AutoBoom® XRT Installation Manual for Salford 90 FT Machines on CNH Titan and Trident 5550

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Chapter 1:

Important Safety Information

NOTICE

Follow the operation and safety instructions included with the implement and/or controller and read this manual carefully before installing, servicing, or operating this Raven system.

- Park the machine where the ground is level, clean, and dry.
- Bleed pressure from the hydraulic system and leave the machine turned off for the duration of the installation or maintenance process.

Follow the operation and safety instructions included with the implement and/or controller. Before installing or operating this Raven system, review and understand the information presented on this site.

- Failure to follow safety instructions may lead to equipment damage, personal injury, or death.
- Review equipment operation with your local dealer and follow all safety information presented on this site.
- Contact a local Raven dealer for assistance with any portion of the installation, service, or operation of Raven equipment.
- Follow all safety labels affixed to system components. Be sure to keep safety labels in good condition and replace any missing or damaged labels. Contact a local Raven dealer to obtain replacements for safety labels.

Observe the following safety measures when operating the implement after installing this Raven system:

- Do not operate this Raven system or any agricultural equipment while under the influence of alcohol or an illegal substance.

- Be alert and aware of surroundings while operating this Raven system.
  - Determine and remain a safe working distance from obstacles and bystanders. The operator is responsible for disabling the system when a safe working distance has diminished.
  - Do not operate the implement on any public road with this Raven system enabled.
  - Maintain control of the vehicle at all times during operation. For example,
    - Remain in the operator seat while the system is enabled and disable automated Raven controls before exiting the operator seat.
    - Maintain control of safety devices such as E-Stops at all times during operation.
  - Disable this Raven system prior to starting any maintenance work on the implement or components of this Raven system.
- Do not attempt to modify or lengthen any of the system control cables. Extension cables are available from a local Raven dealer.

Field Computers, Displays, and Control Consoles

- If the display will not be used for an extended period, it is best to remove the display from the machine and store it in a climate controlled environment. This may help to extend the service life of electronic components.
- To prevent theft, secure the display and GNSS antenna when leaving the machine unattended.

⚠ **WARNING**

Hydraulic Safety

When installing or servicing a hydraulic system or hydraulic components, be aware that hydraulic fluid may be extremely hot and under high pressure. Caution must be exercised.

- Always wear appropriate personal protective equipment when installing or servicing hydraulic systems.
- Never attempt to open or work on a hydraulic system with the implement running.
- Always take care when servicing or opening a system that has been pressurized.

- The implement or machine must remain stationary and switched off with booms or implement sections unfolded and supported during installation or maintenance.

- Any work performed on the hydraulic system must be done in accordance with the machine manufacturer's approved maintenance instructions.

- Before installing hydraulic components, ensure there are no issues with the machine hydraulic system (e.g. pump issues, faulty hydraulic motors, fine metal deposits in the hydraulic lines, etc.).

- Take precautions to prevent foreign material or contaminants from being introduced into the implement hydraulic system. Contaminants that are able to bypass the hydraulic filtration system will reduce performance and may damage hydraulic components.

    - Verify that the hydraulic system is using fresh oil and the filters have been changed.

- Stand clear of the implement when starting the system for the first time after installing or servicing hydraulic components in case a hose has not been properly connected or tightened.

⚠ CAUTION

Electrical Safety

- Always verify that power leads are connected to the correct polarity as marked. Reversing the power leads could cause severe damage to the Raven system or other components.

- To prevent personal injury or fire, replace defective or blown fuses with only fuses of the same type and amperage.

- Do not connect the system power cable to the vehicle ignition or battery until all system components are mounted and all electrical connections are completed.

- Always start the machine before initializing this Raven system to prevent power surges or peak voltage.

- To avoid tripping and entanglement hazards, route cables and harnesses away from walkways, steps, grab bars, and other areas used by the operator or service personnel when operating or servicing the equipment.

