

**John Deere 6X20/6X30 and 7X20/7X30
(Small Frame) - Steering Ready
SmarTrax™ Installation Manual**

P/N 016-5034-019 Rev A 04/16

E20389

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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**

- 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: 6X20 - 6120, 6320, 6420, 6520, 6620, 6820, and 6920 Steering Ready

6X30 - 6230, 6330, 6430, 6530, 6630, 6830, and 6930 Steering Ready

Small Frame 7X20 - 7220, 7320, 7420, and 7520 Steering Ready

Small Frame 7X30 - 7130, 7230, 7330, 7430, and 7530 Steering Ready

FIGURE 1. John Deere 6430



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 6x20/6x30	Centered	4.3 ft./1.32 m	9 ft./2.74 m
John Deere 7x20/7x30	Centered	5 ft./1.52 m	9.7 ft./2.95 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 6X20/6X30 and 7X20/7X30 (Small Frame) SmarTrax™ Installation Manual

-Manual No. 016-5034-019 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.

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. SmarTrax Installation Kit (P/N 117-5034-019)

Picture	Item Description	Part Number	Qty.
Not Pictured	Manual - SmarTrax and SmartSteer Calibration & Operation	016-0171-277	1
Not Pictured	Manual - John Deere 6X20/6X30 and Small Frame 7X20/7X30 SmarTrax Installation	016-5034-019	1
	Node - SmarTrax RTK	063-0173-228	1
	Bracket - Node Mounting	107-0172-128	1

TABLE 1. SmarTrax Installation Kit (P/N 117-5034-019)

Picture	Item Description	Part Number	Qty.
	Bracket - Front Support Node Mounting	107-0172-168	1
	Bracket - Rear Support Node Mounting	107-0172-169	1
	Cable - Node Harness	115-4001-087	1
	Cable - Valve Harness	115-4001-175	1
	Assembly - SmarTrax Enable Foot Switch	063-0172-470	1
	Terminator - Encoder	063-4001-003	2
	Terminator - John Deere Wheel Angle Sensor	063-4001-008	1
	Bolt - 1/4"-20 UNC x 1"	311-0050-105	3
	Nut - 1/4"-20 Nylon Insert Lock	312-4000-057	3
	Nut - 3/8"-16 Thin Lock	312-4001-109	3

CHAPTER

3

Cab Component Installation

Prepare the Cab for Installation

Premium Models with IVT Transmissions

FIGURE 1. Components to be Removed



1. Using a screwdriver, gently pry the monitor, cup holder, and button panel from the clips used to secure them into the side console top panel.

Note: Leave the wires attached to the components.

2. Set the components aside.

FIGURE 2. Screw Locations



3. Remove the screws used to secure the side console top panel as shown in Figure 2 above.
4. Raise the top cover panel.
5. Proceed to the *All Models* section on page 11.

Premium Models with Electronic SCV and AutoQuad™ Plus or PowrQuad™ Plus Transmission

