

RAVEN

SmarTrax™ Installation Manual



John Deere 50/60/70 Series Combines

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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: 9X50 STS Series - 9450, 9550, 9650, and 9750
YEAR: 2005 & Older

MODEL: 9X60 STS Series - 9560, 9660, 9760, and 9860
YEAR: 2009 & Older

MODEL: 9X70 STS Series - 9570, 9670, 9770, and 9870
YEAR: 2011 & Older

FIGURE 1. John Deere 9660 STS



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.

During the installation process, follow good safety practices. Be sure to carefully read the instructions in this manual as you complete the installation process. Bleed pressure from the hydraulic system by loosening the hydraulic fittings slowly, where applicable.

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.*

Note: *The units in the table below are measured in inches. To convert the values to centimeters, multiply the listed value by 2.54.*

Note: *The values in the table below must be converted into feet or meters before being entered into the field computer.*

- To convert the values to feet, divide the listed value by 12.
- To convert the values to meters, multiply the listed value by 0.0254.

Machine Preset	Antenna X Position (left to right)	Antenna Y Position (from the rear wheel axle to the antenna position on the cab in inches)	Antenna Z Position (ground to top of antenna in inches)
John Deere 9750 STS	Centered	192	132.25
John Deere 9x70STS	Centered	176.5	171.5

- 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 50/60/70 Series Combines SmarTrax™ Installation Manual*
- Manual No. 016-5034-017 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.

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 local Raven dealer.

Note: *The SmarTrax node (P/N 063-0173-228) is sold separately.*

TABLE 1. SmarTrax Installation Kit (P/N 117-5034-017)

Picture	Item Description	Part Number	Qty.
Not Pictured	Manual - SmarTrax and SmartSteer Calibration & Operation	016-0171-277	1
Not Pictured	Manual - John Deere 50/60/70 STS Series SmarTrax Installation Manual	016-5034-017	1

TABLE 1. SmarTrax Installation Kit (P/N 117-5034-017)

Picture	Item Description	Part Number	Qty.
	Valve - SmarTrax Hydraulic	334-0003-090	1
	Bracket - WAS Rod Mounting	107-0172-030	1
	Bracket - Node Mounting	107-0172-055	1
	Bracket - Valve Mounting	107-0172-183	1
	Bracket - Axle Clamp Sensor Mounting	116-0159-726	1
	Cable - Node Harness	115-4001-161	1
	Cable - 3' Power Strip	115-4001-164	1
	Cable - Valve Harness	115-4001-168	1
	Assembly - Enable Foot Switch	063-0172-470	1
	Housing - Rocker Switch Base	118-0159-056	1
	Housing - Rocker Switch Cover	118-0159-057	1

TABLE 1. SmarTrax Installation Kit (P/N 117-5034-017)

Picture	Item Description	Part Number	Qty.
	Switch - Master	412-2011-104	1
	Sensor - 350 mm Non-Contact Linear Wheel Angle Sensor	416-0001-054	1
	Mount - M10 Ball Linear Sensor	103-0001-029	1
	Mount - M10 Stud Linear Sensor	103-0001-030	1
	Transducer - 0-3000 PSI Pressure	422-0000-086	1
	Clamp - 1-1/2" Muffler	435-3003-030	1
	Tape - 3.5" Double-Sided	332-0000-019	6
	Spacer - 0.406" OD x 0.750" OD x 1" Long Steel	107-0172-038	1
	Screw - #4-40 Phillips Pan-Head Machine	311-0008-027	4
	Bolt - 5/16"-18 x 7/8" Hex	311-0052-104	4
	Bolt - 5/16"-18 x 1" Hex	311-0052-105	2

TABLE 1. SmarTrax Installation Kit (P/N 117-5034-017)

Picture	Item Description	Part Number	Qty.
	Bolt - 3/8"-16 x 1-1/4" Hex	311-0054-106	2
	Bolt - M10 x 1.5 x 60mm Hex	311-0070-025	1
	Nut - 3/8"-16 Zinc Hex	312-1001-037	2
	Nut - 5/16"-18 Flanged Lock	312-1001-169	6
	Nut - M10 x 1.5 Jam	312-1002-035	2
	Nut - M10 x 1.5 Lock	312-4000-208	2
	Nut - 3/8"-16 Lock	312-4001-109	3
	Washer - 5/16" Split Lock	313-1000-019	4
	Washer - 0.344" ID Flat	313-2300-012	4
	Washer - 0.406" ID Flat	313-2300-014	2

