

RAVEN

Simply improving your position.SM

SmarTrax™ Installation Manual



John Deere 7x20 Large Frame

Disclaimer

While every effort has been made to ensure the accuracy of this document, Raven Industries assumes no responsibility for omissions and errors. Nor is any liability assumed for damages resulting from the use of information contained herein.

Raven Industries shall not be responsible or liable for incidental or consequential damages or a loss of anticipated benefits or profits, work stoppage or loss, or impairment of data arising out of the use, or inability to use, this system or any of its components. Raven Industries shall not be held responsible for any modifications or repairs made outside our facilities, nor damages resulting from inadequate maintenance of this system.

As with all wireless and satellite signals, several factors may affect the availability and accuracy of wireless and satellite navigation and correction services (e.g. GPS, GNSS, SBAS, etc.). Therefore, Raven Industries cannot guarantee the accuracy, integrity, continuity, or availability of these services and cannot guarantee the ability to use Raven systems, or products used as components of systems, which rely upon the reception of these signals or availability of these services. Raven Industries accepts no responsibility for the use of any of these signals or services for other than the stated purpose.

| | | |
|------------------|--|-----------|
| Chapter 1 | <i>Important Safety Information</i> | 1 |
| | Hydraulic Safety | 2 |
| | Electrical Safety | 2 |
| Chapter 2 | <i>Introduction</i> | 3 |
| | Updates | 3 |
| | Preparing for Installation | 4 |
| | Recommendations | 4 |
| | Point of Reference | 4 |
| | Hydraulic Fittings | 5 |
| | Kit Contents | 5 |
| Chapter 3 | <i>Hydraulic Installation</i> | 11 |
| | Install Fittings in the SmarTrax Valve | 12 |
| | Mount the SmarTrax Valve | 13 |
| | Install the Left and Right Steering Hoses | 14 |
| | Install the Tank Hose | 15 |
| | Install the Load Sense Hose | 16 |
| | Install the Pressure Hose | 17 |
| Chapter 4 | <i>Wheel Angle Sensor Installation</i> | 19 |
| | Assembly the Wheel Angle Sensor (WAS) | 19 |
| | Mount the WAS | 19 |
| Chapter 5 | <i>Cab Component Installation</i> | 23 |
| | Install the Power Connection - SmarTrax-Only Systems | 23 |
| | Install the SmarTrax Node | 23 |
| | Node Mounting Locations | 23 |
| | Mount the SmarTrax Node | 24 |
| | Install the Node Harness | 25 |
| | Install the Foot Switch | 25 |
| | Install the Valve Harness | 26 |
| | System Diagram | 27 |
| | SmarTrax-Only Systems | 27 |
| | Multiple CAN Systems | 28 |
| | Node Wiring Diagram | 29 |
| Chapter 6 | <i>Startup Procedures</i> | 31 |
| | Remove Air from the Hydraulic System | 31 |
| | Verify the Hydraulic System Installation | 32 |

Calibrate the SmarTrax System 32

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

- Do not use hands to check for leaks. Hydraulic fluid under pressure can penetrate the skin and cause serious injury or death.
- 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 Raven SmarTrax system! This system is designed to provide cutting-edge, hands-free steering of agricultural equipment via GPS (Global Positioning System) coordinates.

This manual applies to the following machines. For future reference, write your serial number in the space below.

MAKE: John Deere
MODEL: 7x20 Series
SERIAL NUMBER:

FIGURE 1. John Deere 7x20



Updates

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

<http://www.ravenhelp.com>

Preparing for Installation

Before installing the SmarTrax system, park the machine where the ground is level, clean, and dry. Bleed pressure from the hydraulic system and 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.

Recommendations

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.

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:

- 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 valve is using fresh oil and debris is flushed from the hydraulic hoses, valves, and filters.

Point of Reference

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

Hydraulic Fittings

This manual may reference the following types of hydraulic fittings:

- SAE O-ring fittings
- ORFS fittings
- JIC fittings

SAE O-ring fitting



ORFS fitting



JIC fitting (M)



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 SmarTrax kit with the components on this list. If you have questions about the kit, contact your Raven dealer.

TABLE 1. John Deere 7x20 Large Frame Installation Kit (P/N 117-5034-005)

| Picture | Item Description | Part Number | Qty. |
|---|---|--------------|------|
| Not Pictured | Manual - John Deere 7x20 Large Frame SmarTrax™ Installation | 016-4001-008 | 1 |
|  | Valve - SmarTrax Hydraulic | 334-0003-088 | 1 |
|  | Bracket - Hydraulic Block Mounting | 107-0171-907 | 1 |
|  | Bracket - Node Mounting | 107-0171-946 | 1 |
|  | Bracket - John Deere 7x20 SPS Base | 107-0172-052 | 1 |

