Case IH Titan 4XXX - Steering Ready, Model Years 13 and Newer Raven SC1 HDU Guidance and Steering Installation Manual

P/N 016-5032-164 Rev. A   12/18   E32415

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IMPORTANT SAFETY INFORMATION

NOTICE

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

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

⚠ WARNING

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

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 SC1 HDU 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

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.

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.

KIT CONTENTS

This section contains a list of the components that are included in the SC1 HDU 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.

TABLE 1. **Kit, SC1/HDU, CIH Titan 4XXX MY 13 and Newer Steer Ready (P/N 117-5032-164)**

Item Description	Part Number	Qty.
Sheet - Help/Warranty (016-5032-164)	016-0171-649	1
Unit - Hydraulic Drive	063-0173-887	1
ECU, SC1, Standard	0630-0173-990	1
Cable, SC1, CNH Titan 4XXX	115-1040-109	1
Bracket, Node Mounting, HDU Generic	107-0172-543	1
Cable, WAS Adapter, 4-Pin DTM to M12	115-4010-032	1
Cable, IDO Bus Extension, 3-Pin Deutsch to 13'	115-4010-099	1
Cable, GPS, Trimble 372 to SC1	115-4010-105	1
Bracket, HDU/Boom Sense, Generic	107-0172-578	1
Bolt, M6 X 25 X 1.0, Hex Head	311-0070-059	2
Washer, Lock, M6	313-1000-046	6

TABLE 1. **Kit, SC1/HDU, CIH Titan 4XXX MY 13 and Newer Steer Ready (P/N 117-5032-164)**

Item Description	Part Number	Qty.
Nut, Flanged Lock, 1/4" - 20	312-1001-168	4
Nut, Hex M6 1 MM Pitch DIN 934, Clear Plated Zinc	312-1001-183	4

TABLE 2. **Case IH Titan 4XXX WAS Installation Kit (P/N 117-0192-051)**

Item Description	Part Number	Qty.
Bracket - WAS Offset Clamp	107-0172-641	1
Sensor - Linear Non-Contact, 300 MM	416-0001-052	1
Mount - Universial, M10 Stud	103-0001-030	1
Clamp - U-Bolt, 2.5"	435-3003-062	1
Mount - Linear Sensor, M10 Ball	103-0001-029	1
Nut - Jam, M10 x 1.5 Pitch x 5 mm Thick	312-1002-035	2
Bolt - Flanged Hex, M10 - 1.5 x 35 mm	311-4050-181K	2
Nut - M10 x 1.5 Lock Nylon Insert	312-4000-208	2

UPDATES

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

portal.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

-Case IH Titan 4XXX - Steering Ready, Model Years 13 and Newer Raven SC1 HDU Guidance and Steering Installation Manual
-P/N 016-5032-164 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.

CHAPTER

3

WHEEL ANGLE SENSOR INSTALLATION

WAS INSTALLATION

ASSEMBLE THE WHEEL ANGLE SENSOR (WAS)

FIGURE 1. 4XXX WAS

Base-End of Sensor

Ball-End of Sensor

1. Install one M10 universal stud end (P/N 103-0001-030), on the base end of the Linear WAS (P/N 416-0001-052), and one M10 universal ball joint end (P/N 103-0001-029) on the rod end WAS along with the M10 jam nuts (P/N 312-1002-035).
2. Leave the nuts and ball mounts loose until the sensor is installed later in the procedure.

INSTALLING THE WAS

NOTE: Ensure that the machine's wheels are pointed straight ahead.

1. Use the provided 2.5" U-bolt (P/N 435-3003-046) and mounting hardware provided with the U-bolt to install the WAS Rod Mounting Plate (P/N 107-0172-461) on the left side of the machine's tie rod. Ensure the M10 - 1.5" x 35 mm" bolt (P/N 311-0070-060) is through the third hole and is pointed straight up so the WAS can attach to that bolt.

