

**EIGHT Series XL
VRT AIR CART**

N42298-01



MORRIS

Seeding, Tillage and Haying Solutions

**OPERATOR'S
Manual**

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Section 1: Safety

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Safety

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.

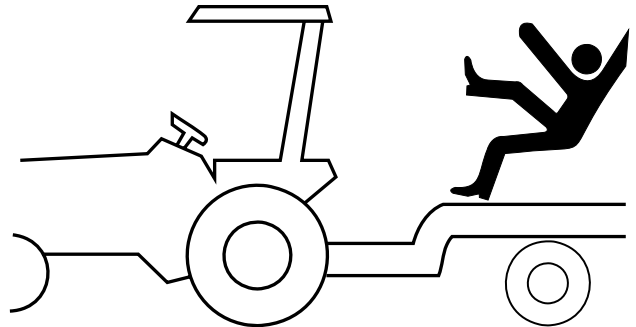
The words **Important** and **Note** are not related to personal safety but are used to give additional information and tips for operating or servicing this equipment.

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.

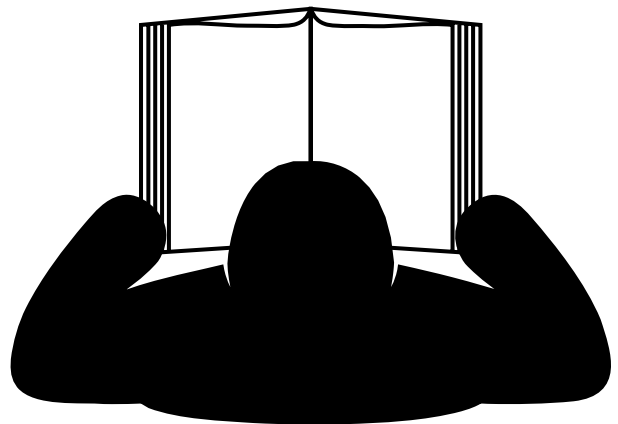
General Operation

- **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.



Safety

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.

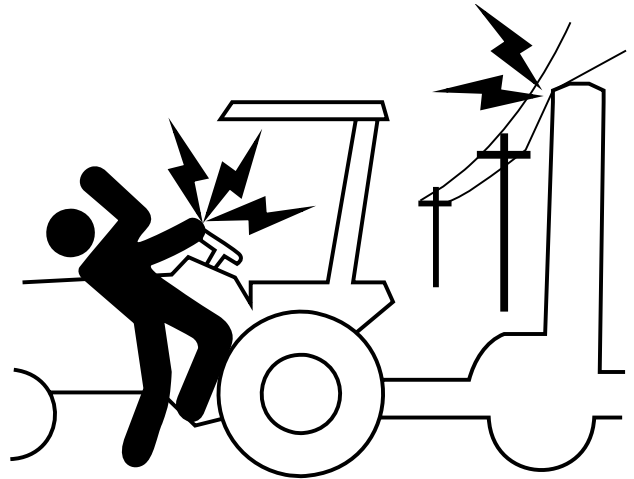
Always be sure pressure is relieved before disconnecting hoses or parts.

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.

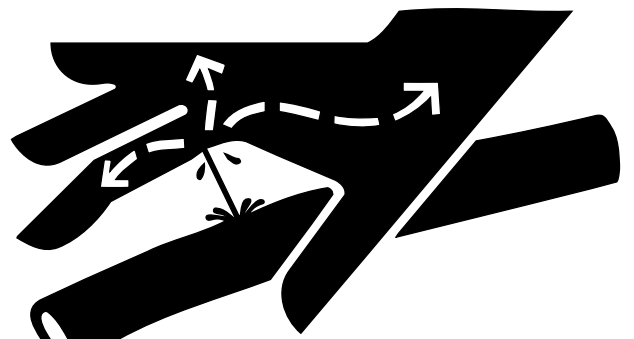
Transporting

- **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.
- **REDUCE SPEED** with material in tank. **Do Not** exceed a speed of 10 mph (16 kph).
- 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

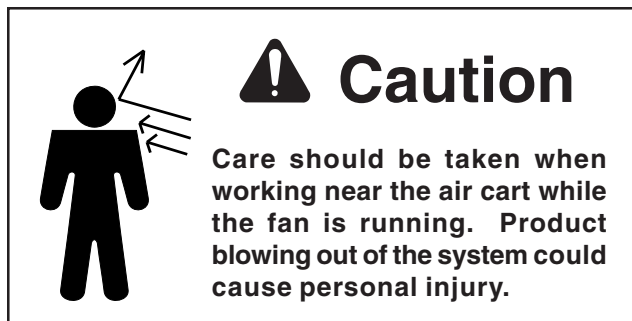
- **Do not** search for high pressure hydraulic leaks without hand and face protection. A tiny, almost invisible leak can penetrate skin, thereby requiring immediate medical attention.
- Use cardboard or wood to detect hydraulic leaks - never your hands.
- Double check that all is clear before operating 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.



Safety

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.



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

GUARD MISSING
When this is visible
DO NOT OPERATE

N32799

⚠ 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

CRUSHING HAZARD
To prevent serious injury:

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

N36255

⚠ WARNING

MOVING PART HAZARD
To prevent serious injury or death from moving parts:

- Secure any guards and shields before starting.
- Keep hand, feet, hair and clothing away from moving parts.
- Disconnect and lockout power source before adjusting or servicing.
- Sprockets and chains CAN START MOVING even though Air Cart is stationary.

N29355

⚠ 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

OVERHEAD HAZARD
To prevent serious injury or death:

- Stay away from beneath the ladder when in the raised position or being lowered.
- Keep others away.

N36261

⚠ 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

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

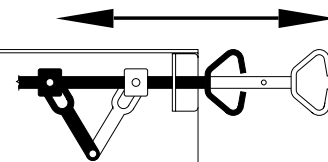
IMPORTANT

ENSURE THAT ALL WHEEL NUTS ARE TORQUED TO THE FOLLOWING:

- 5/8" Tapered Wheel Nuts - 150 ft-lbs
- 3/4" Flanged Wheel Nuts - 270 ft-lbs

N24412

IMPORTANT



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

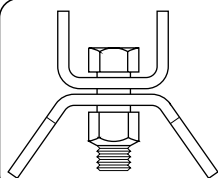
N36264

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

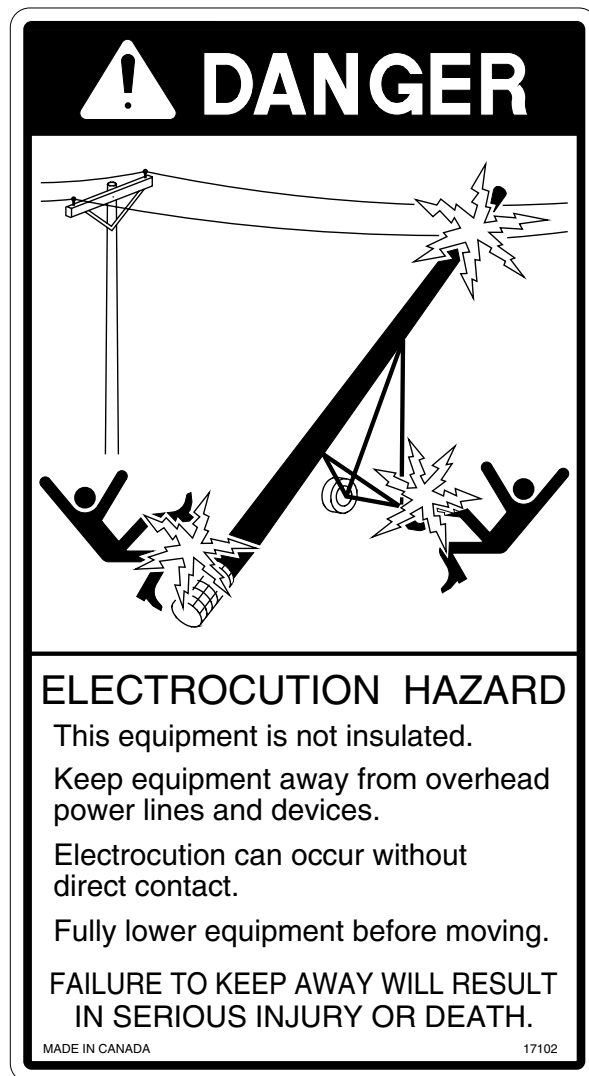
TANK BOLTS MUST BE A LOOSE FIT.
DO NOT REPLACE WITH SHORTER BOLTS.

N29729



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

Safety Signs - Continued

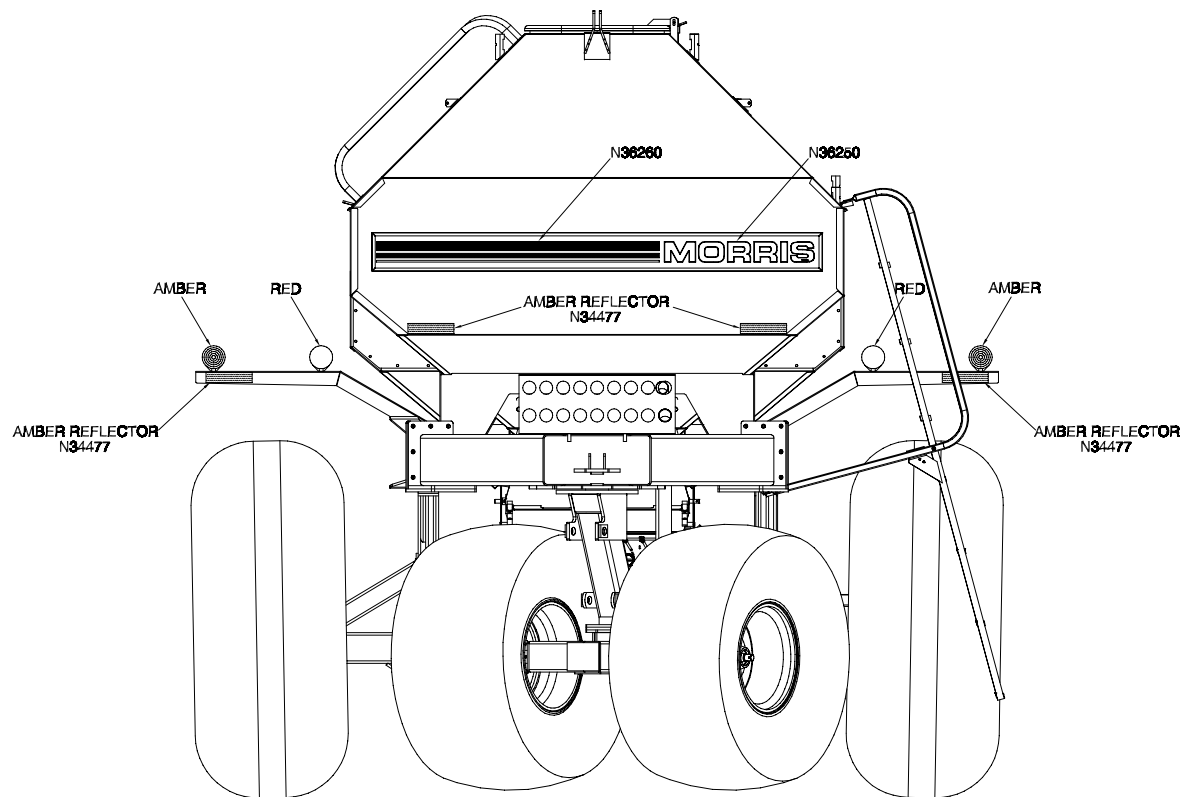


Familiarize yourself with the location of all decals. Read them carefully to understand the safe operation of your machine.

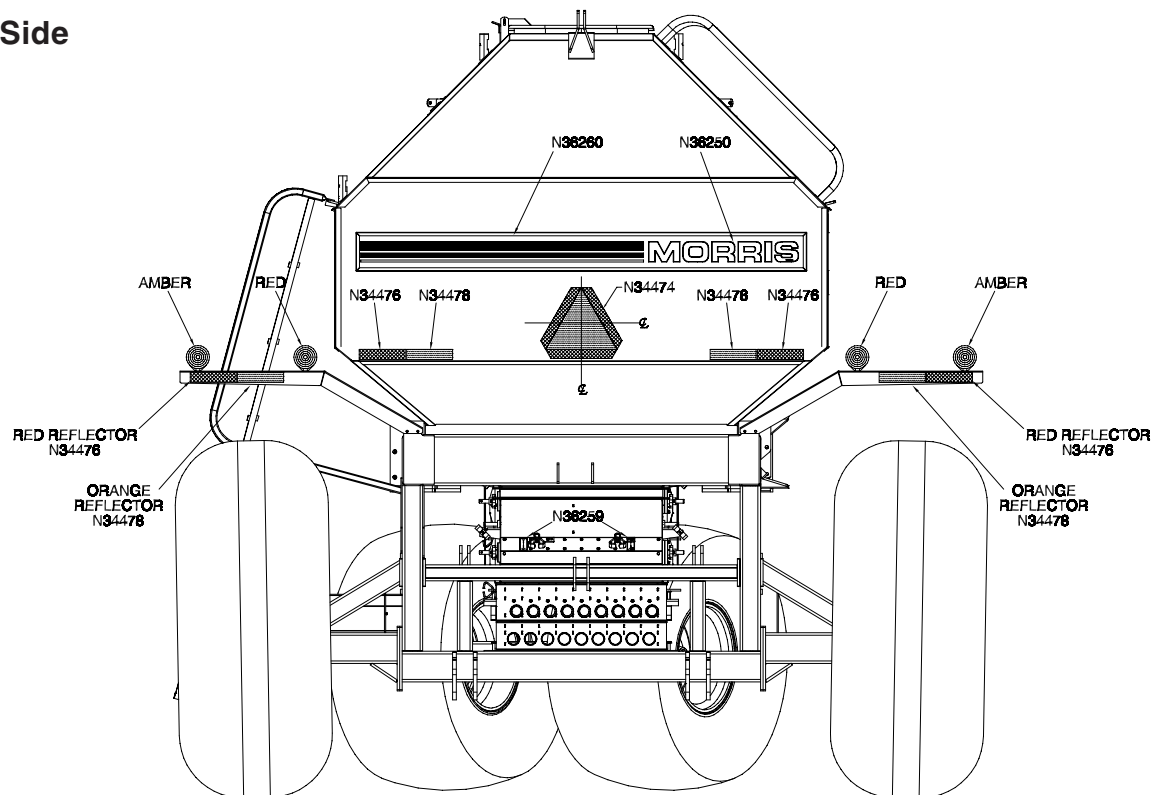
Safety

Safety Signs - Continued

Front Side

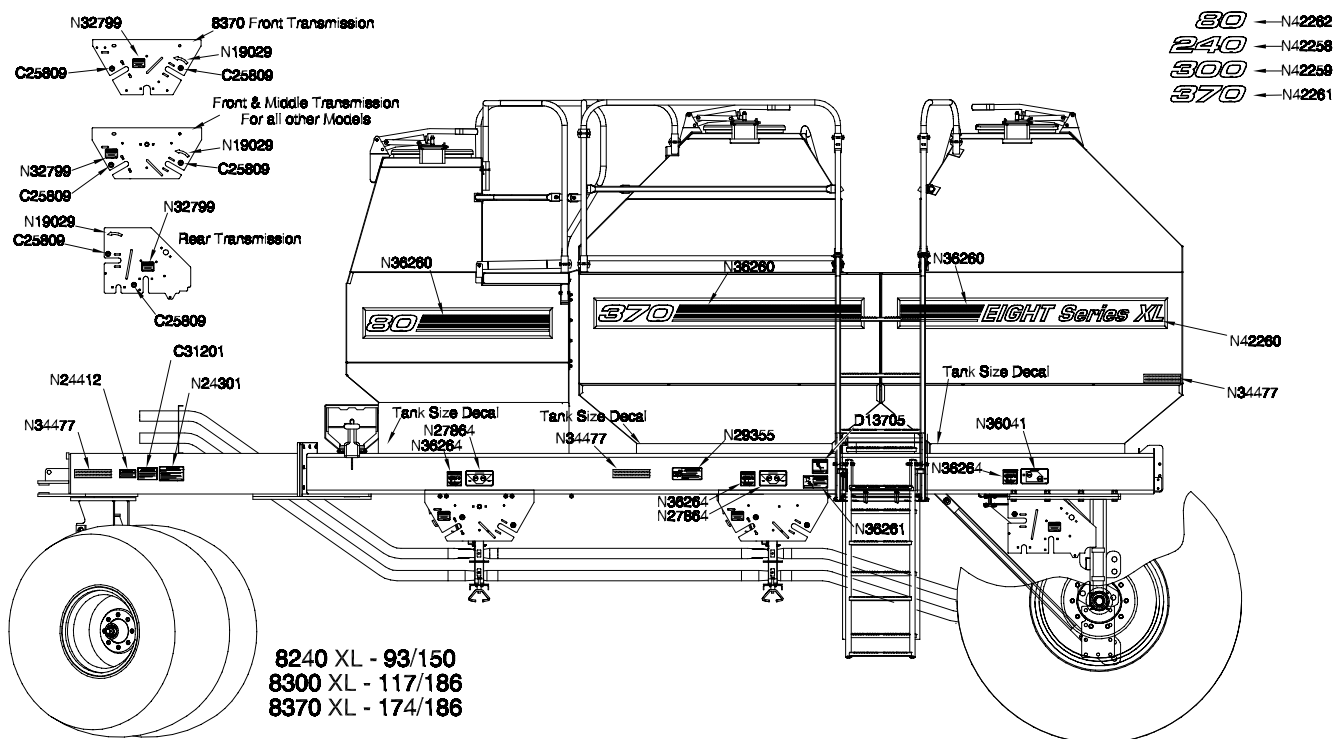
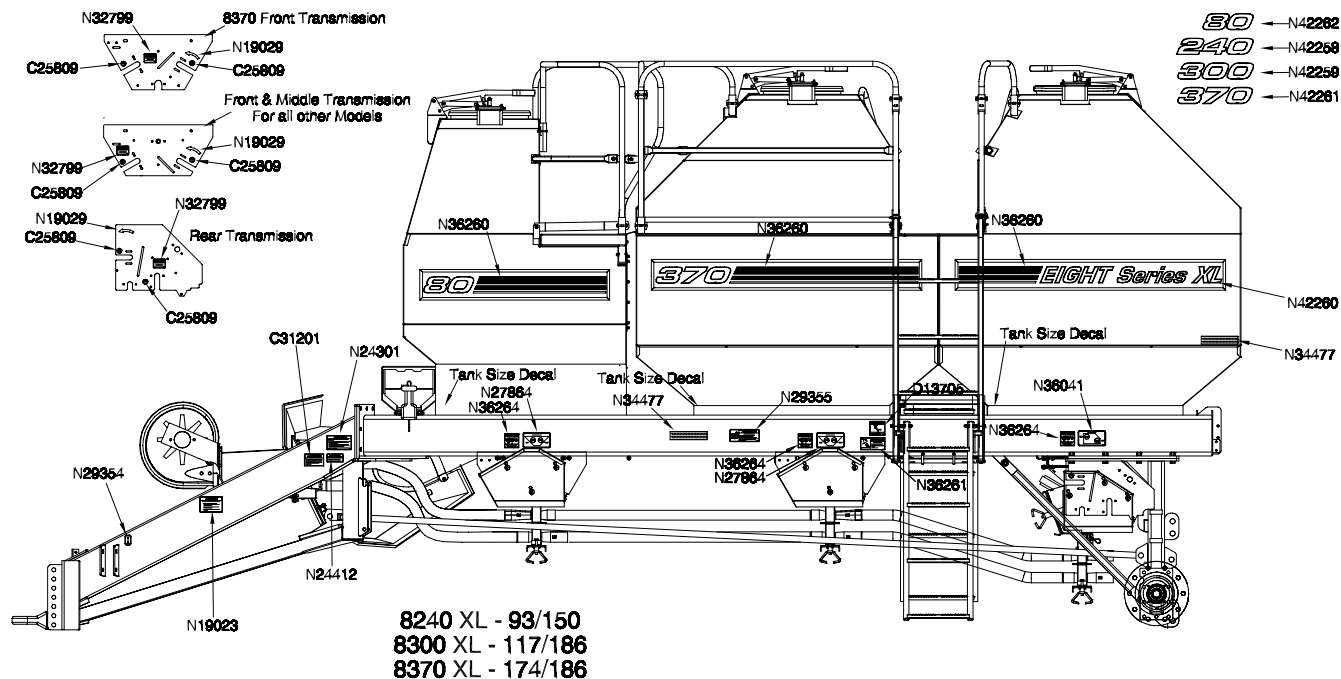


Rear Side



Safety Signs - Continued

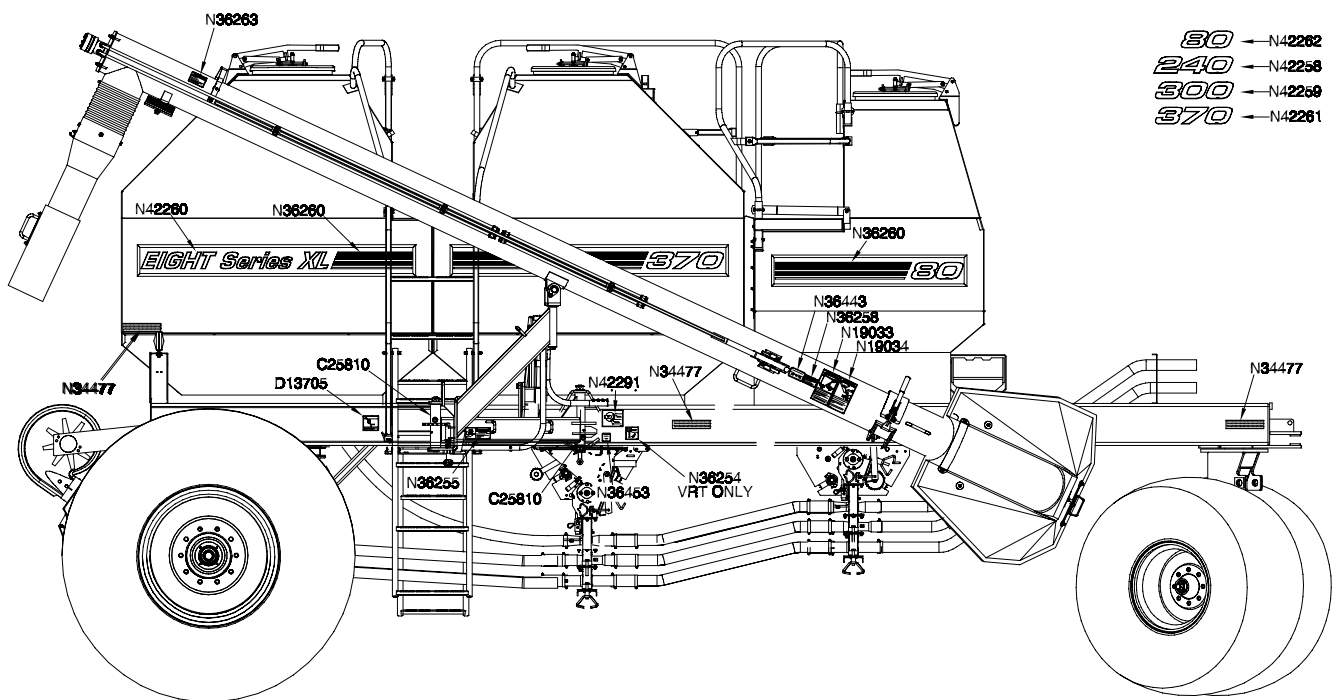
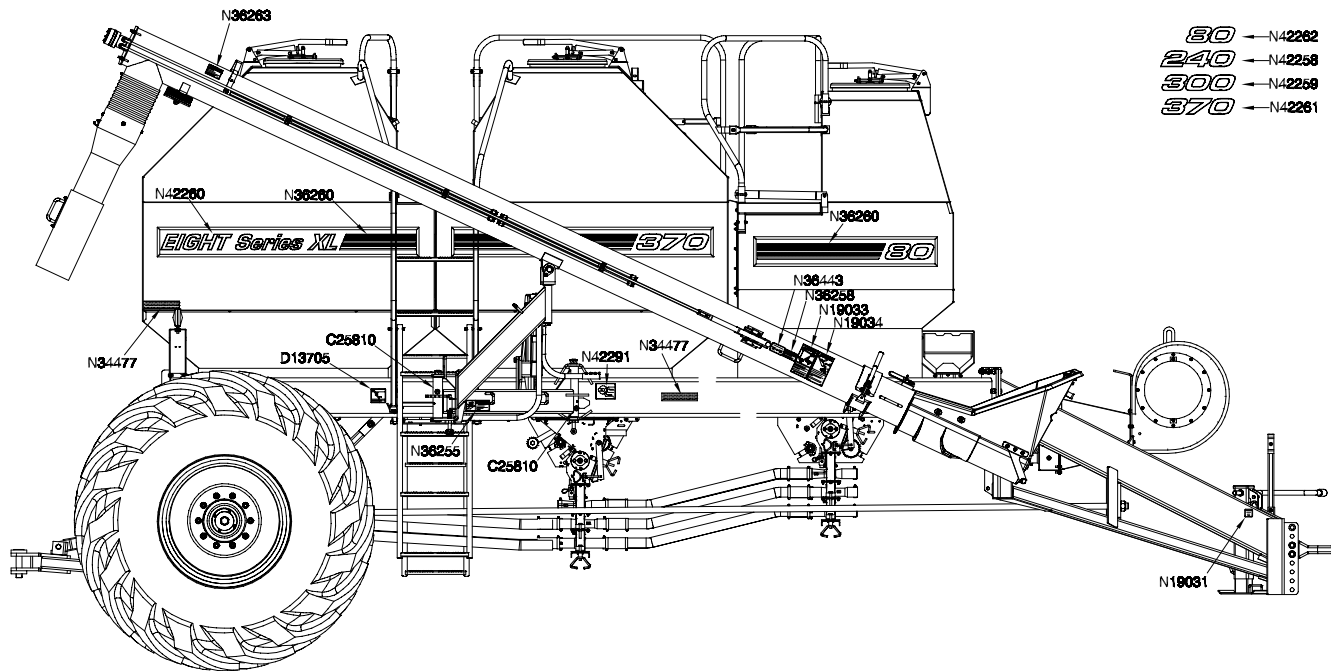
Left Side



Safety

Safety Signs - Continued

Right Side



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.

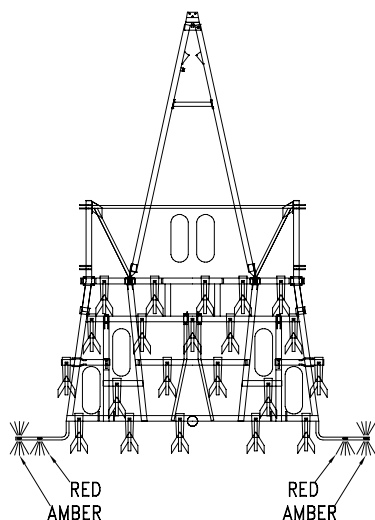
Note: Always replace missing or damaged lights and/or connectors.

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.

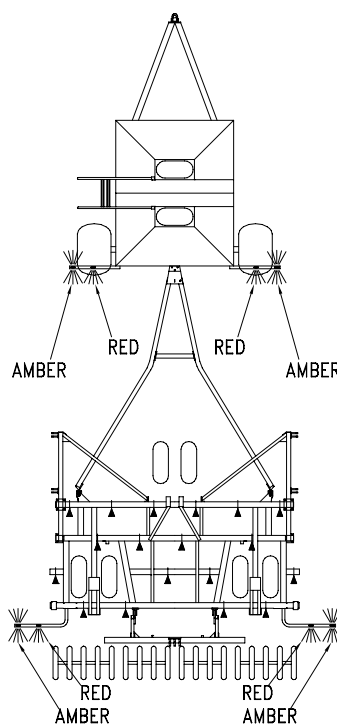


Tillage Unit



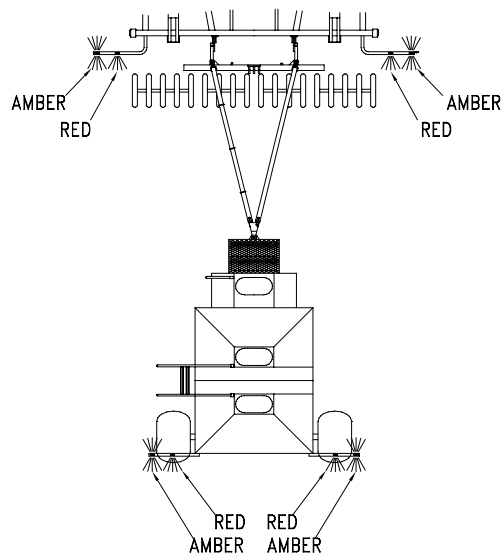
Seeding Unit

Tow Between



Seeding Unit

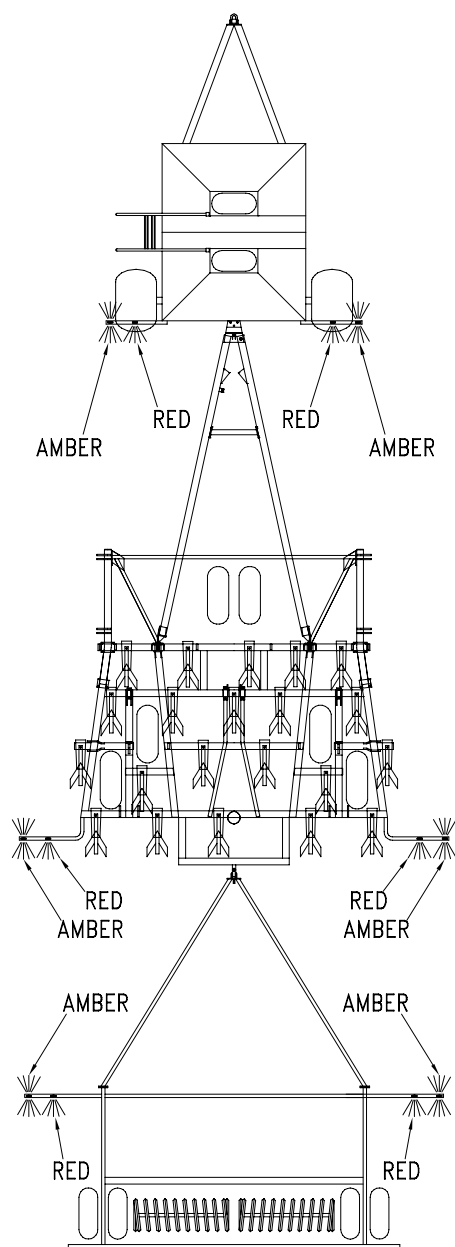
Tow Behind



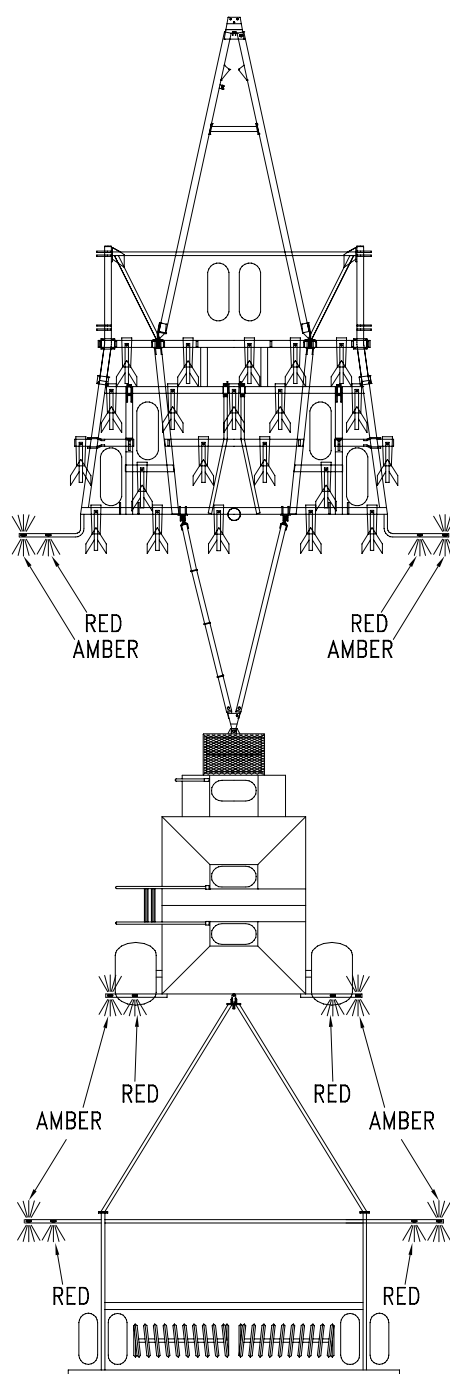
Safety

Lighting and Marking - Continued

**Seeding Unit - Tow Between
with Packer Bar**



**Seeding Unit - Tow Behind
with Packer Bar**



Section 2: Specifications

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Specifications

8240XL Specifications and Options

Model	8240XL	8240XL
Configuration	Tow Between	Tow Behind
Length without auger (with auger)	23' 4" (7.14m) (24' 7" (7.49m))	23' 4" (7.14m) (24' 7" (7.49m))
Height	14' (4.27m)	14' (4.27m)
Width	12' 5" (3.78m)	12' 5" (3.78m)
Weight (Hydraulic Drive)	11,766 lbs. (5,348 kg)	9,595 lbs. (4,361 kg)
Safety Lights	Standard	Standard
Safety Chain	Standard	Standard
Tank Capacity	Optional 83 bu (2,938 ℓ)	Optional 83 bu (2,938 ℓ)
- Front Tank	93 bu (3,272 ℓ)	93 bu (3,272 ℓ)
- Middle Tank	150 bu (5,278 ℓ)	150 bu (5,278 ℓ)
- Rear Tank		
- Total	243 bu (8,550 ℓ)	243 bu (8,550 ℓ)
Tank Screens	Standard	Standard
Tank Access Ladder R.H.S.	Standard	Standard
Rated Fan Speed	13" fan - up to 5,500 r.p.m. 17" fan - up to 5,000 r.p.m.	13" fan - up to 5,500 r.p.m. 17" fan - up to 5,000 r.p.m.
Fan Impeller Diameter	Standard 13" (33 cm) Optional 17" (43 cm)	Standard 13" (33 cm) Optional 17" (43 cm)
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.	12cc (Standard) 18 U.S. gal./min. (68 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 5.5 U.S. gal/min (21 l/min) 16cc (Optional) (Standard on 17" Fan) 21 U.S. gal./min. (80 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 5.5 U.S. gal/min (21 l/min)	12cc (Standard) 18 U.S. gal./min. (68 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 5.5 U.S. gal/min (21 l/min) 16cc (Optional) (Standard on 17" Fan) 21 U.S. gal./min. (80 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 5.5 U.S. gal/min (21 l/min)
Loading Auger	Standard (10" Dia x 21' Lg.) (0.25m Dia x 6.4m Lg.)	Standard (10" Dia x 21' Lg.) (0.25m Dia x 6.4m Lg.)
Tires - Standard (Front)	N/A	(2) 21.5 x 16.1 - 10 ply rating Soft Trac
- Optional (Front)	N/A	(2) 21.5 x 16.1 - 12 ply rating Lug (2) 560/65 D24 LI 140 Soft Trac (2) 500/70 R24 Lug
- Standard (Rear)	(2) 23.1 x 26 - 12 ply rating AWT	(2) 23.1 x 26 - 12 ply rating AWT
- Optional (Rear)	(2) 23.1 x 26 - 10 ply rating Rice (2) 30.5 x 32 - 12 ply rating AWT (2) 30.5 x 32 - 14 ply rating Lug (2) 800/65 R32 - LI 172 Lug (2) 900/65 R32 - LI 172 Lug	(2) 23.1 x 26 - 10 ply rating Rice (2) 30.5 x 32 - 12 ply rating AWT (2) 30.5 x 32 - 14 ply rating Lug (2) 800/65 R32 - LI 172 Lug (2) 900/65 R32 - LI 172 Lug
Metering - Ground Driven	Standard	Standard
- Variable Rate (VRT)	Optional	Optional
- GPS Compatible VRT	Optional - FarmScan Monitor	Optional - FarmScan Monitor
Meter Shut Off	Electric	Electric
Number Secondary Runs - Single Shoot	21 to 90	21 to 90
Number Secondary Runs - Double Shoot	42 to 180	42 to 180
Primary Hose - Diameter	2 1/2" (6.4 cm)	2 1/2" (6.4 cm)
Secondary Hose - Diameter	15/16" (2.4 cm)	15/16" (2.4 cm)
Frame	Formed heavy wall 4" x 10" (10 cm x 25.4 cm) tubing	Formed heavy wall 4" x 10" (10 cm x 25.4 cm) tubing
Walk Through Tank	Standard	Standard
Easy Clean Out System	Standard	Standard
Meter Drive Options		
- Second Clutch (For spot fertilizing on the go)	Standard	Standard
Monitor (Shaft Motion (3), Bin Level (3), Fan Speed, Acre Tally, Ground Speed)	Standard Optional Seed Flow	Standard Optional Seed Flow
Work Switch (Mounted to Seeding Machine)	Optional (Ground Drive Only)	Optional (Ground Drive Only)
Rear Tow Hitch	Standard (Max 26,000 lb Draft Load) (Max 11,818 kg Draft Load)	Optional (Max 15,000 lb Draft Load) (Max 6,818 kg Draft Load)
Mechanical Acre Meter	Optional (Ground Drive Only)	Optional (Ground Drive Only)
Hitch Stand	N/A	Optional

8300XL Specifications and Options

Model	8300XL	8300XL
Configuration	Tow Between	Tow Behind
Length without auger (with auger)	23' 4" (7.14m) (24' 7" (7.49m))	23' 4" (7.14m) (24' 7" (7.49m))
Height	15' (4.57m)	15' (4.57m)
Width	13' 4" (4.06m)	12' 5" (3.78m)
Weight (Hydraulic Drive)	11,986 lbs. (5,448 kg)	9,815 lbs. (4,461 kg)
Safety Lights	Standard	Standard
Safety Chain	Standard	Standard
Tank Capacity	Optional 83 bu (2,938 ℓ)	Optional 83 bu (2,938 ℓ)
- Front Tank	117 bu (4,126 ℓ)	117 bu (4,126 ℓ)
- Middle Tank	186 bu (6,537 ℓ)	186 bu (6,537 ℓ)
- Rear Tank	303 bu (10,663 ℓ)	303 bu (10,663 ℓ)
- Total		
Tank Screens	Standard	Standard
Tank Access Ladder R.H.S.	Standard	Standard
Rated Fan Speed	13" fan - up to 5,500 r.p.m. 17" fan - up to 5,000 r.p.m.	13" fan - up to 5,500 r.p.m. 17" fan - up to 5,000 r.p.m.
Fan Impeller Diameter	Standard 13" (33 cm) Optional 17" (43 cm)	Standard 13" (33 cm) Optional 17" (43 cm)
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.	12cc (Standard) 18 U.S. gal./min. (68 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 5.5 U.S. gal/min (21 l/min) 16cc (Optional) (Standard on 17" Fan) 21 U.S. gal./min. (80 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 5.5 U.S. gal/min (21 l/min)	12cc (Standard) 18 U.S. gal./min. (68 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 5.5 U.S. gal/min (21 l/min) 16cc (Optional) (Standard on 17" Fan) 21 U.S. gal./min. (80 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 5.5 U.S. gal/min (21 l/min)
Loading Auger	Standard (10" Dia x 21' Lg.) (0.25m Dia x 6.4m Lg.)	Standard (10" Dia x 21' Lg.) (0.25m Dia x 6.4m Lg.)
Tires - Standard (Front)	N/A	(2) 21.5 x 16.1 - 10 ply rating Soft Trac
- Optional (Front)	N/A	(2) 21.5 x 16.1 - 12 ply rating Lug (2) 560/65 D24 LI 140 Soft Trac (2) 500/70 R24 Lug
- Standard (Rear)	(2) 30.5 x 32 - 12 ply rating AWT	(2) 23.1 x 26 - 12 ply rating AWT
- Optional (Rear)	(2) 30.5 x 32 - 14 ply rating Lug (2) 800/65 R32 - LI 172 Lug (2) 900/65 R32 - LI 172 Lug	(2) 23.1 x 26 - 10 ply rating Rice (2) 30.5 x 32 - 12 ply rating AWT (2) 30.5 x 32 - 14 ply rating Lug (2) 800/65 R32 - LI 172 Lug (2) 900/65 R32 - LI 172 Lug
Metering - Ground Driven	Standard	Standard
- Variable Rate (VRT)	Optional	Optional
- GPS Compatible VRT	Optional - FarmScan Monitor	Optional - FarmScan Monitor
Meter Shut Off	Electric	Electric
Number Secondary Runs - Single Shoot	21 to 90	21 to 90
Number Secondary Runs - Double Shoot	42 to 180	42 to 180
Primary Hose - Diameter	2 1/2" (6.4 cm)	2 1/2" (6.4 cm)
Secondary Hose - Diameter	15/16" (2.4 cm)	15/16" (2.4 cm)
Frame	Formed heavy wall 4" x 10" (10 cm x 25.4 cm) tubing	Formed heavy wall 4" x 10" (10 cm x 25.4 cm) tubing
Walk Through Tank	Standard	Standard
Easy Clean Out System	Standard	Standard
Meter Drive Options		
-Second Clutch (For spot fertilizing on the go)	Standard	Standard
Monitor (Shaft Motion (3), Bin Level (3), Fan Speed, Acre Tally, Ground Speed)	Standard Optional Seed Flow	Standard Optional Seed Flow
Work Switch (Mounted to Seeding Machine)	Optional (Ground Drive Only)	Optional (Ground Drive Only)
Rear Tow Hitch	Standard (Max 26,000 lb Draft Load) (Max 11,818 kg Draft Load)	Optional (Max 15,000 lb Draft Load) (Max 6,818 kg Draft Load)
Mechanical Acre Meter	Optional (Ground Drive Only)	Optional (Ground Drive Only)
Hitch Stand	N/A	Optional

Specifications

8336XL Specifications and Options

Model	8336XL	8336XL
Configuration	Tow Between	Tow Behind
Length without auger (with auger)	23' 4" (7.14m) (24' 7" (7.49m))	23' 4" (7.14m) (24' 7" (7.49m))
Height	13' 4" (4.06)	13' 4" (4.06)
Width	13' 4" (4.06)	12' 5" (3.78)
Weight (Hydraulic Drive)	12,611 lbs. (5,732 kg)	10,440 lbs. (4,745 kg)
Safety Lights	Standard	Standard
Safety Chain	Standard	Standard
Tank Capacity - Front Tank - Middle Tank - Rear Tank - Total	103 bu (3,650 l)	103 bu (3,650 l)
	93 bu (3,272 l)	93 bu (3,272 l)
	150 bu (5,278 l)	150 bu (5,278 l)
	346 bu (12,200 l)	346 bu (12,200 l)
Tank Screens	Standard	Standard
Tank Access Ladder R.H.S.	Standard	Standard
Rated Fan Speed	13" fan - up to 5,500 r.p.m. 17" fan - up to 5,000 r.p.m.	13" fan - up to 5,500 r.p.m. 17" fan - up to 5,000 r.p.m.
Fan Impeller Diameter	Standard 13" (33 cm) Optional 17" (43 cm)	Standard 13" (33 cm) Optional 17" (43 cm)
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.	12cc (Standard) 18 U.S. gal./min. (68 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 5.5 U.S. gal/min (21 l/min)	12cc (Standard) 18 U.S. gal./min. (68 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 5.5 U.S. gal/min (21 l/min)
	16cc (Optional) (Standard on 17" Fan) 21 U.S. gal./min. (80 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 5.5 U.S. gal/min (21 l/min)	16cc (Optional) (Standard on 17" Fan) 21 U.S. gal./min. (80 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 5.5 U.S. gal/min (21 l/min)
Loading Auger	Standard (10" Dia x 21' Lg.) (0.25m Dia x 6.4m Lg.)	Standard (10" Dia x 21' Lg.) (0.25m Dia x 6.4m Lg.)
Tires - Standard (Front) - Optional (Front) - Standard (Rear) - Optional (Rear)	N/A	(2) 21.5 x 16.1 - 10 ply rating Soft Trac
	N/A	(2) 21.5 x 16.1 - 12 ply rating Lug (2) 560/65 D24 LI 140 Soft Trac (2) 500/70 R24 Lug
	(2) 30.5 x 32 - 12 ply rating AWT	(2) 23.1 x 26 - 12 ply rating AWT
	(2) 30.5 x 32 - 14 ply rating Lug (2) 800/65 R32 - LI 172 Lug (2) 900/65 R32 - LI 172 Lug	(2) 23.1 x 26 - 10 ply rating Rice (2) 30.5 x 32 - 12 ply rating AWT (2) 30.5 x 32 - 14 ply rating Lug (2) 800/65 R32 - LI 172 Lug (2) 900/65 R32 - LI 172 Lug
Metering - Ground Driven - Variable Rate (VRT) - GPS Compatible VRT	Standard	Standard
	Optional	Optional
	Optional - FarmScan Monitor	Optional - FarmScan Monitor
Meter Shut Off	Electric	Electric
Number Secondary Runs - Single Shoot	21 to 90	21 to 90
Number Secondary Runs - Double Shoot	42 to 180	42 to 180
Primary Hose - Diameter	2 1/2" (6.4 cm)	2 1/2" (6.4 cm)
Secondary Hose - Diameter	15/16" (2.4 cm)	15/16" (2.4 cm)
Frame	Formed heavy wall 4" x 10" (10 cm x 25.4 cm) tubing	Formed heavy wall 4" x 10" (10 cm x 25.4 cm) tubing
Walk Through Tank	Standard	Standard
Easy Clean Out System	Standard	Standard
Meter Drive Options		
-Second Clutch (For spot fertilizing on the go)	Standard	Standard
Monitor (Shaft Motion (3), Bin Level (3), Fan Speed, Acre Tally, Ground Speed)	Standard Optional Seed Flow	Standard Optional Seed Flow
Work Switch (Mounted to Seeding Machine)	Optional (Ground Drive Only)	Optional (Ground Drive Only)
Rear Tow Hitch	Standard (Max 26,000 lb Draft Load) (Max 11,818 kg Draft Load)	Optional (Max 15,000 lb Draft Load) (Max 6,818 kg Draft Load)
Mechanical Acre Meter	Optional (Ground Drive Only)	Optional (Ground Drive Only)
Hitch Stand	N/A	Optional

Specifications

8370XL Specifications and Options

Model	8370XL	8370XL
Configuration	Tow Between	Tow Behind
Length without auger (with auger)	23' 4" (7.14m) (24' 7" (7.49m))	23' 4" (7.14m) (24' 7" (7.49m))
Height	15' (4.57m)	15' (4.57m)
Width	13' 4" (4.06m)	13' 4" (4.06m)
Weight (Hydraulic Drive)	13,618 lbs. with 3rd tank	10,440 lbs. (4,745 kg)
Safety Lights	Standard	Standard
Safety Chain	Standard	Standard
Tank Capacity	Optional 83 bu (2,938 ℓ)	Optional 83 bu (2,938 ℓ)
- Front Tank		
- Middle Tank	174 bu (6,184 ℓ)	174 bu (6,184 ℓ)
- Rear Tank	186 bu (6,537 ℓ)	186 bu (6,537 ℓ)
- Total	360 bu (12,721 ℓ)	360 bu (12,721 ℓ)
Tank Screens	Standard	Standard
Tank Access Ladder R.H.S.	Standard	Standard
Rated Fan Speed	13" fan - up to 5,500 r.p.m. 17" fan - up to 5,000 r.p.m.	13" fan - up to 5,500 r.p.m. 17" fan - up to 5,000 r.p.m.
Fan Impeller Diameter	Standard 13" (33 cm) Optional 17" (43 cm)	Standard 13" (33 cm) Optional 17" (43 cm)
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.	12cc (Standard) 18 U.S. gal./min. (68 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 5.5 U.S. gal/min (21 l/min)	12cc (Standard) 18 U.S. gal./min. (68 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 5.5 U.S. gal/min (21 l/min)
	16cc (Optional) (Standard on 17" Fan) 21 U.S. gal./min. (80 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 5.5 U.S. gal/min (21 l/min)	16cc (Optional) (Standard on 17" Fan) 21 U.S. gal./min. (80 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 5.5 U.S. gal/min (21 l/min)
Loading Auger	Standard (10" Dia x 21' Lg.) (0.25m Dia x 6.4m Lg.)	Standard (10" Dia x 21' Lg.) (0.25m Dia x 6.4m Lg.)
Tires	- Standard (Front) - Optional (Front) - Standard (Rear) - Optional (Rear)	(2) 560/65 D24 - LI 140 Soft Trac (2) 500/70 R24 Lug (2) 30.5 x 32 - 12 ply rating AWT (2) 30.5 x 32 - 14 ply rating Lug (2) 800/65 R32 - LI 172 Lug (2) 900/65 R32 - LI 172 Lug
Metering	- Ground Driven - Variable Rate (VRT) - GPS Compatible VRT	Standard Optional Optional - FarmScan Monitor
Meter Shut Off	Electric	Electric
Number Secondary Runs - Single Shoot	21 to 90	21 to 90
Number Secondary Runs - Double Shoot	42 to 180	42 to 180
Primary Hose - Diameter	2 1/2" (6.4 cm)	2 1/2" (6.4 cm)
Secondary Hose - Diameter	15/16" (2.4 cm)	15/16" (2.4 cm)
Frame	Formed heavy wall 4" x 10" (10 cm x 25.4 cm) tubing	Formed heavy wall 4" x 10" (10 cm x 25.4 cm) tubing
Walk Through Tank	Standard	Standard
Easy Clean Out System	Standard	Standard
Meter Drive Options		
-Second Clutch (For spot fertilizing on the go)	Standard	Standard
Monitor (Shaft Motion (3), Bin Level (3), Fan Speed, Acre Tally, Ground Speed)	Standard Optional Seed Flow	Standard Optional Seed Flow
Work Switch (Mounted to Seeding Machine)	Optional (Ground Drive Only)	Optional (Ground Drive Only)
Rear Tow Hitch	Standard (Max 26,000 lb Draft Load) (Max 11,818 kg Draft Load)	Optional (Max 15,000 lb Draft Load) (Max 6,818 kg Draft Load)
Mechanical Acre Meter	Optional (Ground Drive Only)	Optional (Ground Drive Only)
Hitch Stand	N/A	Optional

Specifications

8425XL Specifications and Options

Model	8425XL	8425XL
Configuration	Tow Between	Tow Behind
Length without auger (with auger)	23' 4" (7.14m) (24' 7" (7.49m))	23' 4" (7.14m) (24' 7" (7.49m))
Height	13' 4" (4.06)	13' 4" (4.06)
Width	13' 4" (4.06)	13' 4" (4.06)
Weight (Hydraulic Drive)		11,500 lbs. (5,227 kg)
Safety Lights	Standard	Standard
Safety Chain	Standard	Standard
Tank Capacity		
- Front Tank	130 bu (4,559 l)	130 bu (4,559 l)
- Middle Tank	117 bu (4,126 l)	117 bu (4,126 l)
- Rear Tank	186 bu (6,537 l)	186 bu (6,537 l)
- Total	433 bu (15,222 l)	433 bu (15,222 l)
Tank Screens	Standard	Standard
Tank Access Ladder R.H.S.	Standard	Standard
Rated Fan Speed	13" fan - up to 5,500 r.p.m. 17" fan - up to 5,000 r.p.m.	13" fan - up to 5,500 r.p.m. 17" fan - up to 5,000 r.p.m.
Fan Impeller Diameter	Standard 13" (33 cm) Optional 17" (43 cm)	Standard 13" (33 cm) Optional 17" (43 cm)
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.	12cc (Standard) 18 U.S. gal./min. (68 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 5.5 U.S. gal/min (21 l/min)	12cc (Standard) 18 U.S. gal./min. (68 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 5.5 U.S. gal/min (21 l/min)
	16cc (Optional) (Standard on 17" Fan) 21 U.S. gal./min. (80 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 5.5 U.S. gal/min (21 l/min)	16cc (Optional) (Standard on 17" Fan) 21 U.S. gal./min. (80 l/min) at 2,750 p.s.i. (18,960 kpa) VRT requires an additional 5.5 U.S. gal/min (21 l/min)
Loading Auger	Standard (10" Dia x 21' Lg.) (0.25m Dia x 6.4m Lg.)	Standard (10" Dia x 21' Lg.) (0.25m Dia x 6.4m Lg.)
Tires		
- Standard (Front)	N/A	(2) 560/65 D24 - LI 140 Soft Trac
- Optional (Front)	N/A	(2) 500/70 R24 Lug
- Standard (Rear)	(2) 800/65 R32 - LI 172 Lug	(2) 30.5 x 32 - 12 ply rating AWT
- Optional (Rear)	(2) 900/65 R32 - LI 172 Lug	(2) 30.5 x 32 - 14 ply rating Lug (2) 800/65 R32 - LI 172 Lug (2) 900/65 R32 - LI 172 Lug
Metering		
- Ground Driven	Standard	Standard
- Variable Rate (VRT)	Optional	Optional
- GPS Compatible VRT	Optional - FarmScan Monitor	Optional - FarmScan Monitor
Meter Shut Off	Electric	Electric
Number Secondary Runs - Single Shoot	21 to 90	21 to 90
Number Secondary Runs - Double Shoot	42 to 180	42 to 180
Primary Hose - Diameter	2 1/2" (6.4 cm)	2 1/2" (6.4 cm)
Secondary Hose - Diameter	15/16" (2.4 cm)	15/16" (2.4 cm)
Frame	Formed heavy wall 4" x 10" (10 cm x 25.4 cm) tubing	Formed heavy wall 4" x 10" (10 cm x 25.4 cm) tubing
Walk Through Tank	Standard	Standard
Easy Clean Out System	Standard	Standard
Meter Drive Options		
-Second Clutch (For spot fertilizing on the go)	Standard	Standard
Monitor (Shaft Motion (3), Bin Level (3), Fan Speed, Acre Tally, Ground Speed)	Standard Optional Seed Flow	Standard Optional Seed Flow
Work Switch (Mounted to Seeding Machine)	Optional (Ground Drive Only)	Optional (Ground Drive Only)
Rear Tow Hitch	Standard (Max 26,000 lb Draft Load) (Max 11,818 kg Draft Load)	Optional (Max 15,000 lb Draft Load) (Max 6,818 kg Draft Load)
Mechanical Acre Meter	Optional (Ground Drive Only)	Optional (Ground Drive Only)
Hitch Stand	N/A	Optional

Section 3: Checklist

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SAFETY-ALERT SYMBOL



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

ATTENTION - BE ALERT.
Your safety is involved.

Manuals

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

Warranty Void if Not Registered

Parts Manual

Order Part Number N42302

Assembly Manual

Order Part Number N42299

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

- ☐ 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!!**

Checklist

Notes

Section 4: Introduction

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Introduction

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 EIGHT Series XL Air Cart.

To protect your investment, study your manual before starting or operating in the field. Learn how to operate and service your EIGHT Series XL 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 EIGHT Series XL 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 EIGHT Series XL 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 EIGHT Series XL 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 EIGHT Series XL Air Cart represents the latest in air cart design technology. There are currently five sizes available: 243 bushel two tank cart, 303 bushel two tank cart, 346 bushel three tank cart, 360 bushel two tank cart and 433 bushel three tank cart with hydraulic fan drive. 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 8240 has a 38:62 tank split, the 8300 has a 39:61 tank split, the 8336 has a 29:26:45 tank split, the 8370 has a 48:52 tank split and 8425 cart has a 30:27:43 tank split. 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 metering system incorporates spiral fluted wheels. The size of the metering wheel is matched to the number of outlets on the patented flat fan 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 VRT system enables the operator the ability to increase or decrease application rates from the tractor seat by pressing a button. Application rates can be changed on the go in increments of 5% from the operator set application rate (Max/Min - 50%). This gives the producer the ability to match application rates to varying soil requirements.

