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SmarTrax™ Installation Manual



Case IH STX

280, 330, 335, 380, 385, 430, 435, 480, 485, 530, 535

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CHAPTER

1

Important Safety Information

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 components. Be sure to keep safety labels in 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 from the operator's seat and machine.
- Do not drive the machine with SmarTrax enabled on any public thorough-fare or main 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.

Please review the operation and safety instructions included with your implement and/or controller.

WARNING

- Always wear appropriate protective equipment when working on hydraulics.
- This machine must remain stationary and switched off with the booms unfolded and supported while installation or maintenance is conducted.
- Before starting the hydraulic installation, be sure to bleed pressure from the hydraulic system.
- Hydraulic fluid may be hot or under high pressure. When starting the machine for the first time after installing the SmarTrax system, be sure that all persons stand clear of the machine in case a hose or fitting has not been completely tightened.

CAUTION

Hydraulic Safety

- Raven Industries recommends that appropriate protective equipment be worn at all times when working on the hydraulic system.
- Never attempt to open or work on a hydraulic system with the equipment running. Care should always be taken when first opening a system that has previously been pressurized.
- When disconnecting the hydraulic hoses or purging is required, be aware that the hydraulic oil may be extremely hot and under high pressure. Caution must be exercised.
- Any work carried out on the hydraulic system must be performed in accordance with the machine manufacturer's approved maintenance instructions.
- When installing SmarTrax hydraulics or performing diagnostics, maintenance, or routine service, ensure precautions are taken to prevent any foreign material or contaminants from being introduced in the machine's hydraulic system. Objects or materials that are able to bypass the machine's hydraulic filtration system will adversely reduce performance and possibly damage the SmarTrax hydraulic valves.

Electrical Safety

- Always verify that the power leads are connected to the correct polarity as marked. Reversing the power leads could cause severe damage to the equipment.
- Ensure that the power cable is the last cable to be connected.

CHAPTER

2

Introduction

Congratulations on your purchase of the Raven SmarTrax system. This system is designed to provide cutting-edge, hands-free steering of agricultural equipment via GPS (Global Positioning System) coordinates.

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

Make: CaseIH STX 280, 330, 335, 380, 385, 430, 435, 480, 485, 530, and 535

Year:

Serial Number:

FIGURE 1. CaseIH STX 430



Updates

Updates for Raven manuals as well as software updates for Raven consoles are available at the Applied Technology Division web site:

<http://www.ravenprecision.com/Support/index2.jsp>

Sign up for e-mail alerts and we will notify you when updates for your Raven products are available on the Raven web site.

<http://www.ravenprecision.com>

Preparing for Installation

Before installing SmarTrax, park the machine where the ground is level, clean, and dry. Be sure to follow proper safety practices and procedures during the SmarTrax installation procedure. Bleed pressure from the hydraulic system and leave the machine turned off for the duration of the installation process. Carefully read and follow the instructions in this manual to properly complete the installation process.

Recommendations

Observe the following recommendations while installing the SmarTrax system:

- Use part numbers to identify parts.
- Do not remove the plastic wrapping 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

Before beginning the installation process, it is a good idea to gather all the tools that you will need. These tools include the following items:

- Screwdrivers of various sizes
- SAE Standard-sized wrenches
- Allen wrenches
- Utility knife
- Drill
- Drill bits
- Side Cutters
- Pliers

Point of Reference

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

Hydraulic Fittings

The following fitting types may be referenced in this manual:

FIGURE 2. Hydraulic Fitting Types



Kit Contents

This section contains a list of the kit contents that you should have received with this SmarTrax kit. Before you begin assembling the kit, compare the items in your SmarTrax kit with this list. If you have questions about your kit, contact your local Raven dealer or the Raven Customer Support Center.

In addition to the following kits, a SmarTrax Controller or Node kit is required to complete installation of the SmarTrax system. Contact your local Raven dealer for available kits and ordering information.

TABLE 1. CaseIH STX 280, 330, 335, 380, 385, 430, 435, 480, 485, 530, and 535 SmarTrax Installation Kit (P/N 117-0195-073)





Picture	Item Description	Part Number	Qty
Not Pictured	Manual - SmarTrax Installation	016-0190-073	1
	Sensor - Yaw	063-0172-684	1
	Cable - SmarTrax Console Harness	115-0171-775	1
	Plate - Universal Mounting	107-0171-578	1
	Bracket - Hydraulic Valve Mounting	116-0159-527	1

TABLE 1. CaseIH STX 280, 330, 335, 380, 385, 430, 435, 480, 485, 530, and 535 SmarTrax Installation Kit (P/N 117-0195-073)

Picture	Item Description	Part Number	Qty
	Bracket - SmarTrax Controller	107-0171-703	1
	Switch - SmarTrax Hydraulic Override (with Hardware)	422-0000-074	1
	Valve - SmarTrax Hydraulic	334-0003-066	1
	Bolt - 5/16" Hex Head	311-0052-104	4
	Bolt - 3/8" Hex	311-0054-105	4
	Bolt - M8 Hex	311-0070-020	2
	Nut - 3/8"	312-1001-037	4
	Nut - Nyloc	312-4000-162	4
	Screw -10-32 x 3/4" Phillips Head	311-0007-037	4
	Washer - 5/16" Split Lock	313-1000-019	6

TABLE 1. CaseIH STX 280, 330, 335, 380, 385, 430, 435, 480, 485, 530, and 535 SmarTrax Installation Kit (P/N 117-0195-073)








Picture	Item Description	Part Number	Qty
	Washer- 3/8" Split Lock	313-1000-022	4
	Washer - 3/8" Flat	313-2300-013	4

TABLE 2. CaseIH STX 280, 330, 335, 380, 385, 430, 435, 480, 485, 530, and 535 SmarTrax Hydraulic Kit (P/N 117-0194-073)

Picture	Item Description	Part Number	Qty
	Fitting - 9/16" JIC (M/F) 45° Swivel Elbow	333-0012-027	6
	Fitting - 13/16" ORFS Swivel Run Tee (M/M/F)	333-0012-028	2
	Fitting - 1" ORFS Swivel Run Tee (M/M/F)	333-0012-031	1
	Fitting - 1" ORFS (M/F) 90° Swivel Elbow	333-0012-096	1
	Fitting - 14 mm SAE O-Ring Boss (M) to 9/16" JIC (M) Adapter	333-0012-232	1
	Fitting - 9/16" JIC (M/M) Union	333-0012-250	1
	Hose - 9/16" JIC (F) 90° to 9/16" JIC (F), 102"	214-1000-294	1



TABLE 2. CaseIH STX 280, 330, 335, 380, 385, 430, 435, 480, 485, 530, and 535 SmarTrax Hydraulic Kit (P/N 117-0194-073)

Picture	Item Description	Part Number	Qty
	Hose- 13/16" ORFS (F) to 9/16" JIC (F), 33"	214-1000-434	2
	Hose - 1" ORFS (F) to 9/16" JIC (F), 19"	214-1000-435	1
	Hose - 11/16" ORFS (M) to 9/16" JIC (F), 58"	214-1000-436	1
	Hose - 11/16" ORFS (F) 90° to 9/16" JIC (F), 70"	214-1000-437	1
	Hose - 9/16" JIC (F) to 9/16" JIC (F), 30"	214-1000-503	1

CHAPTER

3

*Mounting the
SmarTrax Hydraulic
Valve*

Mount the SmarTrax Hydraulic Valve


	<p>NOTICE</p> <p>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.</p>
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FIGURE 1. Valve Mounting Location



Valve Mounting Location

1. Mount the valve mounting bracket (P/N 116-0159-527) to the right side of the machine below the batteries using the supplied bolts (P/N 311-0054-105), flat washers (P/N 313-2300-013), lock washers (P/N 313-1000-022), and nuts (P/N 312-1001-037). Use the supplied mounting plate (P/N 107-0171-578) if necessary.

Note: Be sure to check the inside of the frame before drilling to avoid hitting any hoses or mounting tabs.

2. Mount the SmarTrax hydraulic valve (P/N 334-0003-066) to the mounting bracket using the supplied bolts (P/N 311-0052-104) and lock washers (P/N 313-1000-019).