Touch Screen

- Only touch the touch-screen with your finger or by using a special touch-screen stylus or pen. Operating the touch-screen with sharp objects may cause permanent damage to the screen.

- Only clean the screen using a damp cloth. Never use caustic or other aggressive substances.

Recommendations and Best Practices

Point of Reference

Instructions provided generally assume you are standing behind the machine facing toward the cab. More specific orientation may be provided as necessary to complete procedures.

Preparing for Install

- Ensure there are no issues with the machine hydraulic system (e.g., pump issues, faulty hydraulic motors, fine metal deposits in the hydraulic hoses, etc.).

- Verify that the machine hydraulic system is using fresh oil and that the filters have been recently changed.

- Ensure there are no issues with the steering system (e.g., worn bushings, faulty tie rod ends, improperly adjusted steering components, etc.)

Hose Routing

The word "hose" is used to describe any flexible, fluid carrying components. Use the following guidelines and recommendations when connecting and routing hoses while installing or maintaining this Raven system:

- Leave protective caps/covers over hose ends until connecting the end into the hydraulic system to help prevent contaminants from entering the system.

- Follow existing hose runs already routed on the implement as much as possible. Proper hose routing should:

    - Secure hoses and prevent hoses from hanging below the implement.

    - Provide sufficient clearance from moving components and operational zones around shafts; universal joints and suspension components; pulleys, gears, belts, and chains; moving linkages, cylinders, articulation joints, etc.

    - Protect hoses from field debris and surrounding hazards (e.g. tree limbs, fence posts, crop stubble, dirt clumps or rocks that may fall or be thrown by the implement).

    - Protect hoses from sharp bends, twisting, or flexing over short distances and normal implement operation.

    - Ensure sufficient length for free movement of the implement during normal operation and prevent pulling, pinching, catching, or rubbing, especially in articulation and pivot points. Clamp hoses securely to force controlled movement of the hose.

    - Avoid abrasive surfaces and sharp edges such as sheared or flame cut corners, fastener threads or cap screw heads, hose clamp ends, etc.

    - Avoid areas where the operator or service personnel might step or use as a grab bar.

- Do not connect, affix, or allow hoses to come into contact with components with high vibration forces, hot surfaces, or components carrying hot fluids beyond the temperature rating of hose components.

    - Hoses should be protected or shielded if routing requires the hose to be exposed to conditions beyond hose component specifications.

- Avoid routing hoses in areas where damage may occur due to build up of material (e.g. dirt, mud, snow, ice, etc.).

Harness Routing

The word "harness" is used to describe any electrical cables and leads, both bundled and unbundled. Use the following guidelines and recommendations when connecting and routing harnesses while installing or maintaining this Raven system:

- Leave protective caps/covers over harness connectors until needed to avoid dirt and moisture from contaminating electrical circuits.

- Secure the harness to the frame or solid structural members at least every 12 in [30 cm].
- Follow existing harness runs already routed on the implement as much as possible. Proper harness routing should:
  - Secure harnessing and prevent the harness from hanging below the implement.
  - Provide sufficient clearance from moving components and operational zones around shafts; universal joints and suspension components; pulleys, gears, belts, and chains; moving linkages, cylinders, articulation joints, etc.
  - Protect harnessing from field debris and surrounding hazards (e.g. tree limbs, fence posts, crop stubble, dirt clumps or rocks that may fall or be thrown by the implement).
  - Protect harnessing from sharp bends, twisting, or flexing over short distances and normal implement operation.
  - Connectors and splices should not be located at bending points or in harness sections that move.
  - Ensure sufficient length for free movement of the implement during normal operation and prevent pulling, pinching, catching, or rubbing, especially in articulation and pivot points. Clamp harnessing securely to force controlled movement of the harness.
  - Avoid abrasive surfaces and sharp edges such as sheared or flame cut corners, fastener threads or cap screw heads, hose clamp ends, etc.
- Do not connect, affix, or allow harnessing to come into contact with components with high vibration forces, hot surfaces, or components carrying hot fluids beyond the temperature rating of harness components.
  - Harnessing should be protected or shielded if routing requires the hose to be exposed to conditions beyond harnessing component specifications.
- Avoid routing harnesses in areas where damage may occur due to build up of material (e.g. dirt, mud, snow, ice, etc.).
- Avoid routing harnesses in areas where the operator or service personnel might step or use as a grab bar.

