MORRIS

OPERATOR'S MANUAL

9 Series
AIR CART
GROUND DRIVE

N53347-06

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Section 1: Safety

Section Contents

SAFETY-ALERT SYMBOL

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

ATTENTION - BE ALERT.
Your Safety is involved.

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

Signal Words

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

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

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

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

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

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

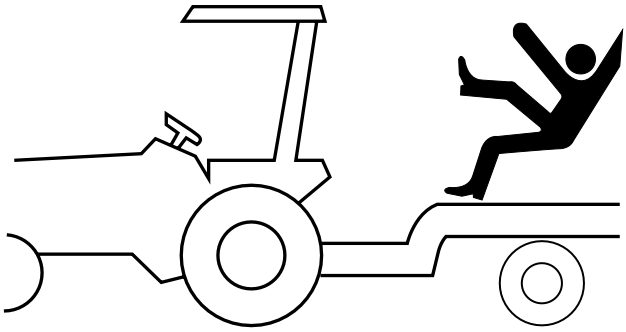
The words **Important** and **Note** are not related to personal safety but are used to give additional information and tips for operating or servicing this equipment.

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

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

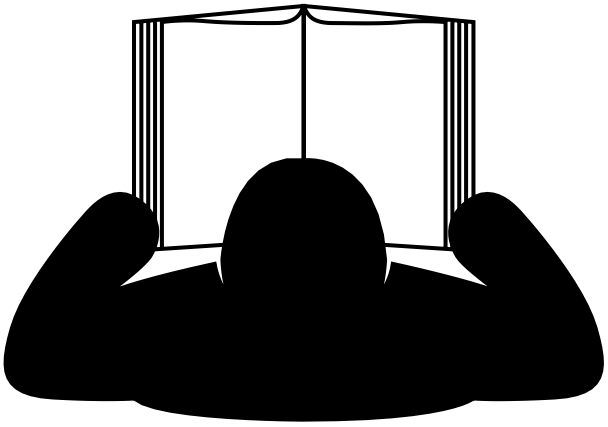
General Operation

- **DO NOT RIDE!!** Do not allow riders on the implement when in motion.
- Do not allow extra riders in the tractor unless an instructor seat and seat belt are available.
- **Check behind** when backing up.
- **Reduce speed** when working in hilly terrain.
- Never allow anyone within the immediate area when operating machinery.
- **Keep all shields in place**, replace them if removed for service work.
- Always lock auger attachment in raised position.
- Keep hands clear of tank opening when closing lid. Keep lid seal clean to ensure proper sealing.
- **Do Not enter tank unless another person is present and the tractor engine has been shut off.**



Tractor Operation

- Be aware of the correct tractor operating procedures, when working with implements.
- Review tractor operator's manual.
- Secure hitch pin with a retainer and lock drawbar in centre position.



Chemicals

- **Use extreme care** when cleaning, filling or making adjustments.
- **Always read** granular chemical or treated seed manufacturer's warning labels carefully and follow them.
- Wear close fitting clothing and appropriate personal protective equipment for the job as specified by the chemical and/or seed manufacturer.
- **Always wear** safety goggles, breathing apparatus and gloves when handling granular chemical or treated seed.
- **Do not feed** any treated seed to livestock. Treated seed is poisonous and may cause harm to persons or livestock.
- **Wash exposed skin immediately** - do not leave chemicals on your skin.
- **Properly store** chemicals in original containers with labels intact per the manufacturer's instructions.
- Always follow the manufacturer's operating instructions and warning labels when operating an ammonia tank with the equipment.
- **Do Not enter tank unless another person is present and the tractor engine has been shut off.**

⚠ Danger

Failure to comply may result in serious injury or death.

Read Operator's Manual and decals on **Ammonia** tank before operating air cart. Become familiar with all warnings, instructions, and controls.

Always wear gloves and goggles when transferring or handling ammonia.

Always stay clear of hose and valve openings.

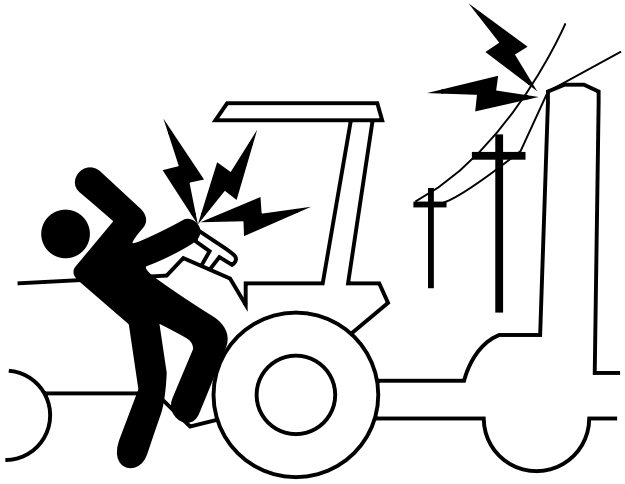
Always be sure pressure is relieved before disconnecting hoses or parts.

Always secure connecting parts and safety chains before towing ammonia trailer.

Always have ample water available in case of exposure to ammonia liquid or gases.

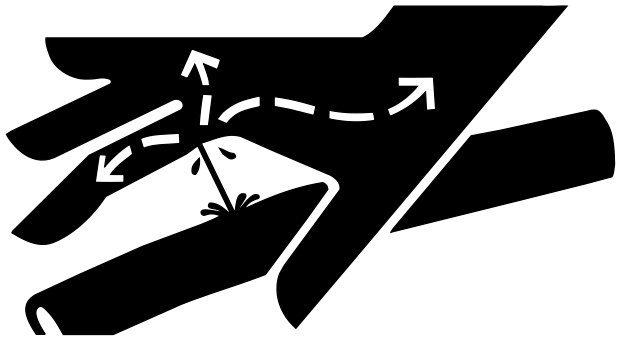
Transporting

- **Be aware** of the height, length and width of implement. Make turns carefully and be aware of obstacles and overhead electrical lines.
- Empty tanks before transporting. Do Not Exceed 20 mph (32 kph) with an empty air cart.
- Use an agricultural tractor that is large enough with sufficient braking capacity so that the weight of the loaded equipment towed does not exceed 1.5 times the weight of the tractor.
- Use flashing amber warning lights, turn signals and SMV emblems when on public roads.
- Do not transport in poor visibility.
- The slow moving vehicle (SMV) emblem and reflectors must be secured and be visible on the machine for transport.
- Avoid soft surfaces, the additional wing weight on the centre wheels could cause the machine to sink.
- Ensure safety chain is attached correctly to the towing vehicle and the hitch of the air cart.
- Check that wings are firmly seated in transport wing stops, and lock pins installed.
- Secure transport locks on depth control cylinders.
- Be familiar with, and adhere to, local laws.



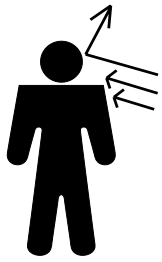
Hydraulics

- **Do not** search for high pressure hydraulic leaks without hand and face protection. A tiny, almost invisible leak can penetrate skin, thereby requiring immediate medical attention.
- Use cardboard or wood to detect hydraulic leaks - never your hands.
- Double check that all is clear before operating hydraulics.
- **Never** remove hydraulic hoses or ends with machine elevated. Relieve hydraulic pressure before disconnecting hydraulic hoses or ends.
- Maintain proper hydraulic fluid levels.
- Keep all connectors clean for positive connections.
- Ensure all fittings and hoses are in good condition.
- Do not stand under wings.



Maintenance

- **Shut tractor engine off** before making any adjustments or lubricating the machine.
- **Block** machine securely to prevent any movement during servicing.
- Wear close fitting clothing and appropriate personal protective equipment for the job.
- **Always wear** safety goggles, breathing apparatus and gloves when working on seeder filled with granular chemical or treated seed per the manufacture's instructions.
- Do not modify the machine.



Caution

Care should be taken when working near the air cart while the fan is running. Product blowing out of the system could cause personal injury.

Caution

Keep service area clean and dry. Wet or oily floors are slippery. Wet spots can be dangerous when working with electrical equipment.

Storage

- Store implement away from areas of main activity.
- Level implement and block up securely to relieve pressure on jack.
- Do not allow children to play on or around stored implement.
- Refer to Storage Section for more details.

Safety Signs

DANGER

CONFINED SPACE HAZARD

To Prevent Serious Injury or Death:

- Do not enter tank.
- Be aware of and follow safety precautions
- Read and follow chemical manufacturer's safety instructions.

N36262

DANGER

- Hydraulic motor or engine and exhaust system becomes extremely hot from operation.
- Keep hands, feet and clothing away from moving parts.
- Keep all covers, shrouds and guards in place.

N19023

WARNING

Personal injury or property damage may result from loss of control.

- Always use large enough tractor with sufficient braking capacity.
  - ➢ Weight of fully loaded implement should not be more than 1.5 times weight of tractor.
- Maximum recommended towing speed is 20 mph (32 km/h).
- Use flashing amber warning lights and SMV emblem when on public roads, except where prohibited by law.
- Refer to tractor and implement Operator's Manuals for weights and further information.

N24301

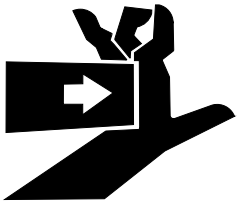
WARNING

BURN HAZARD

To Prevent Serious Injury:

- Do Not Touch hydraulic motor or oil lines.
- Hydraulic motor and oil lines become extremely hot from operation.

N36263



WARNING

CRUSHING HAZARD

To prevent serious injury:

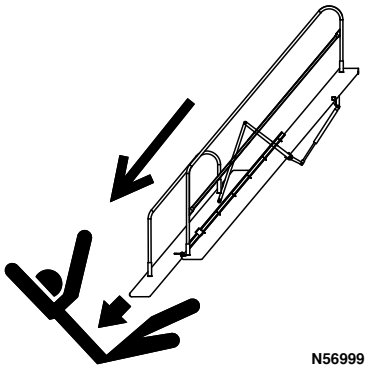
- Keep hands clear of auger arm top when moving auger.
- Use handle.

N36255

CAUTION

CRUSHING HAZARD

- STAND CLEAR - Stairway may fall rapidly when unlatching lock pin.



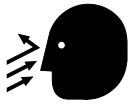
N56999

CAUTION

Secure Auger in storage position before transporting by:

1. Locking auger cradle latch
2. Locking auger arm latch

N36258



CAUTION

To avoid injury, do not open lids while fan is operating. Air gust may contain dust and particles.

N15094

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

Safety Signs - Continued

IMPORTANT

BEFORE FILLING TANK

- Ensure each meter is set correctly as described in the Operator's Manual.
- Ensure Tank clean out door is fully closed.

BEFORE APPLYING PRODUCT

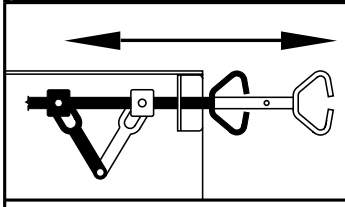
- Set rate according to the procedure and rate chart described in the Operator's Manual.
- Take a sample and adjust the rate, if necessary.

AIR LEAKS AFFECT METERING ACCURACY

- Ensure all seals are properly positioned and all lids are tightly closed.

N42356

IMPORTANT



Cycle Collector Valve Daily to ensure free movement. Minimum of 5 cycles.

N36264

IMPORTANT

ENSURE THAT ALL WHEEL NUTS ARE TORQUED TO THE FOLLOWING:

- 5/8" Tapered Wheel Nut - 150 ft-lbs (203 Nm)
- 3/4" Flanged Wheel Nut - GR.8 - 450 ft-lbs (610 Nm)
- 7/8" Flanged Wheel Nut - GR.8 - 525 ft-lbs (711 Nm)
- 22mm Flanged Wheel Nut - GR.10.9 - 500 ft-lbs (677 Nm)
- 24mm Wheel Bolt - GR.10.9 - 590 ft-lbs (800 Nm)

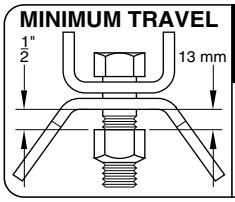
N55695

IMPORTANT

PREVENT CORROSION

Clean the Metering Body (Including Air Passages) and the Collector Body. A light coating of Silicone Lubricant or WD-40 or Penetrating Oil should be applied before storage.

N21604



IMPORTANT

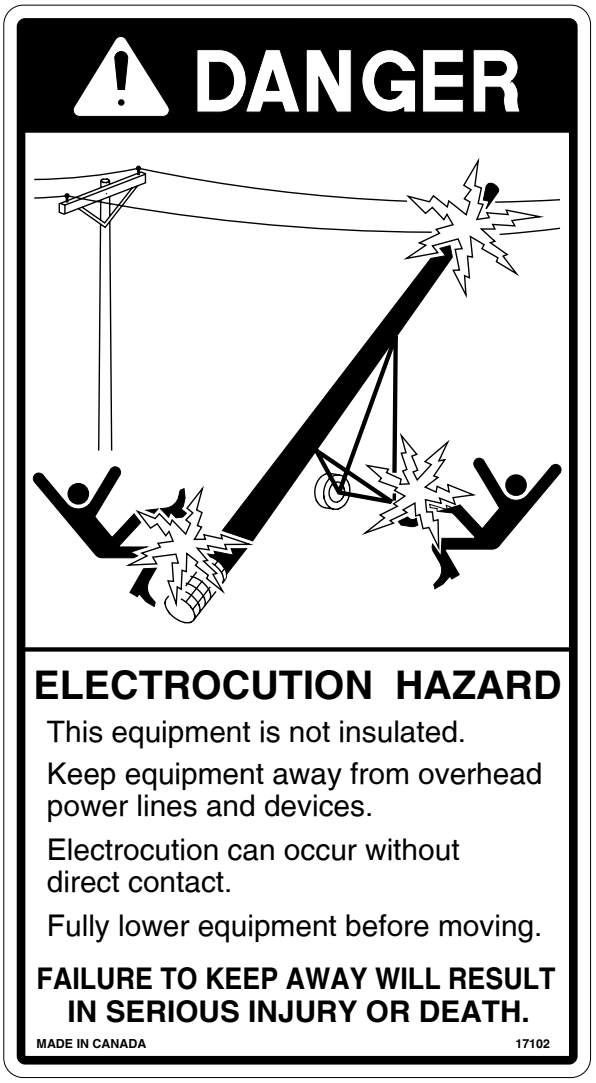
TANK BOLTS MUST BE A LOOSE FIT.

DO NOT REPLACE WITH SHORTER BOLTS.

N29729

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

Safety Signs - Continued



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

Safety Signs - Continued

Decals

Part #	Description	QTY
Tanks		
N53153	Decal - “MORRIS” (9” height)	2
N53154	Decal - Morris Bullet (12” Diameter)	1
N53155	Decal - Morris Bullet (47” Diameter)	1
N53156	Decal - ARROW	2
N53157	Decal - “9365” (2 tank Small Frame)	2
N53159	Decal - “9450” (3 tank Small Frame)	2
N53160	Decal - “9535” (4 tank Small Frame)	2
N53158	Decal - “9445” (2 tank Large Frame)	2
N53180	Decal - “9550” (3 tank Large Frame)	2
N53181	Decal - “9650” (4 tank Large Frame)	2
N55820	Decal - “9555” (2 tank)	2
N53182	Decal - “9680” (3 tank)	2
N53183	Decal - “9800” (4 tank)	2
N53195	Decal - “91000” (4 tank)	2
N53185	Decal - Tank Size - 86 Bu	1
N53186	Decal - Tank Size - 107 Bu	1
N53187	Decal - Tank Size - 133 Bu	1
N53188	Decal - Tank Size - 162 Bu	1
N53189	Decal - Tank Size - 182 Bu	1
N53190	Decal - Tank Size - 221 Bu	1
N53191	Decal - Tank Size - 265 Bu	1
N53192	Decal - Tank Size - 284 Bu	1
N53193	Decal - Tank Size - 331 Bu	1
N53194	Decal - Tank Size - 349 Bu	1

Rate Charts - Imperial

N36021 - Slow Speed
N36022 - Seed
N36023 - Fertilizer

Rate Charts - Metric

N37146 - Slow Speed
N37147 - Seed
N37148 - Fertilizer

Part #	Description	QTY
Rear Wheels		
N56050	Decal - Wheel Torque	2
Stair Way		
N56999	Decal - Warning - “Stand Clear	2

Safety Signs - Continued

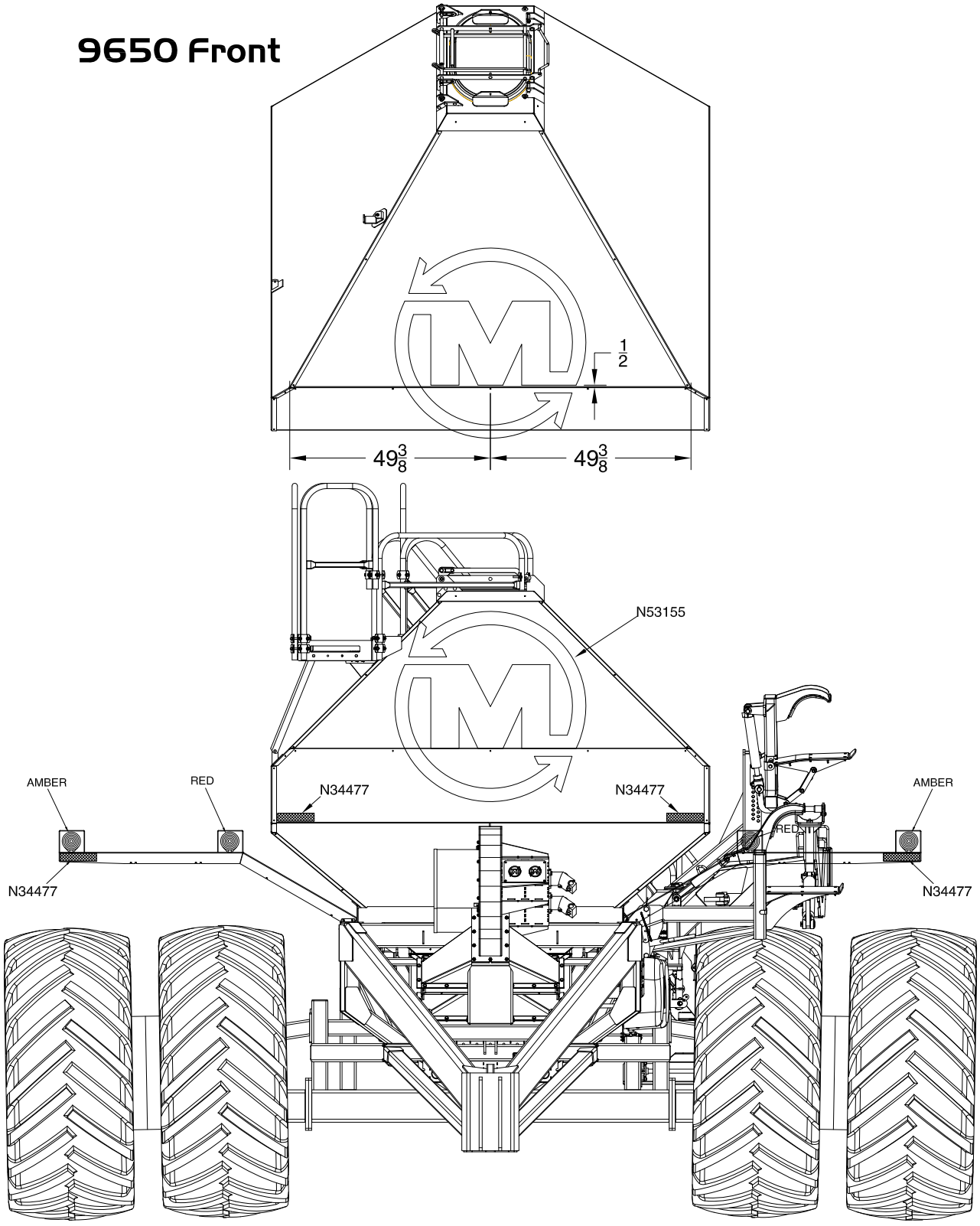
Decals - Continued

Part #	Description	QTY
Frame		
C31201	Decal - Warning	1
D13705	Decal - Warning - “No Riders”	2
N19023	Decal - Danger	1
N24301	Decal - Warning	1
N36261	Decal - Warning - “Over Head Hazard”	1
N36264	Decal - Important - “Cycle Collector Valve Daily”	1per metering Body
N36263	Decal - Warning - “Burn Hazard”	1
N36255	Decal - Warning - “Crushing Hazard”	1
N36259	Decal - “Open/Close”	2 per metering Body
N36262	Decal - Danger - “Confined Space Hazard”	1 per Lid
N15094	Decal - Caution - “To Avoid Injury”	1 per Lid
N42356	Decal - Important - “Before Filling Tank”	1 per Lid
N21604	Decal - Important - “Prevent Corrosion”	1
N45429	Decal - Patented	1
N55496	Decal - Patented	1
N29355	Decal - Warning - “Moving Part Hazard” (VRT ONLY)	1
N32799	Decal - Danger - “Guard Missing” (VRT ONLY)	3
N45427	Decal - “Seed Plate Usage” (VRT ONLY)	1
N36254	Decal - “Calibrate/Fan” (VRT ONLY)	1
N49783	Decal - “Calibrate/Fan” (VRT ONLY)	1
N19029	Decal - “Rotation” (VRT Drive)	3
N19029	Decal - “Rotation” (Standard Drive)	1
N53933	Decal - “Rotation” (Standard Drive) 9445, 9550 and 9650 Behind	1
N19028	Decal - “Hair Pin Location” (Large Frame)	2
N27864	Decal - “Hair Pin Location” (Small Frame)	2
N27864	Decal - “Hair Pin Location” (Large Frame Tow Between)	1 rear transmission)
N44287	Decal - “Hair Pin Location” (Large Frame Tow Behind)	1 rear transmission)
N36256	Decal - “Quick Change Sprocket”	1 per transmission
N36257	Decal - “Meter Shaft Sprocket”	1 per transmission
N42291	Decal - “Auger Position”	1
N36453	Decal - “Fan/Auger”	1
N50875	Decal - Conveyor - Lock/Unlock - Raise/Lower	1
N36443	Decal - “Lever Position”	1
N36258	Decal - Caution - “Secure Auger”	1
N19033	Decal - Danger - “Electrocution Hazard”	1
N19034	Decal - Danger - “Rotating Flighting Hazard”	1
C25809	Decal - “Grease 50 Hours”	2 per transmission
C25810	Decal - “Grease 100 Hours”	2
N37492	Decal - “Open/Closed” - Plenum	2
N55695	Decal - Wheel Torque Chart	1
N34476	Reflector - Red	4
N34477	Reflector - Yellow	8
N34478	Reflector - Orange	4
N34475	SMV Sign	1

The following pages provide basic Decal Location information, for more details contact Morris’ Customer Service.

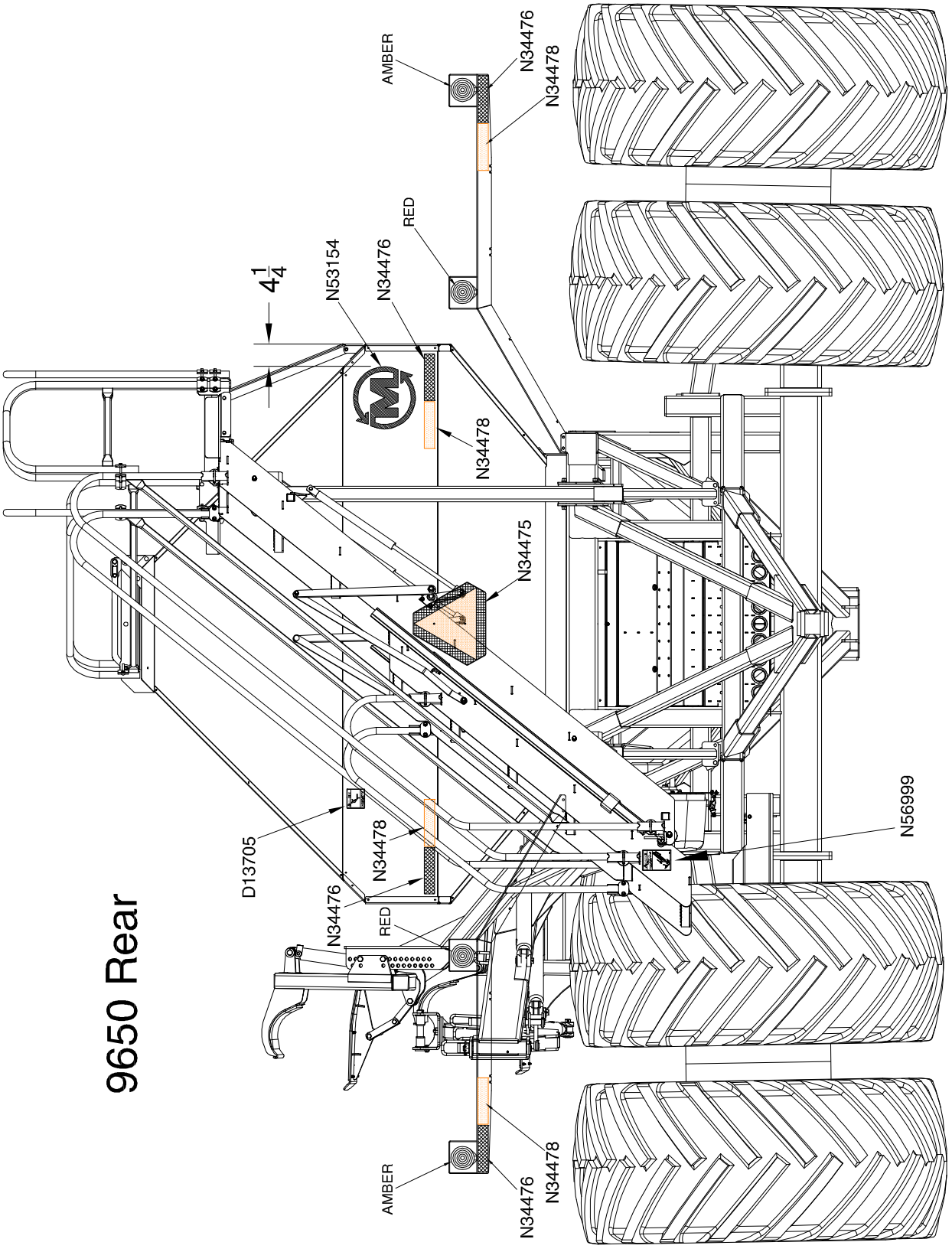
Safety Signs - Continued

Front



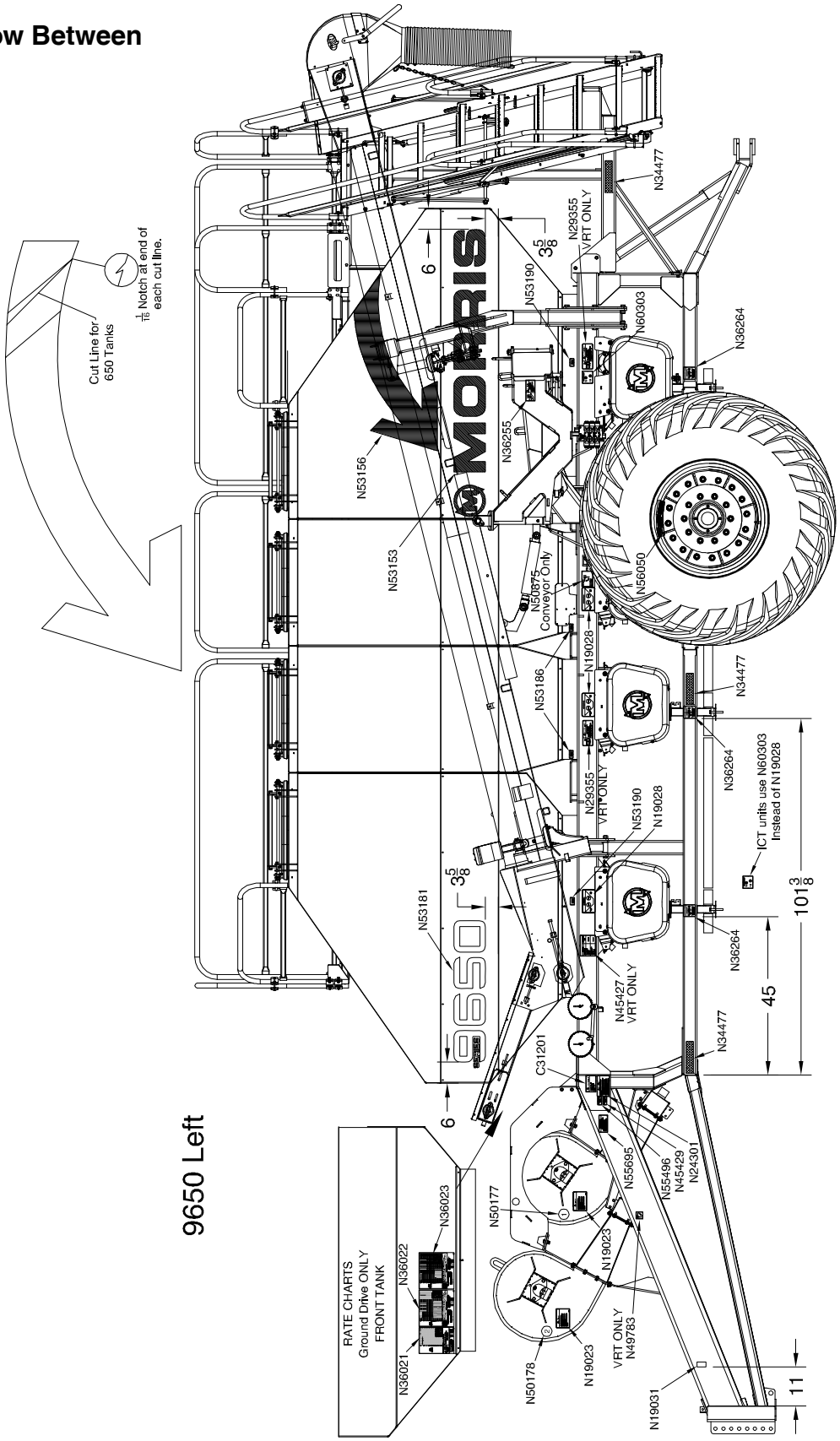
Safety Signs - Continued

Rear



Safety Signs - Continued

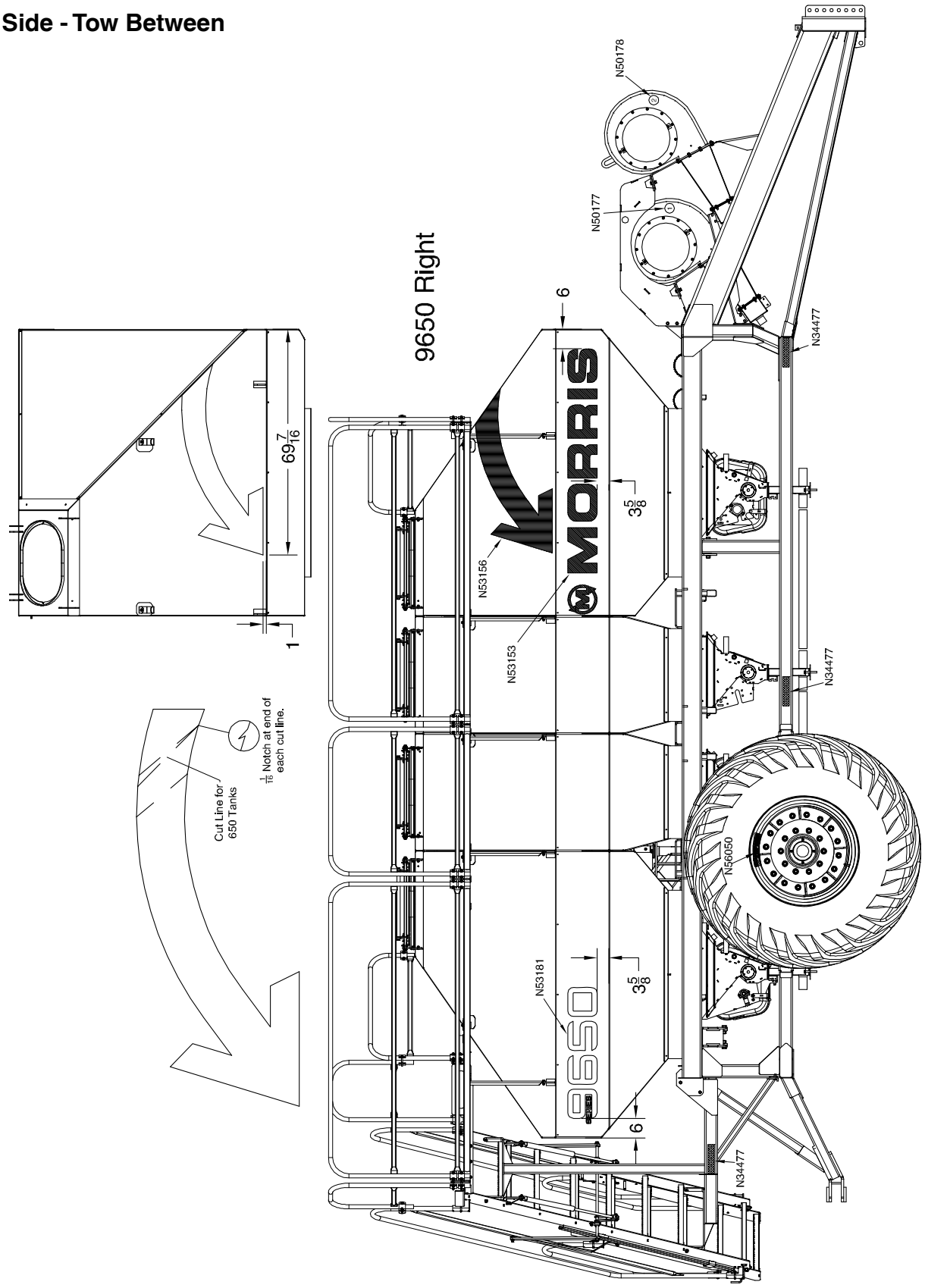
Left Side - Tow Between



9650 Left

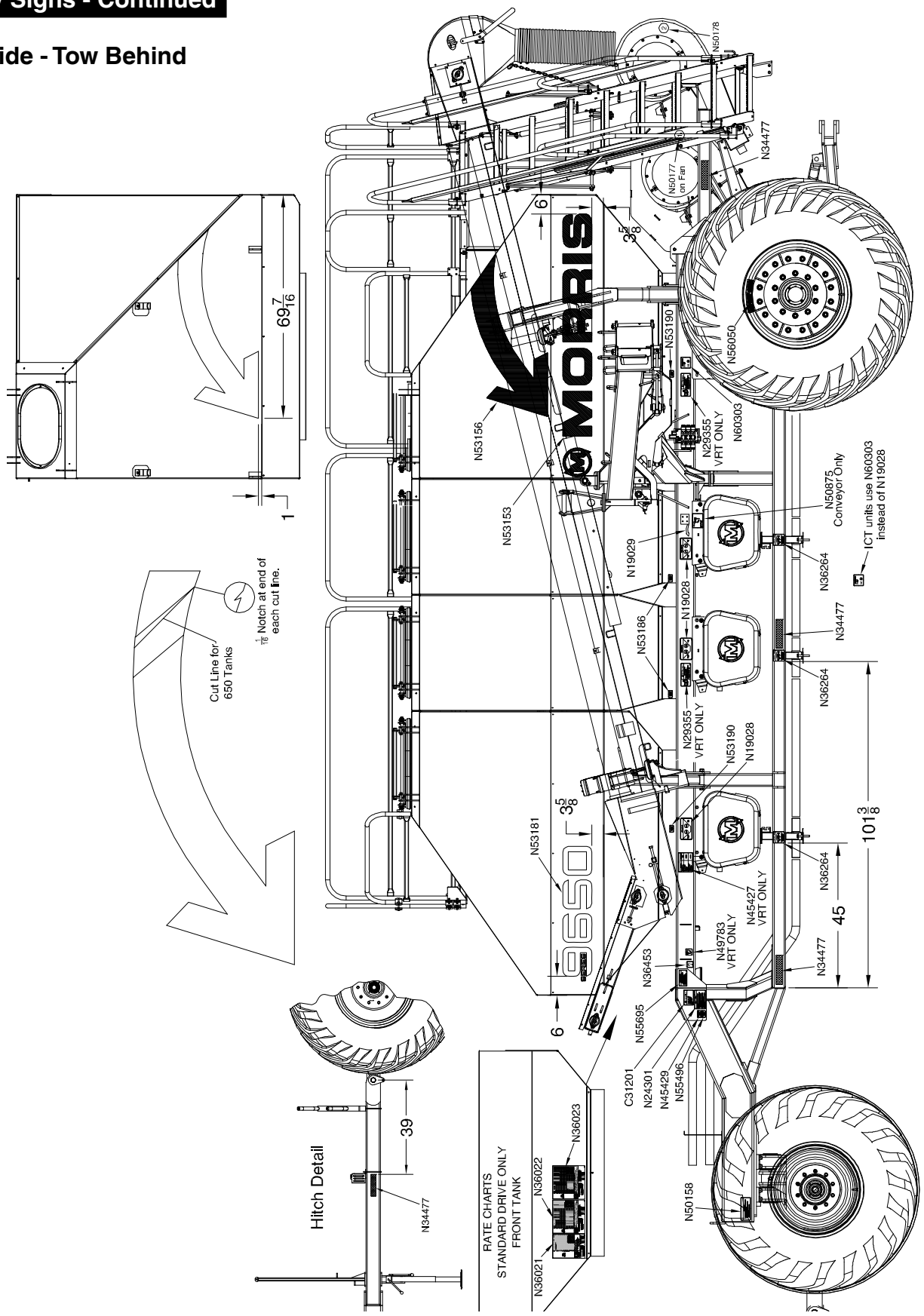
Safety Signs - Continued

Right Side - Tow Between



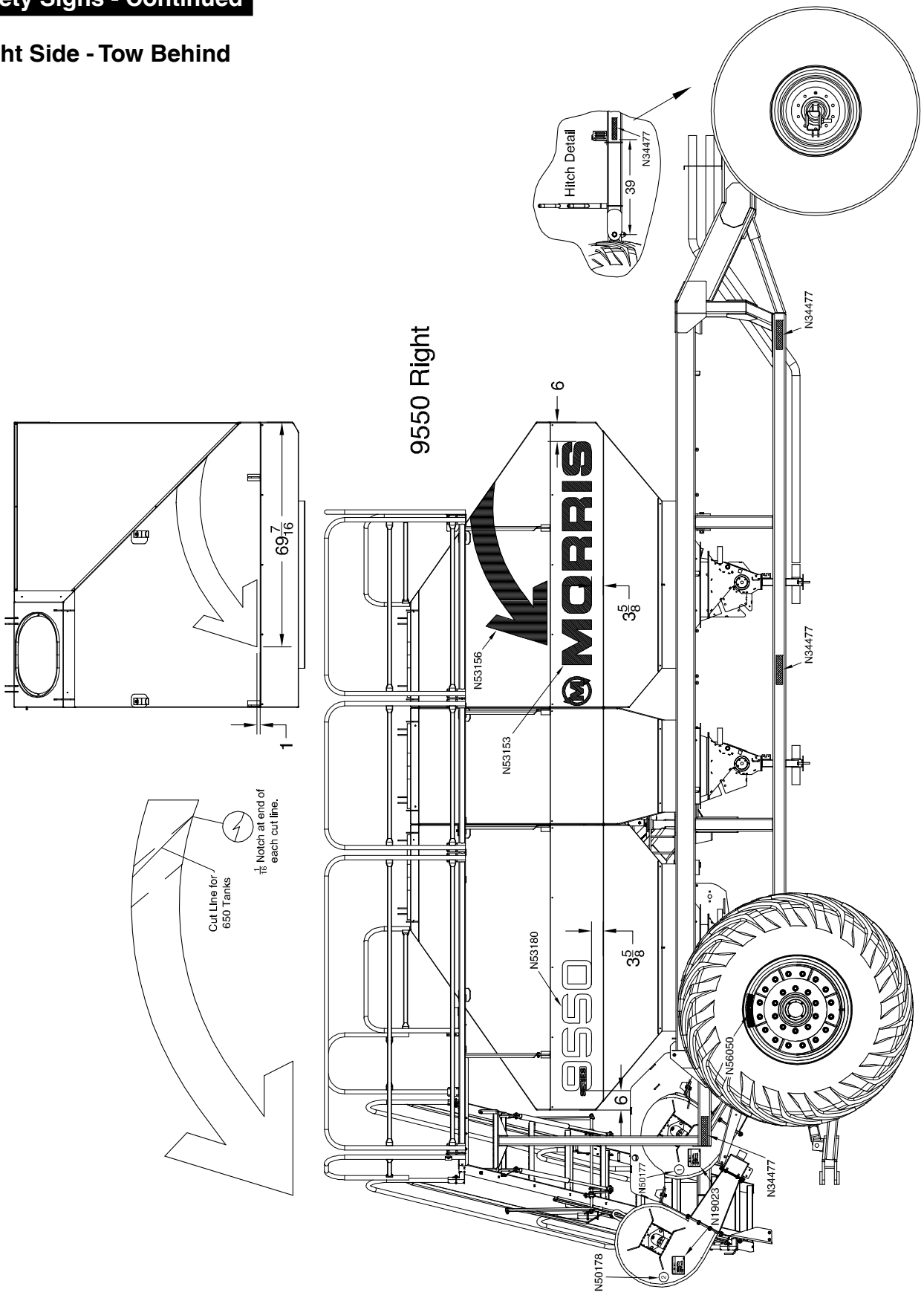
Safety Signs - Continued

Left Side - Tow Behind



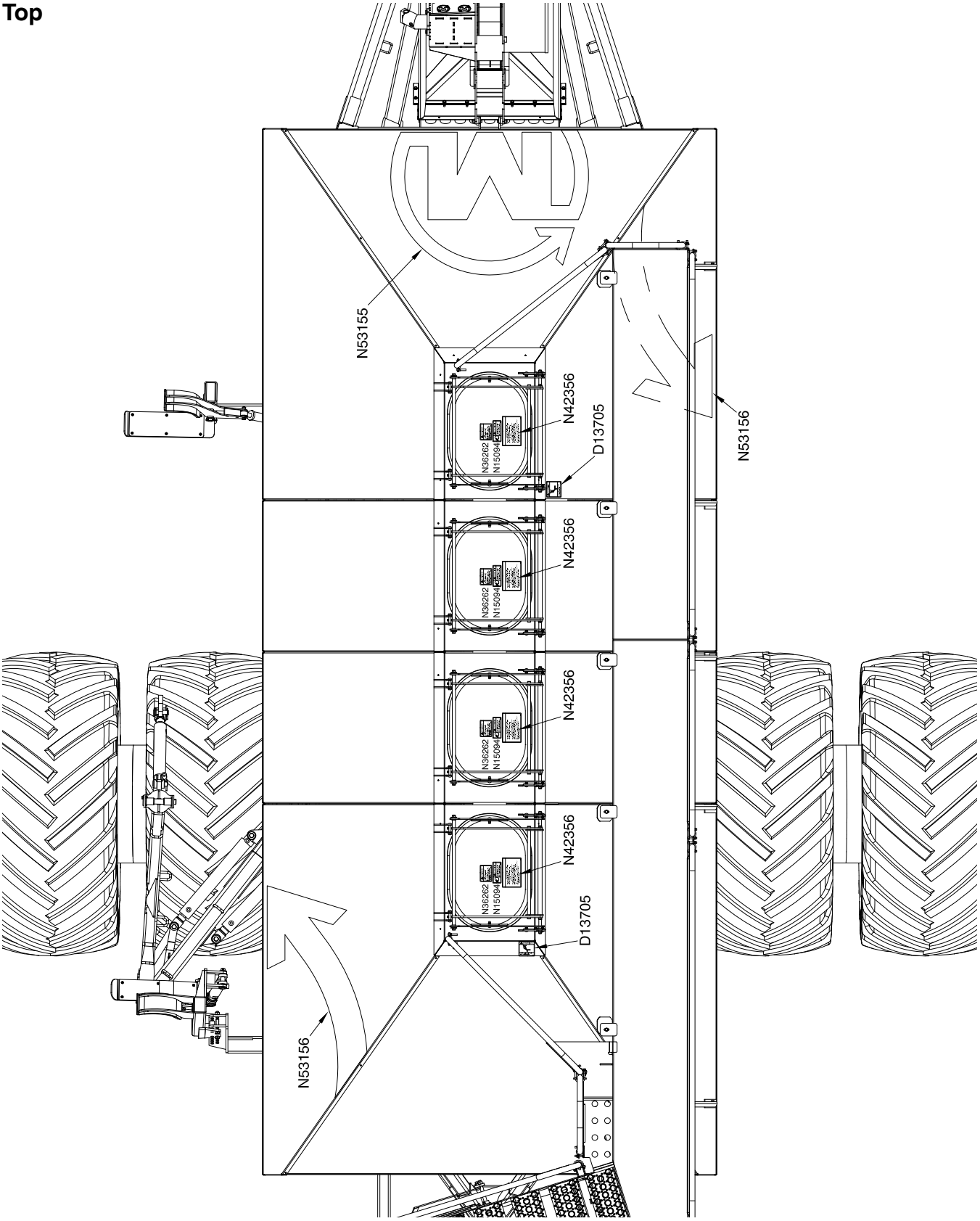
Safety Signs - Continued

Right Side - Tow Behind



Safety Signs - Continued

Top



Lighting and Marking

MORRIS recommends the use of the correct lighting and marking to meet the ASAE standard for roadway travel. Be familiar with, and adhere to, local laws.

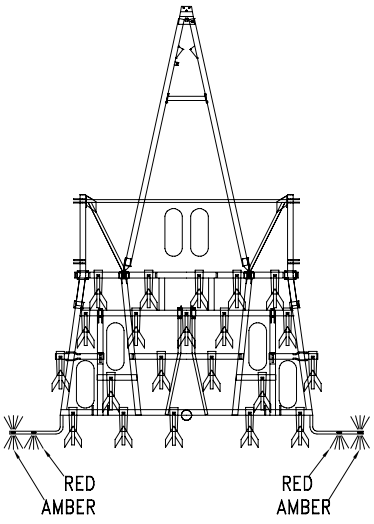
Amber warning and red taillights secured on the machine promote correct transportation of this implement.

Note: Always replace missing or damaged lights and/or connectors.

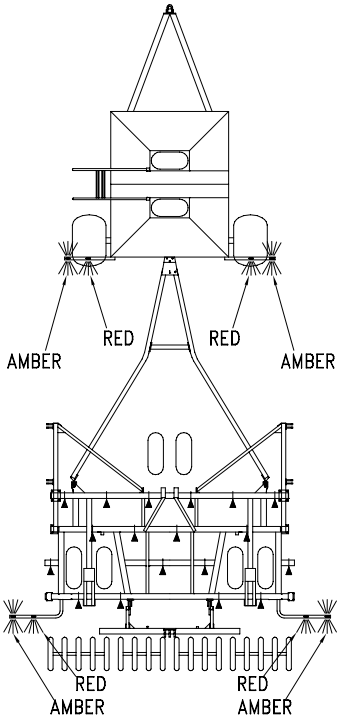
Amber warning and red taillights must be mounted to the rear of the implement and be visible from front and rear. The lights must be within 16 inches (41 cm) of the extremities of the machine and at least 39 inches (99 cm) but not over 10 feet (3 m) above ground level.

Note: Always replace missing or damaged front, side, rear reflectors and SMV emblem.

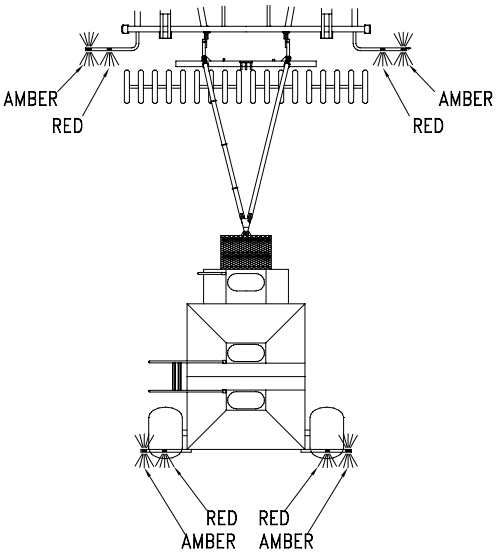
Tillage Unit



Seeding Unit
Tow Between

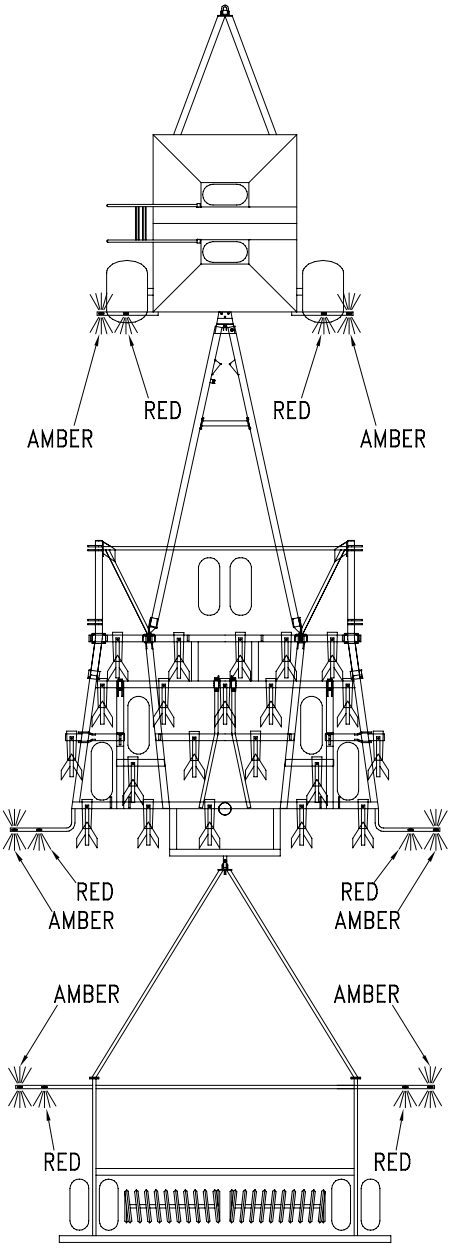


Seeding Unit
Tow Behind

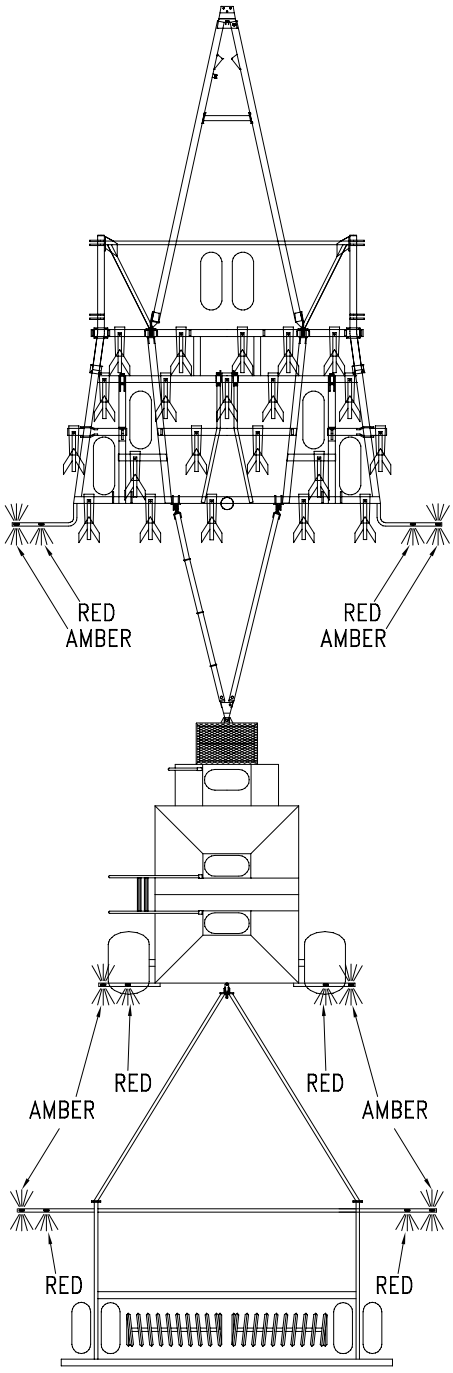


Lighting and Marking - Continued

Seeding Unit - Tow Between with Packer Bar



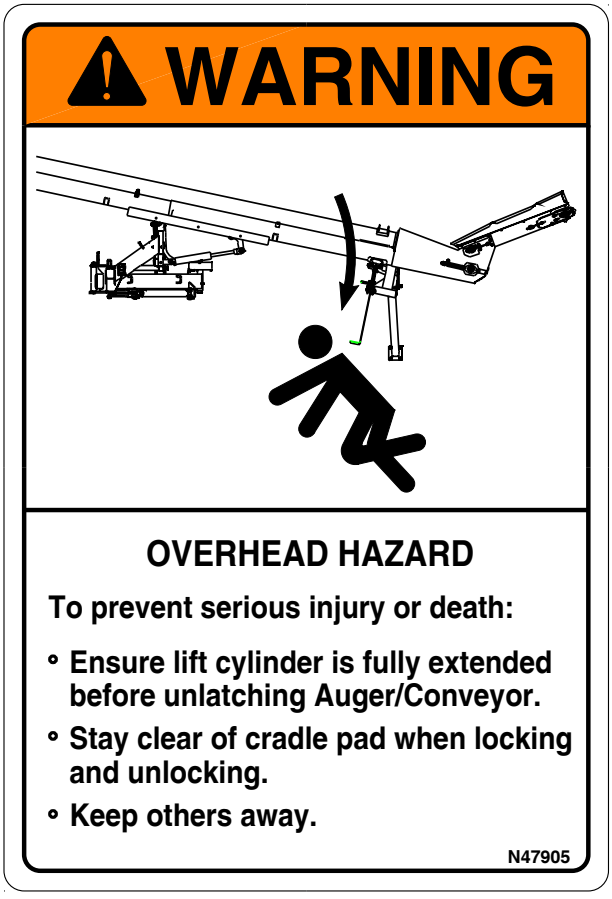
Seeding Unit - Tow Behind with Packer Bar



Conveyor Safety

General

- As the owner and/or operator it is your responsibility to know what requirements, hazards and precautions exist, and to inform all personnel associated with the equipment or are in the area.
- Avoid any alteration to the equipment. Such alterations may produce a very dangerous situation, where serious injury or death may occur.
- Untrained operators subject themselves and other to serious injury or death. NEVER ALLOW untrained personnel to operate this equipment.
- Keep children and other unqualified personnel out of the working area at all times.
- NEVER start equipment until ALL persons are clear of the work area.
- Be sure ALL operators are adequately rested and prepared to perform all functions of operating this equipment.
- Keep hair, loose clothing , and shoestrings away from rotating and moving parts. Never wear loose fitting clothing when working around conveyors.
- NEVER allow anyone inside a bin, truck, or wagon which is being unloaded by a conveyor. Flowing grain can trap and suffocate in seconds.
- Keep hands and feet away from the conveyor intake and other moving parts.
- NEVER attempt to assist machinery operation or to remove trash from the equipment while in operation.
- Keep the area around intake free of obstacles that might trip workers.
- Components of this equipment have sharp edges which can scrape and/or cut an operator.
- A moving conveyor can sever an operator's limb or even kill.
- Always keep all shields and guards in place during operation.

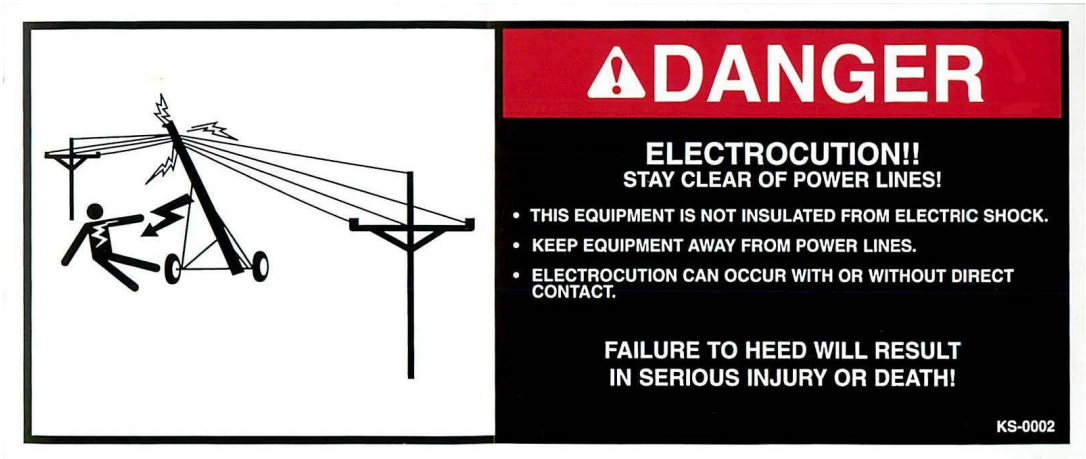


Conveyor Safety - Continued

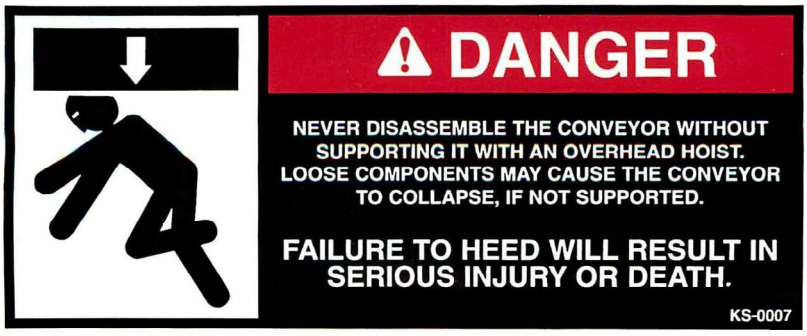
Safety Signs

The Safety Decals listed below are included with the conveyor, the following pages show the location of the decals on the conveyor. Inspect all decals and replace any that are worn, illegible, or missing. Contact your dealer or the factory to order replacement decals.

KS-0008



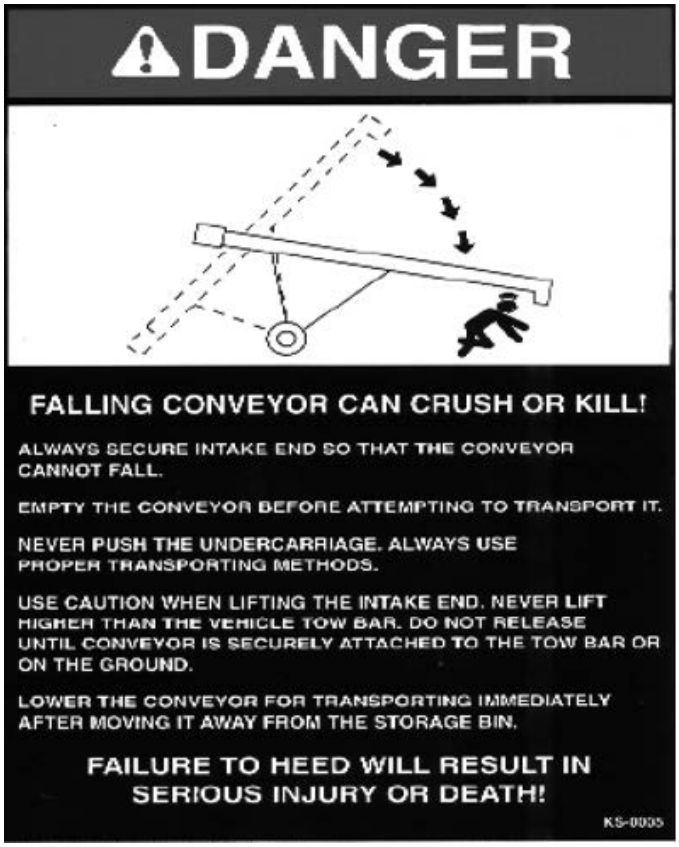
KS-0002



KS-0007

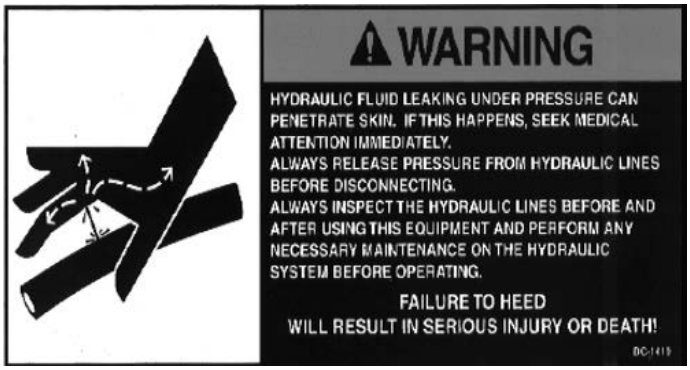
Conveyor Safety - Continued

Safety Signs - Continued



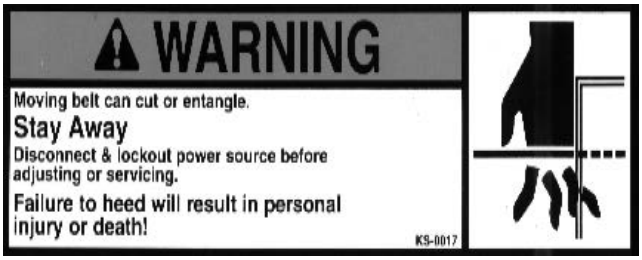
Conveyor Safety - Continued

Safety Signs - Continued



KS-1419

KS-0015



KS-0017

Conveyor Safety - Continued

Safety Signs - Continued

KS-0006

KS-0016

Notes

Section 2: Specifications

Section Contents

Specifications

9365, 9450 and 9535 - Tow Behind
Specifications and Options

Model	9365	9450	9535
Configuration	**Tow Behind**	**Tow Behind**	**Tow Behind**
Length (Hitch pin to end of Auger) (Hitch Removed)	34’ 6” (10.52 m)	34’ 6” (10.52 m)	36’ 10” (11.15 m) 30’ 10” (9.40 m)
Height - Rails up	15’ 2” (4.623 m)	15’ 2” (4.623 m)	15’ 2” (4.623 m)
Height - Rails Lowered	14’ 2” (4.318 m)	14’ 2” (4.318 m)	14’ 2” (4.318 m)
Width - Single Axle - 800/65 R32	13’ 7” (4.14 m)	13’ 7” (4.14 m)	13’ 7” (4.14 m)
- Single Axle - 900/65 R32	13’ 10” (4.22 m)	13’ 10” (4.22 m)	13’ 10” (4.22 m)
- Dual Axle - 520/85 R38	15’ 11” (4.81 m)	15’ 11” (4.81 m)	15’ 11” (4.81 m)
- Dual Axle - 800/65 R32	20’ (6.10 m)	20’ (6.10 m)	20’ (6.10 m)
Weight (Hydraulic Drive)	10900 lbs (4944 kg)	11900 lbs (5398 kg)	13000 lbs (5897 kg)
Safety Lights	Standard	Standard	Standard
Safety Chain	Standard	Standard	Standard
Tank Capacity - Tank 1	N/A	182 bu (6414 l)	182 bu (6414 l)
- Tank 2	N/A	N/A	86 bu (3030 l)
- Tank 3	182 bu (6414 l)	86 bu (3030 l)	86 bu (3030 l)
- Tank 4	182 bu (6414 l)	182 bu (6414 l)	182 bu (6414 l)
- Total	**364 bu (12828 l)**	**450 bu (15858 l)**	**536 bu (18888 l)**
Tank Screens	Standard		
Fan Impeller Diameter	17” (43 cm) - Up to 5,000 r.p.m.		
Hydraulic Drive - piston type orbit motor (Closed Centre or Closed Centre Load Sensing systems required) Hydraulic requirements for Air Cart only at Rated Fan Speed.	16cc - 21 U.S. gal./min. (80 l/min) at 2,750 p.s.i. (18,960 kpa) Dual Fans require 42 U.S. gal./min. (160 l/min) VRT requires an additional 6 U.S. gal/min (23 l/min)		
Loading Auger	Standard (10” Dia) (25.4 cm Dia) Optional - extended hopper on hydraulic assisted auger		
Loading Conveyor	Optional (16”) (40.6 cm) x 23 ft long		
Tires - Off-Set Dual Axle (Front) - Standard on 9365 and 9450 - N/A for 9535	2) 500/70 R24 Lug Distance Center-Center Inner 40” (102 cm)		
- Quad Steer Axle (Front) - Standard on 9535 - Optional on 9365 and 9450	(2) 28LR26 Lug Distance Center-Center Inner 138” (351 cm)		
- Rear - Standard on 9365 and 9450 - N/A for 9535	(2) 800/65R32 - LI 172 Lug Distance Center-Center 128” (325 cm)		
- Rear - Standard on 9535 - Optional on 9365 and 9450	(2) 900/65R32 - LI 172 Lug Distance Center-Center 132” (335 cm)		
- Rear - Optional on 9365 and 9450	Duals - (4) 520/85R38 Lug Distance Center-Center Inner 119” (302 cm) Distance Center-Center Outer 171” (434 cm)		
- Rear - Optional on 9535	Duals - (4) 800/65R32 - LI 172 Lug Distance Center-Center Inner 132” (335 cm) Distance Center-Center Outer 208” (516 cm)		
Metering - Ground Driven	Standard		
- Variable Rate (VRT)	Optional		
- GPS Compatible VRT	Optional		
- ICT (Input Control Technology)	Optional with VRT		
Meter Shut Off	Electric		
Number Secondary Runs - Single Shoot	21 to 99 (ICT 21 - 90)		
Number Secondary Runs - Double Shoot	42 to 198 (ICT 42 - 180)		
Primary Hose - Diameter	2 1/2” (6.4 cm)		
Secondary Hose - Diameter	Standard - 15/16” (2.4 cm) Optional - 1 1/8” (2.8 cm)		
Frame - Trussed	4” x 6” (10 cm x 15.2cm) tubing by 4” x 4” (10 cm x 10 cm) tubing		
Easy Clean Out System	Standard		
Meter Drive Options - Second Clutch (For spot fertilizing on the go)	Standard		
Monitor (Shaft Motion (3), Bin Level (3), Fan Speed, Acre Tally, Ground Speed)	Standard Optional Seed Flow		
Work Switch (Mounted to Seeding Machine)	Optional		
Rear Tow Hitch	Optional (Max 15,000 lb Draft Load) (Max 6,818 kg Draft Load)		
Hitch Stand	Optional - N/A for 9535		

9365 and 9450 - Tow Between
Specifications and Options

Model		9365	9450
Configuration		**Tow Between**	**Tow Between**
Length (with auger)		31' 5" (9.58 m)	31' 5" (9.58 m)
Height - Rails up		15' 2" (4.623 m)	15' 2" (4.623 m)
Height - Rails Lowered		14' 2" (4.318 m)	14' 2" (4.318 m)
Width	- Single Axle - 800/65 R32	13' 7" (4.14 m)	13' 7" (4.14 m)
	- Single Axle - 900/65 R32	13' 10" (4.22 m)	13' 10" (4.22 m)
	- Dual Axle - 520/85 R38	15' 11" (4.81 m)	15' 11" (4.81 m)
	- Dual Axle - 800/65 R32	20' (6.10 m)	20' (6.10 m)
Weight (Hydraulic Drive)		14100 lbs (6396 kg)	15100 lbs (6849 kg)
Safety Lights		Standard	Standard
Safety Chain		Standard	Standard
Tank Capacity	- Tank 1	N/A	182 bu (6414 l)
	- Tank 2	N/A	N/A
	- Tank 3	182 bu (6414 l)	86 bu (3030 l)
	- Tank 4	182 bu (6414 l)	182 bu (6414 l)
	- Total	**364 bu (12828 l)**	**450 bu (15858 l)**
Tank Screens		Standard	
Fan Impeller Diameter		17" (43 cm) - Up to 5,000 r.p.m.	
Hydraulic Drive - piston type orbit motor (Closed Centre or Closed Centre Load Sensing systems required) Hydraulic requirements for Air Cart only at Rated Fan Speed.		16cc - 21 U.S. gal./min. (80 l/min) at 2,750 p.s.i. (18,960 kpa) Dual Fans require 42 U.S. gal./min. (160 l/min) VRT requires an additional 6 U.S. gal/min (23 l/min)	
Loading Auger		Standard (10" Dia) (25.4 cm Dia) Optional - extended hopper on hydraulic assisted auger	
Loading Conveyor		Optional (16") (40.6 cm) x 23 ft long	
Tires	- Standard (Rear)	(2) 800/65R32 - LI 172 Lug Distance Center-Center 128" (325 cm)	
	- Optional (Rear)	(2) 900/65R32 - LI 172 Lug Distance Center-Center 132" (335 cm)	
	- Optional (Rear)	Duals - (4) 800/65R32 - LI 172 Lug Distance Center-Center Inner 132" (335 cm) Distance Center-Center Outer 208" (516 cm)	
Metering	- Ground Driven	Standard	
	- Variable Rate (VRT)	Optional	
	- GPS Compatible VRT	Optional	
	- ICT (Input Control Technology)	Optional with VRT	
Meter Shut Off		Electric	
Number Secondary Runs - Single Shoot		21 to 99 (ICT 21 - 90)	
Number Secondary Runs - Double Shoot		42 to 198 (ICT 42 - 180)	
Primary Hose - Diameter		2 1/2" (6.4 cm)	
Secondary Hose - Diameter		Standard - 15/16" (2.4 cm) Optional - 1 1/8" (2.8 cm)	
Frame - Trussed		4" x 6" (10 cm x 15.2cm) tubing by 4" x 4" (10 cm x 10 cm) tubing	
Easy Clean Out System		Standard	
Meter Drive Options - Second Clutch (For spot fertilizing on the go)		Standard	
Monitor (Shaft Motion (3), Bin Level (3), Fan Speed, Acre Tally, Ground Speed)		Standard Optional Seed Flow	
Work Switch (Mounted to Seeding Machine)		Optional	
Rear Tow Hitch		Standard (Max 26,000 lb Draft Load) (Max 11,818 kg Draft Load)	
Hitch Jack - Hydraulic		Optional	
Work Lights - LED		Optional	
Hitch Clevis		Standard - Catagory 4 Optional - Catagory 5	

Specifications

9445, 9550 and 9650 - Tow Behind
Specifications and Options

Model		9445	9550	9650
Configuration		**Tow Behind**	**Tow Behind**	**Tow Behind**
Length (Hitch pin to Dual Fan) (Hitch Removed)		39' 3" (11.96 m) 36' 7" (11.15 m)	39' 3" (11.96 m) 36' 7" (11.15 m)	39' 3" (11.96 m) 36' 7" (11.15 m)
Height - Rails up		15' 2" (4.623 m)	15' 2" (4.623 m)	15' 2" (4.623 m)
Height - Rails Lowered		14' 2" (4.318 m)	14' 2" (4.318 m)	14' 2" (4.318 m)
Width	- Single Axle - 900/65 R32	13' 10" (4.22 m)	13' 10" (4.22 m)	13' 10" (4.22 m)
	- Dual Axle - 520/85 R38	15' 11" (4.81 m)	15' 11" (4.81 m)	15' 11" (4.81 m)
	- Dual Axle - 800/65 R32	20' (6.10 m)	20' (6.10 m)	20' (6.10 m)
Weight (Hydraulic Drive)		17,300 lbs (7,847 kg)	18,000 lbs (8,165 kg)	18,700 lbs (8,482) kg)
Safety Lights		Standard	Standard	Standard
Safety Chain		Standard	Standard	Standard
Tank Capacity	- Tank 1	N/A	221 bu (7788 l)	221 bu (7788 l)
	- Tank 2	N/A	N/A	107 bu (3772 l)
	- Tank 3	221 bu (7788 l)	107 bu (3772 l)	107 bu (3772 l)
	- Tank 4	221 bu (7788 l)	221 bu (7788 l)	221 bu (7788 l)
	- Total	**442 bu (15,576 l)**	**549 bu (19348 l)**	**656 bu (23,120 l)**
Tank Screens		Standard		
Fan Impeller Diameter		17" (43 cm) - Up to 5,000 r.p.m.		
Hydraulic Drive - piston type orbit motor (Closed Centre or Closed Centre Load Sensing systems required) Hydraulic requirements for Air Cart only at Rated Fan Speed.		16cc 21 U.S. gal./min. (80 l/min) at 2,750 p.s.i. (18,960 kpa) Dual Fans require 42 U.S. gal./min. (160 l/min) VRT requires an additional 6 U.S. gal/min (23 l/min)		
Loading Auger		Standard (10" Dia) (25.4 cm Dia) Optional - extended hopper on hydraulic assisted auger		
Loading Conveyor		Optional (16") (40.6 cm) x 23 ft long		
Tires	- Quad Steer (Front)	(2) 28LR26 Lug Distance Center-Center Inner 138" (351 cm)		
	- Standard (Rear)	Single - (2) 900/65R32 - LI 172 Lug Distance Center-Center Inner 140" (356 cm)		
	- Optional (Rear)	Duals - (4) 800/65R32 - LI 172 Lug Distance Center-Center Inner 140" (356 cm) Distance Center-Center Outer 216" (549 cm)		
	- Optional (Rear)	Single - (2) 710/70R38 - DT - 824 TL Lug Distance Center-Center 118" (300 cm)		
Metering	- Ground Driven	Standard		
	- Variable Rate (VRT)	Optional		
	- GPS Compatible VRT	Optional		
	- ICT (Input Control Technology)	Optional with VRT		
Meter Shut Off		Electric		
Number Secondary Runs - Single Shoot		21 to 99 (ICT 21 - 90)		
Number Secondary Runs - Double Shoot		42 to 198 (ICT 42 - 180)		
Primary Hose - Diameter		2 1/2" (6.4 cm)		
Secondary Hose - Diameter		Standard - 15/16" (2.4 cm) Optional - 1 1/8" (2.8 cm)		
Frame - Trussed		4" x 6" (10 cm x 15.2cm) tubing by 4" x 4" (10 cm x 10 cm) tubing		
Easy Clean Out System		Standard		
Meter Drive Options - Second Clutch (For spot fertilizing on the go)		Standard		
Monitor (Shaft Motion (3), Bin Level (3), Fan Speed, Acre Tally, Ground Speed)		Standard Optional Seed Flow		
Work Switch (Mounted to Seeding Machine)		Optional		
Rear Tow Hitch		Standard (Max 26,000 lb Draft Load) (Max 11,818 kg Draft Load)		

9445, 9550 and 9650 - Tow Between
Specifications and Options

Model	9445	9550	9650
Configuration	**Tow Between**	**Tow Between**	**Tow Between**
Length (with auger)	34’ 6” (10.52 m)	34’ 6” (10.52 m)	34’ 6” (10.52 m)
Height - Rails up	15’ 2” (4.623 m)	15’ 2” (4.623 m)	15’ 2” (4.623 m)
Height - Rails Lowered	14’ 2” (4.318 m)	14’ 2” (4.318 m)	14’ 2” (4.318 m)
Width - Dual Axle	20’ (6.10 m)	20’ (6.10 m)	20’ (6.10 m)
Weight (Hydraulic Drive)	20,000 lbs (9072 kg)	20700 lbs (9389 kg)	21400 lbs (9707 kg)
Safety Lights	Standard	Standard	Standard
Safety Chain	Standard	Standard	Standard
Tank Capacity - Tank 1	N/A	221 bu (7788 l)	221 bu (7788 l)
- Tank 2	N/A	N/A	107 bu (3772 l)
- Tank 3	221 bu (7788 l)	107 bu (3772 l)	107 bu (3772 l)
- Tank 4	221 bu (7788 l)	221 bu (7788 l)	221 bu (7788 l)
- Total	**442 bu (15,576 l)**	**549 bu (19348 l)**	**656 bu (23,120 l)**
Tank Screens	Standard		
Fan Impeller Diameter	17” (43 cm) - Up to 5,000 r.p.m.		
Hydraulic Drive - piston type orbit motor (Closed Centre or Closed Centre Load Sensing systems required) Hydraulic requirements for Air Cart only at Rated Fan Speed.	16cc 21 U.S. gal./min. (80 l/min) at 2,750 p.s.i. (18,960 kpa) Dual Fans require 42 U.S. gal./min. (160 l/min) VRT requires an additional 6 U.S. gal/min (23 l/min)		
Loading Auger	Standard (10” Dia) (25.4 cm Dia) Optional - extended hopper on hydraulic assisted auger		
Loading Conveyor	Optional (16”) (40.6 cm) x 23 ft long		
Tires - Standard (Rear)	Duals - (4) 800/65R32 - LI 172 Lug Distance Center-Center Inner 132” (335 cm) Distance Center-Center Outer 208” (516 cm)		
Metering - Ground Driven	Standard		
- Variable Rate (VRT)	Optional		
- GPS Compatible VRT	Optional		
- ICT (Input Control Technology)	Optional with VRT		
Meter Shut Off	Electric		
Number Secondary Runs - Single Shoot	21 to 99 (ICT 21 - 90)		
Number Secondary Runs - Double Shoot	42 to 198 (ICT 42 - 180)		
Primary Hose - Diameter	2 1/2" (6.4 cm)		
Secondary Hose - Diameter	Standard - 15/16” (2.4 cm) Optional - 1 1/8” (2.8 cm)		
Frame - Trussed	4” x 6” (10 cm x 15.2cm) tubing by 4” x 4” (10 cm x 10 cm) tubing		
Easy Clean Out System	Standard		
Meter Drive Options - Second Clutch (For spot fertilizing on the go)	Standard		
Monitor (Shaft Motion (3), Bin Level (3), Fan Speed, Acre Tally, Ground Speed)	Standard Optional Seed Flow		
Work Switch (Mounted to Seeding Machine)	Optional		
Rear Tow Hitch	Standard (Max 26,000 lb Draft Load) (Max 11,818 kg Draft Load)		
Hitch Jack - Hydraulic	Standard		
Work Lights - LED	Optional		
Hitch Clevis	Standard - Catagory 4 Optional - Catagory 5		

Specifications

9555, 9680 and 9800 - Tow Behind
Specifications and Options

Model		9555	9680	9800
Configuration		**Tow Behind**	**Tow Behind**	**Tow Behind**
Length (Hitch pin to Dual Fan) (Hitch Removed)		43' 6"(13.28 m) 34' 6"(10.52 m	43' 6"(13.28 m) 34' 6"(10.52 m	43' 6"(13.28 m) 34' 6"(10.52 m)
Height - Rails up		15' 8" (4.77 m)	15' 8" (4.77 m)	15' 8" (4.77 m)
Height - Rails Lowered		14' 8" (4.47 m)	14' 8" (4.47 m)	14' 8" (4.47 m)
Width	- Dual Axle - 800/65 R32 - Prior to 2016	20' 10" (6.35 m)	20' 10" (6.35 m)	20' 10" (6.35 m)
	- Dual Axle - 800/70R38	22' 4" (6.81 m)	22' 4" (6.81 m)	22' 4" (6.81 m)
	- Dual Axle - 850/80R38	22' 4" (6.81 m)	22' 4" (6.81 m)	22' 4" (6.81 m)
Weight (Hydraulic Drive)		27652 (12543 kg)	28946 (13130 kg)	30240 lbs (13720 kg)
Safety Lights		Standard	Standard	Standard
Safety Chain		Standard	Standard	Standard
Tank Capacity	- Tank 1	265 bu (9339 l)	265 bu (9339 l)	265 bu (9339 l)
	- Tank 2	N/A	N/A	133 bu (4700 l)
	- Tank 3	N/A	133 bu (4700 l)	133 bu (4700 l)
	- Tank 4	284 bu (10008 l)	284 bu (10008 l)	284 bu (10008 l)
	- Total	**549 bu (19347 l)**	**682 bu (24047 l)**	**815 bu (28747 l)**
Tank Screens		Standard		
Fan Impeller Diameter		17" (43 cm) - Up to 5,000 r.p.m.		
Hydraulic Drive - piston type orbit motor (Closed Centre or Closed Centre Load Sensing systems required) Hydraulic requirements for Air Cart only at Rated Fan Speed.		16cc 21 U.S. gal./min. (80 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 6 U.S. gal/min (23 l/min)		
Loading Auger		Standard (10" Dia) (25.4 cm Dia) Optional - extended hopper on hydraulic assisted auger		
Loading Conveyor		Optional (16") (40.6 cm)		
Brakes - Rear		**Standard - 22" (55.9 cm) Diameter Disc - 4 piston caliper**		
Tires	- Standard Quad Steer (Front) (Tow Behind only)	(2) 800/65 R32 - LI 172 Lug Distance Center-Center Inner 155" (393 cm)		
	- Optional Quad Steer (Front) (Tow Behind only)	(2) 800/70R38 - LI 172 Lug Distance Center-Center Inner 155" (393 cm)		
	- Standard (Rear)	Duals - (4) 800/70R38 - LI 172 Lug Distance Center-Center Inner 154" (391.2 cm) Distance Center-Center Outer 234" (594.4 cm)		
	- Optional (Rear)	Duals - (4) 850/80R38 - LI 172 Lug Distance Center-Center Inner 154" (391.2 cm) Distance Center-Center Outer 234" (594.4 cm)		
Metering	- Ground Driven	Standard		
	- Variable Rate (VRT)	Optional		
	- GPS Compatible VRT	Optional		
	- ICT (Input Control Technology)	Optional with VRT		
Meter Shut Off		Electric		
Number Secondary Runs - Single Shoot		21 to 110 (ICT 21-100)		
Number Secondary Runs - Double Shoot		42 to 220 (ICT 42-200)		
Primary Hose - Diameter		2 1/2" (6.4 cm)		
Secondary Hose - Diameter		Standard - 15/16" (2.4 cm) Optional - 1 1/8" (2.8 cm)		
Frame - Trussed		4" x 10" (10 cm x 25.4cm) tubing by 4" x 4" (10 cm x 10 cm) tubing		
Easy Clean Out System		Standard		
Meter Drive Options - Second Clutch (For spot fertilizing on the go)		Standard		
Monitor (Shaft Motion (3), Bin Level (3), Fan Speed, Acre Tally, Ground Speed)		Standard Optional Seed Flow		
Work Switch (Mounted to Seeding Machine)		Optional		
Rear Tow Hitch		Standard (Max 26,000 lb Draft Load) (Max 11,818 kg Draft Load)		
Mechanical Acre Meter		Optional (Ground Drive Only)		

9555, 9680 and 9800 - Tow Between
Specifications and Options

Model	9555	9680	9800
Configuration	**Tow Between**	**Tow Between**	**Tow Between**
Length (Hitch pin to conveyor end)	35' 1" (10.69 m)	35' 1" (10.69 m)	35' 1" (10.69 m)
Height - Rails up	15' 8" (4.77 m)	15' 8" (4.77 m)	15' 8" (4.77 m)
Height - Rails Lowered	14' 8" (4.47 m)	14' 8" (4.47 m)	14' 8" (4.47 m)
Width - Dual Axle - 800/65 R32 **- Prior to 2016**	20' 10" (6.35 m)	20' 10" (6.35 m)	20' 10" (6.35 m)
- Dual Axle - 800/70R38	22' 4" (6.81 m)	22' 4" (6.81 m)	22' 4" (6.81 m)
- Dual Axle - 850/80R38			
Weight (Hydraulic Drive)	27152 lbs (12316 kg)	28446 (12903 kg)	29740 lbs (13490 kg)
Safety Lights	Standard	Standard	Standard
Safety Chain	Standard	Standard	Standard
Tank Capacity - Tank 1	265 bu (9339 l)	265 bu (9339 l)	265 bu (9339 l)
- Tank 2	N/A	N/A	133 bu (4700 l)
- Tank 3	N/A	133 bu (4700 l)	133 bu (4700 l)
- Tank 4	284 bu (10008 l)	284 bu (10008 l)	284 bu (10008 l)
- Total	**549 bu (19347 l)**	**682 bu (24047 l)**	**815 bu (28747 l)**
Tank Screens	Standard		
Fan Impeller Diameter	17" (43 cm) - Up to 5,000 r.p.m.		
Hydraulic Drive - piston type orbit motor (Closed Centre or Closed Centre Load Sensing systems required) Hydraulic requirements for Air Cart only at Rated Fan Speed.	16cc 21 U.S. gal./min. (80 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 6 U.S. gal/min (23 l/min)		
Loading Auger	Standard (10" Dia) (25.4 cm Dia) Optional - extended hopper on hydraulic assisted auger		
Loading Conveyor	Optional (16") (40.6 cm)		
Brakes - Rear	**Standard - 22" (55.9 cm) Diameter Disc - 4 piston caliper**		
Tires - Standard (Rear)	Duals - (4) 800/70R38 - LI 172 Lug Distance Center-Center Inner 154" (391.2 cm) Distance Center-Center Outer 234" (594.4 cm)		
- Optional (Rear)	Duals - (4) 850/80R38 - LI 172 Lug Distance Center-Center Inner 154" (391.2 cm) Distance Center-Center Outer 234" (594.4 cm)		
Metering - Ground Driven	Standard		
- Variable Rate (VRT)	Optional		
- GPS Compatible VRT	Optional		
- ICT (Input Control Technology)	Optional with VRT		
Meter Shut Off	Electric		
Number Secondary Runs - Single Shoot	21 to 110 (ICT 21-100)		
Number Secondary Runs - Double Shoot	42 to 220 (ICT 42-200)		
Primary Hose - Diameter	2 1/2" (6.4 cm)		
Secondary Hose - Diameter	Standard - 15/16" (2.4 cm) Optional - 1 1/8" (2.8 cm)		
Frame - Trussed	4" x 10" (10 cm x 25.4cm) tubing by 4" x 4" (10 cm x 10 cm) tubing		
Easy Clean Out System	Standard		
Meter Drive Options - Second Clutch (For spot fertilizing on the go)	Standard		
Monitor (Shaft Motion (3), Bin Level (3), Fan Speed, Acre Tally, Ground Speed)	Standard Optional Seed Flow		
Work Switch (Mounted to Seeding Machine)	Optional		
Rear Tow Hitch	Standard (Max 26,000 lb Draft Load) (Max 11,818 kg Draft Load)		
Mechanical Acre Meter	Optional (Ground Drive Only)		

Specifications

91000 - Tow Behind Specifications and Options	
Model	**91000**
Configuration	**Tow Behind**
Length (Hitch pin to Dual Fan) (Hitch Removed)	43' 6"(13.28 m) 34' 6"(10.52 m)
Height - Rails up	16' 6" (5.03 m)
Height - Rails Lowered	15' 6" (4.73 m)
Width - Dual Axle - 800/70R38	22' 4" (6.81 m)
- Dual Axle - 850/80R38	
Weight (Hydraulic Drive)	31240 lbs (14170 kg)
Safety Lights	Standard
Safety Chain	Standard
Tank Capacity - Tank 1	331 bu (11664 l)
- Tank 2	162 bu (5709 l)
- Tank 3	162 bu (5709 l)
- Tank 4	349 bu (12298 l)
- Total	**1004 bu (35380 l)**
Tank Screens	Standard
Fan Impeller Diameter	17" (43 cm) - Up to 5,000 r.p.m.
Hydraulic Drive - piston type orbit motor (Closed Centre or Closed Centre Load Sensing systems required) Hydraulic requirements for Air Cart only at Rated Fan Speed.	16cc 21 U.S. gal./min. (80 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 6 U.S. gal/min (23 l/min)
Loading Auger	Standard (12" Dia) (30.5 cm Dia) Optional - extended hopper on hydraulic assisted auger
Loading Conveyor	Optional (16") (40.6 cm) x 25 ft long
Tires - Standard Quad Steer (Front) (Tow Behind only)	(2) 800/65R32 - LI 172 Lug Distance Center-Center Inner 155" (393 cm)
- Optional Quad Steer (Front) (Tow Behind only)	(2) 800/70R38 - LI 172 Lug Distance Center-Center Inner 155" (393 cm)
- Standard (Rear)	Duals - (4) 800/70R38 - LI 172 Lug Distance Center-Center Inner 154" (391.2 cm) Distance Center-Center Outer 234" (594.4 cm)
- Optional (Rear)	Duals - (4) 850/80R38 - LI 172 Lug Distance Center-Center Inner 154" (391.2 cm) Distance Center-Center Outer 234" (594.4 cm)
Metering - Ground Driven	Standard
- Variable Rate (VRT)	Optional
- GPS Compatible VRT	Optional
- ICT (Input Control Technology)	Optional with VRT
Meter Shut Off	Electric
Number Secondary Runs - Single Shoot	21 to 110 (ICT 21-100)
Number Secondary Runs - Double Shoot	42 to 220 (ICT 42 - 200)
Primary Hose - Diameter	2 1/2" (6.4 cm)
Secondary Hose - Diameter	Standard - 15/16" (2.4 cm) Optional - 1 1/8" (2.8 cm)
Frame - Trussed	4" x 10" (10 cm x 25.4cm) tubing by 4" x 4" (10 cm x 10 cm) tubing
Easy Clean Out System	Standard
Meter Drive Options - Second Clutch (For spot fertilizing on the go)	Standard
Monitor (Shaft Motion (3), Bin Level (3), Fan Speed, Acre Tally, Ground Speed)	Standard Optional Seed Flow
Work Switch (Mounted to Seeding Machine)	Optional
Rear Tow Hitch	Standard (Max 26,000 lb Draft Load) (Max 11,818 kg Draft Load)

Section 3: Checklist

Section Contents

SAFETY-ALERT SYMBOL

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

ATTENTION - BE ALERT.