FIGURE 2. Large Frame SmarTrax Hydraulic Valve Mounting Example

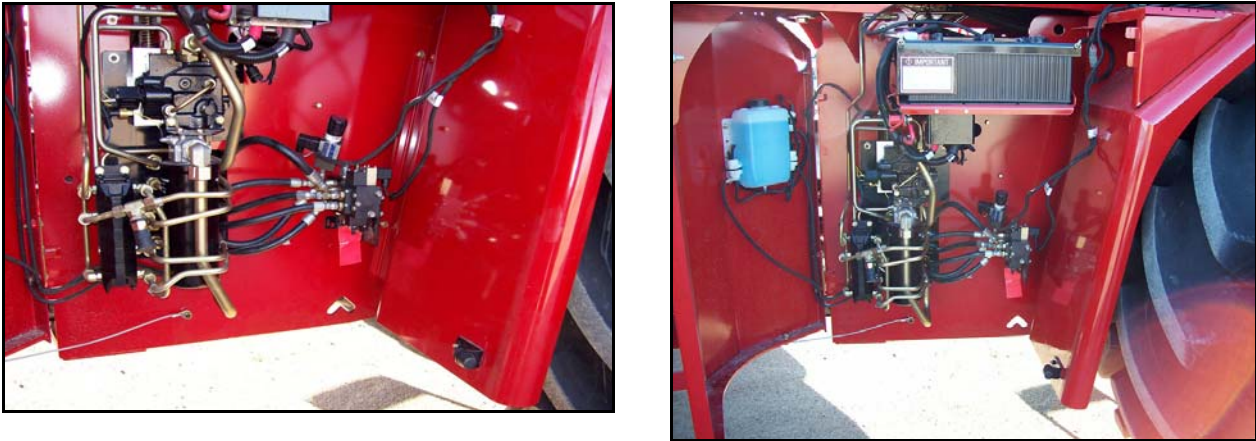
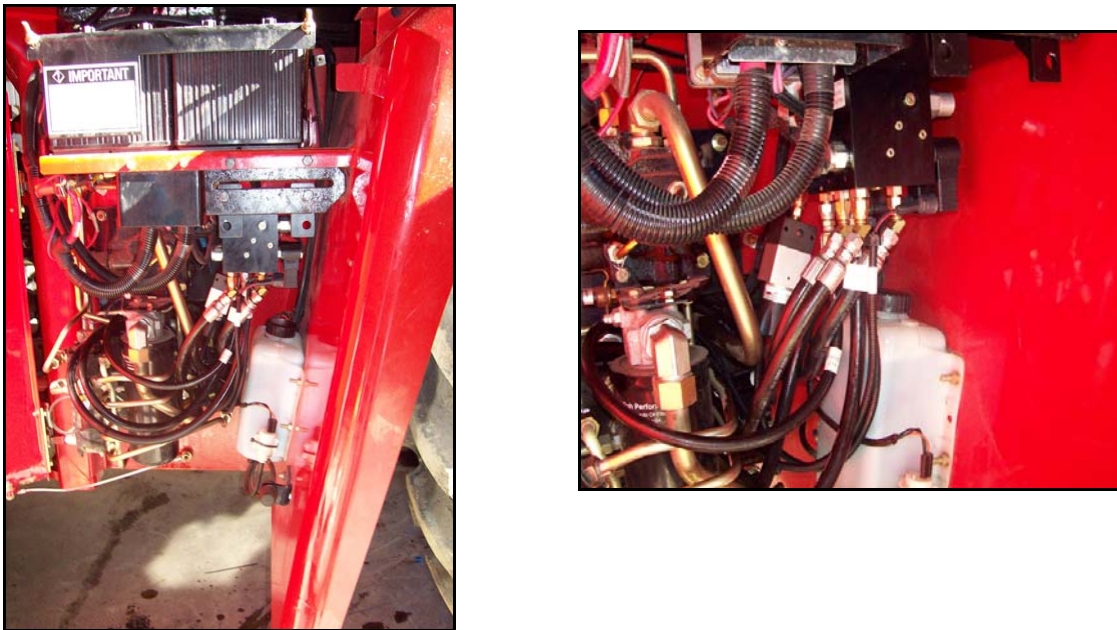


FIGURE 3. Small Frame SmarTrax Hydraulic Valve Mounting Example.



CHAPTER

4

*Hydraulic
Connections*



⚠ WARNING

Hydraulics may be under pressure. Never attempt to open or work on a hydraulic system with the equipment running. Care should always be taken when working on a system that has previously been pressurized. When disconnecting or purging hydraulic connections, be aware that hydraulic oil within the system may be extremely hot and under high pressure.



⚠ CAUTION

Ensure 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 adversely reduce performance and possibly damage the SmarTrax hydraulic valves.



⚠ CAUTION

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



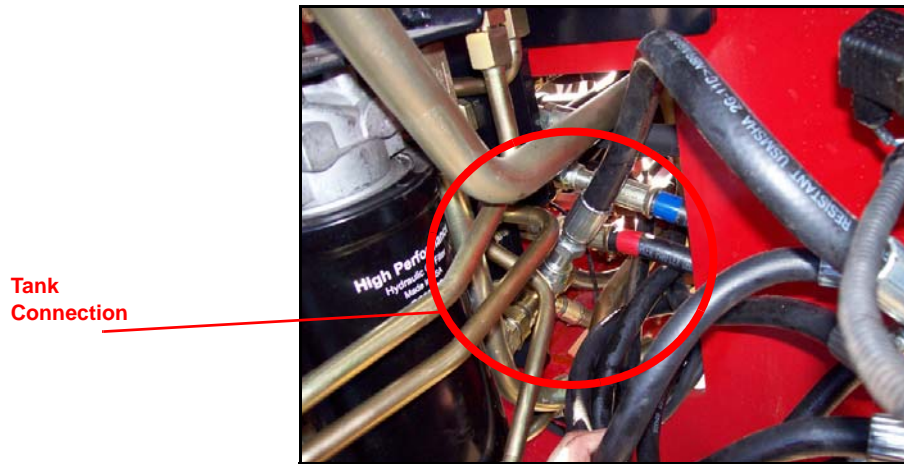
NOTICE

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 the Tank Hose

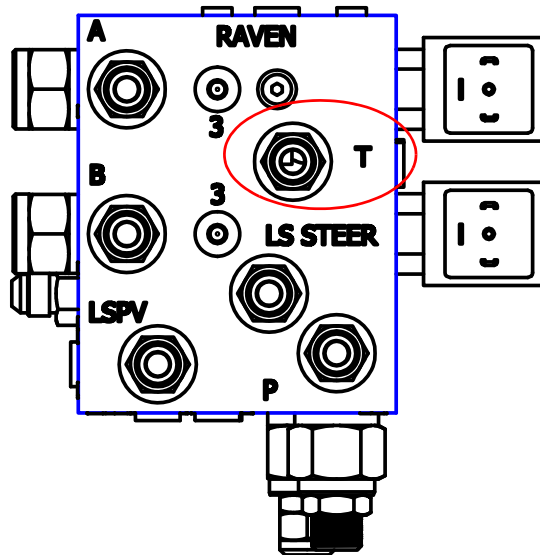
1. Remove the cap from the tank port on the steel line, which comes out of the back of the hydraulic filter.
2. Install the supplied run tee fitting (P/N 333-0012-031) and re-attach the cap to the end of the tee fitting using a supplied 90° fitting (P/N 333-0012-096) if necessary.
3. Connect the supplied hose (P/N 214-1000-435) to the remaining branch of the tee fitting.

FIGURE 1. Tank Connection



4. Route the other end of the hose to Port 'T' of the SmarTrax hydraulic valve using a supplied 45° fitting (P/N 333-0012-027).

FIGURE 2. SmarTrax Hydraulic Valve

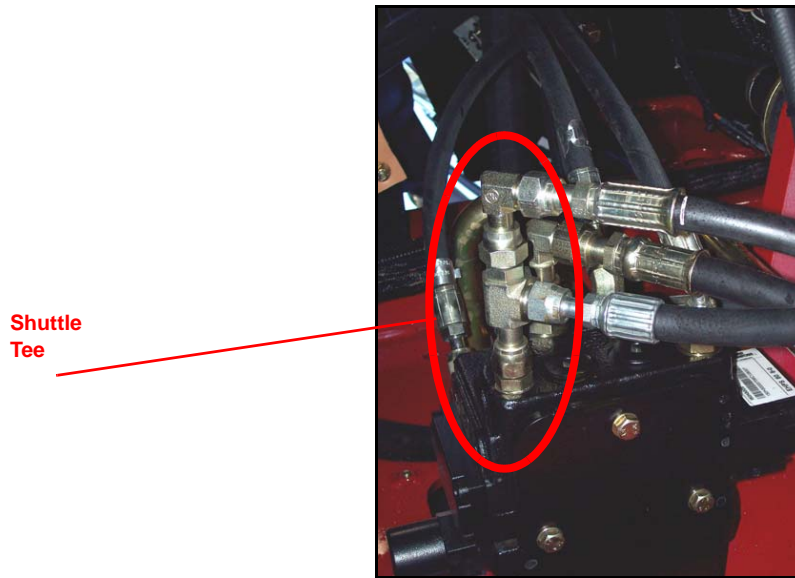


Install the LS-Steer and LS-PV Hoses

Large Frame Machines

1. Locate the hydraulic lines running from the steering valve to the steering orbitrol on the inside right frame rail between the front axle and the transmission.
2. Disconnect the shuttle tee from the 'LS' port on the steering orbitrol.

FIGURE 3. Shuttle Tee



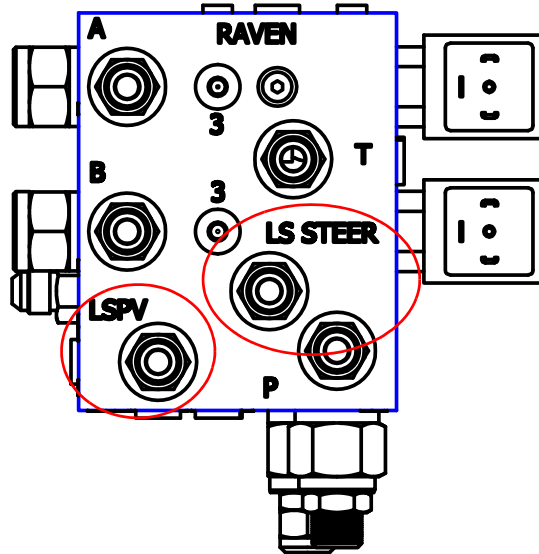
3. Attach the 90° end of the supplied hose (P/N 214-1000-437) to the open port on the steering orbitrol.

