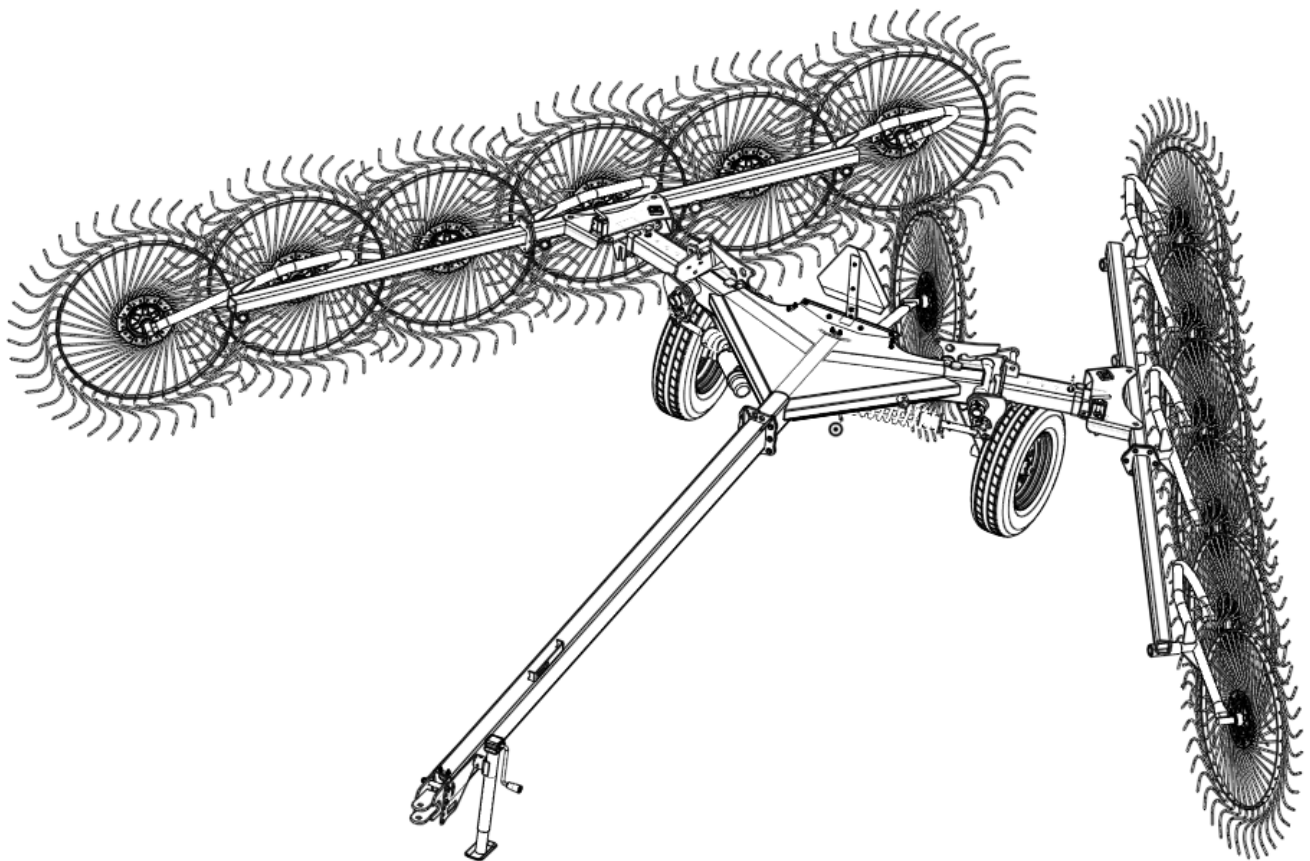




**NORDEN** MFG

# Owner's Manual

WR8, WR10, WR12 Wheel Rakes



Operator's Manual for the WR-Series Wheel Rakes

**MADE IN THE USA** 

*Read, Understand, and Follow the manual. This manual provides information and procedures to safely operate and maintain the Wheel Rake.*





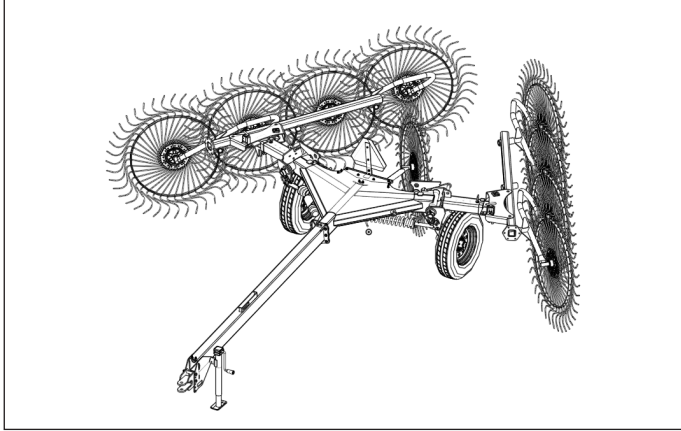
# CONTENTS

<b>1. INTRODUCTION</b> .....	<b>2</b>	<b>7. TRANSPORTING</b> .....	<b>21</b>
1.1 Welcome. . . . .	2	7.1 Transporting Safety (Road) . . . . .	21
1.2 Description and Intended Use . . . . .	2	7.2 Transporting Procedure . . . . .	22
1.3 Safe Operation . . . . .	3	<b>8. STORAGE</b> .....	<b>23</b>
1.4 Specifications . . . . .	3	8.1 Storage Safety. . . . .	23
1.5 Intended Usage . . . . .	3	8.2 Placing In Storage . . . . .	23
1.6 Operator Orientation . . . . .	3	8.3 Removing From Storage . . . . .	23
1.7 Serial Number Location . . . . .	3	<b>9. MAINTENANCE</b> .....	<b>24</b>
1.8 Owner/Operator Manual Storage . . . . .	4	9.1 Maintenance Safety . . . . .	24
1.9 Product Improvements . . . . .	4	9.2 Welding Repairs . . . . .	25
1.10 Disposal of Equipment at End of Useful Life	4	9.3 Lubrication . . . . .	26
1.11 Unanswered Questions . . . . .	4	9.4 Bolt Torque Requirements . . . . .	27
<b>2. SAFETY</b> .....	<b>4</b>	9.5 Standard Torque Values . . . . .	27
2.1 General . . . . .	4	<b>10. TROUBLESHOOTING</b> .....	<b>28</b>
2.2 Safety Alert Symbol . . . . .	5	<b>11. PARTS SECTION</b> .....	<b>29</b>
2.3 Safety Icons Nomenclature . . . . .	5	11.1 Ordering Parts . . . . .	29
2.3.1 Personal Protection / Important Informa- tion . . . . .	5	11.2 Decals. . . . .	29
2.3.2 Prohibited Actions.....	5	11.12 Main View . . . . .	30
2.3.3 Hazard Avoidance.....	5	11.13 Main Frame View . . . . .	31
2.4 General Safety Instruction . . . . .	6	11.14 Manifold View . . . . .	32
2.5 Operation Safety. . . . .	7	11.15 Tongue View . . . . .	33
2.6 Transporting Safety . . . . .	7	11.16 Kicker Wheel View . . . . .	34
2.7 Storage Safety. . . . .	7	11.17 Hydraulics View . . . . .	35
2.8 Maintenance Safety . . . . .	7	11.18 Hub Assembly 5 Bolt View . . . . .	36
2.9 Federal Guidelines . . . . .	8	11.19 Lift Arm and Flotation View . . . . .	37
2.10 Sign-Off Form . . . . .	9	11.20 Left Arm WR8 View . . . . .	38
<b>3. SAFETY SIGNS AND LABELS</b> .....	<b>10</b>	11.21 Right Arm WR8 View . . . . .	39
3.1 General Information . . . . .	10	11.21 Left Arm WR10 View . . . . .	40
3.2 How to Install Replacement Safety Signs . .	10	11.21 Right Arm WR10 View. . . . .	41
3.3 Safety Sign Locations . . . . .	11	11.21 Left Arm WR12 View . . . . .	42
3.4 Wheel Rake Safety Signs . . . . .	12	11.21 Right Arm WR12 View. . . . .	43
<b>4. TERMINOLOGY</b> .....	<b>13</b>		
<b>5. ASSEMBLY</b> .....	<b>14</b>		
5.1 Tools Required. . . . .	14		
5.2 Assembly Procedure . . . . .	14		
<b>6. OPERATION</b> .....	<b>15</b>		
6.1 OSHA Training Requirements . . . . .	15		
6.2 Attaching to Tractor . . . . .	15		
6.3 Setting the Wheel Rake . . . . .	16		
6.3.1 Level the Rake . . . . .	16		
6.3.2 Adjust the Overall Rake Working Width. . . . .	17		
6.3.3 Adjust the Rake Angle . . . . .	18		
6.3.4 Adjust the Rake Wheel Ground Pressure . . . . .	18		
6.3.5 Wheel Rake Operation . . . . .	18		
6.3.6 Single Sided Rake Operation . . . . .	19		
6.5 Optional Center Wheel Kit . . . . .	19		
6.6 Detaching From Tractor . . . . .	20		

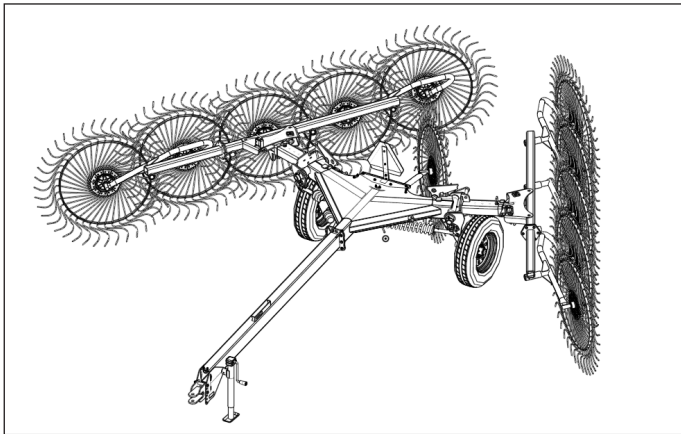
# 1. Introduction

## 1.1 Welcome

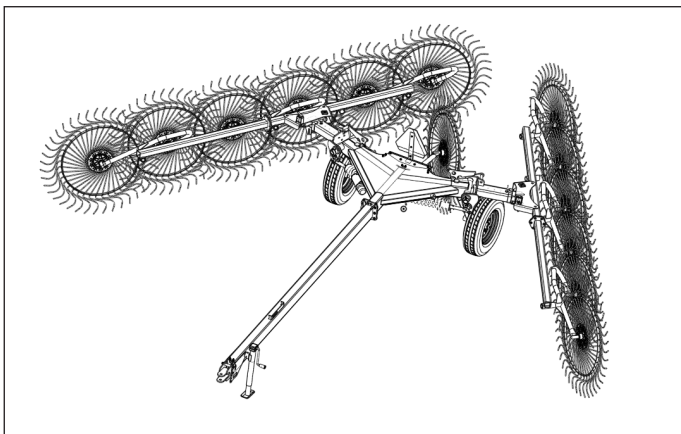
Congratulations on your choice of a Norden Mfg LLC WR-Series Wheel Rakes. This equipment has been designed and manufactured to meet the needs of discerning users.



WR8 Series Wheel Rake



WR10 Series Wheel Rake



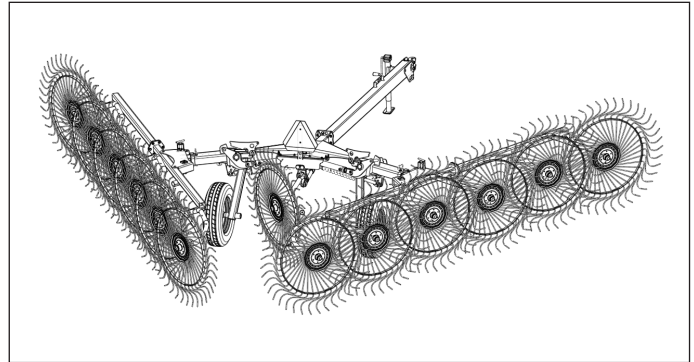
WR12 Series Wheel Rake

Many features incorporated into this wheel rake are the result of suggestions made by customers like you. Read this manual carefully to learn how to operate the wheel rake safely and how to set it to provide maximum efficiency.

By following the assembly, operating, and maintenance instructions in this manual, your Norden Mfg LLC wheel rake will provide many years of trouble-free service.

## 1.2 Description and Intended Use

The wheel rake is designed to invert cut hay or other forage crop to allow wet hay on the bottom of the swath to be exposed to sun and wind, to merge swaths together, and to narrow the swath into a windrow of the required width for harvester or baler pick-up. The rake uses eight, ten, or twelve wheels plus an optional kicker wheel to turn the center of the windrow.



**SAFETY  
INSTRUCTIONS**

**Do not use the wheel rake for anything other than its intended purpose.**

### 1.3 Safe Operation

Safe, efficient, and trouble-free operation of your wheel rake requires that you, and anyone else who will be using or maintaining the unit, read and understand the information contained within this manual and other related OEM equipment manuals.

Use this manual for frequent reference and to pass on to new operators or owners.

**⚠ WARNING**  **Read, Understand, and Follow**

To prevent personal injury or even death, be sure you read, understand, and follow all of the instructions in this manual and other related OEM equipment manuals! The wheel rake, if not assembled, used, and maintained properly, can be dangerous to users unfamiliar with its operation. Do not allow operating, maintaining, adjusting, or cleaning of this wheel rake until the user has read this manual and has developed a thorough understanding of the safety precautions and functions of the unit.

This wheel rake is designed for the specific purpose of raking hay and other forage crops. DO NOT modify or use this wheel rake for any application other than that for which it was designed.

Wheel rakes maintained or operated improperly or by untrained personnel can be dangerous; exposing the user and/or bystanders to possible serious injury or death.

### 1.4 Specifications

Model	WR8	WR10	WR12
No. of Wheels	8	10	12
Wheel Diameter	55"		
Tines per Wheel	40 (1/4" diameter)		
Kicker Wheel available	Yes		
Overall Weight	1590 w/ kicker wheel 1510 w/o kicker wheel	1750 w/ kicker wheel 1670 w/o kicker wheel	1900 w/ kicker wheel 1820 w/o kicker wheel
Tongue Weight	85 lbs	216 lbs	324 lbs
Pickup Width	179.4"-215.6"	203.2"-254.6"	227"-293.5"
Windrow Width	40"-88"	40"-88"	40"-88"
Transport Length *	242"	242"	276"
Transport Width *	117"	123"	128"
Transport Height *	101"	101"	101"
Wheels/Tires	5 Lug Pneumatic 225/75R15		
Horsepower Requirement	50 HP		

\* Rake arms set to the A3 position  
WR Series Wheel Rakes

### 1.5 Intended Usage

Do not use this wheel rake for any other purpose than its intended use of raking hay and other forage crops.

### 1.6 Operator Orientation

The directions left, right, front, and rear, as mentioned throughout this manual, are as seen from the tractor operator's seat and facing in the direction of travel.

### 1.7 Serial Number Location

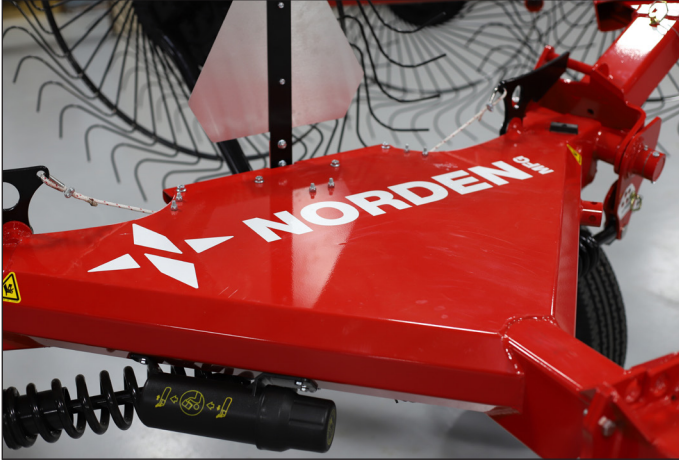
The rake's serial number is located on a crossmember behind the right-side lift cylinder. Please use this number when requesting service, seeking information, or ordering parts. Record the serial number in the space provided for easy reference when contacting Norden Mfg LLC with questions.



Serial Number \_\_\_\_\_

## 1.8 Owner/Operator Manual Storage

Store the Owner/Operator manual and other operating materials in the document storage tube located on the crossmember near the tongue.



## 1.9 Product Improvements

Because Nordén Mfg LLC maintains an ongoing program of product improvement, we reserve the right to make improvements in design or changes in specifications without incurring any obligation to install them on units previously sold.

