Operator Manual

ADC1150

Air Drill Cart

Great Plains
Manufacturing, Inc.
www.greatplainsmfg.com

Read the operator manual entirely. When you see this symbol, the subsequent instructions and warnings are serious - follow without exception. Your life and the lives of others depend on it!

Illustrations may show optional equipment not supplied with standard unit or may depict similar models where a topic is identical.

ORIGINAL INSTRUCTIONS

EN

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Important Safety Information

Look for Safety Symbol

The SAFETY ALERT SYMBOL indicates there is a potential hazard to personal safety involved and extra safety precaution must be taken. When you see this symbol, be alert and carefully read the message that follows it. In addition to design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel involved in the operation, transport, maintenance and storage of equipment.

Be Aware of Signal Words

Signal words designate a degree or level of hazard seriousness.

DANGER, and the color Safety Red, indicate an imminent hazard which, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations, typically for machine components that, for functional purposes, cannot be guarded.

WARNING, and the color Safety Orange, indicate a potential hazard which, 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.

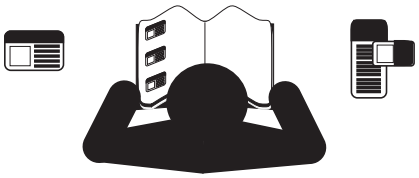
CAUTION, and the color Safety Yellow, indicate a potential hazard which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

Prepare for Emergencies

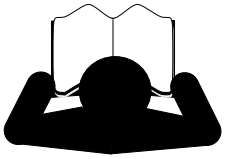
- *Be prepared if a fire starts*
- *Keep a first aid kit and fire extinguisher handy.*
- *Keep emergency numbers for doctor, ambulance, hospital and fire department near phone.*

Be Familiar with Safety Decals

- *Read and understand "**Safety Decals**" on page 6, thoroughly.*
- *Read all instructions noted on the decals.*
- *Keep decals clean. Replace damaged, faded and illegible decals.*



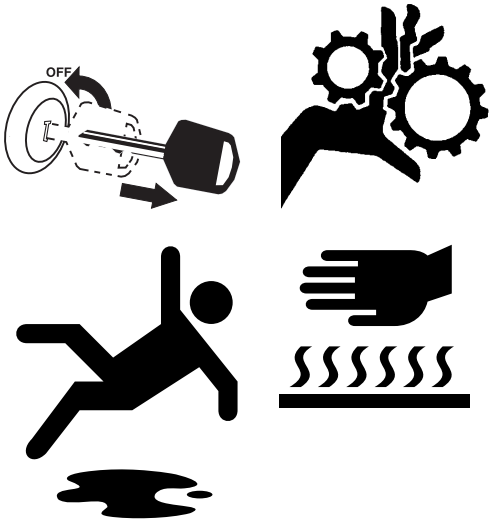
Safety At All Times



Thoroughly read and understand the instructions in this manual before operation. Read all instructions noted on the safety decals.

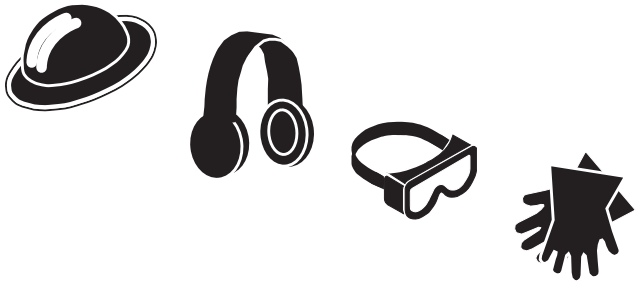
- *Be familiar with all air drill cart drill and drill functions.*
- *Operate machinery from the driver's seat only.*
- *Do not leave drill unattended with tractor engine running.*
- *Do not dismount a moving tractor. Dismounting a moving tractor could cause serious injury or death.*
- *Do not stand between the moving tractor and air drill cart during hitching.*
- *Keep hands, feet and clothing away from power-driven parts.*
- *Wear snug-fitting clothing to avoid entanglement with moving parts.*
- *Make sure all persons are clear of working area.*

Practice Safe Maintenance



- *Understand procedure before doing work. Use proper tools and equipment. Refer to this manual for more information.*
- *Work in a clean, dry area.*
- *Lower the air drill cart, put tractor in park, turn off engine, and remove key before performing maintenance. If work must be performed with implement raised, use blocks or jackstands rated for the air drill cart weight.*
- *Make sure all moving parts have stopped and all system pressure is relieved.*
- *Allow drill to cool completely.*
- *Disconnect battery ground cable (-) before servicing or adjusting electrical systems.*
- *Welding: Disconnect battery ground (-) before welding. Avoid fumes from heated paint.*
- *Inspect all parts. Make sure parts are in good condition and installed properly.*
- *Remove buildup of grease, oil or debris.*
- *Remove all tools and unused parts from air drill cart before operation.*

Wear Protective Equipment



- *Wear protective clothing and equipment.*
- *Wear clothing and equipment appropriate for the job. Avoid loose-fitting clothing.*
- *Because prolonged exposure to loud noise can cause hearing impairment or hearing loss, wear suitable hearing protection such as earmuffs or earplugs.*
- *Because operating equipment safely requires your full attention, avoid wearing entertainment headphones while operating machinery.*

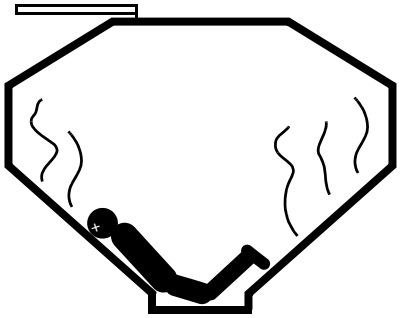
Handle Chemicals Properly

Agricultural chemicals can be dangerous. Improper use can seriously injure persons, animals, plants, soil and property.

- *Do not use liquid seed treatments with the 800.*
- *Read and follow chemical manufacturer's instructions.*
- *Wear protective clothing.*
- *Handle all chemicals with care.*
- *Avoid inhaling smoke from any type of chemical fire.*
- *Never drain, rinse or wash dispensers within 100 feet (30m) of a freshwater source, nor at a car wash.*
- *Store or dispose of unused chemicals as specified by chemical manufacturer.*
- *Dispose of empty chemical containers properly. Laws generally require power rinsing or rinsing three times, followed by perforation of the container to prevent re-use.*

Confined Space

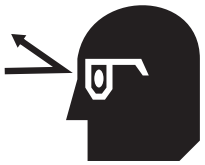
With grain or fertilizer present, and once used for hazardous fertilizers, or seeds with hazardous treatments, your hoppers may become "*permit-required confined spaces*" under applicable statutes, regulations, insurance rules or business policy.



- *A full, encrusted or bridged grain hopper can be a rapid suffocation hazard.*
- *Even when empty, hazardous fumes or low oxygen may be present. You can be quickly overcome even with the hopper lid open.*
- *Do not enter a hopper for material loading, material unloading, hopper cleaning or meter maintenance.*
- *Clean hopper by power washing from outside the hopper top.*
- *Remove large obstructions, perform meter maintenance, and perform sensor maintenance by removing meters from*

bottom of empty hopper.

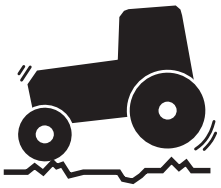
Avoid High Pressure Fluids



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

- *Avoid the hazard by relieving pressure before disconnecting hydraulic lines.*
- *Use a piece of paper or cardboard, NOT BODY PARTS, to check for suspected leaks.*
- *Wear protective gloves and safety glasses or goggles when working with hydraulic systems.*
- *If an accident occurs, seek immediate medical attention from a physician familiar with this type of injury.*

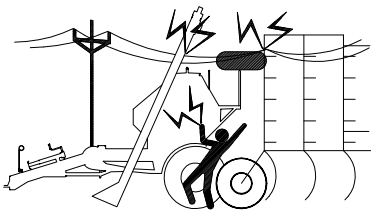
Transport Machinery Safely



Maximum transport speed for implement is 20 mph (30 km/h). Some rough terrains require a slower speed. Sudden braking can cause a towed load to swerve and upset.

- *Ensure towing vehicle weighs at least 2/3 (67%) of gross implement weight.*
- *Do not exceed 20 mph (30 km/h). Never travel at a speed which does not allow adequate control of steering and stopping. Reduce speed if drill is not equipped with brakes.*
- *Comply with state and local laws.*
- *Follow your tractor manual recommendations for maximum hitch loads. Insufficient weight on tractor steering wheels will result in loss of control.*
- *Carry reflectors or flags to mark air drill cart in case of breakdown on the road.*
- *Keep clear of overhead power lines and other obstructions when transporting. Refer to transport dimensions under +.*

Check for Overhead Lines



Seed auger or drill markers contacting overhead electrical lines can introduce lethal voltage levels on air cart, drill and tractor frames. A person touching almost any metal part can complete the circuit to ground, resulting in serious injury or death. At higher voltages, electrocution can occur without direct contact.

- *Avoid overhead lines during seed loading, unloading and marker operations.*

Use A Safety Chain

- *Use a safety chain to help control drawn machinery should it separate from tractor drawbar.*
- *Use a chain with a strength rating equal to or greater than the gross weight of towed machinery.*
- *Attach chain to tractor drawbar support or other specified anchor location. Allow only enough slack in chain to permit turning.*
- *Replace chain if any links or end fittings are broken, stretched or damaged.*
- *Do not use safety chain for towing.*

Keep Riders Off Machinery

Riders obstruct the operator's view. Riders could be struck by foreign objects or thrown from the machine.

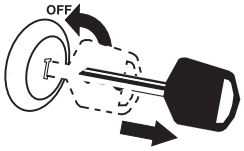
- *Never allow children to operate equipment.*
- *Keep all bystanders away from machine during operation*

Use Safety Lights and Devices

Slow-moving tractors and towed implements can create a hazard when driven on public roads. They are difficult to see, especially at night.

- *Use flashing warning lights and turn signals whenever driving on public roads.*
- *Use lights and devices provided with implement.*

Shutdown and Storage



- *Park on level ground.*
- *Clean out and safely store or dispose of residual chemicals.*
- *Store in an area where children normally do not play.*
- *Secure air cart using blocks and the stand provided.*

Tire Safety

Tire changing can be dangerous and should be performed by trained personnel using correct tools and equipment.

- *When inflating tires, use a clip-on chuck and extension hose long enough for you to stand to one side–not in front of or over tire assembly. Use a safety cage if available.*
- *When removing and installing wheels, use wheel-handling equipment adequate for weight involved.*

Safety Decals

Safety Reflectors and Decals

Your implement comes equipped with all lights, safety reflectors and decals in place. They were designed to help you safely operate your implement.

- ▲ *Read and follow decal directions.*
- ▲ *Keep lights in operating condition.*
- ▲ *Keep all safety decals clean and legible.*
- ▲ *Replace all damaged or missing decals. Order new decals from your Great Plains dealer. Refer to this section for proper decal placement.*
- ▲ *When ordering new parts or components, also request corresponding safety decals.*

Note: The totals given for the decals are for the number of decals shown in each graphic.

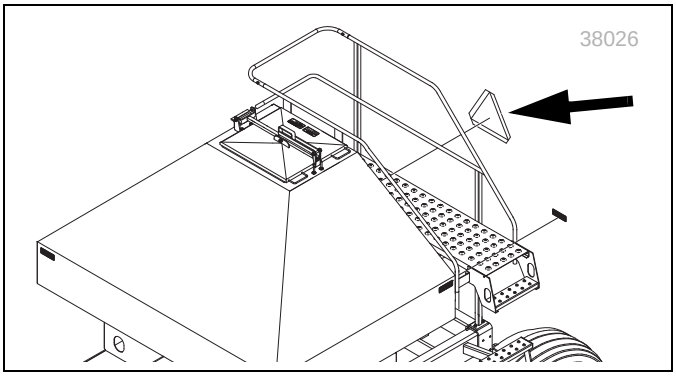
To install new decals:

1. Clean the area on which the decal is to be placed.
2. Peel backing from decal. Press firmly on surface, being careful not to cause air bubbles under decal.

Reflector: Slow Moving Vehicle (SMV)

818-055C

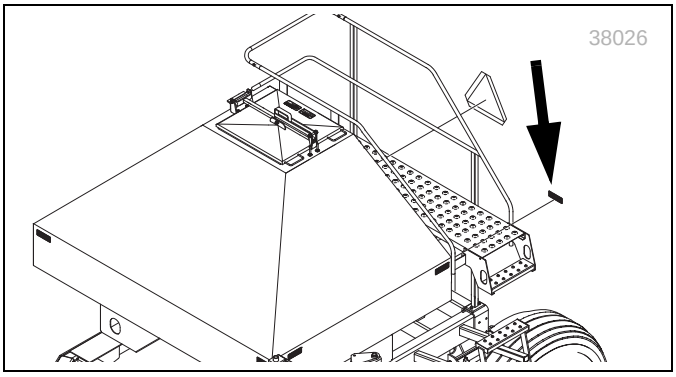
Center of walkboard;
1 total



Reflectors: Red

838-266C

One each side of rear;
2 total.

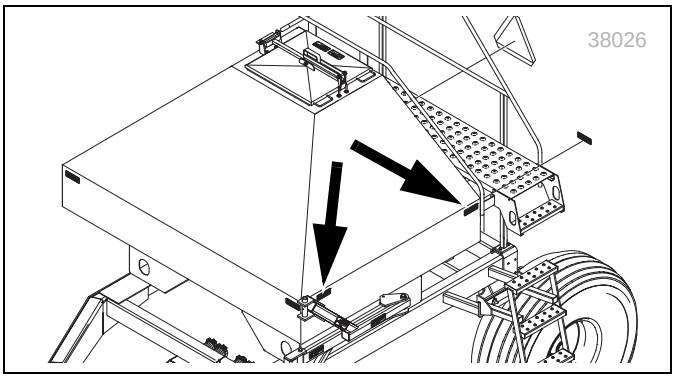


Reflectors: Amber

838-265C

Corners on both sides of bin;
4 total

See “**Transporting**” on page 23.

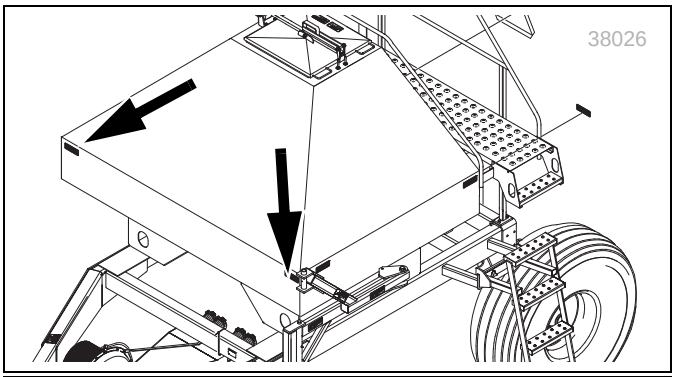


Reflectors: Amber

838-265C

Corners on

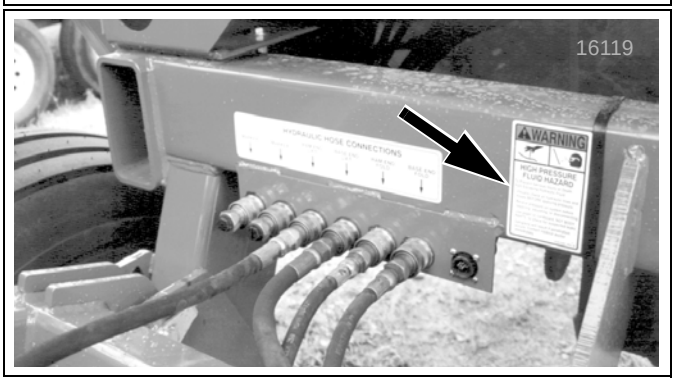
front of bin;
2 total.



Warning High Pressure

818-339C

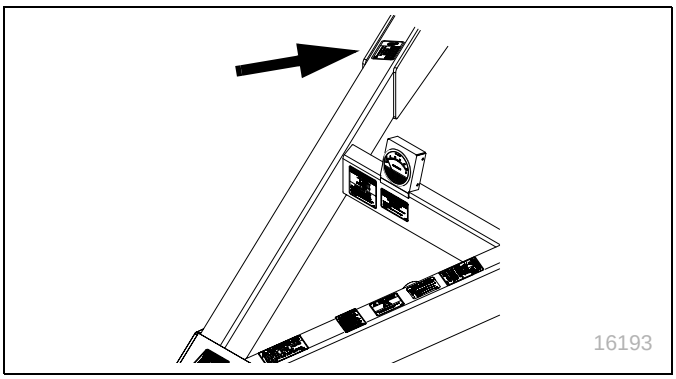
Hydraulic connection panel at rear of mainframe;
1 Total.



Warning: AD Fan Hazard

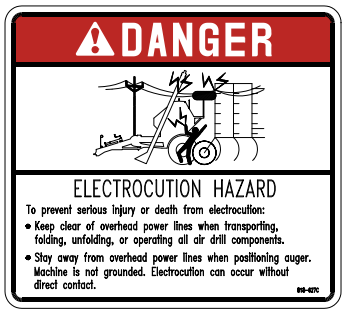
838-632C

Right-hand tongue tube;
1 total

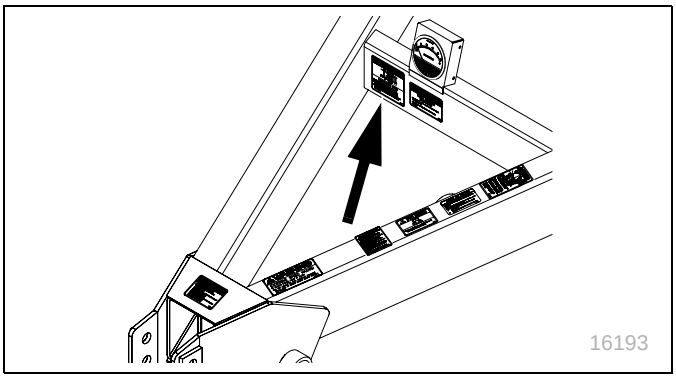


Danger Electrocution Auger

818-627C

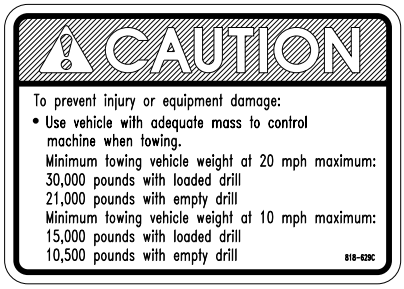


Tongue cross tube;
1 total

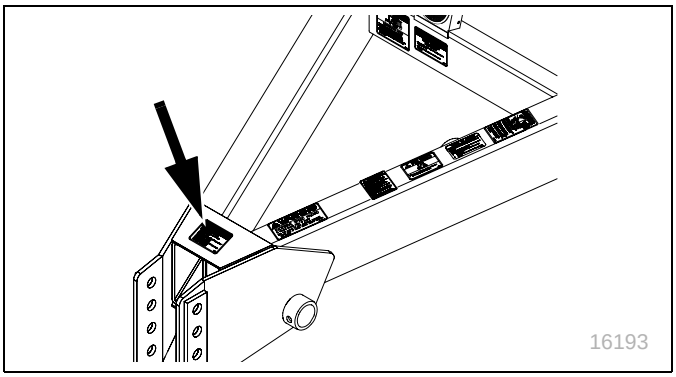


Caution: ADS Towing Vehicle

818-629C



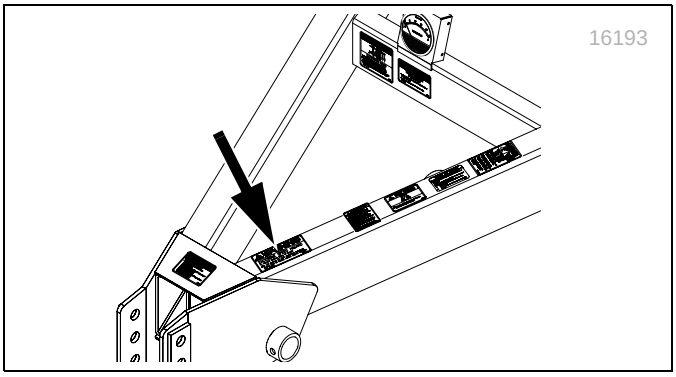
Center of tongue;
1 total



Warning 20 MPH Transportation Speed

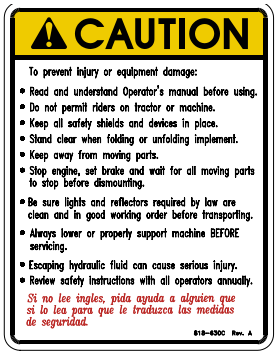
818-188C

Left-hand tongue tube;
1 total.

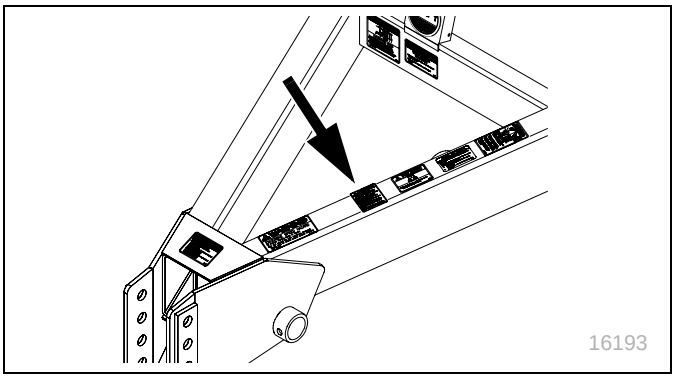


Warning: Moving Parts

818-630C



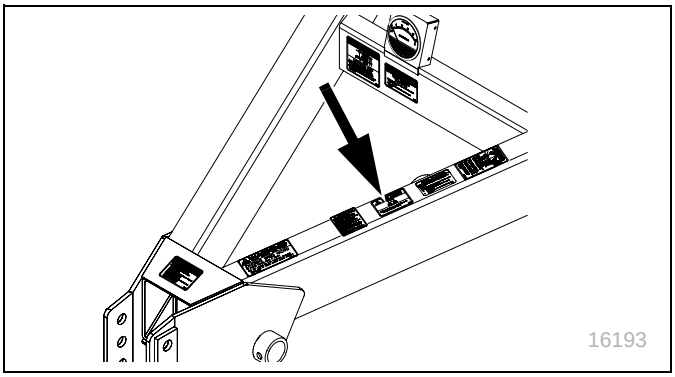
Left-hand tongue tube;
1 total



Danger: Cannot Read English

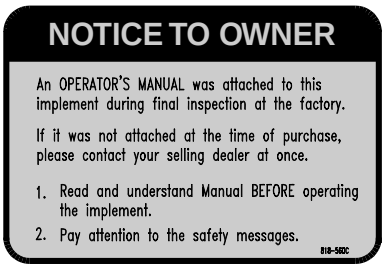
818-557C

Left-hand tongue tube;
1 total.

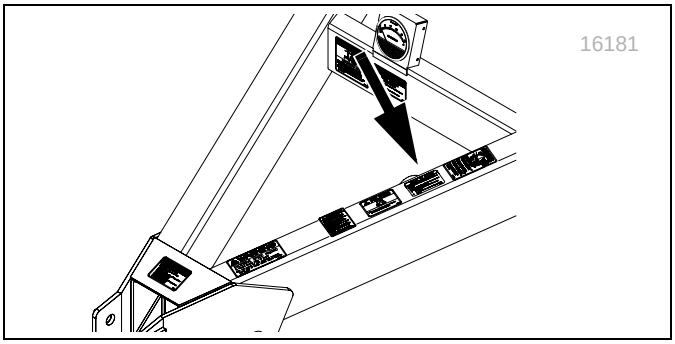


Safety: Notice to Owner

818-560C



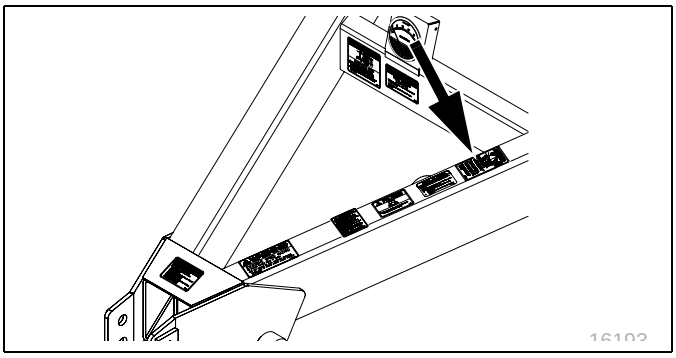
Left-hand tongue tube;
1 total.



Warning: High Pressure

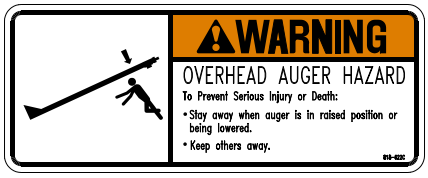
818-339C

Left-hand tongue tube;
1 total.

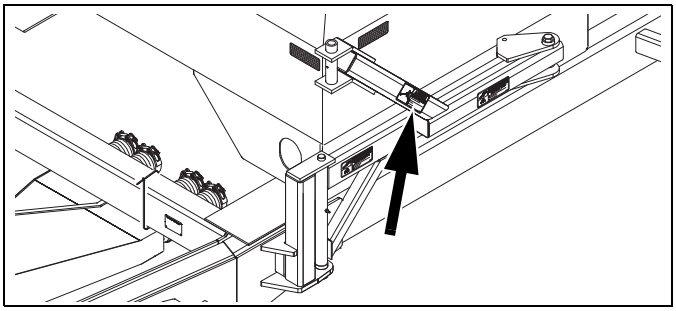


Warning: Overhead Auger

818-622C



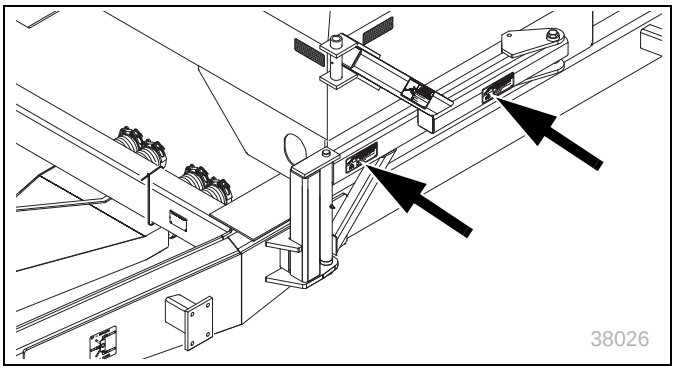
Both sides of auger swing arm;
2 total



Warning: Pinch Point Auger

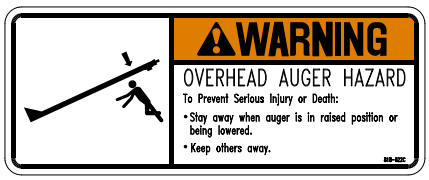
818-623C

Both sides of auger swing arm, two places;
4 total

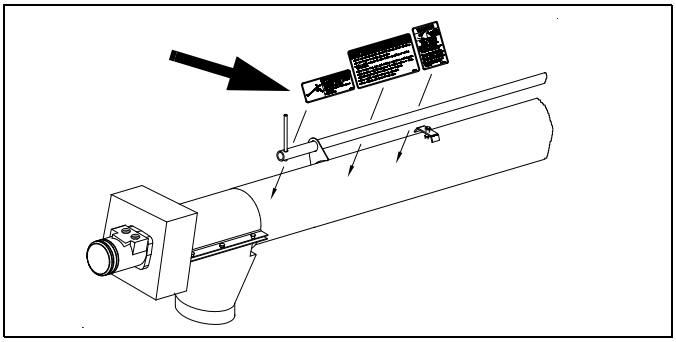


Warning: Overhead Auger

818-622C

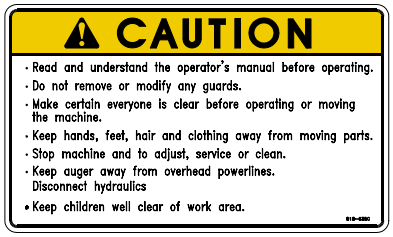


Inlet end of auger;
1 total

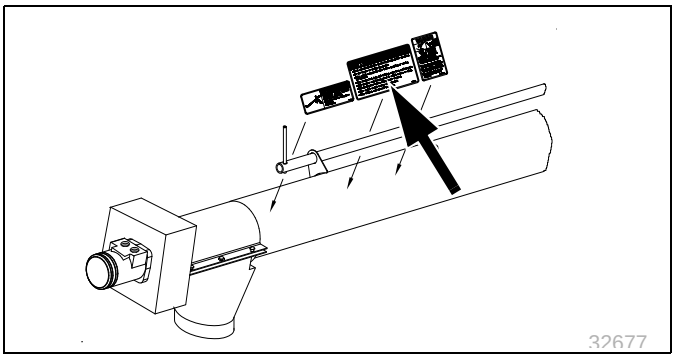


Caution: AD Auger General

818-635C



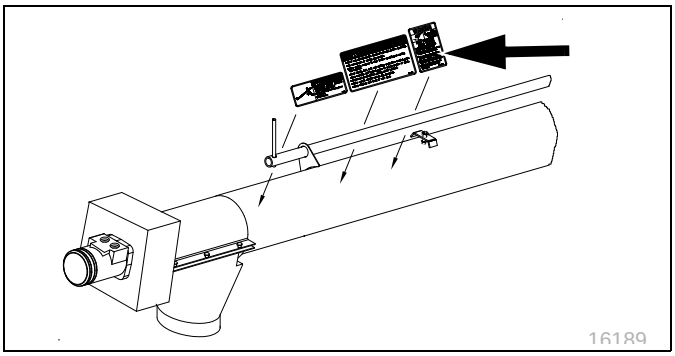
Inlet end of auger;
2 total



Warning: High Pressure

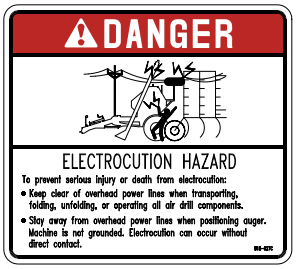
818-339C

Inlet end of auger;
1 Total

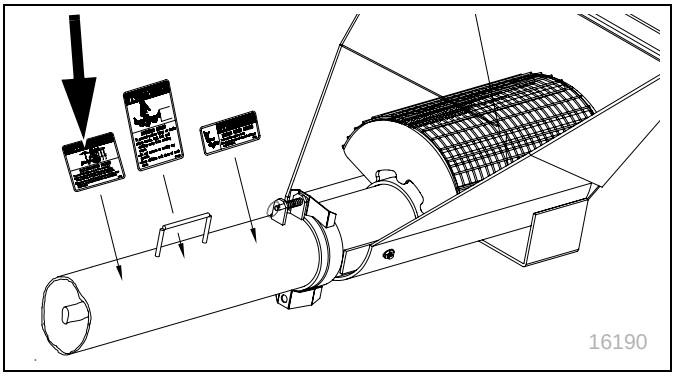


Danger: Electrocution Auger

818-627C



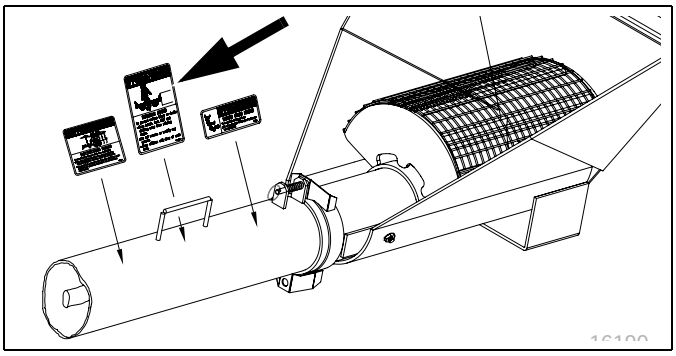
Outlet end of auger;
1 total



Danger: AD Rotating Auger

818-634C

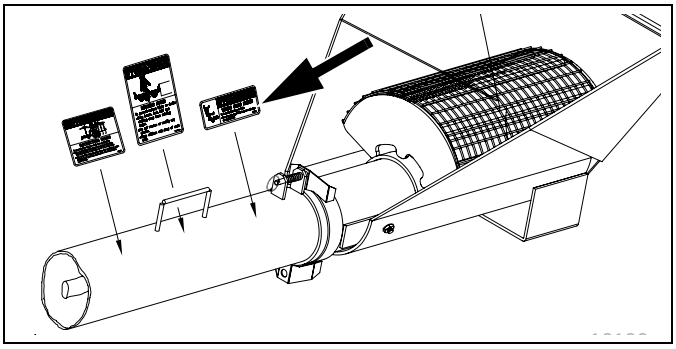
Outlet end of auger;
1 total



Danger: Guard Missing Auger

848-633C

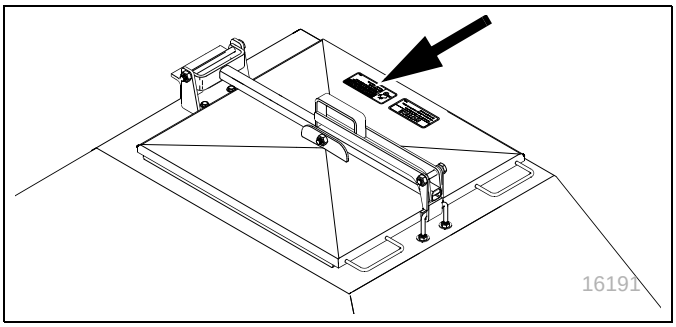
Outlet end of auger;
1 total



Warning: AD Bin Hazards

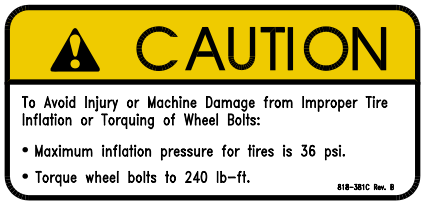
818-628C

Bin lid;
1 total



Caution: Tire Pressure and Torque

818-381C



Rim of each wheel;
2 total

Introduction

Great Plains welcomes you to its growing family of new product owners. This air drill cart has been designed with care and built by skilled workers using quality materials. Proper setup, maintenance, and safe operating practices will help you get years of satisfactory use from the machine.

