PROAG

Morris

OPERATOR'S MANUAL

Auto Align Bale Runner
Model 16K PLUS

K49355-05

Original Issue Date of Manual

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Any updated pages after this date will have the revision date printed on the bottom of the pages.

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Table of Contents

Section 1: Safety

Section Contents

SAFETY-ALERT SYMBOL

Watch for this symbol. It identifies potential hazards to health or personal safety. It means:

ATTENTION - BE ALERT. YOUR SAFETY IS INVOLVED.

Familiarize yourself with the location of all decals. Read them carefully to understand the safe operation of your machine.

Signal Words

The words **DANGER, WARNING** or **CAUTION** are used with the safety alert symbol. Learn to recognize the safety alerts, and follow the recommended precautions and safe practices.

Three words are used in conjunction with the safety-alert symbol:

DANGER — **Indicates an imminently hazardous situation that, if not avoided, will cause DEATH OR VERY SERIOUS INJURY.**

WARNING — **Indicates a potentially hazardous situation that, if not avoided, could cause DEATH OR SERIOUS INJURY.**

CAUTION — **Indicates a potentially hazardous situation that, if not avoided, may cause a MINOR OR MODERATE INJURY.**

Replace any **DANGER, WARNING, CAUTION** or instructional decal that is not readable or is missing. The location and part number of these decals is identified later in this section of the manual.

The words **Important** and **Note** are not related to personal safety but are used to give additional information and tips for operating or servicing this equipment.

IMPORTANT: Identifies special instructions or procedures which, if not strictly observed could result in damage to, or destruction of the machine, process or its surroundings.

NOTE: Indicates points of particular interest for more efficient and convenient repair or operation.

General Equipment Safety

⚠ SAFETY. . . YOU CAN LIVE WITH IT!

General Equipment Safety Guidelines

Safety of the operator is one of the main concerns in designing and developing a new piece of equipment. Designers and manufacturers build in as many safety features as possible. 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 presented in this section. To avoid personal injury, study the following precautions and insist those working with you, or for you, follow them.

- Replace any **CAUTION, WARNING, DANGER** or instruction safety decal that is not readable or is missing. Location of such decals is indicated in this booklet.
- Do not attempt to operate this equipment under the influence of drugs or alcohol.
- Review the safety instructions with all users annually.
- This equipment is dangerous to children and persons unfamiliar with its operation. The operator should be a responsible adult familiar with farm machinery and trained in the equipment's operations. **Do not allow persons to operate 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.**
- To prevent injury or death, use a tractor equipped with a Roll Over Protective System (ROPS).
- 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.
- Never exceed the limits of a piece of machinery. If its ability to do a job, or to do so safely, is in question **- DON'T TRY IT.**

Lighting and Marking

- It is the responsibility of the operator to know the lighting and marking requirements of the local highway authorities and to install and maintain any additional equipment to provide compliance with the regulations. Aftermarket lighting kits are often available from your dealer.
- This machine is equipped with lighting, marking, and signs in compliance with standards published by the American Society of Agricultural Engineers for Slow Moving Agricultural Implements on Public Roadways.

Wheels and Tires

Tire Safety

- Failure to follow proper procedures when mounting a tire on a wheel or rim can produce an explosion which may result in serious injury or death.
- Do not attempt to mount a tire unless you have the proper equipment and experience.
- Inflating or servicing tires can be dangerous. Only trained personnel should be called to service and/or mount tires.
- Only install tires and wheels with appropriate capacity to meet or exceed the anticipated weight to be placed on the equipment.

DON'T FORGET! *Your best assurance against accidents is a careful and responsible* operator. If there is any portion of this manual or function you do not understand, contact your local authorized dealer or the manufacturer.

Brake Safety

Brakes are Important! Brakes are an option on this machine. If your machine is equipped with brakes, please observe the following guidelines regarding operation, maintenance, and adjustment.

- Follow all connection procedures under "Hooking Up for the First Time" in Section 5 of this manual. For the brakes to operate properly, they must be connected properly.
- Be sure all the brakes are adjusted properly, following the procedures outlined under "Air Brake Maintenance" in Section 6 of this manual. If the brakes are not adjusted properly, they will not operate properly.
- Use caution whenever operating this machine. Even though brakes are available for use, this machine can still be driven too quickly for the conditions. Always allow plenty of time to slow down for emergency situations.
- Test the brakes before operation.
- Applying the brakes to lockup will cause the stacker to slide and behave erratically. Avoid this situation.

Bale Runner Operation Safety

Before Operating

- Carefully study and understand this manual.
- Install and test the control box to indicate when the hitch is offset.
- Do not wear loose-fitting clothing which may catch in moving parts.
- Always wear protective clothing and foot wear.
- It is recommended that suitable protective hearing and eye protection be worn.
- The operator may come in contact with certain materials which may require specific safety equipment, relative to the handling of such materials (examples: extremely dusty molds, fungus, bulk fertilizers, etc.)
- Keep wheel lug nuts or bolts tightened to specified torque.
- Ensure that the tires are inflated to the recommended pressure.
- Give the unit a visual inspection for any loose bolts, worn parts or cracked welds, and make necessary repairs. Follow the maintenance safety instructions included in this manual.
- Be sure that there are no tools lying on or in the equipment.
- Do not use the unit until you are sure that the operating area is clear, especially of people and animals.
- Because it is possible that this equipment may be used in dry areas or in the presence of combustibles, special precautions should be taken to prevent fires and fire fighting equipment should be readily available.
- Don’t hurry the learning process or take the unit for granted. Ease into it and become familiar with your new equipment.
- Practice operation of your equipment and its attachment. Completely familiarize yourself and other operators with its operation before using.
- Make sure that the brakes are evenly adjusted.
- Use a tractor equipped with a Roll Over Protective System (ROPS) and fasten your seat belt prior to starting the engine.
- Move tractor wheels to the widest recommended settings to increase stability.
- Securely attach to towing unit. Use the plates, bolts and nuts provided with the machine.
- Do not allow anyone to stand between the hitch and the towing vehicle when backing up to the equipment.

Bale Skoop Operation Safety - Continued

During Operation

- **SAFETY CHAIN:** If the Bale Runner is going to be transported on a public highway, the safety chain should be connected. Always follow state and local regulations regarding a safety chain and auxiliary lighting when towing farm equipment on a public highway. Only a safety chain (not an elastic or nylon/plastic tow strap) should be used to retain the connection between the towing and towed machines in the event of separation of the primary attaching system.
- Install the safety chain by crossing the chains under the hitch and secure to the draw bar cage, hitch or bumper frame.
- Beware of bystanders, **particularly children!** Always look around to make sure that it is safe to start the engine of the towing vehicle or move the unit. This is particularly important with high noise levels and quiet cabs, as you may not hear people shouting.
- **NO PASSENGERS ALLOWED:** Do not carry passengers anywhere on or in the tractor or equipment.
- The tops of the bed and loader are extremely slippery, do not climb, stand, or crawl on them.
- Keep bystanders at least twenty-five feet away from an operating machine or stacked hay. This allows bystanders time to get away from a falling stack or away from a moving machine. The operator is a very busy person and it is easy to miss seeing an observer while operating the Bale Runner.
- Keep hands and clothing clear of moving parts.
- Do not clean, lubricate or adjust your equipment while it is moving.
- When halting operation, even for a short period of time, set the tractor's or towing vehicle's brakes, disengage the PTO, shut off the engine and remove ignition key.
- Be especially observant of the operating area and terrain - watch for holes, rocks or other hidden hazards. Always inspect the area prior to operation.
- **DO NOT** operate near the edge of drop-offs or banks.
- **DO NOT** operate on steep slopes as overturn may result.
- Operate up and down (not across) intermediate slopes. Avoid sudden starts and stops.
- Pick the flattest possible route when transporting across fields. Avoid the edges of ditches or gullies and steep hillsides.
- Always return the hitch to the in-line position whenever moving from the stack to the bales or the bales to the stack.
- Be extra careful when working on inclines.
- Periodically clear the equipment of brush, twigs or other materials to prevent buildup of dry combustible materials.
- Maneuver the tractor or towing vehicle at safe speeds.
- Avoid overhead wires or other obstacles. Contact with overhead lines could cause serious injury or death.
- Avoid loose fill, rocks and holes; they can be dangerous for equipment operation or movement.
- Allow for unit length when making turns.
- Do not walk or work under raised components or attachments unless securely positioned and blocked.
- Keep all bystanders, pets and livestock clear of the work area.

Bale Skoop Operation Safety - Continued

During Operation - Continued

- Operate the towing vehicle from the operator's seat only.
- Never stand alongside of unit with engine running or attempt to start engine and/or operate machine while standing alongside the unit.
- Never leave running equipment attachments unattended.
- As a precaution, always recheck the hardware on equipment following every 100 hours of operation. Correct all problems. Follow the maintenance safety procedures.

After Operation (Storage)

- Following operation, or when unhitching, stop the tractor or towing vehicle, set the brakes, disengage the PTO and all power drives, shut off the engine and remove the ignition key.
- Store the unit in an area away from human activity.
- Do not park equipment where it will be exposed to livestock for long periods of time. Equipment damage and livestock injury could result.
- The tops of the bed and loader are extremely slippery, do not climb, stand, or crawl on them.
- Do not permit children to play on or around the stored unit.
- Make sure all parked machines are on a hard, level surface and engage all safety devices.
- Wheel chocks may be needed to prevent unit from rolling.

Transport Safety

Highway and Transportation Safety

CAUTION: Exceeding speeds of 20 mph (32 km/h) is not legal or safe on public roads. DO NOT exceed 20 mph (32 km/h) with this machine.

WARNING: This machine is over width. Use extreme caution transporting on public roadways and through narrow areas.

- Adopt safe driving practices. . .
- Keep the brake pedals latched together at all times. **NEVER USE INDEPENDENT BRAKING WITH MACHINE IN TOW AS LOSS OF CONTROL AND /OR UPSET OF UNIT CAN RESULT.**
- Always drive at a safe speed relative to local conditions and ensure that your speed is low enough for an emergency stop to be safe and secure.
- Reduce speed prior to turns to avoid the risk of overturning.
- Avoid sudden uphill turns on steep slopes.
- Always keep the tractor or towing vehicle in gear to provide engine braking when going downhill. Do not coast.
- Do not drink and drive!
- Comply with local laws governing highway safety and movement of farm machinery on public roads.
- Be sure stock lights as well as accessory lights are connected and operating properly.
- Use approved accessory lighting, flags and necessary warning devices to protect operators of other vehicles on the highway during daylight and night time transport. Various safety lights and devices are available from your dealer.
- The use of flashing amber lights is acceptable in most localities, however some localities prohibit their use. Local laws should be checked for all highway lighting and marking requirements.
- When driving the tractor and equipment on the road or highway under 20 mph (32 km/h) at night or during the day, use flashing amber warning lights and a slow moving vehicle (SMV) identification emblem.
- Be sure stock lights as well as accessory lights are connected and operating properly.
- Plan your route to avoid heavy traffic.
- Be a safe courteous driver. Always yield to oncoming traffic in all situations, including narrow bridges, intersections, etc.
- Watch for obstructions overhead and to the side while transporting.
- Always operate equipment in a position to provide maximum visibility at all times. Make allowances for increased length, width and weight of the equipment when making turns, stopping the unit, etc.

Maintenance Safety

Performing Maintenance

- Good maintenance is your responsibility. Poor maintenance is an invitation for trouble.
- Make sure there is plenty of ventilation. Never operate the engine of the towing vehicle in a closed building. The exhaust fumes may cause asphyxiation.
- Before working on this machine, stop the towing vehicle, set the brakes, disengage the PTO and all power drives, **shut off the engine and remove the ignition keys**.
- Be sure the bed is supported by a block positioned between the bed rest and the loader.
- Be certain all moving parts on attachments have come to a complete stop before attempting to perform maintenance.
- **Always** use a safety support and block the wheels. Never use a jack to support the machine.
- Always use the proper tools or equipment for the job at hand. Use extreme caution when making adjustments.
- A torque chart is provided in Section 6 of this manual for reference when tightening bolts and nuts.
- Never use your hands to locate a hydraulic leak on attachments. Use a piece of cardboard or wood. Hydraulic fluid escaping under pressure can penetrate the skin.
- When disconnecting hydraulic lines, shut off hydraulic supply and relieve all hydraulic pressure (see Maintenance Section 6 for instructions).
- Openings in the skin and minor cuts are susceptible to infection from hydraulic fluid. If injured by escaping hydraulic fluid, see a doctor at once. Without immediate medical treatment, serious infection, gangrene and allergic reactions can occur.
- Replace **all shields** and guards after servicing and before moving.
- After servicing, be sure all tools, parts and service equipment are removed.
- Do not allow grease or oil to build up on any step or platform.
- Never replace hex bolts with less than grade eight bolts unless otherwise specified. Refer to bolt torque chart for head identification marking.
- 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 claim responsibility for use of unapproved parts and/or accessories and other damages as a result of their use.
- If equipment has been altered in any way from original design, the manufacturer does not accept any liability for injury or warranty.
- A fire extinguisher and first aid kit should be kept readily accessible while performing maintenance on this equipment.

Air System Components

- Stop engine when working under a vehicle. Always block the vehicle wheels against a fore or aft roll. Bleeding off system air pressure may cause the vehicle to roll. Keep hands away from brake chamber, push rods, and slack adjusters; they may apply as system pressure drops.
- Never connect or disconnect a hose or line containing air pressure. It may whip as air escapes. Never remove a component or a pipe plug unless you are certain all system air pressure has been exhausted.
- Never exceed recommended working air pressure and always wear safety glasses when working with air pressure. Never look directly into component ports or direct a pressurized air flow at anyone.
- Never attempt to disassemble a component until you have read and understood all recommended procedures. Some components contain powerful springs and injury can result if not properly disassembled. Use only proper tools and observe all precautions pertaining to the use of those tools.

Safety Signs

Safety Decals

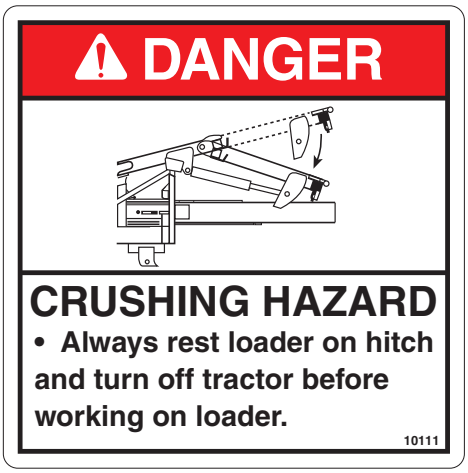
- Keep safety decals and signs clean and legible at all times.
- Replace safety decals and signs that are missing or have become illegible.
- Parts that have been replaced that once displayed a safety sign should have the sign replaced as well.
- Safety decals or signs are available from your distributor, dealer parts department, or the manufacturer.

How to install a new decal

1. Be sure that the installation area is clean and dry.
2. Decide on the exact position before you remove the backing paper.
3. Remove the smallest portion of the split backing paper.
4. Align the decal over the specified area and carefully press the small portion with the exposed sticky backing in place.
5. Slowly peel back the remaining paper and carefully smooth the remaining portion of the decal in place.
6. Small air pockets can be pierced with a pin and smoothed out using the decal backing paper.

To determine missing decals, or to locate proper locations for replacements refer to the "Decal Location Guide" later in this section.

Part # 10110 – Danger Falling Bale Hazard
Location: Both sides of bed.

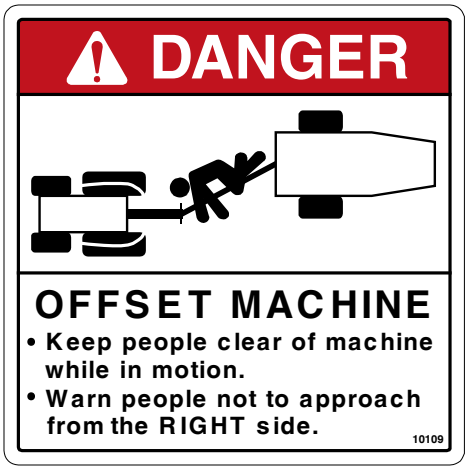


Part # 10111 Danger Crushing Hazard
Location: Left side of bed.

Safety Signs

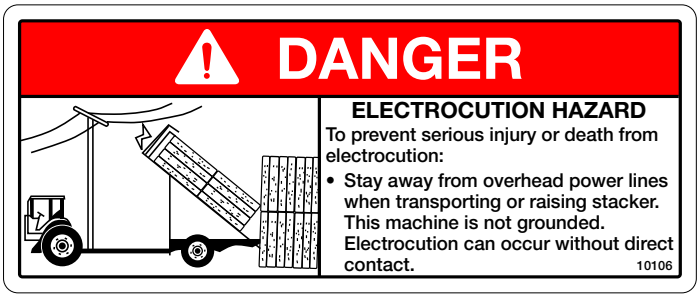
Part # 10119 – Danger Hitch Hazard
Location: Top of hitch.

Part # 10108 - Danger Pinch Injury
Location: Both sides of bed.



Part # 10109 - Danger Offset Machine
Location: Right side of bed.

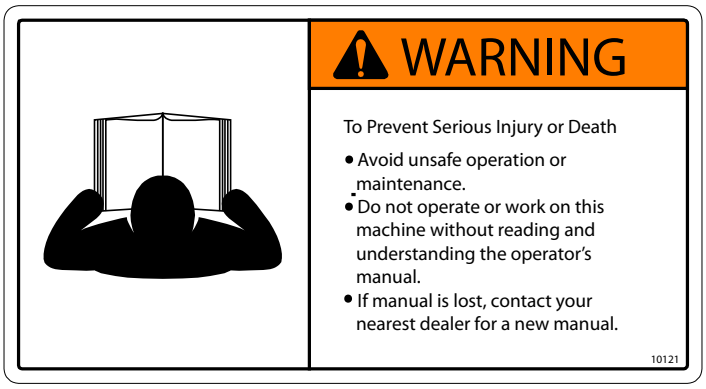
Part # 11549 - Danger Mechanism May Move
Location: Top of hitch.



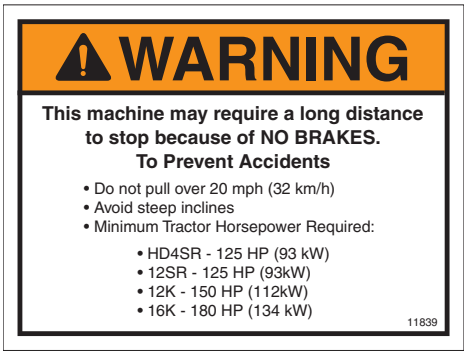
Part # 10106 - Danger Electrocution Hazard
Location: Top of hitch.

Familiarize yourself with the location of all decals. Read them carefully to understand the safe operation of your machine.

Safety Signs - Continued



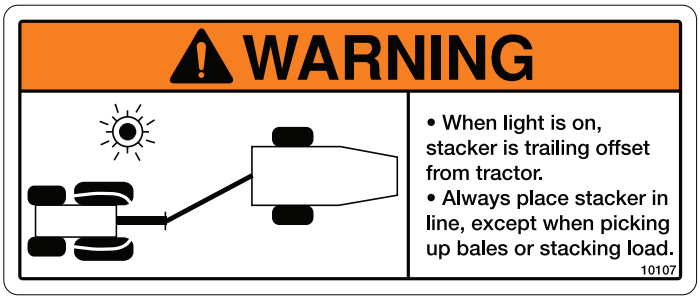
Part # 10121 – Warning To Prevent Serious Injury
Location: Top of hitch.



Part # 11839 - Warning No Brakes
Location: Top of hitch.

Part # 10120 - Warning High Pressure Fluid
Location: Top of hitch.

Part # 10123 - Warning Hitch Safety Pin
Location: Front of frame above hitch.



Part # 10107 - Warning Offset Machine
Location: Top of hitch.

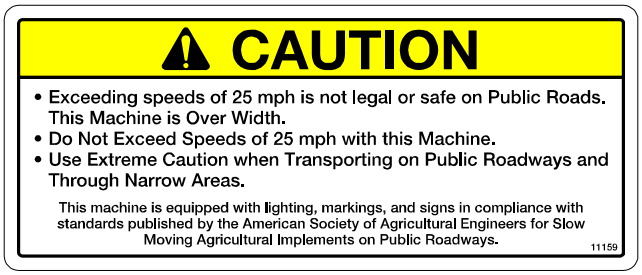
Part # 11546 - Warning Drag Chain Hazard
Location: Both sides of hitch.

Familiarize yourself with the location of all decals. Read them carefully to understand the safe operation of your machine.

Safety Signs - Continued

Part # 10122 – Caution Read Op Manual
Location: Top of hitch.

Part # 10112 - Caution Slippery Surface
Location: Both sides of bed.

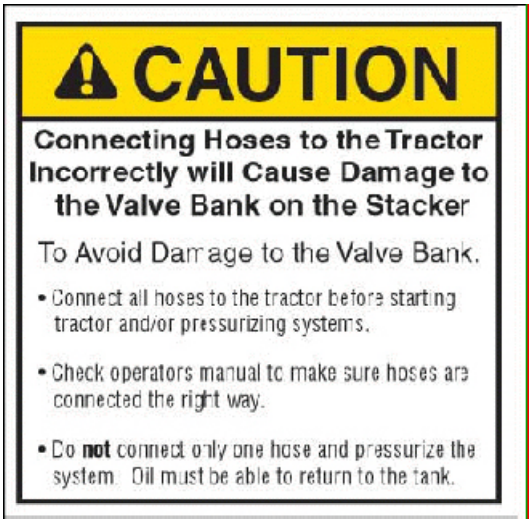


Part # 11159 - Caution Speed
Location: Top of hitch.

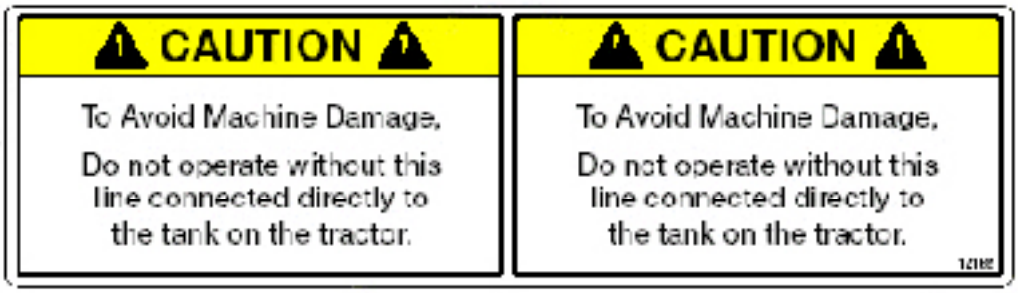
Part# 10774 Warning Torque Requirement Decal
Location: On frame next to suspension

Familiarize yourself with the location of all decals. Read them carefully to understand the safe operation of your machine.

Safety Signs - Continued



Part # 11548 - Caution Connecting Hoses
Location: Top of hitch.



Part # 12185 - Caution Drain Line Decal
Location: End of drain line.

Familiarize yourself with the location of all decals. Read them carefully to understand the safe operation of your machine.

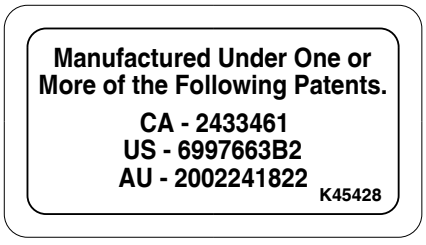
Safety Signs - Continued

Part # 12194 - ProAG Logo Decal
Location: Rear sides of bed.

AUTO LIGN BALE RUNNER 16K PLUS

Part# 11550 - Auto Align Bale Runner 16K PLUS
Location: Both sides of bed

Part # 12195 - Replacement Manual
Location: On frame by op manual box



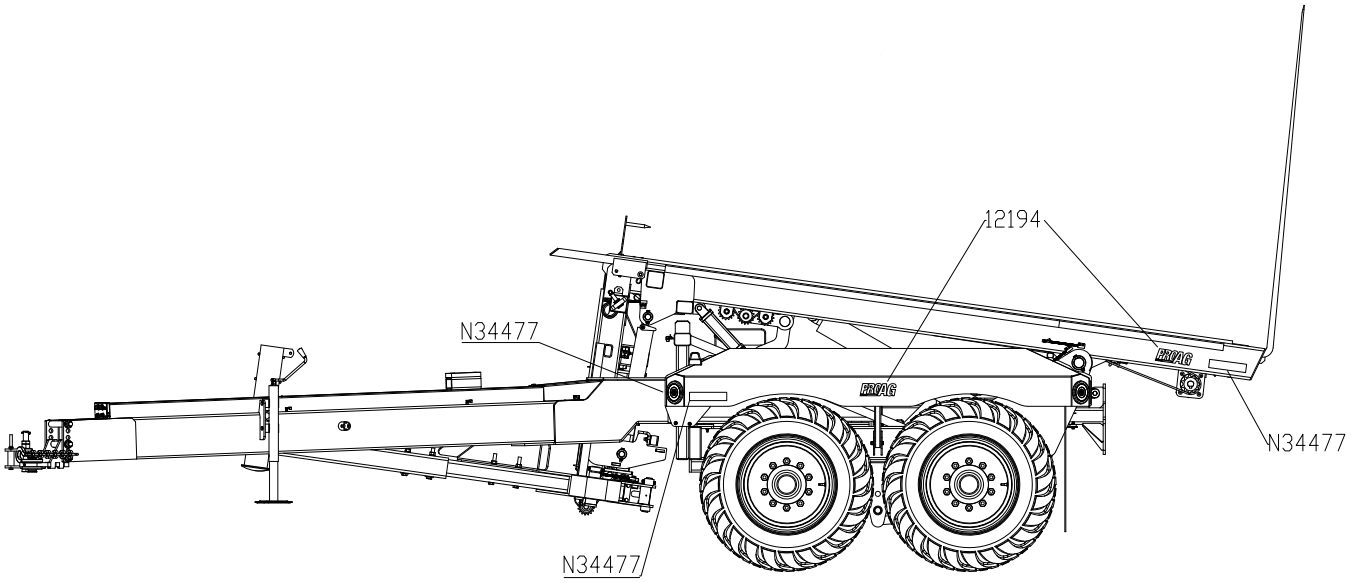
Part # K45428 - Patent Decal
Location: Both sides of bed.

Familiarize yourself with the location of all decals. Read them carefully to understand the safe operation of your machine.

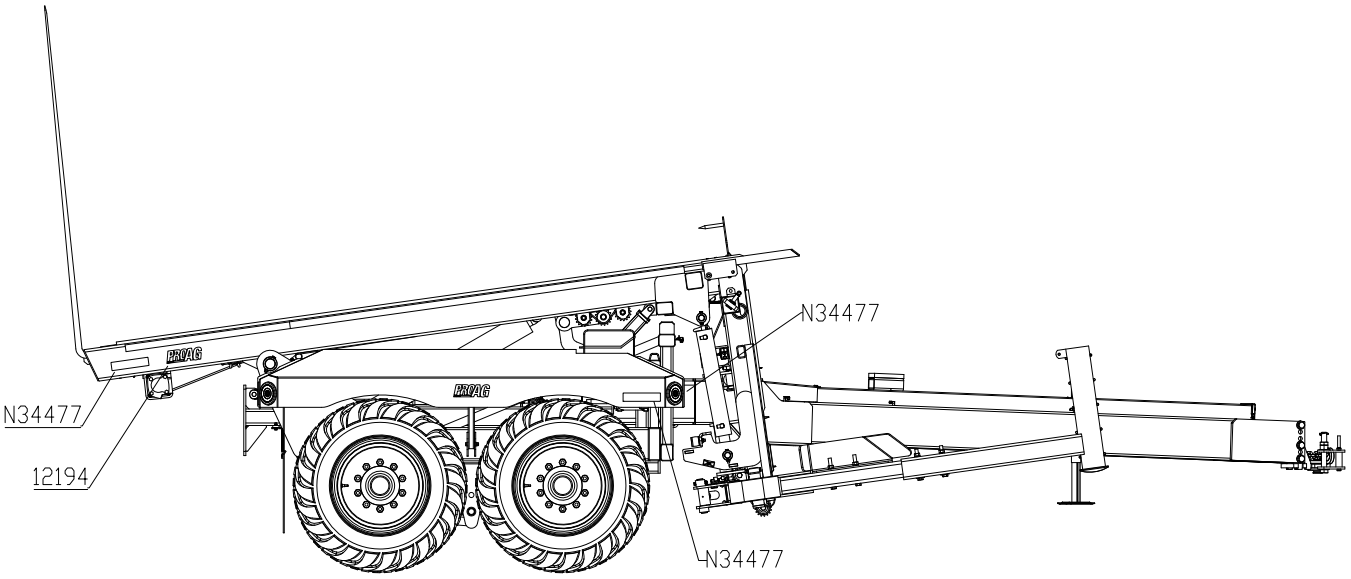
Safety Signs - Continued

Reflector Location Guide

Left Side



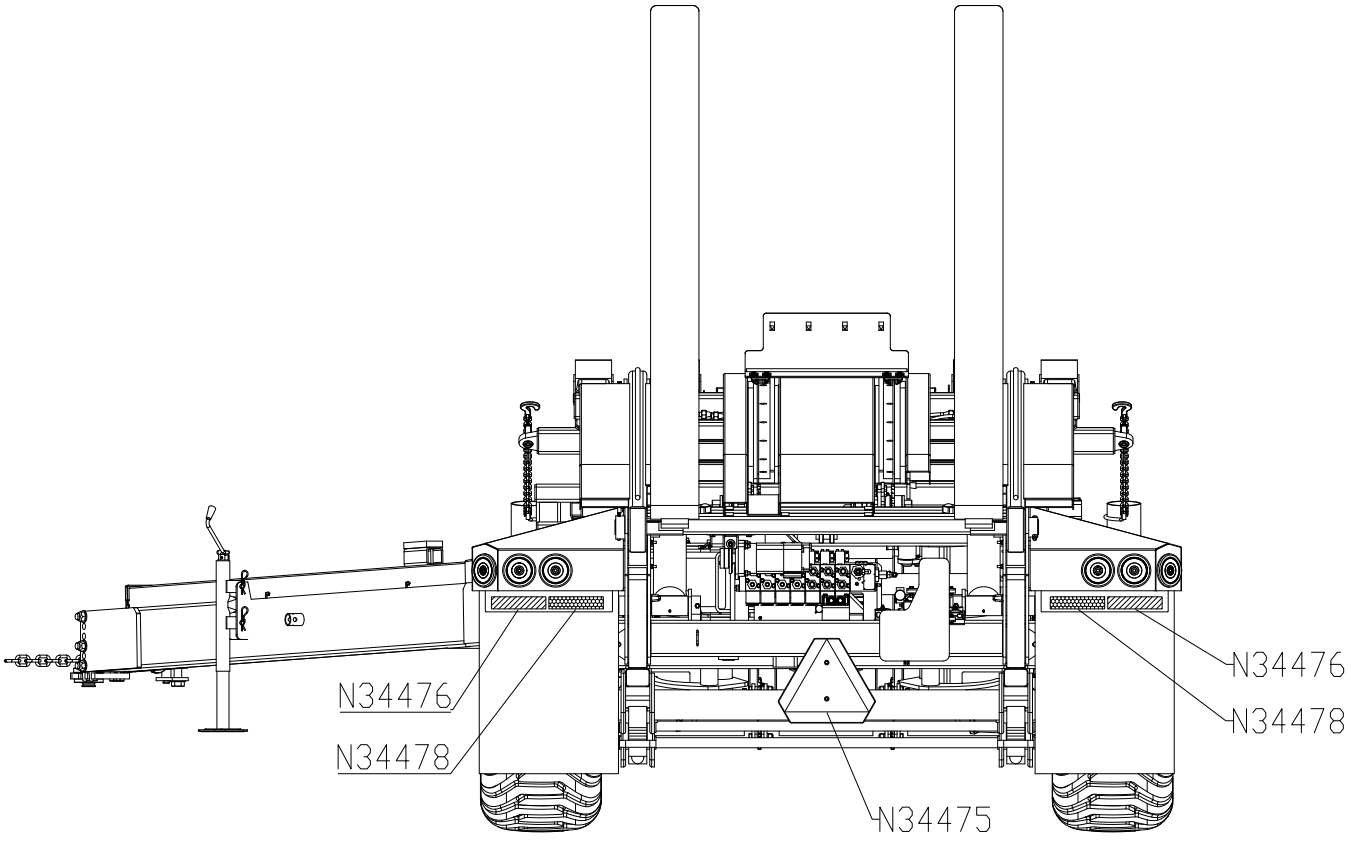
Right Side



Safety Signs - Continued

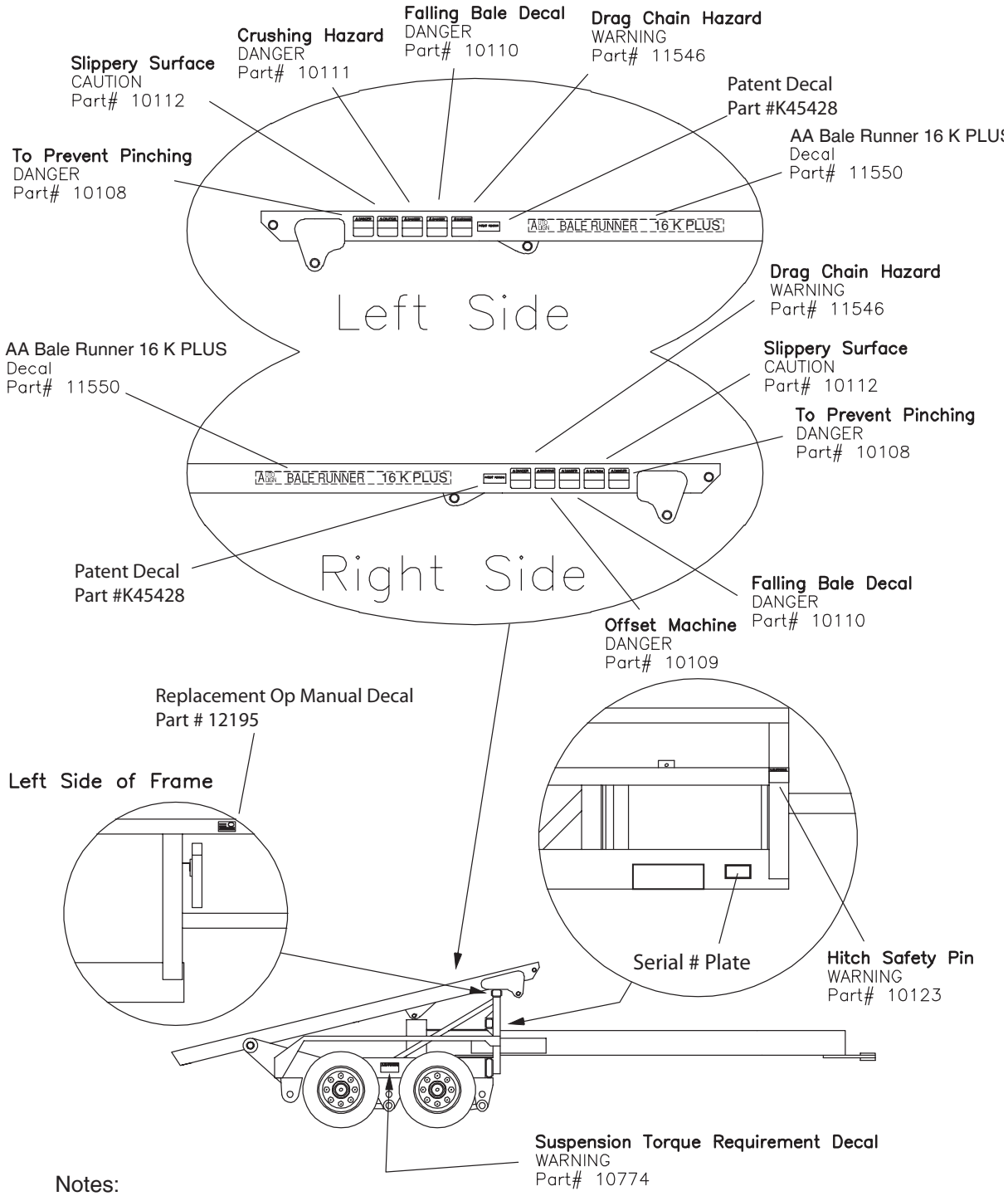
Reflector Location Guide - Continued

Rear View



Safety Signs - Continued

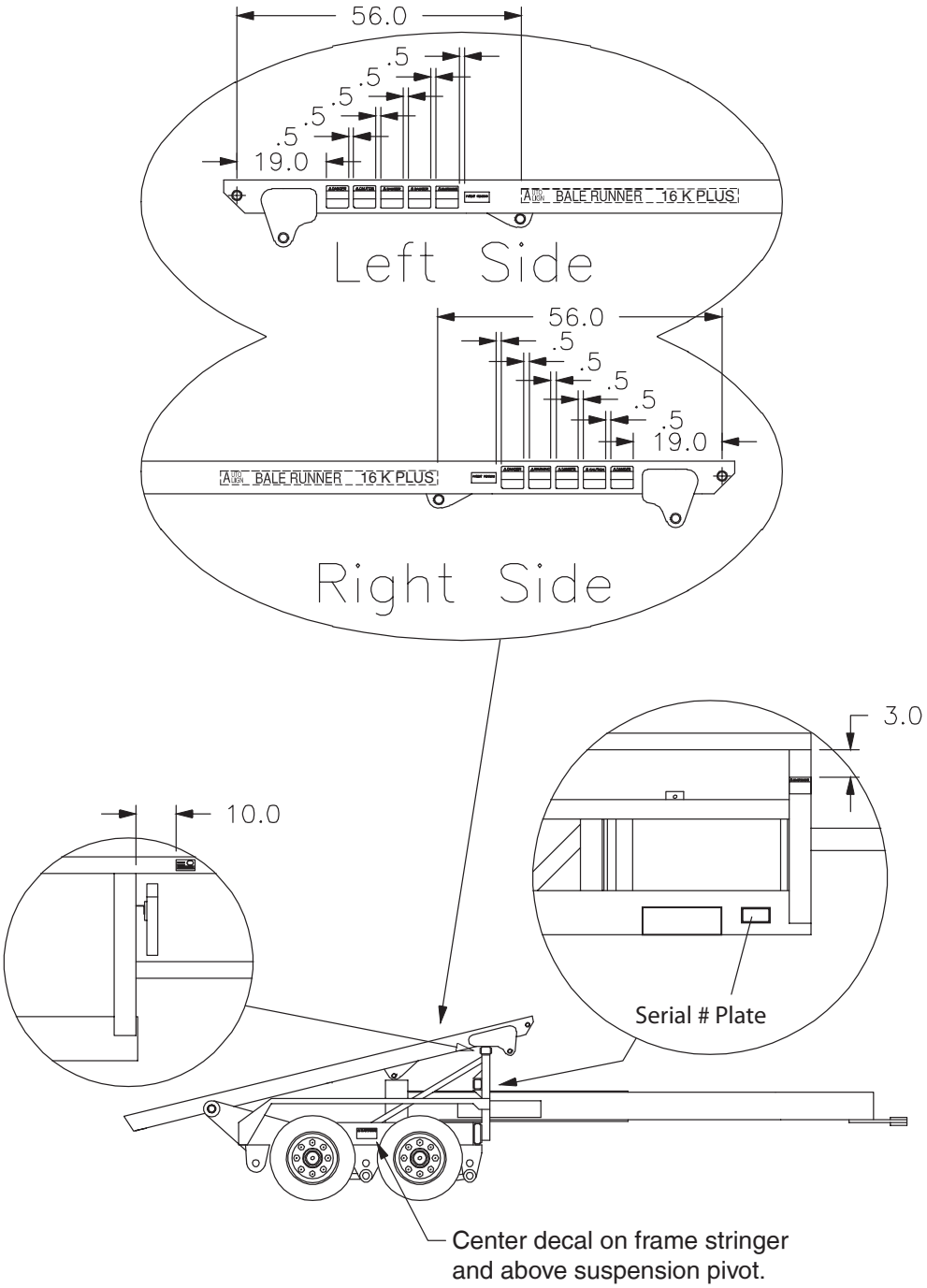
Decal Location Guide



Notes:
1. Some parts not shown for clarity.
2. Dimensional tolerance: ±1/2”

Safety Signs - Continued

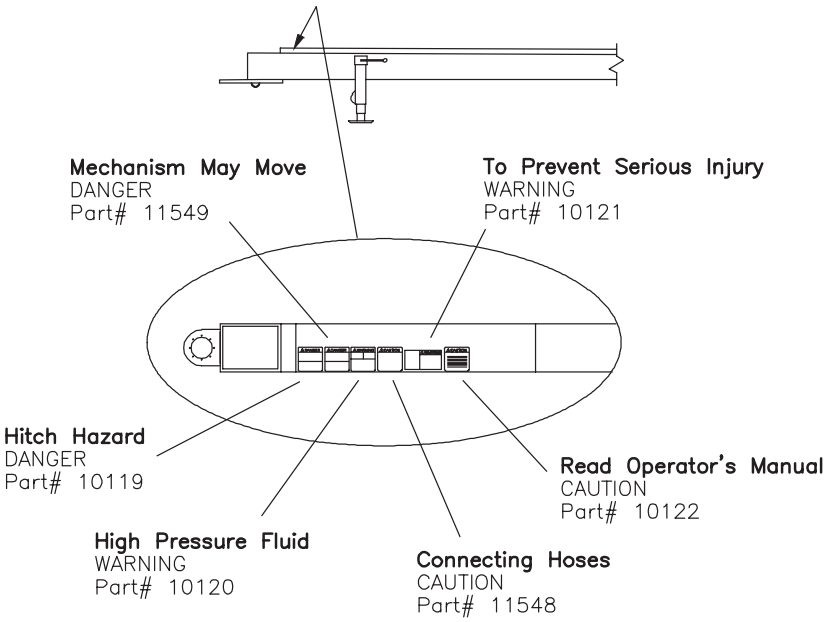
Decal Location Guide - Continued

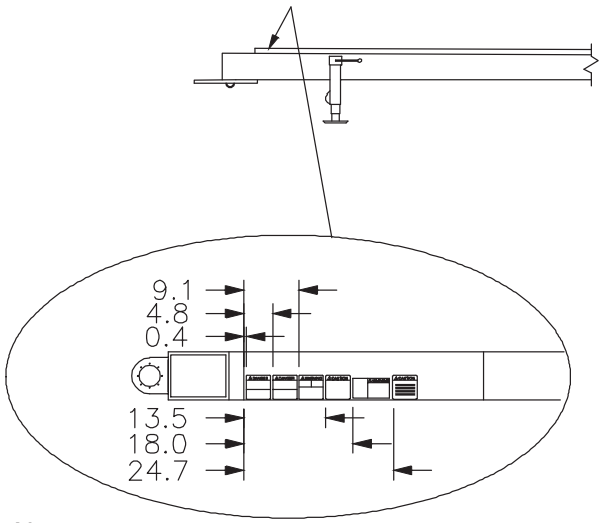


Note:
1. Dimensional tolerance: ±1/2”

Safety Signs - Continued

Decal Location Guide - Continued

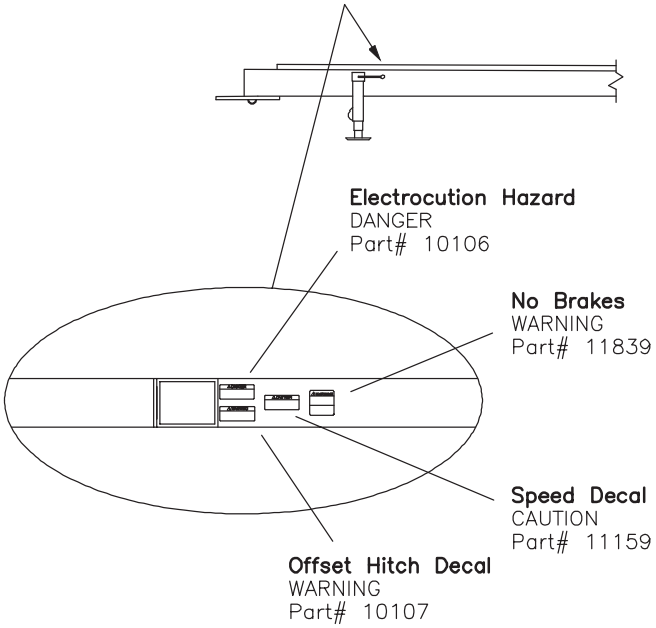


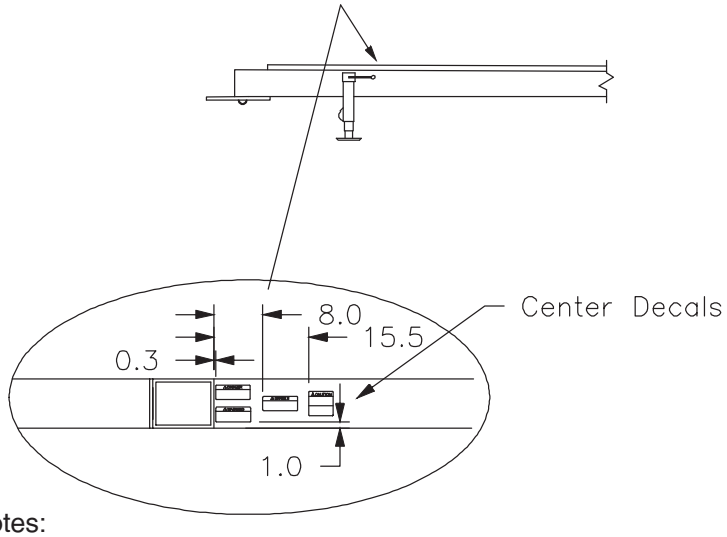


Notes:
1. Not all objects shown for clarity.
2. Dimensional tolerance: ±1/2”

Safety Signs - Continued

Decal Location Guide - Continued





Notes:
1. Not all objects shown for clarity.
2. Dimensional tolerance: ±1/2”

Notes

Section 2: Specifications

Section Contents

Specifications

Machine Specifications

16k PLUS

Maximum lift capacity of the loader ..... 4,500 lbs (2041 kg)
Maximum payload ..... 18,000 lbs (8165 kg)
Road-siding capacity in tons/hour ..... 80 - 120 (72 - 108 tonnes)
Stacker weight ..... 13,000 lbs (5897 kg)
Maximum Gross Vehicle Weight ..... 31,000 lbs (14062 kg)
Tongue weight empty ..... 1,300 lbs (590 kg)
Tongue weight loaded ..... 2,500 lbs (1134 kg)

Tractor Requirements

HP requirements ..... 180HP (134kW) minimum
Minimum tractor weight w/o brakes ..... 20,000 lbs (9072 kg)

Hydraulic Requirements

External drain port
Pressure and return ports
Minimum requirements
- Hydraulic pressure ..... 2,250 psi (15.51 MPa)
- Hydraulic flow ..... 20 Gpm (1.26 L/s)
- Hydraulic controls ..... 3 remotes (2 with double selector valve)

Tire Specifications

Tire brand ..... Alliance
Tire size ..... 500/45-22.5, 16 ply
Minimum tire pressure - Max speed 20 mph (32 km/h) ..... 35 psi (241 kPa)
Recommended tire pressure - Max speed 25 mph (40 km/h) ..... 46 psi (317 kPa)
Maximum tire pressure ..... 71 psi (489 kPa)

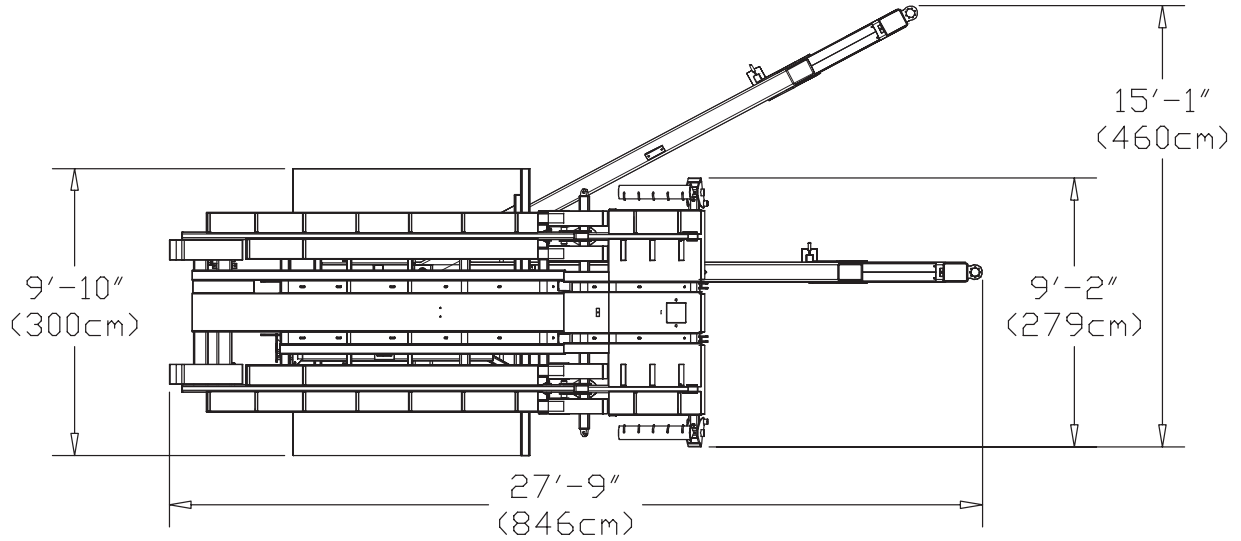
Bale Size

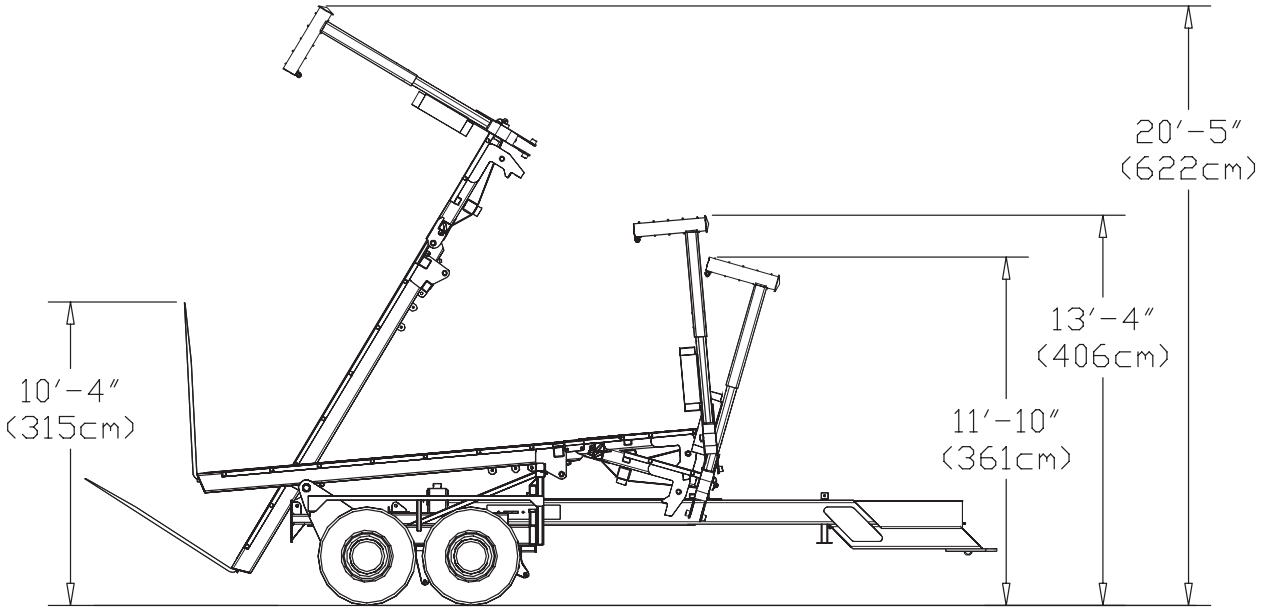
Minimum Bale Length ..... 6 1/2 ft (198 cm)
Maximum Bale Length ..... 8 1/2 ft (259 cm)

Lubricants

Hydraulic oil ..... High quality that meets or exceeds tractor specifications
Axle hub oil ..... 80-90 gear lube
Grease ..... Non clay based

Bale Runner Dimensions





Notes

Section 3: Checklist

Section Contents

SAFETY-ALERT SYMBOL

Watch for this symbol. It identifies potential hazards to health or personal safety. It points out safety precautions. It means:

ATTENTION - BE ALERT.

Your safety is involved.

Manuals

Note: Pre-Delivery Inspection Form must be completed and submitted to Morris Industries within 30 days of delivery date.

Warranty Void if Not Registered

Pre-Operation Checklist

Please read the Operator's Manual carefully and become a "SAFE" operator.

Adopt a good lubrication and maintenance program.

TAKE SAFETY SERIOUSLY.

DO NOT TAKE NEEDLESS CHANCES!!

OWNER REFERENCE

Model: _____

Serial No: _____

Dealer: _____

Town: _____ State: _____

Phone: _____

OWNER/OPERATOR: _____

Date: _____

Before operating Bale Runner check the following items:

Pre-Operation Check

____ **Lug nuts** - Check that all lug nuts are present and torqued to the appropriate specification.

____ **Pin retaining bolts** - Check for any missing or loose bolts or pins, replace or tighten as necessary.

____ **Hydraulic hoses** - Inspect all hydraulic hoses and replace any worn hoses. *Remember:* Use a piece of cardboard or wood to look for leaks, replace leaky hoses.

____ **Jack** - Check that the jack has been raised to its hightest position and that the extension leg has been fully retracted.

____ **Hitch Safety Pin** - If traveling, check that the Hitch Safety Pin is securely in place. If gathering or stacking, check that the Hitch Safety Pin has been removed.

____ **Warning Light** - Check that the Warning Light functions properly.

____ **Lighting** - Make sure the lighting is hooked up and functioning properly.

____ **Tire Pressure** - Check tire pressure to make sure it is within the specified range given on page 3 in the Machine Specifications section.

____ **Hitch Connection** - Check the bolt system that connects the stacker to the tractor drawbar. A loose connection will wear faster and possibly uncouple.

____ **Breakaway Device** - Make sure the hitch safety chain is connected.

____ **Brakes** - Check to see that the brake system is hooked up and functioning properly if so equipped.

Notes

Section 4: Introduction

Section Contents

Introduction

This Operator's Manual has been carefully prepared to provide the necessary information regarding the operation and adjustments, so that you may obtain maximum service and satisfaction from your new ProAG Bale Runner 16K PLUS.

To protect your investment, study your manual before starting or operating in the field. Learn how to operate and service your Bale Runner 16k PLUS correctly, failure to do so could result in personal injury or equipment damage.

If you should find that you require information not covered in this manual, contact your local ProAG Dealer. The Dealer will be glad to answer any questions that may arise regarding the operation of your ProAG Bale Runner 16k PLUS.

ProAG Dealers are kept informed on the best methods of servicing and are equipped to provide prompt, efficient service if needed.

Occasionally, your Bale Runner 16k PLUS may require replacement parts. Your Dealer will be able to supply you with the necessary replacement parts required. If the Dealer does not have the necessary part, the ProAG Factory will promptly supply the Dealer with it.

Your ProAG Bale Runner 16k PLUS is designed to give satisfaction even under difficult conditions. A small amount of time and effort spent in protecting it against rust, wear and replacing worn parts will increase the life and trade-in value.

Keep this book handy for ready reference at all times. It is the policy of ProAG to improve its products whenever it is possible to do so. The Company reserves the right to make changes or add improvements at any time without incurring any obligation to make such changes on machines sold previously.

Section 5: Operation

Section Contents

Section Contents

CAUTION

BE ALERT

SAFETY FIRST

REFER TO SECTION 1 AND REVIEW ALL SAFETY RECOMMENDATIONS.

Tractor

Tires

- Proper ballast and tire pressure are required when pulling heavy implements.
- Consult your tractor operator's manual and follow all recommended procedures.

Hydraulics

- Wipe all hydraulic fittings and couplers with a clean cloth to avoid contaminating the system.
- Check that the hydraulic reservoir is filled to the proper level.

Drawbar

- Center and pin in a fixed position for easier hitching and greater stability.

Warning

Do not permit smoking, sparks or an open flame where combustible fuels are being used. Keep the work area well ventilated.

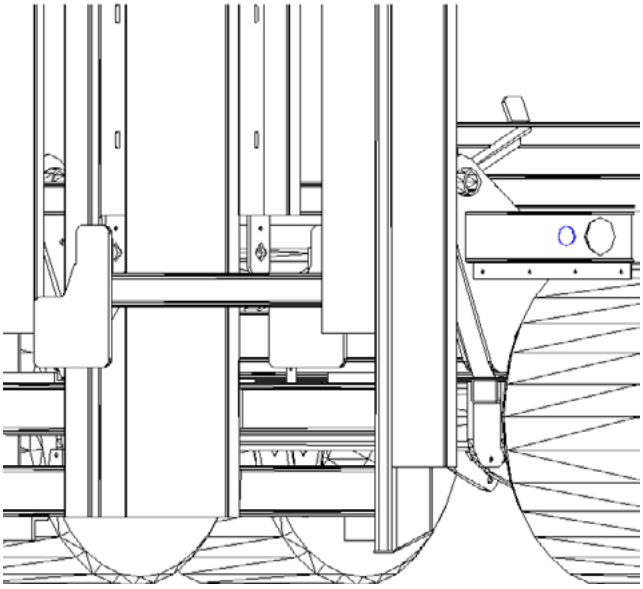
Warning

Do not search for high-pressure hydraulic leaks without hand and face protection. A tiny, almost invisible leak can penetrate skin, thereby requiring immediate medical attention.

Machine Conventions

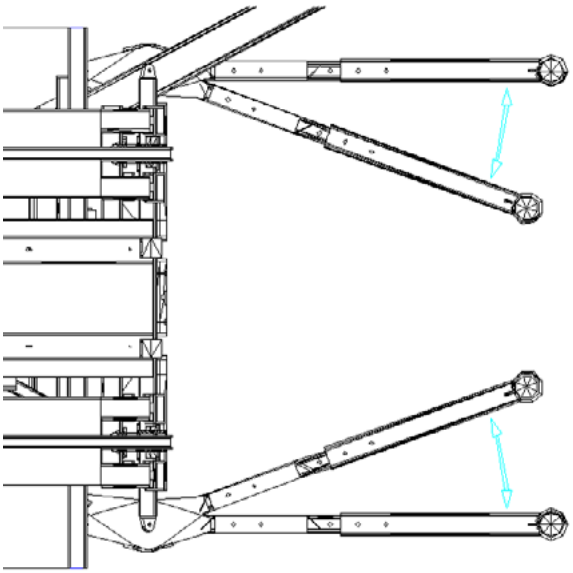
"Pushoff In" The pushoff is retracted into the pushoff tube.

