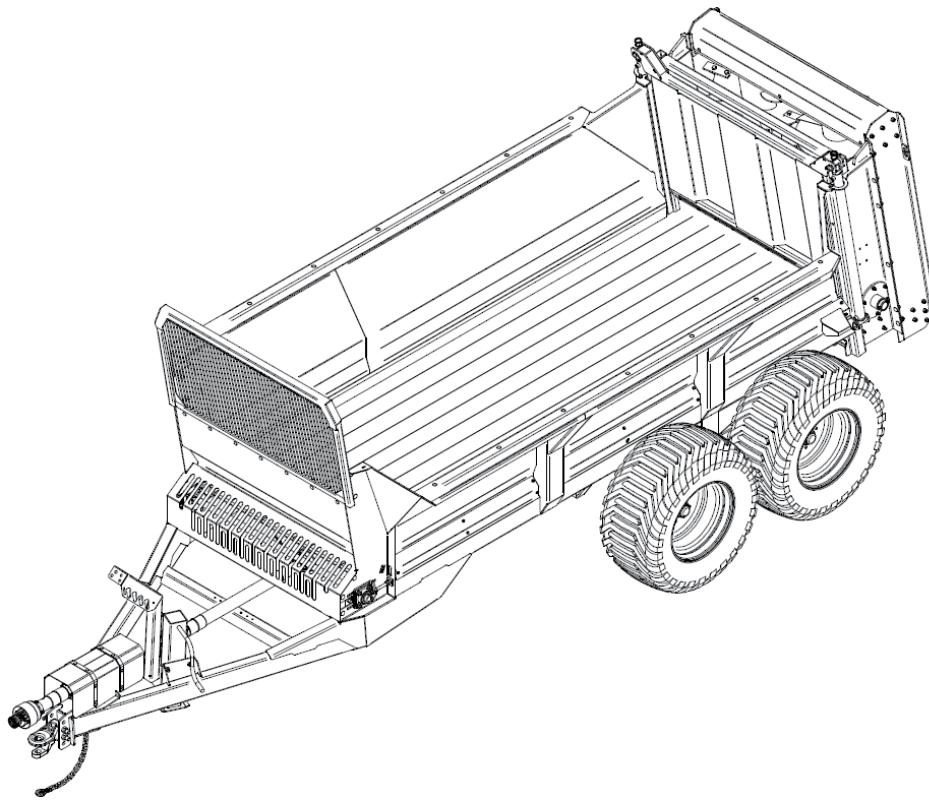


# **Tubeline Manure Spreader**

## **Nitro 525RS**



# Operator's Manual

Thank you for choosing the Tubeline 525RS Manure Spreader.  
Our hope is that it will give you many years of productive service.  
This machine is designed to spread various types of manure evenly over a wide area.

Please read and understand this manual and the machine before operation.

## Warranty and Limitation of Liability

All equipment is sold subject to mutual agreement that it is warranted by the company to be free from defects of materials and workmanship. But the company shall not be liable for special, indirect or consequential, damages of any kind under this contract or otherwise. The company's liability shall be limited exclusively to replacing or repairing without charge, at its factory or elsewhere, at its discretion. Any material, or workmanship defects which become apparent within one year from the date on which the equipment was purchased, and the company shall have no liability for damages of any kind. The buyer by the acceptance of the equipment will assume all liability for any damages, which may result from the use or misuse by his employees or others.

Warranty coverage is null and void unless Warranty  
Registration form has been completely filled in and is on file at  
Tubeline Manufacturing Ltd.

## Serial Number

The implement serial number is located on the front of the frame.  
This number helps us to track changes and improvements and must be mentioned  
when ordering parts or requesting service. For your convenience, a space has been  
provided inside the front cover of this manual to record the serial number,  
model number, purchase date, and dealer name.

Model # : \_\_\_\_\_

Serial # : \_\_\_\_\_

Date Purchased : \_\_\_\_\_

Dealer Name : \_\_\_\_\_

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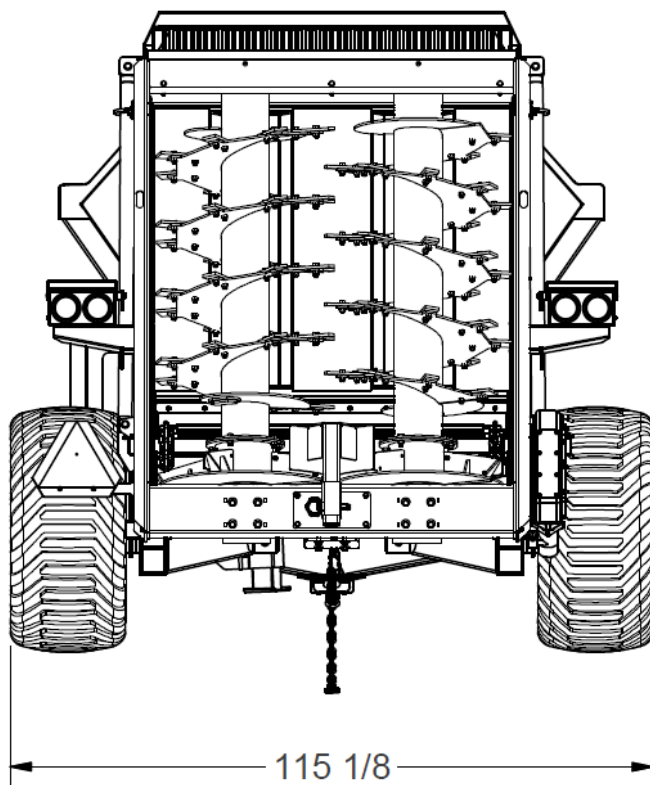
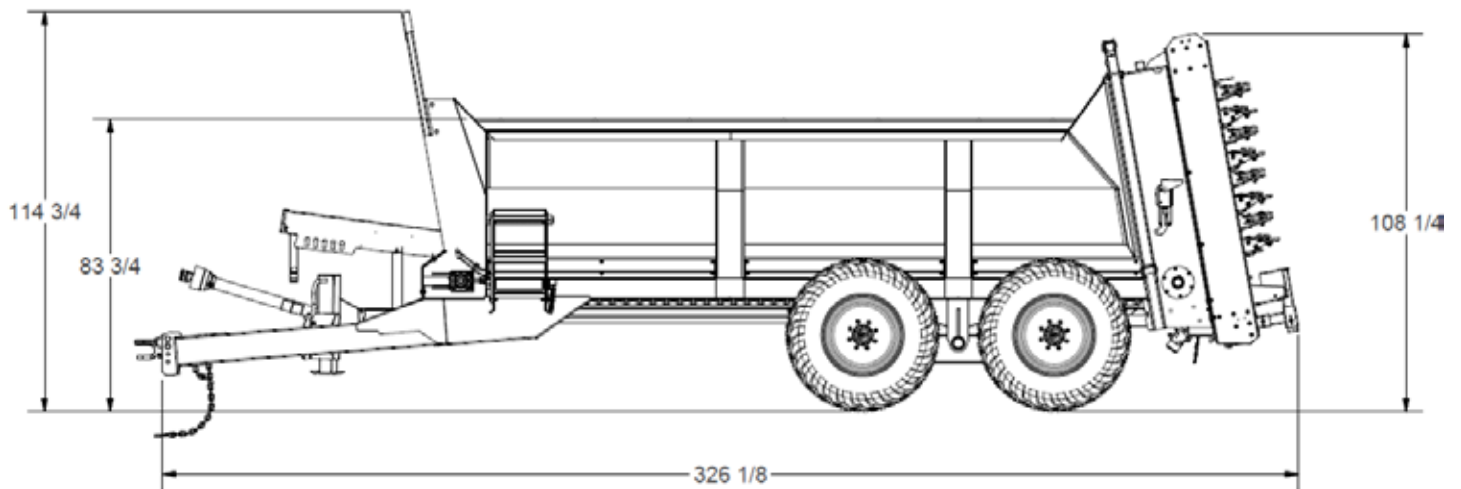
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## Specifications



<b>Nitro 525</b>	
Cu.ft. Struck	407'
Heaped Cu.ft	555'
Inside Width	62.5"
Inside Depth	45.5"
Inside Length	218"
Loading Height	80"
Overall Length	27.5'
Beater Diameter	34"
Beater Speed	420 RPM
Axle Type	Tandem
Hub Capacity	12,000 lbs
PTO Speed	1000 RPM

## Principals of Operation

The Nitro 525RS Manure Spreader is designed to be hitched behind a tractor. The Manure Spreader consists of a poly board floor trailer with an apron chain drag system, that pulls material to the rear of the trailer, through a set of vertical, spinning beaters and is then spread in an even pattern on the field. The rear beaters are connected to the tractor's PTO via gearboxes and PTO drivelines. The variable speed apron chain is operated from the tractor cab, and controls the speed of materials being fed through the beaters.

The apron chain and rear lift gate are operated using the tractor's hydraulic power outputs. The rear lift gate prevents material from jamming the beaters while loading, as well as preventing material from falling onto a roadway during transport.

We recommend that you carefully read this entire manual before operating the Manure Spreader. Please do not assume you know how to operate and maintain your machine before reading this manual carefully. Keep this manual available for reference.  
Call your authorized dealer if you need any assistance or more information.

*Intentionally Left Blank*

# Section 1 - Safety

**Take note!** This safety alert symbol is found throughout this manual to call your attention to instructions involving yourself and others working around the machine.

Failure to follow these instructions can result in injury or death!



This symbol means

**- Attention!  
Become Alert!  
Your Safety is involved!**

## **Safety Signal Words / Safety Messages**

**Caution:** Indicates a potentially hazardous situation that may result in injury.

**Warning:** Indicates a potentially hazardous situation that could result in serious injury or death.

**Danger:** Indicates a hazardous situation that needs to be avoided. It is you the operator that needs to be aware of these dangers.

If you have any questions not answered in this manual, please contact your dealer or Tubeline Manufacturing Ltd.

You can also check for a newer manual version at [www.tubeline.ca/support](http://www.tubeline.ca/support)

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## **Safety Guidelines**

Safety of the operator is one of our main concerns, however we do hear of some accidents that could have been avoided if some precautions had been taken. To avoid personal injury study the following precautions and insist those working with you or for you, follow them.

In most cases the pictures will have the shielding in place, in some they may be removed, only to show a view behind the shield. Keep all the shields, safety doors in place. If they become faulty and fail to work replace them. They are for your safety, do not operate the equipment with them removed.

Replace any decals that may be missing or that are not readable. Location of the decals is indicated in this manual.

Do not operate this machine while under the influence of drugs or alcohol.

Review the safety instructions with all users annually.

This equipment should not be operated by children, or with those unfamiliar with the operation of the machine. Do not allow persons to operate this machine until they have read this manual and/or were instructed by a qualified person.

Do not paint over, remove or deface any safety signs or warning decals on your equipment. Observe all safety signs and practice the instructions on them.

## **Lighting & Marking**

This machine is equipped with lights and reflectors as required by the most stringent government and ASAE specifications. They should work with the tractor 7-pin connector.

## A Word To The Operator

It is **YOUR** responsibility to read and understand the safety section in this book before operating the Nitro Manure Spreader. You must ensure that you and anyone else who is going to use, maintain or work around the Nitro Manure Spreader be familiar with the use, maintenance procedures and related safety information contained in this manual. Remember that **YOU** are the key to safety. Good safety practices not only protect you, but also the people around you. Most accidents can be prevented. Do not risk injury or death by ignoring good safety practices.

1. Study the features in this book and make them a working part of your safety program. Keep in mind that this safety section is written only for the Nitro Manure Spreader.

2. Nitro Manure Spreader owners must give operating instructions to operators or employees before allowing them to operate the machine, and at least annually thereafter per OSHA (Occupational Safety and Health Administration) regulation 1928.57

3. The most important safety device on this equipment is a **SAFE** operator. It is the operator's responsibility to read and understand **ALL** Safety and Operating instructions in the manual and to follow these.

4. A person who has not read and understood all directive and safety instructions is not qualified to use the Nitro Manure Spreader. An untrained operator exposes himself and bystanders to possible serious injury or death.

5. Practice all other usual and customary safe working precautions and above all ;

### REMEMBER !

**SAFETY IS YOUR RESPONSIBILITY. YOU CAN PREVENT SERIOUS INJURY OR DEATH.**

6. This safety section is intended to point out some of the basic safety situations that can be encountered during the normal operation and maintenance of the Nitro Manure Spreader, and to suggest possible ways of dealing with these situations. This section is **NOT** a replacement for

other safety practices featured in other sections of this book.

## General Safety

1. Read and understand the Operator's Manual and all safety signs before operating, maintaining, adjusting or cleaning the Nitro Manure Spreader.

2. All equipment has a limit. Make sure you understand the speed, brakes (additional option), stability and load characteristics of the Nitro Manure Spreader and your tractor before you start.

3. Make sure the tractor is in proper operating condition as stated in the tractor Operator's Manual. The tractor must have enough weight and braking capacity, especially when operating on uneven terrain.

### WARNING !

Only use a tractor with a ROPS cab and seat belt.

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

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

6. **NEVER** allow riders. Keep others away from your work area.

7. Wear appropriate protective gear. This list includes but is not limited to:

- Protective shoes with slip-resistant soles
- Protective glasses
- Hearing protection
- Respirator or filter mask

8. Install and secure all guards before starting.

9. Turn machine off, stop and disable engine, remove ignition key and place in your pocket and wait for all moving parts to stop before servicing, adjusting, repairing, or unplugging.

10. Clear area of people, especially small children, before using the unit.

11. Review safety related items annually with all personnel who will operate or maintain the Nitro Manure Spreader.

12. Where possible avoid operating the Nitro Manure Spreader near roads, ditches, embankments or holes. Reduce speed when operating on rough, slippery, or muddy surfaces and when turning or crossing slopes, Stay off slopes too steep for proper operation.

13. Beware of the machine size and have enough space to allow for operation. Never operate the Nitro Manure Spreader at high speeds in crowded places.

14. Do NOT use attachments unless the attachments are approved optional equipment.

15. Securely fasten your seat belt before operating the machine. Always remain seated when operating the machine.

### **Equipment Safety Guidelines**

1. Safety of the operator and bystanders is one of the main concerns in designing and developing equipment. However, every year many accidents occur which could have been avoided by a few seconds of thought and a more careful approach to handling equipment. You, the operator, can avoid many accidents by observing the following precautions in this section. To avoid personal injury or death, study the following precautions and insist those working with you, or for you, follow them.

2. In order to provide a better view, certain photographs or illustrations in this manual may show an assembly with a safety shield removed. However, equipment should never be used in this condition. Keep all shields in place. If shield removal becomes necessary for repairs, replace the shield prior to use.

3. Replace any safety sign or instruction sign that is not readable or missing. Location of such safety signs are indicated in this manual.

4. Never use alcoholic beverages or drugs which can hinder alertness or coordination while using this equipment. Consult your doctor about using this machine while taking prescription medications.

5. Under no circumstances should young children be allowed to work on this equipment. Do not allow persons to use or assemble this unit until they have read this manual and have developed a thorough understanding of the safety precautions and of how the machine works. Review the safety instructions with all users annually.

6. This equipment is dangerous to children and persons unfamiliar with its operation. The operator should be a responsible, properly trained and physically able person, familiar with machinery and trained in this equipment's operations. If an elderly person is assisting with work, their physical limitations need to be recognized and accommodated.

7. Never exceed the limits of a piece of machinery. If its ability to do a job, or to do it safely, is in question - **DON'T TRY IT.**

8. In addition to the design and configuration of this implement, hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel involved in the operation, transportation, maintenance, and storage of the machine.

**THINK SAFETY! WORK SAFELY!**

## Safety Training

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

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

3. It has been said, "The best safety feature is an informed, careful operator." We ask that you to be that kind of operator. It is the operator's responsibility to read and understand ALL safety instructions in the manual and follow them. Accidents can be avoided.

4. Working with unfamiliar equipment can lead to careless injuries. Read this manual before assembly or use, to acquaint yourself with the machine. If this machine is used by any person other than yourself, or is loaned or rented, it is the machine owner's responsibility to make certain that the operator, prior to using:

- Reads & understands the operator's manual.
- Is instructed in safe and proper use.

5. Know your controls and how to stop the engine and machine quickly in an emergency.

6. Train all new personnel and review instructions frequently with existing workers. Be certain only a properly trained and physically able person will use the machinery. A person who has not read and understood all the safety instructions is not qualified to use the machine. An untrained operator exposes himself and bystanders to possible serious injury or death. If the elderly are assisting with the work, their physical limitations need to be recognized and accommodated.



**THINK SAFETY! WORK SAFELY!**

## Safety Signs

1. Keep safety signs clean and legible at all times.
2. Replace safety signs that are missing or have become illegible.
3. Replaced parts that displayed a safety sign should also display the current sign.
4. Safety signs displayed in Safety Sign Locations each have a significant purpose and need to be cleaned or replaced when necessary.
5. Safety signs are available from your authorized distributor or dealer parts department or from the manufacturer.