## 1.10 Disposal of Equipment at End of Useful Life

The Nordén Mfg LLC wheel rake has been designed for the specific purpose of raking hay and other forage crops. When this unit is no longer capable of doing its designed purpose, it should be dismantled and scrapped. Do not use any materials or components from this unit for any other purpose.

## 1.11 Unanswered Questions

If you have any questions not answered in this manual, require additional copies, or the manual is damaged, please contact your dealer or:

Norden Mfg LLC  
4210 Kinsmann Rd. NW  
North Bloomfield, OH 44450

Phone: 877-296-5851  
Fax: 440-693-4336  
E-mail: [parts@nordenmfg.com](mailto:parts@nordenmfg.com)

The manual is also available for download at:  
[www.nordenmfg.com](http://www.nordenmfg.com)

# 2. Safety

## 2.1 General

Most work related accidents are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. As you operate and maintain the wheel rake you must be alert to potential hazards. You should also have the necessary training, skills, and tools to perform any assembly procedure.

Improper operation and/or maintenance of this unit could cause a dangerous situation that results in injury or death.

Do not use this unit until you read and understand the information contained in this manual. Do not use the wheel rake for anything other than its intended purpose.



**Do not use the wheel rake until you read and understand the information contained in this manual.**

## **⚠ WARNING** (continued)

**Safety precautions and warnings are provided in this manual and on the unit. If these hazard warnings are not heeded, bodily injury or death could occur to you or to other persons.**

**Norden Mfg LLC cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this manual and on the product are, therefore, not all-inclusive. If a method of operation not specifically recommended by us is used, you must satisfy yourself that it is safe for you and for others. You should also ensure that the unit will not be damaged or be made unsafe by the methods that you choose.**

The information, specifications, and illustrations in this manual are based on the information that was available at the time this material was written and can change at any time.

## 2.2 Safety Alert Symbol



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

This manual contains DANGERS, WARNINGS, CAUTIONS, IMPORTANT NOTICES, and NOTES which must be followed to prevent the possibility of improper service, damage to the equipment, personal injury, or death. The following key words call the readers attention to potential hazards.

Hazards are identified by the “Safety Alert Symbol” and followed by a signal word such as “DANGER”, “WARNING”, or “CAUTION”.



Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations.



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



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



Indicates that equipment or property damage can result if instructions are not followed.



Safety instructions (or equivalent) signs indicate specific safety-related instructions or procedures.

**Note:** Contains additional information important to a procedure.

## 2.3 Safety Icons Nomenclature

This manual and the equipment have numerous safety symbols. These safety symbols indicate important information about personal injury hazards.

### 2.3.1 Personal Protection / Important Information



Read the manual



Maintenance procedure



Eye protection



Hand protection



Inspect equipment



Do not weld



Use proper tools



Warning decal alert



Stop machine engine



Check/Maintain Fluid Levels



Place in neutral



Remove key



Stop engine



Set parking brake



Fire hazard



Hot surface



Sharp object hazard



High pressure fluid hazard



Zero pressure



Entanglement hazard



Defective or broken part



Maintain safe distance



Pinch point hazard



Pinch point hazard



Pinch point hazard



Pinch point hazard



Electrocution hazard



Tip over hazard

### 2.3.2 Prohibited Actions



No riders



No children

### 2.3.3 Hazard Avoidance



Safety alert symbol



Crushing hazard



Crushing hazard



Falling hazard

## 2.4 General Safety Instruction

The owner/operator is responsible for the SAFE use and maintenance of the wheel rake. Make sure anyone who is operating, maintaining, or working around the wheel rake is familiar with the operating and maintenance procedures and related SAFETY information contained in this manual. This manual will take you step-by-step through your working day and alerts you to all good safety practices that should be used while using the wheel rake.

In addition to the design features of the wheel rake, including safety signs, accident prevention is dependent upon the awareness, concern, prudence, and proper training of the people involved in the operation, maintenance, and storage of the wheel rake.

These general safety instructions apply to the overall use and maintenance of the wheel rake.

In addition to this safety section, refer also to safety messages and instructions in each of the appropriate sections of this manual.

More specific instructions on safety are found in the operation, transporting, maintenance, and storage sections of this manual. Refer to these sections before performing any of these tasks.

### **WARNING**

Failure to comply with the following safety instructions could result in serious injury and possibly even death if they are not understood and followed.



#### **Provide User with Literature**

Norden Mfg LLC wheel rake owners must provide operator instructions to anyone using the wheel rake before use, and at least annually thereafter.



#### **Stay Clear**

Clear the area of people, especially small children, before using the wheel rake. Under no circumstances should young children be allowed to work with or around the wheel rake.



#### **Crush Hazard**

Hydraulic or mechanical failure can allow a wing to drop suddenly without warning. Do not allow anyone to walk under or stand near a raised wing.



#### **Impaired User Hazard**

Do not attempt to assemble, operate, or maintain this wheel rake under the influence of drugs or alcohol. Consult your doctor before using this wheel rake while taking prescription medications.



#### **Fall or Crush Hazard**

Do not allow anyone to ride on the tractor or the wheel rake. Falling or crushing hazards could result in severe injuries or death.



#### **No Unauthorized Modifications**

Do not modify the wheel rake or safety devices. Do not weld on the unit. Unauthorized modifications may impair its function and safety. Personal injury or death could result from unauthorized modifications.

If the wheel rake has been altered in any way from the original design, Norden Mfg LLC does not accept any liability for injury or warranty.



#### **Damaged Parts Hazard**

Do not use the wheel rake if any parts are damaged. If the wheel rake has a defect, immediately stop using it and remedy the problem before continuing.

### **CAUTION**

The following safety instructions are provided to help prevent potential injury. Not following these instructions may lead to injury.

#### **Personal Protection Equipment**

When using this wheel rake, wear appropriate personal protective equipment. This list may include, but is not limited to:



- Protective shoes with slip resistant soles
- Protective eyewear
- Protective clothing and gloves
- Hearing protection





### **Hearing Loss Prolonged Exposure To Loud Noise May Cause Permanent Hearing Loss!**

Working environments with noise-producing equipment can cause partial to permanent hearing loss. We recommend using hearing protection any time noise levels exceed 80 decibels (dB). Noise levels over 85 dB, on a long-term basis, can cause severe hearing loss. Noise levels over 90 dB over a period of time can cause permanent and even total hearing loss.

Hearing loss from loud noise is cumulative over a lifetime without hope of natural recovery.



### **Crush Hazard**

The tractor should be equipped with a Roll Over Protective Structure (ROPS) and a seat belt. A crushing hazard may occur if the driver is ejected from the seat while the tractor is in motion. Fasten the seat belt whenever the tractor is moving.

### **SAFETY INSTRUCTIONS**

The following safety instructions are provided to help prevent injury or limit equipment damage.



### **Safety Signs**

Replace any missing or hard-to-read safety signs or instructional labels. Use care when washing or cleaning the wheel rake.

Replacement safety sign locations and part numbers are provided in this manual and are available from an authorized dealer parts department or the factory.



### **First Aid Kit**

Have a first aid kit available for use should the need arise and know how to use it.



### **Fire Extinguisher**

Have a fire extinguisher available for use should the need arise and know how to use it.

## **2.5 Operation Safety**

Refer to “6.1 OSHA Training Requirements” for safety recommendations related to using the wheel rake. All applicable safety recommendations in other sections should also be followed.

Anyone who will be using and/or maintaining the wheel rake must read, clearly understand, and follow ALL safety, operation, and maintenance information presented in this manual, other related OEM manuals, and the safety signs

If you do not understand any information in this manual, see your dealer or contact Norden Mfg LLC before proceeding.

Do not use or allow anyone else to use this wheel rake until all information has been reviewed. Annually review this manual before the season start-up.

Make periodic reviews of SAFETY and OPERATION of the wheel rake a standard practice. An untrained operator is not qualified to use this wheel rake.

## **2.6 Transporting Safety**

Refer to “7.1 Transporting Safety” for safety recommendations related to transporting the wheel rake. All applicable safety recommendations in other sections should also be followed.

## **2.7 Storage Safety**

Refer to “8.1 Storage Safety” for safety recommendations related to storing the wheel rake. All applicable safety recommendations in other sections should also be followed.

## **2.8 Maintenance Safety**

Refer to “9.1 Maintenance” for safety recommendations related to maintaining the wheel rake. All applicable safety recommendations in other sections should also be followed.

## 2.9 Federal Guidelines

### **IMPORTANT FEDERAL LAWS AND REGULATIONS CONCERNING EMPLOYERS, EMPLOYEES AND OPERATORS**

This section is intended to explain in broad terms the concept and effect of the following federal laws and regulations. It is not intended as a legal interpretation of the laws and should not be considered as such.

#### **U.S. PUBLIC LAW 91-596 (The Williams-Steiger Occupational Safety and Health Act of 1970) OSHA**

##### **This Act Seeks:**

“... to assure so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources ... “

#### **DUTIES**

##### **Sec. 5(a) Each Employer -**

- (1) shall furnish to each of its employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to its employees.
- (2) shall comply with occupational safety and health standards promulgated under this Act.
  - (b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his or her own actions and conduct.

##### **OSHA Regulations**

Current OSHA regulations state in part: “At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee in the safe operation and servicing of all equipment with which the employee is, or will be involved.” These will include (but are not limited to) instructions to:

Keep all guards in place when the machine is in operation;

Permit no riders on equipment;

Stop engine, disconnect the power source, and wait for all machine movement to stop before servicing, adjusting, cleaning, or unclogging the equipment, except where the machine must be running to be properly serviced or maintained, in which case the employer shall instruct employees as to all steps and procedures which are necessary to safely service or maintain equipment.

Make sure no one is within 300 feet of machinery before starting the engine, engaging power, or operating the machine.

#### **EMPLOYEE TRACTOR OPERATING INSTRUCTIONS:**

1. Securely fasten your seat belt if the tractor has a ROPS.
2. Where possible, avoid operating the tractor near ditches, embankments, and holes.
3. Reduce speed when turning, crossing slopes, and on rough, slick, or muddy surfaces.
4. Stay off slopes too steep for safe operation.
5. Watch where you are going, especially at row ends, on roads, and around trees.
6. Do not permit others to ride.
7. Operate the tractor smoothly - no jerky turns, starts, or stops.
8. Hitch only to the drawbar and hitch points recommended by tractor manufacturers.
9. When tractor is stopped, set brakes securely and use park lock if available.

##### **Child Labor Under 16 Years Old**

Some regulations specify that no one under the age of 16 may operate power machinery. It is your responsibility to know what these regulations are in your own area or situation. (Refer to U.S. Dept. of Labor, Employment Standard Administration, Wage & Home Division, Child Labor Bulletin #102).

**2.10 Sign-Off Form**

Norden Mfg LLC follows the general Safety Standards specified by the Farm Equipment Manufacturers Association (FEMA), the American National Standards Institute (ANSI) and the American Society of Agricultural and Biological Engineers (ASABE). Anyone who will be using and/or maintaining the wheel rake must read and clearly understand ALL safety, operation and maintenance information presented in this manual.

Do not use or allow anyone else to use this wheel rake until all information has been reviewed. Annually review this manual before the season start-up.

Make periodic reviews of SAFETY and OPERATION of the wheel rake a standard practice. An untrained operator is not qualified to use this wheel rake.

This sign-off sheet is provided for your records to show that all personnel who will be working with the equipment have read and understand the information in this Operation and Parts Manual and have been instructed in the operation of the equipment.

<b>Sign-Off Form</b>		
<b>Date</b>	<b>User's Signature</b>	<b>Owner's Signature</b>

## 3. SAFETY SIGNS AND LABELS

### 3.1 General Information

The types of safety signs (hazard labels) and instructional labels, along with their locations on the equipment, are shown in the following illustrations. Good safety practices require that you familiarize yourself with the various safety signs, the type of warning, and the area or particular operation related to that area that requires your SAFETY AWARENESS.



**Think SAFETY!**

**Work SAFELY!**

Pay close attention to the safety signs and instructional labels attached to the tractor and the wheel rake. Duplicate safety signs, which are attached to the wheel rake, can also be found in this section. If the wheel rake is missing a label or one is unreadable, replace the label before using the wheel rake.



### Safety Signs and Instructional Labels

1. **Keep safety signs or instructional labels clean and legible at all times. Use a clean, damp cloth to clean safety decals.**
2. **Replace any missing or hard-to-read safety signs or instructional labels.**
3. **Use care when washing or cleaning the equipment not to remove or damage the labels. When using a pressure washer to clean the wheel rake, avoid spraying too close to decals; high-pressure water can enter through very small scratches or under edges of decals causing them to peel or come off.**
4. **Locations for the labels and replacement part numbers are shown in this section.**
5. **Replacement parts must have replacement labels attached during installation and/or before the wheel rake is used.**
6. **Labels are available from your authorized dealer or from Norden Mfg LLC at no charge.**

### 3.2 How to Install Replacement Safety Signs

1. Clean and dry the installation area.  
**Note:** Do not install the signs if the temperature is below 50°F.
2. Determine the exact position before you remove the backing paper.
3. Remove the backing paper.
4. Align the sign over the specified area and carefully press the sign to the part/frame.  
**Note:** Small air pockets can be pierced with a pin and smoothed out using the piece of backing paper.

### 3.3 Safety Sign Locations



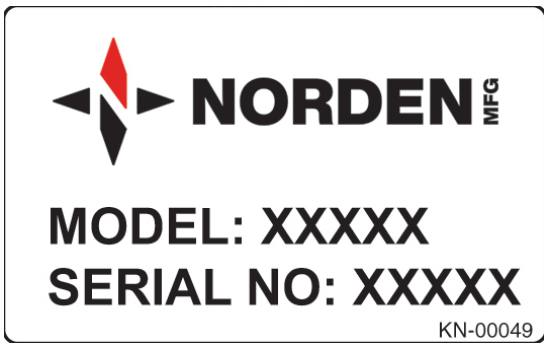
Item	Type	Description	Qty.	Part #
1	WARNING	Consult Owner's Manual	1	1015030
2	DANGER	Yellow Reflector	4	1007980
3	WARNING	Pinch Point	2	1015040
4	SERIAL	Red Reflector	2	1007990
5	INSTRUCTIONAL	Flourescent Orange Reflector	2	1008000
6	WARNING	SMV Triangle	1	1003750

### 3.4 Wheel Rake Safety Signs

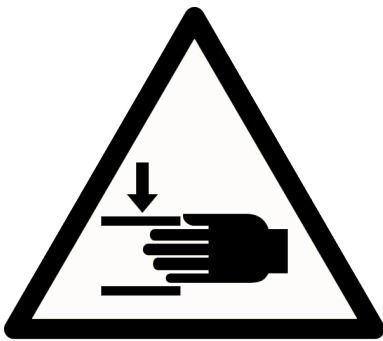
1.



2.



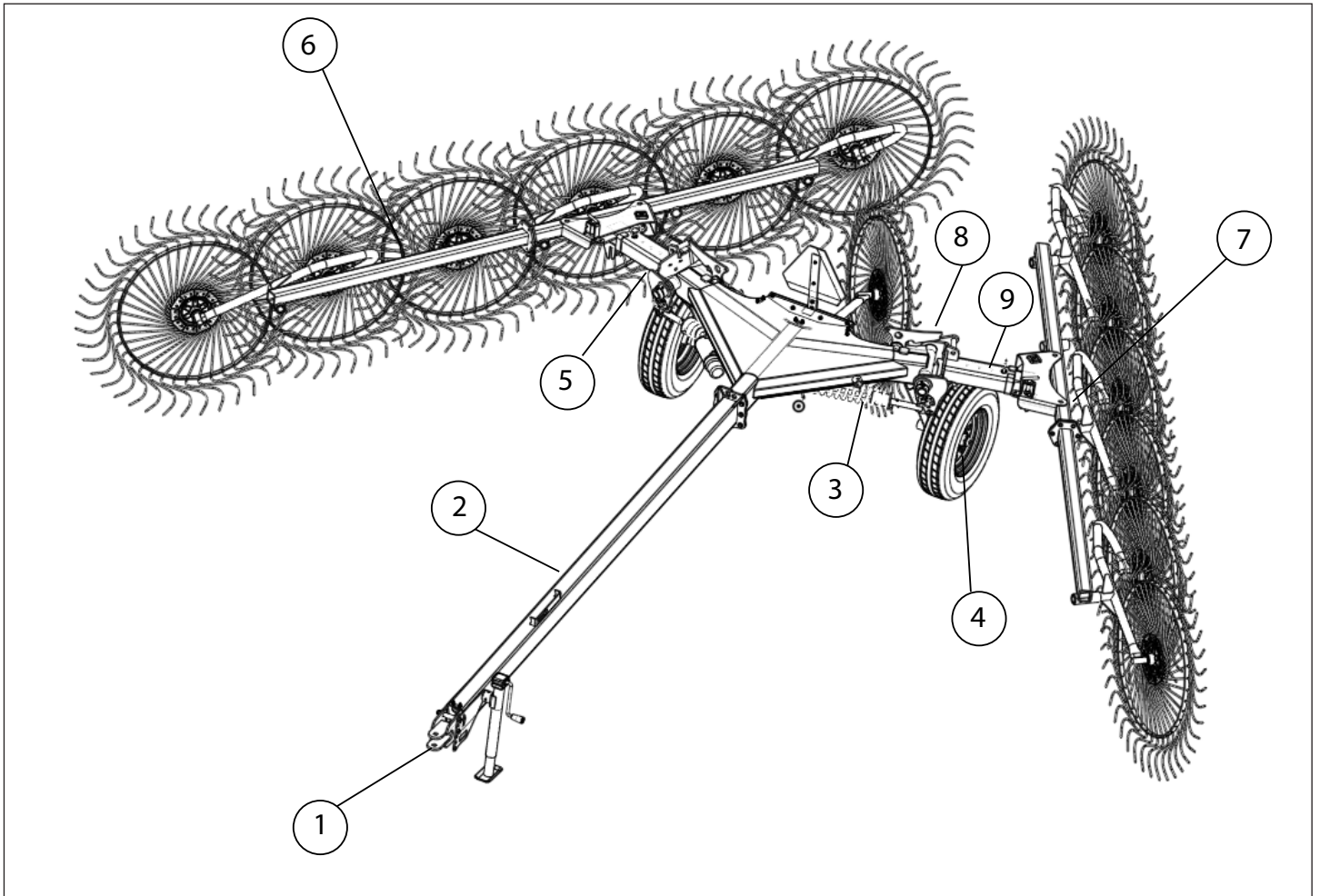
3.