TABLE 1. John Deere 7x20 Large Frame Installation Kit (P/N 117-5034-005)





| Picture | Item Description | Part Number | Qty. |
|---|--|--------------|------|
|  | Bracket - John Deere 7x20 SPS Rod | 107-0172-053 | 1 |
|  | Cable - John Deere 7000 Series Chassis | 115-4001-093 | 1 |
|  | Sensor - 250 mm Non-Contact Linear Wheel Angle | 063-0181-017 | 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 - 3/8" ID x 3/4" OD x 3/4" Long Plastic | 107-0172-037 | 1 |
|  | Bolt - 5/16"-18 UNC x 7/8" Hex | 311-0052-104 | 4 |
|  | Bolt - M10 x 1.5" x 60 mm Metric Hex | 311-0070-025 | 1 |
|  | Bolt - M10 x 1.5" x 70 mm Class 8.8 Metric Hex | 311-0070-033 | 2 |
|  | Nut - M10 x 1.5 Pitch x 5 mm Thick Jam | 312-1002-035 | 2 |

TABLE 1. John Deere 7x20 Large Frame Installation Kit (P/N 117-5034-005)






| Picture | Item Description | Part Number | Qty. |
|---|--|--------------|------|
|  | Nut - 5/16"-18 Nylon Insert Lock | 312-4000-059 | 4 |
|  | Nut - 3/8"-16 Nyloc | 312-4000-061 | 3 |
|  | Nut - M10 x 1.5" Nylon Insert Lock | 312-4000-208 | 4 |
|  | Washer - 5/16" Lock | 313-1000-019 | 4 |
|  | Washer - .406" ID x .812" OD x .065" Thick | 313-2300-014 | 4 |

TABLE 2. Hydraulic Kit (P/N 117-0199-008)









| Picture | Item Description | Part Number | Qty. |
|---|--|--------------|------|
|  | Fitting - -4 ORFS M/F 90° Swivel Elbow | 333-0012-023 | 1 |
|  | Fitting - -8 ORFS M/M/F Swivel Run Tee Adapter | 333-0012-028 | 3 |
|  | 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/F 45° Elbow | 333-0012-090 | 1 |

TABLE 2. Hydraulic Kit (P/N 117-0199-008)

| Picture | Item Description | Part Number | Qty. |
|---|---|--------------|------|
|  | Fitting - -6 ORFS (M) to -8 SAE O-Ring (M) 90° Elbow | 333-0012-165 | 1 |
|  | 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 | 1 |
|  | Fitting - -6 ORFS (M) to -10 SAE O-Ring (M) Straight Adapter | 333-0012-233 | 2 |
|  | Fitting - M16 x 1.5" (M) to -6 ORFS (M) Straight Adapter | 333-0012-339 | 1 |
|  | Hydraulic Hose - -6 ORFS (F) to -6 ORFS (F) 90° - 44" | 214-1000-495 | 1 |
|  | Hydraulic Hose - -8 ORFS (F) to -6 ORFS (F) 90° - 96" | 214-1000-759 | 2 |
|  | Hydraulic Hose - -6 ORFS (F) to -8 ORFS (F) 90° - 13" | 214-1000-786 | 1 |
|  | Hydraulic Hose - -4 ORFS (F) to -6 ORFS (F) 90° - 18" | 214-1000-787 | 1 |
|  | Hydraulic Hose - -6 ORFS (M) to -4 ORFS (F) 90° - 18" | 214-1000-788 | 1 |

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 |
|  | Harness - SmarTrax Node | 115-4001-109 | 1 |
|  | Assembly - SmarTrax Enable Switch | 063-0172-470 | 1 |

CHAPTER

3

Hydraulic 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.

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 cause damage to the SmarTrax hydraulic valve.

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. Refer to the figure and table on the following page to install the fittings in the appropriate ports of the SmarTrax valve.

FIGURE 1. Fittings Installed in the SmarTrax Valve



| Fitting | Part Number | Port |
|--|--------------|-------------------|
| Fitting - -6 ORFS (M) to -8 SAE O-Ring (M) 90° Elbow | 333-0012-165 | T |
| Fitting - -4 ORFS (M) to -6 SAE O-Ring (M) Straight Adapter | 333-0012-195 | LSPV, LS STEER |
| Fitting - -4 ORFS M/F 90° Swivel Elbow | 333-0012-023 | LSPV |
| Fitting - -6 ORFS (M) to -8 SAE O-Ring (M) Straight Adapter | 333-0012-199 | P |
| Fitting - -6 ORFS (M) to -10 SAE O-Ring (M) Straight Adapter | 333-0012-233 | A, B |
| Transducer - 0-3000 PSI Pressure | 422-0000-086 | PS |

Mount the SmarTrax Valve

FIGURE 2. SmarTrax Valve Mounting Location



1. Identify the valve mounting location in the right-rear corner of the machine, next to the SCV outlets.

Note: It may be necessary to remove the slow moving vehicle triangle from the machine.

FIGURE 3. Valve Mounted to the Machine



2. Secure the SmarTrax valve (P/N 334-0003-088) to the hydraulic valve mounting plate (P/N 107-0171-907) using four 5/16"-18 x 7/8" hex head bolts (P/N 311-0052-104) and four 5/16" lock washers (P/N 313-1000-019).
3. Mount the SmarTrax valve and mounting plate to the machine using the machine's existing bolts.

Note: Ensure the valve is mounted in a location where there is no interference between the valve and the 3-point hitch.

