

R A V E N

SmarTrax™ Installation Manual



John Deere 8X00/8X10 Series

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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 SmarTrax™ 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 SmarTrax 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 SmarTrax, observe the following safety measures:

- Be alert and aware of surroundings.
- Do not operate SmarTrax 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 SmarTrax is engaged.
- Disable SmarTrax when exiting the operator's seat and machine.
- Do not drive the machine with SmarTrax enabled on any public road.
- Determine and remain a safe working distance from other individuals. The operator is responsible for disabling SmarTrax when the safe working distance has diminished.
- Ensure SmarTrax is disabled prior to starting any maintenance work on SmarTrax or the machine.

WARNING

- When starting the machine for the first time after installing SmarTrax, be sure that all persons stand clear in case a hose has not been properly tightened.
- The machine must remain stationary and switched off during SmarTrax installation or maintenance.

 **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 SmarTrax 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 SmarTrax valve.

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

Congratulations on your purchase of the SmarTrax system! This system is designed to provide cutting-edge, hands-free steering of the machine via Global Positioning System (GPS) coordinates.

This manual applies to the following machines:

MAKE: John Deere

MODEL: 8x00, 8x10

FIGURE 1. John Deere 8x00



Preparing for Installation

Before installing the SmarTrax system, park the machine where the ground is level, clean, and dry. Turn off the machine and leave it turned off for the duration of the installation process. Bleed pressure from the hydraulic system by loosening the hydraulic fittings slowly, where applicable.

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

Recommendations

Raven Industries recommends the following best practices when installing or operating the SmarTrax system for the first time, at the start of the season, or when moving the SmarTrax system to another machine:

- Install the GPS antenna in the recommended location. Refer to the following table for the machine-specific antenna mounting location.

Note: *If your machine is not listed, install the antenna on the front-center of the cab..*

Machine Preset	Antenna X Position (left to right)	Antenna Y Position (from the rear wheel axle to the antenna position on the cab)	Antenna Z Position (ground to top of antenna)
John Deere 8x00/10/20/30	Centered	5.0 ft./1.52 m	9.7 ft./2.96 m

- Ensure the machine's hydraulic filters have been recently changed and there are no issues with the machine's hydraulic system (e.g., pump issues, faulty hydraulic motors, fine metal deposits in the hydraulic hoses, etc.).
- Ensure the machine's hydraulic system is using fresh oil and debris is flushed from the hydraulic hoses, valves, and filters.

Raven Industries recommends the following best practices when installing the SmarTrax 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.

Point of Reference

The instructions in this manual assume that you are standing behind the machine, looking toward the cab.

Updates

Software and manual updates are available on the Raven Applied Technology website:

<http://www.ravenhelp.com>

At Raven Industries, we strive to make your experience with our products as rewarding as possible. One way to improve this experience is to provide us with feedback on this manual.

Your feedback will help shape the future of our product documentation and the overall service we provide. We appreciate the opportunity to see ourselves as our customers see us and are eager to gather ideas on how we have been helping or how we can do better.

To serve you best, please send an email with the following information to

techwriting@ravenind.com

- John Deere 8X00/8X10 Series SmarTrax™ Installation Manual
- Manual No. 016-5034-006 Rev. B
- Any comments or feedback (include chapter or page numbers if applicable).
- Let us know how long have you been using this or other Raven products.

We will not share your email or any information you provide with anyone else. Your feedback is valued and extremely important to us.

Thank you for your time.

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Kit Contents

This section contains a list of the components that are included in the SmarTrax kit. Before beginning the SmarTrax installation, compare the items in the kit with the components on this list. If you have questions about the kit, contact your Raven dealer.

TABLE 1. John Deere 8x00/8x10 SmarTrax Installation Kit (P/N 117-5034-006)

Picture	Item Description	Part Number	Qty.
Not Pictured	Manual - John Deere 8X00/8X10 Series SmarTrax Installation	016-5034-006	1
	Valve - SmarTrax Hydraulic	334-0003-088	1
	Bracket - Node Mounting	107-0171-947	1
	Bracket - WAS Base MFWD Without ILS	107-0172-051	1

TABLE 1. John Deere 8x00/8x10 SmarTrax Installation Kit (P/N 117-5034-006)

Picture	Item Description	Part Number	Qty.
	Bracket - Hydraulic Valve Mounting	107-0172-060	1
	Bracket - WAS Rod MFWD Without ILS	107-0172-061	1
	Bracket - WAS Rod	107-0172-062	1
	Bracket - WAS Base	107-0172-063	1
	Cable - John Deere 8000 Series Valve Harness	115-4001-122	1
	Sensor - 250 mm Non-Contact Linear Wheel Angle	063-0181-017	1
	Cartridge - -08 Ball Shuttle Hydraulic	334-0002-109	1
	Transducer - 0-3000 PSI Pressure	422-0000-086	1
	Mount - M10 Ball Linear Sensor	103-0001-029	1
	Mount - M10 Stud Linear Sensor	103-0001-030	1
	Spacer - Load Sense	104-1000-258	1

TABLE 1. John Deere 8x00/8x10 SmarTrax Installation Kit (P/N 117-5034-006)

Picture	Item Description	Part Number	Qty.
	Spacer - 3/8" ID x 3/4" OD x 1" Long Steel	107-0172-038	1
	Disc - Load Sense	321-0000-415	1
	Bolt - 5/16"-18 UNC x 7/8" Hex	311-0052-104	4
	Bolt - 3/8"-16 UNC x 1-1/2"	311-0054-107	4
	Bolt - M10 x 1.5 x 60 mm Metric Hex	311-0070-025	1
	Bolt - M10 x 1.5 x 40 mm Class 8.8 Hex	311-0070-039	1
	Bolt - M10 x 1.5" x 80 mm Class 8.8 Metric Hex	311-0070-046	2
	Nut - M10 x 1.5 Pitch x 5 mm Thick Jam	312-1002-035	2
	Nut - 3/8"-16 Nylon Insert Lock	312-4000-061	4
	Nut - M10 x 1.5 Nylon Insert Lock	312-4000-208	4
	Nut - 3/8"-16 Thin Nylon Insert Lock	312-4001-109	3

TABLE 1. John Deere 8x00/8x10 SmarTrax Installation Kit (P/N 117-5034-006)

Picture	Item Description	Part Number	Qty.
	Washer - 5/16" Lock	313-1000-019	4
	Washer - 0.344" ID x 0.688" OD x 0.065" Thick	313-2300-012	4
	Washer - 0.406" ID x 0.812" OD x 0.065" Thick	313-2300-014	17

TABLE 2. Hydraulic Kit (P/N 117-0199-006)

Picture	Item Description	Part Number	Qty.
	Fitting - -8 ORFS M/M/F Swivel Run Tee Adapter	333-0012-028	2
	Fitting - -4 SAE O-Ring (M) Plug	333-0012-051	1
	Fitting - -6 ORFS M/F 90° Swivel Elbow	333-0012-065	4
	Fitting - -8 ORFS M/F 90° Swivel Elbow	333-0012-067	2
	Fitting - -6 ORFS M/M/F Swivel Run Tee Adapter	333-0012-069	2
	Fitting - M14 x 1.5 (M) to -6 ORFS (M) Straight Adapter	333-0012-077	3
	Fitting - -6 SAE O-Ring (M) Plug	333-0012-104	1

TABLE 2. Hydraulic Kit (P/N 117-0199-006)

Picture	Item Description	Part Number	Qty.
	Fitting - -4 ORFS (M) to -6 SAE O-Ring (M) Straight Adapter	333-0012-195	2
	Fitting - -6 ORFS (M) to -8 SAE O-Ring (M) Straight Adapter	333-0012-199	2
	Fitting - -6 ORFS (M) to -10 SAE O-Ring (M) Straight Adapter	333-0012-233	2
	Fitting - -4 SAE O-Ring (F) to Female Diagnostic Coupler Hydraulic	333-0012-336	1
	Fitting - -4 ORB M/F Adjustable Elbow	333-0012-337	1
	Hydraulic Hose - -6 ORFS (F) to -6 ORFS (F) 90° - 36"	214-1000-333	2
	Hydraulic Hose - -8 ORFS (F) to -6 ORFS (F) 90° - 96"	214-1000-759	2
	Hydraulic Hose - -6 ORFS (F) to -4 ORFS (F) 90° - 36"	214-1000-833	2

TABLE 3. Node Kit (P/N 117-5030-005) - SmarTrax-Only Systems

Picture	Item Description	Part Number	Qty.
Not Pictured	Manual - SmarTrax and SmartSteer Calibration & Operation	016-0171-277	1
	Node - SmarTrax 3D CAN Control	063-0173-228	1

TABLE 3. Node Kit (P/N 117-5030-005) - SmarTrax-Only Systems

Picture	Item Description	Part Number	Qty.
	Harness - SmarTrax Node	115-4001-109	1
	Assembly - SmarTrax Enable Switch	063-0172-470	1

Note: The node installation kit is sold separately.



