



Seedbed Tillage

Raptor™ Strip-Till Tool With 12-Ton Dry Fertilizer Cart

Models 2130DT & 2115DT
Beginning with Serial Number A70820100

Operator's Manual Part Number 47979

Refer to Part Number 47980 for Part's Manual.

12-TON DRY FERTILIZER CART — Introduction

Foreword



This symbol identifies important safety messages. When you see it, read the message that follows and be alert to the possibility of personal injury.

Remember, safety instructions stated in this manual are for your protection. Read them carefully and follow them closely when working around or using this machine.

Read and study this manual completely before attempting to operate this implement. Take this manual to the field for handy reference when operating, adjusting, or servicing your machine.

When referenced, “Right-Hand” (RH) and “Left-Hand” (LH) side of the machine are determined by standing behind the machine and facing in the direction of travel.

Pre-Operation Checklist

- ☐ Wheel bolts tightened (recheck after initial use)
- ☐ Tire pressures checked
- ☐ Hardware tightened
- ☐ Machine lubricated
- ☐ Safety and operating procedures reviewed
- ☐ Field adjustment information reviewed
- ☐ Hoses properly routed/fittings tight

IMPORTANT

The information, specifications, and illustrations in the manual are on the basis of information available at the time it was written. Due to continuing improvements in the design and manufacture of Unverferth products, all specifications and information contained herein are subject to change without notice.

Table Of Contents

SECTION I

Safety

| | |
|---------------------------------------|-----|
| General Hazard Information | 1-2 |
| Safety Decals | 1-3 |
| Following Safety Instructions | 1-4 |
| Before Servicing or Operating | 1-4 |
| During Operation | 1-5 |
| Before Transporting | 1-5 |
| During Transport | 1-6 |
| Pressurized Oil | 1-6 |
| Fertilizer and Chemical Hazards | 1-7 |
| Preparing for Emergencies | 1-7 |
| Wearing Protective Equipment | 1-7 |

SECTION II

Set Up

| | |
|------------------------------------------------|------|
| Pre-Delivery Checklist | 2-2 |
| General Set Up Information | 2-2 |
| Basic Set Up | 2-3 |
| Hydraulic System | 2-3 |
| Wheel/Tire Set Up | 2-3 |
| Tire Pressure | 2-3 |
| Wheel Nuts | 2-3 |
| SMV Emblem & SIS Decal | 2-3 |
| Transport Lighting and Markings | 2-4 |
| Lamp Set Up | 2-4 |
| Platform Working Lights Set Up | 2-5 |
| Tank Scraper Weldment | 2-5 |
| Relocate Row Unit Hose Holders | 2-6 |
| RCM Set Up | 2-7 |
| Fertilizer Hoses — 2.5" ID Delivery Hose | 2-24 |

Table Of Contents

SECTION III

Operation

| | |
|----------------------------------------|------|
| General Operation Information | 3-2 |
| Preparing Tractor..... | 3-2 |
| Preparing Raptor Strip-Till Tool | 3-3 |
| Hardware | 3-3 |
| Pins..... | 3-3 |
| Hydraulics | 3-3 |
| Lubrication | 3-3 |
| Tire Pressure | 3-3 |
| Electrical Hook-Up | 3-4 |
| Hydraulic Hook-Up..... | 3-4 |
| Transporting..... | 3-5 |
| Ladder Operation..... | 3-6 |
| Dry Fertilizer Cart Operation..... | 3-8 |
| Lid Operation..... | 3-8 |
| Filling Tank | 3-10 |
| Fan Speed | 3-10 |
| Lights..... | 3-10 |
| Meter Housing Flow | 3-11 |
| Applying Fertilizer | 3-12 |
| Scraping Tank Material..... | 3-13 |
| Scale Calibration Procedure..... | 3-14 |
| Catch Test Procedure..... | 3-16 |

Table Of Contents

SECTION IV
Maintenance

| | |
|-----------------------------------------------------|------|
| Daily Service..... | 4-2 |
| Beginning of Day | 4-2 |
| End of Day..... | 4-2 |
| Annual Service..... | 4-3 |
| Beginning of Season | 4-3 |
| End of Season..... | 4-3 |
| Seasonal Storage | 4-3 |
| Lubrication Points..... | 4-4 |
| Troubleshooting..... | 4-4 |
| How To Cleanout Meter Housing Assembly | 4-5 |
| How To Empty The Tanks | 4-7 |
| Wheel, Hub & Spindle Disassembly and Assembly | 4-8 |
| Wheels and Tires..... | 4-10 |
| Wheel Nut Torque..... | 4-10 |
| Tire Pressure | 4-10 |
| Tire Warranty | 4-11 |
| Complete Torque Chart..... | 4-12 |
| Hydraulic Fittings - Torque and Installation | 4-14 |
| Schematics - Electrical..... | 4-16 |
| Schematics - Hydraulic..... | 4-21 |
| Meter Wheel Location Layouts | 4-22 |
| Manifold Nozzle Location Layouts | 4-23 |

Notes

SECTION I

Safety

| | |
|---------------------------------------|-----|
| General Hazard Information | 1-2 |
| Safety Decals | 1-3 |
| Following Safety Instructions | 1-4 |
| Before Servicing or Operating | 1-4 |
| During Operation | 1-5 |
| Before Transporting | 1-5 |
| During Transport | 1-6 |
| Pressurized Oil | 1-6 |
| Fertilizer and Chemical Hazards | 1-7 |
| Preparing for Emergencies | 1-7 |
| Wearing Protective Equipment | 1-7 |

12-TON DRY FERTILIZER CART — Safety

General Hazard Information

No accident-prevention program can be successful without the wholehearted cooperation of the person who is directly responsible for the operation of the equipment.

A large number of accidents can be prevented only by the operator anticipating the result before the accident is caused and doing something about it. No power-driven equipment, whether it be transportation or processing, whether it be on the highway, in the field, or in the industrial plant, can be safer than the person who is at the controls. If accidents are to be prevented--and they can be prevented--it will be done by the operators who accept the full measure of their responsibility.

It is true that the designer, the manufacturer, and the safety engineer can help; and they will help, but their combined efforts can be wiped out by a single careless act of the operator.

It is said that, "the best kind of a safety device is a careful operator." We, at Unverferth Mfg. Co., Inc. ask that you be that kind of operator.



REMEMBER:
THINK SAFETY
A CAREFUL OPERATOR IS THE
BEST INSURANCE AGAINST AN
ACCIDENT!

SIGNAL WORDS



INDICATES AN EXTREMELY HAZARDOUS SITUATION OR ACTION THAT WILL RESULT IN SERIOUS INJURY OR DEATH.



INDICATES A HAZARDOUS SITUATION OR ACTION THAT COULD RESULT IN SERIOUS INJURY OR DEATH.



INDICATES AN UNSAFE SITUATION OR ACTION THAT MAY RESULT IN PERSONAL INJURY.



Is used for instruction on operating, adjusting, or servicing a machine.

12-TON DRY FERTILIZER CART — Safety

Safety Decals

WARNING

- REPLACE LOST, DAMAGED, PAINTED, OR UNREADABLE DECALS IMMEDIATELY. IF PARTS THAT HAVE DECALS ARE REPLACED, ALSO MAKE SURE TO INSTALL NEW DECALS. THESE DECALS INFORM AND REMIND THE OPERATOR WITH OPERATIONAL INFORMATION AND SAFETY MESSAGES.



PART NO.
9008838



PART NO.
98350



PART NO. 97048



PART NO. 97945



PART NO.
9008714

SMV EMBLEM
PART NO. TA510514



PART NO.
TA1-906109-0



PART NO. 97048



PART NO. 9003125
Fluorescent Strip



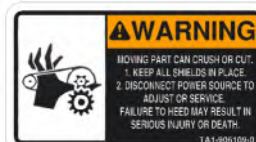
PART NO. 9003126
Reflector RED



PART NO. 9003127
Reflector AMBER






PART NO.
TA1-906109-0




PART NO.
TA1-906109-0

12-TON DRY FERTILIZER CART — Safety

Following Safety Instructions

- Read and understand this operator's manual before operating.

- All machinery should be operated only by trained and authorized personnel.
- To prevent machine damage, use only attachments and service parts approved by the manufacturer.
- Always shut tractor engine off and remove key before servicing.

- Avoid personal attire such as loose fitting clothing, shoestrings, drawstrings, pants cuffs, long hair, etc., that may become entangled in moving parts.
- Do not allow anyone to ride on the implement. Make sure everyone is clear before operating machine or towing vehicle.

- When working around sweeps and points, be careful not to be cut by sharp edges.
- Never walk on or play in granular material. Granular material can bridge and collapse trapping victim. Collapsing and flowing granular material can suffocate victim in seconds.
- Never attempt to operate implement unless you are in driver's seat.

Before Servicing or Operating

- Avoid working under an implement; however, if it becomes absolutely unavoidable, make sure the implement is safely blocked.

- Ensure that all applicable safety decals are installed and legible.
- When working around the implement, be careful not to be cut by sharp edges.
- To prevent personal injury or death, always ensure that there are people who remain outside the tank to assist the person working inside, and that all safe workplace practices are followed. There is restricted mobility and limited exit paths when working inside the implement.
- Explosive separation of a tire and rim can cause serious injury or death. Only properly trained personnel should attempt to service a tire and wheel assembly.
- Add sufficient ballast to tractor to maintain steering and braking control at all times. Do not exceed tractor's lift capacity or ballast capacity.

12-TON DRY FERTILIZER CART — Safety

Before Servicing or Operating (continued)

- Do not stand between towing vehicle and implement during hitching.
- Verify that all safety shields are in place and properly secured.
- Always make certain everyone and everything is clear of the machine before beginning operation.
- Secure drawbar pin with safety latch and lock tractor drawbar in fixed position.
- Hot parts can cause severe burns. Use caution when working around power system/ground engaging components. Allow parts to cool before servicing.
- Ensure that the towing vehicle drawbar has sufficient strength to support the draft and vertical tongue load of a fully-loaded dry spreader.

During Operation

- Comply with all laws and product label directions governing safe product application.
- Regulate speed to field conditions. Maintain complete control at all times.
- Never service or lubricate equipment when in operation.
- Keep away from overhead power lines. Electrical shock can cause serious injury or death.
- Use extreme care when operating close to ditches, fences, or on hillsides.
- Do not leave towing vehicle unattended with the engine running.

Before Transporting

- Check for proper function of all available transport lights. Make sure that all reflectors are clean and in place on machine. Make sure that the SMV emblem and SIS decal are visible to approaching traffic.
- Follow all federal, state and local regulations governing highway safety and transporting chemicals.

During Transport

- Comply with all laws governing highway safety when moving machinery.
- Use transport lights as required by all laws to adequately warn operators of other vehicles.
- Use good judgement when transporting equipment on highways. Regulate speed to road conditions and maintain complete control.
- Maximum transport speed of this implement should never exceed 20 mph as indicated on the machine. Maximum transport speed of any combination of implements must not exceed the lowest specified speed of the implements in combination. Do not exceed 10 mph during off-highway travel.
- Slow down before making sharp turns to avoid tipping. Drive slowly over rough ground and side slopes.
- It is probable that this implement is taller, wider and longer than the towing vehicle. Become aware of and avoid all obstacles and hazards in the travel path of the equipment, such as power lines, ditches, etc.

Pressurized Oil

- Relieve the hydraulic system of all pressure before adjusting or servicing. See hydraulic power unit manual for procedure to relieve pressure.
- High-pressure fluids can penetrate the skin and cause serious injury or death. Use cardboard or wood to detect leaks in the hydraulic system. Seek medical treatment immediately if injured by high-pressure fluids.
- Hydraulic system must be purged of air before operating to prevent serious injury or death.
- Do not bend or strike high-pressure lines. Do not install bent or damaged tubes or hoses.
- Repair all oil leaks. Leaks can cause fires, personal injury, and environmental damage.
- Route hoses and lines carefully to prevent premature failure due to kinking and rubbing against other parts. Make sure that all clamps, guards and shields are installed correctly.
- Check hydraulic hoses and tubes carefully. Replace components as necessary if any of the following conditions are found:
 - o End fittings damaged, displaced, or leaking.
 - o Outer covering chafed/cut or wire reinforcing exposed.
 - o Outer covering ballooning locally.
 - o Evidence of kinking or crushing of the flexible part of a hose.



12-TON DRY FERTILIZER CART — Safety

Fertilizer and Chemical Hazards

- Always wear personal protective equipment when working with or near fertilizers and/or chemicals. This equipment includes, but is not limited to: protective eye wear, gloves, shoes, socks, long-sleeved shirt, and long pants. Additional protection may be required for many types of fertilizers and/or chemicals.
- Seek and receive fertilizer and/or chemical product training prior to using agricultural fertilizers and/or chemicals.
- Read and understand the entire label of every fertilizer and/or chemical being applied with this dry spreader.
- Wash hands before eating, drinking, chewing gum, or using the toilet.
- Remove clothing immediately if fertilizers and/or chemicals penetrate clothing and contact skin. Wash thoroughly and put on clean clothing.
- Dispose of unused fertilizer and/or chemical in accordance with fertilizer and/or chemical label directions and local/national regulations.

Preparing for Emergencies

- Keep a first aid kit and properly rated fire extinguisher nearby.
- Keep emergency numbers for fire, rescue, and poison control personnel near the phone.



Wearing Protective Equipment

- Wear clothing and personal protective equipment appropriate for the job.
- Wear steel-toed shoes when operating.
- Wear hearing protection when exposed to loud noises.
- Do not wear additional hearing impairing devices such as radio headphones, etc.



Notes

SECTION II

Set Up

| | |
|------------------------------------------------|------|
| Pre-Delivery Checklist | 2-2 |
| General Set Up Information | 2-2 |
| Basic Set Up | 2-3 |
| Hydraulic System | 2-3 |
| Wheel/Tire Set Up | 2-3 |
| Tire Pressure | 2-3 |
| Wheel Nuts | 2-3 |
| SMV Emblem & SIS Decal | 2-3 |
| Transport Lighting and Markings | 2-4 |
| Lamp Set Up | 2-4 |
| Platform Working Lights Set Up | 2-5 |
| Tank Scraper Weldment | 2-5 |
| Relocate Row Unit Hose Holders | 2-6 |
| RCM Set Up | 2-7 |
| Fertilizer Hoses — 2.5" ID Delivery Hose | 2-24 |

12-TON DRY FERTILIZER CART — Set Up

Pre-Delivery Checklist

- ☐ Power wash any road salt off this unit to help prevent corrosion.
- ☐ Torque wheel nuts and check tire pressure as specified in MAINTENANCE section.
- ☐ All grease fittings have been lubricated.
- ☐ Verify all safety decals are correctly located and legible. Replace if damaged.
- ☐ Verify all reflective decals are correctly located.
- ☐ Verify transport lights are working properly.
- ☐ Check hydraulic components for leaks.
- ☐ Check all plumbing components for leaks.
- ☐ Paint all parts scratched during shipment and dealer set up.

General Set Up Information

For your safety, and the safety of others, use proper tools and equipment and always use safe working procedures. Refer to these instructions before starting any work on your machine.

WARNING

- **READ AND UNDERSTAND SAFETY RULES BEFORE OPERATING OR SERVICING THIS MACHINE. REVIEW "SAFETY" SECTION IN THIS MANUAL IF NECESSARY.**
- **TIPPING OR MOVEMENT OF THE MACHINE CAN CAUSE SERIOUS INJURY OR DEATH. BE SURE THE MACHINE IS SECURELY BLOCKED.**
- **MOVING PARTS CAN CRUSH AND CUT. KEEP AWAY FROM MOVING PARTS.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**
- **FALLING OBJECTS CAN CAUSE SERIOUS INJURY OR DEATH. DO NOT WORK UNDER THE MACHINE AT ANY TIME WHILE BEING HOISTED. BE SURE ALL LIFTING DEVICES AND SUPPORTS ARE RATED FOR THE LOADS BEING HOISTED. THESE ASSEMBLY INSTRUCTIONS WILL REQUIRE SAFE LIFTING DEVICES UP TO 8,000 LBS. SPECIFIC LOAD RATINGS FOR INDIVIDUAL LOADS WILL BE GIVEN AT THE APPROPRIATE TIME IN THE INSTRUCTIONS.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING THE IMPLEMENT.**

12-TON DRY FERTILIZER CART — Set Up

Basic Set Up

Due to shipping requirements and various dealer-installed options, some initial implement set up will be required after it arrives from the factory. Use the following procedures as needed for initial implement set up.

Hydraulic System

Check all hoses and cylinders for signs of leakage. Hoses should not be kinked, twisted or rubbing against sharp edges. Re-route or repair hoses as necessary. Refer to SAFETY section for additional information on safe repair and inspection of hydraulic components.

Wheel/Tire Set Up

Tire Pressure

Tire pressure must be verified before first use and adjusted as necessary. Refer to MAINTENANCE section of this manual for information on tire pressure.

Wheel Nuts

CAUTION

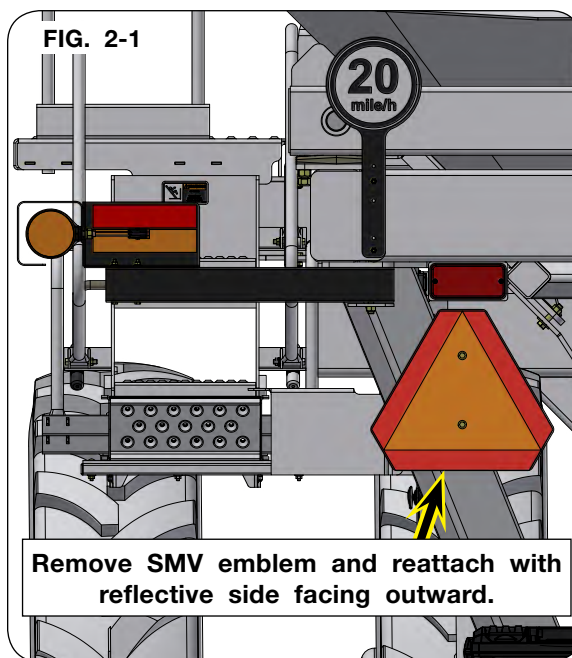
- IMPROPERLY TORQUED WHEEL NUTS/BOLTS CAN CAUSE A LOSS OF IMPLEMENT CONTROL AND MACHINE DAMAGE. WHEEL NUTS/BOLTS MUST BE CHECKED REGULARLY. SEE TORQUE PAGE IN THE "MAINTENANCE" SECTION FOR PROPER WHEEL NUT/BOLT SPECIFICATIONS. WARRANTY DOES NOT COVER FAILURES CAUSED BY IMPROPERLY TORQUED WHEEL NUTS/BOLTS.

SMV Emblem & SIS Decal

Before the implement is used the reflective surface of the SMV must face rearward. This may require removal of film protecting the reflective surface or removing and reinstallation of the SMV.

When reinstalling the SMV make sure that it is mounted with the wide part of the SMV at the bottom.

Ensure the SIS decals (one on the front and one on the rear of the implement) are clean and visible.



12-TON DRY FERTILIZER CART — Set Up

Basic Set Up (continued)

Transport Lighting and Markings

Compliance with all lighting and marking laws is the responsibility of the operator at the time of travel.

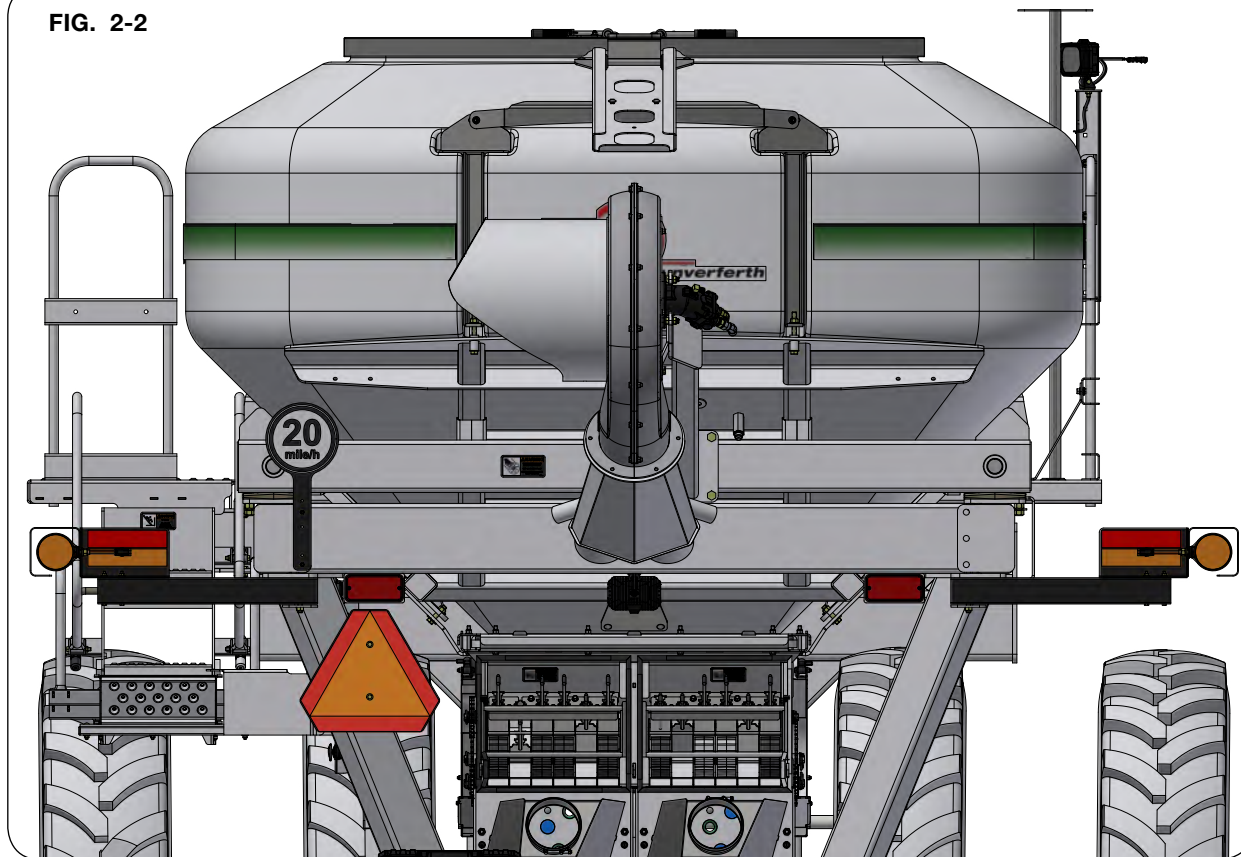
See federal regulation 49 CFR 562; available at www.govinfo.gov for US federal law requirements.

