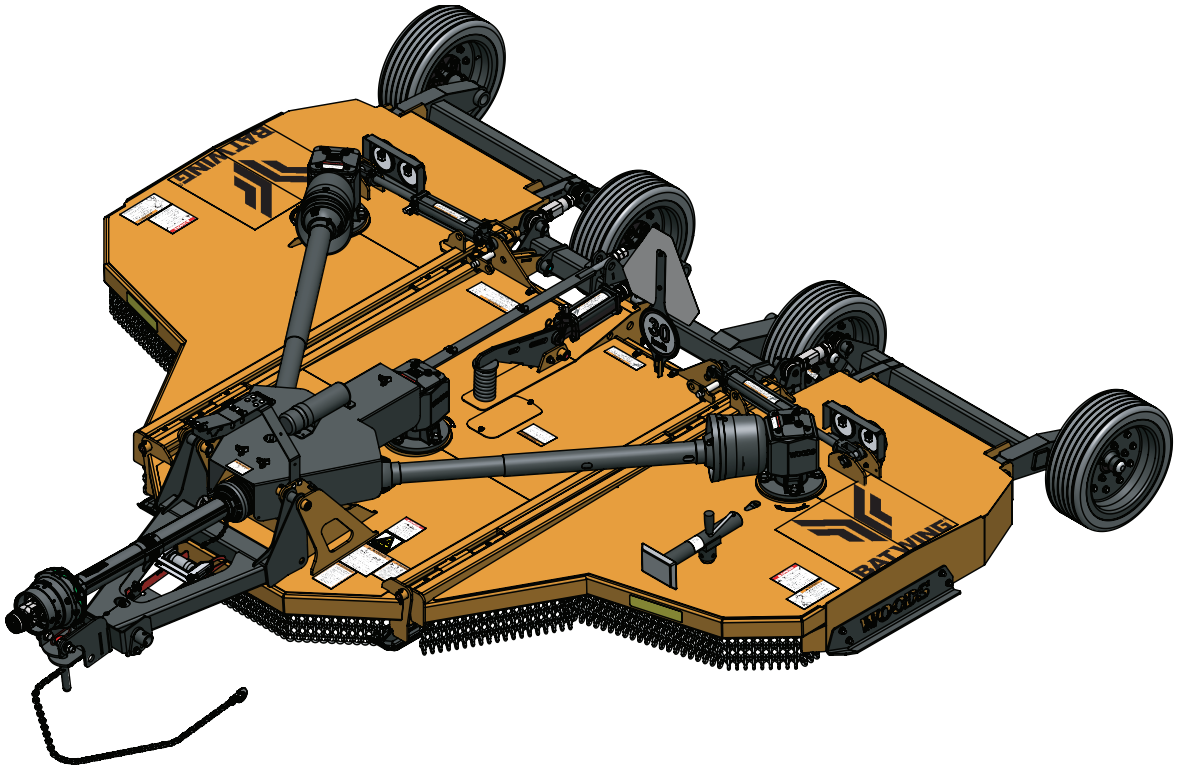
BATWING®
ROTARY CUTTER
BW12.40



OPERATOR'S MANUAL

MAN1395
(Rev 07/22/2025)

WOODS®

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.

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

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

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

IMPORTANT or *NOTICE* Is used to address practices not related to physical injury.

NOTE Indicates helpful information.

TABLE OF CONTENTS

¡LEA EL INSTRUCTIVO!

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

NOTICE:
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.

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

	BW12.40
Cut Capacity	2.5”
Cutting Height (varies with tire selection)	2" - 12"
Cutting Width	144" (12' 0")
Overall Width	152" (12' 8")
Transport Width	88.5" (7' 5")
Overall Length (from drawbar pin with largest tires)	13' 7"
Tractor Maximum PTO HP	120
Tractor Minimum PTO HP	40
Tractor PTO RPM	540
Number of Blade Spindles	3
Blade Overlap (with wings level)	6"
Number of Blades (standard/optional)	6
Blade Rotation (viewed from above)	Left Spindle - CW, Center & Right Spindles - CCW
Blade Tip Speed - 540 RPM (wing/center) - FT/Min	15,522 / 15,459
Wing Driveline Category	Cat 4
CV Input Driveline Category	Cat 4
Deck Thickness	7 ga (.180)
Side Frame Thickness	1/4" (.250")
Weight (varies with tires & options) - LB	2850 - 3250
Tongue Weight (varies with options) - LB	1040
Wheel/Tire Size Options	21" OD Laminated (70 LB) 21" Severe Duty (48 LB w/ air or 90 LB w/ foam) 25" Severe Duty (56 LB w/ air or 108 LB w/ foam)
Number of Wheels (min - max)	4 - 6
Driveline Torque Protection	Slip Clutch
Slip Clutch Type	2 Plate
Ambient Operating Temperature Range	-10° F to 110° F

GENERAL INFORMATION

⚠ WARNING

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

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

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

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

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/EuktqJNAjhc

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.shop.aem.org/en/promo/*
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.

INSTALLATION

- **Hydraulics must be connected as instructed in this manual. Do not substitute parts, modify, or connect in any other way. Refer to Dealer Set-up Instructions on page 36.**

TRAINING

- **This machine is capable of amputating hands and feet and throwing objects. Failure to observe the following safety instructions could result in serious injury or death.**
- **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.**
- **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.**
- **Route hydraulic 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 hose immediately.**
- **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.**
- **After connecting hoses, check that all control lever positions function as instructed in the Operator's Manual. Do not put into service until control lever and equipment movements are correct.**
- **Set tractor hydraulic relief valve at 2500 psi (170 bars) (17,000 kPa) to prevent injury and equipment damage due to hydraulic system failure.**
- **Your dealer can supply original equipment hydraulic accessories and repair parts. Substitute parts may not meet original equipment specifications and may be dangerous.**

(Safety Rules continued on next page)

SAFETY RULES

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

(Safety Rules continued from previous page)

- **Always wear relatively tight and belted clothing to avoid getting caught in moving parts. Wear safety glasses or goggles, sturdy, rough-soled work shoes, gloves, and hearing protection. Respiratory protection may be required, depending on the work.**
- **When attaching a pull-type unit to the tractor drawbar, always use a high-strength drawbar pin that meets the requirements of the latest version of ANSI/ASABE S625. The drawbar pin must have a device that will lock it into position. Secure safety chain to attachment and tractor.**
- **Do not leave a running machine unattended. Always park on level ground, disengage tractor PTO, set parking brake, and stop engine.**
- **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.**
- **If installed, make sure driveline guard tether chains are attached to the tractor and equipment as shown in the pamphlet that accompanies the driveline. 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 drive-lines, repair and replace bearings before putting equipment into service.**
- **Remove buildup of grease, oil, and 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.**
- **Check that the tongue weight of the rotary cutter does not exceed the tractor's drawbar capacity. (Refer to specifications for machine's tongue weight.)**
- **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.**
- **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.**
- **Equip tractor with a fire extinguisher and first aid kit.**
- **Always walk around tractors and machinery instead of stepping over or on the PTO shaft, PTO master shield, Power Input Connection or guards.**

TRANSPORTATION

- **Power unit must be equipped with Roll Over Protection System (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 raise unit and install transport locks before transporting. Leak down or failure of mechanical or hydraulic system can cause equipment to drop.**
- **Always attach safety chain to tractor drawbar when transporting unit.**
- **Always comply with all state and local lighting and marking requirements. Check that all lights are working and turn on flashing warning lights before traveling on a public roadway.**
- **Check SMV sign and reflector condition before proceeding onto public roads.**
- **Never allow riders on power unit or attachment.**
- **Do not operate PTO during transport.**
- **Do not operate or transport on steep slopes. Refer to tractor manual for proper ballasting and slope recommendations.**

(Safety Rules continued on next page)

SAFETY RULES

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

(Safety Rules continued from previous page)

- **When transporting, do not exceed 20 mph (30 kph) and use a towing vehicle whose weight is at least 2/3 the weight of the rotary cutter. (Refer to specifications for machine weights.)**
- **Do not operate or transport equipment while under the influence of alcohol or drugs.**
- **The maximum transport speed for this machine is 20 mph (30 km/h). Regardless of the maximum speed capability of the towing tractor, do not exceed the implement's maximum transport speed. Doing so could result in:**
  - **Loss of control of the implement and tractor**
  - **Reduced or no ability to stop during braking**
  - **Implement tire failure**
  - **Damage to the implement or its components.**
- **Use additional caution and reduce speed when under adverse surface conditions, turning, or on inclines.**
- **Never tow this implement with a motor vehicle.**

OPERATION

- **To avoid injury from thrown objects, do not allow bystanders or animals within 300 feet (92 m) of the area when operating the equipment.**
- **Do not allow bystanders or animals within 25 feet (7.6 m) when attaching, removing, assembling, or servicing equipment.**
- **Never walk, stand, or place yourself or others under a raised wing or in the path of a lowering wing. Hydraulic system leak-down, hydraulic system failures, mechanical failures, or movement of control levers can cause wings to drop unexpectedly and cause severe injury or death.**
- **Full chain shielding must be installed at all times. Thrown objects could injure people or animals 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).**
- **Never direct discharge toward people, animals, or property.**
- **Disengage the tractor's PTO to stop blade rotation before crossing gravel surfaces.**
- **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. Check that all lights are working and turn on flashing warning lights before traveling on a public roadway.**
- **Never allow riders on power unit or attachment.**
- **Tragic accidents can occur if the operator is not alert to the presence of children. Children are often attracted to the machine and the mowing activity. Never assume that children will remain where you last saw them.**
- **Keep children out of the operating area and under the watchful care of a responsible adult other than the operator.**
- **Do not carry children, even with the blade(s) shut off. Children could fall off and be seriously injured or interfere with safe machine operation. Children who have been given rides in the past could suddenly appear in the mowing area for another ride and be run over or backed over by the machine.**
- **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.**
- **Except in emergencies, reduce tractor engine speed to low idle before disengaging tractor PTO to prevent blades from sticking together.**

(Safety Rules continued on next page)

SAFETY RULES

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

(Safety Rules continued from previous page)

- **Raise or lower wings slowly to prevent personal injury or damage to cutter.**
- **Look down and to the rear and make sure area is clear before operating in reverse.**
- **Do not operate or transport on steep slopes. Refer to tractor manual for proper ballasting and slope recommendations.**
- **Do not stop, start, or change directions suddenly on slopes.**
- **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.**
- **Always walk around tractors and machinery instead of stepping over or on the PTO driveline shafts or tongue.**
- **Do not operate at ambient temperatures above 110°F. Gearboxes may become too hot to safely touch.**
- **Continuous operation while the clutch is slipping could cause heat build-up resulting in fire. Adjust slip clutch pressure by tightening springs to the dimension shown in the "Owner Service" section. If clutch is set to minimum spring length, replace the friction disks as shown.**

MAINTENANCE

- **Before dismounting tractor or performing any service or maintenance, follow these steps:**
  - **Disengage power to equipment and wait for all moving parts to stop.**
  - **Lower all raised components to the ground and operate valve levers to release any hydraulic pressure.**
  - **Place all controls in neutral and set parking brake.**
  - **Stop tractor engine, remove ignition key and unfasten seat belt.**
- **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.**
- **To avoid injury from thrown objects, do not allow bystanders or animals within 300 feet (92 m) of the area when operating the equipment.**
- **Do not allow bystanders or animals within 25 feet (7.6 m) when attaching, removing, assembling, or servicing equipment.**
- **Wear long sleeves, long pants, boots, and gloves when cleaning machine to avoid contact with poisonous plants.**
- **Inspect suspension components and relieve spring pressure before disassembling any springs.**
- **Use care when installing or removing suspension springs. Springs store energy when compressed and, if released suddenly, can cause personal injury.**
- **Always make sure any material and waste products from the repair and maintenance of the implement are properly collected and disposed.**
- **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 an authorized dealer.**
- **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 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.**
- **Never perform cleaning, service or maintenance with engine running.**
- **Do not disconnect hydraulic lines until engine is stopped, power unit is properly secured, equipment and all components are lowered to the ground, and system pressure is released by operating all valve control levers.**
- **When lubricating telescoping PTO drives, keep fingers out of shield access slots to prevent injury.**
- **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.**
- **Explosive separation of tire and rim parts can cause serious injury or death. Release all air pressure before loosening bolts on wheel.**

STORAGE

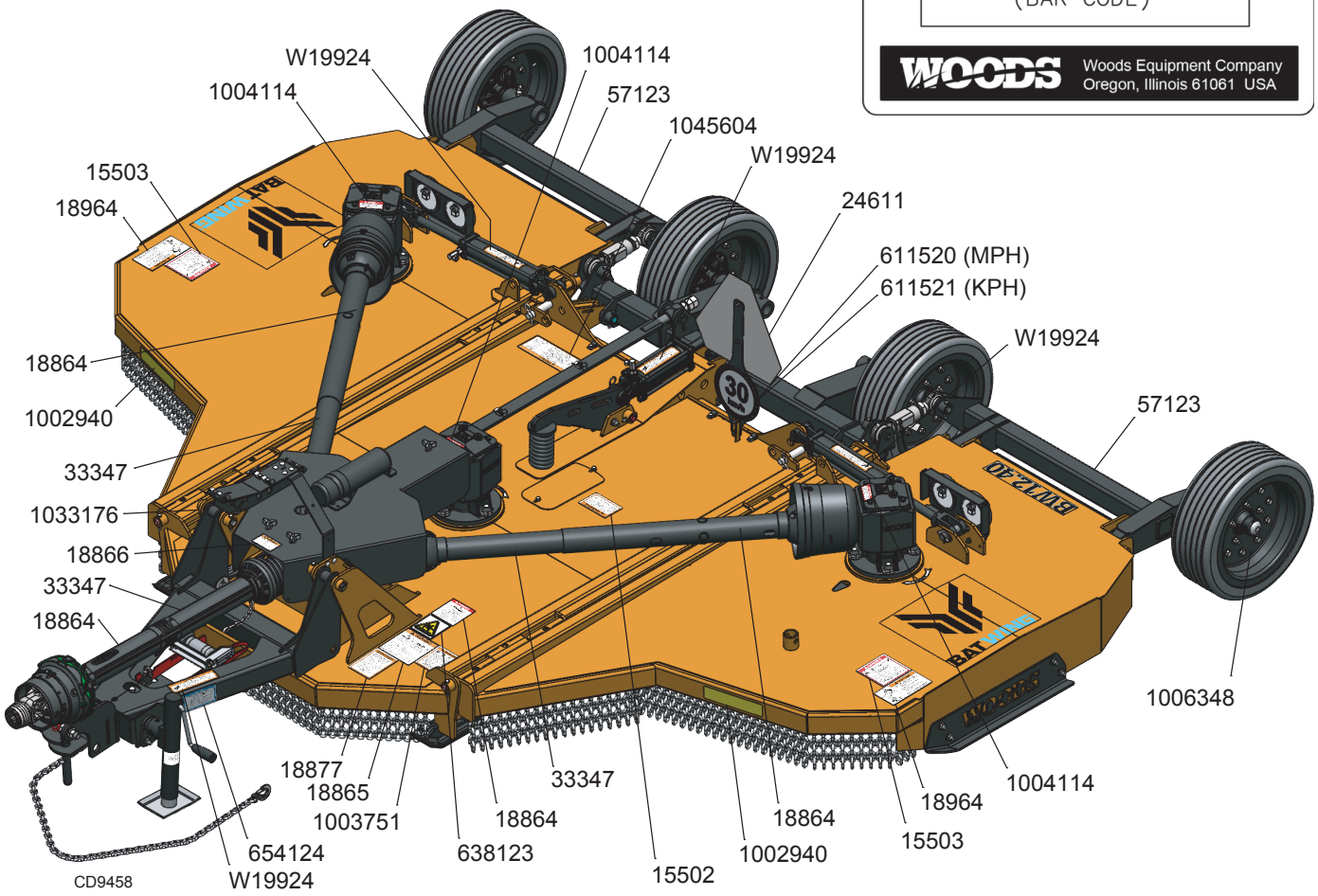
- **Before disconnecting and storing, follow these instructions:**
  - **Store on level, solid ground.**
  - **Disengage power to equipment and wait for all moving parts to stop.**
  - **Lower wings to ground.**
  - **Raise cutter center section and pin transport bar in raised position.**
  - **Disconnect input driveline from tractor and use the *SmartLift*™ CV lift assist to store off the ground.**
  - **Attach parking jack and raise tongue weight off tractor drawbar.**
  - **Place wedge blocks at front and rear of wheels on center section and each wing to prevent wheel rotation.**
  - **Securely block all four corners of center section and each wing with jackstands.**
  - **Remove hydraulic hoses after tractor is turned off and all system pressure is released by operating valve levers several times.**
  - **Remove safety tow chain.**
  - **Remove retainer pin and high strength drawbar pin.**
- **Keep children, bystanders, and animals away from the equipment and the storage area.**

SAFETY & INSTRUCTIONAL DECALS

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

Replace Immediately If Damaged!

Serial Number Tag - 1033176



4 - PN 1006348 - Located on Wheel Rims

PN 1002940 FRONT AMBER REFLECTOR

PN 57123 REAR RED REFLECTOR

BE CAREFUL!

Use a clean, damp cloth to clean safety decals.

Avoid spraying too close to decals or serial tag 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 Woods 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.

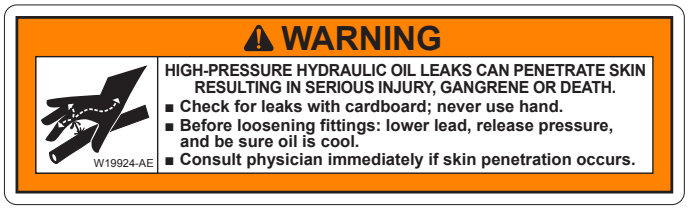
SAFETY & INSTRUCTIONAL DECALS

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

Replace Immediately If Damaged!

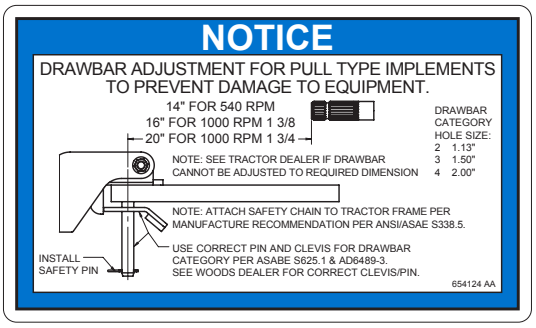
PN 18866 (540 RPM)

PN W19924



PN 1004114

PN 654124



PN 638123 - Slippery Surface

PN 15503

PN 18864

PN 18865

SAFETY & INSTRUCTIONAL DECALS

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

Replace Immediately If Damaged!

PN 1045604

PN 33347

PN 1003751

PN 18877

PN 15502

PN 18964

PN 611520

PN 611521

OPERATION

The designed and tested safety of this machine depends on it being operated within the limitations as explained in this manual. Be familiar with and follow all safety rules in the manual, on the cutter and on the tractor.

This Batwing® rotary cutter is intended to mow or shred grass, weeds, brush, and crop residue when attached to a tractor. Refer to SPECIFICATIONS for recommended tractor PTO hp by model.

The safe operation of this cutter is the responsibility of the operator, who must be properly trained. The operator should be familiar with the equipment and all safety practices before starting operation. Read the safety information on page 7 through page 14.

Recommended tractor ground speed for most conditions is from 1 to 6 mph.

Always operate tractor at 540 RPM PTO speed when using your machine.

⚠ DANGER

- **Full chain shielding must be installed at all times. Thrown objects could injure people or animals 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 children or untrained persons to operate equipment.**
- **To avoid injury from thrown objects, do not allow bystanders or animals within 300 feet (92 m) of the area when operating the equipment.**
- **Do not allow bystanders or animals within 25 feet (7.6 m) when attaching, removing, assembling, or servicing equipment.**
- **Make sure spring-activated locking pin or collar slides freely and is seated firmly in tractor PTO spline groove.**
- **Make sure that tractor PTO Master Shield is in place and has a 2" overlap with driveline shield.**

⚠ 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 safety glasses or goggles, sturdy, rough-soled work shoes, gloves, and hearing protection. Respiratory protection may be required, depending on the work.**

CONNECTING CUTTER TO TRACTOR

NOTICE

- **For tractors with a 1-3/8" diameter PTO shaft, the horizontal distance from the end of the tractor PTO shaft to the center of drawbar pin should be 14" for 540 RPM cutter. This will minimize joint knock and damage to drive components.**

Use of the *SmartLift*™ CV Lift Assist System

The Batwing® cutter has a system to help lift and support the driveline while connecting and disconnecting it from the tractor. Follow the instructions below.

1. Remove klik pin.
2. Lift lever to vertical position which will lift driveline.
3. Connect coupler to tractor PTO shaft.
4. Lower lever and secure with klik pin.

If the driveline is held too high or low, the roller carriage can be adjusted by removing the mounting bolts, moving it to the preferred position, and replacing the bolts.

NOTICE

Do not operate with the *SmartLift*™ CV lift in the raised position to prevent damage to drive-line and lift assist.

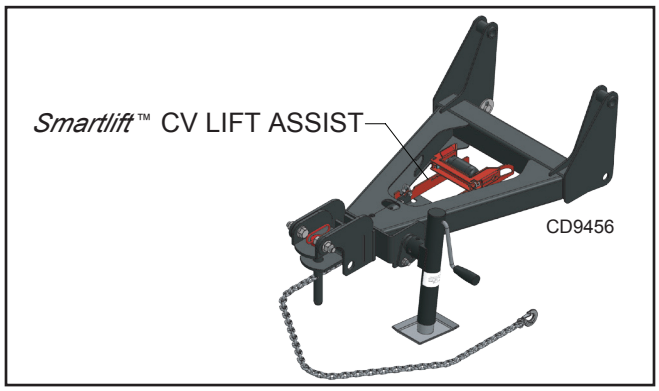


Figure 1. Cutter to Tractor Connection

Mechanical Connection

(Figure 1)

1. Check the size of the tractor drawbar hole and use the 1-1/8" diameter Category 2 clevis pin and retainer clip to secure.

   NOTE: For tractor drawbars with a larger hole size, contact your dealer for a Category 3 or Category 4 clevis and matching clevis pin.

2. Attach safety tow chain to drawbar support. Leave enough slack for turning.
3. Connect cutter driveline to tractor PTO shaft, making sure the spring-activated lock pin slides freely and is seated in tractor PTO splined groove.
4. Attach driveline shield tether chain to tractor drawbar to prevent rotation, if provided.
5. With cutter supported by the tractor drawbar, remove the lower bolt in the jack mount and pivot the jack so the foot plate is flat on the ground. Reinsert bolt and tighten.

   NOTE: It may be necessary to slightly loosen the pivot bolt at the center of the jack mount to allow it to pivot. Tighten bolt after adjustment.

6. Remove parking jack from the tongue and attach it to the storage post on the front of the left wing.

Hydraulic Connection

1. Inspect hydraulic cylinders, fittings and hoses to ensure they are in good condition. Repair or replace all damaged parts.
2. Clean the fittings before connecting them to the tractor hydraulic ports.
3. Adjust the hose and wire positions to suit the tractor by loosening clamps and allowing the excess to loop over the gearbox shield. Tighten clamps and make sure the hoses and wire do not contact the PTO shaft and do not become snagged when turning.
4. Attach the hydraulic hose to the tractor. Refer to tractor operator's manual for details.
5. From the operator position, start tractor and raise and lower deck several times to purge trapped air from the hydraulic cylinder.

   NOTE: The Batwing(R) hydraulic system is only compatible with petroleum-based fluids.

Interference Check

1. Be sure that tractor 3-point lift links do not interfere with hydraulic hoses, cutter driveline, or cutter frame.
2. Check for straight-ahead operation and at full turning angles. If there is any interference, remove the lower lift links.
3. Contact between tractor lift links and cutter parts can cause damage, especially when turning.