Install the Left and Right Steering Hoses

FIGURE 4. Left and Right Steering Hose Location

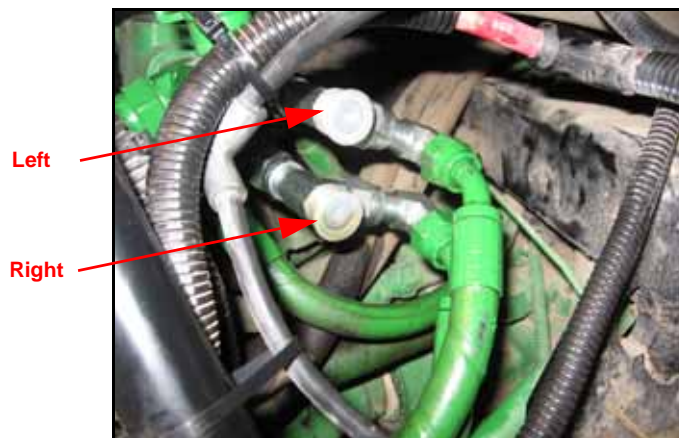


1. Locate the left and right steering hose connections on the steering orbital.

Note: The left and right steering hoses run from the steering cylinder on the left front of the tractor frame to the steering orbital located directly in front of the cab. There is a green plastic shield (not shown in the figure above) that must be removed to access the left and right steering hose connections.)

2. Label the machine's left and right steering hoses.
3. Disconnect the steering hoses from the steering orbital.

FIGURE 5. Tee Fittings Installed



Note: Due to space restrictions, it best to perform the following steps one at a time, starting at the bottom of the machine and working toward the top.

4. Install a -8 ORFS M/M/F swivel run tee adapter fitting (P/N 333-0012-028) in the right steering hose port on the machine's steering orbital.
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. Connect the machine's right steering hose to the installed 90° elbow fitting.
7. Install the straight end of the supplied hydraulic hose (P/N 214-1000-759) on the installed tee fitting in the machine's right steering port.

FIGURE 6. Ports A and B of the SmarTrax Valve



8. Connect the 90° end of the installed hydraulic hose to the fitting installed in Port A of the SmarTrax valve.
9. Install a -8 ORFS M/M/F swivel run tee adapter fitting (P/N 333-0012-028) in the left steering hose port on the machine's steering orbital.
10. Install a -8 ORFS M/F 90° swivel elbow fitting (P/N 333-0012-067) on the 90° end of the installed tee fitting.
11. Connect the machine's left steering hose to the 90° installed 90° elbow fitting.
12. Install the straight end of the supplied hydraulic hose (P/N 214-1000-759) on the installed tee fitting in the machine's left steering port.
13. Connect the 90° end of the installed hydraulic hose to the fitting installed in Port B of the SmarTrax valve.

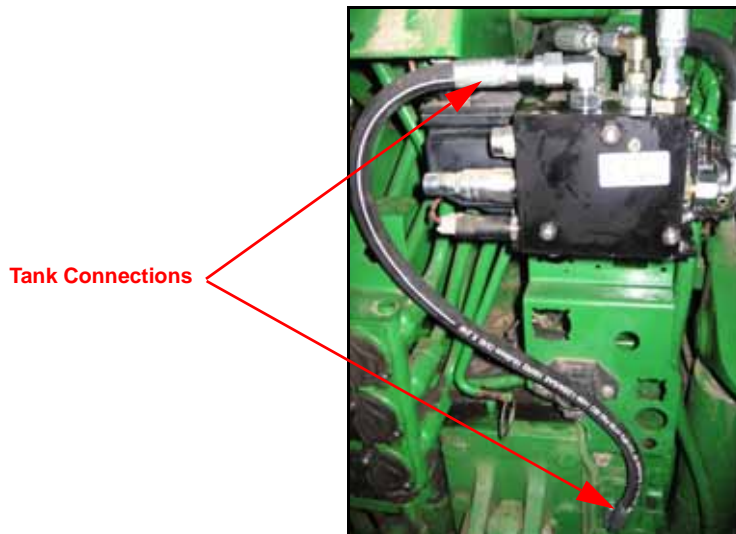
FIGURE 7. Steering Hoses Installed



Install the Tank Hose

1. Remove the plug from the back of the rear directional housing, located behind the hydraulic fill tube.

FIGURE 8. Tank Hose Installed



2. Install the M16 x 1.5" (M) to -6 ORFS (M) straight adapter fitting (P/N 333-0012-339) in the open port of the rear differential housing.
3. Install the 90° end of the supplied hydraulic hose (P/N 214-1000-495) on the installed adapter fitting.
4. Connect the straight end of the installed hydraulic hose to the fitting installed in Port T of the SmarTrax valve.