TABLE 2. Hydraulic Kit (P/N 117-0199-122)

Picture	Item Description	Part Number	Qty.
	Fitting - -8 ORFS M/M/F Swivel Run Tee Adapter	333-0012-028	2
	Fitting - -6 ORFS M/F 90° Swivel Elbow	333-0012-065	1
	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	1
	Fitting - -6 ORFS (M) to -10 SAE O-Ring (M) Straight Adapter	333-0012-233	2
	Fitting - -8 ORFS (M) to -10 SAE O-Ring (M) Straight Adapter	333-0012-304	1
	Fitting - -10 ORFS (M) to -10 SAE O-Ring (M) Straight Adapter	333-0012-377	2
	Hydraulic Hose - -6 ORFS (F) to -6 ORFS (F) 90° - 40"	214-1000-942	1
	Hydraulic Hose - -8 ORFS (F) to -6 ORFS (F) 90° - 38"	214-1000-943	1
	Hydraulic Hose - -8 ORFS (F) to -8 ORFS (F) 90° - 30"	214-1000-944	1
	Hydraulic Hose - -10 ORFS (M) to -10 ORFS (F) 90° - 22"	214-1000-945	1

TABLE 2. Hydraulic Kit (P/N 117-0199-122)

Picture	Item Description	Part Number	Qty.
	Hydraulic Hose - -10 ORFS (F) to -10 ORFS (F) 90° - 56"	214-1000-946	1

CHAPTER

3

*Hydraulic System
Installation*



⚠ 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 334-0003-090) 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 - -6 ORFS (M) to -10 SAE O-Ring (M) Straight Adapter	333-0012-233	A, B
Fitting - -8 ORFS (M) to -10 SAE O-Ring (M) Straight Adapter	333-0012-304	T
Fitting - -10 ORFS (M) to -10 SAE O-Ring (M) Straight Adapter	333-0012-377	P, EF
Transducer - 0-3000 PSI Pressure	422-0000-086	PS

Mount the SmarTrax Valve

FIGURE 2. Shroud to be Removed



1. Remove the machine's shroud at the front of the cab.
2. Install the SmarTrax valve (P/N 334-0003-090) on the valve mounting bracket (P/N 107-0172-183) using four 5/16"-18 x 7/8" hex bolts (P/N 311-0052-104) and four 5/16" lock washers (P/N 313-1000-019).

FIGURE 3. SmarTrax Valve Installed on Machine



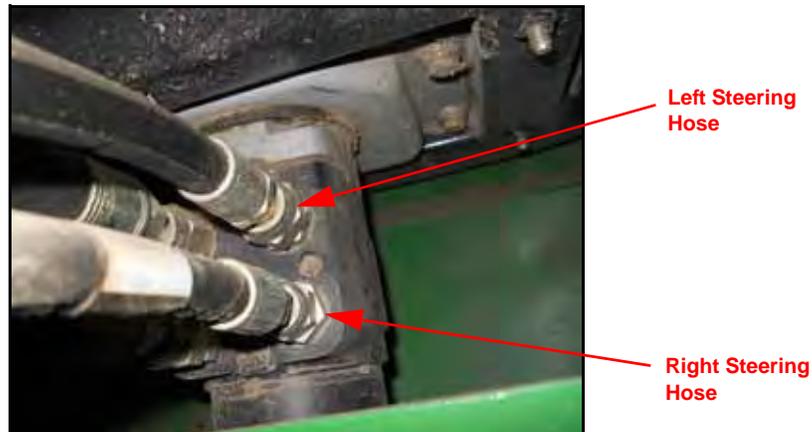
3. Mount the valve mounting bracket on the machine on the left cab support beam using two 5/16"-18 x 1" hex bolts (P/N 311-0052-105), four 5/16" flat washers (P/N 313-2300-012), and two 5/16" 18 lock nuts (P/N 312-1001-169).

