

OPERATOR'S MANUAL

CARTED WHEEL RAKE

WR6008

WR6010

WR6012



FRONTIER

OMUS00W6F (07/04/13)

INTRODUCTION

READ THIS MANUAL carefully to learn how to operate and service your machine correctly. Failure to do so could result in personal injury or equipment damage. This manual and safety signs on your machine may also be available in other languages. (See your Frontier dealer to order.)

THIS MANUAL SHOULD BE CONSIDERED a permanent part of your machine and should remain with the machine when you sell it.

MEASUREMENTS in this manual are given in both metric and customary U.S. unit equivalents. Use only correct replacement parts and fasteners. Metric and inch fasteners may require a specific metric or inch wrench.

RIGHT-HAND AND LEFT-HAND sides are determined by facing in the direction the implement will travel when going forward.

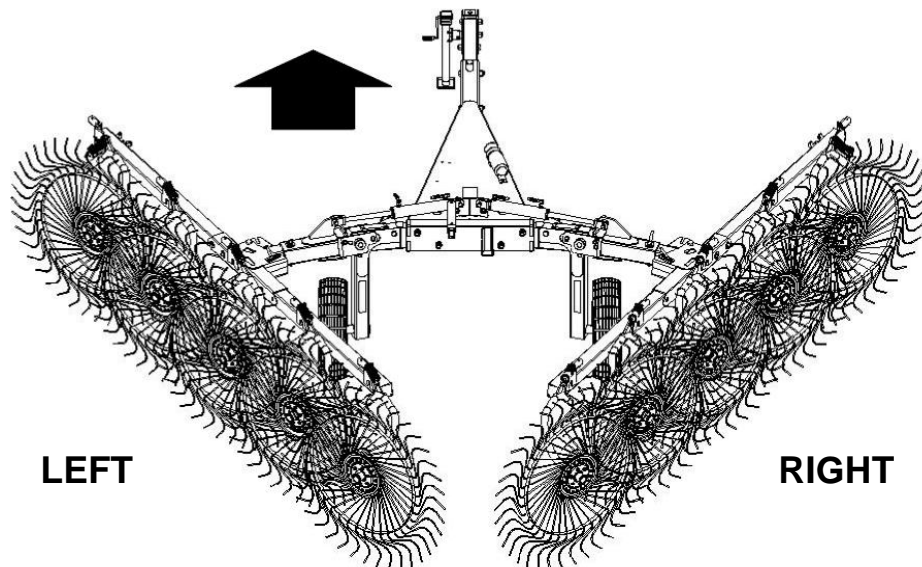
WRITE PRODUCT IDENTIFICATION NUMBERS

(P.I.N.) in the Specification section. Accurately record all the numbers to help in tracing the machine should it be stolen. Your dealer also needs these numbers when you order parts. File the identification numbers in a secure place off the machine.

WARRANTY is provided as part of Frontier's support program for customers who operate and maintain their equipment as described in this manual.

This warranty provides you the assurance that Frontier will back its products where defects appear within the warranty period. In some circumstances, Frontier also provides field improvements, often without charge to the customer, even if the product is out of warranty. Should the equipment be abused, or modified to change its performance beyond the original factory specifications, the warranty will become void and field improvements may be denied. Setting fuel delivery above specifications or otherwise overpowering machines will result in such action.

THE TIRE MANUFACTURER'S warranty applicable to your machine may not apply outside the U.S.



IMPORTANT! - Determine the right or left side of the machine by viewing it from the rear.

TABLE OF CONTENTS

	Page
SAFETY	4
PREPARING THE TRACTOR	
Positioning Tractor Drawbar	15
Using Drawbar Shield	15
Making Drawbar Shield	16
Three-Point Hitch Position	16
Checking Ballast, Wheel Spacing, and Tire Inflation	16
PREPARING THE RAKE	
Checking Tire Inflation Pressure	17
Checking Wheel Nut Torque	17
ATTACHING AND DETACHING	
Attaching Rake to Tractor Drawbar.....	18
Attaching to Tractor Hydraulic System	19
Detaching Rake from Tractor	20
TRANSPORTING	
Preparing Rake For Transport.....	22
OPERATING THE RAKE	
Prestarting Checks.....	24
Preparing Rake for Field Operation.....	25
Operating the Rake.....	27
Setting Working Width	28
Adjusting Raking and Windrow Width	29
Adjusting Raking Wheel Ground Pressure	31
Flip-up-Raking.....	32
Raking a Single Windrow or Swath	35
ATTACHMENTS Center Kicker Wheel	36
LUBRICATION AND MAINTENANCE	
Perform Lubrication and Maintenance	37
Observe Lubrication Symbols	37
Alternative and Synthetic Lubricants.....	38
Grease.....	38
Lubricant Storage.....	39
Every 10 Hours	39
Every 50 Hours	39
Every 100 Hours.....	40
Annually	41
As Required	42
TROUBLESHOOTING.....	43
SERVICE	
Servicing Tires Safely.....	44

TABLE OF CONTENTS

Servicing Rake Safely	44
Replacing Wheel Tines.....	45
Identifying Left-Hand and Right-Hand Rake Wheels	45
STORAGE	
End of Season	46
Beginning of Season	46
CHECKLISTS	
Dealers Record	47
Predelivery	47
Delivery	47
ASSEMBLY.....	48-67
FINAL INSPECTION AND LUBRICATION	
Final Inspection and Lubrication	68
SPECIFICATIONS	
WR60 Carted Wheel Rake	69
Record Product Identification Number	70
Tightening Flare Type Tube Fittings	70
Unified Inch Bolt and Cap Screw Torque Values	70
Metric Bolt and Cap Screw Torque Values	72
SPARE PARTS.....	73-94
INSTALLING CENTER KICKER WHEEL.....	95-99
INDEX.....	100

SAFETY



This safety alert symbol indicates important safety messages in this manual and on safety signs on the machine.

This symbol means:

ATTENTION!
BECOME ALERT!
YOUR SAFETY IS INVOLVED!

Carefully read and follow the safety message accompanying this symbol.

Why is SAFETY important to you?

- 3 BIG REASONS
- ACCIDENTS DISABLE AND KILL
 - ACCIDENTS COST
 - ACCIDENTS CAN BE AVOIDED

SIGNAL WORDS

Note the use of the signal words DANGER, WARNING, and CAUTION with safety messages. The appropriate signal word for each message has been selected using the following guidelines:



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



WARNING – Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury. It is also used to alert against unsafe practices.



CAUTION – Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It is also used as a reminder of good safety practices.

SAFETY

FOLLOW SAFETY INSTRUCTIONS

Carefully read all safety messages in this manual and on your machine safety signs. Keep safety signs in good condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs. Replacement safety signs are available from your John Deere dealer.

Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.

Keep your machine in proper working condition. Unauthorized modifications to the machine may impair the function and/or safety and affect machine life.

If you do not understand any part of this manual and need assistance, contact your John Deere dealer.



OPERATE RAKE SAFELY

All machinery should be operated by responsible persons who have been properly instructed and delegated to do so.

Before each use, inspect entire machine. Check tightness of all hardware.

Stop the tractor engine and engage parking brake before leaving tractor operator's station to adjust, lubricate, clean or unclog the machine.

Never hand feed material into the machine.

Do not lean against, sit, or stand on rake.

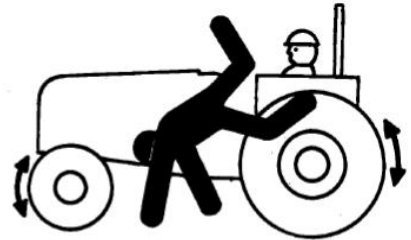
Make sure bystanders are clear of machine before lowering rake wheels.

SAFETY

KEEP RIDERS OFF MACHINE

Only allow the operator on the machine. Keep riders off.

Riders on machine are subject to injury such as being struck by foreign objects and being thrown off of the machine. Riders also obstruct the operator's view resulting in the machine being operated in an unsafe manner.

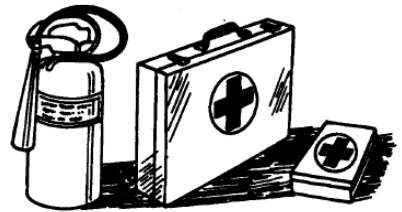


PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

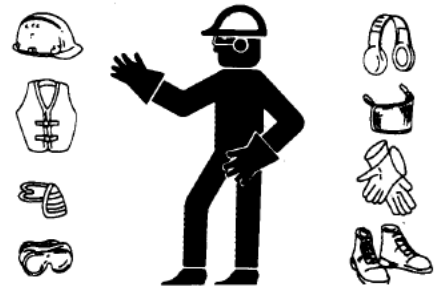
Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.



WEAR PROTECTIVE CLOTHING

Wear close fitting clothing and safety equipment appropriate to the job.

Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.



SAFETY

HANDLE CHEMICAL PRODUCTS SAFELY

Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with Frontier equipment include such items as lubricants, coolants, paints, and adhesives.

A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.

Check the MSDS before you start any job using a hazardous chemical. That way you will know exactly what the risks are and how to do the job safely. Then follow procedures and recommended equipment.

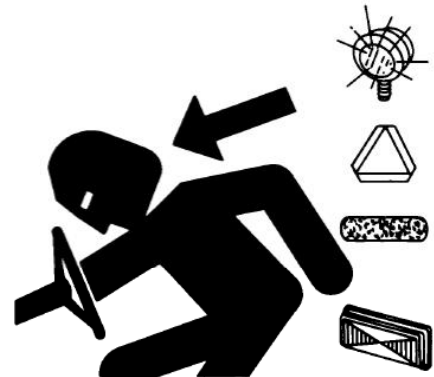
(See your John Deere dealer for MSDS's on chemical products used with Frontier equipment.)



USE SAFETY LIGHTS AND DEVICES

Prevent collisions between other road users, slow moving tractors with attachments or towed equipment, and self-propelled machines on public roads. Frequently check for traffic from the rear, especially in turns, and use hand signals or turn signal lights.

Use headlights, flashing warning lights, and turn signals day and night. Follow local regulations for equipment lighting and marking. Keep lighting and marking visible and in good working order. Replace or repair lighting and marking that has been damaged or lost.



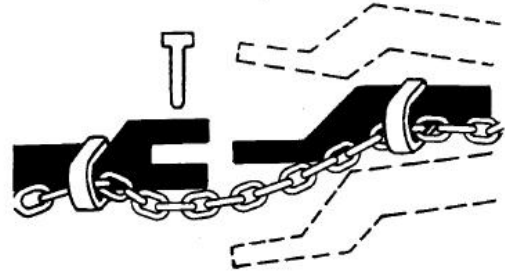
SAFETY

USE A SAFETY CHAIN

A safety chain will help control drawn equipment should it accidentally separate from the drawbar.

Using the appropriate adapter parts, attach the chain to the tractor drawbar support or other specified anchor location. Provide only enough slack in the chain to permit turning.

See your John Deere dealer for a chain with a strength rating equal to or greater than the gross weight of the towed machine. Do not use safety chain for towing.



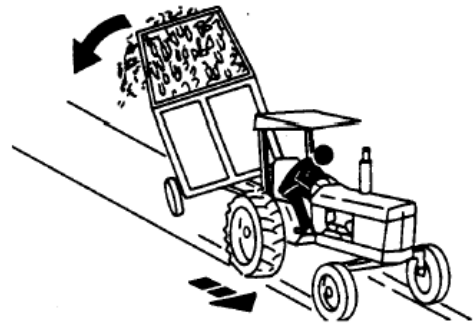
TOW LOADS SAFELY

Stopping distance increases with speed and weight of towed loads, and on slopes. Towed loads with or without brakes that are too heavy for the tractor or are towed too fast can cause loss of control. Consider the total weight of the equipment and its load.

Observe these recommended maximum road speeds, or local speed limits which may be lower:

- If towed equipment does not have brakes, do not travel more than 32 km/h (20 mph) and do not tow loads more than 1.5 times the tractor weight.
- If towed equipment has brakes, do not travel more than 40 km/h (25 mph) and do not tow loads more than 4.5 times the tractor weight.

Ensure the load does not exceed the recommended weight ratio. Add ballast to recommended maximum for tractor, lighten the load, or get a heavier towing unit. The tractor must be heavy and powerful enough with adequate braking power for the towed load. Use additional caution when towing loads under adverse surface conditions, when turning, and on inclines.



SAFETY

SERVICE RAKE SAFELY

To help prevent injury caused by unexpected movement, be sure to service machine on level surface.

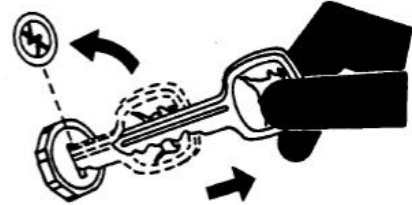
Lower rake wheels before servicing or adjusting rake.

If machine is connected to a tractor:

- Engage tractor parking brake and/or place transmission in "Park."
- Shut off engine and remove key.

If machine is detached from tractor, block wheels and use safety stands to prevent movement.

To avoid eye injuries, cuts and bruises, take care when working around raised wheels. Do not service or adjust machine with rake wheels raised.



PRACTICE SAFE MAINTENANCE

Understand service procedure before doing work. Keep area clean and dry.

Never lubricate, service, or adjust machine while it is moving. Keep hands, feet, and clothing from power-driven parts. Disengage all power and operate controls to relieve pressure. Lower equipment to the ground. Stop the engine. Remove the key. Allow machine to cool.

Securely support any machine elements that must be raised for service work.

Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.

Disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.



SAFETY

REMOVE PAINT BEFORE WELDING OR HEATING

Avoid potentially toxic fumes and dust.

Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.

Do all work outside or in a well ventilated area. Dispose of paint and solvent properly.

Remove paint before welding or heating:

- If you sand or grind paint, avoid breathing the dust. Wear an approved respirator.
- If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.



AVOID HEATING NEAR PRESSURIZED FLUID LINES

Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders. Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials. Pressurized lines can be accidentally cut when heat goes beyond the immediate flame area.



SAFETY

AVOID HIGH-PRESSURE FLUIDS

Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before apply pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from John Deere & Company Medical Department in Moline Illinois, U.S.A.



STORE ATTACHMENTS SAFELY

Stored attachments such as dual wheels, cage wheels, and loaders can fall and cause serious injury or death.

Securely store attachments and implements to prevent falling. Keep playing children and bystanders away from storage area.



SAFETY

DISPOSE OF WASTE PROPERLY

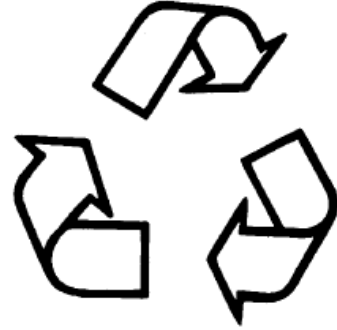
Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with Frontier equipment include such items as oil, fuel, coolant, brake fluid, filters and batteries.

Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

Do not pour waste onto the ground, down a drain, or into any water source.

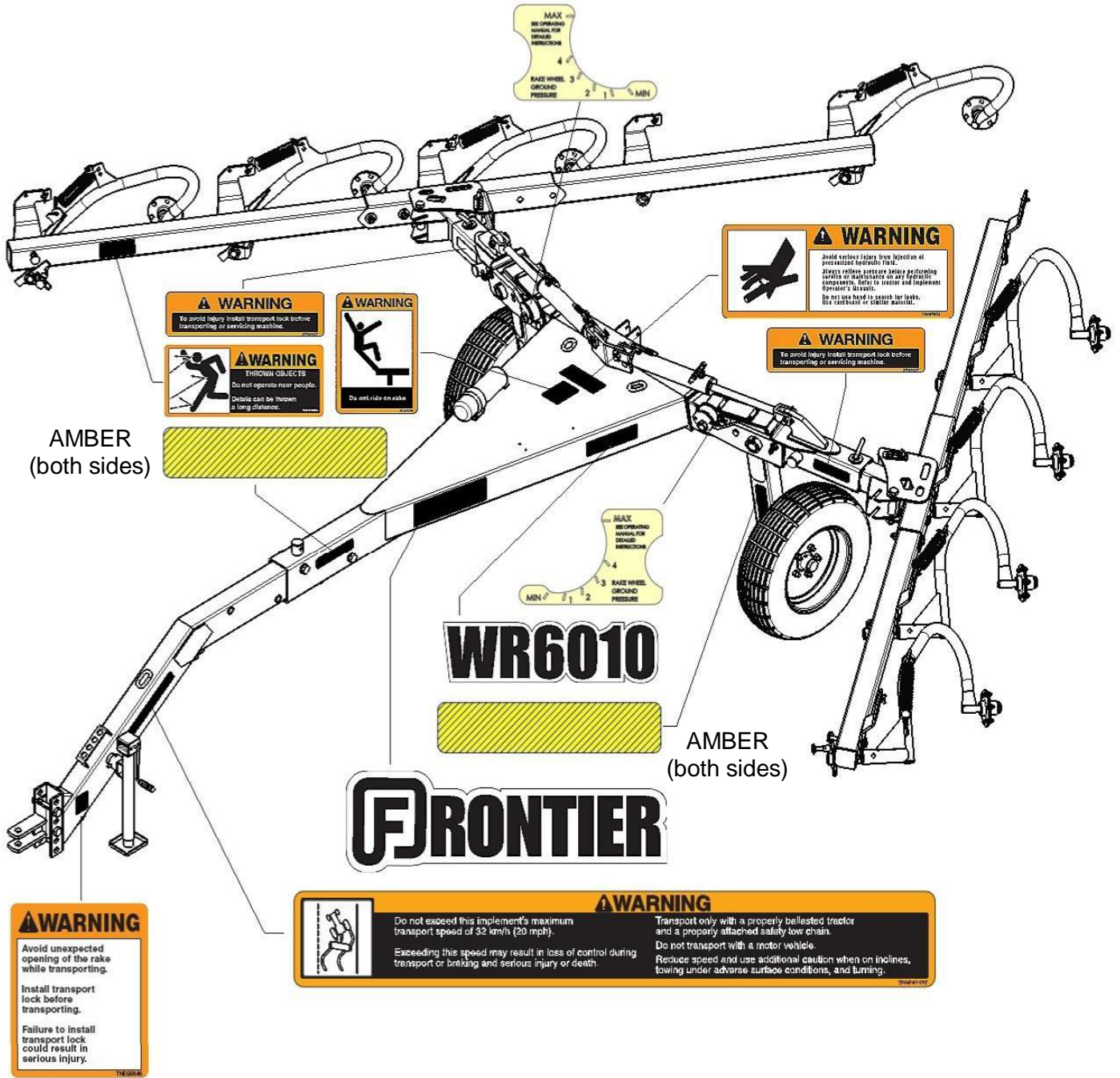
Air conditioning refrigerant escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.

Inquire on the proper way to recycle or dispose of waste from your local environmental or recycling center, or from your Frontier dealer.



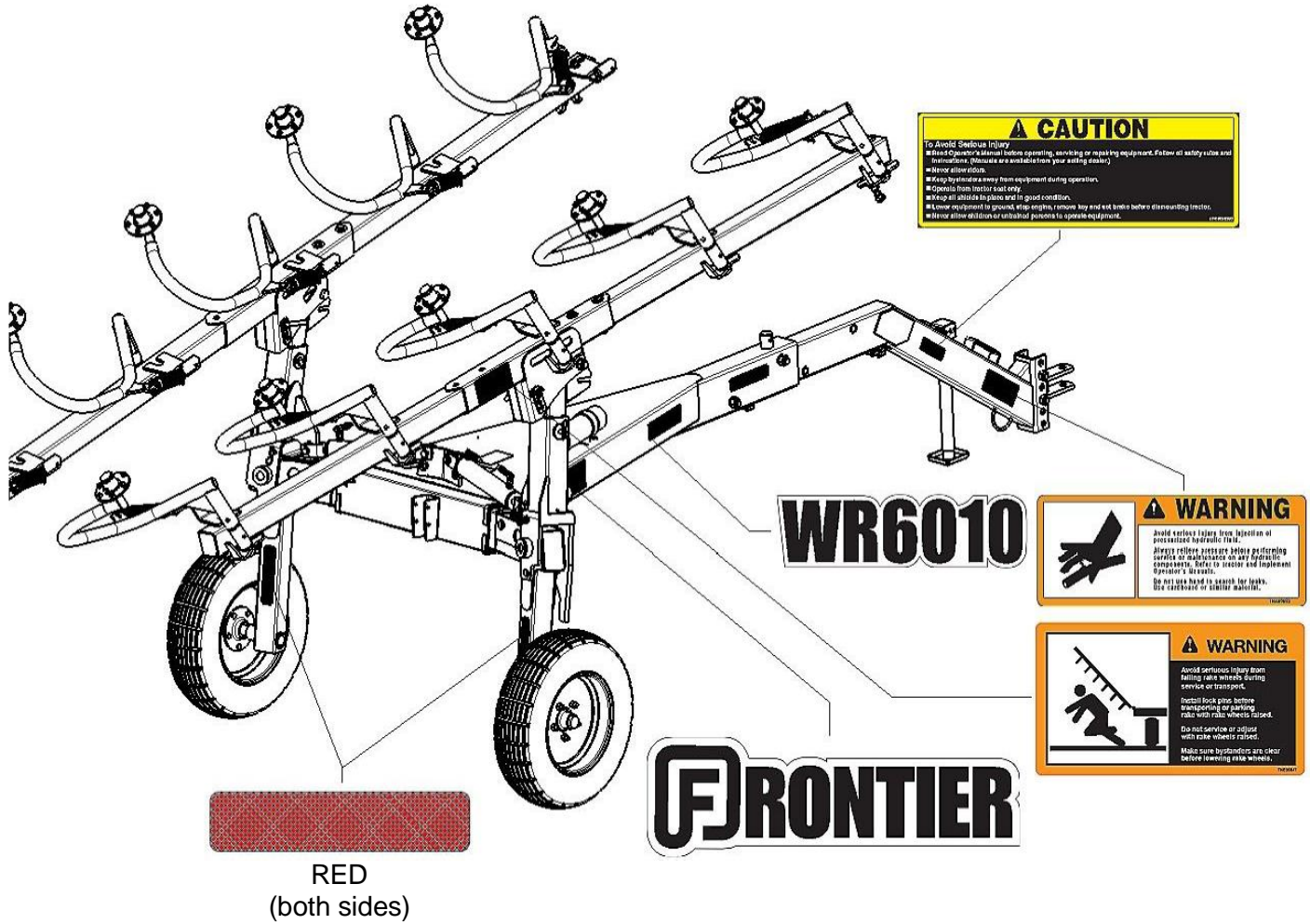
SAFETY

SAFETY SIGNS



SAFETY

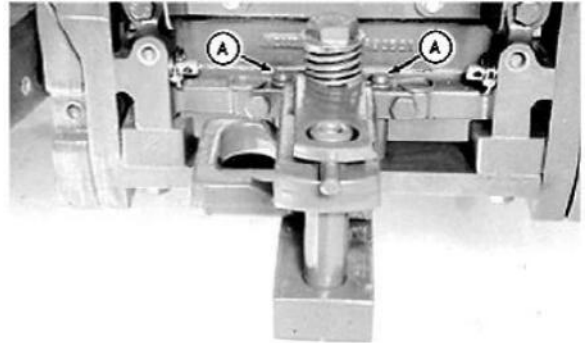
SAFETY SIGNS



PREPARING THE TRACTOR

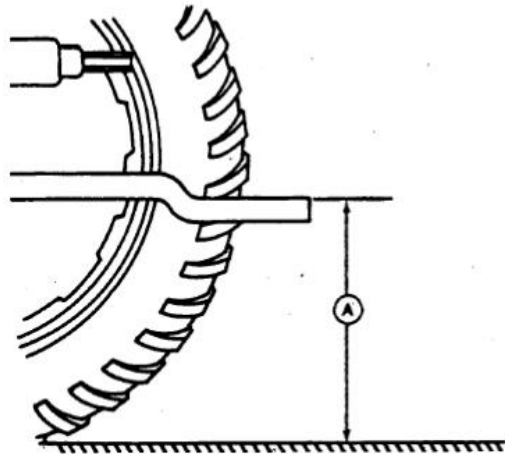
POSITIONING TRACTOR DRAWBAR

1. Remove locking pins (A) and move drawbar to center position.
2. Install locking pins (A).



3. Extend drawbar away from tractor as far as possible for better maneuverability when attaching, detaching, and operating in the field.
4. Remove clevis assembly, if equipped.
5. If drawbar is offset, turn drawbar so offset is down, as illustrated.

The rake can be attached to any tractor having a drawbar that conforms to ASAE-SAE standards of 330 to 559 mm (13 to 22 in.) (A) from the ground.



USING DRAWBAR SHIELD

If a tractor drawbar catches and disturbs the windrow under the tractor, a drawbar shield can be used.

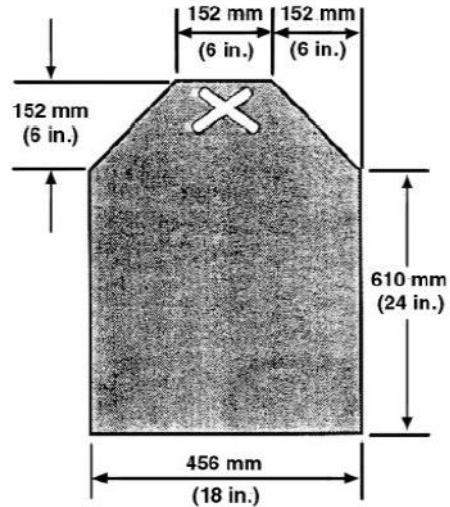
See Making Drawbar Shield in this section.



PREPARING THE TRACTOR

MAKING DRAWBAR SHIELD

Use 2 or 4 ply belting.



THREE-POINT HITCH POSITION

IMPORTANT: To prevent damage to rake hitch when making turns, make sure draft links clear rake tongue.

Position tractor draft links to avoid interference with rake tongue when making turns.

CHECKING BALLAST, WHEEL SPACING, AND TIRE INFLATION

Provide sufficient weight to stabilize tractor when operating on hilly land or other adverse conditions. (See your tractor operator's manual.)

To insure proper stability, adjust ballast, wheel spacing and tire inflation according to tractor operator's manual.

PREPARING THE RAKE

CHECKING TIRE INFLATION PRESSURE

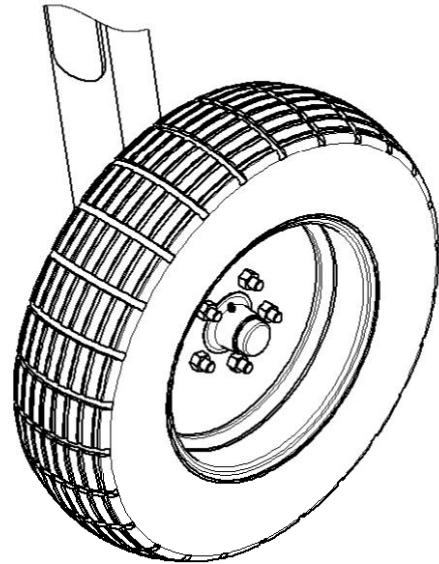
To maintain machine efficiency, use only the tires specified.

TIRE SIZE
205/75-15

TIRE PRESSURE
250 kPa (36 psi) (2.5 Bar)

CHECKING WHEEL NUT TORQUE

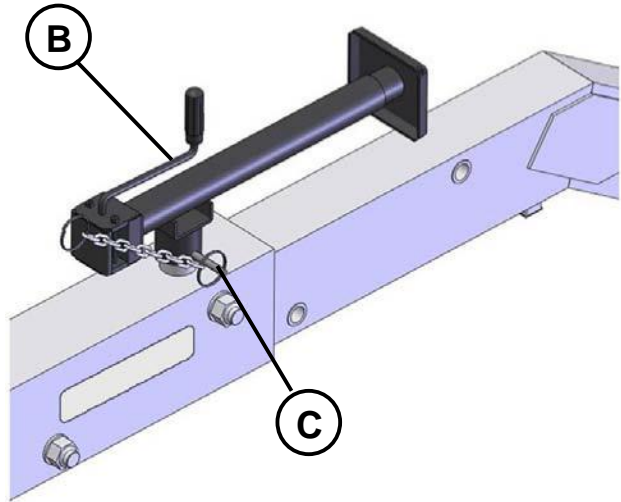
Whenever a wheel has been removed and installed, check torque after one hour of operation and at 50 hour intervals. Wheel nut should be tightened. According to Specifications section for bolt torque charts (Page 71).



ATTACHING AND DETACHING

ATTACHING RAKE TO TRACTOR DRAWBAR

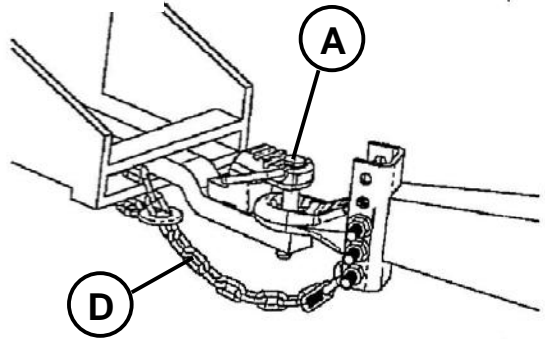
1. Position tractor drawbar. (See Positioning Tractor Drawbar in Preparing the Tractor section.)
2. Remove hitch pin.
3. Back up tractor to rake. Align hitch pin holes in tractor drawbar and rake tongue.
4. Engage tractor parking brake and/or place transmission in "Park."
5. Shut off tractor engine and remove key.
6. Install hitch pin (A). Fasten with quick-lock pin.
7. Raise jackstand (B) and fasten with pin (C).



A—Hitch Pin
B—Jackstand
C—Pin
D—Chain

CAUTION: A safety chain will help control drawn equipment should it accidentally separate from the drawbar. A runaway machine could cause severe injury or death to someone. Provide only enough slack in chain to permit turning. Do not use safety chain for towing.

8. Connect chain (D) to rake tongue. Route chain through loop on drawbar and connect to tractor drawbar support. Do not fasten to drawbar. Remove all slack except what is needed for turns.



ATTACHING AND DETACHING

ATTACHING TO TRACTOR HYDRAULIC SYSTEM

CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

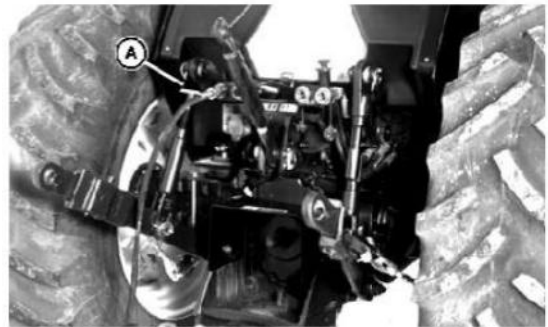
Search for leaks with a piece of cardboard.

Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source, such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.



1. Push tractor SCV lever to the float position.
2. Connect hydraulic hoses (A) to tractor receptacle.
3. Put tractor SCV lever in the neutral position.



A—Hydraulic Hoses

ATTACHING AND DETACHING

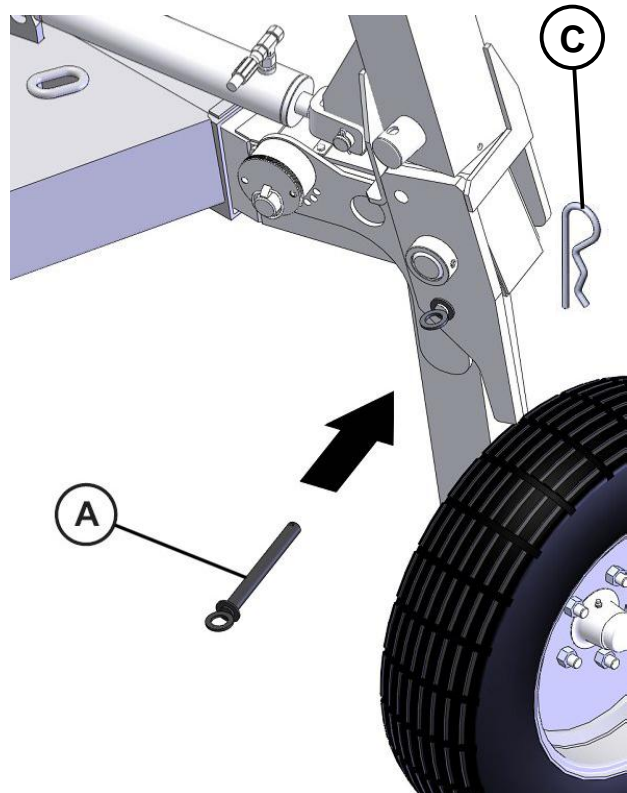
DETACHING RAKE FROM TRACTOR



CAUTION: To prevent personal injury caused by unexpected movement:

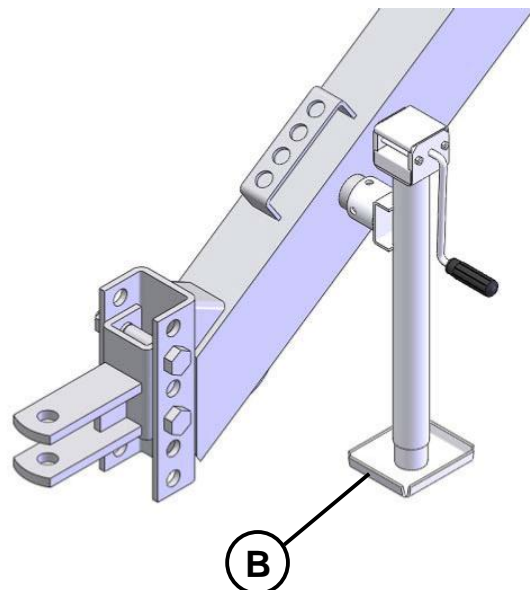
- Park machines on a level surface.
- Engage tractor parking brake and/or place transmission in "Park."
- Shut off tractor engine and remove key.

1. Park rake on level surface, or block ground wheels so machine cannot roll after detaching from tractor.
2. Lower rake wheels, or raise rake wheels .
 - If rake wheels are raised, install transport pins (A) through arm support brackets and fasten with spring-locking pins.
3. Engage tractor parking brake and/or place transmission in "Park."
4. Shut off tractor engine and remove key.
5. Push tractor SCV lever to the float position.



A—Transport Pins
B—Jackstand
C—Spring Lock Pin

6. Lower jackstand (B) and fasten with pin.
7. Adjust rake hitch to support weight of rake on jackstand.



ATTACHING AND DETACHING

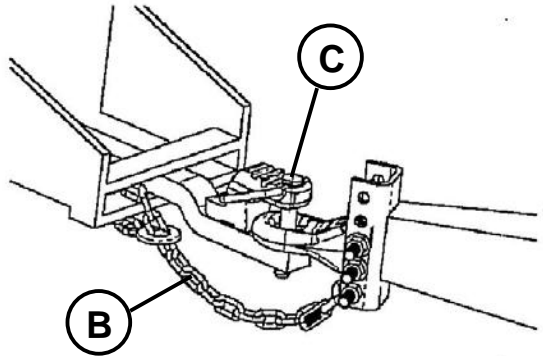
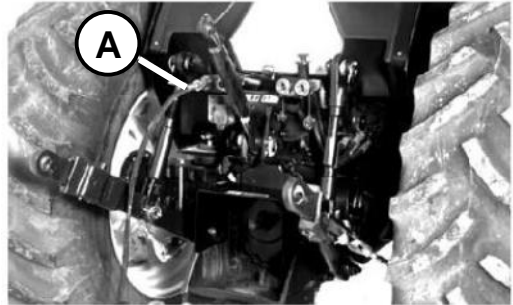
CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard.

Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source, such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

8. Disconnect hydraulic hoses (A) from tractor receptacles.
9. Unhook safety chain (B).
10. Remove hitch pin (C).
11. Put tractor SCV lever in the neutral position..