  Note: *Avoid applying direct spray or pressure washing of electrical components and connections. High pressure streams and sprays can penetrate seals, cause corrosion, or otherwise damage electrical components. When performing maintenance:*

- Inspect electrical components and connectors for corrosion, damaged pins or housings, etc. Repair or replace components or harnessing as necessary.

- Ensure connectors are kept clean and dry. Apply dielectric grease to the sealing surfaces of all connections exposed to moisture, dirt, debris, and other contaminates. Repair or replace harnessing as necessary.

- Clean electrical components with pressurized air, aerosol electrical cleaning agent, or low pressure rinse.

- Remove visible surface water from electrical components and connections using pressurized air or an aerosol cleaning agent. Allow components to dry thoroughly before reconnecting cables.

Chapter 2:

Installation Overview

The AutoBoom® XRT system is designed to provide automated boom height adjustment for agricultural equipment.

This installation procedure applies to the following machines:

MAKE: Salford

SERIES: 6700

YEAR: 2022 and Newer

Prepare for Installation

Before installing AutoBoom® XRT, park the machine where the ground is level, clean, and dry. Leave the machine turned off for the duration of the installation process.

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

> *Note: A Salford ICAN software update is required for proper communication to the ABM. Contact a local Salford dealer for assistance with updating Salford software.*

Recommendations

Raven Industries recommends the following before installing or operating the AutoBoom® XRT system for the first time, at the start of the season, or when moving the AutoBoom® XRT system to another machine:

- Ensure the machine hydraulic filters have been recently changed and there are no issues with the machine hydraulic system (e.g., pump issues, faulty hydraulic motors, fine metal deposits in the hydraulic hoses, etc.).

- Operate each of the machine boom hydraulic functions (i.e., tilt, fold, center rack, tongue extension, or other hydraulic valve functions) three times to ensure the machine hydraulic valve is using fresh oil and debris is flushed from the hydraulic hoses, valves, and filters.

- Upon installation of the AutoBoom® XRT system, operate the boom and center rack raise/lower functions through the machine manual control functions first before operating them via the AutoBoom® XRT controller/field computer to ensure the hydraulic system has been installed correctly and air is released from the system.

Raven Industries recommends the following when installing the AutoBoom® XRT system.

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

Tools Needed

The following tools are recommended for installation of the AutoBoom® XRT system:

- Standard-sized wrenches
- Cable ties
- Set of tools

Point of Reference

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

Hydraulic Fittings

This manual may reference the following types of hydraulic fittings:

SAE O-Ring Fittings

ORFS (O-Ring Face Seal) Fittings

JIC Fittings

Kit Contents

This section contains a list of the components that are included in the kit. Before beginning the installation, compare the items in the kit with the components on this list. If you have questions about the kit, contact a local Raven dealer.

AutoBoom® XRT Installation Kit for Salford Machines with 90' Booms (P/N 117-0236-100-A)

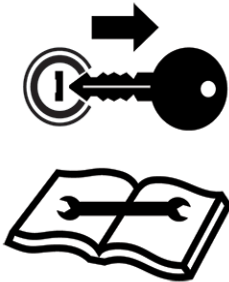| QTY	PART #	DESCRIPTION
1	053-0159-197	BOX, SHIPPING
1	115-0235-181	CABLE, XRT ABM/REM SALFORD
2	115-0235-188	CABLE, SECONDARY BOOM, XRT, SALFORD
1	063-0173-965	ECU, ISOBUS, REM, RAVEN
1	063-0174-066	ECU, RAVEN, AUTOBOOM XRT, ABM, WITH AUTOBOOM UNL
2	063-0173-962	SENSOR BOOM HEIGHT RADAR
1	117-0235-060	10114752 - KIT, AUTOBOOM, XRT, WO RAVEN COMPONENTS

Chapter 3:

Install AutoBoom® XRT

The following sections describe how to install an AutoBoom® XRT system:

Remove the Orifice Fittings (For Machines with AutoBoom® Already Installed)

⚠ WARNING
The implement or machine must remain stationary and switched off with booms or implement sections unfolded and supported during installation or maintenance.

