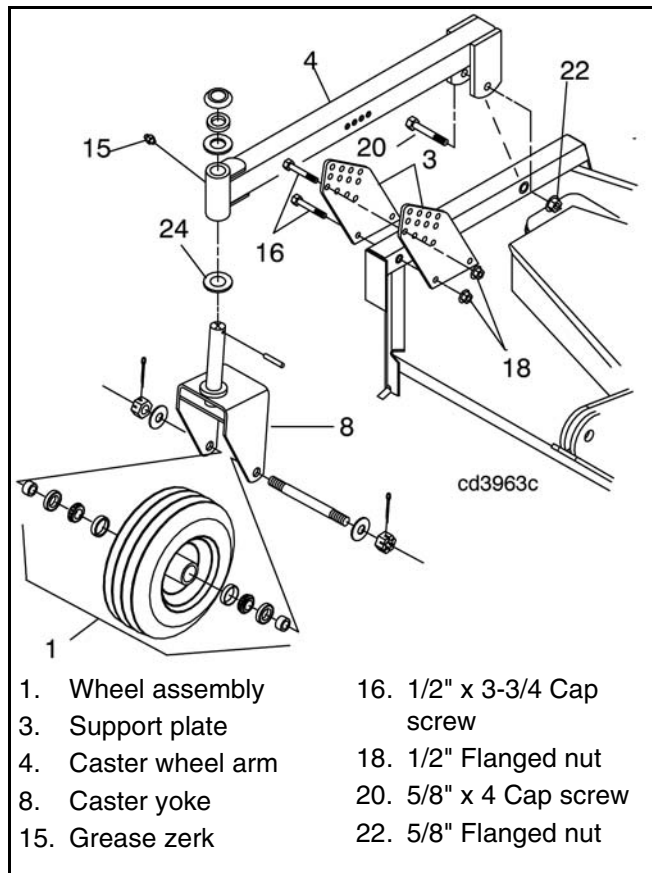


Figure 36. Front Caster Wheel Installation

Rear Caster Wheel Installation for RM990-3

Remove the rear caster wheel and arm assemblies from shipping location along the inner deck rails. Discard the shipping bolts.

Attach adjustment lugs to frame with bolts (36), lock washers (37) and nuts (38). Attach caster wheel arm to frame with bolt (36), lock washer (37) and nuts (38).

The wheel comes assembled with bearings and cups installed.

Adjust mower cutting height by using chart (page 11) and secure with bolts (32) and nuts. Tighten all hardware (see page 67).

Repeat for opposite rear caster wheel.

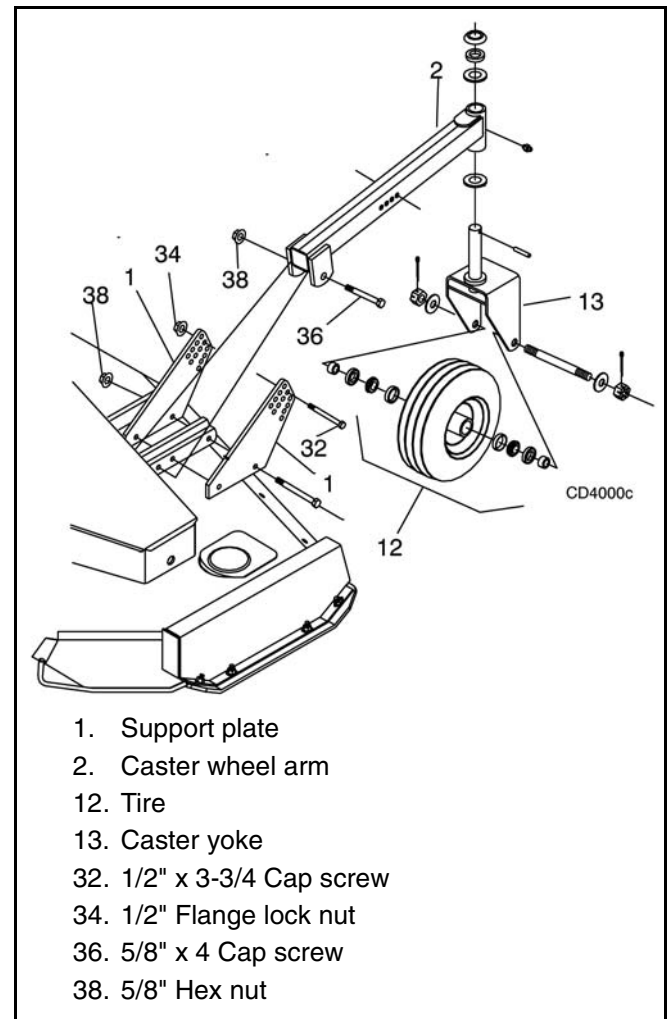


Figure 37. RM990-3 Rear Caster Wheel Installation

Initial Filling of Gearbox

NOTICE

■ Gearbox was not filled with oil at the factory. It must be serviced before operating. Failure to service will result in damage to gearbox.

The gearbox was not filled at the factory. Remove the fill plug and pour in one quart of SAE 90W gear lube, wait five minutes and add an additional pint and one half. Allow an additional five minutes for the lube to flow through the bearings, then check to make sure half of the horizontal gear shaft is covered. Replace the fill plug.

DEALER CHECKLISTS

PRE-DELIVERY CHECKLIST

(Dealer Responsibility)

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

The following check lists are a reminder of points to inspect. Check off each item as it is found satisfactory or after proper adjustment is made.

___ Check that all safety decals are installed and in good condition. Replace if damaged.

___ Check that shields and guards are properly installed and in good condition. Replace if damaged.

___ Check all bolts to be sure they are tight.

___ Check that all cotter pins and safety pins are properly installed. Replace if damaged.

___ Check and grease all lubrication points as identified in "Service, Lubrication Information".

___ Gearboxes are not filled at the factory. Prior to delivery, fill as specified in the "Service, Lubrication Information" and check to see that there are no leaking seals.

___ Check that blades have been properly installed.

DELIVERY CHECKLIST

(Dealer 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.

___ 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.

___ Show customer how to make sure driveline is properly installed and that spring-activated locking pin or collar slides freely and is seated in groove on tractor PTO shaft.

___ Explain to customer the potential crushing hazards of going underneath raised equipment. Instruct that before going underneath to disconnect the driveline, securely block up all corners with jack stands and to follow all instructions in the "Service, Blocking Methods" section of the operators manual. Explain that blocking up prevents cutter dropping from hydraulic leak down, hydraulic system failures or mechanical component failures.

___ Point out the correct mounting and routing of hydraulic hoses. Explain that during operation, mounting, dismantling and storage, care must be taken to prevent hose damage from pulling, twisting and kinking.

___ Show customer the safe, proper procedures to be used when mounting, dismantling, and storing equipment.

___ For mounted units, add wheel weights, ballast in front tires, and/or front tractor weight to enhance front end stability. A minimum 20% of tractor and equipment gross weight must be on front tractor wheels. When adding weight to attain 20% of tractor and equipment weight on front tractor wheels, you must not exceed the ROPS weight certification. Weigh the tractor and equipment. Do not estimate!

___ Make customer aware of optional equipment available so that customer can make proper choices as required.

___ Point out all guards and shields. Explain their importance and the safety hazards that exist when not kept in place and in good condition.

INDEX TO PARTS LIST

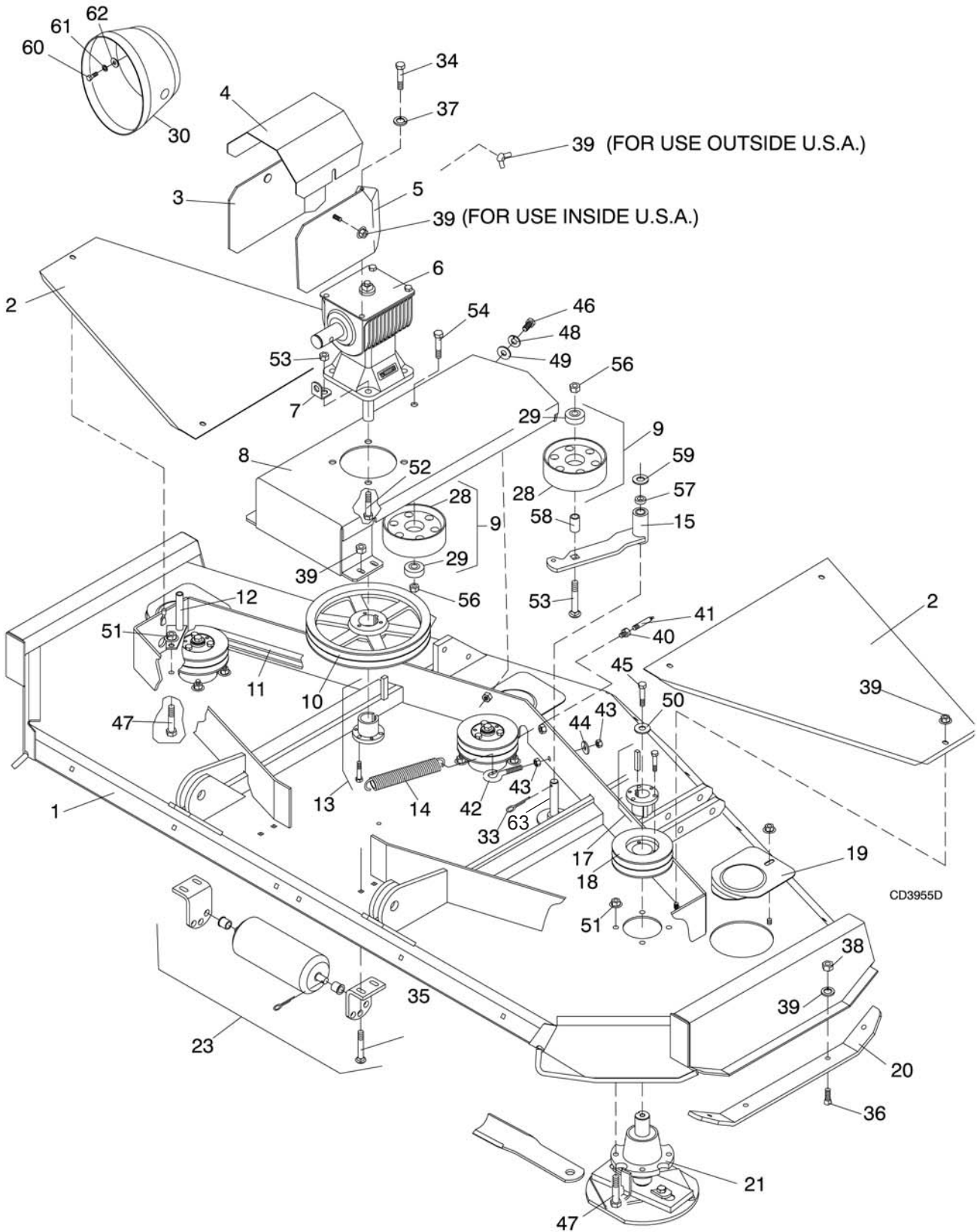
RM990-3 (Mounted Model)

RM990-3 & P990-3 Common Parts Main Frame Assembly	page 42
RM990-3 Main Frame Assembly	page 44
Gearbox Assembly	page 46
Gearbox Assembly (After S/N 788882).	page 48
Blade Spindle Assembly	page 51
Rubber Shielding Assembly	page 52
Chain Shielding Assembly	page 53
Front Roller Assembly (Optional)	page 54
Front Caster Wheel Assembly	page 55
Rear caster arm assembly	page 56
Front Gauge Roller Assembly (Optional)	page 57
Drives	
Drive shaft for serial numbers 725411 and later	page 50
Front 1/2 Drive Assembly with Square Shaft for Serial Numbers 577000 and Below	
Standard Drive	page 61
Long Drive.	page 62
With Tri-Lobe Shaft for Serial Numbers 577001 thru 725410	page 60
Rear 1/2 drive assembly	
With Tri-Lobe Shaft for Serial Numbers 577001 thru 725410	page 60
With Square Shaft for Serial Numbers 577000 and Below	page 61
Quick hitch kit (optional).	page 63

P990-3 (Pull-Type)

Main Frame Assembly	
RM990-3 & P990-3 Common Parts	page 42
P990-3 Main Frame Assembly	page 45
Gearbox Assembly	page 46
Rear 1/3 of Universal Drive	page 47
Gearbox assembly (after s/n 788882).	page 48
Front 2/3 of 3-Joint Drive	page 49
Blade Spindle Assembly	page 51
Parking Jack	page 51
Rubber Shielding Assembly	page 52
Pneumatic Tire Assembly	page 52
Chain Shielding Assembly	page 53
Hub Assembly for Pneumatic Tire.	page 54
Front Roller Assembly (Optional)	page 54
Front Gauge Roller Assembly (Optional)	page 57
Hydraulic Hose Kit & Fittings (Optional)	page 58
Hydraulic Stroke Control Kit (Optional)	page 58
Hydraulic Cylinder (Optional)	page 59