## How to Install Safety Signs

1. Be sure that the installation area is clean and dry.
2. Be sure the temperature is above 10C (50F).
3. Determine the exact position of the new safety sign before removing the paper backing.
4. Align the sign over the specific area, carefully press the sign on, slowly peeling away the backing paper while smoothing the sign in place.
5. Small air pockets can be pierced with a pin and smoothed out using a piece of sign backing paper.

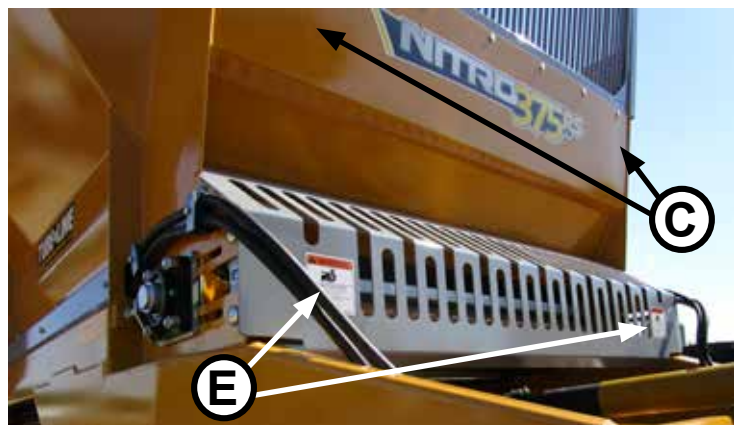
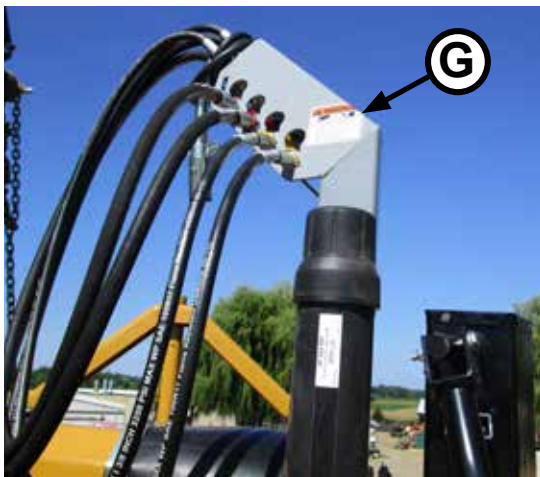
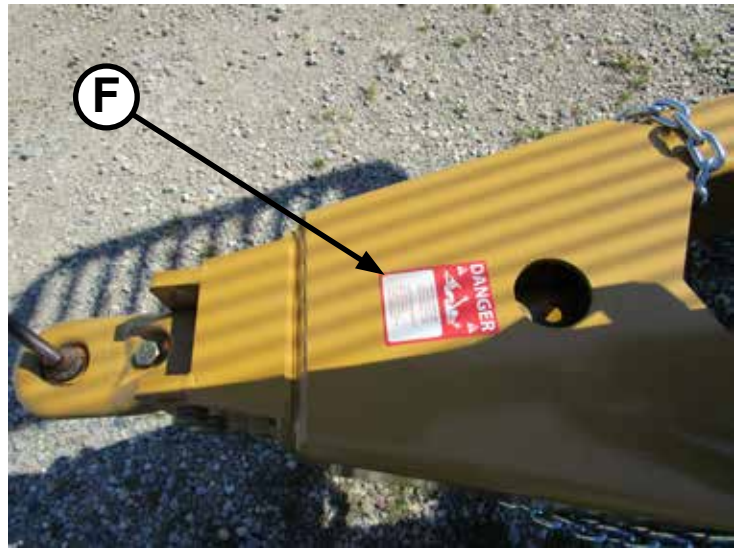
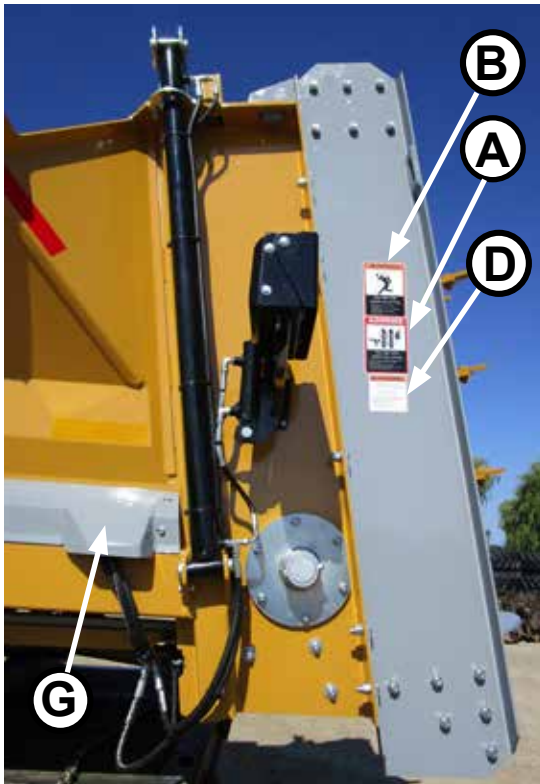
## Safety Sign Locations

The types of safety signs and locations on the equipment are shown in the illustrations that follow. Good safety requires that you familiarize yourself with the various safety signs, the types of warning, and the area, or proper function related to that area, that requires your safety awareness.

*Examples only - Actual decals may differ in text and graphic representation.*

### REMEMBER

If safety signs have been damaged, removed, become illegible or parts replaced without safety signs, new safety signs must be applied. New safety signs are available from your authorized dealer.



## Safety Decals

Item - A

Part # : DE39395



Item - B

Part # : DE39396



Item - C

Part # : DECANADA





## Safety Decals

Item - D

Part # : DE23845



Item - E

Part # : DE23836



Item - F

Part # : DE39397



Item - G

Part # : DE23838



## Section 2 - Operation

### Preparation Safety

1. Never use the Nitro Manure Spreader until you have read and completely understand this manual and each of the safety messages found on the safety signs on the Nitro Manure Spreader.
2. Personal protection equipment including safety glasses, safety shoes and gloves are recommended during assembly, installation, operation, adjustment, maintaining, repairing, removal, cleaning or moving the unit. Do not allow long hair, loose fitting clothing or jewelry to be around equipment.
3. Clear working area of obstacles that might be hooked or snagged, causing injury or damage.
4. Use only in daylight or good artificial light.
5. Be sure machine is properly maintained, adjusted and in good operating condition.
6. Ensure that all safety shielding and safety signs are properly installed and in good condition.
7. Never ride anywhere on the Nitro Manure Spreader while setting up, operating or troubleshooting problems.
8. The upright beaters on the Nitro can maim or kill. Always check for bystanders before engaging the PTO.

**THINK SAFETY! WORK SAFELY!**

### Hydraulic Requirements

The Nitro Manure Spreader requires 16 GPM hydraulic flow for optimal performance.

### PTO / Horsepower Requirements

The Nitro 525 Manure Spreader requires a minimum of 125 horsepower.

### Hook-up / Unhooking

The Nitro Manure Spreader should always be parked on a level, dry area that is free of debris and foreign objects. Follow this procedure when attaching:

1. Clear the area of bystanders and remove foreign objects from the machine and working area.
  2. Make sure there is enough room to back the tractor up to the hitch pole.
  3. Start the tractor and slowly back it up to the hitch point.
  4. Stop the tractor engine, place all controls in neutral, set park brake and remove ignition key before dismounting.
  5. Use the hitch pole jack to raise or lower the pole to align with the drawbar.
  6. Install a drawbar pin with provisions for a mechanical retainer. Install the retainer.
  7. Install a safety chain between the tractor drawbar and the hitch pin.
  8. Connect PTO driveline to tractor.
  9. Connect the hydraulics. To connect, proceed as follows:
    - Use a clean cloth or paper towel to clean the couplers on the ends of the hoses. Also clean the area around the couplers on the tractor.
    - Remove the plastic plugs from the couplers and insert the male ends.
- NOTE: If the direction of motion is wrong, reverse the couplers.*
10. Raise the hitch jack.



11. When unhooking from the tractor, reverse the above procedure. *NOTE: Occasionally air may become trapped in the hydraulic circuit, making it necessary to “bleed” the circuit.*

To perform this operation cycle the hydraulic several times or especially on older tractors, temporarily loosen an easily accessible hose fitting enough to allow any trapped air to escape while cycling the hydraulics. Retighten fitting.

## Tractor Preparation

Follow this procedure when selecting and preparing a tractor for use with the machine:

1. Use only a tractor of sufficient power and weight to adequately handle the machine. It is recommended that the tractor have at least 125 PTO horsepower for normal operating conditions. (See PTO / Horsepower Requirements on [page 2-1.](#))
2. It is recommended to pin the drawbar in its centre draft position.
3. Use only a drawbar pin with provisions for a mechanical retainer. Always install the retainer.
4. Always attach a safety chain between the tractor and the machine to prevent unexpected separation.

## Spreader Preparation

Your new Nitro spreader has a brief breaking-in period that you should follow for optimal operation, and for maximum lifetime of your product. When using the machine for the first time, it is extremely important to follow all of the procedures especially those listed in the “Before using” section to avoid damage:

### Before Using

1. Read the Nitro Operator’s Manual. Do not operate the spreader until the safety precautions in this manual and the decals on the spreader have been read and understood by the operator.

2. Check for proper assembly and tighten all bolts. All bolts were checked at the factory when assembled but may need to be re-torqued as vibrations in shipment may loosen them slightly.

3. Complete all steps in “Tractor Preparation & Spreader Preparation” sections.

4. Lubricate the machine. Refer to the Service section of this manual. Proper maintenance and lubrication is the user’s responsibility and must begin before the first use.

5. Operate the machine slowly for a period of time to run the chains in and confirm that all parts work freely.

### After operating for 2 hours:

1. Check wheel bolts torque.
2. Check all shields and guards. Tighten as required.
3. Visually inspect all hydraulic hoses and couplers. See “Hydraulic Safety” in the Service & Maintenance section of this manual.
4. Check chain tightness. See “Adjust Chain Tension” in the Maintenance & Safety section of this manual, [page 4-2.](#)

### After operating for 10 hours:

1. Repeat the 2 hour service list.

## Operation Safety

1. Please remember it is important that you read and heed the safety signs on the Nitro Manure Spreader. Clean or replace all safety signs if they cannot be clearly read and understood. They are there for your safety, as well as the safety of others. The safe use of this machine is strictly up to YOU, the operator.
2. All things with moving parts are potentially hazardous. There is no substitute for a cautious, safe-minded operator who recognizes potential hazards and follows reasonable safety practices. The manufacturer has designed the Nitro Manure Spreader to be used with all its safety equipment properly attached, to minimize the chance of accidents. Study this manual to make sure you have all safety equipment attached.
3. Close and secure all guards, deflectors and shields before starting and operating.
4. Read and understand the Owner and Operator's Manual before starting. Review safety instructions annually.
5. Personal protection equipment including safety glasses, safety shoes and gloves are recommended during operation, adjustment, maintaining or repairing. Do not allow long hair, loose-fitting clothing, or jewelry to be around moving parts.
6. Never place any part of your body where it could be in danger if movement should occur during assembly, installation, operation, maintenance, repairing, unplugging or moving.
7. Turn tractor off, remove ignition key and place in your pocket, and wait for moving parts to stop before servicing, adjusting, repairing or unplugging.
8. Never use alcohol or drugs which can hinder alertness or coordination while operating this equipment. Consult your doctor about operating this machine while taking prescription medications.

9. Do not allow riders on the Nitro Manure Spreader at any time. There is no safe place for any riders even for troubleshooting issues.
10. Never allow children or unauthorized people to operate or be around the Nitro Manure Spreader.
11. Keep the working area clear of people and other machines to prevent accidents.
12. Do not exceed a safe travelling speed when transporting.
13. Always use extra caution when turning around corners or in tight areas.



14. The upright beaters on the Nitro can maim or kill. Always check for bystanders before engaging the PTO.

## Pre-operation Checklist

It is important for both personal safety and maintaining the good mechanical condition of the machine that this pre-operational checklist be followed. Before operating the machine and each time thereafter, the following areas should be checked off:

1. Lubricate the machine completely. Refer to "Service" in the Service & Maintenance section of this manual.
2. Use only a tractor of adequate power (see PTO / Horsepower Requirements on pg. 3-1) and weight to handle the spreader.
3. Ensure that the machine is properly attached to the tractor using a drawbar pin with provisions for a mechanical retainer. Make sure that a retainer is installed.
4. Ensure that the safety chain on the hitch is installed.
5. Check tires and ensure that they are inflated to the pressure specified for the spreader's tires.

6. Check oil level in the tractor hydraulic reservoir. Top up as required.

**WARNING :** Use extreme care when working around a high pressure hydraulic system. Make sure all connections are tight and all components are in good repair. Wear hand and eye protection then searching for suspected leaks.

7. Inspect all hydraulic lines, hoses, fittings and couplers for tightness. Tighten if there are leaks. Use a clean cloth to wipe any accumulated dirt from the couplers before connecting to the tractor's hydraulic system.

See "[Hydraulic Safety](#)" in the Troubleshooting / Maintenance section of this manual.

8. Inspect all moving and rotating parts. Remove any debris that has become entangled in the rear beaters or the PTO drive line.

9. Make sure that all guards and shields are installed and secured in position.

10. Check the oil level in the gearboxes. Top up as required.

11. Ensure that the PTO driveline is securely attached on both ends and can telescope easily. Check that the PTO driveline shield rotates freely.

## Loading



**IMPORTANT :** When parking the spreader for loading, put the tractor in PARK or NEUTRAL and apply the parking brake.

1. Fully Close Rear Hydraulic Gate

2. Load the Spreader

The manure consistency will determine how full your spreader can be loaded. Solid manure can usually be loaded level to slightly heaped. Wet materials are heavier and may limit loading.

*NOTES: It is unlawful to allow any manure spillage to occur on public roadways. Do not heap load such that manure is allowed to fall off spreader during transporting on roadways. Always check the apron chain and slats to make sure they are not frozen to the bottom of the bed. Operating the spreader when the slats or chain are frozen to the bed may cause damage. Also make sure there are no lumps of manure frozen to the floor.*

It is recommended to make sure the apron chain is operating properly before loading the spreader.

## Unloading

1. Engage the Rear Beaters.

2. Fully Open Rear Gate

Fully extend the cylinders so the gate is fully open all the way to the top.

**NOTE :** Before starting the apron chain, the operator should get the beaters up to speed and open the rear gate to desired height.

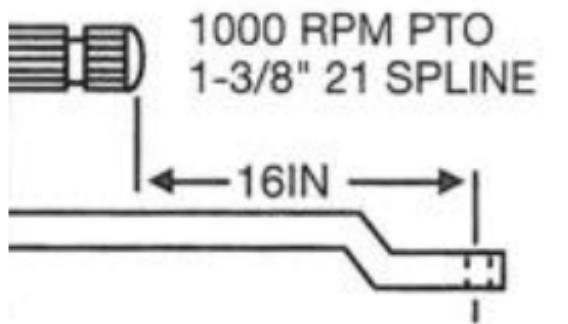
Turn on the tractor hydraulics used to start the apron chain. The hydraulics adjust the speed at which material is being pulled towards the rear beaters. The slower the speed - the finer the spread as the rear beaters have more time to "process" the material.

See *Optional Flow Control* [pages \(6-10 to 6-14\)](#), if applicable to your Nitro Manure Spreader.

## Section 3 - Transportation / Storage

### Transport Safety

1. Comply with state and local laws governing safety and transporting of machinery on public roads.
2. Do not exceed a safe travel speed. Slow down on rough terrain and while cornering.
3. Never allow riders on the machine.
4. Keep tractor drawbar and Nitro hitch parallel. An uneven PTO may shear off a spline shaft. Below diagram shows standard tractor dimensions matching the front PTO on the Nitro spreaders.



### Storage Safety

1. Store the Nitro Manure Spreader in an area away from human activity.
2. Do not allow children to play on or around the Nitro Manure Spreader.
3. Store the Nitro Manure Spreader in a dry, level area.

### Maintenance Safety

1. Good maintenance is your responsibility. Poor maintenance is an invitation for trouble.
2. Follow good shop practices.
  - Keep service area clean and dry
  - Be sure electrical outlets and tools are properly grounded
  - Use adequate light for the job at hand
3. Never attempt to service hydraulic applications while pressurized or with engine running.
4. Never work under equipment unless it is blocked securely.
5. Always use personal protection devices such as hand, eye and hearing protectors, when performing any service or maintenance work.
6. Where replacement parts are necessary for periodic maintenance and servicing, genuine factory replacement parts must be used to restore your equipment to original specifications. The manufacturer will not be responsible for injuries or damages caused by the use of unapproved parts and/or accessories.
7. A fire extinguisher and first aid kit should be kept readily accessible while performing maintenance on this equipment.
8. Periodically tighten all bolts, nuts, and screws and check that all electrical connections are properly secured to ensure unit is in a safe condition.
9. When completing maintenance or service function, make sure all safety shields and devices are installed before placing unit in service.

