

RoGator RG900, RG1100,
and RG1300 Model Year
2012-2014 (Steer-Ready) -
RS1/HDU Installation
Manual

016-5033-058 Rev. A

2/2020

E34474



DISCLAIMER

While every effort has been made to ensure the accuracy of this document, Raven Industries assumes no responsibility for omissions and errors. Nor is any liability assumed for damages resulting from the use of information contained herein.

Raven Industries shall not be responsible or liable for incidental or consequential damages or a loss of anticipated benefits or profits, work stoppage or loss, or impairment of data arising out of the use, or inability to use, this system or any of its components. Raven Industries shall not be held responsible for any modifications or repairs made outside our facilities, nor damages resulting from inadequate maintenance of this system.

As with all wireless and satellite signals, several factors may affect the availability and accuracy of wireless and satellite navigation and correction services (e.g. GPS, GNSS, SBAS, etc.). Therefore, Raven Industries cannot guarantee the accuracy, integrity, continuity, or availability of these services and cannot guarantee the ability to use Raven systems, or products used as components of systems, which rely upon the reception of these signals or availability of these services. Raven Industries accepts no responsibility for the use of any of these signals or services for other than the stated purpose.

Chapter 1	Important Safety Information.....	1
Electrical		2
General		2
Instructions for Wire Routing		2
Chapter 2	Introduction.....	5
Preparing for Installation		5
Recommendations		5
Point of Reference		6
Updates		6
Kit Contents		7
Chapter 3	Wheel Angle Sensor Installation	9
Chapter 4	Cab Component Installation.....	11
Install the RS1/HDU Harness		11
Install the HDU Node		14
Install the RS1		15
Install the ISOBUS Connection		17
Install the Valve Harness		18
Identify the Resume Switch and Master Switch		19
Chapter 5	Startup Procedures	21
Verify the RS1/HDU System Installation		21
Calibrate the RS1/HDU System		22

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 RS1/HDU 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 RS1/HDU 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 RS1/HDU, observe the following safety measures:

- Be alert and aware of surroundings.
- Do not operate RS1/HDU 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 RS1/HDU is engaged.
- Disable RS1/HDU when exiting from the operator's seat and machine.
- Do not drive the machine with RS1/HDU enabled on any public road.
- Determine and remain a safe working distance from other individuals. The operator is responsible for disabling RS1/HDU when the safe working distance has diminished.
- Ensure RS1/HDU is disabled prior to starting any maintenance work on RS1/HDU or the machine.

WARNING

- When starting the machine for the first time after installing RS1/HDU, be sure that all persons stand clear in case a hose has not been properly tightened.

CAUTION

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

INTRODUCTION

2

Congratulations on your purchase of the RS1/HDU 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: AGCO RoGator
MODEL: RG900, RG1100, and RG1300
YEAR: 2012-2014

FIGURE 1. AGCO RoGator RG1100



PREPARING FOR INSTALLATION

IMPORTANT: Ensure C1000 software version is 3.1.2.150512 or greater prior to installation. Contact your equipment dealer for more information.

Before installing the RS1/HDU system, park the machine where the ground is level, clean, and dry. Turn off the machine and leave it turned off for the duration of the installation process.

During the installation process, follow good safety practices. Be sure to carefully read the instructions in this manual as you complete the installation process.

RECOMMENDATIONS

Raven Industries recommends the following best practices when installing or operating the RS1/HDU system for the first time, at the start of the season, or when moving the RS1/HDU system to another machine:

- Install the GPS antenna in the recommended location. Refer to the following table for the machine-specific antenna mounting location.
- Ensure the machine's hydraulic filters have been recently changed and there are no issues with the machine's hydraulic system (e.g., pump issues, faulty hydraulic motors, fine metal deposits in the hydraulic hoses, etc.).
- Ensure the machine's hydraulic system is using fresh oil and debris is flushed from the hydraulic hoses, valves, and filters.

Raven Industries recommends the following best practices when installing the RS1/HDU system:

- Use part numbers to identify the parts.
- Do not remove the plastic wrap from a part until it is necessary for installation.
- Do not remove plastic caps from a part until it is necessary for installation.

POINT OF REFERENCE

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

UPDATES

Software and manual updates are available on the Raven Applied Technology website:

<http://www.ravenhelp.com>

At Raven Industries, we strive to make your experience with our products as rewarding as possible. One way to improve this experience is to provide us with feedback on this manual.

Your feedback will help shape the future of our product documentation and the overall service we provide. We appreciate the opportunity to see ourselves as our customers see us and are eager to gather ideas on how we have been helping or how we can do better.