Note: The valve should be oriented so that the pressure transducer installed in Port PS points to the left side of the machine.

Note: If there are no existing bolt holes on the cab support beam, use the valve mounting bracket as a template to drill holes in the desired mounting location.

Install the Left and Right Steering Hoses

FIGURE 4. Machine's Left and Right Steering Hoses



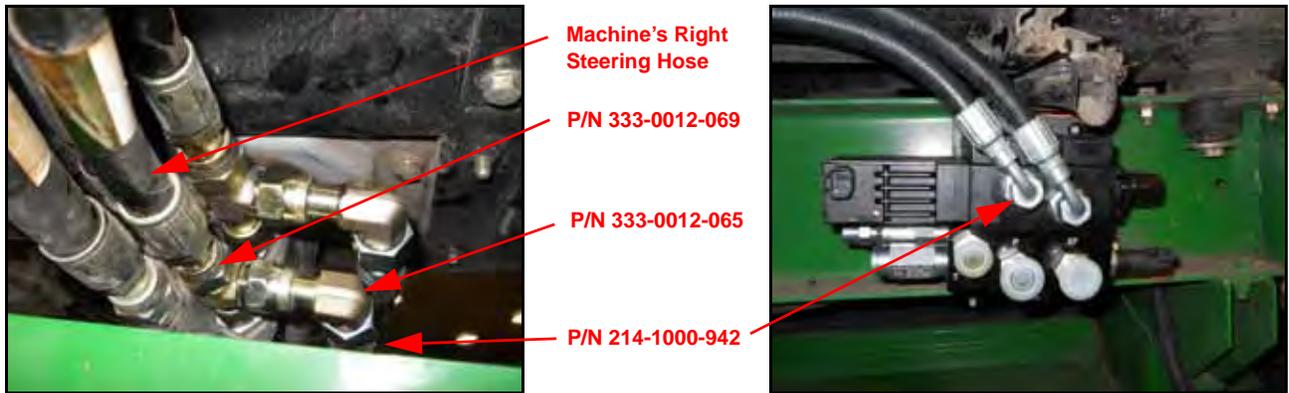
1. Locate the machine's left and right steering hoses on the steering orbital.

FIGURE 5. Left Steering Hose Installed



2. Disconnect the left steering hose from the steering orbital.
3. Install a -8 ORFS M/M/F swivel run tee adapter fitting (P/N 333-0012-028) on the existing fitting in the left steering port of the steering orbital.
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° swivel 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 214-1000-943) on the installed elbow fitting.
7. Connect the 90° end of the installed hydraulic hose to the fitting installed in Port A of the SmarTrax valve (P/N 334-0003-090).

FIGURE 6. Right Steering Hose Installed



8. Disconnect the right steering hose from the steering orbital.
9. Install a -6 ORFS M/M/F swivel run tee adapter fitting (P/N 333-0012-069) on the existing fitting in the right steering port of the steering orbital.
10. Connect the machine's right steering hose to the opposite end of the installed tee fitting.
11. Install a -6 ORFS M/F 90° swivel elbow fitting (P/N 333-0012-065) on the 90° end of the installed tee fitting.
12. Install the straight end of the supplied hydraulic hose (P/N 214-1000-942) on the installed elbow fitting.
13. Connect the 90° end of the installed hydraulic hose to the fitting installed in Port B of the SmarTrax valve.

Install the Tank Hose

FIGURE 7. Machine's Tank Hose



1. Locate the machine's tank hose on the steering orbital.

FIGURE 8. Tank Hose Installed on the Steering Orbital



2. Disconnect the tank hose from the steering orbital.
3. Install a -8 ORFS M/M/F swivel run tee adapter fitting (P/N 333-0012-028) on the existing fitting in the tank port of the steering orbital.
4. Connect the machine's tank hose to the opposite end of the installed tee fitting.
5. Install a -8 ORFS M/F 90° swivel 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 214-1000-944) on the installed elbow fitting.

