

**Raven RS1™ HDU  
Installation Manual for  
Case IH Patriot 2250  
(Steer Ready, MY 2017-  
2019)**

*016-5032-110 Rev. A*

*8/2019*

*E33389*



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# CHAPTER

# 1

# IMPORTANT SAFETY INFORMATION

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## NOTICE

Read this manual and the operation and safety instructions included with your implement and/or controller carefully before installing the SC1™ HD 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 SC1 HD 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 SC1 HD, observe the following safety measures:

- Be alert and aware of surroundings.
- Do not operate SC1 HD 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 SC1 HD is engaged.
- Disable SC1 HD when exiting from the operator's seat and machine.
- Do not drive the machine with SC1 HD enabled on any public road.
- Determine and remain a safe working distance from other individuals. The operator is responsible for disabling SC1 HD when the safe working distance has diminished.
- Ensure SC1 HD is disabled prior to starting any maintenance work on SC1 HD or the machine.

## WARNING

- When starting the machine for the first time after installing SC1 HD, 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

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### 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.

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### 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 SC1 HD 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.



Congratulations on your purchase of the SC1™ HDU system!

The following instructions are designed to assist with the proper installation of the SC1 HDU system. Refer to the SC1 Calibration & Operation Manual (P/N 016-4010-005) for assistance with calibrating the software and using the SC1 HDU system.

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### PREPARING FOR INSTALLATION

Before installing the SC1 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 SC1 HDU system for the first time, at the start of the season, or when moving the SC1 HDU system to another machine:

- Install the SC1 unit in the recommended location.
- 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.ravenprecision.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](mailto:techwriting@ravenind.com)

- Raven RS1™ HDU Installation Manual for Case IH Patriot 2250 (Steer Ready, MY 2017-2019)
- 016-5032-110 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 SC1 HD kit. Before beginning the system 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 1. RS1/HDU Kit for Case IH Patriot 2250 (MY 2017-18, Steer-Ready)

THIS KIT TO CONTAIN THE FOLLOWING ITEMS LISTED BELOW:

ITEM #	QTY	PART #	DESCRIPTION
1	1	053-0159-079	BOX, SHIPPING (LABELED 1 OF 2)
2	1	016-0171-649	SHEET, WARRANTY/HELP (016-5032-110)
3	1	063-0173-887	ECU, HYDRAULIC DRIVE UNIT (HDU)
4	1	107-0172-498	BRACKET, MOUNTING, RS1 CNH
5	1	107-0172-586	BRACKET, NODE MOUNTING, HDU PATRIOT 2250
6	1	115-4010-110	CABLE, HDU, PATRIOT 2250 SR MY2017
7	1	115-4010-032	CABLE, WAS ADAPTER, 4P DTM TO M12
8	1	115-4010-120	CABLE, RS1, PATRIOT 2250 ROOF
9	1	408-4002-734	TERMINATOR, 3 PIN, DT SERIES, J1939 PLUG
10	1	053-0159-074	ENVELOPE, PLASTIC
11	4	311-0003-041	SCREW, MACHINE, 1/4"-20 X 1/2" FLAT HEAD
12	4	312-4000-216	NUT, FLANGED, NYLON LOCK, M6
13	4	312-1001-168	NUT, FLANGED LOCK, 1/4"-20
14	4	313-1000-046	WASHER, LOCK, M6
15	2	311-0050-106	BOLT, HEX HEAD, 1/4"-20 UNC-2A, 1-1/4" LONG, ZINC PLATED

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# CHAPTER

# 3

# WHEEL ANGLE SENSOR (WAS) INSTALLATION

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**NOTE:** A factory steering cylinder with an internal WAS must be installed for the SC1 kit to function.  
If a new steering cylinder is necessary, contact your local Case IH dealer and order P/N 51417100.