The VRT monitor with its easy to read display and Smart Sensors make basic operation effortless with unmatched reliability. Advanced functions are simple to program and the monitor can be quickly plugged into the harness at the air cart for ease of calibration. The monitor constantly monitors shaft rotation and bin levels, and with just a push of a button displays fan speed, ground speed, field acres seeded, total acres seeded and actual application rates per acre. Real time actual application rate of two tanks can be displayed simultaneously on the monitor display.

Each metering shaft (up to three) is independently driven by a hydraulic motor. The hydraulic motors are independently controlled through electric solenoid valves. The VRT system senses ground speed and adjusts the hydraulic valves to maintain precise meter shaft rotation vs ground speed at a frequency of 20 times per second. The VRT system has the flexibility to allow the use of either tank for fertilizer or seed as well as the third tank or granular tank.

Standard Features

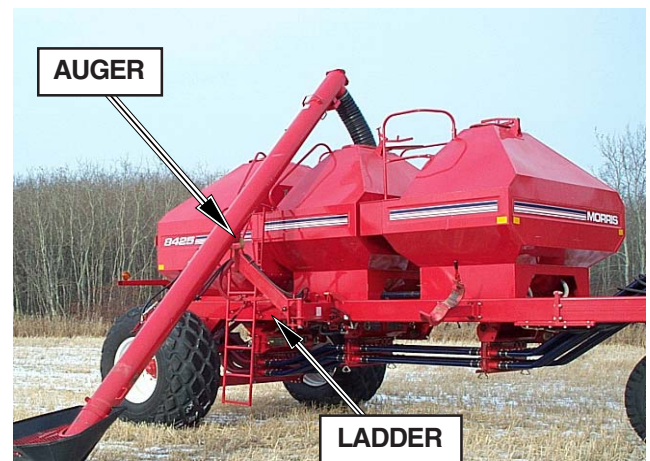
Hydraulic Auger

The 10" diameter hydraulic auger is designed to make loading and unloading product from the air cart tank very simple and easy.

Fast, easy unloading and loading of all tanks is possible with the high output well balanced auger.

Right Hand Side Ladder

This ladder allows the operator easy access to the walkway and tank lids making filling the tanks more convenient.



Introduction

Options

Full Bin Indicator

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

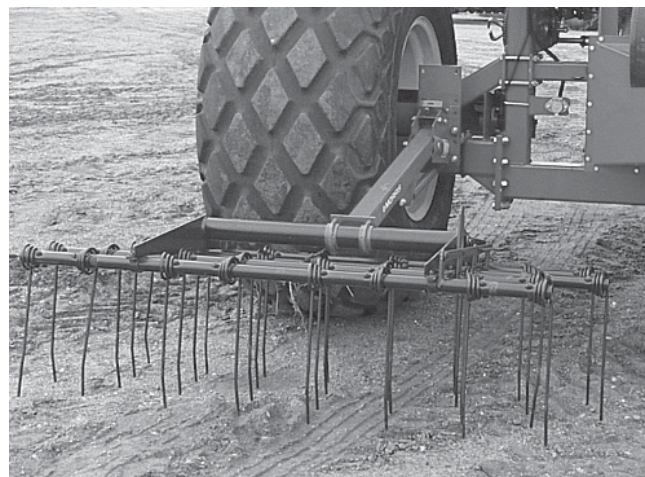


Fill Indicator - Optional

Mounted Harrow Kit

The mounted harrow kit allows two six foot harrows to be attached on the tow behind air cart models.

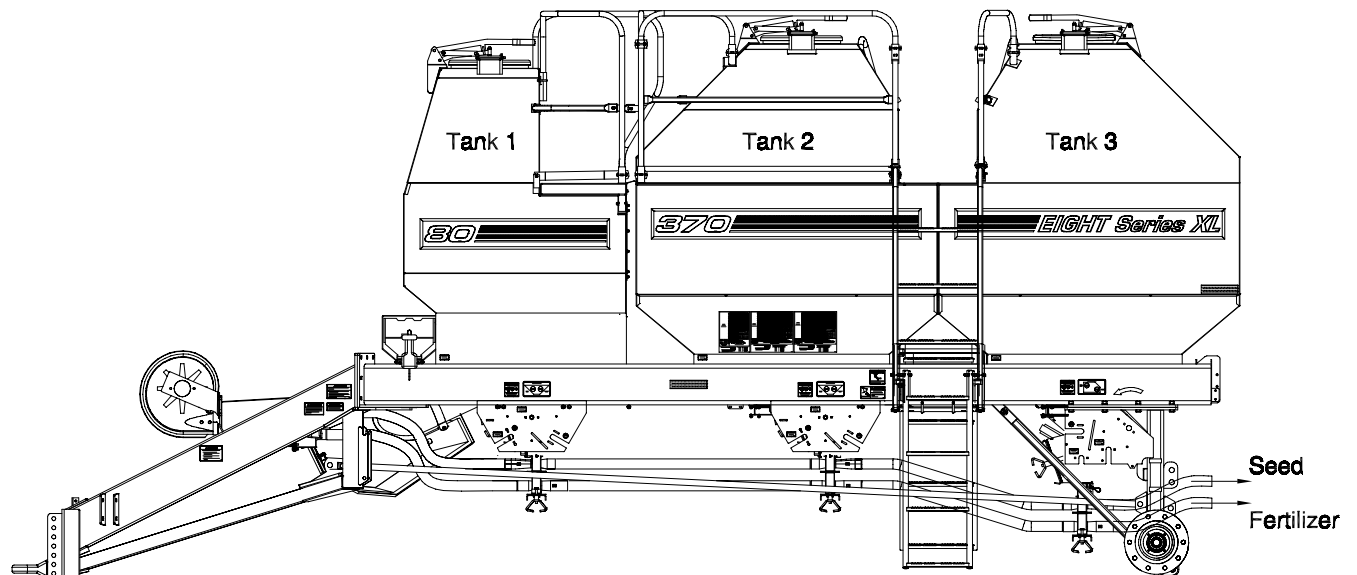
The harrows will eradicate the air cart tracks.



Options - Continued

Double Shoot Distribution

This is used when fertilizer is placed at a separate depth from the seed.



Hitch Stand Kit (Tow Behind)

The hitch stands make hitching and unhitching easier.



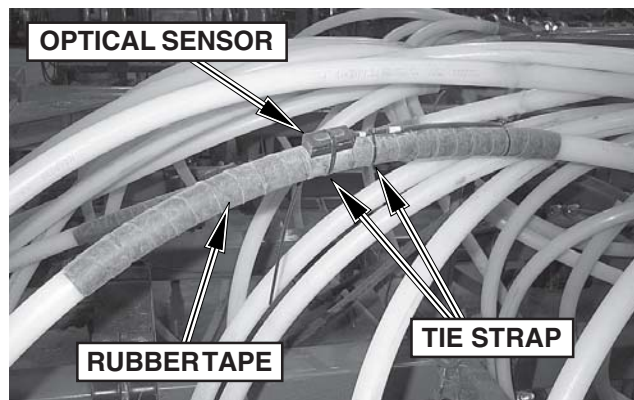
Introduction

Options - Continued

Flow Sensors

This option requires the use of Blockage Modules. The Blockage Modules signal the monitor on the loss of flow at any sensor.

Up to 12 blockage modules may be connected, each of which can have up to 16 flow sensors connected, providing a 192 run capability. More information is given in the Monitor Section under “Flow”.



Optical Sensor Installation

Rear Tow Hitch

The Tow Hitch is available only on tow behind models.

The Tow Hitch enables the operator the ability to attach a packer bar or an anhydrous tank behind the air cart.



Seed Boots

MORRIS offers a variety of seed boots for the EIGHT Series XL Air Cart. Check with your Morris Dealer for new additions and application of the MORRIS seed boot line-up.

Note: *For guidelines see Operation Section under “Opener Adjustments”.*

Section 5: Operation

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CAUTION



BE ALERT

SAFETY FIRST

REFER TO SECTION 1 AND REVIEW ALL SAFETY RECOMMENDATIONS.

Application

The Morris EIGHT Series XL Air Cart applies a wide range of seed and granular fertilizer products. It has the capacity to single shoot or double shoot and can apply seed and starter fertilizer in one airstream, while deep banding additional fertilizer at the same time.

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

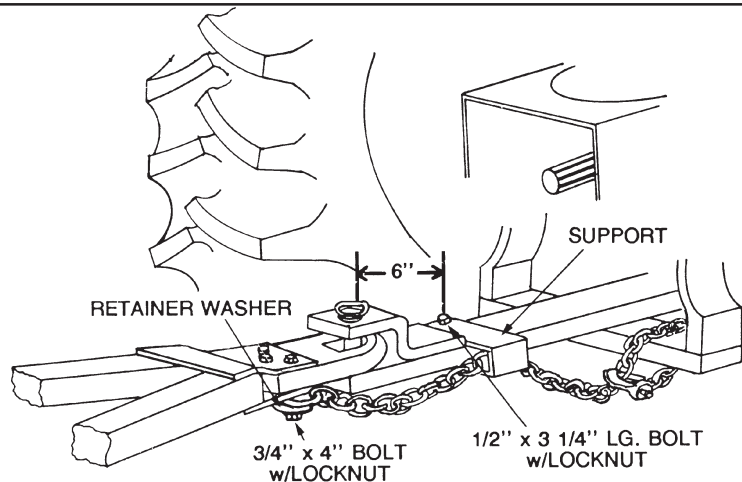
Do not search for high pressure hydraulic leaks without hand and face protection. A tiny, almost invisible leak can penetrate skin, that requires immediate medical attention.

Operation



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.



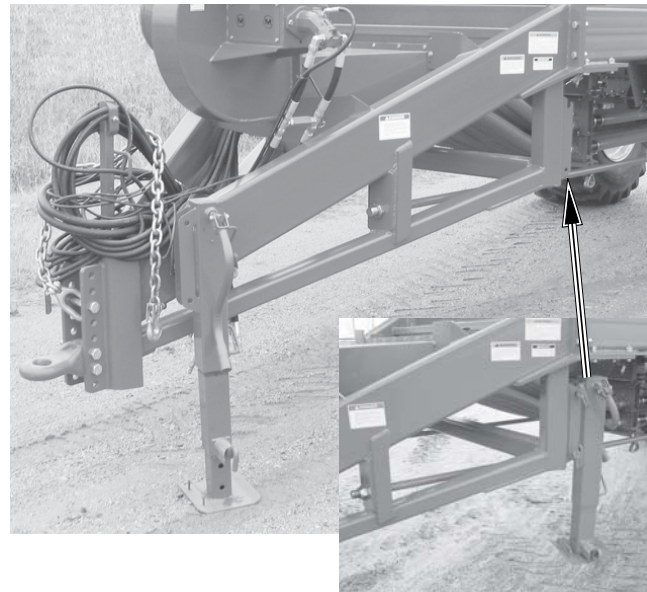
Attach safety chain to the tractor drawbar support or other specified anchor location with the appropriate parts.

Hitching to Tractor (Seeding Tool or Tow Between Cart)

- 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

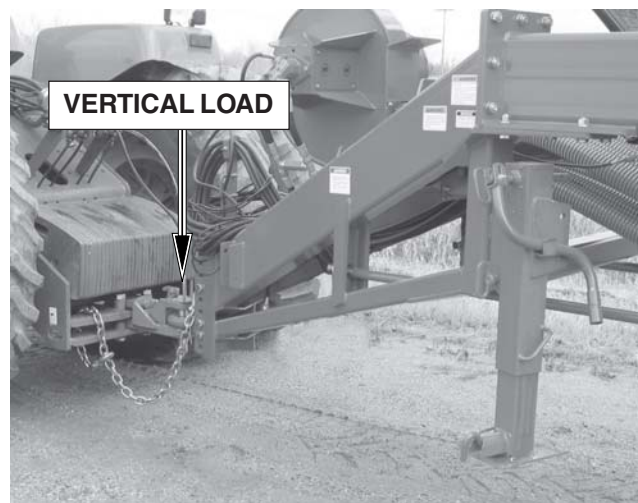
Dirt in the hydraulic system could damage O-rings, causing leakage, pressure loss and total system failure.

Hitching to Tractor (Seeding Tool or Tow Between Cart) - Continued

Tractor Drawbar Requirements

Tractor drawbar vertical load requirements for loaded tow between air carts are as follows:

8240	5,200 lbs (2,364 kg) minimum
8240/Third Tank	7,500 lbs (3,410 kg) minimum
8300	6,200 lbs (2,818 kg) minimum
8300/Third Tank	8,500 lbs (3,864 kg) minimum
8336	8,500 lbs (3,864 kg) minimum
8370	8,500 lbs (3,864 kg) minimum
8370/Third Tank	11,000 lbs (5,000 kg) minimum
8425	11,000 lbs (5,000 kg) minimum

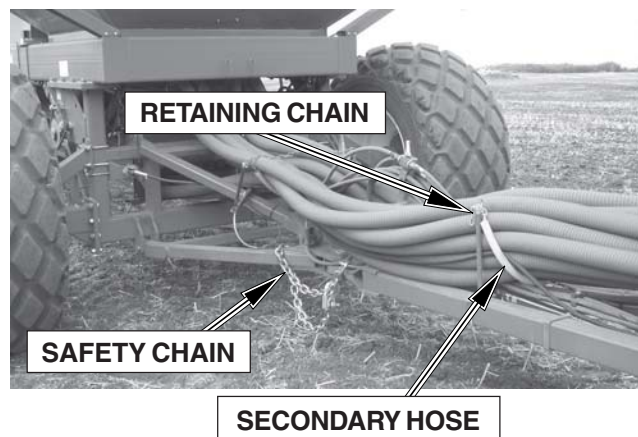


Hitching to Seeding Tool (Tow Between Cart)

- 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" hairpin.
- 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.



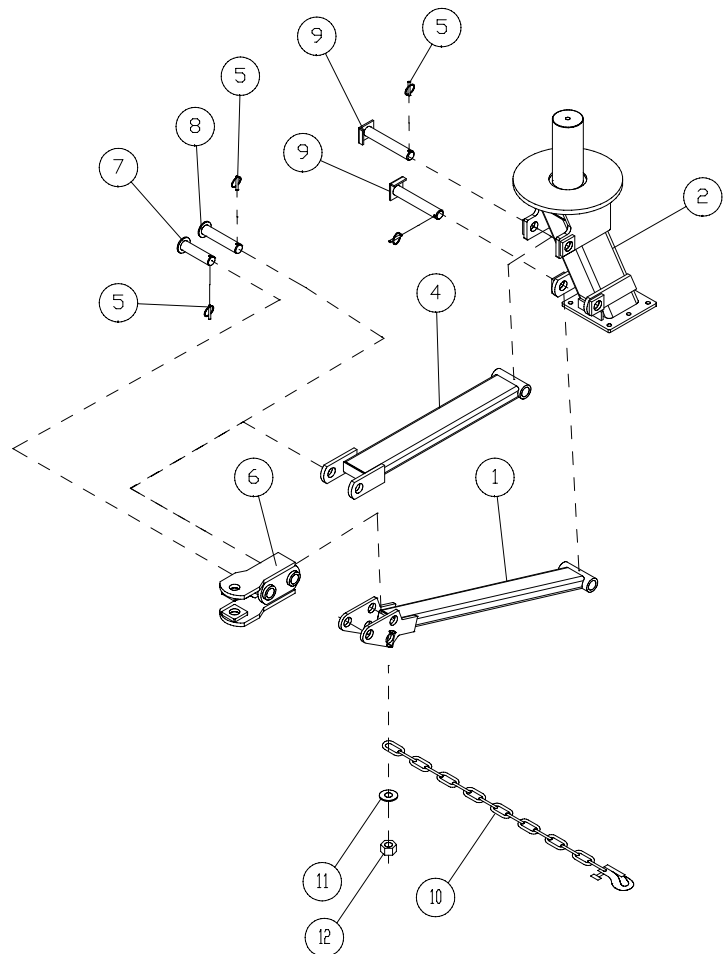
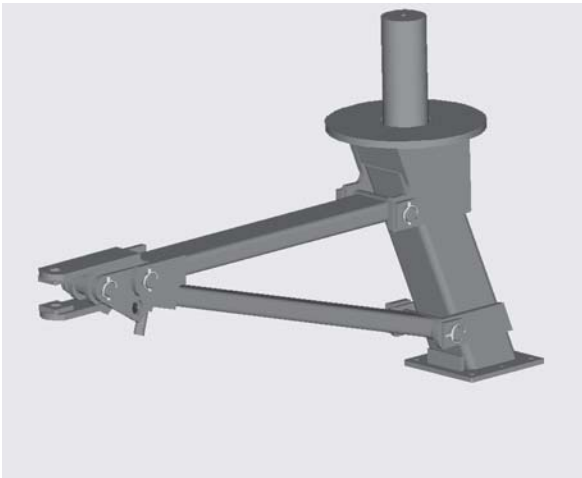
Operation

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.

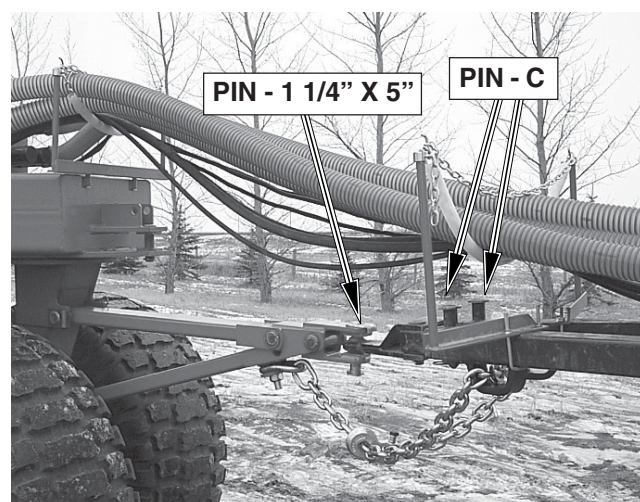
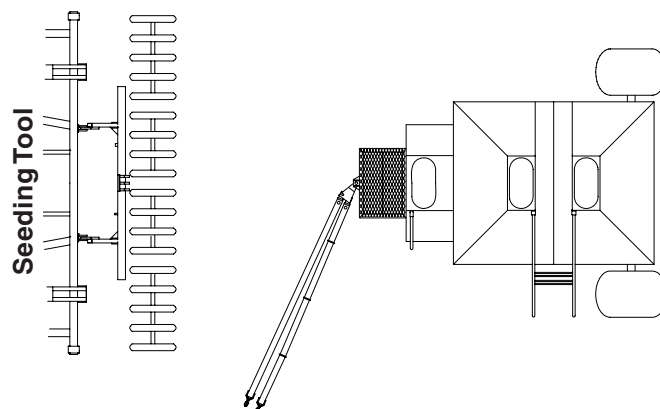
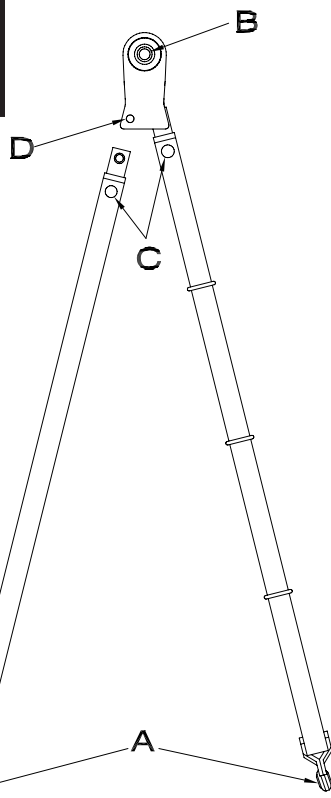


Hitching to Seeding Tool (Tow Behind Cart)

- 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.

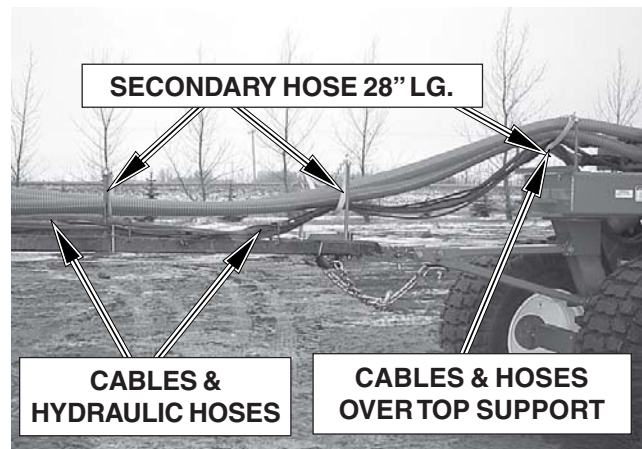
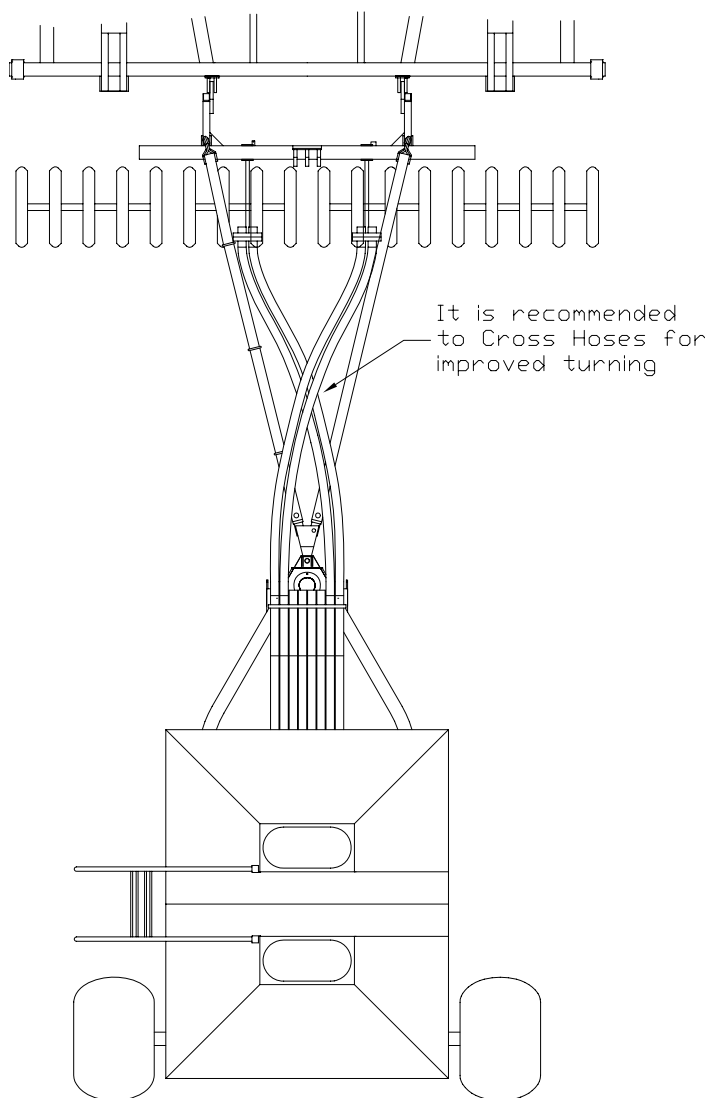
PIN SIZE	
A	1 1/8" x 3 11/16"
B	1 1/2" x 5 5/8"
C	1" x 5 13/32"
D	1" x 3 3/4"



Operation

Hitching to Seeding Tool (Tow Behind Cart) - Continued

- Route controller and monitor wires and hydraulic lines through rear retaining chain with the secondary hose over the bottom half of the chain.
- Route controller 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 controller quick connectors at both the tractor/seeding tool and the seeding tool/air cart connections.

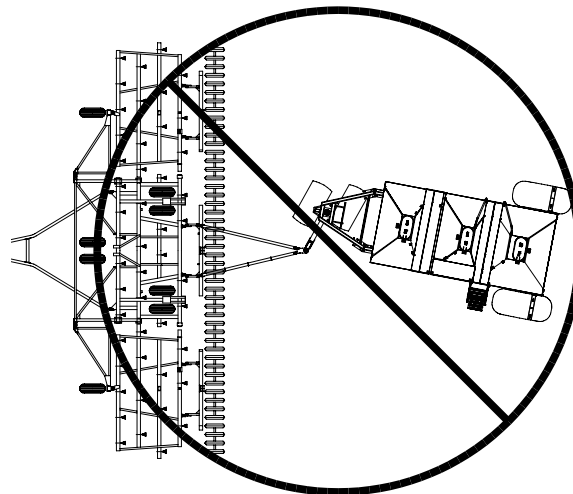


Hoses with correct amount of sag

Important

Extreme care is required when backing up unit.

Hitch damage will occur if castor jackknifes.

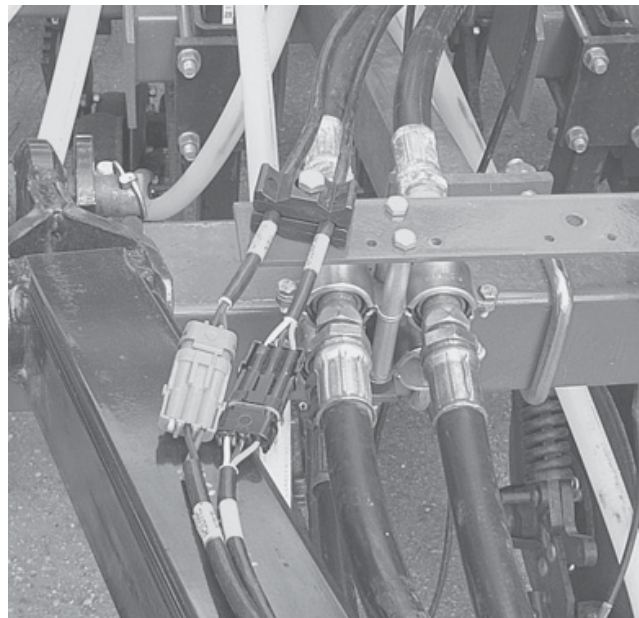


Primary Hose Coupler

Hitching to Seeding Tool (Tow Behind Cart) - Continued

Hydraulic Connections

- Connect the monitor and VRT controller 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.

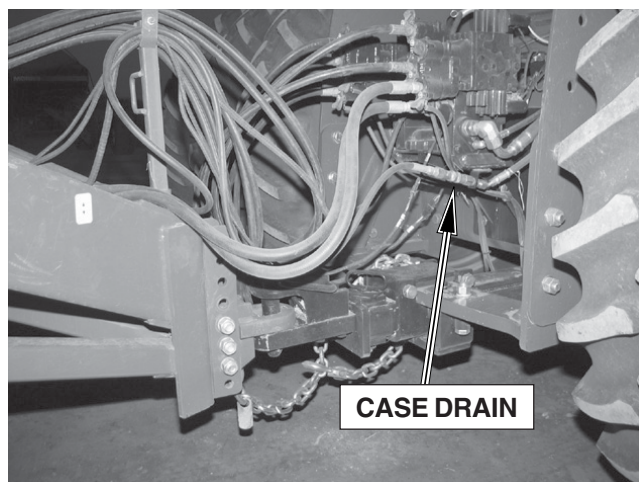


Seeding Tool Coupling

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 case drain 3/8" diameter hose 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

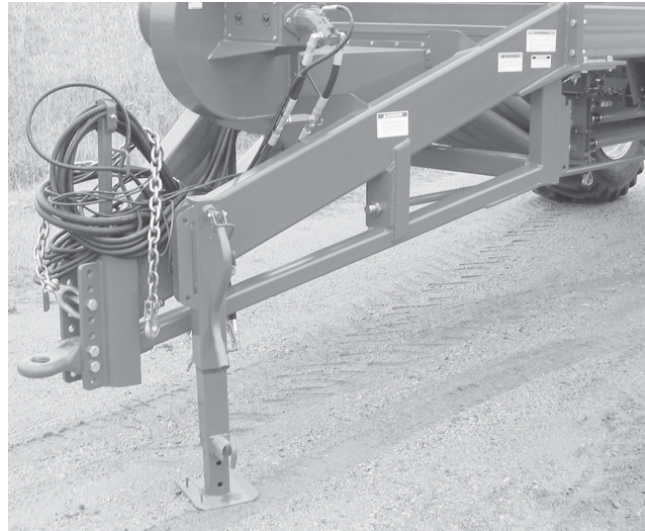
Operation

Unhitching from Tractor (Seeding Tool or Tow Between Cart)

- 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.

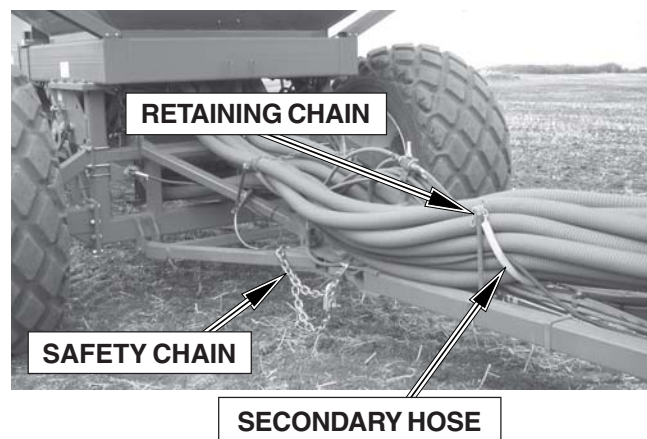
- Ensure all transport locks are properly secured. Refer to seeding tool manual for more details.
- Relieve pressure in the hydraulic hoses by positioning tractor hydraulic lever in “float” position or turn tractor engine off and cycle lever back and forth several times.
- Disconnect the hydraulic hoses.
- Disconnect the VRT controller 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

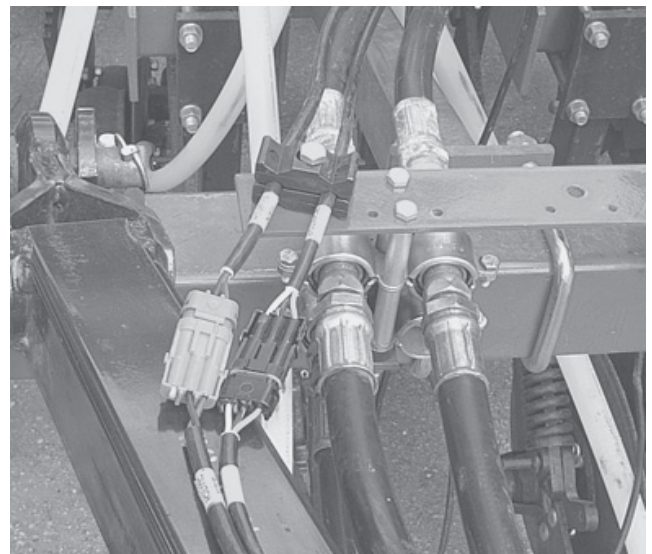
Unhitching from Seeding Tool (Tow Between Cart)

- 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 cart away from seeding tool.

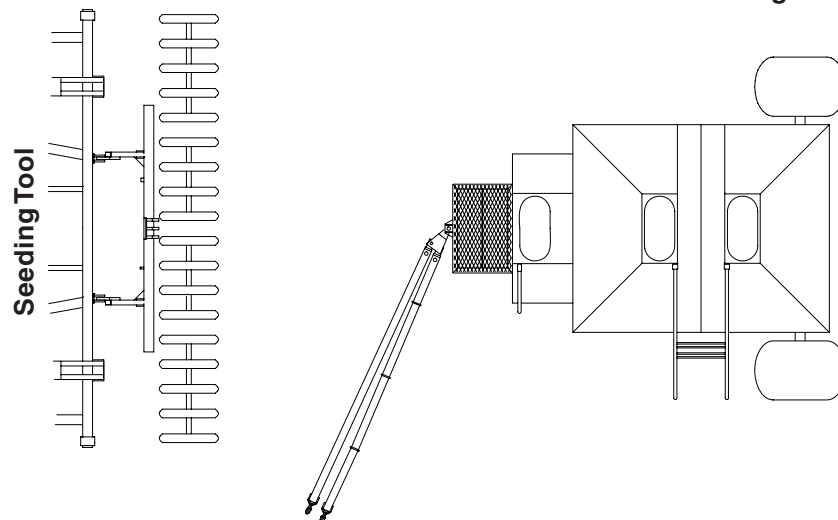


Unhitching from Seeding Tool (Tow Behind Cart)

- 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 controller and monitor cables.
- Remove the hitch pins.
- Move hitch poles to the side of cart, if not equipped with hitch stands.
- Slowly move seeding tool away from air cart.



Seeding Tool Coupling



Operation

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 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.
- **REDUCE SPEED** with material in tank. **Do Not** Exceed a speed of 10 mph (16 kph).
- 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.

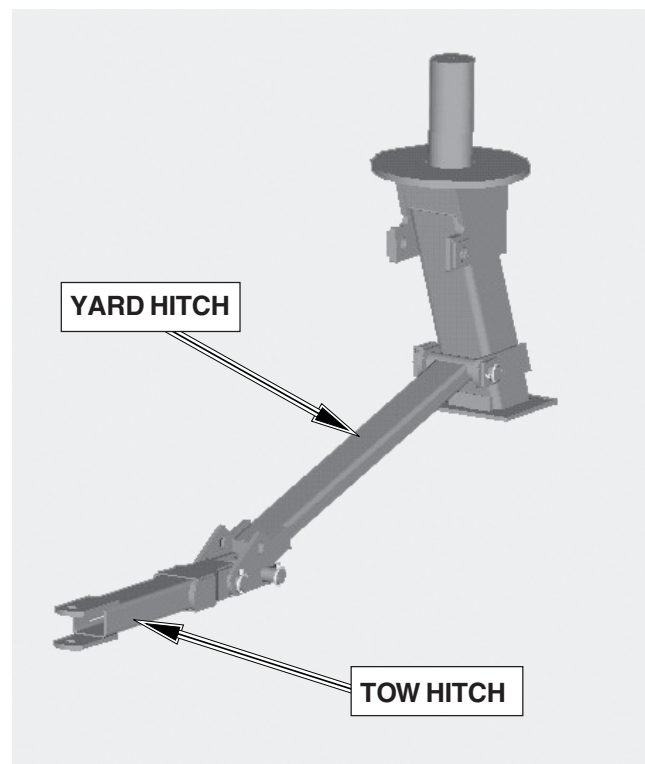
Tow Hitch (Tow Behind Units)

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

Important

When the machines are being towed by a semi tractor or trucks of any description, the units **HAVE to be towed separately from seeding tool with tow hitch provided.**



Tow Hitch

Preparing VRT

Zero Shaft Hydraulic Motor Solenoids

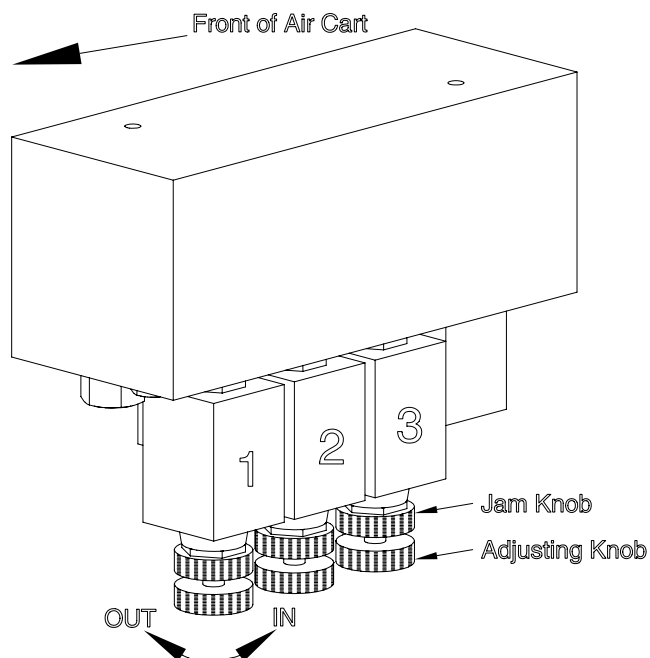
Upon initial setup the preload of the valves must be set to match the tractor hydraulics.

Note: Tanks must be empty.

Zero the shaft hydraulic motors by using the following procedure:

- Ensure there is no product in any tanks.
- Warm up hydraulic system by running fan system for 5-10 minutes. Hydraulic hoses at fan motor should be warm to touch.
- **Turn OFF** Monitor, VRT Console and Controller.
- Start with ***all*** adjusting knobs ***turned out fully***.
- Adjust each valve individually by following the procedure below:
 - Start with rear tank first adjusting knob '3'.
 - Loosen jam knob.
 - Turn adjusting knob IN until motor starts to turn.
 - Allow motor to turn for 1-2 minutes to allow for motor to reach optimal operating temperature.
 - Then turn adjusting knob OUT until motor stops turning.
 - Turn adjusting knob OUT an additional 1/2 turn.
 - Tighten jam knob to secure adjusting knob in place.
- Repeat the above procedure for the other valves.

Note: If air cart is ***NOT*** equipped with a Third Tank or Granular Tank solenoid '1' must be unplugged and the adjusting knob turned out fully.



Note: It is recommended to check the zero of the valves at the start of each season or if a different tractor is used on the system.

Operation

Preparing VRT - Continued

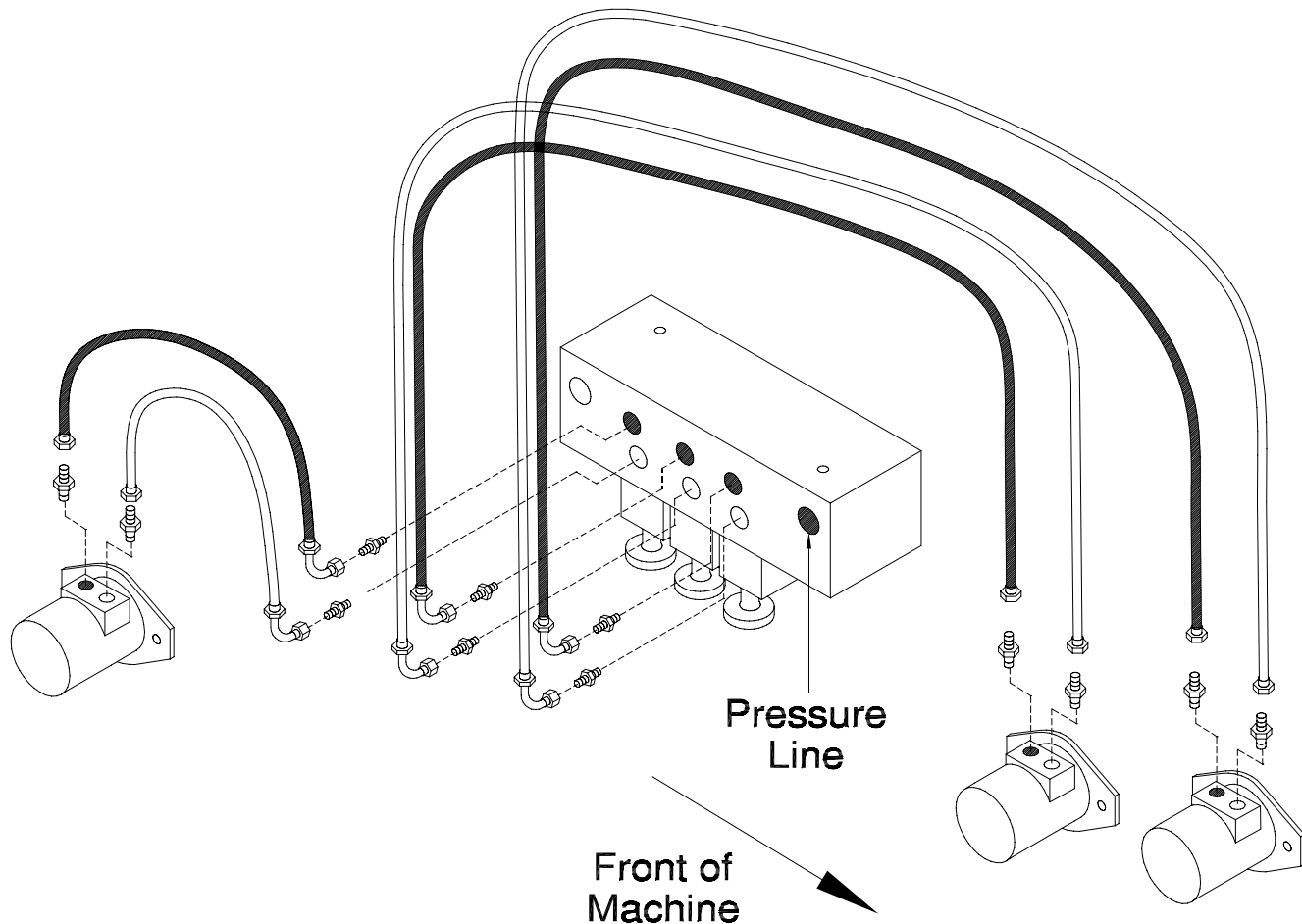
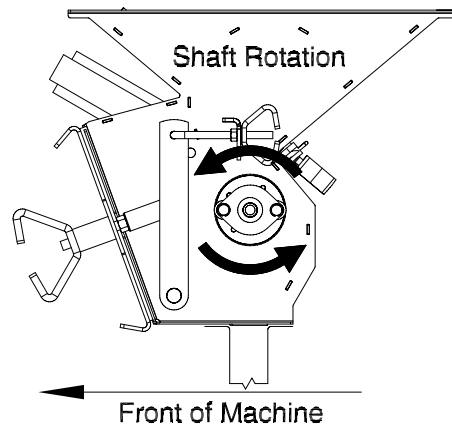
Verify VRT Hydraulic Assembly

VRT system should be run to confirm correct rotation of meter shafts.

The diagram below illustrates the correct hose orientations for the VRT valve body.

Note: The pressure line from the tractor is the front port of the valve body.

To ensure correct hose installation, the meter shafts will turn counterclockwise when viewed from transmission side during system operation.



Metering System

The EIGHT Series XL 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 EIGHT Series XL 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.

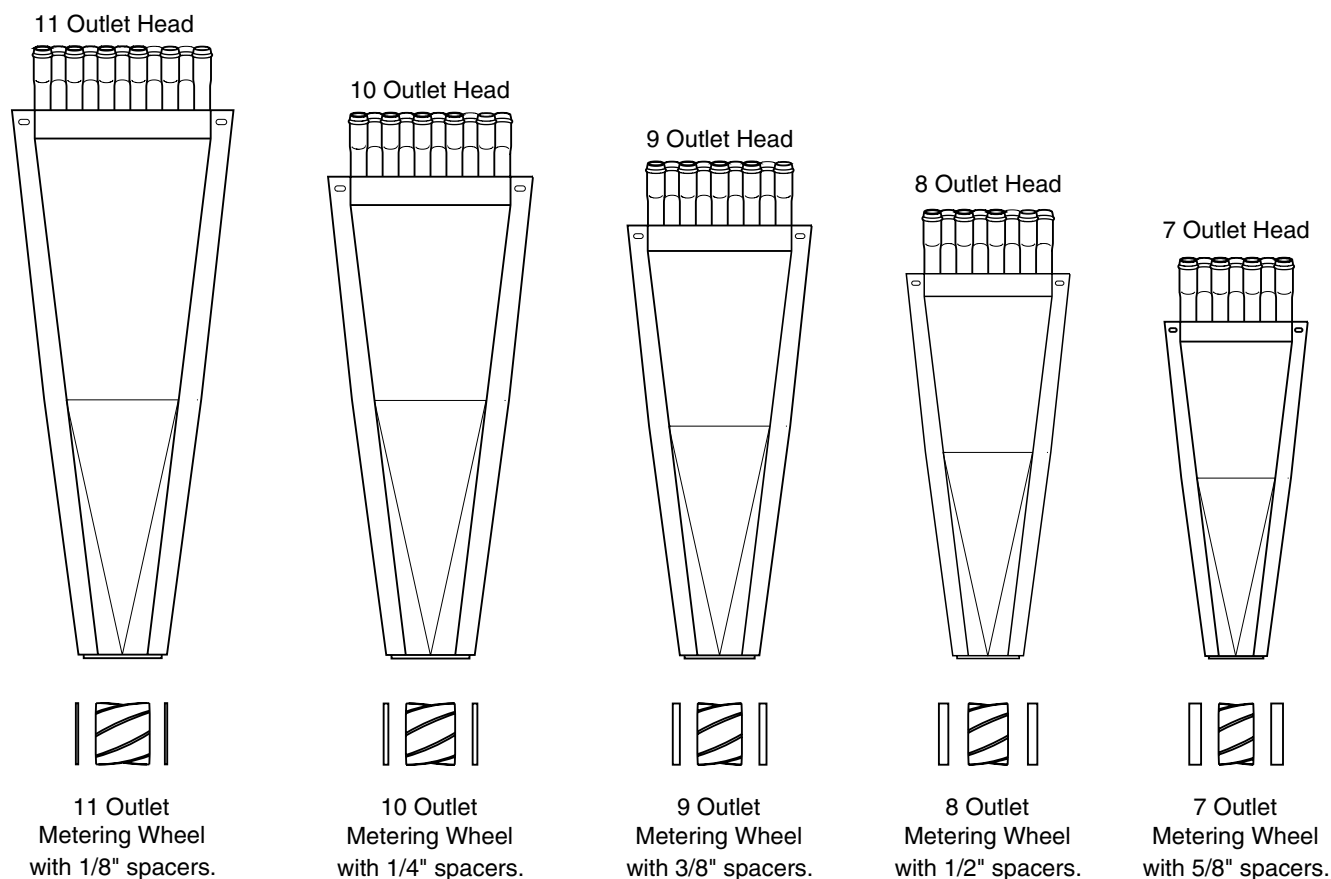
Note: Before putting product into the tanks check the following:

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.



Operation

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.

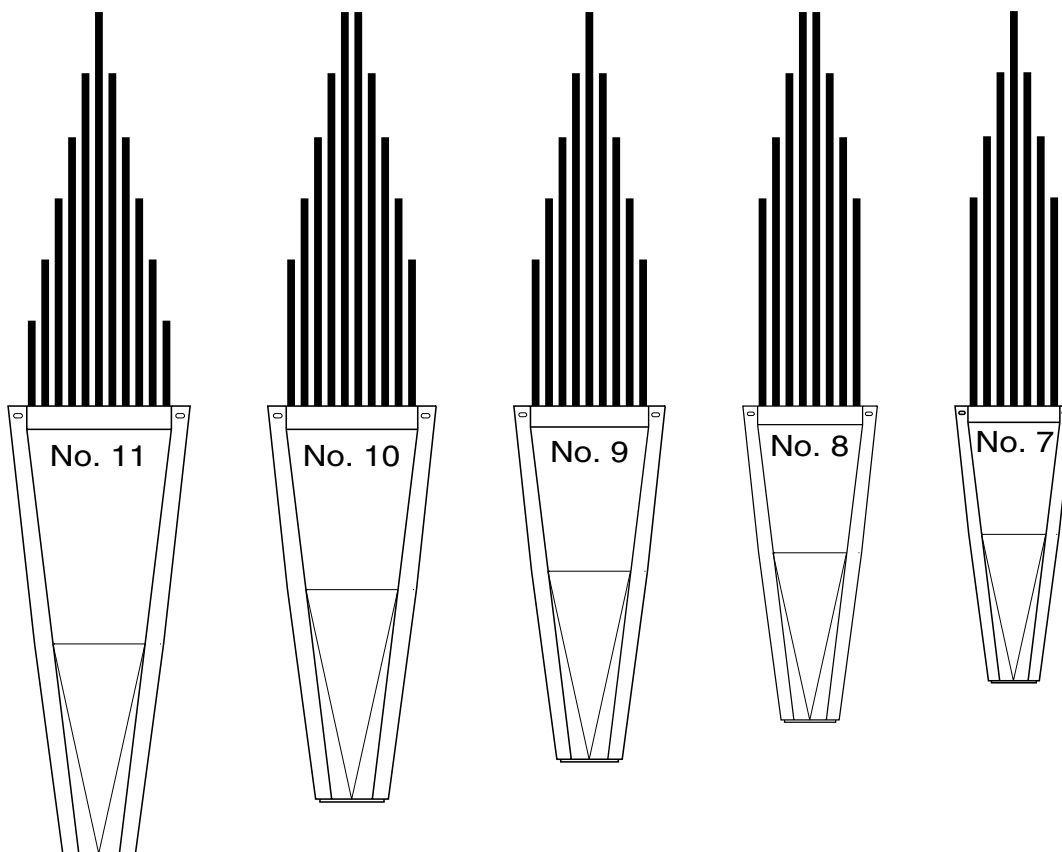
Important

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

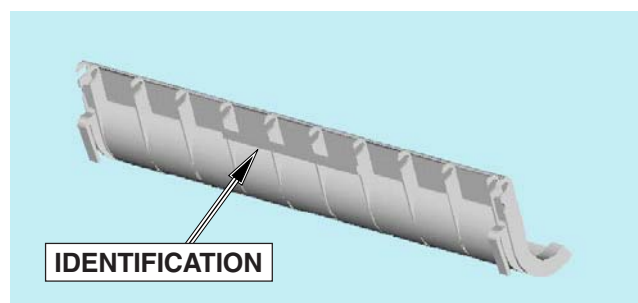
Seed Plate Sizes

The seed plate comes in 3 different sizes, fine, medium and coarse. Each seed plate is designed for use with specific product types. The coarse seed plate is offered in two versions - standard and coated. The coated seed plate is recommended for DAP fertilizers.

The three different seed plates allow all types of seeds and fertilizers to be metered.

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

The seed plates are identified by an inscription (FINE, MEDIUM, or COARSE) on the back.



Seed Plate

Seed Plate Usage	
Product	Seed Plate
Canola Flax Mustard Nitragin Nodulator	Fine
Barley Lentils Milo Oats Rice Wheat Tag Team Fine Fertilizer	Medium
Beans Peas Soybeans Sunflowers 10-46-0-0 Fertilizer 11-51-0 Fertilizer Fertilizers containing Sulphur and/or Potash	Coarse

Operation

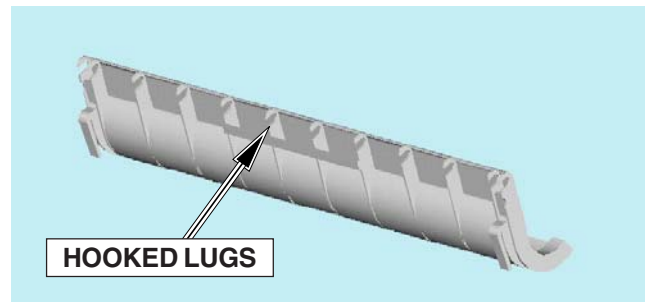
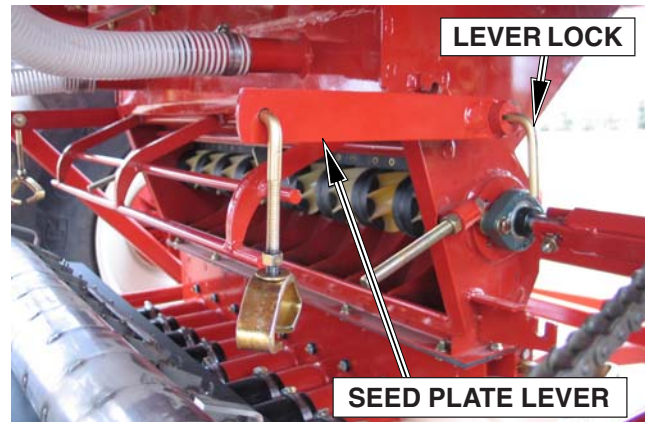
Metering System - Continued

Seed Plate Installation

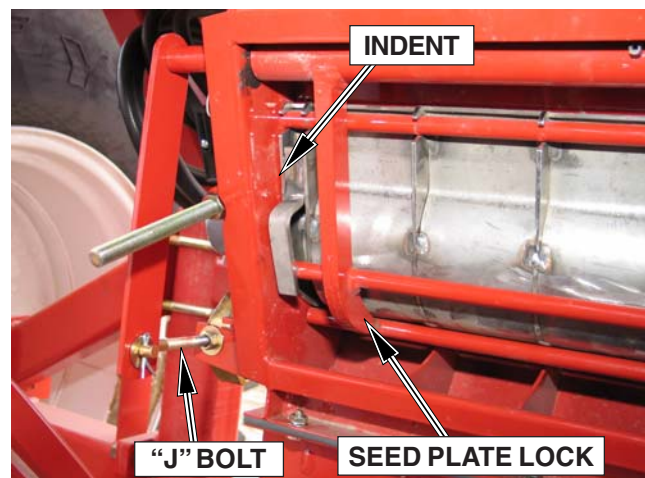
- Ensure Tank Shut-Offs are closed if there is product in the tanks.

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

- Install seed plate with hooked lugs 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 up 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



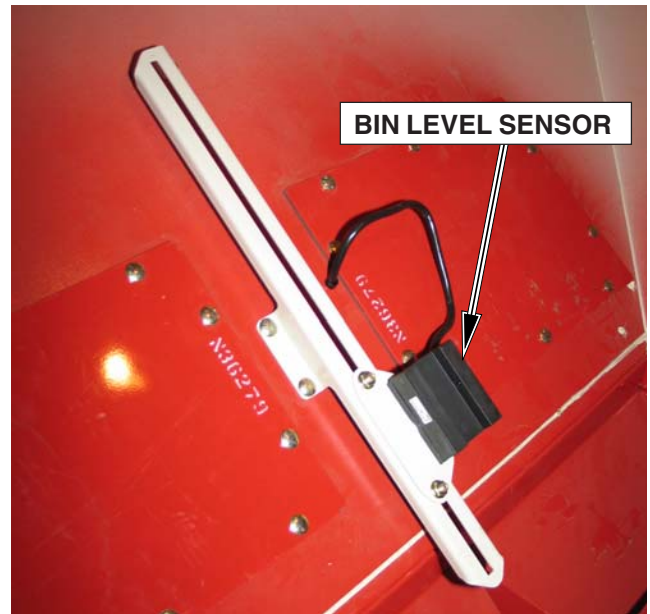
Important

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 position for cereal grains.
 - Lower position for fine seeds.



Full Bin Indicator

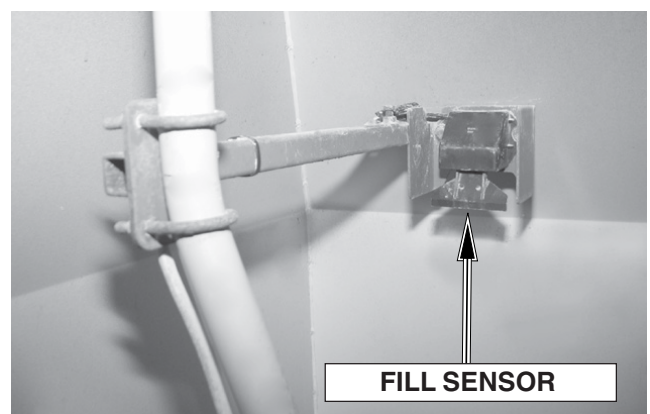
The Morris EIGHT Series XL Air Cart can be equipped with an optional fill indicator to alert when bins are full.

Sensor position 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 - Optional



Fill Sensor - Optional

Operation

Filling Tank

The Morris EIGHT Series XL Air Cart is equipped with 2 or 3 tanks. 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.

