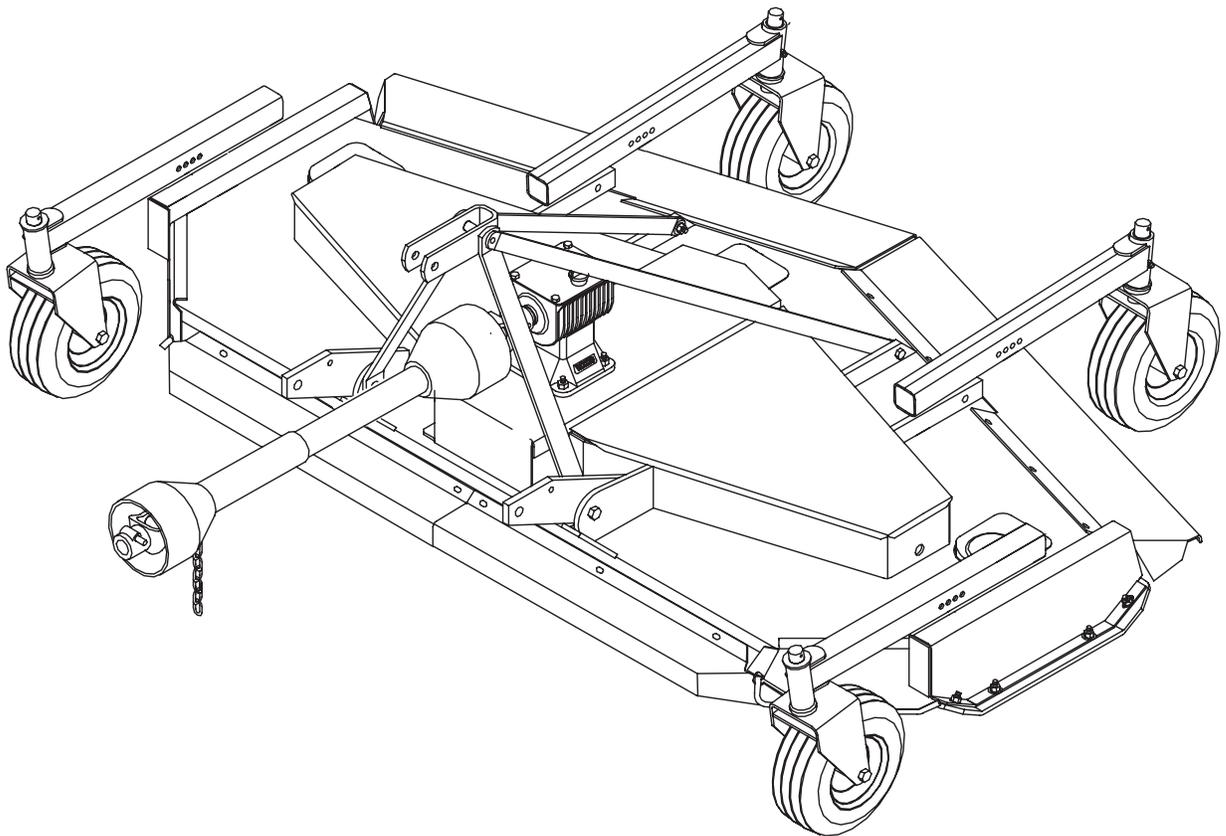


O P E R A T O R ' S M A N U A L

GROOMING MOWERS

GM1190R



FRONTIER
EQUIPMENT™

TO THE DEALER:

Assembly and proper installation of this product is the responsibility of the Frontier 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 form, located on the Frontier website. **Failure to complete and return the form does not diminish customer's warranty rights.**

TO THE OWNER:

Read this manual before operating your Frontier 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 the adjustment and operating procedures before attempting to operate. Replacement manuals can be obtained from your selling dealer.

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

Use only genuine Frontier 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 **IMPORTANT** 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 Safety-Alert Symbol indicates a hazard and means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**



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



Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed.



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

IMPORTANT

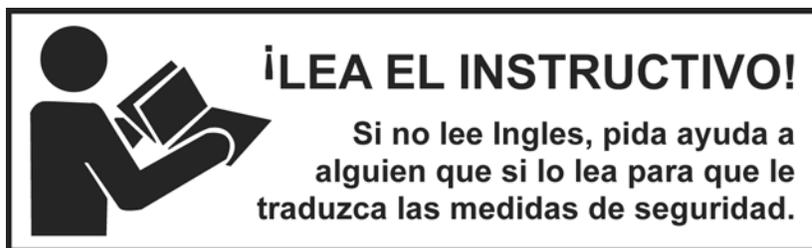
Indicates that failure to observe can cause damage to equipment.

NOTE

Indicates helpful information.

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

SPECIFICATIONS

Hitch	3-Point, Category 1
Cutting Width	90 in. (2.29 m)
Cutting Height Range.	1-1/2 - 8 in. (38 - 203 mm)
Operating Weight (approximate)	1200 lbs (544 kg)
Blade Speed (per minute)	15,569 ft (4745 m)
Blade Speed (rpm)	1,926
Blades Spindles	3
Number of Blades	6
Universal Drive Series	ASAE Cat. 4
Caster Wheels	13 x 5 x 10 in. (330 x 127 x 254 mm) Solid Rib Tread
	-or-
	13 x 5-6 Pneumatic Tire
Tractor PTO Speed RPM	540
Recommended Maximum Tractor Horsepower	50
Mower Frame Thickness	7 Gauge

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, but due to possible inline production changes, your machine may vary slightly in

detail. We reserve the right to redesign and change the machines as may be necessary without notification.

 **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.**

Throughout this manual, references are made to right and left direction. These are determined by standing behind the equipment facing the direction of forward travel. Blade rotation is counter-clockwise as viewed from the top of the mower.

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.) 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.**

■ **Keep hands and body away from pressurized lines. Use paper or cardboard, not hands or other body parts to check for leaks. Wear safety goggles. Hydraulic fluid under pressure can easily penetrate skin and will cause serious injury or death.**

■ **Make sure that all operating and service personnel know that if hydraulic fluid penetrates skin, it must be surgically removed as soon as possible by a doctor familiar with this form of injury or gangrene, serious injury, or death will result. CONTACT A PHYSICIAN IMMEDIATELY IF FLUID ENTERS SKIN OR EYES. DO NOT DELAY.**

■ **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.**

■ **Air in hydraulic systems can cause erratic operation and allows loads or equipment components to drop unexpectedly. When connecting equipment or hoses or performing any hydraulic maintenance, purge any air in hydraulic system by operating all hydraulic functions several times. Do this before putting into service or allowing anyone to approach the equipment.**

■ **Make sure all hydraulic hoses, fittings, and valves are in good condition and not leaking before starting power unit or using equipment. Check and route hoses carefully to prevent damage. Hoses must not be twisted, bent sharply, kinked, frayed, pinched, or come into contact with any moving parts. Operate moveable components through full operational range to check clearances. Replace any damaged hoses immediately.**

■ **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.**

■ **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.**

■ **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.**

■ **Make sure driveline shield tether chains are attached to the tractor and equipment as shown in this manual. Replace if damaged or broken. Check that driveline guards rotate freely on driveline before putting equipment into service.**

■ **Before starting power unit, check all equipment driveline guards for damage. Replace any damaged guards. Make sure all guards rotate freely on all drivelines. If guards do not rotate freely on drivelines, repair and replace bearings before putting equipment into service.**

■ **Inspect chain, rubber, belt, or curtain shielding before each use. Replace if damaged.**

■ **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.**

(Safety Rules continued on next page)

SAFETY RULES



ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!



(Safety Rules continued from previous page)

- 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.
- Do not put this equipment into service unless all side skids 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 a loader, 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.
- On pull-type or semi-mounted units with optional hydraulic cutting height adjustment, use a single-acting cylinder with a maximum extended length of 28-1/4" (718 mm) from attaching point center to center.

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.
- A minimum 20% of tractor and equipment weight must be on the tractor front wheels when attachments are in transport position. Without this weight, tractor could tip over, causing personal injury or death. The weight may be attained with a loader, front wheel weights, ballast in tires or front tractor weights. Weigh the tractor and equipment. Do not estimate.
- Always raise unit and install transport locks before transporting. Leak down or failure of mechanical or hydraulic system can cause equipment to drop.
- 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.

OPERATION

- Keep bystanders away from equipment.
- Never go underneath equipment (lowered to the ground or raised) unless it is properly blocked and secured. Never place any part of the body underneath equipment or between moveable parts even when the engine has been turned off. Hydraulic system leak down, hydraulic system failures, mechanical failures, or movement of control levers can cause equipment to drop or rotate unexpectedly and cause severe injury or death. Follow Operator's Manual instructions for working underneath and blocking requirements or have work done by a qualified dealer.
- Never direct discharge toward people, animals, or property.
- Do not operate or transport equipment while under the influence of alcohol or drugs.
- Operate only in daylight or good artificial light.
- Keep hands, feet, hair, and clothing away from equipment while engine is running. Stay clear of all moving parts.
- Always comply with all state and local lighting and marking requirements.
- Never allow riders on power unit or attachment.
- Power unit must be equipped with ROPS or ROPS cab and seat belt. Keep seat belt securely fastened. Falling off power unit can result in death from being run over or crushed. Keep foldable ROPS system in "locked up" position at all times.
- Always sit in power unit seat when operating controls or starting engine. Securely fasten seat belt, place transmission in neutral, engage brake, and ensure all other controls are disengaged before starting power unit engine.
- Operate tractor PTO at 540 RPM. Do not exceed.
- Do not operate PTO during transport.
- Look down and to the rear and make sure area is clear before operating in reverse.
- Do not operate or transport on steep slopes.

(Safety Rules continued on next page)

SAFETY RULES



ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!



(Safety Rules continued from previous page)

- 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.
- 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.
- On pull-type models, before working underneath, raise mower, install transport lock, and securely block up all four corners of mower. Hydraulic system leak down and failure of mechanical system can cause equipment to drop.
- Before working underneath, carefully read Operator's Manual instructions, disconnect driveline, raise mower, securely block up all corners with jackstands, and check stability. Secure blocking prevents equipment from dropping due to hydraulic leak down, hydraulic system failures, or mechanical component failures.
- Before performing any service or maintenance, disconnect driveline from tractor PTO.
- On pull-type or semi-mounted units with optional hydraulic cutting height adjustment, use a single-acting cylinder with a maximum extended length of 28-1/4" (718 mm) from attaching point center to center.

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.
- On pull-type models, before working underneath, raise mower, install transport lock, and securely block up all four corners of mower.

Hydraulic system leak down and failure of mechanical system can cause equipment to drop.

- Before working underneath, carefully read Operator's Manual instructions, disconnect driveline, raise mower, securely block up all corners with jackstands, and check stability. Secure blocking prevents equipment from dropping due to hydraulic leak down, hydraulic system failures, or mechanical component failures.
- Do not modify or alter or permit anyone else to modify or alter the equipment or any of its components in any way.
- Your dealer can supply original equipment hydraulic accessories and repair parts. Substitute parts may not meet original equipment specifications and may be dangerous.
- To prevent contamination during maintenance and storage, clean and then cover hose ends, fittings, and hydraulic ports with tape.
- 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.
- Never go underneath equipment (lowered to the ground or raised) unless it is properly blocked and secured. Never place any part of the body underneath equipment or between moveable parts even when the engine has been turned off. Hydraulic system leak down, hydraulic system failures, mechanical failures, or movement of control levers can cause equipment to drop or rotate unexpectedly and cause severe injury or death. Follow Operator's Manual instructions for working underneath and blocking requirements or have work done by a qualified dealer.
- 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.
- Do not handle blades with bare hands. Careless or improper handling may result in serious injury.

(Safety Rules continued on next page)

SAFETY RULES



ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!



(Safety Rules continued from previous page)

- 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.

- Wear gloves when installing belt. Be careful to prevent fingers from being caught between belt and pulley.

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

STORAGE

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

SAFETY & INSTRUCTIONAL DECALS

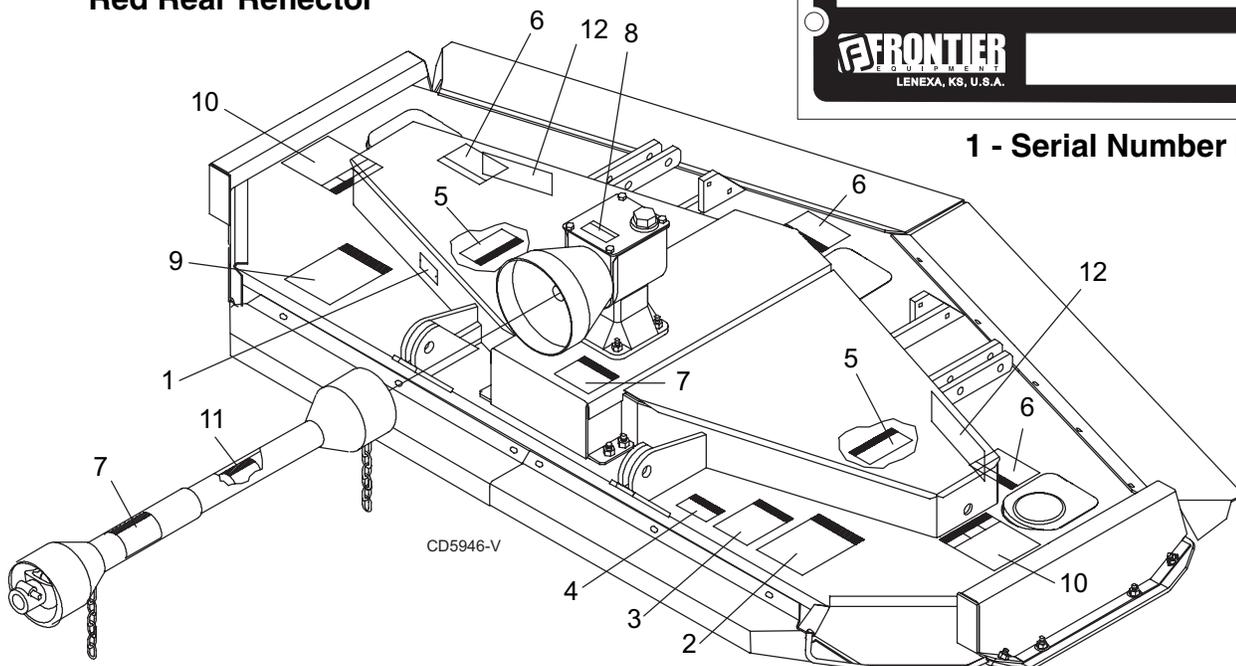


ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!



Replace Immediately If Damaged!

**12 - WP57123
Red Rear Reflector**



1 - Serial Number Plate

BE CAREFUL!

Use a clean, damp cloth to clean safety decals.

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

Replacement safety decals can be ordered free from your dealer.

(Safety Decals continued on next page)



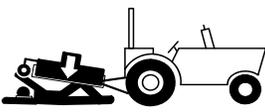
SAFETY & INSTRUCTIONAL DECALS

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

Replace Immediately If Damaged!