"Pushoff Out" The pushoff is extended from the pushoff tube and penetrates through the hole in the rear of the bed. The bed must be fully raised before the pushoff tube can be extended, otherwise component collision is possible.



"Power Slider Home" The power slider is fully returned underneath the loader.

"Power Slider Back" The power slider has gone through half of its cycle and is positioned on top of the bed. This position varies along the bed depending on the number of bales that have already been gathered.



"Alignment Arms Open" The alignment arms are open when the portion of the alignment arms that are closest to the tractor are at their widest position.

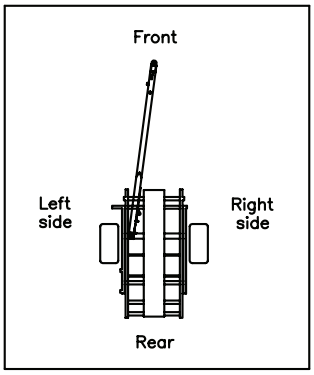
"Alignment Arms Closed" The alignment arms are closed when the portion of the alignment arms that are closest to the tractor are at their narrowest position.

"Grab Hooks In" The grab hooks are in when they are engaged, or grabbing the bale through the front of the loader.

"Grab Hooks Out" The grab hooks are out when they are disengaged back behind the loader, or have released the bale.

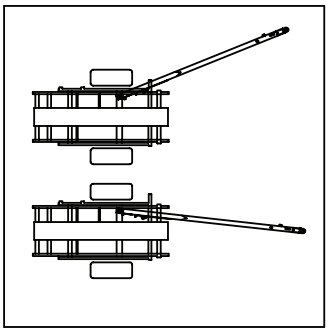
Machine Conventions

Auto Align Bale Runner Directional Conventions



"Right and Left" The right and left side of the Bale Runner is your right or left when standing behind the Bale Runner and looking toward the front of the machine.

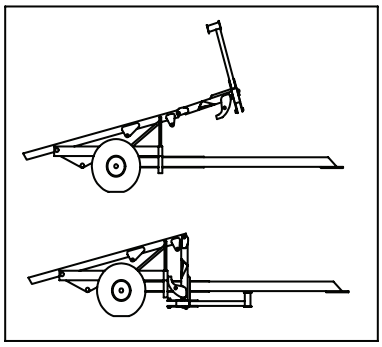
"Front and Rear" The front is the high end of the bed. The rear of the Bale Runner is the low end of the bed.



Hitch Offset — Hitch Inline

"Offset" The machine configuration when the Hitch is maneuvered to allow machine to pick up bales. The end of the Hitch is to the left of the left side tire.

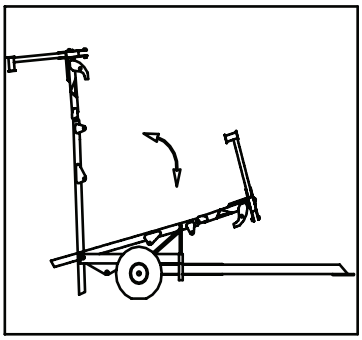
"Inline" The machine configuration when the end of the Hitch is centered between the wheels of the Bale Runner.



Loader Raised — Loader Lowered

"Raise the Loader" Move the hydraulic control to move, or physically lift the Loader into the raised position.

"Lower the Loader" Move the hydraulic control to move, or allow Loader to rest in the lowered position.



Bed Raised - Bed Lowerd

"Raise the Bed" Move the hydraulic control to move the Bed into the raised position.

"Lower the Bed" Move the hydraulic control to move the Bed into the lowered position.

Hydraulic System Configuration

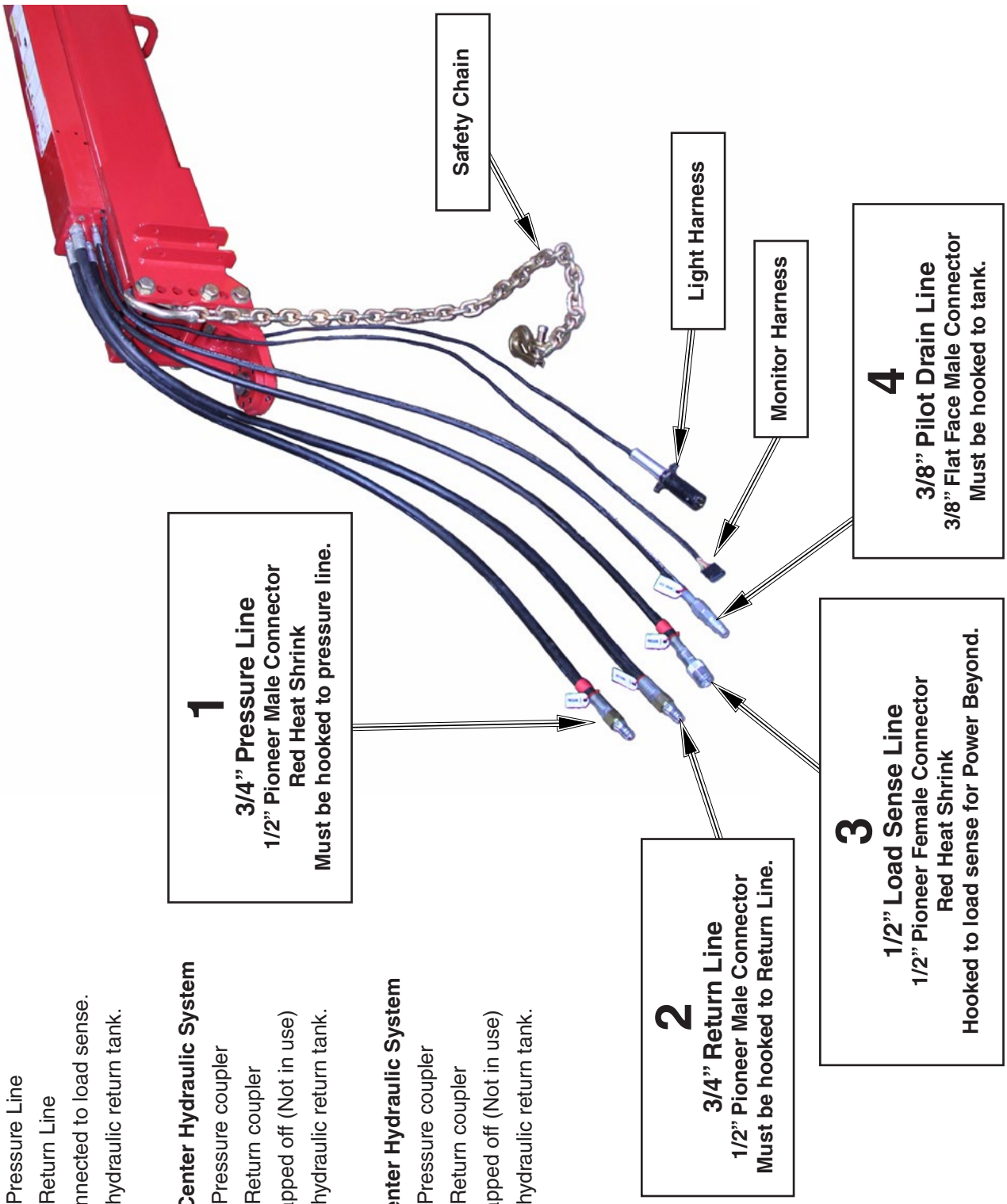
Tractor Connection

Recommended to connect to Power Beyond.

Power Beyond
(Closed Center - Load Sensing)
- 1 to Pressure Line
- 2 to Return Line
- 3 connected to load sense.
- 4 to hydraulic return tank.

Closed Center Hydraulic System
- 1 to Pressure coupler
- 2 to Return coupler
- 3 Capped off (Not in use)
- 4 to hydraulic return tank.

Open Center Hydraulic System
- 1 to Pressure coupler
- 2 to Return coupler
- 3 Capped off (Not in use)
- 4 to hydraulic return tank.



Hydraulic System Configuration - Continued

Hawe Valve Block

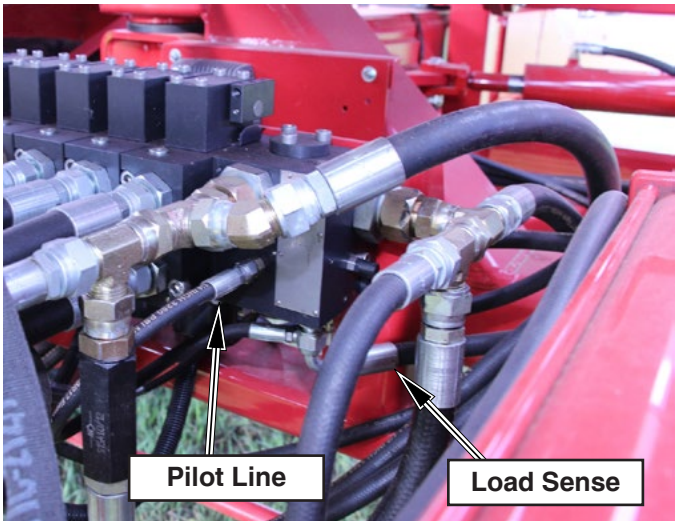
The Pilot line and Load Sense line on the Hawe Valve Block must be setup to match the hydraulics of the tractor.

Closed Center Hydraulic System

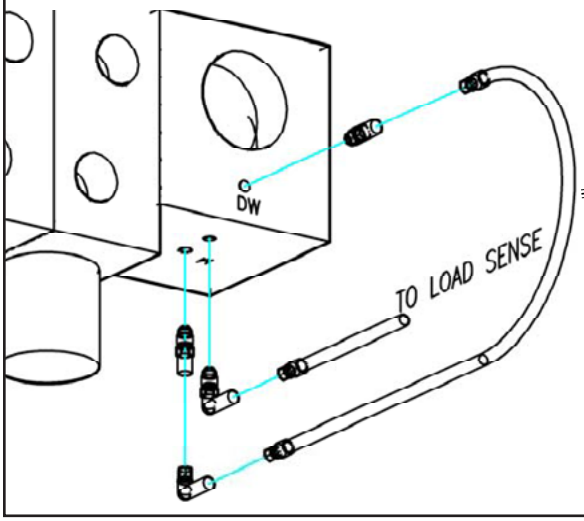
- Pilot Line conneted to front port.
- Load Sense Line conneted to rear port.

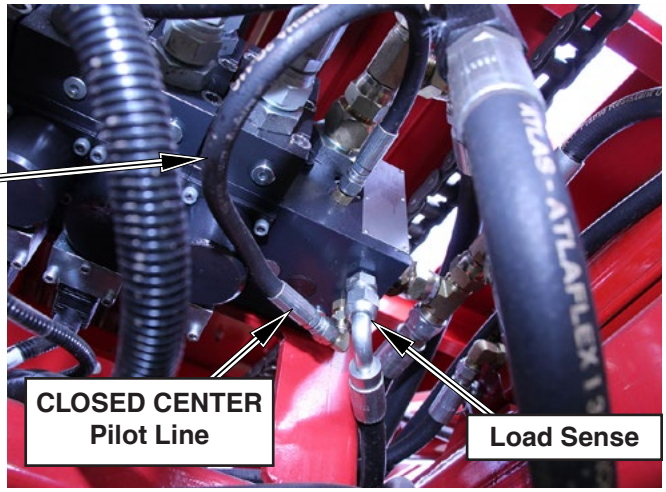
Open Center Hydraulic System

- Pilot Line conneted to rear port.
- Load Sense Line conneted to front port.

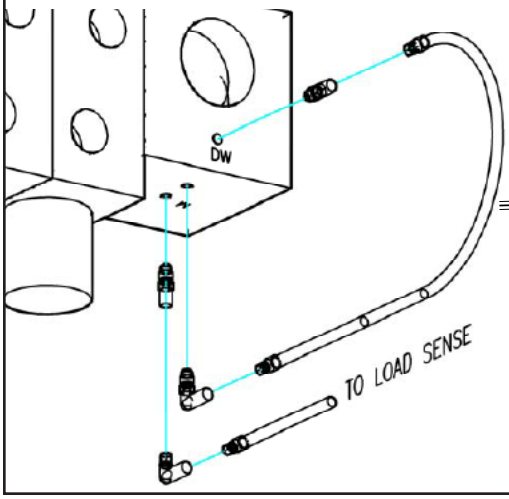


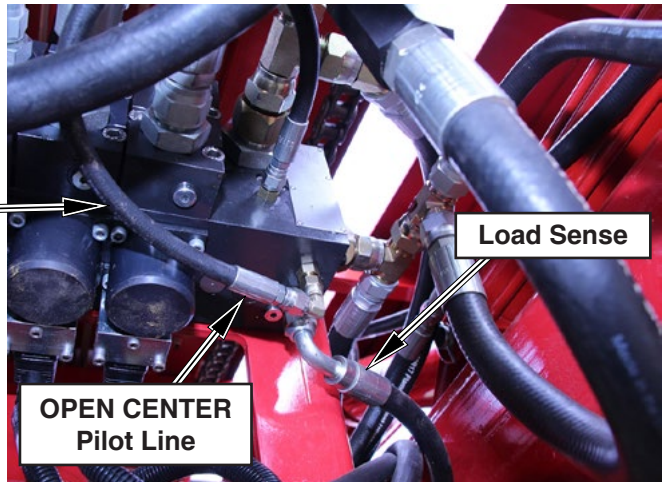
Closed Center





Open Center





Hooking Up for the First Time

Use the following outline as a checklist to ensure your Auto Align Bale Runner is properly set up for use.

⚠ Warning

Remember to turn off hydraulic system and tractor and remove the key from ignition before working on the Bale Runner.

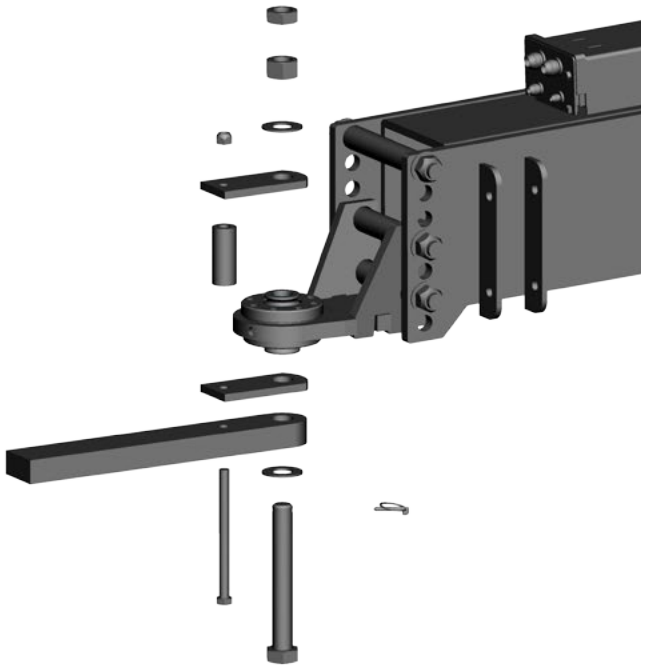
Parts Needed

1	Hitch Bolt	1 1/4” x 9” special
2	Hitch Washer	1 1/4” flat washer
1	Hitch Nut	1 1/4” plain
1	Hitch Jam Nut	1 1/4” special
1	Hitch Spacer Bolt	5/8” x 8”
1	Hitch Spacer	3/4” ID x 3 9/16” tube
2	Hitch Plates	1/2” x 3” x 6 3/8”
1	Spacer Bolt Nut	5/8” Nylock
1	Bolt Safety Pin	3/16” Snaplock Pin

Step 1: Attach Bale Runner to Tractor

- Line up the Ball Hitch on the machine with the tractor draw bar.

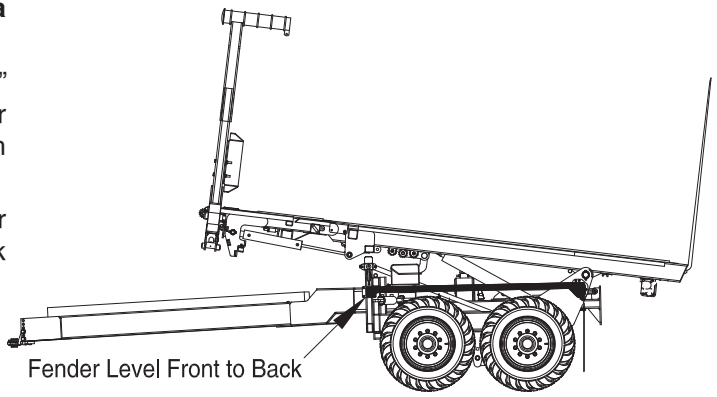
⚠ WARNING: Do not allow anyone to stand between the tractor and the stacker while backing the tractor to the machine hitch.



- Secure the machine to the tractor with the 1 1/4” x 9” bolt threaded up through (1) - 1 1/4” flat washer, tractor draw bar, lower hitch plate, ball, the upper hitch plate, (1) - 1 1/4” flat washer, 1 1/4” nut, 1 1/4” jam nut, and insert bolt safety pin through eyelet in bolt.

Note: If tractor drawbar pin hole is larger than 1 1/4” a bushing must be added to provide a snug fit. (Bushing not supplied)

- Secure the hitch plates into position with the (1) -5/8” x 8” bolt threaded up through lower hitch plate, tractor draw bar, (1) - 3/4” ID x 3 9/16” tubing, upper hitch plate, and (1) - 5/8” lock nut.
- Adjust hitch clevis so **fender is level** front to back or front of fender may be slightly lower than the back not to exceed 1 1/2 inches.



Hooking Up for the First Time - Continued

Step 1: Attach Bale Runner to Tractor - Continued

CAUTION: Operating Bale Runner without Safety Chain connected to tractor can be hazardous. Always attach Safety Chain to tractor.

- Secure Hitch Safety Chain to tractor or tractor draw bar. ***Note:*** Chain should be loose enough to allow tractor to turn without allowing chain to drag on the ground.
- Connect the trailer light cable to the tractor and test the system to be sure the lights are operating properly.
- Read the “Air Brake Maintenance” section to adjust the air brakes properly if the machine is so equipped.

DANGER: Improperly set up brakes can cause loss of control of the stacker and towing unit. Be sure to adjust brakes according to the procedures described in this manual.

CAUTION: Operating Bale Runner without brakes and lights connected to the tractor can be hazardous. Always attach the electrical cables to the tractor.

- Lift jack to its highest position, then remove pin and fully retract the extension leg.

Step 2: Set Up Monitor

CAUTION: Use care when working with electricity. Disconnect battery of tractor first if attempting to connect control box assembly directly to battery.

Parts Needed - 1 Monitor Assembly

- Mount the Monitor in the cab (preferably to the right of the driver). The monitor must be mounted in a safe place out of harm’s way and the weather.
- Route the connecting cable from the cab to an area near the hitch. The flanged end of the cable should be located near the hitch, and the free-hanging end should be located in the cab.
- Plug the control cable on the stacker into the connecting cable on the tractor.
- Plug the multifunction grip into the monitor.
- Connect the power cable from the monitor to the auxiliary power connector in the tractor.
- If it is necessary to connect the controls directly to the battery, then be sure to ground properly to prevent damage to the monitor and controller circuits.
- The controls should now be functional and the warning light will turn on when the power is switched on and the hitch is not in the inline position.

CAUTION: DO NOT operate machine without the Monitor installed and fully operational.

Hooking Up for the First Time - Continued

Step 3: Connect Hydraulics

CAUTION: Be sure the hydraulic system is off and all moving parts are at their lowest position before working on the hydraulic system. Also, turn off tractor, place in park, and remove key.

CAUTION: Refer to diagram on page 5-6 before hooking up hydraulics. Make sure hydraulic lines are hooked up properly to avoid component damage.

- First connect 3/4" male connector (non-pressure line) to tank or return.
- Connect 3/4" male connector (red line) to pressure line.
- Connect 3/8" flat face connector (drain line) to tank or return.
- Connect 1/2" fermale connector (red line) to load sense of tractor.
- Check the hydraulic oil level in the tractor.

DANGER: Keep bystanders away from moving parts

- When the bed is raised, and the Bale Runner is parked on level ground, be sure the forks on the back of the bed are within 2" (5 cm) of the ground. If they aren't you will need to raise the hitch by turning over the drawbar on the tractor.

Step 4: Lubricate Stacker

WARNING: Before working on this machine, stop the towing vehicle, set the brakes, disengage the PTO and all power drives, shut off the engine and remove the ignition keys.

- Use the "Lubrication Points" in Section 6 and grease all pivots on the machine.
- Check the oil in the axle hubs. See the "Daily Maintenance" in Section 6 for recommendations on oil.

Getting Started

The first thing the operator needs to do is to turn on electrical and hydraulic power to the stacker.

- The power switch on the monitor box will turn the electrical system on.
- Hydraulic power will be on when the tractor is running if the stacker is connected to the power beyond system of the tractor.

WARNING: Always pressurize the system the correct way. Reversing the pressure and return lines could cause damage to hydraulic components.

After hydraulic and electrical power has been established, the operator must navigate through a couple of safety screens on the monitor before the controls are operational. The stacker will initially start in automatic mode. If the user wants to run the machine in manual mode, press the manual button on the screen.

Pre-Operation Checklist

Before operating Bale Runner check the following items:

Pre-Operation Check

☐	**Lug nuts**	Check that all lug nuts are present and torqued to the appropriate torque rating.
☐	**Pin retaining bolts**	Check for any missing or loose bolts or pins, replace or tighten as necessary.
☐	**Hydraulic hoses**	Inspect all hydraulic hoses and replace any worn hoses. *Remember:* Use a piece of cardboard or wood to look for leaks, replace leaky hoses.
☐	**Hitch Jack**	Check that the hitch jack has been raised to its hightest postion and that the extension leg has been fully retracted.
☐	**Warning Light**	Check that the Warning Light functions properly.
☐	**Hitch Safety Pin**	If traveling, check that the hitch safety pin is securely in place. If gathering or stacking, check that the hitch safety pin has been removed.
☐	**Tire Pressure**	Check tire pressure to make sure it is within the specified range given in the “Machine Specifications” Section 2.
☐	**Hitch Connection**	Check the bolt system that connects the stacker to the tractor drawbar. A loose connection will wear faster and possibly uncouple.
☐	**Breakaway Device**	Make sure the hitch safety chain is connected.
☐	**Lighting**	Make sure the lighting is hooked up and functioning properly.
☐	**Brakes**	Check to see that the brake system is hooked up and functioning properly if so equipped.

Configuring Alignment Arms and Bed Extensions

Set the postion of the alignment arms and bed extensions to match the type of bale being stacked.

Bale Sizes	Stack Size	Stacker Configuration
Freeman - 3x4 38"x46" On Strings	5 High x 2 Deep	**Long Alignment Arms** Engage Bed Extensions
NH 595 - 3x4 35"x47" On Strings	6 High x 2 Deep	**Long Alignment Arms** Engage Bed Extensions
Hesston 4900 - 4x4 51"x48" On or Off Strings	4 High x 2 Deep	**Long Alignment Arms** Disengage Bed Extensions
Hesston 4755 - 3x3 35"x32" On Strings	6 High x 2 Deep	Shorten Length of Alignment Arms Engage Bed Extensions Shorter Forks on Bed **are recommended** ***see PROAG Dealer for more information.**
Hesston 4755 - 3x3 35"x32" On Strings	6 High x 3 Deep	**Long Alignment Arms** Engage Bed Extensions

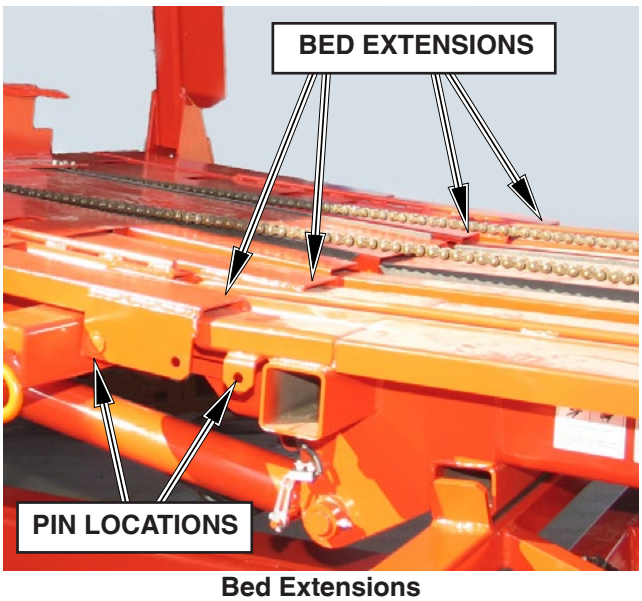
Note: Other manufacturer's balers create the same size bales - these were used for illustration purposes only.
To pick bales "Off Strings" it is recommended to use a bale turner on the baler.

Adjusting Alignment Arms

To adjust the alignment arms, remove the alignment arm adjustment bolts and slide the arms to their next position. Reinsert the bolts and torque to 270 ft. lbs.

Adjusting Bed Extensions

With the hitch offset and the loader lowered all the way, remove the pins from the rear hole in the bottom of the bed extensions. Slide the bed extensions forward, with the tip of the bed extension under the loader sheet. Reinsert the pins using the forward holes in the bed extensions.



Bed Extensions

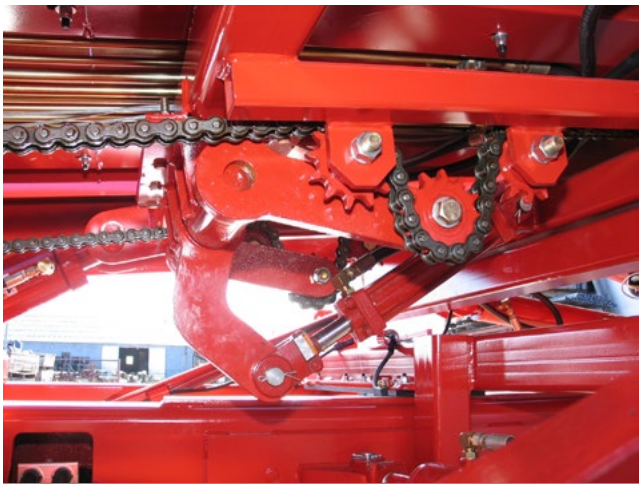
Replacing Forks on Bed

- Raise the bed to the fully raised position.
- Remove the fork retaining bolt and retaining block from the back of the bed.
- Slide the fork to the center of the bed past the retaining tab **(Warning: Forks are heavy, use caution)**.
- Reverse above procedure to install new fork. Torque retaining bolt to 270 ft. lbs.

Chain Tension Adjustments

Warning: When making adjustments on the Bale Runner, always stop the towing vehicle, set the parking break, disengage the PTO and all power drives, shut off the engine and remove the ignition keys.

- If the power slider chains are jumping teeth or appear to be over tightened, then the power slider chain tension may need to be adjusted.
- The **Power Slider Chain Tension** is controlled by a hydraulic pressure reducing and relief valve located on the side of the pushoff. The aluminum valve has an adjustment screw protruding from the rear of the valve. Once the 9/16" jam nut is loosened, the adjustment screw can be turned with a 5/32" Allen wrench. When adjusting the system use small increments (1/4 turn), bottoming out the adjustment nipple or over pressurizing the system could potentially damage hydraulic components. Turning the adjustment screw in (clockwise) increases pressure, and turning the screw out (counter clockwise) decreases the pressure.
- Adjusting the **Motor Chain Tension** can be accomplished with two 3/4" wrenches. First loosen the four (4) bolts holding the motor mount to the bed. Then adjust the threaded rod until the appropriate amount of tension is achieved in the chain. (Approximately 3/4"of slack in the middle of the slack side of the chain.) Re-tighten all bolts and torque to specs. (Page 6-20)



Power Slider Chain Tension

Motor Chain Tension

Setting Alignment Arm Pressure

- When the stacker picks up a bale in automatic mode, the arms will squeeze until the hydraulic pressure in the cylinder exceeds the set-point. The arms then stop squeezing, and the loader starts raising. There are two pressure set-points for the stacker. The 1st Bale Pressure is used for the first bale picked up, and the 2nd Bale Pressure is used for the next one. In the case of 3 X 3 bales, the 2nd Bale Pressure is also used for the third bale. If the alignment arms don't appear to be squeezing the bales tight enough or the bales are slipping through the alignment arms, the pressure probably needs to be increased. If the alignment arms appear to be squeezing the bales too tight and the bales are bowing in the middle, the pressure probably needs to be decreased.
- The **Alignment Arm Pressure** can be adjusted from the Adjust menu. See **Adjust Menu:** *Example: Changing the Squeeze Pressures* for details.

Power Slide Valve Adjustment

The 16k PLUS has been equipped with a relief valve on Power Slide motor circuit. This valve allows the operator to adjust the pressure that the Power Slider applies to the bale.

Adjust relief pressure as follows:

1. Stop all controls and tractor engine, remove ignition key.
2. Turn electrical power off on control box.
3. Secure the position of all mechanisms before servicing or adjusting.
4. To reduce the pressure the Power Slider applies to the bale, screw “B” out, in 1/2 turn increments. If Power Slide becomes too weak to push bales back, screw “B” in, in 1/4 turn increments. Adjust screw “B” as required.

DANGER

Mechanism on Stacker May Move Automatically Without Warning

TO AVOID INJURY OR DEATH

- Stop all controls and engine, remove ignition key.
- Turn electrical power off on control box.
- Secure the position of all mechanisms before servicing or adjusting.

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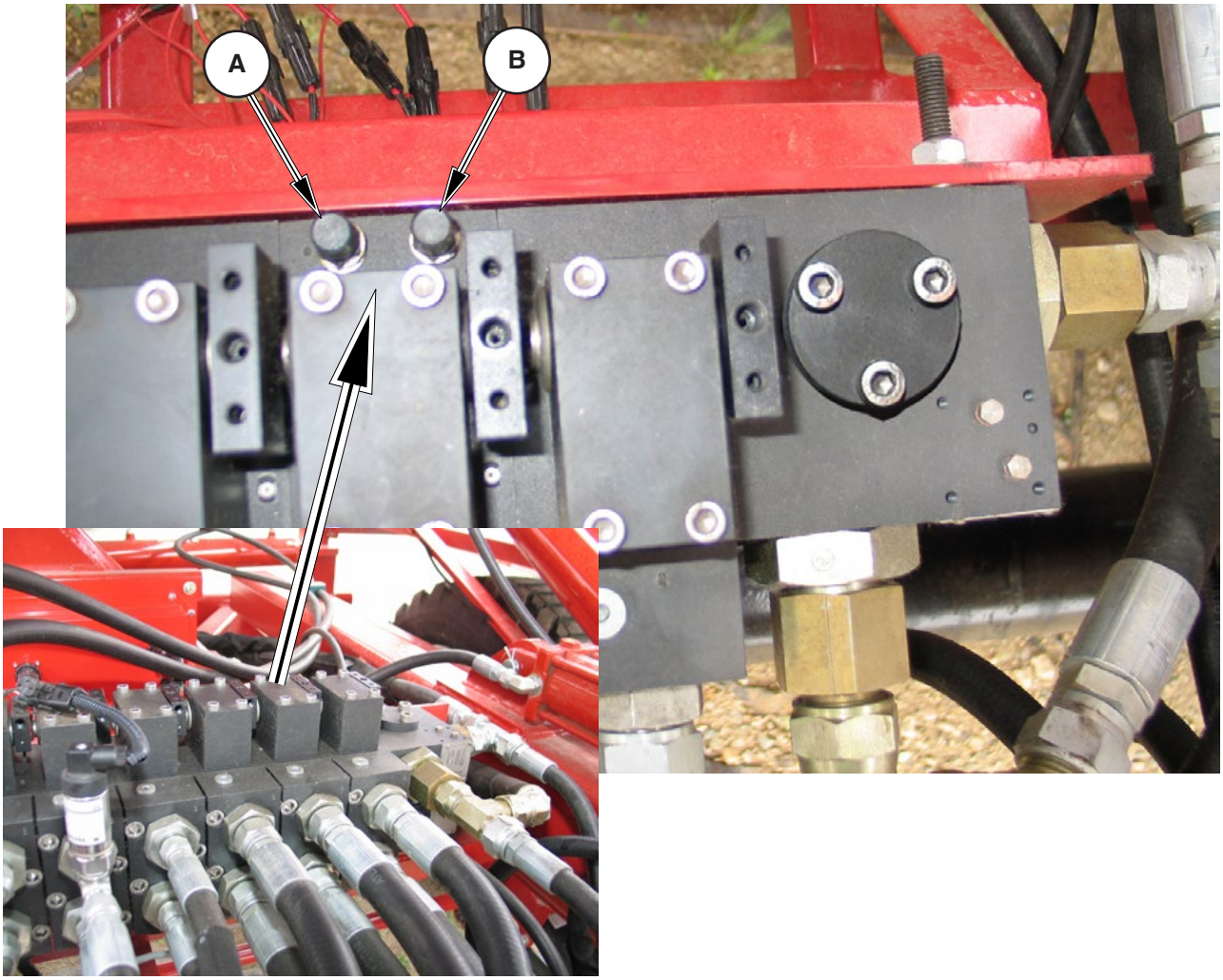


Power Slide Push Back Adjustment

When the power slide is pushing bales back in the Auto screen, the monitor starts it out slowly and accelerates as the bales move back. The monitor controls this acceleration by observing the Shaft Sensor on the “star wheel”, located on the power slide drive shaft. Each time a tooth passes by the sensor, a “Pulse” is sent to the monitor that signals it to increase the speed. The speed of the motor is increased by the percentage value specified in the 1st and 2nd Acceleration rates. A larger value causes the power slide to pick up speed more quickly, and a smaller value causes it to speed up more slowly.

Note: The monitor does not accelerate power slide in the Manual Load screen the way it does in the Auto screen. The speed of the slider is fixed in the Speed Adjustments menu.

Note: If the power slide is unable to push the bales back at all, the power slide valve pressure may be set too low. See *“Power Slide Valve Adjustment”* for more information. Or, if the pressure is set to maximum, see *“Automatic Mode - Operating the Machine in Automatic Mode - Auto Load Sequence for Sticky Bales, or Traveling Down-Hill”* for more information on Sticky Bales.

There are four parameters associated with controlling the power slide as it pushes bales.

- **1st Acceleration Rate:** When the power slide first begins to push the bales back, it will accelerate by the percentage specified in this variable.

Note: If the top bale tends to tip forward when the bale first starts to move down the loader, the 1st Acceleration Rate is too high.

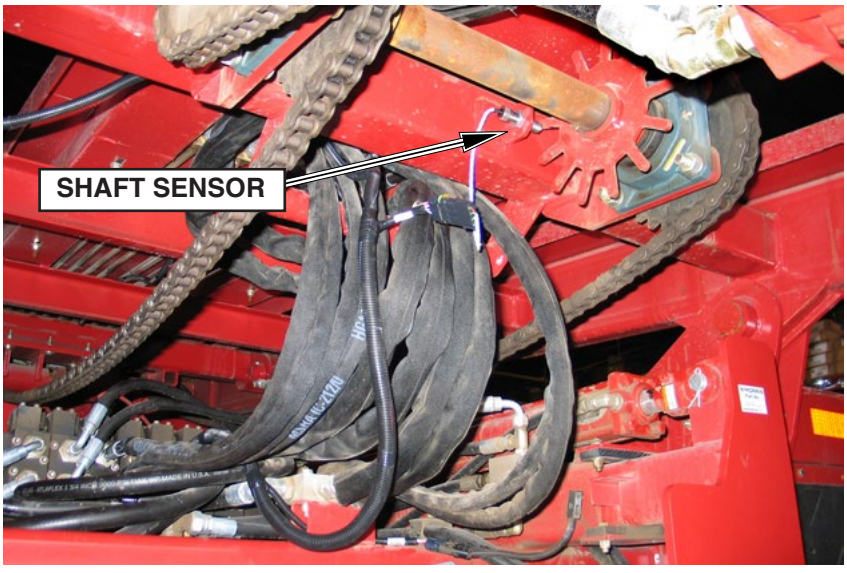
- **2nd Acceleration Rate**: When the power slide reaches a specified point on the bed, a new variable is used to control how fast the power slide accelerates.

Note: If the top bale tends to tip rearward when the bales are part-way down loader, the 2nd Acceleration Rate is too low.

- **Start 2nd Acceleration**: This variable controls where the second acceleration begins. The units in the menu “Pulse” refers to the “number of teeth” counted at the star wheel. Each “tooth” equals approximately 2” of travel down the bed.

Note: The factory setting has been found to be satisfactory for most conditions. Adjusting the 1st and 2nd Acceleration rates will solve most problems with pushing bales back.

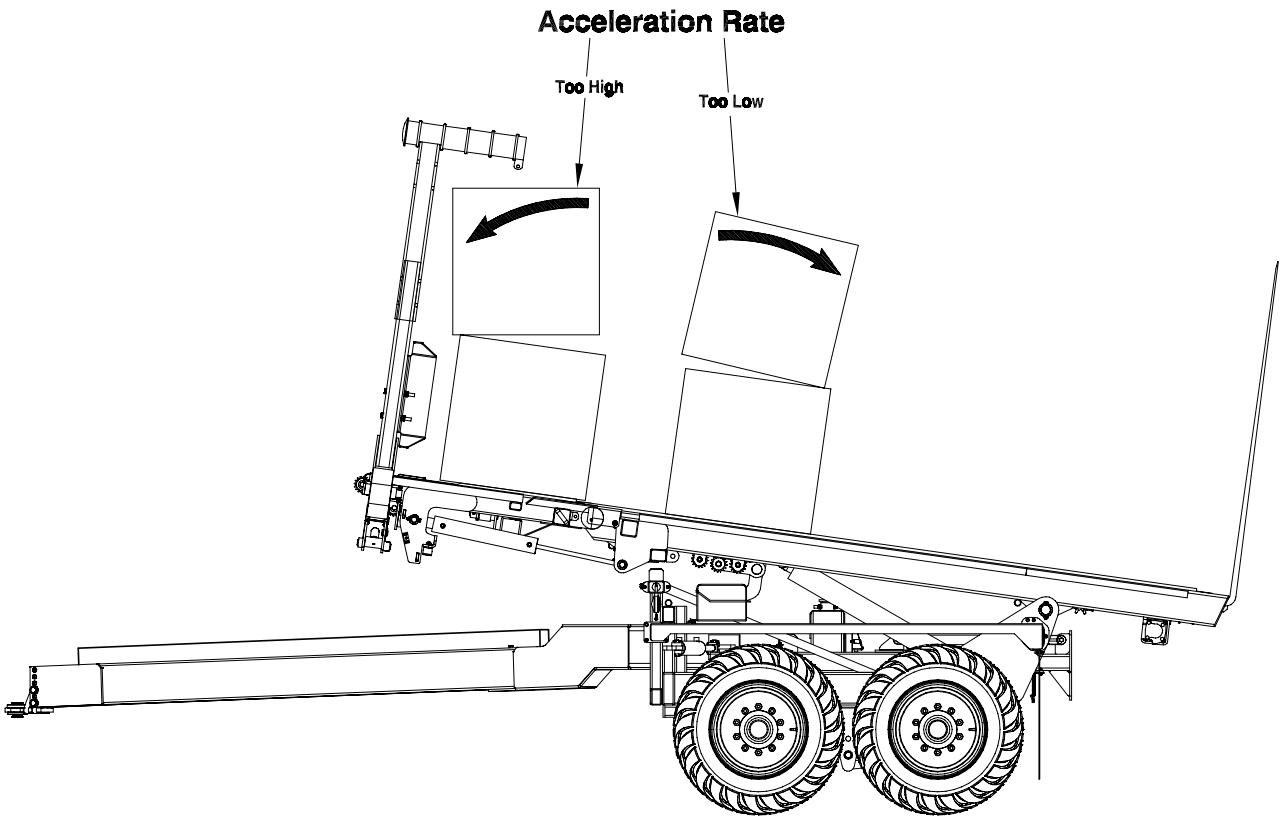
- **Initial Power Slide Force**: Sets the initial valve opening when pushing back bales in the Auto-Load sequence. If it is set too high, the power slide will start too suddenly.

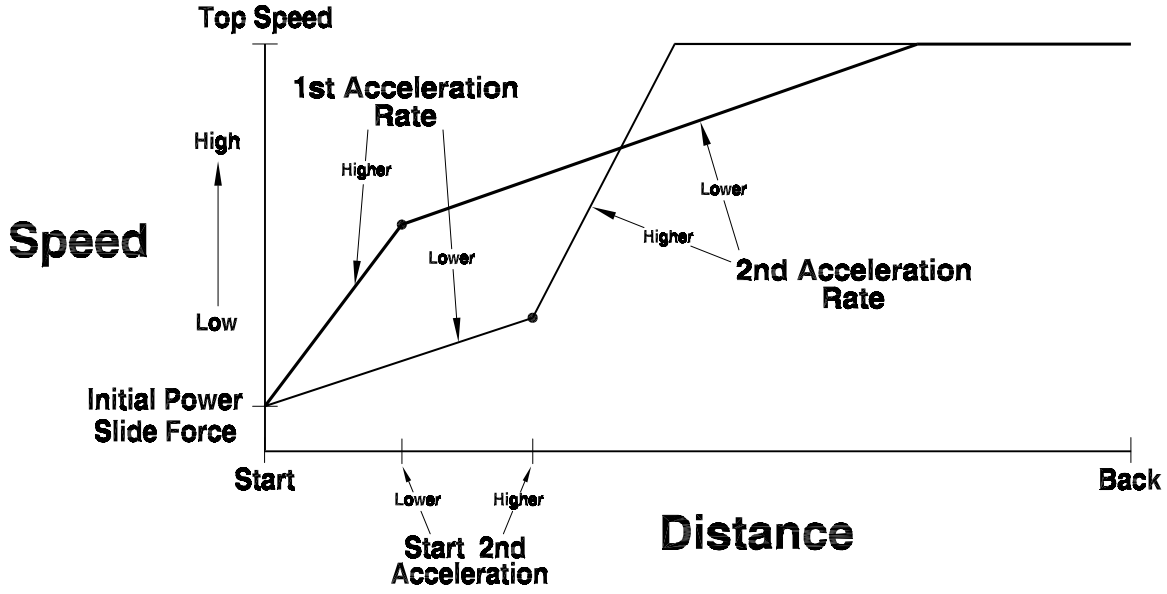


Power Slide Push Back Adjustment - Continued

Power Slide Acceleration Curve

See "Menu Screens - Adjust Menu - Power Slide Push Back" for adjustment details.





Gathering Bales

Approaching Bales

Bales are picked up on their 8 foot side. The easiest way to pick up bales is by driving the Bale Runner perpendicular to the path of the baler.

Before arriving at a bale offset the hitch and lower the loader all the way down until it is perpendicular to the ground.

Note: The Bale Runner will need to be configured for each type of bales picked up. See the configuration chart under "Configuring Alignment Arms and Bed Extensions".

Note: For correct bale count on the monitor, use the Adjust Bale Count screen to set configuration.

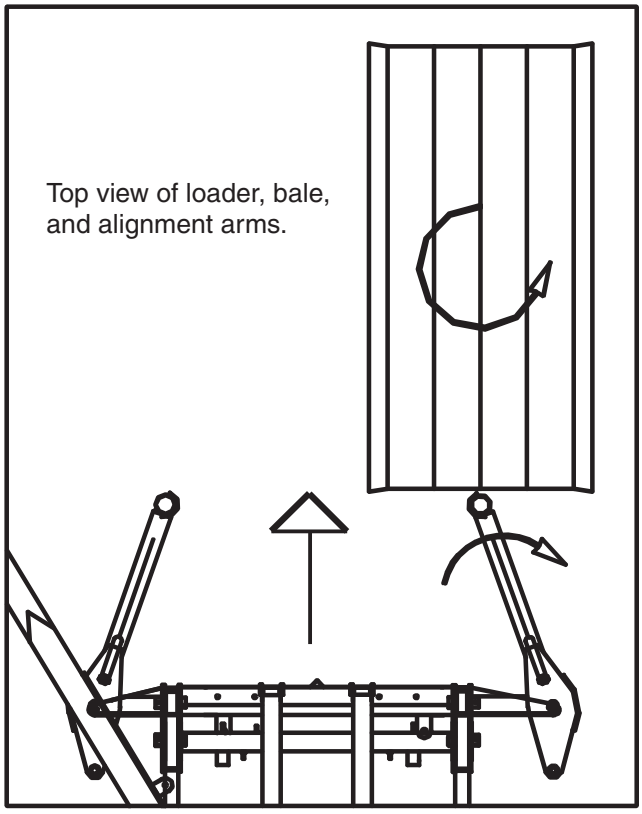
WARNING: Keep bystanders at least twenty-five feet away from an operating machine or stacked hay.

WARNING: Avoid rocks rough terrain, steep slopes, banks and drop offs when possible. Always maneuver tractor at safe speeds.

Rotating Bales

The Auto Align system will allow the operator to approach the bale from almost any direction. When approaching a bale "end-on" the bale may be rotated, or spun, by:

- Closing the alignment arms slightly and bumping the end of the bale with the right alignment arm.
- Drive ahead slowly while opening the alignment arms.
- The bale will rotate into the loader as the stacker continues to move ahead.



Rotating bales

Quarter Turning Bales

To quarter turn a bale on the ground:

- Squeeze the alignmentarms together and raise the loader until the ends of the alignment arms will contact the bale about halfway up the side
- Drive forward slowly
- When the alignment arms contact the bale, continue driving forward while raising the loader.
- Back up a few feet to lower the loader and retrieve the bale.

Note: Quarter turning with a Bale Runner is very time consuming and is not recommended for a large number of bales in a row.

Repositioning Bales

If bales are located in a corner or tight place, the alignment arms can be used to grab a bale and reposition it in a better working location.

Gathering Bales - Continued

Stair-Stepping Bales

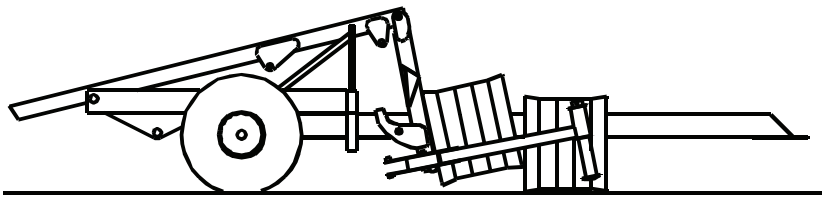
Some amount of “stair-step” is recommended to help keep the top bale secure while the load is being pushed to the back of the stacker.

- After retrieving the first bale, leave the loader slightly raised while picking the second bale.
- 6 to 12 inches is usually all that is required.

To fix the amount of stair-step after picking up two bales in the alignment arms,

- Raise the loader a few inches
- Open the alignment arms to release the second bale. The bale will slide to the ground.
- Squeeze the alignment arms and raise the loader.

Note: Keep alignment arms on the first bale closed until ready to pick the second bale.



Stair-stepping ½ Ton Bales

Building Stacks

CAUTION: Return stacker to the "in-line" position when moving between bales in field and stack. This reduces the chance of running over anybody or anything in the field.

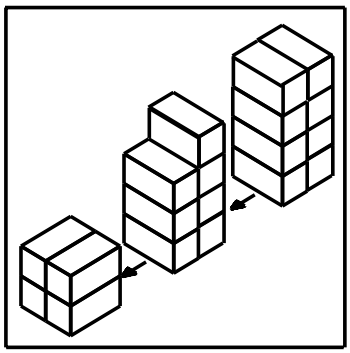
Starting Stacks

1. Choose a level area, with enough room to maneuver a tractor and Bale Runner even after the stack is finished.

Important: If completely level ground is not available, then build your stack uphill (front of tractor and Bale Runner facing uphill).

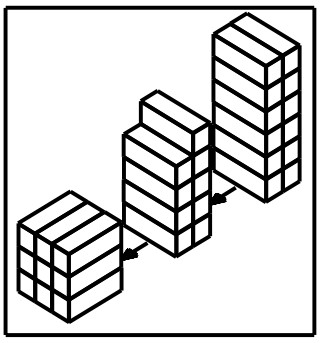
2. Begin stack by building a "backstop". The proper backstop should be built to withstand backing into the stack every time a load is delivered. We recommend the following back stop configurations:

1 Ton Squares: A 2 bale by 2 bale square set at one end, perpendicular to the length of the bales in the stack. The first load in the stack should be only 7 bales.



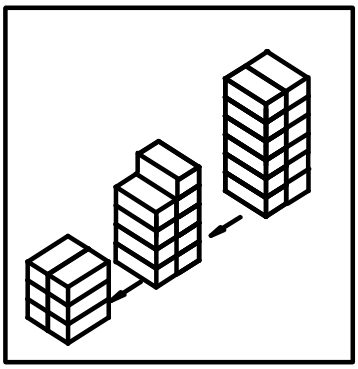
1 Ton Backstop

1/2 Ton Squares: A 3 bale by 3 bale square set at one end, perpendicular to the length of the bales in the stack. The first load in the rest of the stack should only be 2 bales by 4 bales, with one extra in the fifth tier.



1/2Ton Backstop

3 X 4 Bales: A 2 bale by 3 bale stack set at one end, perpendicular to the length of the bales in the stack. The first load in the stack should be 9 bales, and the rest should be 12 bales.



3X4 Backstop

Stacking Bales

Note: The bales should be stacked on level ground. When stacking on a slight incline, stack with the tractor facing uphill. Stacking downhill or on a slight side incline will make it difficult to build good stacks.

- For better visibility while building stacks, offset the hitch until the center of the tractor is inline with the edge of the stacker.
- When backing up to the stack, minor adjustments using the hitch control will help guide the stacker back more precisely.
- Raise the bed so it is almost vertical, but the weight of the bales is still clearly against the bed. (Between 70 and 80 degrees)
- Back up until the corner of the bottom bale on the Bale Runner comes into contact with the back stop.
- Continue to raise the bed and back up until the load is vertical.

Important: It is critical that the first load into the stack is vertical. To avoid the stack tipping over, DO NOT ALLOW THE BED TO GO PAST VERTICAL ON THE FIRST LOAD.

- Release the alignment arms from the stack.
- Extend pushoff while slowly moving stacker forward.
- Lower the bed after the forks are out from under the stack.

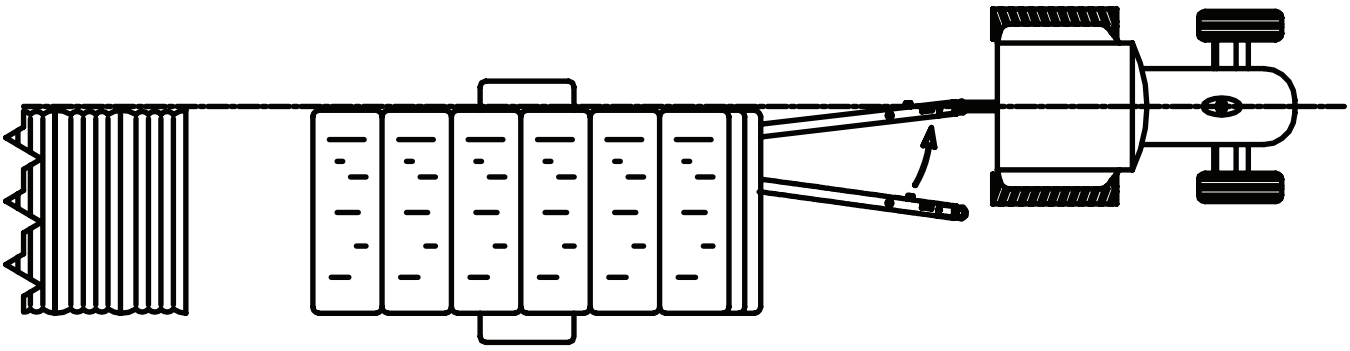
Tightening the Stack

If the stack is not tight enough after the bed has been raised all the way up:

- Pull the stacker ahead about three feet
- Back the stacker into the load to push the bales tight.

CAUTION: Avoid overhead wires to prevent serious injury or death. Electrocution can occur without direct contact.

CAUTION: Keep bystanders at least twenty-five feet away from an operating machine or stacked hay.



Lining up the center of the tractor with the edge of the stack

Stacking Bales - Continued

Stacking a Full Load With No Back-Stop

This practice is not recommended, as part of the stack may fall over during this procedure.

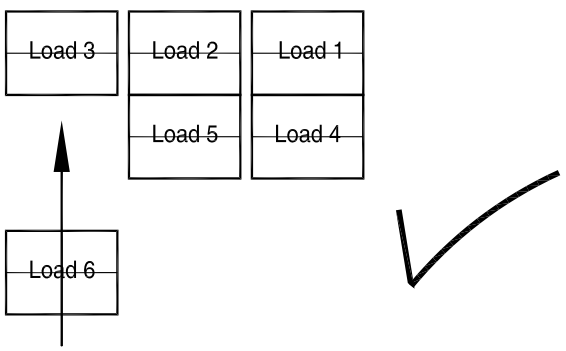
- When stacking a full load with no back stop or existing stack,
- Raise the bed to a 60 - 70 degree angle.
- Open the alignment arms and Lower the loader *slightly*.
- Squeeze the alignment arms and raise the loader again to compress the bales between the alignment arms and forks.
- Very carefully proceed to unload normally. Be aware without a proper backstop part of the stack may fall over during this procedure.

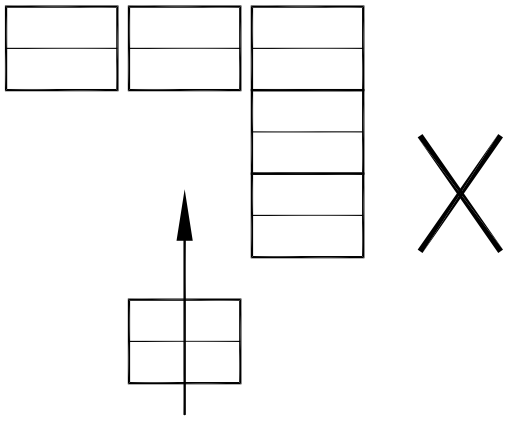
⚠ Warning

Stand Clear, part of the stack may fall over during this procedure without a proper backstop.

Stacking Side-By-Side

- Create a single row in each stack starting from right to left.
- Add second row from right to left.
- Continue this procedure until stack is completed.





Transporting Bale Runner

WARNING: Attach safety chain to Bale Runner and Tractor before moving on highway.

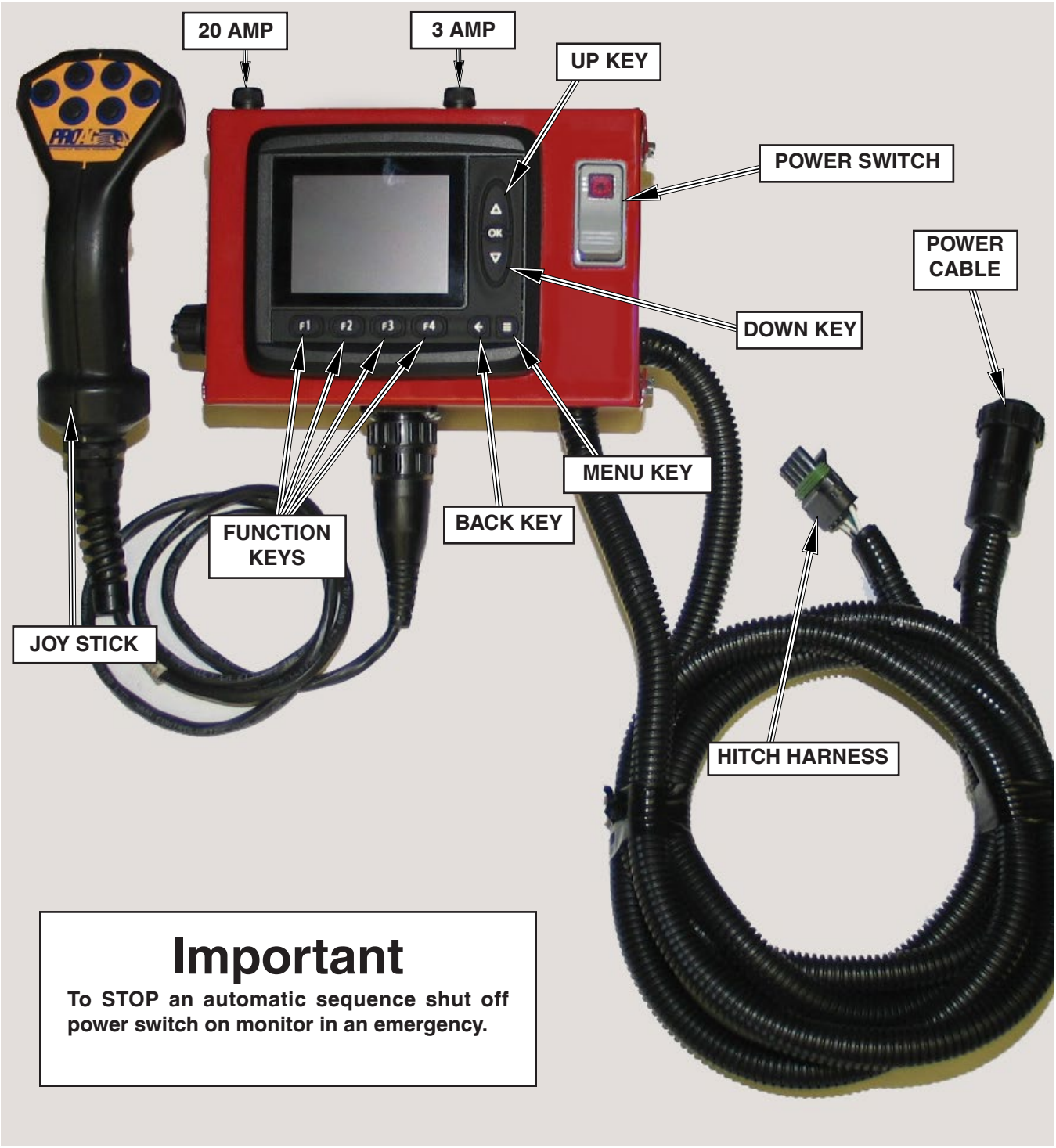
CAUTION: Exceeding speeds of 20 mph (32 km/h) is not legal or safe on public roads. DO NOT exceed 20 mph (32 km/h) with this machine.

WARNING: Use Hitch Safety Pin to lock hitch in the in-line position before transporting Bale Runner on public roads. This will secure hitch in case of accidental activation or failure of hitch cylinder.