RM990-3 & P990-3 MAIN FRAME ASSEMBLY - COMMON PARTS



42 Parts

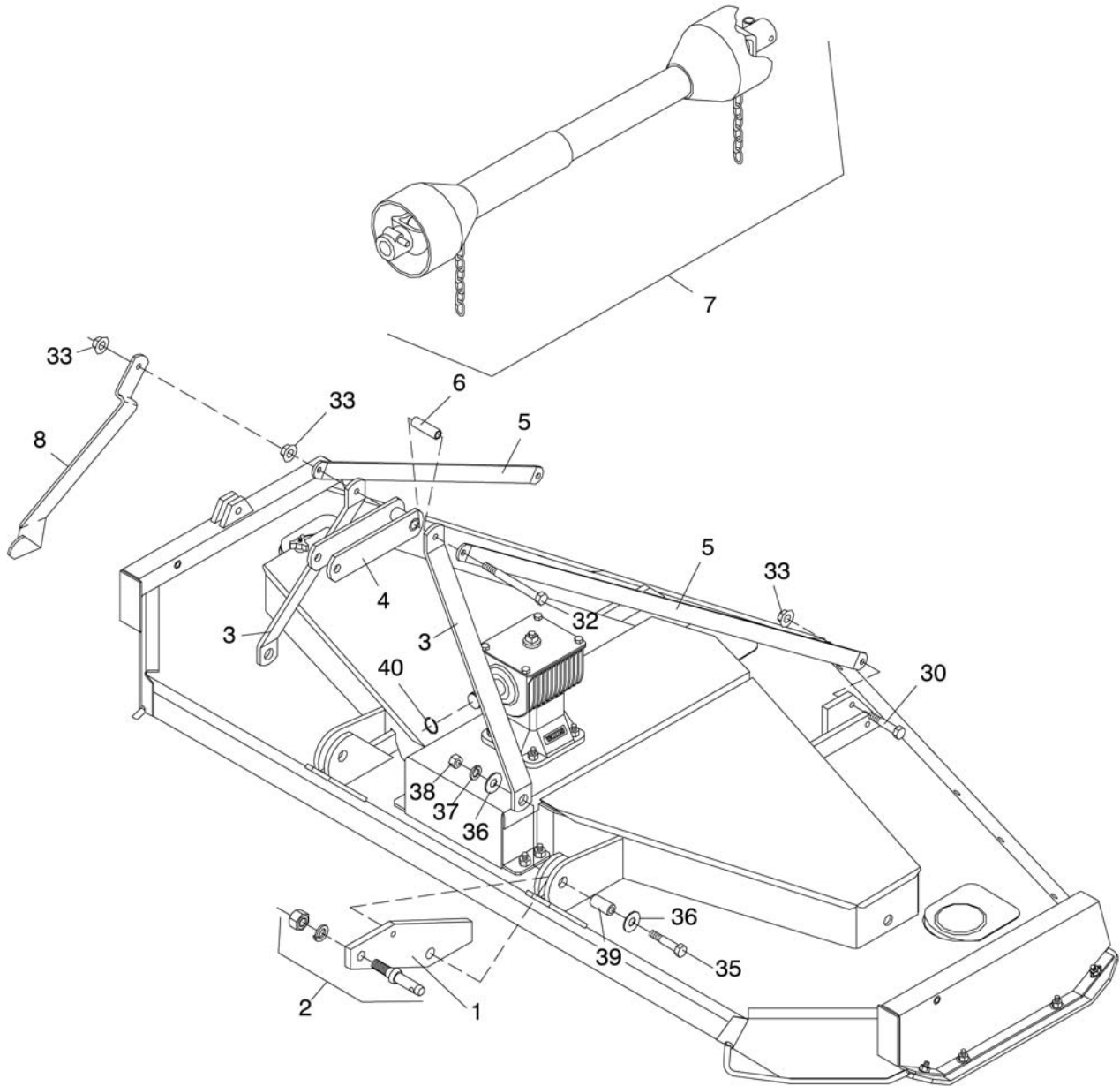
20944 (Rev. 3/14/2008)

RM990-3 & P990-3 MAIN FRAME ASSEMBLY - COMMON PARTS

REF	PART	QTY	DESCRIPTION	REF	PART	QTY	DESCRIPTION
1	----	1	Deck (not sold separately)	34	307133		M8 x 1.25 x 25 mm Cap screw GR5 (after S/N 788882)
2	20787	2	Belt shield	35	6697	*	3/8 NC x 1 Carriage bolt GR5
3	20134	1	Right drive shield mounting bracket (P990 only)	36	21636		3/8 x 1-1/4 Clipped head plow bolt
4	20136	1	Gearbox drive shield (P990 only)	37	838	*	3/8 Standard lock washer
5	20135	1	Left drive shield mounting bracket (P990 only)	38	835	*	3/8 NC Hex nut, plated
6	20670	1	Gearbox, 1.76:1 CCW (SN 788882 and prior) -or-	39	14350		3/8 NC Flanged hex lock nut -or-
6	1003409	1	Gearbox, 1.69:1 CCW (after SN 788882)	39	1287	*	3/8 NC Wing nut
7	15843	1	Bent link, (P990 only)	40	20786		Grease adapter, 1/4-28 male x 1/8NPT female
8	19535	1	Gearbox stand	41	18960		Grease fitting, 1/8 male PTF x 2.63"
9	19570	2	Flat pulley with bearing	42	24445		7/16 NC x 3-1/2 Eyebolt
10	27925	1	2 TB 11.4 Sheave P	43	4638	*	7/16 NC Hex nut
11	18990	1	2V Power band belt 2W140	44	2210	*	7/16 Standard flat washer
12	19587	1	Spindle belt guide	45	25475		1/2 NC x 1 Cap screw GR5, full thread
13	10799	1	P 1 x 1-1/2 Straight bore bushing (S/N 788882 and prior) -or-	46	6100	*	1/2 NC x 1-1/4 Cap screw GR5
13	1482	1	P 1 x 1-1/4 Straight bore bushing (after S/N 788882)	47	3699	*	1/2 NC x 2 Cap screw GR5
14	28928	1	.187 x 1.3 x 8.17 Ext. spring	48	855	*	1/2 Extra heavy lock washer
15	19541	1	Idler arm assembly	49	3598	*	1/2 SAE Flat washer
17	13557	3	P 1, 1-3/8 Straight bore bushing	50	29553		1/2 x 1-5/8 x 1/4 Flat washer
18	19575	3	Sheave, 5.4 2G B P	51	11900	*	1/2 NC Flanged hex lock nut
19	3444	3	Access cover	52	19024		5/8 x 1-3/4 Cap screw, flanged
20	19589	2	Side skid (includes items 38 & 39)	53	20419		5/8 NC x 3 Carriage bolt GR5
21	24520	3	CCW Spindle assembly	54	1605	*	5/8 NC x 4 Cap screw GR5
23	24650	1	Front roller bundle complete - Optional	55	19025		5/8 NC Flanged hex lock nut
24	20137	1	Complete english decal set, RM/P990-3	56	6239	*	5/8 NC Hex lock nut
25	20138	1	English safety decal set, RM/P990-3	57	22060		5/8 x 1 x 1/4 Felt seal
26	50138	1	French safety decal set, RM/P990-3	58	19543		.657 x .875 x 1.25 Sleeve
27	24590KT	1	CCW Blade, 13" long - standard -or-	59	11036		3/4 x 1-1/2 x 18 GA Shim washer
27	28329KT	1	CCW Low suction blade, 13" long - Optional	60	6096		5/16 NC x 3/4 Cap screw GR5 (RM990 only) -or-
28	19571	2	Flat pulley 5.95 x 2 x 1.85	60	24801		M8 x 1.25P x 20 mm Cap screw GR5 (RM990 only)
29	6095	2	.626 ID x 1.85 OD Ball bearing	61	2472	*	5/16 Standard lock washer (RM990 only)
30	51849	1	Counter-cone shield (RM990 only)	62	4378	*	5/16 Standard flat washer (RM990 only) -or-
33	1266	*	3/16 x 1-1/2 Cotter pin	62	35155	*	5/16 SAE Flat washer ZP (RM990 only)
34	839	*	3/8 NC x 1 Cap screw GR5 (S/N 788882 and prior) -or-	63	29341		Idler post

* Obtain Locally

RM990-3 MAIN FRAME ASSEMBLY - MOUNTED MODEL



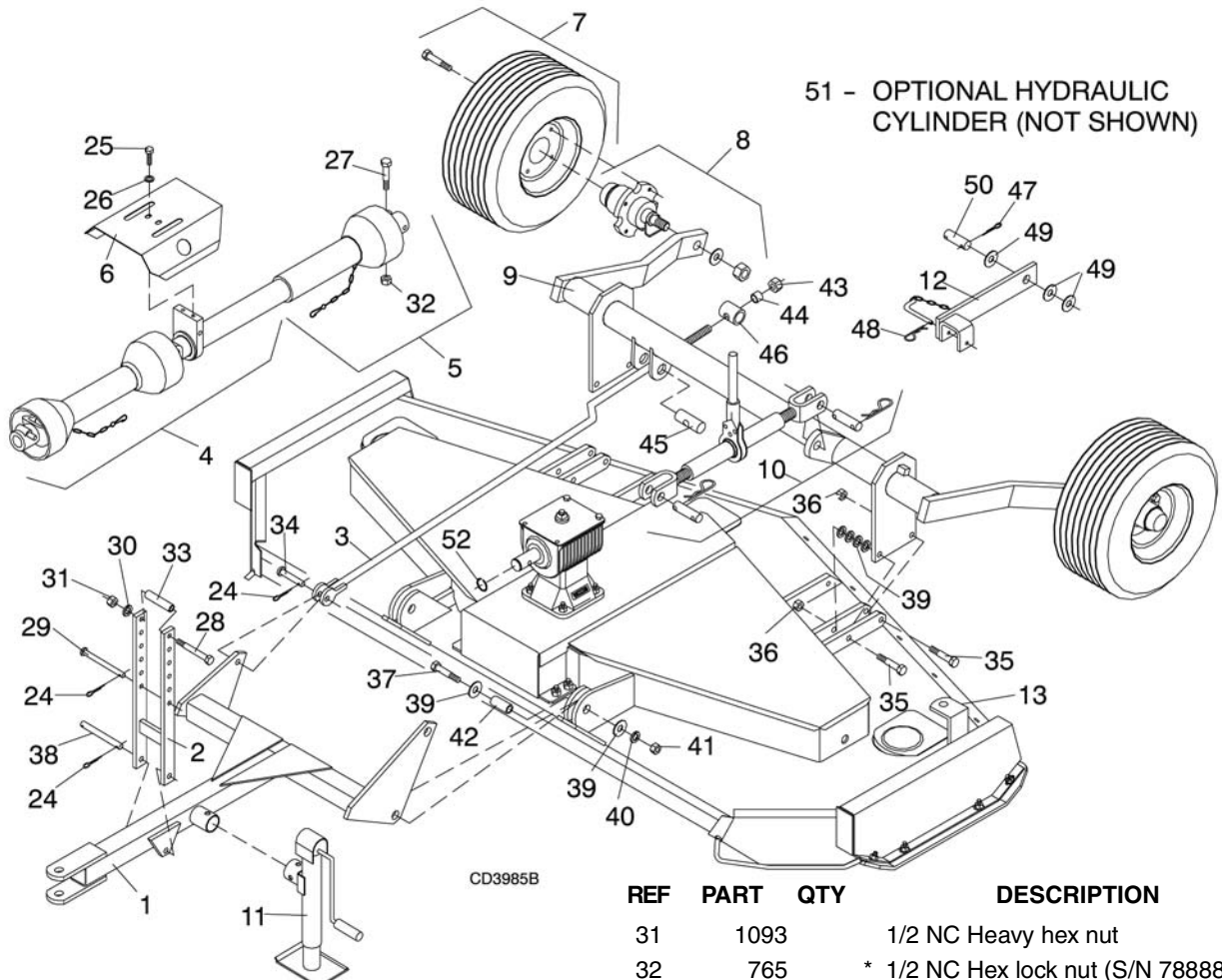
REF	PART	QTY	DESCRIPTION	REF	PART	QTY	DESCRIPTION
1	19975	1	Hitch pin bracket, left -or-	30	3379	*	1/2 NC x 1-1/2 Cap screw GR5
1	19976	1	Hitch pin bracket, right	32	29561		1/2 NC x 4-3/4 Cap screw GR5
2	33661	2	Category 1 mounting pin	33	11900	*	1/2 NC Flanged hex lock nut
3	19977	2	Offset link, .05 x 2.50 x 27.25	35	23141		5/8 NC x 3-1/2 Cap screw GR5
4	19585	1	Pivot link	36	692	*	5/8 Standard flat washer
5	19578	2	Offset link, .25 x 1.50 x 45.56	37	1286	*	5/8 Heavy lock washer
6	64814	1	1/2 Schedule 40 x 2-3/4 pipe	38	230	*	5/8 NC Hex nut
7	-----	1	Universal drive	39	19524		.64 x 1 x 2.09 Sleeve HT
8	36998	1	PTO hanger bracket	40	15345		External snap ring, .05 x 1.38

* Standard hardware, obtain Locally

44 Parts

20944 (Rev. 3/14/2008)