FIGURE 4. 'LS-Steer' Connection



4. Route the other end of the hose to the SmarTrax hydraulic valve and connect to the 'LS-Steer' port using a 45° fitting (P/N 333-0012-027) if necessary.
5. Attach the female end of the supplied hose (P/N 214-1000-436) to 'LS-PV' Port of the SmarTrax hydraulic valve using a supplied 45° fitting (P/N 333-0012-027) if necessary.

FIGURE 5. SmarTrax Hydraulic Valve



6. Route and attach the other end of the hose to the previously disconnected shuttle tee.

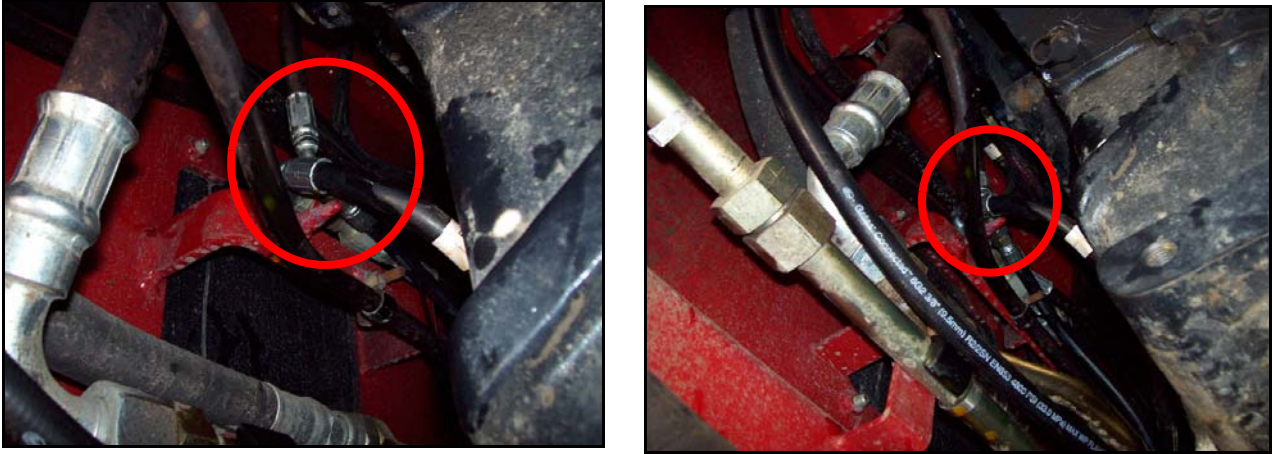
FIGURE 6. 'LS-PV' Connection



Small Frame Machines

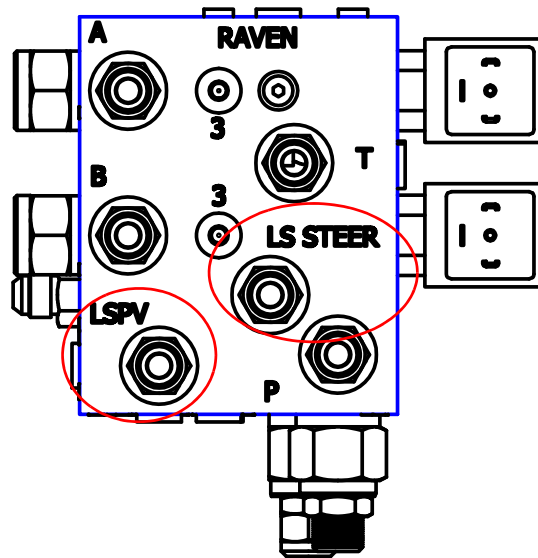
Locate the steering orbitrol under the hood directly in front of the cab. Locate the 'EF' port on the steering orbitrol and trace the steel line back to the bulkhead fitting, located at the center of the machine on the inside of the right frame rail next to the front of the transmission.

FIGURE 7. Bulkhead Fitting



1. Remove the hose connecting the 'EF' port to the bulkhead fitting.
2. Attach the supplied hose (P/N 214-1000-436) to the disconnected hose.
3. Route the other end of the hose to the SmarTrax hydraulic valve and connect to the 'LS-Steer' port using a 45° fitting (P/N 333-0012-027) if necessary.
4. Attach the supplied hose (P/N 214-1000-437) to the 'LS PV' port on the SmarTrax hydraulic valve.

FIGURE 8. SmarTrax Hydraulic Valve

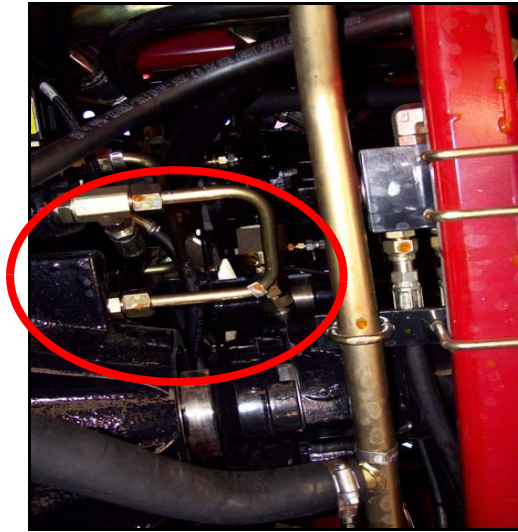


5. Route the hose and attach to the open bulkhead fitting.

Install the Pressure Hose

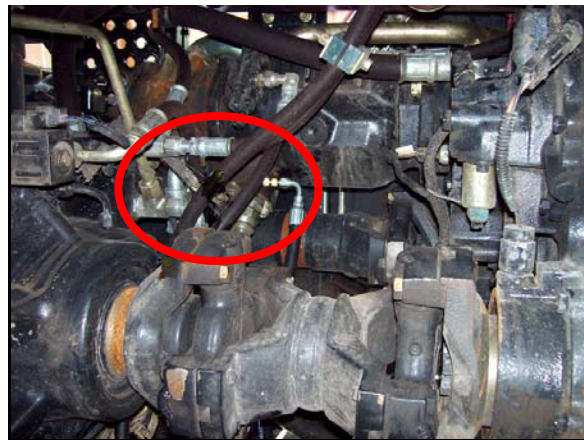
Locate the pressure line coming off of the top of the machine's steering orbitrol. The pressure line is a large hydraulic hose that goes to the hydraulic pump on the front of the upper left side of the transmission. The hose connects to a small manifold that is attached to the pump. On wheeled machines, the pressure connection faces downward and is accessible from underneath the machine. On track machines, the manifold is located on top of the pump and is accessible between the cab and walk way on the left side of the machine. The manifold has one port with a test fitting and another port that is plugged.

FIGURE 9. Pressure Manifold



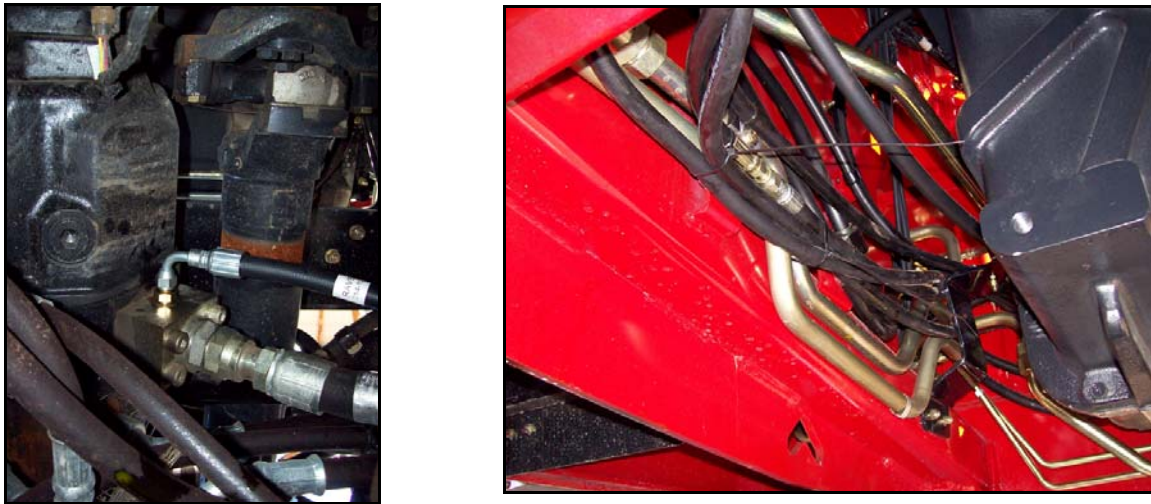
1. Remove the plug from the manifold and install the supplied 14mm adapter (P/N 333-0012-232).

FIGURE 10. Pressure Connection



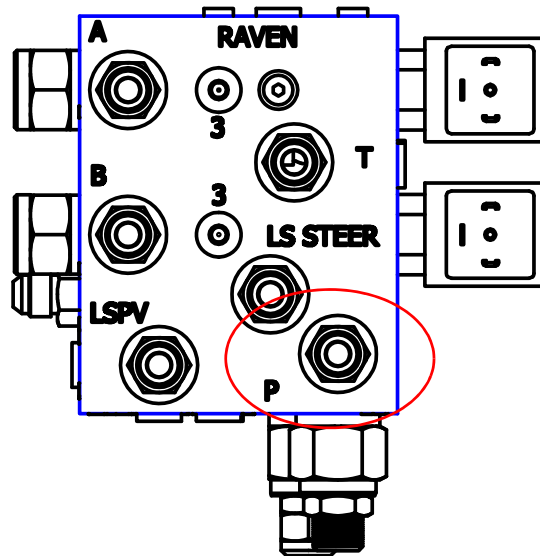
2. Attach the 90° end of the hose (P/N 214-1000-294) to the previously installed fitting.