Description of Unit

The ADC1150 is a air drill cart that uses air to move seed or fertilizer from the air drill cart to the implement. Air is supplied by a fan driven by a hydraulic motor. A pressurized meter under the bin dispenses material into the air stream at a rate proportional to distance traveled. The meter rate can be adjusted.

Intended Usage

This air drill cart air drill cart is to be used with a Great Plains air drill implement. It is to be used primarily for seeding small grains and legumes.

Models Covered

This manual applies to Great Plains air drill cart models:

1150-1506	15-row 6 inch (15.2 cm)
1150-1275	12-row 7.5 inch (19.1 cm)

Standard 1150 Models have a main seed box. Fertilizer and/or Smalls Seeds capability may be added.

Using This Manual

This manual familiarizes you with safety, assembly, operation, adjustments, troubleshooting, and maintenance. Read this manual and follow the recommendations to help ensure safe and efficient operation.

The information in this manual is current at printing. Some parts may change to assure top performance.

Document Family

167-101M	1150 Air Drill CartOperator Manual (this document, including seed rate charts0
167-101P	1150 Air Drill Cart Parts Manual
167-101Q	1150 Air Drill Cart Pre-Delivery Manual

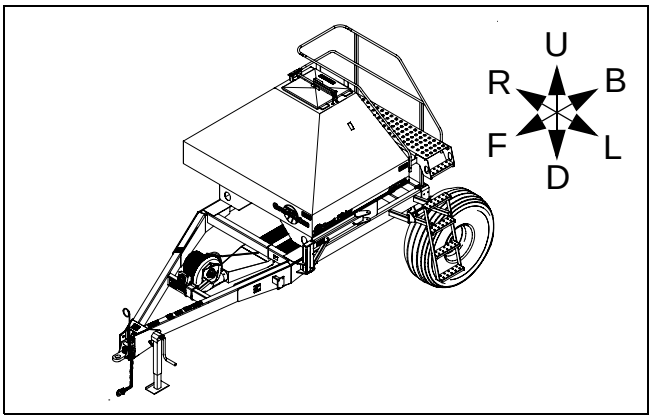


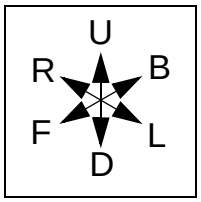
Figure 1
1150 Air Drill Cart

16942

Definitions

The following terms are used throughout this manual.

Right-hand and left-hand as used in this manual are determined by facing the direction the machine will travel while in use unless otherwise stated. An orientation rose in some line art illustrations shows the directions of: Up, Back, Left, Down, Front, Right.



NOTICE

Identifies an Economic (not a Safety) Risk:
A NOTICE provides a crucial point of information related to the current topic. Read and follow the instructions to avoid damage to equipment and ensure desired field results.

Note: A note sets off useful information related to the current topic, or forestalls possible misunderstanding.

Owner Assistance

If you need customer service or repair parts, contact a Great Plains dealer. They have trained personnel, repair parts and equipment specially designed for Great Plains products.

Refer to Figure 2

Your machine's parts were specially designed and should only be replaced with Great Plains parts. Always use the serial and model number when ordering parts from your Great Plains dealer. The serial-number plate is located on the left side of the air drill cart frame below the front bin.

Record your air drill cart model and serial number here for quick reference:

Model Number:_____

Serial Number: _____

Your Great Plains dealer wants you to be satisfied with your new machine. If you do not understand any part of this manual or are not satisfied with the service received, please take the following actions.

1. Discuss the matter with your dealership service manager. Make sure they are aware of any problems so they can assist you.
2. If you are still unsatisfied, seek out the owner or general manager of the dealership.

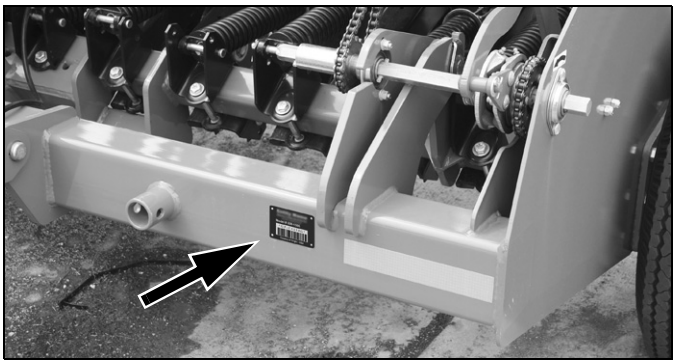


Figure 2 32591
Serial Number Location

Further Assistance

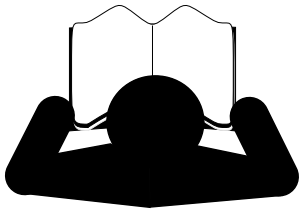
Great Plains Manufacturing, Inc. wants you to be satisfied with your new Implement Type. If for any reason you do not understand any part of this manual or are otherwise dissatisfied with the product please contact:

Great Plains Service Department
1525 E. North St.
P.O. Box 5060
Salina, KS 67402-5060

Or go to www.greatplainsag.com and follow the contact information at the bottom of your screen for our service department.

Preparation and Setup

This section helps you prepare your tractor and air drill cart for use. Before using the air drill cart in the field, you must hitch the air drill cart to a suitable tractor and also setup the air drill cart.



Initial Setup

Prior to first use, the following items need to be checked or completed:

- The cart must have the correct sprockets for your drill. See "**Cart Drive System**" on page 16.
- The seed monitor console must be installed in the tractor cab. See "**Loup II Console System Installation and Setup**" on page 100.
- Initial configuration data must be loaded in the console. See "**Loup II Console System Installation and Setup**" on page 100.

Pre-Setup Checklist

1. Read and understand "**Important Safety Information**" on page 1.F
2. Check that all working parts are moving freely, bolts are tight, and cotter pins are spread.
3. Remove grease from cylinder rods and connect hoses if these steps taken at previous storage.
4. Check that all grease fittings are in place and lubricated. See "**Maintenance and Lubrication**" on page 88.
5. Check that all safety decals and reflectors are correctly located and legible. Replace if damaged. See "**Safety Decals**" on page 6.
6. Inflate tires to pressure recommended and tighten wheel bolts as specified. See "**Appendix A**" on page 97.

16974

Cart Drive System

Before hitching to the implement, check that the air drill cart has the correct sprockets for the implement you will be using. Without the correct sprockets, the air drill will meter seed inaccurately.

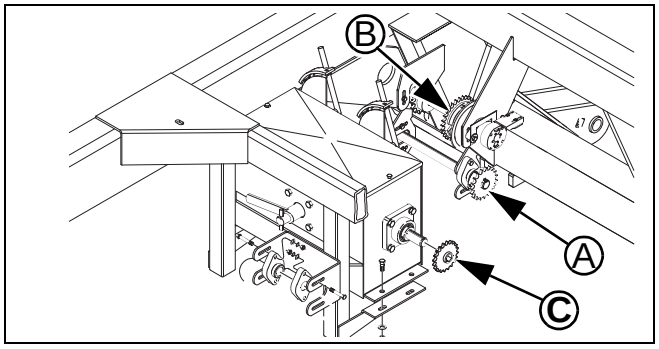


Figure 3 16974
Drive Sprockets

ADC1150 Sprocket Sizes

Sprocket Location	Sprocket Size for Implement Used				
	NTA3010	NTA3510	CTA4000	ADI334	ADI3345
A-Main Transfer Shaft, Inboard	**15 T**	**17 T**	**15 T**	**17 T**	**17 T**
B-Clutch Shaft	**38 T**	**38 T**	**29 T**	**38 T**	**29 T**
C-Gearbox Output Shaft, Inboard	**18 T**	**15 T**	**15 T**	**15 T**	**15 T**

Hitching Air Drill Cart to Tractor

DANGER

Crushing Hazard:
You may be severely injured or killed by being crushed between the tractor and the air drill cart. Always park and shut off the tractor before placing any body part between the air drill cart and tractor.

When ready for planting, the air cart is part of an assembly that includes the tractor, the air cart, and the drill. When hitching for the first time, hitch cart to tractor first.

Note: Static tongue weight of a loaded cart is about 5,500 pounds on level ground and more when facing downhill.

Once the air cart and drill are hitched together, they are usually left connected, unless parking or storage considerations require separation.

This manual includes full details only for the air drill cart front hitch. Consult the drill manual for trailing drill hitching.

1. Back the tractor drawbar up to the air drill cart until the holes in the air drill cart hitch and the tractor drawbar are aligned. Use the jack to make height adjustments.
2. Install the drawbar pin. Remove the jack. Store jack in-line with the left tongue rail on the storage stob.
3. Attach the air drill cart safety chain to an anchor on the tractor capable of pulling the unit.
4. Plug the electric-harness lead from the air drill cart into the monitor lead.
5. Install the monitor in your tractor. Refer to "**System Monitor**," page 89.
6. Plug harness lighting connector into receptacle on tractor.

Hydraulic Hose Connections

WARNING

High Pressure Fluid Hazard:
Only trained personnel should work on system hydraulics! Escaping fluid under pressure can penetrate the skin causing serious injury. Check all hydraulic lines and fittings before applying pressure. Use paper or cardboard, NOT BODY PARTS, to check for suspected leaks. Wear protective gloves and safety glasses or goggles when working with hydraulic systems. If an accident occurs, seek immediate medical attention from a physician familiar with this type of injury.

The air cart itself consumes hydraulic power for one or two circuits, and has a low pressure sump return line. The cart also passes through three circuits necessary for drill operations.

Great Plains hydraulic hoses are coded to help you connect hoses to your tractor outlets. Some machines have a hydraulic hose label on the hoses as shown in the illustration.

Some hoses are color coded as shown in the chart.

Color	Hydraulic Function
Blue	**Lift Cylinders**
Orange	**Marker Cylinders and Auger**
Yellow	**Air Drill Fan and Fold Cylinders**

To distinguish hoses on the same hydraulic circuit, refer to plastic hose holder. See Figure 4. Hoses under extended-cylinder symbol feed cylinder base ends. Hoses under retracted-cylinder symbol feed cylinder rod ends.

Make sure all tractor levers are in neutral or float, or tractor hydraulics are off, before making connections.

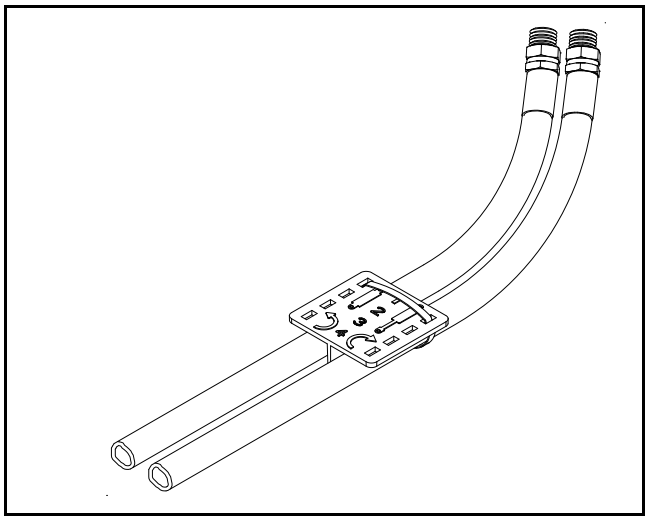


Figure 4 17641
Hydraulic Hose Label

Connections for Air Drill Carts Y1078 and Later

NOTICE

For CTA implements, some tractors require an auxiliary flow kit to prevent damage to the hydraulic pump. Contact a service technician who is factory trained on your tractor before connecting to air drill cart and CTA implement.

1. Connect blue-coded lift hoses to tractor outlets. Lift hoses are 3/8 inch hoses that go directly to couplers C and D on rear of air drill cart.
2. Connect orange-coded auger hoses to tractor outlets. Auger hoses go to the diverter valve on the inside of the left tongue rail.
3. Connect yellow-coded fan hoses to tractor outlets. If your tractor has a priority circuit for hydraulic motors, connect fan hoses to this circuit.
   - Connect fan hose under extended-cylinder symbol to the outlet you choose to be the pressure side of circuit. The pressure hose ① runs out of the selector valve. See Figure 5.
   - Connect fan hose under retracted-cylinder symbol to other outlet.

Note: Fan hoses are not the same size. A 1/2 inch and a 3/8 inch hose are paired together.

4. Connect decaled sump hose to the tractor hydraulic reservoir. Refer to your tractor operator's manual for instructions. The sump hose (2) runs beside the air drill cart fan. See Figure 5.

NOTICE

IMPORTANT: Failure to properly plumb sump hose into tractor hydraulic reservoir may result in tractor or drill damage.

Note: For proper hydraulic flow, use a poppet-style, Pioneer quick coupler to connect sump hose to tractor. See Figure 6.

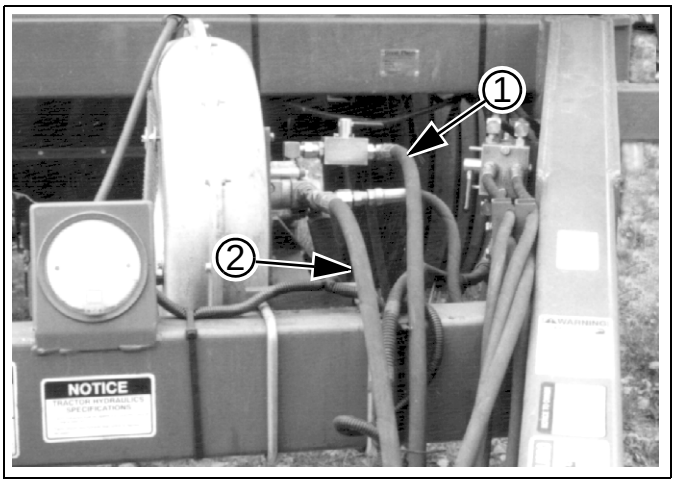


Figure 5 17172
Hydraulic Connections for Air Drill Carts Y1078 and Later

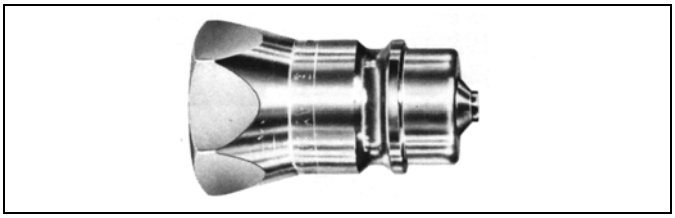


Figure 6 26467
Poppet-Style Coupler for Sump Hose

Connections for Air Drill Carts Y1077 and Earlier

For Use with NTA Implements

1. Connect lift hoses. Lift hoses are 3/8 inch hoses that go directly to lift couplers on rear of air drill cart.
2. Connect auger hoses. Auger hoses go to the diverter valve on inside of tongue rail.
3. Connect fan hoses. If your tractor has a priority circuit for hydraulic motors, connect hoses to this circuit.
   - Connect 1/2 inch hose (1) shown in Figure 7 to the outlet you choose to be the pressure side of circuit.
   - Connect 3/8 inch hose to other outlet.

Note: Fan hoses are not the same size. A 1/2 inch and a 3/8 inch hose are paired together.

- Connect 1/2 inch sump hose (2) shown in Figure 6 to the tractor hydraulic reservoir. Refer to your tractor operator manual for instructions.

NOTICE

IMPORTANT: Failure to properly plumb sump hose into tractor hydraulic reservoir may result in tractor or drill damage.

Note: For proper hydraulic flow, use a poppet-style, Pioneer quick coupler to connect sump hose to tractor. See Figure 6.

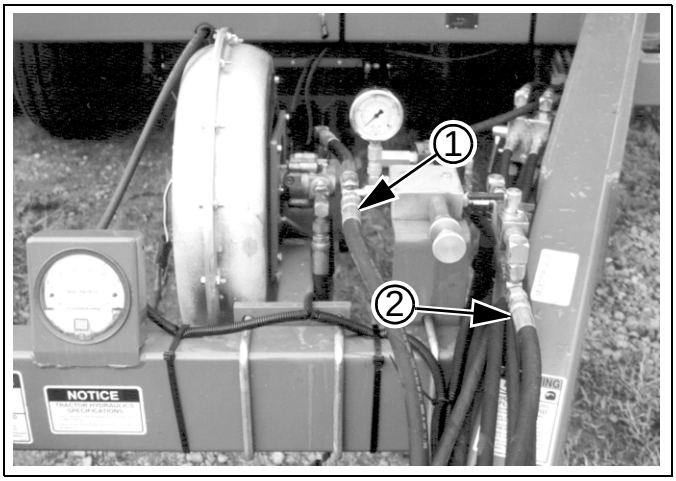


Figure 7 16444
Hydraulic Connections for Older Air Drill Carts with NTA

For Use with ADI Implements

1. Connect auger/fold hoses. Auger/fold hoses go to the diverter valve on the inside of the left tongue rail.
2. Connect lift hoses. Lift hoses are the 3/8 inch hoses that go directly to the lift couplers on rear of air drill cart.
3. Connect fan hoses. If your tractor has a priority circuit for hydraulic motors, connect hoses to this circuit.
   - Connect 1/2 inch hose (1) shown in Figure 8 to the outlet you choose to be the pressure side of circuit.
   - Connect 3/8 inch hose to other outlet.

Note: Fan hoses are not the same size. A 1/2 inch and a 3/8 inch hose are paired together.

   - Connect 1/2 inch sump hose (2) shown in Figure 8 to the tractor hydraulic reservoir. Refer to your tractor operator's manual for instructions.

Note: For proper hydraulic flow, use a poppet-style, Pioneer quick coupler to connect sump hose to tractor. See Figure 6.

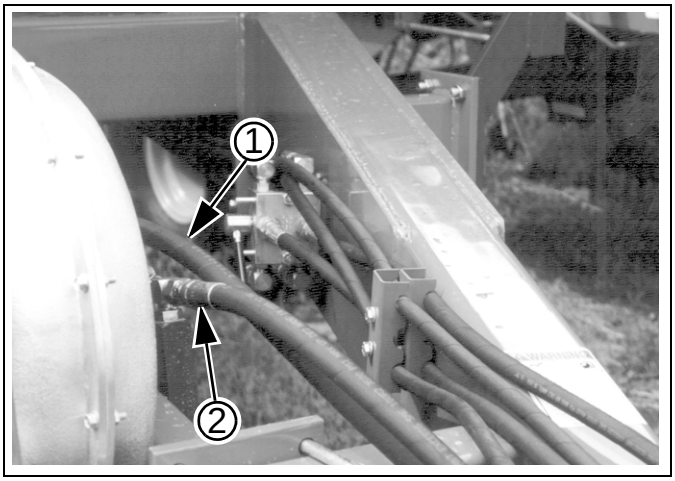


Figure 8 16563
Hydraulic Connections for Older Air Drill Carts with ADI

Operating Instructions

This sections covers general operating procedures. Experience, machine familiarity and the following information will lead to efficient air drill cart operation and good working habits. Carefully read the operator's manual for the implement you will be using with air drill cart. Always operate farm machinery with safety in mind.

General Description

Seed metering is powered by the air drill cart tire and driven at a rate proportional to distance traveled. Each seed bin is self-contained and has its own metering device. The seed bin are sealed and held at the same pressure as the meter boxes so metering is controlled mechanically–not by air-flow fluctuations. The metered seed is carried by air through the hoses to the distribution towers on the implement. These towers then divide the air and seed into individual rows.

The metering devices are driven through an electro-magnetic clutch. The clutch which will not engage unless the fan motor is running at high speed and implement is lowered past an adjustable height switch. This prevents the primary seed hoses from being plugged by seed metered into the hoses without the fan running. This also allows seed metering to be shut off automatically when the drill is lifted for headland turns.

Pre-start Checklist

1. Lubricate the air drill cart as indicated under *Lubrication*, "**Maintenance and Lubrication**," page 88.
2. Check the tires for proper inflation according to *Tire Inflation Chart*, "**Appendix A**," page 97.
3. Check the chains for proper tension and alignment as shown under *Drive System Adjustments,* "**Adjustments**," page 82.
4. Perform all beginning-of-season and daily service items discussed in under *Maintenance and Lubrication,* "**Maintenance and Lubrication**," page 88.
5. Check for worn or damaged parts and repair or replace before going to the field.
6. Check all nuts, bolts and screws. Tighten bolts as specified on *Torque Values Chart*, "**Appendix B**," page 102.

lid is fully open.

Transporting

DANGER

Electrocution hazard. To prevent serious injury or death from electric shock, keep clear of overhead power lines when transporting, folding, unfolding or operating all air drill components. Machine is not grounded. Electrocution can occur without direct contact.

Great Plains recommends transporting the air cart without seed loaded. Although designed for highway movement with a full bin, the additional weight of seed may cause the implement assembly to exceed the rated ability of the tractor, makes the assembly more difficult to control and stop, and increases wear on cart tires and wheel bearings.

WARNING

Towing the drill at high speeds or with a vehicle that is not heavy enough can lead to loss of vehicle control. Loss of vehicle control can lead to serious road accidents, injury and death. To reduce the hazard:

- *Do not exceed 20 mph.*
- *Do not tow a drill that, when fully loaded, weighs more than 1.5 times the weight of the towing vehicle.*

Before transporting the air drill cart, check and practice the following items.

Minimum Towing Vehicle Weight

When hitched to ADI345: 20,250 pounds

When hitched to ADI334: 17,600 pounds

When hitched to NTA3010: 25,100 pounds

When hitched to NTA3510: 25,950 pounds

Warning Lights. Always use implement warning lights when transporting the air drill.

Auger Latch. Properly latch auger to rear storage arm before transporting.

In-Cab Electric Switch Off. Check that the in-cab electric switch is off while transporting.

Transport Locks. Check that all implement transport locks are securely in place.

Tires. Check that all tires are properly inflated as listed on *Tire Inflation Chart*, “**Appendix A**,” page 97.

Bystanders. Check that no one is in the way before moving. Do not allow any one to ride on the air drill cart or implement.

Remove Main Drive Chain. If the air drill cart will be transported more than 15 miles, remove the main drive chain to avoid wear.

Clearance. Know the transport dimensions of the air drill cart and implement and follow a route that provides adequate clearance from all obstructions, including overhead lines. Refer to “**Specifications and Capacities**,” on page 94 and in the implement operator’s manual.

Stopping Distance. Allow sufficient stopping distance and reduce speed prior to any turns or maneuvers. If the air drill cart is transported with a full bin, allow extra stopping distance.

Road Rules. Comply with all federal, state and local laws when transporting on public roads.

Watch Traffic. Remember that the bin obstructs a portion of your rear view. Be prepared for sudden maneuvers from following vehicles.

Parking

Following these steps when parking the drill. Refer to *Storage*, “**Maintenance and Lubrication**,” page 88, for information on long-term storage preparation.

1. Place the air drill cart on firm, level ground.Check that bin lids are latched, and secure the bin lids with security cable or padlock and chain to prevent entry by children. See “**Lid Closing**” on page 25.
2. Check that bin lids are latched, and secure the bin lids with security cable or padlock and chain to prevent entry by children. See “**Lid Closing**” on page 25.
3. Remove jack from storage position and pin securely to lifting stob on outside of air drill cart tongue.
4. If ground is soft place a wide block or plate under the jack to increase contact area.
5. Securely block air drill cart tires to prevent rolling.
6. Extend jack until weight is off of the tractor drawbar.
7. Disconnect electrical lines and install plugs as provided.
8. Release pressure on hydraulic system, then disconnect hydraulic lines and pull all lines back onto air drill cart tongue. Be sure hose ends do not rest on the ground.
9. Remove the drawbar pin.
10. Disconnect the safety chain.

Storage

1. Store the air drill cart in an area where children do not play. If possible, store air drill cart inside for longer machine life.
2. Undo the bin-lid latch to release pressure on seal.
3. Empty the bin completely. Hand crank the meter several turns to empty completely. Blow out the meter with air to remove all material.
4. Raise the auger, then run the motor in reverse until auger is completely empty. Return to storage position.
5. Remove the drive chains and store in oil.
6. Lubricate the air drill cart at all points listed under *Lubrication*, this page.
7. Check all bolts, pins, fittings and hoses. Tighten, repair or replace parts as needed.
8. Check all moving and earth-contact parts for wear or damage. Make notes of any parts needing repair before the next season.
9. Thoroughly wash the bin with water inside and out to prevent corrosion.
10. Open the meter-box doors to release seal pressure. Do not open the doors wide enough for animals to enter the meters. Wire doors in place if needed. Do not store the air drill cart with the seal compressed.
11. Turn the auger hopper so rain or debris will not collect in the hopper.
12. If the air drill cart is disconnected from the implement for storage, plug all 2 1/2 inch (64 mm) openings to prevent birds from nesting.
13. Use touch-up paint to cover scratches, chips and worn areas to prevent rust.

Bin Lid

Keep lid closed. Keep tightly closed for operations. Keep loosely closed for storage. Open only for material loading, bin clean-out, and lid maintenance.

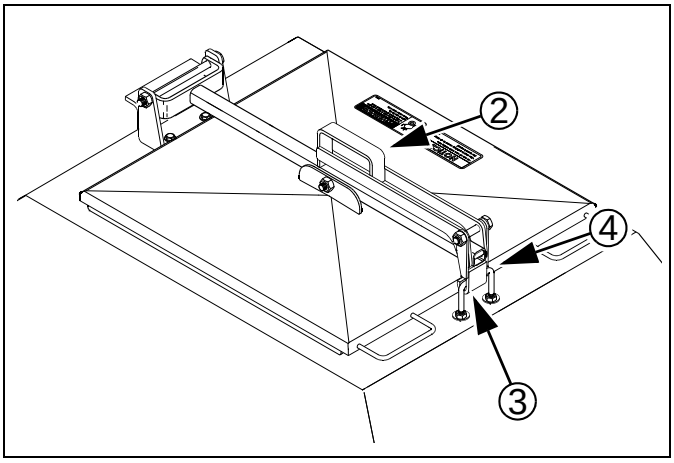


Figure 9 16191
Hopper Lid Latched

Lid Opening

Refer to Figure 9

1. Lift handle ②.
2. Swing handle ② out until hook ③ releases from U-bolt ④.
3. Move hook clear of U-bolt and re-close handle.
4. Swing lid open.

Lid Closing

1. Open handle ② and engage hook ③ on U-bolt ④.
2. Close handle with hook engaged for operations or short-term parking.

   For long-term storage, do not engage hook or latch handle, to avoid deforming the seal.
3. For storage, particularly unlatched, a locked chain deters entry.

Strainer

Refer to Figure 10

Each bin is equipped with a strainer ⑤ intended to:

- capture foreign matter in seed and materials that is too large to pass through the meter, and
- prevent entry.

Leave the strainer in place except during strainer and bin cleaning.

Check the strainer for residue prior to each loading operation. Remove, empty and return it to the bin.

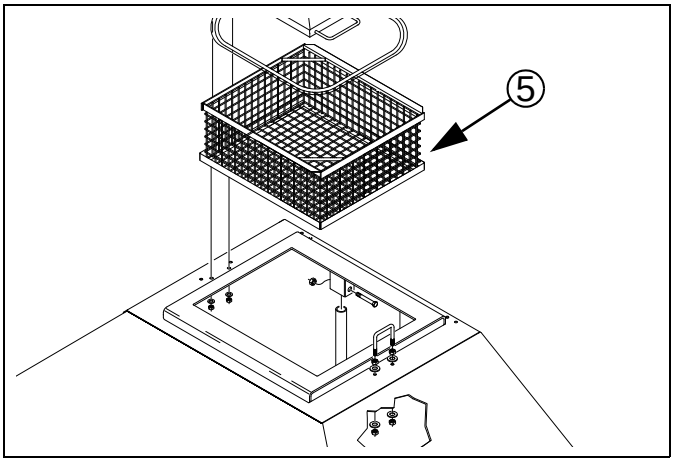


Figure 10 16137
Bin Strainer

4. For strainer or bin cleaning, the strainer lifts out when the lid is fully open.

Filling the Air Drill Cart

1. Be certain the air drill cart is securely hitched to a tractor that has adequate weight and power. See *Tractor Requirements*, “**Preparation and Setup**,” page 15.

Note: Static tongue weight of a loaded air drill cart is about 5,500 pounds on level ground and more when facing downhill.

2. Be certain the bin unloading door on the bottom of the meter box is securely closed and latched as shown in Figure 11.
3. With the air drill cart fan running, check bin lid and meter-box seals carefully for air leaks. Adjust bin latch or replace seals to prevent leakage.

NOTICE

IMPORTANT: Before filling the air drill cart for the first time and at the beginning of each season, check the entire bin for leaks. A small air leak can cause large variations in seeding rates.

4. Park air drill cart on solid, level ground.
5. Shut off all hydraulic power to the air drill cart.
6. Check that the auger-motor control on the auger body is in the center, off position as shown in Figure 12.