FIGURE 3. Components to be Removed

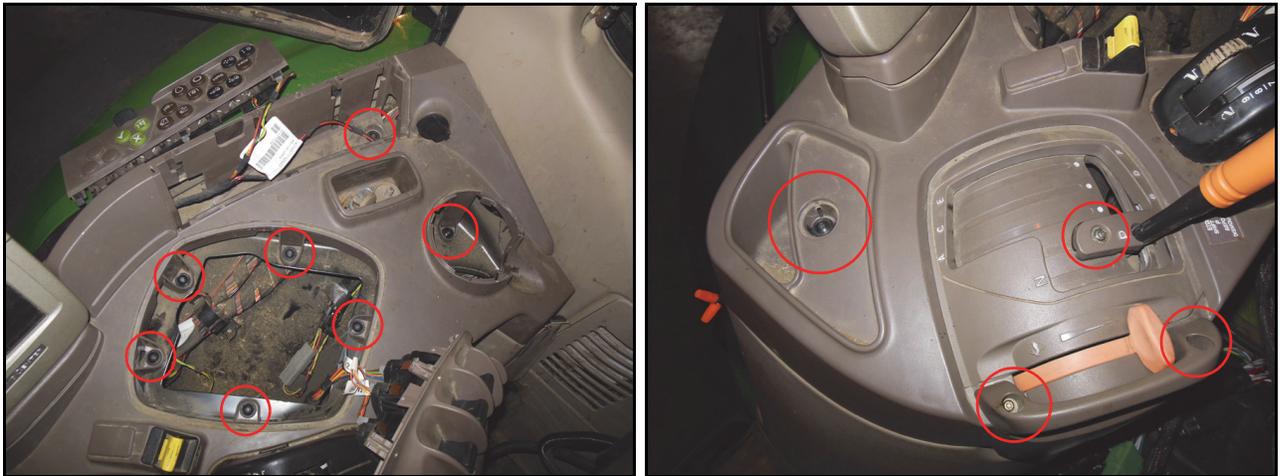


1. Using a screwdriver, gently pry the cup holder, SCV switch panel, and button panel from the clips used to secure them into the side console top panel.

Note: Leave the wires attached to the components.

2. Set the components aside.

FIGURE 4. Screws to be Removed



3. Remove the screws used to secure the side console top panel as shown in Figure 2 above.
4. Raise the side console top panel.
5. Proceed to the *All Models* section on page 11.

Premium Models with Manual SCV and AutoQuad Plus or PowrQuad Plus Transmission

FIGURE 5. Components to be Removed



1. Using a screwdriver, gently pry the cup holder and button panel from the clips used to secure them into the side console top panel.

Note: Leave the wires attached to the components.

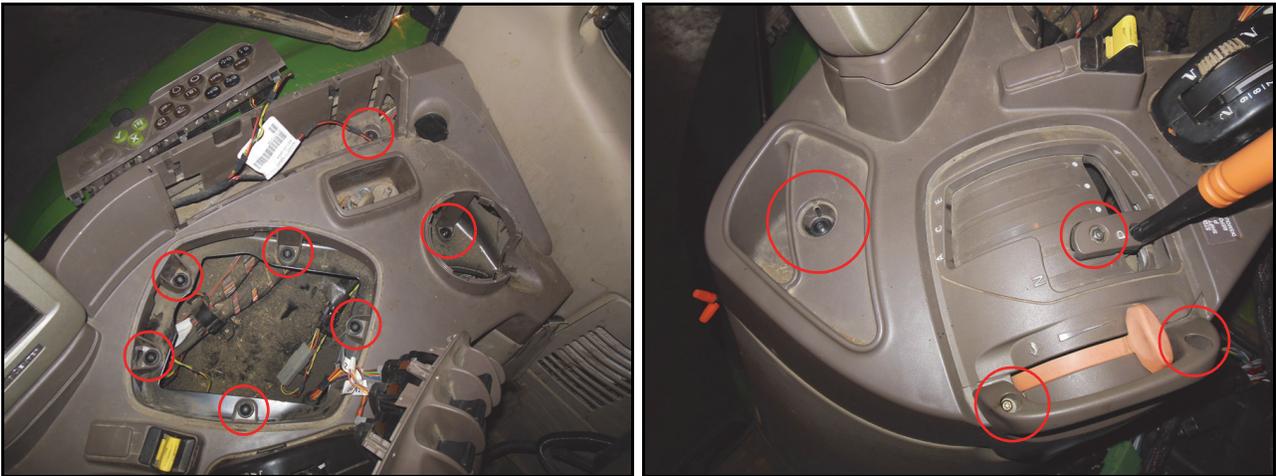
2. Set the components aside.

FIGURE 6. Components to be Removed



3. Gently pry the SCV lever covers from the tops of the SCV lever handles.
4. Remove the nut used to secure the lever handles to the levers.
5. Remove the lever handles.
6. Using a screwdriver, gently pry the cover panel surrounding the levers off.

FIGURE 7. Screws to be Removed



7. Remove the screws used to secure the side console top panel as shown in Figure 7 above.
8. Raise the side console top panel.
9. Proceed to the next section.