See your Unverferth dealer for additional brackets, reflectors, or lights to meet your requirements.

Lamp Set Up

Pivot lamp extension arms into position at sides of implement. Be sure that the red reflector and orange fluorescent decal are facing the rear of the implement.

FIG. 2-2



12-TON DRY FERTILIZER CART — Set Up

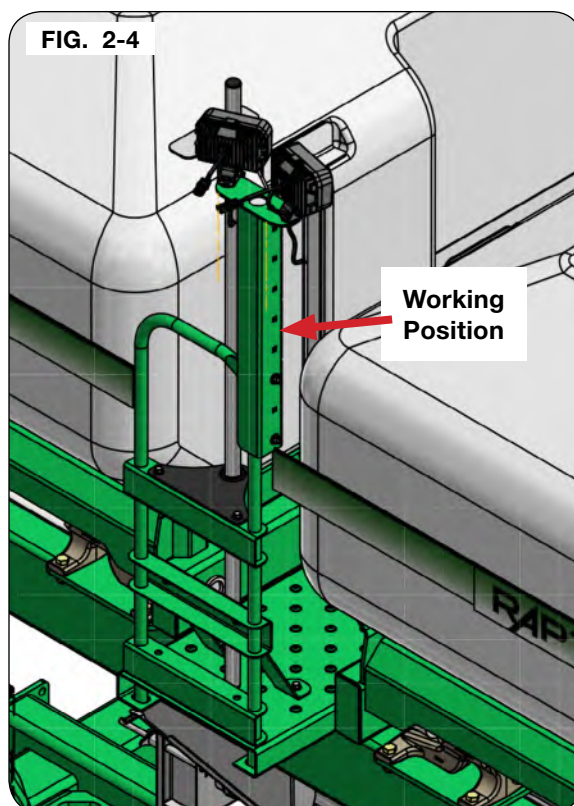
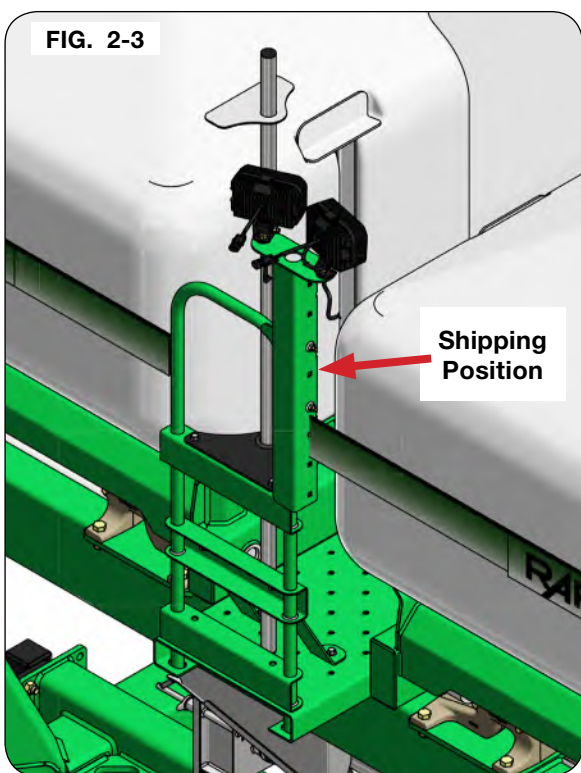
Basic Set Up (continued)

Platform Working Lights Set Up

NOTE: Ensure ladder and steps are free from snow/debris before changing ladder positions and climbing.

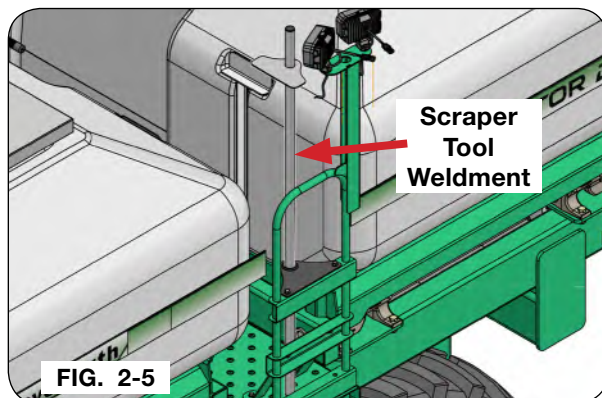
NOTE: To change ladder assembly positions, refer to “Ladder Operation” in the OPERATION section.

Reposition the light bracket weldment (44978G or 44978R) higher using the 3/8”-16UNC x 1” carriage bolts (9388-051) and 3/8”-16UNC large flange nuts (91263).



Tank Scraper Weldment

Locate the tank scraper weldment (45928) and place it in the scraper mounting bracket.

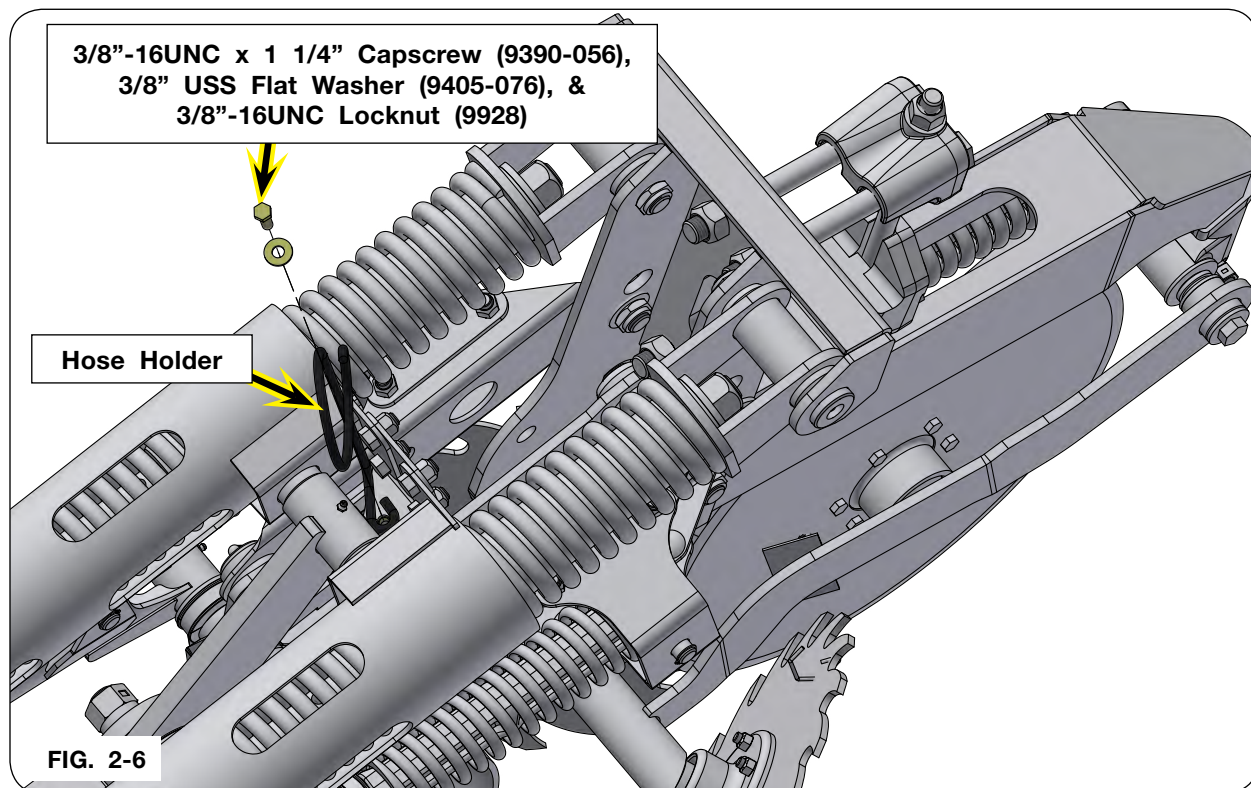


Basic Set Up (continued)

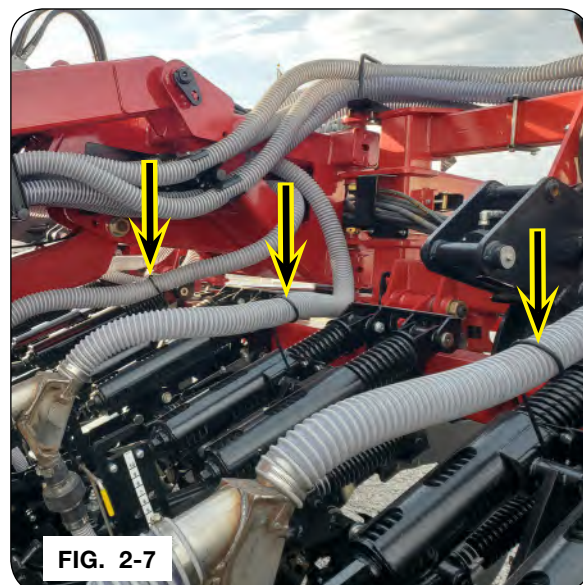
Relocate Row Unit Hose Holders

NOTE: Row unit hose holders are shipped zip tied to the shanks.

1. Secure the hose holders to the row units with 3/8"-16UNC x 1 1/4" capscrews (9390-056), 3/8" USS flat washers (9405-076), and 3/8"-16UNC locknuts (9928). (FIG. 2-6)



2. Route fertilizer hoses through the hose holders. (FIG. 2-7)



12-TON DRY FERTILIZER CART — Set Up

RCM Set Up

Whenever the RCM is reset, the following steps will need to be completed for the RCM to function properly.

1. On the initial start-up screen, begin by entering the profile name for your strip till toolbar.
2. Select “Generic” as the desired machine type from the drop down menu.
3. Enter the application width of your strip till toolbar.

NOTE: Highest value for Application Width is 40 ft or 480 in.

4. Press the Next Page icon.

FIG. 2-6 Name Profile

The screenshot shows the 'Name Profile' screen. It has a blue header with the title 'Name Profile'. Below the header, there are four input fields: 'Profile Name' with the text 'UM Raptor', 'Machine Type' with a dropdown menu showing 'Generic', 'Application Width' with a numeric input '40.000' and a unit dropdown '(ft)', and 'Software Version Number' with the text '22.3.0.112'. Below these is a 'Hardware Serial Number' field with the text '60280'. At the bottom, there is a 'RAVEN' button and a 'Next Page' icon (a square with a right arrow). Red arrows point to the 'Profile Name' field, the 'Machine Type' dropdown, the 'Application Width' input, and the 'Next Page' icon.

5. Default for ECU box is 1. Touch Number of Products box and enter 2.
6. Press the Next Page icon.

FIG. 2-7 Setup System

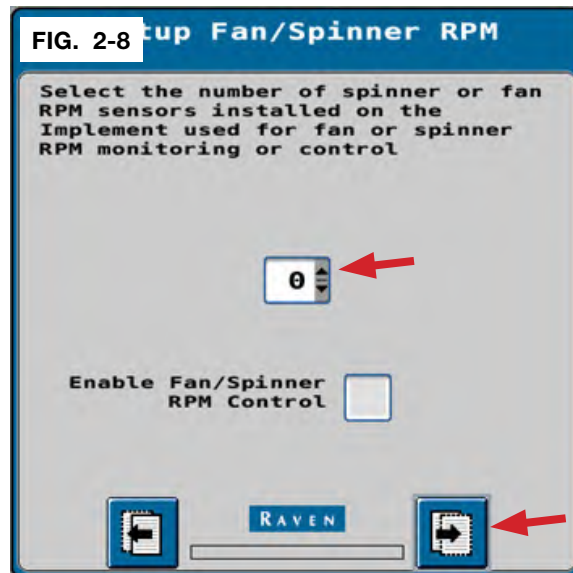
The screenshot shows the 'Setup System' screen. It has a blue header with the title 'Setup System'. Below the header, there are three input fields: 'ECU S/N' with the text 'RCM-30190', 'ECU #' with a numeric input '1', and 'Number of Products' with a numeric input '2' and a question mark icon. At the bottom, there is a 'Previous Page' icon (a square with a left arrow), a 'RAVEN' button, and a 'Next Page' icon (a square with a right arrow). Red arrows point to the 'ECU #' input, the 'Number of Products' input, and the 'Next Page' icon.

12-TON DRY FERTILIZER CART — Set Up

RCM Set Up (continued)

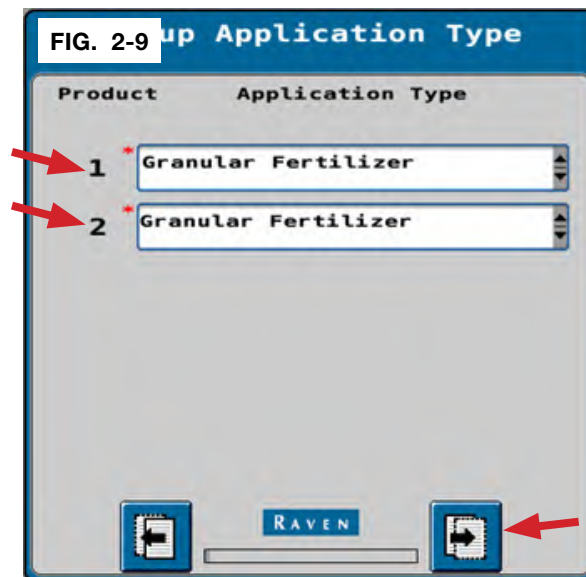
7. Ensure “0” is selected for number of spinner or fan RPM sensors.

8. Press the Next Page icon.



9. Select “Granular Fertilizer” as the Application Type for Product 1 (rear bin) and Product 2 (front bin).

10. Press the Next Page icon.

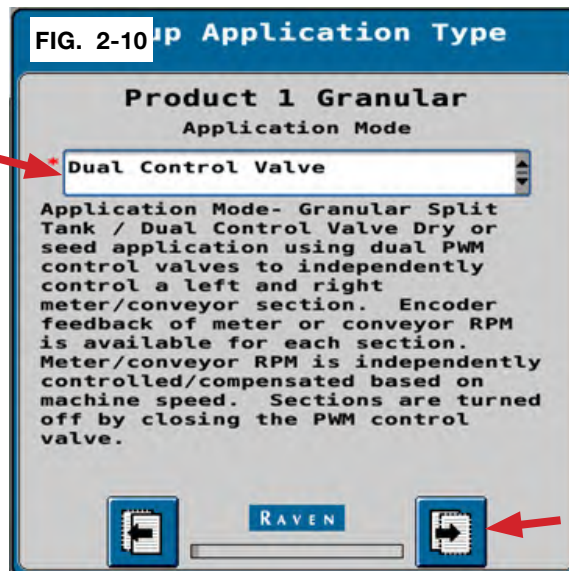


12-TON DRY FERTILIZER CART — Set Up

RCM Set Up (continued)

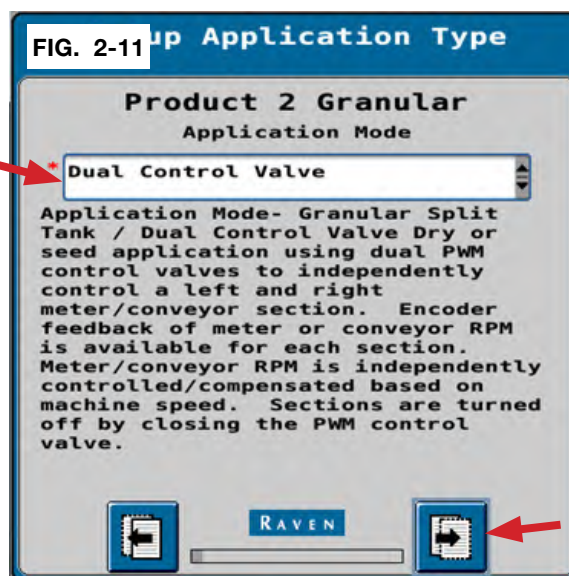
11. Select “Dual Control Valve” from the drop down menu for Product 1 Granular Application Mode.

12. Press the Next Page icon.



13. Select “Dual Control Valve” from the drop down menu for Product 2 Granular Application Mode.

14. Press the Next Page icon.

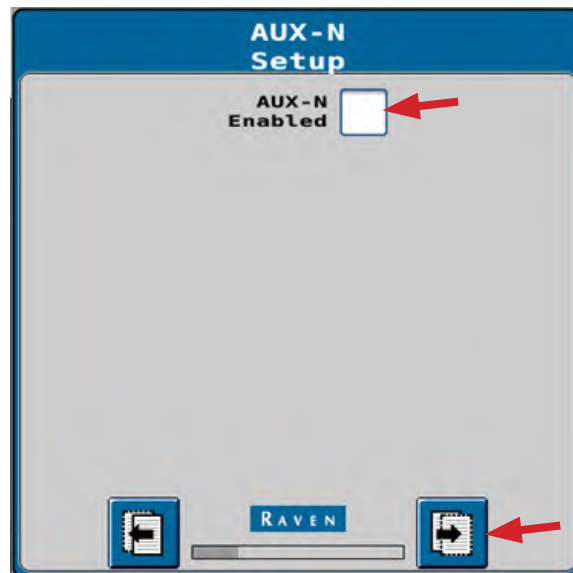


12-TON DRY FERTILIZER CART — Set Up

RCM Set Up (continued)

15. Ensure “AUX-N Setup” is unchecked.

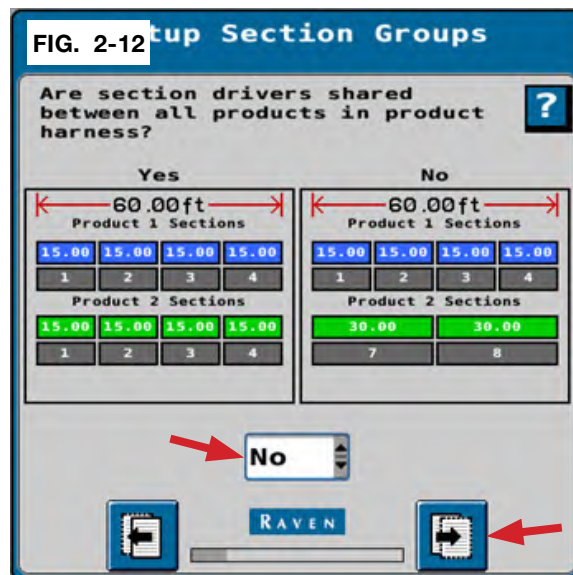
16. Press the Next Page icon.



17. Select “No” from the drop down menu.

18. Press the Next Page icon.

NOTE: 60.00 FT dimension is just an example and does not represent actual widths.



12-TON DRY FERTILIZER CART — Set Up

RCM Set Up (continued)

19. Select “2” for Number of Section Groups. Ensure Master Clutch and Granular Product Sections Power to Apply are both unchecked.

20. Press the Next Page icon.

FIG. 2-13 Setup Section Groups

Number of Section Groups

Master Clutch ☐

Granular Product Sections Power to Apply ☐

21. This page shows an example of setting up section groups.

22. Press the Next Page icon.

NOTE: 60.00 FT dimension is just an example and does not represent actual widths.

FIG. 2-14 Setup Section Harnessing

You will now be guided through section harnessing setup. Please reference your product harness to identify appropriate section drivers. Ensure unused section drivers are skipped as shown below.

| Section Group | Starting Section Number | Number Of Sections |
|---------------|-------------------------|--------------------|
| 1 | 1 | 4 |
| 2 | 7 | 2 |

Example

60.00ft

| | | | |
|----------------------|-------------------|---------------------|-------|
| 15.00 | 15.00 | 15.00 | 15.00 |
| 1 | 2 | 3 | 4 |
| | | | |
| 30.00 | 30.00 | | |
| 7 | 8 | | |
| Liquid Section Width | Dry Section Width | Wired Signal Driver | |

RCM Set Up (continued)

23. Enter “1” and “3” for Starting Section Number for Section Group 1 and 2 respectively. Then enter “2” for Number of Sections for each Section Group. Select Equal Section Widths for each group.

24. Press the Next Page icon.

FIG. 2-15 p Section Harnessing

| Section Group | * Starting Section Number | Number Of Sections | Equal Section Widths |
|---------------|---------------------------|--------------------|-------------------------------------|
| 1 | 1 | 2 | <input checked="" type="checkbox"/> |
| 2 | 3 | 2 | <input checked="" type="checkbox"/> |

At the bottom of the screen, there is a left arrow icon, a progress bar labeled "RAVEN", and a right arrow icon. A red arrow points to the right arrow icon.

25. Select “Section Group 1” for Product 1 and “Section Group 2” for Product 2.

26. Press the Next Page icon.

FIG. 2-16 Setup Section Group Assignment

| Product | Section Groups |
|---------|-----------------|
| 1 | Section Group 1 |
| 2 | Section Group 2 |

At the bottom of the screen, there is a left arrow icon, a progress bar labeled "RAVEN", and a right arrow icon. A red arrow points to the right arrow icon.