## Travel Speed

A suggested starting speed is between 4-5 mph. This can be adjusted to operator preference.



**WARNING:** Normally, the load itself blocks manure and loose materials from being thrown towards the front. As the load/pile gets reduced, the rotation of the rear beaters can throw some material forward, therefore it is strongly recommended to lower the rear gate about 1/3 of the way down to prevent debris from being projected towards the front.

## Unplugging

The following is a recommended procedure that may help if the manure spreader becomes plugged or the PTO disengages:

1. Disengage the hydraulics that run the apron chain.
2. Reverse the apron chain by flipping your tractor hydraulic lever.
3. Engage the hydraulics to reverse the apron chain in order to back material away from beaters. Stop apron chain after material is backed away from beaters or if pile doesn't move.
4. Engage the beaters. Bring beaters back up to regular speed.
5. Follow the instructions in the **Unloading** section (pg. 2-4) to start the apron chain in the standard operation direction.

If this above procedure does not solve the situation, closer inspection and possible manual unplugging may be required. Make sure to stop tractor and wait for all moving parts to stop before servicing or unplugging:



**WARNING:** Stop tractor engine, place all controls in neutral, set park brake, remove ignition key and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.

## Storage and Cleaning

Disconnect PTO drive shaft and hydraulic hoses before cleaning, adjusting, lubricating, or servicing this machine.

1. The spreader must be thoroughly cleaned for extended storage. Manure is acidic and will damage paint and cause rusting of metal components.

2. Allow the spreader to completely unload.

3. To clean the spreader, raise the rear gate.



**Warning:** Turn off all power during cleaning and inspection. Do not use power to move any components or to discharge material while cleaning or inspecting.

4. Hose off manure from the outside and inside of the spreader. Completely clean manure from moving mechanisms such as the beaters and rear gate. Remove accumulation in confined areas or pockets that trap manure.

5. Avoid directing high pressure spray directly on bearings, seals and flow control valve.

6. Keep high pressure spray moving on painted surfaces. Sustained spray on cracks or scratches in paint can result in paint peeling.

7. Allow machine to dry.

8. Lower rear gate completely down before storing spreader.

9. Inspect the spreader for loose connections, damaged hydraulic hoses or connections and for other damaged components. Repair if necessary so the spreader is ready for future operation. See Hydraulic Safety on [page 4-1](#).

## Section 4 - Troubleshooting / Maintenance

### Tire Safety

1. Failure to follow proper mounting procedures when mounting a tire on a wheel or rim can produce an explosion which may result in serious injury or death.
2. Do not attempt to mount a tire unless you have the proper equipment and experience to do the job.
3. Have a qualified tire dealer or repair service perform required tire maintenance.
4. When replacing worn tires, make sure they meet the original tire specifications.



### Hydraulic Safety

1. Make sure that all components in the hydraulic system are kept in good condition and are clean.
2. Before applying pressure to the system, make sure that all components are tight, and that lines, hoses and couplings are not damaged.
3. Do not attempt any makeshift repairs to the hydraulic lines, fittings, or hoses by using tapes, clamps or cements. The hydraulic system operates under extremely high pressure. Such repairs will fail suddenly and create a hazardous and unsafe condition.
4. Wear proper hand and eye protection when searching for a high pressure hydraulic leak. Use a piece of wood or cardboard as a backstop instead of hands to isolate and identify a leak.
5. If injured by a concentrated high pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or toxic reaction can develop from hydraulic fluid piercing the skin surface.
6. Relieve pressure on the hydraulic system before maintaining or working on the system.



## Fluids & Lubricants

1. Grease: Use an SAE multi-purpose grease with extreme pressure (EP) performance. Also acceptable is an SAE multi-purpose lithium base grease.
2. Gearbox Oil: Use an SAE 80W90 gear oil for all operating conditions.
3. Storing Lubricants: Your machine can operate at top efficiency only if clean lubricants are used. Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture and other contaminants.

## Greasing your Machine

1. Use only a hand-held grease gun for all greasing.
2. Wipe grease fitting with a clean cloth before greasing, to avoid injecting dirt.
3. Replace and repair broken fittings immediately.
4. If fittings will not take grease, remove and clean thoroughly. Also clean lubricant passage-way. Replace fitting if necessary.
5. Inject 2-3 pumps on each grease zerk.

## Adjusting Apron Chain Tension

1. Occasionally check the apron chain for any bent or damaged slats. It is important to straighten or replace any damaged slats immediately.
2. The apron chain tension should be checked and adjusted on occasion. If apron chain has slack, tightening is required:
  - To tighten apron chain, loosen the four bolts on bearing and turn nut until proper tightness is achieved (both sides) then tighten 4 bolts on the bearing.

When adjusting the apron chain tension use the following procedure.

- a) Start on one side and tighten the nut a few turns.
- b) Repeat on opposite side of machine to evenly tighten chain tension.
- c) Repeat this procedure 2-3 times until moderate chain tension is achieved.

*Caution: It is important to ensure nuts on 4 bolts on bearing are tightened after adjusting apron chain. In the event of the nuts not being tightened, and the apron chain is reversed, equipment damage may occur.*



**Apron chain tension adjustment of spreader.**



## Every 10 Hours/Daily

Grease each zerk with 2-3 pumps of grease every 10 hours. Grease zerk locations are shown.



Apron chain bearing grease zerk, located at front and rear of spreader on both sides.



Grease all fittings on the PTO driveline.



Grease zerk on PTO drive line bearing.



Grease 3 fittings on PTO driveline underneath spreader at front, middle, or rear crossbars.

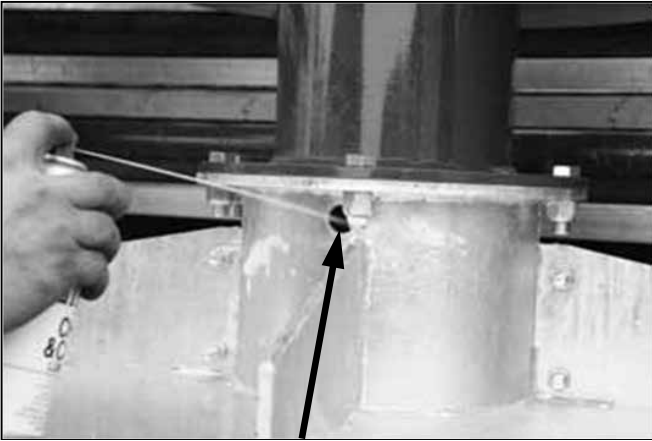


Grease all fittings on rear PTO shaft.

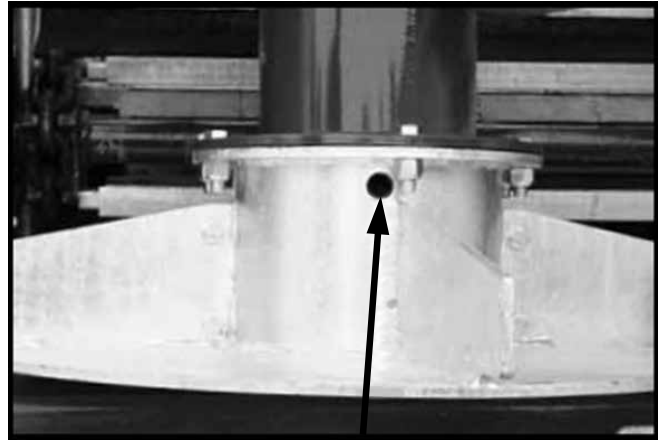


## Every 10 Hours/Daily

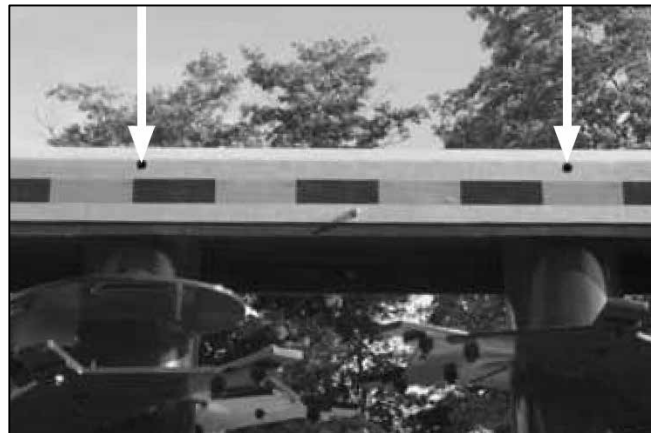
Grease each zerk with 2-3 pumps of grease every 10 hours. Grease zerk locations are shown.



Spray gear lube on connector chain.



Grease 2 zerks on rear beaters located at bottom of each beater.

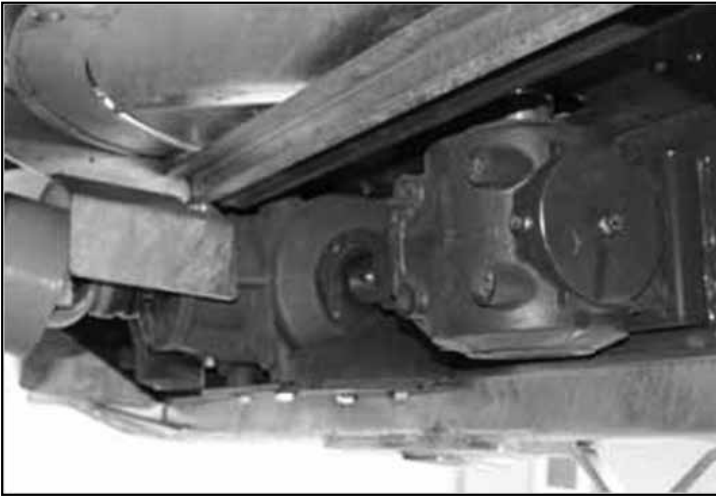


Grease 2 zerks on rear beaters located at top of each beater.

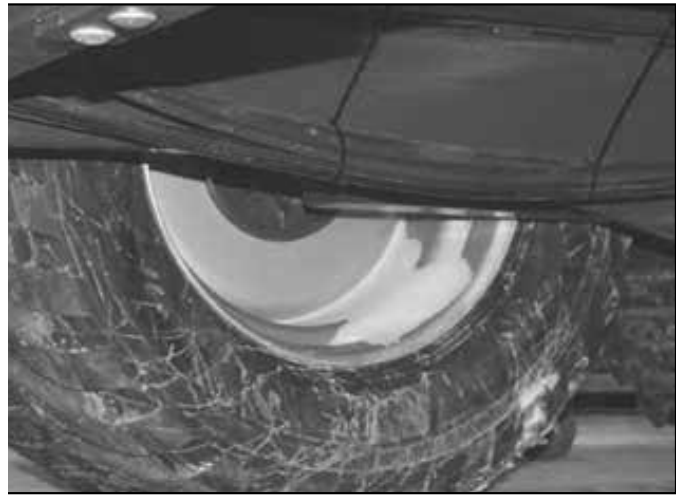
### **Every 40 hrs / Weekly**

### **Every 400 hrs / Annually**

Grease each zerk with 2-3 pumps of grease every 10 hours. Grease zerk locations are shown.

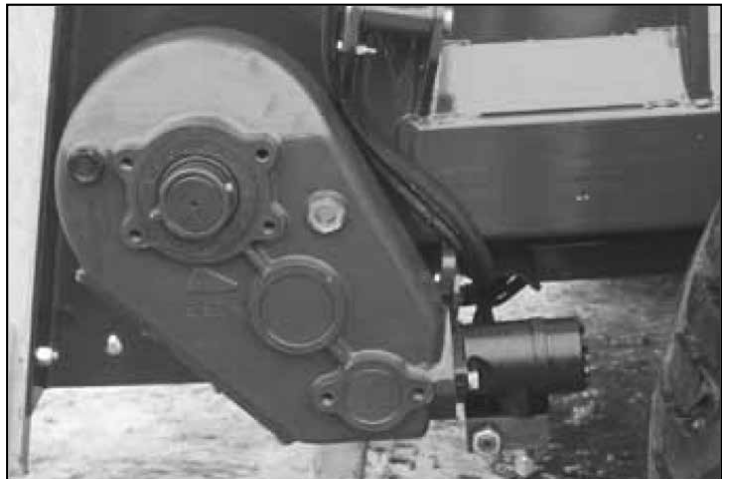


Visually inspect gearboxes for leaks.



Repack wheel bearings annually

### **Every 200 hrs / Semi-Annually**

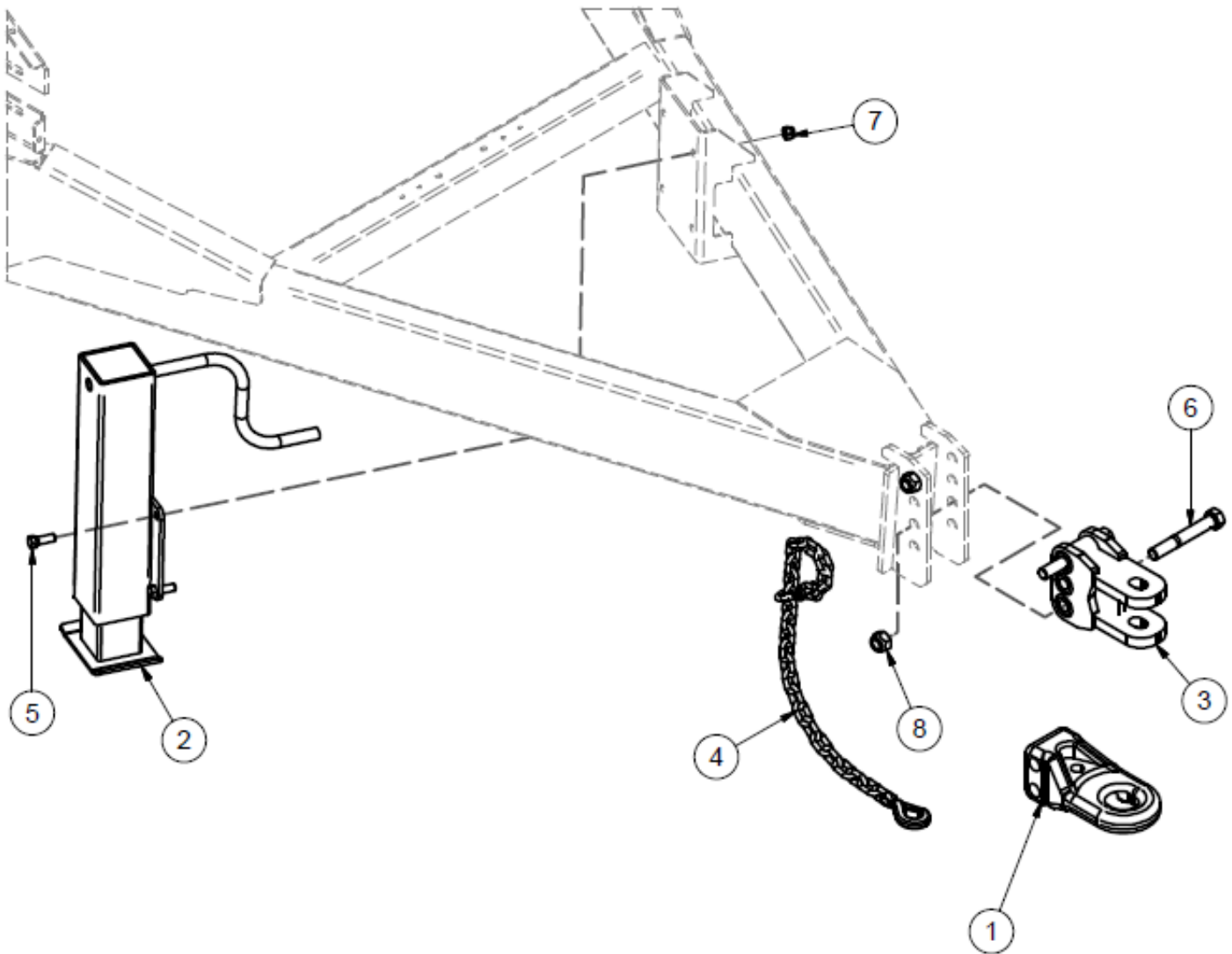


Check oil levels in gearboxes, top up with SAE 80W90 gear oil if needed.