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## CHAPTER

# 4

## CAB COMPONENT INSTALLATION

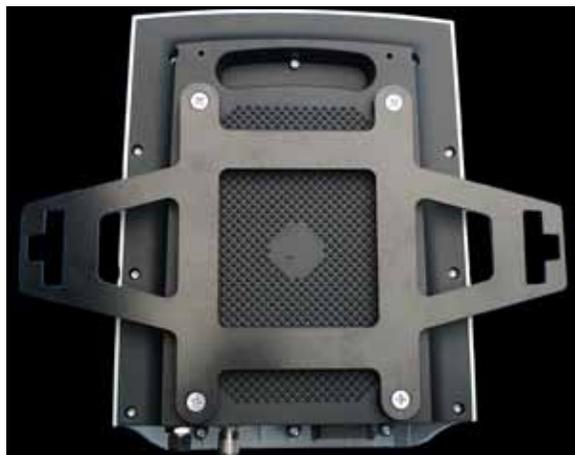
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### INSTALL THE RS1

FIGURE 1. RS1 Mounting Location

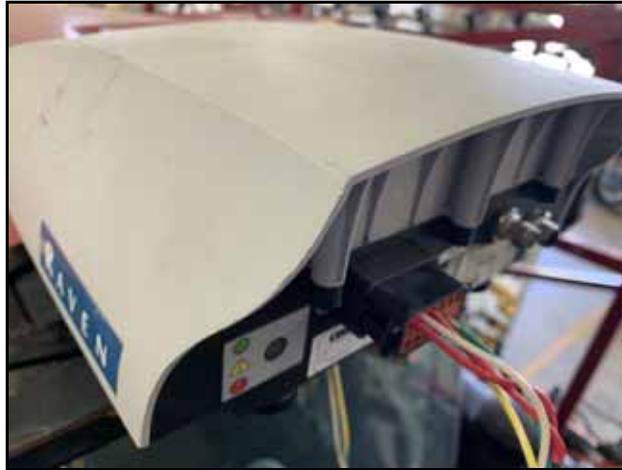


FIGURE 2. Mounting Bracket Installed



1. Install the RS1 mounting bracket (P/N 107-0172-498) on the bottom of the RS1 unit using four 1/4"-20 x 1/2" flat head machine screws (P/N 311-0003-041).
2. Connect the mating connector on the Steer-Ready Roof Cable (P/N 115-4010-120) to the existing roof harness.
3. Connect the remaining rectangular connector to the RS1.

FIGURE 3. GPS Receiver Adapter Cable Installed



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## INSTALL THE HYDRAULIC DRIVE UNIT (HDU)

### INSTALL THE HDU HARNESS

FIGURE 4. Access Panel to be Removed



1. Locate and remove the wall panel behind the operator seat.

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**FIGURE 5. Existing Machine XB-7 Bulkhead Connection**


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2. Locate the machine's existing XB-7 bulkhead connection in the bottom, right of the cab.
3. From outside the cab, remove the nut and disconnect the machine's 31-pin plug from the XB-7 bulkhead connector.
4. From inside the cab, remove the XB-7 bulkhead connector from the hole in the cab wall.
5. Install the male 31-pin connector of the HDU harness (P/N 115-4010-110) in the hole in the cab wall and secure it using the nut that was removed in step 3.
6. From outside the cab, connect the machine 31-pin connector on the installed HDU harness connector.
7. Connect the existing machine XB-7 bulkhead connector to the 31-pin connector of the HDU harness.
8. Inside the cab, connect the 40-pin connector of the HDU harness to the machine's NAV CONNECTOR 1 connection.

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**FIGURE 6. Existing Machine XB-7 Bulkhead Connection**


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9. Locate the existing CAN terminator under the right arm rest.

FIGURE 7. Existing CAN Terminator

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10. Remove the terminator and install one of the "To Machine Terminator" connectors on the HDU cable to the mating connector on the existing machine cable.

FIGURE 8. HDU Cable Connected

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**NOTE:** If the machine is equipped with Raven CAN product control, skip to step 15 and install the provided CANbus Terminator on the other "To Machine Terminator" connector.

11. Locate the machine CAN Diagnostic port at the rear, left of the cab.

FIGURE 9. Diagnostic Port



12. Remove the top panel to access the connector.
13. Locate the second CAN terminator.

FIGURE 10. CAN Terminator inside Removed Cover



14. Remove the terminator and connect the other "To Machine Terminator" connection on the HDU cable to the mating cable connector.