P990-3 MAIN ASSEMBLY - PULL-TYPE

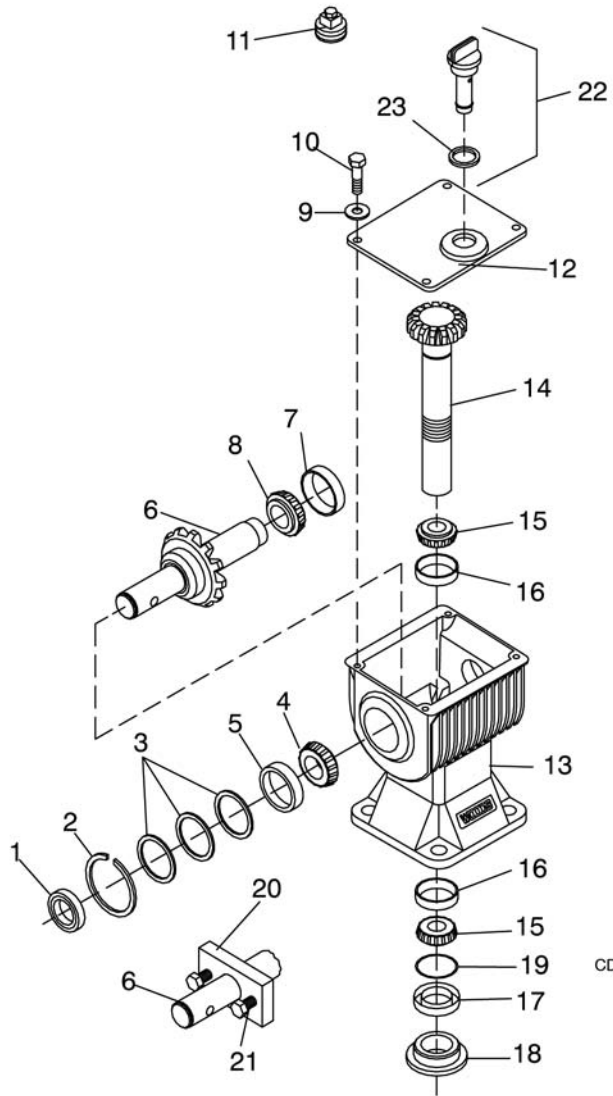


REF	PART	QTY	DESCRIPTION
1	20266	1	Tongue assembly
2	7668	1	H-Frame assembly
3	30972	1	Attitude rod assembly
4	-----	1	Front 2/3 of 3-joint drive
5	-----	1	Rear 1/3 of universal drive
6	19012	1	Drive shaft shield
7	14255	2	18 x 9.5 x 8 Rib tire & 5-hole wheel
8	34931	2	Wheel hub and axle assembly
9	30975	1	Wheel yoke
10	23650	1	Ratchet adjustment link bundle
11	23790	1	Swivel parking jack
12	34859	1	Transport bar
13	20788	1	Jack mounting lug
24	1256	*	3/16 x 1 Cotter pin
25	839	*	3/8 x 1 Cap screw GR5
26	838	*	3/8 Standard lock washer
27	15349	*	1/2 NC x 3 Shear bolt (SN 788882 and prior)
28	12305	*	1/2 NC x 5-1/2 Cap screw GR5
29	404		1/2 x 5-3/4 Clevis pin HT
30	855	*	1/2 Extra-heavy lock washer
31	1093		1/2 NC Heavy hex nut
32	765	*	1/2 NC Hex lock nut (S/N 788882 and prior)
33	7035		1/2 Schedule 40 x 3-9/16 pipe
34	5777		5/8 x 2-1/4 Clevis pin
35	34473	*	5/8 NC x 3 Cap screw GR5
36	6239	*	5/8 NC Hex lock nut
37	23141		5/8 NC x 3-1/2 Cap screw HT
38	8317		5/8 x 5-21/32 Clevis pin
39	692	*	5/8 Standard flat washer
40	1286	*	5/8 Heavy lock washer
41	230	*	5/8 NC Hex nut
42	19524		.64 x 1 x 2.09 Sleeve HT
43	2371	*	3/4 NC Hex lock nut
44	11190		3/4 Schedule 80 x 3/4 pipe
45	11099		1-1/4 x 3-1/4 Long pin
46	11100		1-5/16 x 1-3/4 x 2-1/8 Sleeve
47	923	*	1/4 x 1-3/4 Cotter pin
48	18270	*	3/16 Safety pin
49	24636		1 x 2 x 10 GA Flat washer
50	34827		Lock-up pin
51	10475		Hydraulic cylinder - Optional
52	15345		External snap ring, .05 x 1.38 (S/N 788882 and prior)

* Standard hardware, obtain Locally

GEARBOX ASSEMBLY

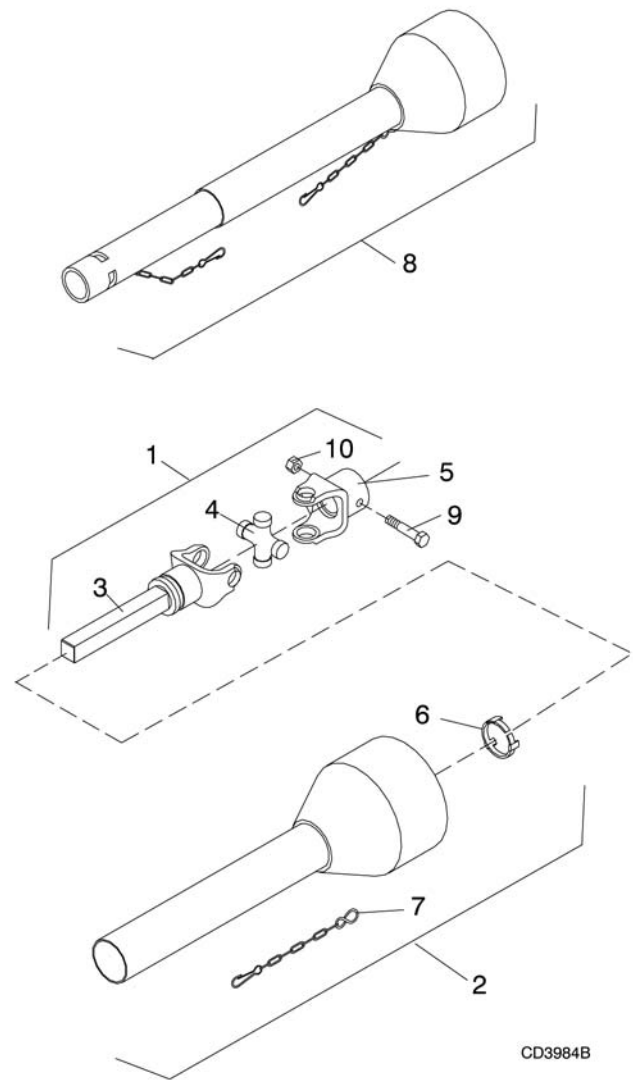
REF	PART	QTY	DESCRIPTION
--	20670	-	1.76:1 CCW Gearbox
1	20689	1	1.38 x 2.56 x .38 Seal
2	20676	1	Internal retaining ring, .093 x 2.56
3	19075	1	Shim washer kit
4	2716	1	Bearing cup
5	2717	1	Bearing cone
6	20680	1	30-Tooth gear & 1.38 shaft
7	3586	1	Bearing cone
8	3585	1	Bearing cup
9	838	4	* 3/8 Standard lock washer
10	1686	4	* 3/8 NC x 3/4 Cap screw GR5
11	10362	1	1" Sq head vented pipe plug (used prior to S/N 2000)
12	20675	1	Gearbox cover, 10GA, 6.1 x 6.9
13	20673	1	Gearbox flange mount housing
14	20682	1	1.63 x 9.8 x 17-T Gear shaft
15	11114	2	Bearing cone
16	11115	2	Bearing cup
17	11553	1	2.25 x 3 x .375 Double lip seal
18	20677	1	Round stake nut, 1-5/8 16UN
19	12889	1	3/32 x 1-9/16 OD O-Ring
20	19077	1	Puller kit (includes bolts, #21)
21	62144	-	3/8 x 2-1/2 Cap screw, full thread
22	19165	1	Dipstick (includes item 23)
23	23542	1	1/8 x 1-1/4 ID 218 O-Ring



CD3622D

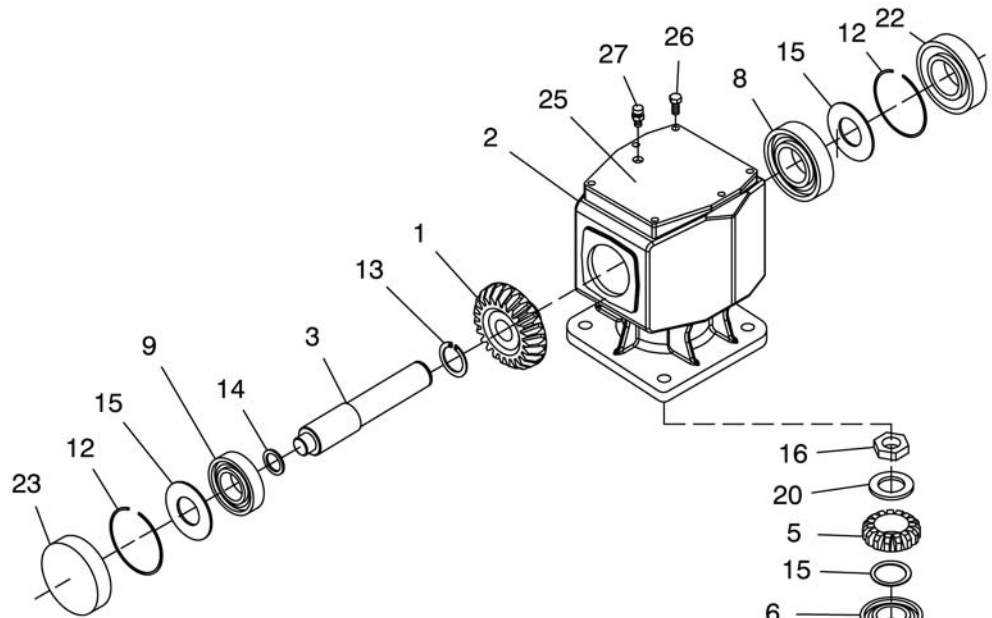
P990-3 REAR 1/3 OF UNIVERSAL DRIVE - PULL-TYPE

REF	PART	QTY	DESCRIPTION
1	20199	1	Drive yoke & shaft, shielded 15.50 long
2	20191	1	Plastic shield 3.00 x 17.44 (includes items 6 & 7)
3	20192	1	Yoke & shaft 14N x 15.50
4	154	1	Universal joint repair kit L14R
5	20193	1	Shear yoke, 2000 series (S/N 788882 and prior)
5	148	1	Quick disconnect yoke, 1-3/8 (after S/N 788882)
6	15740	1	Outer shield bearing
7	15739	1	Shield tether chain 27.5" long
8	19613	1	Plastic shield kit (consists of 20191 & 20196)
9	15349	1	1/2 NC x 3 Shear bolt
10	765	1	1/2 NC Hex lock nut



CD3984B

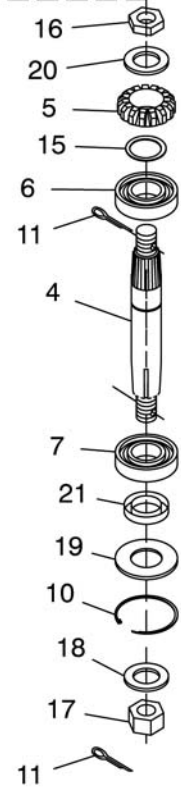
GEARBOX ASSEMBLY - AFTER S/N 788882



REF	PART	QTY	DESCRIPTION
1	1001224	1	Crown gear 22T M5.7
2	NS	1	Gearbox housing
3	57465	1	Input shaft 1-3/8 - 6 spline
4	1001218	1	Output shaft
5	1001223	1	Gear pinion 13T M5.7
6	57477	1	Bearing cup & cone
7	57478	1	Bearing cup & cone
8	57462	1	Bearing cup & cone
9	20890	1	Ball bearing
10	20897	1	Internal retainer ring 81 mm
11	-----	2	* Cotter pin
12	57466	2	Snap ring
13	57467	1	Snap ring
14	57373	1	Spacer 35.3 x 48 x 2.5
15	57328	2	Gearbox shim kit
16	57469	1	Castle nut M24 x 1.5
17	20892	1	Castle nut metric M24 x 2
18	20893	1	Protective washer
19	57475	1	Flat washer 21 x 37 x 3
20	57474	1	Flat washer 25 x 48 x 2.5
21	20900	1	Metric seal 40 x 80 x 12
22	57463	1	Oil seal 35 x 72 x 10
23	57374	1	Oil cap
25	57376	1	Top cover
26	-----	6	* M8 x 16 Bolt CL8.8
27	57076	1	Plug 1/2 breather