CV Driveline Turning Limits

NOTICE

- **You must not exceed a turning angle of 80 degrees at the head of the Constant Velocity driveline or damage will occur.**

1. To check for potential excessive turn angle, disconnect the driveline from tractor.
2. Start engine and turn as far right or left as possible while driving forward.
3. Shut engine off and try to connect CV driveline to tractor. If it cannot be connected, the turn angle is too severe.
4. Restart engine and straighten angle slightly, shut off engine and try to connect CV driveline to tractor.
5. Repeat the process until the driveline can be connected. The point at which the driveline can be connected is the maximum turn that should be made.

Cutting Height Adjustment

NOTICE

- **Avoid ground contact with blades. Striking ground with blades produces one of the most damaging shock loads a cutter can encounter. If this occurs repeatedly, the cutter, driveline, and gearboxes will be damaged.**

Cutting height range is from 2" to 12". A hydraulic cylinder is used for cutting height adjustment.

Stroke control spacers are included to return to the same desired cutting height.

When selecting a cutting height, you should consider the area of operation. If the ground is rolling and has mounds the blades could contact, set the cutting height accordingly. The cutting height (blade edge) is approximately 1-3/4" above the bottom of the side skid.

Cutting Height (Normal Mowing) - Center Section

1. Position the cutter on a hard level surface and select an approximate cutting height, (example 6").
2. Raise wings and lock them in the UP position.
3. Raise or lower the center section to obtain a distance of 14-3/4" from the ground to the center of the rear wing hinge pin.
4. Measure the distance from the ground to the center of the front wing hinge pin. It should be about 14 -1/4" for normal mowing.
5. If necessary, loosen jam nuts on attitude rod which runs from the tongue to the rear wheel arm and adjust until the front of the hinge pin is about 1/2" lower than the rear.
6. Tighten both jam nuts.

NOTICE

- **You may operate the cutter with the deck 1/2" to 1" higher in the front than in the rear to increase shredding or mulching action, but it will require more power and fuel.**

Cutting Height (Normal Mowing) - Wings

1. Lower wings to normal mowing position.
2. Measure from the ground up to the center of the wing wheel arm pivot pin near the wing hinge and to the center of the wing wheel arm pivot pin near the outside of the wing.
3. To level, loosen the jam nut on the adjustable link assembly. Use a 1-3/8" wrench to turn the large square nut. Lengthening the linkage will raise the outer end of the wing and shortening it will lower the wing.
4. When the wing wheel arm pins are the same distance from the ground, the wing will be level. Hold the large square nut and torque the jam nut to 150 lbs-ft.
5. Repeat procedure for the opposite wing.

TRACTOR OPERATION

Use care when operating around tree limbs and other low objects. Avoid being knocked off tractor and being injured.

⚠ WARNING

- **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. The cutter is operated with tractor controls. Engage the PTO at a low RPM to prevent excessive loads on the cutter drive system. Increase throttle to recommended PTO operating RPM.**

Be sure operator is familiar with all controls and can stop tractor and cutter quickly in an emergency. The operator should give complete, undivided attention to operating tractor and cutter.

CUTTER OPERATION

⚠ WARNING

- **To avoid injury from thrown objects, do not allow bystanders or animals within 300 feet (92 m) of the area when operating the equipment.**

Power for operating the cutter is supplied by the tractor PTO. Operate tractor PTO at 540 RPM. Do not exceed.

Know how to stop the tractor and cutter quickly in an emergency.

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.

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 1 to 6 mph. Tall, dense material should be cut at a low speed; thin, medium-height material can be cut at a faster ground speed.

Always operate tractor PTO at proper RPM (540) to maintain blade speed and to produce a clean cut.

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.

Do not operate at ambient temperatures above 110°F. Gearboxes may become too hot to safely touch and shaft seals may be damaged.

Mowing Tips

⚠ WARNING

- **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 additional caution and reduce speed when under adverse surface conditions, turning, or on inclines.**
- **Watch for hidden hazards on the terrain during operation.**

⚠ CAUTION

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

Maximum recommended ground speed for cutting or shredding is 6 miles per hour. Adjust tractor ground speed by using higher or lower gears to provide a clean cut without lugging tractor engine.

Tall material should be cut twice. Cut material higher the first pass. Cut at desired height at 90 degrees the second pass.

Remember, sharp blades produce cleaner cuts and use less power. Refer to Blade Sharpening, page 24.

Before entering an area, analyze it to determine the best procedure. Consider the height and type of material to be cut and the terrain type (hilly, level or rough, etc.).

Shredding

The cutter may be used to shred various crops including green manure, straw, stubble, asparagus residue, corn stalks and similar crops in preparation for tilling. It may also be used to shred pruning in orchards, groves and vineyards.

Each shredding operation may require a different set-up. Start with front edge of cutter high. Adjust up or down as necessary with attitude rod. Experiment until you obtain the results you want.

When adjusting attitude for shredding, also check that the wings are level and adjust as needed.

TRANSPORTING

⚠ WARNING

- **Power unit must be equipped with Roll Over Protection System (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 raise unit and install transport locks before transporting. Leak down or failure of mechanical or hydraulic system can cause equipment to drop.**
- **Check that all lights are working and turn on flashing warning lights before traveling on a public roadway.**
- **Always attach safety chain to tractor drawbar when transporting unit.**
- **Check SMV sign and reflector condition before proceeding onto public roads.**
- **When transporting, do not exceed 20 mph (30 kph) and use a towing vehicle whose weight is at least 2/3 the weight of the rotary cutter. (Refer to specifications for machine weights.)**
- **Never allow riders on power unit or attachment.**
- **Do not operate PTO during transport.**
- **Do not operate or transport on steep slopes. Refer to tractor manual for proper ballasting and slope recommendations.**
- **Do not operate or transport equipment while under the influence of alcohol or drugs.**

⚠ CAUTION

- **Always comply with all federal, state and local lighting and marking requirements. Check that all lights are working and turn on flashing warning lights before traveling on a public roadway.**

Lock-Up

Always transport with wings and center frame in the raised, locked position.

Wing Lock-Up

1. Raise wing to the up position.
2. Remove klik pin and lock pin from storage position.
3. Place lock pin in lock position and secure with klik pin.
4. Repeat steps 1 to 3 for opposite wing.
5. Lower cylinder against lock-up pins (Figure 2).

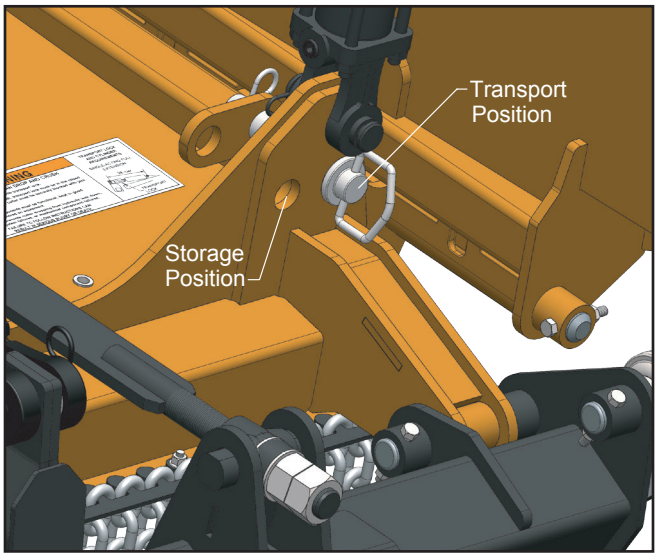


Figure 2. Transport Lock Pin

Center Section Lock-Up

1. Raise cutter with hydraulic cylinder to maximum height.
2. Remove klik pin and lock pin from storage position (Figure 3).

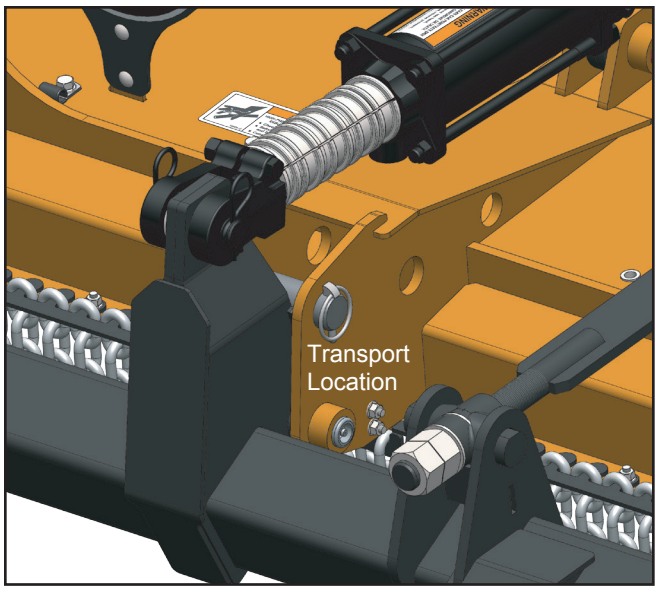


Figure 3. Transport Lock Pin in Standard & Narrow Width Positions

3. Place lock pin and klik pin in lock position and lower cutter against lock pin.
4. To lower cutter for operation, extend hydraulic cylinder to raise cutter. Move lock pin from lock position to storage position (Figure 4).
5. Lower cutter to desired cutting height
6. Clip stroke control bushings on the lift cylinder rod to maintain cutting height during use.

   NOTE: Use the various sizes of bushings to achieve the desired stack height. Extra bushings can be clipped on the rocker above the spring.

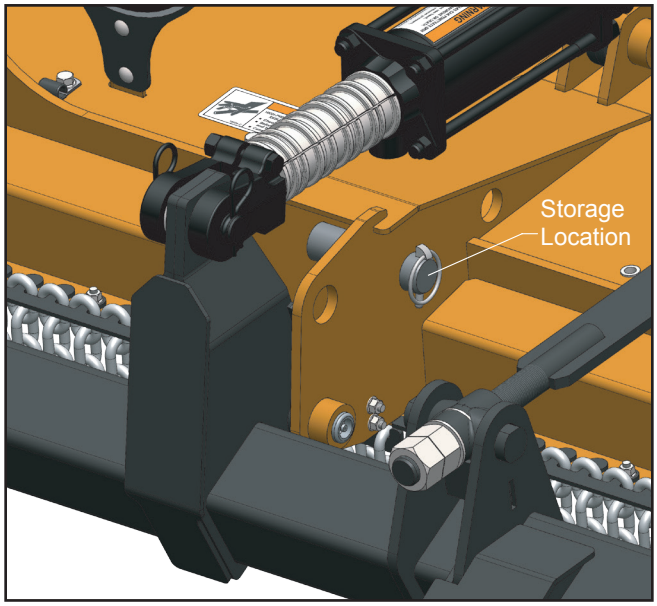


Figure 4. Transport Lock Pin In Operation Position

STORAGE

Follow these steps when storing your cutter:

1. Clean cutter before storing. See page 26 for cleaning instructions. Store on level, solid ground.
2. Disconnect input driveline from tractor and use the *SmartLift*™ CV lift assist to store off the ground.
3. Lower wings to ground.
4. Raise cutter center section and pin transport bar in raised position.
5. Attach parking jack and raise tongue weight off tractor drawbar.
6. Place wedge blocks at front and rear of wheels on center section and each wing to prevent wheel rotation.
7. Securely block all four corners of center section and each wing with jack stands.
8. Remove hydraulic hoses after tractor is turned off and all system pressure is released by operating valve levers several times.
9. Remove safety tow chain.
10. Remove retainer pin and high strength drawbar pin.
11. Keep children, bystanders, and animals away from the equipment and the storage area.

PRE-OPERATION CHECKLIST

(OWNER'S RESPONSIBILITY)

_____ Review and follow all safety rules and safety decal instructions on page 7 through page 14.

_____ Check that all safety decals are installed and in good condition. 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.

_____ Check all lubrication points and grease as instructed in 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.

_____ Lubricate all grease fitting locations. Make sure PTO shaft slip joint is lubricated.

_____ 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.

_____ Check that all hardware is properly installed and secured.

_____ Check cutting height and attitude adjustment.

_____ Raise and lower equipment to make sure air is purged from hydraulic cylinders and hoses.

_____ Check that blades are sharp and secure and cutting edge is positioned to lead in a counter clockwise rotation for center and right wings, and clockwise for left wing.

_____ Inspect crossbar hub nuts are tight, with cotter pin inserted and spread. Make sure crossbar is not bent or cracked and replace if damaged.

_____ Make sure tractor ROPS or ROPS cab and seat belt are in good condition. Keep seat belt securely fastened during operation.

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

_____ 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.

_____ Inspect area to be cut and remove stones, branches, or other hard objects that might be thrown and cause injury or damage.

_____ Inspect rubber or chain shielding and replace any damaged rubber shield or missing links.

_____ Make sure tractor 3-point lift links do not interfere with hydraulic hoses or driveline throughout full turning range.

_____ Inspect tractor drawbar, clevis weldment, clevis pin, hitch weldment and hitch angle stop for signs of cracks or wear at the connecting point and the pivots. Make sure that all bolts are tight. Replace any damaged parts.

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.**
- **Before performing any service or maintenance, follow these steps:**
  - **Disengage power to equipment and wait for all moving parts to stop.**
  - **Lower all raised components to the ground and operate valve levers to release any hydraulic pressure.**
  - **Place all controls in neutral and set parking brake.**
  - **Stop tractor engine, remove ignition key and unfasten seat belt.**
- **Before working underneath, disconnect driveline from tractor, lower wings to ground, raise cutter, and pin transport bar in raised position. Attach parking jack and lower to ground. Securely block all four corners of center section and each wing with jack stands. Blocking up prevents the cutter from dropping due to hydraulic leak down, hydraulic system failure, or mechanical component failure.**
- **Service and maintenance work not covered in OWNER SERVICE must be done by a qualified dealership. Special skills, tools, and safety procedures may be required. Failure to follow these instructions can result in serious injury or death.**
- **Before cleaning, 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.**
- **Never perform cleaning, service or maintenance with engine running.**

⚠ 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 safety glasses or goggles, sturdy, rough-soled work shoes, gloves, and hearing protection. Respiratory protection may be required, depending on the work.**
- **Wear long sleeves, long pants, boots, and gloves when cleaning machine to avoid contact with poisonous plants.**

BLOCKING METHOD

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

⚠ WARNING

- **Before performing any service or maintenance, lower equipment to ground or block securely, turn off engine, remove key, and 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.**

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

1. Jackstands with a load rating of 1000 lbs. or more are the only approved blocking device for this cutter. Install jackstands (shown by **X**s in Figure 5) under the cutter before working underneath unit.
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.

NOTICE

- **If the cutter moves during storage and pressurizes the hoses, that pressure can be relieved by jacking at the locations shown by X's in Figure 5.**

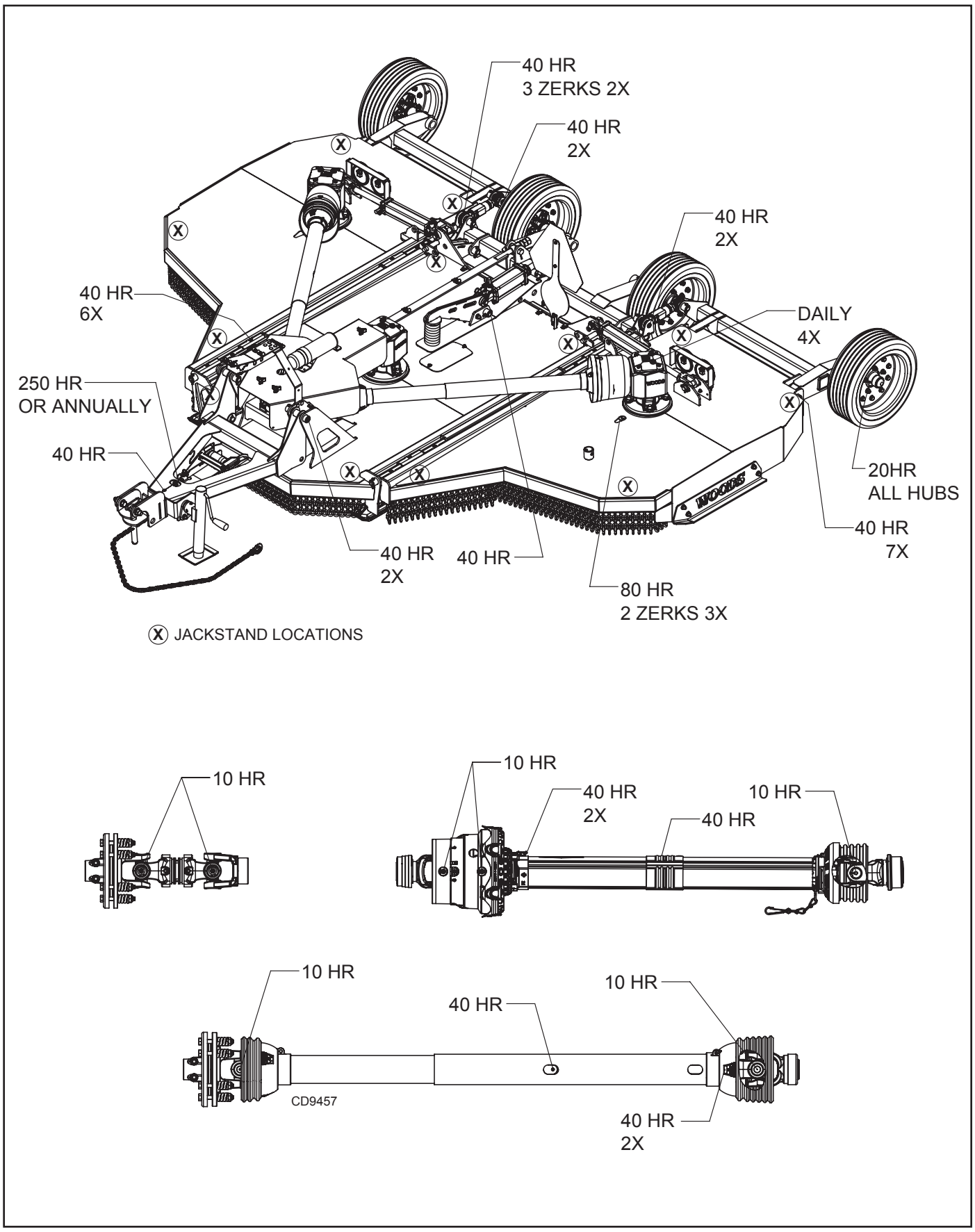


Figure 5. Jackstand Placement and Lubrication Points

LUBRICATION

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

See Figure 5 for lubrication points and frequency or lubrication based on normal operating conditions. Severe or unusual conditions may require more frequent lubrication.

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

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. Fill gearbox until oil is above lower line on dipstick. Check gearbox oil level daily for evidence of leakage, and contact your dealer if leakage occurs. Check vent plug periodically and clean if it does not relieve pressure.

Driveline Lubrication

1. Lubricate the driveline slip joint every eight operating hours. Failure to maintain proper lubrication could result in damage to U-joints, gearbox, and driveline.
2. With the cutter lowered to the ground, use the *SmartLift*™ CV lift assist to support the input driveline and disconnect from the tractor PTO shaft.
3. Locate the grease access slot on the driveline shield and slide to cover to open.
4. Extend the driveline and rotate the shield to access the grease fitting, clean the fitting and apply 2 to 3 pumps of grease.
5. Grease the wing drivelines in the same way, but it is not necessary to disconnect when the wings are lowered to the ground.

Seasonal Lubrication

In addition to the daily recommended lubrication, a more extensive application is recommended seasonally.

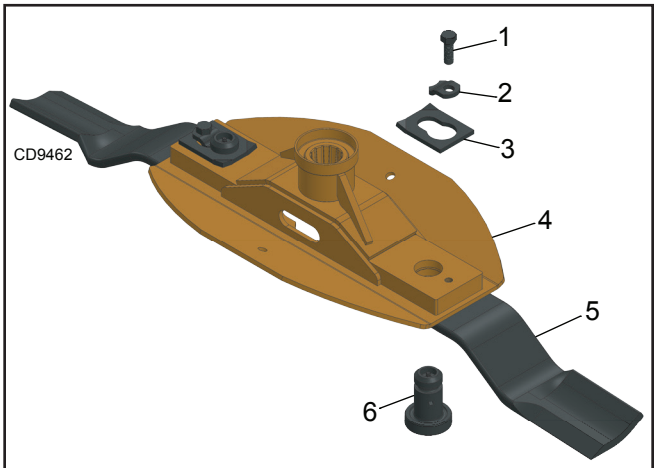
1. Fill CV double yokes with 20 pumps of grease with the joints in a straight line.
2. Articulate CV body to maximum angle several times to ensure full coverage of joints.
3. Place joints in the straight position and a add 10 additional pumps of grease to both joints.
4. Wipe telescoping drive clean of all old grease and contaminants.
5. Add a thin layer of new grease over telescoping drive.
6. Clean and oil the exposed threads on each of the attitude rods.

BLADES

⚠ WARNING

- **Before working underneath, read manual instructions, securely block up, and check stability. Secure blocking prevents equipment from dropping due to hydraulic leak down, hydraulic system failure, or mechanical component failure.**
- **Do not handle blades with bare hands. Wear gloves. Careless or improper handling may result in injury.**

Blade Removal (Figure 6)



ITEM #	QTY	DESCRIPTION
1	2	BOLT, HEX 1/2 NC X 1.50 GR5
2	2	BLADE PIN LOCK CLIP SPEC
3	2	KEYHOLE PLATE SPECIAL
4	1	CROSSBAR
5	2	BLADE, .50 X 4.0 X 14.0 CW, 3.0
6	2	PIN, BLADE, DRL 2.04

Figure 6. Blade Assembly

1. Using *SmartLift*™ CV lift assist, disconnect input driveline from tractor PTO.
2. Raise cutter and place 4 jack stands under center frame at locations marked “X” in Figure 5, and block securely.
3. Raise wings and engage transport lock pins.
4. Align hole in crossbar (4) with blade access hole in the cutter frame. Remove the bolt (1), blade pin lock clip (2) and keyhole plate (3). Carefully drive blade pin (6) out of crossbar and remove blade (5).
5. Rotate crossbar and repeat for opposite blade.

NOTICE

- **If blade pin (6) is seized in crossbar and extreme force will be needed to remove it, support crossbar from below to prevent gearbox damage.**

Blade Installation (Figure 6)

⚠ CAUTION

- **Your dealer can supply genuine replacement blades. Substitute blades may not meet original equipment specifications and may be dangerous.**
- **Crossbar rotation has clockwise rotation on left gearbox and counterclockwise rotation on the right and center gearboxes when looking down on cutter. Be sure to install blade cutting edge to lead in correct rotation.**
- **Make sure that blade offset is oriented downward and that each blade freely swings all the way around when installed.**

NOTE: Always replace or sharpen both blades at the same time.

1. Inspect blade pin (6) for nicks or gouges, and if you find any replace the blade pin.
2. Insert blade pin (6) through the blade (5). Blade should swivel on blade pin; if it doesn't, determine the cause and correct.
3. Align crossbar (4) with blade access hole in cutter frame. Make sure blade offset is down away from cutter.
4. Insert blade pin (6) through blade (5). Apply anti-sieze compound to the blade pin and push through crossbar (4).
5. Assemble keyhole plate (3) into groove in blade pin (6).
6. Align keyhole plate (3) to tapped hole in crossbar (4) and assemble blade pin lock clip (2) into groove in blade pin (6).
7. Secure blade pin lock clip (2) with bolt (1). Torque bolt to 85 lbs-ft.

   NOTE: Blade should be snug but should swivel on pin without having to exert excessive force. Blade should not move more than a 1/4 inch up or down at the tip. Shims are available to compensate for wear as needed. Use #10520RP - Blade Shim, .048" and #13946RP - Blade Shim, .036" as needed.
8. Grease pin via zerk at end of pin.
9. Repeat steps for opposite side.

