



New Leader NL4560 Operator's Manual

UNIT SERIAL NUMBER _____

TR3000 SERIAL NUMBER _____

MANUAL NUMBER: 313794-AA-B

EFFECTIVE 02/2017



Highway Equipment Company

Building the best since 1939.

1330 76TH AVE SW
CEDAR RAPIDS, IA 52404-7052
PHONE (800) 363-1771 | FAX (319) 286-3350
www.new-leader.com

Copyright 2016 Highway Equipment Company, Inc.

Interactive Features.....	4
Warranty.....	6
Preface.....	7
Safety.....	8
Important Safety Information	8
Safety Alert Symbols	8
General Safety Rules.....	9
Safety Decals	19
Informational Decals	26
Hydraulic Requirements.....	29
Hitch Requirements	29
Electrical Requirements	29
Controller Requirements	29
Implement Preparation and Connection	30
Implement Hitch Adjustment	30
Implement Connection.....	30
ISOBUS Connections	33
Hydraulic Hose Installation Guide.....	34
General Description.....	35
Introduction.....	36
Dimensions & Capacities	38
Initial Startup.....	40
General Operating Procedures	41
Inspection Ladder	42
Back Plate Storage	42
Anti-Slab Chain Storage / Hillside Divider Panel	42
Tire Pressure and Transport Speeds	43
Implement Maneuvering	44
Backing and Turning Tips	44
Maximum Hitch Angles and Walking Beam Travel	44
Rear Pulling Lugs.....	45
Lubrication & Maintenance.....	47
Preventative Maintenance Pays!	47
Hydraulic System.....	47
Service Schedule.....	47
Conveyor Chain.....	49
Conveyor Belt Maintenance	50
Bin Sensor	50
Conveyor Gearcase	52
Lubrication of Bearings	52
Fasteners.....	52
Trailer Brakes	53
Tires	54
Wheels & Lug Nuts	54
Clean Up	55
End-of-Season Storage.....	55
Lubricant & Oil Specifications.....	57
Hydraulic System.....	57
Gearcase Lubricant	57
Grease Gun Lubricant	57
Chain Oiler Mixture.....	57
Lubrication & Maintenance Chart	58
Serial Number Locations	62
Standard Torques	63

Troubleshooting	64
Electrical Schematic - TR3000	66
Spreader Module LED Light Alerts	67
Pre- & Post-Season Checklists	68
Hydraulics	69
Controller Operations.....	73
Introduction	73
How the ISOBUS Works	73
Terminologies	73
Cab to Enclosure Diagram	74
Modules to Function Diagram	75
Navigation.....	77
Navigation Control Buttons.....	78
Registration.....	79
Machine Configuration	79
Settings	83
Component Calibration.....	87
Operations/Features	91
Create New Job.....	91
Bin Fill	94
Feedgate Optimizer	96
Boundary Spreading	97
Diagnostics.....	98
Hydraulics	101
Bin Flush	102
Chain Oiler	104
Bin Sequencing	106
Alarm List.....	108
Default Settings.....	110
Configuration	110
Calibration	111
Alarms.....	111
Spread Pattern.....	113
Crushing Strength	113
SGN	113
Product Calibration.....	114
Product Setup Guidelines	114
Crush Test	115
SGN Scale Test	116
Spread Pattern Testing.....	119
Performing a Spread Pattern Test	119
Spread Pattern Test Kit	119
Spinners	120
Spreader Preparation	120
Test Procedure	121
Data Recording	122
Driving Methods	123
Troubleshooting.....	124

NOTE:

This manual incorporates several interactive features to provide supplemental information and ease of navigation. The information below is to aid in the identification and use of these features.

Hyperlinks

Hyperlinks provide direct access to a specific destination when clicked. The entire Table of Contents of this manual is hyperlinked to provide quick access to all sections of this manual when viewing the electronic version.

Hyperlinks within the content are denoted by **[blue, bold underlined text](#)**. Electronic format viewers can click these links for direct access to New Leader online features. Internet access is required.

Quick Reference (QR) Codes

Quick reference codes provide direct access to a specific destination when activated. An example is provided below. In the printed version of this manual, viewers may scan the codes with a supporting mobile device for direct access to New Leader online features. Mobile data is required.

The electronic version of this manual provides the option to scan codes on-screen, or to click the code like a button. Internet access/mobile data is required.



Click or Scan - Highwayequipment.com

This page is intentionally left blank.

Insert Current New Leader
Warranty

PLEASE ! ALWAYS THINK SAFETY FIRST !!

The purpose of this manual is to familiarize the person (or persons) using this unit with the information necessary to properly install, operate, and maintain this system. The safety instructions indicated by the safety alert symbol in the following pages supersede the general safety rules. These instructions cannot replace the following: the fundamental knowledge that must be possessed by the installer or operator, the knowledge of a qualified person, or the clear thinking necessary to install and operate this equipment. Since the life of any machine depends largely upon the care it is given, we require that this manual be read thoroughly and referred to frequently. If for any reason you do not understand the instructions, please call your authorized dealer or our Product Sales and Support Department at 1-888-363-8006.

It has been our experience that by following these installation instructions, and by observing the operation of the spreader, you will have sufficient understanding of the machine enabling you to troubleshoot and correct all normal problems that you may encounter. Again, we urge you to call your authorized dealer or our Product Sales and Support Department if you find the unit is not operating properly, or if you are having trouble with repairs, installation, or removal of this unit.

We urge you to protect your investment by using genuine HECO parts and our authorized dealers for all work other than routine care and adjustments.

Highway Equipment Company reserves the right to make alterations or modifications to this equipment at any time. The manufacturer shall not be obligated to make such changes to machines already in the field.

This Safety Section should be read thoroughly and referred to frequently.

ACCIDENTS HURT !!!

ACCIDENTS COST !!!

ACCIDENTS CAN BE AVOIDED !!!

IMPORTANT SAFETY INFORMATION

Figure 1.1 - The need for safety cannot be stressed strongly enough in this manual. At Highway Equipment Company, we urge you to make safety your top priority when operating any equipment. We firmly advise that anyone allowed to operate this machine carefully read, learn and understand all messages and information in this manual and on machine's safety decals before operating machine, as well as familiarize themselves with the location and function of all machine controls.

The following guidelines are intended to cover general usage and to assist you in avoiding accidents. There will be times when you will run into situations that are not covered in this section. At those times the best standard to use is common sense. If, at any time, you have a question concerning these guidelines, please call your authorized dealer or our Product Sales & Support Department at (800) 363-1771.

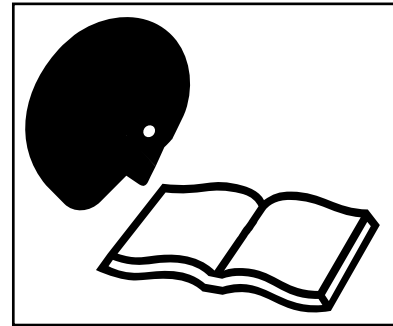


Figure 1.1

SAFETY ALERT SYMBOLS



TAKE NOTE! THIS SAFETY ALERT SYMBOL FOUND THROUGHOUT THIS MANUAL IS USED TO CALL YOUR ATTENTION TO INSTRUCTIONS INVOLVING YOUR PERSONAL SAFETY AND THAT OF OTHERS. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH.

In this manual and on the safety signs placed on the unit, the words "DANGER," "WARNING," "CAUTION," and "NOTICE" are used to indicate the following:



DANGER

Indicates an imminently hazardous situation that, if not avoided, **WILL** result in death or serious injury. This signal word is to be limited to the most extreme situations and typically for machine components that, for functional purposes, cannot be guarded.



WARNING

Indicates a potentially hazardous situation that, if not avoided, **COULD** result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.



CAUTION

Indicates a potentially hazardous situation that, if not avoided, **MAY** result in minor or moderate injury. It may also be used to alert against unsafe practices.

NOTICE!

Is used for informational purposes in areas which may involve damage or deterioration to equipment but generally would not involve the potential for personal injury.

NOTE:

Provides additional information to simplify a procedure or clarify a process.

Operations**PREPARE FOR EMERGENCIES**

Figure 1.2 - Be prepared if a fire starts. Keep a fully charged fire extinguisher and first aid kit in accessible place on the vehicle at all times.

Fire extinguisher must be Type ABC or Type BC.

Keep emergency numbers for doctors, ambulance service, hospital and fire department available at all times.



Figure 1.2

INSPECT HARDWARE BEFORE USE

Figure 1.3 - Inspect all bolts, screws, fasteners, keys, chain drives, body mounts and other attachments periodically. Immediately replace any missing or damaged parts immediately with proper specification parts.

Inspect spinner fins, spinner frame mounting and spinner fin hardware daily. Look for missing or loose fasteners, wear and cracks. Replace immediately if needed. Use only new SAE grade 5 or grade 8 screws and self-locking nuts.

Tighten all bolts, nuts and screws to specified torques. Refer to “Standard Torques” in Maintenance section of this manual.

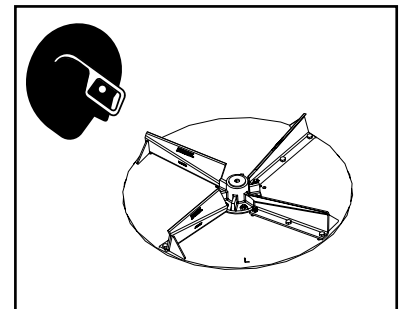


Figure 1.3

HANDLE FLAMMABLE MATERIALS SAFELY

Figure 1.4 - Handle fuel and hydraulic oil with care. They are highly flammable.

Always stop the engine before refueling machine or filling hydraulic reservoir.

Never smoke while adding fuel or oil to machine. Add fluids in a safe place away from open flame and sparks.

Do not allow overflow. Clean up spilled fuel and oil immediately.

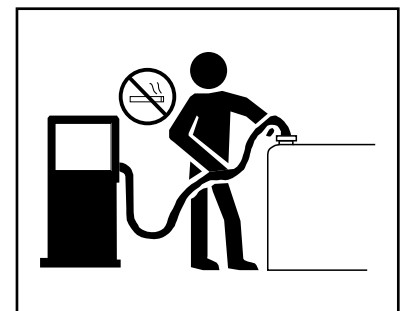


Figure 1.4

Always have a multipurpose dry chemical fire extinguisher filled and available during machine operation and when adding fuel. Know how to use it.

Operations

HANDLE HAZARDOUS MATERIALS SAFELY

Figure 1.5 - Materials to spread can be dangerous.

Improper selection, application, use or handling may be a hazard to persons, animals, plants, crops or other property.

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

Check the SDS before starting any job using a hazardous material. Follow all instructions and precautions given by the material manufacturer.



Figure 1.5

WORK IN WELL-VENTILATED AREAS



WARNING

Never run machine engine inside a building unless adequate ventilation is provided to safely and properly remove exhaust fumes.

Figure 1.6 - Always work in a properly ventilated area.

Engine exhaust fumes can cause sickness or death. If it is necessary to run an engine in an enclosed area, use proper equipment to safely remove exhaust fumes from the working area.

Open building doors and get fresh air into the working area whenever possible.

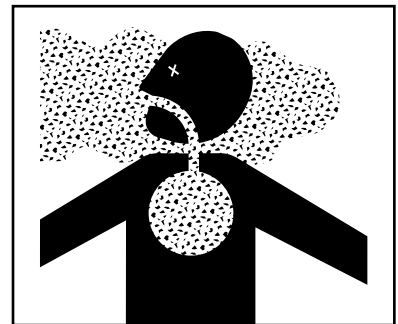


Figure 1.6

PROTECT AGAINST NOISE

Figure 1.7 - Long periods of exposure to high decibels or loud noise can cause hearing impairment or loss.

Wear proper hearing protection during periods of exposure to high decibels or loud noise.

Wear a proper hearing protective device such as earmuffs or earplugs to protect against high decibels and / or uncomfortable loud noises.

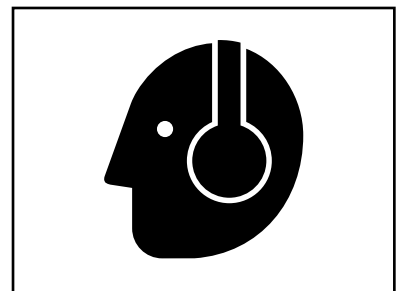


Figure 1.7

Operations**AVOID MOVING PART HAZARDS**

Figure 1.8 - Entanglement in rotating drive lines or moving parts will cause serious injury or death.

Stay clear of all moving parts, such as shafts, couplings and universal joints.

Make sure all personnel are clear of machine before starting.



Figure 1.8

Figure 1.9 - Do not operate machine without all guards and shields closed and secured. Disconnect and lock out power source before removing guards.

Disconnect and lock out power source before adjusting or servicing.

Keep hands, feet, hair and clothing away from moving parts.

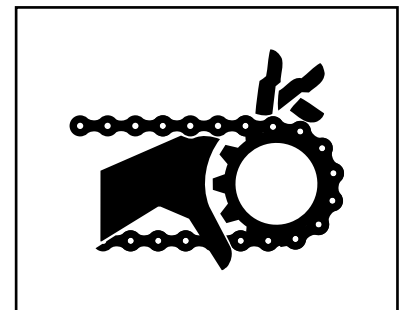


Figure 1.9

Figure 1.10 - Keep away from spinners while they are turning.

Rocks, scrap metal and other material can be thrown from the spinners violently. Stay away from discharge area.

Stop machine before servicing or adjusting. Wear eye protection.

Make sure discharge area is clear before spreading.

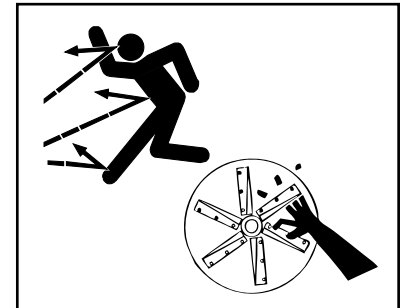


Figure 1.10

Figure 1.11 - Stay out of the spreader.

If it is necessary to enter the spreader, return to the shop, empty body, turn off all power, engage brakes, shut down engine and remove keys before entering.

Tag all controls to prohibit operation. Tags should only be placed, and later removed, by the person working in the body.

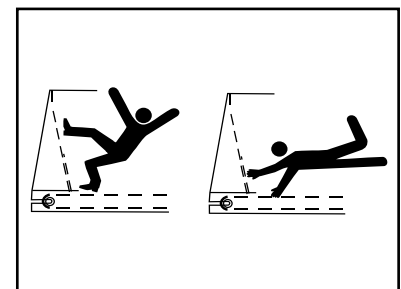


Figure 1.11

Operations**DO NOT CLIMB OR STAND ON MACHINE**

Figure 1.12 - Never allow any personnel to ride in or on the machine.

Use only inspection ladder or portable ladder to view the unit. Use caution when getting on and off the ladder, especially in wet, icy, snowy or muddy conditions. Clean mud, snow and ice from steps and footwear.

Always maintain three-point contact with steps, ladders and handholds. Face the machine when mounting and dismounting inspection ladder. Do not jump off the machine.



Figure 1.12

OPERATE MACHINE SAFELY

Always walk around and visually inspect the machine before using. Check immediate vicinity of machine for people and obstructions. Ensure adequate visibility.

Avoid distractions such as reading, eating or operating personal electronics that take your attention away from operating the machine. Never operate the machine under the influence of alcohol, drugs or while otherwise impaired.

Always come to a complete stop before reversing. Be sure that all personnel are clear of machine path. Turn around and look directly for best visibility. Ensure all rear view mirrors are properly installed and adjusted. Use a signal person when backing if view is obstructed or when in close quarters.

Always disengage hydraulics before shutting down engine. DO NOT start engine with hydraulics engaged.

Transportation & Handling**TRAVELING & TRANSPORTING ON PUBLIC ROADS**

Always walk around and visually inspect the machine before traveling on public roads. Check for damage and/or faulty components that can fail and create a hazard or unsafe condition. Make sure all machine systems operate properly, including but not limited to: headlights, tail and brake lights, hazard warning lights, turn indicators, parking brake, horn and rear view mirrors. Repair or replace any component that is not in proper working order.

Never drive machine at a speed that causes it to bounce or cause loss of control.

Obey all traffic safety laws and regulations. Operate the machine with hazard warning lights on, unless prohibited by law. It is the operator's responsibility to activate and use road lights properly while traveling on public roads.

Cover all loads that may spill or blow away. Environmental damage may result. Do not spread dusty materials where dust may create pollution, visibility issues or interfere with traffic on public roads.

When transporting equipment or machine on a trailer, ensure it is properly secured. Be sure that SMV signs on equipment or machine are covered while in transport on a trailer.

Be aware of overhead structures and power lines. Make sure machine can safely pass under. Refer to "Dimensions & Capacities" pages in the Operations section of this manual.

NAVIGATING ROUGH & UNEVEN TERRAIN

Figure 2.1 - Turn slowly and be careful when traveling on rough surfaces and side slopes. Avoid holes, ditches and obstructions that may cause machine to roll over, especially with a loaded spreader.

Never drive near the edge of a gully or steep embankment.

Load may shift, causing vehicle to tip.

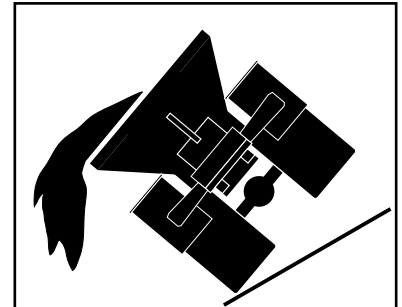


Figure 2.1

Maintenance**READ AND UNDERSTAND MAINTENANCE PROCEDURES**

Figure 3.1 - Read the maintenance and safety instructions and understand them before performing any maintenance procedure.

Never perform any maintenance procedure or repair if the instructions and safety procedures are not fully understood. Only trained and qualified personnel should perform any maintenance procedure or repair.

Never modify any equipment or add attachments not approved by Highway Equipment Company.

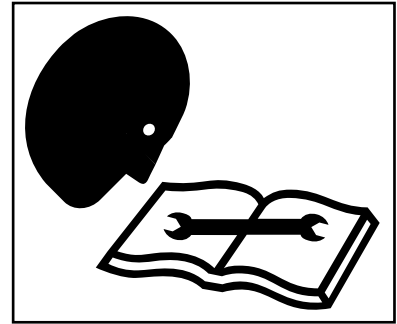


Figure 3.1

DO NOT SERVICE OR ADJUST MACHINE WHILE IN MOTION

Figure 3.2 - Never lubricate, service or adjust the machine or any of its components while they are moving.

Never wear loose clothing or jewelry when working near machine tools or moving parts.

Remove rings and other jewelry to prevent electrical shorts and other personal injury when in contact with machine tools or moving parts.

Close and secure all guards removed for service. Check all screws, bolts, nuts and fasteners for proper torques before operating machine.

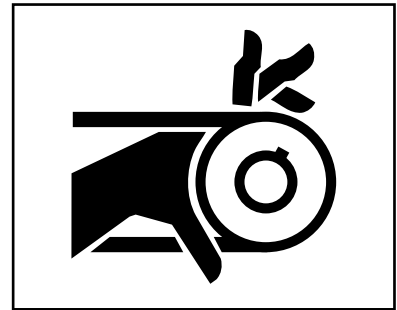


Figure 3.2

WEAR PROPER PROTECTIVE EQUIPMENT

Figure 3.3 - Wear close-fitting clothing and proper safety equipment for the job.

Always wear eye protection when working on or around the machine.

Wear a suitable hearing protection device such as earmuffs or earplugs to protect against high decibels or loud noises.

Prolonged exposure to high decibels or loud noise can cause hearing impairment or loss of hearing.

Wear protective gloves to protect hands from cuts, abrasions and minor burns.

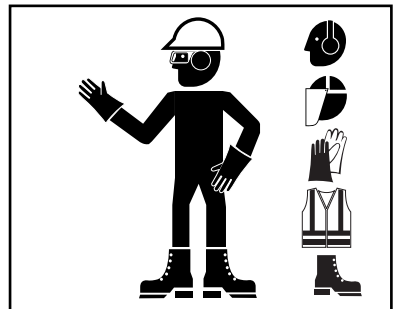


Figure 3.3

Maintenance**HANDLE FLAMMABLE SOLVENTS SAFELY**

Figure 3.4 - Never use diesel fuel, kerosene, gasoline or any flammable solvents for cleaning.

Perform work using flammable fluids and solvents in a safe place away from open flame and sparks. Do not smoke.

Do not weld, grind or flame cut on any tank containing oil, fuel, fumes or any other flammable material, or any container that contents or previous contents are unknown. Move all flammable materials and containers away from work area.

Clean up spilled fuel and oil immediately.

Always have a multipurpose dry chemical fire extinguisher filled and available. Know how to use it.



Figure 3.4

USE PROPER LIFTING EQUIPMENT

Figure 3.5 - Use only lifting devices that meet or exceed OSHA standard 1910.184 or ASME B30.20-2013.

Never lift equipment over people.

Never lift a loaded unit. Never lift unit with any loose objects or persons in the body. Loads may shift or fall if improperly supported, causing death, serious injury or machine damage.

Before unfastening heavy parts or assemblies, support with adequate hoist or other device to prevent falling, tipping, swinging or any other movement that may cause injury or damage.



Figure 3.5

USE PROPER TOOLS FOR THE JOB

Figure 3.6 - Use of improper tools (such as a screwdriver instead of a pry bar, pliers instead of a wrench, a wrench instead of a hammer) can cause serious injuries or machine damage.

Use power tools only to loosen threaded parts and fasteners. Using power tools to tighten may cause over-tightening and component damage.

Use only service parts meeting New Leader specifications.

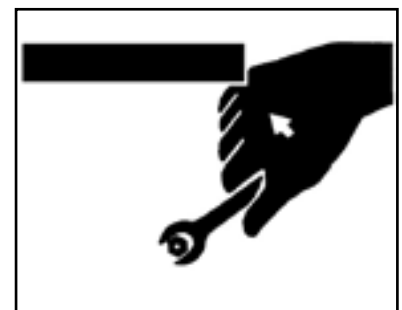


Figure 3.6

Maintenance**HIGH PRESSURE FLUID HAZARDS**

Figure 3.7 - Escaping fluid under pressure can penetrate the skin causing serious injury.

Always stop machine, allow to cool and relieve pressure before servicing hydraulic system. Never open hydraulic lines under pressure. Make sure all connections are tight and all hoses are in good condition before pressurizing system.

Always use a piece of cardboard or wood to search for leaks instead of hand. Wear impervious gloves and eye protection when servicing system.

Seek medical attention immediately if fluid penetrates your skin. Gangrene may result if wound is left untreated.

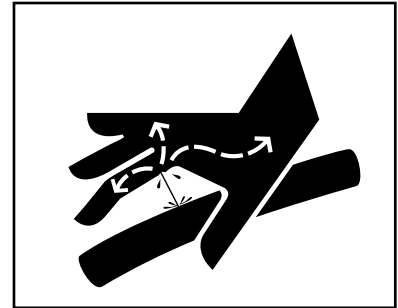


Figure 3.7

AVOID HEATING NEAR HIGH PRESSURE FLUID LINES

Figure 3.8 - Flammable spray can be generated by heating near pressurized fluid lines, resulting in burns to yourself and bystanders.

Do not heat by welding, soldering or using a torch near pressurized fluid lines or other flammable materials.

Pressure lines can suddenly burst when heat goes beyond the immediate flame area.

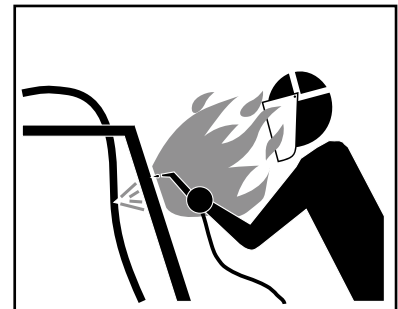


Figure 3.8

AVOID TOXIC FUMES & DUST

Figure 3.9 - Hazardous fumes can be generated when paint is heated from welding, soldering or using a torch.

Remove paint before heating:

- Remove a minimum of 4 in (100mm) from area to be affected by heating. If paint cannot be removed, wear an approved respirator while heating or welding.
- Avoid breathing dust from sanding or grinding on paint.
- If a solvent or paint stripper is used, wash stripper away with soap and water before heating or welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse for at least 15 minutes before heating or welding.



Figure 3.9

Do not use chlorinated solvents in areas where welding will take place.

Perform all work in a well-ventilated area that will carry all toxic fumes and dust away.

Maintenance**CLEAN MACHINE OF HAZARDOUS CHEMICALS****CAUTION**

During application of hazardous chemicals, residue can build up on the inside or outside of the vehicle. Clean vehicle according to use instructions of hazardous chemical.

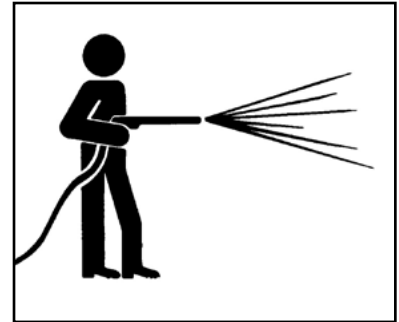
**Figure 3.10**

Figure 3.10 - When exposed to hazardous chemicals, clean exterior and interior of vehicle daily to keep free of the accumulation of visible dirt and contamination.

1. Clean operator's station to maintain unobstructed visibility of all windows and mirrors, and safe operation of all controls.

NOTICE!

Directing pressurized water at electronic/ electrical components, bearings and hydraulic seals or other sensitive parts and components may cause product malfunctions. Reduce pressure and spray at 45 to 90 degree angles.

2. Wash entire exterior of vehicle.
3. Dispose of any wash water with hazardous concentrations of active or non-active ingredients according to published regulations or directives.

HANDLE BATTERIES SAFELY**WARNING**

Sulfuric acid in battery electrolyte is poisonous. It can burn skin, eat holes in clothing, and cause blindness if it contacts eyes.

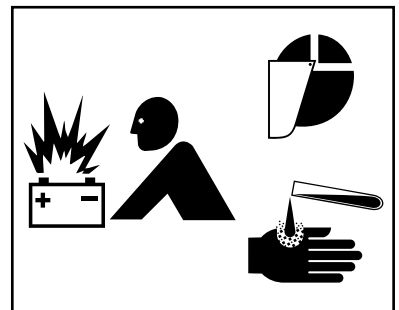
**Figure 3.11**

Figure 3.11 - Lead acid batteries generate flammable and explosive gases. Keep sparks and flame away from batteries. Do not smoke.

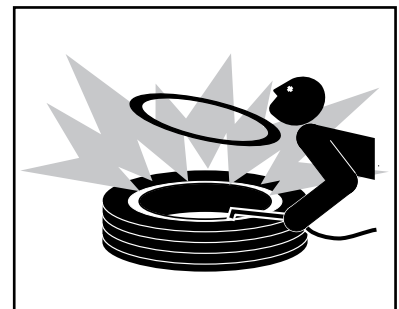
If acid contacts eyes, skin or clothing, flush with water immediately. Seek immediate medical attention if acid contacts eyes.

PROPER TIRE MAINTENANCE

Figure 3.12 - Never weld on a wheel or rim that has a tire on it.

Never attempt to mount or remove a tire unless using the proper equipment, tire safety cage, instructions, training, and you are qualified to perform the work safely. Failure to follow the correct procedures when mounting a tire on a wheel or rim can cause an explosion and serious injury.

Tire service procedures must be performed by trained and qualified personnel.

**Figure 3.12**

Storage

PARK VEHICLE SAFELY

Figure 4.1 - When leaving the vehicle unattended for any reason, be sure to:

- Shut down PTO.
- Shut off vehicle's engine, and unit's engine if applicable.
- Place vehicle transmission in "Neutral" or "Park".
- Set parking brake firmly.
- Remove ignition key and take it with you.
- Block wheels.

These actions are recommended to avoid unauthorized use, runaway, vandalism, theft and unexpected operation during startup.

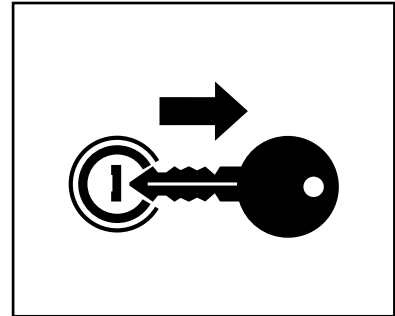


Figure 4.1

SUPPORT MACHINE PROPERLY

Figure 4.2 - When machine is removed from vehicle, always store on adequate supports on a firm level surface. Improper supporting or storage of spreader may cause machine to fall, resulting in serious injury or death.

Never use lifting device to free machine from a chassis, storage stands or frozen ground, or to lift the chassis in any way. Shock loading is prohibited and sudden accelerations must be avoided. Lifting in such a manner could result in injury or machine damage.



Figure 4.2

DISPOSE OF WASTE PROPERLY

Figure 4.3 - Improper disposal of waste can threaten the environment and ecology. Potentially harmful waste used with New Leader equipment such as fuel, oil, filters and batteries.

Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them. Do not pour waste onto the ground, down a drain, or into any water source.

Inquire on proper disposal methods from your local environmental or recycling center, or from your local dealer.

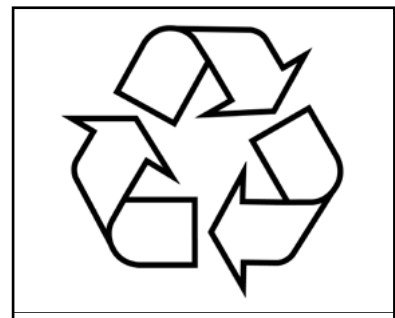


Figure 4.3

SAFETY DECAL MAINTENANCE

Keep safety decals and signs clean and legible at all times.