FIGURE 11. Hose Routing



3. Route the other end of the hose to the SmarTrax hydraulic valve and connect to the 'P' port using a 45° fitting (P/N 333-0012-027) if necessary.

FIGURE 12. SmarTrax Hydraulic Valve

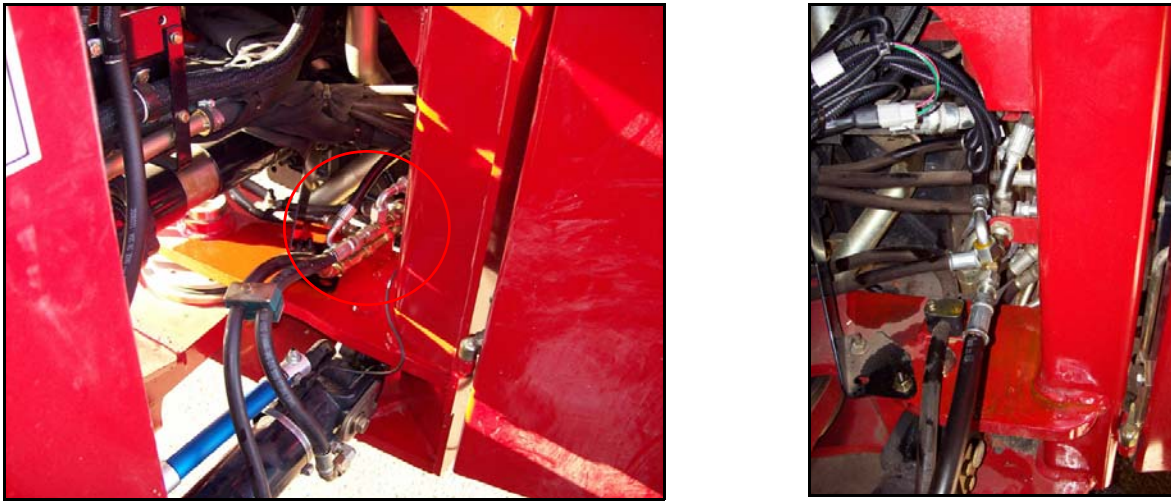


Install the Left and Right Steer Hoses

Left and right steer connections are located on the right side of the center pivot for large frame machines and on both sides for small frame machines.

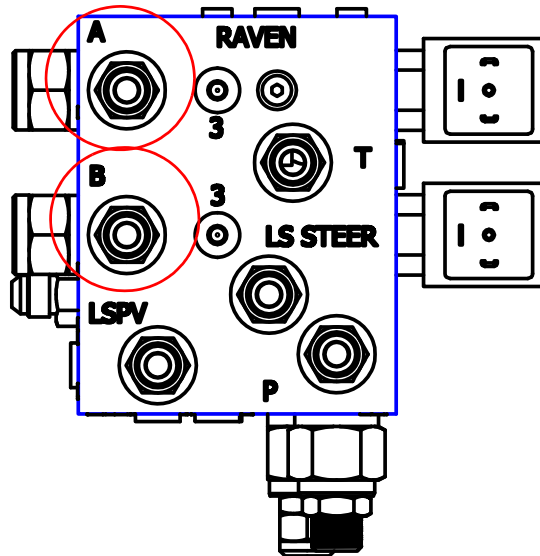
1. Disconnect the existing left and right steer hoses from the steering orbitrol.
2. Install the supplied run tee fitting (P/N 333-0012-028) and reconnect the original left steer hose to the straight portion of the fitting.
3. Connect the 90° end of the supplied hose (P/N 214-1000-434) to the remaining branch of the tee fitting.

FIGURE 13. Left and Right Steering Connections



4. Route the other end of the hose to the SmarTrax hydraulic valve using a supplied 45° fitting (P/N 333-0012-027) if necessary. Left steer connects to port 'A' and right steer connects to port 'B'.

FIGURE 14. SmarTrax Hydraulic Valve



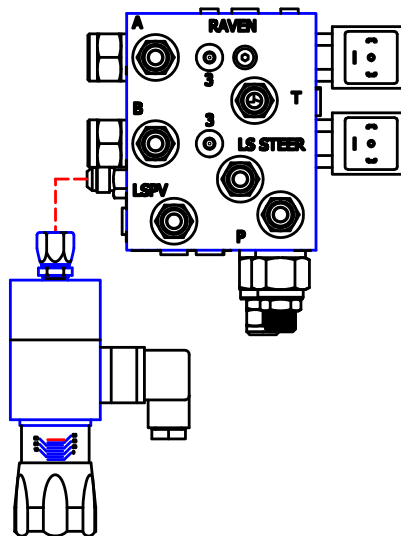
5. For small frame machines, use the supplied extension hose (P/N 214-100-503) and supplied fitting (P/N 333-0012-250) to reach the steering line on the opposite side of the machine from the SmarTrax valve.



Install the Pressure Switch

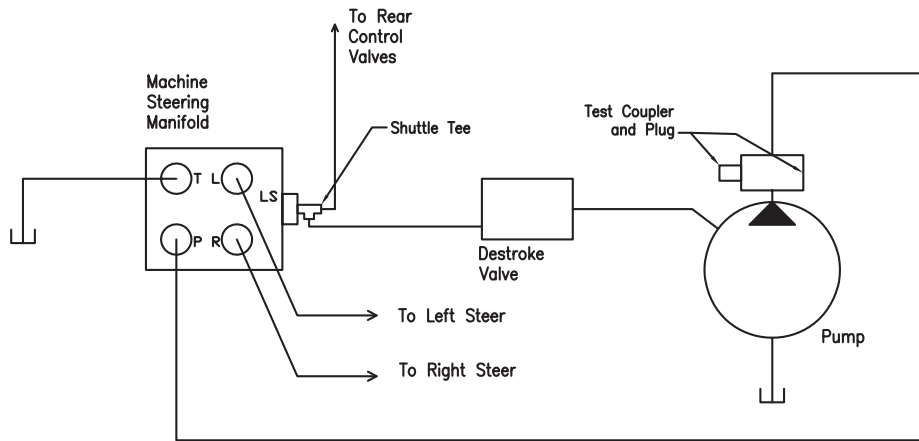
Install the pressure switch (P/N 422-0000-074) directly to the 'PS' Port on the SmarTrax hydraulic valve.

FIGURE 15. Pressure Switch Installed

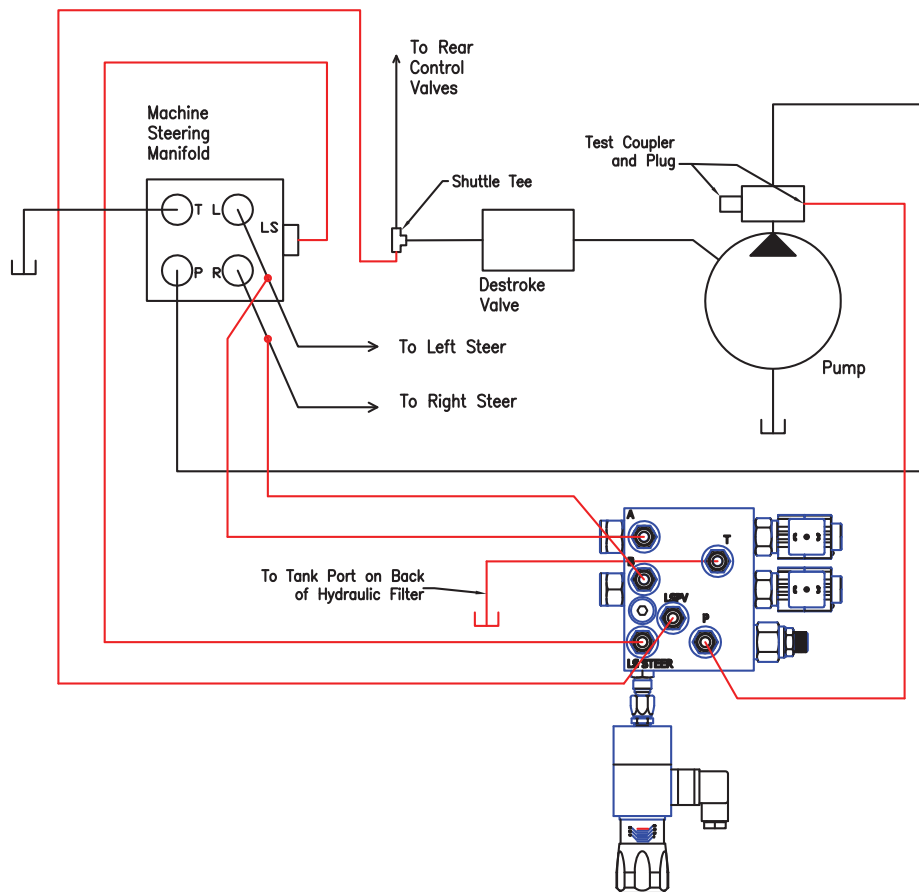


Hydraulic Connection Diagram

Before Smartrax Installation



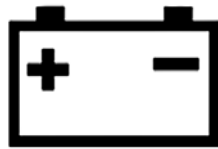
After Smartrax Installation



CHAPTER

5

Wiring and Electrical Connections



⚠ CAUTION

Ensure that the power cable is the last cable connected.
Do not reverse the power leads. Doing so will cause severe damage to the equipment.
Ensure the leads are connected to the correct polarity.