4.



## 4. Terminology



Item	Description
1	Hitch Clevis
2	Tongue
3	Flotation
4	Transport Wheel
5	Right Lift Arm
6	Right Rake Arm
7	Left Rake Arm
8	Headlands and Transport Lock
9	Left Lift Arm

## 5. Assembly

---

### 5.1 Tools Required

Tools Required
Wrenches, 9/16"
Ratchet with extension and sockets as above

### 5.2 Assembly Procedure

1. Attached wheel to hub. Nuts in rake wheel should face the same direction as the nuts on the hub lugs.



2. Tighten all nuts (33 ft-lb)





## 6. Operation

### 6.1 OSHA Training Requirements

The following training requirements have been taken from Title 29, Code of Federal Regulations Part 1928.57 (a) (6). [www.osha.gov](http://www.osha.gov).

Operator instructions. At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee who operates an agricultural tractor and implements in the safe operating practices and servicing of equipment with which they are or will be involved, and of any other practices dictated by the work environment.

#### **WARNING**



#### **Roll Away Hazard**

Before leaving the tractor seat, make sure the engine is stopped, the transmission is placed in park, the key is removed, and the parking brake is set.



The weight of the tractor, plus the wheel rake, if it rolls onto a person, could cause serious crushing injury or death.



#### **Crush Hazard**

The tractor should be equipped with a Roll Over Protective Structure (ROPS) and a seat belt. A crushing hazard could occur if the driver is ejected from the seat while the tractor is in motion. Fasten the seat belt whenever the tractor is moving.



#### **Crush Hazard**

Hydraulic or mechanical failure can allow a wing to drop suddenly without warning. Do not allow anyone to walk under or stand near a raised wing when the wing locks are removed.

#### **SAFETY INSTRUCTIONS**

The following safety instructions are provided to help prevent injury or limit equipment damage.



#### **Train Unfamiliar Users**

It is the wheel rake owner's responsibility to make sure any person using the wheel rake, especially if it is loaned or rented, has been thoroughly trained on its proper and safe use.

Be certain only physically-able persons will use the wheel rake.



Users who have not read and understood all operating and safety instructions are not qualified to use the wheel rake.

If the elderly are assisting with the work, their physical limitations need to be recognized and accommodated.

Never allow children to operate equipment.

### 6.2 Attaching to Tractor

Use caution when connecting the wheel rake to the tractor. The wheel rake should be securely resting at ground level or setting on blocks. Keep hands and feet clear of pinch points between the tractor drawbar and wheel rake hitch.

1. Use the jack to adjust the hitch to the height of the tractor drawbar. See section 6.3.1 for instruction on setting hitch clevis.
2. Board the tractor and start the engine. Back the tractor up to the rake hitch clevis until the holes in the drawbar and clevis are aligned.
  -   **Crush Hazard** Crush hazard between hitch and implement. Do not allow anyone to stand between the hitch and implement during hook-up operations.
3. Turn off the tractor engine and dismount.
4. Insert a 1" hitch pin with retaining clip through the clevis and drawbar holes and install retaining clip. Do not use a homemade or shop made pin.



#### **Crush Hazard**

Unexpected separation of the implement from the tractor could cause death or serious injury. Use only an OEM high strength drawbar pin. Do not use a homemade or shop made pin.

5. Retract the jack, remove the locking pin, move the jack to its storage location on the wheel rake frame, and secure it with the locking pin.
6. Inspect all the hydraulic hoses to ensure they are in good condition. Route the hydraulic hoses through the hose rack, make sure the fittings are clean, and attach to the tractor's hydraulic ports. Make sure the hoses are adequately supported so they cannot come in contact with other parts or the ground.
7. If installed, lower the kicker wheel.
  - a. Open the shut off valve.
  - b. Operate the hydraulics raising and lowering the wings and kicker wheel in order to remove any air trapped in the system. It may take several cycles to remove all of the air. The kicker wheel should raise and lower with the wings.
8. Lower the rake wings.
  - a. Ensure "Rake Arm Position" valves are both in the unlocked position.



- b. Pull on the rope to unlock the safety latches



- c. While holding the rope tight, operate the appropriate valve to lower the wings

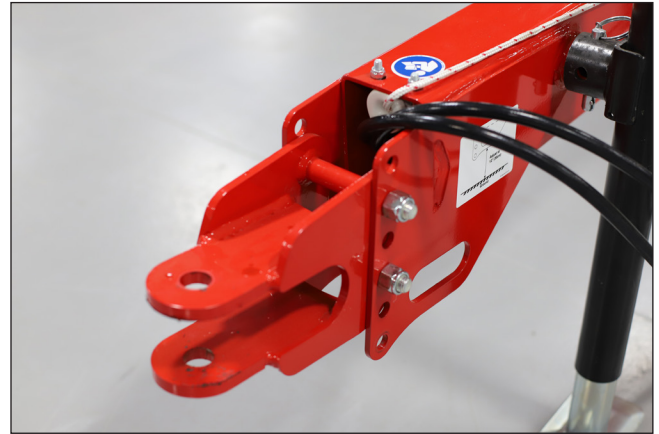
### 6.3 Setting the Wheel Rake

Properly setting the wheel rake is essential for efficient operation. The adjustments to make before using are:

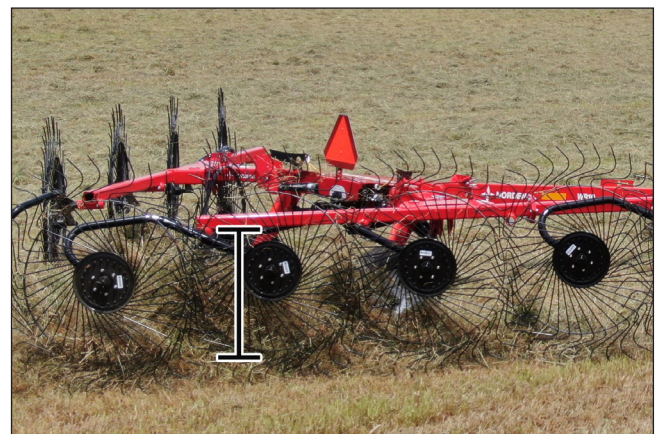
#### 6.3.1 Level the Rake

It is very important that the wheel rake is level in the operating position.

1. If the rake arm is not level, remove the two 5/8" bolts holding the hitch clevis



2. Using the jack, adjust the tongue up or down so that the rake arm is level.
3. Re-install the bolts and tighten to the proper torque.
4. The rake is designed to be level when this edge is 12" above ground. See sticker for illustration.
5. For really tall drawbar heights, the hitch clevis can be inverted to gain extra height.



### 6.3.2 Adjust the Overall Rake Working Width

The overall width can be adjusted to operate the rake at a steeper angle in heavy crops or at a flatter angle in light crops and still maintain the desired windrow width.

1. Using the tractor hydraulics, fold and lock the wings.
2. Remove the jack from its storage location attach it to the jack mount on the wing. Make sure to position the jack foot in the notched bracket. Install the retaining clip in the jack mount.



3. Remove the clevis pin from the wing arm adjustment hole.



4. Operate the jack to align the adjustment holes for the desired width. Refer to section 6.3.7 for rake specifications.
5. Re-install the clevis pin and its retaining clip in the wing arm adjustment hole.
6. Remove the jack, and repeat the process for the other wing arm.
7. When finished, move the jack to its storage location on the wheel rake frame, and secure it



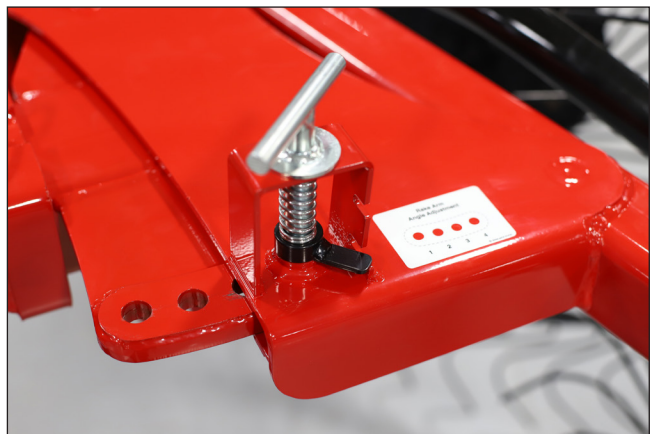
with the locking pin.



### 6.3.3 Adjust the Rake Angle

The rake angle can be set to any one of three available positions.

1. Using the tractor hydraulics, raise the wings until the rake wheels are off of the ground..
2. Rotate the lock tab, pull out on the pin, and rotate the lock tab into the upper notch. Refer to section 6.3.7 for rake specifications.



Tip: this is easier to do if you leave the rake arm up is lifted just high enough that the rake wheels are not touching the ground

3. Pivot the rake arm to the desired position.

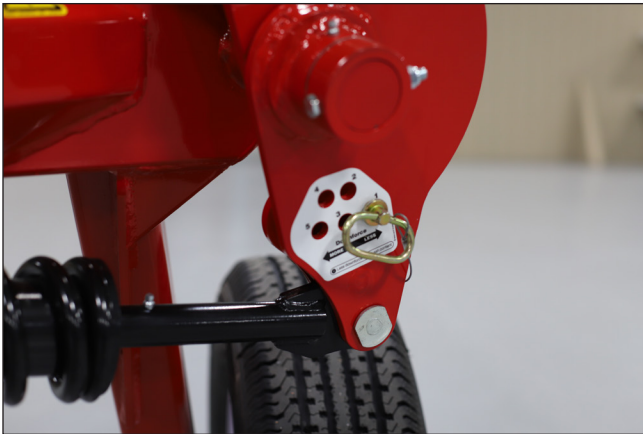


4. Rotate the lock tab, push in the pin, and rotate the lock tab into the lower notch.
5. Repeat the process for the other wing.

### 6.3.4 Adjust the Rake Wheel Ground Pressure

Rake wheel ground pressure can be controlled by adjusting the flotation spring tension to any one of five settings. Adjust the ground pressure to the least amount necessary to achieve good raking action. Excessive rake wheel ground pressure can cause crop damage, premature rake wheel tine wear, and broken tines.

1. Using the tractor hydraulics, fold and lock the wings.
2. Remove the flotation catch pin.



3. Insert the pin into the desired hole to increase or decrease ground pressure. Replace the lynch pin retainer.

**Note:** Using the hole 1 will result in the least amount of ground pressure. Using the hole 5 will give the most ground pressure.



4. Repeat the process for the other wing.

### 6.3.5 Wheel Rake Operation

Begin raking at a low ground speed until you are familiar and comfortable with the rake. Working speed is normally 5 to 10 mph, and will vary with different hay conditions or terrain.

Reduced ground speed may be necessary for hills or rough terrain.

Raking direction will affect raking efficiency. For sickle mowed hay, rake in the same direction as mower travel. For rotary mowed hay, rake in the opposite direction as mower travel.

Most raking problems can be traced to incorrect speed, incorrect ground pressure, or broken or missing tines.

Use only enough ground pressure to pick up the crop material.

**NOTICE** *Raise the rake wheels before backing the tractor. Backing the tractor with the tines in contact with the ground will cause tine breakage.*

### 6.3.6 Single Sided Rake Operation

The rake can be operated with one side only. This is helpful when raking very thick hay to limit the windrow size, or when a windrow needs to be moved to the side or inverted.

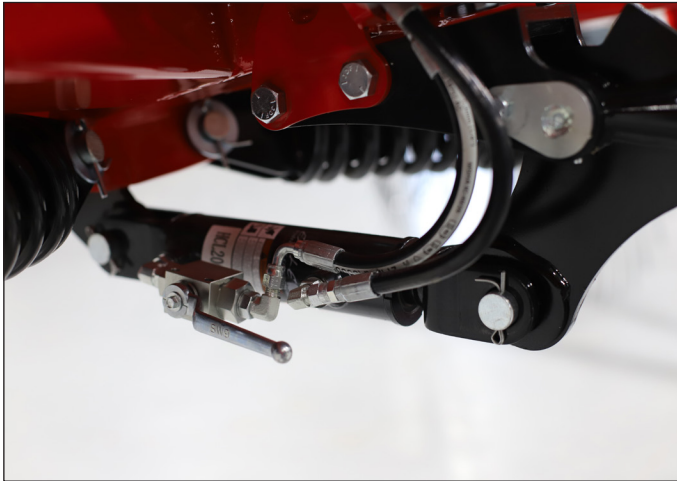
To use single side raking, lift the rake arms into the transport location. In the back of the rake, turn the valve on the side of the rake you do not want to use. Turning this valve will keep that rake arm in the upright/transport location while allowing the other side to move up and down as normal.

To go back to raking with both sides, put both rake arms up again and open up the valve on the side that was previously turned off. Because the Norden rake has an equalizer block, it is important that the arms are “in sync” when opening the valve again.




## 6.4 Optional Center Wheel Kit

Center (kicker) Wheel Kits are available. The Single Wheel Kit is shown in the pictures below. The Center Wheel Kit mounts on the back of the wheel rake and is designed to move the hay that lays in the center and does not get touched by the main rake assemblies. Opening the hydraulic valve on the cylinder allows the center wheel to raise and lower with the rakes. When transporting, the center wheel kit can be locked by closing the hydraulic valve.




## 6.5 Detaching From Tractor

1. Raise the wings and install the wing locks.

**WARNING**   **Hydraulic or mechanical failure can allow a wing to drop suddenly without warning. Do not allow anyone to walk under or stand near a raised wing when the locks are removed.**

2. Park the tractor, place the transmission in park or neutral, and apply the parking brake. Shut down the engine, remove the key, and move the cylinder operating lever in both directions to relieve hydraulic pressure.
3. Remove the jack from the main frame and secure it to the hitch by fully inserting the locking pin through the jack and the hitch bracket. Use the jack to raise the rake hitch to the height needed to disconnect the clevis from the drawbar.
4. Disconnect the hydraulic hoses from the tractor. Secure the hoses to the rake frame off the ground.

**WARNING**  **Be sure all hydraulic pressure is relieved before disconnecting hydraulic lines or fittings between the wheel rake and the tractor hydraulic system.**


**Escaping hydraulic fluid under pressure, even a pinhole size leak, can penetrate body tissue, causing serious injury and possible death. If fluid is injected into your skin, it must be treated immediately by a doctor familiar with this type of injury.**



5. Remove the rope from the tractor and wrap around the provided bracket.
6. Remove the hitch pin.

## 7. Transporting


### 7.1 Transporting Safety (Road)

**WARNING** Failure to understand and follow these safety instructions could result in serious injury and possibly even death.



**Operating the Tractor**  
 Before attaching the wheel rake to the tractor, be familiar with its controls and how to stop it quickly in the event of an emergency. Read and understand this manual and the one provided with your tractor before transporting the wheel rake.

 **Fall and Crush Hazard**  
 Do not allow riders on the wheel rake or tractor.

**Maximum Transporting Speed**  
Do not exceed 20 MPH when transporting the wheel rake. Slow down for corners and rough terrain.

 **Visibility**  
Clean reflectors, SMV or SIS sign, and tractor tail lights before towing. Make sure all the lights and reflectors required by highway and transport authorities are in place and can be seen clearly by all overtaking and oncoming traffic.


