Case IH Steiger and New Holland T9.XXX - Steering Ready, Model Year 2016 & Newer SmarTrax™ Installation Manual

P/N 016-5032-044 Rev. A 01/17 E28627

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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 or a safe working distance away from the booms at all times when SmarTrax is engaged.
- Disable SmarTrax when exiting from 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, with the booms unfolded and supported, during installation or maintenance.

⚠ CAUTION

HYDRAULIC

GENERAL

- 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 hydraulic valve.

INSTRUCTIONS FOR HOSE ROUTING

The word "hose" is used to mean all flexible fluid carrying components. Follow existing hoses as much as possible and use these guidelines:

Hoses should not contact or be attached to:

- Components with high vibration forces
- Components carrying hot fluids beyond component specifications

Avoid contact with any sharp edge or abrading surfaces such as, but not limited to:

- Sheared or flame cut edges
- Edges of machined surfaces
- Fastener threads or cap screw heads
- Ends of adjustable hose clamps

Routing should not allow hoses to:

- Hang below the unit
- Have the potential to become damaged due to exposure to the exterior environment. (i.e. tree limbs, debris, attachments)
- Be placed in areas of or in contact with machine components which develop temperatures higher than the temperature rating of hose components
- Hoses should be protected or shielded if it needs to route near hot temperatures beyond hose component specifications

Hoses should not have sharp bends

Allow sufficient clearance from machine component operational zones such as:

- Drive shafts, universal joints and hitches (i.e. 3-point hitch)
- Pulleys, gears, sprockets
- Deflection and backlash of belts and chains
- Adjustment zones of adjustable brackets
- Changes of position in steering and suspension systems

- Moving linkages, cylinders, articulation joints, attachments
- Ground engaging components

For hose sections that move during machine operation:

- Allow sufficient length for free movement without interference to prevent: pulling, pinching, catching or rubbing, especially in articulation and pivot points
- Clamp hoses securely to force controlled movement to occur in the desired hose section
- Avoid sharp twisting or flexing of hoses in short distances

Protect hoses from:

- Foreign objects such as rocks that may fall or be thrown by the unit
- Buildup of dirt, mud, snow, ice, submersion in water and oil
- Tree limbs, brush and debris
- Damage where service personnel or operators might step or use as a grab bar
- Damage when passing through metal structures
- High pressure wash

ELECTRICAL

GENERAL

- 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.
- A minimum of 12 VDC is required for system operation with a maximum of 15 VDC.

INSTRUCTIONS FOR WIRE ROUTING

The word “harness” is used to mean all electrical leads and cables, bundled and unbundled. When installing harness, secure it at least every 30 cm (12in) to the frame. Follow existing harness as much as possible and use these guidelines:

Harness should not contact or be attached to:

- Lines and hoses with high vibration forces or pressure spikes
- Lines and hoses carrying hot fluids beyond harness component specifications

Avoid contact with any sharp edge or abrading surfaces such as, but not limited to:

- Sheared or flame cut edges
- Edges of machined surfaces
- Fastener threads or cap screw heads
- Ends of adjustable hose clamps
- Wire exiting conduit without protection, either ends or side of conduit
- Hose and tube fittings

Routing should not allow harnesses to:

- Hang below the unit
- Have the potential to become damaged due to exposure to the exterior environment. (i.e. tree limbs, debris, attachments)
- Be placed in areas of or in contact with machine components which develop temperatures higher than the temperature rating of harness components
- Wiring should be protected or shielded if it needs to route near hot temperatures beyond harness component specifications

Harnessing should not have sharp bends

Allow sufficient clearance from machine component operational zones such as:

- Drive shafts, universal joints and hitches (i.e. 3-point hitch)
- Pulleys, gears, sprockets
- Deflection and backlash of belts and chains
- Adjustment zones of adjustable brackets
- Changes of position in steering and suspension systems
- Moving linkages, cylinders, articulation joints, attachments
- Ground engaging components

For harness sections that move during machine operation:

