Case IH MX 180-270, MFWD Axles - Model Year 1999-2002 SmarTrax™ Installation Manual

P/N 016-5032-033 Rev. A 02/17 E26344

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: MX 180, 200, 220, 240, and 270
YEAR: 1999-2002

FIGURE 1. **Case IH MX270**

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 MX 180-270, MFWD Axles - Model Year 1999-2002 SmarTrax™ Installation Manual
-P/N 016-5032-033 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 117-5032-033)

Picture	Item Description	Part Number	Qty.
Not Pictured	Manual - Case IH MX 180-270, MFWD Axles - Model Year 1997-2002 SmarTrax Installation	016-5032-033	1
	Valve - SmarTrax Hydraulic	334-0003-088	1
	Bracket - WAS Mounting	107-0172-030	1
	Bracket - Node Mounting	107-0172-033	1
	Bracket - Valve Mounting	107-0172-451	1
	Bracket - Case IH MX WAS Mounting	107-0172-455	1
	Cable - Safety Switch Tee Adapter	115-4001-209	1
	Cable - Valve Harness	115-4001-237	1
	Sensor - 300 mm Linear Wheel Angle	413-0001-052	1

TABLE 1. SmarTrax Installation Kit (P/N 117-5032-033)

Picture	Item Description	Part Number	Qty.
	Mount- M10 Ball	103-0001-029	2
	Transducer - 0-3000 PSI Pressure	422-0000-086	1
	Clamp - 2" Muffler	435-3003-055	1
	Spacer - Steel	107-0172-103	1
	Bolt - 1/4"-20 x 1-1/4" Hex	311-0050-106	2
	Bolt - 5/16"-18 Hex Bolt	311-0052-104	4
	Bolt - 3/8"-16 x 1-1/4" Hex	311-0054-106	1
	Bolt - 3/8"-16 x 1-3/4" Hex	311-0054-108	1
	Nut - 1/4"-20 Zinc Plated Hex	312-1001-031	2
	Nut - M10 x 1.5 Jam	312-1002-035	2
	Nut - 5/16"-18 Nylon Insert Lock	312-4000-059	2

TABLE 1. SmarTrax Installation Kit (P/N 117-5032-033)

Picture	Item Description	Part Number	Qty.
	Nut - 3/8"-16 Nylon Insert Lock	312-4001-109	5
	Washer - 5/16" Split Lock	313-1000-019	4
	Washer - 5/8" ID Flat	313-2300-322	2
	Washer - 1/4" ID Flat	313-2301-810	2

TABLE 2. Hydraulic Kit (P/N 117-0199-146)

Picture	Item Description	Part Number	Qty.
	Fitting - -8 ORFS M/F 90° Swivel Elbow	333-0012-023	1
	Fitting - -8 ORFS M/M/F Swivel Run Tee Adapter	333-0012-028	4
	Fitting - -8 ORFS M/F 90° Elbow	333-0012-067	4
	Fitting - -8 ORFS M/F 45° Elbow	333-0012-102	2
	Fitting - -8 ORB (M) to -8 ORFS (M) Straight Adapter	333-0012-168	2
	Fitting - -6 ORB (M) to -4 ORFS (M) Straight Adapter	333-0012-195	2

TABLE 2. Hydraulic Kit (P/N 117-0199-146)

Picture	Item Description	Part Number	Qty.
	Fitting - -10 ORB (M) to -8 ORFS (M) Straight Adapter	333-0012-304	2
	Hydraulic Hose - -8 ORFS (F) 90° to -8 ORFS (F) - 84″	214-1001-069	4
	Hydraulic Hose - -6 ORFS (M) to -4 ORFS (F) - 84″	214-1001-070	1
	Hydraulic Hose - -6 ORFS (F) to -4 ORFS (F) - 84″	214-1001-071	1

TABLE 3. **Node Kit (P/N 117-5030-005)**

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 SYSTEM INSTALLATION

⚠ WARNING

Hydraulics are under pressure. Care should always be taken with a system that has been pressurized.

Before beginning the SmarTrax hydraulic installation, turn off the machine and relieve pressure by turning the steering wheel left and right.

Never work on a hot machine. Always allow it to cool before performing diagnostics, maintenance, or routine service.

When disconnecting or purging hydraulic hoses, be aware that the hydraulic fluid within the machine's system may be extremely hot and under high pressure.

Tampering with hydraulic valves may cause serious injury or death, and will void the warranty.

⚠ CAUTION

When installing SmarTrax hydraulics or performing diagnostics, maintenance, or routine service, ensure precautions are taken to prevent any foreign material from being introduced into the machine's hydraulic system.

Objects or materials that are able to bypass the machine's hydraulic filtration system will reduce performance and possibly damage the SmarTrax hydraulic valve.

NOTICE

The appearance of the SmarTrax hydraulic valve may vary slightly from the images contained in this manual. However, the fittings, hose connections, and cable connections remain the same.

INSTALL FITTINGS IN THE SMARTRAX VALVE

Before mounting the SmarTrax valve 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 following table to install the fittings in the appropriate ports of the SmarTrax valve.

Fitting	Part Number	Port
Fitting - -4 ORFS (M) to -6 SORB (M) Straight Adapter	333-0012-195	LSPV, LS STEER
Fitting - -8 ORFS (M) to -8 ORB (M) Straight Adapter	333-0012-168	P, T
Fitting - -8 ORFS (M) to -10 ORB (M) Straight Adapter	333-0012-304	A, B
Transducer - 0-3000 PSI Pressure	422-0000-086	PS

MOUNT THE SMARTRAX VALVE

FIGURE 1. Valve Mounting Location

1. Identify the valve mounting location behind the right-rear tire.

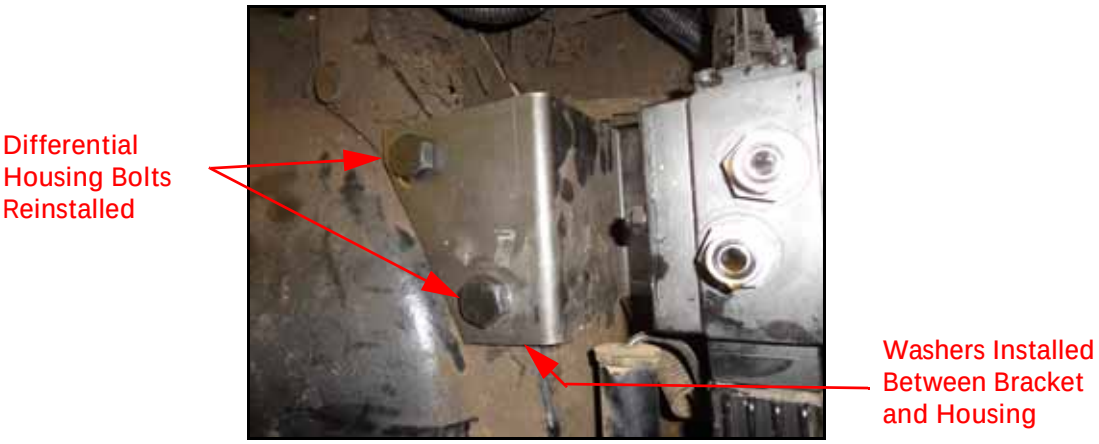
FIGURE 2. Bolts to be Removed

2. Remove the two mounting bolts from the rear differential housing as shown in Figure 2 below.

FIGURE 3. Valve Mounted to Bracket

3. Mount the SmarTrax valve (P/N 334-0003-088) to the mounting bracket (P/N 107-0172-451) using supplied 5/16" bolts and lock washers.