⚠ WARNING

Hydraulics are under pressure. Care should always be taken with a system that has been pressurized.

Before beginning the SmarTrax hydraulic installation, turn off the machine and relieve pressure by turning the steering wheel left and right.

Never work on a hot machine. Always allow it to cool before performing diagnostics, maintenance, or routine service.

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.

Tampering with hydraulic valves may cause serious injury or death, and will void the warranty.



⚠ CAUTION

When installing SmarTrax hydraulics or performing diagnostics, maintenance, or routine service, ensure precautions are taken to prevent any foreign material 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 SmarTrax hydraulic valve.

	NOTICE
<p>The appearance of the SmarTrax hydraulic valve may vary slightly from the images contained in this manual. However, the fittings, hose connections, and cable connections remain the same.</p>	

Install Fittings in the SmarTrax Valve

Before mounting the SmarTrax valve (P/N 334-0003-088) 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.

FIGURE 1. Fittings Installed in the SmarTrax Valve



Fitting	Part Number	Port
Fitting - -4 SAE O-Ring (M) Plug	333-0012-051	PS
Fitting - -4 ORFS (M) to -6 SAE O-Ring (M) Straight Adapter	333-0012-195	LS STEER
Fitting - -6 ORFS (M) to -8 SAE O-Ring (M) Straight Adapter	333-0012-199	P, T
Fitting - -6 ORFS (M) to -10 SAE O-Ring (M) Straight Adapter	333-0012-233	A, B
Cartridge - -08 Ball Shuttle Hydraulic	334-0002-109	EP1

1. Refer to the table and figure above to install the fittings in the appropriate ports of the SmarTrax valve.
2. Remove the existing cartridge from Port EP1 of the SmarTrax valve and replace it with the -08 ball shuttle hydraulic cartridge (P/N 334-0002-109).

Mount the SmarTrax Valve

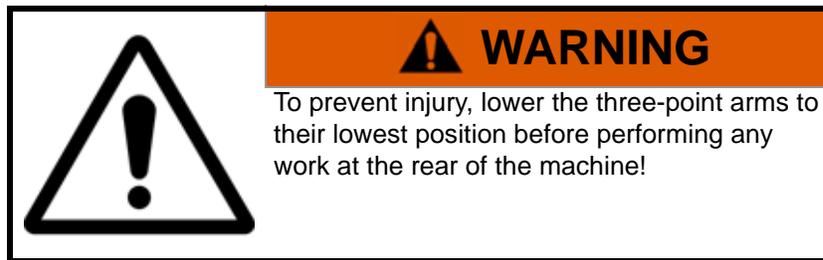
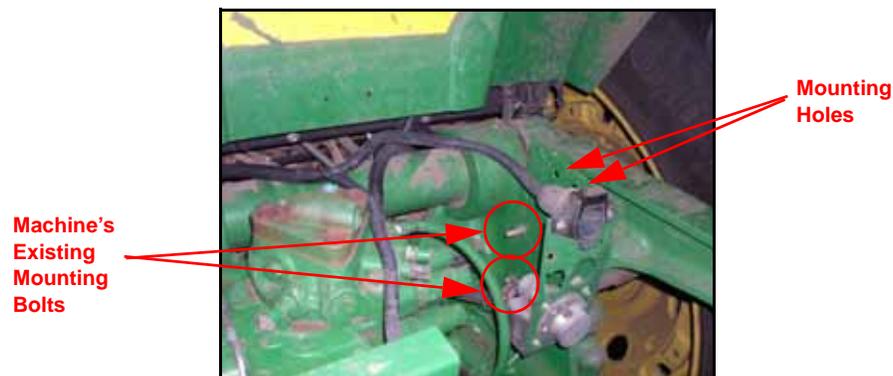


FIGURE 2. SmarTrax Valve Mounting Location



1. Identify the valve mounting location on the right-rear corner of the machine.

FIGURE 3. Machine's Existing Mounting Bolts



2. Remove the nuts from the machine's existing mounting bolts.
3. Mount the SmarTrax valve mounting plate (P/N 107-0172-060) to the machine's existing mounting bolts and secure it by reinstalling the machine's nuts on the existing mounting bolts.

FIGURE 4. Valve Mounting Plate Installed



Installed 3/8"-16 UNC
x 1" Hex Bolts
(P/N 311-0054-107)

4. Install two 3/8"-16 UNC x 1-1/2" hex bolts (P/N 311-0054-107), four washers (P/N 313-2300-014), and two 3/8"-16 nylon insert lock nuts (P/N 312-4000-061) in the mounting holes shown in the figure above.
5. Install the SmarTrax valve (P/N 334-0003-088) on the hydraulic valve mounting plate (P/N 107-0172-060) using four 5/16"-18 x 7/8" hex bolts (P/N 311-0052-104), four washers (P/N 313-2300-012) and four 5/16" lock washers (P/N 313-1000-019).

Install the Pressure Transducer

FIGURE 5. Shield Covering the Steering Control Unit (SCU)



Hose Shield

1. Remove the hose shield covering the steering control unit on the left side of the machine.

FIGURE 6. DR Port Hydraulic Fitting Assembly



2. Install the -4 ORB M/F adjustable 90° elbow fitting (P/N 333-0012-337) on the -4 SAE O-ring (F) to female diagnostic coupler hydraulic fitting (P/N 333-0012-336).
3. Install the 0-3000 psi pressure transducer (P/N 422-0000-086) on the installed adjustable 90° elbow fitting.

FIGURE 7. Transducer Assembly Installed on DR Port

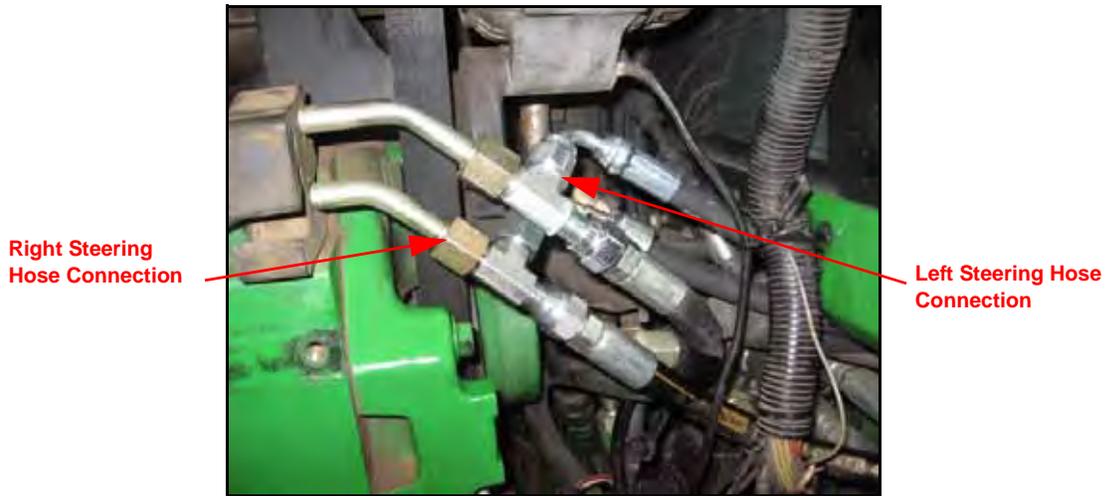


4. Remove the cap from the DR port of the John Deere steering block and install the hydraulic fitting assembly.

Note: The DR port is located directly behind the left and right steering connections on the machine.