All Models

FIGURE 8. Side Panel

Standard Models



Premium Models



1. Remove the side panel(s) below the side console.

Note: Premium models have one side panel to remove; non-premium models have two.

FIGURE 9. Screws to be Removed



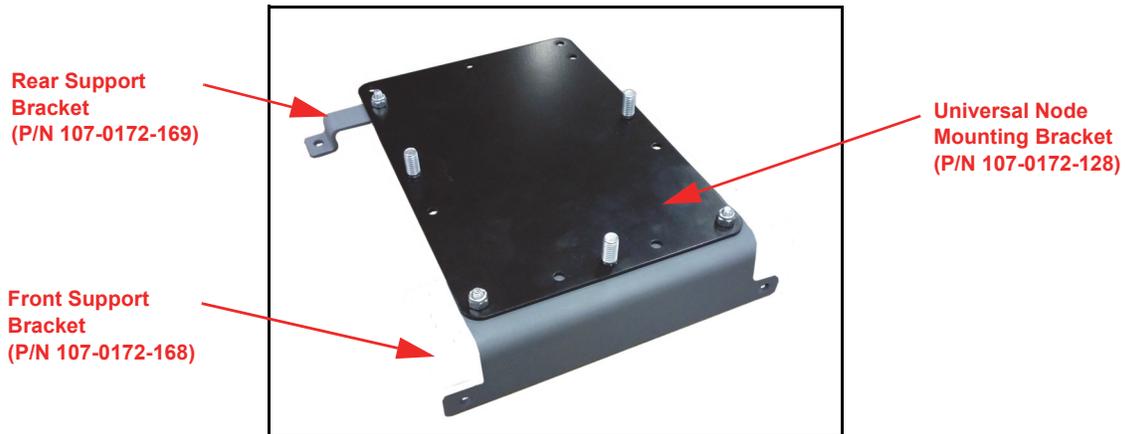
2. Remove the screws and washers indicated in Figure 4 above.

Note: Keep the hardware separate from the screws removed earlier in the procedure.

Install the SmarTrax Node

Mount the SmarTrax Node

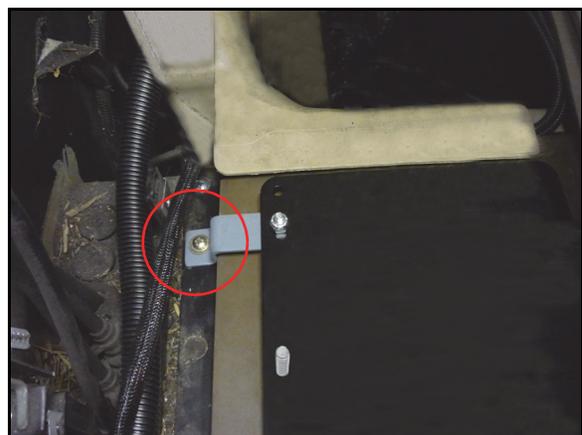
FIGURE 10. Node Mounting Bracket Assembly



1. Secure the front support bracket (P/N 107-0172-168) to the end of the universal node mounting bracket (P/N 107-0172-128) as shown in Figure 9 using two 1/4"-20 UNC x 1" hex bolts (P/N 311-0050-105) and two 1/4"-20 nylon insert lock nuts (P/N 312-4000-057).
2. Install the rear support bracket (P/N 107-0172-169) to the other end of the universal node mounting bracket using one 1/4"-20 UNC x 1" hex bolt (P/N 311-0050-105) and one 1/4"-20 nylon insert lock nut (P/N 312-4000-057).

Note: Do not fully tighten the back support node mounting bracket nut as it will be adjusted later in the procedure.

FIGURE 11. Node Installed



3. Secure the front support bracket to the trim strip using two 1/4" UNC x -1" bolts (P/N 311-0050-105) and the washers from the screws removed earlier in the procedure.
4. Reinstall the machine's screw through the hole in the rear support node mounting bracket.
5. Tighten the nut installed in the rear support mounting bracket.