NOTE: Do not fully tighten the U-Bolt at this time.

FIGURE 2. 4XXX Series WAS Mounting Bracket on Tie Rod

U-Bolt Hardware

M10 1.5 X 35 MM Bolt

U-Bolt

2. Using the supplied M10 lock nut (P/N 312-4000-208), attach the rod end of the sensor to the M10 - 1.5 x 35 mm bolt in the WAS Mounting bracket.

FIGURE 3. Rod End of the WAS Secured to the WAS Bracket

3. Install the WAS Base End Mounting Bracket (P/N 107-0172-591) by inserting it between the hydraulic manifold and front axle.
4. Use the provided M8 - 1.25 x 30 mm bolts (P/N 311-4050-181K) to secure the WAS bracket and the hydraulic manifold.

FIGURE 4. WAS Installing Location

5. Feed the stud on the base end of the WAS into the closest hole in the WAS base end mounting bracket.

FIGURE 5. Base End Installed in the WAS Bracket

6. Using the provided M10 lock nut, secure the base end of the WAS to WAS Mounting bracket.

7. With the wheels pointed straight ahead, adjust the U-bolt until half of the sensor stroke length is used.

8. Tighten the U-bolt hardware.

9. Connect the WAS Adapter Cable (P/N 115-4010-032) to the WAS.

FIGURE 6. WAS Adapter Cable Installed

10. Connect the other end of the WAS adapter cable to the AutoSense connection.

FIGURE 7. AutoSense Connection
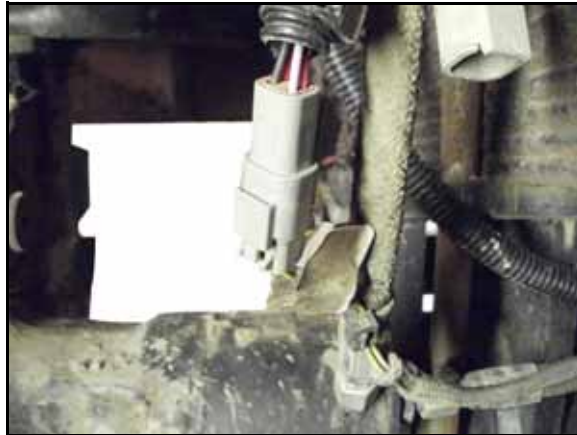
11. Turn the machine wheels to the left and right locks to ensure the sensor is not over compressed or extended.

CHAPTER	CAB COMPONENT
4	INSTALLATION

INSTALL THE HYDRAULIC DRIVE UNIT (HDU)

1. Lift the instructional seat cushion.

FIGURE 1. HDU Installed

2. Remove the hardware used to secure the machine's existing electronic control unit (ECU) to the wall of the instructional seat.
3. Install the HDU to the HDU mounting bracket (P/N 107-0172-578) using two 1/4"-20 UNC flanged lock nuts (P/N 312-1001-168).
4. Align the holes in the machine's ECU with the remaining holes in the HDU mounting bracket and insert the ECU mounting hardware that was removed in step 2.
5. Align the HDU mounting bracket with the existing ECU holes in instructional seat wall.
6. Tighten the mounting hardware to secure the mounting bracket to the instructional seat wall.

INSTALL THE SC1 UNIT

1. Locate the instruction seat in the cab.

FIGURE 2. Instruction Seat

2. Remove the instruction seat and compartment wall to access the SC1 mounting location.

3. Mount the SC1 node (P/N 063-0173-990) to the mounting studs on the node mounting bracket and secure using the supplied 1/4" - 20 flanged lock nuts (P/N 312-1001-168).

