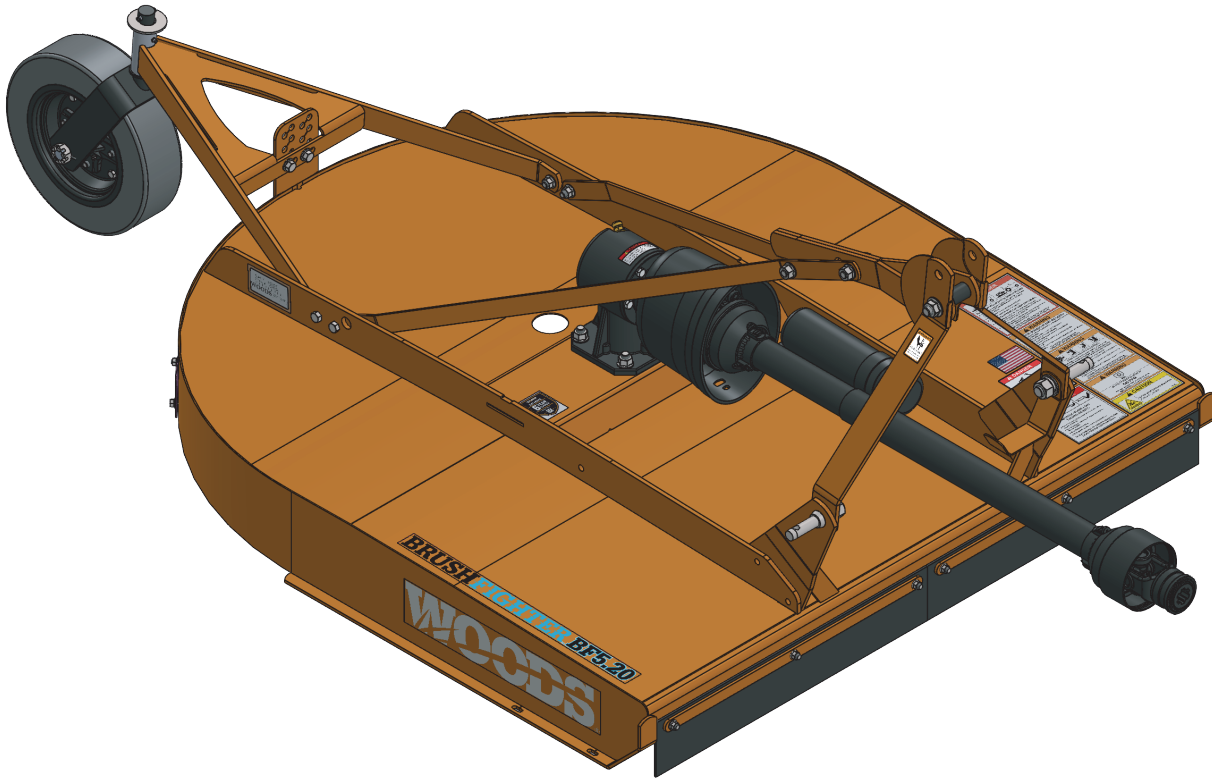


ROTARY CUTTER

BF4.20

BF5.20

BF6.20



MAN1394
(Rev 10/10/2024)

WOODS[®]

OPERATOR'S MANUAL

TO THE DEALER:

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

The dealer must complete the online Product Registration form at the Woods Dealer Website which certifies that all Dealer Checklist items have been completed. Dealers can register all Woods product at dealer.WoodsEquipment.com under Product Registration.

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

TO THE OWNER:

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

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

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

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

Model: _____ **Date of Purchase:** _____

Serial Number: (see Safety Decal section for location) _____

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

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



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



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



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



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



Is used to address practices not related to physical injury.

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

	BF4.20	BF5.20	BF6.20
Cutting Width	48"	60"	72"
Overall Width	52.3"	61.3"	73.3"
Weight (Approximate w/ chain shield)	410 lbs	494 lbs	575 lbs
Cutting Height	2" - 9"		
Blade Spindle	1		
Number of Blades	2		
Blades	Heat Treated Alloy Steel		
Blade Rotation	CCW		
Blade Speed (feet per minute)	13,100	13,620	14,340
Gearbox Ratio	1:1.93	1:1.69	1:1.47
Recommended Tractor HP	15 - 40	20 - 50	
Tractor PTO RPM	540		
3-Point Hitch Category	1		
Operating Temperature Range	-20 to 100		
Universal Drive Category	3		
Side Frame Thickness	12 GA		
Tailwheel	4" x 16"		

GENERAL INFORMATION

WARNING

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

The purpose of this manual is to assist you in operating and maintaining your cutter. Read it carefully. It furnishes information and instructions that will help you achieve years of dependable performance. These instructions have been compiled from extensive field experience and engineering data. Some information may be general in nature due to unknown and varying operating conditions. However, through experience

and these instructions, you should be able to develop procedures suitable to your particular situation.

The illustrations and data used in this manual were current at the time of printing but, due to possible inline production changes, your machine may vary slightly in detail. We reserve the right to redesign and change the machines as may be necessary without notification.

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



¡LEA EL INSTRUCTIVO!

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

NOTE:

If you would like to receive a free Spanish language translation of the Safety Rules section of this manual, plus a set of Spanish language safety decals, please contact your local Woods dealer.

AVISO:

Si desea recibir una traducción al español gratuita de la sección de Reglas de seguridad de este manual y un juego de etiquetas de seguridad en español, por favor comuníquese con su concesionario local de Woods.

BE SAFE!

BE ALERT!

BE ALIVE!

**BE TRAINED
Before Operating Mowers!**



ASSOCIATION OF
EQUIPMENT
MANUFACTURERS

*Safety Training
Does Make a Difference.*

Watch a Mower Safety Video Online

The AEM (Association of Equipment Manufacturers) offers a safety training video, *Industrial and Agricultural Mower Safety Practices*. The 22-minute video can be viewed online for free at TheAEMStore, <https://youtu.be/uEWXsDqhDq0>

It reinforces the proper procedures to follow while operating your mowing equipment. The video does not replace the information contained in the Operator's Manual, so please review this manual thoroughly before operating your new mowing equipment.

Also, available from the Association of Equipment Manufacturers:

A large variety of training materials (ideal for groups) are available for a nominal charge from AEM. Following is a partial list:

- **Training Package for Rotary Mowers/Cutters-English**

Contains: DVD & VHS (English)

 Guidebook for Rotary Mowers/Cutters (English)

 AEM Industrial/Agricultural Mower Safety Manual (English)

 AEM Agricultural Tractor Safety Manual (English)

- **Training Package for Rotary Mowers/Cutters-English/Spanish**

Contains: DVD & VHS (English/Spanish)

 Guidebook for Rotary Mowers/Cutters (English/Spanish)

 AEM Industrial/Agricultural Mower Safety Manual (English/Spanish)

 AEM Agricultural Tractor Safety Manual (English/Spanish)

AEM training packages are available through:

AEM at: www.aem.org

or

Universal Lithographers, Inc.

Email: aem@ulilitho.com

800-369-2310 tel

866-541-1668 fax

SAFETY RULES



ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!



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

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

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

TRAINING

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

PREPARATION

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

- Make sure spring-activated locking pin or collar slides freely and is seated firmly in tractor PTO spline groove.
- Connect PTO driveline directly to power unit PTO shaft. Never use adapter sleeves or adapter shafts. Adapters can cause driveline failures due to incorrect spline or incorrect operating length and can result in personal injury or death.
- Before starting power unit, check all equipment driveline guards for damage. Replace any damaged guards. Make sure all guards rotate freely on all drivelines. If guards do not rotate freely on drive-lines, repair and replace bearings before putting equipment into service.
- Power unit must be equipped with ROPS or ROPS cab and seat belt. Keep seat belt securely fastened. Falling off power unit can result in death from being run over or crushed. Keep foldable ROPS systems in "locked up" position at all times.
- Inspect chain, rubber, or steel band shielding before each use. Replace if damaged.
- Remove accumulated debris from this equipment, power unit, and engine to avoid fire hazard.
- Make sure all safety decals are installed. Replace if damaged. (See Safety Decals section for location.)
- Make sure shields and guards are properly installed and in good condition. Replace if damaged.
- A minimum 20% of tractor and equipment weight must be on the tractor front wheels when attachments are in transport position. Without this weight, front tractor wheels could raise up resulting in loss of steering. The weight may be attained with front wheel weights, ballast in tires, front tractor weights or front loader. Weigh the tractor and equipment. Do not estimate.
- Inspect and clear area of stones, branches, or other hard objects that might be thrown, causing injury or damage.

OPERATION

- To avoid damage to cutter or driveline, make sure driveline holder is properly stored before operation.
- Do not allow bystanders within 25 feet of the area when operating, attaching, removing, assembling, maintaining, or servicing equipment.

SAFETY RULES



ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!



- Full chain shielding must be installed when operating in populated areas or other areas where thrown objects could injure people or damage property.
 - If this machine is not equipped with full chain shielding, operation must be stopped.
 - This shielding is designed to reduce the risk of thrown objects. The mower deck and protective devices cannot prevent all objects from escaping the blade enclosure in every mowing condition. It is possible for objects to ricochet and escape, traveling as much as 300 feet (92m).
- 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.
- Do not stop, start, or change directions suddenly on slopes.
- Use extreme care and reduce ground speed on slopes and rough terrain.
- Watch for hidden hazards on the terrain during operation.
- Stop power unit and equipment immediately upon striking an obstruction. Turn off engine, set parking brake, remove key, inspect, and repair any damage before resuming operation.
- Leak down or failure of mechanical or hydraulic system can cause equipment to drop.

MAINTENANCE

- Before performing any service or maintenance, disconnect driveline from tractor PTO.
- Before working underneath, disconnect driveline, raise cutter, lock in transport position, and block cutter securely. Hydraulic system leak down and failure of mechanical or hydraulic system can cause equipment to drop.
- Do not modify or alter or permit anyone else to modify or alter the equipment or any of its components in any way.
- Always wear relatively tight and belted clothing to avoid getting caught in moving parts. Wear sturdy, rough-soled work shoes and protective equipment for eyes, hair, hands, hearing, and head; and respirator or filter mask where appropriate.
- Make sure attachment is properly secured, adjusted, and in good operating condition.
- Do not allow bystanders in the area when operating, attaching, removing, assembling, or servicing equipment.
- 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. Wear gloves. Careless or improper handling may result in injury.

SAFETY RULES



ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!



- Your dealer can supply original equipment hydraulic accessories and repair parts. Substitute parts 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.
- Service and maintenance work not covered in OWNER SERVICE must be done by a qualified dealership. Special skills, tools, and safety procedures may be required. Failure to follow these instructions can result in serious injury or death.

TRANSPORTATION

- Disengage the PTO and wait for all moving parts to come to a complete stop. Raise the tractor 3-point arms to bring the cutter into transport position.
- With cutter adjusted to transport position, set upper stop on tractor lift quadrant to prevent cutter from contacting driveline while being raised.
- Always comply with all state and local lighting and marking requirements.

STORAGE

- Keep children, bystanders and animals away from equipment and storage area.
- Disconnect cutter driveshaft and secure up off ground. Raise cutter with 3-point hitch. Place blocks under cutter side skids. Lower cutter onto blocks. Disconnect cutter from tractor 3-point hitch and carefully drive tractor away from cutter (see Figure 10 on page 18).

SAFETY & INSTRUCTIONAL DECALS

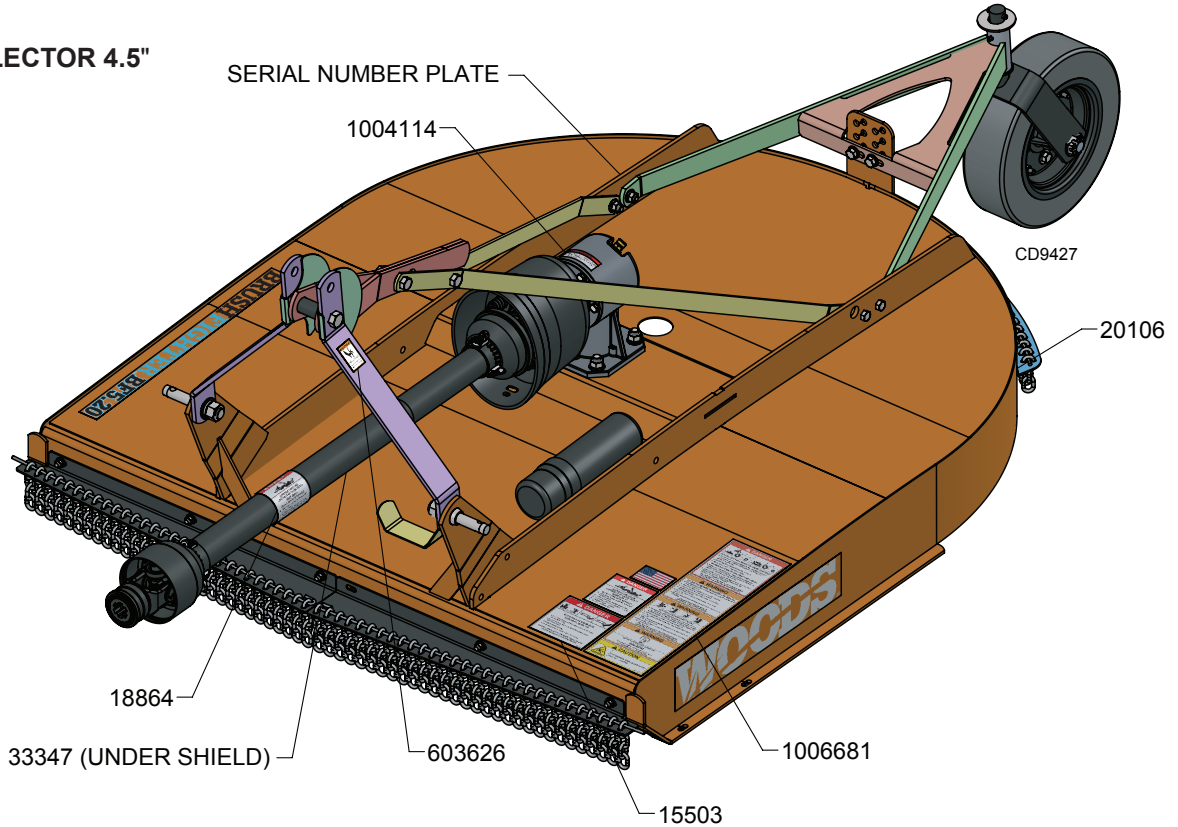


ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!



Replace Immediately If Damaged!

PN 20106
RED REAR REFLECTOR 4.5"



SERIAL NUMBER PLATE - PN 1033176



PN 18864



BE CAREFUL!

Keep safety decals clean and visible.

Use a clean, damp cloth to clean safety decals.

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

Replace safety decals if they are missing or illegible.

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

PN 1004114



SAFETY & INSTRUCTIONAL DECALS





ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!



Replace Immediately If Damaged!

PN 1006681

⚠ DANGER

FALLING OFF WILL RESULT IN BEING RUN OVER.

- Tractor must be equipped with ROPS (or ROPS CAB) and seat belt. Keep foldable ROPS systems in "locked up" position at all times.
- Buckle Up! Keep seat belt securely fastened.
- Never allow riders on mower or tractor.

RAISED EQUIPMENT CAN DROP AND CRUSH.

- 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 from dropping from hydraulic leakdown, hydraulic system failures or mechanical component failures.

FALLING OFF OR FAILING TO BLOCK SECURELY WILL RESULT IN SERIOUS INJURY OR DEATH.

⚠ WARNING

TO AVOID SERIOUS INJURY OR DEATH:

- Read Operator's Manual (available from dealer) and follow all safety precautions.
- Keep all shields in place and in good condition.
- Operate mower from tractor seat only.
- Lower mower, stop engine and remove key before dismounting tractor.
- Allow no children or untrained persons to operate equipment.
- Do not transport towed or semi-mounted units over 20 mph (30 km/h).

FAILURE TO OPERATE SAFELY CAN RESULT IN INJURY OR DEATH.

⚠ 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.

⚠ WARNING



540

DO NOT EXCEED PTO SPEED OF 540 RPM

PTO speeds higher than 540 RPM can cause equipment failure and personal injury.

