

**Buhler Versatile 260/290/310 Steering  
Ready, Model Year 2015 & Newer  
SmarTrax™ Installation Manual**

*P/N 016-5031-008 Rev. A*

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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**

- 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**

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## *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.

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## *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.

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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: Buhler Versatile**

**MODEL: Row Crop 260, 290, and 310**

**YEAR: 2015 & Newer**

**FIGURE 1. Buhler Versatile Row Crop 310**



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*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](mailto:techwriting@ravenind.com)**

*-Buhler Versatile 260/290/310 Steering Ready, Model Year 2015 & Newer SmarTrax™ Installation Manual*

*-P/N 016-5031-008 Rev. A*

*-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.*

## 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 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)
Versatile 260, 290, 310	Centered	5 ft./1.524 m	11 ft. 2 in./3.404 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.

## 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. SmarTrax Installation Kit (P/N 117-5031-008)**

Picture	Item Description	Part Number	Qty.
Not Pictured	Manual - SmarTrax Calibration & Operation	016-0171-532	1
Not Pictured	Manual - Buhler Versatile 260/290/310 Series, Model Year 2015 & Newer SmarTrax Installation	016-5031-008	1
	Node - Buhler Versatile SmarTrax	063-0173-441	1
	Cable - Valve Harness	115-4001-159	1
	Cable - Node Harness	115-4001-165	1

**TABLE 1. SmarTrax Installation Kit (P/N 117-5031-008)**

Picture	Item Description	Part Number	Qty.
	Terminator - CAN	063-0172-369	1
	Bolt - M8 x 1.25 x 25 mm Hex	311-0070-001	3

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CHAPTER

3

*Cab Component  
Installation*

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*Install the SmarTrax Node*

Mount the SmarTrax Node

**FIGURE 1. SmarTrax Node Mounting Location - Side Console Panel Removed**



1. Remove the panels to the right and behind the operator's seat.
2. Route the rectangular ECU 1 and ECU 2 node connectors of the node harness (P/N 115-4001-165) from the rear access point to the side compartment.

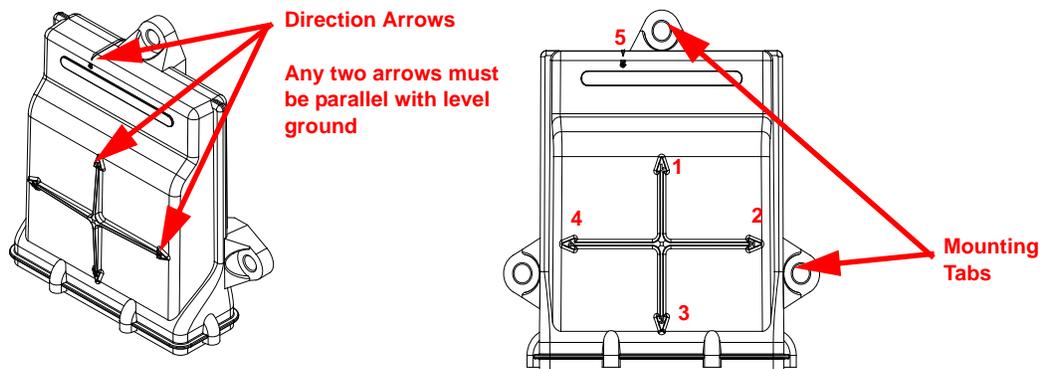
FIGURE 2. SmarTrax Node Installed



3. Connect the ECU 1 and ECU 2 connectors into to the correct ports of the node (P/N 063-0173-441), tightening the bolts of the harness to secure the connections.
4. Locate the three holes in the side console compartment.
5. Secure the node to the machine's side compartment using three M8 x 1.25 x 25 mm hex bolts (P/N 311-0070-001).