Your safety is involved.

Manuals

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

Warranty Void if Not Registered

Parts Manual Order Part Number N53349

Assembly Manual Order Part Number N53348

Checklist

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

Adopt a good lubrication and maintenance program.

General

____Check if assembled correctly.

____Proper chain tension.

____Check hose connections.

____Ensure cleanout door and tank lid are connected correctly.

Lubrication - Grease

____Metering Drive

____Axle Pivots

____Auger Pivots

Lubrication - Oil

____Drive chains

Tire Pressure

____See Maintenance, Section 7.

Transport

____Lock-up pins must be in place.

____Tighten wheel bolts.

____Check hose connections.

OWNER REFERENCE

Model: _____

Serial No: _____

Dealer: _____

Town: _____ State: _____

Phone: _____

OWNER/OPERATOR _____

Date: _____

TAKE SAFETY SERIOUSLY.

DO NOT TAKE NEEDLESS CHANCES!!

Notes

Section 4: Introduction

Section Contents

Introduction

This Operator's Manual has been carefully prepared to provide the necessary information regarding the operation and adjustments, so that you may obtain maximum service and satisfaction from your new MORRIS 9 Series Air Cart.

To protect your investment, study your manual before starting or operating in the field. Learn how to operate and service your 9 Series Air Cart correctly, failure to do so could result in personal injury or equipment damage.

If you should find that you require information not covered in this manual, contact your local MORRIS Dealer. The Dealer will be glad to answer any questions that may arise regarding the operation of your MORRIS 9 Series Air Cart.

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

Occasionally, your 9 Series Air Cart may require replacement parts. Your Dealer will be able to supply you with the necessary replacement parts required. If the Dealer does not have the necessary part, the MORRIS Factory will supply the Dealer with it promptly.

Your MORRIS 9 Series Air Cart is designed to give satisfaction even under difficult conditions. A small amount of time and effort spent in protecting it against rust, wear and replacing worn parts will increase the life and trade-in value.

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

Introduction - Continued

The MORRIS 9 Series Air Cart represents the latest in Air Cart design technology. Each cart incorporates a four wheel, wide-stance high clearance frame. The high clearance frame gives easy access to the metering wheels and the easiest cleanout in the industry. The tank lids are easily accessed by the convenient stairs and tank walkway.

Each tank has its own metering system and metering drive. Included with the unit is a sample collector box that an operator can use to confirm seeding rates. The meter drives are positive, convenient, simple to set and are ground driven through an electric clutch. The metering system incorporates spiral fluted wheels.

The size of the metering wheel is matched to the number of outlets on the secondary divider giving the best in accuracy. The spiral fluted metering wheels combined with the multi-range transmission allows a full range of products such as canola and peas to be seeded without having to change the metering wheels.

The Air Cart comes equipped with a monitor that senses all bin levels, motion of all metering shafts and fan speed. It also gives ground speed and provides an acre meter.

High quality 2 1/2" diameter hose is standard equipment for the distribution system. The patented flat fan divider, which is matched in size to the metering wheel, ensures final accurate distribution of the product.

Standard Features

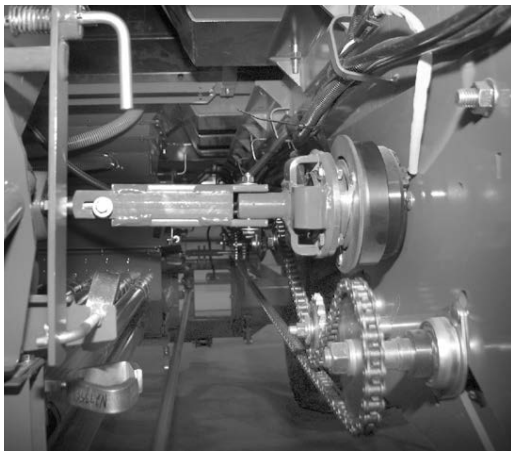
Second Clutch

The second clutch is mounted to any one of the tanks **metering shaft.**

This enables the operator to stop or start the metering of that tank while the metering continues from the other tanks. This is especially useful for spot fertilizing.

The clutch is electric operated and is switched from inside the tractor cab.

Note: The primary clutch still controls the input to all tank transmissions.



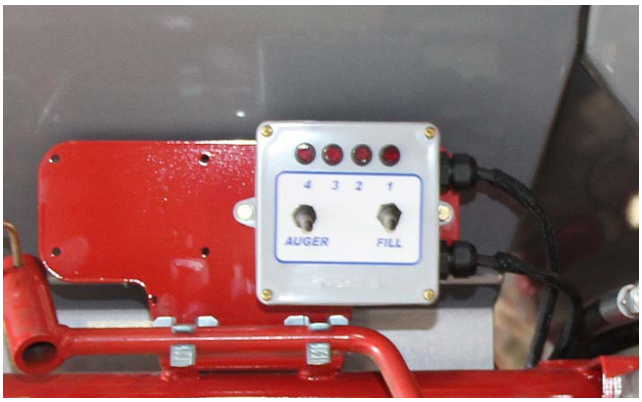
Hydraulic Auger

The hydraulic auger is designed to make loading and unloading product from the Air Cart tank very simple and easy. Shown here with optional extended hopper.

Standard Features - Continued

Full Bin Indicator

The Morris 9 Series Air Cart can be equipped with an optional full bin indicator to alert when bins are full during loading.



Fill Indicator - Optional

Blank Off Cover - N40980

The blank off cover closes off any unused openings in the collector body. The blank off cover prevents the unused run from filling with product.

Note: The blank off cover and run caps must be removed before storage to clean out any particles that accumulated during use.

Options

Hydraulic Conveyor

The 16” wide conveyor is designed to make loading and unloading product from the Air Cart tank very simple and easy.

Options - Continued

Digi-Star Weigh Scale

The Morris 9 Series Air Cart can be equipped with an optional Digi-Star Weigh Scale to track product usage.

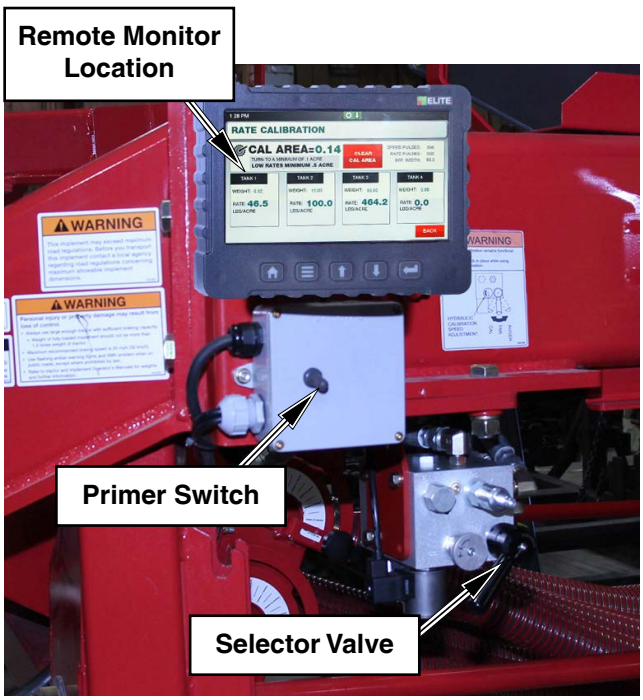
Digi-Star Weigh Scale

Dual Fan

The dual fan system allows for higher application rates on larger five frame seed units.

Hydraulic Rate Calibration

The Hydraulic Rate Calibration feature automates the process for performing application rate checks.



Notes

Section 5: Operation

Section Contents

Section Contents - Continued

Section Contents - Continued

CAUTION

BE ALERT

SAFETY FIRST

REFER TO SECTION 1 AND REVIEW ALL SAFETY RECOMMENDATIONS.

Application

The Morris 9 Series Air Cart applies a wide range of seed and granular fertilizer products. It has the capacity to single shoot and double shoot. See “Double Shoot Settings” for more details.

Tractor

Tires

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

Hydraulics

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

Drawbar

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

Warning

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

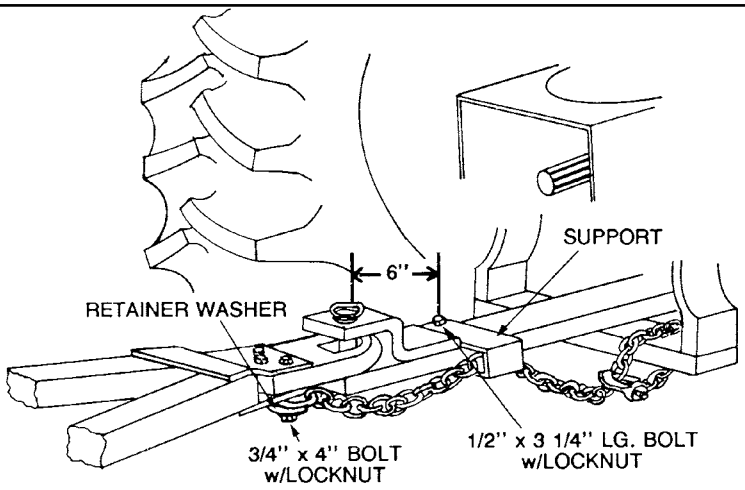
Warning

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

Hitching

Caution

A safety chain will help control towed machines should it accidentally separate from the drawbar while transporting. A runaway machine could cause severe injury or death. Use a safety chain with a strength rating equal to or greater than the gross weight of the towed machines.



Attach safety chain to the tractor drawbar support or other specified anchor location with the appropriate parts.

Hitching to Tractor (Tow Between Cart)

Tractor Drawbar Requirements

Tractor drawbar vertical load requirements for loaded Tow Between Air Carts are as follows:

9365.....8,500 lbs (3,864 kg) minimum

9450.....11,000 lbs (5,000 kg) minimum

9445, 9550 & 9650 ...8,900 lbs (4,050 kg) minimum

9555, 9680 & 9800 ...12,000 lbs (5,443 kg) minimum

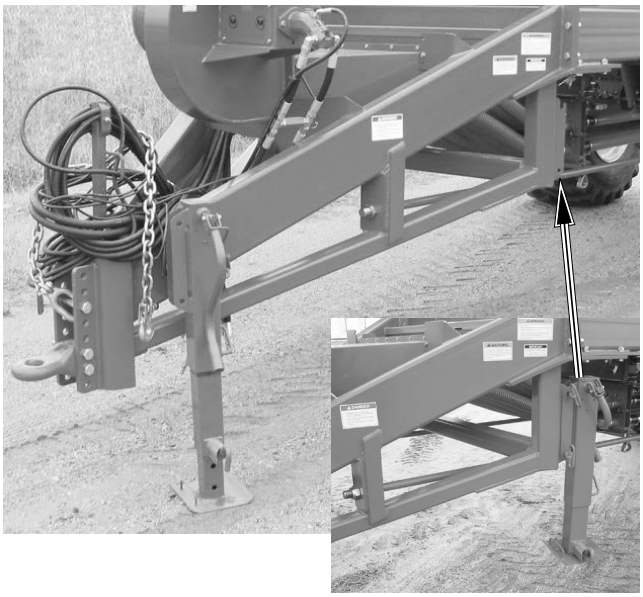
Hitching to Tractor (Tow Between Cart) - Continued

9365 and 9450 - Tow Between

- Ensure swinging drawbar is locked in the centre position.
- Ensure hitch pin is in good condition.
- Level clevis with tractor drawbar using hitch jack.
- Back tractor into position and attach hitch clevis to drawbar, using an adequate hitch pin.
- Lock hitch pin in place with a hairpin or other proper locking device.
- After tractor to implement connection is made, relieve pressure off the hitch jack.
- Place hitch jack in raised position.
- Route Safety Chain through chain support and drawbar support.
- Lock safety hook onto chain.

Note: Provide only enough slack in chain to permit turning.

- Ensure hydraulic hose quick couplers are dirt free.
- Inspect all fittings and hoses for leaks and kinks. Repair as necessary
- Connect the hydraulic hoses to the tractor quick couplers.



⚠ Caution

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

Note: Stairway down indicator will flash when stairs are in lowered postion.

Important

Raise Stairs before moving Cart.

Stair damage will occur in lowered position.

Hitching to Tractor (Tow Between Cart) - Continued

9445, 9550 and 9650 - Tow Between

9555, 9680 and 9800 - Tow Between

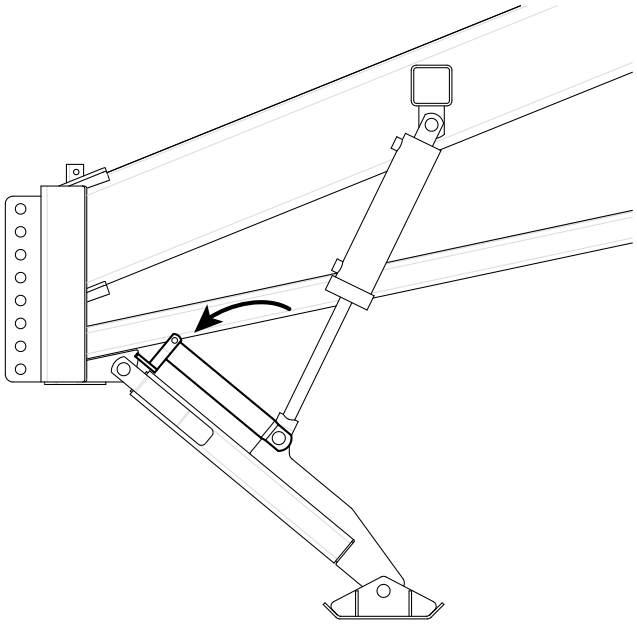
(Optional for 9365 and 9450)

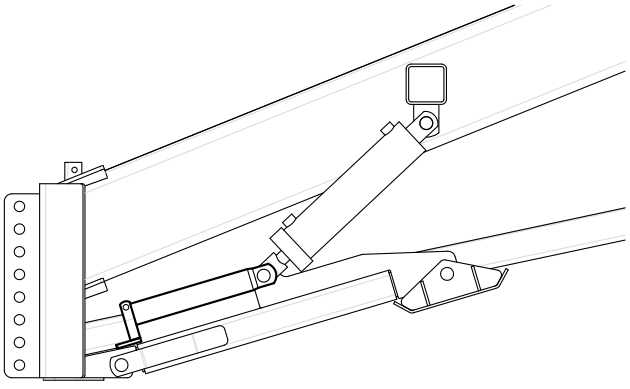
- Ensure swinging drawbar is locked in the centre position.
- Ensure hitch pin is in good condition.
- Back tractor into position with drawbar a couple of feet in front of cart hitch clevis.
- Ensure hydraulic hose quick couplers are dirt free.
- Inspect all fittings and hoses for leaks and kinks. Repair as necessary
- Connect the hydraulic hoses to the tractor quick couplers.
- Unlock hydraulic hitch jack line lock valve.
- Operate tractor hydraulics to extend hydraulic hitch jack.
- Disengage hydraulic hitch jack lock.
- Operate tractor hydraulics to level clevis with tractor drawbar using hydraulic hitch jack.
- Back tractor into position and attach hitch clevis to drawbar, using an adequate hitch pin.
- Lock hitch pin in place with a hairpin or other proper locking device.
- After tractor to cart connection is made, raise hydraulic hitch jack fully.
- Lock hydraulic hitch jack line lock valve.
- Route Safety Chain through chain support and drawbar support.
- Lock safety hook onto chain.

Note: Provide only enough slack in chain to permit turning.

⚠ Caution

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



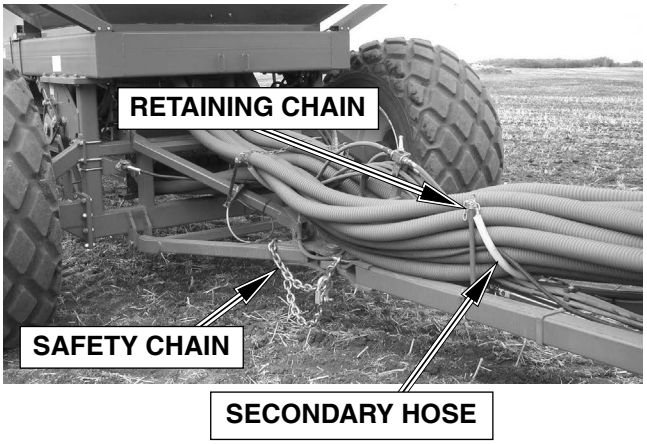


Hitching to Seeding Tool (Tow Between Cart)

- Connect air cart to tractor.
- Back air cart into position, aligning seeding tool hitch with air cart.
- Attach hitch to air cart with 1 1/2” x 6 1/2” pin and retain with a 1/4” hair pin.
- Attach safety chain to air cart.

Note: Provide only enough slack in chain to permit turning.

- Connect hydraulic hose quick couplers.
- Connect the primary hose couplers.
- Loop retaining chain around the primary hoses with the secondary hose over the bottom half of the chain.

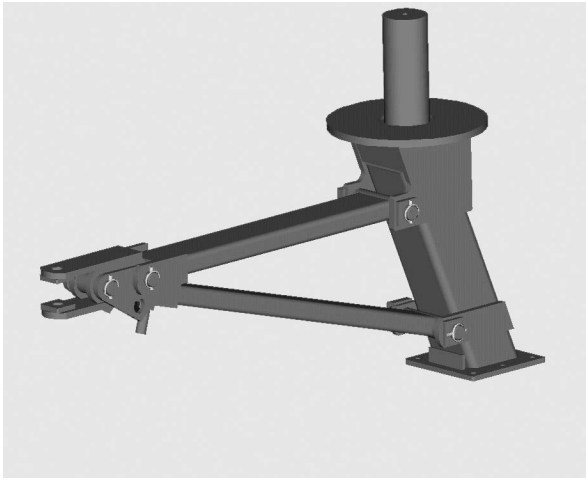


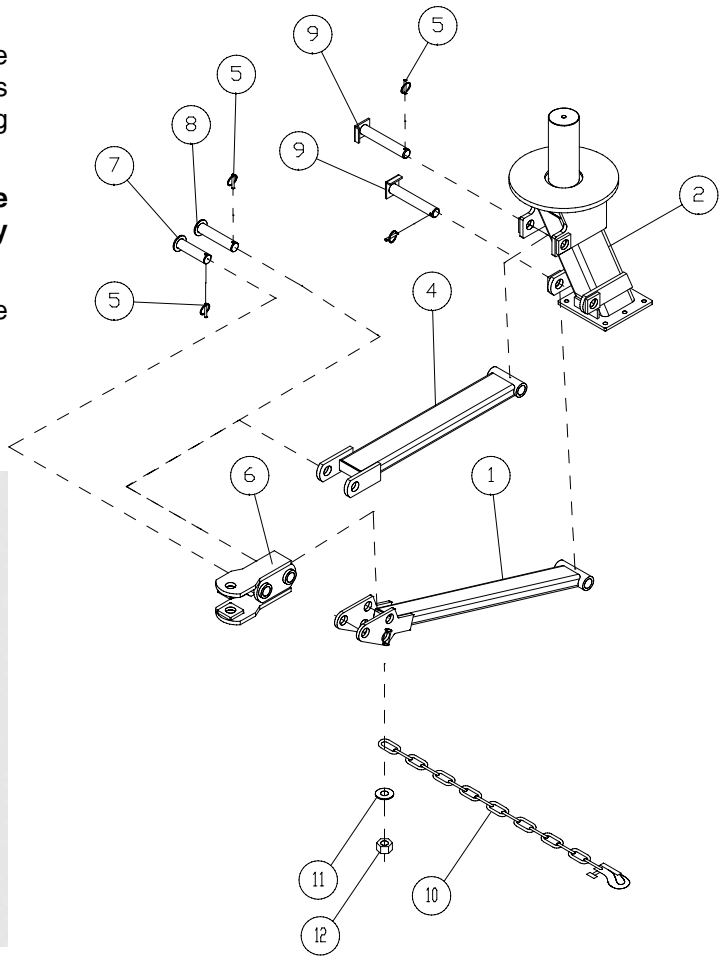
Hitching Front Castor (Tow Behind Cart)

- Assemble hitch components to the front castor axle as shown in the accompanying diagram. Item (7) is 1 1/2” x 5 1/8” lg pin. Item (8) is 1 1/2” x 6 7/16” lg pin and Item (9) is 1 1/2” x 8 3/8” lg pin.

Note: Pin item (9) holding item (4) cannot be installed or removed with the wheel assembly mounted.

- Assemble safety chain to item (1) using 1” Unitorque nut and 1 1/16” ID flatwasher.

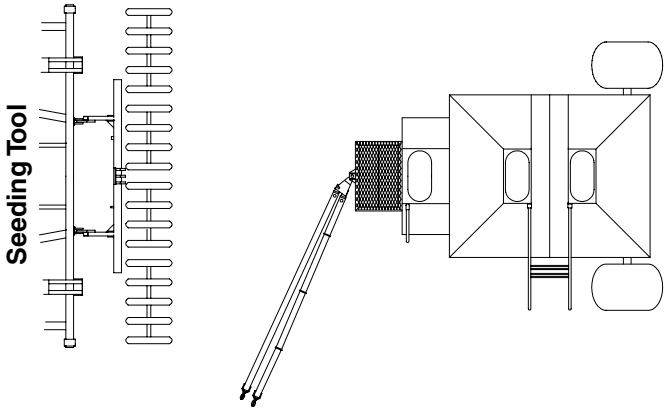


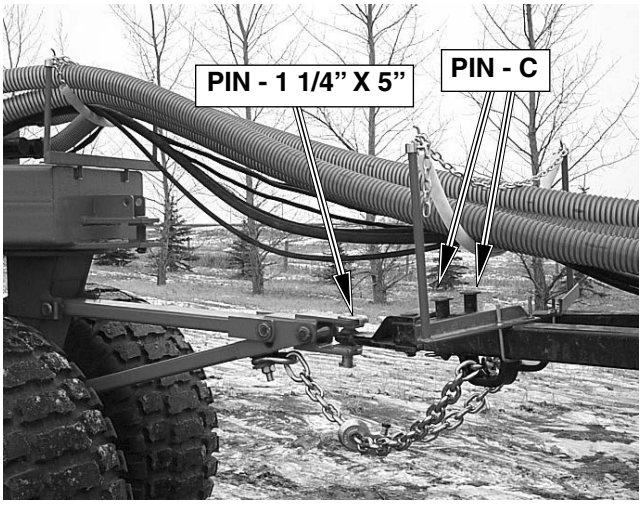


Hitching to Seeding Tool (Tow Behind Cart)

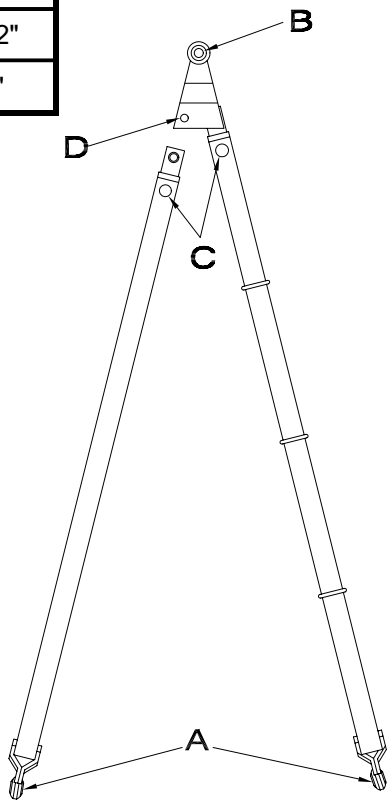
- Connect seeding tool to tractor.
- Attach hitch to air cart with 1 1/4” x 5” pin.
- Back seeding tool into position with air cart.
- Extend the telescopic hitch arms and connect the air cart to seeding tool using 1 1/8” x 3 11/16” pins.
- Block the tires of the air cart and insert the 1” x 5 13/32” pins into their bushings.
- Slowly back seeding tool toward air cart until the telescopic arms are fully retracted and the pins drop through the hitch tube locking the hitch poles.
- Retain the pins with click pins.
- Attach safety chain to air cart.

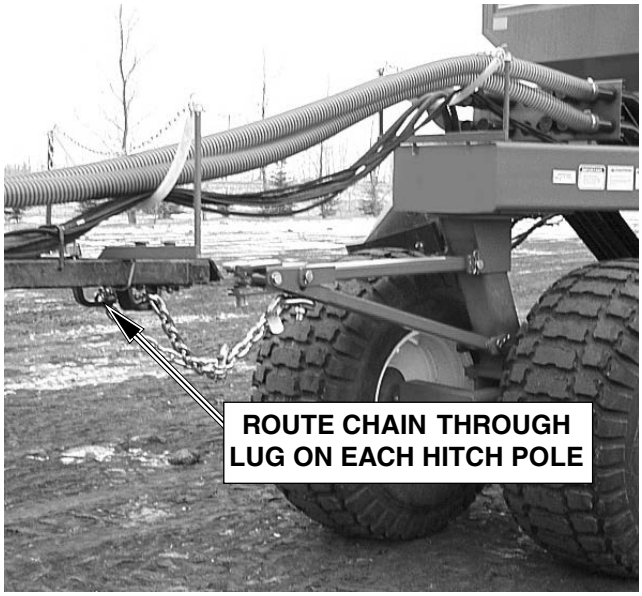
Note: Provide only enough slack in chain to permit turning.





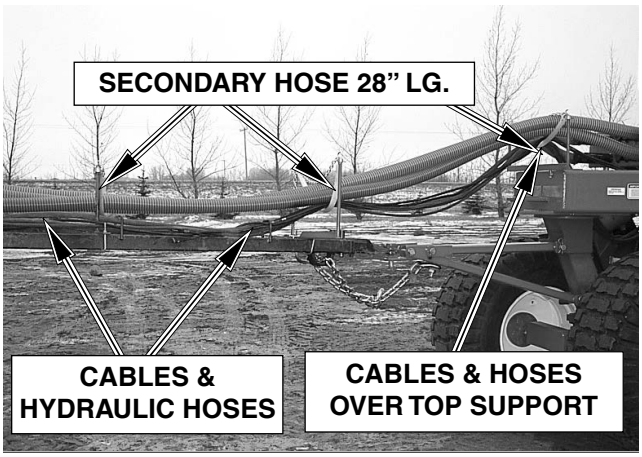
PIN SIZE	
A	1 1/8" x 3 11/16"
B	1 1/2" x 5 5/8"
C	1" x 5 13/32"
D	1" x 3 3/4"





Hitching to Seeding Tool (Tow Behind Cart) - Continued

- Route clutch and monitor wires and hydraulic lines through rear retaining chain with the secondary hose over the bottom half of the chain.
- Route clutch and monitor wires through the loops on the left hand hitch pole.
- Route the hydraulic lines (if any) through the loops on the left hand hitch pole.
- Connect the primary hose couplers.
- Loop retaining chain around the primary hoses with the secondary hose over the bottom half of the chain.
- Connect the monitor and clutch quick connectors at both the tractor/seeding tool and the seeding tool/ air cart connections.

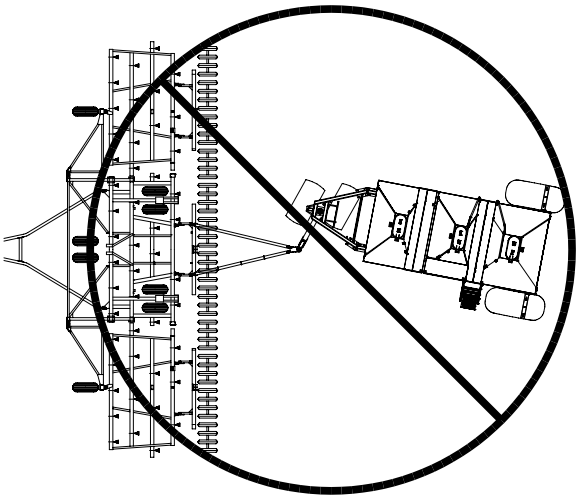


Hoses with correct amount of sag

Important

Extreme care is required when backing up unit.

Hitch damage will occur if castor jackknifes.



Primary Hose Coupler - Tow Between Shown

Important

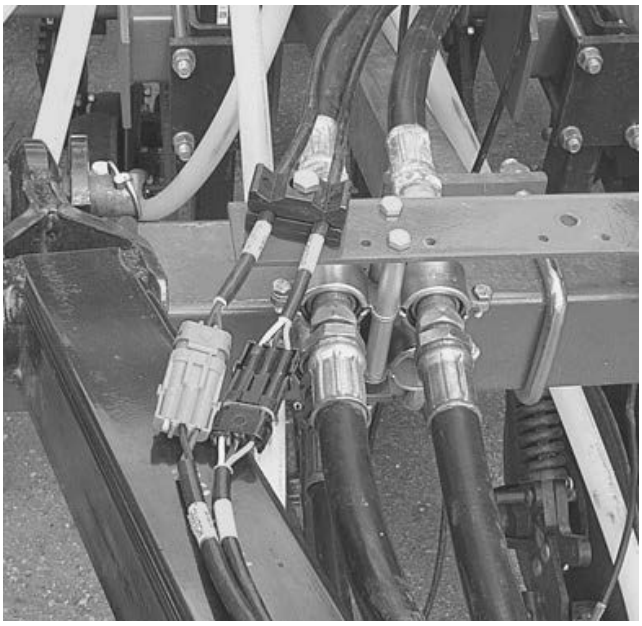
Raise Stairs before moving Cart.

Stair damage will occur in lowered position.

Hitching to Seeding Tool (Tow Behind Cart) - Continued

Hydraulic Connections

- Connect the monitor and clutch quick connectors at both the tractor/seeding tool and the seeding tool/air cart connections.
- **Hydraulic fan drive,** connect the fan hydraulic quick couplers at both the tractor/seeding tool and the seeding tool/air cart connections. Ensure couplers are clean and dirt free.

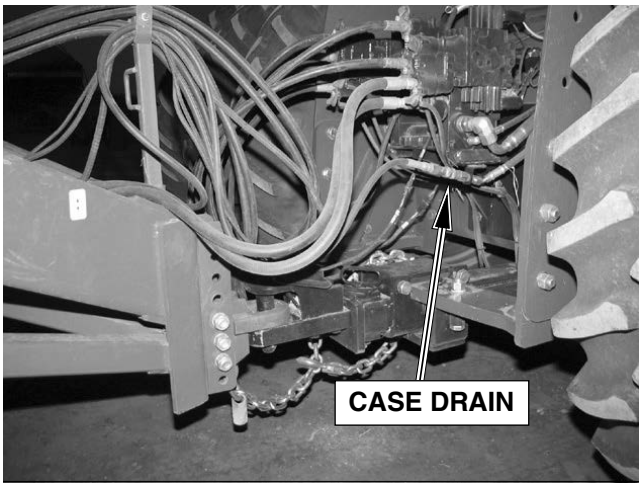


Seeding Tool Coupling

⚠ CAUTION

Hydraulic oil under pressure can penetrate the skin causing serious injury. Avoid personal injury by relieving all pressure, before disconnecting hydraulic hoses.

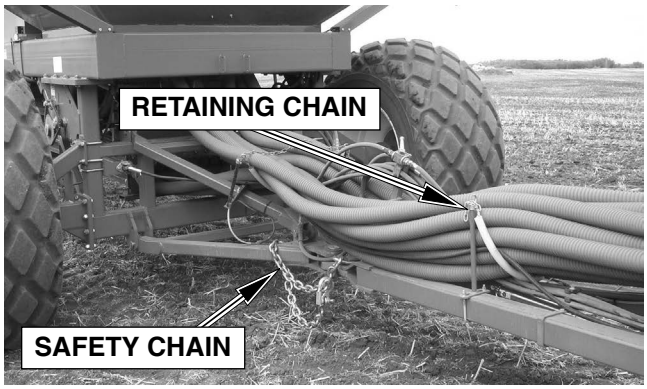
Note: The 3/8" diameter hose for fan motor case drain, must be run directly into the hydraulic tank otherwise damage will occur to the seal in the motor. If the hose is run through the filler cap then ensure the cap is *VENTED*. A quick coupler can still be used between the tractor and the seeding tool.



Hydraulic Coupling on Tractor

Unhitching from Seeding Tool (Tow Between Cart)

- Lower hitch jack taking the weight off the seeding tool hitch poles.
- Relieve pressure in the hydraulic hoses by positioning tractor hydraulic lever in “float” position or turn tractor engine off and cycle lever back and forth several times.
- Disconnect the primary hose couplers.
- Disconnect the hydraulic hoses.
- Remove the hitch pin.
- Slowly move air cart away from seeding tool.



Unhitching from Tractor (Seeding Tool or Tow Between Cart)

9365 and 9450 - Tow Between

- Pin hitch jack in working position.
- Lower hitch jack taking the weight off the air cart clevis.

Note: For added safety it is recommended to unload any material that may be in the tanks.

- Ensure all transport locks are properly secured. Refer to seeding tool manual for more details.
- Relieve pressure in the hydraulic hoses by positioning tractor hydraulic lever in “float” position or turn tractor engine off and cycle lever back and forth several times.
- Disconnect the hydraulic hoses.
- Disconnect the clutch and monitor cables.
- Remove the safety chain.
- Remove the drawbar pin.
- Slowly move tractor away from seeding tool or tow between cart.

Tow Between Cart

Unhitching from Tractor (Seeding Tool or Tow Between Cart) - Continued

9445, 9550 and 9650 - Tow Between

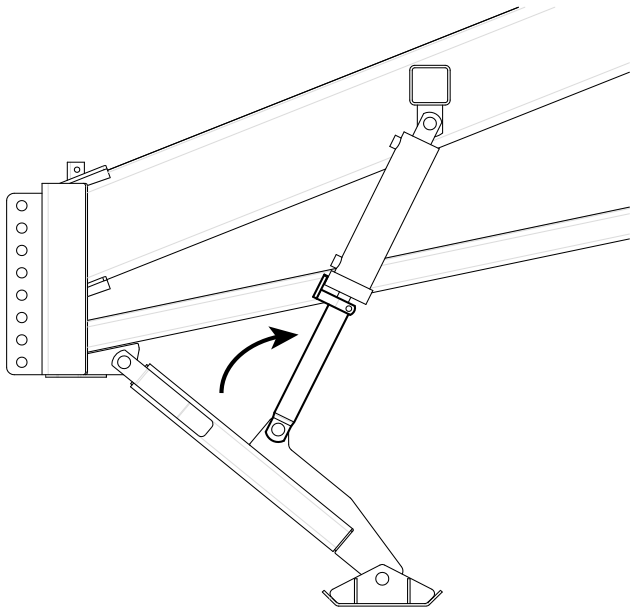
9555, 9680 and 9800 - Tow Between

(Optional for 9365 and 9450)

- Unlock hydraulic hitch jack line lock valve.
- Operate tractor hydraulics to lower hydraulic hitch jack taking the weight off the air cart clevis.

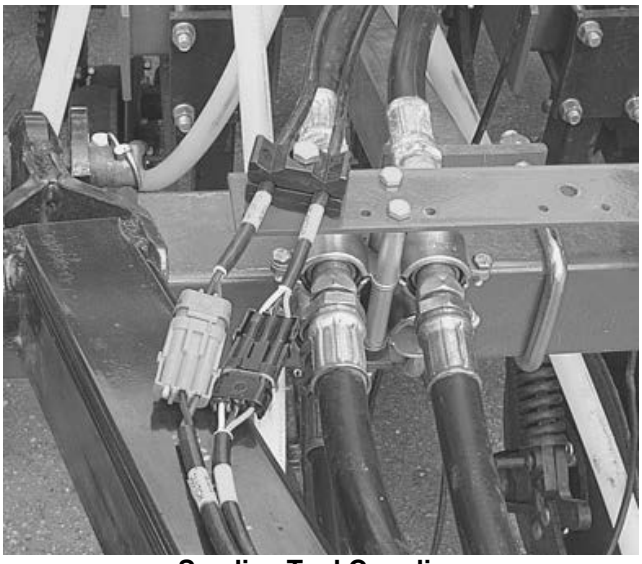
Note: For added safety it is recommended to unload any material that may be in the tanks.

- Disconnect the clutch and monitor cables.
- Remove the safety chain and drawbar pin.
- Slowly move tractor one foot (30 cm) away from cart.
- Operate tractor hydraulics raising cart hitch to fully extend hydraulic hitch jack.
- Engage hydraulic hitch jack lock.
- Ensure all transport locks are properly secured. Refer to seeding tool manual for more details.
- Relieve pressure in the hydraulic hoses by positioning tractor hydraulic lever in “float” position or turn tractor engine off and cycle lever back and forth several times.
- Lock hydraulic hitch jack line lock valve.
- Disconnect the hydraulic hoses.
- Slowly move tractor away from seeding tool or tow between cart.

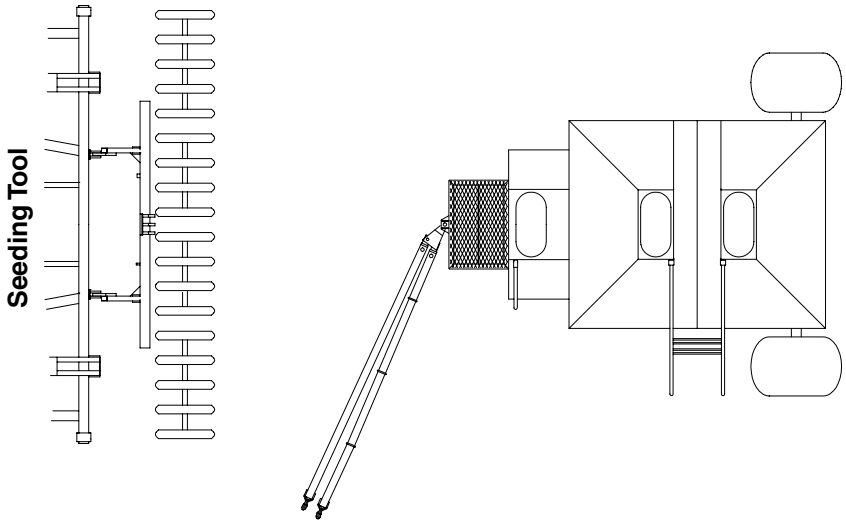


Unhitching from Seeding Tool (Tow Behind Cart)

- Lower hitch stands, if so equipped, taking the weight off the hitch poles.
- Relieve pressure in the hydraulic hoses by positioning tractor hydraulic lever in “float” position or turn tractor engine off and cycle lever back and forth several times.
- Disconnect the primary hose couplers.
- Disconnect the hydraulic hoses.
- Disconnect the clutch and monitor cables.
- Remove the hitch pins.
- Move hitch poles to the side of air cart, if not equipped with hitch stands.
- Slowly move seeding tool away from air cart.



Seeding Tool Coupling



Quad Steer Operation

- Ensure safety chains are used at hitch pole connection to seeding tool.
- Retorque axle pivot bolts after first 2 hours and periodically afterwards. See “Quad Steer” in Maintenance Section for details.
- Retorque wheel nuts to 400 lb-ft (542 Nm) after first fifteen minutes of operation and every fifteen minutes for the next 2 hours. Check periodically afterwards.
- Avoid sharp turns which cause the steering to reach its limits and drag the front tires of the cart.
- Do not tow any implements behind cart.
- Do not tow cart in excess of 20 mph (32 kph).
- Do not transport fully loaded cart on roadways.
- Use manufacturer’s rims and tires only.

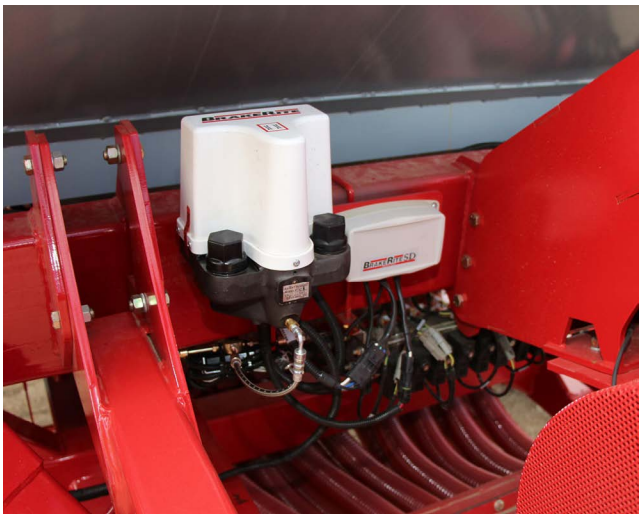
Important

Extreme care is required when backing up unit.

Hitch damage will occur if axle jackknifes.

Brakes

Morris is using Titan's BrakeRite II brake actuation system located on back of frame near rear tires. The Titan BrakeRite II is an electric over Hydraulic brake system. The BrakeRite system is actuated when the brake pedal of the tractor is depressed. The Air Cart brakes can also be applied independently by applying the manual over-ride on the In-Cab Brake Controller.



In-Cab Brake Controller

The In-Cab Brake Control is equipped with a gain control to adjust the braking of the Cart to match operating conditions. The Controller is also equipped with a manual override button to apply the brakes on the Air Cart without applying the brakes on the tractor.

Toggle Switch Functions

- Switch Up (Towards the Operator) brake signal in is turned OFF (RED light flashes). Towing brake signal is used elsewhere. Control will operate in the manual mode only (PUSH button).
- Switch Down (Away from Operator) control responds normally to external brake signal.

Turn Power ON

GREEN LED is ON, indicates control is powered up.

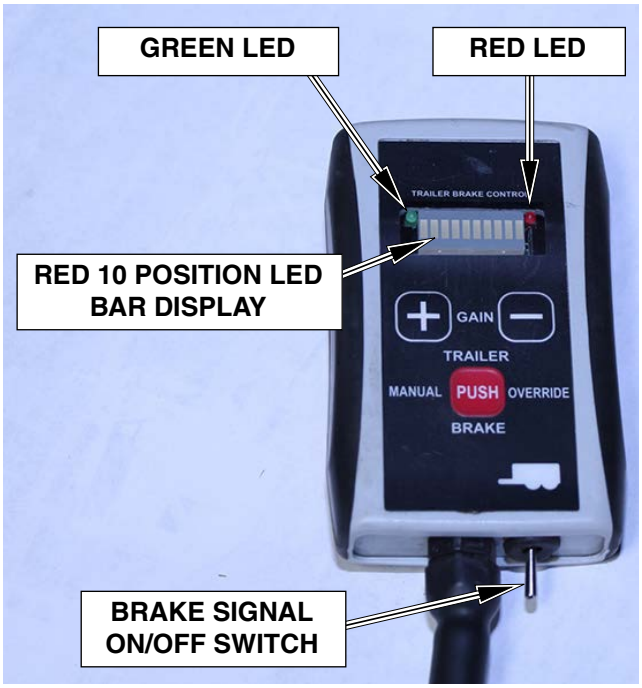
RED LED Light Bar turns on for 3/5 seconds and displays last gain setting. Also, power out to brakes is on for this period.

Set Gain

Press the **+** symbol to increase braking if inadequate Cart braking is being experenced.

Press the **-** symbol to decrease braking if excessive Cart braking is being experenced.

Note: These Buttons must be pressed repeatedly to change setting. Holding the buttons pressed only moves 1 step. Gain settings can be changed only when there is no external brake signal present.



GREEN LED is ON when 12v power is in control.

RED LED flashes when brake switch is in the OFF position.

RED 10 positions LED Bar displays gain and level of braking.

Manual Operation

Press "PUSH" button with variable force to apply brakes manually. This button is pressure sensitive.

Higher Pressure on button = Higher brake pressure

Brakes - Continued

Operation

Before using the Air Cart always check:

1) Proper Brake Fluid Level:

Must be between 3/8 & 3/4 inch of filler opening.

2) Prior to Moving the Coupled Unit:

a. Verify the brake system is working properly.

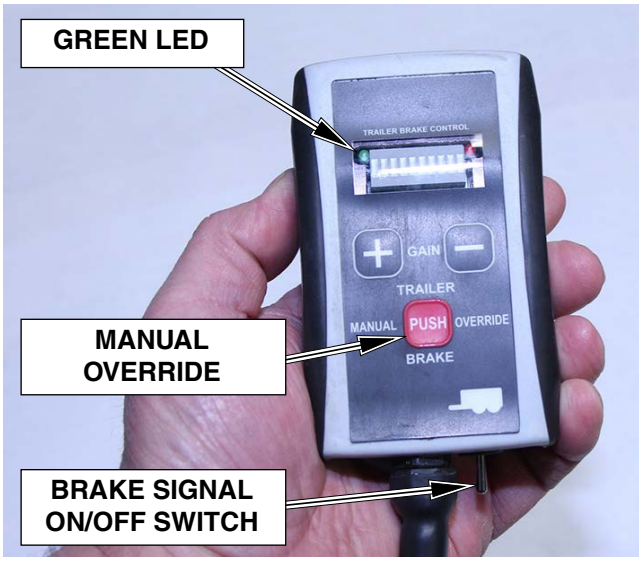
To assure proper connections have been made, check In-Cab Controller green LED should light when switch is in ON postion. Before moving the Cart depress the Tractor brake pedal, the BrakeRite unit should start (you can hear the unit running). Release the Tractor brake pedal and activate the BrakeRite unit by operating the "manual override" on the In-Cab Controller, again you will hear the unit turn on. With the manual override you are able to tell by the change in tone that the system is building pressure relative to the amount of "activation" initiated on the override switch. **Do Not attempt to move the unit until the brake system performs in the tests described above.**

3) When Operating/Transporting the Air Cart:

a. Do not rely on the Air Cart brakes for deceleration of the entire combined unit braking. The Air Cart Brakes are designed for braking of the Air Cart only and not the entire combined unit.

b. Always operate the combined unit within the specified parameters outlined in the Tractor Owner Manuals and OBEY ALL LAWS.

PROPER ELECTRICAL WIRING is CRITICAL for the performance of any of these systems. Improper wiring can result in damage to the actuation system or system failure after initial use. A "pure ground" and direct power (+12 VDC) with fuse or circuit breaker (30 amp) are necessary to ensure good performance.



Important:

Use only DOT III brake fluid.

Maintain fluid level within 3/8 to 1/2 inch below the filler opening.

Use caution when removing the filler cap to prevent contaminants entering into the fluid reservoir.

Brakes - Continued

Operation - Continued

Getting the feel of the system and setting the In-Cab controller:

After the system responds to the tests previously described proceed with moving the unit to establish a feel for the brake system and set the desired brake response by setting the gain on the In-Cab Brake Controller.

Do Not attempt to operate this unit in traffic until totally familiarized with the “feel” and performance of the system. Every operator must be familiarized with the feel of the unit, the performance of the brake system, and the proper operation and setting selections of the In-Cab Brake Controller.

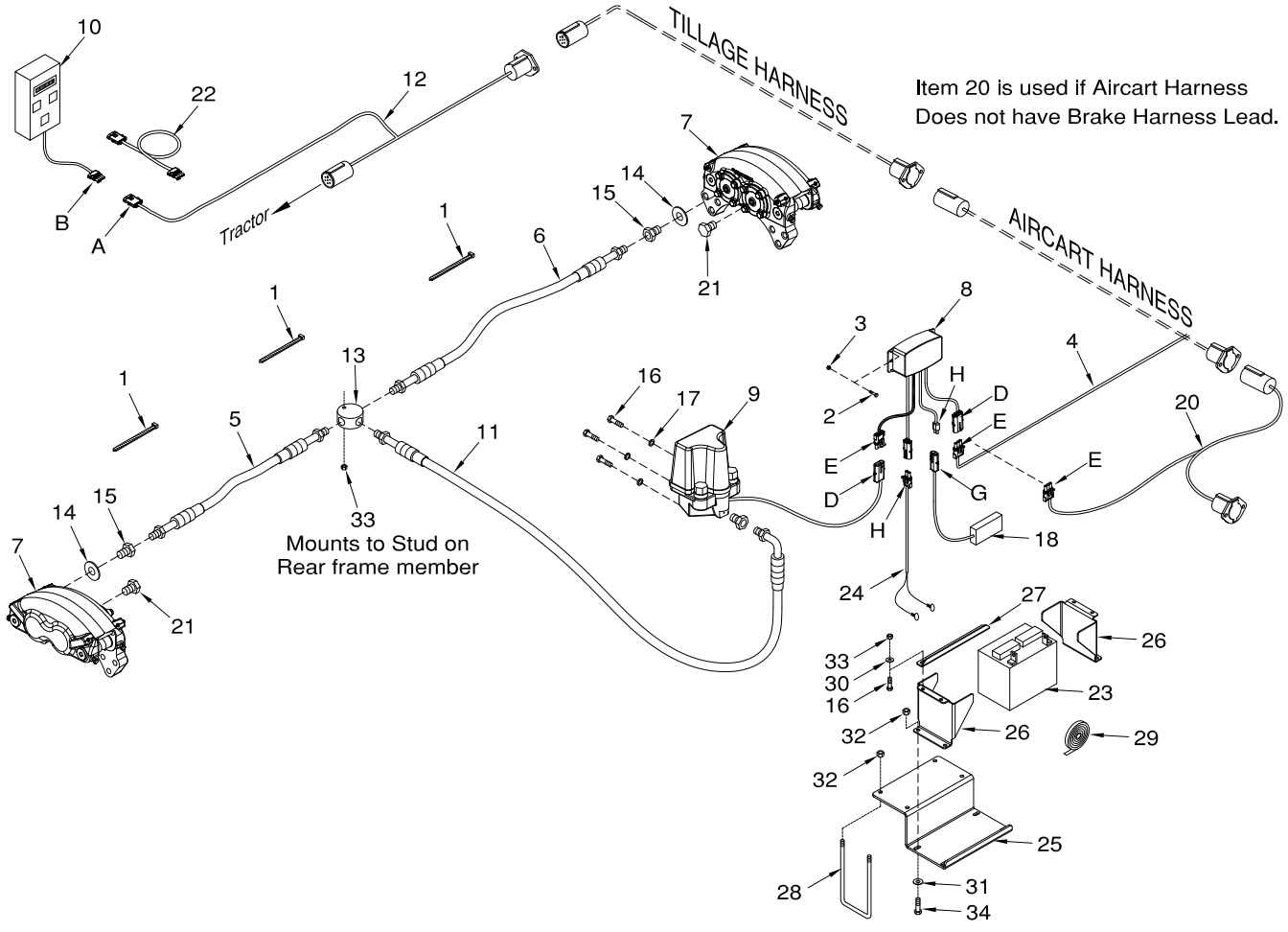
Operation:

Air Cart brakes are meant to assist the Tractor in the stopping of the combined units, they are not intended to stop the entire combined unit.

Thoroughly know the In-Cab Contorllers performance and “feel” before any extensive travel is considered.

Manual override should be fully understood for safe operation. When operating on wet/slippery surfaces or going down a steep incline it is desirable to brake only with the Air Cart brakes to maintain alignment of the implements and help prevent a jack-knife condition. By maintaining adequate braking on the Cart, sway or the tendency of the Cart to “push” the Tractor is greatly reduced.

Installation



Brakes - Continued

Installation - Continued

Item	Part No.	Description	Qty
1	D-4951	Nylon Tie Strap - 7 3/8 Lg	12
2	N16563	Slotted Screw - #8 x 1 1/4 Lg	4
3	N16564	Locknut - #8 Serrated	4
4	N34658	Aircart Lighting Harness	1
5	N53387	Brake Hose - 1/4 x 150 Lg	1
6	N53388	Brake Hose - 1/4 x 180 Lg	1
7	N53389	Brake Caliper	2
8	N53394	Control Module	1
9	N53396	BrakeRite SD II - Electric/Hydraulic Acturator	1
10	N53397	BrakeRite SD AG Controller	1
11	N53398	Brake Hose - 1/4 x 24	1
12	N53650	Wiring Harness - Cab Controller - 96 Lg Brake Lead	1
13	N53652	Brass Tee Fitting	1
14	N53653	Brass Brake Washer - 1/2 ID x 7/8 OD	2
15	N53654	Brass Adaptor - Brake Fitting	2
16	W-471	Bolt - 5/16 x 1 Lg	5
17	W-522	Lockwasher - 5/16	3
18	N53393	BrakeRite SD Breakaway switch	1
19	N53395	Brakerite SD Battery Cable - Optional battery hook up (Not Shown)	1
20	N53651	Wiring Harness - Brake Connector - 36 Lg Brake Lead	1
21	N55840	Plug - 5/16 MORB	2
22	N56076	Extension Harness - Cab Controller - 10 ft Lg	1
23	N53577	Battery - 250 CCA - Interstate #SP-30	1
24	N53571	Battery Cable -	1
25	N53569	Holder Plate - Battery	1
26	N53578	Bracket - Battery	2
27	N53579	Clamp Strap - Battery	1
28	N19723	U-Bolt- 3/8 Dia.x 4.063 x 6.938 UL	2
29	N15716	Seal Strip - 1/4 x 1/Foot	3 FT
30	D-5488	Washer - .344 x .688 x 16 Gauge	2
31	D-5579	Washer - .406 ID x 1 OD x 16 Gauge	4
32	D-5279	Locknut - 3/8 Serrated	8
33	C32925	Locknut - 5/16 Center	3
34	W-475	Bolt - 3/8 x 1 Lg	4
	N52683	Brake Hose Kit - (Contains Items 5, 6, 11, 13, 14 &15)	
	N53391	Brakerite SD Kit - (Contains Items 9 & 10)	

Transport

Observe all of the safety precautions under transport heading in Safety, Section 1.

- Refer to Specifications, Section 2, for weight, transport height, and width.
- Transport with tractor only!
- Use Tow Hitch when transporting without seeding tool (Tow Behind Units).
- Always connect safety chain provided to the towing vehicle and the hitch of the air cart.
- Do not transport with the fan running.
- Ensure meter drive clutch switch is turned OFF.
- Disconnect main drive chain when towing air cart a long distance.
- Ensure all transport pins are secured.

Speed

- Always travel at a safe speed. Do Not Exceed 20 mph (32 kph) with an empty air cart.
- The combined weight of the implements being towed, including material in tank, ***must not exceed 1.5 times*** the weight of the towing tractor.
- Use additional caution when towing loads under adverse surface conditions, when turning, and on inclines.

Lights

- Ensure proper reflectors are in place, refer to Safety, Section 1.
- Be familiar with, and adhere to, local laws.

Tow Hitch (Tow Behind Units)

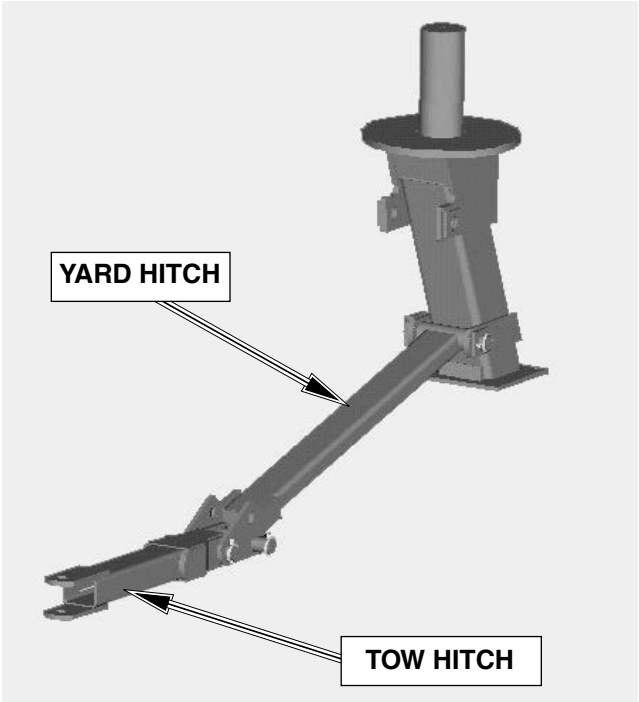
- Disconnect main hitch and remove the two pins connecting the hitch tube to the yard hitch tube.
- Attach hitch clevis to the yard hitch tube with two 1 1/2” x 5 1/8” and 1 1/2” x 6 7/16” pins.
- Retain the pins with klik-pins.
- Use tow hitch when towing without seeding tool.
- **Do not** use transport hitch with material in tank.

MORRIS EQUIPMENT LTD. WILL NOT BE RESPONSIBLE FOR ANY DAMAGES OR OPERATOR INJURY RESULTING FROM NON-USE OR IMPROPER USE OF TRANSPORT LOCKS.

Important

Raise Stairs before moving Cart.

Stair damage will occur in lowered position.



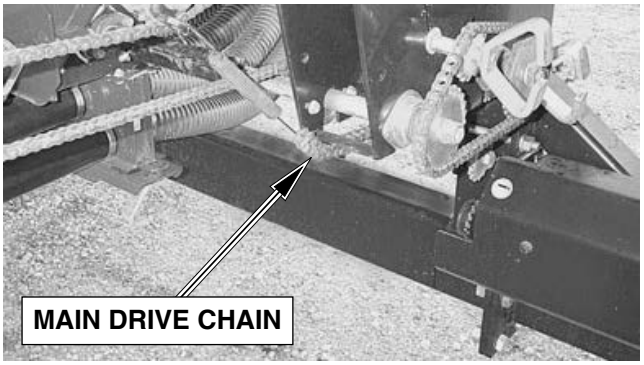
Tow Hitch

Transport - Continued

Disconnect Main Drive Chain

When traveling any distance the drive chain should be removed to prevent premature wear on the drive.

- Remove spring from the bottom idler.
- Remove chain from the jackshaft.
- Insert end of spring through the chain and hook other end of spring to the top idler as shown.



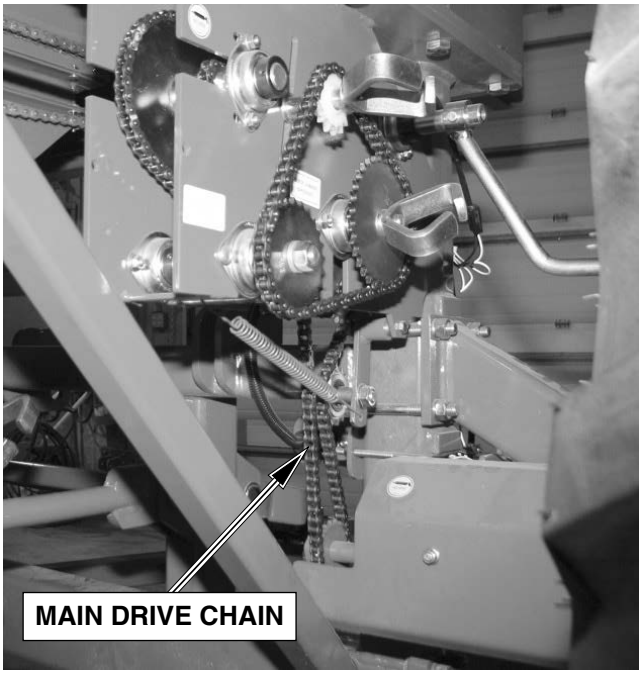
Main Drive Chain Installation

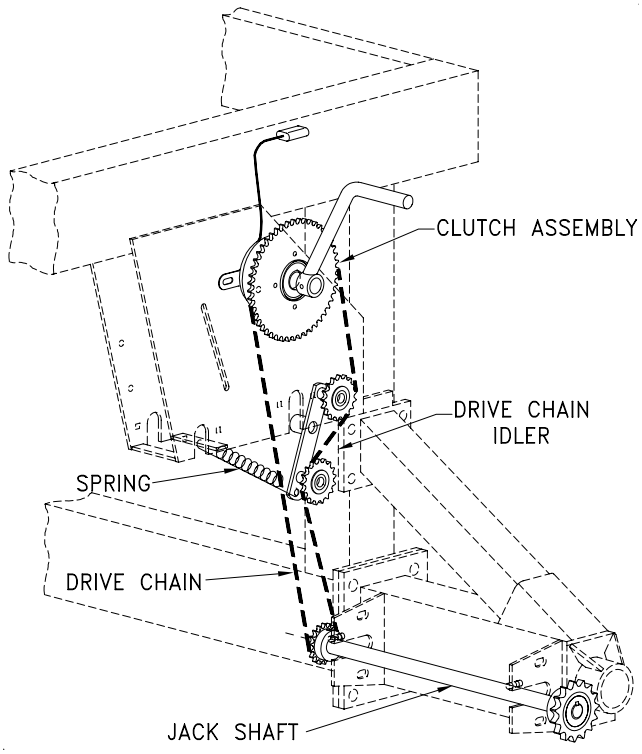
9365 and 9450 - Tow Between

9365, 9450 and 9535 - Tow Behind

9445, 9550 and 9650 - Tow Behind

- Unhook idler spring.
- Position chain on the jackshaft and idler sprockets as shown.
- Connect idler spring to transmission brace with idlers as shown.



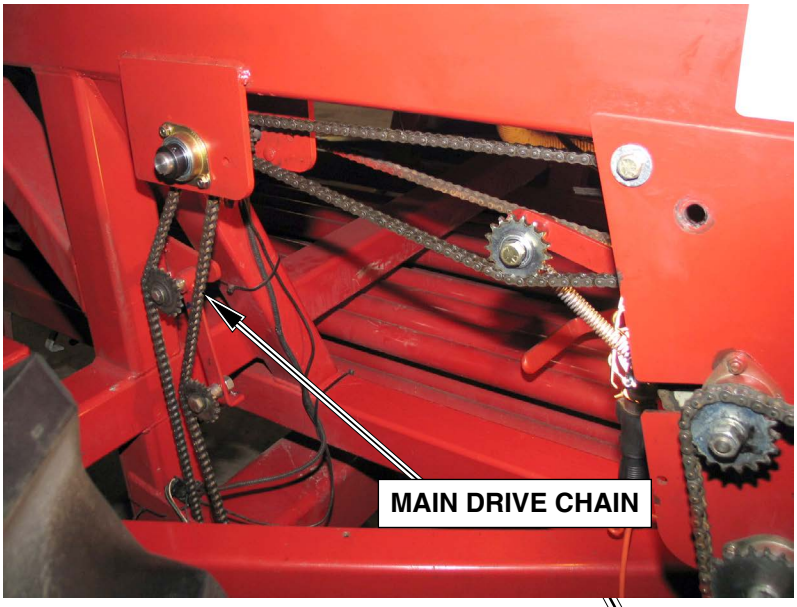


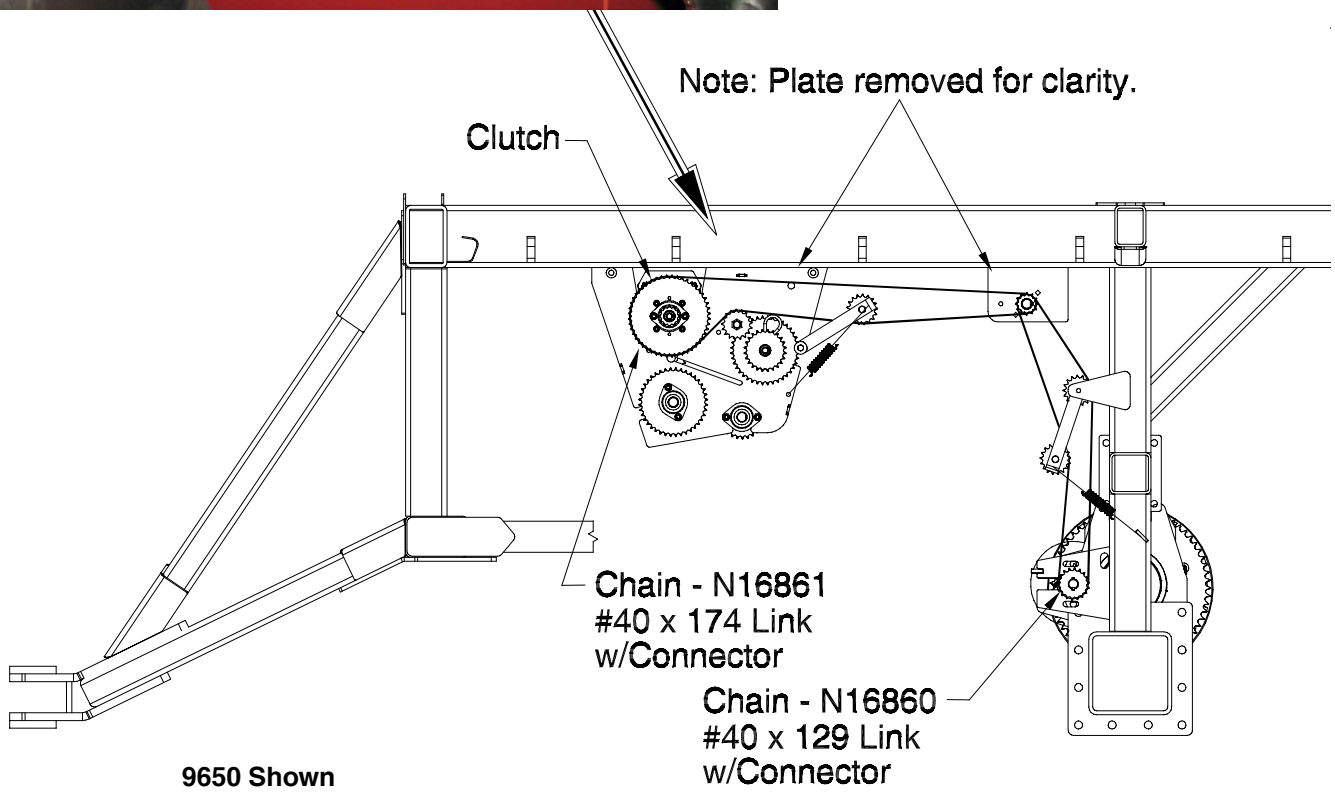
Transport - Continued

Main Drive Chain Installation - Continued

9445, 9550 and 9650 - Mid Mounted Rear Axle

9800 Tow Behind and Tow Between





9650 Shown

Metering System

The 9 Series Air Cart uses a combination of metering wheels and spacers shown below. The metering wheel is individually sized to correspond to the number of outlets at the connected secondary head and the spacers make up the space between the wheel and the body. Some openings may be blanked off depending on the number of secondary divider heads used on the seeding tool.

The 9 Series Air Cart can meter all types of seeds and fertilizers by simply installing the correct seed plate. See *"Seed Plate Settings"* for more details.

Different rates are easily obtained using the selection of quick change sprockets that attach to either of the two meter transmissions.

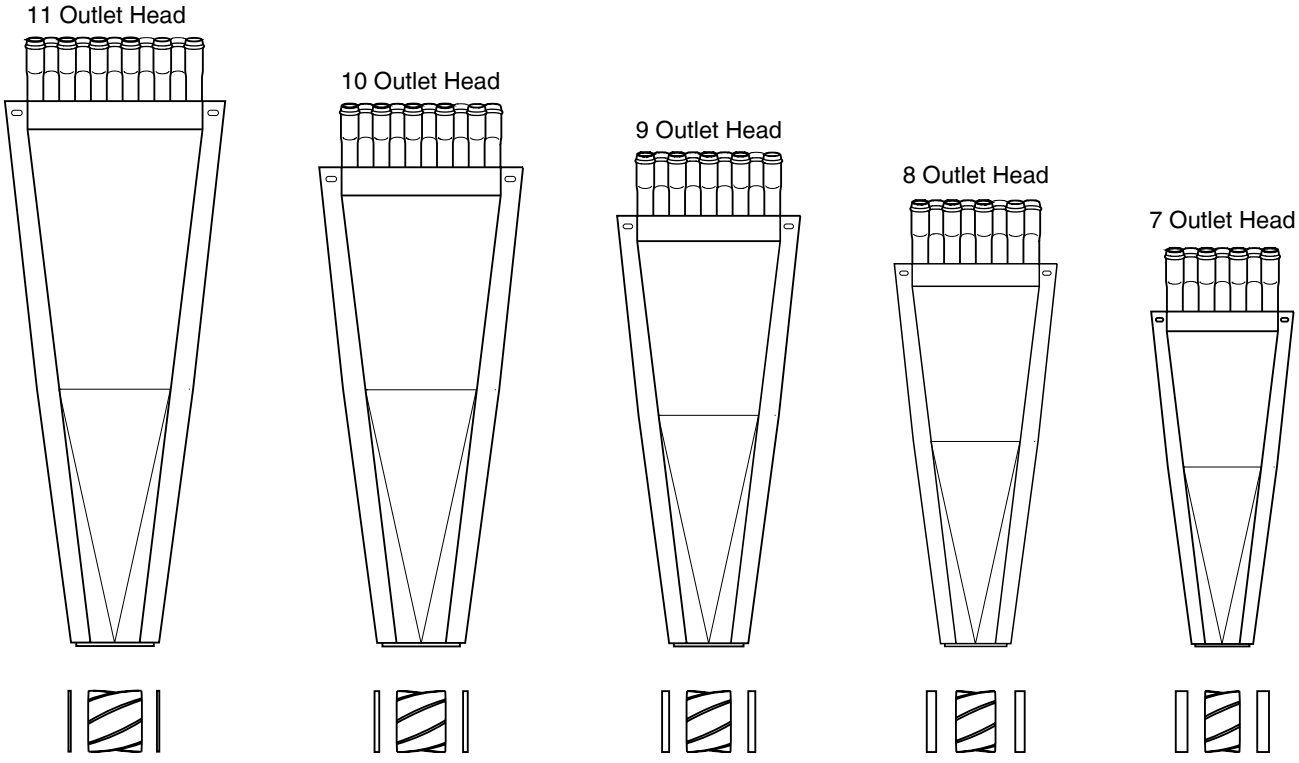
Note: Before putting product into the tanks check the following:

1. The correct Seed Plates are installed for the product being applied.
2. The clean-out doors are fully closed and sealed.
3. The plastic bag covering the fan is removed.

Important

Ensure distribution system is balanced. It is very important that head outlets only vary by one. (i.e. use only 7 and 8 together, 8 and 9 together, 9 and 10 together)

Note: The number of outlets on the divider head must match the metering wheel size.



11 Outlet Metering Wheel with 1/8" spacers.

10 Outlet Metering Wheel with 1/4" spacers.

9 Outlet Metering Wheel with 3/8" spacers.

8 Outlet Metering Wheel with 1/2" spacers.

7 Outlet Metering Wheel with 5/8" spacers.

Metering System - Continued

Secondary Hose Installation

The lengths of the 15/16” (24 mm) diameter hoses are **very important.**

For accurate distribution the secondary hoses have to be arranged by length symmetrically around the centre line.

The **longest** hoses **have to be** in the **centre** of the divider head. These hoses would normally feed the openers furthest away from the head.

- Ensure that the secondary hoses 15/16” (24 mm) diameter do not run higher than 3” (76 mm) above the height of the flat fan divider head.
- Allow an extra 3” (76 mm) of hose before cutting secondary hose for fitting in the seed boot.
- Always ensure that the secondary hoses are sufficiently long to accommodate tripping of trips.
- **Avoid sharp bends** in any of the hoses.
- Check for pinch points and clearances when folding in and out of transport.

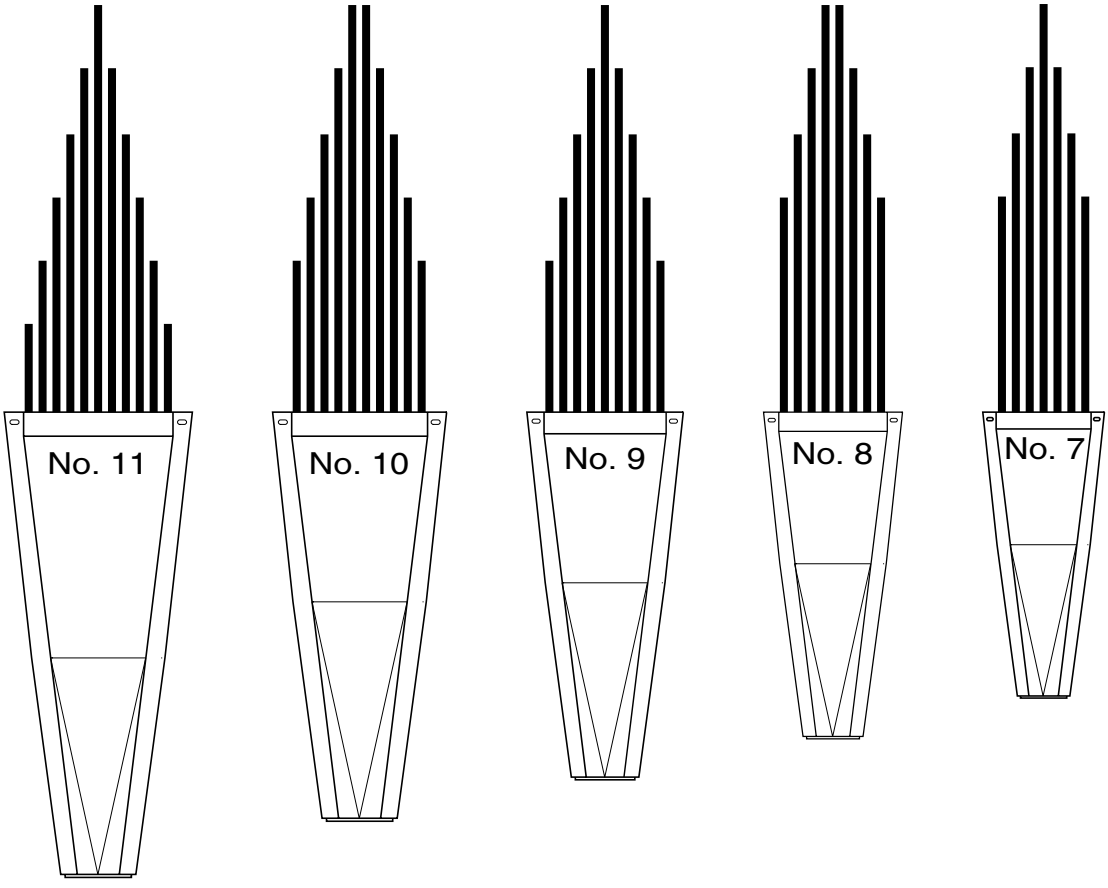
Important

Hot water is the only acceptable lubricant for the installation of the secondary hose.