To serve you best, please send an email with the following information to

techwriting@ravenind.com

-RoGator RG900, RG1100, and RG1300 Model Year 2012-2014 (Steer-Ready) - RS1/HDU Installation Manual

-016-5033-058 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 RS1/HDU kit. Before beginning the RS1/HDU installation, compare the items in the kit with the components on this list. If you have questions about the kit, contact your Raven dealer.

FIGURE 2. RS1 Installation Kit for Rogator A (P/N 117-5033-058 Rev. A)

QTY	PART #	DESCRIPTION
1	053-0159-079	BOX, SHIPPING (LABELED BOX 1 OF 2)
1	016-0171-649	SHEET, WARRANTY/HELP (016-5033-058)
1	063-0173-887	ECU, HYDRAULIC DRIVE UNIT
1	107-0172-606	BRACKET, SC1/HDU, ROGATOR A
1	115-4010-161	CABLE, RS1/HDU, ROGATOR A
1	115-4010-146	CABLE, VALVE, SC1/HDU, ROGATOR A
1	053-0159-074	ENVELOPE, PLASTIC
4	313-2300-182	WASHER, FLAT, M6
2	312-1001-168	NUT, FLANGED, LOCK, 1/4-20 UNC
1	117-0192-054	KIT, WAS, ROTARY ROGATOR A RG900, 1100, 1300
1	117-5001-055	(LABELED BOX 2 OF 2) KIT, ROOF, RS1, AGCO APPLICATORS



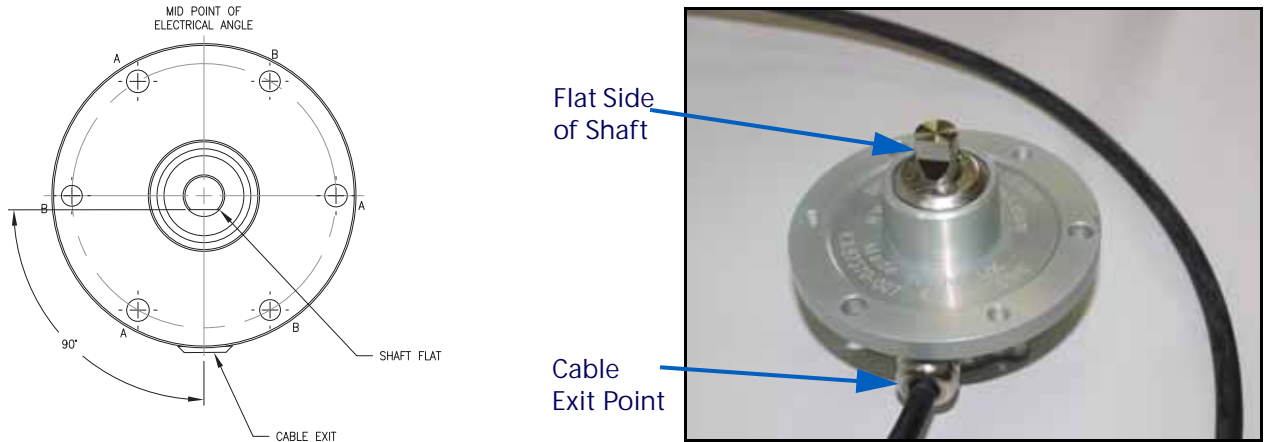
CHAPTER

3

WHEEL ANGLE SENSOR INSTALLATION

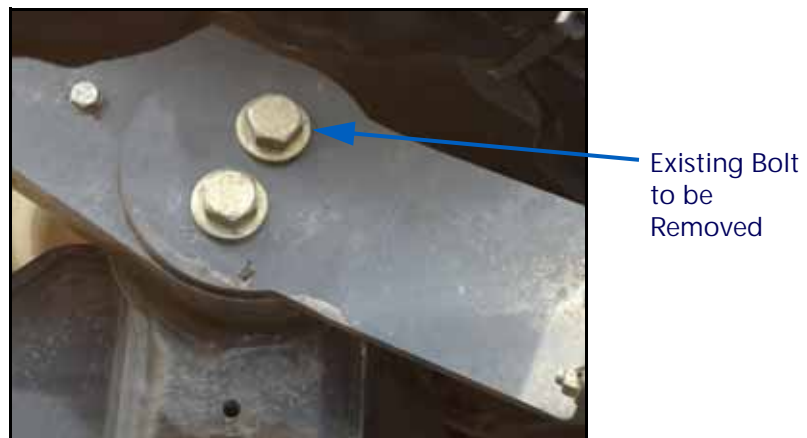
1. Park the machine on a level surface, with the wheels pointing straight ahead.