Connecting the SmarTrax Hydraulic Valve

1. Place a solenoid gasket (included in the packet with the console cable harness) on the solenoid installed in port '1A' on the SmarTrax hydraulic valve (P/N 334-0003-066).
2. Locate the connector labeled 'LEFT' on the SmarTrax console cable harness (P/N 115-0171-775).
3. Insert the connector labeled 'LEFT' to the solenoid installed in port '1A' on the SmarTrax hydraulic valve.
4. Tighten the bolt on the solenoid connector to secure the connection and to help prevent moisture penetration.
5. Repeat step 1 through step 4 to connect the 'RIGHT' connector to the solenoid on port '1B'.

Connecting the Pressure Override Switch

1. On the console cable harness (P/N 115-0171-775), identify the connector labeled 'OVERRIDE'.
2. Connect the 'OVERRIDE' connector to the pressure override switch.
3. Tighten the bolt on the connector to secure the connection and to help prevent moisture penetration.

Route the Console Cable Harness

Once the SmarTrax hydraulic valve and pressure override switch are connected to the console cable harness, the remaining connectors must be routed into the cab.

1. Locate an access point through which the console cable harness (P/N 115-0171-775) may be routed into the cab.
2. Route the cable to the access point and use the provided cable ties to secure the cable to avoid catching or damaging the cable during normal equipment operation.

Note: When routing the SmarTrax console cable harness, follow the path of other hoses or cables to avoid potential wear areas.

3. Feed enough of the cable into the cab to allow each cab control component to be connected.
4. Spool and secure any excess cable.

Install the Foot Switch

1. Select a location for the SmarTrax foot switch (P/N 063-0172-470) within easy reach of the operator to fully press the front of the pedal.
2. Use the SmarTrax foot switch as a template and pre-drill holes in the floor.
3. Secure the foot switch to the floor with four screws or bolts through each of the mounting holes.
4. Locate the connector labeled 'ENABLE' on the SmarTrax console cable harness (P/N 115-0171-775) and connect it to the foot switch cable.

FIGURE 1. Foot Switch Mounting Example



Mount the SmarTrax Controller

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

- The controller is not weatherproof. Mount the controller in the vehicle's cab within easy reach of the operator.
 - Mount the controller in a location where it will not impede the operator's ability to control the vehicle and where other components within the cab will not strike or jar the controller during normal operation.
 - Ensure that all cabling is routed to avoid tripping hazards and prevent crimping or breaking the cables during normal operation.
1. In the cab on the right A pillar post, remove the plastic cover to expose the bolt.
 2. Remove the bolt and discard it.
 3. Carefully cut back the plastic in the direction of the windshield to expose an additional mounting hole.
 4. Use the M8 hex bolts (P/N 311-0070-020) to attach the smartrax controller mounting bracket (P/N 107-0171-703) to the A pillar post.
 5. Use the phillip head screws (P/N 311-0007-037), and the nyloc nuts (P/N 312-4000-162) to mount the SmarTrax controller to the SmarTrax controller mounting bracket.

FIGURE 2. SmarTrax Controller Mounting Bracket



To Install the SmarTrax Controller

1. Connect the large, round connector on the SmarTrax console cable harness (P/N 115-0171-775) to the back of the controller box.
2. Connect your receiver or source of DGPS to the connector labeled 'DGPS'.
3. Connect the console or lightbar providing machine guidance to the connector labeled 'LIGHTBAR'.
4. Insert the power cable (P/N 115-0171-465) to the power connector on the controller box.
5. Route the power leads to the vehicle's battery and connect.
 - a. Connect the red power lead on the positive battery terminal.
 - b. Connect the black power lead on the negative battery terminal.

Install the Yaw Sensor

When choosing the location for the yaw sensor, consider the following points:

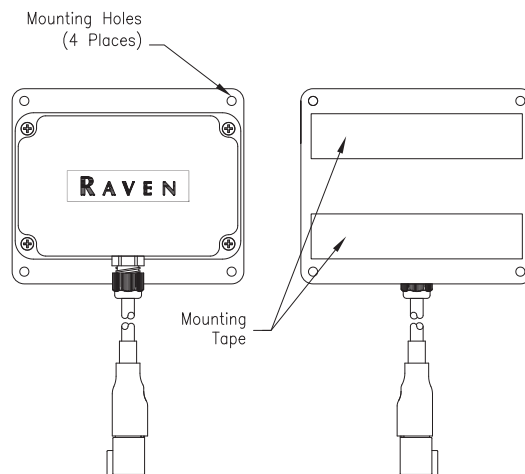
- The yaw sensor is not weatherproof. Mount the sensor inside the cab.
- Mount the yaw sensor in a location away from foot traffic.
- Mount the yaw sensor to a flat, level surface. The floor of the cab is generally ideal.
- Mount the yaw sensor so that the Raven logo faces up.
- The SmarTrax yaw sensor does not need to be oriented toward the direction of vehicle travel.

Note: If you are going to use the double-sided tape to mount the SmarTrax yaw sensor, be sure to thoroughly clean and dry the mounting location first.

To Install the Yaw Sensor

1. Select the preferred location for the SmarTrax yaw sensor (P/N 063-0172-684). See the recommendations for choosing a mounting location above.
2. Mount the yaw sensor using one of the following methods:
 - Remove the protective covering from the double-sided tape and affix the yaw sensor to the floor.
 - Using the yaw sensor as a template, mark and pre-drill holes in the floor. Using bolts or screws (not supplied), secure the yaw sensor in position.
3. Locate the connector labeled 'YAW SENSOR' on the SmarTrax console cable harness (P/N 115-0171-775).
4. Insert this connector to the yaw sensor cable connection.

FIGURE 3. Yaw sensor Model

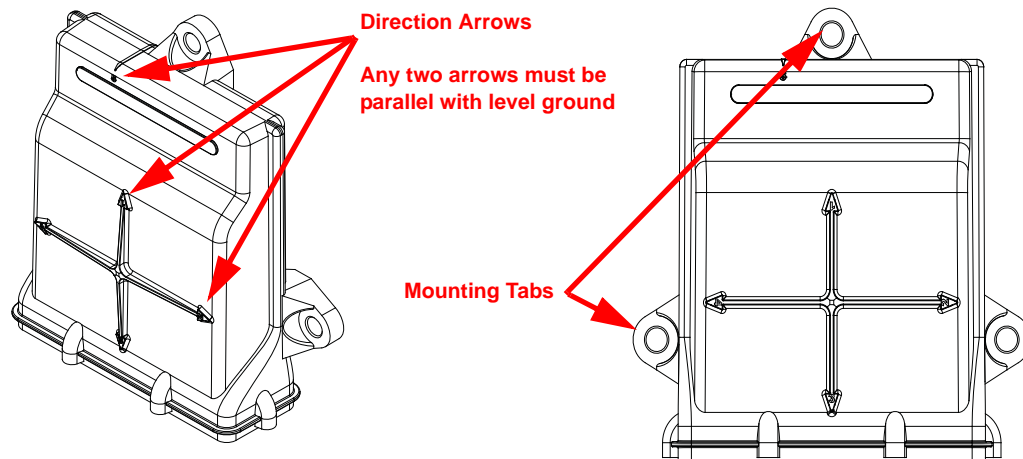


Install the SmarTrax Node

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

- The node is not weatherproof. Mount the SmarTrax node inside the machine's cab or driver's compartment.
- The node mounting location must not create tripping hazards and allow cable routing to avoid crimping or damaging the cables or the node connections.
- Mount the SmarTrax node to a flat surface with two of the arrows on the node parallel to the ground and in a location where it will not be kicked or jarred during normal equipment operation.
- One of the six numbered direction arrows on the node must be oriented in the direction of forward vehicle travel. Note the number of the arrow corresponding to forward travel for SmarTrax calibration. One arrow must also point straight up.
- Mount the node to a flat, level surface. The floor of the cab is generally ideal.
- 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.