4. Mount the node and bracket assembly to the floor studs and secure to the floor using the supplied M6 x 1.0mm nuts (P/N 312-1001-183).
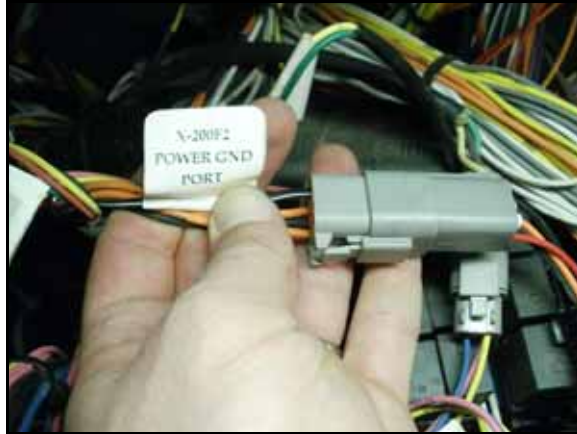
FIGURE 3. Node and Bracket Secured to Floor Studs

5. Route and connect the two rectangular connectors of the cable (P/N 115-4010-109) to the mating ports of the SC1 node.

INSTALL THE SC1/HDU CABLES

INSTALL THE HDU HARNESS CABLE

1. Lift the top of the instructional seat.

FIGURE 4. POWER Connection

2. Locate the machine's X-200 POWER GND PORT INTERFACE connection on the machine's harness, stored under the instructional seat.

3. Connect the POWER connector of the SC1 harness cable (P/N 115-4010-109) to the machine's X-200 POWER GND PORT INTERFACE.

FIGURE 5. 37-Pin Interface Connection
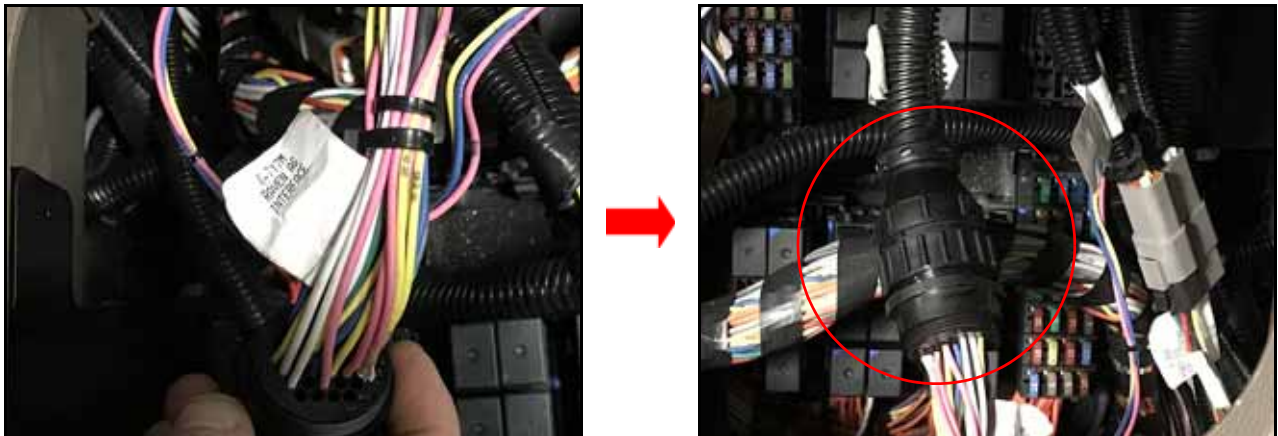
4. Connect the 37-pin connector of the SC1 harness cable to the machine's X-717 RAVEN AG INTERFACE connection, located on the floor of the instructional seat compartment.

5. Connect the black and gray 12-pin Deutsch connectors to the HDU.

FIGURE 6. HDU Installed

FIGURE 7. SC1/HDU Harness Cable Installed on HDU

6. Locate and remove the 3-pin Deutsch terminator on the machines harness, located near the 40-pin and 24-pin steering connectors.

FIGURE 8. 12-Pin Deutsch Installed Near Steering Connectors

7. Install the 3-pin Deutsch connector on the 115-4010-109 cable to the location where the terminator was removed.

FIGURE 9. 3-Pin Deutsch Connected to Terminator Location

NOTE: A new terminator is provided in the kit so the terminator removed in step 7 no longer needed.