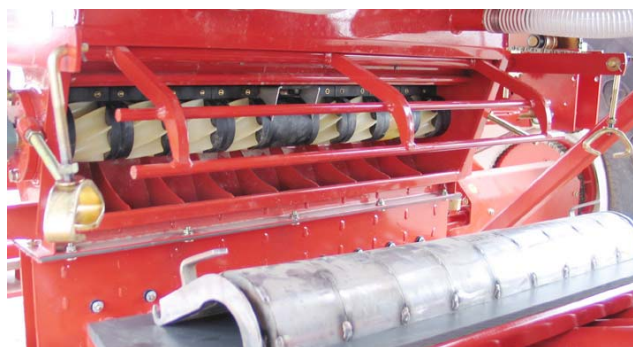
Tank Capacity

Model	Front Tank	Middle Tank	Rear Tank	Total Capacity
8240	Optional 83 bu 103 cu ft 2,938 litres	93 bu 115 cu ft 3,272 litres	150 bu 186 cu ft 5,278 litres	243bu 301 cu ft 8,550 litres
8300	Optional 83 bu 103 cu ft 2,938 litres	117 bu 145 cu ft 4,126 litres	186 bu 232 cu ft 6,564 litres	303 bu 377 cu ft 10,690 litres
8336	103 bu 129 cu ft 3,650 litres	93 bu 115 cu ft 3,272 litres	150 bu 186 cu ft 5,278 litres	346 bu 430 cu ft 12,200 litres
8370	Optional 83 bu 103 cu ft 2,938 litres	174 bu 218 cu ft 6,184 litres	186 bu 232 cu ft 6,537 litres	360 bu 450 cu ft 12,721 litres
8425	130 bu 161 cu ft 4,559 litres	117 bu 145 cu ft 4,126 litres	186 bu 232 cu ft 6,537 litres	433 bu 538 cu ft 15,222 litres

Important

Before putting product into the tanks check the following:

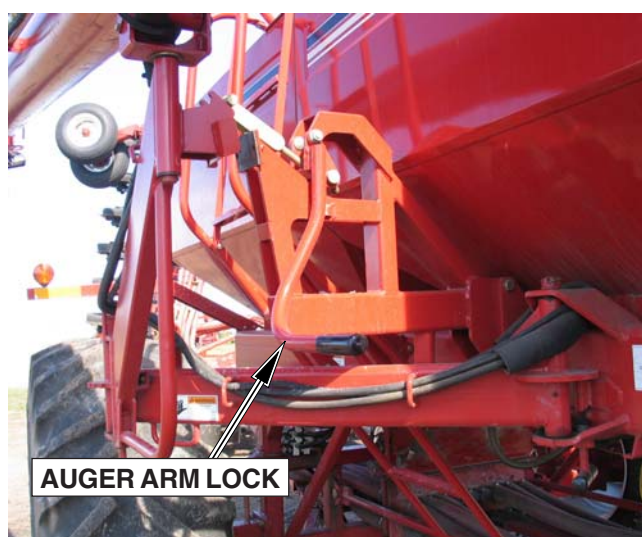
1. The correct seed plate is installed for product being applied.
2. The clean-out doors are fully closed and sealed.
3. The plastic bag covering the fan is removed.
4. Inspect all augers used in handling the products for seeding. Run augers to clean out any debris inside auger so it does not get transferred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



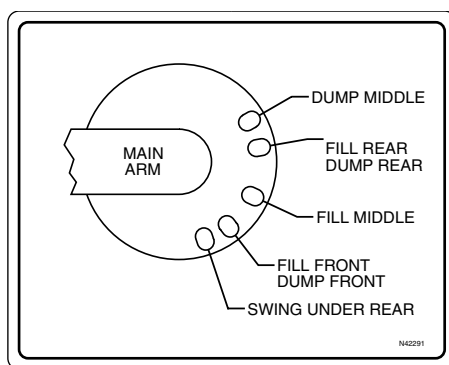
Inspect Metering Body

Filling Tank - Continued

- Unlatch front auger lock.
- Unlatch auger arm lock.
- Refer to decal on auger arm for auger arm positions.
- Ensure lock pins are unlocked to allow free movement of the arm.
- Unlatch the auger from its transport position.
- Swing out the auger. Engage auger arm lock pins into position for the tank to be loaded.



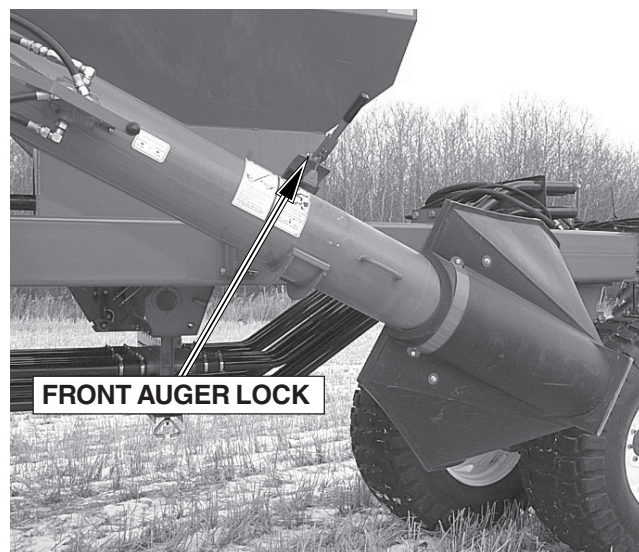
Arm Lock



Auger Arm Lock Pin
- Unlocked -



Auger Arm Lock Pin
- Locked -



Front Lock - Standard



Front Lock - Optional



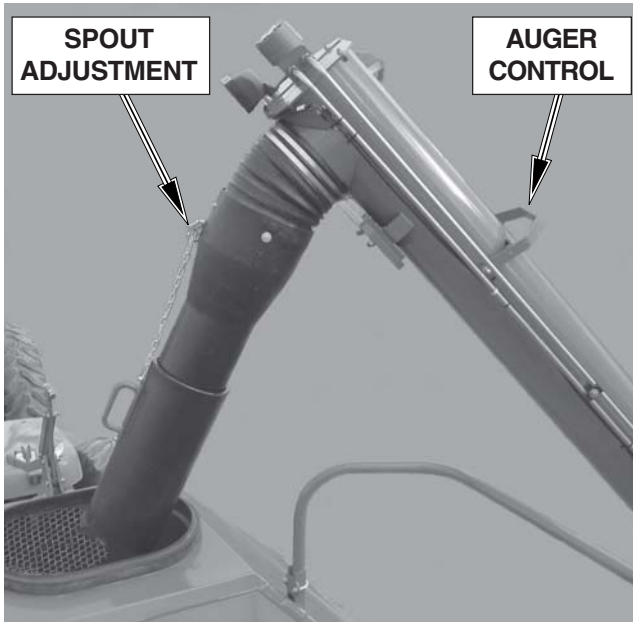
Operation

Filling Tank - Continued

- Open lid on tank to be filled and place auger spout in tank.
- Back truck to the hopper and engage the hydraulic motor on the auger.
- Ensure selector valve is in correct position for auger operation and engage tractor hydraulics.
- Auger product into tank until desired level in tank is reached. (If equipped with the optional fill indicator fill until indicator light turns on.)
- Stop the flow of product into the auger and allow auger to empty.
- Auger operation can be controlled from either the top or bottom of the auger.



Auger Position



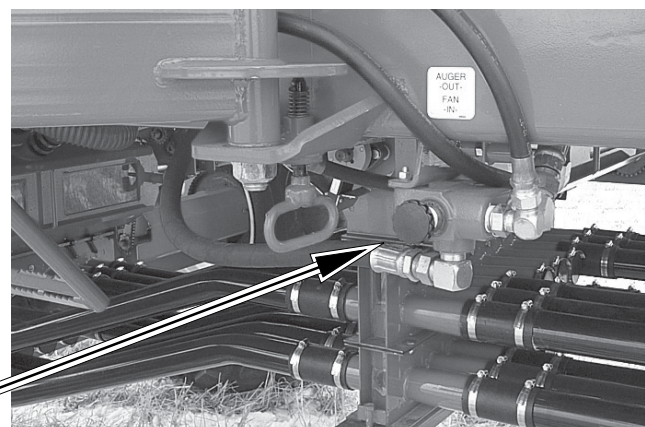
Adjustable Auger Spout



Fill Indicator - Optional

Important

Do not exceed 10 mph with tanks full.



Selector Valve

Filling Tank - Continued

- Clean lid seal and ensure lid seal is positioned correctly before closing tank lid.
- Reverse auger flow to clean out the hopper, screen may be removed for easier clean out.



Auger screen removed



Auger screen installed

- Reinstall auger screen.
- Place ladder in transport position.
- Unlock auger arm lock pins.
- Secure auger in transport position.
- Lock auger arm lock and front auger lock.
- 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.

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.



Auger locks

Operation

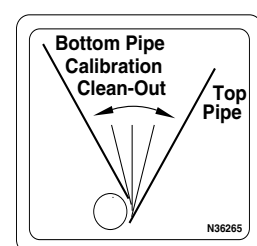
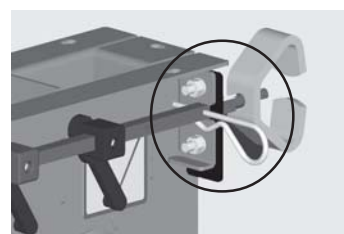
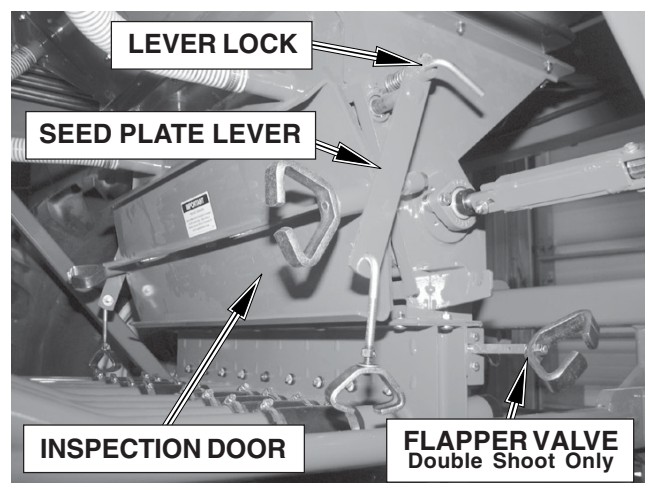
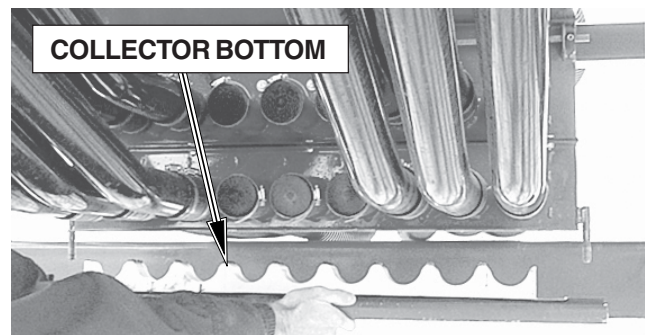
Unloading Tanks

Emptying tanks is quick and easy to do.

- See auger arm decal for lock pin location.
- Position auger under the tank to be emptied.
Note: Right side ladder must be in transport position to empty rear tank.
- Remove collector bottom.
- Move flapper valves to “**Clean-Out**” position on the collector body. (**Double Shoot Only**)
- Loosen inspection door approximately 1” (25 mm).
Note: The wing nuts will be near the end of the threaded rod.
- 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 meter body inspection door and 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.

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.



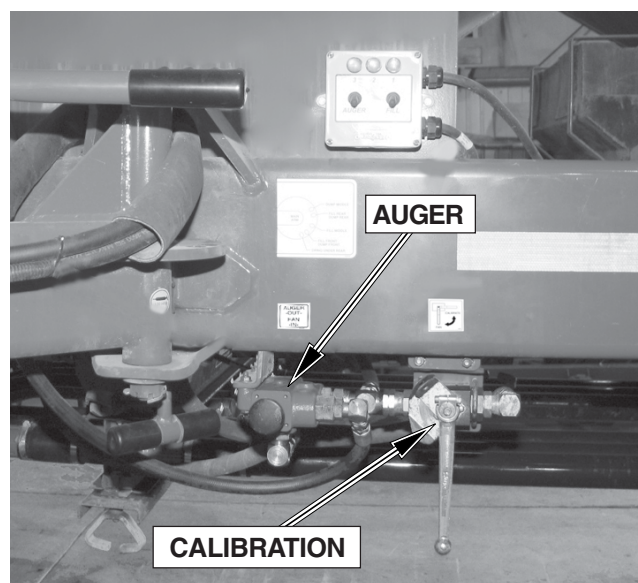
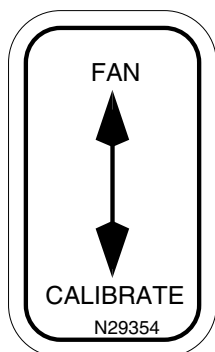
Rate Calibration

The practice of doing a rate calibration is strongly recommended, as it will confirm the **actual** amounts of product per motor revolution (**WT/REV**).

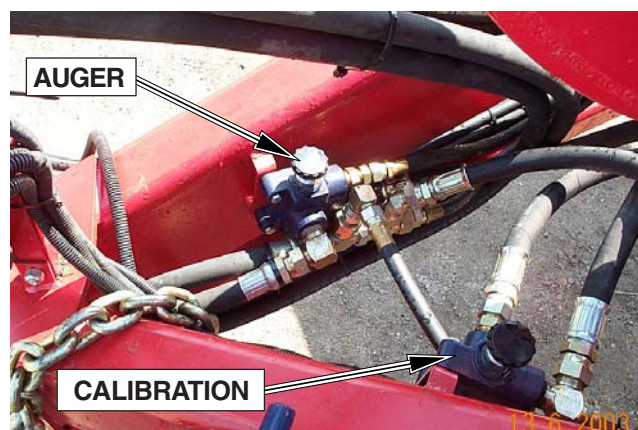
The VRT system requires the **WT/REV** in order to determine the shaft motor rpm to deliver the correct application rate.

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

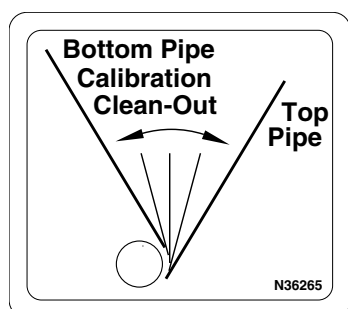
- Engage hydraulic lever to run air cart.
- **Turn off fan** by switching selector valve (located in the fan supply line) to calibration position.
- Remove the wing nuts on the collector bottom.
- Remove the bottom of the collector.
- Set Flapper Valves to “**Calibration**” as per the decal located on the front of the Collector.



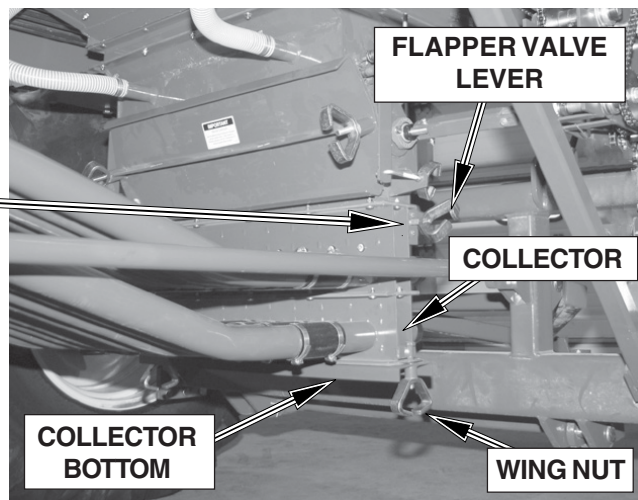
Selector Valves - Tow Behind



Selector Valves - Tow Between



Decal on Collector



Double Shoot Shown

Operation

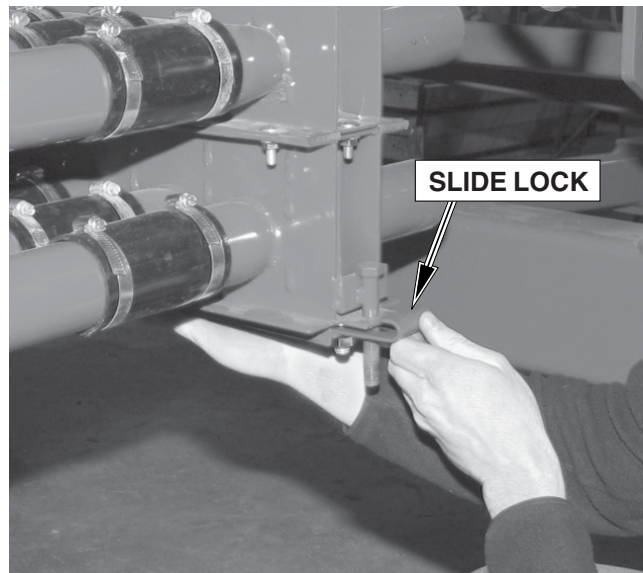
Rate Calibration - Continued

- Hook the Rate Calibration Insert on collector bottom and rotate up into position. Secure in place with slide lock.
- Slide the rate check box onto the collector body.
- **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.

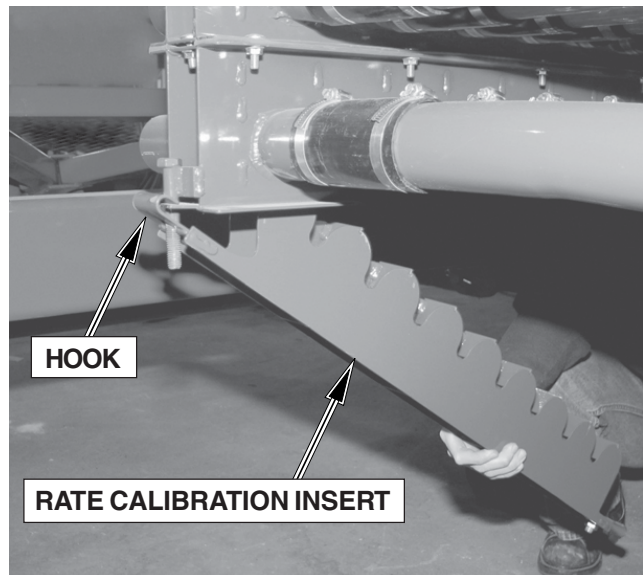
Note: Monitor must be turned off in order for the primer switch to work.

Note: *Ensure the fan is not running.*

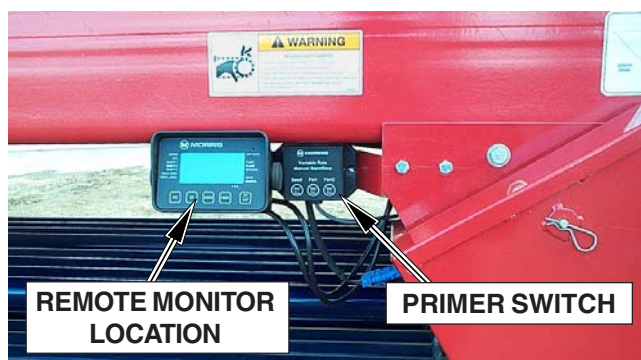
- Empty material from rate check box and reinstall it on the same collector.
- The monitor can be relocated to the remote monitor location for ease of calibration. The three-pin plug connects to the monitor harness and the two-pin plug connects to the VRT controller harness.



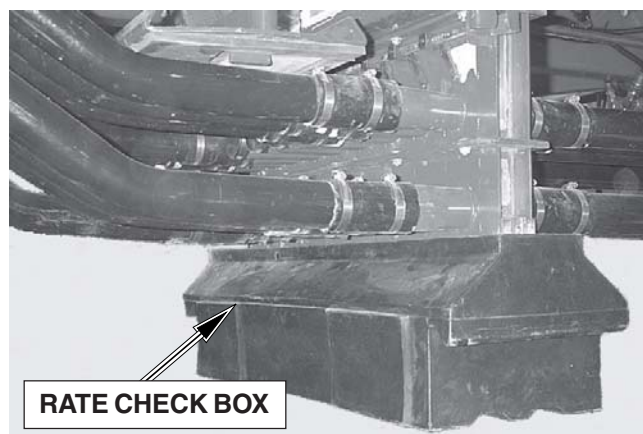
Tow Between - Calibration Insert



Tow Behind - Calibration Insert



Primer Switch



Rate Calibration - Continued

Actual Sample

- Enter Calibration Mode for **actual sample**.
- Use the UP or DOWN button to move the triangle icon to the desired shaft.
- Hold the **ACK** button until 4 short beeps and 1 long beep sound. Release button after the long beep.
- The word **REVS** will be displayed on line 1. Line 2 will display the last entry used.
- Choose the desired revolutions wanted for the shaft to turn for calibration. Enter desired revs on line 2.
 - Use **20** for Direct Drive.
 - Use **50** for Slow Speed Drive.
- Press **Mode** button the word **RPM** will be displayed on line 1. Line 2 will display the last entry used.
- Choose the desired speed wanted for the shaft to turn during calibration. Enter desired revs on line 2.
 - Use **20** for Direct Drive.
 - Use **20** for Slow Speed Drive.

Note: *Ensure the fan is not running.*

- Press **Mode** button, the word **REVING** will be displayed on line 1 and the shaft motor will start turning the desired number of revolutions.
- Line 2 will display progress as a % of the final number of rotations. (Range 0 to 100)
- Once line 2 displays 100 the shaft motor will come to a stop.
- Remove rate check box from the collector body.

Note: Accuracy of sample is critical for actual application rate accuracy.

Calibration - Version 2		
Variable Rate		
Motor Revolutions		Motor RPM
10		
20		20
25		
50		50
100		160
200		200
400		

Operation

Rate Calibration - Continued

Actual Sample - Continued

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

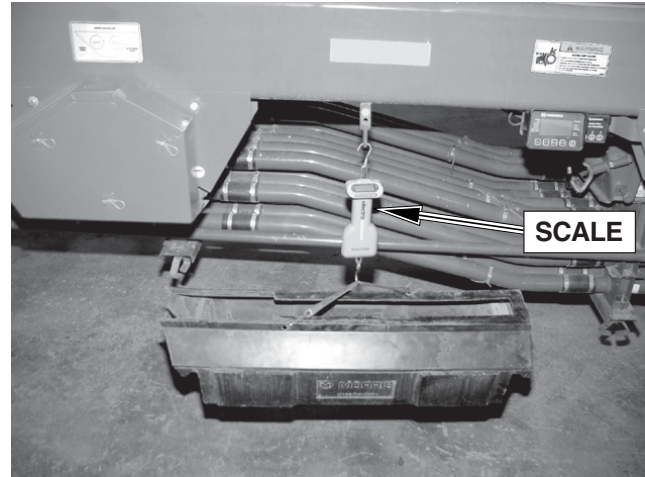
Note: Remember to subtract the weight of the rate check box from the total sample weight.

- Press the mode button.
- The word **WEIGHT** will be displayed on line 1.
- Enter the weight of the collected material on line 2 using the UP or DOWN buttons.
- Press the **MODE** button.
- The word **WT/REV** will be displayed on line 1.
- The calculated weight per rev will be displayed on line 2.
- Press the **MODE** button.
- The **SAVE** display appears on line 1. If the calculated weight per rev should be saved, press UP to choose yes (Y).
- Exit calibration mode from the **SAVE** display, by pressing the ACK button until 4 short beeps and 1 long beep sounds.

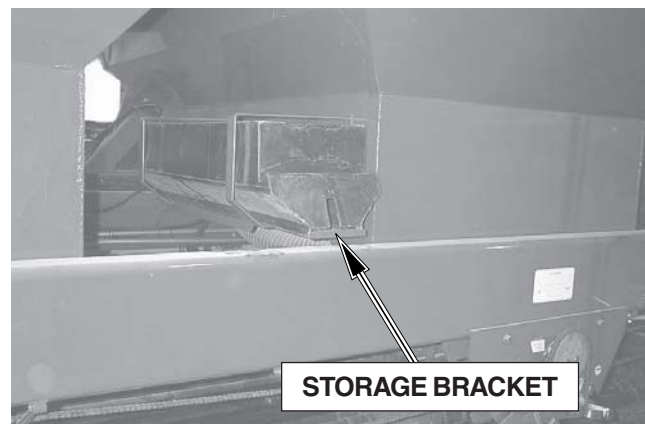
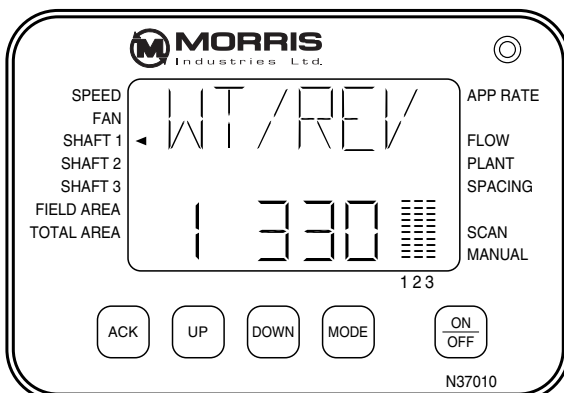
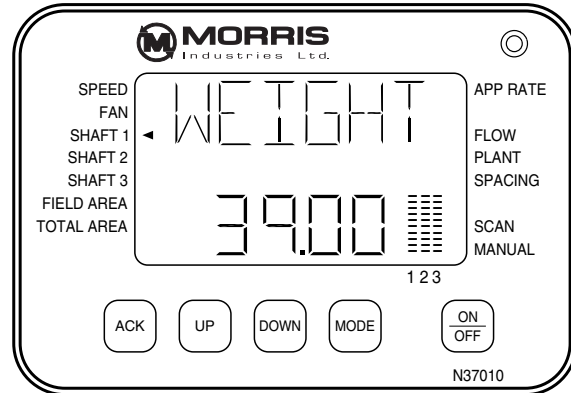
Note: Only when **SAVE Y** is displayed can the calibration mode data be saved on exit.

- This new **WT/REV** figure will appear under the shaft program mode. *(If saved)*
- Replace the bottom of the collector.
- Follow the above procedure to check the rate of the other tanks.

Note: Accuracy of sample is critical for actual application rate accuracy.



Weigh Sample



Storage Bracket

Rate Calibration - Continued

Below is a quick reference chart for metering calibration of a product.

Calibration Mode - Version 2	
ACK	Press ACK button and hold for five beeps - 4 short and 1 long.
REVS	Line one will display REVS. Enter desired number of revolutions on line two. Direct Drive - 20 Slow Speed Drive - 50
MODE	Press MODE button to select the speed at which the shafts will turn during calibration.
RPM	RPM will be displayed on line one. Enter desired number of revolutions on line two. Direct Drive - 20 Slow Speed Drive - 20
MODE	Press MODE button to begin calibration (RE Ving).
RE Ving	RE Ving will be displayed on line one. Line two will display % of final number of rotations (range 0 - 100). Once RE Ving is complete, weigh sample.
MODE	Press MODE button once reving has finished.
WEIGHT	Line one will display WEIGHT. Enter weight of sample collected on line two.
MODE	Press MODE button to display weight per rev (WT/REV).
WT/REV	Line one will display WT/REV. Line two will display the calculated weight per rev of sample collected.
MODE	Press MODE button to move to next function.
SAVE Y	To save WT/REV, press UP to choose yes (Y).
ACK	Press ACK button and hold for five beeps - 4 short and 1 long. This will save WT/REV and exit calibration mode.

NOTE: WT/REV can only be saved when **SAVE Y** is being displayed.

Important

Accuracy of sample is critical for actual application rate accuracy.

Prime metering wheels before taking actual sample.

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

Calibration Chart - Imperial

EIGHT SERIES AIRSEEDER - VARIABLE RATE - CALIBRATION CHART

WT/REV (LBS./REV)

SLOW SPEED DRIVE SEED & INOCULANT															DIRECT DRIVE SEED															DIRECT DRIVE FERTILIZER														
# of Outlets					SSD - 1	SSD - 2	SSD - 3	SSD - 4	SSD - 5	# of Outlets					DD - 1	DD - 2	DD - 3	DD - 4	DD - 5	DD - 6	DD - 7	DD - 8	DD - 9	DD - 10	# of Outlets					DD - 1	DD - 2	DD - 3	DD - 4	DD - 5										
21	0.032	0.035	0.036	0.045	0.053	0.153	0.207	0.269	0.294	0.347	0.380	0.428	0.444	0.517	0.569	0.302	0.339	0.377	0.425	0.456	0.316	0.356	0.395	0.445	0.478	0.331	0.372	0.413	0.465	0.500	0.302	0.339	0.377	0.425	0.456									
22	0.034	0.037	0.038	0.047	0.056	0.160	0.217	0.282	0.308	0.363	0.398	0.448	0.465	0.541	0.596	0.316	0.356	0.395	0.445	0.478	0.331	0.372	0.413	0.465	0.500	0.331	0.372	0.413	0.465	0.500	0.316	0.356	0.395	0.445	0.478									
23	0.035	0.039	0.040	0.049	0.058	0.168	0.227	0.295	0.322	0.380	0.416	0.469	0.486	0.566	0.624	0.316	0.356	0.395	0.445	0.478	0.331	0.372	0.413	0.465	0.500	0.331	0.372	0.413	0.465	0.500	0.316	0.356	0.395	0.445	0.478									
24	0.037	0.040	0.042	0.051	0.061	0.175	0.237	0.307	0.336	0.396	0.434	0.489	0.508	0.590	0.651	0.345	0.388	0.431	0.485	0.522	0.345	0.388	0.431	0.485	0.522	0.345	0.388	0.431	0.485	0.522	0.345	0.388	0.431	0.485	0.522									
25	0.038	0.042	0.043	0.053	0.063	0.182	0.247	0.320	0.350	0.413	0.452	0.509	0.529	0.615	0.678	0.359	0.404	0.449	0.506	0.543	0.359	0.404	0.449	0.506	0.543	0.359	0.404	0.449	0.506	0.543	0.359	0.404	0.449	0.506	0.543									
26	0.040	0.044	0.045	0.055	0.066	0.189	0.257	0.333	0.364	0.429	0.470	0.530	0.550	0.640	0.705	0.374	0.420	0.467	0.526	0.565	0.374	0.420	0.467	0.526	0.565	0.374	0.420	0.467	0.526	0.565	0.374	0.420	0.467	0.526	0.565									
27	0.041	0.045	0.047	0.058	0.068	0.197	0.266	0.346	0.378	0.446	0.488	0.550	0.571	0.664	0.732	0.388	0.436	0.484	0.546	0.587	0.388	0.436	0.484	0.546	0.587	0.388	0.436	0.484	0.546	0.587	0.388	0.436	0.484	0.546	0.587									
28	0.043	0.047	0.049	0.060	0.071	0.204	0.276	0.359	0.392	0.462	0.506	0.571	0.592	0.689	0.759	0.403	0.452	0.502	0.566	0.609	0.403	0.452	0.502	0.566	0.609	0.403	0.452	0.502	0.566	0.609	0.403	0.452	0.502	0.566	0.609									
29	0.044	0.049	0.050	0.062	0.073	0.211	0.286	0.372	0.406	0.479	0.524	0.591	0.613	0.714	0.786	0.417	0.469	0.520	0.587	0.630	0.417	0.469	0.520	0.587	0.630	0.417	0.469	0.520	0.587	0.630	0.417	0.469	0.520	0.587	0.630									
30	0.046	0.050	0.052	0.064	0.076	0.218	0.296	0.384	0.420	0.495	0.542	0.611	0.635	0.738	0.813	0.421	0.475	0.528	0.596	0.652	0.421	0.475	0.528	0.596	0.652	0.421	0.475	0.528	0.596	0.652	0.421	0.475	0.528	0.596	0.652									
31	0.047	0.052	0.054	0.066	0.078	0.226	0.306	0.397	0.434	0.512	0.560	0.632	0.656	0.763	0.841	0.426	0.482	0.536	0.604	0.662	0.426	0.482	0.536	0.604	0.662	0.426	0.482	0.536	0.604	0.662	0.426	0.482	0.536	0.604	0.662									
32	0.049	0.054	0.056	0.068	0.081	0.233	0.316	0.410	0.448	0.528	0.578	0.652	0.677	0.787	0.868	0.433	0.491	0.545	0.614	0.672	0.433	0.491	0.545	0.614	0.672	0.433	0.491	0.545	0.614	0.672	0.433	0.491	0.545	0.614	0.672									
33	0.050	0.055	0.057	0.070	0.083	0.240	0.326	0.423	0.462	0.545	0.596	0.672	0.698	0.812	0.895	0.440	0.500	0.554	0.624	0.682	0.440	0.500	0.554	0.624	0.682	0.440	0.500	0.554	0.624	0.682	0.440	0.500	0.554	0.624	0.682									
34	0.052	0.057	0.059	0.072	0.086	0.248	0.336	0.436	0.476	0.561	0.615	0.693	0.719	0.837	0.922	0.448	0.509	0.563	0.633	0.691	0.448	0.509	0.563	0.633	0.691	0.448	0.509	0.563	0.633	0.691	0.448	0.509	0.563	0.633	0.691									
35	0.053	0.059	0.061	0.075	0.088	0.255	0.345	0.448	0.490	0.578	0.633	0.713	0.740	0.861	0.949	0.455	0.517	0.571	0.641	0.699	0.455	0.517	0.571	0.641	0.699	0.455	0.517	0.571	0.641	0.699	0.455	0.517	0.571	0.641	0.699									
36	0.055	0.060	0.062	0.077	0.091	0.262	0.355	0.461	0.504	0.594	0.651	0.734	0.761	0.886	0.976	0.462	0.525	0.579	0.649	0.707	0.462	0.525	0.579	0.649	0.707	0.462	0.525	0.579	0.649	0.707	0.462	0.525	0.579	0.649	0.707									
37	0.057	0.062	0.064	0.079	0.094	0.269	0.365	0.474	0.518	0.611	0.669	0.754	0.783	0.910	1.003	0.469	0.533	0.587	0.657	0.715	0.469	0.533	0.587	0.657	0.715	0.469	0.533	0.587	0.657	0.715	0.469	0.533	0.587	0.657	0.715									
38	0.058	0.064	0.066	0.081	0.096	0.277	0.375	0.487	0.532	0.627	0.687	0.774	0.804	0.935	1.030	0.477	0.541	0.595	0.665	0.723	0.477	0.541	0.595	0.665	0.723	0.477	0.541	0.595	0.665	0.723	0.477	0.541	0.595	0.665	0.723									
39	0.060	0.065	0.068	0.083	0.099	0.284	0.385	0.500	0.546	0.644	0.705	0.795	0.825	0.960	1.057	0.484	0.548	0.602	0.672	0.730	0.484	0.548	0.602	0.672	0.730	0.484	0.548	0.602	0.672	0.730	0.484	0.548	0.602	0.672	0.730									
40	0.061	0.067	0.069	0.085	0.101	0.291	0.395	0.512	0.560	0.660	0.723	0.815	0.846	0.984	1.085	0.491	0.555	0.609	0.679	0.737	0.491	0.555	0.609	0.679	0.737	0.491	0.555	0.609	0.679	0.737	0.491	0.555	0.609	0.679	0.737									
41	0.063	0.069	0.071	0.087	0.104	0.299	0.405	0.525	0.574	0.677	0.741	0.835	0.867	1.009	1.112	0.499	0.563	0.617	0.687	0.745	0.499	0.563	0.617	0.687	0.745	0.499	0.563	0.617	0.687	0.745	0.499	0.563	0.617	0.687	0.745									
42	0.064	0.071	0.073	0.090	0.106	0.306	0.414	0.538	0.588	0.693	0.759	0.856	0.888	1.033	1.139	0.506	0.570	0.624	0.694	0.752	0.506	0.570	0.624	0.694	0.752	0.506	0.570	0.624	0.694	0.752	0.506	0.570	0.624	0.694	0.752									
43	0.066	0.072	0.075	0.092	0.109	0.313	0.424	0.551	0.602	0.710	0.777	0.876	0.909	1.058	1.166	0.513	0.577	0.631	0.701	0.759	0.513	0.577	0.631	0.701	0.759	0.513	0.577	0.631	0.701	0.759	0.513	0.577	0.631	0.701	0.759									
44	0.067	0.074	0.076	0.094	0.111	0.320	0.434	0.564	0.616	0.726	0.795	0.897	0.931	1.083	1.193	0.520	0.584	0.638	0.708	0.766	0.520	0.584	0.638	0.708	0.766	0.520	0.584	0.638	0.708	0.766	0.520	0.584	0.638	0.708	0.766									
45	0.069	0.076	0.078	0.096	0.114	0.328	0.444	0.577	0.630	0.743	0.813	0.917	0.952	1.107	1.220	0.528	0.592	0.646	0.716	0.774	0.528	0.592	0.646	0.716	0.774	0.528	0.592	0.646	0.716	0.774	0.528	0.592	0.646	0.716	0.774									
46	0.070	0.077	0.080	0.098	0.116	0.335	0.454	0.589	0.644	0.759	0.831	0.937	0.973	1.132	1.247	0.535	0.599	0.653	0.723	0.781	0.535	0.599	0.653	0.723	0.781	0.535	0.599	0.653	0.723	0.781	0.535	0.599	0.653	0.723	0.781									
47	0.072	0.079	0.082	0.100	0.119	0.342	0.464	0.602	0.658	0.776	0.850	0.958	0.994	1.156	1.274	0.542	0.606	0.660	0.730	0.788	0.542	0.606	0.660	0.730	0.788	0.542	0.606	0.660	0.730	0.788	0.542	0.606	0.660	0.730	0.788									
48	0.073	0.081	0.083	0.102	0.121	0.350	0.474	0.615	0.672	0.792	0.868	0.978	1.015	1.181	1.301	0.549	0.613	0.667	0.737	0.795	0.549	0.613	0.667	0.737	0.795	0.549	0.613	0.667	0.737	0.795	0.549	0.613	0.667	0.737	0.795									
49	0.075	0.082	0.085	0.104	0.124	0.357	0.484	0.628	0.686	0.809	0.886	0.998	1.036	1.206	1.329	0.556	0.620	0.674	0.744	0.802	0.556	0.620	0.674	0.744	0.802	0.556	0.620	0.674	0.744	0.802	0.556	0.620	0.674	0.744	0.802									
50	0.076	0.084	0.087	0.107	0.126	0.364	0.493	0.641	0.70																																			

Calibration Chart - Imperial

EIGHT SERIES AIRSEEDER - VARIABLE RATE - CALIBRATION CHART

WT/REV (LBS./REV)

SLOW SPEED DRIVE SEED & INOCULANT															DIRECT DRIVE SEED															DIRECT DRIVE FERTILIZER																																																																																																																																																																																																																																																																																																																																																																																	
# of Outlets					SSD - 1					SSD - 2					SSD - 3					SSD - 4					SSD - 5					# of Outlets					DD - 1					DD - 2					DD - 3					DD - 4					DD - 5					DD - 6					DD - 7					DD - 8					DD - 9					DD - 10					# of Outlets					DDF - 1					DDF - 2					DDF - 3					DDF - 4					DDF - 5																																																																																																																																																																																																																																																																																																	
59	0.090	0.099	0.102	0.126	0.149	0.430	0.582	0.756	0.826	0.974	1.066	1.202	1.248	1.452	1.600	59	0.848	0.953	1.059	1.193	1.282	59	0.848	0.953	1.059	1.193	1.282	60	0.863	0.970	1.077	1.214	1.304	60	0.863	0.970	1.077	1.214	1.304	61	0.877	0.986	1.095	1.234	1.326	61	0.877	0.986	1.095	1.234	1.326	62	0.891	1.002	1.112	1.254	1.348	62	0.891	1.002	1.112	1.254	1.348	63	0.906	1.018	1.130	1.274	1.369	63	0.906	1.018	1.130	1.274	1.369	64	0.920	1.034	1.148	1.294	1.391	64	0.920	1.034	1.148	1.294	1.391	65	0.935	1.050	1.166	1.315	1.413	65	0.935	1.050	1.166	1.315	1.413	66	0.949	1.067	1.184	1.335	1.435	66	0.949	1.067	1.184	1.335	1.435	67	0.963	1.083	1.202	1.355	1.456	67	0.963	1.083	1.202	1.355	1.456	68	0.978	1.099	1.220	1.375	1.478	68	0.978	1.099	1.220	1.375	1.478	69	0.992	1.115	1.238	1.396	1.500	69	0.992	1.115	1.238	1.396	1.500	70	1.006	1.131	1.256	1.416	1.522	70	1.006	1.131	1.256	1.416	1.522	71	1.021	1.147	1.274	1.436	1.543	71	1.021	1.147	1.274	1.436	1.543	72	1.035	1.164	1.292	1.456	1.565	72	1.035	1.164	1.292	1.456	1.565	73	1.050	1.180	1.310	1.477	1.587	73	1.050	1.180	1.310	1.477	1.587	74	1.064	1.196	1.328	1.497	1.608	74	1.064	1.196	1.328	1.497	1.608	75	1.078	1.212	1.346	1.517	1.630	75	1.078	1.212	1.346	1.517	1.630	76	1.093	1.228	1.364	1.537	1.652	76	1.093	1.228	1.364	1.537	1.652	77	1.107	1.244	1.382	1.557	1.674	77	1.107	1.244	1.382	1.557	1.674	78	1.121	1.261	1.400	1.578	1.695	78	1.121	1.261	1.400	1.578	1.695	79	1.136	1.277	1.418	1.598	1.717	79	1.136	1.277	1.418	1.598	1.717	80	1.150	1.293	1.435	1.618	1.739	80	1.150	1.293	1.435	1.618	1.739	81	1.165	1.309	1.453	1.638	1.761	81	1.165	1.309	1.453	1.638	1.761	82	1.179	1.325	1.471	1.659	1.782	82	1.179	1.325	1.471	1.659	1.782	83	1.193	1.341	1.489	1.679	1.804	83	1.193	1.341	1.489	1.679	1.804	84	1.208	1.357	1.507	1.699	1.826	84	1.208	1.357	1.507	1.699	1.826	85	1.222	1.374	1.525	1.719	1.848	85	1.222	1.374	1.525	1.719	1.848	86	1.236	1.390	1.543	1.739	1.869	86	1.236	1.390	1.543	1.739	1.869	87	1.251	1.406	1.561	1.760	1.891	87	1.251	1.406	1.561	1.760	1.891	88	1.265	1.422	1.579	1.780	1.913	88	1.265	1.422	1.579	1.780	1.913	89	1.280	1.438	1.597	1.800	1.934	89	1.280	1.438	1.597	1.800	1.934	90	1.294	1.454	1.615	1.820	1.956	90	1.294	1.454	1.615	1.820	1.956

Operation

Calibration Chart - Imperial

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	FINE	45	56		SSD - 2
CANARY SEED		35	44		
ALFALFA	FINE	34	42		SSD - 3
CLOVER		36	45		
NODULATOR	FINE	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		50	62		
DURUM	MEDIUM	51	63		DD - 5
WINTER WHEAT		48	60		
FALL RYE		45	56		
LENTILS (LAIRD)	MEDIUM	48	60		DD - 6
LENTILS (ESTON)	MEDIUM	48	60		DD - 7
PINTO BEANS	COARSE	47	59		DD - 8
FABA BEANS		50	62		
GARBONZO BEANS	COARSE	50	62		DD - 9
CHICK PEAS (LARGE)		46	57		
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	COARSE	67	83	DDF - 5	
0 - 45 - 0		62	77		

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 the APRATE and or the WT/REV under the shaft program mode of the monitor.

Note: It is recommended to set WT/REV by doing a “Rate Calibration”.

If desired the seed/fertilizer WT/REV can be determined from the charts located on the previous pages. To determine a seed/fertilizer WT/REV from the charts follow the steps outlined below:

- Determine which “Chart Column” the product to be applied falls into from the “Calibration Material” columns on the left.
- Go to the specific “Chart Column” and follow column down to the number of outlets on seeding tool.

Note: It is recommended to use a highlighter to make line easier to follow.

- At this intersection will be the required **WT/REV** for the product.

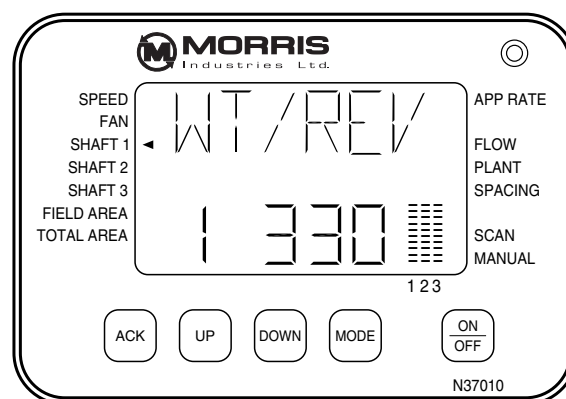
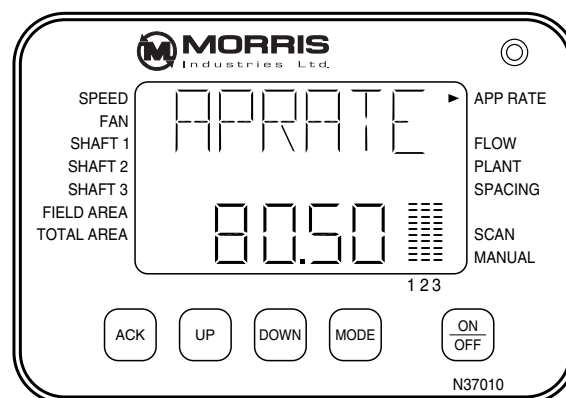
Change the **APRATE** and **WT/REV** on monitor as follows:

- Use the UP or DOWN button to move the triangle icon to the desired shaft.
- Hold the **MODE** button until 4 short beeps and 1 long beep sound. Release button after the long beep.
- The word **APRATE** will be displayed on line 1. Line 2 will display the last application rate used.
- Use the UP or DOWN buttons to enter desired application rate of product.
- Press the **MODE** button.
- The word **WT/REV** will be displayed on line 1. Line 2 will display the last weight per rev used or the WT/REV determined under “Rate Calibration”.
- Use the UP or DOWN buttons to enter desired weight per rev of product from calibration chart.

Note: It is recommended to set WT/REV by doing a “Rate Calibration”.

- Press MODE button until the **SAVEY** display appears on display line 1.
- Then hold down ACK button until 4 short beeps and 1 long beep sound. Release button after the long beep. Settings have been saved.
- Follow the above procedure to set the rate of the other tanks.

Note: 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”.



Operation

Metering Rate Adjustment

Below is a quick reference chart for setting metering rate of a product.

Metering Rate Adjustments	
MODE	Press MODE button and hold for five beeps 4 short and 1 long beep.
APRATE	Line one will display APRATE. Enter desired application rate of product on line two.
MODE	Press MODE button to move to next function.
WT/REV	Line one will display WT/REV. Line two will display the calculated weight per rev of sample collected in calibration mode. NOTE: WT/REV can be manually changed if desired.
MODE	Press MODE button to move to next function.
PULSES	Line one will display PULSES. SHAFT 1 - 4; SHAFT 2 - 4; SHAFT 3 - 4
MODE	Press MODE button to move to next function.
LEVEL	Line one will display LEVEL. Line two will display 20.
MODE	Press MODE button to move to next function.
SAVE Y	To save changes press UP to choose yes (Y).
ACK	Press ACK button and hold for five beeps 4 short and 1 long beep. This will save changes and quit out of program mode.

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.

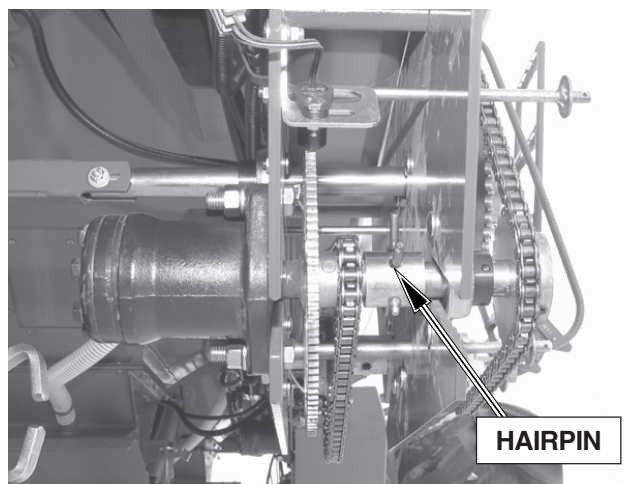
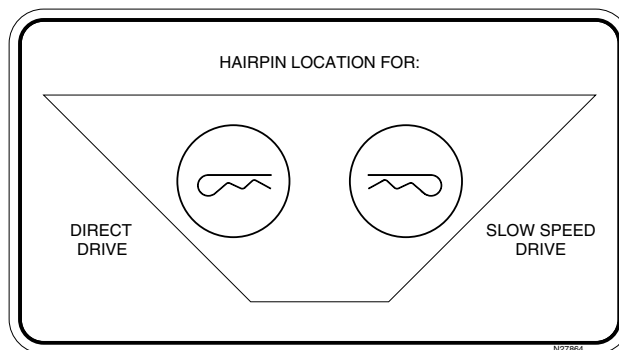
The slow speed transmission is incorporated in **All** the Posi-Drive Transmissions.

- 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.

Note: Seed must be placed in the front tank.



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.

Operation

Hydraulic Fan Drive

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

Note: An additional 5 1/2 gpm (21 liters/min) is required for the VRT system.

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”.

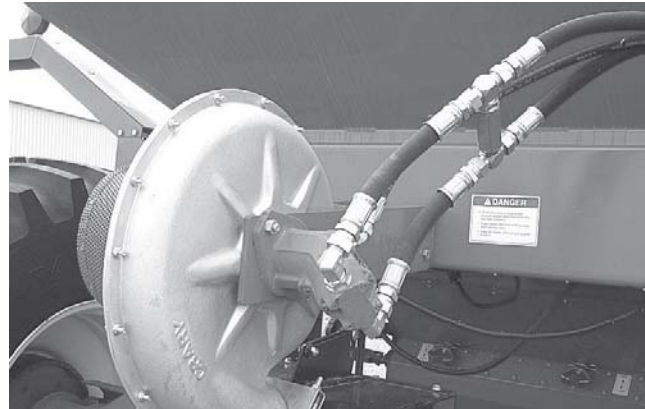
Speed fluctuations will result if the fan is not connected to the priority valve if hydraulic system is equipped with a priority valve.

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 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.

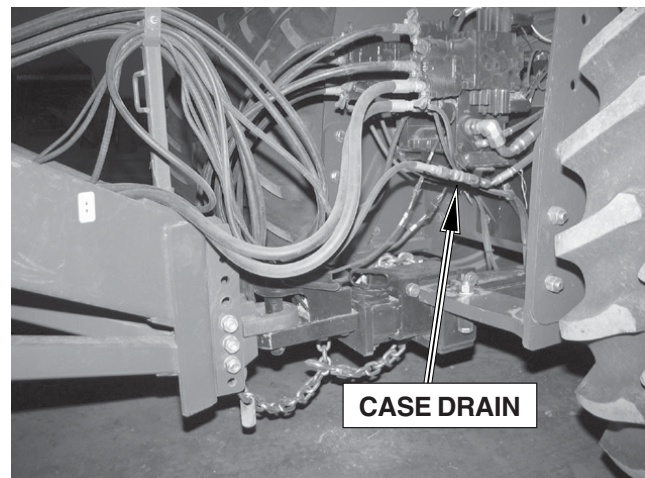
A piston motor creates leakage past the internal components for lubrication. This oil needs to go back to the oil reservoir at the lowest pressure possible. The motor has a 3/8" diameter case drain line. This line must be connected directly into the tractor hydraulic reservoir to ensure that there is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



Hydraulic Drive

IMPORTANT

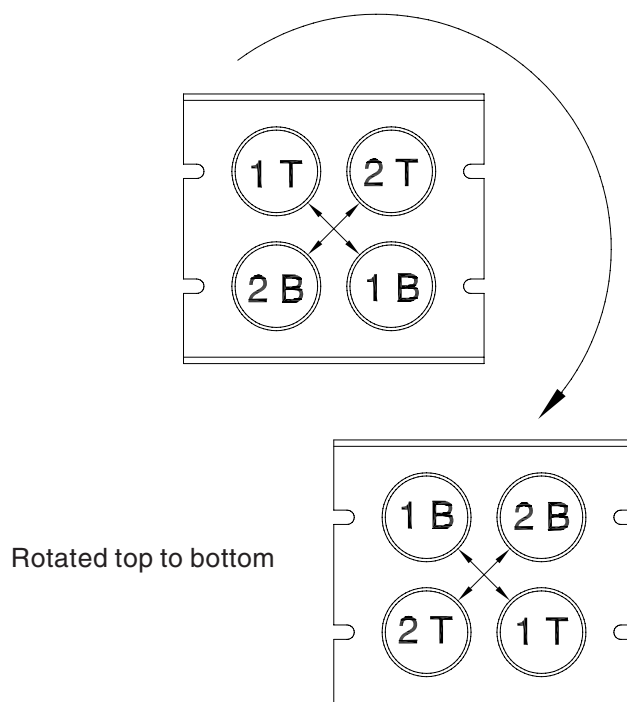
Run hydraulic fan drive at lowest rpm possible (1,000-2,000) for 5-10 minutes before operating at set rpm. This is required to warm up the hydraulic fluid. Cold hydraulic fluid will cause pressure spikes in the system that will damage the case drain seal in the orbit motor.



Hydraulic Coupling on Tractor

Quick Coupler

Hoses on Quick Coupler should be plumbed on a cross pattern. This orientation of the hoses allows the operator to switch which air stream is being used by simply rotating coupler top to bottom.



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 or adjusting engine speed on engine fan drive models.

Air volume; hence fan speed requirements will vary with:

1. Ground speed
2. Metering rate
3. Number of primary runs
4. Width of machine
5. 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.

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.

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".

Operation

Fan Speed Recommendations - Continued

Charts are based on a 40 foot machine traveling at 5 mph.

13 inch Diameter Impeller Suggested Fan RPM @ 5 mph		
Combined Application Rate	Fan Speed Setting	
	Single Shoot	Double Shoot
3 - 50 lbs/acre 3 - 56 kg/ha	3500 - 3750 RPM	3400 - 3650 RPM
50 - 100 lbs/acre 56 - 112 kg/ha	3750 - 4000 RPM	3650 - 3900 RPM
100 - 150 lbs/acre 112 - 168 kg/ha	4000 - 4250 RPM	3900 - 4150 RPM
150 - 200 lbs/acre 168 - 224 kg/ha	4250 - 4500 RPM	4150 - 4400 RPM
200 - 250 lbs/acre 224 - 280 kg/ha	4500 - 4750 RPM	4400 - 4650 RPM
250 - 300 lbs/acre 280 - 336 kg/ha	4750 - 5000 RPM	4650 - 4900 RPM
300 - 350 lbs/acre 336 - 392 kg/ha	5000 - 5250 RPM	4900 - 5150 RPM
> 350 lbs/acre > 392 kg/ha	5250 - 5500 RPM	5150 - 5400 RPM
Note: Fan Speeds given are when applying product. It is normal for fan speed to drop when not applying product.		

17 inch Diameter Impeller Suggested Fan RPM @ 5 mph		
Combined Application Rate	Fan Speed Setting	
	Single Shoot	Double Shoot
3 - 50 lbs/acre 3 - 56 kg/ha	3000 - 3250 RPM	2900 - 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.		

Double Shoot 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.

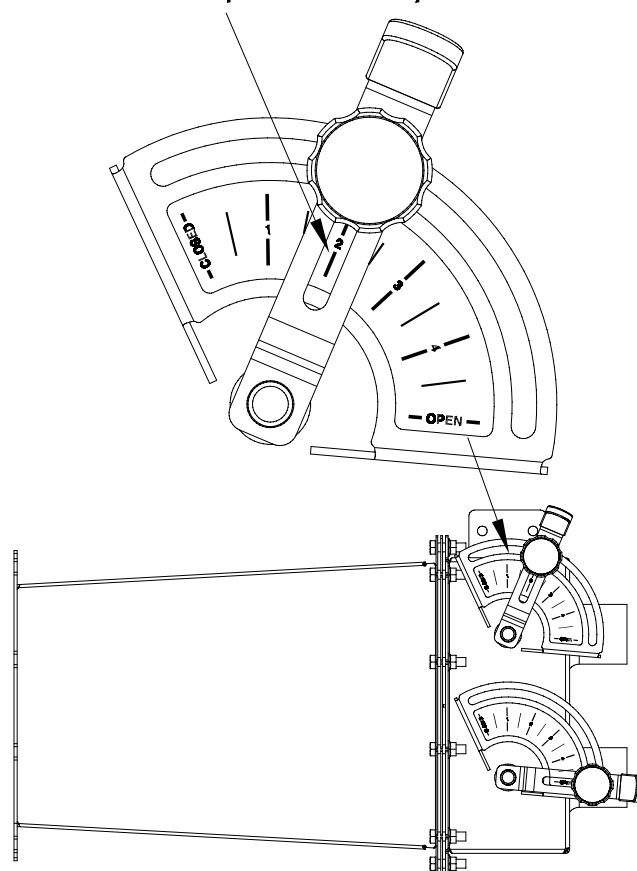
Note: The settings in the table should be used only as a guide.