⚠ CAUTION



CUTTER DECK SURFACE IS SLIPPERY
Avoid walking on deck

1006681 AD

PN 33347

⚠ DANGER



**GUARD MISSING.
DO NOT OPERATE.**

⚠ DANGER



**GUARD MISSING.
DO NOT OPERATE.**

33347

⚠ DANGER

PN 15503

⚠ DANGER






ROTATING BLADES AND THROWN OBJECTS

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

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

15503-C

OPERATION

The intended use of this standard-duty cutter is for grass and weed mowing and shredding applications.

The operator is responsible for the safe operation of the cutter. The operator must be properly trained. Operators should be familiar with the cutter, the tractor, and all safety practices before starting operation. Read the safety rules and safety decals on page 7 through page 11.

Recommended mowing speed for most conditions is from 2 to 5 mph.

⚠ DANGER

- Full chain shielding must be installed when operating in populated areas or other areas where thrown objects could injure people or damage property.
 - If the machine is not equipped with full chain shielding, operation must be stopped.
 - This shielding is designed to reduce the risk of thrown objects. The mower deck and protective devices cannot prevent all objects from escaping the blade enclosure in every mowing condition. It is possible for objects to ricochet and escape, traveling as much as 300 feet (92m).

⚠ WARNING

- Never allow riders on power unit or attachment.
- Do not allow bystanders within 25 feet of the area when operating, attaching, removing, assembling, maintaining, or servicing equipment.
- Operate tractor PTO at 540 RPM. Do not exceed.

⚠ 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 entanglement in moving parts. Wear sturdy, rough-soled work shoes and protective equipment for eyes, hair, hands, hearing, and head; and respirator or filter mask where appropriate.

TRACTOR STABILITY

⚠ WARNING

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

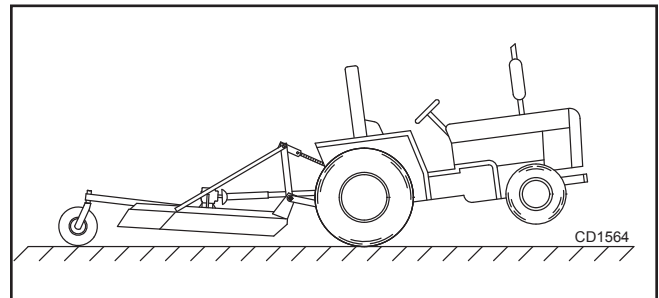


Figure 1. Tractor Stability

ATTACHING CUTTER TO TRACTOR

Standard Hitch

(Figure 2)

1. Position tractor 3-point arms over the hitch pins and secure.
2. Connect the tractor top link to the cutter A-frame using the upper holes and the appropriate hardware. The break link must be placed in the lower holes of the A-frame.
3. For subcompact tractors, it may be necessary to position the break link pivot in the front location.

Quick Hitch

1. Break link pivot must be located in rear location.
2. Install quick hitch sleeves over hitch pins and secure with Klik pin.
3. Attach tractor with the quick hitch to the cutter and secure according to the quick hitch manufacturer's instructions.

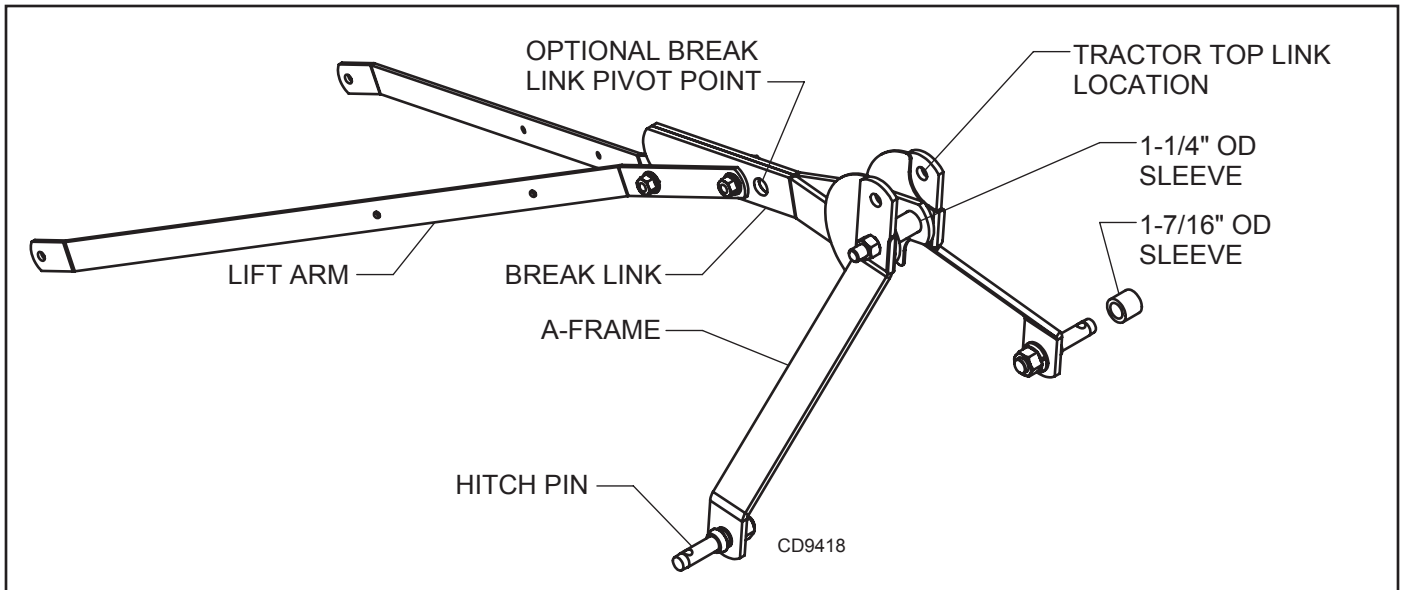


Figure 2. Standard Hitch and Quick Hitch Configurations

DRIVELINE ATTACHMENT

CAUTION

- **Make sure driveline will not bottom out at the shortest length and that it has at least 4" overlap at the longest length.**

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

There must be at least 4 inches of engagement at the cutter's lowest possible point of operation.

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

The driveline must not bottom out when raised to the maximum height possible.

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

INSTALLATION AND REMOVAL OF DRIVELINE (TRACTOR PTO)

To Install:

Pull locking collar back and at the same time push driveline onto tractor PTO shaft until locking device engages.

To Remove:

Hold driveline into position, pull locking collar back, and slide driveline off tractor PTO shaft.

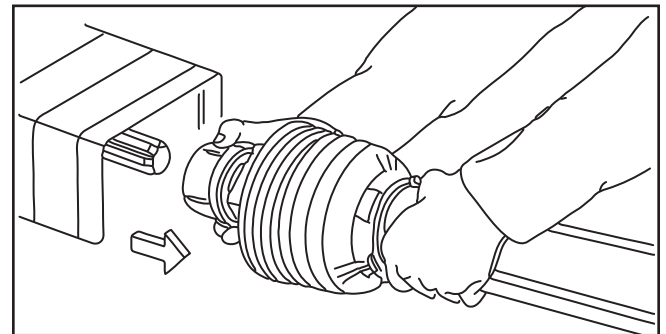


Figure 3. Lock Collar

SHORTENING DRIVELINE

1. Move mower up and down to measure the shortest possible distance between tractor PTO shaft and gearbox input shaft.
2. Separate driveline into two halves and connect them to the tractor PTO and gearbox.
3. Place driveline halves parallel to one another to determine how much to shorten the driveline.



Figure 4. Drive Halves Placed Parallel

4. Measure from end of the upper shield to the base of the bell on the lower shield (A). Add 1-9/16" to dimension (A). See Figure 5.

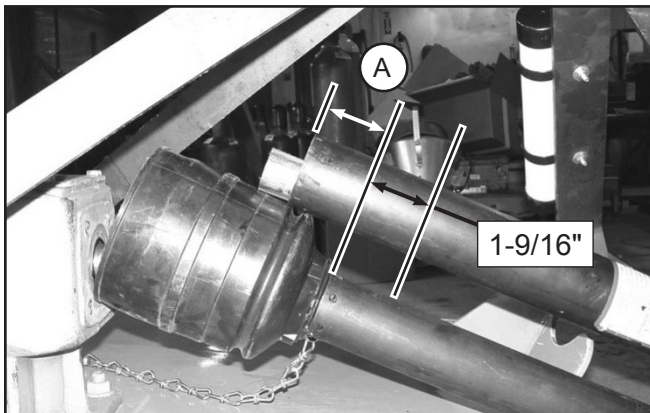


Figure 5. Determine Shield Length

5. Cut the shield to the overall dimension.
6. Place the cut-off portion of the shield against the end of the shaft and use as a guide. Mark and cut the shaft.

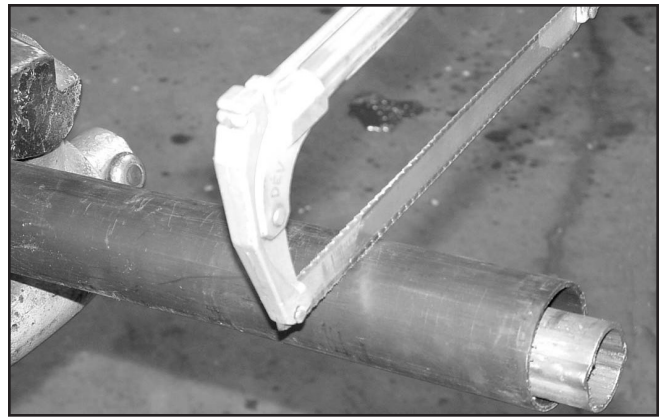


Figure 6. Cut Shield



Figure 7. Cut Shaft to Length

7. Repeat step 6 for the other half of the drive.
8. File and clean cut ends of both drive halves.

Do not use tractor if proper driveline engagement cannot be attained through these methods.

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

NOTICE

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

DRIVELINE INTERFERENCE CHECK

1. Check for proper clearance between driveline and mower deck.
2. Slowly lift mower and observe driveline. If clearance between driveline and mower deck is less than 1 inch, shorten top link or limit upper travel of lower hitch arms. Refer to tractor operator's manual for instructions.

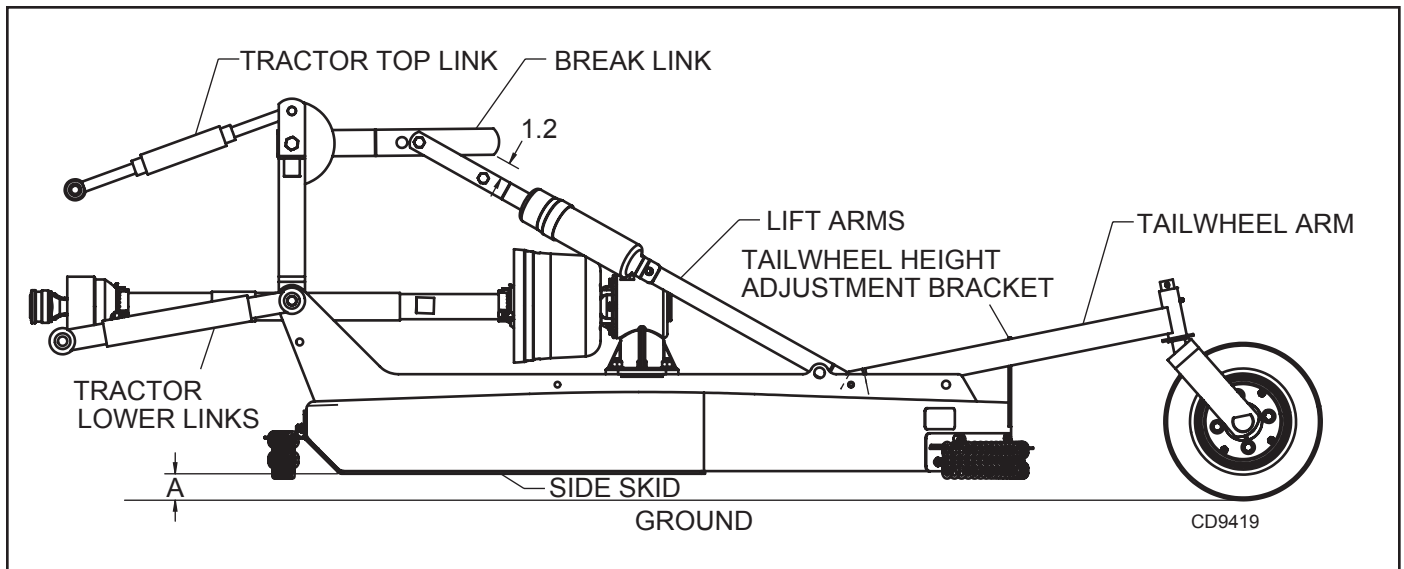


Figure 8. Cutting Height Adjustment

CUTTING HEIGHT ADJUSTMENT

⚠ WARNING

- Keep all persons away from operator control area while performing adjustments, service, or maintenance.
- Avoid low cutting heights. Striking the ground with blades produces one of the most damaging shock loads a cutter can encounter. Allowing blades to contact ground repeatedly will cause damage to cutter and drive.

1. Level cutter from side to side. Check by measuring from cutter frame to the ground at each deck rail.
2. Adjust, using tractor 3-point arm leveling device.

NOTE: Keep the front of cutter level with or slightly lower than rear for best mowing.

3. Control cutting height with tractor 3-point arms, rear tailwheel adjustment, or optional check chains.
4. To raise rear of cutter, move tailwheel down.
5. To raise front of cutter, raise tractor 3-point arms.

The cutting height is the distance between the blade and the ground. The blades are approximately 1.25" above the skid shoe. To check cutting height, do the following:

- a) Select a cutting height; as an example, for an approximate cutting height of 3", set the skid shoe 2" above the ground.

3" Desired cutting height

- 1.25" Distance blade cutting edge is above skid shoe

= 1.75" Distance skid shoe is above ground

- b) Adjust the front-to-rear attitude from 1/2" to 3/4" higher than the front.

6. Adjust top link to provide 1.2" of clearance between break link and rear lift arms. See Figure 8. The clearance will allow cutter to float over uneven terrain.

SHREDDING MATERIAL HEIGHT ADJUSTMENT

For shredding, set the cutter lower at rear. Determine how much lower to set the rear by experimenting in different situations.

CHECK CHAIN ADJUSTMENT (OPTIONAL)

1. Refer to **INSTALL OPTIONAL CHECK CHAINS**, page 31 for check chain installation.
2. After making cutting height adjustment, adjust both chains (3) in check chain bracket (2) so you have the same number of links on each side. This will keep cutting level.

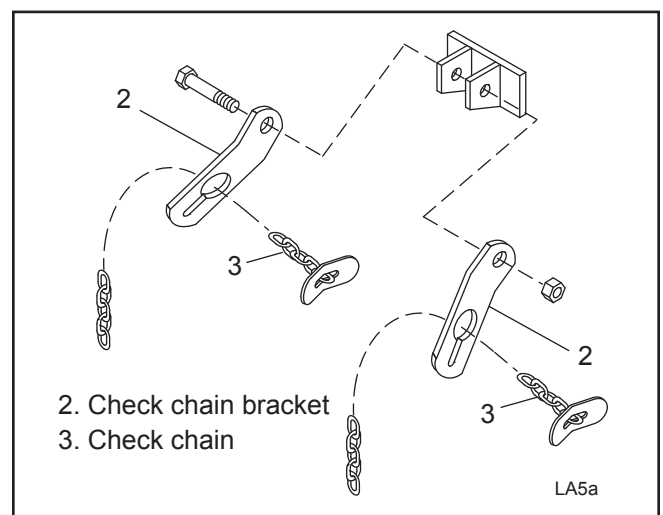


Figure 9. Check Chain Adjustment

PRE-OPERATION CHECKLIST

(OWNER'S RESPONSIBILITY)

- _____ Review and follow all safety rules and safety decal instructions on page 7 through page 11.
- _____ 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.
- _____ Set tractor PTO at 540 RPM.
- _____ Lubricate all grease fitting locations. Make sure PTO shaft slip joint is lubricated.
- _____ Check to be sure gear lube runs out the small check plug on side of gearbox.
- _____ Check that all hardware is properly installed and secured.
- _____ Check that blades are sharp and secure and cutting edge is positioned to lead in a counter-clockwise rotation.
- _____ Check that shields and guards are properly installed and in good condition. Replace if damaged.
- _____ Check cutting height, front-to-rear attitude, and top link adjustment.
- _____ Place tractor PTO and transmission in neutral before starting engine.
- _____ Inspect area to be cut and remove stones, branches, or other hard objects that might be thrown and cause injury or damage.