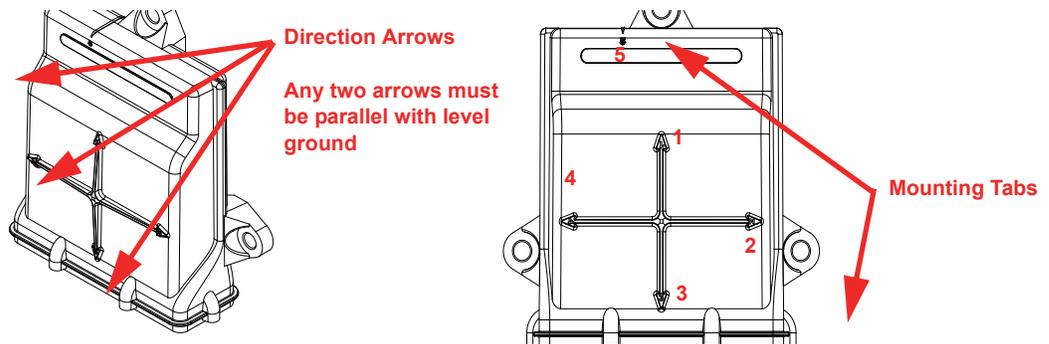
FIGURE 12. Node and Node Harness Installed



6. Install the node (P/N 063-0173-228) on the node mounting bracket assembly using three 3/8"-16 nylon insert thin lock nuts (P/N 312-4001-109).
7. Install the two large, rectangular connectors of the node harness (P/N 115-4001-087) into the correct ports of the node, tightening the bolts on the harness connectors to secure the connections.

Node Mounting Locations

FIGURE 13. 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.

Connect to the Steering Wheel Encoder

FIGURE 14. Steering Column Shroud Raised/Removed

Shroud Raised



Right Side of Shroud Removed



1. Depending on the steering column shroud style, raise the shroud or remove the right side of the shroud surrounding the steering column.

FIGURE 15. Encoder Connector Location



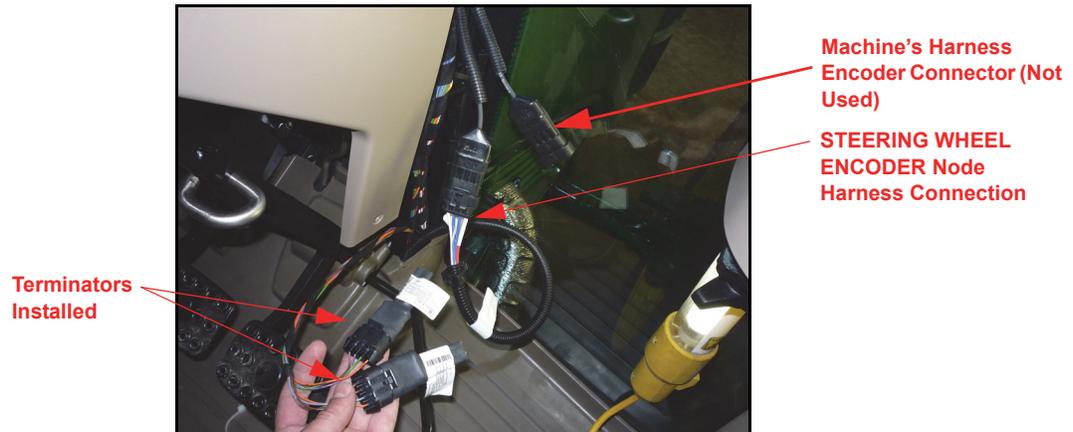
2. Locate the machine's two encoder connections located under the steering column.

FIGURE 16. Encoder Connections



3. Disconnect the two encoder connections.

FIGURE 17. Node Harness and Terminators Installed on Machine's Harness



4. Route and connect the STEERING WHEEL ENCODER connector from the node harness (P/N 115-4001-087) to one of the mating encoder connections on the machine's harness.