REMEMBER: When transporting any piece of oversized equipment:

- Be familiar with local laws by contacting local authorities before transporting Bale Runner on public roads. Obey all regulations as they pertain to the Bale Runner. The specifications at the front of the manual contain most of the information that may be needed.
- This machine is equipped with lighting, markings, and signs in compliance with standards published by the American Society of Agricultural Engineers for Slow Moving Agricultural Implements on Public Roadways.
- Use flags, warning lights and slow moving vehicle signs as they are needed. Flag-persons may be required by local authorities and may be helpful even if they aren't required.
- Always remember the extra width of the Bale Runner. The widest part of the Bale Runner is approximately 9 feet 10 inches (300 cm) wide.
- Drive carefully at an appropriate speed for the size and weight of the Bale Runner. Allow for the extra length of the trailer when making corners. Reduce speed when navigating corners to prevent overturning machine. Link brakes to prevent loss of control during panic braking.
- Plan route to avoid heavy traffic. Drive in a courteous manner.
- Never drink and drive!

Operation of Controls



Important

To STOP an automatic sequence shut off power switch on monitor in an emergency.

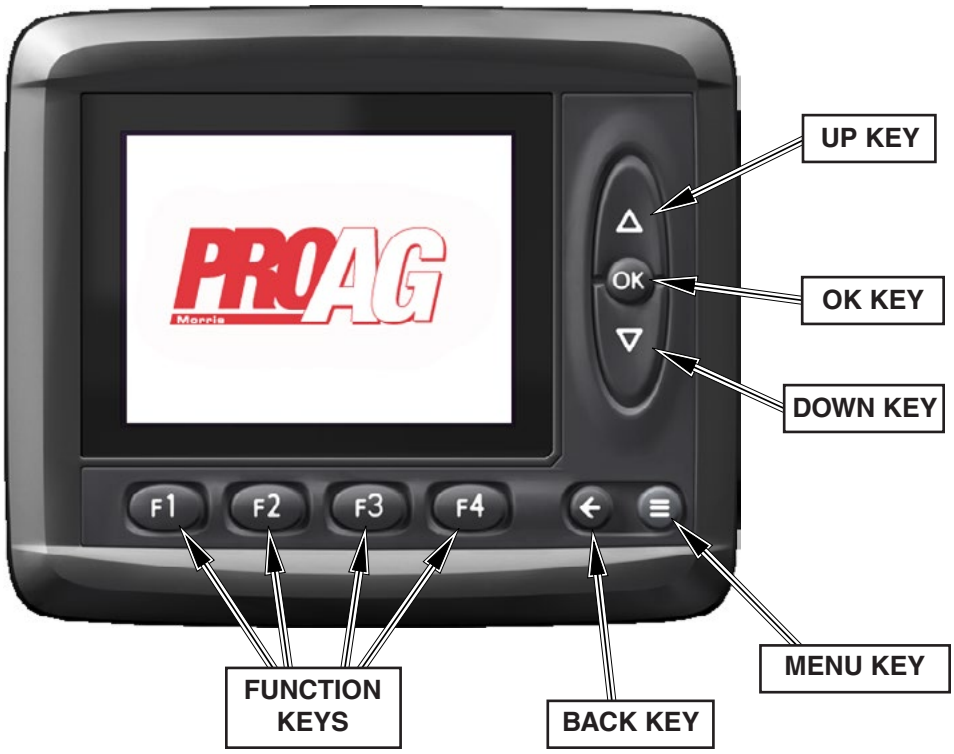
Initial Start-Up

When the unit is turned on, the following display sequence takes place:

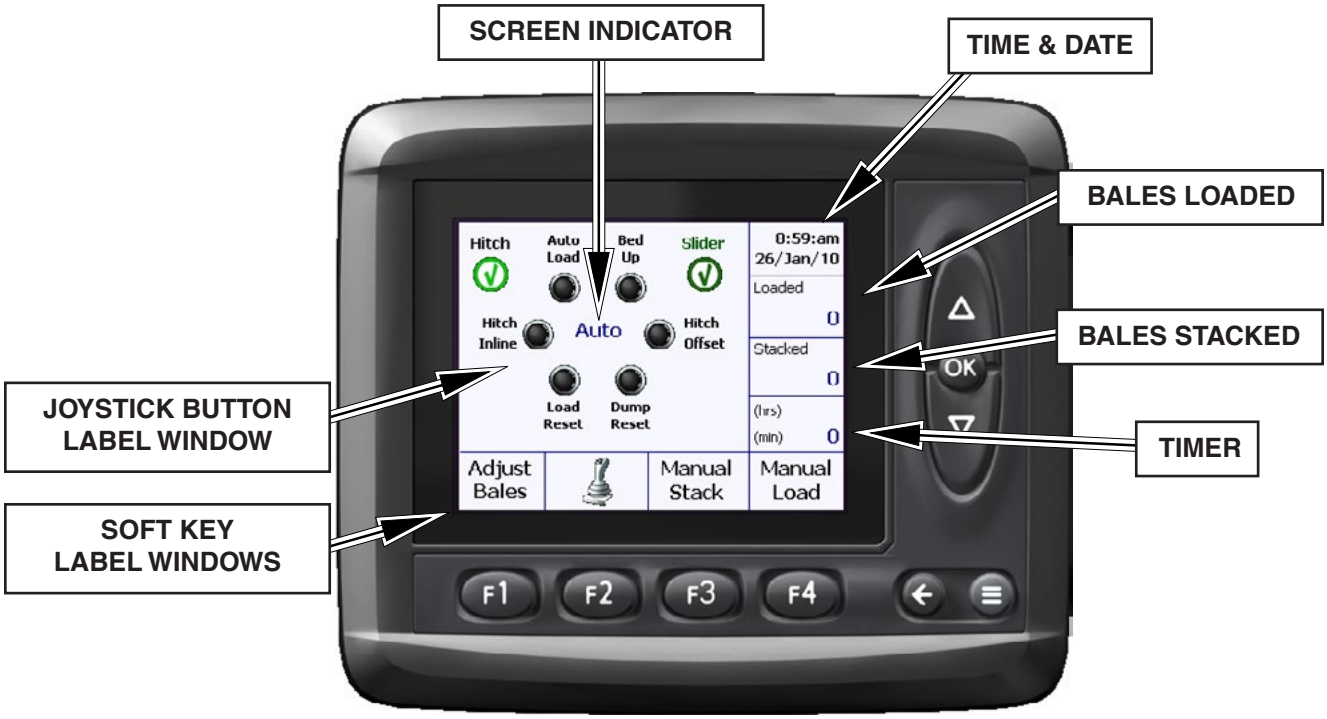
- PROAG is briefly displayed.
- DANGER warning displays until operator press **OK** to continue.

Important: Ensure area around 16k PLUS is clear of obstacles and persons before pressing "OK" button.

Identifying Monitor Switches



Identifying Monitor Displays



Display Settings

Day/Night Screen

The monitor is equipped with two display modes for ease of viewing during day or night operation.

Note: The monitor must be in the "Auto" screen to select the display mode.

- From start-up the monitor will always display the black back ground.
- From "Auto" screen press the BACK button to toggle between the two display modes.

Note: The setting selected in the "Auto" screen will be used in the "Manual Stack" and "Manual Load" screens.

Back Light

The brightness of the screen can be adjusted.

Note: The monitor must be in the "Auto" screen to adjust back lighting.

- From "Auto" screen press the DOWN button to display the back light dial.
- Use the UP and DOWN buttons to adjust.
- Press OK to accept new setting.

Note: The setting selected in the "Auto" screen will be used in all other screens.

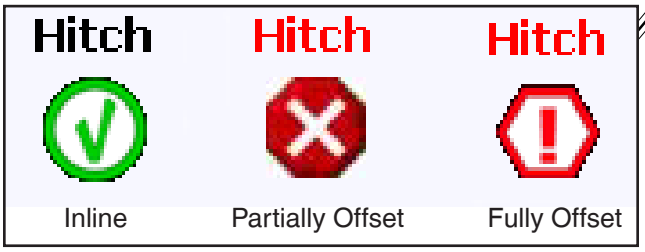
Symbol Identification

Hitch Position

In the top left corner of the screen a symbol indicates the position of the hitch.

- The green indicates the hitch is inline.
- The red indicates the hitch is offset.
- The red indicates the hitch is fully offset.

Note: It is only safe to travel with hitch inline and green check mark displayed.



Power Slide Position

In automatic mode many of the functions rely on the power slide starting in the correct position.

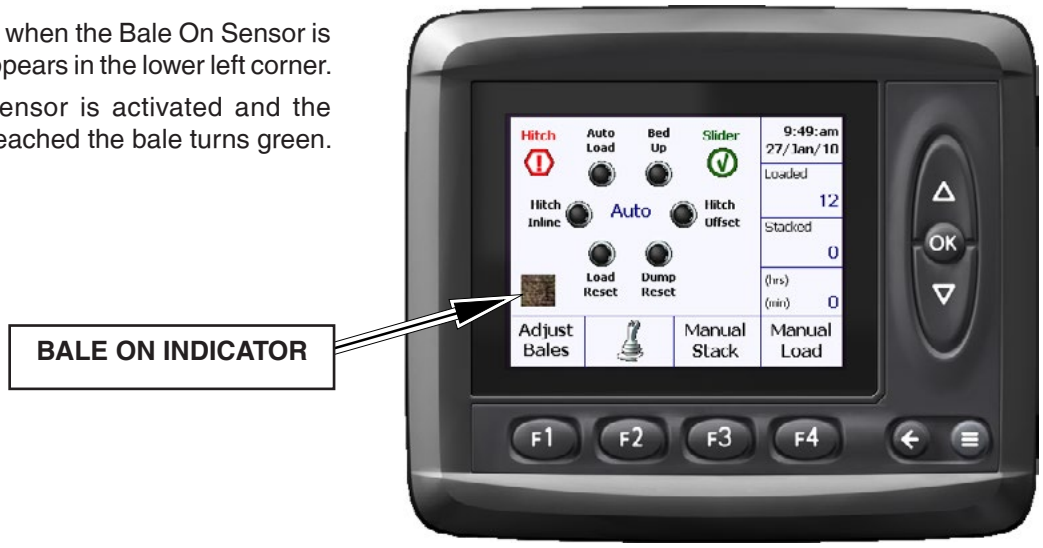
- The green indicates the power slide is ready to begin the Auto Load Sequence.
- The red indicates the power slide is out of Home Position.

Note: See "Resetting Power Slide" for more information on setting the power slide in the Home Position.

Symbol Identification - Continued

Bale On Indicator

- In the automatic mode, when the Bale On Sensor is activated a gray bale appears in the lower left corner.
- When the Bale On Sensor is activated and the Squeeze Pressure is reached the bale turns green.



Important

To STOP an automatic sequence shut off power switch on monitor in an emergency.

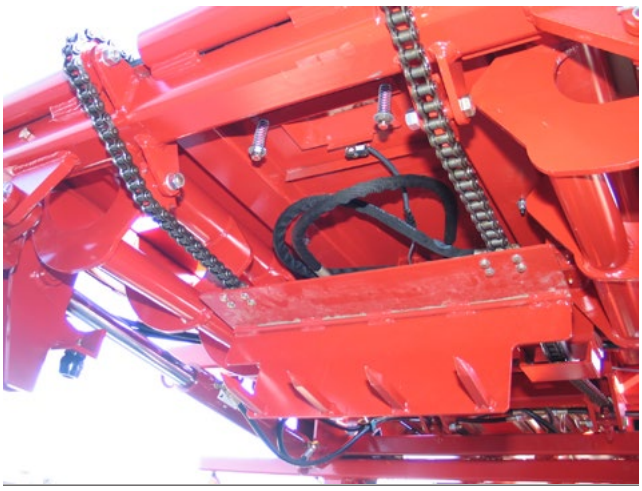
Resetting Power Slide

In order to load bales in automatic mode, the power slide must be in the Home Position.

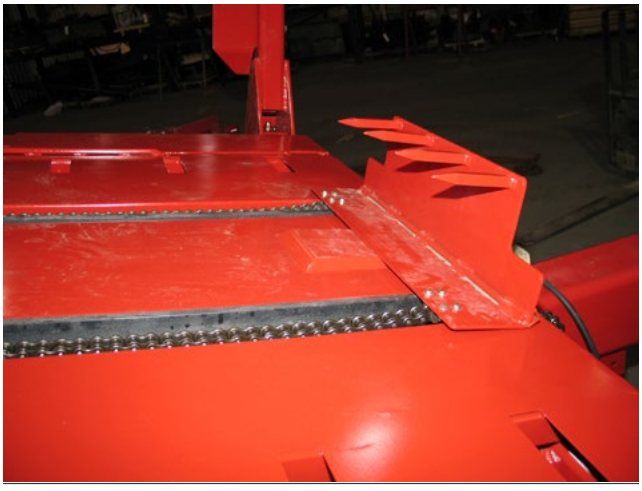
Resetting the power slide Home Position is done in the Manual Load screen.

Important: The following sequence must be used.

- In Manual Stack screen, position the Power Slide at the foot of the loader.
- Press F2 button to reset the Power Slide position.
- Press F4 button to confirm
- Manually move Power Slide to Home Position, underneath the loader, approximately under the center Bale Claw.
- Return to Auto screen, the green checkmark should be displayed for the Power Slide.



Power Slide at Home Position



Power Slide at Foot of Loader

Manual Load

When the Manual Load screen is displayed, the operator can perform the following functions pressing the corresponding button on the monitor or on the joystick as indicated on the screen.

Functions will only operate when the user is pressing the corresponding button. When the user releases the button, the function will stop. There is no sequencing in manual mode.

Note: Crash avoidance is built into the monitor programming to aid operator in avoiding damage. If a function is selected that could potentially harm the machine, the monitor will disregard the command and a warning screen will be displayed. See "Trouble Shooting" for more information.

The functions on the Manual Load screen are those typically needed to pick bales up off the field:

Arms Close - Squeezes the alignment arms shut.

Arms Open - Opens the alignment arms.

Loader Up - Raises the loader.

Loader Down - Lowers the loader.

Slide Back - Pushes bales back down the bed.

Slide Return - Returns the slider to its home position.

Hooks In - Engages the grab hooks.

Hooks Out - Releases the grab hooks.

From this screen the user can get to three other screens:

Auto Mode press F4 button.

Manual Stack press F3 button.

Menu press button.

Manual Stack

When the Manual Stack screen is displayed, the operator can perform the following functions pressing the corresponding button on the monitor or on the joystick as indicated on the screen.

Functions will only operate when the user is pressing the corresponding button. When the user releases the button, the function will stop. There is no sequencing in manual mode.

Note: Crash avoidance is built into the monitor programming to aid operator in avoiding damage. If a function is selected that could potentially harm the machine, the monitor will disregard the command and a warning screen will be displayed. See "Trouble Shooting" for more information.

The functions on the Manual Stack screen are those used for stacking a full load of bales:

Arms Close - Squeezes the alignment arms shut.

Arms Open - Opens the alignment arms.

Bed Up - Raises the bed.

Bed Down - Lowers the bed

Loader Up - Raises the loader. **UP Button**

Loader Down - Lowers the loader. **DOWN Button**

Hitch Inline - Moves the hitch inline.

Hitch Offset - Moves the hitch offset.

Push-Off In - Retracts the pushoff. **F1 Button**

Push-Off Out - Extends the pushoff. **F2 Button**

From this screen the user can get to three other screens:

Auto Mode press F4 button.

Manual Load press F3 button.

Menu press button.

Automatic Mode

Danger

Keep all persons clear of machine while operating. There are several functions this machine performs automatically. Unexpected movements can cause serious injury or death.

When the Auto screen is displayed, the operator can perform all the normal functions for loading and stacking bales. The function of each joystick button is indicated on the screen.

Some buttons will initiate a sequence of events. Functions will continue to operate after the user has released the joystick button.

Note: Crash avoidance is built into the monitor programming to aid operator in avoiding damage. If a function is selected, by the operator or as part of a sequence, that could potentially harm the machine, the monitor will disregard the command. See "Trouble Shooting" for more information.

The functions available on the Auto screen are:

Auto Load

- Pressing the Auto Load button will close the alignment arms. Once the arms are closed, the loader will start to move up. If the button is held for 1.5 seconds, the loader will continue to rise automatically. Pressing the Load Reset button will stop it.
- If the Bale On Indicator is displayed, the grab hooks will also extend when the loader begins to rise.
- If there are bales in the arms when the loader is fully raised, the power slider will position itself at the foot of the bales when the loader is all the way up.
- Once the power slider is positioned, the grab hooks will retract.

Load Reset

- Pressing the Load Reset button will open the alignment arms. If there is no bale in the arms, once they are fully opened the loader will start to move down. If the button is held for 1.5 seconds, the loader will continue to lower automatically. Pressing the Auto Load button will stop it.
- If the loader has fully raised with a bale, and the power slide is position at the foot of the bale, pressing the Load Reset button will open the alignment arms. Once the arms are fully open, the power slide will push the bales down the bed before returning to its home position.

Note: The Power Slide cannot be stopped once it has begun its sequence. In an emergency shut off power switch on monitor will stop sequence.

- Once the power slider is home, the loader will drop automatically. Pressing the Auto Load button will stop the loader.
- If the bales will not slide down the bed when the alignment arms are open, it is possible to raise the bed using the Bed Up button to assist the power slide. In this instance, once the power slide has returned to the home position, the bed will lower automatically before lowering the loader.
- After the power slide has pushed back the last set of bales, it will remain engaged until the alignment arms are closed. Once the arms are closed, the slider will return to the home position. In this instance, pressing the Hitch Inline button once will bring the hitch inline automatically. Also, the loader cannot be lowered using the Load Reset button until the load is stacked.

Automatic Mode - Continued

Bed Up

- The Bed Up button raises the bed. If the pushoff is not in, it will be retracted before the bed goes up.

Dump Reset

- The Dump Reset button will lower the bed. If the pushoff is not in, it will be retracted first. If the bed starts above the mid-position, and the Dump Reset button is held for more than 2 seconds, it will continue to lower automatically. Pressing the Bed Up button will stop this automatic movement.
- If the bed descends past the bed-mid position while the loader is down, it will stop and raise the loader automatically before continuing down.
- If the bed was initially above the bed mid position when it started, the arms will close and the hitch will move inline automatically after the bed is all the way down. Pressing the Load Reset button once while the arms are closing will stop them, and similarly, pressing the Hitch Offset button while the hitch is moving inline will stop it.

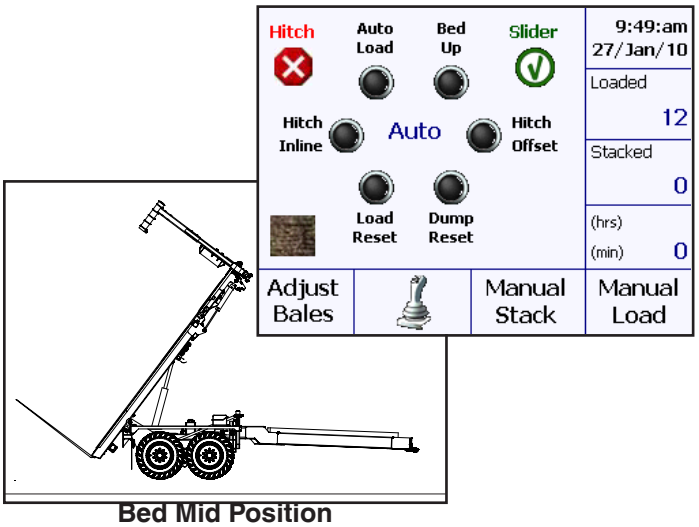
Hitch Inline

- The Hitch Inline button moves the hitch inline. Normally, if the button is released, the hitch will stop.
- If the hitch is moving inline automatically, either after the last row of bales has been loaded, or after a load of bales has been stacked, pressing the Hitch Offset button will stop the hitch from moving inline.

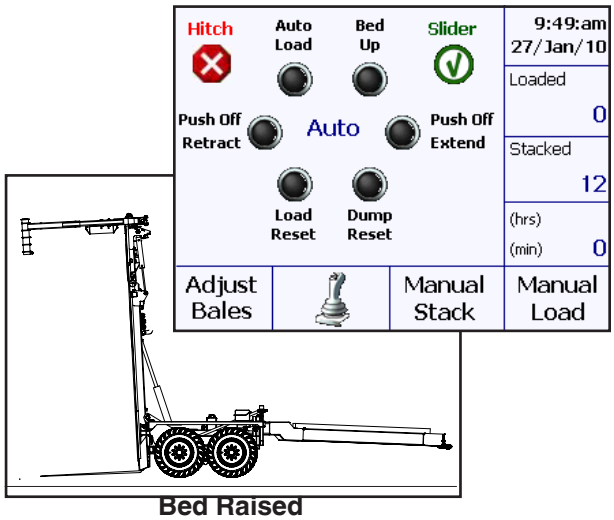
Hitch Offset

- The Hitch Offset button moves the hitch offset. The button must be held to perform this function.

Note: The Pushoff Retract and Pushoff Extend functions are only available in Automatic mode when the bed is all the way up. The Hitch Inline and Hitch Offset buttons disappear from the joystick control.



Bed Mid Position



Bed Raised

Pushoff Retract

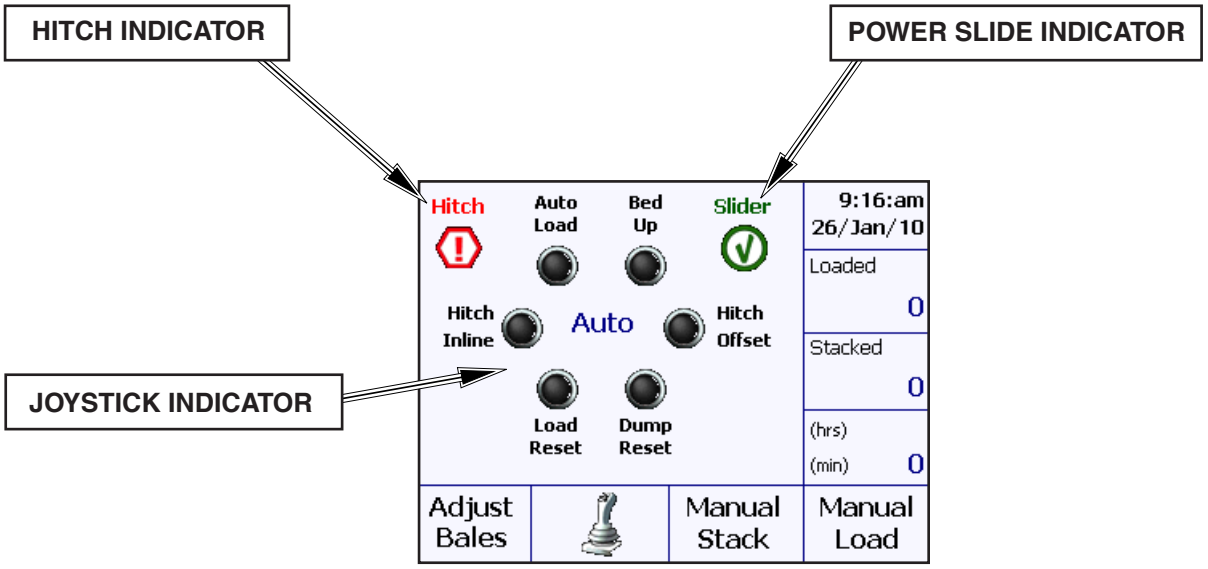
- The Pushoff Retract button retracts the pushoff. The button must be held to perform this function. This option is only available when the bed has been fully raised.

Pushoff Extend

- The Pushoff Extend button extends the pushoff. The button must be held to perform this function. This option is only available when the bed has been fully raised.

Automatic Mode - Continued

Operating the Machine in Automatic Mode



1. Setting up the stacker to load bales.

A. Check if the loader is up.

- If the loader is not up go to step B.
- If it is up go to step C.

B. Manually raise the loader.

- Press the Manual Load button on the monitor to get to the Manual Load screen.
- Raise the loader using the Loader Up button on the joystick.
- Return to the Automatic screen by pressing the Auto Load button.

C. Confirm that the Power Slide is in home position.

- Visually check to ensure the power slide is in the proper position.
- Ensure the Power Slide Indicator on the monitor shows a green check mark .
- See Resting Power Slide for more details.

D. Move the hitch offset using the Hitch Offset button on the joystick.

- Ensure the Hitch Indicator on the monitor shows a red **!** mark.

E. Lower the loader using the Load Reset button on the joystick.

- The alignment arms open and then the loader begins to lower.
- After 1.5 seconds the operator may release the Load Reset switch.
- The monitor continues to lower the loader for the time specified in the Configuration screen.

Automatic Mode - Continued

Operating the Machine in Automatic Mode - Continued

2. Auto Load Sequence

The loading sequence starts with the loader down and the alignment arms open.

1. Place a bale between the alignment arms ensuring that it is activating the Bale On sensor by pressing against loader platform.
   - The Bale On indicator will appear in the lower left corner of the screen when the Bale On sensor is activated.
2. Press the Auto Load button on the joystick to begin loading the first bale.
   - The alignment arms will close until the First Squeeze Pressure is reached. See “Setting Squeeze Pressures” for more information.
   - The loader begins to rise.
   - The grab hooks begin to engage after the Grad Hook Delay time and will continue closing for the Grad Hook Engagement 2 time. See “Adjust Menu - Timer Adjustment” for more information.
3. The Auto Load button should be released to stop the loader before it starts to raise automatically. If the button is held for more than 1.5 seconds, the loader can be stopped by pressing the Load Reset button.
4. Press the Load Reset button to prepare the loader to pick the next bale.
   - The alignment arms will open.
   - Release the Load Reset button before the alignment arms fully open to prevent the loader from lowering.

Tip: If the loader has been raised too high when picking the first bale, the height can be adjusted by using the Auto Load and Load Reset buttons. See “Gathering Bales” for more information on stair-stepping technique.

5. Place the second bale between the arms.
6. Press the Auto Load button to begin loading the second bale.
   - The alignment arms close until the Second Squeeze Pressure is reached. See Setting Squeeze Pressures” for more information.
   - The loader begins to rise.
   - After holding the Auto Load button for more than 1.5 seconds, the loader will continue to rise automatically, even if the button is released.
   - When the loader is fully raised, the power slider will move to the foot of the bales.
   - The grab hooks release automatically.

Note: It is recommended to have the stacker level when sliding the bales back. If operating the stacker on a hill, always have the machine pointing up or down-hill while pushing the bales back.

8. Press the Load Reset Button until the alignment arms are fully open.
   - At this point the operator may release the button as the power slide will begin to move automatically.
   - The power slide forces the bales to the rear of stacker. The speed and acceleration of the power slide are set in the “Adjust Power Slide Push Back Menu” for more details.
   - When the power slider has pushed the bales all the way to the rear, it returns its home position under loader automatically.
   - The monitor lowers the loader for the time specified in the Configuration. Pressing the Auto Load button while the loader is lowering will stop it. See “Adjust Menu - Timer Adjustment” for more details.

Important: **To STOP an automatic sequence shut off power switch on monitor in an emergency.**

Automatic Mode - Continued

Operating the Machine in Automatic Mode - Continued

3. Auto Load Sequence for Sticky Bales, or Traveling Down-Hill.

This sequence can be used when the power slide needs assistance pushing the bales back.

1. The operator picks up a pair of bales and the monitor positions the power slide in front of them. (Steps 1 through 6 of the Auto Load Sequence)
2. Use the Bed Up button to raise the bed.
   - Adjust the incline of the bed to assist the power slide.
   - If necessary, the Dump Reset can be used to lower the bed.
3. When ready, press the Load Reset switch to open the alignment arms.
   - When the alignment arms are fully open, the monitor activates the power slide to push the bales back.
   - If the bales do not move, the power slide will continue to push against them. It is still possible to raise the bed even more with the Bed Up switch if desired.

Note: To stop power slide exit the Auto Load screen by pressing the Manual Load or Manual Stack buttons.

4. After the bales are pushed back, the monitor returns the power slider to its home position under loader.
   - The bed lowers automatically.
   - The loader lowers for time specified in the Configuration screen.

4. Full Load Sequence

When picking the last row of bales, the monitor will recognize a full load.

1. After pushing the last row of bales back, the power slide signals the operator by **not** returning to the home position.
2. Push the Auto Load button to close alignment arms.
   - When the squeeze pressure has been reached, the slider will return to the home position.
3. Pressing the Hitch Inline button briefly will move the hitch inline automatically.

Note: When a full load has been detected the loader will not lower in Auto Mode until the load has been stacked.

Automatic Mode - Continued

Operating the Machine in Automatic Mode - Continued

5. Stacking Bales

Stacking sequence begins with a full load, the bed down and the alignment arms closed, and the 16k PLUS aligned with the stack.

Warning: Stand Clear of stack. As a precaution, check surrounding area to be sure it is safe to raise bed.

1. Press the Bed Up button until the bed is 70-80 degree angle.
   - If the pushoff is not in, the monitor retracts it first.
   - The bed goes up as long as the button is pressed. Releasing the button stops the bed.
2. Back up 16k PLUS until the corner of the bottom bale on the Bale Runner comes into contact with the back stop.
3. When the bed is raised above the midway position, the loader can be lowered with the Load Reset button which will first open the alignment arms.
   - WARNING: Ensure the bed is sufficiently raised to prevent top row of bales from dropping when lowering the loader.

   Tip: Lowering the loader allows stacks to be placed tightly side-by-side. See “Tips and Techniques” for more information.
4. Press the Bed Up button until bed is completely raised.
   - Some times it is helpful to reverse the tractor while performing this step to ensure a tight stack.
   - The screen indicates a change in button functions by replacing the “Hitch Inline” and “Hitch Offset” text with “Pushoff Retract” and “Pushoff Extend”.
5. Press the Pushoff Extend button while driving slowly forward to assist in unloading the bales.
   - The pushoff will extend as long as the Pushoff Extend button is pressed.
6. Press the Dump Reset button once 16k PLUS is clear of the stack.
   - The pushoff will retract.
   - When the pushoff is fully retracted the bed starts down.
   - The operator may release the Dump Reset button after the bed has lowered for 1.5 seconds.
   - The bed continues to lower automatically. Pressing the Bed Up button will stop the automatic lowering.
   - The loader raises automatically when the bed has been lowered below the midway position.
   - After the loader has been raised, the bed continues to lower until it is all the way down.
   - The alignment arms close. Pressing the Load Reset button will stop the arms from closing.
   - The hitch moves inline. Pressing the Hitch Offset button will stop the hitch from moving in line.

Warning

Stand Clear of stack.

As a precaution, check surrounding area to be sure it is safe to raise bed.

Danger

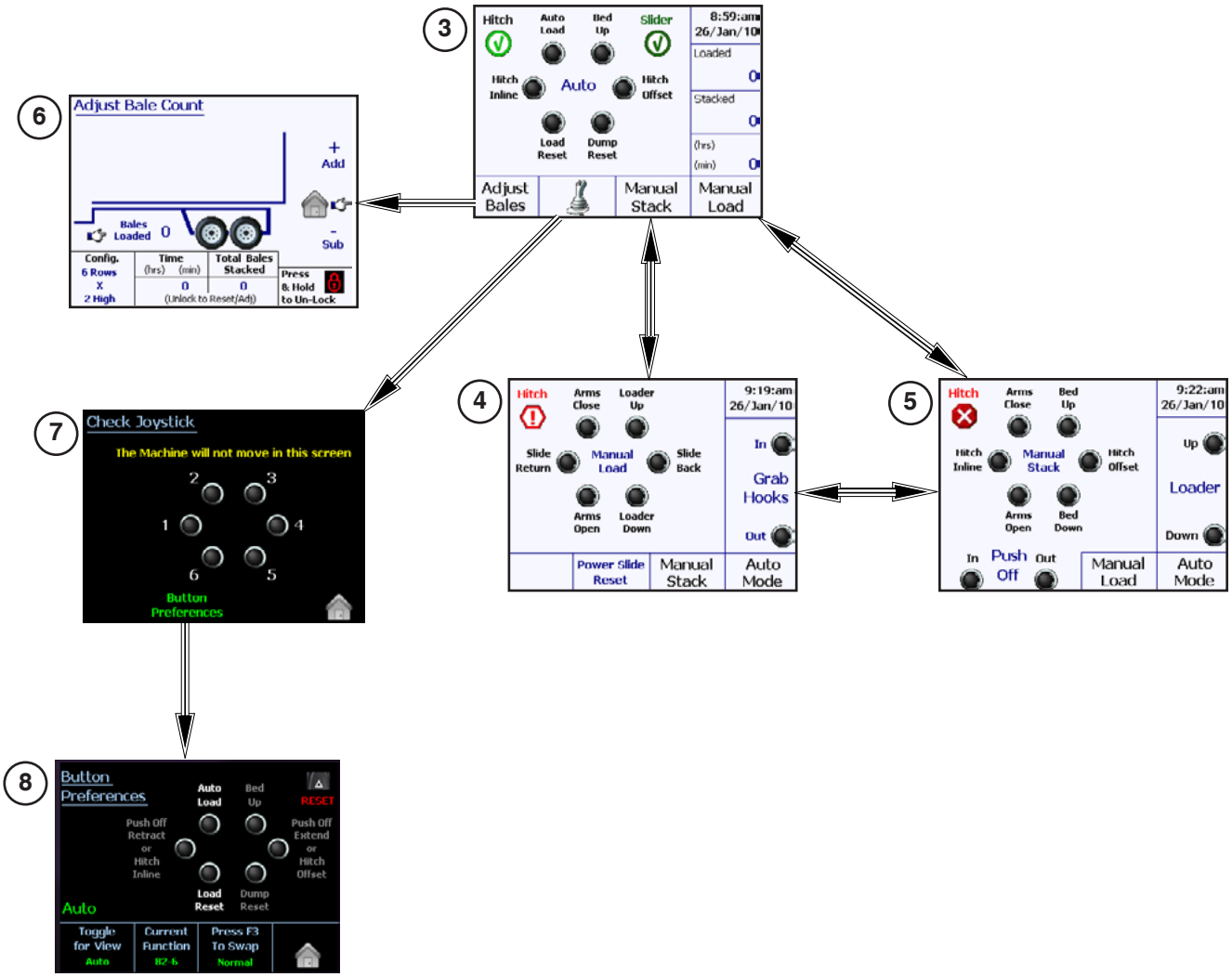
Always stay clear of stacker bed being raised, lowered or in elevated position. Ensure cylinders are completely filled with hydraulic fluid - bed may fall rapidly causing injury or death.

Operation of Controls - Continued

Operating Screen Map

1. Start-Up Screen
2. Warning Screen
3. Auto Screen
4. Manual Stack Screen
5. Manual Load Screen
6. Adjust Bale Count Screen
7. Check Joystick Screen
8. Button Preferences Screen

The number located next to the buttons indicate which screen is displayed when that button is pressed.



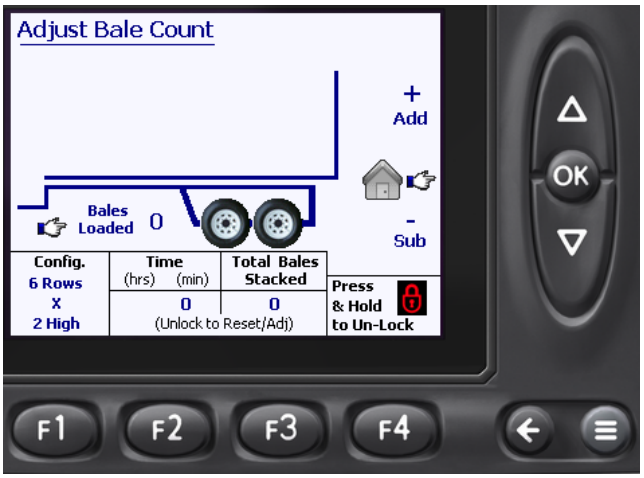
Operation of Controls - Continued

Operation Screens - Continued

Adjusting Bale Count Screen

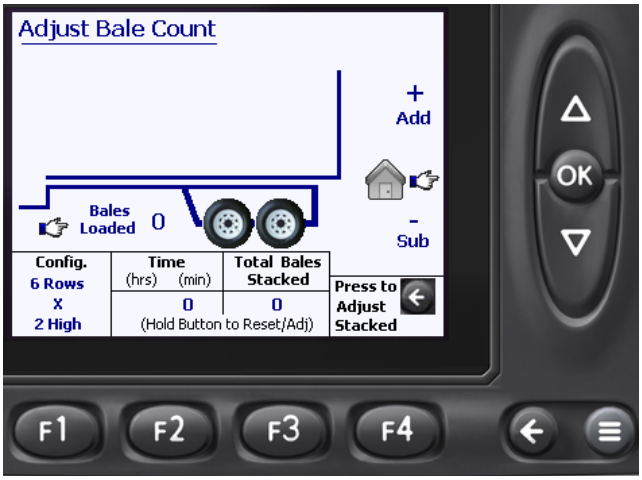
This screen allows the operator to easily set the Bale Configuration, as well as adjusting the Bales Loaded, Bales Stacked and Timer displayed on the Auto Load screen.

- To access this screen press F1 (Adjust Bales) from the Auto Load screen.
- Upon entering the Adjust Bale Count screen, the page will be locked. This is to prevent the accidental changes of settings. The only function available to change while the screen is locked is the Bales Loaded.



Unlocking the Screen

- To unlock the page, press and hold the F4 button for 3 seconds.
- Notice the red locked symbol disappears from above the F4 button.



Adjusting the Bale Configuration

The Bale configuration is located in the lower left corner of the screen. It is important to adjust the Bale Configuration to match the type of bales being picked. This is required to aid the monitor in counting the correct number of bales loaded on the machine.

- See “Configuring Alignment Arms and Bed Extensions” for more information on configuring the bed extensions and the alignment arms.

Use the following procedure to adjust the Bale Configuration.

- Press and hold the F4 button for 2 seconds to unlock the page.
- Press F1 to toggle through the different bale configuration options depending on the type of bales being stacked:

  5 Rows x 2 High

  6 Rows x 2 High

  4 Rows x 2 High

  6 Rows x 3 High

  - All changes will be saved when the monitor is returned to the Auto Load screen by pressing the OK button.

Resetting the Timer

A convenient timer is provided to assist the operator in monitoring loading performance. When the monitor is restarted, it always resets to zero. The operator may also reset the Timer to zero using the following procedure:

- Press and hold the F4 button for 2 seconds to unlock the page.
- Press and hold the F2 button for 2 seconds to reset the Time to 0.

Operation of Controls - Continued

Operation Screens - Continued

Adjusting the Bales Loaded

The Bales Loaded represents the number of bales that are currently loaded on the 16k PLUS.

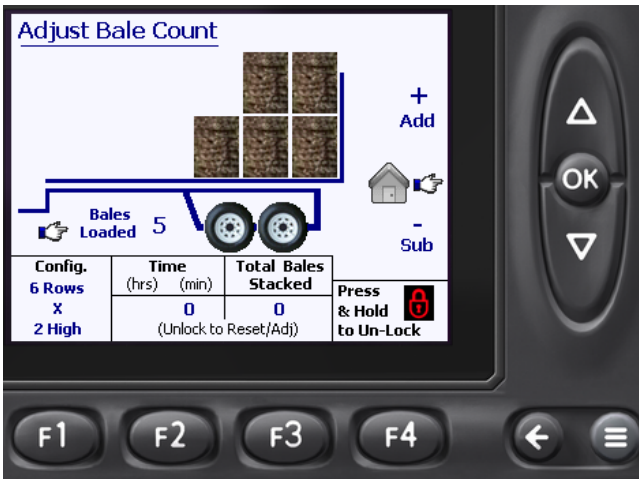
Every time the loader is raised with a bale on in the Auto Load screen, the monitor assumes either 2 or 3 bales were loaded. (depending on the Bale Configuration)

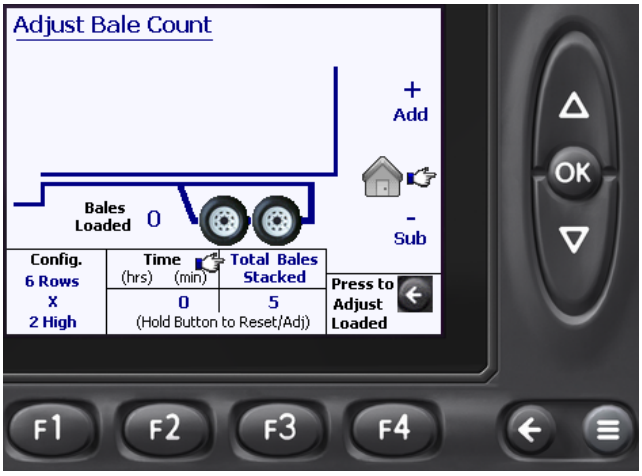
At times, it is necessary to correct the Bales Loaded. Common reasons to do so include:

- When building the backstop for a stack, only one bale was picked in the last row.
- Bales were loaded using the Manual Load screen, and therefore not counted by the monitor.

Upon entry of the Adjust Bale Count screen, the number of bales loaded can be adjusted using the UP and DOWN arrow buttons

- The Bales Loaded can be adjusted regardless if the page is locked or unlocked.
- Notice the symbol points towards the Bales Loaded when the screen is locked
- If the screen is unlocked and the symbol is pointing towards the Total Bales Stacked, press the button to toggle the symbol back to Bales Loaded
- All changes will be saved when the monitor is returned to the Auto Load screen by pressing the OK button.





Adjusting the Bales Stacked

The Bales Loaded represents the number of bales that the 16k PLUS has stacked.

Every time the bed is fully raised with bales loaded, the monitor adds the number of Bales Loaded to the Bales Stacked and resets the Bales Loaded to zero.

At times, it is necessary to adjust the Bales Stacked. Common reasons to do so include:

- The Bales Loaded was incorrect when the bales were stacked.
- A new stack is being started and the operator wants the Bales Stacked reset to zero.

Upon entry of the Adjust Bale Count screen, the page must first be unlocked before the number of Bales Stacked can be adjusted.

- Unlock the page by holding the F4 button for 2 seconds
- Notice the symbol points towards the Bales Loaded when the screen is first unlocked. Press the button to toggle the symbol to Bales Stacked.
- Use the UP and DOWN arrows to adjust the number of Bales Stacked, -OR- Press and hold the F3 button to reset the Bales Stacked to zero.
- All changes will be saved when the monitor is returned to the Auto Load screen by pressing the OK button.

Operation of Controls - Continued

Operation Screens - Continued

Check Joystick

This screen provides a safe way to test the function of the joystick.

- To access this screen, press F2 in the Auto Load screen. (Under the symbol)
- Pressing any button on the joystick will light up the corresponding symbol on the screen.

Note: Pressing buttons in this screen will NOT signal the machine to move.

- Press F4 (under the symbol) to return to the Auto screen.

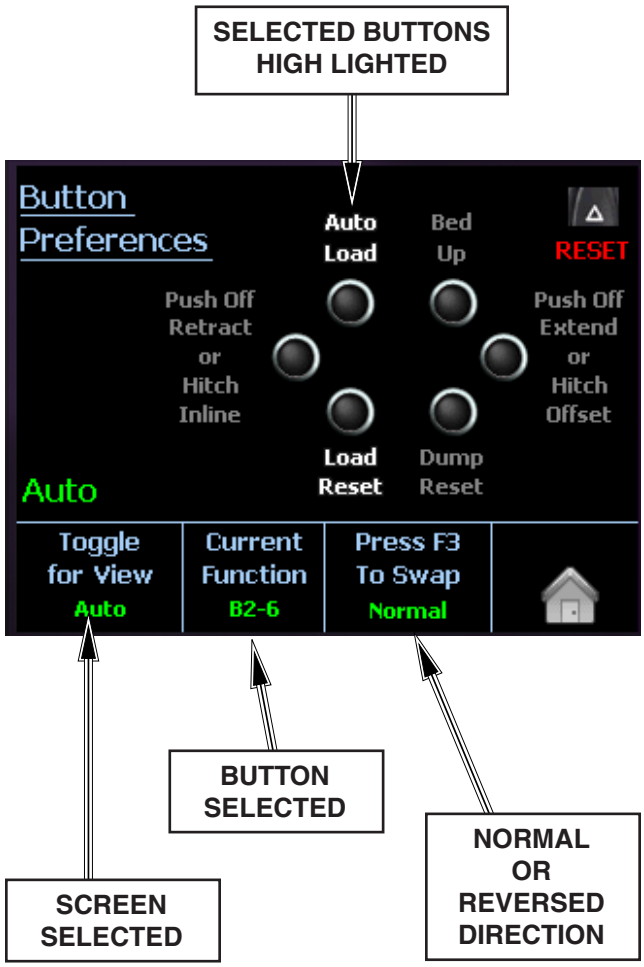
Joystick Preferences

It is possible to customize the joystick functions.

Note: The Auto, Manual Load, and Manual Stack screens can be changed independently.

i.e. It is possible to reverse the joystick functions in the Auto screen, and not in either of the manual screens.

- To access this screen, from the Auto screen press F2 (under the symbol to enter the Check Joystick screen. Press F2 (labeled “Button Preferences”) again to enter the Joystick Preferences screen.
- Press F1 to toggle through to the screen you wish to modify.
- Press F2 to toggle though each of the button pairs on the joystick. The selected buttons will be highlighted in Yellow.
- Press F3 to toggle between “normal” and “reversed” operation of the buttons.
- Use the UP button to reset all the buttons in all three screens to “normal” operation.
- When you are satisfied with all the changes made in all the screens, press F4 button (under the symbol) to return to the Auto screen.



Menu Screens

Main Menu

- Press the button to access main menu from any operation screen.
- Press the button from any sub-menus brings back the previous menu.
- To exit the menu screens, press the button to bring back the last control screen.

Warning: When in the menu screens, the joystick buttons are still functional. The machine will perform as indicated in the last operation screen.

Tip: When diagnosing problems, it is possible to observe the menu screens while operating the machine with joystick.

The Main menu provides access to the following sub-Menus:

- The **Adjust** menu F1 contains all the settings that govern the performance of the machine.
- The **Measure** menu F2 contains information about the machine's current state. No adjustments to the machine's operation can be made in this menu.
- The **Preferences** menu F3 allows the operator to set the date and time.
- The **Info** menu F4 contains information on about the operation of the monitor. This information is for diagnostic purposes regarding the performance of the monitor, and cannot be altered. None of the information included in this menu is relevant to the performance of the 16k PLUS. The Info menu will not be discussed any further in this manual.

Menu Screens - Continued

Preferences Menu

- From the Main menu, press F3 to enter the Preferences menu.
- Press the button to return to the Main menu.

  -OR-
- Press the button to exit the menu pages.

Setting the Date and Time

- In the Preferences menu, press F2 to enter Date/Time menu.
- Press F1 to set the date.
  - The year will be highlighted on the screen. Use the UP/DOWN keys to set the year. Press OK to accept.
  - The month will then be highlighted on the screen. Use the UP/DOWN keys to set the month. Press OK to accept.
  - The day will then be highlighted on the screen. Use the UP/DOWN keys to set the day. Press OK to accept.
- Press F2 to set the time.
  - The hour will be highlighted on the screen. Use the UP/DOWN keys to set the hour. Press OK to accept.

Note: When setting the time, a 24 hour clock is displayed.

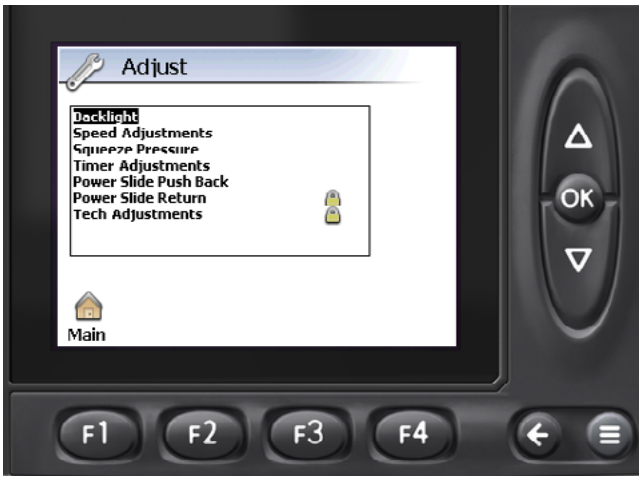
  - The minutes will then be highlighted on the screen. Use the UP/DOWN keys to set the minutes. Press OK to accept.
- Press the button to return to the Main menu.

  -OR-
- Press the button to exit the menu pages.

Menu Screens - Continued

Adjust Menu

The Adjust menu contains all the settings used to customize the performance of the machine. These settings allow the operator to fine tune the machine according to the operating conditions.



- From the Main menu, press F1 to enter the Adjust Menu.
- Use the UP/DOWN keys to select the parameter group. Refer to Table 1 for a list of parameter groups and the parameters found within.
- Press OK to enter the selected group.
- Use the UP/ DOWN keys to select the parameter to modify. Press OK to select.
- Use the UP and DOWN keys to change the parameter value. Press OK to accept.
- Press the key to return to the Adjust menu.

  -OR-
- Press the key to exit the menu pages.

Note: An example of changing the squeeze pressures is given, but the procedure for changing all the other parameters is the same.

Important: The parameters groups "Power Slide Return" and "Tech Adjustments" are locked. The parameters within these groups are set at the factory and should not be changed. Adjusting parameters within these groups could have severely negative affect on the performance of the machine.

- Pressing the Reset key will reset the value back to the factory setting.

Restoring Factory Default Settings

When a parameter has been highlighted in the menu, or when changing the value of a parameter, the "Reset" icon will appear above the F2 key.

- Press the F2 key to restore the parameter to the factory setting.
- The monitor will ask you to confirm the change.
  - Press F2 again to accept the change.
  - Press F4 to cancel.

Menu Screens - Continued

Adjust Menu - Continued

Example: Changing the Squeeze Pressures.

1. Press the key to enter the Main menu.
2. Press F1 key to enter the Adjust menu.
3. Use the UP/DOWN keys to highlight “Squeeze Pressure”. Press the OK key .
4. Use the UP/DOWN keys to highlight “1st Squeeze Pressure”.
   - The current value of the parameter highlighted will be displayed.
   - To adjust the value of the parameter, press the OK key.

Note: To reset the value to the factory default, press F2 key.

5 Use the UP/DOWN keys to change the squeeze pressure value as required. The units for this parameter are psi.
   - Press the OK key to accept the value and exit back to the Squeeze Pressure menu.

Note: To reset the value to the factory default, press F2 key.

6 Use the UP/DOWN keys to highlight the “2nd Squeeze Pressure”.
   - Use the UP/DOWN keys to change the squeeze pressure value as required. Press the OK key to accept.

Note: If the 2nd squeeze pressure is set lower than the 1st, then the “1st Squeeze Pressure” will be used for BOTH.

7 Press the F1 key to exit to the Main menu page.

-OR-

- Press the key to return to the Adjust menu.

-OR-

- Press the key to exit the menu pages.

Saved settings are retained even after power has been removed from the monitor.

Menu Screens - Continued

Adjust Menu - Continued

Backlight Menu

- Backlight: Adjusts how bright or dark the screen is.

Note: This parameter can also be adjusted by pressing the DOWN key when in the Auto screen.

Speed Adjustments

- Hitch: Adjusts how fast the hitch moves inline and offset.
- Loader Up: Adjusts how fast the loader moves up.
- Loader Down: Adjusts how fast the loader moves down.
- Alignment Arms: Adjusts how fast the alignment arms open or close.
- Auto Power Slide Back Min: Used to fine tune the operation of the Power Slide in Auto screen.

Note: The purpose of this procedure is to find the minimum current (in Milliamps) required to just begin opening the power slide valve. Once this variable is set, it should not be adjusted. If more power is needed to begin pushing bales back in the Auto screen, adjust the "Initial Power Slide Force" parameter in the Power Slide Push Back menu.

To set this parameter, use the following steps:

Warning: Keep all people clear of the machine while performing this procedure

1. Change the operation screen to Manual Load.
   - Observe which buttons on the joystick control the "Slide Back" and "Slide Return".
   - Move the power slide up on top of the bed where it is easily observed.
2. Enter the "Speed Adjustments" menu and select the "Manual Load Power Slide Return" parameter.
   - Record the value of this parameter for future use.
3. Set the value of "Manual Load Power Slide Return" to the minimum value.
   - Press the "Slide Return" button on the joystick. If the power slide begins to move, use the minimum value for "Auto Power Slide Back Min".
   - If the power slide does not move, hold the "Slide Back" button on the joystick while pressing the UP key to raise the value of "Auto Power Slide Back Min".
   - Record the value of "Manual Load Power Slide Return" when the power slide first begins to move.
4. Return the value of "Manual Load Power Slide Return" to that recorded in step 2.
5. Set the value of "Auto Power Slide Back Min" to the value found in step 3.

- Auto Power Slide Back Max: In the AUTO screen, adjusts the maximum speed of the power slide in Auto Mode.
- Auto Power Slide Return: Adjusts the maximum speed the power slide will return in Auto screen.
- Manual Load Power Slide Back: Adjusts the maximum speed the power slide pushes back in the Manual Load screen.
- Manual Load Power Slide Return: Adjusts the maximum speed the power slide returns in the Manual Load screen.

Menu Screens - Continued

Adjust Menu - Continued

Squeeze Pressure

- 1st Squeeze Pressure: Adusts the pressure used to pick the first bale in the Auto load sequence.
- 2nd Squeeze Pressure: Adjusts the pressure used to pick the second (and third if aplicable) bale in the Auto Load sequence.

Note: If the "2nd Squeeze Pressure" is set lower than the "1st Squeeze Pressure", then the monitor will use the "1st Squeeze Pressure".

Timer Adjustments

Using the factory settings for the timers is recommended

- Lower Loader Timer: In the Auto-Load Sequence, the monitor will hold the valve open to lower the loader for the time specified in this parameter.
- Grab Hooks Delay Timer: In the Auto-Load Sequence, when the first squeeze pressure is reached, the monitor will begin to raise the loader and engage the grab hooks. By delaying the grab-hook engagement slightly, a little more hydraulic power is sent to the loader initially to help lift the bale off the ground. This helps to reduce the distance the bale is dragged on the ground.
- Grab Hook Engagement: In the Auto-Load Sequence, the monitor will hold the valve open to engage or disengage the grab hooks for the time specified in this parameter.

Power Slide Push Back

The parameters set in this menu are related to the how the power slide pushes bales in the Auto-Load Sequence.

- 1st Acceleration Rate: When the power slide is pushing bales back in the Auto screen, the monitor starts pushing the bales back slowly, and accelerates as the bale move back. Each time the Hall Effect sensor (located near the power slide drive shaft) senses a tooth on the "star wheel" it increases the speed of the motor. A higher percentage for the first acceleration rate will speed the power slide up faster.
- 2nd Acceleration Rate: When the power reaches a certain point on the bed, a new variable is used to control how fast the motor accelerates.
- Start 2nd Acceleration: This variable controls where the second acceleration begins. The units of the variable is the "# of teeth" counted at the star wheel. Each "tooth" equals approximately 2" of travel down the bed.
- Initial Power Slide Force: Sets the initial valve opening when pushing back bales in the Auto-Load sequence.

See "Power Slide Push Back Adjustment - Power Slide Acceleration Curve" for diagram.

Menu Screens - Continued

Adjust Menu - Continued

Power Slide Return

- The parameter group “Power Slide Return” is locked. The parameters within this group is set at the factory and should not be changed. Adjusting parameters within this group could have severely negative affect on the performance of the machine.

Tech Adjustments

- The parameter group “Tech Adjustments” is locked. The parameters within this group is set at the factory and should not be changed. Adjusting parameters within this group could have severely negative affect on the performance of the machine.

Measure Menu

The Measure menu contains important information about the monitor/controller and the 16k PLUS machine. This information can be useful for monitoring the 16k PLUS machine’s performance or diagnosing errors.

Note: No adjustments can be made from the Measure menu.

- From the Main menu, press F2 to enter the Measure Menu.
- Use the UP/DOWN keys to select the measure group. Refer to Table 1 for a list of measure groups and the information found within.
- Press OK to enter the selected group.
- If there is more information lower or higher than that displayed on the page, use the UP/ DOWN keys to scroll to it.
- Press the key to return to the Adjust menu.

  -OR-
- Press the key

Sensors

1. Alignment Arms: When the alignment arms are completely open, the sensor will read true.
2. Bale On: When the bale on pad is depressed, the sensor will read true.
3. Bed Down: When the bed is securely resting in the cradle, the sensor will read true.
4. Bed Mid: When the bed is raised above 45 degrees, the sensor will read true.
5. Bed Up: When the bed is raised to the vertical position, the sensor will read true.
6. Hitch Inline: When the hitch is completely in line, the sensor will read true.
7. Hitch Offset: When the hitch is completely offset, the sensor will read true
8. Loader Up: When the loader is completely raised up. the sensor will read true.
9. Push Off In: When the push off is completely retracted, the sensor will read true.
10. Squeeze Pressure: This sensor reads the pressure (in psi) in the alignment arm cylinders.
11. Power Slide Counter: This sensor keeps track of the location of the power slide as it moves along the bed. The “0” location should be approximately at the foot of the loader. The home position should be below -5.

Menu Screens - Continued

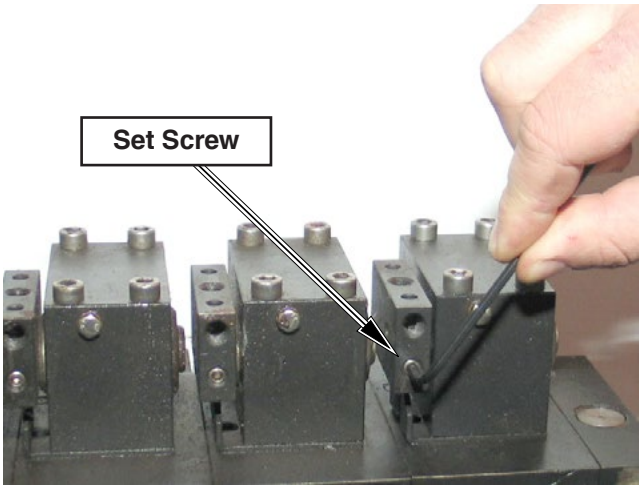
Measure Menu - Continued

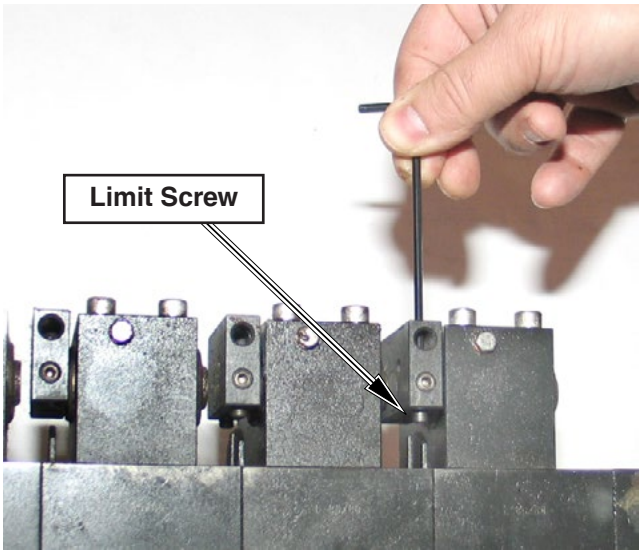
Outputs

This menu shows the operator the electrical current the Control Box is sending to open and close the valve.