FIGURE 9. Tank Hose Installed on the SmarTrax Valve

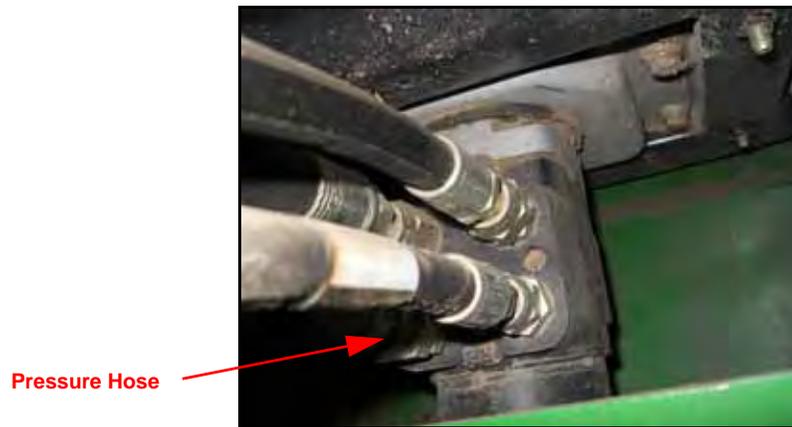


7. Connect the 90° end of the installed hydraulic hose to the fitting installed in Port T of the SmarTrax valve (P/N 334-0003-090).

Install the Pressure Hoses

Important: Proper installation of the pressure hoses is critical. Installation of the hoses in the incorrect ports may result in serious damage to the machine's hydraulic components.

FIGURE 10. Machine's Pressure Hose



1. Locate and disconnect the pressure hose on the steering orbital.

FIGURE 11. Hydraulic Hose Installed on Pressure Hose



2. Install the male end of the supplied hydraulic hose (P/N 214-1000-945) on the machine's pressure hose.

FIGURE 12. Hydraulic Hose Installed on SmarTrax Valve



3. Connect the 90° end of the installed hydraulic hose to the fitting installed in Port P of the SmarTrax valve.

FIGURE 13. Pressure Hose Installed on Steering Orbital



4. Install the straight end of the supplied hydraulic hose (P/N 214-1000-946) on the existing fitting in the pressure port of the steering orbital.

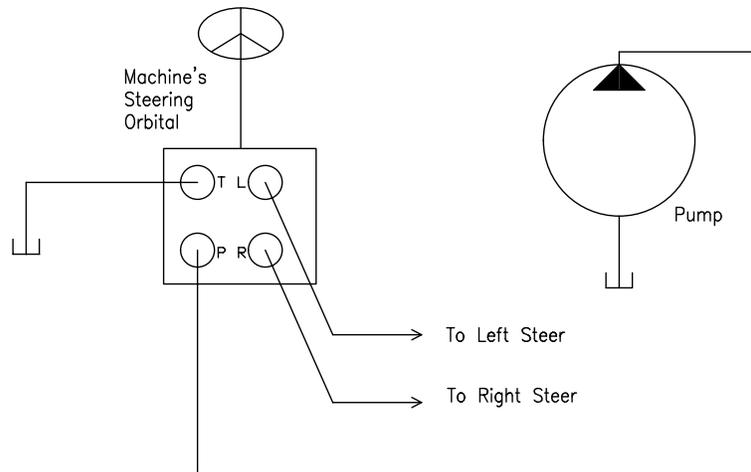
FIGURE 14. Hydraulic Hose Installed on SmarTrax Valve