FIGURE 1. Rotary Sensor Assembly Alignment



2. Align the flat side of the shaft on the rotary sensor assembly (P/N 063-0181-024) so that it is parallel with the cable exit point as shown in the figure above.

FIGURE 2. WAS Installation Location



3. Remove the top bolt in the machine's kingpin on the right side of the axle as shown in Figure 2.

FIGURE 3. Rotary Sensor Installed



4. Install the rotary sensor assembly on the WAS mounting bracket (P/N 107-0172-228) using the supplied hardware.
5. Using care to not move the sensor shaft, slide the WAS arm bracket (P/N 116-0159-671) onto the rotary sensor shaft.
6. Insert the supplied set screw through the hole in the arm bracket, tightening it against the flat spot on the sensor shaft.
7. Secure the WAS assembly to the machine's kingpin using the machine's bolt that was removed in step 3.
8. Install the 1/2"-13 hex nut (P/N 312-1001-166) on the 1/2"-13 x 7" hex bolt (P/N 311-0058-113).
9. Insert the head of the bolt into the slot on the WAS arm bracket and position the end of the bolt over the hole in the axle.
10. Screw the bolt into the hole in the axle until the head of the bolt rests on the WAS arm bracket.
11. Tighten the nut on the end of the bolt until it is snug against the axle.

CHAPTER

4

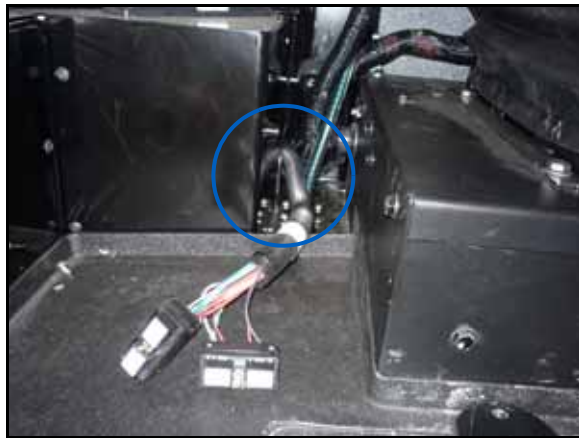
CAB COMPONENT INSTALLATION

INSTALL THE RS1/HDU HARNESS

1. Remove the access panel cover on the outside right-rear corner of the cab.

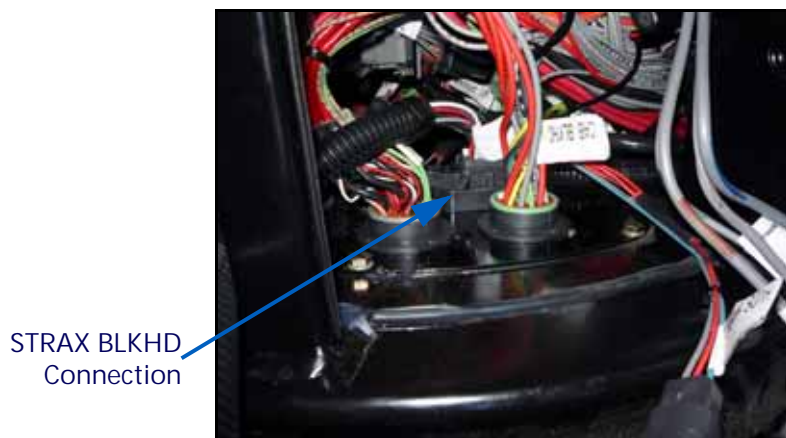
NOTE: If SmarTrax is installed on the machine, remove the SmarTrax harness.

FIGURE 1. SmarTrax Node Harness to be Removed and Machine Access Panel



2. Route the two 12-pin Deutsch connectors labeled "HDU" on the RS1/HDU cable (P/N 115-4010-161) into the machines cab, through the access hole.
3. Remove the bulkhead plug from the cab floor in the right-rear corner of the cab.

FIGURE 2. STRAX BLKHD Connection



4. Install the Valve Bulkhead connector in the hole.

FIGURE 3. CAB HARNESS Connection



5. Connect the CAB HARNESS connector into the machine's mating bulkhead connector.

FIGURE 4. Ring Terminals Connected



6. Install the ring terminal connections on the appropriate power terminal studs.
7. Install the ROAD SW Tee connector on the HDU Harness in between the machines hydraulic lockout connection.