Blade Sharpening

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.**
- **Do not handle blades with bare hands. Wear gloves. Careless or improper handling may result in injury.**

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.

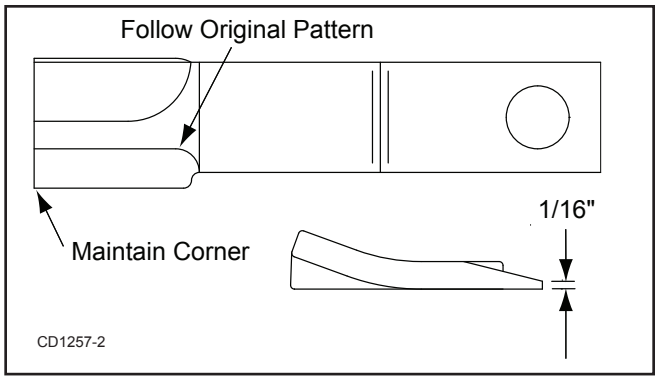


Figure 7. Blade Sharpening

SLIP CLUTCH ADJUSTMENT

(FIGURE 8)

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. Remove driveline from tractor PTO.

3. Access the spindle drivelines by removing the center gearbox shield.
4. Loosen six 10 mm cap screws (9) to remove tension from Pressure plate (6).
5. Hold flange hub (1) solid and turn shaft to make sure clutch slips.
6. If clutch does not slip freely, disassemble and clean the flanged hub faces (4), internal disc (5), and flanged hub (1).
7. Reassemble clutch.
8. Reassemble clutch and tighten bolts (9) no more than 1/8 of a turn at a time until desired setting of 1.2" is reached as shown in Figure 8.
9. If a clutch continues to slip check friction discs (3) for excessive wear. Discs are 1/8" when new. Replace discs after 1/16" wear. Minimum disc thickness is 1/16".

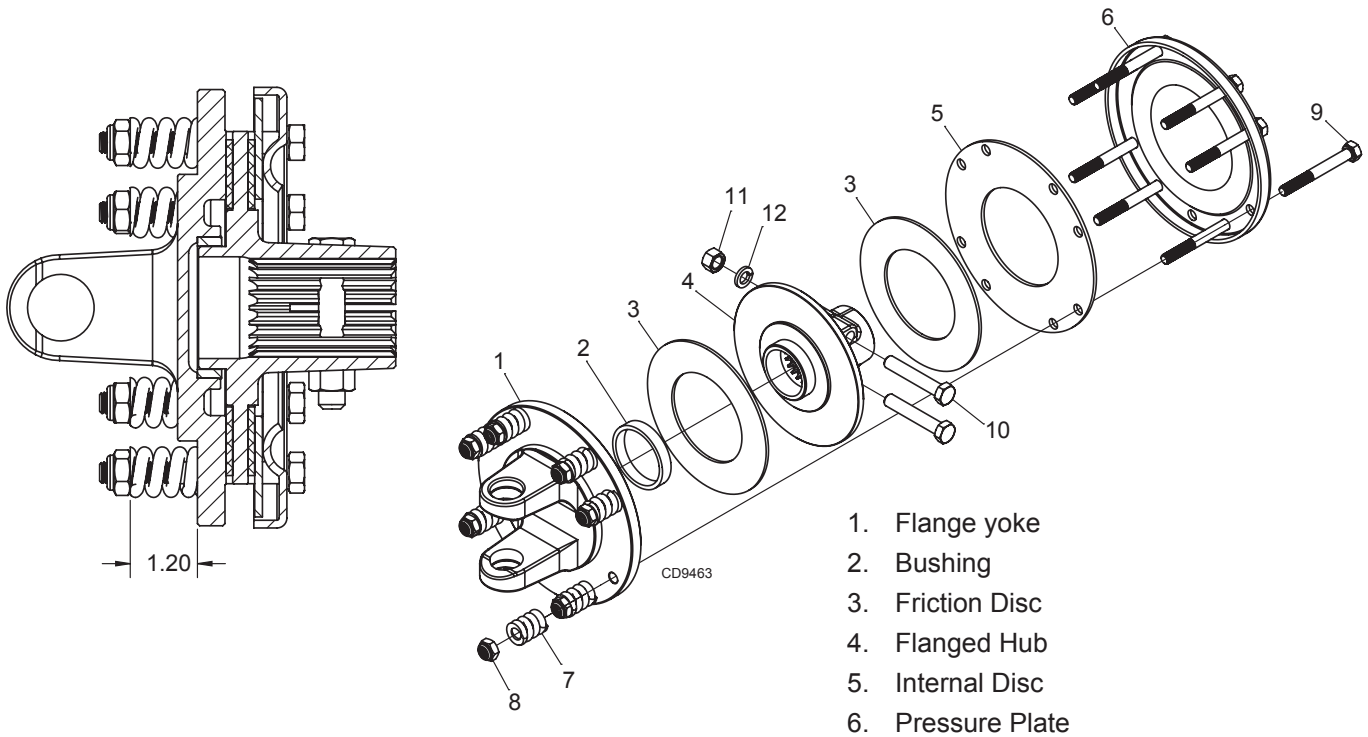
SHIELDING REPAIR

⚠ DANGER

- **Full chain shielding must be installed at all times. Thrown objects could injure people or animals 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).**

Repairing Chain Shielding

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



1. Flange yoke
2. Bushing
3. Friction Disc
4. Flanged Hub
5. Internal Disc
6. Pressure Plate
7. Spring
8. M10X1.5 Hex Lock Nut
9. M10X1.5 X 85mm Long Hex Head Bolt
10. M12X1.75 X 70mm Long Hex Head Bolt
11. M12X1.75 Hex Nut
12. M12 Split Washer

Figure 8. Slip Clutch Assembly

SERVICING TIRES SAFELY

Split Rim Tires (Figure 9)

⚠ WARNING

- **Explosive separation of tire and rim parts can cause serious injury or death. Release all air pressure before loosening bolts.**

- **Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job.**
- **Always maintain the correct tire pressure. Do not inflate pneumatic tires above 40 psi. Never weld or heat a wheel and tire assembly. The heat can cause an increase in air pressure and result in a tire explosion. Welding can structurally weaken or deform the wheel.**
- **When inflating tires, use a clip-on chuck and an extension hose long enough to allow you to stand to the side — not in front of or over the tire assembly. Use a safety cage if available.**
- **Check wheels for low pressure, cuts, bubbles, damaged rims, or missing lug bolts and nuts.**
- **Never remove split rim assembly hardware (A) with the tire inflated.**

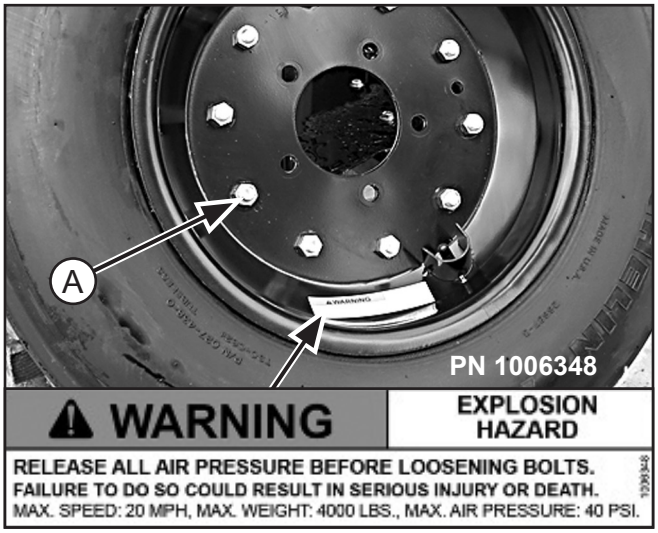


Figure 9. Split Rim Tire Servicing

CLEANING

⚠ CAUTION

- **Wear long sleeves, long pants, boots, and gloves when cleaning machine to avoid contact with poisonous plants.**
- **Wear safety glasses or goggles and a dust mask. Use a leaf-blower, or broom to remove debris without damaging decals, hoses or wiring.**

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 (supplied free by your Woods dealer).**

Periodically or Before Extended Storage

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

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Does not cut	Dull blades	Sharpen blades.
	Worn or broken blades	Replace blades. (Replace in pairs only.)
	Incorrect PTO speed	Set at rated PTO speed.
	Ground speed too fast	Reduce ground speed.
	Drive not functioning (blades do not turn when PTO is running)	Check drive shaft connection. Check gearbox.
	Gearbox malfunction	Repair gearbox.
	Excessive clutch slippage	Adjust clutch.
	Incorrect blade direction	Check to be sure blade edge is correct for direction of rotation.
Streaks or ragged cut	Broken or worn blades	Replace or sharpen blades.
	Attitude incorrect	Level machine.
	Ground speed too fast	Reduce ground speed.
	Excessive cutting height	Lower cutting height. (**Note:** Set height so blades do not frequently hit ground.)
	Excessive lush and tall vegetation	Recut at 90° to first pass.
Excessive side skid wear	Running with skids continuously on ground	Raise cutting height or adjust.
Excessive clutch slippage	Clutch out of adjustment	Adjust clutch.
	Clutch discs worn; wear stops contacting opposite plate	Replace discs.
	Blades hitting ground	Raise cutting height.
Vibration	Broken blade	Replace blades in pairs.
	Bearing failure	Check gearbox shafts for side play.
	Hitch length incorrect	Reset hitch length.
Blades hitting deck	Bent blades or crossbar	Replace bent blades or crossbar.
Unit will not raise	Low oil	Add hydraulic oil.
Unit doesn't cut level	Wing section cuts lower than center	Lengthen turnbuckle connecting center yoke to wing wheel yoke.
	Wing section cuts higher than center	Shorten turnbuckle connecting center yoke to wing wheel yoke.

DEALER SERVICE

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

⚠ WARNING

- **Before performing any service or maintenance, follow these steps:**
  - **Disengage power to equipment and wait for all moving parts to stop.**
  - **Lower all raised components to the ground and operate valve levers to release any hydraulic pressure.**
  - **Place all controls in neutral and set parking brake.**
  - **Stop tractor engine, remove ignition key and unfasten seat belt.**
- **Before working underneath, read manual instructions, securely block up, and check stability. Secure blocking prevents equipment from dropping due to hydraulic leak down, hydraulic system failure, or mechanical component failure.**
- **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 safety glasses or goggles, sturdy, rough-soled work shoes, gloves, and hearing protection. Respiratory protection may be required, depending on the work.**

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 with an API service rating of GL-4 or GL-5. Proper oil level is between lowest ring and end of dipstick.

   NOTE: Repair to this gearbox is limited to replacing bearings and seals. 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.

   NOTE: Bearing failure is indicated by excessive noise and side-to-side or end-play in gear shafts.

Seal Replacement (Figure 10)

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

Leakage can occur at the shaft seals.

Leakage at the horizontal 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.

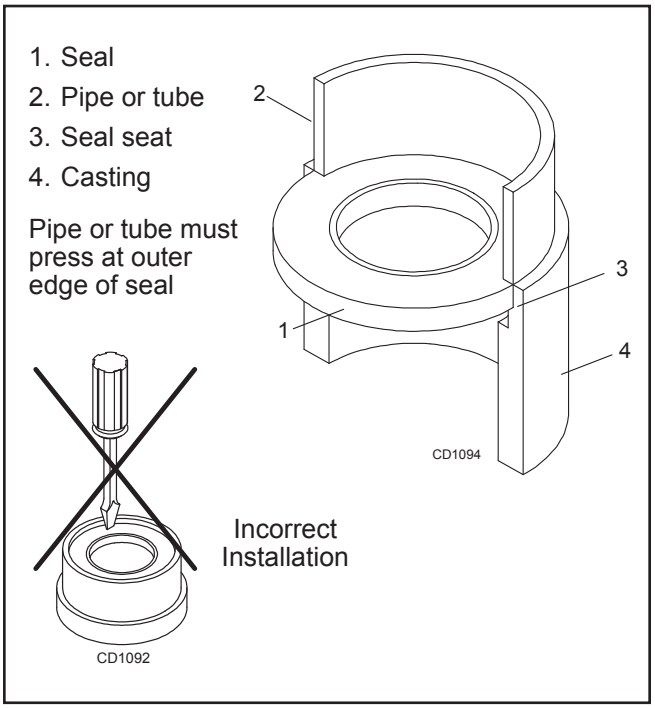


Figure 10. Seal Installation

Vertical Shaft Seal Replacement (Figure 11)

1. Disconnect and remove the driveline from the gearbox.
2. Remove drain plug and drain gear lube from housing. Replace plug when empty.
3. Remove crossbar (see page 33).
4. Remove protective seal (8) and vertical shaft seal (18). Replace seal (18) with new seal.

   NOTE: Vertical seal should be recessed in housing. Horizontal seal (19) should be pressed flush with out-side of housing.

   NOTE: Distortion to seal cage or damage to seal lip will cause seal to leak.
5. Fill gearbox with SAE 80W or 90W (API GL-4 or GL-5) gear lube until it runs out the level plug.
6. Remove and replace any seal damaged in installation.

Horizontal Shaft Seal Replacement (Figure 11)

1. Disconnect and remove the driveline from the gearbox.
2. Remove drain plug and drain gear lube from housing. Replace plug when empty.
3. If the leak occurred at either end of horizontal shaft, remove oil cap (20) and/or oil seal (19). Replace with new one.
4. Fill gearbox with SAE 80W or 90W (API GL-4 or GL-5) gear lube to proper level.

GEARBOX REPAIR

Removal from Cutter (Figure 11)

⚠ WARNING

- **Gearboxes are heavy and can cause muscle strain or back injury. Use lifting aids and proper lifting techniques when handling.**

1. Disconnect and remove the rear driveline from the gearbox.
2. Remove cotter pin and nut from vertical shaft and remove crossbar (see page 33).
3. Remove the six bolts that attach gearbox to cutter and remove gearbox.

Disassembly (Figure 11)

1. Remove six cap screws (23) and top cover (22) from gearbox and pour out gear oil.
2. Remove oil cap (20) (to be replaced).
3. Remove snap ring (10) and shim (13) from input shaft (3).
4. Support gearbox in hand press and push on input shaft (3) to remove bearing (7).
5. Remove gear (1) from inside housing.
6. Remove oil seal (19) from front of housing (to be replaced).
7. Remove snap ring (10) and shim (13) from front of housing (2).
8. Remove input bearing (7) by using a punch and hammer from outside of housing.
9. Support housing in vise in a horizontal position.
10. The castle nut (15), cotter pin (25), and hub are already removed with the stump jumper/crossbar. Remove the protective seal (8), and oil seal (18).
11. Remove cotter pin (9), castle nut (14), and shim (17) from output shaft (4).
12. Remove output shaft (4) by using a punch and hammer and tap on top to drive down. Remove gear (5) and shim (16) from inside housing.
13. Remove bottom bearing (26) by using a punch and hammer from the top, outside the housing.
14. Support housing upside down (top cover surface) and remove pinion bearing (6) by using a punch and hammer from the bottom side of the housing.
15. 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.
16. Inspect vertical and horizontal shafts for grooves, nicks, or bumps in the areas where the seals seat. Resurface any damage with emery cloth.
17. Inspect housing and caps for cracks or other damage.

Assembly (Figure 11)

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. Insert both output bearings (6) in the housing, using a round tube of the correct diameter and a hand press.
4. Slide output shaft (4) through both bearings (6) until it rests against top bearing (6).
5. Slide shim (16) over output shaft (4).
6. Press gear (5) onto output shaft (4) and secure with shim (17), castle nut (14), and cotter pin (9).
7. Apply grease to lower seal lips (18) and press seal (18) over output shaft (4), using a tube of the correct diameter. Be sure not to damage the seal lip.
8. Press in housing so that seal is recessed. Press protective seal (8) until seated flush with housing. Verify that the seal (8) is seated correctly.

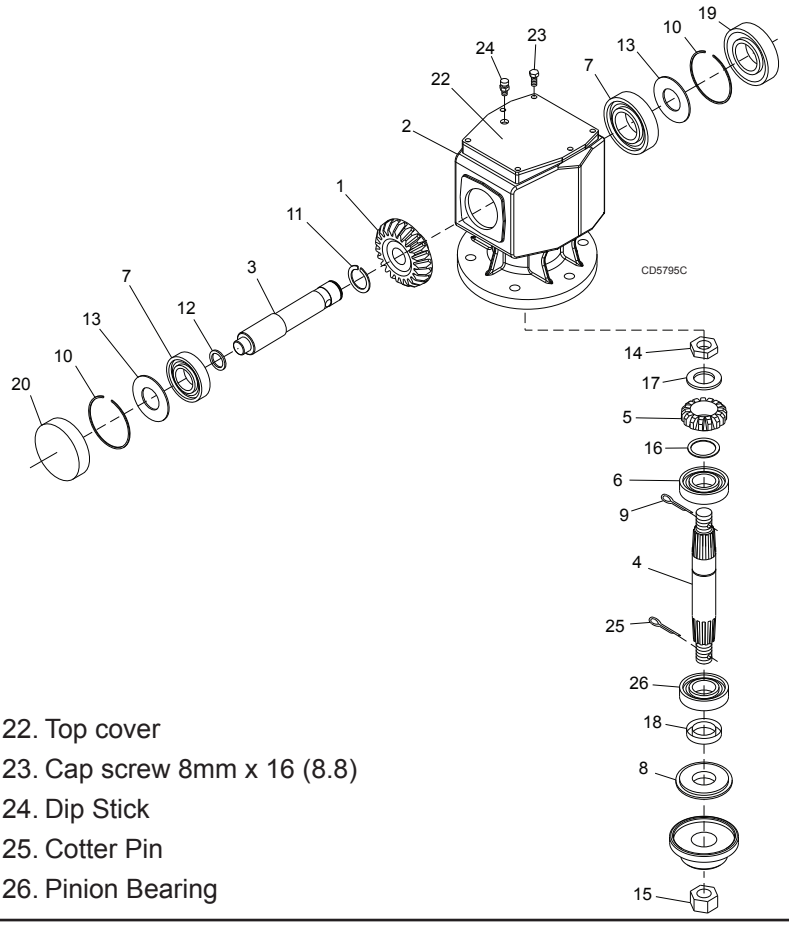
9. Press bearing (7) into the housing, using a round tube of the correct diameter and a hand press. Secure with shim (13) and snap ring (10).
10. Secure snap ring (11) on input shaft (3) if not already secure.
11. Place gear (1) through top of housing and align gear (1) and gear (5) so that gear teeth are a match.
12. While holding gear (1) in place, slide input shaft (3) through gear (1) and bearing (7). Align splines on shaft (3) and gear (1).
13. Slide shim (12) over input shaft (3) and press bearing (7) onto input shaft (3), using a round tube of the correct diameter and a hand press.
14. Slide shim (13) over input shaft (3) and secure with snap ring (10).
15. Check input shaft end float by moving the input shaft (3) by hand. If end float is higher than 0.012", insert shim between input shaft (3) and rear bearing (7). Repeat until end float is less than 0.012". Check rotational torque by hand. The torque should be less than 2.2 lbs-inch.
16. Check that the gear backlash is between 0.006" and 0.016". You should not have to adjust the backlash.
17. Press in input oil seal (19), using tube of correct diameter. Be careful not to damage seal lip.
18. Press oil cap (20) on to cover the rear of housing, using a tube of the correct diameter.
19. Apply Permatex® Aviation 3D Form-A-Gasket or equivalent sealant to top of housing. Place top cover (22) on top of housing and secure with six cap screw (23).
20. 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.
21. Remove gearbox from water and dry off with compressed air. Add SAE 80W or 90W (API GL-4 or GL-5) gear lube to proper level. Tighten all plugs.

Reinstallation

⚠ WARNING

- **Gearboxes are heavy and can cause muscle strain or back injury. Use lifting aids and proper lifting techniques when handling.**

1. Set gearbox on cutter and fasten with bolts and nuts. Torque bolts to 300 lbs-ft.
2. Attach crossbar (Crossbar Installation, page 34).



1. Crown gear
2. Gearbox housing
3. Input shaft
4. Output shaft
5. Gear pinion
6. Pinion bearing
7. Input bearing
8. Protective seal
9. Cotter pin
10. Snap ring
11. Snap ring
12. Shim, 45.3 x 2.5
13. Shim, 70.3 x 84.7
14. Nut
15. Castle nut
16. Shim, 50.3 x 70.3
17. Shim
18. Oil seal (Vertical Shaft)
19. Oil seal (Horizontal Shaft)
20. Cap
22. Top cover
23. Cap screw 8mm x 16 (8.8)
24. Dip Stick
25. Cotter Pin
26. Pinion Bearing

Figure 11. Gearbox

SPLITTER GEARBOX REPAIR

(Figure 12)

Removal from Cutter

⚠ WARNING

- **Gearboxes are heavy and can cause muscle strain or back injury. Use lifting aids and proper lifting techniques when handling.**

1. Disconnect and remove all drivelines from gearbox.
2. Remove the four cap screw and lock washers that secure gearbox to cutter, and remove gearbox.

Disassembly

Center Shaft

1. Remove plug from side of gearbox and pour out the gear oil. Replace plug after draining.
2. Remove seal (11, to be replaced) from the front and rear of the center shaft (14).
3. Remove snap ring (10) and shim (12) from the front and rear of the center shaft (14).
4. Support gearbox in a hand press and push on the rear of the center shaft.
5. Remove bearing (13) from center shaft (14).
6. Remove six cap screws (20) and top cover (21) from the gearbox housing.
7. Remove gear (17) and bearing (16).
8. Snap ring (15) does not have to be removed from shaft (14) unless it is damaged.

Side Shaft

9. Remove seal (2, to be replaced) from the output shaft (1).
10. Remove snap ring (4) and shim (8) from output shaft (1).
11. Support gearbox in hand press. Using a punch through the front opening of the gearbox and, push shaft (1) and bearing (5) out the backside of housing.
12. Remove gear (6) from inside housing.
13. Remove bearing (7) and shim (8) by using a hammer and punch through front opening of the gearbox and force them out the backside of the housing.
14. Repeat steps 7 through 11 for opposite side shaft.

Inspect Components

15. Inspect gears for broken teeth and wear. Some wear is normal and will show on the loaded side of the teeth. Forged gear surfaces are rough when new. Check that wear pattern is smooth.
16. Inspect shafts for grooves, nicks, or bumps in the areas where seals seat. Resurface any damage with emery cloth or replace shaft. from gearbox.
17. Inspect housing and caps for cracks or other damage.

Assembly

1. Clean housing, pay specific attention to areas where gaskets are installed.
2. Wash housing and all components thoroughly.
3. Select a clean work area to assemble gearbox.
4. Replace all seals and bearings.
5. All parts must be clean and lightly oiled before assembly.

Side Shaft

6. Insert bearing (7) and shim (8) in housing using a round tube of the same size diameter and a hand press.
7. Place gear (6) inside the housing and slide output shaft (1) through gear (6) and into bearing (7).
8. Slide bearing (5) and shim (8) over output shaft. Secure with snap ring (4).
9. Check end play of shaft by moving it in and out. If end play is more than 0.012", insert another shim (8) between snap ring and bearing. Repeat process until end play is less than 0.012".
10. Check rotational torque. Torque should be less than 2.2 lbs-inch gear.
11. Place seal (2) over shaft and press into housing using a tube of the same diameter. Seal should be flush with housing when properly installed.
12. Repeat steps 6 through 10 for opposite side shaft.