## 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.

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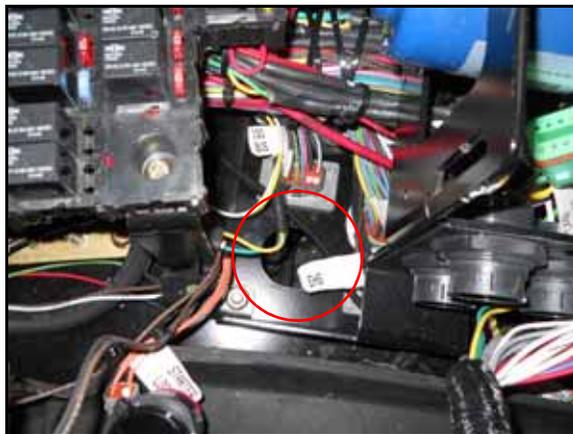
## *Install the Node Harness*

**FIGURE 4. 6-Pin Deutsch Connector on Node Harness**



1. Connect the unlabeled 6-pin Deutsch connector to the mating connector on the machine's harness.

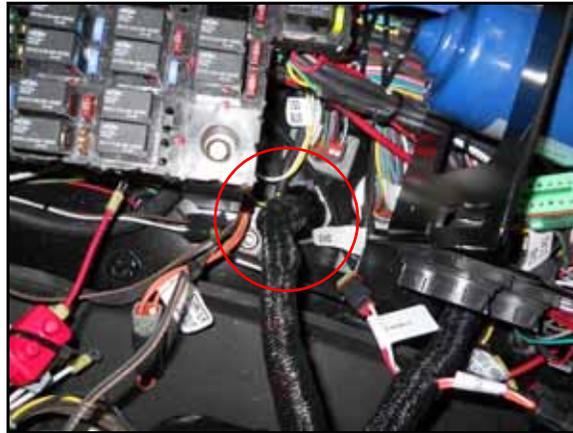
**FIGURE 5. Grommet in Bottom of Compartment**



2. Remove the rubber grommet in the bottom of the compartment.

**FIGURE 6. Node Harness Routed to Machine's Bulkhead**

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3. Route the 21-pin bulkhead connector on the node harness into the hole in the bottom of the compartment.

**FIGURE 7. Node Harness Secured to Bulkhead**

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4. From outside the cab, secure the bulkhead connector to the machine using the lock nut on the connector.

**FIGURE 8. Machine's Ground Bar**

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5. Locate the machine's ground bar on the right side of the compartment.

6. Install the two ground wires on the grounding bar.
7. Locate the fuse panel on the right side of the compartment.
8. Remove the bolt from the machine's red battery cable.
9. Install the two power wires from the node cable on the bolt.

**Note:** It may be necessary to cut the ring terminals from the power wires and crimp new ring terminals (P/N 405-0200-052 or 405-0200-053) on the end.

10. Reinstall the machine's red battery cable on the bolt.
11. Reinstall the bolt in the fuse panel.
12. Loop and tie-off the REMOTE SWITCH cable connection, securing it with plastic cable ties as necessary.

**Note:** The ENABLE and REMOTE SWITCH connectors are not used in the SmarTrax system. Ensure the cables are secured away from moving parts and heat sources.

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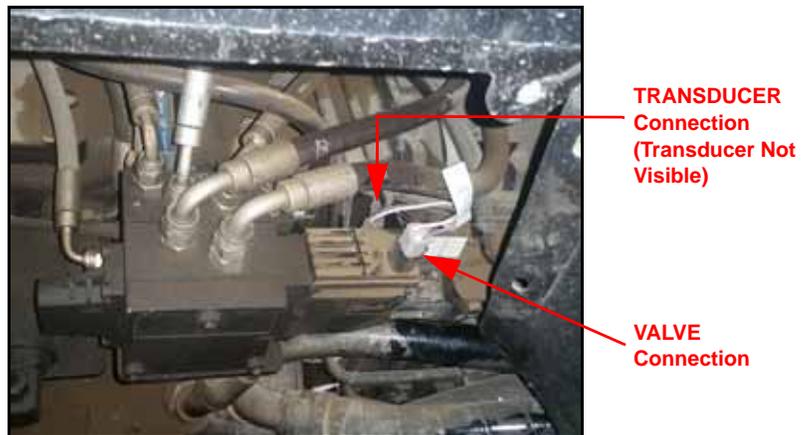
## Install the Valve Harness

FIGURE 9. Valve Harness Secured to Bulkhead



1. Connect the round 21-pin connector on the valve harness (P/N 115-4001-159) to the mating bulkhead connector under the machine's cab.
2. Route the valve harness toward the existing SmarTrax valve located under the cab near the right wheel.