FIGURE 5. ROAD SW Tee Installed



INSTALL THE HDU NODE

HDU INSTALLATION

1. Install the HDU (P/N 063-0173-887) on the HDU mounting plate using the provided 1/4" - 20 nuts .

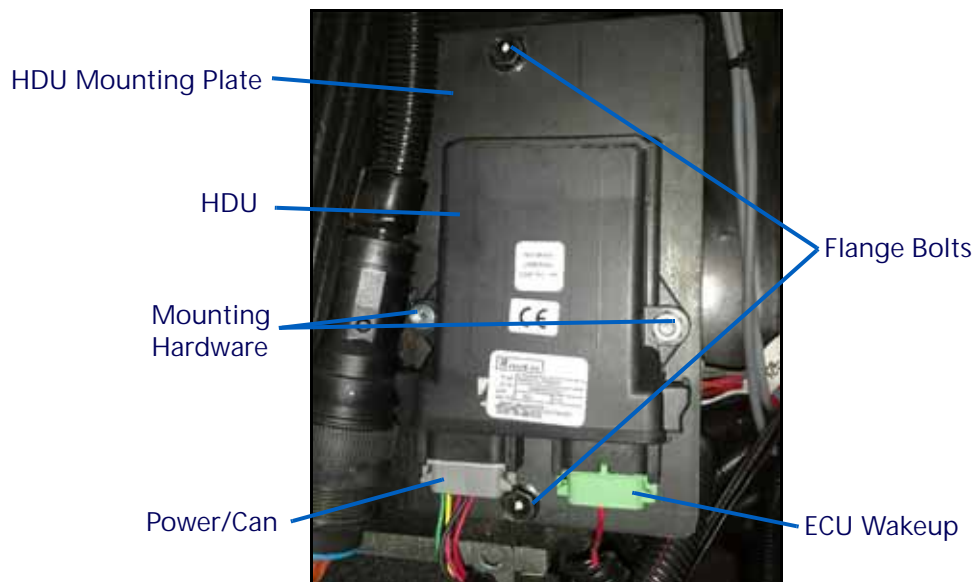
FIGURE 6. Node Mounting



NOTE: Note the connectors should face the short side of the HDU mounting plate.

2. Locate the HDU mounting location on the right side of the seat base.
3. Remove the two flange bolts on the right side of the seat base.
4. Install the HDU mounting bracket utilizing the bolts removed in the previous step.

FIGURE 7. HDU Mounting

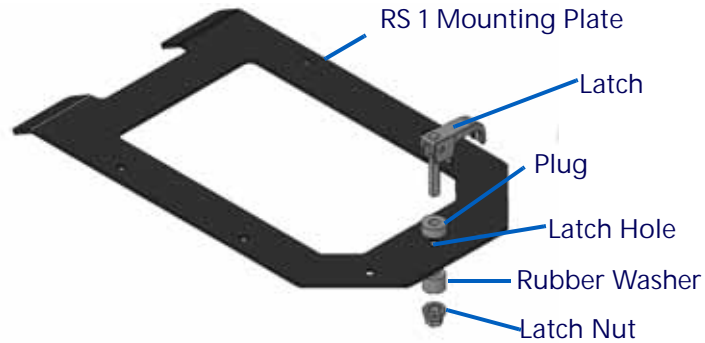


5. Plug the connectors labeled "HDU" on the RS1/HDU harness into the appropriate connectors on the HDU.
6. Route the connector labeled "RS1" up to the rear of the cab roof.

INSTALL THE RS1

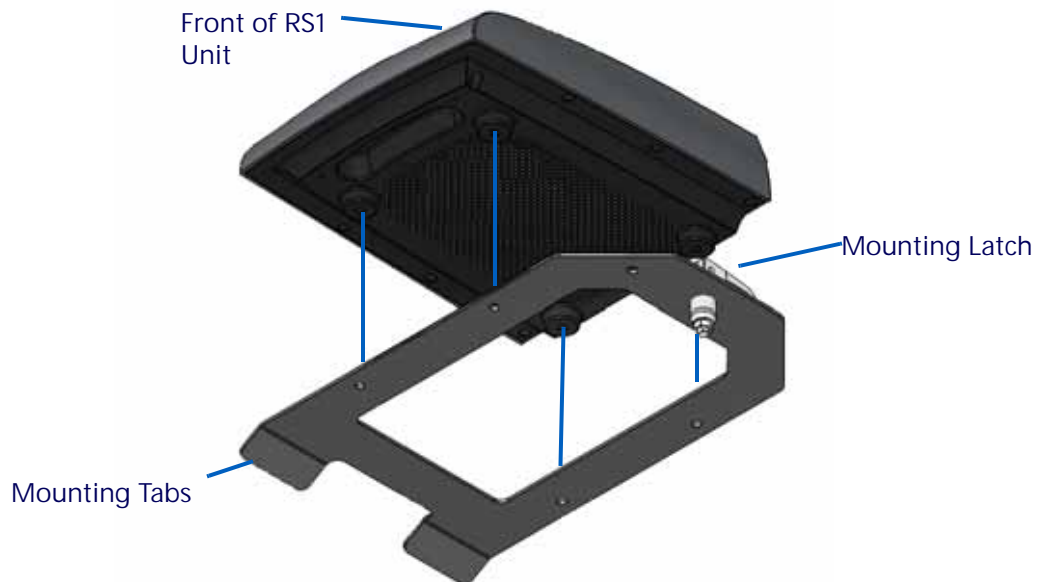
1. Assemble the latch, plug, rubber washer, and latch nut through the latch hole on RS1 mounting plate.