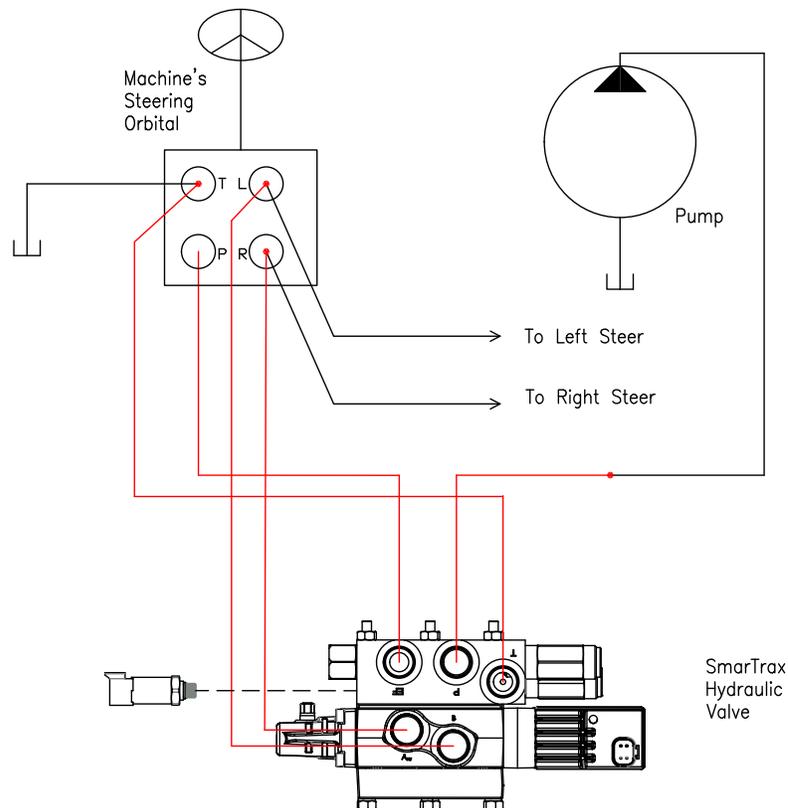
5. Connect the 90° end of the installed hydraulic hose to the fitting installed in Port EF of the SmarTrax valve.

Hydraulic Diagram

Before SmarTrax Installation



After SmarTrax Installation



CHAPTER 4

Wheel Angle Sensor Installation

Assemble the Wheel Angle Sensor (WAS)

FIGURE 1. WAS Assembly



1. Install the M10 stud linear sensor mount (P/N 103-0001-030) and one M10 jam nut (P/N 312-1001-035) on the base-end of the 350 mm non-contact WAS (P/N 416-0001-054).
2. Install the M10 ball linear sensor mount (P/N 103-0001-029) and one M10 jam nut (P/N 312-1001-035) on the rod-end of the WAS.

Mount the WAS

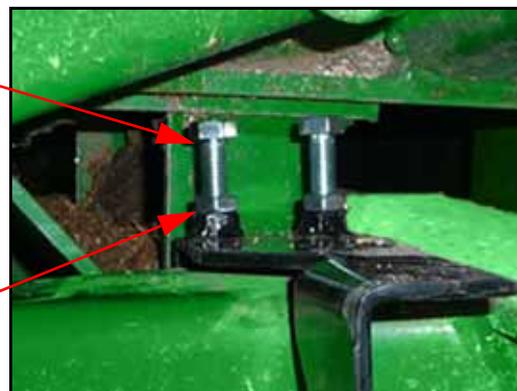
1. Turn the machine's front wheels fully to the right to access the left side of the rear axle.

FIGURE 2. Base Mounting Bracket Installed



P/N 311-0054-106

P/N 312-1001-037



2. Hook the axle clamp sensor mounting bracket (P/N 116-0159-726) over the top of the left rear axle's support frame, between the axle and steering cylinder.

3. Thread the two 3/8"-16 nuts (P/N 312-1001-037) onto the two 3/8"-16 x 1-1/4" bolts (P/N 311-0054-106), approximately 2/3 of the way up the bolt shaft.

Note: Do **NOT** use the 3/8"-16 lock nuts (P/N 312-4001-109) supplied in the SmarTrax installation kit!

4. Insert the bolts into the holes in the sensor mounting bracket, tightening them until the weldment is securely mounted to the axle support frame.
5. Tighten the installed nuts until they are snug against the sensor mounting bracket.

FIGURE 3. Base-End of Sensor Installed on the Machine



6. Secure the base-end of the WAS (P/N 416-0001-054) to the back side of the base mounting bracket using one washer (P/N 313-2300-014) and one M10 x 1.5 nylon insert lock nut (P/N 312-4000-208).