**Regulations**  
Make sure all local, state, and federal regulations, regarding the transport of equipment on public roads and highways, are met. Check with the local authorities regarding transporting the wheel rake on public roads. Obey all applicable laws and regulations.


 **Rollover Protection**  
 The tractor should be equipped with a Roll Over Protective Structure (ROPS) and a seat belt.  
The wheel rake is top heavy when the wings are folded. Use caution when transporting over uneven surfaces and slow down for turns.


#### SAFETY INSTRUCTIONS

The following safety instructions are provided to help prevent injury or limit equipment damage.


 **Drive Safely**  
Be a safe and courteous driver. Anticipate what other drivers will do and drive accordingly.

 **Allow Extra Distance**  
Apply brakes early. Leave extra distance between your vehicle and the one(s) ahead to provide adequate stopping space. Extra distance will be required to stop the vehicle.


 **Clear Vision**  
Remove all objects from the area that would prevent clear vision of the complete work area or would present an obstacle when moving the wheel rake.

 **Hitch Attachment**  
Be sure the wheel rake is securely attached to the tractor and in good operating condition before using.

 **Working Taillights**  
Make sure lights on the tractor are working properly.

 **Additional Lighting**  
For wheel rakes without lights, install additional lights on the rear of the tractor to safeguard against rear-end collisions. Daybreak and dusk are particularly dangerous and rear pilot vehicles are recommended. Wheel rakes without lights should be transported on public roads only during daylight hours.

 **Hazard Flashers**  
Use hazard flashers on the tractor when transporting unless prohibited by law.

 **Right-of-Way**  
When travelling below the posted speed limit, keep to the right and yield the right-of-way to allow faster traffic to pass.

## 7.2 Transporting Procedure

1. Prior to towing, make sure the brakes, brake lights, running lights, turn signals, and hazard lights on the tractor are operating correctly.
2. Raise the wings with the tractor hydraulics. Before the lift arm makes contact with the Headlands Lock, pull on the rope to lift the lock.



3. Make sure the jack stand is secured in its storage location on the left side of the frame.



**WARNING** Do not place hands or fingers between moving and/or stationary parts. The weight of the unit could easily cause serious bodily injury.

**WARNING** After raising the wings, install both wing locks.

4. Ensure the Headlands Lock is in place.



**WARNING** The wheel rake is top heavy when the wings are raised. To avoid injury or death from rollover, use caution when transporting over uneven surfaces and slow down for turns.

5. Tow the wheel rake to the work site following all applicable regulations and all the safety instructions in this manual.



## 8. Storage

### 8.1 Storage Safety

At the end of the season, the wheel rake should be thoroughly inspected and prepared for storage. Repair or replace any worn or damaged components to prevent any unnecessary downtime at the beginning of the next season.

**WARNING**   The wheel rake is top heavy when the wings are raised. To avoid injury or death from rollover, store the rake on a firm, level surface.

**CAUTION**   Store the wheel rake in an area away from human activity. To prevent the possibility of serious injury, do not permit children to play on or around the stored wheel rake.

**NOTICE** *To prevent damage to the wheel rake, store it in a dry, level area.*

### 8.2 Placing In Storage

To extend the life of the cylinders and hoses, store the wheel rake inside a building.

1. Remove all entangled vegetation.
2. Thoroughly wash the wheel rake with a pressure washer or water hose to remove all clippings, dirt, mud, or debris. Be sure to avoid too much water pressure on or near any stickers.
3. Raise the wings with the tractor hydraulics and install the wing locks and their retaining pins.
4. Select an area that is dry, level, and free of debris (inside a building is ideal). Move the wheel rake to its storage area. Disconnect the wheel rake from the tractor.
5. Lubricate all grease points. Make sure all grease cavities have been filled with grease to remove any remaining water from washing.
6. Touch up all paint nicks and scratches to prevent rusting.

### 8.3 Removing From Storage

1. Grease all lubrication points. Refer to “9.3 Lubrication”.
2. Before placing the wheel rake back into service, replace any worn or defective parts and perform the Pre-Operation Checklist.

## 9. Maintenance

### 9.1 Maintenance Safety

**WARNING** Failure to comply with the following safety instructions could result in serious injury and possibly even death.



#### Personal Protection Equipment

Wear close fitting and belted clothing to avoid getting caught in moving parts. Wear personal protection equipment (PPE), which may include hard hat, safety glasses, safety shoes, gloves, etc. appropriate for the work site and working conditions.



#### Damaged Parts Hazard

Do not use the wheel rake if any parts are damaged. If the wheel rake is believed to have a defect which could cause it to work improperly, immediately stop using it and remedy the problem before continuing.



#### No Unauthorized Modifications

Do not modify the wheel rake or safety devices. Do not weld on the unit. Unauthorized modifications may impair the cutter's function, or create safety hazards, and will void the warranty.

If the wheel rake has been altered in any way from the original design, the manufacturer does not accept any liability for injury or warranty.



#### Crush Hazard

Always set the wheel rake on safety stands or on the ground and chock the wheels when performing maintenance.



#### Good Working Condition

Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts.



#### Replacement Parts

If replacement parts are necessary, genuine factory replacement parts must be used to restore the unit to its original specifications. Unapproved parts could create a safety hazard. The manufacturer will not accept responsibility for damages as a result of the use of unapproved parts.

#### WARNING



#### Crush Hazard

The wings may drop unexpectedly if the wing locks are not installed. To avoid serious injury or death from crushing, always make sure the lock bars and their retaining pins are properly installed whenever the wings are raised.



The wheel rake is top heavy when the wings are raised. To avoid injury or death from rollover, make sure the rake is on a firm, level surface.



#### Trapped Air Hazard

When installing, replacing, or repairing hydraulic system cylinders or parts, make sure that the entire system is charged and free of air before resuming operations. Failure to bleed the system of all air can result in improper machine operation, causing severe injury.



#### Zero Pressure

Relieve pressure from the hydraulic system before servicing or disconnecting from the tractor.



#### Explosive Separation Hazard

Replace any worn, cut, abraded, flattened, or crimped hoses.



#### High-Pressure Fluid Hazard

Keep all hydraulic lines, fittings, and couplers tightly secured and free of leaks.

Do not make any temporary repairs to the hydraulic lines, fittings, or hoses using tape, clamps, or cement. The hydraulic system operates under extremely high pressure and temporary repairs may fail suddenly and create a hazardous/dangerous situation.

DO NOT use your bare hand to check for potential leaks. Always use a board or cardboard when checking for a leak.

Escaping hydraulic fluid under pressure, even a pinhole size leak, can penetrate body tissue, causing serious injury and possible death. If fluid is injected into your skin, it must be treated immediately by a doctor familiar with this type of injury.

**SAFETY  
INSTRUCTIONS**

The following safety instructions are provided to help prevent injury or limit equipment damage.



**Safety Equipment**

A fire extinguisher and first aid kit should be readily accessible while performing maintenance on this equipment.



**Clean Work Area**

Do not leave tools lying around the work area. Follow good shop practices. Keep service area clean and dry. Be sure electrical outlets and tools are properly grounded. Use adequate light.



**Use the Right Tools**

Use the correct tools, jacks, hoists, or other tools that have the capacity for the job.



**Proper Support**

Use certified safety stands rated to support the load when working beneath the wheel rake, or performing repairs, service, or maintenance.

The wheel rake weighs almost 2000 lbs. Before working underneath, place it on a minimum of four jack stands, with a load rating of at least 2000 lbs. each.

Do not position the jack stands under wheels, axles, or wheel supports, as they may rotate and cause the wheel rake to fall.

Make sure the jack stands are stable and the wheel rake deck is approximately level. Test the stability of the wheel rake before working underneath.

If the wheel rake is attached to the tractor, set the brakes, remove the key, chock the tractor wheels, and block the wheel rake before working underneath.

**9.2 Welding Repairs**



Before performing any type of welding repair to the wheel rake, contact Norden Mfg LLC for approval. Repair welding must be done with care and with procedures that may be beyond the capabilities of the ordinary welder.

**WARNING**

**Personal Injury Hazard**  
Repairs or modifications to the wheel rake can result in serious injury or death should these repairs fail.

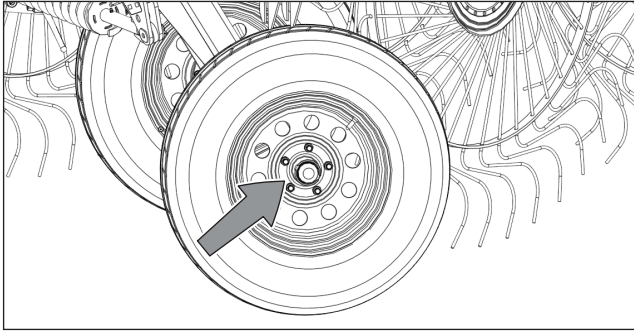
**NOTICE**

*Anyone performing a welding repair should be certified in accordance to the American Welding Society (AWS) standards.*

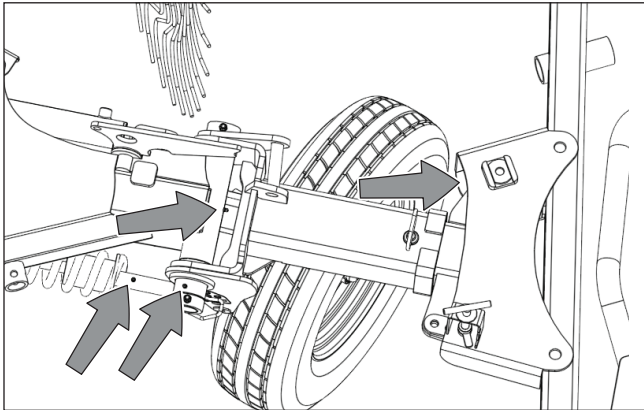
### 9.3 Lubrication

1. Clean, repack, and adjust the wheel bearings annually. Use only wheel bearing grease when repacking these units. Check for excessive end play.

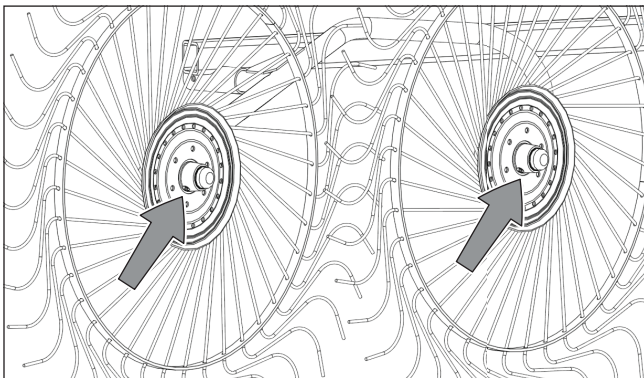
To adjust wheel bearing, remove dust cap and cotter pin. Lift tire and slowly rotate while tightening the spindle nut. Tighten only until a slight drag is felt on the rotating wheel. Re-install cotter pin and dust cap.



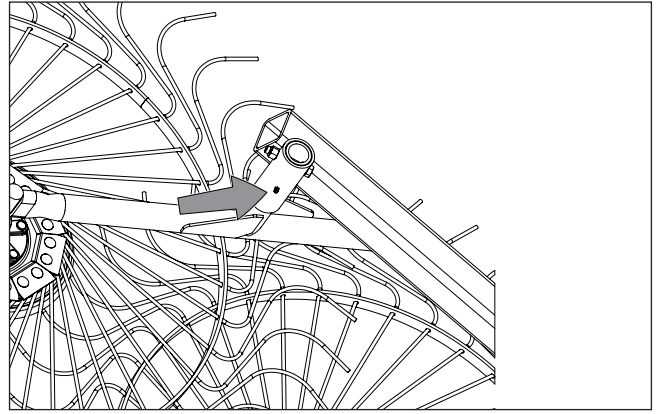
2. Grease the flotation rods, wing pivot pins, and rake arm pivot pins every 15 hours of operation.



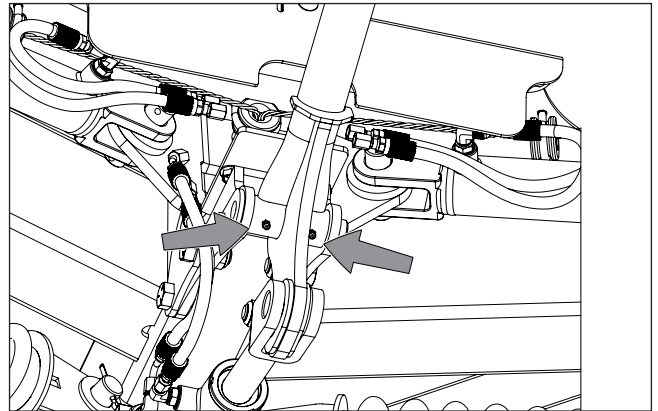
3. Lubricate the rake wheel hubs every 15 hours of operation.



4. Grease rake tubes every 15 hours when in use.



5. Grease kicker wheel arm every 15 hours when in use.



6. Check the hydraulic hoses periodically for cracks, abrasions or leaks. Replace defective hoses immediately with factory replacement parts only.
7. Check tightness of lug bolts after one hour of operation and every six months thereafter. Check tire pressure whenever maintenance is performed.

## 9.4 Bolt Torque Requirements

It is extremely important to apply and maintain proper torque on all bolts. Use a torque wrench to assure the proper amount of torque is being applied to the fastener.

Start all bolts or nuts by hand to prevent cross threading.

Torque figures indicated in the chart are used for non-greased or non-oiled threads unless otherwise specified. Therefore, do not grease or oil bolts or cap screws unless otherwise specified in this manual. When using locking elements, increase torque values by 5%.

The chart gives correct torque values for various bolts and cap screws. Tighten all bolts to the torque specified in the chart unless otherwise noted. Check tightness of bolts periodically, using the bolt torque chart as a guide. Always replace hardware with the same Grade bolt.

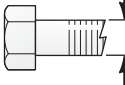



**SAFETY  
INSTRUCTIONS**



## Equipment Failure

The torque value for bolts and cap screws are identified by their head markings. Replacing higher "Grade" bolts (Grade 5) with lower Grade bolts will lead to equipment failure and can result in injury or death. Always use replacement bolts with the same Grade markings as the removed bolt.

## 9.5 Standard Torque Values

Bolt Diameter 	English Bolt Torque Specifications					
	Grade 2  No Marking		Grade 5  3 Radial Lines		Grade 8  6 Radial Lines	
	N·m	ft.lbs.	N·m	ft.lbs.	N·m	ft.lbs.
1/4"	8	6	12	9	17	12
5/16"	13	10	25	19	36	27
3/8"	27	20	45	33	63	45
7/16"	41	30	72	53	100	75
1/2"	61	45	110	80	155	115
9/16"	95	60	155	115	220	165
5/8"	128	95	215	158	305	220
3/4"	225	165	390	290		398
7/8"	230	170	570	420	880	650
1"	345	225	850	630	1320	970

## 10. Troubleshooting

Problem	Cause	Solution
Hay is carrying around the wheels.	Tines not polished.	Continue to operate rake to polish tines.
	Mud on tine ends	Material too wet. Allow to dry. Do not operate in wet ground.
Tine breakage.	Backing with tines in contact with ground.	Do not back the tractor with tines in contact with ground.
	Too much ground pressure.	Decrease the ground pressure. Refer to "6.3.4 Adjust the Rake Wheel Ground Pressure".
Rake wheels bounce excessively.	Too little ground pressure.	Increase the ground pressure. Refer to "6.3.4 Adjust the Rake Wheel Ground Pressure".
Rake is missing hay.	Wheels running too fast.	Adjust rake arm angle. Refer to "6.3.3 Adjust the Rake Angle". Slow down tractor.
	Tines missing or worn.	Replace tines. It is best to replace all tines at the same time to keep a uniform height.
Bent tines.	Backing with tines in contact with ground.	Do not back the tractor with tines in contact with ground.
	Excessive speed on rough ground.	Reduce speed.
	Narrow or deep ditches or furrows, rocky ground.	Avoid or cross at a slow speed.
	Too much ground pressure.	Decrease the ground pressure. Refer to "6.3.4 Adjust the Rake Wheel Ground Pressure".

## 11. Parts Section

---

### 11.1 Ordering Parts

We manufacture a quality product that requires very little maintenance or repair. However, should a part break or become damaged, our knowledgeable staff can make sure you receive the part(s) to put your unit back into operation.