FIGURE 4. Valve Mounted on the Machine



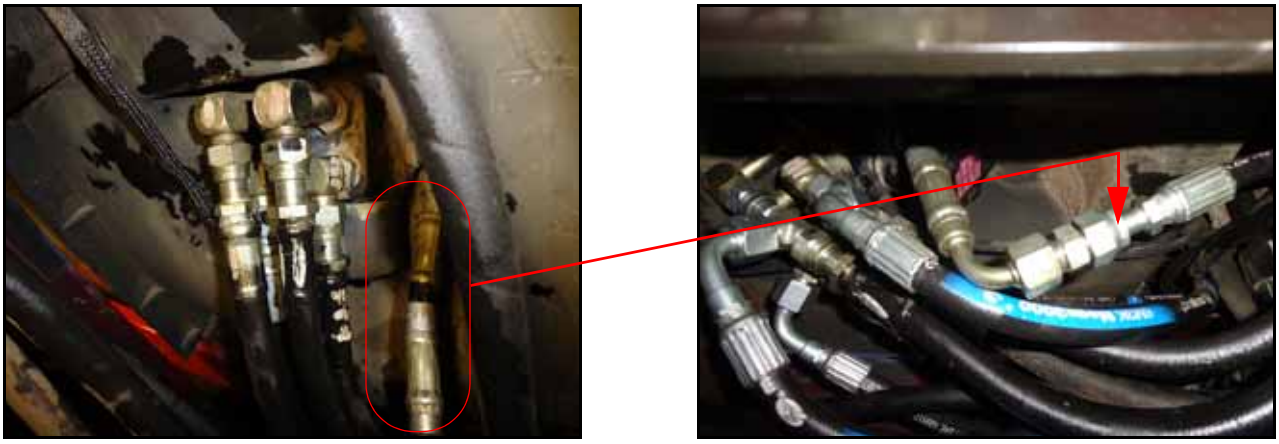
4. Align the holes in the valve mounting bracket with the bolt holes in the differential housing.
5. Install one of the machine's differential housing bolts in the top bolt hole.
6. Place two 5/8" washers between the lower differential housing bolt hole and the valve mounting bracket and secure it with the remaining housing bolt.

INSTALL THE LOAD SENSE HOSES

FIGURE 5. Steering Orbital Location

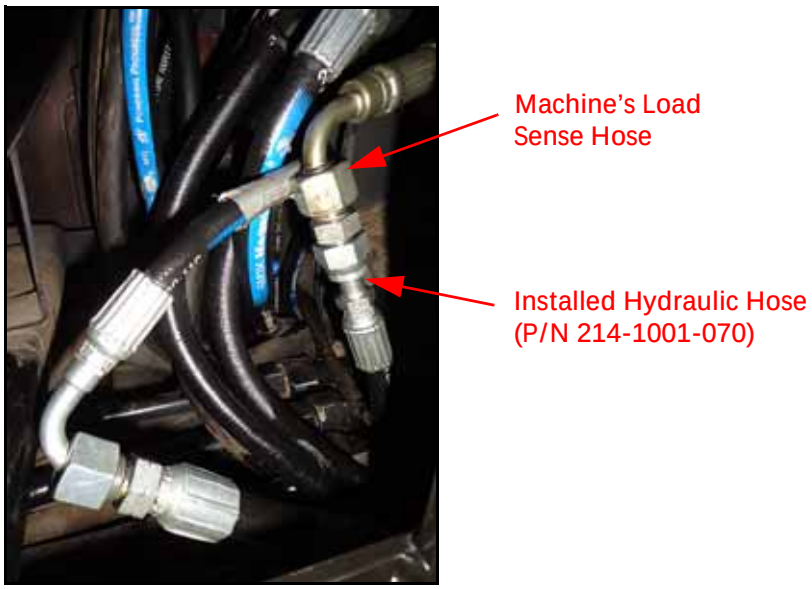
1. Locate the steering orbital hose connections under the hood.

FIGURE 6. Machine's Load Sense Hose



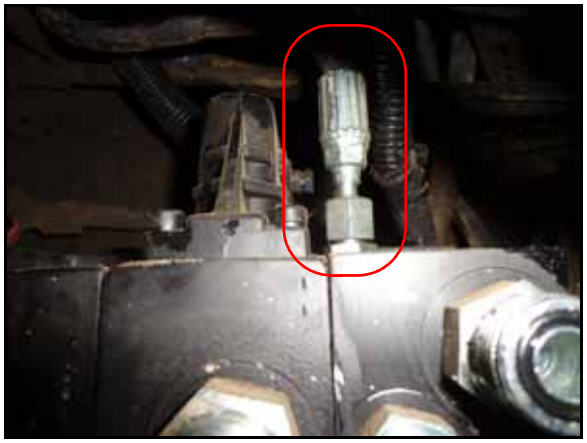
2. Locate the load sense hose on the side of the steering orbital and trace it to the 90° connection.
3. Disconnect the load sense hose from the 90° connection.

FIGURE 7. Hydraulic Hose Installed on Load Sense Hose



4. Install the straight end of the supplied hydraulic hose (P/N 214-1001-070) on the machine's load sense hose that is connected to the steering orbital.

FIGURE 8. Load Sense Hose Installed on SmarTrax Valve



5. Connect the other end of the installed hydraulic hose to the fitting installed in Port LS STEER of the SmarTrax valve.

FIGURE 9. Hydraulic Hose Installed on Load Sense Hose

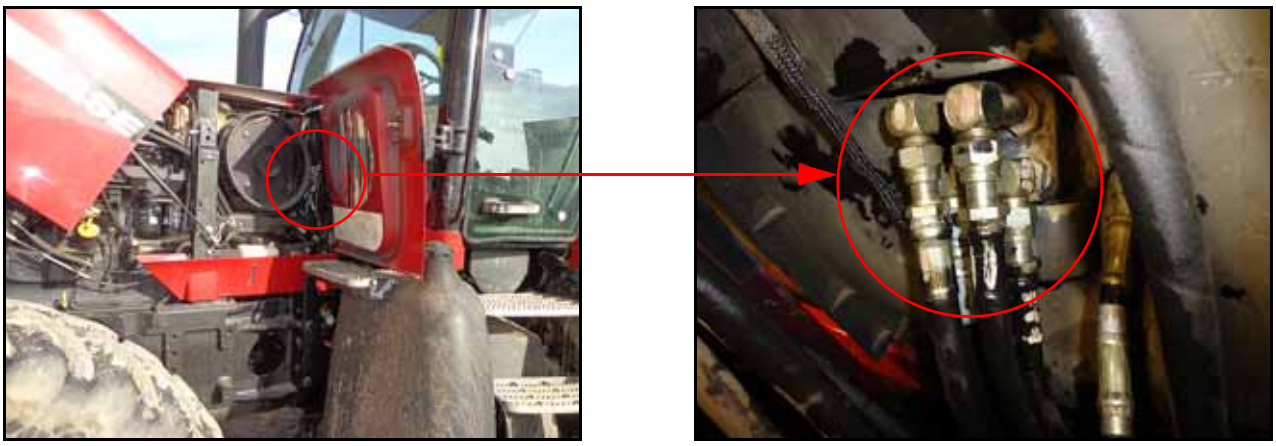
6. Install the 90° end of the supplied hydraulic hose (P/N 214-1001-071) on the end of the load sense hose that is connected to the machine's hydraulic valve.