- Allow sufficient length for free movement without interference to prevent: pulling, pinching, catching or rubbing, especially in articulation and pivot points
- Clamp harnesses securely to force controlled movement to occur in the desired harness section
- Avoid sharp twisting or flexing of harnesses in short distances
- Connectors and splices should not be located in harness sections that move

Protect harnesses from:

- Foreign objects such as rocks that may fall or be thrown by the unit
- Buildup of dirt, mud, snow, ice, submersion in water and oil
- Tree limbs, brush and debris
- Damage where service personnel or operators might step or use as a grab bar
- Damage when passing through metal structures

IMPORTANT:

- Avoid directly spraying electrical components and connections with high pressure water. High pressure water sprays can penetrate seals and cause electrical components to corrode or otherwise become damaged. When performing maintenance:
- Inspect all electrical components and connections for damage or corrosion. Repair or replace components, connections, or cable as necessary.
- Ensure connections are clean, dry, and not damaged. Repair or replace components, connections, or cable as necessary.
- Clean components or connections using low pressure water, pressurized air, or an aerosol electrical component cleaning agent.
- Remove visible surface water from components, connections, or seals using pressurized air or an aerosol electrical component cleaning agent. allow components to dry completely before reconnecting cables.

CHAPTER 2 INTRODUCTION

INTRODUCTION

Congratulations on your purchase of the Raven 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: Case IH
MODEL: Steiger - Steering Ready
YEAR: 2016 & Newer

MAKE: New Holland
MODEL: T9.XXX - Steering Ready, Serial Number ZFF403001 & Higher Only
YEAR: 2016 & Newer

NOTE: New Holland models with a lower serial number uses kit P/N 117-5032-002.

FIGURE 1. **Case IH Steiger Quadtrac535**

PREPARING FOR INSTALLATION

Before installing SmarTrax, park the machine where the ground is level, clean, and dry. 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 before 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.).
- Operate each of the machine's boom hydraulic functions (i.e., tilt, fold, center rack, tongue extension, or other hydraulic valve functions) three times to ensure the machine's hydraulic valve 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.

TOOLS NEEDED

The following tools are recommended for installation of the SmarTrax system:

- SAE standard-sized wrenches
- Cable ties
- Set of tools

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

-Case IH Steiger and New Holland T9.XXX - Steering Ready, Model Year 2016 & Newer SmarTrax™ Installation Manual
-P/N 016-5032-044 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 UltraGlide 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 local Raven dealer.

TABLE 1. SmarTrax Installation Kit (P/N 117-5032-044)

Picture	Item Description	Part Number	Qty.
Not Pictured	Manual - SmarTrax Calibration & Operation Manual	016-0171-277	1
Not Pictured	Manual - Case IH Steiger and New Holland T9.XXX - Steering Ready, Model Year 2016 & Newer SmarTrax Installation	016-5032-044	1
	Node - SmarTrax	063-0173-228	1
	Bracket - Node Mounting	107-0172-084	1

TABLE 1. SmarTrax Installation Kit (P/N 117-5032-044)

Picture	Item Description	Part Number	Qty.
	Harness - SmarTrax Node	115-4001-250	1
	Assembly - Foot Switch	063-0172-470	1
	Nut - 3/8"-16 Nylon Insert Lock	312-4000-061	3
	Nut - M6 x 1.0 Lock	312-4000-207	4
	Washer - 1/4" Split Lock	313-1000-016	4
	Washer - 0.250" ID x 0.562" OD x 0.065" Thick	313-2300-009	4