Replace safety decals and signs that are missing or have become illegible.

Replaced parts that displayed a safety sign should also display the current sign.

Safety decals or signs are available from your dealer's Parts Department or from Highway Equipment Company by calling (800) 363-1771.

SAFETY DECAL INSTALLATION

Clean Surface

Wash the installation surface with a synthetic, free-rinsing detergent. Avoid washing the surface with a soap containing creams or lotion. Allow to dry.

Position Safety Decal

Decide on the exact position before application. Application marks may be made on the top or side edge of the substrate with a lead pencil, marking pen, or small pieces of masking tape. NOTE: Do not use chalk line, china marker, or grease pencil. Safety decals will not adhere to these.

Remove the Liner

A small bend at the corner or edge will cause the liner to separate from the decal. Pull the liner away in a continuous motion at a 180-degree angle. If the liner is scored, bend at score and remove.

Apply Safety Decal

Tack decal in place with thumb pressure in upper corners. Using firm initial squeegee pressure, begin at the center of the decal and work outward in all directions with overlapping strokes. NOTE: Keep squeegee blade even—nicked edges will leave application bubbles. Pull up tack points before squeegeeing over them to avoid wrinkles.

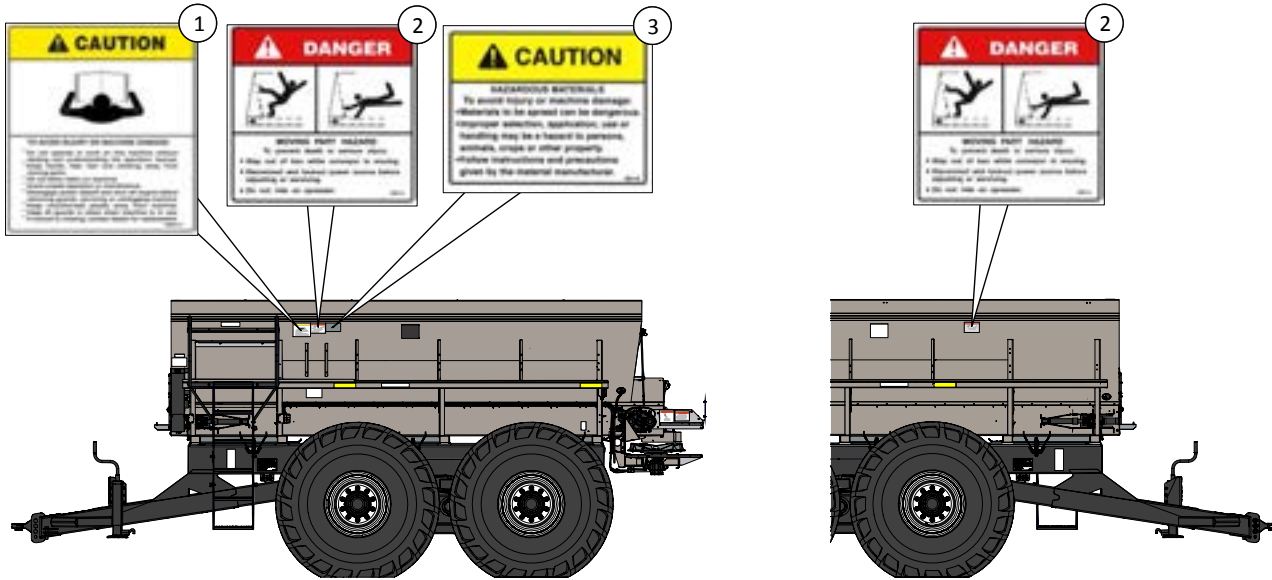
Remove Pre-mask

If safety decal has a pre-mask cover remove it at this time by pulling it away from the decal at a 180 degree angle. NOTE: It is important that the pre-mask covering is removed before the decal is exposed to sunlight to avoid the pre-mask from permanently adhering to the decal.

Remove Air Pockets

Inspect the decal in the flat areas for bubbles. To eliminate the bubbles, puncture the decal at one end of the bubble with a pin (never a razor blade) and press out entrapped air with thumb moving toward the puncture.

Re-Squeegee All Edges



1. CAUTION: TO AVOID INJURY OR MACHINE DAMAGE:

- Do not operate or work on this machine without reading and understanding the operator's manual.
- Keep hands, feet, hair and clothing away from moving parts.
- Do not allow riders on machine.
- Avoid unsafe operation or maintenance.
- Disengage power takeoff and shut off engine before removing guards, servicing or unclogging machine.
- Keep unauthorized people away from machine.
- Keep all guards in place when machine is in use.
- If operator's manual is missing, contact your local New Leader dealer or print a new copy from www.highwayequipment.com.

150034-C

2. DANGER: MOVING PART HAZARD

To prevent death or serious injury:

- Stay out of box while conveyor is moving.
- Disconnect and lock out power source before adjusting or servicing.
- Do not ride on the spreader.

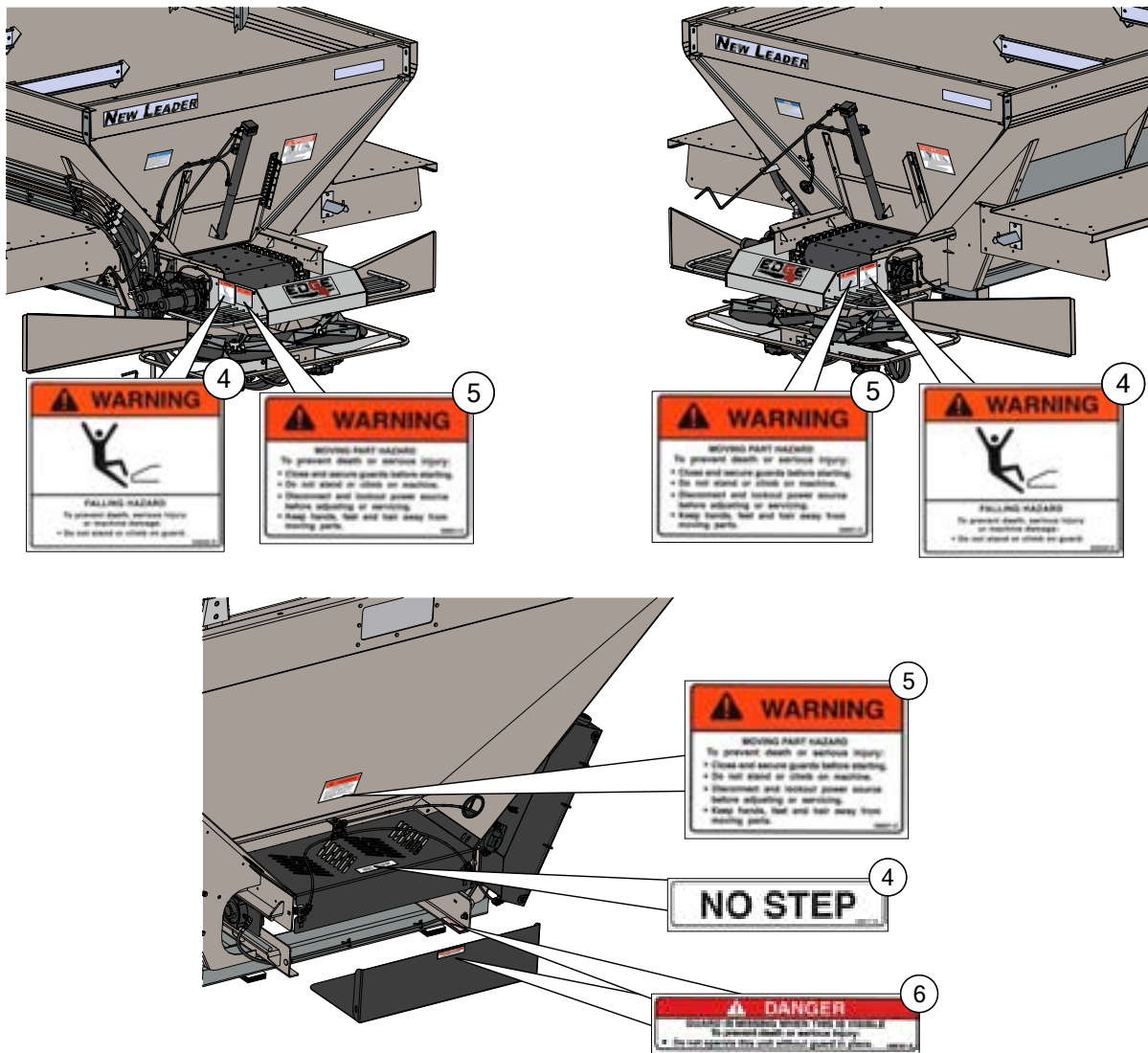
364-C

3. CAUTION: HAZARDOUS MATERIALS

To avoid injury or machine damage:

- Materials to be spread can be dangerous.
- Improper selection, application, use or handling may be hazardous to persons, animals, crops or other property.
- Follow instructions and precautions given by material manufacturer.

321-C



4. WARNING: FALLING HAZARD

To prevent death, serious injury or machine damage:

- Do not climb or stand on guard.
- Do not place objects on fenders.
- Keep off fenders. They are not intended to carry loads.

55631-D / 39017-D / 39200-D

5. WARNING: MOVING PART HAZARD

To prevent death or serious injury:

- Close and secure guards before operating machine.
- Do not stand or climb on machine.
- Disconnect and lockout power source before adjusting or servicing.
- Keep hands, feet and hair away from moving parts.

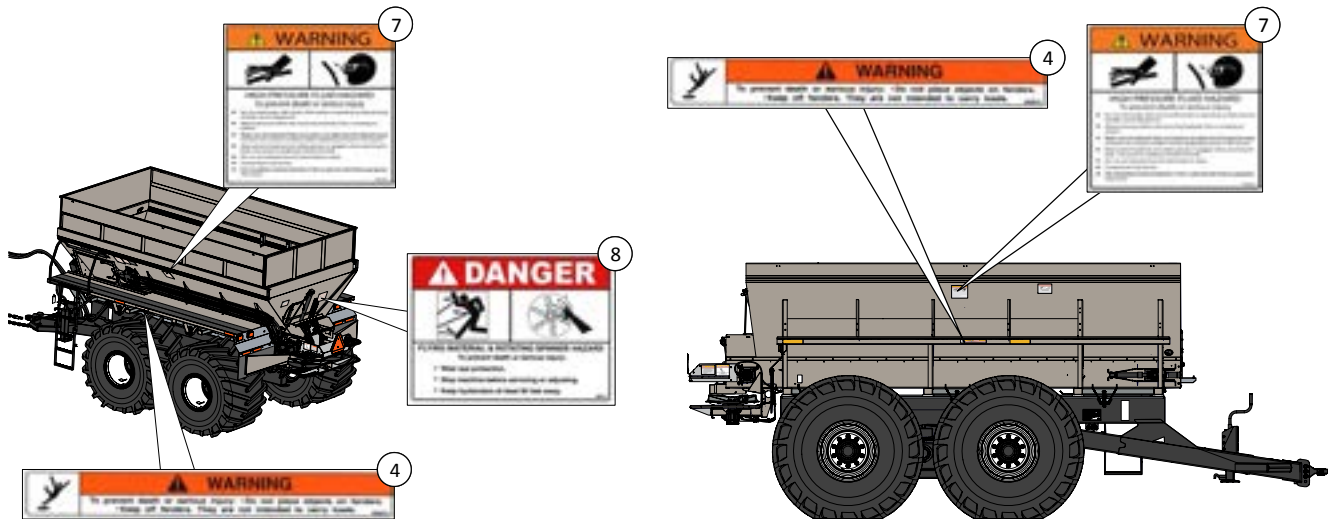
55631-C

6. DANGER: GUARD IS MISSING WHEN THIS IS VISIBLE

To prevent death or serious injury:

- Do not operate this unit without guard in place.

308191-A



7. WARNING: HIGH-PRESSURE FLUIDS

To prevent death or serious injury:

- Do not check for leaks with hands while system is operating as high pressure oil leaks can be dangerous!
- Relieve system pressure before disconnecting hydraulic lines or working on system.
- Make sure all hydraulic fluid connections are tight and all hydraulic hoses and lines are in good condition before applying pressure to the system.
- Wear protective gloves and safety glasses or goggles when searching for leaks. Use wood or cardboard instead of hands.
- Do not use hydraulic lines for hand holds or steps.
- Components may be hot.
- Get immediate medical attention if skin is pierced with fluid as gangrene may result.

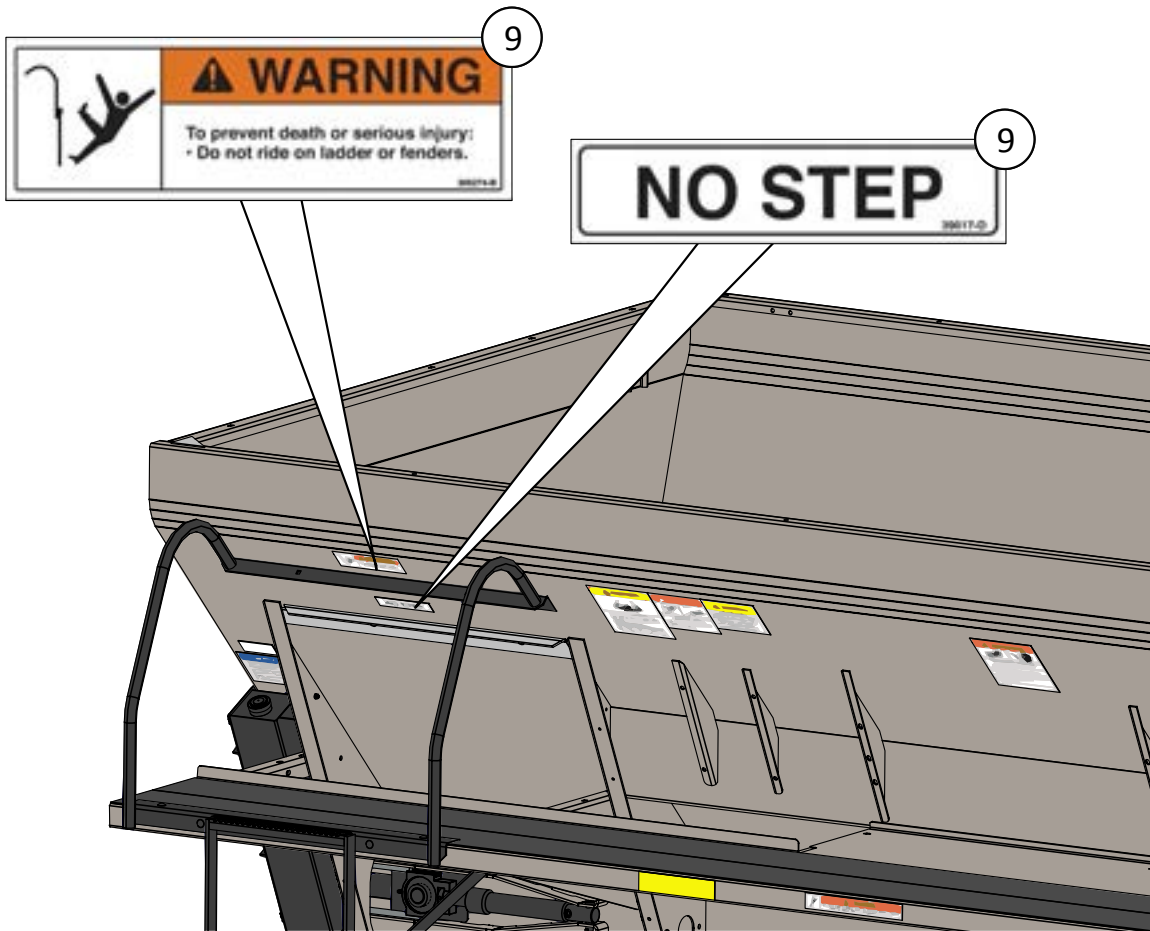
39138-D

8. DANGER: FLYING MATERIAL AND ROTATING SPINNER HAZARD

To prevent death or serious injury:

- Wear eye protection.
- Stop machine before servicing or adjusting.
- Keep bystanders at least 60 feet away.

368-C

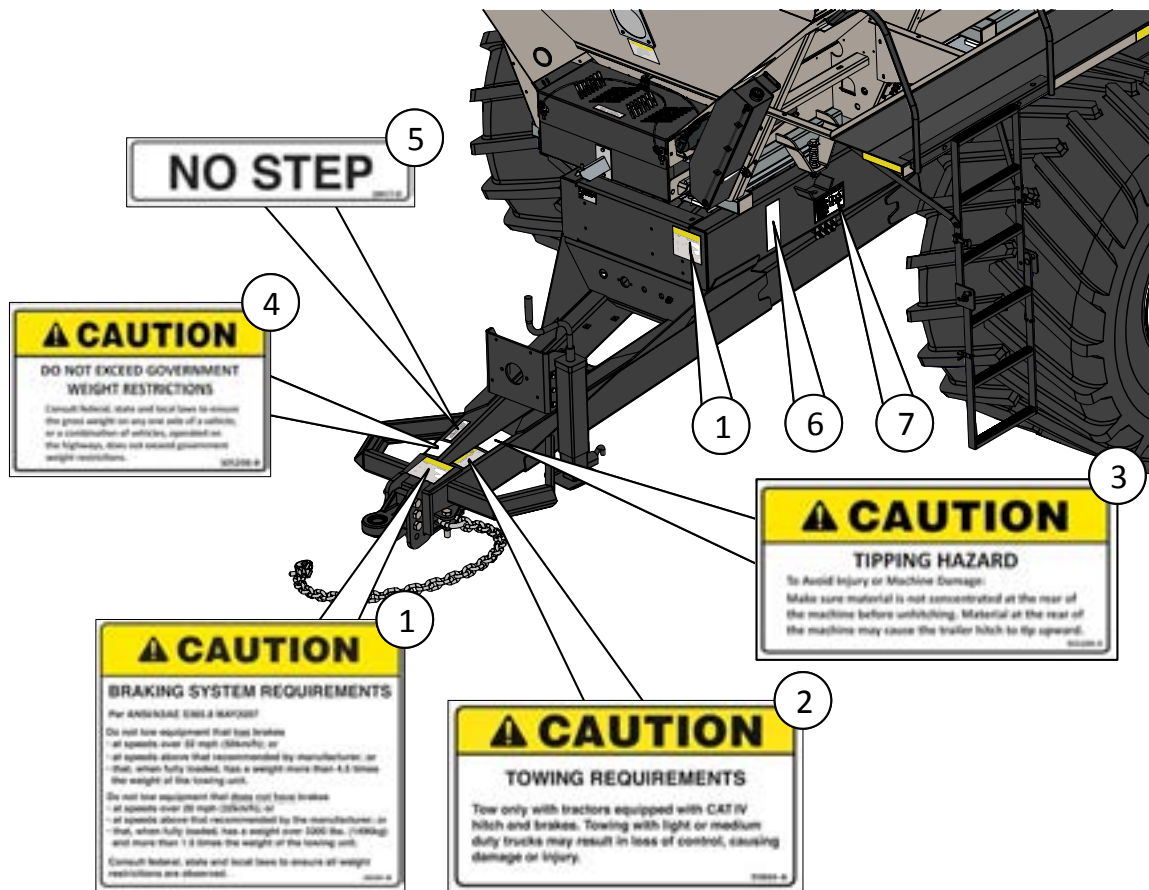


9. WARNING: FALLING HAZARD

To prevent death or serious injury:

- Do not ride on ladder or fenders.

305274-B
39017-D



1. CAUTION: BRAKING SYSTEM REQUIREMENTS

To prevent injury or machine damage, per ANSI/SAE S365.8 MAY 2007:

Do not tow equipment that has brakes:

- at speeds over 32mph (50km/hr); or
- at speeds above that recommended by the manufacturer; or
- that, when fully loaded, has a weight more than 4.5 times the weight of the towing unit.

Do not tow equipment that does not have brakes:

- at speeds over 20mph (32km/hr); or
- at speeds above that recommended by the manufacturer; or
- that, when fully loaded, has a weight over 3300 lbs (1496kg) and more than 1.5 times the weight of the towing unit.

305281-B

2. CAUTION: TOWING REQUIREMENTS

To prevent injury or machine damage:

Tow only with tractors equipped with CAT IV hitch and brakes. Towing with light or medium duty trucks may result in loss of control, causing damage or injury.

313858-A

3. CAUTION: TIPPING HAZARD

To prevent injury or machine damage:

Make sure material is not concentrated at the rear of the machine before unhitching.

Material at the rear of the machine may cause the trailer hitch to tip upward.

305289-A

4. CAUTION: DO NOT EXCEED GOVERNMENT WEIGHT RESTRICTIONS**To prevent injury or machine damage:**

Consult federal, state and local laws to ensure the gross weight of any one axle of a vehicle, or of a combination of vehicles, operated on the highways, does not exceed government weight restrictions.

305298-B

5. WARNING: FALLING HAZARD**To prevent death, serious injury or machine damage:**

- Do not climb or stand on tongue.

TR3000
39017-D**6. NOTICE: TRAILER TIRE SPEED****To avoid injury or machine damage:**

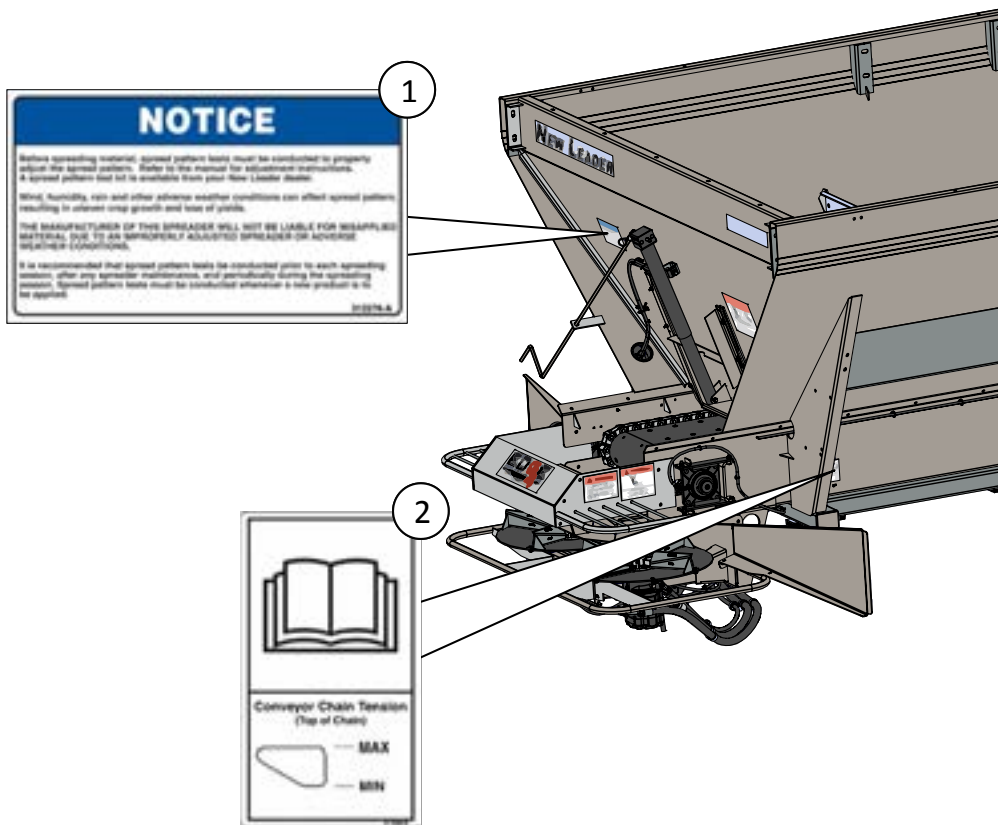
- Only operate spreader with tire pressures, road speeds and payloads in accordance with decal. Refer to "Operations" section of this manual for details.

305275-A

7. NOTICE: MACHINE LUBRICATION**To avoid machine damage and premature deterioration:**

- Periodically lubricate the machine components at the front and rear remote grease banks.
- See "Lubrication & Maintenance Chart" in this manual for details.

310450-A
311814-A
311815-A



1. NOTICE: SPREAD PATTERN TESTING

To obtain optimal machine performance:

Before spreading material, spread pattern tests must be conducted to properly adjust the spread pattern. Refer to manual for adjustment instructions. A spread pattern test kit is available from your New Leader dealer.

Wind, humidity, rain and other adverse weather conditions can affect spread pattern, resulting in uneven crop growth and loss of yields.

THE MANUFACTURER OF THIS SPREADER WILL NOT BE LIABLE FOR MISAPPLIED MATERIAL DUE TO AN IMPROPERLY ADJUSTED SPREADER OR ADVERSE WEATHER CONDITIONS.

It is recommended that a spread pattern test be conducted prior to each spreading season, after any spreader maintenance, and periodically during spreading season. Spread pattern tests must be conducted whenever a new product is to be applied.

This unit is intended for dispensing micronutrients and seeds only - NOT HERBICIDES. The manufacturer is not liable for damage resulting from improper use.

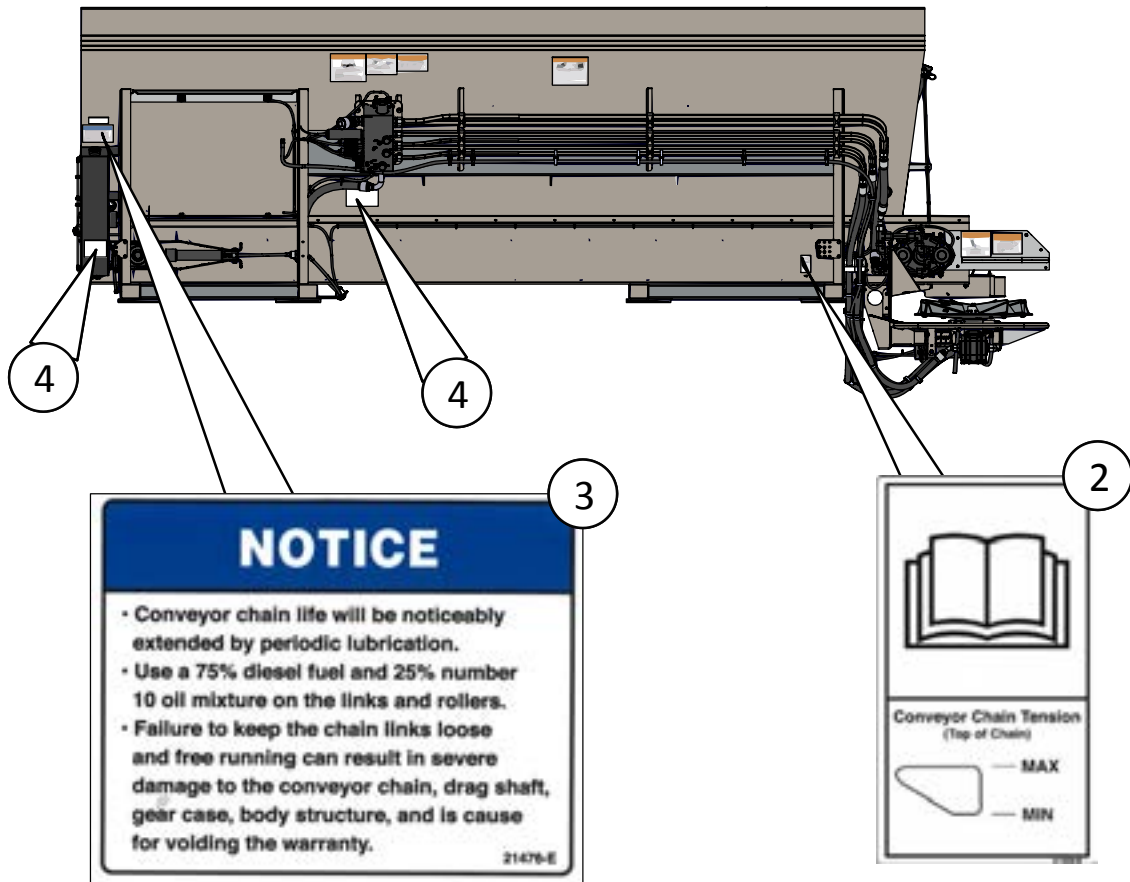
312276-A

2. NOTICE: CONVEYOR CHAIN TENSION

To avoid machine damage and premature deterioration:

- Periodically inspect conveyor chain tension to ensure proper tension is maintained.
- See "Lubrication & Maintenance" section of this manual for details.

311828-B



3. NOTICE: CONVEYOR CHAIN LUBRICATION

To avoid machine damage and premature wear:

- Conveyor chain life will be noticeably extended by periodic lubrication.
- See "Lubricant & Hydraulic Oil Specifications" in this manual for details.
- Failure to keep the chain links loose and free running can result in severe damage to the conveyor chain, drag shaft, gearcase and body structure, and is cause for voiding the warranty.

21476-E

4. NOTICE: MACHINE LUBRICATION

To avoid machine damage and premature deterioration:

- Periodically lubricate the machine components at the front and rear remote grease banks.
- See "Lubrication & Maintenance Chart" in this manual for details.

310450-A
311814-A
311815-A

This page is intentionally left blank.

HYDRAULIC REQUIREMENTS

- Low pressure drop motor return port.
- Zero pressure case drain port.
- Equipped with hydraulic trailer brake system.