Center Shaft

13. Place gear (17) inside housing and slide center shaft (14) through the gear from the front of the housing.
14. Slide bearings (16 & 13) and shims (12) over each end of the center shaft (14). Secure bearings into position using snap rings (10).
15. Check end play of shaft by moving it in and out. If end play is more than 0.012", insert another shim (12) between snap ring and bearing. Repeat process until end play is less than 0.012".
16. Check rotational torque. Torque should be less than 2.2 lbs-inch gear.
17. Check gear backlash, backlash should be between 0.006" and 0.016". You should not have to adjust for backlash.
18. Place seal (11) over shaft and press into housing using a tube of the same diameter. Seal should be flush with housing when properly installed. Repeat process for opposite end shaft.

Check Gearbox

1. Apply Permatex® Aviation 3D Form-A-Gasket or equivalent sealant to top of housing. Place top cover (21) on housing and secure into position using six cap screws (20).
2. Check gearbox for leaks by: plugging all holes except one, applying 4 psi of compressed air, and immersing gearbox in water. Verify gearbox does not leak.

   NOTE: Excessive air pressure will damage seals.
3. Remove gearbox from water and dry off.
4. Remove upper plug (3) on right side of housing. Add SAE 80W or 90W (API GL-4 or GL-5) gear lube until it runs out side level hole. Replace plug.
5. Install breather (18) in top cover.

Reinstallation on Cutter

⚠ WARNING

- **Gearboxes are heavy and can cause muscle strain or back injury. Use lifting aids and proper lifting techniques when handling.**

1. Place gearbox on cutter and secure into position using four cap screws and lock washers.
2. Torque hardware to 300 lbs-ft.
3. Attach all drivelines to gearbox.
4. Install all shields.

1. Shaft 1-3/4, 20 spline, wing
2. Oil seal
3. 3/8 plug
4. Snap ring
5. Bearing
6. Pinion gear
7. Bearing
8. Shim
9. Housing
10. Snap ring
11. Oil seal
12. Shim
13. Bearing
14. Shaft 1-3/4, 20 spline, center
15. Snap ring
16. Bearing
17. Gear
18. 1/2 Breather
19. 5/16 Lock washer
20. M8 x 30 Cap screw 8.8
21. Cover
22. Snap ring

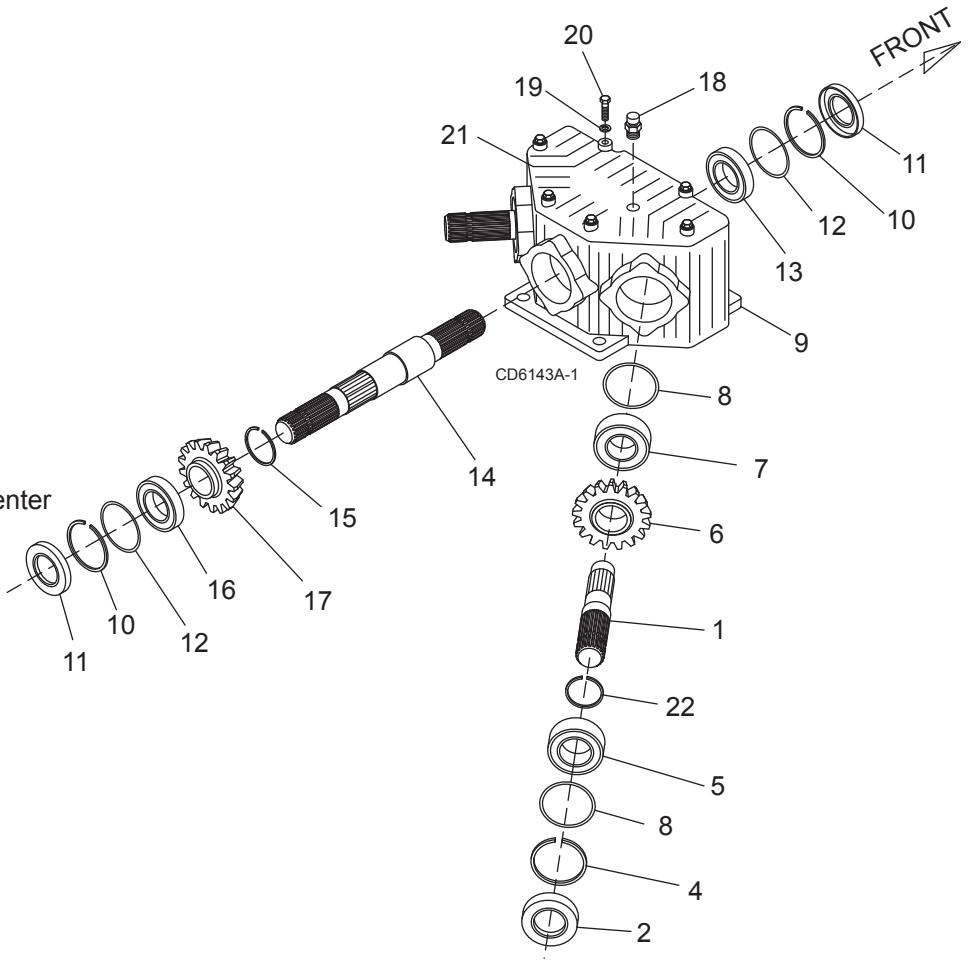


Figure 12. Splitter Gearbox Assembly

CROSSBAR REMOVAL

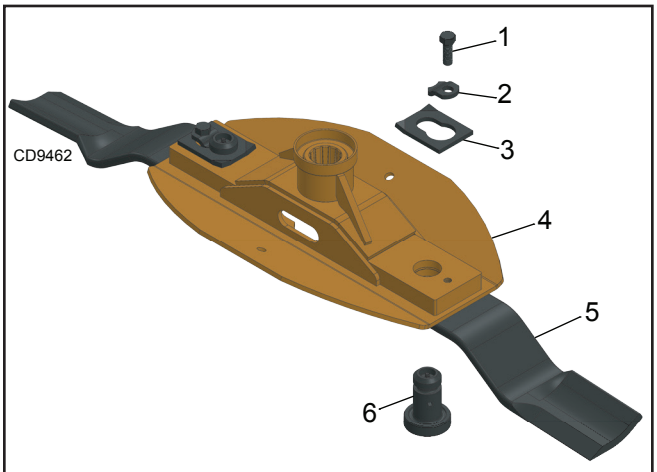
⚠ WARNING

- **Crossbars are heavy and can cause muscle strain or back injury. Use lifting aids and proper lifting techniques when handling.**

1. It is necessary to gain access to bottom side of cutter for crossbar removal. See Blocking Method page 21.

   NOTE: You will need to use either the puller screw (Item 6, Figure 14) or a small hydraulic jack to remove the crossbar.

2. Remove blades from crossbar as shown in Figure 13.

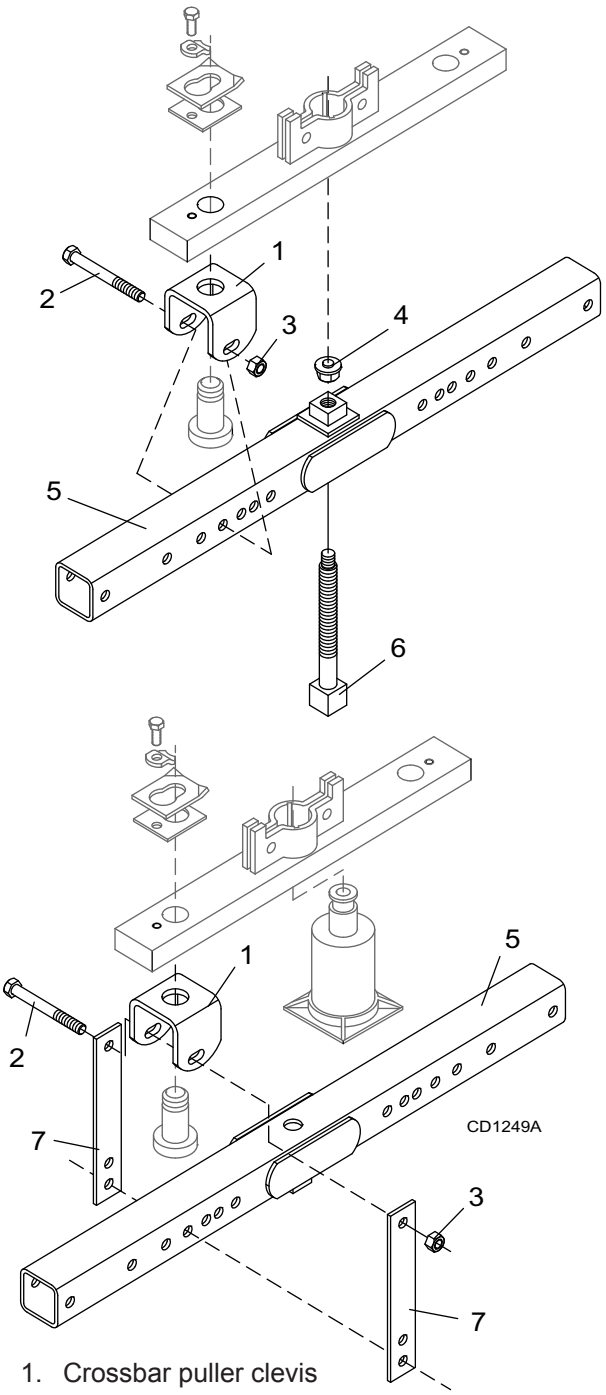


ITEM #	QTY	DESCRIPTION
1	2	BOLT, HEX 1/2 NC X 1.50 GR5
2	2	BLADE PIN LOCK CLIP SPEC
3	2	KEYHOLE PLATE SPECIAL
4	1	CROSSBAR
5	2	BLADE, .50 X 4.0 X 14.0 CW, 3.0
6	2	PIN, BLADE, DRL 2.04

Figure 13. Blade Removal

3. Refer to Figure 14. Remove cotter pin from bottom of crossbar and remove nut and washer.
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 (4) 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°. Use care to prevent bending cross-bar during removal.



1. Crossbar puller clevis
2. 5/8 NC x 4-1/2 HHCS
3. 5/8 NC Hex nut
4. Crossbar puller pad
5. Crossbar puller tube
6. Crossbar puller screw
7. Crossbar puller link

Figure 14. Crossbar Removal

CROSSBAR INSTALLATION

1. Using emery cloth (220 or finer), remove surface rust, Loctite® and foreign material from hub, splined gearbox vertical shaft, and crossbar assembly.
2. Apply anti-sieze compound to splines and slide crossbar assembly onto splined shaft. Install washer and nut and align a slot with hole in splined shaft. Torque nut to 450 lbs-ft.
3. Install cotter pin through slot in nut and bend ends over.

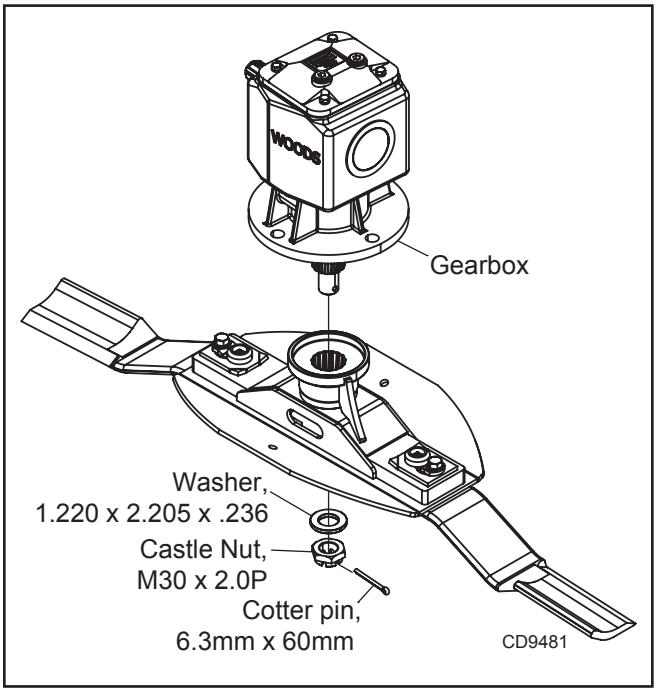


Figure 15. Crossbar Assembly Installation

UNIVERSAL JOINT REPAIR

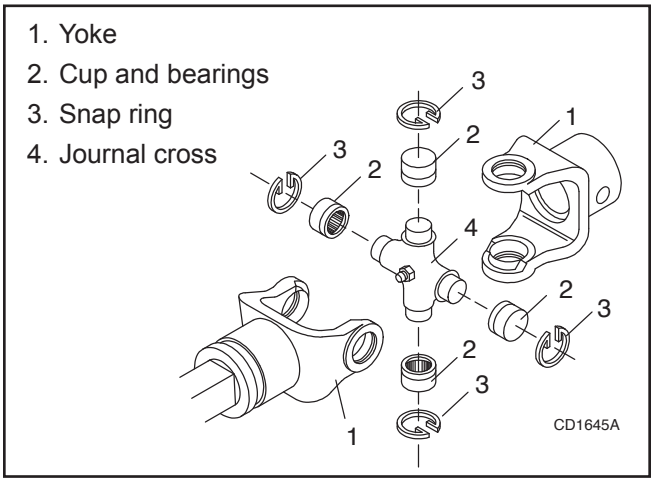


Figure 16. U-Joint Exploded View

U-Joint Disassembly

1. Remove external snap rings from yokes in four locations as shown in Figure 17.

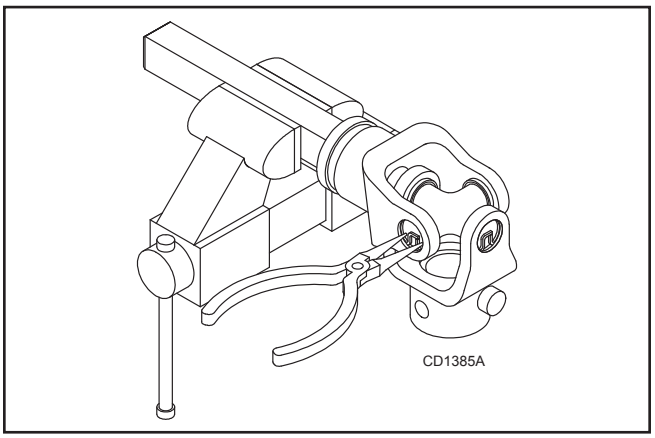


Figure 17.

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 18.

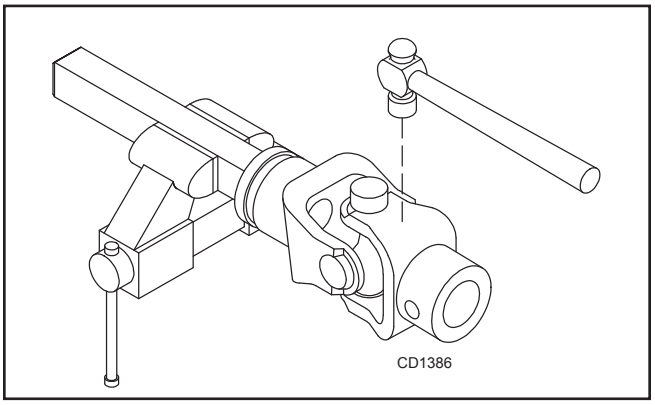


Figure 18.

3. Clamp cup in vise as shown in Figure 19 and tap on yoke to completely remove cup from yoke. Repeat Step 2 & Step 3 for opposite cup.

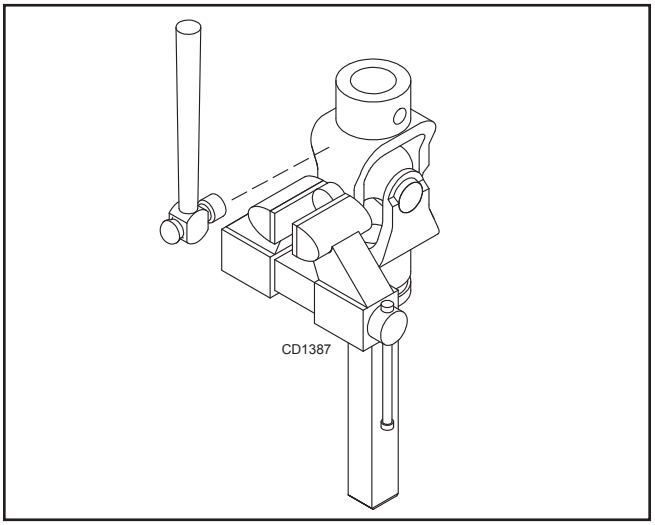


Figure 19.

4. Place universal cross in vise as shown in Figure 20 and tap on yoke to remove cup. Repeat Step 3 for final removal. Drive remaining cup out with a drift and hammer.

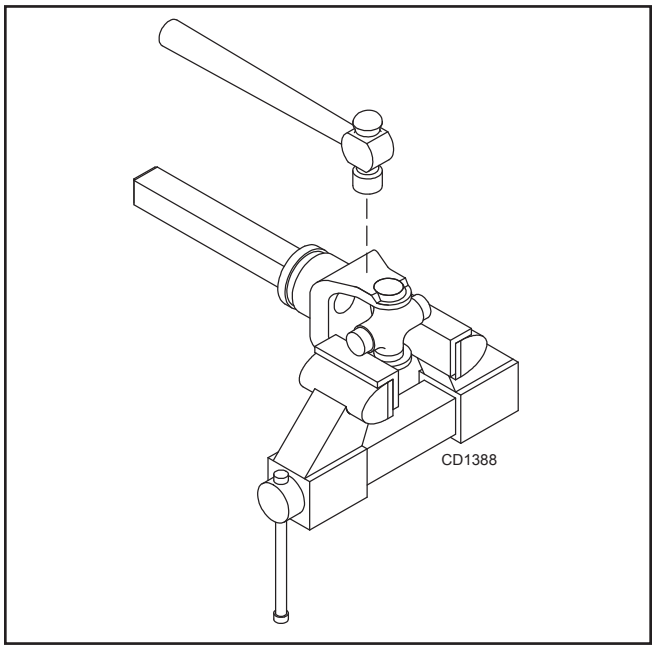


Figure 20.

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 20. 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.

SERVICING TIRES SAFELY

Split Rim Tires (Figure 21)

⚠ WARNING

- **Explosive separation of tire and rim parts can cause serious injury or death. Release all air pressure before loosening bolts.**

Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job.

Always maintain the correct tire pressure. Do not inflate pneumatic tires above 40 PSI. Never weld or heat a wheel and tire assembly. The heat can cause an increase in air pressure and result in a tire explosion. Welding can structurally weaken or deform the wheel.

When inflating tires, use a clip-on chuck and an extension hose long enough to allow you to stand to the side — not in front of or over the tire assembly. Use a safety cage if available.

Check wheels for low pressure, cuts, bubbles, damaged rims, or missing lug bolts and nuts.

Never remove split rim assembly hardware (A) with the tire inflated.

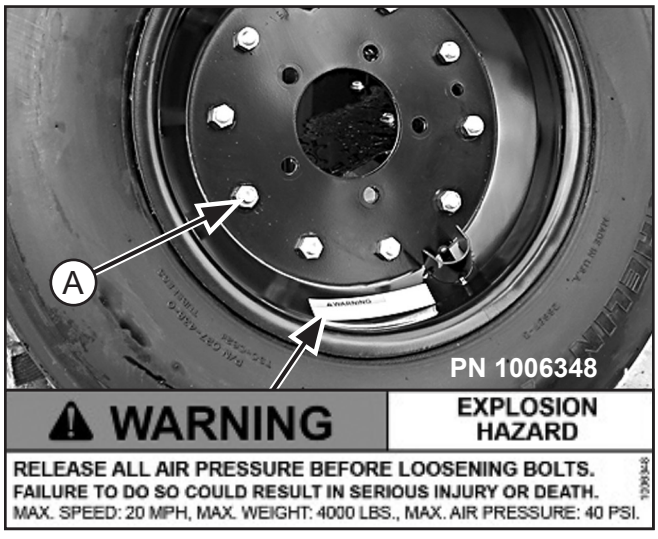


Figure 21. Split Rim Tire Servicing

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. Assembly will be easier if components are aligned and loosely assembled before tightening hardware. Recommended torque values for hardware are located on page 63.

Select a suitable working area. A smooth hard surface, such as concrete, will make assembly much quicker. Open parts boxes and lay out parts and hardware to make location easy. Refer to illustrations, accompanying text, parts lists and exploded view drawings.

Complete the checklist on page 39 when assembly is complete and cutter is delivered to the customer.

⚠ WARNING

- **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 disconnect hydraulic lines until engine is stopped, power unit is properly secured, equipment and all components are lowered to the ground, and system pressure is released by operating all valve control levers.**

⚠ CAUTION

- **Always wear relatively tight and belted clothing to avoid getting caught in moving parts. Wear safety glasses or goggles, sturdy, rough-soled work shoes, gloves, and hearing protection. Respiratory protection may be required, depending on the work.**

Install Wheel

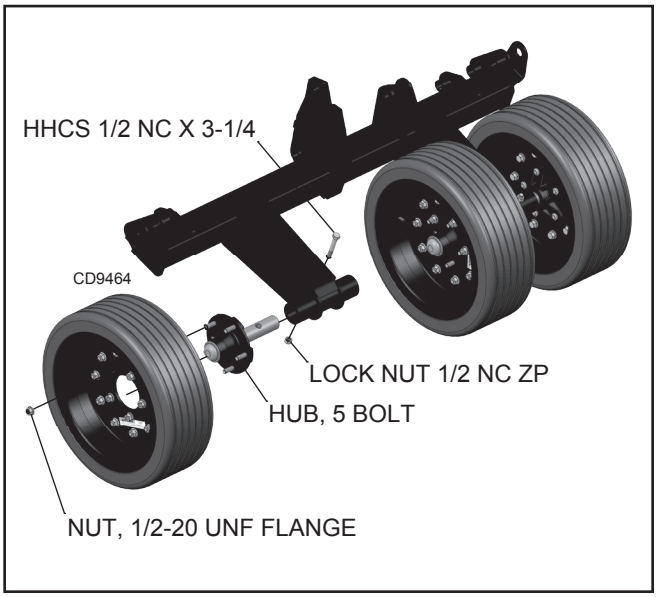


Figure 22. Center Section Wheel and Hub Installation

Install Wing Wheel

(Figure 23)

⚠ WARNING

- **Wheel assemblies are heavy and can cause muscle strain or back injury. Use lifting aids and proper lifting techniques when handling.**

1. Raise mower to max height and insert transport lock pin. (Fig 3, page 19)
2. Insert wheel hub into wing wheel yoke arms and align holes.
3. Secure into position using cap screw and lock nut.
4. Attach wheel to hub using five flanged nuts. Tighten to 85 lbs-ft. Check that tire air pressure is a maximum of 40 psi.
5. Install optional dual wheel and hub to inside of wheel yoke arm.

   NOTE: Notat, (laminated), severe-duty ag, and used aircraft tires are available. See page 57 for parts list.

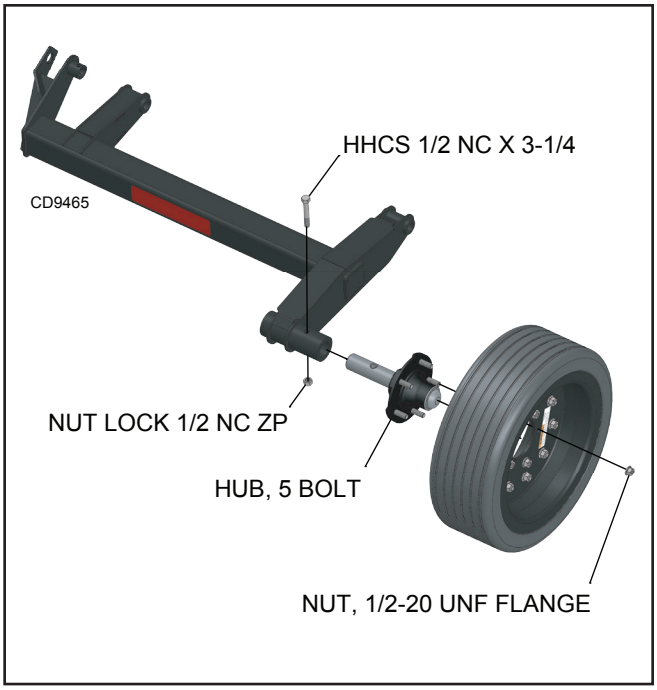


Figure 23. Wing Wheel - Right

Install Driveline

⚠ WARNING

- **Driveline is heavy and can cause muscle strain or back injury. Use lifting aids and proper lifting techniques when handling.**

1. Cut bands and remove driveline from wing.
2. Pull back quick release collar.
3. Slide driveline yoke onto gearbox input shaft until quick release collar clicks into place.

