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OmniRow™ Installation Manual



John Deere Sectional Control

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CHAPTER

1

Important Safety Information

NOTICE

Read this manual and the operation and safety instructions included with your implement and/or controller carefully before installing the OmniRow™ system.

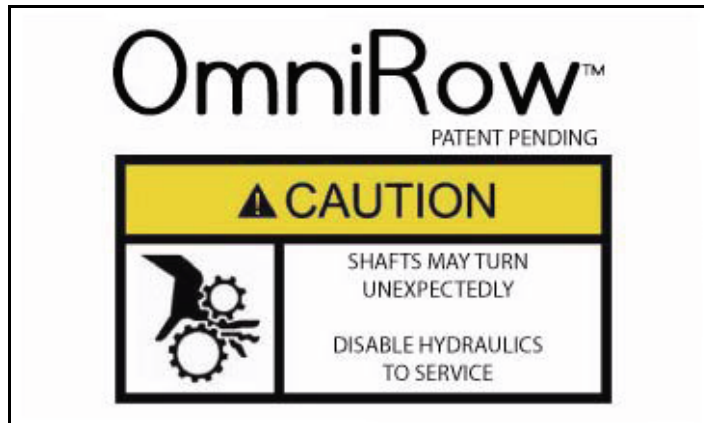
- Follow all safety information presented within this manual.
- If you require assistance with any portion of the installation or service of your Raven equipment, contact your local Raven dealer for support.
- Follow all safety labels affixed to the OmniRow system components. Be sure to keep safety labels in good condition and replace any missing or damaged labels. To obtain replacements for missing or damaged safety labels, contact your local Raven dealer.

When operating the machine after installing OmniRow, observe the following safety measures:

- Be alert and aware of surroundings.
- Do not operate OmniRow or any agricultural equipment while under the influence of alcohol or an illegal substance.
- Remain in the operator's position in the machine at all times when OmniRow is engaged.
- Disable OmniRow when exiting from the operator's seat and machine.
- Do not drive the machine with OmniRow enabled on any public road.
- Determine and remain a safe working distance from other individuals. The operator is responsible for disabling OmniRow when the safe working distance has been diminished.
- Ensure OmniRow is disabled prior to starting any maintenance work on OmniRow or the machine.

WARNING

- When starting the machine for the first time after installing OmniRow, be sure that all persons stand clear, in case a hose has not been properly tightened.
- Install the enclosed warning labels in a highly-visible area of the planter's tool bar.



CAUTION

Hydraulic Safety

- Raven Industries recommends that appropriate protective equipment be worn at all times when working on the hydraulic system.
- Never attempt to open or work on a hydraulic system with the equipment running. Care should always be taken when opening a system that has been previously pressurized.
- When disconnecting the hydraulic hoses or purging is required, be aware that the hydraulic fluid may be extremely hot and under high pressure. Caution must be exercised.
- Any work performed on the hydraulic system must be done in accordance with the machine manufacturer's approved maintenance instructions.
- When installing OmniRow hydraulics or performing diagnostics, maintenance, or routine service, ensure that precautions are taken to prevent any foreign material or contaminants from being introduced into the machine's hydraulic system. Objects or materials that are able to bypass the machine's hydraulic filtration system will reduce performance and possibly damage the hydraulic valves.

Electrical Safety

- Always verify that the power leads are connected to the correct polarity as marked. Reversing the power leads could cause severe damage to the equipment.
- Ensure that the power cable is the last cable to be connected.

CHAPTER

2

Introduction

Introduction

Congratulations on your purchase of the Raven OmniRow system! This system is designed to allow you to manage variable-rate seeding, automatic on/off planter control, and real-time seed monitoring, eliminating costly skips, doubles, and over-plants.

This manual applies to various John Deere planters equipped with standard John Deere row units and options.

Recommendations

Raven Industries recommends the following best practices when installing the OmniRow system:

- Use part numbers to identify the parts.
- Do not remove the plastic wrap from a part until it is necessary for installation.
- Do not remove plastic caps from a part until it is necessary for installation.

Tools Needed

The following tools are recommended for installation of the OmniRow system:

- SAE standard-sized wrenches
- Cable ties
- Set of tools
- Metric wrenches/sockets
- Allen wrenches

Preparing for Installation

Before installing OmniRow, park the machine on a level, clean, and dry surface. Leave the machine turned off for the duration of the installation process.

During the installation process, follow good safety practices. Be sure to carefully read the instructions in this manual as you complete the installation process.

Point of Reference

The instructions in this manual assume that you are standing behind the planter, looking toward the planter's hitch or tractor. The planter row units referenced in the manual are numbered from left to right, with the left row unit being #1.

Hydraulic Fittings

This manual may reference the following types of hydraulic fittings:

- SAE O-Ring fittings
- ORFS (O-Ring Face Seal) fittings
- JIC fittings

SAE O-ring fitting



ORFS fitting



JIC fitting (M)



TABLE 1. Hydraulic Fitting Conversion Chart

Dash Size	JIC and UNO	SAE	ORFS	NPT	BSP
04			9/16"	1/4"	1/4"
06	3/8"	3/8"	11/16"	3/8"	3/8"
08	1/2"	1/2"	13/16"	1/2"	1/2"
10		5/8"	1"		5/8"
12	3/4"	3/4"	1-3/16"	3/4"	3/4"
16			1-7/16"	1"	1"

CHAPTER

3

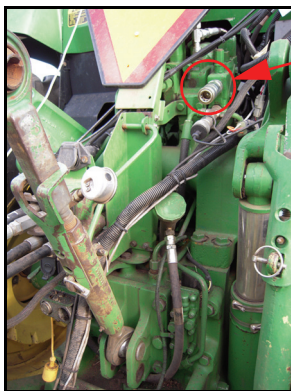
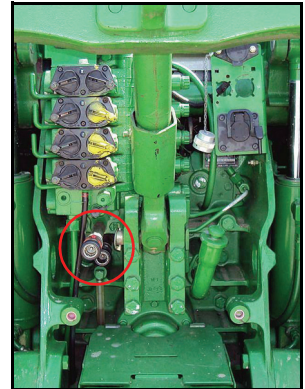
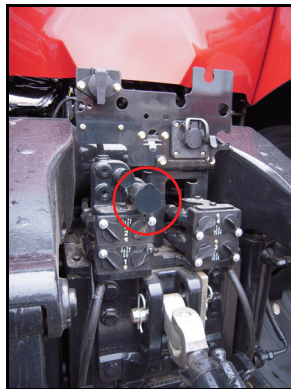
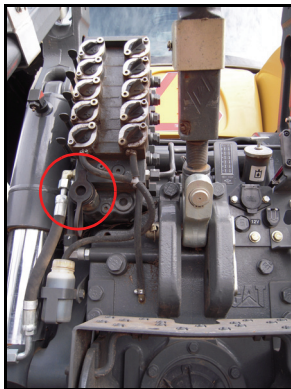
Hydraulics

Preparing for Installation

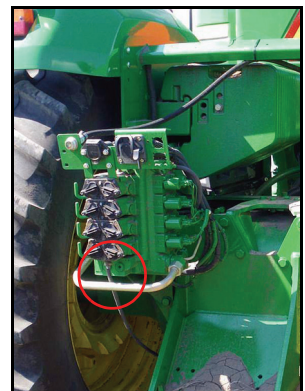
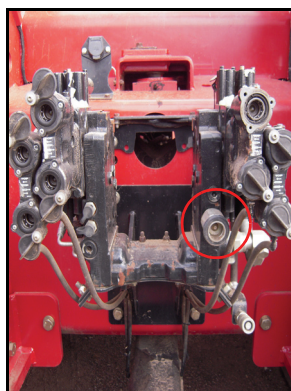
Important: Refer to the implement's operation manual before changing the connection or configuration of any of the existing hydraulic hoses.