Note: *The machine's remaining encoder connector will not be used in the SmarTrax system.*

5. Install the two encoder terminators (P/N 063-4001-003) on the machine's cables that were disconnected from the encoder.

Install the Foot Switch

FIGURE 18. 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 2-pin Deutsch connector on the node harness (P/N 115-4001-087) and connect it to the foot switch connector.

Install the Valve Harness

FIGURE 19. Access Hole in Cab Floor



1. Lift the floor mat on the right side of the cab and locate the access plate in the cab floor.
2. Remove the screws used to secure the access plate to the floor.
3. Raise the access plate and separate it into two pieces.

4. From outside the cab, route the 12-pin connector of the valve harness (P/N 115-4001-175) through the access hole and into the cab.

FIGURE 20. Valve Harness Connected to Node Harness



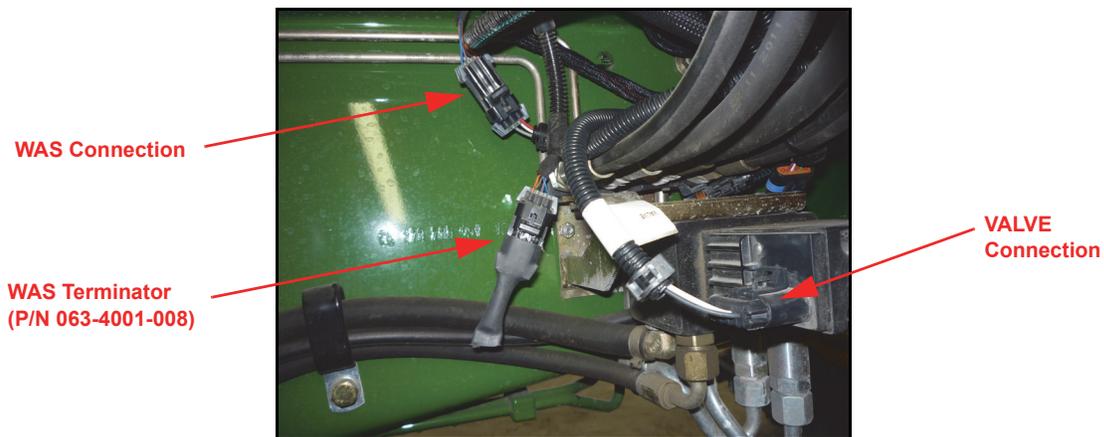
5. Connect the 12-pin connector to the mating 12-pin connector of the node harness (P/N 115-4001-087).

FIGURE 21. Steering Valve Location



6. Locate the machine's steering valve and wheel angle sensor (WAS) connector behind the steps under the right side of the cab.
7. Disconnect the machine's existing cable connection from the steering valve.