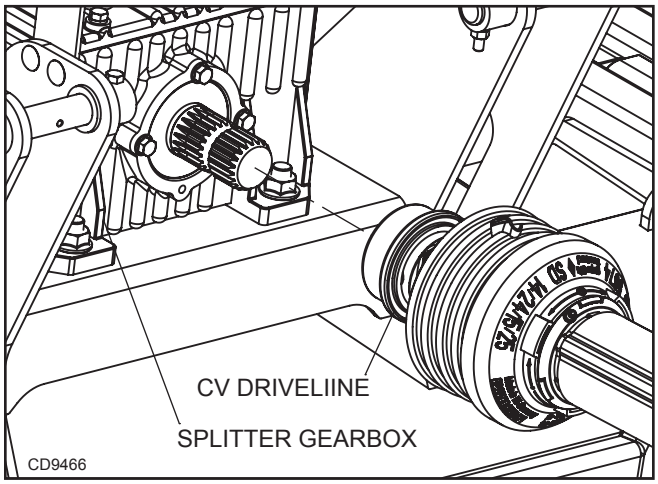


Figure 24. Driveline Installation

Remove Shipping Brackets

1. Loosen nut and remove both shipping brackets from right wing skid.
2. Re-tighten nut and torque to 85 ft-lbs.

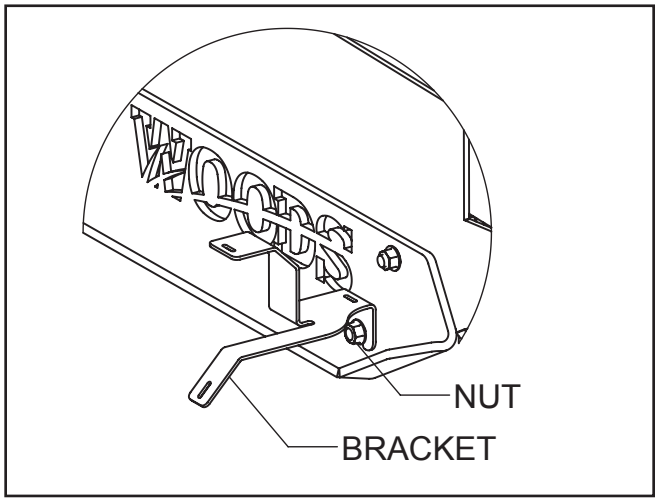


Figure 25. CV Bracket

Double Chain Installation (Optional)

NOTICE

- **Remove single row chain brackets one at a time and move the chains to the corresponding double row chain brackets for installation one at a time.**

1. Raise unit to full height and install transport lock pin. See page 18. Refer to page 21 for blocking instructions.
2. Remove one single chain locking bracket from unit at a time.
3. Compare removed bracket with new double lock brackets to identify correct new part. Refer to Figure 26 for example.

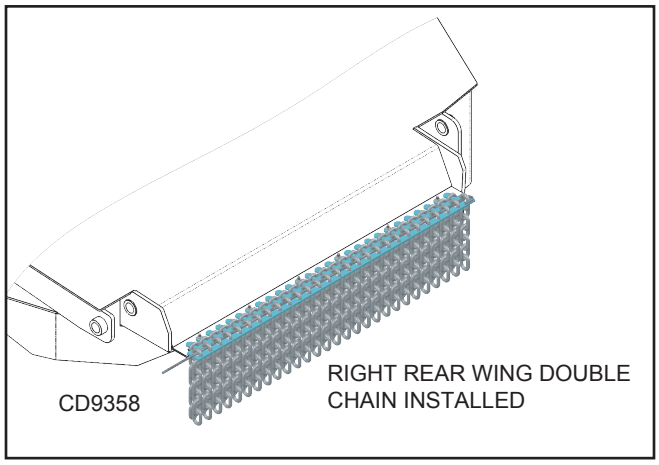


Figure 26. Double Chain

4. Move each of the chains from the single chain bracket to the double chain bracket.
5. Install new chain bracket and attach with new hardware provided.
6. Repeat for each individual chain bracket.

Towing Eye Installation (Optional)

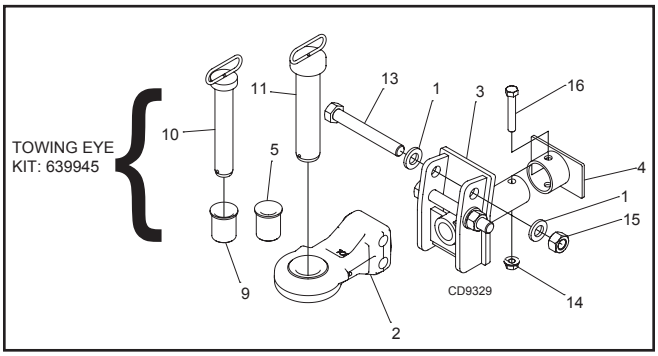


Figure 27. Towing Eye

1. Disassemble the standard hitch and clevis from the tongue by removing the bolt and nut (13, 15).
2. Assemble towing eye hitch (3) to tongue and secure with hitch stop (4) and bolt and nut (13, 15).
3. Assemble towing eye (2) to hitch (3) using bolts, washers and nuts (1, 13, 15) as shown. Torque bolts to 465 lbs-ft.
4. Choose pin (10, 11) and sleeve (5, 9) to fit your tractor drawbar.

NOTICE

- **Towing eye must be used with hammer strap installed on tractor drawbar.**

DEALER CHECKLISTS

DEALER PRE-DELIVERY CHECKLIST

(DEALER'S RESPONSIBILITY)

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

The following checklists 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 wheel bolts for proper torque.

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

_____ Check that blades have been properly installed.

_____ Check and grease all lubrication points as identified in lubrication information on page 22.

_____ Check the level of gearbox fluids before delivery. Service, if required, as specified in the lubrication information on page 23.

_____ Show customer how to use the *SmartLift*™ CV lift assist and point out that it must be folded down for rotary cutter operation.

DELIVERY CHECKLIST

(DEALER'S RESPONSIBILITY)

_____ Show customer how to make adjustments and select proper PTO speed.

_____ 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.

_____ Show customer how to determine the turning limits of the CV PTO driveline.

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

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

_____ 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.

_____ Explain to customer that when transporting the cutter, the wing and center sections should be raised and their respective transport bars installed and pinned in place.

_____ Present Operator's Manual and request that customer and all operators read it before operating equipment. Point out the manual safety rules, explain their meanings and emphasize the increased safety hazards that exist when safety rules are not followed.

_____ Explain to customer the potential crushing hazards of going underneath raised equipment. Instruct that before going underneath to disconnect the driveline, securely block up all corners with jack stands and to follow all instructions in the BLOCKING METHOD, page 21 of the operator's manual. Explain that blocking up prevents equipment dropping from hydraulic leak down, hydraulic system failures or mechanical component failures.

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

_____ Explain to customer to comply with all state and local lighting and marking laws, to turn on flashing warning lights before traveling on a public roadway, and to use the safety tow chain.

NOTES

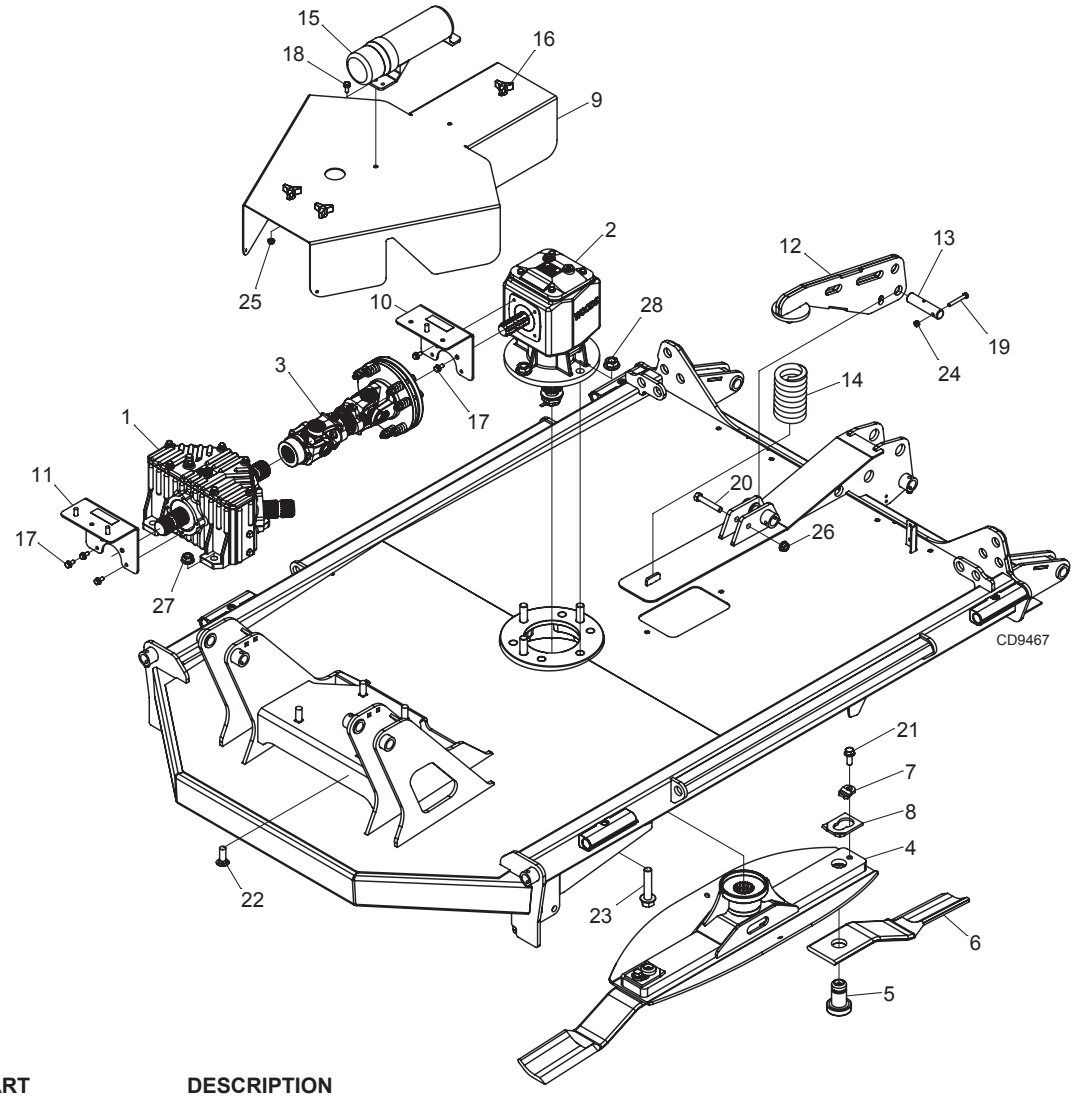
WOODS®

PARTS INDEX

BATWING® Rotary Cutter

BW12.40

BW12.40 CENTER FRAME ASSEMBLY

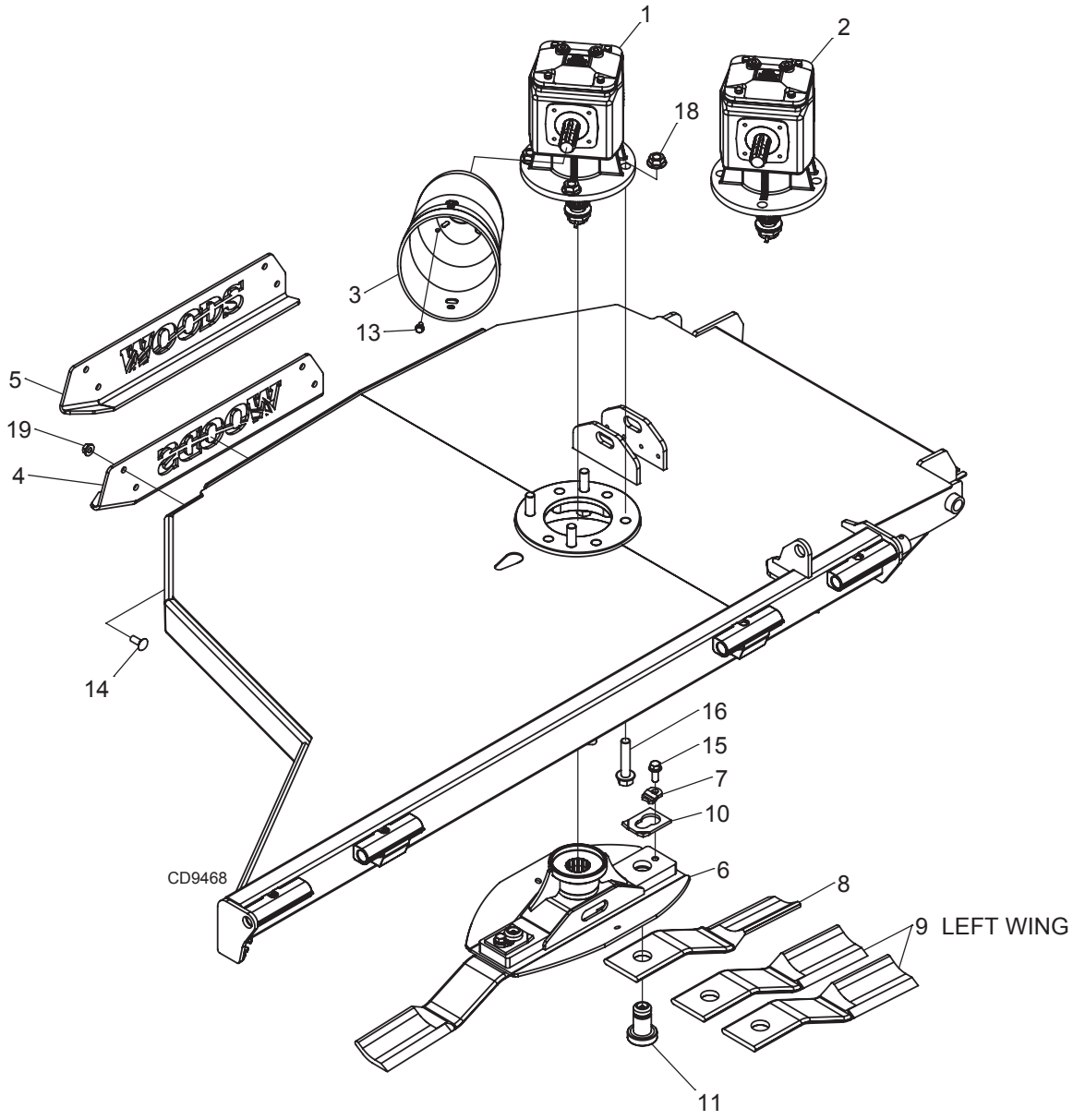


REF	QTY	PART	DESCRIPTION
1	1	1033751SD	GEARBOX, SPLITTER 1:1.35
2	1	642752RP	GEARBOX, REPAIR CCW, 1:1.83, OIL
3	1	642755	DRIVE, BW12 CENTER
4	1	645781RP	CROSSBAR
5	2	608126RP	BLADE PIN
6	2	57099	BLD .50 X 4.00 X 19.00
7	2	32604RP	BLADE PIN LOCK CLIP
8	2	32603	KEYHOLE PLATE
9	1	645663RP	SHIELD, CENTER
10	1	645704RP	SHIELD SUPPORT BRACKET
11	1	645720RP	SHIELD SUPPORT BRACKET FRONT
12	1	645700RP	SPRING ARM
13	1	632366	PIN, 1.00 X 4.31, DRL
14	1	1032100	SPRING, COMPRESSION 3.25 X .56 X 7.25 X 1113
15	1	1003828	MANUAL TUBE
16	3	66840	KNOB 3 PRONG 3/8 NC

OBTAIN LOCALLY:

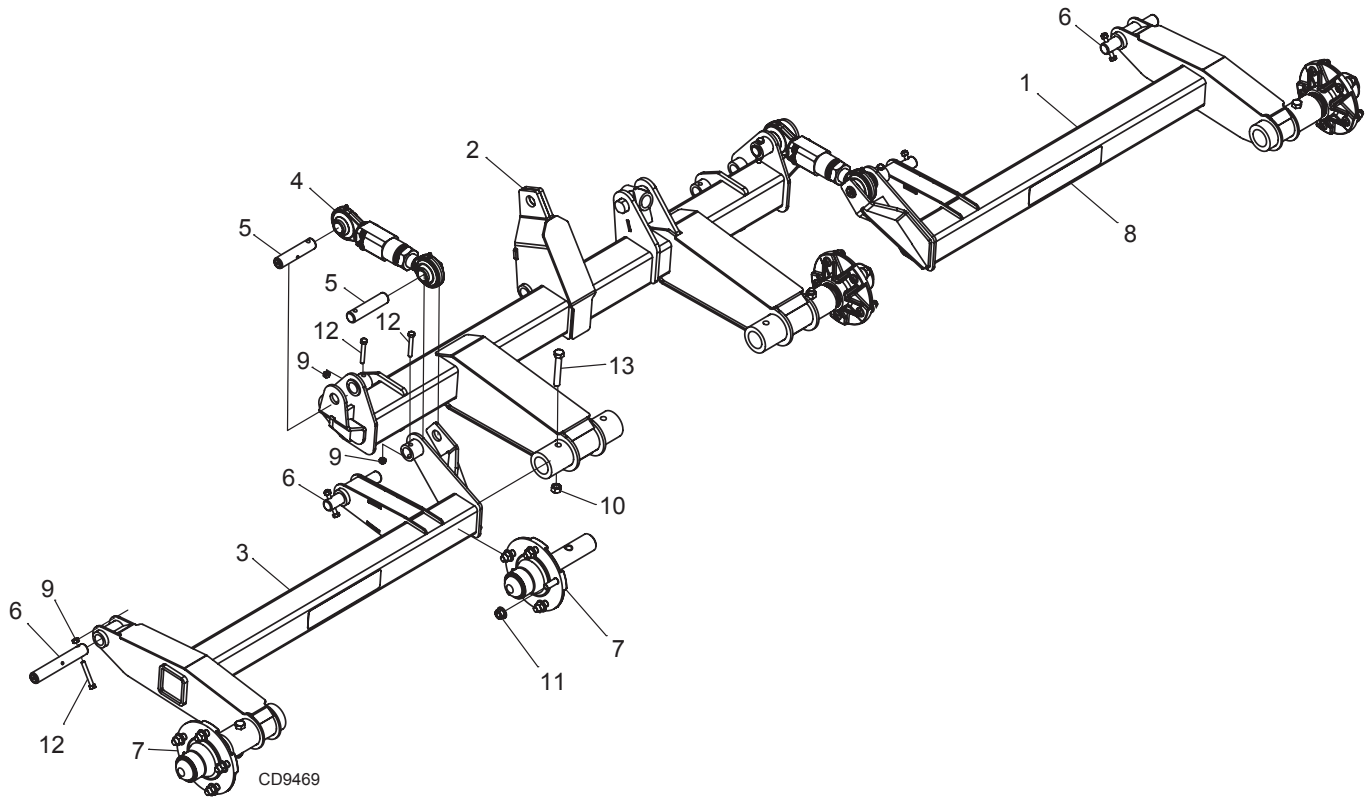
REF	QTY	PART	DESCRIPTION
17	5	1041071	BOLT, HEX FLNG M8 X 16 CL8.8, DRI-LOC
18	2	71851	BOLT, HEX FLNG 5/16 NC X .75 GR5
19	1	7164	HHCS 5/16 NC X 2-1/4 GR5
20	1	3489	HHCS 1/2 NC X 3 GR5 ZP
21	2	1031225	BOLT, HEX FLNG 1/2 NC X 1.25 GR5
22	4	33034	BOLT CRG 5/8 NC X 1-3/4 GR5 ZP
23	4	1043460	BOLT, HEX FLNG 3/4 NC X 3.50 GR5
24	5	6778	NUT LOCK 5/16 NC
25	2	1045655	NUT, HFN 5/16 NC, LOCK, GR F
26	1	1045624	NUT, HFN 1/2 NC, LOCK, GR F
27	4	19025	NUT, HFN 5/8 NC, LOCK, GR F
28	4	1045611	NUT, HFN 3/4 NC, LOCK, GR F

BW12.40 WING ASSEMBLY



REF	QTY	PART	DESCRIPTION
1	1	642750RP	GEARBOX W/DIPSTICK, NUT; RIGHT WING
2	1	642751RP	GEARBOX W/DIPSTICK, NUT; LEFT WING
3	1	1002048	CLUTCH SHIELD 100&143 MM BC
4	1	645718RP	SKID, RIGHT
5	1	645719RP	SKID, LEFT
6	1	645789RP	CROSSBAR
7	2	32604	BLADE PIN LOCK CLIP SPEC
8	2	57099	BLD .50X 4.00X 19.00
9	2	1003490	BLD .50 X 4.00 X 19.00 CW
10	2	32603	KEYHOLE PLATE SPECIAL
11	2	608126	PIN, BLADE, DRL 2.04
12	2	7164	HHCS 5/16 NC X 2-1/4 GR5
13	4	1041071	BOLT, HEX FLNG M8 X16 CL8.8, DRI-LOC
14	4	2615	BOLT CRG 1/2 NC X 1-1/4 GR5
15	2	1031225	BOLT, HEX FLNG 1/2 NC X 1.25 GR5
16	4	1043460	BOLT, HEX FLNG 3/4 NC X 3.50 GR5
17	2	6778	NUT LOCK 5/16 NC
18	4	1045611	NUT, HFN 3/4 NC, LOCK, GR F
19	4	1045624	NUT, HFN 1/2 NC, LOCK, GR F
NS	1	642764	DECAL, MDL, BW12.40
NS	1	651087	DECAL, MDL, BATWING, SMALL

