

AutoBoom® XRT Installation Manual for AGCO RoGator

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| | | |
|---|---|-----------|
| Chapter 1 | Important Information..... | 1 |
| Safety | | 1 |
| Hydraulic Safety | | 2 |
| Electrical Safety | | 2 |
| Recommendations and Best Practices | | 3 |
| Hose Routing | | 3 |
| Harness Routing | | 3 |
| Chapter 2 | Introduction..... | 5 |
| Introduction | | 5 |
| Preparing for Installation | | 6 |
| Recommendations | | 6 |
| Tools Needed | | 6 |
| Point of Reference | | 6 |
| Installation Overview | | 7 |
| Hydraulic Fittings | | 7 |
| Updates | | 8 |
| Kit Contents | | 8 |
| Chapter 3 | Hydraulic System Installation..... | 9 |
| Mount the AutoBoom Valve | | 10 |
| Adjusting Installed AutoBoom Valve | | 10 |
| Installation for Machines with Existing Hydraulic Valve | | 11 |
| Damper Installation | | 12 |
| Large Tree | | 12 |
| Small Tree | | 16 |
| Chapter 4 | Sensor Installation..... | 19 |
| Mount the Boom Sensors | | 19 |
| Boom Sensor Mounting Locations | | 19 |
| Mount the Boom Sensors | | 19 |
| Mount the Center Sensor | | 21 |
| Center Rack Installation for Large Tree | | 22 |
| Rotary Sensor Installation | | 22 |
| Center Rack Position Sensor Installation | | 23 |
| Boom Proximity Sensor Installation | | 24 |
| Tilt Sensor Installation | | 25 |
| Center Rack Installation for Small Tree | | 27 |
| Rotary Sensor Installation | | 27 |
| Center Rack Position Installation | | 28 |
| Boom Proximity Sensor Installation | | 29 |
| Tilt Sensor Installation | | 30 |
| Chapter 5 | Wiring Installation..... | 31 |
| ABM and REM Node Installation | | 31 |
| Electrical Diagrams | | 33 |

| | |
|--|-----------|
| Table of Contents | |
| Connect the ABM/REM Harness | 34 |
| Connect the Harness to the Sensors | 36 |
| Appendix A Kits Lists..... | 37 |
| XRT Kits | 37 |

SAFETY

NOTICE

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

- Follow all safety information presented within this manual. Review implement operation with your local dealer.
- 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 and remain in the operator seat at all times when operating this Raven system.
 - Do not operate the implement on any public road with this Raven system enabled.
 - Disable this Raven system before exiting the operator seat.
 - 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.
 - 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.

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.
- Any work performed on the hydraulic system must be done in accordance with the machine manufacturer's approved maintenance instructions.
- Care should always be taken 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.
- 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.
- 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 power leads to the 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.

RECOMMENDATIONS AND BEST PRACTICES

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.

IMPORTANT: 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 contaminants. 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

INTRODUCTION

2

INTRODUCTION

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

This manual applies to the following machines.

MAKE: RoGator

MODEL: 900, 900B, 1100, 1100B, 1300, 1300B

YEAR: 2012-2017

FIGURE 1. **RoGator**



PREPARING FOR INSTALLATION

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

Always follow good safety practices.

Carefully read the instructions in this manual as you complete the installation process.

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 hydraulic filters have been recently changed and there are no issues with the hydraulic system (e.g., pump issues, faulty hydraulic motors, fine metal deposits in the hydraulic hoses, etc.).
- Operate each of the hydraulic functions (i.e., tilt, fold, center rack, tongue extension, or other hydraulic valve functions) three times to ensure the existing 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 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