For the OmniRow system to function properly, its hydraulic tank line must connect to a low pressure return connection on the tractor that prohibits the tank pressure from exceeding 200 psi. A motor return connection is the ideal connection for the OmniRow system because it prevents the pressure from being reversed to the system. The vacuum fan motor on the planter is often installed on this connection. If this is the case, it is likely that the fan return line can be connected to the SCV return port next to the fan pressure line. If there is no available return connection, one will have to be added to the tractor. Contact your local tractor service provider for more information.

FIGURE 1. Low Pressure Motor Returns



Added Return Coupler (Not Factory Installed)



Disassemble the Planter's Drive System

Note: The OmniRow sectional system requires the use of some of the machine's hex drive shafts. Modifications to the shafts must be made to divide the planter into specific sections. Refer to the planter-specific installation guide included in the OmniRow installation kit to identify the planter sections.

Excluding hex shafts, the planter's existing drive system is not required for operation once the OmniRow system is installed. Although it is not required for the entire existing ground drive or hydraulic transmission(s) to be removed from the planter, it is recommended to do so to help prevent any interference between the existing planter drive system and the OmniRow system.

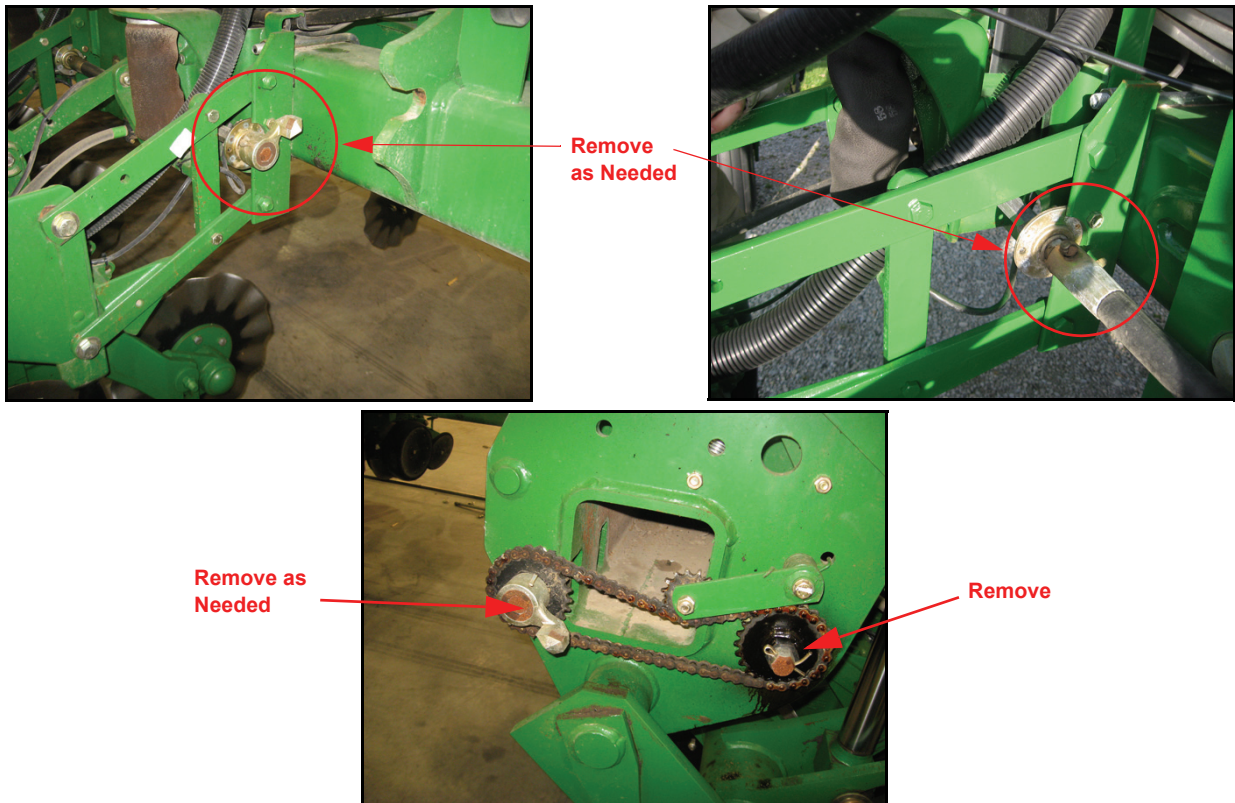
FIGURE 2. Machine's Existing Hex Shaft



1. Using the planter-specific installation guide, identify the four separate planter sections that the OmniRow system will operate.
2. Remove the drive shaft couplers or cut the 7/8" hex shaft as needed so that the planter is separated into four independent sections.
3. Determine which row units the OmniRow motors will be mounted to and remove the 7/8" hex drive shaft from those row units.

Important: Leave the existing sprocket or gearbox on the left side of the row unit. The OmniRow system will utilize it and the existing drive chain or flexible shaft to drive the seed meter.

FIGURE 3. Machine's Supplemental Support Bearings



4. Supplemental support bearings (from the right side of the planter row units, opposite the seed meter drive sprocket) can be removed as needed if they interfere with the OmniRow installation.


Note: Supplemental support bearings are generally located next to folding or flex points, or where drive chains from the transmission attach to the main hex shaft.


FIGURE 4. Components to be Removed as Needed



5. Remaining jack shafts, transmissions, and/or OEM hydraulic motors can be removed as needed if they interfere with the OmniRow installation.

Install the OmniRow Hydraulic Motors

	<p>⚠ WARNING</p> <p>Hydraulics are under pressure. Care should always be taken with a system that has been pressurized. When disconnecting or purging hydraulic hoses, be aware that the hydraulic fluid within the machine's system may be extremely hot and under high pressure.</p>
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CAUTION