BW12.40 WHEEL ARM

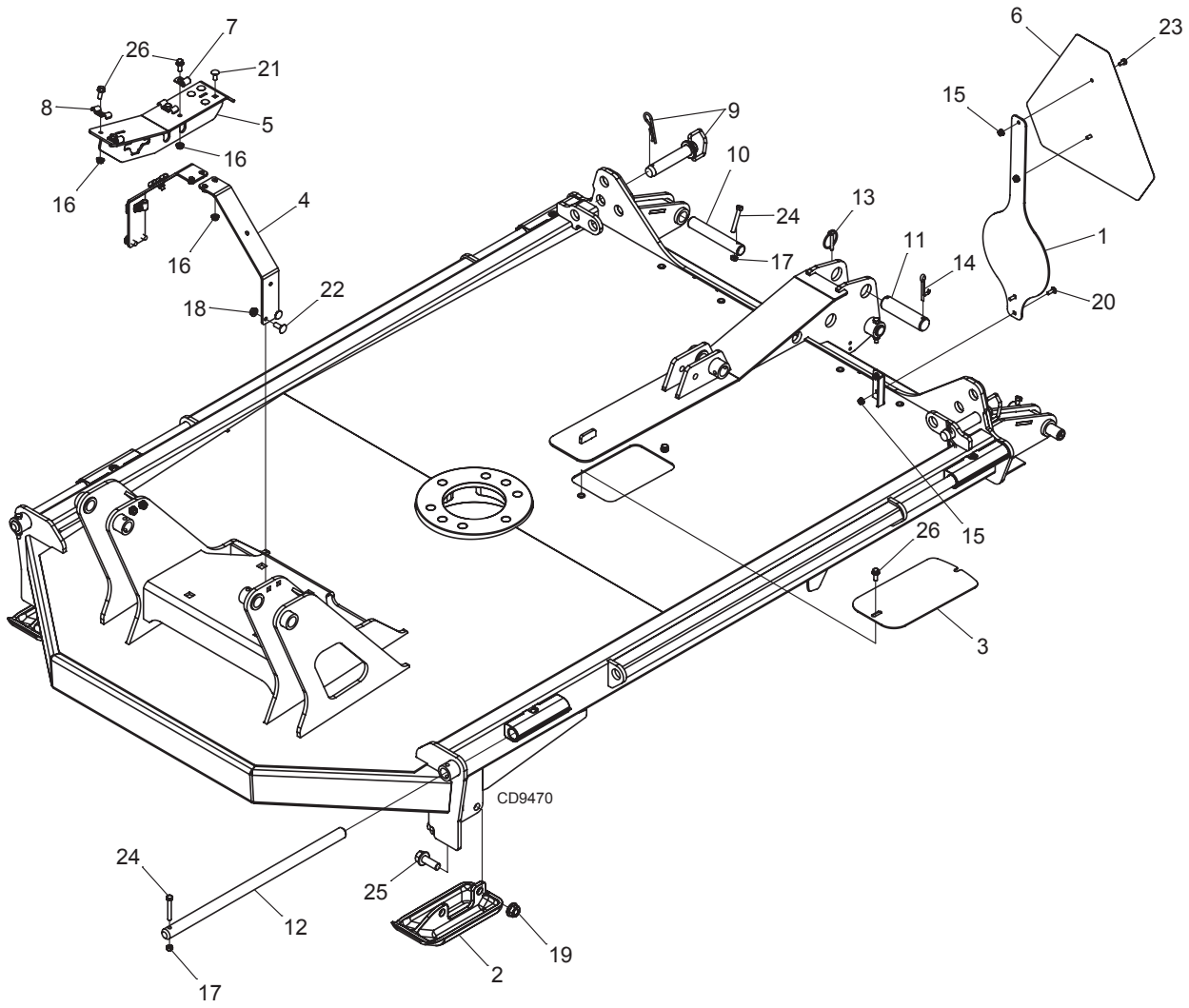


REF	QTY	PART	DESCRIPTION
1	1	642724RP	WA, WHEEL ARM RT BW12.40
2	1	645650RP	WA, WHEEL ARM CTR BW12.40
3	1	642725RP	WA, WHEEL ARM LT BW12.40
4	2	1039950	ADJUSTABLE LINK, TRUNNION
5	4	632366	PIN, 1.00 X 4.31, DRL
6	4	632360	PIN, 1.00 X 6.31, DRL
7	4	632788	WHEEL, HUB, 5 BOLT, NO NUTS
8	2	57123	DECAL, REFLECTOR RED 2.0 X 9.0

OBTAIN LOCALLY:

REF	QTY	PART	DESCRIPTION
9	8	6778	NUT LOCK 5/16 NC
10	4	765	NUT LOCK 1/2 NC ZP
11	20	640406	NUT, 1/2-20 UNF FLANGE
12	8	7164	HHCS 5/16 NC X 2-1/4 GR5
13	4	14069	HHCS 1/2 NC X 3-1/4

HOSE SUPPORT, SKIDS & MISCELLANEOUS

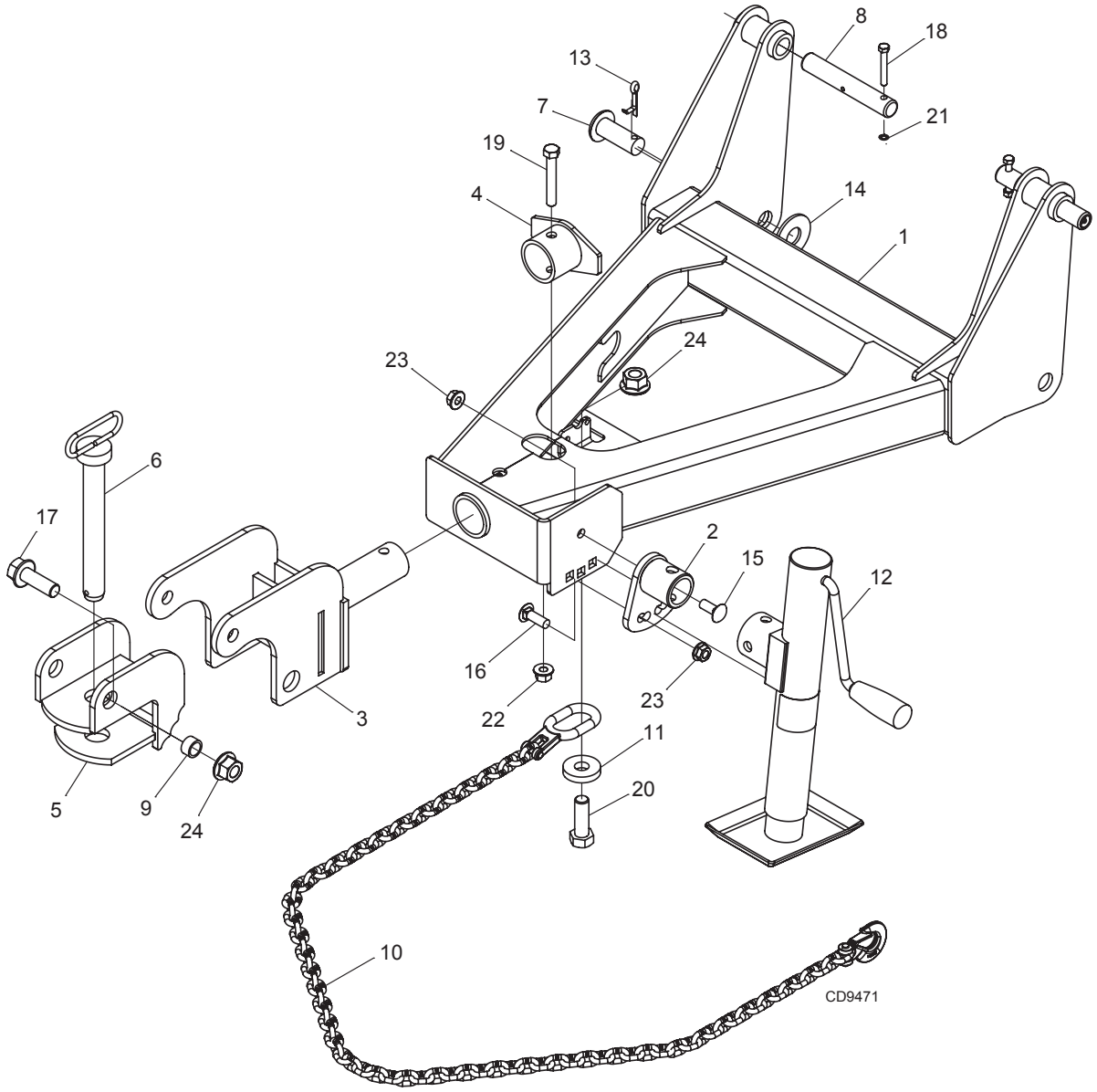


REF	QTY	PART	DESCRIPTION
1	1	632371RP	SMV BRACKET
2	2	639701RP	SKID SHOE
3	1	642749RP	DECK COVER PLATE
4	2	645735RP	HOSE HOLDER UPRIGHT
5	1	645739RP	HOSE HOLDER BRACKET
6	1	24611	SIGN (SMV) SLOW MOVING VEHICLE
7	4	640361	LOOP CLAMP, .38 GALV STEEL, VINYL
8	5	480265	FEEDLINE CLAMP 3/8
9	2	S071051C0	PIN, 1 X 4-1/4 IN SWIV HITCH W/ CL
10	3	632360	PIN, 1.00 X 6.31, DRL
11	1	1044831	PIN, 1.25 X 5.00
12	4	645690	PIN, HINGE 1.000 X 22.531

OBTAIN LOCALLY:

REF	QTY	PART	DESCRIPTION
13	1	62043	1/4 X 1-3/4 KLIK PIN
14	1	6185	1/4 X 2-1/4 COTTER PIN
15	4	62521	NUT LOCK 1/4 NC FLANGE
16	12	1045655	NUT, HFN 5/16 NC, LOCK, GR F
17	7	6778	NUT LOCK 5/16 NC
18	4	1045628	NUT, HFN 3/8 NC, LOCK, GR F
19	5	19025	NUT, HFN 5/8 NC, LOCK, GR F
20	2	21937	BOLT CRG 1/4 NC X 3/4
21	4	51248	BOLT CRG 5/16 X 3/4 GR5 ZP
22	4	6697	BOLT CRG 3/8 NC X 1 GR5 ZP
23	2	5337	HHCS 1/4 NC X 1/2 GR5
24	7	7164	HHCS 5/16 NC X 2-1/4 GR5
25	4	19024	BOLT, HEX FLNG 5/8 NC X 1.75 GR5
26	10	71851	BOLT, HEX FLNG 5/16 NC X .75 GR5

TONGUE ASSEMBLY

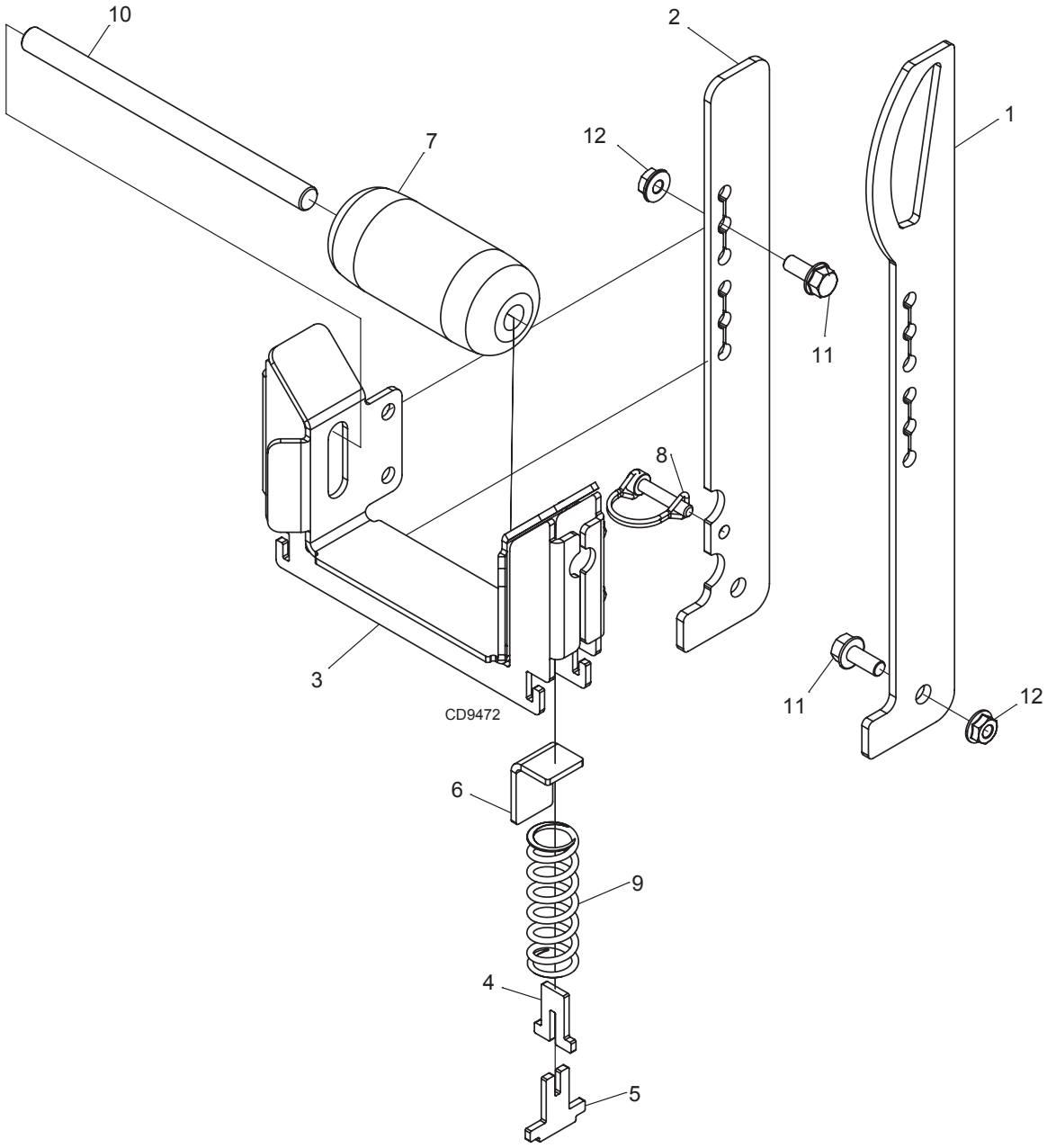


REF	QTY	PART	DESCRIPTION
1	1	642718RP	TONGUE WELDMENT
2	1	632840RP	JACK MOUNT WELDMENT
3	1	645644RP	HITCH WELDMENT
4	1	645643RP	HITCH ANGLE WELDMENT
5	1	645640RP	CLEVIS WELDMENT, CAT 2
6	1	S70056200	PIN, 1-1/8 X 8-1/2 IN RED HEAD HITCH
7	1	46605	PIN CLV 1.00 X 2.26
8	2	632360	PIN, 1.00 X 6.31, DRL
9	2	13087	SLV 3/4 X 1 X 9/16 HT
10	1	19407	ASY, SAFETY CHAIN, 10,000 LB
11	1	W8424	WSHR 3/4ID 2OD 3/8THICK
12	1	23790C	JACK, PARKING SWIVEL 1200LBS CERTIFIED

OBTAIN LOCALLY:

REF	QTY	PART	DESCRIPTION
13	1	1285	1/4 X 1-1/2 COTTER PIN
14	1	832	WSHR 1 STD FLAT
15	1	2615	BOLT CRG 1/2 NC X 1-1/4 GR5
16	1	29893	BOLT CRG 1/2 NC X 1-1/2 HT
17	2	603845	BOLT, HEX FLNG 3/4 NC X 2.25 GR5
18	2	7164	HHCS 5/16 NC X 2-1/4 GR5
19	1	14069	HHCS 1/2 NC X 3-1/4
20	1	13759	HHCS 3/4 NC X 2-1/4 GR5 ZP
21	2	6778	NUT LOCK 5/16 NC
22	1	11900	NUT, HFN 1/2 NC, LOCK, GR G
23	2	1045624	NUT, HFN 1/2 NC, LOCK, GR F
24	3	W302207	NUT, HFN 3/4 NC, LOCK, GR G

SMARTLIFT™ CV LIFT ASSIST

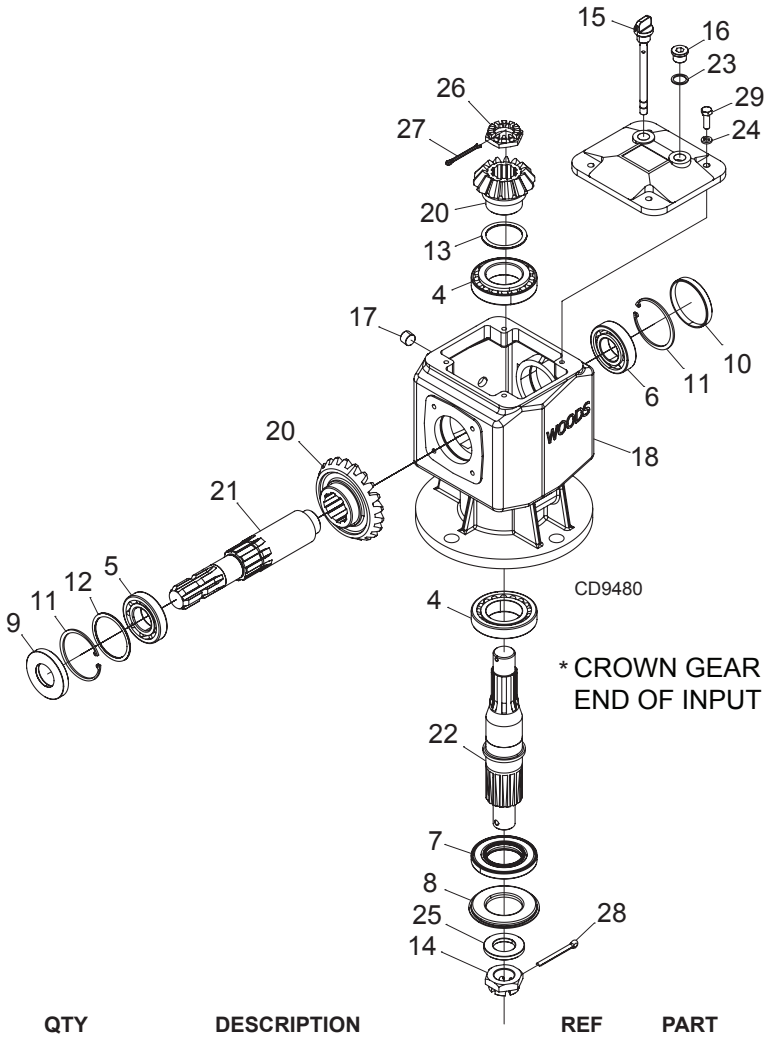


REF	QTY	PART	DESCRIPTION
1	1	645634RP	CV LIFT ARM W/HANDLE
2	1	645635RP	CV LIFT ARM
3	1	1044930RP	SPRING LIFT WELDMENT
4	2	1045027RP	SPRING LINK
5	2	1045028RP	SPRING T
6	2	1045029RP	SPRING ANGLE
7	1	1029865	ROLLER 2 X 4.38
8	1	613811	LOCK PIN, 1/4 X 1.0 RND
9	2	1045026	SPRING, 1.0 X 3.0 - 65LB
10	1	1045030	PIN, .50 X 7.63

OBTAIN LOCALLY:

REF	QTY	PART	DESCRIPTION
11	6	71851	BOLT, HEX FLNG 5/16 NC X .75 GR5
12	6	1045655	NUT, HFN 5/16 NC, LOCK, GR F

BW12.40 WING & CENTER GEARBOX ASSEMBLY



* CROWN GEAR PLACED ON OPPOSITE END OF INPUT SHAFT FOR RIGHT WING

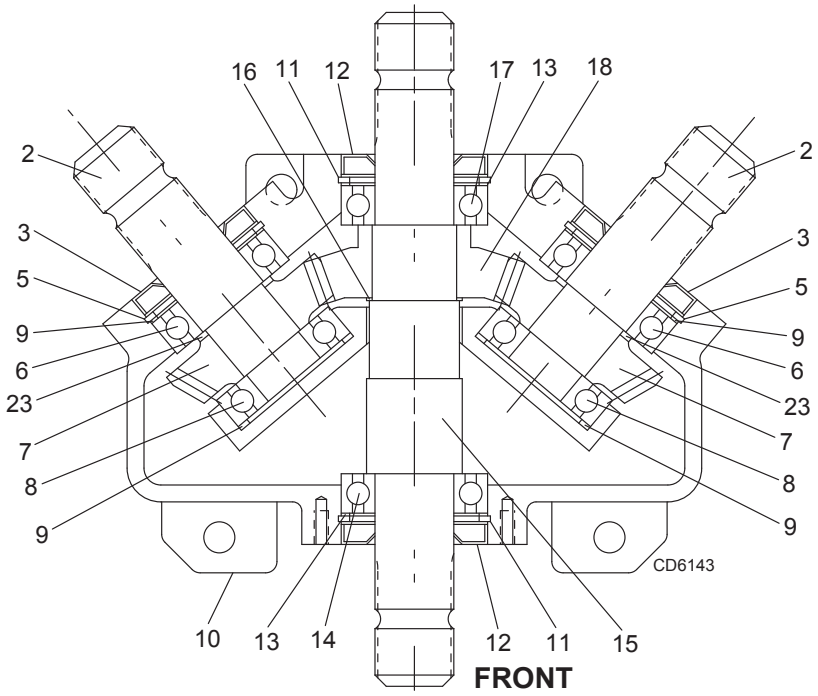
REF	PART	QTY	DESCRIPTION
A	642750RP	1	Complete Gearbox, Right Wing
B	642751RP	1	Complete Gearbox, Left Wing
C	642752RP	1	Complete Gearbox - Center Deck
4	39263	2	Bearing, cone and cup, 30210
5	57462	1	Bearing, cup and cone, 30207
6	20890	1	Bearing, cup and cone, 6207
7	1045873	1	Seal, 50 x 90 x 10
8	57338	1	Seal protector
9	57463	1	Oil seal, 35 x 72 x 10
10	57374	1	Oil Cap
11	57466	2	Retaining ring, 72mm internal
12	57328	1	Shim Set, 62 x 72
13	57471	1	Shim Set, 50.3 x 62.0
14	W39323	1	Slotted hex nut, M30x2-6G
15	651202	1	Dipstick with free flow breather
16	NSS	1	Oil Level Plug
17	NSS	1	Oil fill plug, 3/8 NPT

REF	PART	QTY	DESCRIPTION
18	NSS	1	Housing
19	NSS	1	Inspection Cover
20	NSS	1	Bevel Gears
21	NSS	1	Input Shaft
22	NSS	1	Output Shaft
	NSS		Not Serviced Separately

OBTAIN LOCALLY:

REF	PART	QTY	DESCRIPTION
23	----	1	Sealing washer, 11.5 x 9.0 x 1.5
24	----	4	Lock washer, M8
25	----	1	Flat washer, 56 x 31 x 6
26	----	1	Slotted hex nut, M30x1.5
27	----	1	Cotter pin, 4.0 x 50
28	----	1	Cotter pin, 6.3 x 60
29	----	4	Bolt, M8 x 1.5 x 25, HHCS