FUNCTION	Tractor Side User Supplied		Implement Side Factory Supplied	
	DESCRIPTION	COUPLER	DESCRIPTION	COUPLER
Spreader Pressure	Tractor High Flow SCV	ISO 5675 1/2" Body Female	ISO 5675 1/2" Body Male	3/4" 100R12 Pressure Line
Spreader Return	Motor Return on Tractor Valve Block	ISO 7241/1 Series A 3/4" Body Female	ISO 7241/1 Series A 3/4" Body Male	3/4" 100R2 Return Line
Spreader Case Drain	Zero Pressure Case Drain on Tractor Valve Block	ISO 16028 3/8" Body Female	ISO 16028 3/8" Body Male	3/8" CB Case Drain Line
Trailer Brakes	Hydraulic Brake Supply on Tractor	ISO 5676 3/8" Body Male	ISO 5676 3/8" Body Female	3/8" 100R1 Brake Line

Hydraulics		GPM (LPM) (Gallons/Liters per Minute)	Maximum Pressure (PSI)
Spinner/Conveyor	Tractor Supplied	29.0 (110)	2900

HITCH REQUIREMENTS

- The NL4560 is equipped with a category 4 receiver hitch, requiring a 2" (51mm) hitch pin.

ELECTRICAL REQUIREMENTS

- The NL4560 is equipped with a standard 7-pin connector for operation of lights.
- See "ISOBUS Connections" on page 33 for controller connections.

CONTROLLER REQUIREMENTS

The spreader is equipped with an ISO 11783 compatible control system and will connect to any ISO 11783 compliant virtual terminal with a task controller that supports multi-channel dry granular applicators.

IMPLEMENT PREPARATION AND CONNECTION

WARNING Make sure area is clear between the tractor and implement when backing up to implement.



WARNING DO NOT wear loose clothing. Keep hands and other body parts away from connecting parts of tractor and implement. Entanglement could cause serious injury.



WARNING DO NOT stand on PTO, PTO driveline, tongue, or draw bar. Falling could cause death or serious injury.



WARNING DO NOT use intermediate support as attaching point.

NOTICE! Make sure safety chain is stored safely when not in use.

NOTICE! Inspect the cleanliness of connecting parts. All areas must be free of debris and dirt to ensure a secure connection.

IMPLEMENT HITCH ADJUSTMENT

Factory installs implement hitch in lower two holes of hitch holder. Dealer/customer must adjust hitch position to match tractor drawbar. When hitch is in correct position, tighten grade 8 bolts to torque per “Standard Torques” chart in this manual.

IMPLEMENT CONNECTION

1. Check for visible wear and make sure hitch and draw pin are clear of debris and dirt.
2. Crank the jack to adjust hitch height to match the tractor.
3. Pull out draw pin on tractor hitch. (Figure 1)
4. Back up tractor and align holes on implement hitch and hitch on tongue of implement. (Figure 2)
5. Insert draw pin through implement hitch and tractor drawbar. Insert hitch pin and lock to secure. (Figure 3)
6. Lower handle on draw pin into locking position. Insert securing pin through hole at bottom of draw pin and lock. (Figure 4)
7. Lube implement hitch.
8. Retract jack to storage position.



**Figure 1****Figure 2****Figure 3****Figure 4**

9. Attach safety chain.
10. On left side of hitch, loop safety chain through tractor intermediate support (Figure 5).
11. On left side of hitch, loop safety chain around tractor drawbar (Figure 6).
12. Hook on chain (Figure 7). Allow only adequate slack for articulation.
13. Slide clasp on safety chain to secure locked position (Figure 8). Excess chain will hang between tractor and implement (Figure 9).

NOTE: Replace safety chain if one of more links are damaged, deformed or damaged.

**Figure 5****Figure 6****Figure 7****Figure 8****Figure 9**

10. Connect hydraulic and electrical hookups to appropriate tractor hookups (Figure 10).

- A: Connect 3/8" male quick coupler to zero pressure return (case drain).
- B: Connect 3/4" coupler to tractor return.
- C: Connect 1/2" coupler to tractor pressure.
- D: Connect 7-pin connector to tractor light receptacle.
- E: Connect 3/8" female quick coupler to tractor brake port.
- F: Connect 9-pin ISOBUS connector to ISOBUS tractor receptacle (not shown).

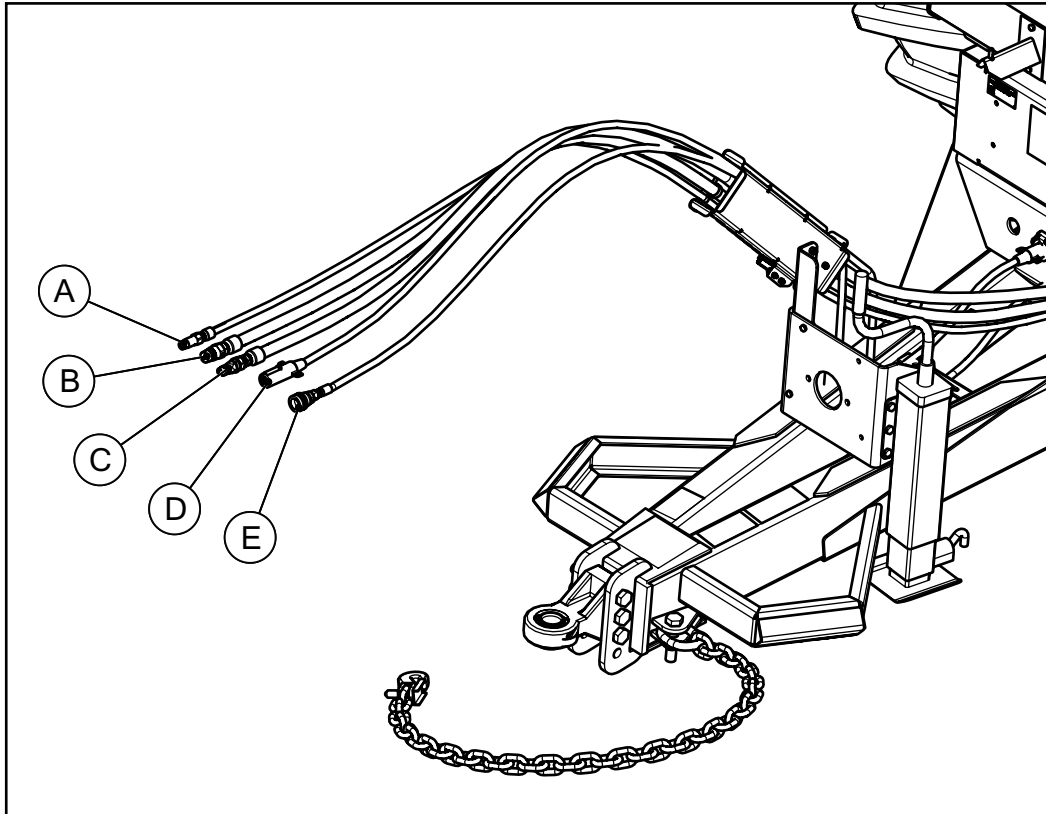


Figure 10

ISOBUS CONNECTIONS

A: Factory Supplied CAN-ISO Connector - Deutsch part no. HDP24-24-91PN-P064

Connects to: Mating Connector - Deutsch part no. HDP26-24-91SN (Not supplied)

- Pin 1 - Battery Ground
- Pin 2 - ECU Return (ECU Ground)
- Pin 3 - 60-amp fused power
- Pin 4 - ECU Power (Switched 12v)
- Pin 5 - N/C
- Pin 6 - TBC Power
- Pin 7 - TBC Return
- Pin 8 - ISO-BUS Can High
- Pin 9 - ISO-BUS Can Low

60-amp power on pin 3 needs to be fused at battery

B: Factory Supplied Power Connector - Deutsch part no. DTP04-4P-L012

Connects to: Mating Connector - Deutsch part no. DTP06-4S (Not supplied)

- Pin 1 - Hydraulic cooler fan power (Switched 12V)
- Pin 2 - Hydraulic cooler fan ground
- Pin 3 - Body and lighting module ground
- Pin 4 - Body and lighting module power (Battery 12V)

30-amp power on pins 1 & 3 must be fused at battery.

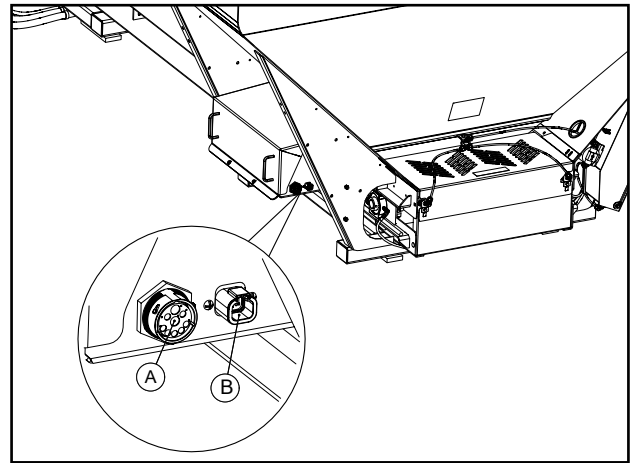
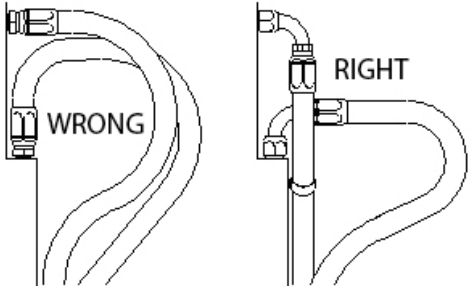
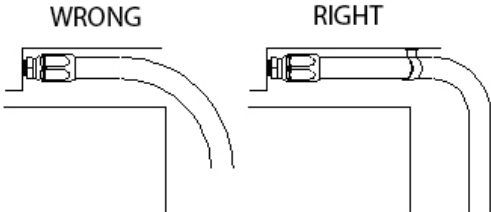
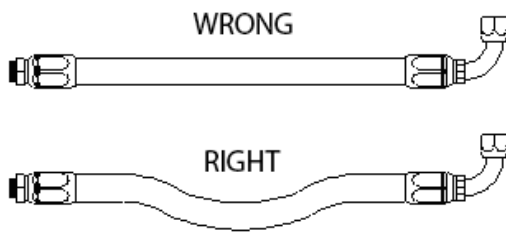
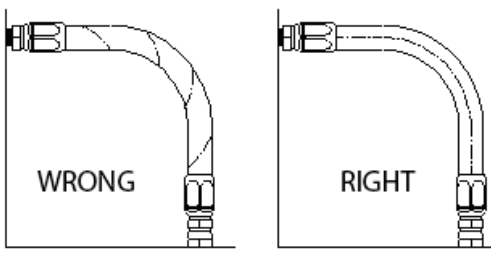
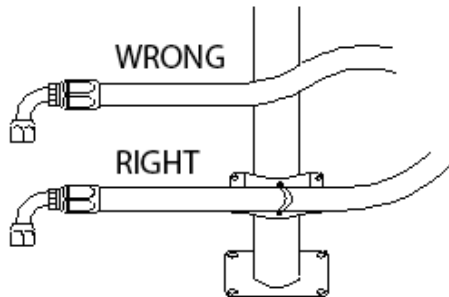
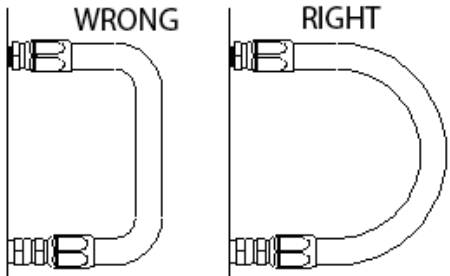


Figure 8

HYDRAULIC HOSE INSTALLATION GUIDE

	
<p>1. Use elbows and adapters in the installation to relieve strain on the assembly, and to provide easier and neater installations that are accessible for inspection and maintenance. Remember that metal end fittings cannot be considered as part of the flexible portion of the assembly.</p>	<p>2. Install hose runs to avoid rubbing or abrasion. Clamps are often needed to support long runs of hose or to keep hose away from moving parts. It is important that the clamps be of the correct size. A clamp that is too large will allow the hose to move in the clamp causing abrasion at this point.</p>
	
<p>3. In straight hose installations allow enough slack in the hose line to provide for changes in length that will occur when pressure is applied. This change in length can be from +2% to -4%.</p>	<p>4. Do not twist hose during installation. This can be determined by the printed layline on the hose. Pressure applied to a twisted hose can cause hose failure or loosening of the connections.</p>
	
<p>5. Keep hose away from hot parts. High ambient temperature will shorten hose life. If you cannot route it away from the heat source, insulate it.</p>	<p>6. Keep the bend radii of the hose as large as possible to avoid hose collapsing and restriction of flow. Follow catalog specs on minimum bend radii.</p>

(Used with the permission of The Weatherhead Company.)

The NL4560 is a pull-type spreader intended for spreading free flowing granular agricultural materials, such as chemical fertilizers and compost. It comprises of a specialized NL4500G4 EDGE spreader and a TR3000 trailer.

The TR3000 is an agricultural implement flotation trailer designed for attachment to specially equipped tractors by means of a category 4 receiver hitch. The TR3000 is equipped with hydraulic brakes and walking beam suspension.

The unit is powered hydraulically and provides independent variable speed control for the spinners and full automatic ground speed control for the conveyor.

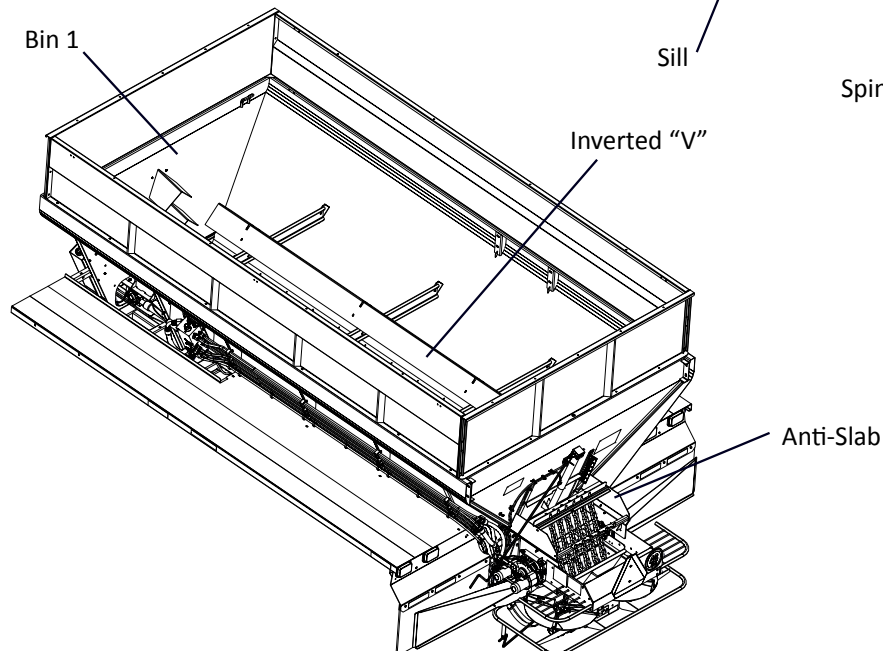
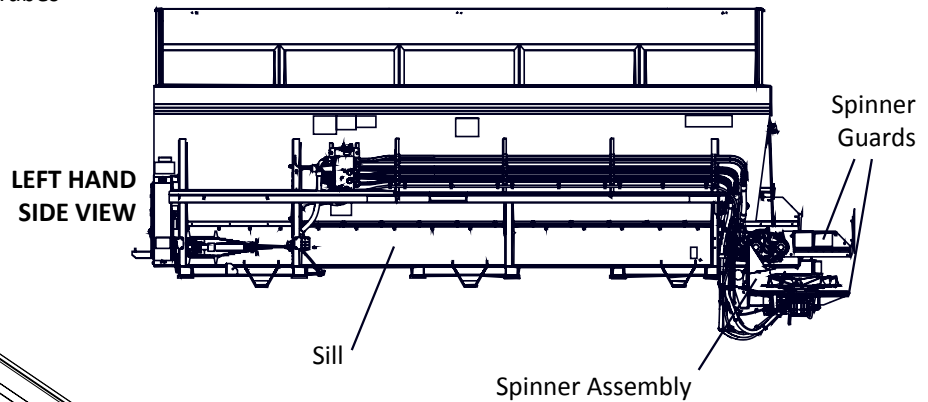
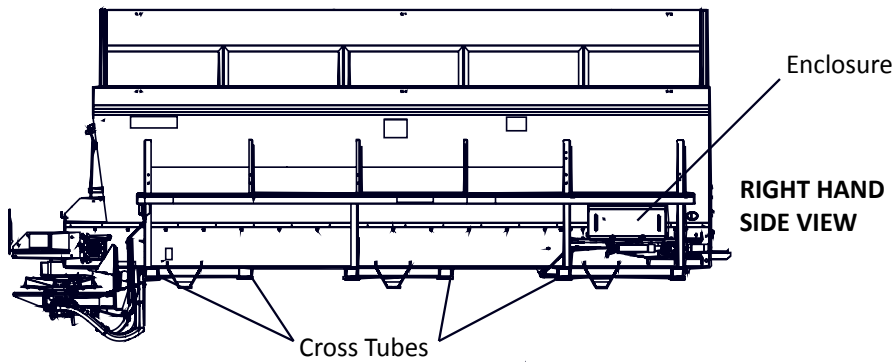
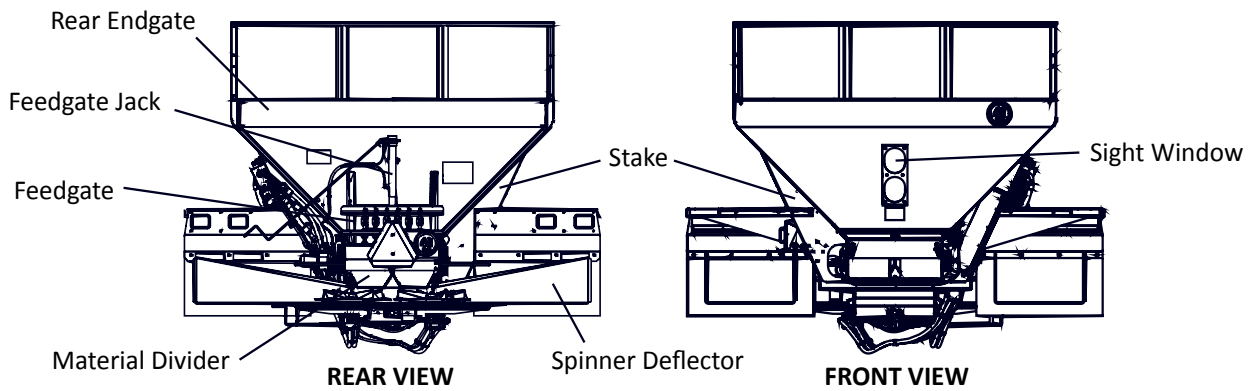
The 30-inch (76cm) wide conveyor delivers material to the spinners through an adjustable metering gate at the rear of the hopper body. Orbital type hydraulic motors mounted to 6-to-1 ratio spur gear case drive the conveyor. The #4 belt-over-chain (BOC) type conveyor consists of parallel strands of pintle type chain joined by cross bars every other link with moderately oil resistant (MOR) belting fastened to each bar.

The spinner assembly has two 24-inch (61cm) diameter dished discs. Each disc has four formed and heat treated fins that are adjustable to radial angle. The spinner is fully adjustable by means of a rotating handle. The spinner assembly features independent spinner speed control, allowing for boundary spreading capabilities.

This product is intended for commercial use only.

**WARNING**

This implement is NOT intended for spreading lime or other high-density materials. Improper use could cause serious injury or machine damage.



Bin 1: Main holding bin for material or Insert. Multiplier and MultiBin inserts (shown on following pages) are configured as Bins 2-4 depending on type used.

Conveyor: Conveys material to rear of unit.

Cross Tubes: Supports body, attaches to Chassis frame. Transfers weight from Main Hopper to Chassis.

Enclosure: Houses spreader control modules, protects them from the elements

Feedgate: Adjustable gate mounted into Rear Endgate. Allows for variable rates of material flow by adjusting jack to desired height.

Hillside Divider: Ensures balanced flow of material across conveyor when on hillsides or uneven terrain.

Inverted "V": Mounted inside Main Hopper when Insert not installed. Distributes weight pressure across conveyor, allowing for consistent material flow to Feedgate, and promotes an improved blend when spreading fertilizer.

Lift Hooks: Used to lift unit or insert with appropriately rated lifting device.

Material Divider: Ensures uniform spread pattern by directing material off of conveyor onto spinner discs.

Rear Endgate: Welded or bolt-in endgate (depending on model) furthest from chassis cab (Rear based on direction of travel). Holds mounted Feedgate, allowing for rear release of material from bin.

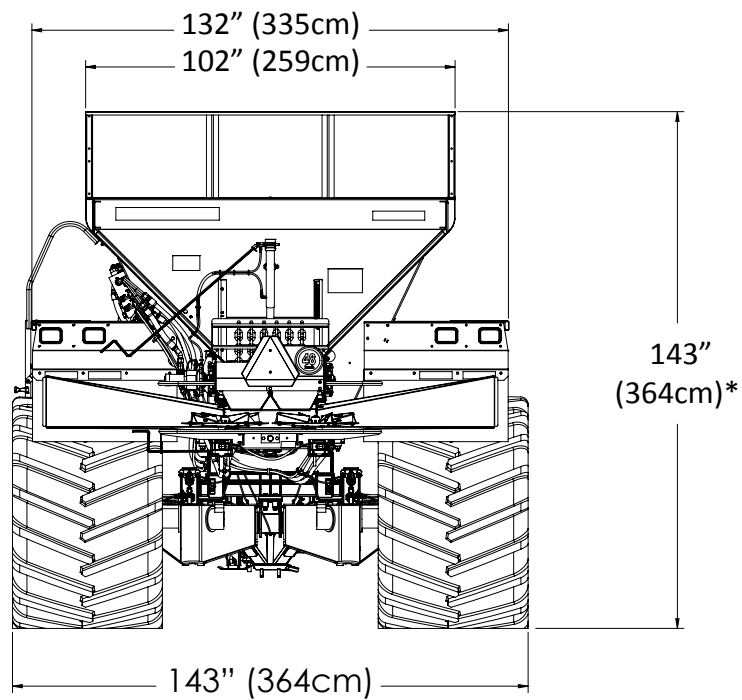
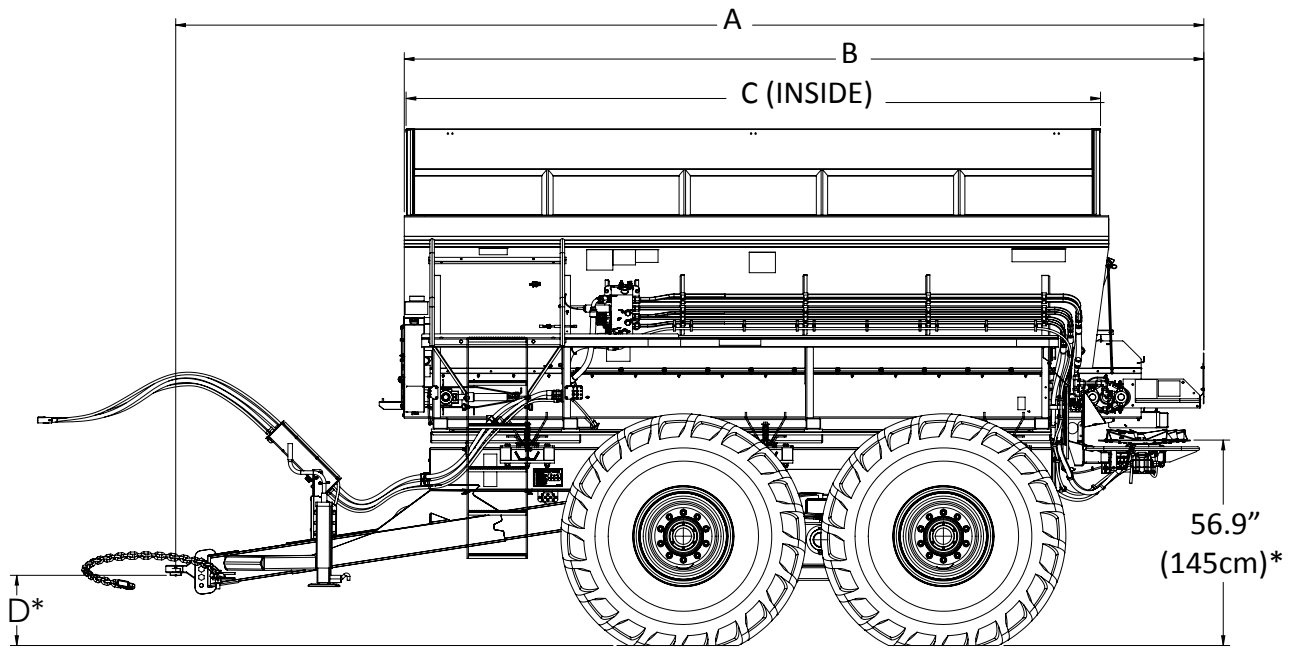
Sill: Base of Main Hopper side walls. Contains Conveyor and supports machine walls.

Spinner Assembly: Contains adjustable G4 Spreader system, consisting of hydraulic spinners used for dispersal of various materials at different positioned settings allowing for consistent, even spread patterns across a wide variety of material with a high rate of accuracy.

Spinner Deflectors: Deflect material away from machine.

Spinner Guards: Upper and Lower guards, protects operators from spinner discs. Must be in place during any operation.

Stake: Side support for machine walls.



*Height dimensions shown with static loaded, OEM-size tires.

NL4560 WEIGHTS & CAPACITIES

Unit Length	Overall Length A	Spreader Length B	Body Length C	Approximate Weight Lbs (Kg)	Struck Capacity Cu Yd (Cu M) Cu Ft
16' (4.88m)	285" (723cm)	220" (559cm)	192" (488cm)	20,780 (9425.6)	22.5 (17.2) 608

	Hitch Height D*
Position 1	19.5" (49.5cm)
Position 2	17.25" (43.8cm)

NOTICE!

Please consult federal, state, and local weight laws and tire manufacturer's ratings to ensure neither government weight restrictions nor tire load ratings are exceeded.



WARNING Stand clear of moving machinery.

NOTE: Do not load spreader with material.

1. Check entire unit to make sure all fasteners are in place and properly tightened per “Standard Torques” section in this manual.
2. Make sure no other persons are in vicinity of spreader.
3. Make sure no loose parts are in unit or on conveyor or spinner.
4. Check oil level in hydraulic reservoir; fill as necessary. Refer to “Lubricant & Hydraulic Oil Specifications” section of this manual for proper oil. Completely open reservoir valves.
5. Start engine and turn on hydraulics. Allow hydraulics to circulate until oil is warm.
6. Run spinner at 300 RPM. Allow to run until spinner is operating smoothly and all air has been purged from system.
7. Run conveyor at 20 RPM and spinner at 300 RPM. Run until conveyor is operating smoothly.
8. Run conveyor at 20 RPM and spinner at 700 RPM. Allow both conveyor and spinner to run until operating smoothly.
9. Enable boundary left and right and verify that RPM adjust accordingly.
10. Run conveyor at 0RPM and spinner at 0RPM. Make sure both conveyor and spinner do not move.
11. Calibrate spreader as defined in the manual for the controller that is supplied with your machine.
12. Complete spread pattern test per “Spread Pattern” section in this manual.
13. Shut system down.



WARNING

DO NOT check leaks with hands while system is operating as high pressure oil leaks can be dangerous! If skin is pierced with hydraulic fluid at high pressure seek immediate medical attention as fluid injected into the skin could cause gangrene if left untreated. Relieve pressure before disconnecting hydraulic lines or working system. Make sure all hydraulic fluid connections are tight and all hydraulic hoses and lines are in good condition before applying pressure to the system. Wear protective gloves and safety glasses or goggles when working with hydraulic systems.



WARNING

DO NOT check for leaks adjacent to moving parts while system is operating as there may be danger of entanglement!

Check all connections in hydraulic system to make sure there are no leaks.
Check hydraulic oil tank and refill to maintain level at mid-point of gauge.
Unit is now ready for field testing.

1. Make sure unit has been properly serviced and is in good operating condition. It is recommended to run the spreader prior to loading material to ensure acceptable operation.
2. Set manual machine settings in controller per Controller section in this manual.
3. Program controller with correct data for material and application.
4. Adjust feedgate to appropriate setting.
5. Adjust spinner to give spread pattern desired. See “Spread Pattern” and “Controller” sections for details. Calibrate and spread pattern test for any new material.
6. Fill unit with material to be spread.
7. Engage hydraulics.
8. Begin spreading.



CAUTION Drive only at speeds which permit good control of vehicle!

NOTICE!

CHANGE HYDRAULIC OIL FILTER AFTER FIRST WEEK (OR NOT MORE THAN 50 HOURS) OF OPERATION ON A UNIT.



Visit <http://newleader.highwayequipment.com/calculators/yield-output> for interactive tools to calculate yield, proper feedgate opening, conveyor revolutions per minute, and mph to maximize the performance of your spreader.



INSPECTION LADDER

**WARNING**

KEEP OFF FENDERS. Do not place objects on fenders. They are not intended to carry loads. Falling from the fenders could cause death or serious injury.

NOTICE!