- 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.

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/lb)	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.

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



Operation

Plenum Settings - Continued

Plenum Damper Settings

27 Outlet Plenum

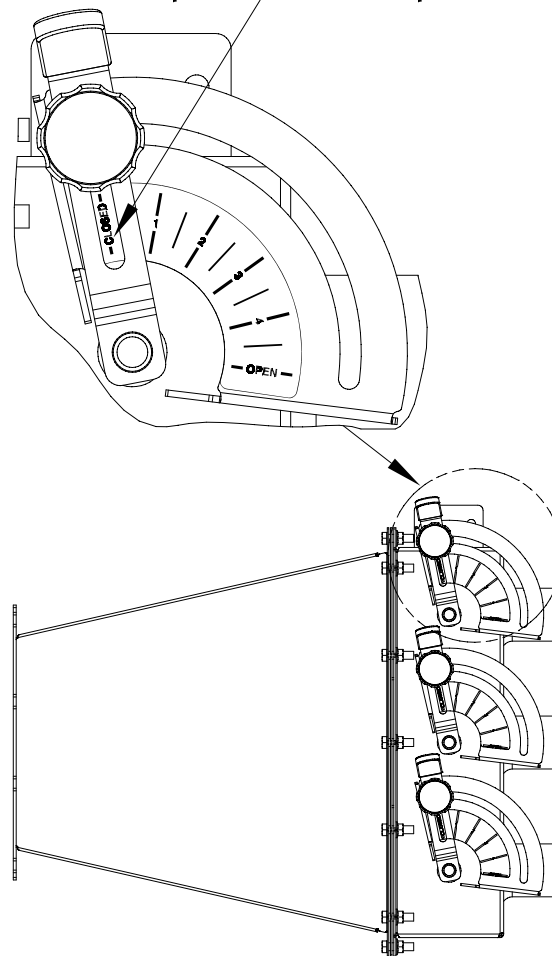
Adequate air volume is necessary at all times to carry the product in the air stream. Air volume can be controlled by adjusting the plenum damper settings.

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 middle of slot.
This damper is set in the closed position



Note: See “Fan Speeds” for Fan RPM.

Suggested Plenum Settings

Product	Seed		Starter Fertilizer		N based Fertilizer	
	Rate lb/acre	Damper Setting	Rate lb/acre	Damper Setting	Rate lb/acre	Damper Setting
Fine Seeds	All Rates	1	All Rates	Open	All Rates	Open
Coarse Grains	90 lb (100 kg/ha)	Open	25 lb (28 kg/ha)	3	50 lb (56 kg/ha)	3
	90 lb (100 kg/ha)	Open	50 lb (56 kg/ha)	3	100 lb (112 kg/lb)	Open
	90 lb (100 kg/ha)	4	75 lb (84 kg/ha)	3	150 + lb (168 kg/ha)	Open
Large Seeds	180 lb (200 kg/ha)	Open	40 lb (45 kg/ha)	2	40 lb (45 kg/ha)	2
Double Shoot	Top & Bottom Pipes - Top Damper use Double Shoot Plenum Settings - Middle Damper Closed - Bottom Damper use Double Shoot Plenum Settings					
Single Shoot	Bottom Pipes - Top Damper Closed - Middle Damper Closed - Bottom Damper Open					

Double and Triple Shoot Settings

Collector Valve Settings

Located in each upper collector body are flapper valves for machines equipped with Double or Triple 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 Triple, 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:

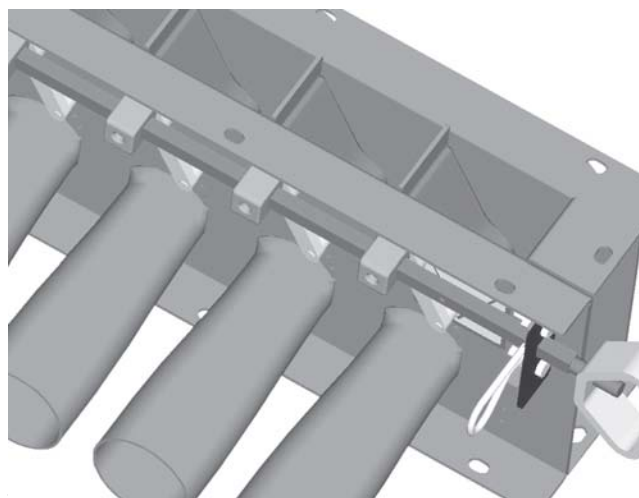
- Set flapper valves to correct position for product delivery.
- Remove the inspection door and visually check that the flappers are fully over and touching the side walls, sealing off the individual air streams.
- The flappers can be adjusted by loosening the individual adjusting setscrews and applying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

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

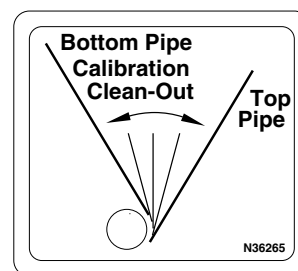
Flapper Valve Run Test

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

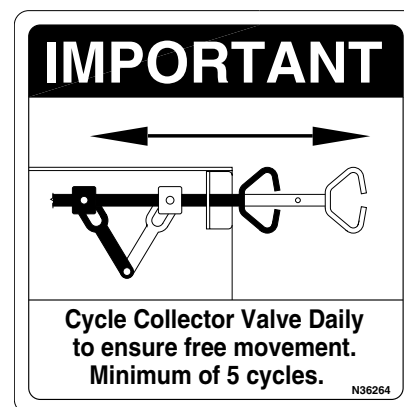
- Check flapper valves in both directions with air running.
 - If valve is set to direct product into the bottom pipe, have the plenum damper open for the top pipes and closed to the bottom pipes.
 - If valve is set to direct product into the top pipe, have the plenum damper open for the bottom pipes 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.

Operation

Double Shoot Settings

Double Shoot Tow Between

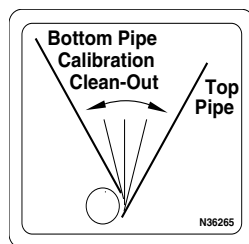
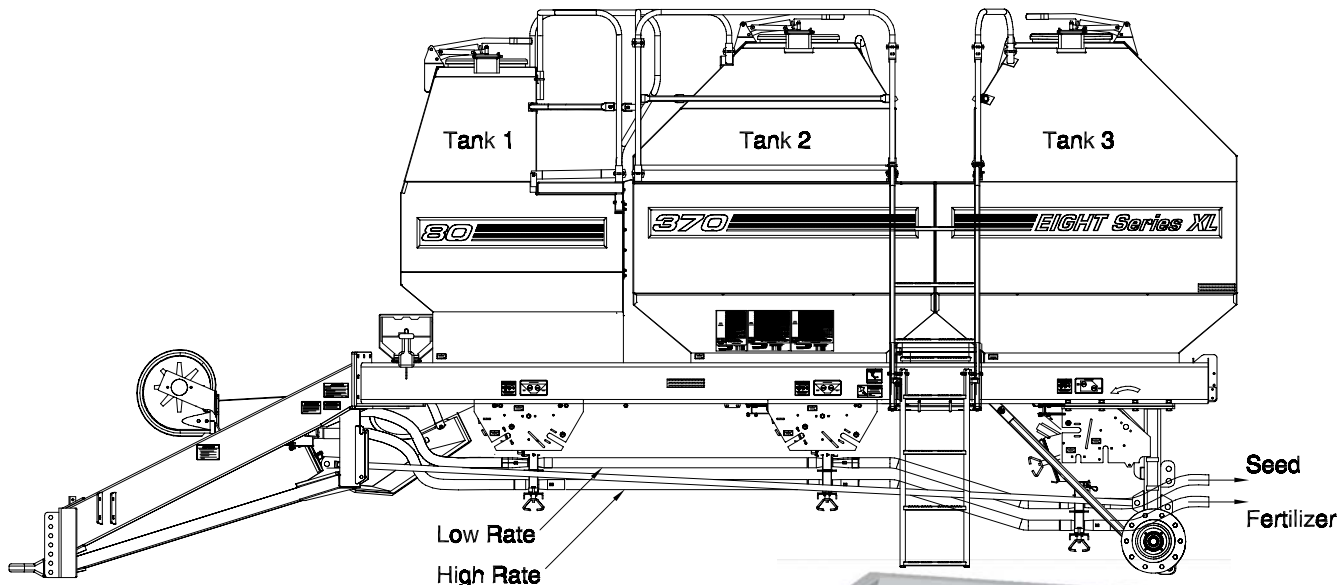
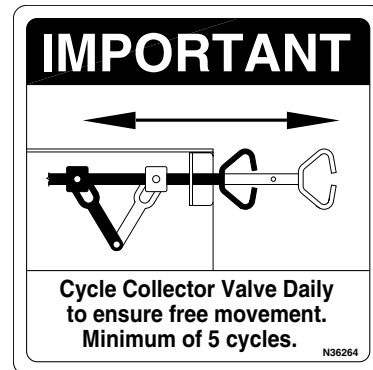
- Combining product from any combination of tanks and placed in either air stream is possible with the EIGHT Series XL distribution system. Some typical examples are shown below.

Example 1.

Tank 1 - Seed

Tank 2 and Tank 3 - Fertilizer

- Collector Valve Setting: Tank 1 - Top Pipe
Tank 2 - Bottom Pipe
Tank 3 - Bottom Pipe
- Plenum Setting: See table on "Plenum Settings" located in previous section "Plenum Damper Settings".



Decal on Collector



COLLECTOR

Collector Valve Shown on "Bottom Pipe" Setting

Double Shoot Settings - Continued

Double Shoot Tow Between

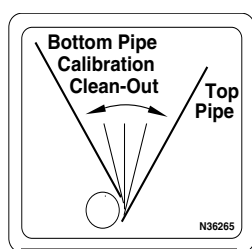
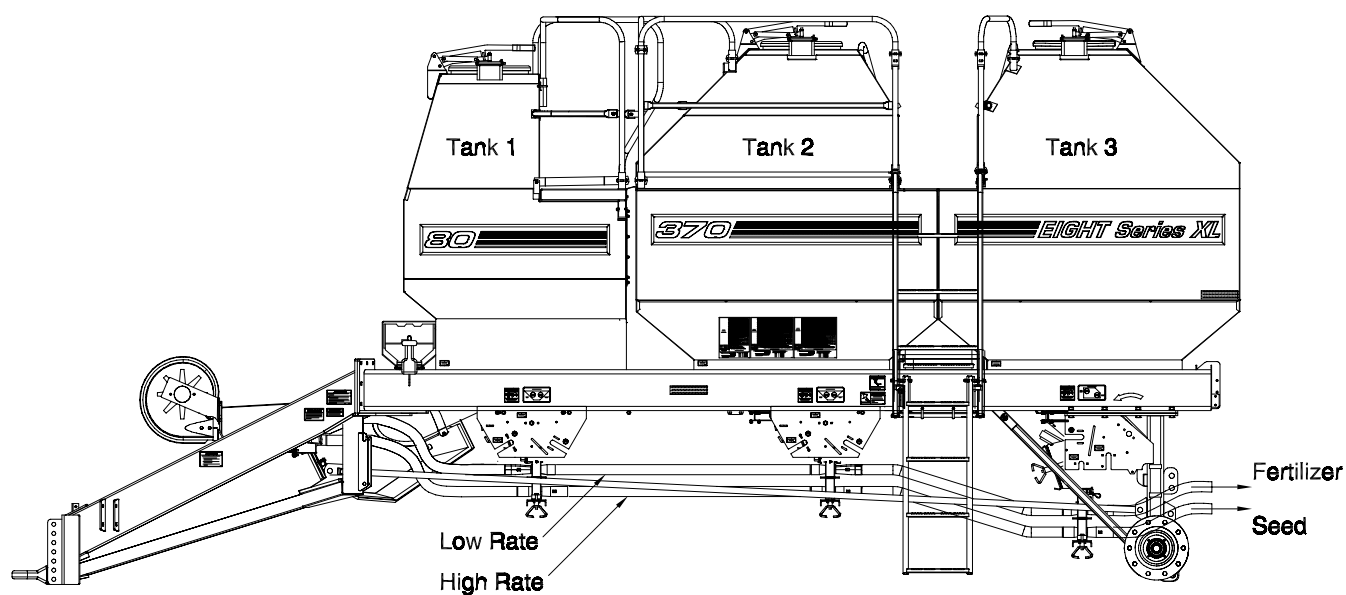
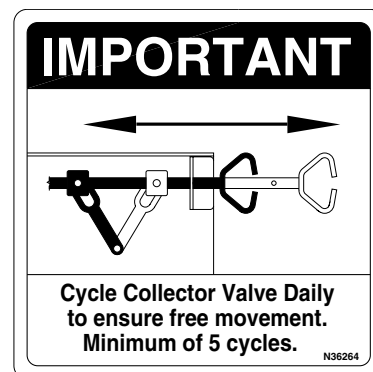
Example 2.

Tank 1 - Inoculant

Tank 2 - Fertilizer

Tank 3 - Peas

- Collector Valve Setting: Tank 1 - Bottom Pipe
Tank 2 - Top Pipe
Tank 3 - Bottom Pipe
- Plenum Setting: See table on "Plenum Settings" located in previous section "Plenum Damper Settings".



Decal on Collector



Collector Valve Shown on "Bottom Pipe" Setting

Operation

Double Shoot Settings - Continued

Single Shoot Tow Between

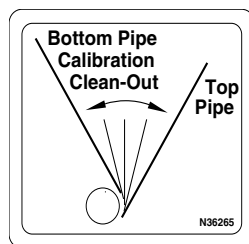
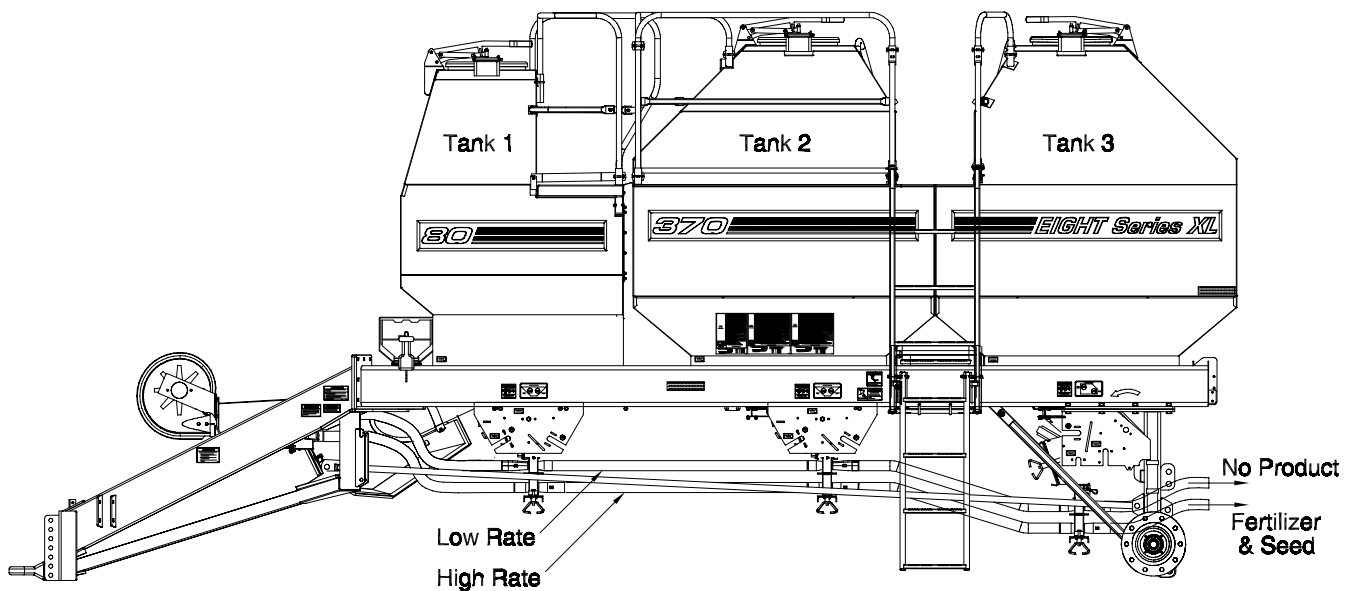
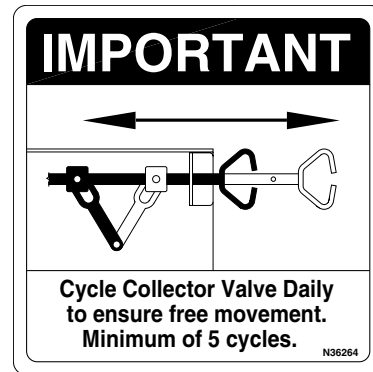
Example 3.

Tank 1 - Seed

Tank 2 - Seed

Tank 3 - Fertilizer

1. Collector Valve Setting: Tank 1 - Bottom Pipe
Tank 2 - Bottom Pipe
Tank 3 - Bottom Pipe
2. Plenum Setting: See table on "Plenum Settings" located in previous section "Plenum Damper Settings".



Decal on Collector



Collector Valve Shown on "Bottom Pipe" Setting

Triple Shoot Settings

Triple Shoot Tow Behind

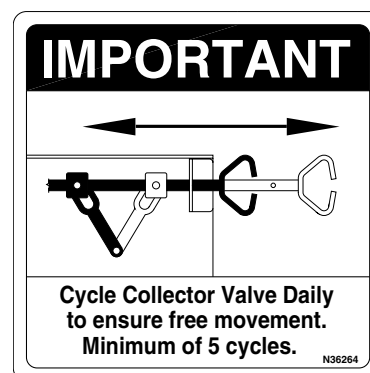
- Combining product from any combination of tanks and placed in either air stream is possible with the EIGHT Series XL distribution system. Some typical examples are shown below.

Example 1.

Tank 1 - Starter Fertilizer

Tank 2 - Coarse or Large Seed

Tank 3 - Nitrogen Fertilizer



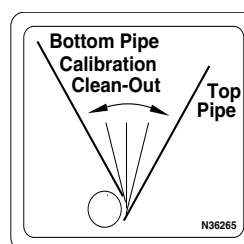
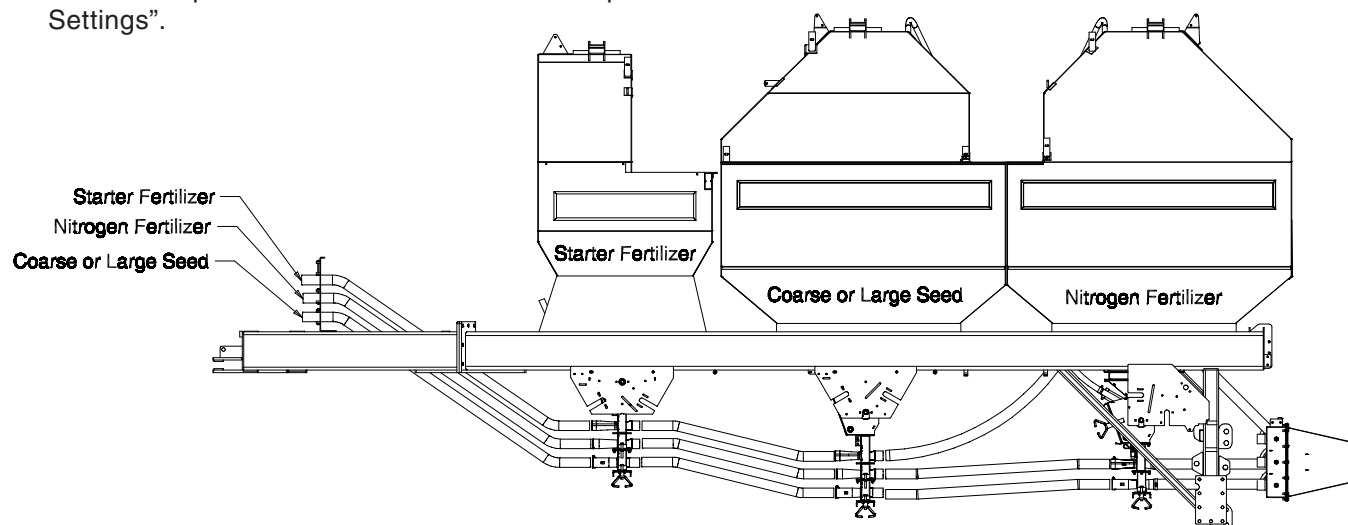
1. Collector Valve Setting:

Tank 1 (Starter Fertilizer) - **Top Pipe**

Tank 2 (Coarse or Large Seed) - **Bottom Pipe**

Tank 3 (Nitrogen Fertilizer) - **Middle Pipe**

2. Plenum Setting: See table on "Plenum Settings" located in previous section "Plenum Damper Settings".



Decal on Collector

Operation

Triple Shoot Settings - Continued

Example 2.

Tank 1 - Small Seed (Canola)

Tank 2 - Starter Fertilizer

Tank 3 - Nitrogen Fertilizer

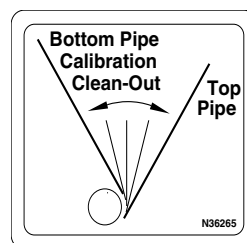
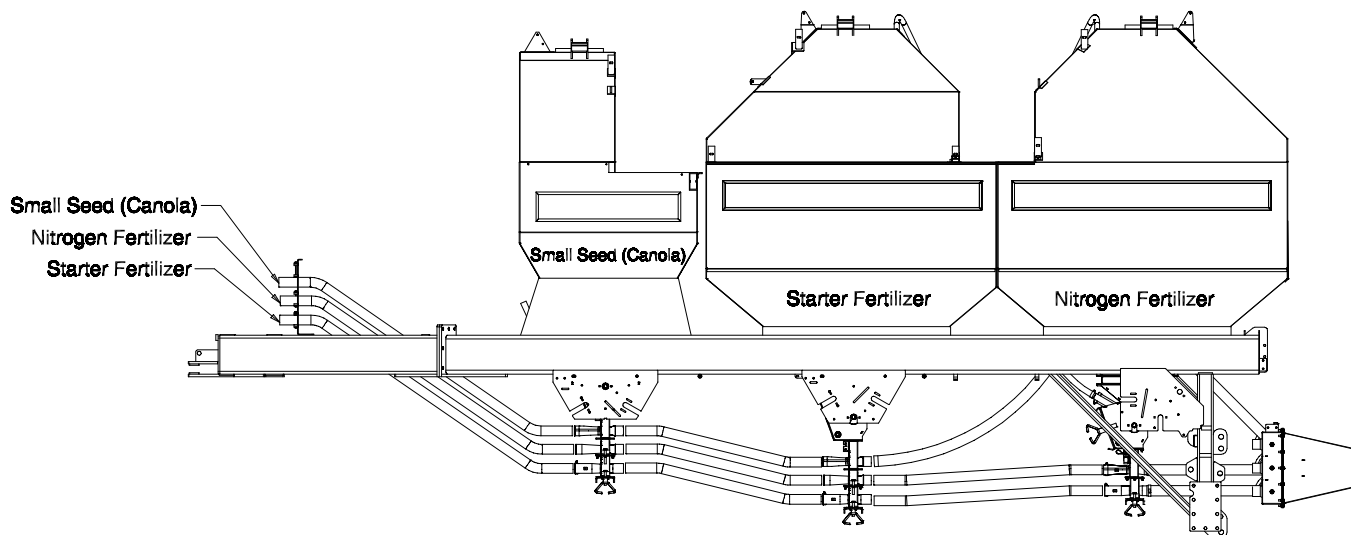
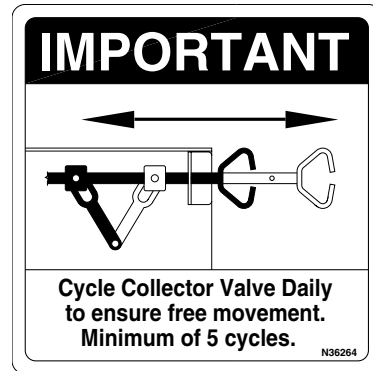
1. Collector Valve Setting:

Tank 1 (Small Seed (Canola)) - **Top Pipe**

Tank 2 (Starter Fertilizer) - **Bottom Pipe**

Tank 3 (Nitrogen Fertilizer) - **Middle Pipe**

2. Plenum Setting: See table on "Plenum Settings" located in previous section "Plenum Damper Settings".



Decal on Collector

Triple Shoot Settings - Continued

Double Shoot Tow Behind

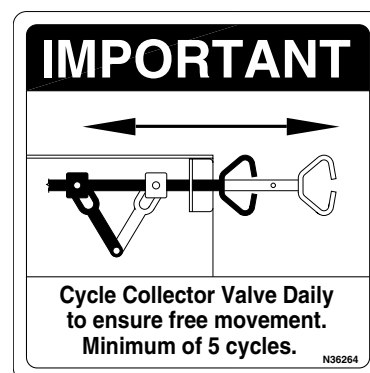
- Combining product from any combination of tanks and placed in either air stream is possible with the EIGHT Series XL distribution system. Some typical examples are shown below.

Example 1.

Tank 1 - Inoculant

Tank 2 - Coarse or Large Seed

Tank 3 - Fertilizer



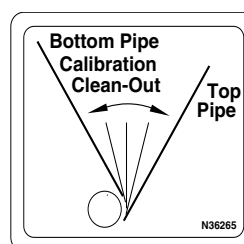
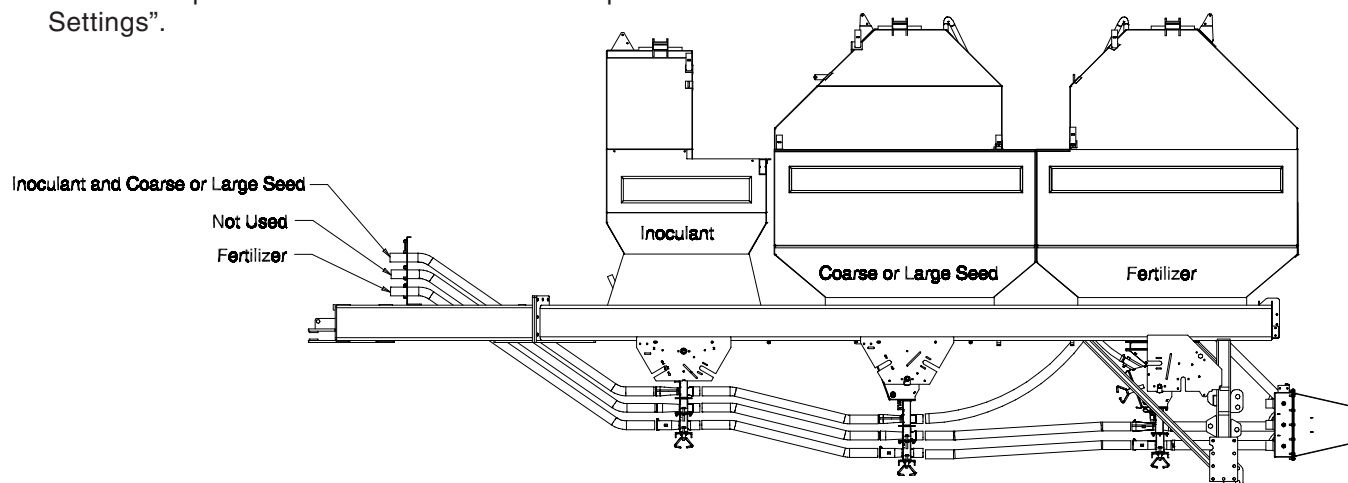
1. Collector Valve Setting:

Tank 1 (Inoculant) - **Top Pipe**

Tank 2 (Coarse or Large Seed) - **Top Pipe**

Tank 3 (Fertilizer) - **Bottom Pipe**

2. Plenum Setting: See table on "Plenum Settings" located in previous section "Plenum Damper Settings".



Decal on Collector

Operation

Triple Shoot Settings - Continued

Single Shoot Tow Behind

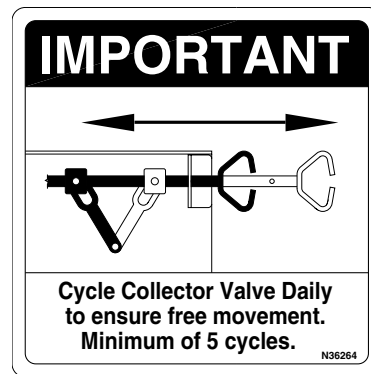
- Combining product from any combination of tanks and placed in either air stream is possible with the EIGHT Series XL distribution system. Some typical examples are shown below.

Example 1.

Tank 1 - Coarse or Large Seed

Tank 2 - Coarse or Large Seed

Tank 3 - Fertilizer



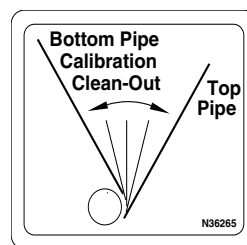
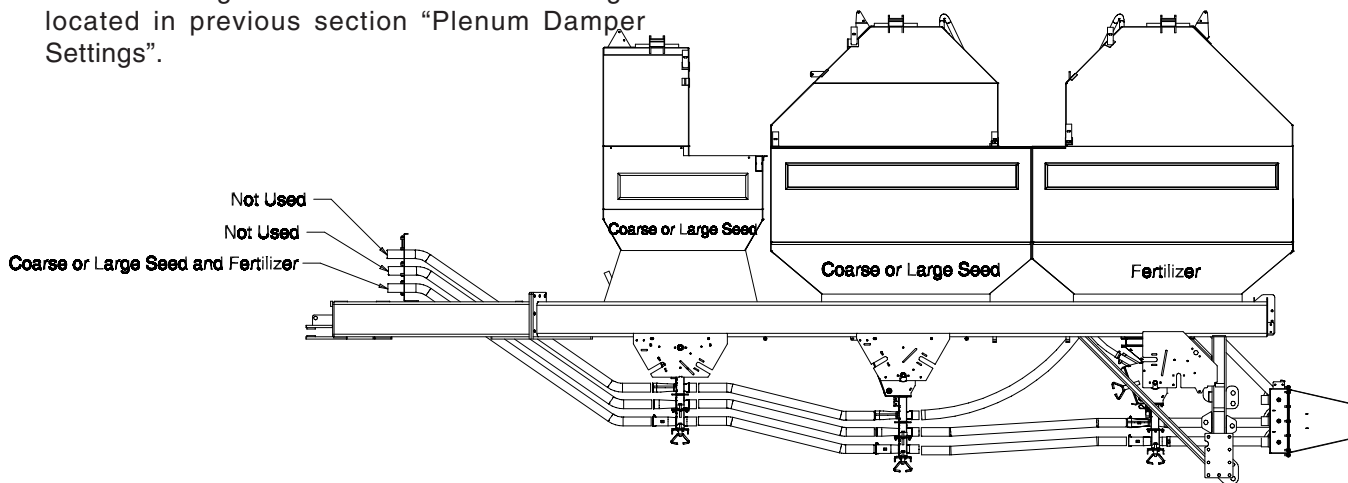
1. Collector Valve Setting:

Tank 1 (Coarse or Large Seed) - **Bottom Pipe**

Tank 2 (Coarse or Large Seed) - **Bottom Pipe**

Tank 3 (Fertilizer) - **Bottom Pipe**

2. Plenum Setting: See table on "Plenum Settings" located in previous section "Plenum Damper Settings".



**Decal on
Collector**

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.

Level Seeding Tool Front to Rear

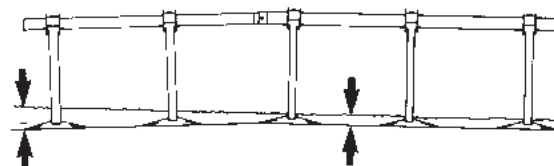
- Poor front to rear leveling causes ridging as shown.
- Check the depth of two adjacent shanks, normally one on the front row and one on the rear row.
- Adjust level as necessary. See seeding tool manual for more details.

Worn Seeding Tool Parts

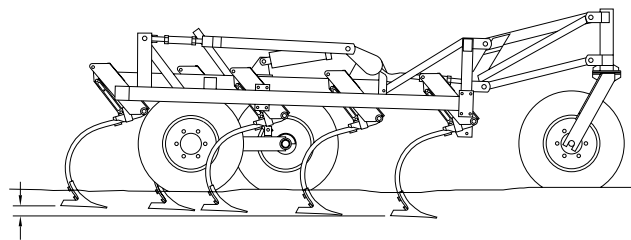
- Shanks that are bent cause uneven depth and they should be repaired or replaced.
- Trip mechanisms that are worn can also cause poor depth control and any worn parts should be repaired or replaced.

Packing

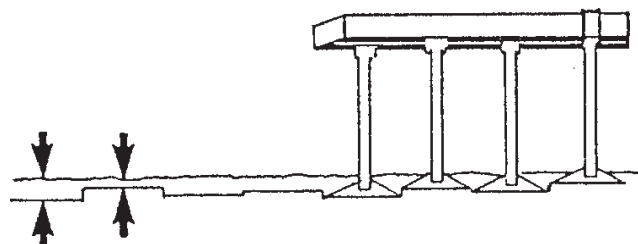
- Packing behind the seeding unit is strongly recommended. This improves germination and helps reduce moisture loss and erosion.
- In wet conditions the head land should be done last to prevent over packing.



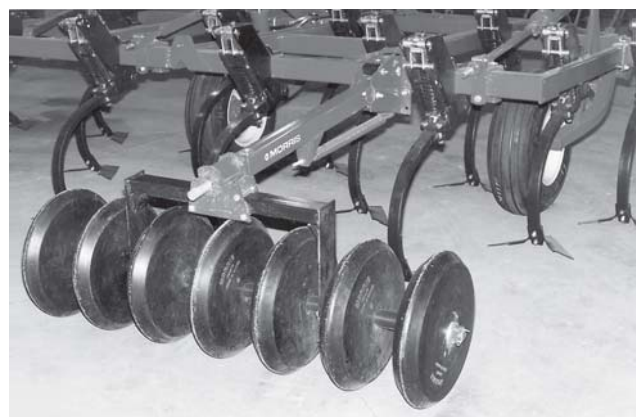
Side to Side Level



Front to Back Level



Ridging Front to Back



Mounted Packers

Operation

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.

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

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.
- 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 VRT console 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: 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 and monitor off, engage meter drives with the primer switch, rotating meter drives 4 to 5 times.
- 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 air leaks occur in the air cart tank as even the smallest air leak from the lid will lead to material bridging in the tank thereby causing misses in the field.

Check the following areas for air leaks:

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

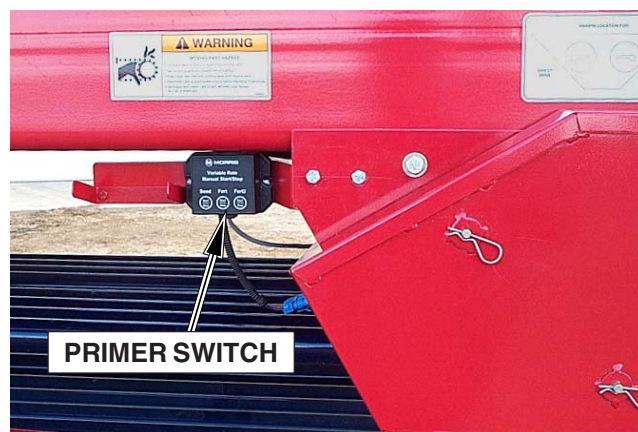
Tank Low in Product

- 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.



Primer Switch

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

Operation

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 System

Opener Adjustments - Double Shoot Boots

Improperly adjusted or worn seed openers can cause poor seed/fertilizer separation and plugging which could result in poor emergence.

It is important that the seed openers be properly adjusted.

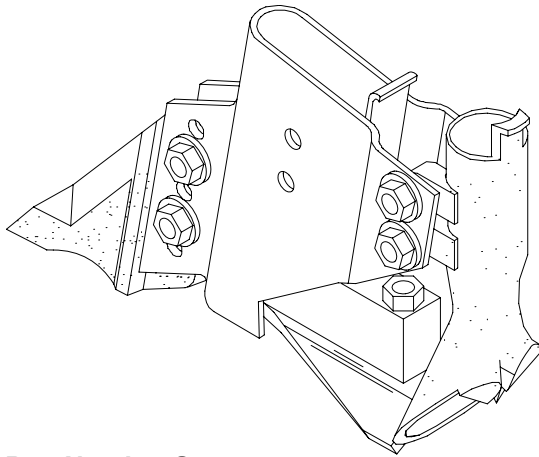
Note: Points should be adjusted according to wear and deflectors replaced when worn.

Listed below are guidelines for seed openers S25962, S28158, S29000, and S29140.

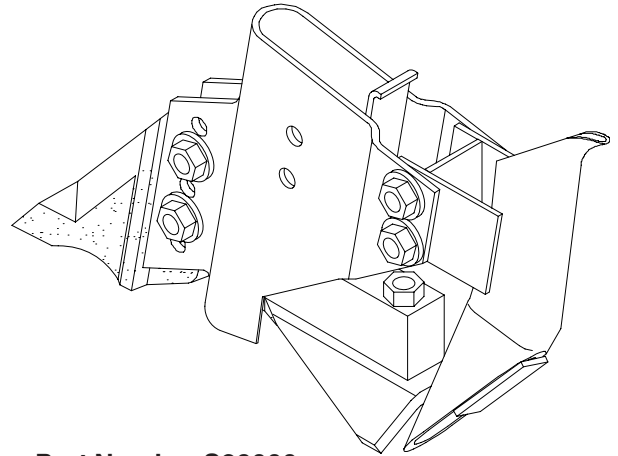
Note: When applying Anhydrous Ammonia it is strongly recommended to consult local agricultural extension offices for allowable rates which are dependent on soil moisture and soil type.

Soil Condition	Point Position		
	Top	Middle (Factory Setting)	Bottom
Light Soil	Soil moisture medium	Soil moisture wet NH ³ or liquid application	Soil moisture dry NH ³ or liquid application Worn Point adjustment
Medium Soil	Soil moisture medium	Soil moisture wet NH ³ or liquid application	Soil moisture dry NH ³ or liquid application Worn Point adjustment
Heavy Soil	Soil moisture dry	Soil moisture wet NH ³ or liquid application	Not recommended Worn Point adjustment

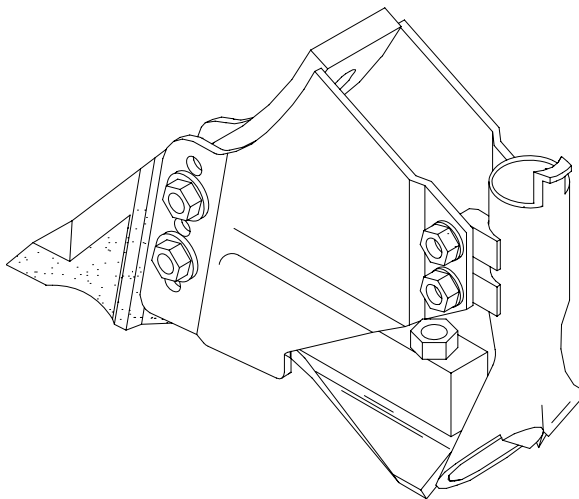
Opener Adjustments (Double Shoot Boots) - Continued



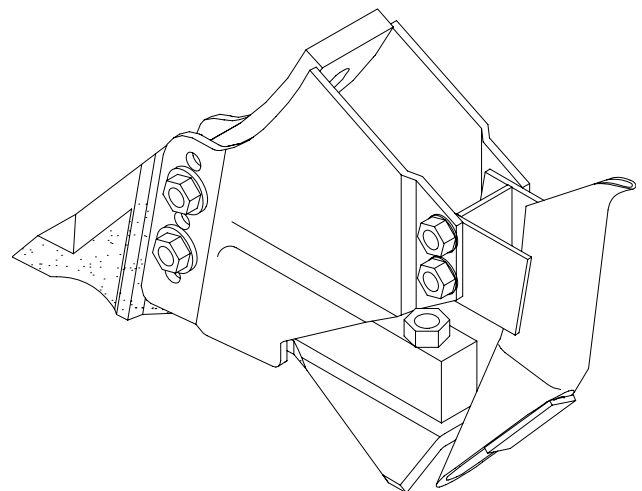
Part Number S28158



Part Number S29000



Part Number S25962



Part Number S29140

Important

Re-tighten all bolts after initial 10 hours.
Check tightness periodically thereafter.

Component Replacement

- Tighten all bolts evenly.
- Drift head of bolts with hammer to seat shoulder of bolt head.
- Re-tighten bolts evenly to specified torque.
 - 3/8" bolts torque to 30 ft. lb. (41 N-m)
 - 7/16" bolts Grade 8 torque to 70 ft. lb. (95 N-m)

Operation

General Field Operation

- Follow guidelines outlined in *“Operating Guidelines”*.
- Switch monitor on as outlined in the Monitor Section.
- 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 systems as outlined in the “Monitor Section” under *“Identifying Variable Rate Console Switches”*.
- Lower seeding tool into ground.
- Rates can be varied across field as desired by using the boost and cut buttons for the appropriate product. See *“Identifying Variable Rate Console Switches”* under Monitor Section.
- Turning at headland: Switch metering systems off with the Master On/Off Switch, immediately raise seeding tool fully rephasing hydraulics (see seeding tool manual).
- Once turned engage metering systems with the Master On/Off Switch 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).]

Manual Override

If the variable rate control system fails, the independent manual override system can be used to maintain seeder operation.

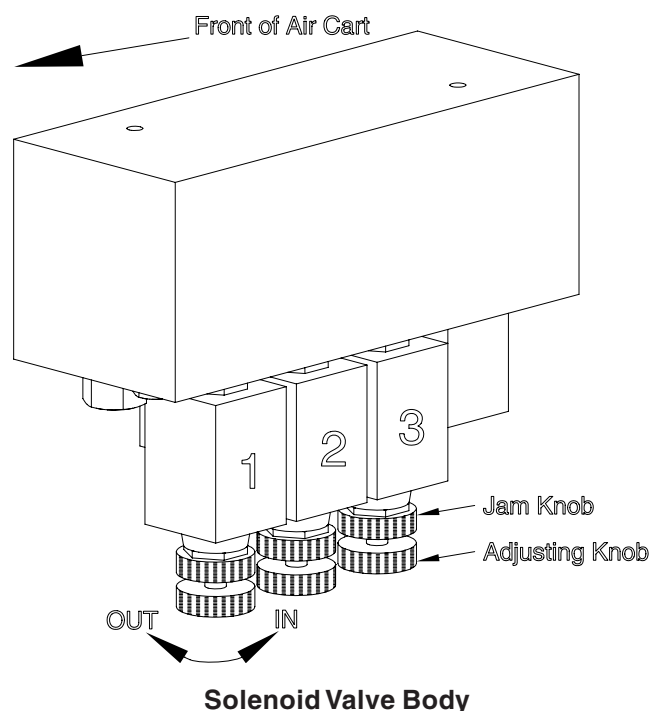
The manual override system provides the ability to run the hydraulic motors at a fixed rate (**not proportional to ground speed**) and to turn the manual system ON and OFF from the tractor cab.

Rate Setting

To set the manual override system use the following procedure:

- Turn Monitor, VRT Console and Controller Switch OFF.
- Empty product from tanks or close tank shut-offs.
- Refer to the appropriate “*Ground Speed Chart*” on the following pages or use the calculations below to determine the meter shaft RPM for the desired product.
- Adjust meter shaft RPM using following procedure:
 - Place hand held tachometer onto meter shaft.
 - Loosen Jam Knob.
 - Turn Adjusting Knob IN (Clockwise) until meter shaft turns desired RPM.
 - Tighten Jam Knob to secure Adjusting Knob in place.
- Repeat the above procedure for the other meter shafts.

Note: Re-zero shaft hydraulic motors once normal operation of system is resumed.



Calculating Meter Shaft RPM

If it is desired to calculate the exact rpm for a more specific ground speed use the following:

Know parameters:

Working Width	The operating width of seeding tool. (feet)
Working Speed	Operating ground speed. (mph)
Application Rate	Weight of product. (lbs/acre)
Product WT/REV	Known from calibration mode or can determine from Calibration Chart. (lbs/rev)

Operation

Manual Override - Continued

Calculating Meter Shaft RPM

Determine in the following order:

- 1) Travel Distance (feet per acre) = $43560 \text{ ft}^2 / \text{Working Width (ft)}$
- 2) Travel Speed (feet per minute) = $\text{Working Speed (mph)} \times 5280 \text{ ft/mile} / 60 \text{ min/hr}$
- 3) Travel Time (minutes per acre) = $\text{Travel Distance ft/acre} / \text{Travel Speed (ft/min)}$
- 4) Motor revs per acre = $\text{Application rate (lbs/acre)} / \text{WT/REV (lbs/rev)}$
- 5) Motor RPM = $\text{Motor Revs (revs/acre)} / \text{Travel Time (min/acre)}$
- 6) **Meter Shaft RPM**
 - Direct Drive = $\text{Motor RPM} / 2$
 - Slow Speed Drive = $\text{Motor RPM} / 16$

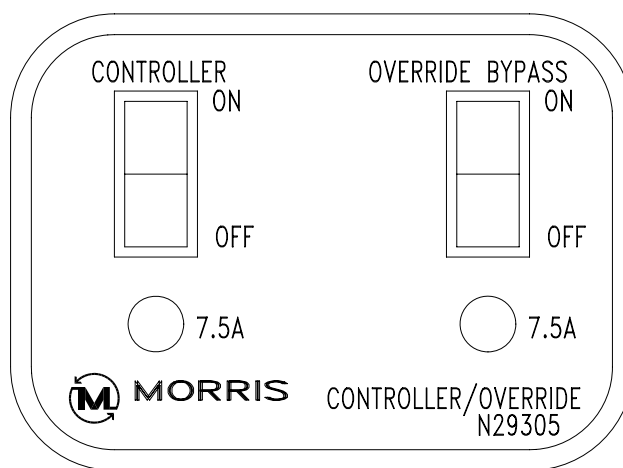
Operating in Manual Override

- Refill tanks or open the tank shut-offs.
- Switch Controller switch OFF and Override **Bypass** switch to ON, this will shut off the shaft motors.
- Start Fan.
- Move forward with seeding tool at desired speed.

Note: It is important to maintain a constant ground speed since product application rate will not adjust to any changes in ground speed.

- Engage metering system by turning OFF Override Bypass switch.
- Lower seeding tool into ground.
- Turning at headland:
 - Disengage metering system by turning ON Override **Bypass** switch, immediately raise seeding tool fully rephasing hydraulics (see seeding tool manual).
 - Once turned engage metering system by turning OFF Override Bypass switch and lower seeding tool into ground.

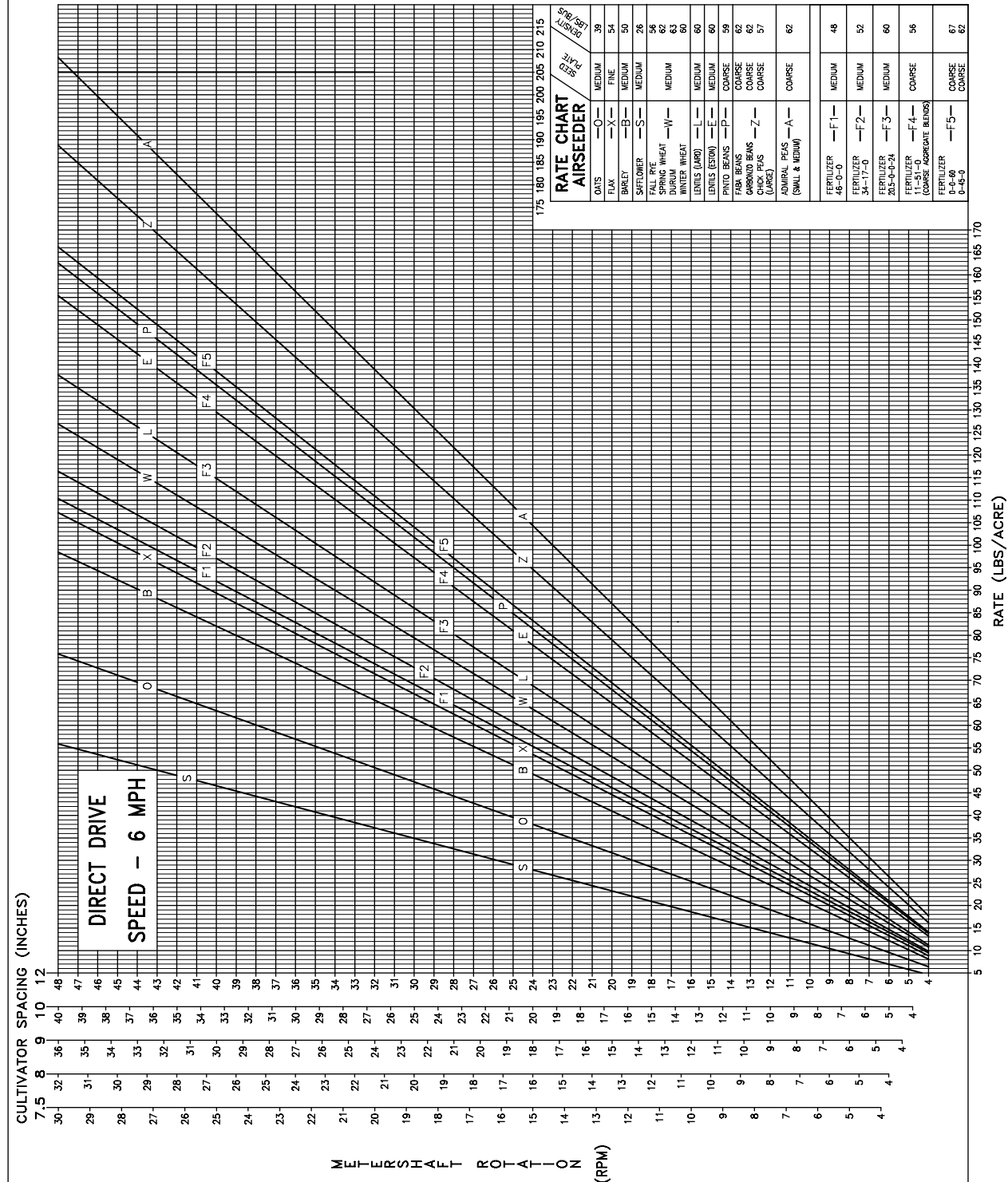
Note: Re-zero shaft hydraulic motors once normal operation of system is resumed.



Controller/Override Switches

Manual Override - Continued

6 mph Ground Speed Chart - Direct Drive

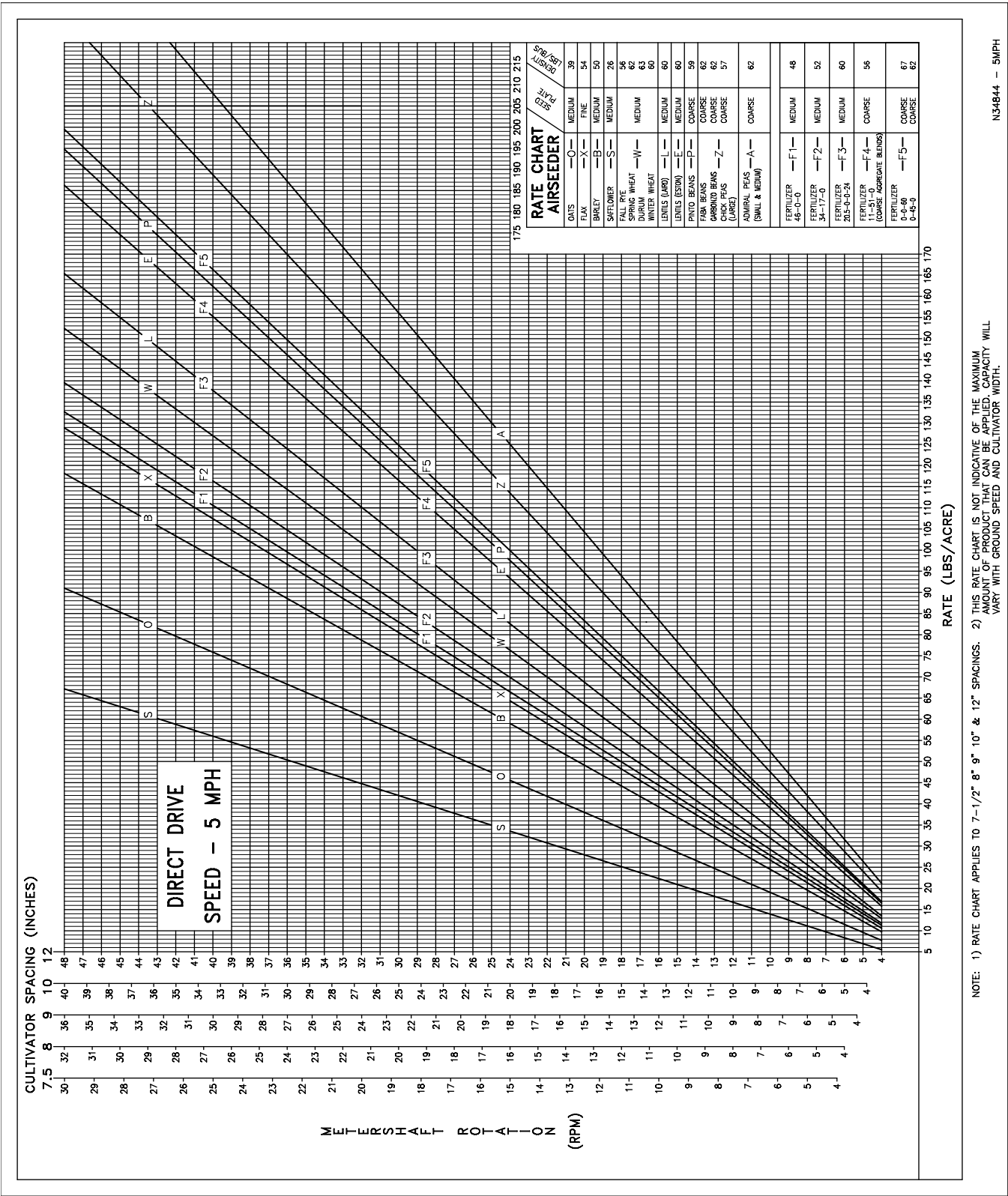


NOTE: 1) RATE CHART APPLIES TO 7-1/2" 8" 9" 10" & 12" SPACINGS. 2) THIS RATE CHART IS NOT INDICATIVE OF THE MAXIMUM AMOUNT OF PRODUCT THAT CAN BE APPLIED. CAPACITY WILL VARY WITH GROUND SPEED AND CULTIVATOR WIDTH.