A—Hydraulic Hose
B—Safety Chain
C—Hitch Pin

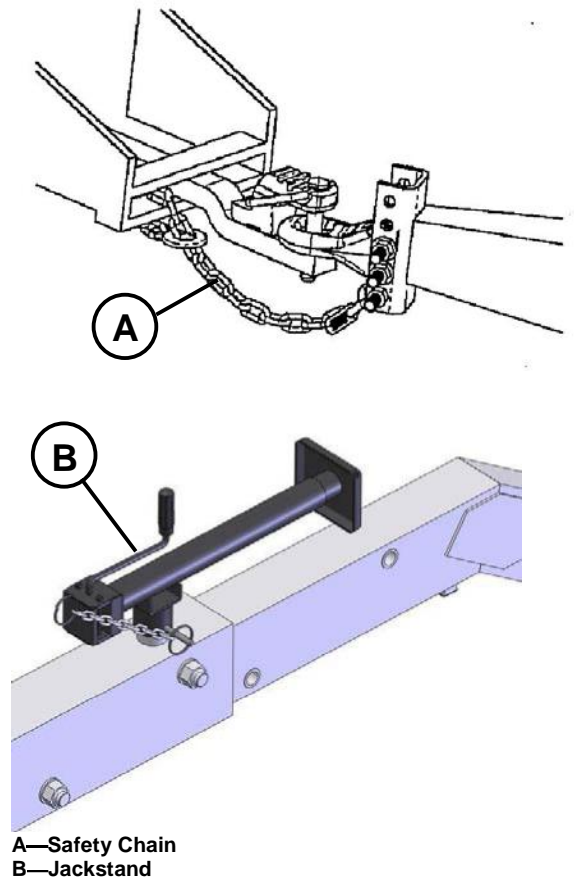
TRANSPORTING

PREPARING RAKE FOR TRANSPORT

1. Park rake on level surface.
2. Engage tractor parking brake and/or place transmission in "Park."
3. Shut off tractor engine and remove key.

CAUTION: A safety chain will help control drawn equipment should it accidentally separate from the drawbar. A runaway machine could cause severe injury or death to someone. Provide only enough slack in chain to permit turning. Do not use safety chain for towing.

4. Make sure safety chain (A) is attached. Provide only enough slack in chain to permit turning.
5. Put jackstand (B) in storage position.



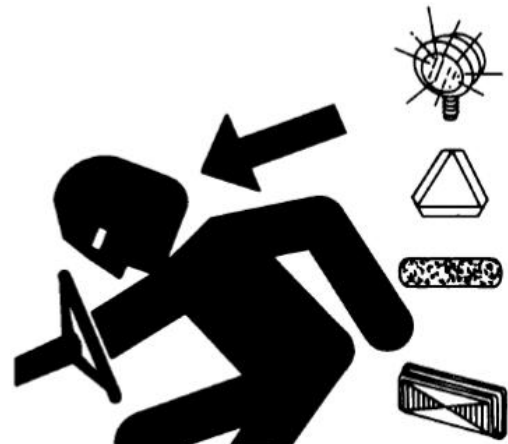
CAUTION: Prevent collisions between other road users, slow moving tractors with attachments or towed equipment, and self-propelled machines on public roads.

Frequently check for traffic from the rear, especially in turns, and use hand signals or turn signal lights.

Use headlights, flashing warning lights, and turn signals day and night. Follow local regulations for equipment lighting and marking.

Keep lighting and marking visible and in good working order. Replace or repair lighting and marking that has been damaged or lost.

6. Be sure SMV emblem and reflectors are clean and visible.



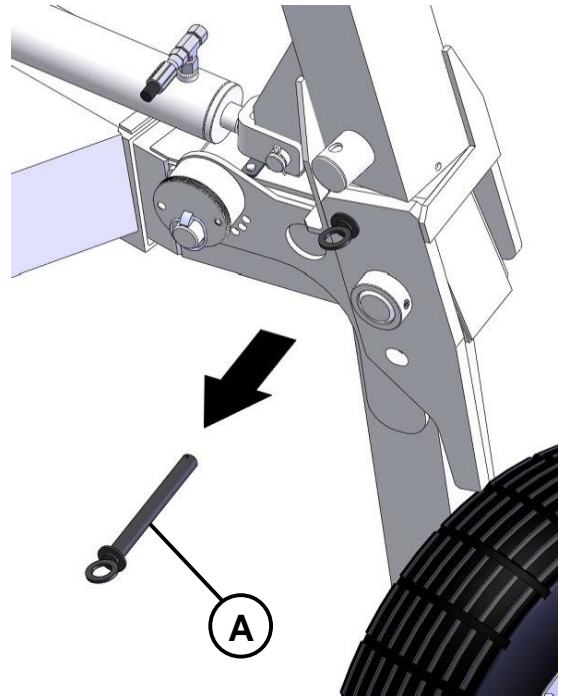
TRANSPORTING

7. Clean out any crop and chaff trapped between rake tines and frame.
8. Remove right-hand and left-hand transport lock pins (A).
9. Raise rake wheels to their maximum height.

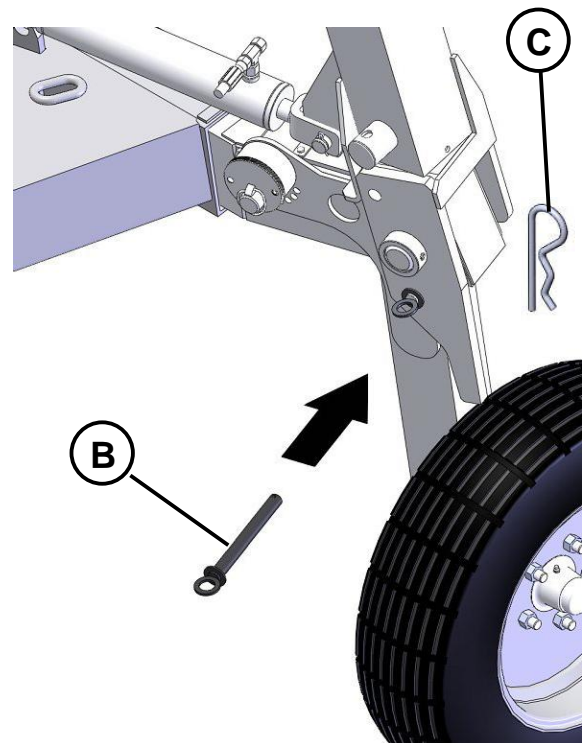


CAUTION: To avoid bodily injury or death, install transport lock pins to prevent rake arms from dropping during transport and colliding with vehicles or other fixed objects.

10. Install transport lock pins (B) through arm support brackets. Fasten with spring-locking pins.



A—Transport Lock Pin



B—Transport Lock Pin
C—Spring Lock Pin

OPERATING THE RAKE

PRESTARTING CHECKS

CAUTION: To prevent personal injury caused by unexpected movement or falling rake wheels:

- **Park machine on a level surface.**
- **Lower rake wheels.**
- **Engage tractor parking brake and/or place transmission in “Park.”**
- **Shut off tractor engine and remove key.**

Inspect and service machine before starting work each day.

- Check for any loose tines, bolts or missing hardware.
 - Check tire inflation pressure. Correct tire pressure is 250 kPa (36 psi) (2.5 Bar).
- Check wheel nut torque. Refer to Specifications section for bolt torque charts (Page 71).

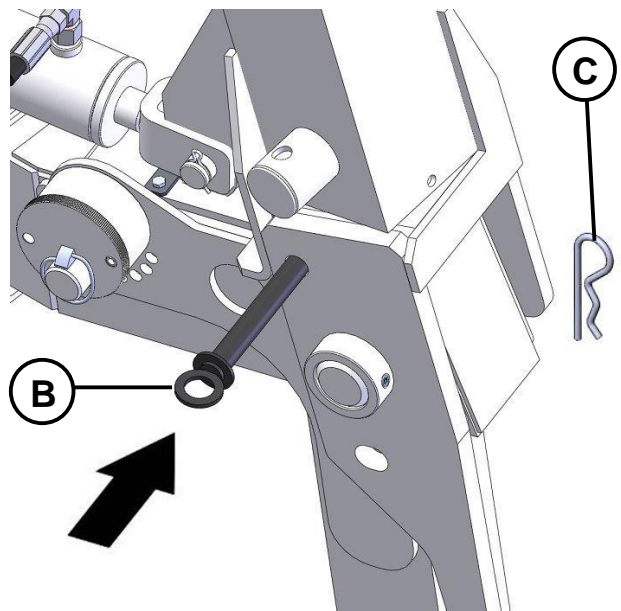
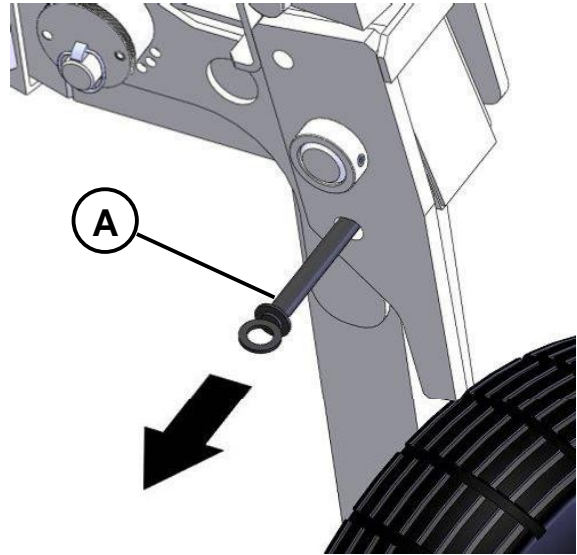
OPERATING THE RAKE

PREPARING RAKE FOR FIELD OPERATION

CAUTION: To prevent personal injury caused by unexpected movement:

- Park machine on a level surface.
- Engage tractor parking brake and/or place transmission in "Park."
- Shut off tractor engine and remove key.

1. Park machine on level surface.
2. Remove spring-locking pins and transport lock pins (A).
3. Put transport lock pin (B) in parking position and fasten with spring-locking pin. Repeat on opposite side.



A—Transport Lock Pin
B—Transport Lock Pin
C—Spring Lock Pin

OPERATING THE RAKE

CAUTION: To avoid bodily injury, make sure bystanders are clear of machine before lowering rake wheels.

IMPORTANT: To avoid machine damage, make sure area is free from obstructions when opening rake.

6. Put tractor SCV lever in the neutral position..
7. Lower rake wheels.



OPERATING THE RAKE

OPERATING THE RAKE

CAUTION: To avoid bodily injury:

- Keep bystanders away from machine while it is operating as foreign objects may be thrown by machine.
- Allow only the operator on tractor platform when operating the tractor and rake.
- Slow down when turning or traveling over rough terrain.
- Engage tractor parking brake and/or place transmission in “Park,” shut off tractor engine and remove key before servicing or making adjustments to rake.



WARNING: Falling from equipment.

Make sure there are no bystanders riding on frame. Falls from heights can result in severe injuries, such as head and spine injuries, and even death.

Regulate ground speed according to crop condition, terrain, and tractor horsepower. In general, raking speeds at 8—11 km/h (5—7 mph) will produce good results. A slower ground speed may be necessary for hills or rough terrain.

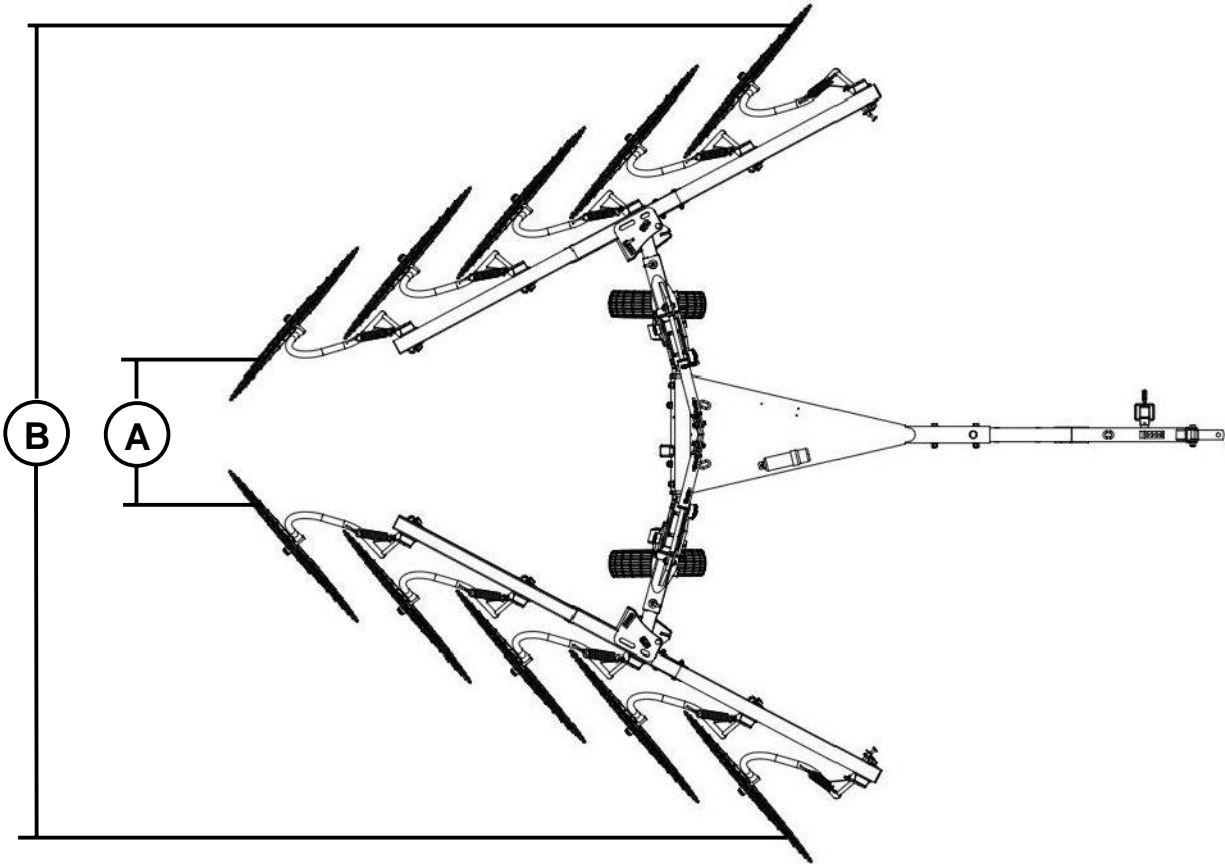
For sickle mowed crop, rake in the same direction as mower travel.

For rotary mowed crop, rake in opposite direction as mower travel.



OPERATING THE RAKE

SETTING WORKING WIDTH



NOTE: Windrow widths (A) and (B) are approximate.

The working width and windrow width will vary due to the type and quantity of crop being raked.

The distance between rings on rear raking wheels can be used to determine basic windrow width. Actual width will depend on crop type, volume, and raking speed. When adjusting the angle of the wing arms with pin and holes, working width will change.

Windrow Width 8-10 Wheel Rake (A)	Windrow Width 12 Wheel Rake (A)
0.40 to 2.27 m (1 ft 4 in. to 7 ft 6 in.)	0.66 to 2.53 m (2 ft 2 in. to 8 ft 4 in.)

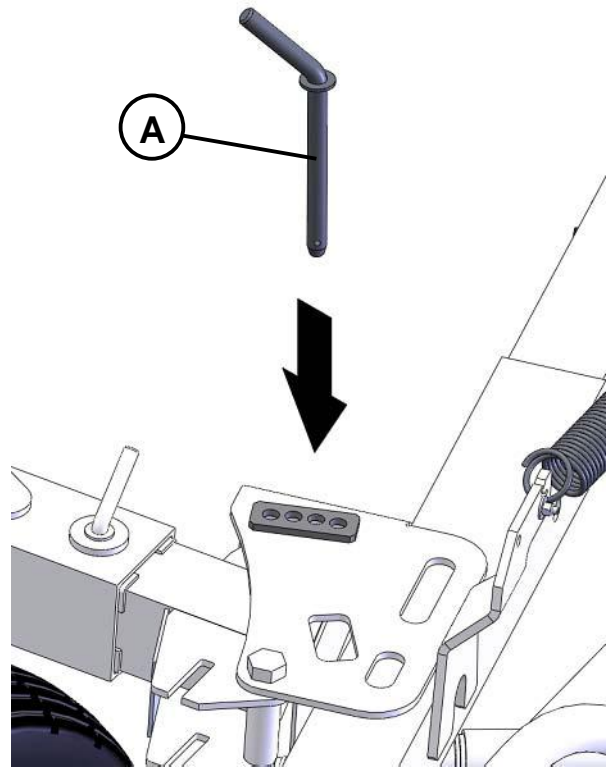
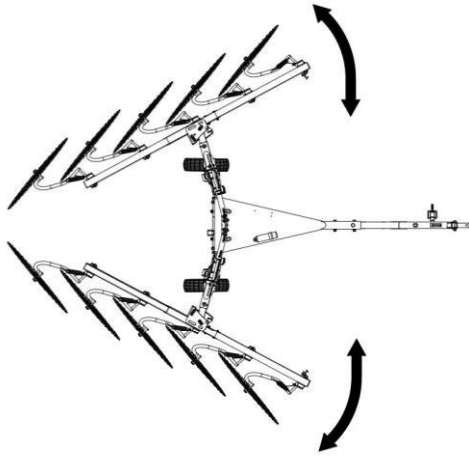
Working Width 8 Wheel Rake (B)	Working Width 10 Wheel Rake (B)	Working Width 12 Wheel Rake (B)
4.80 to 5.27m (15 ft 9 in. to 17 ft 3 in.)	5.47 to 6.36 m (17 ft 11 in. to 20 ft 10 in.)	6.36 to 7.60 m (20 ft 10 in. to 24 ft 11 in.)

OPERATING THE RAKE

ADJUSTING RAKING AND WINDROW WIDTH

The raking width is determined by the windrow width setting and the angle of raking wheels.

To change rake wheel angle, remove spring-locking pin and lock pin (A). There are four positions to increase or decrease angle.



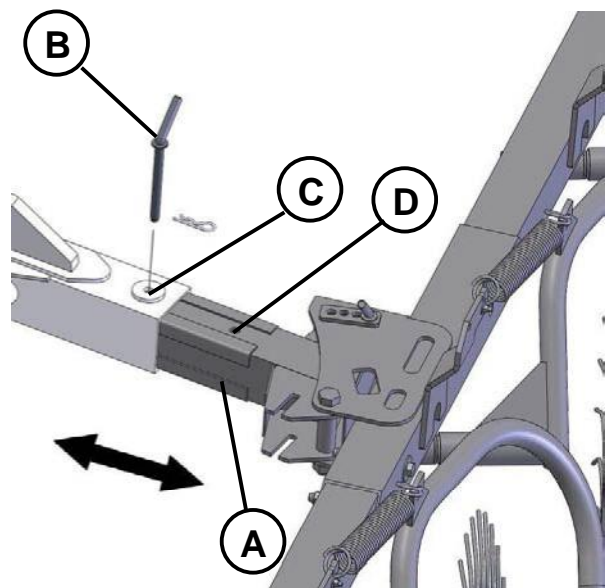
Changing raking width will also change the windrow width. Adjust windrow width as desired.

The rake can be set for windrow widths of 0.40 to 2.53 m (1 ft 4 in. to 8 ft 4 in.).

A windrow of proper width will result in more uniform bales. The overall windrow width should be the same size or slightly wider than the baler bale chamber.

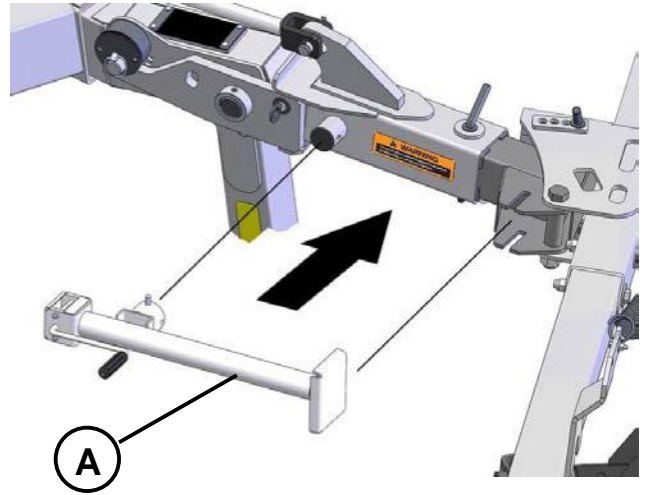
To improve the working capacity without change the angle of the frames:

1. Take off lock-pin (B)
2. Slide frame (A) from standard position (D) to High capacity position (C).
3. Insert the lock-pin (B). Repeat on opposite side.

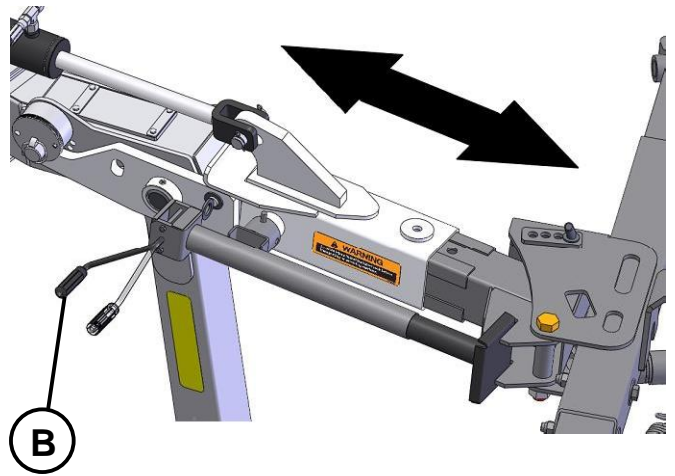


OPERATING THE RAKE

To easily operate the adjustment, you can use the jack stand that comes standard with the machine.
Position the jack stand (A) as shown in the picture.



Move the handle (B) of the jack stand to slide the frame inside or outside to desired position.

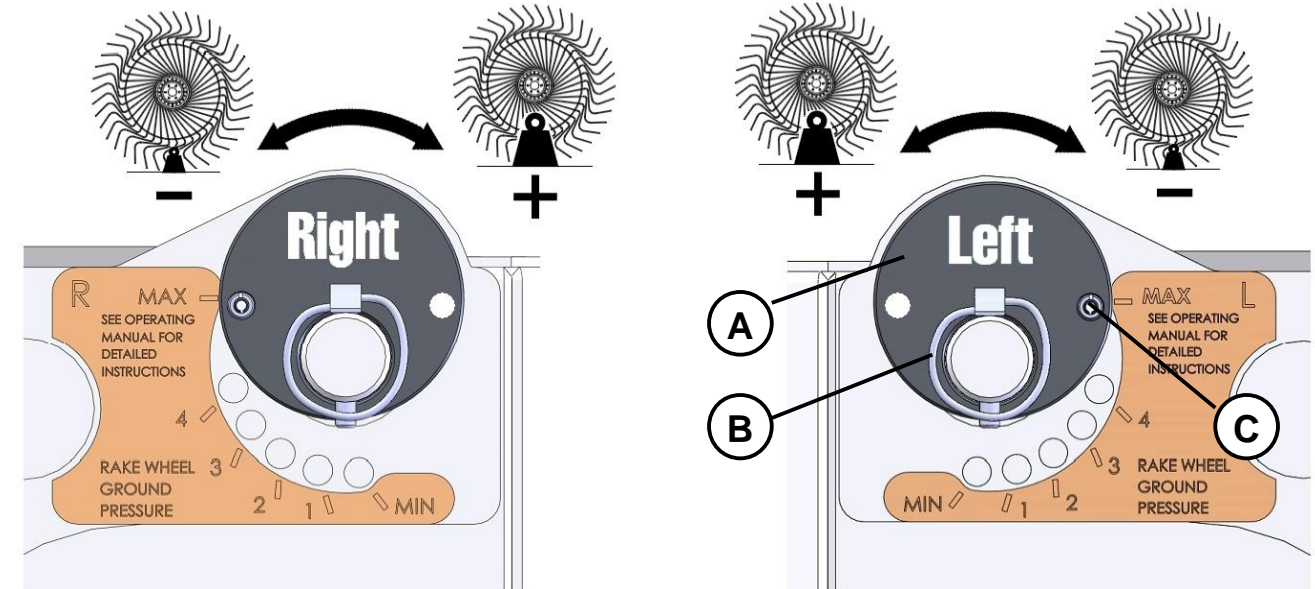


OPERATING THE RAKE

ADJUSTING RAKING WHEEL GROUND PRESSURE

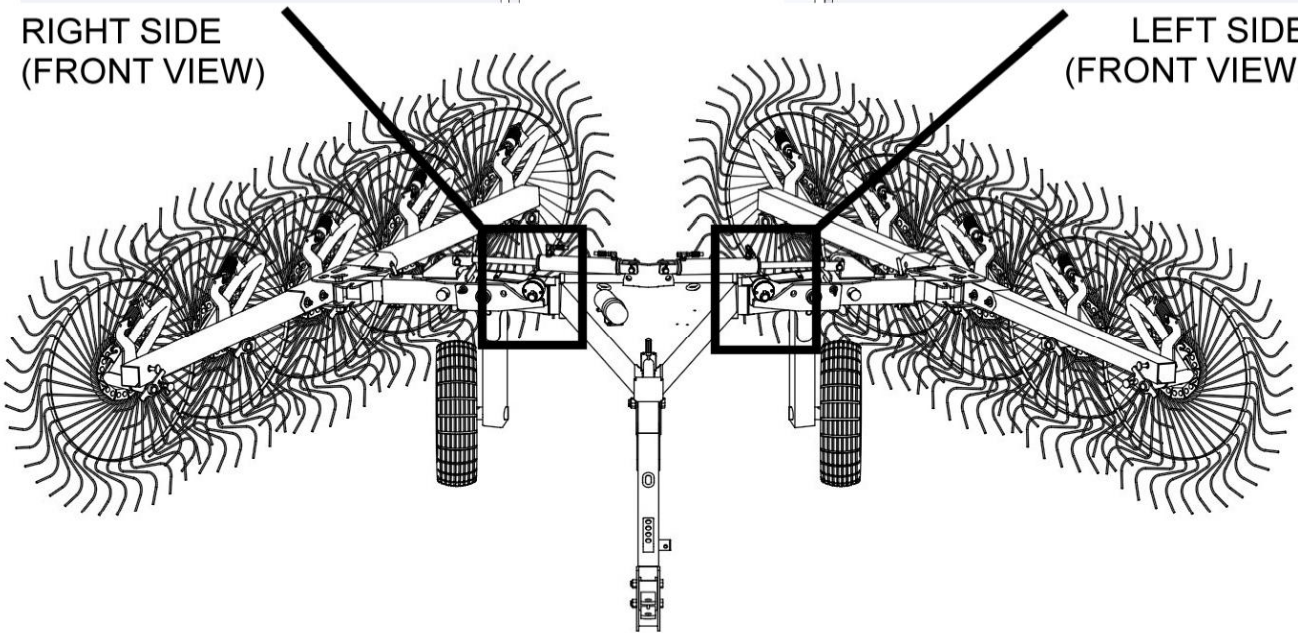
The correct ground pressure on raking wheels may vary depending on field conditions and the type and quantity of crop being raised.

Ground pressure is controlled by the position of each cam on each rake wheel support assembly. The cam can be adjusted at six positions from minimum ground pressure to maximum ground pressure.



RIGHT SIDE
(FRONT VIEW)

LEFT SIDE
(FRONT VIEW)

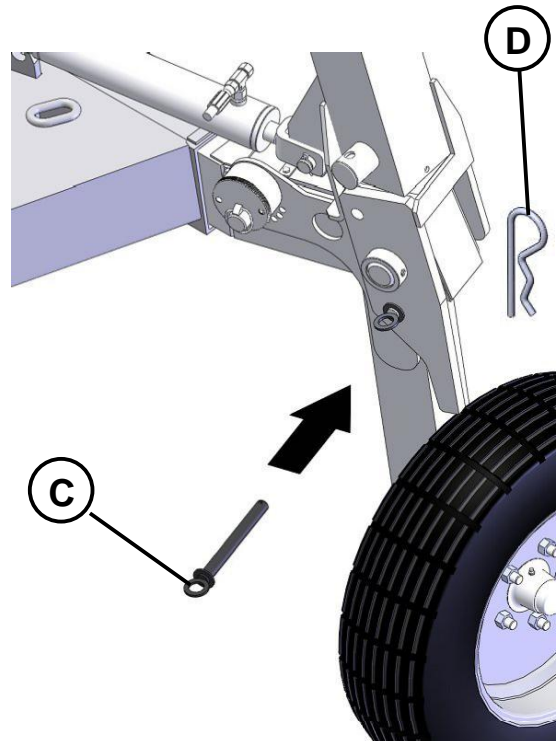


- A—Cam
 - B—Locking ring pin
 - C—Roll pins
- (picture shown the maximum pressure adjustment position)

OPERATING THE RAKE

To adjust ground wheel pressure:

1. Park rake on level surface.
2. Engage tractor parking brake and/or place transmission in "Park."
3. Close the machine to transport position and install transport lock pins (C) through arm support brackets. Fasten with spring-locking pins (D).
4. (See pag. 31) Remove Locking ring pin (B), slide out the Cam (A), rotate to desired hole position, slide in and fix with Locking ring pin (B).

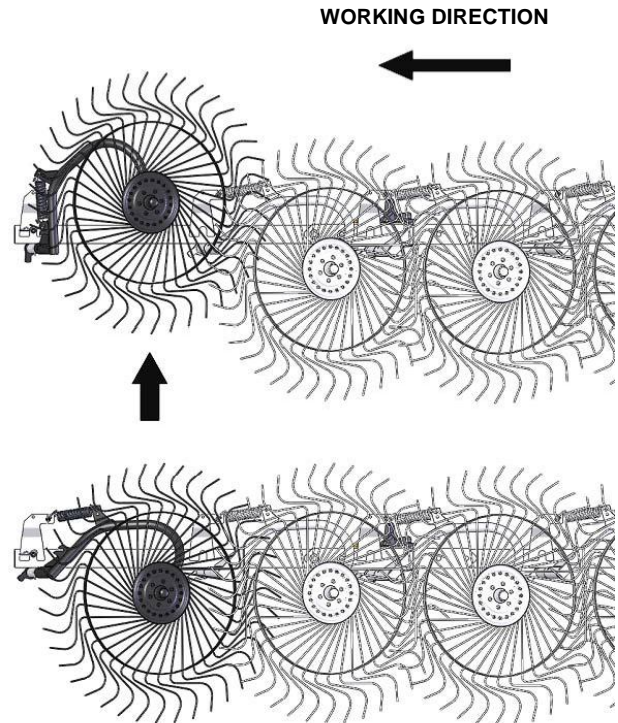


C—Transport Lock Pin
D—Spring Lock Pin

FLIP-UP RAKING (ONLY FOR WR6010 & WR6012)

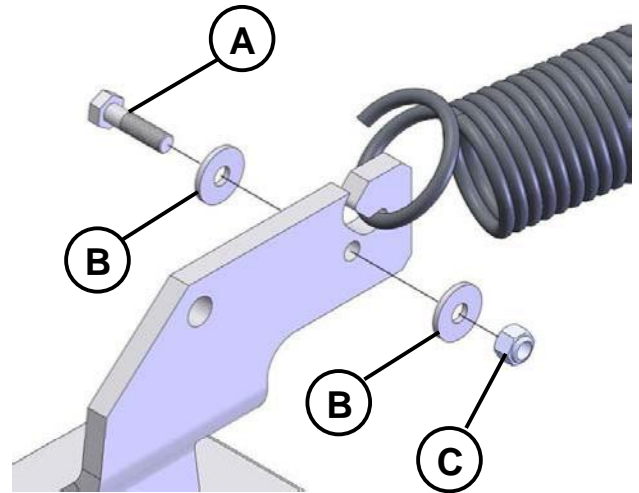
In the presence of large volumes of product, there is the possibility to exclude the action of the first finger wheel to reduce the working capacity or increase efficiency.

To determine this configuration, only for models WR6010 and WR6012, you can raise up the first finger wheel (FLIP-UP) and lock it in the raised position:



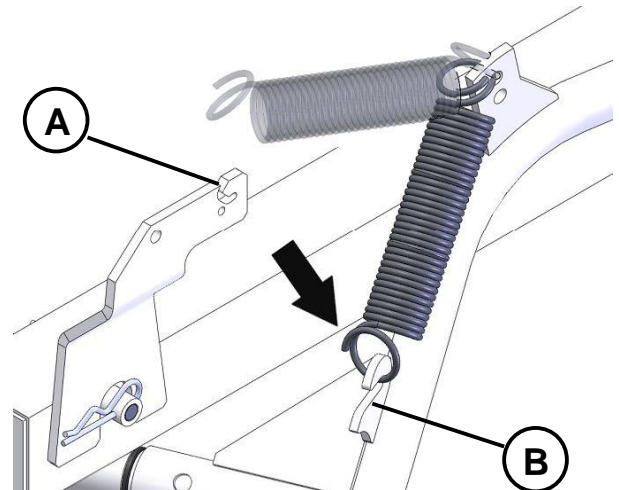
OPERATING THE RAKE

1. Remove Nut (C), Washers (B) and Screw TE (A).

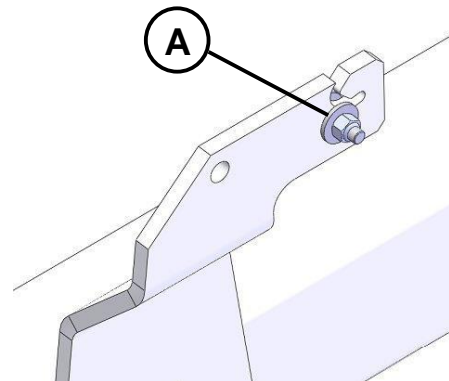


A—Screw TE M8x30
B—Washer M8
C—Nut M8

2. Move spring from position (A) into hook welded on the arm (B).

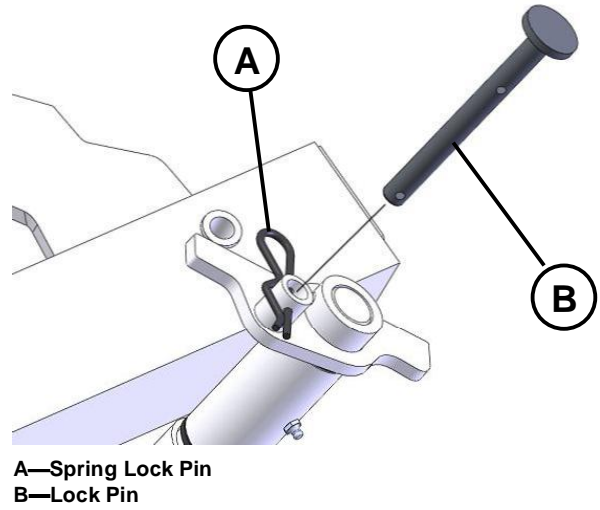
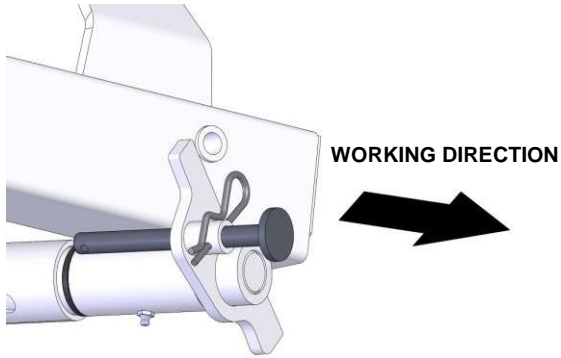


3. Remount screw, washers and nut in the same position (A).

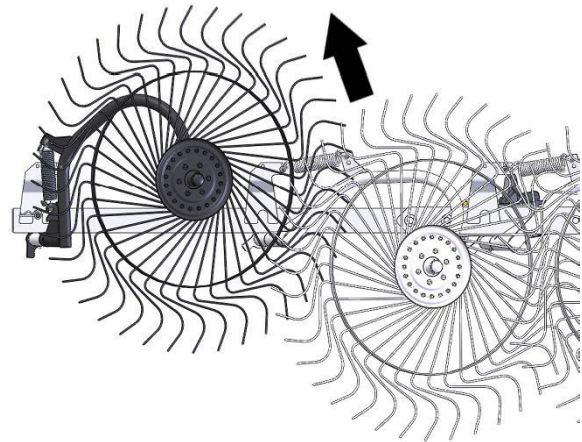


OPERATING THE RAKE

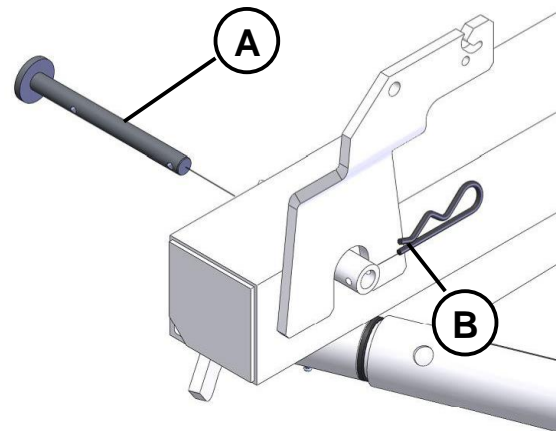
4. Remove spring lock pin (A) and lock pin (B).