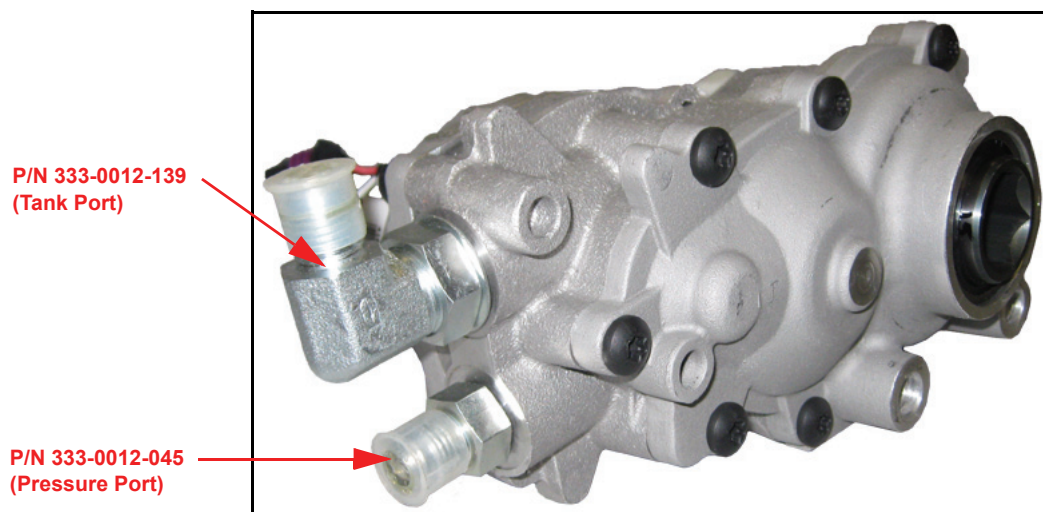
When installing OmniRow hydraulics or performing diagnostics, maintenance, or routine service, ensure precautions are taken to prevent any foreign material or contaminants from being introduced into the machine's hydraulic system.

Objects or materials that are able to bypass the machine's hydraulic filtration system will reduce performance and possibly cause damage to the OmniRow hydraulic equipment.

Install the Fittings on the OmniRow Hydraulic Motors

Before mounting the OmniRow hydraulic motors on the machine, install the proper fittings in the motors. This prepares the motors for installation and simplifies the hose connection process later in the procedure. Refer to the following table to install the fittings in the appropriate ports of the OmniRow hydraulic motors.

FIGURE 5. Fittings Installed on Hydraulic Motors

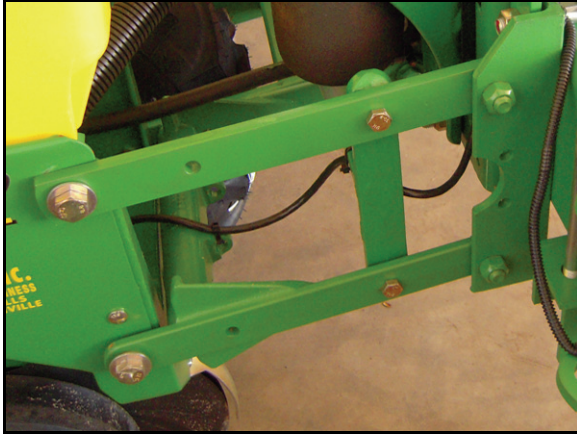


Fitting	Part Number	Port
Fitting - 9/16" SAE O-Ring (M) to 9/16" JIC (M) Straight Adapter	333-0012-045	P
Fitting - 3/4" SAE O-Ring (M) to 9/16" JIC (M) 90° Elbow	333-0012-139	T

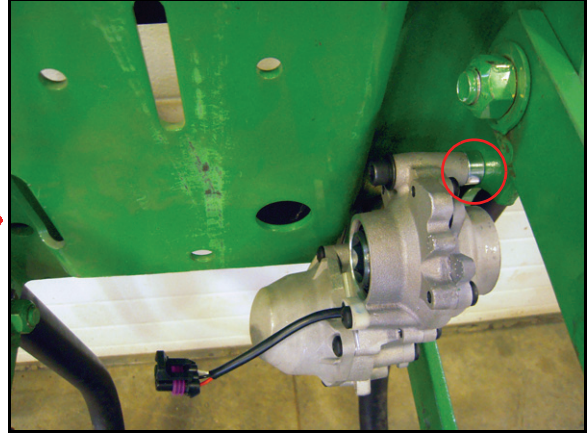
Mount the OmniRow Hydraulic Motors

FIGURE 6. Hydraulic Motor Mounted to the Planter Row Unit

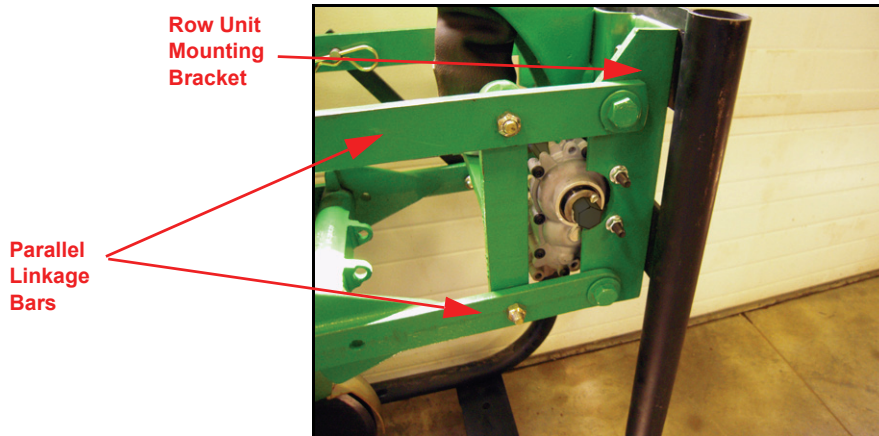
Parallel Linkage Bars on Inside of Row Unit Mounting Bracket (Spacer Required)



Motor Installed (Spacer Installed)

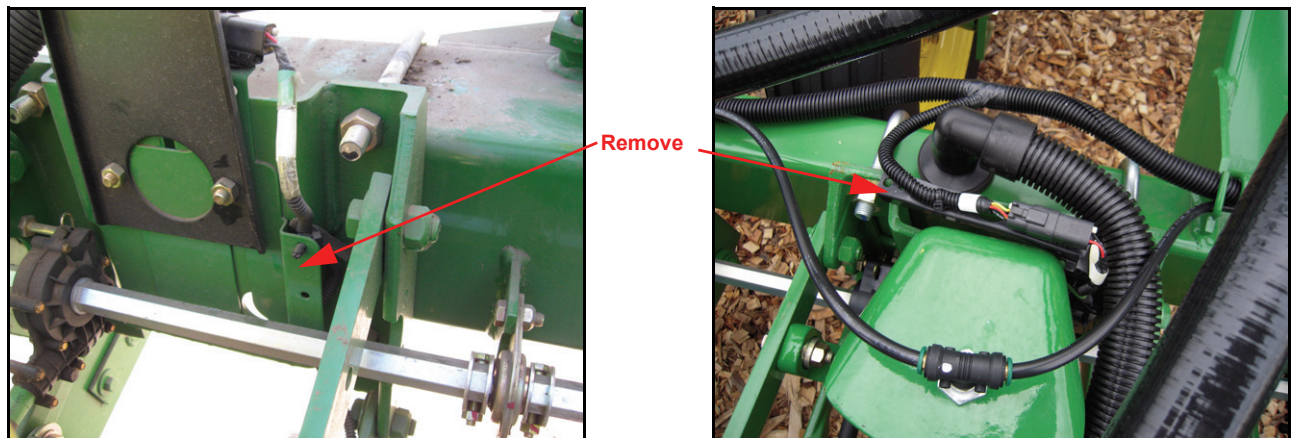


Parallel Linkage Bars on Outside of Row Unit Mounting Bracket (No Spacer Required)



Important: Ensure the motor does not come in contact with the parallel linkage bars or row cleaner/coulter attachments when the row unit travels up and down. If the parallel linkage bars are located on the **inside** of the planter row unit mounting bracket, two 0.375" ID x 0.75" OD x 0.5" L round spacers (P/N 104-1000-256) must be installed between the motor and the planter row unit to provide clearance when the row unit is in motion. Refer to Figure 5 above.