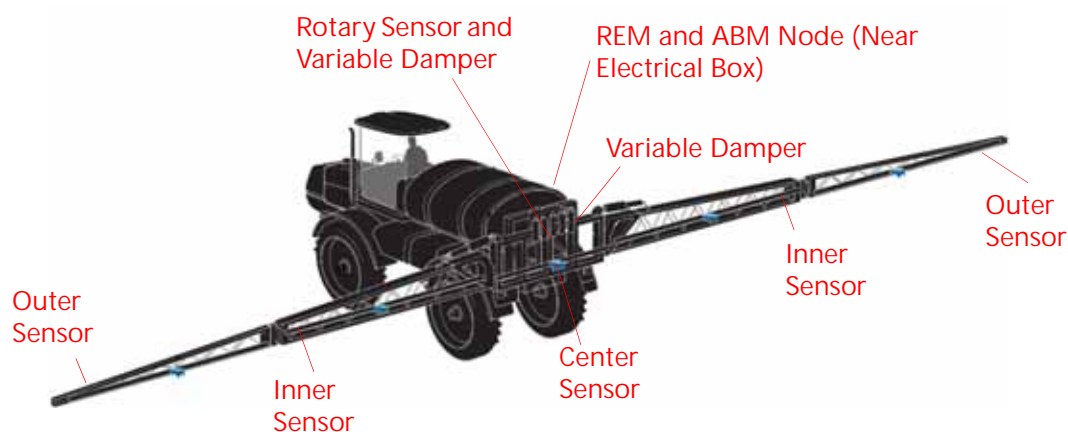
POINT OF REFERENCE

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

INSTALLATION OVERVIEW

The image below shows approximate installation locations for the sensor and nodes. Depending on machine configuration and desired performance some of the sensors and dampers may not be installed.

FIGURE 2. Example Component Locations



For additional information on the component installation, refer to the:

- rotary sensor installation instructions in "Center Rack Installation for Large Tree" on page 22 or "Center Rack Installation for Small Tree" on page 27.
- variable damper installation instructions in "Damper Installation" on page 12.
- REM node installation instructions in "ABM and REM Node Installation" on page 31.
- ABM node installation instructions in "ABM and REM Node Installation" on page 31.
- tilt sensor installation instructions in "Mount the Boom Sensors" on page 19.
- outer sensor installation information in "Mount the Boom Sensors" on page 19.
- inner sensor installation information in "Mount the Boom Sensors" on page 19.
- center sensor installation instructions in "Mount the Center Sensor" on page 21.

HYDRAULIC FITTINGS

This manual may reference the following types of hydraulic fittings:

- SAE O-ring fittings
- ORFS (O-Ring Face Seal) fittings
- JIC fittings

SAE O-Ring Fittings



ORFS Fittings



JIC Fitting



UPDATES

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

<https://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

- AutoBoom® XRT Installation Manual for AGCO RoGator
- 016-0237-002 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 kits available depending on machine features. For a full list of kit contents, refer to the specific kits numbers listed in "Kits Lists" on page 37.

TABLE 1. AutoBoom XRT Kits for RoGator A/B

| Model Year | Model | Series | Boom Material and Length | Tree | Hydraulics | Kit Numbers |
|------------|--------------|---|--------------------------|-------|------------|--------------|
| 2012-2017 | AGCO RoGator | 900, 900B 1100, 1100B 1300, 1300B | Steel 90'/100' | Large | Yes | 117-0237-020 |
| | | | | Small | Yes | 117-0237-021 |
| | | | Steel 120' | Large | Yes | 117-0237-022 |
| | | | Steel 90'/100' | Large | No | 117-0237-023 |
| | | | | Small | No | 117-0237-024 |
| | | | Steel 120' | Large | No | 117-0237-025 |

CHAPTER

3

HYDRAULIC SYSTEM INSTALLATION



WARNING

The machine must remain stationary and switched off, with the booms 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.