Install the Left and Right Steering Hoses

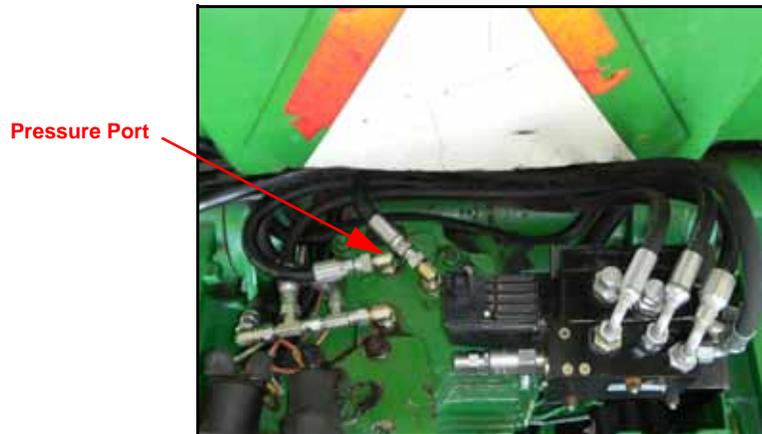
FIGURE 8. Left and Right Steering Hose Connections on the SCU



1. Locate the machine's left and right steering hoses on the SCU.
2. Disconnect the left steering hose from the steel line.
3. Install a -8 ORFS M/M/F swivel run tee adapter fitting (P/N 333-0012-028) on the end of the steel line.
4. Connect the machine's left steering hose to the opposite end of the installed tee fitting.
5. Install a -8 ORFS M/F 90° elbow fitting (P/N 333-0012-067) on the 90° end of the installed tee fitting.
6. Install the straight end of the supplied hydraulic hose (P/N 214-1000-759) on the installed elbow fitting.
7. Route the installed hydraulic hose under the left side of the cab, behind the fender well.
8. Connect the 90° end of the installed hydraulic hose to the fitting installed in Port A of the SmarTrax valve (P/N 334-0003-088).
9. Disconnect the right steering hose from the steel line.
10. Install a -8 ORFS M/M/F swivel run tee adapter fitting (P/N 333-0012-028) on the end of the steel line.
11. Connect the machine's right steering hose to the opposite end of the installed tee fitting.
12. Install a -8 ORFS M/F 90° elbow fitting (P/N 333-0012-067) on the 90° end of the installed tee fitting.
13. Install the straight end of the supplied hydraulic hose (P/N 214-1000-759) on the installed elbow fitting.
14. Route the installed hydraulic hose under the left side of the cab behind the fender well.
15. Connect the 90° end of the installed hydraulic hose to the fitting installed in Port B of the SmarTrax valve.
16. Reinstall the SCU shield.

Install the Pressure Hose

FIGURE 9. Pressure Hose Installed



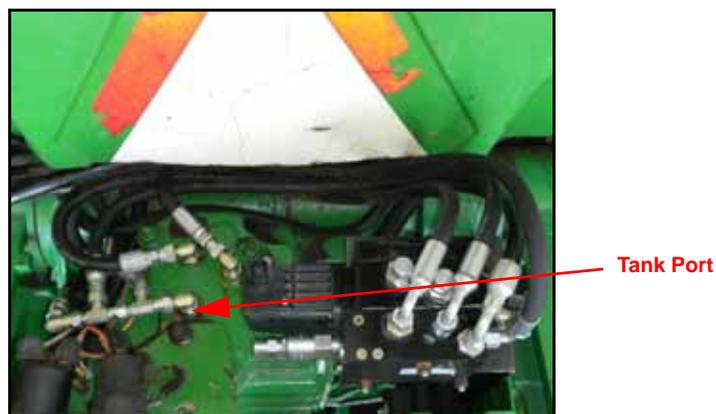
1. Locate the pressure (P) port on the machine's hydraulic valve.
2. Remove the existing plug from port P.
3. Install a M14 x 1.5 (M) to -6 ORFS (M) straight adapter fitting (P/N 333-0012-077) in port P.
4. Install a -6 ORFS M/F 90° swivel elbow fitting (P/N 333-0012-065) on the installed adapter fitting.
5. Install the 90° end of the supplied hydraulic hose (P/N 214-1000-333) to the fitting installed in Port P of the SmarTrax valve (P/N 334-0003-088).
6. Connect the straight end of the installed hydraulic hose on the fitting installed in port P of the machine's hydraulic valve.

3

Install the Tank Hose

Machines with Power Beyond Installed

FIGURE 10. Tank Hose Installed



1. Remove the machine's existing tank hose from the hydraulic valve.

Chapter 3

2. Remove the John Deere Power Beyond plate orifice and adapter fitting from the tank (T) port of the machine's hydraulic valve.
3. Install a M14 x 1.5 (M) to -6 ORFS (M) straight adapter fitting (P/N 333-0012-077) in port T of the machine's hydraulic valve.
4. Install a -6 ORFS M/F 90° swivel elbow fitting (P/N 333-0012-065) on the installed adapter fitting.
5. Install a -6 ORFS M/M/F swivel run tee adapter fitting (P/N 333-0012-069) on the installed elbow fitting.
6. Install the 90° end of the supplied hydraulic hose (P/N 214-1000-333) on the fitting installed in Port T of the SmarTrax valve (P/N 334-0003-088).
7. Connect the straight end of the installed hydraulic hose to the 90° end of the tee fitting installed in step 5.

Machines without Power Beyond Installed

FIGURE 11. Tank Port Location



1. Remove the plug fitting from the machine's tank (T) port.

FIGURE 12. Tank Hose Installed

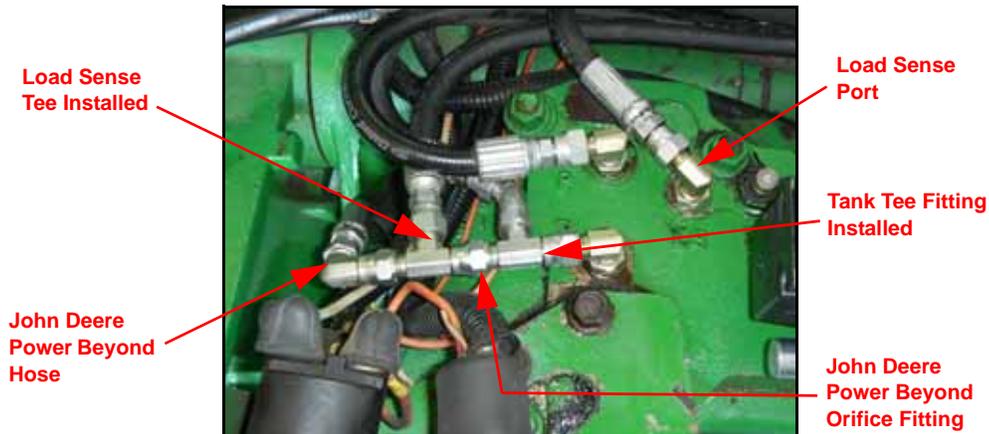


2. Install a M14 x 1.5 (M) to -6 ORFS (M) straight adapter fitting (P/N 333-0012-077) in port T of the machine's hydraulic valve.
3. Install a -6 ORFS M/F 90° swivel elbow fitting (P/N 333-0012-065) on the installed adapter fitting.
4. Install the 90° end of the supplied hydraulic hose (P/N 214-1000-333) on the fitting installed in Port T of the SmarTrax valve (P/N 334-0003-088).
5. Connect the straight end of the installed hydraulic hose to the elbow fitting installed in step 3.