* Standard hardware, obtain locally

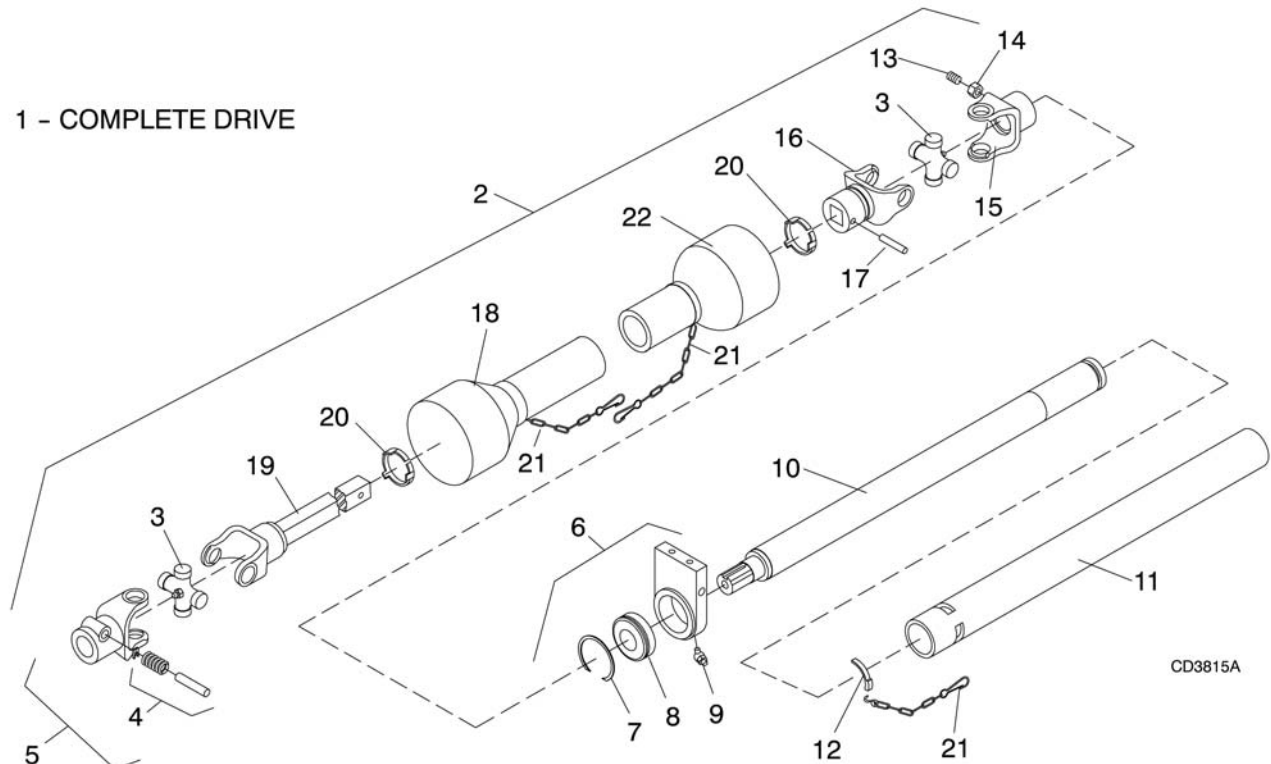
NS = Not Serviced



11

P990-3 FRONT 2/3 OF 3-JOINT DRIVE - PULL-TYPE

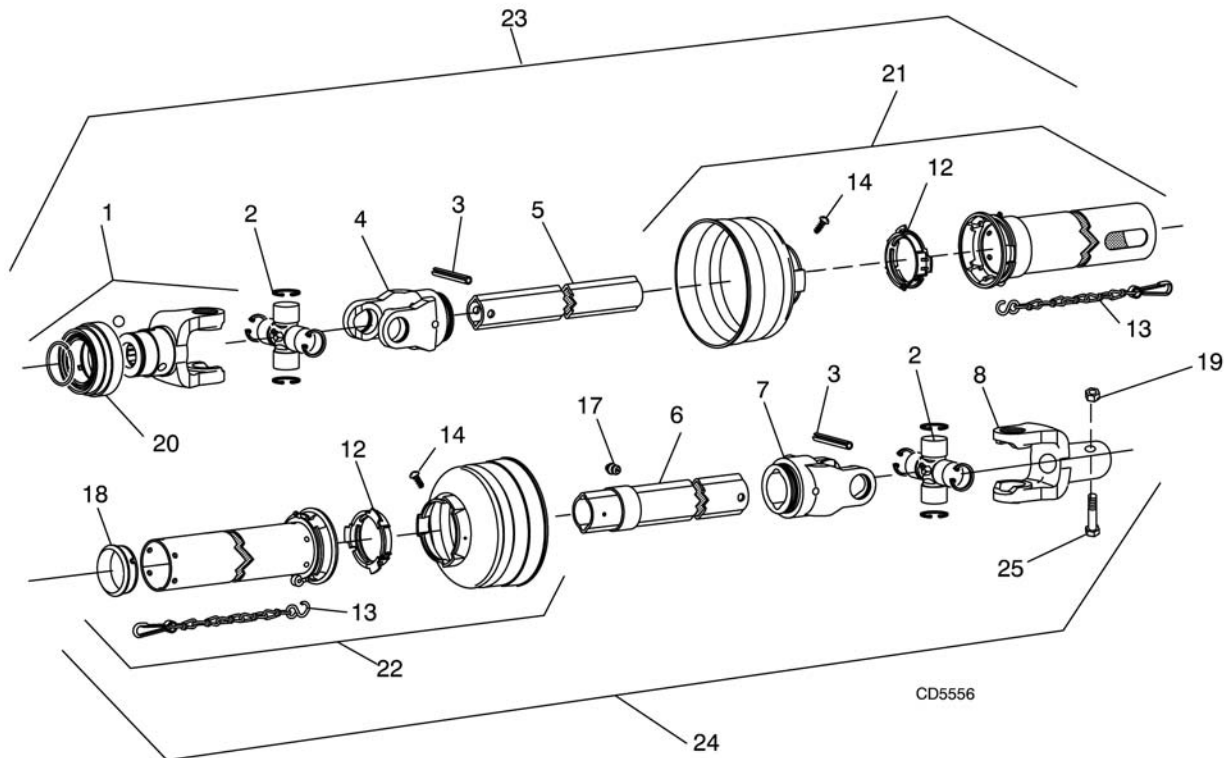
1 - COMPLETE DRIVE



CD3815A

REF	PART	QTY	DESCRIPTION
1	20190	1	Front 2/3 of 3-joint drive complete
2	15928	1	Front 2 joints shielded
3	154	2	U-Joint repair kit L14R
4	117	1	Lock pin & spring
5	148	1	1-3/8 Quick-disconnect yoke
6	1251	1	Bearing holder with bearing
7	12128	1	.062 x 72 mm ID Snap ring
8	3502	1	1.37 ID x 2.83 OD Ball bearing
9	2985	-	* 1/4-28 Threaded 905 grease fitting
10	20197	1	1-3/16 Tube drive 14N, 18.94 long
11	20196	1	Tubular shield with bearing & chain 15.25 long
12	15999	1	Shield bearing kit
13	4390	1	1/2 NF x 1-1/4 Socket head set screw
14	4391	1	1/2 NF Hex jam nut
15	4392	1	1-1/4 Spline U-joint yoke
16	4738	1	Yoke with rectangular hole
17	4674	1	3/8 x 2 Spirol pin
18	15930	1	Outer shield
19	4724	1	Rectangular shaft & yoke
20	15738	2	Inner shield bearing
21	15739	3	Shield tether chain 27.5
22	15932	1	Inner shield with bearing & chain

RM990 DRIVE SHAFT - S/N 725411 AND LATER - MOUNTED MODEL ONLY



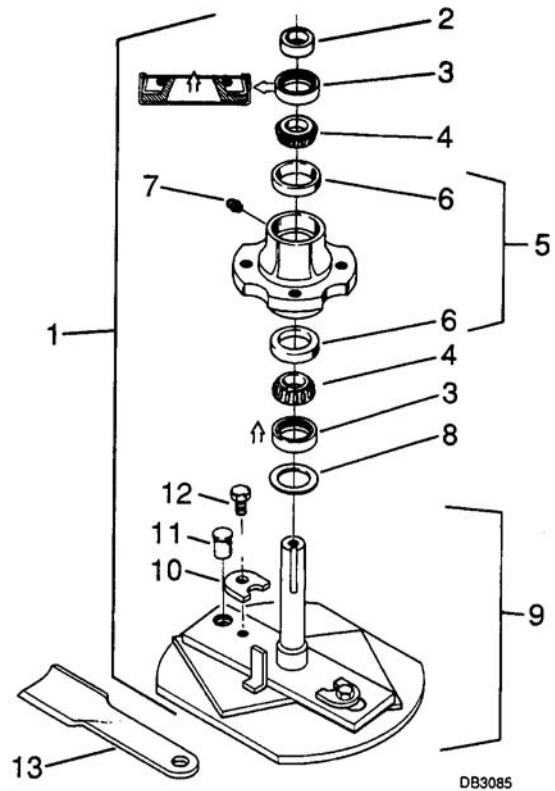
REF	PART	QTY	DESCRIPTION
A	40557	1	Drive assembly complete (S/N 725411 through 788882)
B	1001228	1	Drive assembly complete (after S/N 788882)
1	40574	1	Yoke, 1-3/8-6SP (complete with lock collar)
2	110	2	Cross and bearing kit
3	40764	2	Spring pin 10 mm x 80 mm
4	40575	1	Inboard yoke (male drive tube)
5	40587	1	Inner profile (cut to length)
6	40588	1	Outer profile (cut to length)
7	40576	1	Inboard yoke (female drive tube) (S/N 725411 through 788882)
8	40570	1	Yoke, 1-3/8 round bore (S/N 725411 through 788882)
8	40574	1	Yoke, 1-3/8-6 SP (complete with lock collar) (after S/N 788882)
12	40766	2	Bearing ring (Package of 2)
13	40777	2	Anti-rotation chain
14	40778	2	Screw (Package of 10)
17	40779	1	Grease zerk
18	40767	1	Guard support bearing
19	765	1	1/2 NC Lock nut (S/N 725411 through 788882)
20	40589	2	Lock collar repair kit (without yoke)
21	40590	1	Guard, outer half (also includes items 12, 13 and 14) (cut to length)
22	40591	1	Guard, inner half (also includes items 12, 13, 14 and 18) (cut to length)
23	40744	1	Shaft assembly, male half (complete with guard) (all S/N 725411 and later)
24	40745	1	Shaft assembly, female half (complete with guard) (S/N 725411 through 788882 only)
24	1001226	1	Shaft assembly, female half (complete with guard) (after S/N 788882 only)
25	3489	1	1/2 NC x 3 Cap screw, GR5 (S/N 725411 through 788882 only)

50 Parts

20944 (Rev. 3/14/2008)

RM990-3 & P990-3 BLADE SPINDLE ASSEMBLY

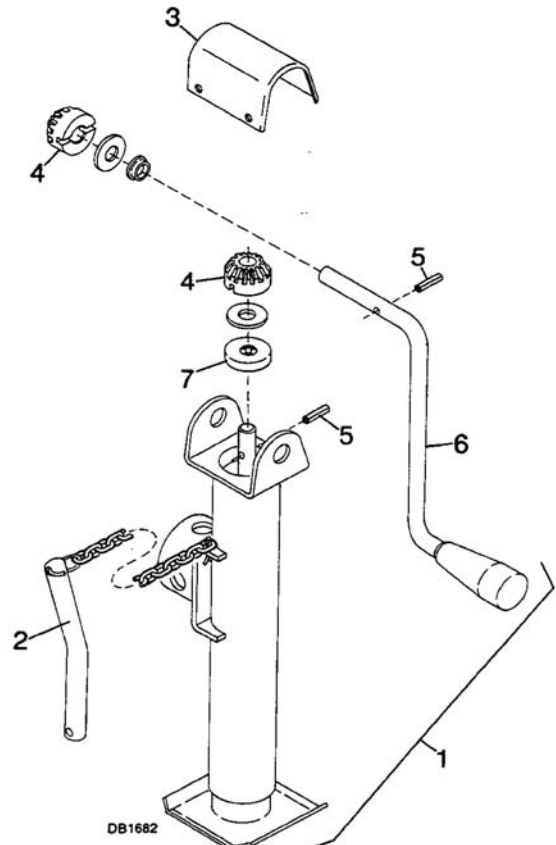
REF	PART	QTY	DESCRIPTION
1	24520	1	CCW Blade spindle complete
2	18359	1	1-3/8 x 1-3/4 x 5/8 Sleeve
3	2715	2	Seal for 1-3/4 shaft
4	2717	2	Bearing cone
5	18361	1	Spindle housing with cups
6	2716	2	Bearing cup
7	----	1	* See extended zerk page 44
8	2718	1	1-3/4 x 2-3/8 x 13 GA Flat washer
9	24521	1	Spindle shaft and crossbar asy
10	24527	2	Spindle blade lock
11	3967	2	QD Blade pin
12	13288	2	1/2 NC x 3/4 Nylok Cap screw
13	24590KT	1	CCW Blade, 13" long - Standard -or-
13	28329KT	1	CCW Low suction blade, 13" long - Optional



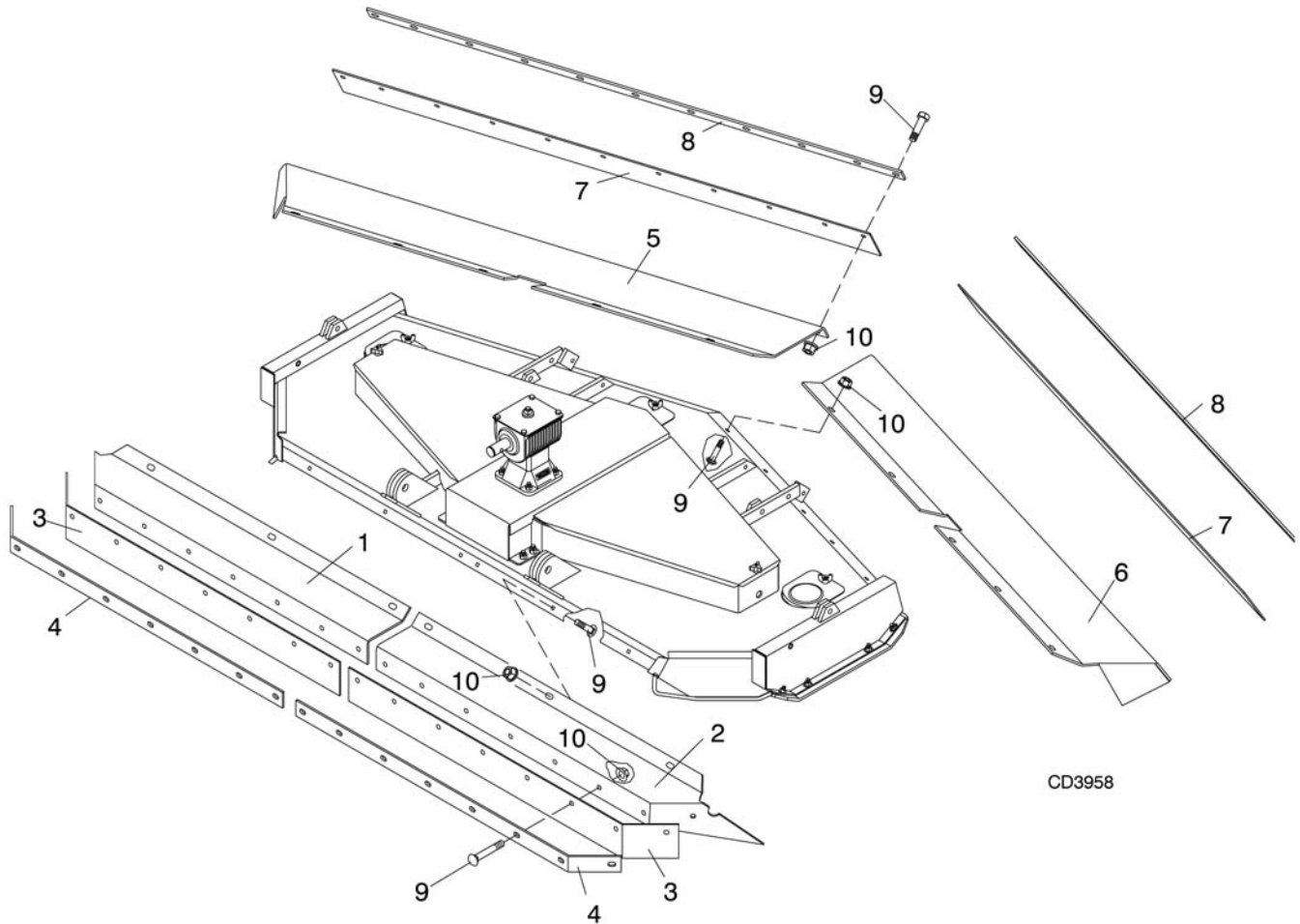
P990-3 PARKING JACK - PULL-TYPE

REF	PART	QTY	DESCRIPTION
1	23790	1	Swivel parking jack complete
2	25857	1	Jack hitch pin assembly
3	25858	1	Jack gearbox cover
4	25859	2	15-Tooth bevel gear
5	25860	2	* 5/32 x 1-1/4 Drive pin
6	25861	1	Jack crank handle
7	25862	1	Thrust bearing