Figure 11 14874
Unloading Door Latched

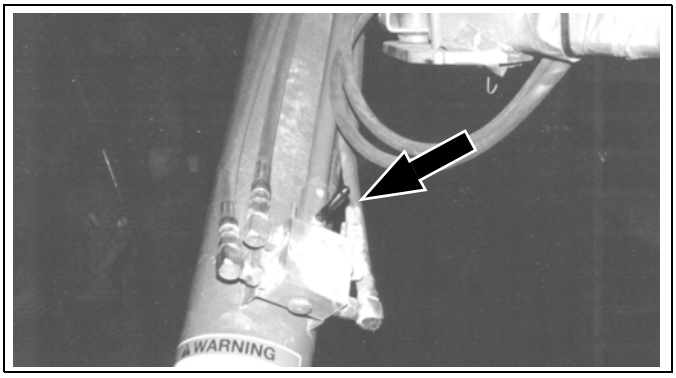


Figure 12 16172
Auger-motor control, Off Position

7. Divert hydraulic flow to the auger by moving the hydraulic diverter down into the auger position. The diverter is shown in Figure 13. The diverter is on the inside of the left-hand tongue rail.
8. Climb the ladder to the air drill cart walkboard. Lift the lid latch handle and move the latch off of the U-bolt catch. Lift the lid and open fully. Do not drop the lid; lower it by hand.
9. Check that the strainer basket is in place in the top of the bin. Remove any foreign material from the basket.

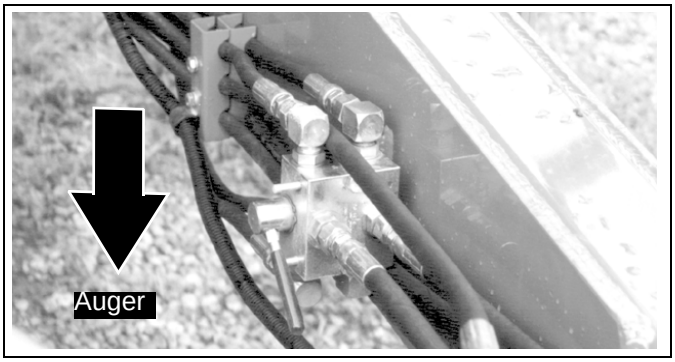


Figure 13 16221
Auger Hydraulic Diverter

WARNING

Keep hands, feet, hair, clothing or any item that could get caught in the auger away from the inlet. If the auger becomes plugged, turn off the auger and tractor before unplugging.

10. Pivot the auger hopper until its opening is facing up. To turn the hopper, pull up on the hopper snap pin as shown in Figure 14.

WARNING

Keep clear of overhead power lines when positioning auger.

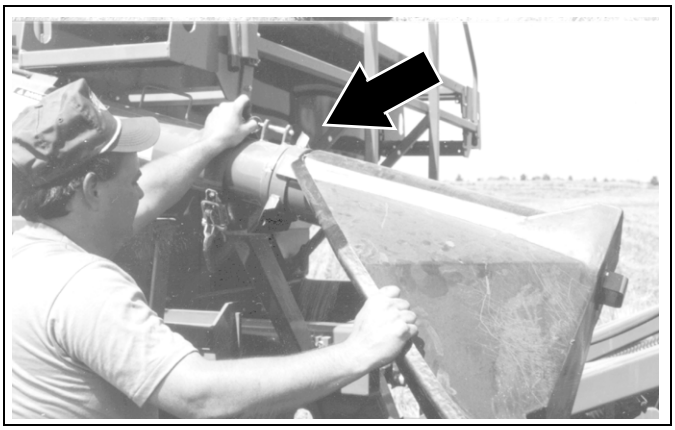


Figure 14 00000
Hopper Snap Pin

11. Undo the latch clamp that holds the auger in place during transport. See Figure 15. Pull auger away from drill, taking care not to damage the auger tube on the ladder.
12. Swing the auger so the spout is centered over the bin opening. Position your grain container for unloading into the auger hopper.

DANGER

Rotating auger. To prevent serious injury or death:

- *Read instructions and safety information before operation.*
- *Keep hands, feet, hair and clothing away from rotating auger.*
- *Do not remove or modify any guards.*
- *Keep children well clear of work area.*

13. Energize tractor hydraulics for auger. You may need to tie the control lever in place or adjust the detent pressure on your tractor.

Figure 15 16977
Auger Latch Clamp

14. Start the auger by turning the auger-motor control left or right. The control is shown in Figure 16. Visually check auger for correct rotation. Reverse handle if needed.

Note: The center location of the valve handle is the off position. Turning the handle to either side will provide forward or reverse rotation depending on direction of the hydraulic flow from the tractor. One side will be forward and the other reverse.

15. Slowly turn on seed flow and fill bin.

Note: When leveled off, the top cone of the bin holds about one-third of bin capacity, the center area one-third and the lower cone one-third.

16. When bin is full, turn off the auger by moving the auger-motor control to the center position.
17. Return auger to storage position. Swing auger toward the air drill cart, place the spout end in the support arm, and close the clamp latch.
18. Turn off the tractor hydraulics.

⚠ CAUTION

Do not turn the auger hydraulic diverter handle until the hydraulics have been shut off. If the diverter is moved with hydraulics on, the drill markers or wings will suddenly begin folding.

19. Remove any foreign matter from the strainer basket.
20. Wipe any grain or foreign matter from lid-seal area on top of air drill cart bin. Close lid and latch securely.
21. Before moving the air drill cart, check that the bin lid is latched, the auger-motor control is off, and the auger is securely latched in transport position.

Figure 16 12713
Auger Motor Control, Rotation Direction

Field Operations

For seed metering, the in-cab rocker switch must be on. You do not need to turn the switch on and off while seeding. A switch on the implement rockshaft automatically turns seed metering off when the implement is raised above an adjustable height. To adjust the switch, refer to *Electric Clutch Switch Adjustment*, "**Adjustments**," page 82.

For normal seeding operations:

1. Check that the air drill cart tires are properly inflated as indicated by *Tire Inflation Chart*, "**Appendix B,**" page 102.
2. Check that all seed hoses are connected and clear of foreign material. Check openers for plugging.
3. Set the seed rate as described under *Setting Metering Rate,* "**Adjustments**," page 33.
4. Check that the in-cab rocker switch is on.
5. With the tractor at a low idle speed, energize tractor hydraulics for fan. Lock hydraulic lever in place for continuous operation. Refer to your tractor operator's manual for instructions on operating hydraulic motor.

NOTICE

Always engage the fan with the tractor at a low engine speed. Engaging the fan when the tractor is at high speed may cause fan damage.

6. Check that the bottom of the fan rotor turns toward the rear of the air drill cart. If not, reverse the direction of the hydraulic flow from the tractor.

NOTICE

Do not reverse hydraulic flow with the fan running.

7. Run fan for at least 15 minutes before seeding. Hydraulic fluid must be warm before fan and wing down pressure will operate properly.
8. Check bin-lid and meter-box seals for air leaks. Adjust the latch or replace the seals to prevent leakage.

Note: It takes only a very small air leak to cause large variations in the seeding rate and pattern.

9. Watch the air drill monitor and adjust fan speed by increasing or decreasing hydraulic flow from the tractor. Use the following guidelines and the fan speed chart to properly adjust fan speed.
   • Higher fan speeds improve seed distribution, but high fan speeds also increase the chance of seed damage and bounce.
   • At first, adjust fan speed to the high end of the suggested range. Watch for excessive seed cracking and seed bounce from the furrow, then reduce fan speed if necessary.
   • Follow the chart below as a guide. Optimal fan speeds will depend on implement width, row spacing, seeding rates, seed weights and seed size. Increase fan speed for heavier seeding rates or seed. Reduce fan speed for lighter seeding rates and seed more prone to cracking.

Fan Speed Chart

Seeds	Fan RMPM
Sunflowers	2,250 - 3,000
Wheat	3,250 - 4,000
Soybeans	2,750 - 3,500
Milo	3,250 - 4,000

NOTICE

*Do not exceed a fan speed of 5000 rpm. Refer to Installation and Setup, "**System Monitor**," page 89, for instructions on setting the in-cab monitor to sound fan-speed alarms.*

WARNING

Make sure no one is in the way of the drill before moving. Do not allow any one to ride on the drill.

10. Pull forward, lower drill and begin seeding.
11. Be aware of the 5 to 10 feet needed for seed to reach the openers. If you stop in the middle of the field, raise the drill and back up 10 feet, then restart seeding.
12. When finished seeding, turn the in-cab switch off**.**

Unloading the Air Drill Cart

1. Be certain the air drill cart is securely hitched to a tractor with adequate weight and power. See *Tractor Requirements*, “**Preparation and Setup**,” page 15.
2. Park air drill cart on solid, level ground.
3. Shut off all hydraulic power to the air drill cart.
4. Check that the auger-motor control on the auger body is in the center, off position as shown in Figure 17.
5. Pivot the auger hopper until opening is facing up. To turn the hopper, pull up on the hopper snap pin.
6. Undo the latch clamp that holds the auger during transport.

DANGER

Keep clear of overhead power lines when positioning auger.

7. Remove the retainer pin that holds the inner section of the auger swing arm to the air drill cart.
8. Pull the auger away from the drill. Swivel the auger until the hopper is centered under the meter-box unloading door.

DANGER

Keep hands, feet, hair, clothing or any items that could get caught in the auger away from the inlet. If the auger becomes plugged, turn off the auger and tractor before unplugging.

9. Move the auger hydraulic diverter down to the auger position as shown in Figure 18.
10. Position your grain container under the auger spout.

DANGER

Rotating auger. To prevent serious injury or death:

- Read instructions and safety information prior to operation.
- Keep hands, feet, hair and clothing away from rotating auger.
- Do not remove or modify any guards
- Keep children well clear of work area.

11. Energize tractor hydraulics for the auger motor. You may need to tie the control lever in place.

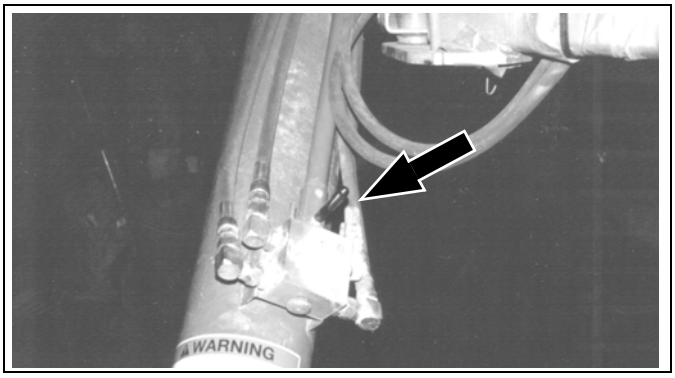


Figure 17 16172
Auger-motor control, Off Position

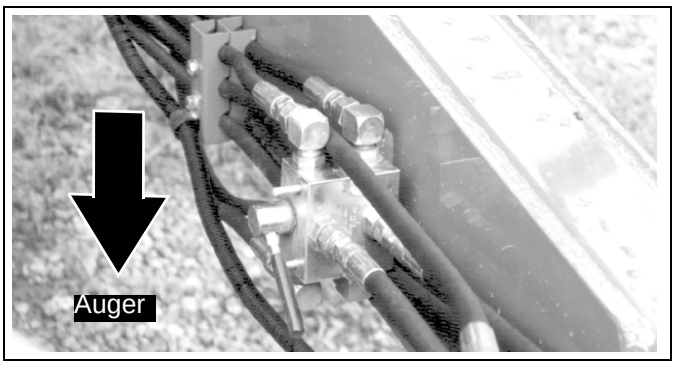


Figure 18 16221
Auger Hydraulic Diverter

12. Start the auger by turning the auger-motor control left or right as shown in Figure 19. Visually check auger for correct direction of rotation. Reverse handle if needed.

Figure 19 12713
Auger Motor Control, Rotation Direction

13. Slowly open the unloading door on the bottom of the meter. When seed flow stops, open the calibration door to ensure complete clean-out. Turn the metering drive train using the hand crank as shown in Figure 20 to make sure the meter is empty.
14. Turn off auger by moving auger-motor control to the center, off position. Turn off the tractor hydraulics.

⚠ CAUTION

Do not turn the auger hydraulic diverter until the hydraulics have been shut off. If the diverter is moved with hydraulics on, the drill markers or wings will suddenly begin folding.

15. Clean out auger hopper by pulling up the hopper snap pin and swiveling the hopper to the side.
16. Swivel the auger toward air drill cart. Place spout end in the support arm and close latch clamp.
17. Replace retainer pin in inner section of swing arm.

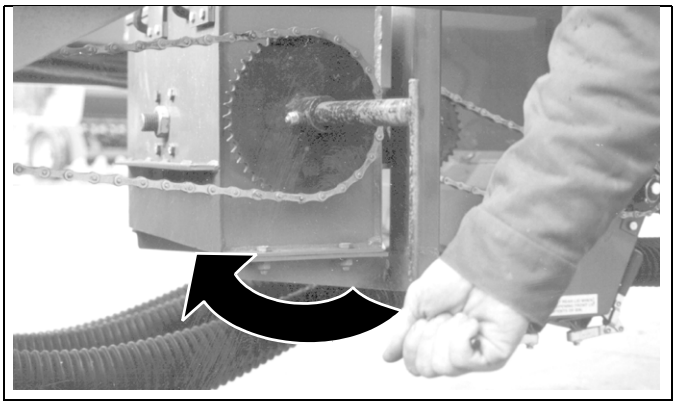


Figure 20 16981
Turning Meter Drive by Hand

⚠ CAUTION

Follow manufacturer recommendations for protective gear when using treated seeds.

18. Wipe top and bottom of meter-door flanges shown in Figure 21, making sure all grain is removed. Look for material caught between seal and flange. Close and latch the doors.Transporting

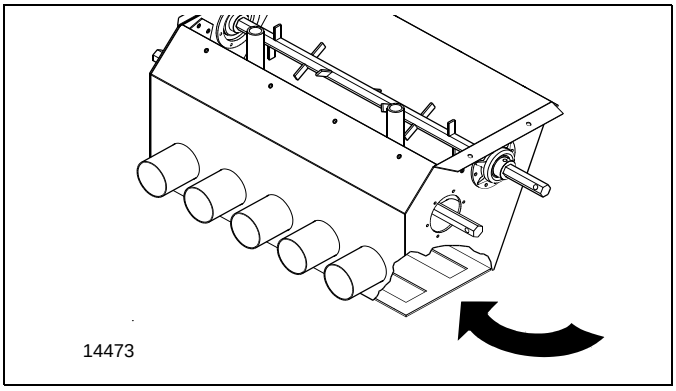


Figure 21 14473
Meter Door Flanges

Setting Metering Rate

To set the meter rate, you must adjust the quick-change sprockets, change the meter-box gear set, shift the gearbox and calibrate the rate.

When adjusting the rate, first check the charts starting on page 37 or the air drill cart bin. The charts are based on cleaned, untreated seed of average size and test weight. Many factors will affect meter rates including foreign material, seed treatment, seed size, field conditions and test weight. Minor adjustments will be needed to compensate for these factors. Initially set the rate according to the charts, then check the rate for your material.

NOTICE

Initially set the rate according to the charts, then check the rate for your material. The seed rate charts are an estimate of the maximum seed rates for the air drill cart. Actual rates will vary based on conditions and machine maintenance. Maintain the air drill cart regularly for optimum performance.

1. Refer to the charts starting on page 37. Find the proper sprocket orientation, gear set and gearbox speed for your desired application rate.

2. Adjust quick-change sprockets shown in Figure 22.
   - Remove the lynch pins from the sprockets.
   - Take the sprockets out of the chains and reverse their position as indicated by the seed rate chart.
   - Replace chains on sprockets.
   - Align holes in sprockets with holes in shafts. Slide sprockets into place and replace the lynch pins.

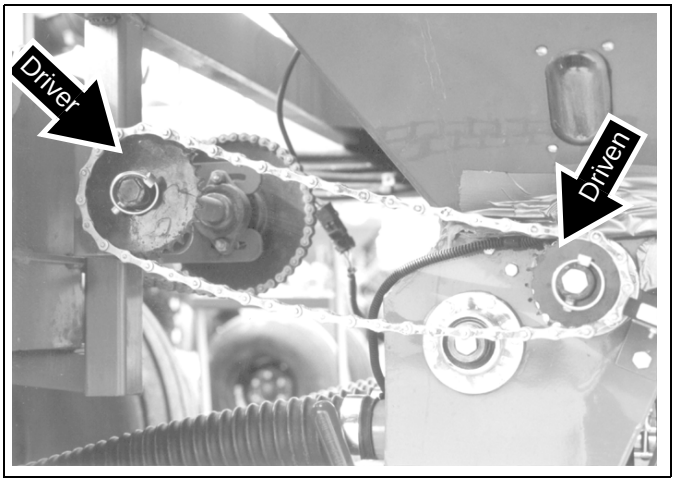


Figure 22 169820
Quick-Change Sprockets

3. Adjust the meter-box gears shown in Figure 23. The gears are on the meter box on the left side of the air drill cart.
   - Remove the lynch pins from the gears.
   - Reverse the gears as indicated on chart, then replace lynch pins

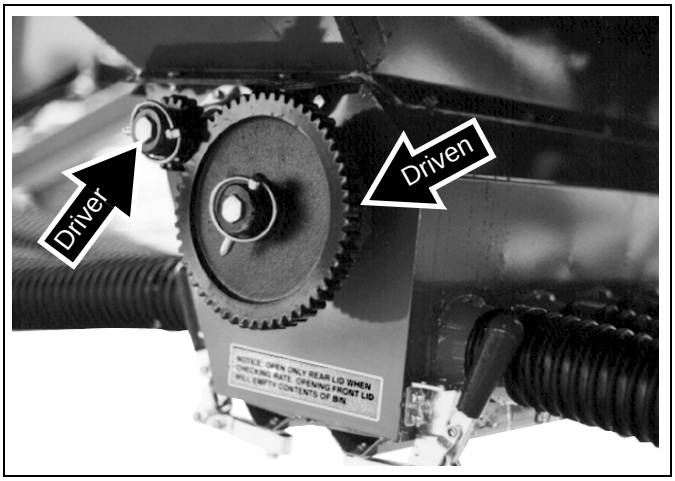


Figure 23 14882
Meter Box Gears

4. Shift the gearbox speed.
   - Disengage the gearbox clutch by rotating the handle down. See Figure 24.

Figure 24
Disengaging Gearbox Clutch
16938

When disengaged, the handle will move out slightly. See Figure 25.

NOTICE

To prevent gearbox damage, always disengage the gearbox clutch before shifting gears.

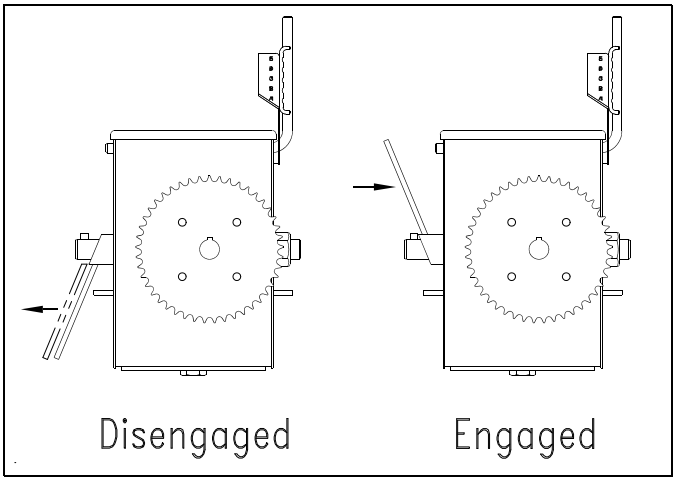


Figure 25
Gearbox Clutch
00000

   - Move the gearbox shifters to the number and letter indicated on chart. See Figure 26. If shifters do not move easily, check that the clutch is disengaged, then turn the metering drive train slightly to relieve binding.
   - Engage clutch by rotating handle up. When engaged, the handle will move in slightly. Refer to Figure 26. If resistance is felt, turn the metering drive slightly as shown in Figure 30 while engaging the clutch.

NOTICE

Do not force the clutch handle into engagement.

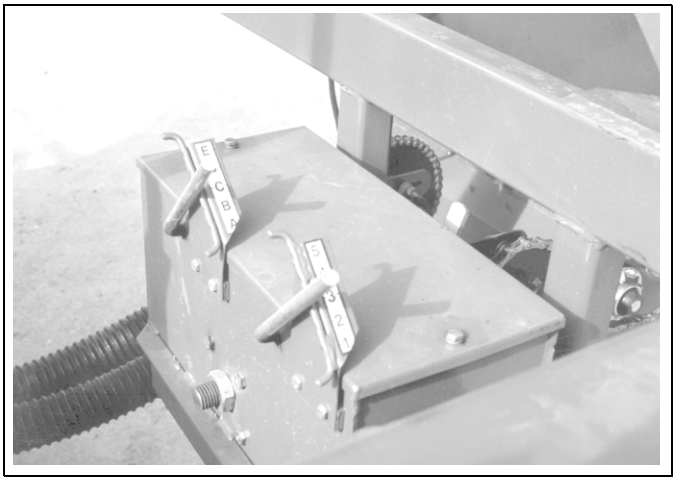


Figure 26
Gearbox Shifters
16984

Checking Metering Rate

Before checking the meter rate, make sure the correct sprockets are installed on air drill cart drive system. Incorrect sprockets will affect seeding rates. Refer to *Air Drill Cart Drive System*, "**Preparation and Setup**," page 15.

1. Open the calibration door on the meter box as shown in Figure 27.

NOTICE

Do not open the unloading door. The calibration door is closer to the rear of the air drill cart.

2. Put enough material in bin so there will be at least a bushel left after seeding one acre. The amount needed will depend on the meter rate.
3. Turn the hand crank a few turns to be sure the meter stars are full of material.

NOTICE

Obey manufacturer or grower recommendations for safety equipment and protective gear when using treated seeds.

4. Wipe all material off the flanges around the meter doors as shown in Figure 28.
5. Accurately weigh an empty container large enough to catch seed coming out of the meter.

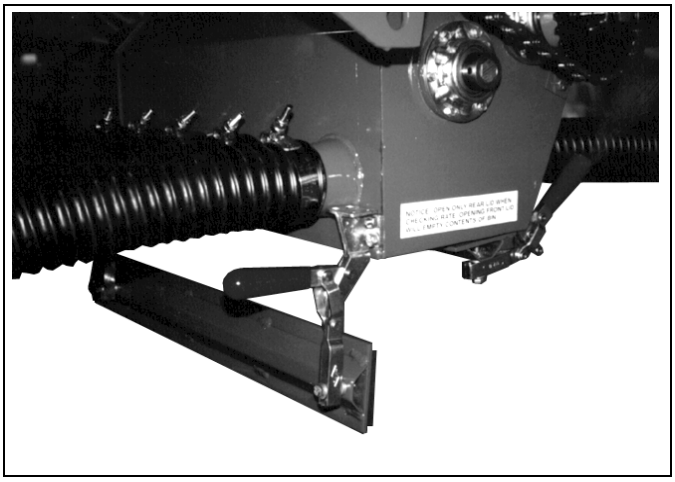


Figure 27 14876
Calibration Door

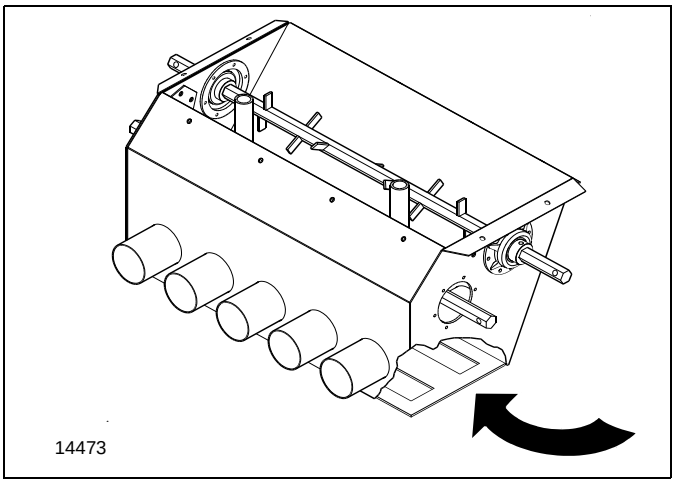


Figure 28 14473
Meter Door Flanges

6. Place container under open calibration door. If your air drill cart is equipped with a calibration kit, loop bag handles over the door handles and hook the bag to the front of the meter. See Figure 29.

Figure 29 16978
Calibration Bag Installed on Meter

7. Find the hand crank on the inside of the frame rail near the gearbox. Use the crank to turn the drive clockwise as shown in Figure 30 Turn crank 64 3/4 revolutions for a one-acre seeding rate. Turn handle at a rate of about 30 rpm (about 2 seconds per revolution).

NOTICE

Turn the handle clockwise. Turning the handle counterclockwise will meter seed at a rate far below that applied in the field.

Note: If you are applying more pounds per acre than your scale will weigh, calculate the rate for one-half acre. For a one-half-acre rate, turn the crank half as many revolutions. Multiply your final weight by 2 for the one-acre rate.

8. Wipe all material off the flanges around the meter doors and capture in the container.
9. Accurately weigh the container with seed. Subtract the weight of the empty container. Adjust to a new setting if this one is not acceptable.
10. When the seeding rate is acceptable, close the calibration door, being careful the seal area is clear of all foreign material. Remove and store the hand crank.

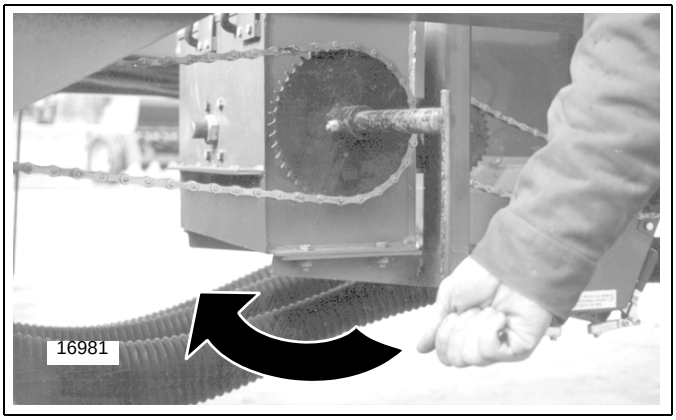


Figure 30 00000
Turning Meter Drive by Hand

Seed Rate Charts

Barley Seed Rate Chart

Robust variety, 52 pounds per bushel

NOTICE

Initially set the rate according to the charts, then check the rate for your material. The seed rate charts are an estimate of the maximum seed rates for the air drill cart. Actual rates will vary based on conditions and machine maintenance. Maintain the air drill cart regularly for optimum performance.

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	17	54	E5	2.0
20	30	17	54	E4	2.3
20	30	17	54	D5	2.5
20	30	17	54	E3	2.7
20	30	17	54	D4	2.9
20	30	17	54	C5	3.1
20	30	17	54	E2	3.3
20	30	17	54	D3	3.4
20	30	17	54	C4	3.6
20	30	17	54	B5	3.6
20	30	17	54	B4	4.2
20	30	17	54	A5	4.2
20	30	17	54	C3	4.2
20	30	17	54	E1	4.2
20	30	17	54	D2	4.2
30	20	17	54	E5	4.7
20	30	17	54	A4	4.8
20	30	17	54	B3	4.9
20	30	17	54	C2	5.1
20	30	17	54	D1	5.3
30	20	17	54	E4	5.4
20	30	17	54	A3	5.6
20	30	17	54	B2	5.9
30	20	17	54	D5	6.0
20	30	17	54	C1	6.4
30	20	17	54	E3	6.4
20	30	17	54	A2	6.8
30	20	17	54	D4	6.8
30	20	17	54	C5	7.2
20	30	17	54	B1	7.5
30	20	17	54	E2	7.7
30	20	17	54	D3	8.0
30	20	17	54	C4	8.3
30	20	17	54	B5	8.4
20	30	17	54	A1	8.6
30	20	17	54	B4	9.7
30	20	17	54	A5	9.7
30	20	17	54	C3	9.7
30	20	17	54	E1	9.7
30	20	17	54	D2	9.7
30	20	17	54	A4	11.1
30	20	17	54	B3	11.3
30	20	17	54	C2	11.6
30	20	17	54	D1	12.1
30	20	17	54	A3	12.9
30	20	17	54	B2	13.6
30	20	17	54	C1	14.6
30	20	17	54	A2	15.6
30	20	17	54	B1	17.0
30	20	17	54	A1	19.5

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	54	17	E5	21.8
20	30	54	17	E4	24.9
20	30	54	17	D5	27.3
20	30	54	17	E3	29.1
20	30	54	17	D4	31.1
20	30	54	17	C5	32.7
20	30	54	17	E2	34.8
20	30	54	17	D3	36.3
20	30	54	17	C4	37.3
20	30	54	17	B5	38.1
20	30	54	17	B4	43.4
20	30	54	17	A5	43.4
20	30	54	17	C3	43.4
20	30	54	17	E1	43.4
20	30	54	17	D2	43.4
30	20	54	17	E5	48.8
20	30	54	17	A4	49.5
20	30	54	17	B3	50.5
20	30	54	17	C2	51.9
20	30	54	17	D1	54.1
30	20	54	17	E4	55.6
20	30	54	17	A3	57.6
20	30	54	17	B2	60.4
30	20	54	17	D5	60.6
20	30	54	17	C1	64.6
30	20	54	17	E3	64.6
20	30	54	17	A2	68.7
30	20	54	17	D4	69.0
30	20	54	17	C5	72.3
20	30	54	17	B1	74.9
30	20	54	17	E2	77.0
30	20	54	17	D3	80.0
30	20	54	17	C4	82.2
30	20	54	17	B5	83.9
20	30	54	17	A1	85.1
30	20	54	17	B4	95.2
30	20	54	17	A5	95.2
30	20	54	17	C3	95.2
30	20	54	17	E1	95.2
30	20	54	17	D2	95.2
30	20	54	17	A4	107.9
30	20	54	17	B3	110.0
30	20	54	17	C2	113.0
30	20	54	17	D1	117.3
30	20	54	17	A3	124.5
30	20	54	17	B2	130.2
30	20	54	17	C1	138.6
30	20	54	17	A2	146.9
30	20	54	17	B1	159.0
30	20	54	17	A1	178.4

Canary Bird Feed Seed Rate Chart

Unknown variety, 53 pounds per bushel

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	17	54	E5	3.6
20	30	17	54	E4	3.9
20	30	17	54	D5	4.1
20	30	17	54	E3	4.3
20	30	17	54	D4	4.5
20	30	17	54	C5	4.7
20	30	17	54	E2	4.9
20	30	17	54	D3	5.0
20	30	17	54	C4	5.1
20	30	17	54	B5	5.2
20	30	17	54	B4	5.7
20	30	17	54	A5	5.7
20	30	17	54	C3	5.7
20	30	17	54	E1	5.7
20	30	17	54	D2	5.7
30	20	17	54	E5	6.2
20	30	17	54	A4	6.3
20	30	17	54	B3	6.4
20	30	17	54	C2	6.5
20	30	17	54	D1	6.7
30	20	17	54	E4	6.9
20	30	17	54	A3	7.1
20	30	17	54	B2	7.3
30	20	17	54	D5	7.4
20	30	17	54	C1	7.7
30	20	17	54	E3	7.7
20	30	17	54	A2	8.1
30	20	17	54	D4	8.2
30	20	17	54	C5	8.5
20	30	17	54	B1	8.8
30	20	17	54	E2	9.0
30	20	17	54	D3	9.3
30	20	17	54	C4	9.5
30	20	17	54	B5	9.7
20	30	17	54	A1	9.8
30	20	17	54	B4	10.8
30	20	17	54	A5	10.8
30	20	17	54	C3	10.8
30	20	17	54	E1	10.8
30	20	17	54	D2	10.8
30	20	17	54	A4	12.1
30	20	17	54	B3	12.3
30	20	17	54	C2	12.6
30	20	17	54	D1	13.1
30	20	17	54	A3	13.9
30	20	17	54	B2	14.5
30	20	17	54	C1	15.4
30	20	17	54	A2	16.3
30	20	17	54	B1	17.7
30	20	17	54	A1	20.0