Figure 1 - Always place the inspection ladder in the storage position while unit is in transit with rubber latches (A) secured.

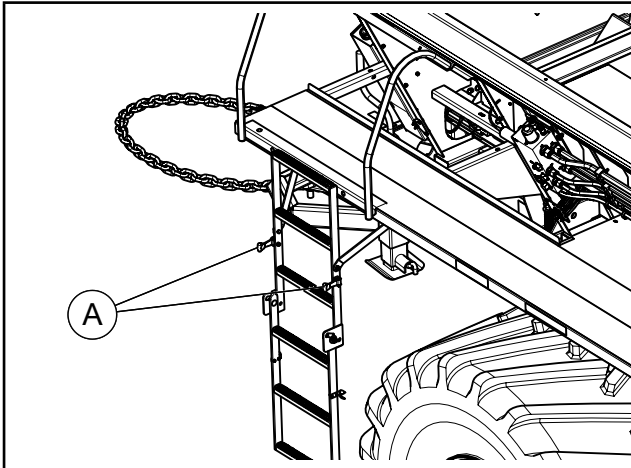


Figure 1A - Inspection Ladder Down

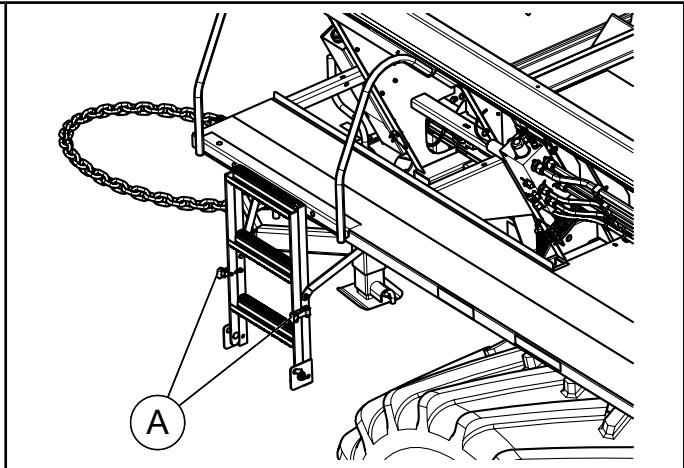


Figure 1B - Inspection Ladder Up

BACK PLATE STORAGE

Figure 2 - When spreading without the Material Divider Back Plate (A) equipped, it can be stored at the front of the unit.

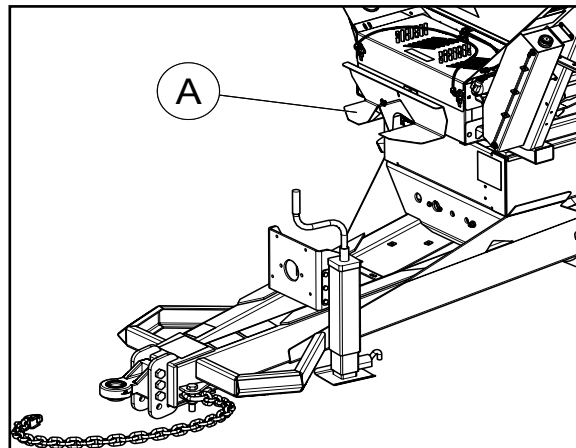


Figure 2

ANTI-SLAB CHAIN STORAGE / HILLSIDE DIVIDER PANEL

Figure 3A - Hook chains over rearmost cross member of Anti-Slab Support to position out of the way.

Figure 3B - Install Hillside Divider Panel on Anti-Slab Support with proper hardware. Adjust so that panel is approximately 3/8" (1cm) above the rubber of the conveyor belt. See "Anti-Slab" in parts manual for details.

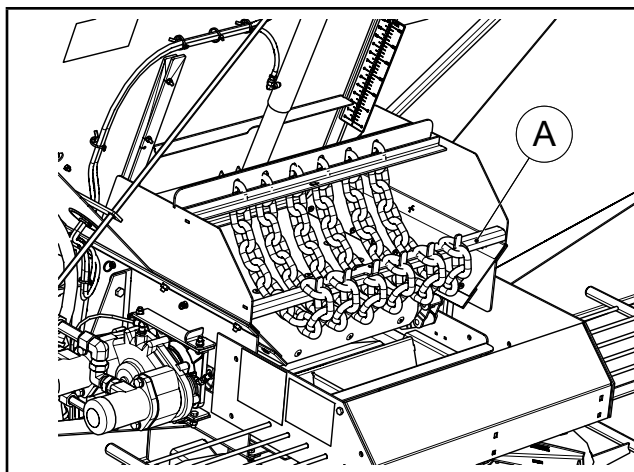


Figure 3A - Chain Storage

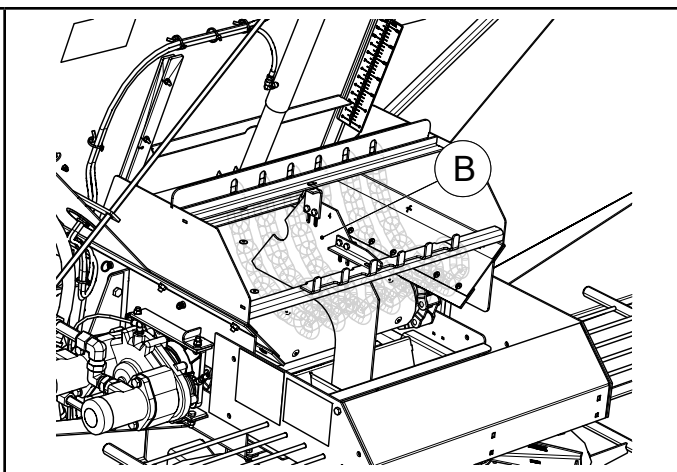


Figure 3B - Divider Panel

TIRE PRESSURE AND TRANSPORT SPEEDS

TRAILER TIRE ROAD SPEED TABLE ⁽³⁾			
Tire Pressure (PSI)	Max Road Speed (MPH)	Max Gross Combined Axle Loads ⁽²⁾	Max Payload ⁽¹⁾ (LBS)
20	30	35200	19600
	25	37300	22000
	20	39400	24400
	15	42900	28300
	10	46400	32200
	5	53000	35000
	0	53000	35000
25	30	39600	24600
	25	41900	27200
	20	44300	29900
	15	48300	34300
	10	52200	35000
	5	53000	35000
	0	53000	35000
30	30	44000	29500
	25	46600	32400
	20	49200	35000
	15	53000	35000
	10	53000	35000
	5	53000	35000
	0	53000	35000

Proper air pressure achieves maximum tire performance. The following table should be used as a guide.



WARNING

Drive at a reasonable and safe speed according to weather, field and road conditions. Loss of tractor or implement control could cause serious injury or death.

NOTICE!

Consult federal, state and local weight laws to ensure government weight, speed, and road restrictions are not exceeded.

1. Maximum payload assumes evenly distributed product in a single bin.
2. Consult federal, state and local laws to ensure the gross weight on any one axle or combination of axles, operated on highways, does not exceed government weight restrictions.
3. This chart is applicable for OEM tires and rims.

IMPLEMENT MANEUVERING

**WARNING**

Make sure the area behind the trailer is clear of obstructions and personnel. Turning or backing may result in limited visibility. Check blind spots. Back and/or turn cautiously. Failure to do so could result in death, serious injury or damage to the implement.

**WARNING**

Maintain reasonable speeds. Consider rough terrain including obstacles such as terraces, ditches, and approaching angles. Know the limits of hitch angles. Failure to do so could result in tipping of implement, bottoming of suspension, jack-knifing, spillage or loss of material and other damages to the implement and/or tractor, resulting in serious injury or death.

BACKING AND TURNING TIPS

NOTICE!

Turning and backing at sharp angles will cause the tractor and implement to jack-knife. DO NOT exceed maximum turning angle of 60°.

MAXIMUM HITCH ANGLES AND WALKING BEAM TRAVEL

**CAUTION**

DO NOT max out suspension travel. Damage may occur to implement. The manufacturer will not be liable for damage to implement due to improper usage.

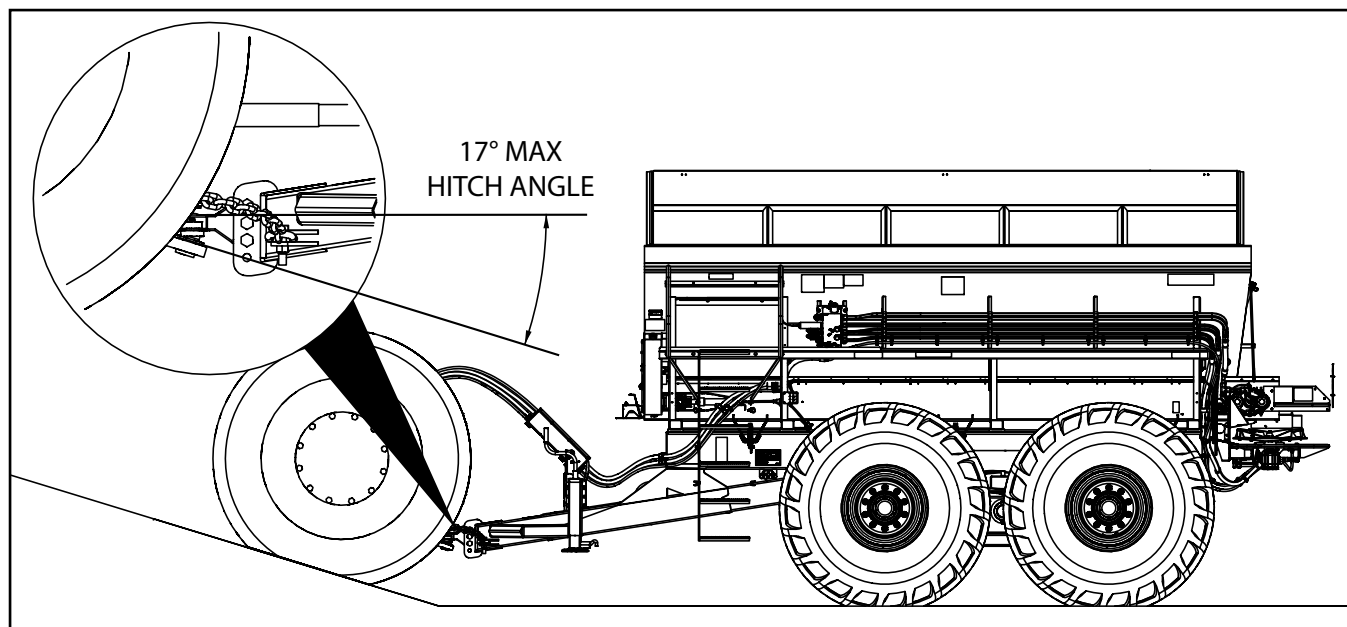


Figure 4 - Maximum Hitch Angles

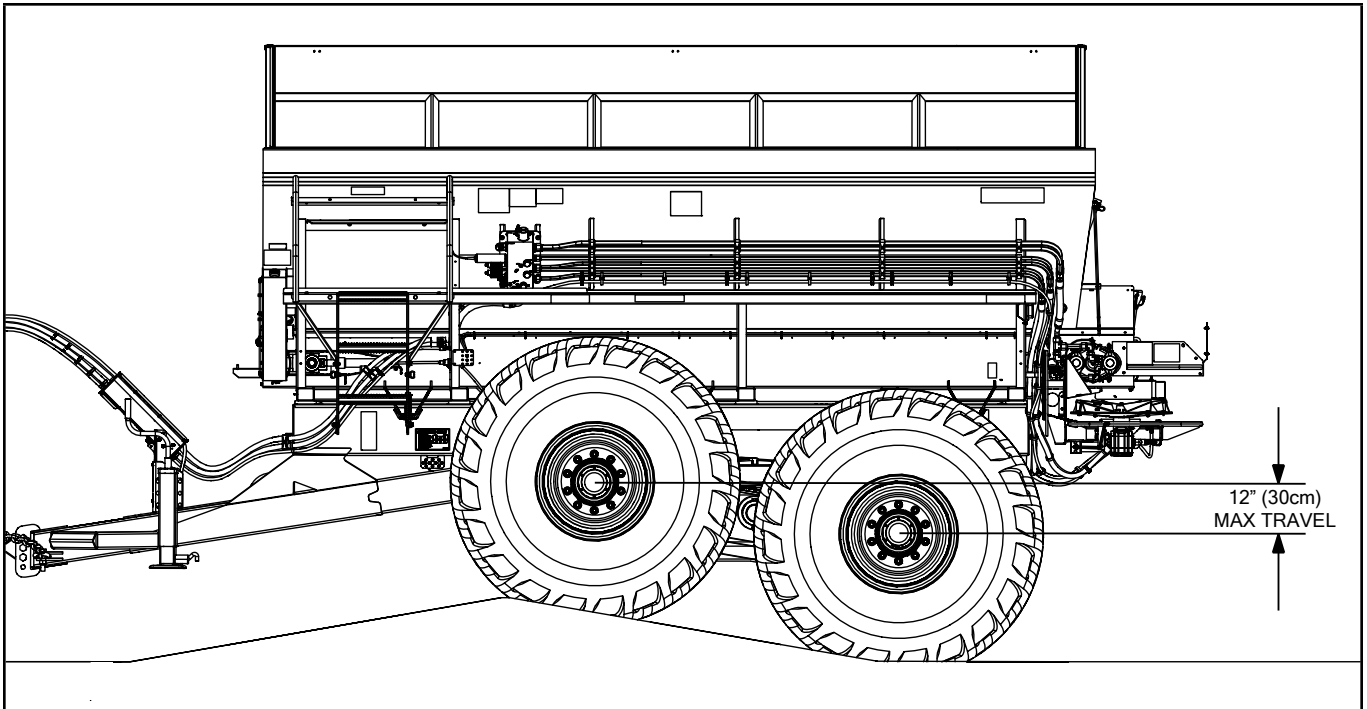


Figure 5 - Walking Beam Travel

REAR PULLING LUGS

NOTICE! Do not pull implement sideways—always pull straight. Always disconnect tractor from implement before using rear lugs. Otherwise, damage to implement may occur.

NOTICE! Failure to raise jack before pulling stuck implement will destroy jack.

If implement becomes stuck in field and cannot be freed by towing through:

1. Empty spreader, shut off tractor power and lower jack.
2. Disconnect implement from tractor.
3. Hook appropriately rated chain to both the left and right hand rear pulling lugs as shown in Figure 5.
4. Fasten chains to tractor.
5. Raise jack.
6. Engage tractor to dislodge implement.

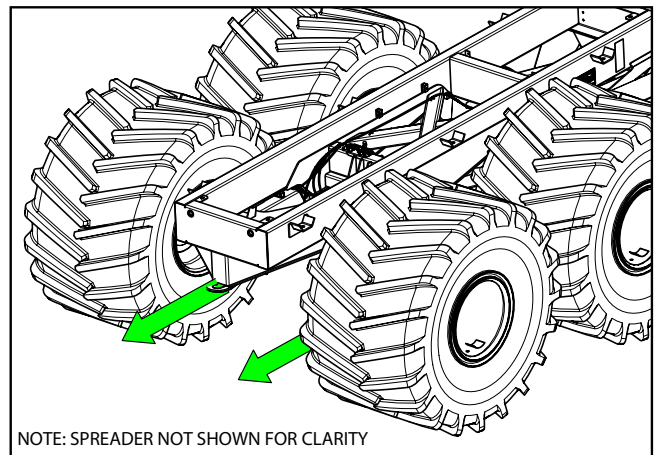


Figure 6 - Rear Pulling Lugs

This page is intentionally left blank.

PREVENTATIVE MAINTENANCE PAYS!

The handling and spreading of commercial fertilizers is a most severe operation with respect to metal corrosion. Establish a frequent, periodic preventative maintenance program to prevent rapid damage to spreading equipment. Proper cleaning, lubrication and maintenance will give you longer life, more satisfactory service and more economical use of your equipment.

**WARNING**

Shut off all power and allow all moving parts to come to rest before performing any maintenance operation.

HYDRAULIC SYSTEM

Proper oil in the hydraulic system is one of the most important factors for satisfactory operation. Utmost cleanliness in handling the oil cannot be stressed enough. Keep hydraulic oil in original closed containers, clean top of container before opening and pouring, and handle in extremely clean measures and funnels.

Refer to “Lubricant & Oil Specifications” on page 57 for selection of the proper hydraulic fluid for use in the hydraulic system.

SERVICE SCHEDULE**WARNING**

DO NOT check leaks with hands while system is operating as high pressure oil leaks can be dangerous! If skin is pierced with hydraulic fluid at high pressure seek immediate medical attention as fluid injected into the skin could cause gangrene if left untreated. Relieve pressure before disconnecting hydraulic lines or working system. Make sure all hydraulic fluid connections are tight and all hydraulic hoses and lines are in good condition before applying pressure to the system. Wear protective gloves and safety glasses or goggles when working with hydraulic systems.

**WARNING**

DO NOT check for leaks adjacent to moving parts while system is operating as there may be danger of entanglement!

Check hydraulic oil daily by means of sight gauge on hydraulic tank. Add oil as necessary to maintain level around mid-point of sight gauge. Periodically inspect hoses and fittings for leaks.

NOTICE!

Change hydraulic oil filter after first week (or not more than 50 hours) of operation on a unit.

Controller will warn when filter is restricted. Change filter when warning sounds.

Drain hydraulic tank through drain plug (not through suction outlet), flush, and refill and change filter element annually. Oil and filter should also be changed whenever oil shows any signs of breaking down under continued high-pressure operation. Discoloration of oil is one sign of breakdown.

HYDRAULIC HOSE

Hose assemblies in operation should be inspected frequently for leakage, kinking, abrasion, corrosion or other signs of wear or damage. Worn or damaged hose assemblies should be replaced immediately. When replacing, use hoses of same or better rating and construction.

**WARNING**

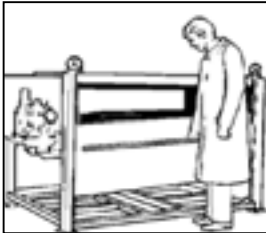
Testing should be conducted in approved test stands with adequate guards to protect the operator.

**Clean**

Clean assembly by blowing out with clean compressed air. Assemblies may be rinsed out with mineral spirits if the tube stock is compatible with oil, otherwise hot water at 150°F (65.55° C) maximum may be used. Ensure all are dry before assembly.

**Inspect**

Examine hose assembly internally for cut or bulged tube, obstructions, and cleanliness. For segment style fittings, be sure that the hose butts up against the nipple shoulder; band and retaining ring are properly set and tight, and segments are properly spaced. Check for proper gap between nut and socket or hex and socket. Nuts should swivel freely. Check the layline of the hose to be sure the assembly is not twisted. Cap the ends of the hose with plastic covers to keep clean.

**Test**

The hose assembly should be hydrostatically tested at twice the recommended working pressure of the hose.

Test pressure should be held for not more than one minute and not less than 30 seconds. When test pressure is reached, visually inspect hose assembly for: 1. Any leaks or signs of weakness. 2. Any movement of the hose fitting in relation to the hose. Any of these defects are cause for rejection.

Storage and Handling

Hose should be stored in a dark, dry atmosphere away from electrical equipment, and the temperature should not exceed 90° F (32.22° C).

CONVEYOR CHAIN



WARNING

Stay out of the spreader. If it's necessary to enter the spreader, return to the shop, empty body, turn off all power, set vehicle brakes, lock engine starting switch and remove keys before entering. Tag all controls to prohibit operation. Tags should be placed, and later removed, only by person working in the body.

Hose down unit and remove any material build-up on sprockets and under chain.

NOTICE!

The conveyor will move away from the bottom panel if material accumulates under the conveyor or on the sprockets. The more material that accumulates, the closer the chain will come to the chain shields. If the conveyor should catch a chain shield, it could permanently damage the conveyor, the chain shields or the unit. Do not remove material while conveyor or spinner is running!

Lubrication

Make sure unit is clean and completely dry. Lubricate conveyor chain via display at an interval of 10 hours of spreading, or at the end of each day of usage.

Tension

Proper chain tension is a factor in chain and sprocket life. Measuring from rear of unit, conveyor should touch at 36" - 40" (91 - 102cm) mark, and top of chain should appear between MIN and MAX lines in sight window (Figure 1). If manual adjustments need to be made, on valve block, loosen jam nut, turn counterclockwise to lower tension, or turn clockwise to increase tension (Figure 2). All tension adjustments must be made when machine is unloaded and conveyor running 15-20 RPM.

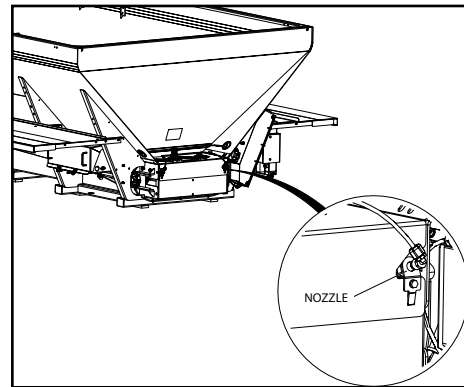


Figure 1

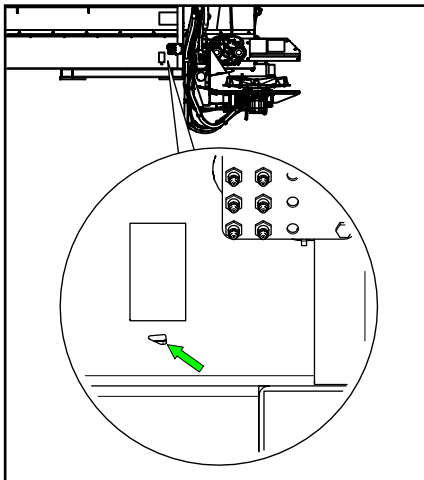


Figure 2A

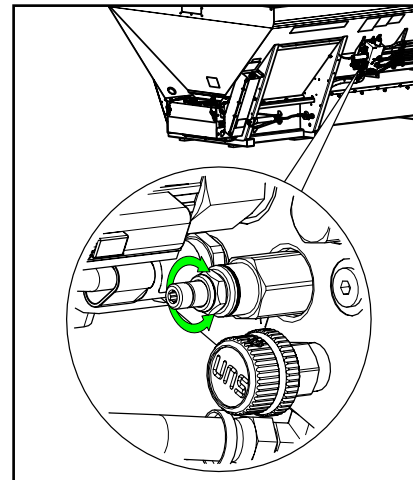
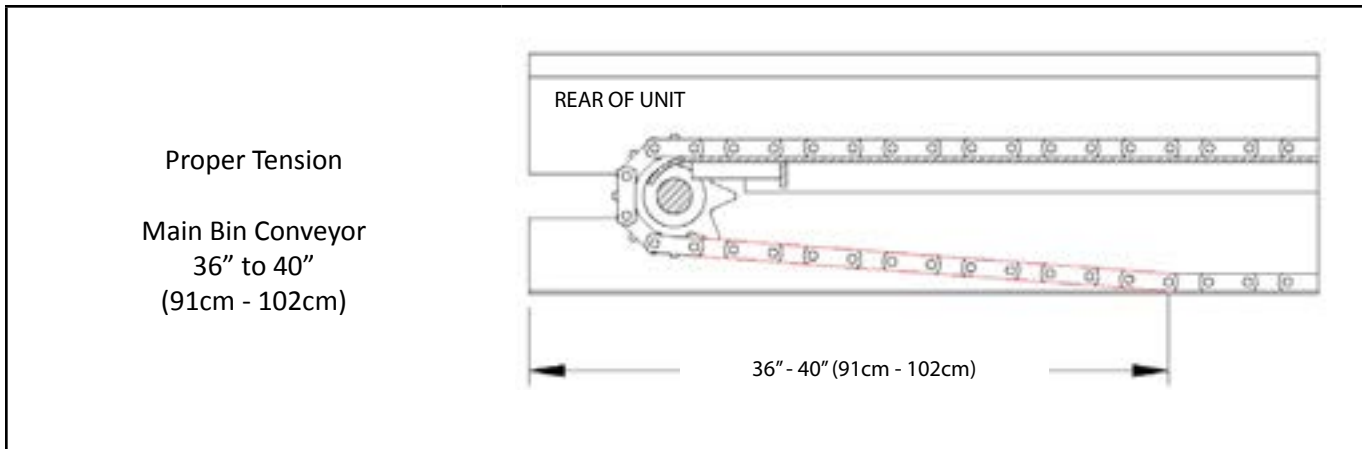


Figure 2B

Over-tensioning of conveyor chain will lead to excessive load on the system which will cause excessive chain and sprocket wear and can cause extremely high starting pressures. Under-tensioning allows conveyor chain to "wrap" around drive sprockets and not exit sprocket freely, causing excessive excessive chain stretch and surging of the conveyor which will result in interrupted flow of material to the spinners.



CONVEYOR BELT MAINTENANCE

Standard belt for the #4 chain is moderate oil resistant that is impervious to moisture, weathering, or normal action which can be used with chemical impregnated fertilizer or oil based additives.

- Inspect belt fastener occasionally for wear or “raveling” of belt grip area.
- Make sure belt connecting pin is positioned correctly as shown in Figure 3.

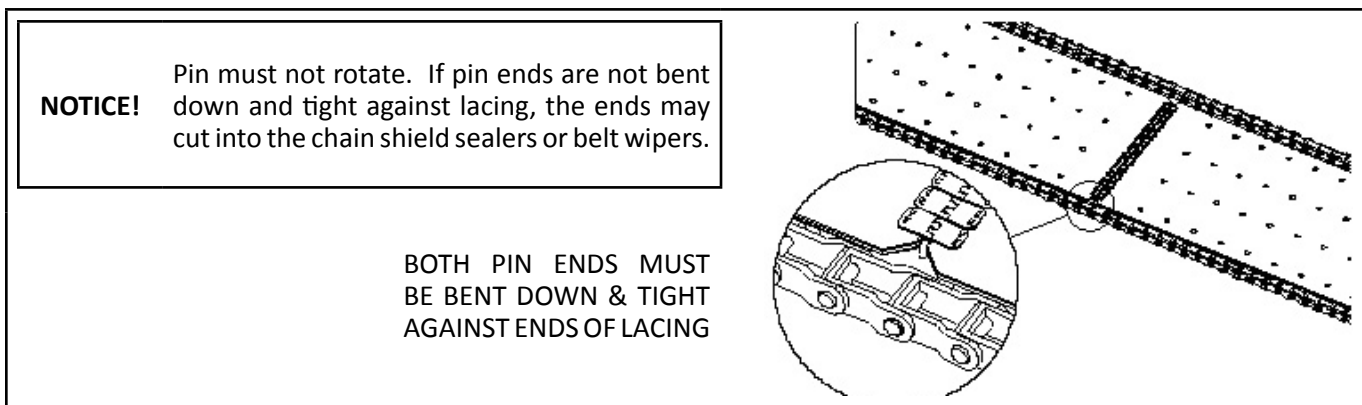


Figure 3 - Conveyor Belt Pin Installation

BIN SENSOR



WARNING

Stay out of the spreader. Do not climb on spreader. Use a portable ladder to inspect, clean and maintain the bin sensor from outside the spreader. Failure to do so could result in injury from falling.

NOTICE!

Wipe sensor clean periodically to prevent accumulation of product. Avoid wet material as it may stick to sensor. If material sticks to sensor it won't warn user when bin is low.

Clean sensor with long handled brush or hose from outside of spreader. Do not aim high pressure sprayer directly at sensor—it could damage the components.

Lubrication & Maintenance

Spinner Fins

Visually inspect spinner fins (Figure 4) daily for build-up of material and wear. Spinner discs and fins must be kept clean and polished. Even a small build-up of material on a spinner can significantly affect the spread pattern. Rough, bent or worn fins will produce bad spread patterns. Replace worn fins or discs as needed. See *Fin Kit Installation Instructions* for replacement part numbers and instructions.

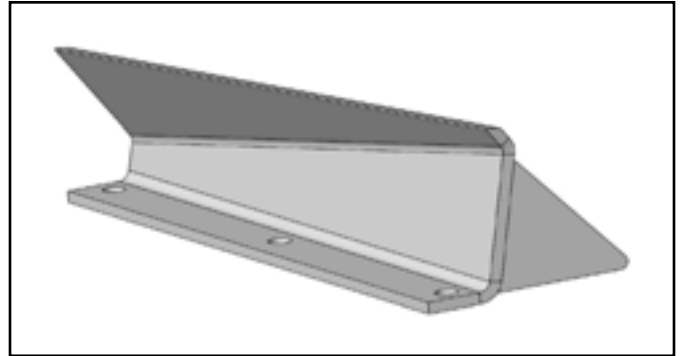


Figure 4 - Fin

Spinner Deflectors

Visually inspect spinner deflectors (Figure 5) daily for build-up of material and damage. Clean as needed. Even a small build-up of material on a spinner deflector can affect the spread pattern. If damaged, bent or otherwise, replace. See *Parts List* in this manual for replacement part numbers.

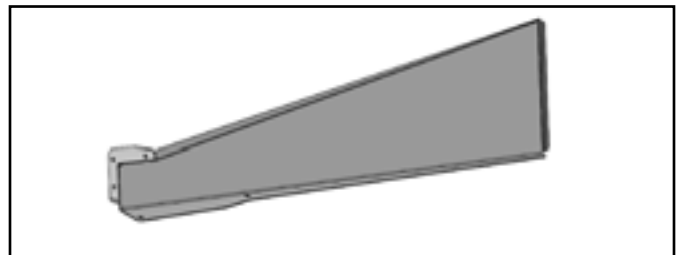


Figure 5 - Spinner Deflector

Material & Hillside Flow Dividers

Visually inspect material divider (Figure 6) and hillside flow dividers (as equipped) daily for build-up of material and wear. Any build-up of material on divider components can affect performance. Clean as needed. Replace worn or damaged parts as necessary. See *Parts List* in this manual for replacement part numbers.