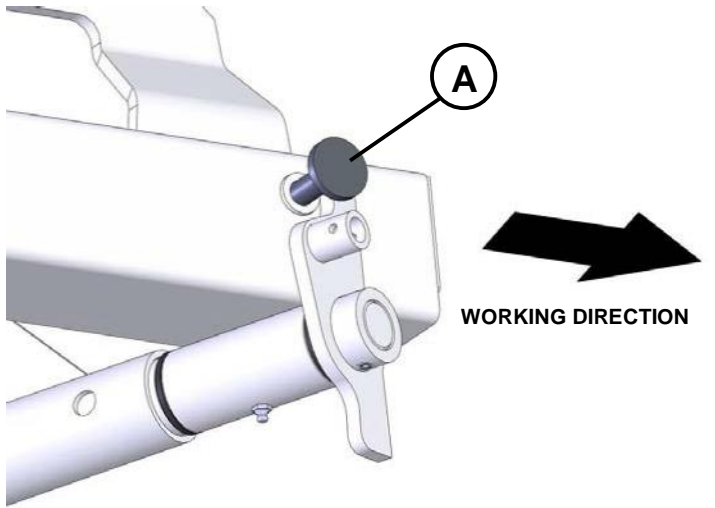
5. Lift up front rake to maximum position.



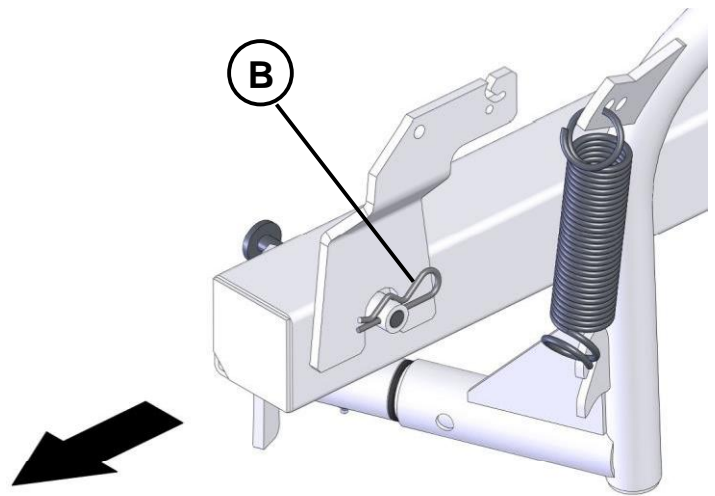
6. Insert the lock pin (A) and spring lock pin (B).



OPERATING THE RAKE



A—Lock Pin
B—Spring Lock Pin



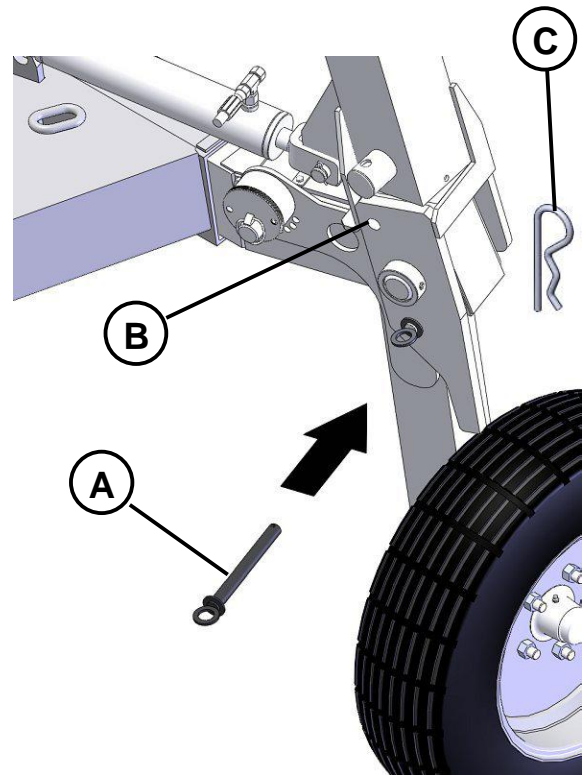
View from opposite side

OPERATING THE RAKE

RAKING A SINGLE WINDROW OR SWATH

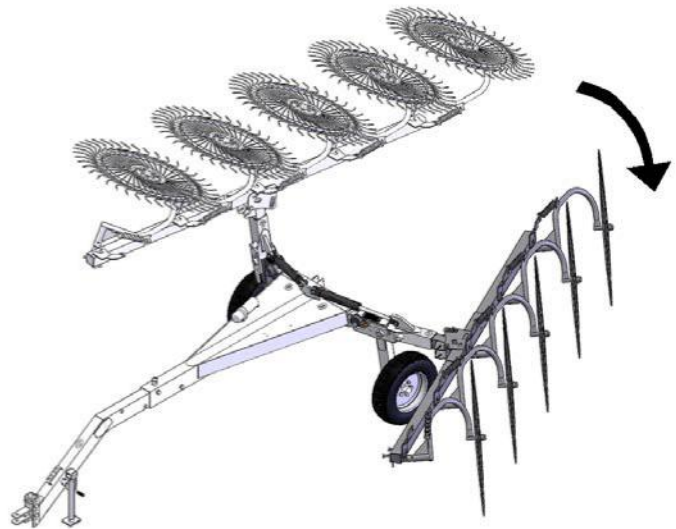
1. Raise raking wheels to maximum height.
2. Install left-hand and right-hand transport lock pins (A). Fasten with spring-locking pins.
3. If left-hand raking is desired, remove transport pin (A) from left-hand support. Install pin (A) through hole (B) for storage.

If right-hand raking is desired, follow same procedure.



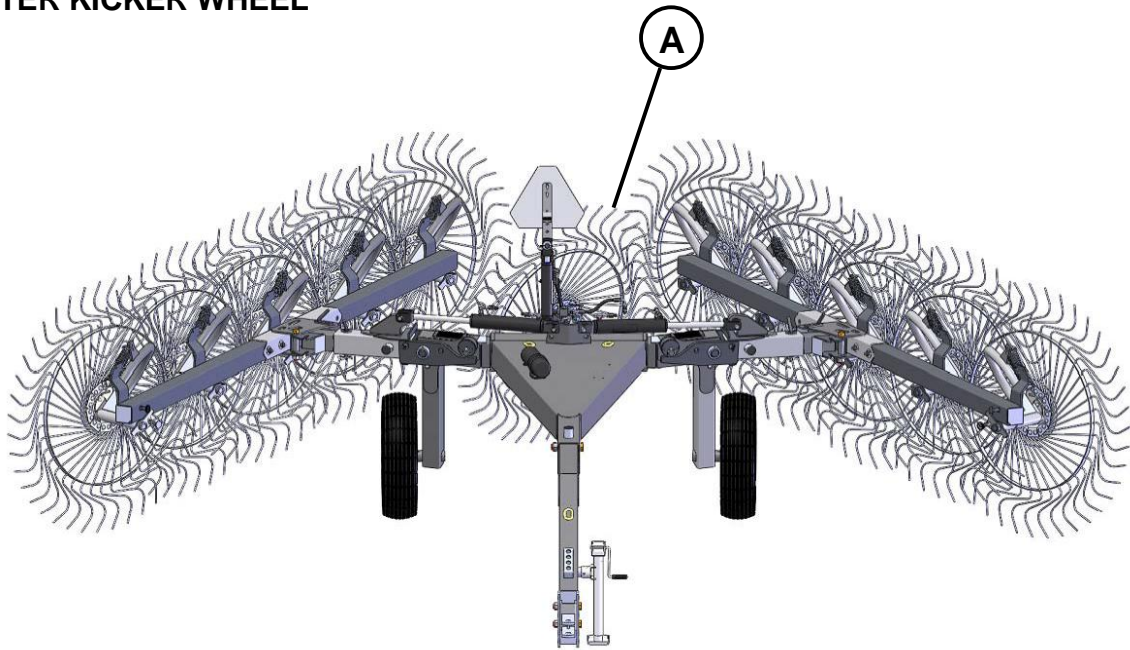
A—Transport Lock Pin
B—Hole For Storage Position
C—Spring Lock Pin

4. Lower raking wheel assembly.



ATTACHMENTS

CENTER KICKER WHEEL

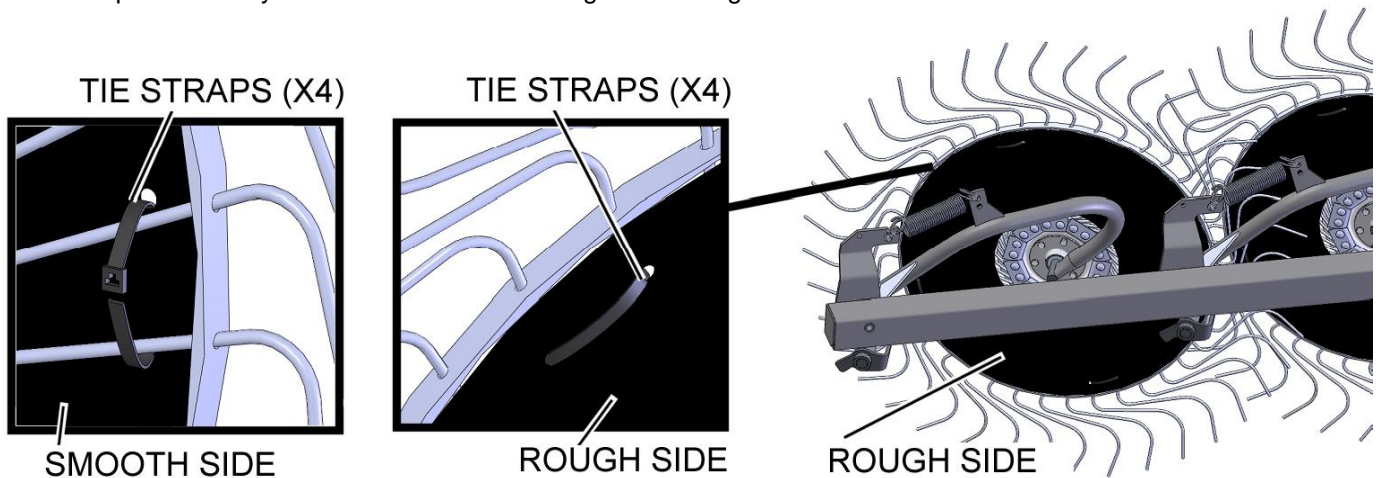


Center wheel (A) is used to fluff center part of windrow. Can be used when raking three windrow together or after mower and tedder applications. Refer to Center Kicker Wheel Assembly Instructions section in operator's manual, page 72.

WIND SHIELD KIT

Wind shield made of ABS plastic should be used:

- to provide smoother movement of the crop
- to help keep fine or short crops in the windrow
- to help prevent crops from sticking to the wheels
- to help block heavy cross winds from interfering while raking



LUBRICATION AND MAINTENANCE

PERFORM LUBRICATION AND MAINTENANCE

CAUTION: Do not clean, lubricate or adjust machine while it is running.

- Park machine on level surface.
- Engage tractor parking brake and/or place transmission in “Park.”
- Shut off tractor engine and remove key .

IMPORTANT: The recommended intervals are based on normal conditions. Severe or unusual conditions may require shorter intervals.

Perform each lubrication and maintenance illustrated in this section at the beginning of the season and at the end of the season.

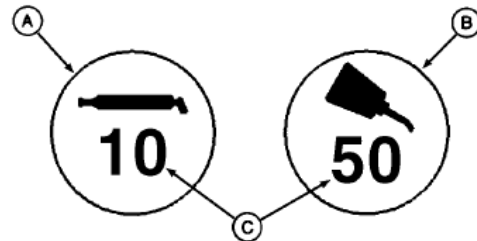
Clean lubrication fittings before lubricating. Replace lost or broken fittings immediately. If a new fitting fails to take grease, remove and check for failure of adjoining parts.

OBSERVE LUBRICATION SYMBOLS (in the following operator manual)

Follow hourly (C) intervals on grease symbols (A) and oil symbols (B).

GREASE SYMBOL (A) Lubricate with High Temp EP grease or equivalent SAE multipurpose grease (unless otherwise specified) at hourly intervals indicated on the symbols.

OIL SYMBOL (B) Lubricate with SAE 30 or heavier oil at hourly intervals indicated on the symbols.



Lubrication Symbols

- A—Grease Symbols
- B—Oil Symbols
- C—Hourly Intervals

LUBRICATION AND MAINTENANCE

ALTERNATIVE AND SYNTHETIC LUBRICANTS

Conditions in certain geographical areas may require lubricant recommendations different from those printed in this manual.

Some coolants and lubricants may not be available in your location.

Consult your John Deere dealer to obtain information and recommendations.

Synthetic lubricants may be used if they meet the performance requirements as shown in this manual.

The temperature limits and service intervals shown in this manual apply to both conventional and synthetic oils.

Refined base stock products may be used if the finished lubricant meets the performance requirements.

GREASE

Use grease based on NLGI consistency numbers and the expected air temperature range during the service interval.

The following greases are preferred:

- John Deere HD POLYUREA GREASE

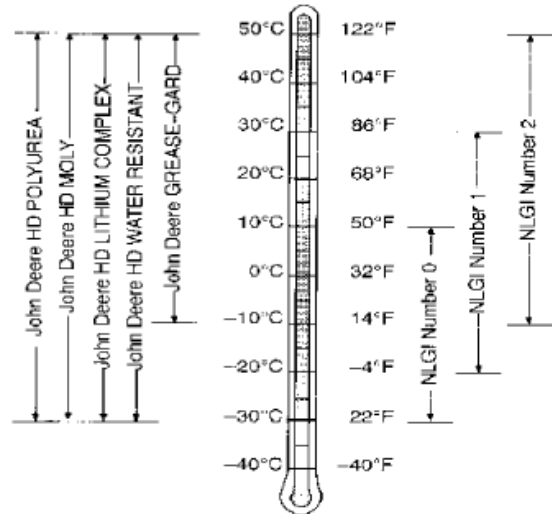
The following greases are also recommended:

- John Deere HD MOLY GREASE
- John Deere HD LITHIUM COMPLEX GREASE
- John Deere HD WATER RESISTANT GREASE
- John Deere GREASE-GARD

Other greases may be used if they meet the following:

- NLGI Performance Classification GC-LB

IMPORTANT: Some types of grease thickener are not compatible with other.



LUBRICATION AND MAINTENANCE

LUBRICANT STORAGE

Your equipment can operate at top efficiency only when clean lubricants are used.

Use clean containers to handle all lubricants.

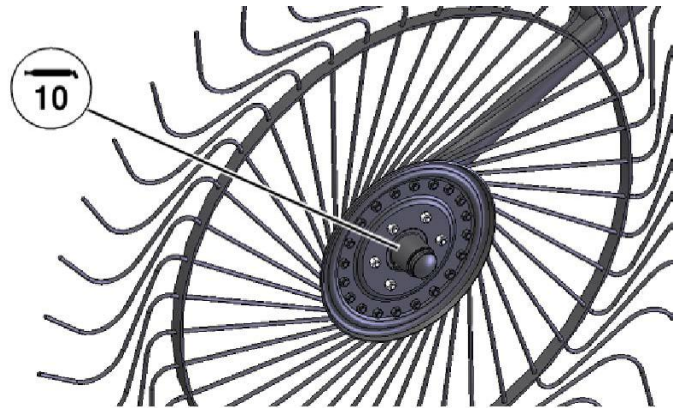
Whenever possible, store lubricants and containers in an area protected from dust, moisture, and other contamination. Store containers on their side to avoid water and dirt accumulation.

Make certain that all containers are properly marked to identify their contents.

Properly dispose of all old containers and any residual lubricant they may contain.

EVERY 10 HOURS

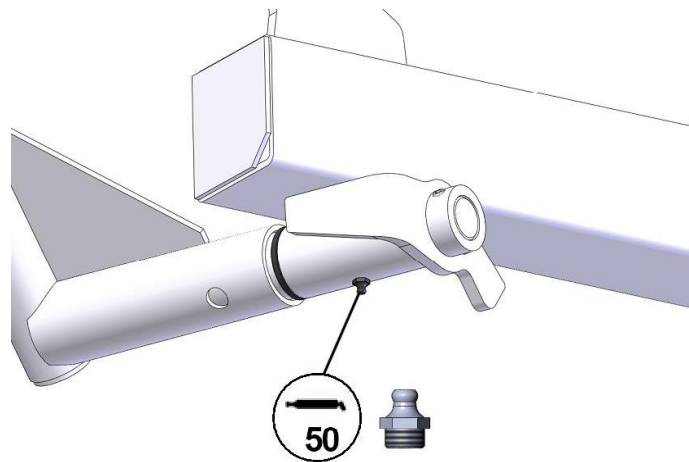
- Rake Wheels



EVERY 50 HOURS

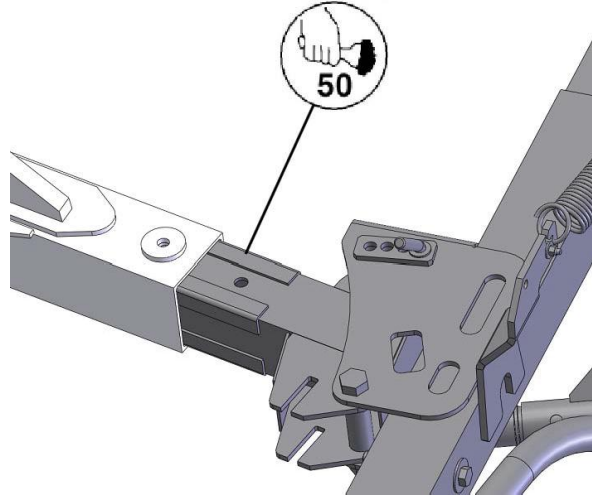
- Left-Hand and Right-Hand Finger wheel arms

Grease lightly.



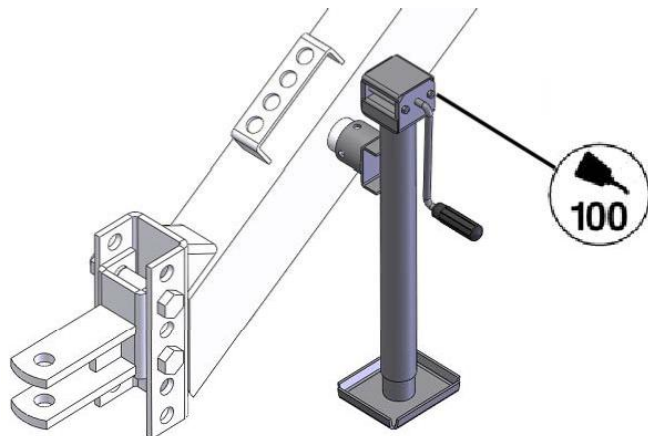
LUBRICATION AND MAINTENANCE

- Left-Hand and Right-Hand Pivots
Grease lightly



EVERY 100 HOURS

- Jackstand
Oil Threads.

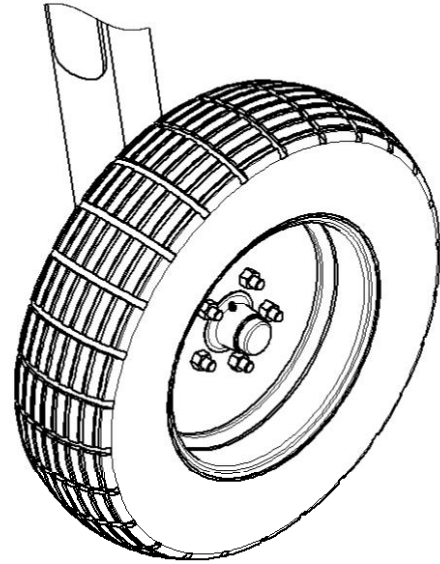


LUBRICATION AND MAINTENANCE

ANNUALLY

Repack Wheel Bearings:

1. Raise one side of machine and install support stands.
2. Remove wheel.
3. Remove hub cap, cotter pin, and wheel nut.
4. Remove washer, bearing, and wheel hub.
5. Remove rear seal and bearing.
6. Clean all parts in solvent and blow dry with compressed air. Replace any worn or damaged parts.
7. Pack bearings with EP Moly or an equivalent SAE multipurpose type grease, or wheel bearing grease. Coat rear seal with same grease.
8. Install rear bearing and seal.
9. Install wheel hub, front bearing, washer and nut.
Tighten nut until a slight drag is felt when hub is turned. Back nut off just enough to install cotter pin in hole in spindle.
10. Install hub cap and wheel. Refer to Specifications section for bolt torque charts (Page 71).
11. Repeat procedure on other wheel.
12. Check wheel hardware torque after one hour of operation and at 50 hour intervals.



LUBRICATION AND MAINTENANCE

AS REQUIRED

Periodically inspect rake and make necessary repairs.

- Check frame for fatigue or cracking. Replace or repair worn or damaged parts.
- Check decals; replace if missing or damaged.
- Check bolts and fasteners; tighten or replace as necessary.
- Check tire pressure. Inflate to 250 kPa (36 psi) (2.5 Bar).
- Check tires and rims for damage.
- Check condition of raking wheels for loose hardware, loose bearings, and broken or bent tines.
- Check hydraulic cylinders and hoses for leaks or damage.

TROUBLESHOOTING

HYDRAULIC PROBLEMS

Symptom	Problem	Solution
Hydraulic system inoperative.	Remote outlet valve not activated.	Open remote hydraulic outlet valve.
	Hose from implement not properly connected to tractor.	Connect hose.
	Hydraulic oil level too low in tractor.	Check tractor operator's manual for proper level.

TROUBLESHOOTING

RAKING PROBLEMS

Symptom	Problem	Solution
Field not cleaned well.	Rake wheels too high.	Adjust rake wheels lower to ground.
Hay is bunching.	Tips of tines collecting dirt.	Remove paint and dirt from tips of tines.
	Incorrect ground speed.	Increase or decrease ground speed.
	Steel burrs on tines or hoops.	Remove burrs.
	Ground wheels and wheel supports obstruct flow of hay.	Adjust wheels and wheel supports toward center of rake.
Rake wheel hoops breaking.	Excessive ground speed.	Reduce ground speed.
	Excessive ground pressure.	Reduce ground pressure.
Tines breaking.	Excessive ground speed.	Reduce ground speed
	Excessive ground pressure.	Reduce ground pressure.
Rake wheel does not turn.	Inadequate lubrication.	Lubricate wheel. (See Lubrication and Maintenance section.)
	Failed bearing.	Replace bearing.
Poor windrow preparation.	Rake wheels too high.	Lower rake wheels.
	Broken or missing tines.	Replace tines.
	Excessive ground speed.	Reduce ground speed.
	Slow ground speed.	Increase ground speed.
	Excessive ground pressure.	Reduce ground pressure.
Rake wheels on one side do not turn.	Rake wheels too high.	Lower rake wheels.
	Broken or missing tines.	Replace tines. (See Replacing Wheel Tines in Service section.)

SERVICE

SERVICING TIRES SAFELY



CAUTION: Explosive separation of a tire and rim parts can cause serious injury or death.

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 the tires above the recommended pressure. Never weld or heat a wheel and tire assembly. The heat can cause an increase in air pressure resulting in a tire explosion. Welding can structurally weaken or deform the wheel.

When inflating tires, use a clip-on chuck and extension hose long enough to allow you to stand to one side and 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.



SERVICING RAKE SAFELY



CAUTION: Avoid serious injury from falling rake wheels during service. Make sure bystanders are clear before lowering rake wheels.

Do not service or adjust machine with rake wheels raised.

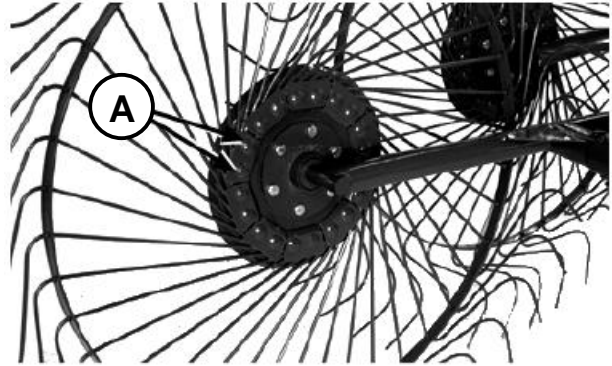


SERVICE

REPLACING WHEEL TINES

To replace a tine:

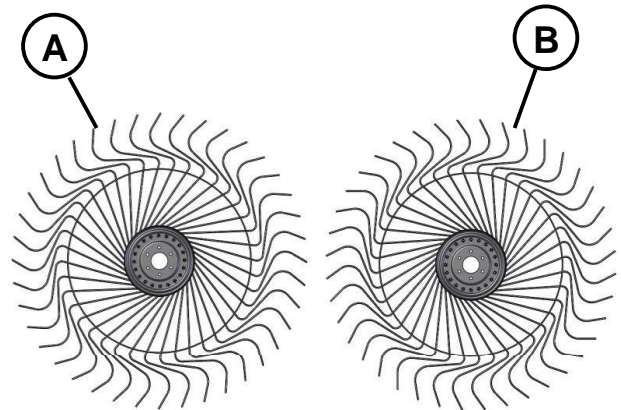
1. Remove two round-head bolts (A), nuts, clip and tine.
2. Install new tine. Fasten with clip, round-head bolts (A) and nuts.



IDENTIFYING LEFT-HAND AND RIGHT-HAND RAKE WHEELS

To identify left-hand and right-hand rake wheels:

- Put rake wheels against a wall with tine mounting clip nuts facing outward.
- If the last bend in the tines curve to a clockwise direction, it is a left-hand rake wheel (A).
- If the tines curve in a counterclockwise direction, it is a right-hand rake wheel (B).



A—Left-Hand Rake Wheel
B—Right-Hand Rake Wheel

STORAGE

END OF SEASON

1. Clean rake thoroughly. Trash and dirt will draw moisture and cause rust.
2. Put rake in a dry place.
3. Thoroughly lubricate machine. (See Lubrication and Maintenance section.)
4. Apply a thin layer of grease on exposed cylinder rods to prevent rusting.
5. Check hydraulic hoses for deterioration and replace if necessary.
6. Tighten any loose bolts, nuts, and hydraulic fittings.
7. Repair or replace worn or broken parts.
8. Paint all parts where necessary.
9. Replace damaged or missing decals.
10. List replacement parts needed and order them early.

BEGINNING OF SEASON

1. Review operator's manual and check adjustments.
2. Lubricate complete machine. (See Lubrication and Maintenance section.)
3. Check air pressure in tires. Correct tire pressure is 250 kPa (36 psi) (2.5 Bar).
4. Check all hardware for tightness.
5. If any major moving parts have been replaced, make sure they run properly.

WR60 CARTED WHEEL RAKE CHECKLISTS

DEALERS RECORD

Owner's Name:	Date Sold:
Address:	Model Number:
City:	Serial Number:
State:	Zip:

PREDELIVERY

After the rake has been completely set up, make sure it is in good running condition before delivering to the customer. The following checklist is a reminder of important points to inspect. Check off each item after it is found satisfactory or after the correct adjustment is made.

- Rake has been assembled correctly.
- Check hydraulic hose and connection for oil leaks or damage.
- Check machine for loose hardware.
- Machine lubricated. (See Lubrication and Maintenance.)
- Check condition of rake wheels tines.
- Check that all rake wheels pivot freely.

- Check all phases of operation.
- Check that safety chain is installed.
- Tire pressures checked.
- Check wheel bolt torque.
- Decals intact and legible.
- Touch up paint, if necessary.

(Date set up)

(Signature)

DELIVERY

The following checklist is a reminder of very important information which should be conveyed to the customer at the time the machine is delivered. Check off each item as it is fully explained to the customer.

- Warranty statement.
- Safe and correct operation and service.
- Advise customer that the life expectancy of the rake, like any other machine, is dependent upon regular lubrication and maintenance as described in the operator's manuals.
- Daily and periodic inspections.
- Servicing machine regularly and correctly.
- Advise to use safety chain.
- Make customer aware of optional equipment offered for this machine.

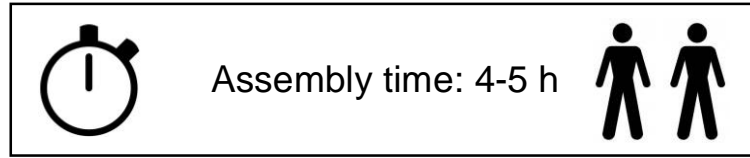
- Transporting machine correctly
- Storing machine correctly.
- Frontier parts and service.
- Give operator's manual to customer and explain all operating adjustments and lubrication and maintenance intervals. Encourage customer to read manual.
- Have customer record machine serial number in the Specifications section.
- Remove and file this page.

(Date Delivered)

(Signature)

ASSEMBLY

Refer to Specifications section for bolt torque charts (Page 71).

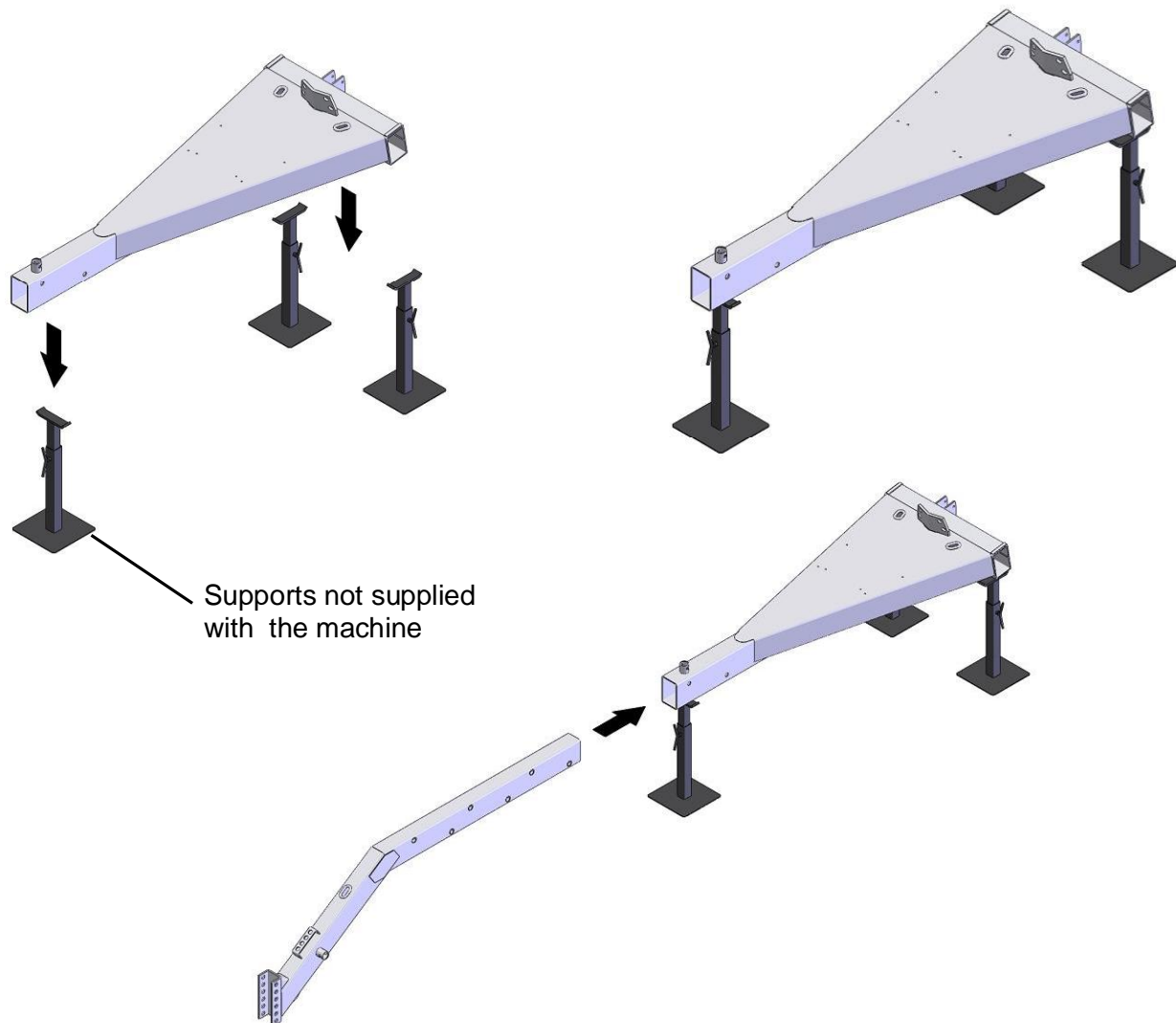


UNCRATING RAKES

Initial set-up may need to be adjusted for customer's environment/application.

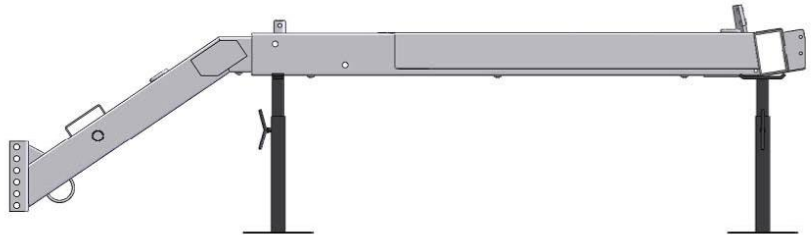
Select an area that has adequate room for parts layout and machine assembly.

Begin assembly by removing all components from the crate. Lay components out individually for ease of locating during assembly.