CAUTION

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

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

NOTICE

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

On machines with AutoBoom® already installed, it is necessary to remove the existing AutoBoom® node and mounting plate as well as remove the orifice fittings in the AutoBoom® valve. The AutoBoom® valve will be reused for the AutoBoom® XRT installation.
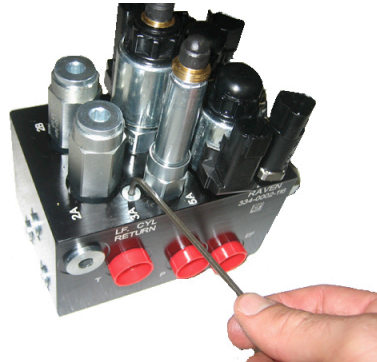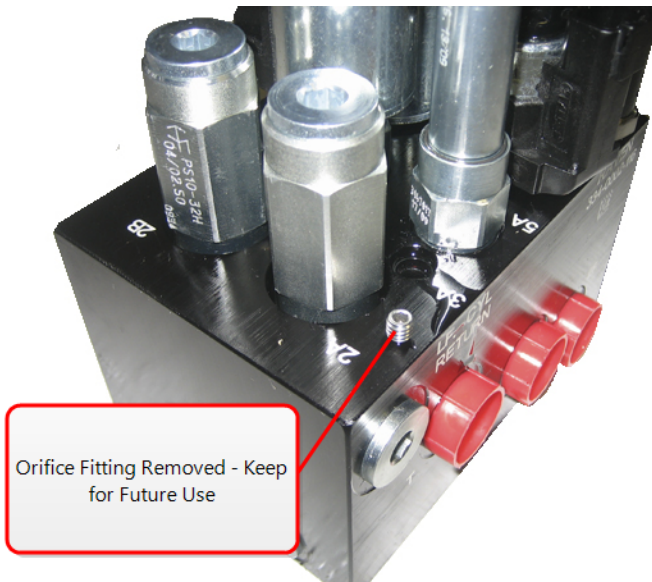
1. Locate Ports 3A and 3B on the AutoBoom® valve.
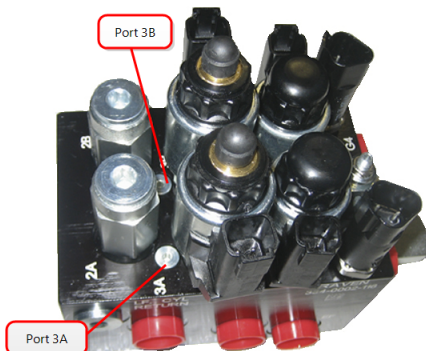
2. Remove the coils from the solenoids near Ports 3A and 3B to gain easy access to those ports.

3. Use an Allen wrench to remove the plugs from Ports 3A and 3B.

4. Remove the orifice fittings from Ports 3A and 3B.

Orifice Fitting Removed - Keep for Future Use

> **Note:** *Tip the AutoBoom® valve on its side and use the Allen wrench to remove the orifice from the cavity, taking care not to let the fitting fall into the valve.*