#### Contact Information

For replacement decals, questions, or to order parts, contact:

**Norden Mfg LLC**  
**4210 Kinsmann Rd. NW**  
**North Bloomfield, OH 44450**

**Phone: 877-296-5851**

**Fax: 440-693-4336**

**E-mail: [service@nordenmfg.com](mailto:service@nordenmfg.com)**

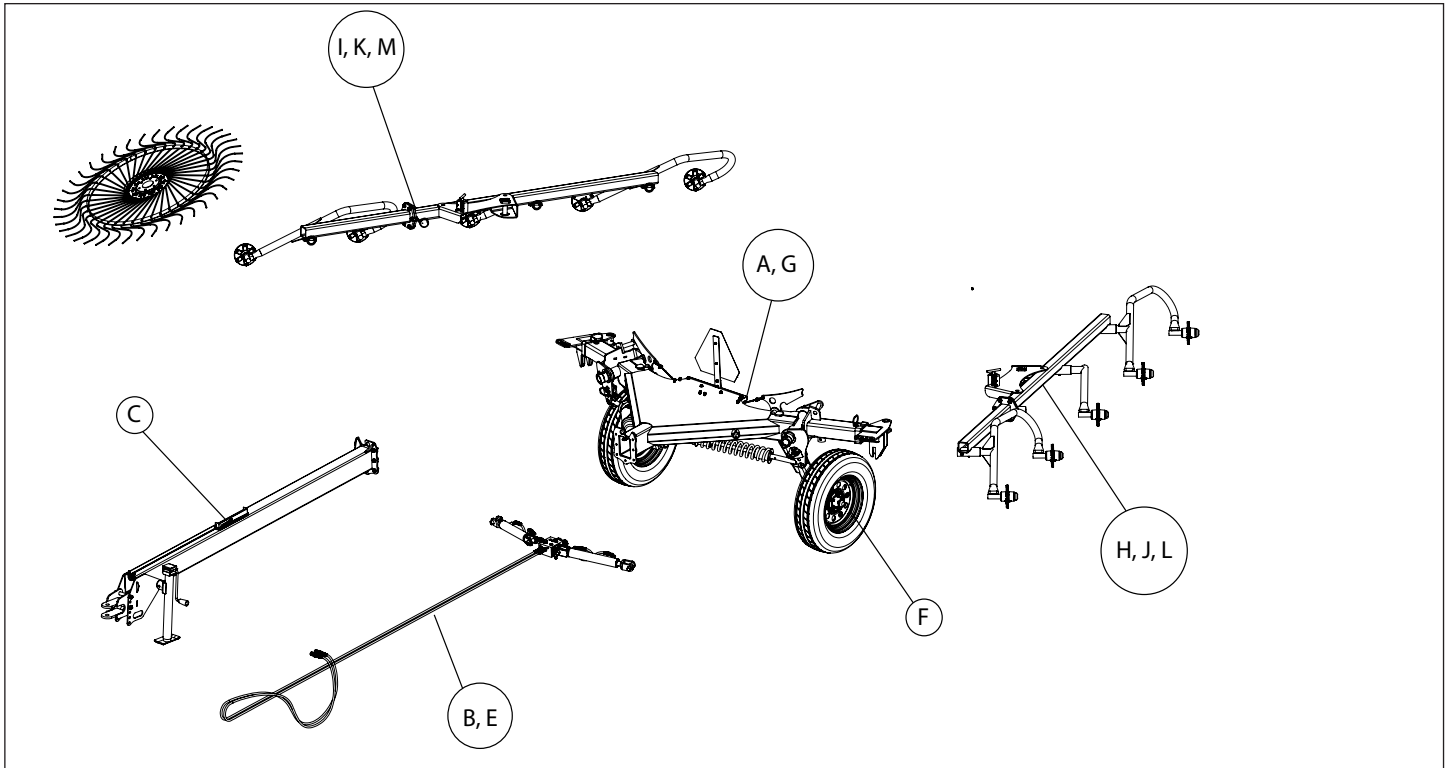
### 11.2 Decals

 **WARNING**  To prevent serious injury or death from not following posted safety instructions, make sure all decals are attached to the unit and are legible at all times.

Safety decals provide a vital role in helping to reduce injuries and/or possibly even death. To ensure the greatest level of safety, all decals must be in place and legible at all times. Remember, it is the users responsibility to maintain these decals.

All decals must be in place and legible or all warranties are void.

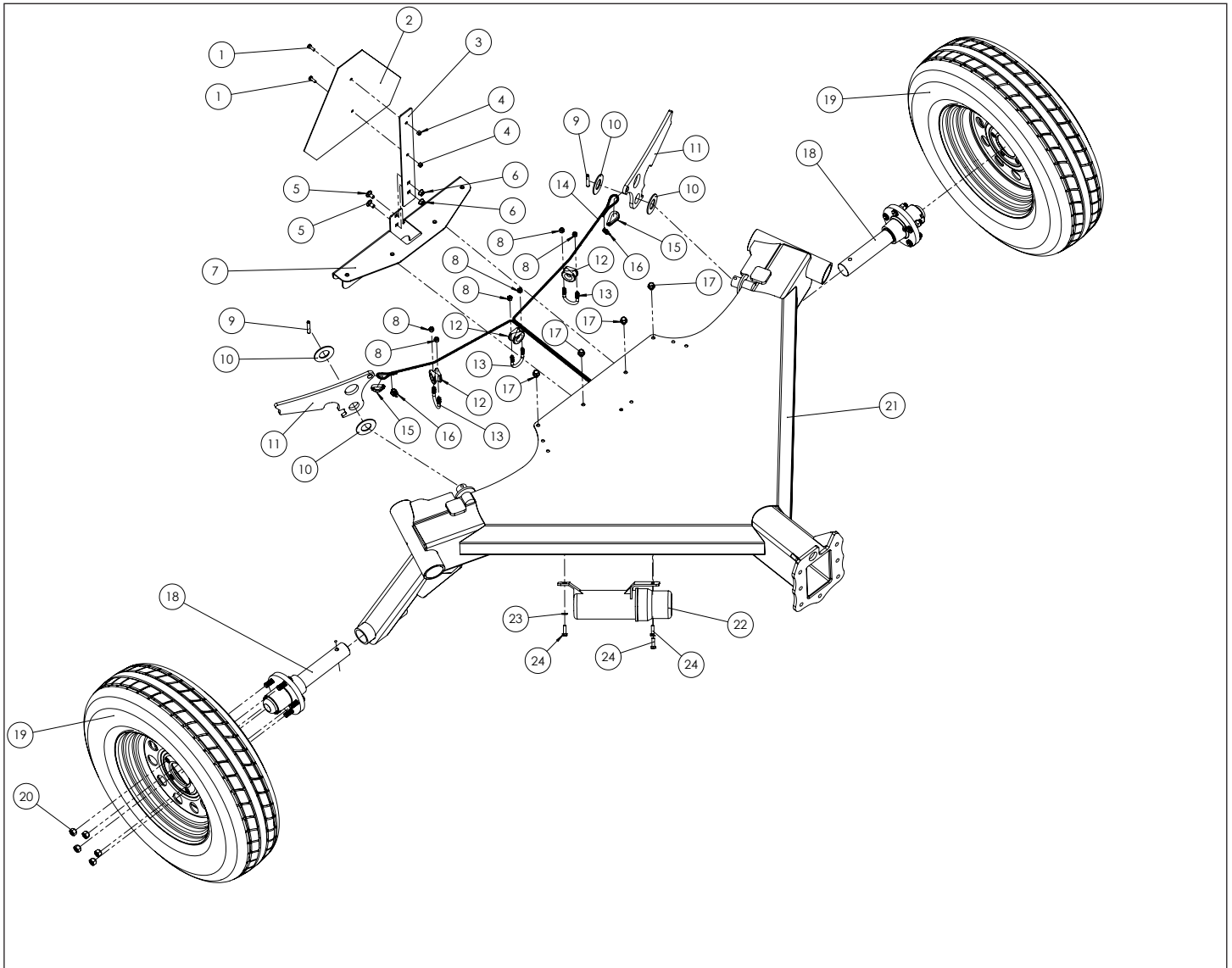
## 11.12 Main View



Item	Description	Section Number
A	Main Frame	11.13
B	Manifold View	11.14
C	Tongue View	11.15
D	Kicker Wheel View	11.16
E	Hydraulics View	11.17
F	Hub Assembly	11.18
G	Lift Arm and Flotation View	11.19
H	Left Arm WR8	11.20
I	Right Arm WR8	11.21
J	Left Arm WR10	11.22
K	Right Arm WR10	11.23
L	Left Arm WR12	11.24
M	Right Arm WR12	11.25



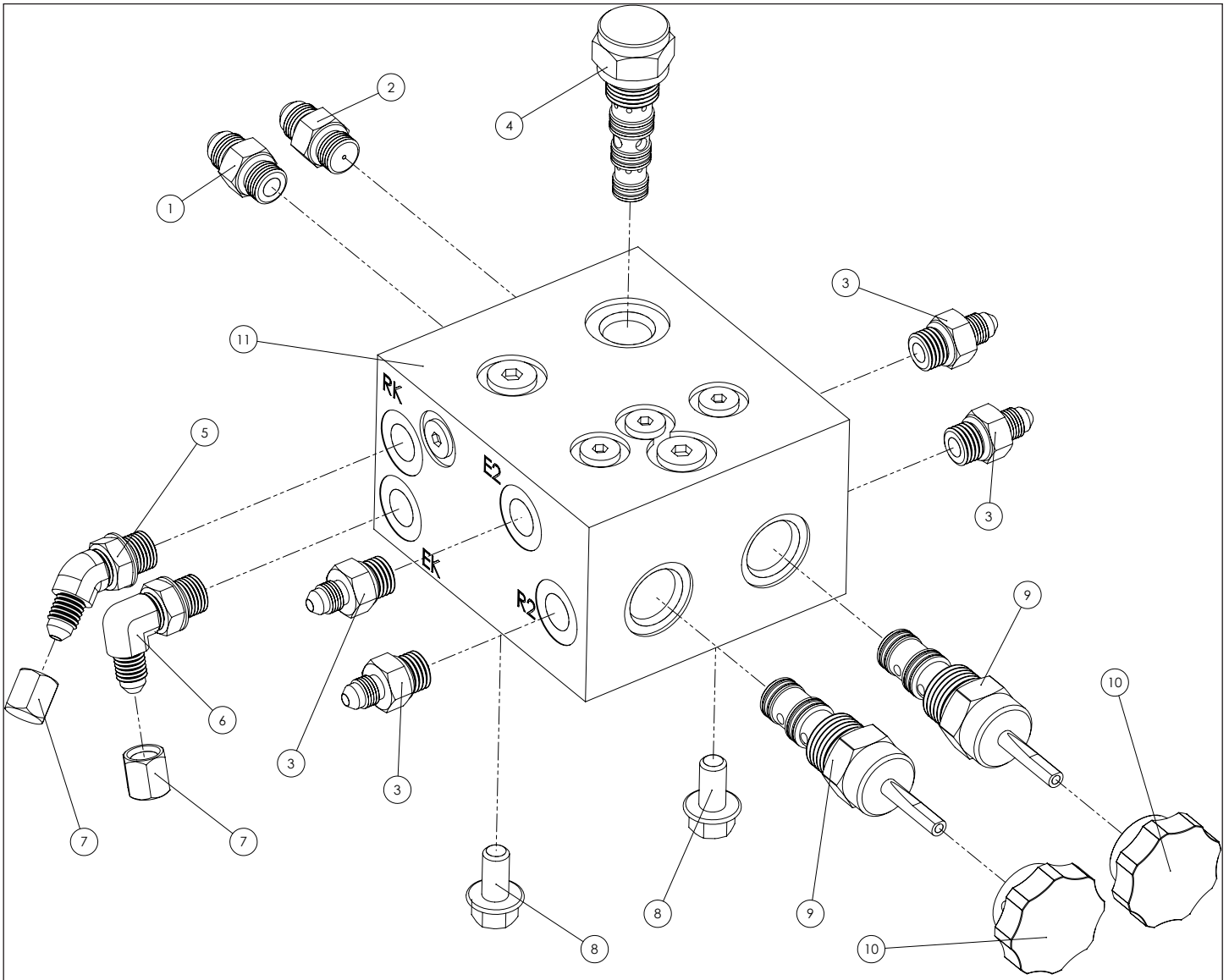
### 11.13 Main Frame View



Item	Part Number	Description	Qty.
1	1006420	1/4-20 x 0.75	2
2	1003750	SMV Triangle	1
3	1014471	SMV Mount	1
4	1006070	1/4-20 Nylock Nut Grade 5	2
5	1006300	3/8-16 x 0.75 Carriage Bolt Grade 5	2
6	1006190	3/8-16 Serrated Flange Nut Grade 5	2
7	1013590	Frame Tail	1
8	1006080	5/16-18 Nylock Nut Grade 5	6
9	1012840	Roll Pin, 0.313 x 2	2
10	1014670	Headlands Lock Washer	4
11	1013231	Headlands Lock	2
12	1009830	Insulator	3
13	1009400	5/16-18 U-Bolt 1-3/8 ID	3
14	1012890	Main Frame Rope 1/4" x 128"	1
15	1015830	Cable Thimble	2

Item	Part Number	Description	Qty.
16	1005190	Cable Clamp	2
17	1009370	3/8-16 x 0.5 Serrated Flange Bolt Grade 5	4
18	1004550	5 Bolt Hub Assembly, Section 11.18	2
19	1013170	Transport Wheel	2
20	1005160	1/2-20 Lug Nut	10
21	1012971	Main Frame	1
22	1006430	Document Canister	1
23	1006140	5/16 SAE Washer Grade 5	1
24	1006290	5/16-18 x 1 Hex Bolt Grade 5	3
*	1006080	5/16-18 Nylock Nut Grade 5	3
*	1006090	3/8-16 Nylock Nut Grade 5	2
*	1006370	3/8-16 x 2.75 Hex Bolt Grade 5	2

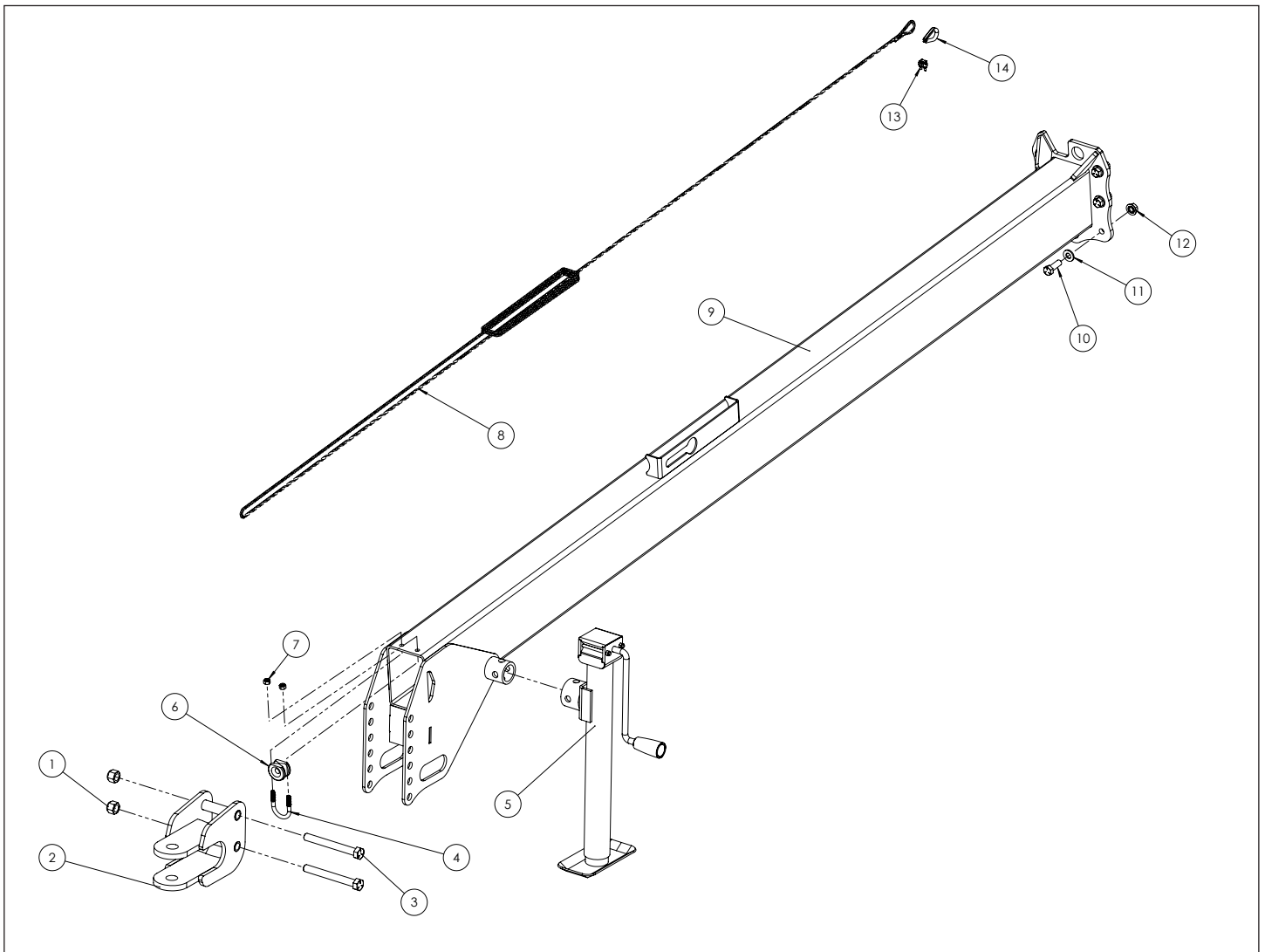
## 11.14 Manifold View



Item	Part Number	Description	Qty.
1	1009680	6MJ-6MB Adapter	1
2	1015020	6MJ-6MB Orifice, 0.062"	1
3	1014970	4MJ-6MB Adapter	4
4	1015080	Flow Divider/Combiner Cartridge	1
5	1014990	4MJ-6MB45 Adapter	1
6	1014980	4MJ-6MB90 Adapter	1