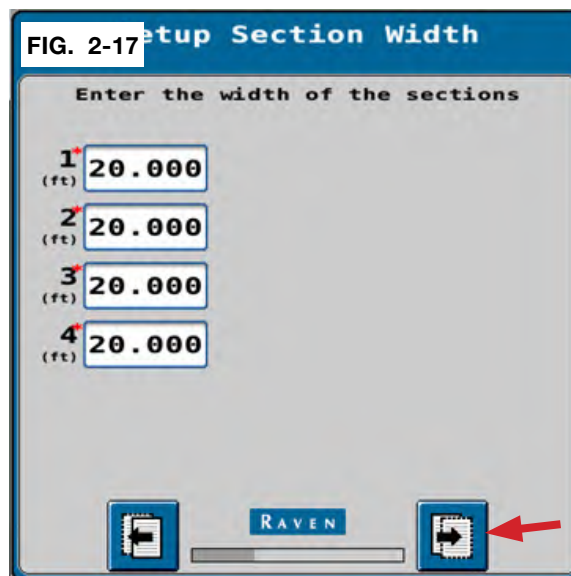
12-TON DRY FERTILIZER CART — Set Up

RCM Set Up (continued)

27. Verify the correct widths of each section.

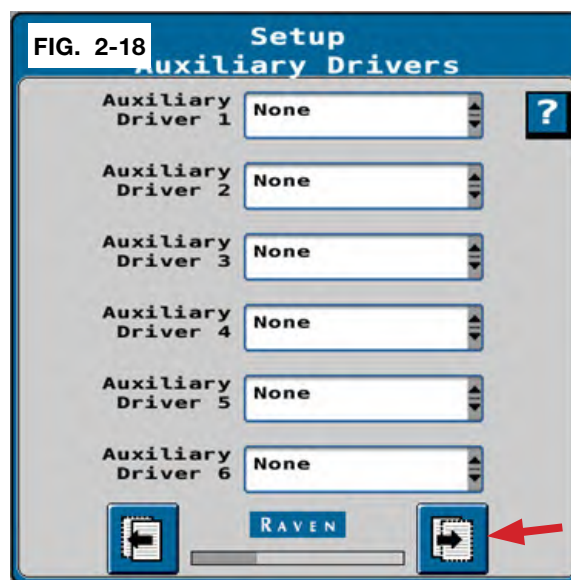
| "Section Width" Settings | | | | | |
|--------------------------|---------|-----------------------|-----------|----------------------|-----------|
| Number of Rows | Spacing | Product 1 (Front Bin) | | Product 2 (Rear Bin) | |
| | | Section 1 | Section 2 | Section 3 | Section 4 |
| 12 | 30" | 180" | 180" | 180" | 180" |
| 16 | 30" | 240" | 240" | 240" | 240" |

28. Press the Next Page icon.



29. Ensure each box says "None".

30. Press the Next Page icon.

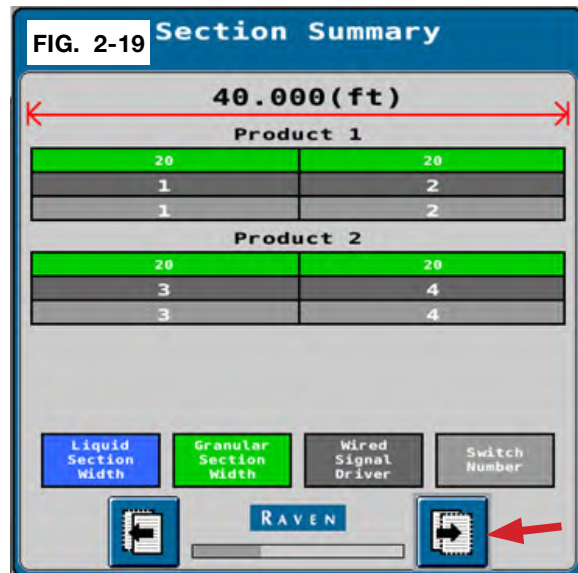


12-TON DRY FERTILIZER CART — Set Up

RCM Set Up (continued)

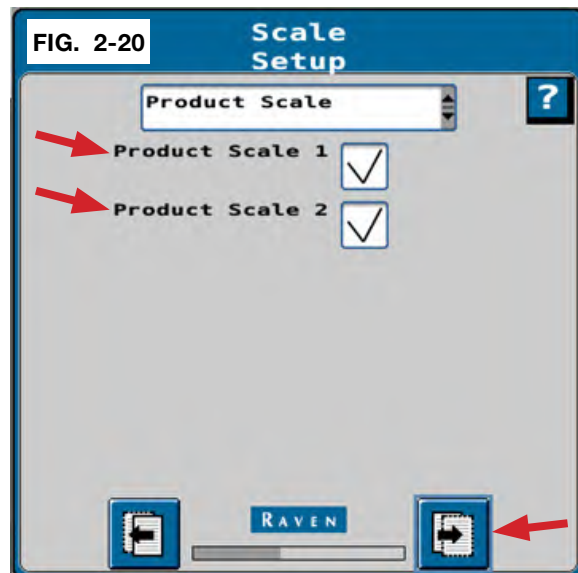
31. Verify Section setup is correct.

32. Press the Next Page icon.



33. Select “Product Scale” and check each box next to Product Scale 1 and 2.

34. Press the Next Page icon.

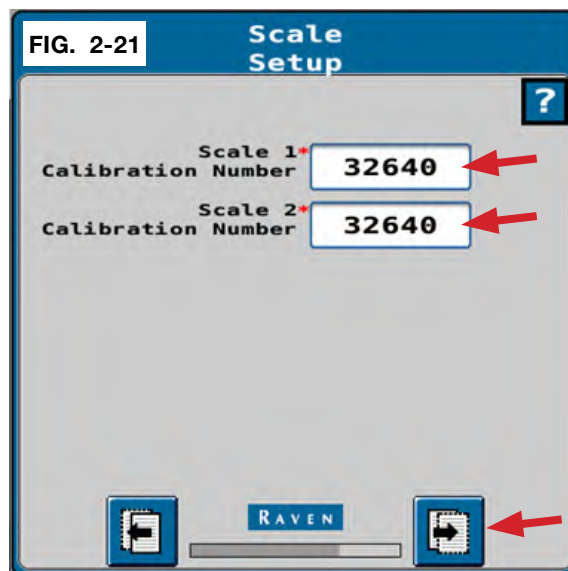


12-TON DRY FERTILIZER CART — Set Up

RCM Set Up (continued)

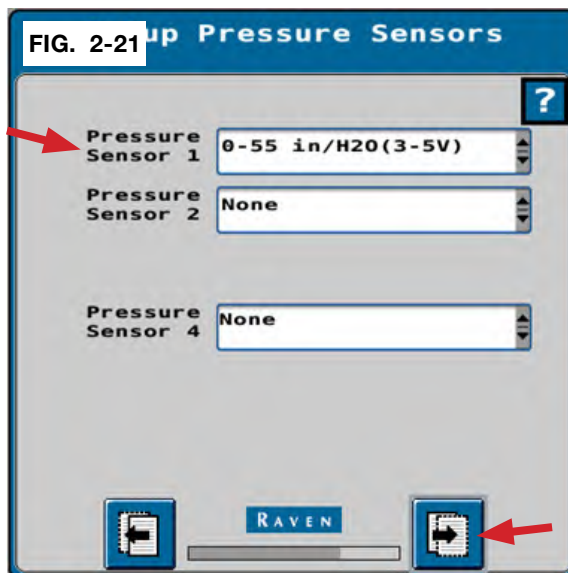
35. Enter 32640 for the scale calibration number for both “Scale 1 Calibration Number” and “Scale 2 Calibration Number.”

36. Press the Next Page icon.



37. Select “0-55 in/H2O (3-5V)” for Pressure Sensor 1 from the drop down list

38. Press the Next Page icon.

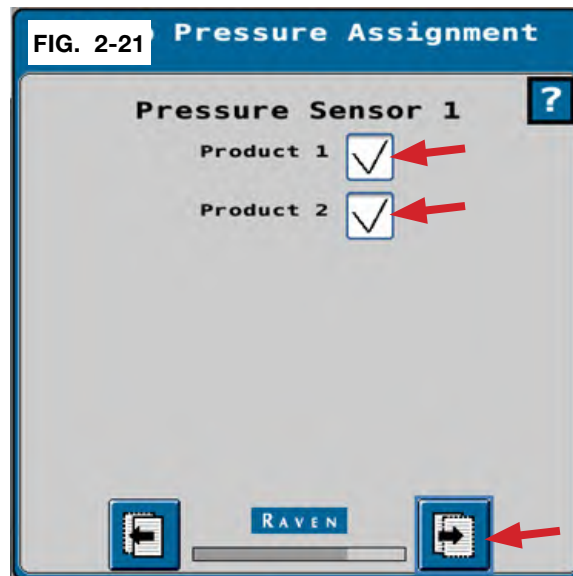


12-TON DRY FERTILIZER CART — Set Up

RCM Set Up (continued)

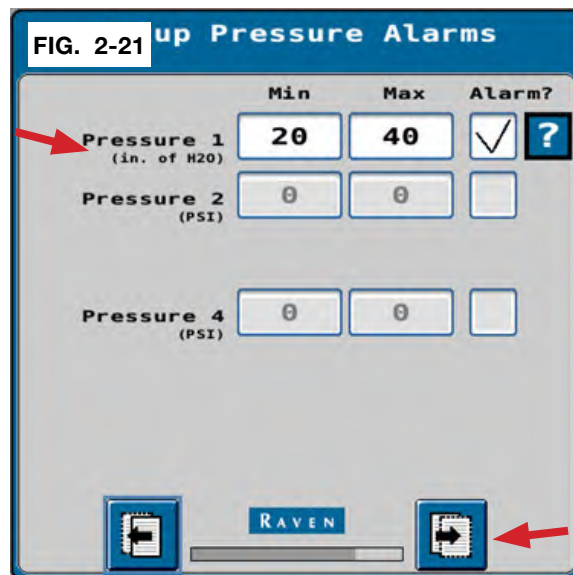
39. Ensure “Product 1” and “Product 2” are both checked under “Pressure Sensor 1”.

40. Press the Next Page icon.



41. For setting the pressure alarm, set the min to “20” and the max to “40”. These numbers can be adjusted later once normal operating pressure is determined.

42. Press the Next Page icon.



RCM Set Up (continued)

43. For Product 1 Granular, select PWM Close for the control valve type.

44. Enter the desired Valve Response Rate and Control Deadband. Ensure Valve Delay is “0.0”. Make sure Enable PWM Smart Control is unchecked.

NOTE: Valve Response Rate - Has a range of 1 to 100 and the setting determines how aggressively the target rate is controlled to. Increasing this value will cause the system to respond more quickly. Decreasing it will cause a slower response. if the flow is slow to reach the target value consider increasing it.

NOTE: Control Deadband - Enter the percent of target rate the control value will control to. For example if 2% is entered the rate controller will attempt to adjust the flow rate until the actual rate is within 2% of the target rate.

NOTE: The pictured values are generic starting numbers. You can fine tune these values to best fit your application. The white question mark outlines what happens when adjusting each value setting.

45. Press the Next Page icon.

46. Enter “65” for coil frequency, “100” for PWM High Limit, “20” for PWM Low Limit, and “5” for PWM Startup.

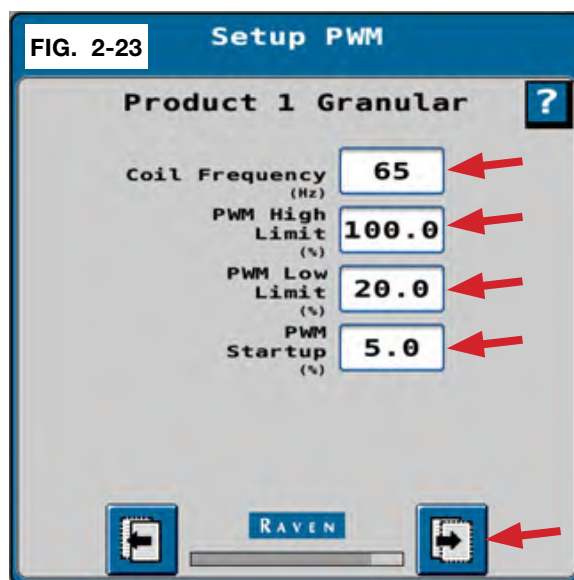
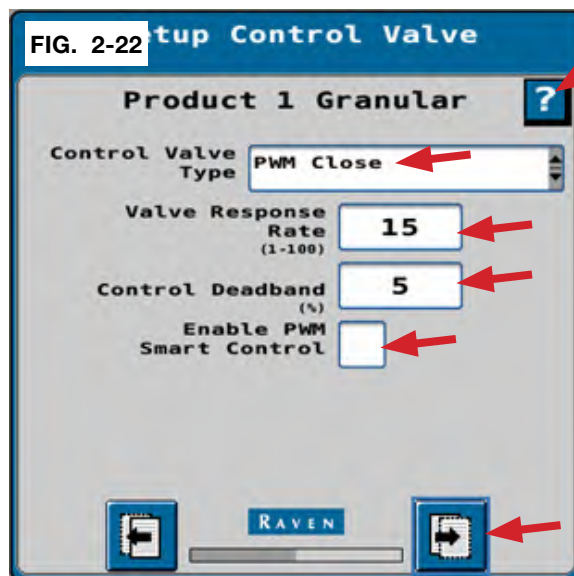
NOTE: Coil Frequency - This value sets the frequency of the pulses which are sent to the PWM valve. Refer to the valve manufacturer for appropriate settings.

NOTE: PWM High Limit - This value is the maximum PWM percent that the product controller will allow the system to go to when the product is turned on.

NOTE: PWM Low Limit - This value is the minimum PWM percent that the product controller will allow the system to go to when the product is turned on.

NOTE: PWM Startup - For PWM closed type valves this is the duty cycle that the PWM valve will be commanded to when the product is activated.

47. Press the Next Page icon.



12-TON DRY FERTILIZER CART — Set Up

RCM Set Up (continued)

NOTE: Reference the density number from the fertilizer supplier.

48. Determine the product density of the material to be applied. Enter this value for Product Density. For quick set-up purposes, you can use “66”.

NOTE: For the initial calibration weight, product density x the cubic foot per rev of our meter wheels. A 12 row machine would have 6 wheels and put out 3 lbs per revolution .05 cu. ft. per rev. A 16 row machine would have 8 wheels and put out 4 lbs per revolution .067 cu. ft. per rev.

Example: $66 \times .05 = 3.3$

NOTE: Once the initial setup wizard is complete the RCM will remember the Cubic foot per rev of the meter wheel and automatically adjust the calibration weight per rev when changing the product density. Catch test will also effect this number.

49. Enter “3.300” for Calibration Weight. Enter “120” for Pulses/Revolution.

50. Press the Next Page Icon.

51. Tank Capacity depends on product density. For testing purposes, entering “12000” is recommended.

52. Low Tank Level is the value an alarm is set off for a low bin level. Recommended setting is “2000” and ensure the Alarm box is checked.

53. Ensure the Low Bin Level Sensor box is unchecked.

54. Press the Next Page Icon.

FIG. 2-24 Setup Rate Sensor

Product 1 Granular

Product Density (lb/cubic feet) 66.0

Calibration Weight (lb/revolution) 3.300

Pulses/Revolution 120.00

RAVEN

FIG. 2-25 Setup Tank/Bin

Product 1 Granular

Tank Capacity (Lb) 12000

Low Tank Level (Lb) 2000

Low Bin Level Sensor

Alarm? ☒

RAVEN

RCM Set Up (continued)

55. “Setup Rates” page controls the application rates for speed and determines how much product is being applied for Product 1. Enter three Preset Rate Values, as desired, which can be clicked between on the home screen. On the home screen, target rates can be changed as well.

56. Enter Rate Bump value in an increment as desired.

57. For Rate Selection, select “Predefined or Rx”. This enables selection of rate from the preset value choices or from a prescription map that is imported from a Universal Terminal.

58. Check Display Smoothing and select “0” for Decimal Shift.

59. Press the Next Page icon.

60. Enter 20 for Off Rate Alarm and check Alarm? box. Make sure the Alarm? box for Split Belt/Dual Encoder Alarm is unchecked.

NOTE: Alarm prompts when over 20% off target rate.

61. Press the Next Page icon.

FIG. 2-26 Setup Rates

Product 1 Granular ?

| | Rate 1 | Rate 2 | Rate 3 |
|----------------------------|-------------------------------------|--------|--------|
| Preset Rate Values (lb/ac) | 200 | 250 | 275 |
| Rate Bump (lb/ac) | 10 | | |
| Rate Selection | Predefined or Rx | | |
| Display Smoothing | <input checked="" type="checkbox"/> | | |
| Decimal Shift | 0 | | |

Navigation icons: Previous, RAVEN, Next

FIG. 2-27 Setup Alarms

Product 1 Granular ?

| | Alarm? |
|------------------------------------|----------------------------------------|
| Off Rate Alarm (% off target rate) | 20 <input checked="" type="checkbox"/> |
| Split Belt/Dual Encoder Alarm | 10 <input type="checkbox"/> |

Navigation icons: Previous, RAVEN, Next

12-TON DRY FERTILIZER CART — Set Up

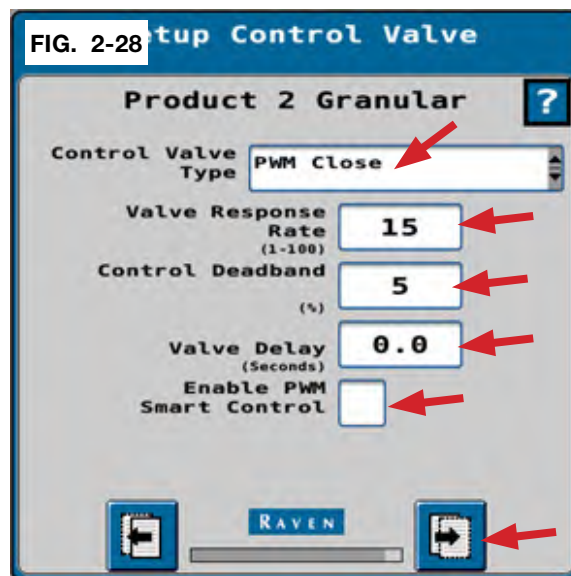
RCM Set Up (continued)

62. For Product 2 Granular, select PWM Close for the control valve type.

63. Enter the desired Valve Response Rate and Control Deadband. Ensure Valve Delay is left at “0.0”. Make sure Enable PWM Smart Control is unchecked.

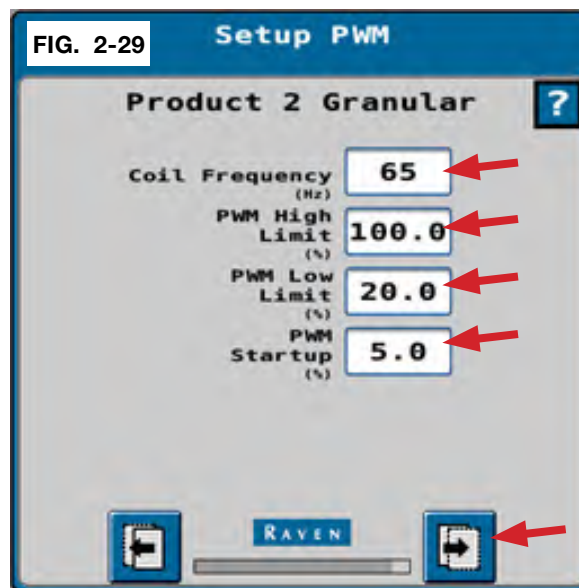
NOTE: The pictured values are generic starting numbers. You can fine tune these values to best fit your application. The white question mark outlines what happens when adjusting each value setting.

64. Press the Next Page icon.



65. Enter “65” for coil frequency, “100” for PWM High Limit, “20” for PWM Low Limit, and “5” for PWM Startup.

66. Press the Next Page icon.



12-TON DRY FERTILIZER CART — Set Up

RCM Set Up (continued)

NOTE: Reference the density number from the fertilizer supplier.

67. Determine the product density of the material to be applied. Enter this value for Product Density. For quick set-up purposes, you can use “66”.

NOTE: For the initial calibration weight, product density x the cubic foot per rev of our meter wheels. A 12 row machine would have 6 wheels and put out 3 lbs per revolution .05 cu. ft. per rev. A 16 row machine would have 8 wheels and put out 4 lbs per revolution .067 cu. ft. per rev.

Example: $66 \times .05 = 3.3$

NOTE: Once the initial setup wizard is complete the RCM will remember the Cubic foot per rev of the meter wheel and automatically adjust the calibration weight per rev when changing the product density. Catch test will also effect this number.

68. Enter “3.300” for Calibration Weight. Enter “120” for Pulses/Revolution.

69. Press the Next Page Icon.

70. Tank Capacity depends on product density. For testing purposes, entering “12000” is recommended.

71. Low Tank Level is the value an alarm is set off for a low bin level. Recommended setting is “2000” and ensure the Alarm box is checked. Ensure the Low Bin Level Sensor box is unchecked.

NOTE: Low Tank Level value can be set to whatever the customer preferred.

72. Press the Next Page Icon.

FIG. 2-30 Setup Rate Sensor

Product 2 Granular ?

| | |
|------------------------------------|--------|
| Product Density (lb/cubic feet) | 66.0 |
| Calibration Weight (lb/revolution) | 3.300 |
| Pulses/Revolution | 120.00 |

Navigation icons: Previous, RAVEN, Next

FIG. 2-31 Setup Tank/Bin

Product 2 Granular

| | |
|----------------------|-------------------------------------|
| Tank Capacity (Lb) | 12000 |
| Low Tank Level (Lb) | 2000 |
| Low Bin Level Sensor | <input type="checkbox"/> |
| Alarm? | <input checked="" type="checkbox"/> |

Navigation icons: Previous, RAVEN, Next

RCM Set Up (continued)

73. “Setup Rates” page controls the application rates for speed and determines how much product is being applied for Product 1. Enter three Preset Rate Values, as desired, which can be clicked between on the home screen. On the home screen, target rates can be changed as well.

74. Enter Rate Bump value in an increment as desired.

75. For Rate Selection, select “Predefined or Rx”. This enables selection of rate from the preset value choices or from a prescription map that is imported from a Universal Terminal.

76. Check Display Smoothing and select “0” for Decimal Shift.

77. Press the Next Page icon.

78. Enter 20 for Off Rate Alarm and check Alarm? box. Make sure the Alarm? box for Split Belt/Dual Encoder Alarm is unchecked.

NOTE: Alarm prompts when over 20% off target rate.