- Hydraulic functions that can be sped up or slowed down with the Control Box (the loader, power slide, hitch and alignment arms) have the units of milliamps. A positive number indicates that the valve is being opened in one direction, and negative indicates the opposite directions direction. (as indicated below)
- All other hydraulic functions operate either true or false. When the function reads true, the Control Box is sending 12 volts to the valve to activate the corresponding function. (The speed of these functions can not be controlled by the computer.)

Note: There are limit screws on the valve that can be used to limit the speed of any function.





- **Loader:** A positive reading opens the valve to raise the loader. A negative reading opens the valve to lower the loader.(milliamps)
- **Power Slide:** A positive reading opens the valve to move the power slide back. A negative reading opens the valve to return the power slide to the front.(milliamps)
- **Hitch:** A positive reading opens the valve to move the hitch offset. A negative reading opens the valve to pull the hitch inline.(milliamps)
- **Alignment Arms:** A positive reading opens the valve to close the alignment arms. A negative reading opens the valve to open the alignment arms.(milliamps)
- **Push Off In:** Reads true when power is supplied to valve to pull the push off in.
- **Push Off Out:** Reads true when power is supplied to valve to push the push off out.
- **Grab Hooks In:** Reads true when power is supplied to valve to engage the grab hooks.
- **Grab Hooks Out:** Reads true when power is supplied to valve to disengage the grab hooks.
- **Bed Up:** Reads true when power is supplied to valve to raise the bed.
- **Bed Down:** Reads true when power is supplied to valve to lower the bed.

Menu Screens - Continued

Measure Menu - Continued

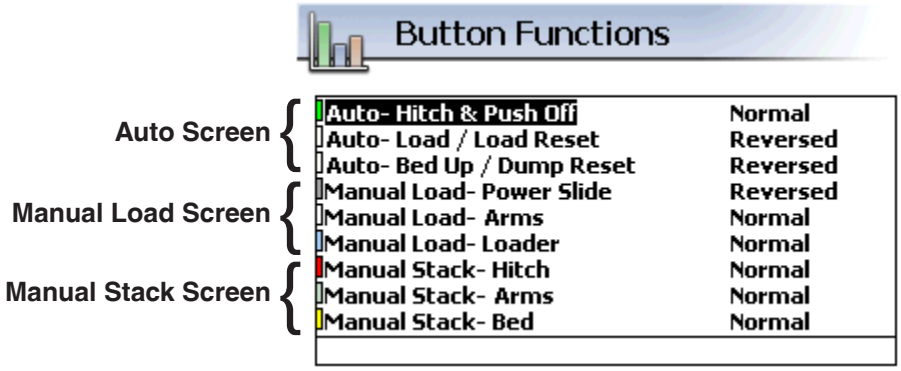
Joystick Buttons

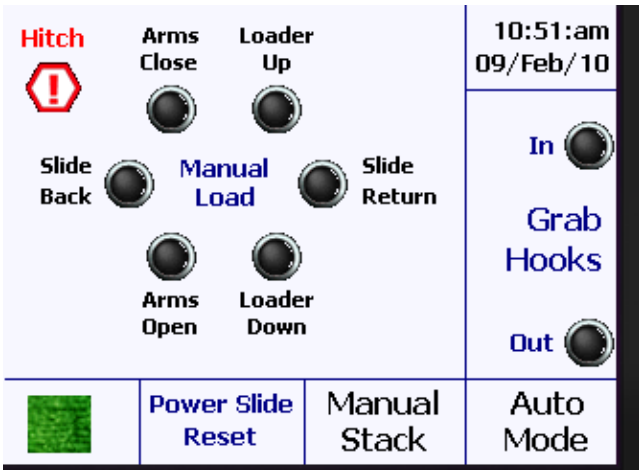
- As each button is pressed, the corresponding button on the screen will read true. The following diagram shows the locations of buttons 1 though 6.

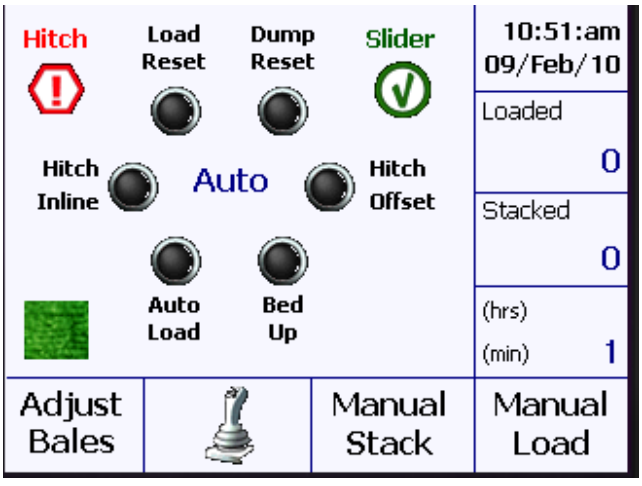
Button Functions

This menu is intended to be a quick reference to how the joystick is configured.

- The first word on each line indicates the operation screen. (Auto, Manual Load, or Manual Stack)
- The rest of the line indicates the button function in that screen.
- “Normal” indicates the buttons are configured as from the factory.
- “Reversed” indicates the buttons functions have been reversed.







Menu Screens - Continued

Measure Menu - Continued

Module Diagnostics

This menu provides a quick reference to how the display screen and control unit on the machine are functioning.

- **Status Display Screen: MD3** OK indicates the monitor in the cab is working properly.
- **+ Bat: MD3** Indicates the voltage the monitor is receiving from the battery.
- **Signal Voltage: MD3** Indicates the voltage being sent to power the joystick.
- **Temp: MD3** Indicates the temperature (in Centigrade) of the monitor.
- **Status Computer: XA2** OK indicates the COMPUTERcontroller on the 16k PLUS is working properly.
- **Address: XA2** Indicates the COMPUTERaddress of the controller on the 16k PLUS.
- **+ Bat: XA2** Indicates the voltage the COMPUTERcontroller is receiving from the battery.
- **Signal Voltage: XA2** Indicates the voltage being sent to power the sensors on the 16k PLUS.
- **Temp: XA2** Indicates the temperature (in Centigrade) of the COMPUTERcontroller.

Notes

Section 6: Maintenance

Section Contents

CAUTION

BE ALERT

SAFETY FIRST

REFER TO SECTION 1 AND REVIEW ALL SAFETY RECOMMENDATIONS.

General

This section deals with two goals, maximum life and dependable operation. Adopt a regular maintenance and lubrication program. Care and sufficient lubrication is the best insurance against delays.

Safety

- Always shut off the tractor and remove key before dismounting.
- Guard against hydraulic high pressure leaks with hand and face protection.
- Never work under the implement unless it is in the down position or securely blocked in place. Do not depend on the hydraulic system to support the frame.

Warning

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

Caution

Keep service area clean and dry. Wet or oily floors are slippery.

Tighten Bolts

- Before operating the unit.
- After the first two hours of operation.
- Check tightness periodically thereafter.
- Use Bolt Torque Chart on page 6-20 for correct values on various bolts.
- Note dashes on hex heads to determine correct grade.

Note: DO NOT use the values in the Bolt Torque Chart if a different torque value or tightening procedure is given for a specific application.

- Fasteners should be replaced with the same or higher grade. If higher grade is used, only tighten to the strength of the original.

Tires

- Inspect tires and wheels daily for tread wear, side wall abrasions, damaged rims or missing lug bolts and nuts. Replace if necessary.
- Tighten wheel bolts - refer to Bolt Torque Chart.
- Check tire pressure daily, when tires are cold. Tire pressures for specific tires are listed in the “Machine Specification” section at the front of this manual.
- Correct tire pressure is important.
- Do not inflate tire above the recommended pressure.

⚠ Warning

After the first 100 hours of use, re-torque all wheel lug nuts.

⚠ Caution

Tire replacement should be done by trained personnel using the proper equipment.

Preventative Maintenance

Before operating your Bale Runner carefully inspect the entire machine, and its components for any sign of excessive wear or weakness. Always follow the Daily Maintenance, General Maintenance, and Year End Maintenance Checklists to allow for early detection of possible hazards.

WARNING: Always wear eye protection and proper protective clothing while performing maintenance on the Bale Runner. Protective clothing includes but is not limited to; heavy pants and shirt, steel toed boots, and gloves.

WARNING: When working with hydraulic fluid you should wear rubber gloves to prevent oil from getting in cuts and scratches in your skin and causing infections or allergic reactions.

Hydraulic System Preventative Maintenance

DANGER: Remember to turn off hydraulic system and tractor and remove key from ignition before servicing the Bale Runner. The Bed and Loader should be lowered to their lowest position or securely blocked in position.

- Maintain tractor hydraulic system and fluid according to manufacturers specifications. Always use a good quality hydraulic fluid.
- Check the fluid level in the tractor with the bed and loader cylinders retracted.

WARNING: Hydraulic fluid escaping under pressure can easily penetrate skin. Openings in the skin and minor cuts are susceptible to infection from hydraulic fluid. If injured by escaping hydraulic fluid, see a doctor at once. Without immediate medical treatment, serious infection and allergic reaction can occur.

- Check for chaffing or kinking of the hydraulic hoses, these are a source of leaks in hoses.
- Check hoses and cylinders for leaks and repair as necessary. *Remember* that hydraulic fluid escaping under pressure can penetrate human skin. Use a piece of cardboard or wood to look for a suspected high pressure leak.
- Replace all hoses or hydraulic components that show any sign of wear, cracks,leaking, etc.

Hydraulic Pressure Relief

IMPORTANT! RELIEVING HYDRAULIC PRESSURE FROM LINES

Repairs to hoses and cylinders will usually require disconnecting a fitting connection. Fittings should not be disconnected until the pressure in the hydraulic circuit has been relieved. Follow this procedure to relieve pressure in the hydraulic lines.

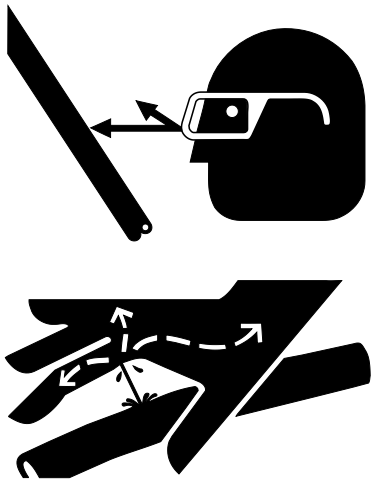
WARNING: Hydraulic fluid escaping under pressure can easily penetrate skin. Openings in the skin and minor cuts are susceptible to infection from hydraulic fluid. If injured by escaping hydraulic fluid, see a doctor at once. Without immediate medical treatment, serious infection and allergic reaction can occur.

WARNING: Always wear eye protection and proper protective clothing while performing maintenance on the Bale Runner. Protective clothing includes but is not limited to; heavy pants and shirt, steel toed boots, and gloves.

WARNING: When working with hydraulic fluid you should wear rubber gloves to prevent oil from getting in cuts and scratches in your skin and causing infections or allergic reactions.

WARNING: Be sure the loader is resting on the hitch or lowered to its lowest position. When the fluid is released from the system it will allow any part to lower uncontrollably to its lowest position.

1. Park the tractor and Bale Runner on level ground, place the transmission in park, set the parking brake, turn off the tractor, and remove the key. When the tractor is off, move each of the hydraulic levers forward and back approximately four times.
2. Uncouple the hoses from the tractor. Slowly unscrew the male hydraulic tips on the ends of the stacker hydraulic hoses, turning them 1/8 th of a turn at a time watching for oil to start leaking out.
3. Use a bucket to catch leaking hydraulic fluid.
4. Crack the hydraulic lines to the loader cylinders as they can have oil under pressure caught by the load check valve.



Warning

HIGH-PRESSURE FLUID HAZARD

To prevent serious injury or death:

- **Relieve pressure on hydraulic system before servicing or disconnecting hoses.**
- **Wear proper hand and eye protection when searching for leaks. Use wood or cardboard instead of hands.**
- **Keep all components in good repair.**

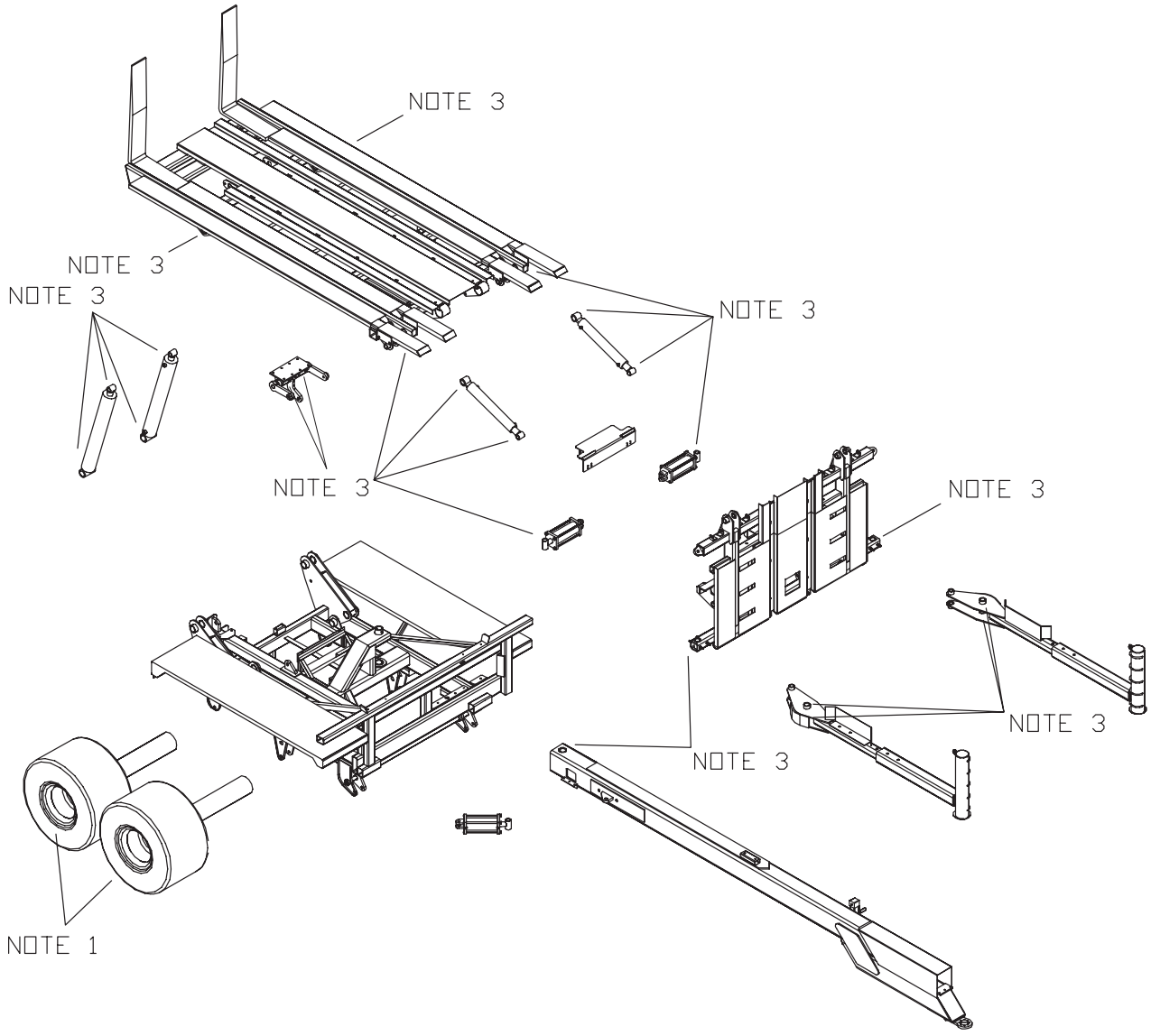
Daily Maintenance

WARNING: After the first 100 hours of use, re-torque all wheel lug nuts.

Daily Check

☐	**Lubricate**	Lubricate all grease points with all-purpose, non-clay based grease. See “Lubrication” section for location of grease zerks.
☐	**Hitch Connection**	Check the bolt system that connects the stacker to the tractor drawbar. A loose connection will wear faster and possibly uncouple.
☐	**Inspect Pins**	Check to make sure all pins and bolts are secure in their proper places. Inspect the pivot pins for wear and replace as necessary.
☐	**Inspect Plastic**	Check all plastic wear plates for wear or breakage. See section in general maintenance.
☐	**Inspect Hydraulics**	Inspect all hydraulic hoses, fittings, and couplings for signs of wear and fix as necessary. Check hydraulic fluid in tractor and general hydraulic system as outlined above.
☐	**Clean**	Keep the Bale Runner clean and free from mud and dirt, especially around hydraulic cylinder rods and moving parts.
☐	**Axle Bearings**	Check the oil level in the axle hubs and fill with 80-90 gear lube as necessary.
☐	**Wheel Lug Nuts**	Examine the wheel lug nuts making sure all are tight and none are missing.
☐	**Tire Air Pressure**	Check air pressure in tires. Tire pressures for specific tires are listed in the “Machine Specification” section at the front of this manual.
☐	**Wiring Harness**	Make sure wires are not rubbing on sharp metal objects etc.
☐	**Lighting**	Check to be sure all lights (brake, turn and clearance) are intact and functioning properly.
☐	**Brakes**	Check brakes for adjustment periodically.
☐	**Sensors**	Wipe off dust and metal from all ferrous metal sensors.

Lubrication Points



Notes:

1. Make sure hubs have oil and the plug is in the hub caps. Changing bearings is dificult and requires large size tools.
2. Grab hooks have no grease zerks. See grab hook assembly for location of plastic bushings.
3. 10 hour grease point.
4. 2 Grease points on tensioner and chain drive shaft bearings.

Lubricants

Hydraulic oil.....High quality that meets or exceeds tractor specifications
Axle hub oil..... 80-90 gear lube
Grease.....Non clay based

General Maintenance

General Check

- Lug nuts should be tightened to 450-500 ft-lbs.
- Bolts in axle suspension system should be tightened to the values on decal 10774 shown below.

⚠ WARNING

SAFETY ALERT! (1) FOLLOW ALL TORQUE REQUIREMENTS. (2) DO NOT USE ANY COMPONENT WITH VISIBLY WORN OR DAMAGED THREADS. FAILURE TO FOLLOW THESE SAFETY ALERTS CAN LEAD TO LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE, SERIOUS PERSONAL INJURY OR DEATH.

Hutchens Suspension Torque Requirements
9600-9700 Series (Decal Part Number 16086-01 Rev. J)

After an initial break in period, approximately 1000 miles, and at least every 4 months periodically thereafter, ALL bolts and nuts should be checked to insure that recommended torque values are being maintained.

Oiled torque values listed are for new fasteners with lubricated threads. It is recommended that new installations be performed with oiled fasteners. For dry threads which have been in service, use the higher torque values which are noted below.

	OILED	DRY
1 1/8-7 (9600 / 9700 Rocker Bolt)	590 lb-ft	790 lb-ft
1-14 or 1-8 (9700 Radius Rod Bolt)	540 lb-ft	720 lb-ft
7/8-14 (Axle U-Bolts & 9600 Radius Rod Bolt)	350 lb-ft	470 lb-ft
3/4-16 (Axle U-Bolts)	310 lb-ft	420 lb-ft
5/8-18 (Radius Rod Clamp Bolt)	130 lb-ft	170 lb-ft
5/8-18 (Spring Retainer Bolt)	35 lb-ft	50 lb-ft

HUTCH Hutchens Industries

Hutchens Industries, Inc., P.O. Box 1427, Springfield, Missouri 65801-1427 Toll Free 1 (800) 654-8824

- Alignment Arm Chains should be kept tight to prevent cracking of the Loader. Check the chain tightness by visually inspecting the chains when the Loader is fully raised. The chains should have little or no slack.

To tighten Alignment Arm Chains

1. Jack up the ends of the Alignment Arms and block them in place. This should create the most slack in the chain.
2. Release the safety latch and unhook the grab hook. Determine the link that would eliminate the most slack in the chain.
3. Remove the double clevis pin in the end of the chain, hook the grab hook on the desired link, and re-lock the safety latch.
4. Re-install the pin on the double clevis on the end of the chain through the pad eye on the Alignment Arm.

- Check all plastic wear surfaces used in the machine. These parts are located at the Hitch pivot point, between the Hitch and the Frame, at the Alignment Arm pivots, and in the Grab Hook pivots.
- Periodically check all bolts. Use grade eight bolts for replacements. A torque chart is provided on page 6-21.

Cylinder Repair

The diagnosis and repair of the hydraulic cylinders on the Auto Align Bale Runner should only be attempted by a qualified service technician familiar with this type of repair.

Bed Extensions

The bed extensions are used to hold the fifth tier in a load, depending on the dimensions of the bales being stacked. Refer to the chart on page 5-17 to determine if your application requires the use of bed extensions. The bed extensions can easily be removed, and re-pinned to the loader if it is desired to stack a different sized bale.

Air Brake Maintenance

Every Three Months or 25,000 Miles

1. Check the condition of the foundation brakes, including drums, shoes and linings, cams, rollers, bushings, etc.
2. Check for structural damage of the housing, worn clevis, worn clevis bushings and condition of the boot for cuts or tears. Replace if necessary.
3. After allowing the brake drum to cool to room temperature, check for correct chamber stroke following the procedure on page 6-10. Due to different operating conditions, chamber stroke tests may be necessary at earlier intervals. See charts on page 6-10 for the recommended stroke measurements.

Note: An automatic slack adjuster should not have to be manually adjusted except for initial installation and at the time of brake reline.

Every Six Months or 50,000 Miles

Gunite slack adjusters are factory lubricated and extensively sealed to protect against dirt, water, salt and other corrosive elements. Nevertheless, periodic lubrication is recommended.

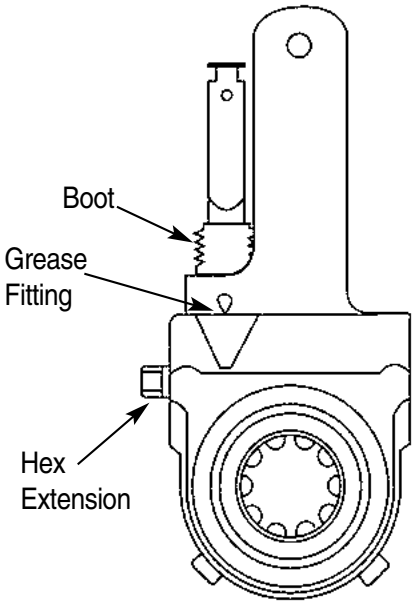


Figure 1 - Lubrication Points

Greasing the Slack Adjuster

1. A grease fitting is provided to allow lubrication during normal chassis servicing (see fig. 1). With a conventional grease gun, lubricate until grease appears on the camshaft, or grease flows from the grease relief.

Note: Slack Adjusters with a grooved and drilled worm wheel will not have a grease relief on the end cap opposite the adjusting hex.

2. The newest Gunite slack adjusters are produced without a grease relief, forcing lubricant through the drilled worm wheel onto the camshaft. Previous designs incorporated a grease relief (see fig. 2).
3. Lubriplate Aero is the grease used in the manufacture of Gunite slack adjusters. It is recommended for use in temperatures as low as -40 degrees F (-40 degrees C).

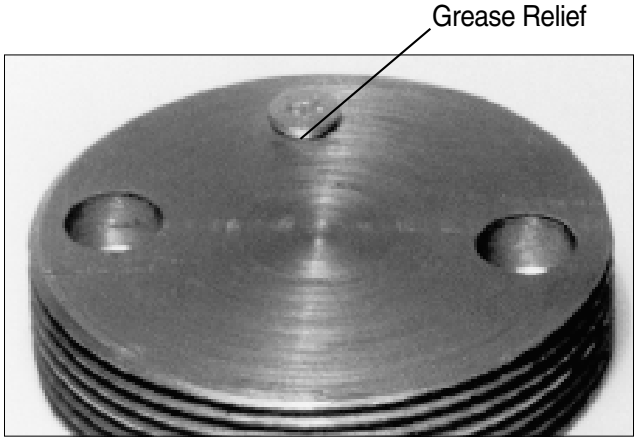


Figure 2 - Grease Relief

Air Brake Maintenance - Continued

Adjust the brakes as follows:

1. Rotate the hex extension clockwise until the brake linings contact the brake drum. Back off the slack adjuster by rotating the hex counterclockwise 1/2 turn.
2. Backing off the slack will require approximately 25 to 30 ft lbs of torque. When backing off the slack adjuster, a ratcheting sound will be heard.
3. Using a ruler, measure the distance from the face of the air chamber to the center of the large pin in the clevis (A) (see fig. 3). Make an 85 psi brake application and allow the chamber push rod to travel its maximum stroke. Measure to the center of the large pin (B). The difference between (A) and (B) is the push rod stroke. Check the following chart for proper maximum stroke after adjustment of the brakes.

Measuring the Free Stroke

4. Free stroke is the amount of movement of the slack adjuster required to move the brake shoes against the drum. With brakes released, measure from the face of the chamber to the center of the clevis pin. Use a ruler to measure the movement of the slack adjuster until the brake shoes contact the drum (fig. 4). The difference between the released and applied measurements is the free stroke. The free stroke should be 3/8" to 5/8". If the free stroke is good, but the applied stroke is too long, there is a problem with the foundation brake. Check the foundation brake for missing or worn components, cracked brake drums, or improper lining to drum contact. If the free stroke is greater than the recommended distance (3/8" to 5/8"), a function test of the slack adjuster should be performed (see page 6-11). If the free stroke is less than 3/8", a dragging brake can occur. Check to see that the manual adjustment procedure was followed correctly. Manually readjust the brake following the procedure on this page.

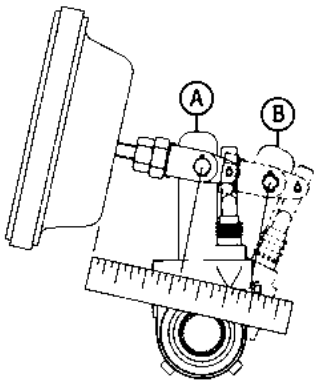


Figure 3 - Measuring Maximum Stroke

"STANDARD" CLAMP TYPE BRAKE CHAMBER DATA

Type	Outside Diameter	Rated Stroke	Maximum stroke at which brakes must be readjusted
9	5-1/4	1.75	1-3/8
12	5-11/16	1.75	1-3/8
16	6-3/8	2.25	1-3/4
20	6-25/32	2.25	1-3/4
24	7-7/32	2.25	1-3/4
30	8-3/32	2.50	2
36*	9	3.00	2-1/4

**Note: If type 36 chamber is used, slack length should be less than 6".*

"LONG STROKE" CLAMP TYPE BRAKE CHAMBER DATA

Type	Outside Diameter	Rated Stroke	Maximum stroke at which brakes must be readjusted
16	6-3/8	2.50	2
20	6-25/32	2.50	2
24	7-7/32	2.50	2
24*	7-7/32	3.00	2-1/2
30*	8-3/32	3.00	2-1/2

**Note: Identified by square air port bosses.*

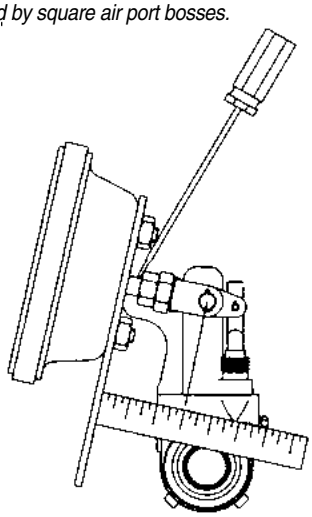


Figure 4 - Free Stroke

Air Brake Maintenance - Continued

Slack Adjuster Function Test

If the maximum stroke, with an 85 psi brake application is less than the distance shown in the chart on page 6-10, the Gunite slack adjuster is functioning properly.

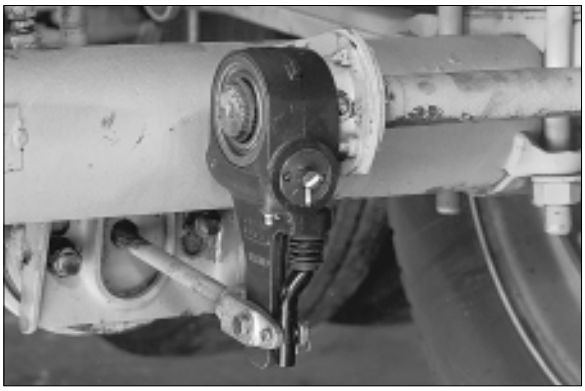
Troubleshooting

1. **The Gunite slack adjuster should not require manual readjustment.** If the maximum chamber stroke is within the range for the size chamber used (see fig. 3), the slack adjuster should not be manually readjusted. If the chamber stroke exceeds the limit, measure the free stroke. If the free stroke is good, but the applied stroke is too long, there is a problem with the foundation brake. Check the foundation brake for missing or worn components, cracked brake drums, or improper lining to drum contact.

   If the free stroke is **greater** than the recommended distance (3/8" to 5/8"), a function test of the slack adjuster should be performed. To test the function of the slack adjuster, place a 7/16" box wrench on the hex extension and rotate it 3/4 of a turn counterclockwise. A ratcheting sound will be heard. Mark the 7/16" hex extension with chalk and apply the brakes several times and watch for the hex to rotate clockwise.

   The hex extension must rotate clockwise. The adjustment is intentionally made in small increments so it will take several cycles to bring the adjuster within the stroke limit shown in the chart.

   If the free stroke is **less** than 3/8", a dragging brake can occur. Check to see that the manual adjustment procedure was followed correctly. Manually readjust the brake following the procedure on page 6-10.



2. Check the torque by attaching a torque wrench to the hex extension and turning it in a counterclockwise direction and record the measurement.
3. If the hex extension did not rotate clockwise during brake application or there is less than 15 ft lbs of torque required to rotate the hex extension in the counterclockwise direction, the slack adjuster must be replaced. If immediate replacement is not possible, proper brake adjustment must be maintained by manual adjustment.
4. If the hex extension rotates clockwise and has a torque of greater than 15 ft lbs when rotated counterclockwise, the slack is functioning properly. Check the foundation brake for proper function, worn cam bushing, pins and rollers, broken springs, worn quick connect clevis, worn clevis bushings and clevis pins. Repair as necessary and repeat the function test.
5. Readjust the brake after the function test.

Air Brake Maintenance - Continued

FF2 Full Function Valve Fitting General Installation Guidelines

1. Dependent on sealant type, the basic guidelines for FF2 pipe fitting installation is finger tight, plus one or two turns **maximum**. Sealant is the variable with the greatest effect on fitting installation. Characteristics of different sealants are as follows:

   Teflon Pipe Sealant

   Teflon pipe sealant acts as a lubricant. Fittings go in farther with the same torque. They may not have to go a full turn past finger tight to seal.

   Fittings Without Sealant

   Fittings without sealant will seal adequately in plastic ports. They arrive at finger tight in less turns than lubricated fittings. Unlike lubricated fittings, fittings without sealant require more turns past finger tight to achieve a seal, typically one or two turns.

   Fittings With Dry Sealant

   Fittings with dry sealant become finger tight in less turns than fittings without sealant. The dry sealant increases the fitting size so it starts tightening sooner. As the fitting is wrench tightened the sealant compresses, Having variable effects on turns required to seal. Sealing still requires one to two turns past finger tight, but more attentions must be paid to fitting torque.

2. Start fittings straight to prevent crossed threads. Fittings should be started by hand for at least one turn before use of wrenches.
3. Dry sealant must be applied properly. If dry sealant is applied to the first thread of a fitting, it will be hard to start the fitting straight.
4. Any pipe fitting or sealant can be used in the installation of the FF2 Full Function Valve. The consistent use of one type of sealant will help you install fittings successfully.
5. The use of teflon tape on a regular basis is not recommended. Bits of tape break off during installation.
6. When the last thread or hex of a fitting is flush with the surface, the fitting has been installed past the point required to seal. **Do not install the fitting farther!**

Max Torque (in-lbs)

1/4”NPTF - 120

3/8”NPTF - 180

Wheel Bearing Adjustment

Wheel Bearing Adjustment Procedure (Double Nut Arrangement)

1. Prior to installing any wheel-end fasteners, make sure the spindle area is free of dirt and debris. As well, make sure all nuts and washers are free of dirt. Clean mating surfaces are important for proper wheel-end assembly.
2. After properly installing the bearing cones and wheel-end seal onto the spindle, and the wheel-end is slid onto the spindle, tighten the inner spindle nut with a torque wrench to 150-200 ft. lbs. to set the bearings and wheel-end. **CAUTION: DO NOT USE AN AIR IMPACT WRENCH TO TIGHTEN THIS NUT!**
3. Loosen this inner nut to allow the brake drum to rotate freely. Backing off one (1) full turn is recommended.
4. Re-tighten the inner spindle nut to 50 ft. lbs. by hand using a torque wrench to position the bearings for final adjustment. **CAUTION: DO NOT USE AN AIR IMPACT WRENCH TO TIGHTEN THIS NUT!**
5. Back the inner spindle nut off 1/4 turn.
6. Install the retaining fastener or fasteners onto the spindle according to the fastener used. If washers are used, be sure they are facing in the right direction and are clean. Make sure any washers with dowels fit properly into the mating holes.
7. Install the outer spindle nut. Using a torque wrench, tighten this nut to 250-300 ft. lbs. Resulting end play should be .001” - .005”.

Note: If end play is not .001” - .005”, disassemble and repeat this procedure.

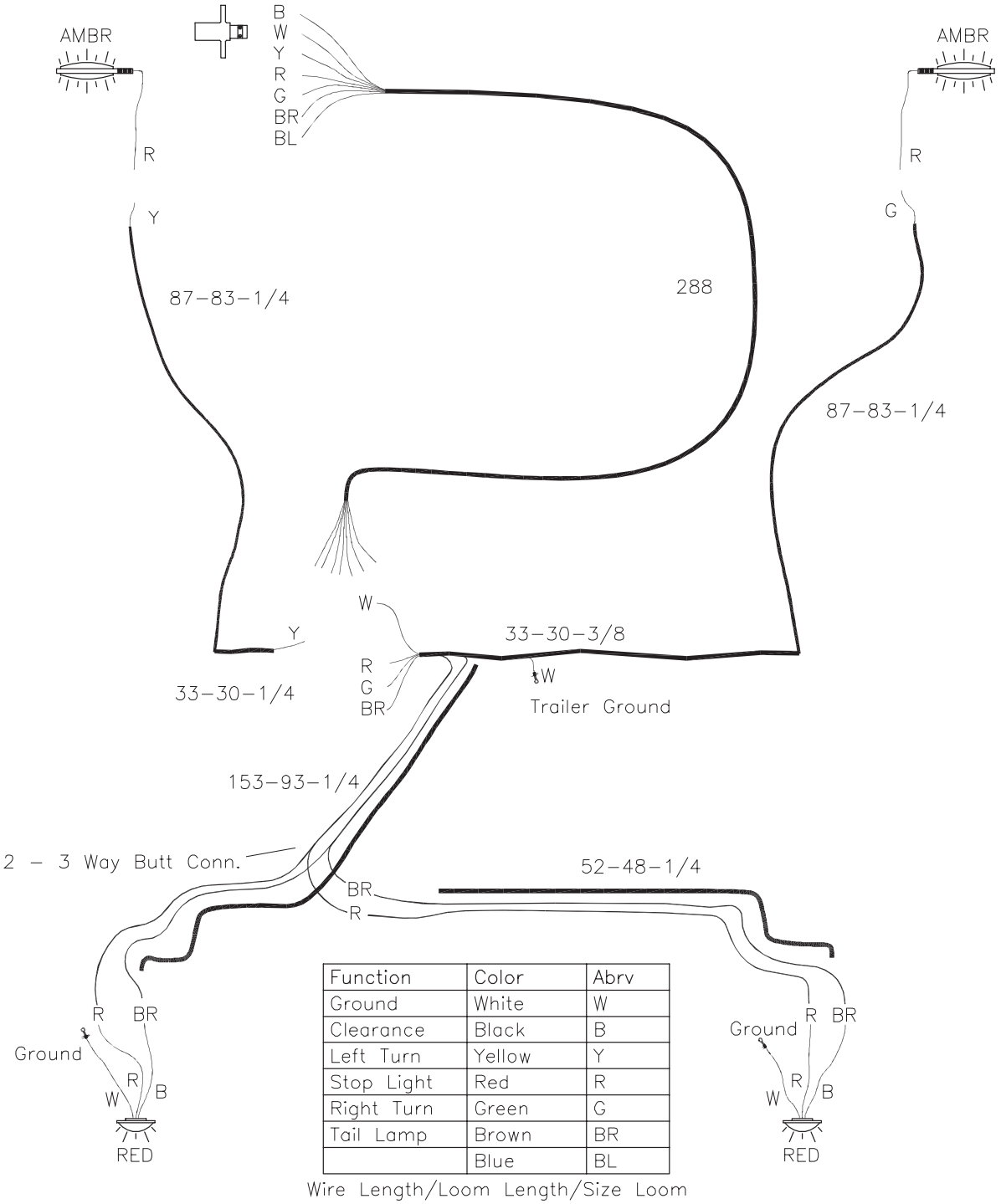
Electrical Maintenance

Electrical components on the 16k PLUS Bale Runner do not need regular maintenance unless wires or cable are worn or broken. This section briefly outlines the function of the electrical systems and gives some basic guidelines for maintenance and repair.

Basic Maintenance and Notes

- Always check the wires for wear from rubbing on different components. When wear is detected, move the wires or shield them.
- When troubleshooting, always check the wires for good connections.
- Use the Electrical Diagrams to rebuild wires if needed.

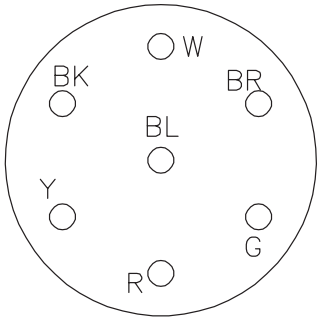
Electrical Diagrams



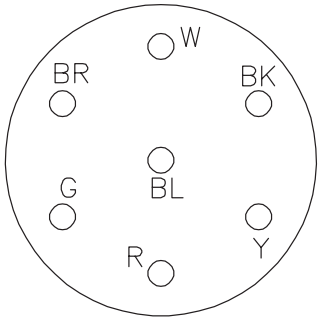
Function	Color	Abrv
Ground	White	W
Clearance	Black	B
Left Turn	Yellow	Y
Stop Light	Red	R
Right Turn	Green	G
Tail Lamp	Brown	BR
	Blue	BL

Wire Length/Loom Length/Size Loom

Electrical Diagrams - Continued

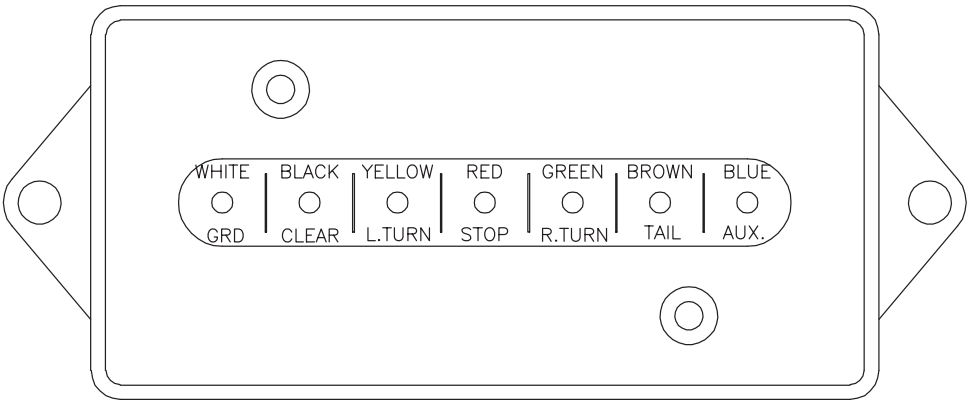


7 Pole Socket Markings



7 Pole Plug Markings

Function	Color	Abrv
Ground	White	W
Clearance	Black	BK
Left Turn	Yellow	Y
Stop Light	Red	R
Right Turn	Green	G
Tail Lamp	Brown	BR
	Blue	BL



Year End Maintenance

Storage

- Park Bale Runner on level ground.
- Lock Hitch in the “in-line” position with Hitch Safety Pin.
- Set Loader on the Hitch.
- Relieve pressure in lines to prevent “thermal” lock.

WARNING: Keep children away from the stored Bale Runner. Many of the surfaces on the machine are slippery and injuries may result from climbing on or around machine.

CAUTION: Keep livestock away from machine so they will not injure themselves or damage the machine.

Preventative Maintenance

- Touch up any scratches or flaking paint.
- Grease all zerks with an all-purpose, non-clay based grease. The non-clay based grease should help eliminate the plugging of grease zerks.
- Cover tires to prevent sun damage.

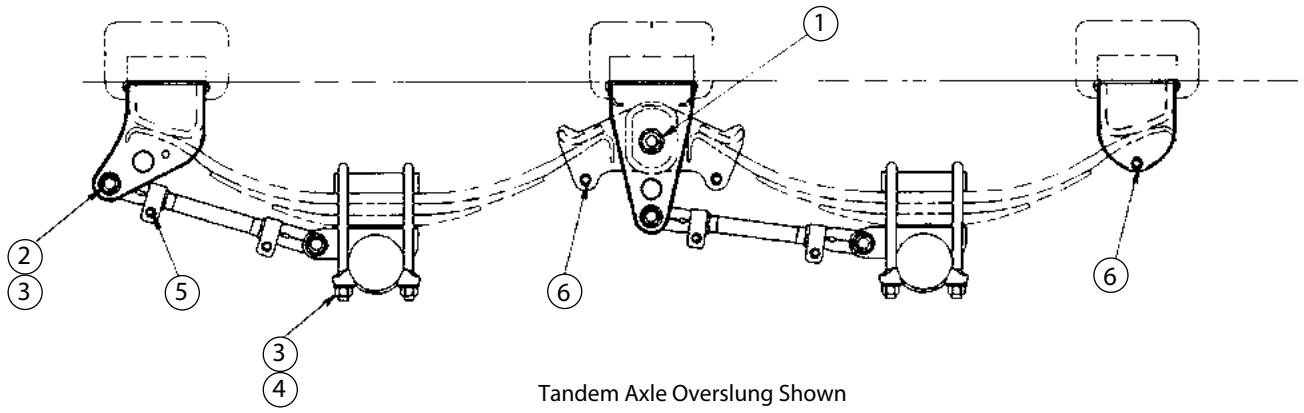
CAUTION: Direct sunlight will cause tires and hoses to deteriorate more quickly.

Suspension Maintenance

The 16k PLUS uses a Hutchens Industries trailer suspension similar to below.

For detailed information visit Hutchens website resource centre at www.hutchensindustries.com.

Suspension used is H-9700 underslung with 44” centers and 2 1/4” spring seat height with 5”round axles.



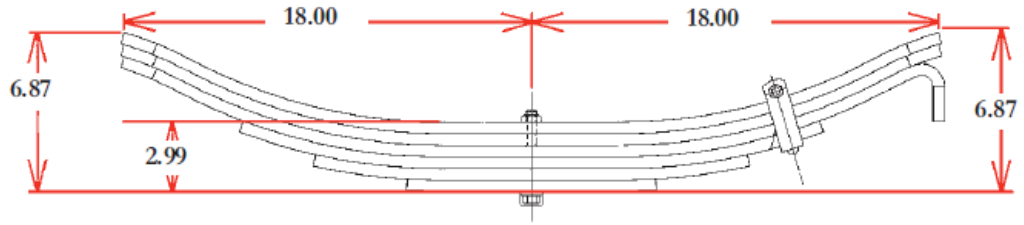
Tandem Axle Overslung Shown

Torque Specifications

Item No.	Fastener	Oiled	Dry
1	1 1/8-7 (9600/9700 Rocker Bolt)	590 Lb-Ft	790 Lb-Ft
2	1-14 (9700 Radius Rod Bolt)	540 Lb-Ft	720 Lb-Ft
3	7/8-14 (Axle U-Bolt & 9600 Radius Rod Bolt)	350 Lb-Ft	470 Lb-Ft
4	3/4-16 (Axle U-Bolt)	310 Lb-Ft	420 Lb-Ft
5	5/8-18 (Radius Rod Clamp Bolt)	130 Lb-Ft	170 Lb-Ft
6	5/8-18 (Spring Retainer Bolt)	35 Lb-Ft	50 Lb-Ft

12146 Spring Leaf Pack - Low Arch, 6 Leaf

44" Axle Center All Positions. Hook to Rear.



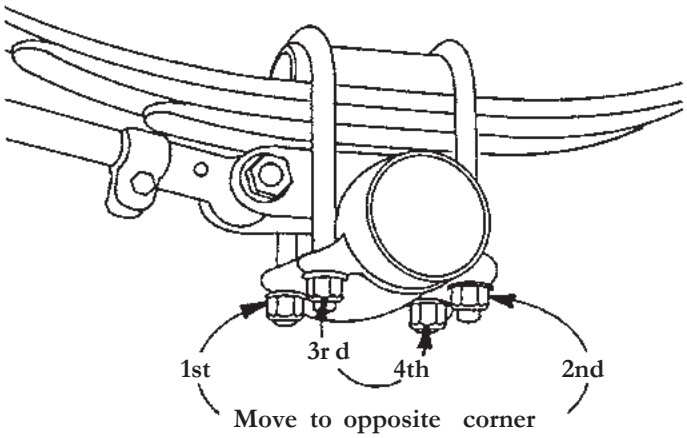
Suspension Maintenance - Continued

Periodically check suspension components and torque bolts to specifications as follows especially after first using a new machine.

Axle Clamp Group and Springs

1. Check the torque on the U-bolt nuts by alternately tightening opposing corners of the clamp assembly. See Figure 1.
   a. When using 7/8" – 14 U-bolts, the nuts should be torqued to a dry level of 470 lb-ft.
   b. When using 3/4" – 16 U-bolts, the nuts should be torqued to a dry level of 420 lb-ft.

Fig. 1

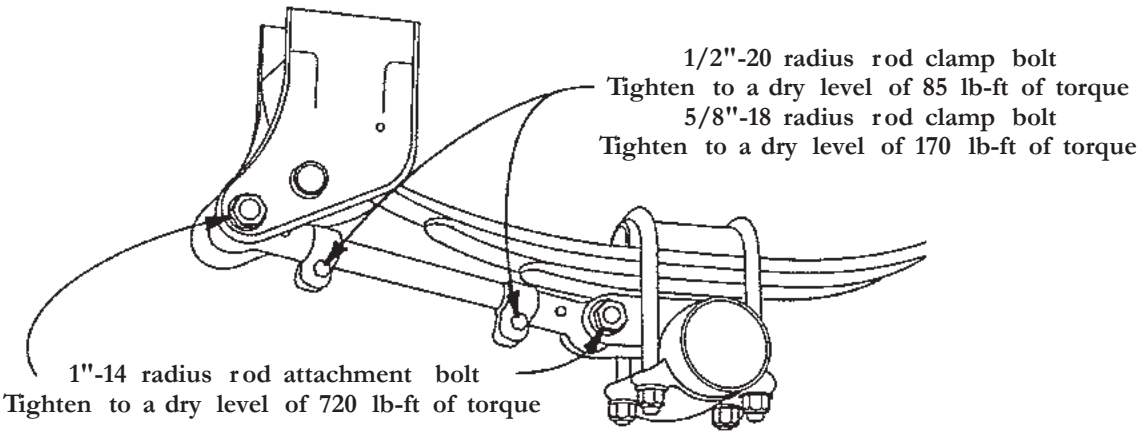


Always carefully inspect the spring and axle clamp components for any signs of wear or cracks, and replace if visible wear or cracks are present.

Radius Rods

2a. The 1" – 14 radius rod attachment bolts at the hangers and spring seats should be tightened to a dry level of 720 lb-ft of torque on both the adjustable and non-adjustable radius rods. See Figure 2.

Fig. 2



Loose operation of this bolt can result in wear requiring that new components be installed to avoid structural damage. During your visual inspection, if you observe any visible wear or loosening in the bushing, it is imperative that you immediately replace the radius rod bushing and bolt. Failure to replace these components will result in damage to the hanger, spring seat, and/or radius rod.

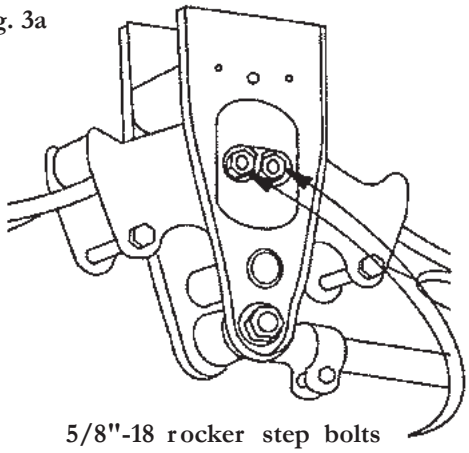
2b. Next check the 1/2" – 20 radius rod clamp bolt, which should be tightened to a dry level of 85 lb-ft of torque. The 5/8" – 18 radius rod clamp bolt should be tightened to a dry level of 170 lb-ft of torque. See Figure 2. If the clamp bolt has not been properly maintained, then wear between the radius rod screw and the eye end may be observed. If so, then the entire radius rod must be replaced. Simply retightening or replacing the clamp bolt will not correct the problem.

Suspension Maintenance - Continued

Rocker Bushings

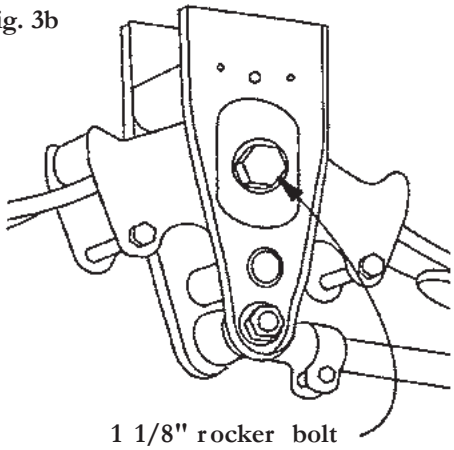
3. The recommended torque values for the rocker bushing clamp bolts are different for each model.
   a. If you are working on the 7700 model suspension, the 5/8" – 18 rocker step bolts should be tightened to a dry level of 170 lb-ft of torque. See Figure 3a.
   b. If you are working on the 9700 model suspension, the single 1 1/8" – 7 rocker bolt should be tightened to a dry level of 790 lb-ft of torque. See Figure 3b.

Fig. 3a



5/8"-18 rocker step bolts
Tighten to a dry level of 170 lb-ft of torque

Fig. 3b



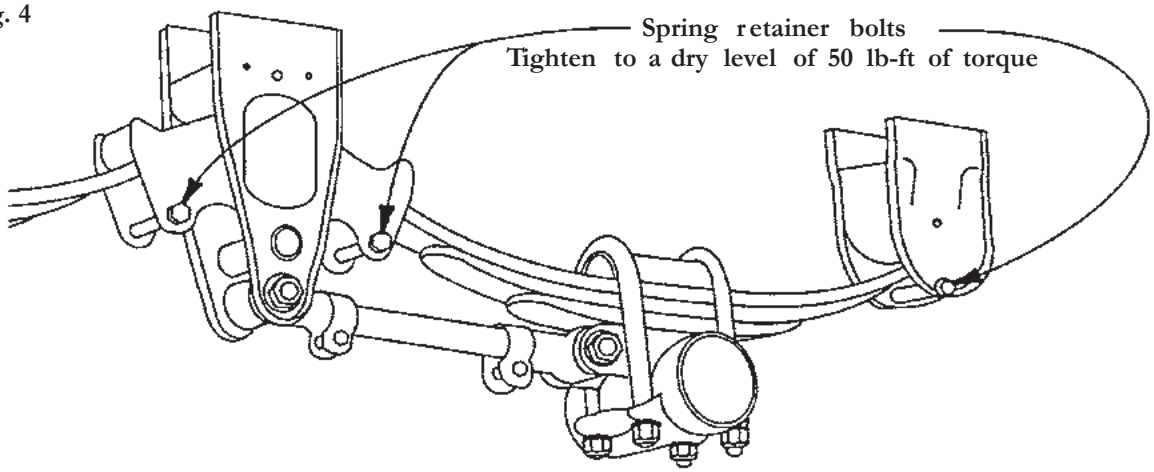
1 1/8" rocker bolt
Tighten to a dry level of 790 lb-ft of torque

During your check, if the bolts are loose a detailed inspection of the rocker is important to ensure that no structural damage has occurred. One way this can be done is by raising the trailer until the trailer weight is taken off the springs. If the rocker is displaced or if the joint is loose, then the rocker should be removed and the rocker and/or rocker bushing be replaced. Again, visually inspect the condition of all rocker/rocker hanger assembly components and replace if visible wear is present.

Hangers

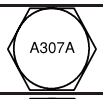
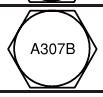
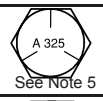
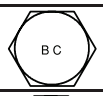
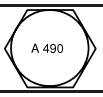
4. Check all of the spring retainer bolts found in the rockers and rear hangers. A dry value of 50 lb-ft of torque should be maintained on all of these bolts. See Figure 4.

Fig. 4



Loose fasteners that are allowed to operate for any period of time will result in irreversible suspension damage and possible loss of vehicle control. **Retightening a worn fastener will not correct a situation created by loose operation!**

Mechanical Specifications for Externally Threaded Fasteners with Grade Markings

Specification	Material	Size Range (in.)	Min. Proof Strength (psi)	Min. Tensile Strength (psi)	Core Hardness Rockwell Min.	Core Hardness Rockwell Max.	Min. Yield Strength (psi)	Grade Identification Marking
SAE J429-Grade 1	Low or medium carbon steel	1/4 - 1 1/2	33,000	60,000	B70	B100	36,000	
SAE J429-Grade 2		1/4 - 3/4 7/8 - 1 1/2	55,000 33,000	74,000 60,000	B80 B70	B100 B100	57,000 36,000	
ASTM A307-Grade A	Low or medium carbon steel	1/4 - 4		60,000	B69 See Note 1	B100		
ASTM A307-Grade B	Low or medium carbon steel	1/4 - 4		60,000(min) 100,000(max)	B69 See Note 1	B95		
SAE J429-Grade 5 ASTM A449-Type1	Medium carbon steel: quenched & tempered	1/4 - 1 1 1/8 - 1 1/2	85,000 74,000	120,000 105,000	C25 C19	C34 C30	92,000 81,000	
ASTM A449-Type 1 See Note 2		1 3/4 - 3	55,000	90,000			58,000	
ASTM A325-Type 1	Medium carbon steel: quenched & tempered	1/2 - 1" 1 1/8 - 1 1/2	85,000 74,000	120,000 105,000	C25 C19 See Note 3	C34 C30	92,000 81,000	 See Note 5
ASTM A354 Grade BC	Medium carbon alloy steel: quenched & tempered	1/4 - 2 1/2 2 1/2 - 4	105,000 95,000	125,000 115,000	C26 C22 See Note 2	C36 C33	109,000 99,000	
ASTM A354 Grade BD	Medium carbon alloy steel: quenched & tempered	1/4 - 2 1/2 2 1/2 - 4	120,000 105,000	150,000 140,000	C33 C31 See Note 2	C39 C39	130,000 115,000	 See Note 4
SAE J429-Grade 8	Medium carbon alloy steel: quenched & tempered	1/4 - 1 1/2	120,000	150,000	C33	C39	130,000	
SAE J429-Grade 8.2	Low carbon boron steel: quenched & tempered	1/4 - 1	120,000	150,000	C33	C39	130,000	
ASTM A490-Type 1	Medium carbon alloy steel: quenched & tempered	1/2 - 1 1/2	120,000	150,000(min) 170,000(max)	C33 See Note 3	C38	130,000	
ASTM A574 Socket Head Cap Screw	Low alloy steel: quenched & tempered	#0 - 1/2 over 1/2 - 2	140,000 135,000	180,000 170,000	C39 C37	C45 C45	162,000 153,000	

Note 1: No minimum hardness is required on bolts and studs 3 x diameter and longer.
Note 2: Bolts less than 3 diameter in length and studs less than 4 diameter in length shall have hardness values not less than minimum and not more than maximum. This hardness testing is the only mechanical testing requirement for these bolts and studs.
Note 3: Bolts less than 3 x diameter are subject only to maximum/minimum hardness testing.
Note 4: ASTM A354-Grade BD with diameters ¼" thru 2 ½" shall be marked with six radial lines and, in addition may be marked with the grade symbol "BD." BD shall be marked on bolts over 2 ½" in diameter.
Note 5: Bolts shall be marked "A325." Additionally, the bolts may be marked with 3 radial 120 degrees apart (as shown).