FIGURE 8. Latch Assembly



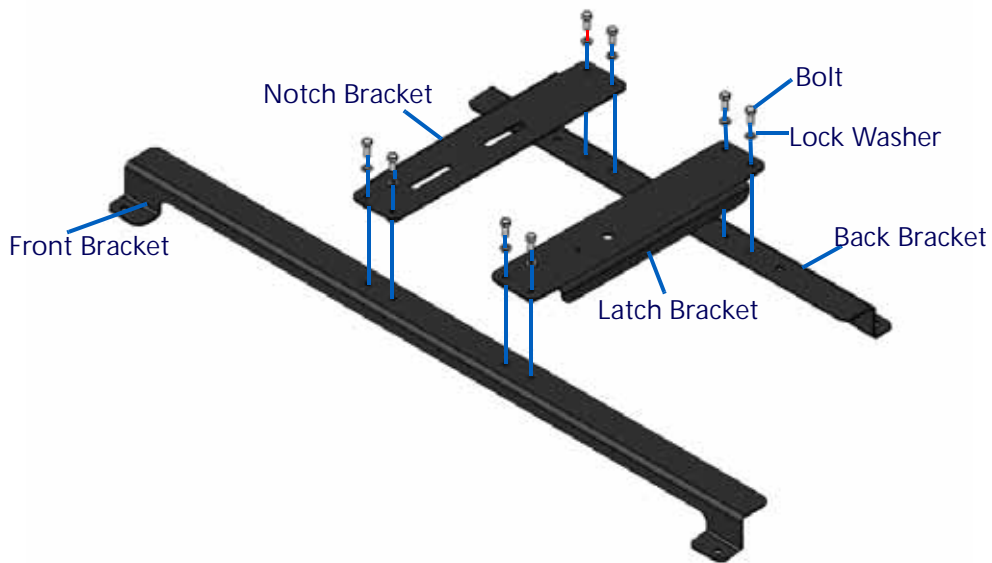
2. Mount the RS1 base plate to the RS1 unit using the four bolts provided. It should be mounted so the mounting tabs are to the right and the latch is to the left.

FIGURE 9. Mounting RS1 Unit to Mounting Bracket



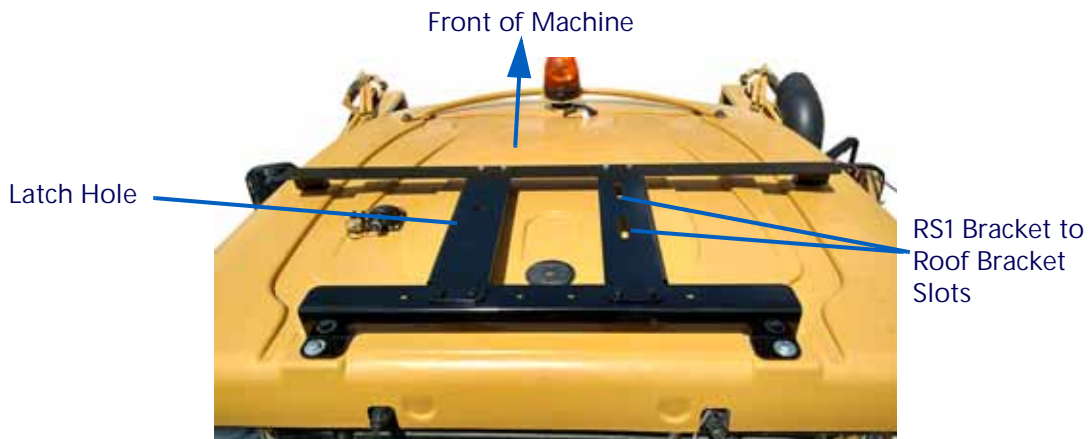
3. Assemble the four pieces of the RS1 roof bracket (as shown in Figure 10 on page 16). Use the eight provided 3/8" x 1" bolts and lock washers to secure the assembly together.

FIGURE 10. RS1 Roof Bracket Assembly



4. Place the RS1 unit roof bracket on the cab with it oriented as shown in Figure 11 on page 16. The holes on the corners of the roof bracket will line up with existing cab top mounting holes.