FIGURE 10. Load Sense Hose Installed on SmarTrax Valve

7. Connect the other end of the installed hydraulic hose to the fitting installed in Port LSPV of the SmarTrax valve.

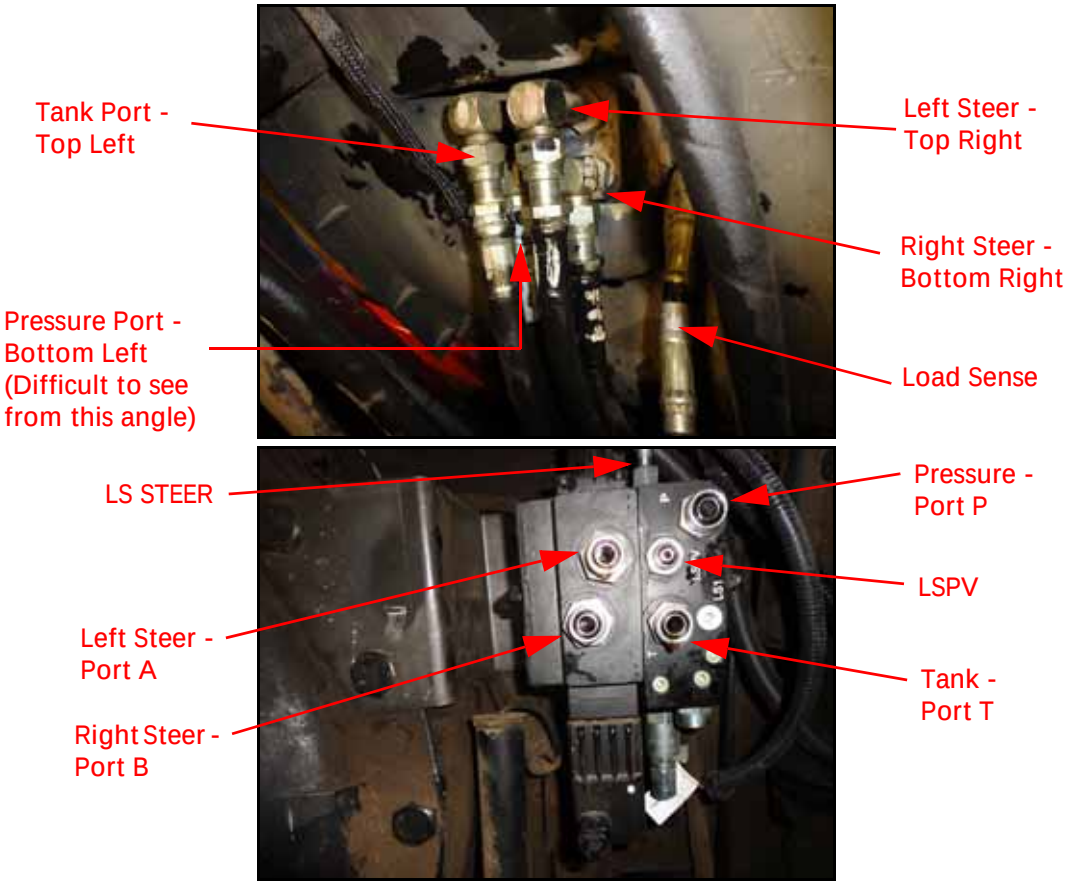
INSTALL THE TANK, PRESSURE, AND LEFT/RIGHT STEERING HOSES

FIGURE 11. Hose Connections



1. Locate the steering orbital hose connections under the hood.

FIGURE 12. Ports of Steering Orbital and SmarTrax Valve



2. Refer to Figure 12 to identify the ports on the machine's steering orbital and the SmarTrax valve.
3. Label the machine's hoses as shown in Figure 12.

FIGURE 13. Hoses Disconnected from Steering Orbital

4. Disconnect the pressure, tank, and left/right steering hoses from the steering orbital.

FIGURE 14. Tee Fitting Installed in Pressure Port

5. Install a -8 ORFS M/M/F swivel run tee adapter fitting (P/N 333-0012-028) in the open pressure port of the steering orbital.

FIGURE 15. Machine's Pressure Hose Installed

6. Install the machine's pressure hose on the opposite end of the installed tee fitting.

FIGURE 16. Hydraulic Hose Installed on Tee Fitting

7. Install the 90° end of the supplied hydraulic hose (P/N 214-1001-069) on the 90° end of the installed tee fitting.

FIGURE 17. Pressure Hose Installed on Steering Valve

8. Connect the other end of the installed hydraulic hose to the fitting installed in Port P of the steering valve.

NOTE: It may be necessary to install a 90° M/F elbow fitting (P/N 333-0012-067) to achieve the connection.

FIGURE 18. Tee Fitting Installed in Tank Port

9. Install a -8 ORFS M/M/F swivel run tee adapter fitting (P/N 333-0012-028) in the open tank port of the steering orbital.

FIGURE 19. Machine's Tank Hose Installed

10. Install the machine's tank hose on the opposite end of the installed tee fitting.

FIGURE 20. Hydraulic Hose Installed on Tee Fitting

11. Install the 90° end of the supplied hydraulic hose (P/N 214-1001-069) on the 90° end of the installed tee fitting.

FIGURE 21. Tank Hose Installed on Steering Valve

12. Connect the other end of the installed hydraulic hose to the fitting installed in Port T of the SmarTrax valve.

NOTE: It may be necessary to install a -8 ORFS M/F 45° elbow fitting (P/N 333-0012-102) or -8 ORFS M/F 90° elbow fitting (P/N 333-0012-067) to achieve the connection.

FIGURE 22. Tee Fitting Installed in Right Steering Port

13. Install a -8 ORFS M/M/F swivel run tee adapter fitting (P/N 333-0012-028) in the open right steering port of the steering orbital.

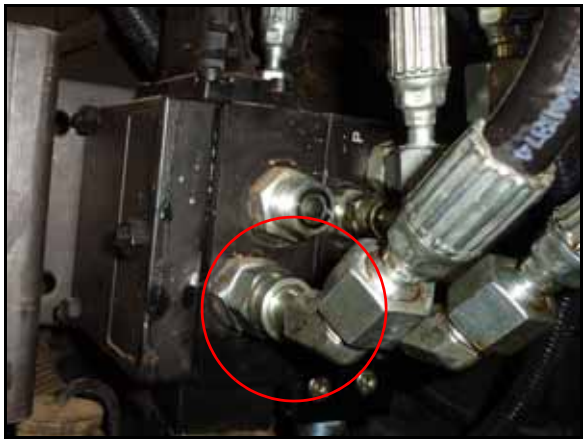
FIGURE 23. Machine's Right Steering Hose Installed

14. Install the machine's right steering hose on the opposite end of the installed tee fitting.

FIGURE 24. Hydraulic Hose Installed on Tee Fitting

15. Install the 90° end of the supplied hydraulic hose (P/N 214-1001-069) on the 90° end of the installed tee fitting.

FIGURE 25. Right Hose Installed on SmarTrax Valve



16. Connect the other end of the installed hydraulic hose to the fitting installed in Port B of the SmarTrax valve.

NOTE: It may be necessary to install a -8 ORFS M/F 45° elbow fitting (P/N 333-0012-102) to achieve the connection.