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	54	17	E5	22.2
20	30	54	17	E4	25.1
20	30	54	17	D5	27.3
20	30	54	17	E3	28.9
20	30	54	17	D4	30.9
20	30	54	17	C5	32.3
20	30	54	17	E2	34.3
20	30	54	17	D3	35.7
20	30	54	17	C4	36.6
20	30	54	17	B5	37.4
20	30	54	17	B4	42.4
20	30	54	17	A5	42.4
20	30	54	17	C3	42.4
20	30	54	17	E1	42.4
20	30	54	17	D2	42.4
30	20	54	17	E5	47.4
20	30	54	17	A4	48.1
20	30	54	17	B3	49.0
20	30	54	17	C2	50.4
20	30	54	17	D1	52.4
30	20	54	17	E4	53.8
20	30	54	17	A3	55.7
20	30	54	17	B2	58.3
30	20	54	17	D5	58.6
20	30	54	17	C1	62.3
30	20	54	17	E3	62.3
20	30	54	17	A2	66.2
30	20	54	17	D4	66.5
30	20	54	17	C5	69.7
20	30	54	17	B1	72.1
30	20	54	17	E2	74.1
30	20	54	17	D3	77.0
30	20	54	17	C4	79.1
30	20	54	17	B5	80.7
20	30	54	17	A1	81.9
30	20	54	17	B4	91.6
30	20	54	17	A5	91.6
30	20	54	17	C3	91.6
30	20	54	17	E1	91.6
30	20	54	17	D2	91.6
30	20	54	17	A4	104.0
30	20	54	17	B3	106.1
30	20	54	17	C2	108.9
30	20	54	17	D1	113.2
30	20	54	17	A3	120.4
30	20	54	17	B2	126.1
30	20	54	17	C1	134.7
30	20	54	17	A2	143.2
30	20	54	17	B1	156.0
30	20	54	17	A1	177.2

Canola Seed Rate Chart

Lirabon variety, 50 pounds per bushel

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	17	54	E5	1.5
20	30	17	54	E4	1.8
20	30	17	54	D5	2.0
20	30	17	54	E3	2.2
20	30	17	54	D4	2.4
20	30	17	54	C5	2.5
20	30	17	54	E2	2.8
20	30	17	54	D3	2.9
20	30	17	54	C4	3.0
20	30	17	54	B5	3.1
20	30	17	54	B4	3.6
20	30	17	54	A5	3.6
20	30	17	54	C3	3.6
20	30	17	54	E1	3.6
20	30	17	54	D2	3.6
30	20	17	54	E5	4.1
20	30	17	54	A4	4.2
20	30	17	54	B3	4.3
20	30	17	54	C2	4.4
20	30	17	54	D1	4.7
30	20	17	54	E4	4.8
20	30	17	54	A3	5.0
20	30	17	54	B2	5.3
30	20	17	54	D5	5.3
20	30	17	54	C1	5.7
30	20	17	54	E3	5.7
20	30	17	54	A2	6.1
30	20	17	54	D4	6.2
30	20	17	54	C5	6.5
20	30	17	54	B1	6.8
30	20	17	54	E2	7.0
30	20	17	54	D3	7.3
30	20	17	54	C4	7.5
30	20	17	54	B5	7.7
20	30	17	54	A1	7.8
30	20	17	54	B4	8.9
30	20	17	54	A5	8.9
30	20	17	54	C3	8.9
30	20	17	54	E1	8.9
30	20	17	54	D2	8.9
30	20	17	54	A4	10.2
30	20	17	54	B3	10.4
30	20	17	54	C2	10.7
30	20	17	54	D1	11.2
30	20	17	54	A3	12.0
30	20	17	54	B2	12.6
30	20	17	54	C1	13.5
30	20	17	54	A2	14.5
30	20	17	54	B1	15.8
30	20	17	54	A1	18.1

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	54	17	E5	20.3
20	30	54	17	E4	23.3
20	30	54	17	D5	25.4
20	30	54	17	E3	27.1
20	30	54	17	D4	29.0
20	30	54	17	C5	30.4
20	30	54	17	E2	32.4
20	30	54	17	D3	33.7
20	30	54	17	C4	34.7
20	30	54	17	B5	35.4
20	30	54	17	B4	40.3
20	30	54	17	A5	40.3
20	30	54	17	C3	40.3
20	30	54	17	E1	40.3
20	30	54	17	D2	40.3
30	20	54	17	E5	45.1
20	30	54	17	A4	45.8
20	30	54	17	B3	46.7
20	30	54	17	C2	48.0
20	30	54	17	D1	49.9
30	20	54	17	E4	51.2
20	30	54	17	A3	53.1
20	30	54	17	B2	55.6
30	20	54	17	D5	55.8
20	30	54	17	C1	59.3
30	20	54	17	E3	59.3
20	30	54	17	A2	63.0
30	20	54	17	D4	63.3
30	20	54	17	C5	66.3
20	30	54	17	B1	68.6
30	20	54	17	E2	70.4
30	20	54	17	D3	73.1
30	20	54	17	C4	75.1
30	20	54	17	B5	76.5
20	30	54	17	A1	77.6
30	20	54	17	B4	86.6
30	20	54	17	A5	86.6
30	20	54	17	C3	86.6
30	20	54	17	E1	86.6
30	20	54	17	D2	86.6
30	20	54	17	A4	98.0
30	20	54	17	B3	99.9
30	20	54	17	C2	102.5
30	20	54	17	D1	106.4
30	20	54	17	A3	112.9
30	20	54	17	B2	118.1
30	20	54	17	C1	125.9
30	20	54	17	A2	133.7
30	20	54	17	B1	145.5
30	20	54	17	A1	165.3

Durum Seed Rate Chart

Plenty variety, 61 pounds per bushel

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	17	54	E5	1.9
20	30	17	54	E4	2.3
20	30	17	54	D5	2.6
20	30	17	54	E3	2.8
20	30	17	54	D4	3.1
20	30	17	54	C5	3.3
20	30	17	54	E2	3.6
20	30	17	54	D3	3.8
20	30	17	54	C4	3.9
20	30	17	54	B5	4.0
20	30	17	54	B4	4.7
20	30	17	54	A5	4.7
20	30	17	54	C3	4.7
20	30	17	54	E1	4.7
20	30	17	54	D2	4.7
30	20	17	54	E5	5.4
20	30	17	54	A4	5.5
20	30	17	54	B3	5.7
20	30	17	54	C2	5.9
20	30	17	54	D1	6.1
30	20	17	54	E4	6.3
20	30	17	54	A3	6.6
20	30	17	54	B2	7.0
30	20	17	54	D5	7.0
20	30	17	54	C1	7.6
30	20	17	54	E3	7.6
20	30	17	54	A2	8.1
30	20	17	54	D4	8.2
30	20	17	54	C5	8.6
20	30	17	54	B1	9.0
30	20	17	54	E2	9.2
30	20	17	54	D3	9.7
30	20	17	54	C4	10.0
30	20	17	54	B5	10.2
20	30	17	54	A1	10.4
30	20	17	54	B4	11.8
30	20	17	54	A5	11.8
30	20	17	54	C3	11.8
30	20	17	54	E1	11.8
30	20	17	54	D2	11.8
30	20	17	54	A4	13.6
30	20	17	54	B3	13.9
30	20	17	54	C2	14.3
30	20	17	54	D1	14.9
30	20	17	54	A3	16.0
30	20	17	54	B2	16.8
30	20	17	54	C1	18.0
30	20	17	54	A2	19.3
30	20	17	54	B1	21.2
30	20	17	54	A1	24.2

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	54	17	E5	27.2
20	30	54	17	E4	31.1
20	30	54	17	D5	34.0
20	30	54	17	E3	36.3
20	30	54	17	D4	38.9
20	30	54	17	C5	40.8
20	30	54	17	E2	43.4
20	30	54	17	D3	45.2
20	30	54	17	C4	46.5
20	30	54	17	B5	47.4
20	30	54	17	B4	54.0
20	30	54	17	A5	54.0
20	30	54	17	C3	54.0
20	30	54	17	E1	54.0
20	30	54	17	D2	54.0
30	20	54	17	E5	60.5
20	30	54	17	A4	61.4
20	30	54	17	B3	62.6
20	30	54	17	C2	64.4
20	30	54	17	D1	66.9
30	20	54	17	E4	68.7
20	30	54	17	A3	71.1
20	30	54	17	B2	74.5
30	20	54	17	D5	74.8
20	30	54	17	C1	79.5
30	20	54	17	E3	79.5
20	30	54	17	A2	84.5
30	20	54	17	D4	84.8
30	20	54	17	C5	88.8
20	30	54	17	B1	91.9
30	20	54	17	E2	94.3
30	20	54	17	D3	97.9
30	20	54	17	C4	100.5
30	20	54	17	B5	102.5
20	30	54	17	A1	104.0
30	20	54	17	B4	115.8
30	20	54	17	A5	115.8
30	20	54	17	C3	115.8
30	20	54	17	E1	115.8
30	20	54	17	D2	115.8
30	20	54	17	A4	130.7
30	20	54	17	B3	133.2
30	20	54	17	C2	136.6
30	20	54	17	D1	141.7
30	20	54	17	A3	150.1
30	20	54	17	B2	156.8
30	20	54	17	C1	166.7
30	20	54	17	A2	176.6
30	20	54	17	B1	191.1
30	20	54	17	A1	215.1

Fertilizer

11-52-0, 60 pounds per cubic foot

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	17	54	E5	2.1
20	30	17	54	E4	2.6
20	30	17	54	D5	2.9
20	30	17	54	E3	3.1
20	30	17	54	D4	3.4
20	30	17	54	C5	3.7
20	30	17	54	E2	4.0
20	30	17	54	D3	4.2
20	30	17	54	C4	4.3
20	30	17	54	B5	4.4
20	30	17	54	B4	5.2
20	30	17	54	A5	5.2
20	30	17	54	C3	5.2
20	30	17	54	E1	5.2
20	30	17	54	D2	5.2
30	20	17	54	E5	6.0
20	30	17	54	A4	6.1
20	30	17	54	B3	6.2
20	30	17	54	C2	6.4
20	30	17	54	D1	6.7
30	20	17	54	E4	7.0
20	30	17	54	A3	7.3
20	30	17	54	B2	7.7
30	20	17	54	D5	7.7
20	30	17	54	C1	8.3
30	20	17	54	E3	8.3
20	30	17	54	A2	8.9
30	20	17	54	D4	8.9
30	20	17	54	C5	9.4
20	30	17	54	B1	9.8
30	20	17	54	E2	10.1
30	20	17	54	D3	10.6
30	20	17	54	C4	10.9
30	20	17	54	B5	11.1
20	30	17	54	A1	11.3
30	20	17	54	B4	12.8
30	20	17	54	A5	12.8
30	20	17	54	C3	12.8
30	20	17	54	E1	12.8
30	20	17	54	D2	12.8
30	20	17	54	A4	14.8
30	20	17	54	B3	15.1
30	20	17	54	C2	15.6
30	20	17	54	D1	16.2
30	20	17	54	A3	17.4
30	20	17	54	B2	18.3
30	20	17	54	C1	19.6
30	20	17	54	A2	20.9
30	20	17	54	B1	22.9
30	20	17	54	A1	26.2

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	54	17	E5	29.4
20	30	54	17	E4	33.6
20	30	54	17	D5	36.7
20	30	54	17	E3	39.1
20	30	54	17	D4	41.8
20	30	54	17	C5	43.9
20	30	54	17	E2	46.7
20	30	54	17	D3	48.6
20	30	54	17	C4	49.9
20	30	54	17	B5	50.9
20	30	54	17	B4	57.8
20	30	54	17	A5	57.8
20	30	54	17	C3	57.8
20	30	54	17	E1	57.8
20	30	54	17	D2	57.8
30	20	54	17	E5	64.7
20	30	54	17	A4	65.6
20	30	54	17	B3	66.9
20	30	54	17	C2	68.7
20	30	54	17	D1	71.4
30	20	54	17	E4	73.3
20	30	54	17	A3	75.8
20	30	54	17	B2	79.3
30	20	54	17	D5	79.6
20	30	54	17	C1	84.5
30	20	54	17	E3	84.5
20	30	54	17	A2	89.6
30	20	54	17	D4	90.0
30	20	54	17	C5	94.1
20	30	54	17	B1	97.3
30	20	54	17	E2	99.8
30	20	54	17	D3	103.5
30	20	54	17	C4	106.2
30	20	54	17	B5	108.2
20	30	54	17	A1	109.7
30	20	54	17	B4	121.9
30	20	54	17	A5	121.9
30	20	54	17	C3	121.9
30	20	54	17	E1	121.9
30	20	54	17	D2	121.9
30	20	54	17	A4	137.1
30	20	54	17	B3	139.6
30	20	54	17	C2	143.1
30	20	54	17	D1	148.3
30	20	54	17	A3	156.9
30	20	54	17	B2	163.8
30	20	54	17	C1	173.9
30	20	54	17	A2	184.0
30	20	54	17	B1	199.1
30	20	54	17	A1	224.2

Fertilizer

Urea, 48 pounds per cubic foot

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	17	54	E5	1.7
20	30	17	54	E4	2.0
20	30	17	54	D5	2.2
20	30	17	54	E3	2.4
20	30	17	54	D4	2.7
20	30	17	54	C5	2.8
20	30	17	54	E2	3.1
20	30	17	54	D3	3.2
20	30	17	54	C4	3.3
20	30	17	54	B5	3.4
20	30	17	54	B4	4.0
20	30	17	54	A5	4.0
20	30	17	54	C3	4.0
20	30	17	54	E1	4.0
20	30	17	54	D2	4.0
30	20	17	54	E5	4.6
20	30	17	54	A4	4.7
20	30	17	54	B3	4.8
20	30	17	54	C2	4.9
20	30	17	54	D1	5.2
30	20	17	54	E4	5.3
20	30	17	54	A3	5.6
20	30	17	54	B2	5.9
30	20	17	54	D5	5.9
20	30	17	54	C1	6.3
30	20	17	54	E3	6.3
20	30	17	54	A2	6.8
30	20	17	54	D4	6.8
30	20	17	54	C5	7.2
20	30	17	54	B1	7.5
30	20	17	54	E2	7.7
30	20	17	54	D3	8.1
30	20	17	54	C4	8.3
30	20	17	54	B5	8.5
20	30	17	54	A1	8.7
30	20	17	54	B4	9.8
30	20	17	54	A5	9.8
30	20	17	54	C3	9.8
30	20	17	54	E1	9.8
30	20	17	54	D2	9.8
30	20	17	54	A4	11.3
30	20	17	54	B3	11.6
30	20	17	54	C2	11.9
30	20	17	54	D1	12.4
30	20	17	54	A3	13.3
30	20	17	54	B2	14.0
30	20	17	54	C1	15.0
30	20	17	54	A2	16.0
30	20	17	54	B1	17.6
30	20	17	54	A1	20.1

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	54	17	E5	22.6
20	30	54	17	E4	25.8
20	30	54	17	D5	28.2
20	30	54	17	E3	30.0
20	30	54	17	D4	32.2
20	30	54	17	C5	33.7
20	30	54	17	E2	35.9
20	30	54	17	D3	37.4
20	30	54	17	C4	38.4
20	30	54	17	B5	39.2
20	30	54	17	B4	44.6
20	30	54	17	A5	44.6
20	30	54	17	C3	44.6
20	30	54	17	E1	44.6
20	30	54	17	D2	44.6
30	20	54	17	E5	49.9
20	30	54	17	A4	50.7
20	30	54	17	B3	51.7
20	30	54	17	C2	53.1
20	30	54	17	D1	55.2
30	20	54	17	E4	56.6
20	30	54	17	A3	58.6
20	30	54	17	B2	61.4
30	20	54	17	D5	61.6
20	30	54	17	C1	65.5
30	20	54	17	E3	65.5
20	30	54	17	A2	69.5
30	20	54	17	D4	69.8
30	20	54	17	C5	73.0
20	30	54	17	B1	75.5
30	20	54	17	E2	77.5
30	20	54	17	D3	80.4
30	20	54	17	C4	82.5
30	20	54	17	B5	84.1
20	30	54	17	A1	85.3
30	20	54	17	B4	94.9
30	20	54	17	A5	94.9
30	20	54	17	C3	94.9
30	20	54	17	E1	94.9
30	20	54	17	D2	94.9
30	20	54	17	A4	106.9
30	20	54	17	B3	108.9
30	20	54	17	C2	111.7
30	20	54	17	D1	115.8
30	20	54	17	A3	122.5
30	20	54	17	B2	127.8
30	20	54	17	C1	135.7
30	20	54	17	A2	143.5
30	20	54	17	B1	155.0
30	20	54	17	A1	173.8

Flax Seed Rate Chart

Unknown variety, 49.5 pounds per bushel

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	17	54	E5	1.5
20	30	17	54	E4	1.8
20	30	17	54	D5	2.0
20	30	17	54	E3	2.2
20	30	17	54	D4	2.4
20	30	17	54	C5	2.6
20	30	17	54	E2	2.8
20	30	17	54	D3	3.0
20	30	17	54	C4	3.1
20	30	17	54	B5	3.2
20	30	17	54	B4	3.7
20	30	17	54	A5	3.7
20	30	17	54	C3	3.7
20	30	17	54	E1	3.7
20	30	17	54	D2	3.7
30	20	17	54	E5	4.3
20	30	17	54	A4	4.4
20	30	17	54	B3	4.5
20	30	17	54	C2	4.6
20	30	17	54	D1	4.8
30	20	17	54	E4	5.0
20	30	17	54	A3	5.2
20	30	17	54	B2	5.5
30	20	17	54	D5	5.5
20	30	17	54	C1	6.0
30	20	17	54	E3	6.0
20	30	17	54	A2	6.4
30	20	17	54	D4	6.4
30	20	17	54	C5	6.8
20	30	17	54	B1	7.1
30	20	17	54	E2	7.3
30	20	17	54	D3	7.6
30	20	17	54	C4	7.9
30	20	17	54	B5	8.0
20	30	17	54	A1	8.2
30	20	17	54	B4	9.3
30	20	17	54	A5	9.3
30	20	17	54	C3	9.3
30	20	17	54	E1	9.3
30	20	17	54	D2	9.3
30	20	17	54	A4	10.7
30	20	17	54	B3	10.9
30	20	17	54	C2	11.2
30	20	17	54	D1	11.7
30	20	17	54	A3	12.6
30	20	17	54	B2	13.2
30	20	17	54	C1	14.2
30	20	17	54	A2	15.1
30	20	17	54	B1	16.6
30	20	17	54	A1	19.0

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	54	17	E5	21.3
20	30	54	17	E4	24.3
20	30	54	17	D5	26.5
20	30	54	17	E3	28.2
20	30	54	17	D4	30.2
20	30	54	17	C5	31.7
20	30	54	17	E2	33.7
20	30	54	17	D3	35.0
20	30	54	17	C4	36.0
20	30	54	17	B5	36.7
20	30	54	17	B4	41.6
20	30	54	17	A5	41.6
20	30	54	17	C3	41.6
20	30	54	17	E1	41.6
20	30	54	17	D2	41.6
30	20	54	17	E5	46.5
20	30	54	17	A4	47.2
20	30	54	17	B3	48.1
20	30	54	17	C2	49.3
20	30	54	17	D1	51.2
30	20	54	17	E4	52.6
20	30	54	17	A3	54.4
20	30	54	17	B2	56.8
30	20	54	17	D5	57.1
20	30	54	17	C1	60.5
30	20	54	17	E3	60.5
20	30	54	17	A2	64.2
30	20	54	17	D4	64.4
30	20	54	17	C5	67.3
20	30	54	17	B1	69.5
30	20	54	17	E2	71.3
30	20	54	17	D3	73.9
30	20	54	17	C4	75.8
30	20	54	17	B5	77.2
20	30	54	17	A1	78.3
30	20	54	17	B4	86.8
30	20	54	17	A5	86.8
30	20	54	17	C3	86.8
30	20	54	17	E1	86.8
30	20	54	17	D2	86.8
30	20	54	17	A4	97.5
30	20	54	17	B3	99.3
30	20	54	17	C2	101.7
30	20	54	17	D1	105.4
30	20	54	17	A3	111.5
30	20	54	17	B2	116.3
30	20	54	17	C1	123.5
30	20	54	17	A2	130.8
30	20	54	17	B1	141.6
30	20	54	17	A1	160.1

Hybrid Pearl Millet Seed Rate Chart

85,5000 seeds per pound

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	17	54	E5	1.9
20	30	17	54	E4	2.3
20	30	17	54	D5	2.5
20	30	17	54	E3	2.7
20	30	17	54	D4	3.0
20	30	17	54	C5	3.1
20	30	17	54	E2	3.4
20	30	17	54	D3	3.5
20	30	17	54	C4	3.6
20	30	17	54	B5	3.7
20	30	17	54	B4	4.3
20	30	17	54	A5	4.3
20	30	17	54	C3	4.3
20	30	17	54	E1	4.3
20	30	17	54	D2	4.3
30	20	17	54	E5	4.9
20	30	17	54	A4	5.0
20	30	17	54	B3	5.1
20	30	17	54	C2	5.2
20	30	17	54	D1	5.5
30	20	17	54	E4	5.6
20	30	17	54	A3	5.9
20	30	17	54	B2	6.2
30	20	17	54	D5	6.2
20	30	17	54	C1	6.6
30	20	17	54	E3	6.6
20	30	17	54	A2	7.1
30	20	17	54	D4	7.2
30	20	17	54	C5	7.5
20	30	17	54	B1	7.8
30	20	17	54	E2	8.1
30	20	17	54	D3	8.4
30	20	17	54	C4	8.7
30	20	17	54	B5	8.8
20	30	17	54	A1	9.0
30	20	17	54	B4	10.1
30	20	17	54	A5	10.1
30	20	17	54	C3	10.1
30	20	17	54	E1	10.1
30	20	17	54	D2	10.1
30	20	17	54	A4	11.6
30	20	17	54	B3	11.9
30	20	17	54	C2	12.2
30	20	17	54	D1	12.7
30	20	17	54	A3	13.6
30	20	17	54	B2	14.3
30	20	17	54	C1	15.3
30	20	17	54	A2	16.4
30	20	17	54	B1	17.9
30	20	17	54	A1	20.5

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	54	17	E5	22.9
20	30	54	17	E4	26.2
20	30	54	17	D5	28.6
20	30	54	17	E3	30.4
20	30	54	17	D4	32.6
20	30	54	17	C5	34.1
20	30	54	17	E2	36.3
20	30	54	17	D3	37.8
20	30	54	17	C4	38.9
20	30	54	17	B5	39.6
20	30	54	17	B4	45.1
20	30	54	17	A5	45.1
20	30	54	17	C3	45.1
20	30	54	17	E1	45.1
20	30	54	17	D2	45.1
30	20	54	17	E5	50.5
20	30	54	17	A4	51.2
20	30	54	17	B3	52.3
20	30	54	17	C2	53.7
20	30	54	17	D1	55.8
30	20	54	17	E4	57.3
20	30	54	17	A3	59.3
20	30	54	17	B2	62.2
30	20	54	17	D5	62.4
20	30	54	17	C1	66.4
30	20	54	17	E3	66.4
20	30	54	17	A2	70.5
30	20	54	17	D4	70.8
30	20	54	17	C5	74.1
20	30	54	17	B1	76.7
30	20	54	17	E2	78.8
30	20	54	17	D3	81.9
30	20	54	17	C4	84.1
30	20	54	17	B5	85.7
20	30	54	17	A1	87.0
30	20	54	17	B4	97.2
30	20	54	17	A5	97.2
30	20	54	17	C3	97.2
30	20	54	17	E1	97.2
30	20	54	17	D2	97.2
30	20	54	17	A4	110.2
30	20	54	17	B3	112.3
30	20	54	17	C2	115.3
30	20	54	17	D1	119.9
30	20	54	17	A3	127.5
30	20	54	17	B2	133.6
30	20	54	17	C1	142.8
30	20	54	17	A2	152.0
30	20	54	17	B1	166.2
30	20	54	17	A1	190.5

Oats Seed Rate Chart

Don variety, 42 pounds per bushel

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	17	54	E5	1.4
20	30	17	54	E4	1.6
20	30	17	54	D5	1.8
20	30	17	54	E3	1.9
20	30	17	54	D4	2.1
20	30	17	54	C5	2.2
20	30	17	54	E2	2.4
20	30	17	54	D3	2.5
20	30	17	54	C4	2.6
20	30	17	54	B5	2.6
20	30	17	54	B4	3.1
20	30	17	54	A5	3.1
20	30	17	54	C3	3.1
20	30	17	54	E1	3.1
20	30	17	54	D2	3.1
30	20	17	54	E5	3.5
20	30	17	54	A4	3.5
20	30	17	54	B3	3.6
20	30	17	54	C2	3.7
20	30	17	54	D1	3.9
30	20	17	54	E4	4.0
20	30	17	54	A3	4.2
20	30	17	54	B2	4.4
30	20	17	54	D5	4.4
20	30	17	54	C1	4.7
30	20	17	54	E3	4.7
20	30	17	54	A2	5.1
30	20	17	54	D4	5.1
30	20	17	54	C5	5.4
20	30	17	54	B1	5.6
30	20	17	54	E2	5.7
30	20	17	54	D3	6.0
30	20	17	54	C4	6.2
30	20	17	54	B5	6.3
20	30	17	54	A1	6.4
30	20	17	54	B4	7.2
30	20	17	54	A5	7.2
30	20	17	54	C3	7.2
30	20	17	54	E1	7.2
30	20	17	54	D2	7.2
30	20	17	54	A4	8.3
30	20	17	54	B3	8.5
30	20	17	54	C2	8.7
30	20	17	54	D1	9.1
30	20	17	54	A3	9.7
30	20	17	54	B2	10.2
30	20	17	54	C1	10.9
30	20	17	54	A2	11.7
30	20	17	54	B1	12.8
30	20	17	54	A1	14.6

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	54	17	E5	16.4
20	30	54	17	E4	18.7
20	30	54	17	D5	20.4
20	30	54	17	E3	21.7
20	30	54	17	D4	23.2
20	30	54	17	C5	24.4
20	30	54	17	E2	25.9
20	30	54	17	D3	27.0
20	30	54	17	C4	27.7
20	30	54	17	B5	28.3
20	30	54	17	B4	32.2
20	30	54	17	A5	32.2
20	30	54	17	C3	32.2
20	30	54	17	E1	32.2
20	30	54	17	D2	32.2
30	20	54	17	E5	36.0
20	30	54	17	A4	36.5
20	30	54	17	B3	37.3
20	30	54	17	C2	38.3
20	30	54	17	D1	39.8
30	20	54	17	E4	40.8
20	30	54	17	A3	42.3
20	30	54	17	B2	44.3
30	20	54	17	D5	44.4
20	30	54	17	C1	47.2
30	20	54	17	E3	47.2
20	30	54	17	A2	50.2
30	20	54	17	D4	50.4
30	20	54	17	C5	52.7
20	30	54	17	B1	54.5
30	20	54	17	E2	56.0
30	20	54	17	D3	58.1
30	20	54	17	C4	59.6
30	20	54	17	B5	60.8
20	30	54	17	A1	61.7
30	20	54	17	B4	68.8
30	20	54	17	A5	68.8
30	20	54	17	C3	68.8
30	20	54	17	E1	68.8
30	20	54	17	D2	68.8
30	20	54	17	A4	77.7
30	20	54	17	B3	79.2
30	20	54	17	C2	81.2
30	20	54	17	D1	84.3
30	20	54	17	A3	89.5
30	20	54	17	B2	93.6
30	20	54	17	C1	99.7
30	20	54	17	A2	105.8
30	20	54	17	B1	115.0
30	20	54	17	A1	130.4

Peas Seed Rate Chart

Early Freezer 680, 2,198 seeds per pound

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	17	54	E5	1.8
20	30	17	54	E4	2.1
20	30	17	54	D5	2.3
20	30	17	54	E3	2.4
20	30	17	54	D4	2.6
20	30	17	54	C5	2.7
20	30	17	54	E2	2.9
20	30	17	54	D3	3.0
20	30	17	54	C4	3.1
20	30	17	54	B5	3.2
20	30	17	54	B4	3.7
20	30	17	54	A5	3.7
20	30	17	54	C3	3.7
20	30	17	54	E1	3.7
20	30	17	54	D2	3.7
30	20	17	54	E5	4.1
20	30	17	54	A4	4.2
20	30	17	54	B3	4.3
20	30	17	54	C2	4.4
20	30	17	54	D1	4.6
30	20	17	54	E4	4.7
20	30	17	54	A3	4.9
20	30	17	54	B2	5.2
30	20	17	54	D5	5.2
20	30	17	54	C1	5.6
30	20	17	54	E3	5.6
20	30	17	54	A2	5.9
30	20	17	54	D4	6.0
30	20	17	54	C5	6.3
20	30	17	54	B1	6.5
30	20	17	54	E2	6.7
30	20	17	54	D3	7.0
30	20	17	54	C4	7.2
30	20	17	54	B5	7.3
20	30	17	54	A1	7.4
30	20	17	54	B4	8.4
30	20	17	54	A5	8.4
30	20	17	54	C3	8.4
30	20	17	54	E1	8.4
30	20	17	54	D2	8.4
30	20	17	54	A4	9.5
30	20	17	54	B3	9.7
30	20	17	54	C2	10.0
30	20	17	54	D1	10.4
30	20	17	54	A3	11.1
30	20	17	54	B2	11.7
30	20	17	54	C1	12.5
30	20	17	54	A2	13.3
30	20	17	54	B1	14.6
30	20	17	54	A1	16.6

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	54	17	E5	18.6
20	30	54	17	E4	21.2
20	30	54	17	D5	23.1
20	30	54	17	E3	24.6
20	30	54	17	D4	26.3
20	30	54	17	C5	27.5
20	30	54	17	E2	29.3
20	30	54	17	D3	30.4
20	30	54	17	C4	31.3
20	30	54	17	B5	31.9
20	30	54	17	B4	36.2
20	30	54	17	A5	36.2
20	30	54	17	C3	36.2
20	30	54	17	E1	36.2
20	30	54	17	D2	36.2
30	20	54	17	E5	40.4
20	30	54	17	A4	41.0
20	30	54	17	B3	41.8
20	30	54	17	C2	42.9
20	30	54	17	D1	44.6
30	20	54	17	E4	45.7
20	30	54	17	A3	47.3
20	30	54	17	B2	49.4
30	20	54	17	D5	49.6
20	30	54	17	C1	52.7
30	20	54	17	E3	52.7
20	30	54	17	A2	55.8
30	20	54	17	D4	56.0
30	20	54	17	C5	58.5
20	30	54	17	B1	60.5
30	20	54	17	E2	62.0
30	20	54	17	D3	64.3
30	20	54	17	C4	65.9
30	20	54	17	B5	67.1
20	30	54	17	A1	68.0
30	20	54	17	B4	75.2
30	20	54	17	A5	75.2
30	20	54	17	C3	75.2
30	20	54	17	E1	75.2
30	20	54	17	D2	75.2
30	20	54	17	A4	84.1
30	20	54	17	B3	85.6
30	20	54	17	C2	87.6
30	20	54	17	D1	90.5
30	20	54	17	A3	95.2
30	20	54	17	B2	98.9
30	20	54	17	C1	104.2
30	20	54	17	A2	109.3
30	20	54	17	B1	116.4
30	20	54	17	A1	127.0