The supplier advised MORRIS that WD-40 or any other lubricant (i.e. liquid detergent) will have a negative effect on the chemical stability of the hose, resulting in the degradation and failure of the hose due to Environmental Stress Cracking.

Important

Distribution uniformity will be adversely affected if hoses are incorrectly installed.



Metering System - Continued

Seed Plate Sizes

The seed plate comes in 3 different sizes, fine, medium and coarse. Each seed plate is designed for use with specific product types.

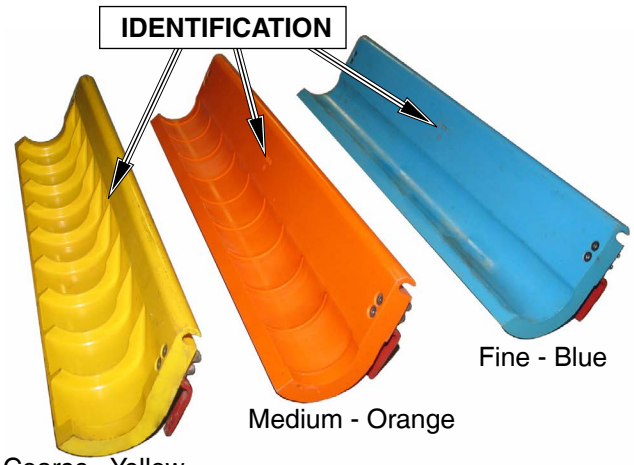
The seed plate has only one position, fully closed against the back plates assembled to the metering body.

The polyurethane seed plates are identified by a part number on the front face as indicated:

N37670 - Coarse Seed Plate (plate only) - Yellow

N40845 - Medium Seed Plate (plate only) - Orange

N40840 - Fine Seed Plate (plate only) - Blue



Viewed from Front

Viewed from Back

Seed Plate Assembly complete with clips:

- N37696 - Coarse Seed Plate Assembly
- N40957 - Medium Seed Plate Assembly
- N40956 - Fine Seed Plate Assembly

Seed Plate Usage

Product	Seed Plate
Canola Canary Seed Clover/Alfalfa Flax Mustard Nitragin Edge Fortress Rival	Fine
Barley Lentils Milo Oats Rice Wheat Safflower Nodulator Tag Team Fine Fertilizer (no Sulphur or Potash) 28-0-0 Fertilizer 46-0-0 Fertilizer 34-17-0 Fertilizer 20.5-0-0-24 Fertilizer	Medium
Beans Peas Soybeans Sunflowers 0-0-60 Fertilizer 0-45-0 Fertilizer 10-46-0-0 Fertilizer 11-51-0 Fertilizer Fertilizers containing Sulphur and/or Potash	Coarse

Note: Seed Plate Chart is a suggested usage. Product variations could require a different seed plate to be used for proper metering.

i.e. Clean 11-51-0 Fertilizer may require a Medium seed plate to reduce product flow.

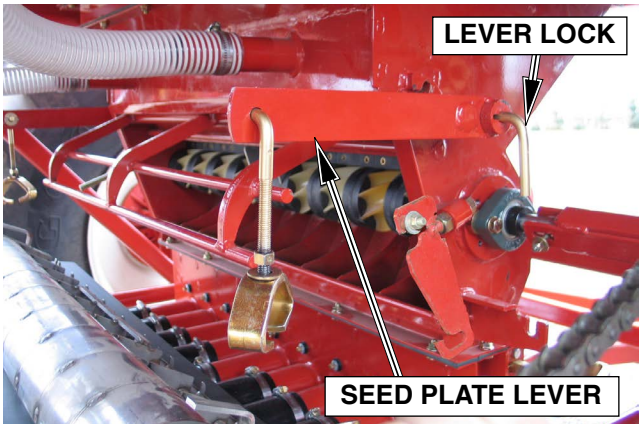
Metering System - Continued

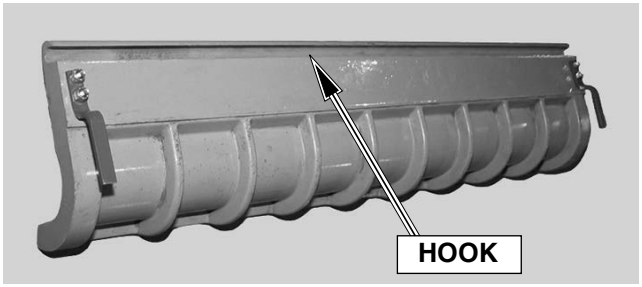
Seed Plate Installation

- Ensure Tank Shut-Offs are closed if there is product in the tanks.

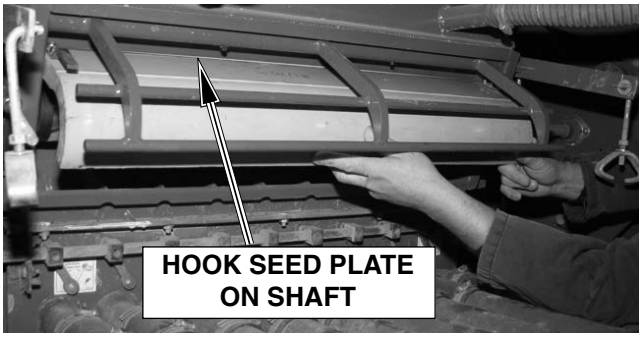
Note: Tank Shut-Offs are only for use when inspecting/servicing meter body with product in tank.

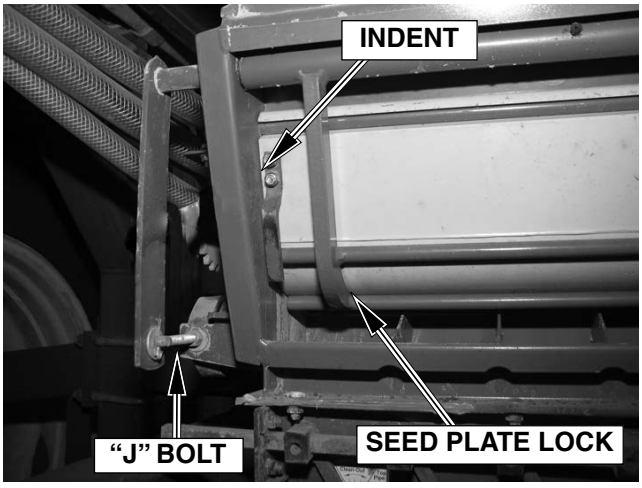
- Install seed plate with hook to the top of the metering body.
- Rotate seed plate towards the metershaft with top part of seed plate hooked to the shaft running through the top of the meter body.
- Let the seed plate hang in the metering body.
- Rotate seed plate lock down to push seed plate against the back plate.
- Install the "J" bolts into the slotted lug welded to the meter body and tighten the wing nuts. **Do not** adjust the flange nuts on the "J" bolts. These nuts are preset on assembly. Refer to Maintenance Section under "Seed Plate Adjustment" for details.
- Ensure Tank Shut-Offs are opened.





Seed Plate





Important

Seed Plate Position

Once "J" bolt wing nuts are tightened, indents in the side plates should just be visible in the slotted area of the hook.

Bin Level Adjustment

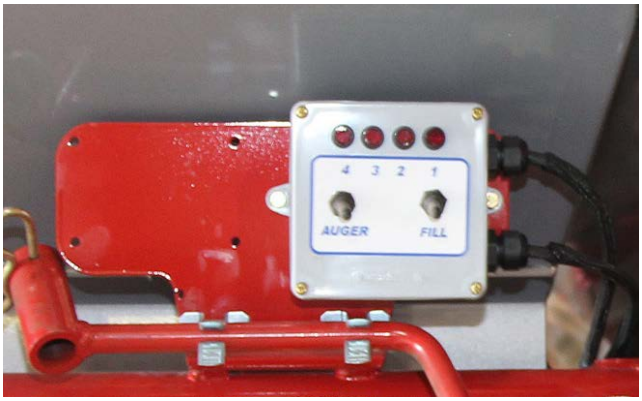
- Adjust bin level sensor to desired alarm point.
  - Top position for large seeds, high rates of fertilizer.
  - Middle postion for cereal grains.
  - Lower postion for fine seeds.

Full Bin Indicator

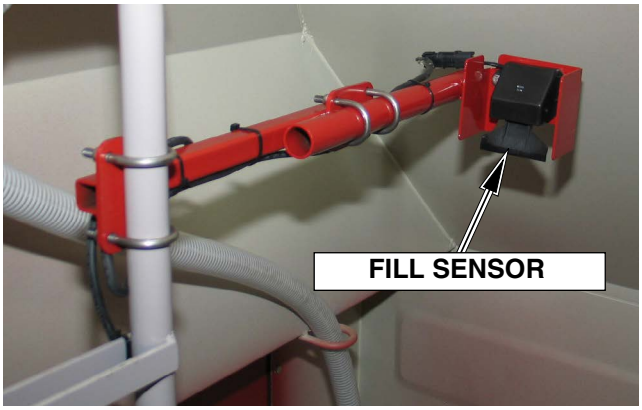
The Morris 9 Series Air Cart is equipped with a fill indicator to alert when bins are full during loading.

Sensor positon in tank can be adjusted by loosening U-Bolts and moving up or down on ladder.

- On some tractor models the tractor working lights need to be on in order to have power at the auger switch box - check by turning auger lights on.
- Turn fill switch to on position during filling.
- The appropriate light will illuminate when bin is full.
- Turn off while seeding.



Fill Indicator



Fill Sensor - Optional

Digi-Star Weigh Scale

The Morris 9 Series Air Cart can be equipped with an optional Digi-Star Weigh Scale to track product usage.

Refer to the Digi-Star manual for setting and operating the scale.

The Digi-Star system requires the following numbers listed below to get the best feedback from the system - for the load cell setups utilized.

Calibration Number
All Tow Between units - 46584
9650 Tow Behind - 62107
9800 / 91000 Tow Behind units - 62111

Setup Number
9650 Tow Behind / Tow Between - 147060
9800 Tow Behind / Tow Between - 147080
91000 Tow Behind - 147090

Note: The last three numbers represent the maximum weight that the system is measuring. Therefore for 147060 - it is weighing a max of 60,000 lbs.

This can be changed to whatever maximum the operator wants - but as the total capacity increases sensitivity increments decrease.

Digi-Star Weigh Scale

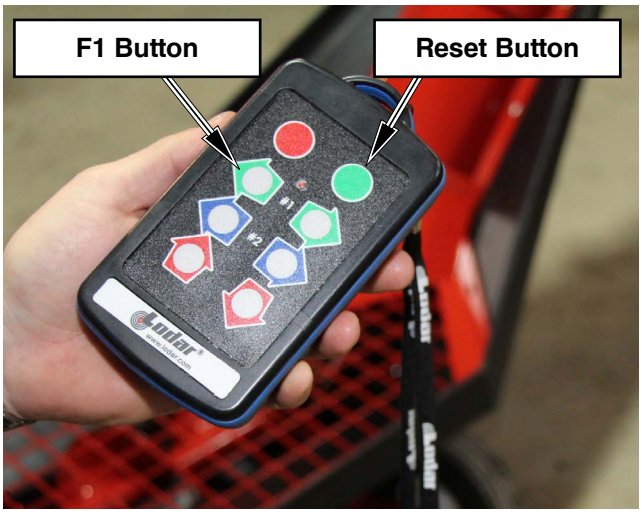
Hydraulic Assist Conveyor/Auger

Remote Controller Operation

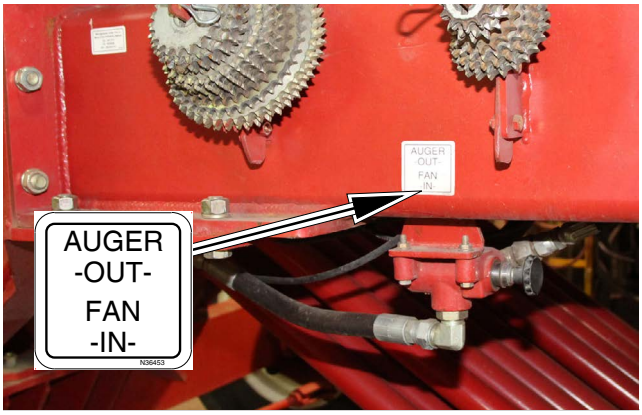
- Familiarize yourself with the remote functions.
- On initial startup of the system the remote needs to learn the transmitter signal of the solenoid by:
  1. Power up the solenoids Receiver located on Air Cart frame by turning on Tractor or unplugging and plugging in the receiver. This opens a 20 second registration window in the Receiver processor. If looking at the Receiver the Fault LED will be flashing.
  2. Immediately PRESS and HOLD the Controller's Reset Button then within 2 seconds PRESS and HOLD the F1 Button, continue to hold BOTH BUTTONS for a MINIMUM of 5 seconds during this 20 second window. When the Transmitter is Registered the Receiver Fault LED will be illuminated for 3 seconds.

Note: Red light will flash on control box located on Cart frame when any arrow button is pressed indicating it is communicating with the remote controller.

Note: The remote will need to learn the transmitter signal each season of use and when batteries are replaced.



Remote Control



Selector Valve

Operation

- Familiarize yourself with the remote functions.
- Ensure selector valve is in correct position for auger operation and engage tractor hydraulics.
- Press round green button to turn controller On.
- Press round red button to turn controller Off.
- Green arrows control inner arm.
- Blue arrows control outer arm.
- Red arrows control lift and lower.
- Store remote controller in tractor cab.

Note: The valve block has a restrictor valve to prevent excessively quick movement of the arms. If arms move rapidly hydraulic flow from tractor is reversed.

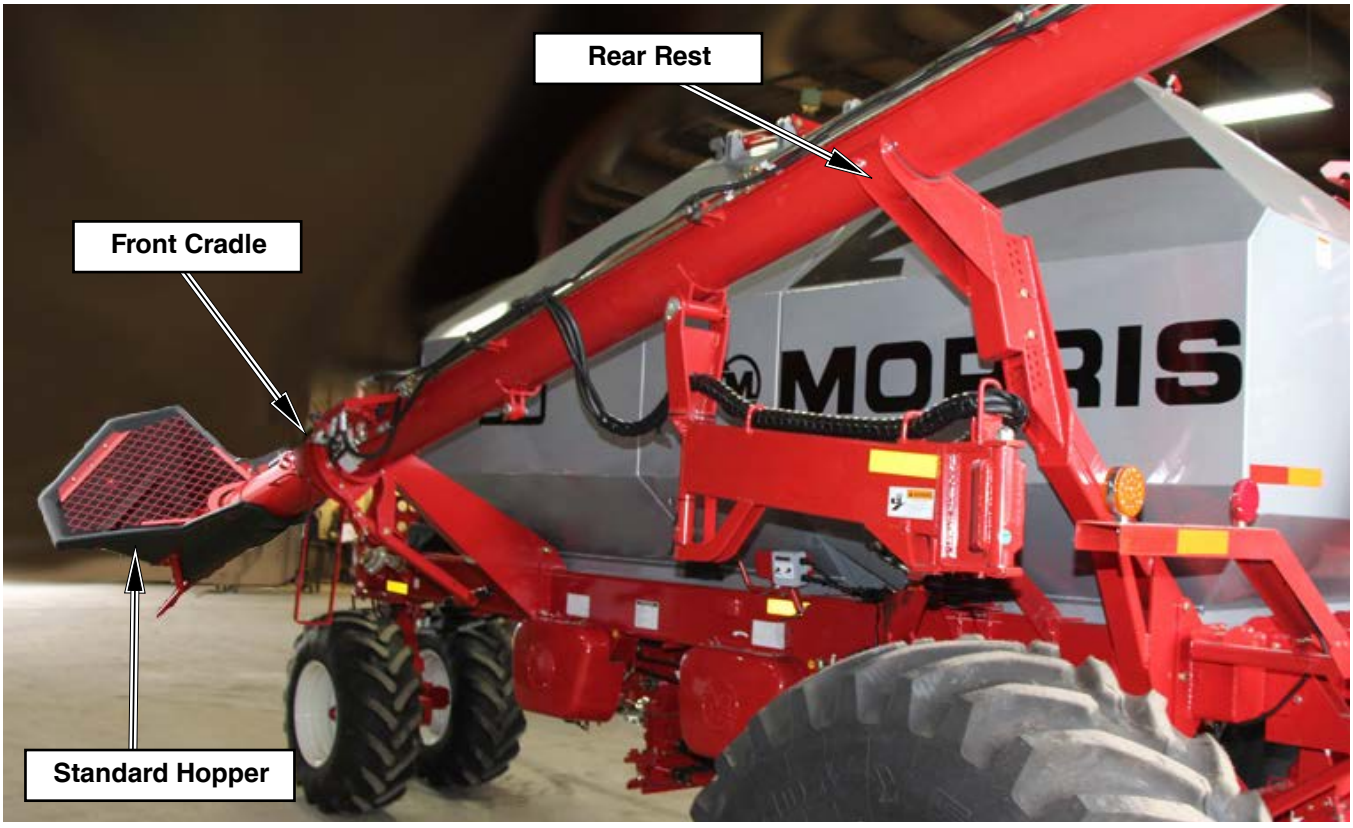
Auger

Manual Arms

Available only with standard hopper.

- Ensure lock pin is unlocked to allow free movement of the inner arm.
- Unlatch front cradle lock.
- Lift auger out of front cradle and pull away from cart.
- Refer to decal on frame for inner arm positions.
- Move inner arm to desired slot position by either pulling on auger or pushing on inner arm itself.
- Engage inner arm lock pin into slot for the tank to be loaded/unloaded.
- Complete auger positioning by swinging outer arm and auger into place as required.
- To place auger into storage position. Disengage lock pin, swing inner arm back to slot #1 and relock pin.
- Swing outer arm back fully toward cart.
- Lift auger until it contacts rear rest and swing front end into cradle.
- Latch front cradle lock before transporting.

Manual Auger - Lock Pin



Auger - Continued

Hydraulic Assisted Arms

- Ensure Fan/Auger selector valve is in correct position for auger operation and engage tractor hydraulics.
- Unlatch front cradle lock. Keep head and upper body clear of pad and cradle handle movement.
- Swing out the auger using controller to extend/retract cylinders as required. See “Remote Controller Operation” for details.

Note: The valve block has a restrictor valve to prevent excessively quick movement of the arms. If arms move rapidly hydraulic flow from tractor is reversed.

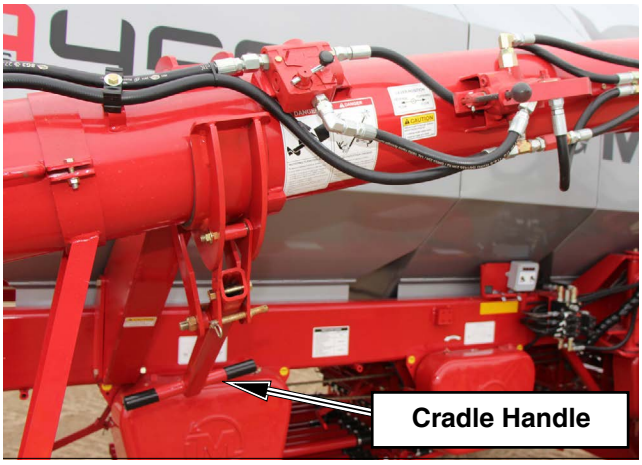
- Whether filling or dumping tanks, start by positioning inner arm then move outer arm as required. Refer to “Semi Trailer Filling Positions” for approximate auger arm positions (Conveyor shown).
- All tanks can be filled from a central hopper location. Keeping hopper anchored move both arms in small increments from one tank to the next.

Auger Storage Position

- Swing auger into storage position using remote control to extend/retract cylinders as required.
- Refer to “Semi Trailer Filling Positons” (Conveyor shown).

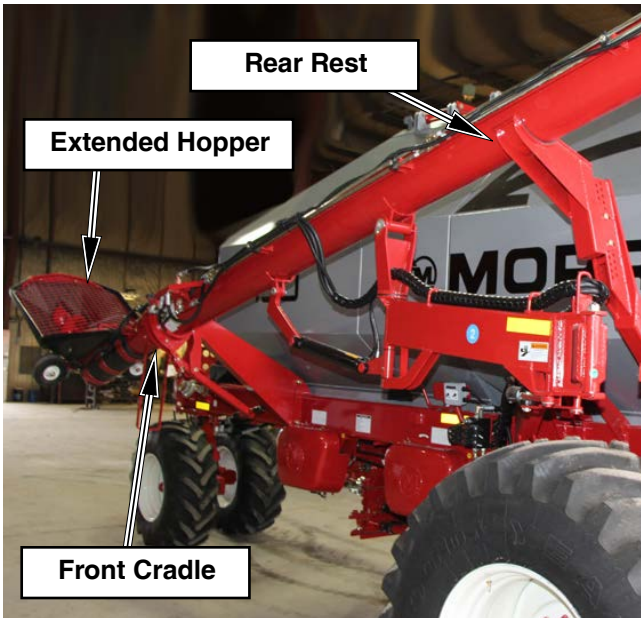
Note: Auger system does not have Lock/Unlock selector valve.

- Manually lock front cradle before transporting.



Front Cradle

Remote Control



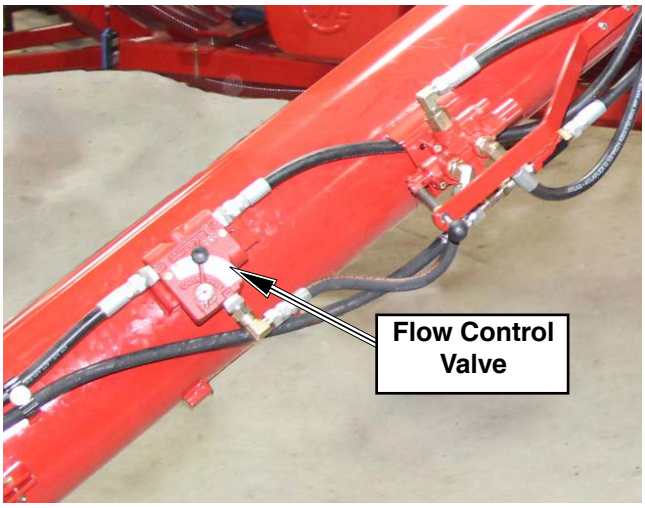
Auger - Continued

Extension Hopper

- Hopper flighting speed is controlled by a flow control valve shown. Flow control range is from 0-2 gpm.
- Recommended initial setting is 1 gpm or # 5 on the range scale.
- With auger running, adjust flighting speed as required for smooth feeding of material into main flyting. The rpm can be estimated by counting revs for 15 seconds and multiplying by 4, it should be 100 + rpm.

Note: Correct lower auger speed should be between 100 to 120 rpm when valve is set to maximum flow. Excessive hopper flighting speed may reduce main flighting speed noticably. Keep hopper flighting speed at the minimum required for proper feeding.

- Hopper is supplied with a bottom cleanout door for easy removal of material.



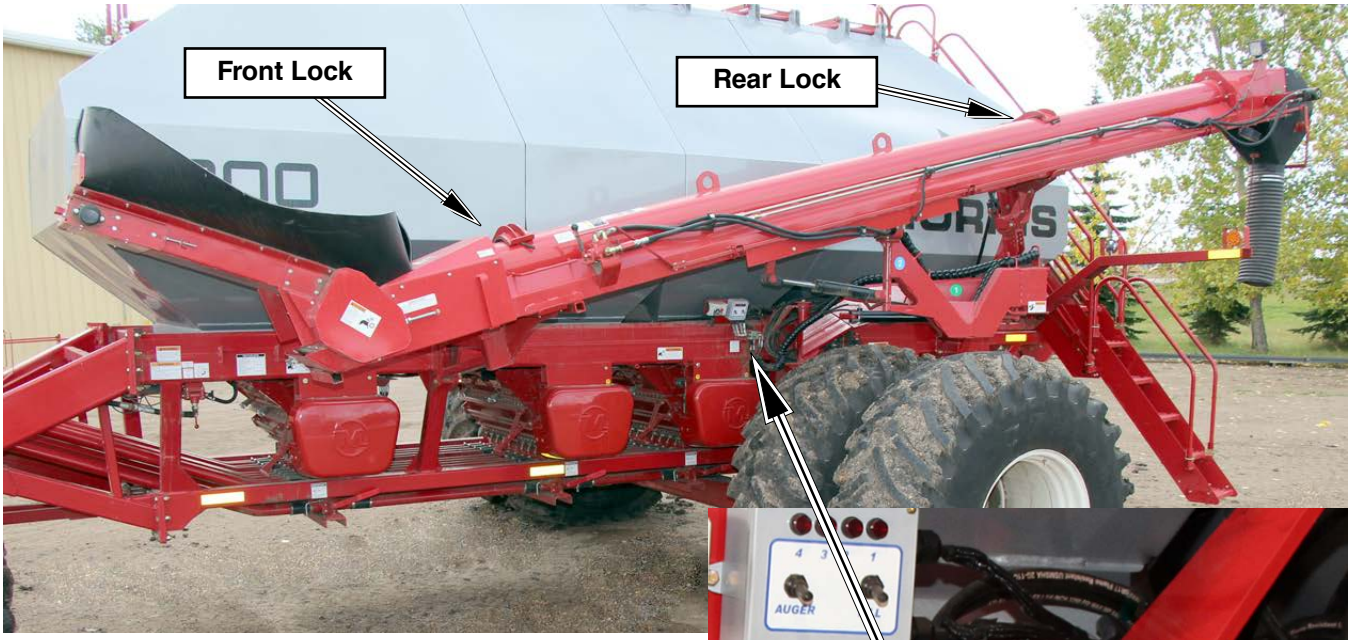
Conveyor

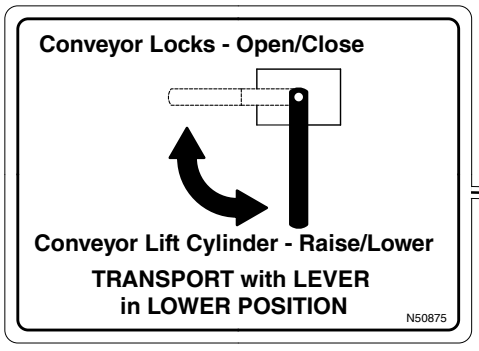
Hydraulic Assisted Arms

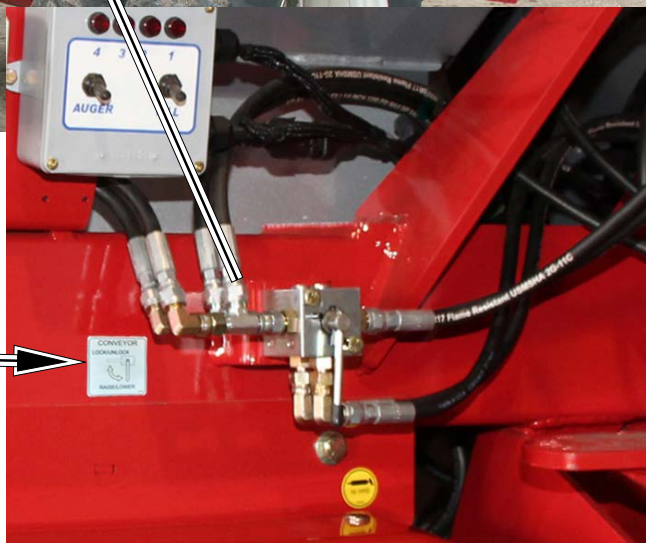
- Ensure Fan/Auger selector valve is in correct position for conveyor operation and engage tractor hydraulics.
- Switch conveyor valve to the “Lock/Unlock” position.
- Unlock cradle pads on the conveyor by operating red arrow buttons on remote control.
- Check to ensure both locks are fully released.
- Swing out the conveyor using controller to extend/ retract cylinders as required. See “Remote Controller Operation” for details.

Note: The valve block has a restrictor valve to prevent excessively quick movement of the arms. If arms move rapidly hydraulic flow from tractor is reversed.

Remote Control







Conveyor - Continued

- Whether filling or dumping tanks, start by positioning inner arm as indicated then move outer arm as required. Refer to “Semi Trailer Filling Postions” for approximate arm postions.
- All tanks can be filled from a central hopper location. Keeping hopper anchored move both arms in small increments from one tank to the next.

Danger

Keep all shields in place. Keep hands, feet and clothing away from auger intake, failure to do so will result in serious injury or death.

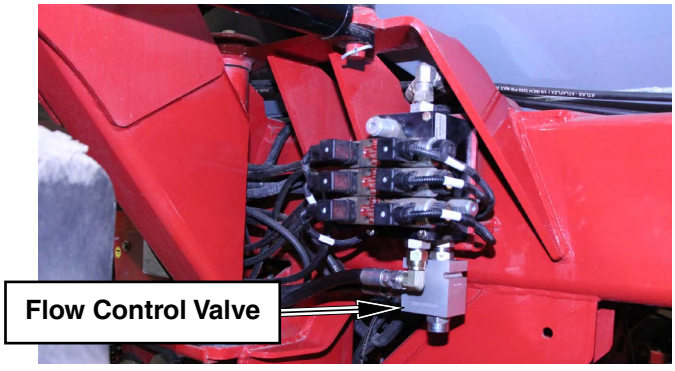
Conveyor Storage Position

- Swing conveyor into Storage position using remote control to extend/retract cylinders as required. Refer to “Semi Trailer Filling Postions” for approximate arm postions.
- Check to ensure both locks are fully engaged before transporting.

Conveyor Belt Speed

The conveyor only requires a flow of 10-15 gpm for optimum feed rate. To ensure the belt does not exceed the maximum speed, a Flow Control Valve is incorporated into the hydraulic circuit maintaining 15 gpm of flow to the conveyor when fan speeds are greater than 3500 rpm.

The recommended conveyor belt speed range for optimum feed rate is as follows:



CLEATED BELT SPEED	CLEATED BELT - TIME / REV		CORRESPONDING FAN SPEED	HYRAULIC FLOW
	23FT	25FT		
Minimum 400 FT/MIN	7 SEC	8 SEC	2400 RPM	10 GPM
Maximum 600 FT/MIN	4.5 SEC	5.5 SEC	3500 RPM	15 GPM

Note: Exceeding the recommended belt speed will reduce product capacity and increase seed damage and may cause hydraulic motor seal failure. Motor Seal Kit Number is N55718.

Conveyor - Continued

Operation

- Set Conveyor Belt Speed before operating. Refer to “Conveyor Belt Speed” for details.
- One person must be in a position to monitor the operation of the conveyor at ALL times. **The operator should be alert to any unusual vibrations or noises that might indicate the need for service or repair during the initial startup and break-in period.**
- For smoother startups, keep the conveyor from starting totally full. This will also ensure efficient operation.
- In cold weather, run empty conveyor for five minutes to warm up belt. Otherwise, do not operate the conveyor empty for long periods of time.
- You must “break-in” the conveyor when it is new and at the beginning of each season. Refer to **“Startup and Break-In”** below.
- Make sure the drive end is empty before shutting down the conveyor.

Be certain to close ALL clean-out and inspection doors in the main conveyor hopper before operating.

The operator should not add power before viewing the entire work area and checking that ALL personnel are clear of the designated work area.

The operator should regulate the grain flow to the main conveyor by controlling the amount of grain fed into the hopper. Avoid plugging the main conveyor by overfeeding the hopper.

Be certain that all safety shields and devices remain in place during operation.

Ensure that hands, feet, and clothing are kept away from moving parts.

Stop the engine and lockout the power source whenever the equipment must be serviced or adjusted.

Startup and Break-In

A. Any conveyor that is new or has set idle for a season needs to go through a “break-in” period.

B. Engage the Conveyor at a slow RPM to minimize shock loads.

C. Do not allow the conveyor belt to “load up” at a low speed. If this occurs, high torque must be used to turn the belt and this can damage the conveyor.

D. Run the conveyor at partial capacity until several hundred bushels of grain have been conveyed and the belt and tube are polished.

E. Retighten belt to restore original belt tension.

F. When the belt and tube are polished and smooth, slowly work up to the recommended speed and run the conveyor at full speed.

⚠ Warning

NEVER perform maintenance on the conveyor unless all safety shields are in place.

Replace any that are damaged or lost. Do not clean, adjust, or lubricate any part of the machine.

Conveyor - Continued

Conveyor Adjustments and Maintenance

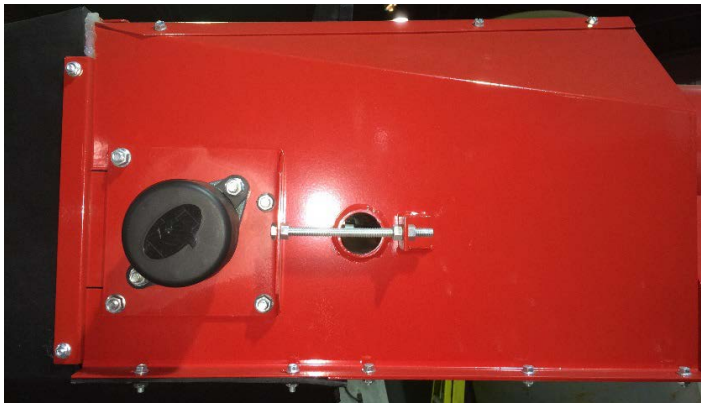
Belt Tension/Tracking - Inspect Daily when cleaning out seed/fertilizer

Damage to the belt caused by improper tracking is not covered under warranty.

Adjust tension of 2" cleated belt in conveyor tube to 23 lb-ft torque on idler roller adjustment bolts. Adjust both sides evenly.

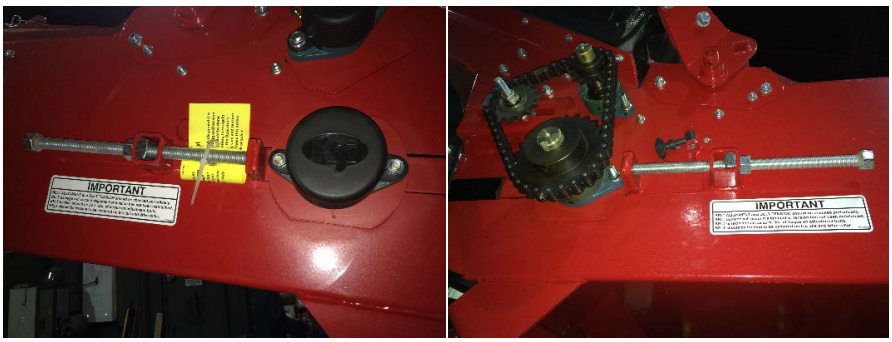
Adjust tension of crescent belt in hopper to 50 lbs-inch torque on idler roller adjustment bolts or until center of belt rises off the support underneath it. Adjust both sides evenly.

Check/adjust belt tracking alignment on idler rollers.



1. **Rollers must be square with the housing and parallel to each other to insure proper belt tracking.**
2. Belt Tension must be great enough to prevent slippage. Check tension of the belts before running the conveyor.
3. Run the conveyor. Check to see that the belt runs centered on the drive roller. Turn off the conveyor. Adjust drive roller to be square with the housing if necessary. **Normally, once the drive roller is tracked at the factory it rarely needs adjustment.**
4. To adjust drive roller, loosen the four nuts on the bearing holder plate, and the jam nut on the threaded adjuster. Retighten after adjusting is complete.

5. Run the conveyor for two minutes.
6. Turn the conveyor off and open the Tail End Cleanout Door to view the idler roller. Check to see that the belt is running centered on the idler roller. **There should be approximately 1/2" gap between the housing and the belt on both sides. Rubbing on the side of the housing can cause severe damage to the belt and/or affect filling capacity.**



7. If adjustment is necessary, **TIGHTEN the roller on the side of the housing that the belt is closest to, or rubbing on.** Adjust bolt in 2-3 turn increments. Run the conveyor after each adjustment to see the result.
8. Once the belt is centered, run the conveyor for at least two more minutes to insure the belt remains in position.
9. Lock adjustment bolt jam-nuts and reinstall the clean out door.

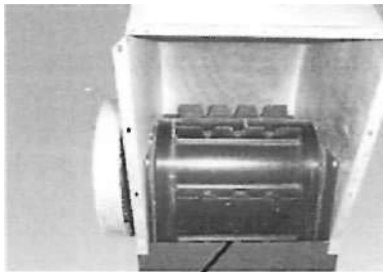
NOTE: Adjust the tracking on the hopper crescent belt in a similar fashion.

Conveyor - Continued

Cleaning/Inspecting the Conveyor - 8 hours or Daily

- **The conveyor tail areas must be inspected and cleaned out before use each day or preferably at the end of the day.** This will help prevent material residue from building up, freezing and causing belt damage and/or difficulty driving the belt.
- **The conveyor drive end should be inspected and cleaned every 40 hours** or weekly for the same reasons.

Access cover and door for hopper clean-out



Access cover for drive head cleanout

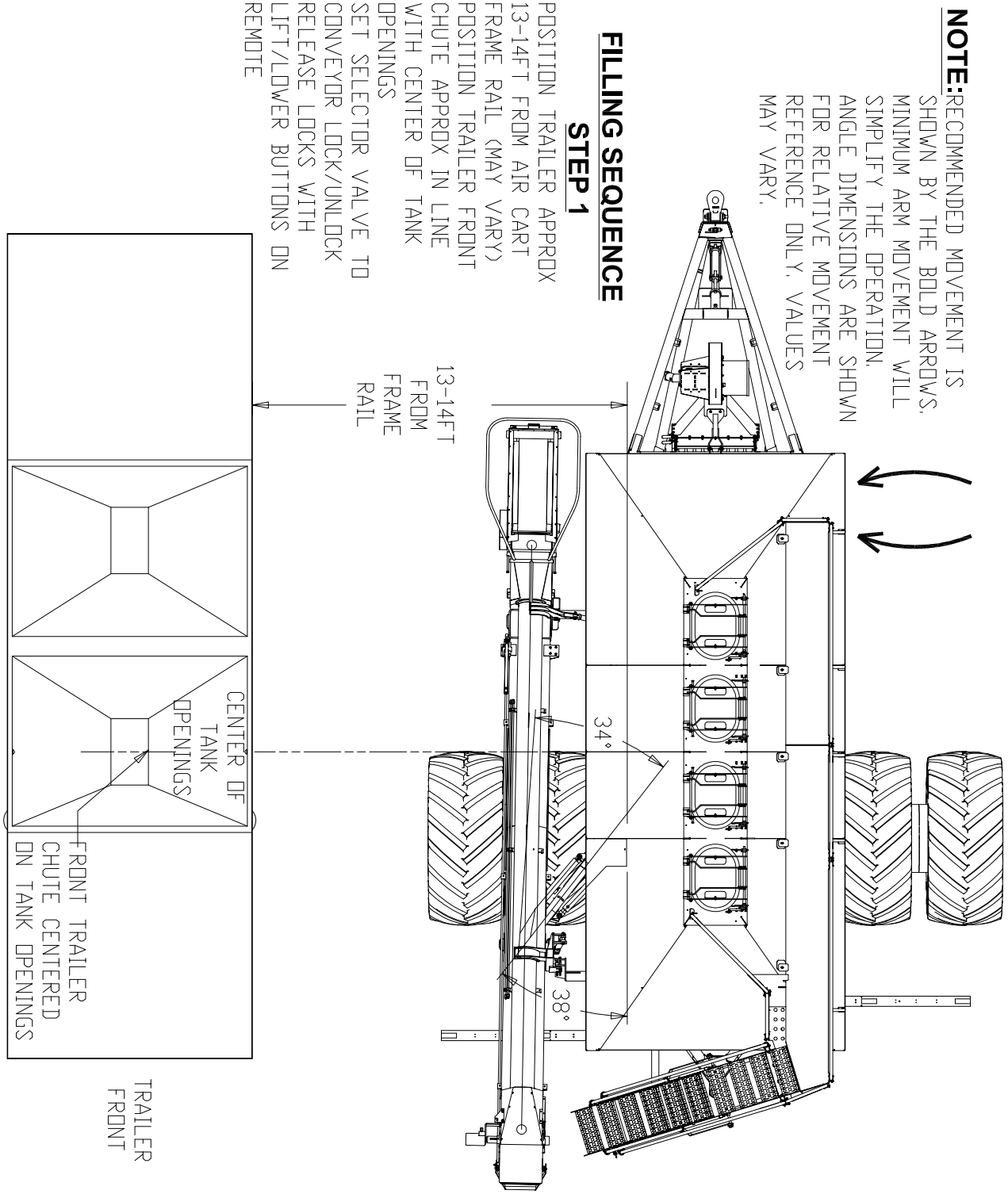
Access cover for incline conveyor cleanout

Conveyor Belt/Tail End Care

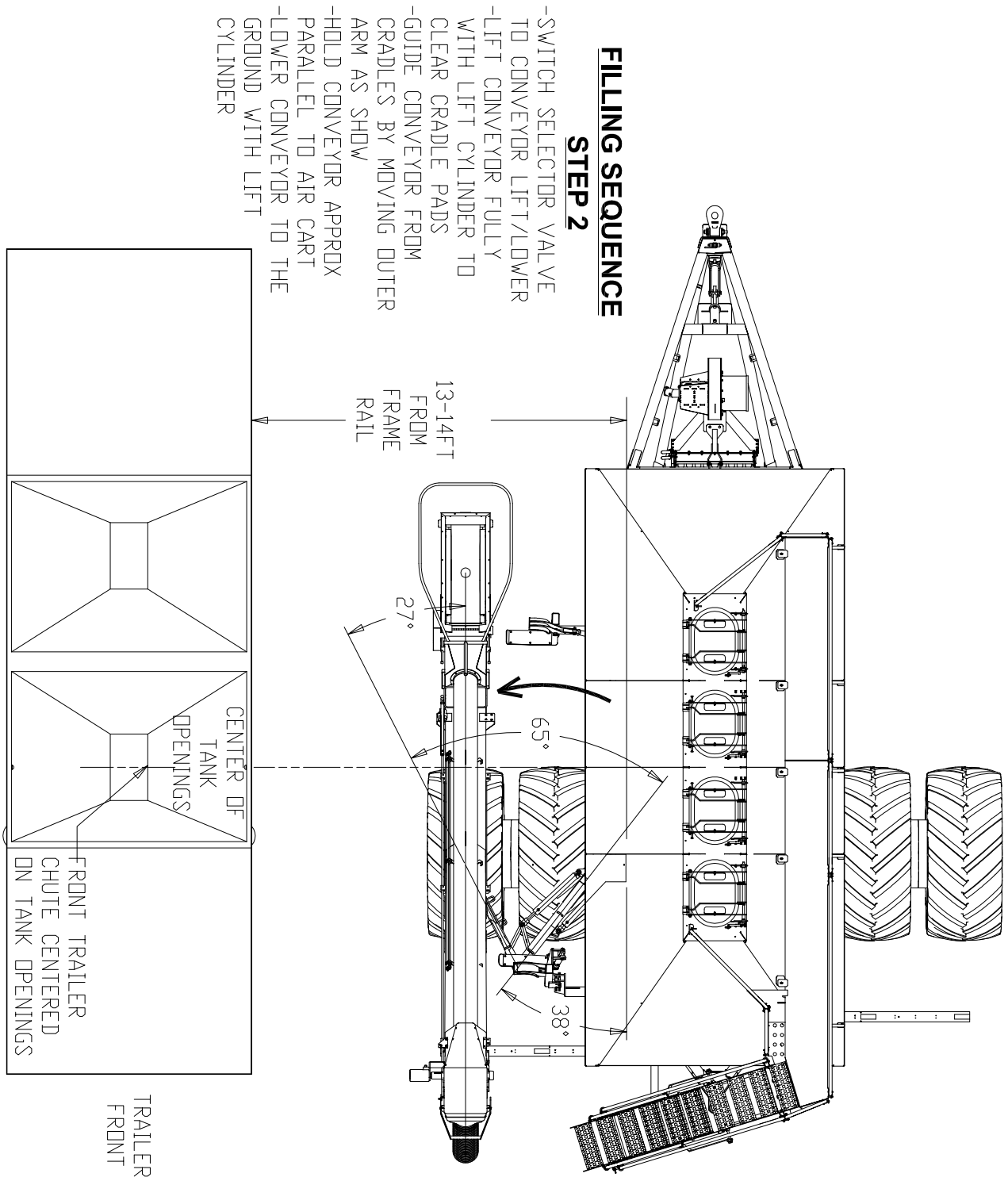
- It is **highly recommended** that both conveyor belts be washed off and the entire tail end be cleaned out at the end of the season.
- This will help prevent material residue from building up and causing rust/paint and/or belt damage.
- In order for water to drain from the lower crescent belt, position the splice on the top side by running and then stopping the conveyor when the splice appears in the hopper.
- **WHEN CLEANING, INSURE ALL HARDENED OR STUCK-ON MATERIAL IS REMOVED.**

Semi Trailer Filling Positions

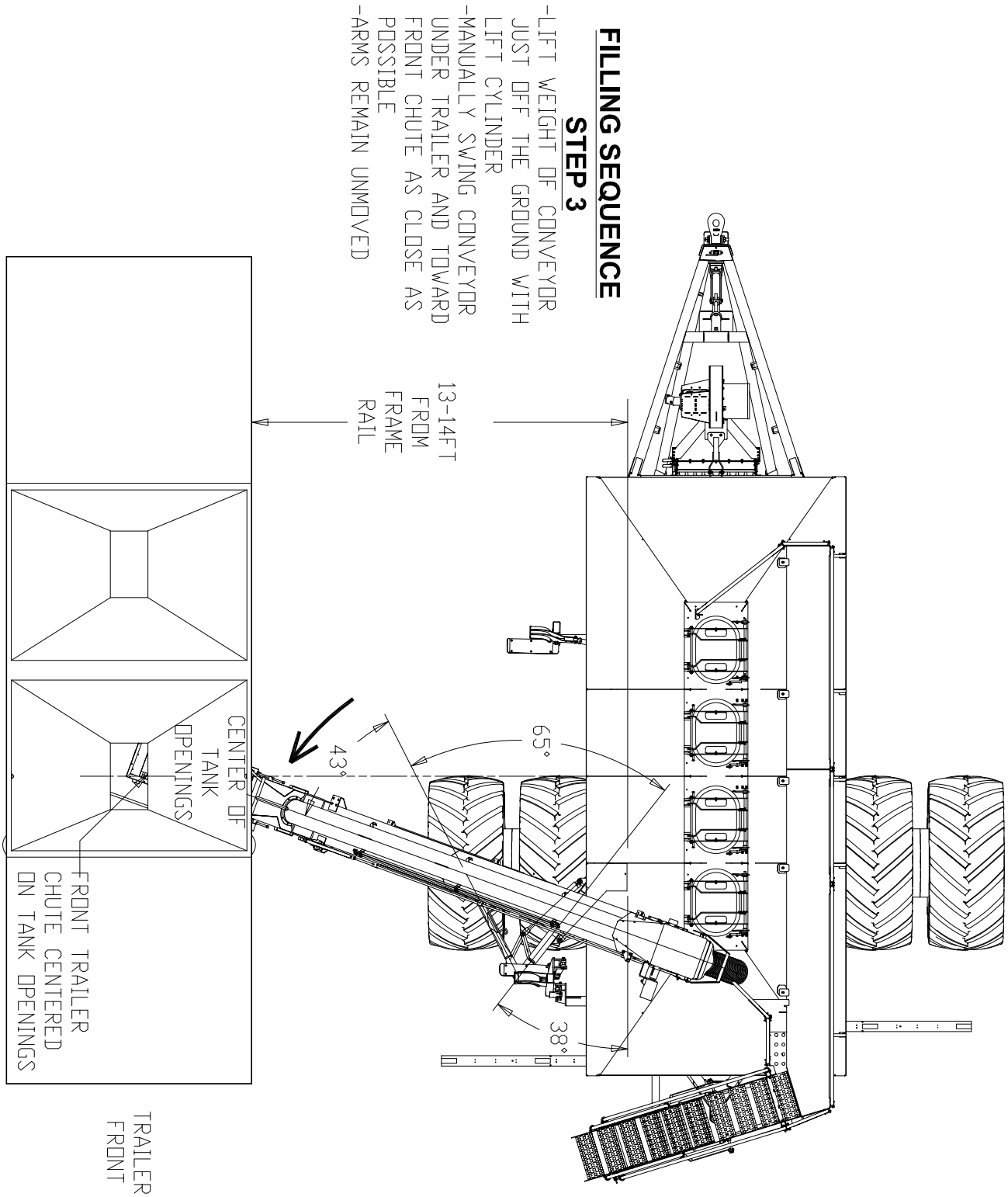
Below is a typical filling sequence from a semi trailer. Due to variations in trailers this procedure may vary.



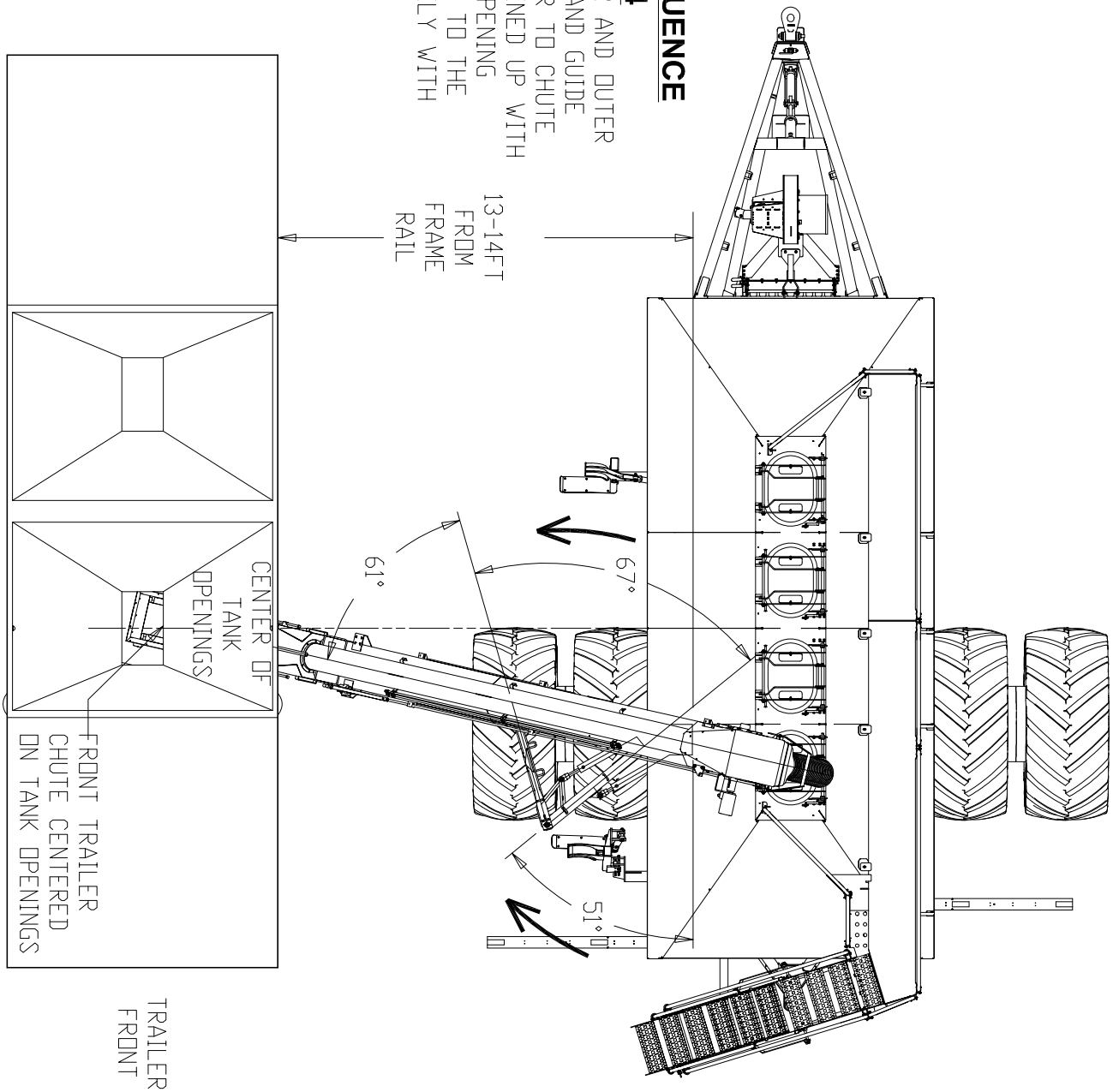
Semi Trailer Filling Positions - Continued



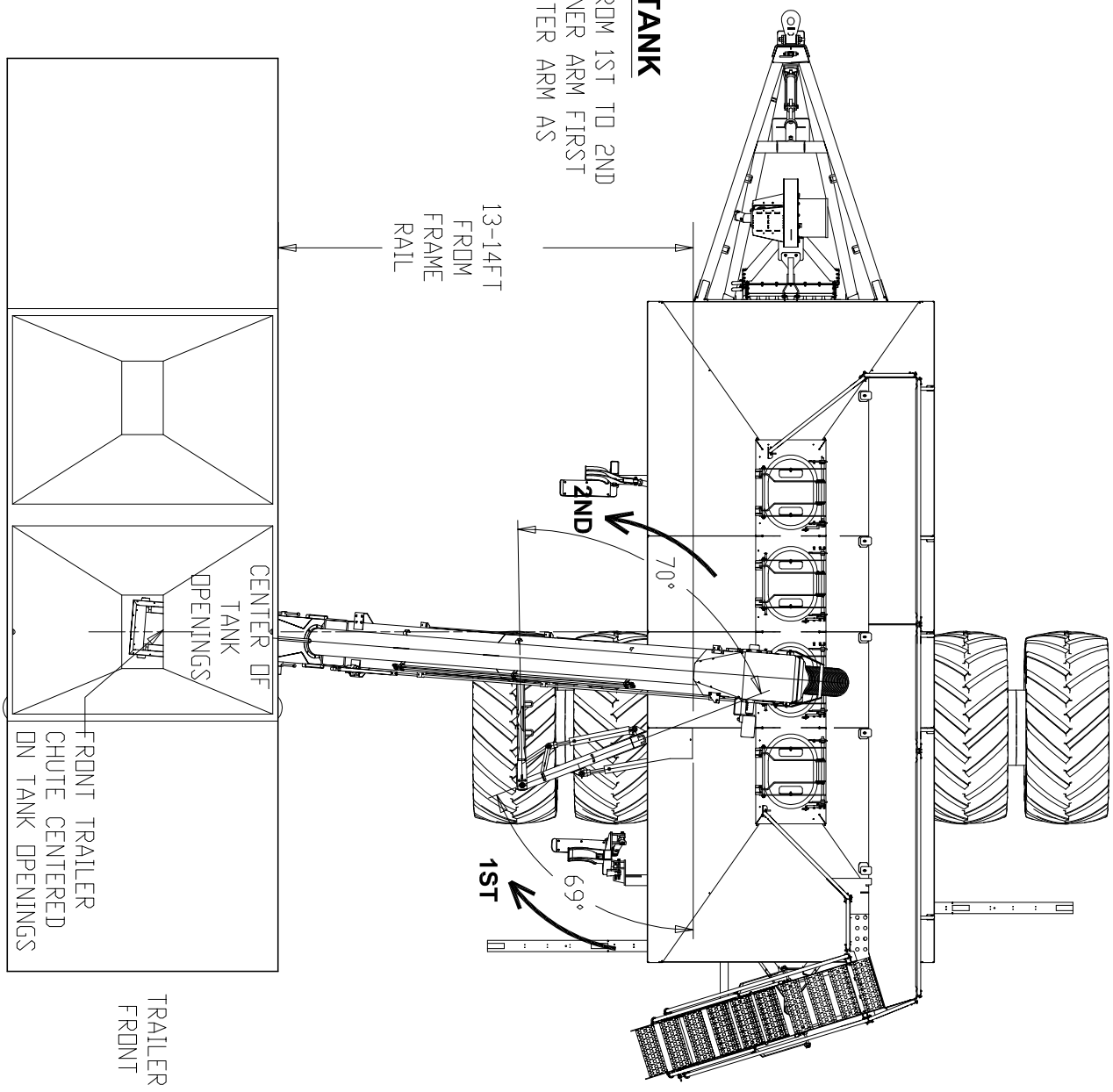
Semi Trailer Filling Positions - Continued



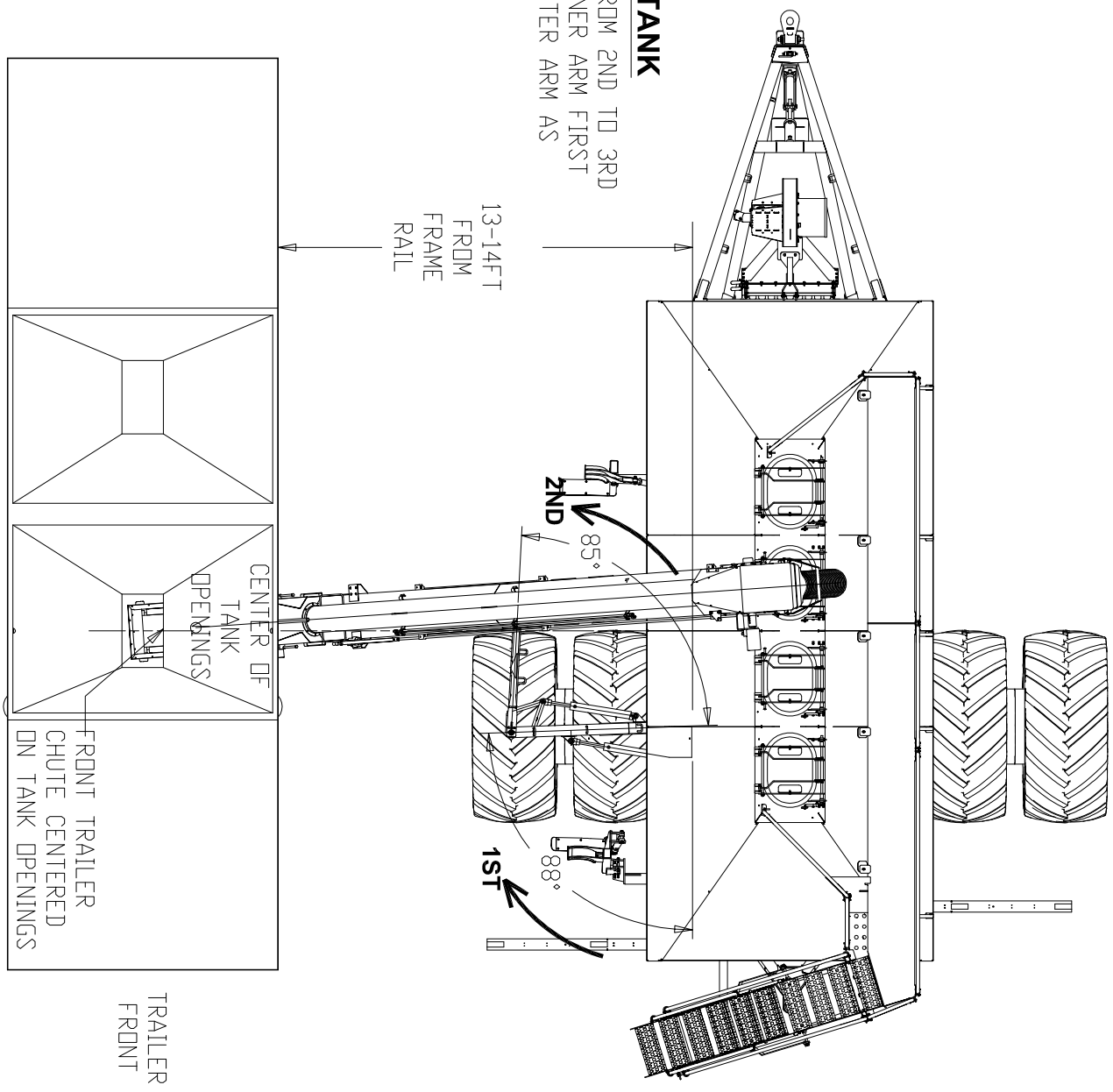
Semi Trailer Filling Positions - Continued



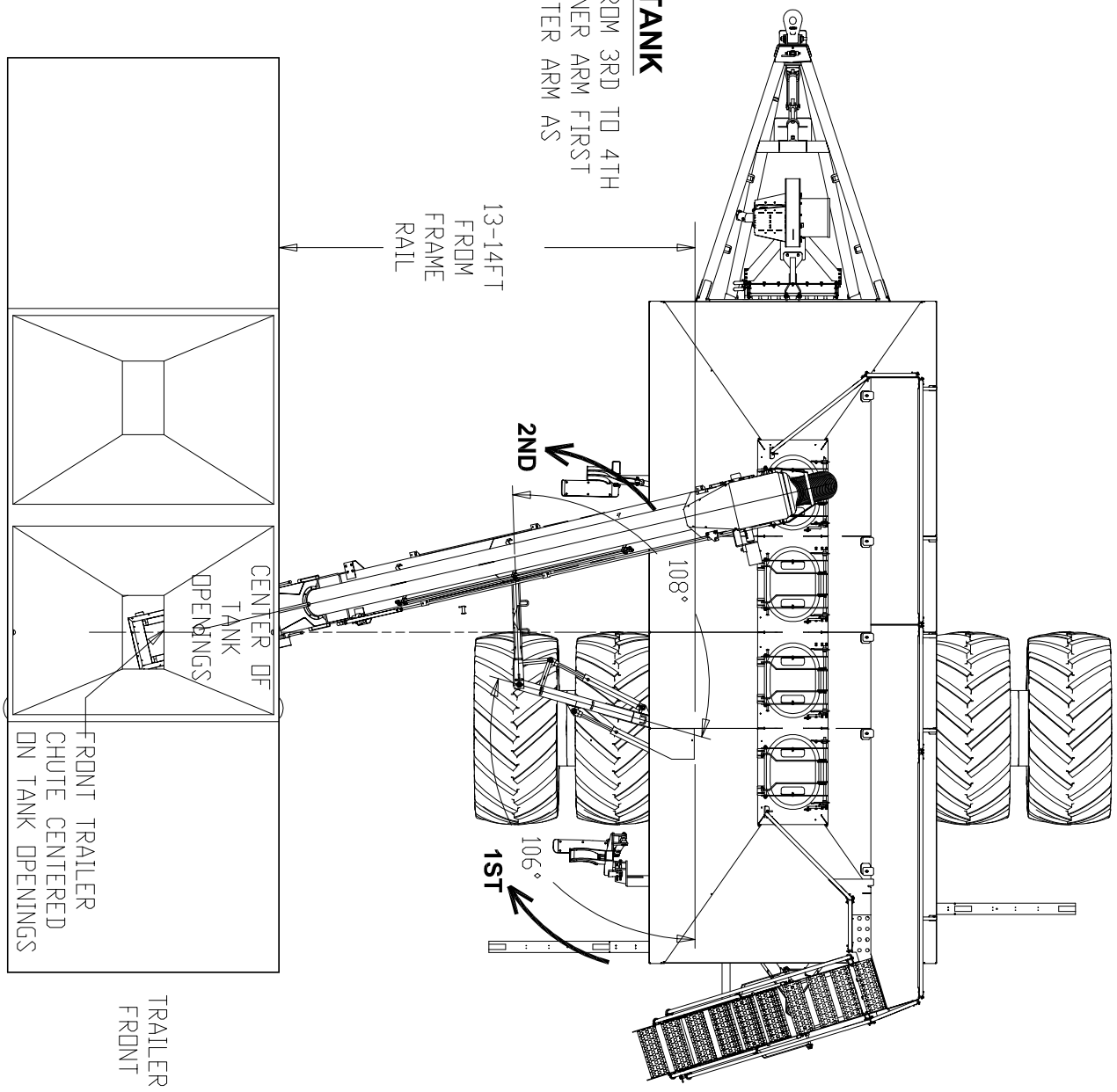
Semi Trailer Filling Positions - Continued



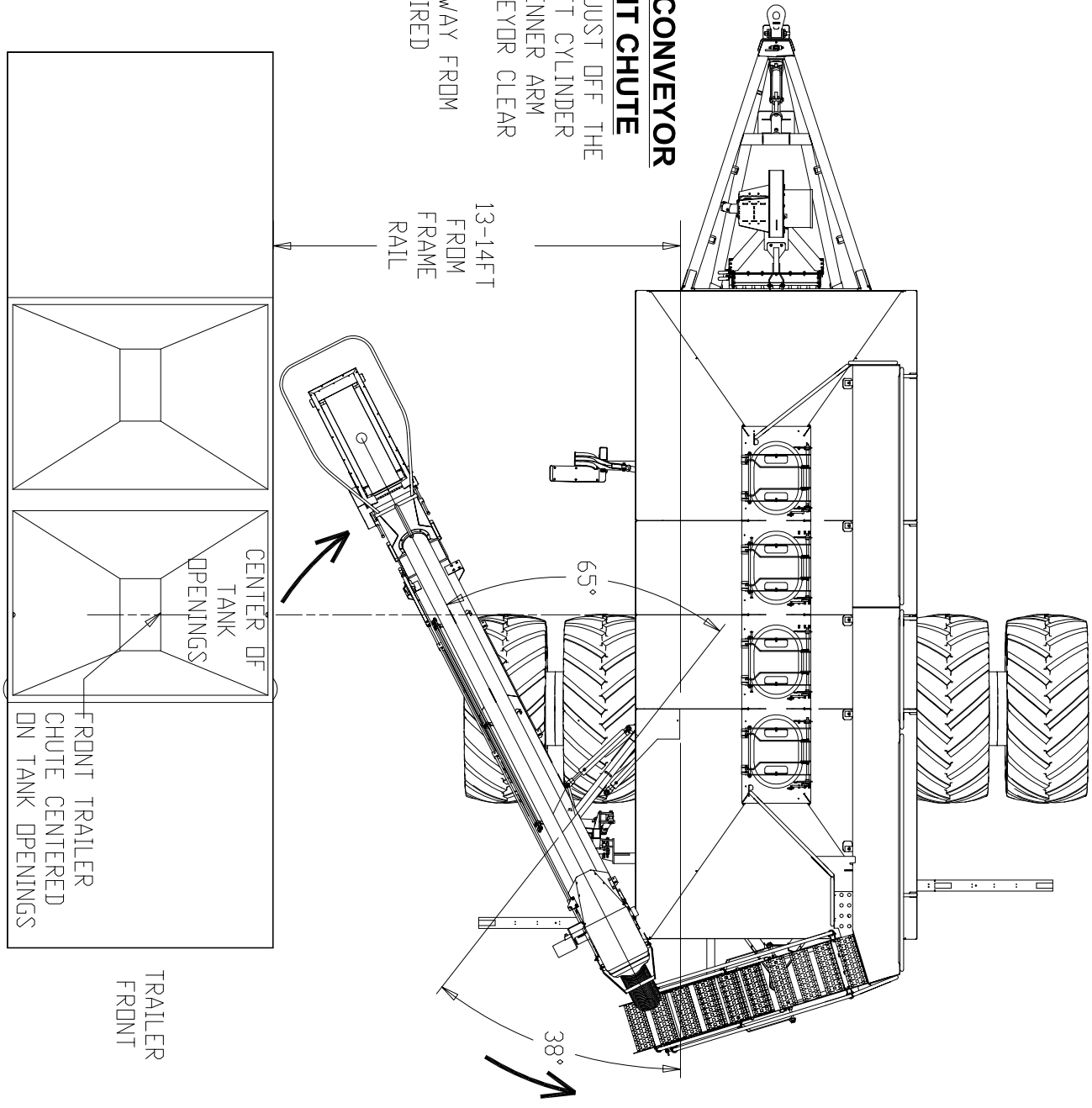
Semi Trailer Filling Positions - Continued



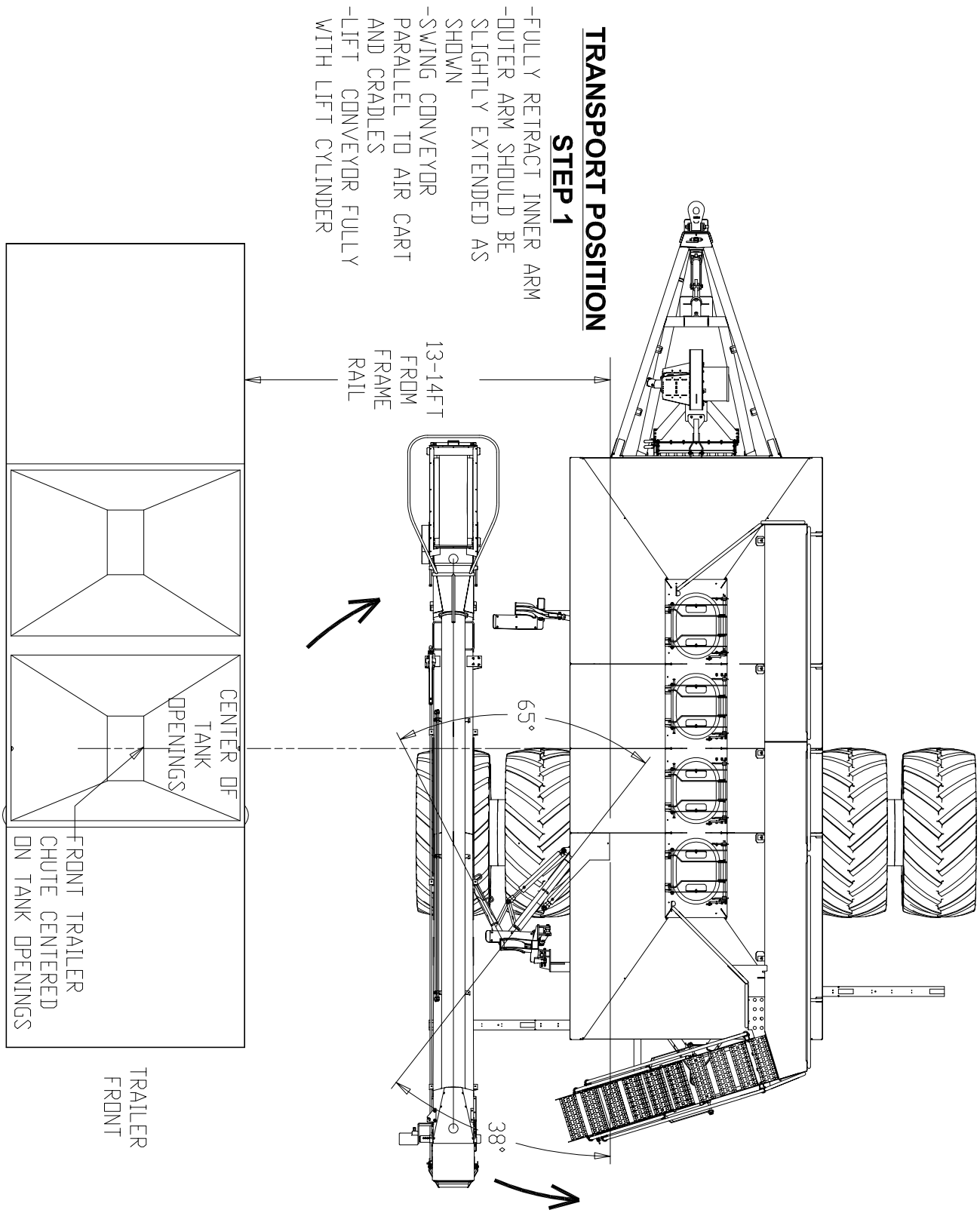
Semi Trailer Filling Positions - Continued



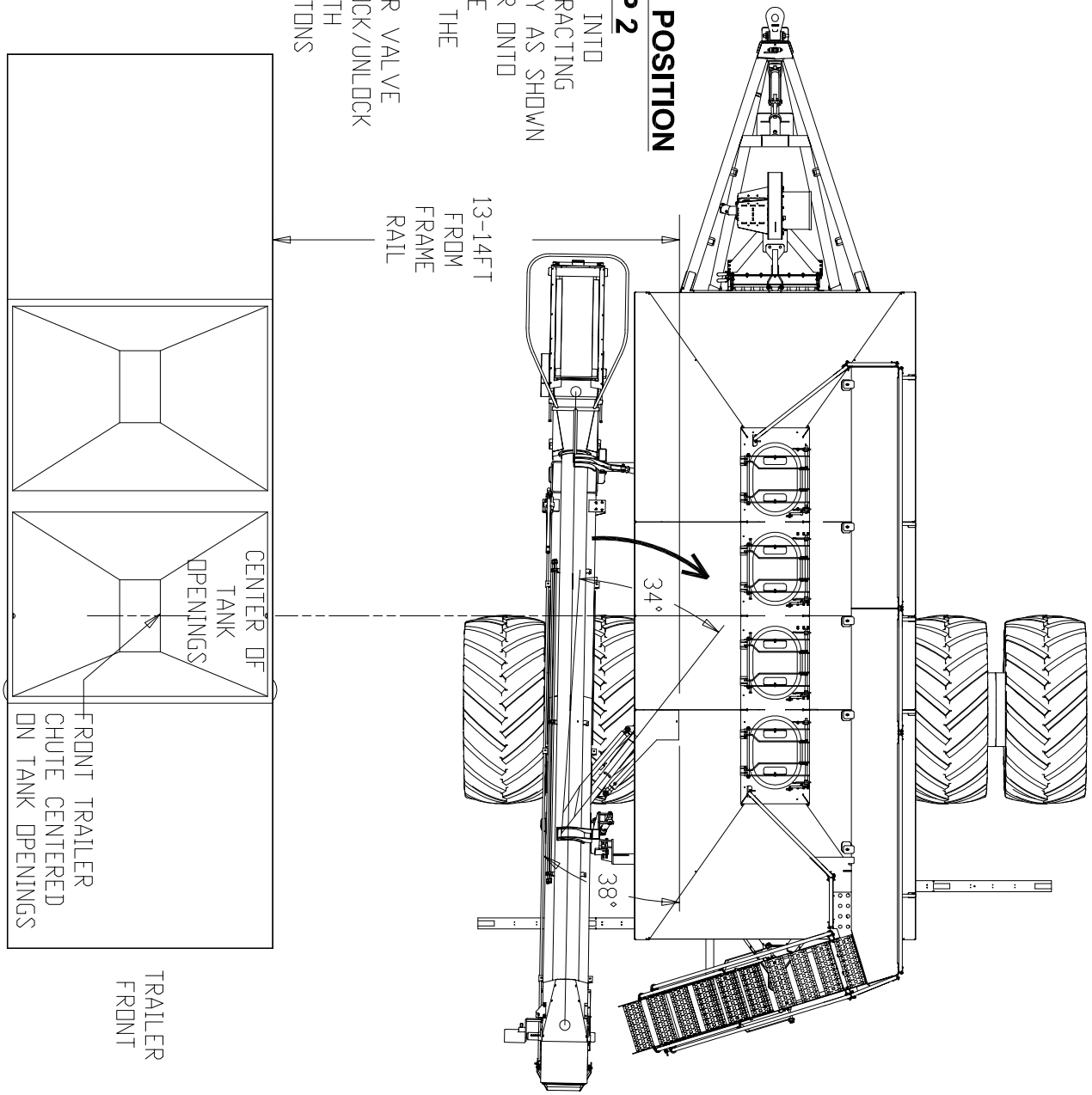
Semi Trailer Filling Positions - Continued



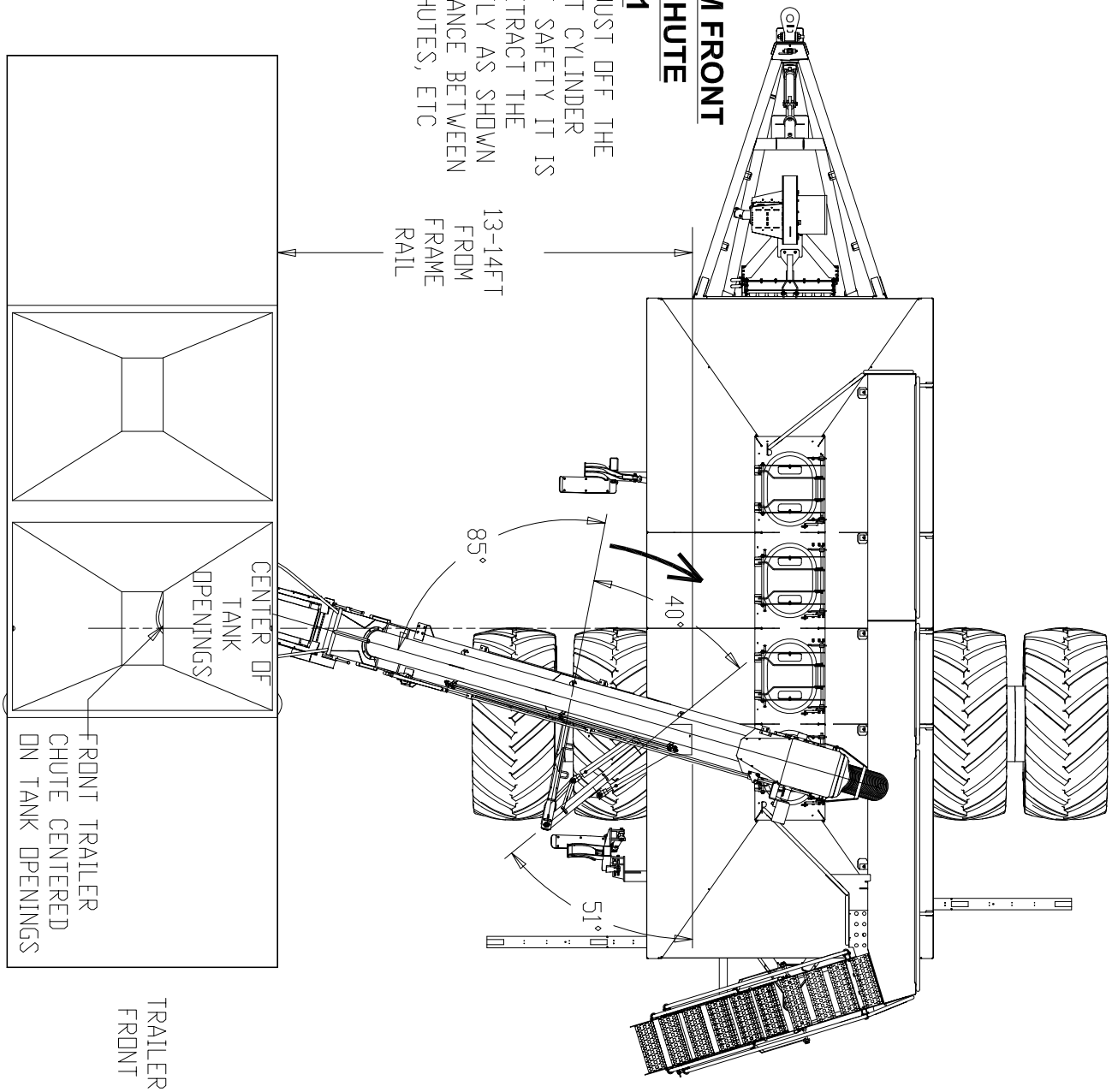
Semi Trailer Filling Positions - Continued