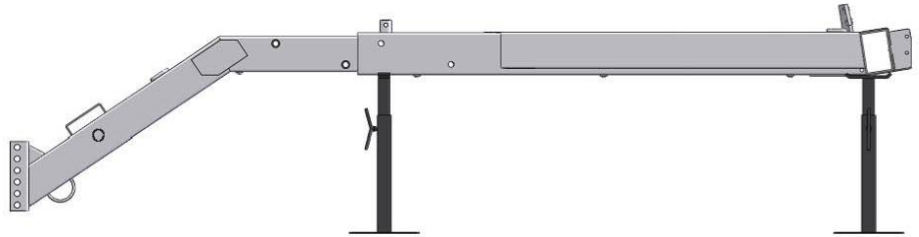


ASSEMBLY

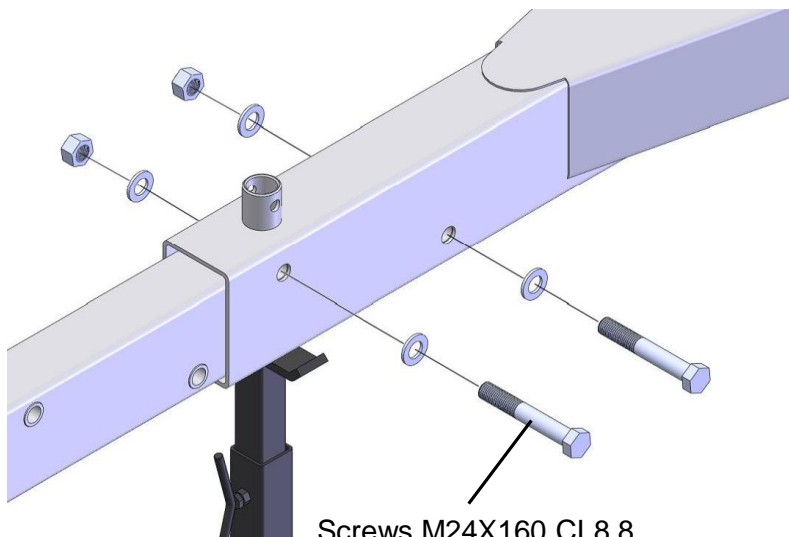
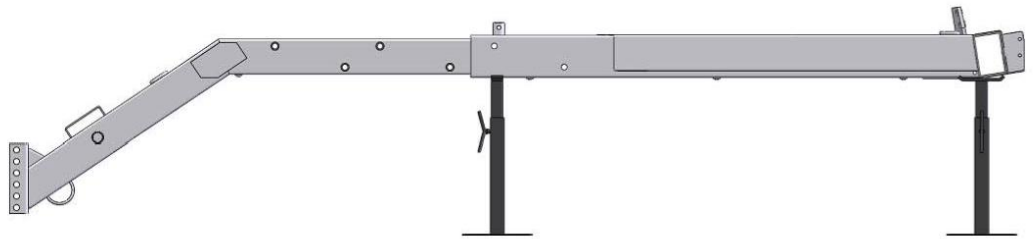
Drawbar position for
WR6008



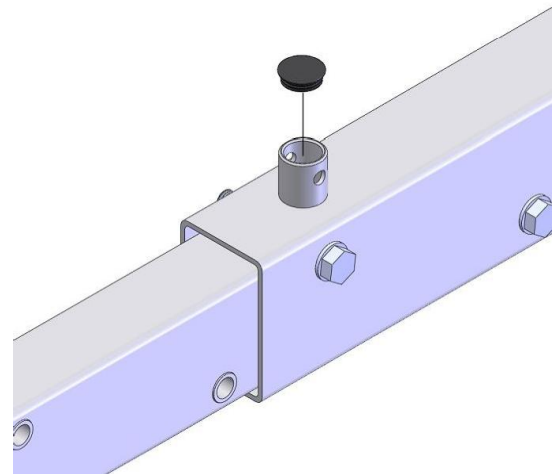
Drawbar position for
WR6010



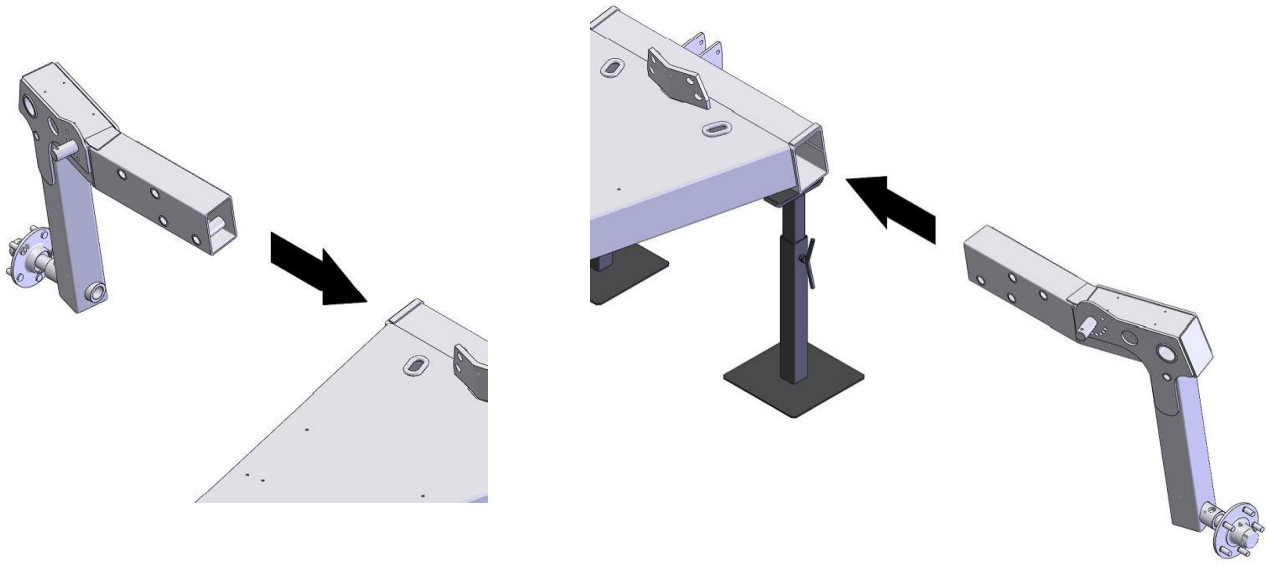
Drawbar position for
WR6012



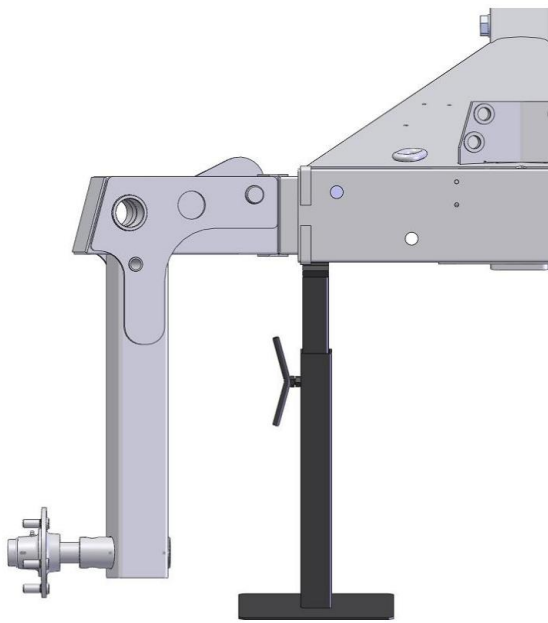
Screws M24X160 CL8.8
Tighten bolts to 200 N*m (150 lb-ft)



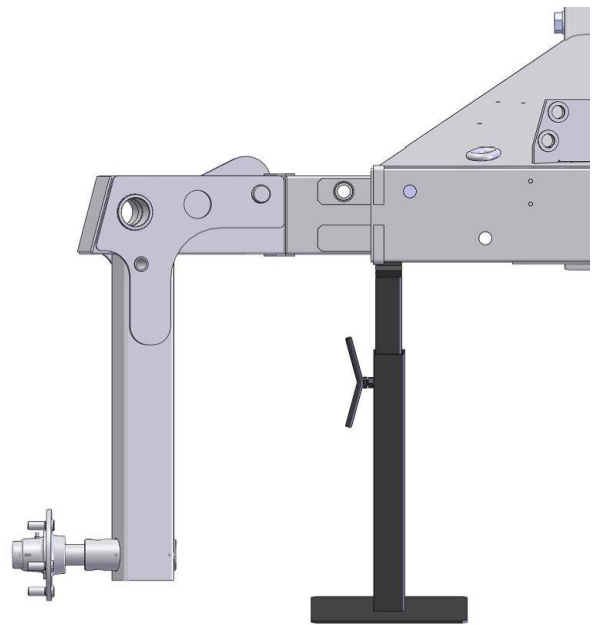
ASSEMBLY



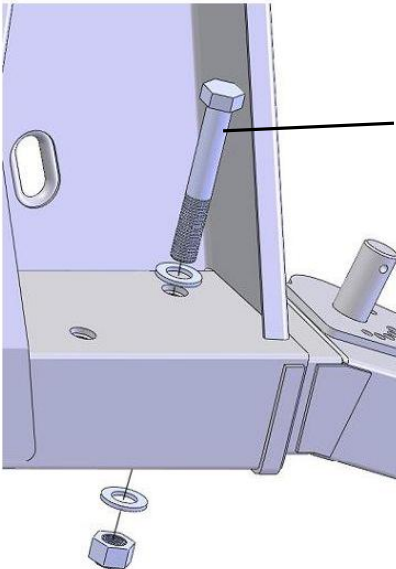
Wheel support position for
WR6008 and WR6010



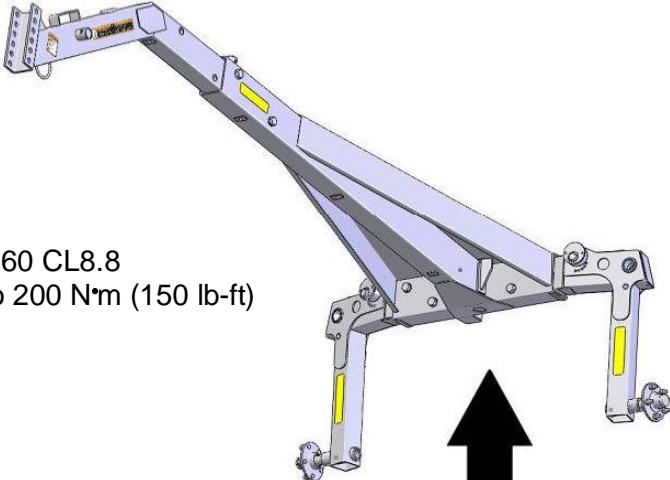
Wheel support position for
WR6012



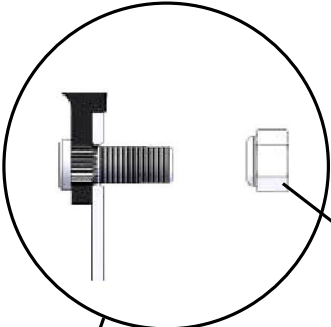
ASSEMBLY



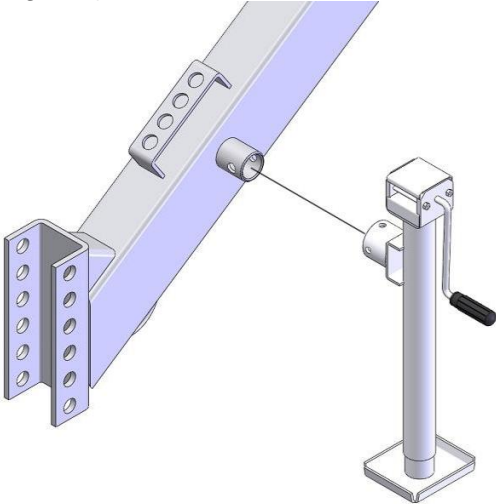
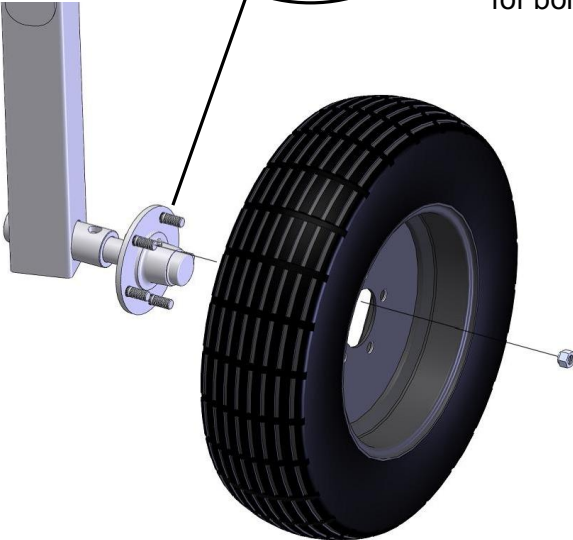
Screws M24X160 CL8.8
Tighten bolts to 200 N*m (150 lb-ft)



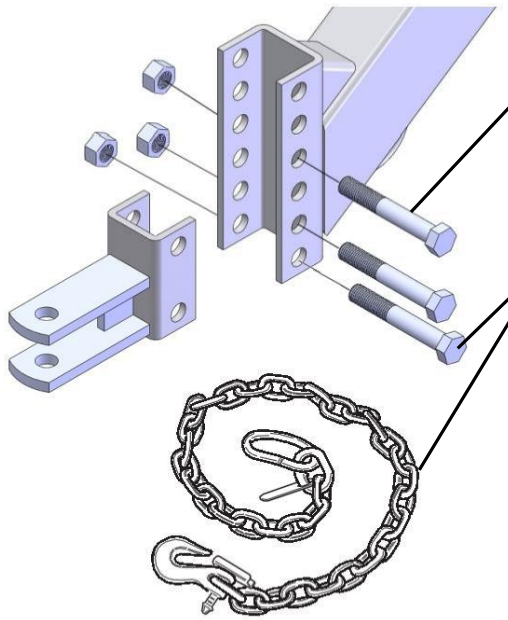
VIEW – UNDER SIDE OF RAKE



Nuts M16 CL8.0
Refer to Specifications section
for bolt torque charts (Page 71).

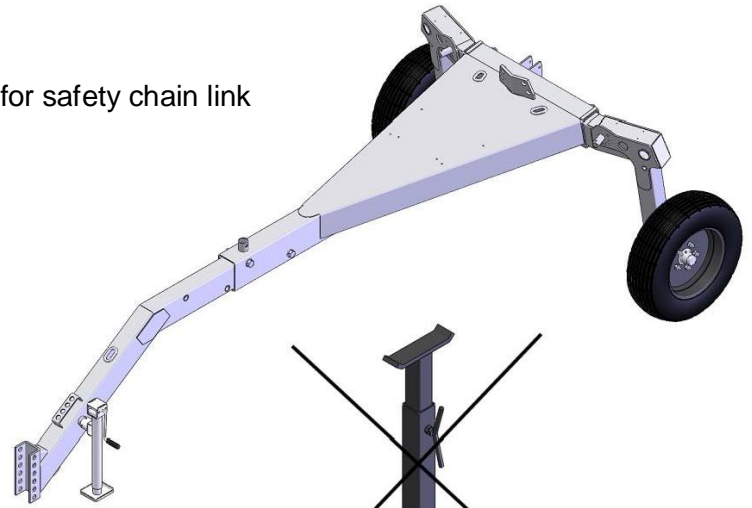


ASSEMBLY

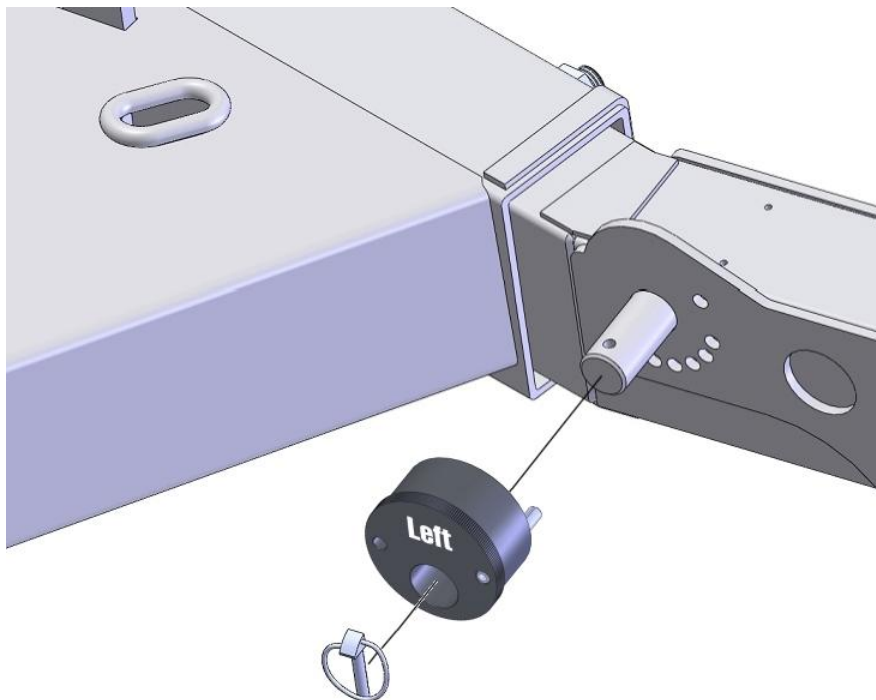


Screws M24X140 CL 8.8
Refer to Specifications section
for bolt torque charts (Page 71).

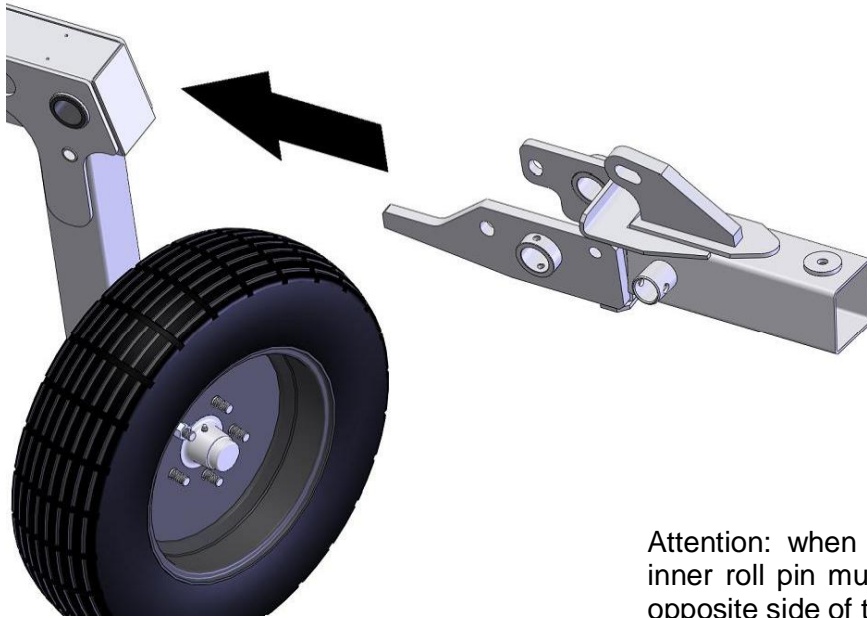
Screw for safety chain link



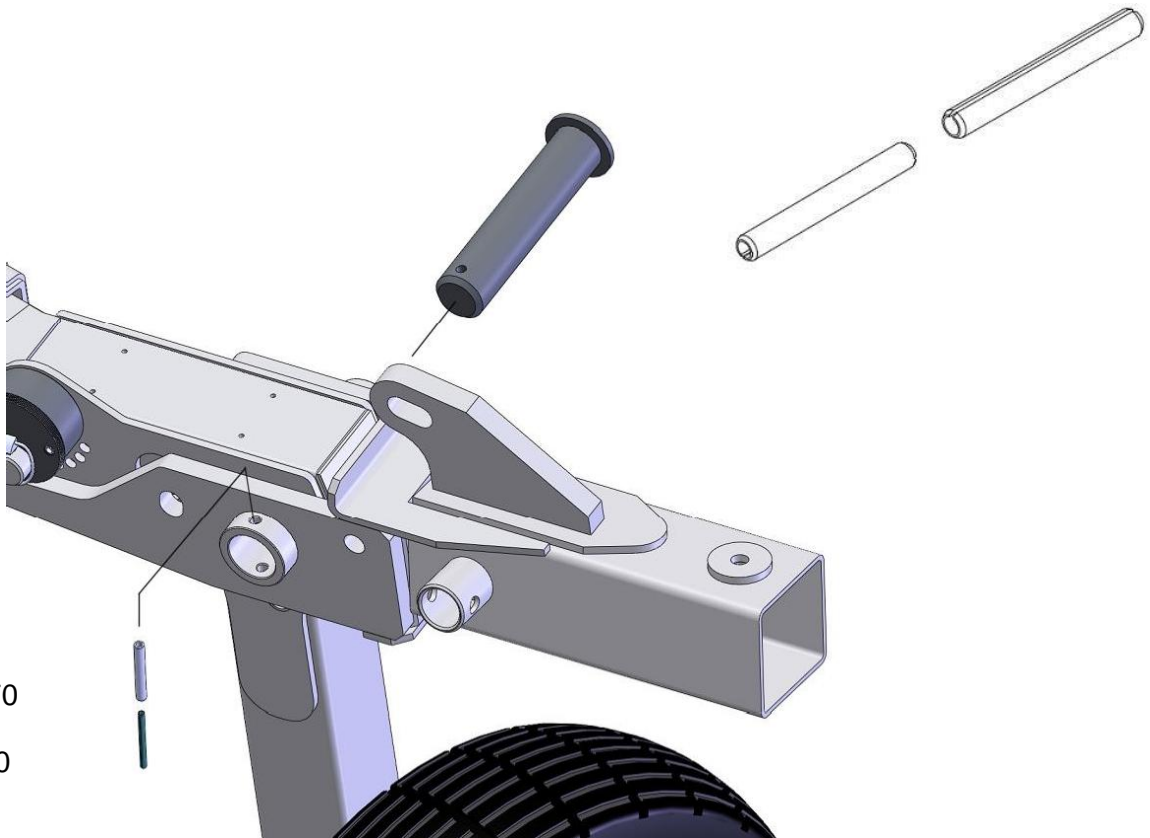
Remove supports once
jackstand and transport
tires are in place.



ASSEMBLY



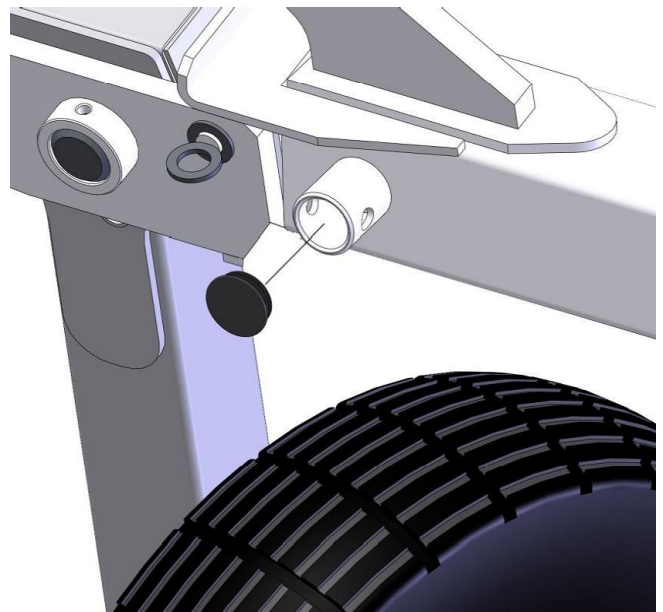
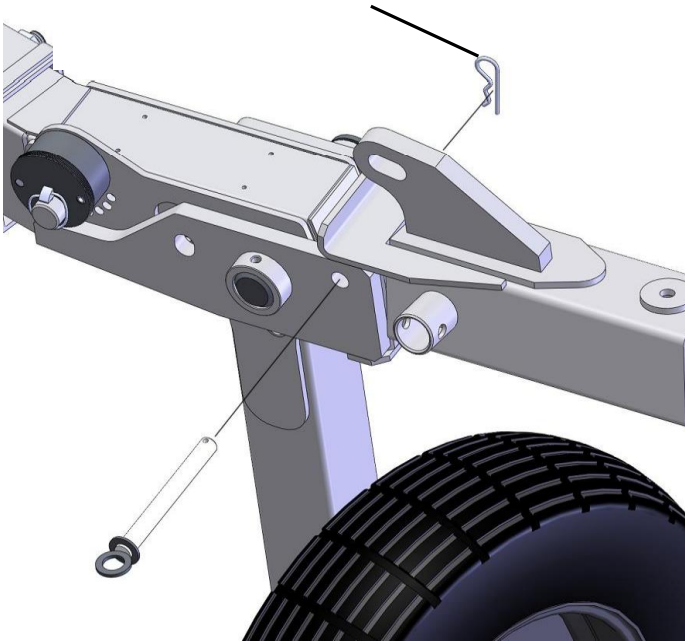
Attention: when mounting double-pin, the inner roll pin must have the fissure at the opposite side of the external one.



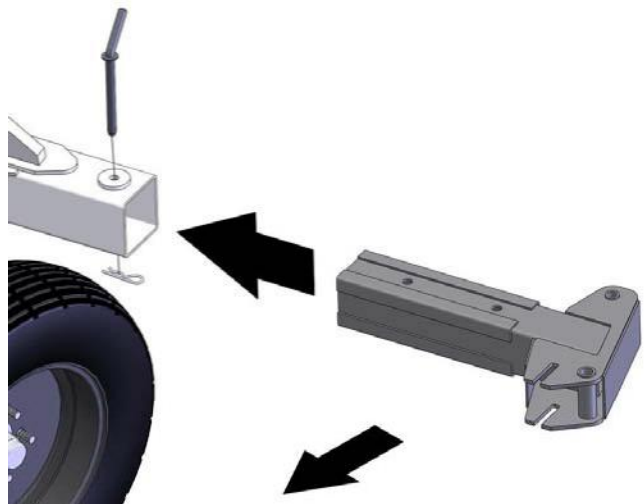
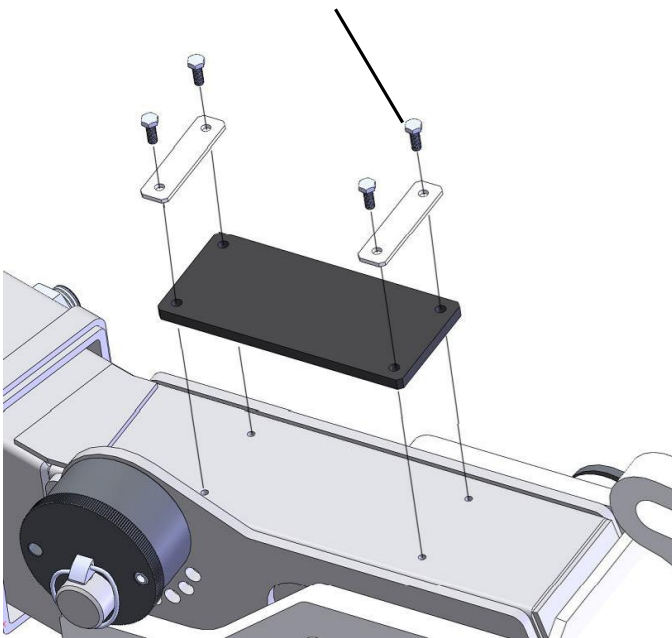
Roll pin 10x70
+
Roll pin 6x70

ASSEMBLY

Spring lock pin "R" 4

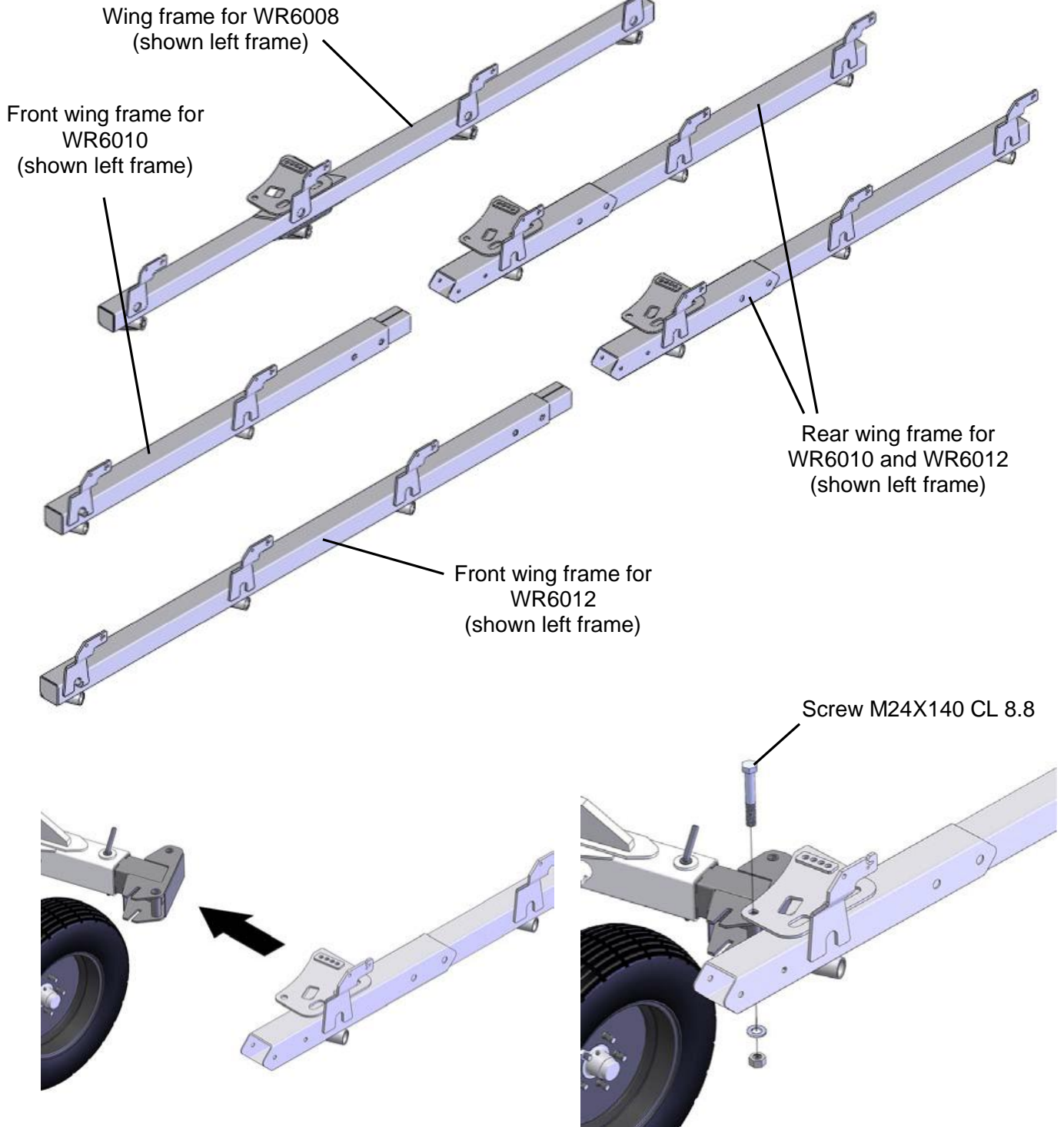


Screws M6x16
(hand tight)



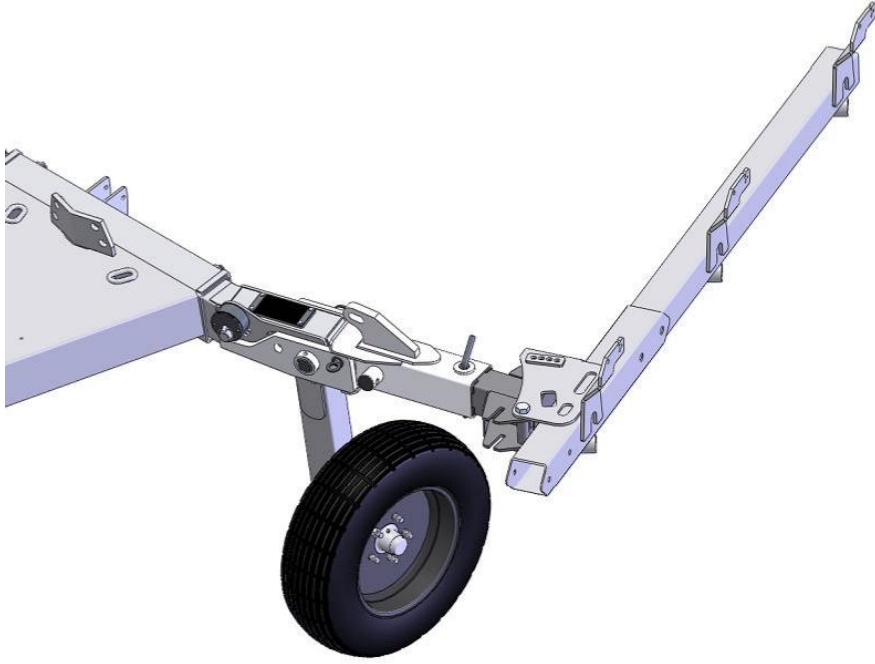
WORKING DIRECTION

ASSEMBLY

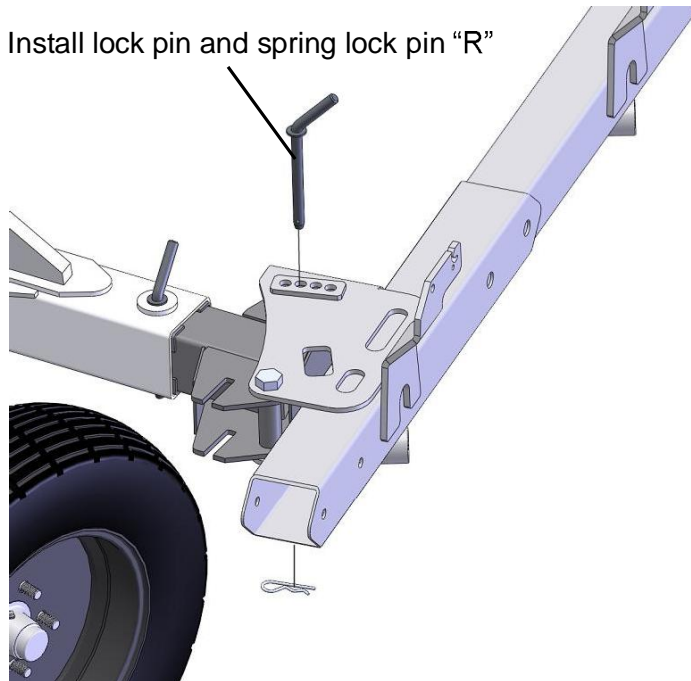


Tighten bolts to 200 N*m (150 lb-ft) to allow movement of rake wheel arm.