Operation

Manual Override - Continued

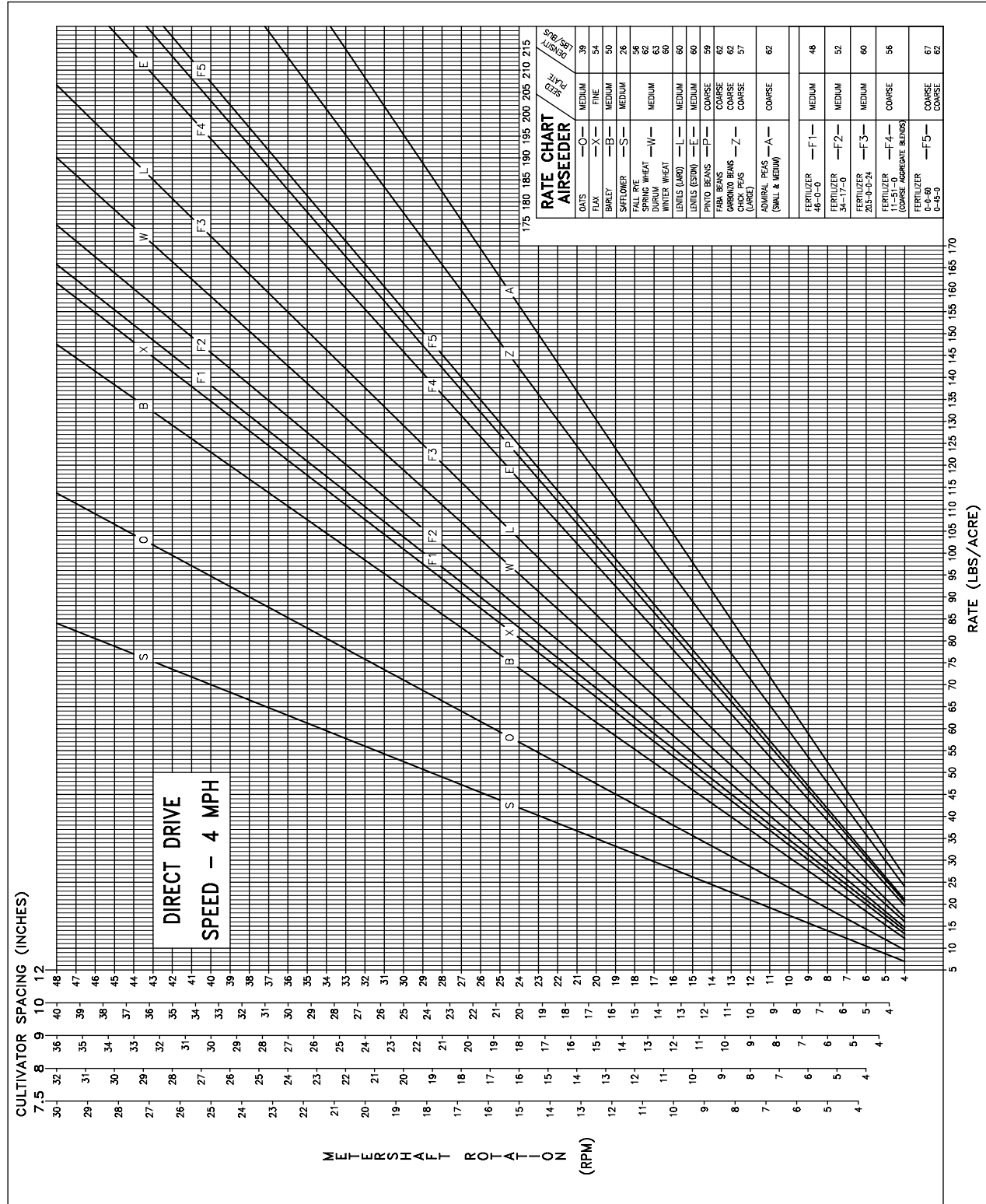
5 mph Ground Speed Chart - Direct Drive



N34844 - 5MPH

Manual Override - Continued

4 mph Ground Speed Chart - Direct Drive

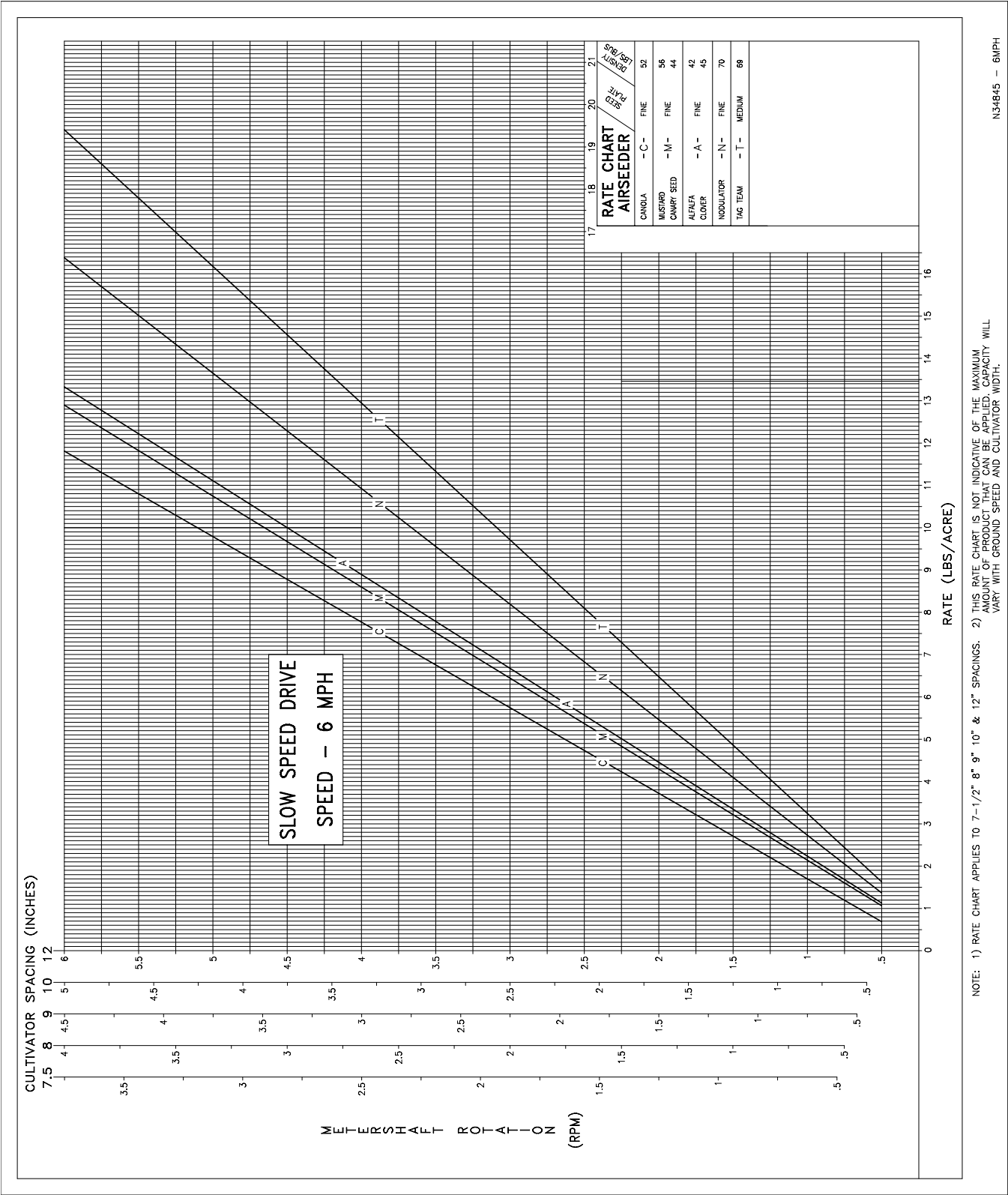


NOTE: 1) RATE CHART APPLIES TO 7-1/2" 8" 9" 10" & 12" SPACINGS. 2) THIS RATE CHART IS NOT INDICATIVE OF THE MAXIMUM AMOUNT OF PRODUCT THAT CAN BE APPLIED. CAPACITY WILL VARY WITH GROUND SPEED AND CULTIVATOR WIDTH.

Operation

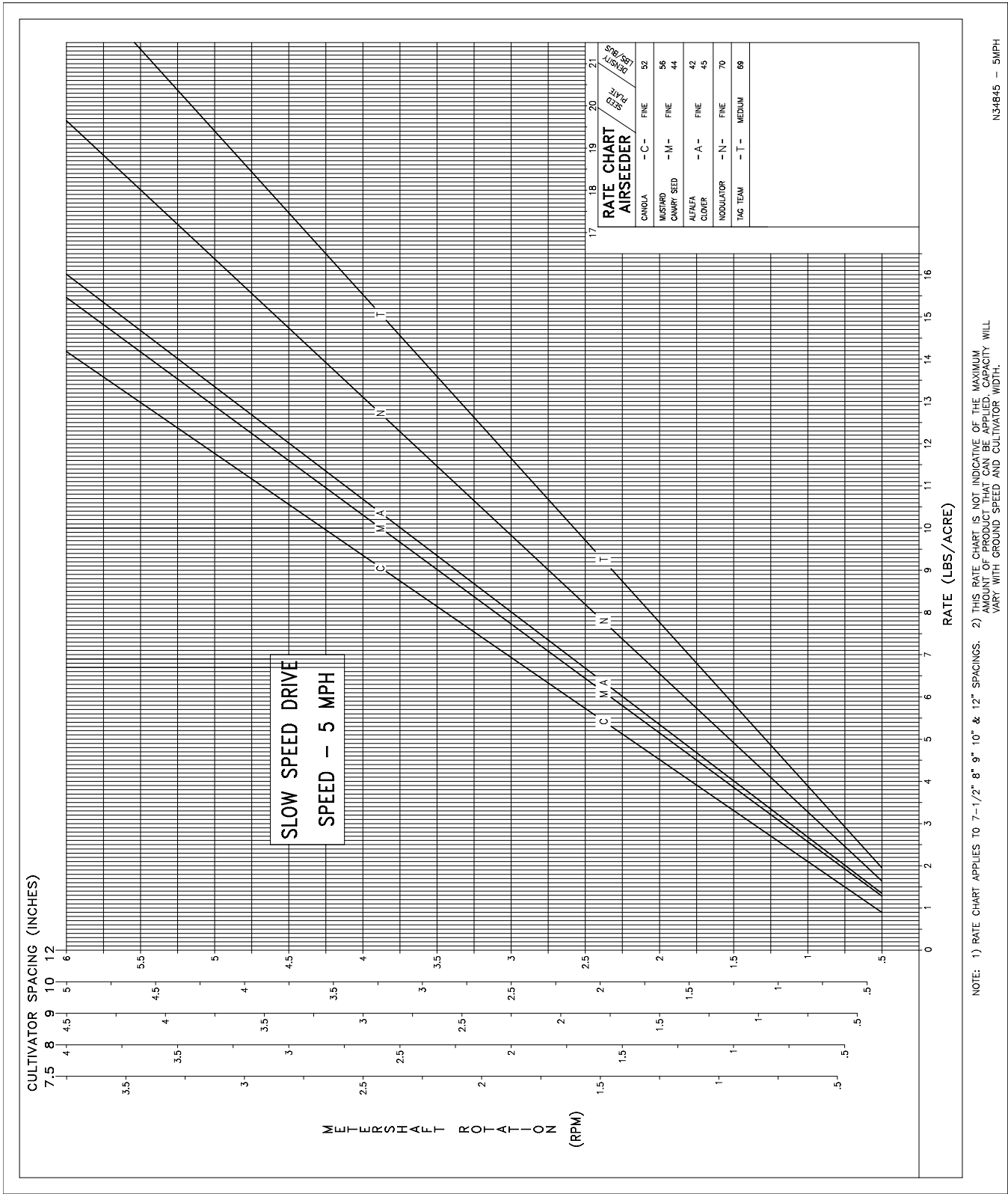
Manual Override - Continued

6 mph Ground Speed Chart - Slow Speed



Manual Override - Continued

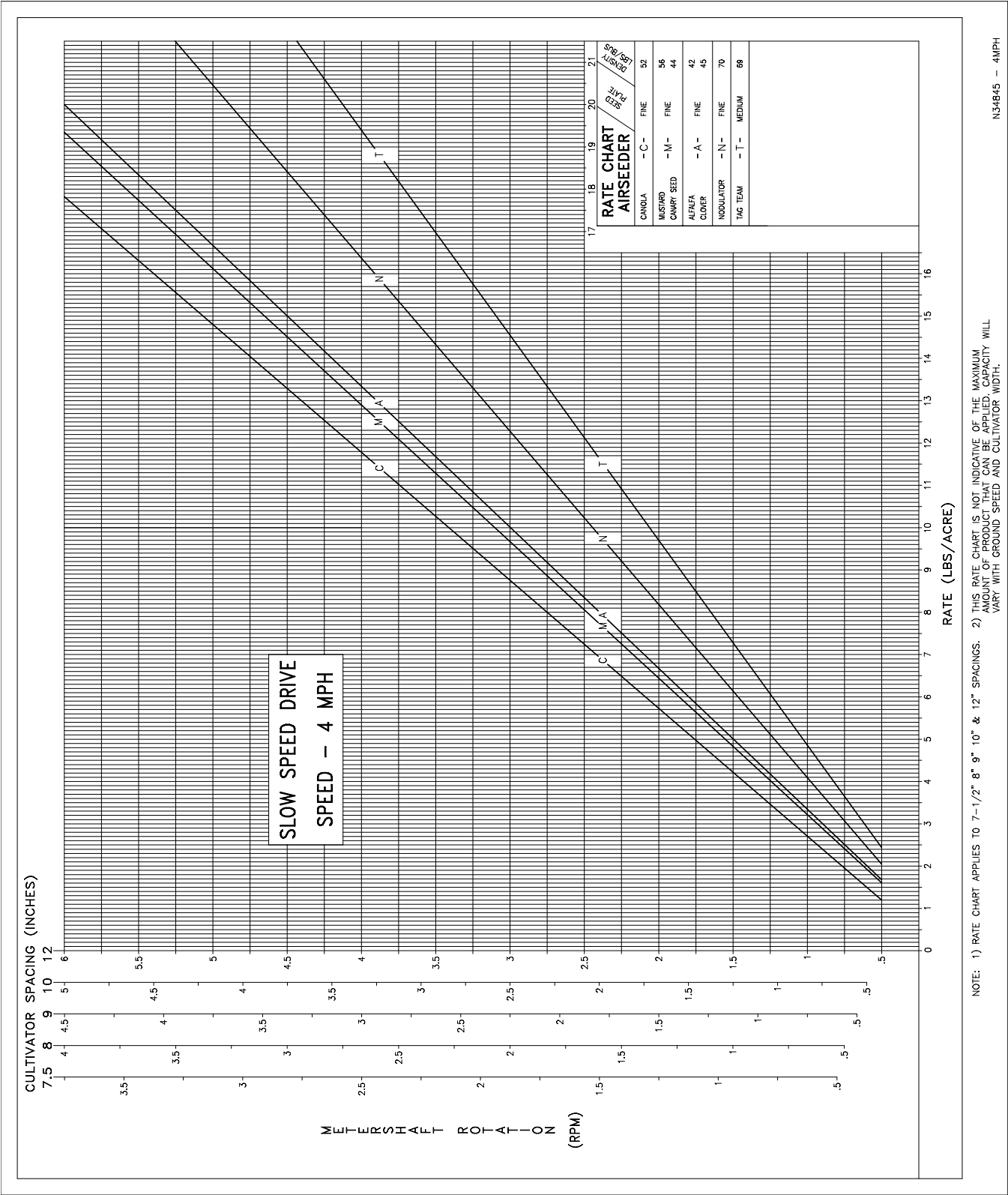
5 mph Ground Speed Chart - Slow Speed



Operation

Manual Override - Continued

4 mph Ground Speed Chart - Slow Speed



Section 6: Monitor

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Introduction

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
- Ground speed
- Shaft speeds (up to 3)
- Bin levels (up to 3)
- Flow Blockage (up to 192 runs)
- Seed rates & Seed counts (up to 24 rows)
- Auxiliary bin pressure

An audio alarm will sound upon detection of low or high fan speed, low shaft speed, low bin level. Also, loss of flow in any runs that are being monitored with Blockage Modules, and low seed rates when seed counting sensors are used generate alarms. Audio alarms persist until the alarm condition is removed or until the alarm is acknowledged by the operator by pressing the ACK button.

In addition, the monitor can determine and display:

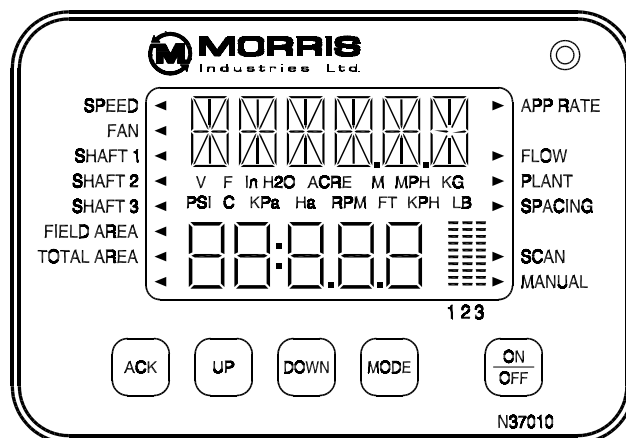
- Field Area
- Total Area
- Application Rate (weight per unit area)

The monitor allows the following settings to be changed:

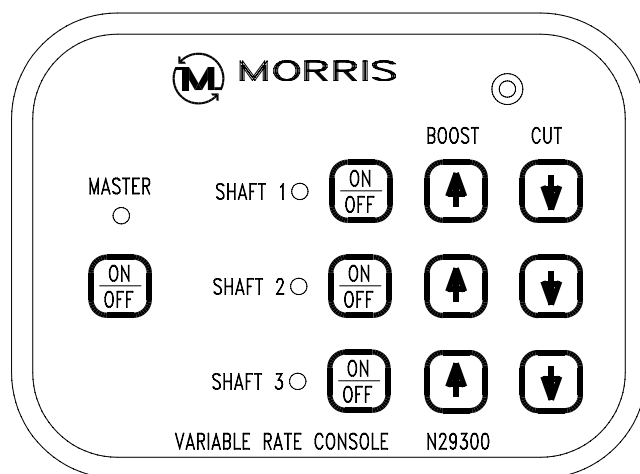
- High and Low fan speed alarm point
- Ground speed pulses per mile and pulses per revolution
- Pulses per revolution of fan and 3 shafts
- Low bin alarm for 3 bins
- The number of Blockage Modules that are connected to the monitor
- Seed rate alarm points for 9 seed types (Plant)
- The width of the implement
- Display imperial or metric units

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

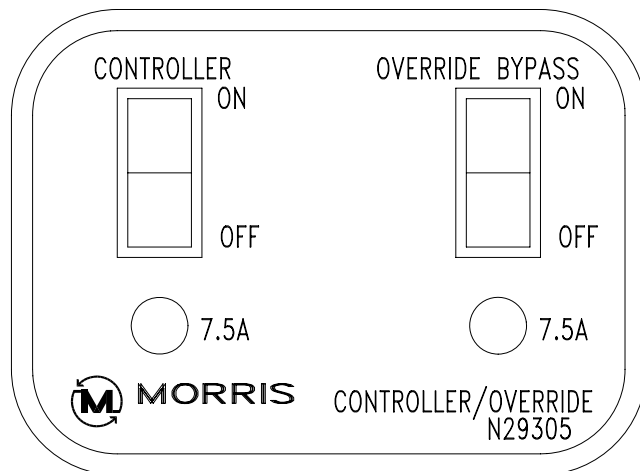
Two cables exit the rear of the monitor. There is a two wire power cable that connects to the tractor power supply. The other is a three wire cable that brings power and communications to the remote sensors through the main harness.



Monitor



VRT Console



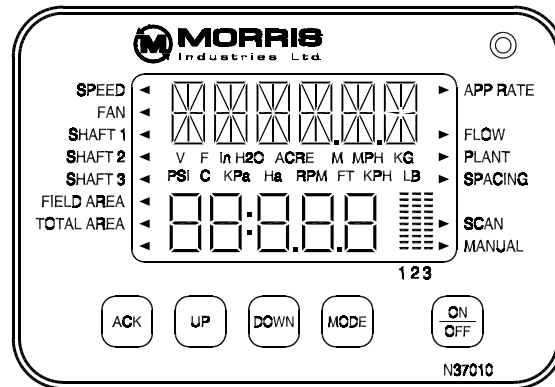
Controller Switch

Monitor

Identifying Monitor Switches

The five push buttons are used for controlling the monitor.

- ACK** • Acknowledge. Primarily used for acknowledging alarms. Also used for exiting from program mode, resetting area, and accessing some special functions.
- UP** • Used for moving function selection icon. Also used to increment parameter in program mode.
- DOWN** • Used for moving function selection icon. Also used for decrementing parameter in program mode.
- MODE** • Used to enter program mode. Also used for going to next parameter in program mode.
- ON/OFF** • Used to turn monitor on and off.



Identifying Monitor Displays

Function Indicators

- The left and right side of the display have triangular icons for indicating the current selected display function.
- These icons will flash when alarm conditions occur for a function.

Upper Display

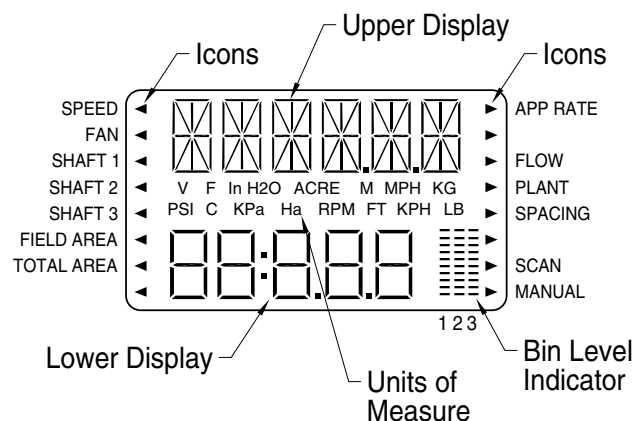
- Displays the selected function, and alarm conditions.
- This line is also used to give information during monitor programming and initial system installation.

Lower Display

- Displays the reading for the selected function, with the unit of measure displayed above value.
- This line is also used to indicate the parameter value during monitor programming.

Bin Level Indicator

- The bars will flash and the audio alarm will sound when bin level is low.



Identifying Variable Rate Console Switches

The variable rate console provides the means to:

- Turn on or off each/all metering shaft(s).
- Increase or decrease the application rate of any given shaft.

Master On/Off

Activates the shaft On/Off buttons. If any of the seed or fertilizer buttons are in an “On” state during a Master On, the variable rate controller will initiate any required motor rotation of the respective shaft at the currently selected application rate. Master Off will deactivate all the shaft On/Off buttons and stop all motor rotation. A LED indicates whether the button is on or off.

Shaft 1 On/Off

Used to turn shaft 1 on and off. A LED indicates the current state of the button.

Shaft 2 On/Off

Used to turn shaft 2 on and off. A LED indicates the current state of the button.

Shaft 3 On/Off

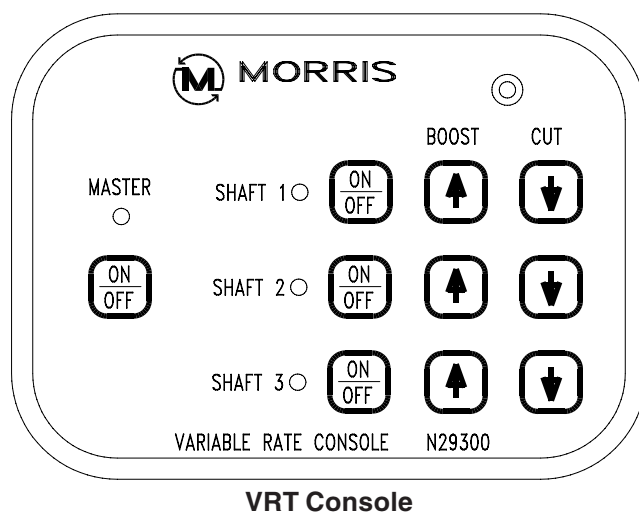
Used to turn shaft 3 on and off. A LED indicates the current state of the button.

Boost

Each push of the Boost button **increases** the application rate by **5%** of the **nominal rate** to a maximum of 50%. The respective LED will flash quickly indicating the application rate is higher than the nominal rate. To return the application rate to nominal, the respective shaft On/Off button is pressed once. The LED will stop flashing and will stay on.

Cut

Each push of the Cut button **decreases** the application rate by **5%** of the **nominal rate** to a minimum of 50%. The respective LED will flash slowly indicating the application rate is lower than the nominal rate. To return the application rate to nominal, the respective shaft On/Off button is pressed once. The LED will stop flashing and will stay on.



Note: The application rate can be increased or decreased up to 50%.

Monitor

Identifying Controller/Override Switches

The Controller/Override switches provide:

- Power to the variable rate control system.
- Manual override of the variable rate control system.

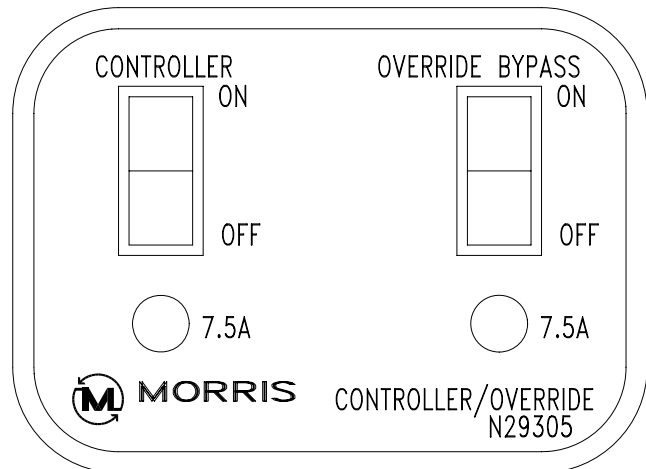
Controller On/Off

Activates the variable rate control system by supplying power to valve body.

Override Bypass

Used if a fault occurs in the electrical wiring of connections to the variable rate control system. The manual override system provides the ability to run the hydraulic motors at a fixed rate (not proportional to ground speed) and to turn the manual system on and off from the tractor cab. **This switch is normally left in OFF position.**

Note: The Controller Switch must be turned on before the monitor.



Controller Switch

Preparing Monitor

- Locate monitor, variable rate console and controller/override switch in a convenient location in cab.
- Connect the red wires to the positive (+) terminal of the battery.
- Connect the black wires to the negative (-) terminal of the battery.
- 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 directly to starter switch.



Start-up

Turn power on in the following sequence:

1. **Controller Switch**
2. **Monitor**
3. **VRT Console** (To run metering system)

The VRT Hydraulic Motors will turn 1/2 revolution to check zero position when the tractor hydraulics are engaged to run the air cart System.

Normal Start-up

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

- All of the display segments turn on one at a time, and then off one at a time.
- MORRIS is briefly displayed.
- The Version number of the monitor software is displayed. **This number should be included with any reports of faulty or unexpected system operation.**
- The sensor numbers of all previously learned sensors are displayed in sequence as initial communication with each sensor takes place.
- The normal operating display starts with the ground speed function active.
- Once normal operating starts the monitor will alarm specific sensors; in 10 seconds the shafts alarm, 20 seconds the bins alarm and in 30 seconds the speed alarm. Press the **ACK** key for each alarm, this will cancel the alarms returning the monitor to ready mode.

It may occur that an error is detected on start-up. In that case the sequence is slightly modified as described in the section on Start-up Error Messages.

Note: The Controller switch in the Controller/Override Module must be turned on before the monitor.

Monitor ID
Version Number

Monitor

Start-up - Continued

Special Start-up

There are two types of special actions that can be controlled when starting up the unit.

- **START SENSOR CONFIGURATION LEARN:** This allows a new sensor configuration to be learned, with the existing configuration cleared from memory.
- **RESET SETTING:** All stored settings, such as pulses per revolution values, alarm points, etc. are restored to their factory default values. All areas and seed counts are also zeroed.

The two actions can be selected independently or together by holding down certain key combinations when the unit is turned on, see chart.

Start-up Error Messages

In rare circumstances certain fault conditions may be detected at start-up. There are two distinct classes of such fault conditions and they are reported differently.

First Class

The **first class** is due to faults that occur while the unit was operating and which cause the unit to restart. In this case, the monitor will display the error message instead of the normally displayed MORRIS. It will then wait for a key press before proceeding with the start-up sequence. The possible error messages (whose individual meanings are technical and primarily of interest to the monitor supplier) are:

COPRST, UUORST, CLKMON, and IMPRST

Second Class

The **second class** includes various conditions that the monitor checks for after the Version Number is displayed. In most cases, when such conditions are detected the system is forced to do a complete factory reset (as if the monitor were turned on with the ACK, Down and Mode keys all held as described above). The possible displayed messages are:

VERCHG, SNSCHG, EEPSC1, EEPSC2, BDSERP, and VERCHS

Special Startup	
Button Combination	What Occurs
ACK and DOWN	FORCED LEARN of all sensors (other settings retained)
ACK and MODE	RESET SETTINGS (sensor configuration retained)
ACK and DOWN and MODE	BOTH FORCED LEARN and RESET SETTINGS

Note: If any of the error messages appear more than twice, the monitor is probably faulty.

Startup Error Codes	
Monitor Display	Display Meaning
VERCHG	Should only be true after installation of new software that changes the way nonvolatile memory (on chip EEPROM) is used. Forces a factory reset.
SNSCHG	Should only be true after installation of new software that changes the order or composition of the default list of connectable sensors. Forces a factory reset.
EEPCS1 EEPCS2	Some data in the microprocessor nonvolatile memory (EEPROM) is invalid. Data is stored in two banks. The message indicates which bank had the problem. If only the first bank is corrupt, then the good bank 2 copy will be used and there will not be a forced factory reset.
BDSERP	A test of the integrity of the additional nonvolatile memory chip (Serial EEPROM) has failed.
VERCHS	Should only be true after installation of new software that changes the way nonvolatile memory (Serial EEPROM) is used. Forces a factory reset.

System Installation

Sensor LEARN Mode

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) A granular applicator is added to the air cart.
- 2) Replacing faulty sensors.
- 3) Replacing faulty monitor with a new monitor.

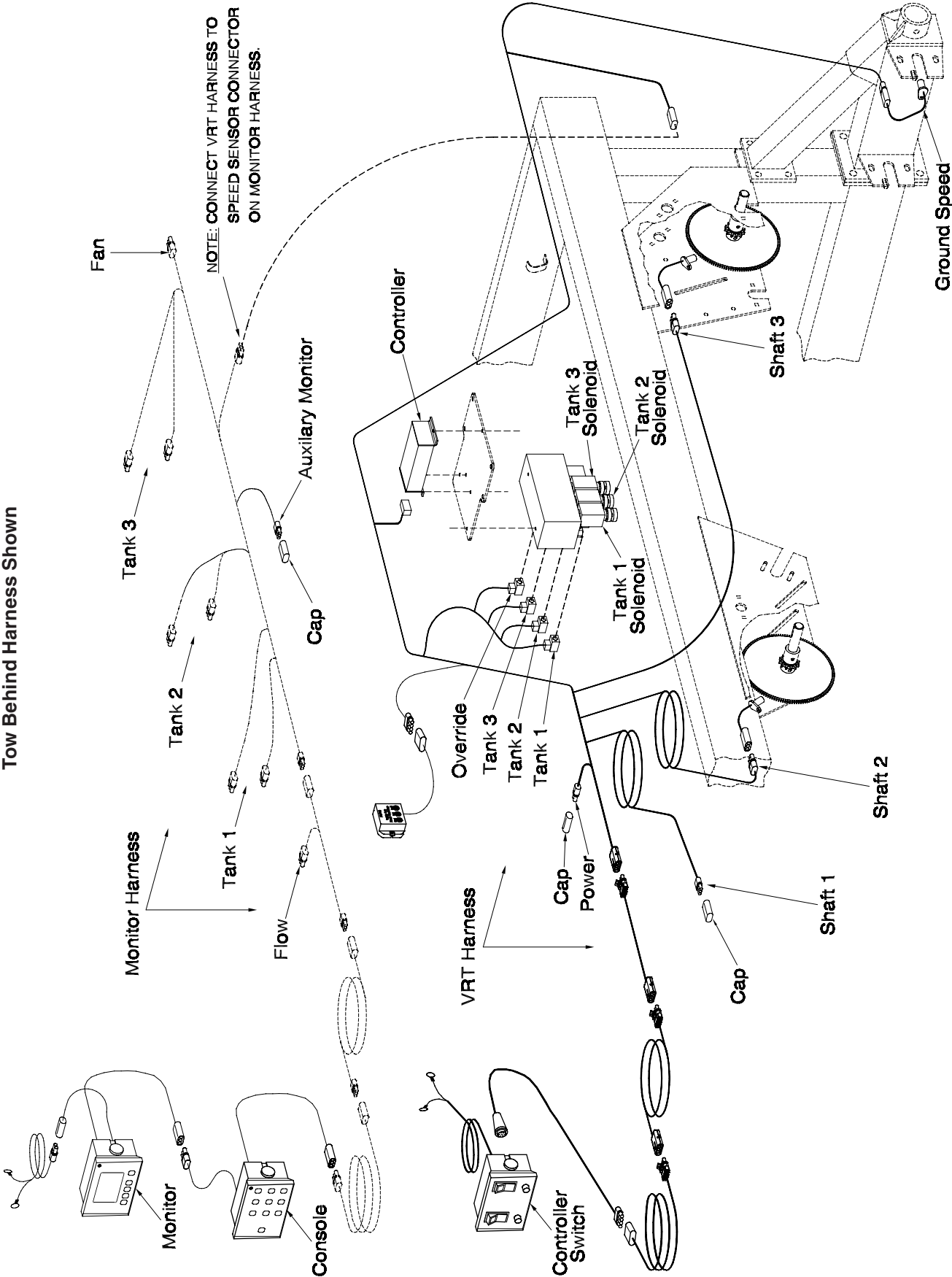
Note: Each monitor is unique to the sensors installed. If monitor is moved to another air cart it has to be reprogrammed to match the sensors.

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 function is plugged in.
 - 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 a full complement of sensors. These sensors can be programmed to be ignored in two ways:
 - i) During initial installation when the monitor prompts for a sensor to be plugged in, the operator can press **ACK** 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.
 - ii) During operation the operator can disable sensors by setting the pulses per revolution to zero. When pulses are set to zero alarms for that 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*".
 - i) **Pin Sensors** - the blockage module **does not have to be removed from the harness** during initial system installation.
 - ii) **Optical Sensors** - the blockage module **must be removed from the harness** during initial system installation.

Sensor Installation Order
Speed (Ground)
Fan
Shaft 1
Shaft 2
Shaft 3
Tank 1
Tank 2
Tank 3
VarCon (Variable Rate) (Unit calls for installation only if var controller is installed)
Plant Sensors
Optical Blockage Modules

Monitor



Factory Setting for VRT Harness

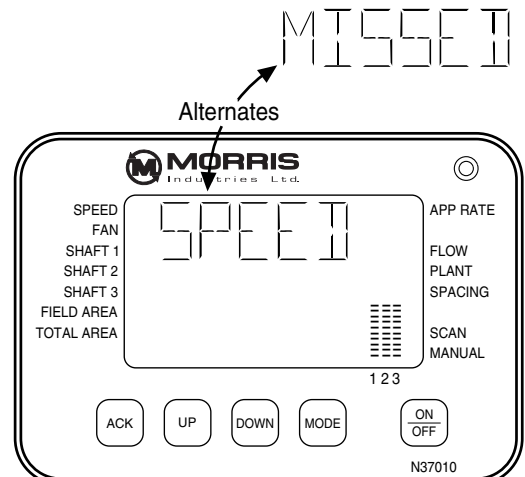
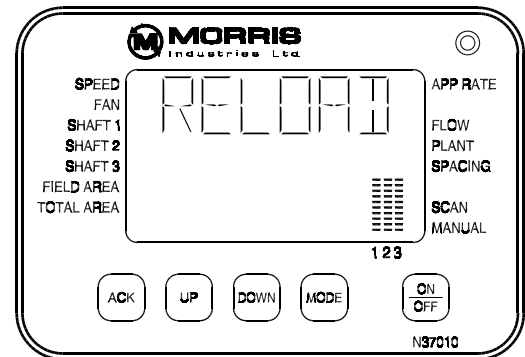
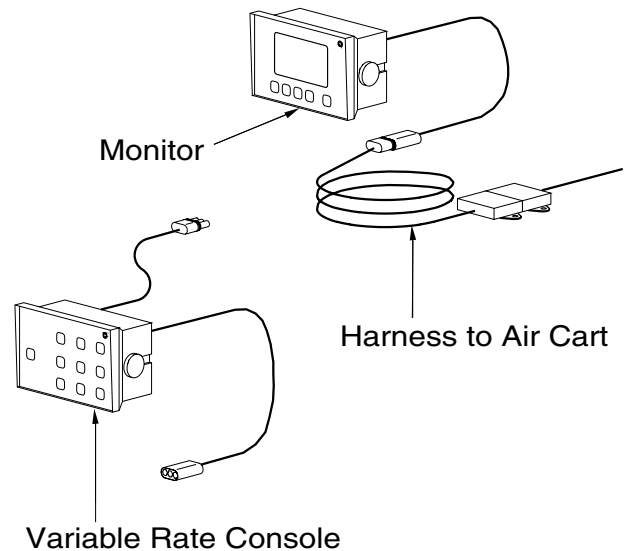
System Installation - Continued

Installation Procedure

- **Disconnect** all the sensors (3 pin connector) from the harness on the air cart (**Black Coloured Connectors**).

Note: Do not disconnect the VRT sensors (Blue Colored Connectors).

- **Disconnect** the Variable Rate Console (3 pin connector) from the harness.
- **Connect** the harness (3 pin connector) into the monitor.
- Turn on the controller switch.
- Hold down both buttons **ACK-DOWN-MODE** and turn on monitor. Continue holding the buttons until **KEYOFF** appears on the display.
- **RELOAD** will be displayed briefly on line 1 when the ACK-DOWN buttons are released. Each sensor must now be individually recognized by the monitor. The monitor will display the order in which the sensors must be plugged in.
- The display on line 1 will alternate between **MISSED** and **SPEED**, indicating that the variable rate harness (Controller) may now be connected to the monitor harness.
- The monitor will give a single beep when it acknowledges the Controller.
- The display on line 1 will now alternate between **MISSED** and **FAN**, indicating that the fan sensor may now be connected. Connect the fan sensor.



Monitor

System Installation - Continued

Installation Procedure - Continued

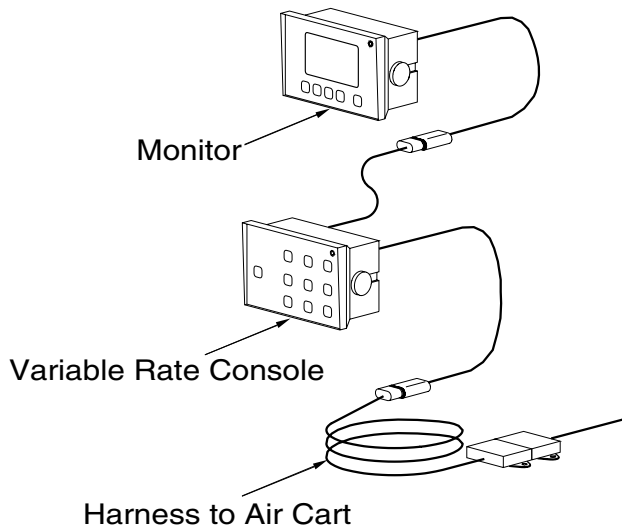
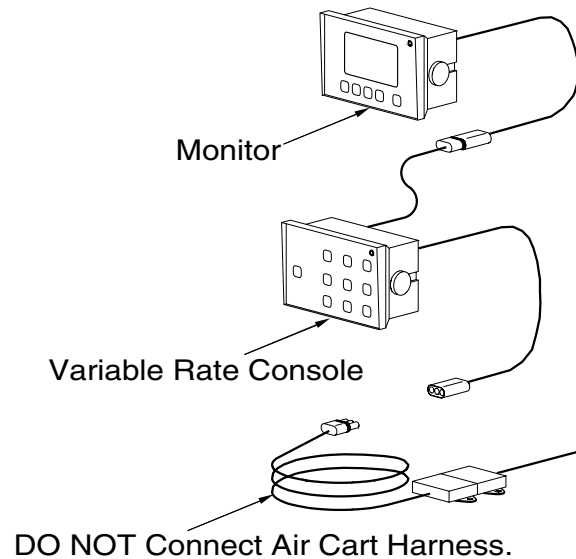
- The process is the same for the rest of the sensors in the sequence.

Note: When the monitor requests a sensor that **will not be used** in the configuration, press the **ACK** key, and the monitor will skip the sensor and advance to the next one in the sequence.

- When the monitor displays **VARCON**, disconnect the harness from the monitor and connect the Variable Rate Console into the monitor **only**.
- Once monitor acknowledges the Console, the air cart harness can be plugged into the Variable Rate Console.

Note: There are “24” **PLANT SENSORS**. To skip past the plant sensors press **ACK** and **MODE** buttons together. Same procedure can be used for the Optical Flow and Blockage Modules if not used.

- To complete the installation, the monitor **must be turned off**, then turned on again. Now, only the names of the learned (but not the skipped) sensors will quickly flash by on the display as the unit goes through its normal “wake up” sequence, after which it advances to its default operating mode, where the ground speed is displayed.



Monitor Programming

Most of the function positions have settings that may be changed. These include various configuration details, alarm trip points, and some convenient options such as whether imperial or metric units should be used for numeric display.

Procedure

The following explains the procedure for entering and exiting any of the Change Settings modes.

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

Entering Change Settings Mode

- Use the UP or DOWN button to move the triangle icon to desired function.
- Hold the MODE button until 4 short beeps and 1 long beep sounds. Release button after the long beep. This starts the change settings mode.
- Display line 1 will show a description of what the setting is.
- Display line 2 will indicate the present numeric value of the setting. An appropriate unit is also indicated.
- Now, each press of the MODE button will advance the display to the next setable item for that function, cycling back to the first one after reaching the end. The last display in the cycle is the save prompt, which allows the user to decide whether settings should be saved into memory.

Exiting from Change Settings Mode

- Press MODE button until the **SAVE** display appears on display line 1.
- If settings should be saved, press UP to choose yes (Y). Then hold down ACK button until 4 short beeps and 1 long beep sounds. Release button after the long beep.
- If settings should not be saved (but remain as they were before the mode started) press DOWN to choose no (N). Then press ACK button, which immediately exits Change Settings Mode.

Note: When the operator is in any of the “*change settings*” modes, the monitor will not generate normal monitor alarms (low fan speed, shaft speed and so on).

See charts on following pages for monitor program settings.

PP400				
Tire Size (Good-Year)	Tire Style	Rating	Pressure	PP400
23.1 x 26	TD8 Lug	10 ply	28 psi	1,164
	AWT	12 ply	24 psi	1,279
30.5 x 32	AWT	12 ply	20 psi	1,433
			24 psi	1,426
	Lug	14 ply	20 psi	1,447
			22 psi	1,428
800/65 R32	Lug	LI 172	15 psi	1,434
			20 psi	1,430
900/60 R32	Lug	176 A8	17 psi	1,337

Important

PP400 is affected by tire circumference. Determine tire circumference under actual field conditions. See “PP400 Calculation”

Note: To “*TURN OFF*” any shaft not in use set **PULSES** to ‘0’ and **APRATE** to ‘0’. This will eliminate any nuisance alarms caused by an inactive shaft.

Monitor

Monitor Programming - Continued

Base Monitor Programming											
MONITOR FUNCTION	PRESS BUTTON Hold for five beeps (4 short and 1 long beep)	Display Upper	Display Lower	PRESS BUTTON	Display Upper	Display Lower	PRESS BUTTON	Display Upper	Display Lower	PRESS BUTTON	Display Upper
SPEED	MODE	PP400	* See Chart PP400	MODE	PPR	4	MODE		Set with UP/DOWN buttons		Set with UP/DOWN buttons
FAN	MODE	PULSES	2	MODE	LO FAN	3000	MODE	HI FAN	5000	MODE	SAVE Y
SHAFT 1	MODE	PULSES	4	MODE	LEVEL	20	MODE				SAVE Y
SHAFT 2	MODE	PULSES	4	MODE	LEVEL	20	MODE				SAVE Y
SHAFT 3	MODE	PULSES	4	MODE	LEVEL	20	MODE				SAVE Y
FIELD AREA or TOTAL AREA	MODE	WIDTH	Seed Tool Width	MODE	UNITS	0-Imperial or 1-Metric	MODE				SAVE Y
FLOW	MODE	BOXES	0	MODE	TYPE	0	MODE				SAVE Y
PLANT	MODE	SDTYPE	1	MODE	SEEDRT	15000	MODE	RSPACE	7.5	MODE	SAVE Y
SPACE	MODE	SELECT	0	MODE							SAVE Y

Canola Setting

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 false seed shaft alarm, since the shaft is rotating below the alarm threshold of 2 rpm.

To avoid this nuisance alarm change the seed shaft pulse setting from 4 to 1, the monitor will think the shaft rpm is 4 times what it actually is.

Example: Actual Seed Shaft rpm is 5.

Monitor set at **4 pulses** will read a seed shaft rpm of **5**.

Monitor set at **1 pulses** will read a seed shaft rpm of **20**.

Note: Change the pulse setting back to 4 when returning to higher application rates.

Monitor Programming - Continued

When an air cart is equipped with a granular tank, blockage modules, or plant counter the settings listed in the Monitor Options Programming chart must be used.

Note: To “**TURN OFF**” any shaft not in use set pulses to 0. This will eliminate any nuisance alarms caused by an inactive shaft.

Monitor Options Programming												
MONITOR FUNCTION	PRESS BUTTON	Display Upper	Display Lower	PRESS BUTTON	Display Upper	Display Lower	PRESS BUTTON	Display Upper	Display Lower	PRESS BUTTON	Display Upper	PRESS BUTTON
	Hold for five beeps (4 short and 1 long beep)		Set with UP / DOWN buttons			Set with UP / DOWN buttons			Set with UP / DOWN buttons		Set with UP / DOWN buttons	Hold for five beeps (4 short and 1 long beep)
SHAFT 3	MODE	PULSES	4	MODE	LEVEL	20	MODE			MODE		ACK
FLOW Pin	MODE	BOXES	Number of Blockage modes used	MODE	TYPE	0	MODE			MODE		ACK
FLOW Optical	MODE	INSTAL	Y	MODE	M01R--	Set number of runs for module	MODE (Will run through all blockage Modules)	M02R-- to M12R--	Set number of runs for module	MODE		ACK
PLANT	MODE	SDTYPE	1 - 9	MODE	SEEDRT	15000 - 35000	MODE	RSPACE	0.1 - 99.9	MODE		ACK
SPACE	MODE	SELECT	0 - seeds/foot or seeds/meter 1 - inches/seed or cm/seed							MODE		ACK

Monitor

Monitor Programming - Continued

Determining Tire Circumference

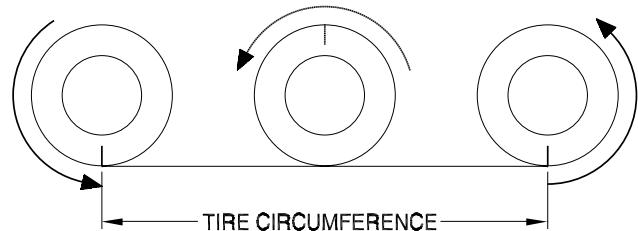
Factors that may affect the tire circumference and in turn metering rates and monitor PP400 values are as follows:

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

Note: The values used for monitor PP400 values 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 circumference for other tires not listed in the PP400 chart or to check the actual tire circumference do the following:

- 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 divid by 10 to get the rolling circumference of the tire.



Monitor Programming - Continued

PP400 Calculation

To determine PP400 value, first determine the tire circumference as outlined in *"Determining Tire Circumference"*.

Note: The PP400 can also be calculated more accurately with the use of the monitor pulse counting mode.

$$\text{Formula for 26 inch rim} \dots\dots\dots \text{New PP400 Value} = \left(\frac{109}{\text{New Tire Circumference}} \right) \times 1,937$$

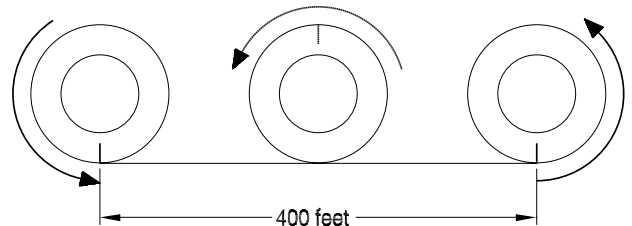
$$\text{Formula for 32 inch rim} \dots\dots\dots \text{New PP400 Value} = \left(\frac{302,400}{\text{New Tire Circumference}} \right)$$

Pulse Counting Mode for PP400

PP400 value can also be determined with the monitor, by placing it into Pulse Counting mode, in which the number of pulses associated with 400 feet of driving are determined.

To start the Pulse Counting Mode:

- Measure and mark out 400 feet.
- Select the SPEED position.
- Hold down the ACK key until after the long beep.
- Display line 1 will show START.
- To start the monitor counting the pulses, the MODE key must be pressed.
- Display line 1 will show COUNT and the bottom line will show "0".
- Drive distance and the monitor will count the number of pulses.
- When the 400 feet has been driven, the operator can press the MODE key once again to stop the pulse counting. This will bring up the SAVE screen.
- To save the count, select Y and then press and hold down ACK button until 4 short beeps and 1 long beep sounds. Release button after the long beep.



Note: The monitor can accept PP400 values from 50 to 1000. Therefore, if the new count is less than 50, the existing count is not replaced.

Monitor

Operation

The VRT monitor requires certain information in order to deliver the desired application rate.

- Implement Width.
- Pulses Per 400 feet (PP400).
- Ground Speed.
- Weight of Product per Revolution (WT/REV).
- Desired Application Rate (APRATE).

The monitor uses the PP400 to determine the ground speed of the implement.

With the ground speed and the implement width the monitor determines the area the implement is covering per unit time.

With the area and the WT/REV the monitor determines the RPM the shaft motor must turn to deliver the APRATE.

EXAMPLES:

The chart below shows how the monitor determines the shaft RPM for two identical air carts on different size and spacing Seeding Tools.

Description	Machine 'A'	Machine 'B'
Air Cart Model	8370	8370
Number of secondary runs	60	60
Application Rate	100 lbs/acre	100 lbs/acre
Trip Spacing of Seeding Tool	12 inches	9 inches
Working Width of Seeding Tool	60 feet	45 feet
Travel Distance per acre (1 acre = 43560 sq.ft.)	726 ft = (43560 ft ² / 60 ft)	986 ft = (43560 ft ² /45 ft)
Travel Speed of 5 mph	440 ft/min (5 mph x 5280 ft/mile / 60 min/hr)	440 ft/min (5 mph x 5280 ft/mile / 60 min/hr)
Travel Time per acre at 5 mph	1.65 min = (726 ft / 440 ft/min)	2.20 min = (968 ft / 440 ft/min)
Material metered per Motor shaft revolution	2 lbs/rev	2 lbs/rev
Motor shaft revs for 100 lbs/acre (100 lbs material)	50 revs = (100 lbs /2 lbs/rev)	50 revs = (100 lbs /2 lbs/rev)
Motor shaft RPM - 100 lbs/acre	30.3 RPM = (50 revs / 1.65 min)	22.7 RPM = (50 revs / 2.20 min)

Normal Operation

The text on either side of the display shows the names of all display functions on the monitor. A particular installation, however, might not use them all (such as installations without the third shaft/tank, or which do not have the FLOW option).

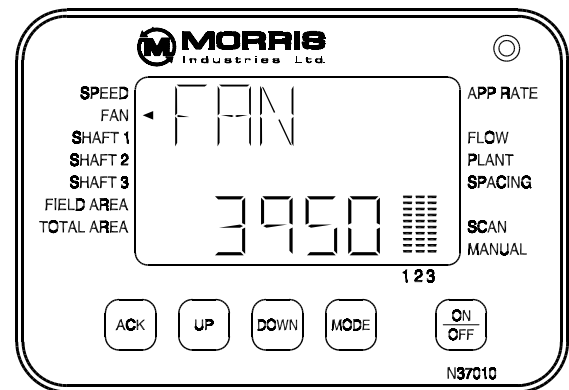
The operator controls which function will be active using the UP and DOWN buttons. The triangular indicator will indicate which function is active. A name will also appear on Line 1.

The numeric value for the selected function is displayed on line 2 unless that function is disabled, in which case line 2 will display OFF.

The unit of measurement for the displayed number is indicated in the units area of the display.

Following is a summary of what is displayed on line 2 for each function. Some functions are discussed later in more detail.

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



VRT MONITOR FUNCTION	LINE 1 TEXT	WHAT APPEARS ON LINE 2
SPEED	SPEED	Ground speed in MPH or KPH
FAN	FAN	Fan speed in RPM
SHAFT 1	SHAFT 1	Application rate in pounds/acre (kg/ha) of the named metering shaft.
SHAFT 2	SHAFT 2	
SHAFT 3	SHAFT 3	
FIELD AREA	F AREA	Area covered while seeding, in ACRES or HECTARES, since the last time the counter was zeroed. The FIELD counter can be cleared alone; clearing TOTAL clears FIELD also.
TOTAL AREA	T AREA	
APP RATE	APRATE	Actual running application rate of any two selected shafts in lb/ac (kg/ha)
FLOW	FLOW	OPEN if all runs are clear, or cycles through display of all blocked runs with format "MmmRrr", where mm=module address, rr=run number. More detail found in Flow section.
PLANT	AVG	Seed Rates or Seed Counts. In either case, for a single run, averaged over all runs, or for the run with the minimum or maximum rate or count. Operator chooses what is shown. More detail found in section on the planter option.
	RAT	
	MIN, MAX	
SPACE	AVG	Number of seeds planter per distance unit or distance between speeds planted for a single run, averaged over all the runs or for the run with the minimum or the maximum rate.
	S/M (IN/S)	
	MIN, MAX	

Monitor

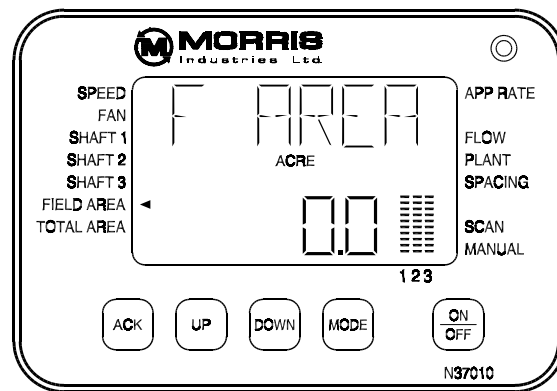
Area Display

There are two area counters, field area and total area. They are both accumulated whenever the system “in motion” condition is true, with one exception; when the system is in Application Rate mode, these area counters are not active. Area counts are stored in memory when the unit is turned off.

The counts are displayed by moving the triangle icon with the UP or DOWN button to the desired function. The FIELD AREA is displayed to the nearest tenth of an acre (or hectare) and the TOTAL AREA is displayed with no decimal. The appropriate unit icon (acres or hectares) is turned on.

Resetting the Field Acre Meter

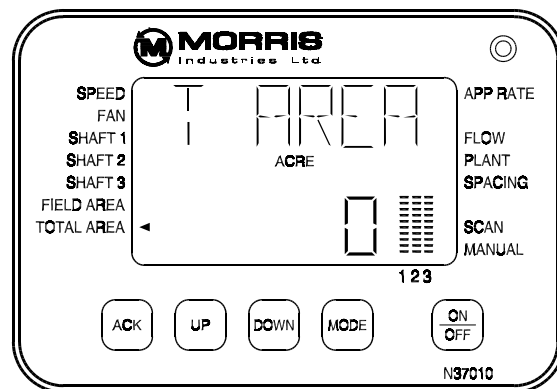
- Use the UP or DOWN button to move the triangle icon to FIELD AREA.
- Hold the ACK button until 4 short beeps and 1 long beep sounds. Release button after the long beep.
- The field area will be reset to zero.



Resetting the Total Acre Meter

- Use the UP or DOWN button to move the triangle icon to TOTAL AREA.
- Hold the ACK button until 4 short beeps and 1 long beep sounds. Release button after the long beep.
- The total area will be reset to zero.

Note: Field area will also be reset to zero when total area is reset.