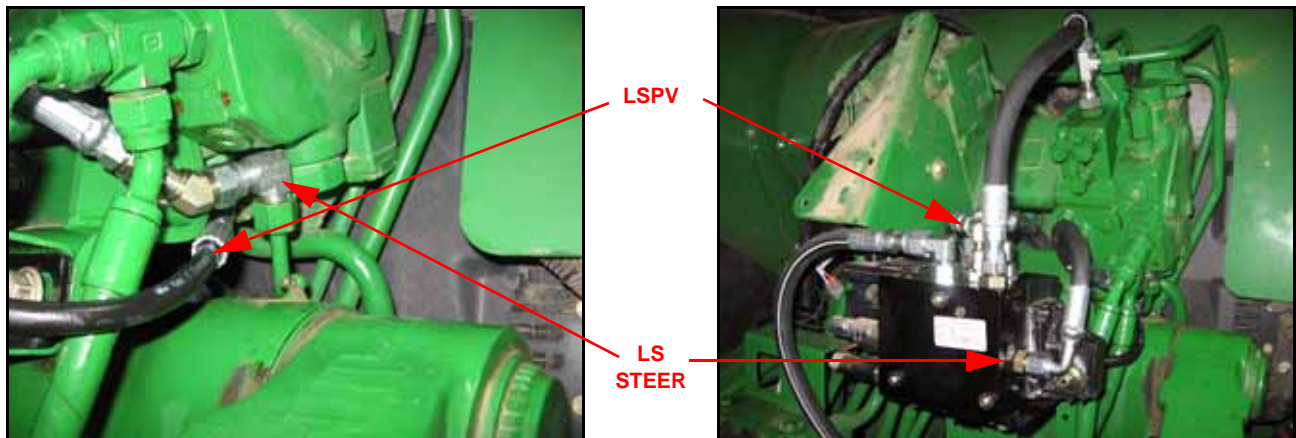
Install the Load Sense Hose

FIGURE 9. Machine's Existing Load Sense Connection



1. Disconnect the existing load sense steel line from the bottom of the machine's hydraulic valve at the rear of the tractor.

FIGURE 10. Load Sense Hoses Installed



2. Install the 90° of the supplied hydraulic hose (P/N 214-1000-787) on the open load sense port on the machine's hydraulic valve.
3. Connect the straight end of the installed hydraulic hose to the 90° elbow fitting installed in Port LSPV of the SmarTrax valve.
4. Install a -6 ORFS M/F 90° swivel elbow fitting (P/N 333-0012-065) on the machine's steel load sense line.
5. Install a -6 ORFS M/F 45° elbow fitting (P/N 333-0012-090) on the installed 90° fitting.
6. Install the straight end of the supplied hydraulic hose (P/N 214-1000-788) on the installed 45° elbow fitting.
7. Connect the 90° end of the installed hydraulic hose to the fitting installed in Port LS STEER of the SmarTrax valve.

Install the Pressure Hose

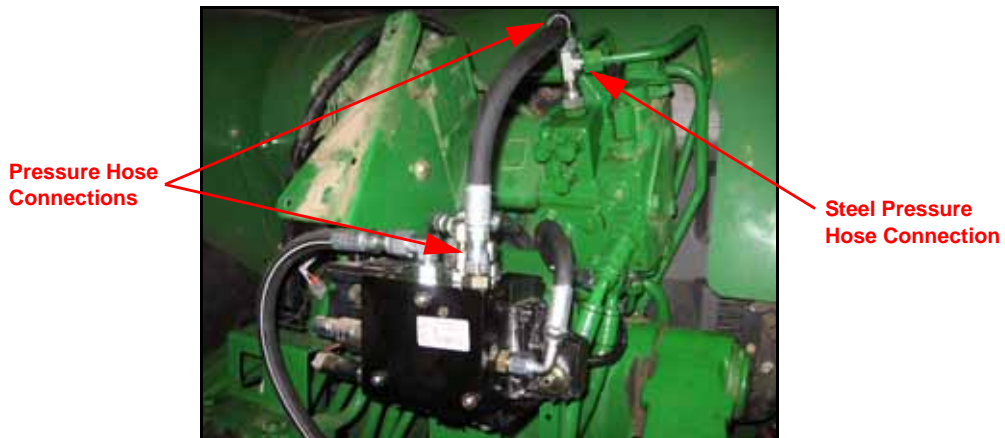
FIGURE 11. Machine's Pressure Connection



1. Disconnect the existing pressure connection from the top of the machine's hydraulic valve and remove the 90° hydraulic fitting.

Note: Keep the fitting for future use in case the SmarTrax system is removed from the machine.

FIGURE 12. Pressure Hose Installed



2. Install a -8 ORFS M/M/F swivel run tee adapter fitting (P/N 333-0012-028) in the machine's open pressure port.
3. Connect the machine's steel pressure line to the 90° end of the installed tee fitting.
4. Install the 90° end of the supplied hydraulic hose (P/N 214-1000-786) to the straight end of the installed tee fitting.
5. Connect the straight end of the installed hydraulic hose to the fitting installed in Port P of the SmarTrax valve.

CHAPTER

4

Wheel Angle Sensor Installation

Assemble the Wheel Angle Sensor (WAS)

FIGURE 1. WAS Assembly



1. Attach the M10 stud linear sensor mount (P/N 103-0001-030) to the base-end (where the cable connects) of the WAS (P/N 063-0181-017) using one M10 lock nut (P/N 312-1002-035).
2. Attach the M10 ball linear sensor mount (P/N 103-0001-029) to the rod-end of the WAS using the remaining M10 lock nut.