Sorghum Seed Rate Chart

Pioneer 8601, 14,000 seeds per pound

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	17	54	E5	1.6
20	30	17	54	E4	2.0
20	30	17	54	D5	2.3
20	30	17	54	E3	2.5
20	30	17	54	D4	2.8
20	30	17	54	C5	3.0
20	30	17	54	E2	3.3
20	30	17	54	D3	3.4
20	30	17	54	C4	3.6
20	30	17	54	B5	3.7
20	30	17	54	B4	4.3
20	30	17	54	A5	4.3
20	30	17	54	C3	4.3
20	30	17	54	E1	4.3
20	30	17	54	D2	4.3
30	20	17	54	E5	5.0
20	30	17	54	A4	5.1
20	30	17	54	B3	5.2
20	30	17	54	C2	5.4
20	30	17	54	D1	5.7
30	20	17	54	E4	5.9
20	30	17	54	A3	6.1
20	30	17	54	B2	6.5
30	20	17	54	D5	6.5
20	30	17	54	C1	7.0
30	20	17	54	E3	7.0
20	30	17	54	A2	7.6
30	20	17	54	D4	7.6
30	20	17	54	C5	8.0
20	30	17	54	B1	8.3
30	20	17	54	E2	8.6
30	20	17	54	D3	9.0
30	20	17	54	C4	9.3
30	20	17	54	B5	9.5
20	30	17	54	A1	9.7
30	20	17	54	B4	11.0
30	20	17	54	A5	11.0
30	20	17	54	C3	11.0
30	20	17	54	E1	11.0
30	20	17	54	D2	11.0
30	20	17	54	A4	12.7
30	20	17	54	B3	13.0
30	20	17	54	C2	13.3
30	20	17	54	D1	13.9
30	20	17	54	A3	14.9
30	20	17	54	B2	15.7
30	20	17	54	C1	16.8
30	20	17	54	A2	18.0
30	20	17	54	B1	19.7
30	20	17	54	A1	22.6

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	54	17	E5	25.3
20	30	54	17	E4	28.9
20	30	54	17	D5	31.6
20	30	54	17	E3	33.7
20	30	54	17	D4	36.0
20	30	54	17	C5	37.7
20	30	54	17	E2	40.1
20	30	54	17	D3	41.7
20	30	54	17	C4	42.9
20	30	54	17	B5	43.7
20	30	54	17	B4	49.6
20	30	54	17	A5	49.6
20	30	54	17	C3	49.6
20	30	54	17	E1	49.6
20	30	54	17	D2	49.6
30	20	54	17	E5	55.4
20	30	54	17	A4	56.2
20	30	54	17	B3	57.3
20	30	54	17	C2	58.8
20	30	54	17	D1	61.1
30	20	54	17	E4	62.7
20	30	54	17	A3	64.8
20	30	54	17	B2	67.7
30	20	54	17	D5	68.0
20	30	54	17	C1	72.1
30	20	54	17	E3	72.1
20	30	54	17	A2	76.4
30	20	54	17	D4	76.7
30	20	54	17	C5	80.1
20	30	54	17	B1	82.8
30	20	54	17	E2	84.9
30	20	54	17	D3	88.0
30	20	54	17	C4	90.2
30	20	54	17	B5	91.9
20	30	54	17	A1	93.1
30	20	54	17	B4	103.2
30	20	54	17	A5	103.2
30	20	54	17	C3	103.2
30	20	54	17	E1	103.2
30	20	54	17	D2	103.2
30	20	54	17	A4	115.9
30	20	54	17	B3	117.9
30	20	54	17	C2	120.8
30	20	54	17	D1	125.1
30	20	54	17	A3	132.2
30	20	54	17	B2	137.9
30	20	54	17	C1	146.3
30	20	54	17	A2	154.7
30	20	54	17	B1	167.3
30	20	54	17	A1	188.6

Soybean Seed Rate Chart

Williams 82 variety, 3,000 seeds per pound

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	17	54	E5	2.3
20	30	17	54	E4	2.7
20	30	17	54	D5	2.9
20	30	17	54	E3	3.1
20	30	17	54	D4	3.3
20	30	17	54	C5	3.5
20	30	17	54	E2	3.7
20	30	17	54	D3	3.8
20	30	17	54	C4	4.0
20	30	17	54	B5	4.0
20	30	17	54	B4	4.6
20	30	17	54	A5	4.6
20	30	17	54	C3	4.6
20	30	17	54	E1	4.6
20	30	17	54	D2	4.6
30	20	17	54	E5	5.2
20	30	17	54	A4	5.2
20	30	17	54	B3	5.3
20	30	17	54	C2	5.5
20	30	17	54	D1	5.7
30	20	17	54	E4	5.9
20	30	17	54	A3	6.1
20	30	17	54	B2	6.4
30	20	17	54	D5	6.4
20	30	17	54	C1	6.8
30	20	17	54	E3	6.8
20	30	17	54	A2	7.3
30	20	17	54	D4	7.3
30	20	17	54	C5	7.7
20	30	17	54	B1	8.0
30	20	17	54	E2	8.2
30	20	17	54	D3	8.5
30	20	17	54	C4	8.8
30	20	17	54	B5	9.0
20	30	17	54	A1	9.1
30	20	17	54	B4	10.2
30	20	17	54	A5	10.2
30	20	17	54	C3	10.2
30	20	17	54	E1	10.2
30	20	17	54	D2	10.2
30	20	17	54	A4	11.7
30	20	17	54	B3	11.9
30	20	17	54	C2	12.2
30	20	17	54	D1	12.8
30	20	17	54	A3	13.6
30	20	17	54	B2	14.3
30	20	17	54	C1	15.3
30	20	17	54	A2	16.3
30	20	17	54	B1	17.8
30	20	17	54	A1	20.3

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	54	17	E5	22.8
20	30	54	17	E4	26.0
20	30	54	17	D5	28.4
20	30	54	17	E3	30.3
20	30	54	17	D4	32.5
20	30	54	17	C5	34.1
20	30	54	17	E2	36.3
20	30	54	17	D3	37.8
20	30	54	17	C4	38.9
20	30	54	17	B5	39.7
20	30	54	17	B4	45.3
20	30	54	17	A5	45.3
20	30	54	17	C3	45.3
20	30	54	17	E1	45.3
20	30	54	17	D2	45.3
30	20	54	17	E5	50.9
20	30	54	17	A4	51.7
20	30	54	17	B3	52.8
20	30	54	17	C2	54.3
20	30	54	17	D1	56.5
30	20	54	17	E4	58.1
20	30	54	17	A3	60.2
20	30	54	17	B2	63.2
30	20	54	17	D5	63.5
20	30	54	17	C1	67.6
30	20	54	17	E3	67.6
20	30	54	17	A2	72.0
30	20	54	17	D4	72.3
30	20	54	17	C5	75.8
20	30	54	17	B1	78.6
30	20	54	17	E2	80.8
30	20	54	17	D3	84.0
30	20	54	17	C4	86.3
30	20	54	17	B5	88.1
20	30	54	17	A1	89.4
30	20	54	17	B4	100.2
30	20	54	17	A5	100.2
30	20	54	17	C3	100.2
30	20	54	17	E1	100.2
30	20	54	17	D2	100.2
30	20	54	17	A4	113.7
30	20	54	17	B3	115.9
30	20	54	17	C2	119.0
30	20	54	17	D1	123.6
30	20	54	17	A3	131.3
30	20	54	17	B2	137.3
30	20	54	17	C1	146.1
30	20	54	17	A2	154.8
30	20	54	17	B1	167.4
30	20	54	17	A1	187.2

Sunflower Seed Rate Chart

Trisun 848, size 3, 5,700 seeds per pound

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	17	54	E5	0.6
20	30	17	54	E4	0.7
20	30	17	54	D5	0.9
20	30	17	54	E3	1.0
20	30	17	54	D4	1.1
20	30	17	54	C5	1.2
20	30	17	54	E2	1.3
20	30	17	54	D3	1.4
20	30	17	54	C4	1.5
20	30	17	54	B5	1.5
20	30	17	54	B4	1.9
20	30	17	54	A5	1.9
20	30	17	54	C3	1.9
20	30	17	54	E1	1.9
20	30	17	54	D2	1.9
30	20	17	54	E5	2.2
20	30	17	54	A4	2.2
20	30	17	54	B3	2.3
20	30	17	54	C2	2.4
20	30	17	54	D1	2.5
30	20	17	54	E4	2.6
20	30	17	54	A3	2.7
20	30	17	54	B2	2.9
30	20	17	54	D5	2.9
20	30	17	54	C1	3.2
30	20	17	54	E3	3.2
20	30	17	54	A2	3.4
30	20	17	54	D4	3.4
30	20	17	54	C5	3.6
20	30	17	54	B1	3.8
30	20	17	54	E2	3.9
30	20	17	54	D3	4.1
30	20	17	54	C4	4.3
30	20	17	54	B5	4.4
20	30	17	54	A1	4.4
30	20	17	54	B4	5.1
30	20	17	54	A5	5.1
30	20	17	54	C3	5.1
30	20	17	54	E1	5.1
30	20	17	54	D2	5.1
30	20	17	54	A4	5.9
30	20	17	54	B3	6.0
30	20	17	54	C2	6.2
30	20	17	54	D1	6.5
30	20	17	54	A3	7.0
30	20	17	54	B2	7.4
30	20	17	54	C1	7.9
30	20	17	54	A2	8.5
30	20	17	54	B1	9.3
30	20	17	54	A1	10.7

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	54	17	E5	12.0
20	30	54	17	E4	13.7
20	30	54	17	D5	15.0
20	30	54	17	E3	16.0
20	30	54	17	D4	17.1
20	30	54	17	C5	18.0
20	30	54	17	E2	19.1
20	30	54	17	D3	19.9
20	30	54	17	C4	20.4
20	30	54	17	B5	20.8
20	30	54	17	B4	23.7
20	30	54	17	A5	23.7
20	30	54	17	C3	23.7
20	30	54	17	E1	23.7
20	30	54	17	D2	23.7
30	20	54	17	E5	26.4
20	30	54	17	A4	26.8
20	30	54	17	B3	27.3
20	30	54	17	C2	28.1
20	30	54	17	D1	29.1
30	20	54	17	E4	29.9
20	30	54	17	A3	30.9
20	30	54	17	B2	32.3
30	20	54	17	D5	32.4
20	30	54	17	C1	34.4
30	20	54	17	E3	34.4
20	30	54	17	A2	36.4
30	20	54	17	D4	36.6
30	20	54	17	C5	38.2
20	30	54	17	B1	39.4
30	20	54	17	E2	40.4
30	20	54	17	D3	41.9
30	20	54	17	C4	42.9
30	20	54	17	B5	43.7
20	30	54	17	A1	44.3
30	20	54	17	B4	49.1
30	20	54	17	A5	49.1
30	20	54	17	C3	49.1
30	20	54	17	E1	49.1
30	20	54	17	D2	49.1
30	20	54	17	A4	55.0
30	20	54	17	B3	56.0
30	20	54	17	C2	57.3
30	20	54	17	D1	59.3
30	20	54	17	A3	62.6
30	20	54	17	B2	65.2
30	20	54	17	C1	69.1
30	20	54	17	A2	73.0
30	20	54	17	B1	78.8
30	20	54	17	A1	88.6

Hard Wheat Seed Rate Chart

Tomahawk variety, 62 pounds per bushel

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	17	54	E5	2.5
20	30	17	54	E4	2.9
20	30	17	54	D5	3.2
20	30	17	54	E3	3.5
20	30	17	54	D4	3.7
20	30	17	54	C5	3.9
20	30	17	54	E2	4.2
20	30	17	54	D3	4.4
20	30	17	54	C4	4.5
20	30	17	54	B5	4.6
20	30	17	54	B4	5.3
20	30	17	54	A5	5.3
20	30	17	54	C3	5.3
20	30	17	54	E1	5.3
20	30	17	54	D2	5.3
30	20	17	54	E5	6.0
20	30	17	54	A4	6.1
20	30	17	54	B3	6.3
20	30	17	54	C2	6.4
20	30	17	54	D1	6.7
30	20	17	54	E4	6.9
20	30	17	54	A3	7.2
20	30	17	54	B2	7.6
30	20	17	54	D5	7.6
20	30	17	54	C1	8.1
30	20	17	54	E3	8.1
20	30	17	54	A2	8.7
30	20	17	54	D4	8.7
30	20	17	54	C5	9.2
20	30	17	54	B1	9.5
30	20	17	54	E2	9.8
30	20	17	54	D3	10.2
30	20	17	54	C4	10.5
30	20	17	54	B5	10.7
20	30	17	54	A1	10.9
30	20	17	54	B4	12.3
30	20	17	54	A5	12.3
30	20	17	54	C3	12.3
30	20	17	54	E1	12.3
30	20	17	54	D2	12.3
30	20	17	54	A4	14.1
30	20	17	54	B3	14.3
30	20	17	54	C2	14.8
30	20	17	54	D1	15.4
30	20	17	54	A3	16.4
30	20	17	54	B2	17.2
30	20	17	54	C1	18.5
30	20	17	54	A2	19.7
30	20	17	54	B1	21.6
30	20	17	54	A1	24.7

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	54	17	E5	27.6
20	30	54	17	E4	31.6
20	30	54	17	D5	34.5
20	30	54	17	E3	36.8
20	30	54	17	D4	39.4
20	30	54	17	C5	41.3
20	30	54	17	E2	44.0
20	30	54	17	D3	45.8
20	30	54	17	C4	47.1
20	30	54	17	B5	48.1
20	30	54	17	B4	54.8
20	30	54	17	A5	54.8
20	30	54	17	C3	54.8
20	30	54	17	E1	54.8
20	30	54	17	D2	54.8
30	20	54	17	E5	61.5
20	30	54	17	A4	62.4
20	30	54	17	B3	63.7
20	30	54	17	C2	65.4
20	30	54	17	D1	68.1
30	20	54	17	E4	70.0
20	30	54	17	A3	72.5
20	30	54	17	B2	76.0
30	20	54	17	D5	76.3
20	30	54	17	C1	81.2
30	20	54	17	E3	81.2
20	30	54	17	A2	86.4
30	20	54	17	D4	86.7
30	20	54	17	C5	90.9
20	30	54	17	B1	94.1
30	20	54	17	E2	96.7
30	20	54	17	D3	100.5
30	20	54	17	C4	103.2
30	20	54	17	B5	105.3
20	30	54	17	A1	106.9
30	20	54	17	B4	119.4
30	20	54	17	A5	119.4
30	20	54	17	C3	119.4
30	20	54	17	E1	119.4
30	20	54	17	D2	119.4
30	20	54	17	A4	135.3
30	20	54	17	B3	137.9
30	20	54	17	C2	141.6
30	20	54	17	D1	147.0
30	20	54	17	A3	156.0
30	20	54	17	B2	163.2
30	20	54	17	C1	173.7
30	20	54	17	A2	184.2
30	20	54	17	B1	199.6
30	20	54	17	A1	224.6

Soft Wheat Seed Rate Chart

Pioneer 2548, 59 pounds per bushel

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	17	54	E5	2.5
20	30	17	54	E4	2.9
20	30	17	54	D5	3.2
20	30	17	54	E3	3.5
20	30	17	54	D4	3.7
20	30	17	54	C5	3.9
20	30	17	54	E2	4.2
20	30	17	54	D3	4.4
20	30	17	54	C4	4.5
20	30	17	54	B5	4.6
20	30	17	54	E1	5.3
20	30	17	54	D2	5.3
20	30	17	54	C3	5.3
20	30	17	54	B4	5.3
20	30	17	54	A5	5.3
30	20	17	54	E5	6.0
20	30	17	54	A4	6.1
20	30	17	54	B3	6.3
20	30	17	54	C2	6.4
20	30	17	54	D1	6.7
30	20	17	54	E4	6.9
20	30	17	54	A3	7.2
20	30	17	54	B2	7.6
30	20	17	54	D5	7.6
20	30	17	54	C1	8.1
30	20	17	54	E3	8.1
20	30	17	54	A2	8.7
30	20	17	54	D4	8.7
30	20	17	54	C5	9.2
20	30	17	54	B1	9.5
30	20	17	54	E2	9.8
30	20	17	54	D3	10.2
30	20	17	54	C4	10.5
30	20	17	54	B5	10.7
20	30	17	54	A1	10.9
30	20	17	54	E1	12.3
30	20	17	54	D2	12.3
30	20	17	54	C3	12.3
30	20	17	54	B4	12.3
30	20	17	54	A5	12.3
30	20	17	54	A4	14.1
30	20	17	54	B3	14.3
30	20	17	54	C2	14.8
30	20	17	54	D1	15.4
30	20	17	54	A3	16.4
30	20	17	54	B2	17.2
30	20	17	54	C1	18.5
30	20	17	54	A2	19.7
30	20	17	54	B1	21.6
30	20	17	54	A1	24.7

Quick Change Sprockets		Meter Box Gears		Gearbox Shift Levers	Seed Rate
Driving	Driven	Driving	Driven		lb. per acre
20	30	54	17	E5	27.6
20	30	54	17	E4	31.6
20	30	54	17	D5	34.5
20	30	54	17	E3	36.8
20	30	54	17	D4	39.4
20	30	54	17	C5	41.3
20	30	54	17	E2	44.0
20	30	54	17	D3	45.8
20	30	54	17	C4	47.1
20	30	54	17	B5	48.1
20	30	54	17	E1	54.8
20	30	54	17	D2	54.8
20	30	54	17	C3	54.8
20	30	54	17	B4	54.8
20	30	54	17	A5	54.8
30	20	54	17	E5	61.5
20	30	54	17	A4	62.4
20	30	54	17	B3	63.7
20	30	54	17	C2	65.4
20	30	54	17	D1	68.1
30	20	54	17	E4	70.0
20	30	54	17	A3	72.5
20	30	54	17	B2	76.0
30	20	54	17	D5	76.3
20	30	54	17	C1	81.2
30	20	54	17	E3	81.2
20	30	54	17	A2	86.4
30	20	54	17	D4	86.7
30	20	54	17	C5	90.9
20	30	54	17	B1	94.1
30	20	54	17	E2	96.7
30	20	54	17	D3	100.5
30	20	54	17	C4	103.2
30	20	54	17	B5	105.3
20	30	54	17	A1	106.9
30	20	54	17	E1	119.4
30	20	54	17	D2	119.4
30	20	54	17	C3	119.4
30	20	54	17	B4	119.4
30	20	54	17	A5	119.4
30	20	54	17	A4	135.3
30	20	54	17	B3	137.9
30	20	54	17	C2	141.6
30	20	54	17	D1	147.0
30	20	54	17	A3	156.0
30	20	54	17	B2	163.2
30	20	54	17	C1	173.7
30	20	54	17	A2	184.2
30	20	54	17	B1	199.6
30	20	54	17	A1	224.6

Monitor System

Loup (I) Monitor System

This manual section covers operation.

Note: For operating instructions for the Loup II monitor system see page 55.

Note: For installation instructions for the Loup (I) monitor system, page 100.

Monitor System Operation

The Loup Electronics monitor is designed for use with Great Plains air drills. The monitor is packaged in a high impact plastic housing with a mounting bracket for tractor installation.

The system is capable of continuously monitoring ground speed, fan speed, meter-shaft speeds, field area, total area and bin level. Using optional modules and sensors, the system can also monitor for blockage in 1 inch seed hoses.

The system warns you when these functions are not operating as specified. You can adjust alarm points and various system settings, including alarm point for low fan speed, alarm point for high fan speed, implement width, English or metric units and number and type of blockage sensors connected to the unit.Operating Instructions–Loup (I) Monitor

-Alarms

Alarms are displayed when the parameter settings described under *Set Parameter Levels*, page 99, are violated. When a parameter level is violated, the monitor will beep repeatedly, the triangle indicator will flash, and the top readout will display the fault.

To silence the alarm, press the ACK button. The triangle indicator will continue to flash until you correct the problem.

Note: No alarms will be generated when the unit is in the parameter-setting mode.

Multiple Alarms. If more than one alarm is tripped at the same time, push the ACK button to acknowledge each alarm in order of priority. The readout will not return to normal until all alarms are acknowledged. Alarm priority is as follows.

1. High Fan RPM
2. Low Fan RPM
3. Front Shaft RPM
4. Rear Shaft RPM
5. Grain Flow Blockage
6. Front Bin Low
7. Rear Bin Low

Figure 31 29019
Loup (I) Console

Ground Drive Alarm. When the air drill cart electric clutch is engaged, the system gives a short double beep whenever ground speed moves above or below two mph. There is no visual display associated with this feature. It is intended to inform you that the air drill cart clutch is operating properly.

Flow Alarms. If your drill is not outfitted with optional seed-flow blockage sensors, the flow function must be set to zero. If you do not zero out the blockage sensors, the monitor will display a communication error. Follow instructions for disabling functions under *Set Parameter Levels*, page 99.

If your air drill is outfitted with blockage sensors, the fault message “FLOW” appears on the top readout when a) flow blockage occurs or b) there is a communication breakdown between the sensors and monitor. Refer to *Operate Mode*, page 53 for more information on flow alarms.

Ground Drive Alarm

When the air drill cart electric clutch is engaged, the system gives a short double beep whenever ground speed moves above or below two mph. There is no visual display associated with this feature. It is intended to inform you that the air drill cart clutch is operating properly.

Flow Alarms. If your drill is not outfitted with optional seed-flow blockage sensors, the flow function must be set to zero. If you do not zero out the blockage sensors, the monitor will display a communication error. Follow instructions for disabling functions under *Set Parameter Levels*, page 99.

If your air drill is outfitted with blockage sensors, the fault message “FLOW” appears on the top readout when a) flow blockage occurs or b) there is a communication breakdown between the sensors and monitor. Refer to *Operate Mode*, page 54 for more information on flow alarms.

Bin Level

Bin level is always displayed on the bar graphs in the lower, right-hand corner of the monitor. Bin level is displayed as full until the bin sensor is uncovered at about 20 percent of bin capacity. The monitor will then display 20 percent full on the bar graphs and sound a low-bin alarm.

Area Rate

There are two function positions for area.

- Field area. When the triangle indicator for field area is lit, the monitor displays area covered since the field-area function was last reset. Field area will be displayed in acres or hectares to the nearest tenth.
- Total area. When the triangle indicator for total area is lit, the monitor displays total area covered since the function was last reset. Total area will be displayed in acres or hectares rounded to the nearest whole number.

To reset field or total area to zero, press the up or down buttons until the area you wish to zero is displayed, then hold the ACK button down for five seconds. The unit will beep each second and then give one long beep, signalling the area has been reset to zero.

Note: Zeroing total area will also zero field area.

Operating Instructions–Blockage Option

Note: The blockage-monitoring system has three modes: test, calibrate and operate. Normally, the system is in operate mode. Test and calibrate are special modes used to test the blockage sensors and calibrate the sensors to your seed. This section explains when and how to use each mode.

Test Mode

After installing the blockage-monitoring system, use the test mode to make sure all sensors and modules are connected correctly. To test the blockage modules and sensors:

1. Park the drill. You can enter the test mode only if ground speed is less that two mph or the clutch is disengaged.
2. Set the displayed function to “FLOW” by pressing the up or down key.
3. Press and hold the ACK button. The monitor will give four short beeps then one long beep. Release the button.
4. The readout will now display “TEST” or “TST OK” on the top line. The system is now in the test mode.

On the lower line, the readout will display in order each module number and the number of sensors that module is set to monitor. For example, if the monitor reads “4.11,” the blockage module at address four is set to monitor 11 seed hoses. As the test continues:

- If the monitor is still trying to communicate with each module, the top line will show “TEST.”
- If the monitor can communicate with the number of sensors set for each module, the top line will show “TST OK”.
- If the monitor cannot communicate with a blockage module, the module number will be displayed, but is sensor digits will be blanked out.
- If the monitor cannot communicate with the module after several attempts, an alarm will sound. Silence the alarm by pressing the ACK button. The message “BLKERR” and the number of the problem module will flash briefly every few seconds. Check that the modules and monitors are wired correctly. Check that each module has the correct address-switch setting. Refer to the installation instructions included with the option package.

Calibrate Mode

Before using the blockage monitors, you must calibrate the sensors for your seed and seeding rate. During the calibration mode, the blockage modules measure and record the seed-flow rate for each 1 inch seed hose. This stored value is used during the operate mode to determine when hoses are blocked. You must calibrate the system whenever you set a new seeding rate or change your seed type.

To calibrate the blockage monitors:

1. Set the displayed function to “FLOW” by pressing the up or down button.
2. Press and hold the ACK button. The monitor will give four short beeps then one long beep. Release the button. The monitor will now display “TEST” or “TST OK” on the top readout.
3. Lower drill, pull forward and beginning seeding. When the monitor detects motion, it will double beep and display “CAL” on the upper line. The system is now in the calibrate mode.
4. During calibration, the monitor display will cycle through module and run numbers as flow information

is recorded. Module and run numbers displayed are for hoses that have *not yet* calibrated.

5. Calibration will be complete after about two or three minutes of continuous seeding. Any hoses that have not calibrated in this time probably are blocked. Stop the drill and clear any blockages, then proceed with seeding to finish calibration.

Note: Stopping the drill to clear blocked runs will not upset the calibration process. When motion stops, the monitor suspends calibration until 30 seconds after motion resumes.

6. When all runs on the module have calibrated, the run number will be replaced with two dashes. For example, “3.--” indicates that all runs on module three are calibrated. When all runs on all modules have calibrated, “CAL OK” will be displayed on the top line and the monitor will beep rapidly several times.
7. Press ACK to end the calibration mode and restore normal monitor operation, including flow monitoring.

Note: If you wish to prematurely exit to the calibration mode, hold the ACK button for five beeps. Any sensors that have not yet calibrated will generate flow errors.

Operate Mode

During normal operation, the blockage modules will continuously monitor seed hoses for plugging–even when the monitor displays a different function such as fan speed.

When the monitor detects a blockage problem, an audible alarm will sound and the monitor will display “FLOW” on the upper line. To correct a flow alarm:

1. Silence the alarm by pressing the ACK button. The triangle indicator will continue to blink as long as the problem persists.
2. If some other function was displayed when the flow alarm went off, use the up or down button to move to the flow function. The display will indicate one of two alarm conditions.

Blocked Seed Hose. If the monitor detects a seed-hose blockage, the monitor will alarm and display the location of the block.

For systems equipped with Pin sensors the readout will display the module and run number. For example, if the display reads “M4 R9,” seed hose nine on module four is blocked.

For systems equipped with Optical sensors the readout will display the row number only. For example, if the display reads “Blk 25,” seed hose 25 on the implement is blocked.

Communication Error. If the monitor detects a communication breakdown between the monitor and any blockage module, the monitor will display “BLCKERR” and the number of the problem module.

Check the indicated hose or module for plugging or improper connections. If the monitor detects problems on multiple modules or hoses, it will display each in order as you press ACK. When all blockages are clear, the monitor will display “OPEN.”

Loup II Monitor System

This manual section covers operation.

Note: For operating instructions for the Loup (I) monitor system see page 55.

Note: For installation instructions for the Loup II monitor system, see page 100.

Figure 32 29013
Loup-II Monitor System Console

Monitor System Operation

The Great Plains Drill Monitor by Loup Electronics is designed to provide fan speed, shaft rpm, bin level, and seed flow information for conventional and air drills.

This manual section covers operation and calibration.

All functions are covered in this section but may not be applicable to your system configuration.

The monitor is capable of monitoring and displaying:

- Ground speed (implement-mounted speed sensor)
- Fan speed
- Two shaft speed RPM's (Front and Rear)
- Seed Flow (up to 112 sensors can be connected)
- Field Area
- Total area

Normal Start-up

For everyday operation the Great Plains drill monitor remembers all settings that have been saved from the previous use.

Refer to Figure 33

To turn on the console, press the power button in the lower right hand corner.

The rocker switch to the right of the console is for enabling or disabling air drill cart clutch power. It can be left off for most console setup operations. It needs to be on for speed calibration (page 74), and needs to be off for NTA folding (see NTA Operator Manual).

"Wait For Sensors to Complete Calibration" appears. During this time the monitor is checking all connected sensors to ensure they are working properly. Once this "self-test" is complete the monitor displays the normal operate screen (next page).

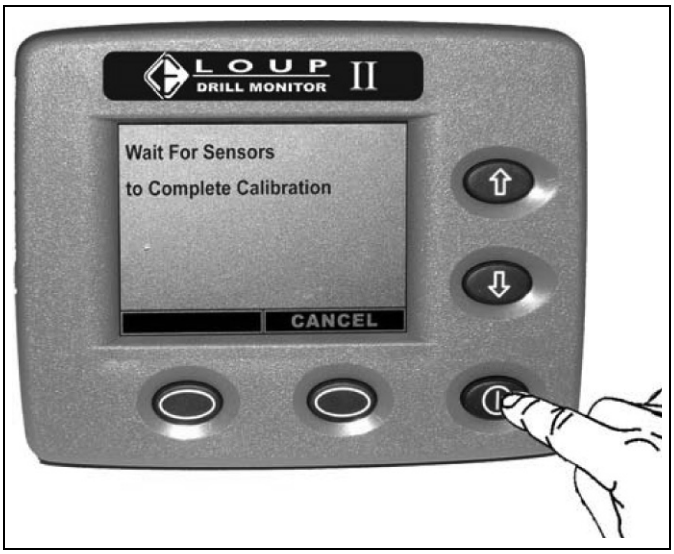


Figure 33 29023
Console Power-On

Normal Operate Screen

Refer to Figure 34

The Normal Operate Screen is divided into the following areas:

- 2 - Display Sections or 1 enlarged Display Section (User Chosen)
- 1 - Active alarm window or, if there are no active alarms, the current ground speed is displayed
- 1 - Bin level icon window
- 2 - Soft-key label windows

Below is a sample screen:

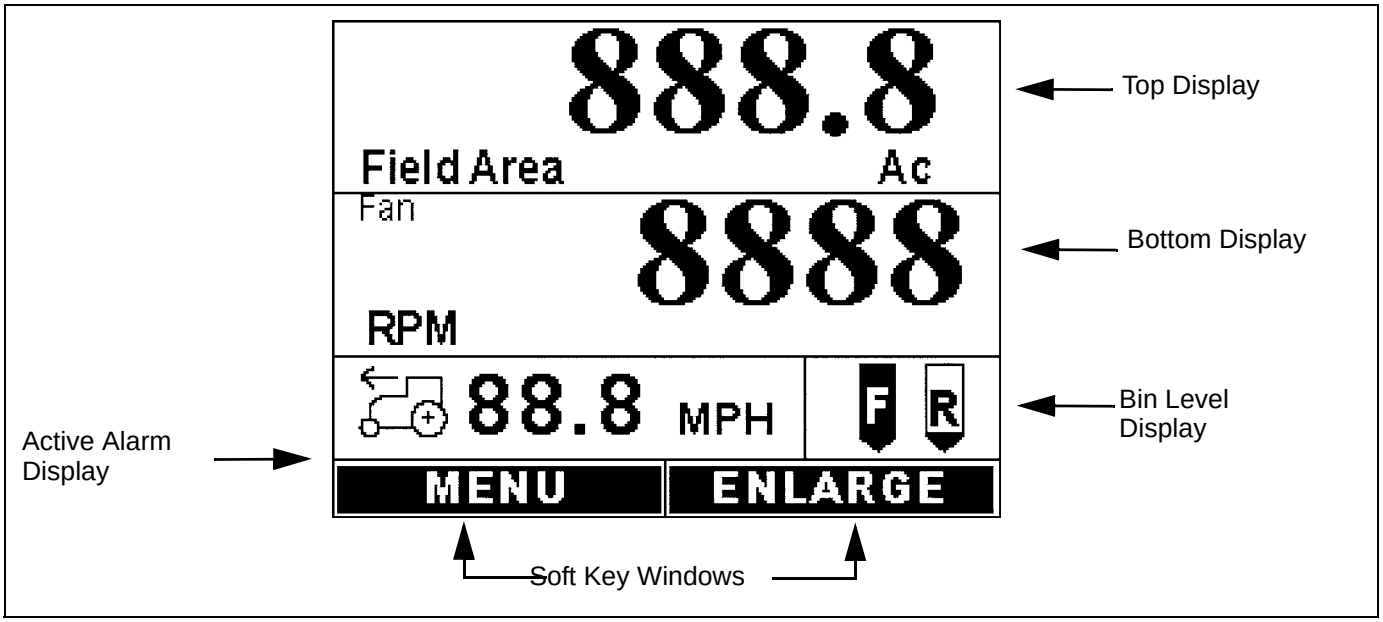


Figure 34
Console Display Regions

In the Sample Normal Operate Screen above, the different areas are as follows:

- The Top Display Section is the window with “Field Area” in it.
- The Bottom Display Section is the “Fan Speed” window.
- The active alarm window has the Ground Speed “88.8 MPH” displayed on it.
- The Bin Level Window is shown as 3 graphics:
  F shows a full bin
  R shows an empty bin
- The soft key windows are displaying “Menu” and “Enlarge”.