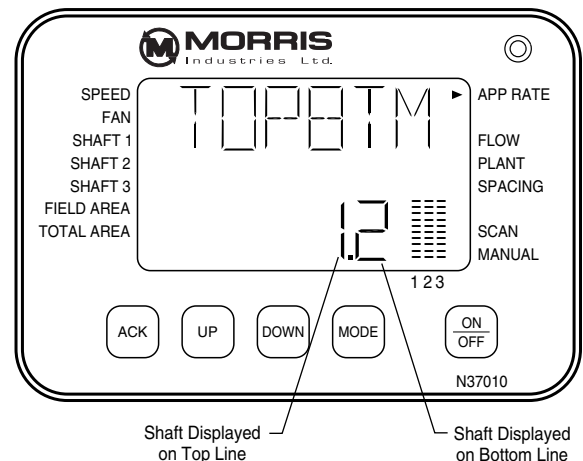
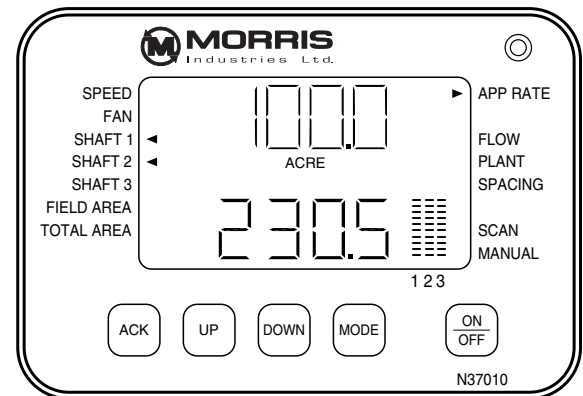
Application Rate Display

The application rate for two shafts are displayed by moving the triangle icon with the UP or DOWN button to **APP RATE**.

The triangle icon for the shafts being displayed will be ON so the operator knows which application rates are displayed.

To change which shafts are displayed follow the procedure below:

- Use the UP or DOWN button to move the triangle icon to **APP RATE**.
- Hold the MODE button until 4 short beeps and 1 long beep sounds. Release button after the long beep. This starts the change settings mode.
- Display line 1 will show **TOPBTM**.
- Display line 2 will indicate which shafts are being displayed.
- Display Options are: **1-2 1-3 2-3**
- Use the UP or DOWN button to change to the desired shafts to be displayed.
 - **1** refers to **Shaft 1**
 - **2** refers to **Shaft 2**
 - **3** refers to **Shaft 3**
- Press MODE button and **SAVE** display appears on display line 1.
- If settings should be saved, press UP to choose yes (Y). Then hold down ACK button until 4 short beeps and 1 long beep sounds. Release button after the long beep.
- If settings should not be saved (but remain as they were before the mode started) press DOWN to choose no (N). Then press ACK button, which immediately exits Change Settings Mode.



Monitor

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.

Note: To “*TURN OFF*” any shaft not in use set pulses to 0. This will eliminate any nuisance alarms caused by an inactive shaft.

When an alarm condition occurs the monitor will beep repeatedly, the indicator icon for the function will flash, and line 1 will indicate the fault condition.

The alarms persist until the alarm condition is removed or until the alarm is acknowledged by the operator. To acknowledge the alarm the ACK button must be pressed, which (if there are no other alarms pending) results in the silencing of the beeper and the return of the normal display. An exception to this is with low fan alarm, as explained later. After acknowledgement, the indicator icon (or the upper portion of the bar graph in the case of bin level alarms) will continue to flash for as long as the alarm condition is present.

Note: If the monitor is in the “*change settings*” mode, no alarms will be generated.

When the alarm condition is corrected, the alarm indicators are removed resuming normal operation.

If more than one alarm condition occurs at the same time, pushing the ACK button will acknowledge each alarm in order of priority. Line 1 will indicate the highest priority alarm that has yet to be acknowledged.

The order of alarm priority is: High Fan RPM, Low Fan RPM, Seed Shaft RPM, Fertilizer Shaft RPM, Auxiliary Shaft RPM, Grain Flow, Seed Bin Low, Fertilizer Bin Low, and Auxiliary Bin Low.

When multiple alarms have been acknowledged, the function indicators for the alarmed functions will continue to flash.

Alarms - Continued

Sensor Alarm Chart

The following chart shows alarms which are generated when alarm thresholds are exceeded. Alarm points for some sensors are fixed, while others can be changed by the user.

Sensor Alarm Priority		
Monitor Display	Display Meaning	Alarm Point
FAN	Fan Speed Too Low or Fan Speed Too High	May be changed by Operator
SHAFT 1	Shaft 1 Rotation Too Slow	Fixed 2 RPM or less
SHAFT 2	Shaft 2 Rotation Too Slow	
SHAFT 3	Shaft 3 Rotation Too Slow	
FLOW	Loss of Seed Flow (Blockage Module Option)	Set by calibration process
TANK 1	TANK 1 Low Level	Fixed
TANK 2	TANK 2 Low Level	
TANK 3	TANK 3 Low Level	
SPEED	Ground Speed below 2 mph	Fixed
CLUTCH	Clutch not engaged	
	Low Seed Rate (Seed Counting Option)	Adjustable alarm point
	Auxiliary Bin Pressure	Fixed

When an alarm condition arises, the beeper will sound, the appropriate triangular indicator will flash, and Line 1 will indicate the fault condition.

To prevent nuisance alarms during setup, while the unit is in any of the special modes, none of the ordinary sensor type alarms will be generated. The special modes include Change Settings mode, Application Rate mode, Pulses Per Mile Count mode, Flow Test and Calibration modes and so on (basically, any mode of operation that is initiated by holding down a button for 5 beeps).

Bin Level Alarms

Bin level alarms use the bar graphs and so are an exception to the above. There is still a Line 1 message and beeping, but instead of a triangular indicator the bar itself indicates the alarm. The lower portion of the bar remains solid, while the upper portion will flash.

Monitor

Alarms - Continued

Sensor Alarms - Continued

Low Fan Alarms

Low fan alarms are treated specially because a stopped fan can result in damage to the metering mechanics as unblown material accumulates. **Low fan alarms can not be acknowledged with the ACK button while the system is “in motion”.** If a low fan alarm occurs while the system is not in motion, the normal rules apply, and the user will be able to silence the alarm with the ACK key. 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. Thus, if a low fan alarm occurs during active seeding, the user will **not be able** to silence the alarm with the ACK key, 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.

Ground Drive “In Motion” Alarm

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 *VRT console ON*.

If ground speed is less than 2 mph for more than 30 seconds the monitor will alarm and display SPEED on line 1.

If ground speed is greater than 2 mph for more than 30 seconds and clutch is not engaged the monitor will alarm and display CLUTCH on line 1.

Note: There is no visual display associated with this feature. It is only intended to inform the operator that the VRT system is operating properly.

Alarms - Continued

Sensor Alarms - Continued

Flow (Blockage Module) Alarms

Regular Blockage Module Alarms - Pin Sensors

If a flow blockage occurs, a fault message 'FLOW' appears on line 1. (See Diagram 1) The operator must select the FLOW function to see the error.

There are two types of flow alarms. There can be seed flow alarms or communication error alarms.

The format for the seed flow alarms is 'MxxRyy'. (See Diagram 2) The 'M' indicates module and the 'xx' represents the blockage module number. The 'R' indicates run and the 'yy' is the seed run that has a blockage.

The format for the communication error alarms **BLK ERR**, will be displayed on line 1. (Diagram 3) The module number where the communication failure has occurred will be displayed on line 2. (Diagram 3) This fault is probably caused by an improper connection of the 3-wire system, or is a result of one or more modules having an incorrect address switch setting.

If communication errors are occurring and no blockage modules are connected, the monitor must be programmed to disable the flow monitoring function. This is done by setting the Blockage Module complement equal to zero.

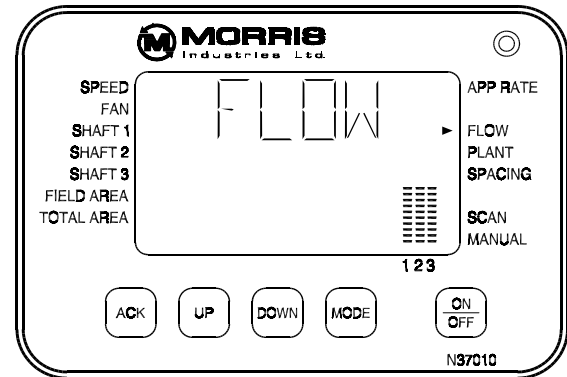


Diagram 1

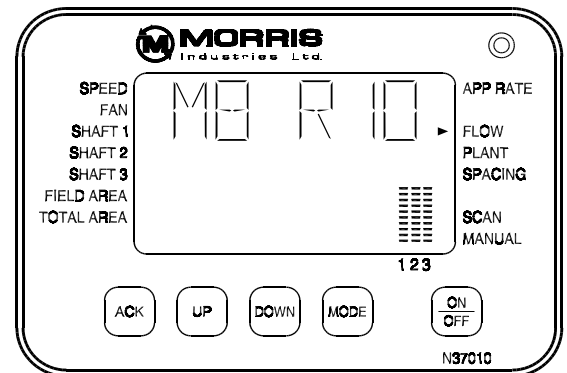


Diagram 2

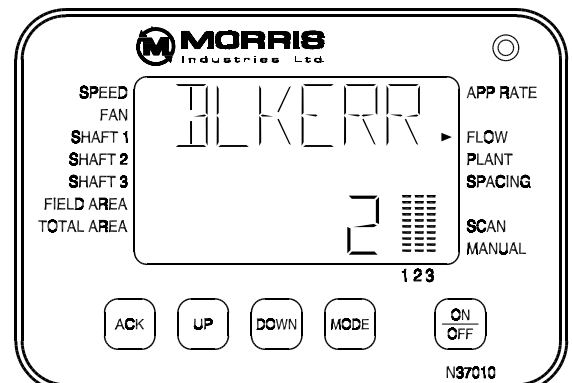


Diagram 3

Monitor

Alarms - Continued

Sensor Alarms - Continued

Optical Blockage Module Alarms

If a run does not pass the self-test mode upon powering up, the blockage module will report that run is bad. Sometimes this will happen if there is too much light shining in the seed tube where the sensor is positioned. This alarm by itself does not mean that the sensor is not working correctly.

During planting, if the blockage monitor does not see any seeds from a run sensor, it will report to the monitor that the run is blocked.

If a run is reported to be bad and blocked at the same time, the monitor will alert the user by saying “*BLOCK”. If the run is in this condition and the run is not blocked, and there are seeds flowing in that tube, that means that the sensor is not working. It should then be replaced.

The alarms can be silenced with the ACK key.

Optical Blockage Alarms		
Blockage module alarm		Meaning
Line 1	Line 2	
BAD	Run number (*)	Run failed self-test. May be due to too much light getting in the tube.
BLOCK	Run number (*)	The sensor has stopped seeing seeds. Clean out the blockage.
BLOCK	Run number ()	The sensor failed self-test and has stopped seeing seeds. If there is no blockage in the tube, the sensor may have stopped working properly.

(*) the numbering of the runs begins with module 1 and continues on through the last module.

Alarms - Continued

Sensor Alarms - Continued

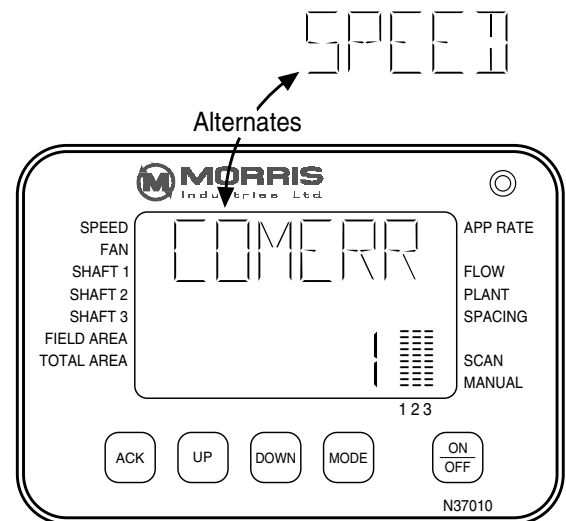
Communication Alarms

Communication Alarms occur when a sensor does not respond to repeated attempts at communication by the monitor.

- The monitor display will alternate between COMERR and SENSOR NAME on line 1.
- The monitor will display the SENSOR ID NUMBER on line 2.

After acknowledgement, the operator is reminded of which sensor is in fault by the blinking of the associated triangular indicator (or in the case of bin level sensors, the associated bar graph).

The display is slightly different when the communication fault is with a Blockage Module, as described under Flow (Blockage Module) Alarms.



Note: If no blockage modules are connected, the number of modules “BOXES” should be set to zero. This will prevent nuisance communication alarms.

System Error Alarms

System errors are displayed with “SYSERR” on line 1, and an error code on line 2. The conditions that are monitored, along with their corresponding error codes are listed in the table.

Line shorts must be located and fixed before normal operation will resume.

System Error Codes	
Monitor Display	Display Meaning
100	Data Line is Shorted Low (Usually a short to ground)
101	Data Line is Shorted High (Usually a short to +12V)
102	Transmitted Byte Not Also Recieved

Monitor

Flow - Pin Sensors

Introduction

There are three modes of operation for the grain flow monitoring system. These are Operate, Test, and Calibrate. Normally, the system is in Operate mode, in which all modules are being monitored for blockage, and blockages cause monitor alarms. Test and Calibrate are special modes which are performed after the first installation and also when the configuration, the normal seed rate, or the type of seed being used changes. The following sections describe each mode in the order that they would be used in a new installation.

Setting Flow Parameters

The number of blockage modules connected must be set at the monitor console in order for the system to operate correctly. This should only need to be done when the blockage modules are first installed, and afterwards only if the number of blockage modules is changed. Refer to monitor programming.

Test Mode

This mode of operation is used to verify a correct installation. It allows the user to see whether all installed blockage modules are in fact communicating with the monitor, and whether the number of runs set for each blockage module are correct.

Calibration Mode

Calibration mode is used to measure the typical seed flow rate as determined by seed type and the air cart settings (i.e. metering rate, fan rpm etc.). The blockage module determines a calibration value and uses it to determine when a run has blocked.

Operation Mode

This is the normal mode of flow monitoring. While the implement is in motion, the monitor will poll each blockage module for the status of its runs.

Note: This will occur regardless of which function on the monitor is presently displayed.

When the FLOW function is active, the display will show one of the following:

FLOW OFF	Indicates the system is set for zero blockage modules connected.
FLOW OPEN	Indicates that all runs are clear.
Mmm Rrr	Indicates which runs are blocked.
BLKERR	Monitor cannot communicate with one or more modules.

Important

***CALIBRATION* must be done each time the seeding rate or the seed type is changed.**

Flow - Pin Sensors - Continued

Test Mode

This mode of operation is used to verify correct installation. It allows the user to see whether all expected blockage modules are communicating with the monitor, and whether the number of runs set for each blockage module are correct.

- Use the UP or DOWN button to move the triangle icon to FLOW (Diagram 4).
- Hold the ACK button until 4 short beeps and 1 long beep sounds. Release button after the long beep.
- **TEST** or **PASSED** will be displayed on line 1.
- This action puts the system in test mode.

Note: Test mode can only be entered if the unit is stationary.

- The monitor will display on line 2 in cyclical fashion each module's number (*address*) and the number of sensors that module is set to monitor (Diagram 4).
- The operator may now verify that the number of sensors displayed for each module agrees with the individual sensors settings on each module (S1 SENSORS). This number may be different for each module on the system (Maximum of 12 Sensors).
- Once the monitor has communicated with each module line 1 will display **PASSED** (Diagram 5).

If there are blockage modules that the monitor is unable to communicate with, then the number of sensors displayed for those modules will be blanked out. If this condition persists for numerous attempts by the monitor, an alarm will occur and **BLK ERR** will be displayed on line 1 (Diagram 5). **BLK ERR** being displayed indicates a blockage module communication failure. The module number where the communication failure has occurred will be displayed on line 2 (Diagram 6). This fault is probably caused by an improper connection of the 3-wire system, or is a result of one or more modules having an incorrect address switch setting. See Assembly Section "Blockage Module".

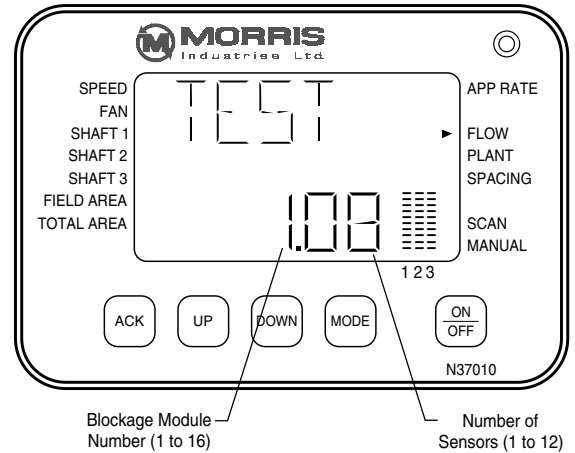


Diagram 4

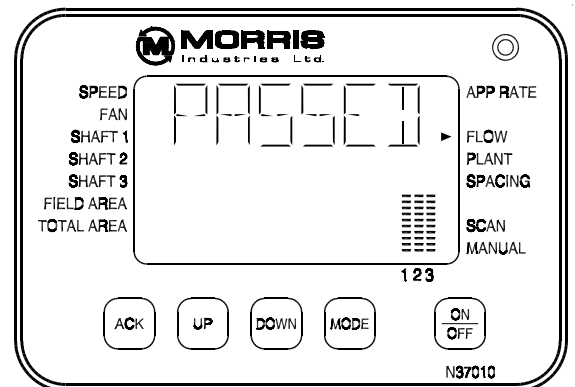


Diagram 5

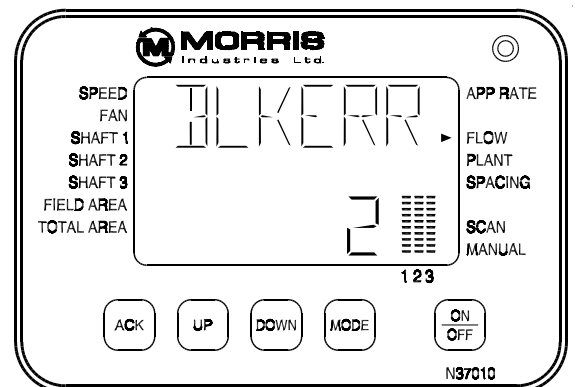


Diagram 6

Monitor

Flow - Pin Sensors - Continued

Calibration Mode

Calibration mode is used to measure the typical seed flow rate as determined by seed type and the air cart settings (i.e. metering rate, fan rpm etc.). The blockage module determines a calibration value and uses it to determine when a run has blocked.

Note: Calibration must be done whenever the seeding rate or the seed type is changed.

- Use the UP or DOWN button to move the triangle icon to FLOW (Diagram 4).
- Hold the ACK button until 4 short beeps and 1 long beep sounds. Release button after the long beep.
- **TEST** or **PASSED** will be displayed on line 1.
- Begin normal seeding. When the ground speed is greater than 2 m.p.h. (3.2 kph), calibration begins with **CAL** being displayed on line 1 (Diagram 7) accompanied by a double beep.

Note: There is a 30 second delay to prevent nuisance alarms occurring.

- Line 2 display will cycle through the blockage module numbers displaying which runs have **not yet calibrated** (Diagram 7).
- When all runs on a module have calibrated line 2 will display the blockage module number and -- for the sensors (Diagram 8).
- When all modules have calibrated, the monitor will beep rapidly several times and display **CAL OK** on line 1 (Diagram 9).
- Exit calibration mode by depressing the ACK button.

Note: Do not exit calibration mode prematurely as any sensors that have not yet been calibrated will generate flow errors.

If it is desired to exit calibration mode prematurely and enter the operation mode, depress the ACK button, until 4 short beeps and 1 long beep sounds. Release button after the long beep.

Important

CALIBRATION must be done each time the seeding rate or the seed type is changed.

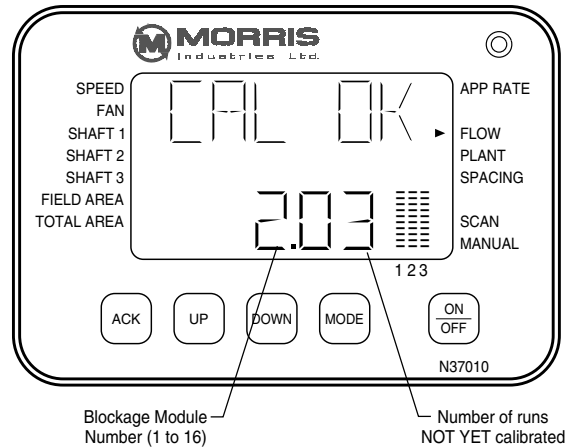


Diagram 7

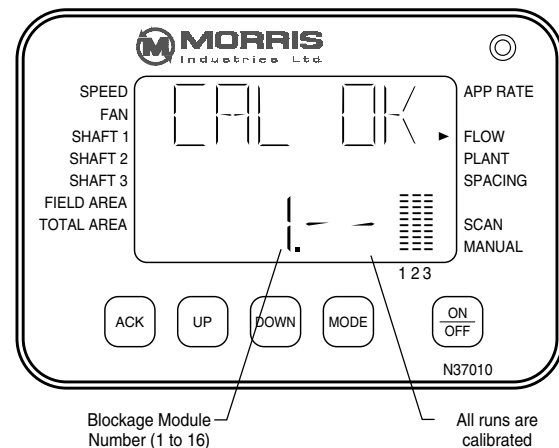


Diagram 8

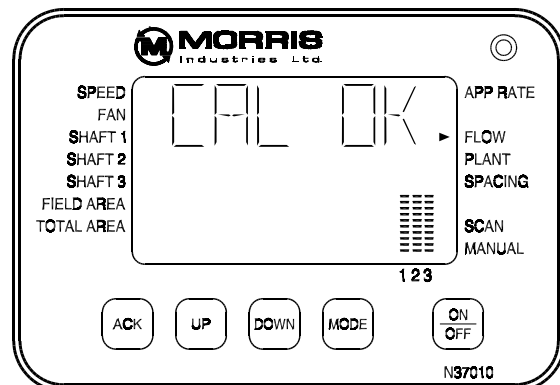


Diagram 9

Flow - Pin Sensors - Continued

Calibration Mode - Continued

Calibration should be completed in approximately two to three minutes of continuous seeding. Any runs that have not calibrated in this time may be blocked and should be cleared. Calibration is suspended when the ground speed is less than 2 m.p.h. (3.2 kph). This allows the air cart to be stopped to clear blocked runs. The calibration procedure will resume when ground speed goes above 2 m.p.h. (3.2 kph).

Runs that do not calibrate will give flow alarms when normal operation is started, except when all runs for a module do not calibrate. In this special case the module assumes that all of its runs have been intentionally disconnected, so no alarms are required. This feature is useful when an entire section of an air cart is not being used.

All calibration data is stored until the next calibration is done (even with power disconnected). This means that if the same conditions are used for seeding recalibration is not required.

Operation Mode

This is the normal mode of flow monitoring. While the implement is in motion, the monitor will poll each blockage module for the status of its runs.

Note: This will occur regardless of which function on the monitor is presently displayed.

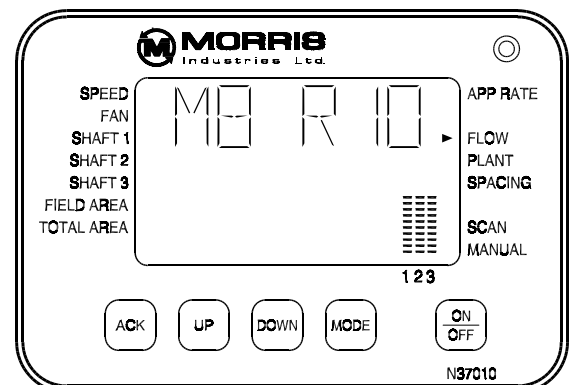
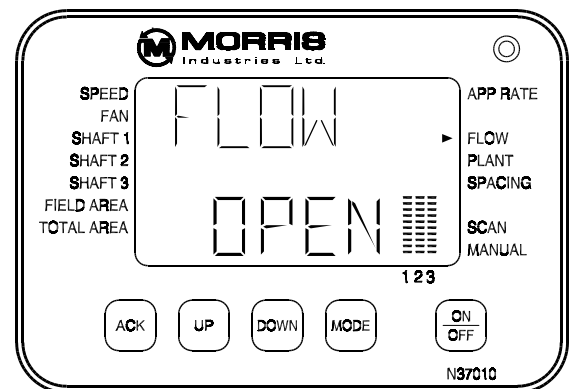
When a blocked run is detected, an audible alarm will sound and an alarm message will be displayed. These will persist until either the alarm is acknowledged using the ACK button or the alarm condition is removed.

When the FLOW function is active, the display will be one of the following:

- FLOW OFF** Indicates the system is set for zero blockage modules connected.
- FLOW OPEN** Indicates that all runs are clear.
- Mmm Rrr** Indicates which runs are blocked. (See Alarms)
- BLKERR** Monitor cannot communicate with one or more modules. (See Alarms)

Note: In double shoot system, sensors in the same module can be installed in seed and fertilizer lines and calibrated for different material flows at same time.

Note: If nuisance alarms occur change the sensitivity of the sensors by recalibrating.



Monitor

Flow - Optical Sensors

Introduction

The module should be mounted near the location of the sensors to minimize the length of cable between the sensors and the module.

The module should be bolted to a grounded metal surface. There should be a good ground path from the case of the module to the cultivator frame. Mounting the module on an air cart is not recommended. If the module must be mounted on an air cart, a ground wire should be run from the case of the module to the cultivator frame.

Optical Blockage Module Setup

The optical blockage module setup mode is different from the norm. The first screen allows the user to select which path to execute. The “Install Path” is selected by choosing “Y” by pressing the UP arrow and then pressing MODE to advance to the next screen. The “Setup Path” is selected by choosing “N” by pressing the DOWN arrow and then pressing MODE to advance to the next screen.

When the runs are connected to the optical blockage module, they must be connected in order - 1, 2, 3, ... Do not skip any runs. When an 8 is entered as the number of runs connected to the blockage module, run numbers 1 to 8 will be monitored.

Note: Once the module is mounted, it must be learned by the monitor. See the “System Installation”.

Important

CALIBRATION must be done each time the seeding rate or the seed type is changed.

Note: It is highly recommended that the “Install Path” is programmed first and then the “Setup Path”.

Install			
Display 1	Function	Limits	Comments
MmmR--(*)	Number of runs connected to module number 1	0 to 16	Default number of runs is 16. MODE advances to the next module. If module is not connected, this number is not used in the monitor.

(*) mm is the module number. Its range is from 1 to 12.

Setup			
Display 1	Function	Limits	Comments
RUN	Enable/Disable individual runs in the system.	1 to the number of runs in the system.	UP/DOWN selects the RUN. The ACK key toggles between enabling and disabling an individual run. Mode advances to the SAVE screen. Default state of the runs: Enabled.

Flow - Optical Sensors - Continued

Flow Function

The FLOW function indicates the status of Flow Monitoring based on information from the Blockage Modules. Line 1 will display FLOW. Line 2 will indicate "OPEN" when all monitored runs are clear. When runs are blocked, it will display in cyclical fashion, all blocked runs. See also the section on flow alarms.

The FLOW function supports two special modes, TEST and CALIBRATE.

Flow Test

This test will inform the user as to how many "good" optical sensors are connected to each module.

At the end of the test, ACK may be pressed to return to normal mode, or the user may start planting and the calibration will automatically begin.

At any time during this test, ACK may be pressed and held until after the long beep to exit the Flow Test Mode.

Important

CALIBRATION must be done each time the seeding rate or the seed type is changed.

Test		
Step	Action	Desired Result (Actual)
1	Stop the implement.	Do not move the implement, or run any seed, during the flow test.
2	On the FLOW screen, press and hold the ACK key for 5 seconds.	TEST should be shown on line 1. Line 2 will cycle through the module numbers.
3	Wait	This may take a few minutes, depending on configuration and application. Should hear 4 short beeps and the screen should display "TST OK" on line 1. The bottom line will cycle through the various modules connected and display, for that module, the number of " good " sensors connected to it. The format of this display is MMr:RR, where MM is the number of the module being reported and RR is the number of valid runs connected to this module. These numbers should correspond to the actual number of sensors connected to the modules.
4	Press ACK	Monitor should revert to FLOW OPEN.

Monitor

Flow (Optical Sensors) - Continued

Flow Function - Continued

Flow Calibration

In calibration mode, the module determines the normal seed flow rate for each run. This calibrated flow rate is used to determine the threshold for indicating that a run is blocked. The calibration mode must be started by command from the monitor as follows:

At any time during this test, ACK may be pressed and held until after the long beep to exit the Flow Test Mode.

Calibration		
Step	Action	Desired Result (Actual)
1	Have the cart "in motion".	Should hear a double beep as the "in motion" boundary is crossed.
2	On the FLOW screen, press and hold the ACK key for 5 seconds.	CAL should be shown on line 1. Line 2 will cycle through the runs that haven't been calibrated yet.
3	Operate the cart in planting conditions.	As material flows through each tube all modules attempt to calibrate their sensors. Should hear 4 short beeps and the screen should display "CAL OK" on line 1 and "--" on line 2. This may take a few minutes, depending on configuration and application.
4	Press ACK	Monitor should revert to FLOW OPEN.

Sensor Replacement

The monitor will alarm the operator if there is a faulty sensor in the system.

To replace the faulty sensor, the replacement sensor is plugged into the harness **prior to turning on the monitor**. When the power is turned on, the monitor will learn the new sensor in place of the faulty sensor.

Note: This procedure will work when there is only one faulty sensor in the system.

When there is **more than one faulty sensor** in the system the installation of the replacement sensors is handled differently.

The monitor is turned on with nothing connected at the faulty sensor locations. The monitor will tell the operator what sensor should be attached to the harness. When it is attached the monitor will recognize it and then ask for the next sensor to be attached. This continues until all the replacement sensors have been attached.

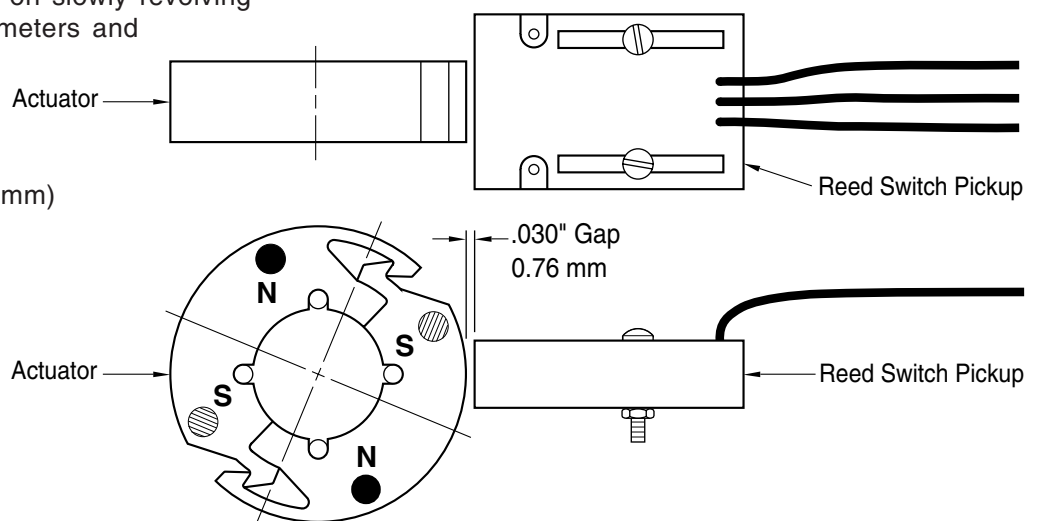
Sensor Gap Settings

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.

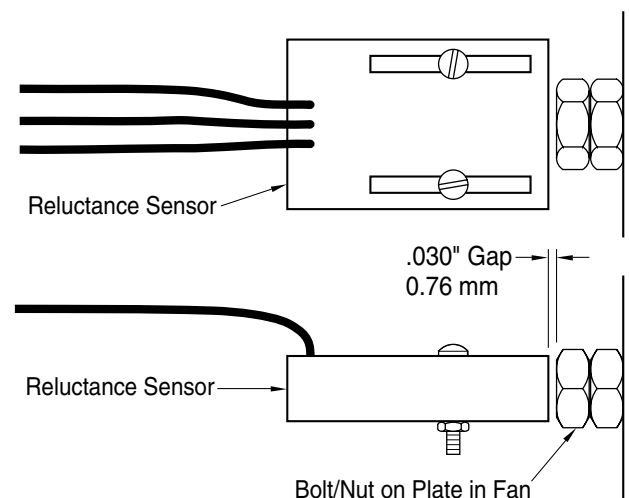


Variable Reluctance Sensors

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.



Monitor

Sensor Gap Settings - Continued

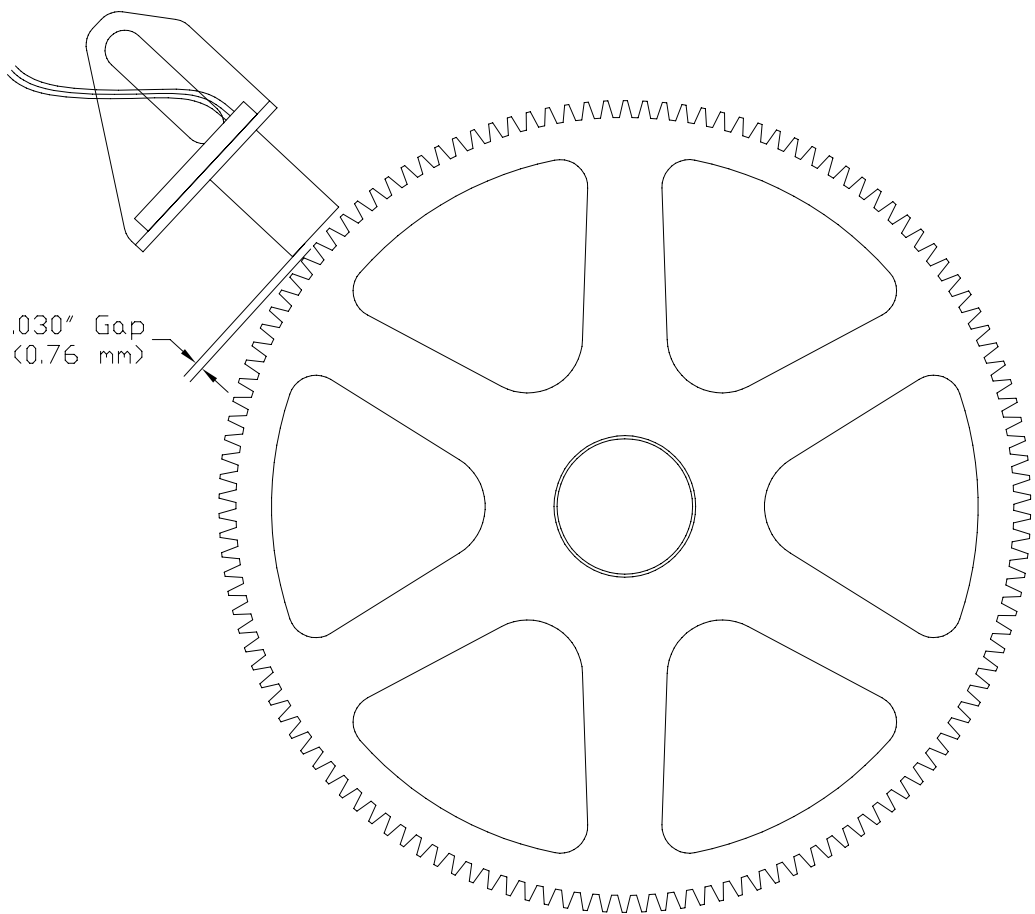
Hall Effect Sensors

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

Sensor wheel to sensor gap and position is critical with these sensors.

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

The sensor must be centred on the sensor wheel.



Trouble Shooting Guides

Most electronic problems are usually one of the following:

- Harness connections.
- Harness to sensor 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 outlined under “*Communication Alarms*” and “*System Error Alarms*”.

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.
- Take the connector shells off to see if any wires have worked loose.

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.

Note: On Tank Level Sensors ensure there is no foreign material covering the optical sensor. Remove material with a cloth as not to damage lens.

Checking Blockage Modules

The best approach to testing a Blockage Module is to first substitute a suspected pin sensor or optical 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 or Blockage Module.

Note: On Pin Sensor, seed or material dust on the sensor may prevent the sensor from accurately sensing seed hits. The sensor pin may be cleaned using a sharp knife and gently scraping away the caked on material.

On Optical Sensor, use a damp non-abrasive cloth as not to scratch sensor eye.

Monitor

Notes

Section 7: Maintenance

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Maintenance

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

Tires

- Inspect tires and wheels daily for tread wear, side wall abrasions, damaged rims or missing lug bolts and nuts. Replace if necessary.
- Tighten wheel bolts - refer to Bolt Torque Chart.
- Check tire pressure daily, when tires are cold.
- 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	
			8240 8300 BH 8336 BH	8300 BT 8336 BT 8370 8425
21.5 x 16.1	Soft Trac	10 ply	28 psi	N/A
21.5 x 16.1	Lug	12 ply	24 psi	N/A
560/65 D24	Soft Trac	LI 140	19 psi	24 psi
500/70 R24	Lug	LI 157	20 psi	25 psi
23.1 x 26	AWT	12 ply	24 psi	N/A
23.1 x 26	Rice	10 ply	28 psi	N/A
30.5 x 32	AWT	12 ply	20 psi	24 psi
30.5 x 32	Lug	14 ply	20 psi	22 psi
800/65 R32	Lug	LI 172	15 psi	20 psi
900/60 R32	Lug	176 A8	17 psi	17 psi

*BH - Tow Behind only

*BT - Tow Between only

Maintenance

Daily Maintenance

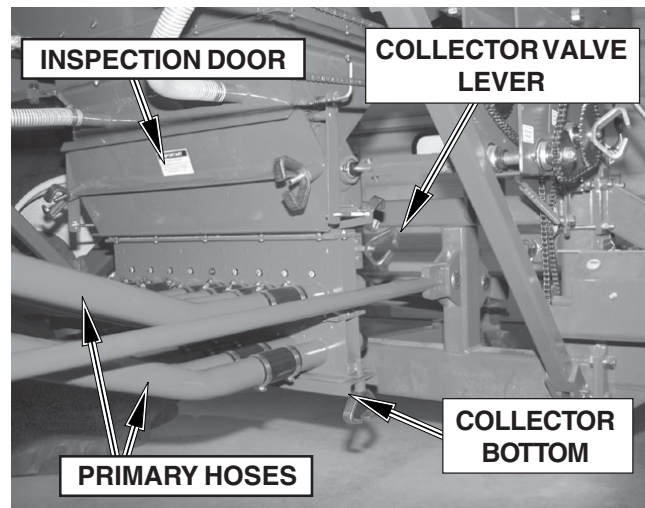
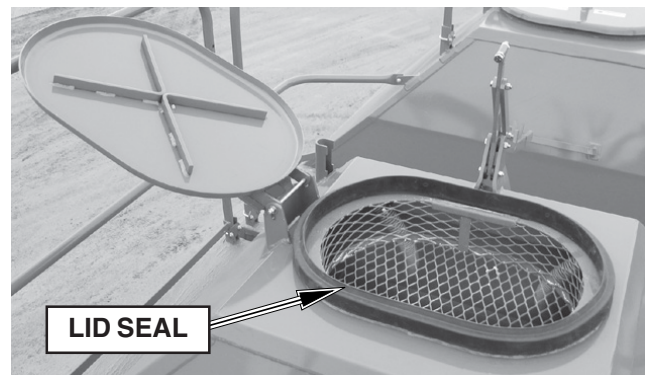
- Check for and remove any water in primary collectors and pressure lines after rainy weather. Remove all inspection doors and collector bottoms to drain water from the tanks and collectors.
- Reinstall collector bottoms and inspection doors.
- Ensure fan screen is clear of debris.

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

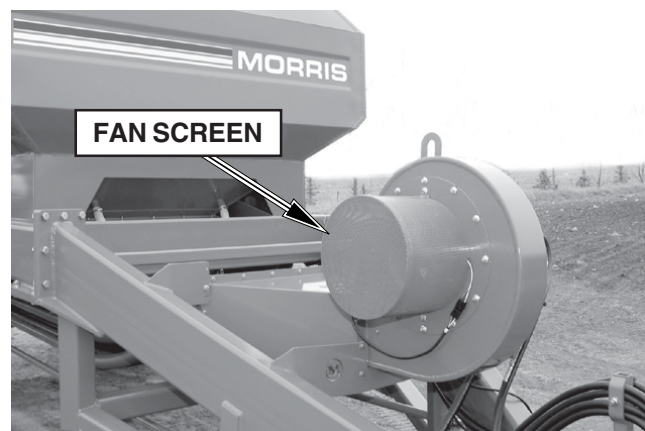
- Check lid seals for damage, and that they are sitting properly on steel ring.
- Check tank pressure hoses for leaks, cracks or plugging.
- **Check the following areas for air leaks:**
 - Tank inspection door
 - Metering body assembly seals
 - Collector assembly seals
 - Tank lid

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.
- 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 Chains

- Oil every 50 hours.

2. Slow Speed Drive

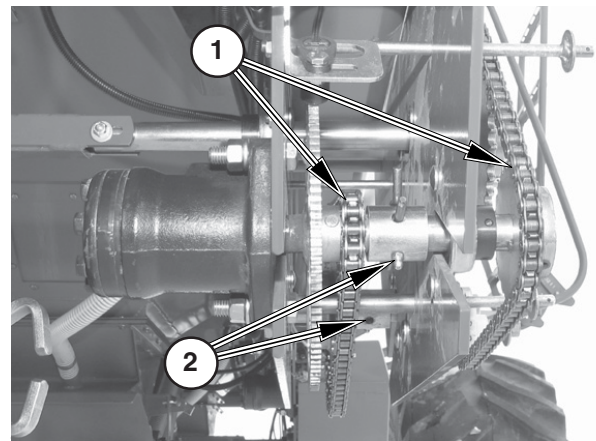
- Grease every 50 hours.

3. Auger Pivot

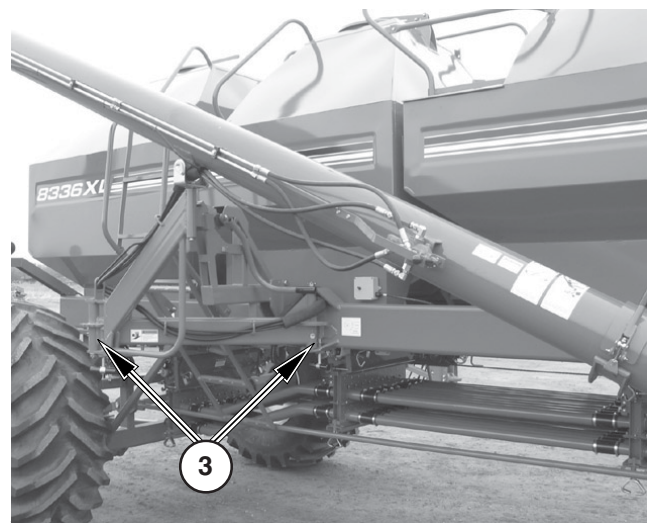
- Grease every 100 hours.

4. Fan Bearing (17" Diameter Fan only)

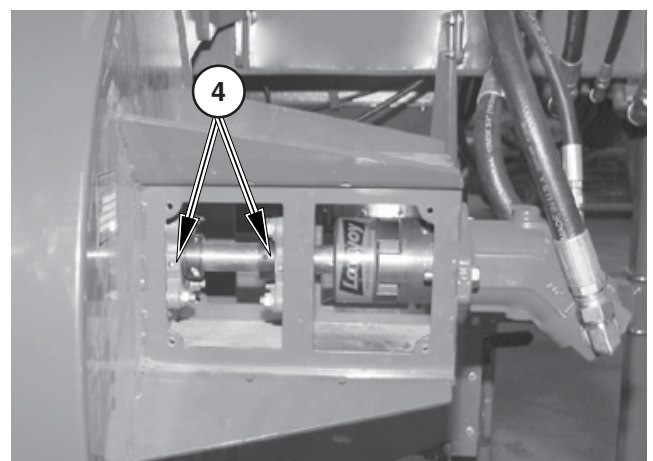
- Apply 2 pumps of grease every 100 hours.



Transmissions



Auger Pivots



Fan Bearings

Maintenance

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.**

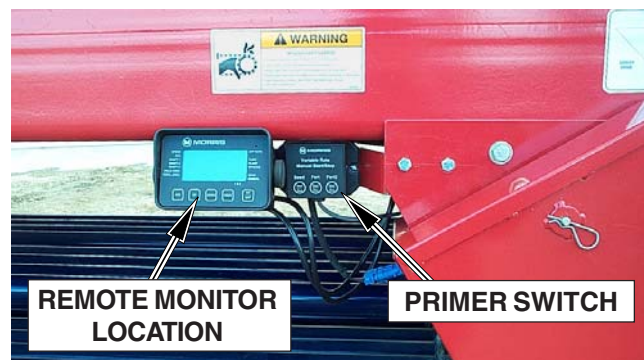
- Regularly check that all hoses are free from kinks or blockages throughout the day. To check for blockages raise seeding tool out of the ground and with the fan running engage meter drives with the primer switch, rotating meter drives 4 to 5 times. Equal amounts of material should be deposited under 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 air leaks from the tank. This air leakage causes air turbulence in the tank which can result in inaccurate metering rates.

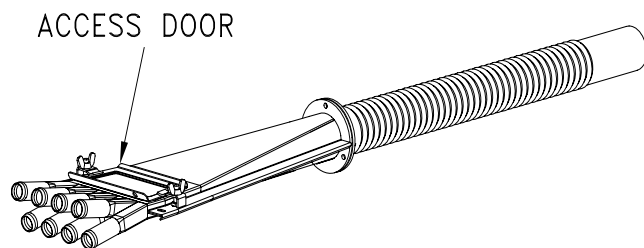
- Once a year check for wear of primary and secondary hoses.

Caution

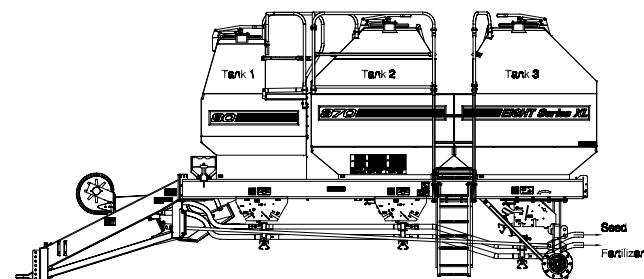
Care should be taken when working near the air cart while the fan is running. Product blowing out of the system could cause personal injury.



Primer Switch



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



Air Delivery System - Continued

Tank Lids

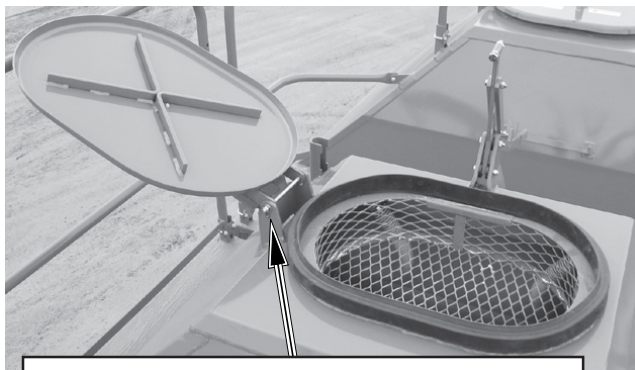
The lid seal is probably the area that sees the most abuse due to the activity associated with filling the tanks.

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.

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. (45 kg) spring scale to check the tank lid opening force. With the lid closed place one end of the scale 1" from the end of the tank lid lever. Pull straight up on the scale and note the maximum force it takes to open the lid. The force needed to open the lid **must be greater than 65 lbs (29 kg)**. Adjust the lid latch adjusting bolt as necessary. The lid latch should close with a **snap**. This will ensure that the lid is sufficiently tight and prevent any leaks.
- Re-check for leaks. If lids still leak turn down bolt one or two more turns. Re-check for leaks.



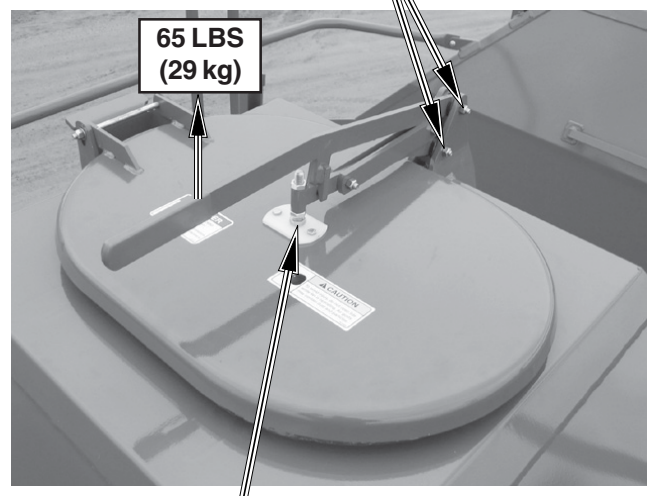
Note: This bolt should be loose enough to allow lid to float in the slot.

Important

It is imperative that no air leaks occur in the air cart tank as even the smallest air leak from the lid will lead to material bridging in the tank thereby causing misses in the field.

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

These bolts and lock nuts must be tightened to maintain a friction fit so the lid latch stays stationary when in open position.



Adjust the lid latch bolt to obtain a force greater than 65 lbs (29 kg) to open the lid.

Maintenance

Air Delivery System - Continued

Air Leak Check

It is **imperative that no air leaks occur** in the air cart tank. Any 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 cultivator at the primary hose coupler(s) by loosening the four 3/8" bolts.
- Install the blank off plate that is supplied with the air cart at each coupler and re-tighten the 3/8" bolts. 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 small 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 air leaks occur in the air cart tank, as even the smallest air leak will lead to material 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.

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.

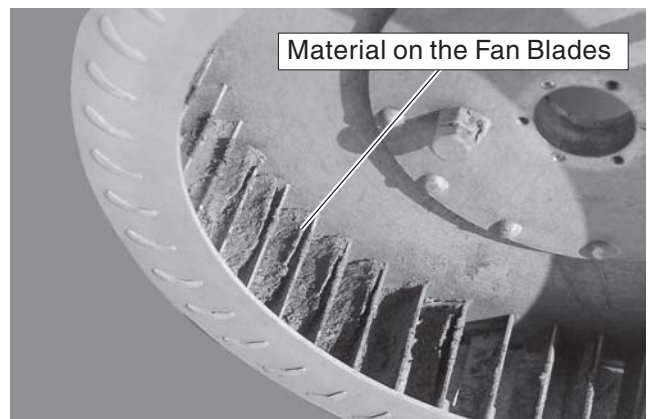
Under normal conditions the fan should be inspected and cleaned at least once a season.

- 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.

Maintenance

Air Delivery System - Continued

Impeller Clearance

The impeller should be centred inside the housing to avoid contact between the impeller and housing.

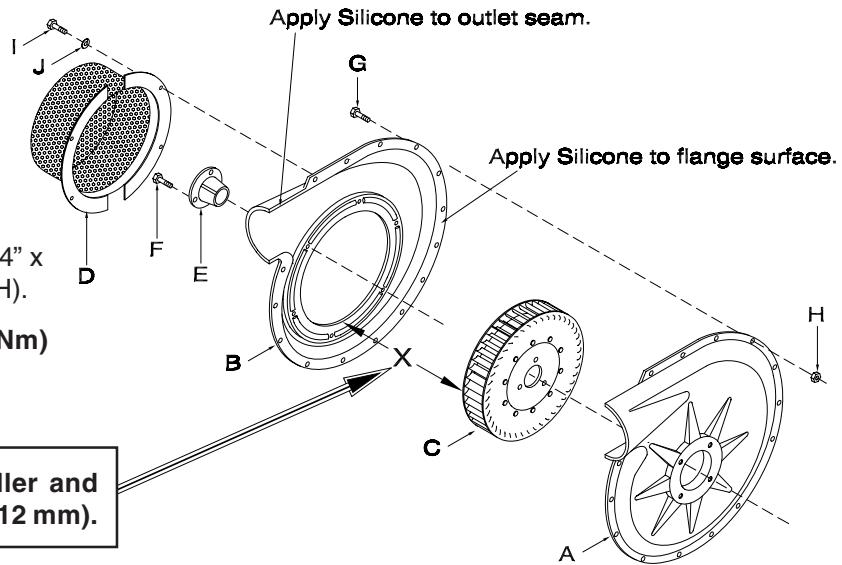
The distance "X" between the impeller and housing inlet, when centred, will be approximately 3/8" to 1/2" (9 - 12 mm).

When assembling fan ensure flange surfaces of housing are clean.

Apply a 1/4" (6 mm) silicone bead to one flange surface of housing including outlet seam.

Mate surfaces and secure in place with 1/4" x 1" hex bolts (G) and 1/4" serrated lock nuts (H).

Note: Torque 1/4" bolts to 49 in. lb. (6 Nm)



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 EIGHT Series XL Air Cart air system all primary hoses **must be equal in length**.

Important

ALL primary hoses must be the same length.

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.

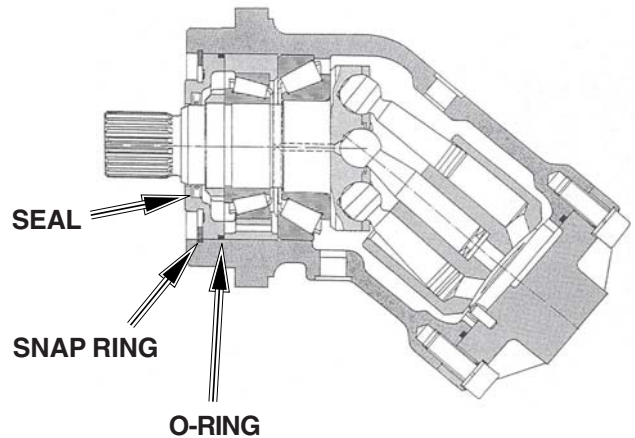
Note: The shaft should never be hammered on or forced in as this will result in motor damage upon startup.

- 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.

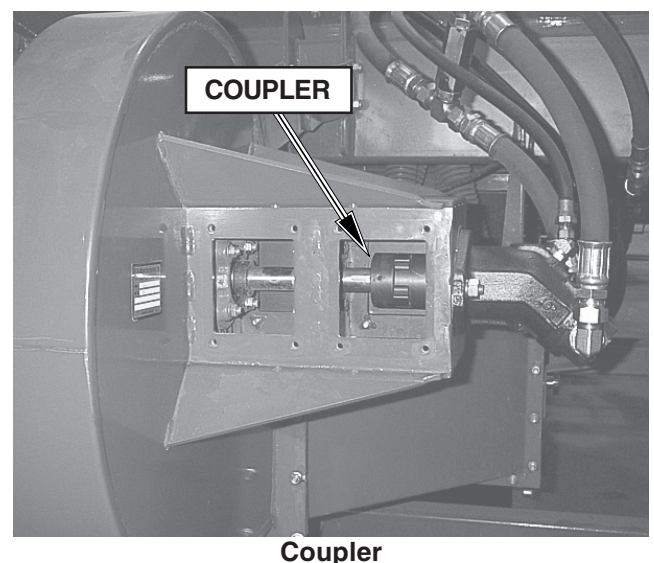
- Replace the O-ring.
- Both the O-ring and shaft seal should be greased with “clean” grease.
- Care must be taken when the front cover is installed so the shaft seal is not damaged.
- Reinstall the snap ring.
- Fill the motor case with “clean” oil before running.

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 nicks or cracks in urethane insert.
- Ensure set screws in each half of the coupler are tight.



Maintenance

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.

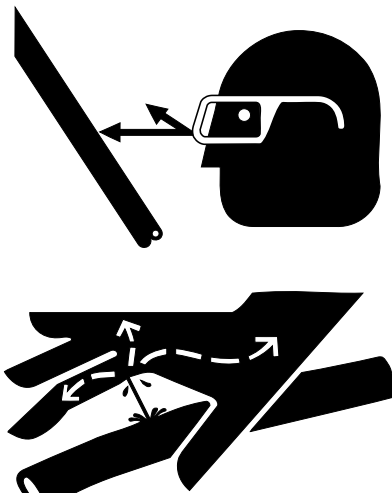


Contact your nearest Dealer for genuine repair parts. Dealers carry ample stock and are backed by the manufacturer and regional associations.