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# Section 5 - Parts Breakdowns & Lists

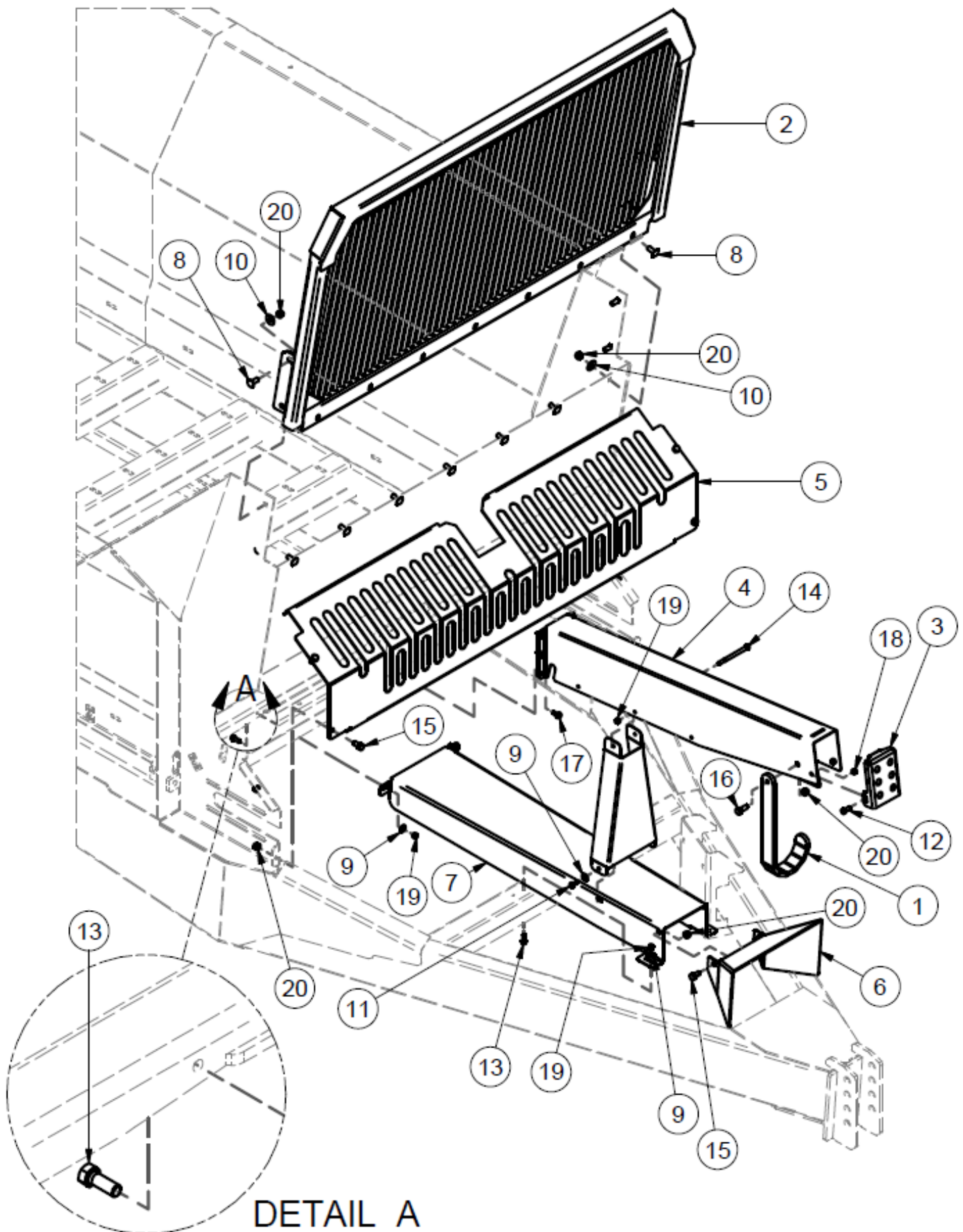
## Front Components



## Front Components

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	30826	Optional Hitch
2	1	30850	Jack
3	1	39870	Hitch
4	1	400-605	Safety Chain
5	4	Obtain Locally	HB .625 x 1.75 Hex Bolt
6	2	Obtain Locally	HB 1 x 7 Hex Bolt
7	4	Obtain Locally	LN .625 Lock Nut
8	2	Obtain Locally	LN 1 Lock Nut

## Front Shields



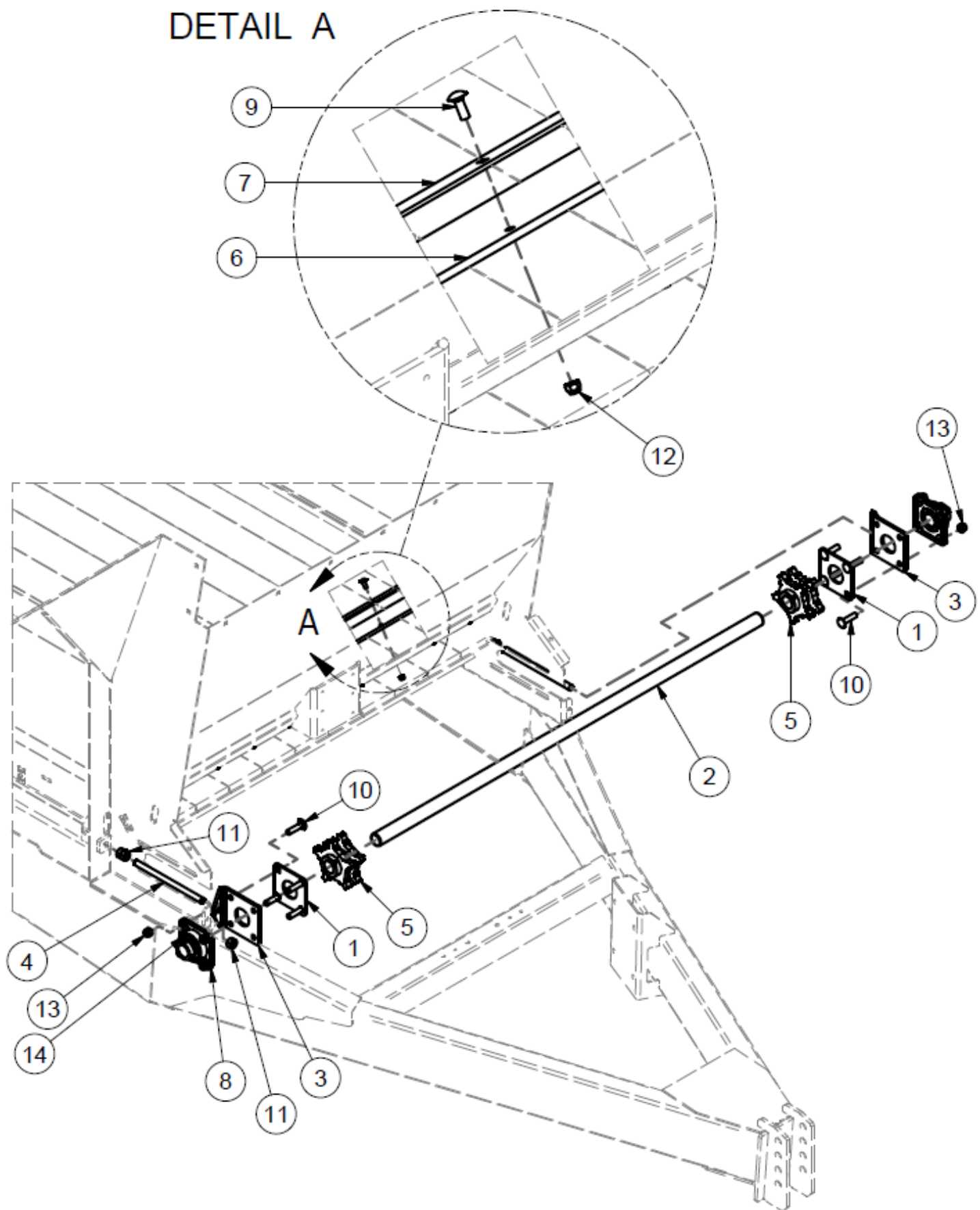
## Front Shields

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	35754	PTO Holder
2	1	37195	Stone Guard
3	1	39413	Hose Mount
4	1	39416	Hose Hanger
5	1	39419	Front Idler Shaft Cover
6	1	39422	PTO Front Pivot Cover
7	1	39455	Long PTO Cover
8	15	Obtain Locally	CB .5 x 1.25 Carriage Bolt
9	6	Obtain Locally	FW .375 Flat Washer
10	23	Obtain Locally	FW .5 Flat Washer
11	10	Obtain Locally	HB .375 x .75 Hex Bolt
12	2	Obtain Locally	HB .375 x 1 Hex Bolt
13	4	Obtain Locally	HB .375 x 1 Hex Bolt
14	1	Obtain Locally	HB .375 x 5 Hex Bolt
15	6	Obtain Locally	HB .5 x 1 Hex Bolt
16	1	Obtain Locally	HB .5 x 1.25 Hex Bolt
17	6	Obtain Locally	HBC .375 x .75 Serrated Hex Bolt
18	33	Obtain Locally	LN .375 Lock Nut
19	37	Obtain Locally	LN .375 Lock Nut
20	42	Obtain Locally	LN .5 Lock Nut



## Front Apron Drive

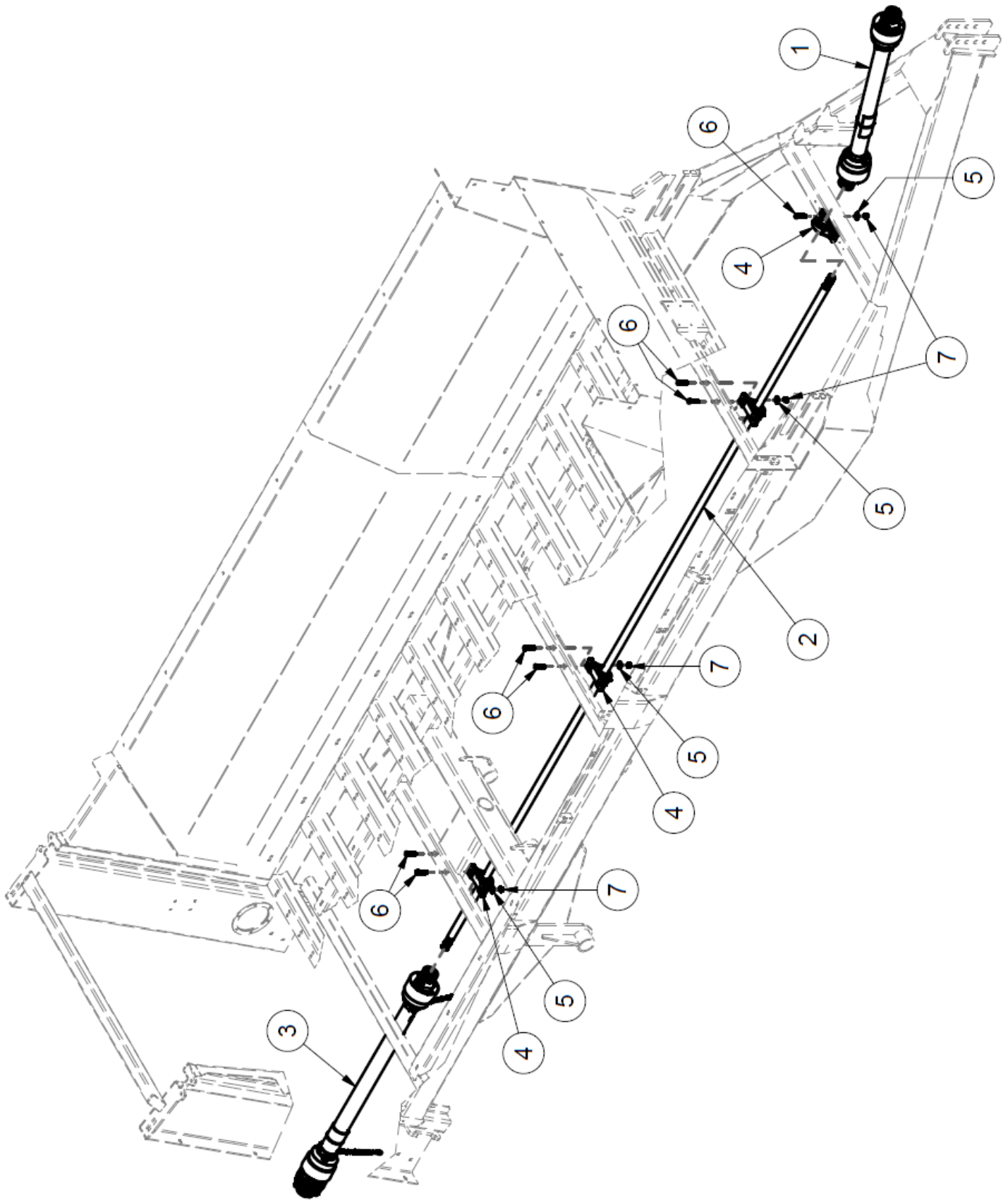
### DETAIL A



## Front Apron Drive

ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	37720	Inside Bearing Plate
2	1	400-162	Front Apron Drive Shaft
3	2	400-169	Bearing Mount Plate
4	2	400-875	Threaded Tightener
5	2	400-916	Apron Sprocket (w/ Set Screws)
6	3	450-441	Rubber Seal
7	2	600-790	Rubber Hold Down
8	2	BEA UCF209-28	Flange Bearing
9	10	Obtain Locally	CB .375 x 1 Carriage Bolt
10	8	Obtain Locally	CB .625 x 2.5 Carriage Bolt
11	6	Obtain Locally	HN .75 Hex Nut
12	10	Obtain Locally	LN .375 Lock Nut
13	8	Obtain Locally	LN .625 Lock Nut
14	2	Obtain Locally	SS .313 x .375 UNF Set Screw

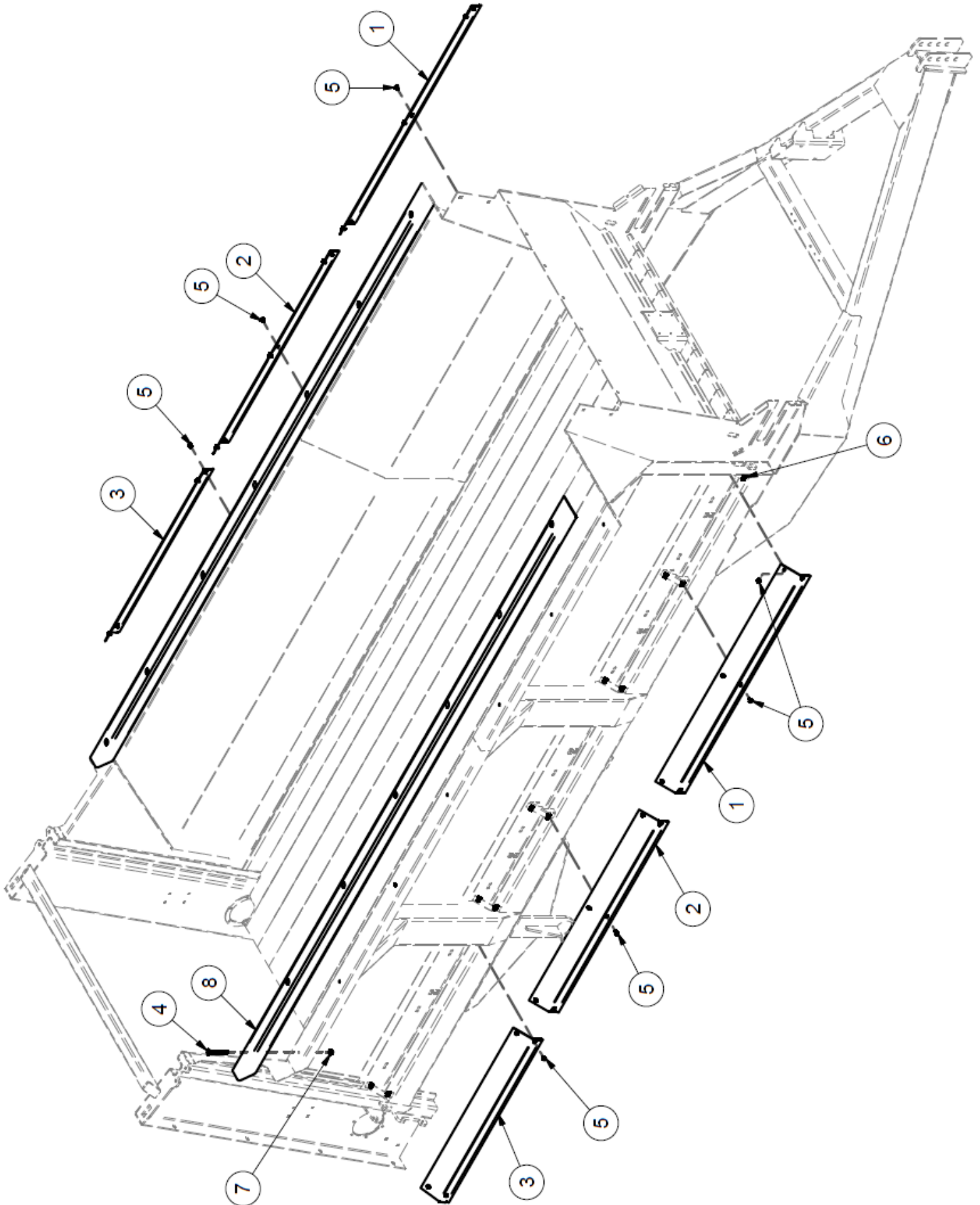
## Driveline



## Driveline

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	36637	CV PTO
2	1	39433	Spline Driveshaft
3	1	39488	Over Running Clutch PTO
4	4	BEA UCP208-24R3	Pillow Block Bearing
5	8	Obtain Locally	FW .5 Flat Washer
6	8	Obtain Locally	HB .5 x 2 Hex Bolt
7	66	Obtain Locally	LN .5 Lock Nut