Mount the WAS

FIGURE 2. Base Bracket Mounting Location



1. Turn the machine's front wheels to the left to access the right front axle.
2. Secure the base-end of the WAS (P/N 063-0181-017) to the base mounting bracket (P/N 107-0172-052) using one M10 x 1.5" nylon insert lock nut (P/N 312-4000-208) and one washer (P/N 313-2300-014).

FIGURE 3. Base-End of Sensor Installed on Machine



3. Remove a differential housing bolt on the front-right side of the machine's axle.
4. Align the base-end of the base mounting bracket over the hole and replace the housing bolt.

FIGURE 4. Rod Mounting Bracket Installed



5. Remove two of the machine's left fender mounting bolts.
6. Install the rod mounting bracket (P/N 107-0172-053) under the fender mount using two M10 x 1.5" x 70 mm class 8.8 metric hex bolts (P/N 311-0070-033), two 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



7. Mount the rod-end of the WAS to the rod mounting bracket using a 3/8" ID x 3/4" OD x 3/4" L plastic spacer (P/N 107-0172-037), 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 steering position sensor 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 steering position sensor through the floor of the cab, 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 Power Connection - SmarTrax-
Only Systems*

For SmarTrax-only systems (no other Raven CAN node is present), the SmarTrax power cable (P/N 115-4001-085) must be installed. Refer to the CAN node wiring diagram on page 29 for information on selecting the power source.

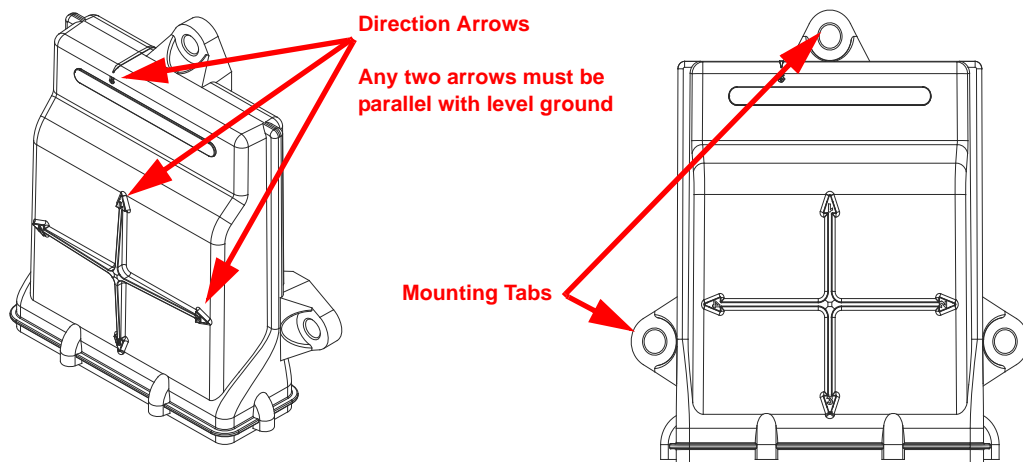
If additional CAN systems are present, refer to wiring diagram 054-5000-001 located on the Raven website:

www.ravenhelp.com

Install the SmarTrax Node

Node Mounting Locations

FIGURE 1. Node Mounting



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

- The node is not weatherproof. Mount the SmarTrax node inside the machine's cab on a flat, level surface.
- 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.

Mount the SmarTrax Node

FIGURE 2. Machine's Existing Access Plate



1. Remove the factory-installed access plate to the floor of the cab on 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 107-0171-946) to the floor of the cab.

FIGURE 3. Node Installed on Node Mounting Plate

3. Secure the SmarTrax node (P/N 063-0173-228) to the node mounting plate using three 3/8"-16 nyloc nuts (P/N 312-4000-061).

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. Connect the node harness to the installed power cable (P/N 115-4001-085), if applicable.

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.

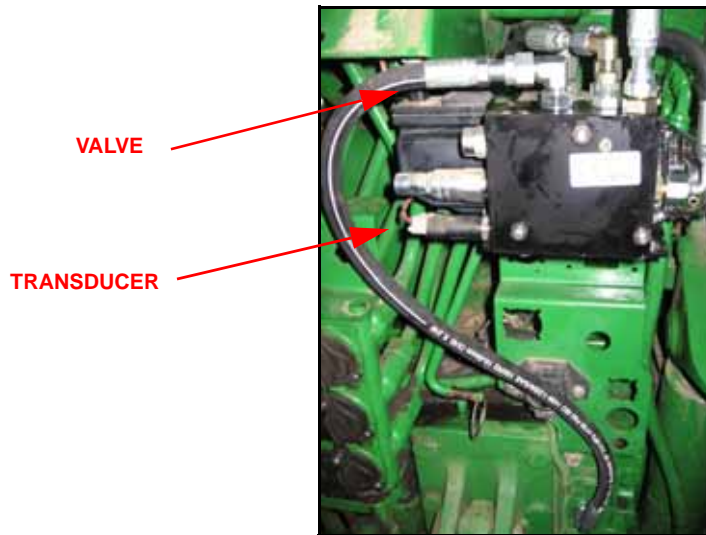
Note: *The foot switch should be installed in a location where the operator has easy access to it and is able to fully press the pedal.*

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. Locate the ENABLE connector on the node harness and connect it to the foot switch cable connector.