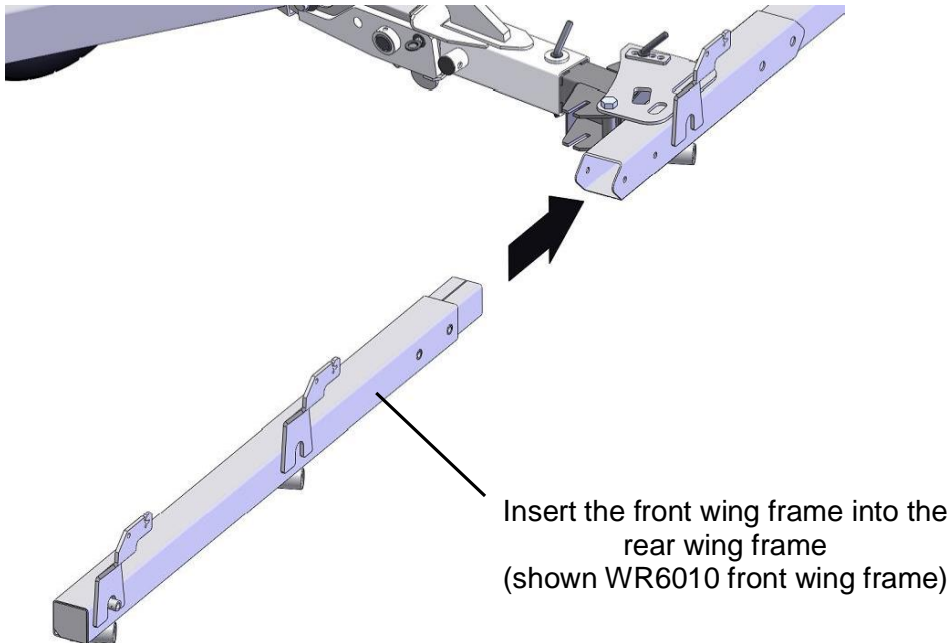
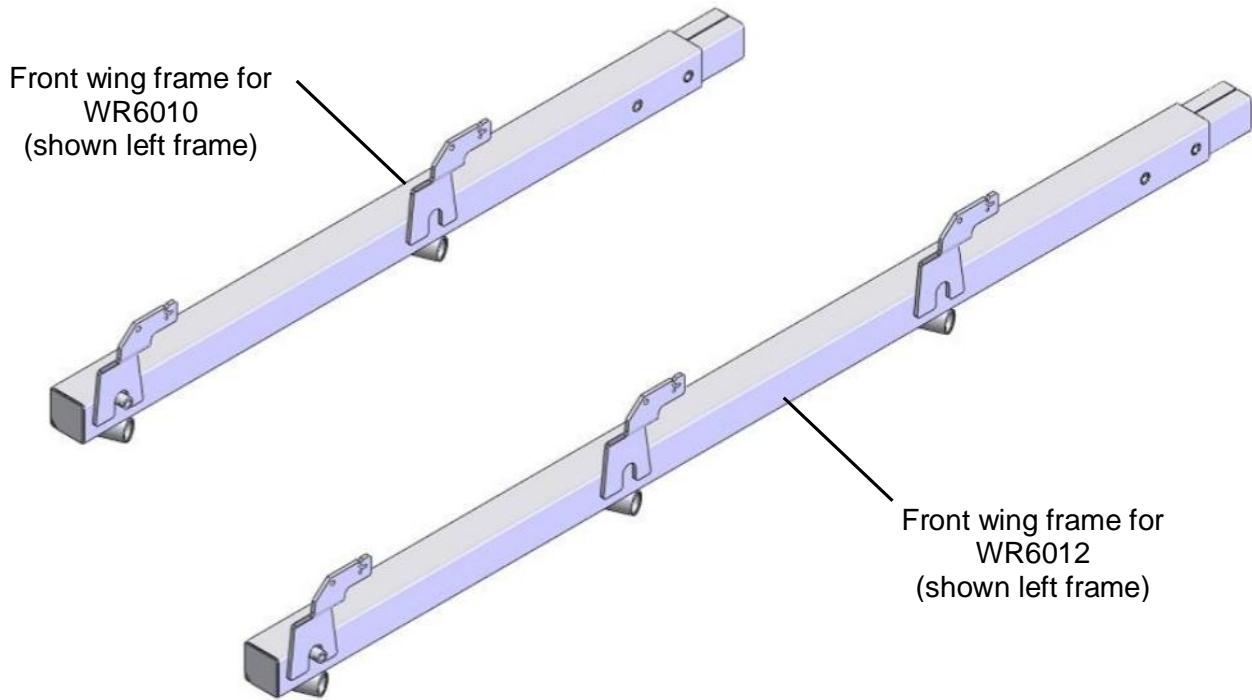
ASSEMBLY



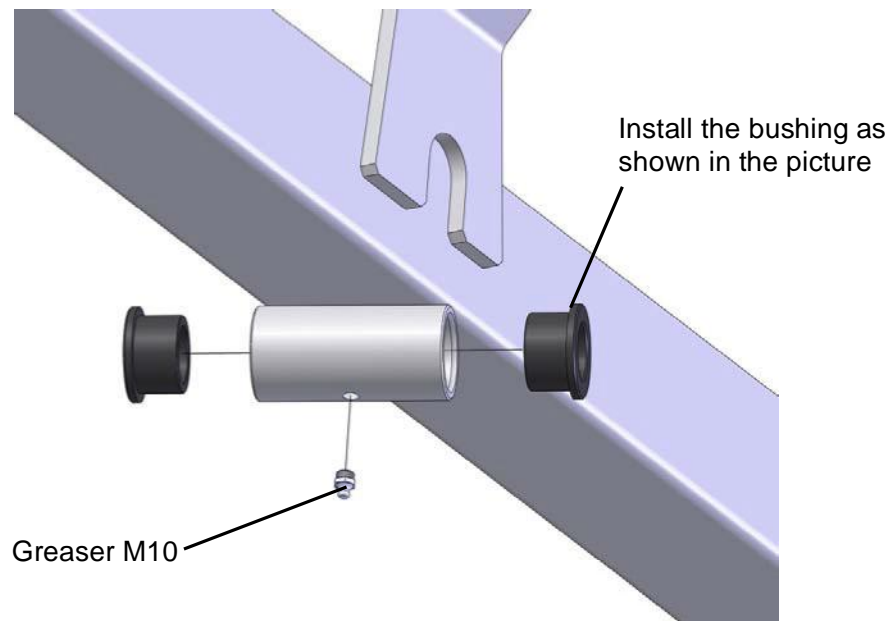
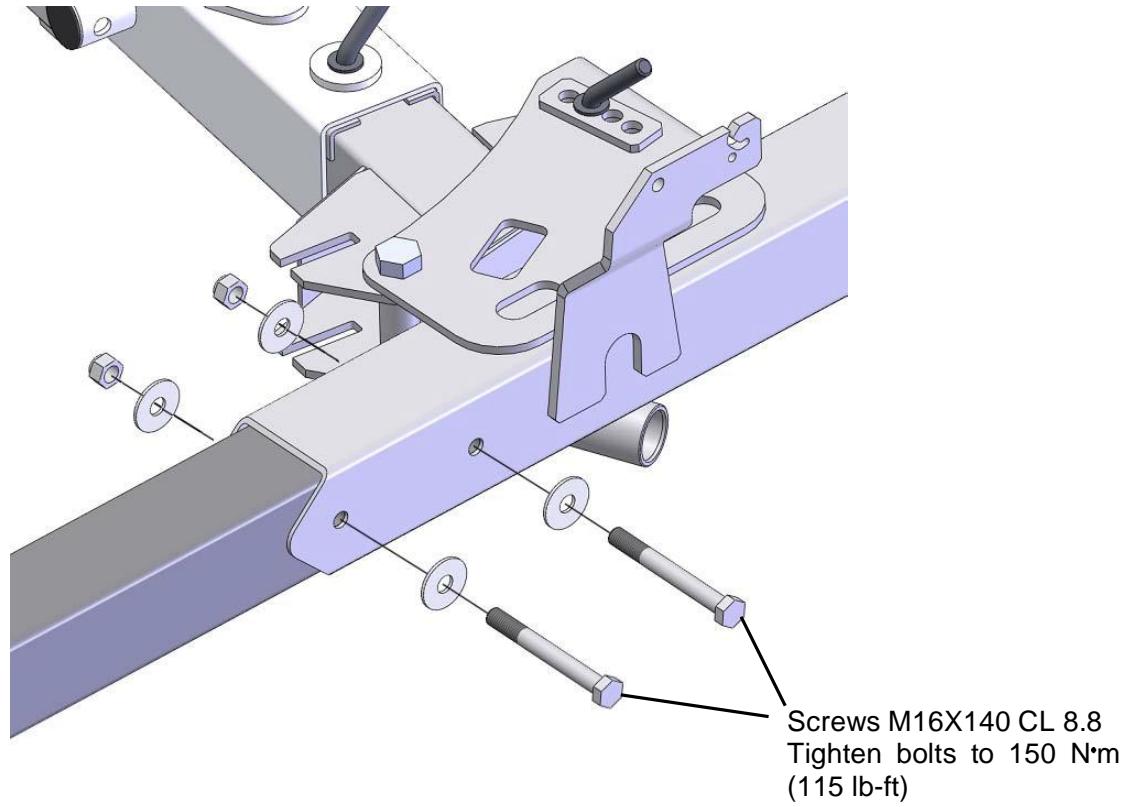
Install lock pin and spring lock pin "R"



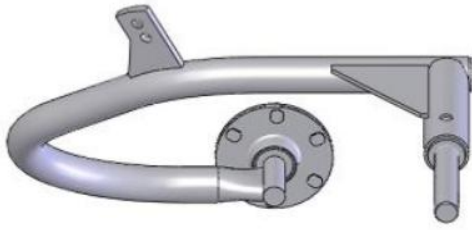
ASSEMBLY



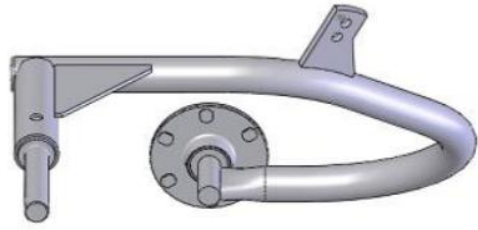
ASSEMBLY



ASSEMBLY

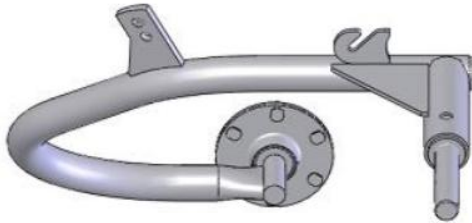


LH Rake arm

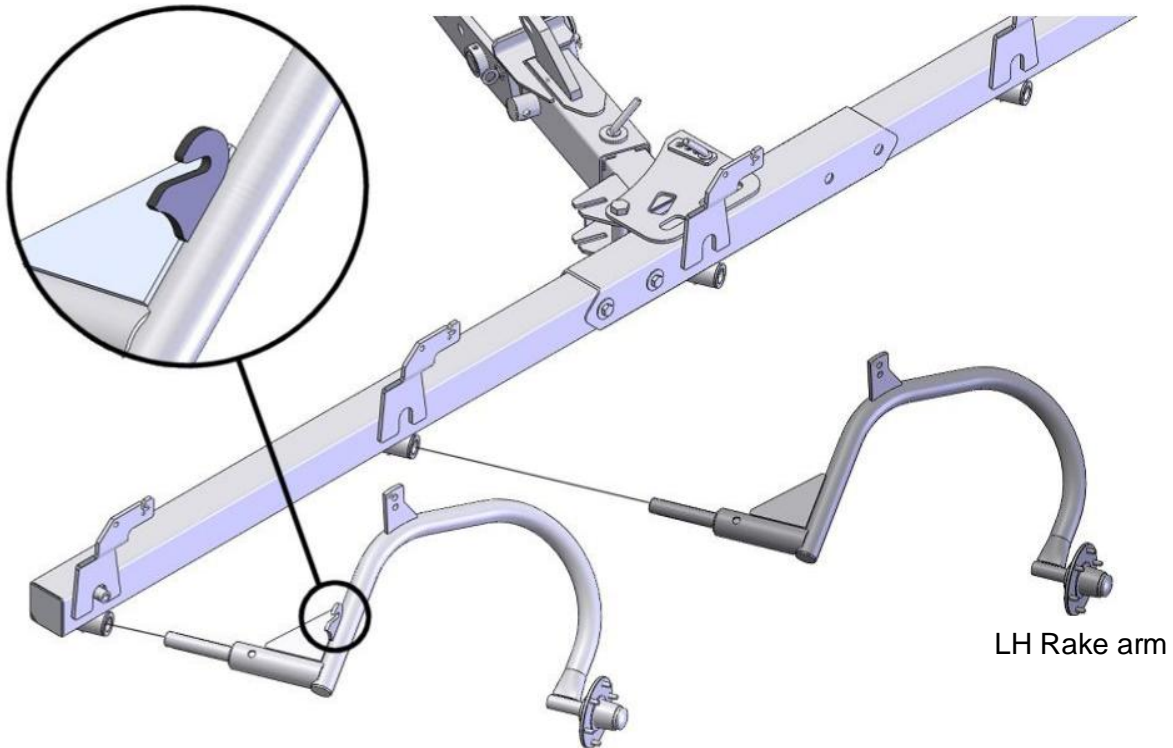
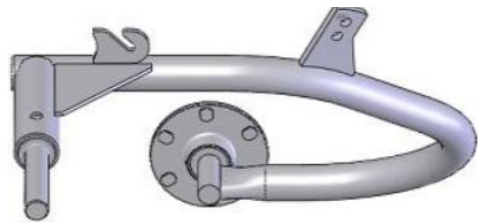


RH Rake arm

LH Front rake arm with hook



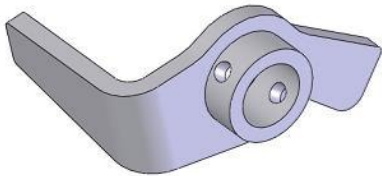
RH Front rake arm with hook



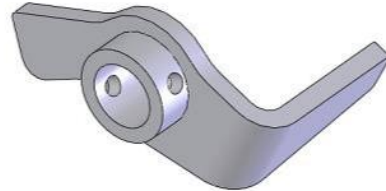
LH Rake arm

ASSEMBLY

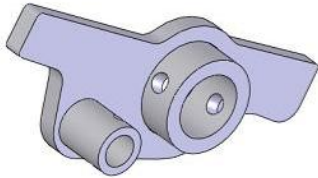
LH Front rake
arm with hook



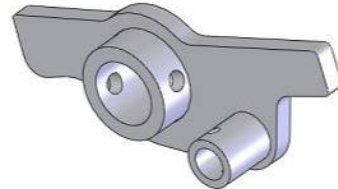
LH Stop arm bushing



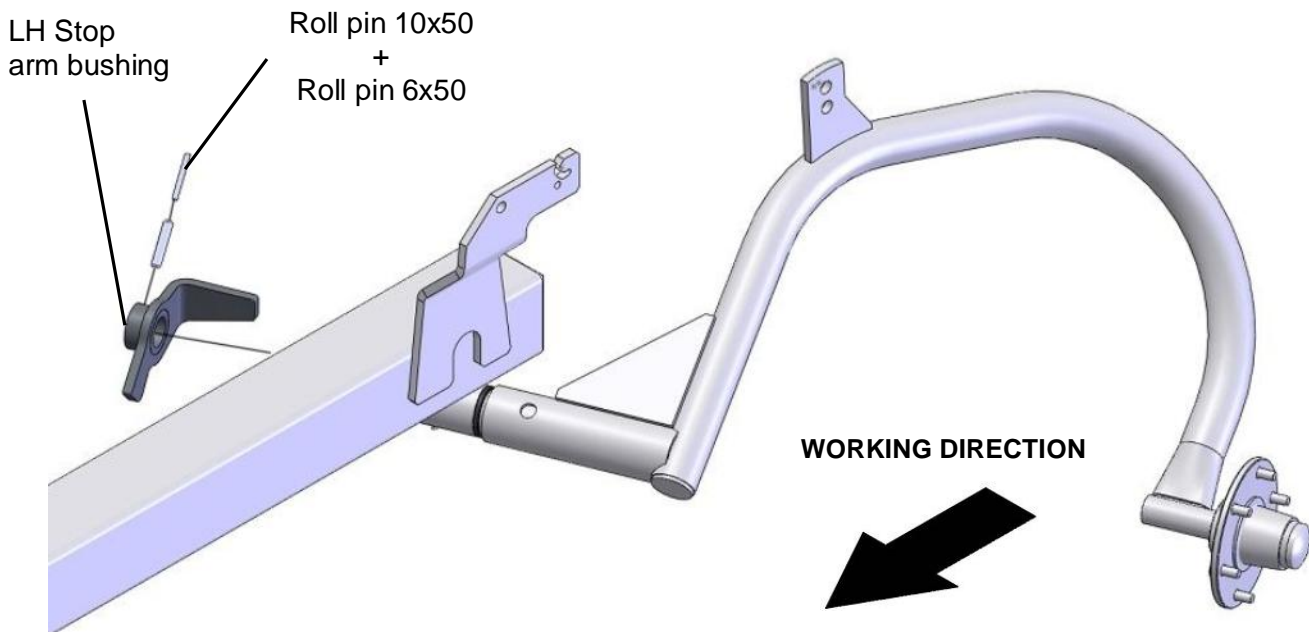
RH Stop arm bushing



LH Flip-up stop

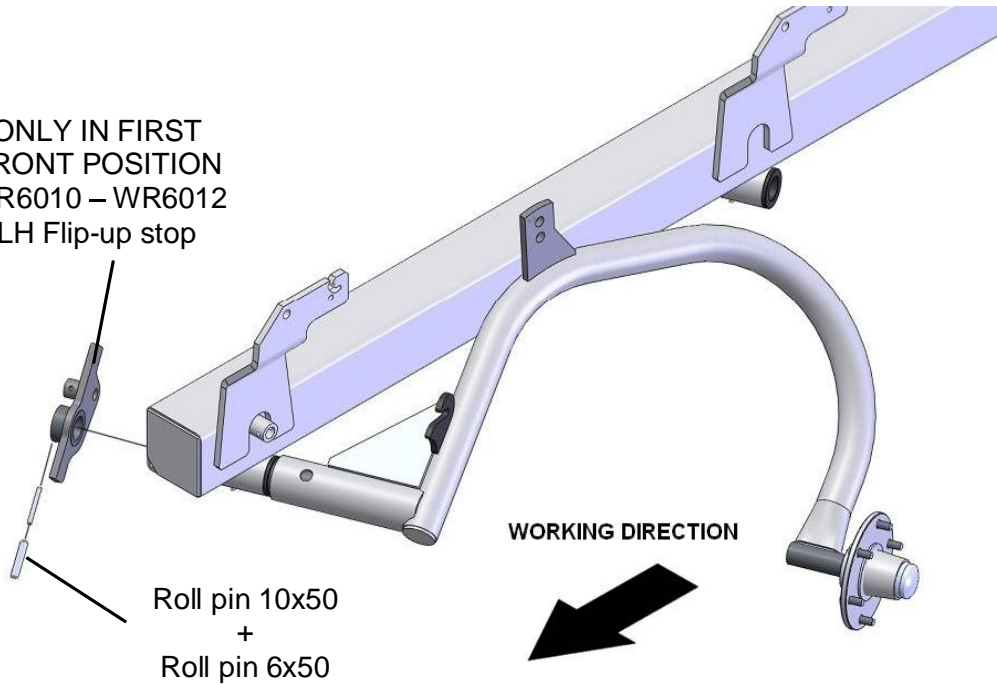


RH Flip-up stop

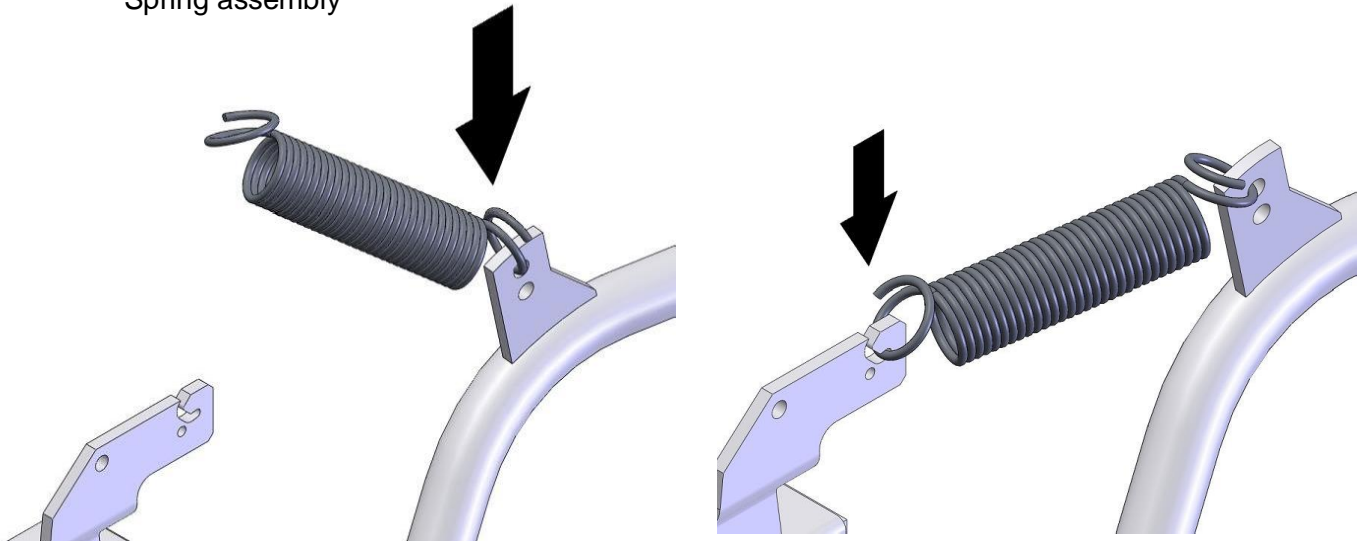


ASSEMBLY

ONLY IN FIRST
FRONT POSITION
WR6010 – WR6012
LH Flip-up stop

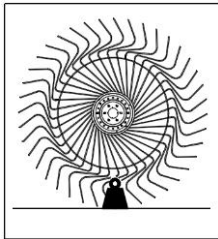
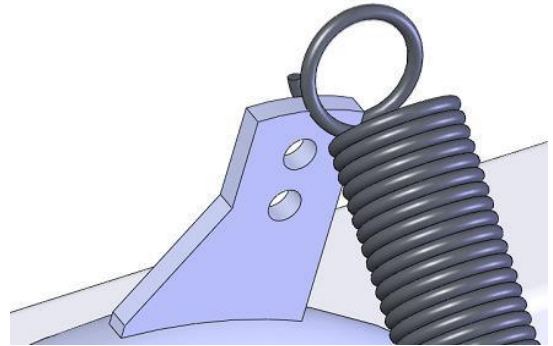
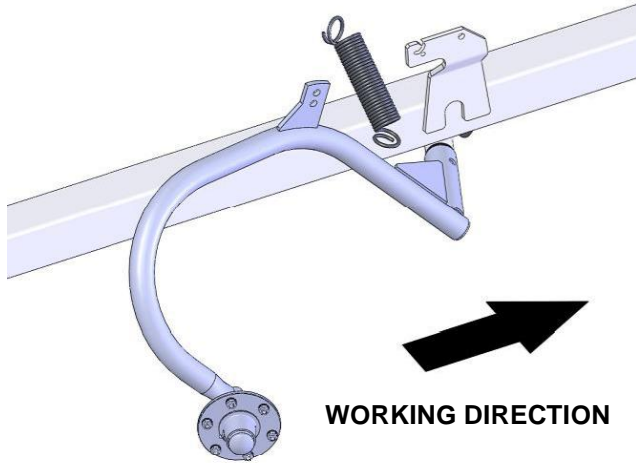


Spring assembly

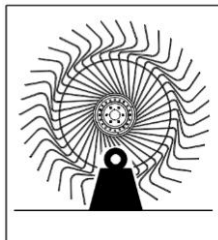
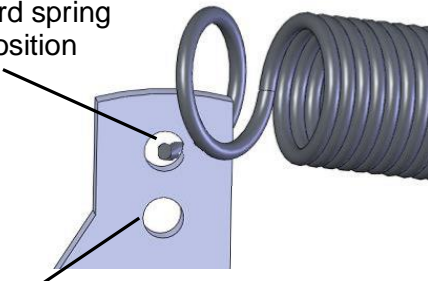


ASSEMBLY

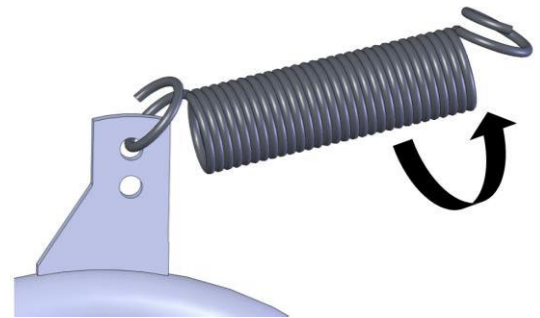
Shown right side spring



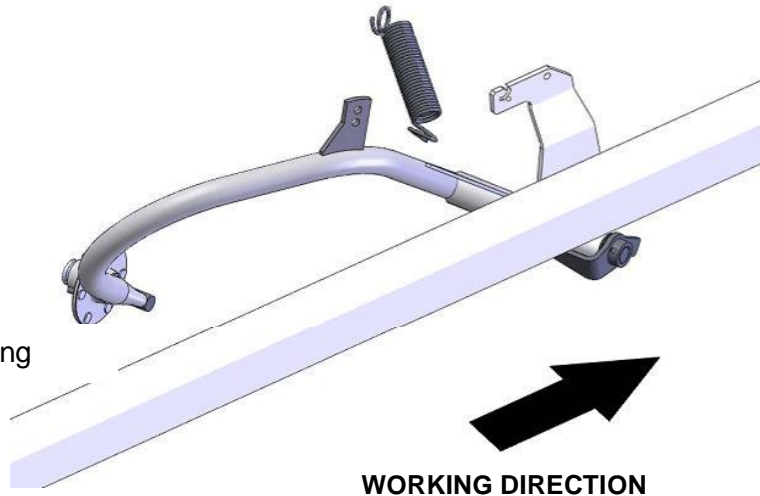
Standard spring hook position



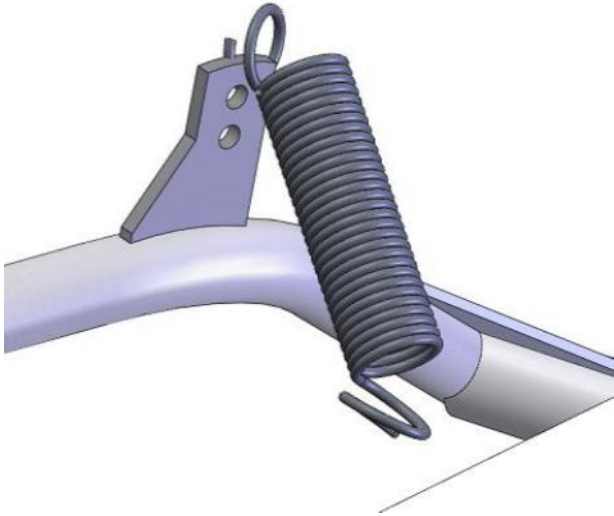
Spring hook position for heavy crop conditions



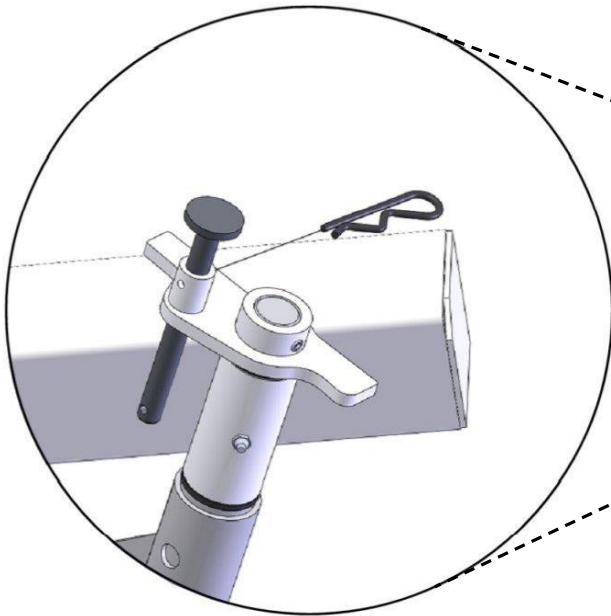
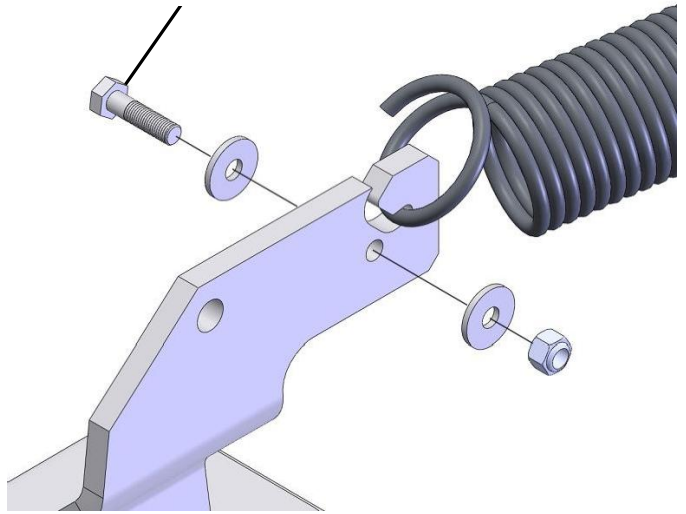
Shown left side spring



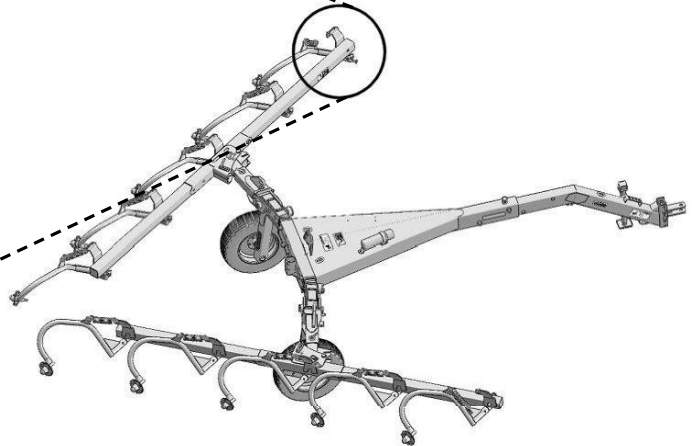
ASSEMBLY



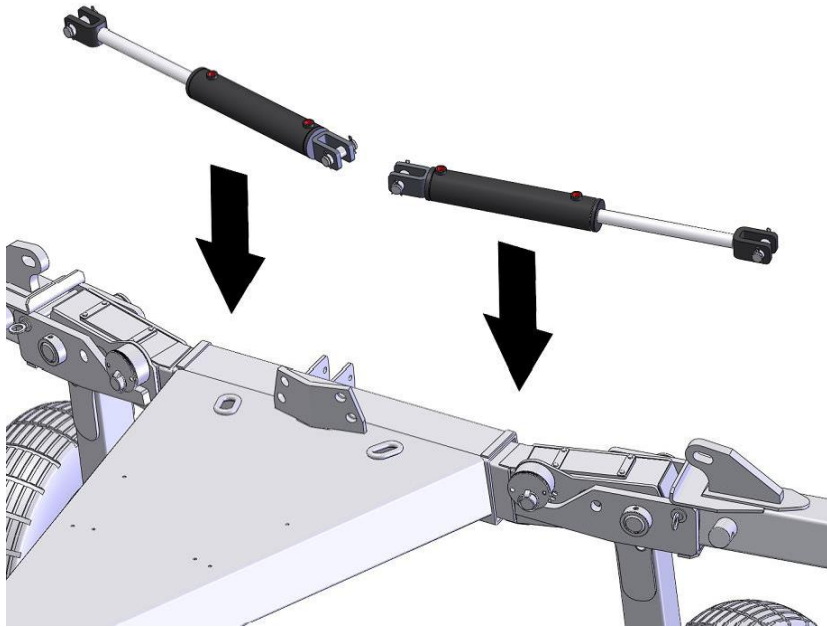
Screw M8x30 CL8.8
Refer to Specifications section for
bolt torque charts (Page 71).



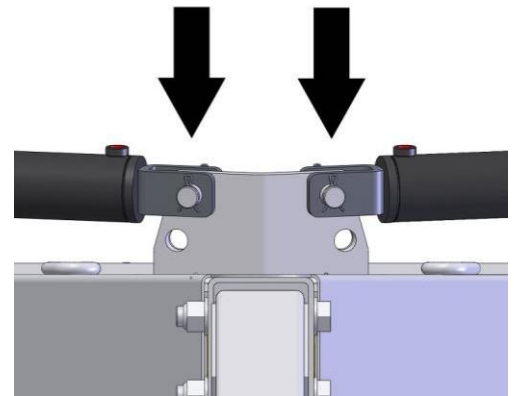
ONLY IN FIRST
FRONT POSITION
WR6010 – WR6012



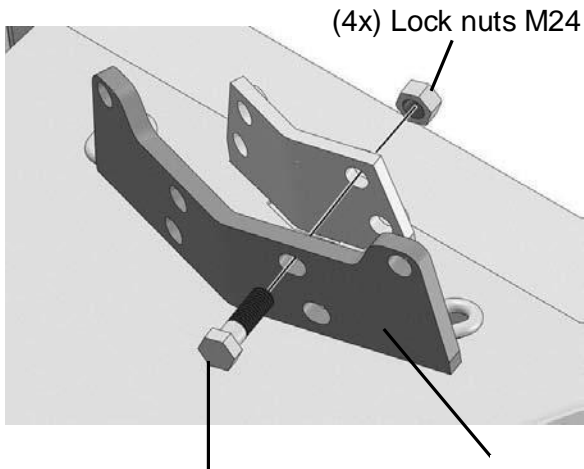
ASSEMBLY



WR6008 – WR6010
Cylinders Position



ONLY FOR WR6012 MODEL

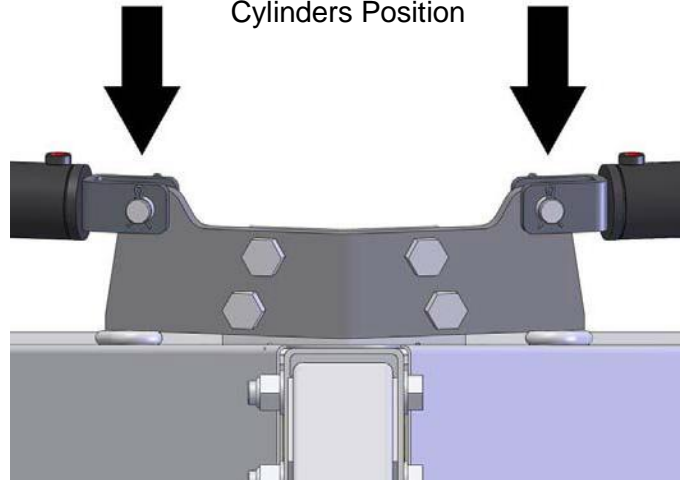


(4x) Lock nuts M24

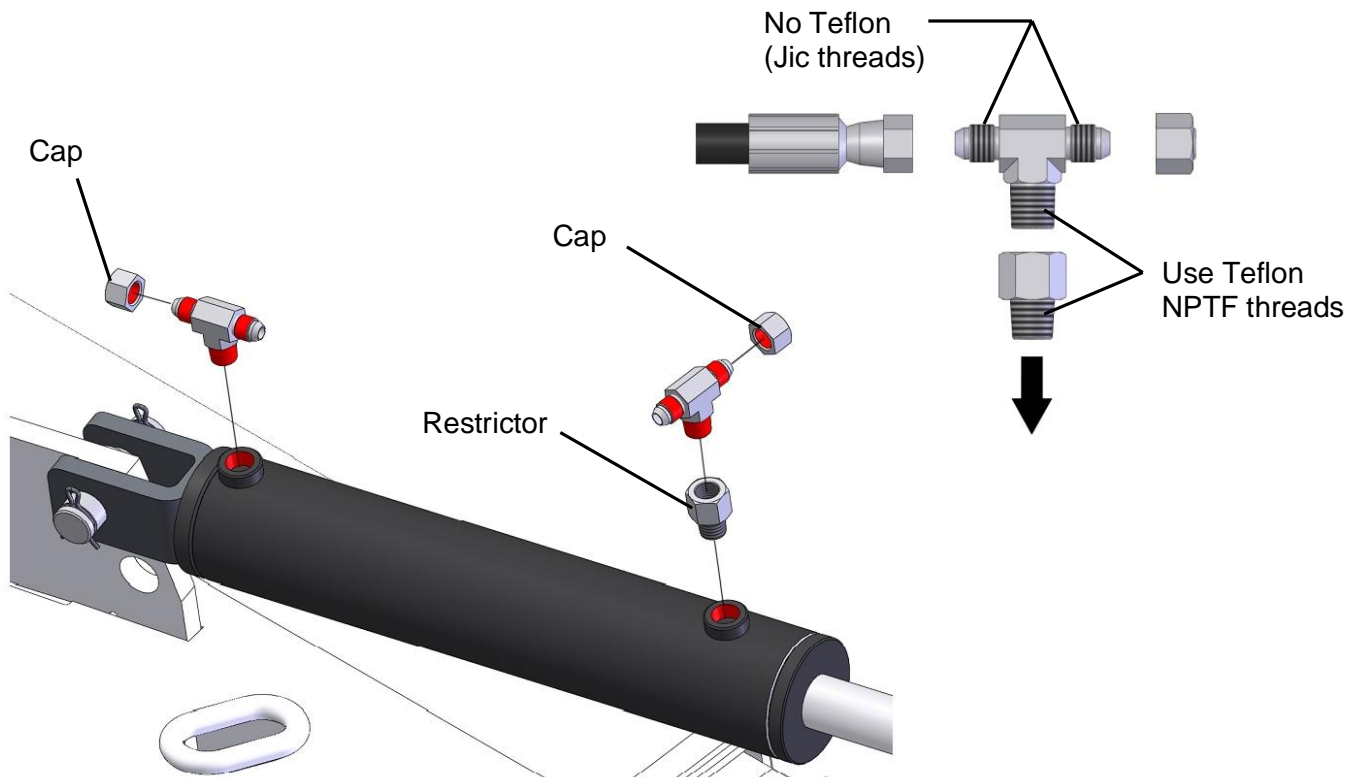
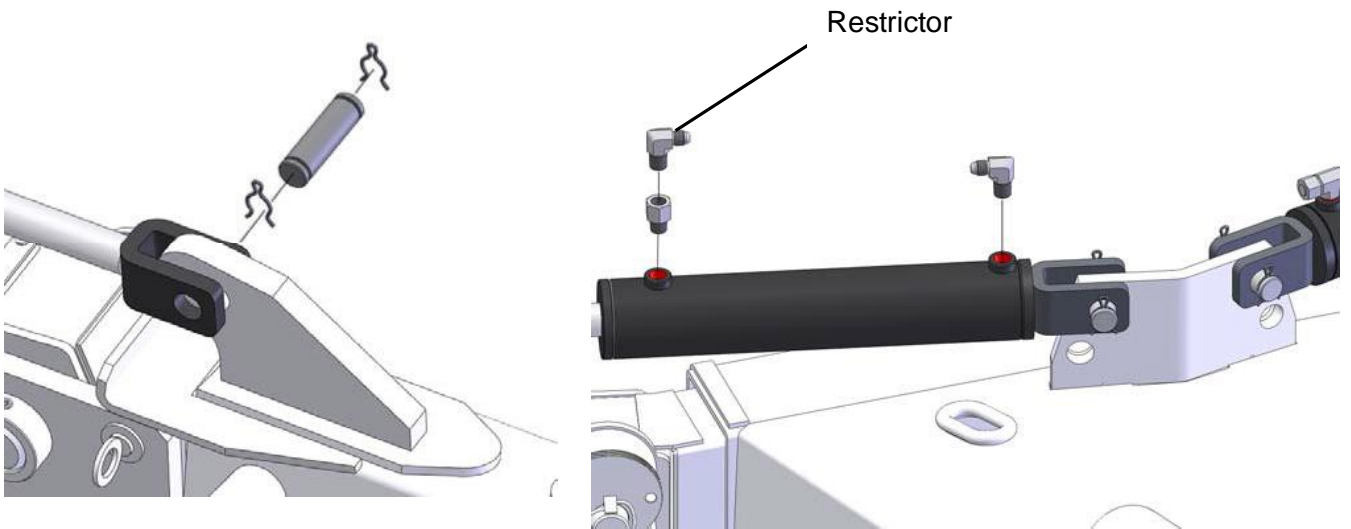
(4x) Screws M24x75 CL8.8
Refer to Specifications section for
bolt torque charts (Page 71).