CHAPTER 3 CAB COMPONENT INSTALLATION

INSTALL THE SMARTRAX NODE

MOUNT THE SMARTRAX NODE

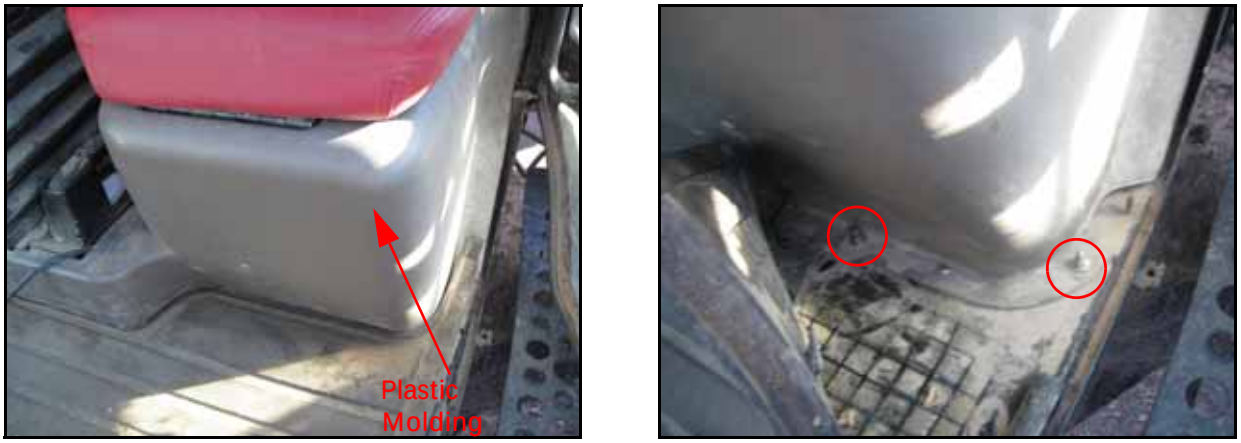
FIGURE 1. Instructional Seat Mounting Screws

1. Uninstall the instructional seat cushion by removing the screws that secure it to the frame.
2. Remove any contents from under the instructional seat.

FIGURE 2. Floor Mat Removed from Cab

3. Lift the floor mat from the floor in front of the seat.

FIGURE 3. Removing Instructional Seat Molding



4. Remove the plastic molding under the instructional seat by removing the nuts and bolts that secure it.

FIGURE 4. Node Mounted to Mounting Bracket

5. Mount the node (P/N 063-0173-228) to the node mounting plate (P/N 107-0172-084) using three 3/8"-16 lock nuts (P/N 312-4000-061).
6. Place the node in the instructional seat compartment so the connectors face the door.
7. Secure the node mounting plate to the existing bolts in the floor of the cab using four 1/4" split lock washers (P/N 313-1000-016), four 1/4" flat washers (P/N 313-2300-009), and four M6 lock nuts (P/N 312-4000-207).

FIGURE 5. Node Cable Installed on Node

8. Install the two large, rectangular connectors of the node harness into the correct ports of the node, tightening the bolts on the connectors to secure the connections.

NOTE: The connectors should be facing the window.

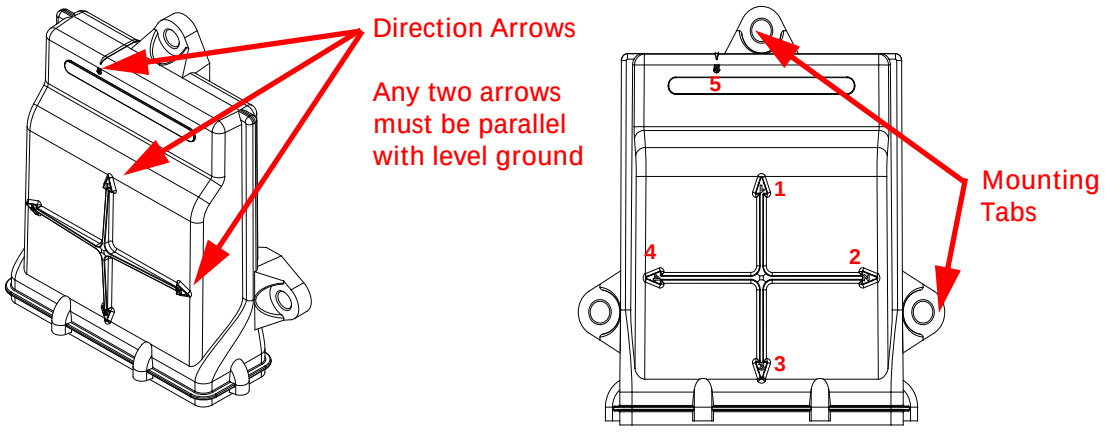
9. Route the node harness into the instructional seat.