(Safety Decals continued from previous page)

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; font-size: small;">18865-C</p>	

2 - WP18865

WARNING
<p>TO AVOID SERIOUS INJURY OR DEATH:</p> <ul style="list-style-type: none"> ■ Read Operator's Manual before operating, servicing or repairing equipment. Follow all safety rules and instructions. (Manuals are available from your selling dealer.) ■ Never allow riders. ■ Keep bystanders away from equipment during operation. ■ Operate from tractor seat only. ■ Keep all shields in place and in good condition. ■ Lower equipment to ground, stop engine, remove key and set brake before dismounting tractor. ■ Never allow children or untrained persons to operate equipment. ■ Do not transport towed or semi-mounted units over 20 MPH. <p>FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH.</p> <p style="text-align: right; font-size: small;">1002423-B</p>

3 - WP1002423

4 - WP18866

WARNING
<p>DO NOT EXCEED PTO SPEED OF 540 RPM</p> <p>PTO speeds higher than 540 RPM can cause equipment failure and personal injury.</p> <p style="text-align: right; font-size: small;">18866-D</p>

6 - WP15502

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>CONTACT WITH ROTATING PARTS CAN CAUSE SERIOUS INJURY.</p> <p style="text-align: right; font-size: small;">15502-B</p>

7 - WP18864

DANGER
<p>SHIELD MISSING</p> <p>DO NOT OPERATE PUT SHIELD ON</p> <p style="text-align: right; font-size: small;">18867-B</p>

5 - WP18867

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 <p style="text-align: right; font-size: small;">18864-C</p>

(Safety Decals continued on next page)



SAFETY & INSTRUCTIONAL DECALS

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

Replace Immediately If Damaged!



(Safety Decals continued from previous page)

⚠ DANGER

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

1004114

8 - WP1004114

⚠ WARNING

CRUSHING AND PINCHING HAZARD

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

FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS INJURY OR DEATH.

1003751-A

9 - WP1003751

⚠ DANGER

GUARD MISSING. DO NOT OPERATE.

⚠ DANGER

GUARD MISSING. DO NOT OPERATE.

33347E

⚠ DANGER

11 - WP33347

10 - WP15503

⚠ 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

OPERATION

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.

The operator is responsible for the safe operation of this mower. The operator must be properly qualified and trained. Operators should be familiar with the mower, tractor and all safety practices before starting operation. Read the Safety Rules and Safety Decals on page 3 through page 8.

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, rubber, or steel band shielding, designed to reduce the possibility of thrown objects, 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, rubber, or steel band shielding, operation must be stopped when anyone comes within 300 feet (91.4 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 MOWER TO TRACTOR

Hitch Point Distance and PTO Clearance (Figure 1)

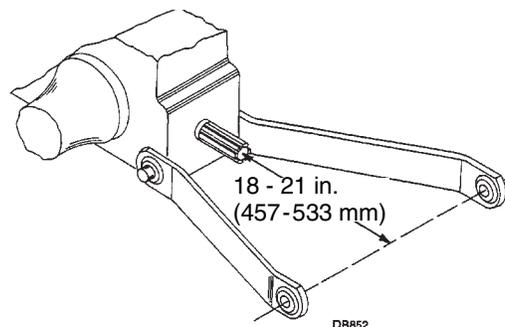


Figure 1. PTO to Mounting Point Distance

The standard drive is intended for use with tractors that have from 18 to 21" (457 to 533 mm) between the end of the tractor PTO shaft and the mounting pin holes on lower lift arms when they are horizontal (refer to Figure 1).

When the PTO/mounting pin distance is less than 18" (457 mm), the slip tubes of the PTO shaft can bottom out. When it exceeds 21" (533 mm), there may not be sufficient engagement when operating on uneven terrain.

When the PTO/mounting pin distance is under 18" (457 mm) or over 21" (533 mm), shorter or longer drives are available. Contact your Frontier 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 (407 Nm).

Attach mower hitch pins to lower tractor lift arms and secure. Attach tractor top link to mower top clevis. Connect driveline to tractor PTO shaft. Top link adjustment will be required (refer to instructions on page 11).

The standard 1-3/8" 6B spline driveline with a QD yoke is used to connect mower to tractor.

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

After mower is attached to tractor, carefully raise mower and check for driveline clearance between drive shielding and front of mower frame; a minimum of 1/2" (13 mm) 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 for Mounted Mowers (Figure 2)

IMPORTANT

- Avoid very low cutting heights. Striking the ground with blades 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.

⚠ WARNING

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

Best mowing results will be obtained with front of mower slightly lower than the rear.

⚠ 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.

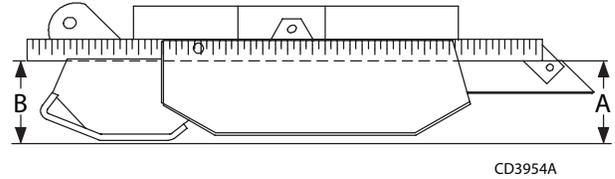


Figure 2. Cutting Height Adjustment

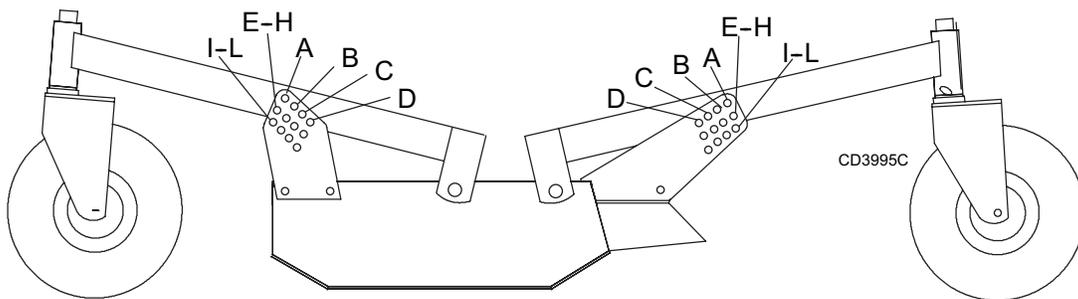
The cutting height will be the distance between the blade and the ground. The blades are approximately 5 (127 mm) below the top of the mower frame. To check cutting height, place a straight edge along top edge of mower frame as shown in Figure 2.

Measure from bottom of straightedge to the ground at locations "A" and "B". Subtract 5" (127 mm) from measurement "B" to determine cutting height.

Remember, measurement at location "A" should be at least 1/4" (6 mm) greater than location "B", and not more than 1/2" (13 mm) greater than location "B".

Cutting Height Adjustment with Front and Rear Caster Wheels (Figure 3)

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



HOLE NO	APPROX. CUTTING HEIGHT
A	1.00" (25 mm)
B	1.50" (38 mm)
C	2.00" (51 mm)
D	2.50" (64 mm)
E	3.00" (76 mm)
F	3.50" (89 mm)

HOLE NO	APPROX. CUTTING HEIGHT
G	4.00" (102 mm)
H	4.50" (114 mm)
I	5.00" (127 mm)
J	6.00" (152 mm)
K	7.00" (178 mm)
L	8.00" (203 mm)

Figure 3. Cutting Height Adjustment with Front Caster Wheels

Top Link Adjustment (Figure 4)

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".

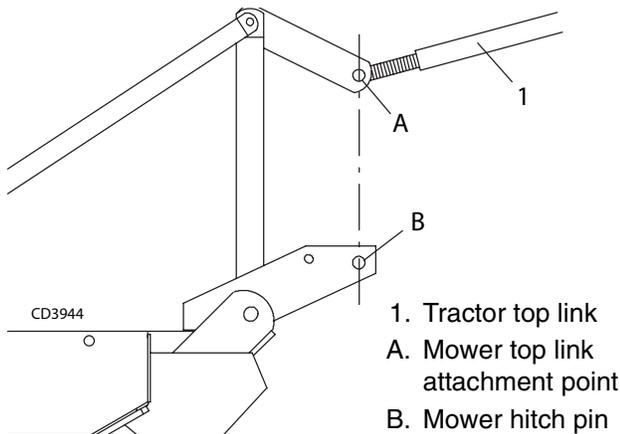


Figure 4. Top Link Adjustment

Tractor Stability (Figure 5)

WARNING

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

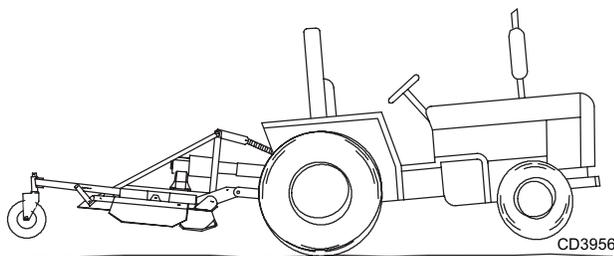


Figure 5. Tractor Stability

PRE-OPERATION CHECK LIST

(OWNER RESPONSIBILITY)

- ___ Review and follow all safety rules and safety decal instructions on page 3 through page 8.
- ___ 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 correct rpm for your equipment.
- ___ 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.

CAUTION

■ **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 Blades

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

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.

STORAGE

Clean equipment before storage. See instructions on page 16.

WARNING

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

OWNER SERVICE

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.

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.

NOTE: Clean off mower deck before servicing.

BLOCKING METHODS

Jackstands, with a load rating of 1,000 pounds (454 kg) or more, are the only approved blocking device for this mower. A minimum of four jackstands, located under the mower as shown in Figure 6, must be installed before working underneath this unit. Do not position

jackstands 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.

Tighten tractor lower 3-point arm anti-sway mechanisms to prevent side to side movement.

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

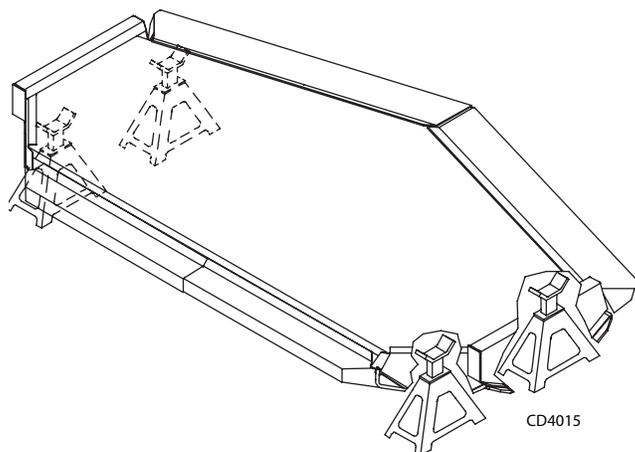


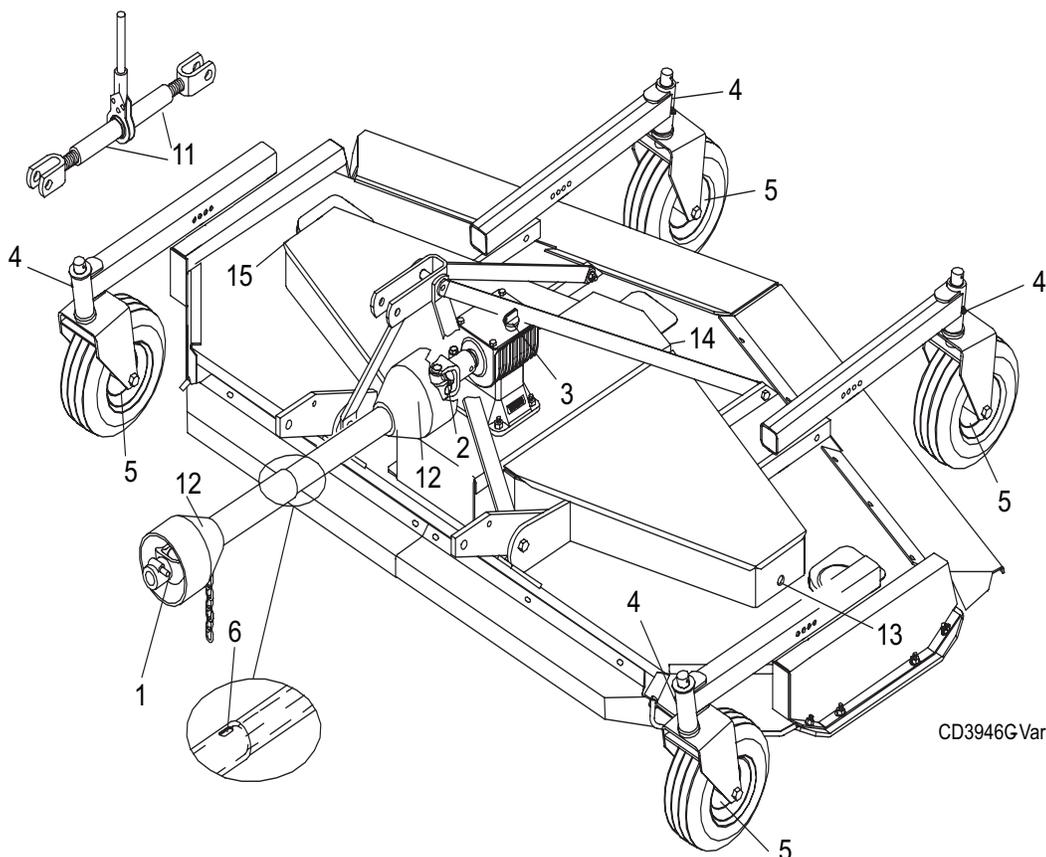
Figure 6. Jackstand Placement
(Tractor and connection not shown)

LUBRICATION INFORMATION (Figure 7)

Figure 7 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.



REF NO	DESCRIPTION	FREQUENCY	REF NO	DESCRIPTION	FREQUENCY
1	Front U-Joint	8 hrs	6	Slip Joint Zerk	8 hrs
2	Rear U-Joint	8 hrs	11	Ratchet Adjustment Link	100 hrs
3	Gearbox, Cover half of horizontal shaft with SAE 90W gear lube	Check Daily	12	Shield Bearing	8 hrs
4	Tailwheel Pivot Arm	8 hrs	13	Left Blade Spindle	10 hrs
5	Tailwheel Bearings	250 hrs Repack	14	Center Blade Spindle	10 hrs
			15	Right Blade Spindle	10 hrs

Figure 7. Lubrication Points

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 driveline 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.

BELT REPLACEMENT (Figure 8)

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.