## Side Shields

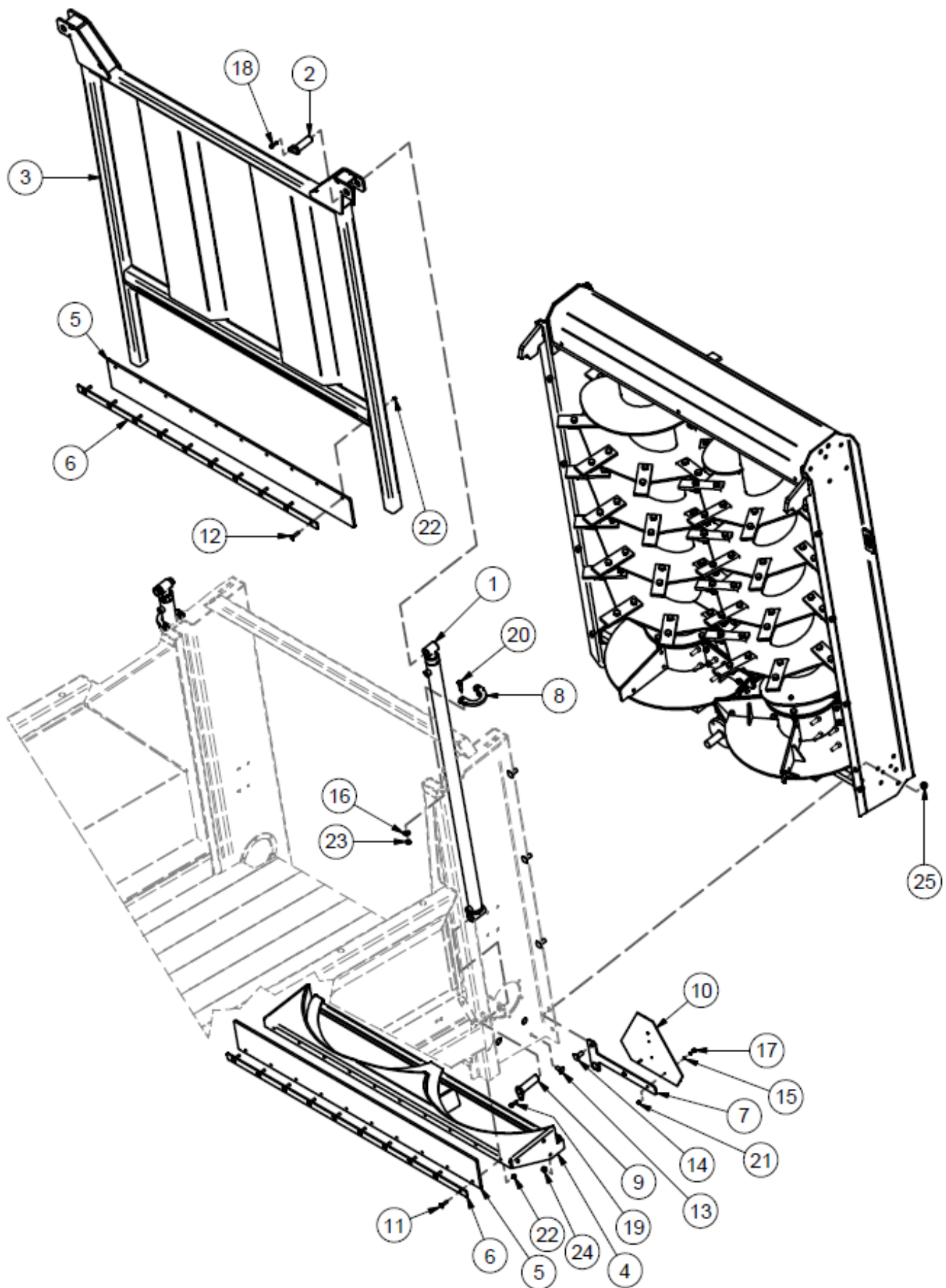


## Side Shields

ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	39427	Front Side Hydraulic Cover
2	2	39428	Middle Side Hydraulic Cover
3	2	39429	Back Side Hydraulic Cover
4	14	Obtain Locally	CB .5 x 5 Carriage Bolt
5	32	Obtain Locally	HBC .313 x .5 Serrated Hex Bolt
6	32	Obtain Locally	HNP .313 Panel Nut
7	14	Obtain Locally	LN .5 Lock Nut
8	2	Obtain Locally*	4" x 4" Pressure Treated Beam

*\* Purchase 4 "x 4" x 15' pressure treated posts from your local hardware store and trim as needed.*

## Endgate

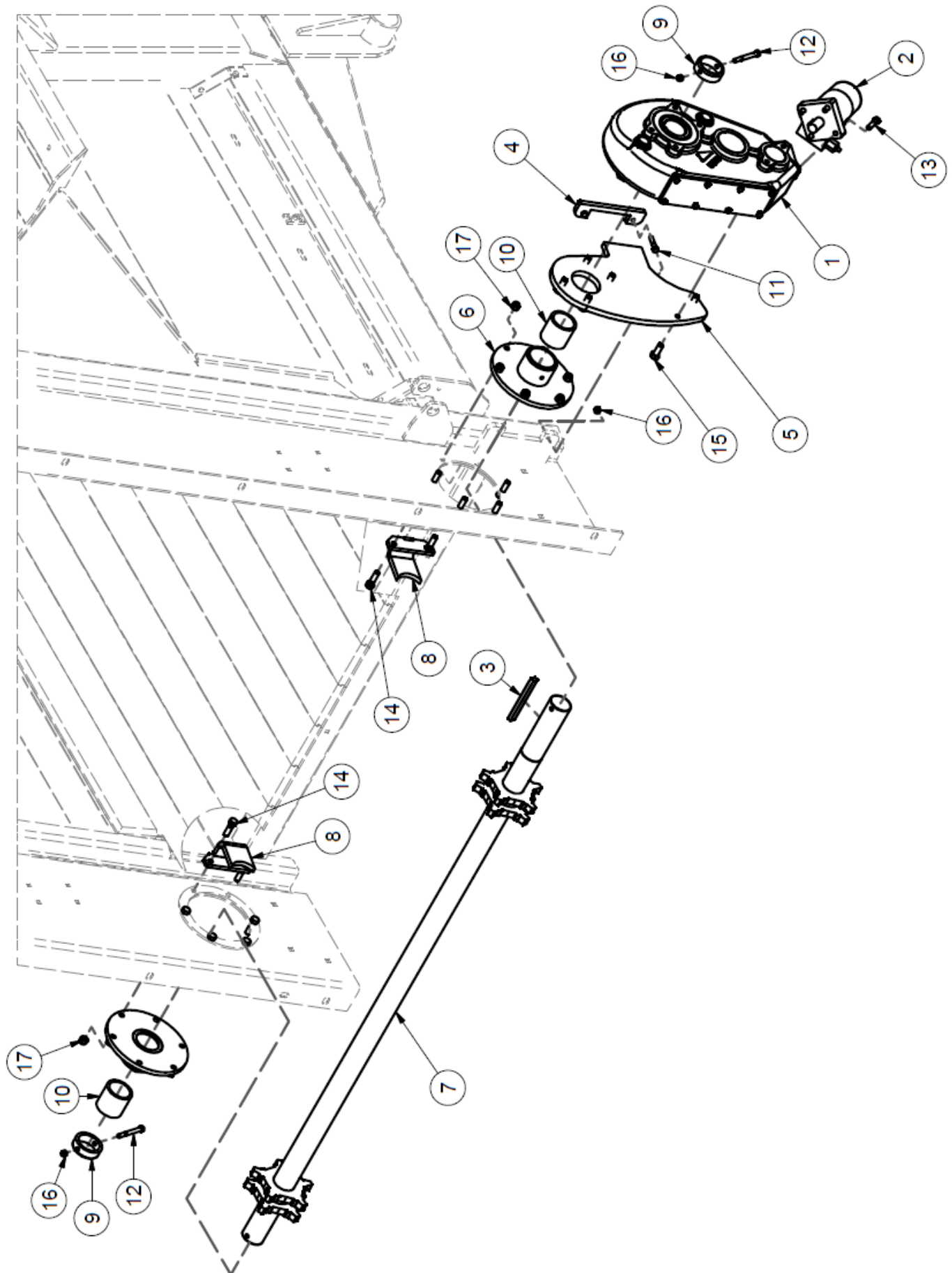


## Endgate

ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	31328	Hydraulic Cylinder
2	2	400-601	Top Cylinder Pin
3	1	450-126	Endgate
4	1	450-130	Pinner Shroud
5	3	450-441	Rubber Seal
6	3	600-790	Rubber Hold Down
7	1	700-108	SMV Sign Mount
8	2	700-142	Endgate Cylinder Support
9	2	700-619	Bottom Cylinder Pin
10	1	DESMV	SMV Sign
11	10	Obtain Locally	CB .375 x 1.5 Carriage Bolt
12	10	Obtain Locally	CB .375 x 1.75 Carriage Bolt
13	6	Obtain Locally	CB .5 x 1.25 Carriage Bolt
14	33	Obtain Locally	CB .625 x 1.5 Carriage Bolt
15	2	Obtain Locally	FW .25 Flat Washer
16	4	Obtain Locally	FW .438 Flat Washer
17	2	Obtain Locally	HB .25 x 1 Hex Bolt
18	2	Obtain Locally	HB .375 x 1.25 Hex Bolt
19	1	Obtain Locally	HB .375 x 1.25 Hex Bolt
20	8	Obtain Locally	HB .438 x 1.75 Hex Bolt
21	2	Obtain Locally	LN .25 Lock Nut
22	47	Obtain Locally	LN .375 Lock Nut
23	4	Obtain Locally	LN .438 Lock Nut
24	24	Obtain Locally	LN .5 Lock Nut
25	37	Obtain Locally	LN .625 Lock Nut



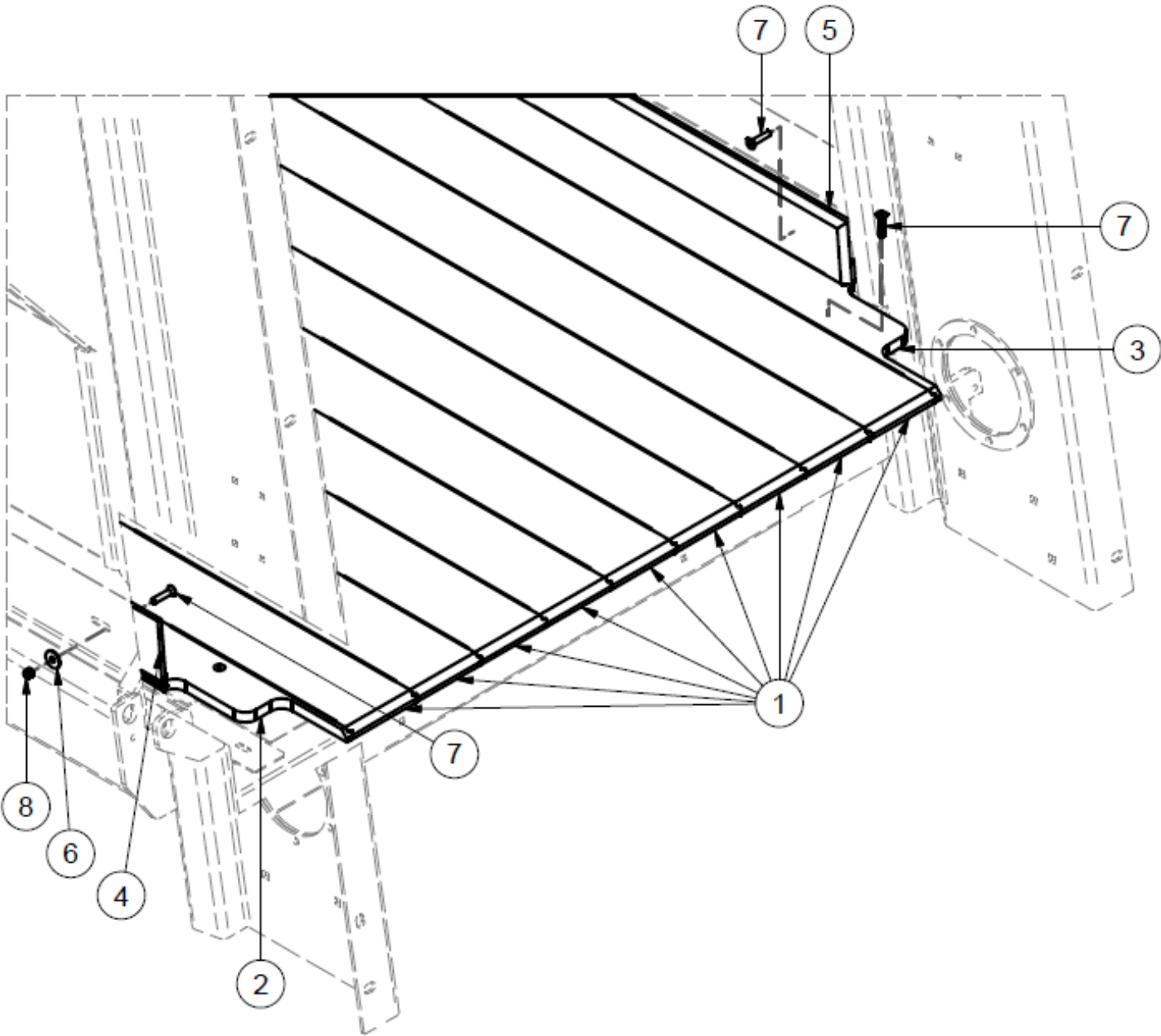
## Rear Apron Drive



## Rear Apron Drive

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	30842	Apron Drive Gearbox
2	1	30854	Hydraulic Motor
3	1	30859	Metric Key 18 x 11 x 150
4	1	375-424	Torque Arm Stop
5	1	39421	Gearbox Torque Arm
6	2	450-135	Bearing Housing
7	1	450-137	Apron Drive Shaft
8	2	450-138	Apron Drive Shaft
9	2	450-371	Apron Shaft Bushing
10	2	700-431	Apron Bushing
11	2	Obtain Locally	HB .375 x 1.75 Hex Bolt
12	2	Obtain Locally	HB .375 x 3.5 Hex Bolt
13	4	Obtain Locally	HB .438 x 1.75 Hex Bolt
14	4	Obtain Locally	HB .5 x 1.75 Hex Bolt
15	6	Obtain Locally	HB M14 x 2 x 35 Hex Bolt
16	2	Obtain Locally	LN .375 Lock Nut
17	12	Obtain Locally	LN .5 Lock Nut