Item	Part Number	Description	Qty.
7	1015010	1/4 JIC Tube Cap	2
8	1006330	3/8-16 x 0.75 Serrated Flange Bolt Grade 5	2
9	1015060	3-Way Rotary Valve	2
10	1015070	Valve Knob	2
11	1015050	Rake Manifold Block	1

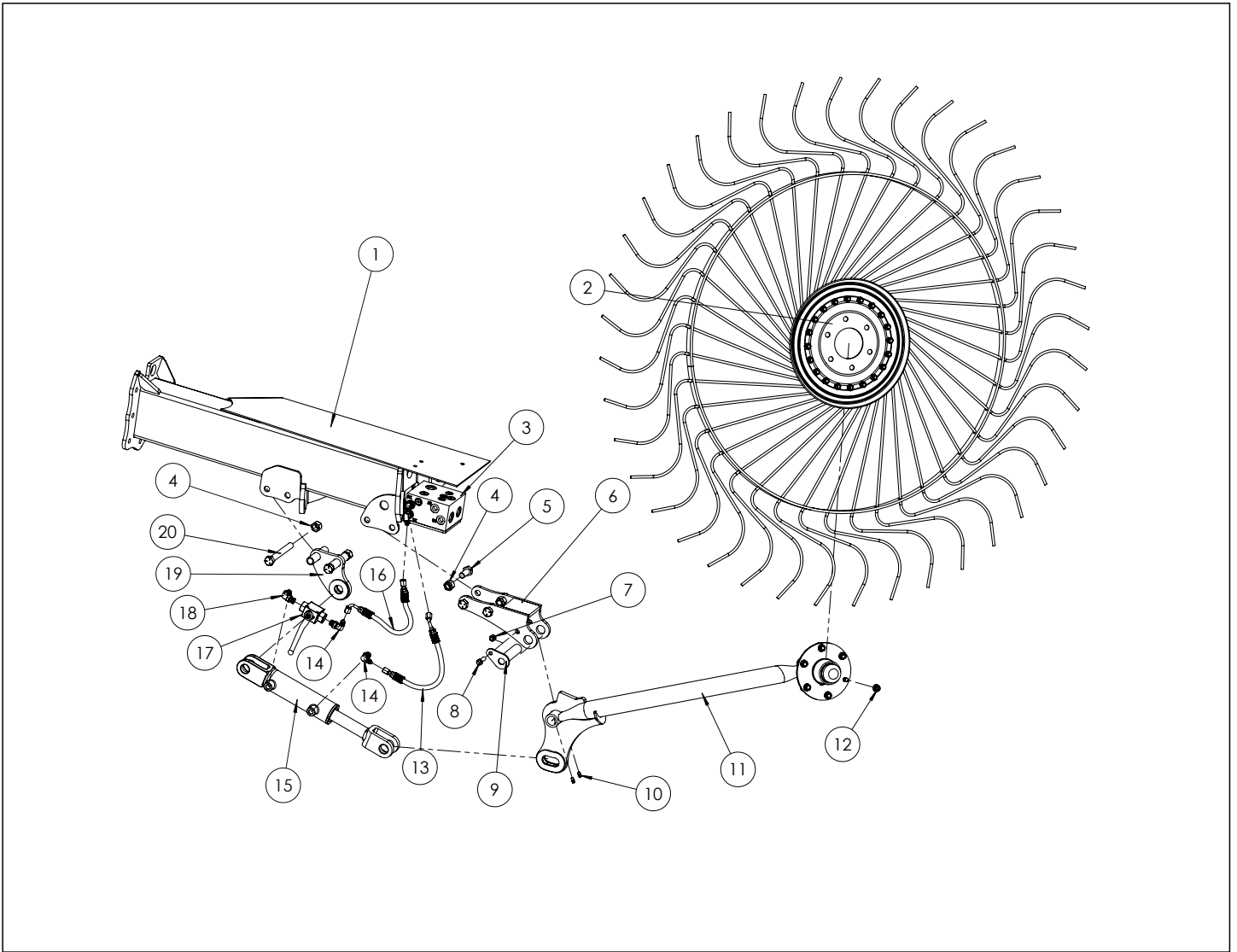
## 11.15 Tongue View



Item	Part Number	Description	Qty.
1	1006120	5/8-11 Nylock Nut Grade 5	2
2	1013000	Hitch Clevis	1
3	1009380	5/8-11 x 5.5 Hex Bolt Grade 5	2
4	1009400	5/16-18 U-Bolt 1-3/8 ID	1
5	1004540	Jack Assembly	1
6	1008930	Insulator	1
7	1006080	5/16-18 Nylock Nut Grade 5	2
8	1012930	Tongue Rope, WR8 and WR10	1
	1012940	Tongue Rope, WR12	

Item	Part Number	Description	Qty.
9	1012910	Short Tongue Weldment, WR8 and WR10	1
	1012920	Long Tongue Weldment, WR12	
10	1006240	1/2-13 x 1.5 Hex Bolt Grade 5	7
11	1006170	1/2 SAE Washer Grade 5	7
12	1006210	1/2-13 Serrated Flange Nut Grade 5	7
13	1005190	Cable Clamp	1
14	1015830	Cable Thimble	1

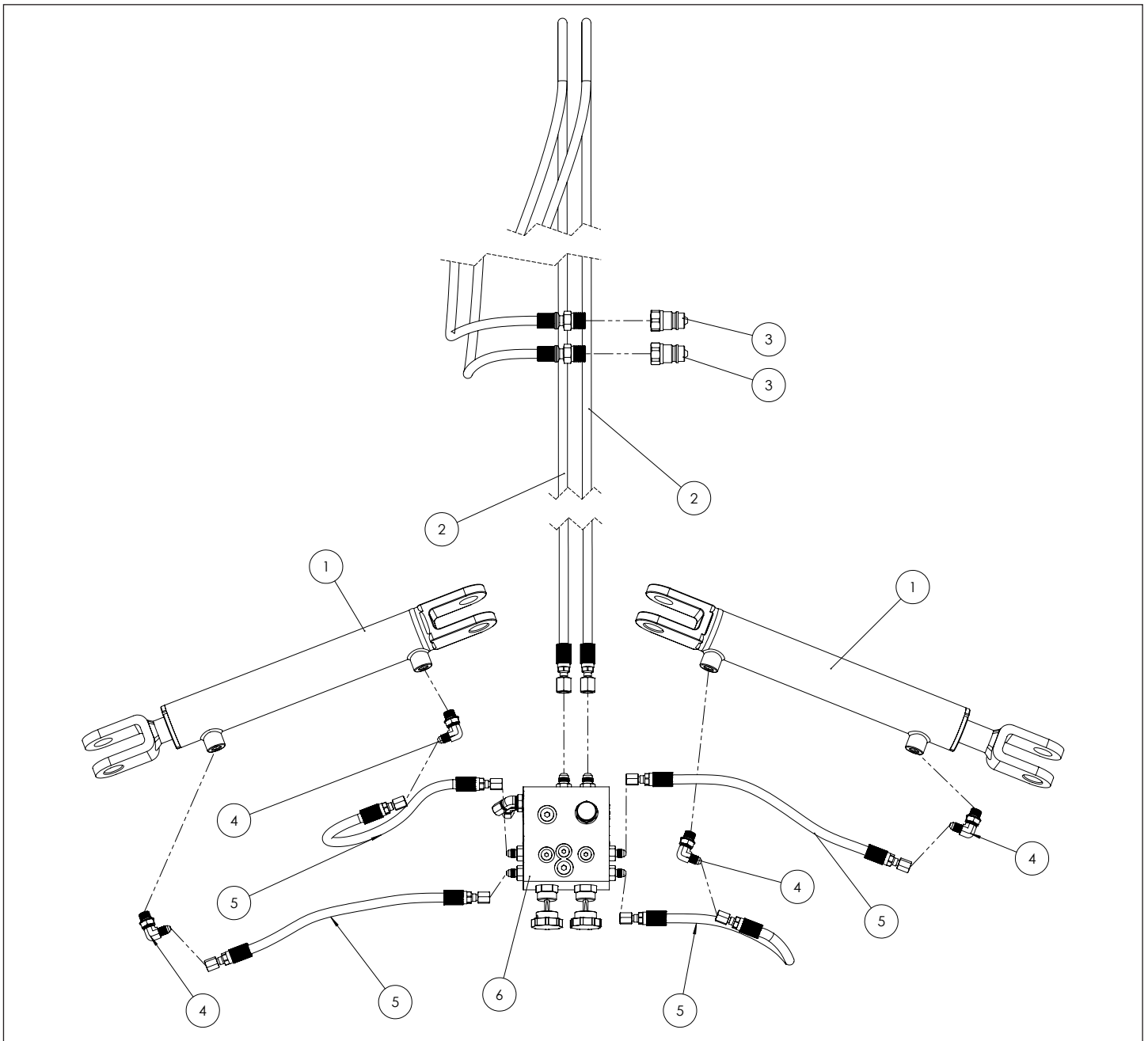
## 11.16 Kicker Wheel View



Item	Part Number	Description	Qty.
1	1012971	Cutaway of Main Frame	1
2	1012980	55" Rake Wheel, Left	1
3	1013630	Rake Manifold Assembly, Section 11.14	1
4	1006120	5/8-11 Nylock Nut Grade 5	6
5	1006400	5/8-11 x 1.5 Hex Bolt Grade 5	4
6	1013150	Kicker Wheel Mount	1
7	1006090	3/8-16 Nylock Nut Grade 5	1
8	1016100	3/8-16 x 1.25 Hex Bolt Grade 5	1
9	1013740	Kicker Wheel Mount Pin	1
10	1003730	1/4" Self Tapping Grease Zerk	2
11	1013130	Kicker Wheel Arm	1

Item	Part Number	Description	Qty.
12	1006190	3/8-16 Serrated Flange Nut Grade 5	6
13	1014950	Kicker Wheel Retract Hose, Port "RK" on Manifold Block	1
14	1014980	4MJ-6MB90 Adapter	2
15	1014870	2x4 Cylinder	1
16	1014940	Kicker Wheel Extend Hose, Port "EK" on Manifold Block	1
17	1014960	Kicker Wheel Valve	1
18	1015000	6MB-6MB90 Adapter	1
19	1013140	Kicker Wheel Cylinder Mount	1
20	1009380	5/8-11 x 5.5 Hex Bolt Grade 5	2

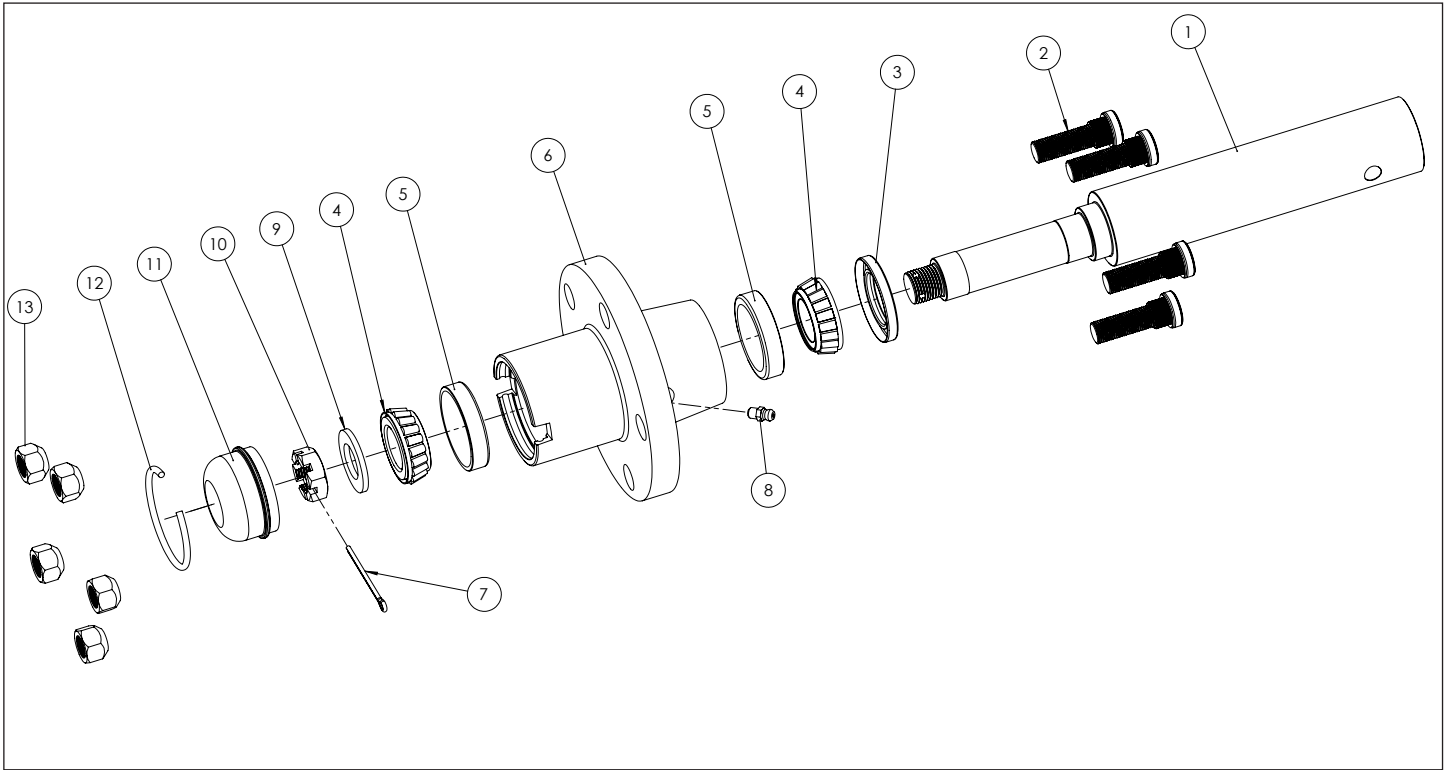
## 11.17 Hydraulics View



Item	Part Number	Description	Qty.
1	1014860	2x10 Hydraulic Cylinder	2
2	1014900	Main Hose, short	2
	1014910	Main Hose, long	
3	1015840	Male Pioneer End	2

Item	Part Number	Description	Qty.
4	1014980	4MJ-6MB90 Adapter	4
5	1014920	Lift Cylinder Hose	4
6	1013930	Rake Manifold Assembly, Section 11.14	1