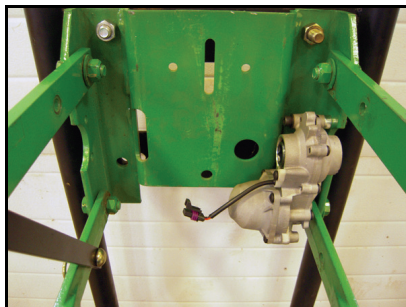
FIGURE 7. Wiring Support Brackets



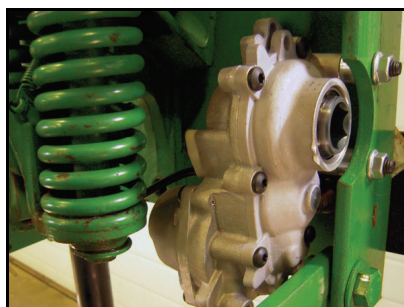
1. Remove the wiring support brackets on the right side of the planter row unit (if applicable) on the row units on which the OmniRow hydraulic motors are mounted.

FIGURE 8. Hydraulic Motor Installed

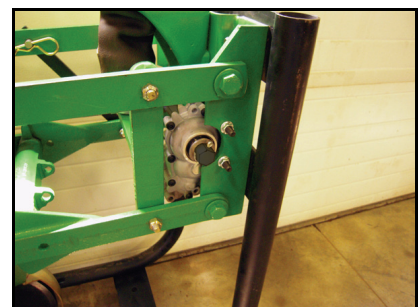
Standard Motor Installation Configuration



Motor Installed with Factory Heavy-Duty Down Force Springs



Motor Installed with Factory Airbag Down Pressure



2. Loosely mount the hydraulic motor to the right side of the planter row unit (across from the drive sprocket/gearbox) using two 3/8"-16 x 3" hex socket head cap screws (P/N 311-0068-108) and two 3/8"-16 zinc flanged lock nuts (P/N 312-1001-164).
3. Install the modified 7/8" hex shafts.
4. Secure the hex shafts with clamps and/or cotter pins on the opposite side of the existing bearing or sprocket that is not next to an OmniRow hydraulic motor.
5. Secure any existing wires within close proximity of the installed hydraulic motor so they don't interfere with the operation of the row unit.

Important: Do not secure the wires between the motor and the row unit mounting bracket, as this makes it difficult to access the wires if maintenance is required.

6. Tighten the nuts to secure the motor to the planter row unit.
7. Repeat the steps above to install the hydraulic motors on the remaining planter row units.

Install the PWM Valve Assemblies

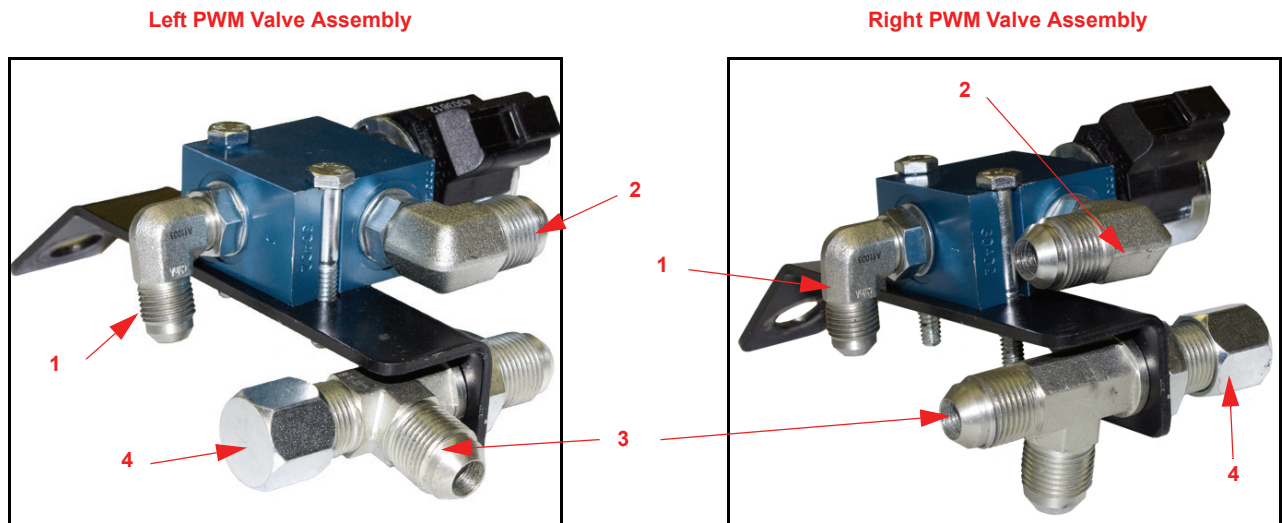
Before the PWM valves (P/N 063-0131-140) are mounted on the machine, the proper hydraulic fittings and mounting brackets must be installed. Refer to the following table to install the fittings in the appropriate ports of the PWM valve.

Install the PWM Valve Assembly - End Sections

Using the planter-specific installation guide included in the OmniRow installation kit, identify the number of left and right end row unit assemblies required for the installation on the machine.

Note: Examples of end row assembly placement locations are the left and right outside row units of the planter, and the ends of the center section hydraulic plumbing.

FIGURE 9. PWM Valve Assembly for End Row Units



#	Fitting	Part Number	Port
1	Fitting - 9/16" JIC (M) to 9/16" SAE O-Ring (M) 90° Elbow	333-0012-072	Port 1
2	Fitting - 3/4" JIC (M) to 9/16" SAE O-Ring (M) 90° Elbow	333-0012-071	Port 2
3	Fitting - 3/4" JIC M/M/M Bulkhead Tee	333-0012-314	Tank Port at the End of the Bracket
4	Fitting - 3/4" JIC (F) Cap	333-0012-272	Outside Tank Tee Branch

1. After installing the fittings on the PWM valves as shown above, secure the PWM valves to the mounting brackets (P/N 107-0171-933) using two 1/4"-20 UNC-2 x 1-3/4" hex head machine bolts (P/N 311-0050-108) and two 1/4"-20 zinc flanged lock nuts (P/N 312-1001-168) per PWM valve.

FIGURE 10. PWM Valve Installed

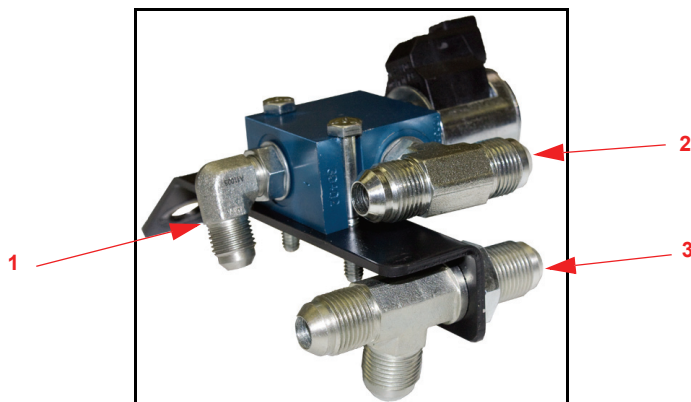


2. Install the PWM mounting brackets on the required end-row units using the supplied M16 flanged lock nuts (P/N 312-1001-178), ensuring that the capped branch of the installed tank tees face the ends of the planter and the open end of the installed tank tee fittings face the center of the planter.