FIGURE 4. Node Mounting



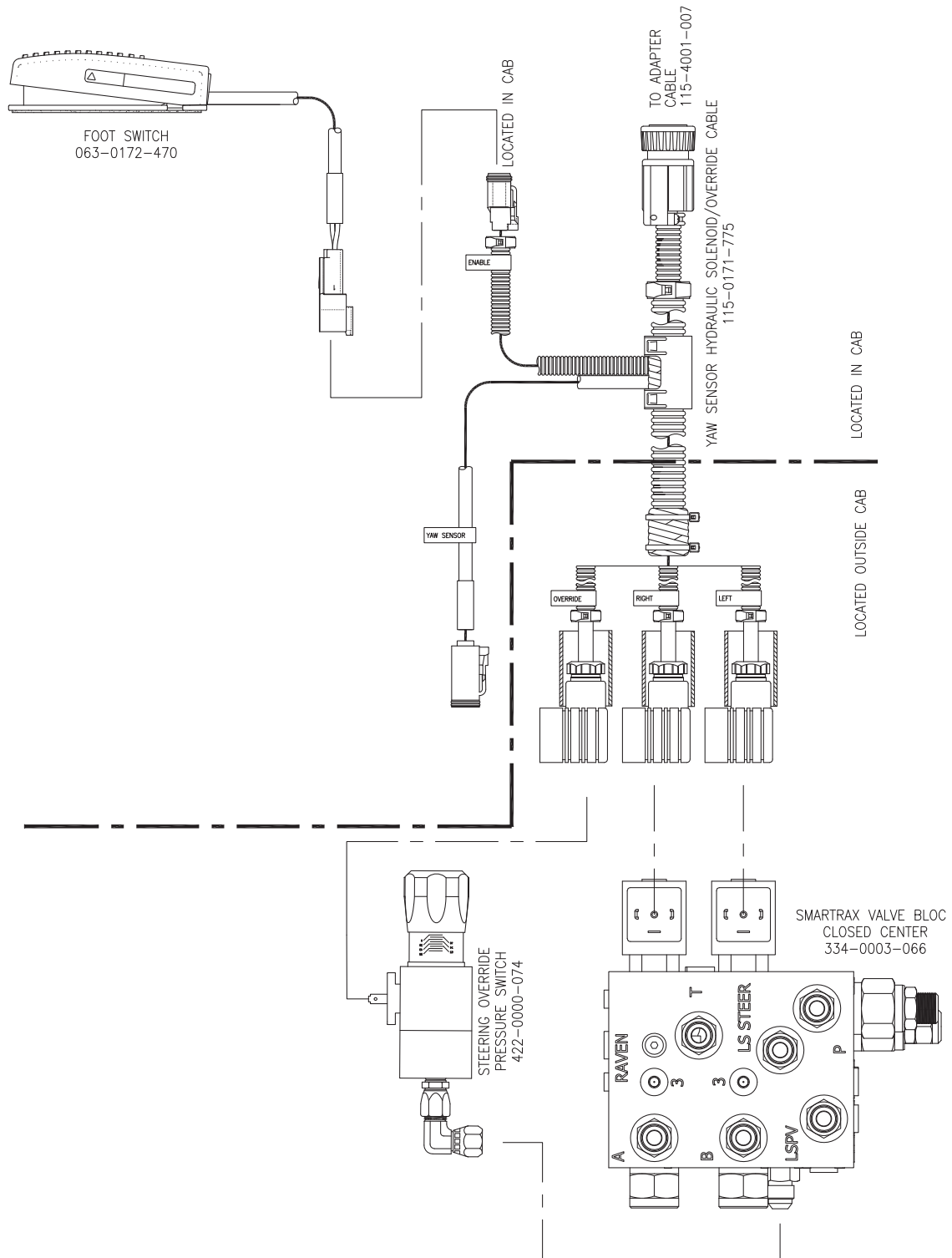
To Install the Node

1. Select the preferred location for the node. See the recommendations for choosing a mounting location above.
2. Using the mounting tabs on the node as a template, mark and pre-drill holes. Using bolts or screws (not supplied), secure the node in position.
3. Connect the large, round connectors on the node adapter cable (P/N 115-4001-007) for Viper Pro/Envizio Pro or (P/N 115-4001-018) for Cruiser to the SmarTrax console cable harness (P/N 115-0171-775).
4. Connect the large, rectangular connectors to the SmarTrax node.
5. Connect your receiver or source of DGPS to the connector labeled 'DGPS' on the node adapter cable.
6. Connect the console providing machine guidance to the remaining small, round connector.
7. Connect the 4-pin deutsch plug to the vehicle's CANbus system (Viper Pro/Envizio Pro) or the DB-9 display cable (Cruizer).
8. Electrical hookup is recommended as shown in the *Can Node Wiring Diagram on page 30*.

Note: *High Current Power, which is used to run steering operations, should be connected to a separate power source than Logic Power, which is used to run processing and communication between the node and the guidance console.*



FIGURE 5. Cable Harness Installation Schematic



**⚠ WARNING**

When starting the machine for the first time, keep the area around the machine clear of people or bystanders in case a fitting or hose has not been fully tightened.

**⚠ WARNING**

DO NOT use hands to check for leaks. Hydraulic fluid under pressure can penetrate the skin and cause serious injury or death.

Always wear appropriate protective equipment when working with the hydraulic system.

Remove Air from the Hydraulic System

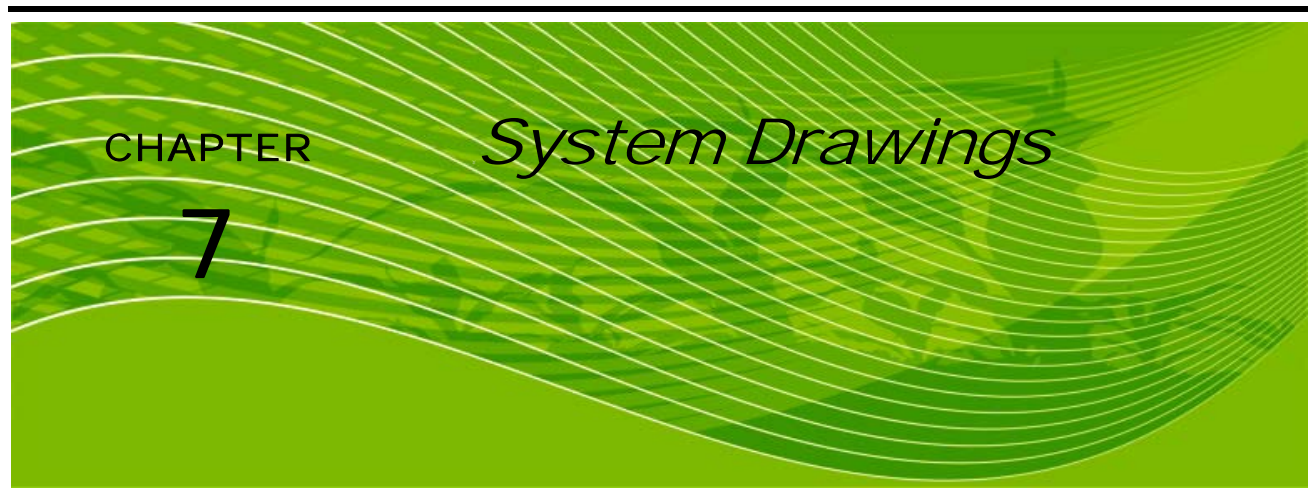
Anytime a hydraulic system is purged for maintenance, or during the SmarTrax system installation, air is introduced into the hydraulic lines. Anytime the system is purged or fittings are loosened or disconnected, it is important to remove air pockets from the hydraulic system to avoid unwanted operation of the hydraulic system.

To remove air from the hydraulic system, turn the wheels fully from side to side repeatedly. If air pockets are present, the wheels may not move consistently while the steering wheel is operated. Continue turning the wheels until the wheels move steadily and smoothly with the steering wheel.

Verify the SmarTrax Installation

1. Turn on the machine.
2. With the machine running, double-check all fitting and hose connections to ensure that:
 - Hoses are not rubbing or interfering with other moving parts.
 - Hydraulic fluid is not leaking.
3. If there are any problems, shutdown the machine and correct problems immediately.

If you need additional assistance, contact your local Raven dealer or the Raven Customer Support Center at 1-800-243-5435.



The following diagrams may be helpful for installing or troubleshooting the SmarTrax system. The following diagrams may show optional features or components not required for operation and will not apply to your system if the required hardware has not been installed.