FIGURE 6. Node Harness Connection

10. Connect the 40-pin connector of the node harness to the machine's mating 40-pin connector.

NODE MOUNTING LOCATIONS

FIGURE 7. 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 8. 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 115-4001-092) and connect it to the foot switch cable connector.

INSTALL THE CHASSIS CABLE - SMARTRAX-ONLY SYSTEMS (IF APPLICABLE)

If the machine does not contain an existing chassis power cable (to connect to systems on an implement such as Raven CAN versions of 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 Gen II 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 115-4001-251).
2. Connect the TO SMARTRAX NODE connector from the chassis cable to the round 16-pin connector on the node harness (P/N 115-4001-250).

FIGURE 9. Node Harness Routing

3. Route the TO CONSOLE CABLE connector of the node harness behind the trim at the rear of the cab and connect it to the Raven console cable.
4. Install a terminator (P/N 063-0172-369) on the CAN cable connector.
5. Locate the 3-pin power connector beneath and behind the instructional seat.

FIGURE 10. 3-Pin Power Connector

6. Disconnect the 3-pin power connector from the machine's accessory power plug located behind the operator's seat.
7. Install the power tee connector of the SmarTrax chassis harness between the 3-pin power connector and accessory power plug.
8. 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.

FIGURE 11. Viper 4 Connection

9. **Optional for Viper 4 Only** - To connect the Viper 4 to the implement ISOBUS:
   a. Connect the round connectors of the Viper 4 to ISOBUS cable (P/N 115-0172-421 - sold separately) to the mating ports on the back of the Viper 4.

FIGURE 12. Viper 4 Connection

b. Connect the 12-pin connector to the machine's mating connector located behind the trim in the right-rear corner post of the cab.

CONNECT SMARTRAX TO AN EXISTING GEN II CHASSIS CABLE (IF APPLICABLE)

NOTE: Gen III SmarTrax chassis cabling is not supported for Steiger models. Consider installing the ISO VT cabling option.

NOTE: The Gen II 6' SmarTrax tee adapter cable (P/N 115-4001-071) and Viper 4 to ISOBUS cable (P/N 115-0172-421) are sold separately.

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 115-4001-071) between the chassis and Raven console harness.
3. Connect the SmarTrax node cable (P/N 115-4001-092) to the remaining connector on the SmarTrax interface tee.

CONNECT SMARTRAX TO AN ISO VT CONSOLE CABLE (IF APPLICABLE)

NOTE: The Viper 4 to ISO VT adapter cable (P/N 115-7300-028) and the CNH ISOBUS display adapter cable (P/N 115-7300-126) are sold separately.

1. Locate the Viper 4 to ISO VT adapter cable (P/N 115-7300-028).
2. Connect the round connector of the Viper 4 to ISO VT adapter cable to the mating port on the back of the Viper 4.
3. Install the mating connector of the CNH ISOBUS display adapter cable (P/N 115-7300-126) to the Viper 4 to ISO VT adapter cable.

FIGURE 13. Viper 4 Connection

4. Connect the 12-pin connector of the CNH ISOBUS display adapter cable to the machine's mating connector located behind the trim in the right-rear corner post of the cab
5. Locate the Viper 4 VT to SmarTrax adapter cable (P/N 115-4001-243).
6. Connect the TO SMARTRAX connector of the Viper 4 VT to SmarTrax adapter cable to the round 16-pin connector of the SmarTrax node harness cable (P/N 115-4001-250).