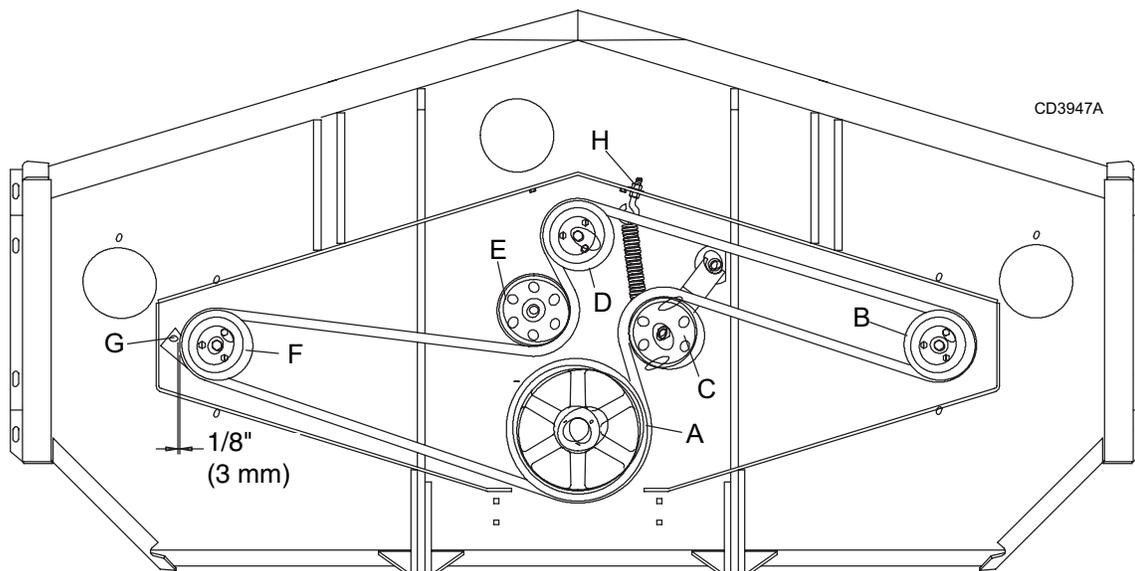


Figure 8. Belt Installation

IMPORTANT

■ 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" (3 mm) away from belt. Tighten to 85 lbs-ft (85 Nm).

SHEAR BOLT REPLACEMENT

IMPORTANT

■ 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 locknut.

CHAIN SHIELDING REPAIR

⚠ DANGER

■ Full chain, rubber, or steel band shielding, designed to reduce the possibility of thrown objects, 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, rubber, or steel band shielding, operation must be stopped when anyone comes within 300 feet (91.4 m).

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

SIDE SKID REPAIR (Figure 9)

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

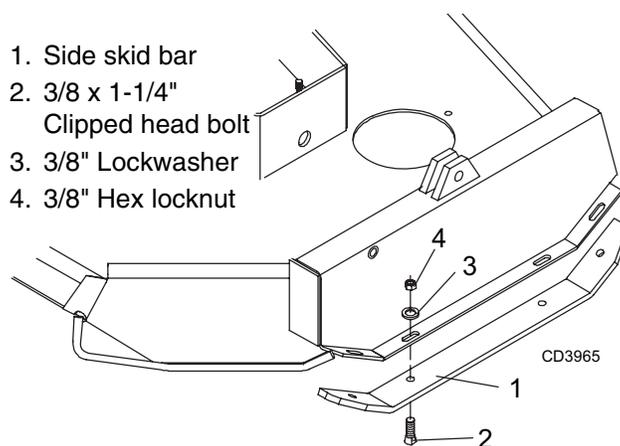


Figure 9. Side Skid Repair

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.

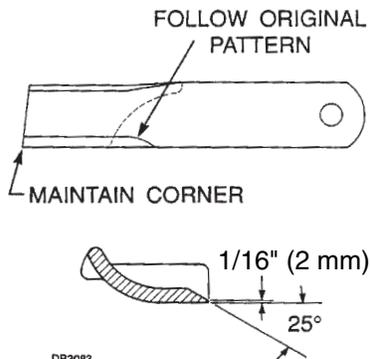
Low suction and general purpose suction blades are available. Use low suction blades in sandy areas where abrasive action could cause excessive blade wear. General purpose suction blades are recommended for all other applications.

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 (Figure 10)

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.



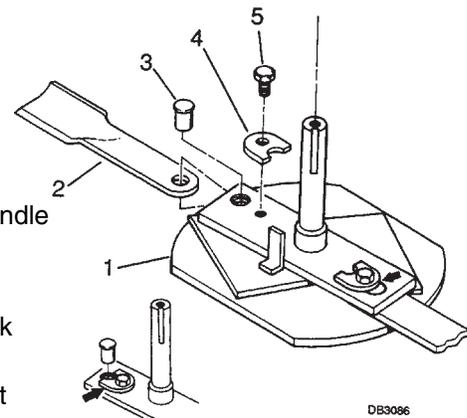
DB3083
Figure 10. Blade Sharpening

Blade Removal (Figure 11)

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 (Figure 11)

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.



DB3086
Figure 11. Blade Installation and Lock

WHEEL BEARING MAINTENANCE

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 locknut against it to maintain bearing adjustment.

CLEANING

After Each Use

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

Periodically or Before Extended Storage

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

TROUBLE SHOOTING

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" (13 mm) of same height. See instructions.
Grass cut lower in center of 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 within 1/2" (13 mm) of same height. See instructions.
Streaking conditions in swath	Conditions too wet for mowing	Allow grass to dry before mowing.
	Blades unable to cut that part of grass pressed down by path of tractor tires	Slow ground speed of tractor but keep engine running at full PTO rpm. Cutting lower will help.
	Dull blades	Sharpen or replace blades.
Material discharges from mower unevenly; bunches of material along swath	Material too high and too much material	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 degrees to first pass. Raise rear of mower high enough to permit material to discharge, but not so high that conditions listed above occur.
	Grass wet	Allow grass to dry before mowing. Slow ground speed of tractor but keep engine running at full PTO rpm. Cutting lower will help.
	Rear of mower too low, trapping material under mower	Adjust mower height and attitude. (See instructions.)

TROUBLE SHOOTING

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 overlubrication	Be careful not to overlubricate. 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 material. Clean all material 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. A belt that does not lie flat (has humps or twists, indicating broken or stretched cords) must be replaced.

DEALER SERVICE

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

NOTE: Clean off mower deck before servicing.

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

Jackstands, with a load rating of 1,000 pounds (454 kg) or more, are the only approved blocking device for this mower. A minimum of four jackstands, located under the mower as shown in Figure 12, must be installed before working underneath this unit. Do not position jackstands under wheels, axles, or wheel supports because these components can rotate.

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

Tighten tractor lower 3-point arm anti-sway mechanisms to prevent side to side movement.

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

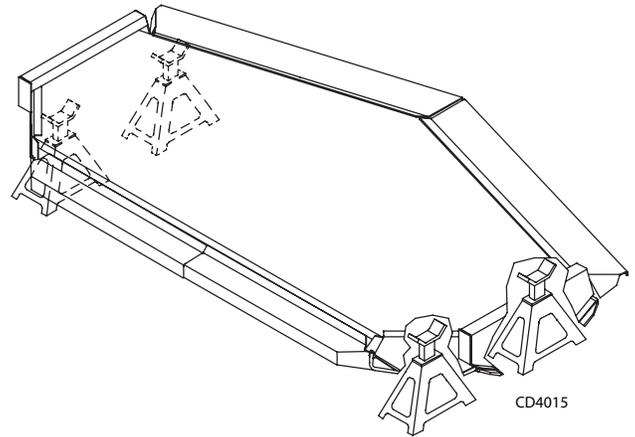


Figure 12. Jackstand Placement
(Tractor and connection not shown)

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 the 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 Aviation Form-A-Gasket^{®1} or equivalent is recommended as a sealant for spindle repair.

1. Permatex Aviation Form-A-Gasket is a registered trademark of the Permatex Corporation.

Blade Spindle Removal

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

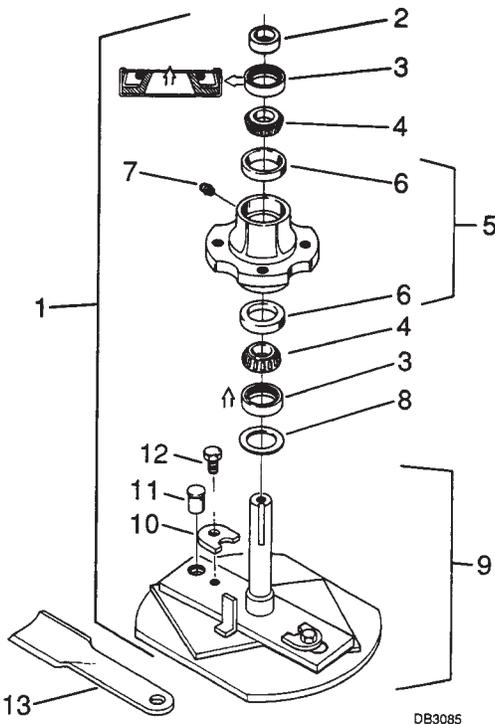
Remove split taper bushing (located on top of pulley) by removing the two bolts and inserting them into the threaded holes in bushing flange. Tighten alternately to remove split taper bushing.

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.

Blade Spindle Disassembly (Figure 13)

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



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" Nylok bolt
13. Blade

Figure 13. Blade Spindle Assembly

Blade Spindle Assembly (Figure 13)

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

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).

IMPORTANT

■ **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.

IMPORTANT

■ **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" (2 mm) above, housing.

Blade Spindle Installation

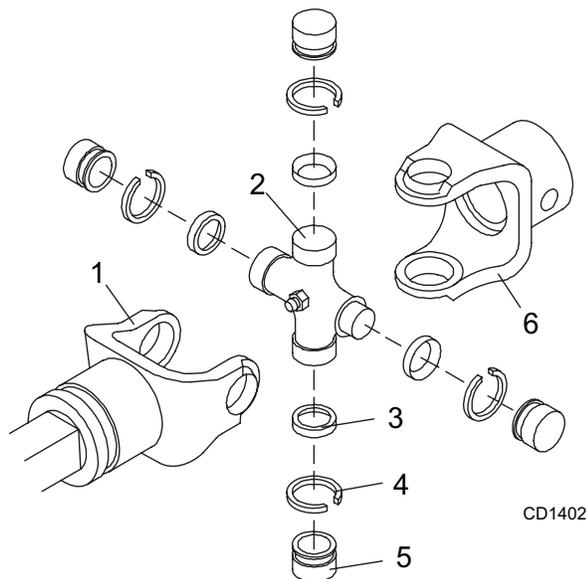
Insert spindle through bottom of mower, positioning grease fitting outward on outer spindles and to the rear on center spindle. Secure to deck with four bolts and flange locknuts.

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 (47 Nm). Place split taper bushing bolts into threaded holes of pulley and tighten alternately to 12 lbs-ft (16 Nm), securing pulley to bushing.

Reinstall blades and belt.

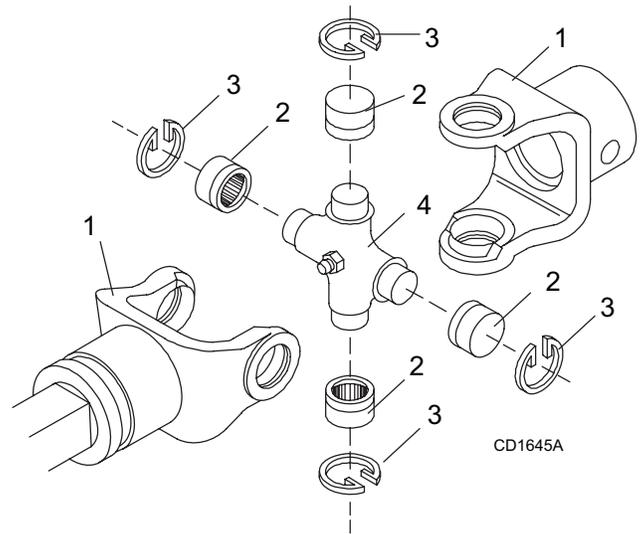
UNIVERSAL JOINT REPAIR

Two different style driveline U-joints are used. The repair procedure is basically the same. One has internal snap rings (Figure 14); the other has external snap rings (Figure 15). Determine which type you are repairing and remove all four snap rings.



1. Yoke
2. Journal cross
3. Seal
4. Snap ring
5. Cup and bearings
6. Yoke

Figure 14. U-Joint Exploded View with Internal Snap Rings



1. Yoke
2. Cup and bearings
3. Snap ring
4. Journal cross

Figure 15. 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 16 only shows the style with internal snap rings.)

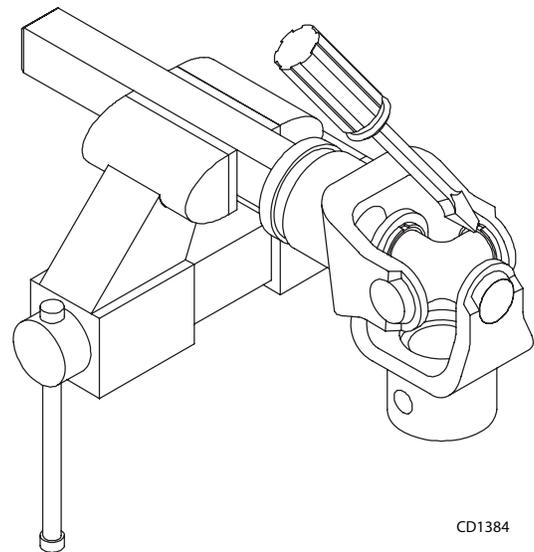


Figure 16

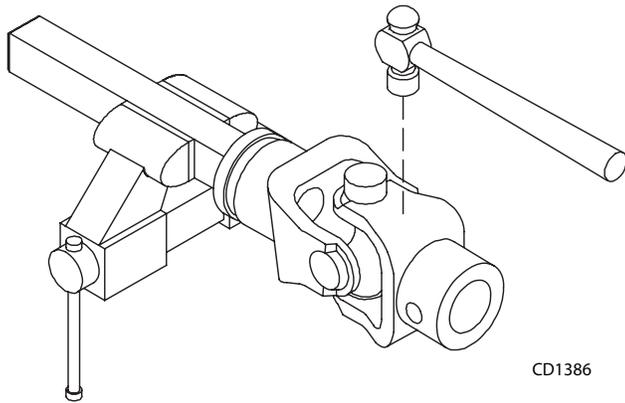


Figure 17

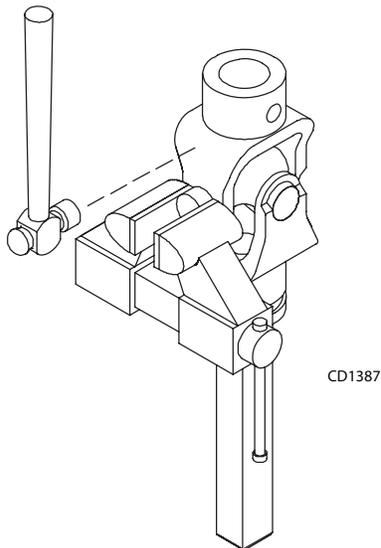


Figure 18

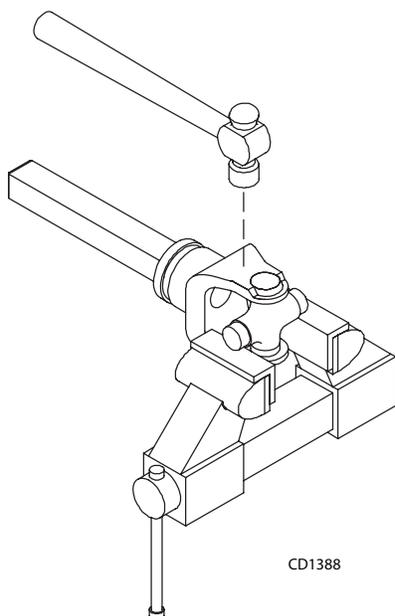


Figure 19

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 17.
3. Clamp cup in vise as shown in Figure 18 and tap on yoke to completely remove cup from yoke. Repeat steps two and three for opposite cup.
4. Place universal cross in vise as shown in Figure 19 and tap on yoke to remove cup. Repeat step three for final removal. Drive remaining cup out with a drift and hammer.