FIGURE 4. M10 Bolt Inserted into Rod Mounting Bracket



7. Insert the M10 x 1.5 x 60 mm metric hex bolt (P/N 311-0070-025) into the rod mounting bracket (P/N 107-0172-030).

FIGURE 5. Rod Mounting Bracket Installed



8. Remove the nuts and clamp from the 1-1/2" muffler clamp (P/N 435-3003-030).
9. Install the muffler clamp on the tie rod with the legs of the U-bolt pointing to the rear of the machine.
10. Replace the clamp and nuts.

Note: Do not tighten the nuts to allow for adjustment later in the procedure.

11. Install the rod mounting bracket and M10 bolt on the muffler clamp using two 5/16"-18 flanged lock nuts (P/N 312-1001-169).

Note: Do not tighten the nuts to allow for adjustment later in the procedure.

FIGURE 6. Rod-End of Sensor Installed on Machine



12. Install one steel spacer (P/N 107-0172-038) on the M10 bolt.
13. Install the rod-end of the WAS to the end of the installed M10 bolt using one 0.406" ID flat washer (P/N 313-2300-014) and one M10 x 1.5 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.

14. Tighten the nuts on the muffler clamp and rod mounting bracket assembly.
15. Check for potential interference points.

CHAPTER

5

*Cab Component
Installation*

Install the SmarTrax Node

Mount the SmarTrax Node

FIGURE 1. Node Mounting Location



1. Clean the notch in the molding to the right of the operator's seat.

FIGURE 2. SmarTrax Node Installed



Chapter 5

2. Mount the SmarTrax node (P/N 063-0173-228) on the node mounting plate (P/N 107-0172-055) using three 3/8"-16 lock nuts (P/N 312-4001-109).
3. Place five double-sided tape strips (P/N 332-0000-019) on the bottom of the node mounting plate.
4. Remove the backing from the double-sided tape and adhere the node mounting plate to the notch in the molding.

Note: The node connectors should point to the front of the machine.

FIGURE 3. Node Harness Installed



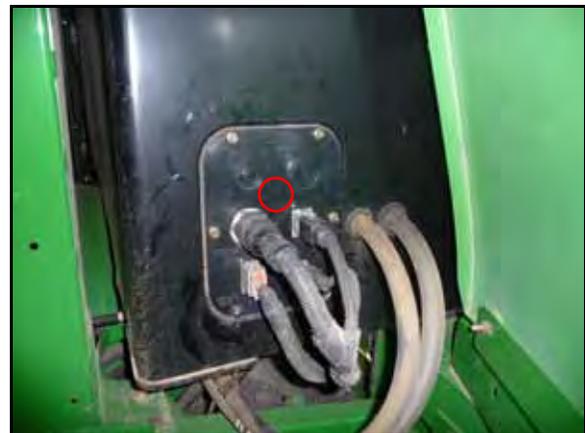
5. Install the two large, rectangular connectors of the node harness (P/N 115-4001-161) into the correct ports of the node, tightening the bolts on the connectors to secure the connections.
6. Route the round 19-pin connector through the access hole in the rear-right corner of the cab.
7. Locate the electrical panel on the exterior of the machine, in the right-rear corner of the cab.

FIGURE 4. Electrical Panel Access Hole

Ideal Cable Routing Location



Alternate Cable Routing Location



8. Determine the appropriate cable routing location in the electrical access panel.
 - If the perforated knockout port in the access panel cover is not being used, use a hammer and punch to remove it.
 - If the hole is already occupied by another cable, drill a 1-3/4" diameter hole centered between the top four connection ports.
9. Remove the screws securing the electrical panel cover and pull the access panel away from the cab.