FIGURE 26. Tee Fitting Installed in Left Steering Port

17. Install a -8 swivel run tee adapter fitting in the open left steering port of the steering orbital.

FIGURE 27. Machine's Left Steering Hose Installed

18. Install the machine's left steering hose on the opposite end of the installed tee fitting.

FIGURE 28. Hydraulic Hose Installed on Tee Fitting

19. Install the 90° end of the supplied hydraulic hose (P/N 214-1001-069) on the 90° end of the installed tee fitting.

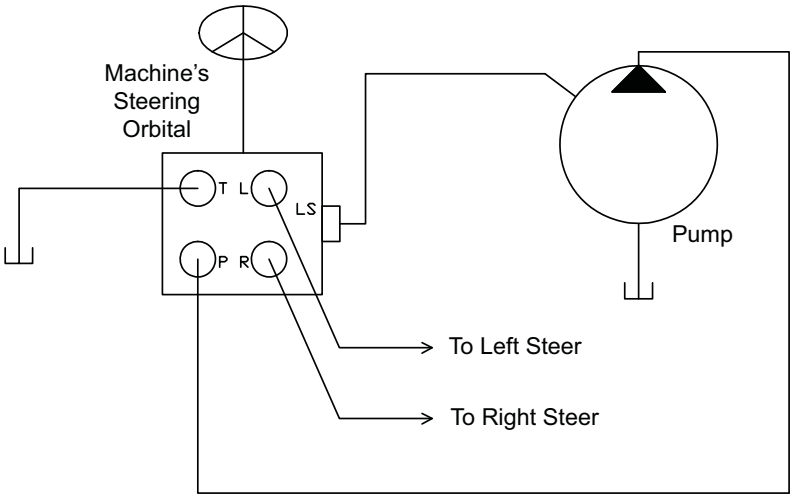
FIGURE 29. Right Hose Installed on Steering Valve

20. Connect the other end of the installed hydraulic hose to the fitting installed in Port A of the steering valve.

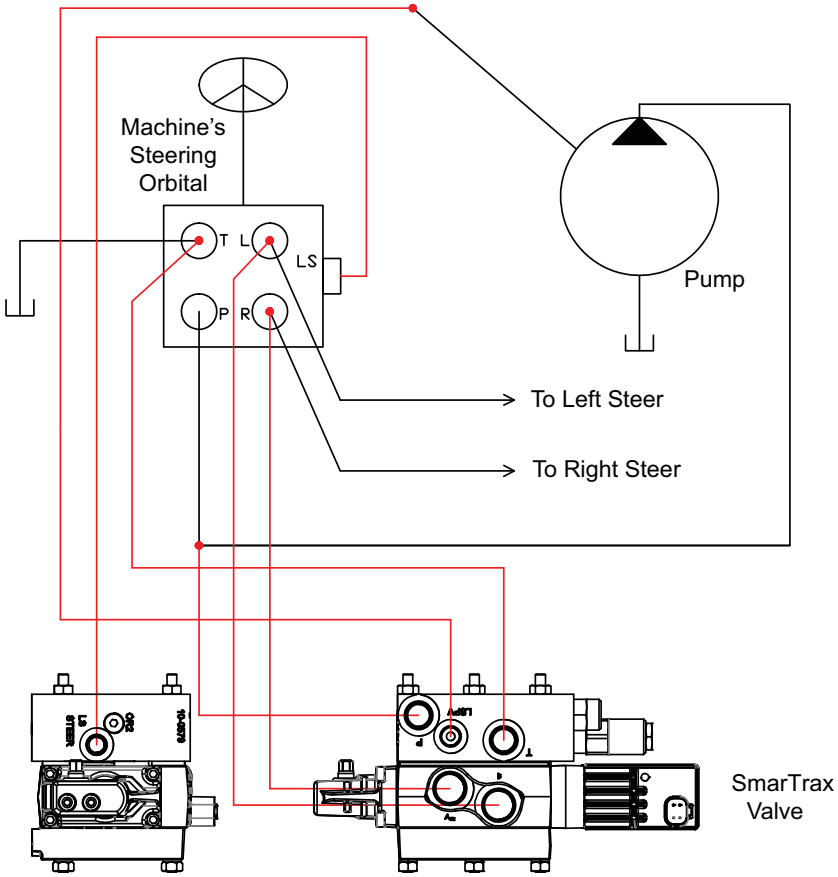
NOTE: It may be necessary to install a an elbow fitting to achieve the connection.

HYDRAULIC SYSTEM DIAGRAM

Before SmarTrax Installation



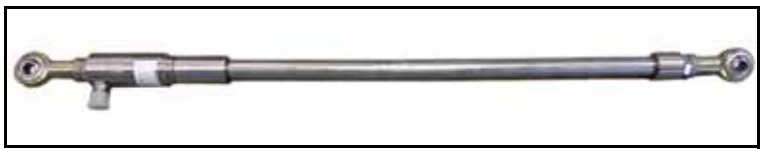
After SmarTrax Installation



CHAPTER 4 WHEEL ANGLE SENSOR INSTALLATION

ASSEMBLE THE WHEEL ANGLE SENSOR (WAS)

FIGURE 1. WAS Assembly



1. Install the M10 ball sensor mount (P/N 103-0001-029) and M10 jam nut (P/N 312-1002-035) on each end of the wheel angle sensor (WAS) (P/N 416-0001-052).
2. Tighten the jam nuts to ensure the ball sensor mounts are installed securely.

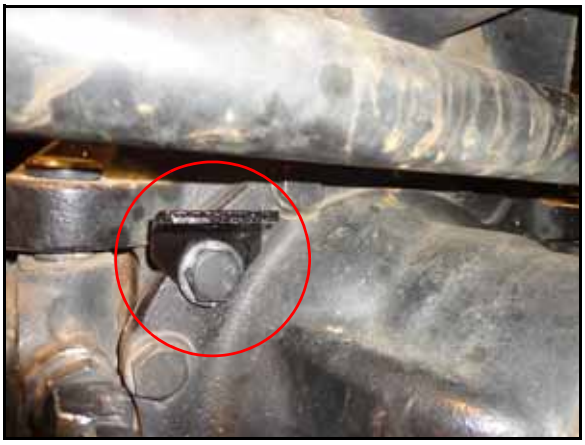
INSTALL THE WAS

1. Turn machine's front wheels fully to the right to access the wheel angle sensor (WAS) mounting location.

FIGURE 2. Bolt to be Removed

2. Identify the WAS mounting location on the front axle, on the side of the differential.
3. Remove the differential housing bolt as shown in Figure 2.

FIGURE 3. WAS Base Mounting Bracket Installed



4. Align the hole in the WAS base mounting bracket (P/N 107-0172-455) with the hole in the differential housing.
5. Reinstall the differential housing bolt to secure the WAS mounting bracket.

FIGURE 4. Muffler Clamp Installed

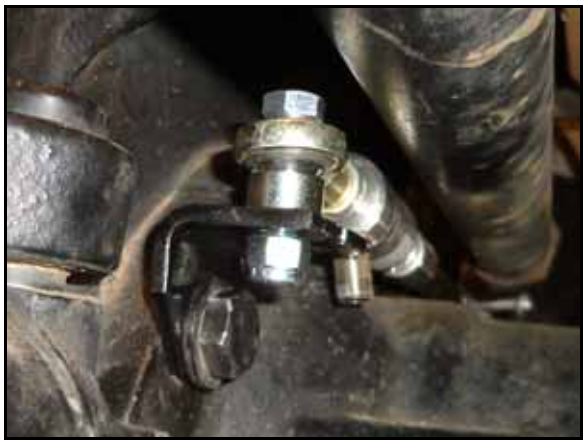
6. Install the 2" muffler clamp (P/N 435-3003-055) on the machine's tie rod on the right side of the machine using the supplied clamp hardware.