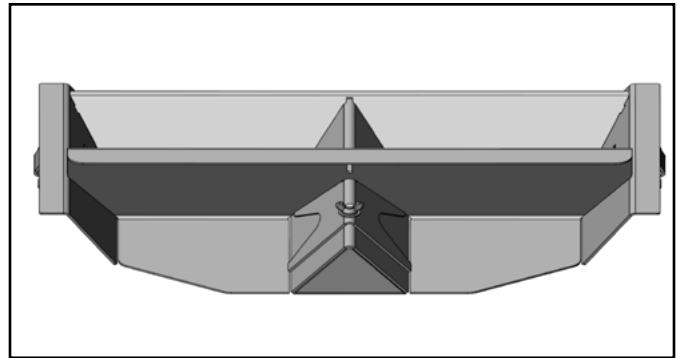


Figure 6 - Material Divider

CONVEYOR GEARCASE

Drain oil in a new unit after first two weeks (or not more than 100 hours) of operation, and flush gear case thoroughly with light oil. Refer to "Lubricant and Hydraulic Oil Specifications" section for proper grade oil and recommended amounts of lubricant. After initial change, oil should be changed every 2,000 hours of operation or annually, whichever occurs first.

Check gearcase oil level monthly.

LUBRICATION OF BEARINGS

Grease in a bearing acts to prevent excessive wear of parts, protects ball races, and balls from corrosion and aids in preventing excessive heat within the bearing. It is very important the grease maintain its proper consistency during operation. It must not be fluid and it must not channel.

Make sure all fittings are thoroughly cleaned before grease is injected. Points to be lubricated by means of a grease gun have standard grease fittings.

Lubricate bearings by pumping grease slowly until it forms a slight bead around the seals. This bead indicates adequate lubrication and also provides additional protection against the entrance of dirt.

FASTENERS

Tighten all screws fasteners to recommended torque's after first week of operation and annually thereafter. If loose fasteners are found at anytime, tighten to recommended torque. Replace any lost or damaged fasteners or other parts immediately. Check body mounting hardware every week.

Check torque on body mounting, hitch, wheels and suspension hardware every week. Tighten front mount hardware so springs are compressed from 3.5" - 3.75" (8.89 - 9.53 cm) (Figure 7A). Tighten each back mount hardware to 80 - 90 ft-lb (108.5 - 122 N-m) (Figure 7B).

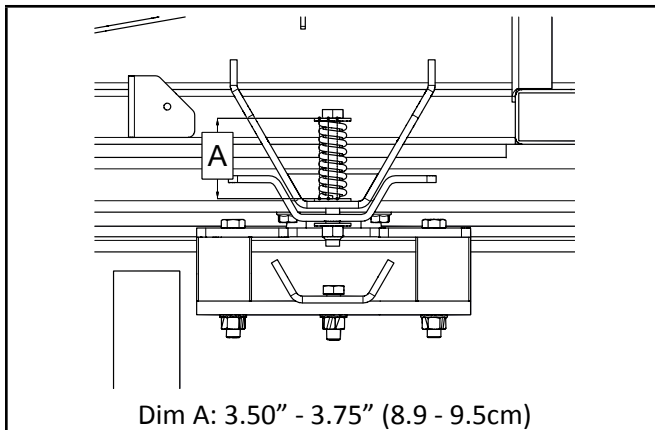


Figure 7A - Front, Middle Mount Spring Compression

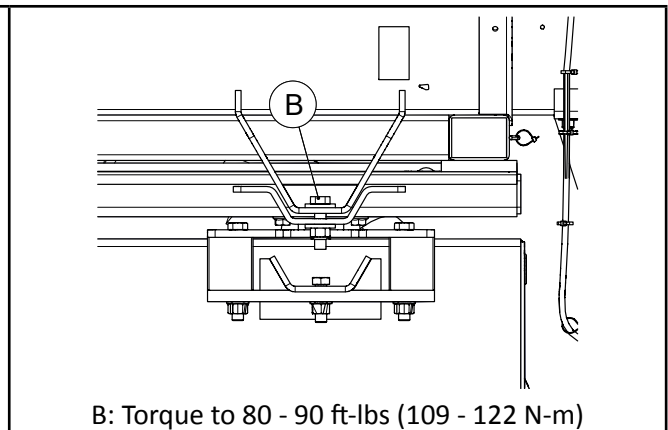


Figure 7B - Spring Torque on Rear Mount

TRAILER BRAKES**WARNING!**

Perform maintenance on level surface with wheels blocked. There is no parking brake on the TR3000. Block the wheels prior to unhitching or any maintenance of the TR3000. Uncontrolled movement of the trailer could cause death or serious injury.

Using sight window on drums' dust shields, adjust brakes, tighten slack adjuster until brake pads touch brake drums, then back off 1/4 turn.

Brake noise and/or sluggish brake response may indicate air in the brake line. To correct this problem perform the bleeding procedure listed below.

Bleeding Procedure:

Modulate tractor brakes to low pressure and flow.

On top of rams, loosen bleeder plugs to fill system.

Attach supply line to tractor. Press brake pedal or operate a pump to charge system.

**DANGER**

Do not check leaks with hands while system is operating as high pressure leaks can be dangerous! If skin is pierced with hydraulic fluid at high pressure seek immediate medical attention as fluid injected into the skin could cause gangrene if left untreated. Relieve pressure before disconnecting hydraulic lines or working with system. Make sure all hydraulic fluid connections are tight and all hydraulic hoses and lines are in good condition before applying pressure to the system. Wear protective gloves and safety glasses or goggles when working with hydraulic systems.

When fluid is seeping from bleeder holes, release brake pedal or turn off hydraulic power unit pump and install bleeder plugs.

Loosen one bleeder plug a 1/2 turn and apply brakes to remove remaining air.

Tighten bleeder plug.

Make sure ram is free of air.

Complete steps 5-7 for all four rams.

Allow system to set for five or more minutes. This will allow any additional trapped air to rise to the top of the system.

Break the line at the highest point. This is located in the center of the bulkhead assembly.

NOTICE! Fittings must be tightened under hydraulic pressure or air may be drawn back into system.

Apply pressure to brake to remove any air from the system and tighten fittings.

Apply brakes and check for leaks. Make sure all rams are fully extended while applying braking force to brake drums. If done correctly, the ram and slack adjuster will be at 90° to each other (Figure 8). The ram should extend approximately 1 1/2 inch (38 mm) to 1 3/4 inch (44 mm).

If brakes chatter or rams do not fully extend repeat steps 5-12.

When complete, rams must be fully retracted.

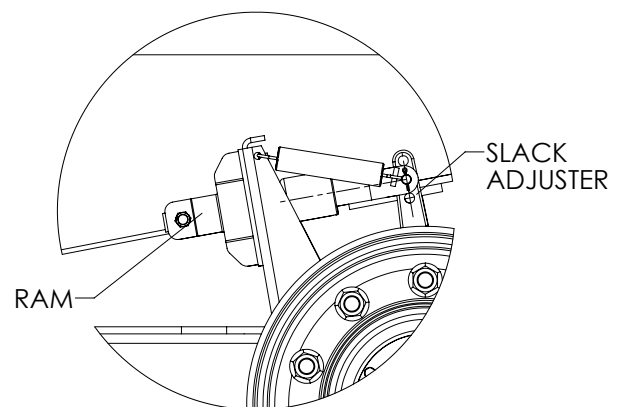


Figure 8

TIRES

NOTICE! Inspect tires and wheels daily for wear and/or loose hardware.

**WARNING**

Service of tires and rims can be dangerous. Follow all safety rules. Only specialized personnel should mount tires. Use proper equipment and procedures. Damaged tires can explode causing injury. Falling and/or rolling tires may cause injury.

**WARNING**

Do not over inflate tires. DO NOT stand in front of or over tires when inflating. If necessary, use a clip-on air chuck and extension hose. Over-inflating can cause tire to explode, causing serious injury. Always inflate tire/rim assembly with an OSHA approved cage or restraining device. Tire and rim diameters should always match.

Always maintain correct tire pressure. Set tire pressure at 20 PSI (1.38 bar) to minimize ground compaction. See “General Operating Procedures” section.

Check tires frequently during extreme temperatures.

Refer to tire manufacturer for additional information.

WHEELS & LUG NUTS

Wheel Installation

**CAUTION**

Retorque wheel studs after 10 hours of operation.

Make sure brakes are not engaged.

Check all parts are free of dirt and grease. Make sure all parts are free of damage. The hub or drum mounting face must be cleaned and kept flat.

Ensure that the brake drum is on the pilots’ raised step, seated fully against the hub.

Clean the wheel’s center hole as necessary so it will fit easily on the hub pilots.

Apply two drops of oil between the nuts and flange and two drops to the last 2 or 3 threads at the end of each stud. Lightly lubricate the pilots on the hub to ease wheel installation and removal.

NOTICE!

DO NOT get lubricant on the mounting face of the drum or wheel. This will cause hardware to loosen prematurely.

Position hub with one pilot at 12 o’clock position. Place wheel onto hub carefully so as not to damage stud threads. Make sure wheel is fully seated against drum.

Install hardened spacer and nuts, finger-tight, at 12 o’clock and 6 o’clock positions. Rotate wheel 180° and make sure wheel is fully seated against drum. Repeat as needed. Install spacers and nuts finger-tight on remaining studs.

Tighten nuts to 50 ft-lb (67.8 N-m) following a crisscross sequence as shown in Figure 9.

After the wheel is installed inspect the seating of the wheels on all four pilots and turn the wheel checking for irregularity of the wheel assembly. This will ensure the wheel is seated on the pilots and flat against the drum. Tighten all nuts to 450-500 ft-lb (610.2-678 N-m) using the crisscross sequence as shown in Figure 32.

Repeat torque sequence until all nuts are consistent to 450-500 ft-lb (610.2-678 N-m).



Figure 9

END-OF-SEASON STORAGE



WARNING

Never store implement with material in bin. Implement could tip and crush or strike someone causing serious injury or even death.

1. Refer to “Pre- & Post-Season Checklists” at the end of this section. Complete End-of-Season Checklist as required.
2. Store implement indoors on a hard, level surface, with wheels blocked to prevent rolling.
3. Lower jack to support the implement so that it is level. Ensure that the jack is placed securely on a hard surface.
4. Place all power connections in storage positions as shown in Figure 10:
 - Store light connector in storage bracket located on hose guide (A).
 - Store ISOBUS connector in receptacle (B).
 - Store hydraulic hoses in provisions on hose guide (C).
5. Disconnect implement from tractor.

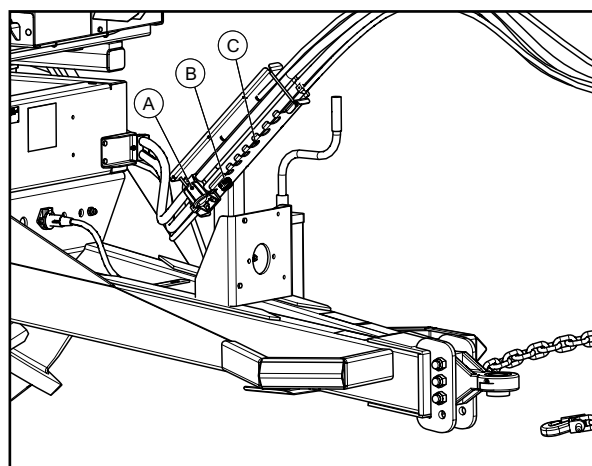


Figure 10

CLEAN UP

NOTICE!

High pressure wash can inject water and/or fertilizer into control components, causing damage. Use caution when cleaning these areas.

Thoroughly wash unit every two to three days during the operating season to maintain minimal maintenance operation. Hose unit down under pressure to free all sticky and frozen material.

It is important the unit be thoroughly cleaned at the end of each operating season. All lubrication and maintenance instructions should be closely followed. Repaint worn spots to prevent formation of rust.

This page is intentionally left blank.

NOTICE!

The lubricant distributor and/or supplier is to be held responsible for results obtained from their products. Procure lubricants from distributors and/or suppliers of unquestionable integrity, supplying known and tested products. Do not jeopardize your equipment with inferior lubricants. No specific brands of oil are recommended. Use only products qualified under the following oil viscosity specifications and classification recommended by reputable oil companies.

HYDRAULIC SYSTEM

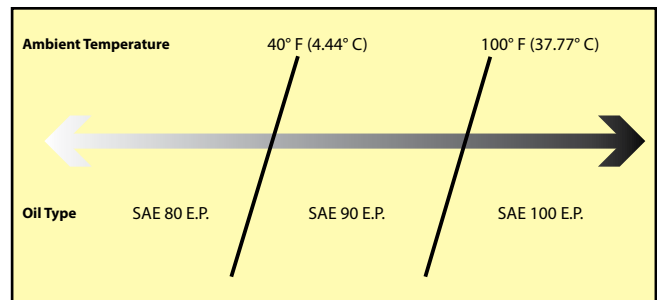
Use premium quality lubricants with 100-200 SUS or 20-43 cSt viscosity at operating temperatures. The hydraulic fluid's specifications in the table below are for normal operating conditions. Extreme environments or dirty conditions may require the use of different oils. Consult your New Leader dealer or the Product Support Department at Highway Equipment Company for systems operating outside normal conditions.

Ideal Oil Operating Temperature	115-158°F (46.11-70° C)
Recommended Premium Lubricant	Multi-Purpose Agriculture Hydraulic & Transmission Oil
Lubricant Specifications Viscosity Index Viscosity at 40°C, cst Viscosity at 100°C, cst	Greater than 130 Less than 68 Greater than 9
Acceptable Fluid Example	Mobil 424

GEARCASE LUBRICANT

Lubricate these assemblies with non-corrosive type extreme pressure (E.P.) gear oil conforming to MIL-L2105 B multi-purpose gear lubricating oil requirements (API Service GL 4) based on ambient temperatures listed below. Refill gearcase with one and a half (1-1/2) pints (.70 liters) of recommended lubricant.

Ambient Temperature	Oil Type
Below 40°F (4.4°C)	SAE 80 E.P.
40° - 100° F (4.4° - 38° C)	SAE 90 E.P.
Above 100° F (38° C)	SAE 140 E.P.

**Figure 7****GREASE GUN LUBRICANT**

Use a waterproof ball and roller bearing lithium base lubricant with a minimum melting point of 300°F (148.8° C). This lubricant should have a viscosity which assures easy handling in the pressure gun at prevailing atmospheric temperatures. The grease should conform to NLGI No. 2 consistency.

CHAIN OILER MIXTURE

Use a mixture of 75% diesel fuel mixed with 25% SAE 10 engine oil (use clean oil, not pre-used oil).



WARNING

Shut off all power and allow all moving parts to come to rest before performing any maintenance operation.

The spreader should be regularly lubricated with the lubricants recommended in this manual in accordance with the following chart:

Location	Places	Method	Frequency
Conveyor			
Idler Bearings (1, 2 - Front Bank)	2	Grease Gun	Weekly
Driveshaft Bearings (2, 3 - Rear Bank)	2		
Chain Oiler	1	Oil Mixture	Daily, After first 10 hours spreading
Gearcase	1	Gear Oil	Check Monthly; Change Annually
Feedgate			
Jack Assembly (6, 7 - Rear Bank)	2	Grease Gun	Weekly
Spinner Assembly			
Jack Assembly (4, 8 - Rear Bank)	2	Grease Gun	Weekly

NOTE: Unusual conditions, such as excessive dust, temperature extremes or excessive moisture may require more frequent lubrication of specific parts.

*See “Lubricant and Hydraulic Oil Specifications” for types of lubricants to be used.

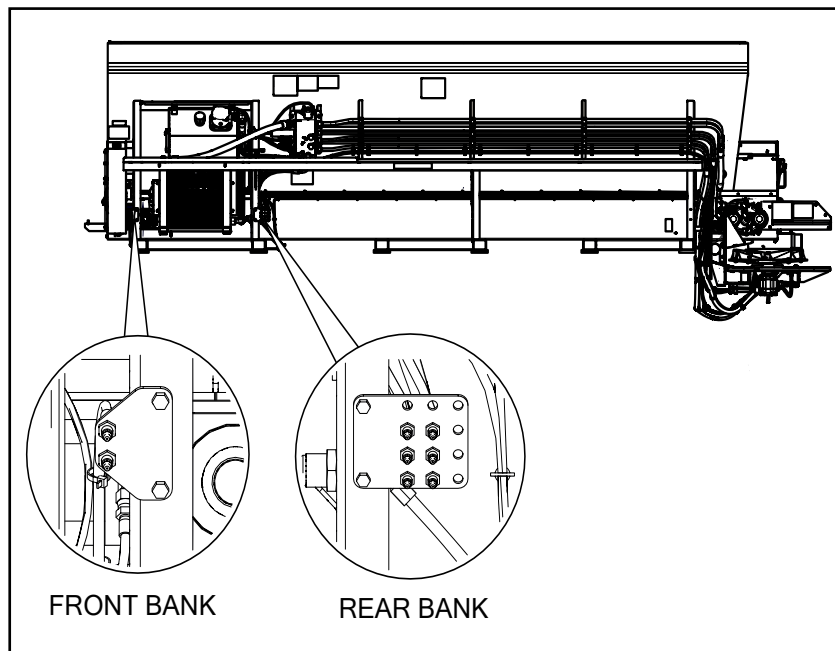


Figure 7 - Spreader Grease Banks

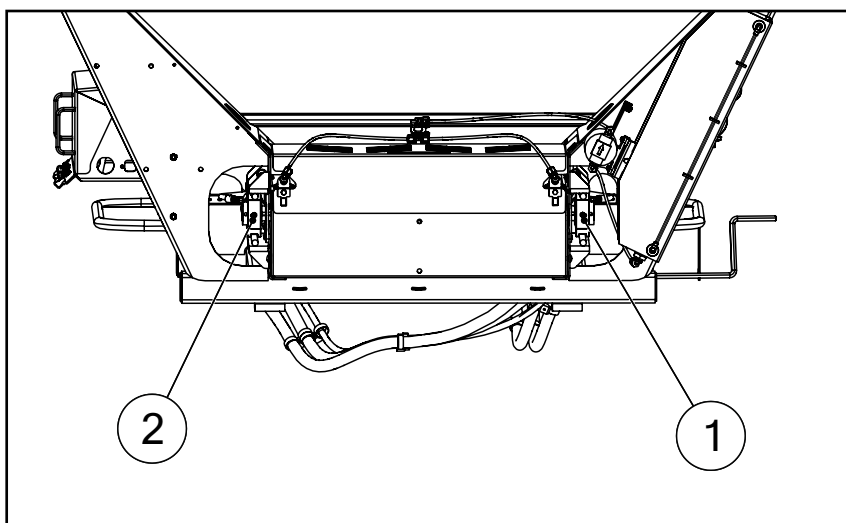


Figure 8 - Front Grease Bank Locations

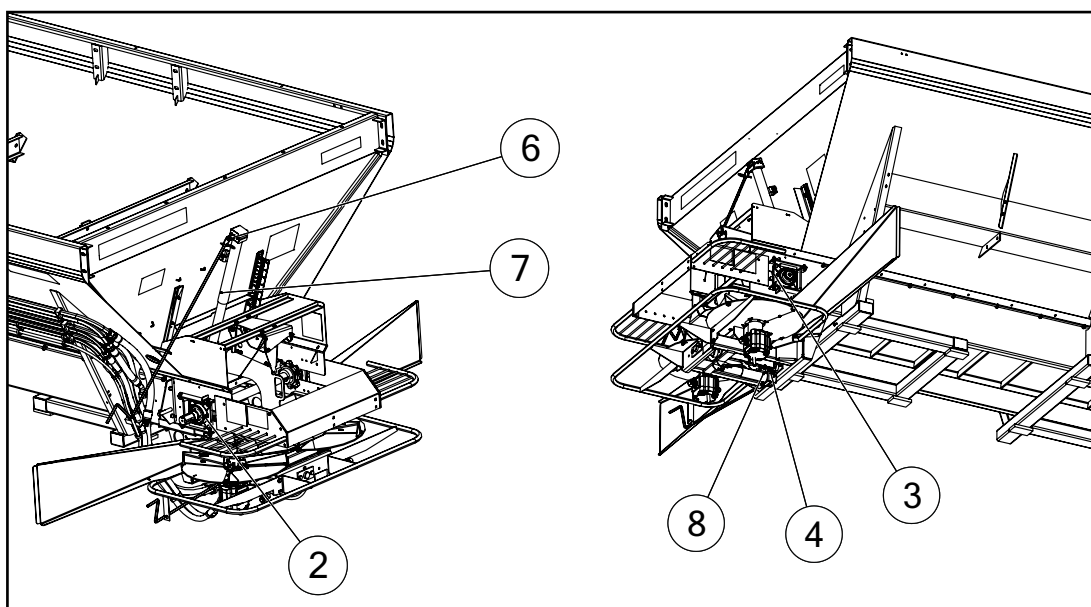


Figure 9 - Rear Grease Bank Locations



WARNING

Shut off all power and allow all moving parts to come to rest before performing any maintenance operation.

The implement should be regularly lubricated with the lubricants recommended in this manual in accordance with the following chart:

Location	Places	Method	Frequency
1. Tongue			
Trailer Jack (a)	1	Grease Gun	Weekly
Bull-Pull Hitch (b)	1	Grease Gun	
2. Wheel End & Axles			
Spindle Bushings (A, D - Grease Banks)	4	Grease Gun	Weekly
Cam Bushings (B, E - Grease Banks)	4	Grease Gun	
Slack Adjusters (C, F - Grease Banks)	4	Grease Gun	
Inner Walking Beam (G - Grease Banks)	2	Grease Gun	
Outer Hanger (H - Grease Banks)	2	Grease Gun	
Outer Walking Beam (I - Grease Banks)	2	Grease Gun	
Center Hanger (J - LH Grease Bank)	1	Grease Gun	
Wheel Bearing (K)	4	Replace synthetic “Semi-Fluid” long-life grease if hub is removed for servicing.	

NOTE: Unusual conditions, such as excessive dust, temperature extremes or excessive moisture may require more frequent lubrication of specific parts.

*See "Lubricant and Hydraulic Oil Specifications" for types of lubricants and oil to be used.

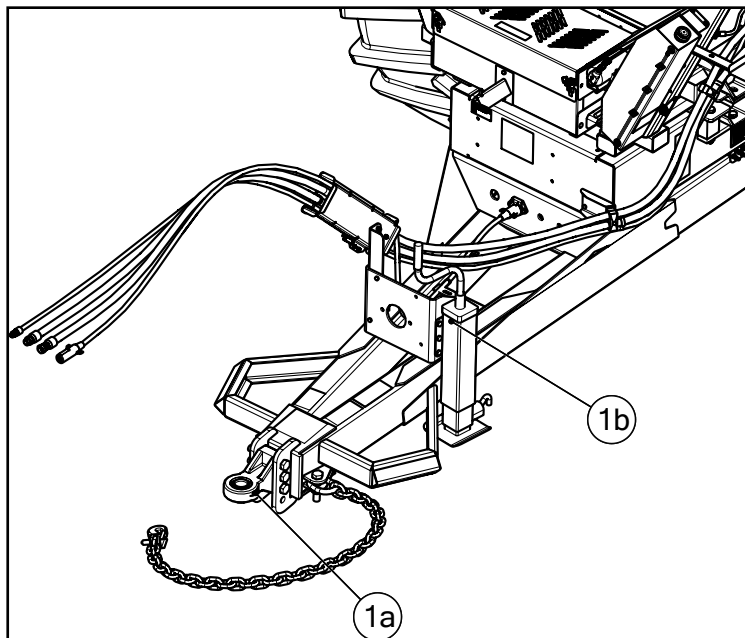


Figure 12 - Trailer Tongue Grease Locations

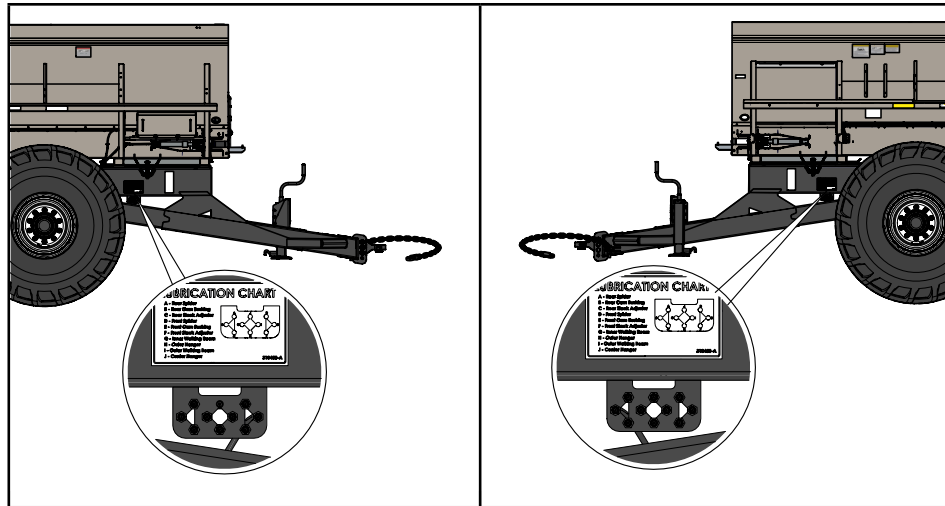


Figure 10 - TR3000 Grease Banks

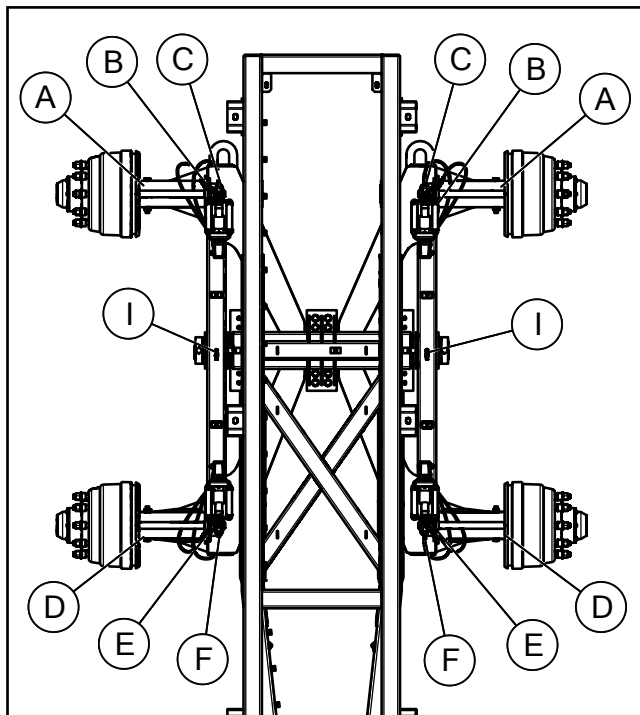


Figure 11A - TR3000 Grease Locations Top Side

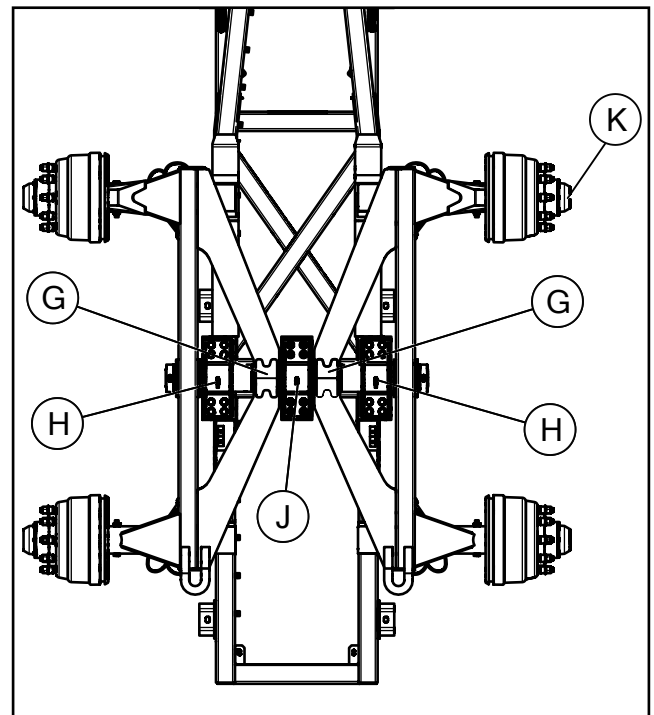
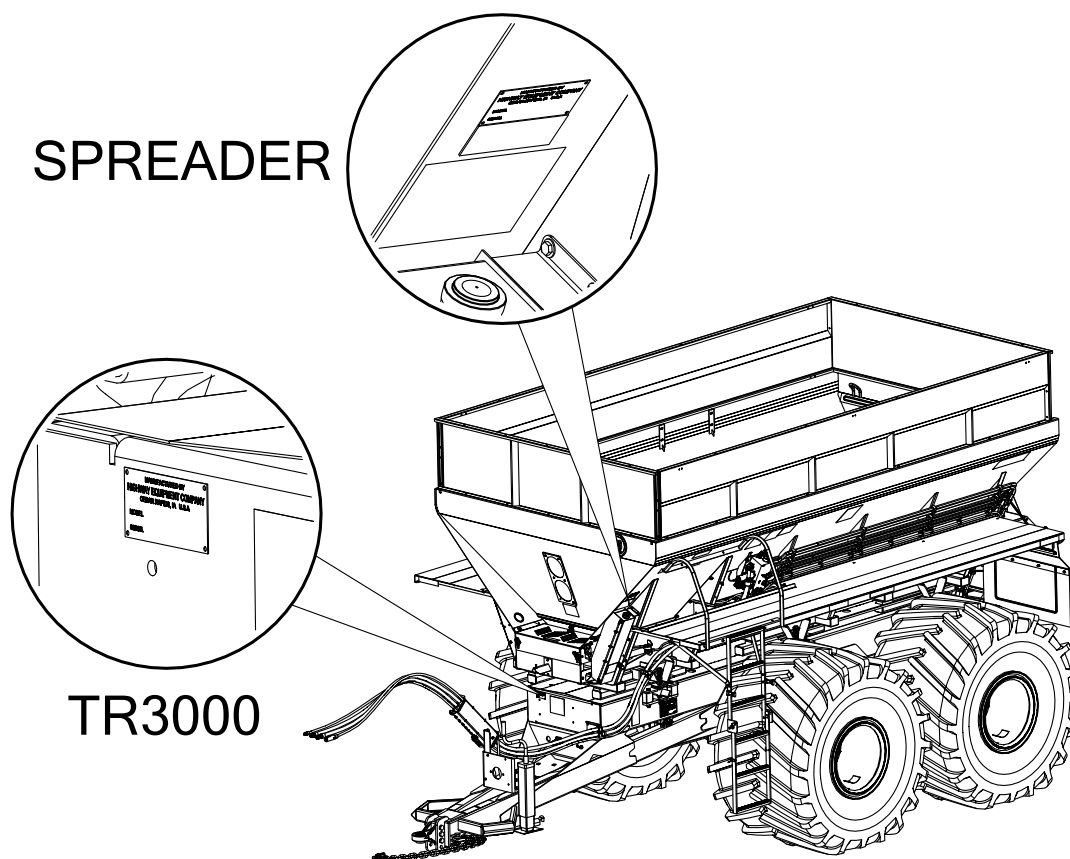
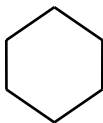


Figure 11B - TR3000 Grease Locations Underside



CAP SCREW GRADE IDENTIFICATION - MARKINGS ON HEAD

SAE GRADE 2  NO MARKINGS

SAE GRADE 5  THREE MARKS - 120 DEGREES APART

SAE GRADE 8  SIX MARKS - 60 DEGREES APART

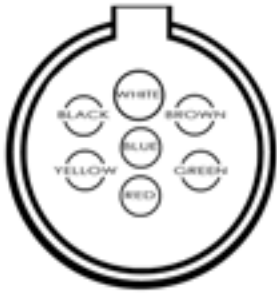
USE GRADE 2 TORQUES FOR STAINLESS STEEL FASTENERS AND CARRIAGE BOLTS.