79. Press the Next Page icon.

FIG. 2-32 Setup Rates

Product 2 Granular [?]

| | Rate 1 | Rate 2 | Rate 3 |
|----------------------------|--------|--------|--------|
| Preset Rate Values (lb/ac) | 200 | 250 | 275 |

Rate Bump (lb/ac): 10

Rate Selection: Predefined or Rx

Display Smoothing: ☒

Decimal Shift: 0

Navigation icons: [Previous] [RAVEN] [Next]

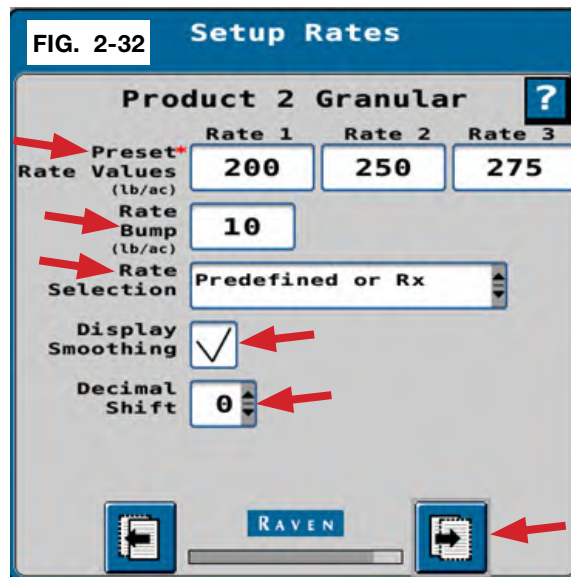
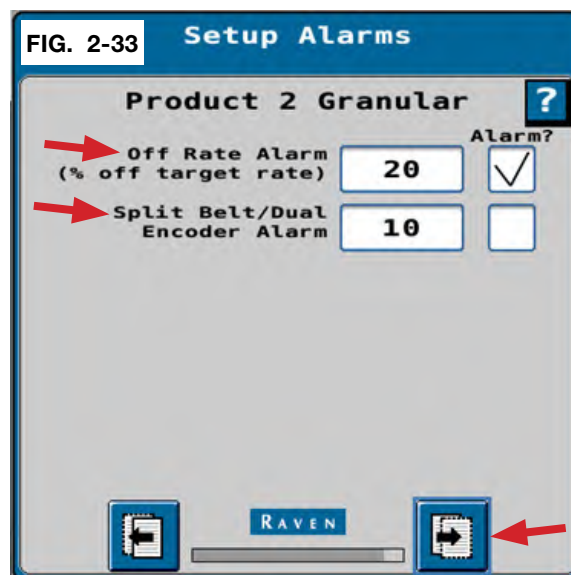


FIG. 2-33 Setup Alarms

Product 2 Granular [?]

| | Alarm? |
|----------------------------------------|-------------------------------------|
| Off Rate Alarm (% off target rate): 20 | <input checked="" type="checkbox"/> |
| Split Belt/Dual Encoder Alarm: 10 | <input type="checkbox"/> |

Navigation icons: [Previous] [RAVEN] [Next]



RCM Set Up (continued)

80. No action required on this screen. Shows the setup summary. Make sure all the values are correct.
81. Press the Next Page icon to finish the RCM set-up

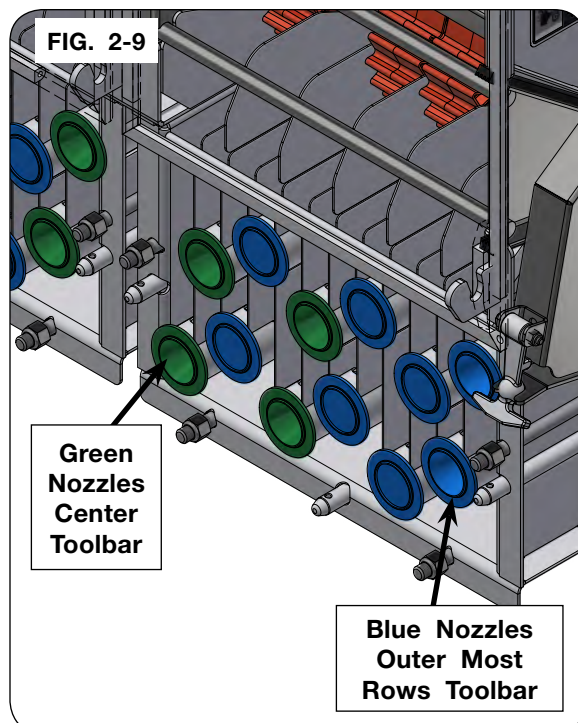


12-TON DRY FERTILIZER CART — Set Up

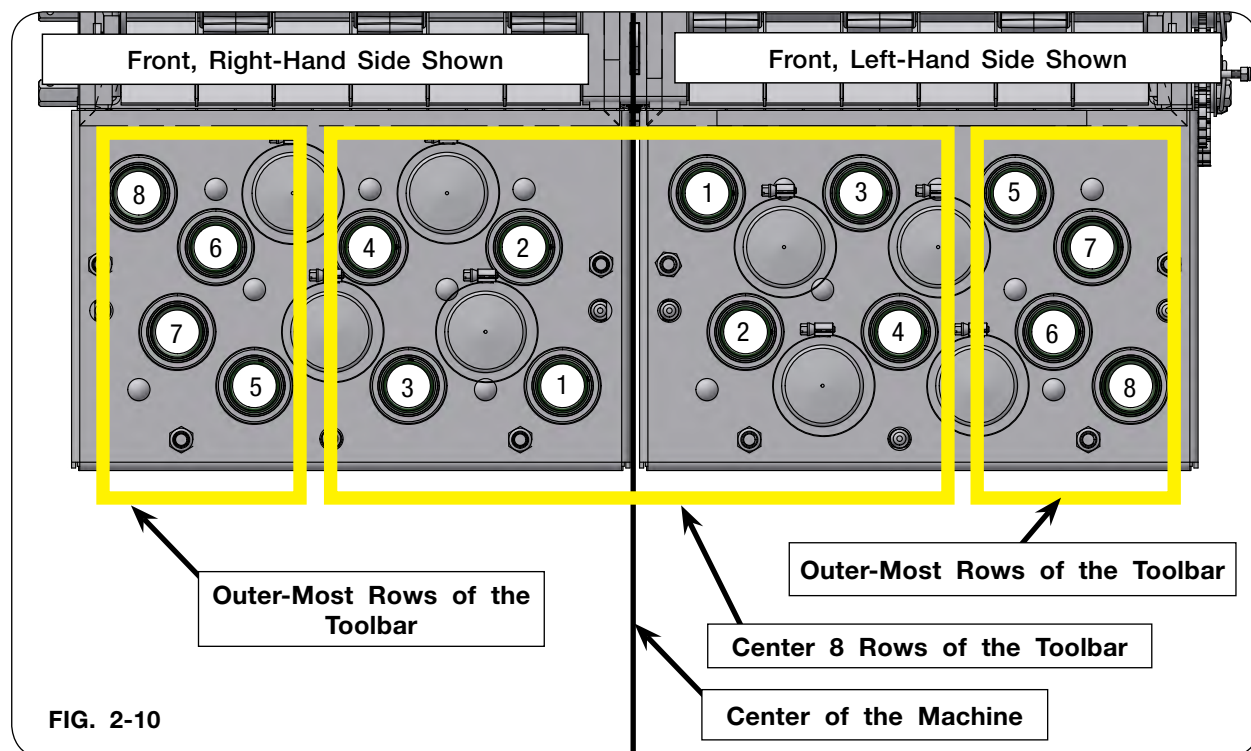
Fertilizer Hoses — 2.5" ID Delivery Hose

Make sure all fertilizer hoses are connected to the rows, and routed so they will not get pinched when folding or lifting the toolbar.

It is important for the hoses to be connected in the correct arrangement at the front of the cart. There are color-coded nozzles at the rear air inlet. The green nozzles are the smallest orifice size, and need to be connected to the center 8 rows of the toolbar. Going out from the center of the machine, the blue nozzles are the largest, and need to be on the outer-most rows of the toolbar. This will ensure proper air flow to each of the rows.



1. Attach the 2 1/2" dia. suction hose/translucent PVC to the front of the secondary distribution box. Hose rows are shown below. (FIG. 2-10)



NOTE: Excessive 2 1/2" dia suction hose/translucent PVC length may need to be trimmed for proper fitting.

SECTION III

Operation

| | |
|----------------------------------------|------|
| General Operation Information | 3-2 |
| Preparing Tractor..... | 3-2 |
| Preparing Raptor Strip-Till Tool | 3-3 |
| Hardware | 3-3 |
| Pins..... | 3-3 |
| Hydraulics | 3-3 |
| Lubrication | 3-3 |
| Tire Pressure | 3-3 |
| Electrical Hook-Up | 3-4 |
| Hydraulic Hook-Up..... | 3-4 |
| Transporting..... | 3-5 |
| Ladder Operation..... | 3-6 |
| Dry Fertilizer Cart Operation..... | 3-8 |
| Lid Operation..... | 3-8 |
| Filling Tank | 3-10 |
| Fan Speed | 3-10 |
| Lights..... | 3-10 |
| Meter Housing Flow | 3-11 |
| Applying Fertilizer | 3-12 |
| Scraping Tank Material..... | 3-13 |
| Scale Calibration Procedure..... | 3-14 |
| Catch Test Procedure..... | 3-16 |

12-TON DRY FERTILIZER CART — Operation

General Operation Information

WARNING

- **READ AND UNDERSTAND SAFETY RULES BEFORE OPERATING OR SERVICING THIS MACHINE. REVIEW "SAFETY" SECTION IN THIS MANUAL IF NECESSARY.**

Read this operation section thoroughly. Acquaint yourself with the adjustments required to obtain efficient and trouble-free operations.

Preparing Tractor

Before operating implement refer to tractor operator's manual for information concerning safe methods of operation, hydraulics, hitch adjustment, tire inflation, wheel adjustments, and tractor weights.

Check tractor brakes and transport lights. Make sure they are in proper working order.

Check tractor hydraulic oil reservoir and add oil if needed.

Be sure tractor drawbar has sufficient capacity to operate the implement.

Preparing Raptor Strip-Till Tool

Perform the service checks as outlined below. Repair or replace any damaged or worn parts before operating.

Hardware

Before going to the field, check all hardware for tightness. Recheck all bolts for tightness, after the unit has been operated for several hours.

CAUTION

- IMPROPERLY TORQUED WHEEL NUTS/BOLTS CAN CAUSE A LOSS OF IMPLEMENT CONTROL AND MACHINE DAMAGE. WHEEL NUTS/BOLTS MUST BE CHECKED REGULARLY. SEE TORQUE PAGE IN THE "MAINTENANCE" SECTION FOR PROPER WHEEL NUT/BOLT SPECIFICATIONS. WARRANTY DOES NOT COVER FAILURES CAUSED BY IMPROPERLY TORQUED WHEEL NUTS/BOLTS.

Pins

Before going to the field, check that all pins are in place and are in good condition. Replace any worn, damaged, or missing pins.

Check that locking hardware for pins are in place and tight.

Hydraulics

Check routing of all hydraulic hoses. Hoses should not be kinked, twisted, or rubbing against sharp edges. Hoses should be secure with tie straps.

Check hoses and fittings for hydraulic leaks. Tighten or replace as required.

Lubrication

Lubricate unit as outlined in MAINTENANCE section.

Tire Pressure

Check tire pressure, see MAINTENANCE section for recommended air pressure. Be sure tire pressure is equal in all tires.

For questions regarding new tire warranty, please contact your local original equipment tire dealer. Used tires carry no warranty. Tire manufacturers' phone numbers and web sites are listed in the MAINTENANCE section of this manual for your convenience.

Attaching To Tractor (continued)

Electrical Hook-Up

NOTE: Unverferth Manufacturing has designed the transport lighting and marking kit to meet United States federal law and ASABE standards at the time of manufacture. Machine modifications, including additional features or changes to the intended configurations, may require updates to the lighting and marking as well.

Compliance with all lighting and marking laws is the responsibility of the operator at the time of travel.

See federal regulation 49 CFR 562; available at www.govinfo.gov for US federal law requirements.

See your Unverferth dealer for additional brackets, reflectors, or lights to meet your requirements.

Connect the main, light harness to the tractor.

Fertilizer cart requires ISO connection to tractor. Connect ISO harness, and route foot switch harness into tractor cab.

Hydraulic Hook-Up



- **ALWAYS RELIEVE HYDRAULIC SYSTEM PRESSURE BEFORE DISCONNECTING HOSES FROM TRACTOR OR SERVICING HYDRAULIC SYSTEM. SEE TRACTOR OPERATOR'S MANUAL FOR PROPER PROCEDURES.**

NOTE: Refer to MAINTENANCE section when checking hydraulic circuit operation.

Check tractor operator's manual for correct hydraulic connection to tractor. Fan connection requires continuous flow of approximately 20 gpm. Meter motor connection requires continuous flow of approximately 15 gpm.

IMPORTANT

- *Case drain is required. Failure to properly connect case drain will result in damage to fan and meter motors.*

12-TON DRY FERTILIZER CART — Operation

Transporting

DANGER

- ELECTROCUTION WILL CAUSE SERIOUS INJURY OR DEATH. THE IMPLEMENT IS NOT INSULATED. KEEP AWAY FROM ALL ELECTRICAL LINES AND DEVICES. ELECTROCUTION CAN OCCUR WITHOUT DIRECT CONTACT.

WARNING

- USE TRANSPORT LIGHTS AS REQUIRED BY ALL LAWS TO ADEQUATELY WARN OPERATORS OF OTHER VEHICLES.
- ALWAYS TRAVEL AT A SPEED WHICH PERMITS COMPLETE CONTROL OF TRACTOR AND IMPLEMENT.

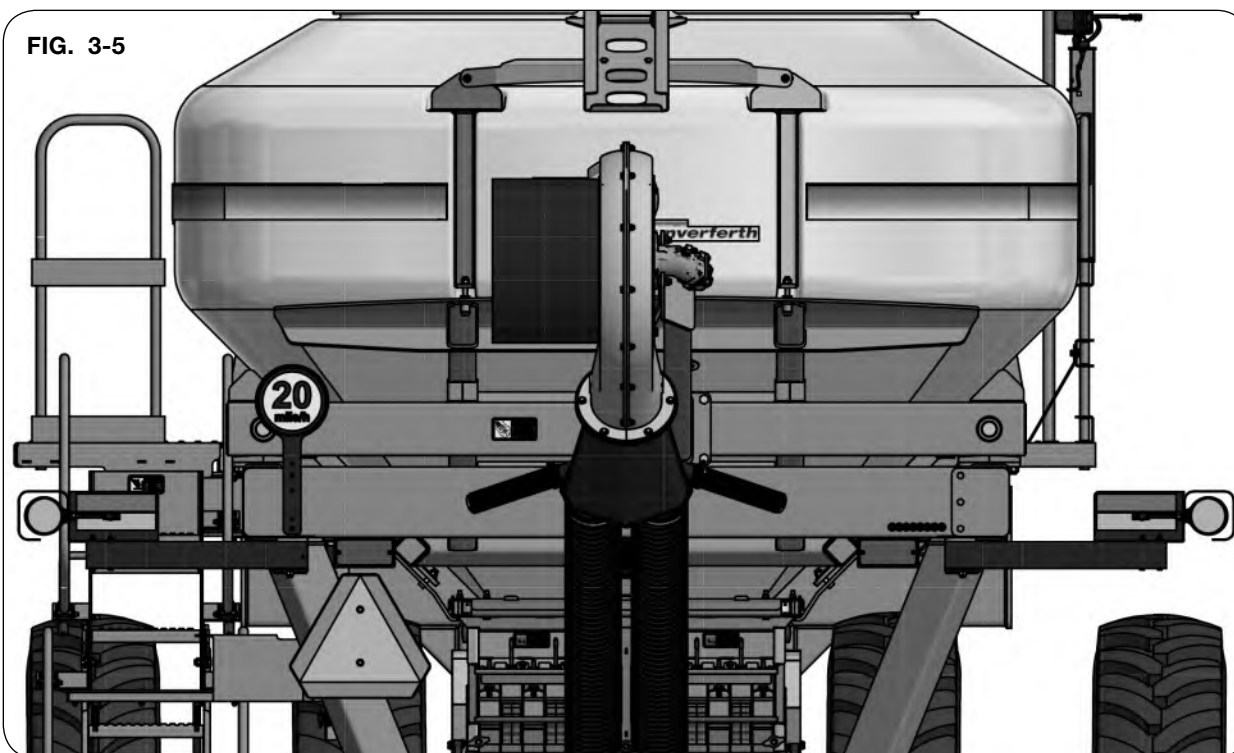
Before unit is transported, be sure the jackstand is in the “Transport Position” in this section.

For safe transporting of this implement, the transport speed should never exceed 10 m.p.h. in the field or over rough terrain. Reduce transport speed to maintain full control of the implement and tractor at all times. Do not exceed 20 m.p.h. when transporting the implement on the highway.

Comply with all laws governing highway safety and regulation when moving machinery on public roads.

Be sure SMV Emblem, lights and reflectors are in place and clearly visible to approaching traffic.

FIG. 3-5



12-TON DRY FERTILIZER CART — Operation

Ladder Operation

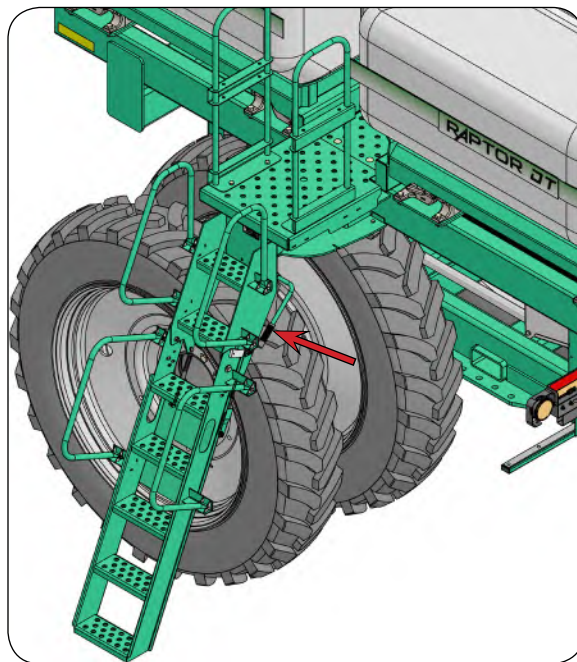
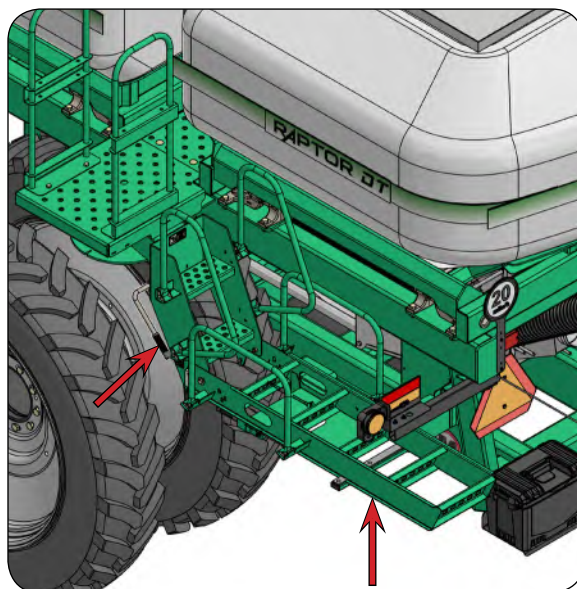
WARNING

- FALLING OR LOWERING EQUIPMENT CAN CAUSE SERIOUS INJURY OR DEATH. KEEP EVERYONE AWAY FROM EQUIPMENT WHEN SUSPENDED, RAISING, OR LOWERING.
- KEEP HANDS CLEAR OF PINCH POINT AREAS.
- DO NOT ALLOW ANYONE TO RIDE ON THE LADDER. MAKE SURE EVERYONE IS CLEAR BEFORE OPERATING MACHINE OR TOWING VEHICLE.

NOTE: Ensure ladder and steps are free from snow/debris before changing ladder positions and climbing.

Working Position

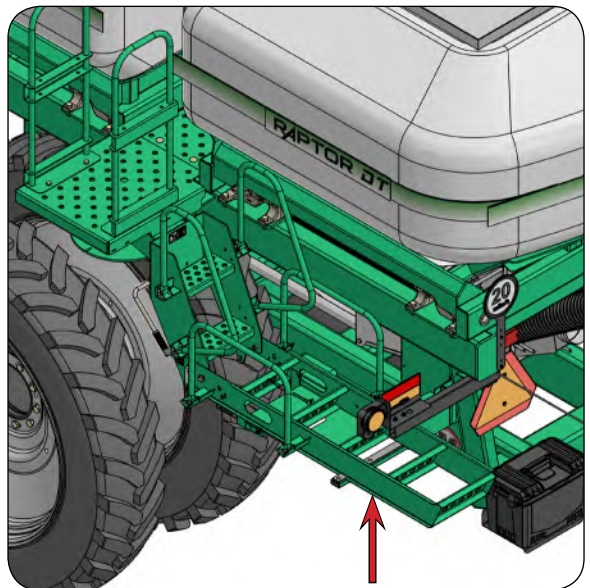
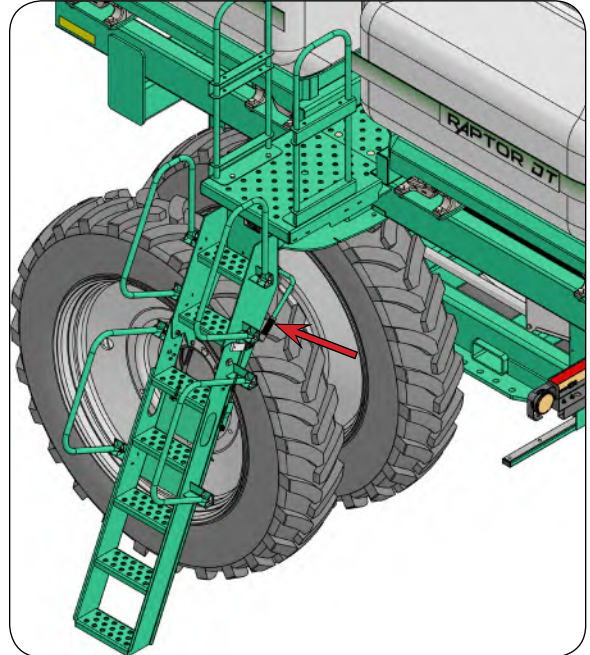
Lift the bottom section of the ladder from the transport bracket and release the lever to pivot the ladder into the working position. Lower the bottom section of the ladder.



Ladder Operation (continued)

Transport Position

To replace the ladder in the transport position, lift the bottom section of the ladder and release the lever to pivot the ladder into the transport position. Lower the bottom section onto the transport bracket.



12-TON DRY FERTILIZER CART — Operation

Dry Fertilizer Cart Operation

DANGER

- NEVER WALK ON OR PLAY IN GRANULAR MATERIAL. GRANULAR MATERIAL CAN BRIDGE AND COLLAPSE TRAPPING VICTIM. COLLAPSING AND FLOWING GRANULAR MATERIAL CAN SUFFOCATE VICTIM IN SECONDS.