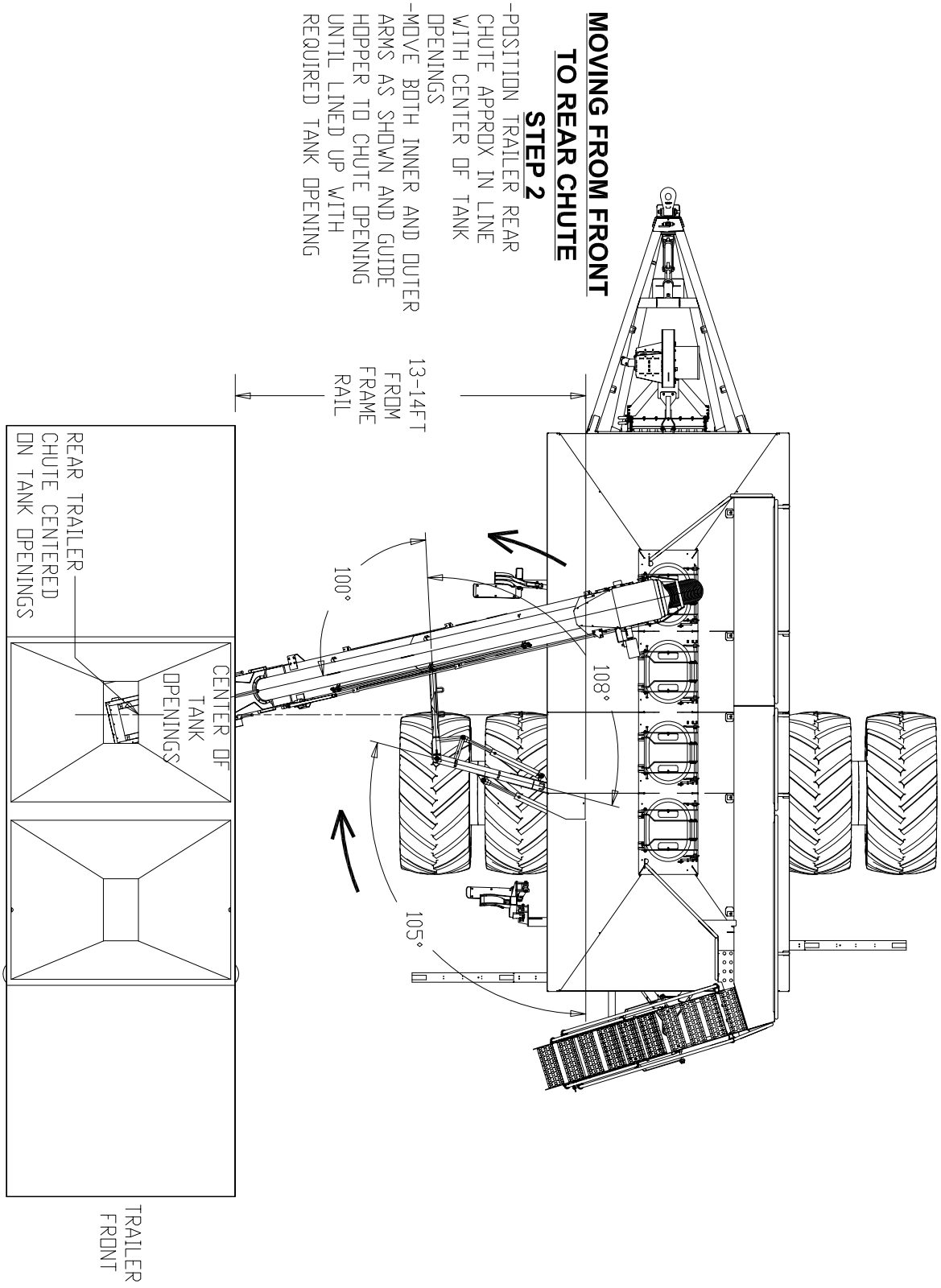
Semi Trailer Filling Positions - Continued



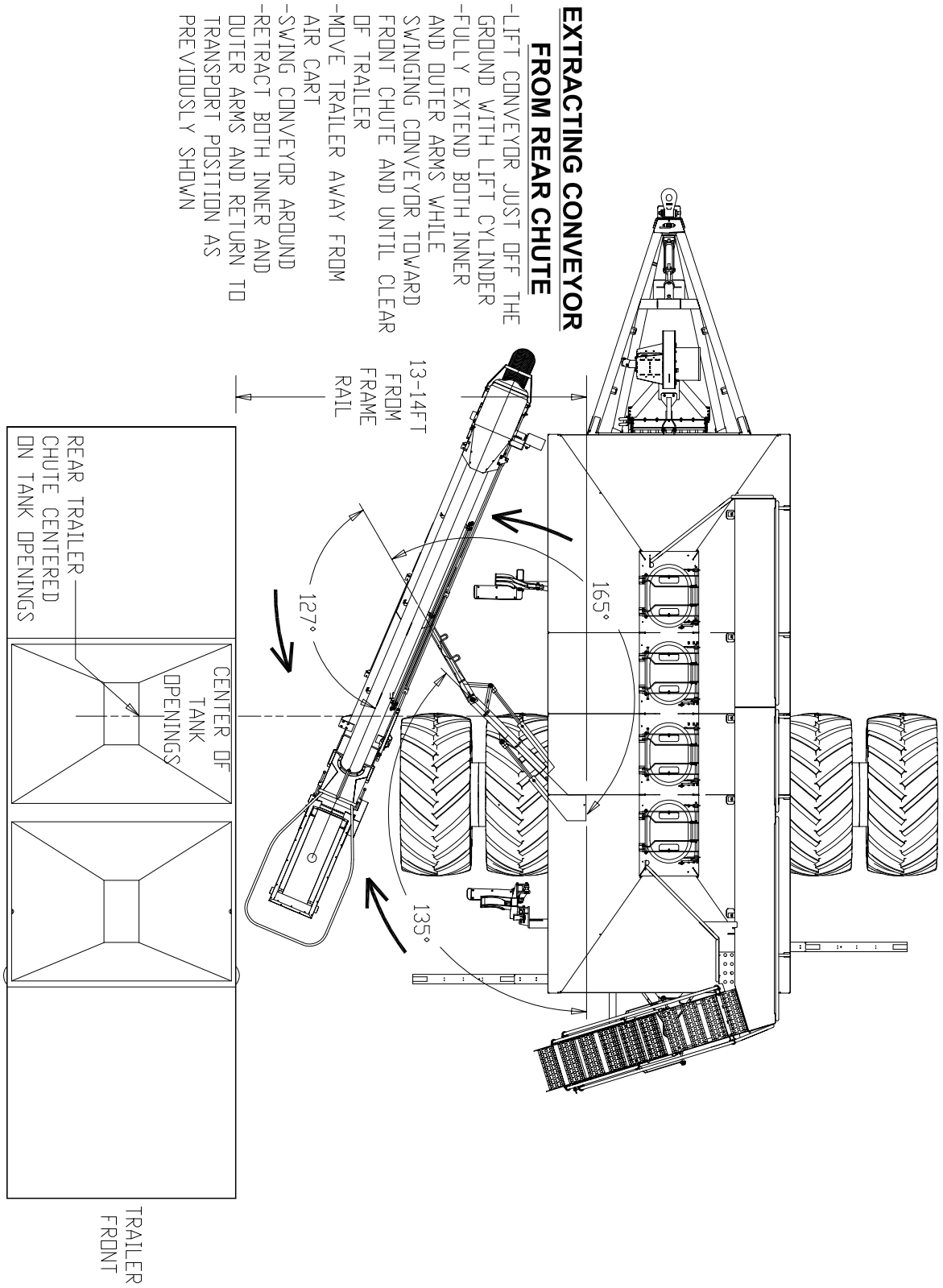
Semi Trailer Filling Positions - Continued



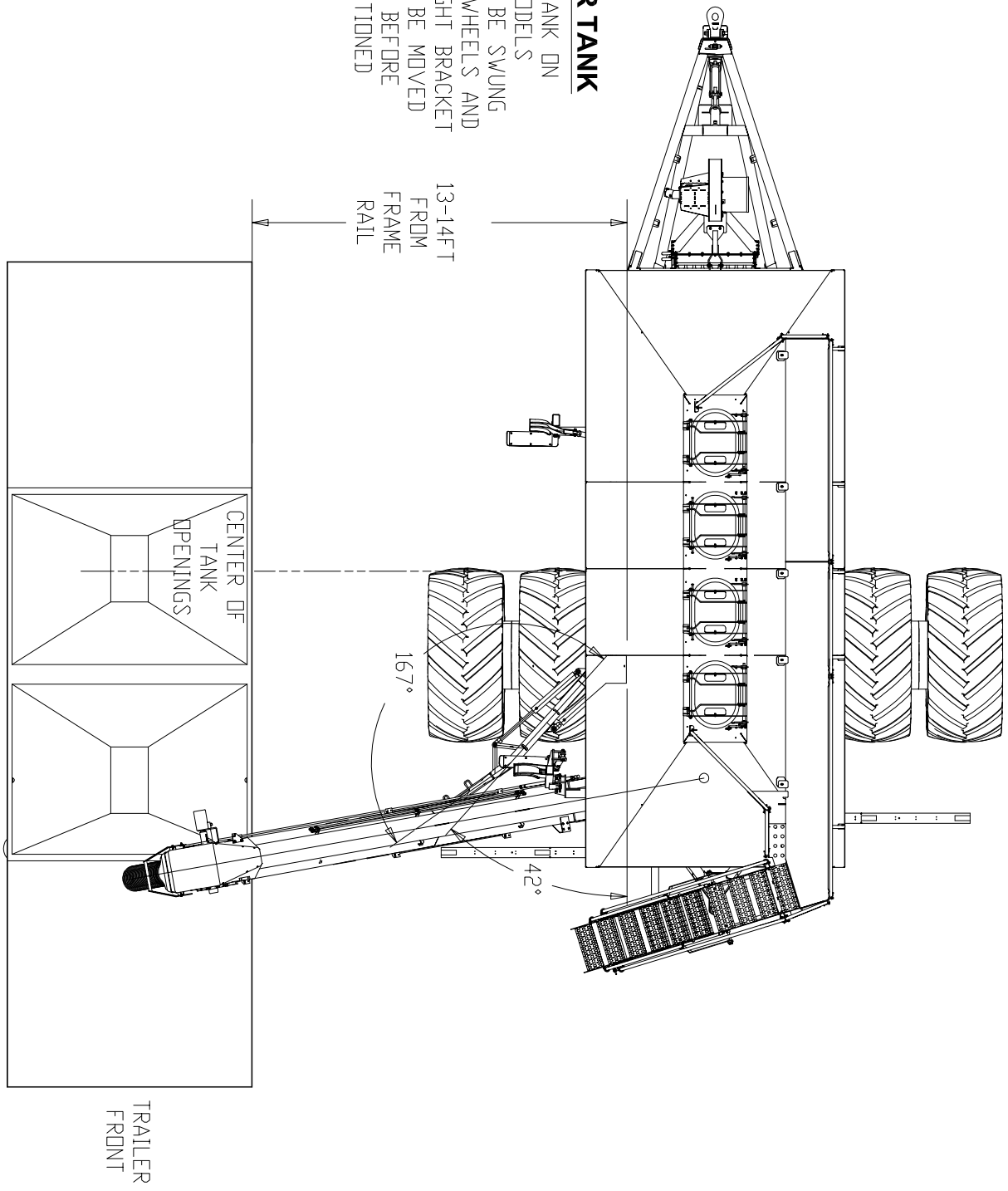
Semi Trailer Filling Positions - Continued



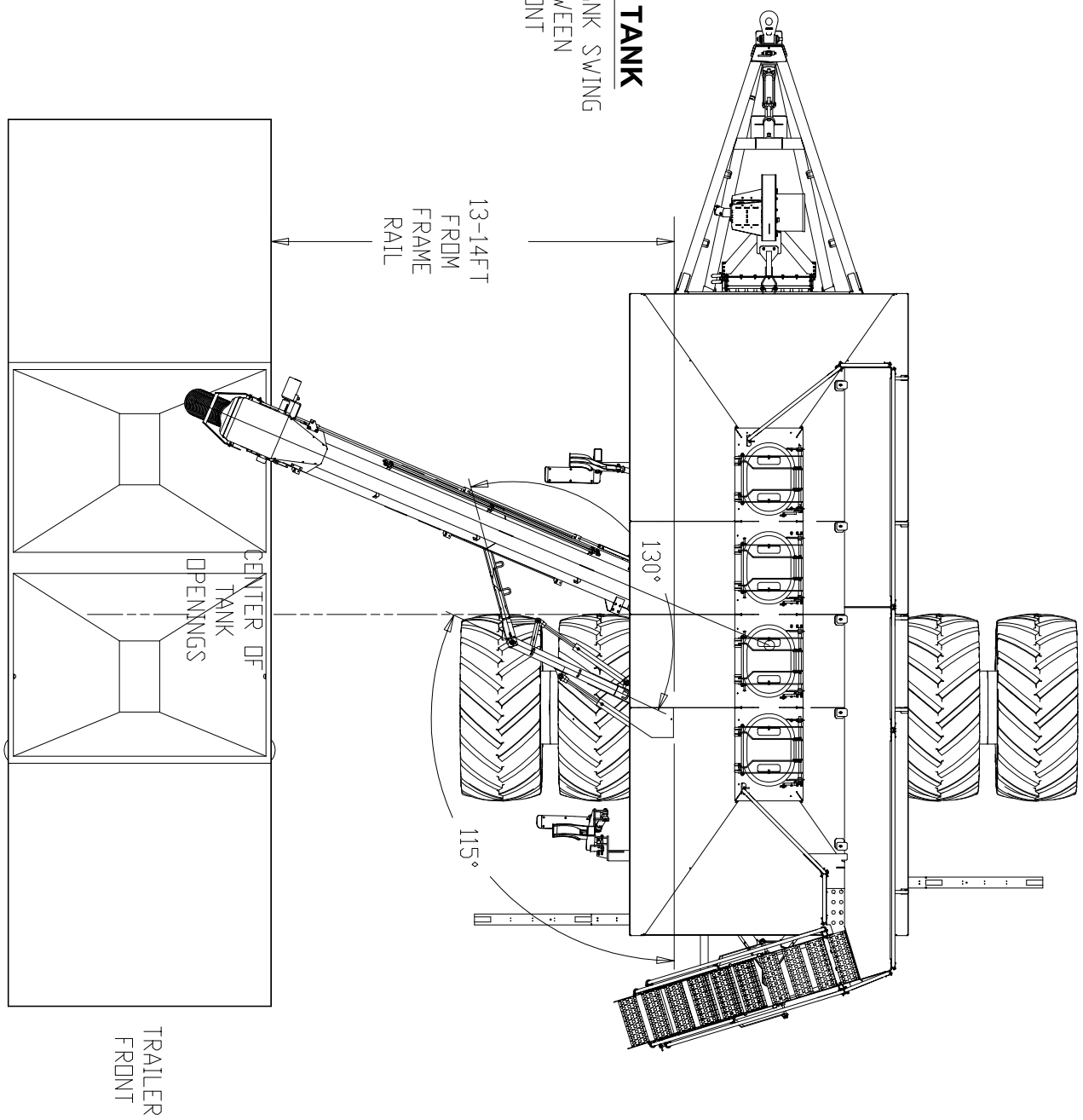
Semi Trailer Filling Positions - Continued



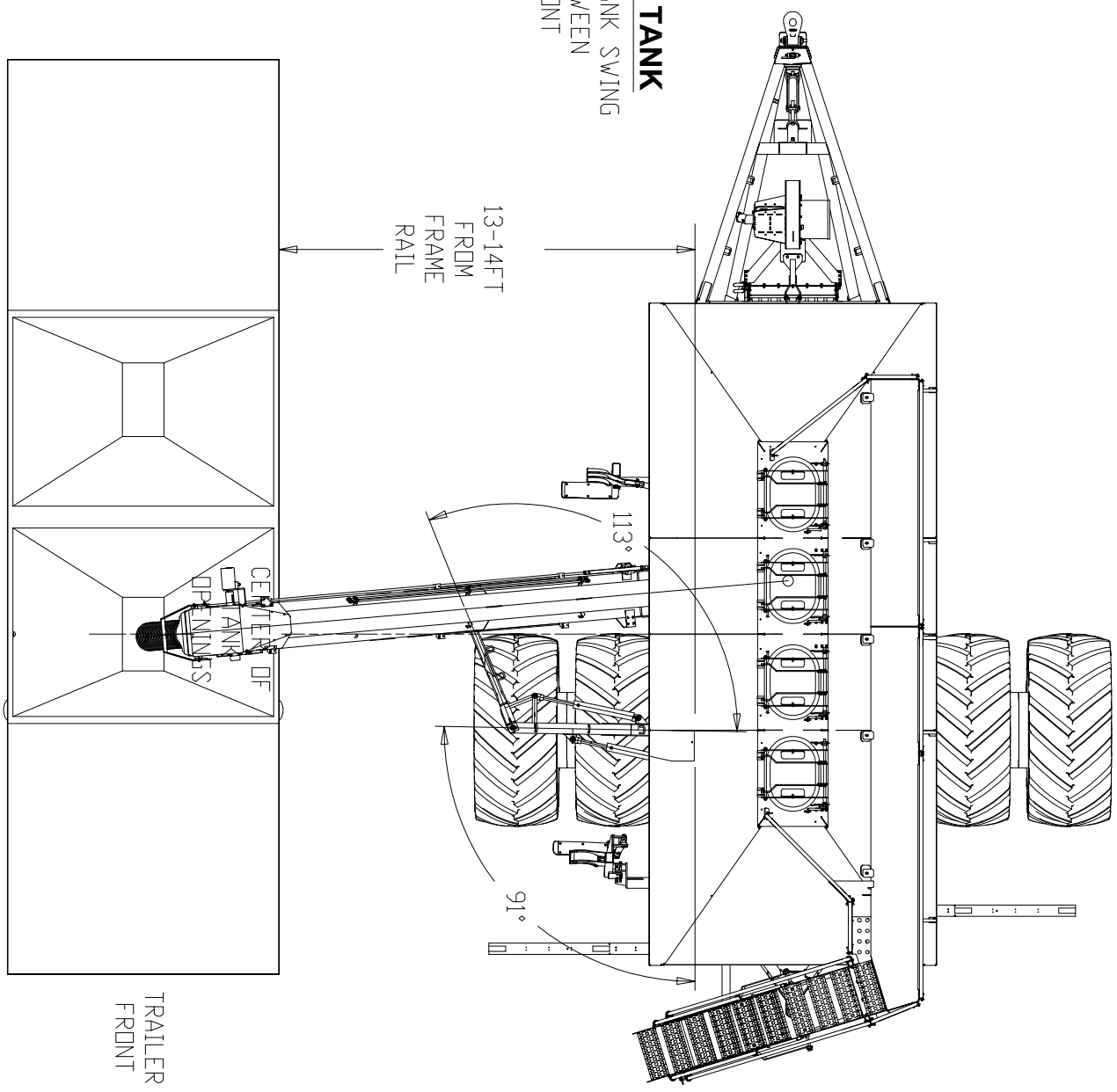
Semi Trailer Dump Positions



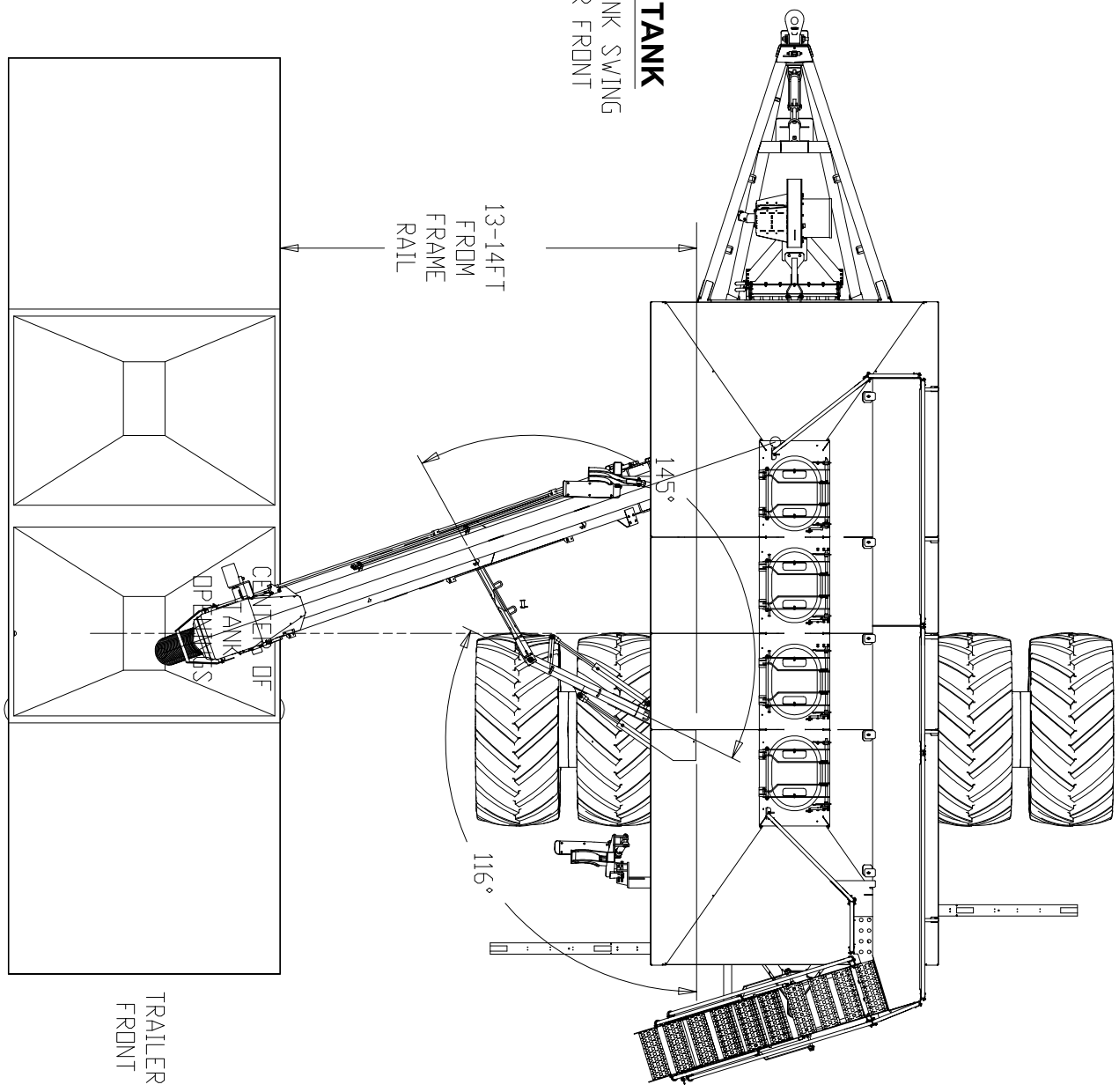
Semi Trailer Dump Positions - Continued



Semi Trailer Dump Positions - Continued



Semi Trailer Dump Positions - Continued



Filling Tank

The Morris 9 Series Air Cart is equipped with 2, 3 or 4 tanks. Typicaly the front tank is for seed and the middle and rear tank is for fertilizer. However, ALL tanks can be used for the same product.

The capacity of the air cart tanks are listed in the tank capacity chart.

- Open lid fully on tank being filled.
- Check and remove any debris inside tank.
- Remove clean-out door.
- Remove seed plate.
- Check for debris inside metering body.
- Ensure Tank Shut-Offs work freely.

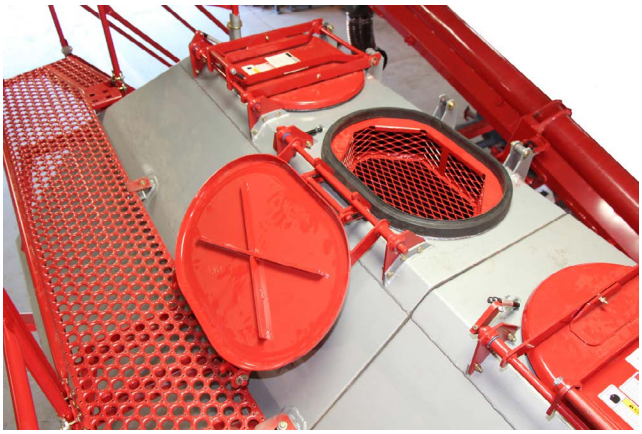
Note: Tank Shut-Offs are only for use when inspecting/servicing meter body with product in tank.

- Check that the correct seed plate is installed for the product being applied.
- Fully close and seal the clean-out door.
- Ensure the auger screen is in place.
- Always use screen to filter debris when filling.
- Adjust bin level sensor to desired alarm point.

Note: Even small fertilizer lumps can cause problems with plugging. All possible precautions should be taken to prevent lumpy fertilizer from entering the tank.

⚠ Warning

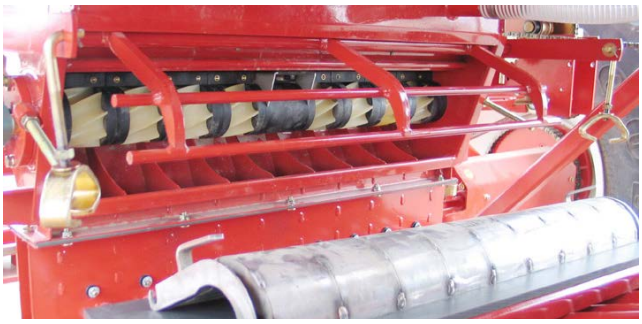
Do not enter tank unless another person is present.



Important

Before putting product into the tanks check the following:

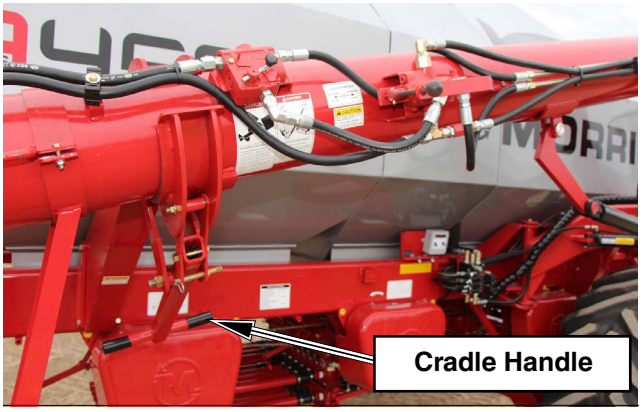
1. **The correct seed plate is installed for product being applied.**
2. **The clean-out doors are fully closed and sealed.**
3. **The plastic bag covering the fan is removed.**
4. **Inspect all augers used in handling the products for seeding. Run augers to clean out any debris inside auger so it does not get transferred to air cart tanks.**



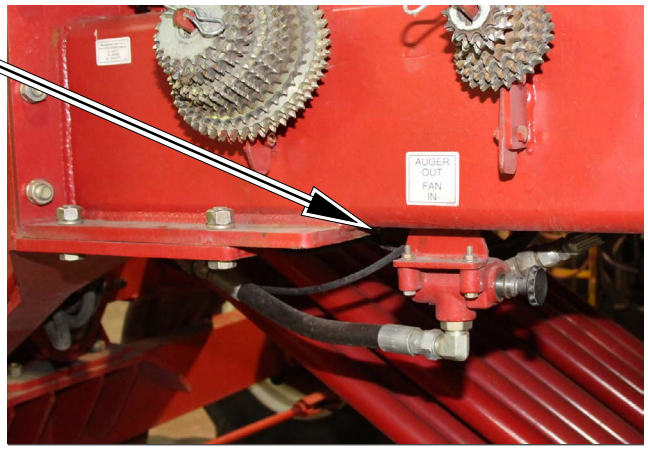
Inspect Metering Body

Filling Tank - Continued

- Unlatch auger/conveyor lock.
- Swing out the auger/conveyor.
- Open lid on tank to be filled and place auger spout in tank.
- Postion truck with the hopper and engage the hydraulic motor on the auger.
- Ensure selector valve is in correct position for auger operation and engage tractor hydraulics.



Cradle Lock - Auger shown



Selector Valve

Conveyor Shown

Filling Tank - Continued

- Auger product into tank until desired level in tank is reached. (If equipped with the optional fill indicator fill until indicator light turns on. See “Full Bin Indicator”)
- Stop the flow of product into the auger/conveyor and allow auger/conveyor to empty.
- Auger operation can be controlled from either the top or bottom of the auger/conveyor.
- Clean lid seal and ensure lid seal is positioned correctly before closing tank lid.
- AUGER ONLY - Reverse auger flow to clean out the hopper.
- Place auger/conveyor in transport position.
- Secure auger/conveyor cradle locks.
- Remove the plastic bag covering fan.
- Check lid for air leaks with your hands once air cart fan is operational. See Maintenance Section 7.
- Check metering body for air leaks. See Maintenance Section 7.

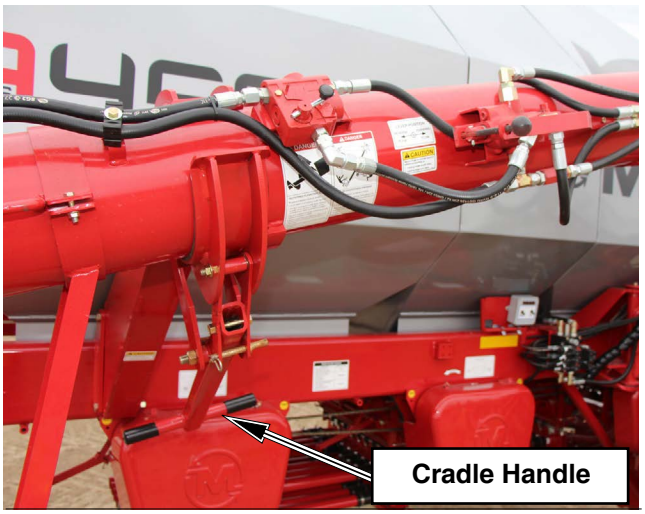
Fill Indicator

Auger Standard Hopper

Note: Before seeding it is recommended that after a rain or dew that fan be run for a few minutes to eliminate moisture in the system.

Important

Do not exceed 10 mph (16 kph) in field operation.

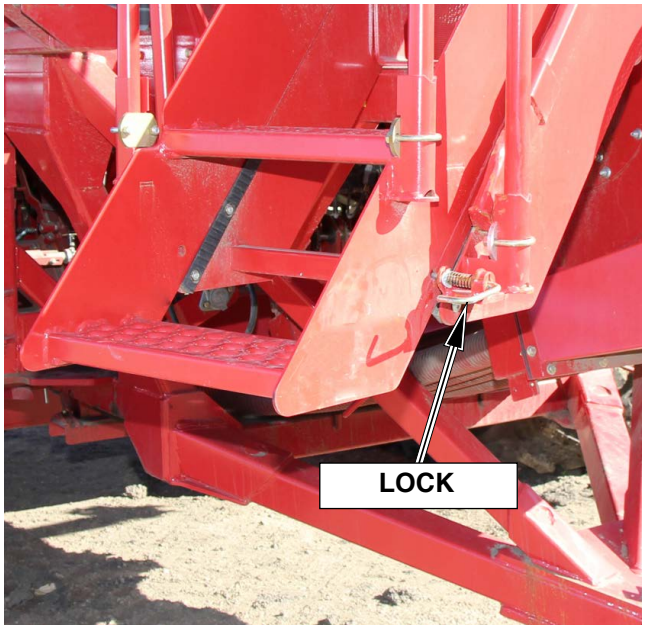


Cradle Lock - Auger shown

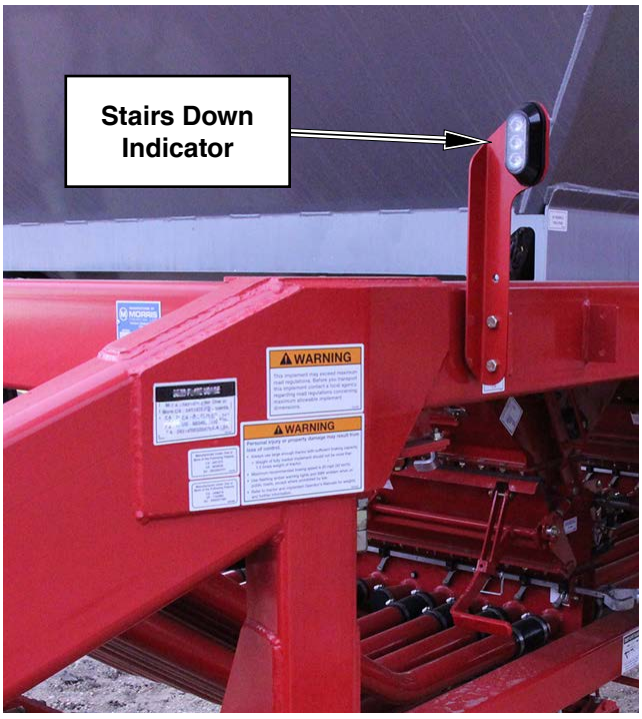
Filling Tank - Continued

- Raise stairs into storage position.
- Engage stair lock to secure stairs in storage position.

Note: Stairway down indicator will flash when stairs are in lowered postion.



Stairs Locked in Storage Position



Important

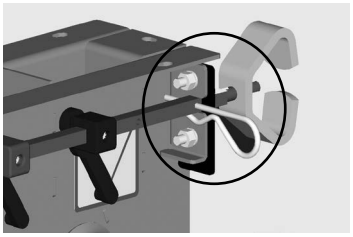
Raise Stairs before moving Cart.

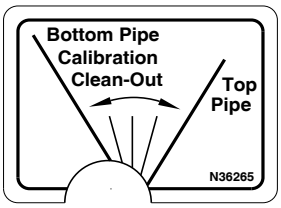
Stair damage will occur in lowered position.

Unloading Tanks

Emptying tanks is quick and easy to do.

- Move flapper valves to **"Clean-Out"** position on the collector body. (**Double Shoot Only**)
- Open collector bottom.
- Install Clean-Out Chute to collector bottom, if so equipped.
- Open inspection door
- Position auger under the tank to be emptied.
- Start auger.
- Open seed plate to first lock point, this will allow material to flow through the metering body into the auger.
- Once all material stops flowing, move "Shut-off" levers in and out a few times to dislodge any product and ensure free movement.
- Remove seed plate completely.
- Rotate meter shaft using crank to empty meter wheel flutes.
- Brush out remaining material in the corners and on top of the back plate.
- Reset flapper valves to correct position for product delivery. Ensure that the flapper settings are correct. This can be done by visually checking that the flappers are fully over and touching the side walls, sealing off the individual airstreams. The flappers can be adjusted by loosening the individual adjusting setscrews and applying pressure to the flapper forcing it against the side wall while tightening the setscrew.
- Reinstall correct seed plate for product being metered.
- Reinstall inspection door and collector bottom ensuring that the seals are free from leaks.





Double Shoot Only

Optional - Clean Out Chute

Unloading Tanks - Continued

Danger

Keep all shields in place. Keep hands, feet and clothing away from auger intake, failure to do so will result in serious injury or death.

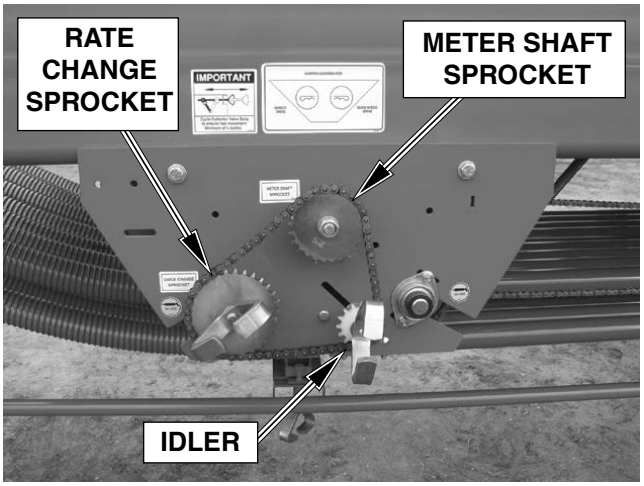
Metering Rate Adjustment

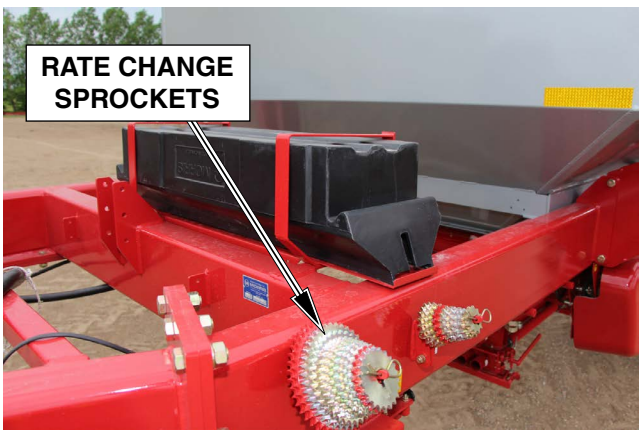
The metering rate adjustment for all tanks is done in the same manner. The rate varies with the speed of the metering wheels. A new rate is achieved by changing a sprocket on the Posi-Drive Transmission.

Refer to the rate charts for desired application rate and sprocket selection.

- Loosen metering chain on posi-drive transmission, by loosening the idler.
- Spin off wing nut and remove rate change sprocket.
- Install desired rate change sprocket and tighten wing nut.
- Tighten chain by adjusting idler.

Note: Do not over tighten chain, just take slack out of chain.





Rate Charts

Spacing Sprocket

The rate chart applies to all spacings listed below.

Check that the correct spacing sprocket is installed on your machine. This sprocket is located on the inner side of the rear transmission on the clutch output shaft.

The spacing sprocket must be matched to the seeding tool trip spacing.

Determining Spacing Sprocket

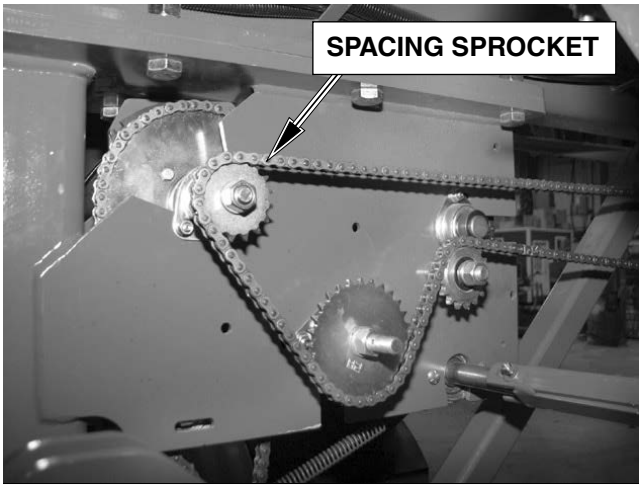
To determine spacing sprocket for other spacings not listed in the chart use the following equation:

$$\text{New Spacing Sprocket} = \left(\frac{\text{New Spacing}}{12”}\right) \text{ x } 20$$

The rate charts and drive rates are all based upon 12” spacing - 20 tooth sprocket.

Note: Due to ratios of spacing the value may not be a whole number and should be rounded to nearest value.

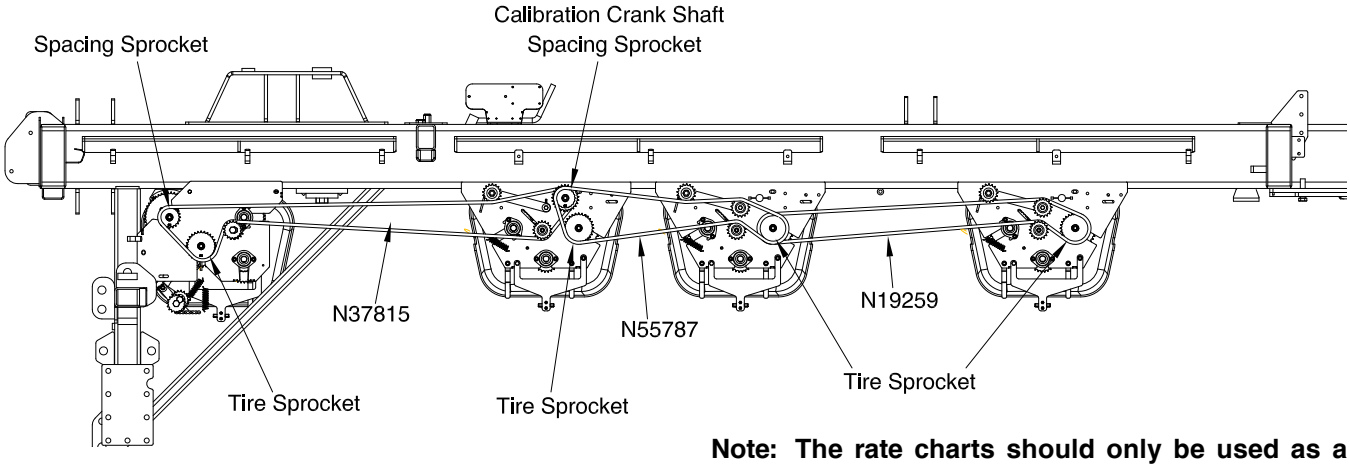
Note: Incorrect spacing sprocket will cause inaccurate application rates.



Spacing Sprocket inside of Left Rear Frame

Spacing Sprocket	
Opener Spacing	**Spacing Sprocket**
7.2” (183 mm)	12 teeth
7.5” (191 mm)	12 teeth
8” (203 mm)	13 teeth
9” (229 mm)	15 teeth
10” (254 mm)	17 teeth
12” (305 mm)	20 teeth
15” (381 mm)	25 teeth

9535 shown



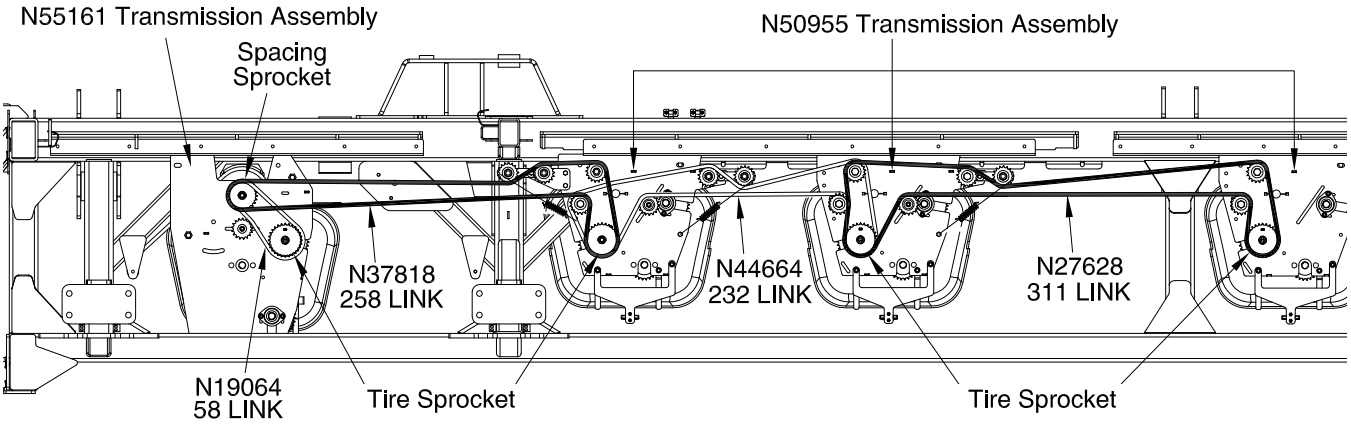
Note: The rate charts should only be used as a guide. Variation in seed size, density, shape, tire pressure and wheel sinkage are all factors that can influence the seed rate.

Rate Charts - Continued

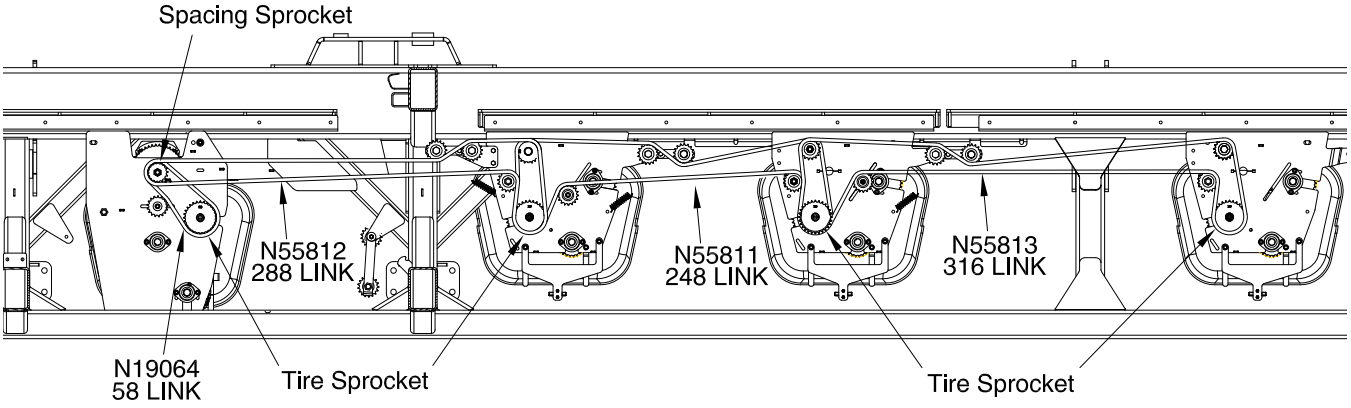
Spacing Sprocket - Continued

9445, 9550 and 9650

9650 shown



9800 and 91000



Rate Charts - Continued

Tire Size Sprocket

In conjunction with the spacing sprocket is the tire size sprocket as illustrated in the previous diagram.

Check that the correct tire sprockets are installed on your machine. These sprockets are located on the inner side of each transmission input shaft and are driven by the spacing sprocket.

The tire sprocket must be matched to the tire size of the air cart.

Determining Tire Circumference

Factors that may affect the tire circumference and in turn metering rates and monitor PP400 values are as follows:

- Manufacturing tire size tolerances can vary +/- 4%.
- Tire pressure.
- Field soil conditions (firm-unworked versus soft-worked).
- Tank capacity (empty tanks versus full tanks).
- Tire manufacturer (Good Year versus Firestone).

Note: The values used for monitor PP400 values and tire size sprockets is based upon the tire circumference of Good Year tires at proper pressure with half full tanks in normal working field conditions.

To determine tire sprocket for other tires not listed in the chart or to check the actual tire circumference use the following equation:

- The tire circumference should be checked under normal field conditions with tanks half full.
- Mark tire and starting point.
- Drive air cart 10 revolutions of tire.
- Mark ending point.
- Measure distance from starting point to ending point and divide by 10 to get the rolling circumference of the tire.

New Tire Sprocket Size:

For 32” Rim = 5992/Tc

For 38” Rim = 5992/Tc **Ts** = _____

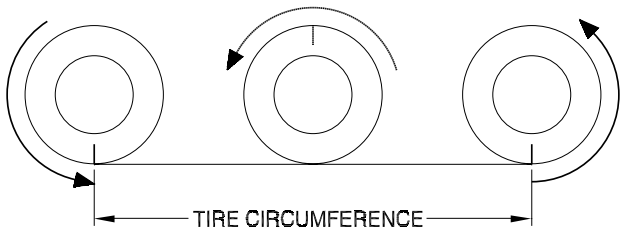
Tc = Tire Circumference measured in inches

Note: Incorrect tire size sprocket will cause inaccurate application rates.

Important

Tire circumference affects metering accuracy. Tire Circumference should be determined for your field conditions by following procedure below. Then determine “New Crank Rotations” outlined under *Crank Calibration Table.* Also determine new “PP400” see “PP400 Calculation” in Monitor Section 6.

Tire Sprocket			
Tire Size	**Tire Style**	**Rating**	**Tire Sprocket**
30.5 x 32	AWT (Implement)	12 ply	28 teeth
30.5 x 32	Lug (Dyna Torque II)	14 ply	28 teeth
520/85 R38 Dual Wheels	Radial (Ultra Torque)	155 A8	28 teeth
710/70 R38	Radial (Dyna Torque)	166 A8	26 teeth
800/65 R32	Radial (Dyna Torque)	172 A8	28 teeth
800/65 R32 Dual Wheels	Radial (Dyna Torque)	172 A8	28 teeth
800/70R38 Dual Wheels	Radial (Dyna Torque)	173 A8	24 teeth
850/80R38 Dual Wheels	Radial (Dyna Torque)	180 A8	22 teeth
900/60 R32	Radial (Dyna Torque)	176 A8	26 teeth



Rate Charts - Continued

Rate Chart Use

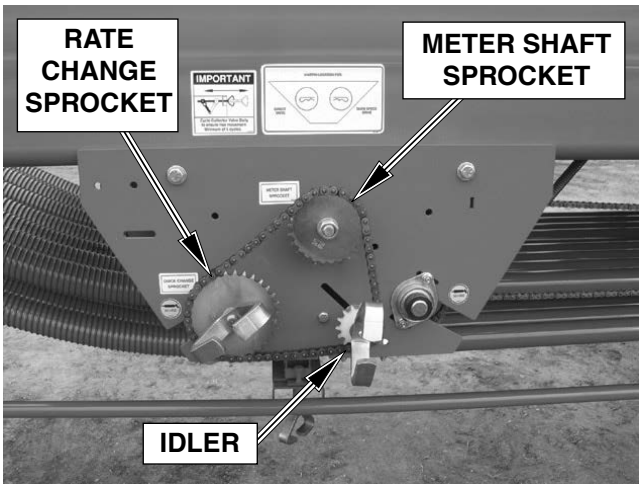
The rate chart applies to all spacings listed below.

The spacing sprocket must be matched to the seeding tool trip spacing see *"Spacing Sprocket"*.

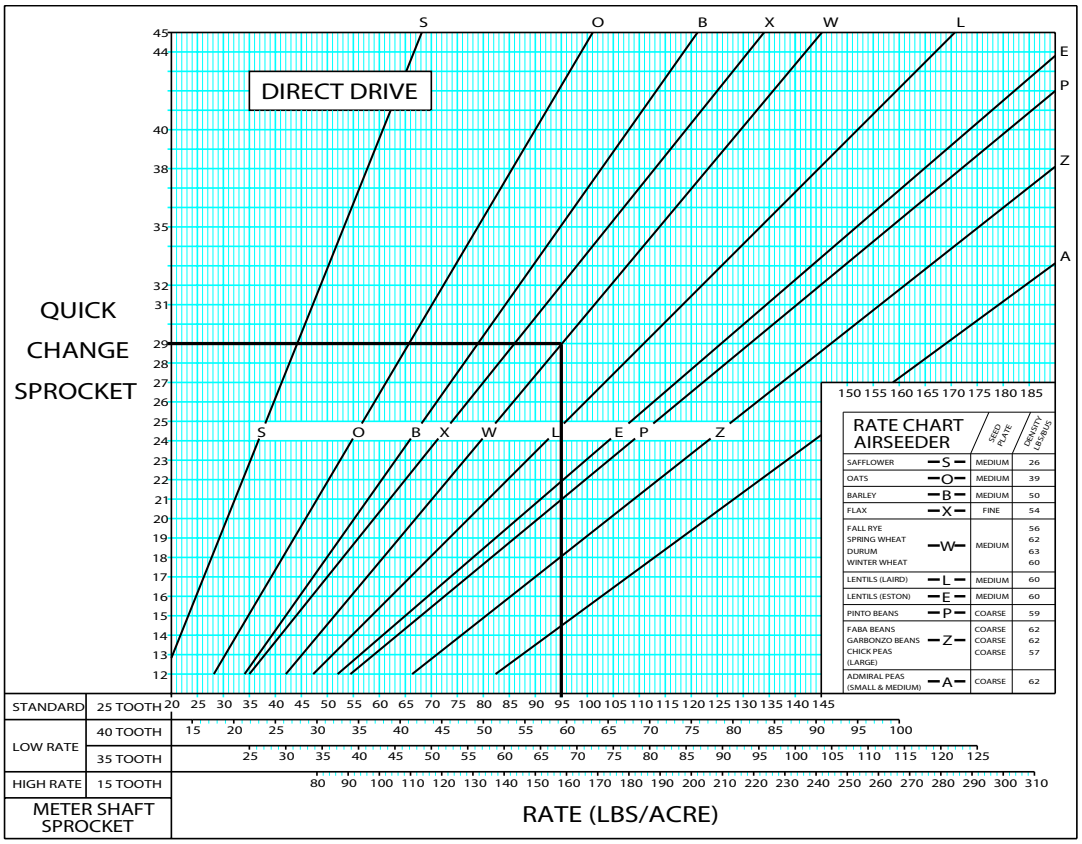
The charts should only be used as a guide. Specific rates can be achieved by using the rate check method as outlined under *"Rate Calibration"*.

To determine a seed/fertilizer rate from the chart:

- Go to the desired rate along the line marked "Standard" of a specific graph. (i.e. 95 lbs/acre of wheat)
- Go straight up from that point to where that line is intersected by the graph. This will give the sprocket size required to give the particular rate chosen.
- At this intersection go straight across to the vertical line of the graph. This will give the sprocket size required to give the particular rate chosen. (i.e. 95 lbs/acre of wheat requires a 29 tooth sprocket)
- Change the Quick Change Sprocket see *"Metering Rate Adjustment"*.
- Perform a rate check to confirm the seed rate see *"Rate Calibration"*.
- Repeat the above procedure for the other tank.
- For very low or very high rates, see next page *"Extra Low Rates"* and *"Extra High Rates"*.



Note: The rate charts should only be used as a guide. Variation in seed size, density, shape, tire pressure and wheel sinkage are all factors that can influence the seed rate.



Rate Charts - Continued

Extra Low Rates

Although the charts show a minimum rate of 35 lbs. per acre for fertilizer and 20 lbs. per acre for seed, sometimes this is not low enough, especially when product is being metered from both tanks.

Rates under the values mentioned can be achieved by replacing the standard 25 tooth meter shaft sprocket on the front of the transmission with either a 35 or 40 tooth sprocket.

The rates obtained when using the 35 and 40 tooth sprocket are shown on the rate charts beside the respective size sprocket.

When both tanks are being used to meter the same product then the 25 tooth sprocket on each transmission must be changed. Now both transmissions will have the same size ***metershaft*** sprocket.

The same metering chain can be used with these larger sprockets up to a certain size of quick change sprocket.

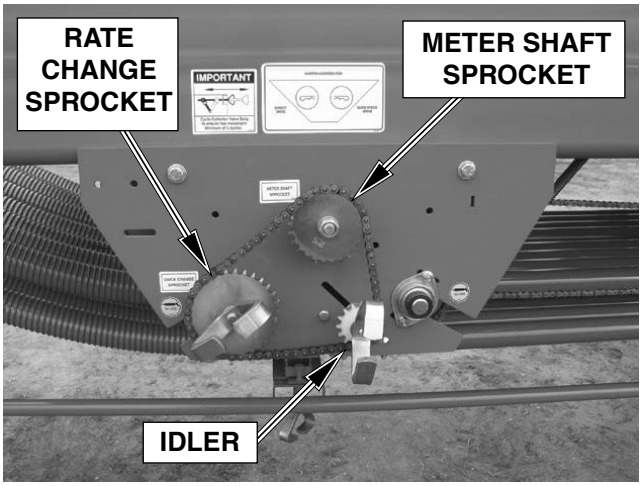
To determine a rate from the chart:

- Go to the desired rate along the line next to the size of metershaft sprocket used.
- Go straight up from that point to where that line is intersected by the graph line of the particular product being metered.
- At this intersection go straight across to the vertical line of the graph. This will give the sprocket size required to give the particular rate chosen.
- Change the quick change sprocket and repeat the rate check to confirm the seed rate.
- Repeat the above procedure for the other tanks.

Extra High Rates

In areas where higher rates of product are required the metershaft sprocket is changed from the standard 25 tooth to a 15 tooth.

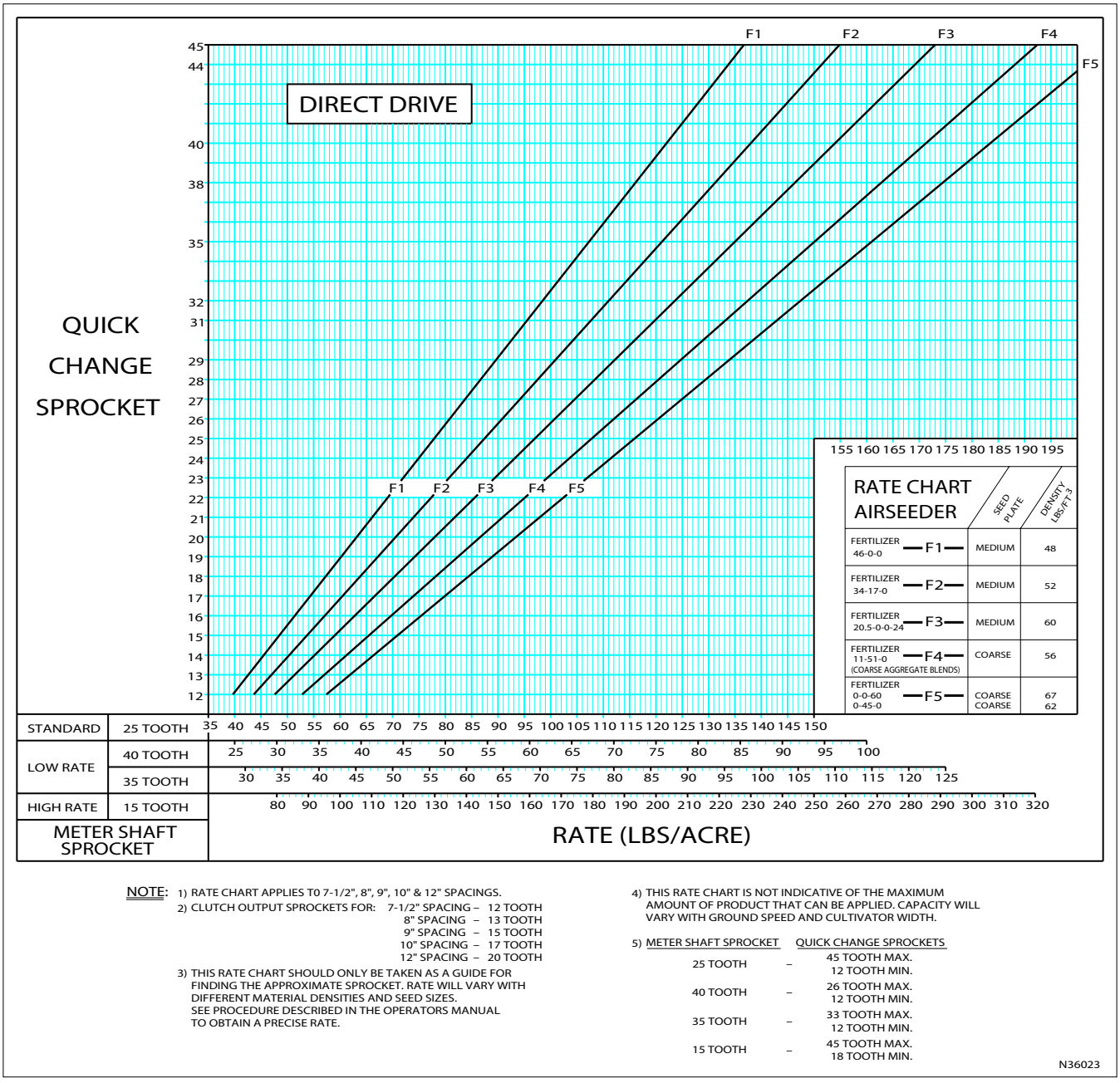
Use the method described under EXTRA LOW RATES to determine the required metering rate.



Rate	Metershaft Sprocket Size	Maximum Size of Quick Change Sprocket	Minimum Size of Quick Change Sprocket
Standard	25 Tooth	45 Tooth	12 Tooth
Low Rate (1)	35 Tooth	33 Tooth	12 Tooth
Low Rate (2)	40 Tooth	26 Tooth	12 Tooth
High Rate	15 Tooth	45 Tooth	18 Tooth

Rate Charts - Continued

Fertilizer Rate Chart

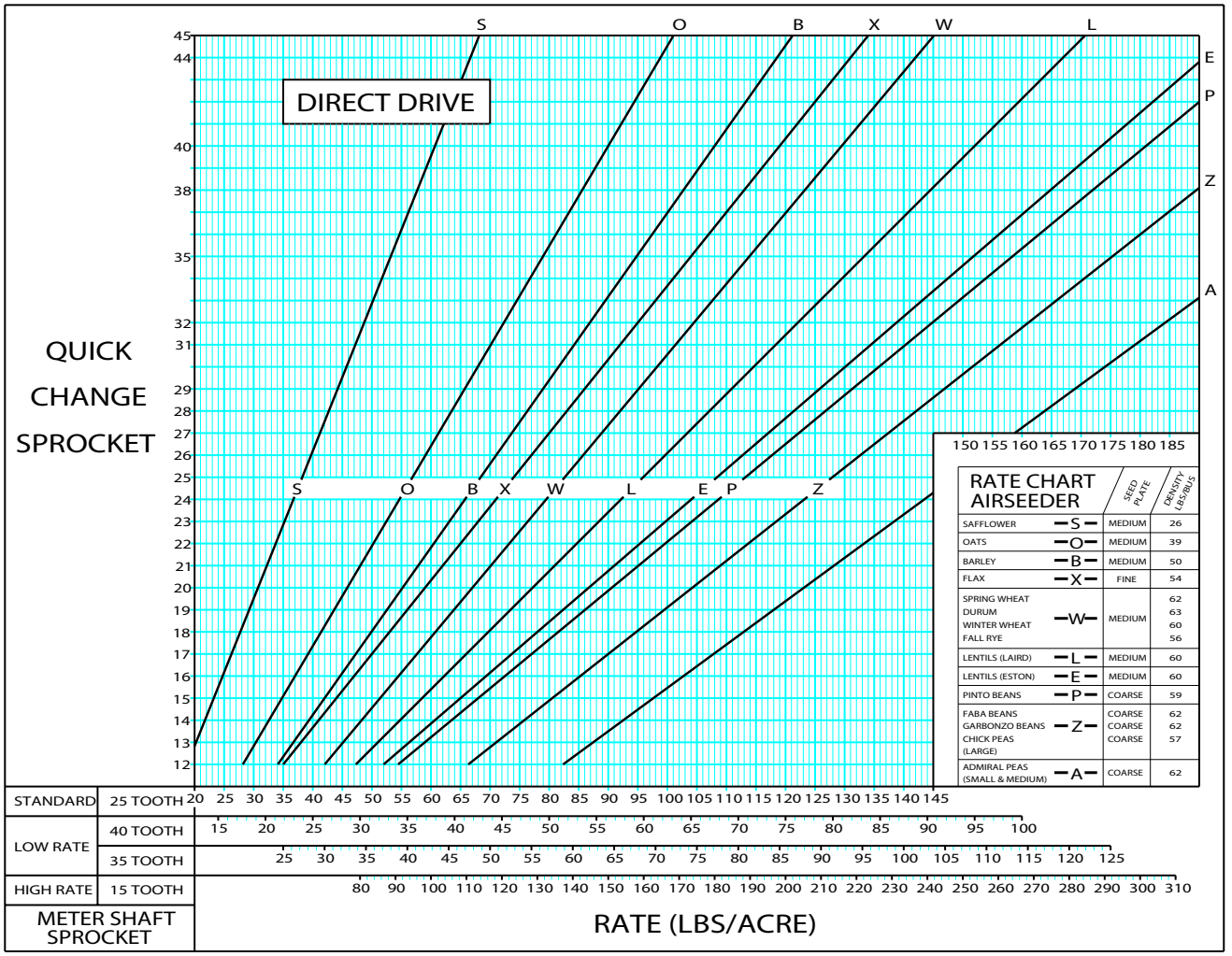


NOTE:
1) RATE CHART APPLIES T0 7-1/2", 8", 9", 10" & 12" SPACINGS.
2) CLUTCH OUTPUT SPROCKETS FOR: 7-1/2" SPACING – 12 TOOTH
8" SPACING – 13 TOOTH
9" SPACING – 15 TOOTH
10" SPACING – 17 TOOTH
12" SPACING – 20 TOOTH
3) THIS RATE CHART SHOULD ONLY BE TAKEN AS A GUIDE FOR FINDING THE APPROXIMATE SPROCKET. RATE WILL VARY WITH DIFFERENT MATERIAL DENSITIES AND SEED SIZES. SEE PROCEDURE DESCRIBED IN THE OPERATORS MANUAL TO OBTAIN A PRECISE RATE.
4) THIS RATE CHART IS NOT INDICATIVE OF THE MAXIMUM AMOUNT OF PRODUCT THAT CAN BE APPLIED. CAPACITY WILL VARY WITH GROUND SPEED AND CULTIVATOR WIDTH.
5) METER SHAFT SPROCKET — QUICK CHANGE SPROCKETS
25 TOOTH – 45 TOOTH MAX. 12 TOOTH MIN.
40 TOOTH – 26 TOOTH MAX. 12 TOOTH MIN.
35 TOOTH – 33 TOOTH MAX. 12 TOOTH MIN.
15 TOOTH – 45 TOOTH MAX. 18 TOOTH MIN.

N36023

Rate Charts - Continued

Seed Rate Chart



NOTE:

1) RATE CHART APPLIES T0 7-1/2", 8", 9", 10" & 12" SPACINGS.
2) CLUTCH OUTPUT SPROCKETS FOR: 7-1/2" SPACING – 12 TOOTH
   8" SPACING – 13 TOOTH
   9" SPACING – 15 TOOTH
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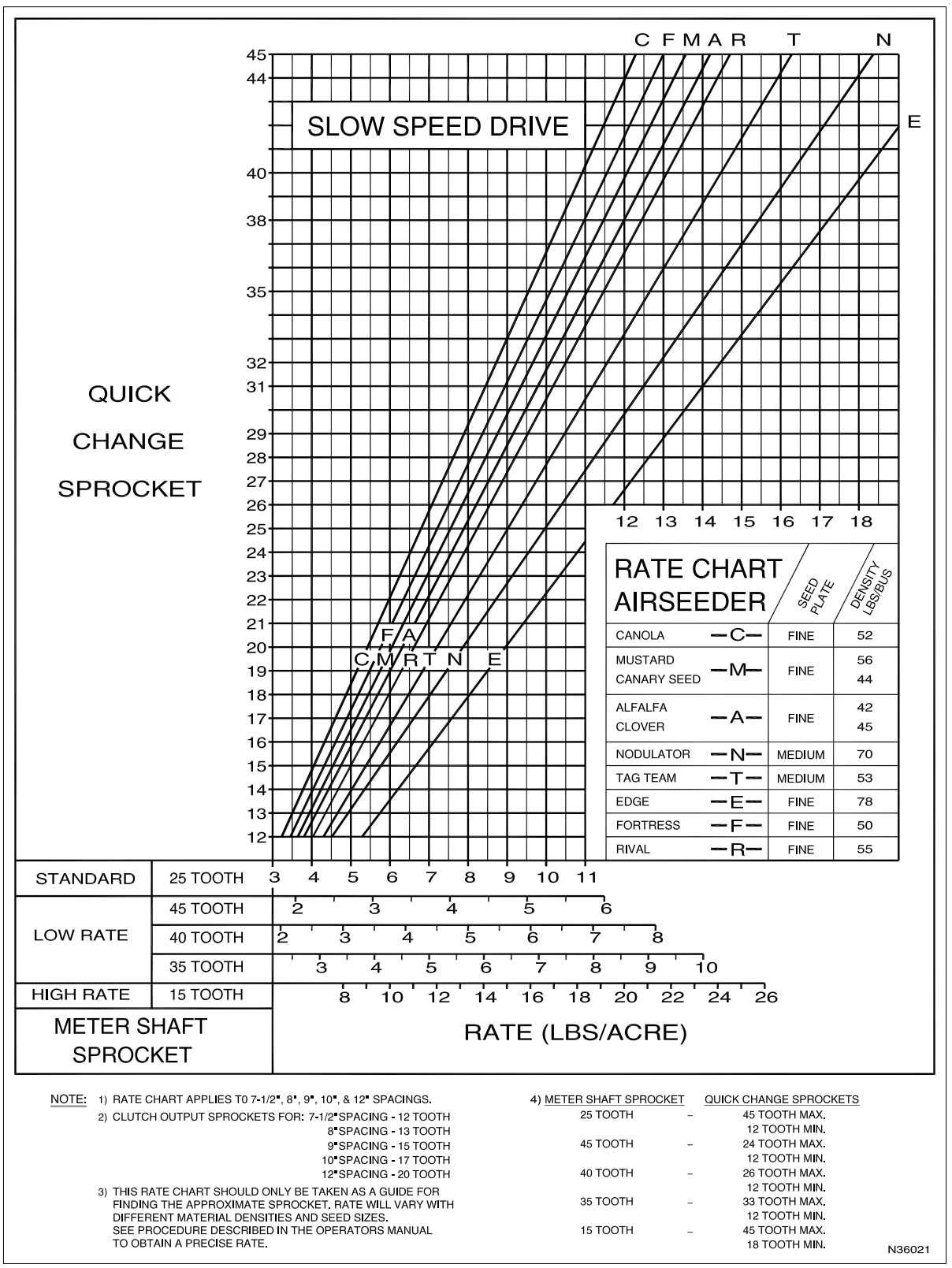
4) THIS RATE CHART IS NOT INDICATIVE OF THE MAXIMUM AMOUNT OF PRODUCT THAT CAN BE APPLIED. CAPACITY WILL VARY WITH GROUND SPEED AND CULTIVATOR WIDTH.
5) METER SHAFT SPROCKET – QUICK CHANGE SPROCKETS

METER SHAFT SPROCKET		QUICK CHANGE SPROCKETS
25 TOOTH	–	45 TOOTH MAX. 12 TOOTH MIN.
40 TOOTH	–	26 TOOTH MAX. 12 TOOTH MIN.
35 TOOTH	–	33 TOOTH MAX. 12 TOOTH MIN.
15 TOOTH	–	45 TOOTH MAX. 18 TOOTH MIN.

N36022

Rate Charts - Continued

Slow Speed Seed Rate Chart



NOTE:
1) RATE CHART APPLIES T0 7-1/2", 8", 9", 10", & 12" SPACINGS.
2) CLUTCH OUTPUT SPROCKETS FOR: 7-1/2"SPACING - 12 TOOTH
8"SPACING - 13 TOOTH
9"SPACING - 15 TOOTH
10"SPACING - 17 TOOTH
12"SPACING - 20 TOOTH
3) THIS RATE CHART SHOULD ONLY BE TAKEN AS A GUIDE FOR FINDING THE APPROXIMATE SPROCKET. RATE WILL VARY WITH DIFFERENT MATERIAL DENSITIES AND SEED SIZES. SEE PROCEDURE DESCRIBED IN THE OPERATORS MANUAL TO OBTAIN A PRECISE RATE.

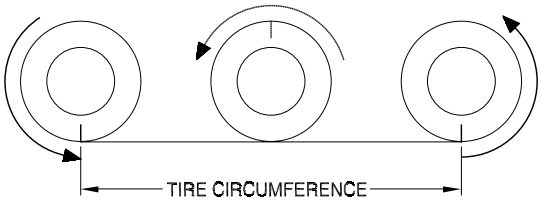
4)

METER SHAFT SPROCKET		QUICK CHANGE SPROCKETS
25 TOOTH	–	45 TOOTH MAX. 12 TOOTH MIN.
45 TOOTH	–	24 TOOTH MAX. 12 TOOTH MIN.
40 TOOTH	–	26 TOOTH MAX. 12 TOOTH MIN.
35 TOOTH	–	33 TOOTH MAX. 12 TOOTH MIN.
15 TOOTH	–	45 TOOTH MAX. 18 TOOTH MIN.

N36021

Rate Calibration

- Ensure tires are at correct pressure.
- Determine Tire Circumference (Tc) as follows:
  - Check under normal field conditions with tanks half full.
  - Mark tire and starting point.
  - Drive air cart 10 revolutions of tire in a straight line.
  - Mark ending point.
  - Measure distance from starting point to ending point and divide by 10 to get the rolling circumference of the tire (Tc).



- Calculate the number of rotations (R) of the calibration crank for 1/10 Acre. Record value below for future reference.

  Note: For reference nominal (R) values are listed in Section 12 of the manual.

- Calculate required tire sprocket size (Ts) and to ensure correct sprockets are installed on the Air Cart. Record value below for future reference.

Note: Due to ratios the value may not be a whole number and should be rounded to nearest value.

- Calculate the monitor PP400 setting. Record value below for future reference. Change monitor to new PP400 value as outlined under *"Changing Monitor Settings"* under Monitor Section.

Example:

For a 9450 with 800/65 R32 Tires and a 51ft wide seeding tool (W) with:

The measured Tire Circumference (Tc) was 211.6 inches.

For 32" Rim
Crank Rotations (R) = (82328.4/W)/Tc
= (82328.4/51)/211.6
= 7.63

Monitor PP400 = 80640/Tc
= 80640/211.6
= 381

Note: Formulas are different for Air Carts with BRAKES, this is due to the difference in drive sprocket teeth.

Calibration Formulas - Imperial

Rotations of Crank for 1/10 Acre:

For 32" Rim = (82328.4/W)/Tc

For 38" Rim = (82328.4/W)/Tc **R** = _____

Tire Sprocket Size:

For 32" Rim = 5992/Tc

For 38" Rim = 5992/Tc **Ts** = _____

Monitor PP400 Setting:

For 32" Rim = 80640/Tc

For 38" Rim = 80640/Tc **PP400 =** _____

Tc = Tire Circumference measured in inches

W = Working Width measured in feet

Optional Acre Tally Factor:

F = 56/R **F =** _____

Calibration Formulas - Imperial

Rotations of Crank for 1/10 Acre: BRAKES

For 32" Rim = (83635.2/W)/Tc

For 38" Rim = (83635.2/W)/Tc **R** = _____

Tire Sprocket Size: BRAKES

For 32" Rim = 6087/Tc

For 38" Rim = 6087/Tc **Ts** = _____

Monitor PP400 Setting: BRAKES

For 32" Rim = 81920/Tc

For 38" Rim = 81920/Tc **PP400 =** _____

Tc = Tire Circumference measured in inches

W = Working Width measured in feet

Optional Acre Tally Factor:

F = 56/R **F =** _____

See Metric Section 10 for metric formulas.

Rate Calibration - Continued

Seed Plate Usage	
Product	**Seed Plate**
Canola Canary Seed Clover/Alfalfa Flax Mustard Nitragin Edge Fortress Rival	Fine
Barley Lentils Milo Oats Rice Wheat Safflower Nodulator Tag Team Fine Fertilizer (no Sulphur or Potash) 28-0-0 Fertilizer 46-0-0 Fertilizer 34-17-0 Fertilizer 20.5-0-0-24 Fertilizer	Medium
Beans Peas Soybeans Sunflowers 0-0-60 Fertilizer 0-45-0 Fertilizer 10-46-0-0 Fertilizer 11-51-0 Fertilizer Fertilizers containing Sulphur and/or Potash	Coarse

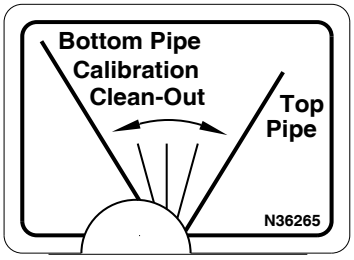
- Ensure correct seed plates are installed.
- Fill tank 1/2 full and drive 600 - 1000 feet to compact product in the tanks.
- Select and install meter rate sprocket per Rate Chart.
- Set Flapper Valves to the **"Calibration"** position.
- Remove the collector bottom from the bottom of the collector body.
- Hook the Rate Calibration Insert on collector bottom and rotate up into postion. Secure in place with slide lock.

Note: Seed Plate Chart is a suggested usage. Product variations could require a different seed plate to be used for proper metering.

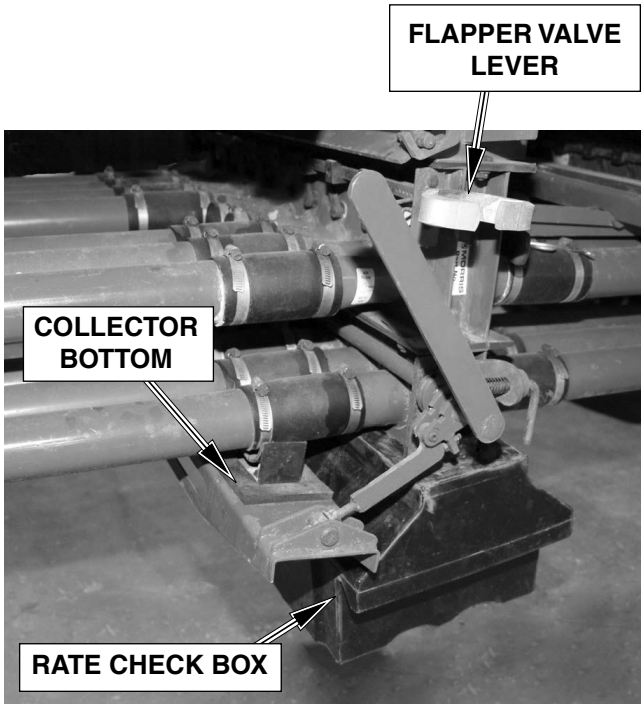
i.e. Clean 11-51-0 Fertilizer may require a Medium seed plate to reduce product flow.

Important

Flapper Valves must be set to "CALIBRATION"



Decal on Collector



Double Shoot Shown

Rate Calibration - Continued

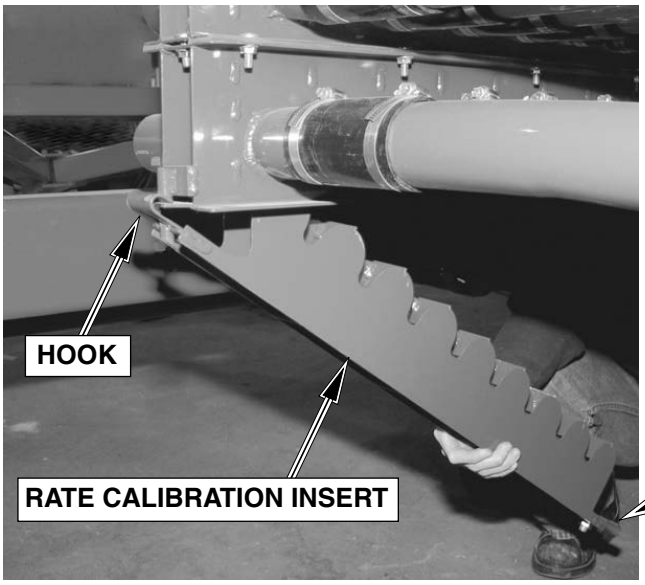
- Remove the metering chain from the transmissions that are **not** being checked.

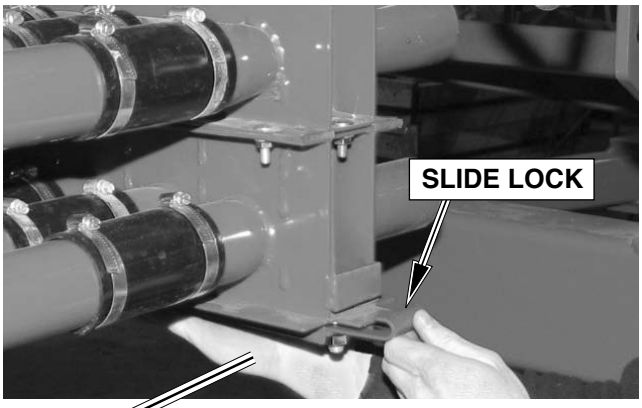
Note: For Hydraulic Rate Calibration see "Rate Calibration" in Section 6 - Monitor.

- Attach the crank to the calibration shaft.
- Turn the crank in direction of the arrow until material begins to fall through the collector body.
- Slide rate check box on the collector body.
- Turn the crank in direction of the arrow the required number of turns (**R**).

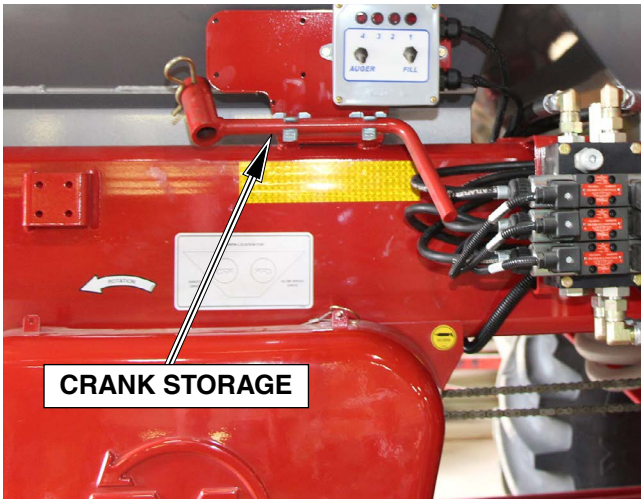
Note: The fan must not be running when a rate check is performed.

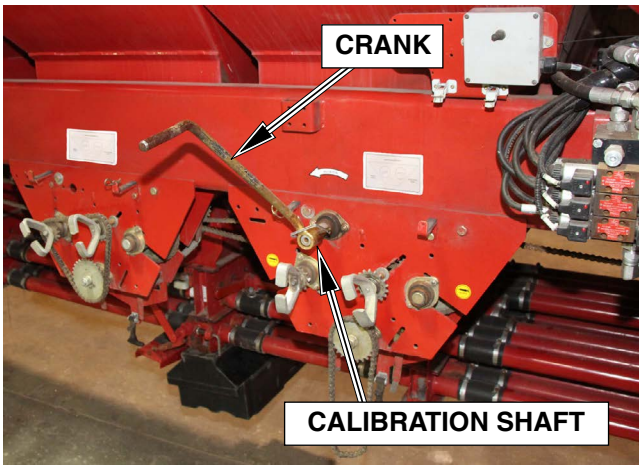
Note: Incorrect rates will occur if crank is rotated clockwise or not turned precisely the correct number of turns.





Calibration Insert





Rate Calibration - Continued

- Weigh the sample by using tarp straps to hook rate check box to scale.