CAP SCREW SIZE	TORQUE - FOOT-POUNDS					
	GRADE 2		GRADE 5		GRADE 8	
	DRY	LUBE	DRY	LUBE	DRY	LUBE
1/4"	5	4	8	6	12	9
5/16"	11	8	17	13	25	18
3/8"	20	15	30	23	45	35
7/16"	30	24	50	35	70	55
1/2"	50	35	75	55	110	80
9/16"	65	50	110	80	150	110
5/8"	90	70	150	110	220	170
3/4"	100	120	260	200	380	280
7/8"	140	110	400	300	600	460
1"	220	160	580	440	900	650

Symptom:	Reason:	Correction:
Spinner will not run	Defective Spinner Control Valve	Replace spinner control valve cartridge and coil.
	No voltage at valve	Verify spinner switch is on.
		Verify spinner enable is checked.
		Verify controller has a target spinner RPM entered.
		Check WSM 7.5 amp fuse is not blown.
		Verify spinner control harness is not damaged.
		Verify system was configured as Basic independent.
	No hydraulic flow	Verify hydraulics are on.
		Pressure test pump - replace as needed.
		System is going over relief - test & replace as needed.
Spinner will not shut off	Defective spinner control valve	Replace spinner control valve cartridge.
	Control valve is manually overrode	Loosen jam nut on control valve cartridge and back set screw out until spinner stops.
Spinner runs erratic	Defective spinner control valve	Replace spinner control valve cartridge.
	Spinner speed sensor harness failure	Replace sensor harness.
	Spinner speed sensor not properly installed	Adjust sensor so that gap between sensor and fin mounting bolt is less than 1/8".
Spinner speed drops off when turning around	Improper control settings	Verify PWM control is set properly (HOLD for gear pumps, CONTROL for variable displacement).
Spinner speed does not hit target	Defective spinner control valve	Replace spinner control valve cartridge.
	Pump failure	Flow and pressure test pump.
	Spinner speed sensor not properly installed	Adjust sensor so that gap between sensor and fin mounting bolt is less than 1/8".
	Hydraulic flow dropping off	Adjust settings and speed. Pressure test relief (adjust or replace as needed).
	Spinner speed sensor harness failure	Replace sensor harness.
	Spinner speed sensor failure	Replace spinner speed sensor.
Conveyor will not run	Defective conveyor control valve	Replace conveyor valve cartridge.
	No voltage at valve	Verify bin switch and master switches on.
		Verify in controller that target rate, density, ground speed and a CFR number are all entered.
		Check WSM 7.5 amp fuse is not blown.
		Verify conveyor control harness is not damaged.
	No hydraulic flow	Verify hydraulics are on.
		Pressure test pump - replace as needed.
		System is going over relief - test & replace as needed.
		Conveyor is going over relief - test & replace as needed.

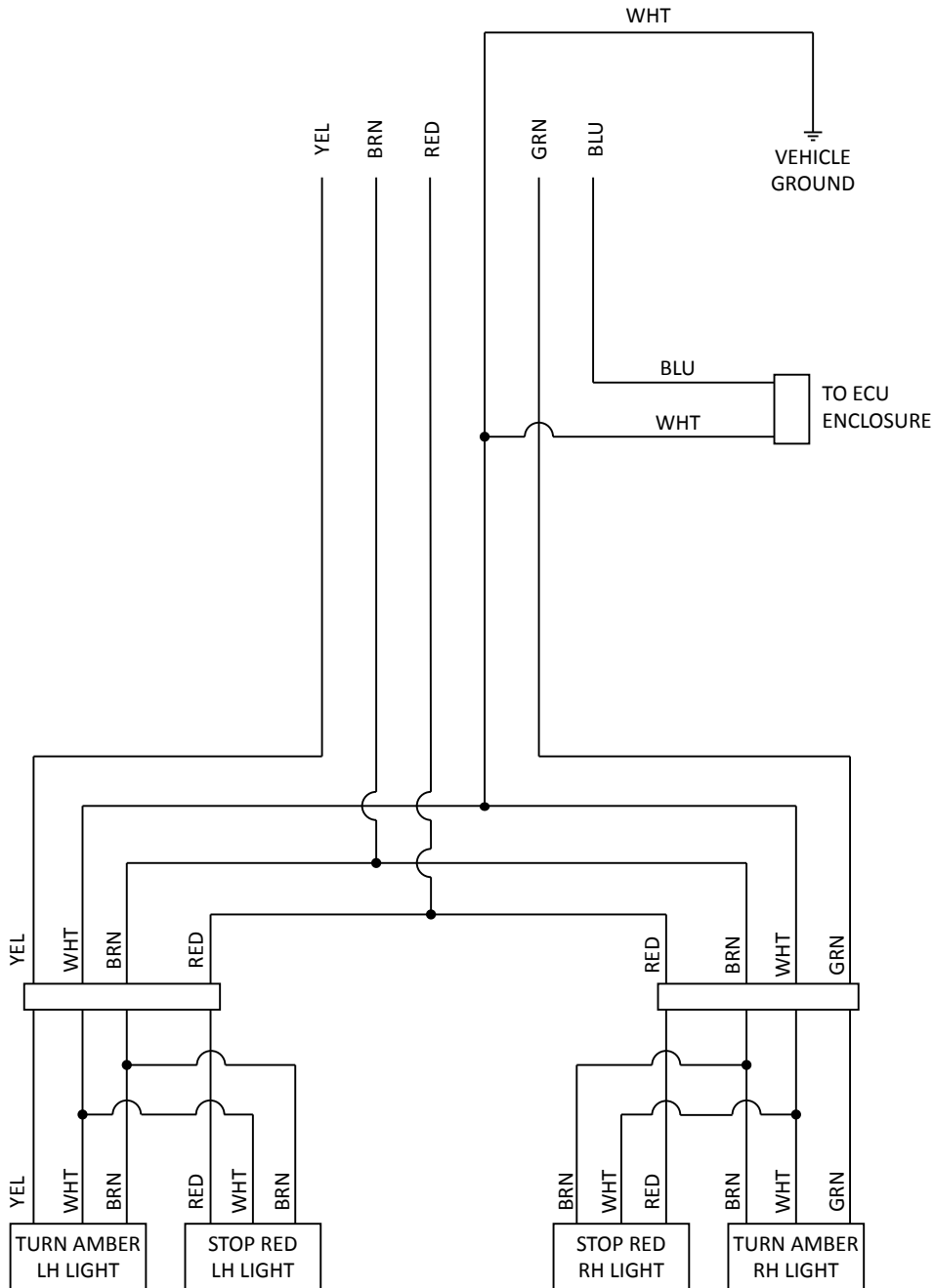
Symptom:	Reason:	Correction:
Conveyor will not shut off	Defective conveyor cartridge	Replace conveyor control valve cartridge.
	Control valve is out of time	Adjust cartridge timing.
Conveyor runs erratic	Defective conveyor cartridge	Replace conveyor control valve cartridge.
	Encoder failure	Replace encoder.
	Encoder harness failure	Replace harness.
	Rates smooting is disabled	Enable rate smoothing.
Bin will not hit target rate	Defective conveyor cartridge	Replace conveyor control valve cartridge.
	Pump failure	Flow and pressure test pump.
	Going over relief	Adjust setting and speed. Pressure test relief (adjust or replace as needed).
	Encoder failure	Replace encoder.
	Encoder harness failure	Replace harness.
Hydraulics over-heating	Pump failure	Flow and pressure test pump.
	Too much flow	Flow test pump.
	System relief	Pressure test relief (adjust or replace as needed). Adjust settings and speed.
	Conveyor valve relief	Pressure test relief (adjust or replace as needed). Adjust settings and speed.
	Oil cooler fan failure	see cooler fan failures.
	Case drain on mono valve is plugged.	Case drain requires zero pressure line back to tank.
Cooler Fan failure	No power at fan	Verify FAN 30-amp fuse is not blown. Verify relay is working properly.
	Fan failure	Replace fan.
No warnings being displayed	Warnings are only shown when VT screen is active on monitor	Switch from viewing map to viewing VT.
Bin level sensors not working properly	Not enabled	Verify system was configured with bin level snesors installed.
	Bin level sensor failure	Replace sensor.
	Bin level sensor harness failure	Replace harness.
Not applying correct rate	Incorrect settings	Verify density, swath width, gate opening, encoder pulses, and CFR number are all adjusted as needed.
No ground speed	Manual speed is enabled, but set to 0	Enter correct speed or disable manual speed
	AUX broadcast speed is enabled but radar not installed	Disable broadcast AUX speed.
	Incorrect speed source is selected	Select correct speed source.
Conveyor tensioning incorrect	Cartridge isn't adjusted properly	Adjust valve to achieve correct tension.
	Cartridge has failed	Replace cartridge.

ELECTRICAL SCHEMATIC - TR3000



WIRING CODE

- 12GA White Wire (Ground)
- Black Wire (Not Used)
- 12GA Yellow Wire (LH Flash Warning & Turn Light)
- 12GA Red Wire (Stop Lights)
- 12GA Green Wire (RH Flash Warning & Turn Light)
- 12GA Brown Wire (Tail Lights)
- 12GA Blue Wire (Oil Cooler)









SPREADER MODULE LED LIGHT ALERTS

Power LED

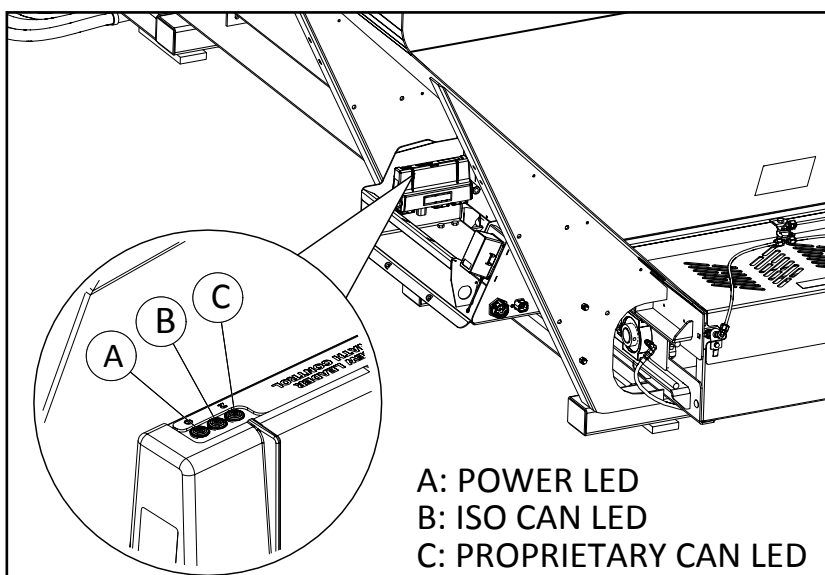
	Off	Solid Red ●	Flashing Red ● ● ● ● ●	Solid Amber ●	Flashing Amber ● ● ● ● ●	Solid Green ●	Flasing Green ● ● ● ● ●
Boot	No Power	N/A	No App	Running	N/A	N/A	N/A
Upgrage		N/A	N/A	N/A	Running	N/A	
Main Application		High Current Power Low	N/A	N/A	N/A	Power OK	

ISO CAN LED

	Off	Solid Red 	Flashing Red 	Solid Amber 	Flashing Amber 	Solid Green 	Flasing Green 
Boot	X	N/A	N/A	N/A	N/A	N/A	N/A
Upgrage	Idle	Bus Off		Bus Error Passive	Bus Error Active		TX / RX
Main Application				Bus Error Passive	Bus Error Active		TX / RX

Proprietary CAN LED

	Off	Solid Red ●	Flashing Red ● ● ● ● ●	Solid Amber ●	Flashing Amber ● ● ● ● ●	Solid Green ●	Flasing Green ● ● ● ● ●
Boot	X	N/A	N/A	N/A	N/A	N/A	N/A
Upgrage	X	N/A		N/A	N/A		N/A
Main Application	Idle	Bus Off		Bus Error Passive	Bus Error Active		TX / RX



IMPORTANT!

Do not operate or work on machine without reading and understanding the operator's manual.

Before starting engine/before starting machine operation

- | | |
|--|---|
| <input type="checkbox"/> Program rate controller and document settings | <input type="checkbox"/> Hydraulic hoses are secured properly |
| <input type="checkbox"/> All stop, tail, and turn lights function properly | <input type="checkbox"/> Gearcase oil level is correct |
| <input type="checkbox"/> Tire pressures are equal on each side of chassis | <input type="checkbox"/> All guards and shields in place |
| <input type="checkbox"/> Battery condition and connection | <input type="checkbox"/> Spinner assy moves through full range of operation |
| <input type="checkbox"/> Electrical connections are tight and secure | <input type="checkbox"/> Spinner discs and fins installed properly |
| <input type="checkbox"/> All fasteners are secure | <input type="checkbox"/> Spinner discs and fins are in acceptable condition |
| <input type="checkbox"/> Inverted V is secure and installed properly | <input type="checkbox"/> Material Divider assembly is square and secure |
| <input type="checkbox"/> Sensor(s) are functioning properly | <input type="checkbox"/> Material Divider is clean of build-up |
| <input type="checkbox"/> Lubricate all grease fittings | <input type="checkbox"/> Feedgate assembly is level and clean of build-up |
| <input type="checkbox"/> Hydraulic connections are tight | <input type="checkbox"/> Encoder installed and secured |
| <input type="checkbox"/> Chain oiler tank is full and operates correctly | <input type="checkbox"/> Spinner sensor adjusted to proper gap |

Start engine/Start and run to operational temperatures

- | | |
|---|---|
| <input type="checkbox"/> Hydraulic fittings are tight and no leaks * | <input type="checkbox"/> Conveyor control valve is operating correctly |
| <input type="checkbox"/> All pressure transducers are operating correctly | <input type="checkbox"/> Calibrate radar/ground speed input |
| <input type="checkbox"/> Check operation of all alarms | <input type="checkbox"/> Test maximum conveyor RPM's |
| <input type="checkbox"/> Hydraulic flow test: ____ GPM @ operating engine RPM | <input type="checkbox"/> Test right and left hand spinner speed; ensure difference is less than 5 RPM (when at operating RPM) |
| <input type="checkbox"/> Check main relief valve setting : ____ PSI | |

Stop operation/Turn off engine and engage parking brake

- | | |
|---|--|
| <input type="checkbox"/> Visually check for leaks | <input type="checkbox"/> All oil levels full |
| <input type="checkbox"/> Check belt/chain tension and alignment | |

Perform Calibrations

- ☐ Product density testing, crush strength, and SGN scale (See *Spread Pattern Calibration* section for instructions).
- ☐ Catch tests of all products and at least 1 blend for conveyor calibration and document settings and product characteristics
- ☐ Spread pattern tests of all products and at least 1 blend and document settings and product characteristics

End of Season

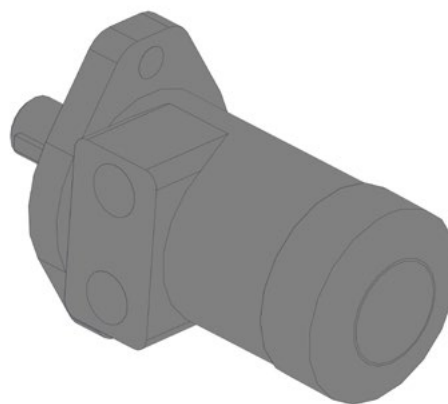
- | | |
|--|--|
| <input type="checkbox"/> Empty unit of all material | <input type="checkbox"/> Clean unit inside and out |
| <input type="checkbox"/> Sand and touch-up paint as necessary | <input type="checkbox"/> Check for leaks |
| <input type="checkbox"/> Wash chain conveyor, lube thoroughly when dry | <input type="checkbox"/> Lubricate all grease fittings |
| <input type="checkbox"/> Check spinner discs and fins for wear | <input type="checkbox"/> Ensure all fasteners are secure |

The following pages contain representative hydraulic schematics and flow diagrams for the NL4560 model spreader.

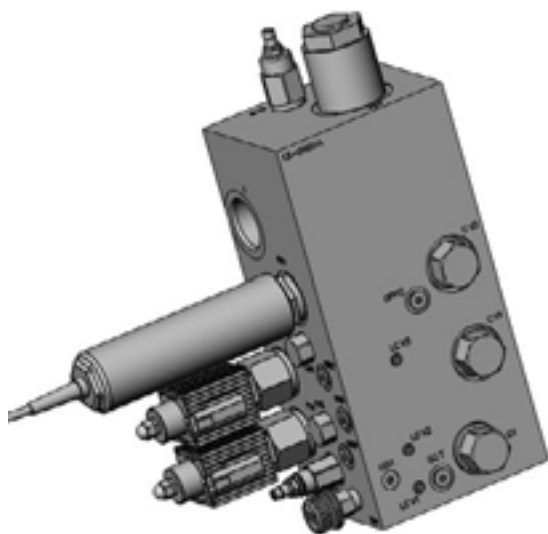
Hydraulic Components



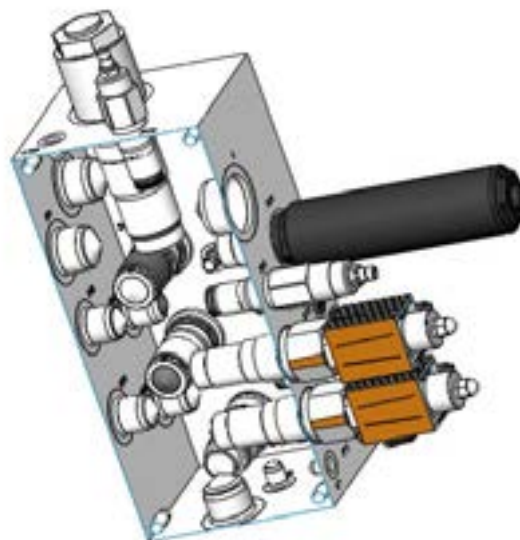
Spinner Motor



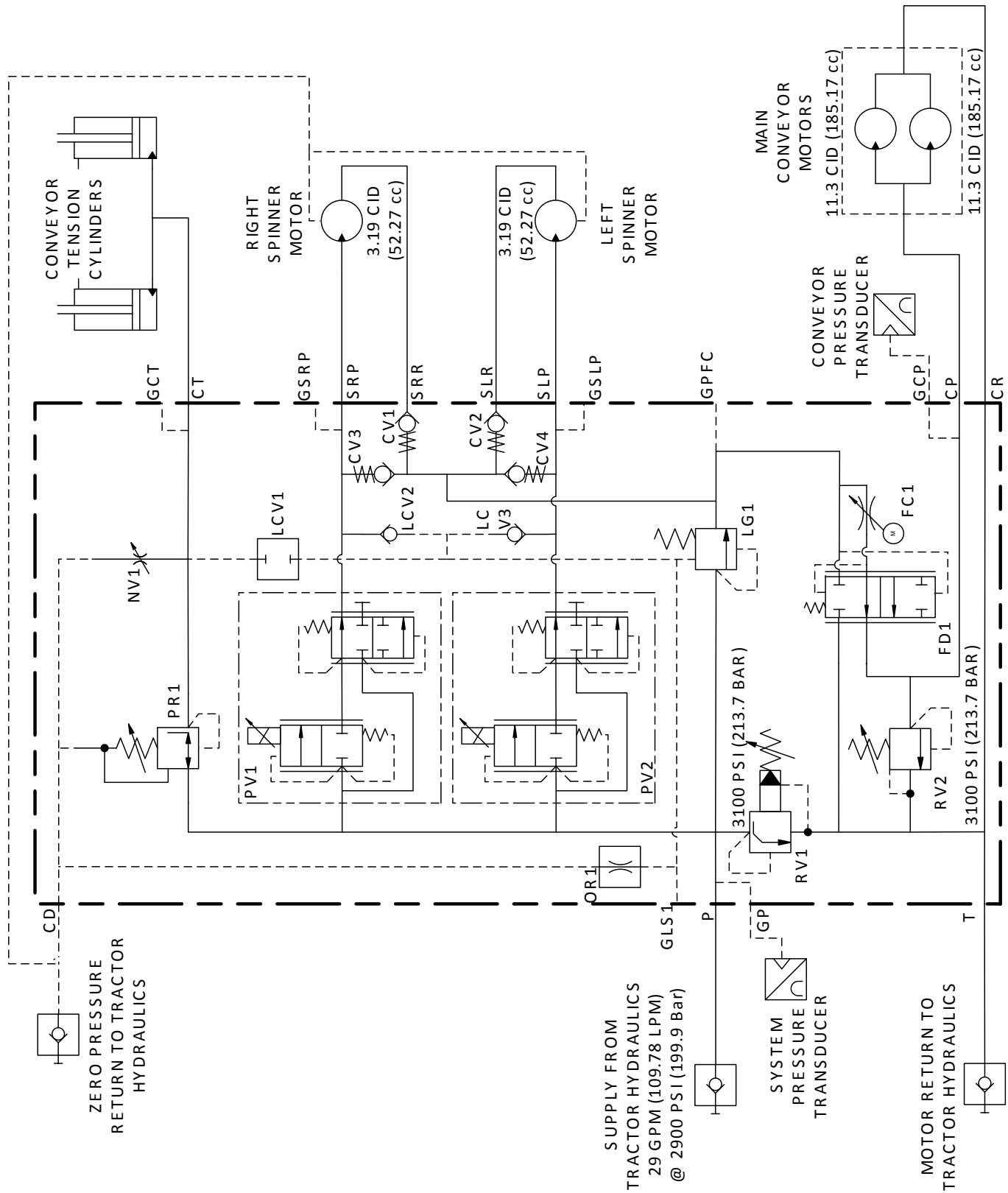
Conveyor Motor

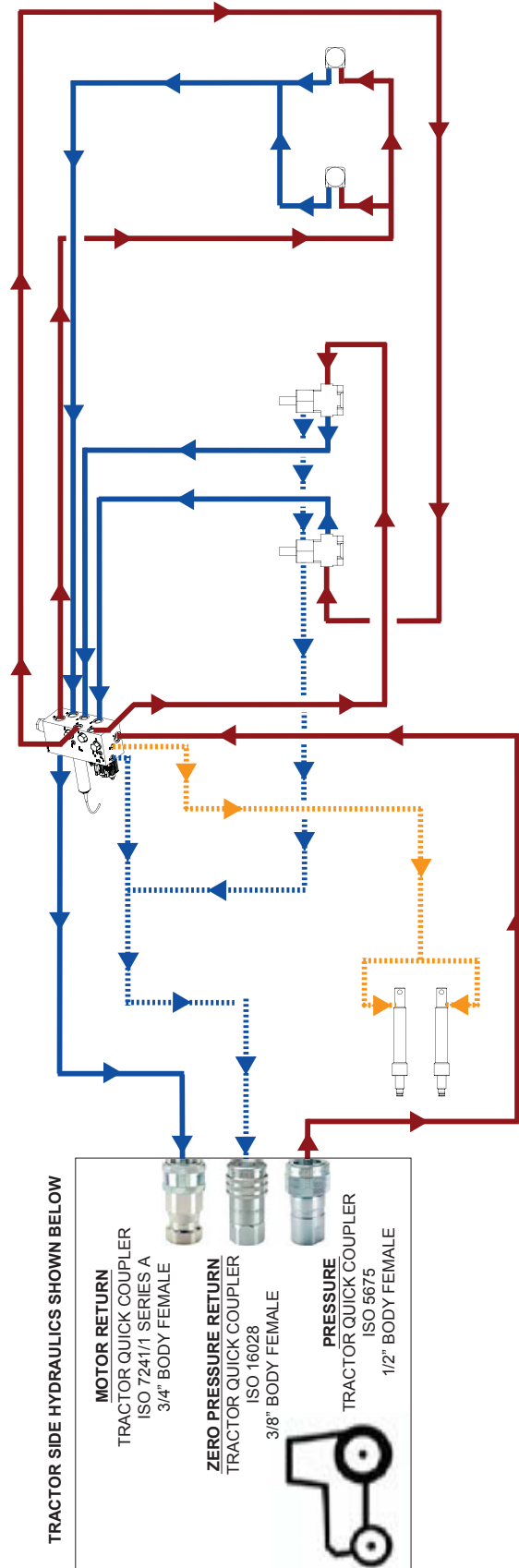


Valve Block - Face



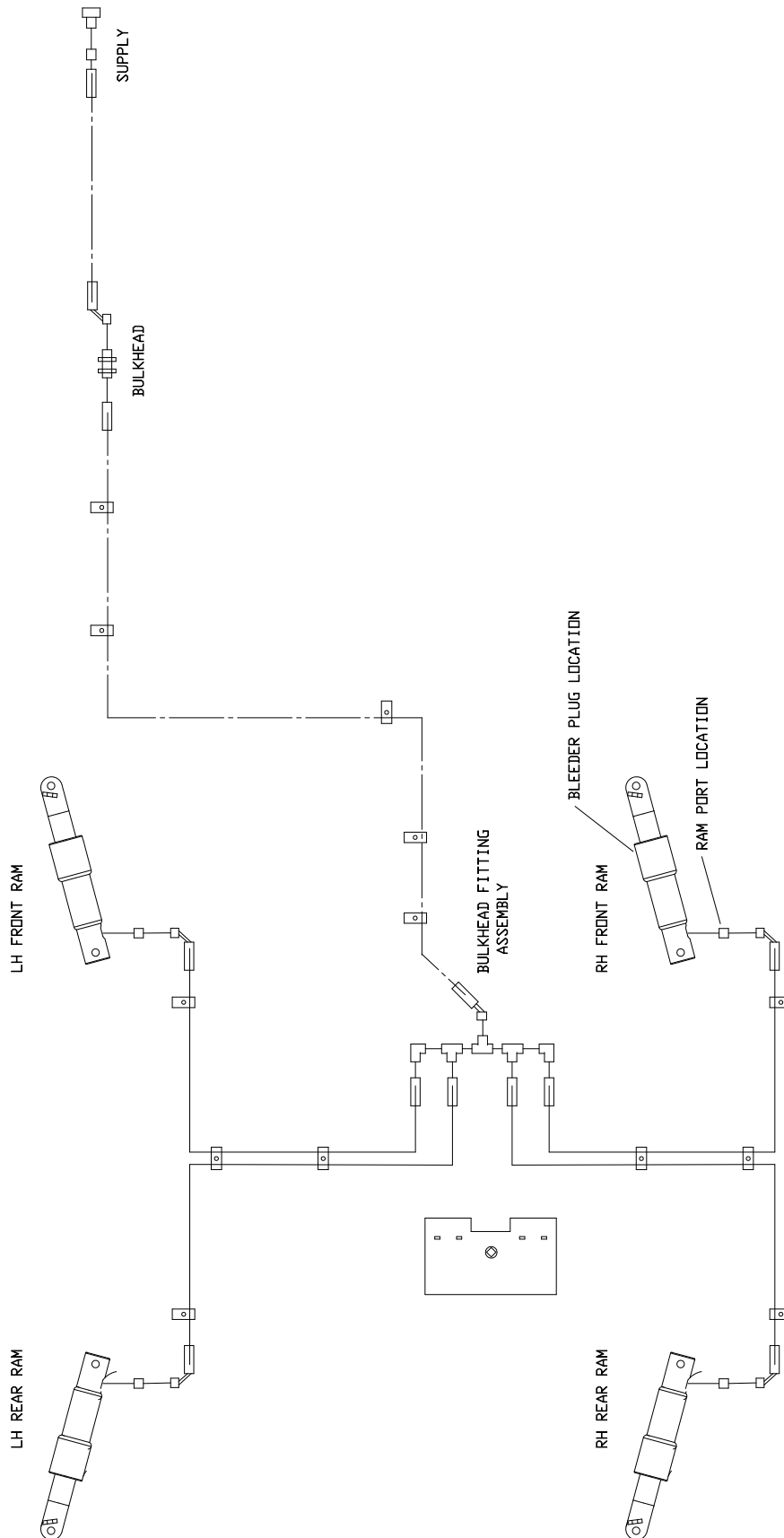
Valve Block - Rear (cut-away)





LEGEND

- CONTROL FLOW (HIGH PRESSURE)
- EXCESS FLOW (HIGH PRESSURE)
- RETURN FLOW (LOW PRESSURE)
- CASE DRAIN (LOW PRESSURE)
- SUCTION FLOW (LOW PRESSURE)
- PRESSURE ONLY (HIGH PRESSURE)



INTRODUCTION

ISOBUS is a protocol standardizing communication between chassis, displays, farm management software, and implements. Adhering to ISO 11783 standards, ISOBUS allows chassis and implements of different colors to share information through a common display. The use of ISOBUS technology allows the end user to minimize the number of necessary monitors in the cab of the chassis, while still enabling full functionality of the implements. The data displays the same way on any monitor.