WARNING

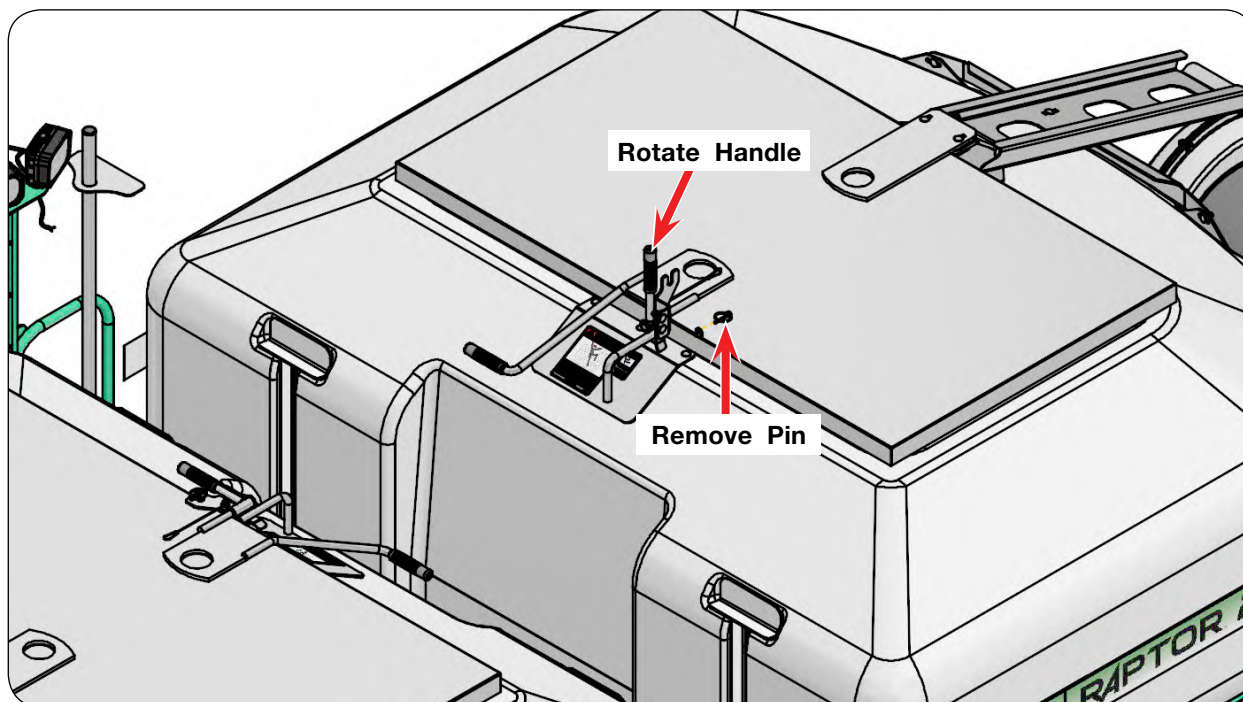
- KEEP HANDS CLEAR OF PINCH POINT AREAS.
- NEVER ENTER TANK WITH TRACTOR RUNNING. SERIOUS OR FATAL INJURY CAN OCCUR DUE TO ENTANGLEMENT WITH ROTATING COMPONENTS. ALWAYS STOP ENGINE AND REMOVE KEY BEFORE ENTERING TANK.
- EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.

NOTE: Park the unit on a firm level surface. Block the tires on the unit to prevent it from moving. Set the tractor parking brake.

Lid Operation

NOTE: Open lid only when the fan is not running.

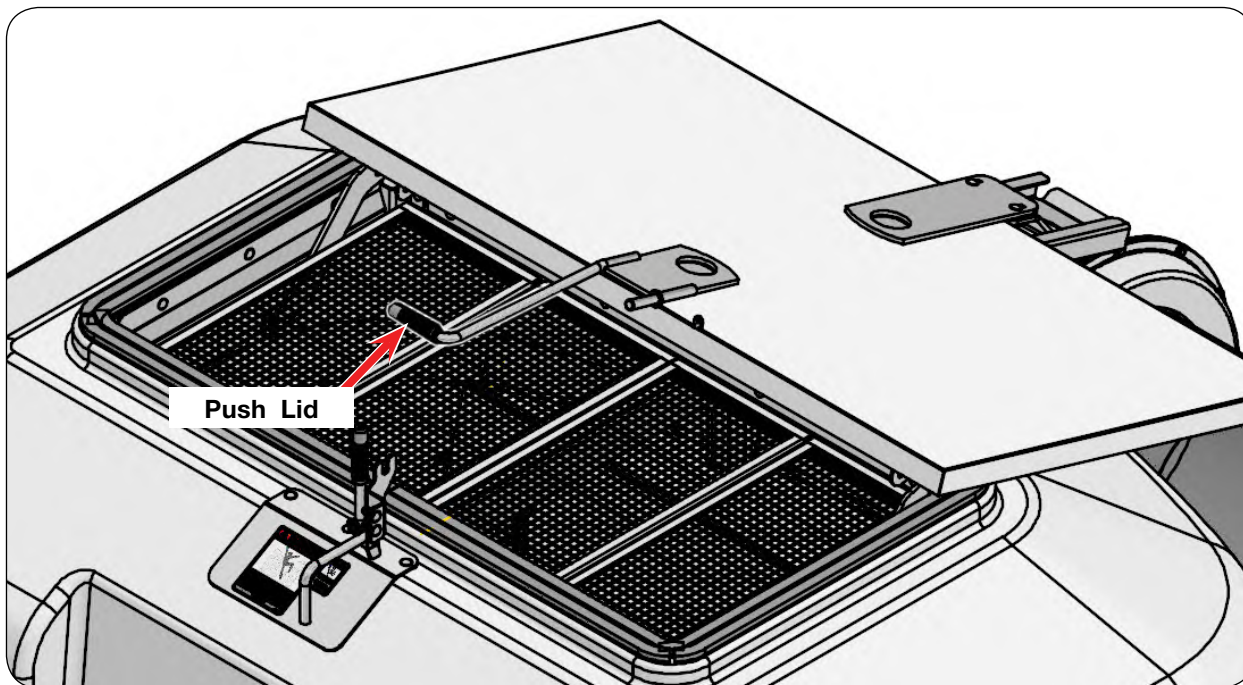
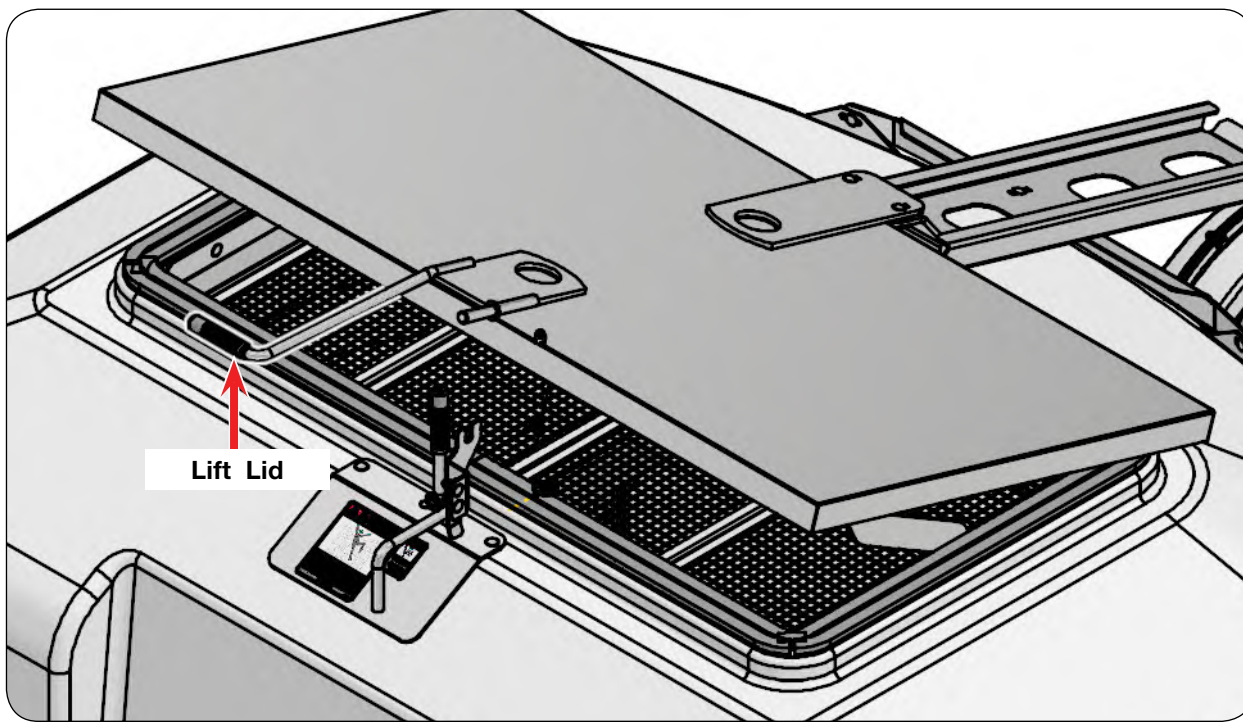
1. Remove the klik pin.
2. Rotate the latch handle.



12-TON DRY FERTILIZER CART — Operation

Dry Fertilizer Cart Operation (continued)

3. Lift and push the lid open for tank access.



4. Close the lid, latch the handle, and reinstall the klik pin.

NOTE: The user can ensure the lids are sealed by engaging the fan hydraulics and feeling around the closed lids for air leaks.

12-TON DRY FERTILIZER CART — Operation

Dry Fertilizer Cart Operation (continued)

Filling Tank

1. Make sure fan and meters are turned off prior to opening lids.
2. Remove click pin, turn latch handle, lift lid.

IMPORTANT

- *Verify that all safety shields are in place and properly secured.*
3. Must keep screens in place to prevent larger debris (stones, clumps, etc.) from getting into tank that could damage or plug meter wheels and air hoses.
 4. Fertilizer must be dry! Every attempt needs to be made to prevent any wet clumps or sticky fertilizer from getting inside tank.
 5. Tender trucks should be positioned to fill the tanks evenly. Care must be taken not to damage lids or tank edges while positioning the tender trucks in place.
 6. Fill tanks with only the amount of fertilizer needed for that day. Empty tanks daily. Fertilizer left in tanks can attract moisture which leads to caking/compaction of fertilizer and poor flow from the tanks.
 7. After filling, tank lids must be closed and latched in place before operating.

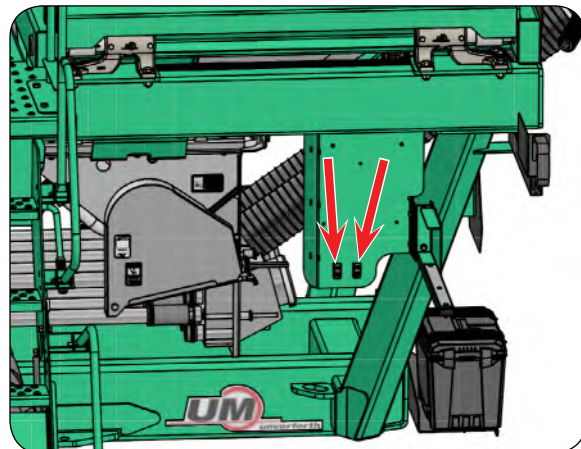
Fan Speed

NOTE: There are two gauges on the unit, one on the front of the dry tank and one in the fan diffuser on the rear of the unit.

1. Set fan speed as close to 30 inches of water as possible using the SCV on the tractor.
2. Fan does have the ability to spin down to a stop. It is recommend that the hydraulics be shut down into float.

Lights

There are switches on the back, left-hand side of the cart. They are for the platform lights and the fan light on the rear of the cart.

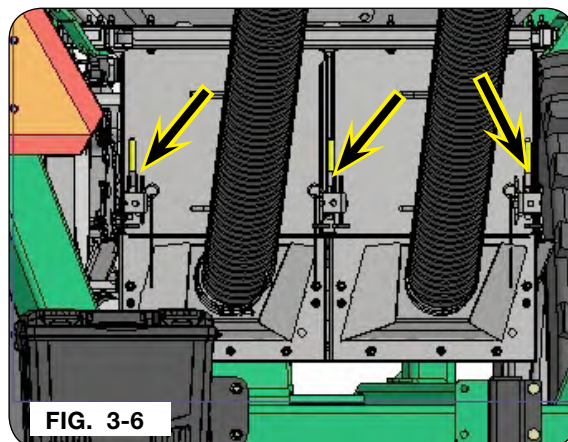
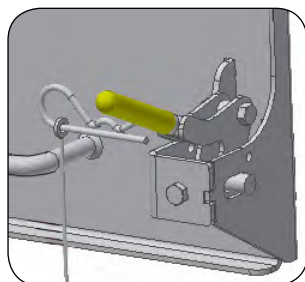


12-TON DRY FERTILIZER CART — Operation

Dry Fertilizer Cart Operation (continued)

Meter Housing Flow

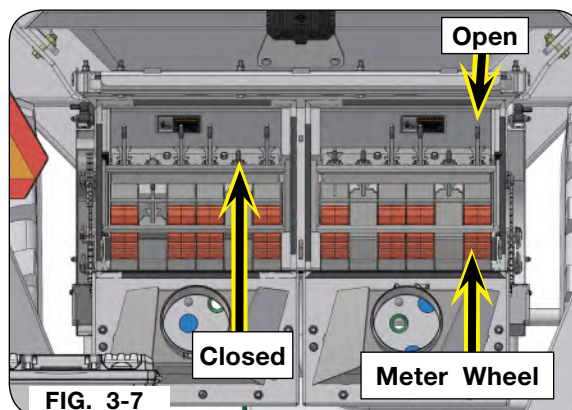
1. Park the unit on a firm level surface. Block the tires on the unit to prevent it from moving. Set the tractor parking brake.
2. Remove the cotter pin, and rotate the lever out. Repeat process for all of the levers retaining the cover assembly doors.



3. Remove and save the cover assembly doors.
4. Make sure the only agitator meter doors that are open are the ones with the meter wheels.

IMPORTANT

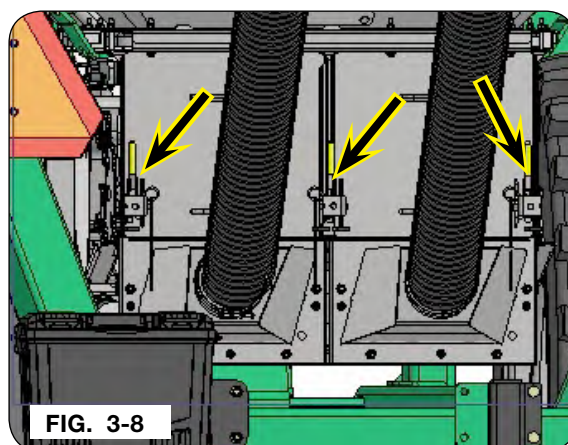
- Opening the agitator meter doors without a meter wheel will result in loss of material.



5. Reinstall the cover assembly doors and secure with all the levers and secure with cotter pins.

IMPORTANT

- If cover assembly doors are not properly shut, granular material will leak when operated.



Dry Fertilizer Cart Operation (continued)

Applying Fertilizer

1. For best results, use fertilizers of uniform granule size, and minimal fine dust. Avoid fertilizers that contain a high percentage of fine dust, as these materials can plug meter rollers and coat the inside of the air system, resulting in more frequent cleaning.
2. Be aware of weather conditions, especially high humidity and/or fog. Fertilizers attract moisture quickly. This can result in poor fertilizer flow from the tanks, and caking of material in the meters/hoses.
3. Set tractor SCV for fan to generate approximately 30 inHg pressure as read on the pressure gauge on the front of the unit.
4. Fan should be started and ran for approximately 10 minutes at the start of the day prior to starting meters. Thereafter, any time the fan is shut down, it should be started and ran 3-5 minutes before starting meters. This will pressurize the tanks, and clear out the lines.
5. Set the application rates.
6. At the beginning of each day, and after each fill, do a self-test to verify that fertilizer is flowing from each tank to each row unit.

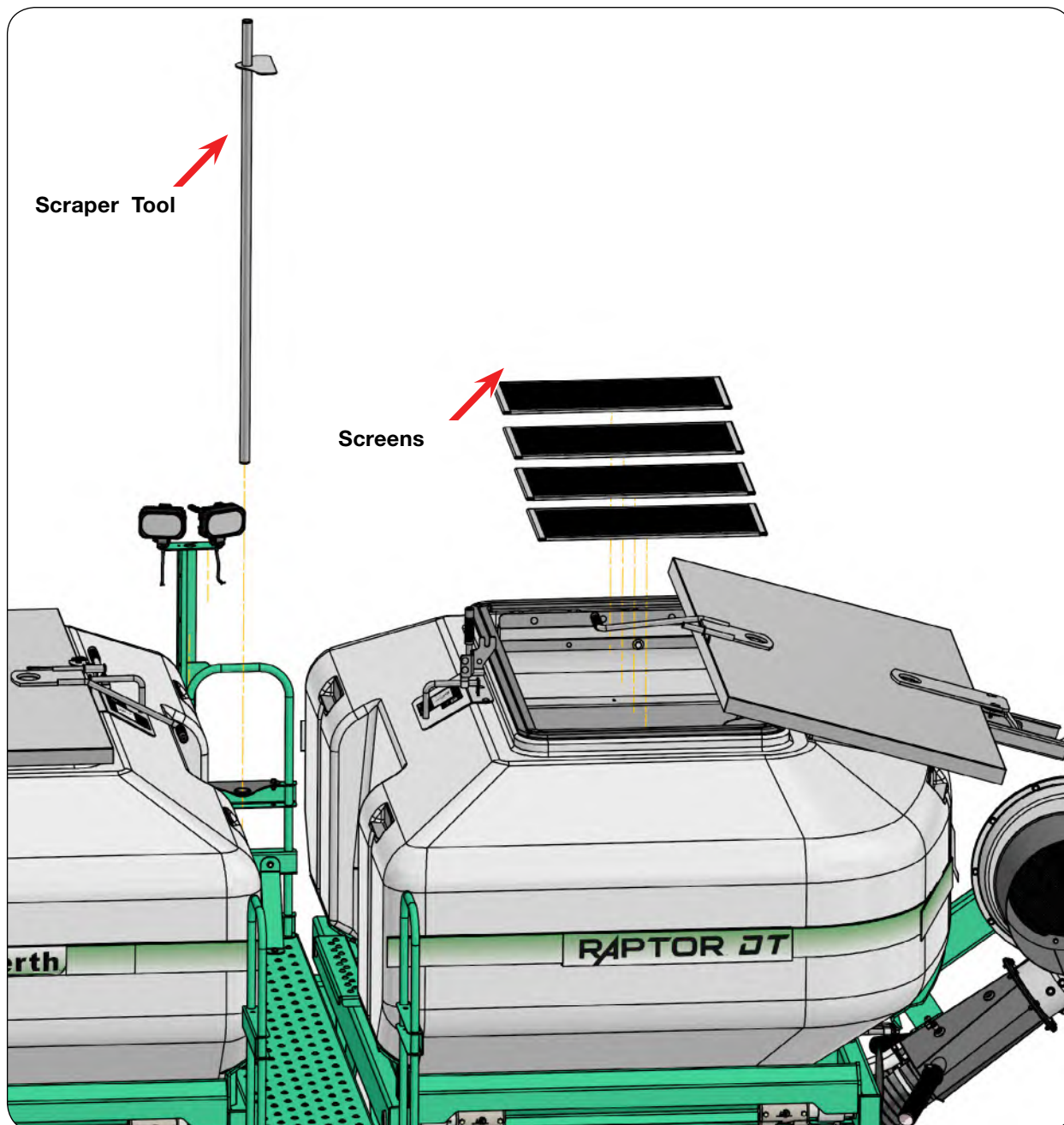
12-TON DRY FERTILIZER CART — Operation

Dry Fertilizer Cart Operation (continued)

Scraping Tank Material

NOTE: The scraper tool is used to unplugged bridged fertilizer in addition to leveling off the product during the filling process.

1. Remove and save the screens from the tank.
2. Use the scraper tool mounted on the platform handrail to remove the material from the walls of the tank.



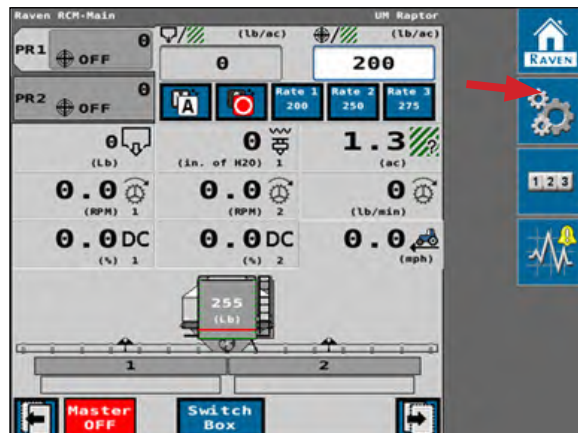
3. Replace screens and scraper tool.

12-TON DRY FERTILIZER CART — Operation

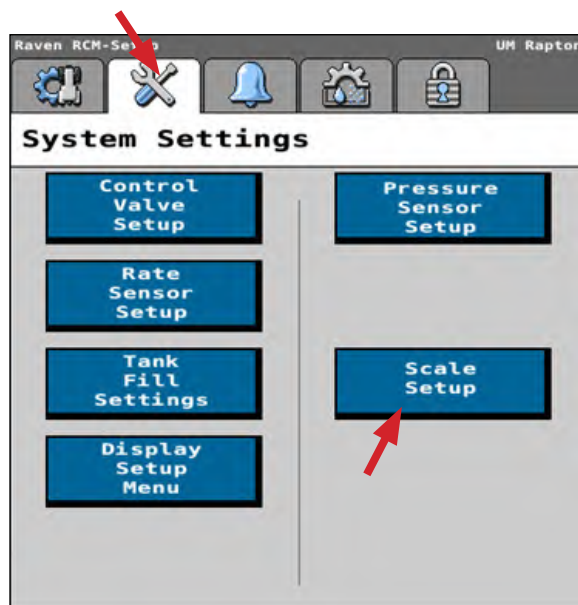
Scale Calibration Procedure

This calibration procedure needs to be completed for each product bin after a new machine profile is created. This scale calibration procedure can also be used if the scale weight reading is inaccurate to the actual product weight.

1. Press the settings page icon.



2. Press the System Settings page icon.
3. Press the Scale Setup icon.



Scale Calibration Procedure (continued)

4. Select which scale you would like to calibrate and press the Scale Calibration icon.
5. Enter the certified weight into the Actual weight selection box.



The Scale Setup screen features a blue header with the title "Scale Setup". Below the header, there are two scale icons. The left icon is selected. To the right of the icons, there are two input fields: "Scale Increment (Lb)" with the value "1" and "Scale Weight (Lb)" with the value "250". A question mark icon is located to the right of these fields. At the bottom center, there is a blue button labeled "Scale Calibration". Below that, the brand name "RAVEN" is displayed. In the bottom right corner, there is a checkmark icon.

6. Enter the Current Scale Weight into the previous weight selection box.
7. Select Calibrate and accept the changed calibration number.



The Scale Calibration screen features a blue header with the title "Scale Calibration". Below the header, there is instructional text: "1. To modify the zero point, remove all weight from the scale, and press the Zero button." and "2. To modify the scale calibration, enter the Actual and Scale weights, then press the Calibrate button." Below the text, there are three input fields: "Current Scale Weight (Lb)" with the value "250", "Current Voltage Differential (mV)" with the value "0.02", and "Calibration Weight (Lb)" with the value "0". To the right of the "Calibration Weight" field, there are two sub-fields labeled "* Actual" and "* Prev." both containing the value "0". At the bottom, there are three blue buttons: "Zero", "Calibrate", and "Clear Calibration". Below the buttons, the brand name "RAVEN" is displayed. In the bottom right corner, there is a checkmark icon.