Install the Load Sense Hose

Machines with Power Beyond Installed

FIGURE 13. Load Sense Hoses Installed



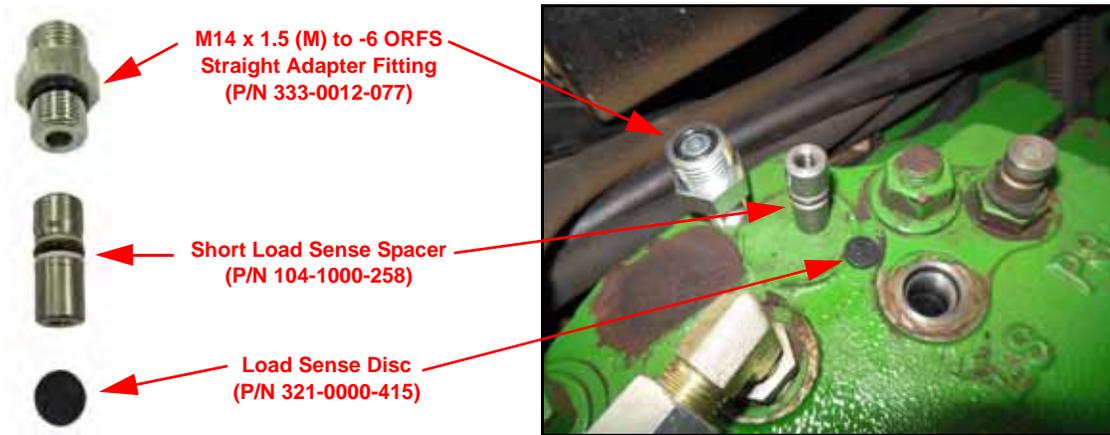
1. Install the John Deere Power Beyond plate orifice fitting in the female end of a -6 ORFS M/M/F swivel run tee adapter fitting (P/N 333-0012-069).
2. Install the end of the tee fitting containing the orifice on the male end of the installed tank tee fitting.
3. Install a -6 ORFS M/F 90° swivel elbow fitting (P/N 333-0012-065) on the straight end of the installed tee fitting.
4. Trace the Power Beyond hose from the Power Beyond quick coupler to the LS port of the machine's hydraulic valve.
5. Disconnect the Power Beyond hose from the machine's LS port.
6. Connect the Power Beyond hose to the fitting installed in step 3.
7. Remove the existing tee adapter fitting in the LS port.

Important: Do not remove the Power Beyond straight adapter fitting, the spacer, or the shuttle from the LS port of the machine's hydraulic valve. These fittings are needed for the SmarTrax load sense hose installation.

8. Install a -6 ORFS M/F 90° swivel elbow fitting (P/N 333-0012-065) in the LS port.
9. Install a -4 ORFS (M) to -6 SAE O-ring (M) straight adapter fitting (P/N 333-0012-195) in Port LSPV of the SmarTrax valve (P/N 334-0003-088).
10. Install the 90° end of the supplied hydraulic hose (P/N 214-1000-833) on the fitting installed in Port LSPV of the SmarTrax valve.
11. Connect the straight end of the installed hydraulic hose to the 90° end of the tee fitting installed in step 2.
12. Install the 90° end of the supplied hydraulic hose (P/N 214-1000-833) on the fitting installed in Port LS STEER of the SmarTrax valve.
13. Connect the straight end of the installed hydraulic hose to the fitting installed in the machine's LS port.

Machines without Power Beyond Installed

FIGURE 14. Load Sense Port Fitting Installation



1. Install a -6 SAE O-ring (M) plug adapter fitting (P/N 333-0012-104) in Port LSPV of the SmarTrax valve (P/N 334-0003-088).
2. Remove the existing plug from the machine's load sense (LS) port.
3. Insert the load sense disc (P/N 321-0000-415) into the LS port.

Note: Ensure the load sense disc lies flat in the bottom of the LS port.

4. Insert the short load sense spacer (P/N 104-1000-258) into the LS port with the wide end pointing up.
5. Install a M14 x 1.5 (M) to -6 ORFS (M) straight adapter fitting (P/N 333-0012-077) in the LS port.

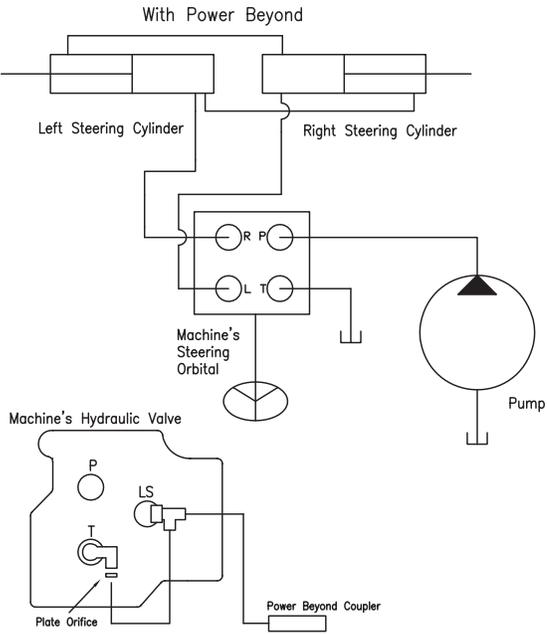
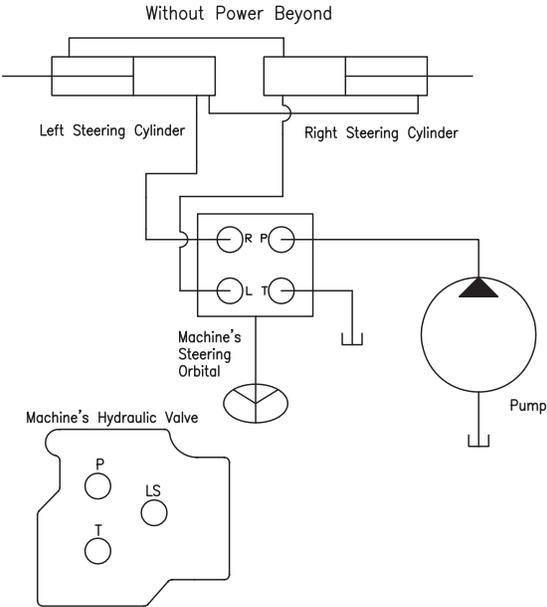
FIGURE 15. Load Sense Hose Installed on Hydraulic Valve