5. Use the Allen wrench to reinstall the port plugs on Ports 3A and 3B of the AutoBoom® valve.
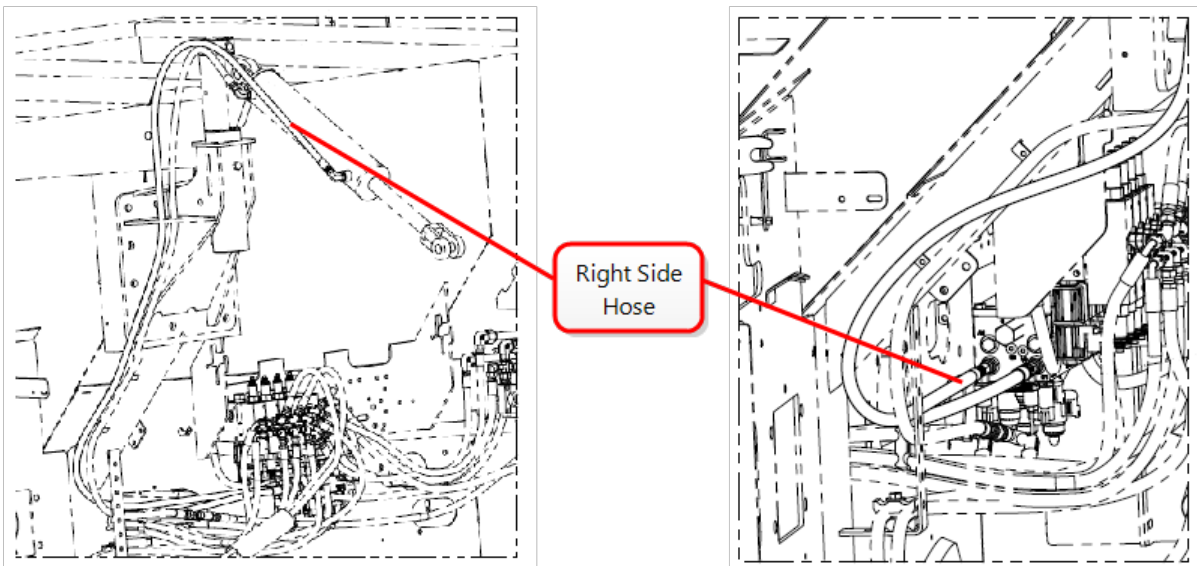
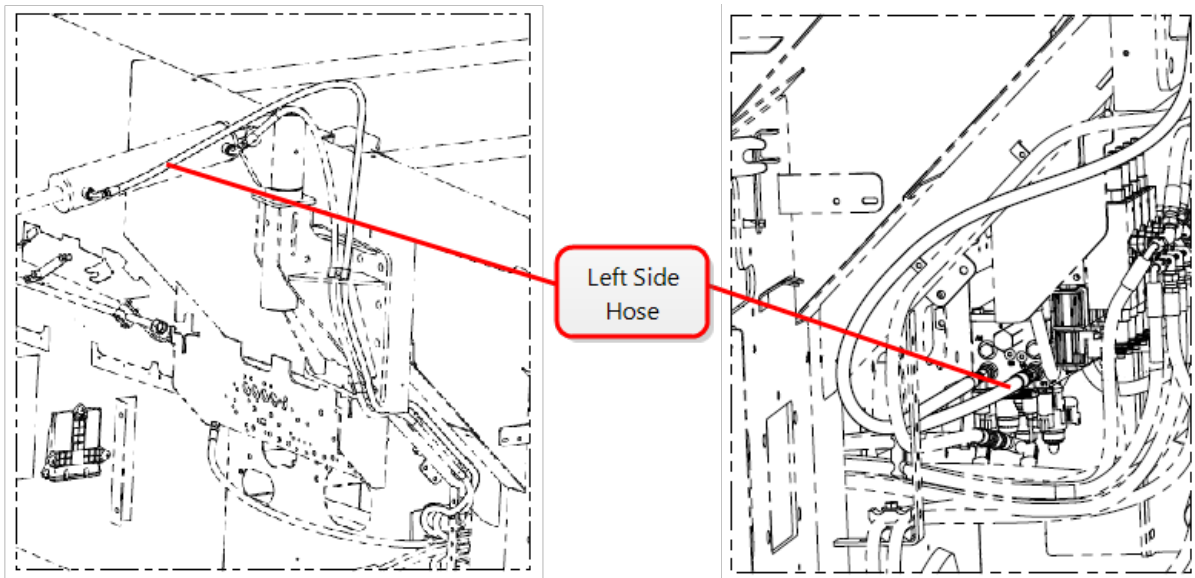6. Reinstall the coils on the solenoids of the AutoBoom® valve.