NOTE: Do not fully tighten the muffler clamp. It will be adjusted later in the installation procedure.

FIGURE 5. Rod Mounting Bracket Installed

7. Insert the 3/8"-16 x 1.25" bolt (P/N 311-0054-106) through the center of the WAS mounting bracket (P/N 107-0172-030).
8. Install the WAS rod mounting bracket on the ends of the muffler clamp and secure it using two 5/16" nylon insert lock nuts (P/N 312-4000-059) as shown in Figure 5.

FIGURE 6. Base-End of Sensor Installed on Machine

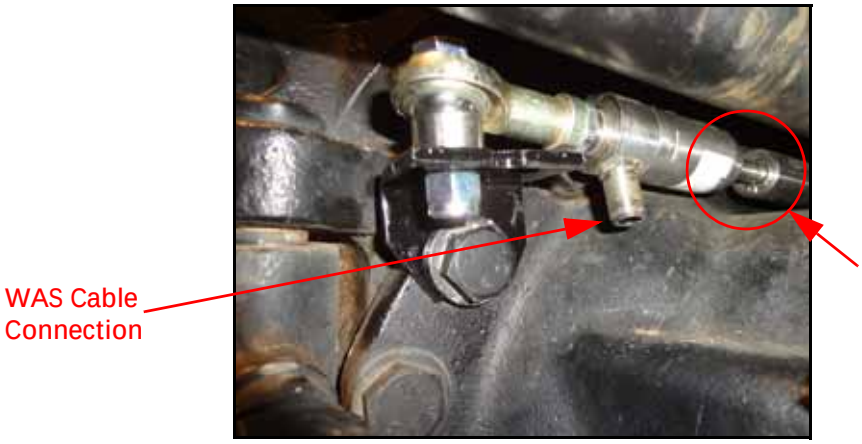


9. Install the base-end of the WAS on the base mounting bracket using the supplied 3/8"-16 x 1.75" bolt (P/N 311-0054-108), spacer (P/N 107-0172-103), and 3/8"-16 lock nut (P/N 312-4001-109).

FIGURE 7. Rod-End of Sensor Installed on Machine.

10. Mount the rod-end of the WAS to the rod mounting bracket using a 3/8"-16 nylon insert lock nut (P/N 312-4001-109).
11. Adjust the muffler clamp so that when the wheels are turned to the right lock, there is approximately 1" of stroke left on the WAS.

FIGURE 8. Muffler Clamp Adjusted



12. Ensure the WAS connector is easily accessible for cable installation.
13. Tighten all WAS installation hardware.

IMPORTANT: Verify that the WAS cannot be overextended or compressed when the wheels are turned to their extremes and adjust the wheel stops as necessary. Also verify that the sensor moves freely and is not being damaged within its range of motion.

CHAPTER 5 CAB COMPONENT INSTALLATION

INSTALL THE SMARTRAX NODE AND NODE HARNESS

INSTALLING THE SMARTRAX NODE AND NODE HARNESS

1. Mount the SmarTrax node (P/N 063-0173-228) to the node mounting bracket (P/N 107-0172-033) using three 3/8" lock nuts (P/N 312-4001-109).

FIGURE 1. Wall Access Plate Removed

2. Remove the back wall access panel below the rear window inside the cab.
3. Remove the rubber mat behind the operator's seat.
4. Remove the metal access plate.

NOTE: Do not reinstall the access panel until the wiring installation is complete.

FIGURE 2. Node Mounting Location

5. Identify the node mounting location in the left rear of the cab.
6. Remove the bolt from the floor of the cab.

FIGURE 3. Outside Panel to be Removed

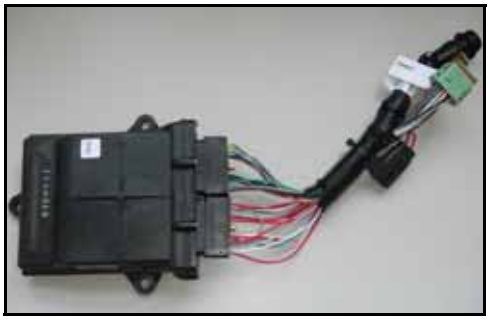
7. Remove the left rear panel outside the cab.

FIGURE 4. Node Installed

8. Align the node mounting bracket with the two holes in the cab floor and secure it using the supplied 1/4"-20 x 1.25" bolts (P/N 311-0050-106), 1/4" washers (P/N 313-2301-810), and 1/4"-20 zinc hex nuts (P/N 312-1001-031).

NOTE: If a second bolt hole does not exist, use the ECU mounting bracket as a template and drill a second hole in the floor.

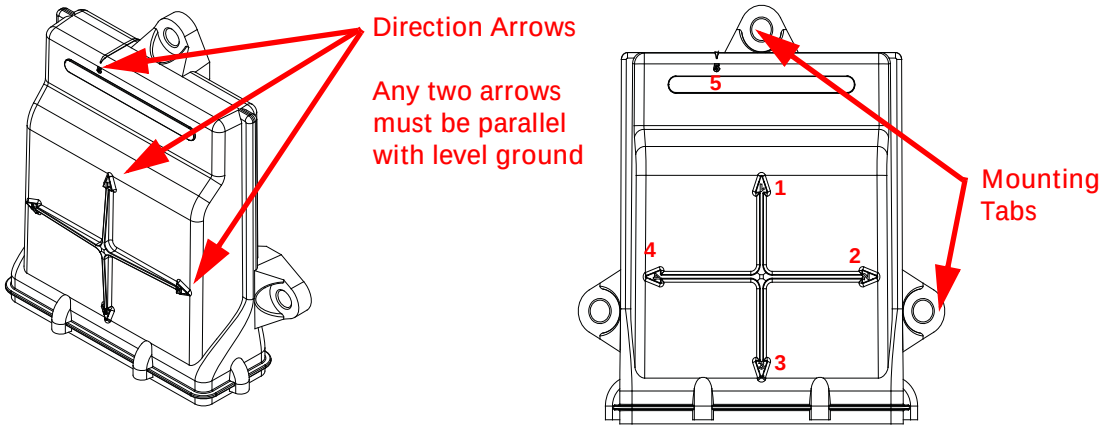
FIGURE 5. Node Harness Connected to Node



9. Install the two large, rectangular connectors of the node harness (P/N 115-4001-109) into the correct ports of the node, tightening the bolts on the harness connectors to secure the connections.

NODE MOUNTING LOCATIONS

FIGURE 6. Node Mounting



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

- Mount the SmarTrax node inside the machine's cab on a flat, level surface for proper performance and cable connection.
- One of the six numbered direction arrows on the node must be oriented in the direction of forward vehicle travel, one arrow pointing straight up, and two of the arrows parallel to the ground.

NOTE: Make a note of the number of the arrow that is oriented in the direction of forward vehicle travel. This number will be needed during the SmarTrax calibration process.

- The node mounting location must not create tripping hazards.
- Mount the node in a location where it will not be kicked or jarred during normal equipment operation.
- The location must allow cable routing to avoid crimping or damaging the cables or the node connections.

Securely fasten the node using bolts or screws through at least two of the three mounting holes. When mounted properly, the node should not become loose or rotate.