FIGURE 10. TRANSDUCER and VALVE Connections



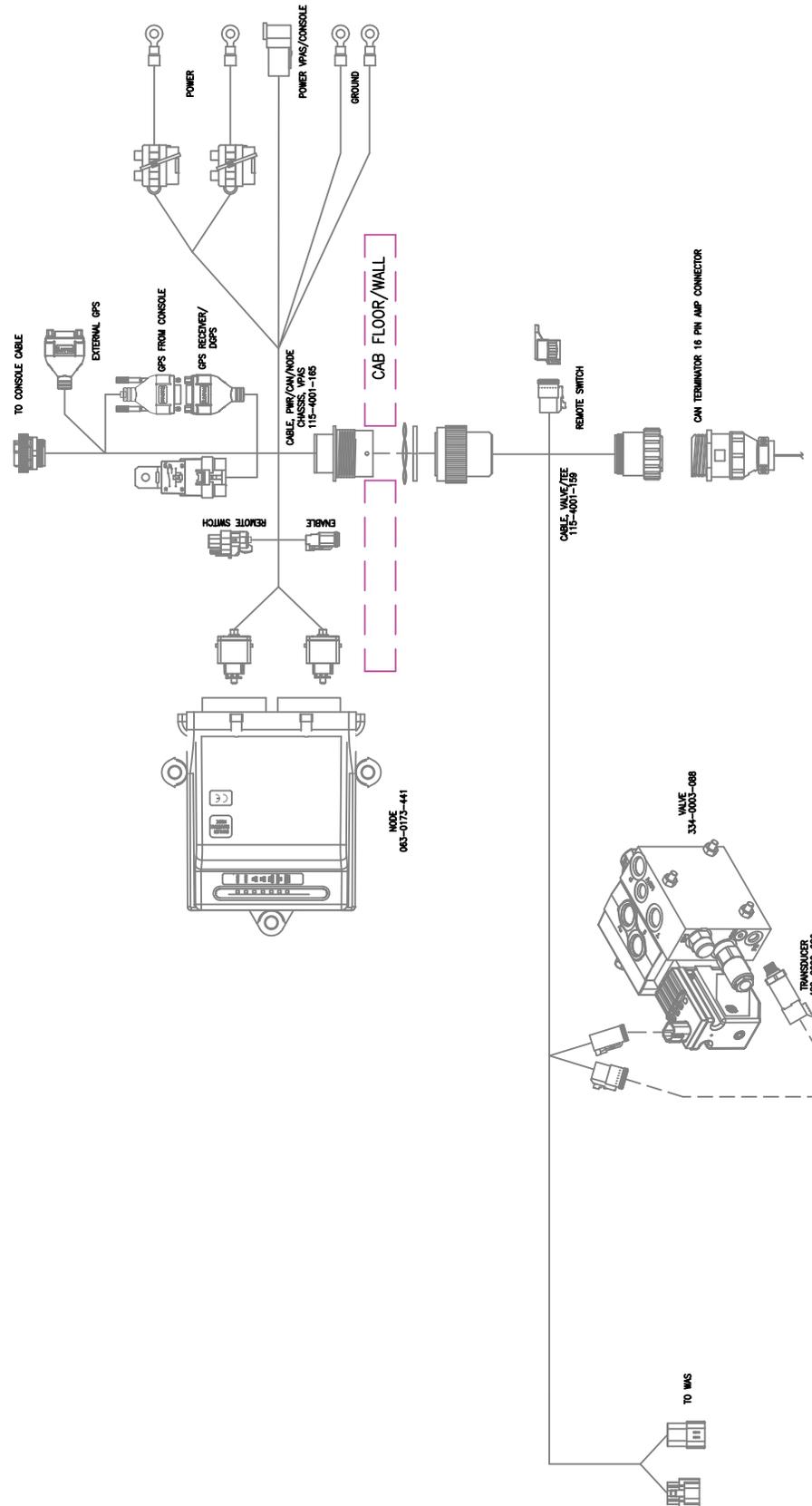
3. Connect the TRANSDUCER connector to the pressure transducer installed in Port PS of the SmarTrax valve.
4. Connect the VALVE connector to the open 4-pin Deutsch port on the PVES valve.