Changing Display Size

Depending on the preference of the operator, the Bottom display of the Loup II can be enlarged to make viewing easier.

Refer to Figure 35

To change the display size press the bottom button labeled ENLARGE.

Figure 35 29025
Small Operate Screen

Refer to Figure 36

Notice the button label now reads SMALLER. To return to the smaller screen press the bottom button labeled SMALLER.

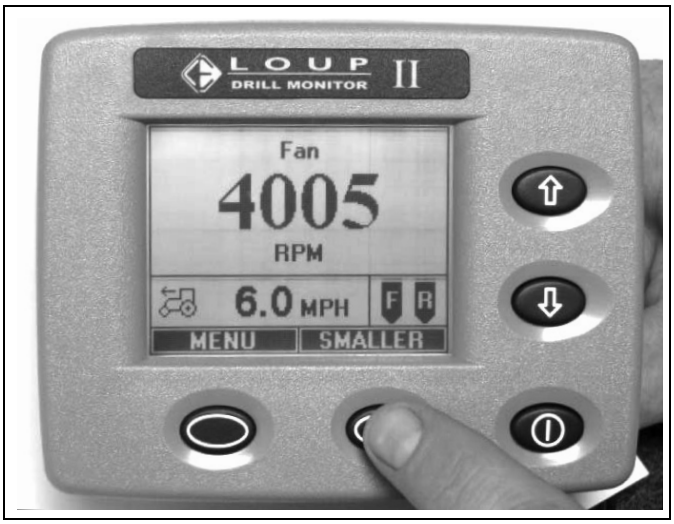


Figure 36 29026
Large Operate Screen

Changing Displayed Functions

Refer to Figure 37 and Figure 38

The display of the Great Plains monitor can be changed to show any of the available functions the operator chooses.

Pressing either the UP arrow or the DOWN arrow button while at the normal operate screen allows you to pick from a list of the available functions.

Pressing the UP arrow changes the Top Display, pressing the DOWN arrow changes the Bottom Display.

Note: The sample procedure on the next page is based on the UP arrow being pressed. The procedure is the same when the DOWN arrow is pressed

Figure 37 29027
For Top Display Use Up Arrow

Figure 38 29028
For Bottom Display Use Down Arrow

Refer to Figure 39

In this sample we change the top display from reading Field Area to Shaft RPM.

Having pressed the UP arrow in the Normal Operate screen, a menu screen titled “Top Display Section” appears. The current displayed function is highlighted. In this sample Field Area was shown in the top display thus Area is highlighted.

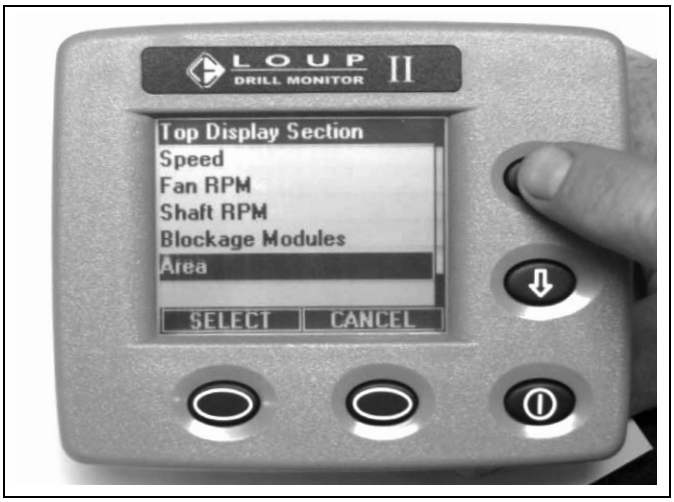


Figure 39 29029
Select Function with Up Arrow

Refer to Figure 40

Press the UP arrow until “Shaft RPM” is highlighted. (Depending on your system set-up, some of the options shown may not be available.)

Press the softkey under “SELECT” when “Shaft RPM” is highlighted.

Figure 40 29030
SELECT a Function

Refer to Figure 41

The “Shaft RPM” menu is displayed.

The “Shaft RPM” menu provides two options to choose from.

- Front - Displays front shaft RPM
- Rear - Displays rear shaft RPM

Figure 41 29031
A Sub-Menu

Refer to Figure 42

For this example use the DOWN arrow button to highlight “Rear”.

Press SELECT

Figure 42 29032
Selecting a Sub-Menu Item

Refer to Figure 43

The display returns to the Normal Operate screen.

Notice that the Top Display now reads Rear Shaft RPM.

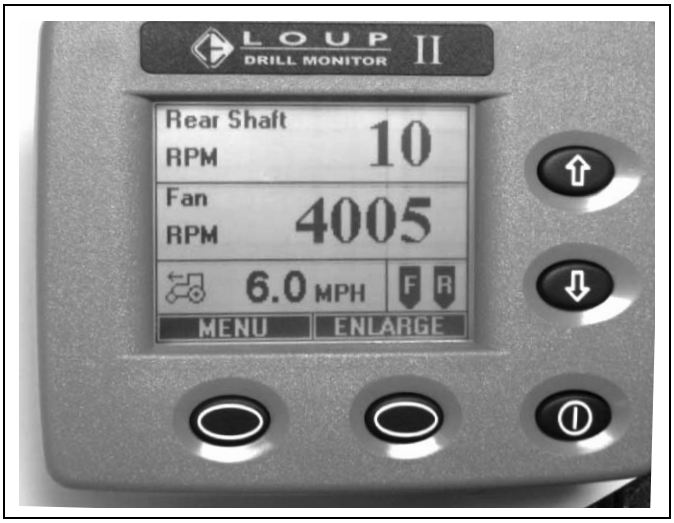


Figure 43 29033
Normal Operating with New Item

Alarms

The alarm display becomes active when any conditions fall below the set alarm points. For example: Low Fan Speed, High Fan Speed, Low Hopper Level, No Ground Speed, Low Seed Flow.

All alarms operate in a similar fashion:
An audible alarm sounds and
an alarm message appears on the display.
This alarm display is only active when the monitor is at its normal operating screen.

Pressing “OK” silences all alarms. All acknowledged alarms are displayed on the normal operating screen active alarm window until the alarm condition is fixed.

Sample alarm screens are shown below.

Should be Seeding
Refer to Figure 44

Should be Seeding alarm indicates that the implement has been out of motion for more than 30 seconds.

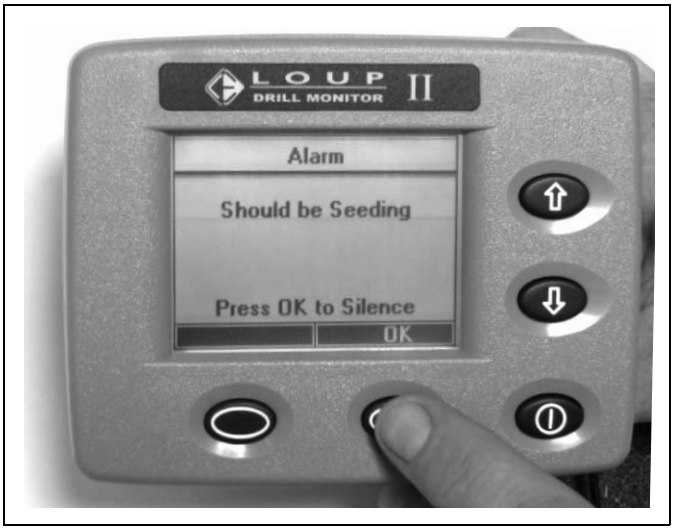


Figure 44 29034
Alarm: Should Be Seeding

Refer to Figure 45

On pressing OK, the display returns to the normal operating screen, with the acknowledged “Should be seeding” Alarm displayed in active alarm window.

Figure 45 29035
Acknowledged: Should Be Seeding

Low Fan Speed
Refer to Figure 46

A Low Fan Speed alarm occurs when the Fan Speed has fallen below the set alarm point. The cause of the problem must be resolved on the machine. A similar alarm occurs for excessive fan speed.

Figure 46 29036
Alarm: Low Fan Speed

Empty Bin

Refer to Figure 47 and Figure 48

An Empty Bin alarm occurs when the grain in the bin has fallen below the bin sensor indicating that the bin is near empty.

An Empty Bin alarm only occurs if your system is equipped with bin level sensors.

Figure 47 29037
Alarm: Empty Bin

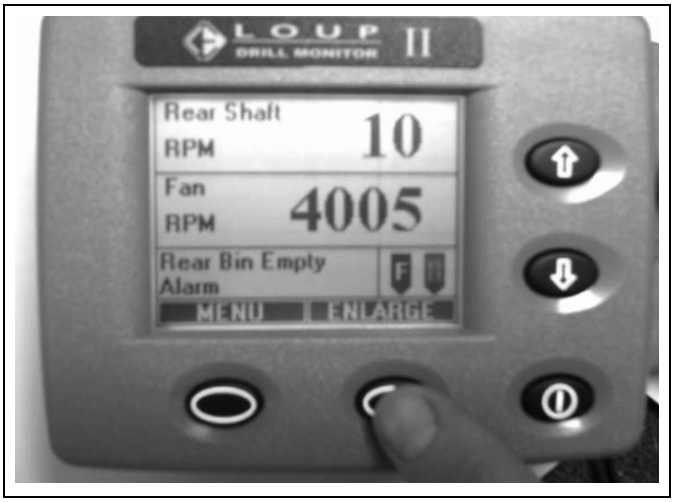


Figure 48 29038
Acknowledged: Empty Bin

Blockage Module

Two different Blockage Module alarms may occur.

Refer to Figure 49 and Figure 50

Blocked

Blockage Module Run 1 is Blocked indicates the displayed row has stopped seeding and should be cleaned.

When acknowledged, the alarm appears in the active alarm window of the normal operating screen.

Figure 49 29039
Alarm: Blockage

Figure 50 29040
Acknowledged: Blockage

Bad

Refer to Figure 51 and Figure 52

Blockage Module Run 1 is Bad indicates the displayed row has stopped and has failed the self test. This does not mean the sensor is bad!

When acknowledged, the alarm appears in the active alarm window of the normal operating screen.

Figure 51 29041
Alarm: Blockage Sensor

Run a blockage calibration as shown on page 79. If the indicated sensor will not calibrate, the sensor should be replaced.

Figure 52 29042
Acknowledged: Bad Sensor

Communication Error

Refer to Figure 53 and Figure 54

A Communication Error occurs any time the monitor loses communication with a learned sensor. This includes Ground Speed, Shaft, Fan Speed, Bin Sensors and Blockage Modules.

If a communication error is received:

- Check that all harness connections are securely connected.
- If no loose connections are found, check all wiring to ensure the wires have not been broken.

If any of the listed alarms persist or if an alarm is displayed that is not listed contact your Great Plains dealer.

Figure 53 29043
Alarm: Communication Error

When acknowledged, the alarm appears in the active alarm window of the normal operating screen.

Figure 54 29044
Acknowledged: Communication Error

Special Start-up

Refer to Figure 55

A special start-up screen appears when the monitor is turned on in the following circumstances:

1. The monitor has been learned but is unplugged from the drill.
2. The monitor has been learned but has lost its memory.
3. The monitor has not been learned.

• System Start-up: Selected for “Normal Operation”. The last used system configuration and settings are loaded.
• Learn New System: Special start-up used to learn all new sensors while keeping the previous system settings.
• Default Settings: Special start-up used to reset all sensor settings to their default setting.
• Learn New System and Default Settings: Complete reset of the monitor. Removes all learned sensors and restores all the default sensor settings.

If this screen appears and you are unsure of what to do contact your Great Plains dealer.

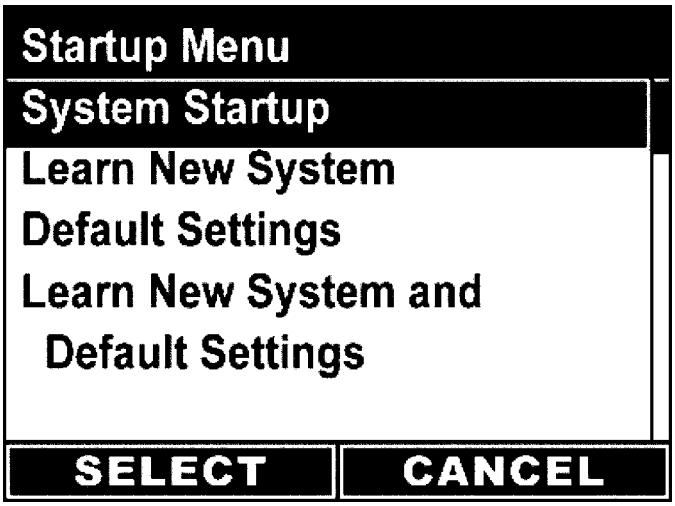


Figure 55 29045
Special Start-Up Screen

Learn New System

The learn mode is a one time process that identifies each sensor with the monitor.

Refer to Figure 57

Before entering the Learn Mode, be sure to unplug all the sensors that have a 3-pin connector, i.e. Ground Speed Sensor, Shaft Sensors, Hopper Sensors, Population Sensors & Blockage Modules. (Blockage Sensors have a 2-pin connector and can be plugged into their appropriate connection on the blockage harness.)

Procedure

1. Press the Power Button to turn the monitor on.

Refer to Figure 56

2. Press the DOWN arrow to highlight Learn New System and Default Settings

Figure 57 29046
Startup: Learn New System

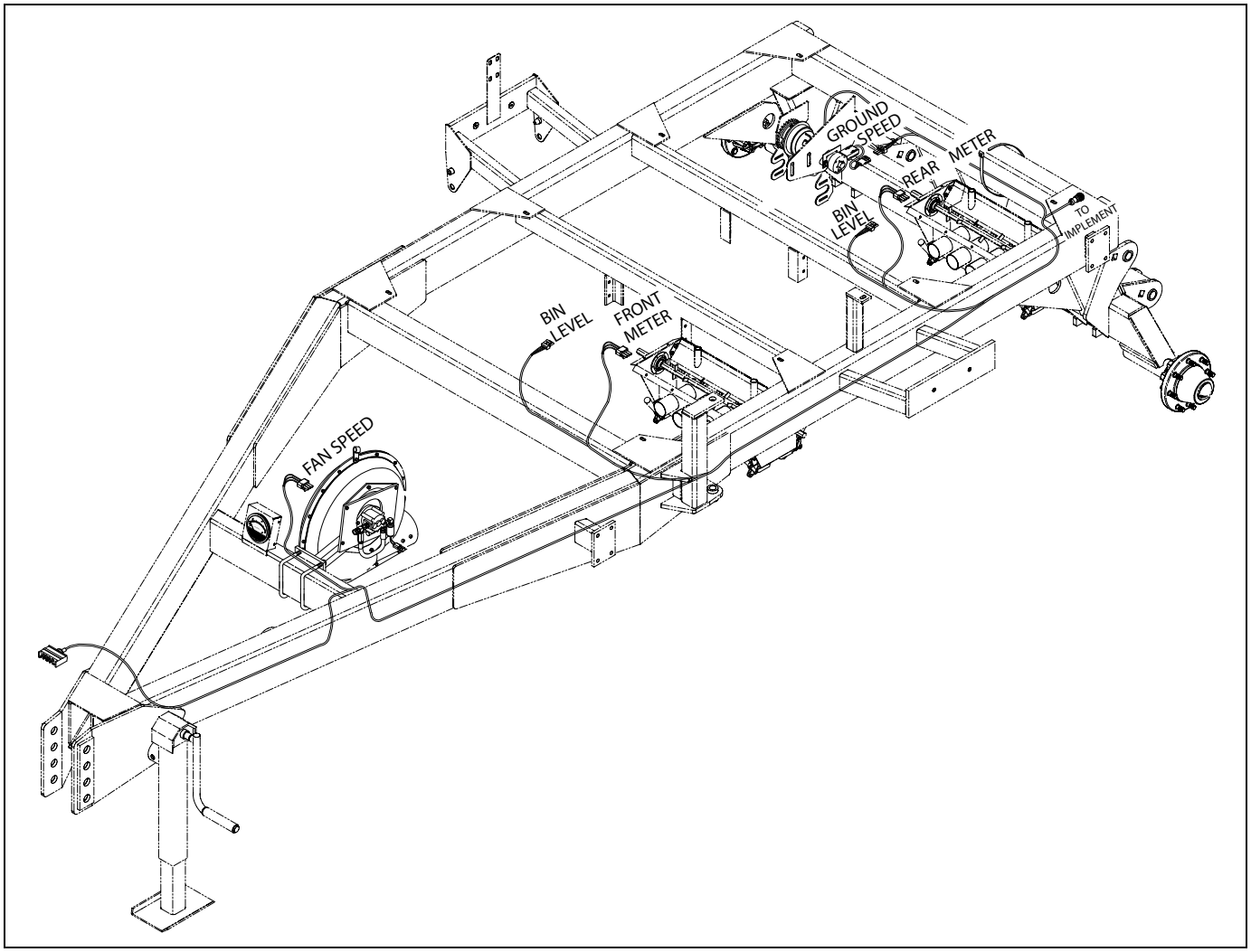


Figure 56 16206
Sensor Locations

Refer to Figure 57

3. Press SELECT

Figure 58 29047
Select Learn New System

Refer to Figure 59

4. An “Are you sure?” prompt appears before the sensor scan begins. Press the softkey under CANCEL to exit, or SELECT to reset system settings and begin scan.

Figure 59 29048
Begin Learn New System

Refer to Figure 60

5. Plug each sensor in as the monitor asks for them. If the sensor is the correct type, it is immediately recognized, the console beeps, and moves on to the next sensor.

The first sensor the monitor looks for is a Fan sensor. This is an implement-mounted sensor monitoring a shaft. Plug it in now.

If the requested sensor is not mounted on the drill, use the arrow keys to highlight “Skip this Sensor”, and press SELECT.

Once the speed sensor has been accepted or skipped, the monitor moves to the next sensor. The order the monitor asks for sensors is:

A. Fan

B. Front Shaft

C. Front Bin

D. Rear Shaft

E. Rear Bin

F. Speed

G. Blockage Module 1 through 8

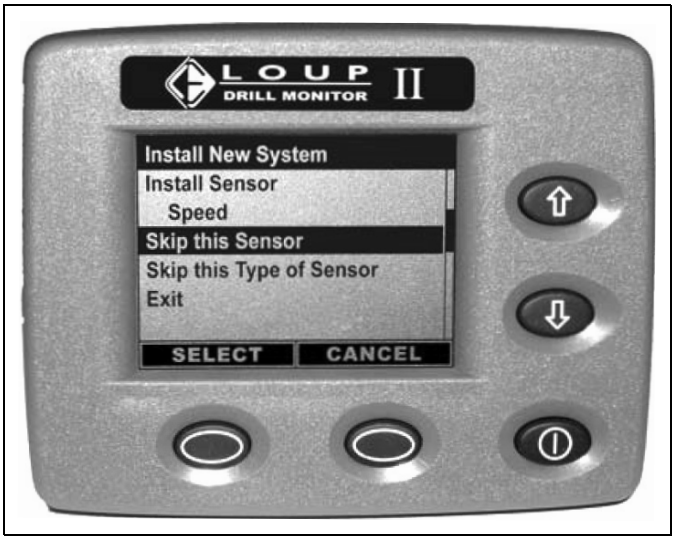


Figure 60 29049
Begin Learn New System

Refer to Figure 61

Note: If during the Learn Mode you receive a Wrong Sensor Type for: message, the monitor is detecting a type of sensor that is incorrect for this function. For example: This message would appear if monitor asks for Front Shaft but a bin sensor is plugged in.

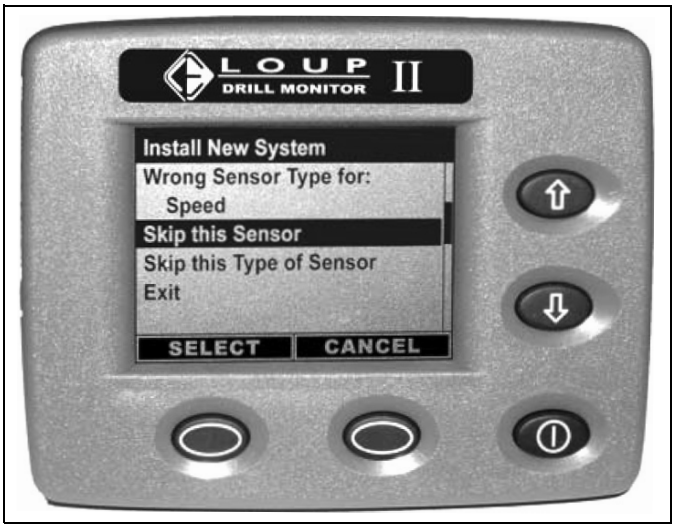


Figure 61 29050
Sensor Type Error

Refer to Figure 62

6. When all sensors have been plugged in or skipped, the monitor displays Installation Complete.
7. Press SELECT.
   The monitor displays the Normal Operate Screen.

Note: It is recommended that you turn the monitor off and back on to ensure the Learn Mode was completed properly. If the Startup Menu appears when the monitor is turned on, check that the monitor has not been disconnected from the harness. If a sensor Missed or Wrong Sensor Type for message appears, check that all harness connections are secure. If no connections are unplugged it may be necessary to Re-Learn the system.

If problems persist, contact your Great Plains dealer.

Figure 62 29051
Sensor Scan Complete

System Settings

Refer to Figure 63

Pressing the MENU button on the Normal Operate Screen accesses your system settings.

Use the DOWN arrow to highlight the desired menu. Press the SELECT button to enter the selected menu item.

Review and change these settings as necessary.

NOTICE

All new systems must have the proper implement width and ground speed to give accurate readings. A Ground Speed Calibration must be done on all new systems (see page 74).

Systems that include blockage sensors must perform a Blockage Calibration (See page 79)

Figure 63 29052
Settings Menu

Installation

Refer to Figure 64

Install New System

Install New System allows you to overwrite the existing Sensor setup. Refer to page 68 for information on Learning a new system.

Replace a Sensor

Replace a Sensor allows you to replace a bad sensor without re-learning the system. This refers only to Learned Sensors; i.e. shaft sensors, hopper sensors, fan speed sensors and blockage modules.

Add a Sensor

Add a Sensor allows you to add a new sensor without re-learning the system. This refers only to Learned Sensors; i.e. shaft Sensors, hopper sensors, fan speed sensors and blockage modules.

Remove a Sensor

Remove a Sensor allows you to remove a sensor from your existing system without re-learning the system. This refers only to Learned Sensors; i.e. shaft Sensors, hopper sensors, fan speed sensors and blockage modules.

Figure 64 29053
Installation Tasks

Implement Setup

Factory defaults for the following settings are very likely to be incorrect for your drill. Review and set these values before calibrating or planting.

Refer to Figure 65

Units

The Units setting changes the units of measure that the monitor accepts as input, calculates and displays.

Note: If you change Units, existing settings are converted to the new units, excepting Speed Calibration course length, which remains 400 feet (121.9 m).

- **Imperial:** (U.S. customary)
  U.S. Survey Acres / Feet / Miles per Hour
- **Metric:**
  Hectares / Meters / Kilometers per Hour

Implement Width

Refer to table at right

Adjust to the size of your drill. The factory default of 40.0 feet (1219 cm) is only approximately correct for 40 foot (12.2 m) drills.

Clear Field Area

Use to zero or clear your Field Acres.

Clear Total Area

Use to zero or clear your Total Acres.

Figure 65
Implement Setup

29054

Width[a] (Swath)		
	Imperial[b]	Metric
ADI334-3512	35.0 (feet)	10.7 (m)
ADI334-4010	33.3 (feet)	10.2 (m)
ADI334-5507	32.1 (feet)	9.8 (m)
ADI345-4512	45.0 (feet)	13.7 (m)
ADI345-5510	45.8 (feet)	14.0 (m)
ADI345-7507	43.8 (feet)	14.0 (m)
CTA4000-5010	40.6 (feet)	12.4 (m)
CTA4000-6575	40.6 (feet)	12.4 (m)
CTA4000-8006	40.5 (feet)	12.4 (m)
CTA4000HD-5010	40.6 (feet)	12.4 (m)
CTA4000HD-6575	40.6 (feet)	12.4 (m)
CTA4000HD-8006	40.5 (feet)	12.4 (m)
NTA3010-3610	30.3 (feet)	9.2 (m)
NTA3010-4875	30.3 (feet)	9.2 (m)
NTA3510-4010	33.7 (feet)	10.3 (m)
NTA3510-5575	34.7 (feet)	10.6 (m)

a. For implements not listed, measure between outside end row units, plus one row space.
b. Use “Imperial” for U.S. customary units.

Speed Settings

Refer to Figure 66

Pulses Per Rev

Pulses per Rev (revolution) are the number of magnets the implement mounted speed sensor sees in one revolution of the ground drive clutch shaft. The magnet assembly is on the inner end of this shaft.

The factory default is 4 pulses per rev (PPR), which is correct for current 1150 air drill carts. Older air drill carts may have 2 or 4 magnets on the shaft, visible as short metal rods in the polymer magnet housing.

Wheel Pulses Per 400 Feet

This is the ground speed calibration number for a implement mounted speed sensor. Refer to page 74 for calibration instructions.

The factory default for speed PPR is:
252
for compatibility with older monitors as a service replacement. This is approximately correct only for ADI334.

Approximate PPR values for various drills are shown in the table at right. Do not rely on these values for planting. Use them as a cross-check of your calibrated rate. If your calibrated PPR is significantly different from the table, it may indicate a mechanical fault, or that your air drill cart is not correctly setup for your drill.

Speed calibration is necessary for all air drills, including ADI334. The default PPR is incorrect for newer drills, and the table values at right are only approximate.

Re-calibration is recommended as tires wear or field conditions change (which can alter effective rolling radius of tires). Always cross-check the monitor reported speed with the tractor speedometer or other reference.

Speed Calibration

All new systems require a ground speed calibration to ensure accurate area totals and accurate ground speed readings. To complete the calibration, measure a course 400 feet (121.9 m) long preferably on level ground with a start and finish point. The drill must be in the down position throughout this procedure.

Refer to Figure 67

1. Position the drill at the start of the course, in lowered field position. Set clutch switch ① to On.

Note: During the calibration the monitor is looking for the number of pulses produced from the drill mounted sensor or in the case of radar, the number of radar pulses. The monitor does not display 400 when the speed calibration is complete rather it displays the pulses counted in 400 feet.

Figure 66 29055
Speed: Pulses per Revolution

Pulses per Rev (Speed) in 400 feet (121.9 m)		
	Imperial[a]	Metric
ADI334	253	253
ADI345	331	331
CTA4000	296	296
CTA4000HD	296	296
NTA3010	226	226
NTA3510	253	253

a. Use “Imperial” for U.S. customary units.

Figure 67 29013
Clutch Switch On

Speed Calibration Procedure:

Refer to Figure 68

2. From the Speed Settings menu, highlight Speed Calibration and press SELECT.

Figure 68 29056
Select Speed Calibration

Refer to Figure 69

3. Press SELECT again to begin counting pulses.

Figure 69 29057
Begin Speed Calibration

Refer to Figure 70

4. The display prompts with
   "Start Driving".
   Pull forward at normal planting speed. As you drive,
   "Wheel Pulses Received"
   count up from 0.

Figure 70 29058
Speed Cal: Start Driving

Refer to Figure 71

5. At the end of the course, press the SELECT softkey to save the pulse count as the new "Pulses per 4000 ft".

Figure 71 29059
Speed Cal: Course Completed

Refer to Figure 72

6. The display is now back at the Speed Settings Menu. Notice the
   Wheel Pulses Per 400 feet
   has changed to the calibrated number.
   (The number shown is for illustrative purposes only).

Figure 72 29060
New Speed Cal Saved

Bin Settings

Refer to Figure 73

Bin Settings allow the operator to Enable and Disable the alarms for Hopper Level Sensor.

By default, these are set to Enable when Hopper Sensors are Learned.

If your system does not include hopper sensors, this menu is not available.

Figure 73 29061
Configure Bin Alarms

Meter Shaft Settings

Refer to Figure 74

Front and rear meters have separate settings for sensor setup and alarms.

Pulses per rev is normally the same for both meters, except when disabling the sensor for an unused meter.

Alarm limits are typically different for each meter if different materials are being applied.

Figure 74 29062
Shaft Settings Top Menu

Pulses per Rev (Meter)

Refer to Figure 75

Pulses per Rev (revolution) are the number of magnets the associated sensor sees in one revolution of the shaft being monitored.

The factory default is 2, which is correct for new 1150 air drill carts.

Changing this number to 0 turns the sensor OFF.

Low Alarm Point

The Low Alarm Point is set as a reference point for the alarm. If the shaft turns slower than this designated point, an alarm sounds.

High Alarm Point

The High Alarm Point is set as a reference point for the alarm. If a shaft turns faster than this designated point, an alarm sounds.

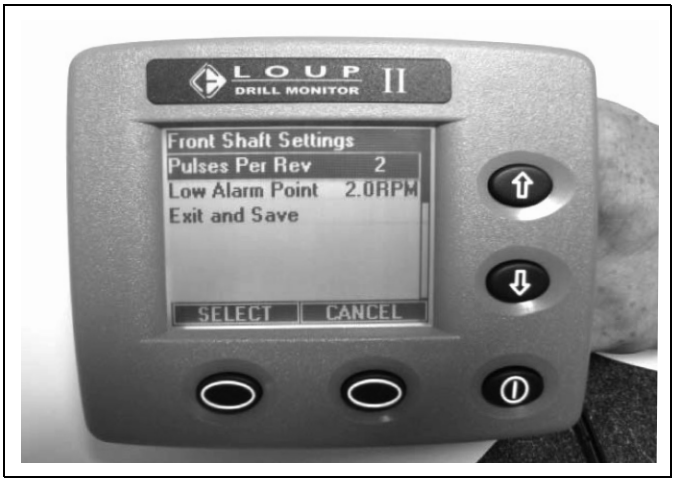


Figure 75 29063
Front Shaft Settings

Blockage Module Settings

Refer to Figure 76

The Blockage Module Settings only affect those systems with Blockage Sensors (single sided sensor detecting seed flow only). A blockage module is a box mounted to the frame of the drill that blockage sensors are connected to.