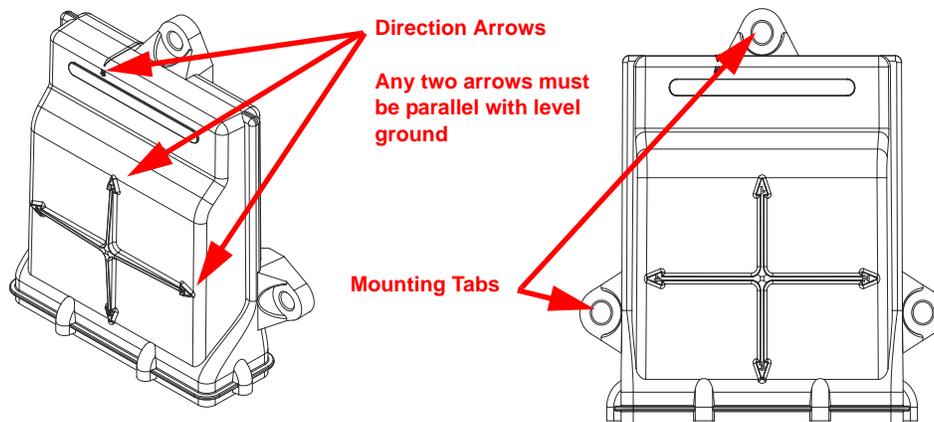
FIGURE 5. Node Harness Installed in Electrical Access Panel



10. Reach behind the access panel cover and locate the 19-pin connector of the node harness.
11. Insert the cable into the hole in the panel and secure it with the supplied lock washer and nut.
12. Route the node harness cable connectors back into the cab.
13. Reinstall the electrical panel cover.

Node Mounting Locations

FIGURE 6. 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 7. 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. Locate the ENABLE connector on the node harness (P/N 115-4001-161) and connect it to the foot switch cable connector.

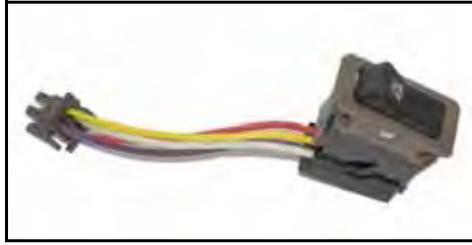
Install the Road Switch

The ideal road switch installation location is in an open switch port in the machine's console. If an open switch port is not available, identify an alternate mounting location which is easily accessible to the operator.

Open Switch Port Installation

1. Locate an unused switch port on the armrest console.
2. Use a flat-head screwdriver to gently remove the cover of the unused switch port.
3. Route the ROAD SWITCH connector of the node harness (P/N 115-4001-161) into the machine's console and through the open port.

FIGURE 8. Road Switch



4. Connect the ROAD SWITCH connector to the road switch (P/N 412-2011-104).
5. Feed the wires back into the console.
6. Press on the switch casing to ensure the switch is securely installed.

Alternate Switch Port Installation

Note: An alternate mounting location must be easily accessible to the operator.

FIGURE 9. Road Switch Assembly



1. Insert the road switch (P/N 412-2011-104) into the road switch base (P/N 118-0159-056) and cover (P/N 118-0159-057) housing.
2. Secure the housing with four #4-40 Phillips pan-head machine screws (P/N 311-0008-027).
3. Route the ROAD SWITCH connector of the node harness (P/N 115-4001-161) to the chosen switch mounting location.
4. Connect the ROAD SWITCH connector to the road switch.
5. Use one double-sided tape strip (P/N 332-0000-019) or two self-tapping screws (not provided) to mount the road switch to the selected mounting location.