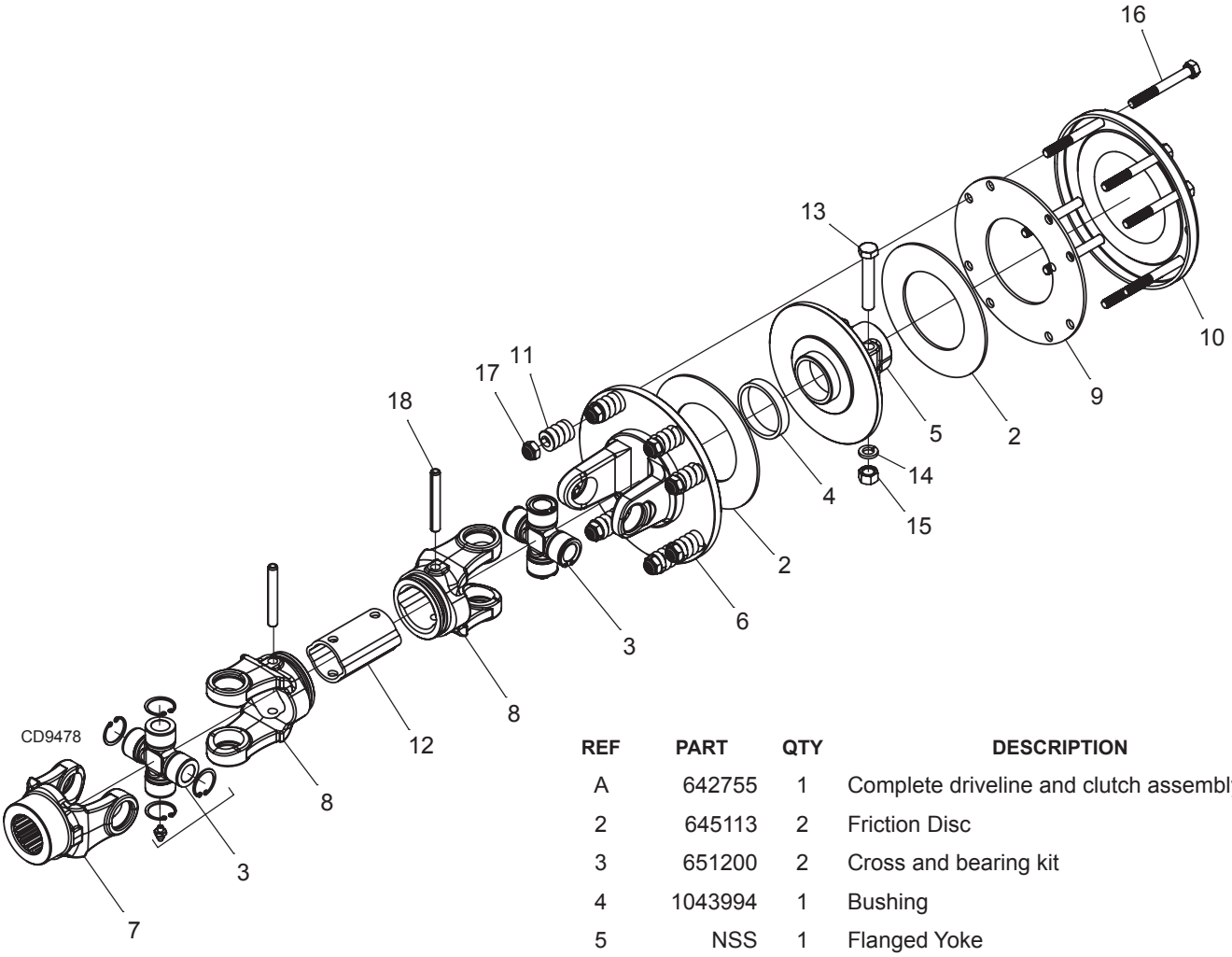
BW12.40 SPLITTER GEARBOX ASSEMBLY



REF	PART	QTY	DESCRIPTION
1	1038897	-	COMPLETE SPLITTER GEARBOX
2	1005308	2	SHAFT 1-3/4-20 SPLINE, WING
3	1005304	2	OIL SEAL
4	-------	2	3/8 PLUG (NOT SHOWN)
5	W39251	2	SNAP RING
6	20891	2	BEARING
7	1005305	2	GEAR
8	W39414	2	BEARING
9	1005306	4	SHIM
10	-------	1	CASTING
11	57320	2	SNAP RING
12	57318	2	OIL SEAL
13	1005307	2	SHIM
14	1034979	1	BEARING
15	1005303	1	SHAFT 1-3/4-20 SPLINE, CENTER
16	1005309	1	SNAP RING
17	1034979	1	BEARING
18	1005310	1	GEAR
19	57076	1	1/2 BREATHER
20	2472	*	5/16 LOCK WASHER, STANDARD
21	-------	*	M8 X 30 MM HHCS CL 8.8
22	-------	1	COVER
23	W20895	2	SNAP RING

* STANDARD HARDWARE, OBTAIN LOCALLY

BW12.40 CENTER DECK DRIVE ASSEMBLY

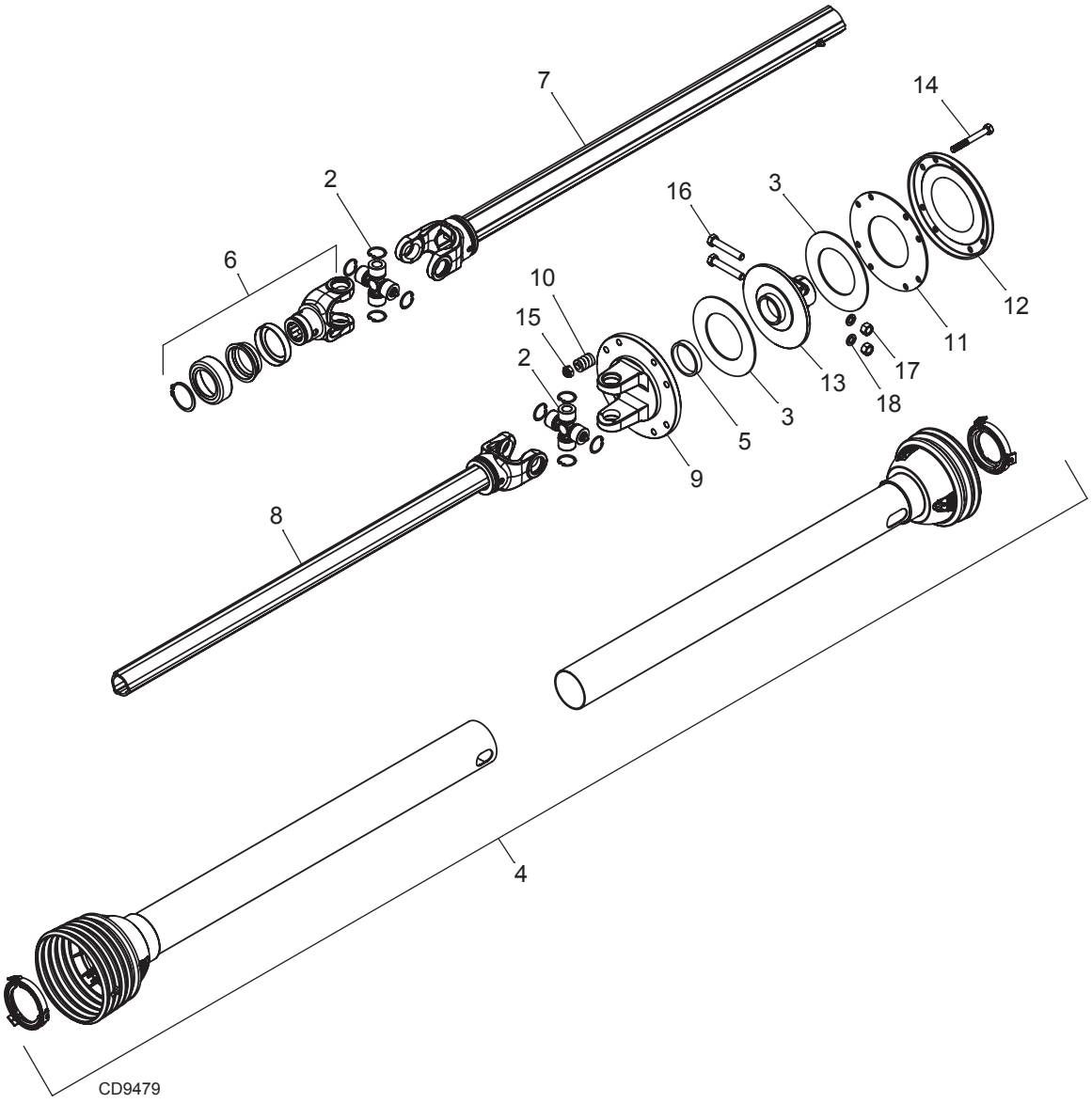


REF	PART	QTY	DESCRIPTION
A	642755	1	Complete driveline and clutch assembly
2	645113	2	Friction Disc
3	651200	2	Cross and bearing kit
4	1043994	1	Bushing
5	NSS	1	Flanged Yoke
6	NSS	1	Flanged Yoke, Spring
7	NSS	1	Splined Yoke
8	NSS	2	Internal Yoke
9	NSS	1	Internal Disc
10	NSS	1	Pressure Plate
11	NSS	8	Clutch Spring
12	NSS	1	Outer Tube
	NSS		Not Serviced Separately

OBTAIN LOCALLY:

REF	PART	QTY	DESCRIPTION
13	---	2	M12 x 1.75 X 75 HHCS
14	----	2	M12 Lock Washer
15	----	2	M12 X 1.75 Hex Nut
16	----	8	M10 X 1.50 X 85 HHCS
17	----	8	M10 x 1.50 Nylon Lock Nut
18	----	2	5mm x 75 mm long spring pin

BW12.40 WING DRIVE ASSEMBLY



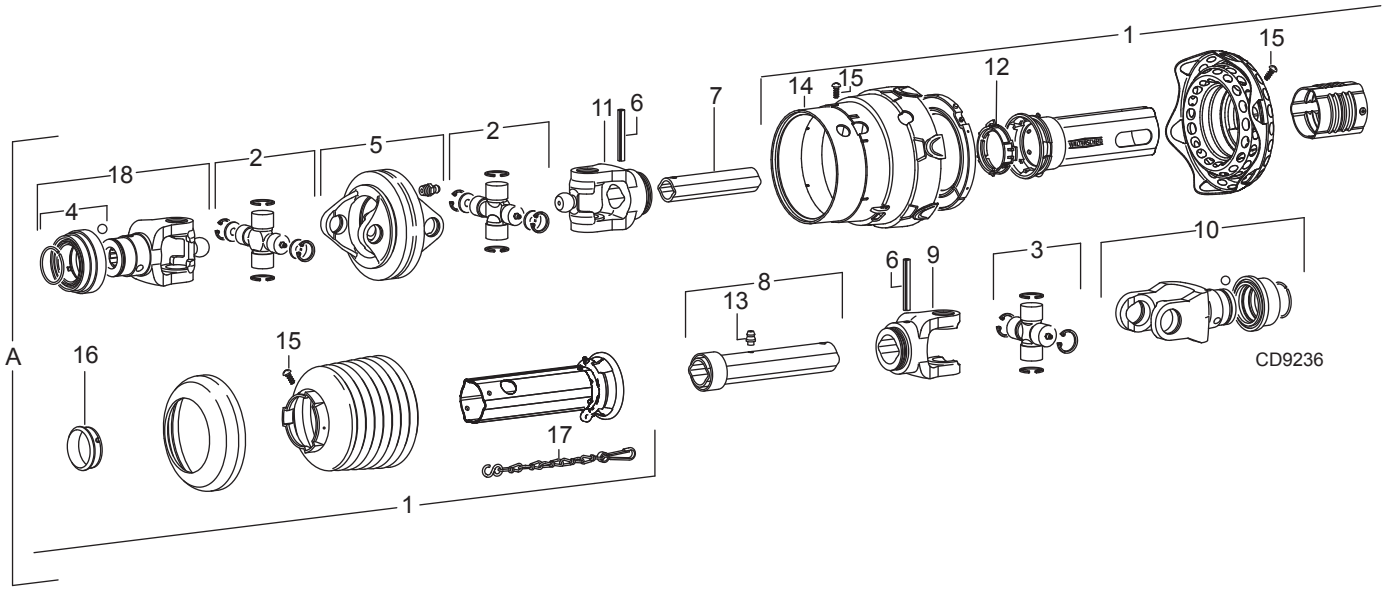
REF	PART	QTY	DESCRIPTION
A	642753	1	Complete driveline and clutch assembly
2	605276	2	Cross and bearing kit
3	645113	2	Friction Disc
4	651201	1	Shield Kit Complete
5	1043994	1	Bushing
6	NSS	1	Complete collar yoke
7	NSS	1	Outer yoke and tube
8	NSS	1	Inner yoke and tube
9	NSS	1	Flanged yoke
10	NSS	8	Spring
11	NSS	1	Internal disc
12	NSS	1	Pressure plate
13	NSS	1	Clutch hub

NSS Not Serviced Separately

OBTAIN LOCALLY:

REF	PART	QTY	DESCRIPTION
14	----	8	M10 x 1.50 X 85, HHCS
15	----	8	M10 x 1.50 x Nylon lock nut
16	----	2	M12 x 1.75 x 75, HHCS
17	----	2	M12 x 1.75 Hex nut
18	----	2	M12 Lock Washer

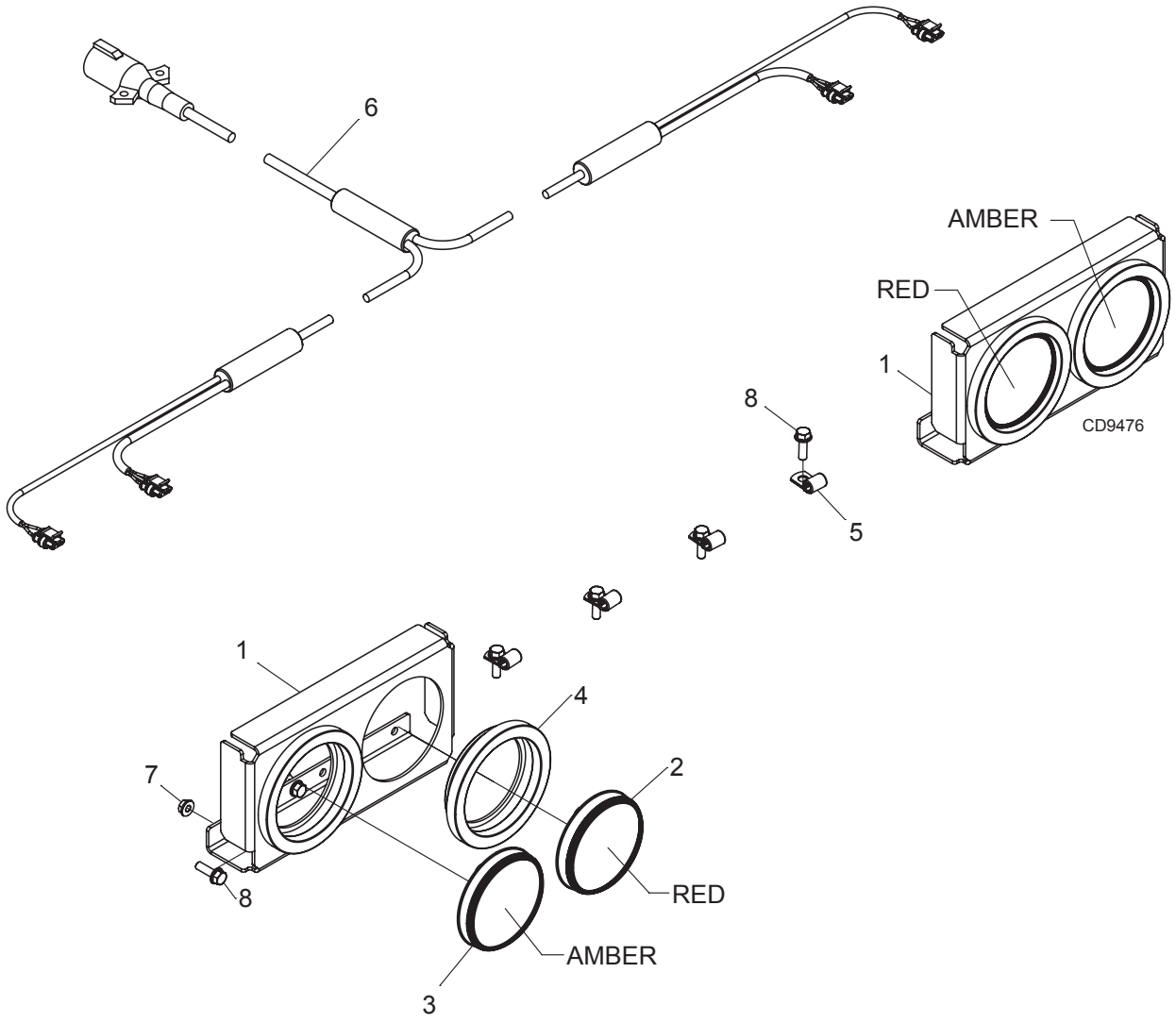
CV DRIVE ASSEMBLY



REF	PART	QTY	DESCRIPTION
A	610479	1	Complete CV drive
1	632555	1	Complete guard kit
2	1041684	2	Cross and bearing kit
3	1045581	1	Cross and bearing kit
4	632554	1	Slide collar repair kit
5	NSS	1	Double yoke
6	NSS	2	Spring pin
7	NSS	1	Inner profile
8	NSS	1	Outer profile
9	NSS	1	Inboard yoke
10	NSS	1	Yoke, 1-3/4, 20 spline
11	NSS	1	Inner yoke
12	NSS	1	Bearing ring
13	NSS	1	Grease fitting
14	NSS	1	Cone and bearing assembly
15	NSS	10	Screw
16	NSS	1	Support bearing
17	NSS	2	Anti-rotation chain
18	NSS	1	Yoke, 1-3/8, 6 spline

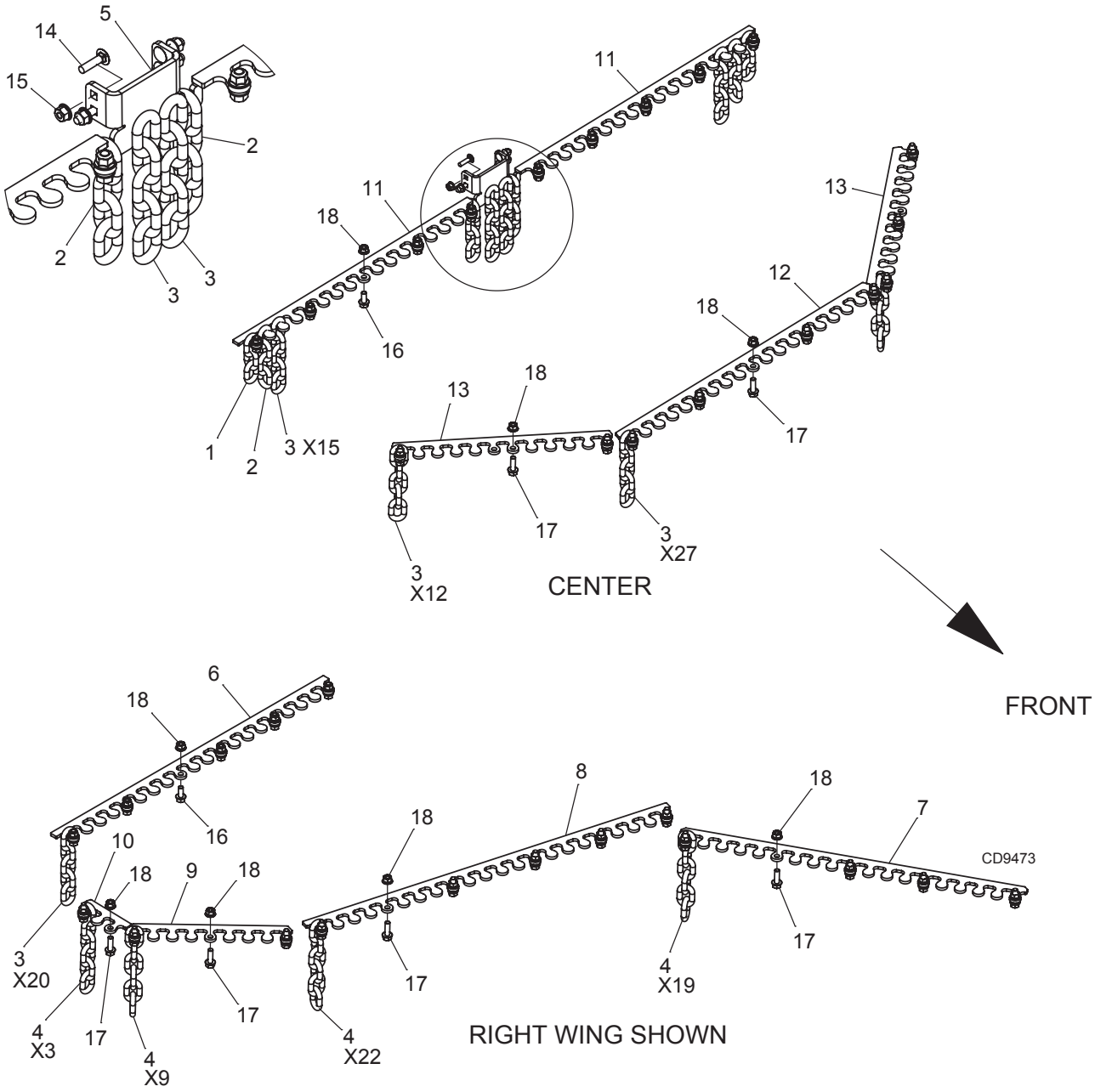
NSS Not Serviced Separately

LIGHTS AND WIRING



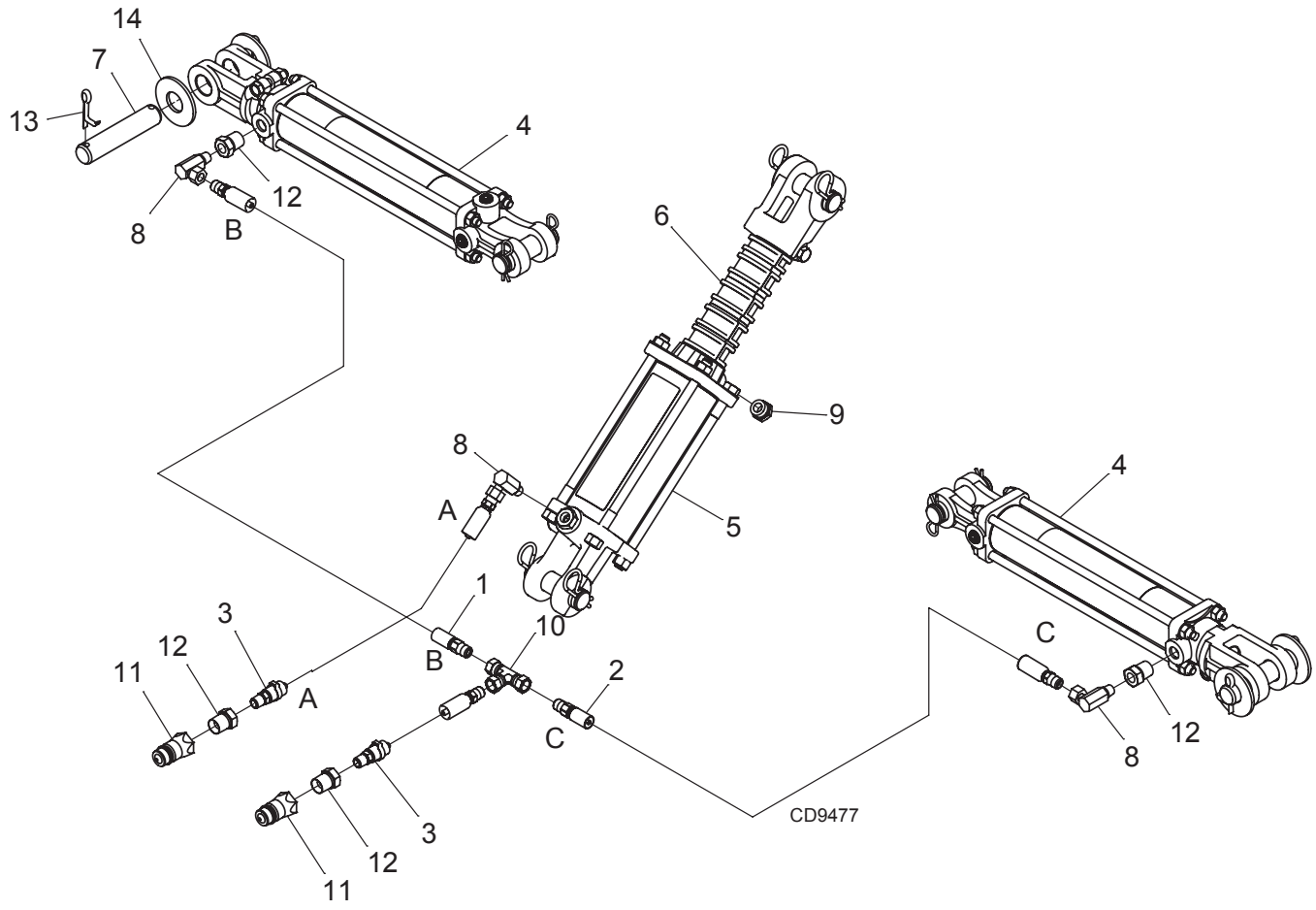
REF	QTY	PART	DESCRIPTION
1	2	645689RP	BRACKET, LIGHTS
2	2	632805	LAMP, 4 IN ROUND RED STOP - TAIL
3	2	632806	LAMP, 4 IN ROUND AMBER TURN
4	4	632807	GROMMET, 4 IN ROUND LAMP
5	4	640361	LOOP CLAMP, .38 GALV STEEL, VINYL
6	1	640367	HARNESS, BW12 LIGHTING
7	4	1045655	NUT, HFN 5/16 NC, LOCK, GR F
8	8	71632	BOLT, HEX FLNG 5/16 NC X 1.00, SRTD