FIGURE 11. WAS Connection

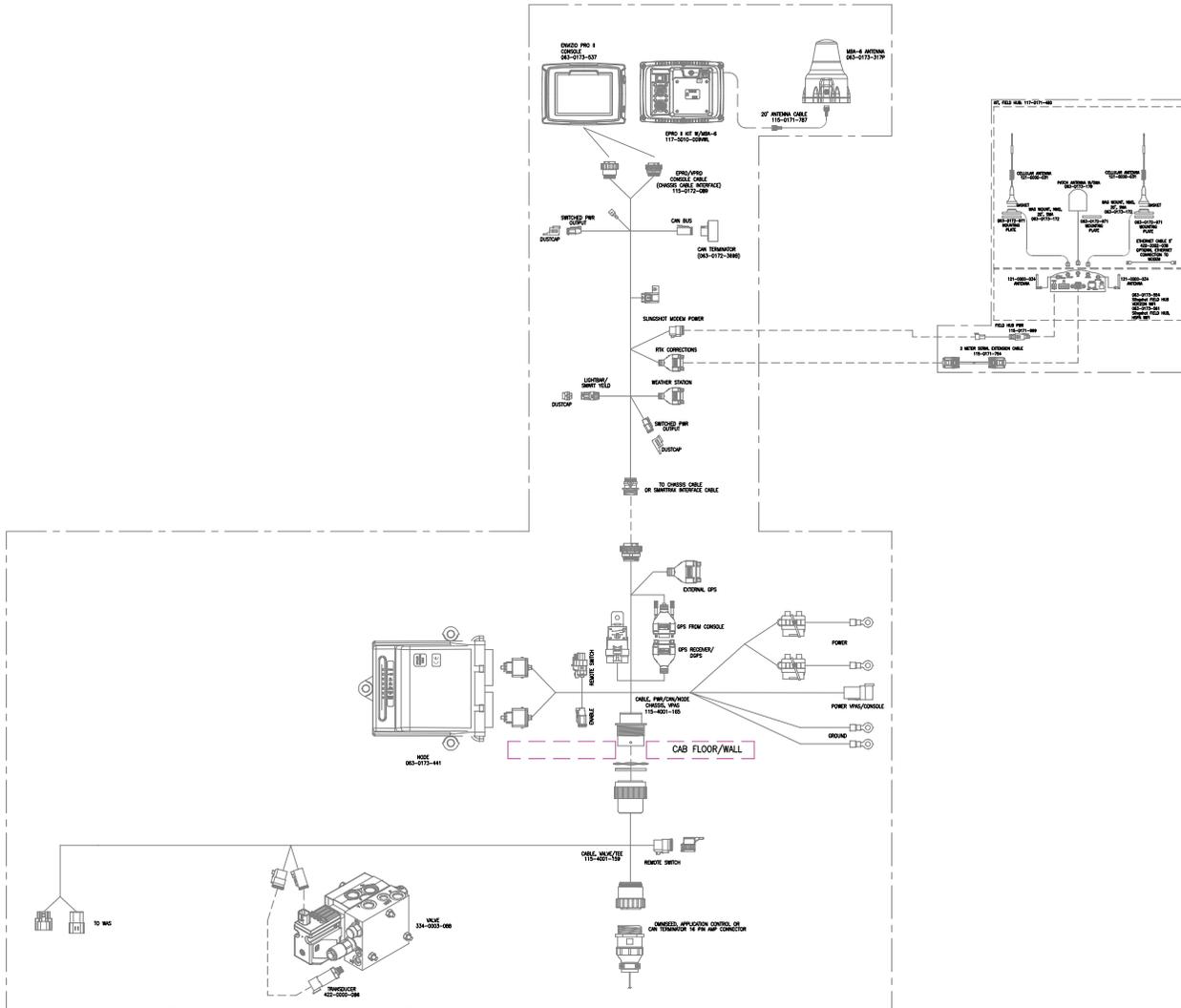


5. Route the WAS connectors of the valve harness toward the front axle.
6. Disconnect the machine's existing WAS connection.
7. Install the WAS connectors of the valve harness between the machine's WAS connectors.
8. Use plastic cable ties to secure any excess cable away from moving parts and heat sources.

FIGURE 12. Valve and Node Harness Wiring Diagram



# System Diagrams



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