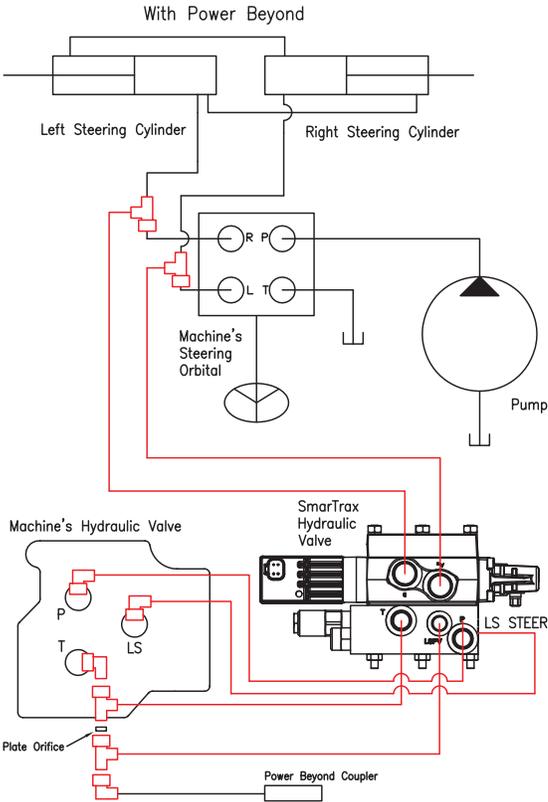
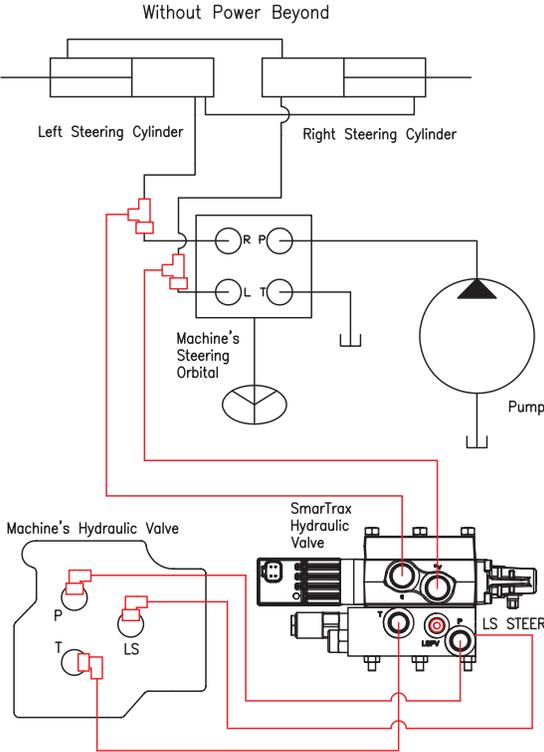
6. Install a -6 ORFS M/F 90° swivel elbow fitting (P/N 333-0012-065) on the installed adapter fitting.
7. Install the 90° end of the supplied hydraulic hose (P/N 214-1000-833) on the fitting installed in Port LS STEER of the SmarTrax valve.
8. Connect the straight end of the installed hydraulic hose to the adapter fitting installed in step 6.

Hydraulic Schematic

Before SmarTrax Installation



After SmarTrax Installation



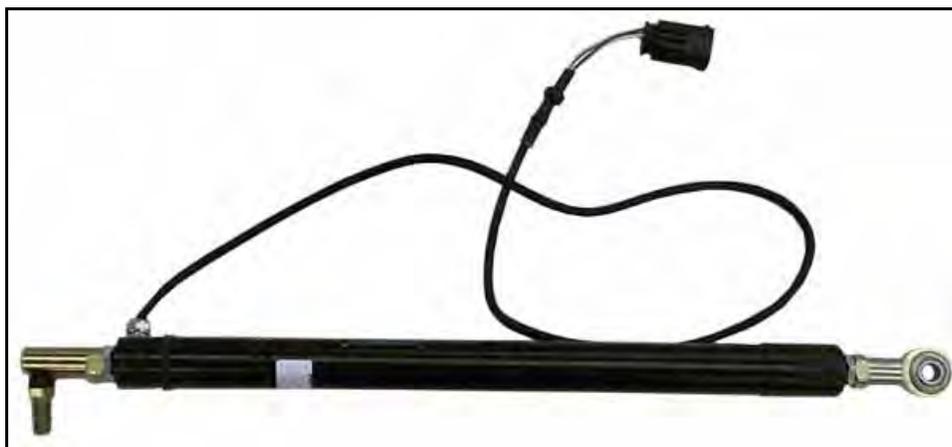
CHAPTER

4

Wheel Angle Sensor Installation

Assemble the Wheel Angle Sensor (WAS)

FIGURE 1. WAS Assembly



1. Install one M10 stud linear sensor mount (P/N 103-0001-030) and one M10 jam nut (P/N 312-1001-035) on the base-end (where the cable connects) of the 250 mm non-contact linear wheel angle sensor (WAS) (P/N 063-0181-017).
2. Install the M10 ball linear sensor mount (P/N 103-0001-029) on the rod-end of the WAS using the remaining M10 jam nut.

Mount the WAS

The hardware used to mount the WAS is determined by the machine's axle structure. Examine the left axle housing and refer to Figure 2 to identify the machine's structure. Proceed to the section that pertains to that configuration.

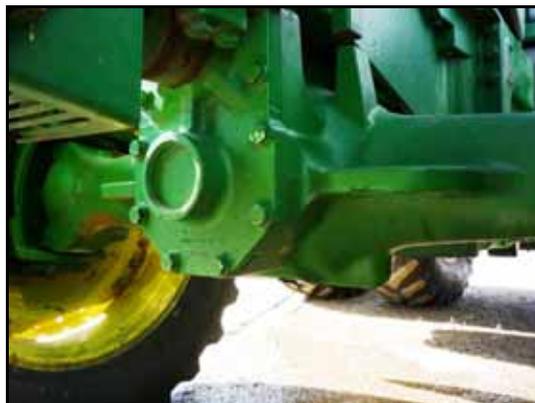
Note: *The 8X10 models have the "late" axle structure. The 8X00 models may contain either axle.*

FIGURE 2. Machine Configuration

Early Axle
(Separate Differential Housing and Axle Tube)



Late Axle
(Differential Housing and Left Axle Tube are Integrated)



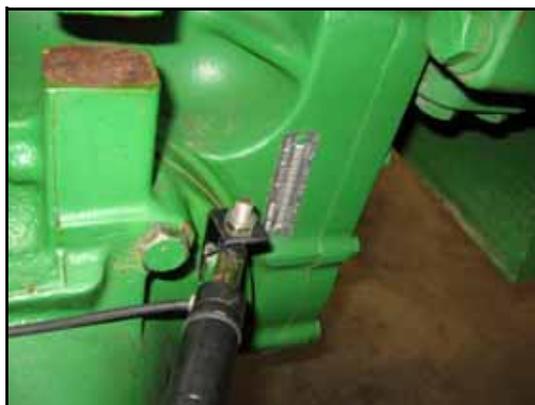
Early Axle

FIGURE 3. WAS Mounted to the Machine



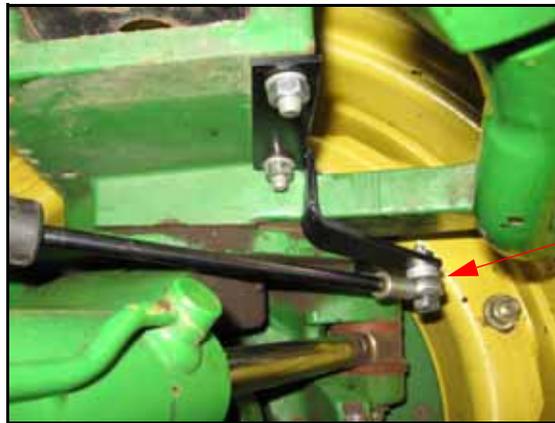
1. Turn the machine's front wheels to the left to access the right front axle.

FIGURE 4. Base-End of Sensor Installed on Machine



2. Remove a differential housing bolt on the front-right side of the machine's axle.
3. Align the base mounting bracket (P/N 107-0172-063) over the hole and replace the housing bolt.
4. Secure the base-end of the WAS (P/N 063-0181-017) to the bottom of the base mounting bracket using one M10 x 1.5" nylon insert lock nut (P/N 312-4000-208) and one washer (P/N 313-2300-014).
5. Remove two of the machine's fender mounting bolts.
6. Install the rod mounting bracket (P/N 107-0172-062) under the steering arm using two M10 x 1.5" x 70 mm class 8.8 metric hex bolts (P/N 311-0070-033), four washers (P/N 313-2300-014) and two M10 x 1.5" nylon insert lock nuts (P/N 312-4000-208).