FIGURE 11. HDU Cable Connected to Machine Harness

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FIGURE 12. HDU Harness Cable Installed on HDU

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15. Install the two rectangular connectors of the HDU harness into the mating ports of the HDU.

## MOUNT THE HDU

FIGURE 13. HDU Installed on HDU Mounting Bracket



1. Install the HDU on the HDU mounting bracket (P/N 107-0172-586) using four 1/4"-20 flanged lock nuts (P/N 312-1001-168).
2. Locate the ECU mounting position.

FIGURE 14. ECU Mounting Location



3. Install the HDU mounting bracket onto the studs in the rear of the cab using the provided M6 lock nuts.

FIGURE 15. HDU Mounting Bracket Installed



4. Reinstall the wall panel behind the operator seat.

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## ROUTINE OPERATION

FIGURE 16. Master and Resume Switch Locations

Master Switch



Resume Switch

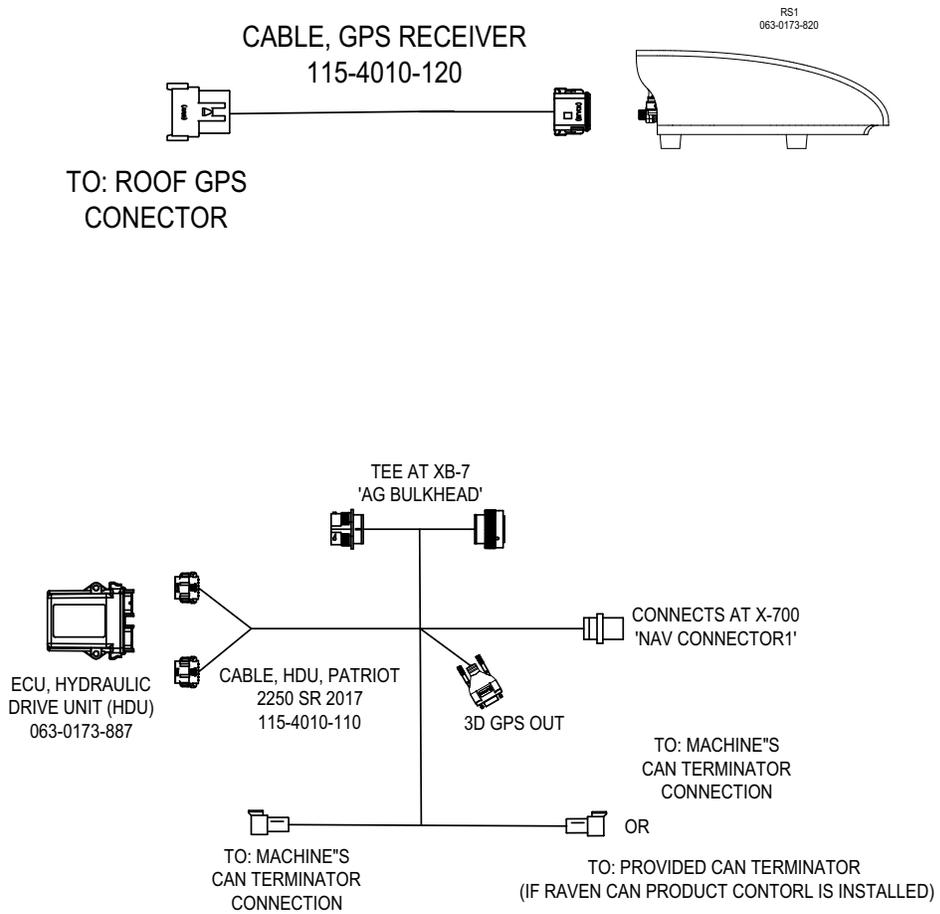


Locate and identify the machine's master switch on the control panel and the resume switch on the joystick as they are required for RS1 system operation.

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

SYSTEM DIAGRAM

FIGURE 17. RS1 HDU System Diagram for Case IH Patriot 2250 (Steer-Ready, MY2017-2018)  
(P/N 054-5032-110 Rev D)





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## C

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# 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](http://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.**