Note: The PWM valves should be mounted on the right side of the planter row units. The mounting brackets should be mounted to the top of the right U-bolts that attach the row units to the planter frame. Do not remove the existing nuts from the U-bolts. Place the PWM valve assemblies onto the U-bolts, then install the supplied lock nuts to secure the valve assemblies

Install the PWM Valve Assembly - Middle Sections

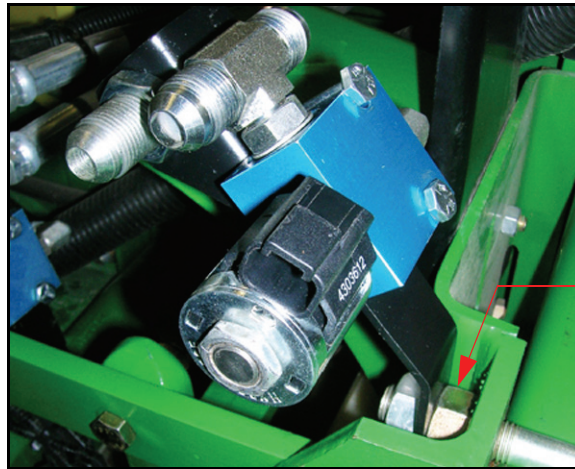
FIGURE 11. PWM Valve Assembly for Middle Row Units



#	Fitting	Part Number	Port
1	Fitting - 9/16" JIC (M) to 9/16" SAE O-Ring (M) 90° Elbow	333-0012-072	Port 1
2	Fitting - 3/4" JIC M/M to 9/16" SAE O-Ring (M) Branch Tee Adapter	333-0012-315	Port 2
3	Fitting - 3/4" JIC M/M/M Bulkhead Tee	333-0012-314	Tank Port at the End of the Bracket

1. After installing the fittings on the PWM valves as shown above, secure the PWM valves to the mounting brackets (P/N 107-0171-933) using two 1/4"-20 UNC-2 x 1-3/4" hex head machine bolts (P/N 311-0050-108) and two 1/4"-20 zinc flanged lock nuts (P/N 312-1001-168) per assembly.

FIGURE 12. PWM Valve Installed



2. Install the PWM valve assemblies on the remaining row units using the supplied M16 flanged lock nuts (P/N 312-1001-178).

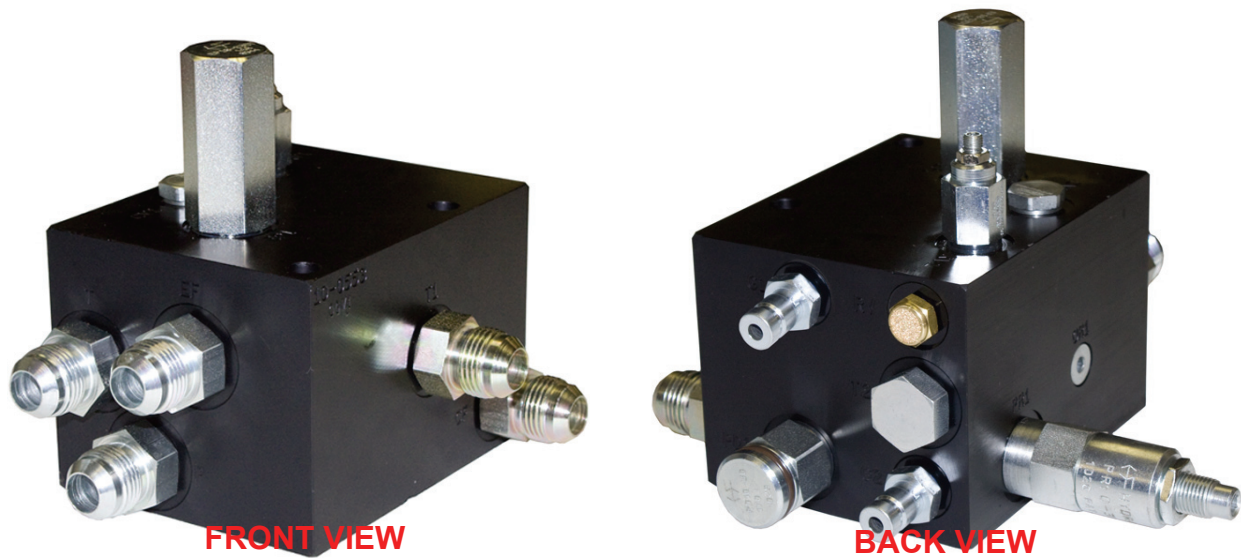
Note: *The PWM valves should be mounted on the right side of the planter row units. The mounting brackets should be mounted to the top of the right U-bolts that attach the row units to the planter frame. Do not remove the existing nuts from the U-bolts. Place the PWM valve assemblies onto the U-bolts, then install the supplied lock nuts to secure the valve assemblies.*

Install the Open Center Pressure-Reducing Valve

Install the Fittings on the Valve

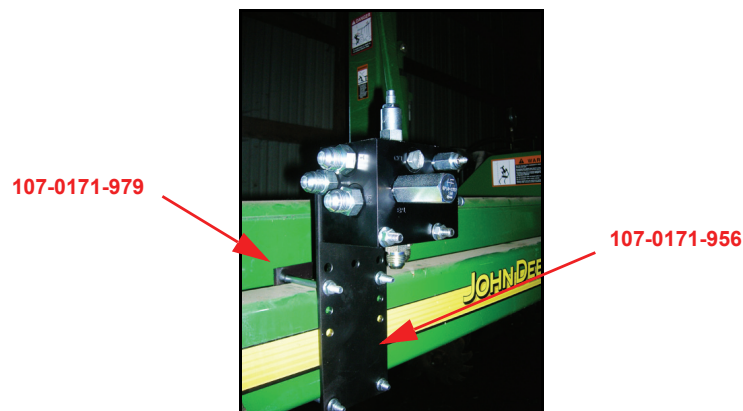
Before mounting the open center pressure reducing valve on the machine, install the proper fittings in the valve. This prepares the valve for installation and simplifies the hose connection process later in the procedure. Refer to the following table to install the fittings in the appropriate ports of the open center pressure reducing valve.