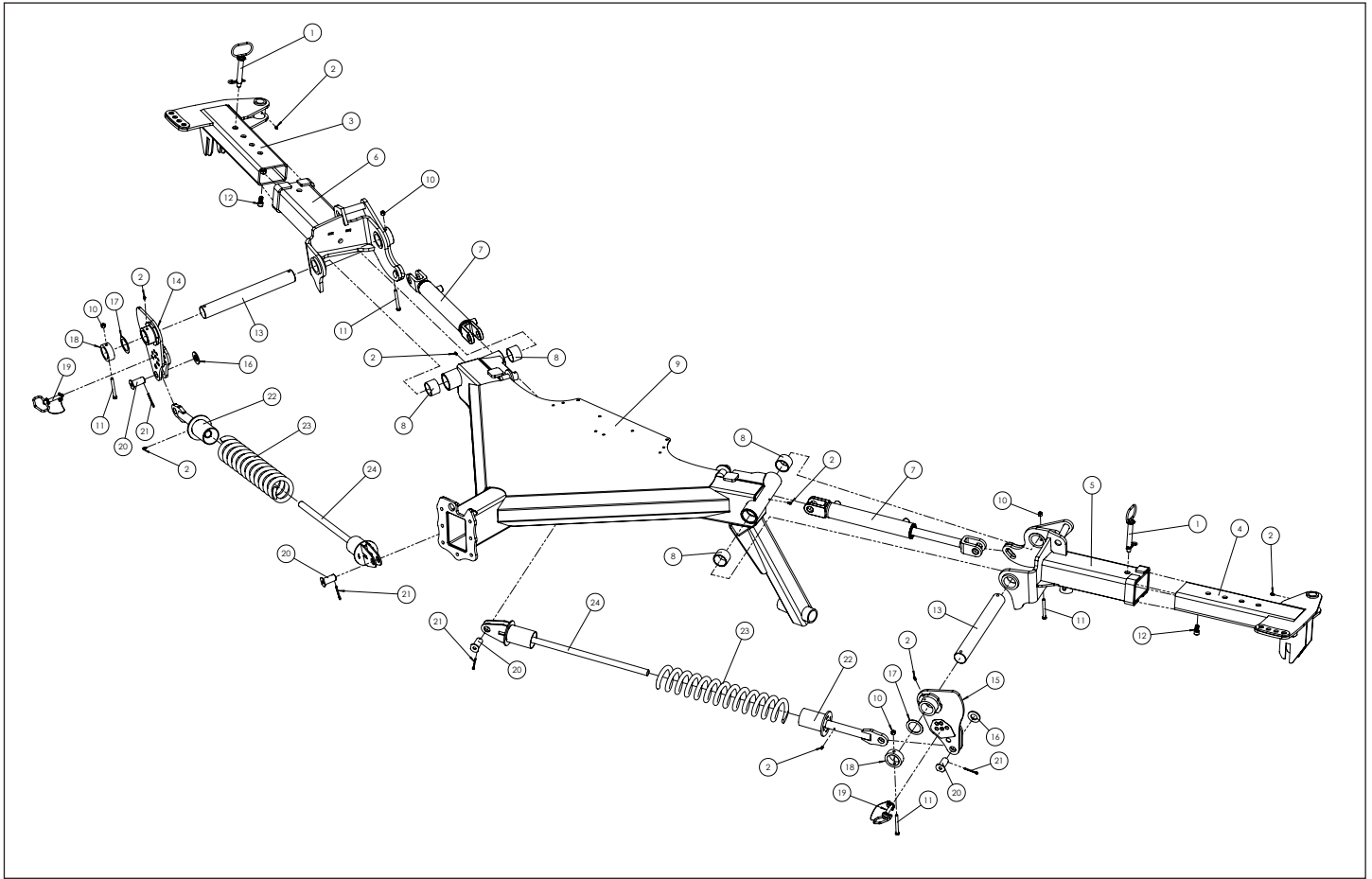
### 11.18 Hub Assembly 5 Bolt View



Item	Part Number	Description	Qty.
1	1006970	5 bolt Hub Spindle	1
2	1008290	5 bolt Hub Stud	5
3	1006990	5 bolt Hub Grease Seal	1
4	1006920	5 bolt Hub Bearing	2
5	1006930	5 bolt Hub Race	2
6	1007000	5 bolt Wheel Hub	1
7	1006960	5 bolt Hub Cotter Pin	1

Item	Part Number	Description	Qty.
8	1003730	Grease Zerk 1/4"	1
9	1006940	3/4" Washer Grade 8	1
10	1006950	3/4"-16 Castle Nut	1
11	1006980	5 bolt Hub Dust Cap	1
12	1008300	5 bolt Hub Snap Ring	1
13	1005160	5 bolt Hub Lug Nut	5

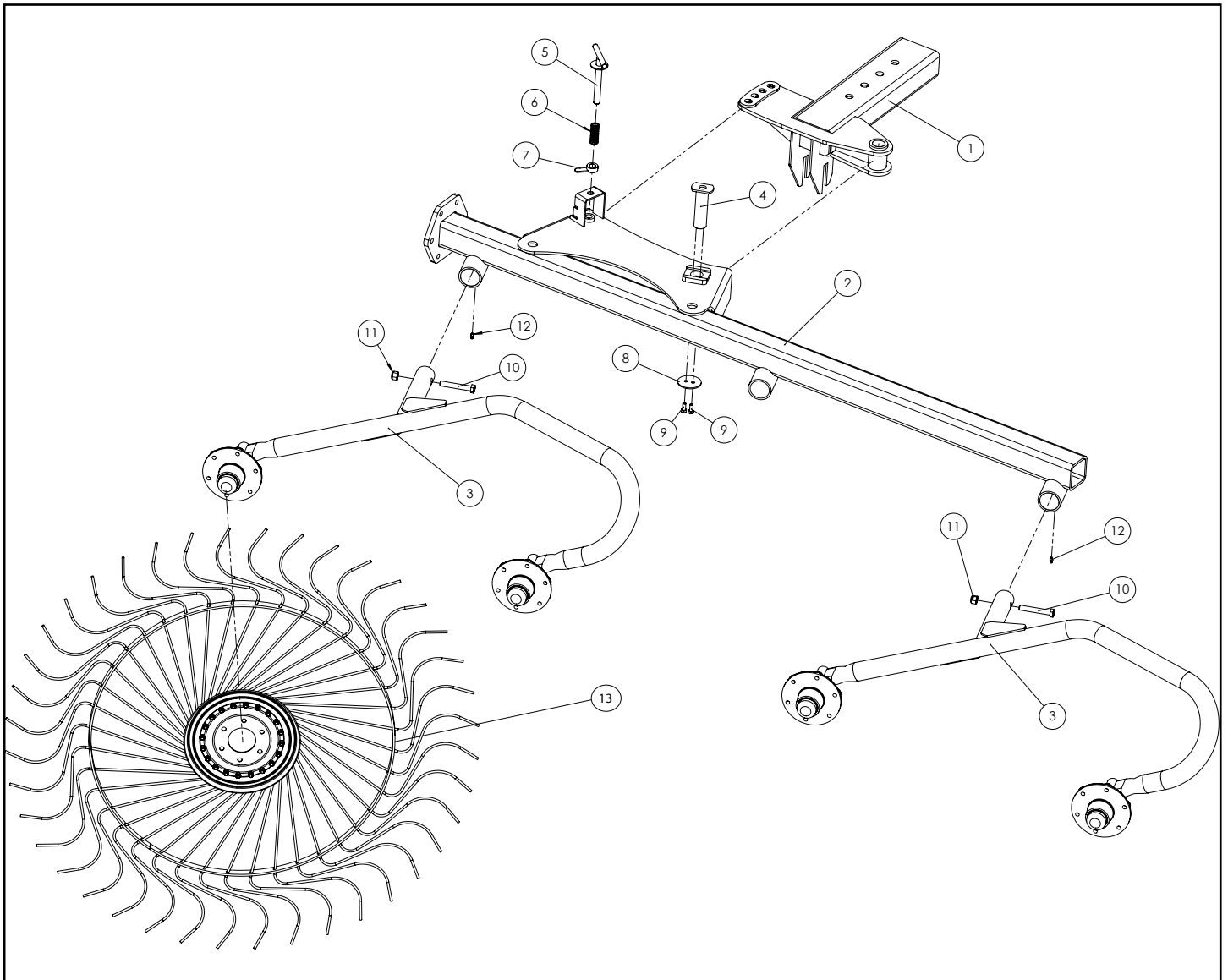
## 11.19 Lift Arm and Flotation View



Item	Part Number	Description	Qty.
1	1013760	Width Adjustment Pin	2
2	1003730	Self Tapping Grease Zerk, 1/4"	8
3	1013700	Lift Arm Insert Right	1
4	1013690	Lift Arm Insert Left	1
5	1013671	Lift Arm Base Left	1
6	1013681	Lift Arm Base Right	1
7	1014860	2x10 Hydraulic Cylinder	2
8	1014850	Bronze Bushing	4
9	1012971	Main Frame	1
10	1006090	3/8-16 Nylock Nut Grade 5	4
11	1016140	3/8-16 x 3.5 Hex Bolt Grade 5	4
12	1016150	1/2-13 x Socket Head Cap Screw Grade 5	2
13	1013240	Lift Arm Pivot Shaft, 2" Solid	2

Item	Part Number	Description	Qty.
14	1013221	Flotation Catch, Right	1
15	1013211	Flotation Catch, Left	1
16	1015920	1" SAE Washer Grade 5	4
17	1013800	2.75x2x0.060 Shim	2
18	1013850	Flotation Catch Sleeve	2
19	1014890	Flotation Catch Pin	2
20	1014600	Suspension Clevis Pin	4
21	1016180	Cotter Pin 0.188 x 1.75	4
22	1013200	Flotation Sleeve, WR8 and WR10	2
	1014660	Flotation Sleeve, WR12	2
23	1013180	Flotation Spring	2
24	1013190	Flotation Rod	2

## 11.20 Left Arm WR8 View

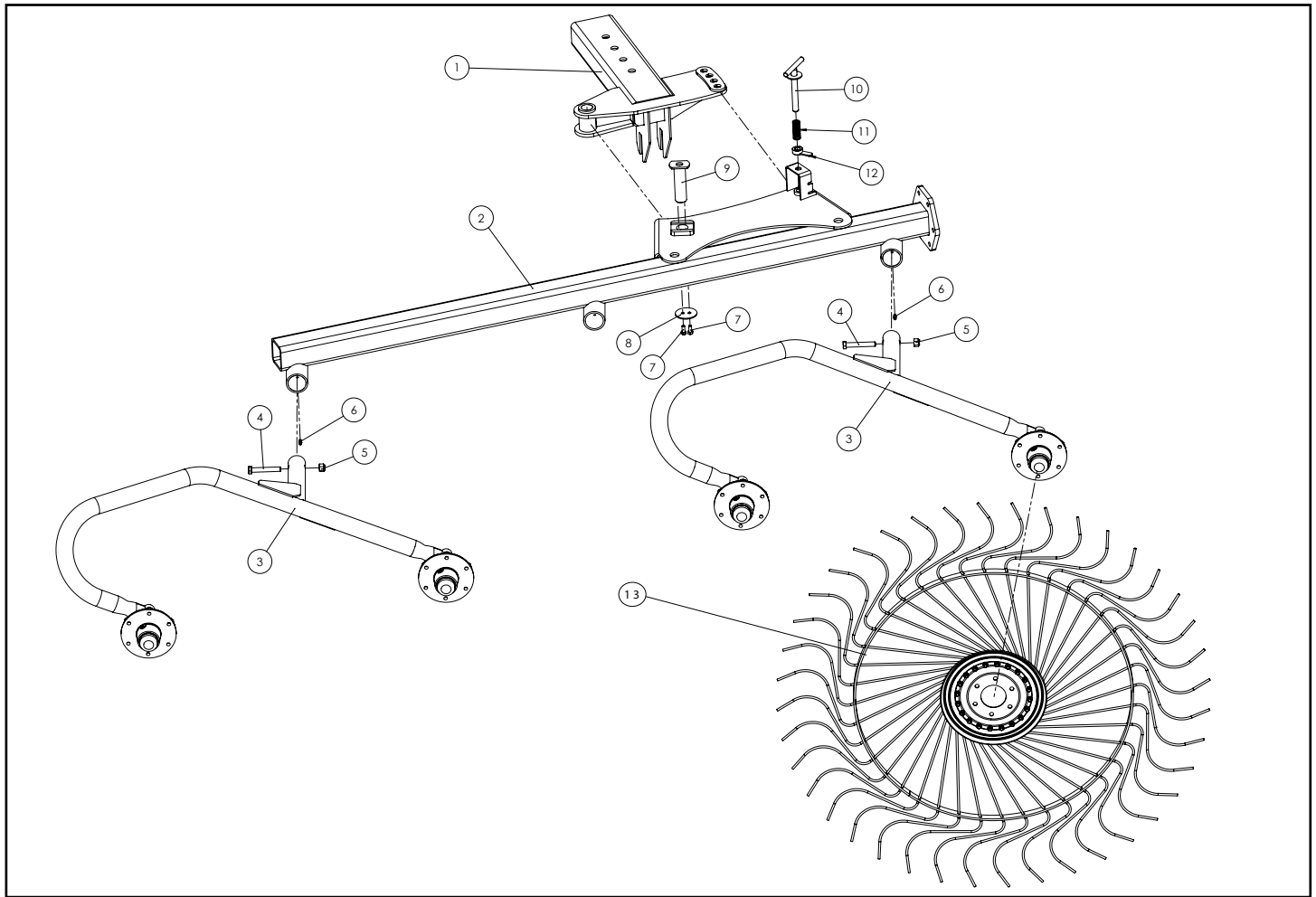


Item	Part Number	Description	Qty.
1	1013690	Lift Arm Insert Left	1
2	1013711	Rake Arm Left	1
3	1013050	Tandem Rake Tube, Left	2
4	1013750	Rake Arm Pivot Pin	1
5	1013820	Angle Lock Pin	1
6	1013810	Angle Lock Pin Spring	1
7	1013730	Angle Lock Depth Set	1

Item	Part Number	Description	Qty.
8	1013790	Pivot Pin Washer	1
9	1006280	5/16-18 x 0.75 Hex Bolt Grade 5	2
10	1016520	1/2-13 x 3.25 Hex Bolt Grade 5	2
11	1006110	1/2-13 Nylock Nut Grade 5	2
12	1003730	1/4" Self Tapping Grease Zerk	2
13	1012980	55 Inch Left Rake Wheel	4



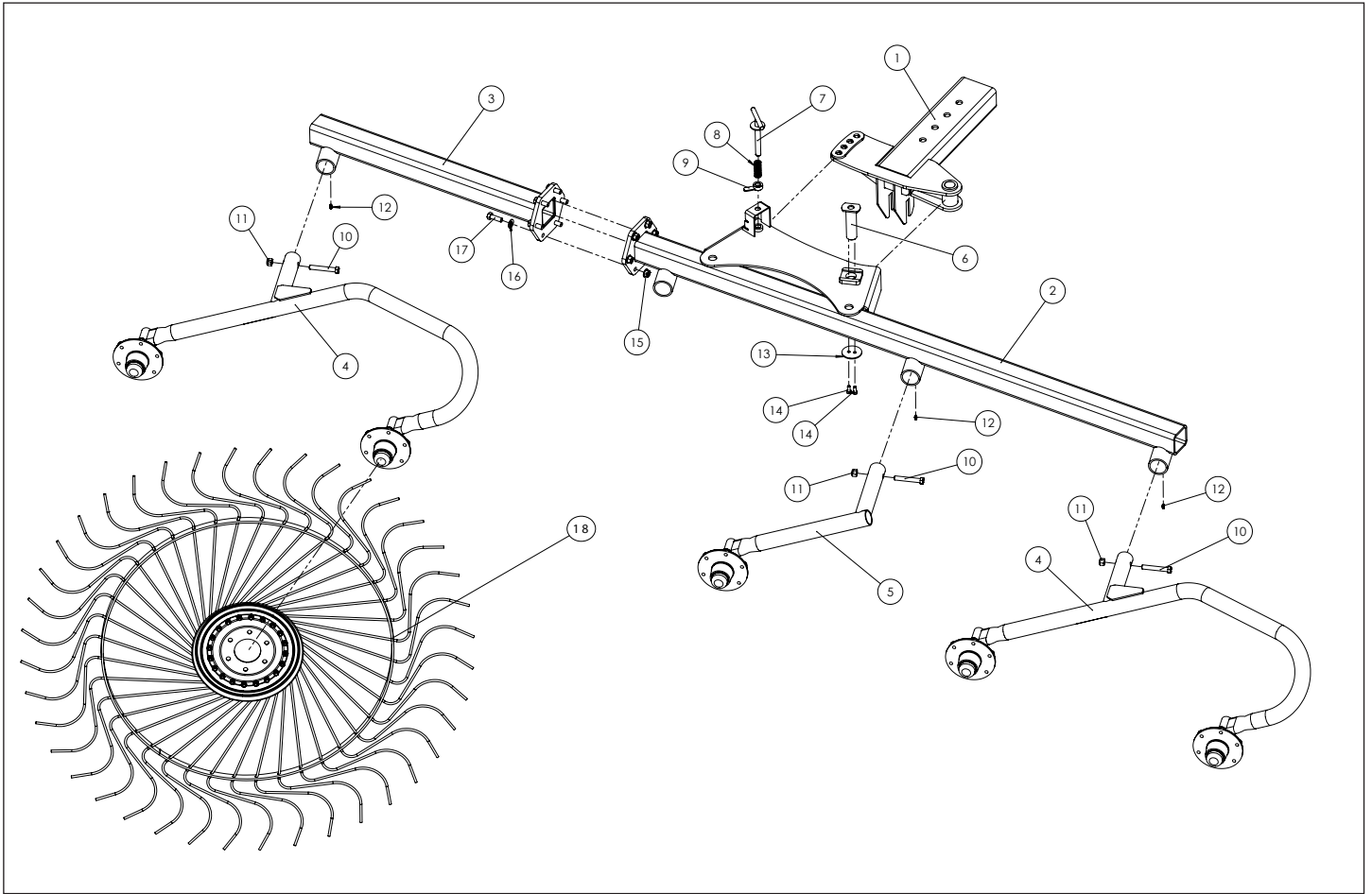
## 11.21 Right Arm WR8 View



Item	Part Number	Description	Qty.
1	1013700	Lift Arm Insert Right	1
2	1013721	Rake Arm Right	1
3	1013060	Tandem Rake Tube, Right	2
4	1016520	1/2-13 x 3.25 Hex Bolt Grade 5	2
5	1006110	1/2-13 Nylock Nut Grade 5	2
6	1003730	1/4" Self Tapping Grease Zerk	2
7	1006280	5/16-18 x 0.75 Hex Bolt Grade 5	2