CHAIN SHIELDING - SINGLE ROW



REF	QTY	PART	DESCRIPTION
1	2	1041054	5/16 CHAIN 3 LINK
2	4	4069	5/16 CHAIN 4 LINK
3	115	3994	5/16 CHAIN 5 LINK
4	106	5498	5/16 CHAIN 6 LINK
5	1	632369RP	CENTER REAR CHANNEL, 2
6	2	645705RP	WING REAR LINK, 20
7	2	645706RP	WING SMALL ANGLED LINK, 19
8	2	645707RP	WING LARGE ANGLED LINK, 22
9	2	645708RP	WING SIDE LINK, 9
10	2	645709RP	WING END LINK, 3
11	2	645712RP	CENTER REAR SIDE LINK, 17
12	1	645713RP	CENTER FRONT LINK, 27
13	2	645714RP	CENTER SIDE LINK, 12
OBTAIN LOCALLY:			
14	4	W73212	BOLT CRG 1/4NC X 1 GR5 ZC
15	4	62521	NUT LOCK 1/4 NC FLANGE
16	22	654068	BOLT, HEX FLNG 5/16 NC X .75 GR8
17	43	654067	BOLT, HEX FLNG 5/16 NC X 1.0 GR8
18	65	14139	NUT, HFN 5/16 NC, LOCK, GR G

CYLINDER AND HOSE ASSEMBLY

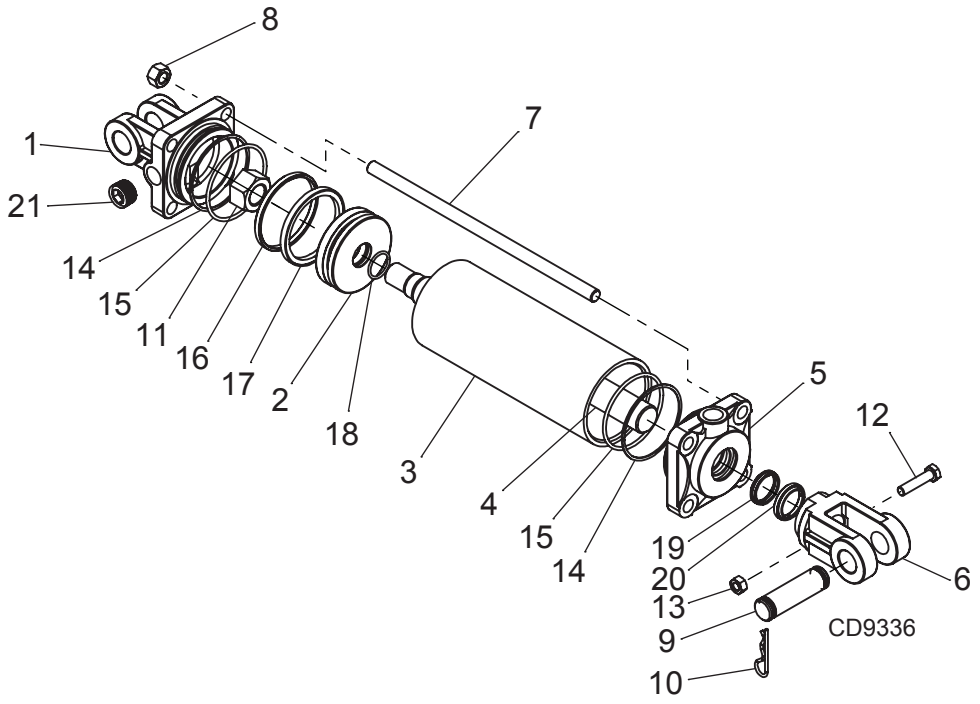


REF	QTY	PART	DESCRIPTION
1	1	8107	1/4 1 WIRE X 36 HYD HOSE
2	1	28522	HOSE, .25ID X .25NPT X 54
3	2	645808	HOSE, .25ID X 174 - .25NPTM X .25NPTM
4	2	597264	CYLINDER, 2.0 X 1.13 X 10.0 SAE6
5	1	597266	CYLINDER, 3.0 X 1.25 X 6.0 SAE8
6	1	24098A	1-1/4CYL STRK CNTRL SET
7	2	8345	PIN HDLS 1.00 X 4.08
8	3	10290	1/4 X 1/4 90 EL 1/16 RSTR
9	1	11975	VENT PLUG, 1/2 NPT
10	1	31239	FITTING, 1/4 F SWIVEL UNION TEE
11	2	66511	CPLR MALE ISO 1/2 NPT
12	5	W11893	ADAPTER 1/4 NPTF 1/2 NPTM

OBTAIN LOCALLY:

REF	QTY	PART	DESCRIPTION
13	4	1285	1/4 X 1-1/2 COTTER PIN
14	4	832	WSHR 1 STD FLAT

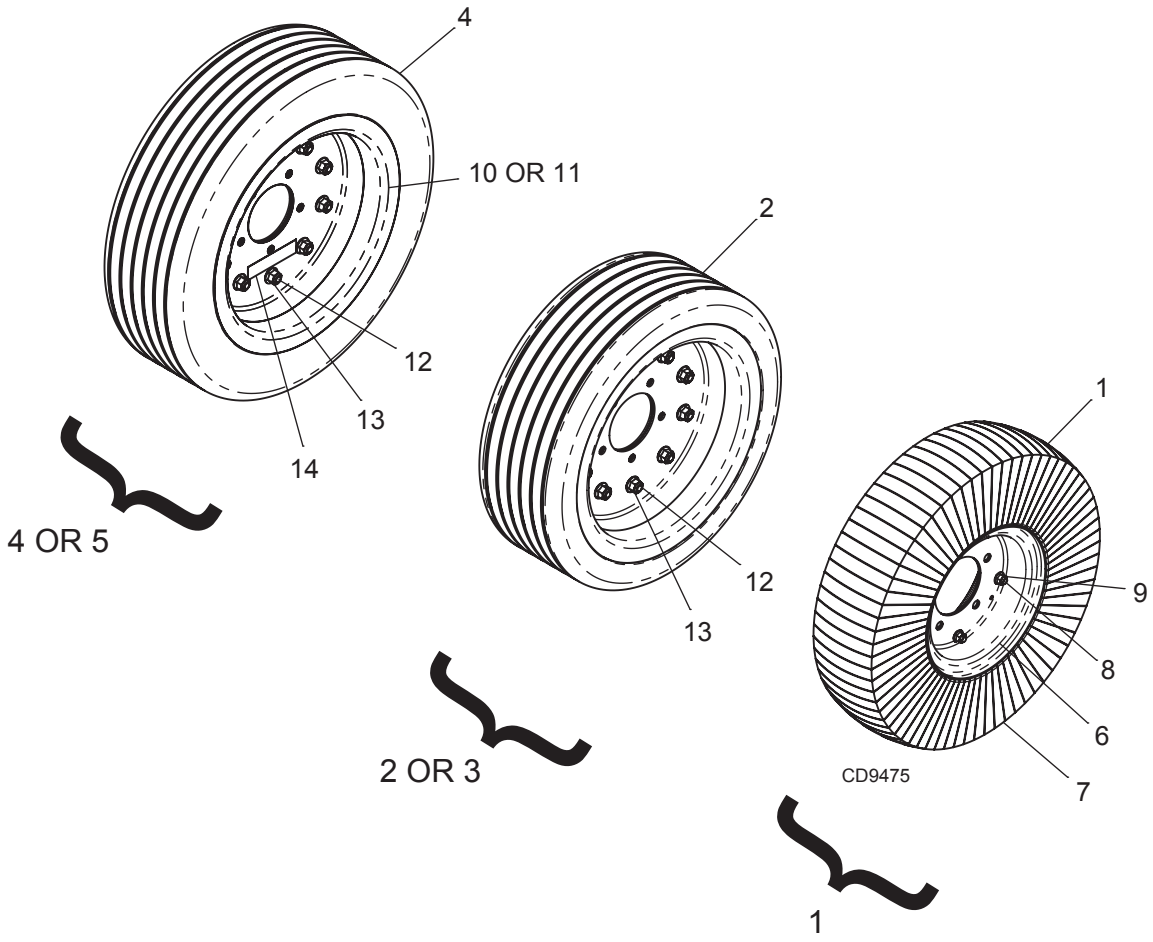
HYDRAULIC CYLINDERS



REF	2.0 x 10.0 WING	3.0 x 6.0 LIFT	QTY	DESCRIPTION
1	NSS	NSS	1	CLEVIS, BASE
2	NSS	NSS	1	PISTON
3	NSS	NSS	1	BARREL
4	NSS	NSS	1	ROD
5	NSS	NSS	1	GUIDE
6	NSS	NSS	1	CLEVIS, ROD
7	NSS	NSS	1	TIE ROD
8	*	*	8	NUT, TIE ROD
9	NSS	NSS	1	PIN, 1.00
10	*	*	4	HAIR PIN
11	*	*	1	NUT, PISTON
12	*	*	1	BOLT
13	*	*	1	NUT, CLAMP
14	NSS	NSS	2	BACKUP RING, TUBE
15	NSS	NSS	2	O-RING, TUBE
16	-	NSS	1	WEAR RING
17	NSS	NSS	1	PISTON SEAL
18	NSS	NSS	1	O-RING, PISTON
19	NSS	NSS	1	ROD SEAL
20	NSS	NSS	1	WIPER RING
21	*	*	1	PLUG, 1/2 NPT
22	651203	651204		SEAL KIT, INCLUDES ITEMS 14 - 20
23	-	651205	1	3 X 6 HYDRAULIC CYLINDER W/ BREATHER
24	597264	-	2	2 X 10 HYDRAULIC CYLINDER, COMPLETE

*	OBTAIN LOCALLY
NSS	NOT SOLD SEPARATELY

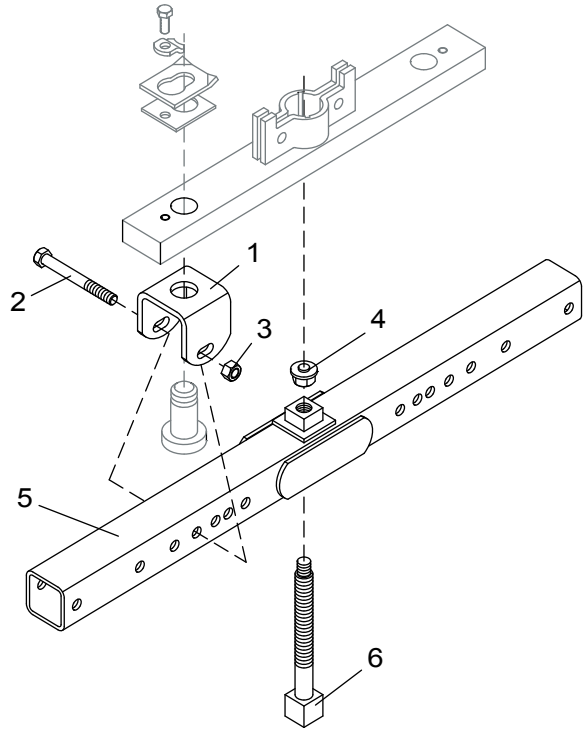
WHEEL AND TIRE ASSEMBLIES

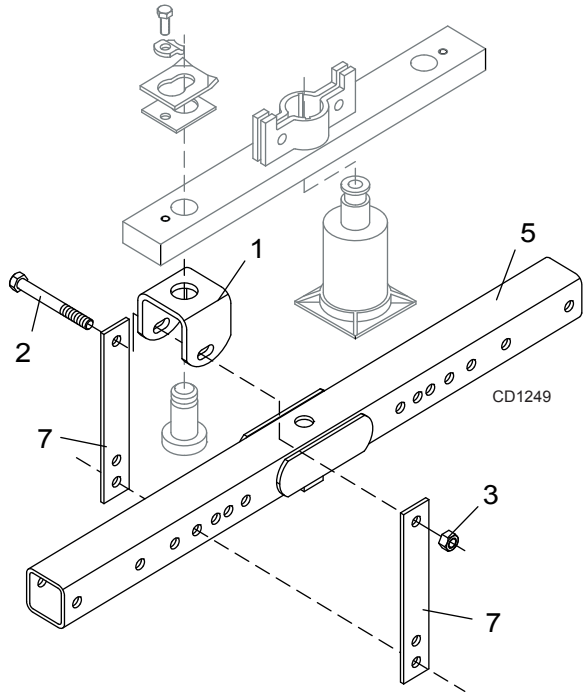


REF	QTY	PART	DESCRIPTION
1	1	1017040	WHEEL ASY, 21OD LAMINATED, 5 BOLT RIM
2	1	645682	WHL ASY, 21X7-12 16PR BSHMSTR, 5 BOLT
3	1	645682F	WHL ASY, 21X7-12 16PR BSHMSTR FM, 5 BOLT
4	1	1039976	WHL ASY, 25.5 X 8-14 20PR TRAKS
5	1	1039976F	WHL ASY, 25.5 X 8-14 FOAM TRAKS
6	2	1017042	RIM HALF 6 X 9 TIRE 5 BLT
7	1	7429	6 X 9 LAMINATED TIRE

REF	QTY	PART	DESCRIPTION
8	5	*	BOLT, HEX FLNG 3/8 NC X 1.00 GR5 SRTD
9	5	14350	NUT, HFN 3/8 NC, LOCK, GR G
10	1	640000	RIM HALF 14 X 6 5BLT
11	1	640001	RIM HALF 14 X 6 W/VLV 5BLT
12	10	1045070	SCREW, HFS, 1/2 NC X 1.0 GR5
13	10	11900	NUT, HFN 1/2 NC, LOCK, GR G
14	1	1006348	DCL, WRNG, WHEEL RIM EXPLOSION

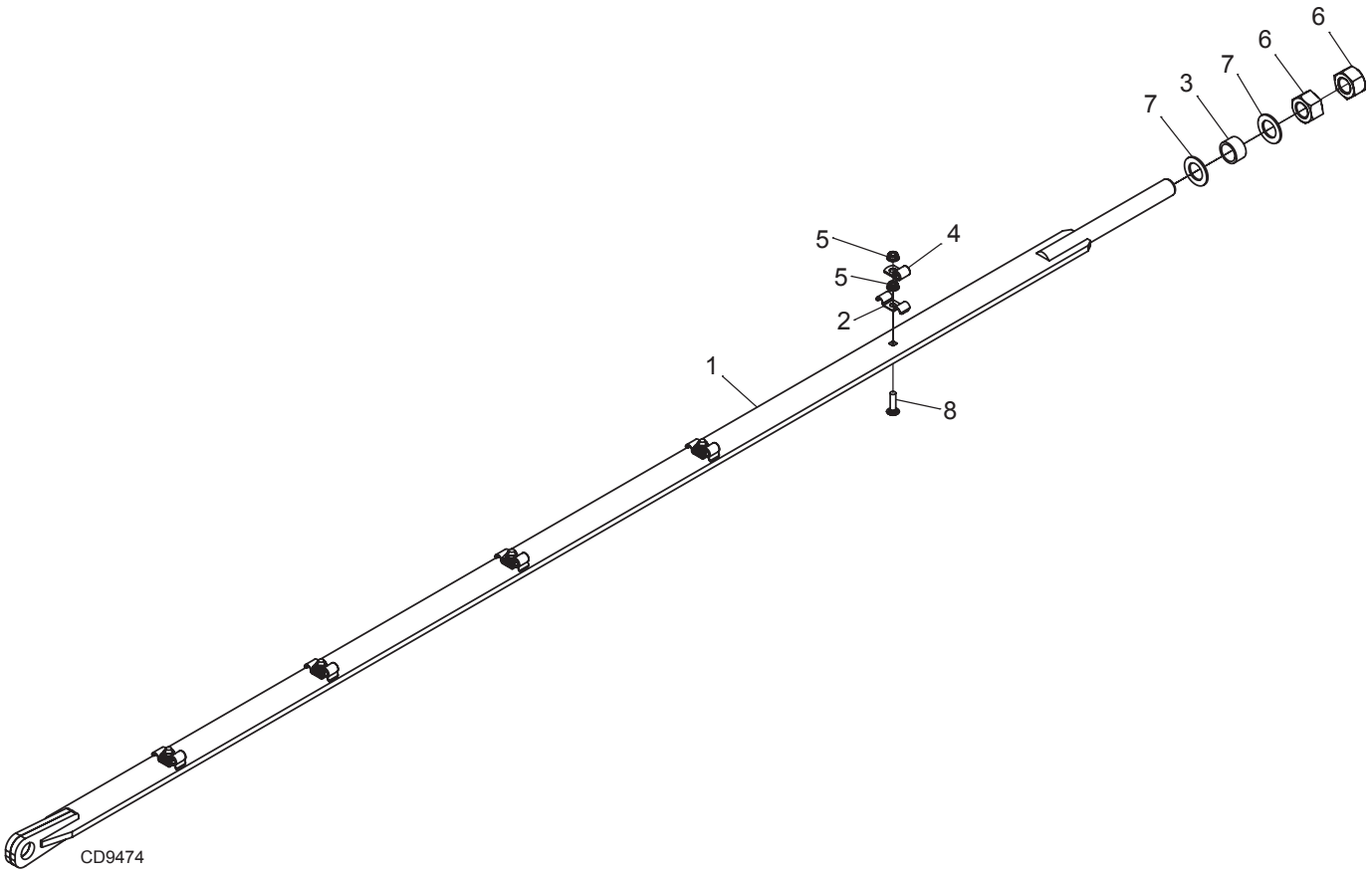
CROSSBAR PULLER (OPTIONAL)





REF	PART	QTY	DESCRIPTION
A	8811	1	CROSSBAR PULLER, COMPLETE
1	------	2	CROSSBAR PULLER CLEVIS
2	3097 *	4	5/8 NC X 4-1/2 HHCS GR5
3	230 *	4	5/8 NC HEX NUT
4	------	1	CROSSBAR PULLER PAD ASSEMBLY
5	24876	1	CROSSBAR PULLER TUBE ASSEMBLY
6	24881	1	CROSSBAR PULLER SCREW ASSEMBLY
7	24885RP	4	CROSSBAR PULLER LINK
	*		STANDARD HARDWARE, OBTAIN LOCALLY

ATTITUDE RODS



REF	QTY	PART	DESCRIPTION
1	1	645722RP	WA, ATTITUDE ROD BW12.40
2	5	480265	FEEDLINE CLAMP 3/8
3	1	33647	SLV, 1.313 X 1.049 X .75
4	5	640361	LOOP CLAMP, .38 GALV STEEL, VINYL

OBTAIN LOCALLY:

REF	QTY	PART	DESCRIPTION
5	10	1045655	NUT, HFN 5/16 NC, LOCK, GR F
6	2	3132	NUT HEX 1 NC ZP
7	2	1863	WASHER, FLAT, 1 SAE ZP
8	5	14458	BOLT CRG 5/16NC X 1-1/4

BOLT TORQUE CHART

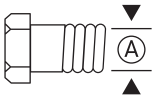
Always tighten hardware to these values unless a different torque value or tightening procedure is listed for a specific application.

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

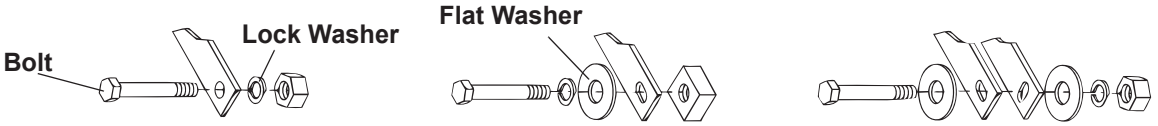
SAE Grade 2
(No Dashes)

SAE Grade 5
(3 Radial Dashes)

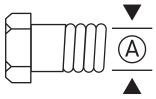
SAE Grade 8
(6 Radial Dashes)

Ⓐ 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

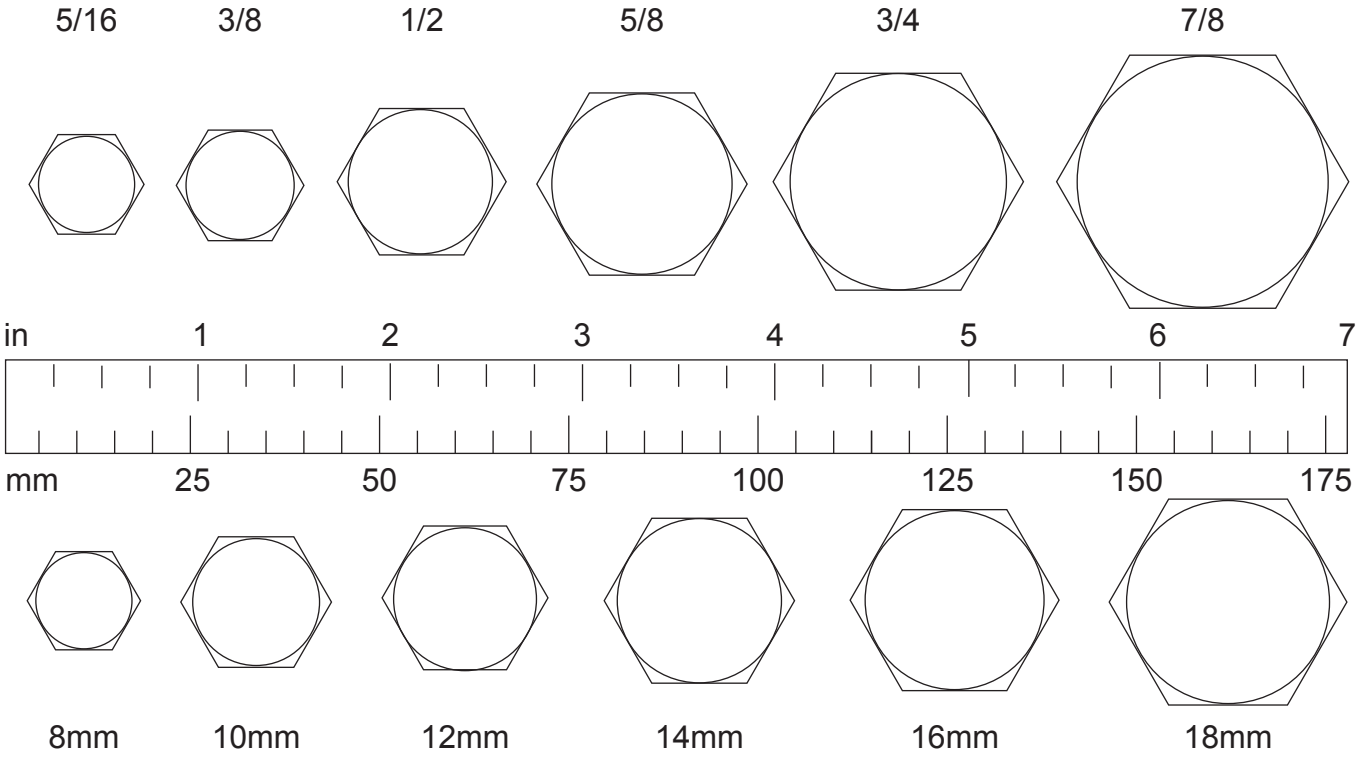
Metric
Grade 10.9

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

BOLT SIZE CHART

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

SAE BOLT THREAD SIZES



METRIC BOLT THREAD SIZES

ABBREVIATIONS

AG . . . . . Agriculture
ASABE . . . . . American Society of Agricultural & Biological Engineers (formerly ASAE)
ASAE . . American Society of Agricultural Engineers
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
FT . . . . . Full Thread
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

INDEX

PART NO.

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