12-TON DRY FERTILIZER CART — Operation

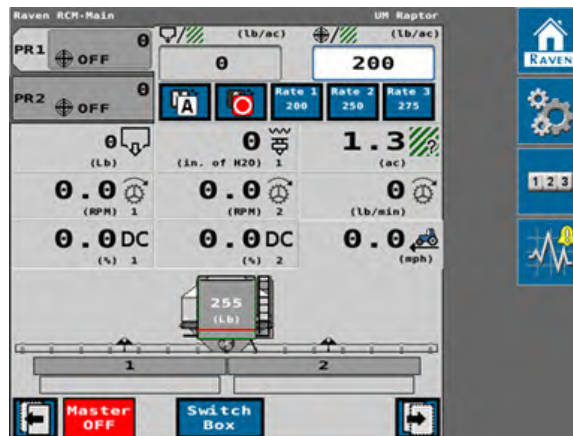
Catch Test Procedure

WARNING

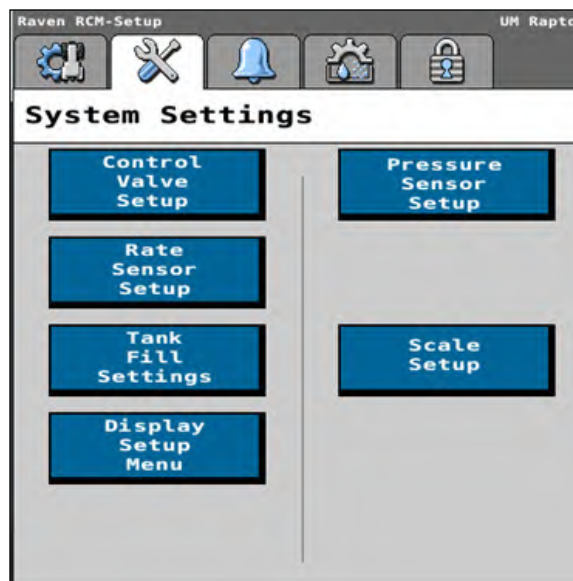
- EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING THE IMPLEMENT.

NOTE: A catch test should be completed for PRIMARY and SECONDARY product bins.

1. Prime each product meter by running the meters in self-test.
2. Place catch containers under each row unit fertilizer discharge pipe.
3. Press the settings page icon.



4. Press the System Settings page icon.
5. Press the Rate Sensor Setup icon.



Catch Test Procedure (continued)

6. Select the Product to be calibrated on the top of the page.

7. Press the Catch Test Calibration icon.

NOTE: If the Catch Test Calibration icon does not appear in blue, make sure your master switch is off and the test speed is 0.

Setup Rate Sensor

PR1 Pulses/Revolution 120.00

PR2 Pulses/Revolution ?

Product Density (lb/cubic feet) 66.0

Calibration Weight (lb/revolution) 3.485

Catch Test Calibration Applied Product Calibration

RAVEN

8. A warning note will pop up saying that movement of the machine will occur. Press the green checkmark to acknowledge.

WARNING

Running this test will cause implement movement. Product may be ejected from the implement.

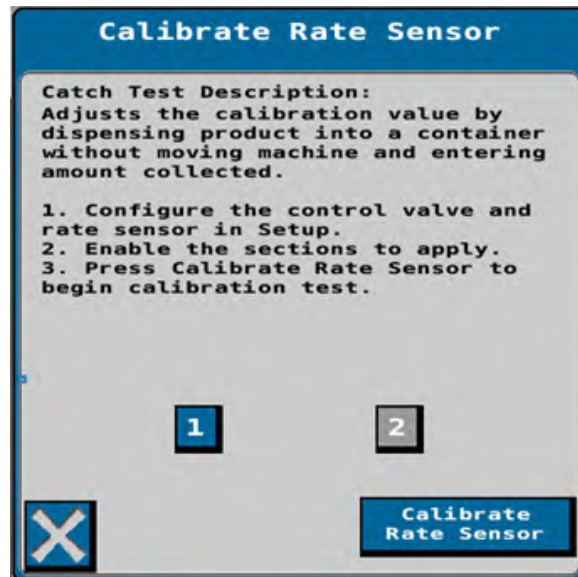
To avoid injury ensure that no bystanders are in the vicinity and keep clear from moving machinery.

If necessary use the master switch to stop operation.

12-TON DRY FERTILIZER CART — Operation

Catch Test Procedure (continued)

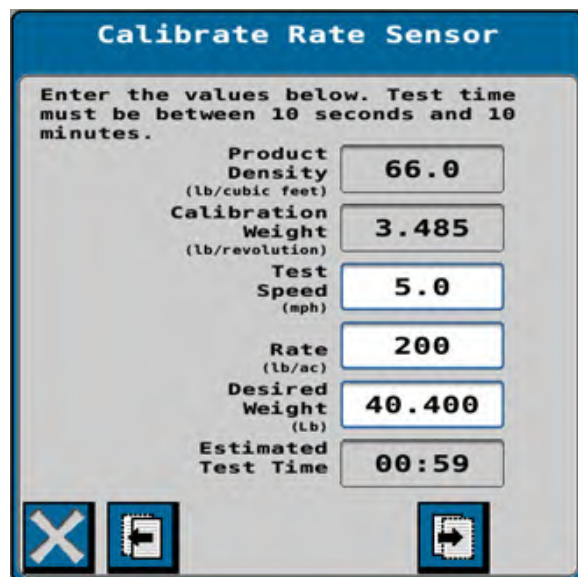
9. Select the sections that have catch containers place under the rows and press Calibrate Rate Sensor.



10. Enter a test speed that is similar to what will be ran during in field operation.
11. Enter the application rate that will be used during in field operation.
12. Enter the desired amount of material to be caught.

NOTE: The amount of weight collected must be less than the size of your catch containers. It is recommended to catch at least 100 lbs. although a larger amount of material collected will lead to a more accurate calibration.

13. Select the Next Page icon.



14. Turn the master switch on and select Start.

NOTE: Make sure hydraulic flow is turned on for the meters and the fan.

15. After the test is complete. Collect the material from each catch container and weigh the total dispensed weight.
16. Enter this weight into the RCM and select the blue checkmark to complete the catch test calibration.
17. Repeat Steps 7-16 to verify accuracy.

SECTION IV

Maintenance

| | |
|-----------------------------------------------------|------|
| Daily Service | 4-2 |
| Beginning of Day | 4-2 |
| End of Day | 4-2 |
| Annual Service | 4-3 |
| Beginning of Season | 4-3 |
| End of Season | 4-3 |
| Seasonal Storage | 4-3 |
| Lubrication Points | 4-4 |
| Troubleshooting | 4-4 |
| How To Cleanout Meter Housing Assembly | 4-5 |
| How To Empty The Tanks | 4-7 |
| Wheel, Hub & Spindle Disassembly and Assembly | 4-8 |
| Wheels and Tires | 4-10 |
| Wheel Nut Torque | 4-10 |
| Tire Pressure | 4-10 |
| Tire Warranty | 4-11 |
| Complete Torque Chart | 4-12 |
| Hydraulic Fittings - Torque and Installation | 4-14 |
| Schematics - Electrical | 4-16 |
| Schematics - Hydraulic | 4-21 |
| Meter Wheel Location Layouts | 4-22 |
| Manifold Nozzle Location Layouts | 4-23 |

Daily Service

Beginning of Day

NOTE: Before initial use, ensure all lubrication points have been greased.

Check all U-bolts and bolts for tightness. This is especially important during the first days of operation. See “Torque Chart” in this section.

IMPORTANT

- *Inspect mast pins for any wear or damage. Replace any worn or damaged pins.*

Perform any daily lubrication outlined in “Lubrication” in this section.

Check stabilizer tire air pressure and inflate to correct pressure, if necessary.

IMPORTANT

- *To assure level penetration of shanks, both tires must be inflated to the same pressure.*

End of Day

Clean off dirt and residue which may have accumulated on implement during operation.

Check implement for damage which could have occurred during operation, and repair.

Annual Service

Beginning of Season



- **READ AND UNDERSTAND SAFETY RULES BEFORE OPERATING OR SERVICING THIS MACHINE. REVIEW "SAFETY" SECTION IN THIS MANUAL IF NECESSARY.**

Check all bolts, U-bolts, and wheel bolts for tightness. Refer to “Torque Chart” in this section.

Lubricate implement (see “Lubrication” in this section).

Check air pressure in tires and inflate to correct pressure if necessary (see “Daily Service” in this section).

End of Season

Your implement is an important investment. Spend a little time to protect it from destructive rust and corrosion. You will be repaid in longer service life and better performance.

Perform the following before placing the implement in storage:

1. Remove dirt and residue which could cause rusting.
2. Repaint any chipped or scraped areas.
3. Lubricate implement (see “Lubrication” in this section).
4. Coat all earth moving surfaces with grease or suitable rust preventatives.
5. Inspect for damaged parts. Replace before next season.
6. Store implement inside, away from livestock.
7. Use support stands to keep implement tires and points up off bare ground.
8. Replace all worn, torn or faded decals and reflectors.

Seasonal Storage

1. Run unit till tanks are empty.
2. Open access panels to meters and air system. Using air (do not use water), blow all remaining fertilizer particles and dust from inside tanks, down through meters and air system. Ensure all seals are in good condition, and close all access panels.
3. Exterior of tanks and meters can be cleaned with water. When this is complete, operate fan for sufficient time to dry out any water that may get into meters and air system.

12-TON DRY FERTILIZER CART — Maintenance

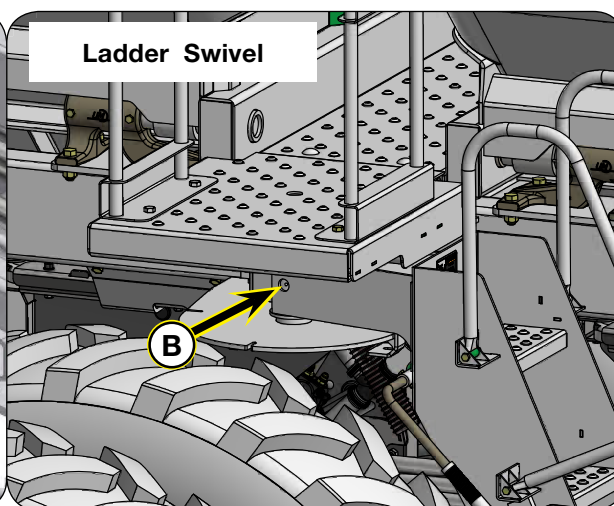
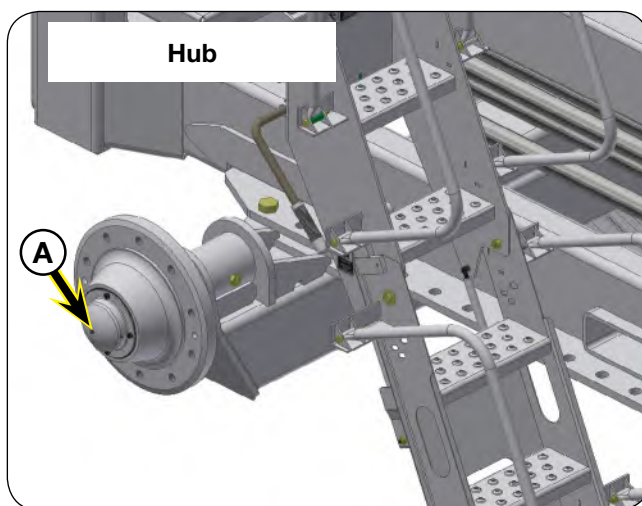
Lubrication Points

To keep your implement in top operating condition and to assure its proper performance and reliability for a long period of time, periodic inspection and lubrication is a must.

Use EP-2 lubricant at the locations described in the chart. All exposed cylinder rods should be coated with grease before seasonal storage to prevent rusting. After seasonal storage, check wing latch for freedom of movement.

The lubrication locations and recommended schedule are as follows:

| ITEM | DESCRIPTION | POINT | QTY | HOURS |
|------|---------------|-------|--------|----------|
| A | Hubs | 2 | 1 Shot | 50 Hours |
| B | Ladder Swivel | 2 | 1 Shot | 50 Hours |



Troubleshooting

PROBABLE CAUSE

CORRECTION

Product Being Applied Lower Than Expected

Density of product changed

Recalibrate applicator.

Sprocket(s) slipping/damaged bearings

Realign sprockets and shafts and tighten set screws. Replace damaged bearings.

Product caking up / hot or humid weather / water in housing/tank

Clean out meter housing

Air seeder hoses not delivering product

Unplug hoses. Replace torn hoses.

Meter housing assembly leaking air

Tighten cover assembly threaded knobs.

Check fan pressure.

Meters not rolling.

Adjust Relief Valve

Product bridging inside tanks

Checking lid for air leaks

How To Clean Out Meter Housing Assembly

1. Park the unit on a firm level surface. Block the tires on the unit to prevent it from moving. Set the vehicle parking brake, shut off the engine, and remove the ignition key.
2. Remove and save the threaded knobs retaining the cover assembly doors.
3. Remove and save the cover assembly doors. (FIG. 4-1)

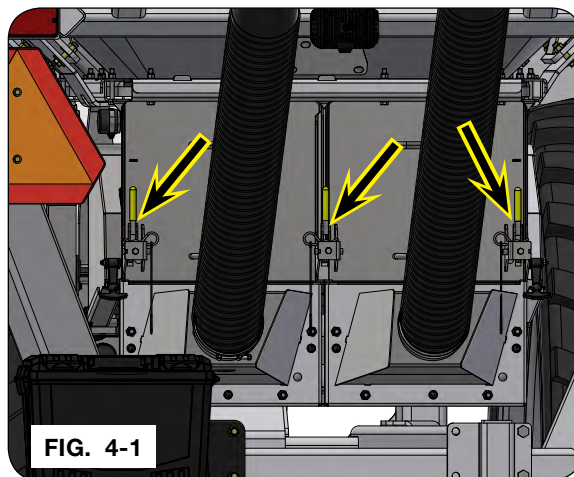
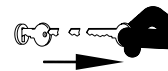


FIG. 4-1

4. Close **ALL** the agitator meter doors. (FIG. 4-2)

IMPORTANT

- Failure to close **ALL** the agitator meter doors will result in loss of material.

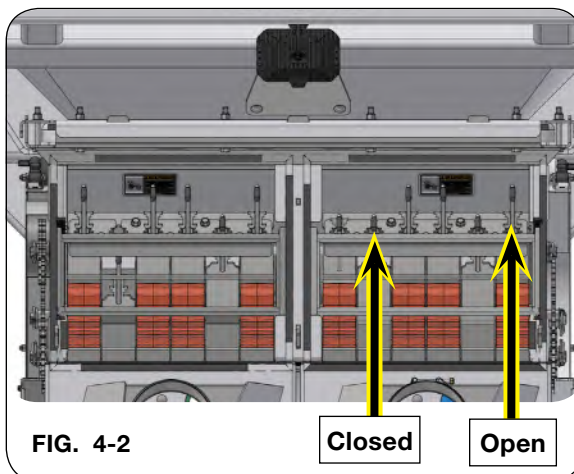


FIG. 4-2

5. Unlatch the left-hand and right-hand shield weldment panels and rotate them out of the way. (FIG. 4-3)

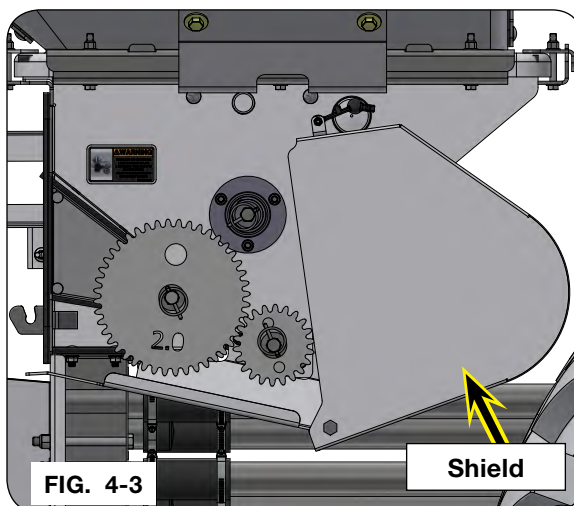


FIG. 4-3

How To Clean Out Meter Housing Assembly (continued)

6. Remove the meter wheel housing section. (FIG. 4-4)

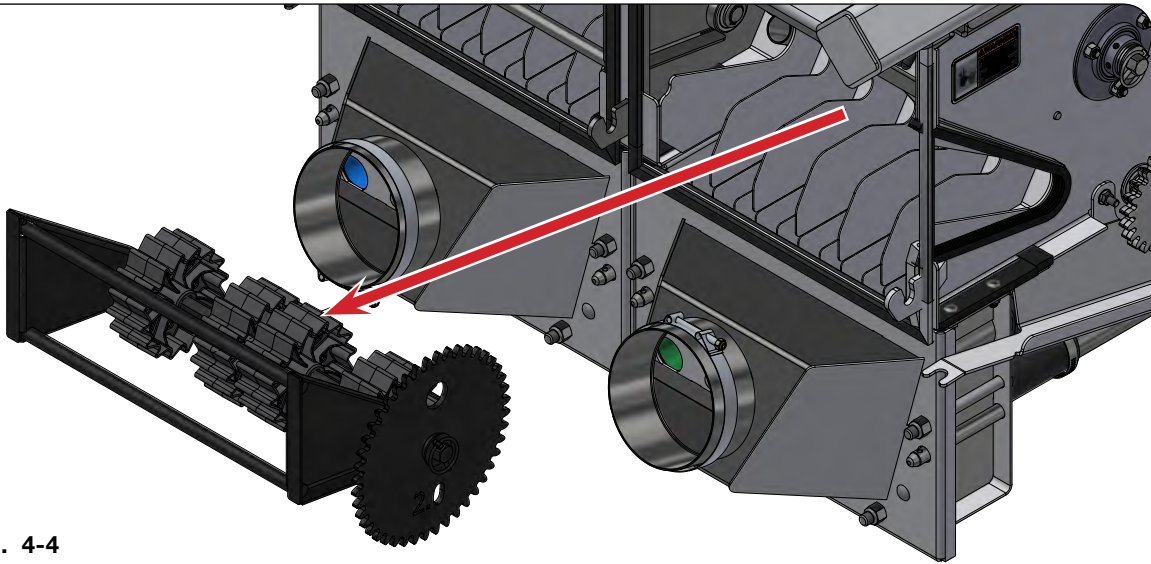


FIG. 4-4

7. Clean out the meter housing assembly.
8. Replace the meter wheel housing section and making sure the sprockets align. (FIG 4-4)
9. Rotate the left-hand and right-hand shield weldment panels back into place and secure the latches. (FIG. 4-5)

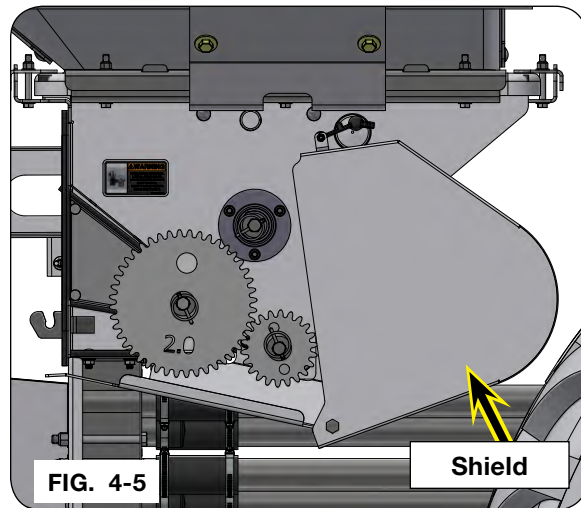
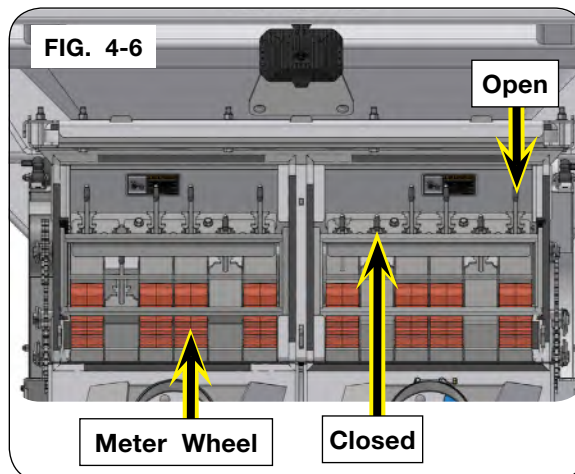


FIG. 4-5

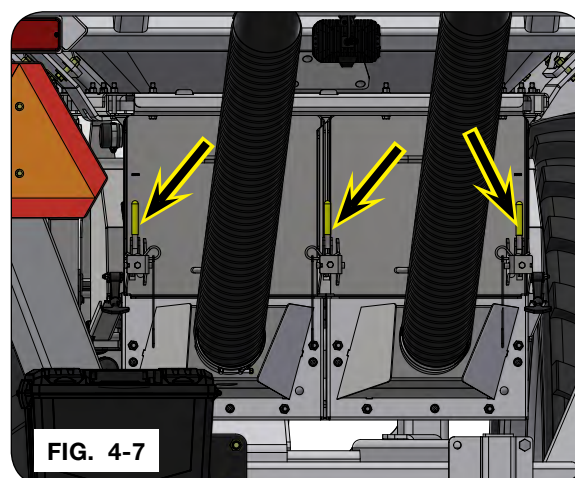
Shield

How To Clean Out Meter Housing Assembly (continued)

10. Open the agitator meter doors with metering wheels only. (FIG. 4-6)



11. Reinstall the cover assembly doors and secure with the previously removed threaded knobs. (FIG. 4-7)



How To Empty The Tanks

There are two ways to empty the tanks.

1st Way - Empty the tanks by running it in the field until all the product is used.

2nd Way - Place a large enough container below the cart to catch the material in the tanks. Remove the cover assembly doors, remove the meter wheel housing section, and open the agitator meter doors.

NOTE: Refer to “How To Clean Out Meter Housing Assembly” on how to open and close the agitator meter doors.

Wheel, Hub & Spindle Disassembly and Assembly

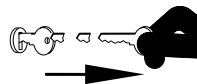
WARNING

- TIPPING OR MOVEMENT OF THE MACHINE CAN CAUSE SERIOUS INJURY OR DEATH. BE SURE MACHINE IS SECURELY BLOCKED.
- FALLING OBJECTS CAN CAUSE SERIOUS INJURY OR DEATH. DO NOT WORK UNDER THE MACHINE AT ANY TIME WHILE BEING HOISTED. BE SURE ALL LIFTING DEVICES AND SUPPORTS ARE RATED FOR THE LOADS BEING HOISTED. THESE ASSEMBLY INSTRUCTIONS WILL REQUIRE SAFE LIFTING DEVICES UP TO 12,000 LBS. SPECIFIC LOAD RATINGS FOR INDIVIDUAL LOADS WILL BE GIVEN AT THE APPROPRIATE TIME IN THE INSTRUCTIONS.
- EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.
- KEEP HANDS CLEAR OF PINCH POINT AREAS.