Torque-Tension Relationships for SAE J429 Grade Bolts

Nominal Thread Size	SAE J429 Grade 2			SAE J429 Grade 5			SAE J429 Grade 8		
	Clamp Load (lbs)	Tightening Torque K = .15	Tightening Torque K = .20	Clamp Load (lbs)	Tightening Torque K = .15	Tightening Torque K = .20	Clamp Load (lbs)	Tightening Torque K = .15	Tightening Torque K = .20
Unified Coarse Thread Series									
1/4-20	1,300	49 in-lbs	65 in-lbs	2,000	75 in-lbs	100 in-lbs	2,850	107 in-lbs	143 in-lbs
5/16-18	2,150	101	134	3,350	157	210	4700	220	305
3/8-16	3,200	15 ft-lbs	20 ft-lbs	4,950	23 ft-lbs	31 ft-lbs	6,950	32.5 ft-lbs	44 ft-lbs
7/16-14	4,400	24	30	6,800	37	50	9,600	53	70
1/2-13	5,850	36.5	49	9,050	57	75	12,800	80	107
9/16-12	7,500	53	70	11,600	82	109	16,400	115	154
5/8-11	9,300	73	97	14,500	113	151	20,300	159	211
3/4-10	13,800	129	173	21,300	200	266	30,100	282	376
7/8-9	11,425	125	166	29,435	321	430	41,550	454	606
1-8	15,000	187.5	250	38,600	482.5	640	54,540	680	900
Unified Fine Thread Series									
1/4-28	1,500	55 in-lbs	75 in-lbs	2,300	85 in-lbs	115 in-lbs	3,250	120 in-lbs	163 in-lbs
5/16-24	2,400	112	150	3,700	173	230	5,200	245	325
3/8-24	3,600	17 ft-lbs	22.5 ft-lbs	5,600	26 ft-lbs	35 ft-lbs	7,900	37 ft-lbs	50 ft-lbs
7/16-20	4,900	27	36	7,550	42	55	10,700	59	78
1/2-20	6,600	41	55	10,200	64	85	14,400	90	120
9/16-18	8,400	59	79	13,000	92	122	18,300	129	172
5/8-18	10,600	83	110	16,300	128	170	23,000	180	240
3/4-16	15,400	144	193	23,800	223	298	33,600	315	420
7/8-14	12,610	138	184	32,480	355	473	45,855	500	668
1-12	16,410	205	273	42,270	528	704	59,670	745	995

Clamp load estimated as 75% of proof load for specified bolts.
Torque values for ¼ and 5/16 inch series are in inch-pounds. All other torque values are in foot-pounds.
Torque values calculated from formula T = KDF where: K=0.15 for "lubricated" conditions K=0.20 for "dry" conditions

Section 7: Storage

Section Contents

Preparing for Storage

- To insure longer life and satisfactory operation, store the implement in a shed.
- If building storage is impossible, store away from areas of main activity on level, firm, dry ground.
- Lock Hitch in the “in-line” position with Hitch Safety Pin.
- Set Loader on the Hitch.
- Relieve pressure in lines to prevent “thermal” lock.
- Clean machine thoroughly.
- Inspect all parts for wear or damage.
- **Avoid delays** - if parts are required, order at the end of the season.
- Lubricate grease fittings. (Refer to Maintenance Section).
- Tighten all bolts to proper specifications (Refer to Maintenance Section).
- For a safer storage, lower the implement into field position and release the hydraulic pressure.
- Level implement using hitch jack and block up.
- Relieve pressure from hydraulic system.
- Raise frames, block up and relieve weight from the tires.
- Cover tires with canvas to protect them from the elements when stored outside.
- Coat exposed cylinder shafts **(Refer to Cylinder Shaft Protection).**
- Touch up any scratches or flaking paint.

Note: Direct sunlight will cause tires and hoses to deteriorate more quickly.

⚠ Warning

Do not allow children to play on or around the machine.

⚠ Caution

Keep livestock away from machine so they will not injure themselves or damage the machine.

Cylinder Shaft Protection

The steps summarized below should be followed when protecting chrome plated shafting on equipment:

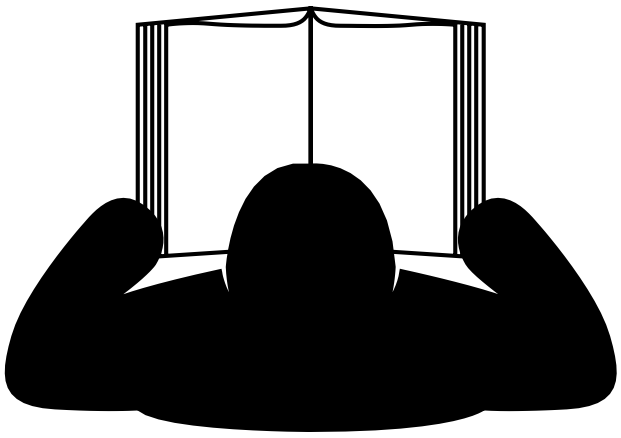
- Position the equipment as it will be stored, and identify all the exposed portions of the chrome plated shafts.
- Clean dirt and dust from the exposed portions of the shaft using a dry cloth or a cloth which has been dampened with an appropriate solvent.
- Prepare a mixture of 60% oil-based rust inhibitor and 40% Kerosene. Apply a thin coating of this mixture to the exposed surfaces of the chrome plated shaft. No. 1 fuel oil may be substituted for Kerosene. A cloth dipped in the mixture can be used to apply the coating.
- Inspect the shaft surfaces after six months and apply additional corrosion preventative mixture.
- If the equipment is to be moved and then stored again for an extended period of time, the steps above should be repeated for all shafts that were stroked during the move.
- **Before retracting the cylinders the protective coating should be removed.** This will prevent fine sand and dirt that has accumulated in the coating, from damaging the shaft seal. **Under no circumstances should sandpaper or other abrasive material be used to clean the surfaces.** Plastic or copper wool in combination with an appropriate solvent will remove most of the dirt.

⚠ Caution

Dirt in the hydraulic system could damage O-rings, causing leakage, pressure loss and total system failure.

Removing from Storage

- Review Operator's Manual.
- Check tire pressure (Refer to Tire Pressure List).
- Clean machine thoroughly. Remove coating from exposed cylinder shafts **(Refer to Cylinder Shaft Protection).**
- Lubricate grease fittings. (Refer to Lubricating Section).
- Tighten all bolts to proper specifications (Refer to Bolt Torque Chart).



Notes

Section 8: Troubleshooting

Section Contents

CAUTION

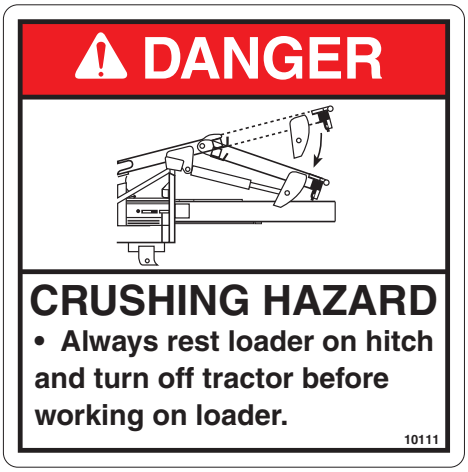
BE ALERT

SAFETY FIRST

REFER TO SECTION 1 AND REVIEW ALL SAFETY RECOMMENDATIONS.

Safety

- Always shut off the tractor and remove key before dismounting.
- Guard against hydraulic high pressure leaks with hand and face protection.
- Never work under the implement unless it is in the down position or securely blocked in place. Do not depend on the hydraulic system to support the frame.

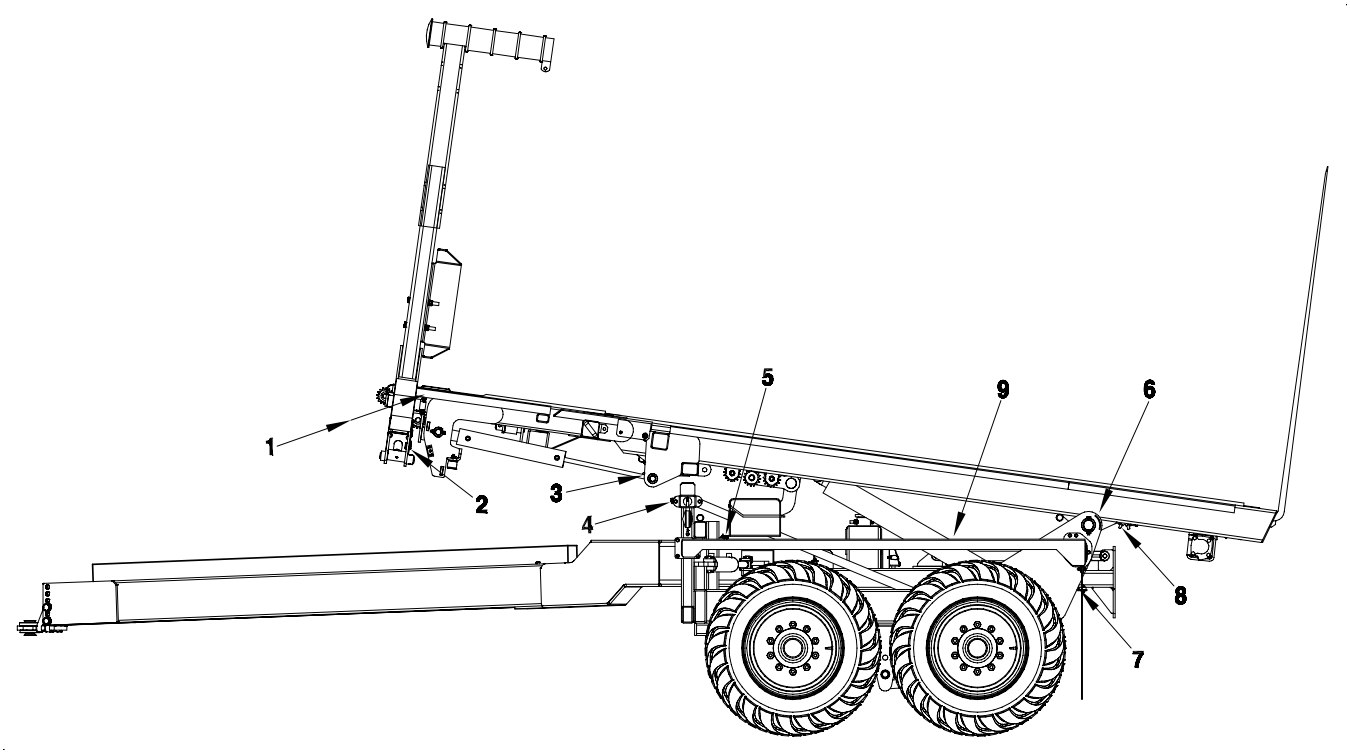


16k PLUS Control System

The 16k PLUS is operated from the monitor in the cab of the tractor, which contains all the computer programming and controls the functions of the stacker. The monitor communicates with the control box on the stacker via a hitch cable. The control box is responsible for opening and closing the valves and monitoring the sensors.

Common Sensor Troubleshooting

There are eleven sensors on the 16k PLUS: nine ferrous metal sensors, one pressure sensor, and one shaft sensor. This manual will refer to each of the sensors by name. Use the following diagram to locate each sensor:



Ferrous Metal Sensors

Ferrous Metal Sensors are located at points 1, 2, 3, 4, 5, 6 and 7 in diagram above. See next two pages for photos of sensors.

The ferrous metal sensors read either true or false. A true reading indicates a piece of steel is near the sensor. (must be magnetic steel). The function of a sensor can be checked by placing a steel washer on the sensor, and checking the reading on the monitor (see Measure - Sensors menu) the sensor should read “true” when it is activated. If the sensor is unplugged, it should read false.

Important: Insufficient gap may allow the sensor to contact moving parts and be destroyed.

16k PLUS Control System - Continued

Sensor Troubleshooting - Continued

Ferrous Metal Sensors - Continued

Common causes for the ferrous metal sensors to not function properly include:

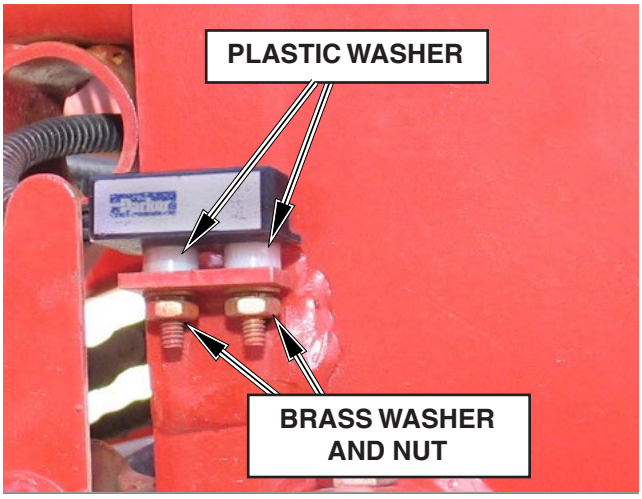
- Incorrect sensor gap: The gap between the sensor and the metal meant to activate it should be between 1/8 and 1/4 of an inch. If the gap is too large, the sensor will not turn true.

Important: Insufficient gap may allow the sensor to contact moving parts and be destroyed.

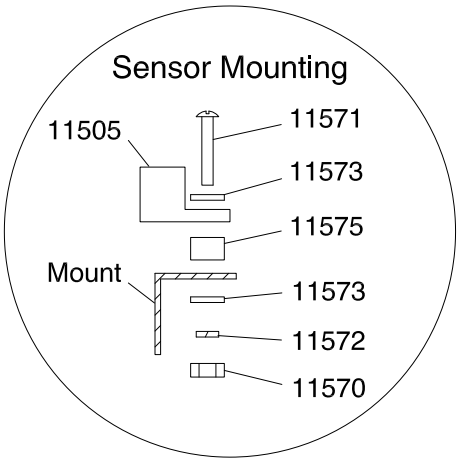
- Debris on sensor: Small metallic particles can build up on the sensor causing it to give a true reading. If metal filings are building up on the sensor, determine the cause of the filings and rectify the problem. If the machine is being operated in an area with volcanic ash, such as the Pacific North West, it may be necessary to regularly clean the sensors of debris.
- Sensor failure: To check the operation of a sensor, unplug the sensor and use an ohmmeter to test the continuity between the two wires. There should be no continuity when the switch is free. There should be no resistance when the switch is placed on a piece of steel. If the state of the sensor does not change, it has failed and should be replaced.

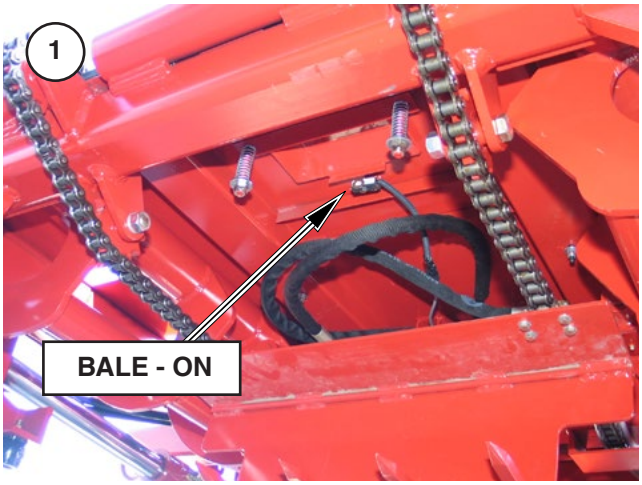
Important: The Ferrous Sensors are installed using brass nuts and bolts and plastic washers. If the sensor is not assembled as shown, it may not work properly.

- Wire Harness Failure: To test the wire harness, unplug the sensor. If the computer still shows “true”, there is a short in the harness. Next, use a short piece of wire to short between the two pins of the plug. If the sensor still reads “false”, there is a break in one of the wires. See “Harness Schematics” for more information.



Ferrous Metal Sensor Mounting

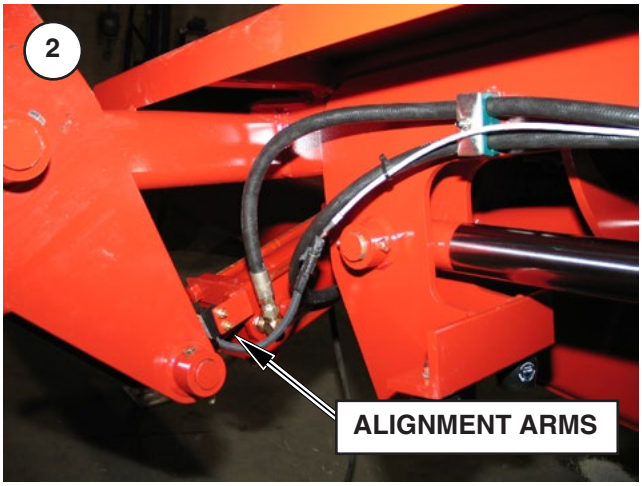


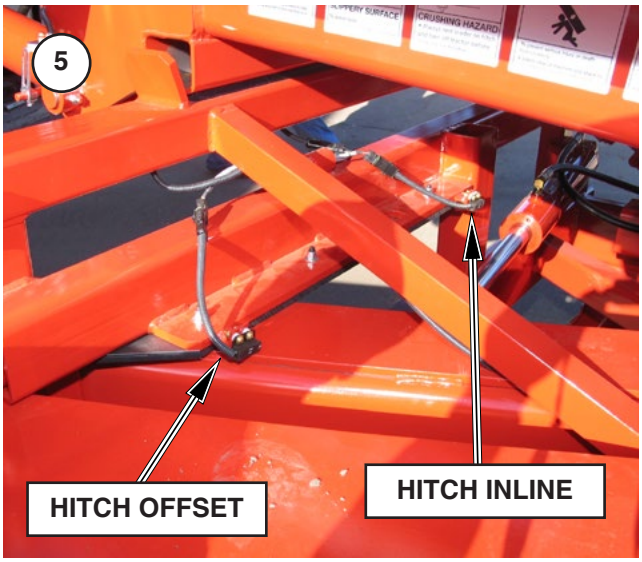


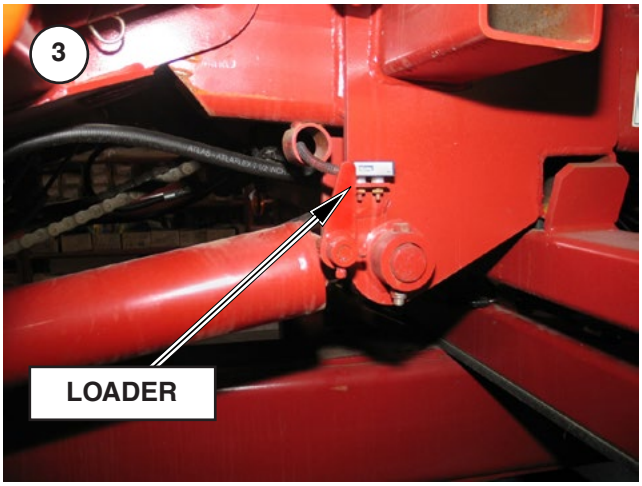
16k PLUS Control System - Continued

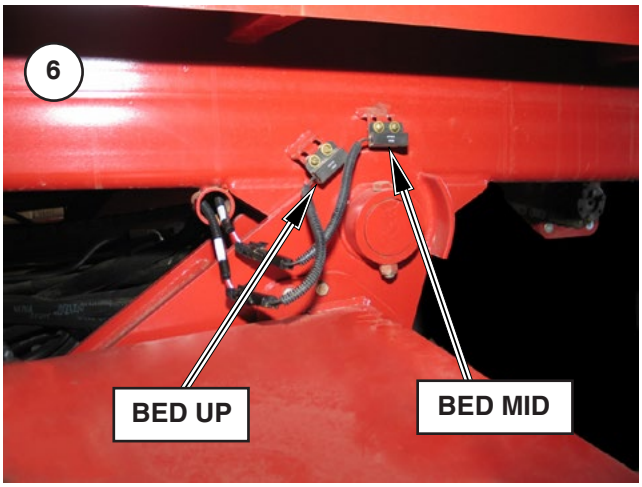
Sensor Troubleshooting - Continued

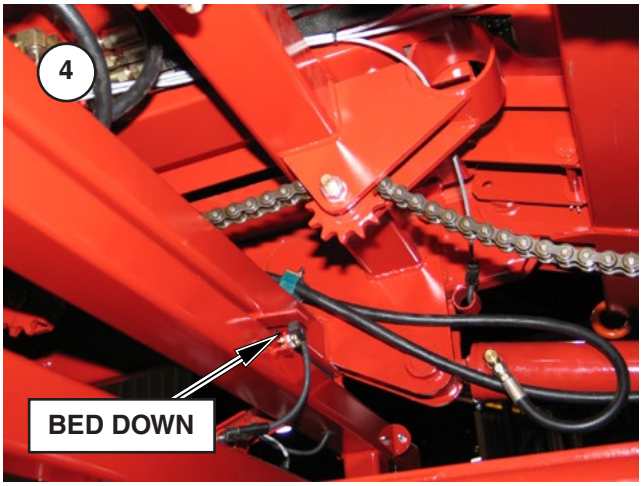
Ferrous Metal Sensors - Continued

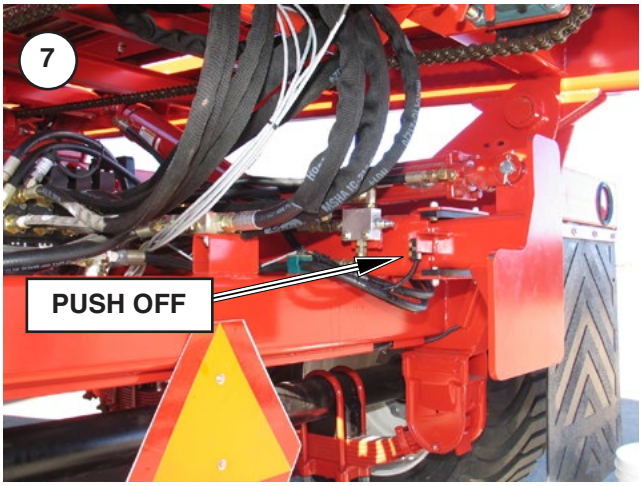












16k PLUS Control System - Continued

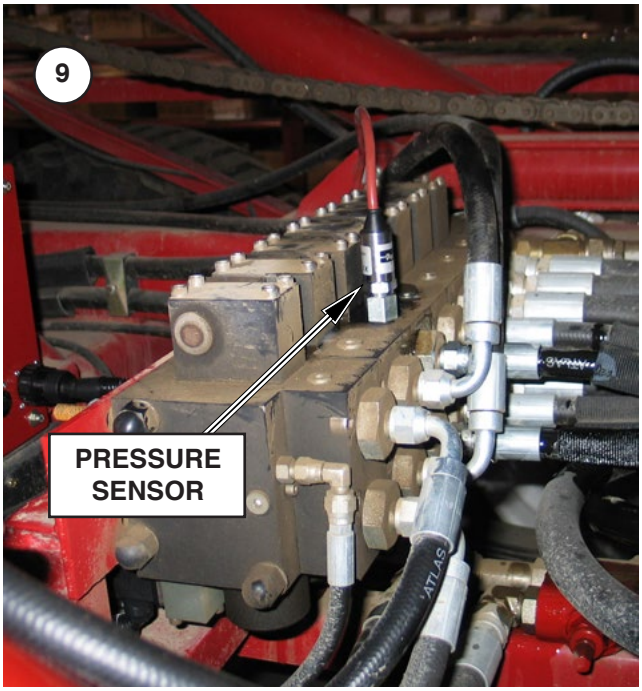
Sensor Troubleshooting - Continued

Pressure Sensor

The pressure sensor on the 16k PLUS measures the squeeze pressure in the alignment arm cylinders. To view what pressure the computer is reading, go to the “Measure - Sensors” menu. The units of measurement are pounds per square inch.

The Monitor may display a low or high pressure warning if the pressure sensor malfunctions.

- To check the operation of the pressure sensor, watch the pressure reading in the “Measure - Sensors” menu as the alignment arm close. The pressure should increase as the bales are being squeezed.
- Sensor failure: From time to time sensors will fail. If you suspect this, first test the wire harness for shorts or broken wires. Otherwise, use a known working sensor to test the operation of computer and harness. See “Harness Schematics” for more information.



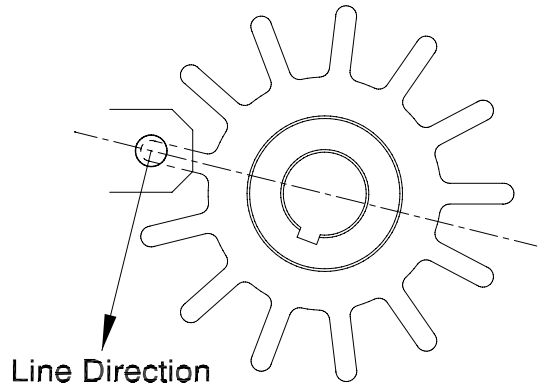
16k PLUS Control System - Continued

Sensor Troubleshooting - Continued

Shaft Sensor Shaft Sensor

The Shaft sensor is used to monitor the location of the power slide as it moves up and down the bed. To view what the computer is reading for the power slide position, go to the “Measure - Sensors” menu. The units of measurement are “pulses”. Each time a tooth of the star wheel passes by the sensor, it either adds or subtracts a “pulse” depending on the direction the tooth is going.

It is very important that the shaft sensor is oriented correctly so it reads in the correct direction. See the following diagram to determine the correct sensor position.



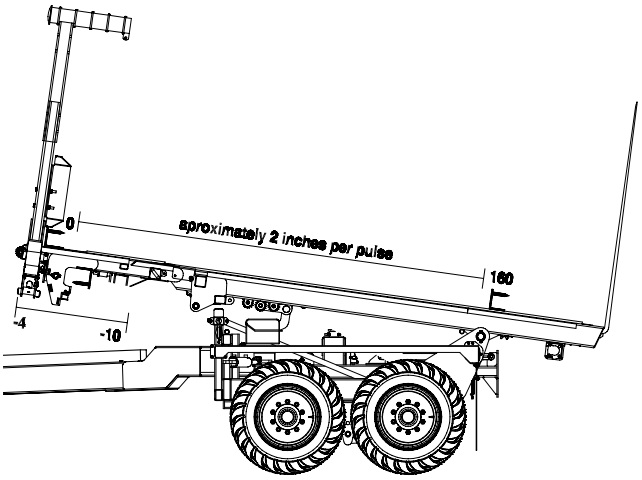
Note: Failure to orient the Shaft sensor correctly will result in erratic or incorrect readings.

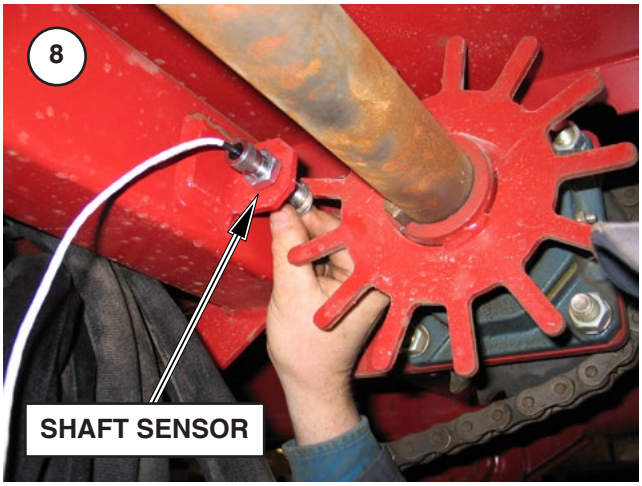
Common causes for the Shaft sensor to not function properly include:

- Incorrect orientation: If the sensor is not oriented correctly, it will not function properly. The number of “Pulses” should increase as the power slide move to the back of the machine, and should decrease as the power slide returns toward the home position. Typically, the power slide “Pulses” should be as shown
- Incorrect sensor gap: The gap between the sensor and the star wheel should be 1/16 of an inch. Too large a gap may give inconsistent readings.

Important: Insufficient gap may allow the sensor to contact moving parts and be destroyed.

- Debris on sensor: Small metallic particles can build up on the sensor causing it stop working. If metal filings are building up on the sensor, determine the cause of the filings and rectify the problem. If the machine is being operated in an area with volcanic ash, such as the Pacific North West, it may be necessary to regularly clean the sensors of debris.
- Sensor failure: From time to time sensors will fail. If you suspect this, first test the wire harness for shorts or broken wires. Otherwise, use a known working sensor to test the operation of computer and harness. See “Harness Schematics” for more information.





16k PLUS Control System - Continued

Crash Avoidance

There are several positions where the 16k PLUS is able to crash into itself causing severe damage. To prevent this, Crash Avoidance is built into the computer programming. Before the computer signals part of the stacker to move, it checks the sensors to ensure it is safe to do so. If the sensors indicate there is the potential for a crash to occur, the stacker will not move. In Auto mode, dangerous commands from the joystick are simply ignored. In the Manual Stack or the Manual Load screens, the stacker will display a warning indicating why it will not move when the Crash Avoidance is activated.

Note: Some functions will stop when a sensor indicates the mechanism is moved to its limit. This is not part of the Crash Avoidance.

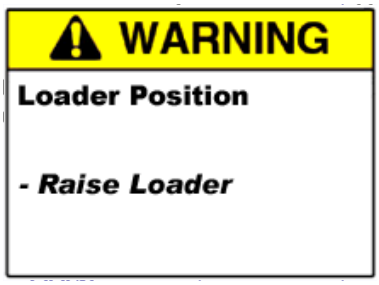
Important: If the operator feels something is malfunctioning on the stacker, use one of the manual screens to determine the problem.

The following functions have crash avoidance built in:

Hitch Inline / Hitch Offset

If the loader is down, moving the hitch inline would cause it to crash into it. Also, if the loader has been lowered onto the hitch, moving the hitch offset could cause damage. For this reason, either the loader must be fully raised, or the bed must be raised above the mid-position for the hitch to move inline or offset.

- The following Warning screen will display in the Manual Stack screen if the Crash Avoidance has been activated:
- The operator must fully raise the loader for the hitch to move.
- If the operator wishes to lower the loader while stacking bales, the bed must be raised above the mid-position before lowering the loader



Raise Loader / Lower Loader

If the hitch is not fully offset, moving the loader is up or down could serious damage. Also, if the bed is not completely down, (but not above the mid-position) lowering the loader could cause a collision. In all screens, the either the hitch must be fully offset, of the bed must be above the mid-position for the loader to lower. In the Auto screen, the loader cannot be raised when the hitch is not fully offset, but because the machine is often stored or transported with the loader resting on the hitch, it is possible to raise the loader in either of the Manual screens. Use caution when raising the loader if the hitch is not fully offset.

- The following screen Warning screen will be displayed in either of the Manual screens if the Crash Avoidance has been activated:

To raise or lower the loader, the operator must either:

- Raise the bed above the mid-position, or
- Lower the bed so it is completely down,

And / Or

- Move the hitch so it is completely offset

16k PLUS Control System - Continued

Crash Avoidance - Continued

Raise Bed / Lower Bed

If the loader down, raising or lowering the bed could cause the loader to crash into the hitch. Also, if the pushoff is extended, raising or lowering the bed could serious damage to the pushoff.

Note. If the bed is lowered below the mid position with the loader down, you mush switch to Manual Mode to raise the loader before you can continue.

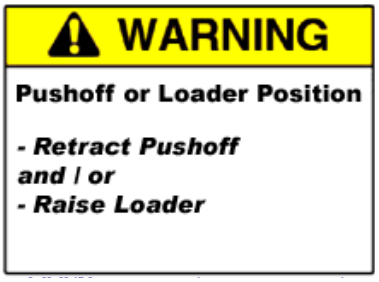
- The following screen Warning screen will be displayed in the Manual Stack screen if the Crash Avoidance has been activated:

To raise or lower the bed, the operator must either:

- Retract the pushoff completely

And / Or

- Raise the loader completely.



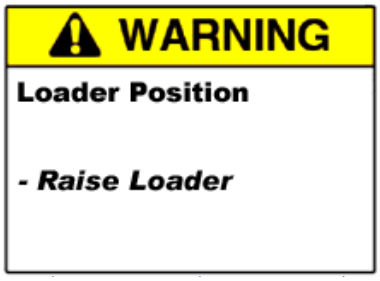
Power Slide Back / Power Slide Return

If the loader down, moving the power slide could cause it to dig into the ground. The loader must be fully raised to move the power slide

- The following screen Warning screen will be displayed in the Manual Load screen if the Crash Avoidance has been activated:

To operate the power slide:

- Raise the loader completely.



Push Off Out

If the bed is not fully raised, extending the Push Off could cause a collision.

- The following screen Warning screen will be displayed in the Manual Stack screen if the Crash Avoidance has been activated:

To operate the Push Off:

- Raise the bed fully.

16k PLUS Control System - Continued

Crash Avoidance - Continued

Summary
To determine why the Crash Avoidance is activating, use the following chart. The state of the sensors can be viewed in the “Measure - Sensors” menu.

To Move:

Alignment Arms Open	None
Alignment Arms Close	None
Loader Up (Auto Screen)	Hitch Offset senor - true AND Bed Down sensor - true -or- Bed-mid sensor - true
Loader Up (Manual Screen)	None
Loader Down (All Screens)	Hitch Offset senor - true AND Bed Down sensor - true -or- Bed-mid sensor - true
Grab Hooks Engaged	None
Grab Hooks Release	None
Power Slide Back	Loader senor - true
Power Slide Return	Loader senor - true
Hitch Offset Bed Mid sensor - true	Loader senor - true -or-
Hitch Inline	Loader senor - true -or- Bed Mid sensor - true
Bed Up	Loader senor - true AND Push-Off sensor - true -or- Bed Mid senor - true AND Push-Off sensor - true
Bed Down	Loader senor - true AND Push-Off sensor - true -or- Bed Mid senor - true AND Push-Off sensor - true
Push-Off Out	Bed Up senor - true
Push-Off In	None

Checking Valve Solenoids

To check the valve solenoids, use the following procedure.

Important: Only use Manual Load or Manual Stack screens when diagnosing problems with the valve.

1. If possible, raise the loader and offset the hitch to help reduce the risk of a crash. If it is not possible, take note of the loader and hitch position and how far each may be moved before a crash will occur.
2. Turn off the tractor
3. Swap the electrical plug of the non-working valve with an adjacent valve that is known to work.
   - Look for any obvious signs of damage to the electrical harness or hydraulic hoses.
   - Select a function that is free to move in both directions. It may be necessary to either unplug certain sensors, or use a metal washer to fool certain sensors to get the function to operate in both directions.

Example of unplugging sensors: If using the hitch inline/offset electrical plug as the “known good” circuit, and the hitch is offset, unplug the “hitch offset” sensor so that the function will operate in both directions. Similarly, if the hitch were inline, unplug the “hitch inline” sensor.

Example of fooling sensors: If using the Push Off plug as the “known good” circuit, you will have to use a metal washer to fool the “bed up” sensor. (or alternatively you could raise the bed all the way up.) Otherwise, the crash avoidance will prevent you from operating the Push Off circuit in manual mode.

4. Start the tractor and engage hydraulics.
5. Use one of the manual screens to try to move the non-working valve with the buttons for the known working valve.

Warning: Use extreme care when moving the machine. The crash avoidance is disabled in this procedure.

If the valve still does not operate, use the “Measure - Outputs” menu to observe the power going to the valve. (Remember that crash avoidance may be preventing the function from operating. See step 3.)

- If there is power going to the valve and it still does not operate properly, service the hydraulic valve.
- If the valve operates normally: try operating the known working valve with the buttons for the non-working valve. Again, use the “Measure - Outputs” menu to observe the power going to the valve.
- If the known-working valve does not operate, check the electrical harness for broken wires or shorts.

Limiting Bed Speed

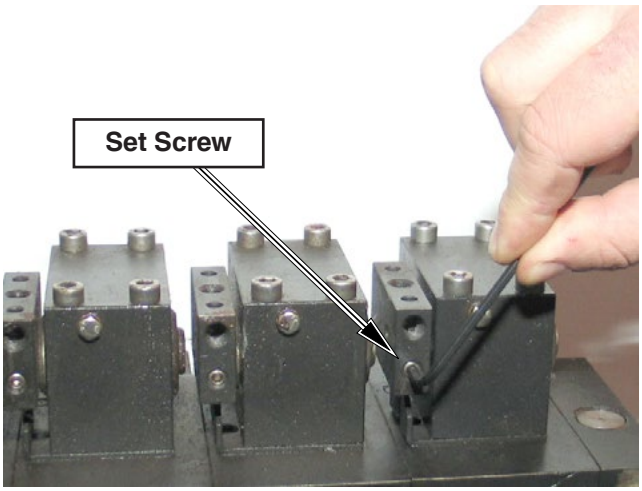
The speed of the bed can be limited by adjusting the stops on the valve rocker. These steps are usually used to limit the speed of the bed, but can also be used for the grab hooks or the push off if desired.

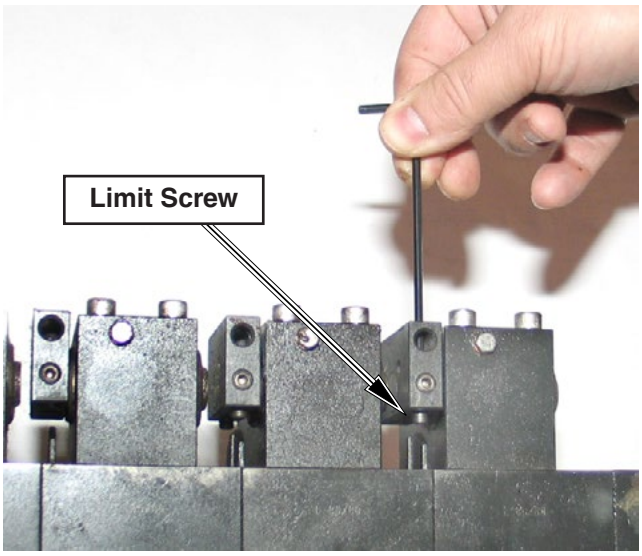
Note: It is recommended that the grab hooks and push off not be limited.

Note: For the hitch, Alignment Arms, Power Slide or Loader, it is preferable to limit these functions using the settings in the "Adjust - Speed Adjustments" menu.

- Loosen the set-screw on the valve using a 3mm Allen wrench.
- Adjust the stop by screwing it down (to slow the bed), again using a 3 mm Allen wrench.
- Tighten the set screw.

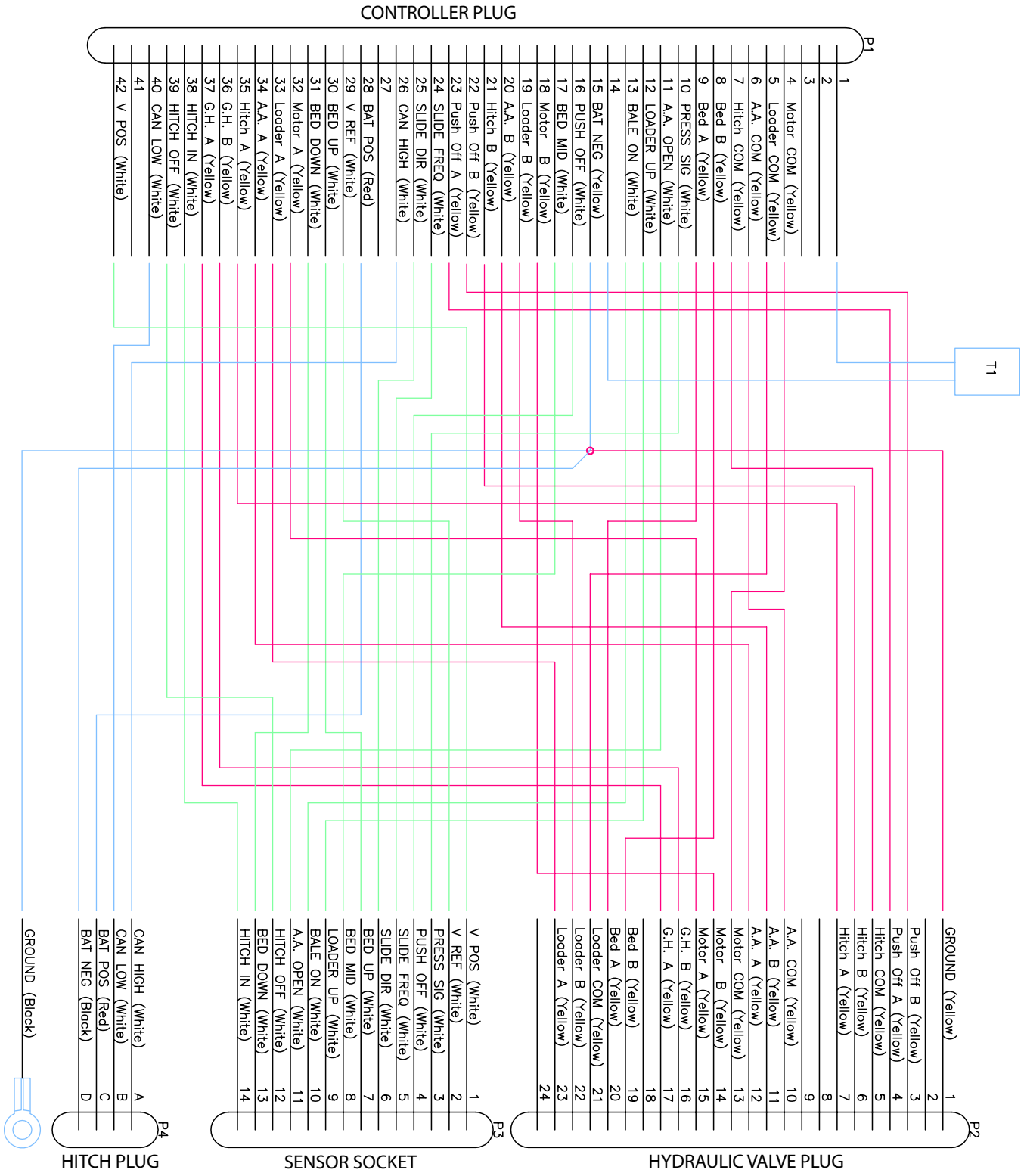
Repeat the process on the other side of the rocker to limit the valve in the other direction.





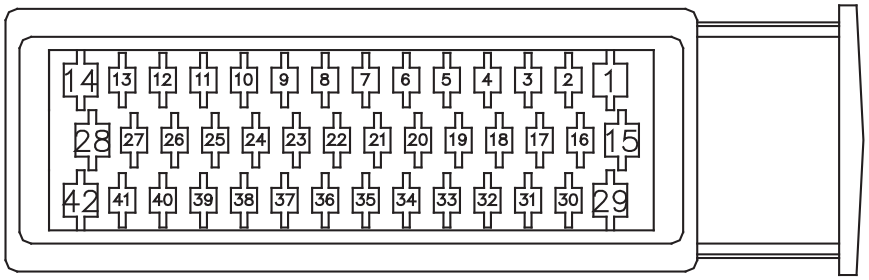
Harness Schematics

Controller Harness

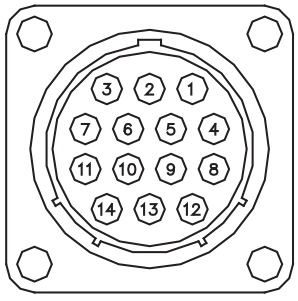


Harness Schematics - Continued

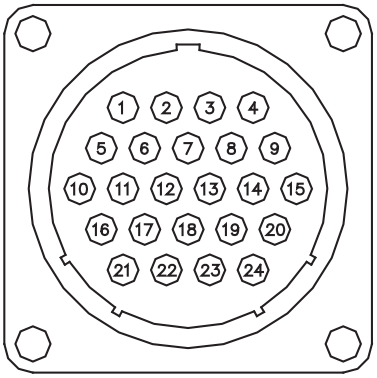
Controller Harness - Continued



CONTROLLER PLUG



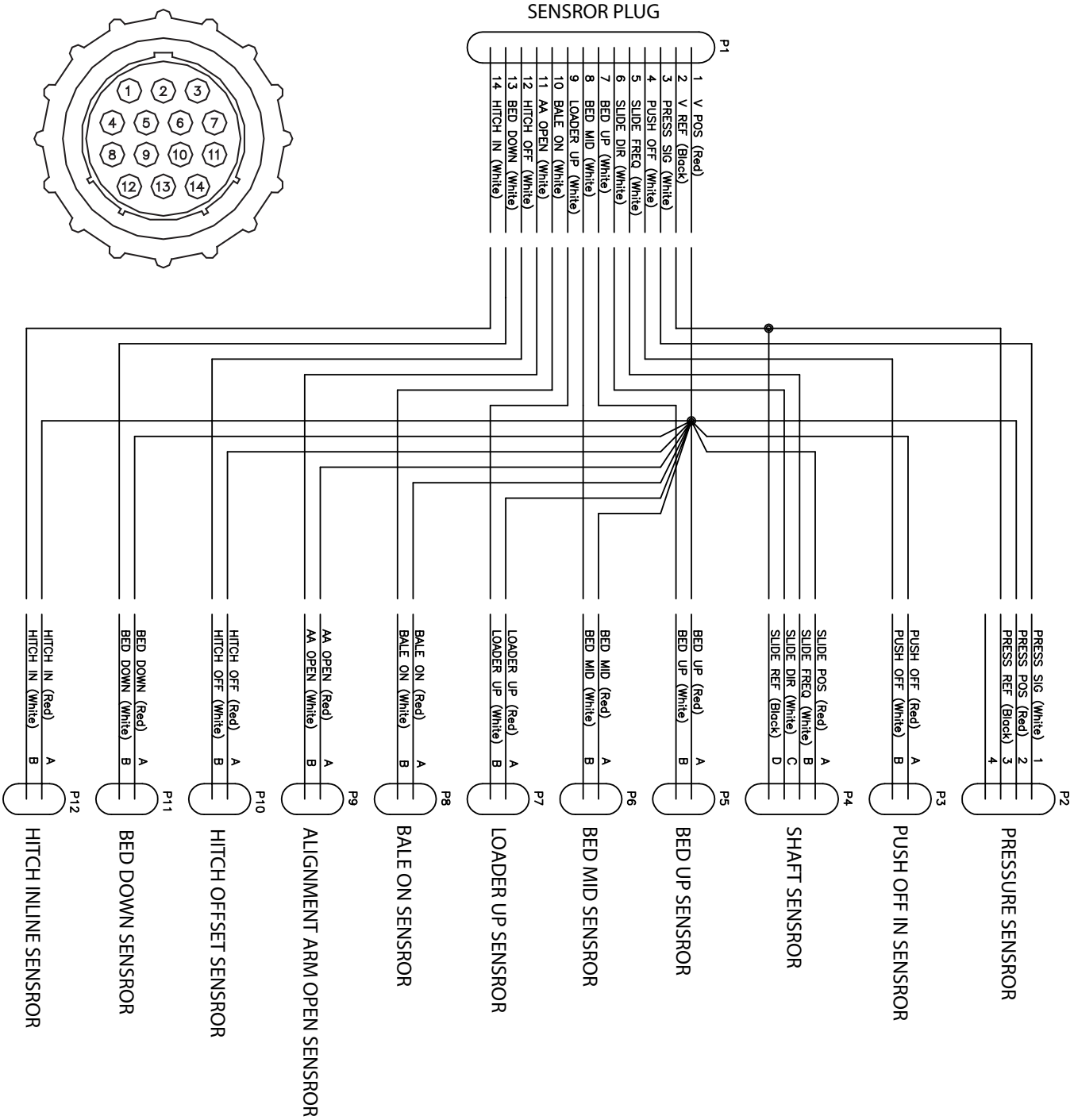
SENSOR PLUG



HYDRAULIC VALVE PLUG

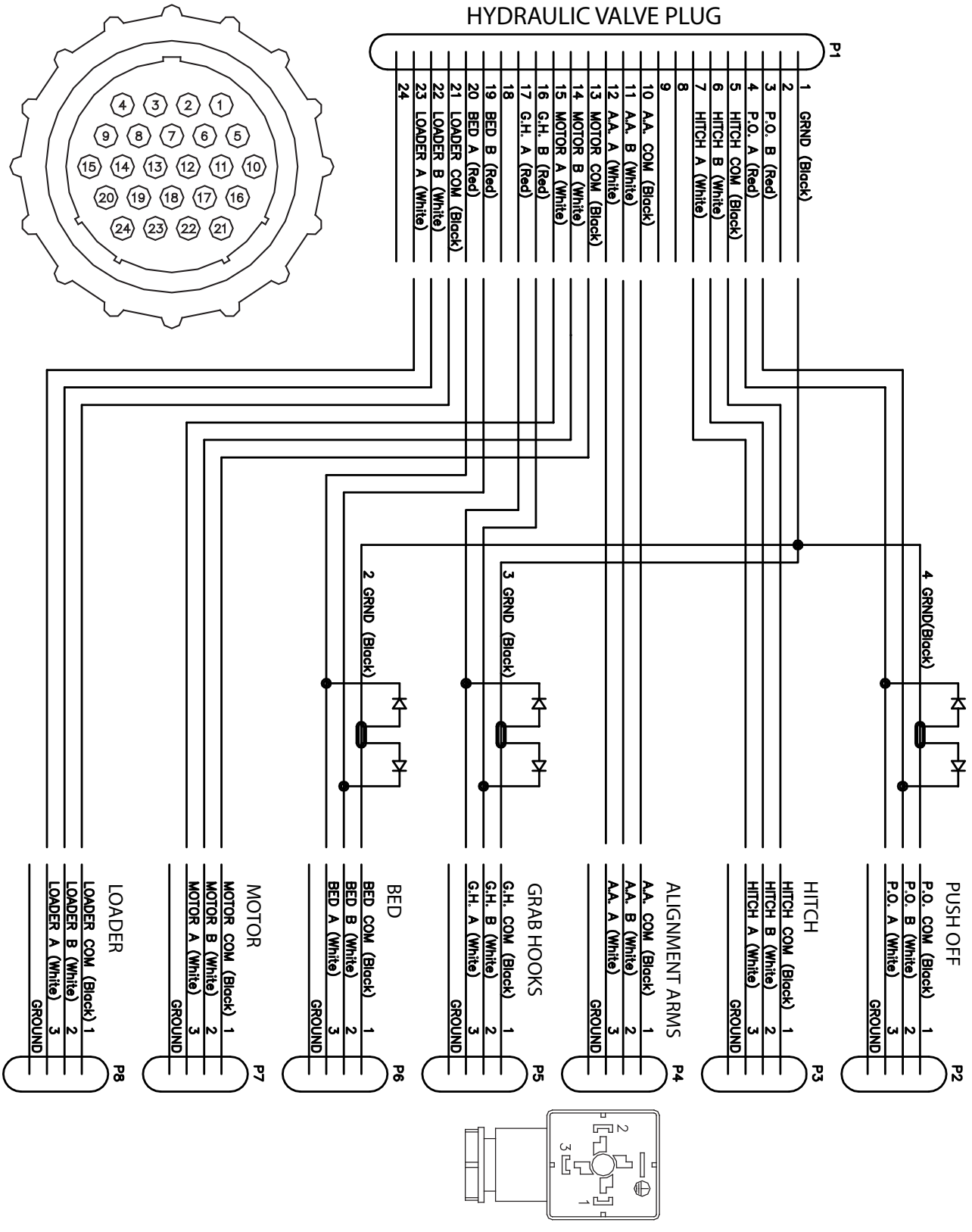
Harness Schematics - Continued

Sensor Harness



Harness Schematics - Continued

Hydraulic Valve Harness



Troubleshooting Summary

The following is a list of actions the 16k PLUS can perform, and a list of possible problems that may prevent them from operating.

Problem	Cause	Correction
Arms won't Open	Crash Avoidance	None
	Both Auto and Manual Mode	Use "measurement - sensors" menu to ensure the arms open sensor is false.
	Auto Mode	Arms will not operate while the power slide is moving.
	Check Current Output	Use "Measure - Outputs" menu to check amperage going to the Alignment Arms valve. The monitor should display a negative amperage when opening the arms. (If there is a broken wire or shorted wire to the valve, the monitor may show an error message.)
	Check valve solenoid	Use procedure described in "Checking Valve Solenoids" to check the operation of the valve.
Arms won't Close	Crash avoidance	None
	Auto Mode	Use "Measure - Sensors" menu to view the pressure sensor reading. Ensure it is lower than the "1st Squeeze Pressure". Arms will not operate while the power slide is moving.
	Check Current Output	Use "Measure - Outputs" menu to check amperage going to the Alignment Arms valve. The monitor should display a positive amperage when opening the arms. (If there is a broken wire or shorted wire to the valve, the monitor may show an error message.)
	Check valve solenoid	Use procedure described in "Checking Valve Solenoids" to check the operation of the valve.

Problem	Cause	Correction
Loader Up	Crash Avoidance	Manual Mode - No restrictions Auto Mode - If the bed is down, use “Measure - Sensors” menu to ensure the hitch offset sensor is true. Auto Mode - If the bed is up, use the “Measure - Sensors” menu to ensure the bed mid sensor is true. **NOTE: If the bed has been lowered below the mid-position with the loader down, the operator MUST switch into one of the Manual screens to raise the loader.**
	Check current output	Use “Measure - Outputs” menu to check amperage going to the Loader valve. The monitor should display a positive amperage when raising the loader. (If there is a broken wire or shorted wire to the valve, the monitor may show an error message.)
	Check valve solenoid	Use procedure described in “Checking Valve Solenoids” to check the operation of the valve.
Loader Down	Crash Avoidance	Both Manual and Auto Mode: If the bed is down, use the “Measure - Sensors” menu to ensure the hitch offset sensor is true and the bed down switch is true. If the bed is raised, use “Measure - Sensors” menu to ensure the bed mid sensor is true. **Note: The loader will not lower if neither the bed mid or the bed down sensors are true.**
	Check Operating Mode	Auto Mode only: The loader cannot be lowered in Auto Mode if the slider is not ready. Look for the Green Check Mark in the top right corner of the Auto screen. If the Green Check Mark is not displayed, see “Resetting Power Slide” for instructions on how to set the Power slide in the home position.

Continued on next page . . .

Problem	Cause	Correction
Loader Down - Continued	Check Operating Mode	Auto Mode only: The loader cannot be lowered in Auto Mode if the Bale On sensor is true. (This is done to prevent dropping bales accidentally.) Look for the bale icon in the lower left corner of the Auto screen, or use the “Measure - Sensors” menu to check the state of the Bale On sensor. Auto Mode only: The loader cannot be lowered in Auto Mode if the computer thinks it has a full load. (This is done to prevent dropping the last row of bales accidentally.) If the power slide stalls during the first 30 inches of travel when pushing the bales back in the Auto Load sequence, the computer assumes the stacker has a full load. To reset the computer, the bed must be raised to the “bed Up” position, or alternatively, use a piece of ferrous metal to turn on the “Bed Up” sensor momentarily.
	Check Current Output	Use “Measure - Outputs” menu to check amperage going to the Loader valve. The monitor should display a negative amperage when lowering the loader. (If there is a broken wire or shorted wire to the valve, the monitor may show an error message.)
	Check valve solenoid	Use procedure described in “Checking Valve Solenoids” to check the operation of the valve.
Grab Hooks Engage/ Release	Crash Avoidance	None
	Check operating mode	Manual mode: Use the soft keys in “Manual Stack” screen to ensure check if the grab hooks work. If the grab hooks do not work in manual mode, check the valve solenoid. Auto Mode: If the grab hooks do not engage in Auto Mode, it is likely the Bale On sensor is not being activated by the bale. The appearance of the grey bale in the bottom left corner of the screen Auto screen indicates the bale-on sensor has been activated. Auto Mode: If the grab hooks do not disengage in Auto Mode, it is likely the Bale On sensor is not turning off. Check there is nothing jammed in the sensor pad to hold the pad down. Then check the ferrous sensor is working properly. Continued on next page . . .

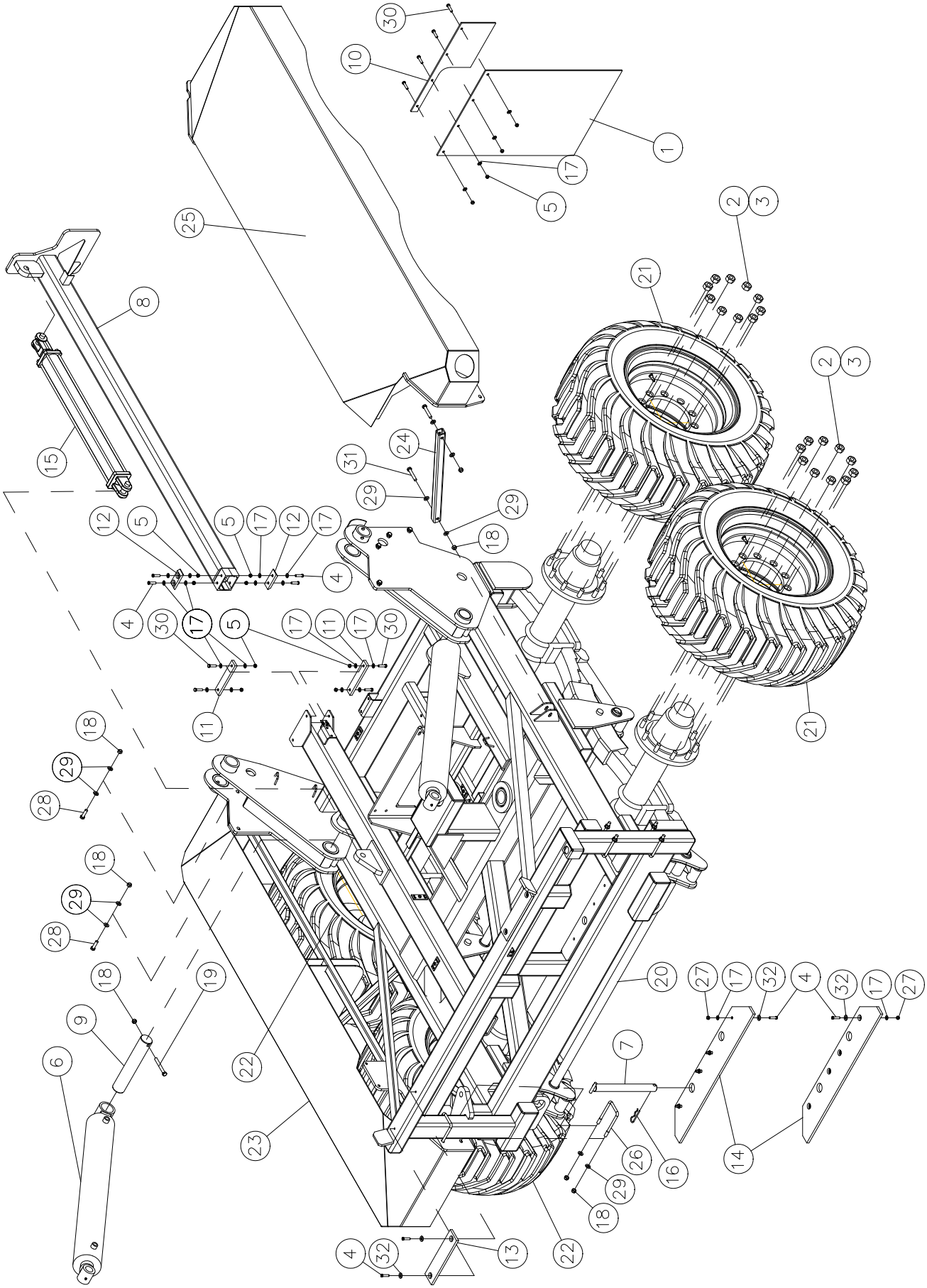
Problem	Cause	Correction
Grab Hooks Engage/ Release - Continued	Check current output	The current output can only be checked in Auto mode. Use the “Measure - Outputs” menu. When “Grab Hooks In” is “true” the computer is sending 12V to the valve to engage the grab hooks. When “Grab Hooks Out” is “true” the computer is sending 12V to the valve to disengage the grab hooks.
	Check valve solenoid	Use procedure described in “Checking Valve Solenoids” to check the operation of the valve.
Bed Up / Down	Crash Avoidance	Both Manual and Auto Mode: Use the “Measure - Sensors” menu to ensure the Push Off In sensor is true. Both Manual and Auto Mode: If the bed is down, use the “Measure - Sensors” menu to ensure the Loader Up sensor is true. - OR - If the bed is raised and the loader is down, use “Measure - Sensors” menu to ensure the bed mid sensor is true. **Note: If the bed is lowered below the Bed Mid sensor with the loader down, the loader must be raised in the manual mode before continuing.**
	Check current output	Use the “Measure - Outputs” menu. When “Bed Up” is “true” the computer is sending 12V to the valve to raise the bed. When “Bed Down” is “true” the computer is sending 12V to the valve to lower the bed.
	Check valve solenoid	Use procedure described in “Checking Valve Solenoids” to check the operation of the valve.