INSTALL THE GPS RECEIVER CABLE

FIGURE 10. GPS Receiver Adapter Cable Connection

1. Locate and remove the existing cabling connecting the GPS receiver and the bulkhead connector to the roof.
2. Connect the two rectangular connectors of the cable (P/N 115-4010-105) to the GPS receiver.
3. Connect the remaining rectangular connector to the roof bulkhead connector.
4. Connect the round connectors of the Viper 4 to the ISOBUS cable (P/N 115-7300-148) to the mating ports on the back of the Viper 4.

FIGURE 11. Viper 4 Connections

5. Connect the round 16-pin connector on the ISOBUS cable (P/N 115-7300-148) to the machine's mating connector located on the machine's A-post.
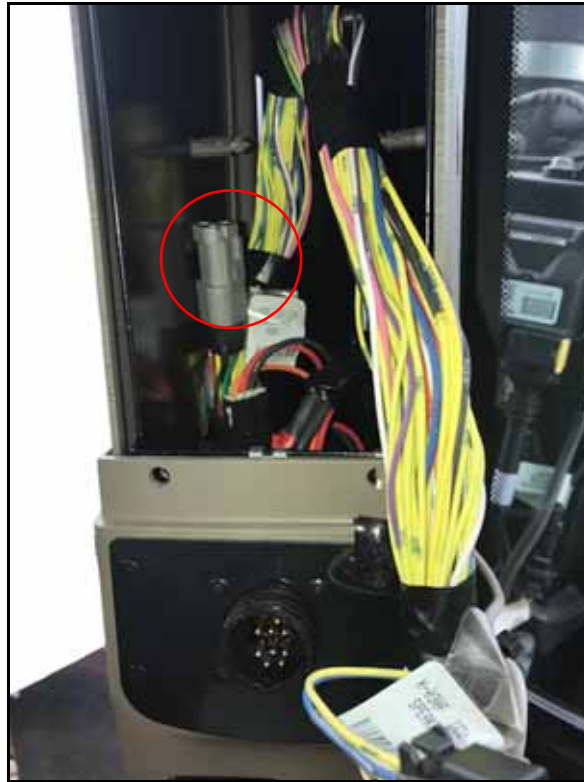
NOTE:　　SC1 will not work without this cable.

INSTALLING THE ISOBUS EXTENSION HARNESS (IF APPLICABLE)

If a New Leader ISO Bed is on the machine, perform the following steps:

1. Remove the cover over the A-post.
2. Locate the 3-pin ISOBus terminator.

FIGURE 12. 3-Pin ISOBus Terminator

3. Remove the terminator.
4. Install one end of the ISOBus Extension Harness (P/N 115-4010-099) onto the 3-Pin connector.
5. Route the other end of the ISOBus Extension harness under the instructional seat.

FIGURE 13. ISOBus Extension Harness

6. Locate and remove the 3-pin terminator on the 115-4010-109 harness.

NOTE: The terminators that were removed are not used in this system.