FIGURE 14. Adapter Cable Routing

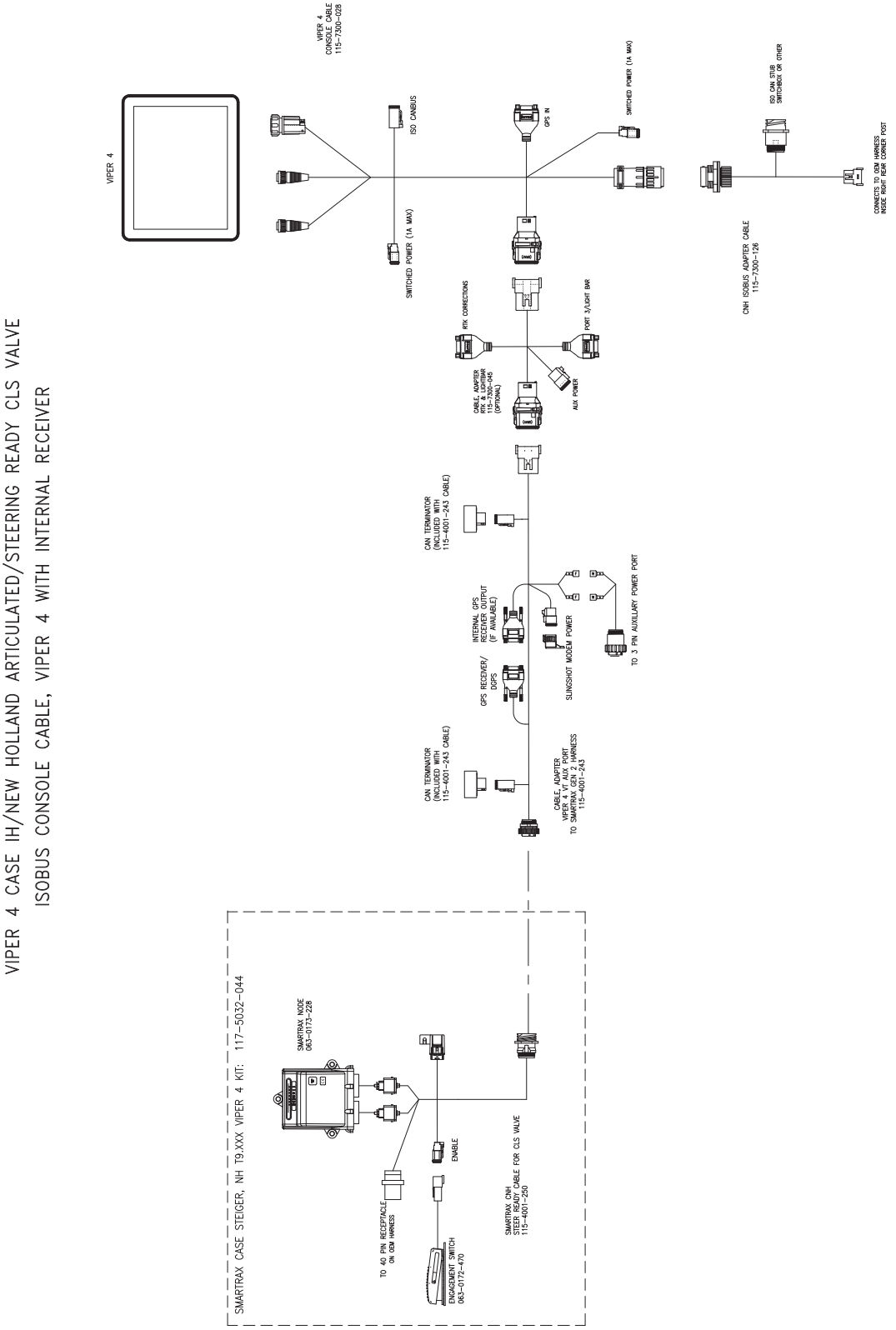
7. Route the Viper 4 VT to SmarTrax adapter cable behind the trim in the rear of the cab.
8. Connect the TO AUX PORT connector of the Viper 4 VT to SmarTrax adapter cable to the mating connector on the Viper 4 to ISO VT adapter cable.
9. Connect the 3-pin power connector to the machine's accessory power plug located behind the operator's seat.
10. Install the terminators (P/N 063-0172-369) on the 4-pin connectors of the Viper 4 VT to SmarTrax adapter cable.