Install the Valve Harness

1. Locate the valve harness (P/N 115-4001-093).
2. Route the 12-pin connector toward the node harness (P/N 115-4001-109).
3. Plug the 12-pin connector of the valve harness into the mating connector of the node harness.
4. Route the valve harness through the bottom of the cab.
5. Connect the WAS valve harness connection to the connector on the installed WAS.

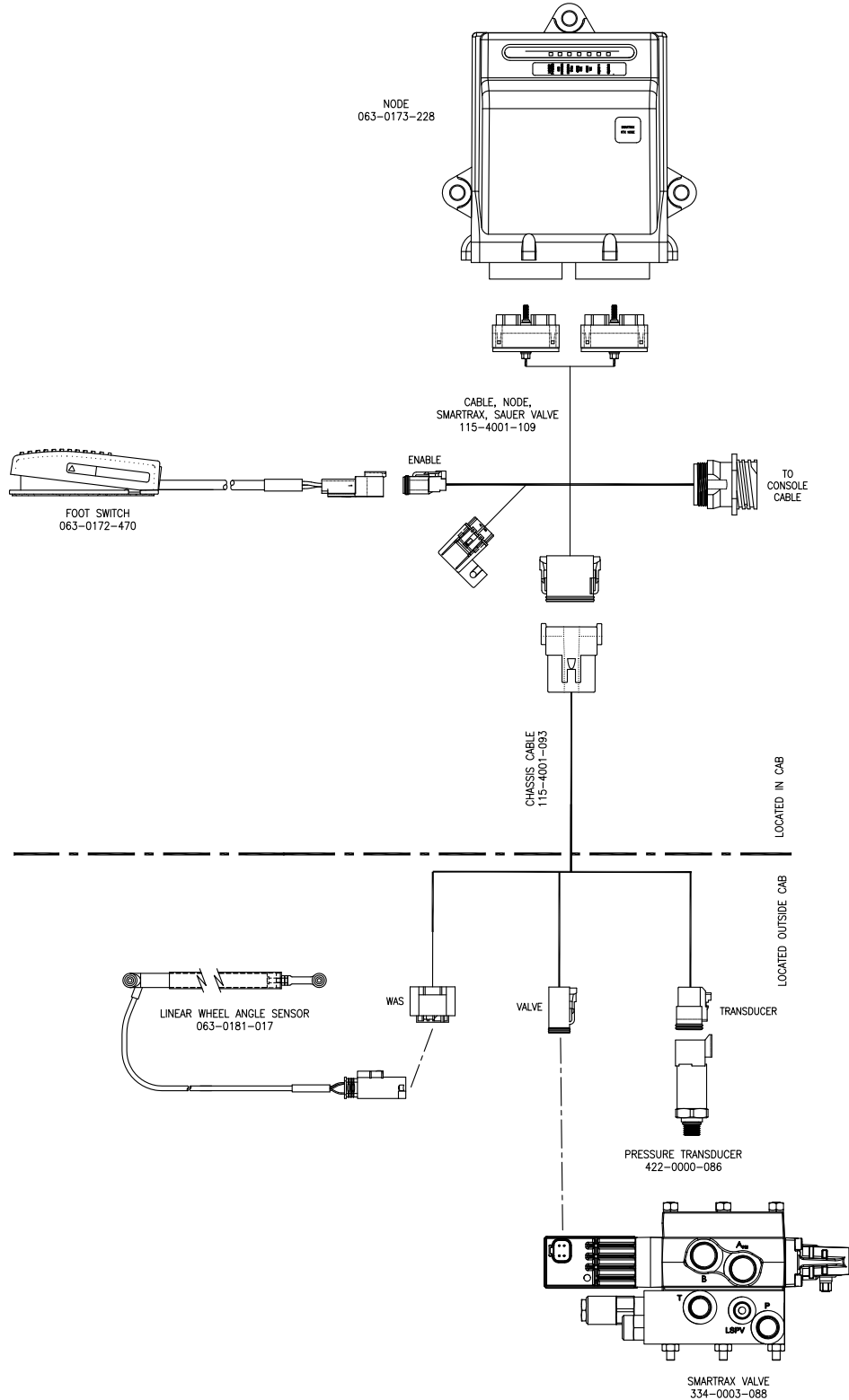
FIGURE 5. Valve Harness Connections



1. Connect the TRANSDUCER connector on the valve harness (P/N 115-4001-093) to the open transducer port on the end of the SmarTrax valve (P/N 334-0003-088).
2. Connect the VALVE connector on the valve harness to the open 4-pin connector on top of the SmarTrax valve.