INSTALL THE FOOT SWITCH

FIGURE 7. Foot Switch Installed

1. Select a suitable location for the foot switch (P/N 063-0172-470) to be installed.

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

2. Using the holes in the foot switch as a template, drill holes in the floor of the cab.
3. Secure the foot switch to the floor by installing the supplied screws in each of the mounting holes.
4. Locate the ENABLE connector on the node harness (P/N 115-4001-109) and connect it to the foot switch cable connector.

INSTALL THE MASTER SWITCH

FIGURE 8. Master Switch Installation Location

1. Locate an unused port of the armrest console and remove the plug.

FIGURE 9. Master Switch Installed

2. Route the 4-pin connector of the SmarTrax tee safety harness (P/N 115-4001-209) through the bottom of the armrest console and into the open port.
3. Connect the 4-pin connector to the connector on the master switch (P/N 063-0173-545).
4. Thread the harness and master switch wires into the armrest console.
5. Press on the master switch casing to ensure the switch is securely installed.

INSTALL THE VALVE HARNESS

FIGURE 10. Valve Harness Routing

1. Carefully remove the exterior panel just below the rear window.
2. Connect the female 12-pin connector of the tee safety harness (P/N 115-4001-209) into the mating 12-pin connector of the node harness (P/N 115-4001-109).

FIGURE 11. Valve Harness Connected to Tee Safety Harness

3. Connect the male 12-pin connector of the tee safety harness to the CHASSIS connector of the valve harness (P/N 115-4001-237).
4. Route the valve harness out through the grommet in the right-rear window to the underside of the tractor.
5. Replace the exterior back panel of the machine.
6. Route the valve harness under the cab and toward the right side of the machine.

NOTE: The harness should follow along the right side of the tractor. Do not route near moving parts, heat sources, or sharp edges.

FIGURE 12. Valve Harness Connected to SmarTrax Valve

7. Plug the TRANSDUCER connector of the valve harness into the pressure transducer installed in Port PS of the SmarTrax valve.
8. Connect the 4-pin connector on the valve harness into the open 4-pin connection port on the SmarTrax valve.

FIGURE 13. Valve Harness Routing

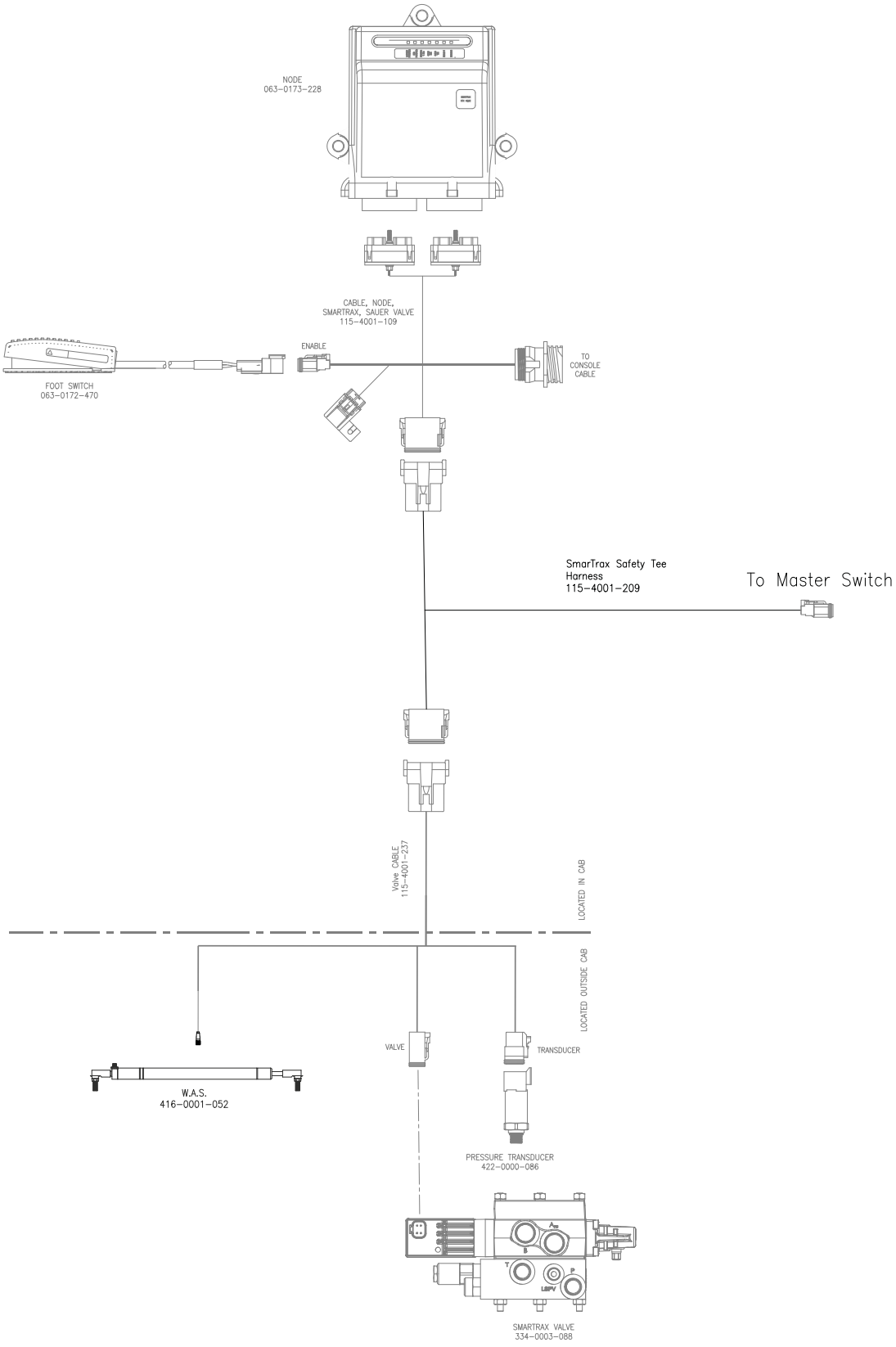
9. Route the valve harness along the right side of the machine's frame.
10. Route the valve harness to the front axle and over to the left side of the machine.
11. Secure the valve harness to the cylinder hose.

FIGURE 14. WAS Connection

12. Plug the WAS connector into the WAS installed on the axle of the machine.

IMPORTANT: Ensure any excess cable is secured away from moving parts and heat sources.

FIGURE 15. Node Wiring



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 115-4001-109).
3. Connect the TO CONSOLE CABLE connector to the Raven console.
4. Install a terminator (P/N 063-0172-369) on the CAN cable connector.
5. Loop and tie-off the REMOVE 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 cable (P/N 151-4001-109) to the remaining SmarTrax interface tee.