> **Note:** After this point, the AutoBoom® valve may be referred to as the AutoBoom® XRT valve.

7. Route the hose from the right side of the machine to the XRT valve and connect to the RC port.

8. Route the hose from the left side of the machine with the existing hose to the XRT valve and connect to the LC port.

Mount the Boom Sensors

Boom Sensor Mounting Locations

Sensor mounting locations vary by boom configuration. If an object enters the sensor's blind range unexpectedly, a false return to the sensor could occur. To ensure optimal operation of the AutoBoom® XRT system and to protect the sprayer boom, the sensor should be mounted behind the boom structure (if possible), above the lowest hanging part of the boom.

Mount the Boom Sensors
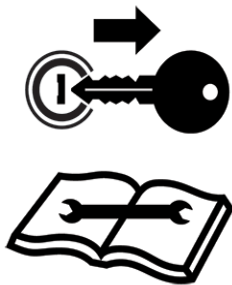
⚠ WARNING
The implement or machine must remain stationary and switched off with booms or implement sections unfolded and supported during installation or maintenance.

1. Install the radar sensors on the sensor mounting brackets using two 1/4" bolts and two 1/4" nylock nuts per sensor.

2. Mount the boom sensor assemblies on the back of the inner boom sections using 5/16" carriage bolts and 5/16" nylock nuts.

Install the Rotation Sensors

1. For machines of model years 2022 and older, use a 3/8" drill bit to drill holes on the left and right side of the machine according to the following diagram.
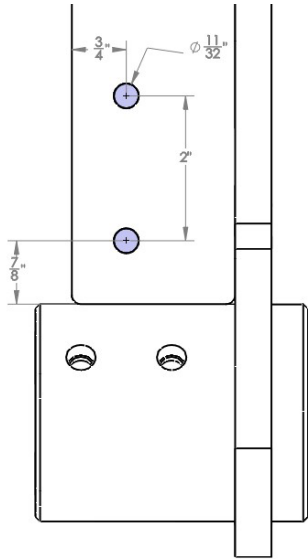
2. Mount the rotation sensors to the mounting plates using #6-32 bolts and #6-32 nylock nuts.

3. Mount the rotation sensor brackets using 3/8" bolts and 3/8" nylock nuts.
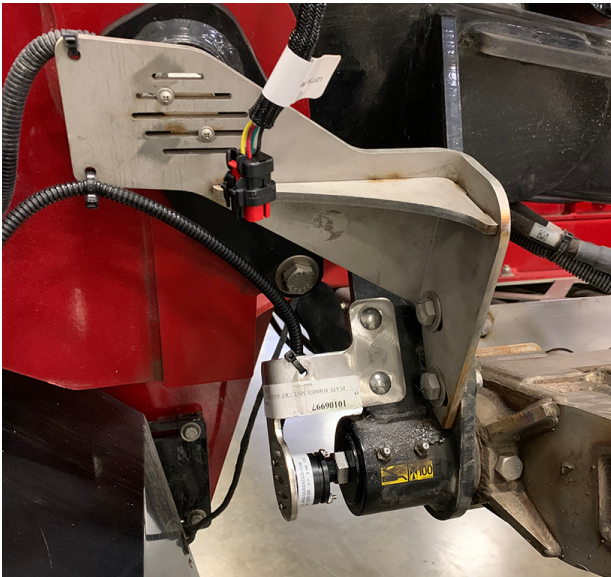
4. To calibrate the rotation sensor, remove the lower bolt and loosen the upper bolt securing the sensor to the bracket.