OPERATING TECHNIQUE

1. Power for operating the cutter is supplied by the tractor PTO. Operate PTO at 540 RPM. Know how to stop the tractor and cutter quickly in an emergency.
2. Engage PTO at a low engine RPM to minimize stress on the drive system and gearbox. With PTO engaged, raise PTO speed to 540 RPM and maintain throughout cutting operation.

Gearbox protection is provided by a slip clutch with replacement fiber disc. The slip clutch is designed to slip when excessive torsional loads occur.
3. Move slowly into material. Adjust tractor ground speed to provide a clean cut without lugging the tractor engine. Use a slow ground speed for better shredding.

Proper ground speed will depend on the terrain and the material's height, type, and density.

Normally, ground speed will range from 2 to 5 mph. Tall, dense material should be cut at a low speed; thin, medium-height material can be cut at a faster ground speed.

4. Always operate tractor PTO at 540 RPM to maintain proper blade speed and to produce a clean cut.
5. Under certain conditions tractor tires may roll down some grass and prevent cutting at the same height as the surrounding area. When this occurs, reduce your ground speed but maintain PTO at 540 RPM. The lower ground speed will permit grass to rebound partially.

TRANSPORTATION

WARNING

- **Disengage the PTO and wait for all moving parts to come to a complete stop. Raise the tractor 3-point arms to bring the cutter into transport position.**
- **With cutter adjusted to transport position, set upper stop on tractor lift quadrant to prevent cutter from contacting driveline while being raised.**
- **Always comply with all state and local lighting and marking requirements.**

STORAGE

WARNING

- **Keep children, bystanders and animals away from equipment and storage area.**
1. Disconnect cutter driveshaft and secure up off ground. Raise cutter with 3-point hitch.
 2. Place blocks under cutter side skids.
 3. Lower cutter onto blocks.
 4. Disconnect cutter from tractor 3-point hitch and carefully drive tractor away from cutter.
 5. Perform the **Pre-Operation Check List, page 16** when returning to use.

OWNER SERVICE

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

WARNING

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

CAUTION

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

BLOCKING METHOD

WARNING

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

To minimize the potential hazards or working underneath the cutter, follow these procedures:

1. Jackstands with a load rating of 1000 lbs. or more are the only approved blocking device for this cutter. Install jackstands (shown by Xs in Figure 10) under the cutter before working underneath unit.

Do not position jackstands under wheels, axles, or wheel supports. Components can rotate and cause cutter to fall.

2. Consider the overall stability of the blocked unit. Just placing jackstands underneath will not ensure your safety.

The working surface must be level and solid to support the weight on the jackstands. Make sure jackstands are stable, both top and bottom. Make sure cutter is approximately level.

3. With full cutter weight lowered onto jackstands, test blocking stability before working underneath.
4. If cutter is attached to tractor when blocking, set the brakes, remove key, and block cutter before working underneath.
5. Securely block rear tractor wheels, in front and behind. Tighten tractor lower 3-point arm anti-sway mechanism to prevent side-to-side movement.

LUBRICATION INFORMATION

1. Do not let excess grease collect on or around parts, particularly when operating in sandy areas.
2. See Figure 10 for lubrication points and frequency or lubrication based on normal operating conditions. Severe or unusual conditions may require more frequent lubrication.
3. Use a lithium grease of #2 consistency with a MOLY (molybdenum disulfide) additive for all locations unless otherwise noted. Be sure to clean fittings thoroughly before attaching grease gun. One good pump of most guns is sufficient when the lubrication schedule is followed.

Gearbox Lubrication

1. For gearbox, use a high quality gear oil with a viscosity index of 80W or 90W and an API service rating of GL-4 or -5 in gearboxes.
2. Fill gearbox until oil is above lower line on dipstick. Check gearbox daily for evidence of leakage, and contact your dealer if leakage occurs.

Driveline Lubrication

1. Lubricate the driveline slip joint every ten operating hours. Failure to maintain proper lubrication could result in damage to U-joints, gearbox, and driveline.
2. Lower cutter to ground, disconnect driveline from tractor PTO shaft, and slide halves apart but do not disconnect from each other.
3. Apply a bead of grease completely around male half where it meets female half. Slide drive halves over each other several times to distribute grease.

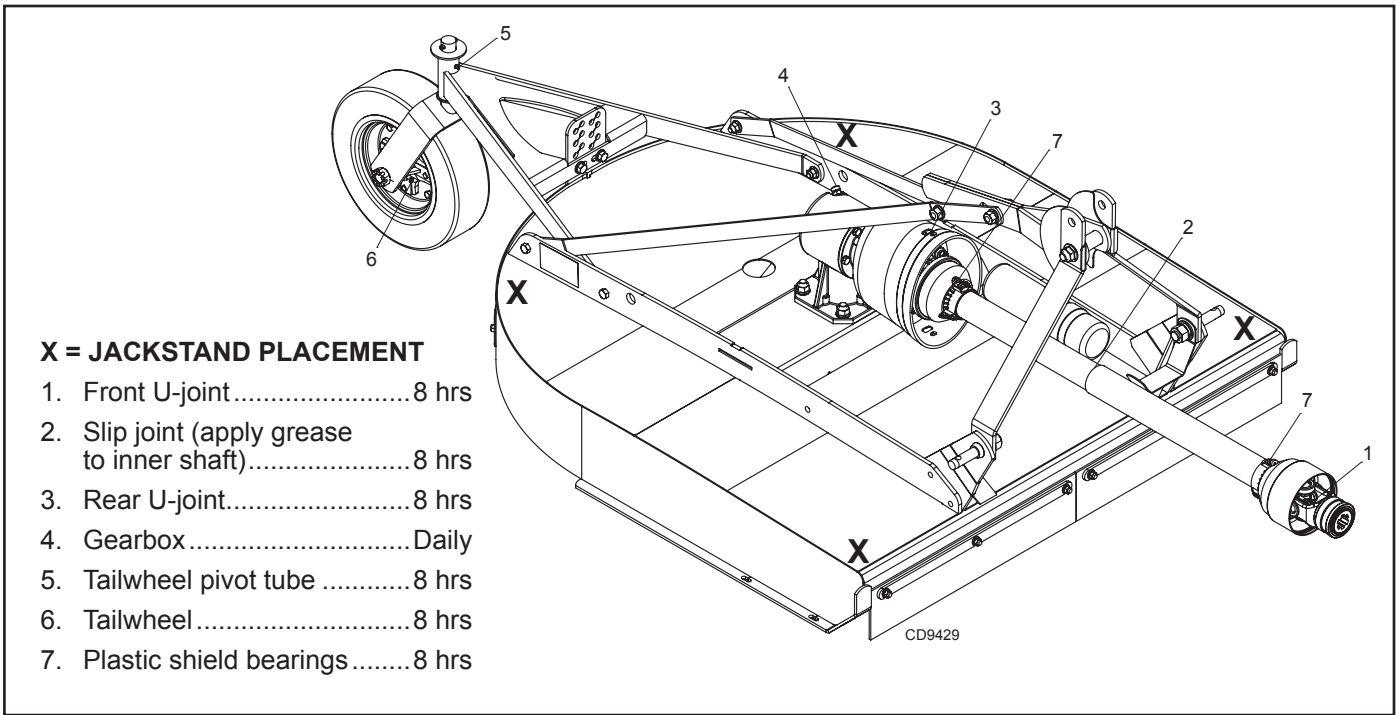


Figure 10. Jackstand Placement and Lubrication Points

BLADE SERVICING

Blade Removal

(Figure 11)

NOTICE

- When sharpening blades, grind the same amount on each blade to maintain balance. Replace blades in pairs. Unbalanced blades will cause excessive vibration, which can damage gearbox bearings. Vibration may also cause structural cracks to cutter.
- If blade pin is seized in crossbar and extreme force will be needed to remove it, support crossbar from below to prevent gearbox damage.

1. Disconnect driveline from tractor PTO.
2. Raise cutter and block securely (see **Blocking Method, Figure 10**).
3. Align crossbar (1) with blade access hole in the cutter frame. Remove blade pin nut (5) and lock washer (4). Carefully drive pin (3) out of crossbar.
4. Rotate crossbar and repeat for opposite blade.

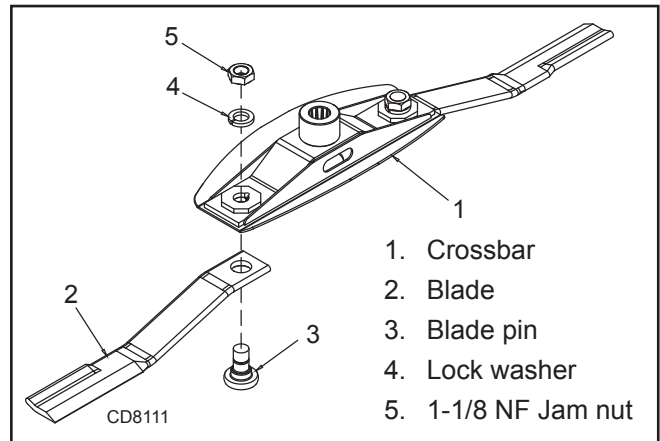


Figure 11. Blade Assembly

Blade Installation

(Figure 11)

CAUTION

- Your dealer can supply genuine replacement blades. Substitute blades may not meet original equipment specifications and may be dangerous.
 - Crossbar rotation is counterclockwise when looking down on cutter. Be sure to install blade cutting edge to lead in counterclockwise rotation.
1. Inspect blade pin (3) for nicks or gouges, and if you find any, replace the blade pin.

2. Insert blade pin through the blade (2). Blade should swivel on blade pin; if it doesn't, determine the cause and correct.
3. Align crossbar (1) with blade access hole in cutter frame. Apply a liberal coating of Never Seez® or equivalent to blade pin and crossbar hole. Make sure blade offset is away from cutter. Push blade pin through crossbar.
4. Insert lock washer (4) and nut (5) through blade access hole in deck. Install on blade pin (3) and tighten to 450 lb-ft using a 1-11/16" socket.

NOTE: Blade should be snug but should swivel on pin without having to exert excessive force.

Blade Sharpening

1. Sharpen both blades at the same time to maintain balance. Follow original sharpening pattern.
2. Do not sharpen blade to a razor edge—leave at least a 1/16" blunt edge.
3. Do not sharpen back side of blade.

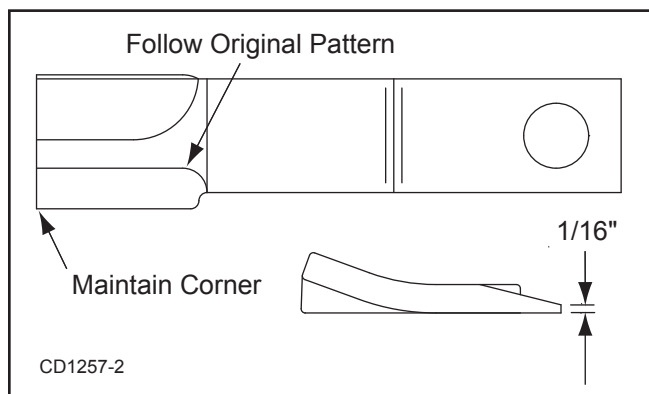


Figure 12. Blade Sharpening

SLIP CLUTCH ADJUSTMENT

The slip clutch is designed to slip so that the gearbox and driveline are protected if the cutter strikes an obstruction.

A new slip clutch or one that has been in storage over the winter may seize. Before operating the cutter, make sure it will slip by performing the following operation:

1. Turn off tractor engine and remove key.
2. Loosen nuts on springs until the springs can rotate freely, yet remain secure on the bolts.
3. Mark outer plates of slip-disc clutch as shown in Figure 13.
4. Securely attach implement to the tractor and start the tractor.
5. Engage PTO for several seconds then quickly disengage it.

6. Turn tractor off and remove key.
7. The friction lining plates should have "slipped". Check the marks placed on the outer plates of the slip-disc clutch in step 3 to make sure this is the case.
8. If clutch does not slip, check assembly for oil, grease and debris. Clean if necessary.
9. Reassemble clutch and tighten bolts no more than 1/8 of a turn at a time until desired setting of 1.26" is reached.
10. If excessive slippage continues, check lining plates for excessive wear. They are 1/8" thick when new and should be replaced after 1/32" of wear to ensure proper operation.

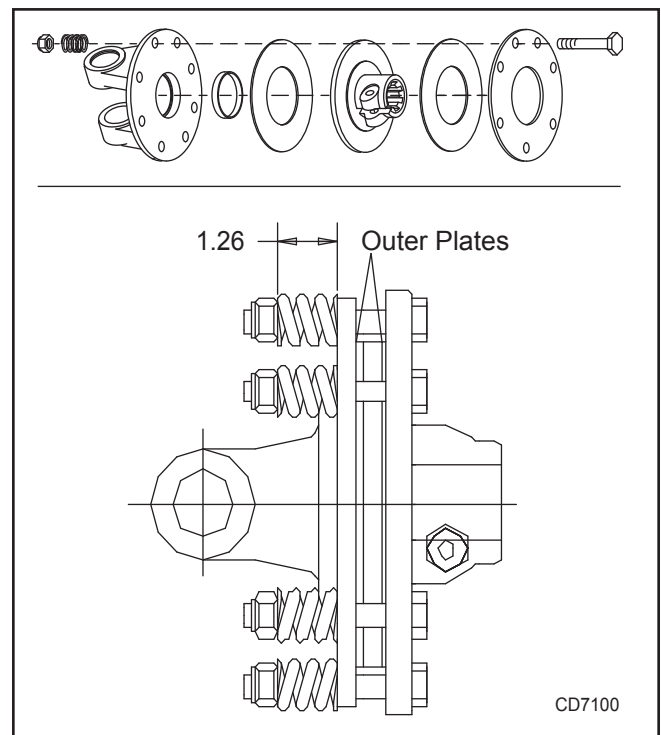


Figure 13. Slip Clutch Assembly

DRIVELINE SHEAR BOLT REPLACEMENT

NOTICE

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

1. Remove damaged shear bolt (7).
2. Rotate driveline (6) to align holes in yoke and shaft. Install shear bolt and secure with lock nut (8).

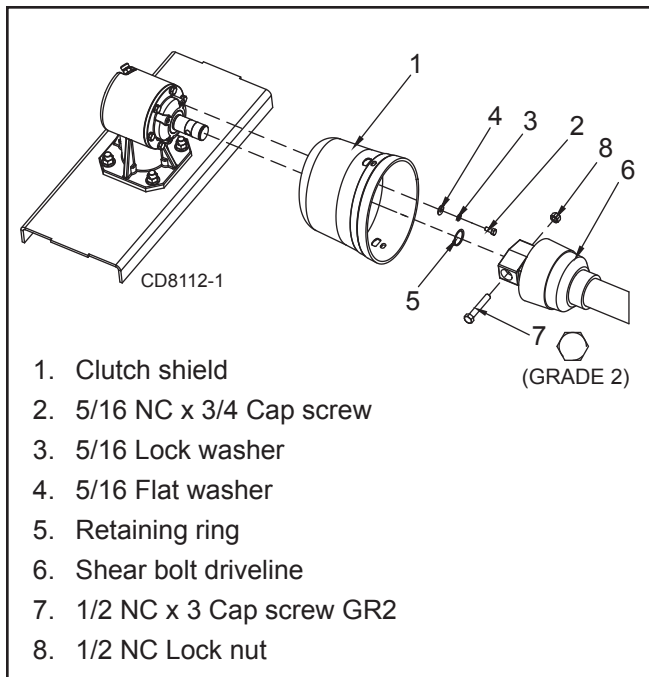


Figure 14. Shear Bolt Driveline Assembly

SHIELDING REPAIR

! DANGER

- **Full chain shielding must be installed when operating in populated areas or other areas where thrown objects could injure people or damage property.**
 - If the machine is not equipped with full chain shielding, operation must be stopped.
 - This shielding is designed to reduce the risk of thrown objects. The mower deck and protective devices cannot prevent all objects from escaping the blade enclosure in every mowing condition. It is possible for objects to ricochet and escape, traveling as much as 300 feet (92m).

Rear Band

Inspect rear band each day of operation and replace if bent, cracked or broken.

Rubber Shielding

Inspect rubber shielding each day of operation and replace if cracked or broken.

Optional Chain Shielding

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

Inspect chain brackets and replace if bent, cracked, or broken.