U-Joint Assembly

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

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 20. 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.

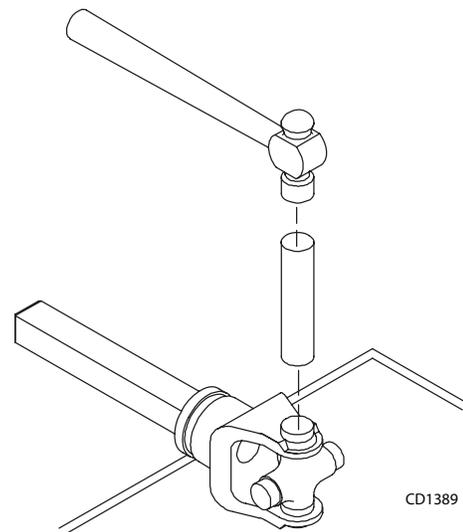


Figure 20

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®¹ 515 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

1. Loctite is a registered trademark of the Henkel Loctite Corporation.

holes on bushing flange. Tighten evenly, forcing the bushing and drive sheave apart.

Remove gearbox from gear stand.

Gearbox Disassembly (Figure 22)

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 surfaces 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.

Gearbox Assembly (Figure 22)

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" (0.305 mm), insert shim between input shaft (3) and rear bearing (8). Repeat until end float is less than 0.012". (0.305 mm) Check rotational torque by hand. The torque should be less than 2.2 lbs-inch (0.25 Nm). Check that the gear backlash is between 0.006" and 0.016" (0.152

- 0.406 mm). 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 (Figure 21)

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" (60 mm), plus or minus .03" (0.76 mm). Variation from this dimension could cause belt misalignment and premature belt failure.

Tighten the bolts in the split taper bushing alternately until they are torqued to 12 lbs-ft (16 Nm). 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.

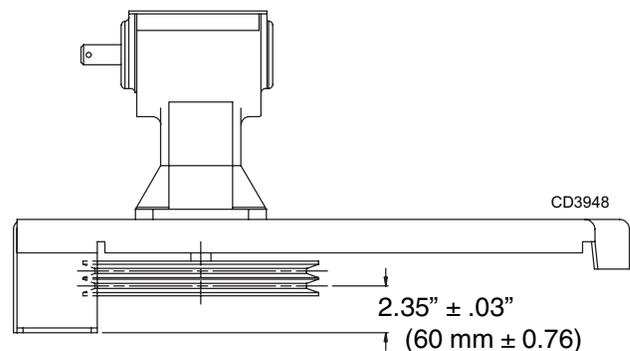


Figure 21. Drive Pulley Installation

1. Crown gear
2. Gearbox housing
3. Input shaft
4. Output shaft
5. Gear pinion
6. Bearing cup & cone WP39257
7. Bearing cup & cone WP57478
8. Bearing cup & cone WP57462
9. Ball bearing
10. Internal retainer ring
11. Cotter pin
12. Snap ring WP57466
13. Snap ring WP20895
14. Spacer
15. Shim kit
16. Castle nut
17. Castle nut metric M24 x 2
18. Protective washer
19. 21 x 37 x 3 mm Washer
20. 25 x 48 x 2.5 mm Washer
21. Metric seal 40 x 80 x 12
22. Oil seal
23. Oil cap
25. Top cover
26. M8 x 16 Bolt
27. Vented plug

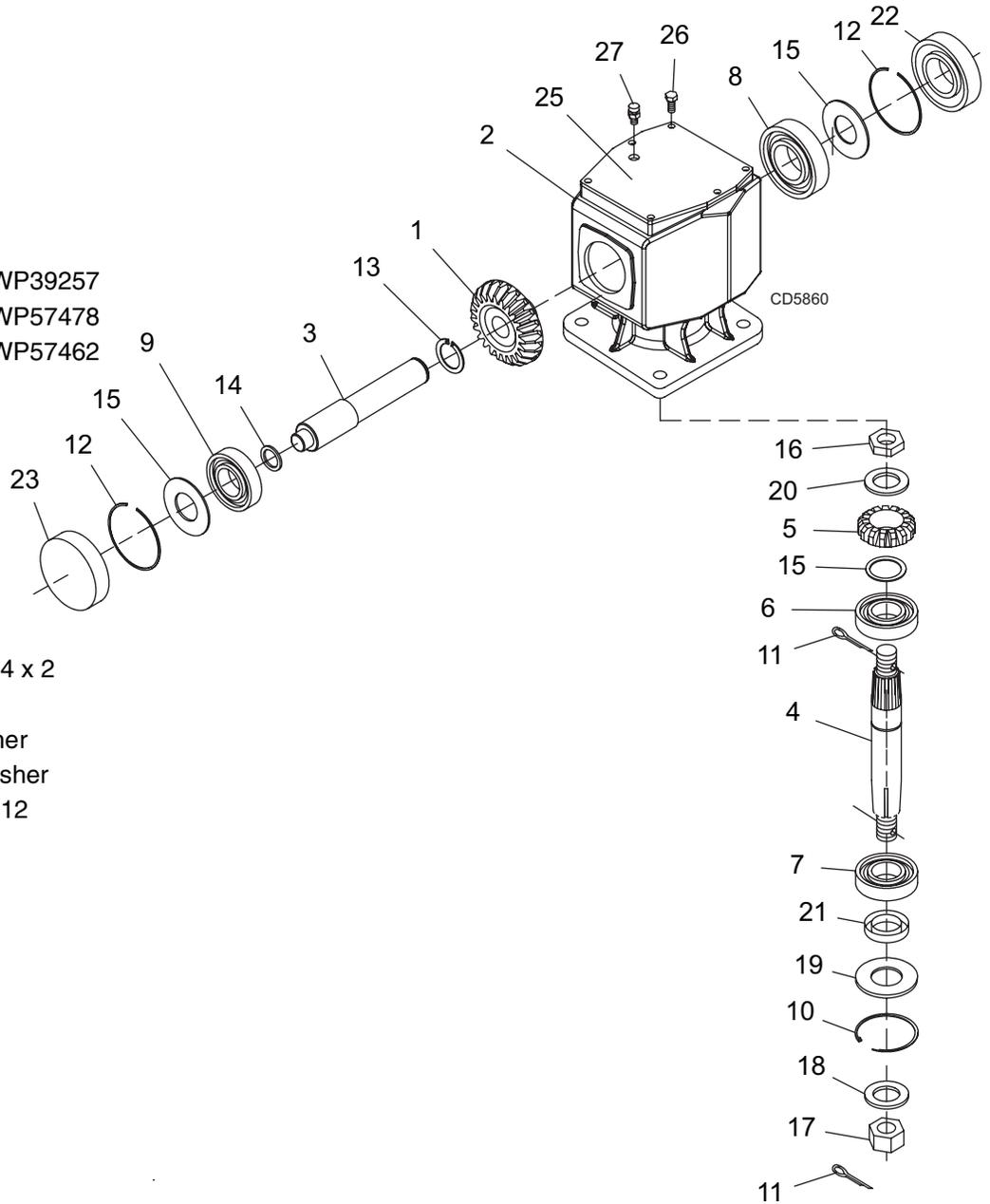


Figure 22. Gearbox Assembly

ASSEMBLY

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.

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.

DEALER SET-UP INSTRUCTIONS

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

Complete the checklists on page 30 when assembly is complete.

IMPORTANT

■ 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 29.

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 41.

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 (Figure 23)

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

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.

Hitch Installation (Figure 24)

The GM1190R is shipped with the Category 1 hitch pins in the shipping location. Remove bolt (1) and hitch pin bracket (4). Remove the hitch pin 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 and A-frame (5). Secure with bolt (1), washers (2), and hex locknut (7). 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 (10), and top-link clevis (11). Secure with flange lock nut (12).

Tighten all hitch assembly hardware according to specifications in Bolt Torque Chart.

Install PTO hanger bracket (14) to upper mast assembly. Secure with flange locknut (12). Do not over-tighten locknut. PTO hanger bracket should be able to rotate freely out of the way when the mower is in operation.

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

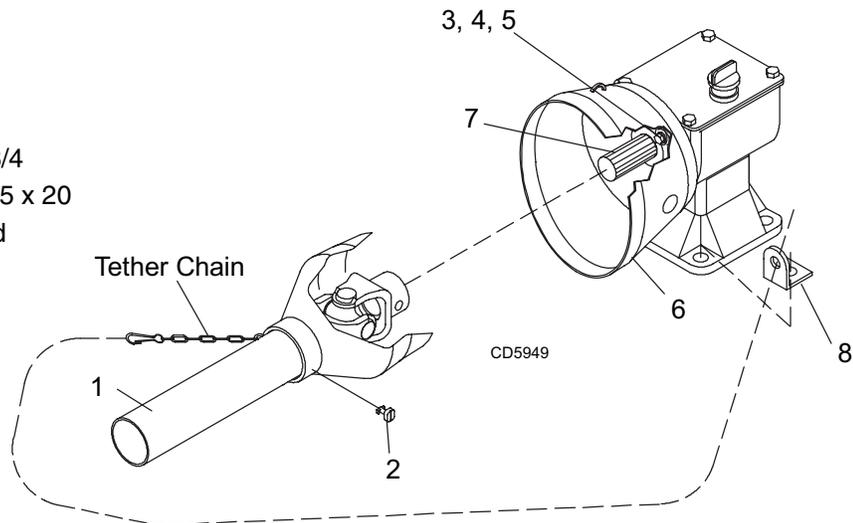


Figure 23. Rear Driveline Installation

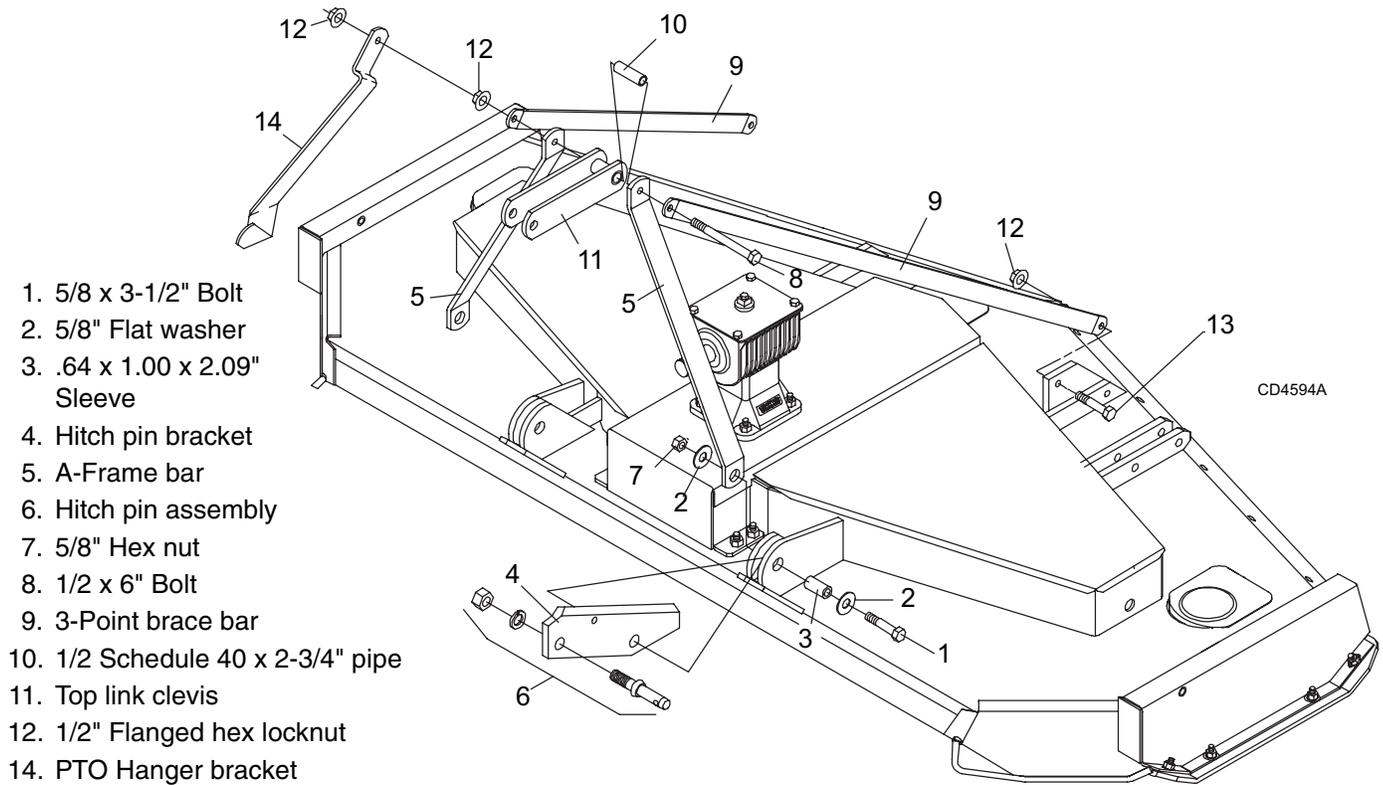


Figure 24. Hitch Installation

Chain Shielding Installation (Figure 25)

Chain is assembled. Attach to mower as shown.