Note: If the menu shows
Number of Modules 0,
this indicates that there are no blockage modules or sensors being used with the current system.

Runs per Module Setup

The Runs per Module setting adjusts the number of Blockage Sensors connected to the selected module.

The factory default is:
16

Individual Runs Setup

The Individual Runs Setup allows you turn specific blockage sensors on (Enable) and off (Disable).

The factory default is:
Enabled (all rows are on)

Blockage Module Test

The Blockage Module Test is used to check communication between monitor and modules.

Blockage Calibration

A blockage calibration must be done for proper operation of the blockage sensors. This procedure should be done when changing seed rates or seed varieties, such as from Soybeans to Wheat.

Blockage Calibration Procedure:
Refer to Figure 77

1. Enter Blockage Calibration mode by highlighting Blockage Calibration and pressing the SELECT softkey.

Figure 76 29064
Blockage Setup

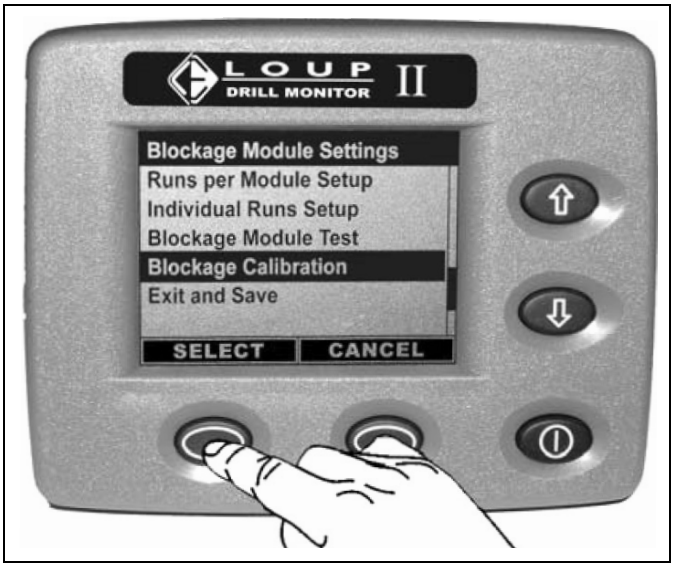


Figure 77 29065
Enter Blockage Calibration

Refer to Figure 78

2. Begin planting a normal speed. You must be planting seed during this entire process.

Figure 78 29066
Begin Planting

Refer to Figure 79

3. As you drive the display shows the number of rows that have been calibrated on the second line (none so far in the figure). The third line shows the Total number of rows.

Note: The number 32 is for illustration purposes only. Your number will be different.

Figure 79 29067
Rows in Calibration

Refer to Figure 80

4. When the Calibrated row equals the Total Calibration is complete.

   Press SELECT to Exit.

Figure 80 29068
Blockage Calibration Complete

Global Settings

Refer to Figure 90

Volume/Pitch
Volume/Pitch adjusts the sound of the audible alarm. The range is 0 to 100%.

Factory default is:
50%

Backlight
Backlight adjust the brightness of the display. The range is 0 to 100%.

Factory default is:
50%

Contrast
Contrast adjust the contrast of the display. The range is 0 to 150%.

Factory default is:
100%

Figure 81 29069
Global Settings

Adjustments

Drive System Adjustments

Initially check the drive chains after the first 10 hours of drill use. Thereafter, check the chains every 100 hours.

Hub Chain

Refer to Figure 82.

Check chain tension. Chain should have 1/8 inch (3.2 mm) slack. To adjust, loosen the bolts holding the main-shaft bearings and slide the main shaft. Tighten bolts.

Note: If you make any adjustments to the hub chain, check tension on the chain from the main shaft to clutch shaft.

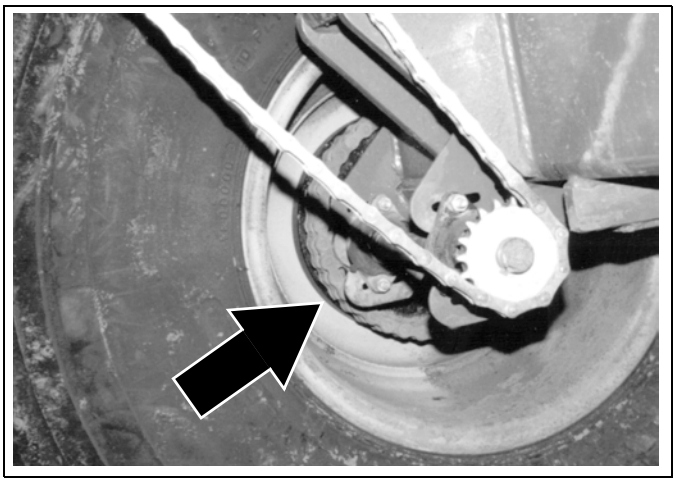


Figure 82
Hub Chain

16219

Clutch Input and Gearbox Input Chains

1. Check that drive sprocket (1) and clutch sprocket (2) are aligned. See Figure 83. If not, loosen the set screws holding the drive sprocket and move drive sprocket until aligned. Tighten the set screws.
2. Check chain tension. Rear span of clutch-input chain should have 1/2 inch (13 mm) slack at the midpoint. Lower span of gearbox-input chain should have 7/8 inch (22 mm) slack at the midpoint. To adjust, loosen bolts holding the clutch-shaft bearings and slide the clutch shaft up or down. Keep the clutch shaft parallel with the main shaft. Tighten bolts.

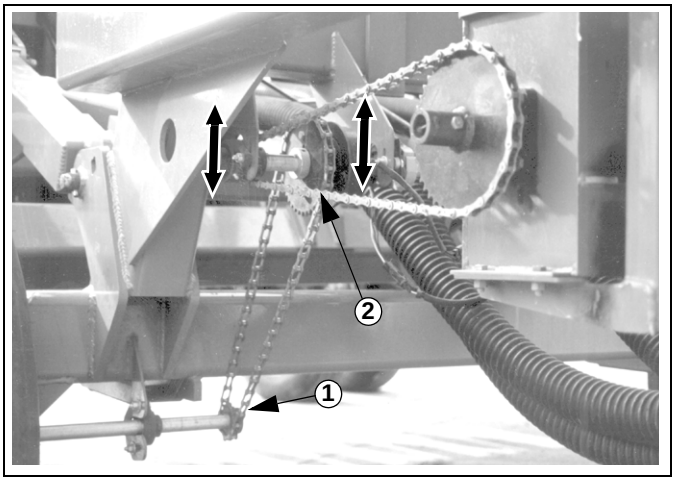


Figure 83 16986
Clutch Input and Gearbox Input Chains

3. If you move the clutch shaft, check the electric clutch anti-rotation tang and stop bolt. See Figure 84. The tang must fit loosely over the stop bolt. If necessary, move the stop bolt in its slot to ensure a loose fit or to get greater chain adjustment.

NOTICE

To ensure long clutch life, it is very important that the bolt is not tight against either end of the slot in the clutch tang

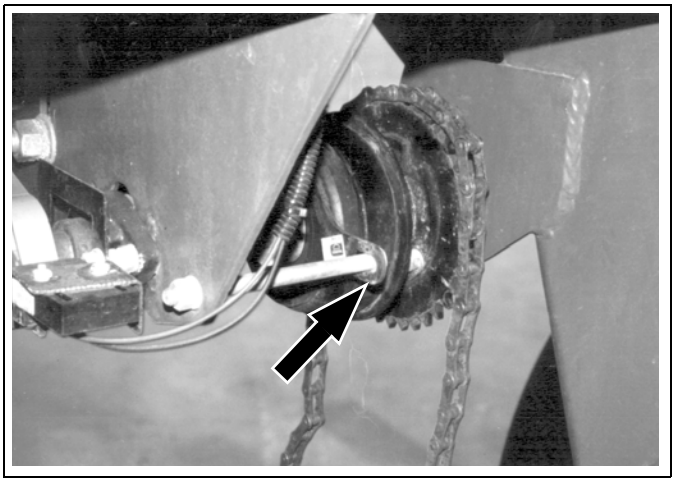


Figure 84 16145
Electric Clutch Anti-Rotation Tang and Stop Bolt

Gearbox Output and Meter Box Input Chains

Refer to Figure 85. Check tension on gearbox-output chain. The chain should have 1/2 inch (13 mm) slack at the midpoint of the lower span.

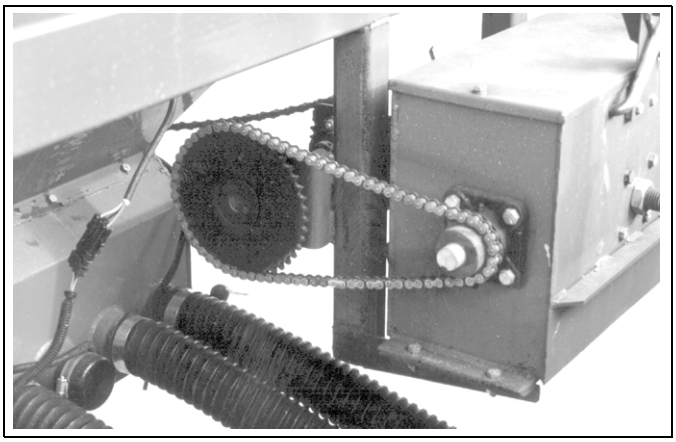


Figure 85 00000
Gearbox Output Chain

Refer to Figure 86. Check tension on meter-box-input chain. Chain should have 5/8 inch (16 mm) slack in the bottom span.

Figure 86 16982
Meter Box Input Chain

To adjust tension, see Figure 87. Loosen bolts holding the jackshaft bearings and slide the jackshaft. Tighten bolt.

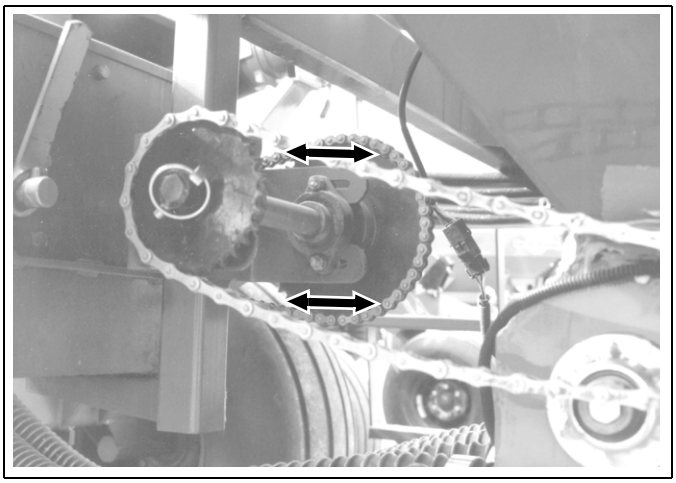


Figure 87 16988
Jackshaft

Electric Clutch Switch Adjustment

A height switch on the implement rockshaft turns seed metering off when the implement is raised. To adjust the height at which seed metering is turned off, follow these steps.

WARNING

Do not place any part of body under implement while making adjustments.

1. Locate the height switch on the left side of the rockshaft.
2. Lower the implement until it is at a height where seeding should start (usually just above ground). Securely support implement frame at this height with jack stands or blocks.
3. Turn off the tractor and remove the key.
4. Refer to Figure 88. Loosen the cam clamp (1) on the rockshaft and turn until the switch roller is just starting to make contact with the ramp surface (2).

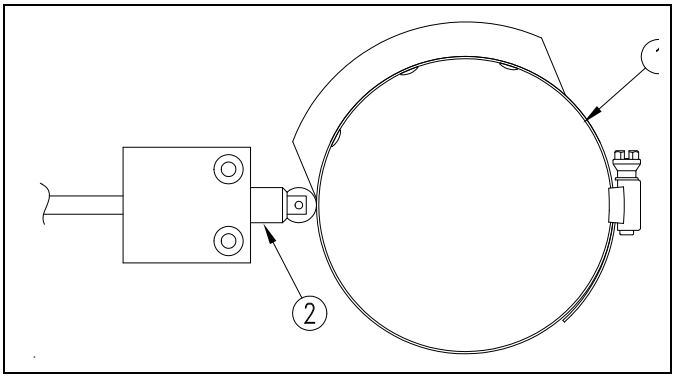


Figure 88 15160
Electric Clutch Switch Adjustment

5. Raise the implement fully and check that the switch is compressed as shown in Figure 89.

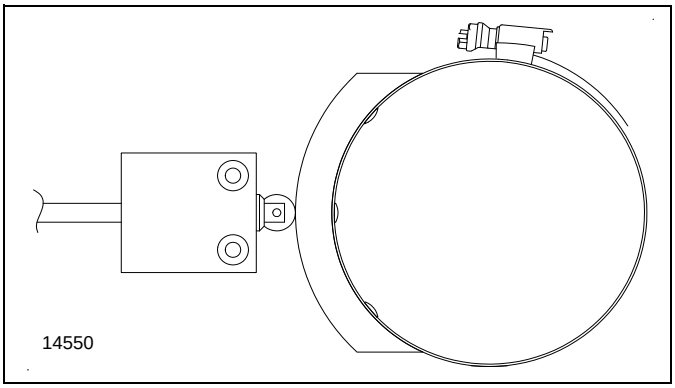


Figure 89 14550
Metering Off Position

Troubleshooting

Problem	Possible Solutions
Actual seed rate is different from rate desired.	Check for air leaks around meters and bin lids. A small air leak can reduce the seeding rate dramatically.
	Check that gearbox, quick-change sprockets and meter-box gears are set correctly. Refer to *Setting the Meter Rate*, "**Adjustments**," page 33.
	Check the tires for correct pressure. Refer to *Tire Inflation Chart*, "**Appendix B**," page 103.
	Check meter for seed treatment build-up. Unload bin and clean meter.
	Check for foreign material that may block meter. Keep strainer basket in place and foreign material out of bin.
	Check that electric clutch is engaging. Adjust switch as explained under *Electric Clutch Switch Adjustment*, "**Adjustments**," page 85.
	Check electric clutch harness for faulty or corroded connections. Clean or replace terminals.
	Run fan at a higher speed. Refer to *Field Operations*, "**Operating Instructions**," page 22.
	Keep enough seed in the air drill cart to cover the agitator shaft. Do not run meter out of seed.
	Check that proper sprockets are installed. Refer to *Air Drill Cart Drive System*, "**Preparation and Setup**," page 15.
	Check that gearbox levers are indicating actual setting. Shifting the gearbox with the clutch handle engaged will force the gearbox shifter out of place. Always disengage gearbox clutch before shifting. Refer to *Setting the Meter Rate*, "**Adjustments**," page 33.
	Check for foreign material in seed. Seeding rate charts are based on clean, untreated seed.
Erratic seeding pattern or emergence	Check if 1 inch seed hoses are plugged. Stop and raise the drill with the fan running. Hand crank the meter to see if any hoses are plugged.
	Check carefully for air leaks and adjust the latch or replace the seals as needed. Air leaks may cause small seeding skips that move across the drill width.
	Check electric-clutch harness for faulty or corroded connections. Clean or replace terminals.
	Check for debris in towers blocking the hoses. Blockage may shift from outlet to outlet.
	Reduce ground speed. Driving too fast can cause erratic seeding.
	On hoe-type drills, check that openers are lined up with press wheels.
Excessive seed cracking	Reduce fan speed. Refer to *Field Operations*, "**Operating Instructions**," page 22.
	Check that dividers are installed in the tower assembly.

Problem	Possible Solutions
Secondary, 1 inch seed hoses are plugging.	Increase fan speed. Refer to *Field Operations*, “**Operating Instructions**,” page 22.
	Check hoses for damage and replace if necessary.
	Check for debris in seed that is too large for hose.
	Take up extra slack in hoses. Leave enough slack for wing down flex.
	Reroute hoses so there are no sharp bends.
Primary, 2 1/2 inch seed hoses are plugging.	Increase fan speed. Refer to *Field Operations*, “**Operating Instructions**,” page 22.
	Check hoses for damage and replace if necessary.
	Reroute hoses so there are no sharp bends.
	Check if metering system is not shutting off when fan is off, filling primary hoses with seed. If so, hydraulic pressure switch may be faulty.
Fan will not run fast enough.	Check that tractor hydraulics are supplying enough oil. They must be able to supply 18 gallons per minute at 2000 psi.
	Check if tractor oil level is too low.
	Check the fan for correct rotation direction. Bottom of the blade should move toward the rear of the drill. Reverse direction of hydraulic flow from tractor if fan is not rotating correctly.
	Inspect fan hydraulic check valve (part number 810-037C). It may be installed backwards. Refer to air drill cart parts manual for check-valve location.
Acremeter is not accurate	Check tire pressure. Inflate as recommended on *Tire Inflation Chart*, “**Appendix B**,” page 103.
	Check for excessive overlap or skips in seeding.
	Consider soil conditions. Loose soil may cause a variation in acres registered.
	Check that proper clutch sprocket is installed. Refer to *Air Drill Cart Drive System*, “**Preparation and Setup**,” page 15.
No seed being metered.	Check power to the electric-clutch circuit.
	Check the clutch-switch adjustment. Refer to *Electric Clutch Switch Adjustment*, “**Adjustments**,” page 85.
	Check that gearbox clutch is engaged.
	Check that sprockets are secured to drive shafts.
	Check if fan pressure switch is faulty or improperly adjusted. Switch should close at 800 psi and higher.
	Check that fan is running and implement is lowered so height switch is extended.

Maintenance and Lubrication

General Maintenance

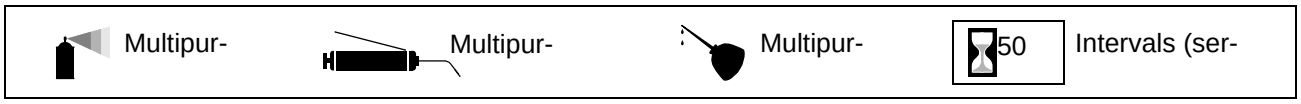
Proper servicing and adjustment is the key to the long life of any farm equipment. With careful and systematic inspection and lubrication, you can avoid many costly repairs and downtime.

WARNING

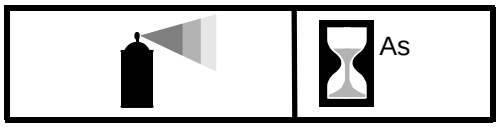
Escaping fluid under pressure can penetrate the skin causing serious injury. Check all hydraulic lines and fittings before applying pressure.Use paper or cardboard, NOT BODY PARTS, to check for suspected leaks. Wear protective gloves and safety glasses or goggles when working with hydraulic systems. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene will result.

1. Always turn off and remove the tractor key before making any adjustments or performing maintenance.
2. After initially running the air drill for several hours, check all bolts to be sure they are tight as specified on the *Torque Values Chart*, “**Appendix B**,” page 102. Use equivalent fasteners to replace any damaged or missing bolts.
3. Clean or replace any fittings which will not take grease. Lubricate the air drill cart as noted under *Lubrication*, this page.
4. Adjust the idlers to take up excess chain slack as described under *Drive System Adjustments*, “**Adjustments**,” page 82. Do not over-tighten chains.
5. Inflate tires as indicated on *Tire Inflation Chart*, “**Appendix B**,” page 102.
6. Replace any worn, damaged or illegible safety labels at once. Refer to *Safety Label*s, “**Important Safety Information**,” page 1.
7. Check and repair all air leaks or damage in bin-lid and meter seals.

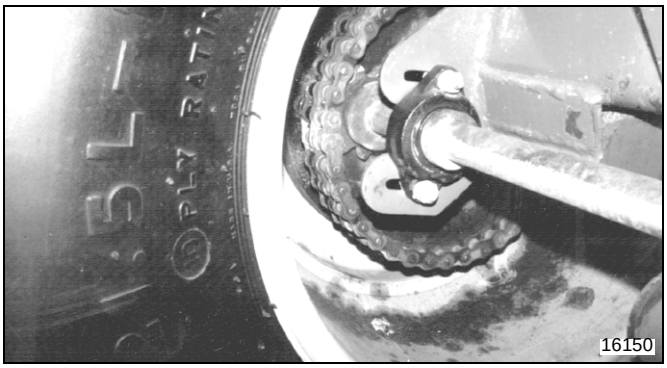
Lubrication



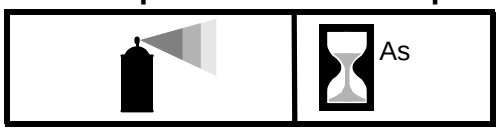
Hub Chain



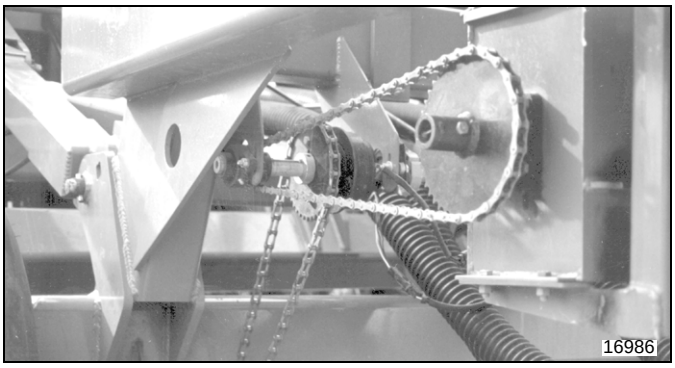
Type of Lubrication: Spray
Quantity: Cover entire chain



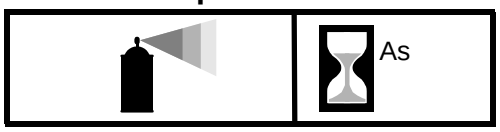
Clutch Input and Gearbox Input Chains



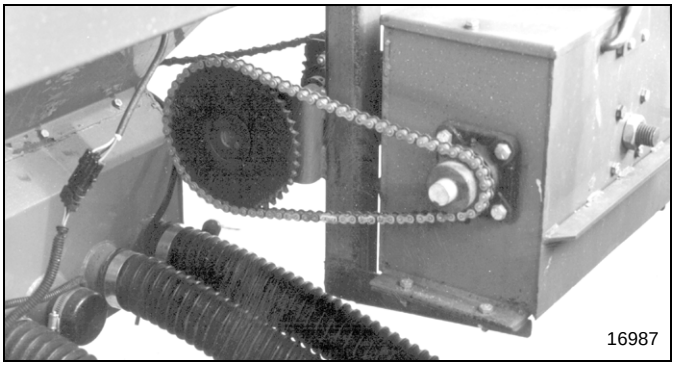
Type of Lubrication: Spray
Quantity: Cover entire chain



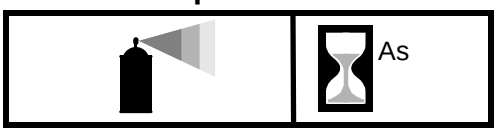
Gearbox Output Chains



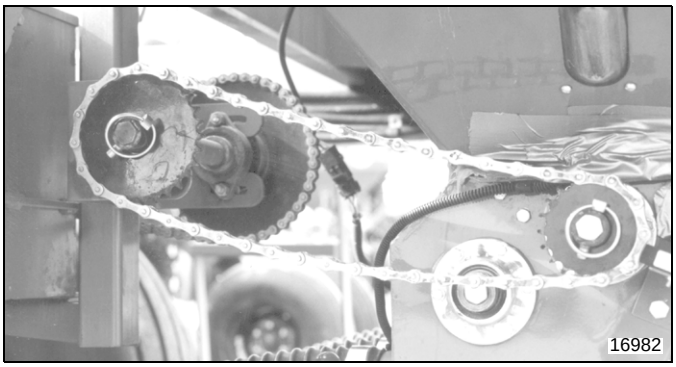
Type of Lubrication: Spray
Quantity: Cover entire chain



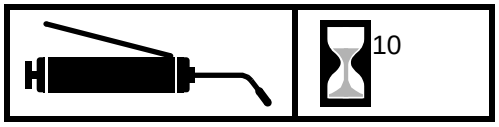
Meter Box Input Chains



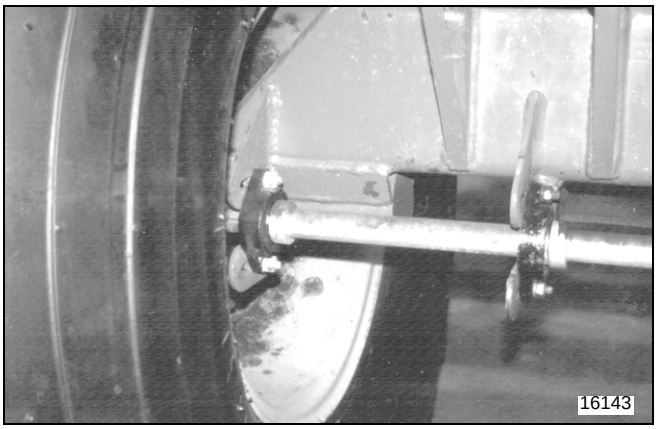
Type of Lubrication: Spray
Quantity: Cover entire chain



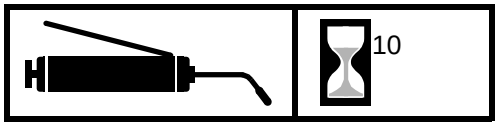
Main Shaft Bearings



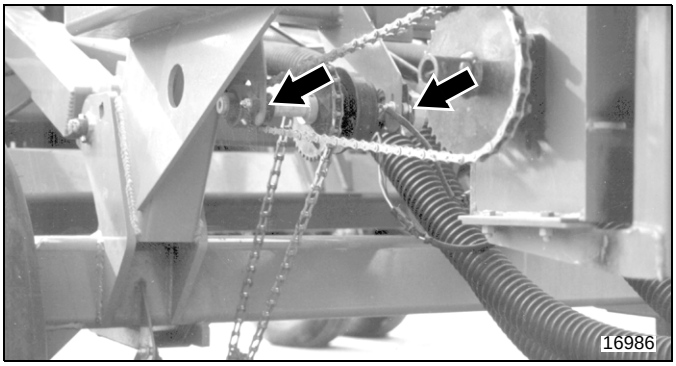
Type of Lubrication: Grease
Quantity: Until resistance is felt



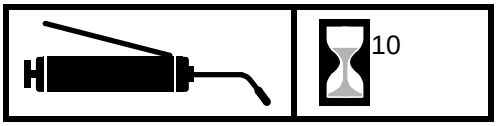
Clutch shaft Bearings



Type of Lubrication: Grease
Quantity: Until resistance is felt

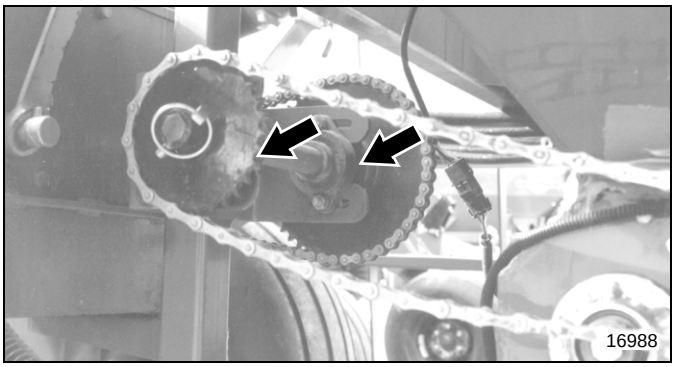


Jackshaft Bearings

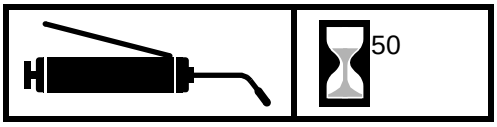


Grease fitting on each end of shaft

Type of Lubrication: Grease
Quantity: Until resistance is felt

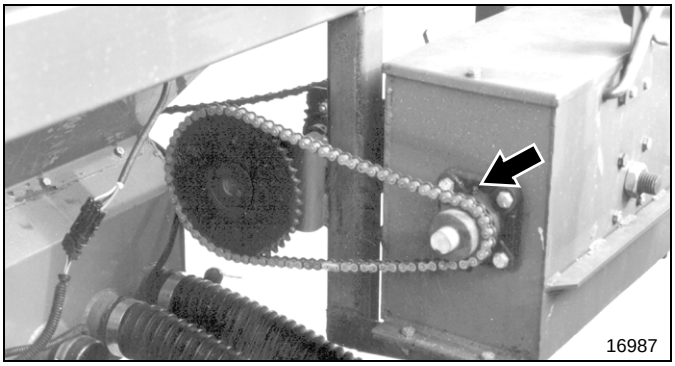


Gearbox Shaft Bearings

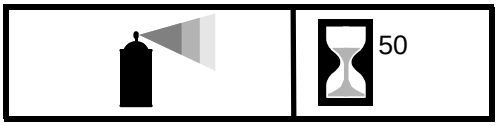


Grease fitting on each end of shaft

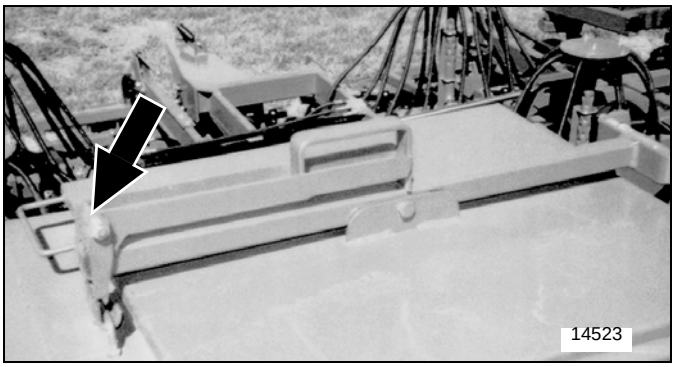
Type of Lubrication: Grease
Quantity: Until resistance is felt



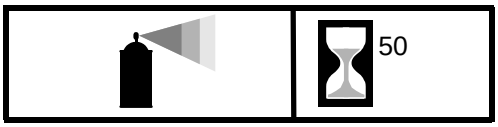
Bin-Lid Pivot Bar and Latch



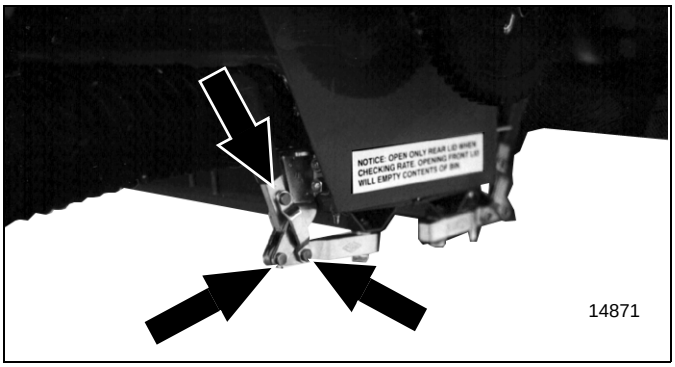
Type of Lubrication: Spray
Quantity = Coat Pivots



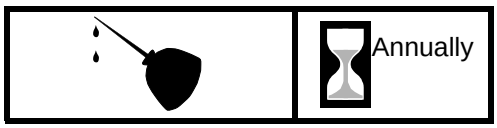
Meter-Lid Clamp Points



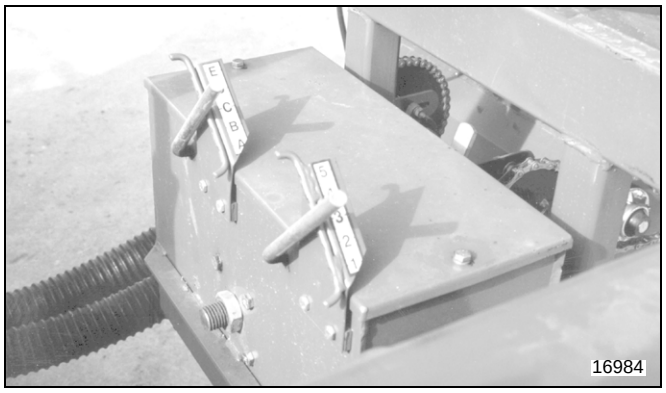
Type of Lubrication: Spray
Quantity = Coat Pivots



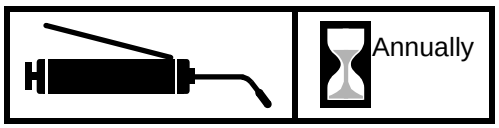
Gearbox



Type of Lubrication: SAE 140
Quantity: 2 1/2 inches (64 mm) deep

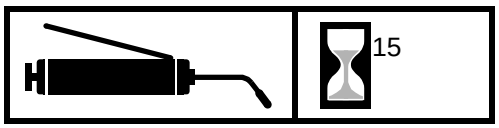


Wheel Bearings



Type of Lubrication: Wheel-bearing grease
Quantity: Pack full

Optional Auger and Swing Arm



Type of Lubrication: Grease
Quantity: Until grease is visible at ends of pivots

Options

Seed-Flow Blockage Option

The Loup Electronics monitor can be outfitted with sensors that monitor for plugging in the 1 inch (25 mm), secondary hoses. The package includes programmable blockage modules for each tower and flow sensors for each secondary seed hose. The blockage modules signal the monitor when flow stops at a sensor. The monitor then sounds an alarm and identifies the problem hose.