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.
 - Replace any safety decals that are missing or not readable. See Safety Decals section for location drawing.

TROUBLESHOOTING

MOWING CONDITIONS

PROBLEM	POSSIBLE CAUSE	SOLUTION
Grass cut lower in center of swath than at edge	Height of cutter lower at rear or front	Adjust cutter height and attitude so that cutter rear and front are within 1/2" of same height.
Streaking conditions in swath	Conditions too wet for mowing	Allow grass to dry before mowing.
	Blades unable to cut that part of grass pressed 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 cutter 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 cutter for the first pass and lower to desired height for the second and cut at 90° to first pass. Raise rear of cutter high enough to permit material to discharge but not so high to cause conditions listed above.
	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 cutter too low, trapping material under cutter	Adjust cutter height and attitude.
Cutter will not cut (Shear bolt drive only)	Shear bolt sheared	Install new shear bolt.
Cutter will not cut all the time (Slip clutch drive only)	Slip clutch slipping	Adjust slip clutch according to instructions in Slip Clutch Adjustment, page 19.

DEALER SERVICE

The information in this section is written for dealer service personnel. The repair described here requires special skills and tools. If your shop is not properly equipped or your mechanics are not properly trained in this type of repair, do not attempt this repair.

WARNING

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

CAUTION

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

GEARBOX MAINTENANCE

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

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

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

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

Seal Replacement

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

Leakage can occur at the vertical or horizontal gaskets and shaft seals.

Leakage at the horizontal gasket or seal can be repaired without removing the gearbox from the cutter.

Seal Installation

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

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

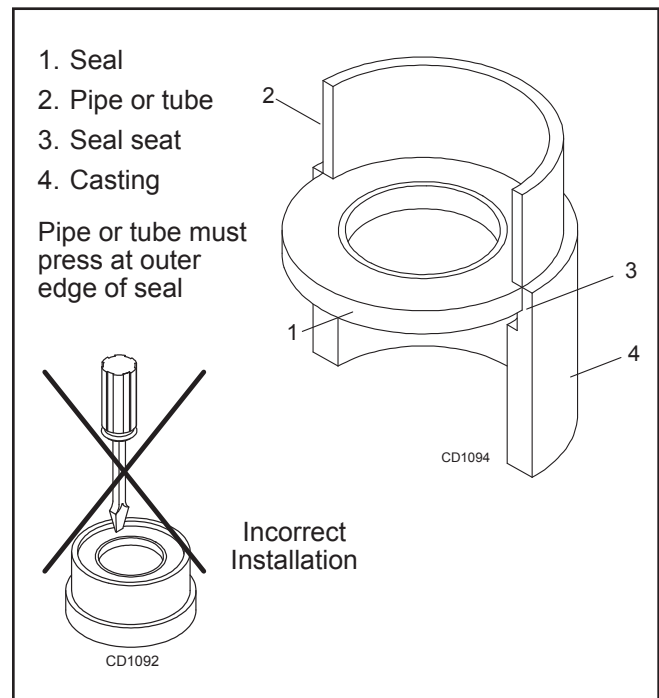


Figure 15. Seal Installation

SEAL REPAIR

(Figure 16)

Vertical Shaft Seal Repair

1. Disconnect and remove the rear driveline from the gearbox.
2. Remove vent plug (24) and siphon gear lube from housing through this opening.
3. Remove crossbar (see **Crossbar Removal, page 25**).
4. Remove output cap (16) and output seal (13) by removing four cap screws (12) and washers (11). Replace with new seal (see **Seal Installation, page 22**).

Vertical seal should be recessed in output cap.

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

5. Secure output cap (16) on to bottom of gearbox using four cap screws (12) and lock washers (11).

NOTE: Make sure output gasket (17) and (18) are in place.

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

7. Remove and replace any seal damaged in installation.

Horizontal Seal Leak Repair

1. Disconnect and remove the rear driveline from the gearbox.
2. Remove vent plug (24) and siphon gear lube from housing through this opening.
3. Remove input cap (2) and input seal (6) by removing six cap screws (12) and washers (11). Replace with new seal (refer to **Seal Installation, page 22**).

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

4. Secure input cap (2) on to front of gearbox using six cap screws (12) and washers (11).

NOTE: Make sure input gasket (8) and (9) are in place.

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

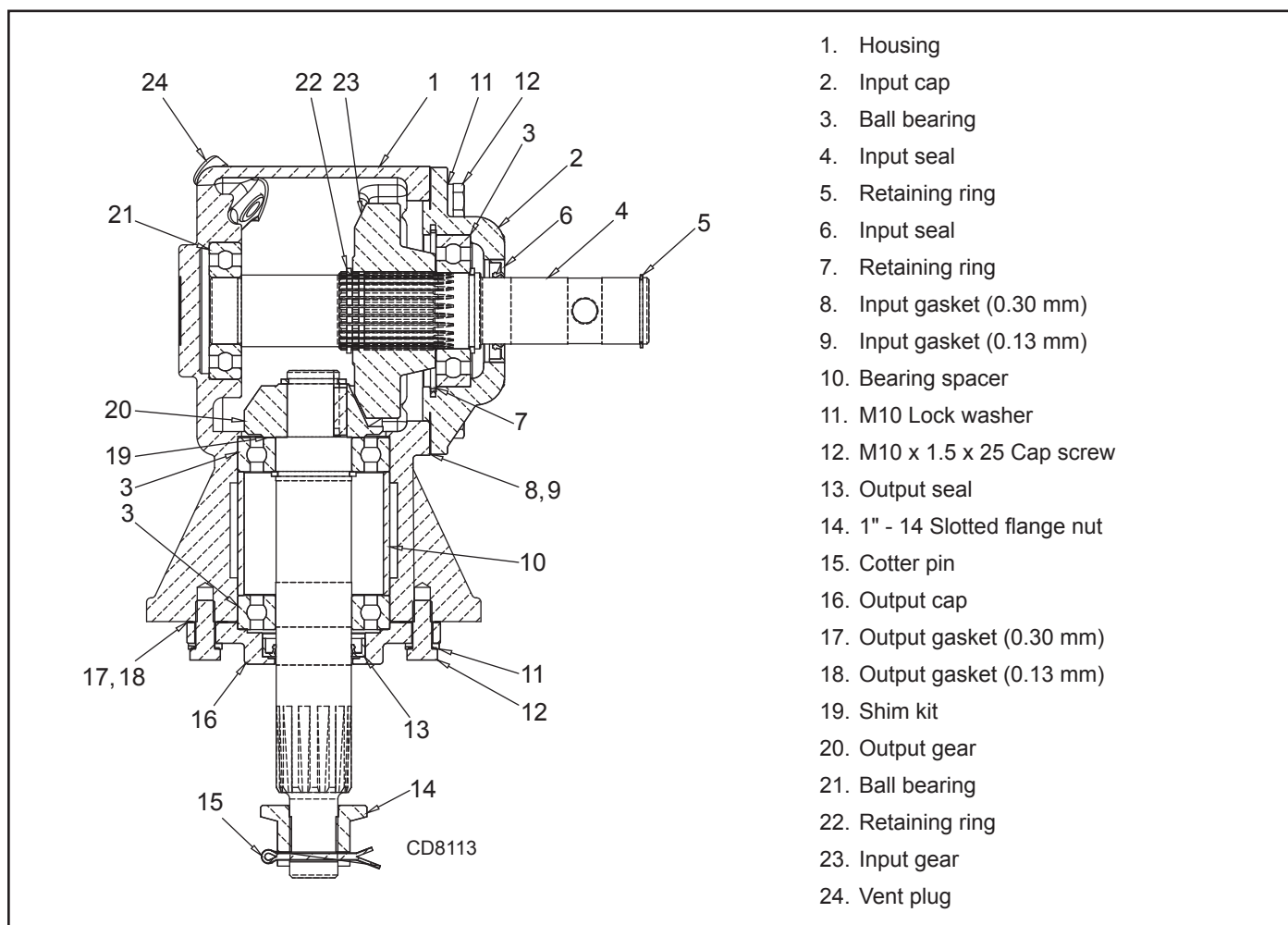


Figure 16. Cast/Crown Top Gearbox Assembly

DISASSEMBLE GEARBOX

(Figure 16)

1. Remove vent plug (24) of gearbox and pour out remaining gear oil.
2. Support housing in vise with the input shaft in a horizontal position.
3. Remove the six cap screws (12) and washers (11) from the input cap.
4. Tap shaft with a hammer side to side to loosen the cap from the housing. Once the cap is loose, pry the cap out of the housing. Please note that the cap, cap bearing, seal, shaft and gear will all come out with the cap.
5. With this cap, shaft and gear assembly removed from the gearbox, remove retaining ring (22).
6. Remove oil seal (6) from input cap.
7. Support cap and press shaft through the gear. Once the shaft and gear are separated from the cap, remove retaining ring (7) from cap. Cap bearing can now be removed.
8. Remove input gaskets from the housing face and cap.
9. Support housing in a vise with the output shaft in a horizontal position.
10. With the hub/stump jumper/crossbar, castle nut, cotter pin already removed, remove the four cap screws (12), lock washers (11) and output cap (16).
11. Remove output gaskets (17) and (18).
12. Push output shaft and pinion (20) down and remove ball bearing (3), output bearing spacer (10), retaining ring (22), shim (19) and remove output shaft and pinion (20).
13. 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.
14. Inspect vertical and horizontal shafts for grooves, nicks, or bumps in the areas where the seals seat. Resurface any damage with emery cloth.
15. Inspect housing and caps for cracks or other damage.

REASSEMBLE GEARBOX

(Figure 16)

1. Clean housing, paying specific attention to areas where gaskets will be installed.
2. 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.
3. Slide ball bearing (3) on to output shaft and pinion (20). Place against gear and secure with retaining ring (22).

4. Install shim (19) in output housing bore. Push output shaft and pinion (20), ball bearing (3) and retaining ring (22) into housing until ball bearing (3) seats flat against the shim in housing socket.
5. Insert output bearing spacer (10) and ball bearing (3) over output shaft until it seats against inside roller bearing (3).
6. Secure output cap (16) with the new output seal (13) installed to bottom of gearbox housing using the four 10 mm X 1.5 X 25 cap screws (12) and lock washers (11).

NOTE: Be sure output gaskets (17 and 18) are in place. Use RTV silicone on gaskets for a leak free seal. Apply grease to output seal (13) lip for easy installation.

7. Place ball bearing (21) at back of housing and press in socket using a round tube of the correct diameter and a hand press until fully seated.
8. Press new ball bearing (3) into cap (2) socket by using a round tube of the correct diameter and hand press until fully seated.
9. Install retaining ring (7) into input cap (2) to retain the bearing (3).
10. Install retaining ring (23) onto input shaft (4) in the groove next to the spline. Press shaft (4) through the bearing (3) that is installed in input cap (2) until retaining ring is fully seated against bearing (3).
11. Install input gear (23) onto input shaft (4) making sure it is seated against bearing (3). Install retaining ring (22) over the spline on input shaft (4) and make sure it is fully seated against the gear face.
12. Install input shaft, cap, and gear assembly into housing using one each input gasket (8) and one each input gasket (9). Using a rubber hammer, tap the end of the input shaft until the cap face is fully seated against the gaskets and housing face.
13. Check that the gear backlash is between 0.006" and 0.016". The backlash can be increased or decreased by adding or removing gaskets between the input cap and housing. Once the backlash is correct add RTV silicone to the input cap face. Install six each bolts (12) and six each washers (11) to secure input cap assembly.
14. Slide input seal (6) onto input shaft (4) and press into housing flush with front using a tube of correct diameter. Be careful not to damage seal lip.
15. 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.
16. Remove gearbox from water and dry off with compressed air. With the gearbox placed in the operating position add SAE 80W or 90W EP oil until it runs out of back level hole threads. Install level plug and breather plug (24). Tighten all plugs.

CROSSBAR REMOVAL

1. It is necessary to gain access to bottom side of cutter for crossbar removal. See **OWNER SERVICE**, page 18.

NOTE: You will need to use either the puller screw (Item 6, Figure 16) or a small hydraulic jack to remove the crossbar.

2. To make crossbar removal easier, remove blades as shown in Figure 17.

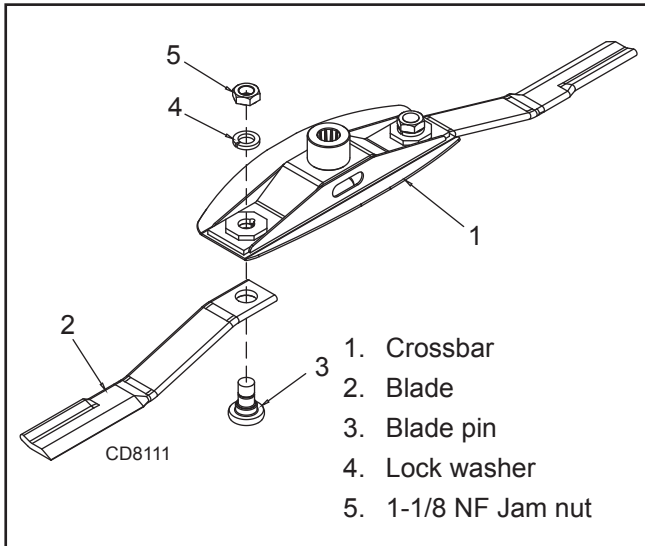


Figure 17. Blade Removal

3. Remove cotter pin and castle nut from bottom of crossbar, Figure 18.
4. Attach a clevis (1) to each end of crossbar, using blade pins, spacers, keyhole plates, and blade pin clips.
5. Position tube assembly (5) with threaded nut toward crossbar for puller screw removal or down for hydraulic jack removal.
6. For removal with puller screw, attach tube (5) to each clevis with bolts (2) and nuts (3). Place pad (4) in nut and thread puller screw (6) into nut from bottom. Tighten until pad is solid against gearbox shaft. For best results, strike head of puller screw with a hammer while tightening with a wrench.
7. For removal with a jack, attach tube to each clevis with puller links (7), bolts (2), and nuts (3). Place jack on tube with end of jack pressing against gearbox shaft. Slowly apply force with jack.

NOTE: Hydraulic jack will not operate if tipped more than 90-degrees. Use care to prevent bending crossbar during removal.

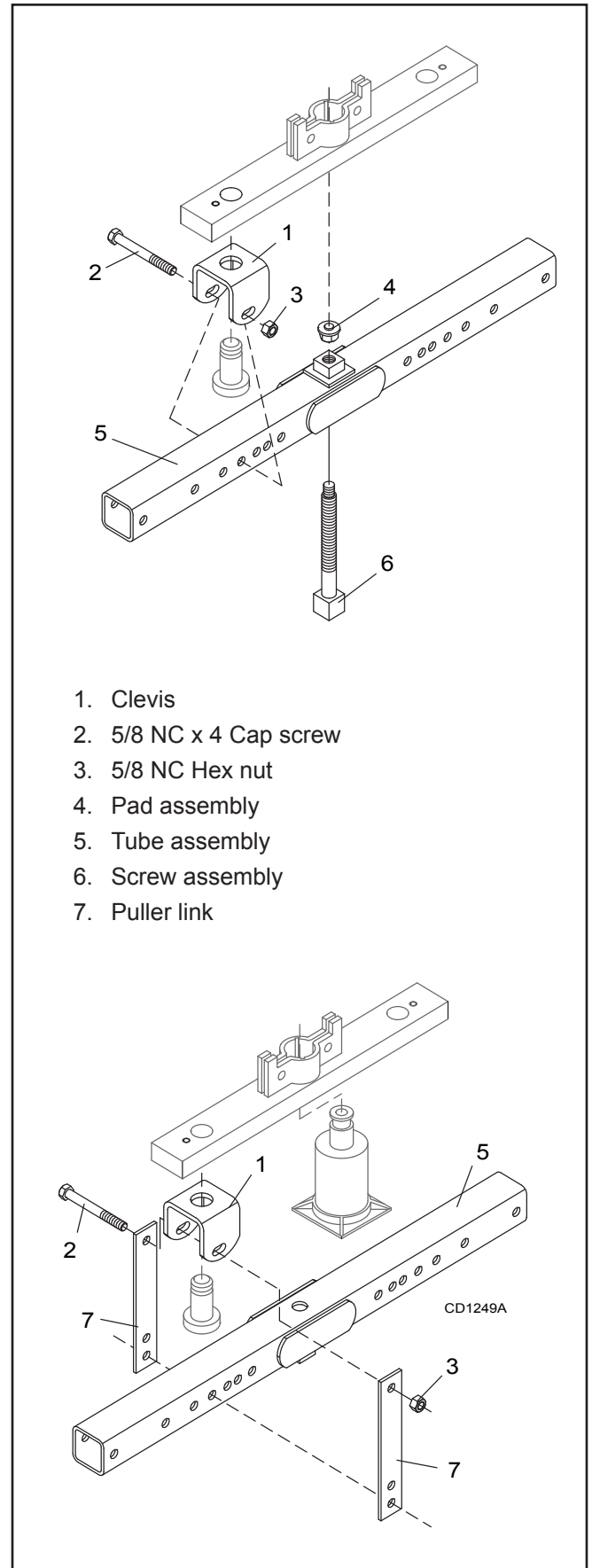


Figure 18. Crossbar Removal

CROSSBAR INSTALLATION

1. Using emery cloth (220 or finer), remove surface rust, Loctite® and foreign material from hub, splined shaft, vertical gearbox, vertical shaft, and crossbar as shown in Figure 19.