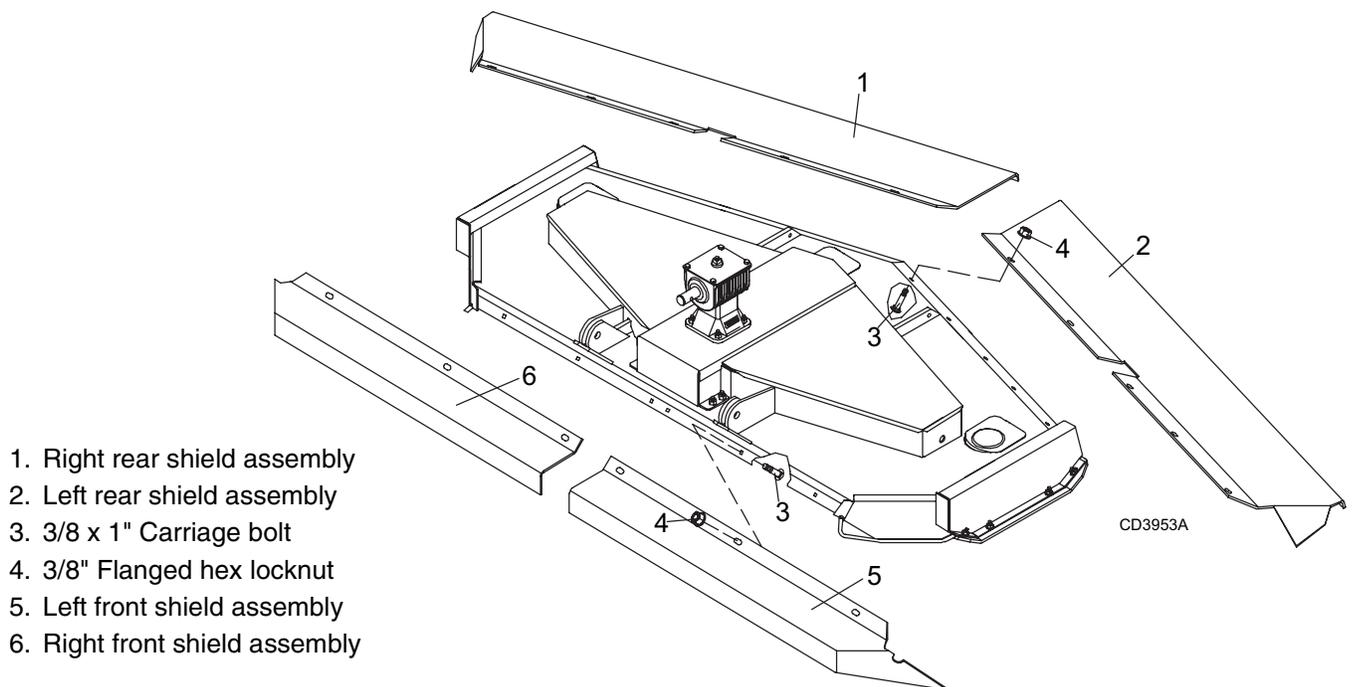


Figure 25. Chain Shielding Installation

Optional Front Roller Installation (Figure 26)

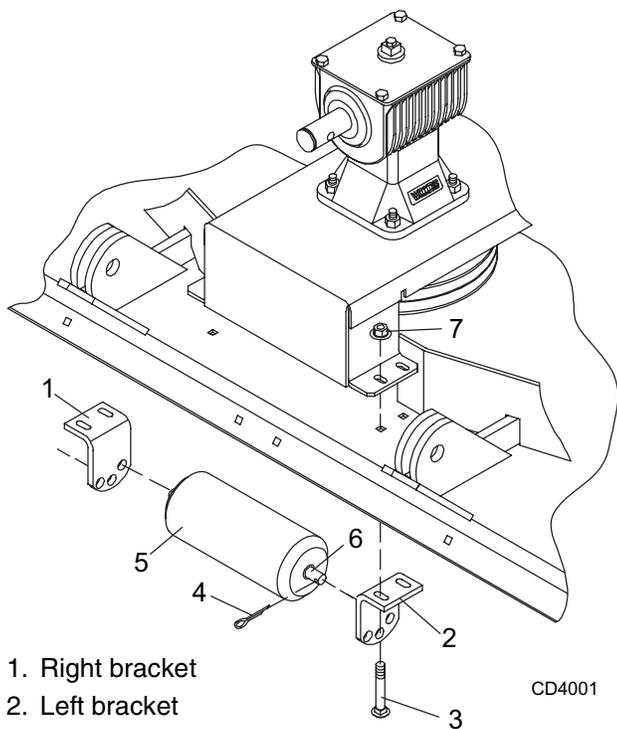
The optional front roller is designed to carry the center of the mower over uneven ground, minimizing scalping.

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 locknuts (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).



1. Right bracket
2. Left bracket
3. 3/8 x 1" Carriage bolt
4. 3/16 x 1" Cotter pin
5. Front roller
6. Rod
7. 3/8" Flanged locknut

Figure 26. Optional Front Roller Installation

Quick Hitch Kit Installation (Optional) (Figure 27)

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.

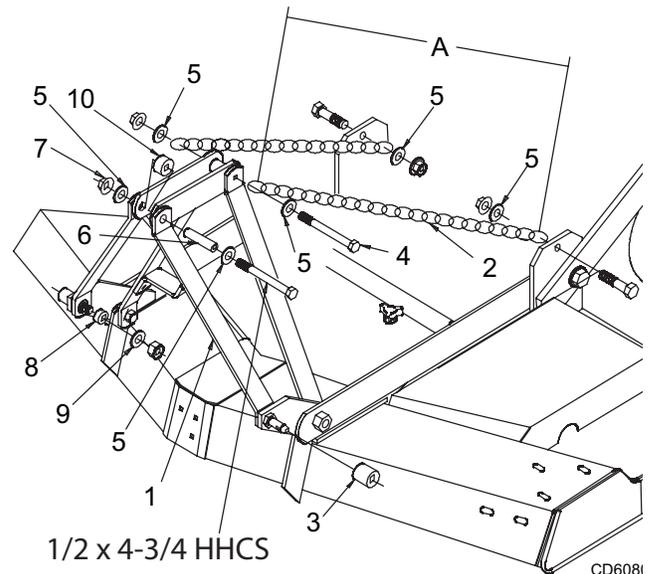
Remove rear offset links and replace with chains (2), cut to required length. Attach chain to top of A-frame as shown, using 1/2 x 6" cap screw (4), 1/2" flat washer (5), and nut.

Attach opposite end of chain (2) to rear mower frame as shown. Cut chain to 45" (1143 mm) 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.

IMPORTANT

■ Failure to follow instructions may result in damage.

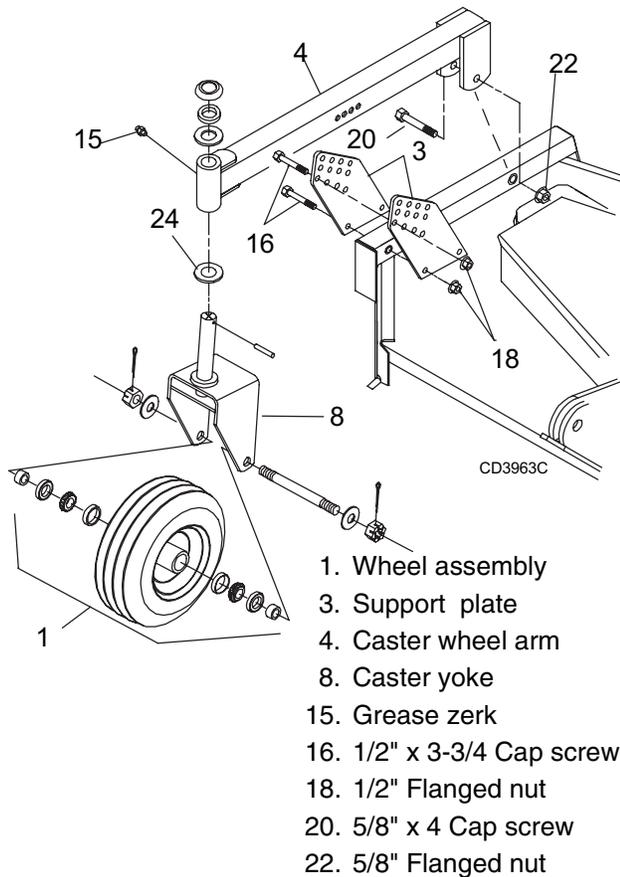
Install sleeve (3) on mounting pins and retain with Klik pin.



1. Offset link
2. 38-Link chain
3. 29/32 x 1-7/16 x 1-1/4" Sleeve
4. 1/2" x 6" Cap screw
5. 1/2" Flat washer
6. 1/2" x 3/4" x 3-3/8" Sleeve
7. 1/2" Flange lock nut
8. 7/8" Sleeve
9. 7/8" Flat washer
10. 13/16 x 1-1/4 x 1-13/16" Sleeve

Figure 27. Quick Hitch Kit Assembly (GM1072S shown)

Front Caster Wheel Installation (Figure 28)



1. Wheel assembly
3. Support plate
4. Caster wheel arm
8. Caster yoke
15. Grease zerker
16. 1/2" x 3-3/4 Cap screw
18. 1/2" Flanged nut
20. 5/8" x 4 Cap screw
22. 5/8" Flanged nut

Figure 28. Front Caster Wheel Installation

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 10) and nut (18). Tighten all hardware (see Bolt Torque Chart, page 41).

Repeat for opposite front caster wheel.

Rear Caster Wheel Installation (Figure 29)

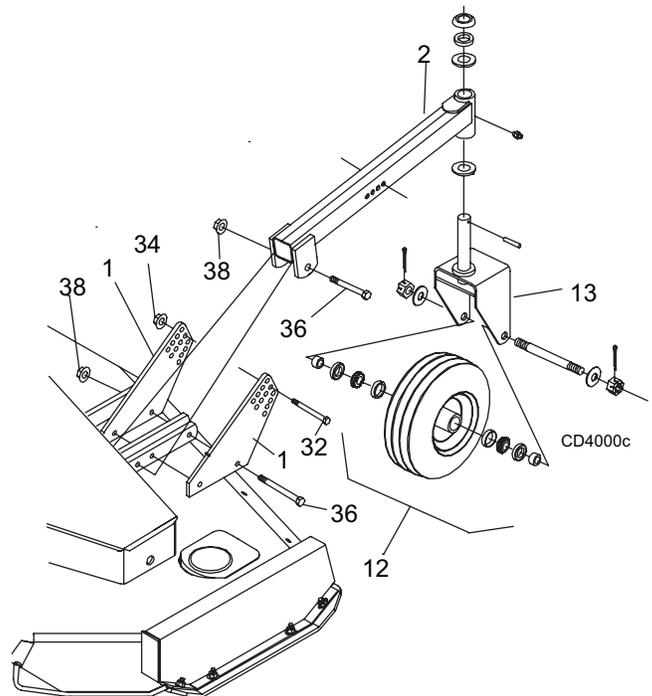
Remove the rear caster wheel and arm assemblies from shipping location along the inner deck rails. Discard the shipping bolts.

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

The wheel comes assembled with bearings and cups installed.

Adjust mower cutting height by using chart (page 10) and secure with bolts (32) and nuts. Tighten all hardware (see Bolt Torque Chart, page 41).

Repeat for opposite rear caster wheel.



1. Support plate
2. Caster wheel arm
12. Tire
13. Caster yoke
32. 1/2" x 3-3/4 Cap screw
34. 1/2" Flange locknut
36. 5/8" x 4 Cap screw
38. 5/8" Hex nut

Figure 29. Rear Caster Wheel Installation

Initial Filling of Gearbox

IMPORTANT

■ 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 CHECK LISTS

PRE-DELIVERY CHECK LIST

(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 properly torqued.
- ___ 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 CHECK LIST

(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

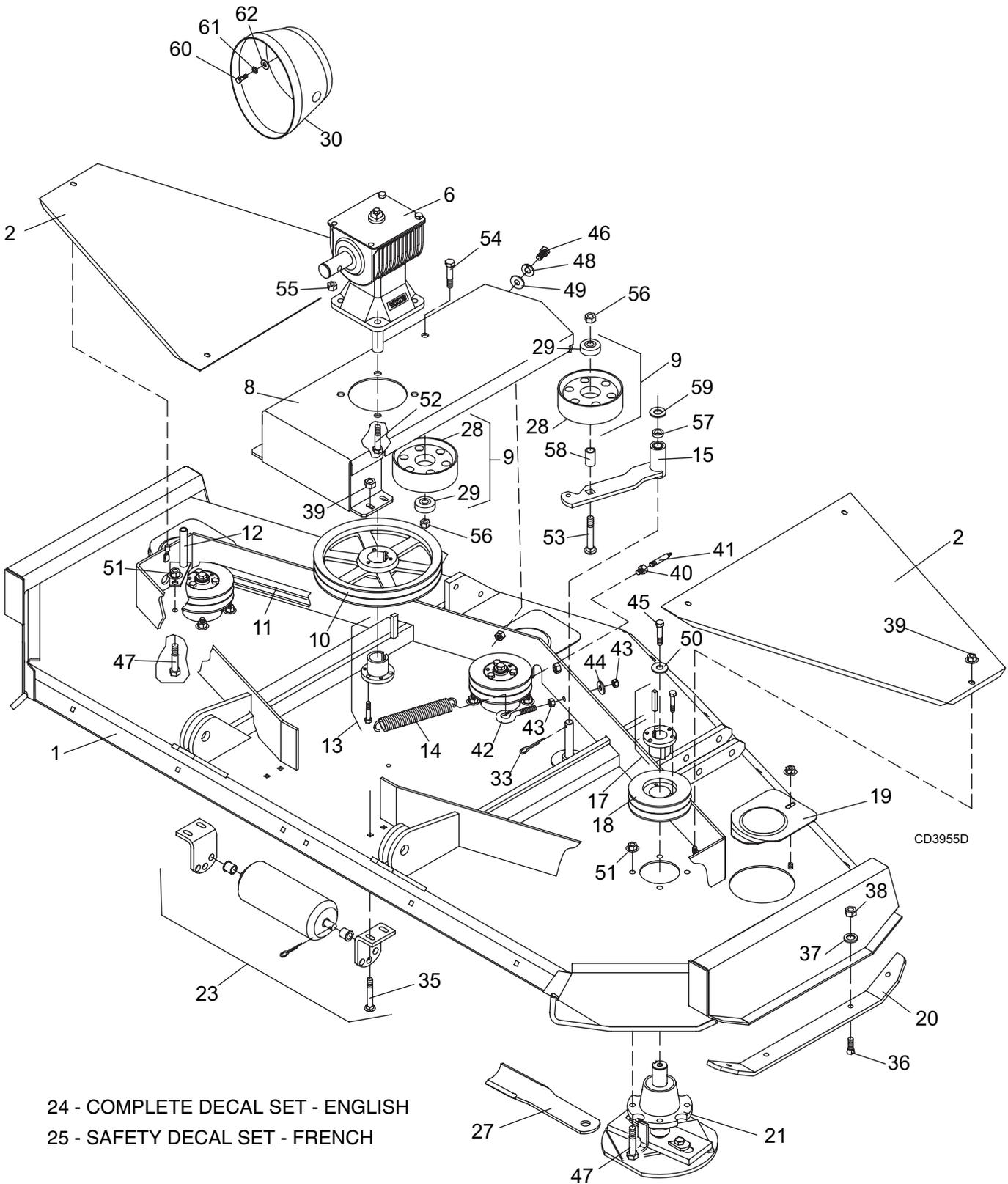
equipment. Point out the manual safety rules, explain their meanings and emphasize the increased safety hazards that exist when safety rules are not followed.

- ___ 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 jackstands and to follow all instructions in the "Service, blocking methods" section of the operators manual. Explain that blocking up prevents equipment 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, dismounting 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, dismounting, 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.