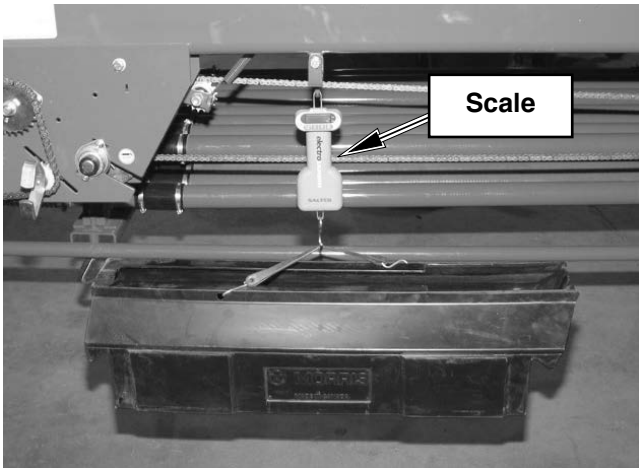
Note: Remember to subtract the weight of the rate check box from the total sample weight.

- Check this rate against rate required.

  For 1/10 acre sample:

  Rate = lbs/acre = Sample Weight (lbs) x 10

- If a different rate is required then increase or decrease the size of the rate change sprocket. Increasing the sprocket size will increase the rate and vice versa.
- Remove rate calibration insert and close collector bottom ensuring that the seals are free from debris and leaks.
- Follow the above procedure to check the rate of the other tanks.
- Once calibration checks have been completed place rate check box into storage bracket.
- Secure transmission covers in place.
- After seeding a few acres recalibrate for more accurate results.



9450 Shown

Secure Covers

For all **Low Rates** (less than 10 lb/ac) it is recommended to take a large sample. Typically to take a sample for 1/2 acre or 1 acre.

Example:

For 1/2 acre sample for a 71ft wide seeding tool with a 9650 with 520/85R38 Dual Tires:

The number of crank turns required for a 1/2 acre is the number of turns required for 1/10 acre for a specific machine width x 5.

From the Calibration Table

Turns required for 1/10 acre = 5.42

Turns required for 1/2 acre = 5.42 x 5 = 27.1

Rate = lbs/acre
= 1/2 acre sample weight (lbs) x 2

Seeding Fine Seeds (Canola, Mustard, etc.)

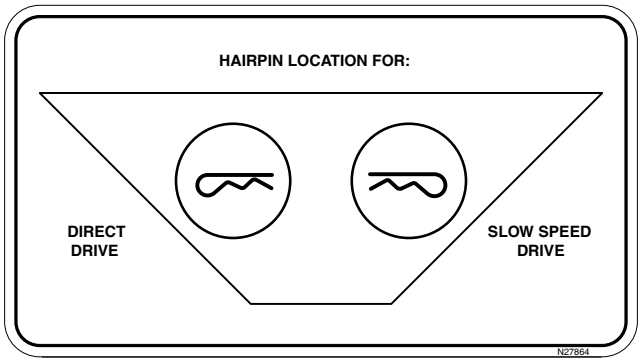
When seeding fine seeds such as canola or mustard, the slow speed transmission has to be engaged to ensure the low rates required for these products.

The slow speed transmission is incorporated in **All** the Posi-Drive Transmissions.

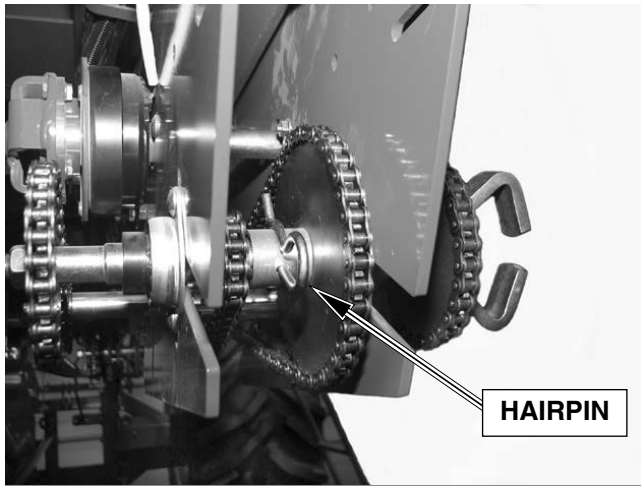
- To engage the slow speed, remove the large hairpin from the front shaft and install through the sleeve and shaft located at the rear of the transmission.

Note: Shaft will have to be rotated to align holes for pin insertion.

- To disengage the slow speed, reverse the above procedure.
- Rate checks can be performed the same way as for other seeds.
- Usually it is necessary to reduce the fan rpm when seeding fine seeds. See *"Fan Speed"* for specific fan speeds.



9450 Shown



Cover removed for clarity

Applying Inoculant

When inoculant is applied at the time of seeding, once the air cart has been filled, the fill-lids should be left open and the fan run for 5-10 minutes at full rpm to dry the seed.

Calibration must be done after the seed is dried, otherwise the calibration will be incorrect.

Note: If the seed is not dried then the seed will have a tendency to bridge and not meter into the air stream.

Hydraulic Fan Drive

The piston type orbit motor on the fan requires tractor to have either a load sensing hydraulic system or a closed centre hydraulic system with flow control.

The flow required is 18 U.S. gpm (68 liters) for the 12 cc motor and 21 U.S. gpm (80 liters) for the 16 cc motor at a pressure of 2,750 p.s.i. (18,960 kPa) However, smaller flows can be used depending on the product being metered.

For correct operation of the fan the hydraulic motor must be coupled to the priority valve (if tractor is so equipped) in the hydraulic valve bank.

Check with the tractor manual or manufacturer to determine if or which spool is a *"priority valve"*.

Speed fluctuations will result if the fan is not connected to the priority valve if hydraulic system is equipped with a priority valve.

Ensure couplers are free of dirt and are clean when connecting the fan hydraulics to the tractor.

Fan speed is adjusted by increasing the amount of oil being delivered to the motor. This is done by adjusting the respective flow control valve until the desired rpm is displayed on the monitor.

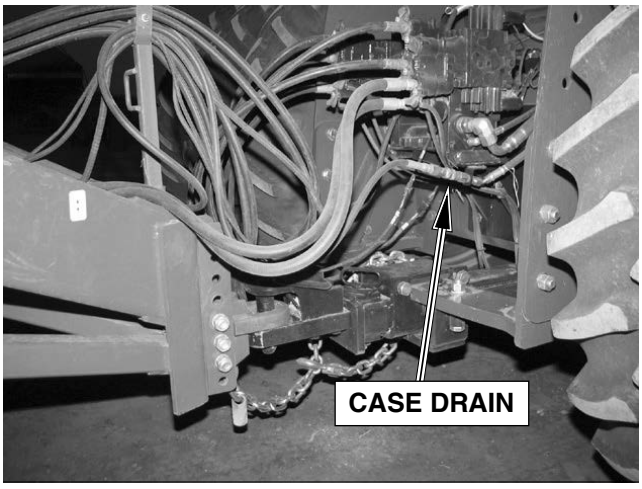
Note: There is a one-way check valve installed in the hydraulic circuit. If the fan does not rotate, then move hydraulic lever in the opposite direction; this will engage the fan. This valve prevents damage to the hydraulic systems when the fan is shut OFF, by allowing the fan to freewheel.

A piston motor creates leakage past the internal components for lubrication. This oil needs to go back to the oil reservoir at the lowest pressure possible. The motor has a 3/8" diameter drain line. This line must be connected directly into the tractor hydraulic reservoir to ensure that there is zero back pressure in the drainline, otherwise damage will result to the motor.

Hydraulic Drive

IMPORTANT

Run hydraulic fan drive at lowest rpm possible (1,000-2,000) for 5-10 minutes before operating at set rpm. This is required to warm up the hydraulic fluid. Cold hydraulic fluid will cause pressure spikes in the system that will damage the case drain seal in the orbit motor.



Hydraulic Coupling on Tractor

Fan Speed Recommendations

Adequate air volume is necessary at all times to carry the product in the air stream. Air volume can be controlled by adjusting hydraulic oil flow on hydraulic fan drives.

Air volume; hence fan speed requirements will vary with:

1. Ground speed
2. Metering rate
3. Number of primary runs
4. Secondary hose size
5. Width of machine
6. Density and size of material

Excessive fan speed can cause seed damage, seed bouncing and premature wear of the system.

Generally fan speed is adequate if product flows through the hoses without surging and the hoses empty quickly and evenly when the system shuts down.

Morris recommends the following operating guidelines for fan speed:

1. Do not operate the fan below 3000 rpm with 1 inch diameter secondary hose.
2. Do not operate the fan below 3500 rpm with 1 1/8 inch diameter secondary hose. Add an additional 500 rpm to speeds shown on the charts.
3. If equipped with a dual fans, keep the speed difference between the two fans within 1000 rpm.
4. Units equipped with VR drives the recommended minimum fan speed is 3500 rpm to ensure sufficient hydraulic flow to the VRT hydraulic valve block.

The charts on the next page list *suggested fan speeds* for various application rates.

Note: The charts should be used only as a guide. If plugging or surging occurs increase the fan speed to eliminate the problem.

Dual Fans

Use application rate of individual air stream to determine fan speed for that air stream.

Note: It is recommended that after a rain or dew the fan be run two to three minutes to expel any moisture in the system.

Important

Keep fan impeller blades clean at all times.

Note: Once fan speed is properly set, be sure to adjust the monitor fan alarm setting accordingly. See Monitor Section "Monitor Programming".

Fan Speed Recommendations - Continued

Charts are based on a 41 foot machine traveling at 5 mph (8 kph).

17 inch Diameter Impeller
Suggested Fan RPM @ 5 mph (8 kph) on a 41 ft unit
1 inch (25 mm) Secondary Hose

*****For 1 1/8 inch (28.6 mm) Secondary Hose add an additional 500 rpm to values below.*****

Combined Application Rate	Fan Speed Setting	
	Single Shoot	Double Shoot
3 - 50 lbs/acre 3 - 56 kg/ha	3000 - 3250 RPM	3000 - 3150 RPM
50 - 100 lbs/acre 56 112 kg/ha	3250 - 3500 RPM	3150 - 3400 RPM
100 - 150 lbs/acre 112 - 168 kg/ha	3500 - 3750 RPM	3400 - 3650 RPM
150 - 200 lbs/acre 168 - 224 kg/ha	3750 - 4000 RPM	3650 - 3900 RPM
200 - 250 lbs/acre 224 - 280 kg/ha	4000 - 4250 RPM	3900 - 4150 RPM
250 - 300 lbs/acre 280 - 336 kg/ha	4250 - 4500 RPM	4150 - 4400 RPM
300 - 350 lbs/acre 336 - 392 kg/ha	4500 - 4750 RPM	4400 - 4650 RPM
> 350 lbs/acre > 392 kg/ha	4750 - 5000 RPM	4650 - 4900 RPM
Note: Fan Speeds given are when applying product. It is normal for fan speed to drop when not applying product.		

Note: In a variable rate application set fan speed to match maximum product rate being applied.

Dual Fans

Use application rate of individual air stream to determine fan speed for that air stream.

Important:

Morris recommends not to operate the fan below 3000 rpm and if equipped with a dual fan setup to keep the speed difference within 1000 rpm.

Fan Speed Recommendations - Continued

Charts are based on a 71 foot machine traveling at 4.5 mph (7.2 kph).

17 inch Diameter Impeller Suggested Fan RPM 4.5 mph (7.2 kph) on a 71 ft unit for 1 inch (25 mm) Secondary Hose		
For 1 1/8 inch (28.6 mm) Secondary Hose add an additional 500 rpm to values below.		
Combined Application Rate	**Fan Speed Setting**	
	Single Shoot	**Double Shoot**
3 - 50 lbs/acre 3 - 56 kg/ha	3250 - 3500 RPM	3000 - 3250 RPM
50 - 100 lbs/acre 56 112 kg/ha	3500 - 3750 RPM	3250 - 3500 RPM
100 - 150 lbs/acre 112 - 168 kg/ha	3750 - 4000 RPM	3500 - 3750 RPM
150 - 200 lbs/acre 168 - 224 kg/ha	4000 - 4250 RPM	3750 - 4000 RPM
200 - 250 lbs/acre 224 - 280 kg/ha	4250 - 4500 RPM	4000 - 4250 RPM
250 - 300 lbs/acre 280 - 336 kg/ha	4500 - 4750 RPM	4250 - 4500 RPM
300 - 350 lbs/acre 336 - 392 kg/ha	4750 - 5000 RPM	4500 - 4750 RPM
> 350 lbs/acre > 392 kg/ha	-	4750 - 5000 RPM
Note: Fan Speeds given are when applying product. It is normal for fan speed to drop when not applying product.		

Note: In a variable rate application set fan speed to match maximum product rate being applied.

Dual Fans

Use application rate of individual air stream to determine fan speed for that air stream.

Important:

Morris recommends not to operate the fan below 3000 rpm and if equipped with a dual fan setup to keep the speed difference within 1000 rpm.

Plenum Settings

Plenum Damper Settings

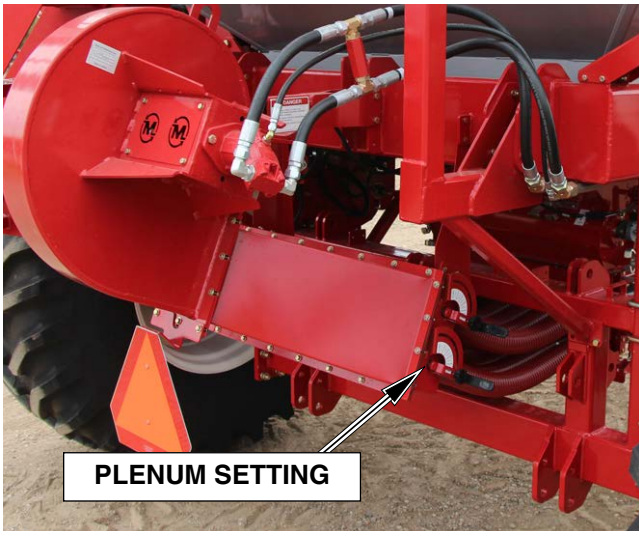
18 Outlet Plenum

Adequate air volume is necessary at all times to carry the product in the air stream. Air volume can be controlled by adjusting the plenum damper settings.

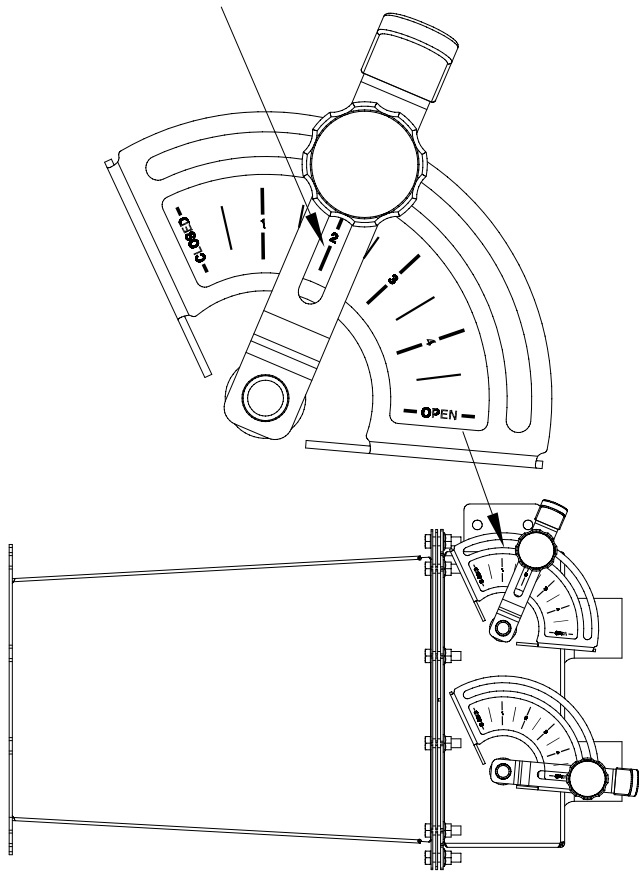
The table below lists initial plenum damper settings for certain products.

Note: The settings in the table should be used only as a guide.

- If **fertilizer** plugging or surging occurs **decrease** the seed damper setting to eliminate the problem.
- If **seed** plugging or surging occurs **increase** the seed damper setting to eliminate the problem.



Set Plenum Damper so that setting is in the middle of slot.
This Damper is set at the 2 position.



Suggested Plenum Settings				
Product	**Seed**		**Fertilizer**	
	Rate lb/acre	**Damper Setting**	**Rate lb/acre**	**Damper Setting**
Fine Seeds	All Rates	1	All Rates	Open
Coarse Grains	90 lb (100 kg/ha)	Open	50 lb (56 kg/ha)	2
	90 lb (100 kg/ha)	4	100 lb (112 kg/ha)	Open
	90 lb (100 kg/ha)	3	150 + lb (168 kg/ha)	Open
Large Seeds	180 lb (200 kg/ha)	Open	40 lb (45 kg/ha)	2
Single Shoot	**Lower Pipes**	- Top Damper Closed - Bottom Damper Open		
	Upper Pipes	- Top Damper Open - Bottom Damper Closed		

Note: See "Fan Speeds" for Fan RPM.

Double Shoot Settings

Collector Valve Settings

Located in each upper collector body are flapper valves for machines equipped with Double Shoot. The flapper valve must be properly set in order for product to flow correctly.

See illustrations on following pages for specific settings for various combinations for Double and Single Shoot set ups.

Flapper valves must be cycled daily to free valves of any fertilizer and grain dust accumulations.

Whenever valves are cycled or reset to a new position the position should be visually inspected as follows:

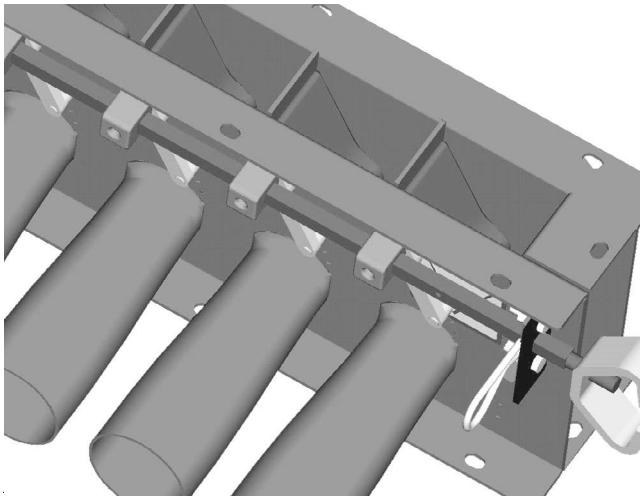
- Set flapper valves to correct position for product delivery.
- Remove the inspection door and visually check that the flappers are fully over and touching the side walls, sealing off the individual air streams.
- The flappers can be adjusted by loosening the individual adjusting setscrews and applying pressure to the flapper forcing it against the side wall while tightening the setscrew.

Note: The bottom air stream should be used to carry the higher rate of product.

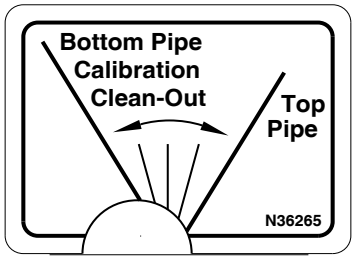
Flapper Valve Run Test

Use the following procedure to check that the flapper valves do not move when air pressure is applied to under side of flappers.

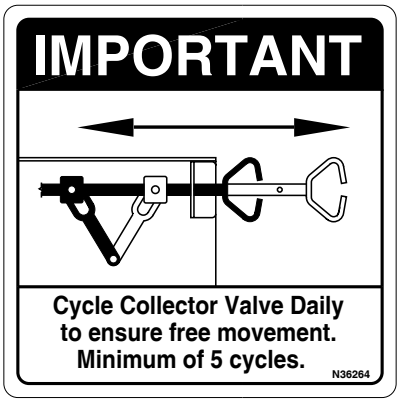
- Check flapper valves in both directions with air running.
  - If valve is set to direct product into the bottom pipe, have the plenum damper open for the top pipes and closed to the bottom pipes.
  - If valve is set to direct product into the top pipe, have the plenum damper open for the bottom pipes and closed to the top pipes.
- **Always wear** safety goggles, breathing apparatus and gloves when working with granular chemical or treated seed per the manufacture's instructions.
- With fan running check flapper valve position.
- The flappers can be adjusted by loosening the individual adjusting setscrews and applying pressure to the flapper forcing it against the side wall while tightening the setscrew.

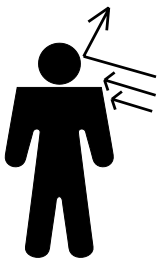


Flapper in "Bottom Pipe" Setting



Decal on Collector





Caution

Care should be taken when working near the air cart while the fan is running. Product blowing out of the system could cause personal injury.

Operating Guidelines

There are a number of areas that can cause problems when seeding. Listed below are specific points that should be addressed at all times. Following these guidelines will ensure better crop emergence and consequently the potential for better yields.

An improperly leveled seeding tool cause uneven depth, which could result in poor emergence.

It is important that the seeding tool is leveled both side to side and front to back.

Check Tire Pressures

- Ensure all tires are inflated to their specified pressure. Incorrect tire pressure can cause depth variations.

Level Seeding Tool

Side to Side

- Check the depth of each shovel on the back row.
- Adjust side to side level as necessary. See seeding tool manual for more details.

Front to Rear

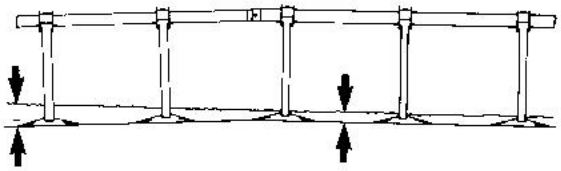
- Poor front to rear leveling causes ridging as shown.
- Check the depth of two adjacent shanks, normally one on the front row and one on the rear row.
- Adjust level as necessary. See seeding tool manual for more details.

Worn Seeding Tool Parts

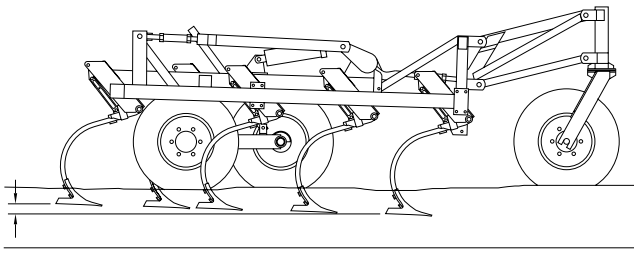
- Shanks that are bent cause uneven depth and they should be repaired or replaced.
- Trip mechanisms that are worn can also cause poor depth control and any worn parts should be repaired or replaced.

Packing

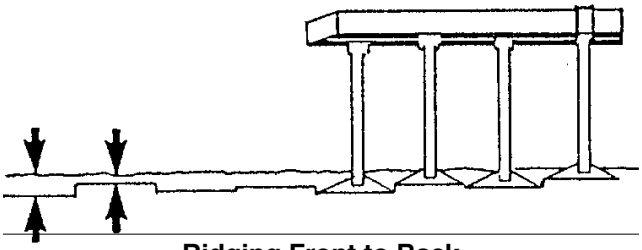
- Packing behind the seeding unit is strongly recommended. This improves germination and helps reduce moisture loss and erosion.
- In wet conditions the head land should be done last to prevent over packing.



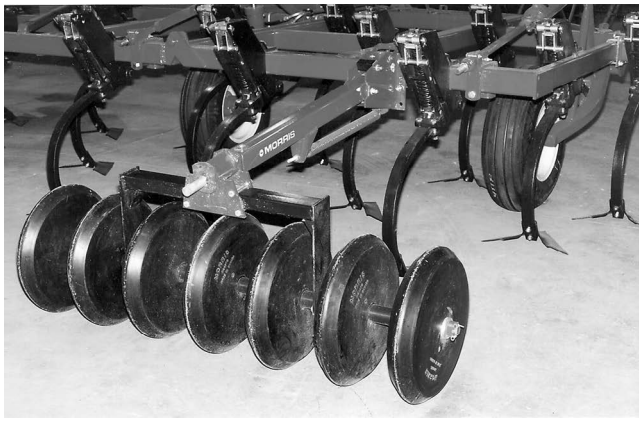
Side to Side Level



Front to Back Level



Ridging Front to Back



Mounted Packers

Operating Guidelines - Continued

Turning

- Avoid sharp turns. Backing up of the outer wings with the seeding tool in the ground has a tendency to plug the seed boot with soil.
- Raise seed boots fully before making sharp turns or backing machine.

Seed Rate Settings

- Remove any caked-on material from seed plate and metering wheels.
- Ensure correct seed plate is installed and metershaft turns freely.
- Check product rates carefully by performing a calibration check.

Fertilizer Application

- Avoid using fertilizers that absorb moisture readily, especially during periods of high humidity.
- Also avoid fertilizers that contain a high percentage of fine dust, as these materials can plug metering wheels and coat the inside of seed distribution system.

Fan Setting

- Run fan at recommended speed. If plugging or surging occurs increase the fan speed to eliminate the problem. If plugging or surging continues reduce ground speed to eliminate the problem.
- Allow tractor hydraulic oil to warm-up thoroughly prior to seeding. Cold oil will cause slower fan speeds (Hydraulic driven fan).

Product Application

- Control product application with the clutch switch in tractor.
- Have machine moving forward before lowering seed boots to avoid plugging.
- To prevent skipping, allow a minimum of 15 feet (5 m) of forward travel to ensure air system has delivered product to seed boots.

  Forward travel should be equal to half the width of the seeding tool. [i.e. for a 40 ft (14 m) wide seeding tool the forward travel should be a minimum of 20 feet (7 m).]

Note: It is strongly recommended to consult local agricultural extension offices for allowable product rates, which are dependent on soil moisture and type.

Important

Raise Stairs before moving Cart.

Stair damage will occur in lowered position.

Note: Do not attempt to meter product when fan is not running. Damage to the metering wheels may occur.

Operating Guidelines - Continued

Adjustments and Operational Checks

- When changing fields and periodically throughout the day, the seeding tool should be checked for level and depth and the seed boots for blockage.

Checking Seed Flow

The following procedure should be implemented throughout the day typically at each fill of the air cart:

- Raise the seeding tool out of the ground.
- With the fan running turn the crank on the rear transmission 4 or 5 turns.
- Seed and/or fertilizer should appear at each outlet on the ground.
- If no seed or fertilizer appears on the ground at any of the openers check for hose blockage in both the 15/16" (24 mm) diameter secondary and the 2 1/2" (64 mm) diameter primary hose, as well as in the flat fan divider.
- See Trouble Shooting Section for possible causes of the blockage.

Moisture Alert

- Whenever air cart has been standing for an hour or more during period of high humidity or damp, rainy days, or after sitting overnight, run fan at recommended rpm, with machine stationary for 5 minutes.

Air Leaks

It is imperative that no excessive air leaks occur in the air cart tank. Air leaks can lead to product bridging in the tank thereby causing misses in the field.

Check the following areas for air leaks:

- Tank lid
- Tank clean-out door
- Collector assembly seals
- Metering body assembly seals

Tank Low in Product

- Refill tank before metering wheels are exposed.
- The metering wheels must be completely covered to avoid unseeded strips.

Important

Check Metering Wheel flutes in the event the primary lines plug.

Flutes may shear if the collector becomes plugged.

Note : Check Seed Flow as described above, after running fan for 5 minutes.

When the slidders are closed product will still be metered until the wheels empty.

Operating Guidelines - Continued

Meter Shut-Off

- Familiarize yourself with the remote functions.
- On initial startup of the system the remote needs to learn the transmitter signal of the solenoid by:
  1. Power up solenoid
  2. Press and hold the remote ON button for 10 seconds.

Note: The remote will need to learn the transmitter signal each season of use and when batteries are replaced.

- To close a meter shut-off section press and hold the remote CLOSE button for approximately 30 seconds. The fan rpm will drop slightly while the cylinders are closing and will resume full rpm once cylinders are closed.
- To open a meter shut-off section press and hold the remote OPEN button for approximately 30 seconds. The fan rpm will drop slightly while the cylinders are opening and will resume full rpm once cylinders are opened.
- Ensure solenoid is correctly wired to match remote. (i.e. Left buttons controlling left shut off)
- Check all wire harness connections for corrosion and use a dielectric spray to clean.
- Periodically throughout the day typically at each fill of the air cart, visually check shut-offs to ensure they are functioning correctly.

Important: It is strongly recommended to have the seeding unit equipped with a blockage monitor system to ensure product flow.

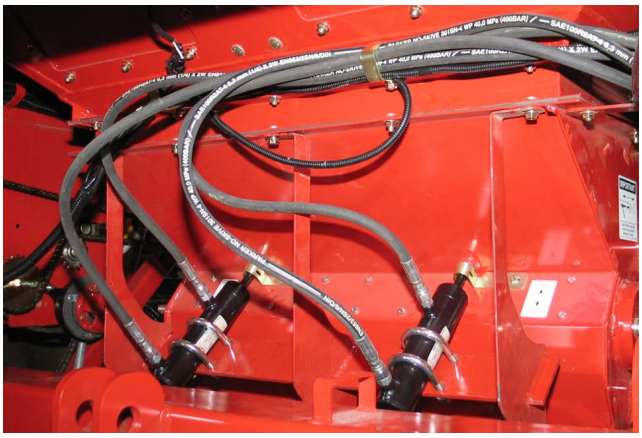
Note: Acres are tabulated using total implement width and does not account for meter shut-off usage.

Important

Metering Wheels require purging once meter shut-offs are opened. A half revolution of the metering wheel is required before product begins to meter. Coarse seeds and fertilizer will require forward travel of the seeding tool of 10 feet (3.5 m) minimum. Fine seeds require forward travel of the seeding tool of 110 feet (34 m) minimum.

Products and rates may vary forward travel distance. Operator must familiarize one-self with distance required for products being used.

Meter Shut-Off Remote Control



Meter Shut-Off Cylinders

Operating Guidelines - Continued

Monitor

- Familiarize yourself with all monitor functions.
- Ensure all monitor *"settings"* are correctly set for the air cart/seeding tool combination.
- Recognize and correct alarm conditions as indicated on the machine.
- Check all wire harness connections for corrosion and use a dielectric spray to clean. Inspect all sensors for proper gap.

MONITOR - N72101

General Field Operation

- Follow guidelines outlined in *"Operating Guidelines".*
- Switch monitor on.
- Start fan.

Note: Load sensing hydraulic systems require "*warming up*" before they function smoothly. See *"Hydraulic Fan Drive" for more details.*

- Move forward with seeding tool.
- Engage metering system clutch (MAIN).
- Lower seeding tool into ground.
- Turning at headland: Switch metering system clutch off (MAIN), immediately raise seeding tool fully rephasing hydraulics (see seeding tool manual).
- Once turned engage metering system clutch (MAIN) and lower seeding tool into ground.

Note: Do not attempt to meter product when fan is not running. Damage to the metering wheels may occur.

Note: It takes a minimum of 15 feet (5 m) of forward travel @ 6 mph (10 kph) before product reaches the seed openers. Forward travel should be equal to half the width of the seeding tool. [i.e. for a 40 ft (14 m) wide seeding tool the forward travel should be a minimum of 20 feet (7 m).]

Clutch Switches

Main

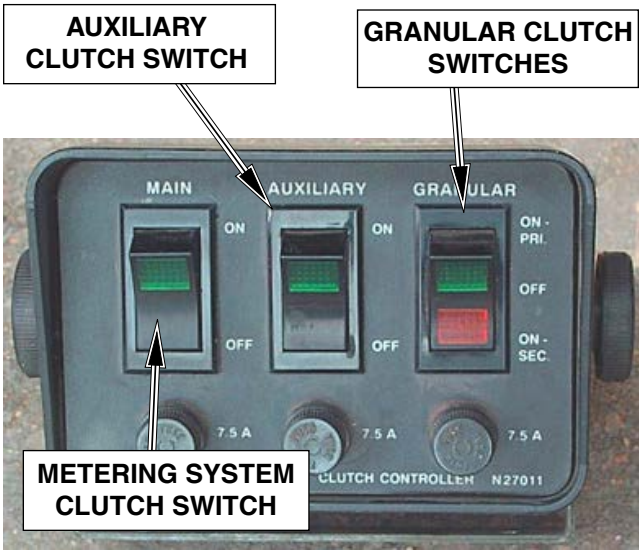
- Controls the main clutch which engages and disengages the ground drive.

Auxiliary

- Controls the optional second clutch.

Granular

- Controls a secondary auxiliary clutch.



Clutch Switch Console

Section 6: Monitor

Section Contents

Section Contents (Continued)

Introduction

The monitor features an easy to use Touch Screen operation. The monitor utilizes a multiplexed data communication system to monitor the functions of the Air Cart. In the multiplexed system, all sensors communicate with the monitor on the same three wires.

The system can monitor and display status of the following functions:

- Fan speed (up to 3)
- Ground speed
- Shaft speeds (up to 4)
- Bin levels (up to 4)
- Flow Blockage (up to 192 runs)

An audio alarm will sound upon detection of: low or high fan speed, low or high shaft speed, low bin level and failure of sensors. Also, loss of flow in any runs that are being monitored with Blockage Modules will generate alarms. Audio alarms persist until the alarm condition is removed or until the alarm is acknowledged by the operator by pressing the appropriate soft key.

In addition, the monitor can determine and display:

- Field Area
- Total Area
- Application Rate (weight per unit area)

The monitor allows the following settings to be changed:

- High and Low fan speed alarm point
- High and Low shaft speed alarm point for 4 shafts
- Ground speed pulses per 400 ft and pulses per revolution
- Pulses per revolution of fans and 4 meter shafts
- Low bin alarm for 4 bins
- The number of Blockage Modules that are connected to the monitor
- The width of the implement
- Imperial or metric units

The settings listed above, as well as field and accumulated areas are stored in nonvolatile memory. This means that the information is retained even when power is disconnected.

The monitor has one tractor harness attached to it. The Tractor harness has a power plug that connects to the tractor power supply and a three pin plug that brings power and communications to the remote sensors through the main harness. The Tractor harness also has a four pin plug for optional radar or GPS connection.

MONITOR - N72101

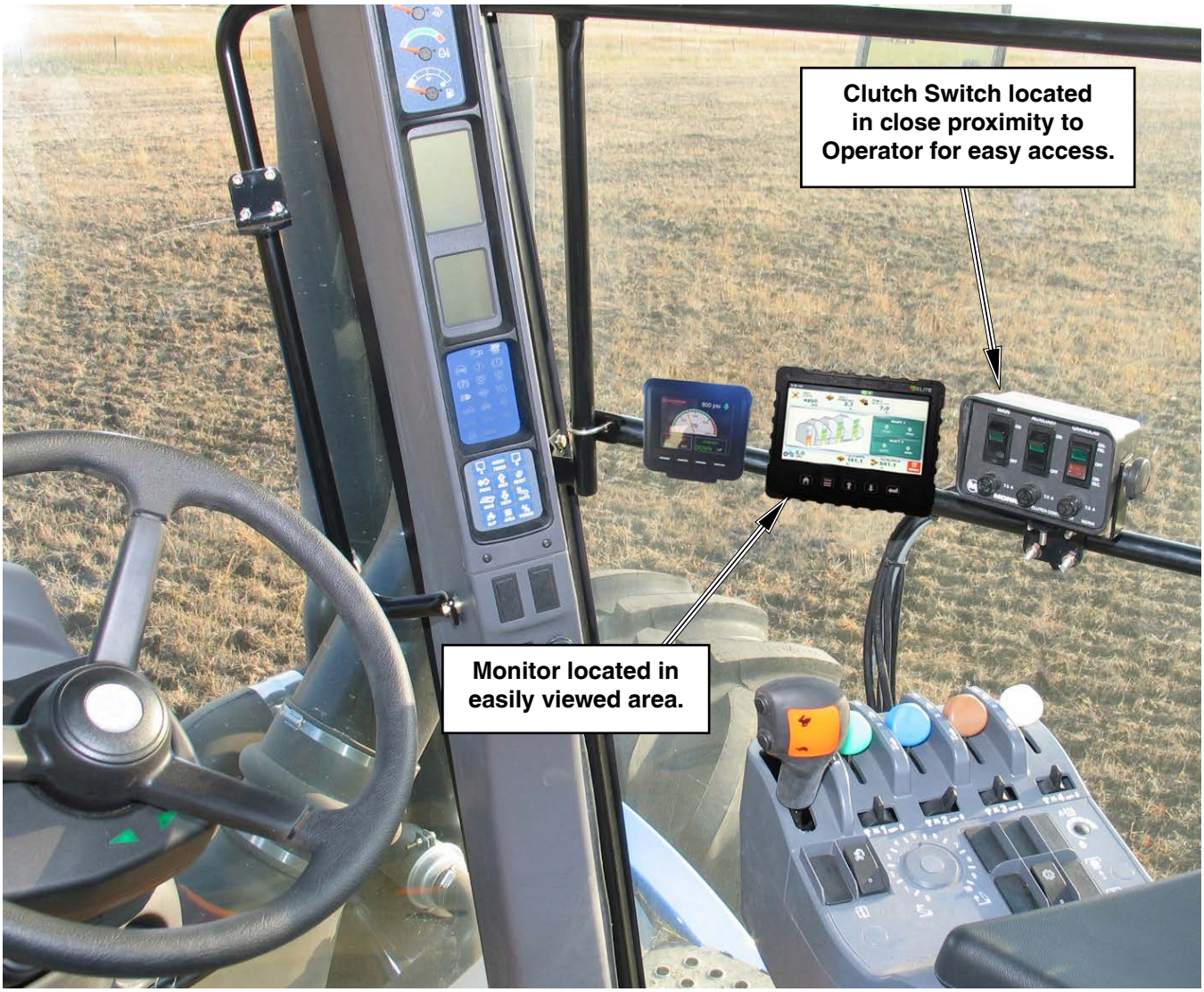
CLUTCH SWITCHES

Installing Monitor

- Locate monitor and clutch switch in a convenient location in cab.
- Plug Monitor power cable directly to a 12V power plug / power bar in cab.
- Connect Clutch Switch power cables directly to a 12V battery.
  - White or Red wires **positive**.
  - Black wires **negative**.
- Route cable harness to seeding tool and Air Cart. Ensure cables clear any pinch points (i.e. tractor articulation point, hitch point, etc.)
- Program monitor as described in *System Installation* and *Monitor Programming* Sections.

Note: Locate monitor, power and ground wires away from radio and antenna if tractor is so equipped.

Note: Do not connect monitor or clutch switch directly to starter switch.



Identifying Monitor Switches

The five keys on the monitor face are used for controlling the monitor.

Home Key • Used to return to Main screen.

Menu Key • Used to access Main Settings Menu.

Up Key • No function attached to this key.

Down Key • No function attached to this key.

Back Key • No function attached to this key.

Note: Monitor will show "communication errors" if the system installation (Sensor Learn Mode) was not completed. *See Sensor Installation.*

Home Screen - Operation Overview

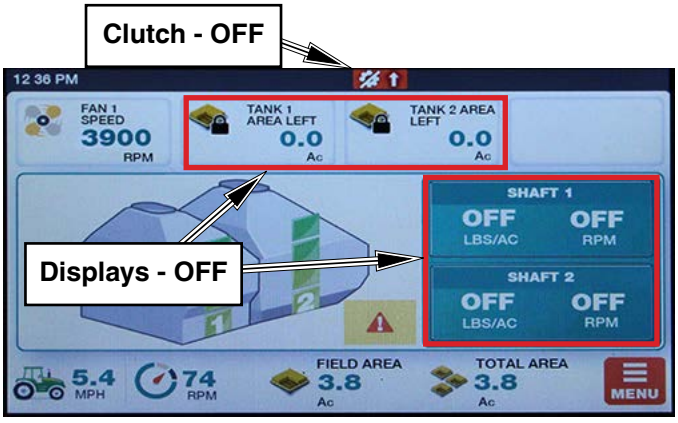
Clutch In Motion Indicator

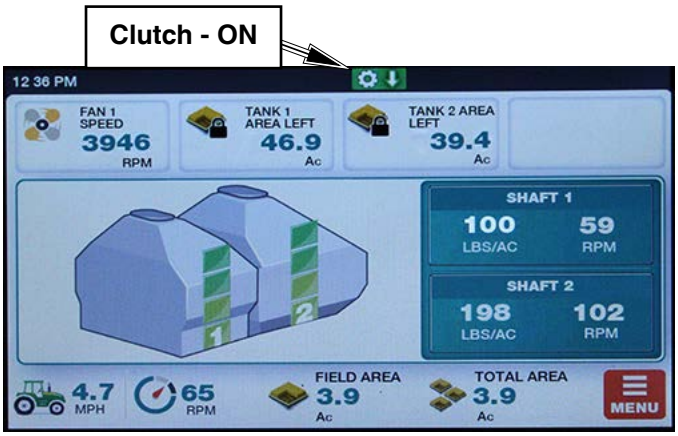
When Clutch is OFF the indicator will be displayed as  and all functions associated with the meter shafts will display OFF or have a zero count.

When Clutch is ON the indicator will be displayed as  and all functions associated with the meter shafts will display their application.

Note: The monitor also emits a double beep whenever the "In Motion" condition becomes true or false.

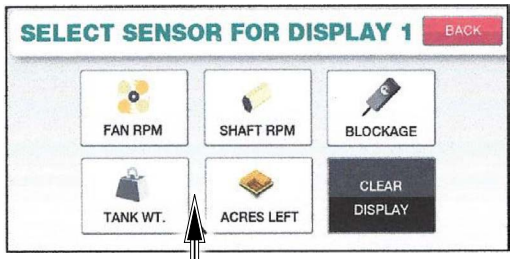
Home Screen Overview continued on next page.

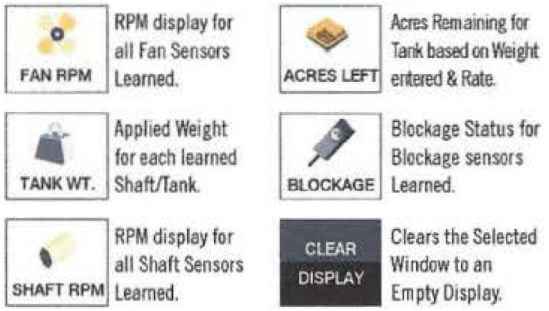




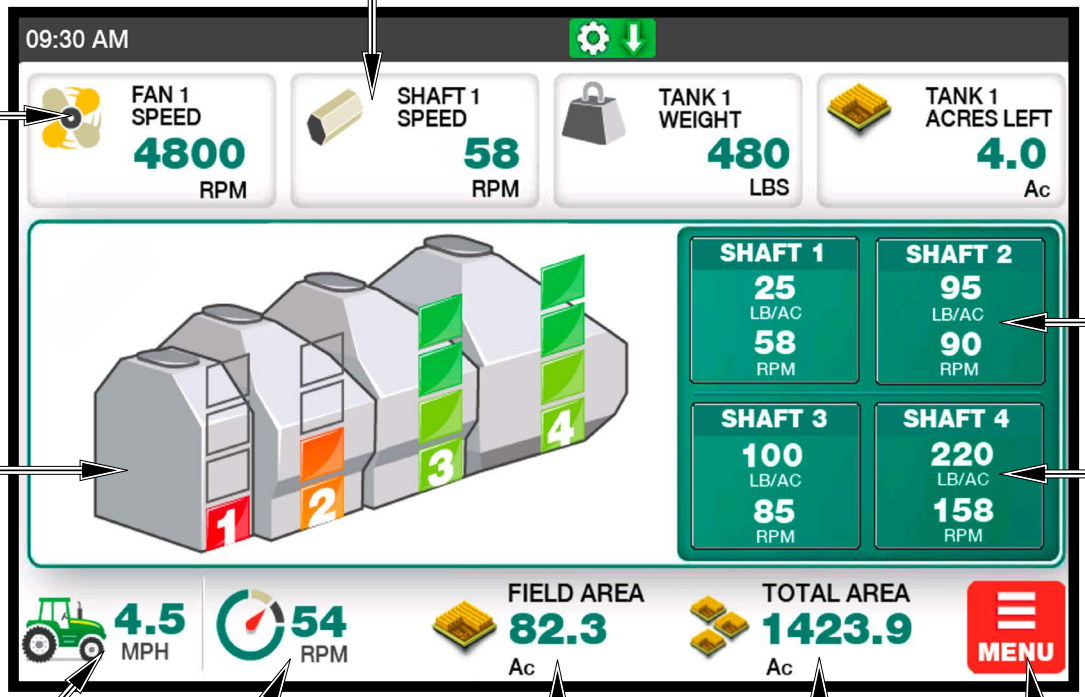
Home Screen - Operation Overview

Lock/Unlock Windows
Long Pressing on windows displaying **Fan RPM, Shaft RPM, Tank Weight,** or **Acres Left** will lock the window. This allows you to focus a window on a particular sensor if you wish. Long press again to disable the lock.





Each of the top 4 windows can be changed to display different functions.



Tank Level Indicators. Up to 4 Bin Level sensors can be learned, either as a single level or 4-level sensor.

Adding or Removing Bin Sensors is reflected in the Tank/ Bin graphics shown here.

Shaft Sensor Details
Up to 4 shafts can be learned and displayed.

Enabling **"Rate Sensor"** within the Shaft Settings allows a **"Pounds/Rev"** value assigned to each sensor. A **"LB/AC"** value is then displayed for that shaft.

Each Sensor can be **"Enabled"** or **"Disabled"** from the Shaft Settings Menu. Disabling a shaft sensor will result in both **"LB/AC"** and **"RPM"** displaying **"OFF"**.

Long Press on Each Shaft Sensor Window to Reset the Tank Weight. This then also prompts you to enter a new Tank Weight for the corresponding Shaft Sensor.

Ground Speed

Ground Speed RPM

Field Area. Select to reset to 0.

Total Area. Select to reset to 0.

Enter the Main Settings Menu

Startup

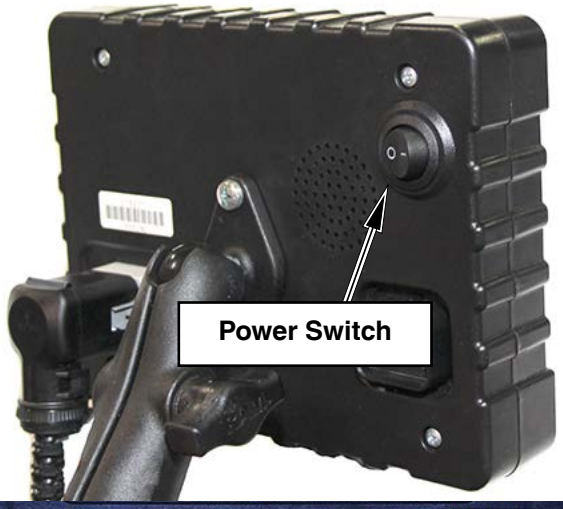
Power On

Toggle the Power switch to turn the monitor on.

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

- ELITE is displayed while the LOUP bar loads.

  This Splash Screen is displayed for a short time – long enough to go through the system startup and wakeup all of the sensors (approximately 3 seconds).
- If any sensors are found, the monitor proceeds to the “Operating” screen
- If no sensors are found, the monitor will display a “COMM ERROR ALARM”.



Power Off

Toggle the Power switch to turn the monitor off.

Note: Monitor will show “communication errors” if the system installation (Sensor Learn Mode) was not completed. *See Sensor Installation.*

COMM ERROR ALARM Screen

Operating Screen

Sensor Installation

The installation procedure is required to configure the monitor to the sensors attached to it.

The operator may have to redo the installation if:

1) An extra tank is added to the Air Cart.
2) Replacing or adding sensors.
3) Replacing monitor with a new monitor.

Installation Precautions

1) During installation the monitor has a predetermined order in which it wants the sensors attached. The installer must be sure that the proper sensor is plugged in the proper sequence.

   i.e. If during installation the installer plugs in the Front Shaft and Ground Speed sensors in the wrong order, the monitor would not know this. The monitor would interpret Front Shaft rpm from the Ground Speed shaft and vice versa.

2) There may be occasions when the operator will not have use of all the sensors.

   i) During sensor installation when the monitor prompts for an unused sensor to be plugged in, the operator can press the SKIP THIS SENSOR key to skip over the sensor. **The sensor will be assigned a disabled status.** A sensor disabled by this method can only be enabled by repeating the installation procedure.

Note: Skip "LIFT SWITCH". The shaft ground speed sensor is connected to the clutch eliminating the need for a lift switch sensor.

   ii) During operation the operator can disable shaft sensors. When disabled, alarms for that shaft sensor and corresponding Bin Level sensor are ignored and no monitoring occurs.

3) Blockage modules attached to the harness are handled differently than the sensors attached to the harness. See Assembly Section *"Blockage Module".*

   Optical Sensors - the blockage modules **have to be unplugged from the harness** before sensor installation can be performed and are connected like the other sensors requested by the monitor during sensor installation.

Note: Each monitor is unique to the sensors installed. If monitor is moved to another Air Cart it has to be reprogrammed to match the sensors.

Sensor Installation Order
Speed (Ground)
Lift Switch
Rate Calibration
Bin 1
Bin 2
Bin 3
Bin 4
Shaft 1
Shaft 2
Shaft 3
Shaft 4
Fan 1
Fan 2
Fan 3
Blockage Modules

Sensor Installation - Continued

Installation Procedure

- **Disconnect** all the sensors (3 pin connector) from the harness before turning monitor on.

Note: Disconnect Hydraulic Rate Calibration at sensor connection indicated below.

1. Turn monitor on. With no sensors found, the monitor display “COMM ERROR ALARM” screen.

   Press “CLEAR ALL ALARMS”.

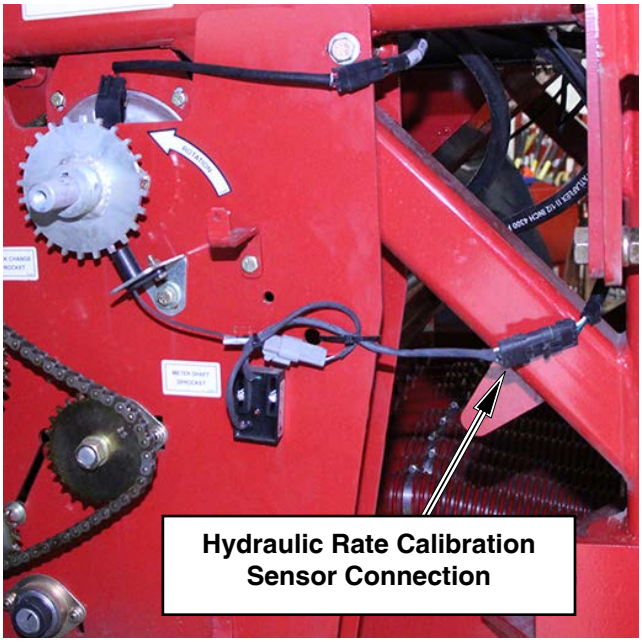
2. The monitor will display the HOME screen.

   Press “MENU” key.

3. The monitor will display the SETTINGS screen.

   Press “INSTALL SETUP” key.

Continued on next page.



Sensor Installation - Continued

Installation Procedure - Continued

4. The monitor will display the INSTALLATION screen.

   Press “LEARN NEW SYSTEM” key.

5. MANUAL LEARN CONFIRM screen will display.

   Press “YES, LEARN NEW SYSTEM” key to start sensor learn sequence.

6. The display will indicate to install the SPEED sensor indicating that the speed sensor may now be connected. Connect the speed sensor.

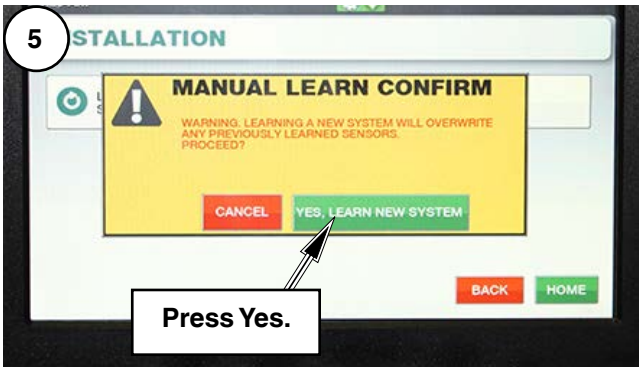
   The process is the same for the rest of the sensors in the sequence.

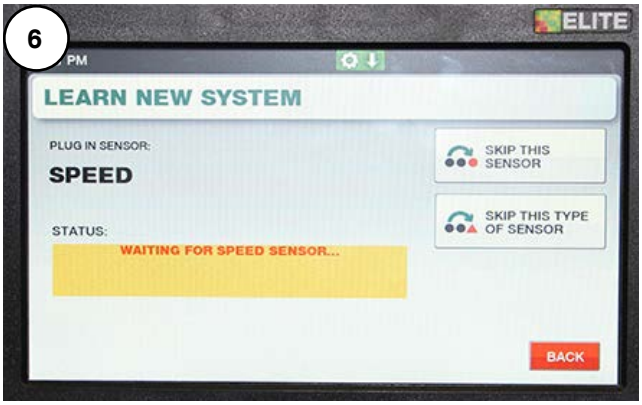
7. When the monitor requests a sensor that **will not be used** in the configuration, press the “Skip this Sensor” key and the monitor will skip the sensor and advance to the next one in the sequence.

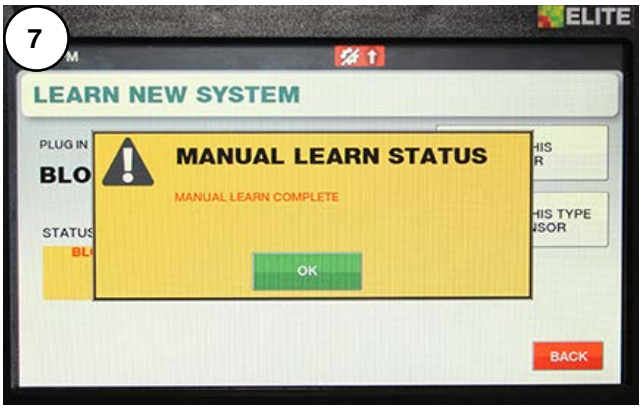
Note: There are **12 Blockage Modules**. To skip past the blockage modules, press the “Skip this Type of Sensor” the monitor will skip all the blockage modules and advance to the next type of sensor in the sequence.

8. When all sensors in the list have either been learned or skipped, the monitor will display “Manual Learn Complete”. Press the OK key to complete sensor installation. The monitor will return to the SETTINGS screen.

   To verify the installation, turn the monitor off, then turn it on again. The monitor will now proceed to the “Operating” screen with no comm errors.







Monitor Settings

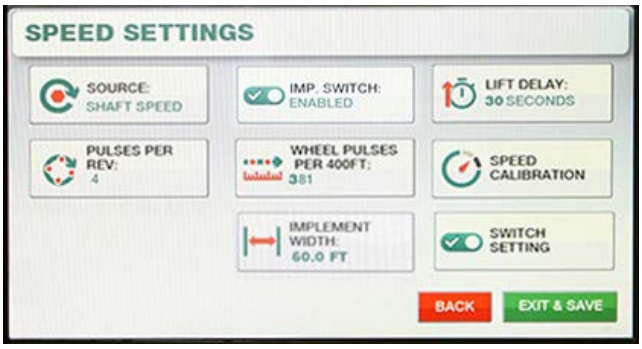
Navigating Settings Screens

The settings screen contains all the configuration information required to tailor the monitoring capabilities to the installed system and user preferences. Only setting parameters that are relevant are displayed (i.e. if no Shaft 3 is installed, there will not be any Shaft 3 setting parameters made available).

Pressing the **MENU** key when in the "**HOME** Screen" enters this mode.

The "**SETTINGS** screen" will list all the user adjustable parameters available.

Speed Settings



Located by selecting "**Menu**" and "**Speed Settings**", these settings control the type of speed input being used as well as calibrating the speed displayed on the main screen.

Select the "**Source**" button to change the type of Speed Input to use. There are four options Shaft Speed, Radar, GPS, and Simulated Speed.

1. SHAFT SPEED SENSOR: Uses the shaft rotation sensor located on the Cart to obtain ground speed. Unless otherwise configured this is also used as the lift switch for acres accumulation.

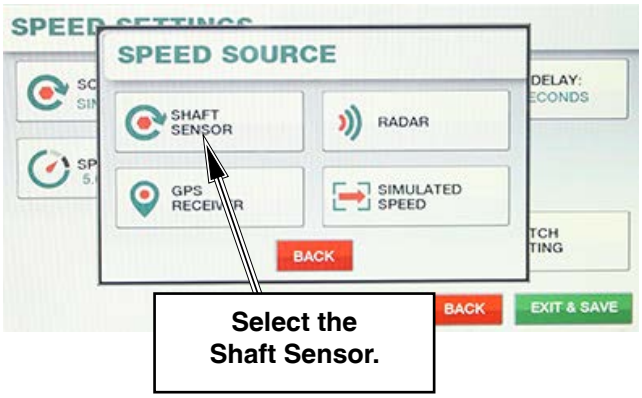
Note: The shaft ground speed sensor is connected to the clutch eliminating the need for a lift switch sensor.

2. RADAR SPEED: Uses the tractor radar for the source of ground speed. Depending on the implement configuration a lift switch may be needed when using radar, this is to ensure accurate accumulation of field acres.

3. GPS SPEED: Uses a GPS receiver for the source of ground speed. Depending on the configuration a lift switch may be needed when using GPS, this is to ensure accurate accumulation of field acres.

4. SIMULATED SPEED: Allows the user to enter a static speed into the monitor without any other speed source. For use in more unique conditions such as a GPS/Radar failure, or other troubleshooting.

Available when "**Simulated Speed**" is selected as the source. Use this field to enter the static speed of choice. The monitor will continually display this speed at all times until otherwise specified.

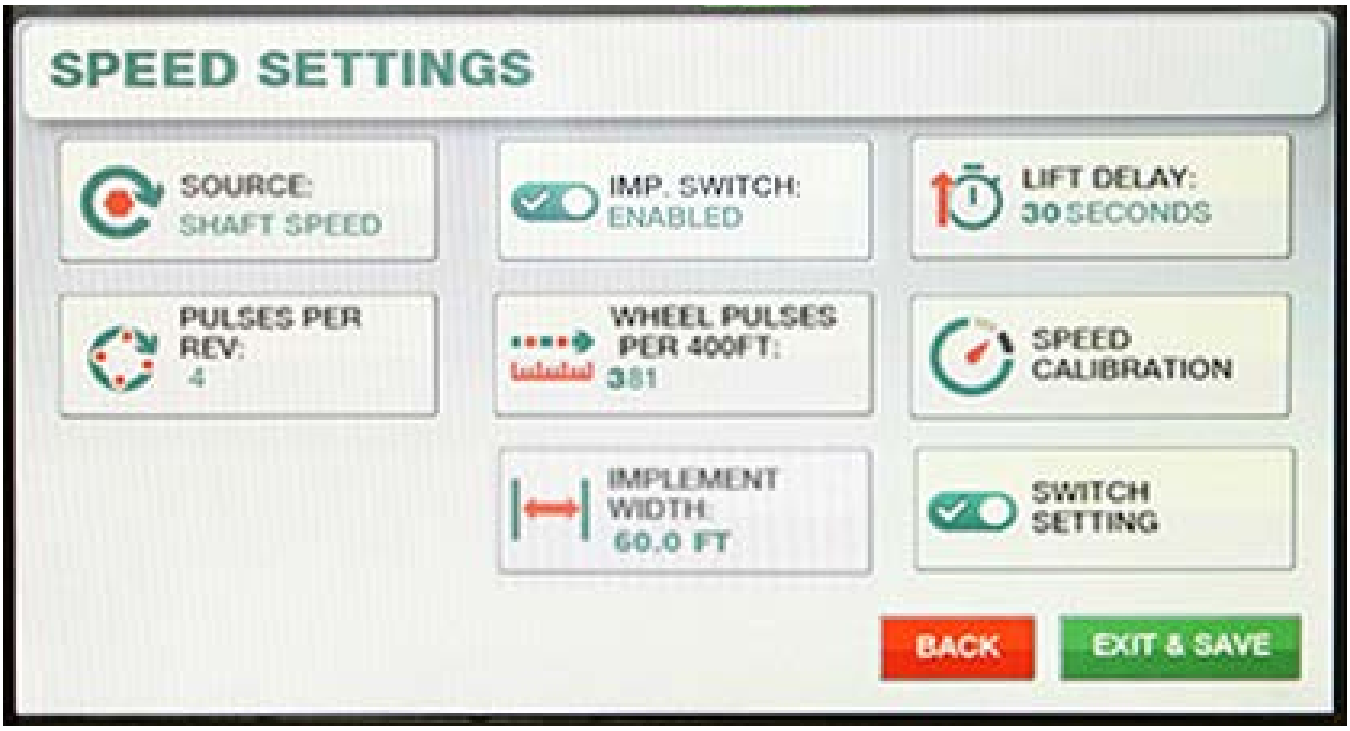


Important

The Ground Drive Air Cart only supports the Shaft Speed Sensor.

Monitor Settings - Continued

Speed Settings - Continued



Note: All Menu settings can be set before selecting "Exit & Save".

Pulses Per Revolution

Available when "Shaft Speed" is selected. Pulses per Rev (Revolution) are the number of magnets the Air Cart mounted speed sensor sees in one revolution of the shaft being monitored. Use keypad to set this number to **4** and select "**Exit & Save**".

Wheel Pulses Per 400FT

Available when "Shaft Speed" is selected. This is the ground speed calibration number for the Air Cart mounted speed sensor.

To change, refer to **PP400 Chart** on next page, select Tire Size on Cart and enter number into the keypad and select "**Exit & Save**".

Implement Width

Use keypad to set this number to the working width of seeding tool and select "**Exit & Save**".

Switch Setting

Select the "**Raised Open**" setting by pressing the **Set Highest** key.

Implement Switch

The implement switch is used to tell the monitor if a lift sensor is being used to determine when the Air Cart is seeding and when it's not. The lift switch sensor is used when shaft rotation cannot be used. (i.e. Radar and GPS)

Morris Air Carts use the shaft ground speed sensor which is connected to the clutch eliminating the need for a lift switch sensor.

Each button push toggles this setting between "Disabled" and "Enabled".

When a "Lift Switch" sensor is learned to the monitor, toggle the "Imp. Switch" button to "Enabled".

If shaft speed sensor is used set to "**Enabled**".

Lift Delay

When enabled, the Lift Delay specifies the seconds given to make a turn before an Alarm sounds. This value can range between 1 and 99 seconds.

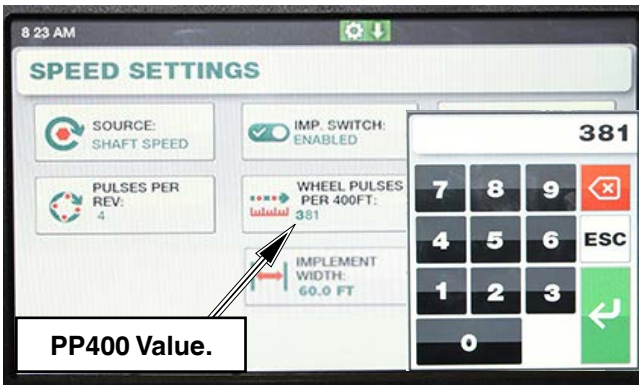
Use keypad to set this number to **30**.

Monitor Settings - Continued

Wheel Pulses Per 400 Feet (PP400) Ground Drive

The chart contains average PP400 values, for the tire options offered by Morris.

Note: Air Carts without brakes use a 63 tooth drive sprocket. Air Carts with brakes use a 64 tooth drive sprocket.



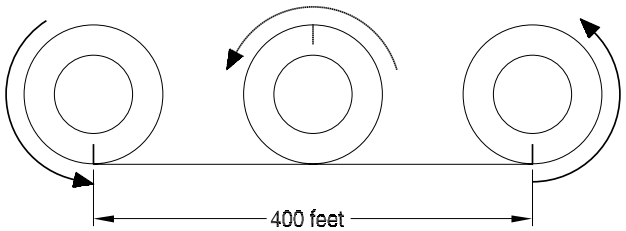
PP400 - Ground Drive				
Tire Size (Good-Year)	**Tire Style**	**Rating**	**Pressure**	**PP400**
800/65R32	Lug	172 A8	15 psi	382
			20 psi	381
No Brakes 800/65R32 Dual Wheels	Lug	172 A8	20 psi	381
Brakes 800/65R32 Dual Wheels	Lug	172 A8	20 psi	387
900/60R32	Lug	176 A8	17 psi	356
			26 psi	351
710/70 R38	Lug	166 A8	36 psi	351
800/70R38 Dual Wheels	Lug	173 A8	20 psi	342
850/80R38 Dual Wheels	Lug	180 A8	15 psi	312
520/85R38 Dual Wheels	Lug	155 A8	20 psi	377

PP400 Math Calculation

To determine PP400 value, first determine the tire circumference as outlined below:

- The tire circumference should be checked under normal field conditions with tanks half full.
- Mark tire and starting point.
- Drive air cart 10 revolutions of tire.
- Mark ending point.
- Measure distance from starting point to ending point and divide by 10 to get the rolling circumference of the tire.

Note: The PP400 can also be determined using the speed calibration feature.



Monitor PP400 Formula - Ground Drive

For 32” Rim = 80640/Tc

For 38” Rim = 80640/Tc **PP400 =** _____

Tc = Tire Circumference measured in inches

Monitor PP400 Formula - Ground Drive with Brakes

For 32” Rim = 81920/Tc

For 38” Rim = 81920/Tc **PP400 =** _____

Tc = Tire Circumference measured in inches

See Metric Section 10 for metric formulas.

Monitor Settings - Continued

Speed Calibration

If the operator does not know what the pulses per 400 feet should be, or, if more accuracy is desired for present levels of tire inflation or soil conditions, the monitor can be put into “Speed Calibration” mode, pulses will be counted while driving a specified distance.

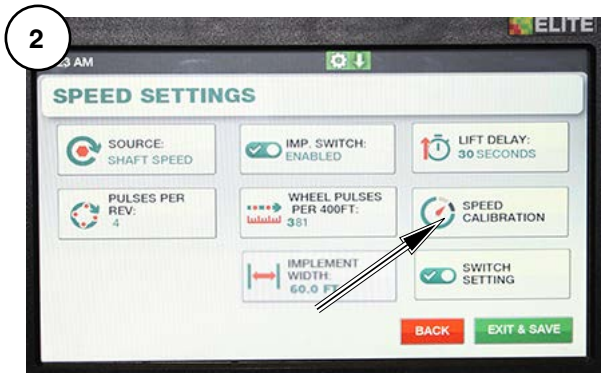
To start the Pulse Counting Mode:

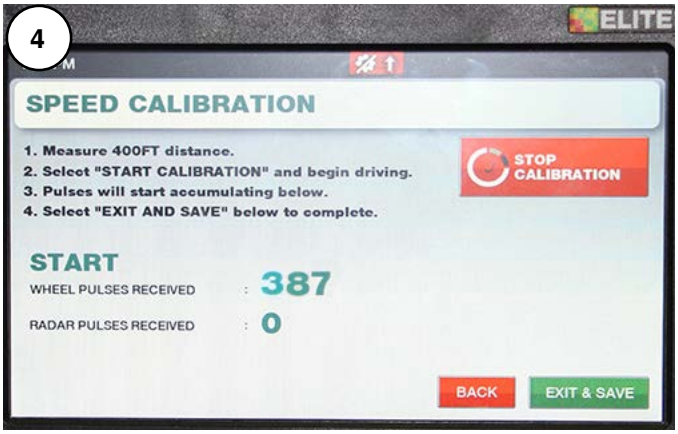
1. Measure and mark out 400 feet (121.92 m).
2. Select **SPEED SETTINGS** under the “Settings Menu”.

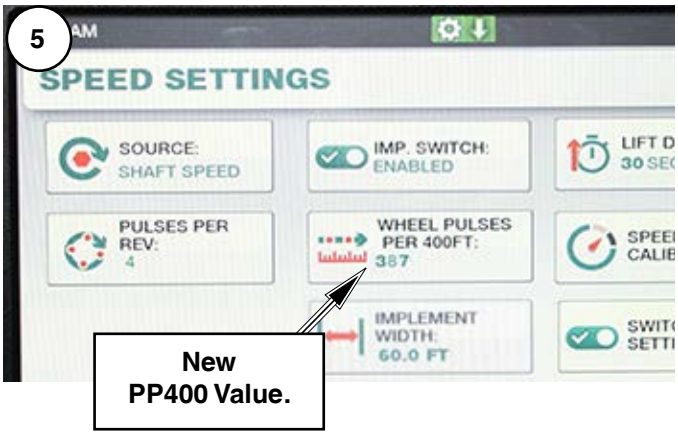
   Then select **SPEED CALIBRATION**.
3. Press **START CALIBRATION** to start the pulse count sequence.

   Drive the marked distance and the monitor will count the number of pulses.
4. When the distance has been travelled, stop forward travel. Press the “**Exit and Save**” to save the new pulse count under the **SPEED SETTINGS** screen.
5. The new value will now be displayed under “**Wheel Pulses Per 400 Feet” (PP400).**
6. To exit **SPEED SETTINGS** press the “E**xit and Save**” to save changes.

Note: The monitor can accept PP400 values from 50 to 9999. Therefore, if the new count is less than 50, the existing count is not replaced. The monitor will state “Pulses Too Low” and display options to “Continue Driving” or “Cancel Calibration”.







Monitor Settings - Continued

Shaft and Fan Settings

1. From the **HOME** screen press "**MENU**" key.

   The monitor will display the **SETTINGS** screen.

   Press "**SHAFT & FAN SETTINGS**" key.

2. The monitor will display the "**SHAFT & FAN SETTINGS**" screen. Starting with **SHAFT 1**.

   Under Shaft 1 set:

   - **Status** - Enabled and **Rate Sensor** - ON

   Pressing the green arrow or red arrow to navigate through the sensors available.

3. Set **PULSES PER REV** to 4 and **HIGH RPM** to 150 and **LOW RPM** to 2

   Repeat steps 2 and 3 for the other shafts.

Note: All Shaft & Fan settings can be set before selecting "Exit & Save".

To save changes press **EXIT & SAVE**.

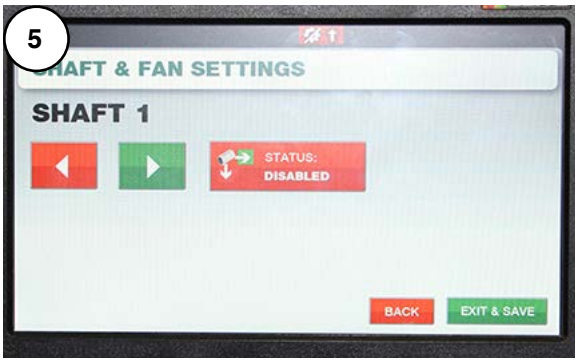
The monitor will return to the **SETTINGS** screen.

4. Turning **Rate Sensor** OFF will close the pounds per rev icon and also the Home screen window for the shaft. The shaft will still be monitored for alarms.

Tank Not In Use

5. If a tank is not being used for an application switch the shaft Status to DISABLED. This will eliminate nuisance alarms.

Remember to Enable shaft when resuming use of tank.



Monitor Settings - Continued

Shaft and Fan Settings - Continued

Rate Setting

6. POUNDS PER REV are automatically set during the Rate Calibration procedure. This value can be manually edited under each shaft setting over-riding the saved setting from Rate Calibration. Once it is overwritten the Rate Calibration value cannot be retrieved. Therefore, it is recommended to keep a record of the Rate Calibration WT/REV value for each tank in a notepad for reference.

   This value is used to calculate the Applied Rate and Tank Area Left display on the home screen.

   Best practice is to perform a Rate Calibration to obtain an accurate WT/REV however, if a quick setting is required the Rate Charts at the end of this section can be used as an estimated value.

Note: Rate Calibration feature does not function on Carts not equipped with Hydraulic Rate Calibration. Manual entry from the charts is the only option on such Carts.

7. Set the Fans to:
   - **PULSES PER REV** to 2
   - **HIGH RPM** to 5000 and **LOW RPM** to 3000

   To save changes press **EXIT & SAVE**.

   The monitor will return to the **SETTINGS** screen.

Note: All Shaft & Fan settings can be set before selecting "Exit & Save".

Settings Menu Chart - Ground Drive

Install Setup

Install New System	See “Sensor Installation”
Add a Sensor	See “Sensor Replacement”
Remove a Sensor	See “Sensor Replacement”

Important

Select “Exit and Save” in each Menu Setting to save changes.

Speed Settings

Source	Set to “Shaft Speed”
Pulses Per Rev	Set to 4
Implement Switch	Enabled
Wheel Pulses Per 400 Feet	See PP400 Chart
Implement Width	Set to width of seeding tool
Lift Delay	30 seconds - Can be adjusted to user preference.
Speed Calibration	See “Pulse Counting Mode for PP 400”
Switch Setting	ON _ Raised Open _ press Set Highest key

Shaft Settings

Shaft 1, Shaft 2, Shaft 3 and Shaft 4

Alarm Setting	Enabled (default)	Set to Disabled if tank is not in use.
Settings	Pulses Per Rev	Set to 4
	High Alarm Point	150 rpm - Can be adjusted to 200 for high rates.
	Low Alarm Point	2.0 rpm - Can be adjusted to 1 rpm for low rates.

Fan Settings

Pulses Per Rev	Set to 2
Low Alarm Point	Set to 3000 rpm
High Alarm Point	Set to 5000 rpm

Blockage Module Settings

Runs per Module Setup	Set individual Module number of Runs
Individual Runs Setup	Allows Runs to be Enabled/Disabled
Blockage Module Test	See “Blockage Module Test”
Blockage Calibration	See “Blockage Calibration”

Display & Updates

Brightness	50% (default)	Set as desired.
Volume	50% (default)	Set as desired.
Clock		Set as desired.
Units	Select Imperial or Metric	
System Update	Software Update	
	Factory Reset - Locked to prevent accidental reset	
	Unlock Reset - Locked to prevent accidental reset	

Note: Only setting parameters that are relevant are displayed (i.e. if no Shaft 3 is installed, there will not be any Shaft 3 setting parameters made available).

Alarms

Introduction

All configured sensors and various other operating conditions are continuously monitored. Alarms fall into one of the following three categories:

- **Sensor alarms** are alarms which are generated when information returned by a sensor exceeds the appropriate threshold.
- **Communication alarms** occur when a sensor repeatedly does not respond to attempts at communication.
- **System alarms** are for various other conditions that are found to be in fault.

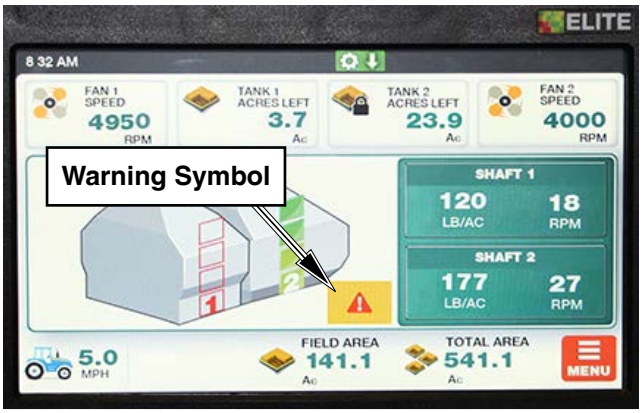
When an alarm condition occurs, the monitor will beep repeatedly, and an alarm screen will pop up indicating the fault condition.

The audio alarm and alarm screen persist until the alarm condition is fixed or until it is acknowledged by the operator. Follow the steps on the screen to fix or acknowledge the alarm.

After acknowledgement, the “Operating Screen” will be displayed with a flashing “Warning Symbol” indicating unfixed alarms. Press the “Warning Symbol” to show the “Active Alarm” window to view alarms.

When the alarm condition is corrected, the flashing “Warning Symbol” notification is removed from the “Operating Screen”.

Alarm Screen



Alarm - Operating Screen

Nuisance Shaft Alarm

Low application rates of Canola may cause the seed shaft to rotate less than 2 rpm.

The low shaft rpm will cause the monitor to give a shaft alarm, since the shaft is rotating below the default alarm threshold of 2 rpm.

To avoid this nuisance alarm, change the seed shaft low rpm alarm setting to 1 rpm and change pulses to 1.

Note: Change the setting back to 2 rpm and 4 pulses when returning to higher application rates.

Alarms - Continued

“In Motion” Notification

The “In Motion” condition means that the monitor, based on ground speed and clutch state, considers that the system is supposed to be actively seeding.

The monitor emits a double beep whenever the “In Motion” condition becomes true or false. This condition is defined as *speed greater than 2 mph (3.2 Kph)* and *drive clutch engaged.*

1. If ground speed is less than 2 mph (3.2 Kph) for more than 30 seconds, the monitor will alarm and display “Should be Seeding”.
2. If ground speed is greater than 2 mph (3.2 Kph) for more than 30 seconds and clutch is not engaged the monitor will alarm and display “Clutch Switch is Off”.
3. Certain alarms are inhibited when the “In Motion” condition is false. These are described elsewhere in this manual, but an example is whether to generate an alarm for a stopped shaft.

If a speed sensor is unavailable the metering shaft monitoring and associated functions will not display.

Low Fan Alarms

Low fan alarms are handled differently because a stopped fan can result in damage to the metering mechanics as unblown material accumulates. **Low fan alarms cannot be acknowledged while the system is “in motion”.** Thus, if a low fan alarm occurs during active seeding, the user will **not be able** to silence the alarm but will need to stop the vehicle or disengage the clutch. When this happens, the monitor accepts it as an acknowledgement of the alarm, and an effective “automatic acknowledge” takes place, resulting in the beeper being silenced and the resumption of normal display with “Fan Low RPM” flashing in the alarm window.

Area Display

There are two area counters, field area and total area. They are both accumulated whenever the system “In Motion” condition is true. Area counts are stored in memory when the unit is turned off.

The area counts can be displayed on the “Operating Screen” as outlined in “Navigating the Operating Screen”. The FIELD AREA and the TOTAL AREA are displayed to the nearest tenth of an acre (or hectare).

Resetting Area

To clear FIELD AREA and/or TOTAL AREA follow the steps below.

- From the “Operating Screen” press the desired function of “Field Area” or “Total Area”.
- The monitor will ask “Are you sure?”
- Press the CANCEL key to leave area count and return to the “Operating Screen”.

  OR

  Press the YES, CONFIRM key to clear area and return to the “Operating Screen”.

Rate Calibration

The practice of doing a rate calibration is strongly recommended as it will confirm the **actual** amounts of product being metered.

The following procedure should be followed for every change of product.

- Ensure correct seed plates are installed.
- Fill tank 1/2 full and drive 600 - 1000 feet to compact product in the tanks.
- Select and install meter rate sprocket per Rate Chart.
- Set Flapper Valves to the **"Calibration"** position.
- Remove the metering chain from the transmissions that are **not** being checked.
- Open the lower collector door at the bottom of the collector body.
- Hook the Rate Calibration Insert on collector bottom and rotate up into position. Secure in place with slide lock.
- Slide rate check box on the collector body.
- Engage hydraulic lever to run air cart.
- **Turn off fan** by switching selector valve (located in the fan supply line) to calibration position.
- **Prime metering wheels first** by using the primer switch to start and stop the meter drive. Allow the drive to run until material begins to fall through the collector body.

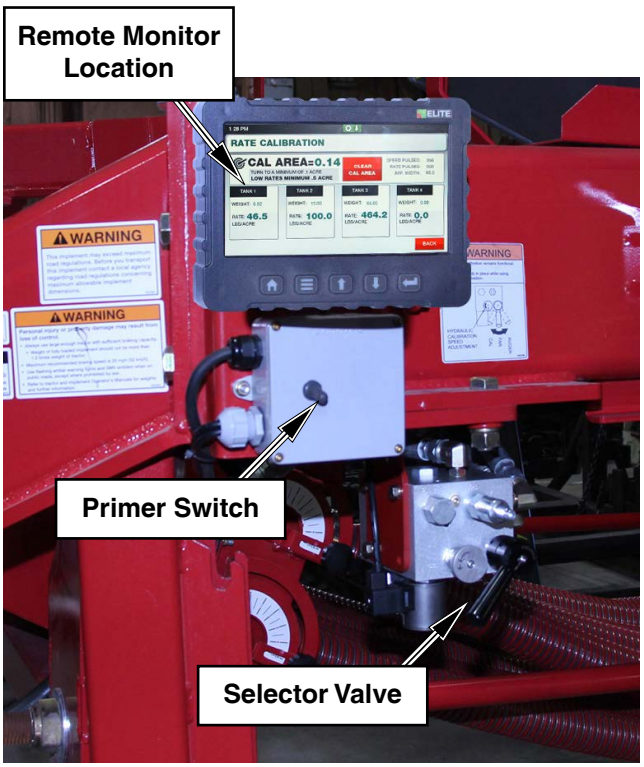
Note: ***Ensure the fan is not running.***

- Empty material from rate check box and reinstall it on the same collector.
- The monitor can be relocated to the remote monitor location for ease of calibration. The 10 pin plug connects to the monitor.