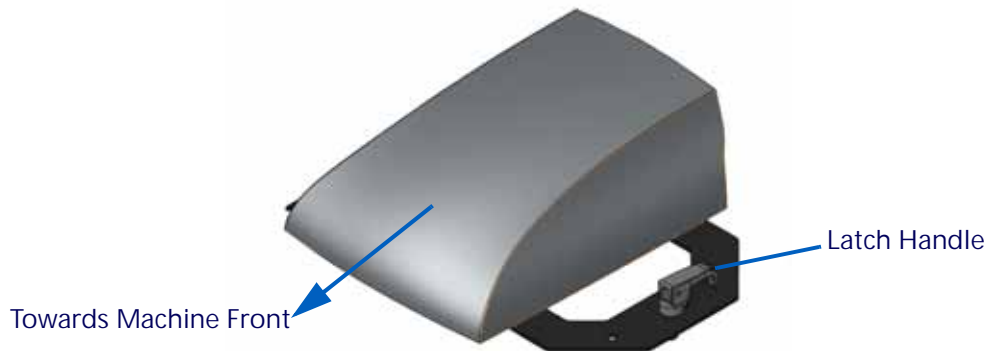
FIGURE 11. RS1 Roof Bracket Orientation



5. Secure the roof bracket utilizing the cab's mounting hardware.
6. Insert the two tabs on the RS1 mounting bracket into the roof bracket slot.
7. Insert the latch into the hole on the roof bracket and secure in place by pressing down on the handle.

NOTE: The latch may need to be adjusted to provide proper compression. To do this, tighten the nut on the bottom of the latch.

FIGURE 12. RS1 Unit Orientation



8. Connect the 12-pin Deutsch connector on the 115-4010-161 cable to the mating receptacle on the RS1 unit.

FIGURE 13. Cabling Connection on RS1 Unit



9. If applicable, connect the cellular antenna to the back of the RS1 unit and secure the antenna to the roof bracket using the magnet attached to the antenna.

INSTALL THE ISOBUS CONNECTION

1. Locate the CAN terminator farthest away from the Viper 4 connection on the HDU Harness.
2. Remove the CAN terminator from the HDU Harness.
3. Locate the machines ISO terminator cable behind the access panel located in the right side of the cab.

FIGURE 14. ISO Terminator



4. Plug the 3-pin ISO connector on the HDU Harness into the mating 3-pin connector on the machine where the ISOBUS CAN terminator was located.
5. Install the Viper 4 according to the directions provided with the field computer.
6. Route the Viper 4 ISO CAN connection on the HDU harness to the Viper 4.
7. Connect the ISOBUS connector to the appropriate port on the back of the field computer.

FIGURE 15. Connection on Back of Viper 4



INSTALL THE VALVE HARNESS

NOTE: If SmarTrax is installed on the machine, then the SmarTrax valve cable will need to be removed.

1. Connect the TRANSDUCER connector on the valve harness (P/N 115-4010-146) to the pressure transducer (P/N 422-0000-086) installed in Port PS of the steering valve.
2. Connect the DB 1, PORT 1A connector to Port 1A of the steering valve.
3. Connect the DB 2, PORT 1B connector to Port 1B of the steering valve.

4. Connect the RIGHT, PORT 2-TOP connector to the top coil of the stack on the steering valve.
5. Connect the LEFT, PORT 2-BOTTOM connector to the bottom coil of the stack on the steering valve.
6. Connect the black 12-pin Deutsch connector on the valve harness to the mating Valve Bulkhead connector of the HDU harness (P/N 115-4010-161) installed at the machine's bulkhead earlier in the procedure.
7. Route and connect the WAS connector to the cable of the installed WAS (P/N 063-0181-024).
8. Using plastic cable ties, secure any excess cable away from moving parts and heat sources.