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GM1190R MAIN FRAME ASSEMBLY (EXPLODED VIEW)



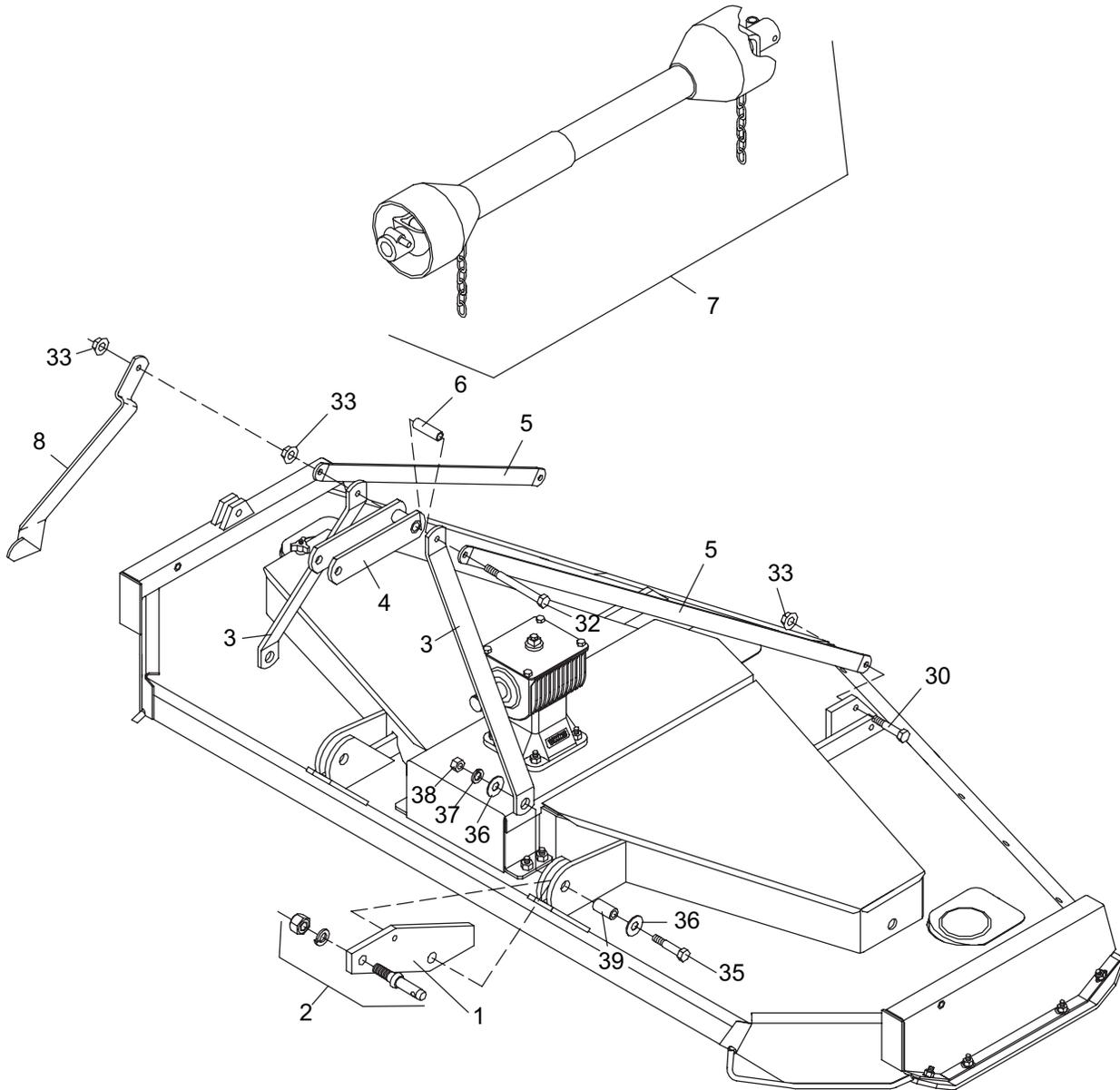
32 Parts

WPMAN0142 (Rev. 9/1/2004)

GM1190R MAIN FRAME ASSEMBLY (EXPLODED VIEW)

				HARDWARE		
<u>REF NO</u>	<u>PART NO</u>	<u>NO USED</u>	<u>DESCRIPTION</u>	<u>REF NO</u>	<u>PART NO</u>	<u>DESCRIPTION</u>
1	-----	1	Deck (not sold separately)	33	*	Pin, Cotter 3/16 x 1-1/2
2	WP20787	2	Shield, Belt	35	*	Bolt, Carriage 3/8 NC x 1 GR5
6	WP1003409	1	Gearbox, 1.69:1	36	WP21636	Bolt, Plow Clipped Hd 3/8 NC x 1-1/4
8	WP19535	1	Gearbox Stand	37	*	Washer, Lock 3/8
9	WP19570	2	Idler, Flat 5.95 Dia	38	*	Nut, Hex 3/8 NC
10	WP27925	1	Sheave, P1 2 TB 11.4 PD	39	WP14350	Nut, Flanged Lock 3/8 NC
11	WP18990	1	V-Belt 2W140	40	WP20786	Grease Fitting, 1/4-28 M x 1/8 F NPT
12	WP19587	1	Guide, Belt	41	WP18960	Grease Fitting, 1/8 M PTF x 2.63
13	WP1482	1	Bushing, P1 1-1/4 In Strt Bore	42	WP24445	Bolt, Eye 7/16 NC x 3-1/2
14	WP28928	1	Spring, Ext .19 x 1.30 x 8.2	43	*	Nut, Hex 7/16 NC
15	WP19541	1	Idler Arm Assembly	44	*	Washer, Flat 7/16 Standard
17	WP13557	3	Bushing, P1 1-3/8 In Strt Bore	45	WP25475	Screw, HHCS 1/2 NC x 1 GR5 FT
18	WP19575	3	Sheave, P1 2 TB 5.4 PD	46	*	Screw, HHCS 1/2 NC x 1-1/4 GR5
19	WP3444	3	Cover, Access Hole	47	*	Screw, HHCS 1/2 NC x 2 GR5
20	WP19589	2	Skid, Side w/Hardware (includes items 37 & 39)	48	*	Washer, Lock 1/2
21	WP24520	3	Spindle, Assembly Complete (see breakdown on page 37)	49	*	Washer, Flat 1/2 SAE
23	WP24650KT	1	Roller Kit, Front Complete-Optional (see breakdown on page 38)	50	WP29553	Washer, Flat .50 x 1.63 x .25
24	WP20137	1	Complete Decal Set - English	51	WP11900	Nut, Flanged Lock 1/2 NC
25	WP50138	1	Safety Decal Set - French	52	WP19024	Screw, Flngd Hex Head 5/8 NC x 1-3/4
27	WP24590KT	1	CCW Blade, 13" long - Standard	53	*	Bolt, Carriage 5/8 NC x 3 GR5
	-or-	-or-		54	*	Screw, HHCS 5/8 NC x 4 GR5
27	WP28329KT	1	CCW Low suction blade, 13" long - Optional	55	WP19025	Nut, Flanged Lock 5/8 NC
28	WP19571	2	Idler, Flat 5.95 Dia Less Bearing	56	*	Nut, Lock 5/8 NC
29	WP6095	2	Bearing, Ball	57	WP22060	Seal, Felt .63 x 1.00 x .25
30	WP51849	1	Shield, Counter Cone	58	WP27211	Sleeve, .63 x .88 x 1.18
				59	WP11036	Washer, Shim .75 x 1.50 x 18 Ga
				60	WP24801	Screw, HHCS M8 x 1.25P x 20mm
				61	*	Washer, Lock 5/16
				62	*	Washer, Flat Standard 5/16
						* Obtain Locally

GM1190R MAIN FRAME ASSEMBLY



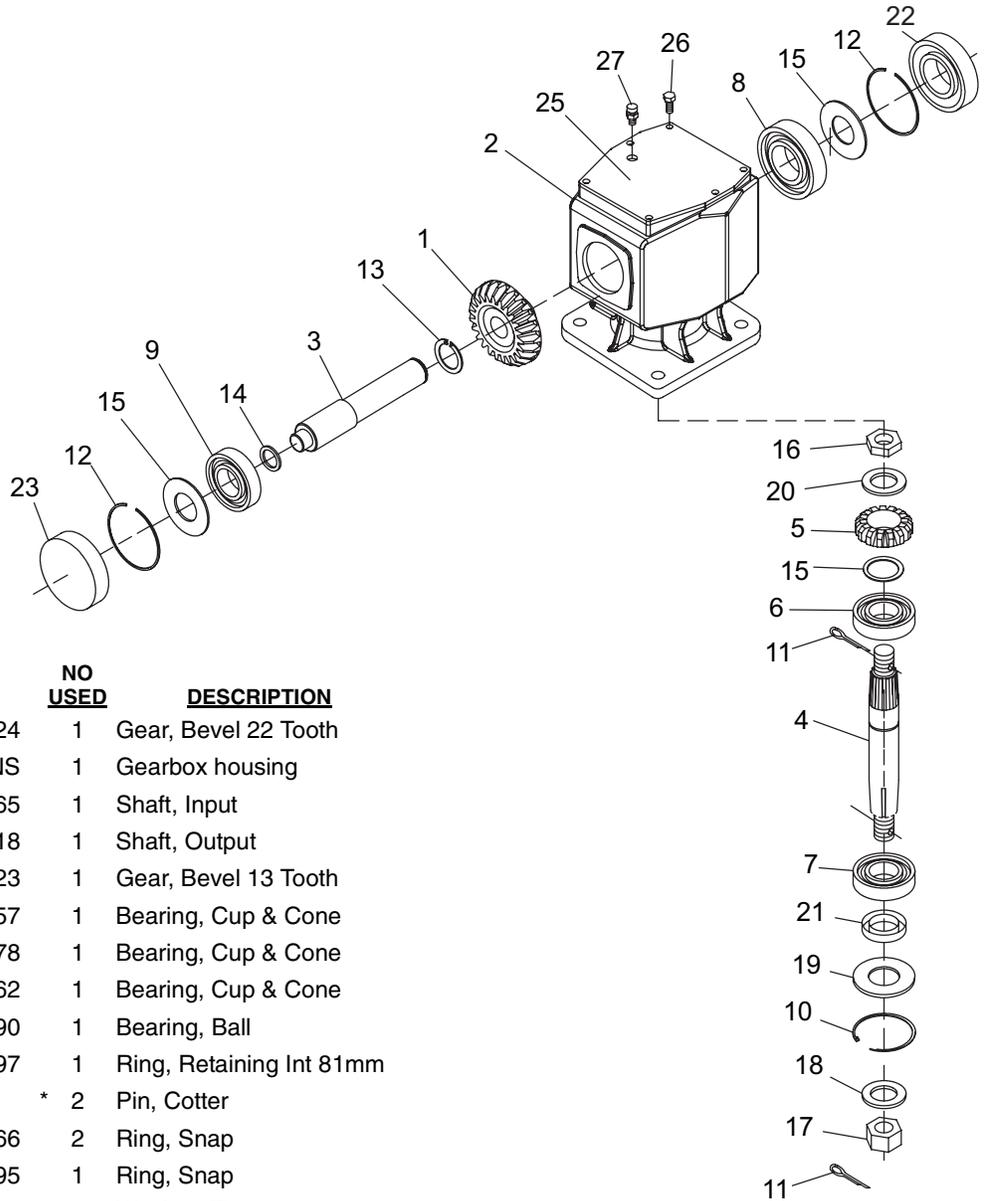
REF NO	PART NO	NO USED	DESCRIPTION
1	WP19975	1	Bracket, Hitch Pin Left
	-or-	-or-	
1	WP19976	1	Bracket, Hitch Pin Right
2	WP33661	2	Pin, Mntng Cat 1 w/Nut & Lkwsshr
3	WP19977	2	Link, Front Offset
4	WP19585	1	Link, Top Clevis
5	WP19578	2	Link, Rear Offset
6	WP64814	1	Sleeve, .62 x .84 x 2.75
7	----	1	Universal drive (see page 36)
8	WP36998	1	Bracket, PTO Hanger

REF NO	PART NO	HARDWARE DESCRIPTION
30	*	Screw, HHCS 1/2 NC x 1-1/2 GR5
32	*	Screw, HHCS 1/2 NC x 4-3/4 GR5
33	WP11900	Nut, Flanged Lock 1/2 NC
35	*	Screw, HHCS 5/8 NC x 3-1/2 GR5
36	*	Washer, Flat 5/8 Standard
37	*	Washer, Lock 5/8
38	*	Nut, Hex 5/8 NC
39	WP19524	Sleeve, HT .64 x 1.00 x 2.09

* Obtain Locally

34 Parts

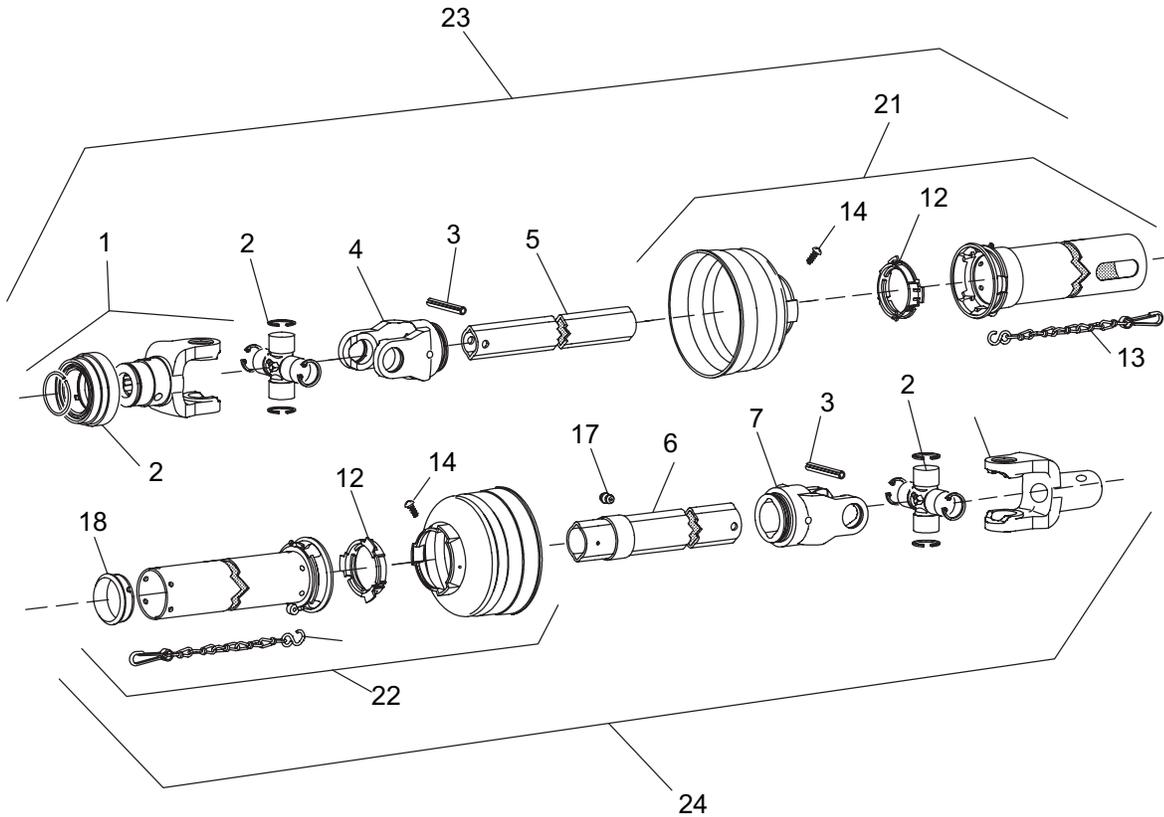
GEARBOX ASSEMBLY



REF NO	PART NO	NO USED	DESCRIPTION
1	WP1001224	1	Gear, Bevel 22 Tooth
2	NS	1	Gearbox housing
3	WP57465	1	Shaft, Input
4	WP1001218	1	Shaft, Output
5	WP1001223	1	Gear, Bevel 13 Tooth
6	WP39257	1	Bearing, Cup & Cone
7	WP57478	1	Bearing, Cup & Cone
8	WP57462	1	Bearing, Cup & Cone
9	WP20890	1	Bearing, Ball
10	WP20897	1	Ring, Retaining Int 81mm
11	*	2	Pin, Cotter
12	WP57466	2	Ring, Snap
13	WP20895	1	Ring, Snap
14	WP57373	1	Washer, Flat 35.3mm x 48mm x 2.5mm
15	WP57328	2	Shim Kit
16	WP57469	1	Nut, Castle M24 x 1.5
17	WP20892	1	Nut, Castle M24 x 2
18	WP20893	1	Washer, Flat 25mm x 44mm x 4mm
19	WP57475	1	Washer, Protective
20	WP57474	1	Washer, Flat 25mm x 48mm x 2.5mm
21	WP20900	1	Seal, 40mm x 80mm x 12mm
22	WP57463	1	Seal, 35mm x 72mm x 10mm
23	WP57374	1	Oil cap
25	WP57376	1	Gearbox top cover
26	*	6	Bolt, 8mm x 16mm (8.8)
27	WP57076	1	Plug, Breather 1/2