FIGURE 22. Valve Harness Connections



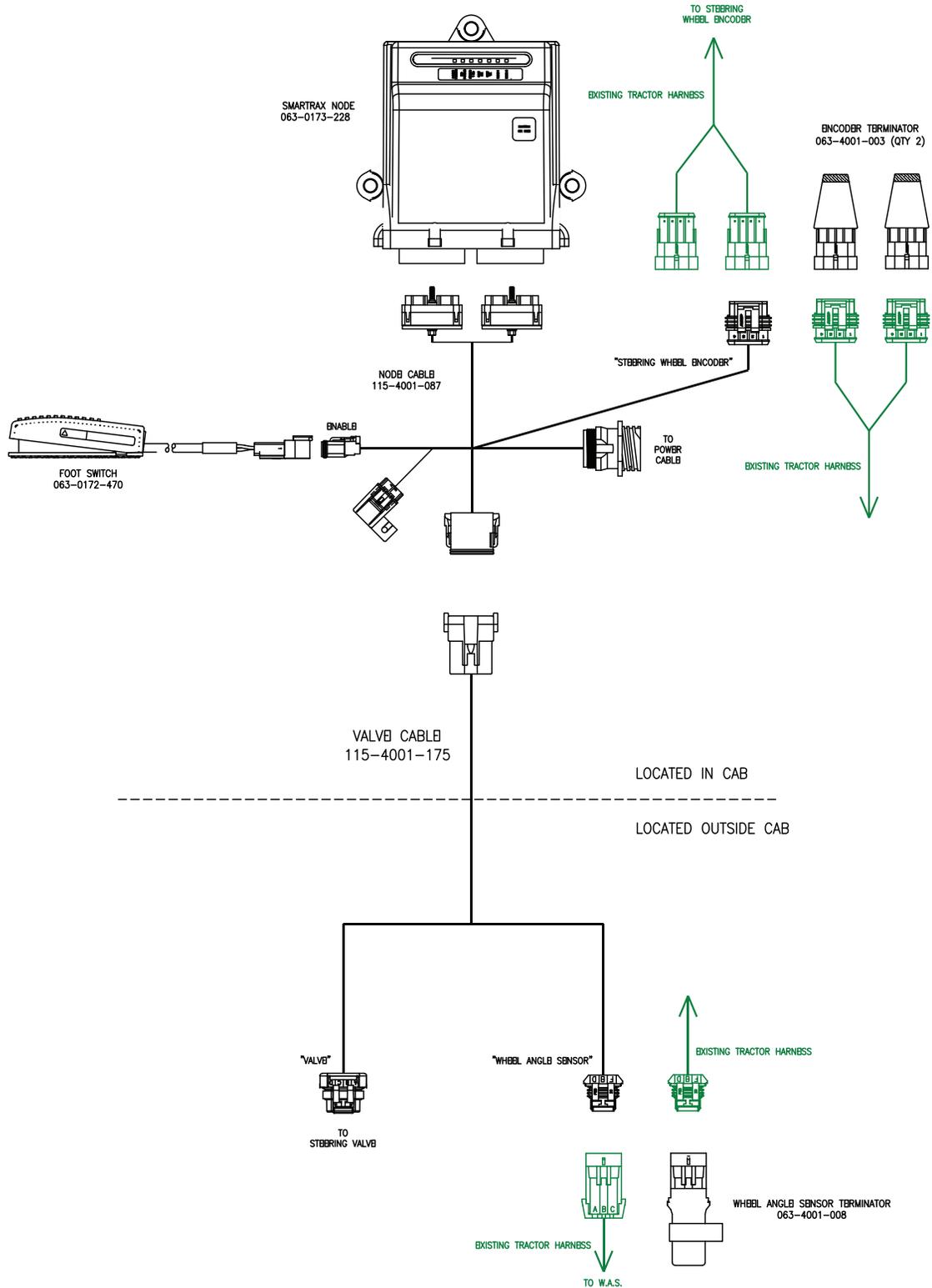
8. Connect the VALVE connector of the valve harness into the open port of the steering valve.
9. Locate and disconnect the 6-pin WAS connection near the steering valve.
10. Connect the WHEEL ANGLE SENSOR connection of the valve harness to the mating 6-pin connector.
11. Install the WAS terminator (P/N 063-4001-008) on the machine's remaining WAS cable end.

FIGURE 23. Cable Routing



12. Secure excess cable and tuck it neatly into the side compartment.

FIGURE 24. SmarTrax Cabling 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 115-4001-087).
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 harness (P/N 115-4001-087) to the remaining SmarTrax interface tee.

Complete the SmarTrax System Installation

Reassemble the Cab

FIGURE 25. Steering Column Shroud Reinstalled



1. Reinstall the steering column shroud.
2. Reinstall the machine's access plate on the cab floor.
3. Reposition the floor mat.