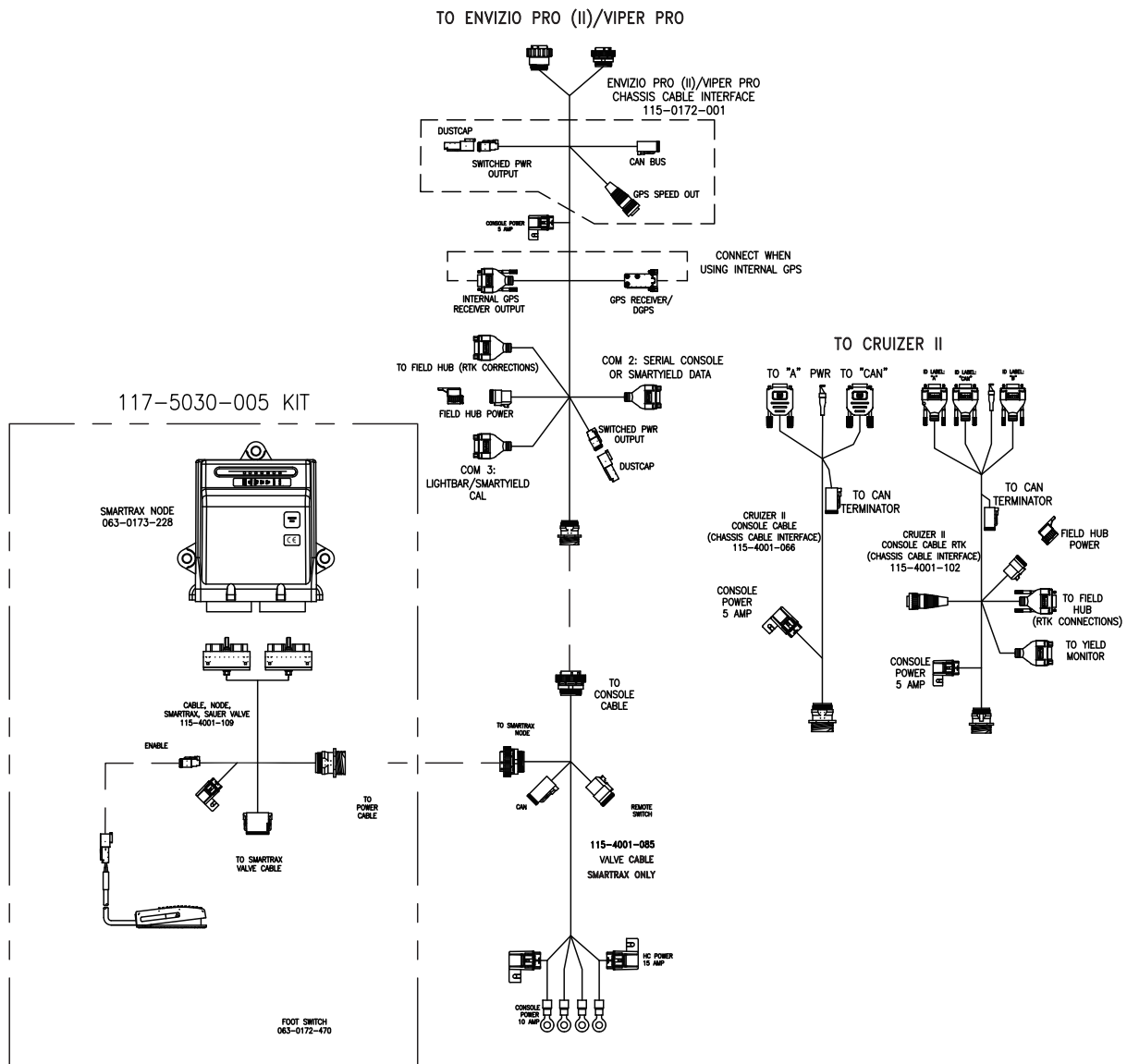
System Diagrams

SmarTrax-Only Systems



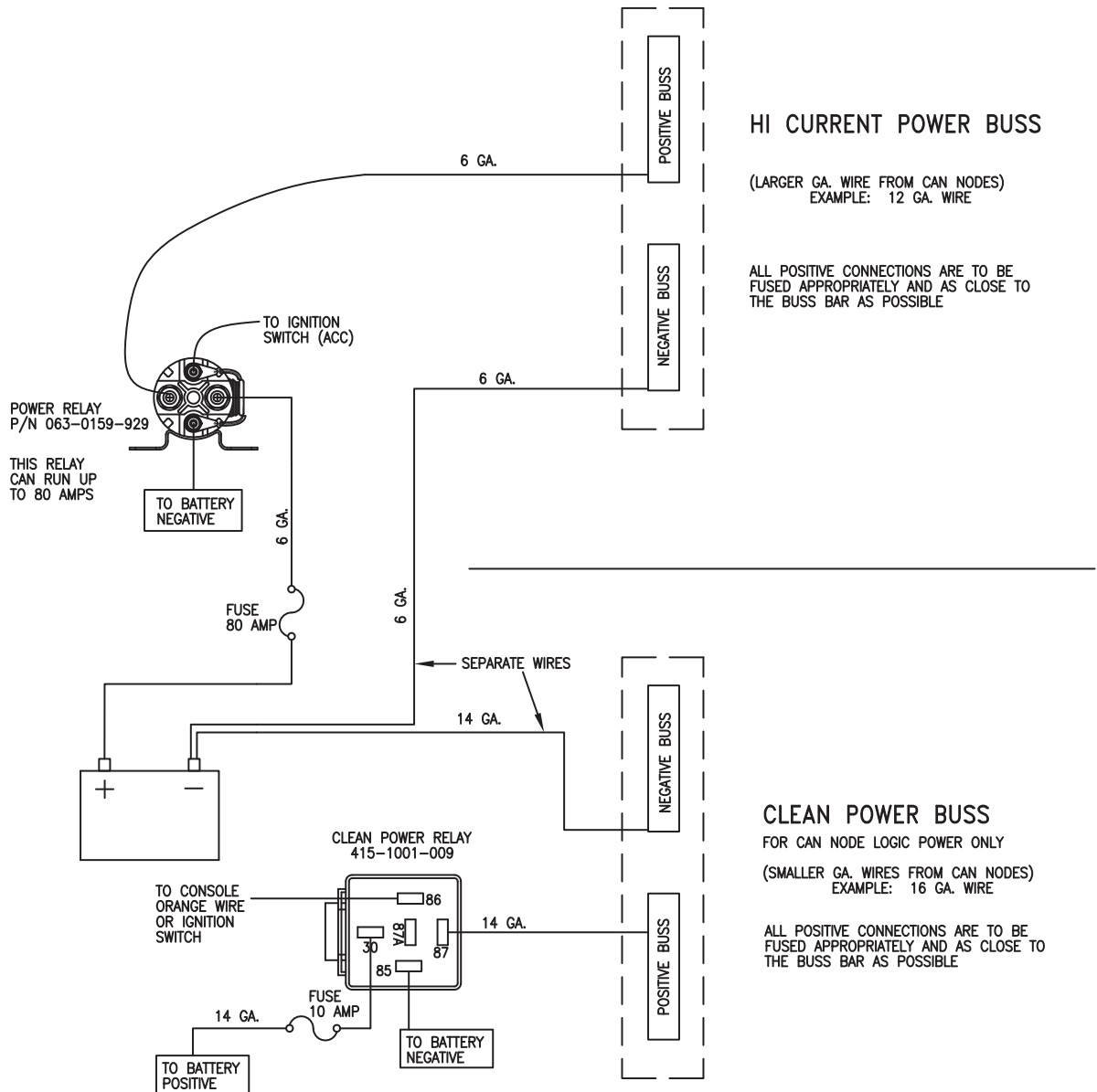
Multiple CAN Systems

GEN II SMARTRAX SYSTEM CABLING CONNECTIONS



Node Wiring Diagram

CAN NODE WIRING



**⚠ 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.

Remove Air from the Hydraulic System

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. To remove air from the hydraulic system and to ensure proper operation of the SmarTrax system:

1. Turn the machine's wheels fully from side to side repeatedly.

Note: *If air pockets are present, the wheels may not move consistently when the steering wheel is turned.*

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

Verify the Hydraulic 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.

Note: *If there are issues with the SmarTrax system, turn off the machine and correct them immediately. For additional assistance, 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.

C

Cab Component Installation 23

- Installing the Foot Switch 25
- Installing the Node Harness 25
- Installing the Valve Harness 26
- Mounting the SmarTrax Node 23
 - Mount the Node 24
 - Node Mounting Locations 23
- System Diagram 27

E

Electrical Safety 2

H

Hydraulic Installation 11

- Installing Fittings in the SmarTrax Valve 12
- Installing the Left and Right Steering Hoses 14
- Installing the Load Sense Hose 16