Plate for cylinders

WR6012
Cylinders Position

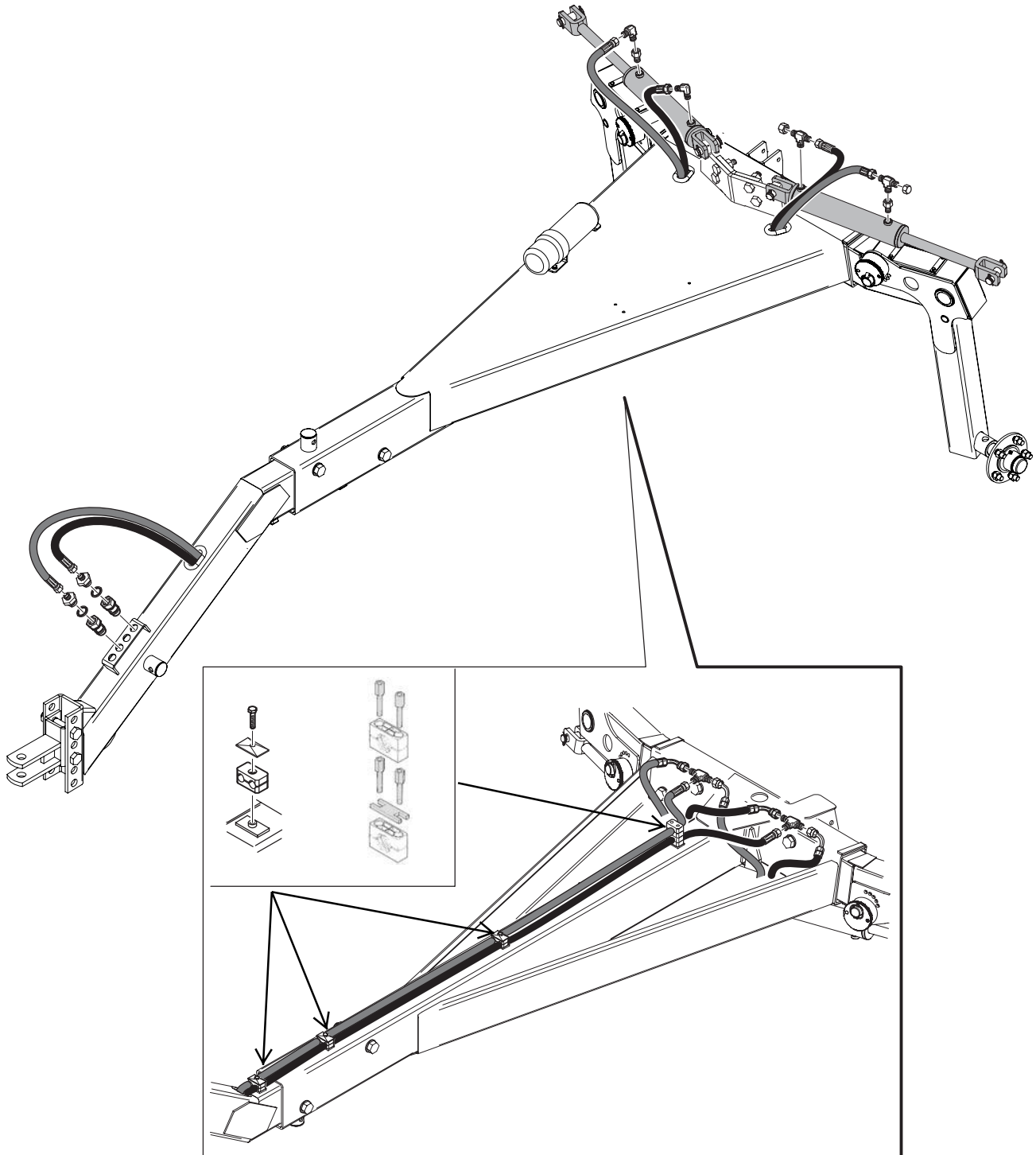


ASSEMBLY



To prevent any leaks use Teflon tape on NPTF threads. (Only on cylinder threaded holes). Do not use Teflon on Jic threads!

ASSEMBLY



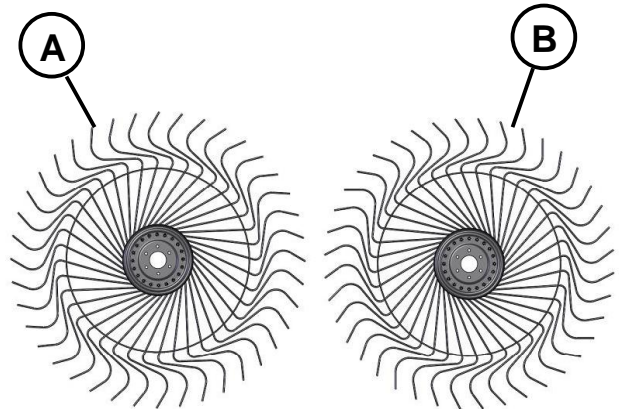
View from underside of rake

ASSEMBLY

1. Identify and separate left-hand and right-hand rake wheels.
2. Lean rake wheels against a wall with tine mounting clip nuts facing outward.

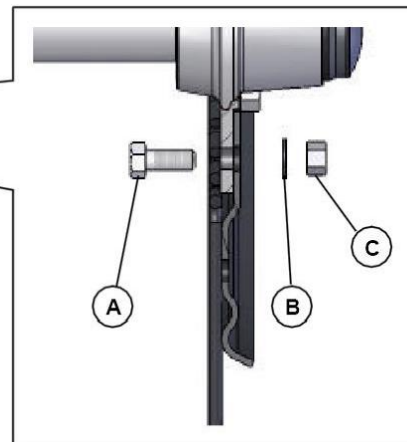
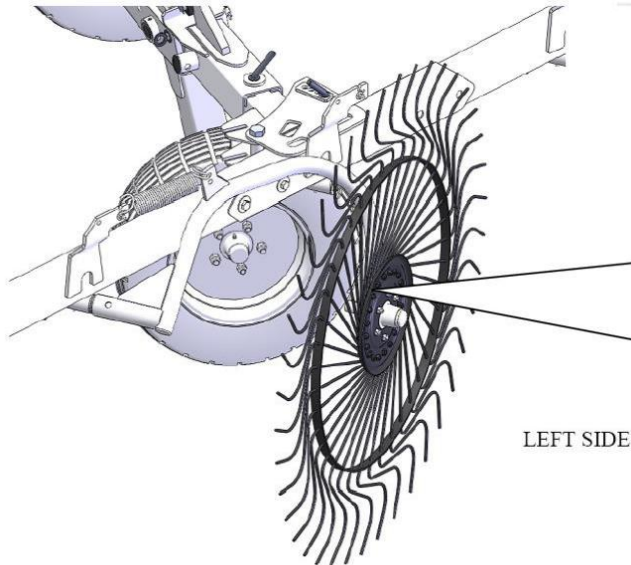
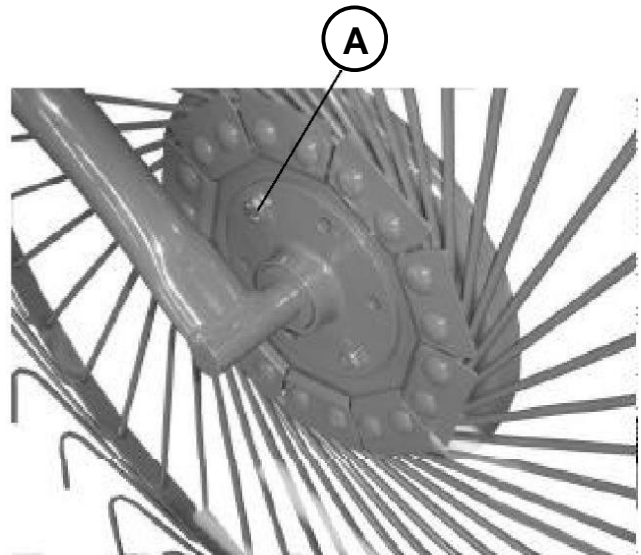
*If the last bend in the tines curve to a clockwise direction, it is a left-hand rake wheel (A).

*If the tines curve in a counter-clockwise direction, it is a right-hand rake wheel (B).



Install left-hand rake wheel with tine clips to the front. Fasten with six M10x25 cap screws (A), flat washers (B), and nuts (C). Install bolt heads to the inside with washer and nuts to the outside.

ATTENTION TO THE CORRECT ASSEMBLY OF THE R.H. AND L.H. RAKE WHEELS



- A—Screw TE M10x25
- B—Washer
- C—Nut M10

Refer to Specifications section for bolt torque charts (Page 71).

FINAL INSPECTION AND LUBRICATION

FINAL INSPECTION AND LUBRICATION

CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately.

Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.



1. Attach rake to tractor (Refer to Attaching and Detaching section in operator's manual.)
2. Make sure rake has enough clearance to raise and lower.
3. Raise and lower rake.
4. Shut off tractor. Check hydraulic system for leaks. **Oil coming out of lift cylinder vent for the first few cycles is normal.**
5. Lubricate entire machine. (See Lubrication and Maintenance section in operator's manual.)

SPECIFICATIONS

WR60 CARTED WHEEL RAKE

Tractor Requirement:

Horsepower (Minimum)	22,4 kW (30 hp)
Hydraulic Pressure Required	8273 kPa (1200 psi) (83 bar)
Hydraulic Flow Required	23 L/min (6 gal/min)
Hydraulic Outlets	One remote outlet

Raking Width:

8 Wheel Rake	5.27 m (17 ft 3 in.) maximum
10 Wheel Rake	6.36 m (20 ft 10 in.) maximum
12 Wheel Rake	7.60 m (24 ft 11 in.) maximum

Windrow Width:

8 Wheel Rake	0.40 —2.27 m (1 ft 4 in. to 7 ft 6 in)
10 Wheel Rake	0.40 —2.27 m (1 ft 4 in. to 7 ft 6 in)
12 Wheel Rake	0.66 —2.53 m (2 ft 2 in. to 8 ft 4 in)

Overall Transport Width:

8 Wheel Rake	2.70 m (8 ft 10 in)
10 Wheel Rake	2.70 m (8 ft 10 in)
12 Wheel Rake	2.95 m (9 ft 8 in)

Transport Height

8 Wheel Rake	2.60 m (8 ft 6 in)
10 Wheel Rake	2.67 m (8 ft 9 in)
12 Wheel Rake	2.67 m (8 ft 9 in)

Overall Length:

8 Wheel Rake	6.64 m (21 ft 9 in)
10 Wheel Rake	7.09 m (23 ft 3 in)
12 Wheel Rake	7.58 m (25 ft 9 in)

Shipping Weight (Approximate):

8 Wheel Rake	919 kg (2026 lb)
10 Wheel Rake	1016 kg (2240 lb)
12 Wheel Rake	1141 kg (2515 lb)

Fold/Unfold Hydraulic cylinders

Adjustments:

Raking Width	Manual
Wheel Height	Manual
Wheel Ground Pressure	Manual
Windrow Width	Manual

Raking Wheels:

Drive System Ground Driven

Number of Ground Wheels:

8 Wheel Rake	2
10 Wheel Rake	2
12 Wheel Rake	2

Tires 205/75—15

SPECIFICATIONS

RECORD PRODUCT IDENTIFICATION NUMBER

When ordering parts, always furnish model and serial number as given on serial number plate. It will assist your John Deere dealer in giving you prompt and efficient Service

Record serial number in space provided.



TIGHTENING FLARE TYPE TUBE FITTINGS











1. Check flare and flare seat for defects that might cause leakage.
2. Align tube with fitting before tightening.
3. Lubricate connection and hand tighten swivel nut until snug.
4. To prevent twisting the tube(s), use two wrenches. Place one wrench on the connector body and with the second, tighten the swivel nut to the torque shown in this chart.

Tube Size OD (in.)	Nut Size Across Flats (in.)	Torque Value *		Recommended Turns To Tighten (After Finger Tightening)	
		(Nm)	(lb-ft)	(Flats)	(Turns)
3/16	7/16	8	6	1	1/6
1/4	9/16	12	9	1	1/6
5/16	5/8	16	12	1	1/6
3/8	11/16	24	18	1	1/6
1/2	7/8	46	34	1	1/6
5/8	1	62	46	1	1/6
3/4	1-1/4	102	75	3/4	1/8
7/8	1-3/8	122	90	3/4	1/8

*The torque values shown are based on lubricated connections as in reassembly.

SPECIFICATIONS

UNIFIED INCH BOLT AND CAP SCREW TORQUE VALUES

SAE Grade and Head Markings	1 or 2 ^b 	5 	5.1 	5.2 	8 	8.2 
SAE Grade and Nut Markings	2 	5 		8 		

Size	Grade 1				Grade 2 ^b				Grade 5, 5.1, or 5.2				Grade 8 or 8.2			
	Lubricated ^a		Dry ^a		Lubricated ^a		Dry ^a		Lubricated ^a		Dry ^a		Lubricated ^a		Dry ^a	
	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft
1/4	3.7	2.8	4.7	3.5	6	4.5	7.5	5.5	9.5	7	12	9	13.5	10	17	12.5
5/16	7.7	5.5	10	7	12	9	15	11	20	15	25	18	28	21	35	26
3/8	14	10	17	13	22	16	27	20	35	26	44	33	50	36	63	46
7/16	22	16	28	20	35	26	44	32	55	41	70	52	80	58	100	75
1/2	33	25	42	31	53	39	67	50	85	63	110	80	120	90	150	115
9/16	48	36	60	45	75	56	95	70	125	90	155	115	175	130	225	160
5/8	67	50	85	62	105	78	135	100	170	125	215	160	240	175	300	225
3/4	120	87	150	110	190	140	240	175	300	225	375	280	425	310	550	400
7/8	190	140	240	175	190	140	240	175	490	360	625	450	700	500	875	650
1	290	210	360	270	290	210	360	270	725	540	925	675	1050	750	1300	975
1-1/8	400	300	510	375	400	300	510	375	900	675	1150	850	1450	1075	1850	1350
1-1/4	570	425	725	530	570	425	725	530	1300	950	1650	1200	2050	1500	2600	1950
1-3/8	750	550	950	700	750	550	950	700	1700	1250	2150	1550	2700	2000	3400	2550
1-1/2	1000	725	1250	925	990	725	1250	930	2250	1650	2850	2100	3600	2650	4550	3350

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

^a "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.

^b Grade 2 applies for hex cap screws (not hex bolts) up to 152 mm (6-in.) long. Grade 1 applies for hex cap screws over 152 mm (6-in.) long, and for all other types of bolts and screws of any length.

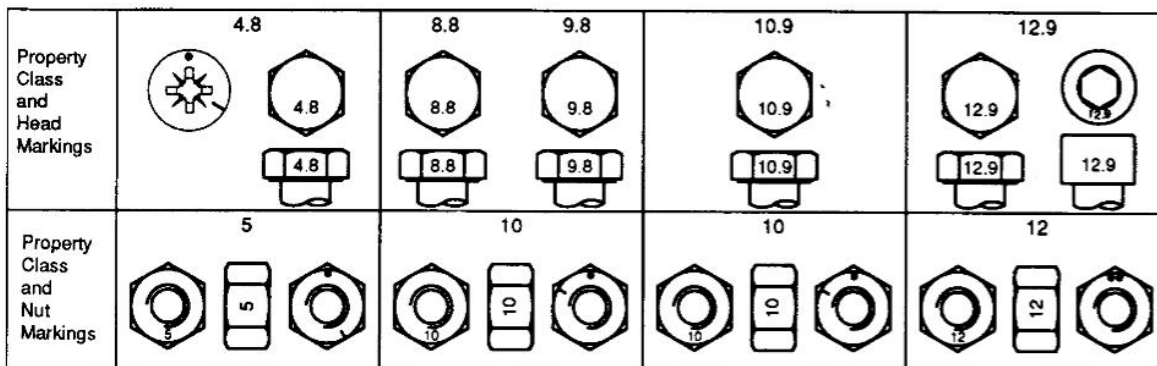
Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

SPECIFICATIONS

METRIC BOLT AND CAP SCREW TORQUE VALUES



Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated ^a		Dry ^a		Lubricated ^a		Dry ^a		Lubricated ^a		Dry ^a		Lubricated ^a		Dry ^a	
	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft
M6	4.8	3.5	6	4.5	9	6.5	11	8.5	13	9.5	17	12	15	11.5	19	14.5
M8	12	8.5	15	11	22	16	28	20	32	24	40	30	37	28	47	35
M10	23	17	29	21	43	32	55	40	63	47	80	60	75	55	95	70
M12	40	29	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	47	80	60	120	88	150	110	175	130	225	165	205	150	260	190
M16	100	73	125	92	190	140	240	175	275	200	350	255	320	240	400	300
M18	135	100	175	125	260	195	330	250	375	275	475	350	440	325	560	410
M20	190	140	240	180	375	275	475	350	530	400	675	500	625	460	800	580
M22	260	190	330	250	510	375	650	475	725	540	925	675	850	625	1075	800
M24	330	250	425	310	650	475	825	600	925	675	1150	850	1075	800	1350	1000
M27	490	360	625	450	950	700	1200	875	1350	1000	1700	1250	1600	1150	2000	1500
M30	675	490	850	625	1300	950	1650	1200	1850	1350	2300	1700	2150	1600	2700	2000
M33	900	675	1150	850	1750	1300	2200	1650	2500	1850	3150	2350	2900	2150	3700	2750
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2750	4750	3500

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical property class.

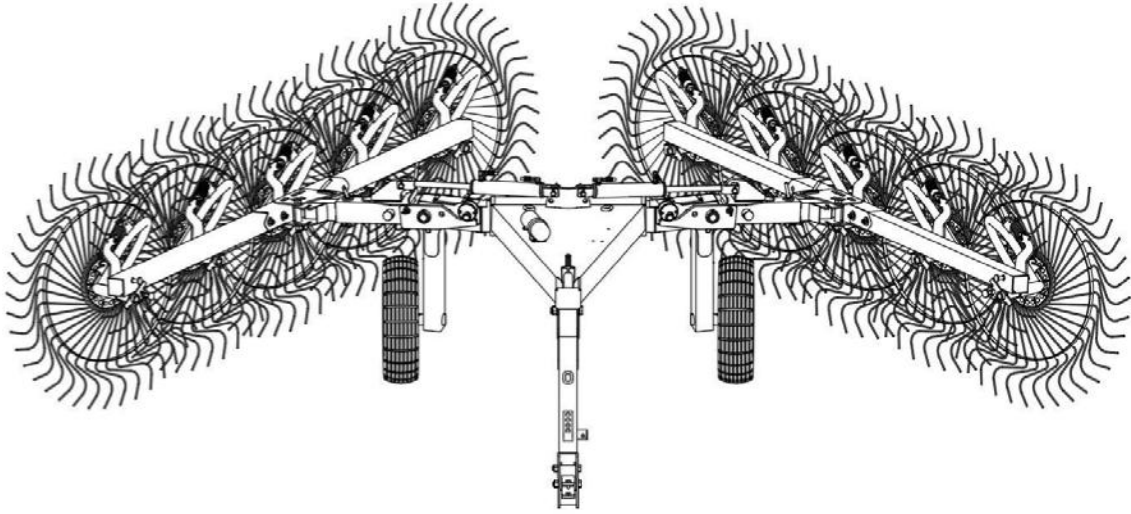
Fasteners should be replaced with the same or higher property class. If higher property class fasteners are used, these should only be tightened to the strength of the original.

^a "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.

Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

A2



*FRONTIER WR60 CARTED 8-WHEEL RAKE
MANUFACTURED (2013-)*

*FRONTIER WR60 CARTED 10-WHEEL RAKE
MANUFACTURED (2013-)*

*FRONTIER WR60 CARTED 12-WHEEL RAKE
MANUFACTURED (2013-)*

(SPECIFICATIONS AND DESIGN SUBJECT TO CHANGE WITHOUT NOTICE.)

SERIAL NUMBER LISTING INFORMATION

SERIAL NUMBER INFORMATION IS LISTED TO SHOW ON WHICH MACHINES EACH PART CAN BE USED; FOR EXAMPLE:

- THE PART CAN BE USED ON ALL MACHINES.
- 000000- THE PART CAN BE USED ON ALL MACHINES BEGINNING WITH THE SERIAL NUMBER LISTED.
- 000000 THE PART CAN BE USED ON ALL MACHINES UP TO AND INCLUDING THE SERIAL NUMBER LISTED.
- 000000-000000 THE PART CAN BE USED ON ALL MACHINES BETWEEN AND INCLUDING THE SERIAL NUMBERS LISTED.

WHEN XXXXXX'S ARE LISTED IN PLACE OF A SERIAL NUMBER, A SERIAL NUMBER CHANGE WAS MADE BUT THE EXACT SERIAL NUMBER WAS NOT AVAILABLE WHEN THE CATALOG WAS PRODUCED.

THE RAKE SERIAL NUMBER IS LOCATED ON THE LEFT-HAND SIDE OF TONGUE.

DIRECTION ARROW

ARROWS ARE USED WITH ILLUSTRATIONS TO INDICATE THE FRONT OF THE UNIT. "RIGHT-HAND" AND "LEFT-HAND" SIDES ARE DETERMINED BY FACING IN THE DIRECTION OF MACHINE FORWARD TRAVEL.

BOX-ENCLOSED ILLUSTRATIONS

A KEY NUMBER, SHOWN IN THE PARTS LIST, IS ASSIGNED TO A BOX ENCLOSING ALL PARTS SOLD AS A SERVICE ASSEMBLY.

BOLT AND CAP SCREW STRENGTH IDENTIFICATION

BOLTS AND CAP SCREWS REQUIRED TO HAVE HIGH-STRENGTH QUALITIES EQUIVALENT TO SAE GRADE 8 ARE IDENTIFIED THROUGHOUT THIS CATALOG BY THE DESCRIPTION HS SAE 8. ALL STANDARD BOLTS AND CAP SCREWS ARE SAE GRADE 5 OR LOWER.

SI UNITS OF MEASURE

METRIC DIMENSIONS ARE GIVEN, WHERE APPLICABLE, THROUGHOUT THIS PARTS CATALOG.

HOSE DIMENSIONS LISTED ARE EITHER FITTING SIZE X LENGTH X FITTING SIZE OR I.D. X LENGTH.

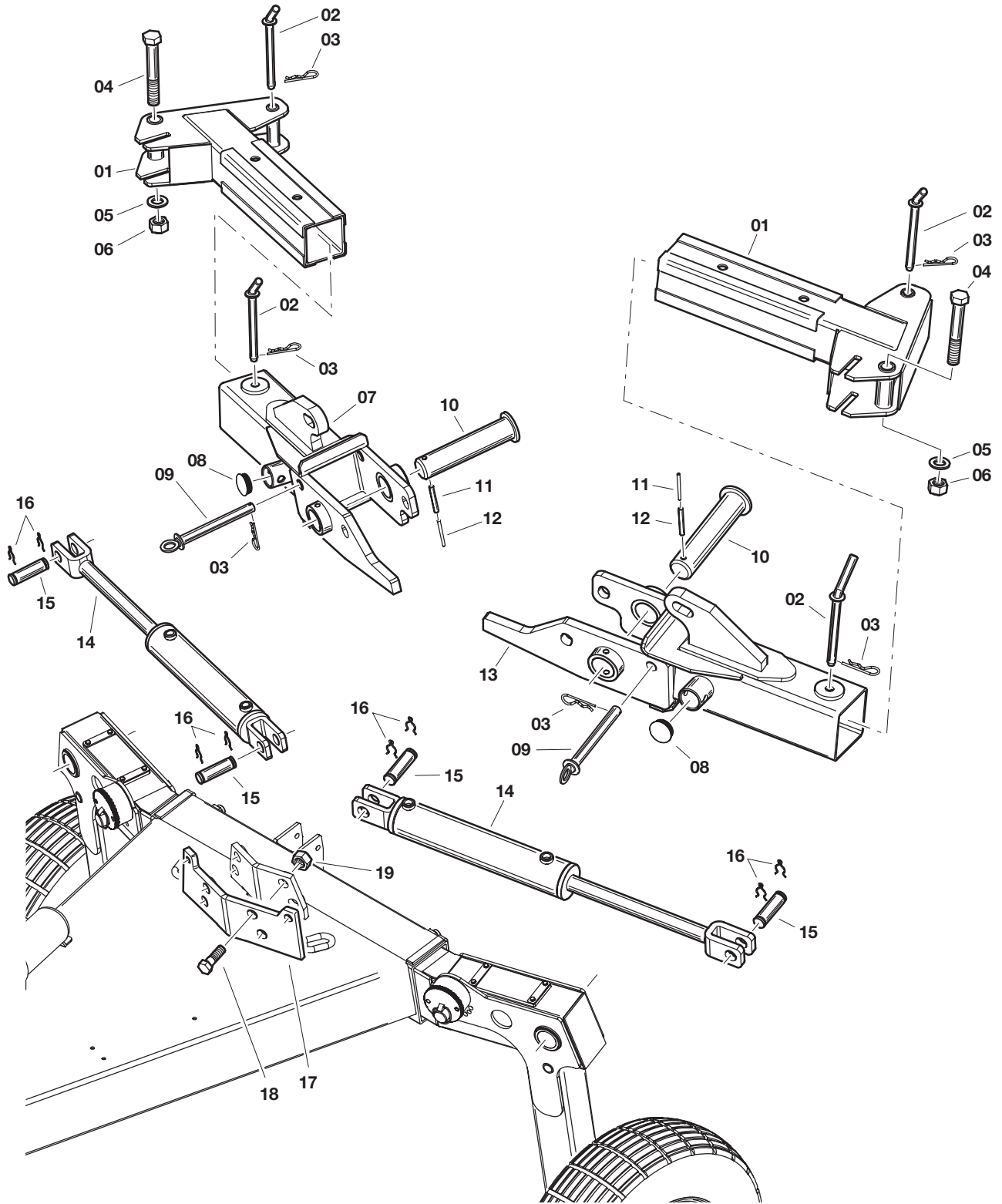
CHANGE INDICATOR LINE (MICROFICHE CATALOGS ONLY)

CHANGES AFFECTING THE ORDERING OF PARTS ARE IDENTIFIED BY VERTICAL LINES MARKED IN THE LEFT-HAND MARGIN OF REVISED PARTS LISTING IMAGES. A LINE IS ALSO AT THE LEFT-HAND EDGE OF THE SAME PART NUMBER IN THE NUMERICAL INDEX TO SHOW THE LOCATION OF REVISED INFORMATION.

FRAME AND DRAWBAR ASSEMBLY

KEY	PART NO.	PART NAME	QTY	SERIAL NO.	W	W	W	REMARKS
					R	R	R	
					6	6	6	
					0	0	0	
					0	1	1	
					8	0	2	
1	5TNV10AZ086	SCREW TE M 24x140 UNI5737 zn	3		X	X	X	
2	5TNP50HZ019	BRACKET ADJ.TRACTOR HITCH (ZINCED)	1		X	X	X	
3	5TNV20BZ022	SELF LOCKING NUT NY. M24 UNI 7474 zn	9		X	X	X	
4	5TNP50FV186	DRAWBAR	1		X	X	X	
5	5TNV85C0025	COVER ILT50+3,5	1		X	X	X	
6	5TNP50ZZ397	JACK STAND	1		X	X	X	
7	5TNV85Z0032	MANUAL HOLDER	1		X	X	X	
8	5TNP50AV467	CENTRAL FRAME	1		X	X	X	
9	5TNV30AZ012	WASHER M24 UNI 6592 ZINCED 25x44x4	12		X	X	X	
10	5TNV10AZ087	HEX.CAP SCREW TE M24x160 UNI5737 Z.	6		X	X	X	
11	TNV20BZ025	NUT - MB16x24x19 - ZINC	10		X	X	X	
12	5TNC60AS049	WHEEL 205/75X15	2		X	X	X	
13	5TNP50DV167	WHEEL SUPPORT L.H.	1		X	X	X	
14	5TNV85A0112	BUSHING Q2FM-5505-50	4		X	X	X	
15	5TNS90C0060	COMPLETE CAM L.H.	1		X	X	X	
16	5TNV45BZ003	QUICK LOCK PIN 8 L=54	2		X	X	X	
17	5TNP70Z0318	PROTECTION COVER	2		X	X	X	
18	5TNP70PZ273	PLATE	4		X	X	X	
19	5TNV10AZ002	SCREW TE M6x16 UNI 5739 ZINCED	8		X	X	X	
20	5TNP50DV166	WHEEL SUPPORT R.H.	1		X	X	X	
21	5TNV10AZ008	HEXAGONAL-HEAD SCREW 8X25 8.8	3		X	X	X	
22	TNV30AZ002	WASHER M8 ISO 7089 ZINCED	3		X	X	X	
23	TNV40B0010	ROLL PIN D. 10x70 UNI6873	1		X	X	X	
24	5TNV40B0047	ROLL PIN d=6x65 UNI 6873	1		X	X	X	
25	5TNP70MZ055	SMV SUPPORT	2		X	X	X	
26	5TNV10AZ002	SCREW TE M 6x 16 UNI5739 ZN	1		X	X	X	
27	5TNV20CZ006	SELF LOCKNUT M6	1		X	X	X	
28	5TN1836001	SIGN SMV METAL	2		X	X	X	
29	5TN52754	SMV SUPPORT	1		X	X	X	
30	5TNV10AZ006	SCREW TE M8x12 UNI 5739 ZINCED	1		X	X	X	
31	TNC45BZ001	SAFETY CHAIN	1		X	X	X	
32	5TNS90C0059	COMPLETE CAM R.H.	1		X	X	X	
33	5TNV85Z0024	STRAP WITH HOOKS	2		X	X	X	

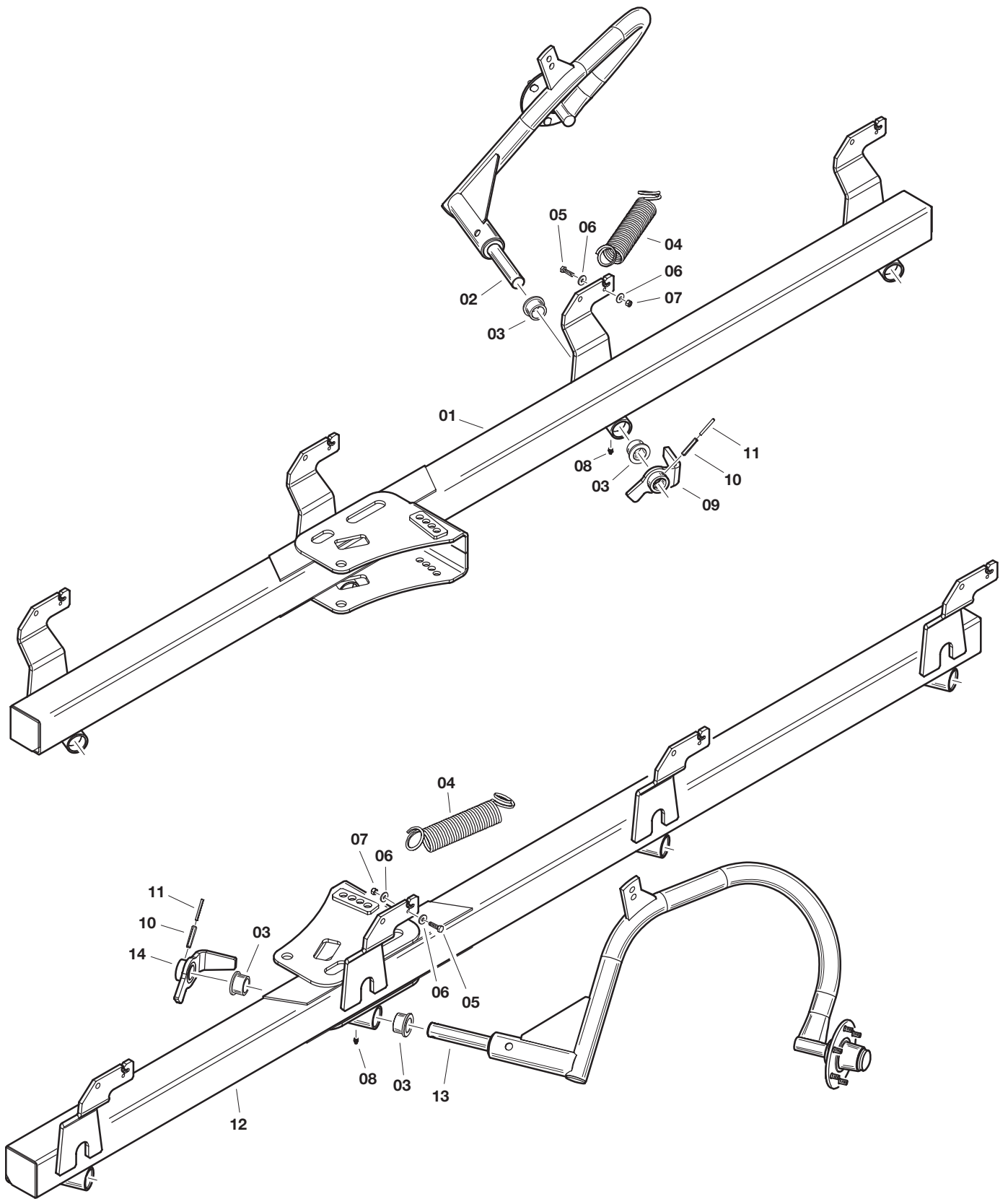
OPENING ARMS ASSEMBLY



OPENING ARMS ASSEMBLY

KEY	PART NO.	PART NAME	QTY	SERIAL NO.	W	W	W	REMARKS
					R	R	R	
					6	6	6	
					0	0	0	
					0	1	1	
					8	0	2	
1	5TNP50BV264	TELESCOPIC ARM	2		X	X	X	
2	5TNC70BZ128	LOCK PIN	4		X	X	X	
3	TNV40CZ008	SPRING LOCK PIN R4 ZN	6		X	X	X	
4	TNV10AZ087	HEX.CAP SCREW TE M24x160 UNI5737 Z.	2		X	X	X	
5	5TNV30AZ012	WASHER M24 UNI 6592 ZINCED 25x44x4	2		X	X	X	
6	TNV20BZ021	SELF LOCKING NUT NY.M24x2 UNI7474 Z	2		X	X	X	
7	5TNP50BV232	R.H. ARM	1		X	X	X	
8	5TNV85C0025	COVER ILT50+3,5	2		X	X	X	
9	5TNC70BZ127	PIN	2		X	X	X	
10	5TNC70BZ129	PIN Ø50	2		X	X	X	
11	TNV40B0010	ROLL PIN D. 10x70 UNI6873	2		X	X	X	
12	5TNV40B0015	ROLL PIN D=6x70	2		X	X	X	
13	5TNP50BV231	L.H. ARM	1		X	X	X	
14	5TNC50BN072	CYLINDER - HYD 2.5x12" WELDED	2		X	X	X	
15	5TNC70BZ108	PIN CYLINDER	4		X	X	X	
16	TNV40DZ001	CIRCLIP	8		X	X	X	
17	5TNP70AV566	PLATE FOR CYLINDER - 12 WHEEL RAKE	1				X	
18	5TNV10AZ171	SCREW TE M 24x75 UNI5737 ZN	4				X	
19	5TNV20BZ022	SELF LOCKING NUT M 24 UNI7474 ZN	4				X	
	5TNC50A0166	SEAL KIT FOR CILINDER	2		X	X	X	