IDENTIFY THE RESUME SWITCH AND MASTER SWITCH

FIGURE 16. Master Switch and Foot Pedal

Master Switch

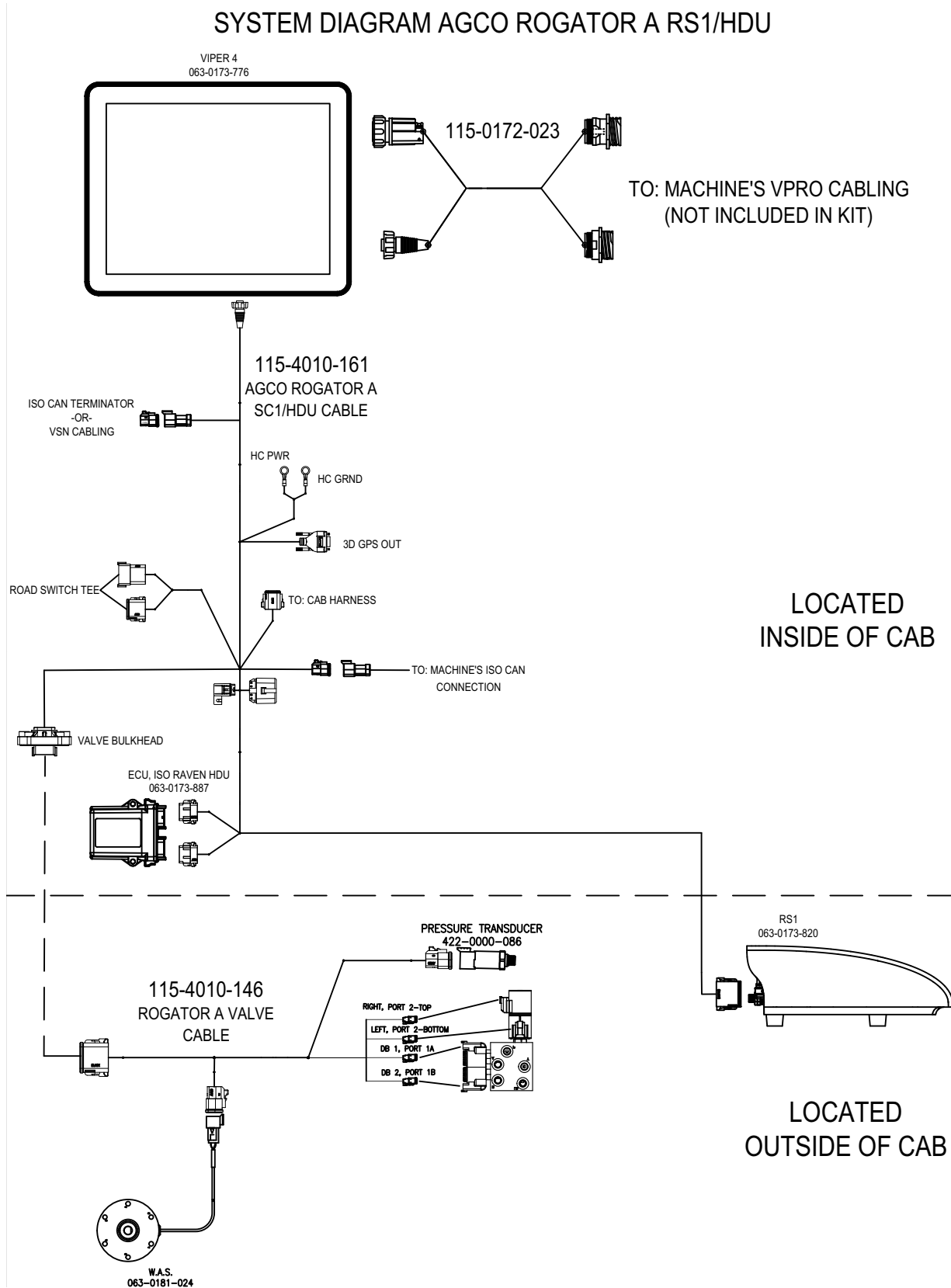



Foot Pedal



NOTE: The MASTER SWITCH is used to disable Auto Steer while the machine is not working in a field.
The FOOT PEDAL will be used to engage the steering system.


FIGURE 17. System Diagram





⚠ WARNING

When starting the machine for the first time after installing RS1/HDU, be sure that all persons stand clear in case a hose has not been properly tightened.



⚠ WARNING

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

VERIFY THE RS1/HDU SYSTEM INSTALLATION

1. Turn on the machine.
2. Double-check all fittings and hose connections to ensure that:
 - Hoses are not rubbing on or interfering with moving parts.
 - Hydraulic fluid is not leaking from the system.
3. Turn the machine's wheels fully from side to side repeatedly to remove air from the hydraulic system.

NOTE: During the RS1/HDU system installation, whenever the hydraulic system is purged for maintenance, or when fittings are loosened or disconnected, air is introduced into the lines of the hydraulic system. If air pockets are present, the wheels may not move consistently when the steering wheel is turned.

4. Continue turning the wheels until they move steadily and smoothly when the steering wheel is turned.

NOTE: If there are issues with the RS1/HDU system, turn off the machine and correct them immediately. For additional assistance, refer to the RS1/HDU Operation Manual (P/N 016-4010-001) or contact your local Raven dealer.

CALIBRATE THE RS1/HDU SYSTEM

Refer to the RS1/HDU Calibration & Operation Manual (P/N 016-4010-001) for instructions on calibrating the RS1/HDU system, adjusting system settings, and system operation.