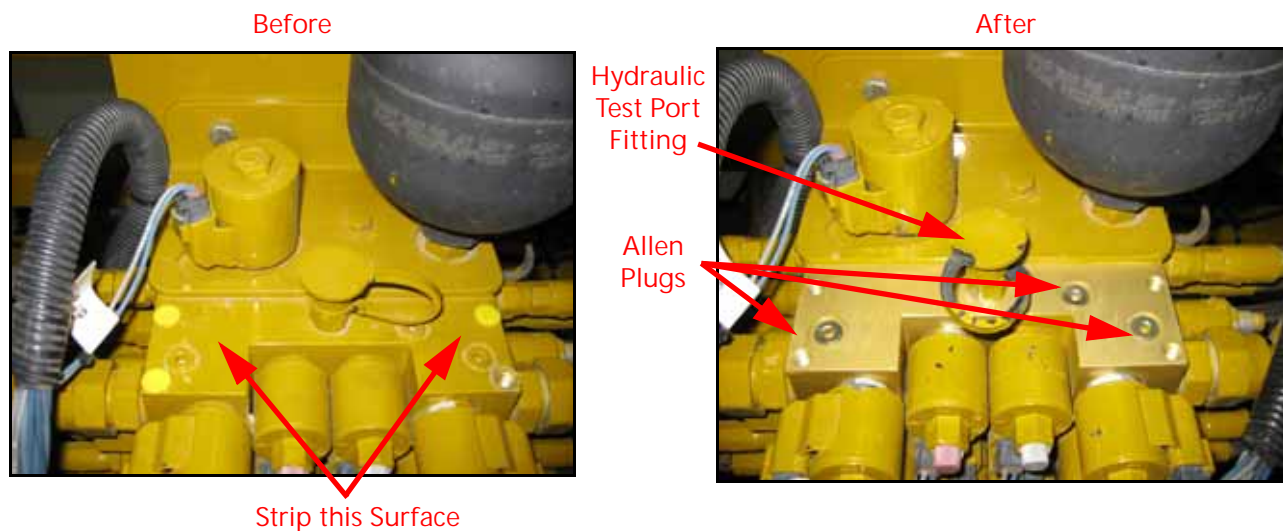
NOTICE

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.

MOUNT THE AUTOBOOM VALVE

ADJUSTING INSTALLED AUTOBOOM VALVE

FIGURE 1. Hydraulic Valve Before AutoBoom Installation



1. Strip the factory paint from the top of the existing hydraulic valve using a chemical approved for paint removal.

IMPORTANT: Do not scrape the paint from the hydraulic valve. Scraping the paint may cause damage to the valve.

2. Remove the hydraulic test port fitting and Allen plugs from the existing hydraulic valve.

NOTE: The test port fitting will be installed on the AutoBoom hydraulic valve later in the procedure. Protect the test port fitting from dust and debris to avoid contamination of the hydraulic system.

3. Clean any remaining paint from the existing hydraulic valve, taking care to prevent paint chips from entering the open hydraulic ports.

FIGURE 2. O-Rings Placed on the Machine Hydraulic Valve



4. Install 9/16" ID Buna-N O-rings (P/N 219-0001-015) in the open ports of the hydraulic valve.

NOTE: Use grease or petroleum jelly to hold the O-rings in place during the AutoBoom valve installation, taking care to avoid contamination of the inside of the open ports.

5. Blow the hydraulic port threads of any excess oil.
6. Clean excess oil, grease, and debris from the top of the hydraulic valve.
7. Clean excess hydraulic fluid from the AutoBoom valve (P/N 334-0235-004).
8. Install the supplied hex bolts in the AutoBoom valve, placing the shorter bolt in the cut-out section of the AutoBoom valve.