FIGURE 26. Side Panels Reinstalled



4. Reinstall the side panel(s).

FIGURE 27. Screws Reinstalled



5. Reposition the side console top panel and reinstall the screws to secure it (if applicable).

FIGURE 28. Components Reinstalled on Top Cover Panel



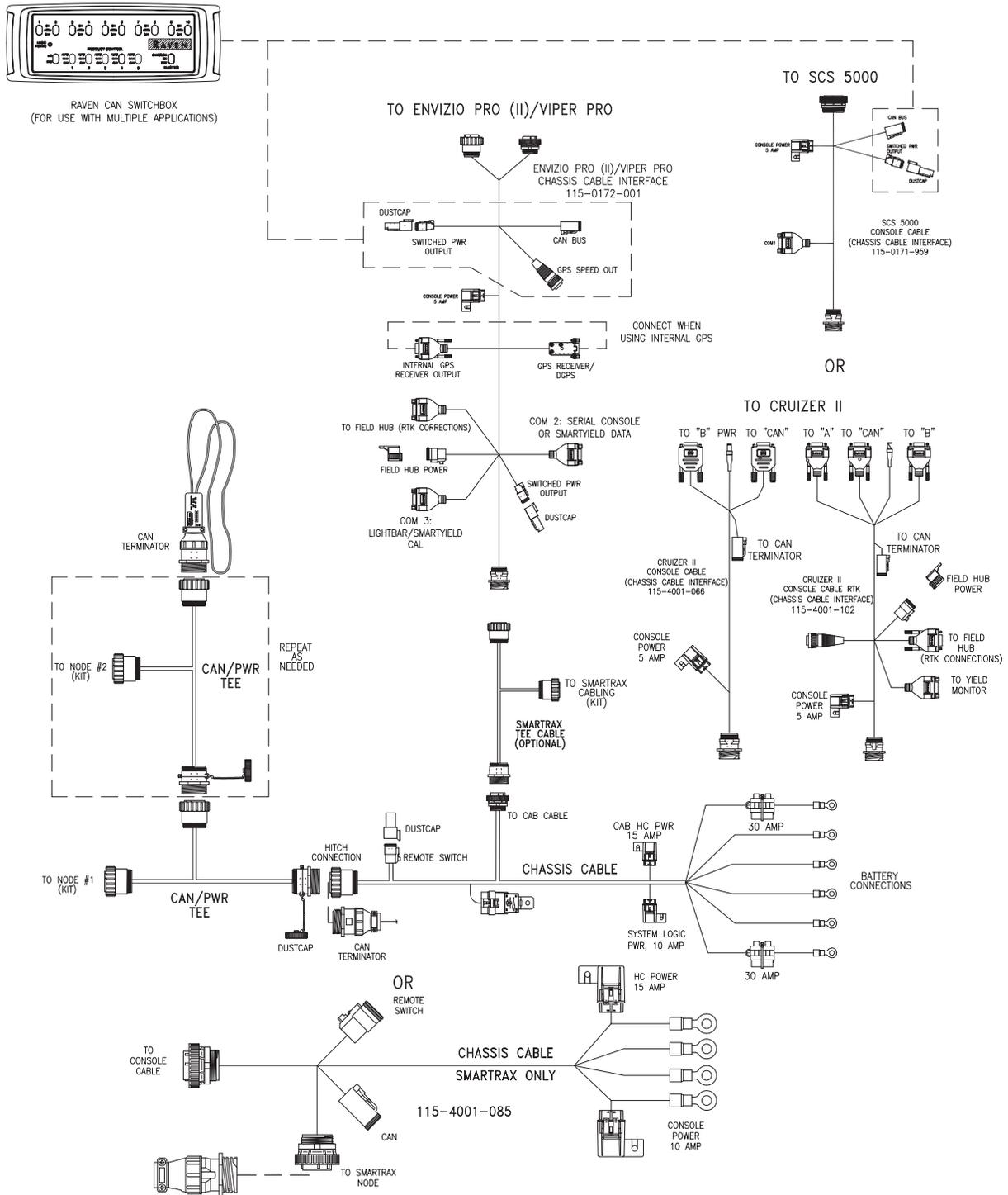
6. Reinstall the cup holder, SCV switch panel, and button panel (if applicable).