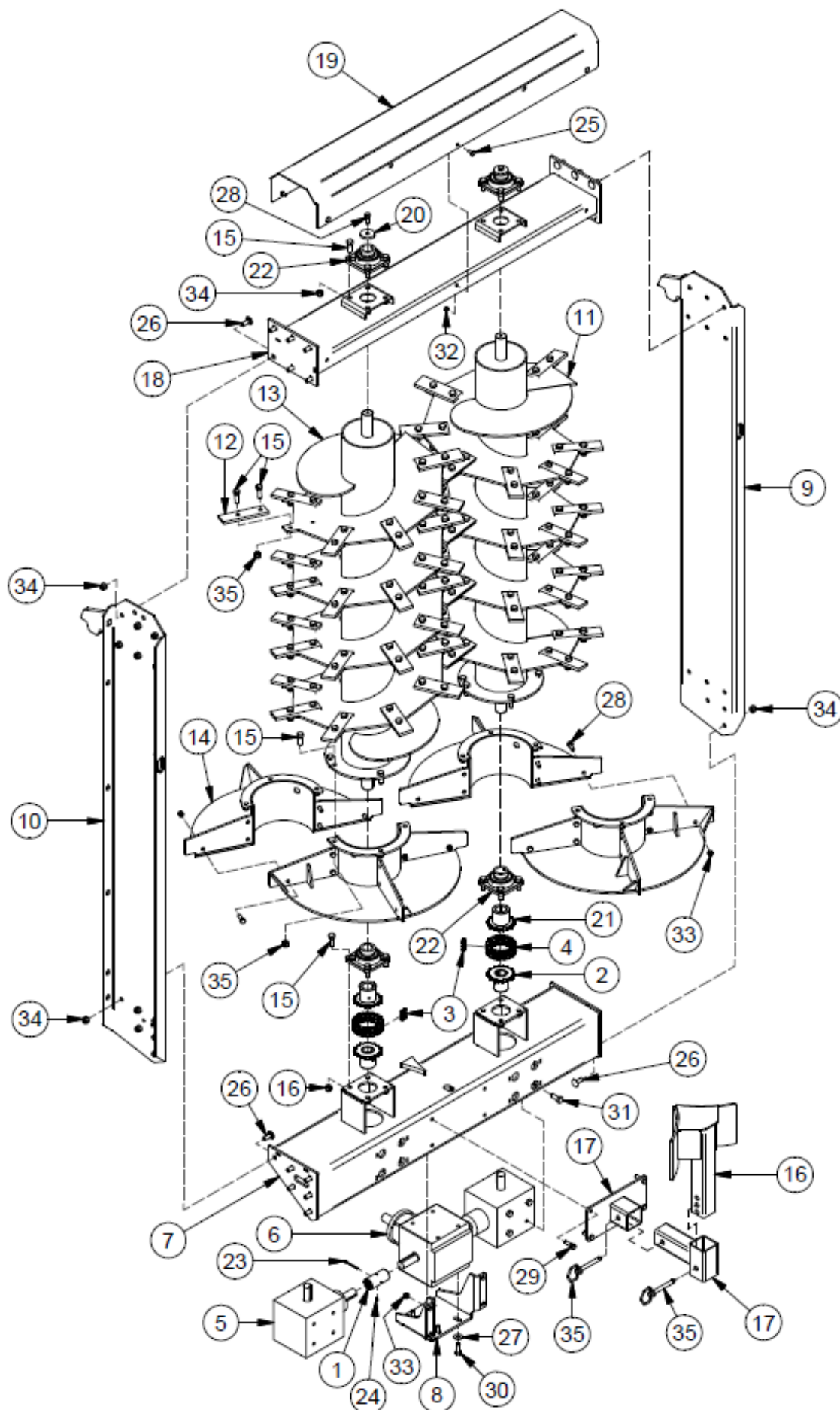
Floor & Side Boards



## Floor & Side Boards

ITEM	QTY	PART NUMBER	DESCRIPTION
1	9	40265	Floor Board
2	1	40266	Left Edge Floor Panel
3	1	40267	Right Edge Floor Panel
4	1	40268	Left Vertical Board
5	1	40269	Right Vertical Board
6	132	Obtain Locally	FW .375 Flat Washer
7	132	Obtain Locally	HB .375 x 1.75 Flat Head Hex Socket Cap Screw
8	132	Obtain Locally	LN .375 Lock Nut

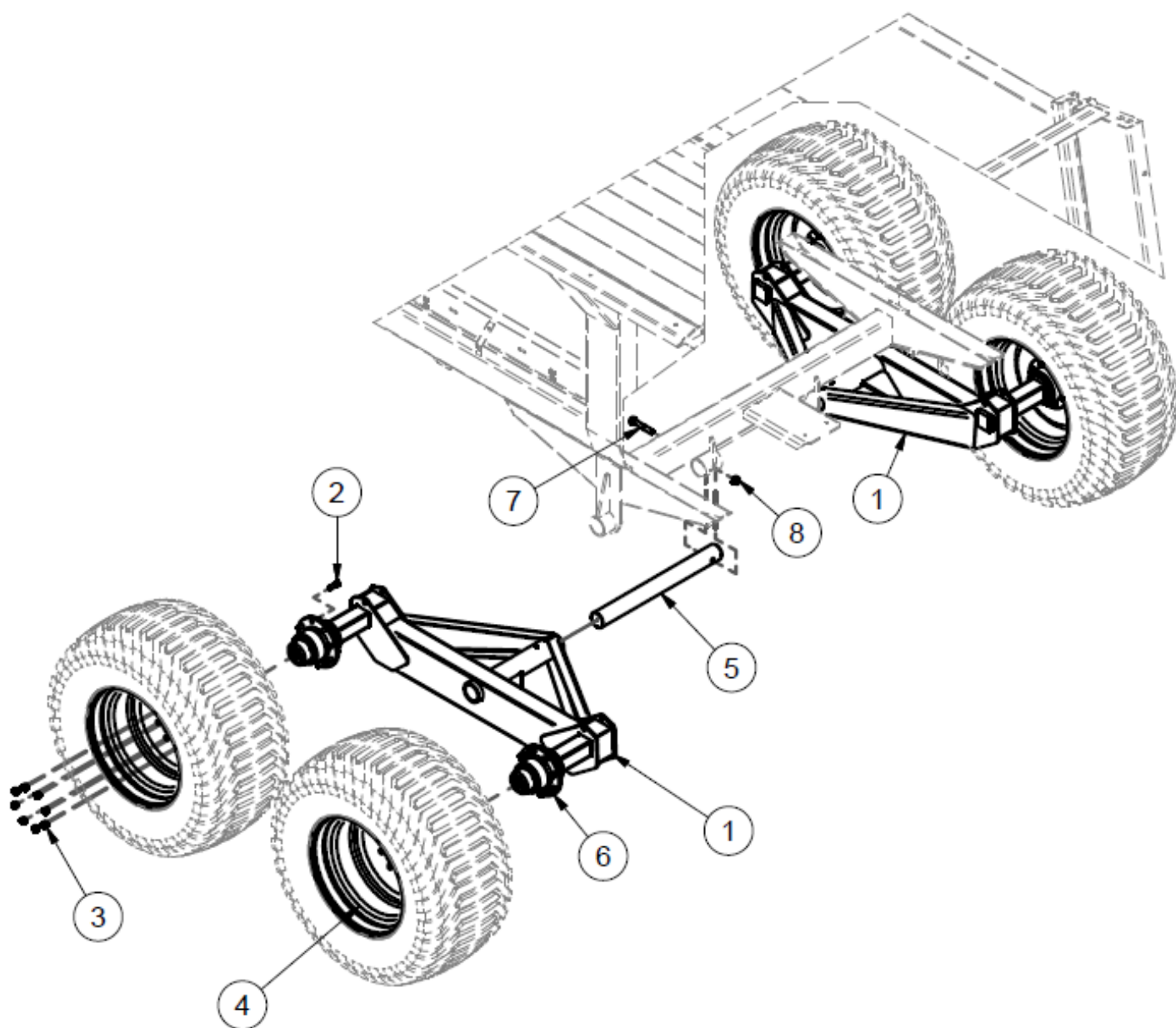
## Beaters



## Beaters

ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	30849	Spline Coupler
2	2	37839	#80 Chain Sprocket
3	2	31516	#80 CHAIN Connector
4	2	31518	DOUBLE #80 CHAIN
5	2	30847	90 Degree GearBox
6	1	30848	Center Gearbox
7	1	40516	Bottom Beater Cross Beam
8	1	40517	Gearbox Mount Bracket
9	1	450-107	Right Beater Side Frame
10	1	450-108	Left Beater Side Frame
11	1	450-111	Right Beater
12	64	400-438	Beater Paddle
13	1	450-112	Left Beater
14	4	450-116	Beater Spinner
15	152	Obtain Locally	HB .625 x 1.75 Hex Bolt
16	1	450-131	Beater Deflector
17	1	450-132	Beater Deflector Mount
18	1	450-133	Top Cross Beam
19	1	450-405	Top Beater Cover
20	2	700-157	Load Bearing Washer
21	2	700-645	#80 Chain Sprocket
22	4	BEA UCF209-28R3	UCF209 Bearing
23	2	CP.188 X 2.5	Cotter Pin
24	2	Obtain Locally	1/4-28 Grease Zerk
25	6	Obtain Locally	CB .375 x 1 Carriage Bolt
26	24	Obtain Locally	CB .625 x 1.5 Carriage Bolt
27	4	Obtain Locally	FW .563 Flat Washer
28	2	Obtain Locally	HB .5 x 1.5 Hex Bolt
29	4	Obtain Locally	HB .5 x 1.75 Hex Bolt
30	4	Obtain Locally	HB M14 x 2 x 40 Hex Bolt
31	8	Obtain Locally	HB M16 x 2 x 40 Hex Bolt
32	6	Obtain Locally	LN .375 Lock Nut
33	4	Obtain Locally	LN .5 Lock Nut
34	176	Obtain Locally	LN .625 Lock Nut
35	2	TL500-100-154	3/4 x 5 Drawpin

## Walking Beams

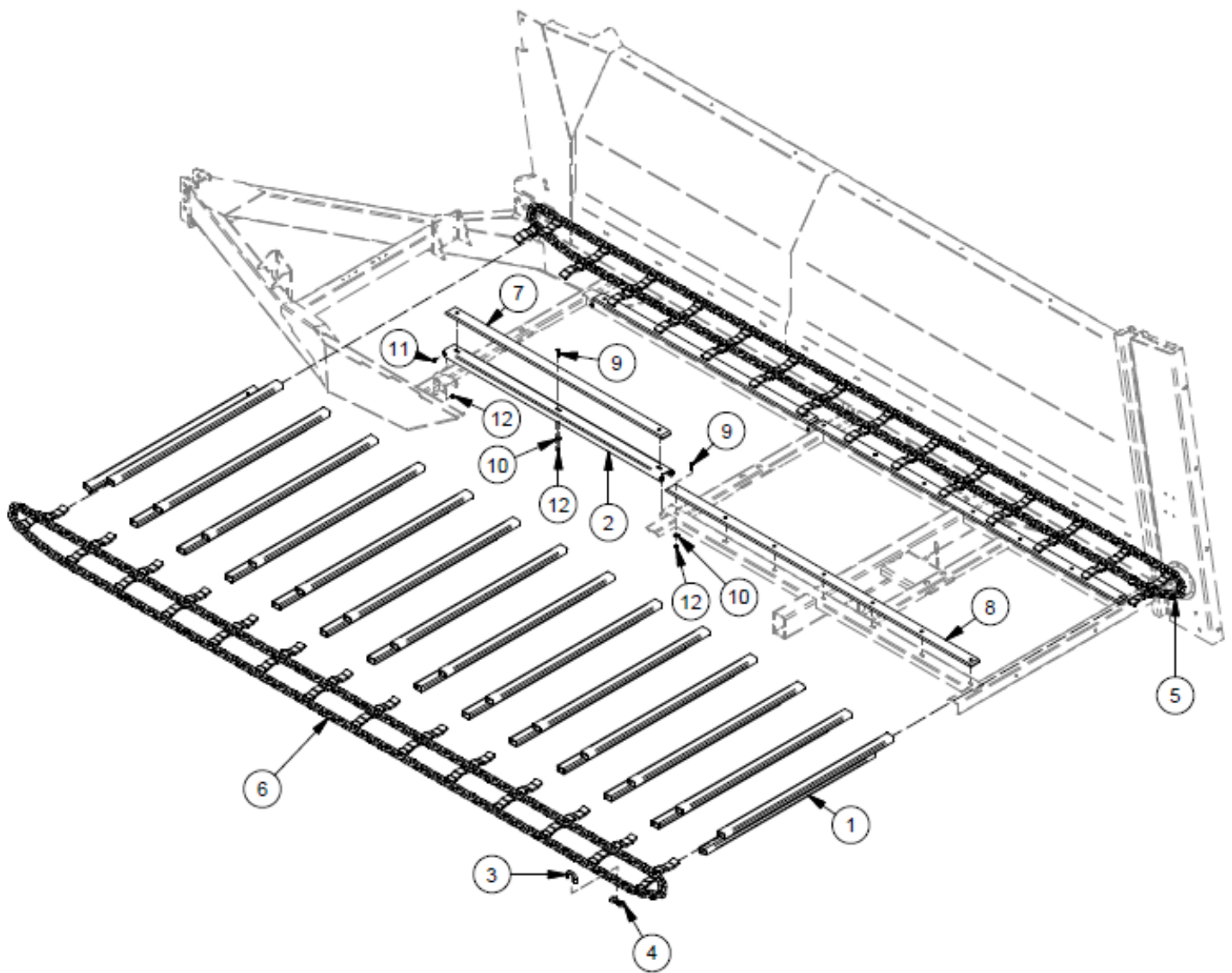


## Walking Beams

ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	27583	Walking Beam
2	1	31531	.625 Wheel Stud
3	1	31532	.625 Wheel Nut
4	4	400-429	8 Bolt Rim
5	2	40293	Walking Beam Pin
6	1	HUB 8000	8000lb Hub
	1	HUB 8000-CCS	8000lb Hub Bearing & Seal Kit
7	2	Obtain Locally	HB .75 x 4.5 Hex Bolt
8	2	Obtain Locally	LN .75 Lock Nut



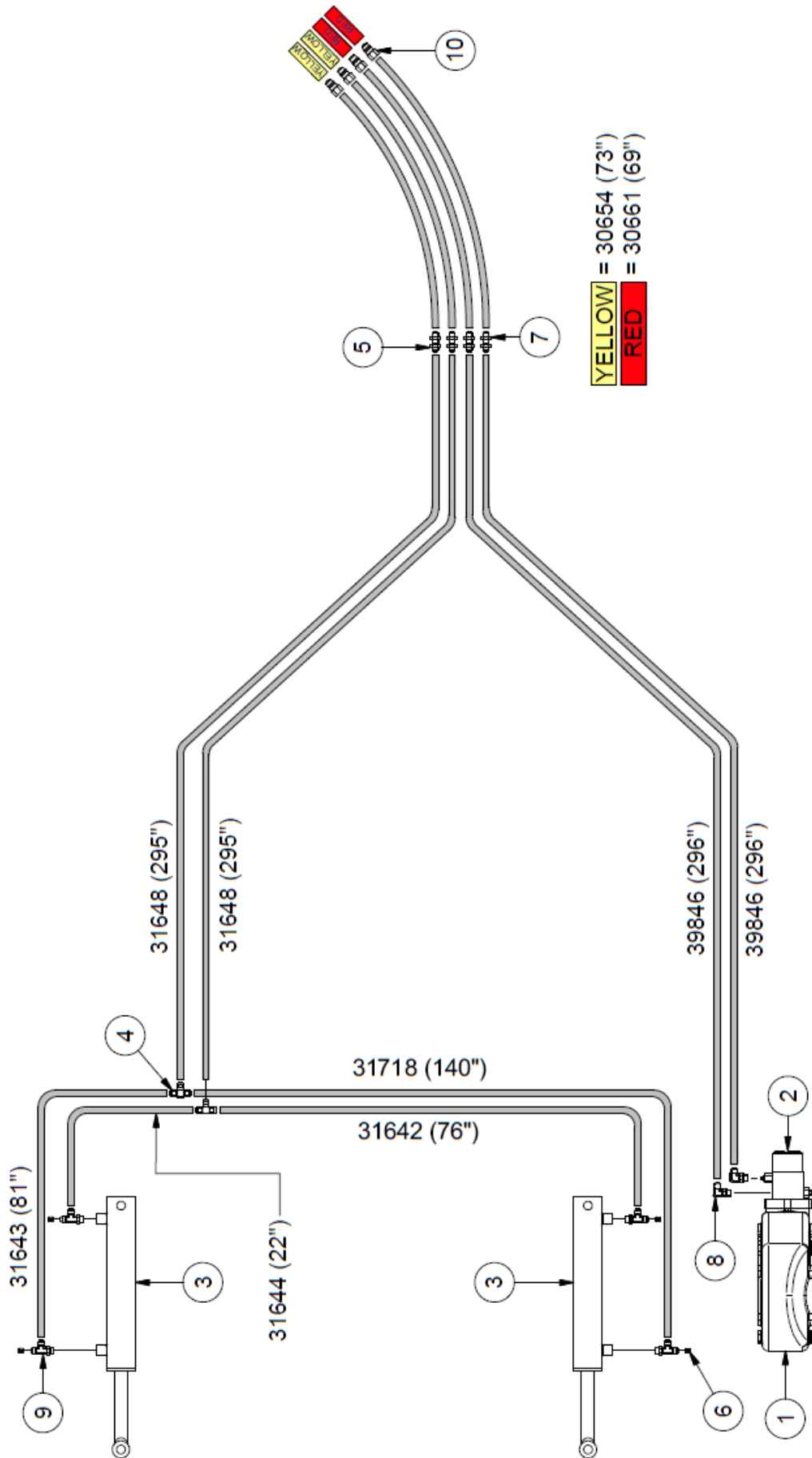
## Apron Runners



## Apron Runners

ITEM	QTY	PART NUMBER	DESCRIPTION
1	28	37820	Slats
2	2	39434	Chain Return Slide
3	2	400-889	Chain Connector Link
4	2	400-890	Chain Connector Tab
5	1	40295	Right Chain Side w/ Lugs
6	1	40296	Left Chain Side w/ Lugs
7	2	40444	Front Apron Runner
8	2	450-442	Rear Apron Runner
9	24	Obtain Locally	FHSCS .375 x 1.75 Countersunk Bolt
10	24	Obtain Locally	FW .375 Flat Washer
11	10	Obtain Locally	HB .375 X 0.75 Hex Bolt
12	84	Obtain Locally	LN .375 Lock Nut