FIGURE 13. Fittings Installed on the Valve



Fitting	Part Number	Port
Fitting - 7/8" JIC (M) to 7/8" SAE O-Ring (M) Straight Adapter	333-0012-246	P, T, EF
Fitting - 7/16" SAE O-Ring (M) to Male Diagnostic Nipple Hydraulic	333-0012-308	G1, G2
Fitting - 7/8" JIC (M) to 3/4" SAE O-Ring (M)	333-0012-110	CF, T1
Fitting - 3/4" SAE O-Ring (M) Plug	333-0012-211	T2
Fitting - 1/4" NPT Breather	333-0012-189	RV

FIGURE 14. Open Center Pressure Reducing Valve Installed



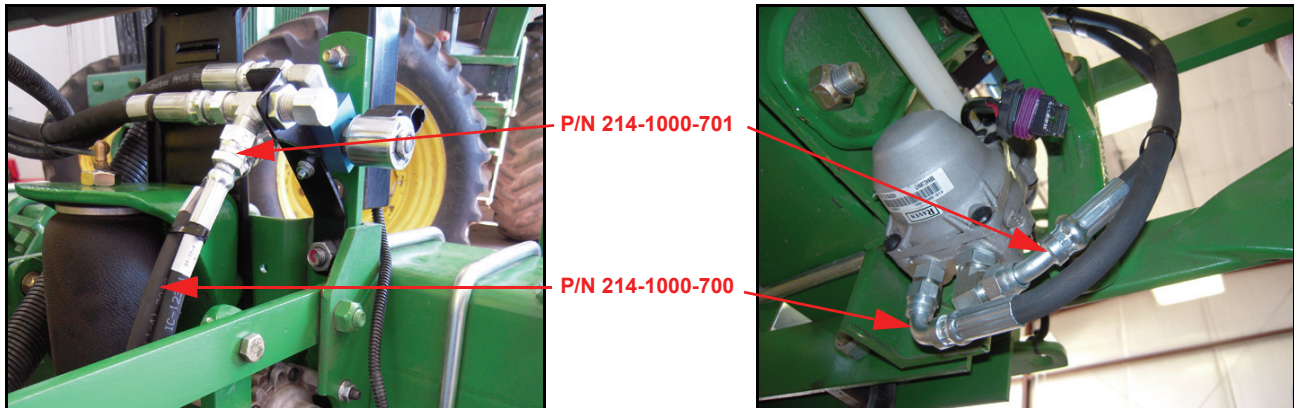
Note: The open center pressure reducing valve should be mounted at the front of the planter, near the hitch in a location that allows the hydraulic hoses to be connected to it without interference. Refer to the machine-specific hydraulic installation sheet for the location. Ports P, T, and EF should face the planter's hitch and Ports G1, G2, and T2 should face the planter's tool bar if possible.

1. Secure the open center pressure reducing valve (P/N 063-0131-142) to the mounting bracket (P/N 107-0171-956) using two 3/8"-16 x 4-3/4" UNC-2 machine bolts (P/N 311-0054-207) and two 3/8"-16 zinc flanged lock nuts (P/N 312-1001-164).
2. Mount the valve to the machine by "sandwiching" the planter's left diagonal draw bar between the two mounting brackets (P/N 107-0171-956 and 107-0171-979) using four 5/16"-18 x 4-3/4" bolts (P/N 311-0052-610), four 5/16"-18 flanged lock nuts (P/N 312-1001-169), and four 5/16" washers (P/N 313-2300-011).

Hydraulic Hose Installation

Install the OmniRow Hydraulic Motor Pressure and Tank Hoses

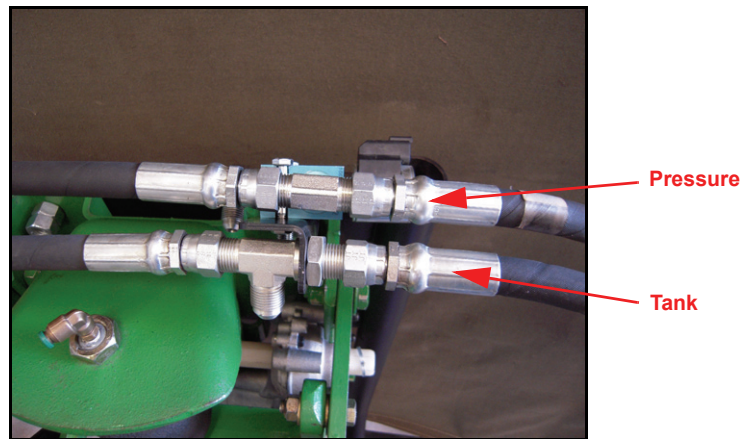
FIGURE 15. Motor Pressure and Tank Hoses Installed



1. Install the 45° end of the supplied hydraulic hose (P/N 214-1000-701) to the fitting installed in the tank port of the OmniRow hydraulic motor of section one.
2. Connect the other end of the supplied hydraulic hose to the 90° end of the bulkhead tee fitting (P/N 333-0012-314) installed on the end of the PWM valve mounting bracket (P/N 107-0171-933).
3. Install the 90° end of the supplied hydraulic hose (P/N 214-1000-700) to the fitting installed in the pressure port of the OmniRow hydraulic motor (P/N 413-8000-001) of section one.
4. Connect the other end of the supplied hydraulic hose to the fitting installed in Port 1 of the PWM valve (P/N 063-0131-140).
5. Repeat the steps above to install the pressure and tank hoses on the remaining sections.

Install the Planter Row Unit Pressure and Tank Hoses

FIGURE 16. Planter Row Unit Pressure and Tank Hoses Installed



Refer to the supplied machine-specific hydraulic installation sheet included with the OmniRow installation kit to install the planter row unit pressure and tank hoses.

Important: Pay close attention to the hydraulic hose part numbers on the diagram and the locations in which each must be installed. Install all pressure hoses before installing tank hoses.

Note: As illustrated in the installation sheet, there are tee fittings installed to connect the pressure and tank hoses to the open center pressure-reducing valve. Additional 45° and 90° elbow fittings are also supplied to assist in routing the hydraulic hoses around obstacles. Install these additional fittings as needed.

1. Install the supplied hydraulic hoses on each end of the installed tee fittings in Port 2 of the PWM valves, continuing from one row unit to the next, until all pressure hoses are installed.
2. Install the supplied hydraulic hoses on each end of the bulkhead tee fittings installed on the end of the PWM valve mounting brackets, continuing from row unit to the next, until all tank hoses are installed.

Install the Open Center Pressure-Reducing Valve Pressure and Tank Hoses

FIGURE 17. Pressure-Reducing Valve Pressure and Tank Hoses Installed

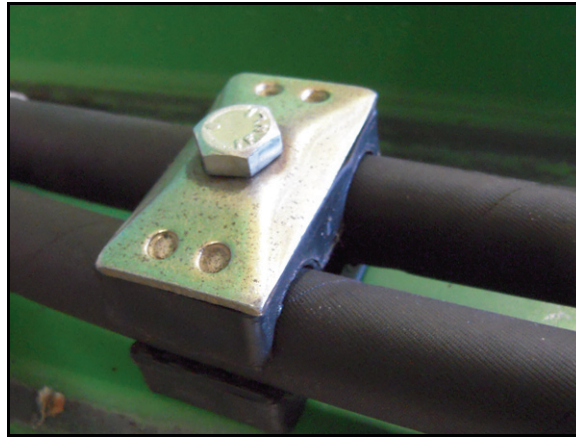


Refer to the supplied machine-specific hydraulic installation sheet included with the OmniRow installation kit to install the open center pressure-reducing valve pressure and tank hoses.