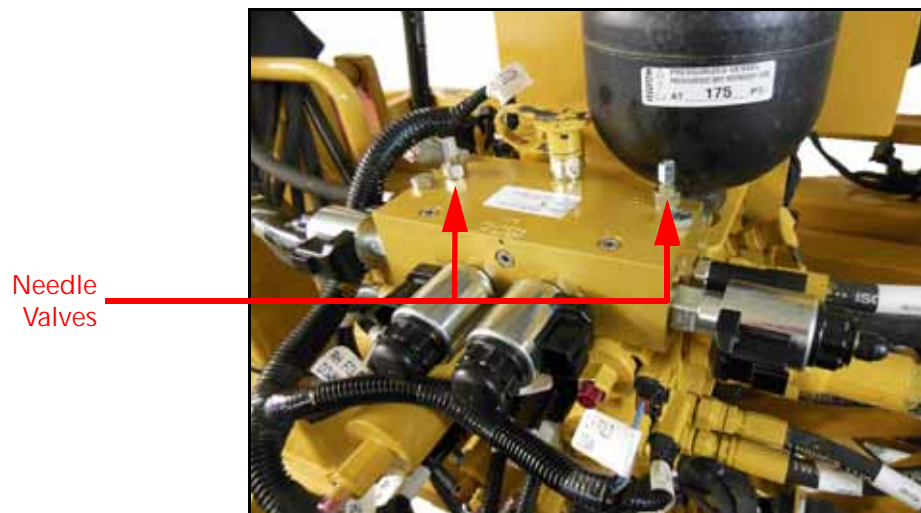
FIGURE 3. Hydraulic Valve without Needle Valves



INSTALLATION FOR MACHINES WITH EXISTING HYDRAULIC VALVE

On machines with existing AutoBoom valves, back the existing needle valves out completely then tighten the jam nut.

FIGURE 4. AutoBoom Valve Mounted to the Hydraulic Valve



9. Carefully place the AutoBoom valve on the existing hydraulic valve, positioning it so that the cut-out section faces the accumulator.
10. Alternately tighten each bolt a small amount to a maximum of 15-20 ft. lbs. per bolt.
11. Install the hydraulic test fitting in Port GP of the AutoBoom valve.

DAMPER INSTALLATION

NOTE: It will be necessary to purchase springs from your AGCO dealer if the machine is not already equipped with centering springs on the center rack.

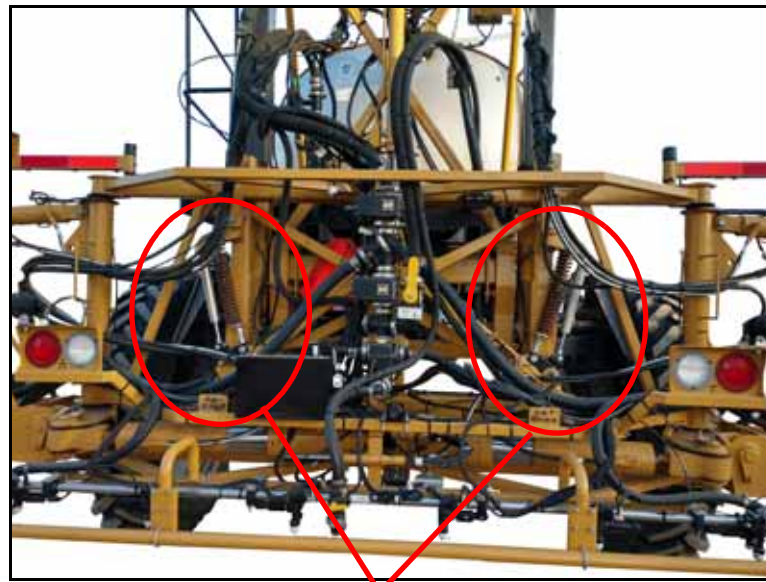
TABLE 1. Centering Springs Parts List (Required if not present)