CAUTION

- IMPROPERLY TORQUED WHEEL NUTS/BOLTS CAN CAUSE A LOSS OF IMPLEMENT CONTROL AND MACHINE DAMAGE. TORQUE WHEEL NUTS/BOLTS TO VALUES IN TABLE. CHECK TORQUE BEFORE USE, AFTER ONE HOUR OF UNLOADED USE OR AFTER FIRST LOAD, AND EACH LOAD UNTIL WHEEL NUTS/BOLTS MAINTAIN TORQUE VALUE. CHECK TORQUE EVERY 10 HOURS OF USE THERE-AFTER. AFTER EACH WHEEL REMOVAL START TORQUE PROCESS FROM BEGINNING. WARRANTY DOES NOT COVER FAILURES CAUSED BY IMPROPERLY TORQUED WHEEL NUTS/BOLTS.

1. Hitch unit to tractor. Park the empty unit on a firm, level surface. Block the tires to keep the machine from moving. Set the tractor's parking brake, shut off engine and remove key from tractor.



2. Use a safe lifting device rated at 12,000 lbs. to support the weight of your empty, dry applicator cart. Place the safe lifting device under the axle closest to the tire.
3. Use a minimum of 1,500 lbs. safe lifting device to support the wheel and tire during removal.

WARNING

- ON UNITS WITH DUAL WHEELS, INNER WHEEL AND TIRE MAY FALL FROM HUB CAUSING SERIOUS INJURY OR DEATH. ALWAYS SUPPORT INNER WHEEL WHEN REMOVING OUTER WHEEL AND/OR THE WHEEL EXTENSION.

4. If only changing wheel and tire, skip to Step 8; otherwise continue with Step 4.

Remove the hardware retaining the hubcap. Next, remove the hubcap, gasket, capscrew, castle nut, and spindle washer. Remove hub with bearings from old spindle using a 200 lbs. lifting device.

Wheel, Hub & Spindle Disassembly and Assembly (continued)

5. Inspect the spindle and replace if necessary. If spindle does not need to be replaced, skip to Step 6; otherwise continue with Step 5.

Remove the bolt and lock nut that retain the spindle to the axle. Using a safe lifting device rated for 150 lbs., replace the old spindle with a new spindle. Coat axle contact length of spindle shaft with anti-seize lubricant prior to installation. Reuse bolt and lock nut to retain spindle to axle. Tighten as outlined in MAINTENANCE Section.

6. Remove seal and inspect bearings, spindle washer, castle nut and cotter pin. Replace if necessary. Pack both bearings with approved grease and reinstall inner bearing. Install new seal in hub with garter spring facing the hub by tapping on flat plate that completely covers seal while driving it square to hub. Install until flush with back face of hub. Using a 200 lb rated lifting device, install hub assembly onto spindle. Install outer bearing, spindle washer and castle nut.

IMPORTANT

- *Do not use an impact wrench!*

7. Slowly tighten castle nut while spinning the hub until drag causes the hub to stop freely spinning. Turn castle nut counterclockwise until the hole in the spindle aligns with the next notch in castle nut. Hub should spin smoothly with little drag and no end play. If play exists, tighten to next notch of castle nut. If drag exists, then back castle nut to next notch of castle nut. Spin and check again. Install bolt and nut. Clean face for hub cap gasket and install gasket, grease filled hub cap and retain hubcap with hardware removed. Tighten hubcap hardware in alternating pattern.
8. Attach the wheel(s) and tire(s) to the hub using the same rated safe lifting device for removal. Tighten wheel nuts to appropriate requirements and recheck as outlined in the Wheel and Tire section of this manual.
9. Raise dry applicator cart, remove lifting device and lower unit to the ground.

Wheels and Tires

Wheel Nut Torque

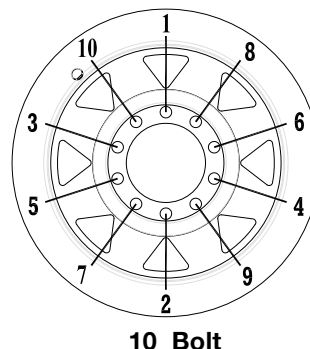
CAUTION

- IMPROPERLY TORQUED WHEEL NUTS/BOLTS CAN CAUSE A LOSS OF IMPLEMENT CONTROL AND MACHINE DAMAGE. TORQUE WHEEL NUTS/BOLTS TO VALUES IN TABLE. CHECK TORQUE BEFORE USE, AFTER ONE HOUR OF USE, AND EACH HOUR UNTIL WHEEL NUTS/BOLTS MAINTAIN TORQUE VALUE. CHECK TORQUE EVERY 10 HOURS OF USE THERE-AFTER. AFTER EACH WHEEL REMOVAL START TORQUE PROCESS FROM BEGINNING. WARRANTY DOES NOT COVER FAILURES CAUSED BY IMPROPERLY TORQUED WHEEL NUTS/BOLTS.

Failure to check torque before first use may damage wheel nut/bolt seats. Once seats are damaged, it will become impossible to keep nuts/bolts tight. Tighten nuts/bolts to applicable torque value shown in table. Start all nuts/bolts by hand to prevent cross threading. Torque nuts/bolts in the recommended sequence as shown in Diagram 1.

| WHEEL HARDWARE | |
|----------------|--------------|
| SIZE | FOOT-POUNDS |
| M22-2.5P | 450 Ft.-Lbs. |
| 7/8"-14 (UNF) | 450 Ft.-Lbs. |

Diagram 1



10 Bolt

Tire Pressure

- The following is to be used as a general guide for tire inflation and figures can vary depending on specific brand of tire used. It is important that tires are inspected after unit is loaded. Start with minimum pressure indicated. The tire should stand up with no side-wall buckling or distress as tire rolls. Record the pressure needed to support the full load and maintain this pressure to achieve proper tire life. Do not exceed maximum recommended tire pressure.

| TIRE | INFLATION |
|------------------------|-------------|
| 380/90R46 R-1W - 159A8 | max. 58 PSI |

(All tire pressures in psi)

Wheels and Tires

Tire Warranty

For questions regarding new tire warranty, please contact your local original equipment tire dealer. Used tires carry no warranty. Following are phone numbers and Websites for your convenience:

| | |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>Firestone</u> | www.firestoneag.com Phone 800-847-3364 |
| <u>Continental/Mitas</u> | www.mitas-tires.com Phone 704-542-3422 Fax 704-542-3474 |
| <u>Titan</u> or <u>Goodyear</u> | www.titan-intl.com Phone 800-USA-BEAR Fax 515-265-9301 |
| <u>Carlisle/Ironman</u> | www.carlisletire.com Phone 800-260-7959 Fax 800-352-0075 |
| <u>Greenball</u> | www.greenball.com Phone nearest location: California 800-937-5204 Georgia 800-283-4569 Florida 800-935-0200 Indiana 800-426-4068 Tennessee 800-946-9412 Ohio 800-840-7295 Pennsylvania 800-869-6787 |

12-TON DRY FERTILIZER CART — Maintenance

Complete Torque Chart

Capscrews - Grade 5

NOTE:

- Grade 5 capscrews can be identified by three radial dashes on the head.
- For wheel torque requirements, refer to Wheels and Tires.
- Tighten U-bolts evenly and equally to have the same number of threads exposed on each end.



| SIZE | FOOT POUNDS | NEWTON METERS |
|----------|----------------|------------------|
| 1/4-20 | 8-10 | 11-13 |
| 1/4-28 | 9-11 | 12-15 |
| 5/16-18 | 15-17 | 20-23 |
| 5/16-24 | 17-19 | 23-26 |
| 3/8-16 | 25-28 | 34-38 |
| 3/8-24 | 28-31 | 38-42 |
| 7/16-14 | 40-45 | 54-61 |
| 7/16-20 | 45-50 | 61-68 |
| 1/2-13 | 62-68 | 84-92 |
| 1/2-20 | 68-75 | 92-102 |
| 9/16-12 | 90-98 | 122-133 |
| 9/16-18 | 100-110 | 134-148 |
| 5/8-11 | 120-135 | 162-183 |
| 5/8-18 | 124-137 | 168-186 |
| 3/4-10 | 200-220 | 270-300 |
| 3/4-16 | 210-230 | 285-310 |
| 7/8-9 | 330-350 | 425-475 |
| 7/8-14 | 360-380 | 460-515 |
| 1-8 | 500-525 | 675-710 |
| 1-14 | 540-560 | 730-760 |
| 1 1/8-7 | 600-635 | 815-860 |
| 1 1/8-12 | 665-700 | 920-950 |
| 1 1/4-7 | 850-895 | 1150-1215 |
| 1 1/4-12 | 940-990 | 1275-1340 |
| 1 3/8-6 | 1125-1175 | 1525-1590 |
| 1 3/8-12 | 1280-1335 | 1735-1810 |
| 1 1/2-6 | 1500-1560 | 2035-2115 |
| 1 1/2-12 | 1685-1755 | 2285-2380 |

IMPORTANT

- Follow these torque recommendations except when specified in text.

Complete Torque Chart

Capscrews - Grade 8

NOTE:

- Grade 8 capscrews can be identified by six radial dashes on the head.
- For wheel torque requirements, refer to Wheels and Tires.
- Tighten U-bolts evenly and equally to have the same number of threads exposed on each end.



| SIZE | FOOT POUNDS | NEWTON METERS |
|---------------------|------------------------|------------------------|
| 5/16-18 5/16-24 | 20-22 21-23 | 27-30 28-31 |
| 3/8-16 3/8-24 | 35-39 36-41 | 47-53 49-55 |
| 7/16-14 7/16-20 | 54-58 55-60 | 73-78 75-80 |
| 1/2-13 1/2-20 | 82-88 94-99 | 110-120 125-135 |
| 9/16-12 9/16-18 | 127-134 147-155 | 170-180 199-210 |
| 5/8-11 5/8-18 | 160-170 165-175 | 215-230 225-235 |
| 3/4-10 3/4-16 | 280-295 330-365 | 380-400 445-495 |
| 7/8-9 7/8-14 | 410-430 420-440 | 555-580 570-595 |
| 1-8 1-14 | 630-650 680-700 | 850-880 920-950 |
| 1 1/8-7 1 1/8-12 | 900-930 930-950 | 1220-1260 1260-1290 |
| 1 1/4-7 1 1/4-12 | 1250-1300 1280-1320 | 1695-1760 1735-1790 |

IMPORTANT

- Follow these torque recommendations except when specified in text.

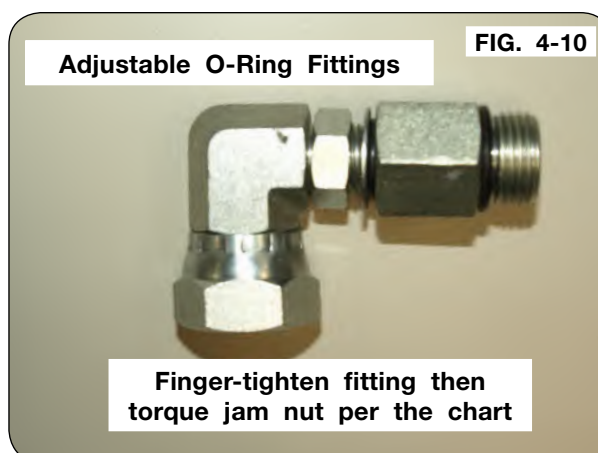
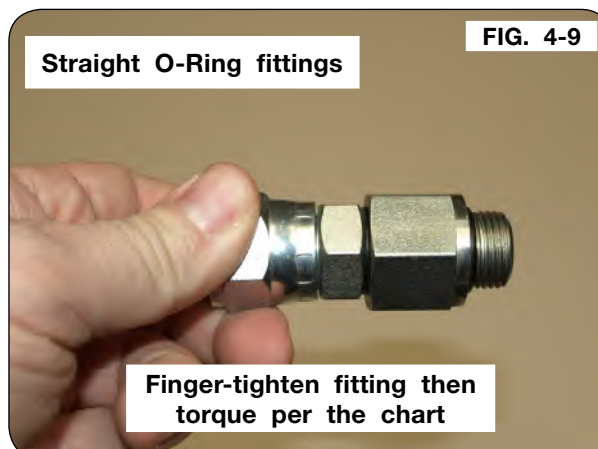
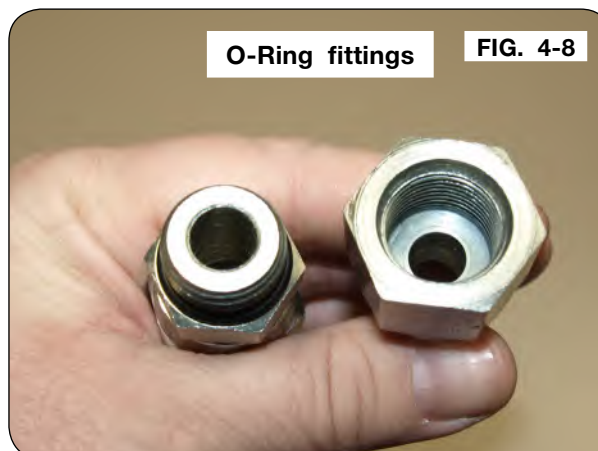
Hydraulic Fittings - Torque and Installation

Tightening O-Ring Fittings

1. Inspect components for damage or contamination. Do not connect any other type of fitting to an O-ring fitting.
2. For adjustable fittings, insure the jam nut and washer are fully backed up.
3. Lubricate the O-ring and threads on the fitting.
4. Turn the fitting into the port until it is finger tight.
5. For adjustable fittings, set in the desired position.
6. Using a wrench, torque the fitting to the value in the below table. For adjustable fittings the jam nut will be tightened.

NOTE: Never use a power tool to install a fitting.

| Dash Size | Thread Size | Straight Stud Torque (Ft-Lbs) | Adjustable Stud Torque (Ft-Lbs) |
|-----------|-------------|-------------------------------|---------------------------------|
| -5 | 1/2-20 | 14-19 | 10-14 |
| -6 | 9/16-18 | 18-24 | 12-16 |
| -8 | 3/4-16 | 27-43 | 20-30 |
| -10 | 7/8-14 | 36-48 | 30-36 |
| -12 | 1-1/16-12 | 65-75 | 44-54 |
| -14 | 1-3/16-12 | 75-99 | 53-70 |
| -16 | 1-5/16-12 | 85-123 | 59-80 |
| -20 | 1-5/8"-12 | 115-161 | 75-100 |
| -24 | 1-7/8"-12 | 125-170 | 105-125 |

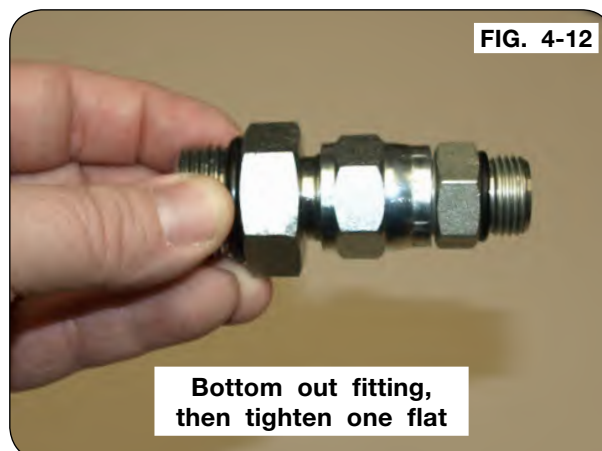


Hydraulic Fittings - Torque and Installation (continued)

Tightening JIC Fittings

1. Inspect all components for damage or contamination. Do not connect any other type of fitting to a JIC fitting.
2. Lubricate the threads.
3. Turn the fitting into the port until it bottoms out.
4. Use one wrench on the fixed hex on the hose to prevent twisting and a second on the swivel. Tighten the fitting another 60 degrees (or one flat)

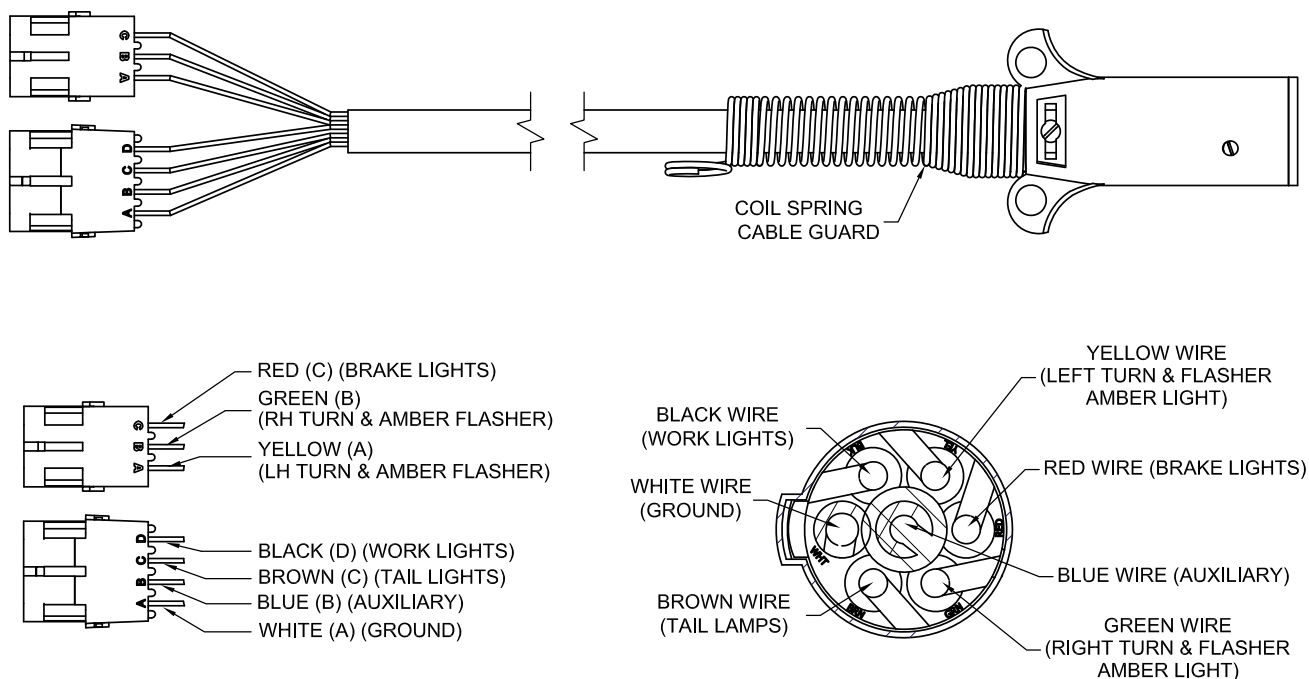
NOTE: Never use a power tool to install a fitting.



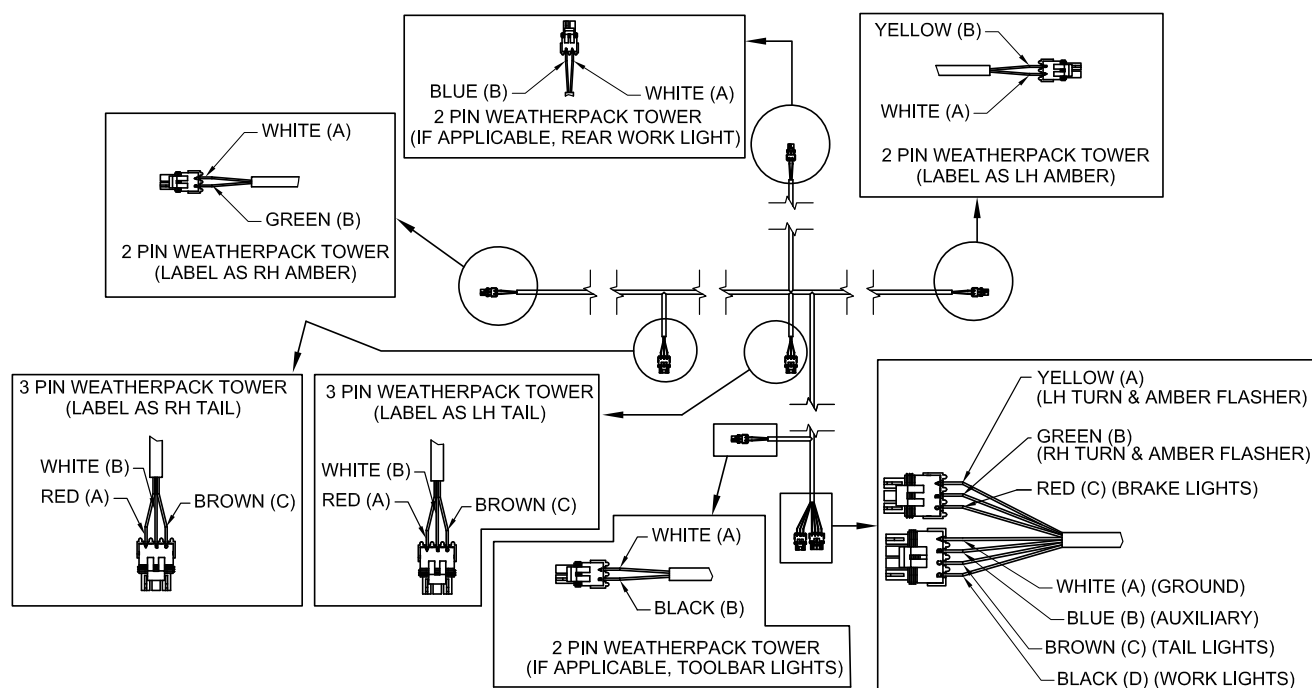
12-TON DRY FERTILIZER CART — Maintenance

Schematics - Electrical

Electrical Harness - Main 480" (45000)