Actual Sample

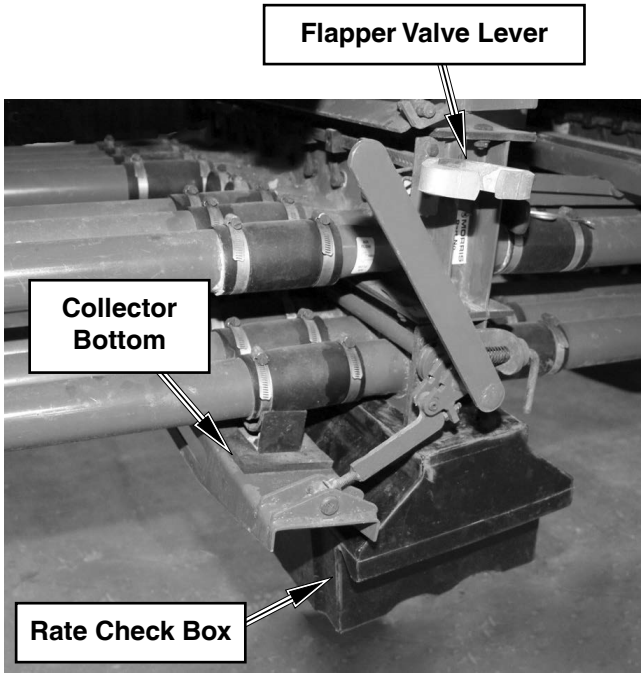
- See following pages.

Note: Rate Calibration feature does not function on Carts not equipped with Hydraulic Rate Calibration.



Important

Flapper Valves must be set to "CALIBRATION"



Double Shoot Shown

Rate Calibration - Continued

Actual Sample

Example: Calibrate Shaft 1.

Note: Rate Calibration always displays four tanks even if the Cart only has two or three tanks.

1. From the HOME screen press the MENU key to enter the SETTINGS screen.

   Press RATE SETTINGS.

2. The monitor will display the RATE SETTINGS screen.

   Press RATE CALIBRATION key to enter function.

Note: The "Rate Cal Num" is Factory set and can not be adjusted.

3. PRIME METER will be displayed, press the prime button it will turn green, then prime metering wheels as outlined on previous page.

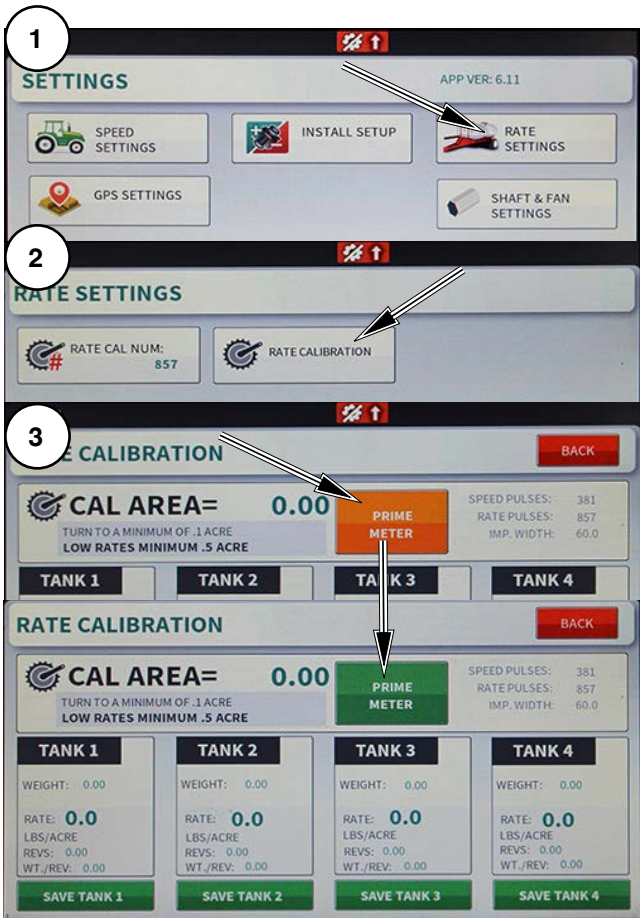
Note: Tapping "Prime Meter" a second time takes you directly to "Start". Only do this if meter wheels are already primed.

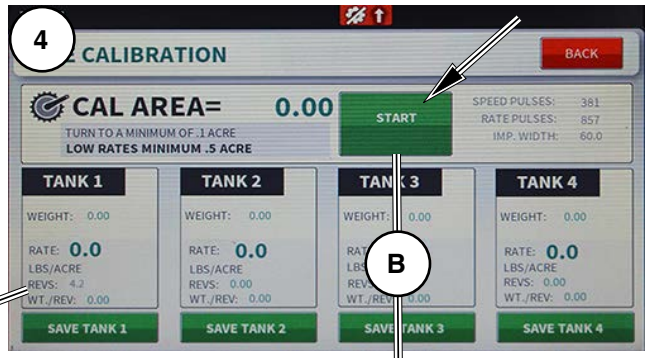
4. START will now be displayed:

   a. Press and hold WT/REV area to bring up warning to RESET TANK CAL WEIGHT, select "Yes" to zero the Tank information.

   b. Press the start button, then engage Hydraulic Calibration Motor by holding switch in ON position to begin CAL AREA count.

Note: REVS must be cleared before taking a sample in order to have an accurate WT/REV calculation.





Rate Calibration - Continued

Actual Sample - Continued

5. Release switch when desired Area count is reach on the monitor.

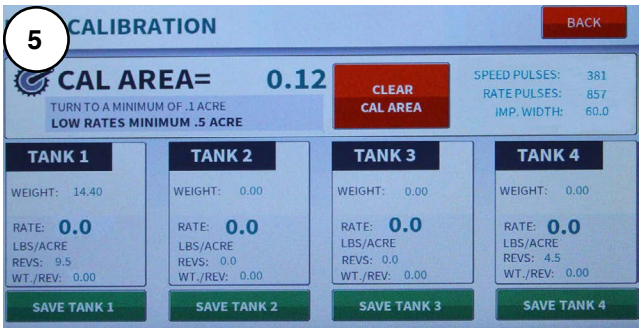
   Remove the rate check box from the collector body.

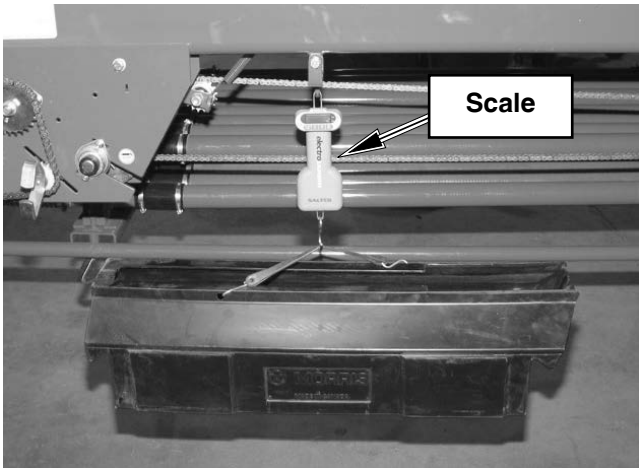
   Weigh the sample by using tarp straps to hook rate check box to spring scale.

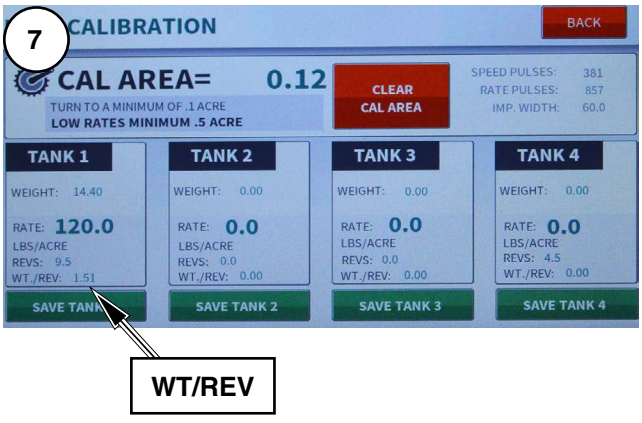
Note: Remember to subtract the weight of the rate check box from the total sample weight. Accuracy of sample is critical for actual application rate accuracy.

6. Press WEIGHT under the Tank being calibrated. Use the keypad to enter the value of the sample weight.
7. The Monitor automatically displays application rate under RATE.

Continued on next page. . .







Rate Calibration - Continued

Actual Sample - Continued

8. To perform a second rate check:
   a. Press and hold WT/REV area to bring up warning to RESET TANK CAL WEIGHT, by selecting “Yes” will zero the Tank information.
   b. Press CLEAR CAL AREA to zero Cal Area.
   c. Repeat steps 4 to 7.
9. Press SAVE TANK to retain value, before moving to next Tank.

Repeat steps 3 to 9 for each Tank.

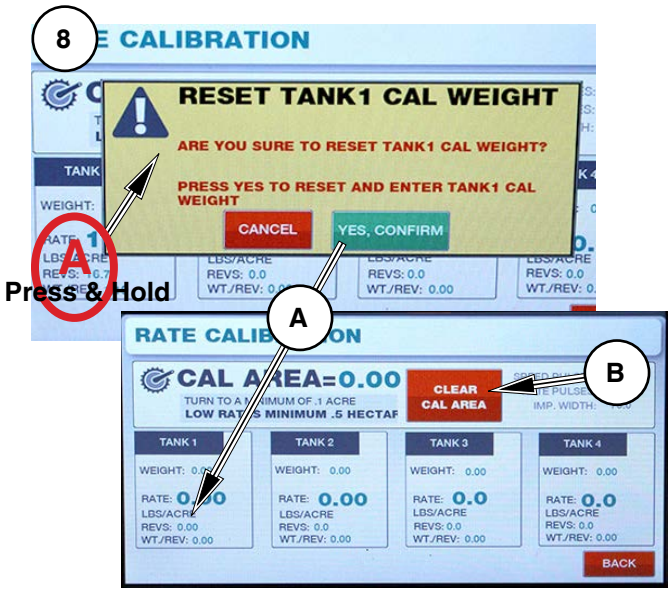
10. Press BACK to return to RATE SETTINGS screen.

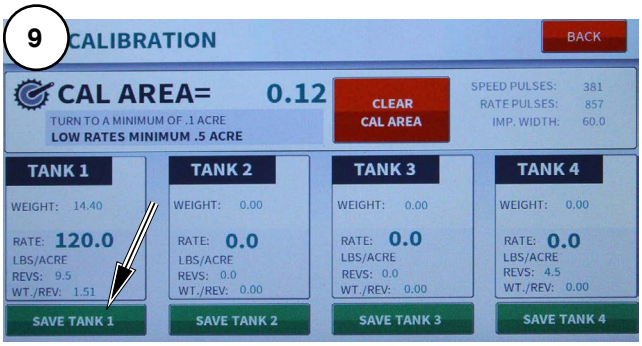
    Under the RATE SETTINGS screen press EXIT & SAVE to save calibration rates and exit back to SETTINGS screen.

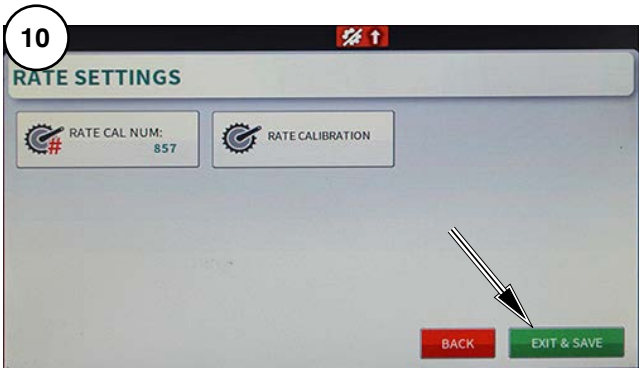
11. Check under the Shaft Settings to verify the WT/REV saved correctly from the Rate Calibration screen.
12. Replace the bottoms of the collectors. Place rate check box into storage bracket.

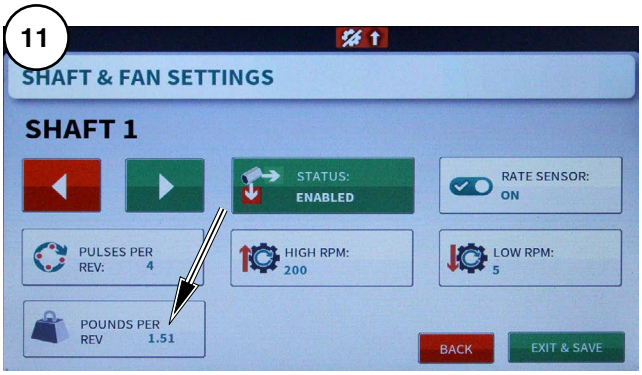
Note: Upon “EXIT & SAVE” from the Rate Settings screen, the WT/REV from each tank gets automatically transferred to the appropriate shaft setting.

The WT/REV value can be manually edited under each shaft setting over-riding the saved setting, which then cannot be retrieved. Therefore, it is recommended to keep a record of the WT/REV for each tank in a notepad for reference.









Displayed Rates

There are two rates that can be displayed on the Home Screen:

1. **Applied Rate** - This is calculated based on the Weight per Rev (WT/REV) saved for each Tank during Rate Calibration.

   Best practice is to perform a Rate Calibration to obtain an accurate WT/REV however, if a quick setting is required the Rate Charts at the end of this section can be used as an estimated value.

2. **Tank Area Left** - This is calculated based on the Weight per Rev (WT/REV) saved for each Tank during Rate Calibration and the weight entered for each Tank. This is meant to be used as a reference on remaining acres, not an actual. The exactness of this value is based on the accuracy of the Tank Weight and the WT/REV entered.

Note: Rate Calibration feature does not function on Carts not equipped with Hydraulic Rate Calibration. Manual entry from the charts is the only option on such Carts.

Determine the product weight in each Tank by:

1. Get each tank capacity **(V)** from the Specification section, bushel (bu) for Imperial measurements or litre (l) for metric measurements.
2. Determine the density of product **(PD)** in pounds per bushel (lbs/bu) for Imperial measurements or kilograms per litre (kg/l) for metric measurements.
3. Use formula below to get weight of each tank.

Tank Weight Formula

PD = Product Density **V** = Tank Volume

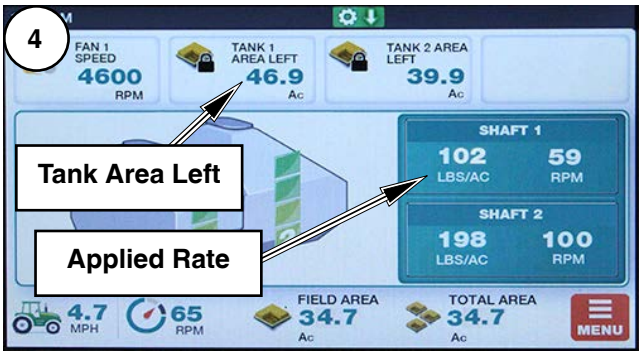
PD x V = Tank Weight _____

Enter Tank Weight for each shaft on Home screen.

1. Long Press on each Shaft Window to Reset the Tank Weight. This will prompt to enter a new Tank Weight for the corresponding Shaft.
2. The monitor will display a RESET TANK WEIGHT screen.

   Press YES, CONFIRM key to enter function.
3. Enter tank weight and press enter.
4. Tank Area Left will now be displayed while seeding.

Tank Weight for each shaft will have to be reset each time the tanks are filled.



Sensor Replacement

The monitor will alarm the operator if there is a faulty sensor in the system by displaying a communication error for the sensor.

To replace a faulty sensor, follow the steps below.

Example: Replace Fan 1 sensor.

1. From the HOME screen press the MENU key to enter the SETTINGS screen.

   Press INSTALL SETUP.

2. The monitor will display the INSTALLATION screen.

   Press ADD A SENSOR key to enter function.

3. The monitor will display the sensor types available. For this illustration we will select FAN SENSOR.

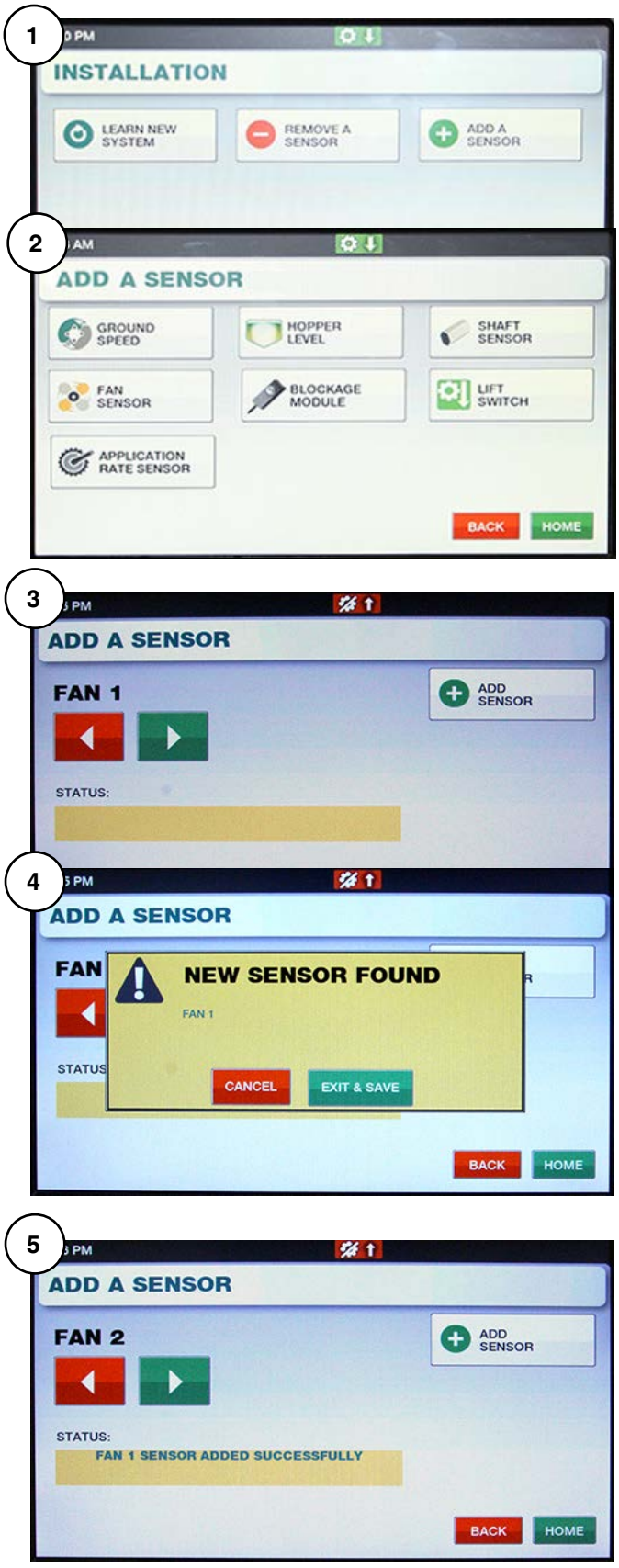
   Pressing the green arrow or red arrow will scroll through the sensors available.

   Pressing ADD SENSOR will promote the monitor to search for new sensor. Plug new sensor into harness at this point.

4. Once the monitor acknowledges the new sensor, the monitor will display NEW SENSOR FOUND Press “Exit and Save” to accept sensor.

5. The monitor will display FAN 1 SENSOR ADDED SUCCESSFULLY under Status confirming sensor installation. Press “HOME” to return to operating screen.

Note: Sensors can also be removed from the system in the same manner by selecting the REMOVE A SENSOR choice from step 2.



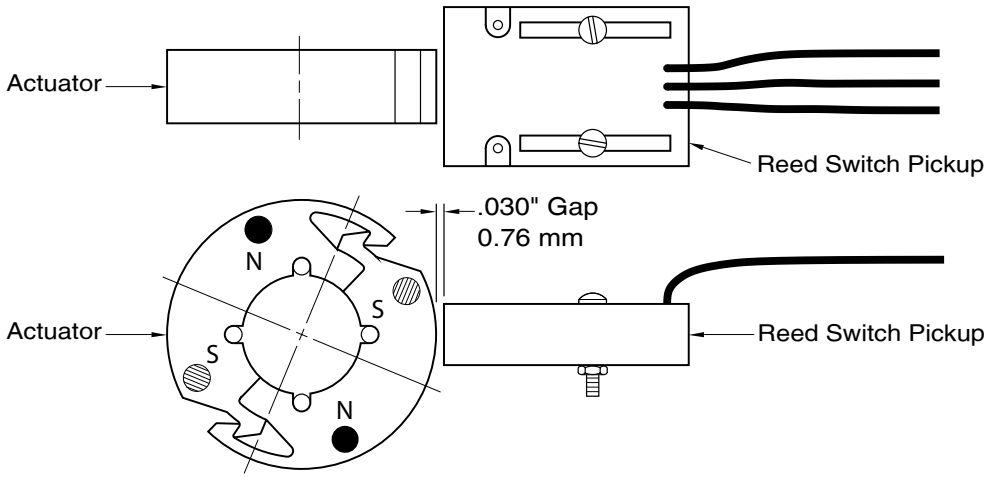
Sensor Gap Settings

Reed Switch Sensors

These sensors are used on slowly revolving shafts, in this case the meters and ground speed.

Check the gap between the sensor and actuator.

A gap of .030 inch (0.76 mm) is recommended.

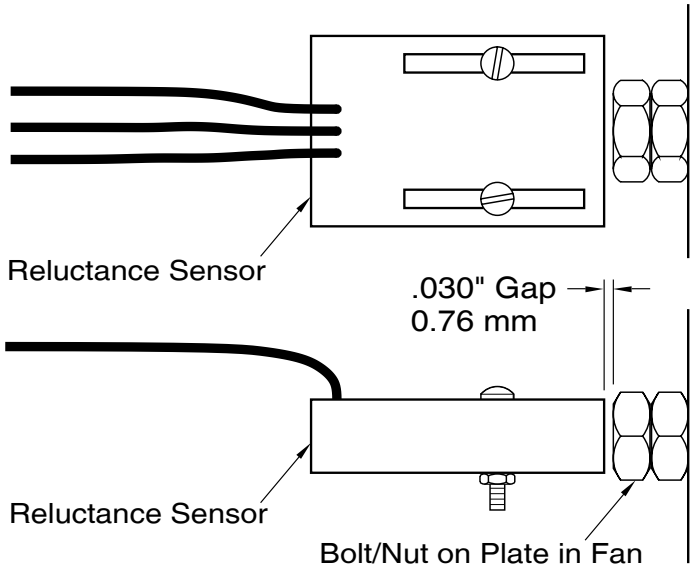


Variable Reluctance Sensors

These sensors are used on high speed shafts, in this case the fan.

Target to sensor gap is critical with these sensors.

A gap of .030 inch (0.76 mm) is recommended.



Trouble Shooting Guide

Most electronic problems are usually one of the following:

- Harness connections.
- Damaged harness wires.
- Loose terminal in harness plug.
- Sensor to Actuator clearance.
- Defective sensor.

The monitor will alert the operator of these problems as a communication error.

Checking Harness

First, check for the obvious things like broken connections, loose terminals, insulation rubbed off and so forth.

- Check continuity of wires with ohm meter.

Checking Sensors

The best approach to testing a sensor is to substitute a suspected sensor with a known good one. If the problem goes away, the sensor is faulty. If it does not go away, it is faulty wiring.

Bin Level Sensors ensure there is no foreign material covering the optical sensor. Remove material with a cloth so as not to damage lens.

Make sure sensor wires are not damaged.

Checking Blockage System

Check modules by performing a blockage module test on the monitor.

Optical sensors make sure the “optical eyes” are not coated with material or worn down. Remove material with a cloth so as not to damage lens.

Pin sensors make sure there is no buildup of material on the pins. Remove material buildup with a knife and gently scrap away the material buildup.

Make sure sensor wires are not damaged.

Diagnostics

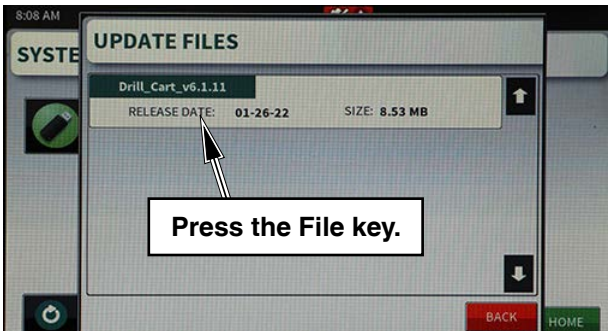
The Diagnostics screen can help in identifying issues with sensors, harnessing or other items. Status reports for Battery Voltage, Sensors Learned, MUX Communication speed and GPS Communication speed are displayed. Contact Loup Electronics if you need technical support.

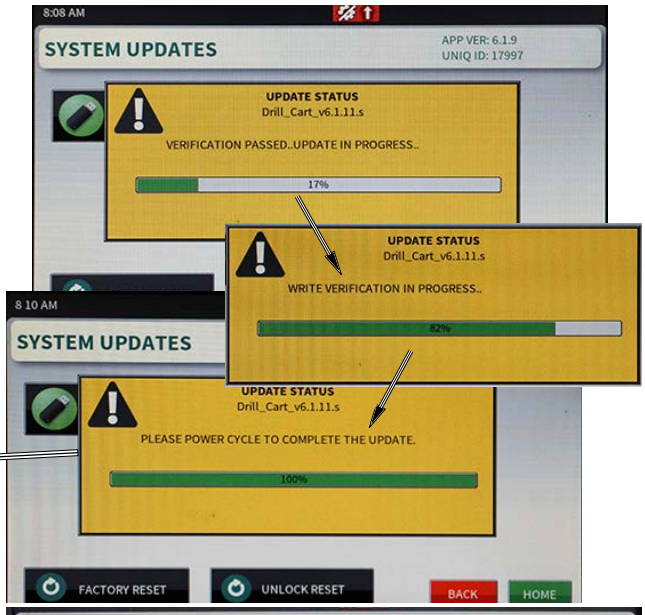
Updating Software

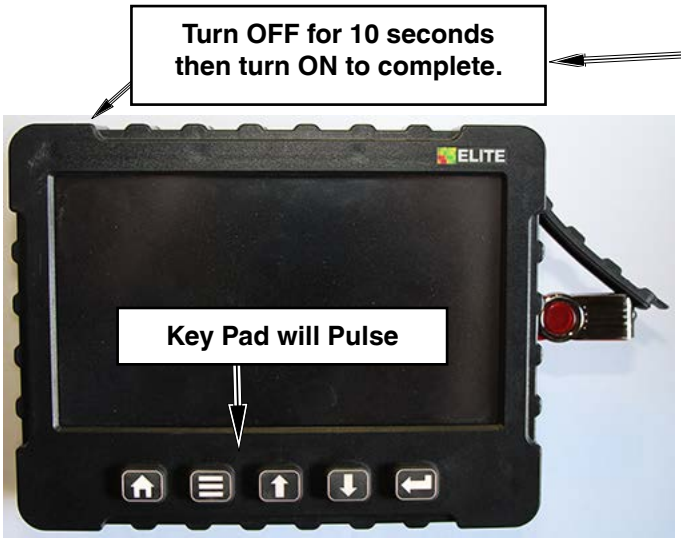
Download software from www.morris-industries.com. The file downloaded will be in a .ZIP format and need to be extracted. When extracted you should see a folder titled “EliteUpdate” and within it the Elite software file. Copy the “EliteUpdate” folder to the root level of the USB drive.

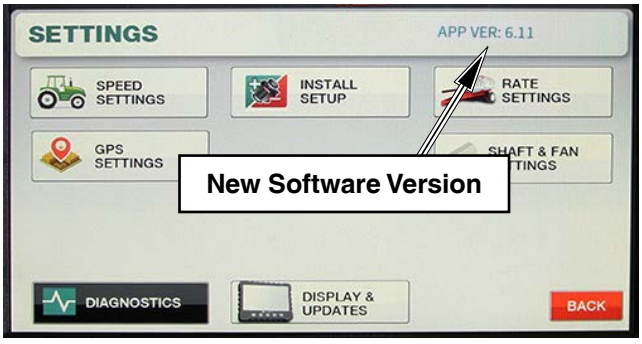
Update Process

1. Insert the USB drive on the right had side of the Elite console.
2. Select “MENU - DISPLAY & UPDATES - SYSTEM UPDATES - SOFTWARE UPDATE”
3. Monitor should now show a popup window displaying the update file on the USB drive.
4. Select the new version to begin loading the software. When done loading the console will ask you to cycle power. Wait 10 seconds to ensure software download is complete.
5. Turn monitor off and remove USB drive. Wait 10 seconds and turn monitor on. Upon doing so the monitor will start with a blank screen and the keypad will pulse for a short period as it finished the update. The console will then boot into the newest version.
6. Confirm the monitor has been updated by checking the version number inside the main settings screen.









Calibration Chart - Imperial

WT/REV (LBS./REV)

SLOW SPEED DRIVE
SEED & INOCULANT

# of Outlets	SSD-1	SSD-2	SSD-3	SSD-4	SSD-5
21	0.032	0.035	0.036	0.045	0.053
22	0.034	0.037	0.038	0.047	0.056
23	0.035	0.039	0.040	0.049	0.058
24	0.037	0.040	0.042	0.051	0.061
25	0.038	0.042	0.043	0.053	0.063
26	0.040	0.044	0.045	0.055	0.066
27	0.041	0.045	0.047	0.058	0.068
28	0.043	0.047	0.049	0.060	0.071
29	0.044	0.049	0.050	0.062	0.073
30	0.046	0.050	0.052	0.064	0.076
31	0.047	0.052	0.054	0.066	0.078
32	0.049	0.054	0.056	0.068	0.081
33	0.050	0.055	0.057	0.070	0.083
34	0.052	0.057	0.059	0.072	0.086
35	0.053	0.059	0.061	0.075	0.088
36	0.055	0.060	0.062	0.077	0.091
37	0.057	0.062	0.064	0.079	0.094
38	0.058	0.064	0.066	0.081	0.096
39	0.060	0.065	0.068	0.083	0.099
40	0.061	0.067	0.069	0.085	0.101
41	0.063	0.069	0.071	0.087	0.104
42	0.064	0.071	0.073	0.090	0.106
43	0.066	0.072	0.075	0.092	0.109
44	0.067	0.074	0.076	0.094	0.111
45	0.069	0.076	0.078	0.096	0.114
46	0.070	0.077	0.080	0.098	0.116
47	0.072	0.079	0.082	0.100	0.119
48	0.073	0.081	0.083	0.102	0.121
49	0.075	0.082	0.085	0.104	0.124
50	0.076	0.084	0.087	0.107	0.126
51	0.078	0.086	0.089	0.109	0.129
52	0.079	0.087	0.090	0.111	0.131
53	0.081	0.089	0.092	0.113	0.134
54	0.083	0.091	0.094	0.115	0.137
55	0.084	0.092	0.095	0.117	0.139
56	0.086	0.094	0.097	0.119	0.142
57	0.087	0.096	0.099	0.122	0.144
58	0.089	0.097	0.101	0.124	0.147

DIRECT DRIVE
SEED

# of Outlets	DD-1	DD-2	DD-3	DD-4	DD-5	DD-6	DD-7	DD-8	DD-9	DD-10
21	0.153	0.207	0.269	0.294	0.347	0.380	0.428	0.444	0.517	0.569
22	0.160	0.217	0.282	0.308	0.363	0.398	0.448	0.465	0.541	0.596
23	0.168	0.227	0.295	0.322	0.380	0.416	0.469	0.486	0.566	0.624
24	0.175	0.237	0.307	0.336	0.396	0.434	0.489	0.508	0.590	0.651
25	0.182	0.247	0.320	0.350	0.413	0.452	0.509	0.529	0.615	0.678
26	0.189	0.257	0.333	0.364	0.429	0.470	0.530	0.550	0.640	0.705
27	0.197	0.266	0.346	0.378	0.446	0.488	0.550	0.571	0.664	0.732
28	0.204	0.276	0.359	0.392	0.462	0.506	0.571	0.592	0.689	0.759
29	0.211	0.286	0.372	0.406	0.479	0.524	0.591	0.613	0.714	0.786
30	0.218	0.296	0.384	0.420	0.495	0.542	0.611	0.635	0.738	0.813
31	0.226	0.306	0.397	0.434	0.512	0.560	0.632	0.656	0.763	0.841
32	0.233	0.316	0.410	0.448	0.528	0.578	0.652	0.677	0.787	0.868
33	0.240	0.326	0.423	0.462	0.545	0.596	0.672	0.698	0.812	0.895
34	0.248	0.336	0.436	0.476	0.561	0.615	0.693	0.719	0.837	0.922
35	0.255	0.345	0.448	0.490	0.578	0.633	0.713	0.740	0.861	0.949
36	0.262	0.355	0.461	0.504	0.594	0.651	0.734	0.761	0.886	0.976
37	0.269	0.365	0.474	0.518	0.611	0.669	0.754	0.783	0.910	1.003
38	0.277	0.375	0.487	0.532	0.627	0.687	0.774	0.804	0.935	1.030
39	0.284	0.385	0.500	0.546	0.644	0.705	0.795	0.825	0.960	1.057
40	0.291	0.395	0.512	0.560	0.660	0.723	0.815	0.846	0.984	1.085
41	0.299	0.405	0.525	0.574	0.677	0.741	0.835	0.867	1.009	1.112
42	0.306	0.414	0.538	0.588	0.693	0.759	0.856	0.888	1.033	1.139
43	0.313	0.424	0.551	0.602	0.710	0.777	0.876	0.909	1.058	1.166
44	0.320	0.434	0.564	0.616	0.726	0.795	0.897	0.931	1.083	1.193
45	0.328	0.444	0.577	0.630	0.743	0.813	0.917	0.952	1.107	1.220
46	0.335	0.454	0.589	0.644	0.759	0.831	0.937	0.973	1.132	1.247
47	0.342	0.464	0.602	0.658	0.776	0.850	0.958	0.994	1.156	1.274
48	0.350	0.474	0.615	0.672	0.792	0.868	0.978	1.015	1.181	1.301
49	0.357	0.484	0.628	0.686	0.809	0.886	0.998	1.036	1.206	1.329
50	0.364	0.493	0.641	0.700	0.825	0.904	1.019	1.058	1.230	1.356
51	0.371	0.503	0.653	0.714	0.842	0.922	1.039	1.079	1.255	1.383
52	0.379	0.513	0.666	0.728	0.858	0.940	1.060	1.100	1.279	1.410
53	0.386	0.523	0.679	0.742	0.875	0.958	1.080	1.121	1.304	1.437
54	0.393	0.533	0.692	0.756	0.892	0.976	1.100	1.142	1.329	1.464
55	0.401	0.543	0.705	0.770	0.908	0.994	1.121	1.163	1.353	1.491
56	0.408	0.553	0.717	0.784	0.925	1.012	1.141	1.184	1.378	1.518
57	0.415	0.562	0.730	0.798	0.941	1.030	1.162	1.206	1.402	1.545
58	0.422	0.572	0.743	0.812	0.958	1.048	1.182	1.227	1.427	1.573

DIRECT DRIVE
FERTILIZER

# of Outlets	DDF-1	DDF-2	DDF-3	DDF-4	DDF-5
21	0.302	0.339	0.377	0.425	0.456
22	0.316	0.356	0.395	0.445	0.478
23	0.331	0.372	0.413	0.465	0.500
24	0.345	0.388	0.431	0.485	0.522
25	0.359	0.404	0.449	0.506	0.543
26	0.374	0.420	0.467	0.526	0.565
27	0.388	0.436	0.484	0.546	0.587
28	0.403	0.452	0.502	0.566	0.609
29	0.417	0.469	0.520	0.587	0.630
30	0.431	0.485	0.538	0.607	0.652
31	0.446	0.501	0.556	0.627	0.674
32	0.460	0.517	0.574	0.647	0.696
33	0.474	0.533	0.592	0.667	0.717
34	0.489	0.549	0.610	0.688	0.739
35	0.503	0.566	0.628	0.708	0.761
36	0.518	0.582	0.646	0.728	0.782
37	0.532	0.598	0.664	0.748	0.804
38	0.546	0.614	0.682	0.769	0.826
39	0.561	0.630	0.700	0.789	0.848
40	0.575	0.646	0.718	0.809	0.869
41	0.589	0.663	0.736	0.829	0.891
42	0.604	0.679	0.754	0.850	0.913
43	0.618	0.695	0.772	0.870	0.935
44	0.633	0.711	0.790	0.890	0.956
45	0.647	0.727	0.807	0.910	0.978
46	0.661	0.743	0.825	0.930	1.000
47	0.676	0.760	0.843	0.951	1.022
48	0.690	0.776	0.861	0.971	1.043
49	0.704	0.792	0.879	0.991	1.065
50	0.719	0.808	0.897	1.011	1.087
51	0.733	0.824	0.915	1.032	1.109
52	0.748	0.840	0.933	1.052	1.130
53	0.762	0.857	0.951	1.072	1.152
54	0.776	0.873	0.969	1.092	1.174
55	0.791	0.889	0.987	1.112	1.195
56	0.805	0.905	1.005	1.133	1.217
57	0.820	0.921	1.023	1.153	1.239
58	0.834	0.937	1.041	1.173	1.261

Calibration Chart - Imperial

WT/REV (LBS./REV)

# of Outlets	SSD-1	SSD-2	SSD-3	SSD-4	SSD-5
59	0.090	0.099	0.102	0.126	0.149
60	0.092	0.101	0.104	0.128	0.152
61	0.093	0.102	0.106	0.130	0.154
62	0.095	0.104	0.108	0.132	0.157
63	0.096	0.106	0.109	0.134	0.159
64	0.098	0.107	0.111	0.136	0.162
65	0.099	0.109	0.113	0.139	0.164
66	0.101	0.111	0.115	0.141	0.167
67	0.102	0.113	0.116	0.143	0.169
68	0.104	0.114	0.118	0.145	0.172
69	0.105	0.116	0.120	0.147	0.174
70	0.107	0.118	0.122	0.149	0.177
71	0.109	0.119	0.123	0.151	0.180
72	0.110	0.121	0.125	0.154	0.182
73	0.112	0.123	0.127	0.156	0.185
74	0.113	0.124	0.128	0.158	0.187
75	0.115	0.126	0.130	0.160	0.190
76	0.116	0.128	0.132	0.162	0.192
77	0.118	0.129	0.134	0.164	0.195
78	0.119	0.131	0.135	0.166	0.197
79	0.121	0.133	0.137	0.168	0.200
80	0.122	0.134	0.139	0.171	0.202
81	0.124	0.136	0.141	0.173	0.205
82	0.125	0.138	0.142	0.175	0.207
83	0.127	0.139	0.144	0.177	0.210
84	0.128	0.141	0.146	0.179	0.212
85	0.130	0.143	0.148	0.181	0.215
86	0.131	0.144	0.149	0.183	0.217
87	0.133	0.146	0.151	0.185	0.220
88	0.134	0.148	0.153	0.188	0.222
89	0.136	0.149	0.154	0.190	0.225
90	0.138	0.151	0.156	0.192	0.228

SLOW SPEED DRIVE
SEED & INOCULANT

# of Outlets	DD-1	DD-2	DD-3	DD-4	DD-5	DD-6	DD-7	DD-8	DD-9	DD-10
59	0.430	0.582	0.756	0.826	0.974	1.066	1.202	1.248	1.452	1.600
60	0.437	0.592	0.769	0.840	0.991	1.085	1.223	1.269	1.476	1.627
61	0.444	0.602	0.781	0.854	1.007	1.103	1.243	1.290	1.501	1.654
62	0.452	0.612	0.794	0.868	1.024	1.121	1.263	1.311	1.525	1.681
63	0.459	0.622	0.807	0.882	1.040	1.139	1.284	1.333	1.550	1.708
64	0.466	0.632	0.820	0.896	1.057	1.157	1.304	1.354	1.575	1.735
65	0.473	0.641	0.833	0.910	1.073	1.175	1.325	1.375	1.599	1.762
66	0.481	0.651	0.846	0.924	1.090	1.193	1.345	1.396	1.624	1.789
67	0.488	0.661	0.858	0.938	1.106	1.211	1.365	1.417	1.648	1.817
68	0.495	0.671	0.871	0.952	1.123	1.229	1.386	1.438	1.673	1.844
69	0.503	0.681	0.884	0.966	1.139	1.247	1.406	1.459	1.698	1.871
70	0.510	0.691	0.897	0.980	1.156	1.265	1.426	1.481	1.722	1.898
71	0.517	0.701	0.910	0.994	1.172	1.283	1.447	1.502	1.747	1.925
72	0.524	0.710	0.922	1.008	1.189	1.301	1.467	1.523	1.771	1.952
73	0.532	0.720	0.935	1.022	1.205	1.320	1.488	1.544	1.796	1.979
74	0.539	0.730	0.948	1.036	1.222	1.338	1.508	1.565	1.821	2.006
75	0.546	0.740	0.961	1.050	1.238	1.356	1.528	1.586	1.845	2.033
76	0.554	0.750	0.974	1.064	1.255	1.374	1.549	1.607	1.870	2.061
77	0.561	0.760	0.986	1.078	1.271	1.392	1.569	1.629	1.894	2.088
78	0.568	0.770	0.999	1.092	1.288	1.410	1.589	1.650	1.919	2.115
79	0.575	0.780	1.012	1.106	1.304	1.428	1.610	1.671	1.944	2.142
80	0.583	0.789	1.025	1.120	1.321	1.446	1.630	1.692	1.968	2.169
81	0.590	0.799	1.038	1.134	1.337	1.464	1.651	1.713	1.993	2.196
82	0.597	0.809	1.051	1.148	1.354	1.482	1.671	1.734	2.018	2.223
83	0.604	0.819	1.063	1.162	1.370	1.500	1.691	1.756	2.042	2.250
84	0.612	0.829	1.076	1.176	1.387	1.518	1.712	1.777	2.067	2.278
85	0.619	0.839	1.089	1.190	1.403	1.536	1.732	1.798	2.091	2.305
86	0.626	0.849	1.102	1.204	1.420	1.554	1.752	1.819	2.116	2.332
87	0.634	0.859	1.115	1.218	1.436	1.573	1.773	1.840	2.141	2.359
88	0.641	0.868	1.127	1.232	1.453	1.591	1.793	1.861	2.165	2.386
89	0.648	0.878	1.140	1.246	1.469	1.609	1.814	1.882	2.190	2.413
90	0.655	0.888	1.153	1.260	1.486	1.627	1.834	1.904	2.214	2.440

DIRECT DRIVE
SEED

# of Outlets	DDF-1	DDF-2	DDF-3	DDF-4	DDF-5
59	0.848	0.953	1.059	1.193	1.282
60	0.863	0.970	1.077	1.214	1.304
61	0.877	0.986	1.095	1.234	1.326
62	0.891	1.002	1.112	1.254	1.348
63	0.906	1.018	1.130	1.274	1.369
64	0.920	1.034	1.148	1.294	1.391
65	0.935	1.050	1.166	1.315	1.413
66	0.949	1.067	1.184	1.335	1.435
67	0.963	1.083	1.202	1.355	1.456
68	0.978	1.099	1.220	1.375	1.478
69	0.992	1.115	1.238	1.396	1.500
70	1.006	1.131	1.256	1.416	1.522
71	1.021	1.147	1.274	1.436	1.543
72	1.035	1.164	1.292	1.456	1.565
73	1.050	1.180	1.310	1.477	1.587
74	1.064	1.196	1.328	1.497	1.608
75	1.078	1.212	1.346	1.517	1.630
76	1.093	1.228	1.364	1.537	1.652
77	1.107	1.244	1.382	1.557	1.674
78	1.121	1.261	1.400	1.578	1.695
79	1.136	1.277	1.418	1.598	1.717
80	1.150	1.293	1.435	1.618	1.739
81	1.165	1.309	1.453	1.638	1.761
82	1.179	1.325	1.471	1.659	1.782
83	1.193	1.341	1.489	1.679	1.804
84	1.208	1.357	1.507	1.699	1.826
85	1.222	1.374	1.525	1.719	1.848
86	1.236	1.390	1.543	1.739	1.869
87	1.251	1.406	1.561	1.760	1.891
88	1.265	1.422	1.579	1.780	1.913
89	1.280	1.438	1.597	1.800	1.934
90	1.294	1.454	1.615	1.820	1.956

DIRECT DRIVE
FERTILIZER

SLOW SPEED DRIVE

SEED & INOCULANT

CALIBRATION MATERIAL	SEED PLATE USED	DENSITY LBS/FT^3	DENSITY LBS/BUSHEL	CHART COLUMN
CANOLA	FINE	42	52	SSD - 1
MUSTARD CANARY SEED	FINE	45 35	56 44	SSD - 2
ALFALFA CLOVER	FINE	34 36	42 45	SSD - 3
NODULATOR	MEDIUM	56	70	SSD - 4
TAG TEAM	MEDIUM	55	69	SSD - 5

DIRECT DRIVE

SEED

CALIBRATION MATERIAL	SEED PLATE USED	DENSITY LBS/FT^3	DENSITY LBS/BUSHEL	CHART COLUMN
SAFFLOWER	MEDIUM	21	26	DD - 1
OATS	MEDIUM	31	39	DD - 2
BARLEY	MEDIUM	40	50	DD - 3
FLAX	FINE	43	54	DD - 4
SPRING WHEAT DURUM WINTER WHEAT FALL RYE	MEDIUM	50 51 48 45	62 63 60 56	DD - 5
LENTILS (LAIRD)	MEDIUM	48	60	DD - 6
LENTILS (ESTON)	MEDIUM	48	60	DD - 7
PINTO BEANS	COARSE	47	59	DD - 8
FABA BEANS GARBONZO BEANS CHICK PEAS (LARGE)	COARSE	50 50 46	62 62 57	DD - 9
ADMIRAL PEAS (SMALL & MEDIUM)	COARSE	50	62	DD - 10

DIRECT DRIVE

FERTILIZER

CALIBRATION MATERIAL	SEED PLATE USED	DENSITY LBS/FT^3	DENSITY LBS/BUSHEL	CHART COLUMN
46 - 0 - 0	MEDIUM	48	60	DDF - 1
34 - 17 - 0	MEDIUM	52	65	DDF - 2
20.5 - 0 - 0 - 24	MEDIUM	60	75	DDF - 3
11 - 51 - 0 COARSE AGGREGATE BLENDS	COARSE	56	70	DDF - 4
0 - 0 - 60 0 - 45 - 0	COARSE	67 62	83 77	DDF - 5

Calibration Chart - Metric

WT/REV (KGS./REV)

SLOW SPEED DRIVE
SEED & INOCULANT

# of Outlets	SSD - 1	SSD - 2	SSD - 3	SSD - 4	SSD - 5
21	0.015	0.016	0.017	0.020	0.024
22	0.015	0.017	0.017	0.021	0.025
23	0.016	0.018	0.018	0.022	0.026
24	0.017	0.018	0.019	0.023	0.028
25	0.017	0.019	0.020	0.024	0.029
26	0.018	0.020	0.020	0.025	0.030
27	0.019	0.021	0.021	0.026	0.031
28	0.019	0.021	0.022	0.027	0.032
29	0.020	0.022	0.023	0.028	0.033
30	0.021	0.023	0.024	0.029	0.034
31	0.021	0.024	0.024	0.030	0.036
32	0.022	0.024	0.025	0.031	0.037
33	0.023	0.025	0.026	0.032	0.038
34	0.024	0.026	0.027	0.033	0.039
35	0.024	0.027	0.028	0.034	0.040
36	0.025	0.027	0.028	0.035	0.041
37	0.026	0.028	0.029	0.036	0.042
38	0.026	0.029	0.030	0.037	0.044
39	0.027	0.030	0.031	0.038	0.045
40	0.028	0.030	0.032	0.039	0.046
41	0.028	0.031	0.032	0.040	0.047
42	0.029	0.032	0.033	0.041	0.048
43	0.030	0.033	0.034	0.042	0.049
44	0.031	0.034	0.035	0.043	0.050
45	0.031	0.034	0.035	0.044	0.052
46	0.032	0.035	0.036	0.044	0.053
47	0.033	0.036	0.037	0.045	0.054
48	0.033	0.037	0.038	0.046	0.055
49	0.034	0.037	0.039	0.047	0.056
50	0.035	0.038	0.039	0.048	0.057
51	0.035	0.039	0.040	0.049	0.058
52	0.036	0.040	0.041	0.050	0.060
53	0.037	0.040	0.042	0.051	0.061
54	0.037	0.041	0.043	0.052	0.062
55	0.038	0.042	0.043	0.053	0.063
56	0.039	0.043	0.044	0.054	0.064
57	0.040	0.043	0.045	0.055	0.065
58	0.040	0.044	0.046	0.056	0.067

DIRECT DRIVE
SEED

# of Outlets	DD - 1	DD - 2	DD - 3	DD - 4	DD - 5	DD - 6	DD - 7	DD - 8	DD - 9	DD - 10
21	0.069	0.094	0.122	0.133	0.157	0.172	0.194	0.201	0.234	0.258
22	0.073	0.098	0.128	0.140	0.165	0.180	0.203	0.211	0.246	0.271
23	0.076	0.103	0.134	0.146	0.172	0.189	0.213	0.221	0.257	0.283
24	0.079	0.107	0.139	0.152	0.180	0.197	0.222	0.230	0.268	0.295
25	0.083	0.112	0.145	0.159	0.187	0.205	0.231	0.240	0.279	0.307
26	0.086	0.116	0.151	0.165	0.195	0.213	0.240	0.249	0.290	0.320
27	0.089	0.121	0.157	0.172	0.202	0.221	0.250	0.259	0.301	0.332
28	0.092	0.125	0.163	0.178	0.210	0.230	0.259	0.269	0.312	0.344
29	0.096	0.130	0.169	0.184	0.217	0.238	0.268	0.278	0.324	0.357
30	0.099	0.134	0.174	0.191	0.225	0.246	0.277	0.288	0.335	0.369
31	0.102	0.139	0.180	0.197	0.232	0.254	0.287	0.297	0.346	0.381
32	0.106	0.143	0.186	0.203	0.240	0.262	0.296	0.307	0.357	0.394
33	0.109	0.148	0.192	0.210	0.247	0.271	0.305	0.317	0.368	0.406
34	0.112	0.152	0.198	0.216	0.255	0.279	0.314	0.326	0.379	0.418
35	0.116	0.157	0.203	0.222	0.262	0.287	0.324	0.336	0.391	0.430
36	0.119	0.161	0.209	0.229	0.270	0.295	0.333	0.345	0.402	0.443
37	0.122	0.166	0.215	0.235	0.277	0.303	0.342	0.355	0.413	0.455
38	0.126	0.170	0.221	0.241	0.285	0.312	0.351	0.365	0.424	0.467
39	0.129	0.175	0.227	0.248	0.292	0.320	0.360	0.374	0.435	0.480
40	0.132	0.179	0.232	0.254	0.300	0.328	0.370	0.384	0.446	0.492
41	0.135	0.184	0.238	0.260	0.307	0.336	0.379	0.393	0.458	0.504
42	0.139	0.188	0.244	0.267	0.315	0.344	0.388	0.403	0.469	0.517
43	0.142	0.192	0.250	0.273	0.322	0.353	0.397	0.413	0.480	0.529
44	0.145	0.197	0.256	0.279	0.329	0.361	0.407	0.422	0.491	0.541
45	0.149	0.201	0.262	0.286	0.337	0.369	0.416	0.432	0.502	0.553
46	0.152	0.206	0.267	0.292	0.344	0.377	0.425	0.441	0.513	0.566
47	0.155	0.210	0.273	0.299	0.352	0.385	0.434	0.451	0.525	0.578
48	0.159	0.215	0.279	0.305	0.359	0.394	0.444	0.461	0.536	0.590
49	0.162	0.219	0.285	0.311	0.367	0.402	0.453	0.470	0.547	0.603
50	0.165	0.224	0.291	0.318	0.374	0.410	0.462	0.480	0.558	0.615
51	0.168	0.228	0.296	0.324	0.382	0.418	0.471	0.489	0.569	0.627
52	0.172	0.233	0.302	0.330	0.389	0.426	0.481	0.499	0.580	0.640
53	0.175	0.237	0.308	0.337	0.397	0.435	0.490	0.508	0.591	0.652
54	0.178	0.242	0.314	0.343	0.404	0.443	0.499	0.518	0.603	0.664
55	0.182	0.246	0.320	0.349	0.412	0.451	0.508	0.528	0.614	0.676
56	0.185	0.251	0.325	0.356	0.419	0.459	0.518	0.537	0.625	0.689
57	0.188	0.255	0.331	0.362	0.427	0.467	0.527	0.547	0.636	0.701
58	0.192	0.260	0.337	0.368	0.434	0.476	0.536	0.556	0.647	0.713

DIRECT DRIVE
FERTILIZER

# of Outlets	DDF - 1	DDF - 2	DDF - 3	DDF - 4	DDF - 5
21	0.137	0.154	0.171	0.193	0.207
22	0.143	0.161	0.179	0.202	0.217
23	0.150	0.169	0.187	0.211	0.227
24	0.157	0.176	0.195	0.220	0.237
25	0.163	0.183	0.203	0.229	0.246
26	0.170	0.191	0.212	0.239	0.256
27	0.176	0.198	0.220	0.248	0.266
28	0.183	0.205	0.228	0.257	0.276
29	0.189	0.213	0.236	0.266	0.286
30	0.196	0.220	0.244	0.275	0.296
31	0.202	0.227	0.252	0.284	0.306
32	0.209	0.235	0.260	0.294	0.315
33	0.215	0.242	0.269	0.303	0.325
34	0.222	0.249	0.277	0.312	0.335
35	0.228	0.257	0.285	0.321	0.345
36	0.235	0.264	0.293	0.330	0.355
37	0.241	0.271	0.301	0.339	0.365
38	0.248	0.279	0.309	0.349	0.375
39	0.254	0.286	0.317	0.358	0.385
40	0.261	0.293	0.326	0.367	0.394
41	0.267	0.301	0.334	0.376	0.404
42	0.274	0.308	0.342	0.385	0.414
43	0.280	0.315	0.350	0.395	0.424
44	0.287	0.323	0.358	0.404	0.434
45	0.293	0.330	0.366	0.413	0.444
46	0.300	0.337	0.374	0.422	0.454
47	0.307	0.345	0.383	0.431	0.463
48	0.313	0.352	0.391	0.440	0.473
49	0.320	0.359	0.399	0.450	0.483
50	0.326	0.367	0.407	0.459	0.493
51	0.333	0.374	0.415	0.468	0.503
52	0.339	0.381	0.423	0.477	0.513
53	0.346	0.389	0.431	0.486	0.523
54	0.352	0.396	0.440	0.495	0.532
55	0.359	0.403	0.448	0.505	0.542
56	0.365	0.411	0.456	0.514	0.552
57	0.372	0.418	0.464	0.523	0.562
58	0.378	0.425	0.472	0.532	0.572

Calibration Chart - Metric

WT/REV (KGS./REV)

SLOW SPEED DRIVE
SEED & INOCULANT

# of Outlets	SSD - 1	SSD - 2	SSD - 3	SSD - 4	SSD - 5
59	0.041	0.045	0.046	0.057	0.068
60	0.042	0.046	0.047	0.058	0.069
61	0.042	0.046	0.048	0.059	0.070
62	0.043	0.047	0.049	0.060	0.071
63	0.044	0.048	0.050	0.061	0.072
64	0.044	0.049	0.050	0.062	0.073
65	0.045	0.050	0.051	0.063	0.075
66	0.046	0.050	0.052	0.064	0.076
67	0.046	0.051	0.053	0.065	0.077
68	0.047	0.052	0.054	0.066	0.078
69	0.048	0.053	0.054	0.067	0.079
70	0.049	0.053	0.055	0.068	0.080
71	0.049	0.054	0.056	0.069	0.081
72	0.050	0.055	0.057	0.070	0.083
73	0.051	0.056	0.057	0.071	0.084
74	0.051	0.056	0.058	0.072	0.085
75	0.052	0.057	0.059	0.073	0.086
76	0.053	0.058	0.060	0.074	0.087
77	0.053	0.059	0.061	0.074	0.088
78	0.054	0.059	0.061	0.075	0.089
79	0.055	0.060	0.062	0.076	0.091
80	0.055	0.061	0.063	0.077	0.092
81	0.056	0.062	0.064	0.078	0.093
82	0.057	0.062	0.065	0.079	0.094
83	0.058	0.063	0.065	0.080	0.095
84	0.058	0.064	0.066	0.081	0.096
85	0.059	0.065	0.067	0.082	0.097
86	0.060	0.066	0.068	0.083	0.099
87	0.060	0.066	0.069	0.084	0.100
88	0.061	0.067	0.069	0.085	0.101
89	0.062	0.068	0.070	0.086	0.102
90	0.062	0.069	0.071	0.087	0.103

DIRECT DRIVE
SEED

# of Outlets	DD - 1	DD - 2	DD - 3	DD - 4	DD - 5	DD - 6	DD - 7	DD - 8	DD - 9	DD - 10
59	0.195	0.264	0.343	0.375	0.442	0.484	0.545	0.566	0.658	0.726
60	0.198	0.269	0.349	0.381	0.449	0.492	0.555	0.576	0.670	0.738
61	0.202	0.273	0.354	0.387	0.457	0.500	0.564	0.585	0.681	0.750
62	0.205	0.278	0.360	0.394	0.464	0.508	0.573	0.595	0.692	0.763
63	0.208	0.282	0.366	0.400	0.472	0.517	0.582	0.604	0.703	0.775
64	0.211	0.286	0.372	0.407	0.479	0.525	0.592	0.614	0.714	0.787
65	0.215	0.291	0.378	0.413	0.487	0.533	0.601	0.624	0.725	0.799
66	0.218	0.295	0.384	0.419	0.494	0.541	0.610	0.633	0.737	0.812
67	0.221	0.300	0.389	0.426	0.502	0.549	0.619	0.643	0.748	0.824
68	0.225	0.304	0.395	0.432	0.509	0.558	0.629	0.652	0.759	0.836
69	0.228	0.309	0.401	0.438	0.517	0.566	0.638	0.662	0.770	0.849
70	0.231	0.313	0.407	0.445	0.524	0.574	0.647	0.672	0.781	0.861
71	0.235	0.318	0.413	0.451	0.532	0.582	0.656	0.681	0.792	0.873
72	0.238	0.322	0.418	0.457	0.539	0.590	0.666	0.691	0.804	0.885
73	0.241	0.327	0.424	0.464	0.547	0.599	0.675	0.700	0.815	0.898
74	0.244	0.331	0.430	0.470	0.554	0.607	0.684	0.710	0.826	0.910
75	0.248	0.336	0.436	0.476	0.562	0.615	0.693	0.720	0.837	0.922
76	0.251	0.340	0.442	0.483	0.569	0.623	0.702	0.729	0.848	0.935
77	0.254	0.345	0.447	0.489	0.577	0.631	0.712	0.739	0.859	0.947
78	0.258	0.349	0.453	0.495	0.584	0.640	0.721	0.748	0.870	0.959
79	0.261	0.354	0.459	0.502	0.592	0.648	0.730	0.758	0.882	0.972
80	0.264	0.358	0.465	0.508	0.599	0.656	0.739	0.768	0.893	0.984
81	0.268	0.363	0.471	0.515	0.607	0.664	0.749	0.777	0.904	0.996
82	0.271	0.367	0.477	0.521	0.614	0.672	0.758	0.787	0.915	1.008
83	0.274	0.372	0.482	0.527	0.622	0.681	0.767	0.796	0.926	1.021
84	0.277	0.376	0.488	0.534	0.629	0.689	0.776	0.806	0.937	1.033
85	0.281	0.380	0.494	0.540	0.637	0.697	0.786	0.815	0.949	1.045
86	0.284	0.385	0.500	0.546	0.644	0.705	0.795	0.825	0.960	1.058
87	0.287	0.389	0.506	0.553	0.652	0.713	0.804	0.835	0.971	1.070
88	0.291	0.394	0.511	0.559	0.659	0.722	0.813	0.844	0.982	1.082
89	0.294	0.398	0.517	0.565	0.666	0.730	0.823	0.854	0.993	1.095
90	0.297	0.403	0.523	0.572	0.674	0.738	0.832	0.863	1.004	1.107

DIRECT DRIVE
FERTILIZER

# of Outlets	DDF - 1	DDF - 2	DDF - 3	DDF - 4	DDF - 5
59	0.385	0.433	0.480	0.541	0.582
60	0.391	0.440	0.488	0.550	0.592
61	0.398	0.447	0.496	0.560	0.601
62	0.404	0.455	0.505	0.569	0.611
63	0.411	0.462	0.513	0.578	0.621
64	0.417	0.469	0.521	0.587	0.631
65	0.424	0.477	0.529	0.596	0.641
66	0.430	0.484	0.537	0.606	0.651
67	0.437	0.491	0.545	0.615	0.661
68	0.443	0.499	0.553	0.624	0.670
69	0.450	0.506	0.562	0.633	0.680
70	0.457	0.513	0.570	0.642	0.690
71	0.463	0.521	0.578	0.651	0.700
72	0.470	0.528	0.586	0.661	0.710
73	0.476	0.535	0.594	0.670	0.720
74	0.483	0.543	0.602	0.679	0.730
75	0.489	0.550	0.610	0.688	0.739
76	0.496	0.557	0.619	0.697	0.749
77	0.502	0.565	0.627	0.706	0.759
78	0.509	0.572	0.635	0.716	0.769
79	0.515	0.579	0.643	0.725	0.779
80	0.522	0.587	0.651	0.734	0.789
81	0.528	0.594	0.659	0.743	0.799
82	0.535	0.601	0.667	0.752	0.808
83	0.541	0.609	0.676	0.761	0.818
84	0.548	0.616	0.684	0.771	0.828
85	0.554	0.623	0.692	0.780	0.838
86	0.561	0.631	0.700	0.789	0.848
87	0.567	0.638	0.708	0.798	0.858
88	0.574	0.645	0.716	0.807	0.868
89	0.580	0.653	0.724	0.817	0.877
90	0.587	0.660	0.733	0.826	0.887

Calibration Chart - Metric

SLOW SPEED DRIVE
SEED & INOCULANT

CALIBRATION MATERIAL	SEED PLATE USED	DENSITY kgs/M³	DENSITY kgs/BUSHEL	CHART COLUMN
CANOLA	FINE	671	24	SSD - 1
MUSTARD CANARY SEED	FINE	722 568	25 20	SSD - 2
ALFALFA CLOVER	FINE	542 580	19 20	SSD - 3
NODULATOR	FINE	903	32	SSD - 4
TAG TEAM	MEDIUM	890	31	SSD - 5

DIRECT DRIVE
FERTILIZER

CALIBRATION MATERIAL	SEED PLATE USED	DENSITY kgs/M³	DENSITY kgs/BUSHEL	CHART COLUMN
46 - 0 - 0	MEDIUM	619	22	DDF - 1
34 - 17 - 0	MEDIUM	671	24	DDF - 2
20.5 - 0 - 0 - 24	MEDIUM	774	27	DDF - 3
11 - 51 - 0 COARSE AGGREGATE BLENDS	COARSE	722	25	DDF - 4
0 - 0 - 60 0 - 45 - 0	COARSE	864 800	30 28	DDF - 5

DIRECT DRIVE
SEED

CALIBRATION MATERIAL	SEED PLATE USED	DENSITY LBS/FT³	DENSITY LBS/BUSHEL	CHART COLUMN
SAFFLOWER	MEDIUM	335	12	DD - 1
OATS	MEDIUM	503	18	DD - 2
BARLEY	MEDIUM	645	23	DD - 3
FLAX	FINE	697	25	DD - 4
SPRING WHEAT DURUM WINTER WHEAT FALL RYE	MEDIUM	800 813 774 722	28 29 27 25	DD - 5
LENTILS (LAIRD)	MEDIUM	774	27	DD - 6
LENTILS (ESTON)	MEDIUM	774	27	DD - 7
PINTO BEANS	COARSE	761	27	DD - 8
FABA BEANS GARBONZO BEANS CHICK PEAS (LARGE)	COARSE	800 800 735	28 28 26	DD - 9
ADMIRAL PEAS (SMALL & MEDIUM)	COARSE	800	28	DD - 10

Section 7: Maintenance

Section Contents

CAUTION

BE ALERT

SAFETY FIRST

REFER TO SECTION 1 AND REVIEW ALL SAFETY RECOMMENDATIONS.

General

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

Safety

- Always shut off the tractor and remove key before dismounting.
- Guard against hydraulic high pressure leaks with hand and face protection.
- Never work under the implement unless it is in the down position or transport lock pins are in place and secured with hair pins. Do not depend on the hydraulic system to support the frame.
- Always wear safety goggles, breathing apparatus and gloves when working on seeder filled with chemical. Follow manufactures recommended safety procedures when working with chemicals or treated seeds.
- Do not feed left over treated seed to livestock, treated seed is poisonous and may cause harm to persons or livestock.

Warning

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

Caution

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

Tighten Bolts

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

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

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

Bolt Torque Chart

Grade 5 Bolt Marking		Bolt Size	Grade 8 Bolt Marking	
Nm	lb-ft		lb-ft	Nm
11	8	**1/4**	12	16
23	17	**5/16**	24	33
41	30	**3/8**	45	61
68	50	**7/16**	70	95
102	75	**1/2**	105	142
149	110	**9/16**	155	210
203	150	**5/8**	210	285
366	270	**3/4**	375	508
536	395	**7/8**	610	827
800	590	**1**	910	1234
1150	850	**1-1/8**	1350	1850
1650	1200	**1-1/4**	1950	2600
2150	1550	**1-3/8**	2550	3400
2850	2100	**1-1/2**	3350	4550

Important

Retorque wheel nuts after first fifteen minutes of operation and every fifteen minutes for the next 2 hours. Check periodically afterwards.

Wheel Bolt Torque

SIZE	Torque
9/16	110 lb-ft (149 Nm)
5/8	150 lb-ft (203 Nm)
3/4 Grade 8	450 lb-ft (610 Nm)
7/8 Grade 8	525 lb-ft (712 Nm)
22 mm	500 lb-ft (678 Nm)
** 24 mm	**Moveero** Rim - 590 lb-ft (800 Nm)
** 24 mm	**Titan** Rim - 800 lb-ft (1085 Nm)

**** Refer to "Dual Wheel 9800 and 91000 - 38 Rims" for details.**

Tires

- Inspect tires and wheels daily for tread wear, side wall abrasions, damaged rims or missing lug bolts and nuts. Replace if necessary.
- Tighten wheel bolts - refer to Wheel Bolt Torque Chart.
- Check tire pressure daily, when tires are cold.
- Correct tire pressure is important.
- Do not inflate tire above the recommended pressure.

⚠ Caution

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

Tire Specifications

Tire	Style	Rating	Pressure						
			BT 9365 9450	BH 9365 9450	BH 9535	BT 9445 9550 9650	BH 9445 9550 9650	BT 9800	BH 9800 91000
28LR26 750/65R26 Quad Steer	Lug	169 A8	-	18 psi 124 kPa OPT Front Axle	18 psi 124 kPa STD Front Axle	-	18 psi 124 kPa STD Front Axle	-	-
500/70 R24 Front Castor	Lug	LI 157	-	25 psi 172 kPa STD Front Axle	-	-	-	-	-
520/85R38 Dual Wheels	Lug	155 A8	-	20 psi 138 kPa OPT Rear Axle	-	-	-	-	-
710/70R38	Lug	166A8	-	-	-	-	36 psi 248 kPa OPT Rear Axle	-	-
800/65R32	Lug	172 A8	20 psi 138 kPa STD Rear Axle	20 psi 138 kPa STD Rear Axle	-	-	-	-	20 psi 138 kPa STD Front Axle
800/65R32 Dual Wheels	Lug	172 A8	20 psi 138 kPa OPT Rear Axle	20 psi 138 kPa OPT Rear Axle	20 psi 138 kPa OPT Rear Axle	20 psi 138 kPa STD Rear Axle	20 psi 138 kPa OPT Rear Axle	-	-
800/70R38	Lug	173 A8	-	-	-	-	-	-	20 psi 138 kPa OPT Front Axle
900/60R32	Lug	176 A8	17 psi 117 kPa OPT Rear Axle	17 psi 117 kPa OPT Rear Axle	26 psi 179 kPa STD Rear Axle	-	26 psi 179 kPa STD Rear Axle	-	-

*BH - Tow-Behind only *BT - Tow-Between only STD - Standard

9800 and 91000 Titan Tires

Tire	Pressure	
	Inner Dual	Outer Dual
800/70R38 Dual Wheels	22 psi 152 kPa	20 psi 138 kPa
850/80R38 Dual Wheels	17 psi 118 kPa	15 psi 104 kPa

9800 and 91000 Moveero and Trelleborg Tires

Tire	Pressure	
	Inner Dual	Outer Dual
IF800/70R38 Front Single Wheel	15 psi 104 kPa	NA
IF800/70R38 Rear Dual Wheels	15 psi 104 kPa	15 psi 104 kPa

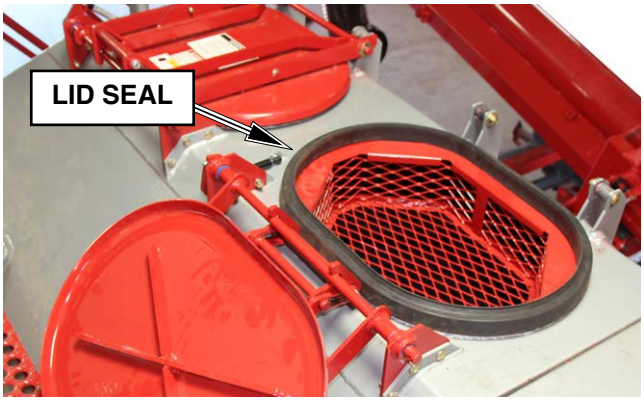
Daily Maintenance

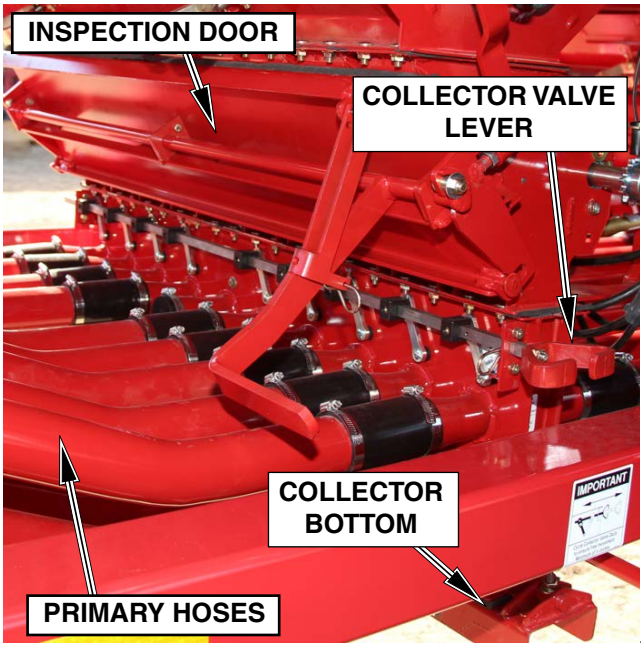
- Check for and remove any water in primary collectors and pressure lines after rainy weather. Remove all inspection doors and collector bottoms to drain water from the tanks and collectors.
- Reinstall collector bottoms and inspection doors.
- Ensure fan screen is clear of debris.

Note: Start fan and run for 3 - 5 minutes prior to loading machine to get rid of accumulated moisture.

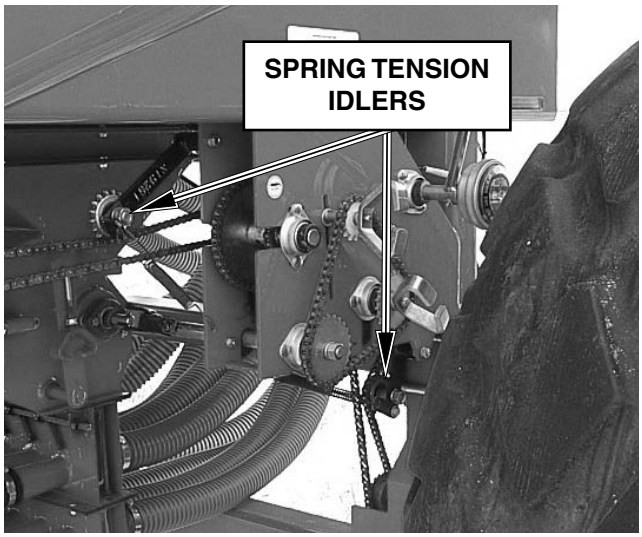
- Check lid seals for damage, and that they are sitting properly on steel ring.
- Check tank pressure hoses for leaks, cracks or plugging.
- Check the following areas for air leaks:
  - Tank inspection door
  - Metering body assembly seals
  - Collector assembly seals
  - Tank lid

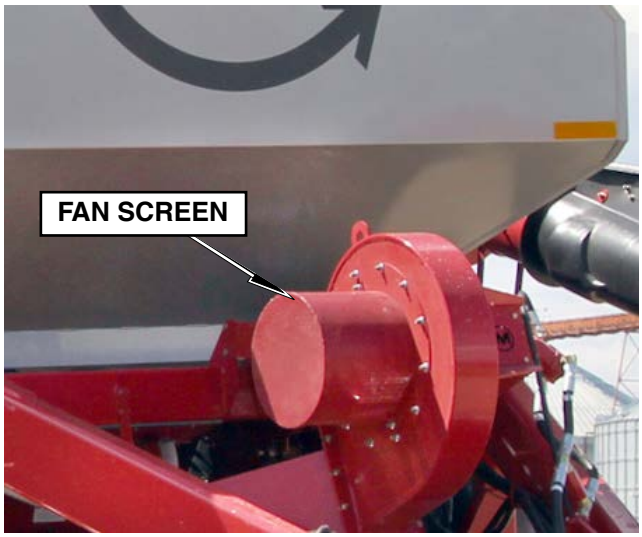
  Refer to “Air Leak Check” under Air System Maintenance.
- Check monitor wiring that all sensor wires are properly routed and retained.
- Check for plugged hoses.
- Cycle Collector Valve five times to ensure parts are free to move.
- Check for free movement of spring loaded chain tension idlers.
- Ensure drive chains are cleared of debris.
- Check torque on wheel bolts.





Double Shoot Shown





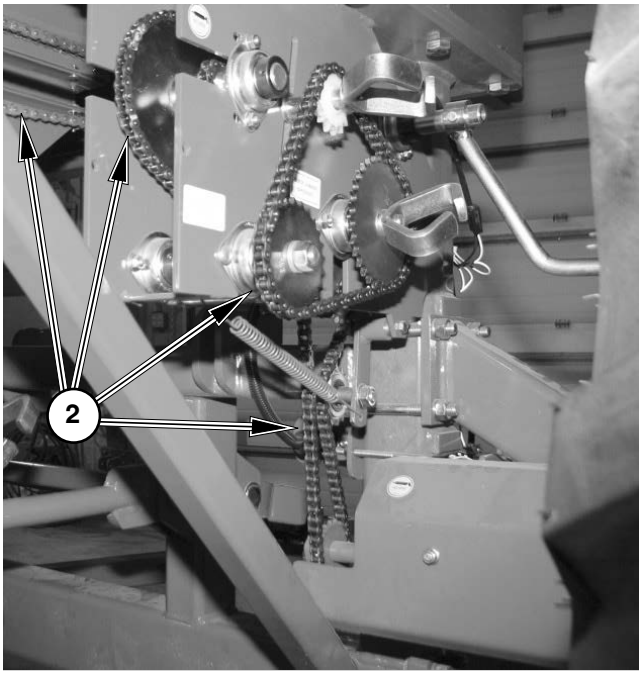
Lubrication

Greasing pivot points prevents wear and helps restrict dirt from entering. However, once dirt does enter a bearing, it combines with the lubricant and becomes an abrasive grinding paste, more destructive than grit alone.

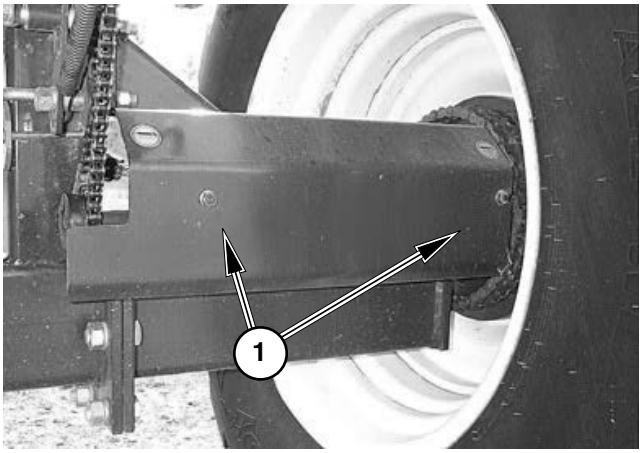
- Apply new lubricant frequently during operation to flush out old contaminated lubricant.
- Use a good grade of **lithium based grease**.
- Use a good grade of machine oil.
- Clean grease fittings and lubricator gun before applying lubricant.

Refer to the following photos for grease fitting locations.

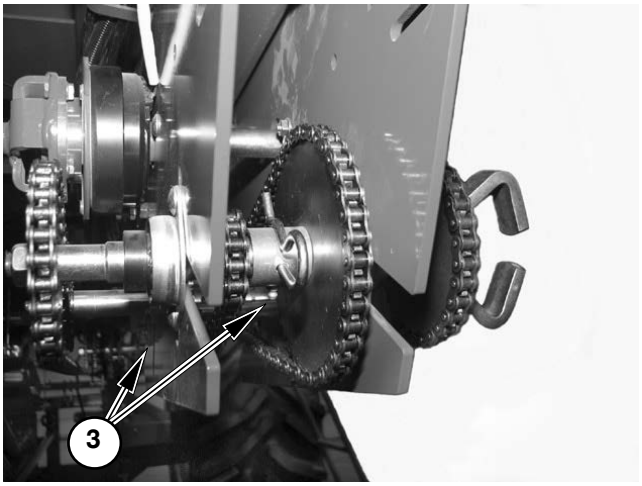
1. **Drive shaft bearings**
   - Grease every 50 hours.
2. **Drive Chains**
   - Oil every 50 hours.
3. **Slow Speed Drive**
   - Grease every 50 hours.



2. Drive Chains



1. Drive Shaft Bearings



3. Slow Speed Drive

Lubrication - Continued

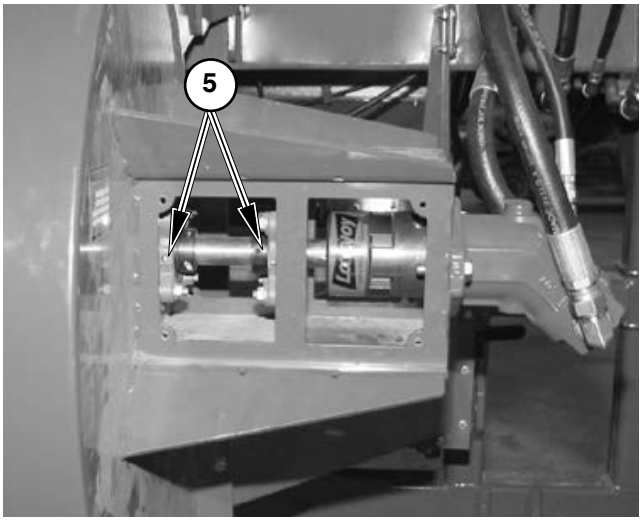
4. Auger Pivot

- Grease every 100 hours.

4. Auger Pivots

5. Fan Bearings (17” Diameter Fan only)

- Apply 2 pumps of grease every 100 hours.



5. Fan Bearings

6. Quad Steer linkage

- Grease every 100 hours.

6. Quad Steer

Air Delivery System

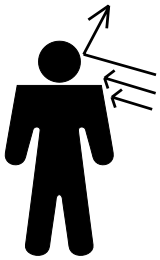
General

The air delivery system of all air carts is extremely important for the proper metering of product to the openers. The metering system on all pressurized air carts is sensitive to air leaks. **Loss of tank air pressure could affect feed rates, which could become erratic or even stop.**

- Regularly check that all hoses are free from kinks or blockages throughout the day. To check for blockages raise seeding tool out of the ground and with the fan running turn crank a couple of turns. Equal amounts of material should be deposited under each boot. If not, check the following for blockage:
  1. Seed openers and secondary hoses.
  2. Divider heads by removing access doors.
  3. Primary hoses and collectors.
  4. Metering wheels for damage to the flutes of the wheel.
- Keep fan inlet screen clear and free from debris.
- Place a plastic bag over the fan when the unit is not in use. This helps prevent moisture from entering the system.
- Check periodically and at the end of each season for air leaks at hose connections.
- Check periodically and at the end of each season for air leaks in the following areas:
  1. Tank lid seals.
  2. Metering body shaft seals.
  3. Metering body to tank seals.
  4. Collector to metering body seals.
  5. Fan to plenum.
  6. Plenum to collector.
  7. Inspection doors, for leaks and loss of seal memory.
  8. Collector door seals.
  9. Couplers between air cart and seeding tool.
  10. Access doors on divider heads.