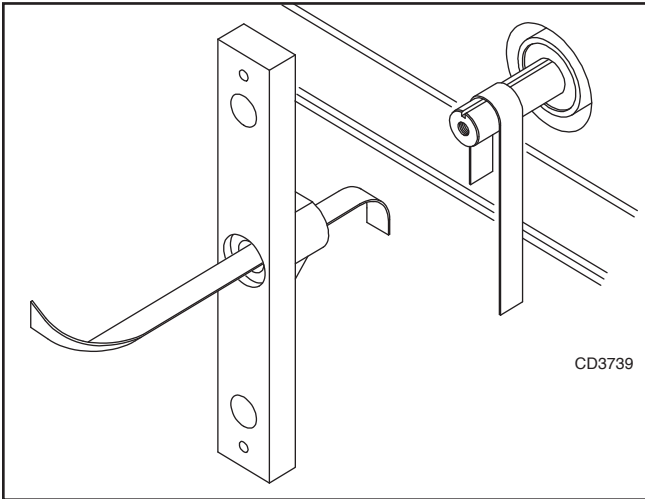


Figure 19.

2. Install crossbar (2) on splined shaft. Install castle nut and cotter pin. Torque nut to 200 lbs-ft
3. Install the blades using existing hardware. Torque blade pin nut to 450 lbs-ft.

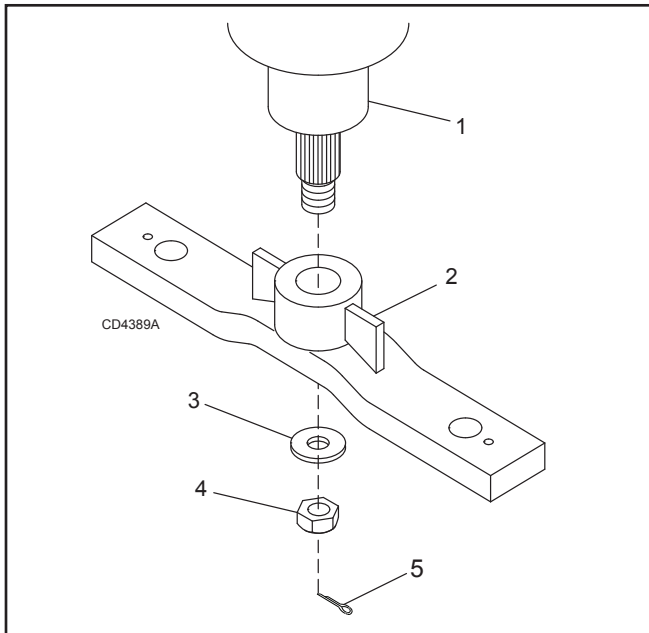


Figure 20.

UNIVERSAL JOINT REPAIR

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

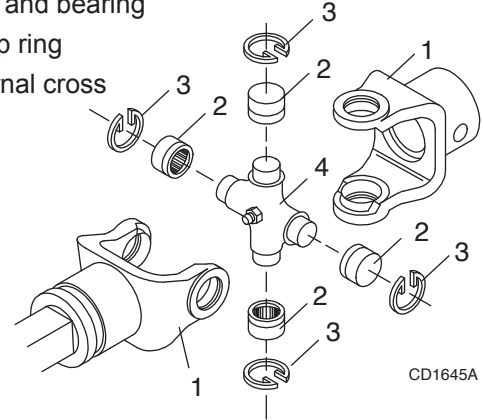


Figure 21. Universal Joint Parts Breakdown

U-Joint Disassembly

1. Remove external snap rings from yokes in four locations as shown in Figure 22.

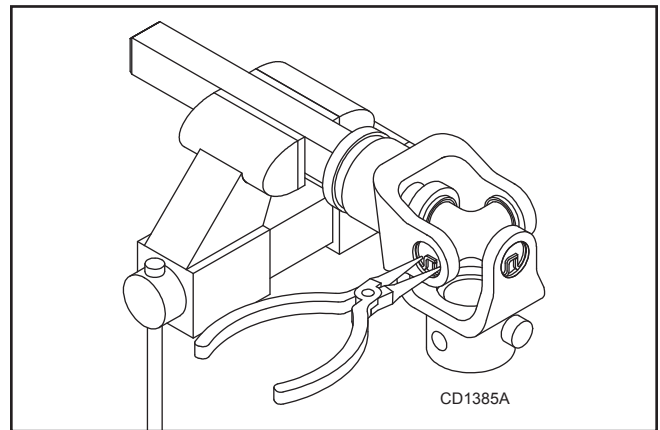


Figure 22. Remove Snap Ring

2. With snap rings removed, support drive in vise, hold yoke in hand and tap on yoke to drive cup up out of yoke. See Figure 23.

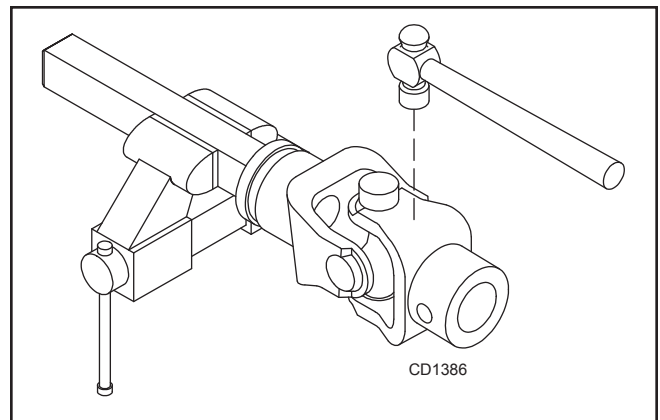


Figure 23. Remove Cups

3. Clamp cup in vise as shown in Figure 24 and tap on yoke to completely remove cup from yoke. Repeat Step 2 and Step 3 for opposite cup.

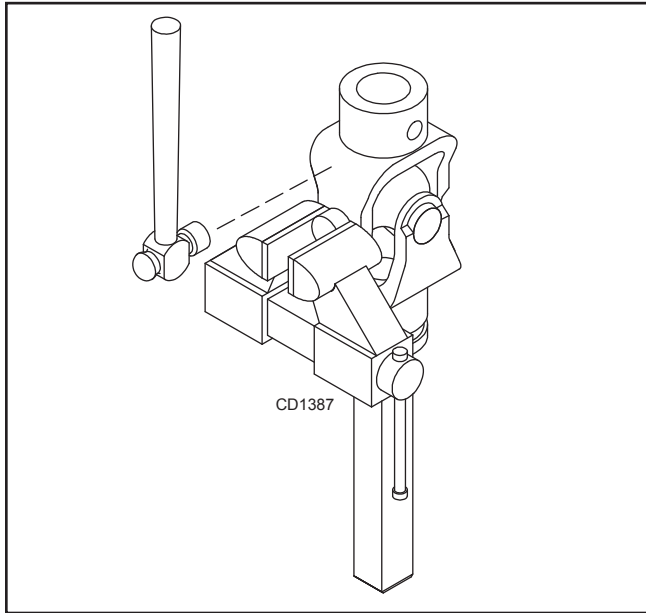


Figure 22. Remove Cups

4. Place universal cross in vise as shown in Figure 25 and tap on yoke to remove cup. Repeat Step 3 for final removal. Drive remaining cup out with a drift and hammer.

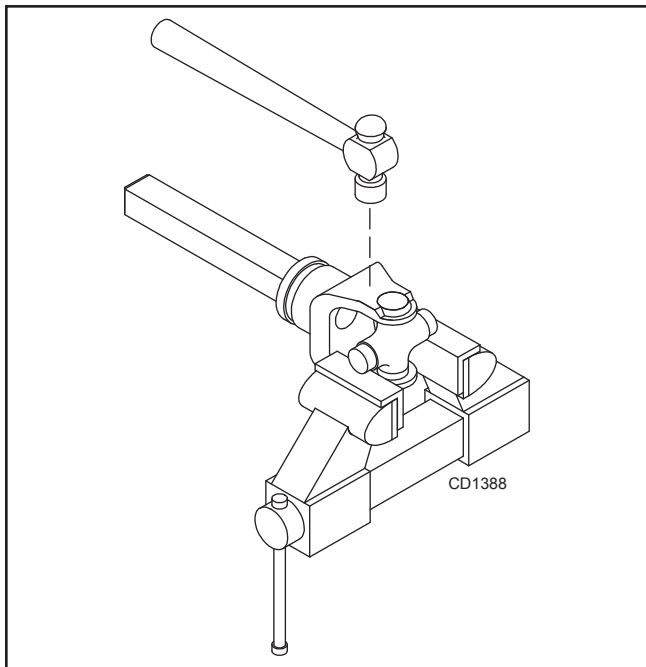


Figure 25. Remove Cups

U-Joint Assembly

1. Place seals securely on bearing cups. Insert cup into yoke from outside and press in with hand pressure as far as possible. Insert journal cross into bearing cup with grease fitting away from shaft. Be careful not to disturb needle bearings. Insert another bearing cup directly across from first cup and press in as far as possible with hand pressure.
2. Trap cups in vise and apply pressure. Be sure journal cross is started into bearings and continue pressure with vise, squeezing in as far as possible. Tapping the yoke will help.
3. Seat cups by placing a drift or socket (slightly smaller than the cup) on cup and rap with a hammer. See Figure 26. Install snap ring and repeat on opposite cup
4. Repeat Step 1 and Step 2 to install remaining cups in remaining yoke.
5. Move both yokes in all directions to check for free movement. If movement is restricted, rap on yokes sharply with a hammer to relieve any tension. Repeat until both yokes move in all directions without restriction.

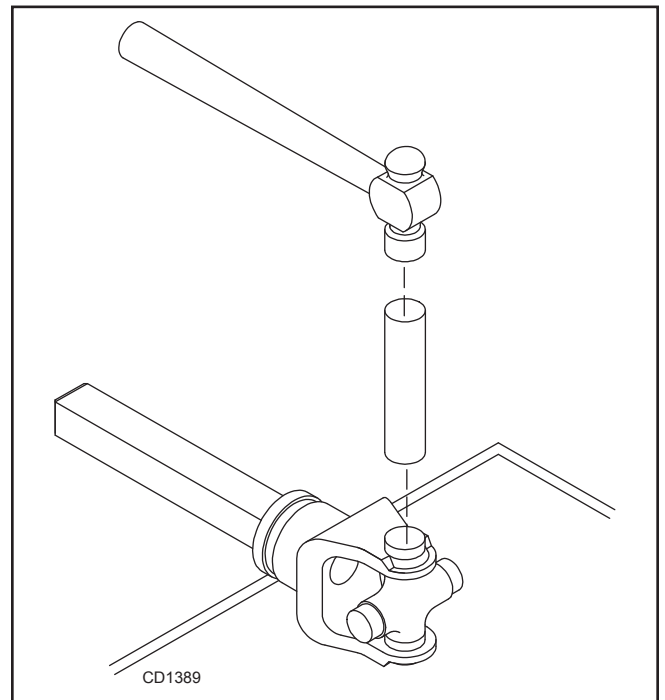


Figure 26. Install Cups

ASSEMBLY

DEALER SET-UP INSTRUCTIONS

Assembly of this cutter is the responsibility of the Woods dealer. It should be delivered to the owner completely assembled, lubricated, and adjusted for normal cutting conditions.

The cutter is shipped partially assembled, and intended to be handled in the vertical position. Use appropriate lifting devices to move into horizontal position for assembly.

Assembly will be easier if aligned and loosely assembled before tightening hardware. Recommended torque values for hardware are located in the **Bolt Torque Chart**, page 42.

Complete **Dealer Checklists**, page 32 when you have completed the assembly.

! DANGER

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

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

! WARNING

- Make sure attachment is properly secured, adjusted, and in good operating condition.

! 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.