* Standard hardware, obtain locally



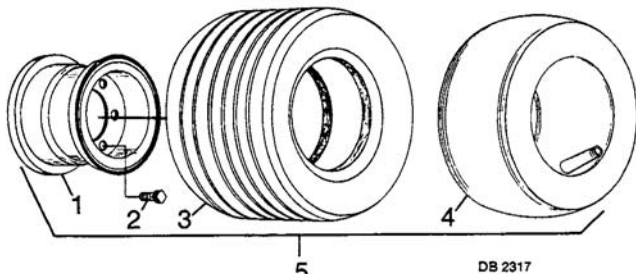
RM990-3 & P990-3 RUBBER SHIELDING ASSEMBLY



REF	PART	QTY	DESCRIPTION	REF	PART	QTY	DESCRIPTION
-	15845	1	Rubber shield bundle complete	6	19567	1	Left rear rubber shield plate
1	19556	1	Right front rubber shield plate	7	19568	2	Rubber belt, 3.75 x 48.50
2	19557	1	Left front rubber shield plate	8	19569	2	Link, .19 x 1.25 x 48.25
3	19558	2	Rubber belt, 3.25 x 35.25	9	6697	54	* 3/8 NC x 1 Carriage bolt GR5
4	19559	2	Bent link, .19 x 1.25 x 34.75	10	14350	54	3/8 NC Flanged hex lock nut
5	19566	1	Right rear rubber shield plate				* Standard hardware, obtain Locally

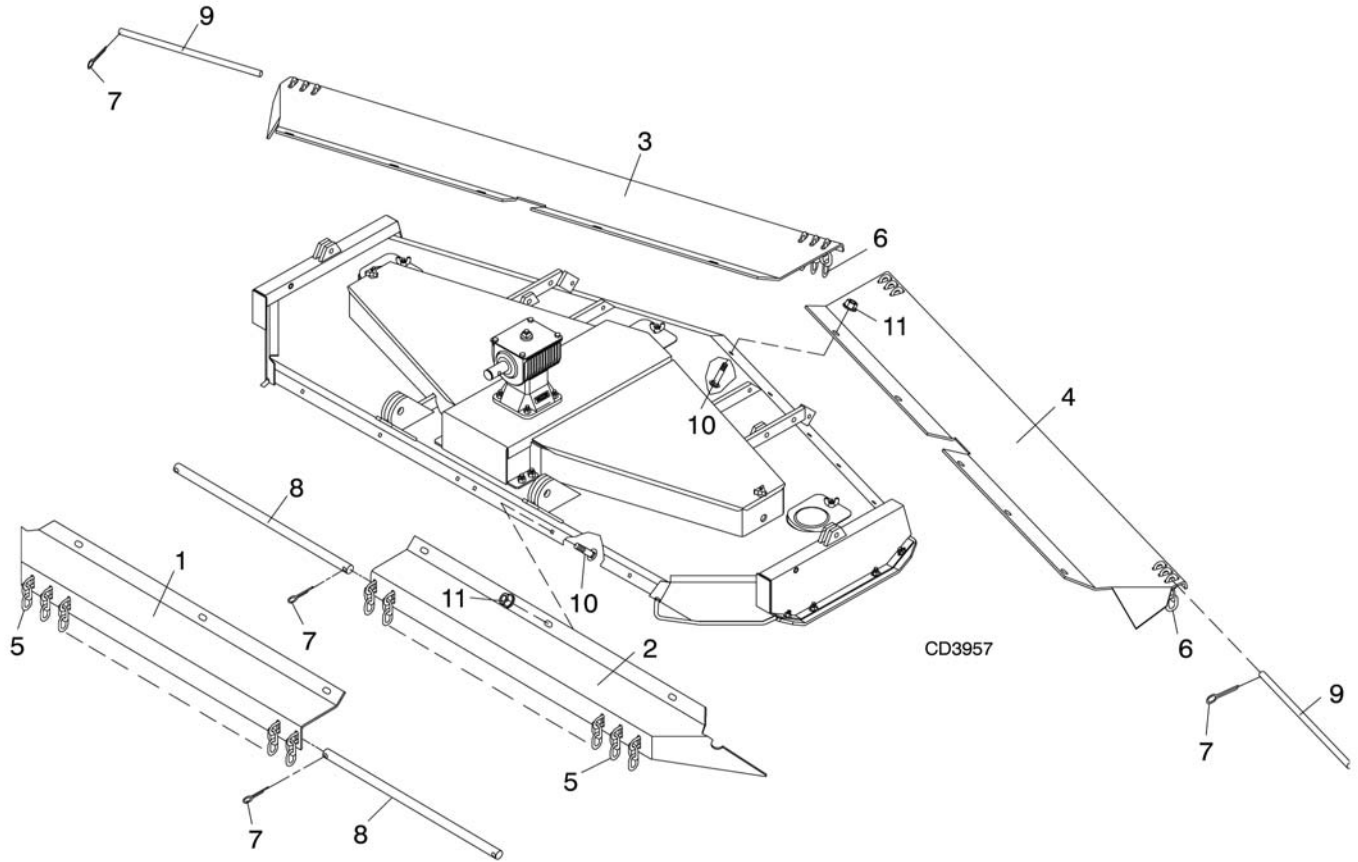
P990-3 PNEUMATIC TIRE ASSEMBLY

TIRE INFLATION: 45 LBS.



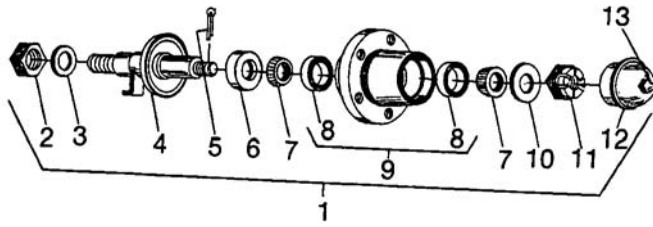
REF	PART	QTY	DESCRIPTION
1	14256	1	Rim for 18 x 9.5 x 8 tire
2	1258	5	1/2 NF x 1-1/8 Wheel bolt
3	14254	1	18 x 9.5 x 8 6-Ply rib tire
4	14576	1	18 x 9.5 x 8 Inner tube
5	14255	1	18 x 9.5 x 8 Rib tire and 5-hole wheel

RM990-3 & P990-3 CHAIN SHIELDING ASSEMBLY



REF	PART	QTY	DESCRIPTION	REF	PART	QTY	DESCRIPTION
-	20795	1	Chain shield bundle complete	6	4765	96	4-Link chain, 1/4 proof
1	19552	1	Right front chain shield plate	7	1256	8	* 3/16 x 1 Cotter pin
2	19553	1	Left front chain shield plate	8	18150	2	3/8 x 29-7/8 Pin, 24-chain
3	20792	1	Right rear chain shield plate	9	11761	2	3/8 x 48-1/2 Pin, 39-chain
4	20793	1	Left rear chain shield plate	10	6697	16	* 3/8 NC x 1 Carriage bolt GR5
5	4763	60	3-Link chain, 1/4 proof	11	14350	16	3/8 NC Flanged hex lock nut
							* Standard hardware, obtain locally

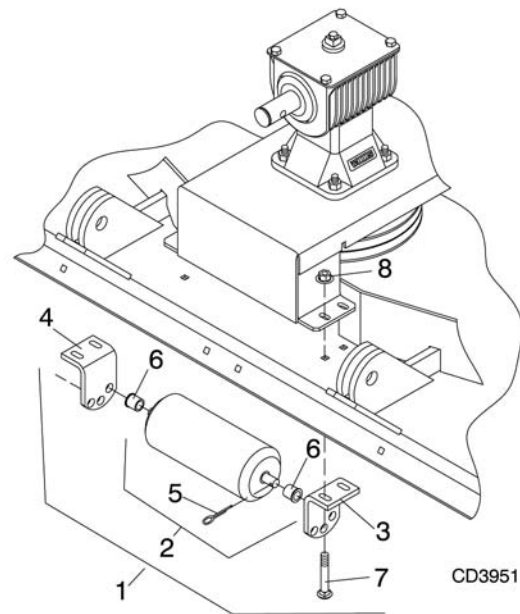
P990-3 HUB ASSEMBLY FOR PNEUMATIC TIRE



REF	PART	QTY	DESCRIPTION	REF	PART	QTY	DESCRIPTION
1	34931	1	Wheel hub and axle assembly	8	2305	2	Bearing cup
2	3626	1	1-14 UNS Hex nut	9	14132	1	5-Bolt wheel hub with cups
3	3627	1	1" Internal tooth lock washer	10	1257	1	* 3/4 Standard flat washer
4	34932	1	Axle assembly	11	5849	1	3/4 NF Slotted hex nut
5	1266	1	* 3/16 x 1-1/2 Cotter pin	12	14133	1	Hub cap with grease fitting
6	314	1	Seal for 1-1/2 shaft	13	6270	1	* Straight 1/4 tapered thread grease fitting (for hub cap)
7	2303	2	Bearing cone				* Standard hardware, obtain locally

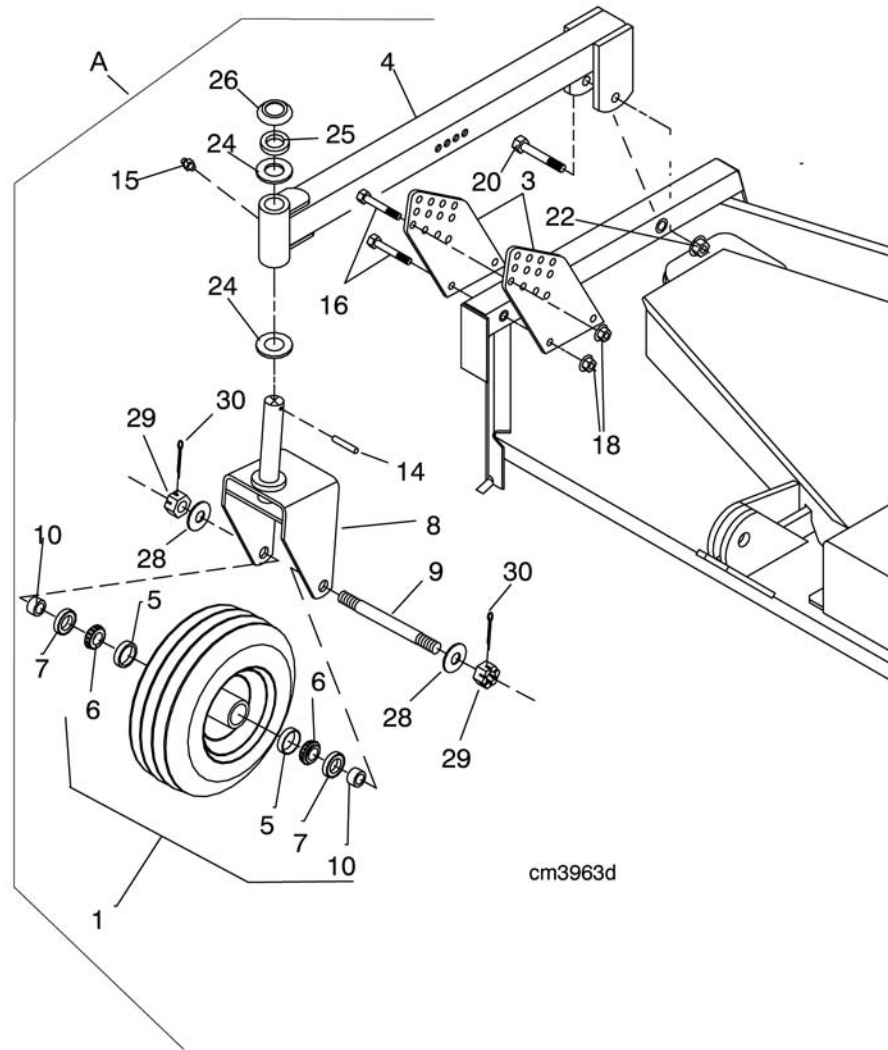
RM990-3 & P990-3 FRONT ROLLER ASSEMBLY (OPTIONAL)

REF	PART	QTY	DESCRIPTION
1	24650	1	Front roller complete
2	24583	1	Front roller, rod & bearings
3	24587	1	Left front roller bracket
4	24586	1	Right front roller bracket
5	1256	2	* 3/16 x 1 Cotter pin
6	29610	2	3/8 x 7/8 x 7/8 Nylon flange bearing
7	6697	4	* 3/8 NC x 1 Carriage bolt GR5
8	14350	4	3/8 NC Flanged hex lock nut
			* Standard hardware, obtain locally