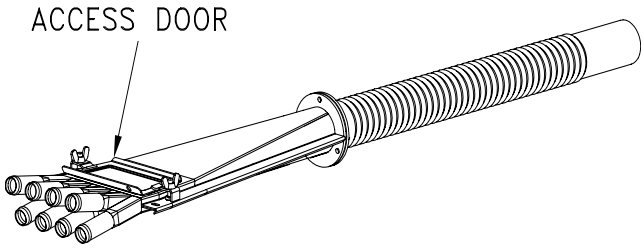
Note: There must not be any excessive air leaks from the tank. This air leakage causes air turbulence in the tank which can result in inaccurate metering rates.

- Once a year check for wear of primary and secondary hoses.



Caution

Care should be taken when working near the air cart while the fan is running. Product blowing out of the system could cause personal injury.



Note: Extended life can be obtained if the hoses are rotated 1/4 turn once a year.

Air Delivery System - Continued

Tank Lids

The lid seal is probably the area that sees the most abuse due to the activity associated with filling the tanks.

With each fill the lid seals should be inspected for cuts, abrasions, debris in the seal and ensure the seal is positioned properly on the steel rim around the tank opening.

Important

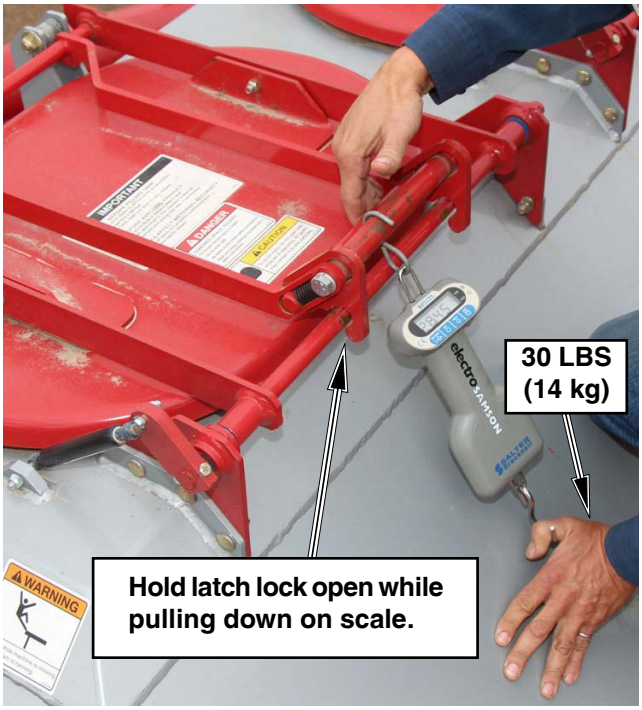
The product will not meter correctly if the lid is not tightly sealed or the tank is not pressurized.

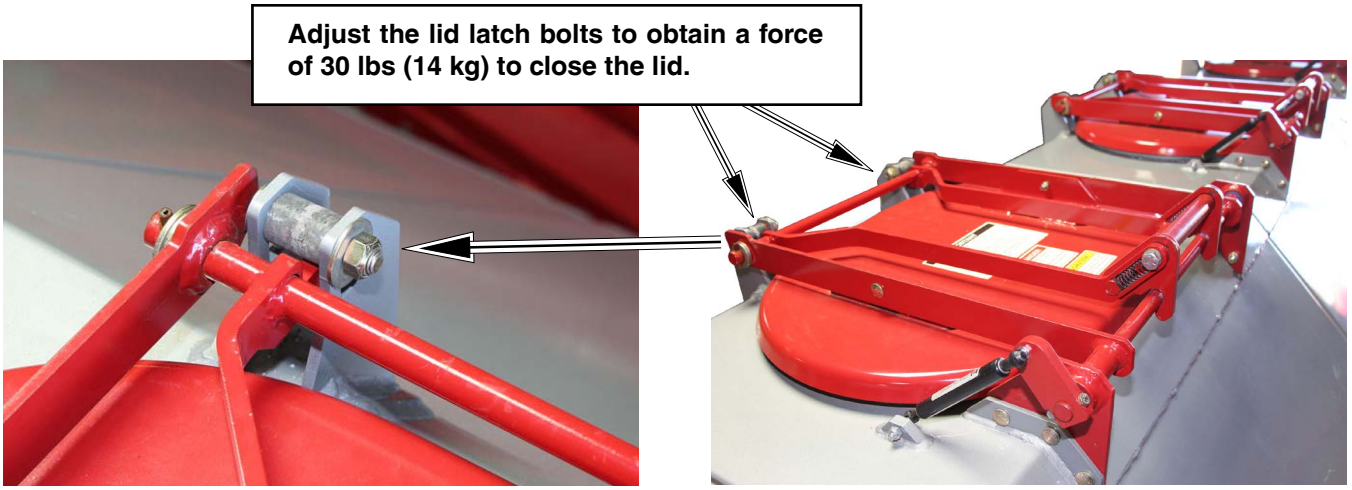
Tank Lid Adjustment

Check Tank Lid tension on *all tanks* at beginning of each season and periodically during season for air leaks. The following checks and adjustments must be made to prevent air leaks from occurring:

- Check for any foreign material embedded into seal. Clean out foreign material from seal surface.
- Check seal for cuts and abrasions. If seal is cut or severely worn, then replace seal.
- Ensure seal is positioned properly on steel rim around tank opening.
- Use a 0-100 lb. (0-45 kg) spring scale to check the tank lid closing force. With the lid near the closed position, place one end of the scale *on* the tank lid handle. Pull down on the scale and note the maximum force it takes to hold the lid. The force needed to close the lid **must be 30 lbs (14 kg).**
- Adjust the lid latch adjusting bolts as necessary. This will ensure that the lid is sufficiently tight and prevent any leaks.
- Re-check for leaks. If Lids still leak re-adjust latch bolts. Re-check for leaks.

Note: When air cart is not in use, leave lid latches loose to help maintain resilience of the seals.



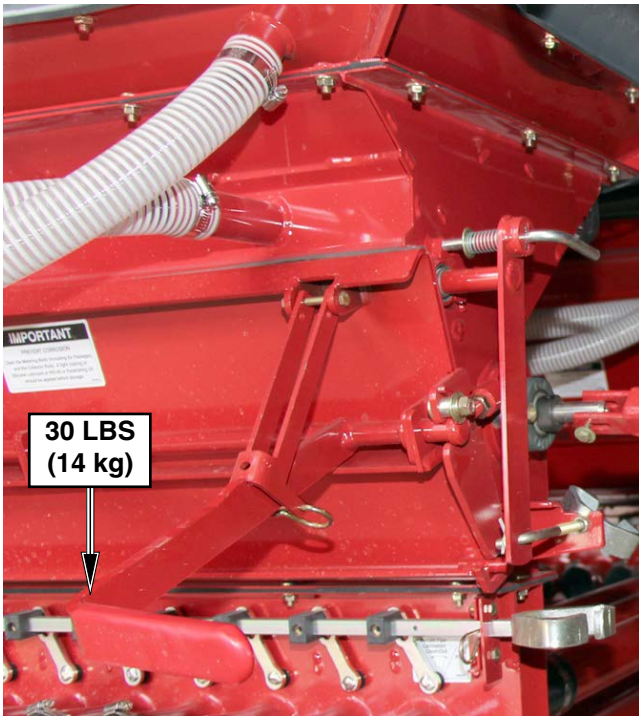


Air Delivery System - Continued

Inspection Door Adjustment

Check Inspection Door on *all metering bodies* at beginning of each season and periodically during season for air leaks. The following checks and adjustments must be made to prevent air leaks from occurring:

- Check for any foreign material embedded into seal. Clean out foreign material from seal surface.
- Check seal for cuts and abrasions. If seal is cut or severely worn, then replace seal.
- Ensure seal is positioned properly on steel rim around tank opening.
- Use a 0-100 lb. (0-45 kg) spring scale to check the Door closing force. With the Door near the closed position, place one end of the scale *on* the Door handle. Pull down on the scale and note the maximum force it takes to latch handle lock. The force needed to latch handle lock **must be 30 lbs (14 kg).**
- Adjust the door latch adjusting bolts as necessary. This will ensure that the lid is sufficiently tight and prevent any leaks.
- Re-check for leaks. If Doors still leak adjust latch bolts one or two more turns. Re-check for leaks.



Adjust the latch bolts to obtain a force of 30 lbs (14 kg) to close the Door.

Important

The product will not meter correctly if the inspection door is not tightly sealed or the tank is not pressurized.

Air Delivery System - Continued

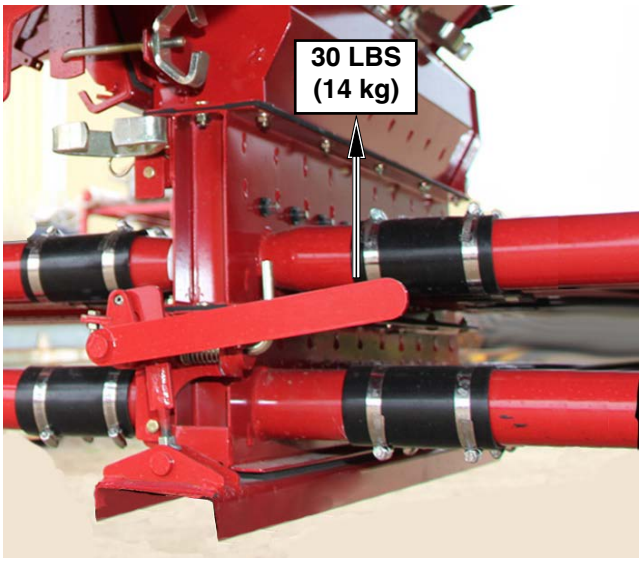
Clean Out Door Adjustment

Check Clean Out Door on *all metering bodies* at beginning of each season and periodically during season for air leaks. The following checks and adjustments must be made to prevent air leaks from occurring:

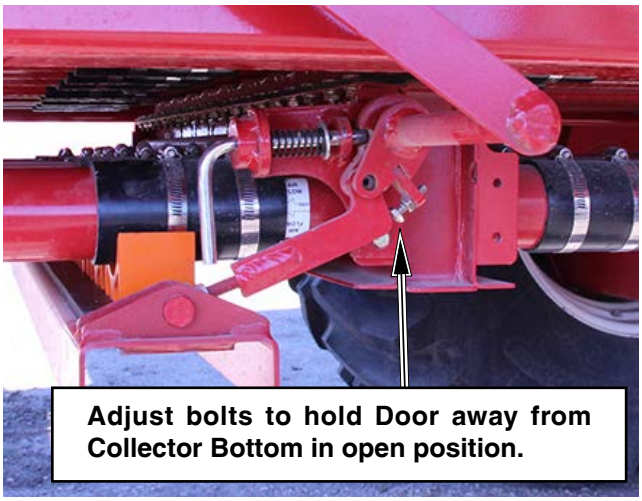
- Check for any foreign material embedded into seal. Clean out foreign material from seal surface.
- Check seal for cuts and abrasions. If seal is cut or severely worn, then replace seal.
- Ensure seal is positioned properly on steel rim around tank opening.
- Use a 0-100 lb. (0-45 kg) spring scale to check the Door closing force. With the Door near the closed position, place one end of the scale *on* the Door handle. Pull down on the scale and note the maximum force it takes to latch handle lock. The force needed to latch handle lock **must be 30 lbs (14 kg).**
- Adjust the door latch adjusting bolts as necessary. This will ensure that the lid is sufficiently tight and prevent any leaks.
- Re-check for leaks. If Doors still leak adjust latch bolts one or two more turns. Re-check for leaks.
- In the open position, adjust the adjusting bolts as necessary to hold collector door away from the collector bottom.

Important

The product will not meter correctly if the clean out door is not tightly sealed or the tank is not pressurized.



Adjust the latch bolts to obtain a force of 30 lbs (14 kg) to close the Door.



Adjust bolts to hold Door away from Collector Bottom in open position.

Air Delivery System - Continued

Air Leak Check

It is ***imperative that no*** **excessive** ***air leaks occur*** in the air cart tank. Air leaks could cause loss of tank air pressure affecting feed rates, which could become erratic or stop.

To prevent this from occurring, it is strongly recommended that a pressure test be conducted prior to seeding time. This can be performed very easily and simply by completing the following steps:

- Clean fan impeller and adjust tank lids.
- Disconnect the 2 1/2" diameter primary hoses from the rear of the seeding tool at the primary hose couplers.
- Install the blank off plate that is supplied with the air cart at each coupler. If the blank off plates are not readily at hand a piece of cardboard can be used in its place.
- Once the blank off plates have been installed, start the fan and run at 4,500 rpm.

Check the following areas for air leaks:

1. Tank lid seals.
2. Metering body shaft seals.
3. Metering body to tank seals.
4. Collector to metering body seals.
5. Fan to plenum and plenum to collector.
6. Inspection doors, for leaks and loss of seal memory.
7. Collector door seals.
8. Tanks union plate.

Air leaks can be detected by spraying a soapy water solution onto the seal area. If bubbling of soap occurs, the seal has a leak. Another method is to use your hand to feel for any air movement around the seal. This method requires a calm day, as the wind can make it difficult to detect a leak.

- If any of the above areas leak, remove the parts and replace the seal. Ensure upon reassembly that the parts are tightened sufficiently to prevent air leakage.
- Remove the blank off plates before using the air cart.

Once the pressure test is complete, check the following areas for air leaks:

9. Couplers between air cart and seeding tool.
10. Access doors on divider heads.

Important

It is imperative that no excessive air leaks occur in the air cart tank. Air leaks will lead to product bridging in the tank, thereby causing misses in the field.

Note: When air cart is not in use leave lid latches and inspection doors loose to help maintain resilience of the seals.

Excessive air leak definition:

When assessing air leaks, the use of hot soapy water serves as an effective detection method. The application of this mixture creates an environment for bubble formation, allowing for clear visual indicators of the severity of the leak.

An excessive leak becomes evident when a large bubble forms and bursts almost immediately upon contact with the soapy solution. This rapid collapse suggests that air is escaping at a significant rate, indicating an area that requires repair.

In contrast, a stable, small bubble that forms at a leak represents an acceptable scenario. These bubbles tend to hold their shape without quickly dissipating, implying that the airflow is minimal. Such leaks will not pose any threat to the integrity of the air system.

This distinction between excessive and acceptable leaks can aid maintenance personnel in diagnostics.

Air Delivery System - Continued

Fan

Debris can build up on the fan screen and blades causing reduced output of the fan. The lack of air flow even at higher fan speeds will cause material plugging of the air system.

The build up of material during operation can cause the following:

1. Fan rpm will increase without increasing oil flow to orbit motor.
2. Air cart distribution system plugging from a lack of air flow (Increasing fan rpm has little or no effect).

Fan Screen

- Ensure fan screen is clear of debris. Check periodically through the day.

Fan Impeller

The fan blades may become plugged under high humidity/dusty conditions/high insect counts.

Under severe conditions the fan blades should be inspected daily and cleaned as required.

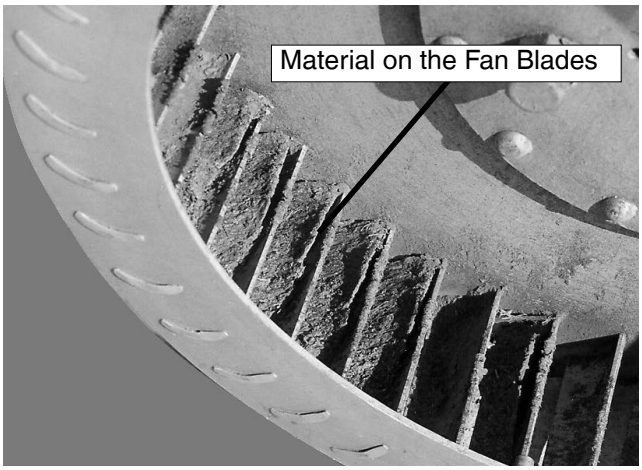
Under normal conditions the fan should be inspected and cleaned at least once a season.

- Care should be taken in cleaning all fan blades thoroughly to restore the fans peak performance.
- Ensure that the balance clips located on the fan blades are not removed, as this will put the fan out of balance.

Storage

To prevent water entering the air system, cover the fan intake with a plastic bag, whenever the seeder is not in use.

Note: Be sure to remove fan cover prior to starting fan or serious damage could result to the fan.

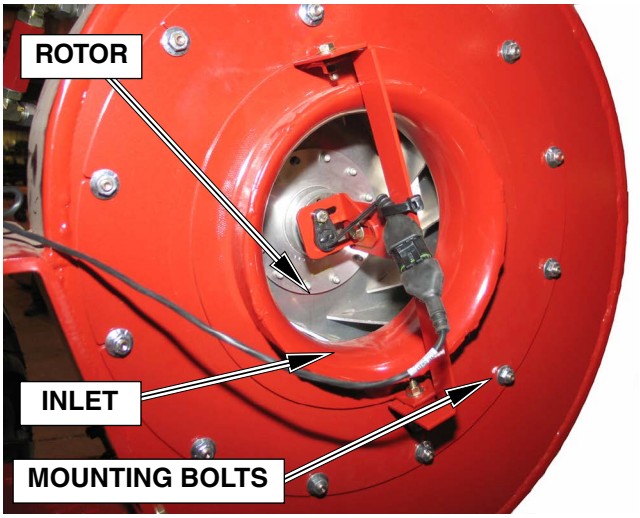


Note: Material build up on the fan blades could cause the fan to be out of balance. The added vibration of the out of balance impeller will reduce the life of the fan components.

Air Delivery System - Continued

Rotor Clearance

- Position rotor 1/8” (3 mm) from inlet.
- Check rotor alignment if tipped at an angle to the inlet adjust inner bearing on blower housing to achieve proper rotor to inlet concentricity.
- If rotor is square to inlet but not concentric to inlet, raise or lower the inlet on the mounting bolts.
- Spin rotor by hand to check for interferences, adjust as required.



Hoses

Inspect air delivery hoses for wear and replace as required. Check areas where hoses may be exposed to moving parts such as hitch hinge area.

Also, inspect hoses for blockage as rodents/birds may nest in hoses that have not been properly capped during storage.

To optimize the 9 Series Air Cart air system the pressure across the inlets of the quick couplers should be balanced. To achieve this all primary hoses **must be equal in length or use equalizers** to achieve a balanced air system.

Consult with your MORRIS Dealer for assistance on hose lengths and location of equalizers.

Important

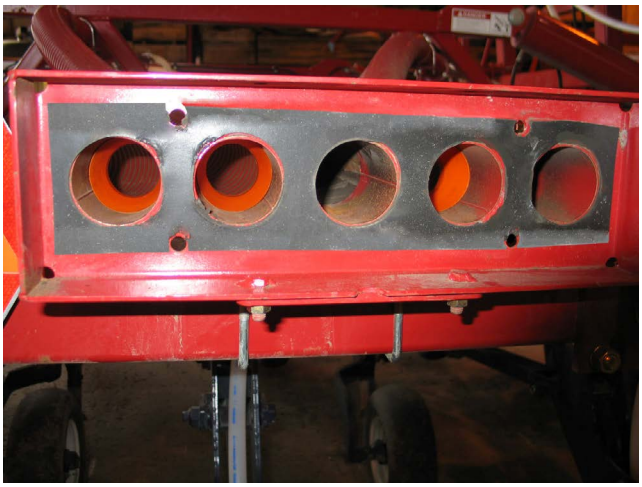
ALL primary hoses must be the same length or use equalizers to achieve a balanced air system.

Air Delivery System - Continued

Equalizers

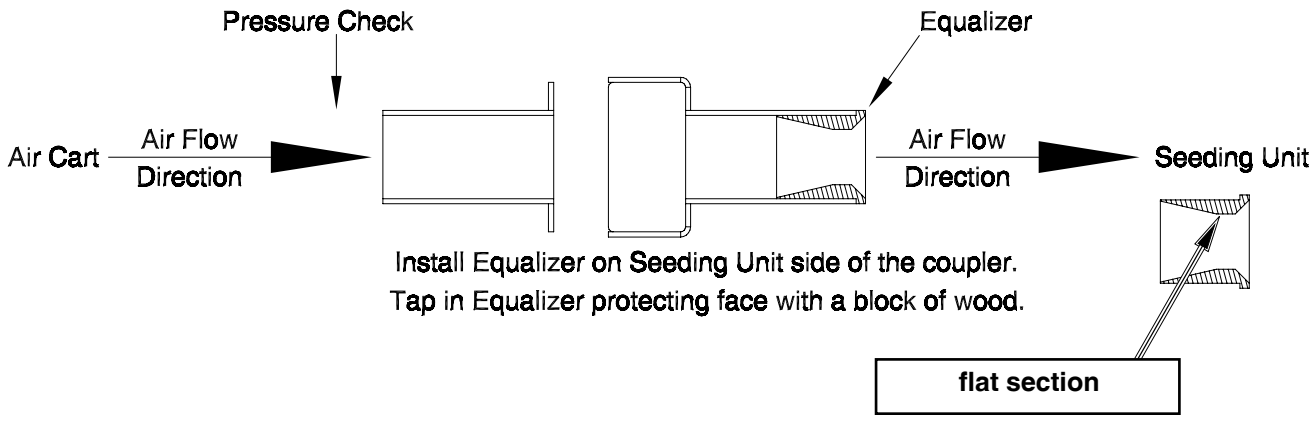
The equalizers reduce the amount of primary hose required to balance the air system of the air cart.

- Equalizers are installed on the shorter primary hoses of the seeding tool. Consult with your MORRIS Dealer for assistance on hose lengths and location of equalizers.
- Check equalizers seasonally for wear. If flat section is gone replace equalizer.



Coupler on Seeding Tool

Insert Equlizers on Coupler Seeding Tool side



Hydraulic Orbit Motor

The motor requires no maintenance itself.

It does, however, require clean oil so the tractor hydraulic filters must be replaced regularly.

Repair/Replacement

- Remove orbit motor from the fan.

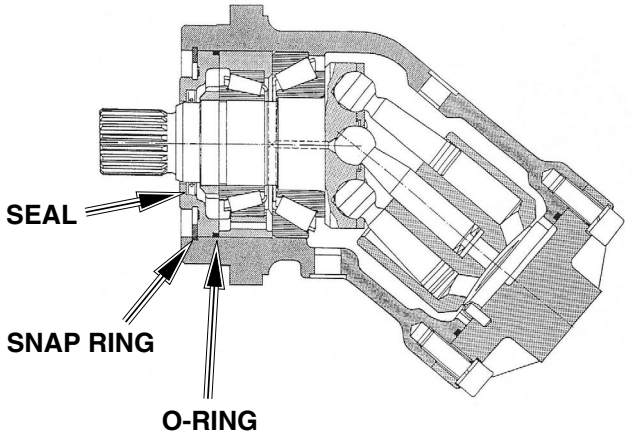
Note: The shaft should never be hammered on or forced in as this will result in motor damage upon startup.

- Remove the snap ring.
- Clean away paint then remove front cover.
- Push out the old shaft seal and press in the new one.

Note: The bearings should never be removed from the shaft as they are pretensioned to the shaft with the motor spinning.

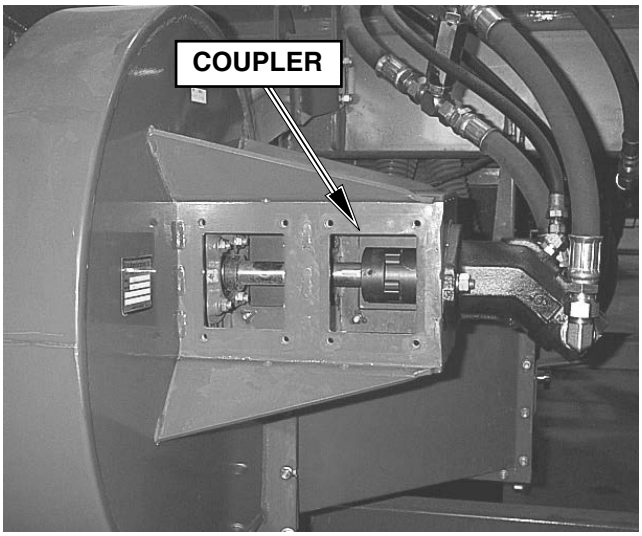
- Replace the O-ring.
- Both the O-ring and shaft seal should be greased with *"clean"* grease.
- Care must be taken when the front cover is installed so the shaft seal is not damaged.
- Reinstall the snap ring.
- Fill the motor case with *"clean"* oil before running.

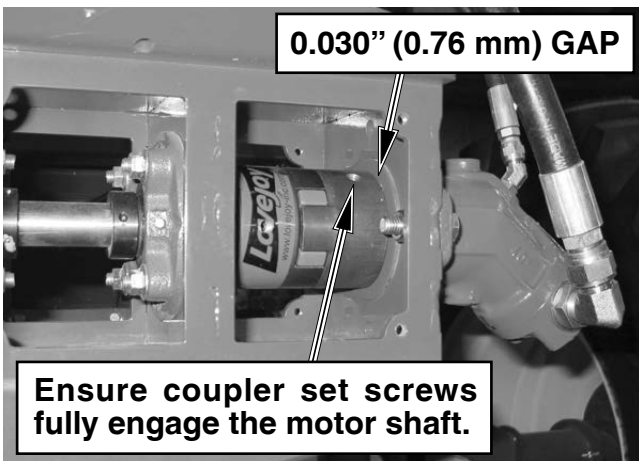
Note: Any time a motor is replaced the case must be filled with oil before it is started, if not, a bearing failure could occur.



Orbit Motor Coupler (17" Diameter Fan only)

- Urethane insert should be inspected every 100 hours or when greasing bearings.
- Inspect that there are no urethane filings or niks or cracks in urethane insert.
- Ensure set screws in each half of the coupler are tight.





Clutch

To check clutch for slippage check the following:

- Check friction plates for corrosion and buff with a wire wheel if necessary.
- Check clutch for side play. If there is movement on the shaft between the two clutch halves, adjust locking collars to snug halves together.
- Check clutch coil resistance. If the meter reads below 2.40 ohms or above 2.90 ohms, then the clutch has failed and needs to be replaced.
- Check clutch current draw. If the meter reads below 4 amps, there is a problem in the electrical system leading to the clutch.

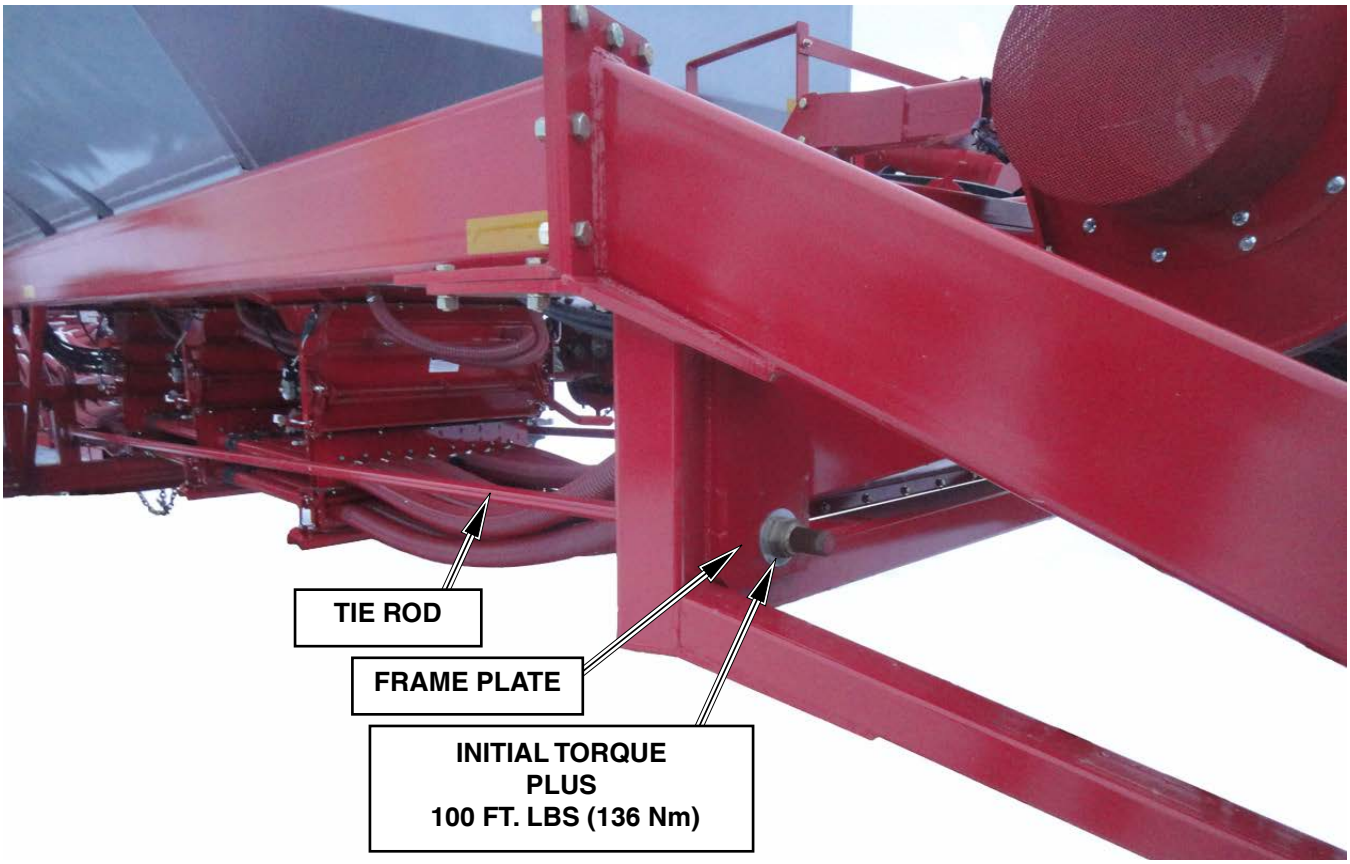
Note: All values taken at room temperature. Voltage at 12 VDC. As temperature increases, resistance increases, and current decreases.

Tie Rod - Tow Between

On the 9365 and 9450 Tow Between Carts the Tie Rod torque procedure as follows:

1. Tighten the nut up to the frame plate.
2. Record the torque just before contacting the plate. (Initial Torque)
3. Add 100 lb-ft (136 Nm) to the recorded torque and tighten the nut against the plate at this torque.

Check at 10 and 50 hours and periodically afterwards.



Hydraulics

Refer to Section 1 regarding hydraulic safety. In addition:

- Inspect hydraulic system for leaks, damaged hoses and loose fittings.
- Damaged hoses and hydraulic tubing can only be repaired by replacement. DO NOT ATTEMPT REPAIRS WITH TAPE OR CEMENTS. High pressure will burst such repairs and cause system failure and possible injury.
- Leaking cylinders - install a new seal kit.
- Fittings - use liquid Teflon on all NPT hydraulic joints. **Do not use liquid Teflon or Teflon tape on JIC or ORB ends.**
- Hydraulic Hose Connections - when connecting the hoses to the cylinders, tubing, etc. always use one wrench to keep the hose from twisting and another wrench to tighten the union. Excessive twisting will shorten hose life.
- Keep fittings and couplers clean.
- Check the Tractor Manual for proper filter replacement schedule.

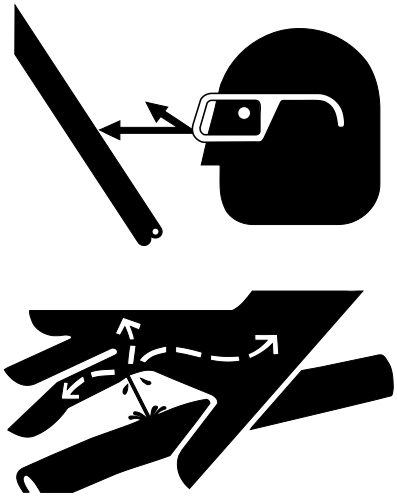
MORRIS Industries Ltd.

Contact your nearest Dealer for genuine repair parts. Dealers carry ample stocks and are backed by the manufacturer and regional associations.

⚠ Caution

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

Note: Extreme care must be taken to maintain a clean hydraulic system. Use only new hydraulic fluid when filling reservoir.



⚠ Warning

HIGH-PRESSURE FLUID HAZARD

To prevent serious injury or death:

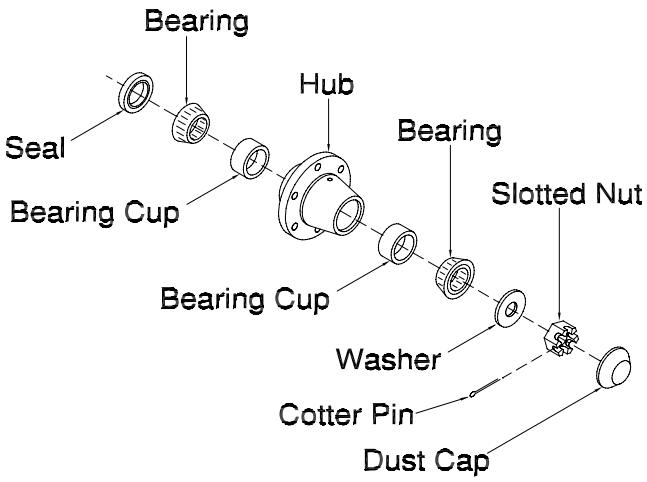
- **Relieve pressure on hydraulic system before servicing or disconnecting hoses.**
- **Wear proper hand and eye protection when searching for leaks. Use wood or cardboard instead of hands.**
- **Keep all components in good repair.**

Wheel Bearings

- Shut tractor off and remove key.
- Block wheel on tractor.
- Raise the air cart wheels enough to clear the surface.
- Securely block air cart frame.
- Remove wheel from hub.
- Remove the dust cap, cotter pin, and the slotted nut and washer.
- Be careful when pulling the hub off as not to drop the outer bearing.
- Clean spindle and bearing components with solvent.
- Inspect for wear on bearings, spindle and cups. Replace parts as required.
- Do not reuse old seals. Use only new seals when assembling.
- Pack inner hub with bearing grease.
- Be sure bearing and cup are dry and clean.
- Work grease into the bearing rollers, until each part of the bearing is completely full of grease.
- Install inner bearing and cup first, then press new seals in place.
- Place hub on spindle.
- Install outer bearing, washer and slotted nut.
- Tighten nut while turning the wheel until a slight drag is felt.
- Back nut off one slot and install a cotter pin. Bend cotter pin up around nut.
- Pack grease inside the dust cap and tap into position.

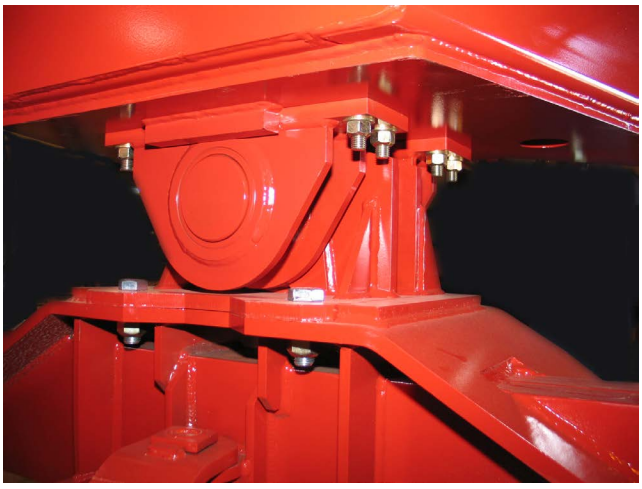
Important

Check wheel bearings for play every 5,000 acres (2,000 hectares) or yearly, which ever occurs first. Tighten as required.



Quad Steer

- Periodically check the 1 x 3 bolts, flatwashers and locknuts attaching the axle and pivot assembly. Torque **Grade 5** bolts to 590 lb-ft. (800 Nm)
- Periodically check the 3/4 x 3 bolts, flatwashers and locknuts attaching the axle and pivot assembly.
  Torque the 3/4 **Grade 5** bolts to 270 lb-ft. (366 Nm)
  Torque the 3/4 **Grade 8** bolts to 375 lb-ft. (508 Nm)
- Toe-in adjustment should be 1/16” to 1/8” maximum.
- Grease all fittings every 100 hours.



Important

Retorque wheel nuts to 450 lb-ft (610 Nm) after first fifteen minutes of operation and every fifteen minutes for the next 2 hours. Check periodically afterwards.

Dual Wheels

Below torques are for 520/85R38 and 800/65R32 tires.

- Torque wheel nuts as follows:
  - 3/4 wheel bolts to 450 lb-ft (610 Nm)
  - 7/8 wheel bolts to 525 lb-ft (712 Nm)
  - 22 mm wheel bolts to 500 lb-ft (678 Nm)

Dual Wheel Assembly

Important

Retorque wheel nuts after first fifteen minutes of operation and every fifteen minutes for the next 2 hours. Check periodically afterwards.

Dual Wheel 9800 and 91000 - 38 Rims

Rim Identification

There are two versions of 38 inch dual wheels used on the 9800 and 91000 Carts for the 800/70R38 and 850/80R38 tires

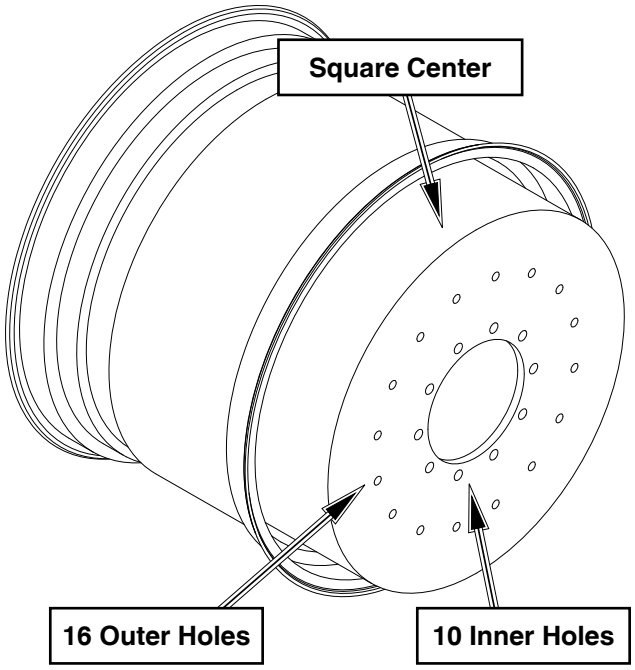
Titan Rim

Rim center is square with 10 inner holes and 16 outer holes.

These rims bolt directly to the 10 bolt hub and uses an inner and outer clamping plates on the outer 16 holes.

- Torque the M22 nuts to 500 lb-ft (678 Nm)
- Torque the M24 nuts to 800 lb-ft (1085 Nm)

See page 7-22 for details.



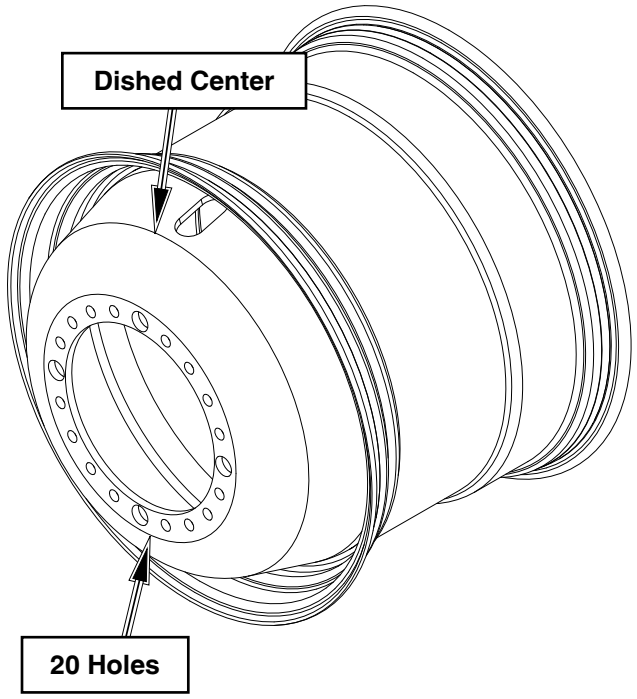
Moveero (GKN) Rim

Rim center is dished with 20 outer holes.

These rims incorporate a hub adapter with 10 inner holes and 20 outer holes to attach to the hub.

- Torque the M22 nuts to 500 lb-ft (678 Nm)
- Torque the M24 bolts to 590 lb-ft (800 Nm)

See page 7-24 for details.



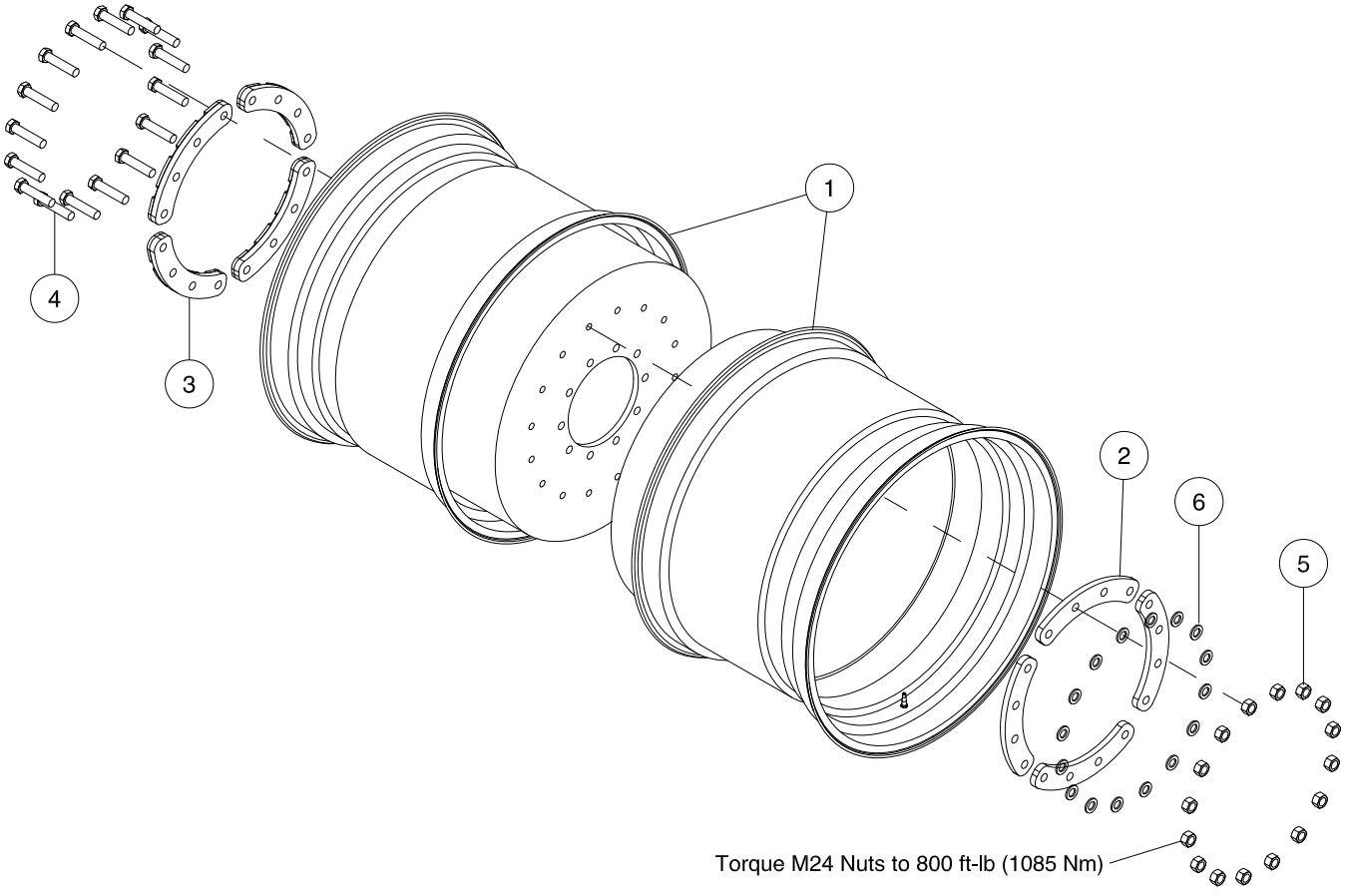
Dual Wheel 9800 and 91000 - 38 Rims - Continued

Titan Rim

The illustration below shows the components of the clamping plates, see following page for details on removing and installing tires.

⚠ Caution

Tire replacement should be done by trained personnel using the proper equipment. Tires are heavy and could fall as soon as the wheel nuts are removed.



Item	Part No.	Description	Qty
1	N69465	Rim - Dual - 28 x 38 Rim (10 inner bolts and 16 outer bolts)	2
2	N69613	Clamp Plate - Outer	4
3	N72184	Clamp Plate - Inner	1
4	N72187	Hex Bolt - M24-3.00 x 110 mm Lg Gr10.9	16
5	N72188	Hex Nut - M24-3.00 Gr10.9	4
6	N72189	Washer Hardened - M24 (25mm ID x 44mm OD x 4mm Thick)	16

Dual Wheel 9800 and 91000 - 38 Rims - Continued

Titan Rim - Continued

Removal and Installation

- Empty all product from air cart tanks.
- Park the air cart on a flat and level area of hard ground.
- Shut tractor off and remove key.
- Block all of the air cart tires to ensure the unit does not move.
- Loosen the wheel nuts while the air cart is still on the ground.
- Raise the air cart tires enough to clear the surface.
- Securely block air cart frame.
- Remove one clamping segment at a time from the outer 16 hole pattern. Remove the bolts and backing plates from inner rim.
- Position a dual wheel dolly to support both tires and block to prevent movement of the dolly.
- Remove the nuts from the inner 10 holes.
- Tires can now be removed slowly with the dolly.

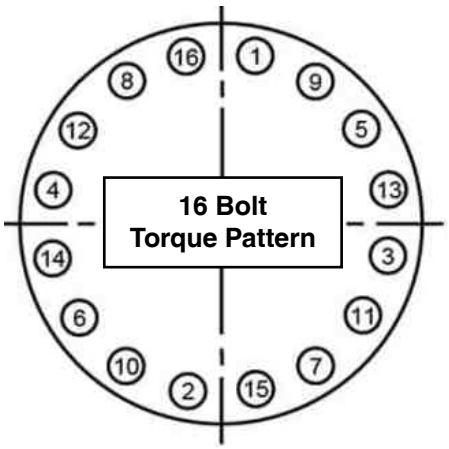
Reverse process to reinstall tires to cart.

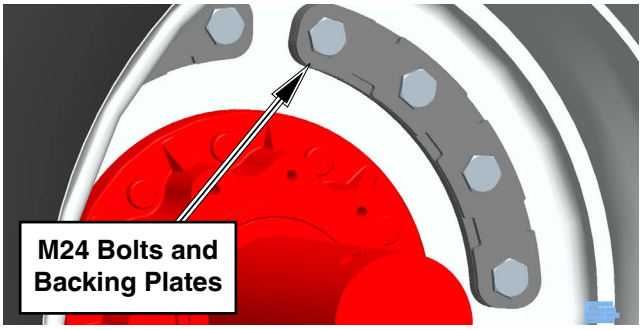
10 Bolt Hub Torque

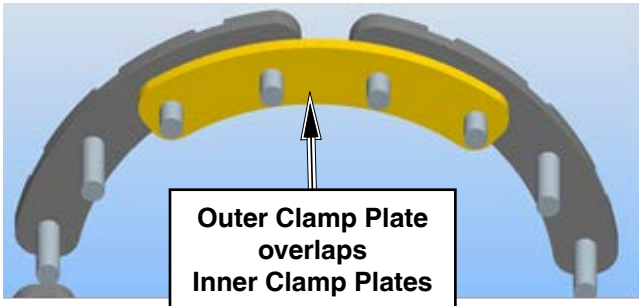
- Dry torque the M22 nuts to **500 lb-ft (678 Nm)** following the sequence in the illustration. A 4:1 torque multiplier is recommended for ease of operation. **(Do not use lubricant)**

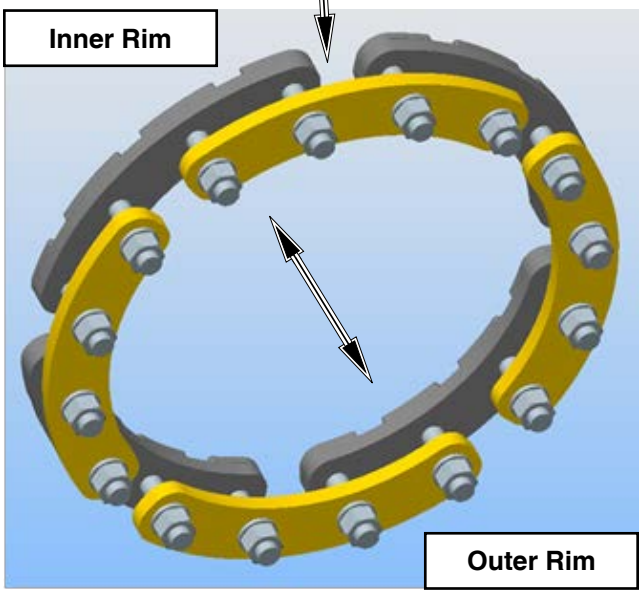
16 Bolt Torque

- Dry torque the M24 nuts to **800 lb-ft (1085 Nm)** following the sequence in the illustration. A 4:1 torque multiplier is recommended for ease of operation. **(Do not use lubricant)**









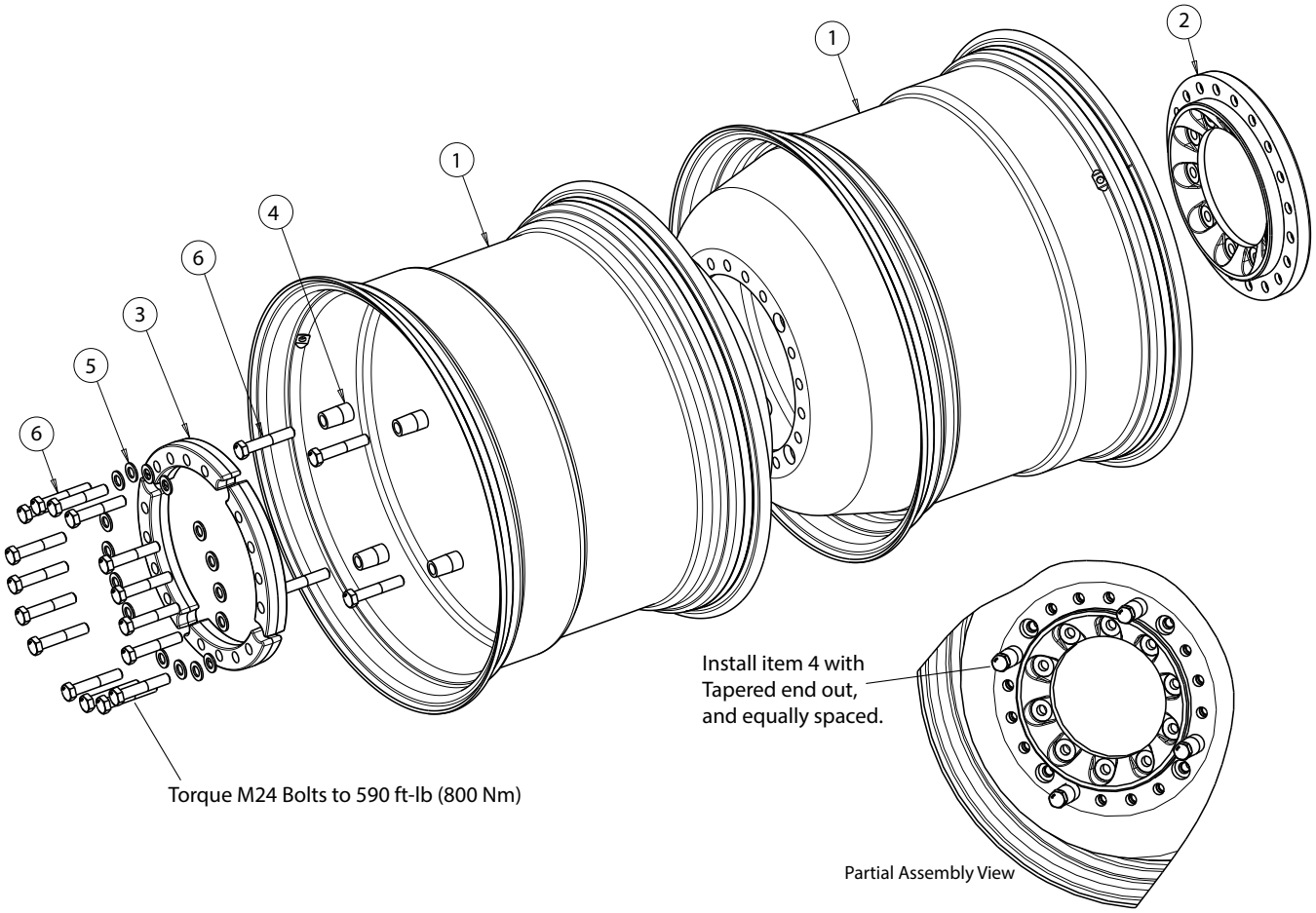
Dual Wheel 9800 and 91000 - 38 Rims - Continued

Moveero (GKN) Rim

The illustration below shows the components of the hub adapter, see following 3 pages for details on removing and installing tires.

⚠ Caution

Tire replacement should be done by trained personnel using the proper equipment. Tires are heavy and could fall as soon as the wheel nuts are removed.



Item	Part No.	Description	Qty
1	N71470	Dual Rim - 38 x DW27B - GKN - (20 bolts)	2
2	N71475	Dual Wheel Hub Adapter - GKN	1
3	N71473	Hub Adapter Spacer Segment - GKN	4
4	N71469	Hub Adapter Alignment Bushing - GKN	4
5	N71476	Washer M24 Hardened - GKN	16
6	N71471	Hex Bolt - M24-3.00 x 130 mm Lg Gr10.9 - GKN	20

Dual Wheel 9800 and 91000 - 38 Rims - Continued

Moveero (GKN) Rim - Continued

Removal and Installation

- Empty all product from air cart tanks.
- Park the air cart on a flat and level area of hard ground.
- Shut tractor off and remove key.
- Block all of the air cart tires to ensure the unit does not move.
- Loosen the wheel nuts while the air cart is still on the ground.
- Raise the air cart tires enough to clear the surface.
- Securely block air cart frame.
- Position dual dolly around wheel to be removed and block to prevent movement of the dolly
- Remove wheel from hub.

Outer Dual Tires:

Outer Dual removal:

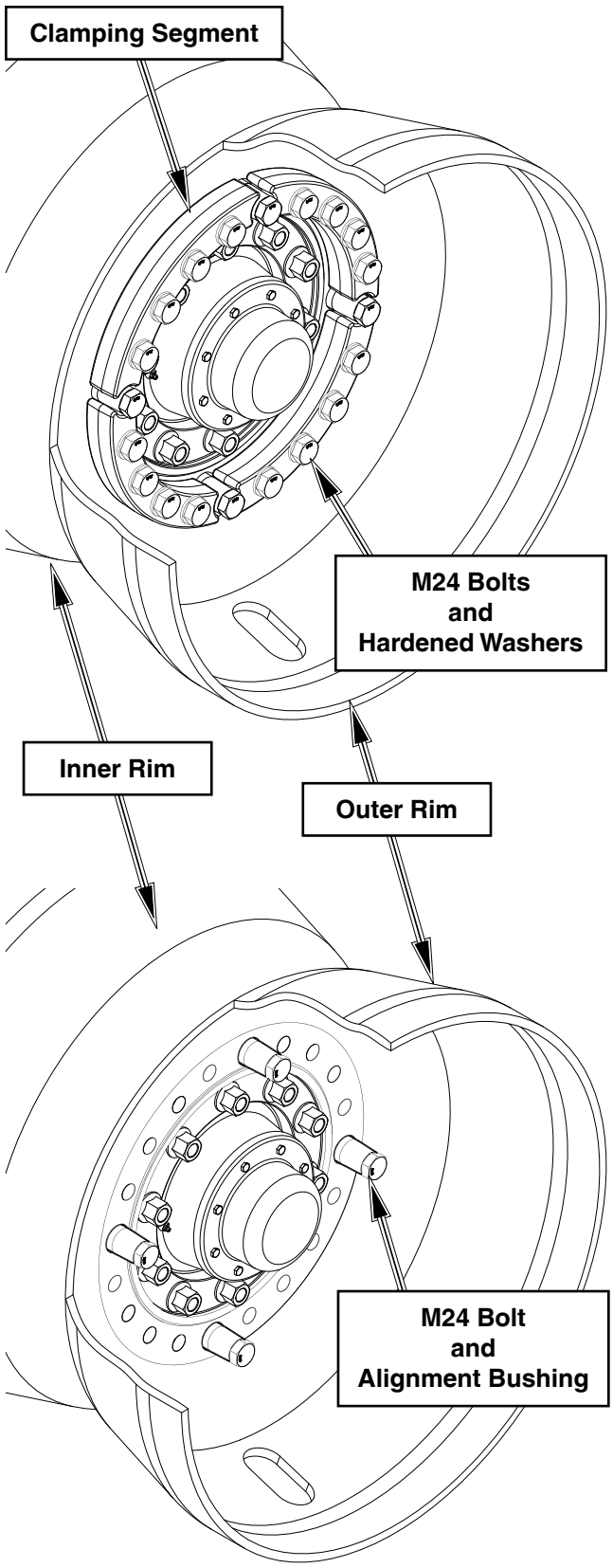
- Remove one clamping segment at a time, leaving the bolts with the alignment bushing in place located in the large holes in the rim.
- The alignment bushings will ensure the inner dual is held on when the outer dual is removed.
- With all four clamping segments removed the outer dual can slide off the alignment bushings.

Outer Dual installation:

- Position the larger holes in the outer dual over the alignment bushings and slide into position.
- Reinstall clamping segments with the hardened washers and M24 bolts.
- Torque the M24 Bolts to 590 lb-ft (800 Nm) See next page for torque sequence details.

⚠ Caution

Tire replacement should be done by trained personnel using the proper equipment. Tires are heavy and could fall as soon as the wheel nuts are removed.



Dual Wheel 9800 and 91000 - 38 Rims - Continued

Moveero (GKN) Rim - Continued

Inner Dual Tires:

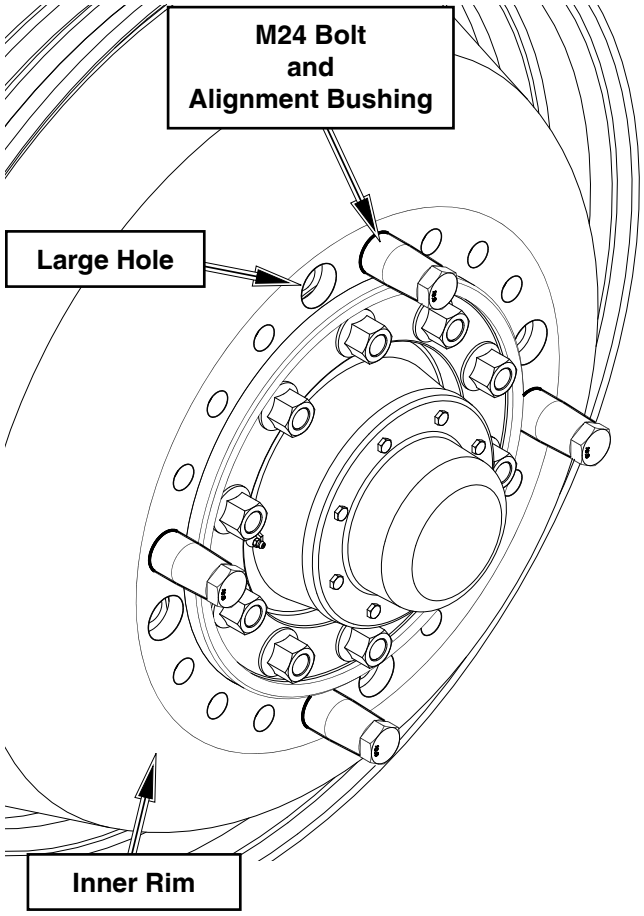
Inner Dual removal:

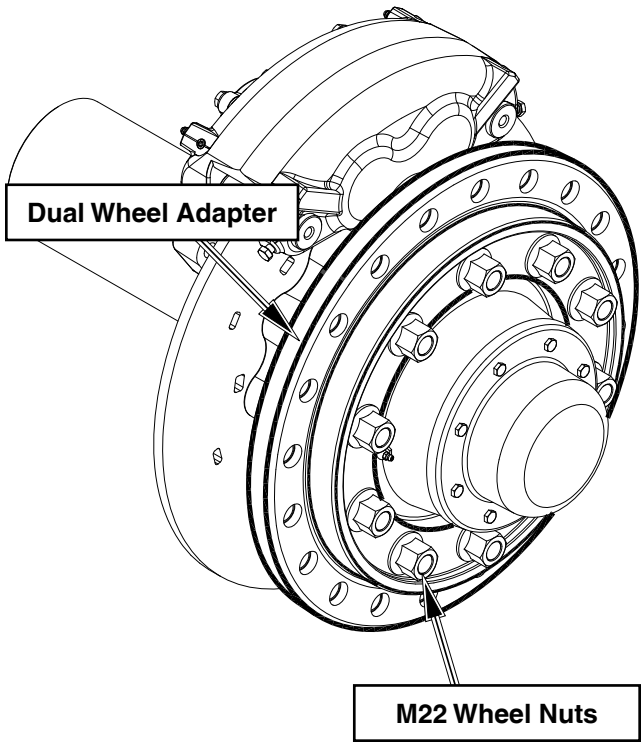
- Remove outer dual as outlined on previous page.
- Remove the M24 bolts and alignment bushings.
- Remove inner dual from dual wheel adapter.

Inner Dual installation:

Install the new dual using the following process:

- Position the inner dual on the lip of the adapter.
- Install the alignment bushings (tapered end out) with M24 bolts in the small holes clockwise of large holes.
- Install the outer dual tire as outlined on previous page.
- Position the larger holes in the outer dual over the alignment bushings and slide into position.
- Reinstall clamping segments with the hardened washers and M24 bolts.
- Torque the M24 Bolts to 590 lb-ft (800 Nm) See next page for torque sequence details.





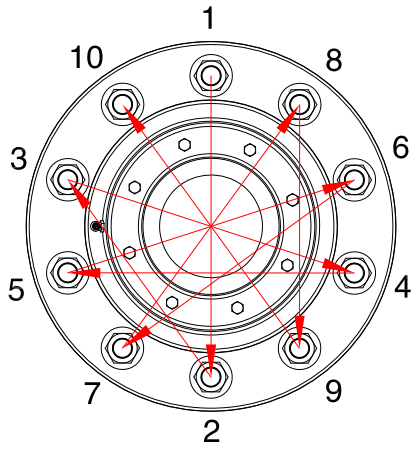
⚠ Caution

Tire replacement should be done by trained personnel using the proper equipment. Tires are heavy and could fall as soon as the wheel nuts are removed.

Dual Wheel 9800 and 91000 - 38 Rims - Continued

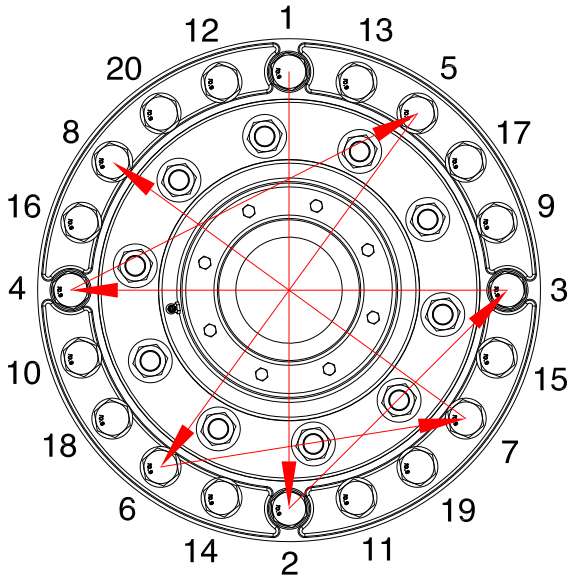
10 Bolt Torque Pattern

- Dry torque the M22 nuts to **500 lb-ft (678 Nm)** following the sequence in the illustration. A 4:1 torque multiplier is recommended for ease of operation. **(Do not use lubricant)**



20 Bolt Torque Pattern

- Dry torque the M24 Bolts to **590 lb-ft (800 Nm)** following the sequence in the illustration. A 4:1 torque multiplier is recommended for ease of operation. **(Do not use lubricant)**



Metering

The metering wheels come in 5 different sizes. Each wheel matches to a specific distribution head mounted on the seeding tool.

If the metering wheel and distribution head are not matched correctly, the distribution accuracy will be adversely affected.

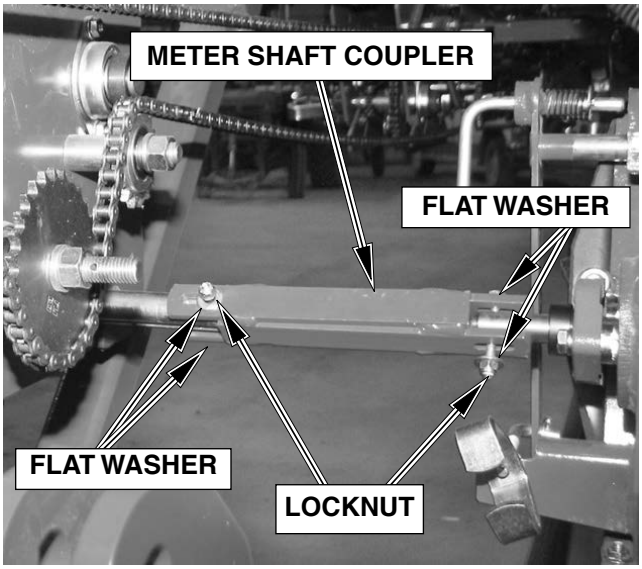
Spacer plates are used to take up the extra space in each metering cup. These spacer plates vary in size according to the size of the metering wheel.

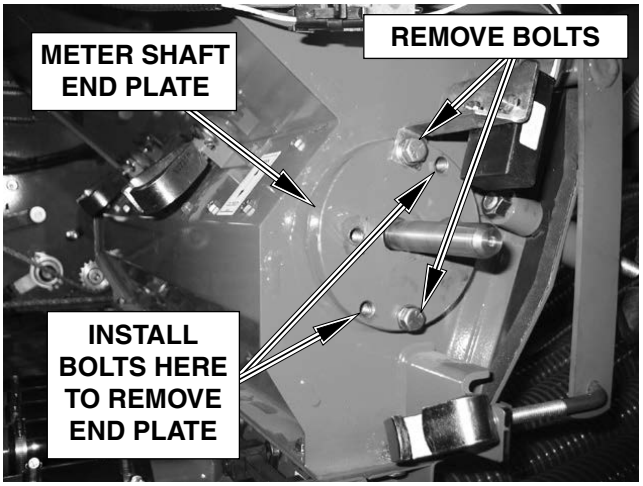
Metering Wheel Replacement

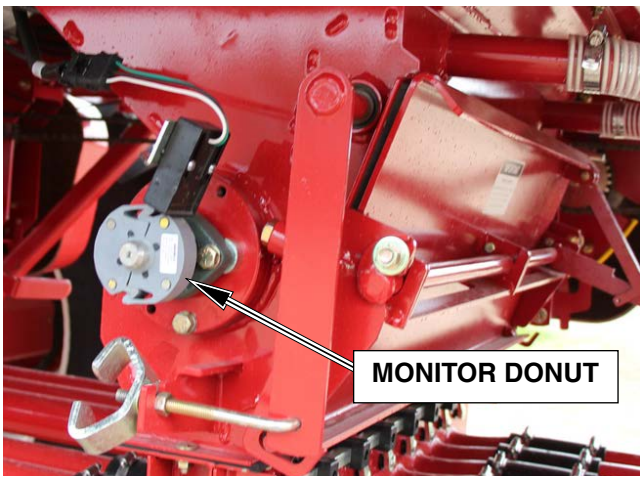
- Close tank Shut-Offs if there is product in tank.
- Remove inspection door and seed plate.
- Clean out any remaining material in the metering body and meterwheels.
- Remove all Blank Off plates.
- Remove the monitor donut and sensor mount from the right hand side of the metering body.
- Disconnect meter shaft coupler from the meter shaft and transmission drive shaft.
- Loosen the locking collars on **both** meter shaft bearings.
- Remove monitor donut and right hand metershaft bearing and spacers.
- Remove 3/8” bolts holding the meter shaft end plate on the right hand side and insert into threaded holes in end plate. Tighten down to pull end plate and remove.

Table 1

Divider Head	Metering Wheel		Spacer	
Outlets	**Number**	**Width**	**Qty**	**Width**
-	Blank Off	-	2	1 1/2” (38 mm)
7	7	1 3/4” (45 mm)	2	5/8” (16 mm)
8	8	2” (51 mm)	2	1/2” (13 mm)
9	9	2 1/4” (57 mm)	2	3/8” (9.5 mm)
10	10	2 1/2” (64 mm)	2	1/4” (6.4 mm)
11	11	2 3/4” (70 mm)	2	1/8” (3.2 mm)







Metering - Continued

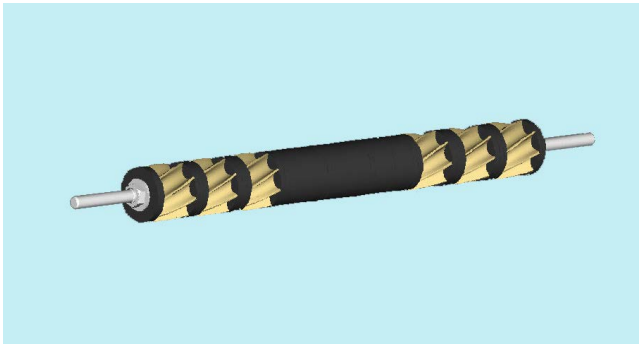
Remove the meter shaft from the right hand side.

Assembly Hint: Mark metering wheel size on the metering body. This will help in ensuring the correct order of metering shaft assembly.

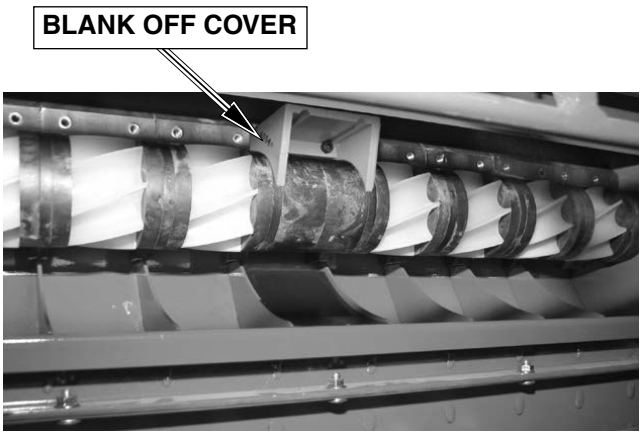
- Remove nut from meter shaft and disassemble wheels and spacers.
- Replace damaged wheels and reassemble shaft. Ensure correct spacers and wheels are located and assembled in the correct order. See diagram on next page. **Note:** After each meter wheel configuration, including any "Blank Offs", add one 5/16" (8 mm) spacer. The distance between the 5/16" (8 mm) spacers should be 3" (76.2 mm) if wheels are assembled correctly.
- Tighten nut on metering shaft until it bottoms out against the shoulder.
- Check if spacers and wheels are tight. If the wheels and spacers are loose, measure shim thickness required. If 1/16" (1.6 mm) shim is required remove nut on meter shaft and install shim between the 1/4" (6.4 mm) end spacer and the spacer used for the run.
- If a 1/8" (3.2 mm) shim is required then remove nut and install 1/16" (1.6 mm) shim between 1/4" (6.4 mm) end spacer and the spacer used for the run. Remove the snap ring at the opposite end of the shaft and install the other 1/16" (1.6 mm) spacer before the 1/4" (6.4 mm) end spacer.
- Reassemble shaft and tighten nut.
- Repeat last two steps above if necessary.
- Clean out any debris remaining in the meterbody.
- Check seed plate setting - **See "Seed Plate Adjustment"**
- Install 'O' Ring onto meter shaft end plate.

Note: Apply thin layer of lubricant on 'O' Ring.

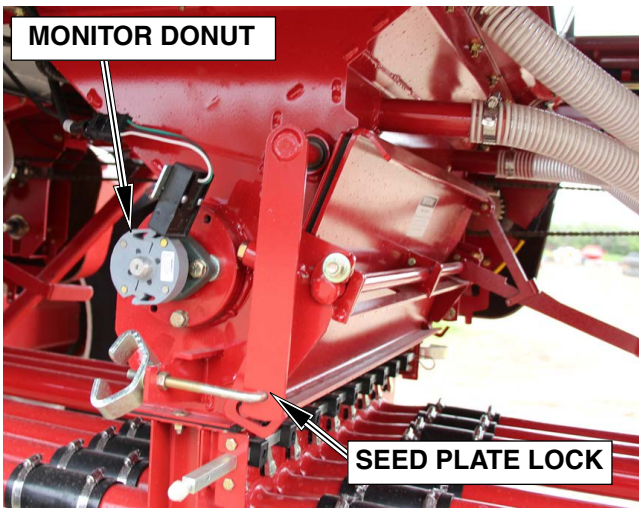
- Reinstall meter shaft assembly, snap ring end first into meter body.
- Install meter shaft end plate and monitor sensor bracket.
- Reinstall Blank Off plates. See "Blank Off Installation" for more details.
- Reinstall right hand side meter shaft bearing and spacers.
- Reinstall left hand side meter shaft bearing and spacers.



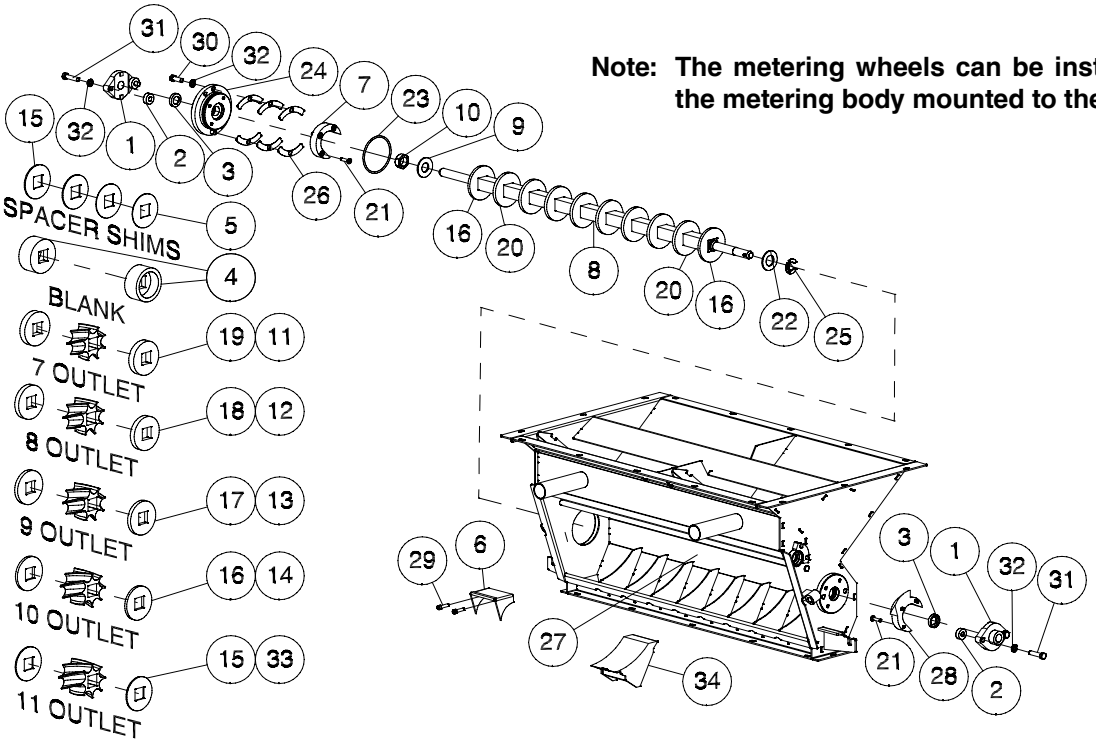
Meter shaft removed



Blank Off



Metering - Continued

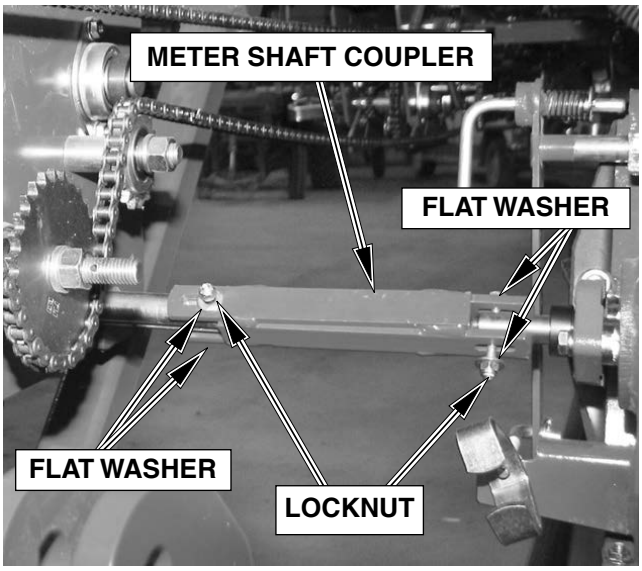


Note: The metering wheels can be installed with the metering body mounted to the air cart.

Item	Part No.	Description	Qty
1	N19269	Flange Bearing	2
2	N21602	Spacer - 13/32 ID x 1 OD x 3/8 Lg	4
3	N21659	Seal	2
4	N36106	Blank Wheel Spacer Half	2
5	N36110	Meter Wheel Spacer - 0.0625	As req
6	N42540	Blank Off - Plastic	As req
7	N36401	Spacer	1
8	N36430	Meter Shaft - 9 Wide	1
	N51775	Meter Shaft - 10 Wide	
9	N36431	Washer - 7/8 ID Stainless Steel	1
10	N36432	Locknut - 7/8 Nylon Insert	1
11	N36717	Meter Wheel - 7 Outlet	1
12	N36718	Meter Wheel - 8 Outlet	1
13	N36719	Meter Wheel - 9 Outlet	1
14	N36720	Meter Wheel - 10 Outlet	1
15	N36731	Meter Wheel Spacer - 0.125	As req
16	N36732	Meter Wheel Spacer - 0.25	4
17	N36733	Meter Wheel Spacer - 0.375	2
18	N36734	Meter Wheel Spacer - 0.5	2
19	N36735	Meter Wheel Spacer - 0.625	2
20	N36736	Meter Wheel Spacer - 0.313	8
21	N36738	Hex Socket Cap Screw - 1/4 x 1 Lg Stainless Steel	6
22	N36744	Washer - 1 ID Stainless Steel	1
23	N36748	O-Ring - 3.234 ID x 0.139 thick	1
24	N36774	End Plate	1
25	N36813	Retaining Ring - 1 Dia	1
26	N37210	Shim - Metering Body End Cap	As req
27	N40671	Metering Body - 9 Wide	1
	N51871	Metering Body - 10 Wide	
28	N40805	Spacer	1
29	N37339	Socket Head Capscrew - 1/4 x 1/2 Lg	2
30	W-475	Hex Bolt - 3/8 x 1 Lg	2
31	W-477	Hex Bolt - 3/8 x 1 1/2 Lg	4
32	W-523	Lockwasher - 3/8	6
33	N36721	Meter Wheel - 11 Outlet	1
34	N40980	Blank Off Plate	As.req

Metering - Continued

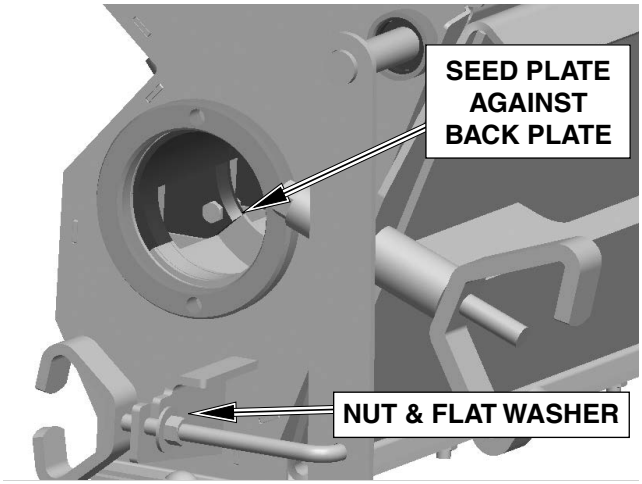
- Tighten locking collars by turning the collars in the direction of the shaft rotation. Lock the collar by tapping the collar with a punch in the direction of rotation of the shaft.
- Reinstall the monitor donut on shaft. Ensure donut is centred to pick-up. Set the gap between the pick-up and the donut at 0.030” (0.76 mm).
- Attach metershaft coupler over the metershaft and transmission drive shaft.
- Install the 1/4” x 2 1/4” special bolt with two flatwashers and locknuts. **Tighten locknuts to bottom of threads.**
- Install **Correct** seed plate for product being metered.



Seed Plate Adjustment

- **Remove** meter shaft from the meter body.
- Install the seed plate and adjust the seed plate locks so that the bottom of the seed plate comes against the bottom of the rear back plate. Tighten nuts so that the surface of the flatwashers are against the bracket.
- Remove the seed plate and set aside.
- Install meter shaft assembly, snap ring end first into meter body.
- Install ‘O’ Ring onto meter shaft end plate.