Item	Part Number	Description	Qty.
8	1013790	Pivot Pin Washer	1
9	1013750	Rake Arm Pivot Pin	1
10	1013820	Angle Lock Pin	1
11	1013810	Angle Lock Pin Spring	1
12	1013730	Angle Lock Depth Set	1
13	1012990	55 Inch Right Rake Wheel	4

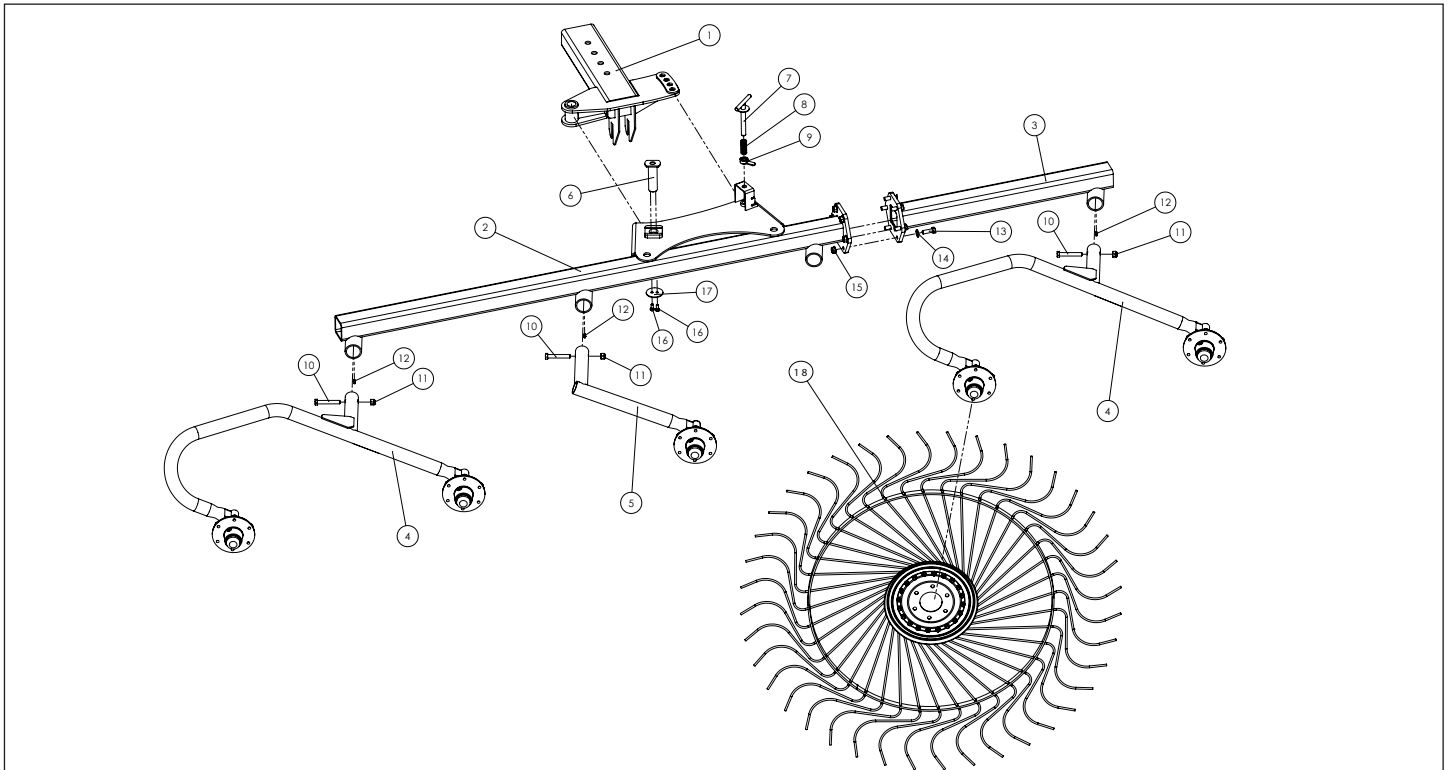
## 11.22 Left Arm WR10 View



Item	Part Number	Description	Qty.
1	1013690	Lift Arm Insert Left	1
2	1013711	Rake Arm Left	1
3	1013090	Rake Arm Extension,WR10,Left	1
4	1013050	Tandem Rake Tube, Left	2
5	1013070	Single Rake Tude, Left	1
6	1013750	Rake Arm Pivot Pin	1
7	1013820	Angle Lock Pin	1
8	1013810	Angle Lock Pin Spring	1
9	1013730	Angle Lock Depth Set	1
10	1016520	1/2-13 x 3.25 Hex Bolt Grade 5	3

Item	Part Number	Description	Qty.
11	1006110	1/2-13 Nylock Nut Grade 5	3
12	1003730	1/4" Self Tapping Grease Zerk	3
13	1013790	Pivot Pin Washer	1
14	1006280	5/16-18 x 0.75 Hex Bolt Grade 5	2
15	1006210	1/2-13 Serrated Flange Nut Grade 5	6
16	1006170	1/2 SAE Washer Grade 5	6
17	1006240	1/2-13 x 1.5 Hex Bolt Grade 5	6
18	1012980	55 Inch Left Rake Wheel	5

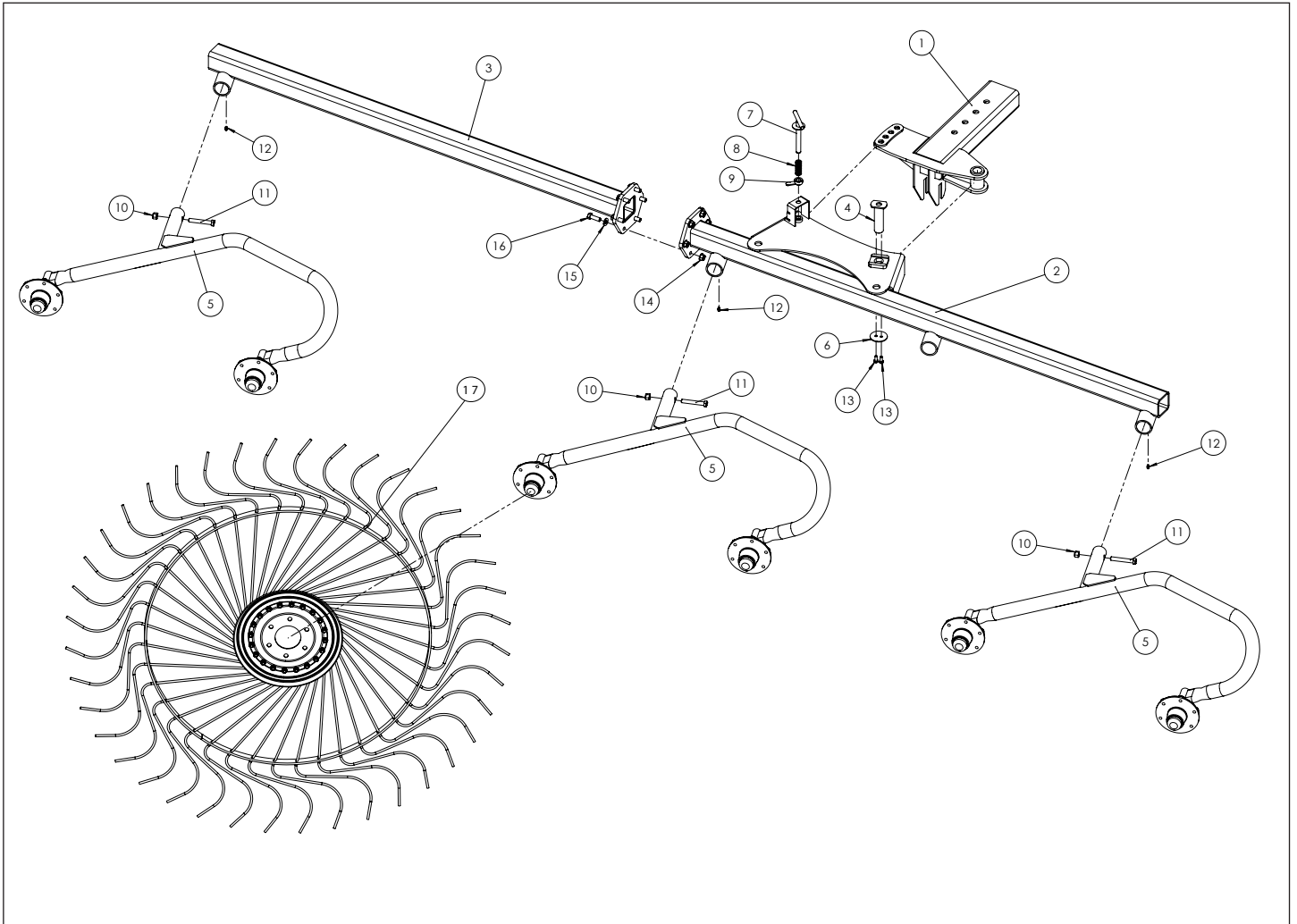
## 11.23 Right Arm WR10 View



Item	Part Number	Description	Qty.
1	1013700	Lift Arm Insert Right	1
2	1013721	Rake Arm Right	1
3	1013100	Rake Arm Extension, WR10, Right	1
4	1013060	Tandem Rake Tube, Right	2
5	1013080	Single Rake Tube, Right	1
6	1013750	Rake Arm Pivot Pin	1
7	1013820	Angle Lock Pin	1
8	1013810	Angle Lock Pin Spring	1
9	1013730	Angle Lock Depth Set	1
10	1016520	1/2-13 x 3.25 Hex Bolt Grade 5	3

Item	Part Number	Description	Qty.
11	1006110	1/2-13 Nylock Nut Grade 5	3
12	1003730	1/4" Self Tapping Grease Zerk	3
13	1006240	1/2-13 x 1.5 Hex Bolt Grade 5	6
14	1006170	1/2 SAE Washer Grade 5	6
15	1006210	1/2-13 Serrated Flange Nut Grade 5	6
16	1006280	5/16-18 x 0.75 Hex Bolt Grade 5	2
17	1013790	Pivot Pin Washer	1
18	1012990	55 Inch Right Rake Wheel	5

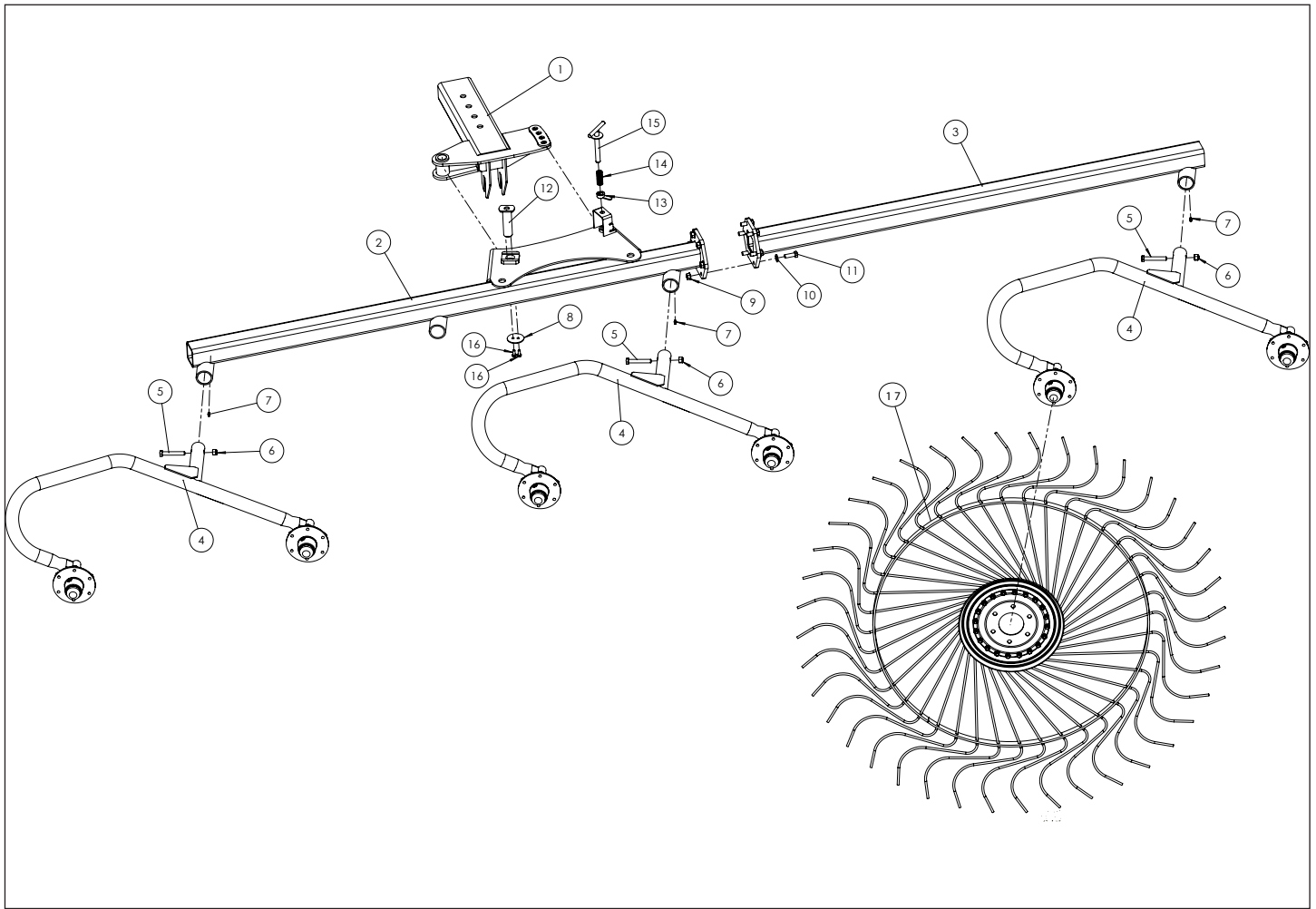
## 11.24 Left Arm WR12 View



Item	Part Number	Description	Qty.
1	1013690	Lift Arm Insert Left	1
2	1013711	Rake Arm Left	1
3	1013110	Rake Arm Extension, WR12, Left	1
4	1013750	Rake Arm Pivot Pin	1
5	1013050	Tandem Rake Tube, Left	3
6	1013790	Pivot Pin Washer	1
7	1013820	Angle Lock Pin	1
8	1013810	Angle Lock Pin Spring	1
9	1013730	Angle Lock Depth Set	1
10	1006110	1/2-13 Nylock Nut Grade 5	3

Item	Part Number	Description	Qty.
11	1016520	1/2-13 x 3.25 Hex Bolt Grade 5	3
12	1003730	1/4" Self Tapping Grease Zerk	3
13	1006280	5/16-18 x 0.75 Hex Bolt Grade 5	2
14	1006210	1/2-13 Serrated Flange Nut Grade 5	6
15	1006170	1/2 SAE Washer Grade 5	6
16	1006240	1/2-13 x 1.5 Hex Bolt Grade 5	6
17	1012980	55 Inch Left Rake Wheel	6

## 11.25 Right Arm WR12 View



Item	Part Number	Description	Qty.
1	1013700	Lift Arm Insert Right	1
2	1013721	Rake Arm Right	1
3	1013120	Rake Arm Extension, WR12, Right	1
4	1013060	Tandem Rake Tube, Right	3
5	1016520	1/2-13 x 3.25 Hex Bolt Grade 5	3
6	1006110	1/2-13 Nylock Nut Grade 5	3
7	1003730	1/4" Self Tapping Grease Zerk	3
8	1013790	Pivot Pin Washer	1
9	1006210	1/2-13 Serrated Flange Nut Grade 5	6
10	1006170	1/2 SAE Washer Grade 5	6
11	1006240	1/2-13 x 1.5 Hex Bolt Grade 5	6

Item	Part Number	Description	Qty.
12	1013750	Rake Arm Pivot Pin	1
13	1013730	Angle Lock Depth Set	1
14	1013810	Angle Lock Pin Spring	1
15	1013820	Angle Lock Pin	1
16	1006280	5/16-18 x 0.75 Hex Bolt Grade 5	2
17	1012990	55 Inch Right Rake Wheel	6







Norden Mfg LLC  
4210 Kinsman Rd NW  
North Bloomfield, OH 44450

**(877) 296-5851**  
[www.nordenmfg.com](http://www.nordenmfg.com)  
[support@nordenmfg.com](mailto:support@nordenmfg.com)