- Installing the Pressure Hoses 17
- Installing the Tank Hose 15
- Mounting the SmarTrax Valve 13

Hydraulic Safety 2

I

Important Safety Information

- Electrical Safety 2
- Hydraulic Safety 2

Introduction

- Hydraulic Fittings 5
- Kit Contents 5
- Preparing for Installation 4
 - Point of Reference 4
 - Recommendations 4
- Updates 3

K

Kit Contents 5

S

Startup Procedures

- Calibrating the SmarTrax System 32
- Removing Air from the Hydraulic System 31
- Verifying the Hydraulic System Installation 32

W

Wheel Angle Sensor Installation 19

- Assembling the Wheel Angle Sensor (WAS) 19
- Mounting the WAS 19

RAVEN

RAVEN INDUSTRIES

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.

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?

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 or other special 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.

R A V E N

John Deere 7x20 Large Frame
SmarTrax™ Installation Manual
(P/N 016-4001-008 Rev A 08/11 E18040)

Simply improving your position.™



Raven Industries
Applied Technology Division
P.O. Box 5107
Sioux Falls, SD 57117-5107

Toll Free (U.S. and Canada): (800)-243-5435
or Outside the U.S. :1 605-575-0722
Fax: 605-331-0426
www.ravenprecision.com

Notice: This document and the information provided are the property of Raven Industries, Inc. and may only be used as authorized by Raven Industries, Inc. All rights reserved under copyright laws.