For information on using the monitor with the optional blockage sensors, refer to *Operating Instructions–Blockage Option*, “**System Monitor**,” page 53.

To order blockage sensors, contact your Great Plains dealer.

Implement and Row Spacing	Part Numbers
NTA3010, 7.5 inch (191 mm)	168-260A
NTA3010. 10 inch (254 mm)	168-261A
NTA3510, 7.5 inch (191 mm)	168-256A
NTA3510, 10 inch (254 mm)	168-257A
ADI334, 7 inch (178 mm)	168-256A
ADI334, 10 inch (254 mm)	168-257A
ADI334, 12 inch (305 mm)	168-261A
ADI345, 7 inch (178 mm)	168-267A
ADI345, 10 inch (254 mm)	168-256A
ADI345, 12 inch (305 mm)	168-260A
CTA4000, 6 inch (152 mm)	168-318A
CTA4000, 7.5 inch (191 mm)	168-319A
CTA4000, 10 inch (254 mm)	168-320A

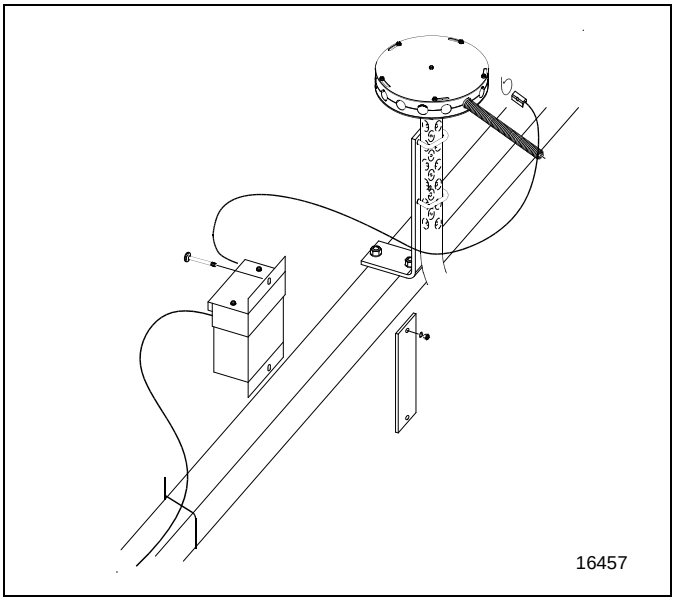


Figure 90
Seed Flow Blockage Option

00000

Specifications and Capacities

Machine Specification

Capacity	150 bu (5285.86 L)
Overall Width	10 ft 8 in (3.25 m)
Overall Height	10 ft 6 in (3.20 m) Auger Stowed,
Length Front To Rear with Auger	18 ft 10 in (5.74 m)
Weight, Empty	4,500 lb (2041.17 kg)
Weight, Fully Loaded	14,100 lb (6395.65 kg)
Tire Size	16.5L by 16.1 10 ply, rib implement
Ground Clearance Below Meters	23 in (58.42 cm)
Maximum Fan Speed	5000 rpm
Seeding Rates	2 to 230 lb per acre (22.40 to 257.80 kg per hectare)
Drive	Electric clutch with automatic height switch
Tractor Power Requirements (Horsepower needed will vary with conditions, terrain and row spacing.)	
with ADI334	180 hp
with ADI345	240 hp
with NTA3010	250 hp
with NTA3510	275 hp
Tractor Hydraulic Requirements	
with ADI334 or ADI345	Load-sensitive or closed-center hydraulics
	Capacity of 15 to 30 gallons (57 to 114 litres) per minute at 2000 psi (138 bar)
	Three sets of hydraulic outlets
with NTA3010 or NTA3510	Three sets of hydraulic outlets
	Capacity of 15 to 30 gallons (57 to 114 litres) per minute at 2000 psi (138 bar)
	Load-sensitive or closed-center hydraulics
	Equipped so a return line can be plumbed directly to the tractor hydraulic reservoir

Fan RPM	Fan rpm is displayed when FAN is selected
	The input signal is from a smart high speed sensor.
	The range is 0-9990 rpm with a resolution of 10 rpm.
	The number of pulses per revolution on the fan can be set from zero (function disabled) to four.
	The low alarm point is user adjustable between zero and the high rpm alarm point.
	The high alarm point is user adjustable between the low alarm point and 9900 rpm.
	Response time to an alarm condition is 1 second maximum.
Shaft RPM	Three shaft speeds (front, rear and auxiliary) are monitored. Shaft speeds are displayed when the appropriate function is selected.
	The input signal is from a smart shaft sensor.
	The number of pulses per revolution on the shaft can be set from zero (function disabled) to 10.
	Shaft alarm generation will be delayed 30 seconds if ground speed is below 2 mph (3.2 kph).
Bin Level Indication	Three bin levels are monitored: front, rear and auxiliary. Bin level is displayed on a 10-segment bar for each bin.
	The input is from a smart optical bin level sensor.
	There is a 15-second delay before the bin alarm is displayed
	When a shaft input is disabled, the corresponding bin level input is also disabled.
Ground Speed	Ground speed is displayed in mph or kph when the SPEED function is selected.
	The speed is sensed from a smart shaft sensor on the clutch output shaft.
	Ground speed calibration may be adjusted by changing the pulses per mile setting.
	Normal speed is 2.5 to 25 mph (4 to.40 kph). The display is to one decimal place. When displaying KPH, the decimal point will flash.
	A short double beep is given when the monitor detects the loss or resumption of the ground speed signal. Loss of ground speed signal is defined as 2 mph (3.2 kph).
	Pulses per mile are variable from 500 to 9999. When the pulse rate is set to low values, the accuracy of the area calculations and ground speed will be degraded and the rate at which the area and speed is updated will be decreased.
Area Meter	There are two area counters on the monitor. They are displayed by selecting the appropriate function. The area is displayed in acres or hectares.
	FIELD AREA is displayed on 0.1 acre or 0.1 hectare increments.
	TOTAL AREA is displayed to the nearest acre or hectare.
	When displaying hectares, the decimal point will flash.
	Field and total area are stored in nonvolatile memory to a maximum of 999.9 and 9999 acres respectively. The display then rolls over and begins again from 000.000 (0000). When displaying area in hectares, the display will roll over at 4046.9 (40469).
Implement Width	Implement width can only be viewed when programing parameters.
	The width may be adjusted between 0 and 100 ft. in 0.1 ft. steps. When in metric mode the default setting is 12.1 meters and the range is 0 to 30.4 m in 0.1 m steps.
Grain Flow Monitor Option	The unit monitors up to 192 pin flow sensors or 112 optical flow sensors using external blockage modules. The optical modules signal the monitor for loss of flow in any run. Blockage is indicated by module number and run number or run number only depending on the type of sensor that has been supplied with the system.

Loup (I) Electronics Monitor General Electrical Specifications

	The monitor operates from 12 V DC nominal, 8 V minimum, 18 V maximum.
	It withstands 24 V transients for one minute maximum and reverse voltage until the fuse blows. Use the correct size fuse (3 amp F.B) **NOTICE** *Installing an incorrectly sized fuse could result in permanent damage to monitor and void the warranty.*
	Operating temperature range is from 14° to 104° (-10°C to +40°C).

Loup (I) General Mechanical Specifications

	The monitor case is black ABS plastic with a metal mounting bracket. The front panel overlay is polycarbonate.
	The signal cable is 4 feet of SJTW 18-3. It is mounted on the rear of the unit with a circular strain relief and terminated with a 2-conductor Packard WeatherPak connector plug.
	The power cable is 4 feet of SJTW 18-2. It is mounted on the rear of the unit with a circular strain relief and terminated with a 2-conductor Packard WeatherPak connector plug.
	An internal fuse is mounted on the circuit board. The two screws behind the front panel must be removed to access the fuse.
	The printed circuit boards are coated against humidity.
	An ON/OFF switch is provided on the front panel.

Appendix A

Loup (I) Monitor System Installation and Setup

Note: For installation instructions for the Loup II monitor system, see page 52.

The Loup Electronics monitor is designed for use with Great Plains air drills. The monitor is packaged in a high impact plastic housing with a mounting bracket for tractor installation.

The system is capable of continuously monitoring ground speed, fan speed, meter-shaft speeds, field area, total area and bin level. Using optional modules and sensors, the system can also monitor for blockage in one-inch seed hoses.

The system warns you when these functions are not operating as specified. You can adjust alarm points and various system settings, including alarm point for low fan speed, alarm point for high fan speed, implement width, English or metric units and number and type of blockage sensors connected to the unit.

Figure 91 29019
Loup (I) Console

Installation and Setup

1. Install the Monitor Control Box

a. Mount the control box ○ in a convenient location in the tractor cab. The control box must be installed where it will not be exposed to high levels of dust or precipitation. The mounting bracket can be removed to ease installation.

b. Attach the black lead ② to the battery ground and red lead ③ to +12Vdc.

c. Connect the 12-pin connector lead ④ to the cart harness ⑤. Coil up and secure any excess wire. Leave enough slack for turning and uneven terrain. Be very careful to allow enough wire slack on articulated tractors.

NOTICE

After installing the control box, immediately install the implement sensors as described under ***Install Implement Sensors*** *following. Sensors must be installed in correct order to function properly.*

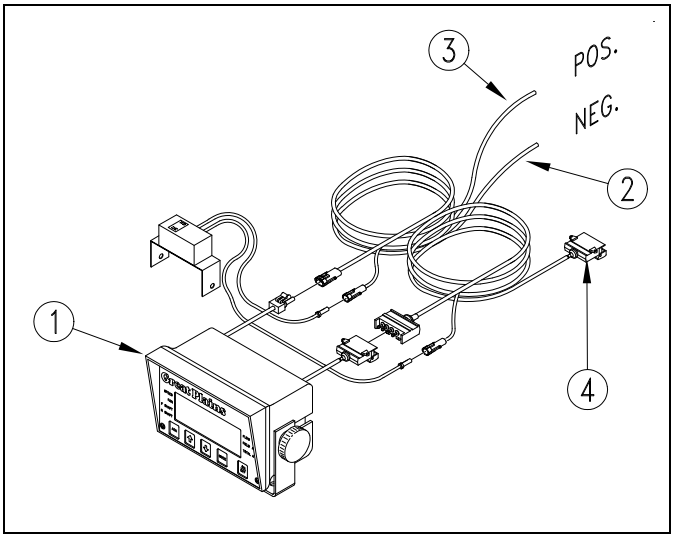


Figure 92 16451
Monitor and Cables

2. Install Implement Sensors

a. Unplug all sensors from the harness. Sensor locations are shown in .

b. Reset system by turning the monitor on while holding down the ACK, MODE and down-arrow buttons at the same time. When monitor display reads KEY OFF, release the buttons.

Note: If the monitor does not display the KEY OFF message, release buttons, turn monitor off and try again to reset the system.

c. Plug sensors into the harness in the requested order. The monitor readout will flash MISSING and the sensor that should be plugged in. As the requested sensor is plugged into the harness, the monitor will double beep, acknowledging the sensor. The monitor will then request the next sensor. Refer to for sensor locations.

The monitor will request sensors as follows:

- Fan Speed
- Front Metering Shaft
- Front Bin Level
- Rear Metering Shaft
- Rear Bin Level
- Ground Speed
- Flow 1-7

When the monitor requests Rear Metering Shaft and Rear Bin Level sensors, press ACK to skip installation of these sensors.

Note: Optional blockage sensors come in 2 varieties; Pin sensors and Optical sensors. The blockage module package included with your system will identify the style of sensor supplied.

Pin blockage sensors do not need to be disconnected and will not be requested during initial monitor setup. If system is equipped with pin style blockage sensors press the ACK button to skip FLOW 1-7. The blockage module package includes installation instructions.

When optical blockage sensors have been supplied, you must plug the 3-pin connector of the blockage module in order as requested by the module; FLOW 1-7. The Optical blockage sensors may be plugged into the proper 2-pin blockage harness connection during initial setup.

d. When you have completed sensor installation, refer to *Set Parameter Levels* below. All parameters must be set before the unit is ready to use.

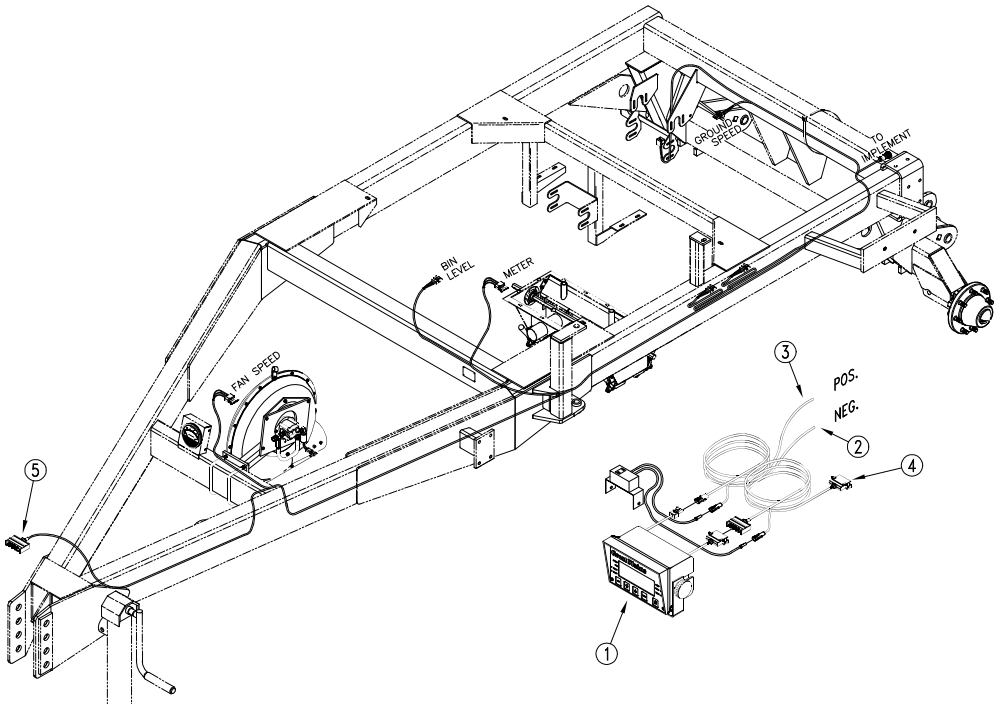


Figure 93 16976
Sensors

3. Set Parameter Levels

You can adjust alarm trip points, sensor configurations and other system features. You must reset these parameters when you initially set up the system. You can adjust the parameters later. Parameter settings are stored in monitor memory even when monitor power is. shut off.

a. Choose the function you wish to program by pressing the up and down buttons until desired function is displayed on the monitor readout.

b. Hold MODE button to enter programming mode.

c. Use the MODE button to switch between the parameters. Each function has several parameters which can be adjusted. The top display indicates which parameter is being adjusted. The lower display indicates how the parameter is currently set.

d. Use the following chart to program the parameters. The chart lists the parameters for each function and proper parameter settings.

e. Use the up and down buttons to increase or decrease the parameter level to the proper setting.

Note: To disable a function, set the pulse level to zero. The system will not monitor disabled functions.

f. When you have properly set all parameters for the function, press MODE button until “SAVE” is on the top display.

g. Press the up button to choose yes (Y) if you wish to save your settings. Press the down button to choose no (N).

h. Hold down the ACK button. If yes was chosen, the unit will beep five times before saving the settings.

i. Repeat steps a. through h. for each function until all parameters have been set.

Parameter Settings

	Parameters As Displayed on Monitor	**Proper Setting**	**Parameter Description**	**Parameter Range**
Ground Speed	PPM	30-ft. drill: 2865 34-ft. drill: 3248 35-ft. drill: 3248 40-ft. drill: 3755 45-ft. drill: 4255	Pulses per mile	500 to 9999
Fan Speed	PULSES	3	Hits per revolution	1 to 10
	LO FAN	2000	Low rpm alarm point	1000 to 9900
	HI FAN	5000	High rpm alarm point	low alarm to 9900
Front Metering Shaft	PULSES	2	Hits per revolution	0 to 4
Rear Metering Shaft	PULSES	Zero	Hits per revolution	0 to 4
Bin Level	LEVEL	20%	Low bin alarm point	0 to 100%
Field and Total Area Set WIDTH and UNITS for both functions.	WIDTH	Implement width	Implement width	0 to 99 ft.
	UNITS	Operator preference	Units values are displayed in	English or Metric
Flow (Pin Sensors)	BOXES	Proper setting is the total number of modules attached.	Number of blockage modules-may not be one per tower, often is not.	3 to 7
	TYPE	Zero	**Function Monitored**	0 to 63
Flow (Optical Sensors)	INSTALL “Y”	Proper setting is the total number of sensors attached to each module	Number of sensors per module	3 to 7
	INSTALL “N”	Operator Preference	Turns row sensors “on” and “off”	ON or OFF

Loup II Console System Installation and Setup

Note: For for installation and setup of the Loup (I) Console System, see page 52.

NOTICE

Mount the console so that it is easy to observe during planting, but does not interfere with safe operation of the tractor in the field or on public roads.

You or your dealer must provide the mounting holes for the included ball swivel. Your dealer may have alternate suction cup or clamping brackets available if you prefer to avoid drilling holes.

Harness cable tie color code:

Ⓑ Blue: Console power
Ⓖ Green: Clutch power
Ⓡ Red: Drill monitor
Ⓨ Yellow: Switched power

Console Harness

1. The Loup II Monitor System 14 includes a Loup II console ①, console harness ③, and Loup II clutch switch box 12.

   The clutch switch box includes a captive harness ② that terminates in two 2-pin weatherpak connectors: a plug (power in), color coded yellow Ⓨ, and a receptacle (power out), color coded green Ⓖ. The yellow lead has a 10A slow-blow fuse Ⓕ.

   The console harness ③ has an 8-position receptacle at one end, and splits into three cables at the other: a 2-pin weatherpak (power), with blue Ⓑ cable tie, a 3-pin weatherpak (monitor), red Ⓡ cable tie, and a 4-pin CPC connector (for radar, normally unused).

2. Mount the console ①. Plug the 8-position receptacle ③ into port J1 of the console. Port J2 is unused.

   Turn the clutch switch 12 to the OFF (0) position.

About Radar

The system supplied by Great Plains relies on a wheel sensor factory-installed on the air cart. The system may alternatively be connected to customer-provisioned radar. Consult your radar dealer for the cable or Y-cable needed to provide radar data to the Loup II console.

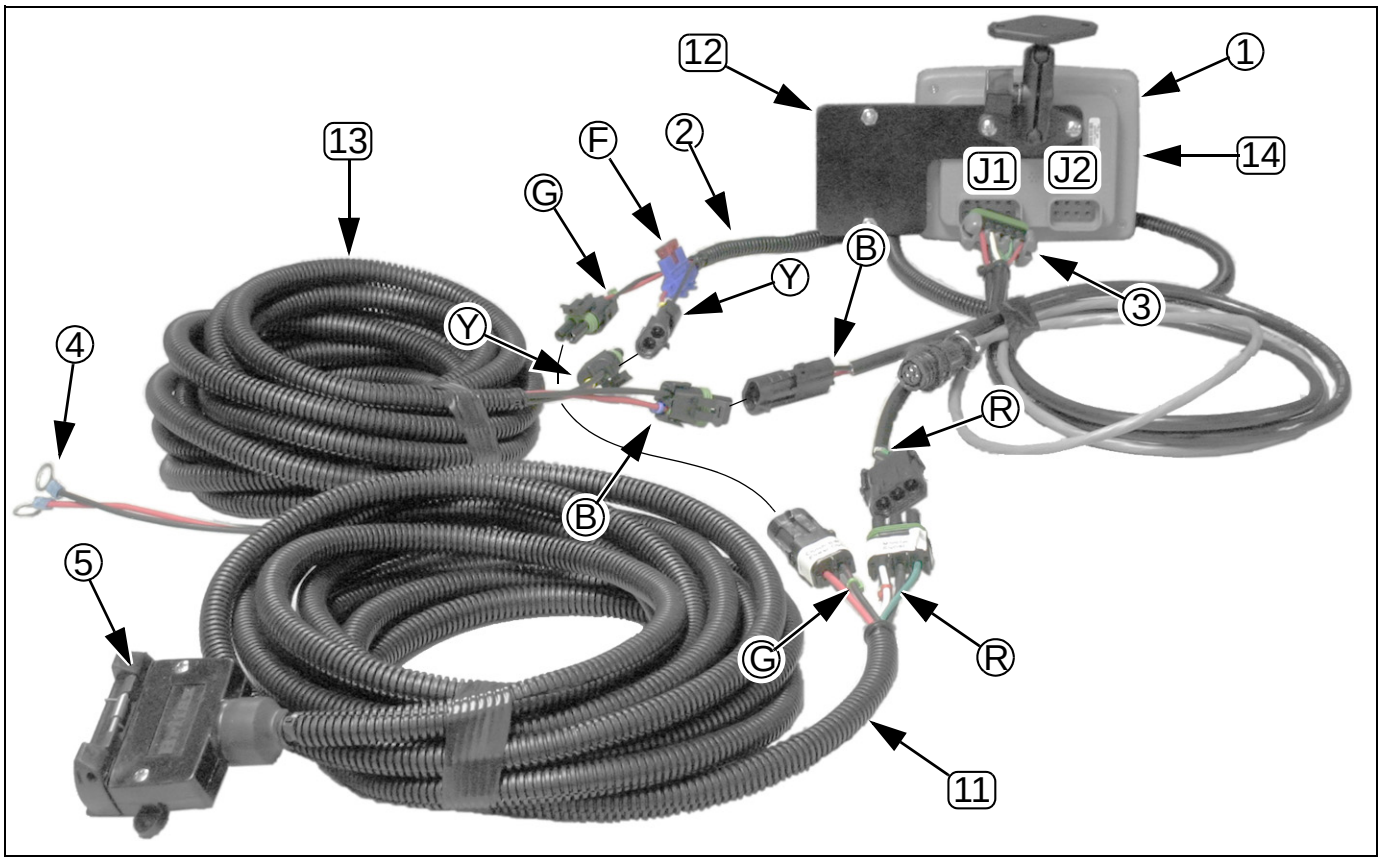


Figure 94
Console and Tractor-Side Harnesses

29010

If tractor radar is used, do not also use the cart sensor. If already configured, use the console “uninstall” procedure (“**Remove a Sensor**” on page 72) to remove it, then “learn” the radar sensor.

Power Connection

The monitor requires 12 volts to operate. Power can be acquired through a direct connection to the battery, connecting to the ignition circuit or using an auxiliary plug.

Note: The monitor will not work connected to 6 volts and will not withstand 24 volts without damage.

Refer to Figure 38 on page 58

3. The out power lead harness ⑬ has ring terminals ④ at one end, and two weather pack connectors at the other, bearing ties color coded blue Ⓑ and yellow Ⓑ.

   Route this cable from the power source to near the console location. Connect the power end, but not the weatherpak end.

   Power connection wire color code:
   Red: +12 Vdc (Positive)
   Black: Ground (Negative)

Note: In the “Off” state, the monitor system consumes 5mA at 12Vdc (60mW), which generally has a negligible effect on tractor battery charge. You can connect the console power to a switched source to shut it off entirely. The non-volatile memory in the console preserves your settings.

In the “On” state, the monitor system consumes a maximum of 1A (12W).

Monitor Harness to Hitch Connection

Refer to Figure 38 on page 58

4. The console output harness ⑪ is identified by a 7-pin Brylite or Britax receptacle ⑤ at one end, and two weatherpak connectors at the other:
   a 3-pin labeled “Monitor Signal”, with a red Ⓡ tie, and
   a 2-pin labeled “Clutch SW Power out”, green Ⓖ tie.

Note: The Loup II drill monitor uses “smart sensor” technology. This means that all the sensors share the same three wires for power, ground and communication.

3-pin sensor connection color code:
Pin A: +12 Vdc (White)
Pin B: Ground (Black)
Pin C: Data (Green)

5. Route the hitch harness ⑭ between the console cable and hitch. The 7-pin connector goes to the hitch; the two weatherpak connectors go to the console.

   Allow slack for tractor articulation (if any) and hitch movement.

Harness Interconnection

Refer to Figure 38 on page 58

6. Connect the monitor leads. This is the two 3-pin weatherpak connectors with red Ⓡ ties.
7. Connect the switched clutch power. This is the two weatherpak connectors with green Ⓖ ties.
8. Connect the switch power input. This is the two weatherpak connectors with yellow Ⓨ ties.
9. Connect the console power input. This is the two weatherpak connectors with blue Ⓑ ties. If you used a battery connection, the console is now in standby mode, and the power switch (|) is active.

Initial Loup-II Setup

If the cart and implement are available, perform the Special Start-up procedure on page 67.

Appendix B

Torque Values Chart

Bolt Size	Bolt Head Identification: Grade 2		Grade 5		Grade 8	
in-tpi[a]	N-m[b]	ft-lb[d]	N-m	ft-lb	N-m	ft-lb
1/4-20	7.4	5.6	11	8	16	12
1/4-28	8.5	6	13	10	18	14
5/16-18	15	11	24	17	33	25
5/16-24	17	13	26	19	37	27
3/8-16	27	20	42	31	59	44
3/8-24	31	22	47	35	67	49
7/16-14	43	32	67	49	95	70
7/16-20	49	36	75	55	105	78
1/2-13	66	49	105	76	145	105
1/2-20	75	55	115	85	165	120
9/16-12	95	70	150	110	210	155
9/16-18	105	79	165	120	235	170
5/8-11	130	97	205	150	285	210
5/8-18	150	110	230	170	325	240
3/4-10	235	170	360	265	510	375
3/4-16	260	190	405	295	570	420
7/8-9	225	165	585	430	820	605
7/8-14	250	185	640	475	905	670
1-8	340	250	875	645	1230	910
1-12	370	275	955	705	1350	995
1 1/8-7	480	355	1080	795	1750	1290
1 1/8-12	540	395	1210	890	1960	1440
1 1/4-7	680	500	1520	1120	2460	1820
1 1/4-12	750	555	1680	1240	2730	2010
1 3/8-6	890	655	1990	1470	3230	2380
1 3/8-12	1010	745	2270	1670	3680	2710
1 1/2-6	1180	870	2640	1950	4290	3160
1 1/2-12	1330	980	2970	2190	4820	3560

Bolt Size	Bolt Head Identification: Class 5.8		Class 8.8		Class 10.9	
mm x pitch[c]	N-m	ft-lb	N-m	ft-lb	N-m	ft-lb
M 5 X 0.8	4	3	6	5	9	7
M 6 X 1	7	5	11	8	15	11
M 8 X 1.25	17	12	26	19	36	27
M 8 X 1	18	13	28	21	39	29
M10 X 1.5	33	24	52	39	72	53
M10 X 0.75	39	29	61	45	85	62
M12 X 1.75	58	42	91	67	125	93
M12 X 1.5	60	44	95	70	130	97
M12 X 1	90	66	105	77	145	105
M14 X 2	92	68	145	105	200	150
M14 X 1.5	99	73	155	115	215	160
M16 X 2	145	105	225	165	315	230
M16 X 1.5	155	115	240	180	335	245
M18 X 2.5	195	145	310	230	405	300
M18 X 1.5	220	165	350	260	485	355
M20 X 2.5	280	205	440	325	610	450
M20 X 1.5	310	230	650	480	900	665
M24 X 3	480	355	760	560	1050	780
M24 X 2	525	390	830	610	1150	845
M30 X 3.5	960	705	1510	1120	2100	1550
M30 X 2	1060	785	1680	1240	2320	1710
M36 X 3.5	1730	1270	2650	1950	3660	2700
M36 X 2	1880	1380	2960	2190	4100	3220

a. in-tpi = nominal thread diameter in inches-threads per inch

b. N· m = newton-meters

c. mm x pitch = nominal thread diameter in mm x thread pitch

d. ft-lb = foot pounds

Torque tolerance + 0%, -15% of torquing values. Unless otherwise specified use torque values listed above. 25199

Tire Inflation Chart

Tire Size	Inflation PSI
16.5L - 16.1SL 10-Ply Rib Implement	36

Note: All tires are warranted by the original manufacturer of the tire. Tire warranty information can be found in the brochures included with your Operator's and Parts Manuals or online at the manufacturer's websites. For service assistance or information, contact your nearest Authorized Farm Tire Retailer.

ManufacturerWebsite

Titanwww.titan-intl.com

Goodyearwww.goodyearag.com

Firestonewww.firestoneag.com

Warranty

Warranty

Great Plains Manufacturing, Incorporated warrants to the original purchaser that this seeding equipment will be free from defects in material and workmanship for a period of one year from the date of original purchase when used as intended and under normal service and conditions for personal use; 90 days for commercial or rental purposes. This Warranty is limited to the replacement of any defective part by Great Plains Manufacturing, Incorporated and the installation by the dealer of any such replacement part. Great Plains reserves the right to inspect any equipment or part which are claimed to have been defective in material or workmanship.

This Warranty does not apply to any part or product which in Great Plains' judgment shall have been misused or damaged by accident or lack of normal maintenance or care, or which has been repaired or altered in a way which adversely affects its performance or reliability, or which has been used for a purpose for which the product is not designed. This Warranty shall not apply if the product is towed at a speed in excess of 20 miles per hour.

Claims under this Warranty must be made to the dealer which originally sold the product and all warranty adjustments must by made through such dealer. Great Plains reserves the right to make changes in materials or design of the product at any time without notice.

This Warranty shall not be interpreted to render Great Plains liable for damages of any kind, direct, consequential, or contingent, to property. Furthermore, Great Plains shall not be liable for damages resulting from any cause beyond its reasonable control. This Warranty does not extend to loss of crops, losses caused by harvest delays or any expense or loss for labor, supplies, rental machinery or for any other reason.

No other warranty of any kind whatsoever, express or implied, is made with respect to this sale; and all implied warranties of merchantability and fitness for a particular purpose which exceed the obligations set forth in this written warranty are hereby disclaimed and excluded from this sale.

This Warranty is not valid unless registered with Great Plains Manufacturing, Incorporated within 10 days from the date of original purchase.

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