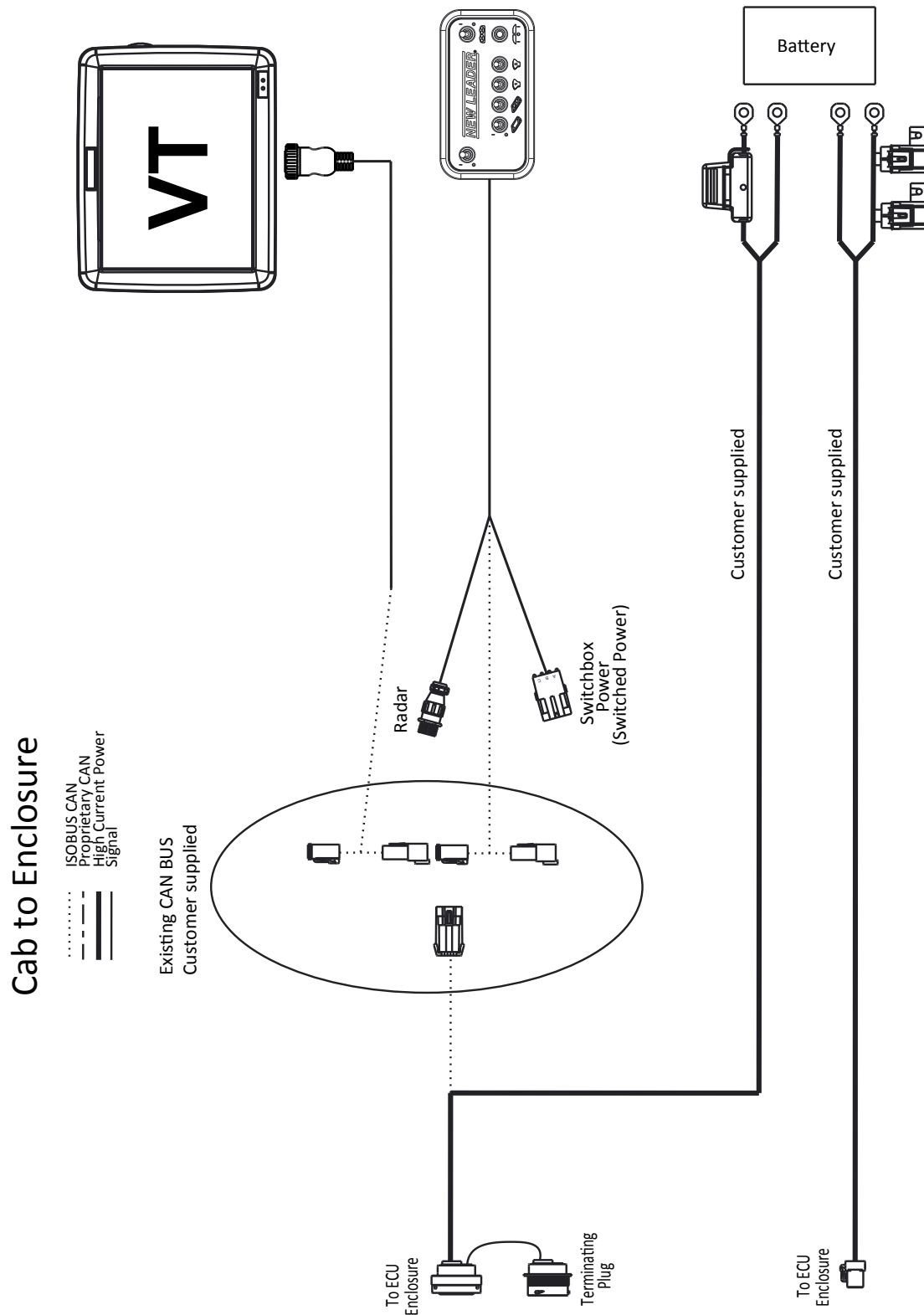
HOW THE ISOBUS WORKS

The BUS is a distinct set of conductors designed to carry data and control signals within a system of parallel connected equipment. Information from the equipment modules is transmitted through the BUS to a Virtual Terminal (VT) in the cab. The Virtual Terminal (VT) uploads a User Interface (UI) which feeds into any Display Monitor. From one Display Monitor, the user can read information and make control changes to the implement(s). Since everything is virtual, multiple implements can be controlled with one monitor by switching back and forth between different VT's.

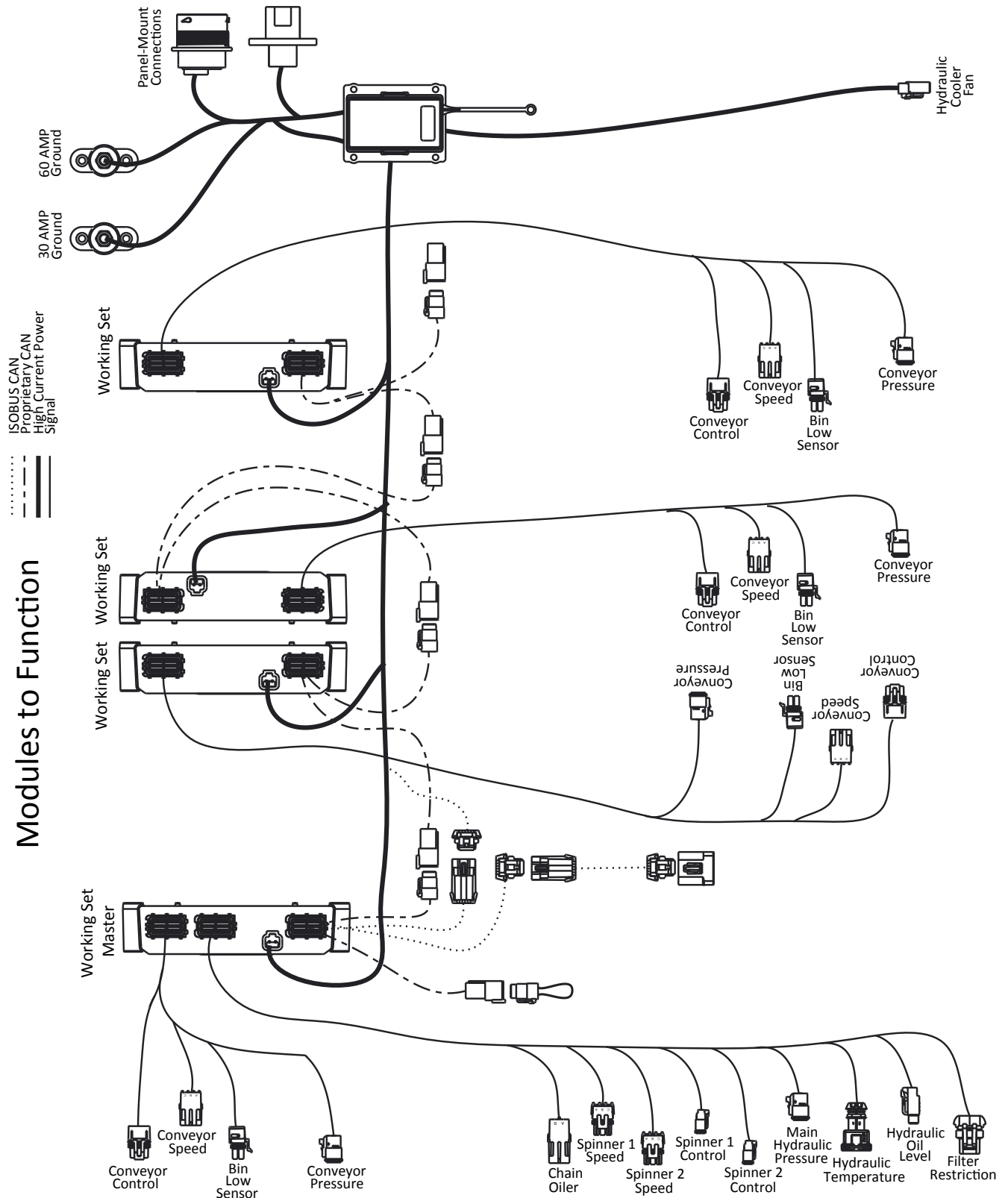
TERMINOLOGIES

- ISOBUS - An electronic communications network used on agricultural and forestry equipment that adheres to the ISO 11783 standards.
- VT (Virtual Terminal) - The electronic interface that resides within the system, rather than on the Display Monitor. By being virtual, the information will display consistently the same on any monitor being used.
- UI (User Interface) - The displayed information and controls the user interacts with on the Display Monitor to make any necessary changes to implement performance.
- ECU (Electronic Control Unit) - New Leader module that controls specific functions of the implement and is attached to the BUS.
- Task Controller - A crucial software component that resides within the Virtual Terminal and is required to provide support for Data Logging, Variable rate application via prescription maps, and on/off implement section control via AutoSwath.
- CANBUS - A CAN (Controller Area Network) BUS system is a vehicle bus standard that allows microcontrollers and devices to communicate with each other within a vehicle without a host computer.
- Display Monitor - The physical monitor used in the cab that communicates with the VT to run the implement(s) and display data from the operations.

CAB TO ENCLOSURE DIAGRAM



MODULES TO FUNCTION DIAGRAM



REQUIREMENTS**System Requirements:**

- Virtual Terminal version 3 that supports AUX-N functionality
- Task Control (Multi-product up to 4 bins)
 - TC-BAS
 - TC-GEO
 - TC-SC

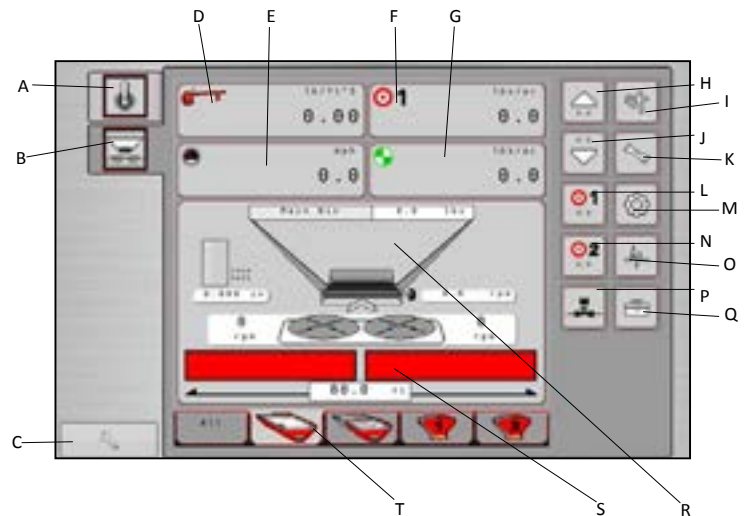
Function:

- VT will load New Leader UI and assign functions to in-cab switches.
- Ability to track totals.
- Ability to log as-applied maps and load prescription maps.
- Ability to activate section control or AutoSwath.

NAVIGATION

To activate the New Leader Controller Interface, power up the monitor and activate the VT settings. For instructions on how to activate the VT, see the Manufacturer's Operations Manual for the specific monitor being used.

Activation of VT will bring up the New Leader Home Screen (also called the "Run Screen"), as shown in Figure 2.









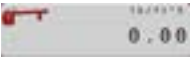













A		Axillary Input	K		Settings
B		Spreader Operations	L		Target Rate 1
C		Virtual Terminal Settings	M		Calibration
D		Density	N		Target Rate 2
E		Speed Source	O		Diagnostics
F		Target Rate	P		Manual Conveyor Mode
G		Actual Rate	Q		Tools
H		Increase Rate Value	R		Bin/Gate settings
I		Run Screen	S		Spinner Settings
J		Decrease Rate Value	T		Bin Selection

Figure 2 - New Leader Home Screen

An on-screen Numeric Keypad is made available for changing configuration settings and calibration numbers. Press the keypad button to access the on-screen numeric entry screen. Keypads may look different depending on VT being used.



Figure 3 - Numeric Keypad

NAVIGATION CONTROL BUTTONS



Back Button



Forward Button



Return to Previous Screen




Accept Entry



Cancel

REGISTRATION

1. Power up Display Monitor and activate VT.


2. Alert screen appears identifying that system is in Demonstration Mode. Press  to continue operating in Demonstration Mode.

**MACHINE CONFIGURATION**

NOTE: Refer to default settings table at end of controller section for factory setup defaults.

NOTE: Before use, Display Monitor must be setup to enable VT connection and a machine configuration may need to be built. See Manufacturer's Operations Manual for detailed instructions on these processes.

1. Perform initial configuration/Factory Setup:
(Only seen on first boot, or if system is reset/reconfigured)
- Power up Display Monitor and activate VT.



- Alert screen appears identifying that system is not configured. Press  to continue.





Overview of attached modules:

- Number of spreader modules will be shown along with any add on modules. Press  to continue.




- Enable installed bins (Select which bins are installed)
- Enable all bins that are installed on the unit by pressing the button next to each. A  will appear next to enabled bins as shown. Press  to continue.




- Enter Bin Settings:
- Bin settings include Name, Capacity, Bin Sensor, Feedgate enabled/disabled, and Pressure Transducer calibration.
- Enter Capacity for Main Bin using keypad. Enable or disable bin level sensor as required. Press  to edit pressure transducer settings. If standard transducers are being used, press  to continue.




- Enable transducers and set calibration settings as necessary (adjust only if standard HECO provided transducers are not being used). Press  to continue.



- Repeat step 3 for MultiApplier or MultiBin Bin 2 as necessary. Press  to continue.




- Repeat step 3 for MultiBin Micro 1 as necessary. Press  to continue.




- Repeat step 3 for MultiBin Micro 2 as necessary. Press  to continue.



- Select Spinner Control Mode:
Determines how spinners are controlled: Basic single, Basic independent, or Monitor.
- Select Basic Independent for L4500 (two PWM)
Press  to continue.





5. Input Task Controller GPS Offsets:
Editing these settings will determine drop point of material behind chassis.
- Select Towed or Self Propelled and enter GPS Offset using keypad. Press  to continue.



Towed




Self-Propelled

6. Review System Setup Summary:
- Verify all settings are correct. Press  to continue or  to go back and adjust as necessary.



7. Configure Auxiliary Switches:
- Switches must be configured before calibration.
- Switchbox switches need to be mapped. Use the Display Monitor's operations manual to map all switches as necessary.

SETTINGS


Changing machine calibrations allows operator to enable/disable bins, adjust valve calibration numbers, change alarm settings and reset modules. Press  to change these settings:

Press  to to enable/disable bins.



1. Enable/Disable bins:
 - Each Installed Bin (as set up in Step 4) will appear. Press each “Enable” button to enable or disable each bin as appropriate for the current job.




2. Press  to adjust valve calibration numbers.

NOTE:

Default settings from the factory should ONLY be changed if absolutely necessary. Changing defaults without researching the specific component may result in erratic behavior of unit.



- Press  to set spinners. Enter appropriate settings:
- PWM Valve settings:
 - “Monitor” - no PWM control
 - “Control” - tries to maintain spinner speed at all times regardless of available hydraulic flow. Best for hydrostatic or CVT drives.
 - “Hold” - Preserves last PWM signal to valve when conveyor is deactivated. Best for geared transmissions with gear pumps.



- PWM Frequency - Frequency that PWM control valve is pulsed at. Settings can be found from valve manufacturer.
- Zero Flow Offset - Represents maximum duty cycle sent to control valve without producing any hydraulic flow from. Increase this number to hit target rate sooner.

IMPORTANT!

Setting Zero Flow Offset too high will cause spinners to overshoot Low Spinner Speeds and could cause delay in reaching set speed. Adjust as needed in small increments.

- PWM Gain - Determines how aggressively control valve responds when making rate adjustments. Higher value means more aggressive system response.

IMPORTANT!

Setting PWM Gain too high spinners will become erratic. Adjust as needed in small increments.

- Set Conveyors by selecting each bin at bottom of screen.

NOTE:

If using PWM valves instead of Servo valved, select “PWM” from “Control Valve Type” list and enter settings as per notes on Spinner valves and test for accuracy.



NOTE:

- Setting value too low can cause product control system to continually hunt for target application rate.
- Setting too high will cause excessive product application error and a delay in target rate being reached.

Enter appropriate settings:

- Valve Response 1 - Determines speed of servo valve when product control error exceeds Response Threshold setting. Represents fast speed of servo valve. Decreasing value will cause servo valve to run slower. Default setting is 40%.
- Valve Response 2 - Determines speed of servo valve when product control error is less than Response Threshold setting. Represents slow speed of servo valve. Decreasing value causes servo valve to run slower. Default setting is 8%.
- Response Threshold - Determines where control channel switches between using Valve Response 1 and Valve Response 2 speed setting. Leaving all other valve control settings at default value and making small adjustments to this setting is usually all that is required to fine-tune system performance. Default setting is 4.

NOTE:

- Decreasing Response Threshold value will have overall effect of speeding up servo valve response.
- Increasing Response Threshold value will have overall effect of slowing servo valve response.

- Allowable Error - Determines the percent of error that is allowed prior to product control system making any flow rate changes. 2% - 3% is normal dead band setting range.

3. Adjust Alarm Settings:


- Press  to adjust alarm settings.



- Edit each Alarm setting as desired.



4. Reconfigure System:

- Press  to reset/reconfigure system.
- “Reconfigure” allows the user to adjust any of the system settings made during first time start up (“Initial Configuration” steps 1-6). “Reset” will restore all settings to factory default and all calibration numbers will be lost. These should only be pressed if instructed to do so by service technician or New Leader product support.



COMPONENT CALIBRATION

NOTE: Before regular use, system must be calibrated to ensure accurate spreading.

1. Power up Display Monitor and activate VT.

- The Run screen will appear. Press  to continue.





2. Calibrate Spinner:

- Press  to calibrate spinner.



- Use keypad to edit numeric setting as necessary:
 - Standard spinner discs, set to 4.
 - If using 5 fin discs, set to 5.
 - If using 6 fin discs, set to 6.


Press  to accept change and continue,
or  to cancel.



3. Calibrate Rate Encoder

- Press **Rate Encoder** to calibrate encoder.



- Use keypad to edit setting as necessary. Enter 180 or 360 as labeled on back of encoder. Press  to continue.



4. Calibrate Conveyor

IMPORTANT!

For best results, a catch test must be done for each product to be spread before season begins, or any time a new supply of product is received.

- Press **Conveyor** to calibrate conveyor.




- Manually enter cubic feet per revolution (CFR) rate using keypad.
- To begin catch test, press **Static Routine**.
- To perform in-field calibration, press **Field Routine**.






WARNING







Do not work near rotating spinners. Severe injury can result from contact with moving parts.

- Spinners will automatically shut off. For added safety, disconnect PWM valves. Press  to continue.




- Verify Feed Gate Height and Product Density are correct. Use keypad to edit as needed. Enter Dispense Amount using keypad. Press  to continue.
- Bring engine up to full operating RPM.




- Using the control buttons    (Reset, Run, Stop), run a catch test. If spreading product that has already been tested, press  to continue. To begin a test, press . Conveyor will run.
- Once controller dispenses specific amount, conveyor will stop. Weigh actual material dispensed and enter actual weight. Press  to continue.




- It is recommended a minimum of three (3) tests be done PER PRODUCT to ensure accuracy. Once each test is done, press "Repeat Calibration" to run a subsequent test. When finished, press .



- The main Calibration screen will appear. To calibrate with a known amount brought to a field, press .

Note: Field totals can be reset from Summary Screen if needed.




- After dispensing product in field, screen displays system perceived total of dispensed product. To enter actual dispensed amount, press .



- Using keypad, enter actual weight of product dispensed. Press  to continue.



- New cubic feet per revolution (CFR) rate will be displayed. Press  when finished.



OPERATIONS/FEATURES**CREATE NEW JOB**

These steps are a guide in running system for first time.

1. Create Job in display.



This operation will vary from display to display. Refer to display manual on how to create a job using Task Control. When finished, activate VT.

2. Verify Product Density.

Material Density will vary from product to product. It is imperative that correct density is entered in controller for rates to come out correctly.

- To change product density, press



- Use keypad to enter density. Press  to accept change and continue, or  to cancel.




3. Verify task control in Target Rate 1.

- Rate will be driven by job setup in display. To verify this, TC should show in place of target rate 1. If not, verify job has been created correctly. Refer to display manual.



4. Verify total spread width and spinner speed:


- Different products may require different spread widths or spinner speeds. Always verify these settings are correct before applying product.
- Press  to set spinner speed.



- Enable Spinner Circuit. Using keypads, enter Spinner Speed and Total Spread Width. If desired, enter Spinner Offset (see *Boundary Spreading* section of this manual for instructions).



5. Verify gate opening:

- Press  to set bin levels and change gate opening.




- Use keypad to set feedgate opening to correct reading.



6. Verify CFR number is correct:

Different products may require different calibration numbers. Verify the CFR number is correct before applying product.

- Press  then .
- Use keypad to change CFR number as needed.




BIN FILL

NOTE:


The interface will provide the operator with a visual representation of how much product is left in each bin, and will adjust accordingly as well as change color. If needed, it can be manually overridden.

1. Power up Display Monitor and activate VT.


- The Run screen will appear. Select appropriate bin button at bottom of screen. Press  to continue.



2. Set Bin Level as appropriate:

- The Bin Events screen will appear. If bin is filled to full capacity based on density, press .



- If bin is partially filled based on a known amount, press  and use keypad to enter weight.





- If bin is emptied completely, press .



3. Set alarms:

- Press  to continue.




- Use keypad to set alarms.
 - “Low Bin Alarm Threshold” will set a weight limit based on total weight in bin and application rate.
 - “Low Bin Alarm Time Delay” will set a time (in seconds) for alarm to sound after the Bin Level Sensor is activated due to actual product reduction.
 - Press  to accept change and continue, or  to cancel.




FEEDGATE OPTIMIZER

NOTE: This program will help to determine the ideal gate position for each specific application, based on speed, swath width, density, and application rate.

1. Power up Display Monitor and activate VT.

- The Run screen will appear. Select appropriate bin button at bottom of screen. Press  to continue.



- The Bin Events screen will appear. Press  to continue.





2. Enter average speed and target rate:

- The Feedgate Optimizer screen will appear. Using keypads, enter Average Speed and Target Rate into appropriate fields for each bin.



3. Accept recommended settings:


- Recommended feedgate opening will be displayed along with minimum and maximum rates. If  is selected, new feedgate setting will be saved and operator must manually adjust feedgate to proper height. If  is selected, new settings are ignored and system settings are kept.



BOUNDARY SPREADING

NOTE: This program allows the operator to independently modify spinner speeds to change the width of spread to either side, creating a “boundary” line to maximize spreading efficiency.

1. Power up Display Monitor and activate VT.

- The Run screen will appear. Press  to continue.



2. Enter spinner offset:

- The Spinner Settings screen will appear. To create a Boundary, use the keypad to enter a specific Spinner Offset. Spinner tests should be completed for each product (see *G4 Spread Pattern* section) to determine best offset settings for each product that might be run based on density/hardness and size. For density/hardness testing, see *SGN & Hardness Test Instructions*

Manual. Press  to save and return.



3. Enable boundary spreading:

- When running normally, Run Screen will display both spinners as full green bars. To activate the Boundary, flip the spinner switch on the switch box to the appropriate side.



- When Boundary is activated, Run Screen will display with boundary showing on the appropriate side (right hand boundary activation shown for reference).



DIAGNOSTICS

NOTE: Advanced diagnostic features are available that allow the operator to quickly diagnose most issues that could occur.


1. Power up Display Monitor and activate VT.

- The Run screen will appear. Press Diagnostics to continue.



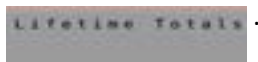
- The Diagnostics screen will appear. To view Bin Diagnostics, press **Module Diagnostics**.




- Diagnostic information for each bin will display (these are used for troubleshooting). Press  to return to Diagnostics screen.



- To view machine lifetimes totals, press **Lifetime Totals**.




- At top of screen, each bin's lifetime totals for acres and weight appears. At bottom of screen, cumulative Acres(ac) and Weight(lbs) will appear. Hours(hrs) will be on main bin only. Press  to return to Diagnostics screen.



- To view active alarms, press



- Current active alarms will display. When an alarm code is highlighted, a description will appear at bottom of screen. This is used for troubleshooting. Press  to return to Diagnostics screen.



- To view unlocked features, press



- Current unlocked features will display. Press “Unlock” to display module serial number and registration number.


Press  to return.



HYDRAULICS

NOTE: This program will show a visual representation of hydraulic monitoring, including system pressure, temperature, conveyor pressure, and indicators for low fluid level and filter restriction. Individual bins can be viewed by pressing the bin icons along the bottom of the screen.

1. Power up Display Monitor and activate VT.

- The Run screen will appear. Press  to continue.



- The Tools main screen will appear. Press



to continue.



2. View hydraulic monitoring:
 - Hydraulics - System pressure, Temperature, and status of Fluid Level and Filter Restrictions will show system wide. Conveyor Pressure will display for Bin 1, and cumulatively for Bins 2-4. Fluid Level and Filter Restriction warnings will display red with warning sign (as shown) if levels are low or if filter is restricted. If neither is at issue, they will display in green without warning sign.

Press  to return to Tools Screen.



BIN FLUSH

NOTE: This program is used to quickly empty each bin. Spinners will automatically shut off and allow the operator to select which bins to empty.

1. Power up Display Monitor and activate VT.

- The Run screen will appear. Press  to continue.



- The Tools main screen will appear. Press



to continue.




WARNING

Do not work near rotating spinners. Severe injury can result from contact with moving parts.



WARNING

Unplug PWM valve to ensure spinners cannot run while in Bin Flush mode to avoid injury.

- Bin Flush will automatically disable spinners. Press  to continue.



2. Select bins:
 - Select bins to be flushed by pressing enable buttons next to each. To adjust conveyor RPM for flush, press



3. Set conveyor RPM:
 - Use keypads to set conveyor RPM for each bin. 20 RPM is default.
 - Bin 1 Maximum = 50 RPM
 - Bin 2 Maximum = 60 RPM
 - Bins 3 & 4 Maximum = 85 RPM

Press to continue.



4. Perform bin flush:
 - To flush bins, press . Conveyors will run until is pressed.

When process completes, press to continue.



WARNING

Do not work near rotating spinners. Severe injury can result from contact with moving parts.


- When exiting Bin Flush process, spinners will restart. Plug PWM valve back in if it was previously disabled. Press to continue.




CHAIN OILER

NOTE: This program is used to manually oil the chain, set alarm frequency, and set auto-lube settings.

1. Power up Display Monitor and activate VT.

- The Run screen will appear. Press  to continue.




- The Tools main screen will appear. Press  to continue.




2. Set duration:
 - Use keypads to set oil chain duration (recommended 1 revolution). Lube routine is not used at this time.





3. Set conveyor dimensions:
- Press “Dimensions” to input conveyor dimensions. Use keypads to input conveyor length and sprocket diameter.

Press  to return to Chain Oiler screen.

Press  to return to Tools Screen.



4. Set service reminder:
- Press “Service Reminder” to set chain oiler reminder. Enable Reminder and use keypad to enter interval hours desired. To restart reminder after manually oiling conveyor, press .

Press  to return to Chain Oiler Screen.




BIN SEQUENCING

NOTE: This program allows the operator to run same product out of two bins, chaining them together so bin 2 starts emptying immediately after bin 1 is empty.

1. Power up Display Monitor and activate VT.

- The Run screen will appear. Press  to continue.