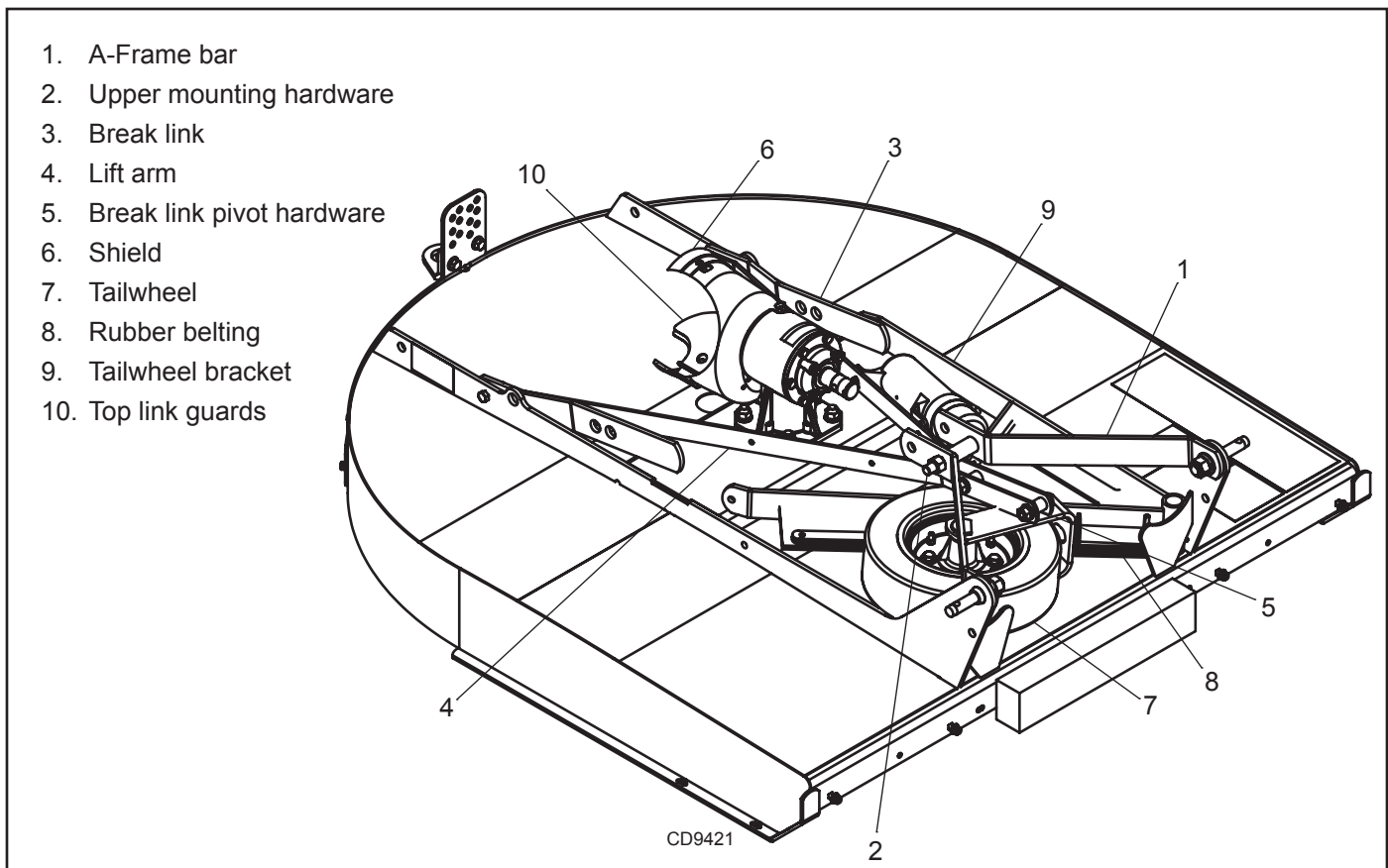
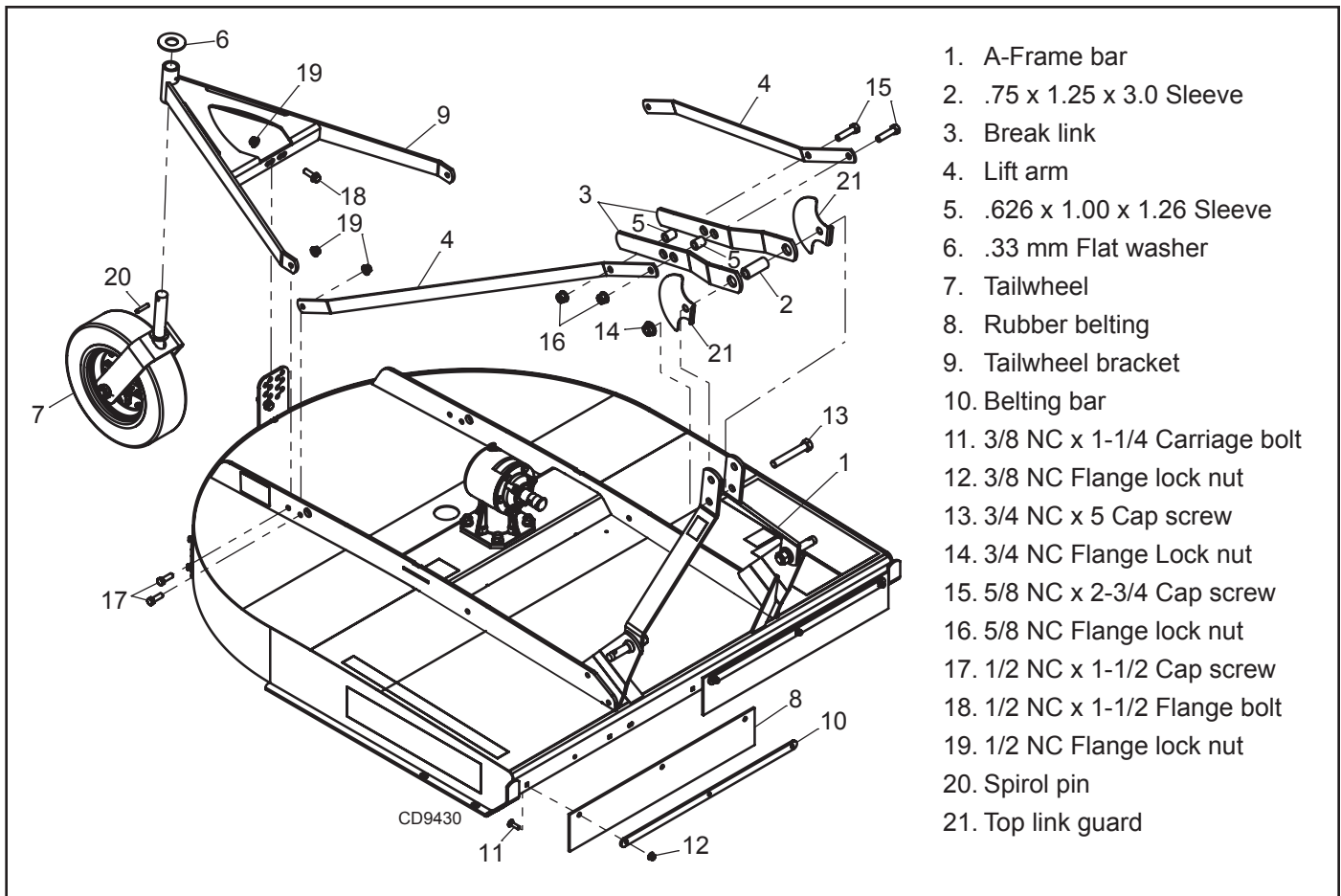


Figure 27. Shipping Configuration



1. A-Frame bar
2. .75 x 1.25 x 3.0 Sleeve
3. Break link
4. Lift arm
5. .626 x 1.00 x 1.26 Sleeve
6. .33 mm Flat washer
7. Tailwheel
8. Rubber belting
9. Tailwheel bracket
10. Belting bar
11. 3/8 NC x 1-1/4 Carriage bolt
12. 3/8 NC Flange lock nut
13. 3/4 NC x 5 Cap screw
14. 3/4 NC Flange Lock nut
15. 5/8 NC x 2-3/4 Cap screw
16. 5/8 NC Flange lock nut
17. 1/2 NC x 1-1/2 Cap screw
18. 1/2 NC x 1-1/2 Flange bolt
19. 1/2 NC Flange lock nut
20. Spirol pin
21. Top link guard

Figure 28. Cutter Assembly

DISASSEMBLE SHIPPING UNIT

(Figure 27)

Remove wood blocks from front and bottom of cutter.

Remove all parts that are zip tied or wired to cutter.

Remove cap screws and flange lock nuts that are securing Lift Arms (4) and Break Links (3) to cutter.

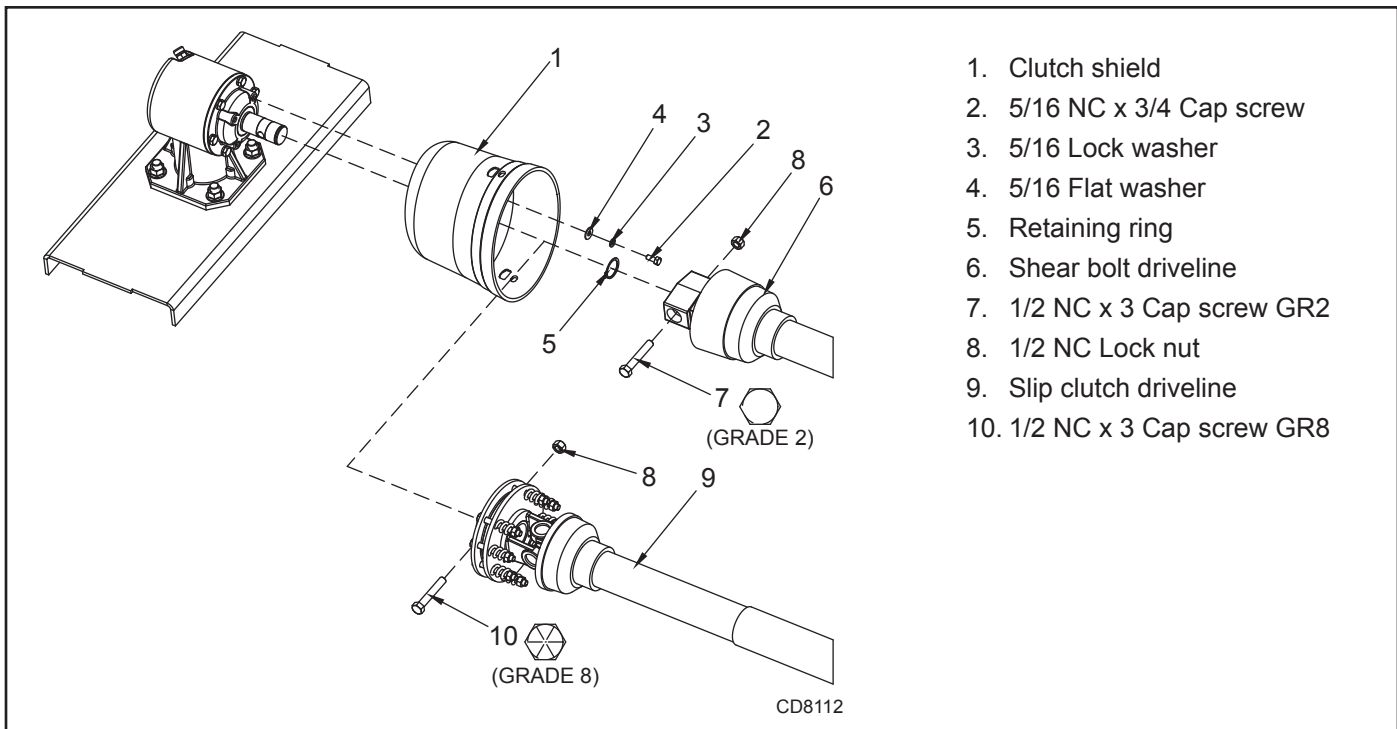
Remove cap screws and flange lock nuts that are securing Tailwheel Bracket (9) to cutter.

Remove Upper Mounting Hardware (2) from A-Frame Bars (1).

ASSEMBLE CUTTER

(Figure 28)

1. Attach Tailwheel Bracket (9) and Lift Arms (4) to cutter rail using 1/2 NC x 1-1/2 cap screws (17) and 1/2 NC flange lock nuts (19).
2. Select desired height adjustment holes and secure Tailwheel Bracket (9) with 1/2 NC x 1-1/2 flange bolt (18) and 1/2 NC flange lock nuts (19).
3. Rotate A-Frame Bars (1) up and attach Top Link Guards (21), Break Links (3), Sleeve (2) to lower hole in top of A-Frame Bars (1) using 3/4 NC x 5 cap screw (13) and 3/4 NC flange lock nut (14).
4. Rotate Lift Arms (4) upward and attach to Break Links (3) using Sleeves (5), 5/8 NC x 2-1/2 cap screws (15), and 5/8 NC flange lock nuts (16). See **Attaching Cutter to Tractor, pg. 12** for adjustments.
5. Attach Rubber Belting (8) and Belting Bar (10) to front of cutter using 3/8 NC x 1-1/4 carriage bolts (11) and 3/8 NC flange lock nuts (12). (Omit if installing optional chain shielding).
6. Secure Tailwheel (7) to Tailwheel Bracket (9) using 33 mm washer (6) and spirol pin (20).



1. Clutch shield
2. 5/16 NC x 3/4 Cap screw
3. 5/16 Lock washer
4. 5/16 Flat washer
5. Retaining ring
6. Shear bolt driveline
7. 1/2 NC x 3 Cap screw GR2
8. 1/2 NC Lock nut
9. Slip clutch driveline
10. 1/2 NC x 3 Cap screw GR8

Figure 29. Shear Bolt and Slip Clutch Assembly

INSTALL DRIVELINE

(Figure 29)

Select either the standard shear bolt or optional slip clutch driveline.

Shear Bolt Driveline

NOTICE

■ A grade 2 bolt must be used for the shear bolt to provide gearbox protection.

1. Position clutch shield (1) against gearbox. Secure using cap screw (2), lock washers (3), and flat washers (4). Torque hardware to 12 lbs-ft.
2. To prevent seal damage, carefully push driveline(6) onto gearbox input shaft until it contacts the gearbox housing.
3. Place retaining ring (5) in slot on input shaft and snap into place.
4. Align the holes in the driveline (6) yoke and gearbox input shaft. Install and tighten shear bolt (7) and nut (8).
5. Lubricate rear driveline half and install front driveline half.

Driveline Slip Clutch

NOTICE

■ A grade 8 bolt must be used to attach clutch driveline to gearbox.

A new slip clutch, or one that has been in storage over the winter, may seize.

1. Before operating slip clutch, make sure it will slip. Refer to **Slip Clutch Adjustment, page 19**.
2. Position clutch shield (1) against gearbox. Secure using cap screw (2), lock washers (3), and flat washers (4). Torque hardware to 12 lbs-ft.
3. Install driveline (9) onto gearbox input shaft and secure with bolt (10) and nut (8).
4. Lubricate rear driveline half and install front driveline half.

INSTALL SAFETY SHIELDING

Chain Shielding (Optional)

⚠ DANGER

- Full chain shielding must be installed when operating in populated areas or other areas where thrown objects could injure people or damage property.
 - If this machine is not equipped with full chain shielding, operation must be stopped.
 - This shielding is designed to reduce the risk of thrown objects. The mower deck and protective devices cannot prevent all objects from escaping the blade enclosure in every mowing condition. It is possible for objects to ricochet and escape, traveling as much as 300 feet (92 m).

The optional chain shielding assemblies are ready for installation when you receive them.

1. Refer to **Front & Rear Chain Shielding, page 40**, and attach as shown by inserting the bolts from inside the cutter frame out through the shielding.
2. Install hardware as shown in the parts drawing.

FILL GEARBOX

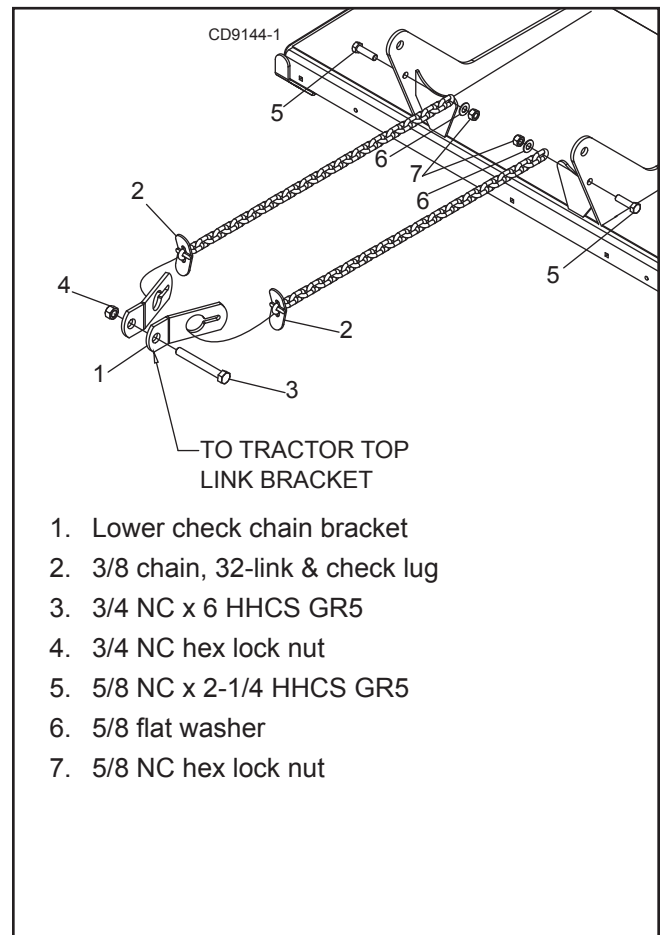
NOTICE

- Gearbox is filled at the factory. Prior to delivery to customer, make sure gearbox is filled only half-full with 80W or 90W API GL-4 or GL-5 gear lube. Use side plug to remove any excess oil.
1. Remove solid plug and discard.
 2. Make sure vent plug hole is clear.
 3. Fill gearbox until oil runs out the side plug on gearbox. Use a high quality gear oil with a viscosity index of 80W or 90W and an API service rating of GL-4 or GL-5.
 4. Install vent plug. Use pipe sealant or thread tape on threads. Vent plug is shipped in the manual tube.

INSTALL OPTIONAL CHECK CHAINS

Check chains are used to carry the front of cutter at a set height.

1. Thread check chains (2) through check chain bracket (1).
2. Attach lower end of check chain (2) to mast plate with bolt (5), washer (6), and nut (7).
3. Attach keyhole brackets (1) to each side of tractor top link bracket with bolt (3) and nut (4).
4. Insert check chains through keyhole brackets and set cutter height.



1. Lower check chain bracket
2. 3/8 chain, 32-link & check lug
3. 3/4 NC x 6 HHCS GR5
4. 3/4 NC hex lock nut
5. 5/8 NC x 2-1/4 HHCS GR5
6. 5/8 flat washer
7. 5/8 NC hex lock nut

Figure 30. Optional Check Chains

DEALER CHECKLISTS

DEALER PRE-DELIVERY CHECKLIST

(DEALER'S RESPONSIBILITY)

Inspect cutter thoroughly after assembly to make sure it is set up properly before delivering it to the customer. The following checklist is a reminder of points to inspect. Check off each item as it is found satisfactory, corrections are made, or services are performed.

- _____ Check all bolts to be sure they are properly torqued.
- _____ Check that all cotter pins are properly installed and secured.
- _____ Check that PTO shaft is properly installed.
- _____ Check that gearbox is properly serviced and seals are not leaking.
NOTE: Gearbox is filled at the factory. It must be serviced before operating cutter. (See **Fill Gearbox, page 31**). Failure to service will result in damage to gearbox.
- _____ Check and grease all lubrication points as identified in, **Lubrication Information, page 17**.
- _____ Check that blades have been properly installed.