CD3951

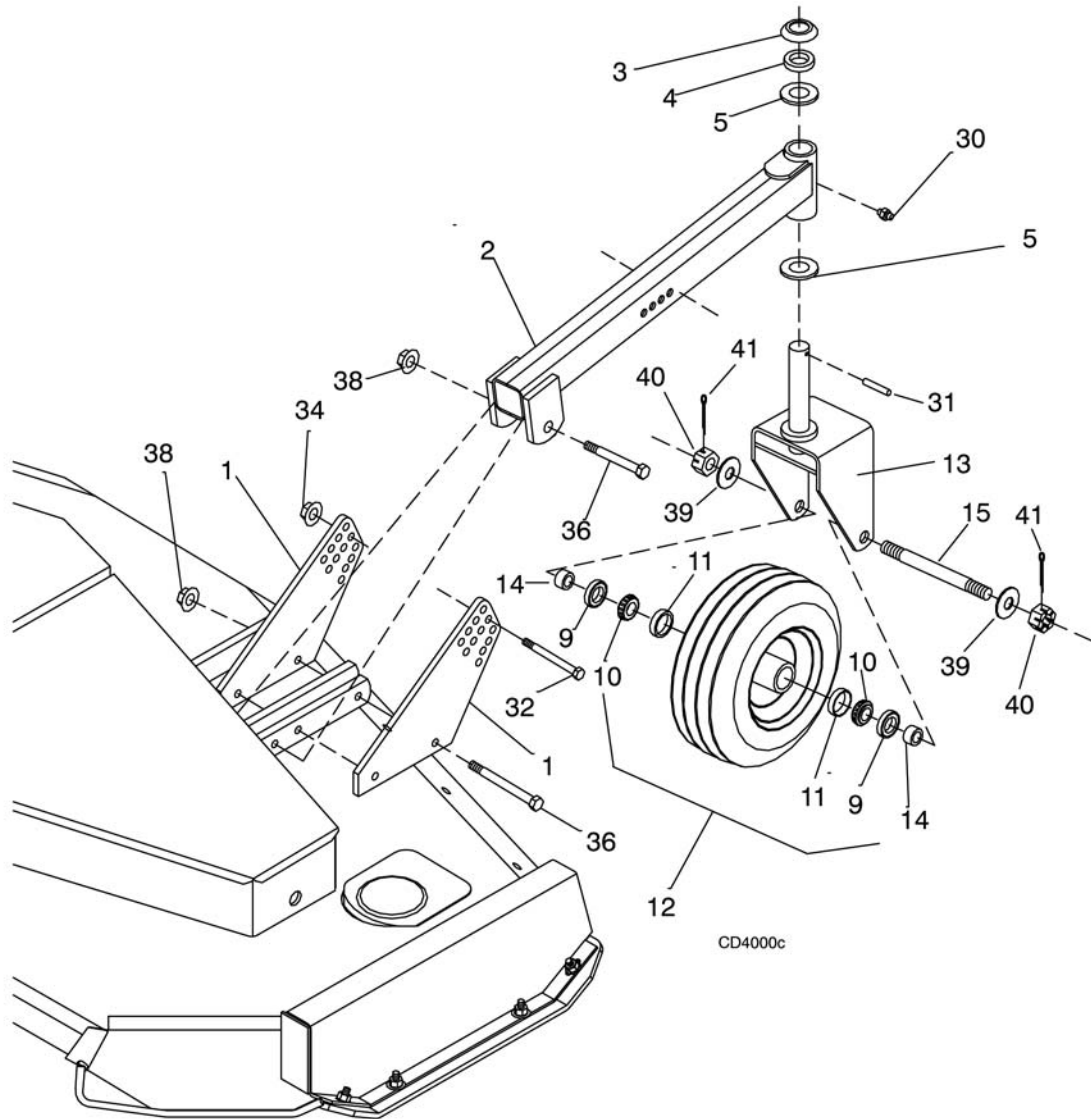
RM990-3 FRONT CASTER ARM ASSEMBLY



REF	PART	QTY	DESCRIPTION	REF	PART	QTY	DESCRIPTION
A	20790KT	1	Complete front caster wheel kit (Solid tires only; includes Ref. 1-30)	10	52744	4	.752 x 1.125 x .625 HT Bushing
1	20718	2	13 x 5 x 10 Solid tire (includes item 5) -or-	14	21022		1/4 x 2 Spirol pin
1	19744	2	13 x 5 x 6 Pneumatic tire (includes item 5)	15	1972	*	1/4-28 Tapered thread grease fitting
3	20777	2	Front caster support plate	16	12024	*	1/2 NC x 3-3/4 Cap screw GR5
4	20781	2	Caster wheel arm (includes PN- 31780 bronze bushing, 1-1/4 x 1-1/2 x 1-1/2)	18	11900		1/2 NC Flange hex lock nut
5	2306	4	Bearing cup	20	1605	*	5/8 NC x 4 Cap screw GR5
6	2304	4	Bearing cone	21	1286	*	5/8 Heavy lock washer
7	5624	4	Seal for 1-1/8" shaft	22	230	*	5/8 NC Hex nut
8	52743	2	Caster yoke	24	23609		1-1/4 x 2-3/8 x 3/16 Flat washer
9	52741	2	Axle	25	24588		1-1/4 x 1-7/8 x 3/8 Felt seal
				26	24589		Caster wheel cap washer
				28	1257	*	3/4 Standard flat washer
				29	5849	*	3/4 NF Slotted hex nut
				30	1266	*	3/16 x 1-1/2 Cotter pin

* Standard hardware, obtain locally

RM990-3 REAR CASTER ARM ASSEMBLY



REF	PART	QTY	DESCRIPTION	REF	PART	QTY	DESCRIPTION
1	20776	2	Rear caster support plate	14	52744	4	.752 x 1.125 x .625 HT Bushing
2	20781	2	Caster wheel arm (includes PN-31780 bronze bushing, 1-1/4 x 1-1/2 x 1-1/2)	15	52741	2	Axle
3	24589	2	Caster wheel cap washer	30	1972	*	1/4-28 Tapered thread grease fitting
4	24588	2	1-1/4 x 1-7/8 x 3/8 Felt seal	31	21022		1/4 x 2 Spirol pin
5	23609	4	1-1/4 x 2-3/8 x 3/16 Flat washer	32	12024	*	1/2 NC x 3-3/4 Cap screw GR5
9	5624	4	Seal for 1-1/8 shaft	34	11900		1/2 NC Flanged hex lock nut
10	2304	4	Bearing cone	36	1605	*	5/8 NC x 4 Cap screw GR5
11	2306	4	Bearing cup	37	1286	*	5/8 Heavy lock washer
12	20718	2	13 x 5 x 10 Solid tire (includes item 11) -or-	38	230	*	5/8 NC Hex nut
12	19744	2	13 x 5 x 6 Pneumatic tire (includes item 11)	39	1257	*	3/4 Standard flat washer
13	52743	2	Caster yoke	40	5849	*	3/4 NF Slotted hex nut
				41	1266	*	3/16 x 1-1/2 Cotter pin
							* Standard hardware, obtain locally

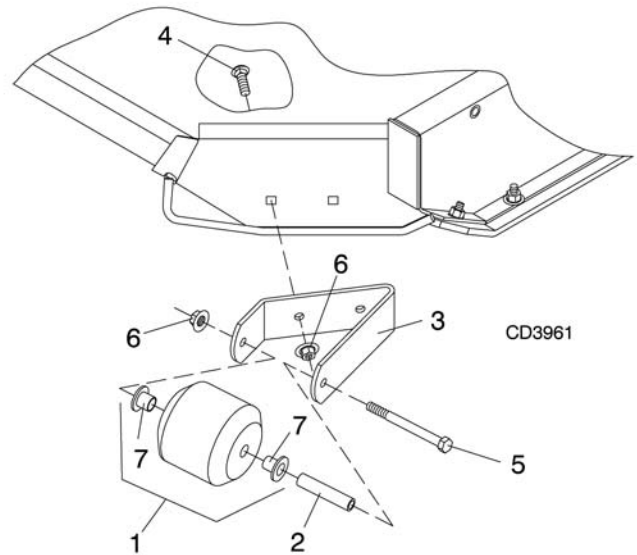
56 Parts

20944 (Rev. 3/14/2008)

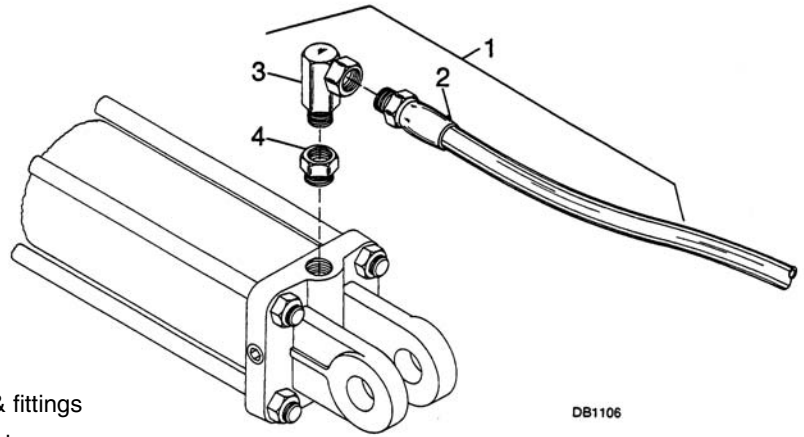
RM990-3 & P990-3 FRONT GAUGE ROLLER ASSEMBLY (OPTIONAL)

REF	PART	QTY	DESCRIPTION
-	15990	1	Front gauge roller complete
1	29361	1	5" Front roller, bearing & sleeve assembly (includes items 2 & 7)
2	29364	1	1/2 x 3/4 x 5-5/16 Sleeve HT
3	19534	1	Roller bracket
4	2615	2	* 1/2 NC x 1-1/4 Carriage bolt GR5
5	22205	1	1/2 NC x 6-1/2 Cap screw GR5
6	11900	3	* 1/2 NC Flanged hex lock nut
7	29363	2	3/4 x 1 x 1-1/2 Bronze flange bearing

* Standard hardware, obtain locally



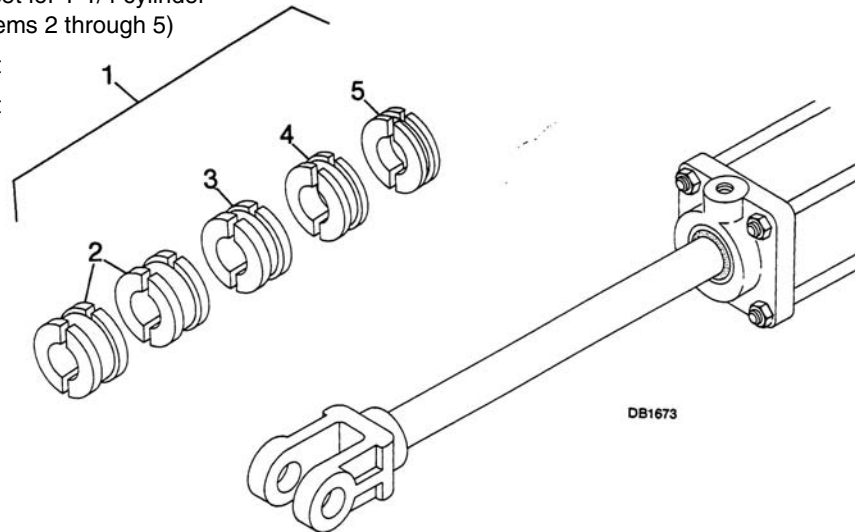
P990-3 HYDRAULIC HOSE KIT & FITTINGS (OPTIONAL)



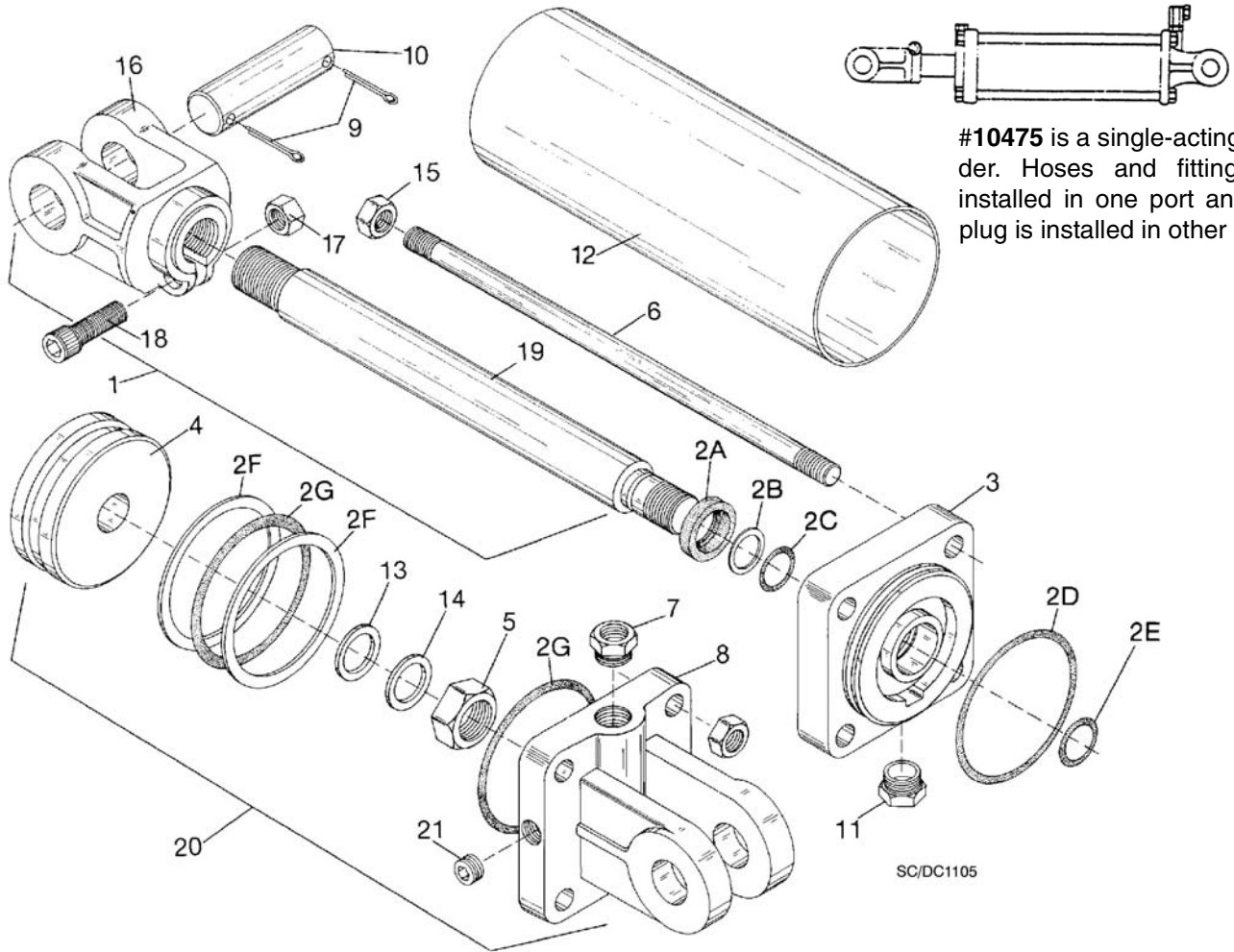
REF	PART	QTY	DESCRIPTION
1	17601	1	1/4 x 108 Hydraulic hose kit & fittings
2	17628	1	1/4 NPT x 108 High pressure hose assembly
3	10290	1	1/4 x 1/4 x 90° Elbow with 1/16 restrictor
4	11893	1	* 1/2 x 1/4 Pipe reducer bushing * Standard hardware, obtain locally

P990-3 HYDRAULIC STROKE CONTROL KIT (OPTIONAL)

REF	PART	QTY	DESCRIPTION
1	24098	1	Stroke control set for 1-1/4 cylinder rod (contains items 2 through 5)
2	-----	2	1-1/2" Segment
3	-----	1	1-1/4" Segment
4	-----	1	1" Segment
5	-----	1	3/4" Segment



**P990-3 3-1/2" BORE X 8" STROKE SINGLE-ACTING HYDRAULIC CYLINDER (OPTIONAL)
FOR PULL-TYPE ONLY**



#10475 is a single-acting cylinder. Hoses and fittings are installed in one port and vent plug is installed in other port.