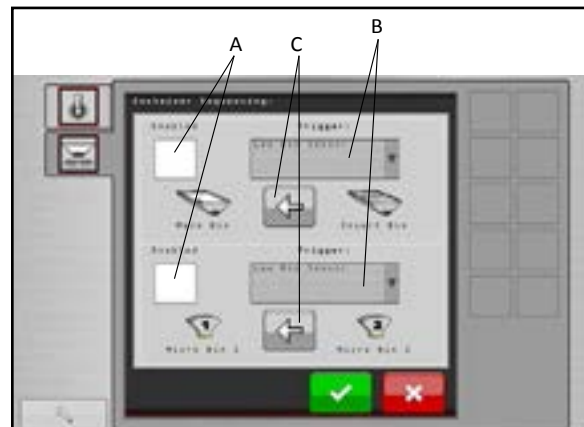
- The Tools main screen will appear. Press  to continue.



2. Setup Bin Sequencing (Chaining):

- Enable bin chaining for Bins 1 & 2, or Bins 3 & 4 as applicable.
- Select trigger type (Manual Only, Low Bin Threshold, Low Bin Sensor, Container Reaches 0).
- Select which bin to empty first by pressing arrow button until arrow points to second bin to empty. Figure at right shows Insert Bin emptying first and Main Bin second; Micro Bin 2 emptying first and Micro Bin 1 second.

Press  to continue.



3. To manually switch bins:
 - When Bin Sequencing is enabled, Manual Override button appears on Run Screen to force switchover to next bin.



ALARM LIST

Warning	Message	Trigger
Rate sensor error during calibration	"Calibration error, lost or intermittent signal from rate sensor. Check sensor and related wiring prior to calibrating conveyor."	Rate sensor signal is lost for a period of two or more consecutive seconds during the Static Conveyor Calibration Routine.
Rate Sensor Error During Conveyor Flush	"Lost or intermittent signal from rate sensor. Check sensor and related wiring prior to continuing Conveyor Flush Routine."	Rate sensor signal is lost for a period of two or more consecutive seconds during the Conveyor Flush Routine.
Low Bin Sensor	"Low Bin Sensor." + channel name.	Bin Level Sensor is installed, metering circuit is commanded on, and the product in the bin does not cover the sensor for a consecutive period of time greater than current [Low Bin Time Delay] setting.
Disable Spinners	"Manually disable or shut off the spinner hydraulic circuit."	At the beginning of the Static Conveyor Calibration and Conveyor flush routine.
Enable Spinners	"Return the spinner hydraulic control to a field ready condition. The spinners will now restart."	At the end of the Static Conveyor Calibration routine and Conveyor flush routine.
Boundary Spinner Not Responding	"Boundary Spinner Not Responding." + Spinner Name.	Automatic control for spinners must be enabled. At least one conveyor must be commanded on. Perceived spinner speed is greater than 30RPM in error from the [Boundary Spreading Spinner RPM Offset].
CLF Basic Single Spinners Not Responding	"Spinners Not Responding."	Automatic control for spinners must be enabled. [CLF Mode] {Basic Single} must be selected. At least one product bin must be commanded on. Perceived spinner speed is greater than 30RPM in error from the [Target Spinner Speed] setting for a period of 5 or more consecutive seconds.
CLF Basic Independent Spinners Not Responding	"Spinner Not Responding." + Spinner Name.	Automatic control for spinners must be enabled. [CLF Mode] {Basic Independent} must be selected. At least one product bin must be commanded on. Perceived spinner speed is greater than 30RPM in error from the [Target Spinner Speed] setting for a period of 5 or more consecutive seconds.
Spinners Off	"Stop Application, Spinners Off!"	CLF is enabled, no spinner speed detected, one or more control channels is commanded on.
Spinners On	"Turn spinner switch off to prevent spinners from running!"	Upon system start up, [CLF Mode] enabled, spinner functionality switch detected in the ON position.

Warning	Message	Trigger
Disable Spinners	Manually disable or shut off the spinner hydraulic circuit.	The point the user selects to run the chain oiler routine.
Enable Spinners	Return the spinner hydraulic circuit to a field ready condition.	The point the user exits the chain oiler routine.
Conveyor Lubrication Required	Conveyor Chain Lubrication Is Required.	[Service Reminder On] setting is enabled and [Service Reminder Interval] has expired.
Rate Not Responding	"Rate Not Responding." + Channel Name.	Control channel is commanded on using automatic control mode. Application rate is +/- [Rate Not Responding Threshold] from target rate for a period of [Rate Not Responding Timeout] or more.
Maximum Conveyor Speed	Conveyor At Maximum RPM, Slow Down + Channel Name.	Product channel is commanded on and conveyor is run at or above maximum speed for a period of 5 or more consecutive seconds.
Minimum Conveyor Speed	Conveyor At Maximum RPM, Slow Down + Channel Name.	Product channel is commanded on and conveyor is run at or below minimum speed for a period of 5 or more consecutive seconds.
Conveyor Not Responding	Conveyor Running While Turned Off + Channel Name.	Product bin is commanded off and conveyor speed >0 and <1 RPM for a period of 30 or more consecutive seconds. Or conveyor speed is >=1 RPM for a period of 5 or more consecutive seconds.
Container Advance	Moving to next container in the sequence.	At the point when the [Container Advance] criteria has been met.
Containers Not Ready to Apply	Containers are not ready to apply check container settings.	At the point the user starts the container sequence and the system perceives all containers not to be in a ready to apply state.
End of Sequence	End of container sequence, do you wish to start the sequence from the beginning?	At the point the last container in the sequence has met the [Container Advance] criteria.

DEFAULT SETTINGS

NOTE: Compatible Insert Bin configurations vary per model. See “General Description” in Operations section for details.

CONFIGURATION

Main Bin Capacities (Cu Ft)	
NL4560	608

Pressure Transducer Settings	
Min PSI	0
Max PSI	5000
Min voltage	1
Max voltage	5

Spinner Settings	
PWM Frequency	50 Hz
Zero Flow Offset	30
PWM Gain	20

CALIBRATION

CFR Values	
Bin	Value
Main Bin	0.256
Insert Bin	0.144
Yellow Micro Bin	0.038
Red Micro Bin	0.019

Control Valve Settings				
	Control Valve			
Control Variable	Main	Insert	Micro 1	Micro 2
Control Valve Type	Servo	Servo	Servo	Servo
Valve Response 1	40	40	40	40
Valve Response 2	8	8	8	8
Response Threshold	4.0	4.0	4.0	4.0
Allowable Error	1	1	1	1

Sensor Settings	
Encoder pulses	180 or 360 - verify by looking on encoder
Spinner pulses	4

ALARMS

Alarm Settings	
Alarm Variable	Bin
	Main
Min Conveyor Speed (RPM)	5
Max Conveyor Speed (RPM)	50
Max Conveyor Pressure (PSI)	2000
Rate Responding Time (sec)	5
Rate Responding Threshold	30
Max System Pressure - Spinner (PSI)	3100

This page is intentionally left blank.

The following information will guide you through using the SGN & Crush Strength Test Kit for your New Leader G4 Spreader. Refer to operator's manual for details on unit safety, operation and maintenance.

PART NUMBER	DESCRIPTION	QUANTITY
308907	Kit - SGN & Crush Strength Test Kit	1
308908	Tester - Crush Strength	1
308909	Scale - SGN	1

**WARNING**

Use great caution while working around the spreader. Contact with spinners and other moving parts is very dangerous. Do not adjust while machinery is moving, wear eye protection and avoid discharge from spinners. Do not ride on moving spreader.

It is highly recommended to perform a Catch Test, Crush Strength Test and SGN Scale Test prior to each season, before using a new product, or if a significant visible change has occurred with a product. Testing will define granular characteristics and help determine proper spinner settings for optimal product spread.

Conduct a G4 Spread Pattern test to check settings based on test results. Refer to *G4 Spreader Installation Instructions* and *G4 Spread Pattern Manual* for installation and adjustment instructions.

CRUSHING STRENGTH

Crushing strength is the minimum pressure needed to crush individual particles.

Testing and knowing the crushing strength of a particular product will help determine maximum spinner RPM. For example: Any granule with less than three (<3) crush strength should not be broadcast with spinner speeds over 700RPM. Verify granules are not pulverized before increasing spinner speed. Refer to *Product Setup Guidelines* for additional spinner speed settings with different crush strength.

SGN

SGN (Size Grade Number) is the measurement of granule size in millimeters multiplied by 100. A product's SGN will affect spread width.

Materials with poor uniformity (a significant percentage in 3 or more columns of scale device) may be difficult to spread accurately. Spread Pattern testing should ALWAYS be performed on any new or different material to determine actual spread width.

NOTE: SGN and Crush Strength together determine spread width.

General Rules:

A small product with low crush strength will have limited spread width capabilities. Spinner RPM must remain lower to keep from pulverizing the soft product, limiting your overall spread width. Additionally, a smaller product has less mass than that of a larger product, and in this case is another limiting factor for overall spread width.

A small product with high crush strength will have limited spread width capabilities. While spinner RPM can be increased with little worry of pulverizing the product, a smaller product has less mass than that of a larger product, which limits how far the product will carry in the spread pattern.

A large product with low crush strength will have limited spread width capabilities. While a larger product with more mass will carry farther, spinner RPM must remain lower to keep from pulverizing the soft product, limiting the overall spread width.

A large product with high crush strength has minimal spread width limitations. Spinner RPM can be increased with little worry of pulverizing the product. Additionally, a large product has more mass than that of a smaller product, allowing the product to carry farther, resulting in a wider spread width.

PRODUCT SETUP GUIDELINES

Granule Mesh	Crush Strength	Maximum Spinner RPM	Flotation Machine (Spinner Height 52") Spread Width ft(m)	Post Machine (Spinner Height 72") Spread Width ft(m)
140-200	1	600	60-65(18-20)	70-75(21-23)
	3	650-700	65-70(20-21)	75-80(23-24)
	6	750-800	70-75(21-23)	80-85(24-26)
	8	850-900	75-80(23-24)	85-90(26-27)
220-300	1	600	70-75(21-23)	80-85(24-26)
	3	650-700	75-80(23-24)	85-90(26-27)
	6	750-800	80-85(24-26)	90-95(27-29)
	8	850-900	85-90(26-27)	95-100(29-30)
320-400	1	600	80-85(24-26)	90-95(27-29)
	3	650-700	85-90(26-27)	95-100(29-30)
	6	750-800	90-95(27-29)	100-105(30-32)
	8	850-900	95-100(29-30)	105-110(32-33)
>400	1	600	90-95(27-29)	100-105(30-32)
	3	650-700	95-100(29-30)	105-110(32-33)
	6	750-800	100-105(30-32)	110-115(33-35)
	8	850-900	105-110(32-33)	115-120(35-37)

IMPORTANT!

Always check crush strength prior to selecting spinner speed. Pan testing should ALWAYS be performed on any new or different material to determine actual spread width. Verify granules are not pulverized by looking in the three center vials following a pan test before increasing spinner speed.

CRUSH TEST**IMPORTANT!**

Select granules of the most typical size and uniform shape as determined by SGN scale. Crushing strength can significantly increase with particle size.

**Figure 1**

1. Figure 1 - Place individual granule on solid, smooth surface.
2. Place New Leader crush strength tester over granule, open end flush with surface.

Ensure marker is next to handle.

**Figure 2**

3. Figure 2 - With one hand on handle, press tester down until granule breaks.

**Figure 3**

4. Figure 3 - Release handle and note where marker rests on number scale. This is granule crushing strength.

For example, the marker in Figure 3 is between 3 and 4 on the scale. Thus, crushing strength is 3.5.

5. Repeat 10 times and average the values.

SGN SCALE TEST

The SGN scale is an instrument designed for simple screen test of fertilizer samples. A small box fitted with five sieves, it directly produces a size histogram of the test sample. From this, the SGN can be estimated.



Figure 4

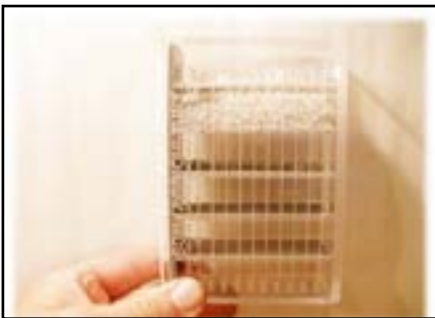


Figure 5

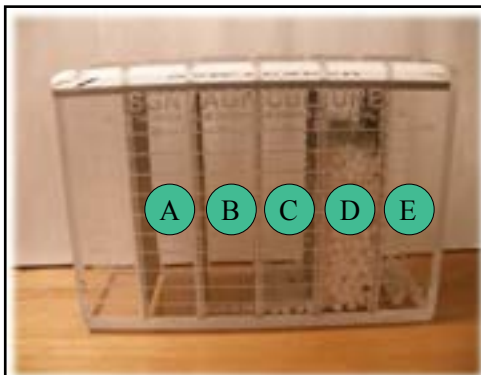
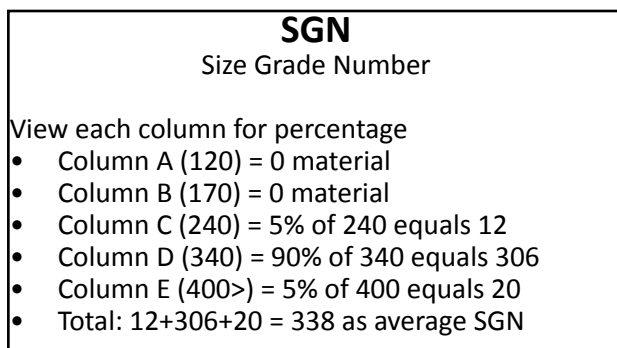


Figure 6

1. Figure 4 - To determine SGN, place scale on flat surface and open lid.
2. Fill end column with selected product to fill line.
3. Close lid securely.
4. Figure 5 - Rotate scale vertical and shake to separate material, usually less than two minutes.
5. When material finishes dispersing, turn scale to starting position.
6. Figure 6 - View level of material in each compartment and determine SGN level based on markings.



7. Figure 7 - Based on column headings and percent in each field, calculate overall SGN of the sample.

Figure 7

Using the above crush strength example of 3.5 and average SGN size of 338, we can now use the chart to determine our maximum spread width. In this case a maximum spinner speed of 650-700 RPM will produce a spread width of 85' to 100' depending on spinner height.

Granule Mesh	Crush Strength	Maximum Spinner RPM	Flotation Machine (Spinner Height 52") Spread Width ft(m)	Post Machine (Spinner Height 72") Spread Width ft(m)
320-400	1	600	80-85(24-26)	90-95(27-29)
	3	650-700	85-90(26-27)	95-100(29-30)
	6	750-800	90-95(27-29)	100-105(30-32)
	8	850-900	95-100(29-30)	105-110(32-33)

This page is intentionally left blank.

PERFORMING A SPREAD PATTERN TEST**WARNING**

Use great caution while working around the spreader. Contact with spinners and other moving parts is very dangerous. Do not adjust while machinery is moving, wear eye protection and avoid discharge from spinners. Do not ride on moving spreader.

It is recommended that spread pattern tests be conducted prior to each spreading season, after any spreader maintenance, and periodically during the spreading season. Spread pattern tests must be performed for each product and application rate.

Spread pattern is affected by many factors. Among the more significant of these are:

- Spinner speed
- Material density
- Material granule size
- Material flow characteristics
- Rate of material delivery
- Point of material delivery on spinner discs
- Angle of the distributor fins on the spinner discs
- Cleanliness of the spinner fins and discs
- Wind and humidity
- Spacing of swaths
- Wear on spinner fins

Since many of these factors will vary for each job, trial and experience must be used to determine the adjustments required to obtain the spread width and spread pattern desired. The following instructions outline the adjustments available and the effect that each will have on the spread pattern.

SPREAD PATTERN TEST KIT

300508 Spread Pattern Test Kit, includes the following:

<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY</u>
70890	Collection Tray	21	99418	Data Sheets	100
87200	Divider	21	300503	Screw – #6-32 x 3/8	42
300506	Rack – Tube	1	300504	Nut – Lock #6-32	42
300507	Test Tubes	21	70897	Flags	5
300505	Clip – Molded	21	87199	Rope – 120' marked	1
87332	Funnel	1	87201	Stakes	2
58897	Scale – Density	1			

SPINNERS**NOTICE!**

Spinner discs and fins must be kept clean and polished. Even a small build-up on a spinner fin can significantly affect the spread pattern. Rusty, rough, bent or worn fins will produce poor spread patterns.

Spinner speed is adjustable from approximately 400 to 900 RPM. This is accomplished by changing the settings in the controller. Proper spinner speed adjustment is very important in obtaining optimal spread patterns. The best spinner speed to use will depend entirely on the material being spread, and must be determined by testing.

A major factor of maximum pattern width is particle size. Pattern width may vary anywhere from 25 feet (7.6 m) for very finely ground dry lime up to 120 feet (37 m) or more for extremely large fertilizer pellets.

For every material there is a critical spinner speed. In other words, there is a speed which will result in the maximum obtainable spread width. Going beyond this speed will not increase spread width, but will result in a poor pattern.

Too high of a spinner speed could result in a heavy deposit behind the truck due to break-down of material. This upper speed limit will be quite low for finely powdered material, and can be quite high for extremely coarse materials. In general, this critical speed will fall somewhere between 600 and 800 RPM for typical materials.

It is recommended that a spread pattern test be performed for each product and application rate you handle. Once initial testing is completed, testing should be repeated at the beginning of every season, or any time maintenance is performed on any component affecting spread patterns.

SPREADER PREPARATION

The spreader to be tested shall be in good mechanical condition and properly adjusted according to the Operation and Maintenance sections in this Manual.

All damaged and worn parts must be replaced. Spinner discs and fins must be free of any material build-up, rust or paint.

Fill the hopper with the material to be spread. Run the material out to the end of the conveyor.

Set the feedgate to deliver the required rate per acre. Make sure the feedgate is level and the indicator reflects the actual gate opening measured by standing a tape measure vertically in the fertilizer.

NOTE: Do not match slope of endgate when making this measurement.

Adjust the spinner assembly by turning the crank or, if an actuator is installed, change the setting in the controller. To begin testing, position the spinner according to the chart below.

NOTE: This chart is to be used as a reference only to begin testing.

MATERIAL	DENSITY lbs/cu ft (kg/cu m)	SPINNER ASSEMBLY POSITION in (cm)
Lime	80-100 (1281-1601)	0 - 1 (0 - 2.5)
Fertilizer	65 (1040)	3.5 - 3.75 (9 - 9.5)
Urea, Light Rate - 50-200 lb/acre (56-224 kg/hectare)	48 (769)	3.5 - 3.75 (9 - 9.5)
Urea, Heavy Rate - >200 lb/acre (>224 kg/hectare)		2.0 - 2.5 (5 - 6.5)
Mixed Product, Multiplier	65 (1040)	3.75 (9.5)

TEST PROCEDURE

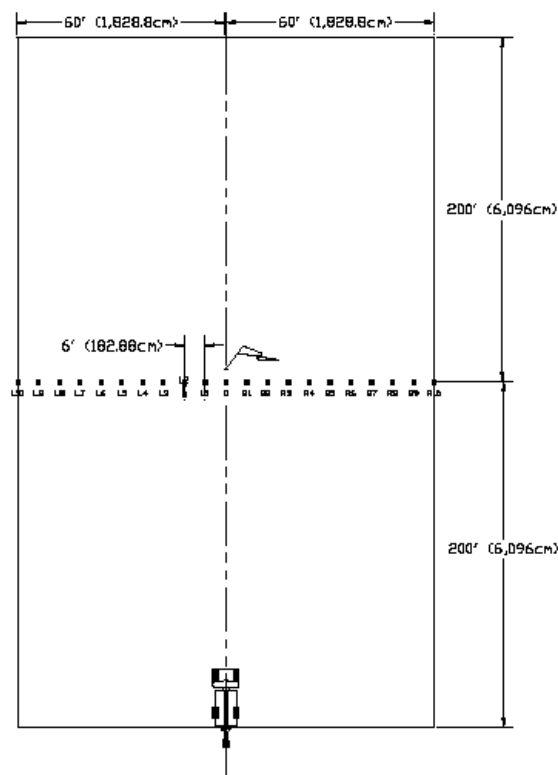
The area selected for testing, measuring 120 feet x 400 feet (37 m x 122 m), should have a slope of less than two degrees.

Insert a plastic grid into each of the 21 collection trays. Position the 21 collection trays on six-foot (6') (182.88cm) centers with the longest dimension of the tray parallel to the direction of travel. (Figure 1A)



DIRECTION OF TRAVEL
COURSE SET UP FOR PATTERN TEST

Figure 1A – Tray Positions



DIRECTION OF TRAVEL
COURSE SET UP FOR PATTERN TEST

Figure 1B – Spreader Position

All testing should be done when the wind velocity is less than 5 MPH (8.05 km). If wind is present, testing must be done with spreader traveling parallel (within ± 15 degrees) to the wind direction.

Do not allow loaded spreader to sit for more than four hours prior to testing.

Prior to driving the spreader through the test course, it should be driven at least 450 feet (137 m) at spreader test speeds.

Spreader must be driven over the collection trays in **ONLY ONE DIRECTION**.

Position spreader at the beginning of the course so that vehicle will straddle center collection tray. (Figure 1B) Set gate opening based on desired rate/acre according to theoretical application charts supplied with each unit.

Drive spreader completely through course at normal operating speeds.

DATA RECORDING

NEW LEADER		G4 SPREAD PATTERN DATA SHEET		1330 76th Ave SW Cedar Rapids, IA 52404-7052 (319) 363-8281	
Pattern Test No. <u>1</u>	Material Used: <u>Polash</u>	Spinner RPM: <u>700</u>			
Site: <u>HECO</u>	Density: <u>65</u>	Spinner Indicator Setting: <u>325</u>			
Date: <u>03/24/2016</u>	Crush Strength: <u>6</u>	Spinner Fin Setting: <u>1-2-1-2</u>			
Wind: From <u>Straight</u> at <u>5</u> MPH	SGN: <u>320</u>	Gate Height: <u>2"</u>			
Spreader Model: <u>L4000 G4</u>	Controller MPH: <u>15</u>	Effective Swath Width: <u>84'</u>			
Serial No. <u>437263</u>	Application Rate: <u>250</u>				
Conveyor Type: <u>#4 BOC</u>	CFR/Constant: <u>221</u>				

UNACCEPTABLE SPREAD PATTERN

99418-E

NEW LEADER		G4 SPREAD PATTERN DATA SHEET		1330 76th Ave SW Cedar Rapids, IA 52404-7052 (319) 363-8281	
Pattern Test No. <u>2</u>	Material Used: <u>Polash</u>	Spinner RPM: <u>700</u>			
Site: <u>HECO</u>	Density: <u>65</u>	Spinner Indicator Setting: <u>325</u>			
Date: <u>03/24/2016</u>	Crush Strength: <u>6</u>	Spinner Fin Setting: <u>1-2-1-2</u>			
Wind: From <u>Straight</u> at <u>5</u> MPH	SGN: <u>320</u>	Gate Height: <u>2"</u>			
Spreader Model: <u>L4000 G4</u>	Controller MPH: <u>15</u>	Effective Swath Width: <u>84'</u>			
Serial No. <u>437263</u>	Application Rate: <u>250</u>				
Conveyor Type: <u>#4 BOC</u>	CFR/Constant: <u>221</u>				

ACCEPTABLE SPREAD PATTERN

99418-E

Figure 2 – Spread Pattern Data Sheet Example

Using the data sheets supplied with the kit, document all spreader adjustments required.

Using the funnel, transfer the contents of each collection tray into its corresponding test tube beginning at one end of the trays and working towards the opposite end.

Record the volume in each test tube in the box on the data sheet under the corresponding tray position. (Figure 2) NOTE: It is highly recommended that **ONLY ONE ADJUSTMENT** be made between test samples taken. If more than one adjustment is made, it will be difficult to determine which adjustment was responsible for the change in pattern shape.

Once a desirable pattern is obtained (Figure 5), optimum driving centers can be determined. To determine optimum driving centers (effective swath width), locate the points on both the left and right side of the pattern where the amount of material applied is half the amount at the center of the pattern. The distance between these two points represents the driving centers to be used.

When blended fertilizers are being applied, a visual inspection of the samples should be made to determine whether the blend within the effective swath width is consistent with the desired blend. If the blend is not consistent, a narrower overall swath width should be used and a new optimum driving center (effective swath width) should be determined.

Once the effective swath width has been established, a change in the controller may be required.

DRIVING METHODS

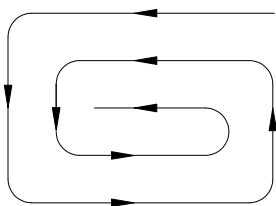


Figure 3 – Perimeter Method

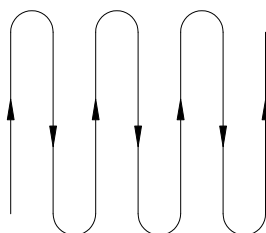


Figure 4 – Switch Back Method

The perimeter (Figure 3) and switch back (Figure 4) driving methods are both acceptable. NOTE: Utilizing the switch back method amplifies non-symmetrical patterns by blending right side on right and left side on left. The perimeter method compensates for non-symmetrical patterns by blending the right side of the pattern with the left side of the adjacent pattern or vice versa.

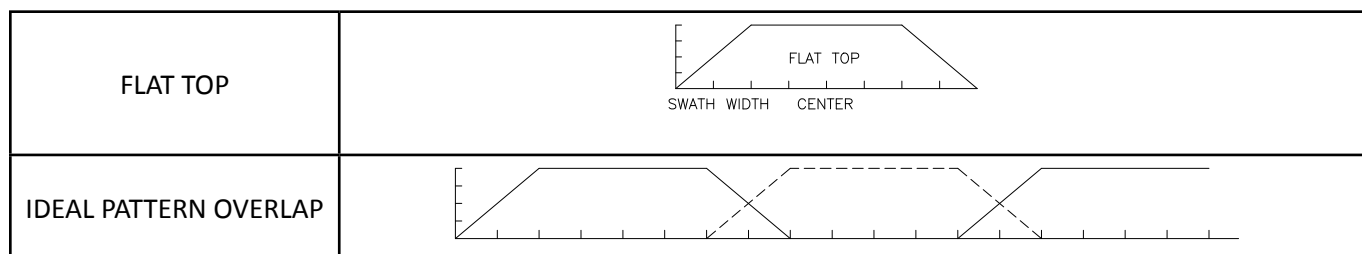
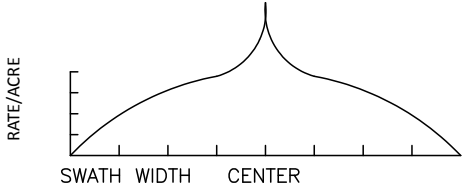
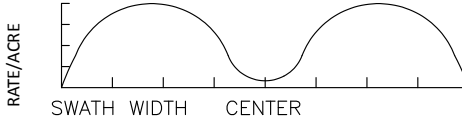
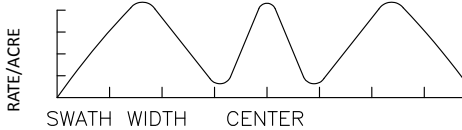
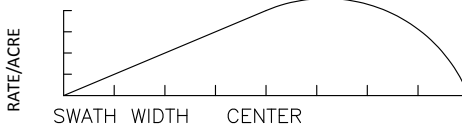


Figure 5 – Ideal Pattern

TROUBLESHOOTING

Problem	Pattern	Recommended Adjustments
Heavy Directly Behind the Vehicle	 <p>The graph shows a single sharp peak at the center of the swath width. The y-axis is labeled 'RATE/ACRE' and the x-axis is labeled 'SWATH WIDTH' with 'CENTER' marked at the peak.</p>	<ol style="list-style-type: none"> 1. Move the spinner forward (toward the conveyor). 2. Decrease spinner RPM. 3. Check spinner fin quality. 4. Move one or two spinner fins to a lower numbered hole.
Light Directly Behind the Vehicle	 <p>The graph shows two distinct peaks on either side of the center, with a dip at the center. The y-axis is labeled 'RATE/ACRE' and the x-axis is labeled 'SWATH WIDTH' with 'CENTER' marked at the dip.</p>	<ol style="list-style-type: none"> 1. Move the spinner rearward (away from conveyor). 2. Increase spinner RPM. 3. Check spinner fin quality. 4. Move one of two spinner fins to a higher numbered hole.
Light Outside Vehicle's Tire Tracks	 <p>The graph shows three distinct peaks corresponding to the tire tracks, with dips between them. The y-axis is labeled 'RATE/ACRE' and the x-axis is labeled 'SWATH WIDTH' with 'CENTER' marked at the first dip.</p>	<ol style="list-style-type: none"> 1. Check spinner fin quality. 2. Decrease spinner RPM. 3. Move one or two spinner fins to a lower numbered hole.
Pattern Off Center	 <p>The graph shows a single broad peak shifted to the right of the center. The y-axis is labeled 'RATE/ACRE' and the x-axis is labeled 'SWATH WIDTH' with 'CENTER' marked at the center of the peak.</p>	<ol style="list-style-type: none"> 1. Check to see feedgate is level and free of caked material. 2. Make sure hillside divider is mounted squarely and centered. 3. Check to be sure spinner assembly is mounted squarely and centered. 4. Make sure material divider is mounted squarely and centered. 5. Testing should be done parallel to wind.