5. Rotate the rotation sensor bracket to obtain access to the hex-shaped magnet inside the rotation sensor.
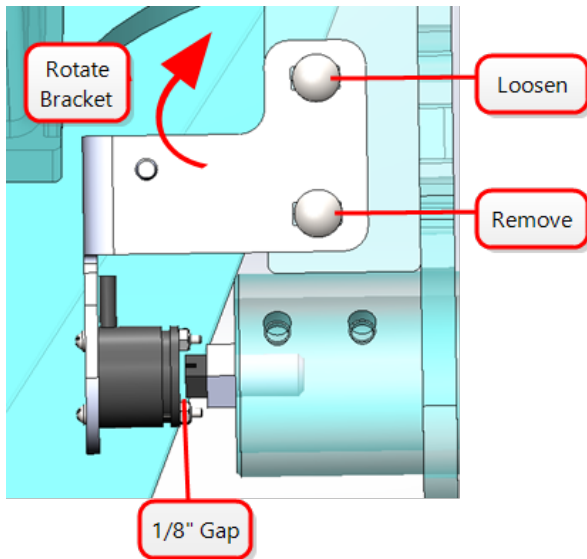
6. Loosen the center retaining bolt and rotate the hex-shaped magnet with a 3/4" wrench. When the lift sensor voltage is 2.5V +/- 0.25V, tighten the center retaining bolt.
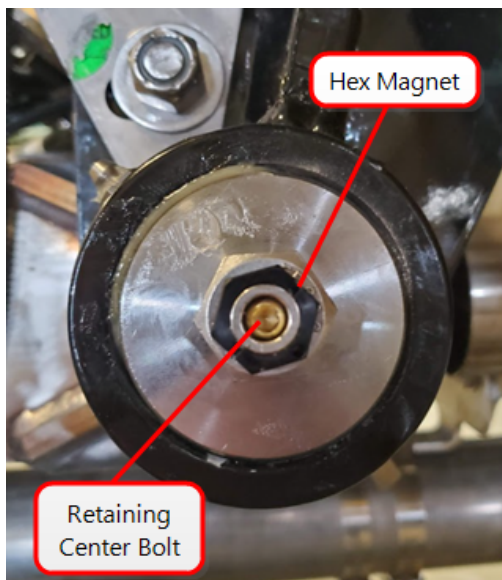
7. Rotate the rotation sensor bracket back into place.

8. Replace and tighten any previously removed or loosened bolts to the mounting bracket, ensuring there is a 1/8" gap between the sensor and the hex-shaped magnet.

ABM and REM Node Installation

1. The ABM node location is dependent on the model year of the machine:

   - For machines of model years 2022 and older, the ABM node is mounted on the right sidewall of the machine.

   - For machines of model years 2023 and newer, the ABM node is mounted on the back wall of the machine.

   Use the provided hardware to mount the ABM node.

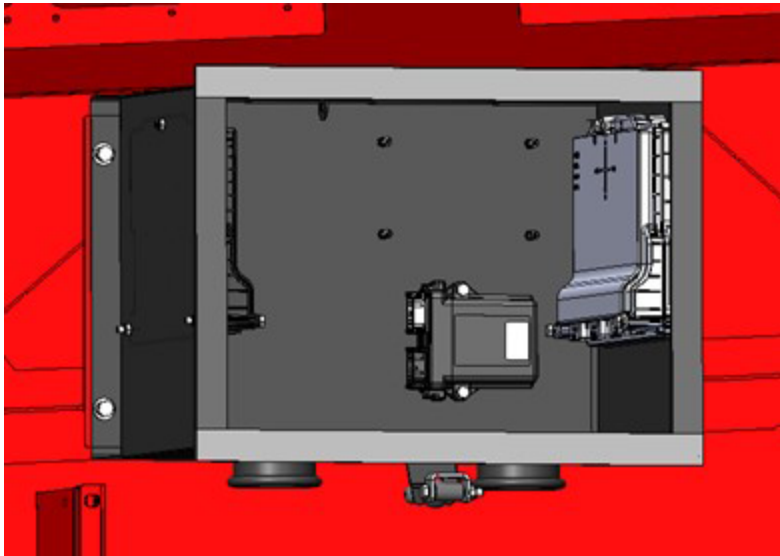2. Using a 1/4" drill bit, drill a hole 4 in. [10.16 cm.] to the left of the hole closest to the outside of the right sidewall to mount the ABM.