FIGURE 5. Rod-End of Sensor Installed on the Machine



**Rod-End of Sensor
Spaced Away from
Bracket with Washers
(P/N 313-2300-014)**

7. Mount the rod-end of the WAS to the rod mounting bracket using four washers (P/N 313-2300-014), one M10 x 1.5" x 40 mm metric hex bolt (P/N 311-0070-039) and one M10 x 1.5" nylon insert lock nut (P/N 312-4000-208).

Important: Verify that the WAS cannot be overextended or compressed when the wheels are turned to their extremes. Also verify that the sensor moves freely and is not being damaged within its range of motion.

8. Route the cable from the base-end of the WAS along the tractor frame, routing it so that it is not near moving parts or heat sources. Secure with plastic cable ties as necessary.

Late Axle

FIGURE 6. WAS Mounted to the Machine



1. Turn the machine's front wheels to the right to access the right front axle.

FIGURE 7. Base-End of Sensor Installed on Machine



2. Remove a differential housing bolt on the front-right side of the machine's axle.
3. Align the base mounting bracket (P/N 107-0172-051) over the hole and replace the housing bolt.
4. Secure the base-end of the WAS (P/N 063-0181-017) to the base mounting bracket using one M10 x 1.5" nylon insert lock nut (P/N 312-4000-208) and one washer (P/N 313-2300-014).
5. Remove two of the machine's fender mounting bolts.
6. Install the rod mounting bracket (P/N 107-0172-061) under the steering arm using two M10 x 1.5" x 70 mm class 8.8 metric hex bolts (P/N 311-0070-033), four washers (P/N 313-2300-014) and two M10 x 1.5" nylon insert lock nuts (P/N 312-4000-208).

FIGURE 8. Rod-End of Sensor Installed on the Machine



7. Mount the rod-end of the WAS to the rod mounting bracket using a 3/8" ID x 3/4" OD x 1" L steel spacer (P/N 107-0172-038), one M10 x 1.5" x 60 mm class 8.8 metric hex bolt (P/N 311-0070-025) and one M10 x 1.5" nylon insert lock nut (P/N 312-4000-208).

Important: *Verify that the WAS cannot be overextended or compressed when the wheels are turned to their extremes. Also verify that the sensor moves freely and is not being damaged within its range of motion.*

8. Route the cable from the base-end of the WAS along the tractor frame, routing it so that it is not near moving parts or heat sources. Secure with plastic cable ties as necessary.

CHAPTER

5

*Cab Component
Installation*

Install the SmarTrax Node

Mount the SmarTrax Node

FIGURE 1. Machine's Existing Access Plate



1. Remove the factory-installed access plate on the floor of the cab (to the left side of the seat, under the floor mat).
2. Using the bolts removed in step 1, install the node mounting plate (P/N 107-0171-947) on the floor of the cab.

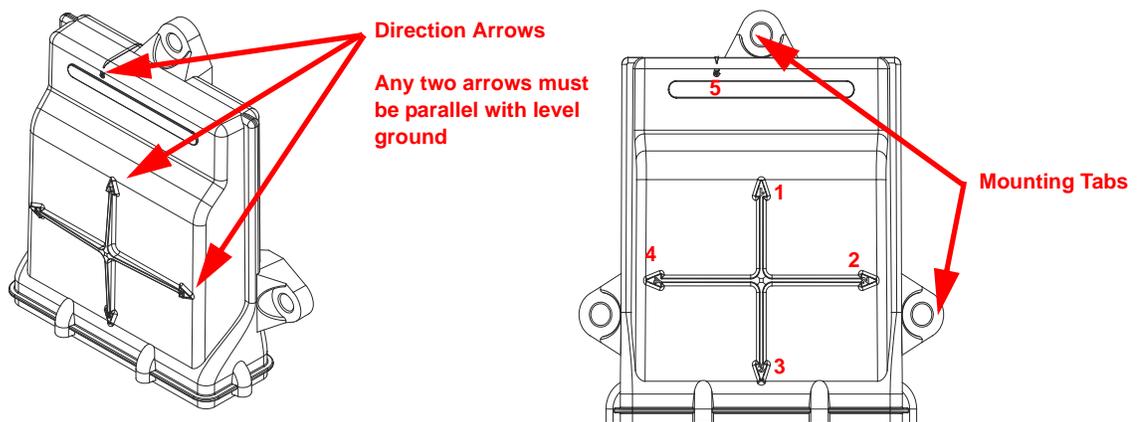
FIGURE 2. Node Installed on Node Mounting Plate



- Secure the SmarTrax node (P/N 063-0173-228) to the node mounting plate using three 3/8"-16 thin nylon insert lock nuts (P/N 312-4001-109).

Node Mounting Locations

FIGURE 3. Node Mounting



When choosing the location for the SmarTrax node, consider the following points:

- Mount the SmarTrax node inside the machine's cab on a flat, level surface for proper performance and cable connection.
- One of the six numbered direction arrows on the node must be oriented in the direction of forward vehicle travel, one arrow pointing straight up, and two of the arrows parallel to the ground.

Note: Make a note of the number of the arrow that is oriented in the direction of forward vehicle travel. This number will be needed during the SmarTrax calibration process.

- The node mounting location must not create tripping hazards.
- Mount the node in a location where it will not be kicked or jarred during normal equipment operation.
- The location must allow cable routing to avoid crimping or damaging the cables or the node connections.
- Securely fasten the node using bolts or screws through at least two of the three mounting holes. When mounted properly, the node should not become loose or rotate.

Install the Foot Switch

FIGURE 4. Foot Switch Installed



1. Select a suitable location for the foot switch (P/N 063-0172-470) to be installed.

Note: *The foot switch should be installed in a location where the operator has easy access to it and is able to fully press the pedal.*

2. Using the holes in the foot switch as a template, drill holes in the floor of the cab.
3. Secure the foot switch to the floor by installing the supplied screws in each of the mounting holes.
4. Route the cable connector behind the operator's seat.

Install the Node Harness

1. Install the two large, rectangular connectors of the node harness (P/N 115-4001-109) into the correct ports of the node.
2. Tighten the bolts on the harness connectors to secure the connections.
3. Locate the ENABLE connector on the node harness and connect it to the foot switch cable connector.

Install the Valve Harness

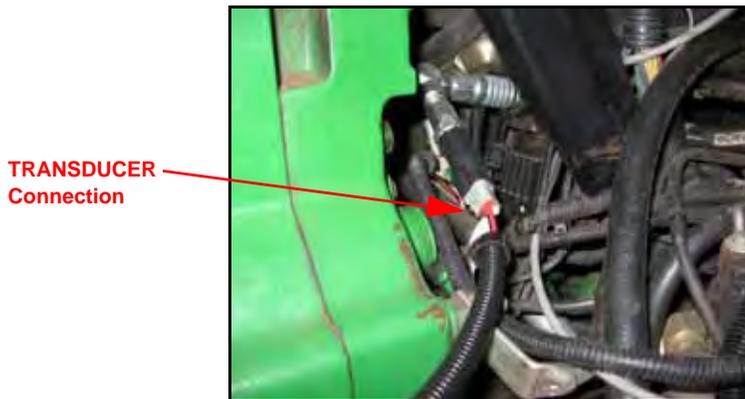
1. Plug the CHASSIS connector of the valve harness (P/N 115-4001-122) into the mating 12-pin connector of the node harness (P/N 115-4001-109).
2. Route the valve harness through the bottom of the cab.