* Obtain locally
NS = Not Serviced

GM1190R DRIVE SHAFT

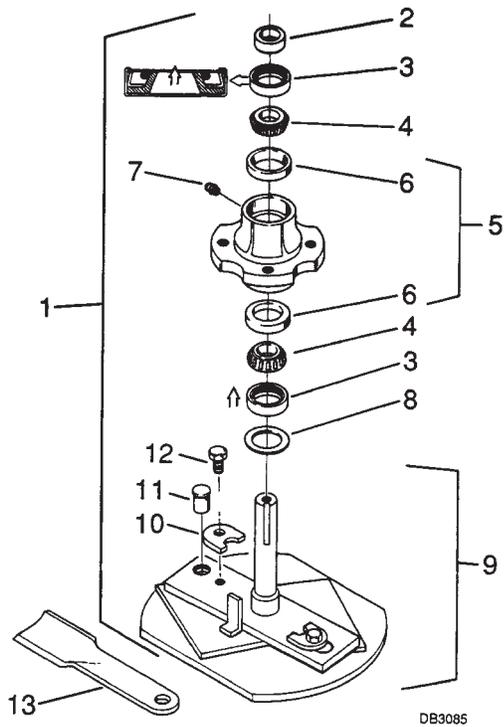


<u>REF NO</u>	<u>PART NO</u>	<u>NO USED</u>	<u>DESCRIPTION</u>
--	WP1001228	1	Complete Drive Shaft
1	WP40574	1	Yoke, 1-3/8 - 6 Spline QD
2	WP110	2	U-Joint Repair Kit 35N
3	WP40764	2	Pin, Spring 10mm x 80mm
4	WP40575	1	Yoke, Inner Profile (male drive tube)
5	WP40587	1	Drive Tube, Inner Profile (cut to length)
6	WP40588	1	Drive Tube, Outer Profile (cut to length)
7	WP40576	1	Inboard yoke
8	WP40570	1	Yoke, 1-3/8
12	WP40766	2	Bearing Ring, Guard
13	WP40777	2	Chain, Guard Anti-Rotation
14	WP40778	2	Screw, Guard Retainer
17	WP40779	1	Grease Zerk, Drive Line
18	WP40767	1	Bearing, Guard Support
20	WP40589	2	Slide Lock Collar Repair Kit
21	WP40590	1	Guard, Outer Half
22	WP40591	1	Guard, Inner Half
23	WP40744	1	Drive, Inner Half Complete
24	WP1001226	1	Drive, Outer Half Complete

36 Parts

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BLADE SPINDLE ASSEMBLY



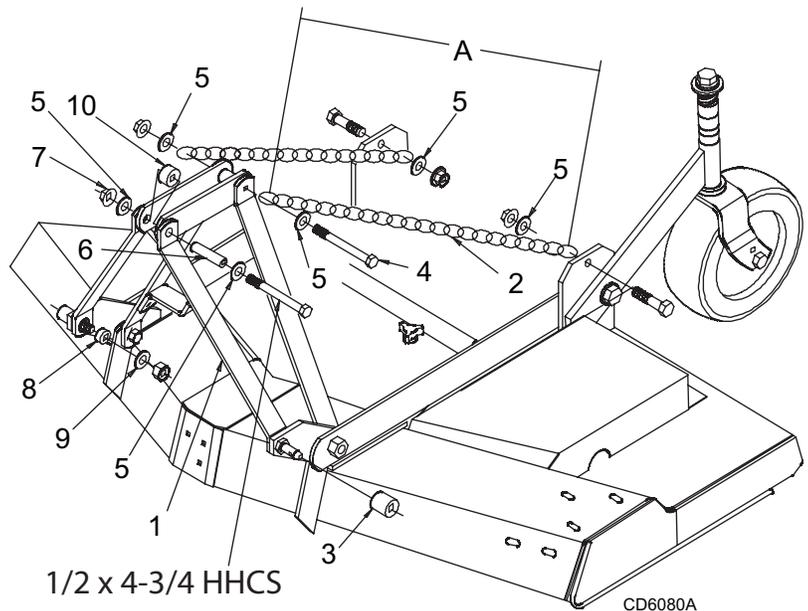
REF NO	PART NO	NO USED	DESCRIPTION
1	WP24520	1	Spindle, Assembly Complete
2	WP18359	1	Sleeve, 1.38 x 1.75 x .63
3	WP2715	2	Seal, 1.75 x 2.56 x .50
4	WP2717	2	Bearing, Cone
5	WP18361	1	Spindle, Housing w/Cups
6	WP2716	2	Bearing, Cup
7	----	1	See extended zerk, page 33
8	WP2718	1	Washer, Flat 1.75 x 2.38 x 13 Ga
9	WP24521	1	Shaft, Blade Spindle & Crossbar
10	WP24527	2	Spindle, Blade Lock
11	WP3967	2	Pin, Blade QD
12	WP13288	2	Screw, HHCS Nylok 1/2 NC x 3/4 GR5
13	WP24590KT	1	CCW Blade, 13" long - Standard
	-or-		-or-
13	WP28329KT	1	CCW Low Suction Blade, 13" Long - Optional

* Obtain Locally

QUICK HITCH KIT (OPTIONAL)

REF NO	PART NO	NO USED	DESCRIPTION
1	WP1003692	2	Link, Offset .38 x 2.0 x 15
2	WP1005401	2	Chain 3/8 Proof Coil 38-Link
3	WP38214	2	Sleeve, .91 x 1.44 x 1.25
4	WP13563	1	Screw, HHCS 1/2 NC x 6 GR5
5		* 6	Washer, Flat 1/2 ZP
6	WP29368	1	Sleeve, .50 x .75 x 3.38
7	WP11900	1	Nut, Flange Lock 1/2 NC
8	WP29281	2	Sleeve, 7/8 x 1-1/8 x 19/32 HT
9		* 2	Washer, Flat 7/8
10	WP1003614	1	Sleeve, .81 x 1.25 x 1.81

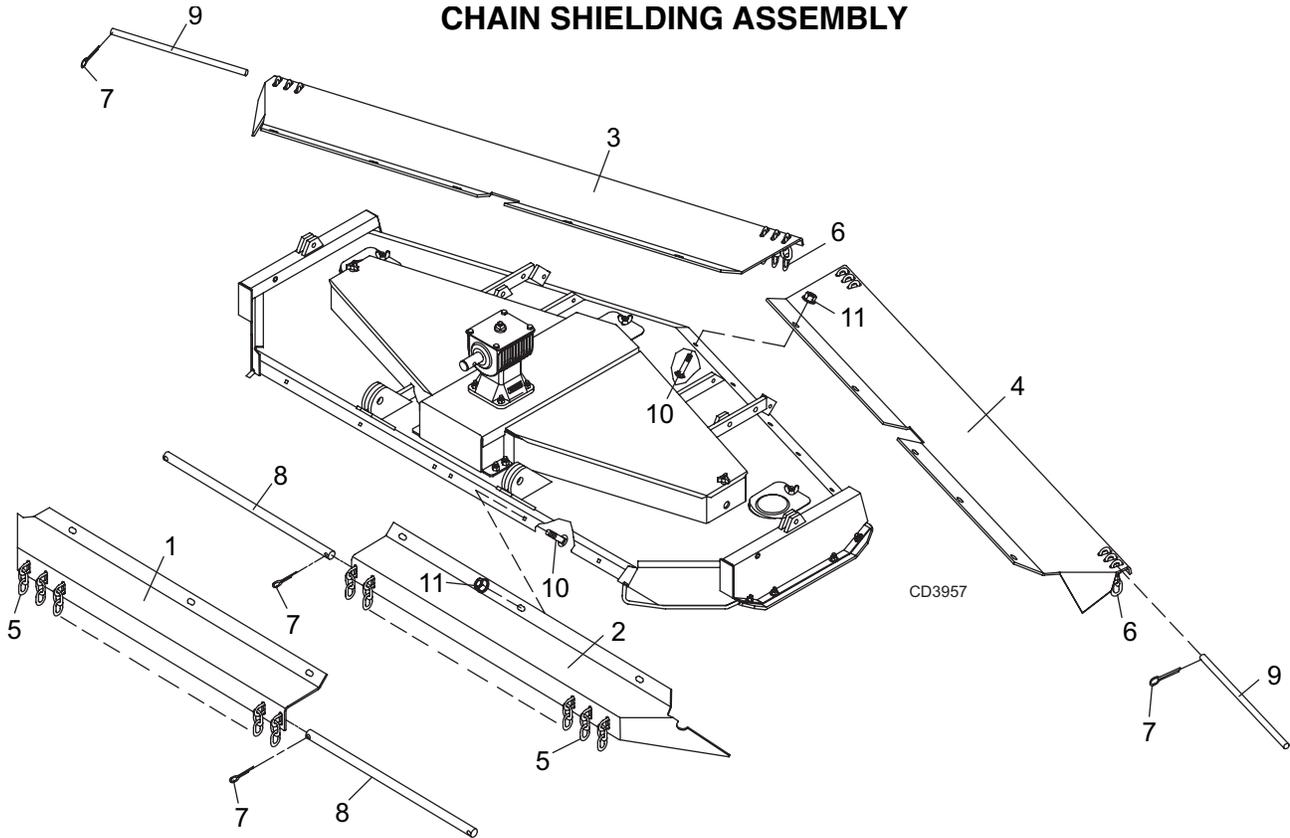
* Obtain locally



1/2 x 4-3/4 HHCS

CD6080A

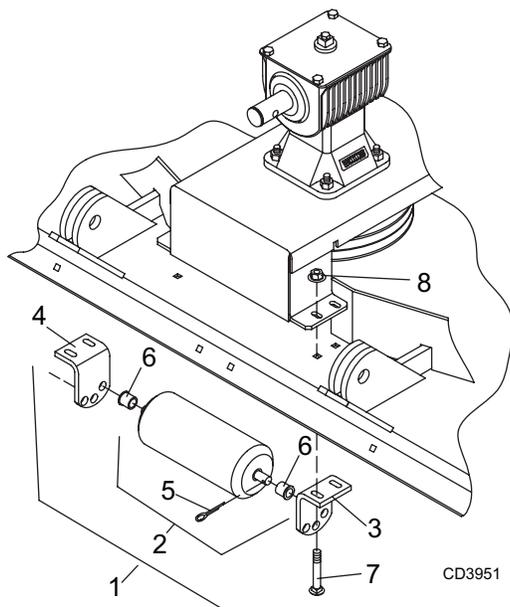
CHAIN SHIELDING ASSEMBLY



<u>REF NO</u>	<u>PART NO</u>	<u>NO USED</u>	<u>DESCRIPTION</u>
-	-----	1	Chain shield bundle complete
1	WP19552	1	Shield, Plate Right Front Chain
2	WP19553	1	Shield, Plate Left Front Chain
3	WP20792	1	Shield, Plate Right Rear Chain
4	WP20793	1	Shield, Plate Left Rear Chain
5	WP4763	60	Chain, 3 Link 1/4 proof
6	WP4765	96	Chain, 4 Link 1/4 proof

<u>REF NO</u>	<u>PART NO</u>	<u>NO USED</u>	<u>DESCRIPTION</u>
7		* 8	Pin, Cotter 3/16 x 1
8	WP18150	2	Pin, Headless .38 x 29.88
9	WP11761	2	Pin, Headless .38 x 48.50
10		* 16	Bolt, Carriage 3/8 NC x 1 GR5
11	WP14350	16	Nut, Flanged Lock 3/8 NC

* Obtain Locally



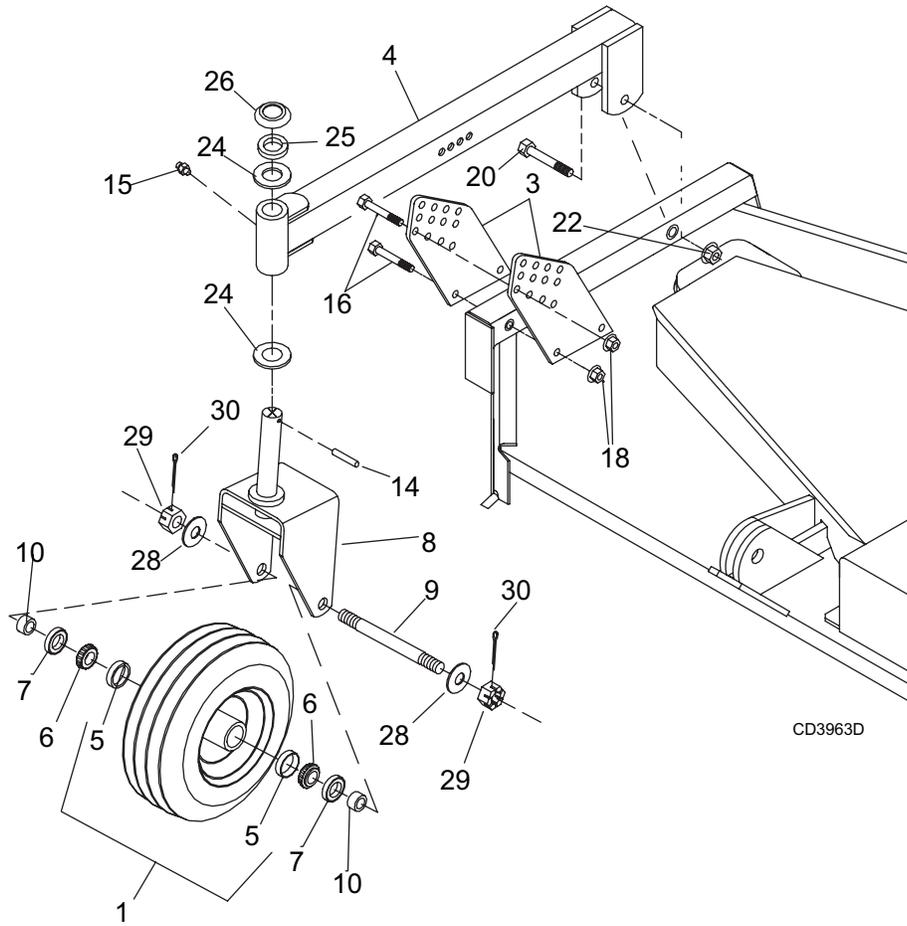
FRONT ROLLER ASSEMBLY (OPTIONAL)