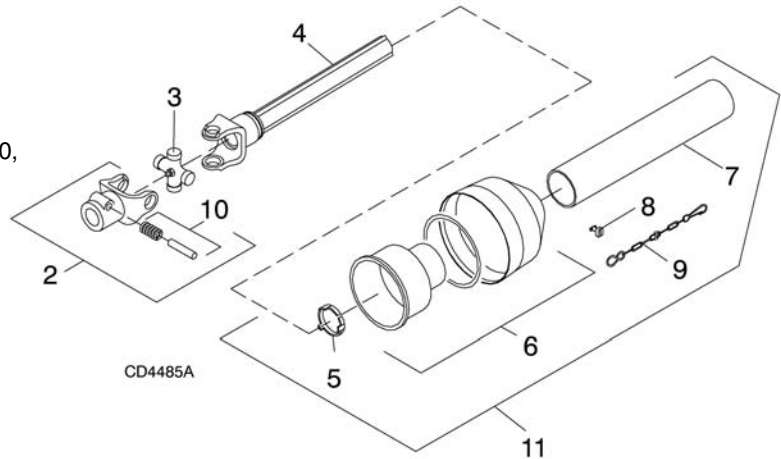
DB1825

SC/DC1105

REF	PART	QTY	DESCRIPTION	REF	PART	QTY	DESCRIPTION
1	----	--	Not available	9	923	4	* 1/4 x 1-3/4 Cotter pin
2	26340	1	Seal repair kit (includes items 2A through 2G)	10	1631	2	1 x 3-5/8 Clevis pin
2A	----	1	† 1-1/4 ID Wiper seal	11	11975	1	1/2 NPT Vent plug
2B	----	1	† Rod back-up ring	12	26342	1	Cylinder barrel
2C	----	2	† 1-1/4 ID O-Ring	13	----	--	Not required
2D	----	2	† 3/16 x 3-1/2 OD O-Ring	14	----	--	Not required
2E	----	1	† 3/32 x 3/4 OD O-Ring	15	4391	8	1/2 NF Hex jam nut
2F	----	2	† 3-1/2 OD Back-up washer	16	25661	1	Cylinder rod clevis
2G	----	1	† Piston seal O-ring	17	6698	1	* 3/8 NC Hex lock nut
3	26338	1	Rod end housing	18	23550	1	* 3/8 NC x 1-1/2 Socket head cap screw
4	25497	1	Piston	19	26343	1	Cylinder rod
5	25496	1	1-14 UNS Jam nut	20	10475	1	Hydraulic cylinder complete (single-acting)
6	26341	4	Tie rod	21	4510	1	* 1/2 Pipe plug
7	11893	1	* 1/2 x 1/4 Pipe reducer bushing				* Standard hardware, obtain locally
8	25494	1	Cylinder butt end				† Included in seal kit

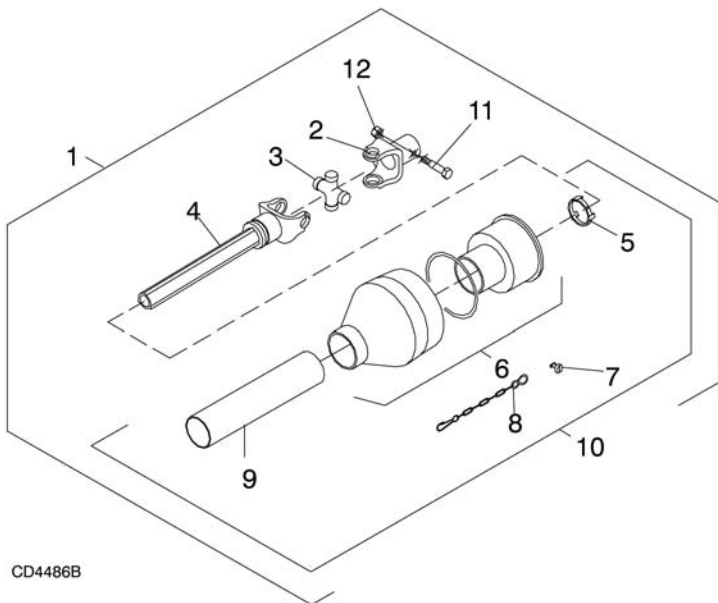
RM990-3 FRONT 1/2 DRIVE ASSEMBLY WITH TRI-LUBE SHAFT FOR S/N 577001 - 725410 MOUNTED MODEL ONLY

REF	PART	QTY	DESCRIPTION
1	53453	1	Complete drive, profile shield 50, 16.9, 1.38 - front half
2	51179	1	50 QD Yoke, 1-3/8 6B
3	36990	1	U-Joint repair kit 50
4	53456	1	Yoke & Tube (profile) 50 x 16.9
5	51190	1	Drive shield bearing 50 (includes rear bearing)
6	N/S	1	Shield bell kit
7	N/S	1	Shield tube
8	30922	3	Retainer shield
9	30917	1	Chain shield tether
10	30913	1	1-3/8 Push pin set
11	53457	1	Outer shield assembly complete (includes items 5 through 9) N/S Not serviceable



1 - COMPLETE FRONT HALF DRIVE

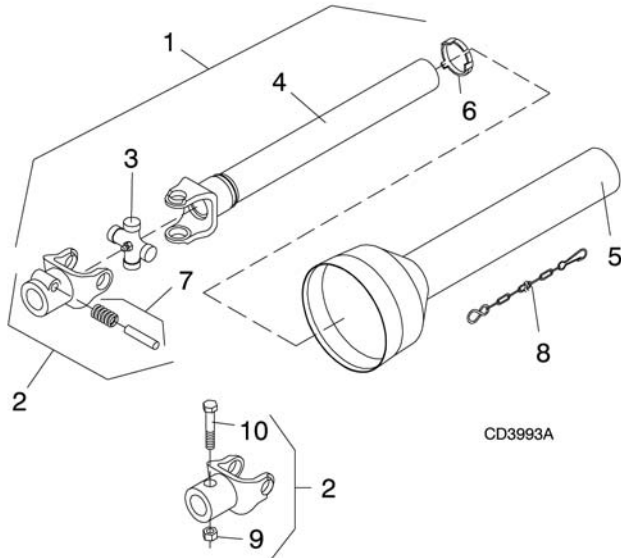
RM990-3 REAR 1/2 DRIVE ASSEMBLY WITH TRI-LOBE SHAFT FOR S/N 577001 - 725410 MOUNTED MODEL ONLY



REF	PART	QTY	DESCRIPTION
1	53462	1	Complete drive, profile shield 50, 18.5, 1.38 SB - rear half
2	53461	1	50 Shear pin yoke
3	36990	1	U-Joint repair kit 50
4	53458	1	Yoke and tube (profile) 50
5	51190	1	Drive shield bearing 50 (includes front bearing)
6	N/S	1	Shield bell kit
7	30922	3	Retainer shield
8	30917	1	Chain shield tether
9	N/S	1	Shield tube
10	53459	1	Shield assembly non-rotating (includes items 5 through 9)
11	3489	1	1/2 NC x 3 Cap screw GR5
12	765	1	1/2 NC Hex lock nut

N/S - Not serviceable

RM990-3 FRONT 1/2 DRIVE ASSEMBLY WITH SQUARE SHAFT FOR S/N 57700 AND BELOW MOUNTED MODEL ONLY



Standard Drive

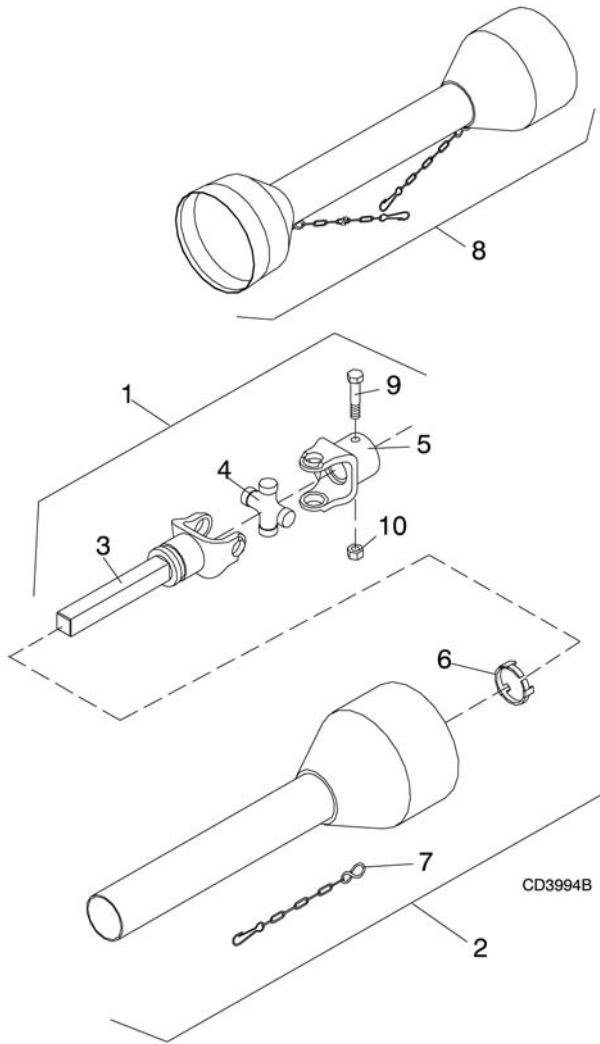
REF	PART	QTY	DESCRIPTION
1	19988	1	Drive, female half shielded, 1800, 18.4, 1.38
2	15510	1	1-3/8 QD Splined yoke, 1800 -or-
2	19894	1	1-1/8 Splined yoke 1800 (includes item 9 and 10)
3	15511	1	Universal joint repair kit, 1800
4	19990	1	Yoke & tube, female telescoping, 1800, 18.38
5	19992	1	Shield, Non-rotating, 2.75 x 19.5
6	15738	1	Shield bearing
7	117	1	Lock pin & spring
8	15739	1	Shield tether chain 27-1/2"
9	6128	1	* 1/4 NC Hex lock nut
10	19898	1	1/4 NC x 1-3/4 Cap screw GR5

Long Drive

REF	PART	QTY	DESCRIPTION
1	20140	1	Drive shield, yoke & tube, 24.88
2	15510	1	1-3/8 QD Splined yoke 1800
3	15511	1	U-Joint repair kit, 1800
4	15513	1	Yoke & tube assembly, 1800 25.13
5	19607	1	Shield 2.75 x 25.6 with decal (includes items 6 & 8)
6	15738	1	Shield bearing
7	117	1	Lock pin & spring
8	15739	1	Shield tether chain 27-1/2"

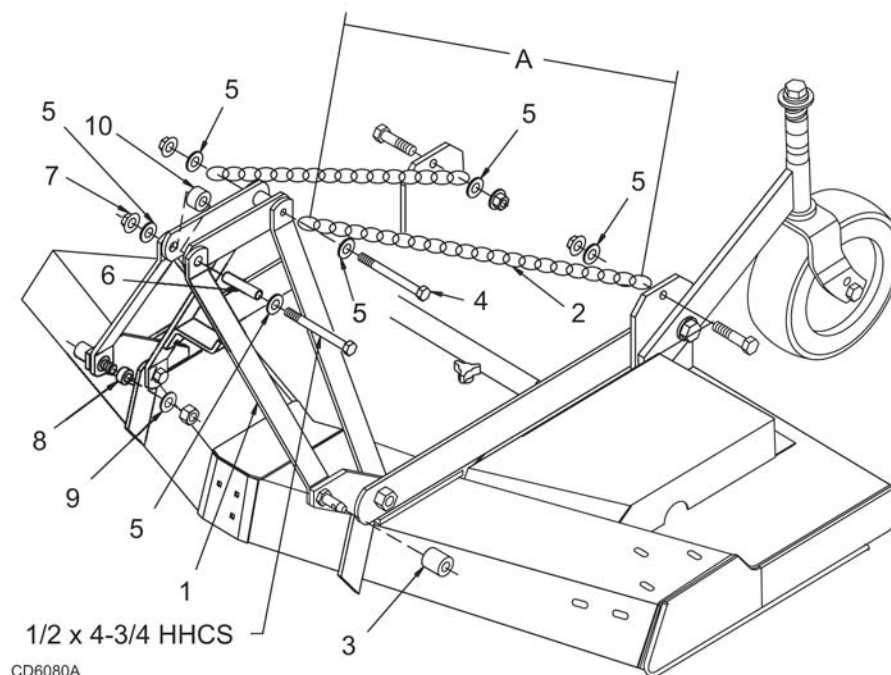
* Standard hardware, obtain locally

RM990-3 REAR 1/2 DRIVE ASSEMBLY WITH SQUARE SHAFT FOR S/N 57700 AND BELOW MOUNTED MODEL ONLY



REF	PART	QTY	DESCRIPTION
1	19994	1	Drive male half shielded, 1800, 20.44, 1.38
2	19996	1	Shield, non-rotating, 2.50 x 2.50 x 19.9
3	19995	1	Yoke & shaft male telescoping, 1800 x 20.44
4	15511	1	Universal joint repair kit, 1800
5	19745	1	Shear yoke, 1800
6	15738	1	Inner shield bearing
7	15739	1	Shield tether chain 27-1/2"
8	19602	1	Shield kit (consists of 19992 & 19996)
9	15349	1	1/2 NC x 3 Shear bolt
10	765	1	1/2 NC Hex lock nut

QUICK HITCH KIT (OPTIONAL)



REF	PART	QTY	DESCRIPTION
1	1003692	2	Link, offset .38 x 2.0 x 15
2	1005401	2	Chain 3/8 proof coil 38 link
3	38214	2	Sleeve, .91 x 1.44 x 1.25
4	13563	1	* Cap screw 1/2 NC x 6 GR5
5	854	6	* Washer, flat 1/2 ZP
6	29368	1	Sleeve, .50 x .75 x 3.38
7	11900	1	Nut, flange lock 1/2 NC
8	29281	2	Sleeve, 7/8 x 1-1/8 x 19/32 HT
9	4258	2	* Washer, flat 7/8
10	1003614	1	Sleeve, .81 x 1.25 x 1.81
11	1005400	1	Quick hitch, complete

* Standard hardware, obtain locally

BOLT TORQUE CHART

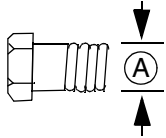
Always tighten hardware to these values unless a different torque value or tightening procedure is listed for a specific application.