FIGURE 5. WAS Harness Connection



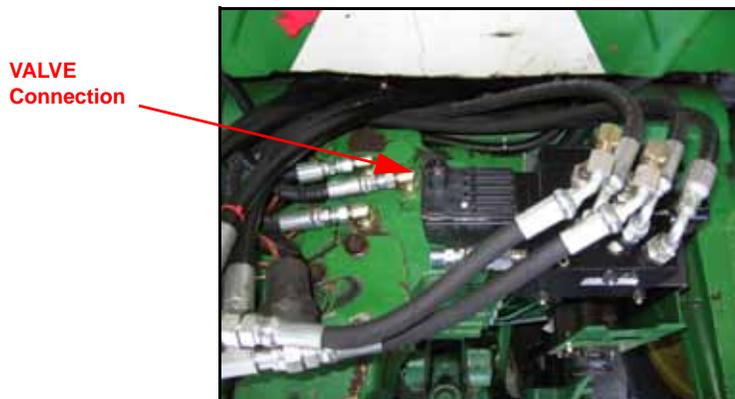
3. Connect the WAS harness connection to the connector on the installed WAS.

FIGURE 6. TRANSDUCER Harness Connection



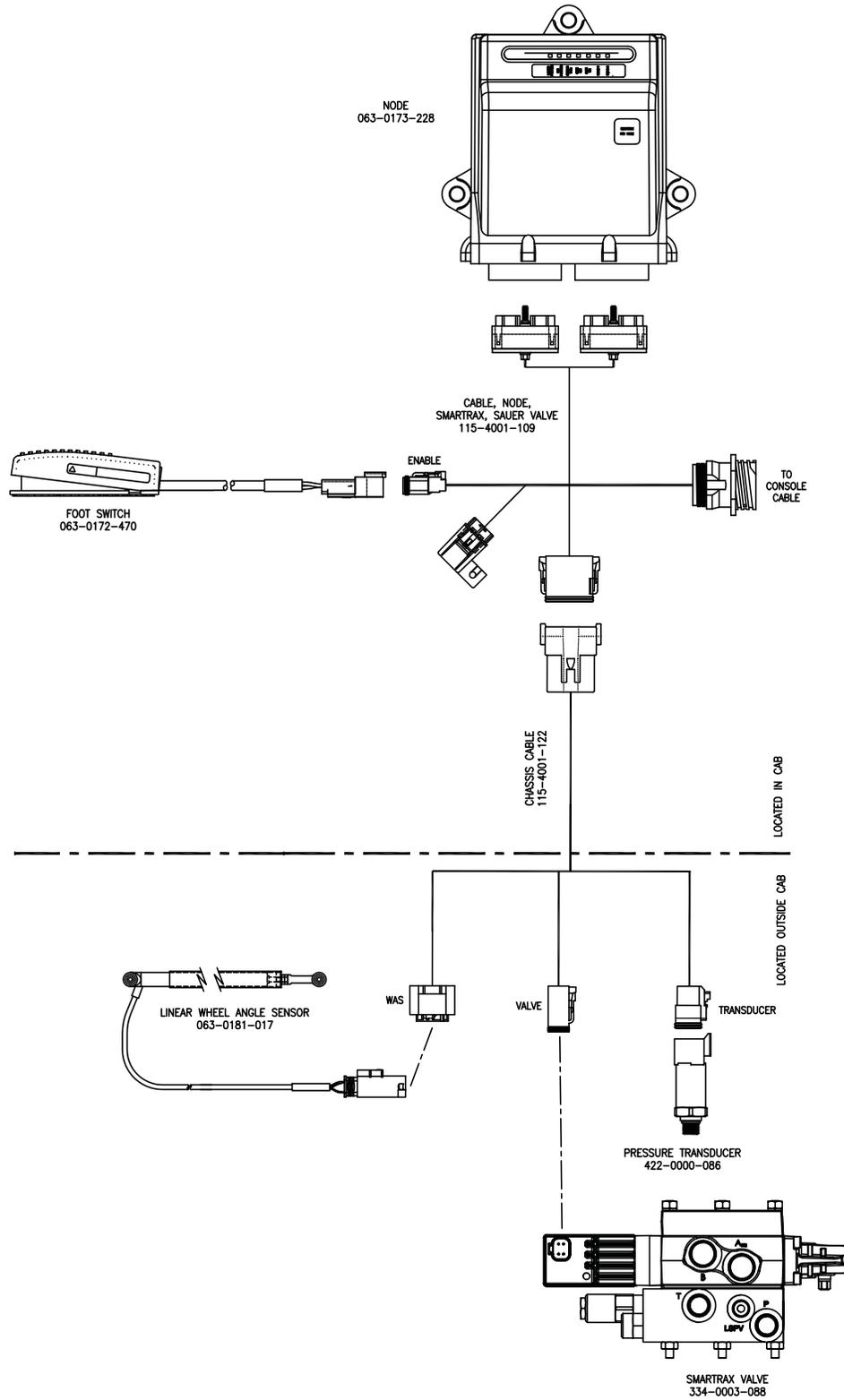
4. Connect the TRANSDUCER connector to the open transducer port on the end of the machine's steering control unit.

FIGURE 7. VALVE Harness Connection



5. Connect the VALVE connector on the valve harness to the open 4-pin connector on top of the SmarTrax valve.
6. Route the cable away from moving parts and heat sources, securing with plastic cable ties as necessary.

FIGURE 8. Valve Harness Wiring Diagram



Install the Chassis Cable - SmarTrax-Only Systems (If Applicable)

If the machine does not contain an existing chassis power system (such as AutoBoom, product control, etc.), it is necessary to install the chassis power cable to operate the SmarTrax system. If a CAN system already exists on the machine, refer to *Connect SmarTrax to an Existing Chassis Cable (If Applicable)* below to connect power to the SmarTrax system.

Note: *The chassis cable is sold separately. Contact your local Raven dealer for ordering information.*

1. Locate the SmarTrax chassis cable (P/N 115-4001-085).
2. Connect the TO SMARTRAX NODE connector from the chassis cable to the round 16-pin connector on the node harness (P/N 115-4001-109).
3. Connect the TO CONSOLE CABLE connector to the Raven console cable.
4. Install a terminator (P/N 063-0172-369) on the CAN cable connector.
5. Loop and tie-off the REMOTE SWITCH cable connection, securing it with plastic cable ties as necessary.

Note: *The REMOTE SWITCH connector is not used in the SmarTrax system. Ensure the cable is secured away from moving parts and heat sources.*