Problem	Cause	Correction
Push Off Out/In	Crash Avoidance	Push Off Out: Use the “Measure - Sensors” menu to ensure the Bed Up sensor is true. Push Off In: None
	Check current output	The current output can only be checked in Auto mode. Use the “Measure - Outputs” menu. When “Push Off Out” is “true” the computer is sending 12V to the valve to extend the push off. When “Push Off In” is “true” the computer is sending 12V to the valve to retract the push off.
	Check valve solenoid	Use procedure described in “Checking Valve Solenoids” to check the operation of the valve.
Hitch Inline/Offset	Crash Avoidance	Both Manual and Auto Mode: If the bed is down, use the “Measure - Sensors” menu to ensure the Loader Up sensor is true. - OR - If the bed is raised and the loader is down, use “Measure - Sensors” menu to ensure the bed mid sensor is true.
	Check Sensors	Use the “Measure - Sensors” menu to view the state of the hitch inline and hitch offset sensors. The hitch will not move inline if the hitch inline sensor is true. Similarly, the hitch will not offset if the hitch offset sensor is true.
	Hitch transport pin is in	Remove pin. It may be necessary to unplug the Hitch Inline sensor to relieve pressure in the cylinder if the hitch offset button was pressed with the pin in place.
	Check current output	Use “Measure - Outputs” menu to check amperage going to the Hitch valve. The monitor should display a negative amperage when moving the hitch offset, and a positive amperage when moving the hitch inline. (If there is a broken wire or shorted wire to the valve, the monitor may show an error message.)
	Check valve solenoid	Use procedure described in “Checking Valve Solenoids” to check the operation of the valve.

Problem	Cause	Correction
Power Slide Back/Return	Crash Avoidance	None
	Auto Mode	The Power slide will not return immediately after pushing the bales back, if there is a full load on the machine. The power slide will return after squeezing the Alignment Arms to secure the load.
	Check current output	Use “Measure - Outputs” menu to check amperage going to the Power Slide valve. The monitor should display a positive amperage when moving the power slide back, and a negative amperage when returning the power slide. (If there is a broken wire or shorted wire to the valve, the monitor may show an error message.)
	Check valve solenoid	Use procedure described in “Checking Valve Solenoids” to check the operation of the valve.
Function operates too fast/ slow	Hitch, Alignment Arms, Power Slide, Loader	Adjust the speed the the function in the “Adjust - Speed Adjustments” menu. Typically, the valve will require a minimum of 600 milliamps to just barely open the valve, and 1150 milli-amps to open the valve fully.
	Bed, Push Off, Grab Hooks	The speed of these functions can be limited by adjusting the Rocker Stop on the Valve Body. See “Limiting the Bed Speed”.

Section 9:
Parts Breakdown

Section Contents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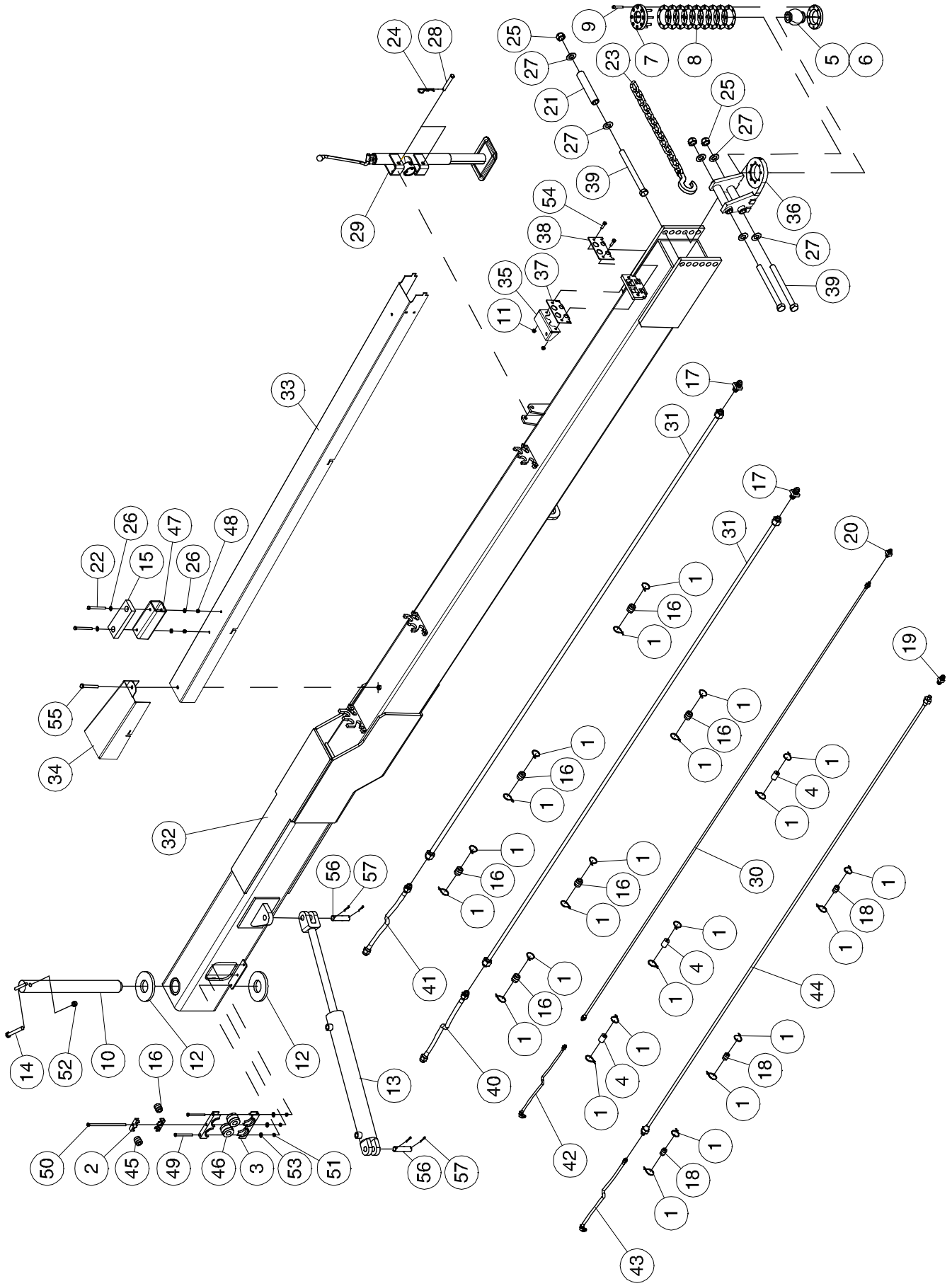
Frame

Item	Part No.	Description	Qty
1	11589	Mud Flap	2
2	10046	Lug Nut - Left	20
3	10047	Lug Nut - Right	20
4	10075	Hex Socket Cap Screw - 3/8 x 1 1/2 Lg	16
5	10229	Locknut - 3/8 Nylon Insert	16
6	10436	Hydraulic Cylinder - 4 x 36 Stroke	2
7	11065	Pin - Hitch Lock	1
8	11373	Push Off	1
9	11382	Pin - 2 7/16 Dia	2
10	K51594	Strap - Mud Flap	2
11	11469	Push Off Tube Plastic	2
12	11470	Push Off Plastic	2
13	11471	Bed Cushion Plastic	2
14	11701	Hitch Cradle Plastic	2
15	12168	Hydraulic Cylinder - 3 x 30 Stroke	1
16	BW-11	Hairpin - 3/16	1
17	D-5489	Washer - 13/32 ID x 13/16 OD x 16 Ga	32
18	F-3405	Locknut - 1/2 Unitorque	22
19	K25798	Hex Bolt - 1/2 x 4 Lg	2
20	K45449	Frame/Suspension/Axles Assembly	1
21	K45650	Tire (11844)+ Rim (11843) Assembly - Left	2
22	K45652	Tire (11844)+ Rim (11843) Assembly - Right	2
23	K48205	Right Fender	1
24	K48208	Support Beam	2
25	K48210	Left Fender	1
26	K51086	U-Bolt - 1/2 x 3 x 5 3/4 UL	4
27	M-3388	Locknut - 3/8 Unitorque	8
28	S-1189	Hex Bolt - 1/2 x 1 3/4 Lg	8
29	S-1925	Flat Washer - 17/32 ID x 1 OD x 13 Ga	28
30	W-477	Hex Bolt - 3/8 x 1 1/2 Lg	12
31	W-491	Hex Bolt - 1/2 x 2 3/4 Lg	4
32	W-538	Flatwasher - 7/16 ID x 1 OD x 14 Ga	12
	11844	Tire - 500/45-22.5 - 16 PLY-HS	
	11843	Rim - 16 x 22.5 - 10 Bolt	
	W-3328	Valve Stem	
	11749	16K Axle	2
	12261	16K Air Brake Axle	2
	K50836	16K Hydraulic Brake Axle	2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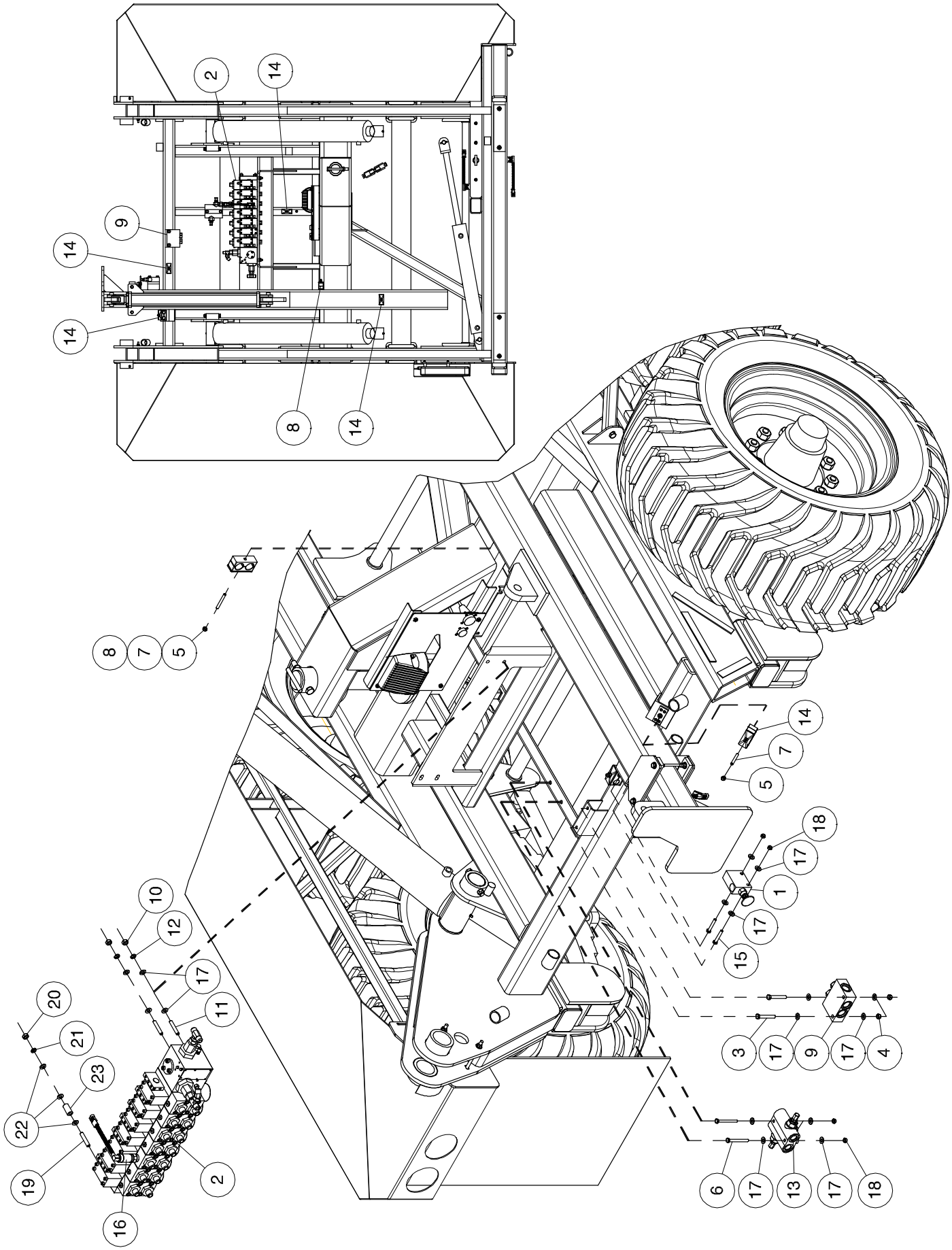
Hitch

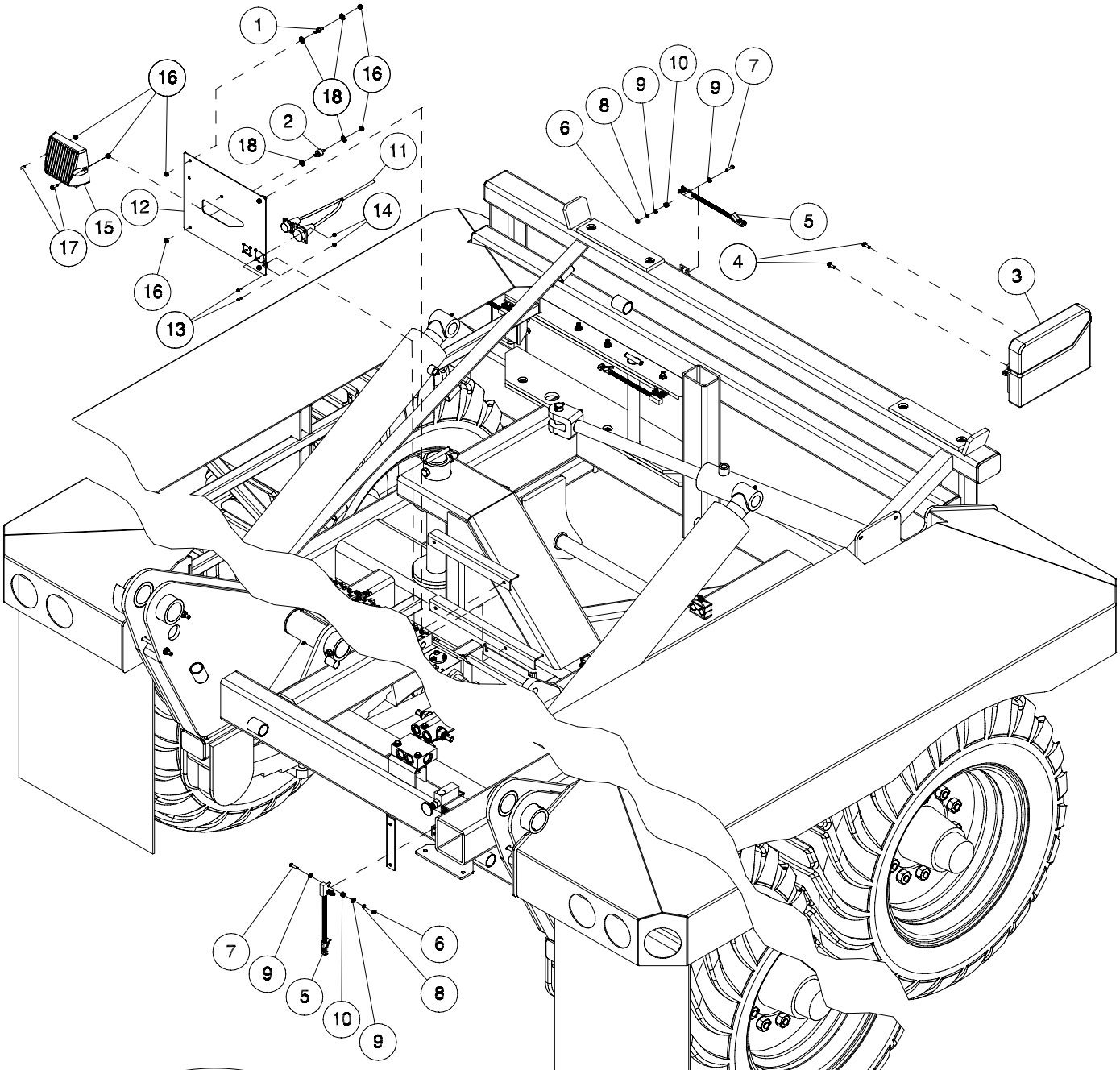
Item	Part No.	Description	Qty
1	D-4838	Tie Strap -14 1/2 Lg (11901)	24
2	12020	Clamp - 2	1
3	1202	Clamp - 3	1
4	12036	Rubber Bushing - 3/8 x 1 1/2	3
5	10049	Ball - Hitch Clevis	1
6	10050	Lower Ring - Ball Clevis	1
7	10051	Upper Ring - Ball Clevis	1
8	10052	Shim - Ball Clevis (as needed to tighten Hitch Clevis Ball to 100 ft lbs Torque)	9
9	10069	Cap Screw - 3/8 x 2 Lg Grade 8 (use LOCTITE) (Torque to 40 ft lbs)	8
10	10129	Pin - Hitch Pivot	1
11	M-3388	Locknut - 3/8 Nylon Insert	2
12	10352	Washer - Hitch Pivot - 1/2	2
13	10449	Hitch Cylinder	1
14	10816	Hex Bolt - 5/8 x 5 Lg	1
15	11468	Loader Stop	1
16	12024	Rubber - 3/4 x 2	7
17	12025	Bulk Head Clamp - 2 x 12 JIC	2
18	12026	Rubber Bushing - 1/2 x 1 1/2	3
19	12031	Bulk Head Clamp - 1 1/2 x 08 JIC	1
20	12035	Bulk Head Clamp - 1 1/2 x 06 JIC	1
21	A45664	Bushing - 1.020 ID x 1.5 OD x 8 Lg	1
22	C-1550	Hex Bolt - 3/8 x 4 Lg	2
23	C18761	Safety Chain - 40,000 Lb	1
24	D-5240	Hairpin - #10	2
25	D-5274	Locknut - 1 Unitorque	3
26	D-5489	Washer - 13/32 ID x 13/16 OD x 16 Ga	4
27	D-5498	Washer - 1-1/16 ID x 2 OD x 11 Ga	6
28	H10462	Adjustment Pin - 0.621 Dia x 3 5/8 UL	2
29	H59985	Top Wind Jack - 7000 Lb	1
30	K44704	Oil Line - 3/8 x 129 Lg - 06 FJIC ends	1
31	K44706	Oil Line - 3/4 x 132 Lg - 12 FJIC ends	2
32	K45667	Hitch	1
33	K50826	Front Cover - Hydraulic Brakes - Work Lights	1
34	K45666	Rear Cover	1
35	K50825	Bulkhead Mount	1
36	K45668	Adjustable Hitch	1
37	K45679	Hose Plate - Rear	1
38	K45680	Hose Plate - Front	1
39	K47771	Bolt - 1 x 11 Lg	3
40	K47787	Hyd Hose - 3/4 x 144 Lg - 1 1/16 - 12 FJIC x 1 1/16 - MJIC	1
41	K47788	Hyd Hose - 3/4 x 155 Lg - 1 1/16 - 12 FJIC x 1 1/16 - 12 MJIC	1
42	K47921	Hyd Hose - 3/8 x 175 Lg - 90 Deg Elbow 9/16 - 18 FJIC x 9/16 - 18 MJIC	1
43	K47922	Hyd Hose - 1/2 x 146 Lg - 90 Deg Elbow 3/4 - 16 FJIC x 3/4 - 16 MJIC	1
44	K47926	Oil Line - 1/2 x 129 Lg	1
45	K47928	Rubber Tube - 2 x 5/8	1
46	K47929	Rubber Tube - 3 x 3/4	2
47	K49088	Loader Stop	1
48	M-3388	Locknut - 3/8 Unitorque	2
49	N15196	Hex Bolt - 5/16 x 4 Lg	2
50	N29479	Hex Bolt - 3/8 x 9 Lg	1
51	N42098	Locknut - 5/16 Nylon Insert	3
52	S-1197	Locknut - 5/8 Unitorque	1
53	S-1199	Washer - 3/8 ID x 7/8 OD x 14 Ga	3
54	W-187	Hex Bolt - 3/8 x 1 1/4 Lg	2
55	W-494	Hex Bolt - 1/2 x 3 3/4 Lg	1
56	11774	Cylinder Pin - 1 x 4 Lg	2
57	N13965	Cotter Pin - 3/16 x 2 1/2 Lg	4

Hydraulic Valves Mounting



Hydraulic Valves Mounting

Item	Part No.	Description	Qty
1	11369	Pressure Relief Valve	1
2	11695	Hawe Valve Assembly - Prior to Serieal Number K161605361	1
	K60525	**Hawe Valve Assembly - Serieal Number K161605361 to present**	**1**
3	10091	Hex Bolt - 3/8 x 2 1/2 Lg Gr.8	2
4	M-3388	Locknut - 3/8 Nylon Insert	2
5	D-5272	Locknut - 5/16 Nylon Insert (10231)	5
6	10646	Hex Bolt - 5/16 x 3 Lg - Gr.8	2
7	10811	Set Screw - 5/16 x 2-1/2 Lg	5
8	10949	Plastic Hose Clamp Assembly - 3/4”	1
9	11360	Load Check	1
10	11586	Hex Nut - 10 mm - Prior to Serieal Number K161605361	4
	11586	**Hex Nut - 10 mm - Serieal Number K161605361 to present**	**2**
11	11587	Set Screw - M10- 1.5x60 mm - Prior to Serieal Number K161605361	4
	11587	**Set Screw - M10- 1.5x60 mm - Serieal Number K161605361 to present**	**2**
12	11588	Lockwasher - 10 mm	4
13	11723	Cushion Valve - 200 PSI	1
14	11740	Plastic Hose Clamp Assembly - 13/16”	4
15	11808	Hex Bolt - 5/16 x 2 Lg - Gr.8	2
16	K47326	Pressure Sensor	1
17	D-5489	Washer - 13/32 ID x 13/16 OD	20
18	N42098	Locknut - 5/16 Nylon Insert	4
19	**K60526**	**Set Screw - M8- 1.25x60 mm - Serieal Number K161605361 to present**	**1**
20	**K60527**	**Hex Nut - 8 mm - Serieal Number K161605361 to present**	**1**
21	**W-522**	**Lockwasher - 5/16 - Serieal Number K161605361 to present**	**1**
22	**D-5488**	**Flatwasher - 11/32 ID x 11/16 OD x 16GA -Serieal Number K161605361 to present**	**3**
23	**N21632**	**Spacer - 0.364 ID x 0.54 OD x 3/4 Lg - Serieal Number K161605361 to present**	**1**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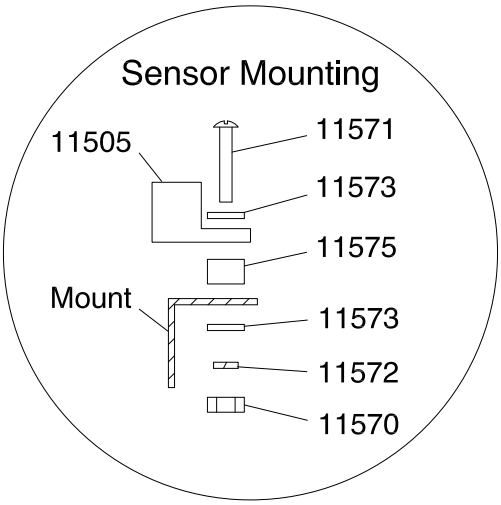
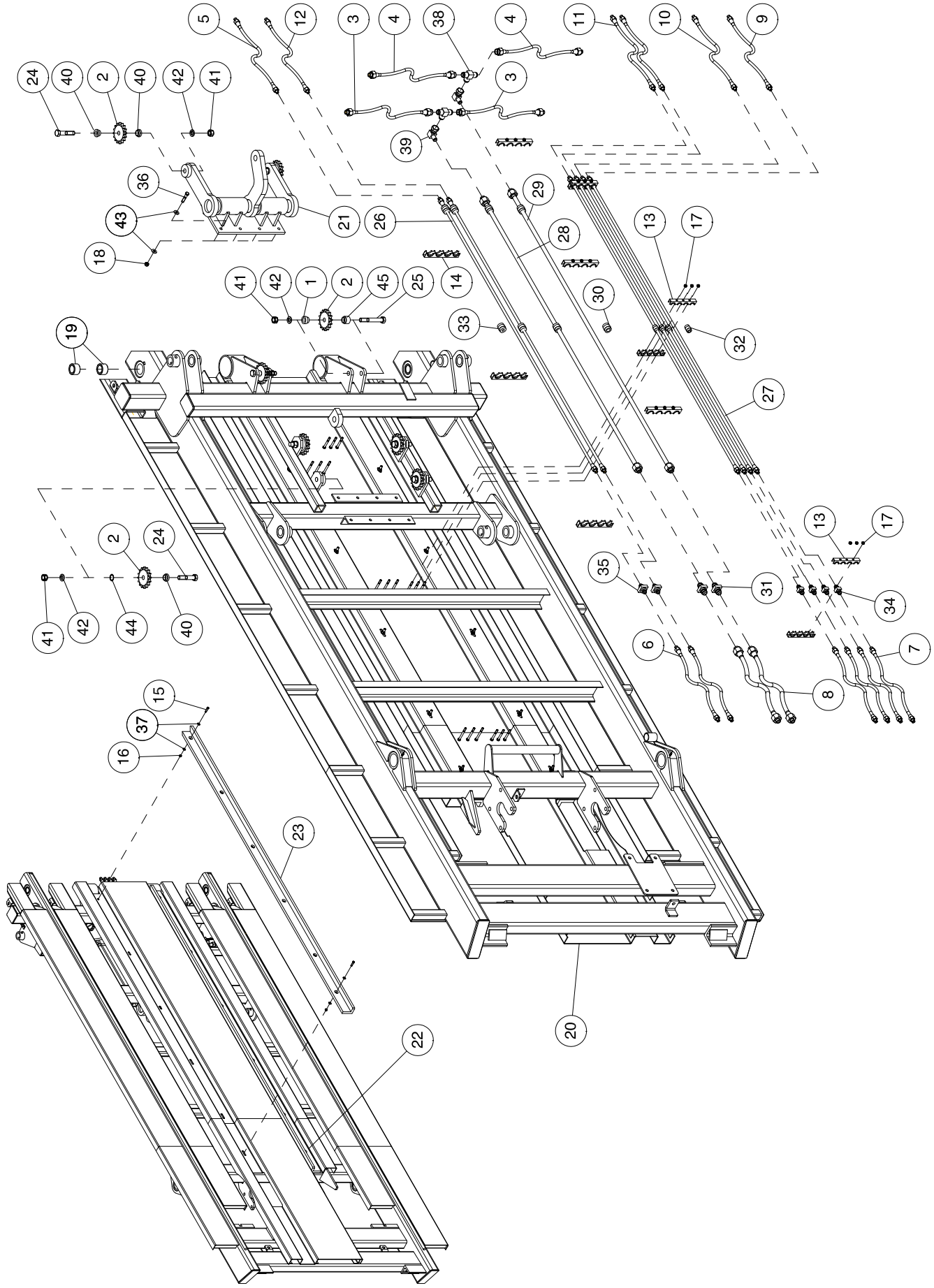

Sensor Mounting
11505
11571
11573
11575
Mount
11573
11572
11570

Sensors Mounting

Item	Part No.	Description	Qty
1	11584	Rubber Computer Mount - 1/2”	2
2	11585	Rubber Computer Mount - 3/4”	2
3	10295	Manual Box	1
4	K51552	Screw - 1/4 x 1 1/4 Lg	2
5	11505	Sensor Assembly	4
6	11570	Hex Nut #12 - Brass	8
7	11571	Machine Screw #12 - 24 x 1 Lg - Brass	8
8	11572	Lockwasher #12 - 0.216 ID - Brass	8
9	11573	Flat Washer #12 - 0.25 ID x 0.562 OD - Brass	16
10	11575	Nylon Spacer - 1/4 ID x 1/2 OD x 1/4Lg	8
11	K45406	XA2 Harness	1
12	K45802	Computer Mount	1
13	K47316	Machine Screw #6 - 1/2	8
14	K47317	Locknut #6 - Nylon Insert	8
15	K47328	IQAN Controler	1
16	N22778	Locknut - 1/4 Nylon Insert	10
17	S-1193	Machine Screw - 1/4 x 3/4	2
18	S-1198	Washer - 5/16 ID x 3/4 OD	8
		See "Electrical Control Assembly" for Harness	

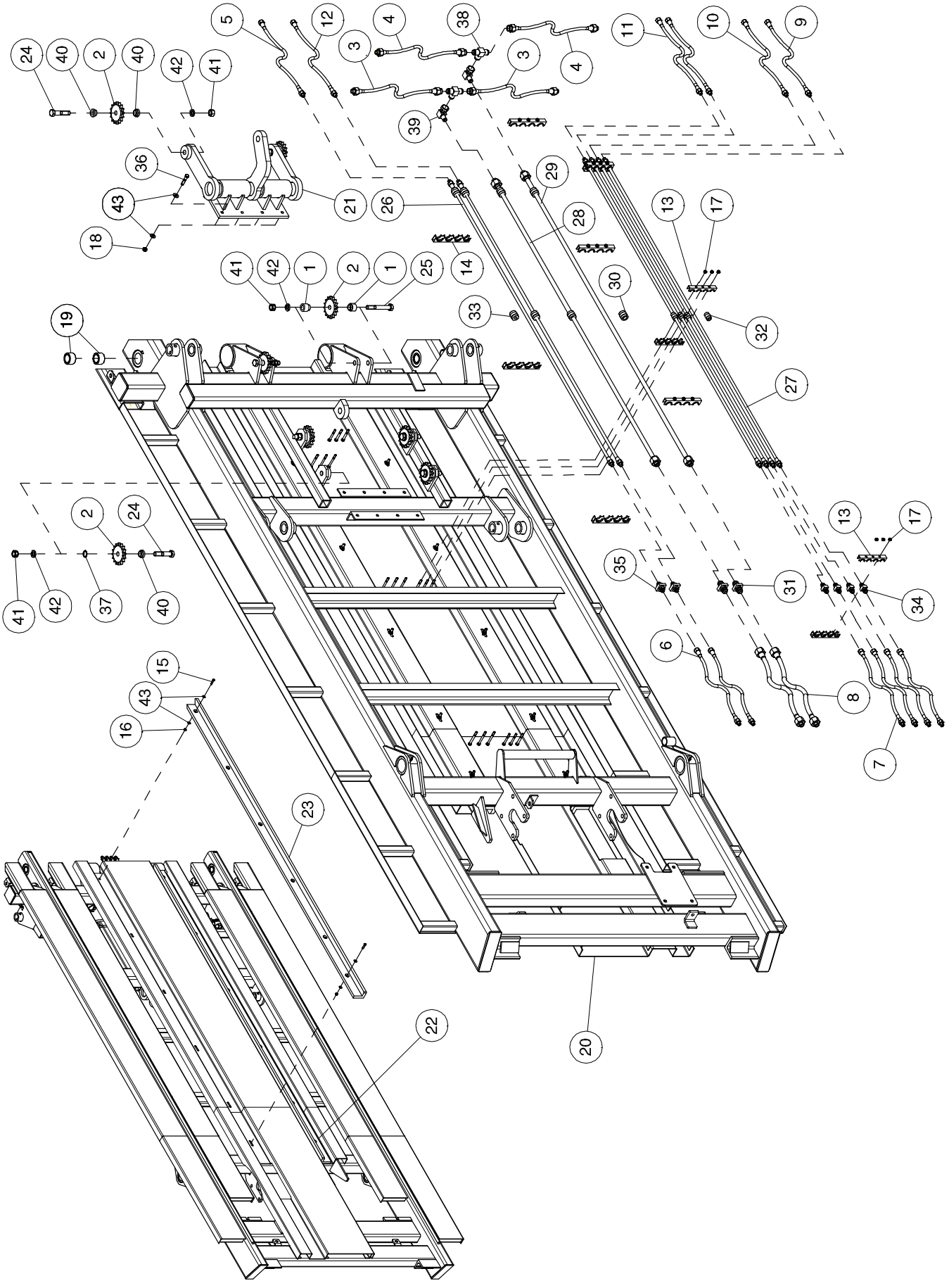
Bed Assembly - Stage 1 - Serial # K161405191 and prior



Bed Assembly - Stage 1 - Serial # K161405191 and prior

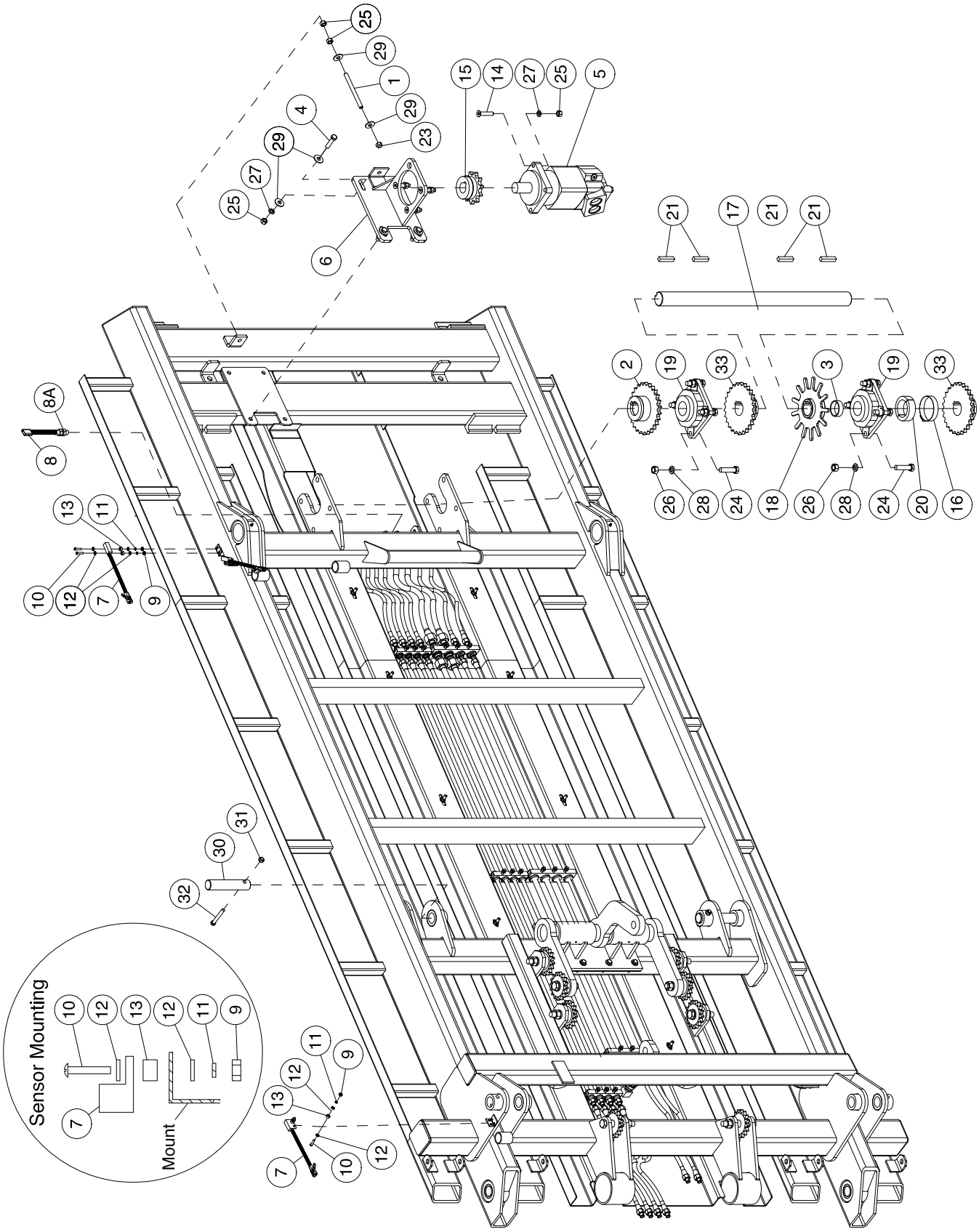
Item	Part No.	Description	Qty
1	11498	Idler Spacer - 0.824 ID x 1.05 OD x 7/8 wide - 80 chain	2
	K53400	**Bushing - 0.765 ID x 0.990 OD x 0.960 wide - 100 chain**	**2**
2	11512	Idler Sprocket - 80 chain	8
	K53404	**Idler Sprocket - 11 tooth - 100 chain**	**8**
3	11845	Hydraulic Hose - 1/2 x 69 Lg	2
4	11846	Hydraulic Hose - 1/2 x 63 Lg	2
5	11847	Hyd Hose - 1/2" x 34" Lg - 08 MJIC x 08 FJIC swivel end - Tensioner Return	1
6	11851	Hyd Hose - 1/2 x 75 Lg - 08 FJIC	2
7	11855	Hydraulic Hose - 1/2 x 52 Lg	4
8	11864	Hydraulic Hose - 3/4 x 38 Lg	2
9	11872	Hydraulic Hose - 1/2 x 139 Lg	1
10	11873	Hydraulic Hose - 1/2 x 99 Lg	1
11	11874	Hydraulic Hose - 1/2 x 80 Lg	2
12	11886	Hydraulic Hose - 1/2 x 25 Lg	1
13	12029	Clamp - 1 1/2 - 4 Hole - 3 Bolt	3
14	12030	Clamp - 2 - 4 Hole - 3 Bolt	3
15	10075	Cap Screw - 3/8 x 1 1/2 Lg	12
16	M-3388	Locknut - 3/8 Nylon Insert (10229)	12
17	D-5272	Locknut - 5/16 Nylon Insert (10231)	18
18	S32944	Locknut - 7/16 Unitorque (10302)	8
19	10936	Bushing - Loader Pivot	4
20	11282	Bed	1
21	11342	Chain Tensioner - 80 chain	1
	K53403	**Chain Tensioner - 100 chain**	**1**
22	11531	Bed Slider Plastic - Right	1
23	11532	Bed Slider Plastic - Left	1
24	11576	Hex Bolt - 3/4 x 3 1/2 Lg - Gr. 8	6
25	11579	Hex Bolt - 3/4 x 5 Lg - Gr.8	2
26	11875	Oil Line - 1/2 x 74	2
27	11876	Oil Line - 1/2 x 80	4
28	11879	Oil Line - 3/4 x 74	1
29	11880	Oil Line - 3/4 x 76	1
30	12024	Rubber Tube - 2 x 3/4	4
31	12025	Bulk Head Clamp - 2	2
32	12026	Rubber Tube - 1 1/2 x 1/2	8
33	12028	Rubber Tube - 2 x 1/2	4
34	12031	Bulk Head Clamp - 1 1/2	4
35	12033	Bulk Head Clamp - 1 1/2 - 4 Hole - 3 Bolt	2
36	12038	Hex Bolt - 7/16 x 2 Lg - Gr. 8	8
37	D-5489	Washer - 13/32 ID x 13/16 OD	24
38	N19549	Tee - 12 MJIC	2
39	N21189	Swivel Elbow	2
40	W-476	Flat Washer - 3/4 - 80 chain	8
	K53402	**Bushing - 0.765 ID x 0.990 OD x 1 1/8 OD x 3/4 wide - 100 chain**	**6**
41	W-518	Hex Nut - 3/4	8
42	W-527	Lockwasher - 3/4	8
43	W-538	Washer - 7/16 ID x 1 OD	16
44	C33958	Retaining Ring - 3/4	4
45	11498	Idler Spacer - 0.824 ID x 1.05 OD x 7/8 wide - 80 chain	2
	K53401	**Bushing - 0.765 ID x 0.990 OD x 1.477 wide - 100 chain**	**2**

Bed Assembly - Stage 1 - Serial # K161405301 to present



Bed Assembly - Stage 1 - Serial # K161405301 to present			
Item	**Part No.**	**Description**	**Qty**
		100 Chain on 22 inch centers	
1	**K55365**	**Bushing - 0.765 ID x 1 3/8 OD x 1.22 Lg - 100 chain**	**4**
2	**K53404**	**Idler Sprocket - 11 tooth - 100 chain**	**8**
3	11845	Hydraulic Hose - 1/2 x 69 Lg	2
4	11846	Hydraulic Hose - 1/2 x 63 Lg	2
5	11847	Hyd Hose - 1/2" x 34" Lg - 08 MJIC x 08 FJIC swivel end - Tensioner Return	1
6	11851	Hyd Hose - 1/2 x 75 Lg - 08 FJIC	2
7	11855	Hydraulic Hose - 1/2 x 52 Lg	4
8	11864	Hydraulic Hose - 3/4 x 38 Lg	2
9	11872	Hydraulic Hose - 1/2 x 139 Lg	1
10	11873	Hydraulic Hose - 1/2 x 99 Lg	1
11	11874	Hydraulic Hose - 1/2 x 80 Lg	2
12	11886	Hydraulic Hose - 1/2 x 25 Lg	1
13	12029	Clamp - 1 1/2 - 4 Hole - 3 Bolt	3
14	12030	Clamp - 2 - 4 Hole - 3 Bolt	3
15	10075	Cap Screw - 3/8 x 1 1/2 Lg	12
16	M-3388	Locknut - 3/8 Nylon Insert (10229)	12
17	D-5272	Locknut - 5/16 Nylon Insert (10231)	18
18	S32944	Locknut - 7/16 Unitorque (10302)	8
19	10936	Bushing - Loader Pivot	4
20	11282	Bed	1
21	**K53403**	**Chain Tensioner - 100 chain**	**1**
22	11531	Bed Slider Plastic - Right	1
23	11532	Bed Slider Plastic - Left	1
24	11576	Hex Bolt - 3/4 x 3 1/2 Lg - Gr. 8	6
25	11579	Hex Bolt - 3/4 x 5 Lg - Gr.8	2
26	11875	Oil Line - 1/2 x 74	2
27	11876	Oil Line - 1/2 x 80	4
28	11879	Oil Line - 3/4 x 74	1
29	11880	Oil Line - 3/4 x 76	1
30	12024	Rubber Tube - 2 x 3/4	4
31	12025	Bulk Head Clamp - 2	2
32	12026	Rubber Tube - 1 1/2 x 1/2	8
33	12028	Rubber Tube - 2 x 1/2	4
34	12031	Bulk Head Clamp - 1 1/2	4
35	12033	Bulk Head Clamp - 1 1/2 - 4 Hole - 3 Bolt	2
36	12038	Hex Bolt - 7/16 x 2 Lg - Gr. 8	8
37	C33958	Retaining Ring - 3/4	4
38	N19549	Tee - 12 MJIC	2
39	N21189	Swivel Elbow	2
40	**K53402**	**Bushing - 0.765 ID x 0.990 OD x 1 1/8 OD x 3/4 wide - 100 chain**	**6**
41	W-518	Hex Nut - 3/4	8
42	W-527	Lockwasher - 3/4	8
43	W-538	Washer - 7/16 ID x 1 OD x 14 Ga	40

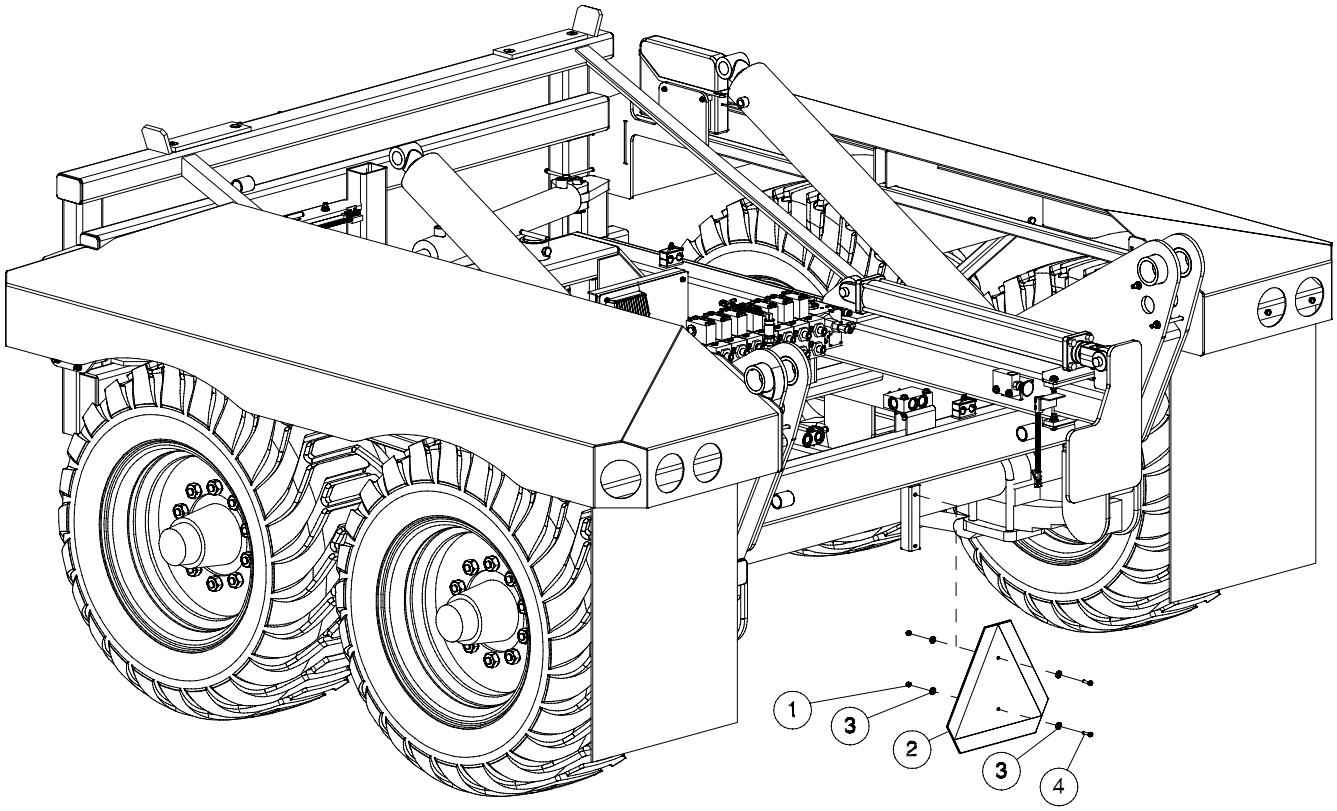
Bed Assembly - Stage 2



Bed Assembly - Stage 2

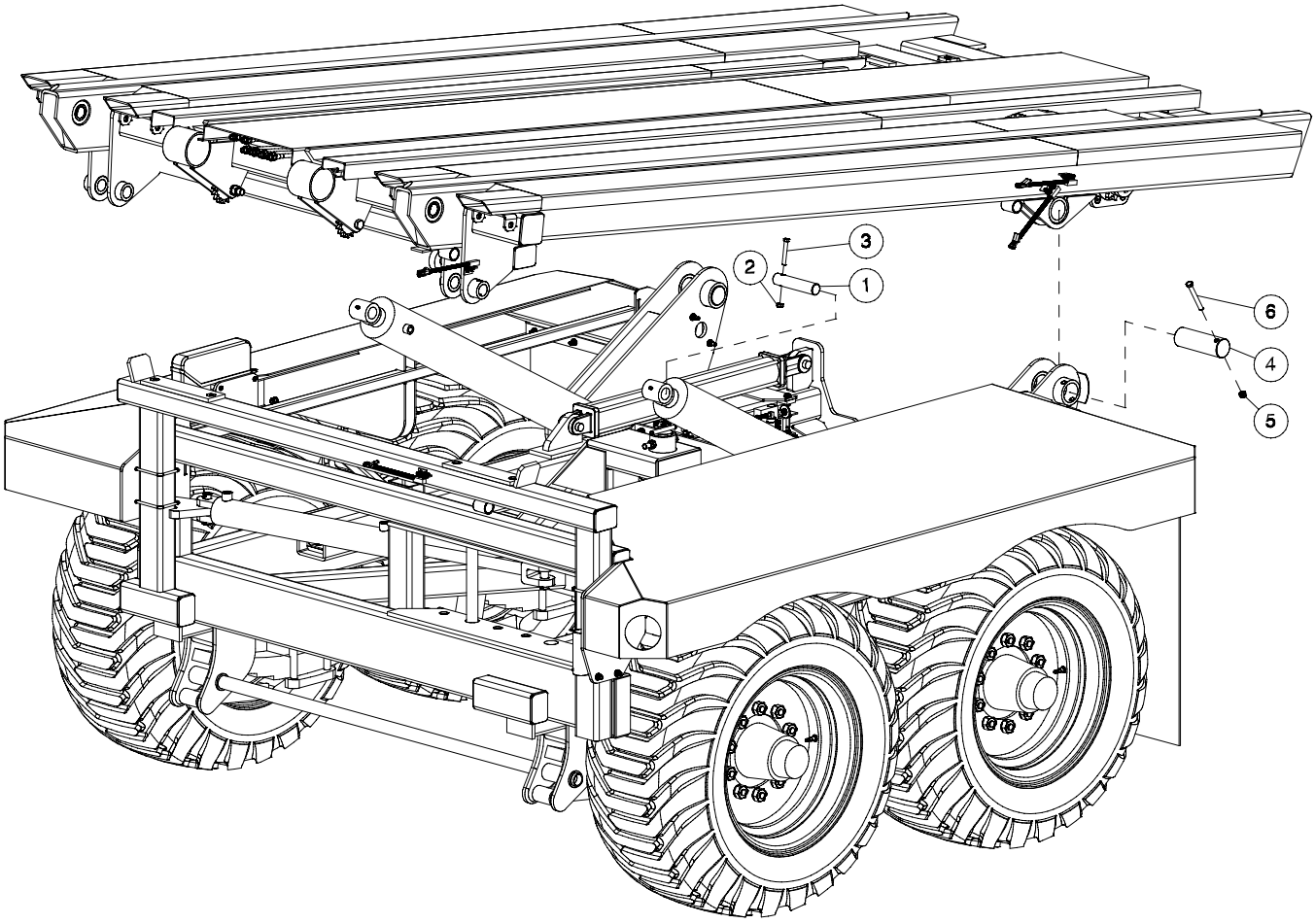
Item	Part No.	Description	Qty
1	11592	Rod - 1/2 x 6 1/4 Full Thread	1
2	12236	Sprocket - 26 Tooth - 80 chain	1
3	12243	Spacer - 11/16 x 2	1
4	10604	Hex Bolt - 1/2 x 2 Lg	4
5	11409	Hydraulic Motor - Char-Laynn 6000 Series	1
6	11414	Bracket - Motor Mount	1
7	11505	Sensor Assembly	3
8	K47327	RPM Sensor	1
8A	K53635	Jam Nut - 5/8-18 UNF - Stainless Steel	2
9	11570	Hex Nut - #12 - Brass	6
10	11571	Machine Screw #12 - 24 x 1 Lg - Brass	6
11	11572	Lockwasher #12 - 0.216 ID - Brass	6
12	11573	Flat Washer #12 - 0.25 ID x 0.562 OD - Brass	12
13	11575	Spacer - 1/4 ID x 1/2 OD x 1/4 Lg Nylon	6
14	11582	Allen Screw - 1/2 x 2 1/2	4
15	11734	Sprocket Browning Taper Lock - 11 Tooth (H80P11)	1
	12050	Browning Sleave - (P1 X 1 1/2)	1
16	12053	Ring Clamp - 2-9/16 - 3-1/2 Dia	1
17	12211	Keyed Shaft - 2 Dia x 33 Lg	1
18	12214	Counter Wheel Weldment	1
19	12237	Flange Bearing - 4 Bolt	2
20	12242	Spacer Shaft - 3 1/2 Dia x 1 1/16 Wide - 80 chain	1
	K53638	**Spacer Shaft - 3 1/2 Dia x 15/16 Wide - 100 chain**	**1**
	K55397	**Spacer Shaft -** 22" SPACING **- 3 1/2 Dia x 1 3/4 Wide - 100 chain**	
21	12254	Key - 1/2 Sq. x 2 1/2 Lg	4
22	* * * * *		
23	F-3405	Locknut - 1/2 Unitorque	1
24	S31736	Hex Bolt - 5/8 x 2-1/2 Lg	8
25	W-516	Hex Nut - 1/2	10
26	W-517	Hex Nut - 5/8	8
27	W-525	Lockwasher - 1/2	8
28	W-526	Lockwasher - 5/8	8
29	W-539	Flatwasher - 1/2	10
30	10256	Pin - 1-7/16 Dia	2
31	S32944	Locknut - 7/16 Unitorque (10302)	2
32	10847	Hex Bolt - 7/16 x 3 Lg Gr8	2
33	12236	Sprocket - 26 Tooth - 80 chain	2
	K53405	**Sprocket - 21 Tooth - 100 chain**	**2**

Slow Moving Vehicle Sign



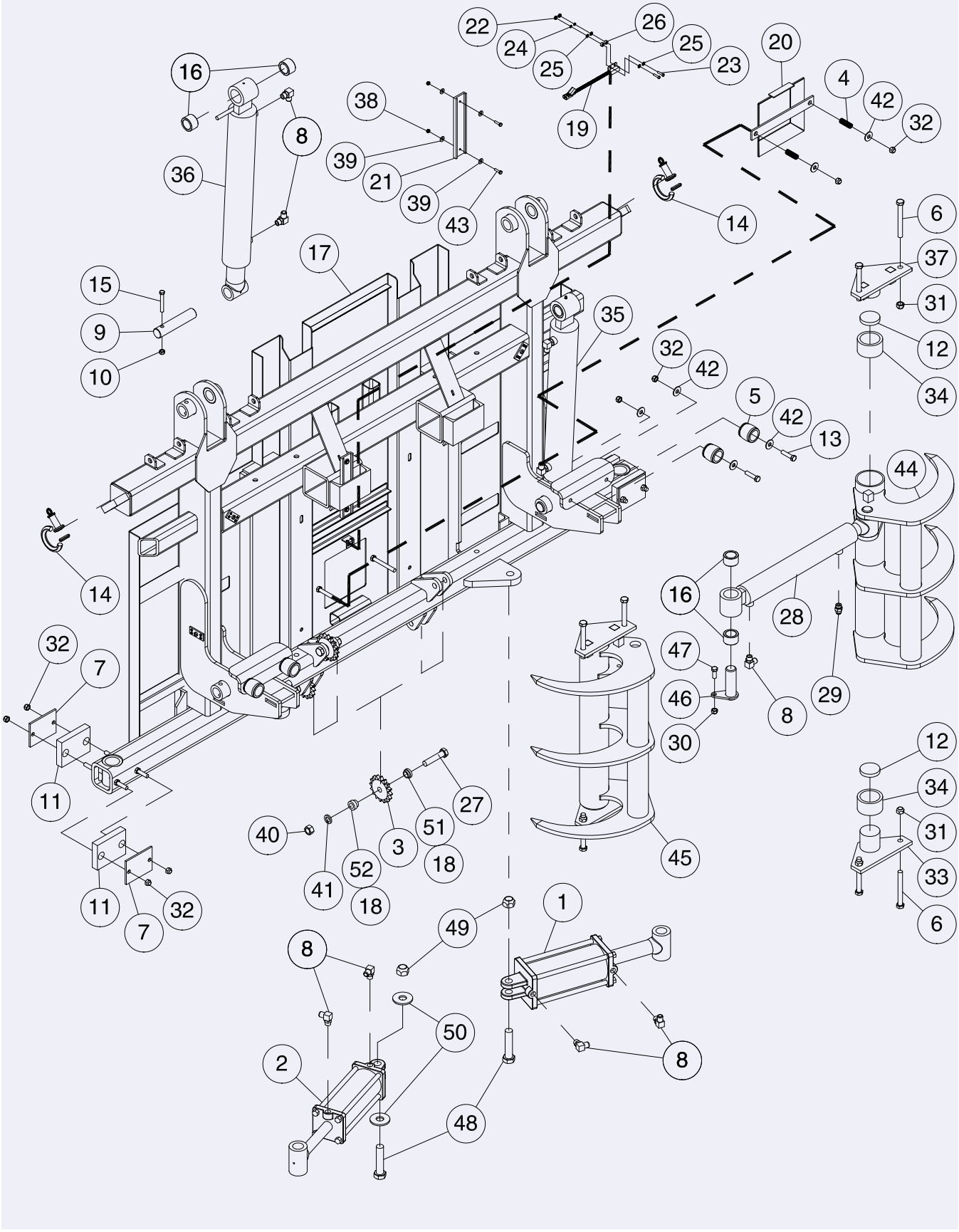
Item	Part No.	Description	Qty
1	N22778	Locknut - 1/4 Nylon Insert	2
2	N34475	Slow Moving Vehicle Emblem	1
3	S-1198	Washer - 5/16 ID x 3/4 OD	4
4	W-1552	Hex Bolt - 1/4 X 1 Lg	2

Bed Attachment



Item	Part No.	Description	Qty
1	10256	Pin - 1 7/16 Dia	2
2	S32944	Locknut - 7/16 Unitorque (10302)	2
3	10847	Hex Bolt - 7/16 X 3 Lg	2
4	11115	Pin - 2 7/16 Dia	2
5	C26701	Locknut - 1/2 Nylon Insert	2
6	K25798	Hex Bolt - 1/2 X 4 Lg	2