SYSTEM DIAGRAMS

FIGURE 16. Existing Chassis System Wiring Diagram

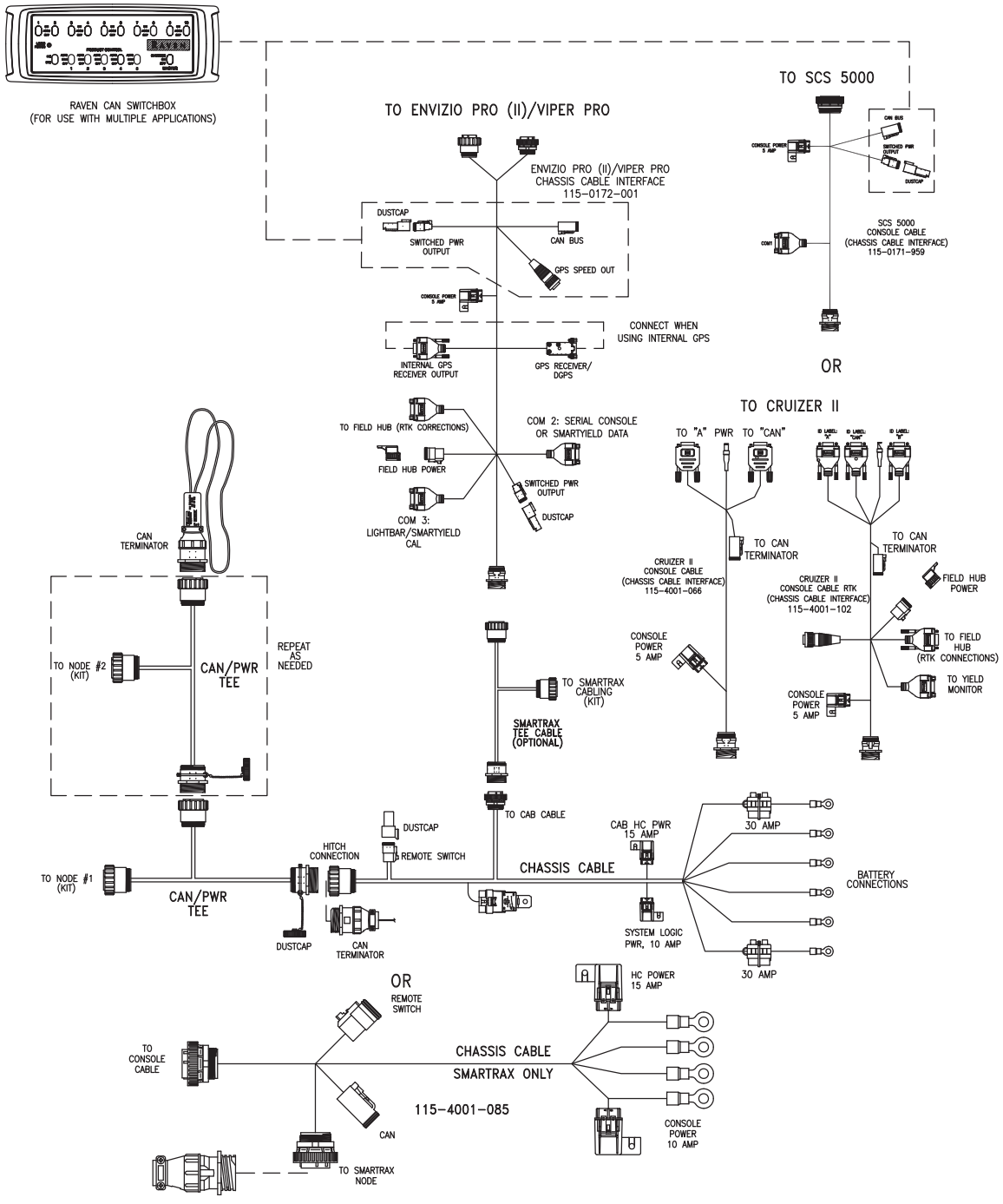


FIGURE 17. Envizio Pro II with Slingshot

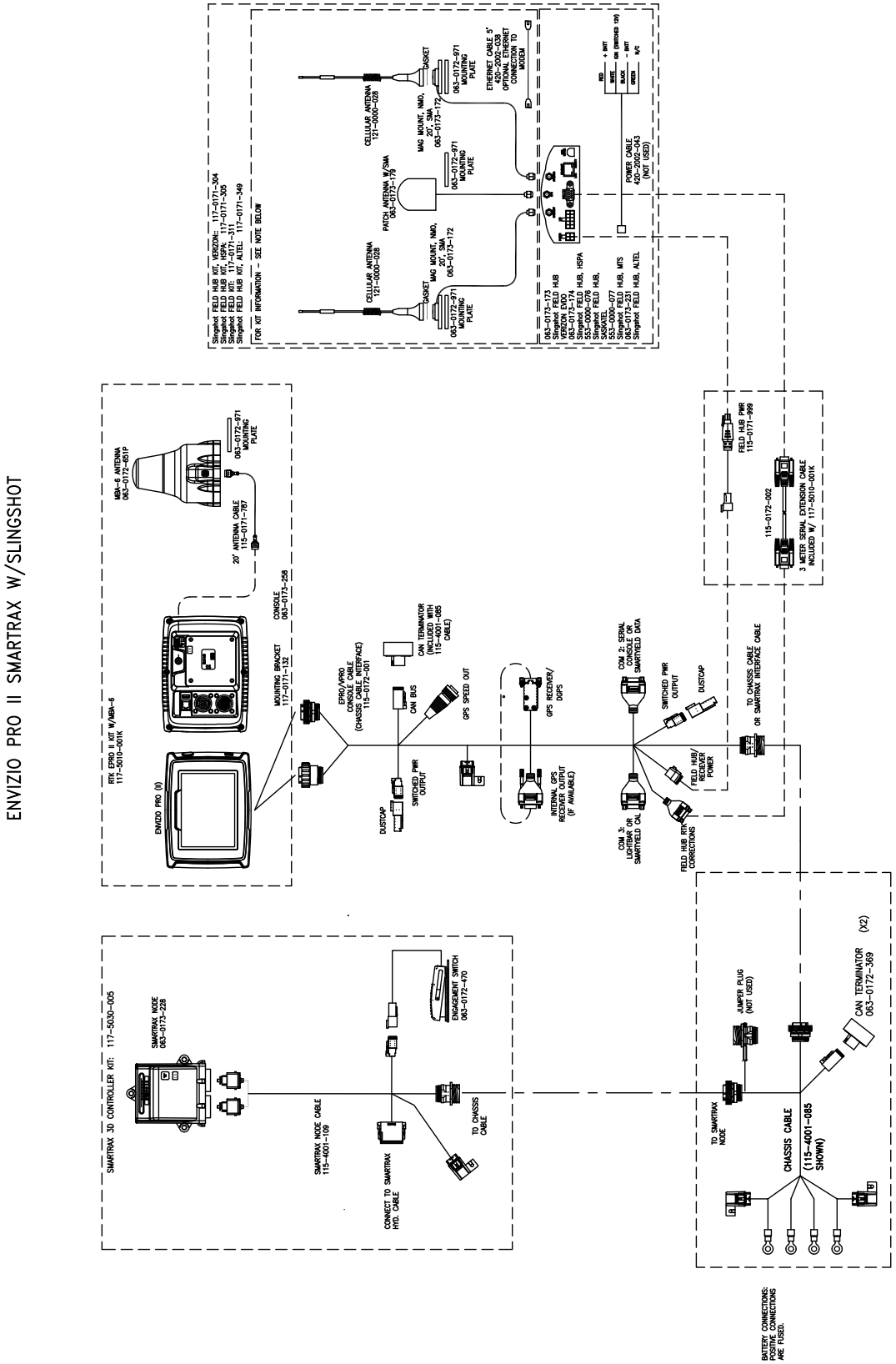