DELIVERY CHECKLIST

(DEALER'S RESPONSIBILITY)

- _____ Show customer how to make adjustments. Describe the options available for this cutter and explain their purpose.
- _____ Explain importance of lubrication to customer and point out lubrication points on cutter.
- _____ 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.
- _____ Point out all guards and shielding. Explain their importance and the safety hazards that exist when not kept in place and in good condition.
- _____ 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!
- _____ Explain to customer that when equipment is transported on a road or highway, safety devices should be used to give adequate warning to operators of other vehicles.

Rotary Cutters

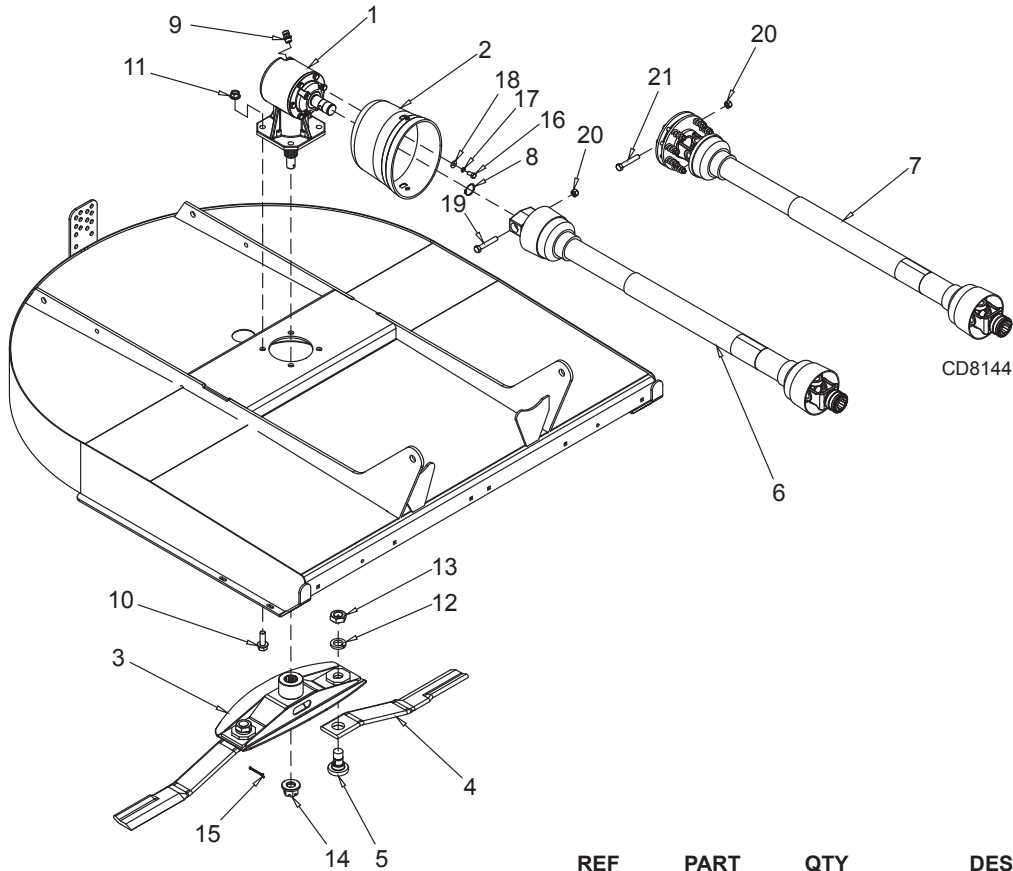
BF4.20, BF5.20, BF6.20

MAIN ASSEMBLY	34 - 35
GEARBOX / BLADE / DRIVE ASSEMBLY	36
GEARBOX ASSEMBLY	37
DRIVELINES:	
SHEAR BOLT DRIVELINE	38
SLIP CLUTCH DRIVELINE	39
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REPLACEABLE SKID SHOES (OPTIONAL)	40
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MAIN ASSEMBLY PARTS LIST

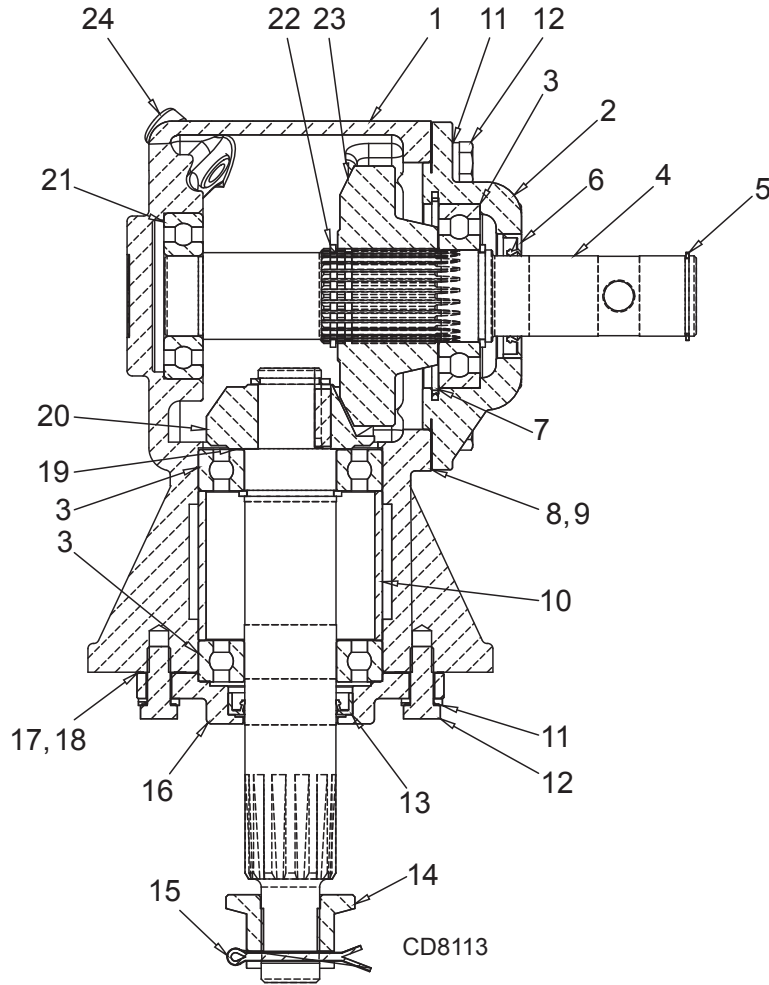
REF	PART	QTY	DESCRIPTION	REF	PART	QTY	DESCRIPTION
1	1038327RP	1	Rear band - BF4.20	24	20973 *	6	3/8 NC x 1-1/4 Carriage bolt GR5
	639723	1	Rear band - BF5.20	25	14350 *	14	3/8 NC Flange lock nut
	1037913RP	1	Rear band - BF6.20	26	25475 *	4	1/2 NC x 1 HHCS GR5
2	639733RP	1	Tailwheel bracket	27	1039944 *	2	1/2 NC x 1-1/2 Flange bolt GR5
3	639726RP	2	A-frame bar	28	3379 *	2	1/2 NC X 1-1/2 HHCS GR5
4	639727RP	2	Break link	29	854 *	4	1/2 Flat washer
5	639725RP	2	Lift arm	30	11900 *	4	1/2 NC Flange lock nut
6	27140	1	Sleeve, 3/4 x 1-1/4 x 3	31	986 *	2	5/8 NC x 2-3/4 HHCS GR5
7	66661	2	Sleeve, .626 x 1.00 x 1.26	32	19025 *	2	5/8 NC Flange lock nut
8	29281	2	Sleeve, 7/8 x 1-1/8 x 19/32 HT	33	2376 *	1	3/4 NC x 5 HHCS GR5
9	33661	2	Cat 1 Mounting pin (w/ nut & lock washer)	34	1045611 *	1	3/4 NC Flange lock nut
10	1026530	1	Manual tube	35	28539 *	2	7/8 Standard flat washer
11	1037877	2	Rubber belt - BF4.20	36	1030523	1	M24 x 2 Axle bolt
	1037878	2	Rubber belt - BF5.20	37	1032105	1	M24 x 2.0P Slotted nut
	1037879	2	Rubber belt - BF6.20	38	7163 *	1	1-1/4 Std flat washer
12	1038326RP	2	Belt bar - BF4.20	39	639728	1	Driveline support
	1037874RP	2	Belt bar - BF5.20	NS	619540	1	Spanish safety decal set
	1037914RP	2	Belt bar - BF6.20	NS	639751	1	Decal, Model, BF4.20
13	1028815RP	1	Tailwheel clevis	NS	639753	1	Decal, Model, BF5.20
14	1019636	1	4 x 8 Rim & Laminated tire	NS	639755	1	Decal, Model, BF6.20
15	1030522	1	Hub 4-bolt	NS	610314	2	Decal, Woods Logo 4 in
16	1030524	2	Bushing, flanged .990 x 1.394 x .98	NOTE: For safety decals see pages 10 and 11. Order decals separately.			
17	----- *	1	Cotter pin, 3/16 x 2	* Standard hardware; obtain locally			
18	38214	2	Sleeve, .91 x 1.44 x 1.25	NS Not shown			
19	640445	2	Guard, top link	NOTE: Replacement Rear Bands (1) are shipped flat. Install to the center of the deck on either side of the height adjustment plate first, and work toward the ends to follow the curve of the deck.			
20	601271 *	2	Rivet, blind .25 X .53 X .06-.25				
22	40775	1	Spirol pin, 10 mm x 65 mm				
23	6697 *	8	3/8 NC x 1 Carriage bolt GR5				

GEARBOX / BLADE / DRIVE ASSEMBLY



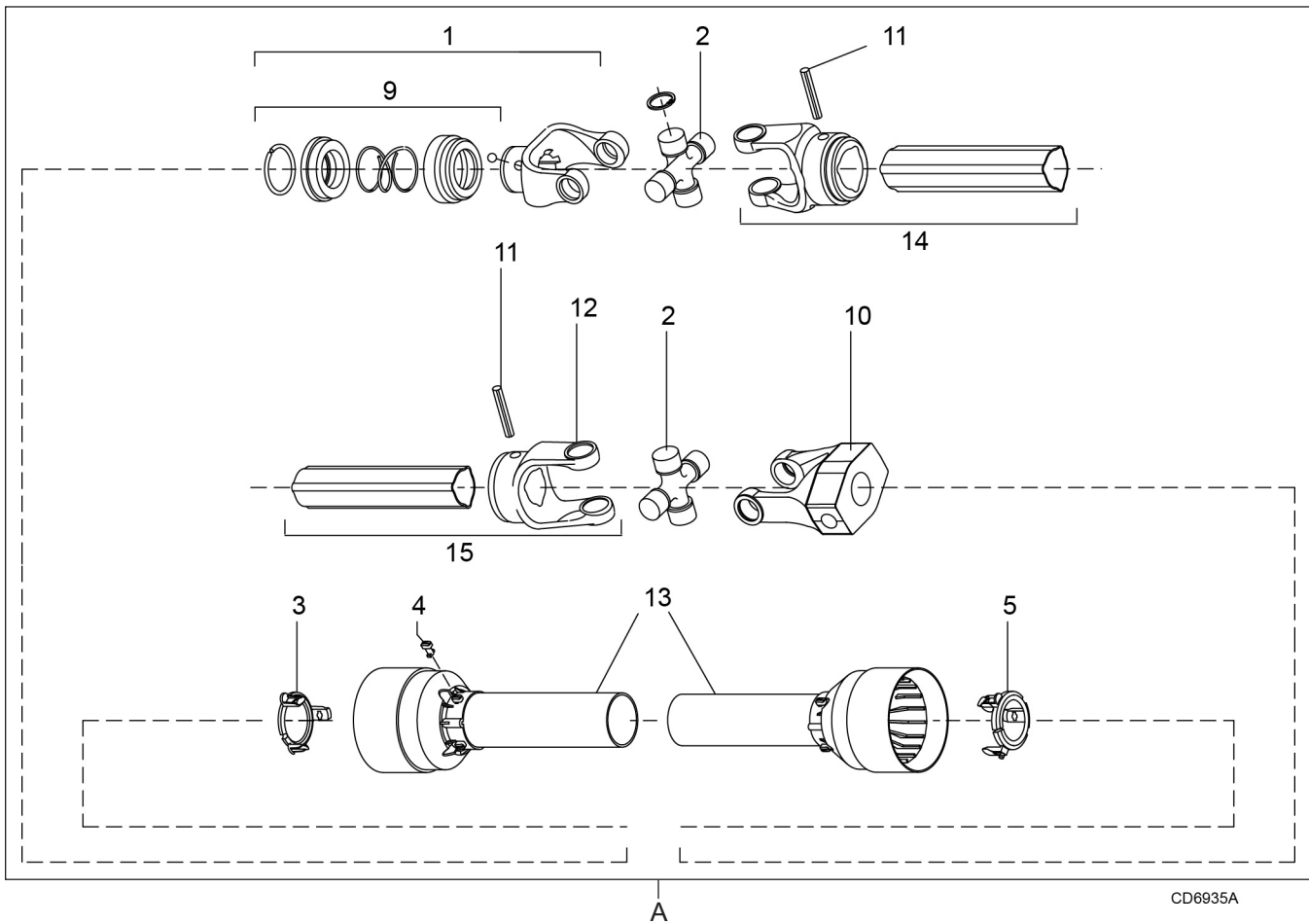
REF	PART	QTY	DESCRIPTION
1	1038350	1	Gearbox - BF4.20 (See pg 37)
	1038352	1	Gearbox - BF5.20 (See pg 37)
	1038351	1	Gearbox - BF6.20 (See pg 37)
2	1002048	1	Clutch shield
3	639743RP	1	Crossbar assembly - BF4.20
	639730RP	1	Crossbar assembly - BF5.20
	639757RP	1	Crossbar assembly - BF6.20
4	1037893KT	1	Blade, 1/2 x 3 x 14.0 CCW - BF4.20
	1037892KT	1	Blade, 1/2 x 3 x 20.5 CCW - BF5.20
	57189KT	1	Blade, 1/2 x 3 x 26.5 CCW - BF6.20
5	1015831	2	Blade pin, .75 x 1.5 x .38 (includes items 12 & 13)
6	1037884	1	Shear bolt drive, BF4.20 , BF5.20 (See page 38)
	1037885	1	Shear bolt drive, BF6.20 (See page 38)
7	632115	1	Slip clutch drive - BF4.20 , (See pg 39)
	1038323	1	Slip clutch drive - BF5.20 (See pg 39)
	1038324	1	Slip clutch drive - BF6.20 (See pg 39)
8	15345	1	Retaining ring, .05 x 1.38
9	1037875	1	Vent plug
10	19024 *	4	5/8 NC x 1-3/4 HFS GR5
11	609225 *	4	5/8 NC Flange lock nut
12	15668 *	2	1.15 x 1.85 x .281 Lock washer
13	15667 *	2	1-1/8 NF Jam nut
14	1018331 *	1	1" - 14 Slotted flange nut
15	----	1	Cotter pin
16	6096 *	4	5/16 NC x 3/4 HHCS GR5
17	2472 *	4	5/16 Lock washer
18	4378 *	4	5/16 Flat washer
19	----	1	1/2" - 13 x 3 HHCS - GR. 2
20	765 *	1	1/2 NC Lock nut
21	636638 *	1	1/2 NC x 3 SHCS GR8 (slip clutch only)
	*		Standard hardware, obtain locally