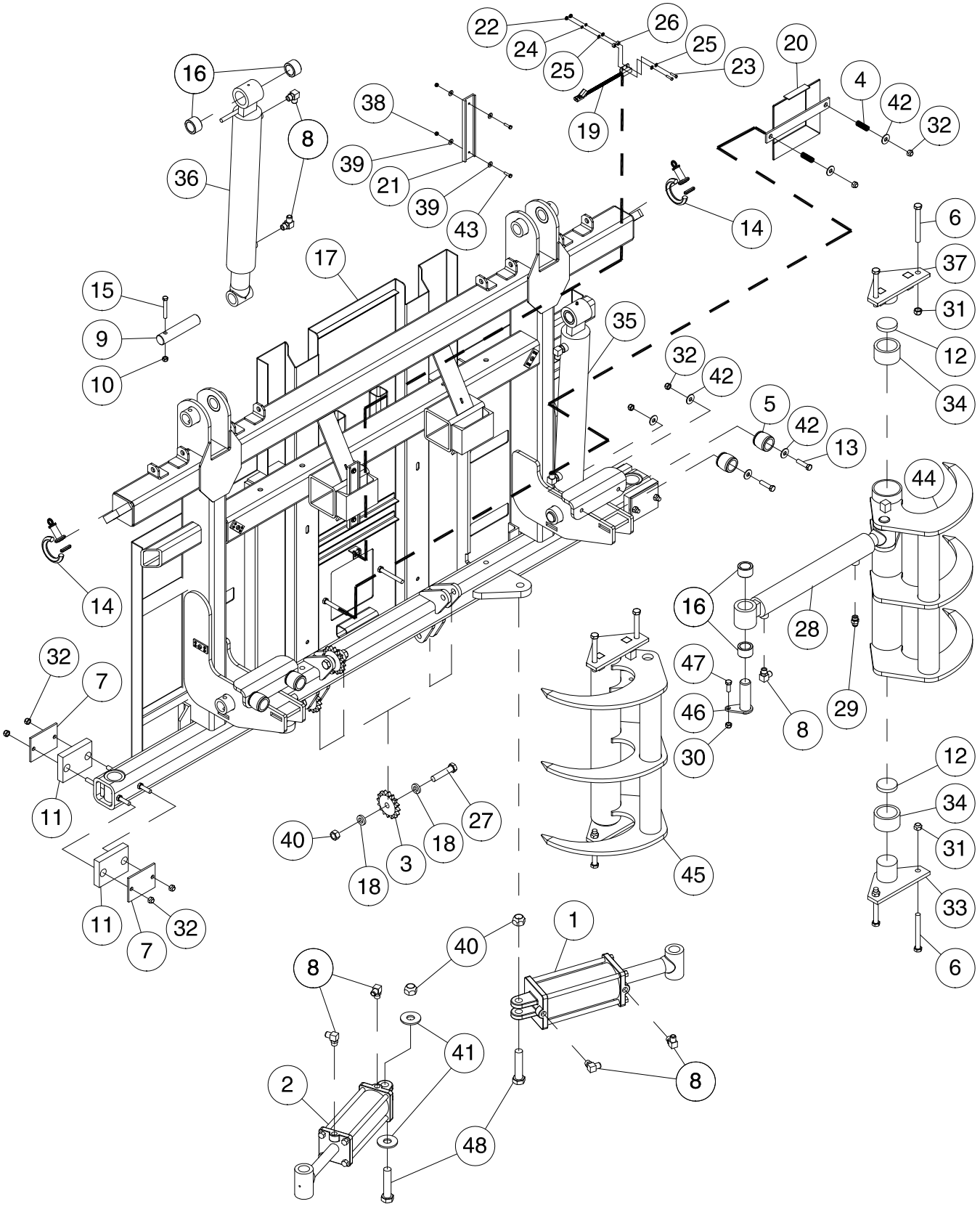
Loader Assembly - Serial # K161405191 and prior



Loader Assembly - Serial # K161405191 and prior

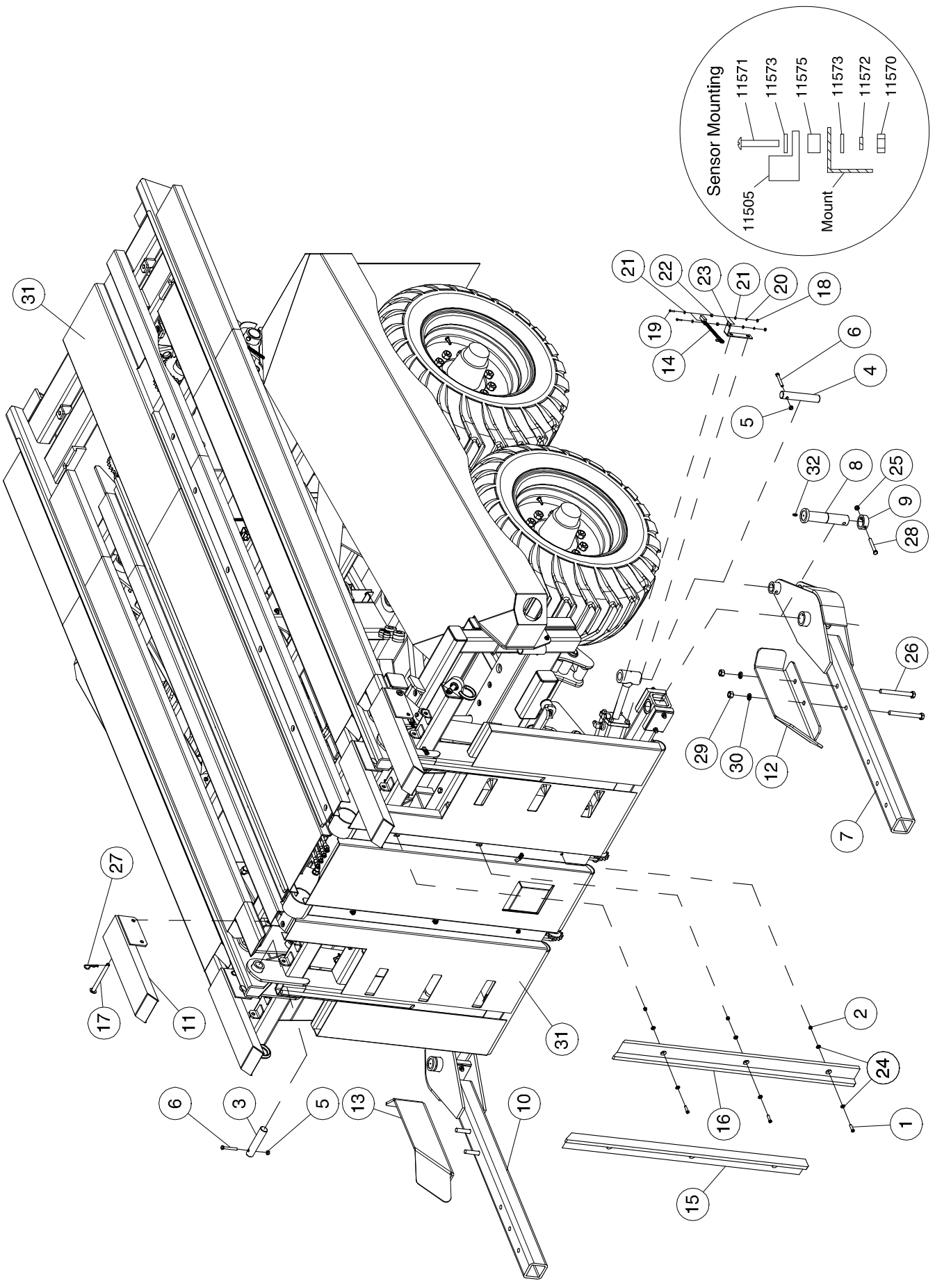
Item	Part No.	Description	Qty
1	10439	Hydraulic Cylinder - 4 1/2 x 8 Stroke	1
2	10440	Hydraulic Cylinder - 4 x 8 Stroke	1
3	11512	Idler Sprocket - 80 chain	4
	K53404	**Idler Sprocket - 11 tooth - 100 chain**	**4**
4	11574	Bale On Spring	2
5	11678	Frame Bumper	4
6	10065	Hex Bolt - 5/8 x 5-1/2	8
7	10104	Plate - Alignment Slider	4
8	10180	90 Deg Elbow - JIC To ORB	9
9	10256	Loader Pin - 1 7/16 Dia	2
10	S32944	Locknut - 7/16 Unitorque (10302)	2
11	10351	Slider - 1 Thick	4
12	10355	Grab Hook Thrust Bearing - 1/2 Dia	4
13	10604	Hex Bolt - 1/2 x 2 Lg	4
14	10827	Shackle Pin - 3/4	2
15	10847	Hex Bolt - 7/16 x 3 Lg Gr8	2
16	10936	Bushing - Loader Pivot	8
17	11309	Loader	1
18	11497	Loader Idler Spacer - 0.824 ID x 1 OD x 7/16 Lg - 80 chain	8
19	11505	Sensor Assembly	1
20	11527	Bale On Weldment	1
21	11541	Upper Chain Plastic - White Polyethylene	2
22	11570	Hex Nut - #12 - Brass	2
23	11571	Machine Screw - #12-24 x 1 Lg - Brass	2
24	11572	Lockwasher - #12 - 0.216 ID - Brass	2
25	11573	Flat Washer - #12 - 0.25 ID x 0.562 Brass	4
26	11575	Spacer - 1/4 ID x 1/2 OD x 1/4 Lg Nylon	2
27	11576	Hex Bolt - 3/4 x 3 1/2 Lg - Gr. 8	4
28	12166	Hydraulic Cylinder - 2 1/2 x 16 Stroke	1
29	10178	Male Connector - 3/4 - 16 MORB x 3/4 - 16 MJIC	1
30	**C26701**	**Locknut - 1/2 Nylon Insert**	**2**
31	C17295	Locknut - 5/8 Nylon Insert	8
32	**F-3405**	**Locknut - 1/2 Unitorque**	**14**
33	K42394	Grab Hook Pivot - Lower	2
34	K42396	Grab Hook Bushing - 3 1/2 Dia	4
35	K44042	Hydraulic Cylinder - 3 1/2 x 19 9/16 Stroke	1
36	K44046	Cylinder, Loader - 3 1/2 x 19 9/16 Stroke - Left	1
37	K47014	Grab Hook Pivot - Upper	2
38	N22778	Locknut - 1/4 Nylon Insert	4
39	S-1198	Washer - 5/16 ID x 3/4 OD x 1/16 Thick	8
40	W-518	Hex Nut - 3/4	4
41	W-527	Lockwasher - 3/4	4
42	W-539	Flatwasher - 1/2	10
43	W-1552	Hex Bolt - 1/4 x 1 Lg	4
44	K45433	Grab Hook	1
45	K45434	Grab Hook	1
46	K45445	Grab Hook Pin	2
47	W-485	Hex Bolt - 1/2 x 1 1/4 Lg	2
48	C-231	Hex Bolt - 1 x 5 1/2 Lg	2
49	D-5274	Locknut - 1 Unitorque	2
50	D-5498	Flat Washer - 1 1/16 ID x 2 OD x 1/8 Thick	2
51	**K51598**	**Bushing - Inner - 0.765 ID x 1 3/8 OD x 0.655 Lg - 100 chain**	**4**
52	**K51599**	**Bushing - Outer - 0.765 ID x 1 3/8 OD x 0.822 Lg - 100 chain**	**4**

Loader Assembly - Serial # K161405301 to present



Loader Assembly - Serial # K161405301 to present			
Item	**Part No.**	**Description**	**Qty**
		100 Chain on 22 inch centers	
1	10439	Hydraulic Cylinder - 4 1/2 x 8 Stroke	1
2	10440	Hydraulic Cylinder - 4 x 8 Stroke	1
3	**K53404**	**Idler Sprocket - 11 tooth - 100 chain**	**4**
4	11574	Bale On Spring	2
5	11678	Frame Bumper	4
6	10065	Hex Bolt - 5/8 x 5-1/2	8
7	10104	Plate - Alignment Slider	4
8	10180	90 Deg Elbow - JIC To ORB	9
9	10256	Loader Pin - 1 7/16 Dia	2
10	S32944	Locknut - 7/16 Unitorque (10302)	2
11	10351	Slider - 1 Thick	4
12	10355	Grab Hook Thrust Bearing - 1/2 Dia	4
13	10604	Hex Bolt - 1/2 x 2 Lg	4
14	10827	Shackle Pin - 3/4	2
15	10847	Hex Bolt - 7/16 x 3 Lg Gr8	2
16	10936	Bushing - Loader Pivot	8
17	**K55360**	**Loader - 22 inch chain centers**	**1**
18	**K55262**	**Loader Idler Spacer - 1 1/32 ID x 1 3/8 OD x 3/8 Thick - 100 chain**	**8**
19	11505	Sensor Assembly	1
20	11527	Bale On Weldment	1
21	11541	Upper Chain Plastic - White Polyethylene	2
22	11570	Hex Nut - #12 - Brass	2
23	11571	Machine Screw - #12-24 x 1 Lg - Brass	2
24	11572	Lockwasher - #12 - 0.216 ID - Brass	2
25	11573	Flat Washer - #12 - 0.25 ID x 0.562 Brass	4
26	11575	Spacer - 1/4 ID x 1/2 OD x 1/4 Lg Nylon	2
27	**K66074**	**Hex Bolt - 1 x 3 1/2 Lg**	**4**
28	12166	Hydraulic Cylinder - 2 1/2 x 16 Stroke	1
29	10178	Male Connector - 3/4 - 16 MORB x 3/4 - 16 MJIC	1
30	**C26701**	**Locknut - 1/2 Nylon Insert**	**2**
31	C17295	Locknut - 5/8 Nylon Insert	8
32	**F-3405**	**Locknut - 1/2 Unitorque**	**14**
33	K42394	Grab Hook Pivot - Lower	2
34	K42396	Grab Hook Bushing - 3 1/2 Dia	4
35	K44042	Hydraulic Cylinder - 3 1/2 x 19 9/16 Stroke	1
36	K44046	Cylinder, Loader - 3 1/2 x 19 9/16 Stroke - Left	1
37	K47014	Grab Hook Pivot - Upper	2
38	N22778	Locknut - 1/4 Nylon Insert	4
39	S-1198	Washer - 5/16 ID x 3/4 OD x 1/16 Thick	8
40	**D-5274**	**Locknut - 1 Unitorque**	**6**
41	D-5498	Flat Washer - 1 1/16 ID x 2 OD x 1/8 Thick	2
42	W-539	Flatwasher - 1/2	10
43	W-1552	Hex Bolt - 1/4 x 1 Lg	4
44	K45433	Grab Hook	1
45	K45434	Grab Hook	1
46	K45445	Grab Hook Pin	2
47	W-485	Hex Bolt - 1/2 x 1 1/4 Lg	2
48	C-231	Hex Bolt - 1 x 5 1/2 Lg	2

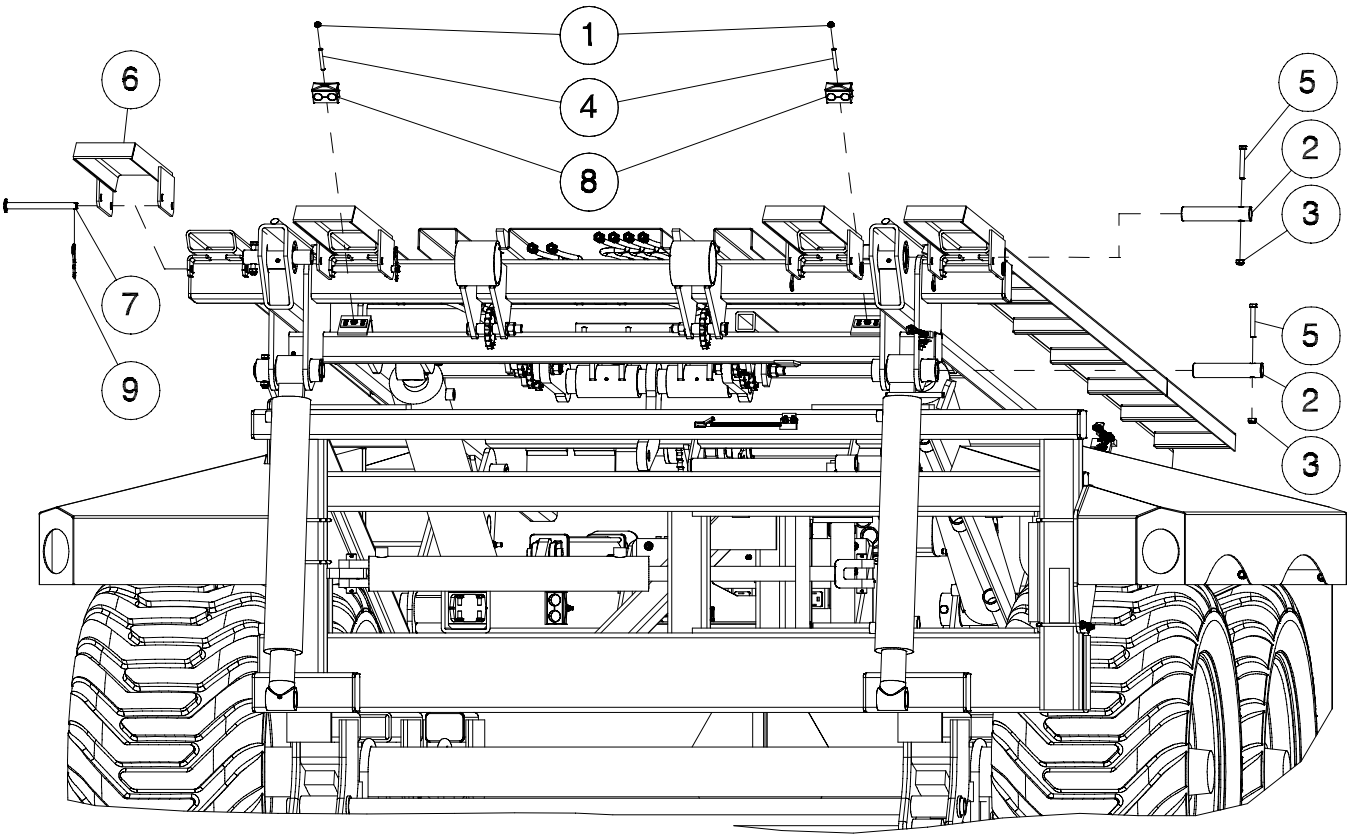
Loader Arm Assembly



Loader Arm Assembly

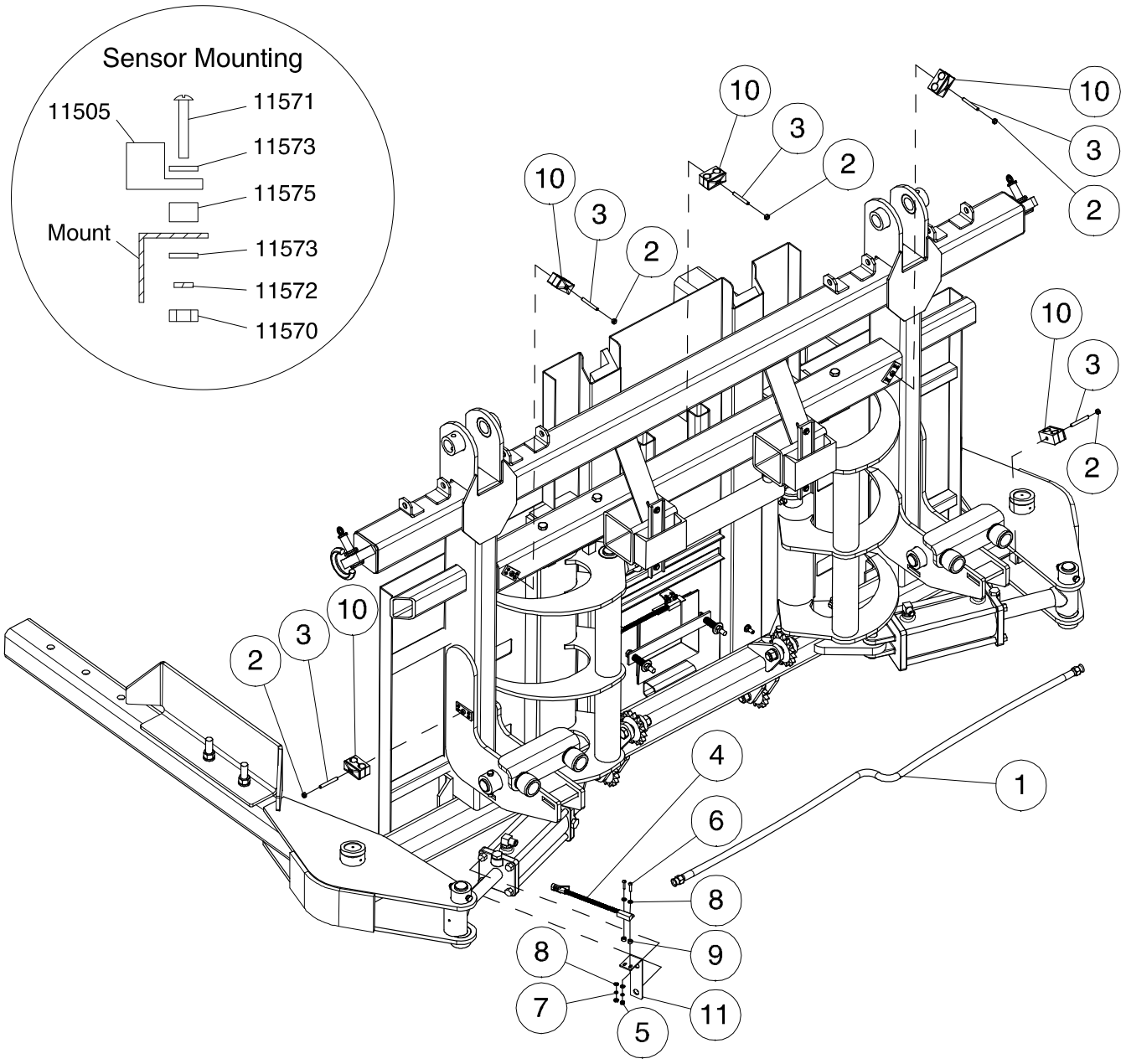
Item	Part No.	Description	Qty
1	10075	Hex Cap Screw - 3/8 x 1-1/2 Lg	6
2	M-3388	Locknut - 3/8 Nylon Insert (10229)	6
3	10256	Loader Pin - 1 7/16 Dia	4
4	10257	Pin - 1-7/16 Dia	2
5	S32944	Locknut - 7/16 Unitorque (10302)	6
6	10847	Hex Bolt - 7/16 x 3 Lg Gr8	6
7	11324	Alignment Arm Stub - Left	1
8	**K55352**	Pin - Alingment Arm - 1-15/16 x 8-7/32 UL - greaseable	2
9	11331	Pin Collar	2
10	11332	Alignment Arm Stub - Right	1
11	**K56049**	**Bed Extension - 2015**	4
12	K47303	Left Arm Add On	1
13	K47304	Right Arm Add On	1
14	11505	Ferro Sensor Assembly	1
15	11533	Loader Slider Plastic - Right	1
16	11534	Loader Slider Plastic - Left	1
17	11543	Bed Extension Pin - 5/8 Dia x 6 59/64 Lg	4
18	11570	Hex Nut - #12 - Brass	2
19	11571	Machine Screw #12 x 1 Lg - Brass	2
20	11572	Lockwasher - #12 - Brass	2
21	11573	Flat Washer - #12 - 1/4 ID x 9/16 OD - Brass	4
22	11575	Spacer - 1/4 ID x 1/2 OD x 1/4Lg Nylon	2
23	12461	Sensor Bracket	1
24	W-538	Washer - 7/16 ID x 1 OD x 14 Ga	12
25	F-3405	Locknut - 1/2 Unitorque	2
26	S32590	Hex Bolt - 3/4 x 7 Gr8	4
27	W-131	Hairpin - 5/32	4
28	W-493	Hex Bolt - 1/2 x 3 1/2 Lg	2
29	W-518	Hex Nut - 3/4	4
30	W-527	Lockwasher - 3/4	4
31	10248	Slip Coat - Gallon	0.4
32	S-752	Grease Zerk	2

Hose Clamp Locations - Stage 1



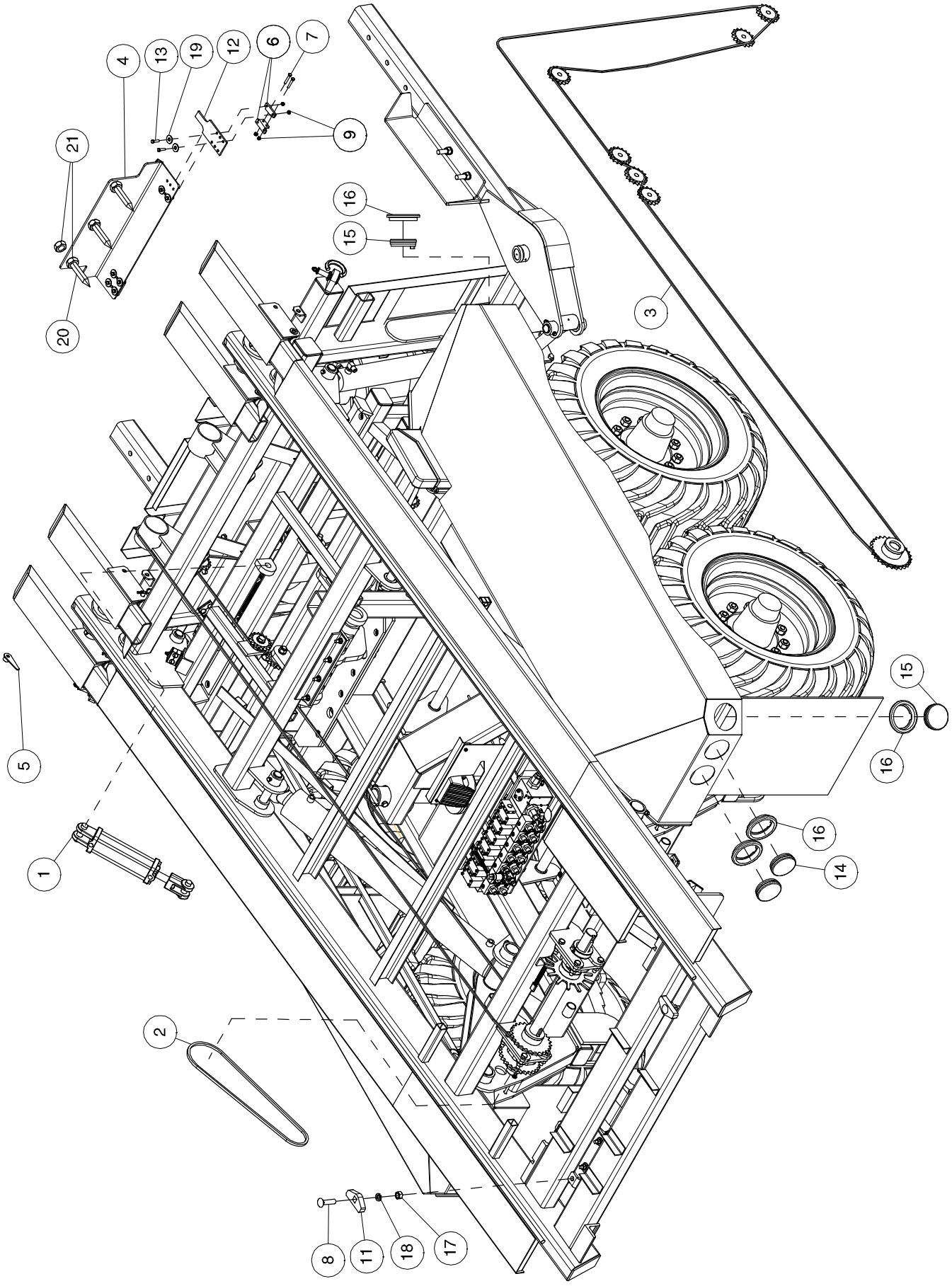
Item	Part No.	Description	Qty
1	D-5272	Locknut - 5/16 Nylon Insert (10231)	2
2	10256	Loader Pin - 1 7/16 Dia	4
3	S32944	Locknut - 7/16 Unitorque (10302)	4
4	10811	Set Screw - 5/16 x 2-1/2 Lg	2
5	10847	Hex Bolt - 7/16 x 3 Lg Gr8	4
6	11333	Bed Extension	4
7	11543	Bed Extension Pin - 5/8 Dia x 6 59/64 Lg	4
8	11740	Plastic Hose Clamp Assembly	2
9	W-131	Hairpin - 5/32	4

Hose Clamp Locations - Stage 2



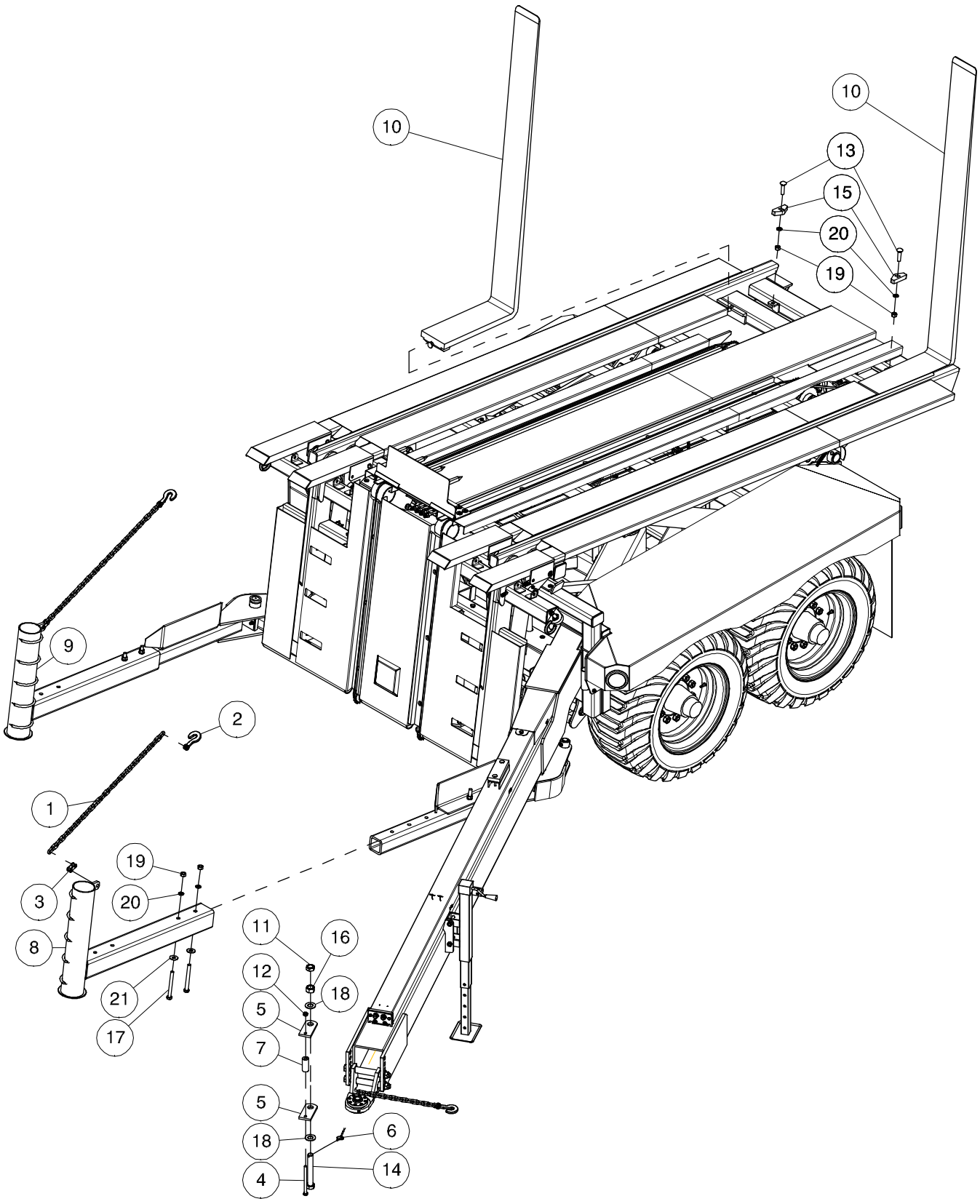
Item	Part No.	Description	Qty
1	11871	Hyd Hose - 1/2 x 139	1
2	D-5272	Locknut - 5/16 Nylon Insert (10231)	5
3	10811	Set Screw - 5/16 x 2-1/2 Lg	5
4	11505	Sensor Assembly	1
5	11570	Hex Nut - #12 - Brass	2
6	11571	Machine Screw #12 x 1 Lg - Brass	2
7	11572	Lockwasher - #12 x 0.216 ID - Brass	2
8	11573	#12 Flat Washer - #12 - 0.25 ID x 0.562 OD Brass	4
9	11575	Spacer - 1/4 ID x 1/2 OD x 1/4Lg Nylon	2
10	11740	Plastic Hose Clamp Assembly	5
11	12461	Sensor Bracket	1

Drive Chain Assembly



Drive Chain Assembly

Item	Part No.	Description	Qty
1	12167	Hydraulic Cylinder - 2 x 8 Stroke	1
2	12238	Roller Chain - #80 57P	1
3	12240	Roller Chain - #80H 383P	2
	K53406	**Roller Chain - #100H 309P**	**2**
4	11751	Power Slide - 80 chain	1
	K47300	Power Slide - 100 chain - Serial # K161405191 and prior	1
	K55367	**Power Slide - 100 chain - 22 inch chain center - Serial # K161405301 to present**	**1**
5	12008	Sensor Target	1
6	34986	Chain Link - 80 chain (K41624 - Kit includes 2 of 34986 and hardware)	4
	K51099	**Chain Link - 100 chain**	**4**
7	44006	Chain Link Bolt - 5/16 x 1 5/8 shoulder x 1 7/8 Lg - 80 chain	4
	K53407	**Hex Bolt - 3/8 x 3 Lg - 100 chain**	**4**
8	C33957	Carriage Bolt - 3/4 x 3 Lg	2
9	D-5272	Locknut - 5/16 Unitorque - 80 chain	12
	M-3388	**Locknut - 3/8 Unitorque - 100 chain**	**12**
10	K45448	Hitch Bolt	1
11	K45683	Fork Retainer Block	2
12	K47015	Slider Spacer - 80 chain	2
13	K47017	Hex Bolt - 5/16 x 1 1/4 Lg - 80 chain	8
	W-478	**Hex Bolt - 3/8 x 2 Lg - 100 chain**	**8**
14	K48395	4" Red Led Lamp	4
15	K48396	4" Amber Led Lamp	4
16	K48397	Rubber Gromet	8
17	W-518	Hex Nut - 3/4	2
18	W-527	Lockwasher - 3/4	2
19	W-539	Flatwasher - 1/2	8
20	**K50112**	**Bale Spike**	**3**
21	W-519	Nut - 7/8	6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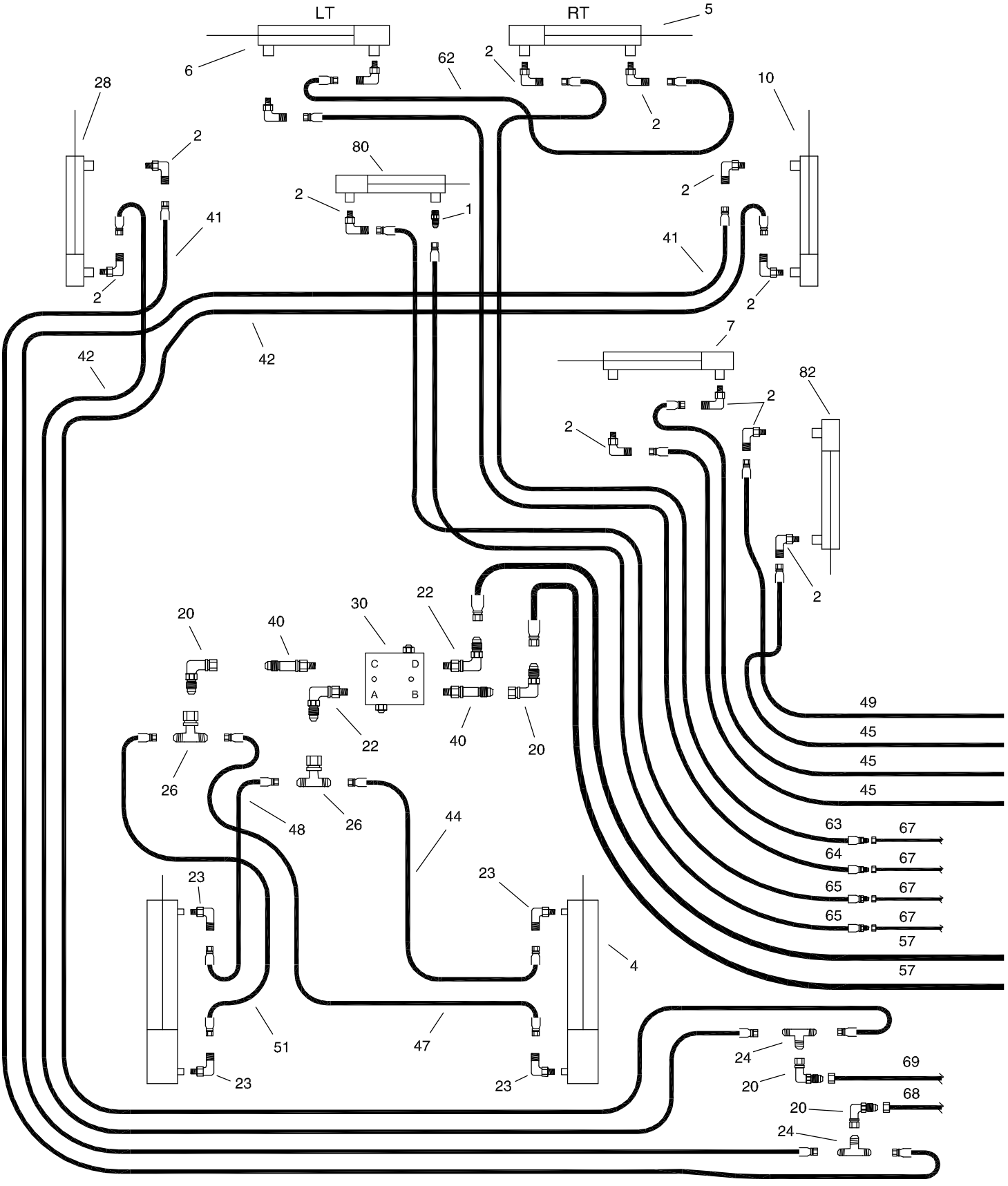
Final Assembly

Item	Part No.	Description	Qty
1	10369	Chain - 3/8 x 8Ft Lg	2
2	10662	Grab Hook - 3/8 Chain	2
3	10677	Twin Clevis	2
4	10066	Hex Bolt - 5/8 x 8 Lg GR8	1
5	10142	Draw Bar Hitch Plate	2
6	10247	Klik Pin - W/Chain+Cotter - 1/4 x 1 3/4 Lg	1
7	10313	Spacer Bushing - 1 1/2 OD x .375W	1
8	11310	Alignment Arm End - Lt	1
9	11319	Alignment Arm End - Rt	1
10	11724	Forklift Tooth - 8 x 84	2
11	C15768	Hex Jam Nut - 1 1/4	1
12	C17295	Locknut - 5/8 Nylon Insert	1
13	C33957	Carriage Bolt - 3/4 x 3 Lg	2
14	K45448	Hitch Bolt	1
15	K45683	Fork Retainer Block	2
16	P61D20	Hex Nut - 1 1/4	1
17	S32590	Hex Bolt - 3/4 x 7 GR8	4
18	S34182	Washer - 1 9/32 ID x 2 1/2 OD	2
19	W-518	Hex Nut - 3/4	6
20	W-527	Lockwasher - 3/4	6
21	W-541	Washer - 2 OD x .813 ID	4
	K56033	**String Saver (Not Shown)** **Part will help to protect strings when Stacking 4X4 bale off string.**	
		Short Bale Brackets (Not Shown)	
	12304	Bracket Rear 2	
	12305	Bracket Front 2	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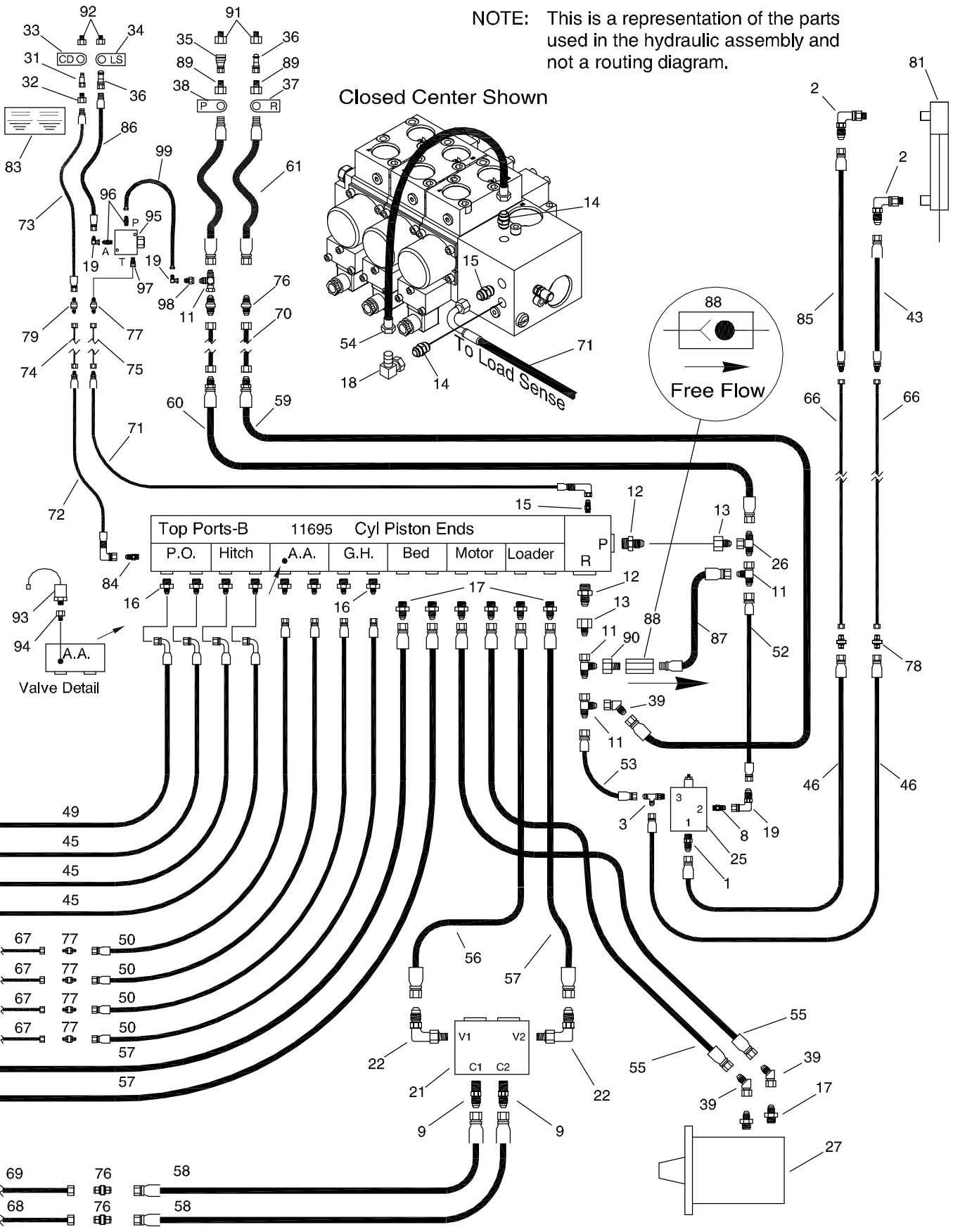
NOTE: This is a representation of the parts used in the hydraulic assembly and not a routing diagram.



Hydraulic Assembly

Item	Part No.	Description	Qty
1	10178	Fitting Straight - 08 MORB x 08 MJIC	2
2	10180	Fitting 90 Elbow - 08 MORB x 08 MJIC	15
3	10187	Fitting-O-Ring Run Tee - 08 MJIC x 08 MJIC x 08 MORB	1
4	10436	Bed Cylinder - 5 x 36 x 2 1/2 Dia shaft - 12 ORB (AW-0024)	2
5	10439	RT AA Cylinder - 4 1/2 x 8 x 2 Dia shaft - 08 ORB (AW-0027)	1
6	10440	LT AA Cylinder - 4 x 8 x 1 3/8 Dia shaft - 08 ORB (AW-0028)	1
7	10449	Hitch Cylinder - 3 1/2 x 18 x 1 3/4 Dia shaft - 08 ORB (AU-0478)	1
8	10854	Inline Fitting Check Valve	1
9	10935	Fitting - Straight - 12 MORB x 12 MJIC	2
10	K44042	Right Loader Cylinder - 3 1/2 x 19 9/16 - 08 ORB (BJ-0071)	1
11	**N29356**	**Fitting - Swivel Nut Run Tee - #12 JIC (11348)**	**4**
12	11350	Fitting - Straight - 20 ORB x 16 JIC	2
13	11351	Fitting - Reducer - 16 JIC x 12 JIC	2
14	11353	Fitting - Straight - 04 MORB x #4 MJIC	2
15	K47925	Adaptor - Straight - 04 ORB x 08 JIC	1
16	11355	Fitting - Straight - 16 MORB x 08 MJIC - Prior to Serieal Number K161605361	8
	N29359	**Connector - 08 MJIC x 10 MORB - Serieal Number K161605361 to present**	**8**
17	11356	Fitting - Straight - 16 MORB x 12 MJIC	8
18	11357	Fitting - 90 Elbow - #4 FJIC x #4 JIC	2
19	**11358**	**Fitting - 90 Elbow - 08 FJIC x 08 MJIC**	**3**
20	11359	Fitting - 90 Elbow - 12 FJIC x 12 MJIC	4
21	11360	Load Check (Seal Kit K55398 - does 1 cartridge, 2 kits req'd)	1
22	11365	Fitting - 90 Elbow - 12 MORB x 12 MJIC	4
23	11366	Fitting - 90 Elbow - 12 MORB x 08 MJIC	4
24	11368	Fitting - Union Tee - 12 MJIC	2
25	11369	Pressure Reducing Relief Valve (Seal Kit K55398)	1
26	11405	Fitting Swivel Nut Branch Tee - 12 MJIC x 12 FJIC x 12 MJIC	3
27	11409	16K Motor	1
	12285	16K Motor Body Seal Kit	
	12286	16K Motor Shaft Seal Kit	
28	K44046	Left Loader Cylinder - 3 1/2 x 19 9/16 - 08 ORB	1
29	11695	16K HAWE Valve 02	1
30	11723	Cushion Valve - 2000 PSI	1
31	K50834	Flat Face Coupler - 3/8 x 08 FORB	1
32	K50961	Connector - 10 MORB x 08 FORB	1
33	K48292	Hose Tag - Case Drain	1
34	K48293	Hose Tag - Load Sense	1
35	N34488	Female Quick Coupler - 1/2 x 10 FORB	1
36	N34498	Male Coupler - 1/2 x 10 FORB	2
37	K48291	Hose Tag - Return	1
38	K48290	Hose Tag - Pressure	1
39	11811	Fitting - 45 Elbow - 12 FJIC x 12 MJIC	3
40	11812	Fitting - Straight - 12 MORB x 12 FJIC	2
41	11845	Hydraulic Hose - 1/2 x 69 Lg - 08 FJIC x 12 FJIC swivel ends - LDR LB, LR, RB	2
42	11846	Hydraulic Hose - 1/2 x 63 Lg - 08 FJIC x 12 FJIC swivel ends - LDR RR	2
43	11847	Hyd Hose - 1/2" x 34" Lg - 08 MJIC x 08 FJIC swivel end - Tensioner Return	1
44	11849	Hyd Hose - 1/2" x 96" Lg - 08 FJIC x 12 FJIC swivel ends - RT Bed Rod	1
45	11850	Hyd Hose - 1/2" x 94" Lg - 90 degree 08 FJIC x 08 FJIC - Hitch R&B PO Rod	3
46	11851	Hyd Hose - 1/2" x 75" Lg - 08 FJIC - P/R To Bed HL Ten Ret	2
47	11852	Hyd Hose - 1/2" x 75" Lg - 08 FJIC x 12 FJIC swivel ends - RT Bed Piston	1
48	11853	Hyd Hose - 1/2" x 60" Lg - 08 FJIC x 12 FJIC swivel ends - Lg LT Bed Rod	1
49	11854	Hyd Hose - 1/2" x 58" Lg - 90 degree 08 FJIC x 08 FJIC - PO Piston	1
50	11855	Hyd Hose - 1/2" x 52" Lg - 08 FJIC - Hawe To Bed HL-GH, AA	4

Hydraulic Assembly

Item	Part No.	Description	Qty
51	11856	Hyd Hose - 1/2" x 45" Lg - 08 FJIC x 12 FJIC swivel ends - LT Bed Piston	1
52	11857	Hyd Hose - 1/2" x 27" Lg - 08 FJIC x 12 FJIC swivel ends - Hawe To P/R Pressure	1
53	11858	Hyd Hose - 1/2" x 22" Lg - 08 FJIC x 12 FJIC swivel ends- Hawe To P/R Return	1
54	11860	Hyd Hose - 1/4" x 21" Lg - 04- Hawe DW To M Port	1
55	11861	Hyd Hose - 3/4" x 105" Lg - 12 FJIC - Motor Hoses	2
56	11862	Hyd Hose - 3/4" x 55" Lg - 12 FJIC - Hawe To LC V1 (Piston)	1
57	11863	Hyd Hose - 3/4" x 49" Lg - 12 FJIC - Hawe To Cush, Lc V2 (Rod)	3
58	11864	Hyd Hose - 3/4" x 38" Lg - 12 FJIC - LC To Bed HL	2
59	11868	Hyd. Hose - 3/4" x 92" Lg - 12 MJIC x 12 FJIC swivel end - Hawe Return	1
60	11869	Hyd. Hose - 3/4" x 81" Lg - 12 MJIC x 12 FJIC swivel end - Hawe Pressure	1
61	N37038	Hydraulic Hose - 3/4 x 84 Lg - 12 MORB x 12 FJIC swivel end	2
62	11871	Hyd Hose - 1/2" x 139" Lg - 08 FJIC swivel ends - AA LT RT Connect	1
63	11872	Hyd Hose - 1/2" x 139" Lg - 08 MJIC x 08 FJIC swivel end - AA Piston (Right)	1
64	11873	Hyd Hose - 1/2" x 99" Lg - 08 MJIC x 08 FJIC swivel end - AA Rod (Left)	1
65	11874	Hyd Hose - 1/2" x 80" Lg - 08 MJIC x 08 FJIC swivel end - GH	2
66	11875	Oil Line - 1/2 x 74 Lg - 08 FJIC - Bed Hard Line 1/2" TEN	2
67	11876	Oil Line - 1/2 x 80 Lg - 08 FJIC - Bed Hard Line 1/2" GH, AA	4
68	11879	Oil Line - 3/4 x 74 Lg - 12 FJIC - Bed Hard Line 3/4" LD Rod	1
69	11880	Oil Line - 3/4 x 76 Lg - 12 FJIC - Bed Hard Line 3/4" LD PIS	1
70	K44706	Oil Line - 3/4 x 132 Lg - 12 FJIC	2
71	K47922	Hydraulic Hose - 1/2 x 146 Lg - 08 FJIC x 08 MJIC	1
72	K47921	Hydraulic Hose - 3/8 x 175 Lg - 90 degree 06 FJIC x 06 MJIC	1
73	K47936	Hydraulic Hose - 3/8 x 78 Lg - 06 FJIC x 10 MORB	2
74	K44704	Oil Line - 3/8 x 129 Lg - 06 FJIC	1
75	K47926	Oil Line - 1/2 x 129 Lg - 08 FJIC	1
76	12025	Bulkhead 2" Clamp - 12 MJIC	4
77	12031	Bulkhead 1 1/2" Clamp - 08 MJIC	5
78	12033	Bulkhead 2" Clamp - 08 MJIC	2
79	12035	Bulk Head 1 1/2" Clamp - 06 MJIC	2
80	12166	Grab Hook Cylinder	1
81	12167	Tensioner Cylinder	1
82	12168	Pushoff Cylinder	1
83	12185	To Avoid Damage Decal	1
84	K47935	Straight Adaptor - 04 MORB x 06 MJIC	1
85	11886	Hyd Hose - 1/2 x 25 Lg - 08 MJIC x 08 FJIC swivel end - Tensioner Pressure	1
86	K47937	Hydraulic Hose - 1/2 x 78 Lg - 10 MORB x 08 FJIC	1
87	K50994	Hyd Hose - 3/4 x 22 Lg - 12 MORB x 12 FJIC	1
88	N16399	Check Valve - 12 FORB	1
89	N37039	Connector - 10 MORB x 12 MORB	2
90	N37849	Connector - 12 MORB x 12 FJIC	1
91	K53636	Connector - 12 FORB x 08 MNPT	2
92	K53637	Connector - 10 MORB x 05 MNPT	2
93	K47326	Arms In Pressure Sensor	1
94	K47330	Connector - 9/16-18 FORB x 7/16-20 MORB	1
		Serieal Number K161605361 to present	
95	**K58420**	**Load Sense Amplifier Valve**	**1**
96	**K58419**	**Connector - 04 Male BSPP x 08 Male JIC**	**2**
97	**K59071**	**Connector - 04 Male BSPP x 08 Female JIC**	**1**
98	**K58440**	**Connector - 12 FJIC x 08 MJIC**	**1**
99	**K58418**	**Hyd Hose - 1/2 x 18 Lg - 08 FJIC**	**1**

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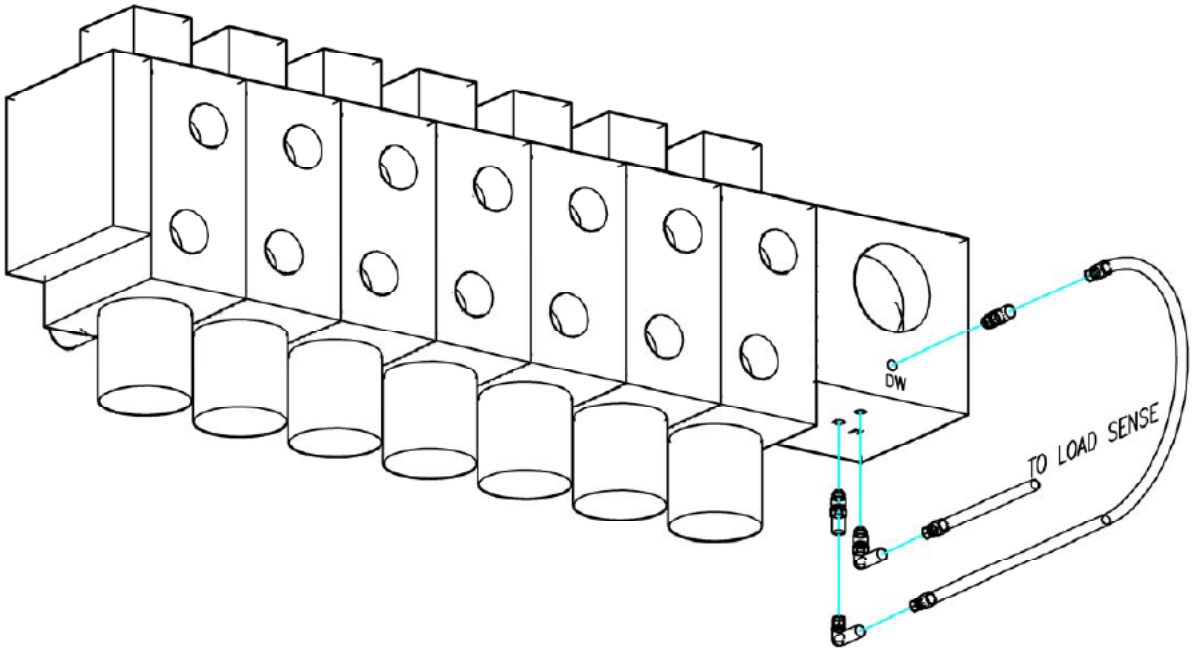

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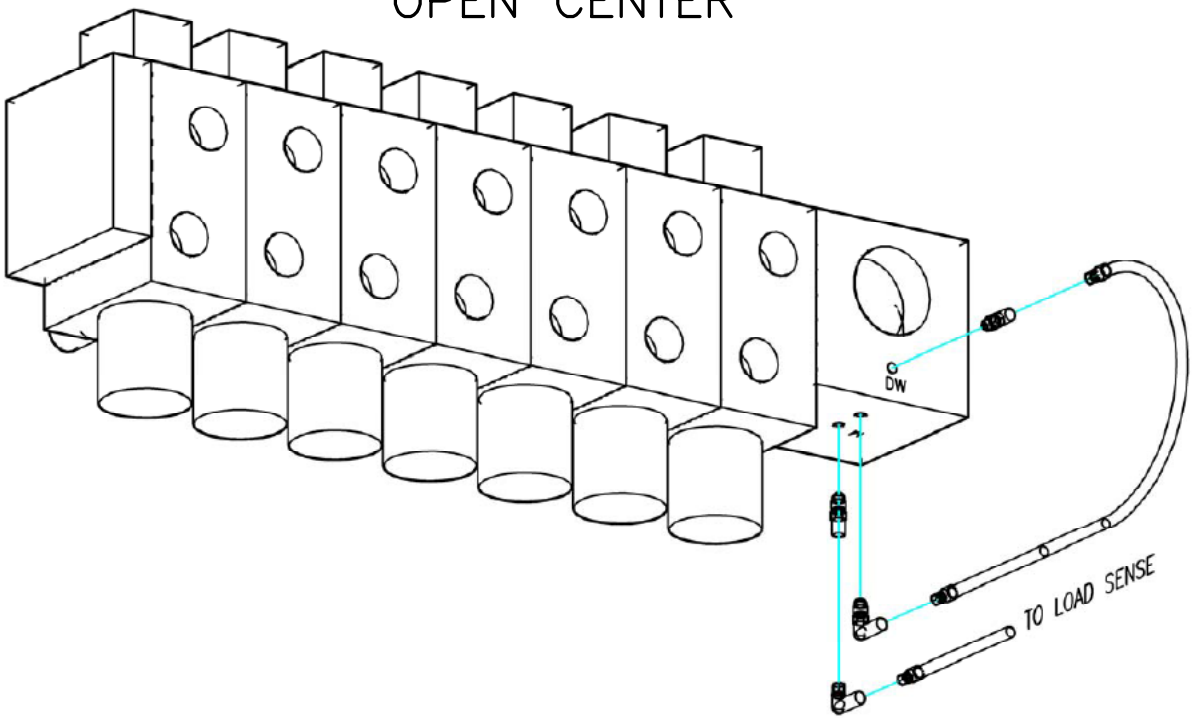


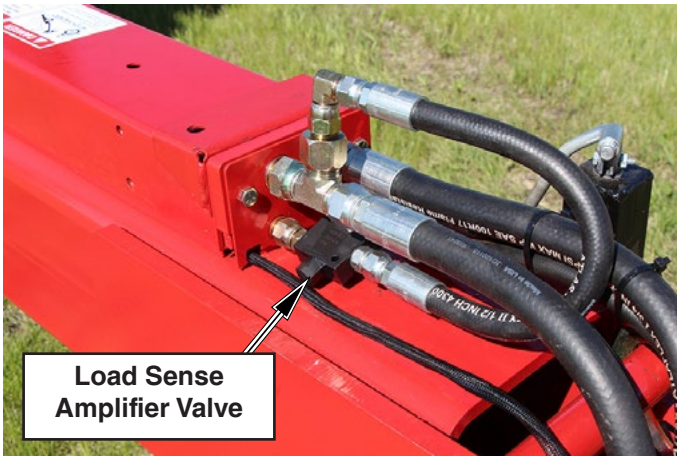
Load Sense Amplifier

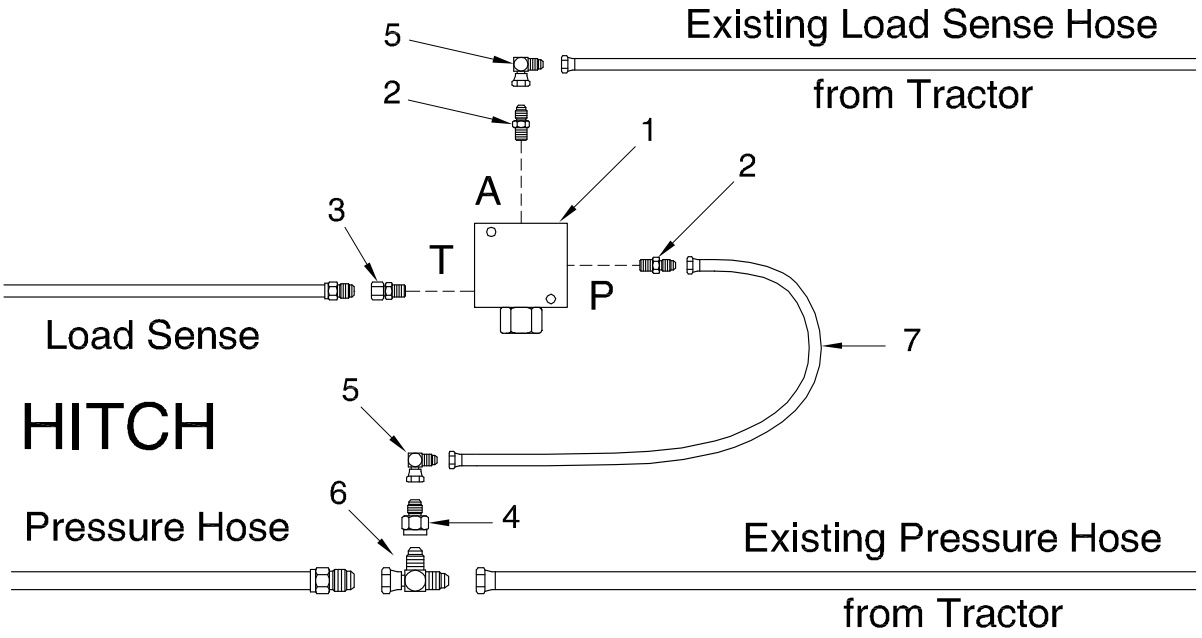
Some tractor models require a stronger hydraulic signal to activate their load sense hydraulics.