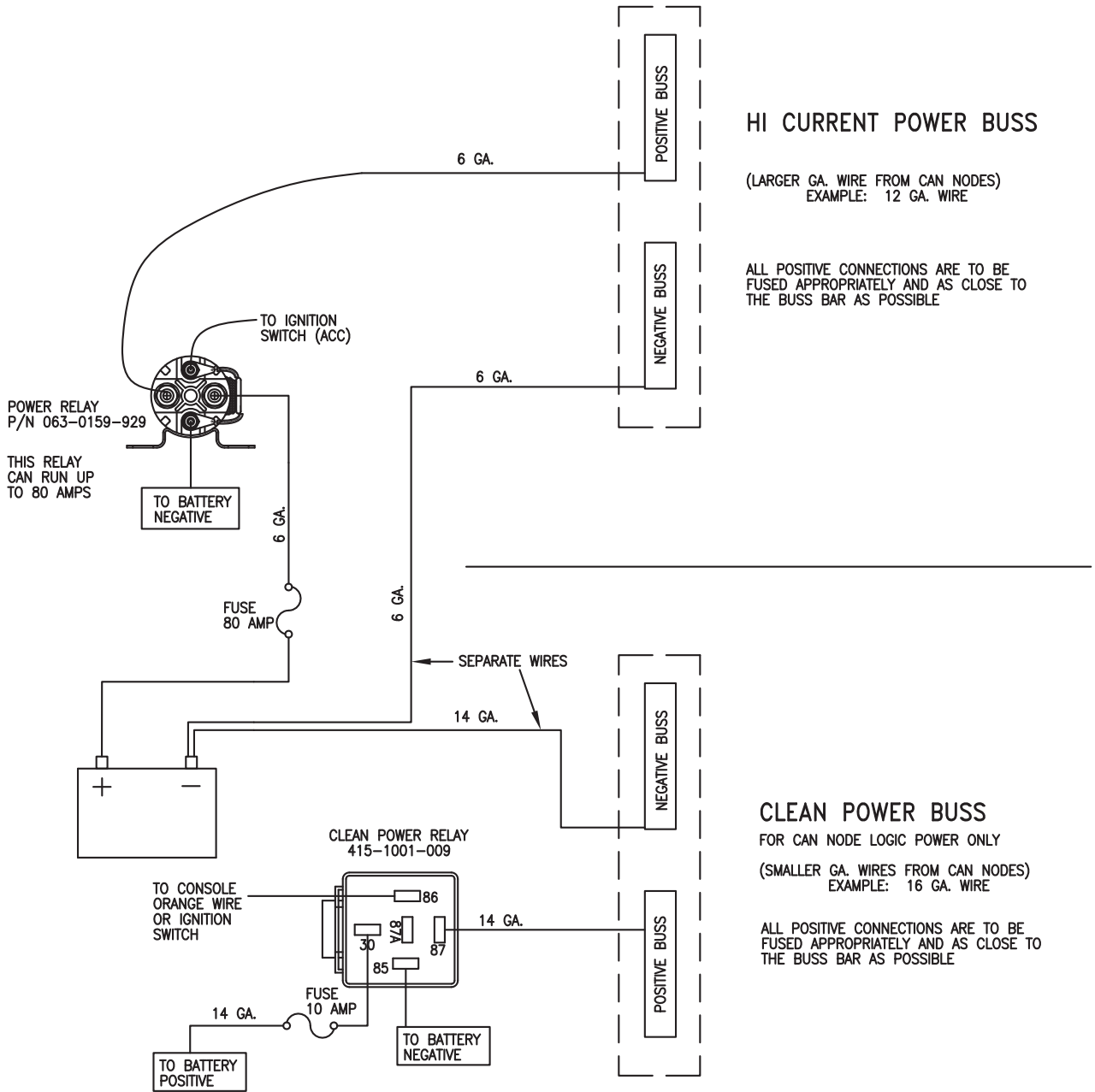
Contact your local dealer for purchasing or more information on components shown in the following diagrams.

Additional system diagrams are available from the Raven Industries web site:

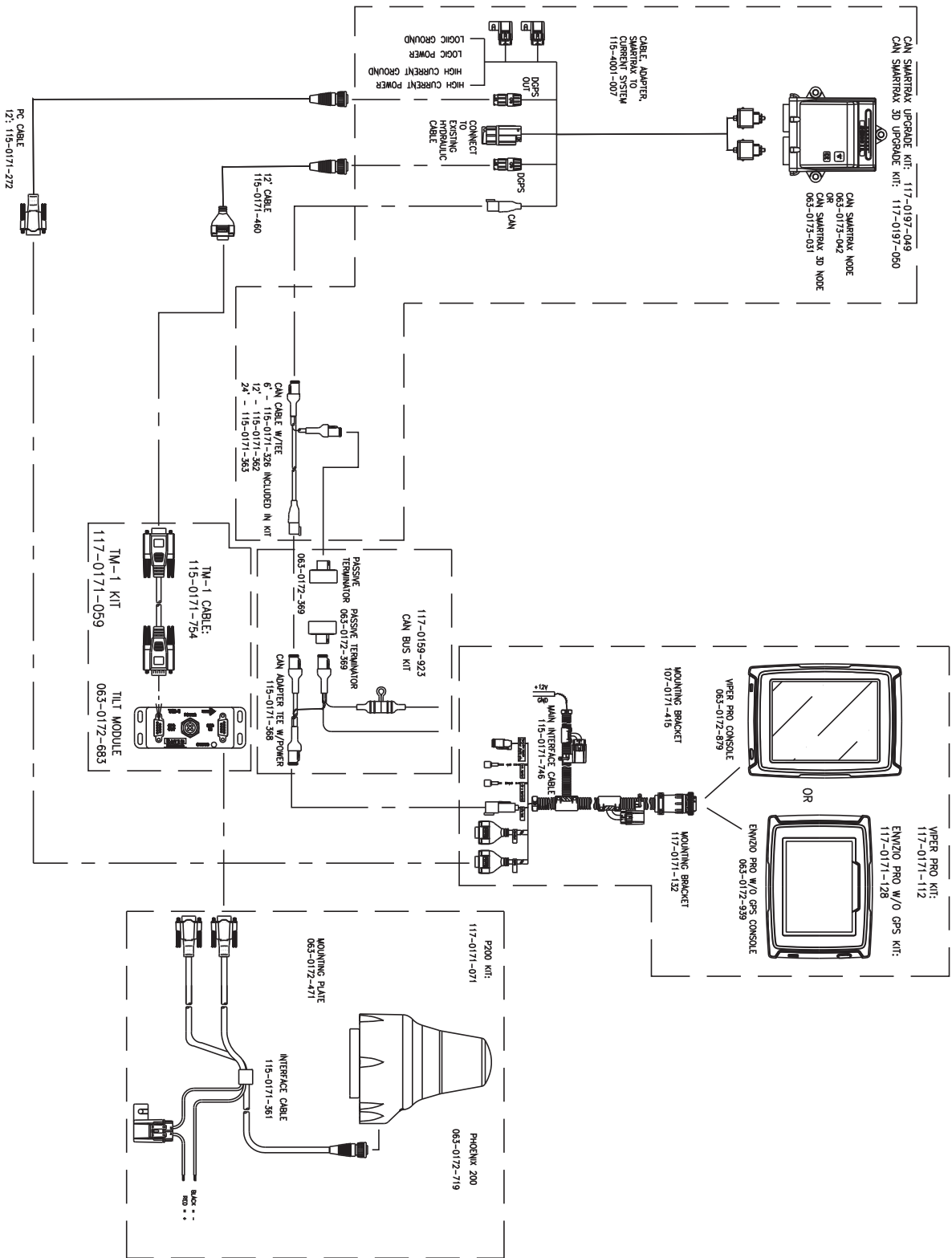
<http://www.ravenprecision.com/Support/ApplicationDrawings/index2.jsp>