Install the Valve Harness

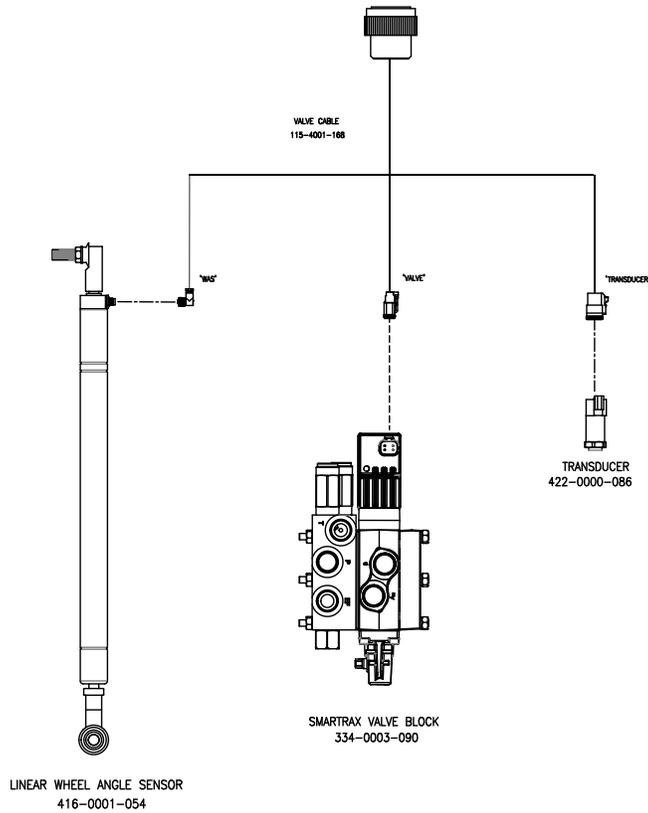
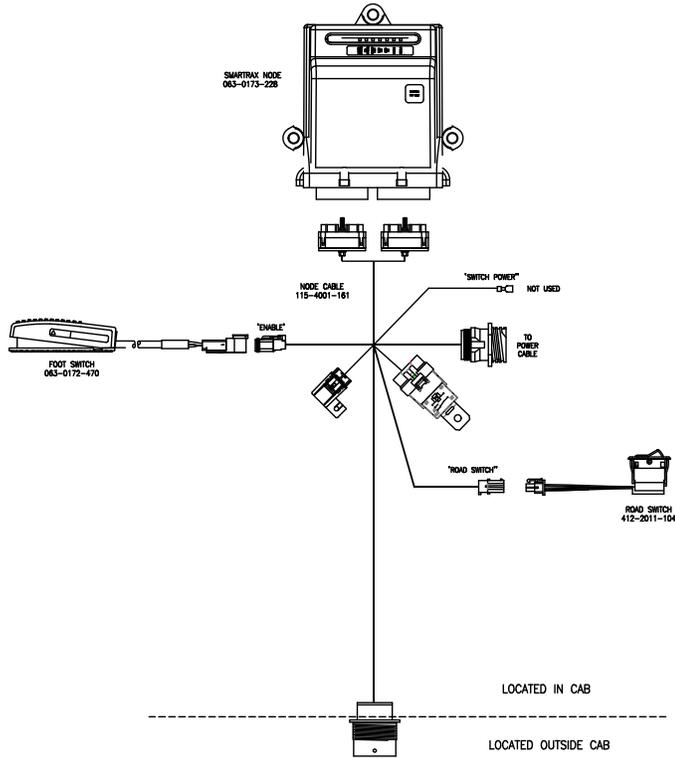
1. Connect the round 19-pin connector of the valve harness (P/N 115-4001-168) to the mating bulkhead connector installed at the electrical panel.
2. Route the VALVE and PSI connectors of the valve harness under the cab.

FIGURE 10. Valve Harness Connections



3. Connect the PSI connector to the pressure transducer (P/N 422-0000-086) installed in Port PS of the SmarTrax valve (P/N 334-0003-090).
4. Connect the VALVE connector to the open PVE port of the SmarTrax valve.
5. Locate the WAS connector and route the cable toward the left rear axle, securing it away from moving parts and heat sources with plastic cable ties as necessary.
6. Connect the WAS connector to the installed WAS (P/N 416-0001-054).

FIGURE 11. 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 or 115-4001-131).
2. Connect the TO SMARTRAX NODE connector from the chassis cable to the round 16-pin connector on the node harness (P/N 115-4001-161).
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.

Note: *The chassis power cable can be connected to the cab's power strip using the supplied 3' power strip cable (P/N 115-4001-164). The red wire is direct battery power, the orange wire is switched power, and the black wire is ground.*

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 115-4001-161) to the remaining SmarTrax interface tee.

Complete the SmarTrax System Installation

1. Verify all hydraulic connections at the steering orbital and the SmarTrax Valve (P/N 334-0003-090) are securely tightened.
2. Double-check all electrical connections on the SmarTrax valve.
3. Reinstall the machine's shroud.

**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.

Important: *When transporting the vehicle, press down on the side of the road switch that contains the icon. To use SmarTrax in the field, toggle the road switch in the opposite direction.*

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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.

RAVEN

John Deere 50/60/70 Series Combines
SmarTrax™ Installation Manual
(P/N 016-5034-017 Rev B 01/13 E20623)



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