One sign of such a tractor is a slow response time when operating the 16K PLUS controller.

To eliminate the lag in tractor's hydraulic response time, Morris has introduced a Load Sense Amplifier Kit to improve tractor load sense response time.

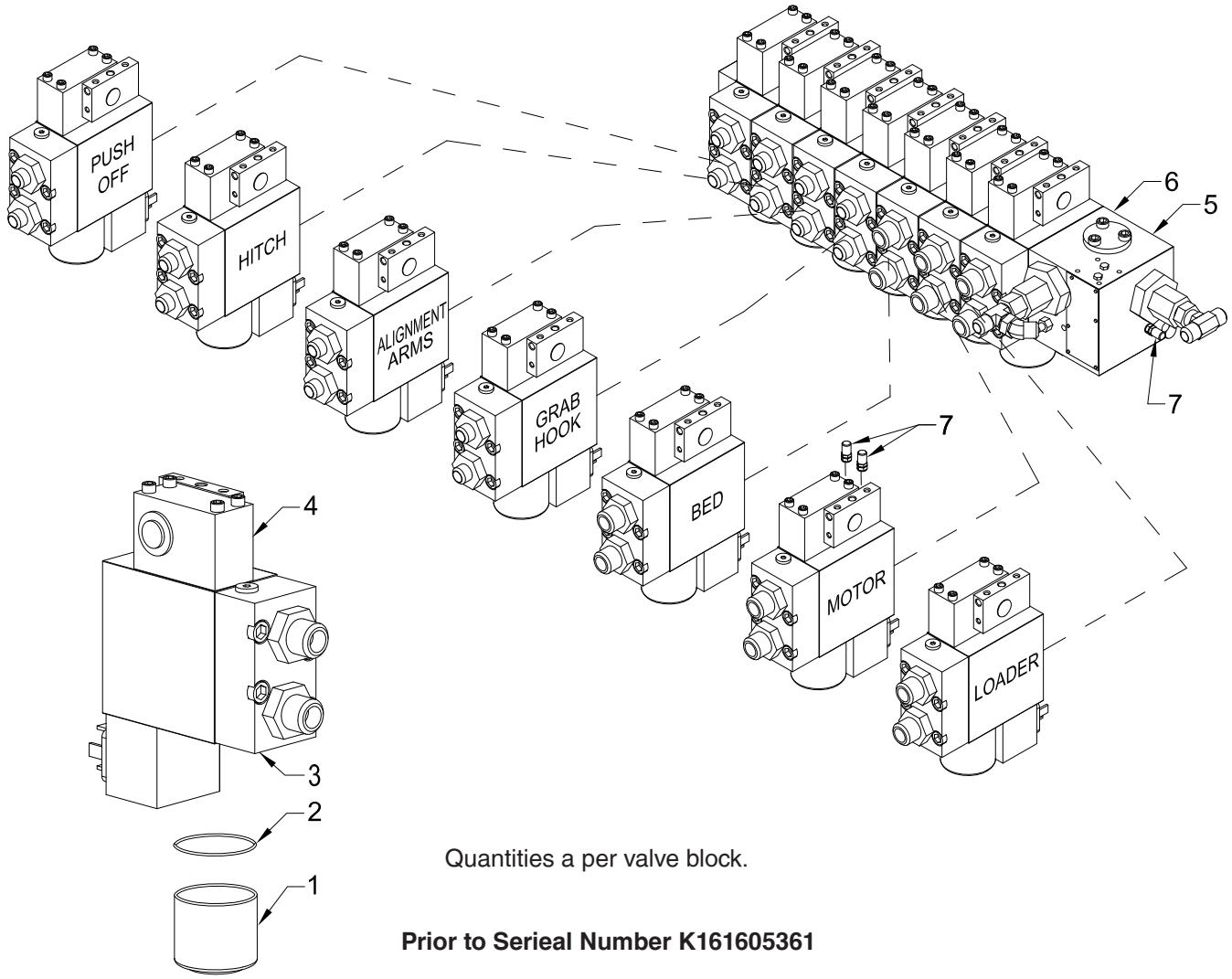
Contact Morris' Parts Department for pricing and availability of the Load Sense Amplifier Kit part number K58442.





Item	Part No.	Description	Qty
1	K58420	Load Sense Amplifier Valve	1
2	K58419	Connector - 04 Male BSPP x 08 Male JIC	2
3	K59071	Connector - 04 Male BSPP x 08 Female JIC	1
4	K58440	Connector - 12 FJIC x 08 MJIC	1
5	11358	90 Elbow - Swivel - 08 MJIC x 08 FJIC	2
6	N29356	Tee - 12 MJIC	1
7	K58418	Hyd Hose - 1/2 x 18 Lg - 08 FJIC	1
	K58442	Kit - Load Sense Amplifier (Includes above items)	

Hawe Valve - 11695

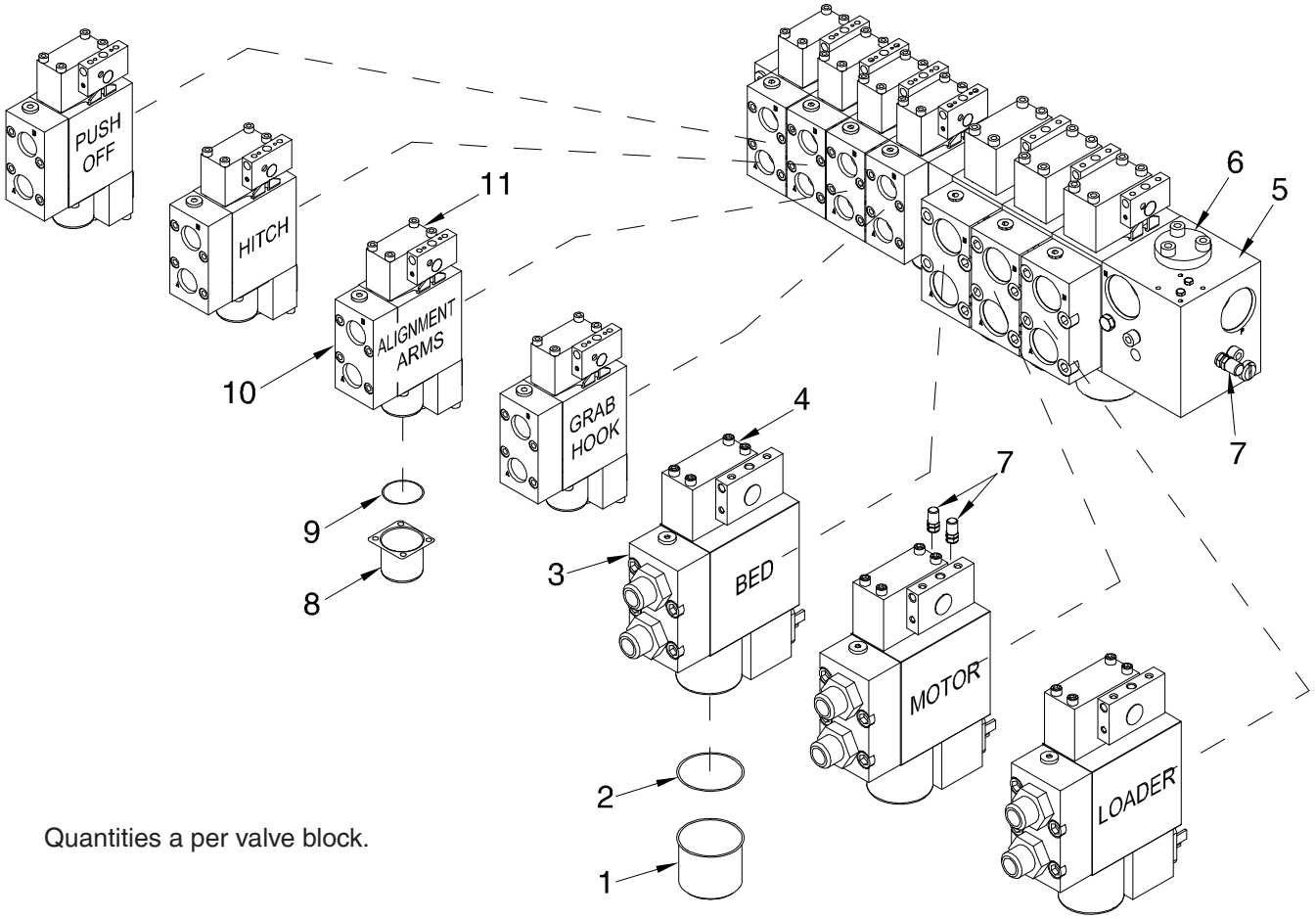


Quantities a per valve block.

Prior to Serieal Number K161605361

Item	Part No.	Description	Qty
1	K60250	Valve Section Spring Cover - Replacement	1
	12125	Valve Section Spring Cover - OEM	
	12124	Flange Kit for Spring Cover (Includes Flanges and 4 Screws)	
2	12126	O-Ring (for Spring Cover 12125)	1
3	K44732	O-Ring/Seal Kit for Valve Section (Includes O-Ring 12126; does not include Spring Cover 12125)	1
4	12492	Rebuild Kit for Vavle Section (Includes O-Ring/Seal Kit K44732; does not include Spring Cover 12125)	1
5	K44731	O-Ring/Seal Kit for Connection Block	1
6	12491	Rebuild Kit for Connection Block (Includeds O-Ring Kit K44731)	1
	K42397	Power Slide Pressure Limiting Valve (Pre 2009 models)	1
7	K51553	Hawe Relief Valve Kit	
	K45674	Lock Valve (Not Shown)	
	12208	Solenoid Coil	

Hawe Valve - K60525



Quantities a per valve block.

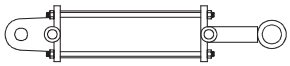
Serieal Number K161605361 to present

Item	Part No.	Description	Qty
1	K60250	Valve Section Spring Cover - Replacement	1
	12125	Valve Section Spring Cover - OEM	
	12124	Flange Kit for Spring Cover (Includes Flanges and 4 Screws)	
2	12126	O-Ring (for Spring Cover 12125)	1
3	K44732	O-Ring/Seal Kit for Valve Section (Includes O-Ring 12126; does not include Spring Cover 12125)	1
4	12492	Rebuild Kit for Valve Section (Includes O-Ring/Seal Kit K44732; does not include Spring Cover 12125)	1
5	K44731	O-Ring/Seal Kit for Connection Block	1
6	12491	Rebuild Kit for Connection Block (Includeds O-Ring Kit K44731)	1
	K42397	Power Slide Pressure Limiting Valve (Pre 2009 models)	1
7	K51553	Hawe Relief Valve Kit	
8	K60902	Valve Section Spring Cover	1
9	K60903	O-Ring (for Spring Cover K60902)	1
10	K60904	O-Ring/Seal Kit for Valve Section	1
11	K60905	Rebuild Kit for Valve Section	1
	K62069	Lock Valve (Not Shown)	
	12208	Solenoid Coil	

Name: Bed Cyl Part # 10436
Type: Welded Length: 48 3/4"
Bore X Stroke: 5" x 36"
Packing Kit PMCK-AW-0024

Name: Left Loader Cyl Part # K44046
Type: Welded
Bore X Stroke: 3 1/2" x 20" Length: 32 7/8"
Packing Kit # K49705
Blind End Journal Bushing # 10936

Name: Right Loader Cyl Part # K44042
Type: Welded
Bore X Stroke: 3 1/2" x 20" Length: 32 7/8"
Packing Kit # K49705
Blind End Journal Bushing # 10936



Name: Left Alnmt Cyl Part # 10440
Type: Tie-Rod
Bore X Stroke: 4" x 8" Length: 19 5/8"
Packing Kit # PMCK-AW-0028

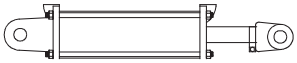
Name: Right Alnmt Cyl Part # 10439
Type: Tie-Rod Length: 19 5/8"
Bore X Stroke: 4.5" x 8"
Packing Kit # PMCK-AW-0027

Name: Grab Hook 03 Cyl Part # 12166
Type: Welded
Bore X Stroke: 2 1/2" x 16" Length: 26 3/4"
Packing Kit # PMCK-AR-707

Name: Tensioner Cyl Part # 12167

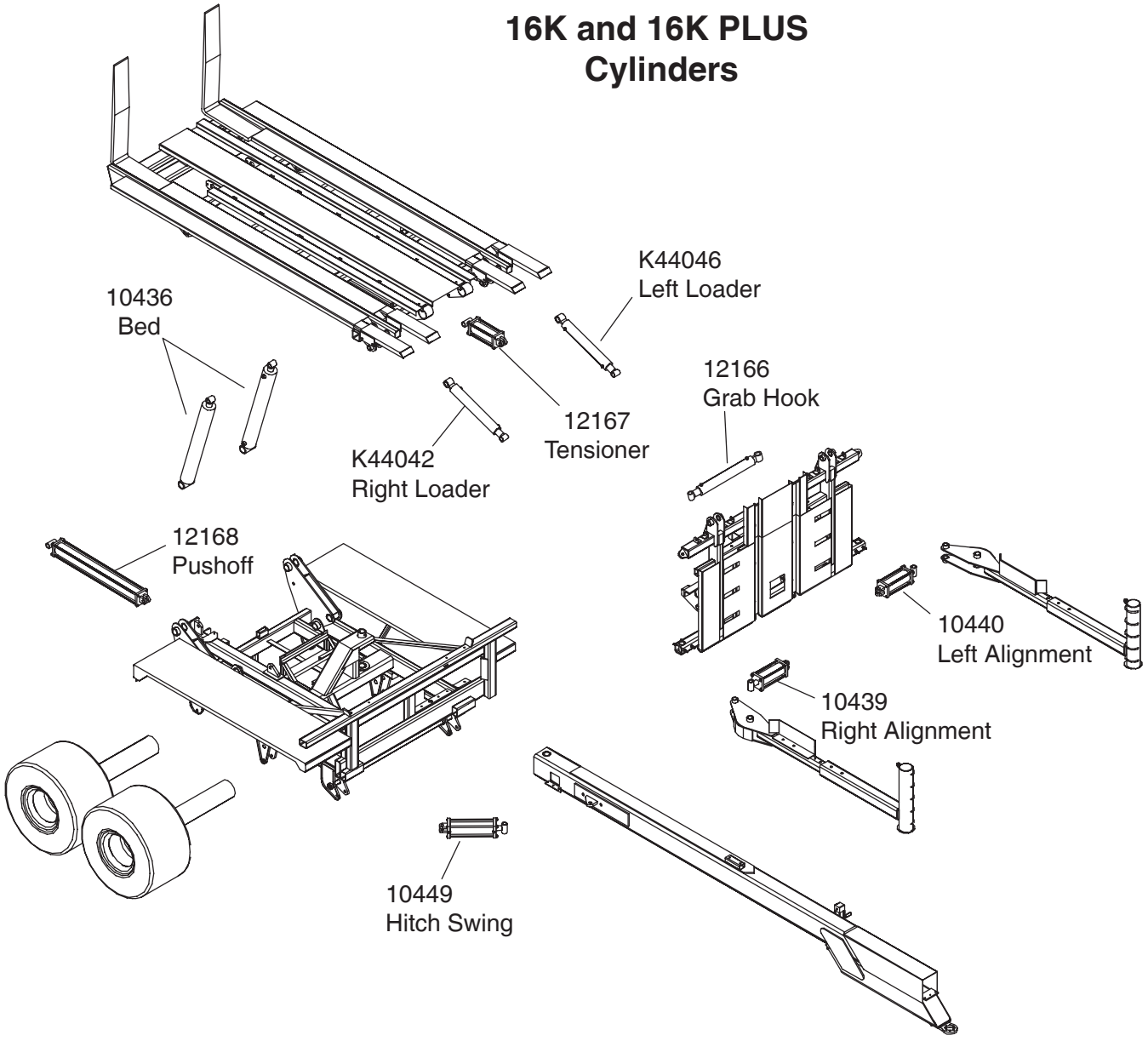
Type: Tie-Rod Length: 18 1/4"
Bore X Stroke: 2" x 8"
Packing Kit # PMCK-BD-0574

Name: K Hitch Cyl Part # 10449
Type: Welded Length: 34 7/8"
Bore X Stroke: 3.5" x 18"
Packing Kit # PMCK-AU-0478
Clevis - Screw On - K49746

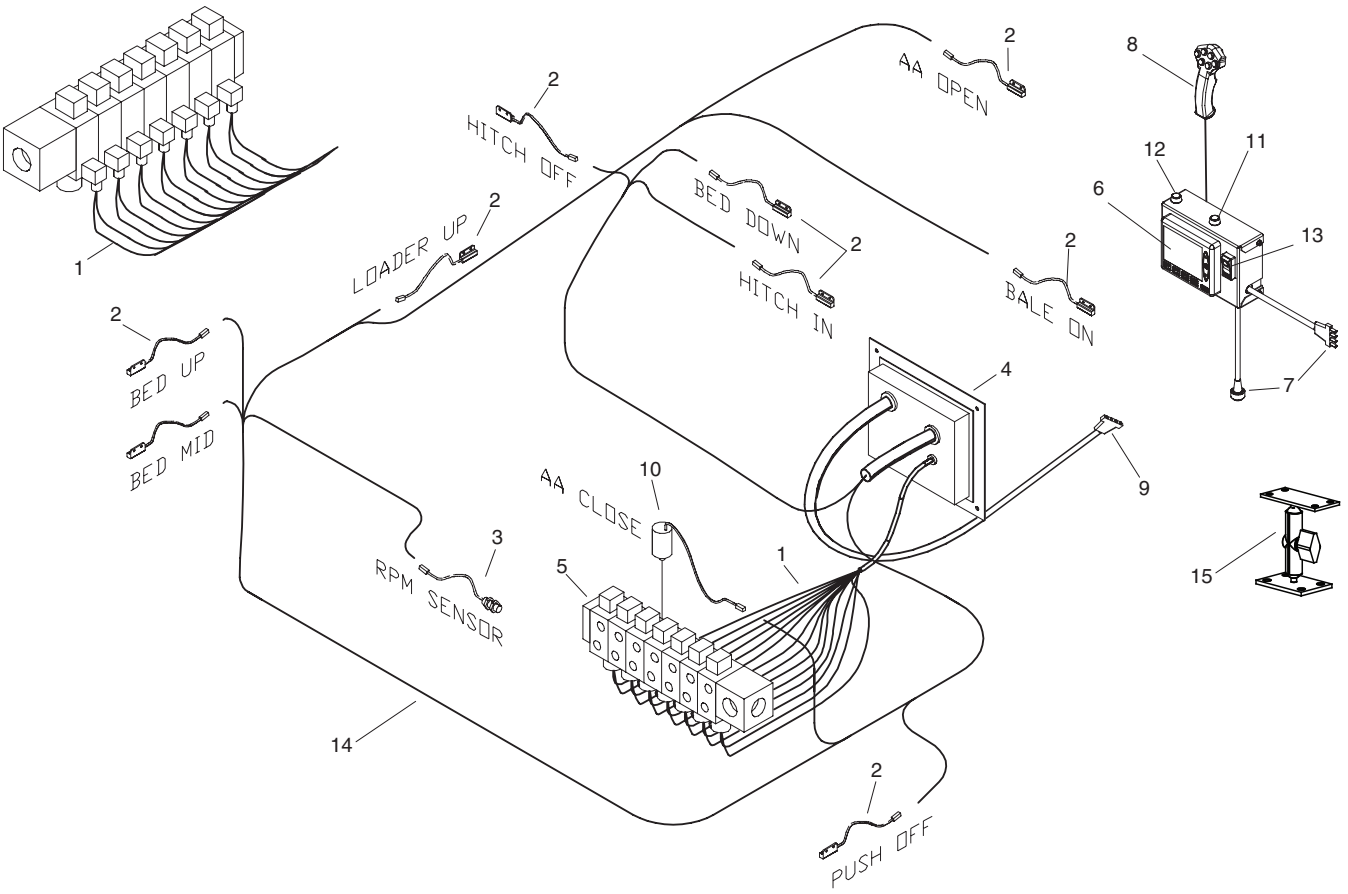


Name: Pushoff Cyl Part # 12168
Type: Tie-Rod
Bore X Stroke: 3" x 30" Length: 40 1/4"
Packing Kit # PMCK-BD-0575

16K and 16K PLUS Cylinders

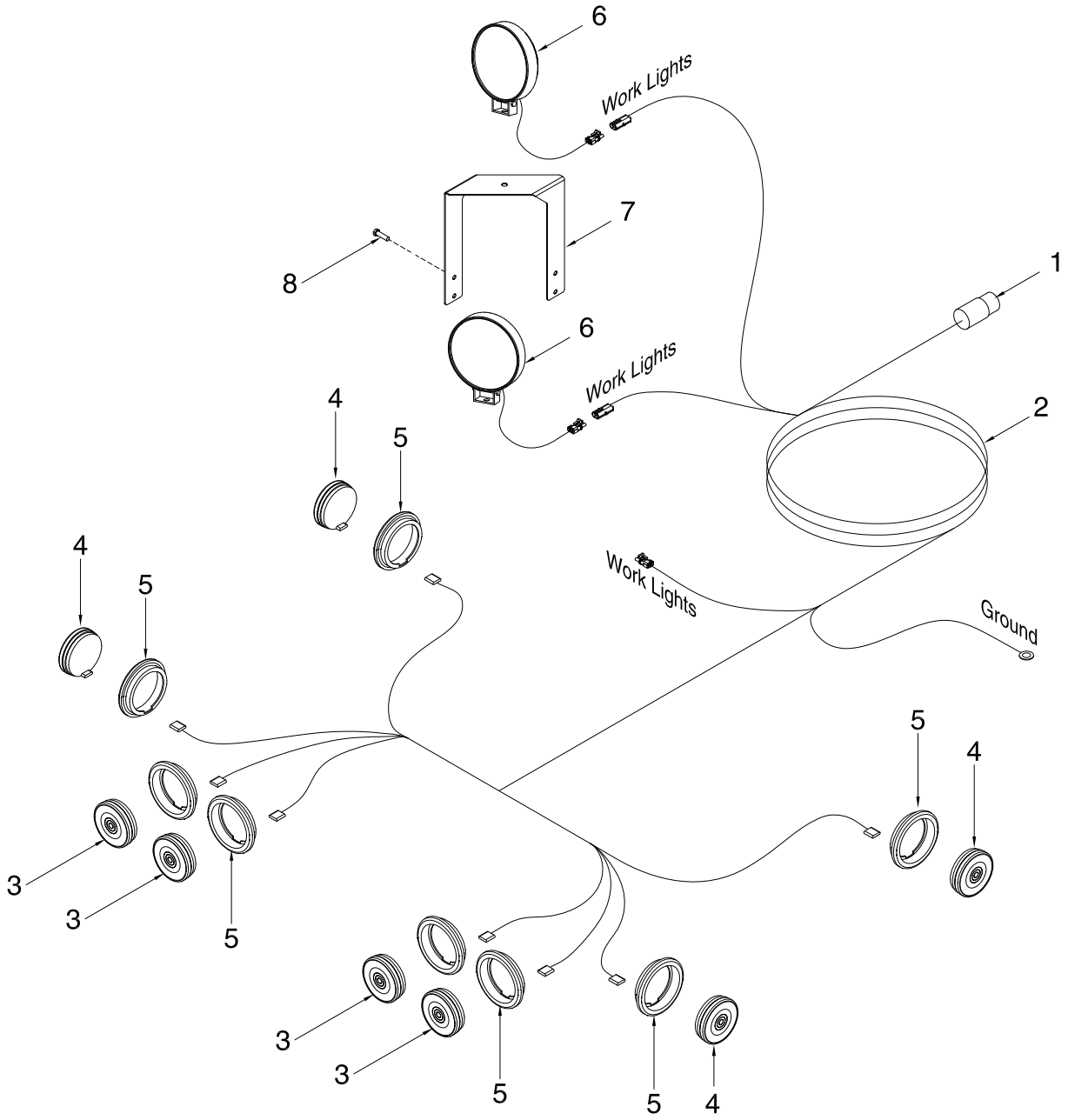


Electrical Control Assembly



Item	Part No.	Description	Qty
1	K45407	Solenoid Harness (Not as illustrated)	1
2	11505	Ferrous Metal Sensor	9
3	K47327	Power Slide Position Sensor	1
4	K47328	Controller (Not as illustrated)	1
	K45406	Controller Harness (Not Shown)	1
	K45802	Controller Mount Plate (Not as illustrated)	1
5	11695	Hawe Valve	1
6	K47321	16K PLUS Monitor Assembly	1
	K47318	Monitor Display Box	
	K45430	Communication Harness (Not Shown)	
7	K45426	Power Harness - Included in Monitor Assembly	1
8	K44708	Multifunction Grip/Cable	1
9	K47019	Control Cable - Hitch (Not as illustrated)	1
10	K47326	Arms In Pressure Sensor	1
	K47330	Connector - 9/16-18 FORB x 7/16-20 MORB	1
11	K47313	3 Amp Fuse - Fast Acting	1
12	K47314	20 Amp Fuse - Fast Acting	1
13	11890	Switch	1
14	K45408	Sensor Harness (Not as illustrated)	1
15	K45647	Kit - Mounting System - PROAG Control Box	1
	K45686	Mounting Arm	1
	K45687	Mount Base	1
	K45685	U-Bolt Base Mount (Not Shown)	2

Light Assembly



Item	Part No.	Description	Qty
1	C32690	7 Pole Plug Connector	1
2	K49081	Harness - LED Lights	1
3	K48395	Lamp - Red LED	4
4	K48396	Lamp - Amber LED	4
5	K48397	Grommet Rubber - Lamp	8
		Work Light Kit - Option	
6	N50367	Work Light - 7 Diameter	2
7	K50828	Mount - Work Light	1
8	W-867	Hex Bolt - 3/8 x 3/4 Lg	4

Suspension Assembly

The 16K PLUS uses a Hutchens Industries trailer suspension similar to below.

For detailed information visit Hutchens website resource centre at www.hutchensindustries.com.

Suspension used is H-9700 underslung with 44” centers and 2 1/4” spring seat height with 5”round axles.

Parts available through PROAG dealers are as follows:

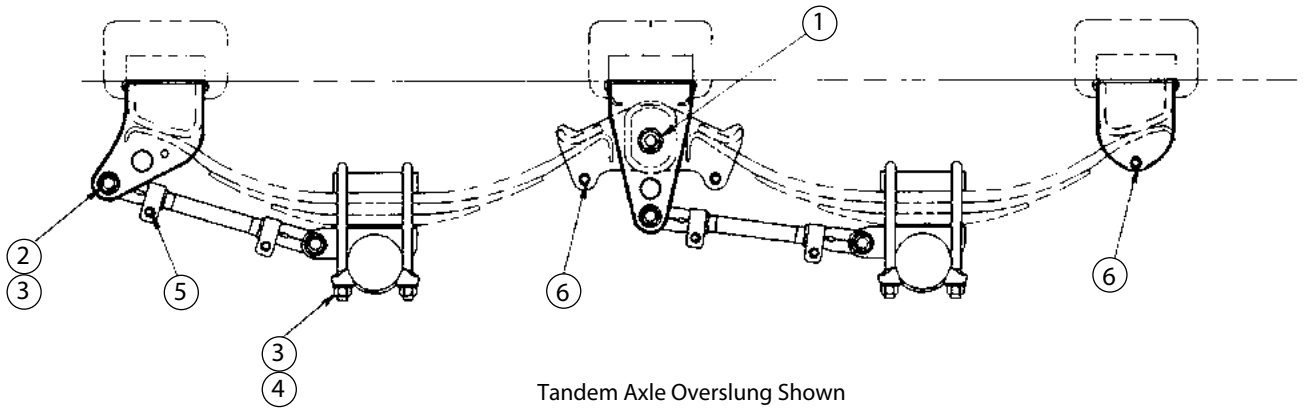
12146 Spring Leaf Pack

12180 Spring Center Bolt

12188 Suspension Bushing Torque Arm

12272 Top Leaf - 16k PLUS Spring Back

All other suspension parts order through a qualified truck trailer shop.



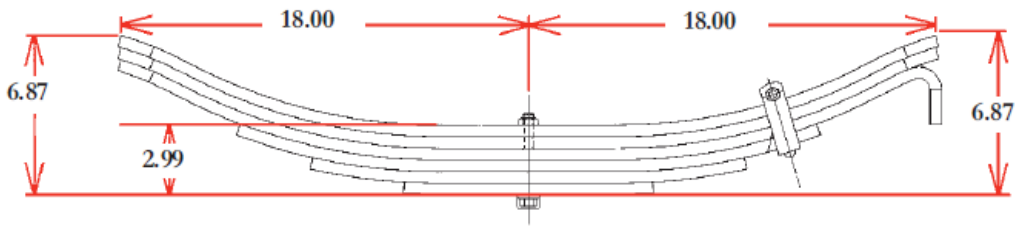
Tandem Axle Overslung Shown

Torque Specifications

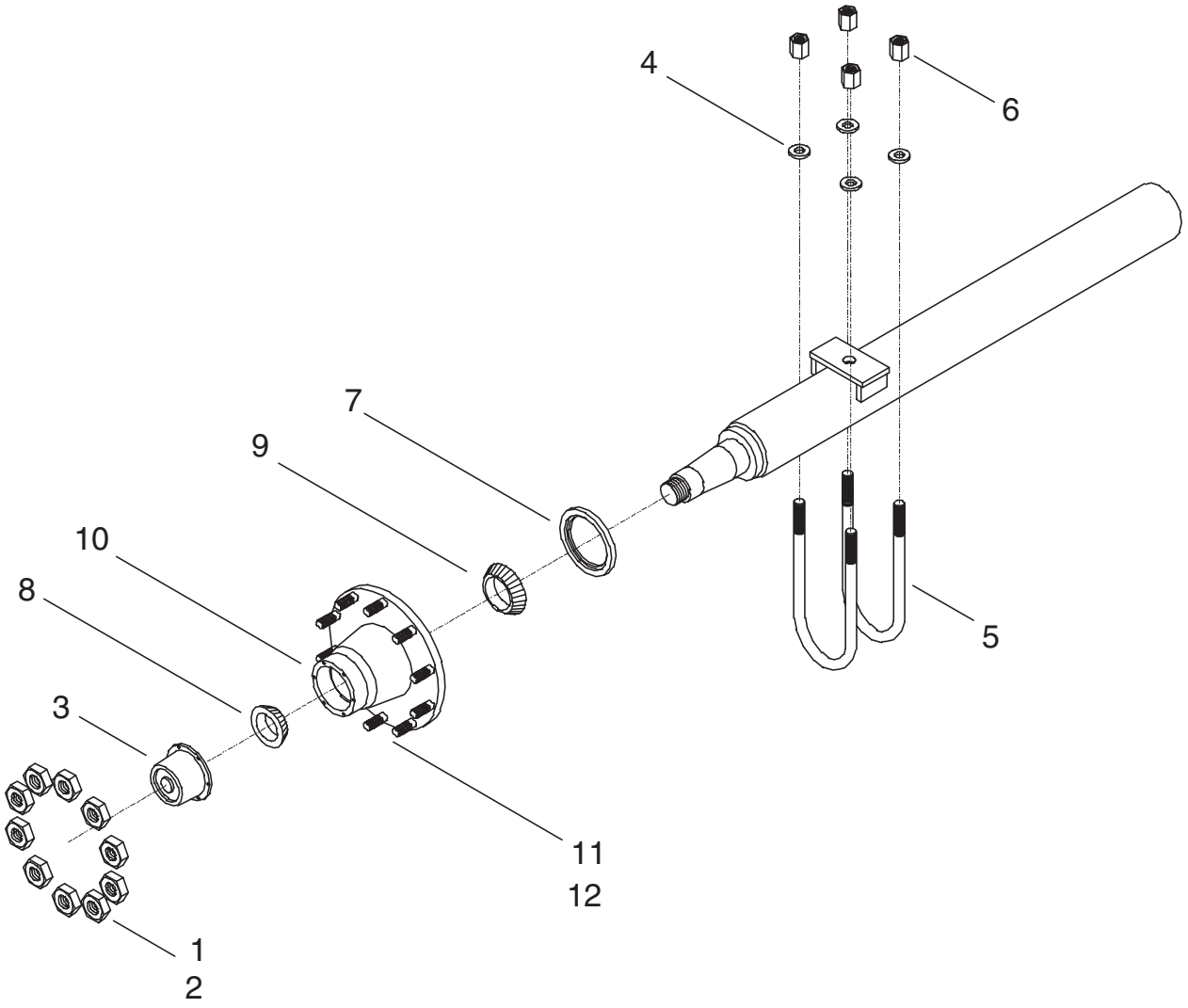
Item No.	Fastener	Oiled	Dry
1	1 1/8-7 (9600/9700 Rocker Bolt)	590 Lb-Ft	790 Lb-Ft
2	1-14 (9700 Radius Rod Bolt)	540 Lb-Ft	720 Lb-Ft
3	7/8-14 (Axle U-Bolt & 9600 Radius Rod Bolt)	350 Lb-Ft	470 Lb-Ft
4	3/4-16 (Axle U-Bolt)	310 Lb-Ft	420 Lb-Ft
5	5/8-18 (Radius Rod Clamp Bolt)	130 Lb-Ft	170 Lb-Ft
6	5/8-18 (Spring Retainer Bolt)	35 Lb-Ft	50 Lb-Ft

12146 Spring Leaf Pack - Low Arch, 6 Leaf

44" Axle Center All Positions. Hook to Rear.

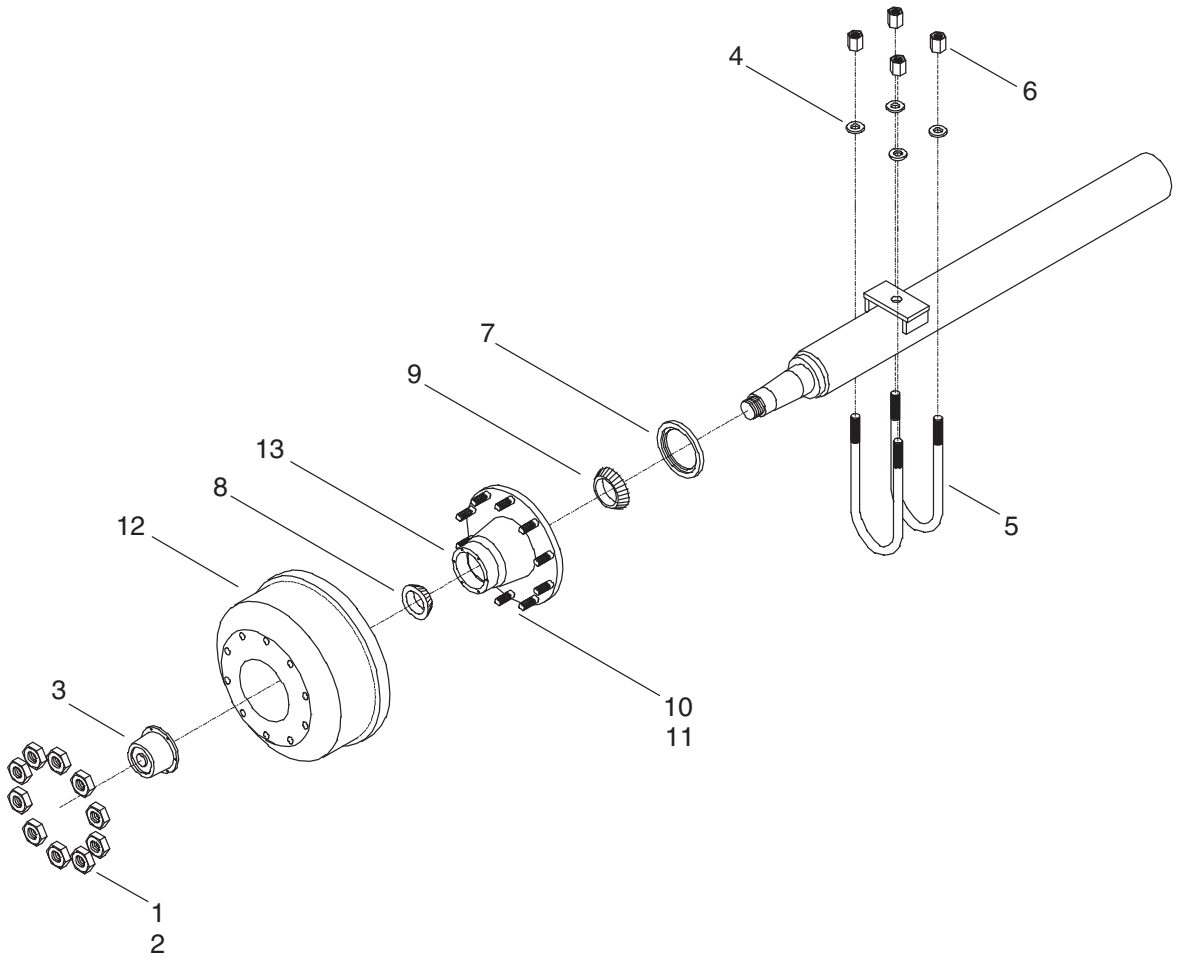


Non Brake Hub Assembly



Item	Part No.	Description	Qty
1	10046	Left Single Lug Nut	10
2	10047	Right Single Lug Nut	10
3	11677	Oil Cap (Aluminum)	2
4	12011	Washer - U-Bolt	8
5	12012	U-Bolt	4
6	12013	Nut - U-Bolt	8
7	12096	Oil Seal	2
8	12097	Outer Bearings	2
9	12098	Inner Bearings	2
10	12099	Non Brake Hub	2
11	12100	Break Right Stud	10
12	12101	Break Left Stud	10

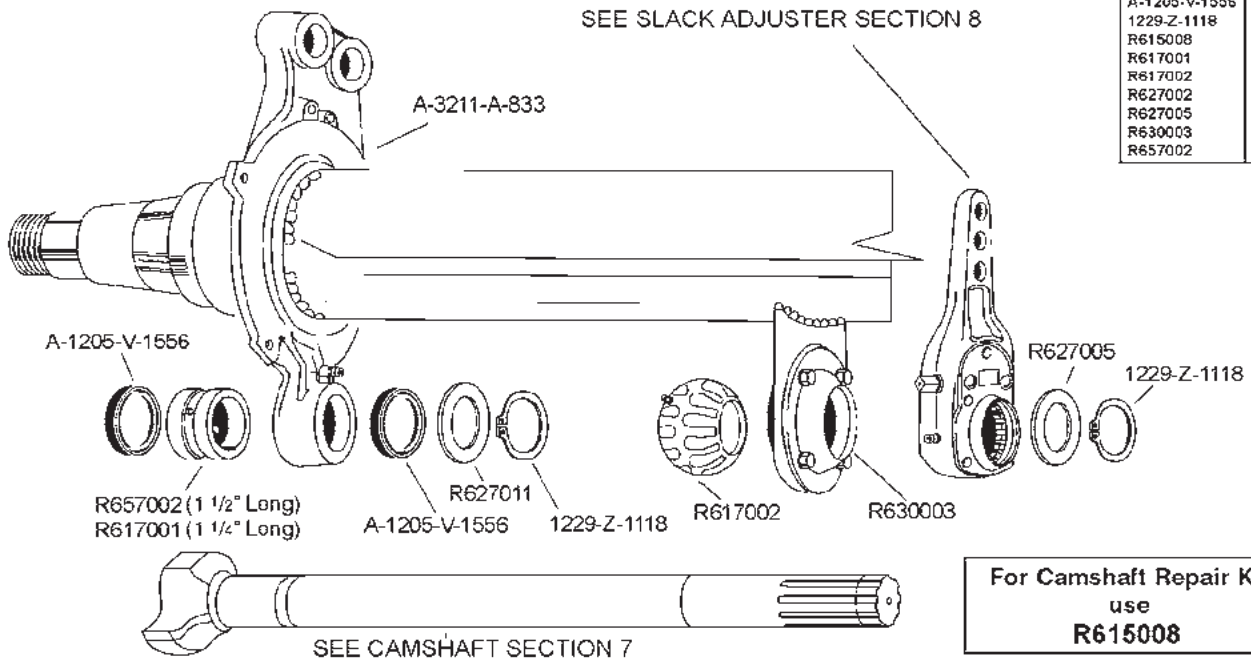
Air Brake Hub Assembly



Item	Part No.	Description	Qty
1	10046	Left Single Lug Nut	10
2	10047	Right Single Lug Nut	10
3	11677	Oil Cap (Aluminum)	2
4	12011	Washer - U-Bolt	8
5	12012	U-Bolt	4
6	12013	Nut - U-Bolt	8
7	12096	Oil Seal	2
8	12097	Outer Bearings	2
9	12098	Inner Bearings	2
10	12100	Break Right Stud	10
11	12101	Break Left Stud	10
12	12102	Air Brake Drum	2
13	12103	Air Brake Hub	2

CAMSHAFT, BUSHINGS AND BRACKET PARTS

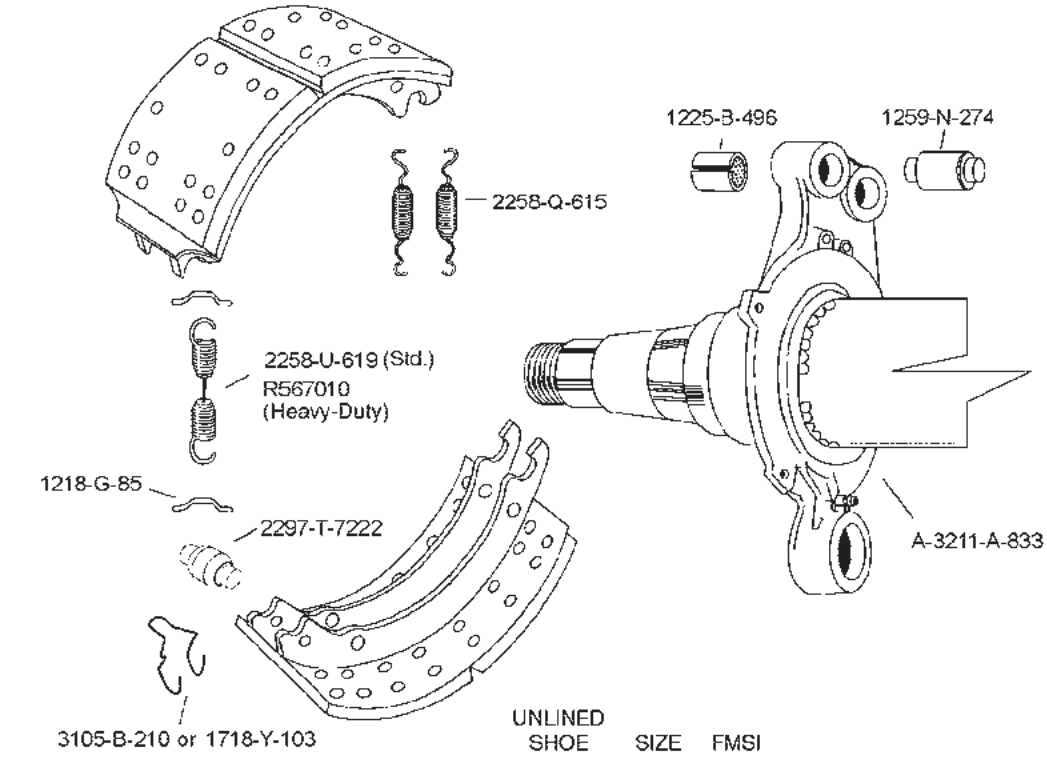
PAGE REFERENCE	
MERITOR NO.	PAGE NO.
A-1205-V-1556	7-76
1229-Z-1118	7-68
R615008	7-58
R617001	7-71
R617002	7-71
R627002	7-66
R627005	7-63
R630003	7-74
R657002	7-70



For Camshaft Repair Kit use **R615008**

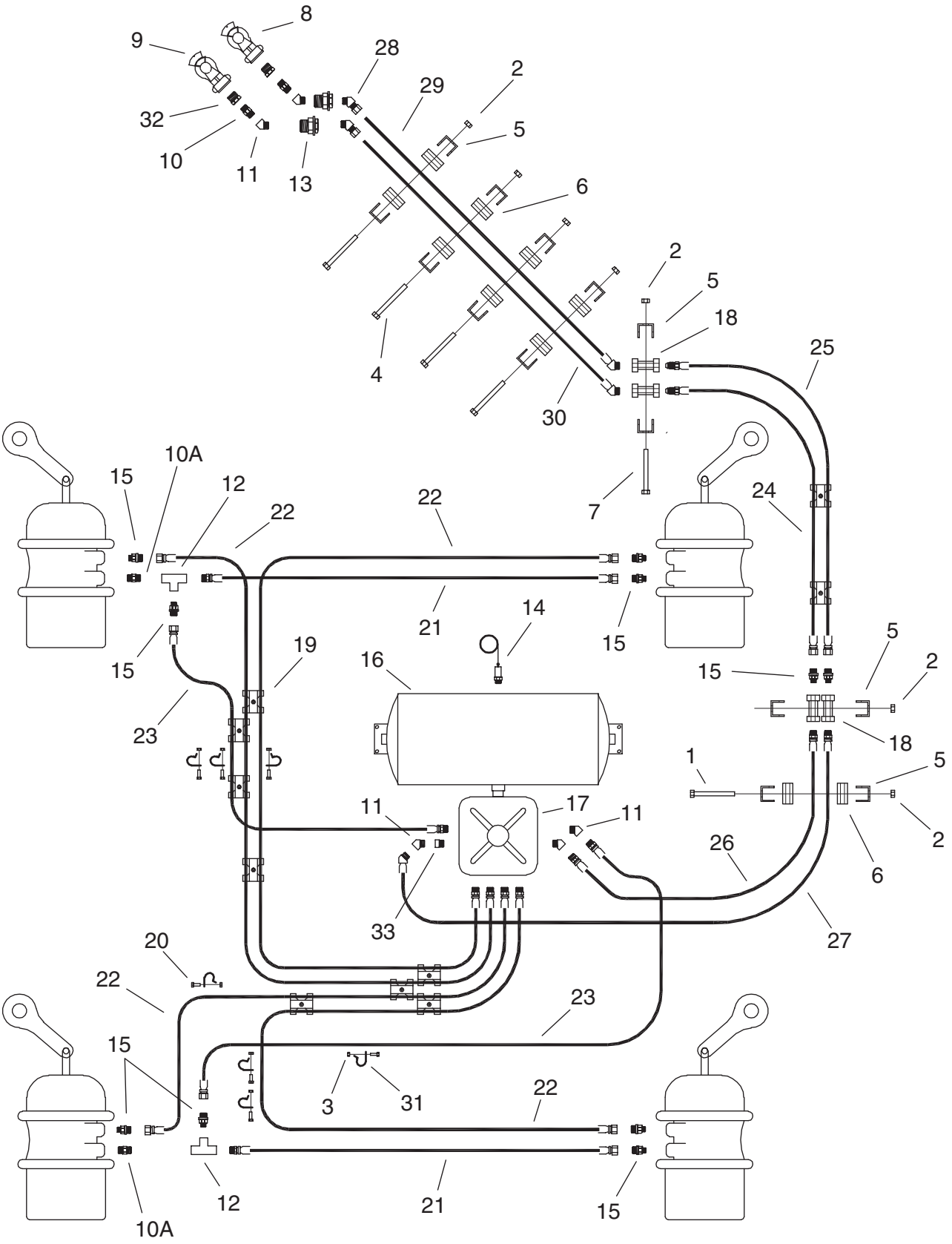
BRAKE SHOES AND HARDWARE

PAGE REFERENCE	
MERITOR NO.	PAGE NO.
1218-G-85	3-17
1225-B-496	3-7
1259-N-274	3-5
1718-Y-103	3-4
2258-Q-615	3-13
2258-U-619	3-15
2297-T-7222	3-2
3105-B-210	3-4
KIT 8000	2-24
KIT 8000HD	2-27
R4515	4-18
R567010	3-15



UNLINED SHOE	SIZE	FMSI
R4515	7"	4515E

For Brake Repair Kit use **KIT 8000, KIT 8000HD**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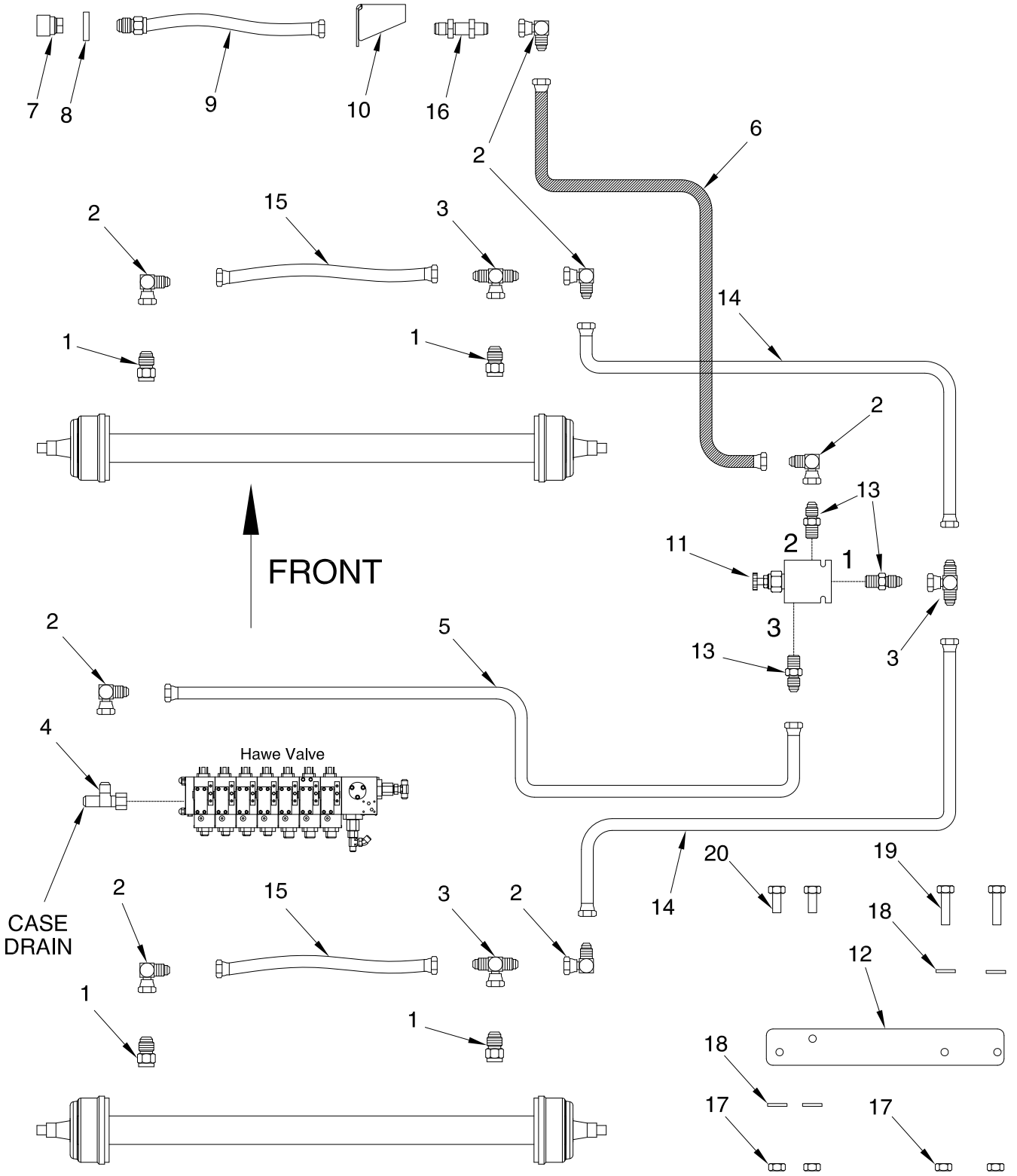
Air Brake Assembly

Item	Part No.	Description	Qty
1	10068	5/16” x 2 1/2” Gr. 8 Plated HHCS	1
2	10231	5/16” Nylock Nut	7
3	10233	1/4” Nylock Nut	7
4	11772	5/16” -18 x 6” Zink HHCS Gr 5	4
5	12019	Clamp 1 1/2”, 2 Hole, 1 Bolt	7
6	12026	Rubber 11/2”, 1/2” Tubing	10
7	12041	5/16” x 7 1/2” HHCS Gr 5 Plated	1
8	12065	Glad Hand Service	1
9	12066	Glad Hand - Supply	1
10	12069	Brass 3/8” Pipe Hex Nipple	2
10A	12069	Brass 3/8” Pipe Hex Nipple	2
11	12071	Brass 3/8” Pipe 45 Street Elbow	5
12	12072	Brass 3/8” Pipe Female Tee	2
13	12077	Brass BH 3/8” FP To 3/8 FP	2
14	12080	Brass Drain Valve 1/4” MP 60” Cable	1
15	12083	Brass 1/2” ABS To 3/8” MP Adapter	10
16	12084	Air Brake Tank	1
17	12085	Air Brake Valve	1
18	12086	Bulkhead, 1 1/2” Clamp, 3/8” FP	4
19	12087	Plastic 2 Air Hose Clamp	10
20	12088	1/4” x 1” Gr. 8 Plated HHCS	7
21	12089	Air Brake Hose 16”	2
22	12090	Air Brake Hose 56 1/2”	4
23	12091	Air Brake Hose 46 1/2”	2
24	12092	Air Brake Hose 29 1/2”	1
25	12093	Air Brake Hose 32 1/2”	1
26	12094	Red Nylon Tubing 1/2” Air Brakes 26”	1
27	12095	Blue Nylon Tubing 1/2” Air Brakes 33”	1
28	12104	Brass 1/2” ABS To 3/8”, 45 Street Elbow	2
29	12128	Blue Nylon Tubing 1/2” Air Brakes 200”	1
30	12129	Red Nylon Tubing 1/2” Air Brakes 202”	1
31	12110	Strap Hose Clamp .88” OD	7
32	12156	Brass Pipe Bushing 1/2” MP To 3/8” FP	2
33	12157	Brass Adapter 3/8” FP To 1/4” MP	1

Hydraulic Brake Assembly



Hydraulic Brake Assembly

Item	Part No.	Description	Qty
1	K50963	Connector - 3/8 MJIC x 3/8 Female BSPP	4
2	S29967	Elbow - 90 - 9/16-18 MJIC x 9/16-18 FJIC swivel	7
3	C14901	Tee - (2)9/16-18 MJIC x (1)9/16-18 FJIC - M-F-M	3
4	C-4403	Tee - (2)9/16-18 MJIC x (1)9/16-18 FJIC - M-M-F	1
5	D17843	Hyd Hose - 1/4 x 40 Lg w/ 9/16-18 FJIC swivel ends	1
6	C26340	Hyd Hose - 1/4 x 252 Lg w/ 9/16-18 FJIC swivel ends	1
7	K50954	Brake Coupler - Female - 08 (1/2 inch) M18 x 1.5 Thread	1
8	K51052	Bonded Seal - 18mm Male DIN (9500-18mm)	1
9	K50988	Brake Hose - 3/8 x 78 Lg w/ M18 x 1.5 Male DIN x 9/16-18 FJIC	1
10	K50825	Bulkhead Mount	1
11	S42307	Pressure Reducing Valve	1
12	K50989	Mount Plate	1
13	C15348	Connector - 3/4-16 MORB x 9/16-18 MJIC	3
14	C14835	Hyd Hose - 1/4 x 36 Lg w/ 9/16-18 FJIC swivel ends	2
15	K50993	Hyd Hose - 1/4 x 28 Lg w/ 9/16-18 FJIC swivel ends	2
16	K50962	Bulkhead - 9/16-18 MJIC	1
17	N42510	Locknut - 1/4 Centre Lock	4
18	S-1198	Flatwasher - 1/4	4
19	W-1540	Hex Bolt - 1/4 x 2 Lg	2
20	W-469	Hex Bolt - 1/4 x 3/4 Lg	2

Notes

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