Note: Apply thin layer of lubricant on ‘O’ Ring.



Seed Plate Adjustment

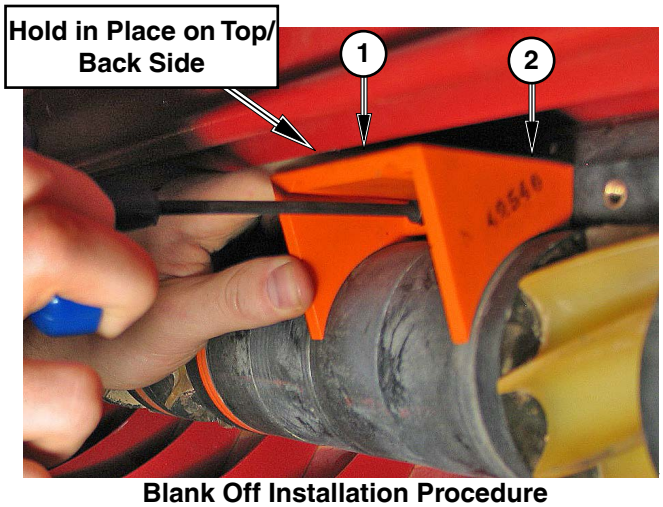
Metering - Continued

Blank Off Installation

Proper fit between the Blank Off and the spacer on the meter roller is important.

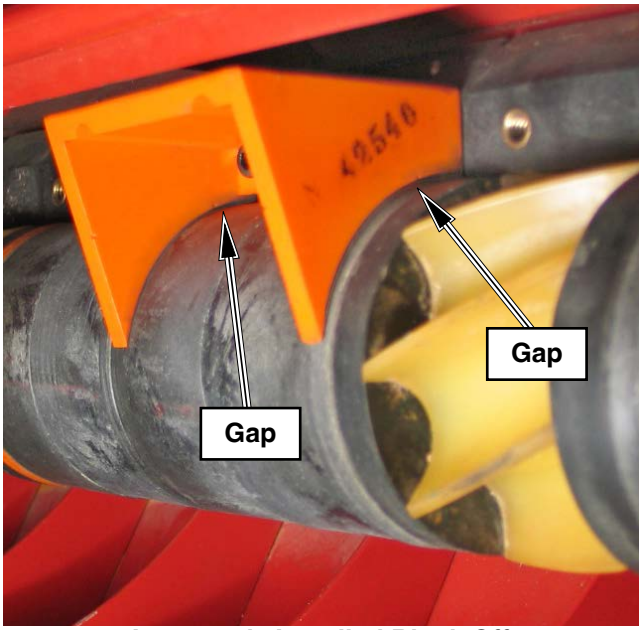
To ensure correct installation of the Blank Off follow the procedures listed below:

- Loosely install the Blank Off covers using (2) 1/4” Hex Socket bolts over the top of **all** the Blanked Off runs.
- Hold in place on top/back side of the Blank Off to align the radius with meter roller while tightening capscrews.
- Tighten capscrews starting with the left screw when facing body.



Blank Off Installation Procedure

Correctly Installed Blank Off



Incorrectly Installed Blank Off

Conveyor

Squaring One End of Belt

Lay a framing square along a straight edge of the belt to make a cut line on the back side of the belt. Cut belt along this line using a utility knife. If the belt has uneven edges, create an average centerline, and square off of this line. **A clean, straight, square cut is required for the belt to run true on the pulleys.**

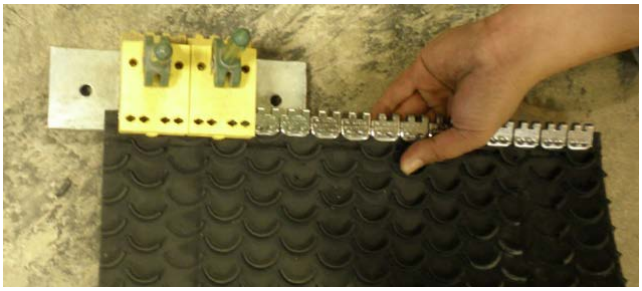
Squaring Belt

Installing Belt Splice

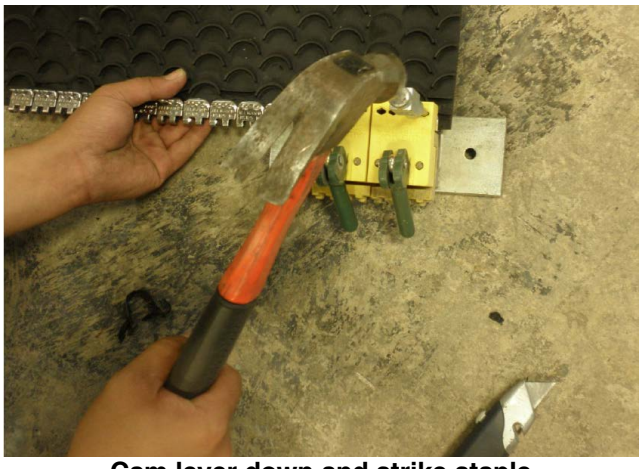
1. Center and press the fastener strip on the belt.
2. Press the Application Tool on the center of fastener strip with the cam lever in the “up” position.
3. Lower cam lever. Strike staple driver on each staple until staple clinches on Application Tool anvil.
4. Raise cam lever and move tool to outer edge of belt.
5. Clinch staples. Repeat until all staples are complete.

Continued on next page . . .

Centering strip on belt



Cam lever up



Cam lever down and strike staple

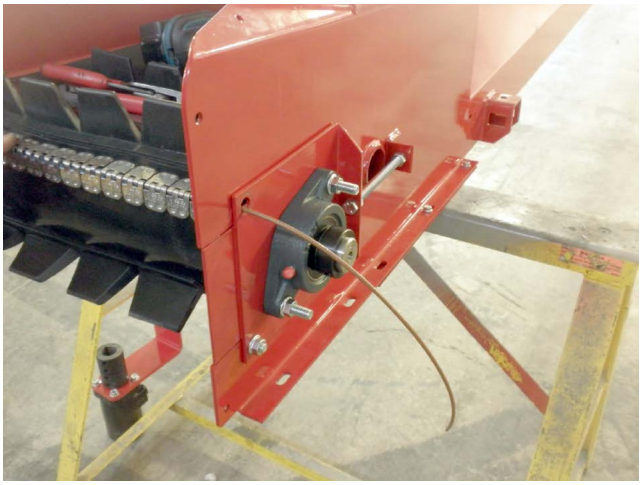
Conveyor - Continued

Installing Belt Splice - Continued

6. Place the splice over a piece of flat steel and clinch each staple with a hammer. Turn belt over and peen staple ends flush with surface of fastener strip.
7. Bend fastener strips until they break apart.
8. Follow the procedure above for installing the second belt splice.
9. Insert the hinge pin. Crimp the pin washers on the ends of the pin using pliers.
10. Tighten the belt tensioning bolts to 20-23 lb-ft. so that each side is adjusted equally.
11. Re-assemble the tail end Door Assembly.

Clinch staples

Bend fastener strips



Insert hinge pin

Crimp pin washers.

Conveyor - Continued

Installing Belt into the Conveyor

1. Remove the Tail End Door Assembly.
2. Slide a fish tape from the discharge end to the tail end of the conveyor. Pull a rope with a belt splice back through the conveyor. Fasten the conveyor belt to the rope splice, and pull the belt into the top of the con-veyor with the rope.
3. Using the fish tape, pull the bottom side of the belt through the conveyor. **Make sure the belt is free of extra twists before pulling it in.**
4. Check to see that the idler is all the way forward (toward the drive end).
5. Pull the belt up tight at the discharge end and cut off the excess length so that there is 1/2” of overlap after the end is squared.

Remove tail

Idler forward

Conveyor - Continued

Tracking the Belt

1. Basic rule: ***the belt moves toward the end of the roller that it contacts first.***
2. Rollers must be square with the housing and parallel to each other.
3. Belt tension must be great enough to prevent slippage. Tension to 20-23 lb-ft. on adjustment bolts

CAUTION: Make sure everyone is clear of machine before running.

4. Run the conveyor. Check to see that the belt runs centered on the drive roller. Turn off the machine. Adjust drive roller if necessary.

WARNING: Do not run the machine while adjusting. Failure to heed may result in personal injury or death.

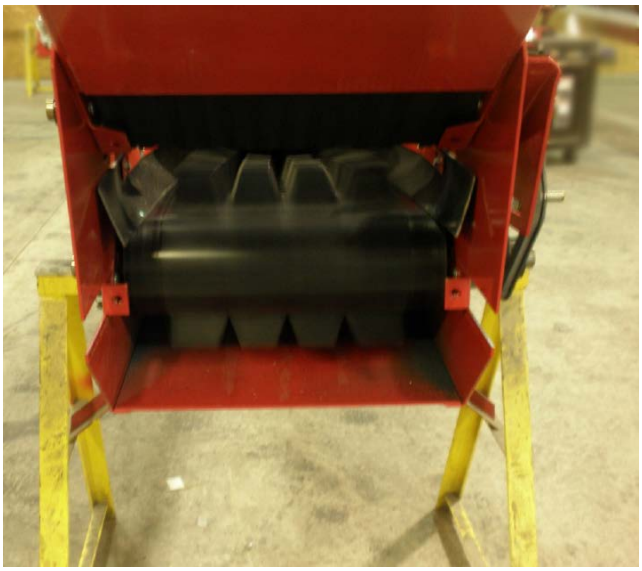
5. To adjust drive roller, loosen the four nuts on the bearing holder plate, and the jam nut on the threaded adjuster. Retighten after adjusting is complete.

CAUTION: Make sure everyone is clear of machine before running.

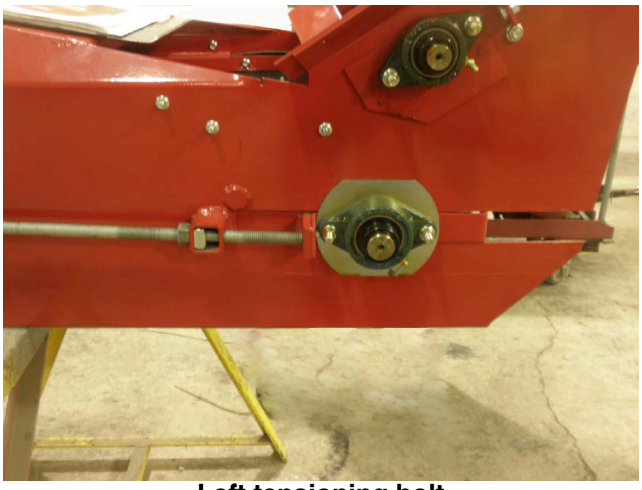
6. Run the machine for two minutes. Make sure belt runs centered on drive pulley.
7. Open the Tail End Door to view the idler.
8. Run the machine. Check to see that the belt is running centered on the idler roller. Turn the machine off.

WARNING: Do not run the machine while adjusting. Failure to heed may result in personal injury or death.

9. If adjustment is necessary, adjust the tensioning bolts on the idler housing to 20-23 lb-ft torque.
10. Check adjustment by running the machine. Make sure belt runs centered on idler pulley. The clearance between the belt and the housing should be the same on both sides.
11. Close the Tail End Door when complete.



Open tail and center belt on rollers



Left tensioning bolt

Right tensioning bolt

Conveyor - Continued

Conveyor Belt Adjustment

Belt tension and tracking will need periodic adjustment. Follow the guidelines under “Tracking the Belt” to make adjustments.

Important

Belt Alignment and Belt Tension shold be checked periodically.

Belt damage will occur if alignment or tension has not been maintained.

Belt tension should be 23 lb-ft of torque on adjustment bolts.

Belt should be tracked to be centere on the idle and drive roller.

Bearings

All drive shafts are supported by self-aligning, sealed ball bearings which have been packed at the factory and require no further lubrication. There is no adjustment to be made to the bearings, but check that the retainers are firmly fastened to the bearing stand. Also check that the setscrews in the lock collars are tight against the drive shaft.

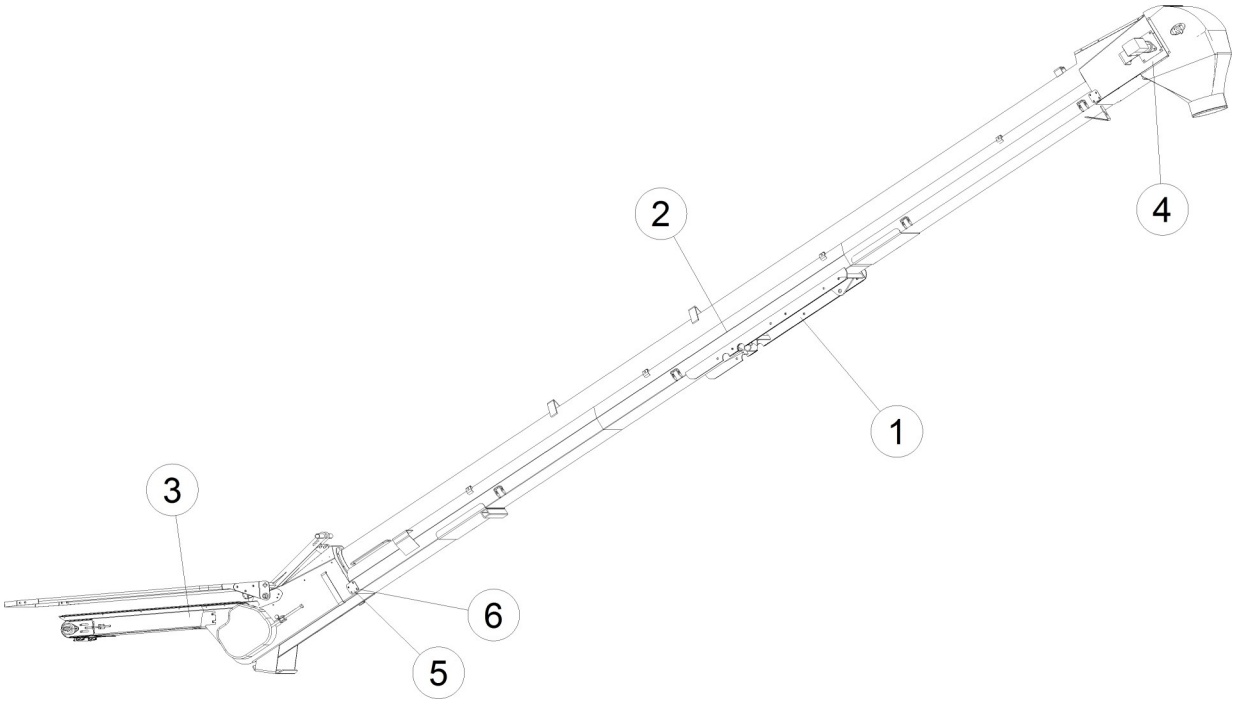
Conveyor Belt Care

It is recommended that the conveyor belt be washed off and the tail end be cleaned out at the end of the season. This will help prevent material residue from building up and causing damage to the belt.

Conveyor - Continued

Conveyor Assembly

25 foot Conveyor shown

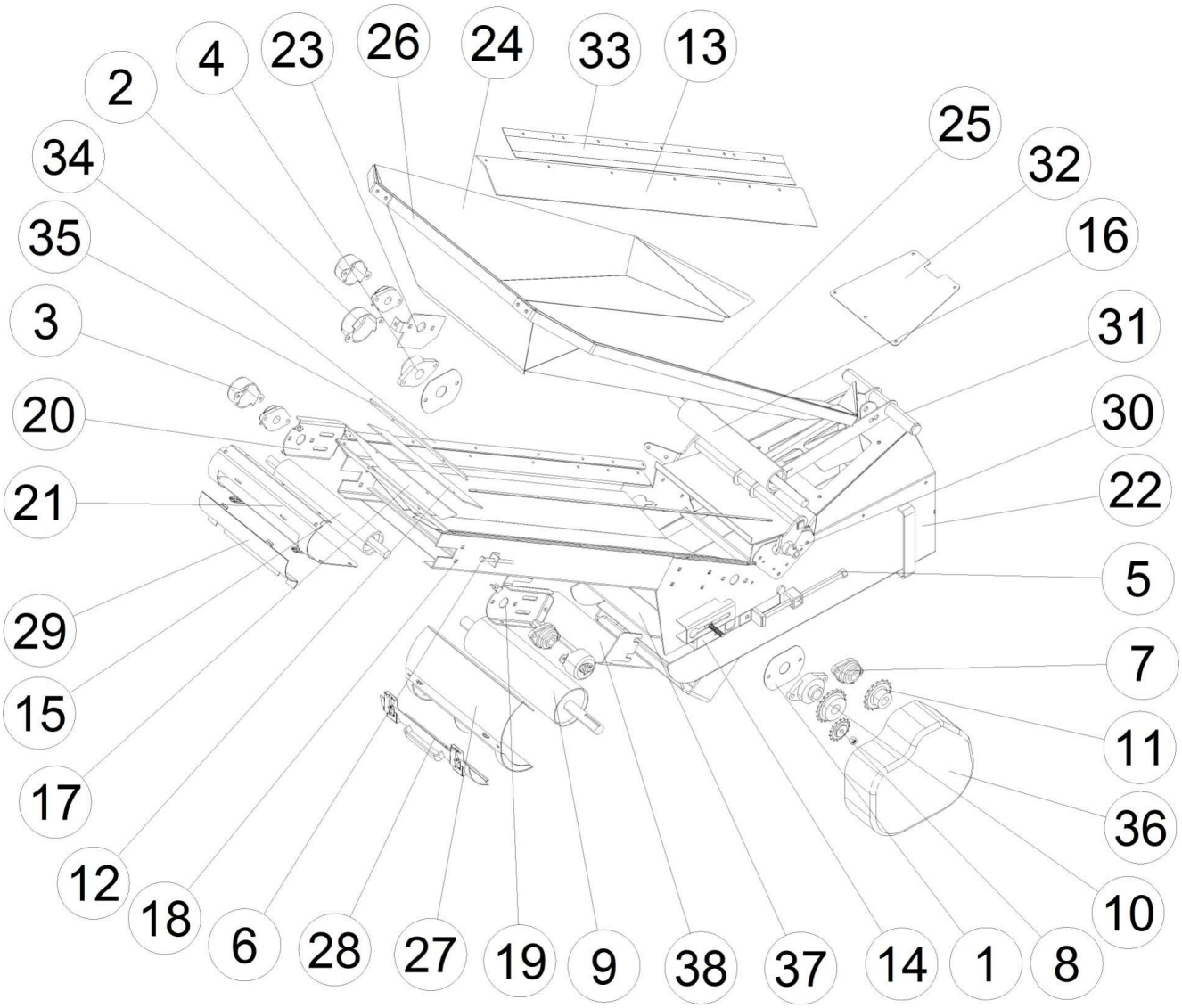


Item	Part No.	Description	Qty
1	81079-00-MR	Carrying Rack	1
2	81080-00-MR	Tube Assembly - 25’	1
3	81081-00	Lower End Group	1
4	81082-00	Upper End Group	1
5	81091-01-MR	Plate - Connector	4
6	81092-01-MR	Plate - Spacer	2
		Items Not Shown	
	N62349	Belt, Rubber Cleated - 16 x 51 ft 4 inches - for 25’ conveyor - 24550-30	1
	N53224	Belt Splice Kit - 16 Cleated Belt - 24387-15	1
	N58827	Splice Pin - 16 Belts - 24121-75	1
	81011-02	Canvas	1

Conveyor - Continued

Lower End Group

23 foot Conveyor



For 23 Serial Number 16188 and Higher

Conveyor - Continued

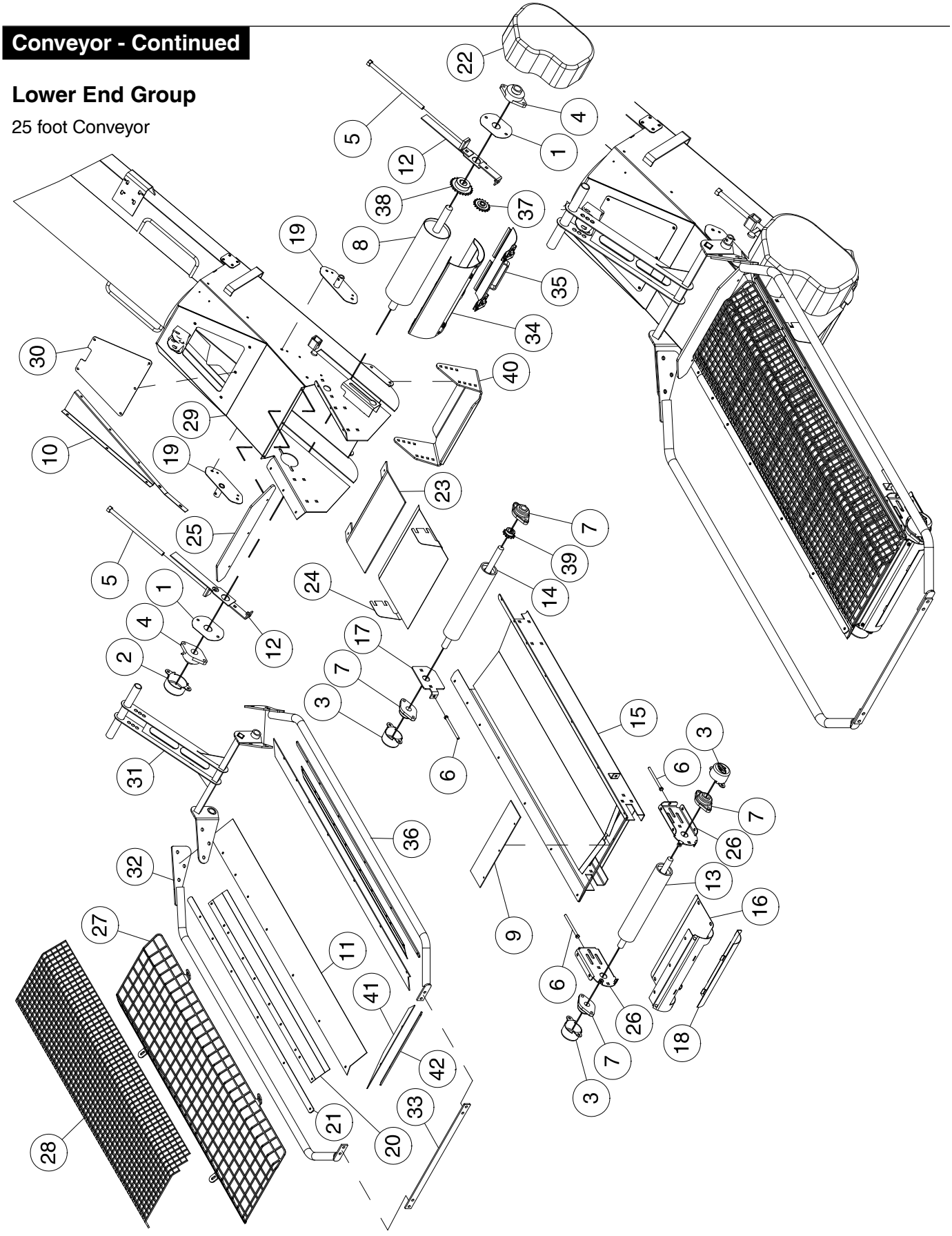
Lower End Group - 23 foot - Continued

Item	Part No.	Description	Qty
1	N60646	Bearing Plate - 20048-01	2
2	N58844	Cover - 1 1/4” Bearing - 23150-02	1
3	N58842	Cover - 1” Bearing - 23150-04	2
4	N49488	Bearing - Flange - 1 1/4” (J-Day T-62G) - 24112-01	2
5	N55874	Screw - Tensioning (5/8) - 24115-01	3
6	24208-01	Tap Bolt - 3/8 x 5 Lg	3
7	N49486	Bearing - Flange - 1” - 24336-01	4
8	N49483	Sprocket, Idler - 50/15 - 24396-01	1
9	N56132	Drum Assembly - 5” - 24440-01	1
10	N56735	Sprocket - 50/25 - 24491-05	1
11	N56736	Sprocket - 50/13 - 24397-02	1
12	N49480	Tail Flap - Lower - 28351-01	1
13	N55892	Flap Hopper Side - 45432-05	2
14	N60649	Bracket Assembly - Lower Bearing - 46007-00-MR	2
15	N56133	Drum Assembly - 3” Idler - 47514-00	1
16	N56134	Drum Assembly - 3” Lagged - 47523-00	1
17	N49476	Flap Hopper - Back - 47640-01	1
18	81003-00-MR	Frame AS.	1
19	81005-00-MR	Bearing Slide	1
20	81006-00-MR	Bearing Slide	1
21	N62090	Rear Cover - Stainless - 81007-80 (for 23' SN 16188 and above)	1
22	81009-00-MR	Transition Assembly - Lower	1
23	81010-01-MR	Bearing Bracket	1
24	N55895	Canvas - 81011-01	1
25	N56091	Hopper Bar - Sides - 81095-00-MR	2
26	N64001	Hopper Strap - Back - 81012-02-MR	1
27	81015-00-MR	Cover - Rear	1
28	N55896	Door - Rear - 81016-00-MR	1
29	N55897	Rear Door - Inlet - 81017-00-MR	1
30	81018-00-MR	Handle Pivot	1
31	N64235	Hopper Handle - 81019-00-MR	1
32	81021-01-MR	Cover - Transition	1
33	81022-81-MR	Hold Down Flap	2
34	N64083	Strap Side - 81023-01-MR	2
35	N64084	Strap End - 81023-02-MR	1
36	81026-01	Guard Chain	1
37	N55889	Flow Guard - 81027-01	1
38	81028-01-MR	Flowguard Flap Support	1
		Items Not Shown	
	N56105	Belt-Crescent Cup - 16 x 112 Lg - 24121-92 (for 23' SN 16188 and above)	1
	N49469	Belt Splice Kit - 24387-16 (Kit can be used with either belt as it only includes lacing parts)	1
	N64090	Belt Splice Tool - 24387-01	
	N53224	Cleated Belt Splice Kit - Includes 24" cleated belt, splices, wire cable, crimp washers	
	24398-03	Link Connecting #50 Heavy	1
	24356-01	Key - 1” Shaft	2
	24492-03	Hitch Pin - 1/2 x 4 Lg	1
	N49477	Cleated Belt Seal Flap - Left Low - 46105-01	1
	N49478	Cleated Belt Seal Flap - Right Low - 46105-02	1
	N49476	Rear Hopper Belt Seal - 47640-01	1
	81027-01	Flowgaurd	1
	81029-01	Flap	1
	N60938	Collapsable Hopper Cover - Fits Collapsible Hopper serial #16188 and Higher	1
	N62290	Collapsable Hopper Cover Kit - Fits Collapsible Hopper serial #16188 and Higher	1

Conveyor - Continued

Lower End Group

25 foot Conveyor



Conveyor - Continued

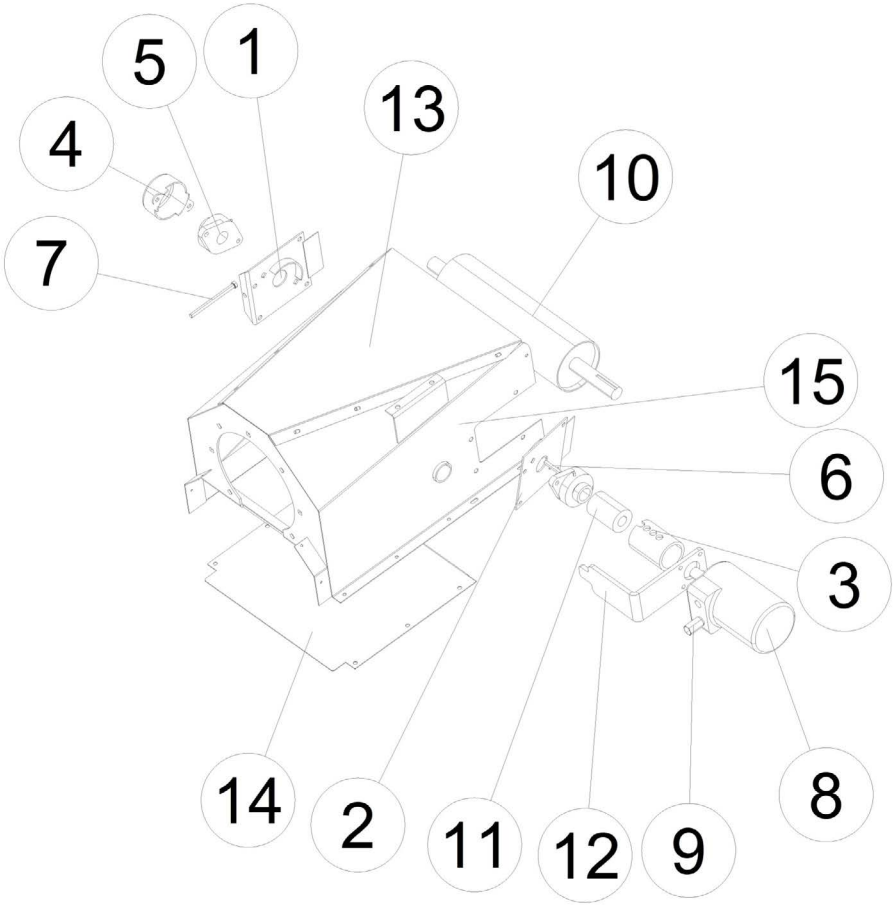
Lower End Group - 25 foot - Continued

Item	Part No.	Description	Qty
1	N60646	Bearing Plate - 20048-01	2
2	N58844	Cover - 1 1/4" Bearing - 23150-02	1
3	N58842	Cover - 1" Bearing - 23150-04	3
4	N49488	Bearing Flange - 24112-01	2
5	N55874	Tensioning Screw - 5/8 - 24115-01	2
6	24208-01	Tap Bolt - 3/8 x 5	3
7	N49586	Bearing Holder - 24336-01	4
8	N56132	Drum 5" - 1 1/4" Shaft Lagged - 24440-01	1
9	N49480	Lower Tail Flap - 28351-01	1
10	N60617	Flap Bracket - Left (Shown) - 45425-01-MR	1
	N60618	Flap Bracket - Right (Not Shown) - 45425-02-MR	1
11	N55892	Flap Hopper Side - 45432-05	2
12	N60649	Lower Braket Assembly - 46007-00-MR	2
13	N56133	Idler Roller Assembly - 47514-00	1
14	N56134	Drive Roller Assembly - 47523-00	1
15	81003-00-MR	Frame Assembly	1
16	N62090	Feed Belt Door Frame - 81007-80	1
17	81010-01-MR	Bearing Bracket	1
18	N55897	Rear Door Inlet - 81017-80	1
19	81018-00-MR	Handle Pivot	2
20	81022-81	Hold Down	2
21	N64083	Side Strap - 81023-01-MR	2
22	81026-01-MR	Chain Guard	1
23	N55889	Flowguard Flap - 81027-01	1
24	81028-01-MR	Flowguard Flap Support	1
25	N55891	Rubber Flap - 81029-01	1
26	81030-00-MR	Lower Bearing Bracket	2
27	N60615	Hopper Screen - 81034-00-MR	1
28	N60620	Hopper Screen Fine - 81063-01-MR	1
29	81083-00-MR	Lower Transition Assembly	1
30	81084-00-MR	Transition Cover	1
31	81086-00-MR	Hopper Handle	1
32	N60645	Hopper Side Rail Right - 81087-00-MR	1
33	N64085	Back Hopper Strap - 81088-01-MR	1
34	81089-00	Rear Cover	1
35	81090-00	Rear Door	1
36	N60644	Hopper Side Rail Left - 81093-00-MR	1
37	N49483	Idler Sprocket - #50-15 - 24396-01	1
38	N56735	Sprocket - 50-25T - 24491-05	1
39	N56736	Sprocket - 50-13T - 24397-02	1
40	N58843	Tail Rest	1
41	N49476	Flap Hopper Back - 47640-01	1
42	N64084	End Strap - 81023-02-MR	1
		Items Not Shown	
	N60642	Canvas - Hopper W/3 Hole Side Rails - 81011-04	1
	N62290	Hopper Cover Kit	1
	N49477	Flap - 10" Left Side - 46105-01	1
	N49478	Flap - 10" Right Side - 46105-02	1
	24356-01	Key - 1/4"	2
	N56105	Belt, 16 Rub Cresct, Skd 9' 4" - 24121-92	1
	N49469	Belt Splice Kit - Lacing Parts Only - 24387-16	1
	N64090	Belt Splice Tool - 24387-01	
	N58827	Splice Pin 16" Belts - 24121-75	1
	24492-03	Hitch Pin	1
	24398-01	Heavy Roller Chain - #50	1
	24253-01	Hinge	1
	24254-01	Rubber Handled Draw Latch	1
	82024-01	Backer Hinge Plate	1

Conveyor - Continued

Upper End Group

23 foot Conveyor

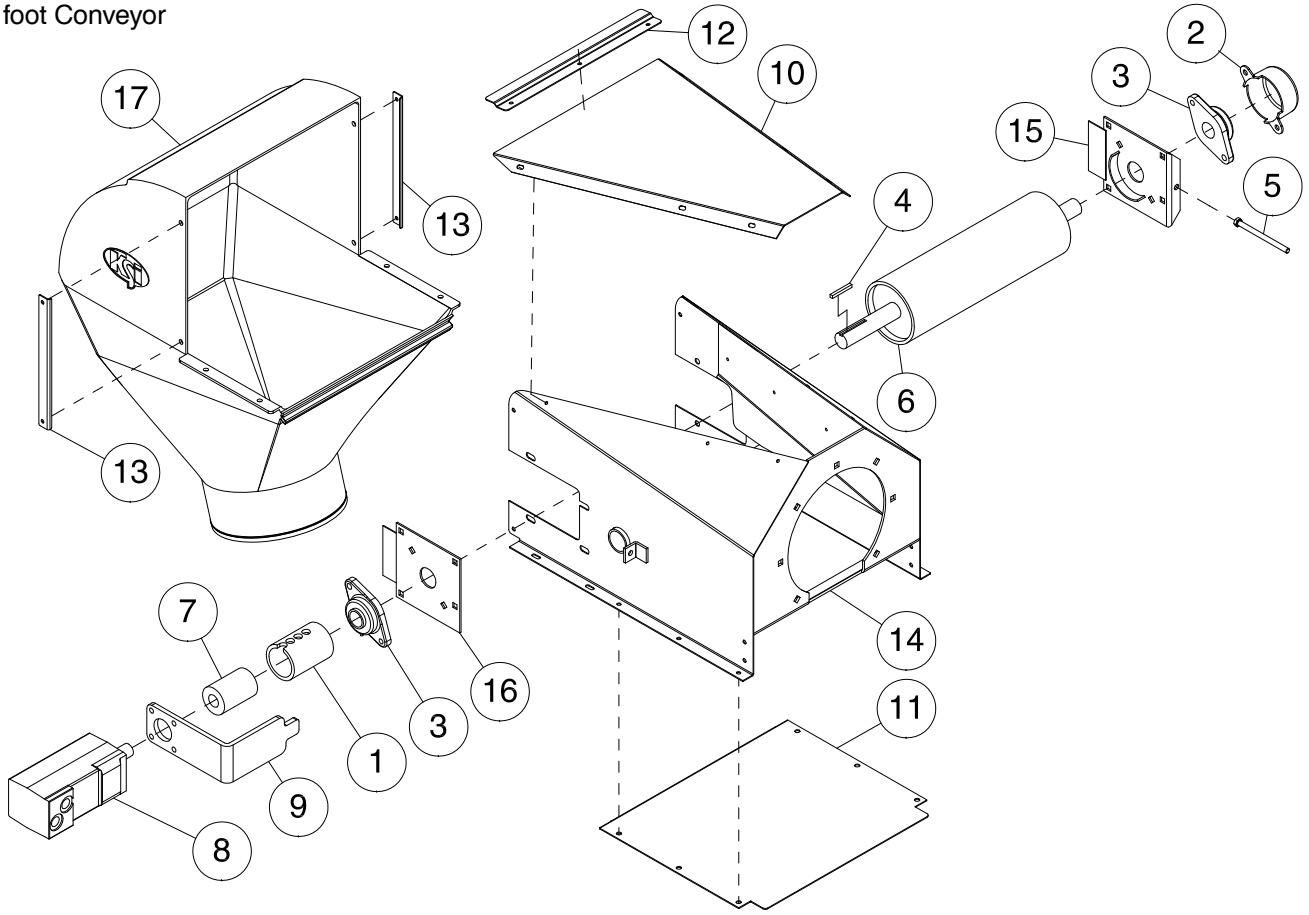


Item	Part No.	Description	Qty
1	N60801	Plate Assembly - Bearing - Left - 20012-00	1
2	N60802	Plate Assembly - Bearing - Right - 20013-00	1
3	N53682	Tube - Shaft Guard - 20077-03	1
4	N58844	Bearing Cover - 1 1/4” Bearing - 23150-02	1
5	N49488	Bearing - Flange - 1 1/4” - 24112-01	2
6	24177-01	Key - 1 1/4” Shaft	1
7	N62327	Tap Bolt - 3/8 x 5 - 24208-01	1
8	N58845	Hydraulic Motor - 7.7 cu. in. - 24495-CaseDrain (Seal Kit - N55718)	1
9	N53729	Check Valve - ORB - 24369-02	1
10	N56132	Drum Assembly - 5” - 24440-01	1
11	N53683	Coupler - 24473-03	1
12	45076-01	Motor Mount - Hydraulic	1
13	N60806	Cover - Top - 46014-01	1
14	N60616	Cover - Bottom - 46034-01	1
15	81014-00	Upper Housing	1

Conveyor - Continued

Upper End Group

25 foot Conveyor



Item	Part No.	Description	Qty
1	N53682	Tube - Shaft Guard - 20077-03	1
2	N58844	Plastic Cover - 1-1/4" Bearing - 23150-02	1
3	N49488	Flange Bearing - 1-1/4" - 24112-01	2
4	24177-01	Key - 1 1/4 Shaft	1
5	N62327	Tap Bolt - 3/8 x 5 - 24208-01	1
6	N56132	Drum Assembly (5"), Lagged - 24440-01	1
7	N53683	Coupler - 24473-03	1
8	N58845	Hydraulic Motor - 7.7 cu. in. - 24495-CaseDrain (Seal Kit - N55718)	1
9	45076-01-MR	Motor Mount (Hyd)	1
10	N60806	Top Cover Panel - 46014-01-MR	1
11	N60616	Top Transition Bottom Cover - 46034-01-MR	1
12	N56129	Hold Down Strap Top - 81024-01-MR	1
13	N56131	Hold Down Strap Side - 81024-02-MR	2
14	81085-00-MR	Head Assembly	1
15	82213-00-MR	Plate, Bearing, Left	1
16	82214-00-MR	Plate, Bearing, Right	1
17	N53679	Moulded Conveyor Spout - 10" - 85074-01	1
	N53729	Hydraulic Check Valve - SAE10 Thread - 24369-02 (Not Shown)	1
	24574-02	Hydraulic Plug - Oring (Not Shown)	1

Brakes

Periodic Inspection should be made of the electrical connecter, wiring, brake lines and hose for the entire brake system to insure there are no abraded or bare wires, damaged steel lines, or cracked and damaged hoses. During inspection assure there are no loose or “hanging” lines or wire that might drag or catch on objects/debris while being towed.

Fill Reservoir

There are two filler caps on the reservoir, either may be used for filling and checking fluid level as they both enter a common reservoir. Use caution when removing a filler cap to prevent the admission of dirt and/or contaminants into the fluid reservoir.

Check the fluid level in the reservoir. The fluid level must be maintained within 3/8 to 1/2 inch below the filler opening. If brake fluid is needed add only **NEW, CLEAN, DOT III BRAKE FLUID.**

Never reuse brake fluid that has been salvaged or removed from another system. Contaminated or dirty brake fluid may cause damage to the system resulting in system failure.

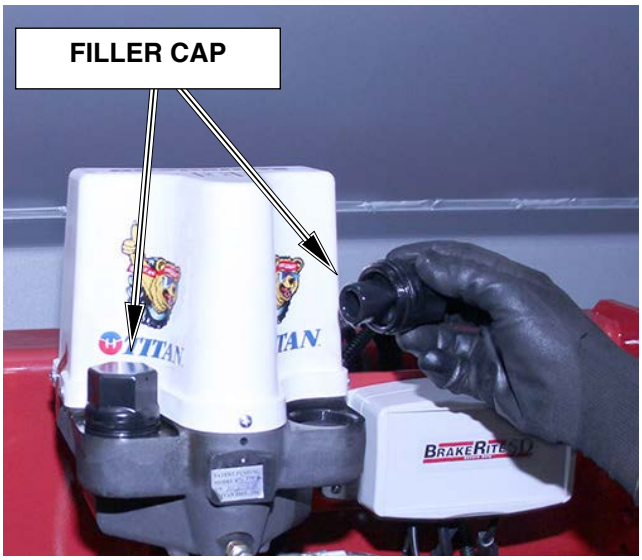
Bleeding the Brakes

It is essential to remove all air from the brakes and brake-lines prior to operation of the Air Cart. Operate unit with tractor brakes or manual override on Controller. Each Caliper has two (2) bleeder screws, each one should be bleed until fluid is free of air bubbles. Starting with the right brake open bleeder screw #1 and allow it to remain open until seeing brake fluid free of air bubbles coming out of the bleeder screw. Close the bleeder screw and move to the second bleeder screw repeating process. Repeat process for left brake.

While performing the bleeding process monitor the fluid level in the reservoir so that more air is not pumped into the brake lines because of low fluid level.

To prevent spilling brake fluid on the ground one end of a length of plastic tubing should be placed over the end of the bleeder screw and the other end should be placed into a container so that the fluid flow can be monitored for bubbles.

Note: Final stage of brake bleeding must be performed with tractor running to achieve full voltage/amps at BrakeRite pump. Unit will not generate maximum pressure otherwise.

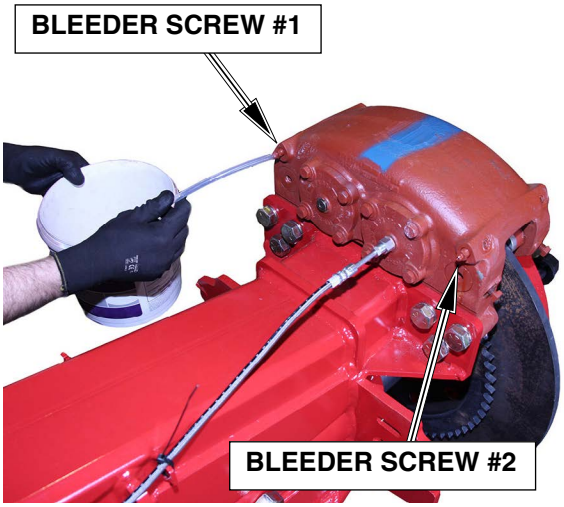


Important:

Use only DOT III brake fluid.

Maintain fluid level within 3/8 to 1/2 inch below the filler opening.

Use caution when removing the filler cap to prevent contaminants entering into the fluid reservoir.



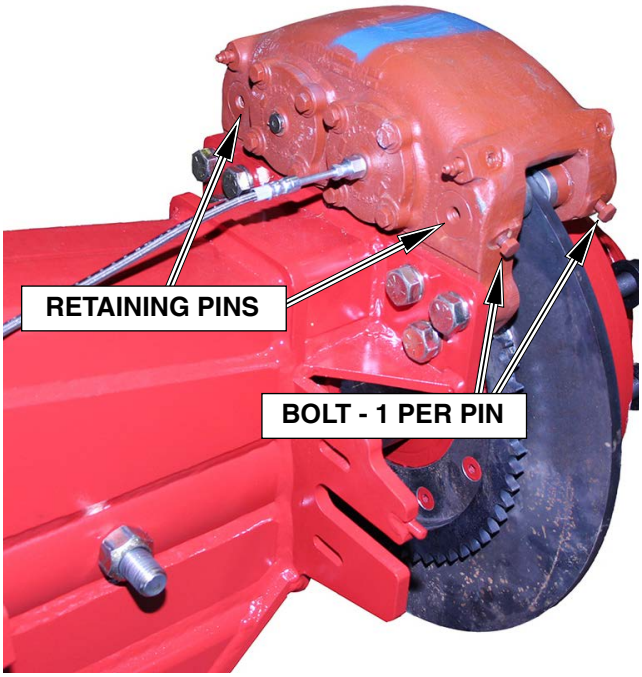
Brakes - Continued

Brake Pads

- Check brake pads for wear. If the thickness of the brake pad is 1/8” or less it is recommended to replace the brake pads.

To replace the brake pads use procedure below:

- Remove the wheels to gain adequate access to the calipers.
- Remove the bolt from each retaining pin.
- Slide the brake pad retaining pins out of the caliper and remove the brake pads.
- Install new brake pads and install retaining pins.
- Secure each retaining pins with bolt.



Caliper Pistons and Seal Replacement

- Remove the wheels to gain access to the calipers.
- Remove brake line and mounting bolts.
- Remove worn brake pads.
- Follow instructions in seal kit for piston removal and seal installation.
- Install new brake pads.
- Mount caliper to mounting plate and attach brake line.
- Bleed brakes.

Battery

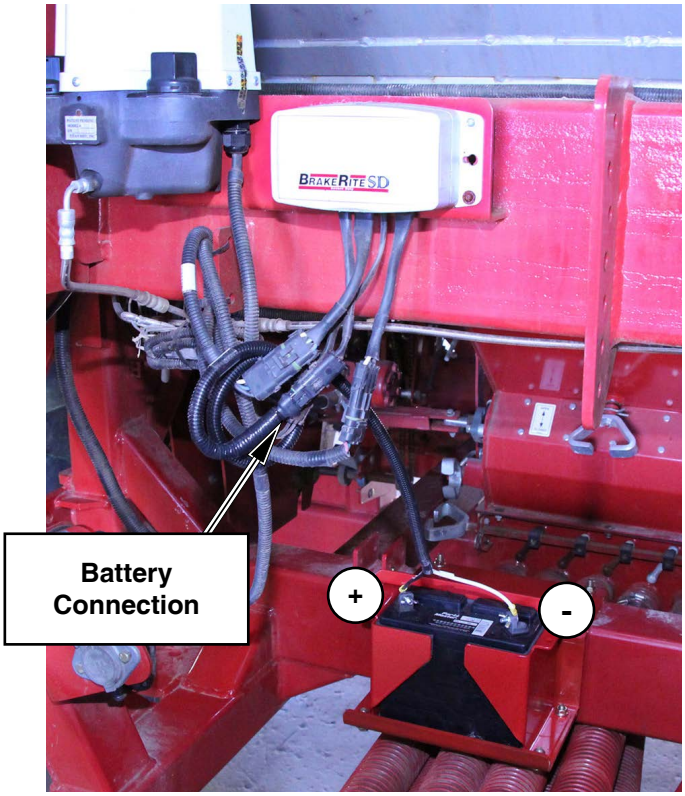
The battery acts as an auxiliary power supply to provide extra power to the brake actuator to develop maximum pressure in the brake system to provide optimum braking performance.

In addition the battery provides power supply to the brake actuator if the ‘break-away’ feature of the brake system is installed and utilized.

The brake controller already has a specific lead to plug the battery harness into.

Note: The battery ‘must be’ connected as illustrated [Positive (+) to Positive (+) and Negative (-) or Ground to Negative (-)] for it to provide the correct power supply to the brake controller.

The brake controller has a built in charger so that it will keep this battery fully charged as the unit is used in the field. The controller draws power from the tractor battery system and in turn charges this auxiliary battery.



Notes

Section 8: Storage

Section Contents

Preparing for Storage

General

- To insure longer life and satisfactory operation, store the 9 Series Air Cart in a shed.
- If building storage is impossible, store away from areas of main activity on firm, dry ground.
- Clean machine thoroughly.
- Inspect all parts for wear or damage.
- Avoid delays - if parts are required, order at the end of the season.
- Lubricate grease fittings (Refer to Lubricating Section).
- Tighten all bolts to proper specifications (Refer to Bolt Torque Chart).
- To prevent corrosion and damage by rodents, clean the hopper boxes and metering systems thoroughly and wash with mild soapy water solution. Rinse with water and dry thoroughly (Refer to Metering Body Storage).
- A light coating of silicone lubricant or WD-40 or penetrating oil should be applied to all metal metering system components before storage.
- Avoid lubricant contact with seals.
- Avoid lubricant contact with grain and fertilizer hoses and tubes.
- Relieve tension on tank lids.
- Loosen clean-out doors.
- Remove all chains and store in clean oil.
- Relieve pressure from hydraulic system.
- Raise frame, block up and relieve weight from the tires.
- Cover tires with canvass to protect them from the elements when stored outside.
- Paint any surfaces that have become worn.

Warning

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

Powder Paint - 2024	
Part Number	**Description**
S73107	Red MORRIS Aerosol Can
	Silver MORRIS Aerosol Can
K65885	White MORRIS Aerosol Can

Enamel Paint - Prior to 2024	
Part Number	**Description**
N53713	Red MORRIS Touch-Up Pen
N53714	Silver MORRIS Touch Up Pen
N53715	Red MORRIS Aerosol Can
N53716	Silver MORRIS Aerosol Can
N31087	Sky White MORRIS Aerosol Can

Preparing for Storage - Continued

Metering Body Storage

It is extremely important that the metering system is thoroughly cleaned before storing for any length of time.

The following procedure should be followed for both tanks:

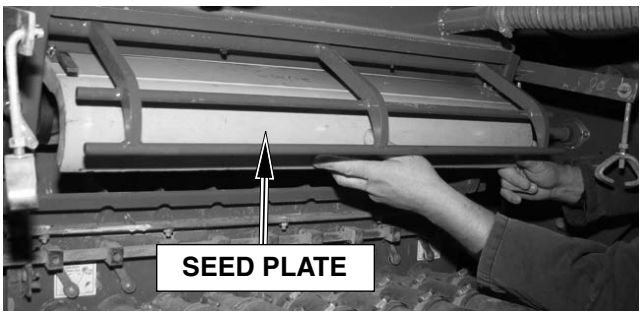
- Empty tanks (Refer to Unloading Tanks).
- Remove all seed plates.
- Remove the collector bottom.
- Remove blank off covers and the run caps on the collectors. Clean debris from chamber area.
- Run fan.
- Wash the interior of both tanks and metering system with soapy water. Wash the collector.
- Rinse with cold water and let the unit air dry.
- Coat metal parts with silicone lubricant or WD-40.

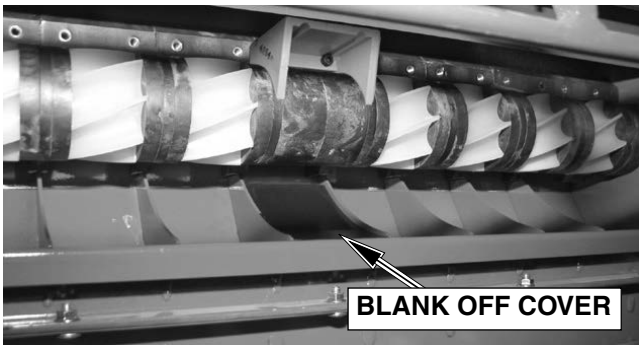
Note: Diesel fuel will harm seals.

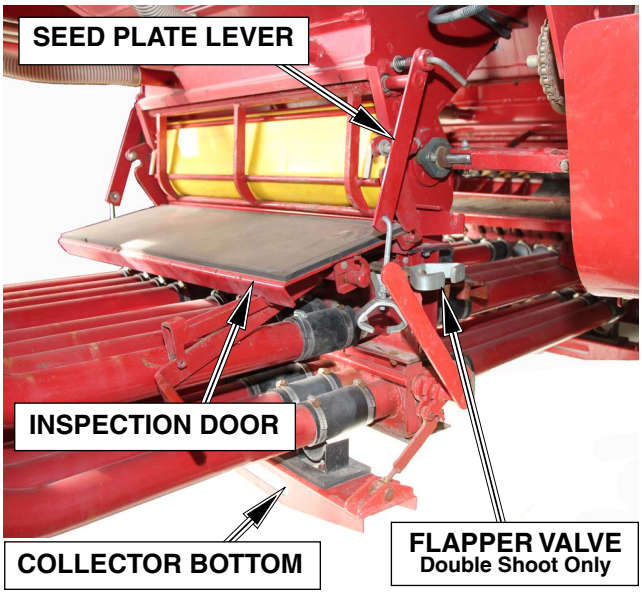
- Reinstall blank off covers and the run caps on the collectors.
- Reinstall seed plates.
- Replace the inspection door and the bottom of the collector.
- Start the fan and operate for 5 minutes to dry out any remaining moisture in the system.
- Leave inspection doors and clollector bottoms loose to help prevent condensation building up inside the tank.
- Leave lid latches loose to help maintain resilience of the seals.

Important

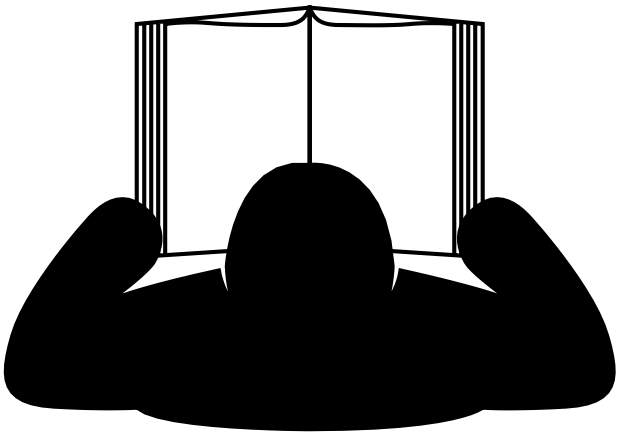
At no time should corrosive fertilizer or similar materials be allowed to remain in the tank or metering body cavity.







Removing From Storage



General

- Review Operator's Manual.
- Check tire pressure (Refer to Tire Pressure List).
- Clean machine thoroughly.
- Tighten lid latches.
- Lubricate and install chains.
- Spray internal parts of the metering body with silicone lubricant or WD-40 or penetrating oil to loosen any corrosion buildup.
- Check for leaks (Refer to Maintenance Section).
- Lubricate grease fittings (Refer to Lubricating Section).
- Tighten all bolts to proper specifications (Refer to Bolt Torque Chart).

Monitor

Familiarize yourself with all monitor functions. Ensure all monitor *"settings"* are correctly set for the air cart/ seeding tool combination. Recognize and correct alarm conditions as indicated on the machine. See Monitor Section for more details.

Check all wire harness connections for corrosion and use a dielectric spray to clean. Inspect all sensors for proper gap. See Monitor Section for more details.

Clutch

Check friction plates for corrosion and buff with a wire wheel if necessary. Check the resistance of the clutch. See Maintenance Section for more details.

Auger

Inspect all augers used in handling the products for seeding. Run augers to clean out any debris inside auger so it does not get transferred to the tank.

Conveyor

Any conveyor that has sat idle for a season needs to go through a "break-in" period. See "Startup and Break-In" under the Operation Section.

Brakes

Check the fluid level in the reservoir. Verify the brake system is working properly. See Operation Section and Maintenance Section.

Section 9: Troubleshooting

Section Contents

Troubleshooting

Problem	Cause	Correction
General		
Delivery hoses plugged	Insufficient air flow.	Clean fan impeller blades. Clean fan intake screen. Increase fan rpm.
	Unbalanced air flow (Double Shoot)	Readjust the plenum damper.
	High Humidity.	Use moisture resistant fertilizer.
	Hose sag.	Shorten hoses or add additional supports.
	Seed boots plugged with dirt.	Clean seed boots. See *"Seed Boot Plugging"* below.
	Hose obstruction.	Remove obstruction from hose.
	Air delivery hose partly off manifold.	Reinstall hose properly on manifold.
	Kinked hoses.	Straighten hoses and properly secure them to framework.
	Obstruction in divider head.	Remove access door and clear obstruction from appropriate outlets - be sure to use appropriate screens when filling.
	Exceeding machine's delivery capabilities.	Reduce ground speed and speed up fan.
	Poorly mounted hoses.	Reroute hoses.
Hydraulic fan will not turn	Selector valve in wrong position.	Switch the selector to fan position.
	Hydraulic hoses not connected properly to tractor.	Reverse hydraulic hoses.
	Insufficient oil flow.	Perform flow test.
Fan turning too slow	Flow to hydraulic motor.	Increase flow control setting.
	Low hydraulic pressure.	Check hydraulic pressure minimum 2100 psi.
Material flowing thru system when unit is stationary and the fan running	Damaged metering wheel.	Replace metering wheel.
	Incorrect Seed Plate installed.	Adjust as required. See *"Seed Plate Settings".*

Problem	Cause	Correction
Material not being divided in distribution head	Head partially blocked.	Remove blockage and reinstall hose.
	Kinked hose running to shank.	Straighten or replace hose.
	Damaged distribution section on head.	Replace head with new one.
	Bent or damaged diffuser pipe.	Straighten or replace diffuser pipe.
	Secondary hose length.	See “Secondary Hose” in Operation Section.
	Tanks not pressurized.	Inspect lid seals. Clean pressurization hoses.
Clutch slipping	Low power supply.	Ensure good connections at the power supply. Battery voltage must be 12V.
	Metering drive torque load too high.	See Maintenance Section.
	Corroded, rusty, dirty clutch.	Clean and inspect clutch.
	Faulty clutch.	Replace clutch.
Material not being metered out	Metering clutch not engaged.	Engage switch in tractor cab.
	Metering Clutch slipping.	See *“Clutch Slipping”* above.
	Main drive chain not installed.	Install drive chain properly on Drive Sprocket.
	Drive chain or chains broken.	Install new chain. Ensure connecting link is installed correctly. Curved part of spring clip should face the direction of chain travel.
	Massive air leak in tank, resulting in material being blown up out of the metering cup.	Repair the air leak. See “Air Leaks” in Maintenance Section. See “Tank Lid Adjustment” in Maintenance Section.
	Material caked up in tank.	Remove material and completely clean out the tank.
	Excessively wet material in tank.	Remove wet material and use reasonably dry material.
	Coupler bolt sheared.	Replace with Grade 8 bolt.

Problem	Cause	Correction
Material not being accurately metered out of the metering body	Air delivery hoses loose, cracked or pulled off.	Tighten the hoses, replace cracked hoses or install hoses pulled off their respective locations.
	Metering Clutch slipping.	See *"Clutch Slipping"* on previous page.
	Inlet screen to fan blocked off.	Clean off material that is blocking the fan screen.
	Incorrect Seed Plate installed.	Install correct Seed Plate
	Seed Plate lock not adjusted correctly.	Adjust Seed Plate lock - See Maintenance Section.
	Material caked up above one or more of the metering cups.	Clean out caked up material.
	Excessively damp material in tank.	Use reasonably dry, fresh material only.
	Foreign obstruction in tank above metering wheels.	Remove obstruction, and always fill tanks through the screen.
	Caked up metering wheels on some or all of the metering cups.	Clean out the metering cups and wheels.
	Damaged metering wheels.	Replace broken metering wheels.
	Metering wheels mismatched to secondary outlet.	Install correct wheels to head. 1 3/4" wide wheel for 7 outlet head. 2" wide wheel for 8 outlet head. 2 1/4" wide wheel for 9 outlet head. 2 1/2" wide wheel for 10 outlet head. Be sure appropriate spacers are also used.
	Incorrect spacing sprocket.	Install correct sprocket on back of transmission. See Maintenance Section.
	Crank rotated wrong way when taking sample.	Crank must be rotated counter clockwise.
	Collector Valves set incorrectly on Double Shoot machines.	See Operation Section.
	Air Leak in System.	Adjust lids and doors as necessary. Replace damaged seals. See Maintenance Section.
	Meterbody pressurization hose disconnected.	Reconnect hose to meterbody/plenum.

Problem	Cause	Correction
Plugged seed boots	Backing up with openers near or in the ground.	Lift machine all the way up before backing up.
	Turning very sharp with openers near or in the ground.	Lift machine all the way up when making sharp turns.
	Lowering machine without any forward motion.	Always have forward motion when lowering machine.
	Worn openers or sweeps.	Replace openers.
	Severely bent or damaged boots.	Straighten or replace as required.
	Excessively wet conditions.	Change openers, operate when drier.
	Opener Adjustment.	See *"Opener Adjustment"* in Operation Section.

Problem	Cause	Correction
Monitor		
Monitor lights up but does not seem to work	Faulty monitor	Replace monitor.
	Completely disconnected harness.	Connect harness.
No fan display	Incorrect gap between sensor and target.	Gap should be 0.030” (0.76 mm).
	Faulty sensor.	Replace sensor.
	Broken or shorted wire.	Replace or repair harness.
No ground speed display	Sensor to magnet gap too large.	Gap should be 0.030” (0.76 mm).
	Faulty sensor.	Replace sensor.
	Broken or shorted wire.	Replace or repair harness.
No meter speed display	Sensor to magnet gap too large.	Gap should be 0.030” (0.76 mm).
	Faulty sensor.	Replace sensor.
	Broken or shorted wire.	Replace or repair harness.
No display, no back light	Switched off	Switch unit on.
	Poor power connections at the battery.	Ensure good connections.
	Battery below 8 volts.	Check battery voltage.
	Temperature below -10C or above +40C.	Operate between -10C and +40C.

Problem	Cause	Correction
Bin indicates always empty	Broken wire.	Repair wire.
	Faulty sensor.	Replace sensor.
	Wires not hooked to sensor.	Hook up correctly.
Bin indicates always full	Blocked light beam on photoelectric sensor.	Remove object blocking the beam.
	Wire shorted to ground	Repair or replace wire.
	Faulty sensor.	Replace Sensor.

Problem	Cause	Correction
Conveyor		
The conveyor is vibrating	Damage can occur to the belting, causing a noise. Damage usually is caused from foreign material being run through the conveyor.	It may be necessary to remove the belting for inspection.
	The belt is not tracking in the center of the conveyor.	Track the belt.
Capacity is too low	There may not be enough grain reaching the conveyor.	Make sure the intake has not bridged over, restricting flow. The belt needs to be covered to achieve maximum capacity.
	Conveyor belt is moving too slow.	Check the belt speed. Low capacity will result from speeds slower than recommended.
		Belt needs tightening.
The conveyor plugs	The conveyor may be "jamming" because too much grain is reaching the conveyor.	Decrease the amount of grain the conveyor is gathering.
	The grain may be wet.	If wet grain or other hard to move materials is being conveyed, reduce the amount of grain being fed into hopper.
	The conveyor may be jammed with foreign material.	Remove any foreign material in the conveyor.
	The discharge end may be plugged.	Unplug any plugs at the discharge end of the conveyor.
	Pulley has spun out and burned the belt in two.	Cut and resplice the belt, An additional piece of belting may be required.
		Tighten and retrack the belt.
Driveline shear bolt shears frequently.	Grain may be flowing too quickly into the hopper.	Reduce the flow rate of grain into hopper.
	The discharge of grain from the conveyor may be restricted.	Inspect conveyor intake and discharge for damage.

Problem	Cause	Correction
Cleated belt is slipping or loose.	Belt tension too low.	Tension belt to 23 ft. lbs. on the adjustment bolts. Tension hopper belt to 80 in. lbs. or until center of the belt rises off the suport pan underneath.
	Belt is extremely dirty.	Clean traction side of belt.
Cleated belt is rubbing side of housing or cleats are coming loose or wearing.	Belt misaligned.	Align belt so its tracks center of idle and drive rollers. Tighten the side of the belt that is tracked off the roller.

Brakes

Indicator on “In Cab Controller” Shows no connection between towed and towing-vehicle.		Inspect plug and wiring for open circuit. Consult applicable wiring diagram to assure proper wiring connections.
Poor response time		Check and add brake fluid as required (figure 5.4.2A-pg.22 Bleed brake lines and devices Check input for adequate “charge” (12 VDC)
Inadequate or excessive Cart braking.		Adjust “gain” control on In-Cab Controller.
BrakeRite unit runs but does not build pressure.		Assure proper brake fluid level, add fluid and bleed the system as required.
BrakeRite unit does not run when the Tractor brake pedal is depressed		Verify and connect wire connections in the entire electrical circuit.
BrakeRite unit does not run when the in-cab manual override is activated.		Verify and connect wire connections in the entire electrical circuit.

Experience has shown that virtually all problems with BrakeRite units are the result of INCORRECT OR FAILED WIRING. If problems arise consult the applicable wiring diagram (Section 9.0) and inspect all wiring and terminations.

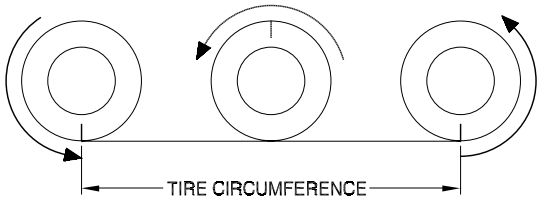
Notes

Section 10: Metric

Section Contents

Rate Calibration - Metric

- Ensure tires are at correct pressure.
- Determine Tire Circumference (Tc) as follows:
  - Check under normal field conditions with tanks half full.
  - Mark tire and starting point.
  - Drive air cart 10 revolutions of tire in a straight line.
  - Mark ending point.
  - Measure distance from starting point to ending point and divide by 10 to get the rolling circumference of the tire (Tc).



- Calculate the number of rotations (R) of the calibration crank for 1/10 Hectare. Record value below for future reference.
- Calculate required tire sprocket size (Ts) and to ensure correct sprockets are installed on the Air Cart. Record value below for future reference.

Note: Due to ratios the value may not be a whole number and should be rounded to nearest value.

- Calculate the monitor PP400 setting. Record value below for future reference. Change monitor to new PP400 value as outlined under *"Changing Monitor Settings"* under Monitor Section.

Example:

For a 9450 with 800/65 R32 Tires and a 51ft (15.54 m) wide seeding tool (W) with:

The measured Tire Circumference (Tc) was 5.375 meters.

For 32" Rim
Crank Rotations (R) = (1574/W)/Tc
= (1574/15.54)/5.375
= 18.84

Monitor PP400 = 2048.256/Tc
= 2048.256/5.375
= 381

Note: Formulas are different for Air Carts with BRAKES, this is due to the difference in drive sprocket teeth.

Calibration Formulas - Metric

Rotations of Crank for 1/10 Hectare:

For 32" Rim = (1575/W)/Tc

For 38" Rim = (1575/W)/Tc **R** = _____

Tire Sprocket Size:

For 32" Rim = 152.196/Tc

For 38" Rim = 152.196/Tc **Ts** = _____

Monitor PP400 Setting:

For 32" Rim = 2048.256/Tc

For 38" Rim = 2048.256/Tc **PP400 =** _____

Tc = Tire Circumference measured in meters

W = Working Width measured in meters

Calibration Formulas - Metric

Rotations of Crank for 1/10 Hectare: BRAKES

For 32" Rim = (1600/W)/Tc

For 38" Rim = (1600/W)/Tc **R** = _____

Tire Sprocket Size: BRAKES

For 32" Rim = 154.612/Tc

For 38" Rim = 154.612/Tc **Ts** = _____

Monitor PP400 Setting: BRAKES

For 32" Rim = 2080.768/Tc

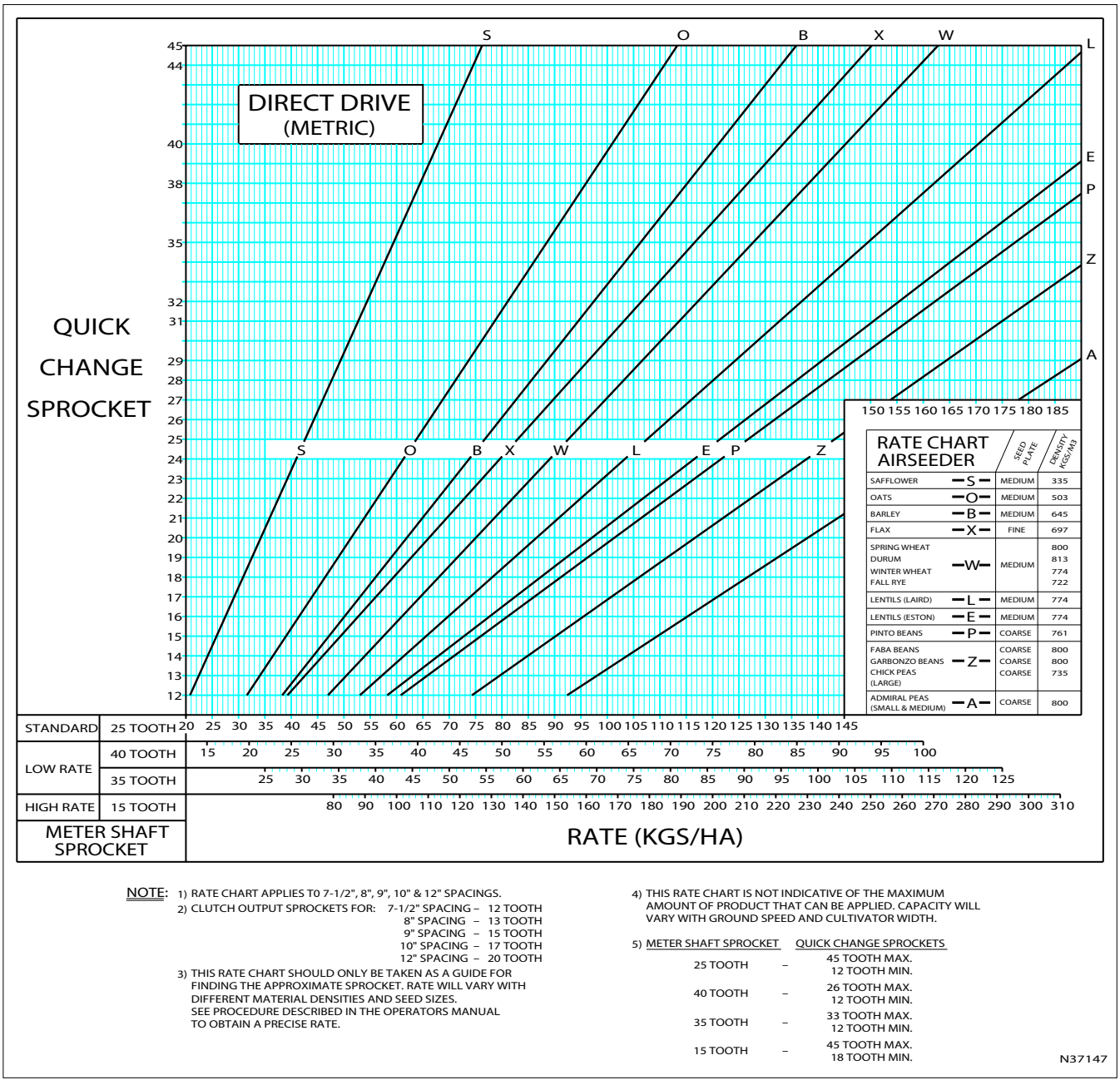
For 38" Rim = 2080.768/Tc **PP400 =** _____

Tc = Tire Circumference measured in meters

W = Working Width measured in meters

Rate Charts - Metric

Seed Rate Chart



NOTE:
1) RATE CHART APPLIES T0 7-1/2", 8", 9", 10" & 12" SPACINGS.
2) CLUTCH OUTPUT SPROCKETS FOR: 7-1/2" SPACING – 12 TOOTH
8" SPACING – 13 TOOTH
9" SPACING – 15 TOOTH
10" SPACING – 17 TOOTH
12" SPACING – 20 TOOTH
3) THIS RATE CHART SHOULD ONLY BE TAKEN AS A GUIDE FOR FINDING THE APPROXIMATE SPROCKET. RATE WILL VARY WITH DIFFERENT MATERIAL DENSITIES AND SEED SIZES. SEE PROCEDURE DESCRIBED IN THE OPERATORS MANUAL TO OBTAIN A PRECISE RATE.
4) THIS RATE CHART IS NOT INDICATIVE OF THE MAXIMUM AMOUNT OF PRODUCT THAT CAN BE APPLIED. CAPACITY WILL VARY WITH GROUND SPEED AND CULTIVATOR WIDTH.
5) METER SHAFT SPROCKET — QUICK CHANGE SPROCKETS
25 TOOTH – 45 TOOTH MAX. 12 TOOTH MIN.
40 TOOTH – 26 TOOTH MAX. 12 TOOTH MIN.
35 TOOTH – 33 TOOTH MAX. 12 TOOTH MIN.
15 TOOTH – 45 TOOTH MAX. 18 TOOTH MIN.

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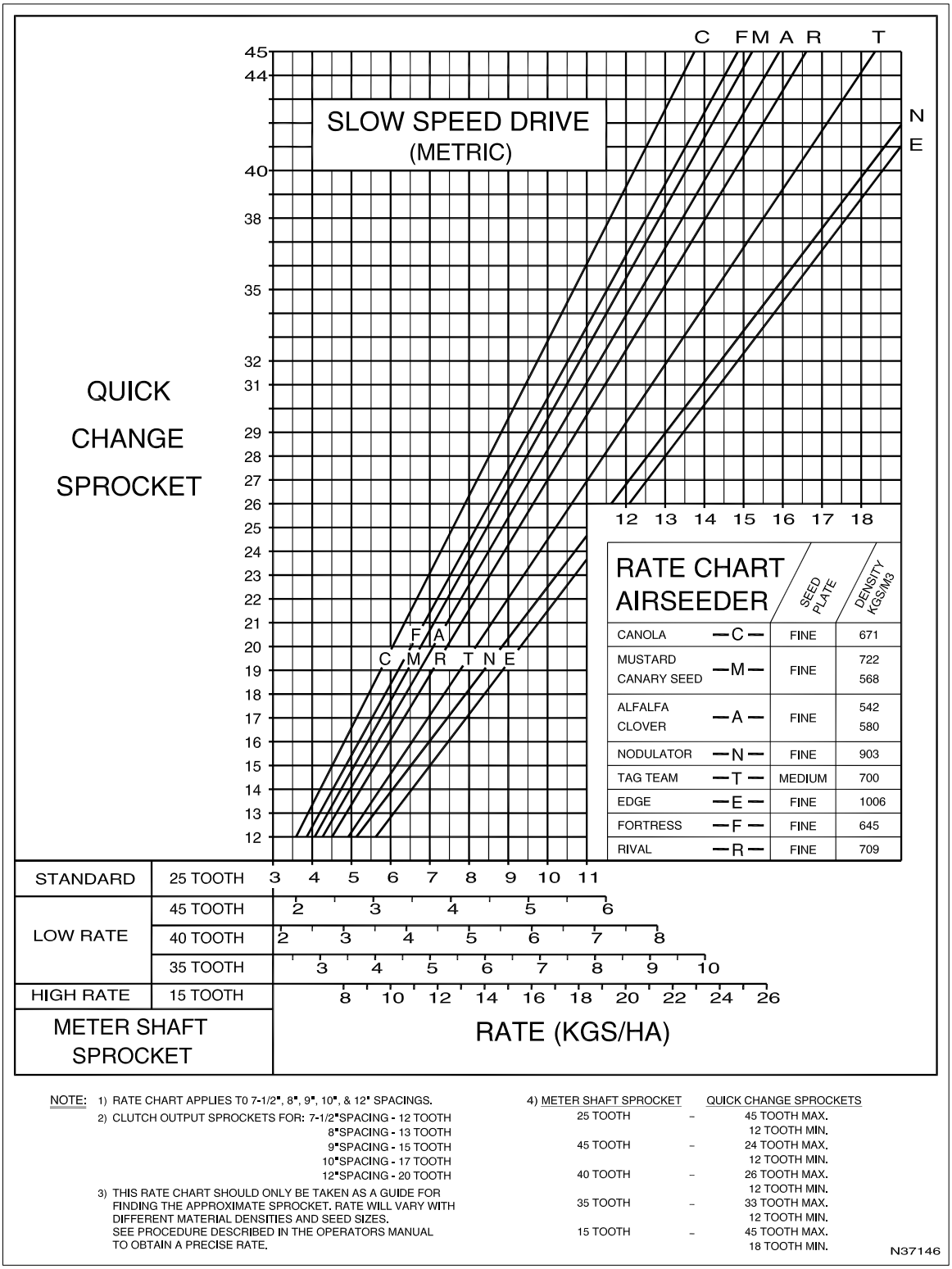
Rate Charts - Continued

Slow Speed Seed Rate Chart



NOTE:
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4) METER SHAFT SPROCKET		QUICK CHANGE SPROCKETS
25 TOOTH	–	45 TOOTH MAX. 12 TOOTH MIN.
45 TOOTH	–	24 TOOTH MAX. 12 TOOTH MIN.
40 TOOTH	–	26 TOOTH MAX. 12 TOOTH MIN.
35 TOOTH	–	33 TOOTH MAX. 12 TOOTH MIN.
15 TOOTH	–	45 TOOTH MAX. 18 TOOTH MIN.

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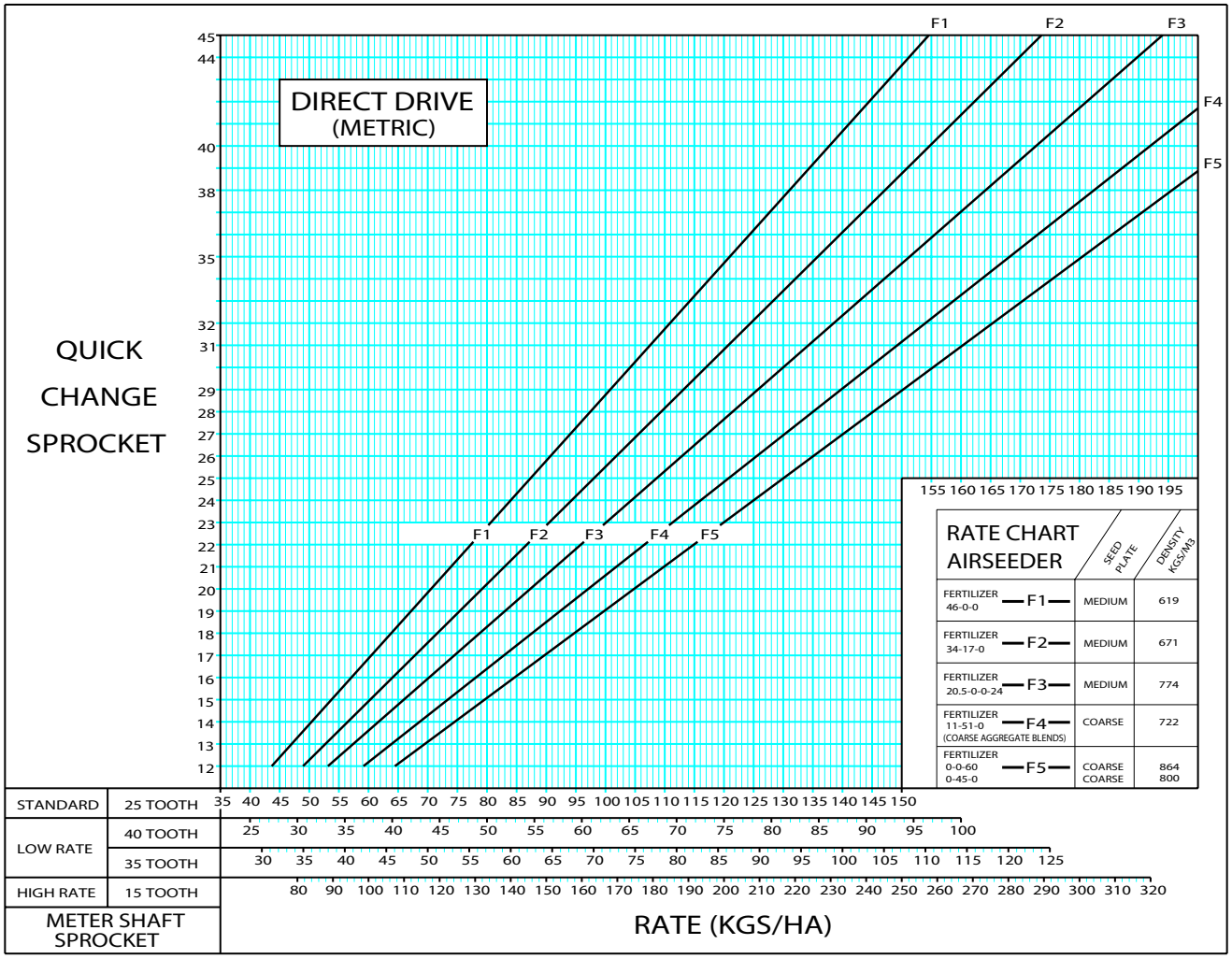
Rate Charts - Continued

Fertilizer Rate Chart



NOTE:
1) RATE CHART APPLIES T0 7-1/2", 8", 9", 10" & 12" SPACINGS.
2) CLUTCH OUTPUT SPROCKETS FOR: 7-1/2" SPACING – 12 TOOTH
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9" SPACING – 15 TOOTH
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40 TOOTH – 26 TOOTH MAX. 12 TOOTH MIN.
35 TOOTH – 33 TOOTH MAX. 12 TOOTH MIN.
15 TOOTH – 45 TOOTH MAX. 18 TOOTH MIN.

N37148

Notes

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