Important: Pay close attention to the hydraulic hose part numbers on the diagram and the locations in which each must be installed.

Note: Install the supplied 90° elbow fittings (P/N 333-0012-108) on the OmniRow hydraulic valve as needed when installing the hydraulic hoses.

FIGURE 18. Hoses Clamped



Note: Use the provided hose clamps (P/N 434-2000-001) to secure the installed hydraulic lines to each end of the machine's draw bar as illustrated in the figure above.

1. Install the supplied hydraulic hose labeled P on the fitting installed in Port P of the open center pressure-reducing valve.
2. Install the supplied hydraulic hose labeled T on the fitting installed in Port T of the open center pressure-reducing valve.
3. Install the supplied hydraulic hose labeled EF on the fitting installed in Port EF of the open center pressure-reducing valve.
4. Install 7/8" SAE O-ring (M) to Pioneer (M) hydraulic couplers (P/N 333-0012-310) on the remaining ends of the installed hydraulic hoses.
5. Route the ends of the installed hydraulic hoses to the planter's hitch.
6. Install the indicated hydraulic hose on the installed fitting in Port CF of the open center pressure-reducing valve.
7. Route the installed hydraulic hose along the machine's draw bar and connect to the tee fitting installed in line with the **pressure** hoses between the row units as indicated on the machine-specific hydraulic installation sheet.
8. Install the indicated hydraulic hose on the installed fitting in Port T1 of the open center pressure-reducing valve.
9. Route the installed hydraulic hose along the machine's draw bar and connect it to tee fitting installed in line with the **tank** hoses between the row units as indicated on the machine-specific hydraulic installation sheet.

CHAPTER

4

Wiring

Install the Tractor Cables

The tractor cables are specific to the tractor being used to pull the planter. For available kits and ordering information, contact your local Raven dealer.

1. Install the chassis cable's main battery connections, leaving room to provide access to the fuses in the cable.
2. Route the chassis cable to the back of the tractor.
3. Connect the chassis cable to the cab cable.

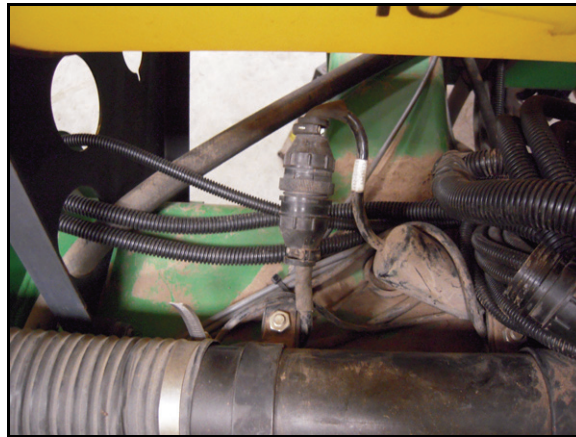
FIGURE 1. Extension Cable Connected to the Tractor Harness Cable



4. Route the cab cable into the cab and connect it to the Envizio Pro II.

Install the OmniRow Harness Cables

FIGURE 2. Seed Tube Sensor Connection



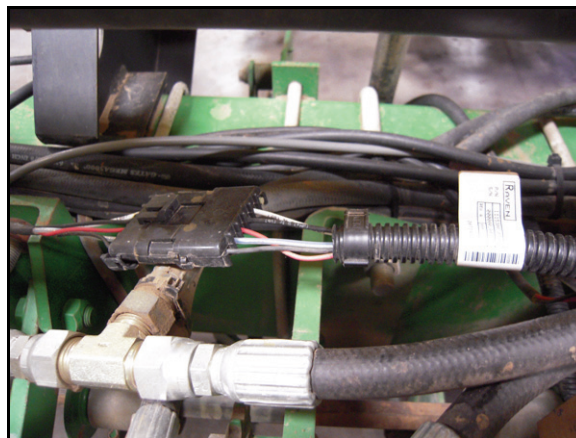
1. Locate the machine's seed tube sense cable.

Note: *The seed tube sense cable is usually located in the center of the planter.*

2. Connect the Seed Tube Sensors connector on the OmniRow harness cable (P/N 115-3001-065) to the machine's seed tube sense cable.
3. Route the 6-pin weatherpack connector section breakouts of the OmniRow harness to the corresponding section's hydraulic motor.

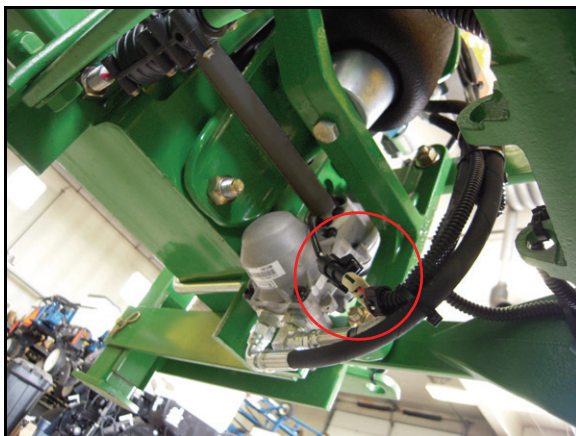
Note: *The harness cable should be laid on top of the installed hydraulic hoses. Tie-off any excess cable, allowing enough slack in the cable around the machine's pivot points for machine articulation.*

FIGURE 3. Harness Cable and Adapter Cable Connection



4. Connect the 6-pin weatherpack connectors of the four OmniRow sectional control adapter cables (P/N 115-3001-050) to the 6-pin weatherpack connectors of the OmniRow harness cable.

FIGURE 4. Adapter Cable Connections on the Row Units



5. Connect the 2-pin Deutsch connector of the adapter cable to the PWM valve installed on section 1 of the planter.
6. Connect the 3-pin metripack connector of the adapter cable to the OmniRow hydraulic motor installed on section 1 of the planter.
7. Repeat steps 5 - 6 above to connect the adapter cables to the remaining planter sections.

FIGURE 5. Extension Cable Routed to the Tractor Hitch



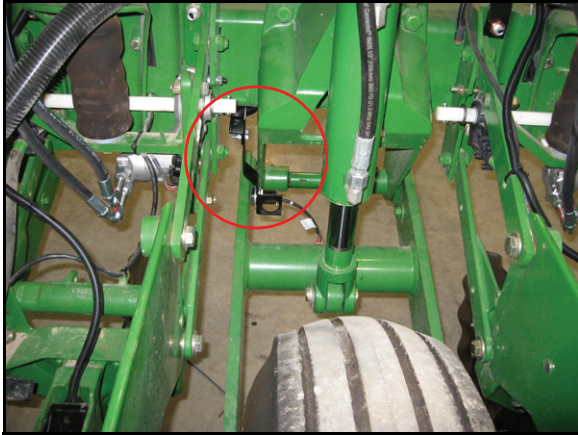
8. Connect the CAN/Power extension cable to the To CAN/Pwr/Speed Extension Cable connector of the OmniRow harness cable.
9. Route the extension cable along the planter's draw bar (along with the installed pressure and tank hoses).
10. Connect the extension cable to the installed tractor harness cable.
11. Secure the installed cables with cable ties.