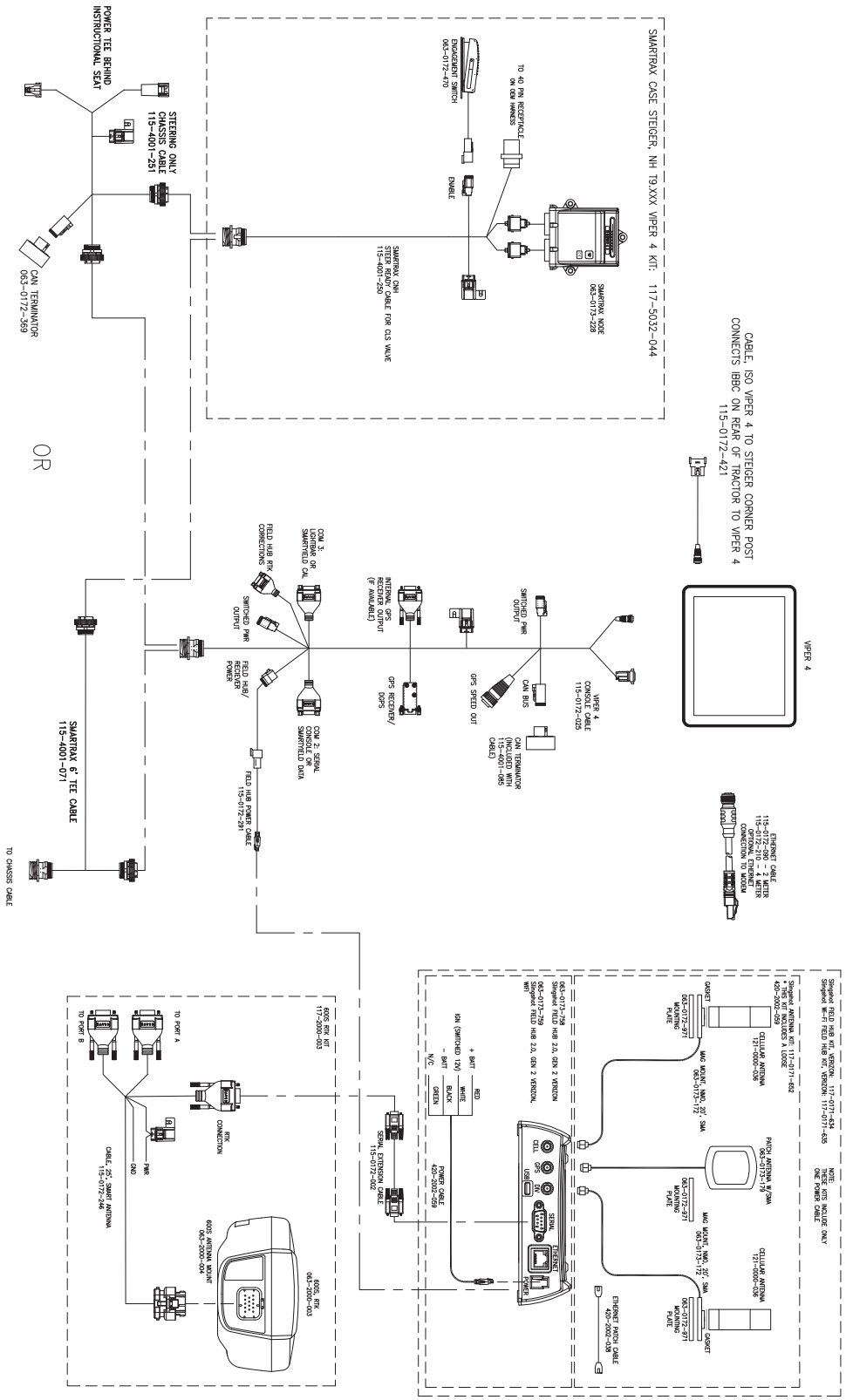
CALIBRATE THE SMARTRAX SYSTEM

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

SYSTEM DIAGRAMS

VIPER 4 CASE IH/NEW HOLLAND ARTICULATED/STEERING READY CLS VALVE
ISOBUS CONSOLE CABLE, VIPER 4 WITH INTERNAL RECEIVER




VIPER 4 CASE IH/NEW HOLLAND ARTICULATED/STEERING READY CLS VALVE W/SLINGSHOT
GEN 2 CONSOLE CABLE, ISO VT THROUGH IBBC
CABLE, ISO VIPER 4 TO STEIGER CORNER POST
CONNECTS IBBC ON REAR OF TRACTOR TO VIPER 4
115-0172-421
SMARTRAX CASE STEIGER, NH T9.XXX VIPER 4 KIT: 117-5032-044
VIPER 4
ETHERNET CABLE
115-0172-210 - 4 METER
115-0172-209 - 10 METER
CONNECTION TO MODEM
VIPER 4
CONSOLE CABLE
115-0172-025
SWITCHED PWR
OUTPUT
CAN BUS
GPS SPEED OUT
CAN TERMINATOR
(INCLUDED WITH
115-4001-085
CABLE)
INTERNAL GPS
RECEIVER OUTPUT
(IF AVAILABLE)
GPS RECEIVER/
DGPS
COM 3:
LIGHTBAR &
SMARTYIELD CAL
FIELD HUB RTN
CORRECTIONS
SWITCHED PWR
OUTPUT
FIELD HUB/
RECEIVER
POWER
COM 2: SERIAL
CONSOLE OR
SMARTYIELD DATA
FIELD HUB POWER CABLE
115-0172-251
SMARTRAX 6' TEE CABLE
115-4001-071
TO CHASSIS CABLE
OR
SMARTRAX CASE
SMARTRAX MODE
063-0173-228