# Hydraulic Schematic



## Hydraulic Schematic

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	30842	Berma RT500 Gearbox
2	1	30854	HMD Motor MLHPQ400C4B
3	2	CYL37871	2" Bore 1.5" Rod 56.75" Stroke Hydraulic Cylinder
4	2	HF 2603-8-8-8	Hydraulic Tee Fitting
5	4	HF 2700LN-8-8	Hydraulic Bulkhead Fitting
6	4	HF 304-C-06	Female JIC #6 Cap
7	4	HF 306-8	Bulkhead Fitting Nut
8	2	HF 6801-8-10	Hydraulic Elbow Fitting
9	4	HF 6804-4-6-6	Hydraulic Tee Fitting
10	4	HF 8010-4	Male Quick Coupler

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## Section 6 - Optional Features

- **Manual Light Kit (TLVLK-525M\*)**

\* Light Kit Base (pg.6-2,6-3), Manual Light Kit (pg.6-4), & Wiring Harness (pg.6-8,6-9)

- **Hydraulic Light Kit (TLVLK-525\*)**

\* Light Kit Base (pg.6-2,6-3), Hydraulic Light Kit (pg.6-5 to 6-7), & Wiring Harness (pg.6-8,6-9)

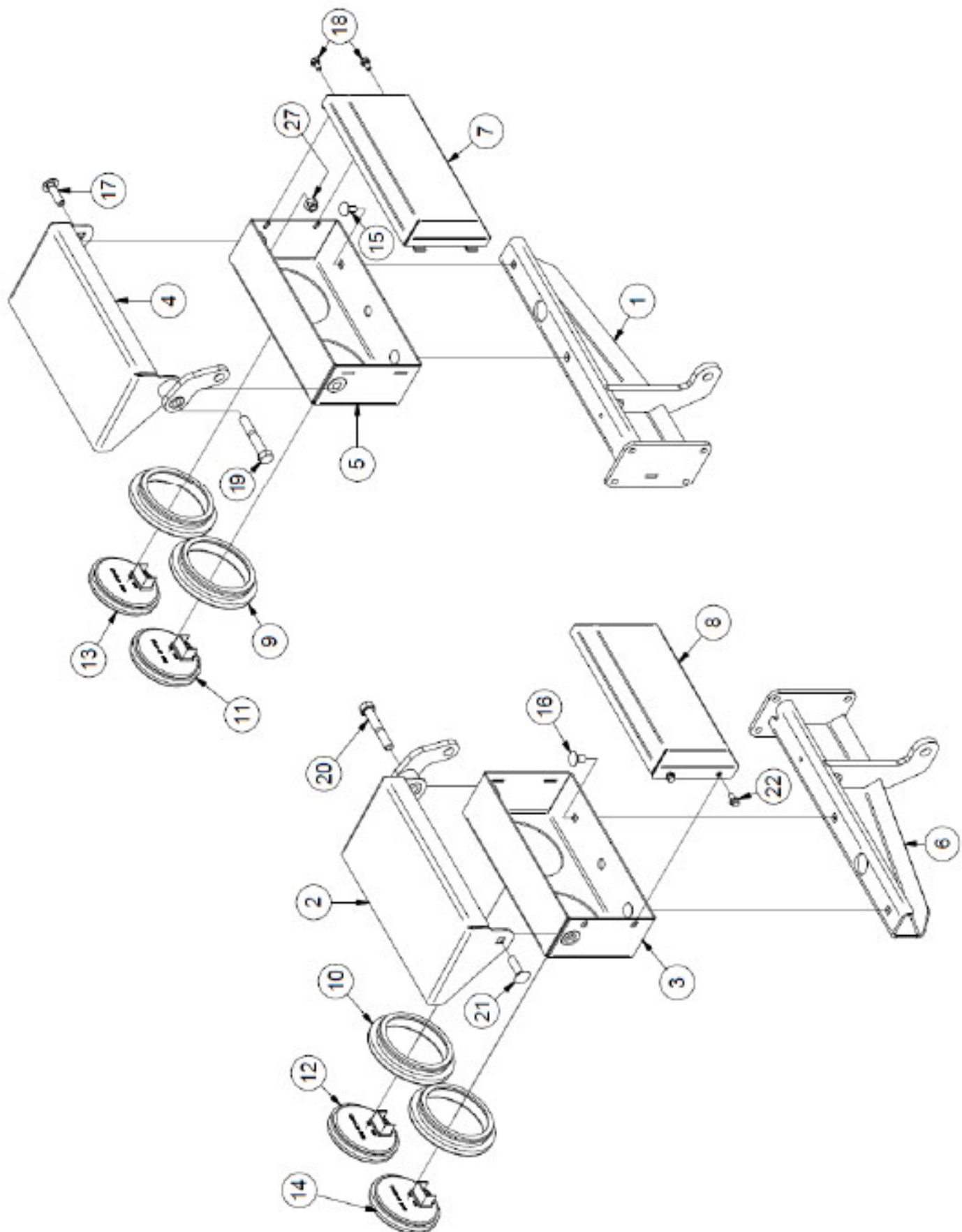
- **Electric Flow Control**

*Includes all items (except Item 7) on Hydraulic pages (6-10,6-11) & Electric pages (6-12,6-13)*

- **Manual Flow Control**

*Includes Items 3-14 on pages 6-10 & 6-11*

## Lights

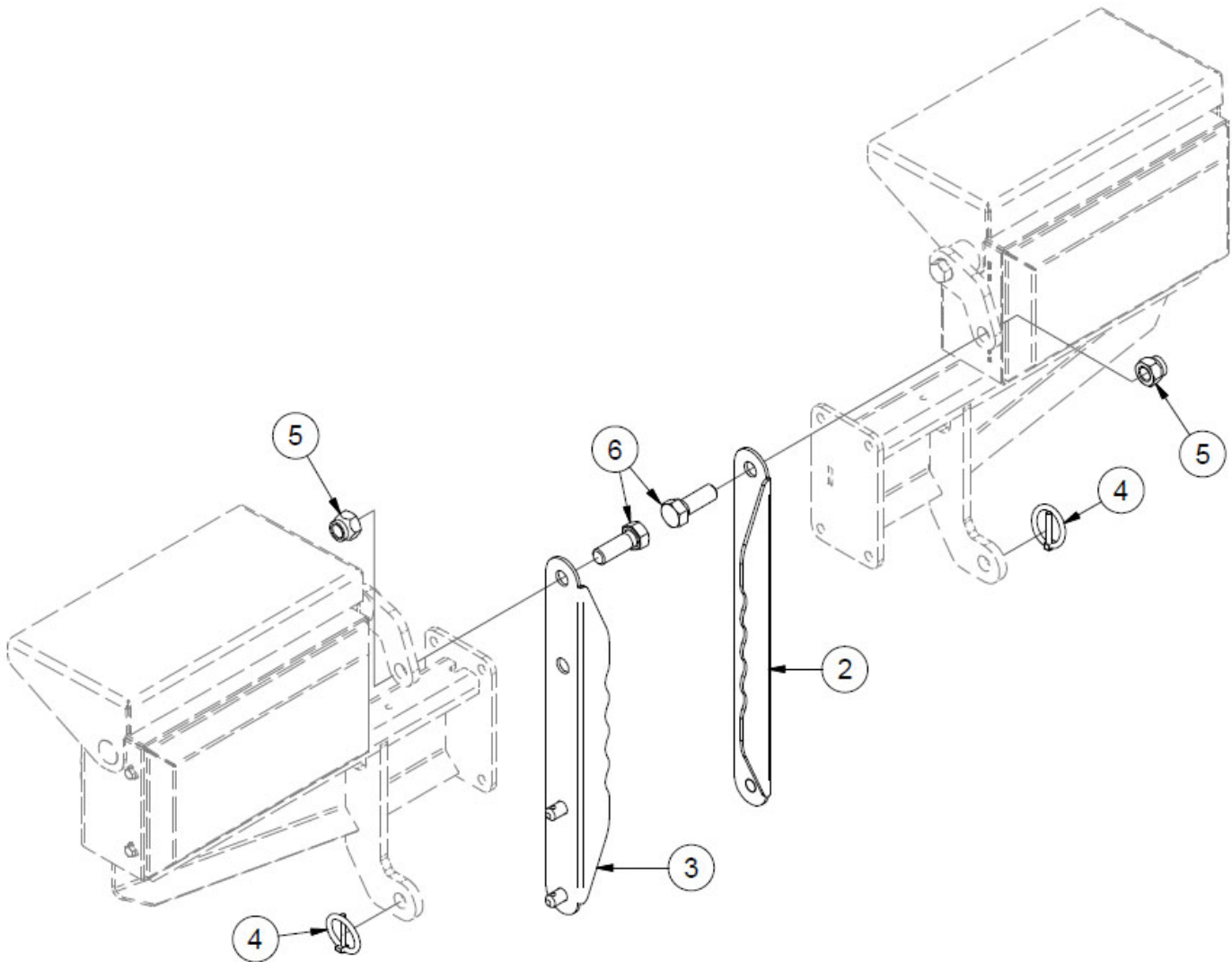


## Lights

Item	Qty	Part #	Description
1	1	400-354	Left Light Mount Bar
2	1	400-355	Right Light Cover
3	1	400-356	Right Light Housing
4	1	400-939	Left Light Cover
5	1	400-940	Left Light Housing
6	1	400-941	Right Light Mounting Bar
7, 8	2	400-943	Light Housing Lid
9, 10	4	31521	4" Rubber Grommet
11, 12	2	31519	Amber Tail Light
13, 14	2	31520	Round Red Tail Light
15, 16	4	Obtain Locally	CB .375 x .75 Carriage Bolt
17	1	Obtain Locally	CB .438 x 1.5 Carriage Bolt
18	2	Obtain Locally	HB .25 x .5 Hex Bolt
19, 20	2	Obtain Locally	HB .5 x 3 Hex Bolt
21	1	Obtain Locally	HB .438 x 1.5 Hex Bolt
22	2	Obtain Locally	HBC .25 x 0.5 Hex Bolt Serrated
23, 24	4	Obtain Locally	LN .375 Lock Nut
25, 26	2	Obtain Locally	LN .5 Lock Nut
27, 28	2	Obtain Locally	LN .438 Lock Nut

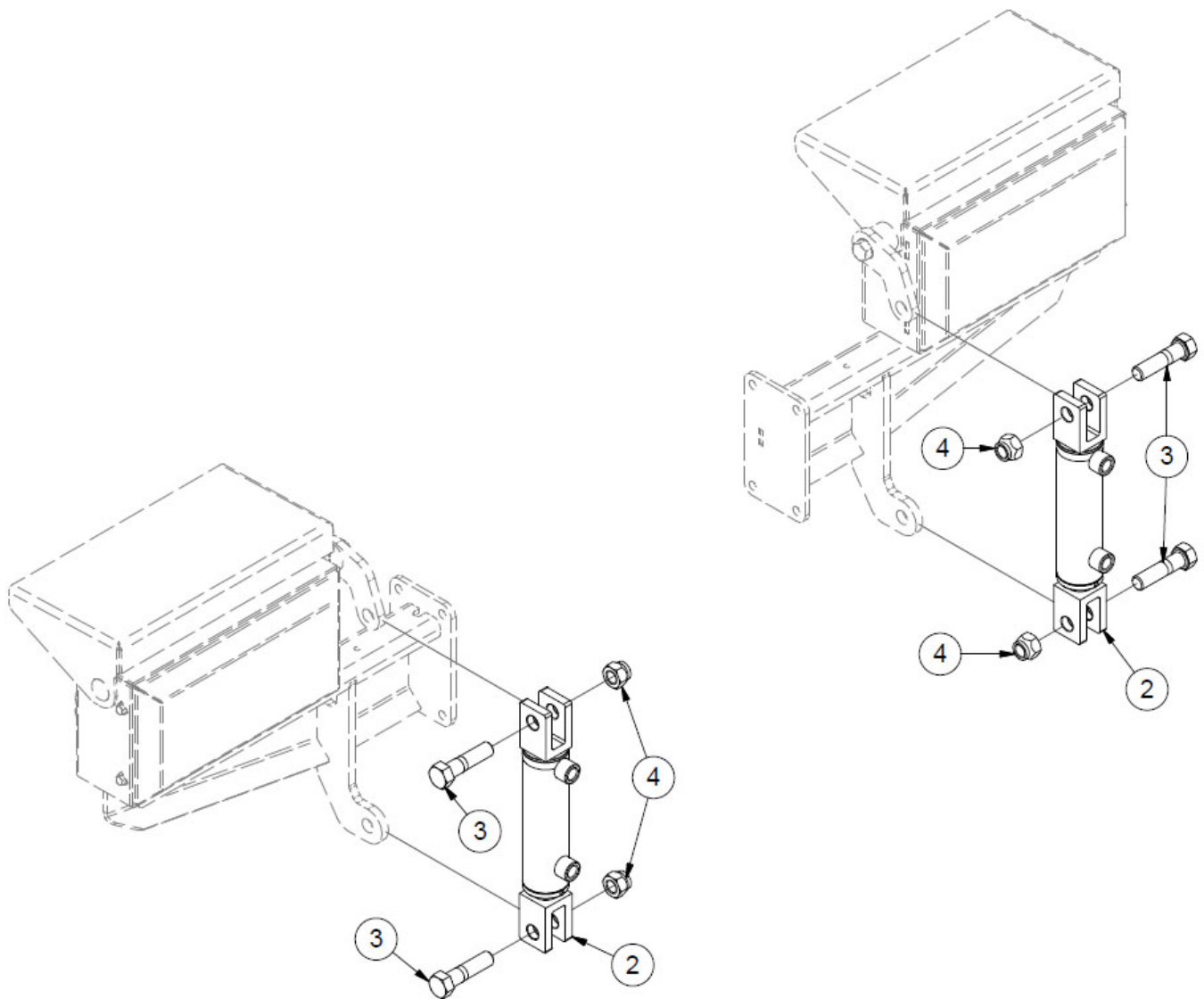


## Manual Light Kit



Item	Qty	Part #	Description
1	1	37773	Manual Light Kit Arms
2	1	37771	Left Light Lid Link
3	1	37772	Right Light Lid Link
4	2	25680	Linch Pin
5	2	Obtain Locally	LN .625 Lock Nut
6	2	Obtain Locally	HB .625 X 1.75 Hex Bolt

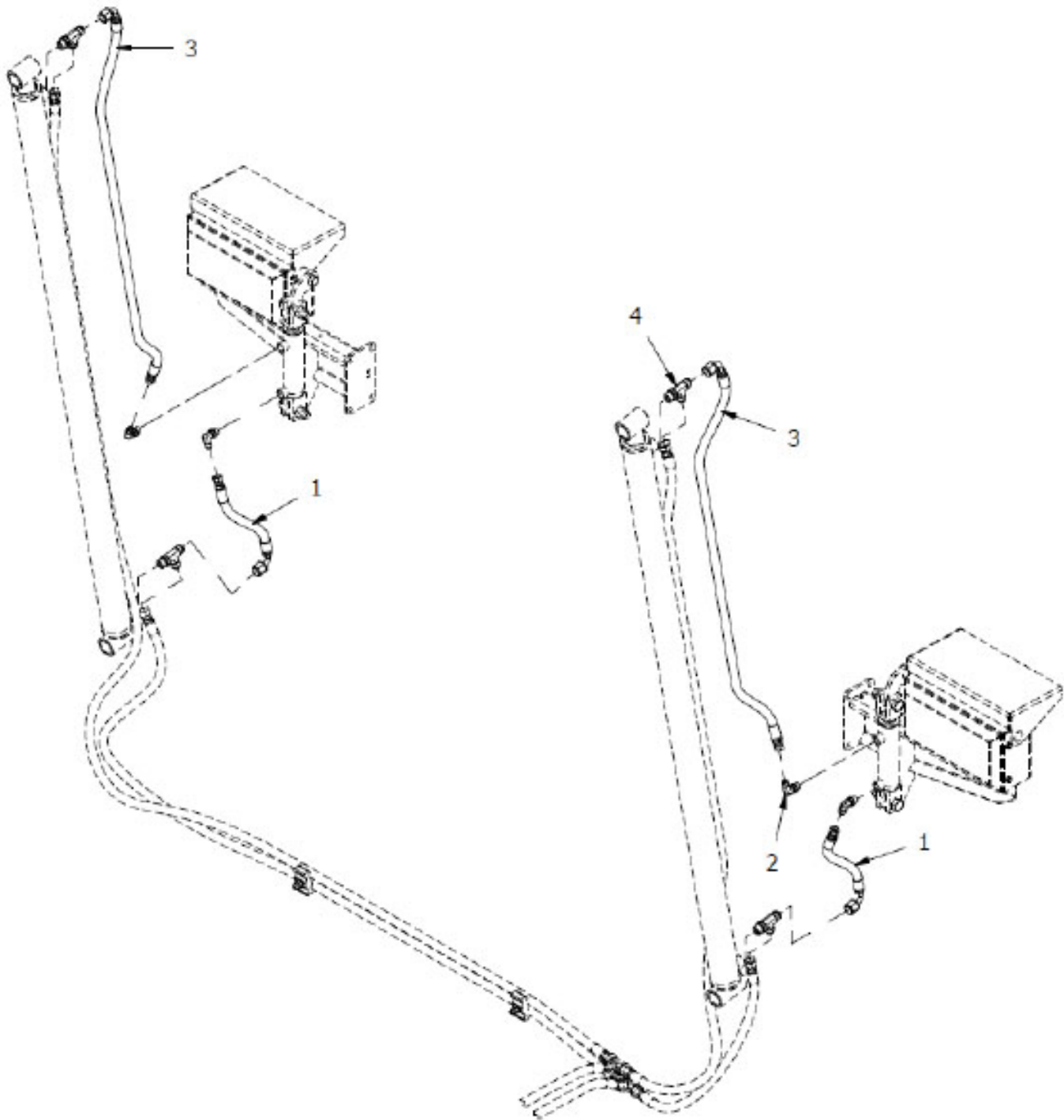
## Hydraulic Light Kit



Item	Qty	Part #	Description
1	1	37768	Complete Hydrualic Kit*
2	2	31326	Hydraulic Cylinder
3	4	Obtain Locally	HB .625 x 2.5 Hex Bolt
4	4	Obtain Locally	LN .625 Lock Nut