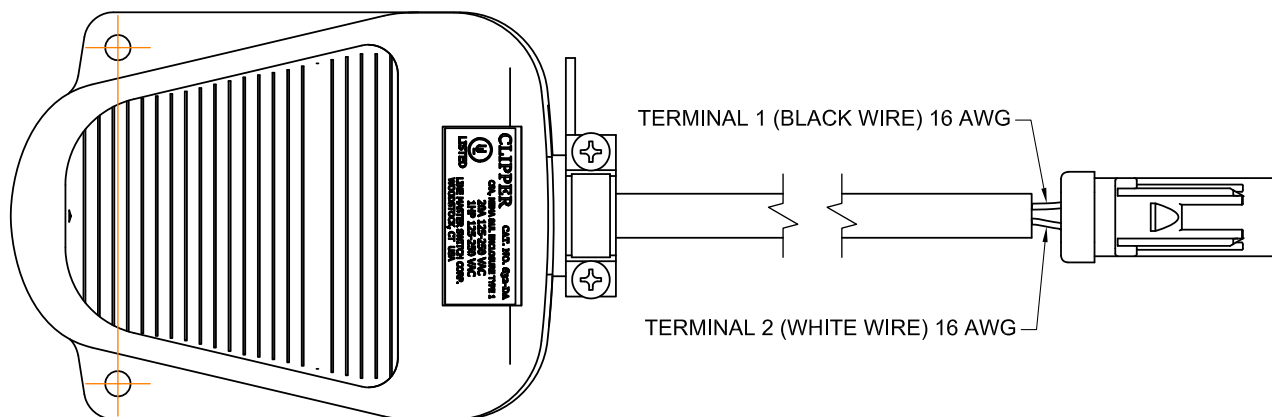


Electrical Harness - Light 418" (44999)

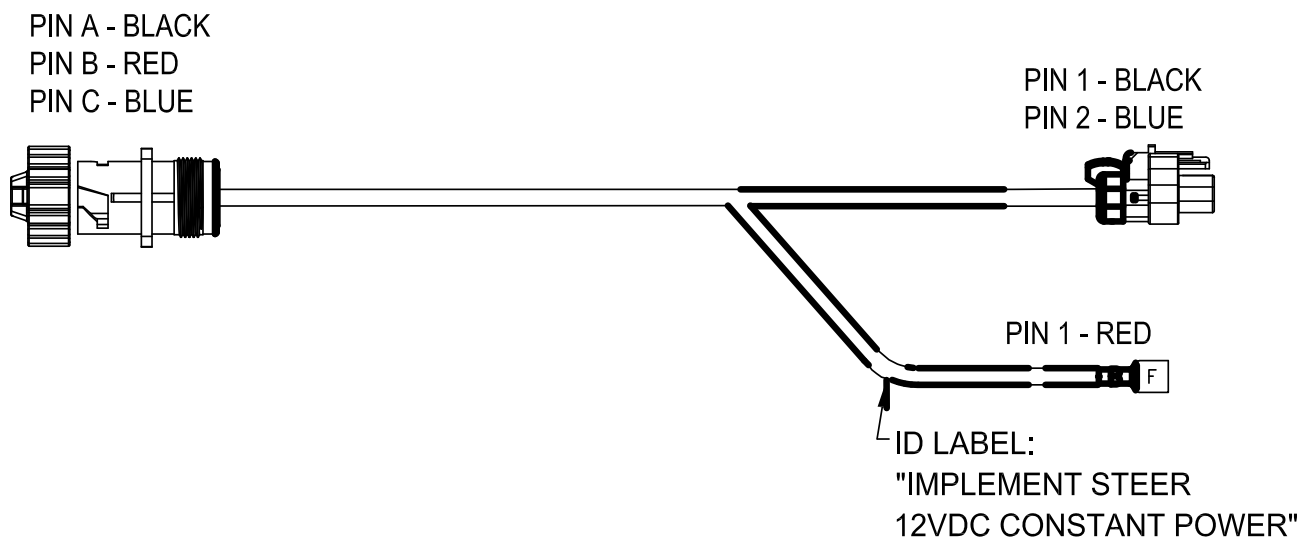


Schematics - Electrical

Foot Switch (9005916)



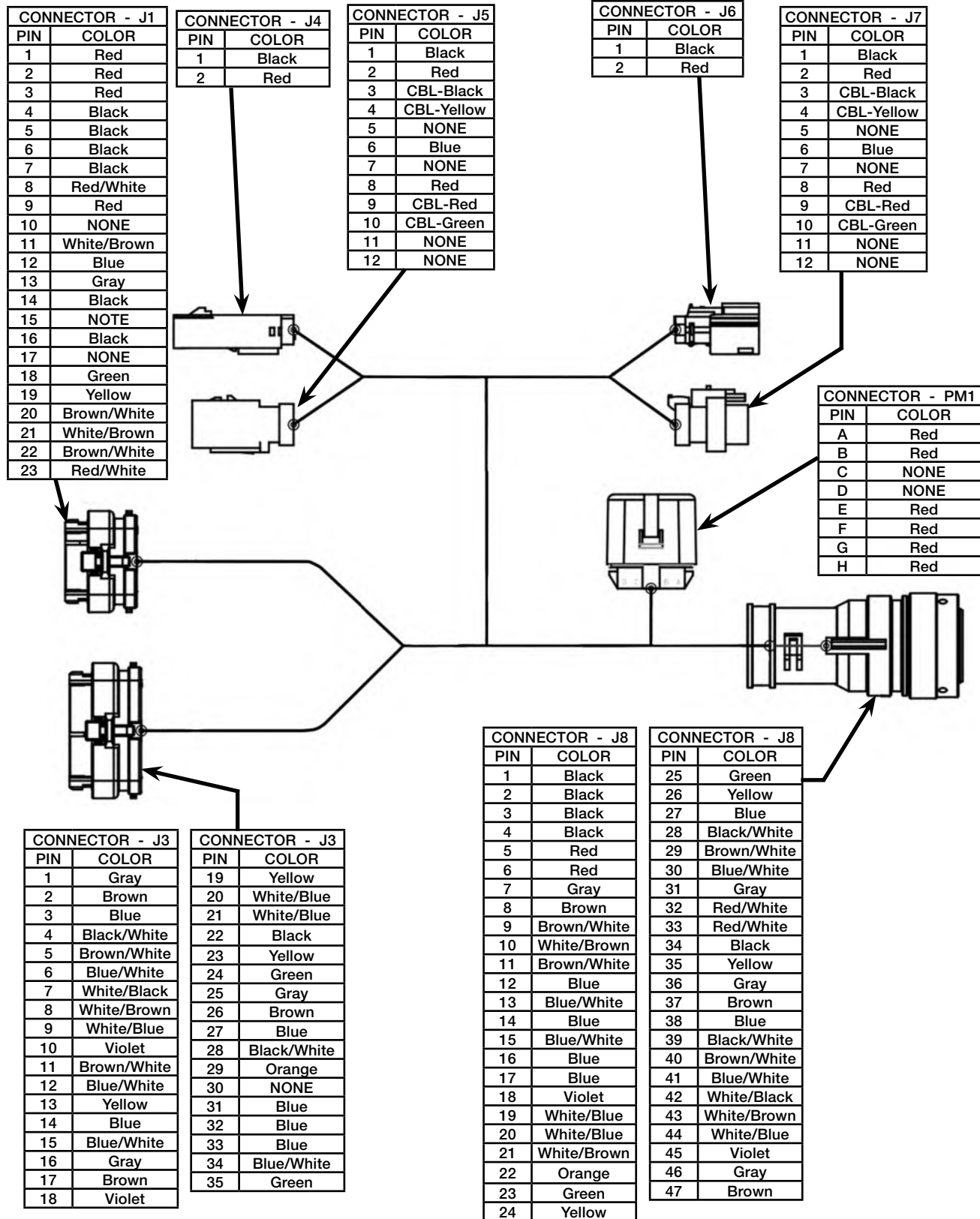
Foot Switch Cable (9503390)



12-TON DRY FERTILIZER CART — Maintenance

Schematics - Electrical

Node Cable, RCM ECU (9008095)



Schematics - Electrical (continued)

GEN 1 ISO Extension Cable (9009019)

| CONNECTOR - J1 | |
|----------------|-------|
| PIN | COLOR |
| 1 | Black |
| 2 | Red |

| CONNECTOR - J3 | |
|----------------|-------|
| PIN | COLOR |
| 1 | Black |
| 2 | Red |

| CONNECTOR - J2 | |
|----------------|------------|
| PIN | COLOR |
| 1 | Black |
| 2 | Red |
| 3 | CBL-Black |
| 4 | CBL-Yellow |
| 5 | NONE |
| 6 | Blue |
| 7 | NONE |
| 8 | Red |
| 9 | CBL-Red |
| 10 | CBL-Green |
| 11 | NONE |
| 12 | NONE |

| CONNECTOR - J4 | |
|----------------|------------|
| PIN | COLOR |
| 1 | Black |
| 2 | Red |
| 3 | CBL-Black |
| 4 | CBL-Yellow |
| 5 | NONE |
| 6 | Blue |
| 7 | NONE |
| 8 | Red |
| 9 | CBL-Red |
| 10 | CBL-Green |
| 11 | NONE |
| 12 | NONE |

GEN 1 ISO To IBIC Hitch Cable (9503926)

| CONNECTOR - J1 | |
|----------------|------------|
| PIN | COLOR |
| 1 | Black |
| 2 | Black |
| 3 | Red |
| 4 | Red |
| 5 | None |
| 6 | CBL-Red |
| 7 | CBL-Black |
| 8 | CBL-Yellow |
| 9 | CBL-Green |

| CONNECTOR - F1 | |
|----------------|-------|
| PIN | COLOR |
| A | Red |
| B | Red |

| CONNECTOR - J3 | |
|----------------|-------|
| PIN | COLOR |
| 1 | Black |
| 2 | Red |

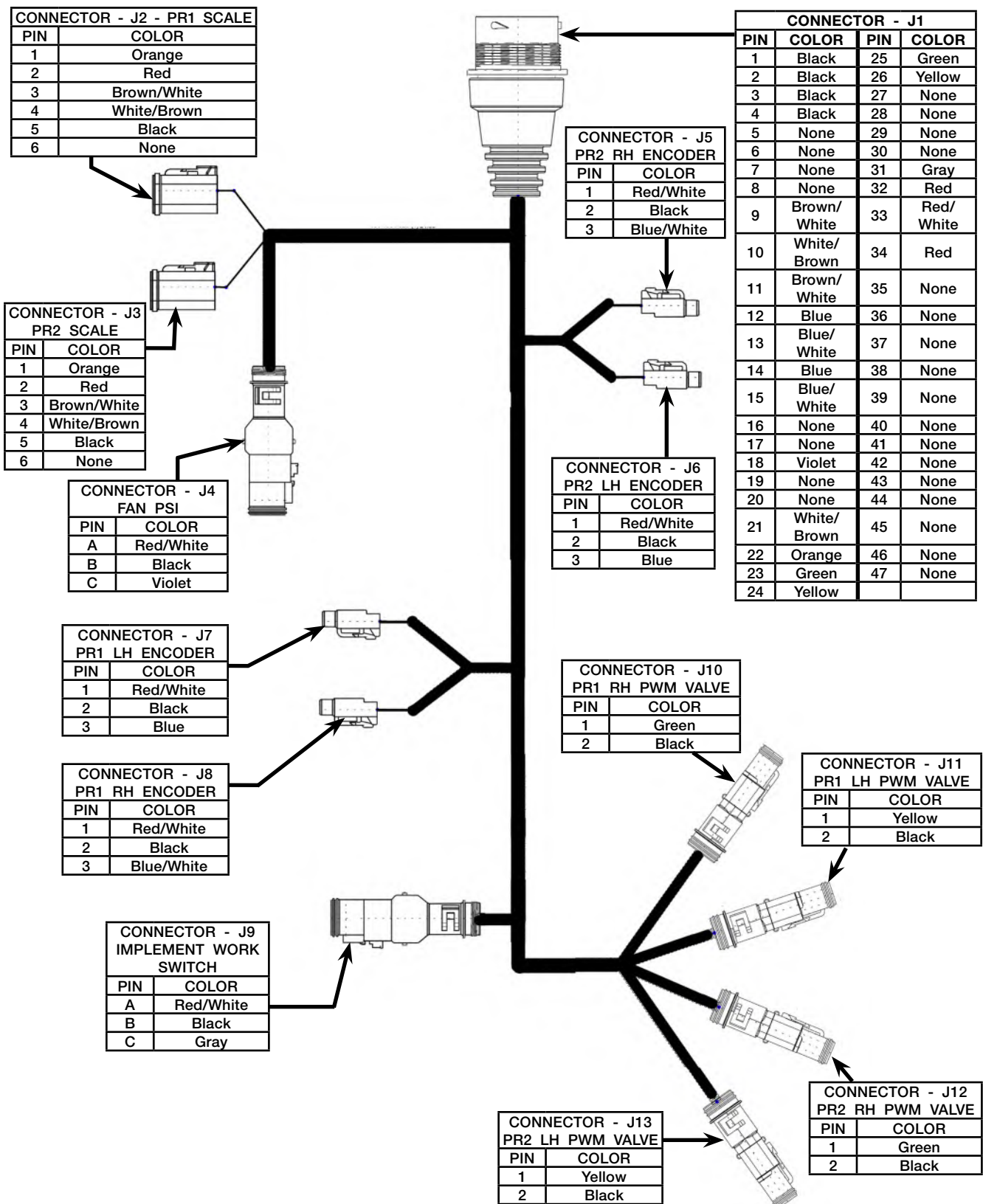
| CONNECTOR - J2 | |
|----------------|-------|
| PIN | COLOR |
| A | Black |
| B | Red |
| C | Blue |

| CONNECTOR - J4 | |
|----------------|------------|
| PIN | COLOR |
| 1 | Black |
| 2 | Red |
| 3 | CBL-Black |
| 4 | CBL-Yellow |
| 5 | None |
| 6 | Blue |
| 7 | None |
| 8 | Red |
| 9 | CBL-Red |
| 10 | CBL-Green |
| 11 | None |
| 12 | None |

12-TON DRY FERTILIZER CART — Maintenance

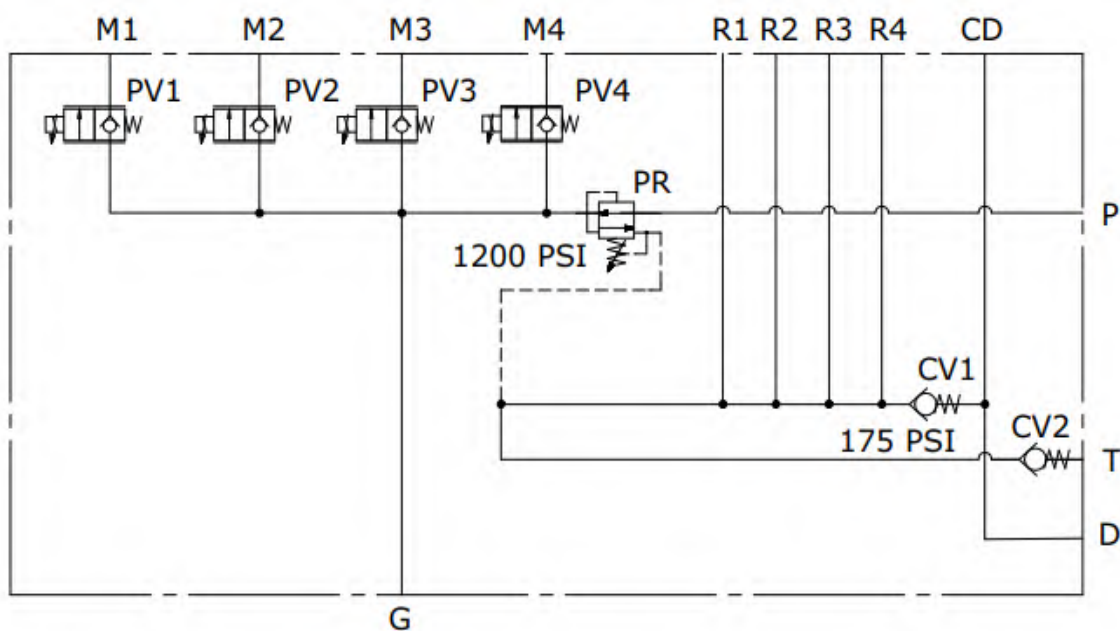
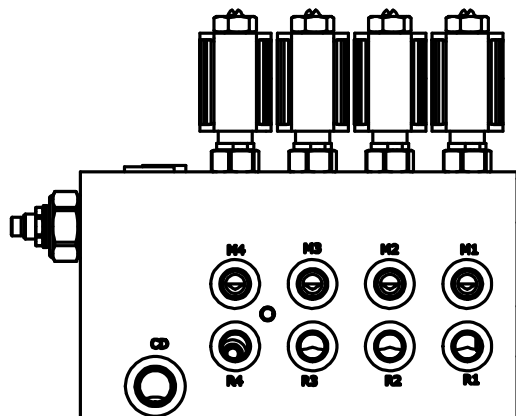
Schematics - Electrical (continued)

Product Cable - 4 Motor Control (9503927)

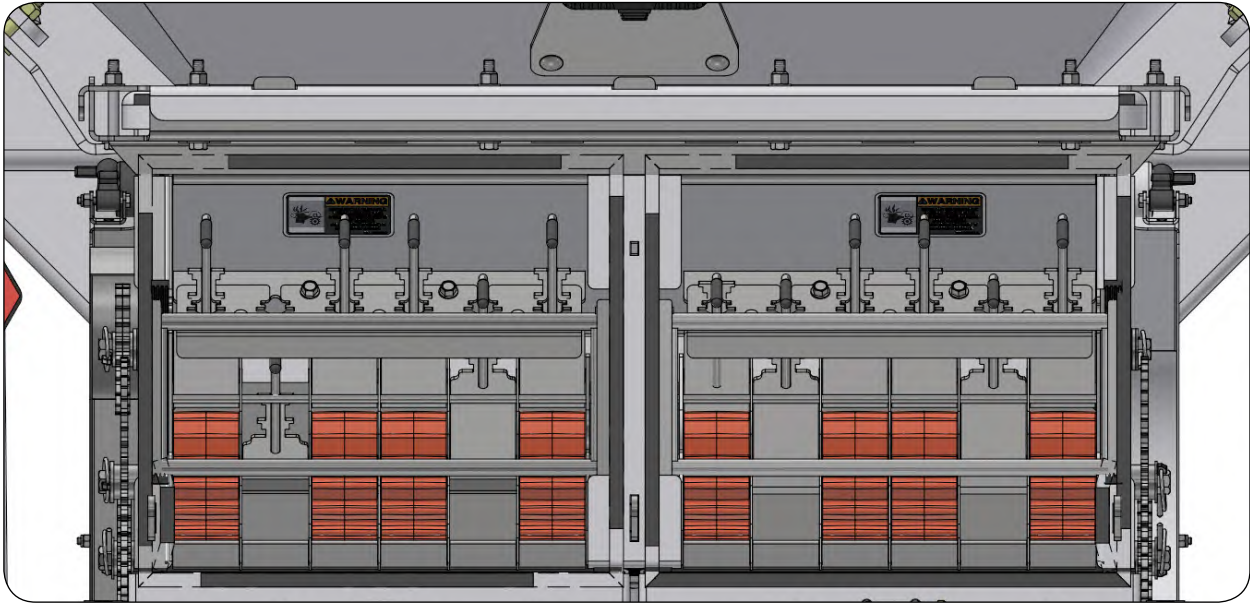


Schematics - Hydraulic

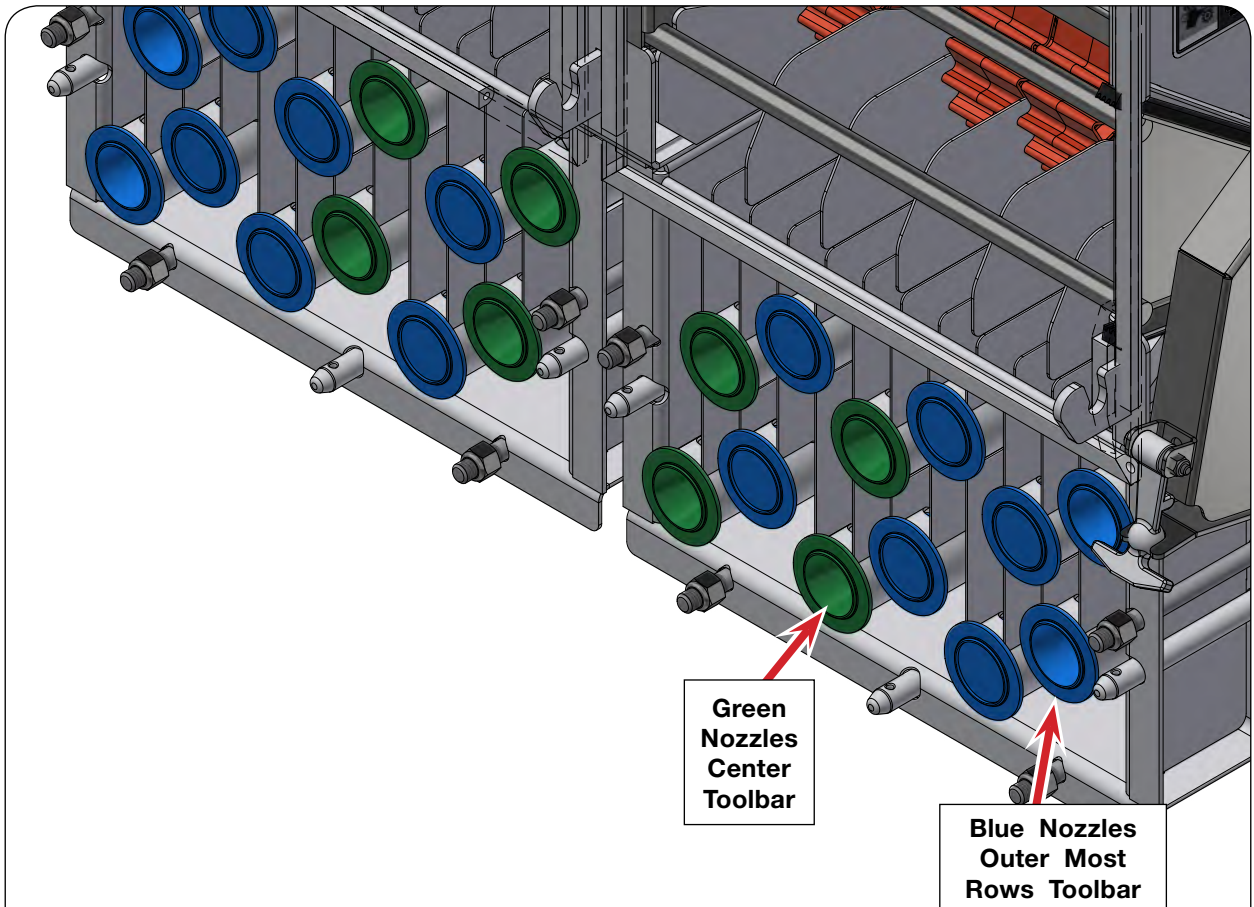
Valve Block Assembly (9503816)



Meter Wheel Location Layouts



Manifold Nozzle Location Layouts





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