<u>REF NO</u>	<u>PART NO</u>	<u>NO USED</u>	<u>DESCRIPTION</u>
1	WP24650KT	1	Roller Kit, Front Complete
2	WP24583	1	Roller, Front w/Rod & Bearings
3	WP24587	1	Bracket, Left Front Roller
4	WP24586	1	Bracket, Right Front Roller
5		* 2	Pin, Cotter 3/16 x 1
6	WP29610	2	Bearing, Flange .63 x .88 x .88
7		* 4	Bolt, Carriage 3/8 NC x 1 GR5
8	WP14350	4	Nut, Flanged Lock 3/8 NC

38 Parts

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FRONT CASTER ARM ASSEMBLY



HARDWARE

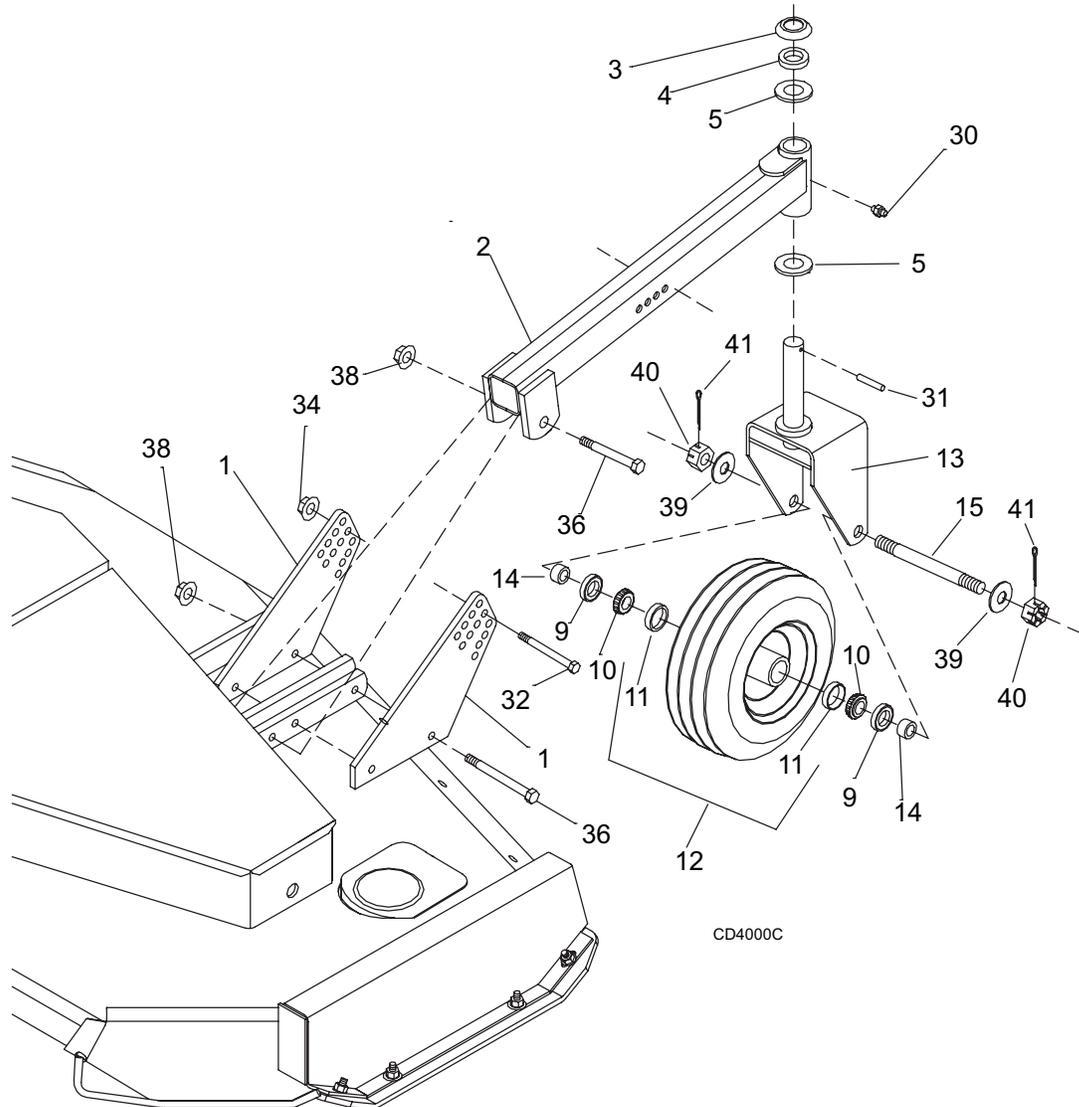
REF NO	PART NO	NO USED	DESCRIPTION	REF NO	PART NO	DESCRIPTION
1	WP20718G	2	Solid tire, wheel & hub, 13.00 x 5.00 x 10 Gray (includes item 5)	14	*	Pin, Spirol 1/4 x 2
	-or-	-or-		15	*	Grease Fitting, 1/4-28 Tapered Thread
1	WP19744G	2	Pneumatic tire, wheel & hub, Gray 13 x 5-6 (includes item 5)	16	*	Screw, HHCS 1/2 NC x 3-3/4 GR5
3	WP20777	2	Plate, Front Caster Support	18	WP11900	Nut, Flanged Lock 1/2 NC
4	WP20781	2	Caster Arm Assembly w/Bearing	20	*	Screw, HHCS 5/8 NC x 4 Hex GR5
5	WP2306	4	Bearing, Cup	22	WP19025	Nut, Flanged Lock 5/8 NC
6	WP2304	4	Bearing, Cone	24	WP23609	Washer, Flat 1.25 x 2.38 x .19
7	WP5624	4	Seal, 1.13 x 1.78 x .47	25	WP24588	Seal, Felt 1.25 x 1.88 x .38
8	WP52743	2	Caster Yoke & Shaft Asy	26	WP24589	Washer, Cap Caster Wheel
9	WP52741	2	Axle, Caster .75 x 8.25	28	*	Washer, Flat 3/4 Standard
10	WP52744	4	Sleeve, HT .75 x 1.13 x .63	29	WP5849	Nut, Slotted Hex 3/4 NF
				30	*	Pin, Cotter 3/16 x 1-1/2

* Obtain Locally

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Parts 39

REAR CASTER ARM ASSEMBLY



REF NO	PART NO	NO USED	DESCRIPTION
1	WP20776	2	Plate, Rear Caster Support
2	WP20781	2	Caster Arm Asy w/Bearing
3	WP24589	2	Washer, Cap Caster Wheel
4	WP24588	2	Seal, Felt 1.25 x 1.88 x .38
5	WP23609	4	Washer, Flat 1.25 x 2.38 x .19
9	WP5624	4	Seal, 1.13 x 1.78 x .47
10	WP2304	4	Bearing, Cone
11	WP2306	4	Bearing, Cup
12	WP20718G	2	Solid tire, wheel & hub, 13.00 x 5.00 x 10 Gray (includes item 5)
	-or-	-or-	
12	WP19744G	2	Pneumatic tire, wheel & hub, Gray 13 x 5-6 (includes item 5)
13	WP52743	2	Caster Yoke & Shaft Asy
14	WP52744	4	Sleeve, HT .75 x 1.13 x .63
15	WP52741	2	Axle, Caster .75 x 8.25

REF NO	PART NO	DESCRIPTION
30	*	Grease Fitting 1/4-28 Tapered Thread
31	*	Pin, Spirol 1/4 x 2
32	*	Screw, HHCS 1/2 NC x 3-3/4 GR5
34	WP11900	Nut, Flanged Lock 1/2 NC
36	*	Screw, HHCS 5/8 NC x 4 GR5
38	WP19025	Nut, Flanged Lock 5/8 NC
39	*	Washer, Flat 3/4 Standard
40	WP5849	Nut, Slotted Hex 3/4 NF
41	*	Pin, Cotter 3/16 x 1-1/2

* Obtain Locally

40 Parts

(Rev. 7/6/2007)
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BOLT TORQUE CHART

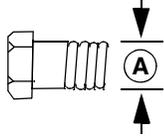
Always tighten hardware to these values unless a different torque value or tightening procedure is listed for a specific application.

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

Always use the proper tool for tightening hardware: SAE for SAE hardware and Metric for metric hardware.

Make sure fastener threads are clean and you start thread engagement properly.

All torque values are given to specifications used on hardware defined by SAE J1701 MAR99 & J1701M JUL96.



SAE SERIES TORQUE CHART



SAE Bolt Head Identification

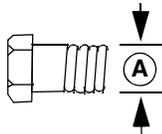


SAE Grade 5
(3 Radial Dashes)



SAE Grade 8
(6 Radial Dashes)

A 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

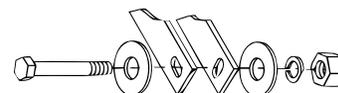
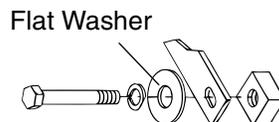
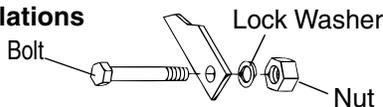


Metric Bolt Head Identification



A Diameter & Thread Pitch (Millimeters)	Wrench Size	COARSE THREAD				FINE THREAD				A Diameter & Thread Pitch (Millimeters)
		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

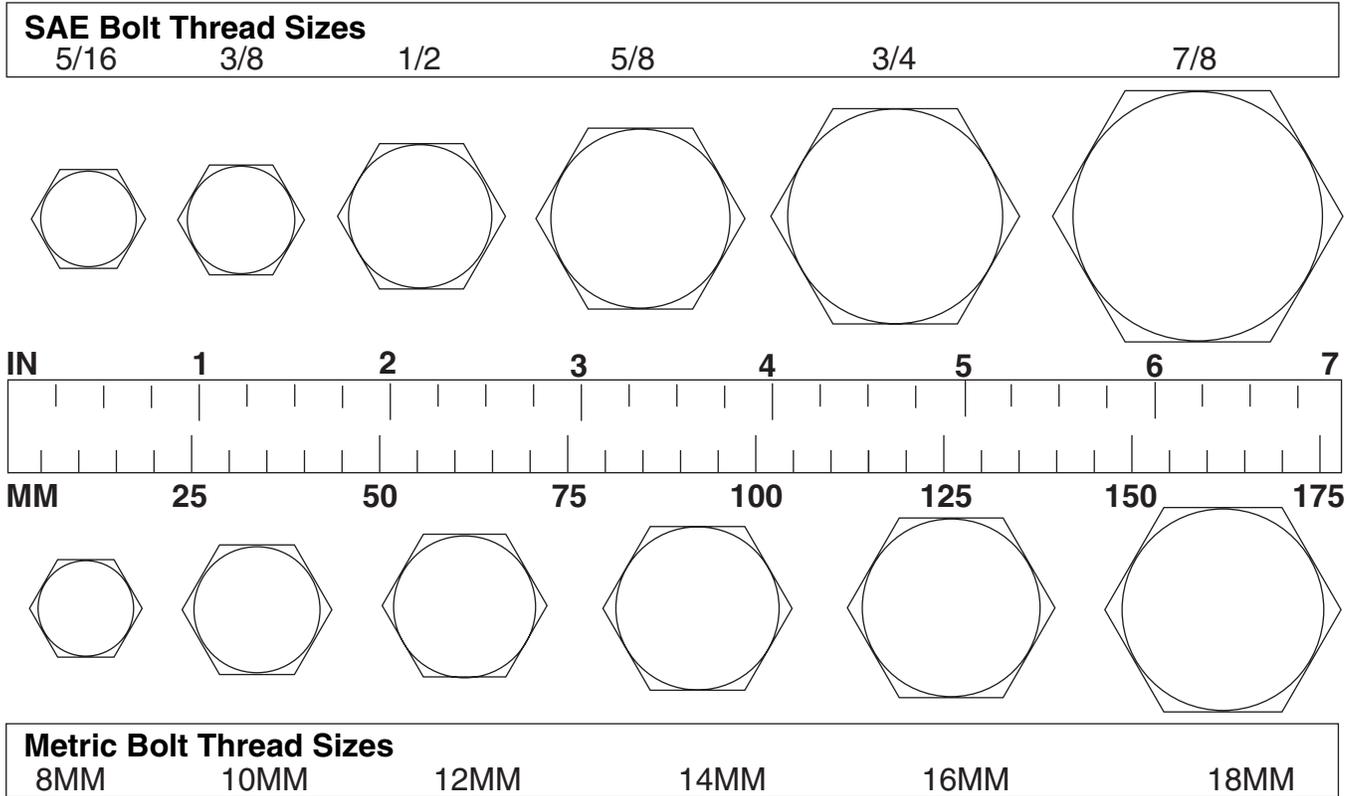
Typical Washer Installations



8/9/00

BOLT SIZE CHART

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



ABBREVIATIONS

AGAgriculture
 ATF Automatic Transmission Fluid
 BSPP British Standard Pipe Parallel
 BSPTM British Standard Pipe Tapered Male
 CV Constant Velocity
 CCW Counter-Clockwise
 CW Clockwise
 F Female
 GA Gauge
 GR (5, etc.) Grade (5, etc.)
 HHCS Hex Head Cap Screw
 HT Heat-Treated
 JIC Joint Industry Council 37° Degree Flare
 LH Left Hand
 LT Left
 m Meter
 mm Millimeter
 M Male
 MPa Mega Pascal
 N Newton

NC National Coarse
 NF National Fine
 NPSM National Pipe Straight Mechanical
 NPT National Pipe Tapered
 NPT SWF National Pipe Tapered Swivel Female
 ORBM O-Ring Boss - Male
 P Pitch
 PBY Power-Beyond
 psi Pounds per Square Inch
 PTO Power Take Off
 QD Quick Disconnect
 RH Right Hand
 ROPS Roll-Over Protective Structure
 RPM Revolutions Per Minute
 RT Right
 SAE Society of Automotive Engineers
 UNC Unified Coarse
 UNF Unified Fine
 UNS Unified Special

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WARRANTY for Replacement Parts

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.

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, service person, 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.

For warranty services contact your selling dealer.

WOODS®



WARRANTY

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.

The warranty periods for certain gearboxes are listed below:

Model No.	Part Warranted	Duration
GM1060R, GM1072R, GM1084R, GM1060S, GM1072S, FM1012R, FM1015R, FM1017R, and GM1190R	Gearbox components	5 years from the date of delivery to the original purchaser
	Blade spindles	3 years from the date of delivery to the original purchaser.

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.

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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.

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.

For warranty services contact your selling dealer.



PART NUMBER
WPMAN0142