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

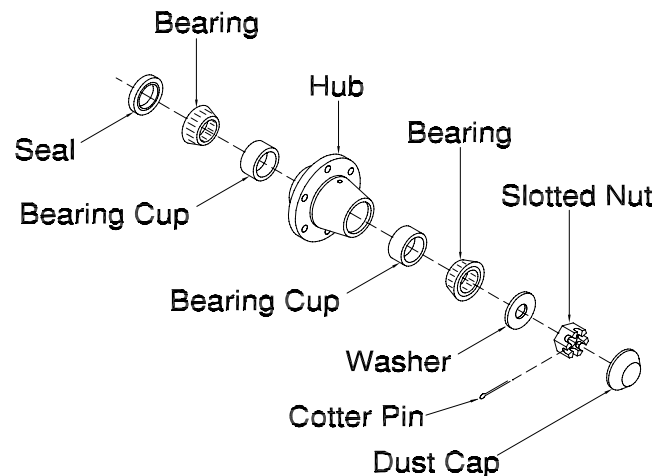
HIGH-PRESSURE FLUID HAZARD

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.



Maintenance

Metering

The metering wheels come in 4 different sizes. Each wheel matches to a specific distribution head mounted on the seeding tool.

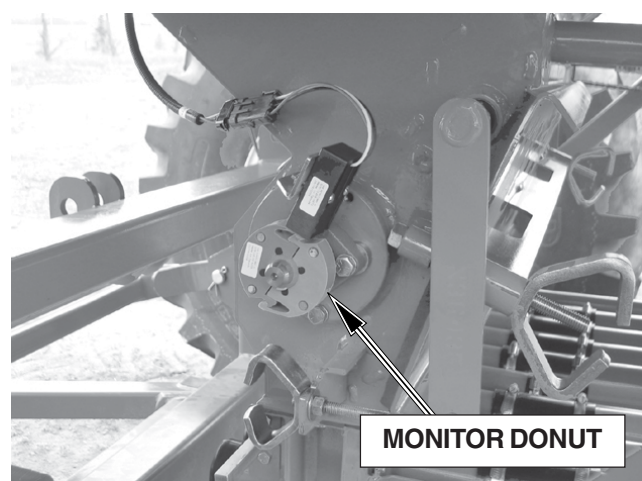
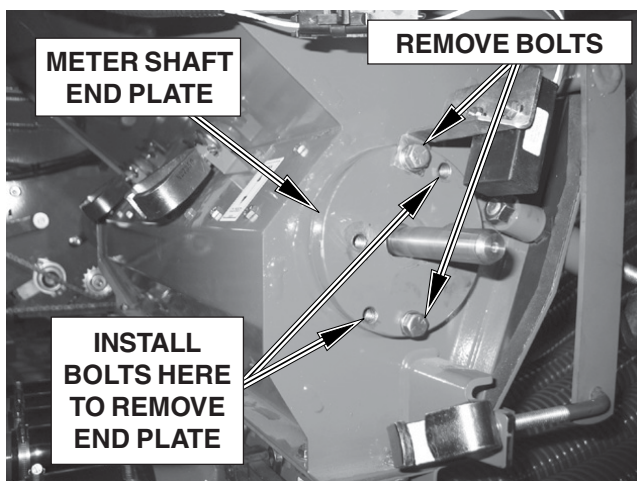
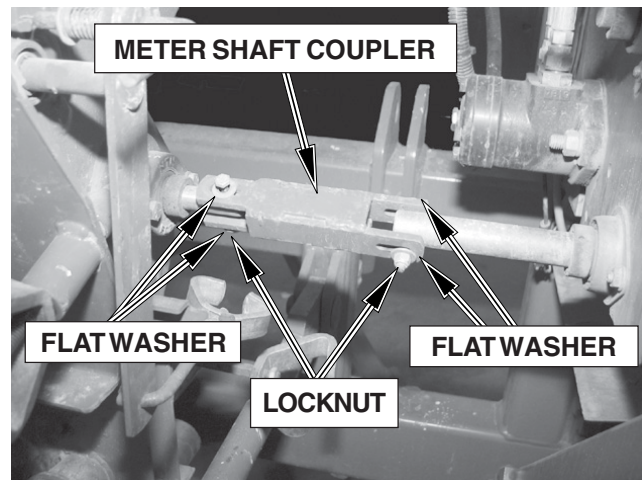
If the metering wheel and distribution head are not matched correctly, the distribution accuracy will be adversely affected.

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 Stainless Steel 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

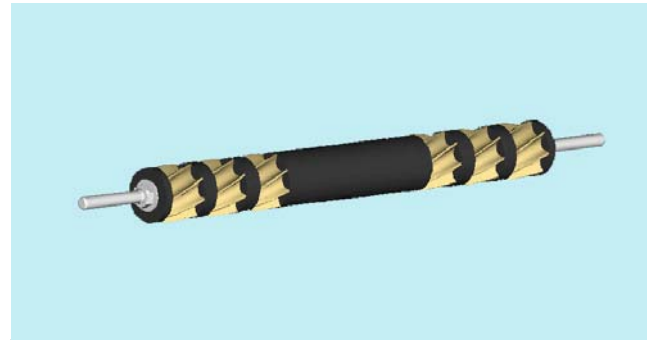
Remove the meter shaft from the right hand side.

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

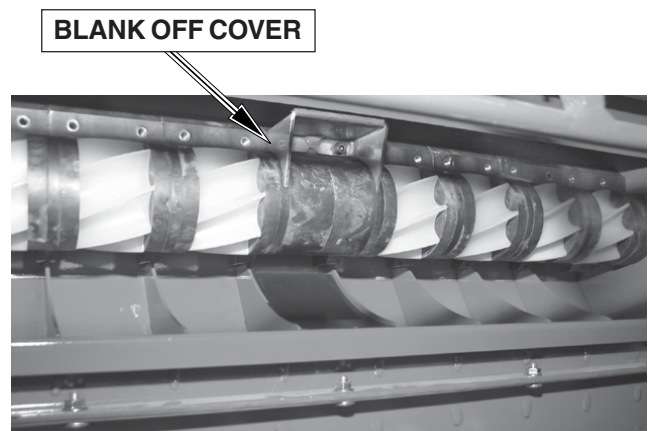
- Remove nut from meter shaft and disassemble wheels and spacers.
- Replace damaged wheels and reassemble shaft. Ensure correct spacers and wheels are located and assembled in the correct order. See diagram on next page. **Note:** After each meter wheel configuration, including any "Blank Offs", add 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.

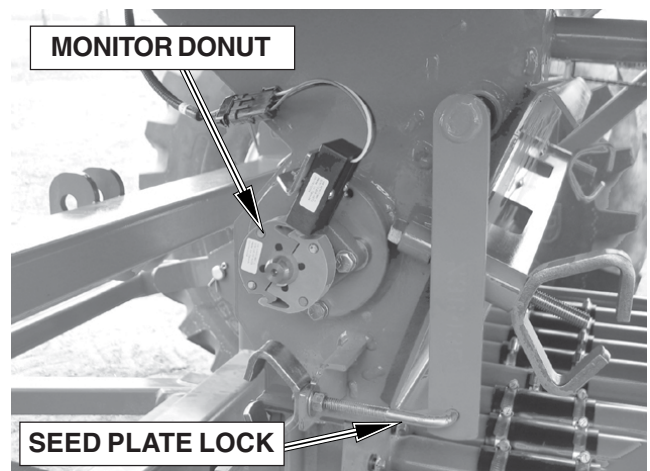
- Reinstall meter shaft assembly, snap ring end first into meter body.
- Install meter shaft end plate and monitor sensor bracket.
- Reinstall Stainless Steel Blank Off plates. See "Blank Off Installation" for more details.
- Reinstall right hand side meter shaft bearing and spacers.
- Reinstall left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



Meter shaft removed

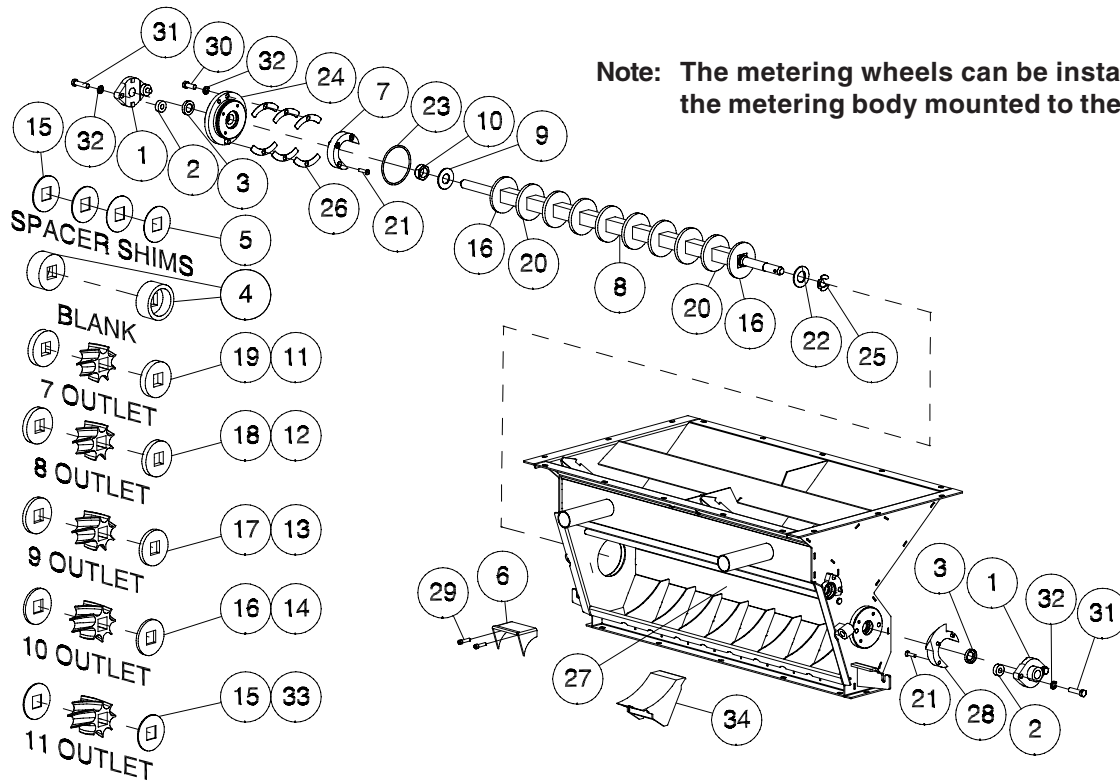


Blank Off



Maintenance

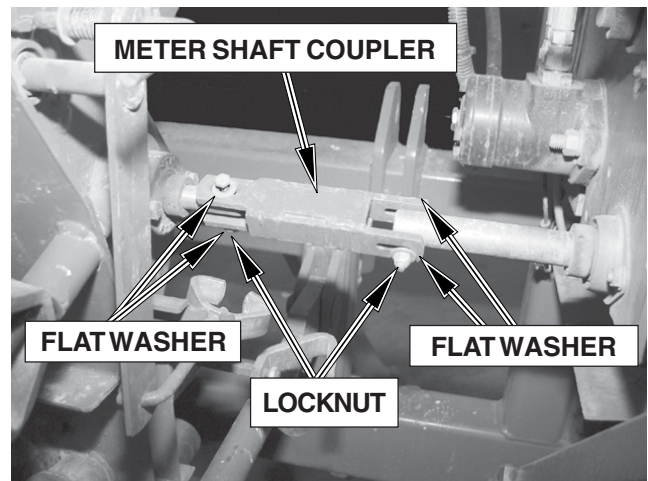
Metering - Continued



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	N36145	Blank Off	As req
7	N36401	Spacer	1
8	N36430	Meter Shaft	1
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	1
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

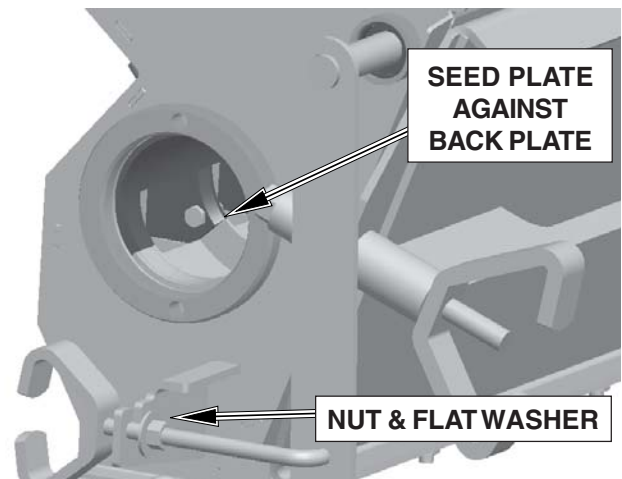
- Tighten locking collars by turning the collars in the direction of the shaft rotation. Lock the collar by tapping the collar with a punch in the direction of rotation of the shaft.
- Reinstall the monitor donut on shaft. Ensure donut is centred to pick-up. Set the gap between the pick-up and the donut at 0.030" (0.76 mm).
- Attach meter shaft coupler over the meter shaft 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

Maintenance

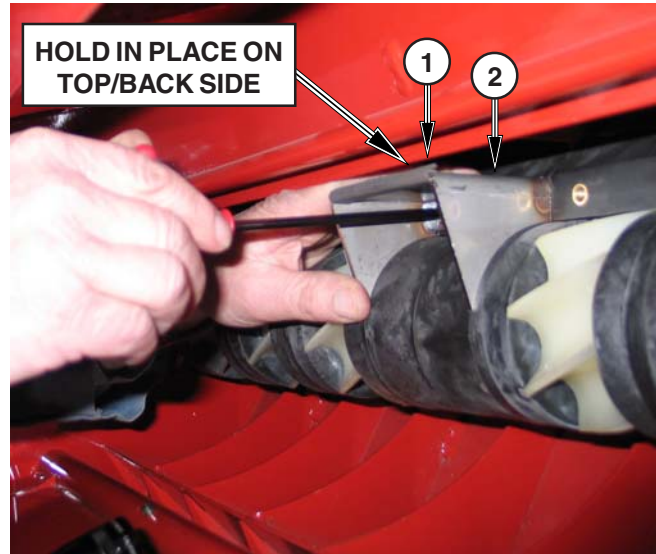
Metering - Continued

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. Ensure seal strip **item # 26** is installed on the front of the Blank Off.
- 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



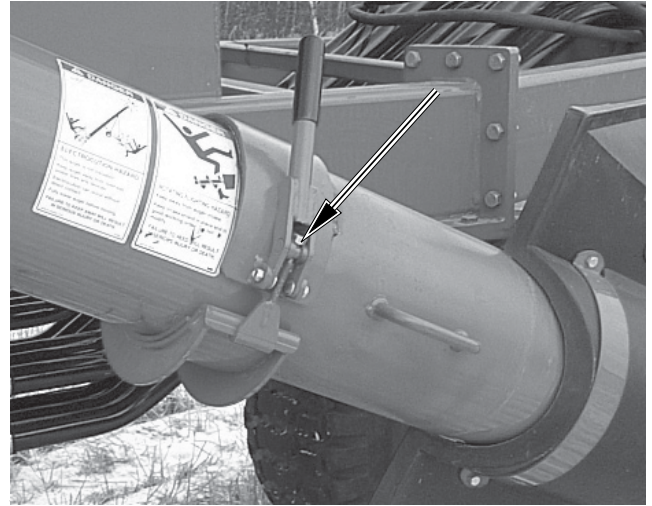
Correctly Installed Blank Off



Incorrectly Installed Blank Off

Auger Arm Locks

- Adjust the 3/8" nuts such that the lock handles snap firmly over centre when they are placed in the locked position.



Auger Front Latch

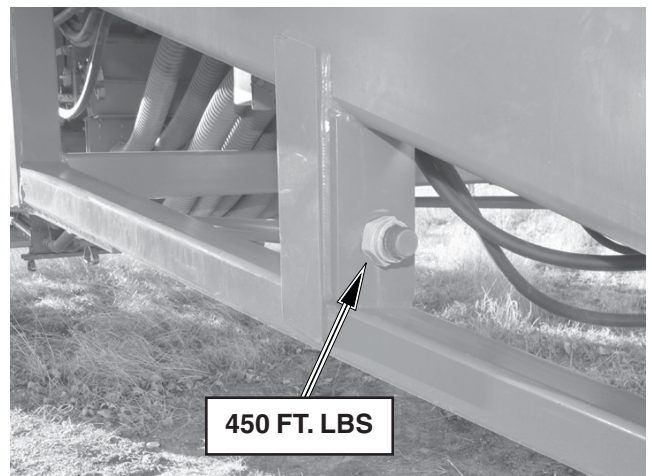
- Adjust the 1/2" nuts such that the lock handle snaps firmly over centre when placed in the locked position.



Auger Rear Latch

Tie Rod - Tow Between

- Check at 10 and 50 hours and periodically afterwards.
- Torque to 450 ft. lbs. (610 N-m).



Maintenance

Notes

Section 8: Storage

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Auger	8-4

Storage

Preparing for Storage

General

- To insure longer life and satisfactory operation, store the EIGHT Series XL 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 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.**

MORRIS PAINT

Spray Cans:

Part Number	Description
W-4647	Red MORRIS Spray Can
W-4648	Blue MORRIS Spray Can
N31087	White MORRIS Spray Can

Litre Cans:

Part Number	Description
Z-10	Red MORRIS Paint/Litre
Z-11	Blue MORRIS Paint/Litre

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:

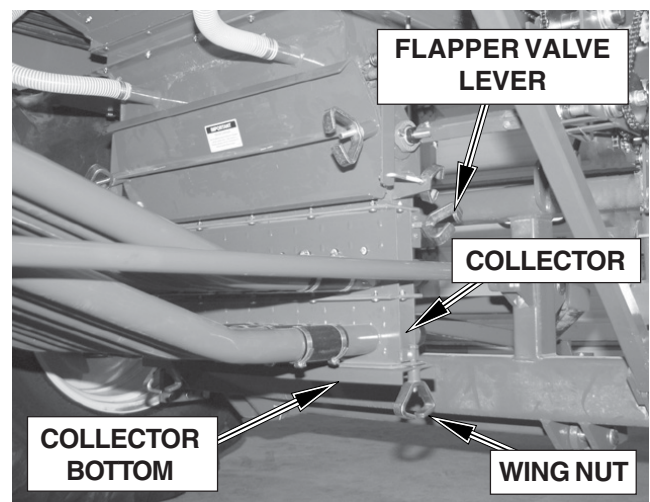
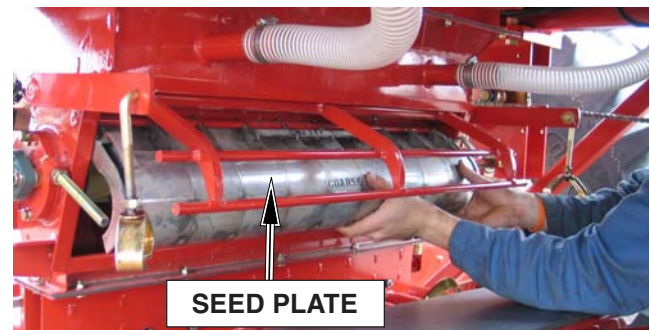
- Empty tanks (Refer to Unloading Tanks).
- Remove all seed plates.
- Remove the collector bottom.
- Run fan.
- Wash the interior of both tanks and metering system with soapy water. Wash the collector.
- Rinse with cold water and let the unit air dry.
- Coat metal parts with silicone lubricant or WD-40.

Note: Diesel fuel will harm seals.

- Reinstall 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 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.



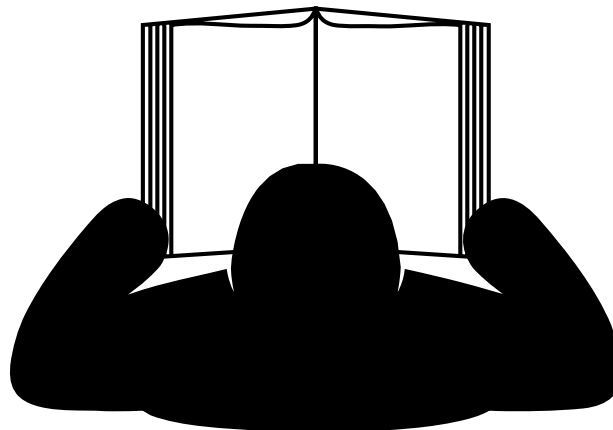
Double Shoot Shown

Storage

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.

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.

Section 9: Troubleshooting

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No display, no back light	9-7
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Bin indicates always full	9-7

Troubleshooting

Problem	Cause	Correction
General		
Delivery hoses plugged	Insufficient air flow.	Clean fan impeller blades. Clean fan intake screen. Increase fan rpm.
	Hose sag.	Shorten hoses or add additional supports.
	Seed boots plugged with dirt.	Clean seed boots. See <i>"Seed Boot Plugging"</i> 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 <i>"Seed Plate Settings"</i> .
Material not being divided in distribution head	Head partially blocked.	Remove blockage and reinstall hose.
	Kinked hose running to shank.	Straighten or replace hose.

Troubleshooting

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.
Clutch slipping	Tanks not pressurized.	Inspect lid seals. Clean pressurization hoses.
	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.
Material not being metered out	Faulty clutch.	Replace clutch.
	Metering clutch not engaged.	Engage switch in tractor cab.
	Metering Clutch slipping.	See “Clutch Slipping” below.
	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.

Troubleshooting

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.
	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.

Troubleshooting

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 <i>"Opener Adjustment"</i> in Operation Section.

Troubleshooting

Problem	Cause	Correction
VRT System		
Motors will not turn in Manual Mode (Controller OFF)	Not equipped with a Third Tank.	Disconnect wire harness from solenoid '1' and turn adjusting knob fully out.
	Selector valve (Fan/Auger).	Switch selector valve to fan position.
	Hydraulic oil flow.	Ensure hydraulic lever is properly engaged.
Motors will not turn in Operation Mode (Controller ON)	Not equipped with a Third Tank.	Disconnect wire harness from solenoid '1' and turn adjusting knob fully out.
	Selector valve.	Switch selector valve to fan position.
	Hydraulic oil flow.	Ensure hydraulic lever is properly engaged.
	VRT Sensor Gap.	Gap should be 0.030" (0.76 mm).
Motors turn continuously in Operation Mode	Shaft Motor Solenoids.	Zero Shaft Motors.
	VRT Sensor Gap.	Gap should be 0.030" (0.76 mm).
Motors turn continuously in Calibration Mode	VRT Sensor Gap.	Gap should be 0.030" (0.76 mm).

Troubleshooting

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 display, no back light	Switched off.	Switch unit on.
	Poor power connections at the battery.	Ensure good connections. Replace monitor.
	Battery below 8 volts.	Check battery voltage.
	Temperature below -10C or above +40C.	Operate between -10C and +40C.
Bin indicates always empty	Broken wire.	Repair wire.
	Faulty sensor.	Replace sensor.
	Wires not hooked to sensor.	Hook up correctly.
	Program Setting at 0.	Change Program Setting to 20.
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.

Troubleshooting

Notes

Section 10: Options Assembly

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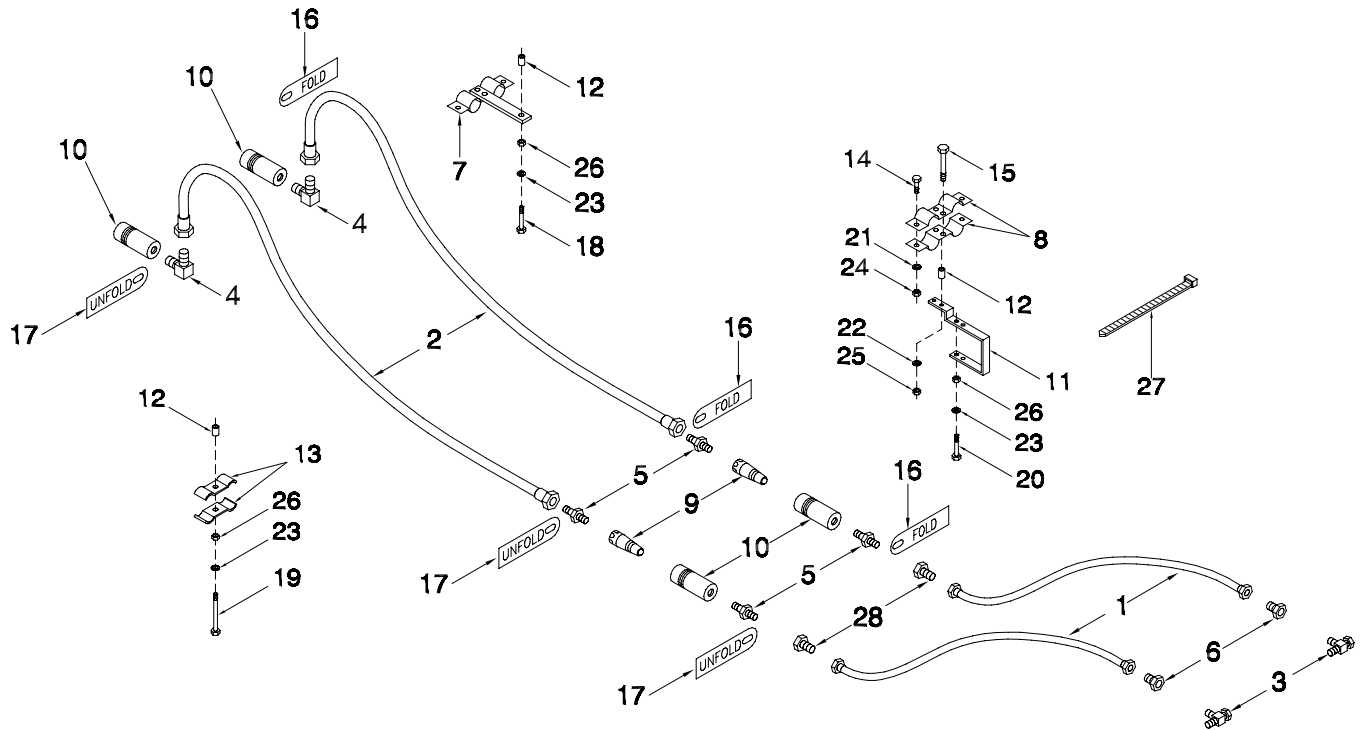
Options Assembly

Rear Tow Hitch

- Attach the upper bracket to the air cart frame with 1 1/4" x 2 1/4" pins and 1/4" x 2 1/4" cotter pins.
- Attach the lower bracket to the air cart frame with 1 1/4" x 5 1/4" pins and 1/4" x 2 1/4" cotter pins.
- Attach the upper bracket to lower bracket with a 1 1/4" x 4 3/4" pin and 1/4" x 2 1/4" cotter pin.



Options Tow Behind Hydraulic Extension Kit for Rear Tow Hitch



Item	Part No.	Description	Qty
1	S39503	Hyd Hose - 1/4 x 132 Lg W/9/16-18 FJIC	2
2	C31369	Hyd Hose - 1/2 x 468 W7/8 - 14 FJIC	2
3	C-4403	Tee - (2) 9/16-18 MJIC x (1) 9/16-18 FJIC	2
4	C15318	90 Elbow - 7/8-14 MJIC x 7/8-14 MORB	2
5	N34620	Connector - Swivel - 7/8-14 MORB x 7/8-14 FJIC	4
6	N37876	Reducer - 3/4-16 MJIC x 9/16-18 FJIC	2
7	S-1379	Pioneer Coupler Assembly	1
8	N16608	Coupler Clamp - Female Pioneer	2
9	N34498	Male Pioneer Tip - 7/8-14 FORB	2
10	N34488	Pioneer Coupler - 7/8-14 FORB	4
11	N21691	Mounting Bracket	1
12	N16257	Spacer	3
13	D-4808	Oil Line Clamp	2
14	W-469	Hex Bolt - 1/4 x 3/4	2
15	W-473	Hex Bolt - 5/16 x 1 1/2	2
16	S29960	Tag - Hose ID - Wing Lift - FOLD	3
17	S29961	Tag - Hose ID - Wing Lift - UNFOLD	3
18	D-5249	Hex Bolt - 3/8 x 3 1/4	1
19	S-1299	Hex Bolt - 3/8 x 4 1/2	1
20	C-3918	Hex Bolt - 3/8 x 5	1
21	W-521	Lockwasher - 1/4	2
22	W-522	Lockwasher - 5/16	2
23	W-523	Lockwasher - 3/8	3
24	W-512	Hex Nut - 1/4	2
25	W-513	Hex Nut - 5/16	2
26	W-514	Hex Nut - 3/8	3
27	D-4838	Tie Strap	10
28	C-4392	Reducer - 7/8-14 FJIC x 9/16-18 MJIC	1
	H38276	Kit - Hydraulic Extension (Includes All Items above) (ORDER THROUGH WHOLEGOODS)	

Options Assembly

Hitch Stand Kit (Tow Behind)

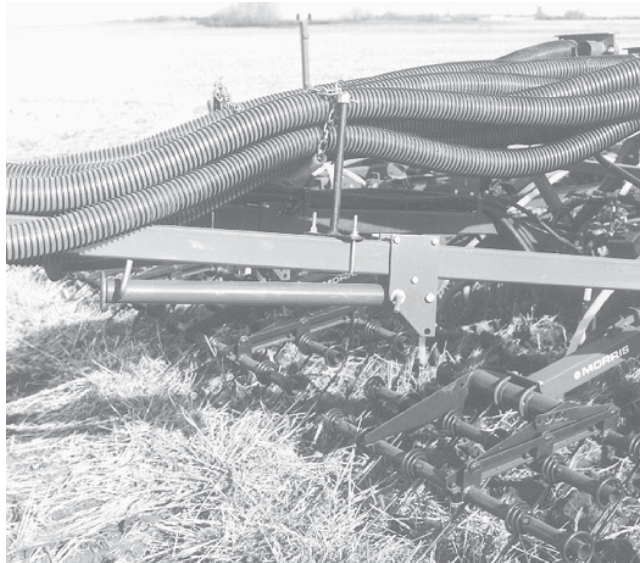
- Attach the mounting plates to the hitch pole using three - 3/8" x 4" bolts, lockwashers and nuts.

Note: Locate hitch stands in a position which will clear any attachments on the seeding tool. (i.e. Mounted Harrows, Packers, etc.)

- Mount the outer tube between mounting plates with a 1/2" x 4 1/2" bolt, lockwasher and nut.
- Slide inner tube into outer tube retaining with the tightener.
- Retain stand with a 5/8" pin and hair pin.



Attached/Detached Position



Transport Position

Mounted Harrow Kit

- Mount the harrow bracket as shown with two 1/2" U-bolts, lockwashers and nuts.
- Attach the harrow arm to the bracket with four 5/8" x 1 3/4" bolts, lockwashers and nuts.
- Mount harrow to the harrow arm.
- Repeat above procedure for the other harrow.



Options Assembly

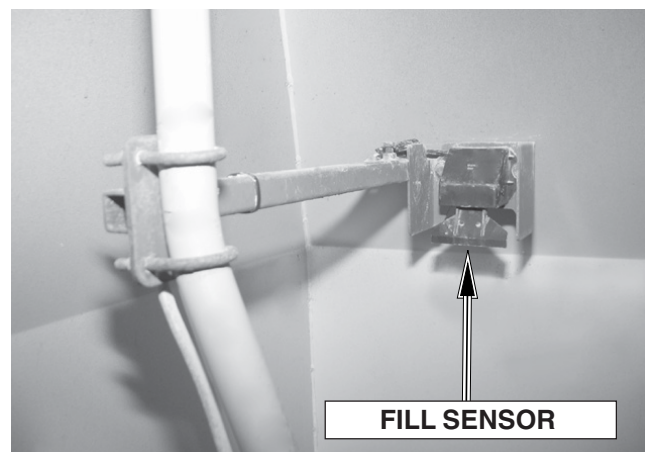
Full Bin Indicator

Position Fill Sensor approximately 16" (40 cm) from the top of the tank.

Final positioning of sensor is the responsibility of the operator.

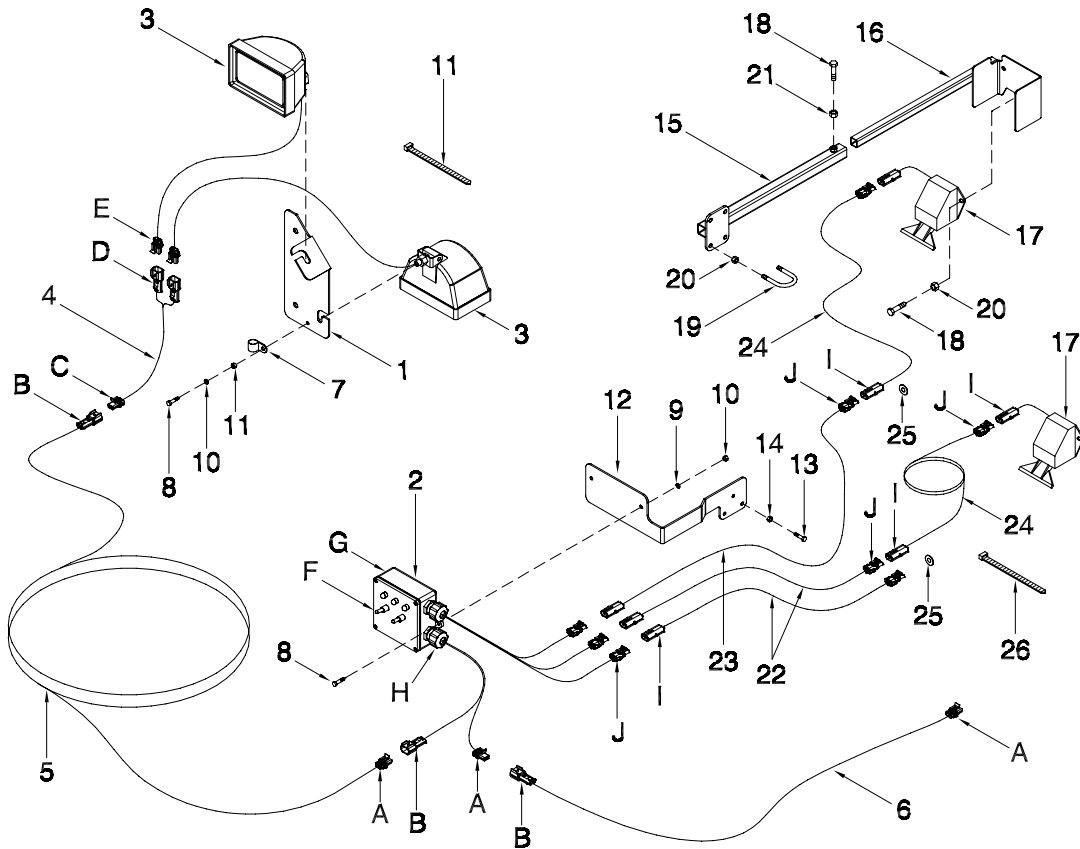


Fill Indicator



Fill Sensor

Lighting Full Bin Indicator & Work Lights



Item	Part No.	Description	Qty
1	N34675	Bracket - Auger Light	1
2	N40540	Switch Box	1
3	N34683	Work Light Assembly	2
4	N34682	Cable - Two Light Adapter	1
5	N34681	Cable - Auger Light	1
6	N34678	Cable - Power Supply	1
7	N34713	Clamp	1
8	W-1552	Hex Bolt - 1/4 X 1	3
9	W-521	Lockwasher - 1/4	3
10	W-512	Hex Nut - 1/4	3
11	N34715	Tie Strap - 5.6 Lg	17
11A	D-4838	Tie Strap - 14 1/2 Lg	5
12	N37562	Switchbox Mounting Bracket (8370 XL ONLY)	1
13	W-469	Hex Bolt - 1/4 x 3/4 (8370 XL ONLY)	3
14	D-5277	Locknut - 1/4 Flange (8370 XL ONLY)	3
Following Item Quantities are listed per Tank			
15	N42143	Bracket - Ladder Mount	1
16	N42145	Switch Bracket	1
17	N42090	Level Sensor	1
18	N15112	Hex Bolt - 5/16 x 3/4	3
19	N42091	U-Bolt - 5/16 x 2 1/4	2
20	N42098	Locknut - 5/16 stainless	6
21	N15144	Hex Nut - 5/16 stainless	1
22	N37014	Cable - 5 ft (Used in Tank 1 and Tank 2) (Front and Middle Tank)	1
23	N37016	Cable - 10 ft (Used in Tank 3) (Rear Tank)	1
24	N42089	Cable - 11 ft (Used in each Tank)	1
24	N42092	Grommet	1
25	N34715	Tie Strap - 5.6 Lg	10

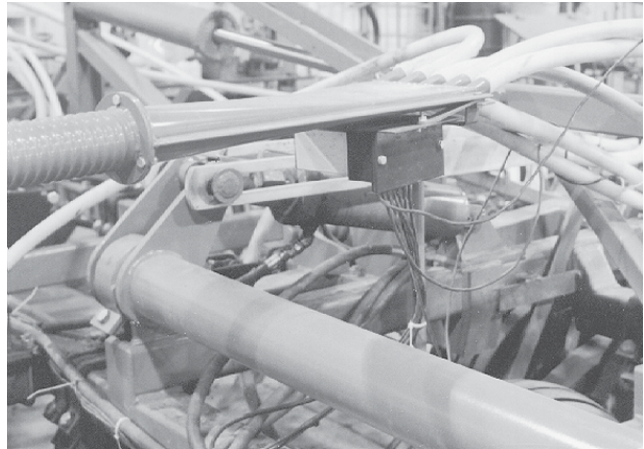
Options Assembly

Pin Blockage System

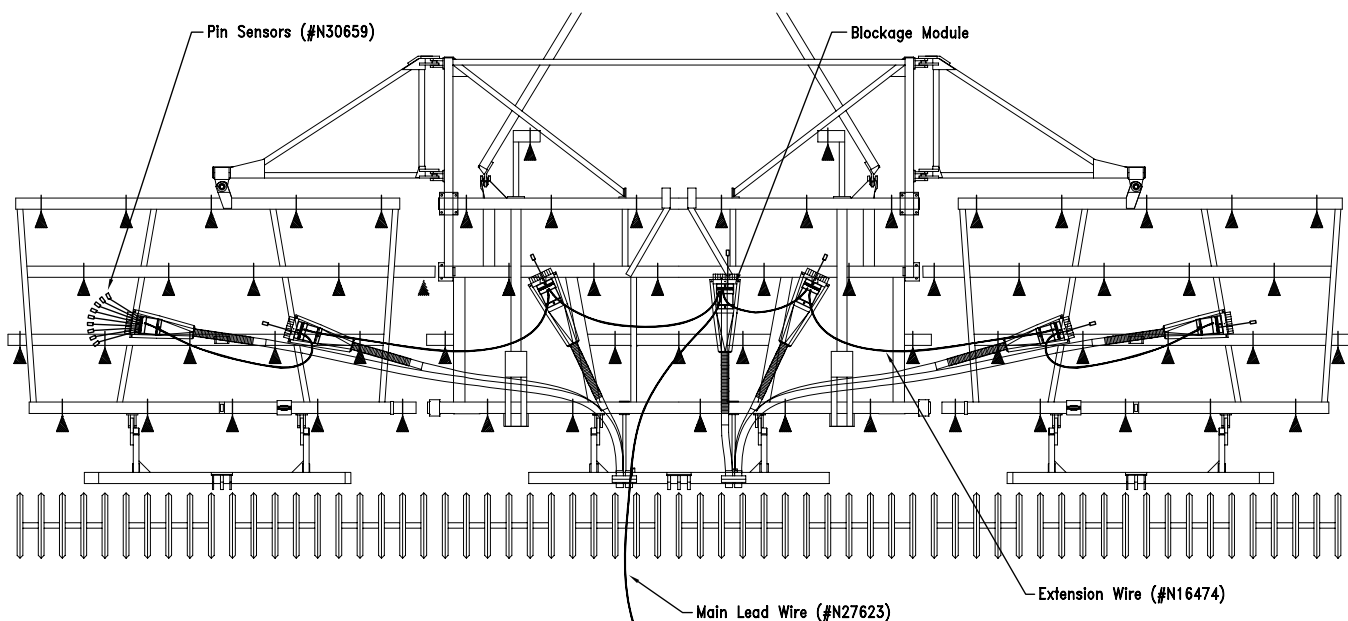
There are two options for mounting Blockage Modules and Pin Sensors.

Option 'A' - Full System

- **All** Secondary Hoses have a Pin Sensor.
- One Module Kit #N27066 mounted on each Divider Head on seeding tool. (10 Modules Maximum)
- Main lead wire #N27623 (25 ft).
- Extension wire #N16474 (15 ft) for each additional module **as required**.
- Pin Sensor Kits #N30659 (5 ft) as req'd.



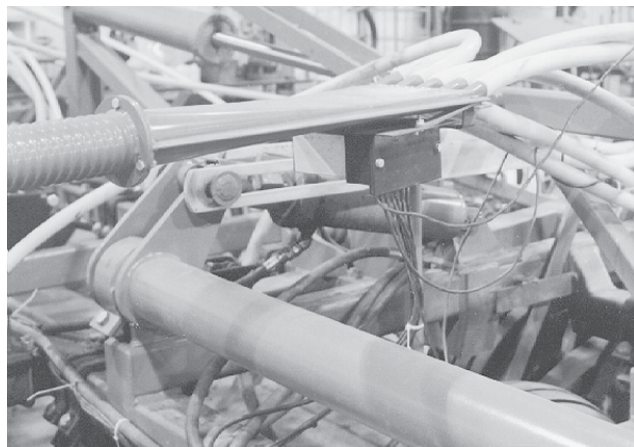
Blockage Module attached to Divider Head



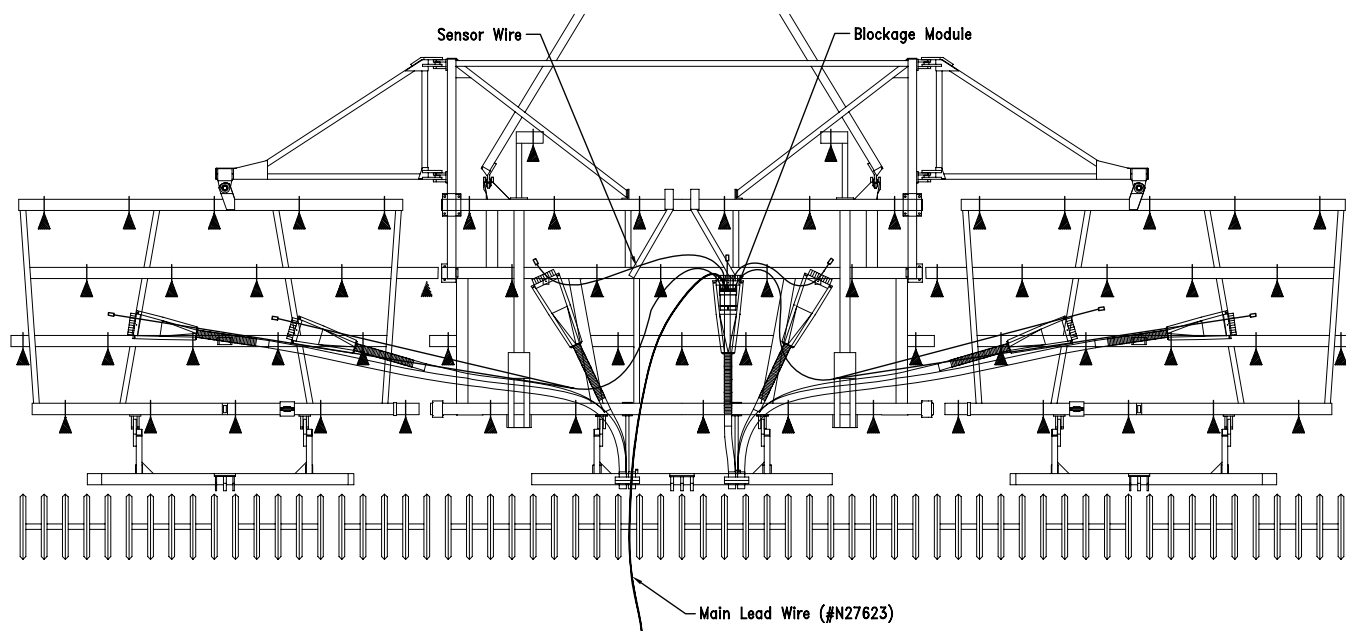
Pin Blockage System - Continued

Option 'B' - Partial System

- **Select** Secondary Hoses have a Pin Sensor.
- One Module Kit #N27066 mounted for each Divider Head - **as required (See charts).**
- Main lead wire #N27623 (25 ft).
- Extension wire #N16474 (15 ft) for each additional module - **as required.**
- Pin Sensor Kits - **as required (See charts).**



Blockage Module attached to Divider Head



Options Assembly

Pin Blockage System - Continued

Option 'B' - One Sensor per Head - Secondary Hoses

One Sensor Per Head - Secondary Hoses						
Machine	Pin Sensor Kits Required					Modules Req'd
	5 foot N30659	10 foot N30660	15 foot N30661	20 foot N30662	30 foot N30663	
Maxim II Air Drill 3 frame models						
- 3 heads	1	0	0	2	0	1
- 4 heads	1	1	1	1	0	1
- 5 heads	1	2	1	1	0	1
- 6 heads	1	3	1	1	0	1
- 7 heads	1	2	1	3	0	1
Maxim II Air Drill 5 frame models						
- 6 heads	1	1	1	1	2	1
- 7 heads	2	1	0	2	2	1
- 8 heads (49 ft)	2	2	1	1	2	1
- 8 heads (55 & 60ft)	1	1	2	2	2	1
Concept 2000 3 frame models						
- 3 heads	1	0	0	2	0	1
- 4 heads	1	1	1	1	0	1
- 5 heads (29 ft)	1	0	0	4	0	1
- 5 heads (32 & 38 ft)	3	0	0	2	0	1
- 6 heads	1	1	0	3	1	1
Concept 2000 5 frame models						
- 5 heads	1	0	0	2	2	1
- 6 heads	1	1	1	1	2	1
- 7 heads	2	1	0	2	2	1
- 8 heads	0	2	2	2	2	1

Pin Blockage System - Continued

Option 'B' - Two Sensors per Head - Secondary Hoses

Two Sensors Per Head - Secondary Hoses						
Machine	Pin Sensor Kits Required					Modules Req'd
	5 foot N30659	10 foot N30660	15 foot N30661	20 foot N30662	30 foot N30663	
Maxim II Air Drill 3 frame models						
- 3 heads	2	0	0	4	0	1
- 4 heads	2	2	2	2	0	1
- 5 heads	2	4	2	2	0	1
- 6 heads	2	6	2	2	0	1
- 7 heads	2	4	8	0	0	2
Maxim II Air Drill 5 frame models						
- 6 heads	2	2	2	2	4	1
- 7 heads	6	0	4	0	4	2
- 8 heads (49 ft)	8	0	4	0	4	2
- 8 heads (55 & 60ft)	4	0	8	0	4	2
Concept 2000 3 frame models						
- 3 heads	2	0	0	4	0	1
- 4 heads	2	2	2	2	0	1
- 5 heads (29 ft)	2	0	0	8	0	1
- 5 heads (32 & 38 ft)	6	0	0	4	0	1
- 6 heads	2	2	0	6	2	1
Concept 2000 5 frame models						
- 5 heads	2	0	0	4	4	1
- 6 heads	2	2	2	2	4	1
- 7 heads	6	0	0	4	4	2
- 8 heads	4	0	4	4	4	2

Options Assembly

Pin Blockage System - Continued

Option 'B' - Three Sensors per Head - Secondary Hoses

Three Sensors Per Head - Secondary Hoses						
Machine	Pin Sensor Kits Required					Modules Req'd
	5 foot N30659	10 foot N30660	15 foot N30661	20 foot N30662	30 foot N30663	
Maxim II Air Drill 3 frame models						
- 3 heads	3	0	0	6	0	1
- 4 heads	3	3	3	3	0	1
- 5 heads	6	3	6	0	0	2
- 6 heads	6	6	6	0	0	2
- 7 heads	6	3	12	0	0	2
Maxim II Air Drill 5 frame models						
- 6 heads	6	0	6	0	6	2
- 7 heads	9	0	6	0	6	2
- 8 heads (49 ft)	12	0	6	0	6	2
- 8 heads (55 & 60ft)	6	0	12	0	6	2
Concept 2000 3 frame models						
- 3 heads	3	0	0	6	0	1
- 4 heads	3	3	3	3	0	1
- 5 heads (29 ft)	9	0	3	3	0	2
- 5 heads (32 & 38 ft)	9	0	6	0	0	2
- 6 heads	6	0	0	12	0	2
Concept 2000 5 frame models						
- 5 heads	6	0	3	6	0	2
- 6 heads	6	0	6	0	6	2
- 7 heads	9	0	0	6	6	2
- 8 heads	6	0	6	6	6	2

Pin Blockage System - Continued

Option 'B' - Four Sensors per Head - Secondary Hoses

Four Sensors Per Head - Secondary Hoses						
Machine	Pin Sensor Kits Required					Modules Req'd
	5 foot N30659	10 foot N30660	15 foot N30661	20 foot N30662	30 foot N30663	
Maxim Air II Drill 3 frame models						
- 3 heads	4	0	0	8	0	1
- 4 heads	8	0	8	0	0	2
- 5 heads	8	4	8	0	0	2
- 6 heads	16	0	8	0	0	2
- 7 heads	12	16	0	0	0	3
Maxim Air II Drill 5 frame models						
- 6 heads	8	0	8	0	8	2
- 7 heads	16	4	8	0	0	3
- 8 heads (49 ft)	16	8	8	0	0	3
- 8 heads (55 & 60ft)	20	4	8	0	0	3
Concept 2000 3 frame models						
- 3 heads	4	0	0	8	0	1
- 4 heads	8	0	8	0	0	2
- 5 heads (29 ft)	12	0	4	4	0	2
- 5 heads (32 & 38 ft)	12	0	8	0	0	2
- 6 heads	8	0	0	16	0	2
Concept 2000 5 frame models						
- 5 heads	8	0	4	8	0	2
- 6 heads	8	0	8	0	8	2
- 7 heads	20	0	8	0	0	3
- 8 heads	20	0	4	8	0	3

Options Assembly

Pin Blockage System - Continued

Installation Procedure

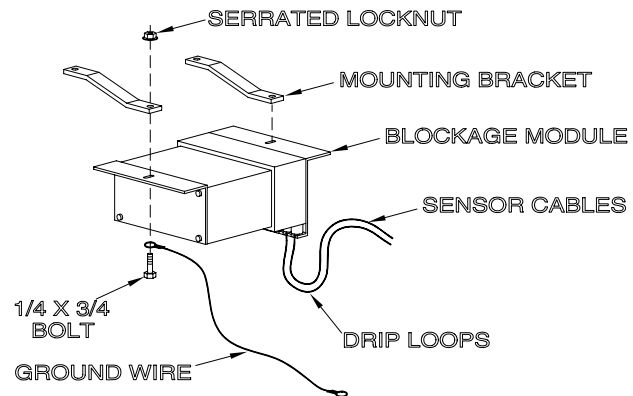
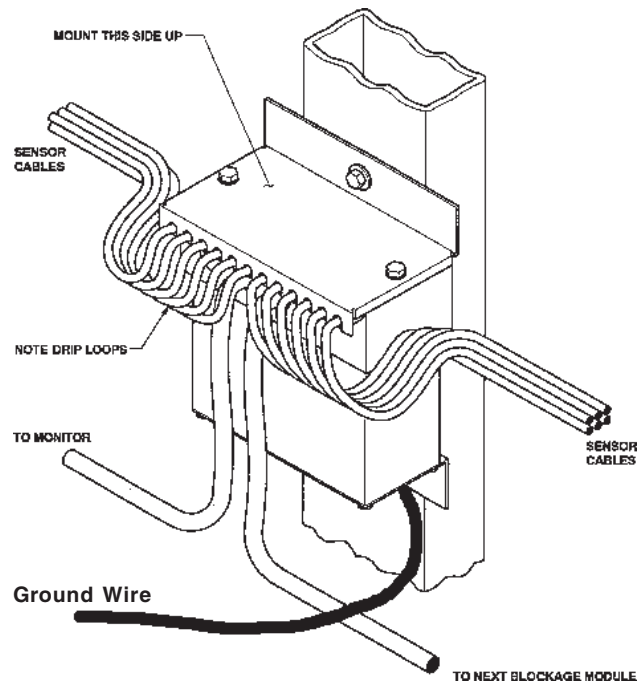
1. Module should be mounted vertically as shown or inverted under a divider head with 'Drip Loops'.
2. Module should be mounted on the seeding tool only (Mounted to divider head).
3. The module must be grounded to seeding tool frame. Attach ground wire provided (or 10 GA wire as required) to the back mounting plate of module and to seeding tool frame for a good ground.

Note: A good ground is essential. Remove paint from any ground contacts.

4. Sensors should be mounted 2 ft away from the divider head to the top side of the secondary hose. Sensors should never be mounted on inside curve of a hose.
5. The pin sensor wire and the module lead wire should always have a 'Drip Loop' to ensure moisture is directed away from the module and pin sensors.
6. Splice secondary hose, connecting bubble into hose with hose clamps.

Note: The sensors should be numbered and should be placed in an orderly fashion in the seed tubes, then connected sequentially to the connector panel (this will make it easier to identify blocked runs).

7. Secure pin sensor to bubble with a tie strap.
8. Disconnect module from main wiring harness at Weather Pak connector when unhooking air cart from seeding tool.



Pin Blockage System - Continued

Wiring Procedure

- Remove blockage module housing.
- Feed the cables through the holes in the housing and then attach the push-on connectors on the connector panel of the module as illustrated in figure 3.
- The cable seal and grommet should then be snugly pushed against the housing.
- Set switch **S1 SENSOR**, located on the front of the connector panel, to the number of sensors that are connected to that module.

S1 SENSOR	
Switch Position	Number of Sensors
0	Not Used
1 - 9	1 - 9
A	10
B	11
C - F	12

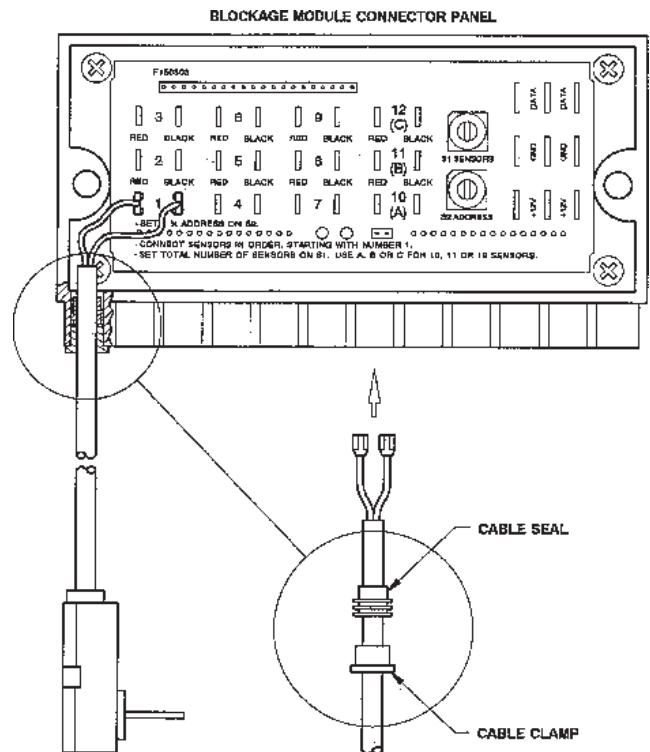


FIGURE 3: FLOW SENSOR ELECTRICAL CONNECTION

Options Assembly

Pin Blockage System - Continued

Wiring Procedure - Continued

- Connect the first module on the system to the air cart wiring harness using the cable with a connector on it. **White or Red wire is +12VDC, Green or Brown is Data, and Black is Ground.** See figure 4.
- Connect module 1 to module 2 and module 2 to module 3 etc. See figure 5.
- Set switch **S2 ADDRESS**, located on the front of the connector panel. In a system where there are 3 blockage modules, the addresses must be 1, 2, and 3. The modules should be numbered in such a way that it is easy for the operator to identify them by the address displayed on the monitor.
- After all the sensors have been connected and electrical connections have been made, the covers should be replaced on the housings.