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 Grade 2
(No Dashes)

SAE Bolt Head Identification

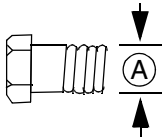


SAE Grade 5
(3 Radial Dashes)



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



METRIC SERIES TORQUE CHART



Metric
Grade 8.8

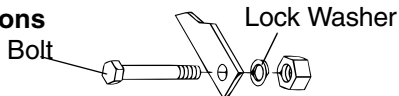
Metric Bolt Head Identification



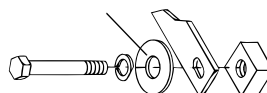
Metric
Grade 10.9

Ⓐ Diameter & Thread Pitch (Millimeters)	Wrench Size	Coarse Thread				Fine Thread				Ⓐ Diameter & Thread Pitch (Millimeters)
		Marking on Head				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

Typical Washer Installations



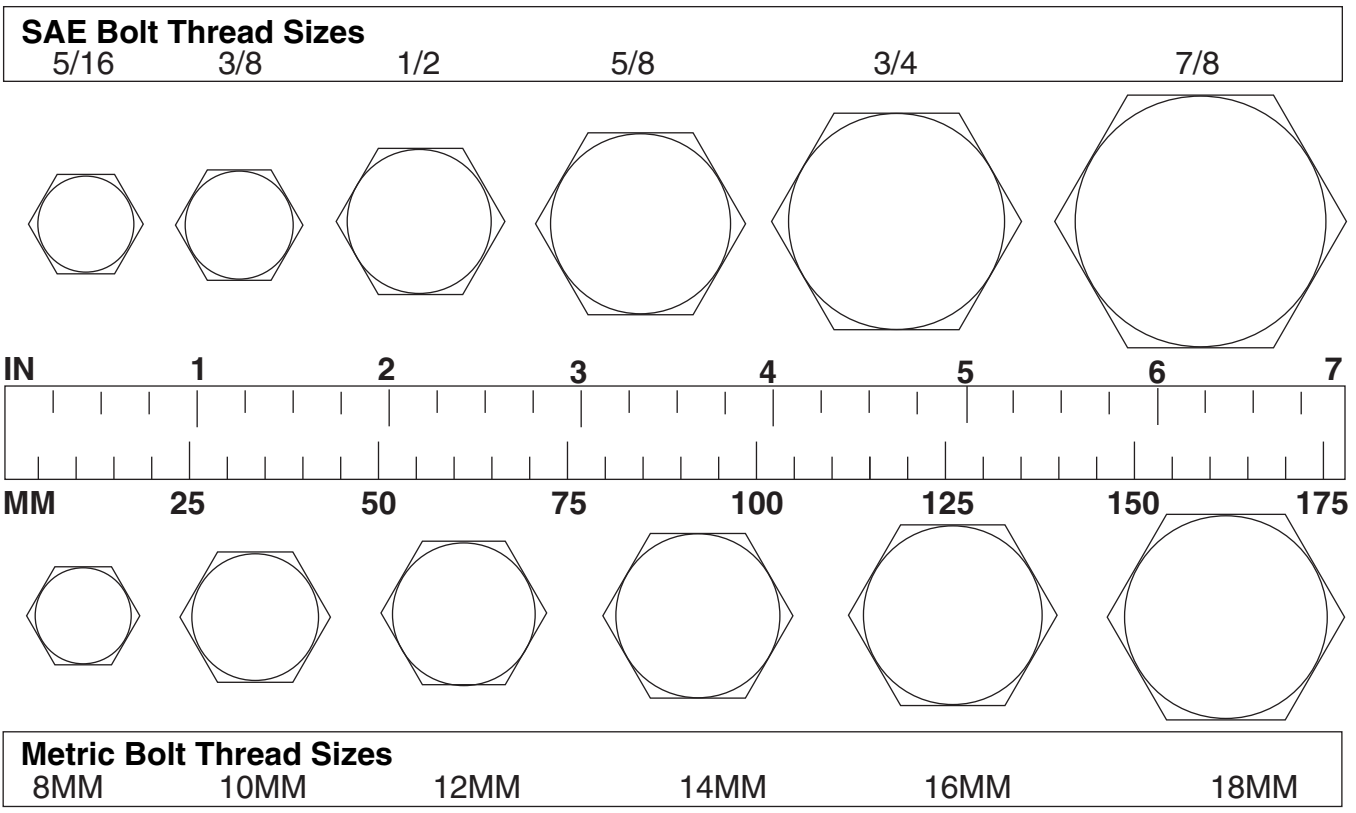
Flat Washer



8/9/00

BOLT SIZE CHART

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



ABBREVIATIONS

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

ASSEMBLY 31

- Dealer Set-Up Instructions 31
- Optional Equipment Installation 36

DEALER CHECK LISTS 40

- Delivery 40
- Pre-Delivery 40

DEALER SERVICE 22

- Blade Spindle 22
 - Assembly 23
 - Disassembly 23
 - Installation 24
 - Removal 22
 - Repair Tips 22
- Blocking Methods 22
- Gearbox 26
 - Assembly 27, 29
 - Disassembly 26, 28
 - Drive Pulley Installation 30
 - Leakage Repair 26
 - Removal 26
- Universal Joint Repair 24
 - Assembly 26
 - Disassembly 25
- Wheel Spindle Repair 24

GENERAL

- Abbreviations 49
- Bolt Size Chart 49
- Bolt Torque Chart 48
- General Information 4
- General information 4
- Introduction 2
- Obtaining Replacement Manuals 2
- Specifications 4
- Warranty
 - Product 64
 - Replacement Parts 1

OPERATION 10

- Attaching Mower to Tractor 10
 - P990-3 12
 - Drawbar to Hitch Point Distance 12
 - RM990-3
 - Cutting Height Adjustment 11
 - Tractor Stability 12
- Cleaning 15
- Operating Techniques 13
 - Optional Blade 14
 - Optional Front Roller 14
 - Tips 14
 - Uneven Terrain 14
- Pre-Operation Checklist,
(Operator's Responsibility) 13
- Starting and Stopping Mower 13
- Transporting P990-3 Mower 14

OWNER SERVICE 16

- Belt Replacement 18
- Blade Servicing 19
 - Installation 19
 - Removal 19
 - Sharpening 19
- Blocking Methods 16
- Lubrication Information 16
- Shear Bolt Replacement 18
- Shielding Repair 18
 - Chain Shielding 19
- Side Skide Repair 19
- Wheel Bearing Maintenance - RM990-3 Only 19

PARTS 41

SAFETY

- Safety & Instructional Decals 7
- Safety Rules 5
- Safety Symbols Explained 2

TROUBLE SHOOTING 20

- Belt Conditions 21
- Mowing Conditions 20

WARRANTY

(All Models Except Mow'n Machine™ Zero-Turn Mowers and Woods Boundary™ Utility Vehicles)

Please Enter Information Below and Save for Future Reference.

Date Purchased: _____ From (Dealer): _____
 Model Number: _____ Serial Number: _____

Woods Equipment Company ("WOODS") warrants this product to be free from defect in material and workmanship. Except as otherwise set forth below, the duration of this Warranty shall be for TWELVE (12) MONTHS COMMENCING ON THE DATE OF DELIVERY OF THE PRODUCT TO THE ORIGINAL PURCHASER.

Woods backhoe models BH70-X, BH80-X, and BH90-X are warranted for two (2) years from the date of delivery to the original purchaser.

The warranty periods for specific parts or conditions are listed below:

Part or Condition Warranted	Model Number	Duration (from date of delivery to the original purchaser)
Gearbox components	BW1260, BW1800	8 years
	BB48X, BB60X, BB72X, BB84X, BB600X, BB720X, BB840X, BB6000X, BB7200X, BB8400X, DS1260, DSO1260, DS1440, TS1680, BW126-2, BW180-2	6 years
	PHD25, PHD35, PHD65, PHD95, 2162, 3240, DS96, DS120, RCC42, RM550-2, RM660-2, RM990-3, PRD6000, PRD7200, PRD8400, 7144RD-2, 9180RD-2, 9204RD-2, S15CD, S20CD, S22CD, S25CD, S27CD	5 years
	RDC54, RD60, RD72	3 years (1 year if used in rental or commercial applications)
Blade spindles	RM550-2, RM660-2, RM990-3, PRD6000, PRD7200, PRD8400, 7144RD-2, 9180RD-2, 9204RD-2	3 years
Rust-through	BB600, BB720, BB840, BB6000, BB7200, BB8400, BW126-2, BW180-2, BW1260, BW1800, 2162, 3240, DS1260, DSO1260, DS1440, TS1680	10 years

Under no circumstances will this Warranty apply in the event that the product, in the good faith opinion of WOODS, has been subjected to improper operation, improper maintenance, misuse, or an accident. This Warranty does not apply in the event that the product has been materially modified or repaired by someone other than WOODS, a WOODS authorized dealer or distributor, and/or a WOODS authorized service center. This Warranty does not cover normal wear or tear, or normal maintenance items. This Warranty also does not cover repairs made with parts other than those obtainable through WOODS.

This Warranty is extended solely to the original purchaser of the product. Should the original purchaser sell or otherwise transfer this product to a third party, this Warranty does not transfer to the third party purchaser in any way. There are no third party beneficiaries of this Warranty.

WOODS makes no warranty, express or implied, with respect to engines, batteries, tires or other parts or accessories not manufactured by WOODS. Warranties for these items, if any, are provided separately by their respective manufacturers.

WOODS' obligation under this Warranty is limited to, at WOODS' option, the repair or replacement, free of charge, of the product if WOODS, in its sole discretion, deems it to be defective or in noncompliance with this Warranty. **The product must be returned to WOODS with proof of purchase within thirty (30) days after such defect or noncompliance is discovered or should have been discovered, routed through the dealer and distributor from whom the purchase was made, transportation charges prepaid.** WOODS shall complete such repair or replacement within a reasonable time after WOODS receives the product. **THERE ARE NO OTHER REMEDIES UNDER THIS WARRANTY. THE REMEDY OF REPAIR OR REPLACEMENT IS THE SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY.**

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE OF THIS WARRANTY. WOODS MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND WOODS SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY AND/OR ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

WOODS shall not be liable for any incidental or consequential losses, damages or expenses, arising directly or indirectly from the product, whether such claim is based upon breach of contract, breach of warranty, negligence, strict liability in tort or any other legal theory. Without limiting the generality of the foregoing, Woods specifically disclaims any damages relating to (i) lost profits, business, revenues or goodwill; (ii) loss of crops; (iii) loss because of delay in harvesting; (iv) any expense or loss incurred for labor, supplies, substitute machinery or rental; or (v) any other type of damage to property or economic loss.

This Warranty is subject to any existing conditions of supply which may directly affect WOODS' ability to obtain materials or manufacture replacement parts.

No agent, representative, dealer, distributor, serviceperson, salesperson, or employee of any company, including without limitation, WOODS, its authorized dealers, distributors, and service centers, is authorized to alter, modify, or enlarge this Warranty.

Answers to any questions regarding warranty service and locations may be obtained by contacting:

Woods Equipment Company
 2606 South Illinois Route 2
 Post Office Box 1000
 Oregon IL 61061
 800-319-6637 tel
 800-399-6637 fax
 www.WoodsEquipment.com



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WARRANTY

(Replacement Parts For All Models Except Mow'n Machine™
Zero-Turn Mowers and Woods Boundary™ Utility Vehicles)

Woods Equipment Company ("WOODS") warrants this product to be free from defect in material and workmanship for a period of ninety (90) days from the date of delivery of the product to the original purchaser with the exception of V-belts, which will be free of defect in material and workmanship for a period of 12 months.

Under no circumstances will this Warranty apply in the event that the product, in the good faith opinion of WOODS, has been subjected to improper operation, improper maintenance, misuse, or an accident. This Warranty does not cover normal wear or tear, or normal maintenance items.

This Warranty is extended solely to the original purchaser of the product. Should the original purchaser sell or otherwise transfer this product to a third party, this Warranty does not transfer to the third party purchaser in any way. There are no third party beneficiaries of this Warranty.

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WOODS shall not be liable for any incidental or consequential losses, damages or expenses, arising directly or indirectly from the product, whether such claim is based upon breach of contract, breach of warranty, negligence, strict liability in tort or any other legal theory. Without limiting the generality of the foregoing, Woods specifically disclaims any damages relating to (i) lost profits, business, revenues or goodwill; (ii) loss of crops; (iii) loss because of delay in harvesting; (iv) any expense or loss incurred for labor, supplies, substitute machinery or rental; or (v) any other type of damage to property or economic loss.

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