FIGURE 18. Viper Pro/Envizio Pro with Slingshot

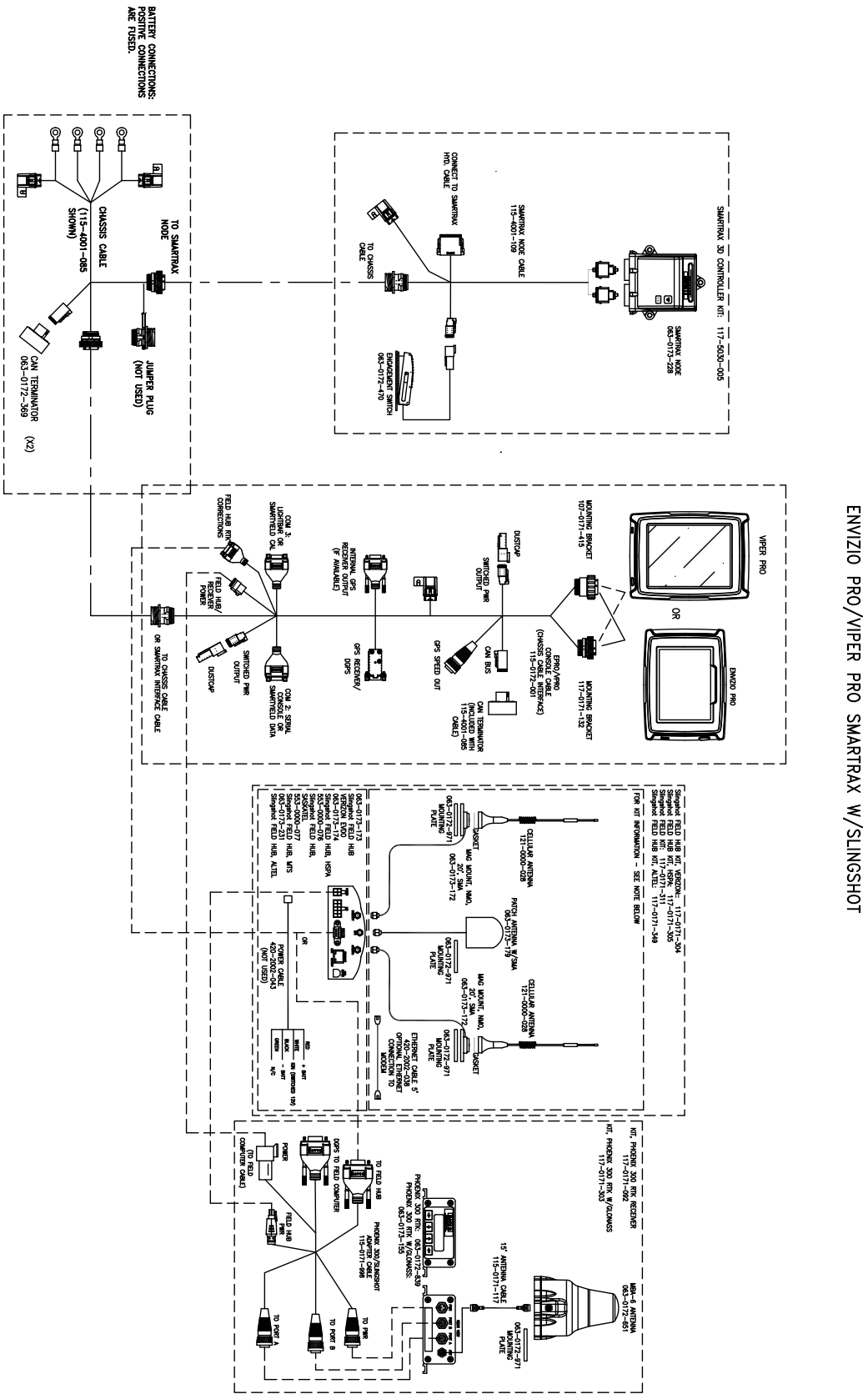
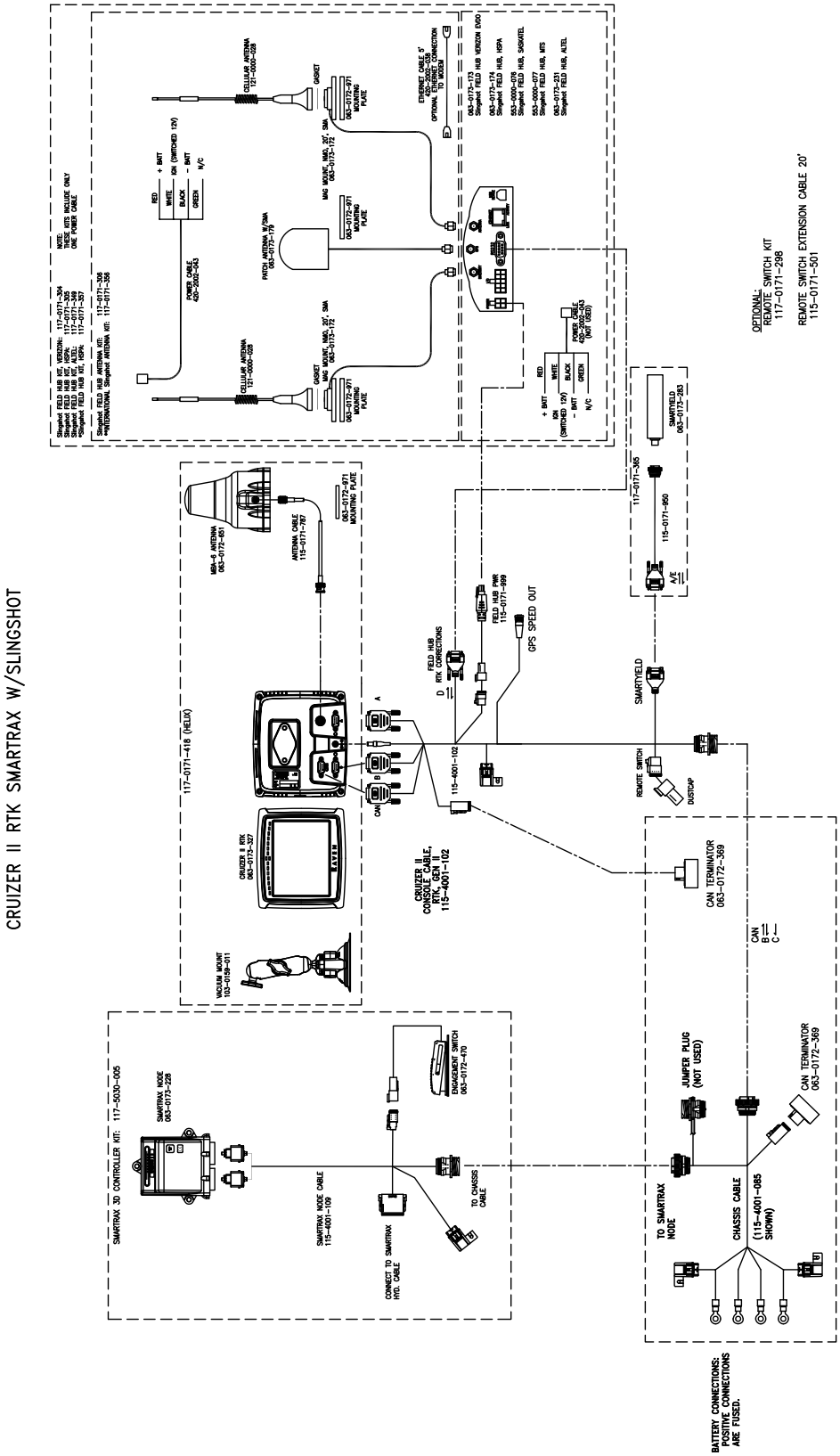


FIGURE 19. Cruizer II with Slingshot



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