Calibrate the SmarTrax System

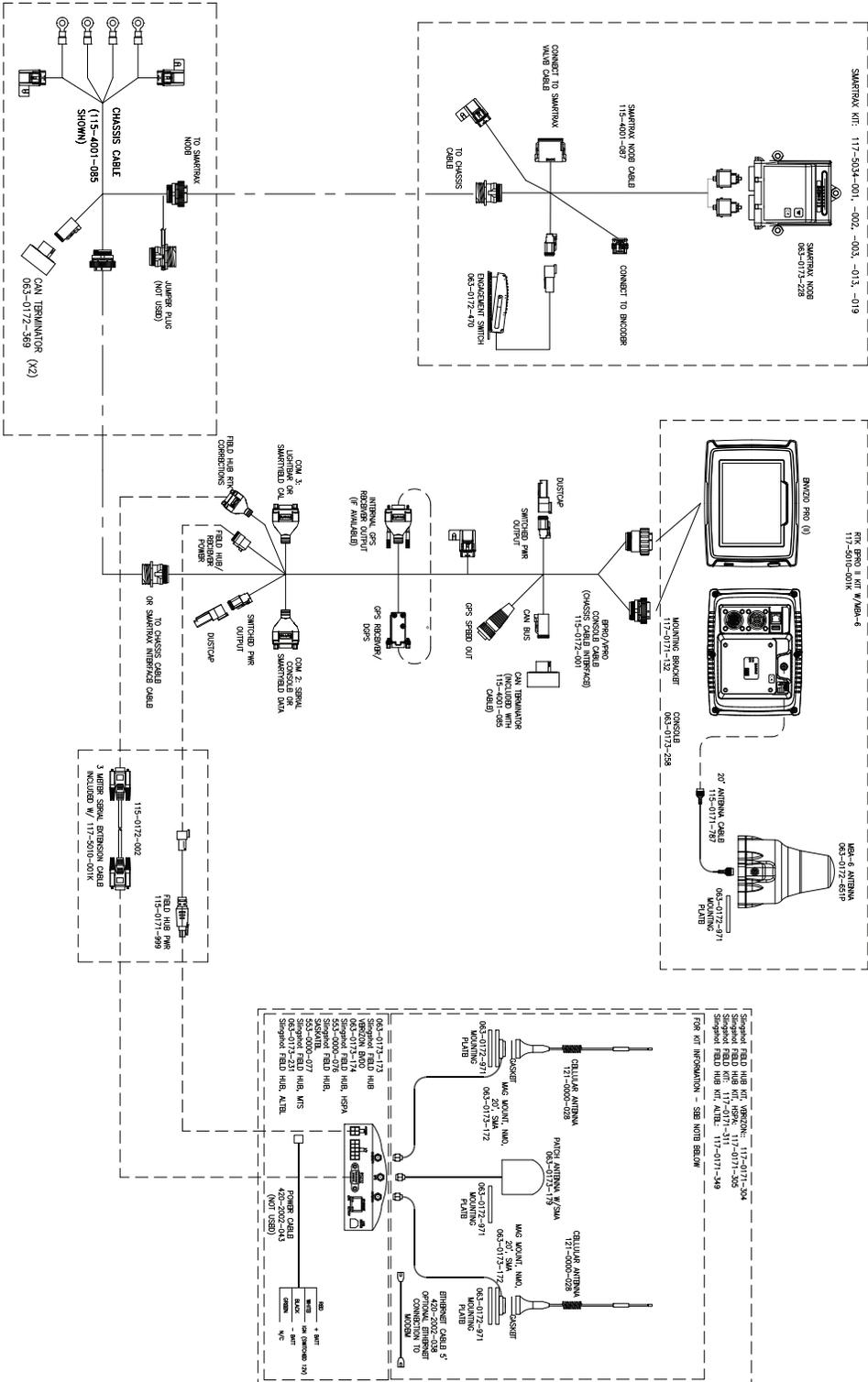
Refer to the SmarTrax and SmartSteer Calibration & Operation Manual (P/N 016-0171-277) for instructions on calibrating the SmarTrax system, adjusting system settings, and system operation.

System Diagrams

GEN II SYSTEM CABLING CONNECTIONS



ENVIZIO PRO II SMARTRAX W/SLINGSHOT



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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.