C

- Cab Component Installation 11
 - Installing the HDU Node 11
 - Installing the SmarTrax Node 14
 - Installing the Valve Harness 18

E

- Electrical Safety 2

I

- Important Safety Information
 - Electrical Safety 2
 - General 2
 - Instructions for Wire Routing 2
- Introduction 5
 - Kit Contents 7
 - Preparing for Installation 5
 - Point of Reference 6
 - Recommendations 5
 - Updates 6

K

- Kit Contents 7

S

- Startup Procedures
 - Calibrating the RS1/HDU System 22
 - Verifying the RS1/HDU System Installation 21

W

- Wheel Angle Sensor Installation 9

LIMITED WARRANTY

WHAT DOES THIS WARRANTY COVER?

This warranty covers all defects in workmanship or materials in your Raven Applied Technology Division product under normal use, maintenance, and service when used for intended purpose.

HOW LONG IS THE COVERAGE PERIOD?

Raven Applied Technology products are covered by this warranty for 12 months from the date of retail sale. In no case will the Limited Warranty period exceed 24 months from the date the product was issued by Raven Industries Applied Technology Division. This warranty coverage applies only to the original owner and is non-transferable.

HOW CAN I GET SERVICE?

Bring the defective part and proof of purchase to your Raven dealer. If the dealer approves the warranty claim, the dealer will process the claim and send it to Raven Industries for final approval. The freight cost to Raven Industries will be the customer's responsibility. The Return Materials Authorization (RMA) number must appear on the box and all documentation (including proof of purchase) must be included inside the box to be sent to Raven Industries.

WHAT WILL RAVEN INDUSTRIES DO?

Upon confirmation of the warranty claim, Raven Industries will (at our discretion) repair or replace the defective product and pay for the standard return freight, regardless of the inbound shipping method. Expedited freight is available at the customer's expense.

WHAT IS NOT COVERED BY THIS WARRANTY?

Raven Industries will not assume any expense or liability for repairs made outside our facilities without written consent. Raven Industries is not responsible for damage to any associated equipment or products and will not be liable for loss of profit, labor, or other damages. The obligation of this warranty is in lieu of all other warranties, expressed or implied, and no person or organization is authorized to assume any liability for Raven Industries.

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

EXTENDED WARRANTY

WHAT DOES THIS WARRANTY COVER?

This warranty covers all defects in workmanship or materials in your Raven Applied Technology Division product under normal use, maintenance, and service when used for intended purpose.

DO I NEED TO REGISTER MY PRODUCT TO QUALIFY FOR THE EXTENDED WARRANTY?

Yes. Products/systems must be registered within 30 days of retail sale to receive coverage under the Extended Warranty. If the component does not have a serial tag, the kit it came in must be registered instead.

WHERE CAN I REGISTER MY PRODUCT FOR THE EXTENDED WARRANTY?

To register, go online to www.ravenhelp.com and select Product Registration.

HOW LONG IS THE EXTENDED WARRANTY COVERAGE PERIOD?

Raven Applied Technology products that have been registered online are covered for an additional 12 months beyond the Limited Warranty for a total coverage period of 24 months from the date of retail sale. In no case will the Extended Warranty period exceed 36 months from the date the product was issued by Raven Industries Applied Technology division. This Extended Warranty coverage applies only to the original owner and is non-transferable.

HOW CAN I GET SERVICE?

Bring the defective part and proof of purchase to your Raven dealer. If the dealer approves the warranty claim, the dealer will process the claim and send it to Raven Industries for final approval. The freight cost to Raven Industries will be the customer's responsibility. The Return Materials Authorization (RMA) number must appear on the box and all documentation (including proof of purchase) must be included inside the box to be sent to Raven Industries. In addition, the words "Extended Warranty" must appear on the box and all documentation if the failure is between 12 and 24 months from the retail sale.

WHAT WILL RAVEN INDUSTRIES DO?

Upon confirmation of the product's registration for the Extended Warranty and the claim itself, Raven Industries will (at our discretion) repair or replace the defective product and pay for the standard return freight, regardless of the inbound shipping method. Expedited freight is available at the customer's expense.

WHAT IS NOT COVERED BY THE EXTENDED WARRANTY?

Raven Industries will not assume any expense or liability for repairs made outside our facilities without written consent. Raven Industries is not responsible for damage to any associated equipment or products and will not be liable for loss of profit, labor, or other damages. Cables, hoses, software enhancements, and remanufactured items are not covered by this Extended Warranty. The obligation of this warranty is in lieu of all other warranties, expressed or implied, and no person or organization is authorized to assume any liability for Raven Industries.

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