7. Plug the mating connector on the 115-4010-099 cable into the mating connector on the 115-4010-109 harness.

ROUTINE OPERATION

FIGURE 14. Master and Resume Switch Locations
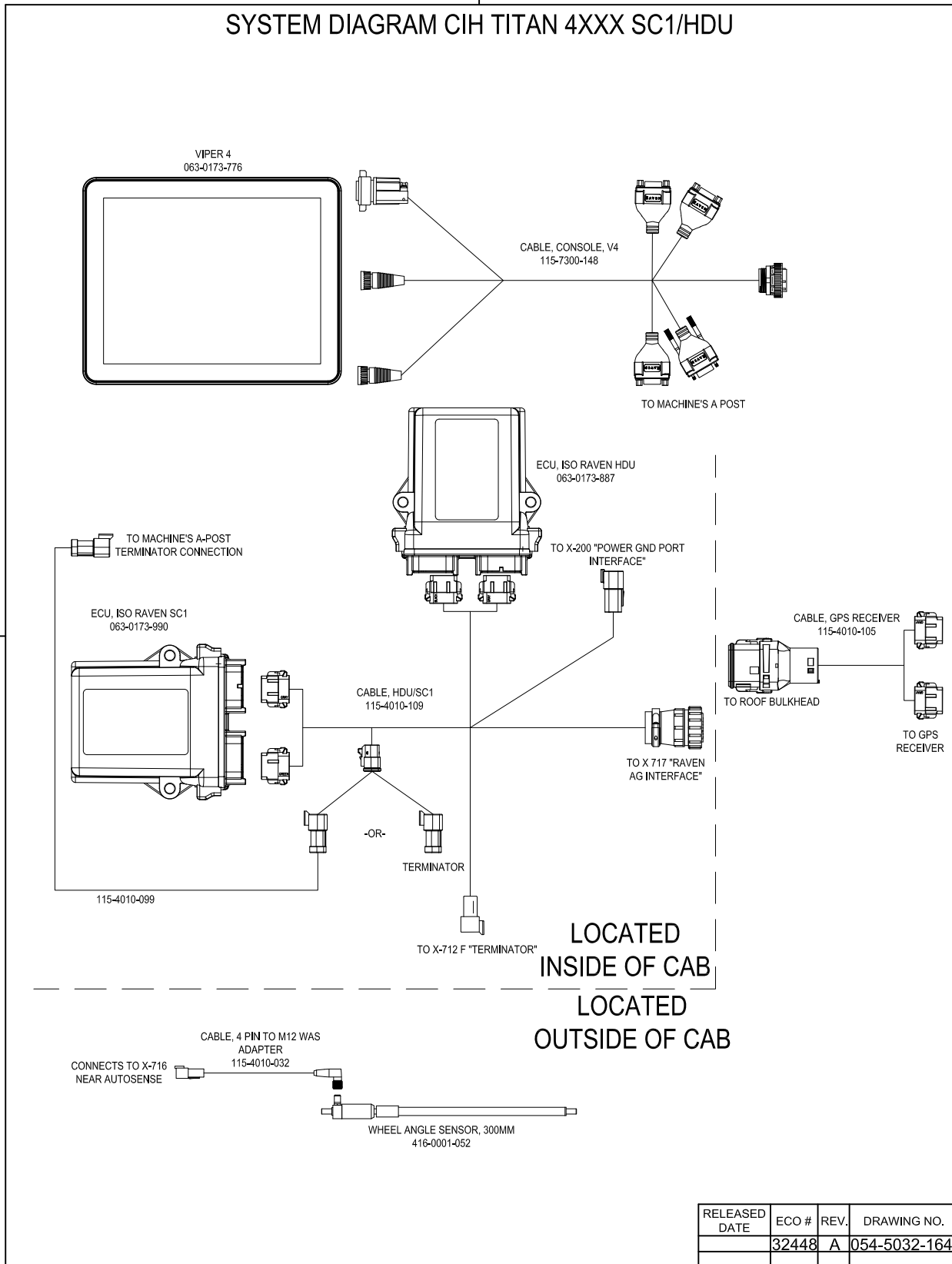
Master Switch   Enable Switch

Locate and identify the machine's master switch on the control panel and the resume switch on the joystick as they are required for SC1 system operation.

Refer to the Raven SC1 Guidance and Steering Calibration & Operation Manual (P/N 016-4010-005) for instructions on Calibrating the SC1 system, adjusting system settings, and system operation.

SYSTEM DIAGRAM (P/N 054-5032-164)

SYSTEM DIAGRAM CIH TITAN 4XXX SC1/HDU

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.

RAVEN

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.

We Solve Great Challenges.

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