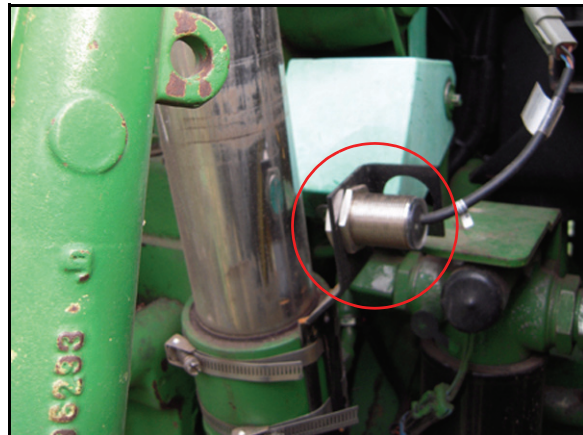
Install the Proximity Switch

FIGURE 6. Proximity Switch Installed

Switch Mounting for Drawn Planter



Switch Mounting for 3-Point Mounted Planter



1. Refer to the supplied Remote Implement Proximity Switch Installation Sheet (P/N 016-0171-374) and the planter-specific installation sheet to install the proximity switch with the parts provided.

Note: *The proximity switch brackets can be assembled in multiple configurations to fit various models of planters. Not all of the supplied brackets may be required for installation.*

2. Route and connect the Implement Switch connector of the OmniRow harness cable to the installed proximity switch.

Install the OmniRow Nodes

FIGURE 7. OmniRow Node Installed



1. Mount the magnets (P/N 418-0000-013) to the bottom of the node mounting plate using the 1/4"-20 x 3/4" HD hex bolts (P/N 311-0049-103) and 1/4"-20 UNC nylon insert lock nuts (P/N 312-4000-057).

2. Mount the OmniRow nodes (P/N 063-3001-001) to the node mounting plates (P/N 107-0171-897) using three 3/8"-16 x 1" HD hex bolts (P/N 311-0054-105) and three 3/8"-16 nylon insert lock nuts (P/N 312-4000-061).

Note: *Position the node so that the cable connections face down or to the side and in a location that allows enough slack in the cable for a drain loop.*

3. Insert the large, rectangular node connectors on the harness cables into the correct ports of the OmniRow nodes.
4. Tighten the bolts on the node connectors to secure the connections.

Install the CAN Terminators

1. Install a CAN terminator (P/N 063-0172-369) on the CAN connector of the OmniRow harness cable (P/N 115-3001-065).
2. Install a CAN terminator on the CAN connector of the cab cable (located in the tractor's cab).

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What Does this Warranty Cover?

This warranty covers all defects in workmanship or materials in your Raven Applied Technology Division product under normal use, maintenance, and service.

How Long is the Coverage Period?

Raven Applied Technology Division products are covered by this warranty for 12 months after the date of purchase. This warranty coverage applies only to the original owner and is nontransferable.

How Can I Get Service?

Bring the defective part and proof of purchase to your Raven dealer. If your dealer agrees with the warranty claim, the dealer will send the part and proof of purchase to their distributor or to Raven Industries for final approval.

What Will Raven Industries Do?

Upon confirmation of the warranty claim, Raven Industries will, at our discretion, repair or replace the defective part and pay for return freight.

What is not Covered by this Warranty?

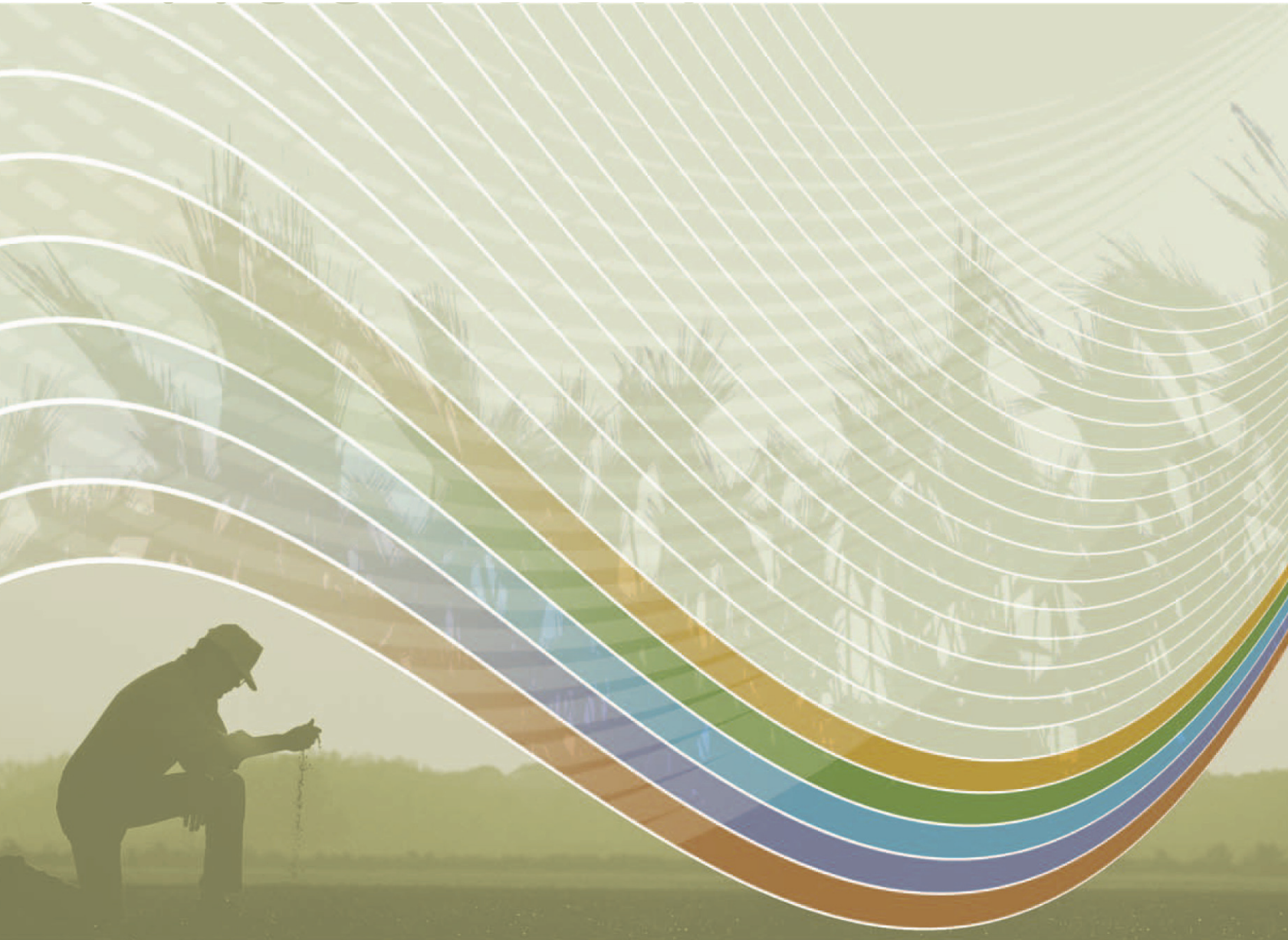
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R A V E N

John Deere Sectional Control
OmniRow™ Installation Manual
(P/N 016-3001-006 Rev A 12/10 E16893)

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