\* This kit also includes Hose Kit (pg.6-6,6-7)

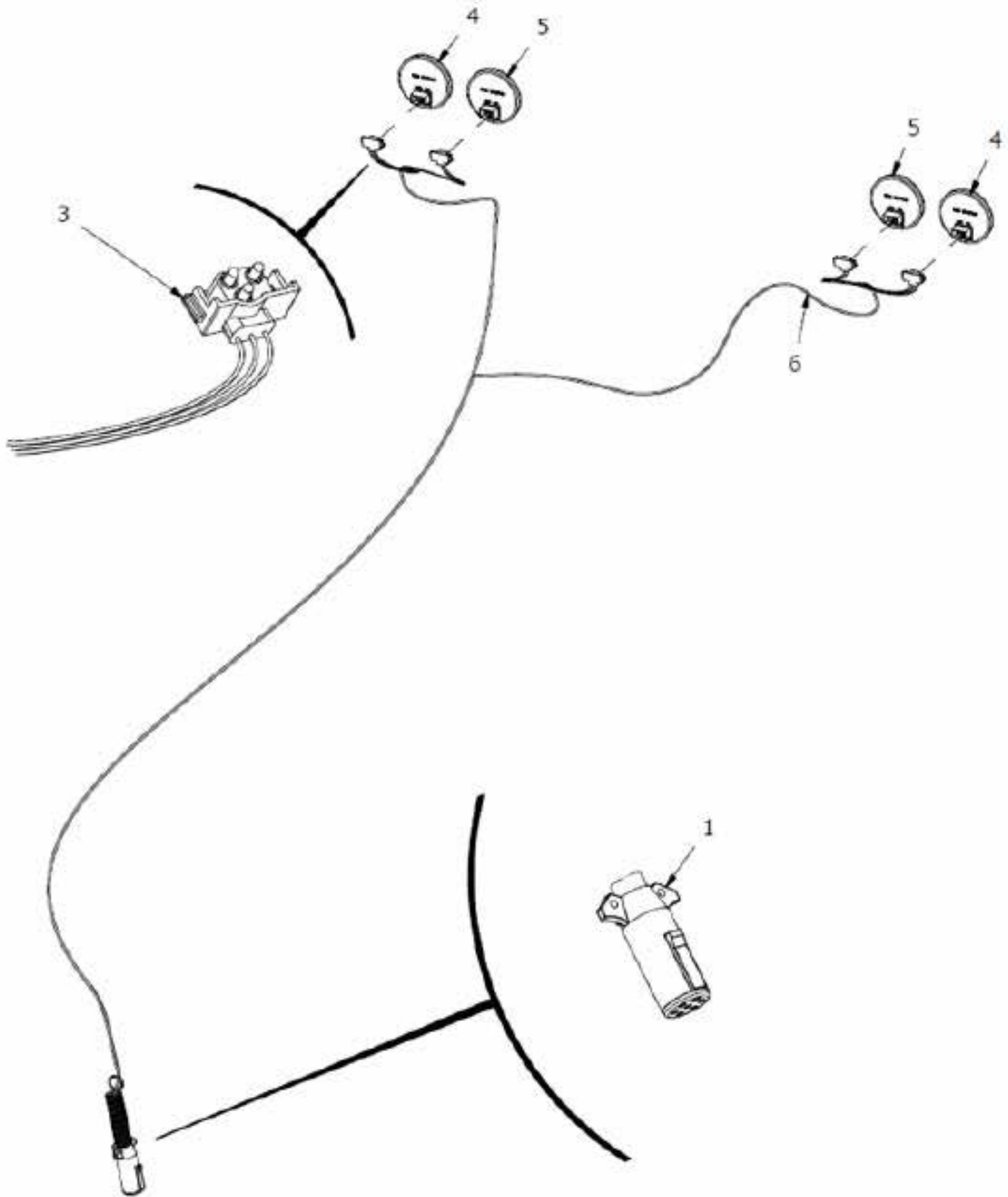
## Light Kit Hydraulics



## Light Kit Hydraulics

Item	Qty	Part #	Description
1	2	30801	Hose .375 (FJX-6, FJ90-6-8) 10"
2	4	HF 6801-6-6	Hydraulic Fitting
3	2	30800	Hose .375 (FJX-6, FJ90-6-8) 43"
4	4	HF 6804-8-8	Hydraulic Fitting

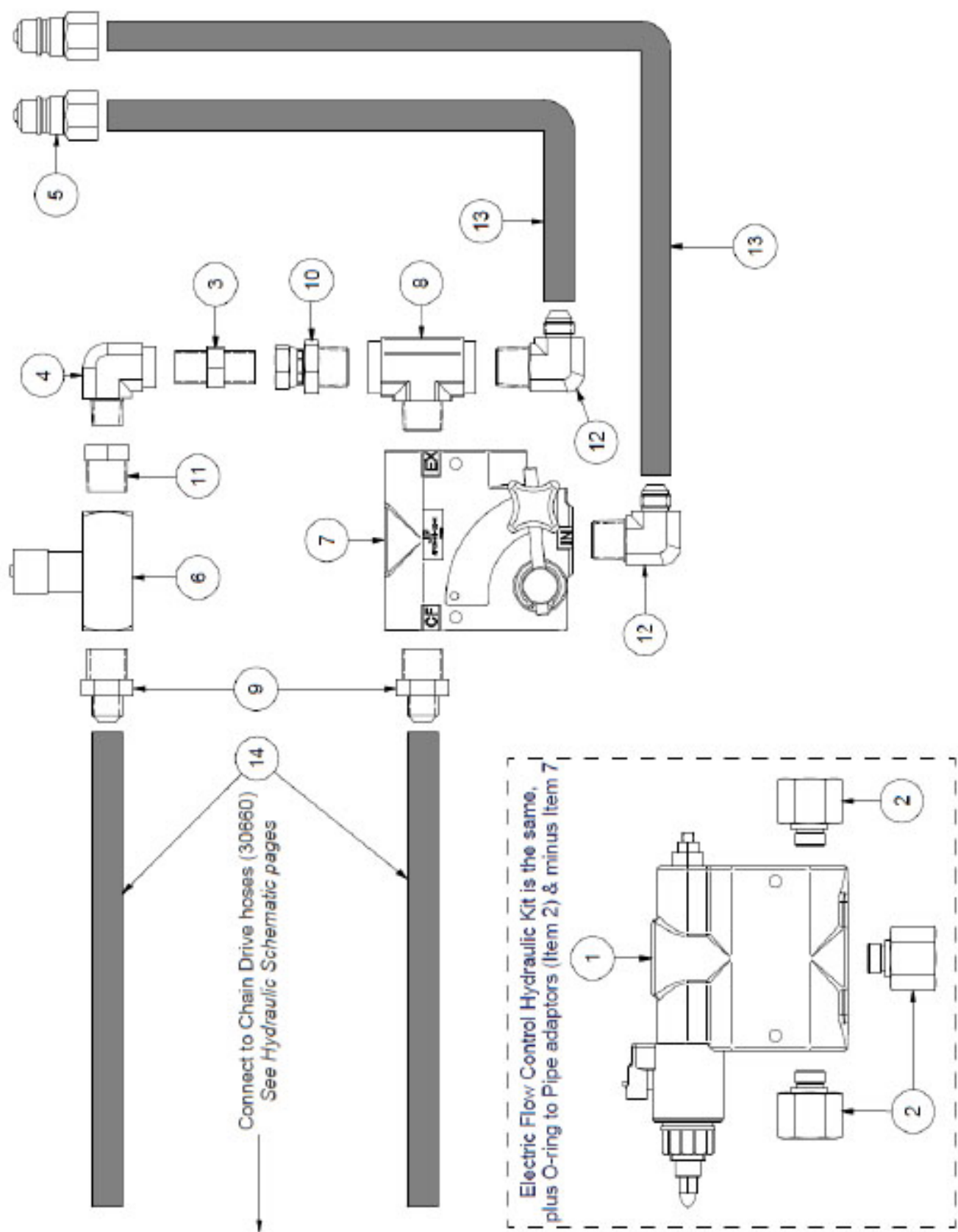
## Light Kit Wiring Harness



## Light Kit Wiring Harness

Item	Qty	Part #	Description
1	1	TL550-200-117	Female 7 Pin Plug
	1	31798	Grommet
3	4	31790	Individual Light Wiring
4	2	31788	Red Tail Light
5	2	31789	Amber Tail Light
6	1	36924	Light Wiring Harness
	1	31573	Complete Wiring

Flow Control Hydraulics

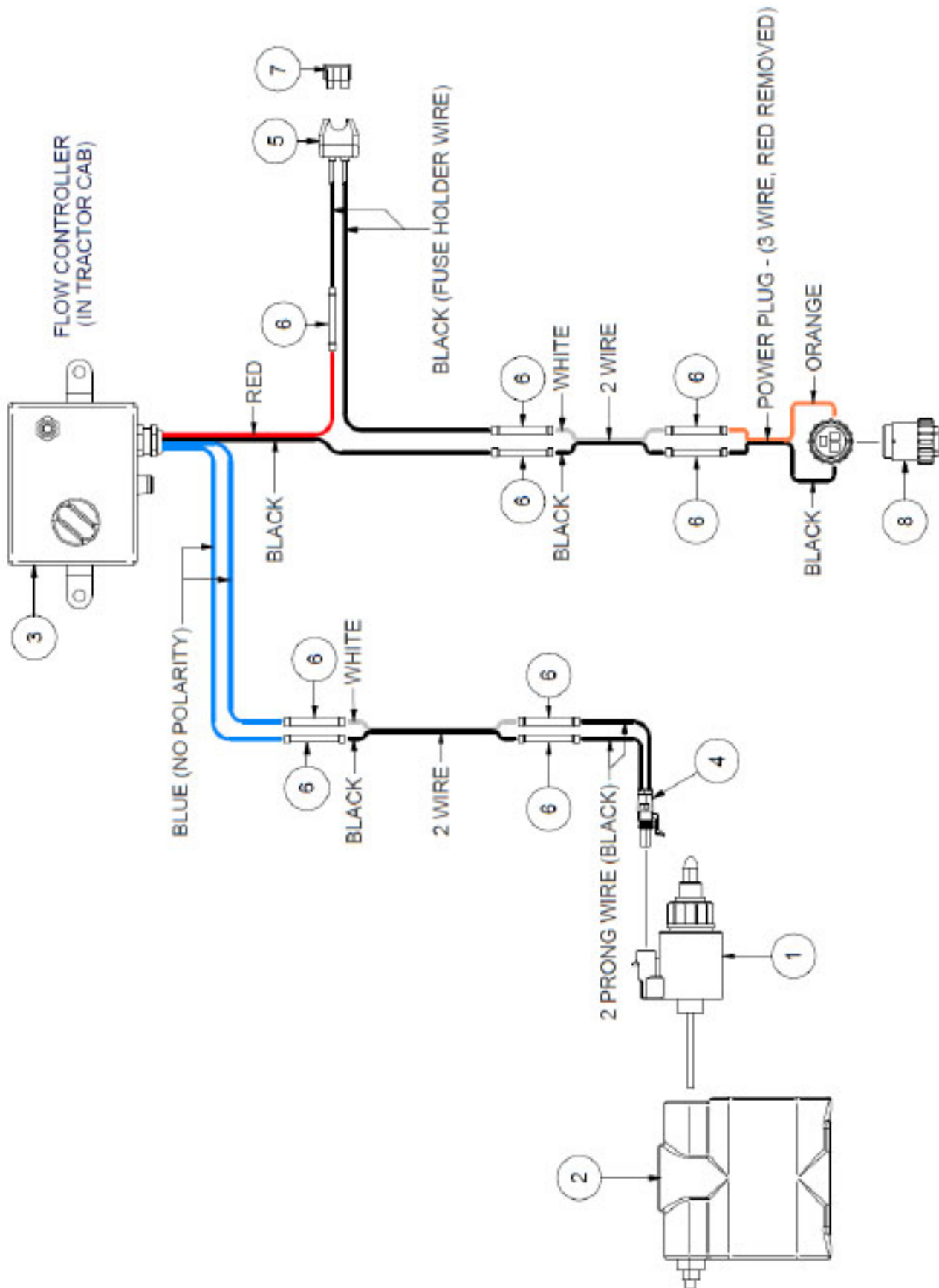


## Flow Control Hydraulics

Item	Qty	Part #	Description
1	1	37976	Electric Flow Control
2	3	HF 6405-8-12	Hydraulic Adaptor
3	1	HF 5404-8-8	Hydraulic Fitting
4	1	HF 5502-8-8	Hydraulic Fitting
5	2	HF 8010-4	Male Quick Coupler
6	1	30857	3/4" Flow Control Valve
7	1	30855	Manual Flow Control
8	1	HF 5604-12-12-12	Hydraulic Tee Fitting
9	2	HF 2404-8-12	Hydraulic Adaptor
10	1	HF 1404-12-8	Hydraulic Adaptor
11	1	HF 5406-12-8	Hydraulic Fitting
12	2	HF 2501-8-12	Hydraulic Fitting
13	2	30661	1/2" Hydraulic Hose (8FJX,8MP) - 69"
14	2	37987	1/2" Hydraulic Hose (8FJX,8FJX) - 73"



## Electric Flow Control Wiring



## Electric Flow Control Wiring

Item	Qty	Part #	Description
1	1	37968	Solenoid
2	1	37974	Flow Control
	1	37976	Complete Electric Flow Control
3	1	37969	Flow Controller
4	1	37970	2 Prong Plug
5	1	82-2164	Fuse Holder
6	9	EL23662	Wire Connector
7	1	TL550-100-079	15 AMP Fuse
8	2	TB109-110-307	Power Plug

## Chain Drive Hydraulics

### Reversing the Apron Chain (with Optional Flow Control)

To prevent accidental reversal of the apron chain and ensuing spreader damage, the apron chain safety valve must be opened manually to reverse the apron chain. The apron chain safety valve is located on the variable speed control valve at the front of the spreader. When this valve is opened (turned counter-clockwise), the direction of the apron chain can be reversed.

To return the apron chain direction to normal rearwards travel, close (turn clockwise rotation) the apron chain safety valve.














Apron chain reverse safety valve.

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# Torque Value Chart - Imperial

## UNIFIED INCH BOLT AND CAP SCREW TORQUE VALUES

SAE Grade and Head Markings	NO MARK	1 or 2 <sup>b</sup>	5	5.1	5.2	8	8.2
							
SAE Grade and Nut Markings	NO MARK	2	5		8		
							

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Size	Grade 1				Grade 2 <sup>b</sup>				Grade 5, 5.1, or 5.2				Grade 8 or 8.2			
	Lubricated <sup>a</sup>		Dry <sup>a</sup>		Lubricated <sup>a</sup>		Dry <sup>a</sup>		Lubricated <sup>a</sup>		Dry <sup>a</sup>		Lubricated <sup>a</sup>		Dry <sup>a</sup>	
	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.

<sup>a</sup> "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.

<sup>b</sup> 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.











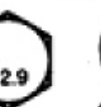
















Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

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.

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# Torque Value Chart - Metric

## METRIC BOLT AND CAP SCREW TORQUE VALUES

Property Class and Head Markings	<div>4.8</div> <div></div> <div></div> <div></div>	<div>8.8</div> <div></div> <div></div> <div></div>	<div>9.8</div> <div></div> <div></div> <div></div>	<div>10.9</div> <div></div> <div></div> <div></div>	<div>12.9</div> <div></div> <div></div> <div></div>
Property Class and Nut Markings	<div>5</div> <div></div> <div></div> <div></div>	<div>10</div> <div></div> <div></div> <div></div>	<div>10</div> <div></div> <div></div> <div></div>	<div>12</div> <div></div> <div></div> <div></div>	

Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated <sup>a</sup>		Dry <sup>a</sup>		Lubricated <sup>a</sup>		Dry <sup>a</sup>		Lubricated <sup>a</sup>		Dry <sup>a</sup>		Lubricated <sup>a</sup>		Dry <sup>a</sup>	
	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.

<sup>a</sup> "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.

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