TO 40 PIN RECEPTACLE
ON IGN MARKERS
ENGAGEMENT SWITCH
063-0172-470
ENABLE
SMARTRAX CASE
STEER READY CABLE FOR CLS VALVE
115-4001-250
POWER TEE BEHIND
INSTRUCTIONAL SEAT
STEERING ONLY
CHASSIS CABLE
115-4001-251
CAN TERMINATOR
063-0172-369
Slingshot FIELD HUB KIT, VERIZON: 117-0171-634
Slingshot Wi-Fi FIELD HUB KIT, VERIZON: 117-0171-635
NOTE:
THESE KITS INCLUDE ONLY
ONE POWER CABLE
Slingshot ANTENNA KIT: 117-0171-692
• THIS KIT INCLUDES A LOOSE
420-2000-209
GASKET
CELLULAR ANTENNA
121-4000-03M
MAG MOUNT, MMCX, 20', SMA
063-0172-172
063-0172-371
MOUNTING
PLATE
PATCH ANTENNA W/GMA
063-0172-179
063-0173-759
Slingshot FIELD HUB 2.0, GEN 2 VERIZON
063-0173-759
Slingshot FIELD HUB 2.0, GEN 2 VERIZON,
WIFI
+ BATT
IGN (SWITCHED 12V)
- BATT
N/C
RED
WHITE
BLACK
GREEN
CELL
GPS
ETH
USB
SERIAL
RS232
POWER
POWER CABLE
420-2000-209
SERIAL EXTENSION CABLE
115-0172-002
ETHERNET PATCH CABLE
420-2000-10M
600S RTK KIT
117-2000-003
TO PORT A
TO PORT B
RTK
CONNECTION
PWR
GND
CABLE, 25', SMART ANTENNA
115-0172-246
600S ANTENNA MOUNT
063-2000-004
600S, RTK
063-2000-003

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