S2 ADDRESS	
Switch Position	Number of Modules
1 - 9	1 - 9
A - F	10 - 15
0	16

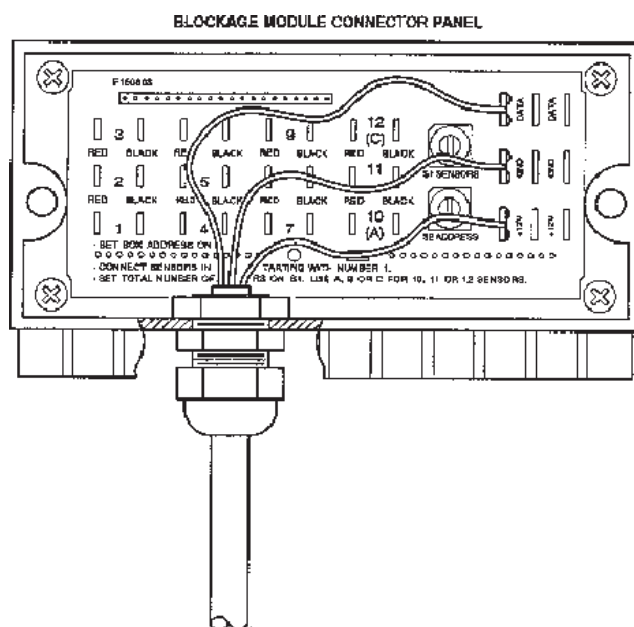


FIGURE 4: COMMUNICATION HARNESS ELECTRICAL CONNECTION

Pin Blockage System - Continued

Wiring Procedure - Continued

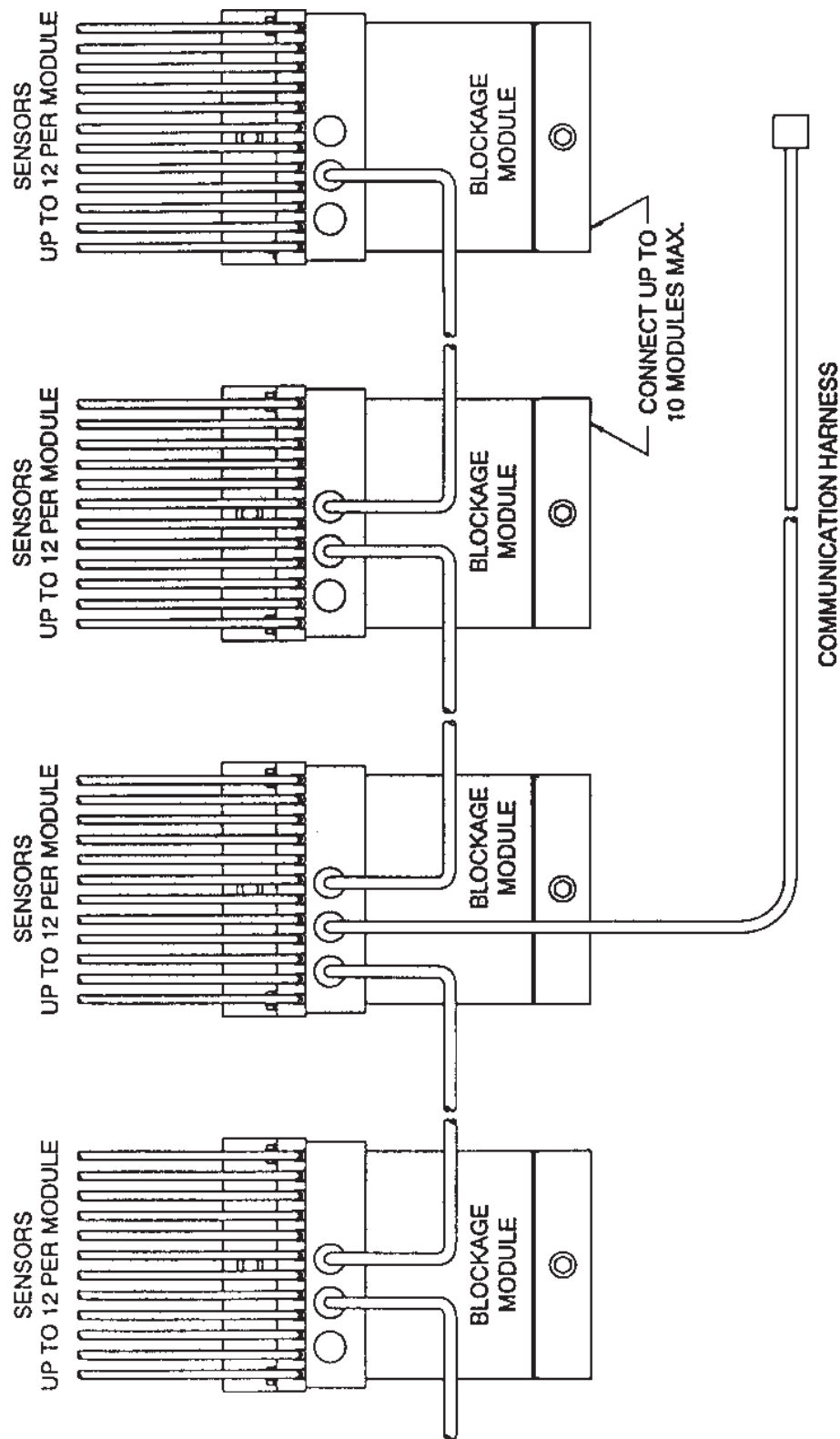


FIGURE 5: BLOCKAGE MODULE SYSTEM CONFIGURATION

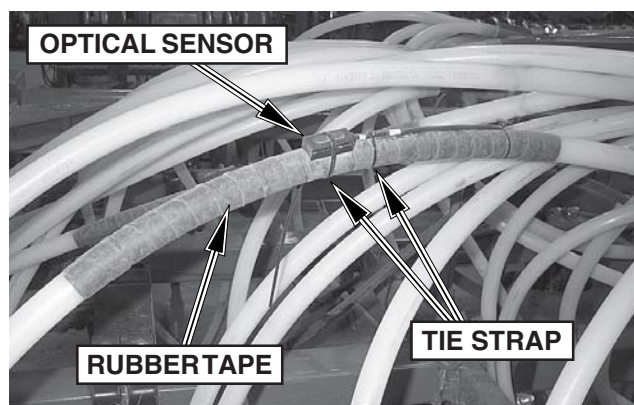
Options Assembly

Optical Blockage System

There are two options for mounting Blockage Modules and Optical Sensors.

Option 'A' - Full System

- **All** Secondary Hoses have a Optical Sensor.
- One Blockage Module #N37011 mounted for each Divider Head on seeding tool (12 Modules Maximum).
- Main lead wire #N34795 (30 ft).
- 'Y' wire #N34791 for each additional module **as required**.
- Extension wire for each additional module **required**. Extension wire lengths available are N34792 (5 ft), N34793 (10 ft), N34794 (20 ft), N34795 (30 ft).
- Optical Sensor Kits #N38652 as req'd.
- Optical Sensor extension cables as req'd. Optical extension cable lengths available are N37014 (5 ft), N37016 (10 ft), N37018 (20 ft), N37020 (30 ft).



Optical Sensor Installation

Option 'B' - Partial System

- **Select** Secondary Hoses have a Optical Sensor.
- One Blockage Module #N37011 mounted for each set of 16 optical sensors. (12 Modules Maximum)
- Main lead wire #N34795 (30 ft).
- 'Y' cable #N34791 for each additional module **as required**.
- Extension wire for each additional module **as req'd**. Extension wire lengths available are N34792 (5 ft), N34793 (10 ft), N34794 (20 ft), N34795 (30 ft).
- Optical Sensor Kits #N38652 - **as required (See Charts)**.
- Optical Sensor extension cables as required. Optical extension cable lengths available are N37014 (5 ft), N37016 (10 ft), N37018 (20 ft), N37020 (30 ft).

Optical Blockage System - Continued

Option 'B' - One Sensor per Head - Secondary Hoses

One Optical Sensor Per Head - Secondary Hoses					
Machine	Sensor Extension Cables Required				Modules Req'd N37011
	5 foot N37014	10 foot N37016	20 foot N37018	30 foot N37020	
Maxim II Air Drill 3 frame models					
- 3 heads	0	1	0	2	1
- 4 heads	0	0	2	2	1
- 5 heads	0	1	2	2	1
- 6 heads	0	0	4	2	1
- 7 heads	0	1	2	4	1
- 8 heads	0	2	2	4	1
Maxim II Air Drill 5 frame models					
- 6 heads	0	0	2	6	1
- 7 heads	0	0	3	6	1
- 8 heads (49 ft)	0	0	4	6	1
- 8 heads (55 & 60ft)	0	0	4	6	1
- 9 heads (55 & 60ft)	0	0	5	6	1
Concept 2000 3 frame models					
- 3 heads	0	1	2	0	1
- 4 heads	0	2	2	0	1
- 5 heads (29 ft)	0	1	2	2	1
- 5 heads (32 & 38 ft)	0	1	2	2	1
- 6 heads	0	2	2	2	1
- 7 heads	0	2	3	2	1
Concept 2000 5 frame models					
- 5 heads	0	1	1	3	1
- 6 heads	0	2	0	4	1
- 7 heads	2	1	2	4	1
- 8 heads	0	2	2	4	1
- 9 heads	0	2	3	4	1

Options Assembly

Optical Blockage System - Continued

Option 'B' - Two Sensors per Head - Secondary Hoses

Two Optical Sensor Per Head - Secondary Hoses					
Machine	Sensor Extension Cables Required				Modules Req'd N37011
	5 foot N37014	10 foot N37016	20 foot N37018	30 foot N37020	
Maxim II Air Drill 3 frame models					
- 3 heads	0	2	0	4	1
- 4 heads	0	0	4	4	1
- 5 heads	0	2	4	4	1
- 6 heads	0	0	8	4	1
- 7 heads	0	2	4	8	1
- 8 heads	0	4	4	8	1
Maxim II Air Drill 5 frame models					
- 6 heads	0	0	4	12	1
- 7 heads	0	0	6	12	1
- 8 heads (49 ft)	0	0	8	12	1
- 8 heads (55 & 60ft)	0	0	8	12	1
- 9 heads (55 & 60ft)	0	0	10	12	2
Concept 2000 3 frame models					
- 3 heads	0	2	4	0	1
- 4 heads	0	4	4	0	1
- 5 heads (29 ft)	0	2	4	4	1
- 5 heads (32 & 38 ft)	0	2	4	4	1
- 6 heads	0	4	4	4	1
- 7 heads	0	4	6	4	1
Concept 2000 5 frame models					
- 5 heads	0	2	2	6	1
- 6 heads	0	4	0	8	1
- 7 heads	4	2	4	8	1
- 8 heads	0	4	4	8	1
- 9 heads	0	4	6	8	2

Optical Blockage System - Continued

Option 'B' - Three Sensors per Head - Secondary Hoses

Three Optical Sensor Per Head - Secondary Hoses					
Machine	Sensor Extension Cables Required				Modules Req'd N37011
	5 foot N37014	10 foot N37016	20 foot N37018	30 foot N37020	
Maxim II Air Drill 3 frame models					
- 3 heads	0	3	0	6	1
- 4 heads	0	0	6	6	1
- 5 heads	0	6	6	6	1
- 6 heads	0	0	12	6	2
- 7 heads	0	3	6	12	2
- 8 heads	0	6	6	12	2
Maxim II Air Drill 5 frame models					
- 6 heads	0	0	6	18	2
- 7 heads	0	0	9	18	2
- 8 heads (49 ft)	0	0	12	18	2
- 8 heads (55 & 60ft)	0	0	12	18	2
- 9 heads (55 & 60ft)	0	0	15	18	2
Concept 2000 3 frame models					
- 3 heads	0	3	6	0	1
- 4 heads	0	6	6	0	1
- 5 heads (29 ft)	0	3	6	6	1
- 5 heads (32 & 38 ft)	0	3	6	6	1
- 6 heads	0	6	6	6	2
- 7 heads	0	6	9	6	2
Concept 2000 5 frame models					
- 5 heads	0	3	3	9	1
- 6 heads	0	6	0	12	2
- 7 heads	6	3	6	12	2
- 8 heads	0	6	6	12	2
- 9 heads	0	6	9	12	2

Options Assembly

Optical Blockage System - Continued

Option 'B' - Four Sensors per Head - Secondary Hoses

Four Optical Sensor Per Head - Secondary Hoses					
Machine	Sensor Extension Cables Required				Modules Req'd N37011
	5 foot N37014	10 foot N37016	20 foot N37018	30 foot N37020	
Maxim II Air Drill 3 frame models					
- 3 heads	0	4	0	8	1
- 4 heads	0	0	8	8	1
- 5 heads	0	4	8	8	2
- 6 heads	0	0	16	8	2
- 7 heads	0	4	8	16	2
- 8 heads	0	8	8	16	2
Maxim II Air Drill 5 frame models					
- 6 heads	0	0	8	24	2
- 7 heads	0	0	12	24	2
- 8 heads (49 ft)	0	0	16	24	2
- 8 heads (55 & 60ft)	0	0	16	24	2
- 9 heads (55 & 60ft)	0	0	20	24	3
Concept 2000 3 frame models					
- 3 heads	0	4	8	0	1
- 4 heads	0	8	8	0	1
- 5 heads (29 ft)	0	4	8	8	2
- 5 heads (32 & 38 ft)	0	4	8	8	2
- 6 heads	0	8	8	8	2
- 7 heads	0	8	12	8	2
Concept 2000 5 frame models					
- 5 heads	0	4	4	12	2
- 6 heads	0	8	0	16	2
- 7 heads	8	4	8	16	2
- 8 heads	0	8	8	16	2
- 9 heads	0	8	12	16	3

Optical Blockage System - Continued

Installation Procedure

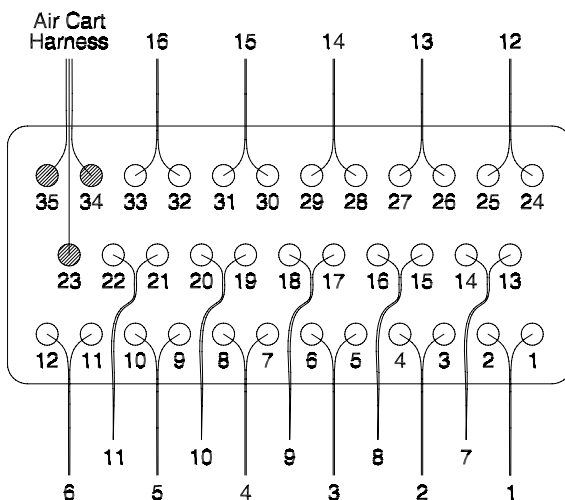
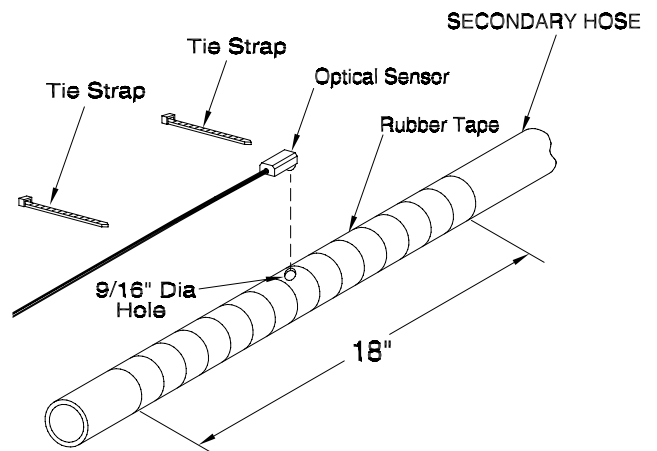
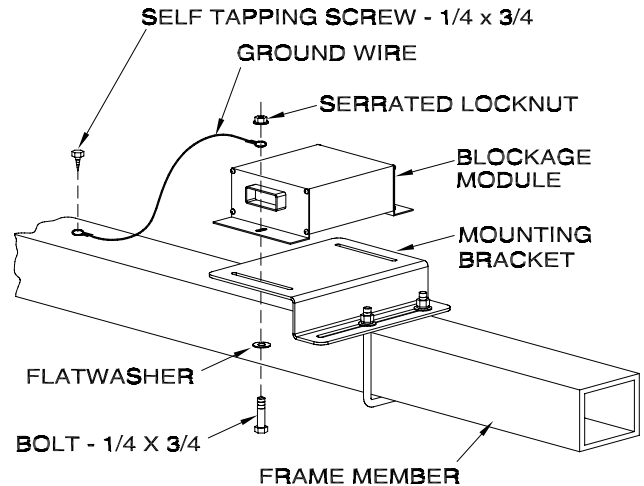
1. Module should be mounted horizontally as shown.
2. Module should be mounted on the seeding tool only.
3. The module must be grounded to seeding tool frame. Attach ground wire provided (or 10 GA wire as req'd) to the mounting plate of module and to seeding tool frame for a good ground.

Note: A good ground is essential. Remove paint from any ground contacts.

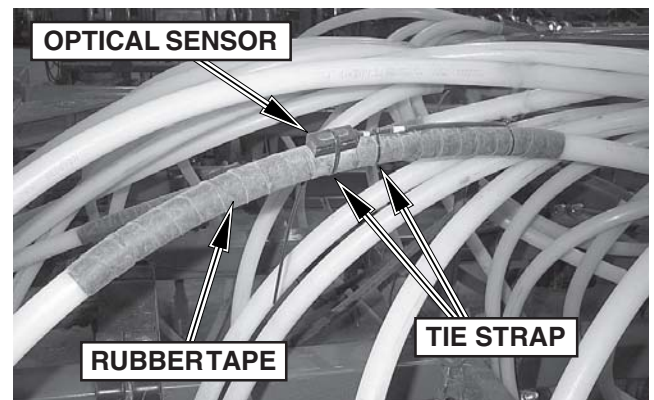
4. On a straight section of the secondary hose, wrap rubber tape for a length of 18 inches.
5. Drill a 9/16-inch diameter hole through one side of secondary hose at mid point of taped section.
6. Ensure hole is clean of debris.

Note: The sensors should be numbered and should be placed in an orderly fashion in the seed tubes, then connected sequentially to the blockage module (this will make it easier to identify blocked runs).

7. Secure the Optical Sensor and wire lead to hose with two tie straps.
8. Disconnect Blockage System wire harness from air cart wire harness when unhooking air cart from seeding tool.



Sensor Arrangement
on Module Cable

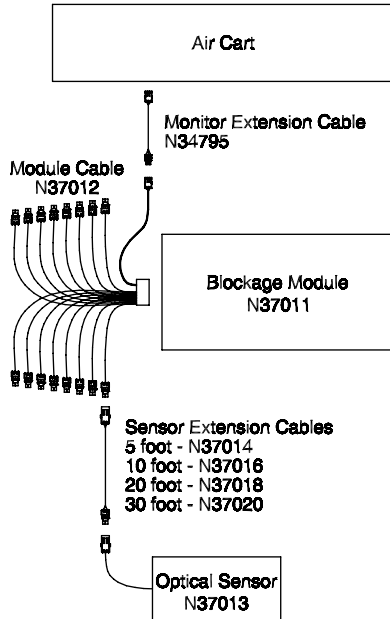


Optical Sensor Installation

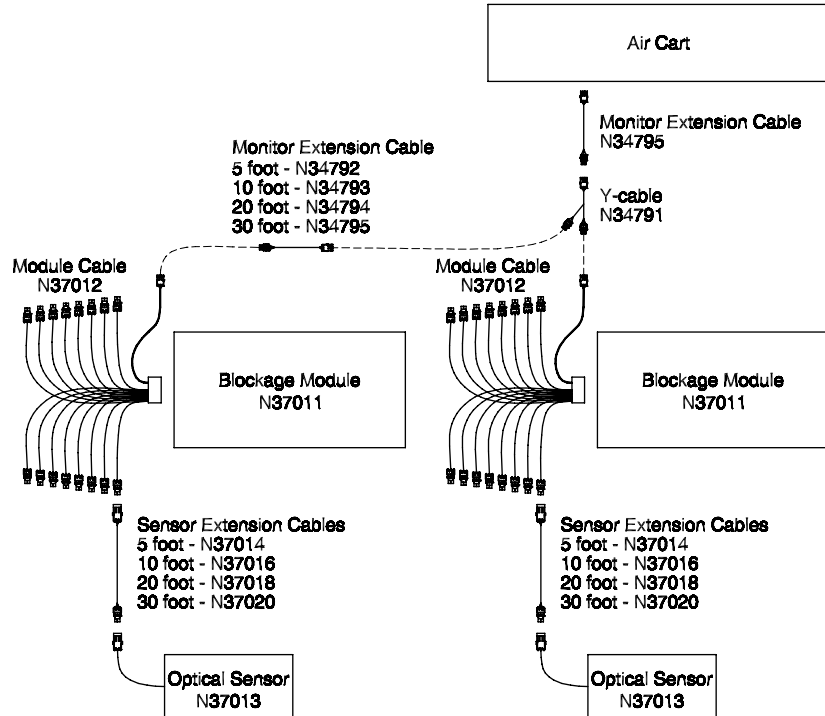
Options Assembly

Optical Blockage System - Continued

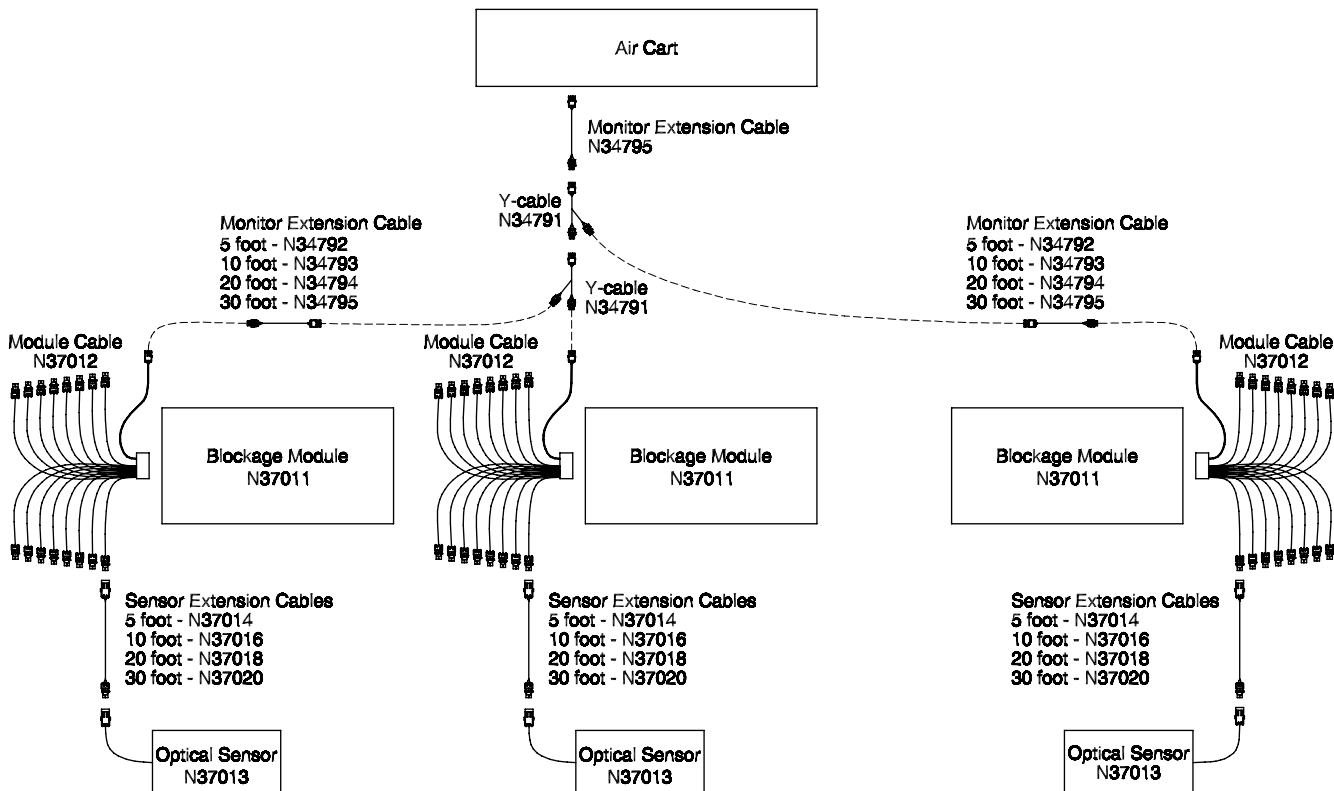
Single Module



Two Modules

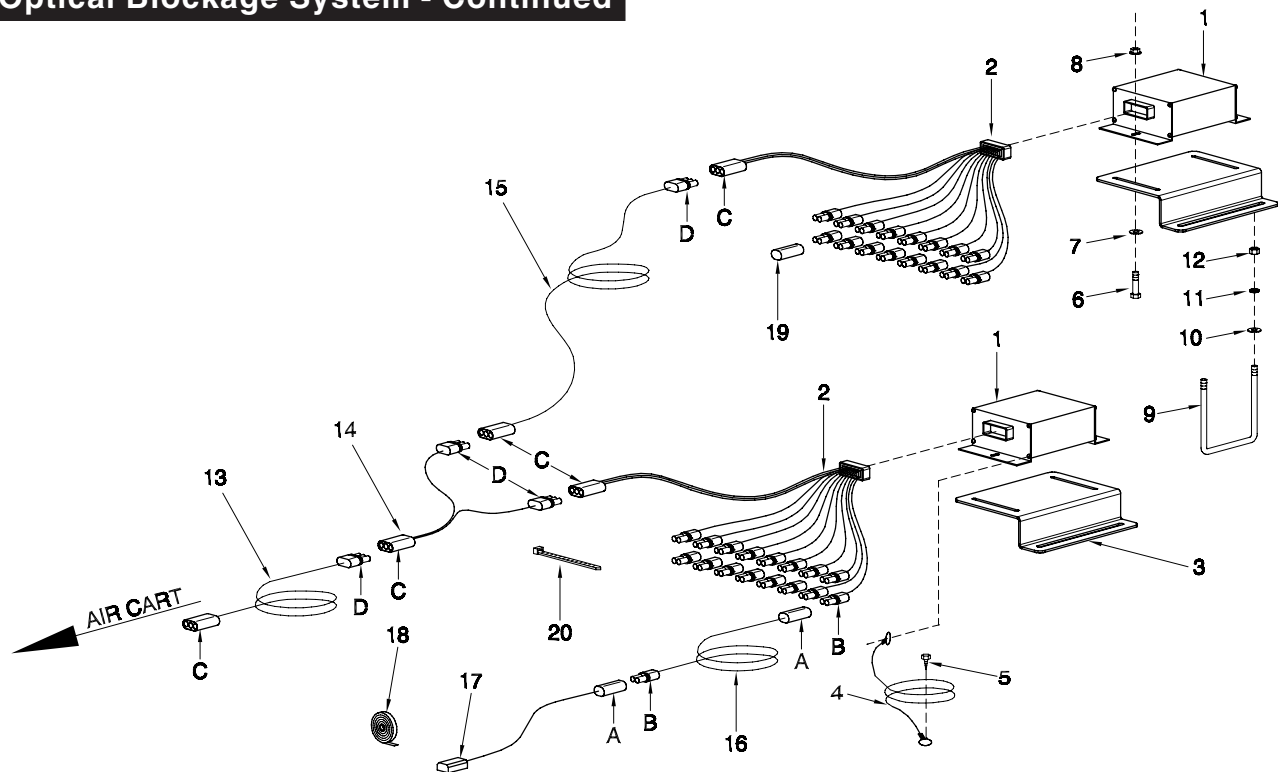


Multiple Modules



Options Assembly

Optical Blockage System - Continued



Item	Part No.	Description	Qty
1	N37011	Optical Module - Blockage	As req
2	N37012	Module Cable (Qty per Blockage Module)	1
3	N34842	Bracket - Mount (Qty per Blockage Module)	1
4	N31049	Wire - Ground - Blockage Module (Qty per Blockage Module)	1
5	N16698	Screw - 1/4 x 3/4 Self Tapping (Qty per Blockage Module)	1
6	W-469	Hex Bolt - 1/4 x 3/4 Lg (Qty per Blockage Module)	3
7	S-1198	Flatwasher- 1/4 (Qty per Blockage Module)	3
8	D-5277	Serrated Locknut - 1/4 (Qty per Blockage Module)	3
9	N15098	U-Bolt - 3/8 x 4 x 5 (Qty per Blockage Module)	1
	N36148	U-Bolt - 3/8 x 3 x 4 (Optional Qty per Blockage Module)	1
	D12714	U-Bolt - 3/8 x 2 x 2 3/4 (Optional Qty per Blockage Module)	1
10	D-5489	Flatwasher - 3/8 (Qty per Blockage Module)	2
11	W-523	Lockwasher - 3/8 (Qty per Blockage Module)	2
12	W-514	Hex Nut - 3/8 (Qty per Blockage Module)	2
13	N34795	Wire - Blockage Module (Required for 1st Module ONLY)	1
14	N34791	Y-Cable (Required for each additional Module ONLY)	1
15	N34792	Extension Cable - 5 Ft Lg	As req
	N34793	Extension Cable - 10 Ft Lg	As req
	N34794	Extension Cable - 20 Ft Lg	As req
	N34795	Extension Cable - 30 Ft Lg	As req
16	N37014	Optical Sensor Extension Cable - 5 Ft Lg	As req
	N37016	Optical Sensor Extension Cable - 10 Ft Lg	As req
	N37018	Optical Sensor Extension Cable - 20 Ft Lg	As req
	N37020	Optical Sensor Extension Cable - 30 Ft Lg	As req
17	N37013	Optical Sensor	As req
18	N34841	Rubber Tape - 30 Ft roll (will do 8 sensors)	As req
19	N29334	Weather Pak Seal Connector - 2 Pin	As req
20	N34715	Nylon Tie Strap - 5.6 Lg (Qty per Pin Sensor)	2
	D-4951	Nylon Tie Strap - 7.375 Lg	18
	S13336	Nylon Tie Strap - 24 Lg	20

Options Assembly

Notes

Section 11: Metric

Section Contents

Calibration Chart - Metric	11-2
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Calibration Chart - Metric

EIGHT SERIES AIRSEEDER - VARIABLE RATE - CALIBRATION CHART

WT/REV (KGS/REV)

SLOW SPEED DRIVE SEED & INOCULANT																DIRECT DRIVE SEED										DIRECT DRIVE FERTILIZER									
# of Outlets					SSD - 1	SSD - 2	SSD - 3	SSD - 4	SSD - 5	# of Outlets					DD - 1	DD - 2	DD - 3	DD - 4	DD - 5	DD - 6	DD - 7	DD - 8	DD - 9	DD - 10	# of Outlets					DD - 1	DD - 2	DD - 3	DD - 4	DD - 5	
21	0.015	0.016	0.017	0.020	0.024	0.069	0.094	0.122	0.133	0.157	0.172	0.194	0.201	0.234	0.258	21	0.137	0.154	0.171	0.193	0.207	21	0.137	0.154	0.171	0.193	0.207	21	0.137	0.154	0.171	0.193	0.207		
22	0.015	0.017	0.017	0.021	0.025	0.073	0.098	0.128	0.140	0.165	0.180	0.203	0.211	0.246	0.271	22	0.143	0.161	0.179	0.202	0.217	22	0.143	0.161	0.179	0.202	0.217	22	0.143	0.161	0.179	0.202	0.217		
23	0.016	0.018	0.018	0.022	0.026	0.076	0.103	0.134	0.146	0.172	0.189	0.213	0.221	0.257	0.283	23	0.150	0.169	0.187	0.211	0.227	23	0.150	0.169	0.187	0.211	0.227	23	0.150	0.169	0.187	0.211	0.227		
24	0.017	0.018	0.019	0.023	0.028	0.079	0.107	0.139	0.152	0.180	0.197	0.222	0.230	0.268	0.295	24	0.157	0.176	0.195	0.220	0.237	24	0.157	0.176	0.195	0.220	0.237	24	0.157	0.176	0.195	0.220	0.237		
25	0.017	0.019	0.020	0.024	0.029	0.083	0.112	0.145	0.159	0.187	0.205	0.231	0.240	0.279	0.307	25	0.163	0.183	0.203	0.229	0.246	25	0.163	0.183	0.203	0.229	0.246	25	0.163	0.183	0.203	0.229	0.246		
26	0.018	0.020	0.020	0.025	0.030	0.086	0.116	0.151	0.165	0.195	0.213	0.240	0.249	0.290	0.320	26	0.170	0.191	0.212	0.239	0.256	26	0.170	0.191	0.212	0.239	0.256	26	0.170	0.191	0.212	0.239	0.256		
27	0.019	0.021	0.021	0.026	0.031	0.089	0.121	0.157	0.172	0.202	0.221	0.250	0.259	0.301	0.332	27	0.176	0.198	0.220	0.248	0.266	27	0.176	0.198	0.220	0.248	0.266	27	0.176	0.198	0.220	0.248	0.266		
28	0.019	0.021	0.022	0.027	0.032	0.092	0.125	0.163	0.178	0.210	0.230	0.259	0.269	0.312	0.344	28	0.183	0.205	0.228	0.257	0.276	28	0.183	0.205	0.228	0.257	0.276	28	0.183	0.205	0.228	0.257	0.276		
29	0.020	0.022	0.023	0.028	0.033	0.096	0.130	0.169	0.184	0.217	0.238	0.268	0.278	0.324	0.357	29	0.189	0.213	0.236	0.266	0.286	29	0.189	0.213	0.236	0.266	0.286	29	0.189	0.213	0.236	0.266	0.286		
30	0.021	0.023	0.024	0.029	0.034	0.099	0.134	0.174	0.191	0.225	0.246	0.277	0.288	0.335	0.369	30	0.196	0.220	0.244	0.275	0.296	30	0.196	0.220	0.244	0.275	0.296	30	0.196	0.220	0.244	0.275	0.296		
31	0.021	0.024	0.024	0.030	0.036	0.102	0.139	0.180	0.197	0.232	0.254	0.287	0.297	0.346	0.381	31	0.202	0.227	0.252	0.284	0.306	31	0.202	0.227	0.252	0.284	0.306	31	0.202	0.227	0.252	0.284	0.306		
32	0.022	0.024	0.025	0.031	0.037	0.106	0.143	0.186	0.203	0.240	0.262	0.296	0.307	0.357	0.394	32	0.209	0.235	0.260	0.294	0.315	32	0.209	0.235	0.260	0.294	0.315	32	0.209	0.235	0.260	0.294	0.315		
33	0.023	0.025	0.026	0.032	0.038	0.109	0.148	0.192	0.210	0.247	0.271	0.305	0.317	0.368	0.406	33	0.215	0.242	0.269	0.303	0.325	33	0.215	0.242	0.269	0.303	0.325	33	0.215	0.242	0.269	0.303	0.325		
34	0.024	0.026	0.027	0.033	0.039	0.112	0.152	0.198	0.216	0.255	0.279	0.314	0.326	0.379	0.418	34	0.222	0.249	0.277	0.312	0.335	34	0.222	0.249	0.277	0.312	0.335	34	0.222	0.249	0.277	0.312	0.335		
35	0.024	0.027	0.028	0.034	0.040	0.116	0.157	0.203	0.222	0.262	0.287	0.324	0.336	0.391	0.430	35	0.228	0.257	0.285	0.321	0.345	35	0.228	0.257	0.285	0.321	0.345	35	0.228	0.257	0.285	0.321	0.345		
36	0.025	0.027	0.028	0.035	0.041	0.119	0.161	0.209	0.229	0.270	0.295	0.333	0.345	0.402	0.443	36	0.235	0.264	0.293	0.330	0.355	36	0.235	0.264	0.293	0.330	0.355	36	0.235	0.264	0.293	0.330	0.355		
37	0.026	0.028	0.029	0.036	0.042	0.122	0.166	0.215	0.235	0.277	0.303	0.342	0.355	0.413	0.455	37	0.241	0.271	0.301	0.339	0.365	37	0.241	0.271	0.301	0.339	0.365	37	0.241	0.271	0.301	0.339	0.365		
38	0.026	0.029	0.030	0.037	0.044	0.126	0.170	0.221	0.241	0.285	0.312	0.351	0.365	0.424	0.467	38	0.248	0.279	0.309	0.349	0.375	38	0.248	0.279	0.309	0.349	0.375	38	0.248	0.279	0.309	0.349	0.375		
39	0.027	0.030	0.031	0.038	0.045	0.129	0.175	0.227	0.248	0.292	0.320	0.360	0.374	0.435	0.480	39	0.254	0.286	0.317	0.358	0.385	39	0.254	0.286	0.317	0.358	0.385	39	0.254	0.286	0.317	0.358	0.385		
40	0.028	0.030	0.032	0.039	0.046	0.132	0.179	0.232	0.254	0.300	0.328	0.370	0.384	0.446	0.492	40	0.261	0.293	0.326	0.367	0.394	40	0.261	0.293	0.326	0.367	0.394	40	0.261	0.293	0.326	0.367	0.394		
41	0.028	0.031	0.032	0.040	0.047	0.135	0.184	0.238	0.260	0.307	0.336	0.379	0.393	0.458	0.504	41	0.267	0.301	0.334	0.376	0.404	41	0.267	0.301	0.334	0.376	0.404	41	0.267	0.301	0.334	0.376	0.404		
42	0.029	0.032	0.033	0.041	0.048	0.139	0.188	0.244	0.267	0.315	0.344	0.388	0.403	0.469	0.517	42	0.274	0.308	0.342	0.385	0.414	42	0.274	0.308	0.342	0.385	0.414	42	0.274	0.308	0.342	0.385	0.414		
43	0.030	0.033	0.034	0.042	0.049	0.142	0.192	0.250	0.273	0.322	0.353	0.397	0.413	0.480	0.529	43	0.280	0.315	0.350	0.395	0.424	43	0.280	0.315	0.350	0.395	0.424	43	0.280	0.315	0.350	0.395	0.424		
44	0.031	0.034	0.035	0.043	0.050	0.145	0.197	0.256	0.279	0.329	0.361	0.407	0.422	0.491	0.541	44	0.287	0.323	0.358	0.404	0.434	44	0.287	0.323	0.358	0.404	0.434	44	0.287	0.323	0.358	0.404	0.434		
45	0.031	0.034	0.035	0.044	0.052	0.149	0.201	0.262	0.286	0.337	0.369	0.416	0.432	0.502	0.553	45	0.293	0.330	0.366	0.413	0.444	45	0.293	0.330	0.366	0.413	0.444	45	0.293	0.330	0.366	0.413	0.444		
46	0.032	0.035	0.036	0.044	0.053	0.152	0.206	0.267	0.292	0.344	0.377	0.425	0.441	0.513	0.566	46	0.300	0.337	0.374	0.422	0.454	46	0.300	0.337	0.374	0.422	0.454	46	0.300	0.337	0.374	0.422	0.454		
47	0.033	0.036	0.037	0.045	0.054	0.155	0.210	0.273	0.299	0.352	0.385	0.434	0.451	0.525	0.578	47	0.307	0.345	0.383	0.431	0.463	47	0.307	0.345	0.383	0.431	0.463	47	0.307	0.345	0.383	0.431	0.463		
48	0.033	0.037	0.038	0.046	0.055	0.159	0.215	0.279	0.305	0.359	0.394	0.444	0.461	0.536	0.590	48	0.313	0.352	0.391	0.440	0.473	48	0.313	0.352	0.391	0.440	0.473	48	0.313	0.352	0.391	0.440	0.473		
49	0.034	0.037	0.039	0.047	0.056	0.162	0.219	0.285	0.311	0.367	0.402	0.453	0.470	0.547	0.603	49	0.320	0.359	0.399	0.450	0.483	49	0.320	0.359	0.399	0.450	0.483	49	0.320	0.359	0.399	0.450	0.483		
50	0.035	0.038	0.039	0.048	0.057	0.165	0.224	0.291	0.318	0.374	0.410	0.462	0.480	0.558	0.615	50	0.326	0.367	0.407	0.459	0.493	50	0.326	0.367	0.407	0.459	0.493	50	0.326	0.367	0.407	0.459	0.493		
51	0.035	0.039	0.040	0.049	0.058	0.168	0.228	0.296	0.324	0.382	0.418	0.471	0.489	0.569	0.627	51	0.333	0.374	0.415	0.468	0.503	51	0.333	0.374	0.415	0.468	0.503	51	0.333	0.374	0.415	0.468	0.503		
52	0.036	0.040	0.041	0.050	0.060	0.172	0.233	0.302	0.330	0.389	0.426	0.481	0.499	0.580	0.640	52	0.339	0.381	0.423	0.477	0.513	52	0.339	0.381	0.423	0.477	0.513	52	0.339	0.381	0.423	0.477	0.513		
53	0.037	0.040	0.042	0.051	0.061	0.175	0.237	0.308	0.337	0.397	0.435	0.490	0.508	0.591	0.652	53	0.346	0.389	0.431	0.486	0.523	53	0.346	0.389	0.431	0.486	0.523	53	0.346	0.389	0.431	0.486	0.523		
54	0.037	0.041	0.043	0.052	0.062	0.178	0.242	0.314	0.343	0.404	0.443	0.499	0.518	0.603	0.664	54	0.352	0.396	0.440	0.495	0.532	54	0.352	0.396	0.440	0.495	0.532	54	0.352	0.396	0.440	0.495	0.532		
55	0.038	0.042	0.043	0.053	0.063	0.182	0.246	0.320	0.349	0.412	0.451	0.508	0.528	0.614	0.676	55	0.359	0.403	0.448	0.505	0.542	55	0.359	0.403	0.448	0.505	0.542	55	0.359	0.403	0.448	0.505	0.542		
56	0.039	0.043	0.044	0.054	0.064	0.185	0.251	0.325	0.356	0.419	0.459	0.518	0.537	0.625	0.689	56	0.365	0.411	0.456	0.514	0.552	56	0.365	0.411	0.456	0.514	0.552	56	0.365	0.411	0.456	0.514	0.552		
57	0.040	0.043	0.045	0.055	0.065	0.188	0.255	0.331	0.362	0.427	0.467	0.527	0.547	0.636</																					

Calibration Chart - Metric

EIGHT SERIES AIRSEEDER - VARIABLE RATE - CALIBRATION CHART

WT/REV (KGS./REV)

SLOW SPEED DRIVE
SEED & INOCULANT

DIRECT DRIVE
SEED

DIRECT DRIVE
FERTILIZER

# of Outlets										# of Outlets																									
SSD - 1					SSD - 2					SSD - 3					SSD - 4					SSD - 5					# of Outlets										
DD - 1	DD - 2	DD - 3	DD - 4	DD - 5	DD - 6	DD - 7	DD - 8	DD - 9	DD - 10	DD - 1	DD - 2	DD - 3	DD - 4	DD - 5	DD - 6	DD - 7	DD - 8	DD - 9	DD - 10	DD - 1	DD - 2	DD - 3	DD - 4	DD - 5	DD - 6	DD - 7	DD - 8	DD - 9	DD - 10	# of Outlets					
59	0.041	0.045	0.046	0.057	0.068	59	0.195	0.264	0.343	0.375	0.442	0.484	0.545	0.566	0.582	0.598	0.614	0.630	0.646	0.662	0.678	0.694	0.710	0.726	0.742	0.758	0.774	0.790	0.806	59	0.385	0.433	0.480	0.541	0.582
60	0.042	0.046	0.047	0.058	0.069	60	0.198	0.269	0.349	0.381	0.449	0.492	0.555	0.576	0.601	0.626	0.651	0.676	0.701	0.726	0.751	0.776	0.801	0.826	0.851	0.876	0.901	0.926	0.951	60	0.391	0.440	0.488	0.550	0.592
61	0.042	0.046	0.048	0.059	0.070	61	0.202	0.273	0.354	0.387	0.457	0.500	0.564	0.585	0.610	0.635	0.660	0.685	0.710	0.735	0.760	0.785	0.810	0.835	0.860	0.885	0.910	0.935	0.960	61	0.398	0.447	0.496	0.560	0.601
62	0.043	0.047	0.049	0.060	0.071	62	0.205	0.278	0.360	0.394	0.464	0.508	0.573	0.595	0.620	0.645	0.670	0.695	0.720	0.745	0.770	0.795	0.820	0.845	0.870	0.895	0.920	0.945	0.970	62	0.404	0.455	0.505	0.569	0.611
63	0.044	0.048	0.050	0.061	0.072	63	0.208	0.282	0.366	0.400	0.472	0.517	0.582	0.604	0.703	0.775	0.847	0.919	0.991	1.063	1.135	1.207	1.279	1.351	1.423	1.495	1.567	1.639	1.711	63	0.411	0.462	0.513	0.578	0.621
64	0.044	0.049	0.050	0.062	0.073	64	0.211	0.286	0.372	0.407	0.479	0.525	0.592	0.614	0.714	0.787	0.859	0.931	1.003	1.075	1.147	1.219	1.291	1.363	1.435	1.507	1.579	1.651	1.723	64	0.417	0.469	0.521	0.587	0.631
65	0.045	0.050	0.051	0.063	0.075	65	0.215	0.291	0.378	0.413	0.487	0.533	0.601	0.624	0.725	0.799	0.871	0.943	1.015	1.087	1.159	1.231	1.303	1.375	1.447	1.519	1.591	1.663	1.735	65	0.424	0.477	0.529	0.596	0.641
66	0.046	0.050	0.052	0.064	0.076	66	0.218	0.295	0.384	0.419	0.494	0.541	0.610	0.633	0.737	0.812	0.884	0.956	1.028	1.100	1.172	1.244	1.316	1.388	1.460	1.532	1.604	1.676	1.748	66	0.430	0.484	0.537	0.606	0.651
67	0.046	0.051	0.053	0.065	0.077	67	0.221	0.300	0.389	0.426	0.502	0.549	0.619	0.643	0.748	0.824	0.896	0.968	1.040	1.112	1.184	1.256	1.328	1.400	1.472	1.544	1.616	1.688	1.760	67	0.437	0.491	0.545	0.615	0.661
68	0.047	0.052	0.054	0.066	0.078	68	0.225	0.304	0.395	0.432	0.509	0.558	0.629	0.652	0.759	0.836	0.908	0.980	1.052	1.124	1.196	1.268	1.340	1.412	1.484	1.556	1.628	1.700	1.772	68	0.443	0.499	0.553	0.624	0.670
69	0.048	0.053	0.055	0.067	0.079	69	0.228	0.309	0.401	0.438	0.517	0.566	0.638	0.662	0.770	0.849	0.919	0.989	1.059	1.129	1.199	1.269	1.339	1.409	1.479	1.549	1.619	1.689	1.759	69	0.450	0.506	0.562	0.633	0.680
70	0.049	0.053	0.055	0.068	0.080	70	0.231	0.313	0.407	0.445	0.524	0.574	0.647	0.672	0.781	0.861	0.931	1.001	1.071	1.141	1.211	1.281	1.351	1.421	1.491	1.561	1.631	1.701	1.771	70	0.457	0.513	0.570	0.642	0.690
71	0.049	0.054	0.056	0.069	0.081	71	0.235	0.318	0.413	0.451	0.532	0.582	0.656	0.681	0.792	0.873	0.943	1.013	1.083	1.153	1.223	1.293	1.363	1.433	1.503	1.573	1.643	1.713	1.783	71	0.463	0.521	0.578	0.651	0.700
72	0.050	0.055	0.057	0.070	0.083	72	0.238	0.322	0.418	0.457	0.539	0.590	0.666	0.691	0.804	0.885	0.955	1.025	1.095	1.165	1.235	1.305	1.375	1.445	1.515	1.585	1.655	1.725	1.795	72	0.470	0.528	0.586	0.661	0.710
73	0.051	0.056	0.057	0.071	0.084	73	0.241	0.327	0.424	0.464	0.547	0.599	0.675	0.700	0.815	0.898	0.968	1.038	1.108	1.178	1.248	1.318	1.388	1.458	1.528	1.598	1.668	1.738	1.808	73	0.476	0.535	0.594	0.670	0.720
74	0.051	0.056	0.058	0.072	0.085	74	0.244	0.331	0.430	0.470	0.554	0.607	0.684	0.710	0.826	0.910	0.980	1.050	1.120	1.190	1.260	1.330	1.400	1.470	1.540	1.610	1.680	1.750	1.820	74	0.483	0.543	0.602	0.679	0.730
75	0.052	0.057	0.059	0.073	0.086	75	0.248	0.336	0.436	0.476	0.562	0.615	0.693	0.720	0.837	0.922	0.992	1.062	1.132	1.202	1.272	1.342	1.412	1.482	1.552	1.622	1.692	1.762	1.832	75	0.489	0.550	0.610	0.688	0.739
76	0.053	0.058	0.060	0.074	0.087	76	0.251	0.340	0.442	0.483	0.569	0.623	0.702	0.729	0.848	0.935	1.005	1.075	1.145	1.215	1.285	1.355	1.425	1.495	1.565	1.635	1.705	1.775	1.845	76	0.496	0.557	0.619	0.697	0.749
77	0.053	0.059	0.061	0.074	0.088	77	0.254	0.345	0.447	0.489	0.577	0.631	0.712	0.739	0.859	0.947	1.017	1.087	1.157	1.227	1.297	1.367	1.437	1.507	1.577	1.647	1.717	1.787	1.857	77	0.502	0.565	0.627	0.706	0.759
78	0.054	0.059	0.061	0.075	0.089	78	0.258	0.349	0.453	0.495	0.584	0.640	0.721	0.748	0.870	0.959	1.029	1.099	1.169	1.239	1.309	1.379	1.449	1.519	1.589	1.659	1.729	1.799	1.869	78	0.509	0.572	0.635	0.716	0.769
79	0.055	0.060	0.062	0.076	0.091	79	0.261	0.354	0.459	0.502	0.592	0.648	0.730	0.758	0.882	0.972	1.042	1.112	1.182	1.252	1.322	1.392	1.462	1.532	1.602	1.672	1.742	1.812	1.882	79	0.515	0.579	0.643	0.725	0.779
80	0.055	0.061	0.063	0.077	0.092	80	0.264	0.358	0.465	0.508	0.599	0.656	0.739	0.768	0.893	0.984	1.054	1.124	1.194	1.264	1.334	1.404	1.474	1.544	1.614	1.684	1.754	1.824	1.894	80	0.522	0.587	0.651	0.734	0.789
81	0.056	0.062	0.064	0.078	0.093	81	0.268	0.363	0.471	0.515	0.607	0.664	0.749	0.777	0.904	0.996	1.066	1.136	1.206	1.276	1.346	1.416	1.486	1.556	1.626	1.696	1.766	1.836	1.906	81	0.528	0.594	0.659	0.743	0.799
82	0.057	0.062	0.065	0.079	0.094	82	0.271	0.367	0.477	0.521	0.614	0.672	0.758	0.787	0.915	1.008	1.078	1.148	1.218	1.288	1.358	1.428	1.498	1.568	1.638	1.708	1.778	1.848	1.918	82	0.535	0.601	0.667	0.752	0.808
83	0.058	0.063	0.065	0.080	0.095	83	0.274	0.372	0.482	0.527	0.622	0.681	0.767	0.796	0.926	1.021	1.091	1.161	1.231	1.301	1.371	1.441	1.511	1.581	1.651	1.721	1.791	1.861	1.931	83	0.541	0.609	0.676	0.761	0.818
84	0.058	0.064	0.066	0.081	0.096	84	0.277	0.376	0.488	0.534	0.629	0.689	0.776	0.806	0.937	1.033	1.103	1.173	1.243	1.313	1.383	1.453	1.523	1.593	1.663	1.733	1.803	1.873	1.943	84	0.548	0.616	0.684	0.771	0.828
85	0.059	0.065	0.067	0.082	0.097	85	0.281	0.380	0.494	0.540	0.637	0.697	0.786	0.815	0.949	1.045	1.115	1.185	1.255	1.325	1.395	1.465	1.535	1.605	1.675	1.745	1.815	1.885	1.955	85	0.554	0.623	0.692	0.780	0.838
86	0.060	0.066	0.068	0.083	0.099	86	0.284	0.385	0.500	0.546	0.644	0.705	0.795	0.825	0.960	1.058	1.128	1.198	1.268	1.338	1.408	1.478	1.548	1.618	1.688	1.758	1.828	1.898	1.968	86	0.561	0.631	0.700	0.789	0.848
87	0.060	0.066	0.069	0.084	0.100	87	0.287	0.389	0.506	0.553	0.652	0.713	0.804	0.835	0.971	1.070	1.140	1.210	1.280	1.350	1.420	1.490	1.560	1.630	1.700	1.770	1.840	1.910	1.980	87	0.567	0.638	0.708	0.798	0.858
88	0.061	0.067	0.069	0.085	0.101	88	0.291	0.394	0.511	0.559	0.659	0.722	0.813	0.844	0.982	1.082	1.152	1.222	1.292	1.362	1.432	1.502	1.572	1.642	1.712	1.782	1.852	1.922	1.992	88	0.574	0.645	0.716	0.807	0.868
89	0.062	0.068	0.070	0.086	0.102	89	0.294	0.398	0.517	0.565	0.666	0.730	0.823	0.854	0.993	1.093	1.163	1.233	1.303	1.373	1.443	1.513	1.583	1.653	1.723	1.793	1.863	1.933	2.003	89	0.580	0.653	0.724	0.817	0.877
90	0.062	0.069	0.071	0.087	0.103	90	0.297	0.403	0.523	0.572	0.674	0.738	0.832	0.863	1.004	1.104	1.174	1.244	1.314	1.384	1.454	1.524	1.594	1.664	1.734	1.804	1.874	1.944	2.014	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 Kgsm ³	DENSITY Kg/BUSHEL	CHART COLUMN
CANOLA	FINE	671	24	SSD - 1	
MUSTARD	FINE	722	25	SSD - 2	
CANARY SEED		568	20		
ALFALFA	FINE	542	19	SSD - 3	
CLOVER		580	20		
NODULATOR	FINE	903	32	SSD - 4	
TAG TEAM	MEDIUM	890	31	SSD - 5	

DIRECT DRIVE

SEED

CALIBRATION MATERIAL	SEED PLATE USED		DENSITY LBS/FT. ³	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		800	28		
DURUM	MEDIUM	813	29		DD - 5
WINTER WHEAT		774	27		
FALL RYE		722	25		
LENTILS (LAIRD)	MEDIUM	774	27		DD - 6
LENTILS (ESTON)	MEDIUM	774	27		DD - 7
PINTO BEANS	COARSE	761	27		DD - 8
FABA BEANS		800	28		
GARBONZO BEANS	COARSE	800	28		DD - 9
CHICK PEAS (LARGE)		735	26		
ADMIRAL PEAS (SMALL & MEDIUM)	COARSE	800	28		DD - 10

DIRECT DRIVE

FERTILIZER

CALIBRATION MATERIAL	SEED PLATE USED		DENSITY Kgsm ³	DENSITY Kg/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	COARSE	864	30		
0 - 45 - 0	COARSE	800	28		DDF - 5



MORRIS

Seeding, Tillage and Haying Solutions

www.morris-industries.com

Corporate Head Office
and Training Centre: 2131 Airport Drive
Saskatoon, Saskatchewan
S7L 7E1 Canada
Phone: 306-933-8585
Fax: 306-933-8626

United States Office: P.O. Box 1117
Minot, North Dakota
58702-1117 USA.
Phone: 701-852-4171
Fax: 701-838-9444

Manufacturing and
Research & Development: P.O. Box 5008, 85 York Road
Yorkton, Saskatchewan
S3N 3P2 Canada
Phone: 306-783-8585
Fax: 306-782-5250

Manufacturing: 284 - 6th Ave. N.W.
Minnedosa, Manitoba
R0J 1E0 Canada
Phone: 204-867-2713
Fax: 204-867-2678

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