Route Cabling

While making the following connections, be aware of the cable routing and avoid possible cable pinch points and other issues.

Connect the Radar Sensor Cables

1. Connect 4-pin plug to the radar sensor.

2. Route cable through the booms toward the tilt joints along the hydraulic hose cabling.

Connect the ABM/REM Harness

1. 1. Plug the gray 23-pin plug on the XRT cable (P/N 115-0235-181) to the mating connector on the bottom of the REM node.

2. Plug black 23-pin plug on the XRT cable to the mating connector on the bottom of the REM node.

3. Plug black 35-pin plug on the XRT cable to the mating connector on the bottom of the REM node.

4. Plug gray 12-pin DTM plug connector and plug into the ABM node.

5. Route the cable through the front hole on the bottom of the machine control box.

   Note: *Remove and replace cable ties once cable is routed.*

6. Route cable behind control box and up.

   Note: *This is to follow existing cable harnesses.*

Connect the Left Boom Harness

1. Route connectors labeled for the LEFT side to the machine and connect to X.

2. Connect LEFT TIP HEIGHT SENSOR to the installed tilt sensor.

3. Connect LEFT BOOM to the boom sensor cable.

Connect the Right Boom Harness

1. Route the connectors labeled for the RIGHT side to the machine through the hose chase to the right side.

2. Connect RIGHT TIP HEIGHT SENSOR to the installed tilt sensor.

3. Connect RIGHT BOOM to boom sensor cable.

Connect the Valve Harness

1. Connect the RH BLOCKER VALVE plug on the XRT cable to port 4B on the AutoBoom® XRT valve.

2. Connect the LH BLOCKER VALVE plug on the XRT cable to port 4A on the AutoBoom® XRT valve.

3. Connect the LEFT PROP VALVE plug on the XRT cable to port 5A on theAutoBoom® XRT valve.

4. Connect the RIGHT PROP VALVE plug on the XRT cable to port 13A on the AutoBoom® XRT valve.

Limited and Extended Warranties

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 36 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 completed RMA form, Certificate of Decontamination, and retail 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 (at our discretion) repair or replace this product or any component of the product found to be defective during the warranty period. Replacement will be made with a new or remanufactured product or component. Standard return freight will be paid, regardless of 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 outside our facility 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, improper installation and maintenance are not covered by this warranty.
- Worn/Chafed hoses and cables.
- Items in contact with fluids and chemicals including seals and O-rings.
- Software downloads and updates.
- Tamper-Evident label broken or customer disassembly.
- Any customer modification to the original product outside normal calibration and adjustments, without written approval.
- Intentional modification to cables.
- Failures due to lack of cleaning or preventive maintenance, and any condition, malfunction or damage not resulting from defects in material or workmanship.
- Items in contact with fluids or chemicals, returned without proper cleaning, decontamination and documentation.

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 https://portal.ravenprecision.com and select Product Registration.

To register, fill out the Product Registration form online at https://portal.ravenprecision.com.

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 completed RMA form, Certificate of Decontamination, and Extended Warranty Registration Number) 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 warranty claim, Raven Industries (at our discretion) repair or replace this product or any component of the product found to be defective during the warranty period. Replacement will be made with a new or remanufactured product or component. Standard return freight will be paid, regardless of 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 outside our facility 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, improper installation and maintenance are not covered by this warranty.
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- Items in contact with fluids or chemicals, returned without proper cleaning, decontamination and documentation.