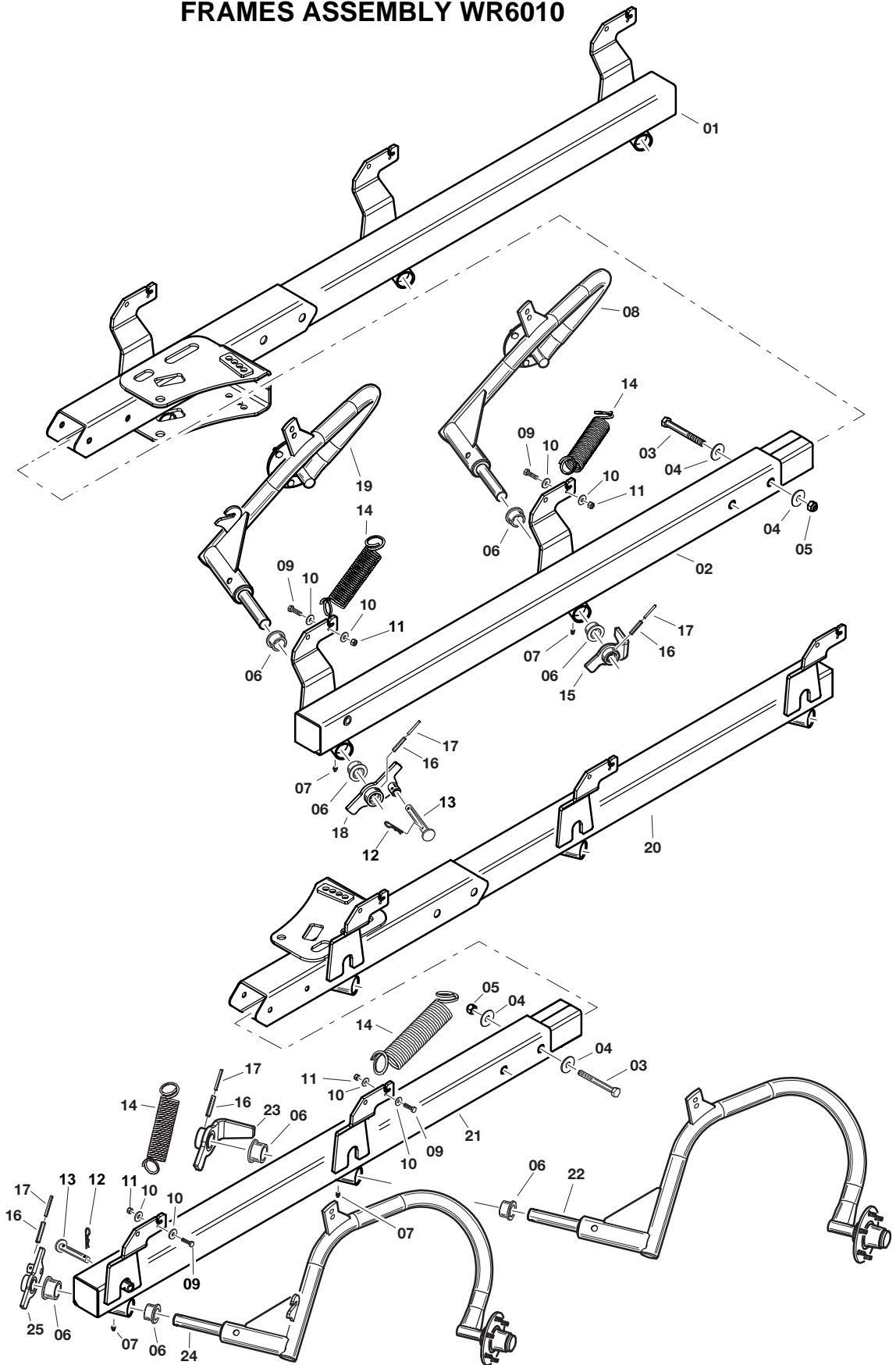
FRAMES ASSEMBLY WR6008



FRAMES ASSEMBLY WR6008

KEY	PART NO.	PART NAME	QTY	SERIAL NO.	W	W	W	REMARKS
					R	R	R	
					6	6	6	
					0	0	0	
					0	1	1	
					8	0	2	
1	5TNP50AV245	FRAME RH - 8	1		X			
2	5TNP50BV222	RIGHT RAKE ARM	4		X			
3	TNV85A0001	BUSHING NYLON	16		X			
4	5TNC40AZ027	SPRING FOR RAKE WHEEL ARM	8		X			
5	5TNV10AZ009	SCREW TE M8x30 UNI 5737 ZINCED	8		X			
6	5TNV30AZ051	WASHER M8 LARGA UNI 6593 zn	16		X			
7	TNV20BZ001	SELF-LOCKING NUT M8 - ZINC	8		X			
8	TNV99AZ001	GREASER-M10x1 UNI 7663-A	8		X			
9	5TNP50ZV440	STOP R.H.	4		X			
10	5TNV40B0008	ROLL PIN 10x50	8		X			
11	5TNV40B0045	ROLL PIN 6x50	8		X			
12	5TNP50AV246	FRAME LH 8	1		X			
13	5TNP50BV221	LEFT RAKE ARM	4		X			
14	5TNP50ZV437	STOP L.H.	4		X			

FRAMES ASSEMBLY WR6010

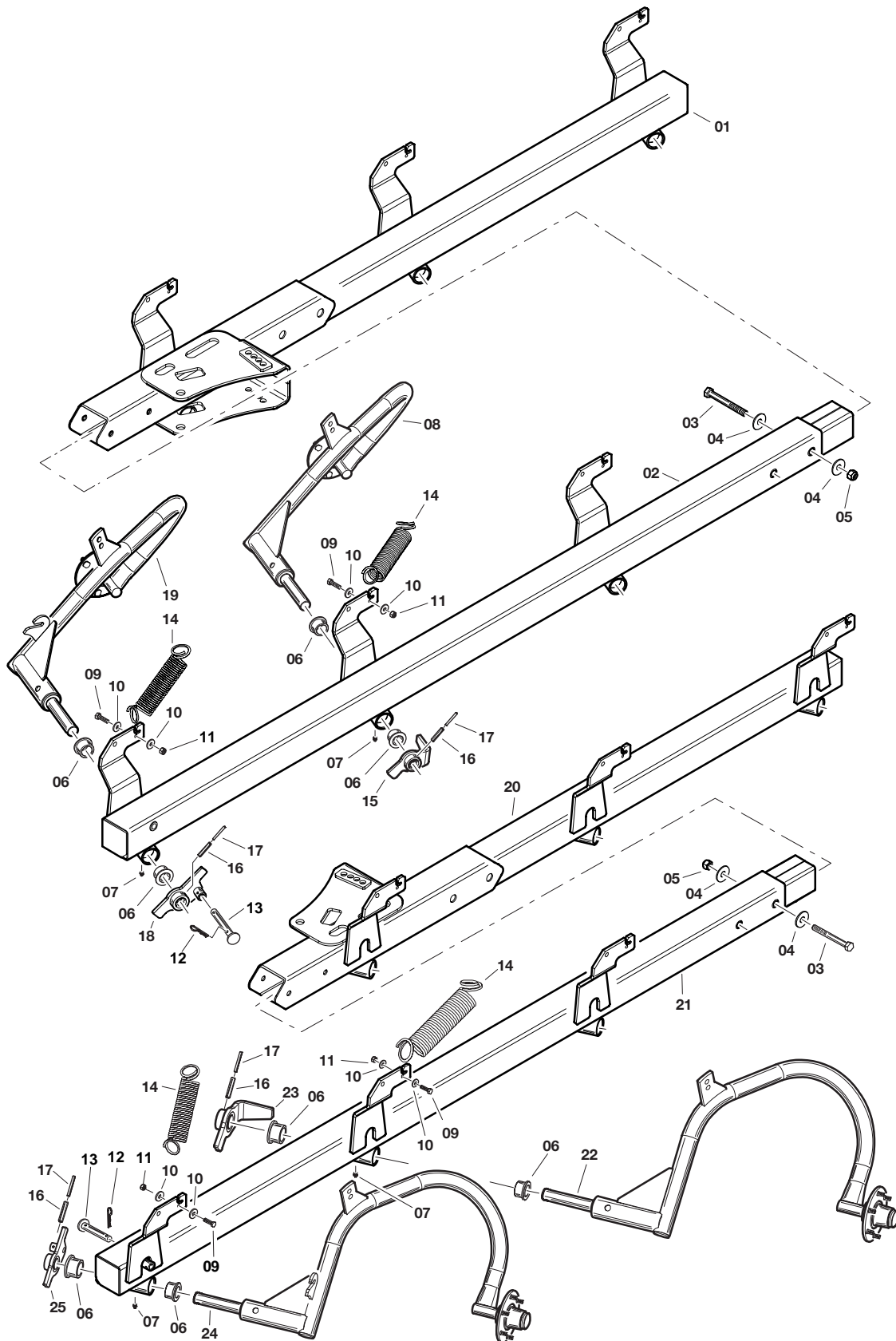


FRAMES ASSEMBLY WR6010

W W W
R R R
6 6 6
0 0 0
0 1 1
8 0 2

KEY	PART NO.	PART NAME	QTY	SERIAL NO.	REMARKS
1	5TNP50AV247	REAR FRAME RH 10-12	1		X
2	5TNP50AV623	FRONT FRAME RH 10	1		X
3	5TNV10AZ160	SCREW TE M 16x140 UNI5737 zn	4		X
4	5TNV30AZ018	WASHER M16 zn DIN9021	8		X
5	5TNV20BZ051	NUT SELFLOCK.HIGH M16 CL8 UNI7473	4		X
6	TNV85A0001	BUSHING NYLON	20		X
7	TNV99AZ001	GREASER-M10x1 UNI 7663-A	10		X
8	5TNP50BV222	RIGHT RAKE ARM	4		X
9	5TNV10AZ009	SCREW TE M8x30 UNI 5737 ZINCED	10		X
10	5TNV30AZ051	WASHER M8 LARGA UNI 6593 zn	20		X
11	TNV20BZ001	SELF-LOCKING NUT M8 - ZINC	8		X
12	TNV40CZ009	SPRING LOCK PIN R D=5 ZN	2		X
13	5TNC70BZ162	LOCK PIN	2		X
14	5TNC40AZ027	SPRING FOR RAKE WHEEL ARM	10		X
15	5TNP50ZV440	STOP R.H.	4		X
16	5TNV40B0008	ROLL PIN 10x50	10		X
17	5TNV40B0045	ROLL PIN 6x50	10		X
18	5TNP50ZV439	STOP R.H. FLIP UP	1		X
19	5TNP50BV224	RIGHT FLIP UP RAKE ARM	1		X
20	5TNP50AV249	REAR FRAME LH 10-12	1		X
21	5TNP50AV624	FRONT FRAME LH 10	1		X
22	5TNP50BV221	LEFT RAKE ARM	4		X
23	5TNP50ZV437	STOP L.H.	4		X
24	5TNP50BV223	LEFT FLIP UP RAKE ARM	1		X
25	5TNP50ZV438	STOP L.H. FLIP UP	1		X

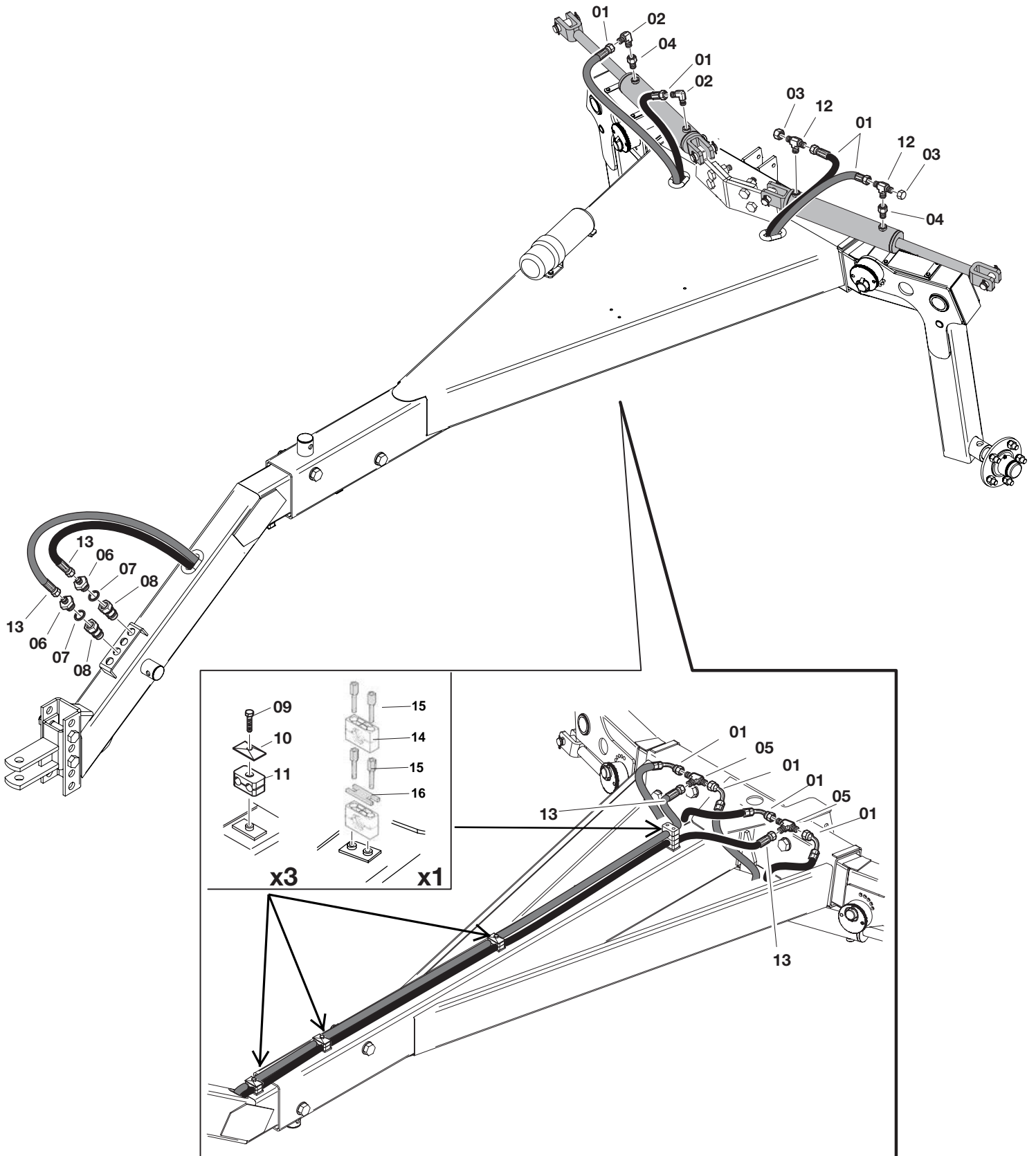
FRAMES ASSEMBLY WR6012



FRAMES ASSEMBLY WR6012

KEY	PART NO.	PART NAME	QTY	SERIAL NO.	W	W	W	REMARKS
					R	R	R	
					6	6	6	
					0	0	0	
					0	1	1	
					8	0	2	
1	5TNP50AV247	REAR FRAME RH 10-12	1					X
2	5TNP50AV248	FRONT FRAME RH 12	1					X
3	5TNV10AZ160	SCREW TE M 16x140 UNI5737 zn	4					X
4	5TNV30AZ018	WASHER M16 zn DIN9021	8					X
5	5TNV20BZ051	NUT SELFLOCK.HIGH M16 CL8 UNI7473	4					X
6	TNV85A0001	BUSHING NYLON	24					X
7	TNV99AZ001	GREASER-M10x1 UNI 7663-A	12					X
8	5TNP50BV222	RIGHT RAKE ARM	5					X
9	5TNV10AZ009	SCREW TE M8x30 UNI 5737 ZINCED	12					X
10	5TNV30AZ051	WASHER M8 LARGA UNI 6593 zn	24					X
11	TNV20BZ001	SELF-LOCKING NUT M8 - ZINC	10					X
12	TNV40CZ009	SPRING LOCK PIN R D=5 ZN	2					X
13	5TNC70BZ162	LOCK PIN	2					X
14	5TNC40AZ027	SPRING FOR RAKE WHEEL ARM	12					X
15	5TNP50ZV440	STOP R.H.	5					X
16	5TNV40B0008	ROLL PIN 10x50	12					X
17	5TNV40B0045	ROLL PIN 6x50	12					X
18	5TNP50ZV439	STOP R.H. FLIP UP	1					X
19	5TNP50BV224	RIGHT FLIP UP RAKE ARM	1					X
20	5TNP50AV249	REAR FRAME LH 10-12	1					X
21	5TNP50AV250	FRONT FRAME LH 12	1					X
22	5TNP50BV221	LEFT RAKE ARM	5					X
23	5TNP50ZV437	STOP L.H.	5					X
24	5TNP50BV223	LEFT FLIP UP RAKE ARM	1					X
25	5TNP50ZV438	STOP L.H. FLIP UP	1					X

HYDRAULIC LIFT LINKAGE ASSEMBLY



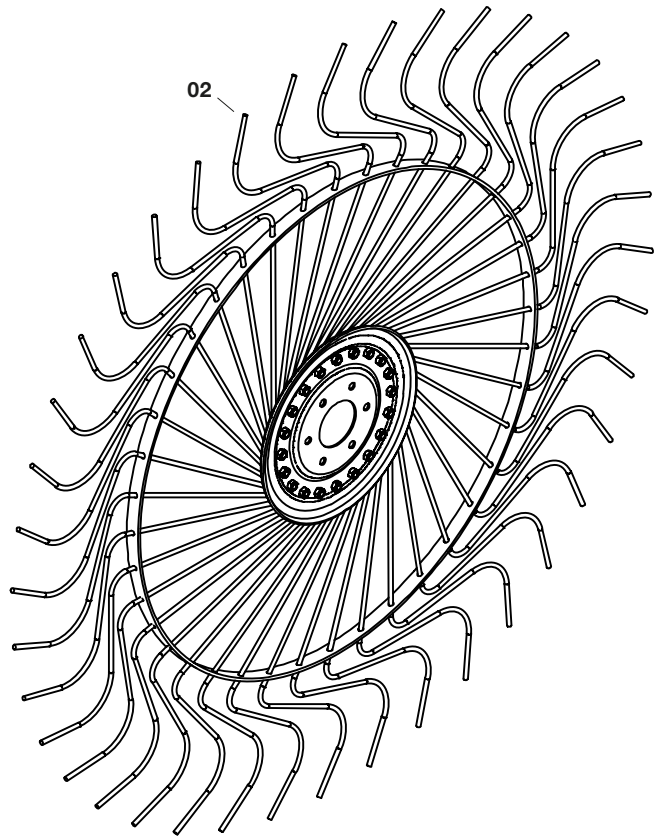
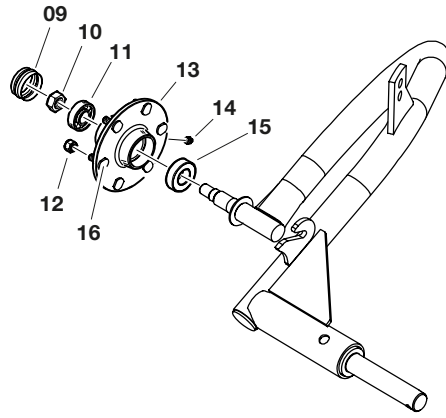
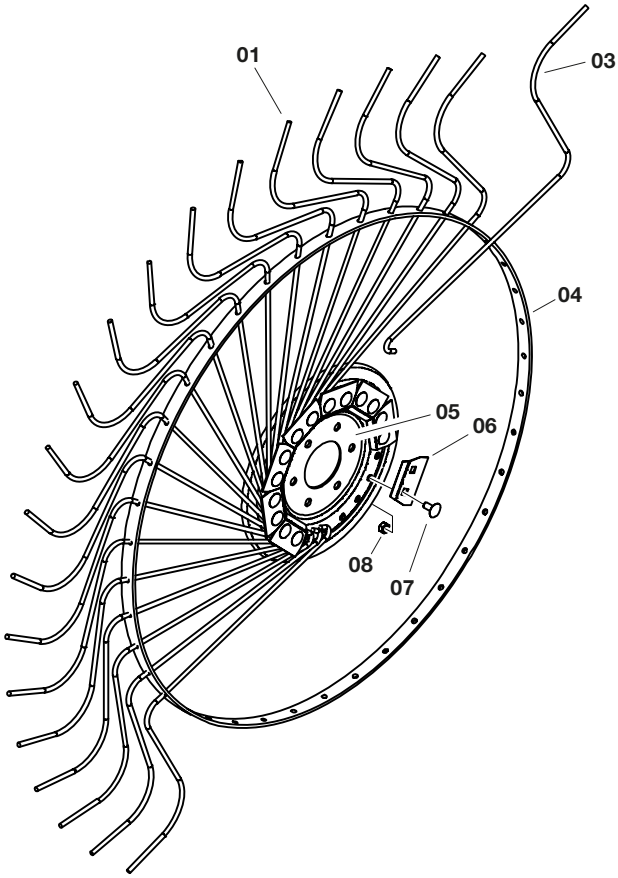
HYDRAULIC LIFT LINKAGE ASSEMBLY

KEY	PART NO.	PART NAME	QTY	SERIAL NO.	W	W	W	REMARKS
					R	R	R	
					6	6	6	
					0	0	0	
					0	1	1	
					8	0	2	
1	5TNC22A0137	HOSE SAE100 A.P.25 D10 L=1000	4		X	X	X	
2	TNC25A0004	90° ELBOW ADAPTER 3/8 NPTF-9/16-18 JIC	2		X	X	X	
3	5TNC25B0004	THREADED CAP 9/16-18 JIC	2		X	X	X	
4	5TNC25H0023	FITTING M/F 3/8" NPTF - HOLE 1,5 mm	2		X	X	X	
5	TNC25D0002	FITTING T 9/16-18 JIC	2		X	X	X	
6	TNC25A0010	FITTING 1/2"x9/16" - 18 JIC	2		X	X	X	
7	TNC25F0010	WASHER + OR 1/2"	2		X	X	X	
8	TNC25E0001	FAST FLUID CONNECTOR 1/2"	2		X	X	X	
9	5TNV10AZ127	SCREW M 8 x 35 UNI5737	3		X	X	X	
10	5TNC70DZ002	COVER FOR HOSECLAMP	3		X	X	X	
11	5TNV85B0006	CLAMP FOR 2 HOSES	3		X	X	X	
12	5TNC25D0003	FITTING T 3/8"NPTF -9/16-18 JIC	2		X	X	X	
13	5TNC22A0029	HOSE SAE100 A.P.25 D10 L=4600	2		X	X		
13	5TNC22A0151	HOSE SAE100 A.P.25 D10 L=5100	2				X	
14	5TNV85B0013	CLAMP FOR 1 HOSE	2		X	X	X	
15	5TNV10BZ097	STACKING BOLT	4		X	X	X	
16	5TNC70DZ008	SAFETY LOCKING PLATE	2		X	X	X	

SEALS SPARE PARTS CODES:

TO ORDER THE SEALS KIT REFER TO THE PRINTED SEALS CODE ON HYDRAULIC JACK STEEL CYLINDER.

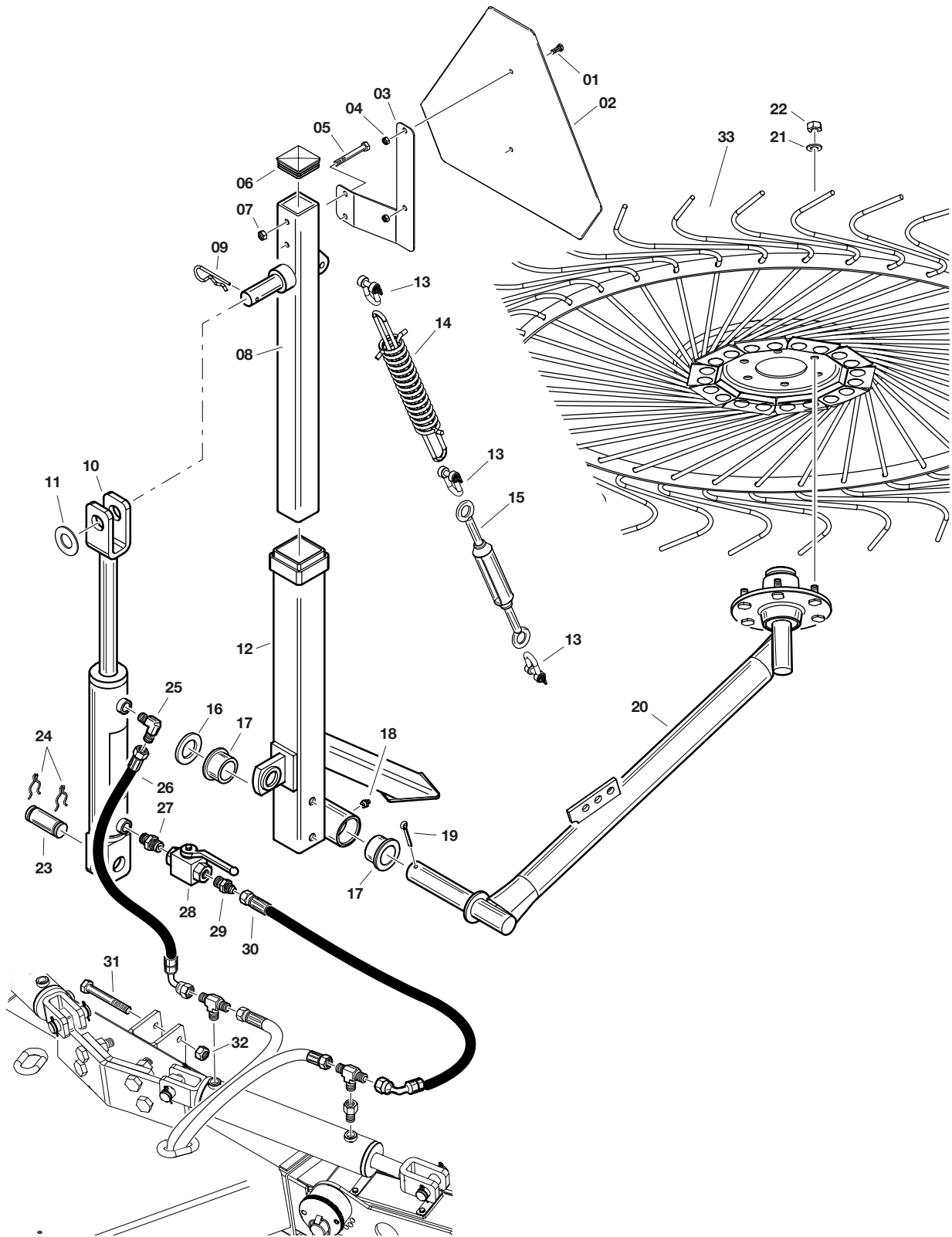
FINGER WHEELS ASSEMBLY



FINGER WHEELS ASSEMBLY

KEY	PART NO.	PART NAME	QTY	SERIAL NO.	W	W	W	REMARKS
					R	R	R	
					6	6	6	
					0	0	0	
					0	1	1	
					8	0	2	
1	5TNP20BV003	RAKE WHEEL COMPLETE R.H.			4	5	6	
2	5TNP20BV004	RAKE WHEEL COMPLETE L.H.			4	5	6	
3	5TNP25AV002	TINES STRAIGHT V.BUNDLE OF 40 TINES 7			X	X	X	
4	TNP50ZV169	HOOP			8	10	12	
5	TNP70AV069	PLATE/TINE			8	10	12	
6	TNS10BZ001	CLIP TINE RAKE WHEELS ZN			80	100	120	
7	TNV10BZ006	SCREW TTWST M 10x21 UNI5588 ZN			160	200	240	
8	5TNV20AZ047	NUT-HEX M10-1.50 CL8 YZ D934			160	200	240	
9	TNS95AV001	CAP FOR HUB			8	10	12	
10	TNV20BZ006	SELF LOCKING NUTNYLON MB18			8	10	12	
11	TNV60A0001	BUSHING			8	10	12	
12	TNV20AZ003	HEXAGONAL NUT 6S M10 UNI5588 ZN			48	60	72	
13	TNS10AV004	HUB W/GREASE			8	10	12	
14	TNV99AZ001	GREASER 10 MB UNI7663-A			8	10	12	
15	TNV60D0001	BUSHING 6205 Z			8	10	12	
16	TNV10AZ015	HEX.CAP SCREW TE M10x25 UNI5739 Z			48	60	72	

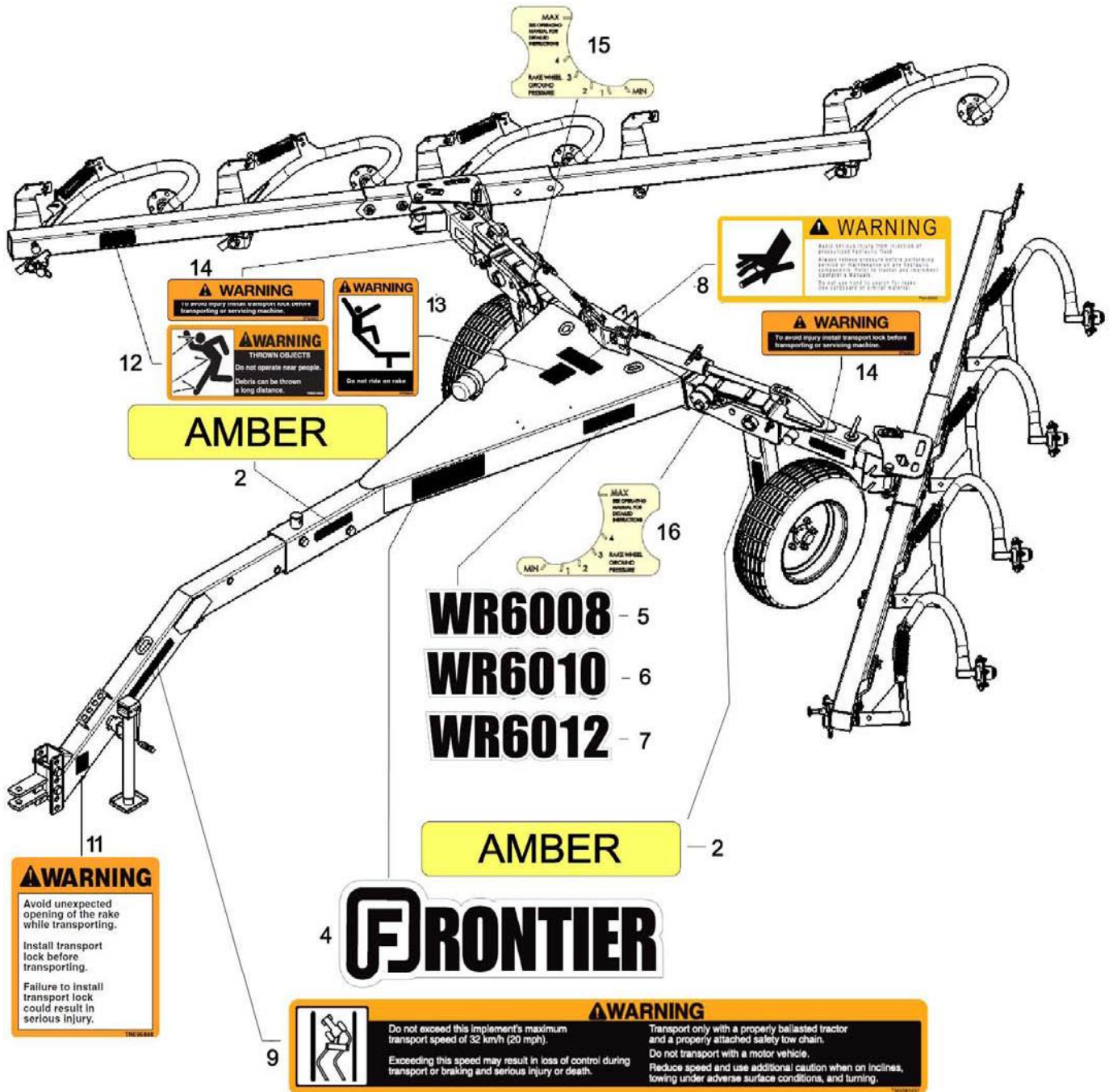
CENTER KICKER WHEEL (OPTIONAL)