GEARBOX ASSEMBLY



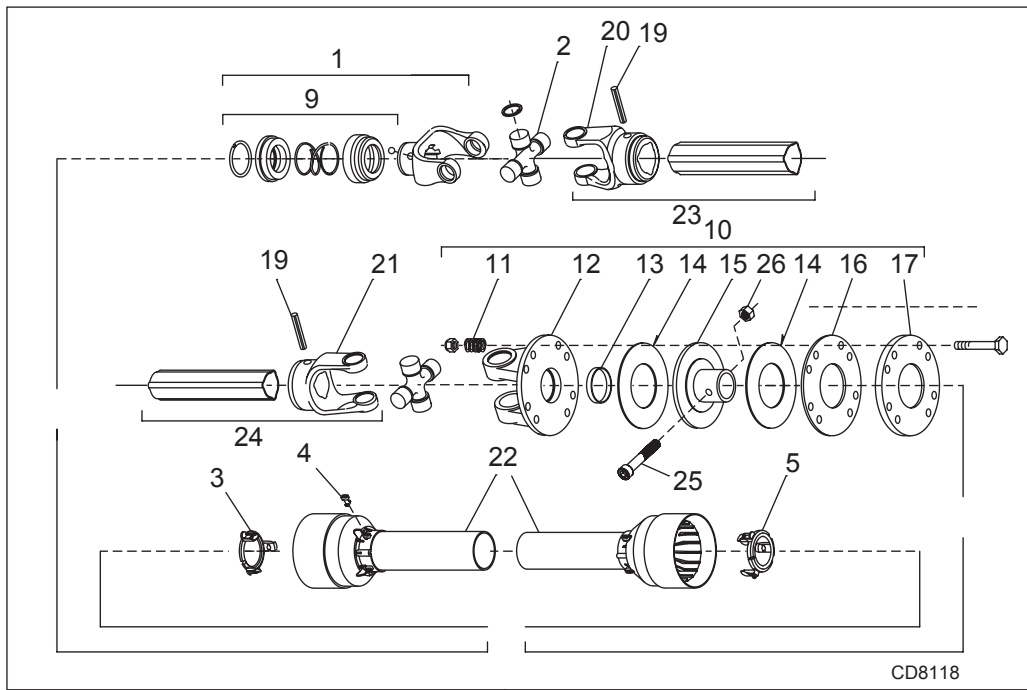
REF	PART	QTY	DESCRIPTION	REF	PART	QTY	DESCRIPTION
A	1038350	1	Gearbox - BF4.20	13	1018328	1	Output seal
	1038352	1	Gearbox - BF5.20	14	1018331	1	1" - 14 Slotted flange nut
	1038351	1	Gearbox - BF6.20	15	----	1	Cotter pin
1	----	1	Housing	16	1038357	1	Output cap
2	1038356	1	Input cap	17	1018329	A/R	Output gasket (0.30 mm)
3	1018326	3	Ball bearing	18	1018330	A/R	Output gasket (0.13 mm)
4	----	1	Input shaft	19	1032963	1	Shim kit (.20 mm)
5	15345	1	Retaining ring, .05 x 1.38	20	----	1	Output gear
6	58815	1	Input seal	21	1018325	1	Ball bearing
7	----	1	Retaining ring	22	----	3	Retaining ring
8	1038358	A/R	Input gasket (0.30 mm)	23	----	1	Input gear
9	1038359	A/R	Input gasket (0.13 mm)	24	1037875	1	Vent plug
10	----	1	Bearing spacer				
11	----	10	M10 Lock washer				A/R As Required
12	----	10	M10 x 1.5 x 25 Cap screw				

SHEAR BOLT DRIVELINE ASSEMBLY



REF	PART	QTY	DESCRIPTION
A	1037884	1	Complete driveline - BF4.20, BF5.20
	1037885	1	Complete driveline - BF6.20
1	----	2	Complete collar yoke C12 1-3/8 - 6
2	1038361	2	Cross & bearing kit
	----	1	M8x1.0 45 deg grease fitting (obtain locally)
3	----	1	Outer cone fix ring
4	----	6	Cone locking pin
5	----	1	Inner cone fix ring
9	1038365	1	Lock collar repair kit
10	----	1	Shear bolt yoke
11	----	1	Roll Pin 8 mm x 60 mm
12	----	1	Inner tube yoke
13	1038370	1	Shield complete - BF4.20, BF5.20 (includes items 3,4,5,13)
	1038371	1	Shield complete - BF6.20 (includes items 3,4,5,13)
14	----	1	Outer yoke & tube
15	----	1	Inner yoke & tube

SLIP CLUTCH DRIVELINE ASSEMBLY

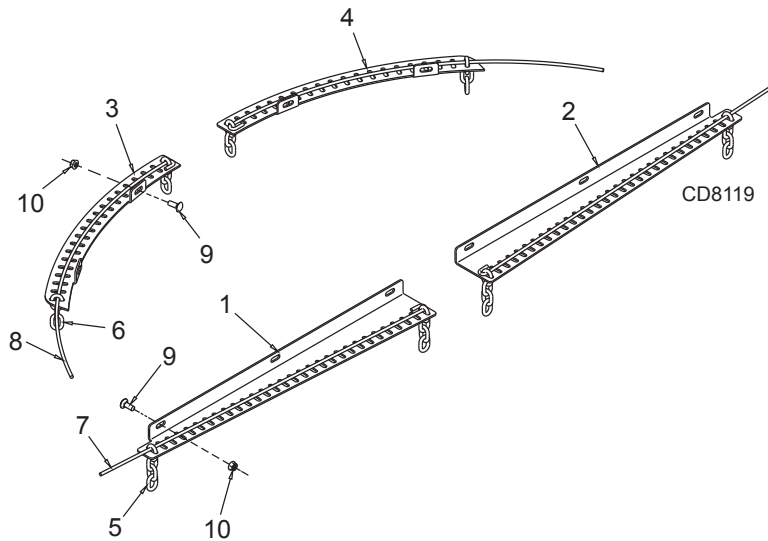


A

REF	PART	QTY	DESCRIPTION
A	632115	1	Complete drive - BF4.20
	1038323	1	Complete drive - BF5.20
	1038324	1	Complete drive - BF6.20
1	----	2	Complete collar yoke C12 1-3/8 - 6
2	1038361	2	Cross & bearing kit
	----	*1	M8x1.0 45 deg grease fitting
3	----	1	Outer cone fix ring
4	----	6	Protection fixing ring
5	----	1	Inner come fix ring
9	1038365	1	Lock collar repair kit
10	----	1	Complete slip clutch
11	----	8	Spring
12	----	1	Flanged yoke
13	1038378	1	Bushing
14	1038379	2	Friction disk
15	----	1	Special hub F10
16	----	1	Pressure plate
17	----	1	End plate
18	----	*8	Bolt M10 x 85
18a	----	*8	M10 nylon lock nut
19	----	2	Roll pin 8 mm x 60 mm
20	----	1	Outer yoke tube
21	----	1	Inner tube yoke
22	632113	1	Shield complete - BF4.20 (includes items 3,4,5,22)
	1038385	1	Shield complete - BF5.20 (includes items 3,4,5,22)
	1038386	1	Shield complete - BF6.20 (includes items 3,4,5,22)
23	----	1	Outer yoke & tube
24	----	1	Inner yoke & tube
25	636638	*1	Screw, 1/2-13 socket head cap GR8
26	----	*1	1/2 NC Hex lock nut

* Standard Hardware, obtain locally

FRONT AND REAR CHAIN SHIELDING (OPTIONAL)



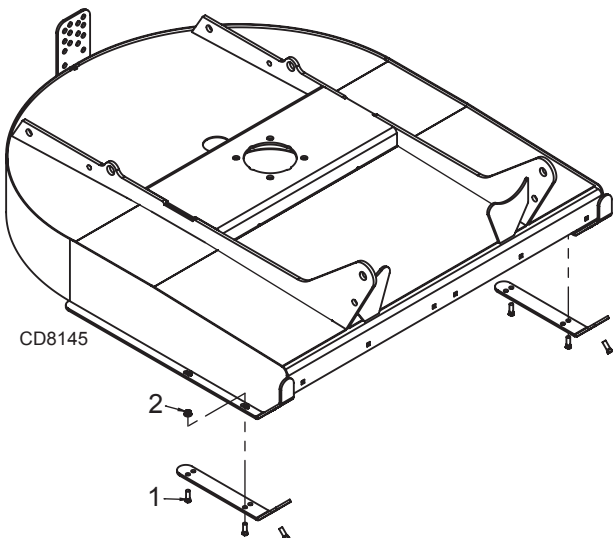
REF	QTY	PART BF4.20	PART BF5.20	PART BF6.20	DESCRIPTION
NS	1	1037926	645167	1037928	Chain shield bundle, complete
1	1	1037934RP	1037938RP	1037942RP	Right front chain plate
2	1	1037935RP	1037939RP	1037943RP	Left front chain plate
3	1	1037936RP	645832RP	1037944RP	Right rear chain plate
4	1	1037937RP	645833RP	1037945RP	Left rear chain plate
5	A/R	4765 (26 chains)	4765 (30 chains)	4765 (36 chains)	1/4 - 4 Link chain
6	A/R	4763 (17 chains)	4763 (20 chains)	4763 (24 chains)	1/4 - 3 Link chain
7	2	1003643	1003644	1003646	.243 Dia. Bent pin
8	2	1003639	1003642	57249	.234 Dia. Bent pin
9		6697 *	6697 *	6697 *	3/8 NC x 1 Carriage bolt GR5
10		14350 *	14350 *	14350 *	3/8 NC Flange lock nut

A/R As Required

* Standard hardware, obtain locally

NS Not shown

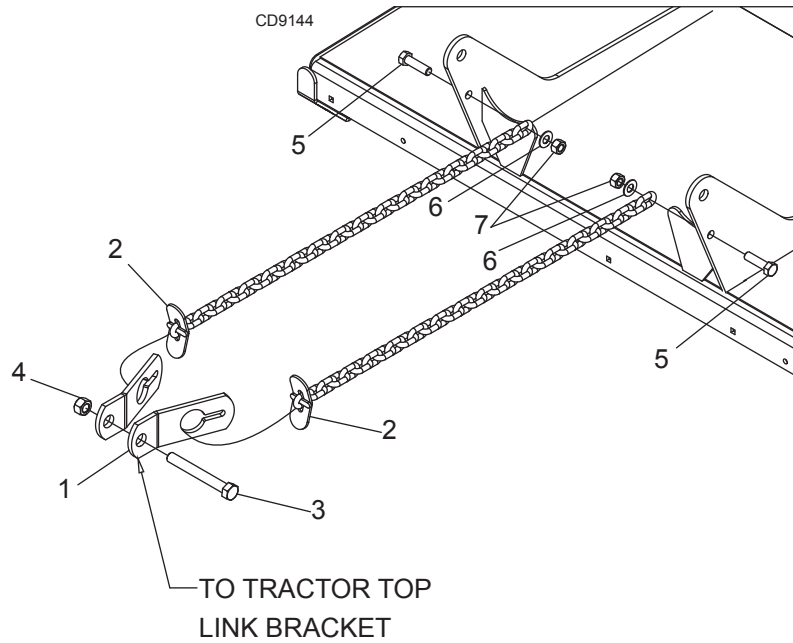
REPLACEABLE SKID SHOES (OPTIONAL)



REF	PART	QTY	DESCRIPTION
A	1038335	1	Kit, bolt-on skid shoes
1	21636	6	Bolt, 3/8 x 1-1/4 clipped head plow
2	14350 *	6	3/8 NC Flange lock nut

* Standard hardware, obtain locally

CHECK CHAIN ASSEMBLY (OPTIONAL)



REF	PART	QTY	DESCRIPTION
A	10521	1	Check chain assembly, complete
1	7906	2	Check chain bracket, lower
2	18048	2	3/8 chain, 32-link and check lug
3	2377 *	1	3/4 NC x 6 HHCS GR5
4	2371 *	1	3/4 NC hex lock nut
5	12274 *	2	5/8 NC x 2-1/4 HHCS GR5
6	3632 *	2	5/8 flat washer
7	6239 *	2	5/8 NC hex lock nut

* Standard hardware, obtain locally

BOLT TORQUE CHART

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

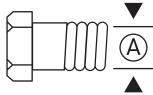
Fasteners must always be replaced with the same grade as specified in the manual parts list.

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

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

SAE SERIES TORQUE CHART

SAE Bolt Head Identification



SAE Grade 2
(No Dashes)



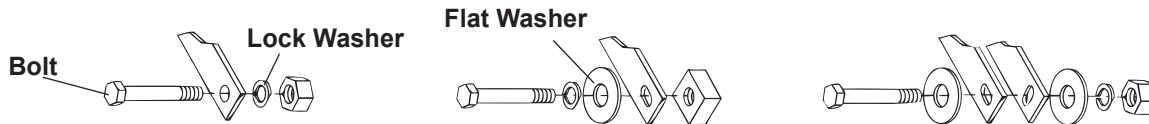
SAE Grade 5
(3 Radial Dashes)



SAE Grade 8
(6 Radial Dashes)

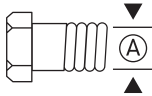
Ⓐ Diameter (Inches)	Wrench Size	Marking on Head					
		SAE 2		SAE 5		SAE 8	
		lbs-ft	N-m	lbs-ft	N-m	lbs-ft	N-m
1/4"	7/16"	6	8	10	13	14	18
5/16"	1/2"	12	17	19	26	27	37
3/8"	9/16"	23	31	35	47	49	67
7/16"	5/8"	36	48	55	75	78	106
1/2"	3/4"	55	75	85	115	120	163
9/16"	13/16"	78	106	121	164	171	232
5/8"	15/16"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

TYPICAL WASHER INSTALLATIONS



METRIC SERIES TORQUE CHART

Metric Bolt Head Identification



Metric
Grade 8.8



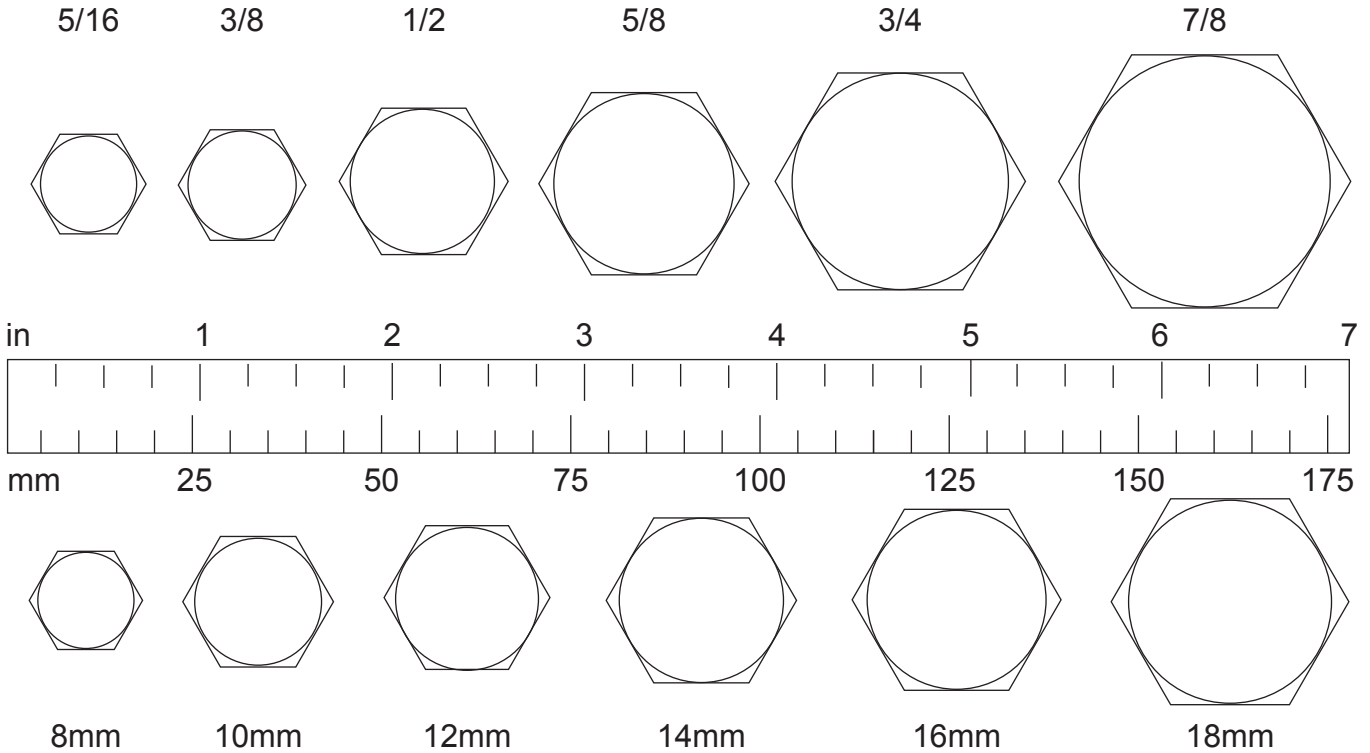
Metric
Grade 10.9

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

BOLT SIZE CHART

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

SAE BOLT THREAD SIZES



METRIC BOLT THREAD SIZES

ABBREVIATIONS

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

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PART NO.
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