6. Connect the ring terminals to the battery.

Note: *The positive connectors are fused.*

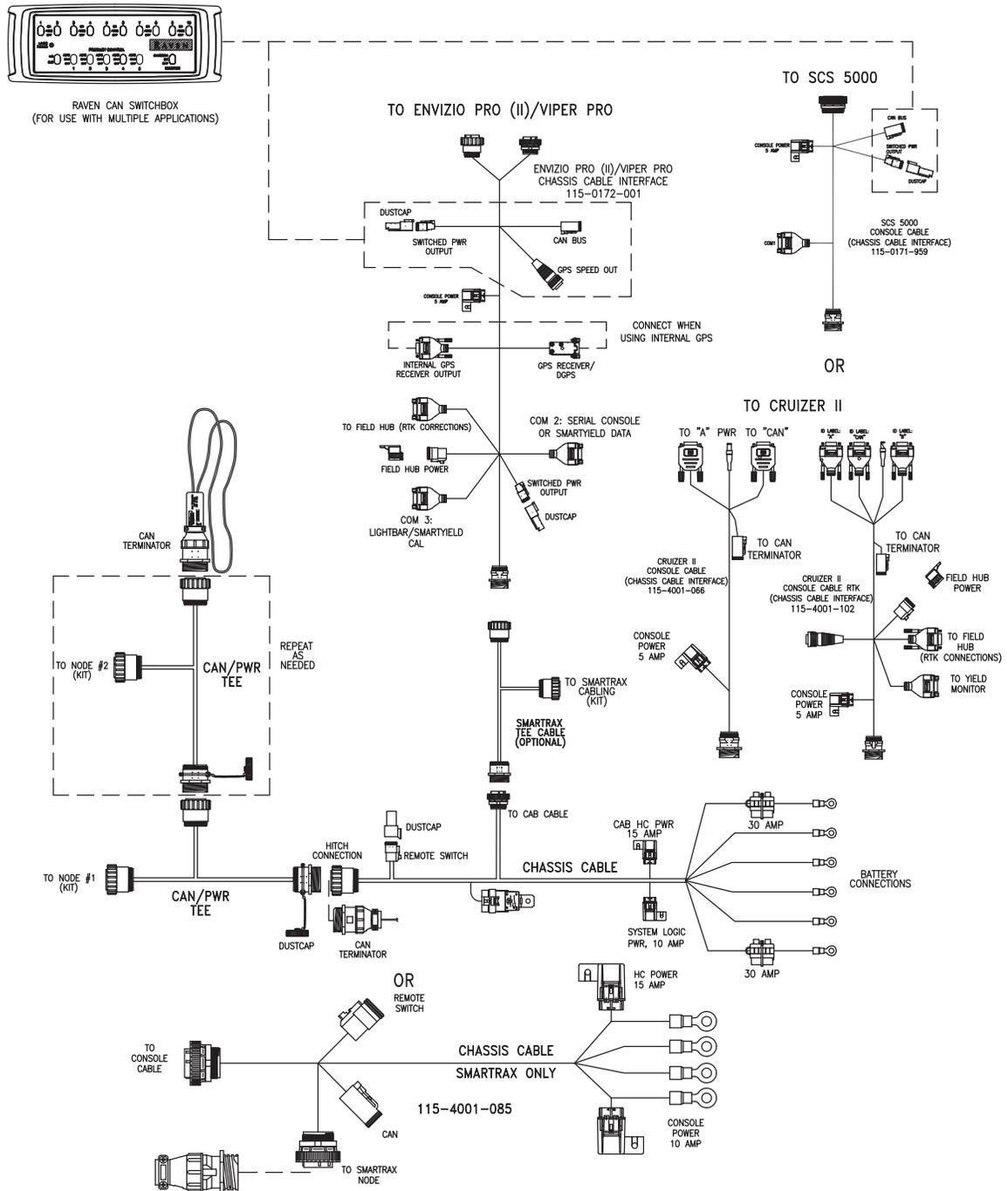
Connect SmarTrax to an Existing Chassis Cable (If Applicable)

Note: *The SmarTrax interface tee is sold separately. Contact your local Raven dealer for ordering information.*

1. Locate and disconnect the connection between the Raven console cable and chassis cable on the machine's existing CAN system.
2. Install the SmarTrax interface tee cable (P/N 115-4001-070 or 115-4001-071) between the chassis and Raven console harness.
3. Connect the SmarTrax node cable (P/N 115-4001-109) to the remaining SmarTrax interface tee.

System Diagrams

FIGURE 9. Existing Chassis System Wiring Diagram



**WARNING**

When starting the machine for the first time after installing SmarTrax, be sure that all persons stand clear in case a hose has not been properly tightened.

**WARNING**

Do not use hands to check for leaks. Hydraulic fluid under pressure can penetrate the skin and cause serious injury or death.

Verify the SmarTrax System Installation

1. Turn on the machine.
2. Double-check all fitting and hose connections to ensure that:
 - Hoses are not rubbing on or interfering with moving parts.
 - Hydraulic fluid is not leaking from the system.
3. Turn the machine's wheels fully from side to side repeatedly to remove air from the hydraulic system.

Note: *During the SmarTrax system installation, whenever the hydraulic system is purged for maintenance, or when fittings are loosened or disconnected, air is introduced into the lines of the hydraulic system. If air pockets are present, the wheels may not move consistently when the steering wheel is turned.*

4. Continue turning the wheels until they move steadily and smoothly when the steering wheel is turned.

5. Access the System Diagnostic screen by selecting the MACHINE TEST option on the Machine Type screen and turn the wheels using the Raven console.

Note: *If there are issues with the SmarTrax system, turn off the machine and correct them immediately. For additional assistance, refer to the SmarTrax and SmartSteer Calibration & Operation Manual (P/N 016-0171-277) or contact your local Raven dealer.*

Calibrate the SmarTrax System

Refer to the SmarTrax & SmartSteer Calibration and Operation Manual (P/N 016-0171-277) for instructions on calibrating the SmarTrax system, adjusting system settings, and system operation.

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RAVEN

Limited Warranty

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 when used for intended purpose.

How Long is the Coverage Period?

Raven Applied Technology products are covered by this warranty for 12 months from the date of retail sale. In no case will the Limited Warranty period exceed 24 months from the date the product was issued by Raven Industries Applied Technology Division. This warranty coverage applies only to the original owner and is non-transferable.

How Can I Get Service?

Bring the defective part and proof of purchase to your Raven dealer. If the dealer approves the warranty claim, the dealer will process the claim and send it to Raven Industries for final approval. The freight cost to Raven Industries will be the customer's responsibility. The Return Materials Authorization (RMA) number must appear on the box and all documentation (including proof of purchase) must be included inside the box to be sent to Raven Industries.

What Will Raven Industries Do?

Upon confirmation of the warranty claim, Raven Industries will (at our discretion) repair or replace the defective product and pay for the standard return freight, regardless of the inbound shipping method. Expedited freight is available at the customer's expense.

What is not Covered by this Warranty?

Raven Industries will not assume any expense or liability for repairs made outside our facilities without written consent. Raven Industries is not responsible for damage to any associated equipment or products and will not be liable for loss of profit, labor, or other damages. The obligation of this warranty is in lieu of all other warranties, expressed or implied, and no person or organization is authorized to assume any liability for Raven Industries.

Damages caused by normal wear and tear, misuse, abuse, neglect, accident, or improper installation and maintenance are not covered by this warranty.



Extended Warranty

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 when used for intended purpose.

Do I Need to Register My Product to Qualify for the Extended Warranty?

Yes. Products/systems must be registered within 30 days of retail sale to receive coverage under the Extended Warranty. If the component does not have a serial tag, the kit it came in must be registered instead.

Where Can I Register My Product for the Extended Warranty?

To register, go online to www.ravenhelp.com and select Product Registration.

How Long is the Extended Warranty Coverage Period?

Raven Applied Technology products that have been registered online are covered for an additional 12 months beyond the Limited Warranty for a total coverage period of 24 months from the date of retail sale. In no case will the Extended Warranty period exceed 36 months from the date the product was issued by Raven Industries Applied Technology Division. This Extended Warranty coverage applies only to the original owner and is non-transferable.

How Can I Get Service?

Bring the defective part and proof of purchase to your Raven dealer. If the dealer approves the warranty claim, the dealer will process the claim and send it to Raven Industries for final approval. The freight cost to Raven Industries will be the customer's responsibility. The Return Materials Authorization (RMA) number must appear on the box and all documentation (including proof of purchase) must be included inside the box to be sent to Raven Industries. In addition, the words "Extended Warranty" must appear on the box and all documentation if the failure is between 12 and 24 months from the retail sale.

What Will Raven Industries Do?

Upon confirmation of the product's registration for the Extended Warranty and the claim itself, Raven Industries will (at our discretion) repair or replace the defective product and pay for the standard return freight, regardless of the inbound shipping method. Expedited freight is available at the customer's expense.

What is Not Covered by the Extended Warranty?

Raven Industries will not assume any expense or liability for repairs made outside our facilities without written consent. Raven Industries is not responsible for damage to any associated equipment or products and will not be liable for loss of profit, labor, or other damages. Cables, hoses, software enhancements, and remanufactured items are not covered by this Extended Warranty. The obligation of this warranty is in lieu of all other warranties, expressed or implied, and no person or organization is authorized to assume any liability for Raven Industries.

Damages caused by normal wear and tear, misuse, abuse, neglect, accident, or improper installation and maintenance are not covered by this warranty.

John Deere 8X00/8X10 Series
SmarTrax™ Installation Manual
(P/N 016-5034-006 Rev B 01/13 E20605)

R A V E N



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