Can Node Wiring Diagram

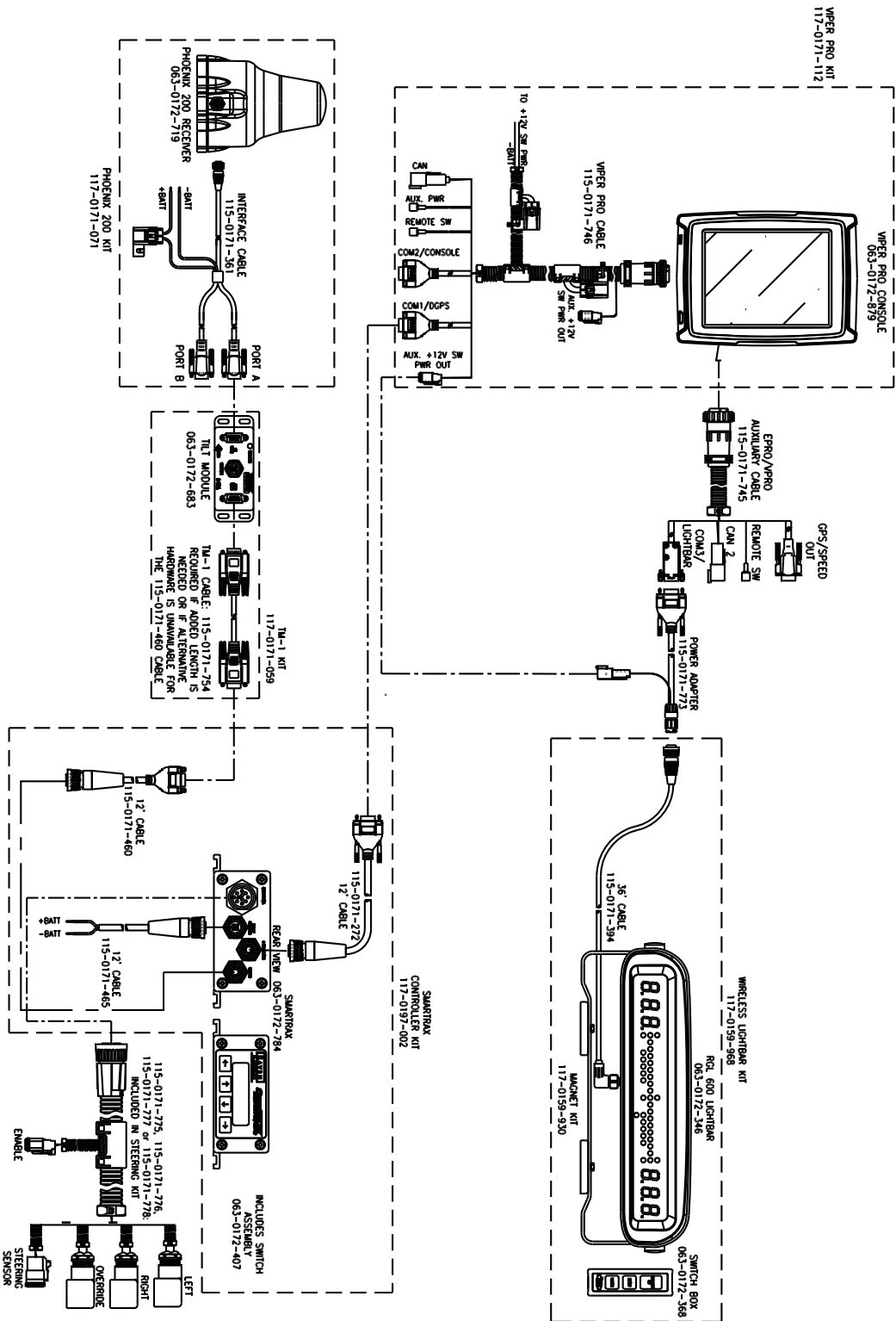
CAN NODE WIRING



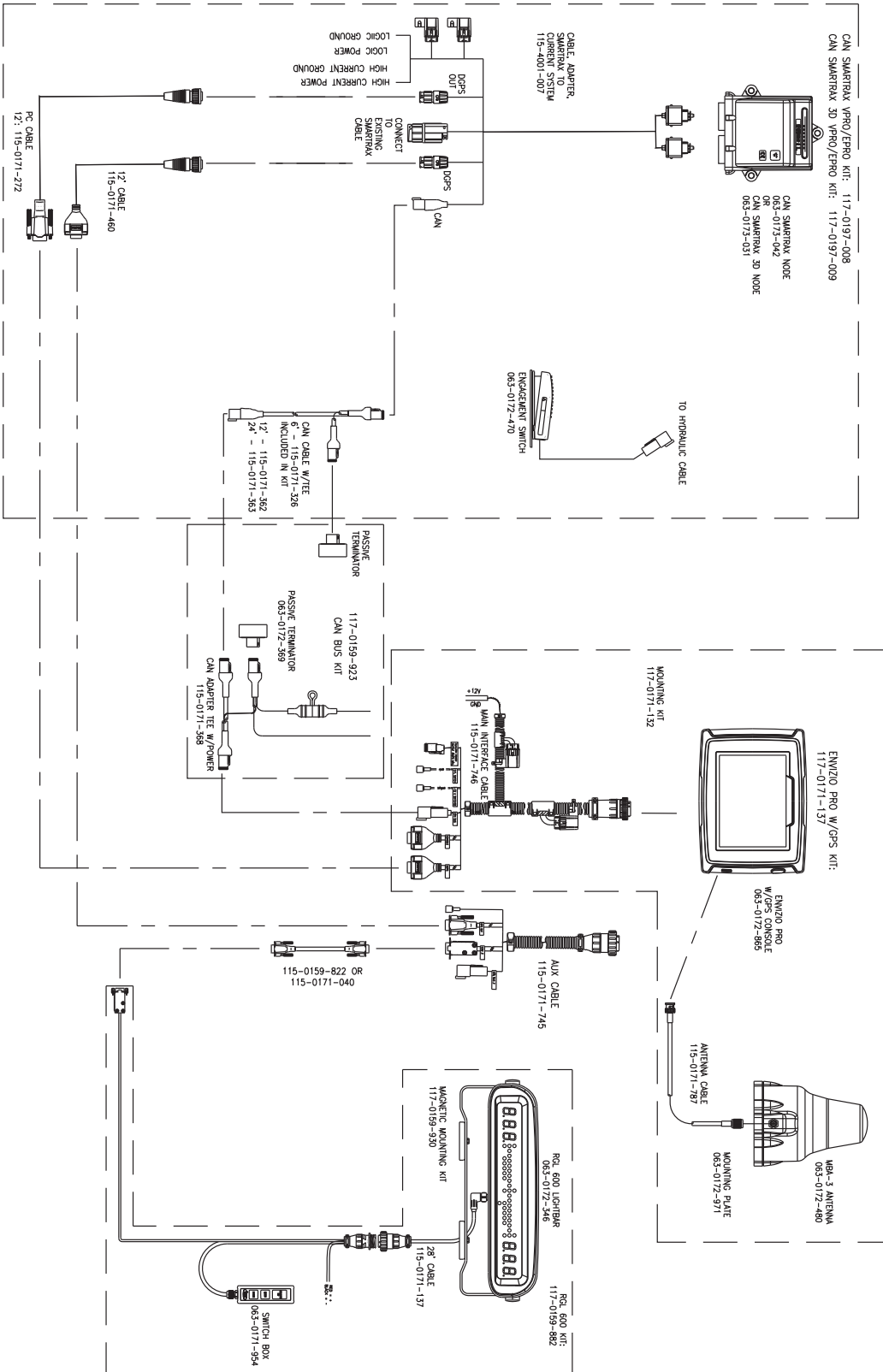
ENVIZIO PRO/VIPER PRO CAN SMARTRAX/SMARTRAX 3D UPGRADE W/PHOENIX 200, TM-1



VIPER PRO WITH GPS, SMARTRAX, TM-1 AND EXTERNAL LIGHTBAR

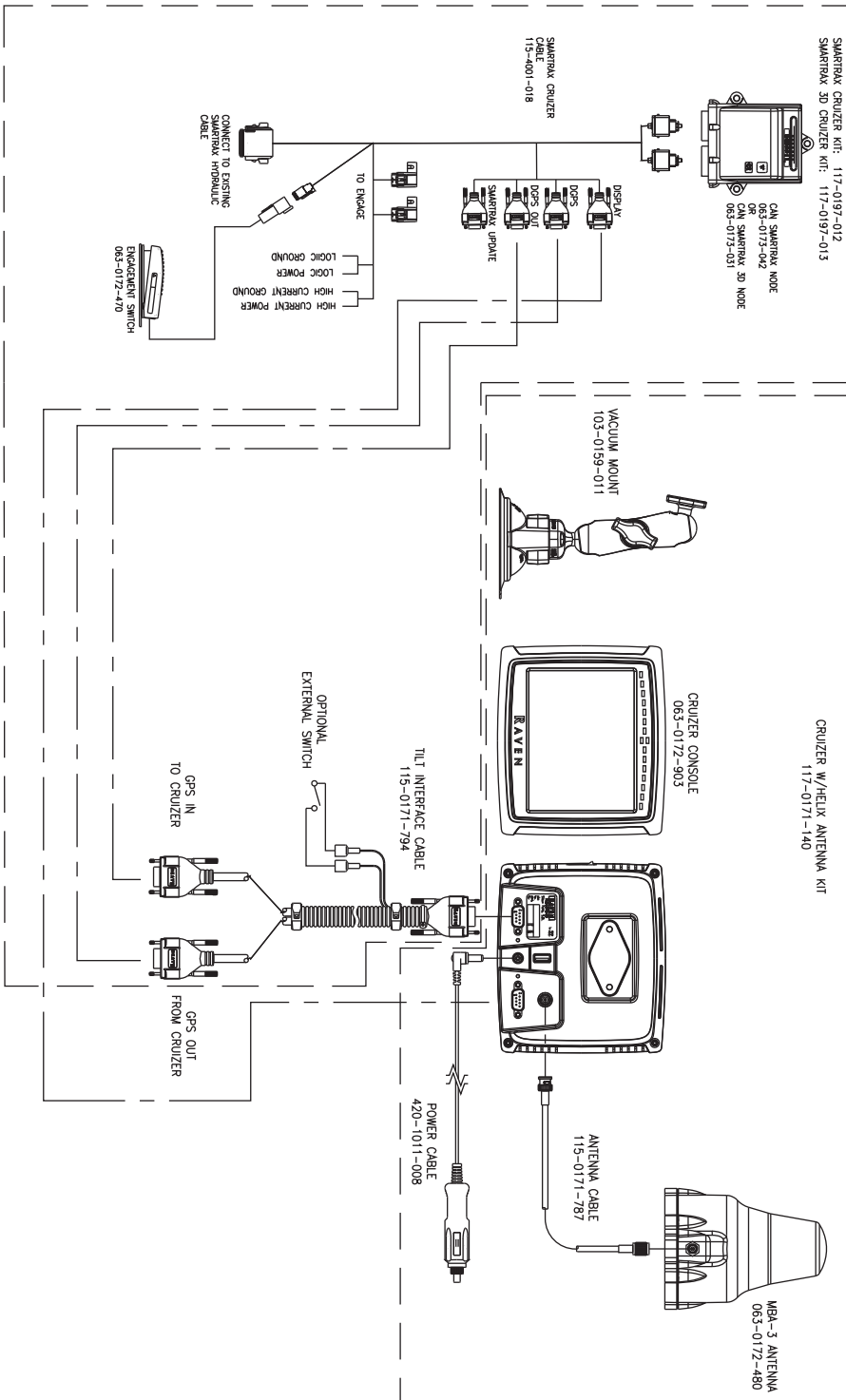


ENVIZIO PRO W/GPS/RGL 600 CAN SMARTRAX/SMARTRAX 3D



Cruizer

CRUIZER WITH HELIX ANTENNA, SMARTRAX/SMARTRAX 3D



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What Does this Warranty Cover?

This warranty covers all defects in workmanship or materials in your Raven Applied Technology Product under normal use, maintenance, and service.

How Long is the Coverage Period?

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What Will Raven Industries Do?

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Damages caused by normal wear and tear, misuse, abuse, neglect, accident, or improper installation and maintenance are not covered by this warranty.

R A V E N

Case IH STX
280, 330, 335, 380, 385, 430, 435, 480, 485, 530, 535
SmarTrax™ Installation Manual
(P/N 016-0190-073 Rev D 2/10 E 15720)

Simply improving your position.™



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