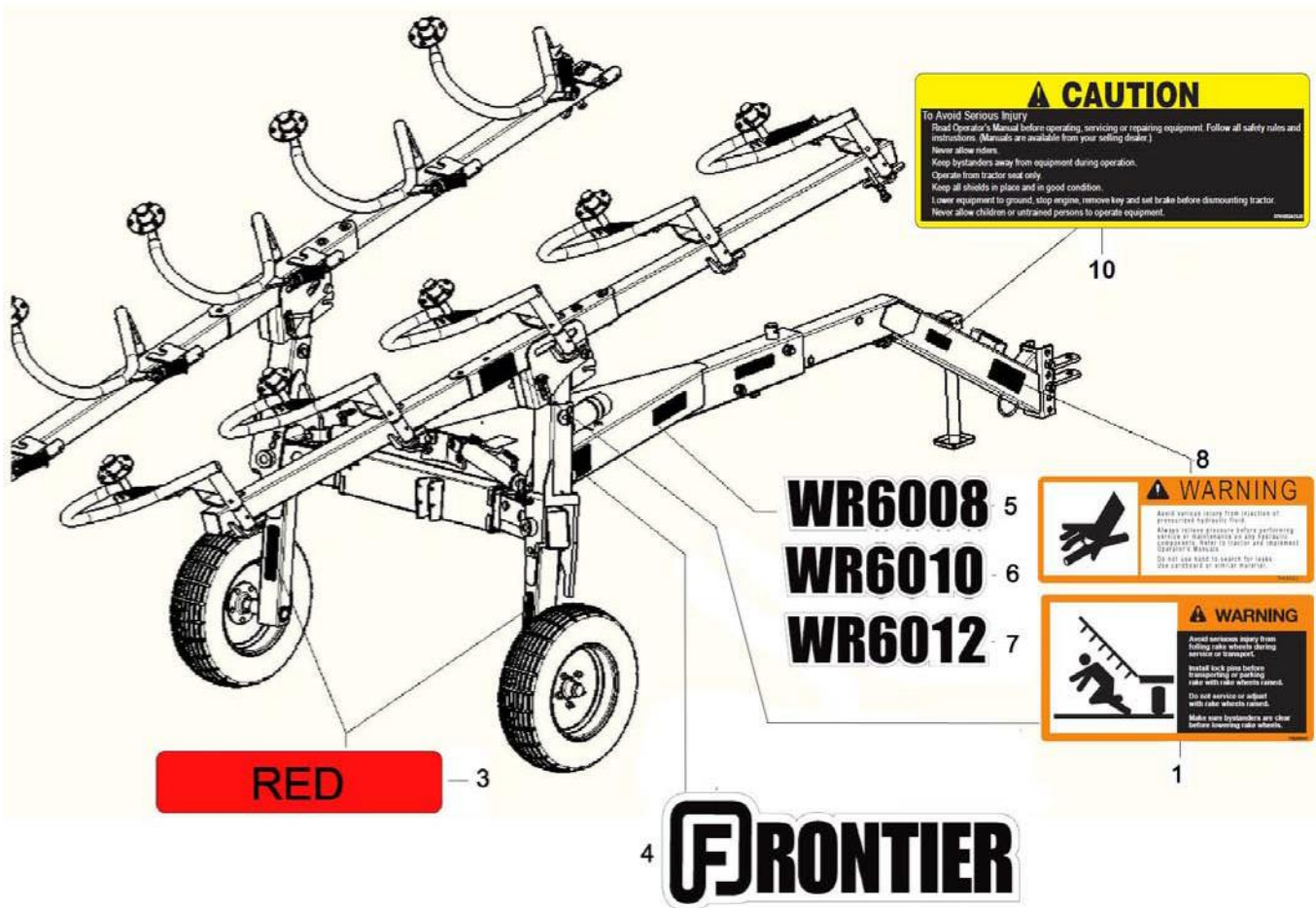
CENTER KICKER WHEEL (OPTIONAL)

KEY	PART NO.	PART NAME	QTY	SERIAL NO.	W	W	W	REMARKS
					R	R	R	
					6	6	6	
					0	0	0	
					0	1	1	
					8	0	2	
1	5TNV10AZ002	SCREW TE M6x16 UNI 5739 ZINCED	2		X	X	X	
2	5TN1836001	SIGN - #2 SMV METAL PM101105-2A	1		X	X	X	
3	5TNP70MZ056	SMV SUPPORT	1		X	X	X	
4	5TNV20CZ006	SELF LOCKNUT-NYLON-06MA	2		X	X	X	
5	5TNV10AZ017	SCREW TE M8x65	2		X	X	X	
6	5TNV85C0027	COVER ILQ50+3.5	1		X	X	X	
7	5TNV20CZ001	NUT METABLOCK M8 DIN 980 ZINCED	2		X	X	X	
8	5TNP50RV040	SLIDING	1		X	X	X	
9	TNV40CZ008	SPRING LOCK PIN R4 ZN	1		X	X	X	
10	TNC50BN060	CYLINDER WELDED 2" x 8" - BLACK	1		X	X	X	
11	TNV30AZ014	STEEL WASHER 25.5x50.5x2.5	1		X	X	X	
12	5TNP50DV162	SUPPORT FOR SLIDING	1		X	X	X	
13	TNV50AZ002	SHACKLE ZINC - D=8	3		X	X	X	
14	TNC40AZ003	SPRING ZINCED	1		X	X	X	
15	TNC30AZ007	TURNBUCKLE M12 ZINCED	1		X	X	X	
16	TNV30BZ007	STEEL B. WASHER 32.5x53x5 ZN	1		X	X	X	
17	TNV85A0001	BUSHING NYLON	2		X	X	X	
18	TNV99AZ001	GREASER-M10x1 UNI 7663-A	1		X	X	X	
19	TNV40CZ002	COTTER PIN D=5x40 UNI 1336 ZINCED	1		X	X	X	
20	5TNP50BV234	CENTER KICKER WHEEL ARM	1		X	X	X	
21	TNV30AZ004	WASHER M10 ISO7089 ZINCED	6		X	X	X	
22	TNV20AZ003	NUT-HEX M10-1.50 CL8 YZ D934	6		X	X	X	
23	5TNC70BZ085	PIVOT FOR WELDED CYLINDER L=70 ZN	1		X	X	X	
24	TNV40DZ001	CIRCLIP	2		X	X	X	
25	TNC25A0004	90° ELBOW 3/8 NPTF-9/16-18 JIC	1		X	X	X	
26	5TNC22A0135	TUBO SAE100 A.P.25 D10 L=600	1		X	X	X	
27	5TNC25A0014	NIPPLE OIL 3/8 NPTF-3/8 NPTF	1		X	X	X	
28	5TNC25M0003	TAP F/F 3/8" NPTF-3/8" NPTF- 210 atm.	1		X	X	X	
29	TNC25A0005	NIPPLE OIL 3/8 NPTF-9/16-18 JIC	1		X	X	X	
30	5TNC22A0136	TUBO SAE100 A.P.25 D10 L=700	1		X	X	X	
31	TNV10AZ040	HEX.CAP SCREW TE M12x90 UNI5737 Z.	2		X	X	X	
32	TNV20CZ003	LOCK NUT - M12 ZN	2		X	X	X	
33	5TNP20BV003	RAKE WHEEL COMPLETE R.H. STR. 7 GREY	1		X	X	X	
	5TNC50A0101	SEAL KIT	1		X	X	X	

DECALS



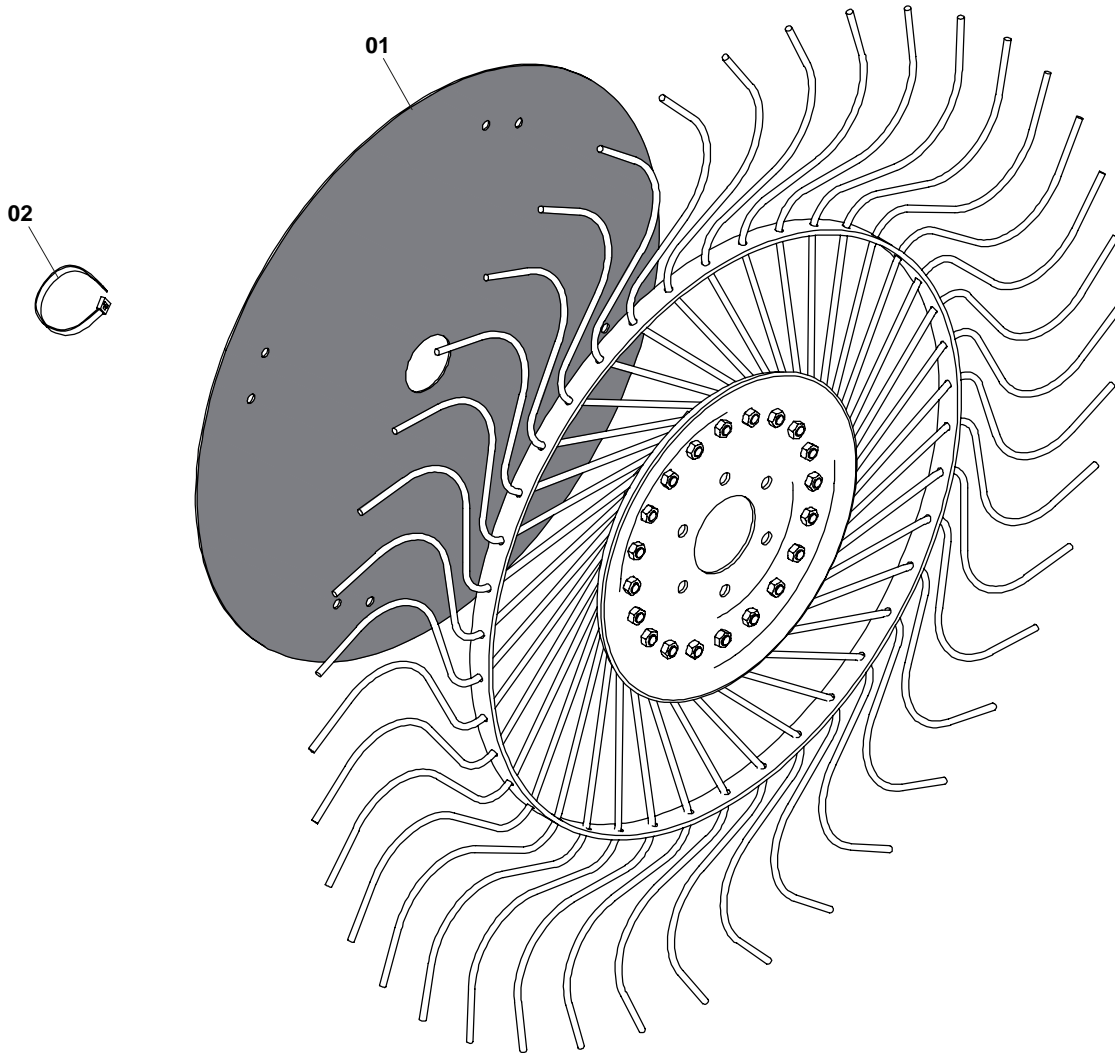
DECALS



W W W
R R R
6 6 6
0 0 0
0 1 1
8 0 2

KEY	PART NO.	PART NAME	QTY	SERIAL NO.	REMARKS
1	TNE95847	LABEL WARNING	4	X X X	
2	TNC90A0003	YELLOW REFLECTOR	4	X X X	
3	TNC90A0002	RED REFLECTOR	2	X X X	
4	5TN2626	LABEL FRONTIER	2	X X X	
5	5TN2623	LABEL WR 6008	2	X	
6	5TN2624	LABEL WR 6010	2	X	
7	5TN2625	LABEL WR 6012	2	X	
8	TNA80689	LABEL "HIGH PRESSURE "	2	X X X	
9	TNN262437	LABEL "MAXIMUM TRANSPORT SPEED"	1	X X X	
10	5TN1002423JD	LABEL CAUTION	1	X X X	
11	TNE95848	LABEL WARNING	1	X X X	
12	TNES10894	LABEL WARNING "THROWN OBJECTS...."	2	X X X	
13	5TN2620	LABEL WARNING "DO NOT RIDE.."	1	X X X	
14	5TN2622	LABEL WARNING " TO AVOID INJURY..."	2	X X X	
15	5TN2347	RIGHT PRESSURE STICKER	1	X X X	
16	5TN2348	LEFT PRESSURE STICKER	1	X X X	

WIND SHIELD KIT (OPTIONAL)



KEY	PART NO.	PART NAME	QTY	SERIAL NO.	W	W	W	REMARKS
					R	R	R	
1	5TNP70Z0076	WING SHIELD	1		X	X	X	
2	5TNL05Z0008	TIE STRAP	4		X	X	X	

NUMERICAL INDEX

PART NO.	KEY	PAGE	PART NO.	KEY	PAGE	PART NO.	KEY	PAGE	PART NO.	KEY	PAGE
5TN1002423JD	10	93	5TNP25AV002	3	89	5TNP50ZZ397	6	77	5TNV40B0008	16	85
5TN1836001	28	77	5TNP50AV245	1	81	5TNP70AV566	17	79	5TNV40B0015	12	79
5TN1836001	2	91	5TNP50AV246	12	81	5TNP70MZ055	25	77	5TNV40B0045	11	81
5TN2347	15	93	5TNP50AV247	1	83	5TNP70MZ056	3	91	5TNV40B0045	17	83
5TN2348	16	93	5TNP50AV247	1	85	5TNP70PZ273	18	77	5TNV40B0045	17	85
5TN2620	13	93	5TNP50AV248	2	85	5TNP70Z0076	1	94	5TNV40B0047	24	77
5TN2622	14	93	5TNP50AV249	20	83	5TNP70Z0318	17	77	5TNV45BZ003	16	77
5TN2623	5	93	5TNP50AV249	20	85	5TNS90C0059	32	77	5TNV85A0112	14	77
5TN2624	6	93	5TNP50AV250	21	85	5TNS90C0060	15	77	5TNV85B0006	11	87
5TN2625	7	93	5TNP50AV467	8	77	5TNV10AZ002	19	77	5TNV85B0013	14	87
5TN2626	4	93	5TNP50AV623	2	83	5TNV10AZ002	26	77	5TNV85C0025	5	77
5TNS2754	29	77	5TNP50AV624	21	83	5TNV10AZ002	1	91	5TNV85C0025	8	79
5TNC22A0029	13	87	5TNP50BV221	13	81	5TNV10AZ006	30	77	5TNV85C0027	6	91
5TNC22A0135	26	91	5TNP50BV221	22	83	5TNV10AZ008	21	77	5TNV85Z0032	7	77
5TNC22A0136	30	91	5TNP50BV221	22	85	5TNV10AZ009	5	81	TNA80689	8	93
5TNC22A0137	1	87	5TNP50BV222	2	81	5TNV10AZ009	9	83	TNC25A0004	2	87
5TNC22A0151	13	87	5TNP50BV222	8	83	5TNV10AZ009	9	85	TNC25A0004	25	91
5TNC25A0014	27	91	5TNP50BV222	8	85	5TNV10AZ017	5	91	TNC25A0005	29	91
5TNC25B0004	3	87	5TNP50BV223	24	83	5TNV10AZ086	1	77	TNC25A0010	6	87
5TNC25D0003	12	87	5TNP50BV223	24	85	5TNV10AZ087	10	77	TNC25D0002	5	87
5TNC25H0023	4	87	5TNP50BV224	19	83	5TNV10AZ127	9	87	TNC25E0001	8	87
5TNC25M0003	28	91	5TNP50BV224	19	85	5TNV10AZ160	3	83	TNC25F0010	7	87
5TNC40AZ027	4	81	5TNP50BV231	13	79	5TNV10AZ160	3	85	TNC30AZ007	15	91
5TNC40AZ027	14	83	5TNP50BV232	7	79	5TNV10AZ171	18	79	TNC40AZ003	14	91
5TNC40AZ027	14	85	5TNP50BV234	20	91	5TNV10BZ097	15	87	TNC45BZ001	31	77
5TNC50A0101		91	5TNP50BV264	1	79	5TNV20AZ047	8	89	TNC50BN060	10	91
5TNC50A0166		79	5TNP50DV162	12	91	5TNV20BZ022	3	77	TNC90A0002	3	93
5TNC50BN072	14	79	5TNP50DV166	20	77	5TNV20BZ022	19	79	TNC90A0003	2	93
5TNC60AS049	12	77	5TNP50DV167	13	77	5TNV20BZ051	5	83	TNE95847	1	93
5TNC70BZ085	23	91	5TNP50FV186	4	77	5TNV20BZ051	5	85	TNE95848	11	93
5TNC70BZ108	15	79	5TNP50HZ019	2	77	5TNV20CZ001	7	91	TNES10894	12	93
5TNC70BZ127	9	79	5TNP50RV040	8	91	5TNV20CZ006	27	77	TNN262437	9	93
5TNC70BZ128	2	79	5TNP50ZV437	14	81	5TNV20CZ006	4	91	TNP50ZV169	4	89
5TNC70BZ129	10	79	5TNP50ZV437	23	83	5TNV30AZ012	9	77	TNP70AV069	5	89
5TNC70BZ162	13	83	5TNP50ZV437	23	85	5TNV30AZ012	5	79	TNS10AV004	13	89
5TNC70BZ162	13	85	5TNP50ZV438	25	83	5TNV30AZ018	4	83	TNS10BZ001	6	89
5TNC70DZ002	10	87	5TNP50ZV438	25	85	5TNV30AZ018	4	85	TNS95AV001	9	89
5TNC70DZ008	16	87	5TNP50ZV439	18	83	5TNV30AZ051	6	81	TNV10AZ015	16	89
5TNL05Z0008	2	94	5TNP50ZV439	18	85	5TNV30AZ051	10	83	TNV10AZ040	31	91
5TNP20BV003	1	89	5TNP50ZV440	9	81	5TNV30AZ051	10	85	TNV10AZ087	4	79
5TNP20BV003	33	91	5TNP50ZV440	15	83	5TNV40B0008	10	81	TNV10BZ006	7	89
5TNP20BV004	2	89	5TNP50ZV440	15	85	5TNV40B0008	16	83	TNV20AZ003	12	89

NUMERICAL INDEX

<i>PART NO.</i>	<i>KEY</i>	<i>PAGE</i>	<i>PART NO.</i>	<i>KEY</i>	<i>PAGE</i>	<i>PART NO.</i>	<i>KEY</i>	<i>PAGE</i>	<i>PART NO.</i>	<i>KEY</i>	<i>PAGE</i>
TNV20AZ003	22	91									
TNV20BZ001	7	81									
TNV20BZ001	11	83									
TNV20BZ001	11	85									
TNV20BZ006	10	89									
TNV20BZ021	6	79									
TNV20BZ025	11	77									
TNV20CZ003	32	91									
TNV30AZ002	22	77									
TNV30AZ004	21	91									
TNV30AZ014	11	91									
TNV30BZ007	16	91									
TNV40B0010	23	77									
TNV40B0010	11	79									
TNV40CZ002	19	91									
TNV40CZ008	3	79									
TNV40CZ008	9	91									
TNV40CZ009	12	83									
TNV40CZ009	12	85									
TNV40DZ001	16	79									
TNV40DZ001	24	91									
TNV50AZ002	13	91									
TNV60A0001	11	89									
TNV60D0001	15	89									
TNV85A0001	3	81									
TNV85A0001	6	83									
TNV85A0001	6	85									
TNV85A0001	17	91									
TNV99AZ001	8	81									
TNV99AZ001	7	83									
TNV99AZ001	7	85									
TNV99AZ001	14	89									
TNV99AZ001	18	91									

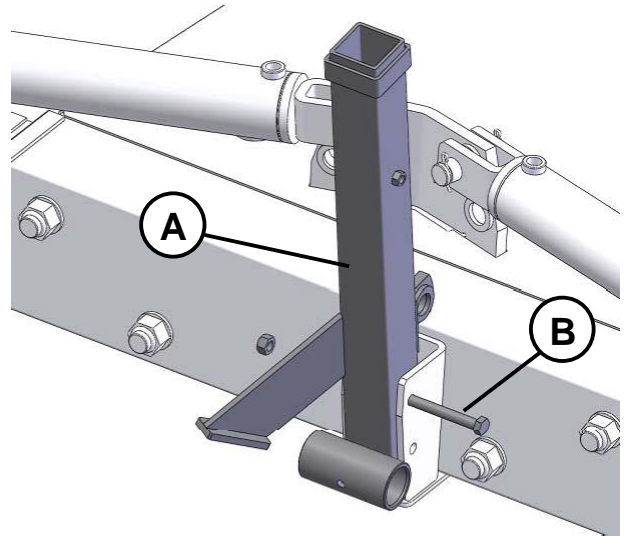
Installing Center Kicker Wheel

WR60 Carted Wheel Rake

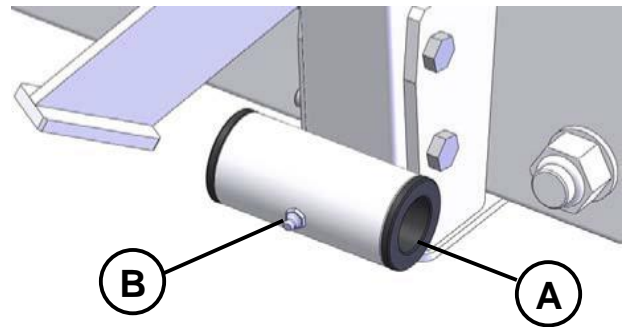
INSTALLATION INSTRUCTION

INSTALL WHEEL

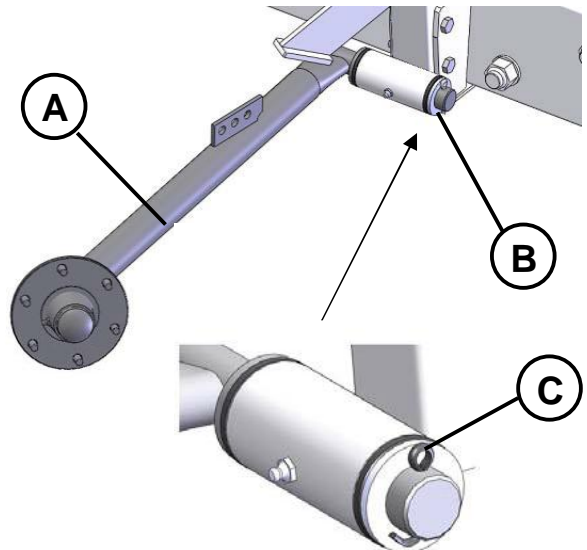
1. Install wheel support (A) and fasten with M12 x 90 cap screws (B) and nuts.



2. Install nylon bushings (A) in mounting bracket. Seat bushings with rubber mallet. Install grease zerk (B).

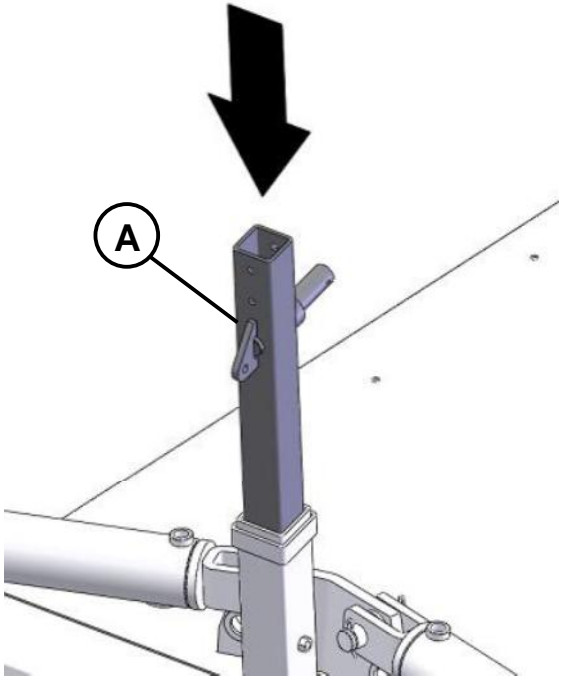


3. Install rake wheel arm (A) to mounting bracket. Fasten with 5 x 32 x 53 mm washer (B) and cotter pin (C).

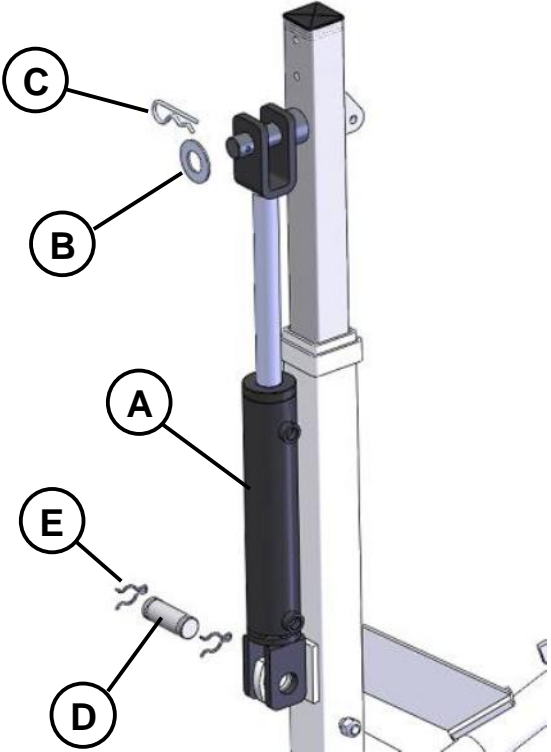


INSTALLATION INSTRUCTION

4. Insert sliding support (A).



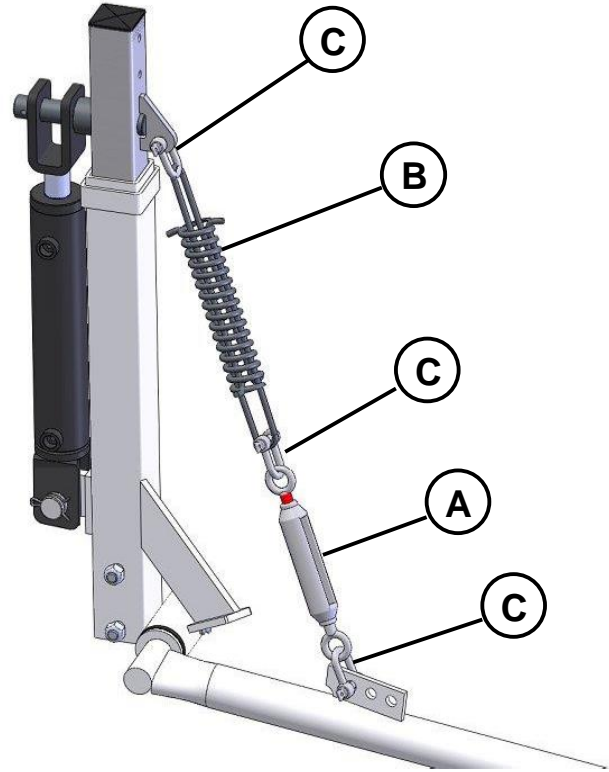
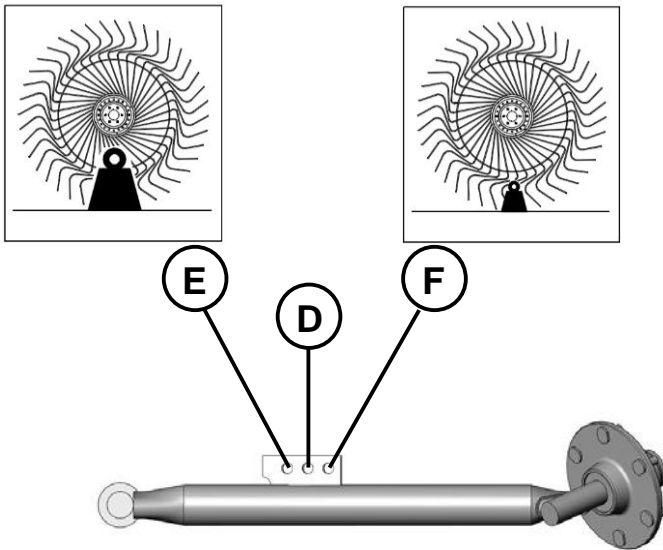
5. Install hydraulic cylinder (A). Fasten with washer (B), Spring lock pin (C), Pin (D) and Circlips (E).



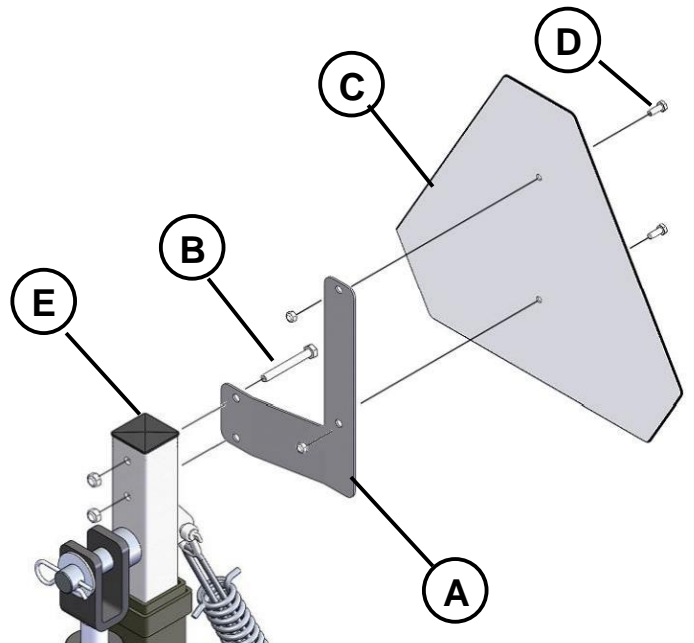
INSTALLATION INSTRUCTION

6. Connect rake arm to sliding support using Turnbuckle (A), Spring (B) and U-shackles (C).

Use hole (D) for standard pressure position, use hole (E) for max pressure position, use hole (F) for minimum pressure position depending on crop and terrain conditions.

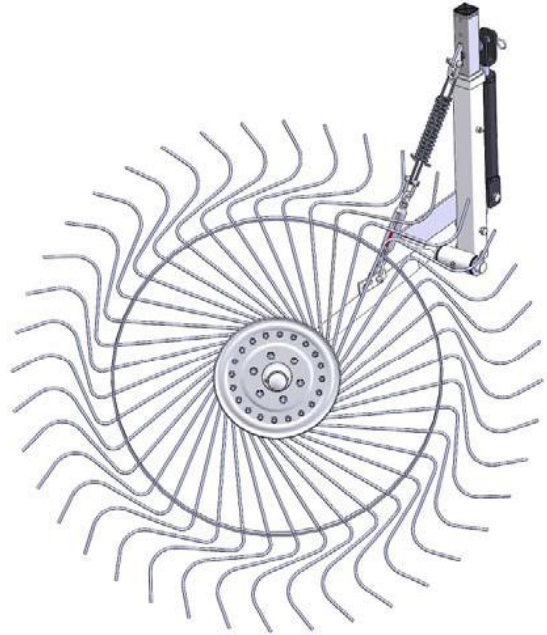


7. Install SMV support (A) with M8x65 hex cap screws (B) and nuts. Install SMV sign (C) and fasten with M6x16 Hex cap screws (D) and nuts. Install cap (E).

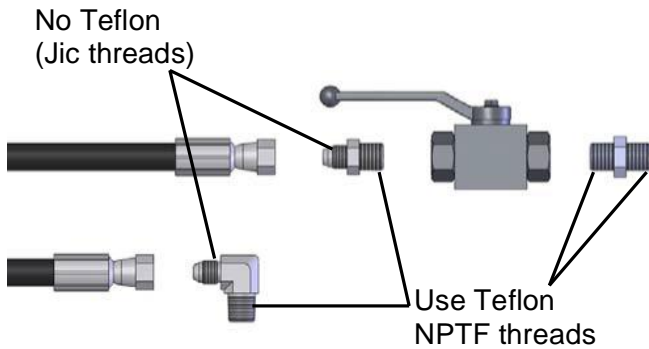


INSTALLATION INSTRUCTION

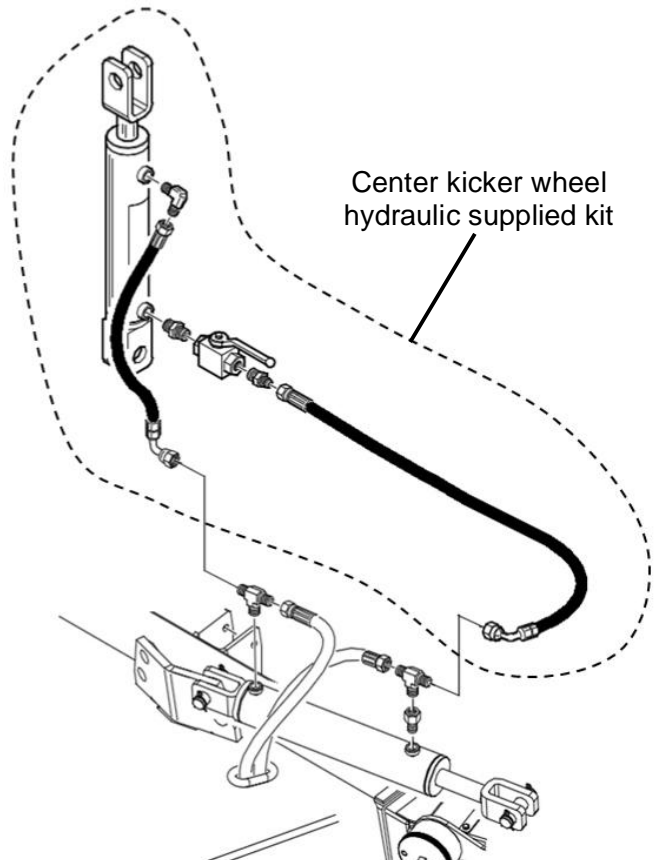
11. Install wheel with tine clips to the front of machine. Fasten with six M10 x 25 cap screws with heads to front of machine. Install flat washers and nuts to the rear of machine.



12. Install hydraulic hoses as shown in the picture.



To **prevent any leaks use** Teflon tape on NPTF threads. (Only on cylinder threaded holes). Do not use Teflon on Jic threads!



INDEX

	Page		Page
A			
Attaching rake		Lubricant	
To tractor drawbar.....	18	Storage.....	40
To tractor hydraulic system.....	19	Lubrication and Maintenance	
B			
Ballast,		As required.....	43
Checking.....	16	Lubrication	
D			
Detaching rake from tractor.....	20	Annually.....	42
Drawbar shield, making.....	16	Every 10 hours.....	40
Drawbar shield, using.....	15	Every 100 Hours.....	41
Drawbar, tractor, positioning.....	15	Every 50 hours.....	40
F			
Field operation, preparing rake for.....	25	M	
Fittings, flare type tube, tightening.....	71	Metric torque values.....	73
Flare type tube fittings, tightening.....	71	O	
G			
Grease		Operating the rake.....	27
Extreme pressure and multipurpose.....	38	Prestarting checks.....	24
Ground pressure, adjusting raking wheel.....	31	Product identification number, record.....	71
H			
Hitch, three-point, position.....	16	R	
I			
Inch torque values.....	72	Rake wheels, identifying left-hand and right-hand.....	46
Inflation, checking tire pressure.....	17	Rake, detaching from tractor.....	20
Inflation, checking tractor tire.....	16	Rake, operating the.....	27
L			
		Rake, preparing for field operation.....	25
		Rake, preparing for transport	22
		Raking a single windrow or swath.....	36
		Raking wheel ground pressure, adjusting.....	31
		Replacing wheel tines.....	46
		S	
		Serial number, record.....	71
		Shield, making drawbar.....	16
		Shield, using drawbar.....	15
		Single windrow or swath, raking a.....	36
		Spacing, checking wheel.....	16

INDEX

	Page
Specifications.....	70
Storage	
Beginning of season.....	47
End of season.....	47
Storing lubricants.....	40

T

Three-point hitch position.....	16
Tines, replacing wheel.....	46
Tire inflation pressure, checking.....	17
Tire inflation, checking tractor.....	16
Tires, servicing safely.....	45
Torque values	
Inch.....	72
Metric.....	73
Torque, checking wheel nut.....	17
Tractor drawbar positioning.....	15
Tractor hydraulic system, attaching to.....	18
Transport, preparing rake for.....	22
Transporting.....	22
Troubleshooting	
Hydraulic problems.....	43
Raking problems.....	44
Tube fittings, flare type, tightening.....	71

W

Wheel ground pressure, adjusting raking.....	31
Wheel nut torque, checking.....	17
Wheel spacing, checking.....	16
Wheel, center kicker.....	37
Wheels, rake, identifying left-hand and right-hand.....	46
Width, adjusting windrow.....	30
Width:	
Adjusting raking.....	30
Setting working.....	29
Windrow or swath, raking a single.....	36
Windrow width, adjusting.....	30

NOTES

NOTES

NOTES

**PART NO.
5TNOMUS00W6F**