| Large Tree Center Rack | | | Small Tree Center Rack | | |
|------------------------|-----|------------------------------------|------------------------|-----|-----------------------------|
| AGCO Part Number | Qty | Description | AGCO Part Number | Qty | Description |
| 601102D1 | 2 | Threaded Rod | AG517248 | 2 | End Rod |
| AG517248 | 2 | End Rod | AG518092 | 2 | Spring |
| SN1040 | 6 | Lockwasher 3/4" | SN1040 | 4 | Lockwasher 3/4" |
| 375100X1 | 6 | Hex Nut 3/4"-10 SAE 5 ZN | 375100X1 | 2 | Hex Nut 3/4"-10 SAE 5 ZN |
| AG561156 | 2 | Flat Washer 3/4" | AG561156 | 2 | Flat Washer 3/4" |
| 7701329 | 2 | Hex Cap Screw 3/4"-10 x 2-1/4" GR5 | AG562291 | 8 | Hex Nut 3/4"-16 |
| AG562291 | 6 | Hex Nut 3/4"-16 | 593746D1 | 2 | Threaded Rod |
| 514655D1 | 2 | Spring | AG108604 | 2 | Spring Cap |
| AG108604 | 2 | Spring Cap | | | |
| 515416D1 | 2 | Bracket (as reqd) | | | |

LARGE TREE

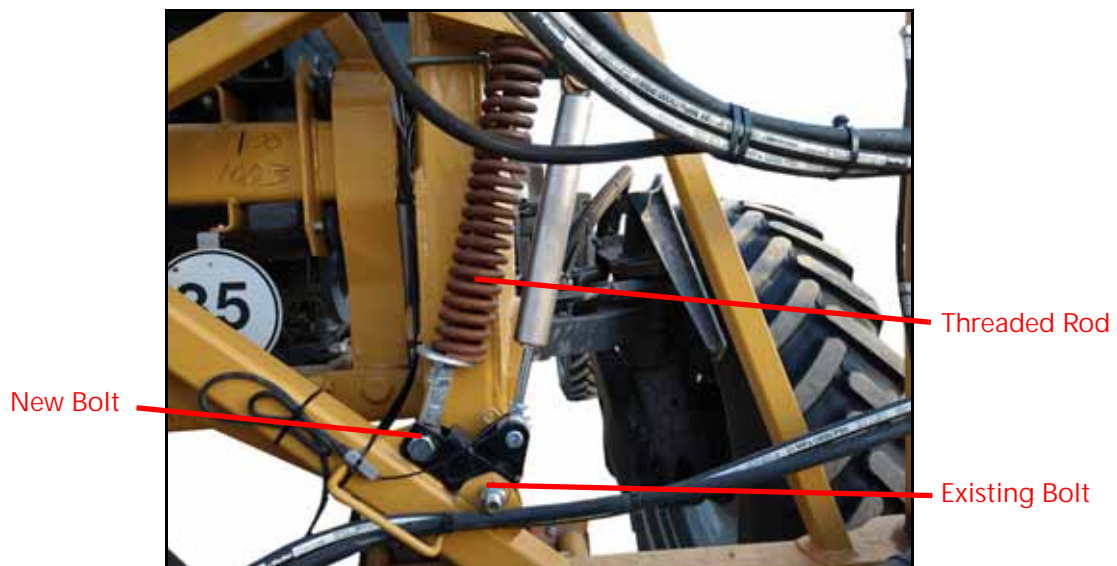
1. Unfold the booms and remove the rubber bumpers that limit center rack rotation.
2. Identify the damper installation location.

FIGURE 5. Damper Installation Location (Booms Unfolded)

Damper Installation
Location

3. Measure the distance of thread showing between jam nuts and eye swivel on spring assembly.
 4. Loosen nuts on the threaded rod holding the spring to remove as much tension as possible.
- NOTE: It will be necessary to purchase springs from your AGCO dealer if the machine is not already equipped with the spring.
5. Remove the 3/4"-10 bolt and nut holding the threaded rod and spring and remove from the machine.

FIGURE 6. Detailed Damper Installation Location



6. Install the damper mounting bracket in the location where the 3/4"-10 bolt was removed.

7. Reinstall the 3/4"-10 bolt and nut with the bolt head facing the front of the machine.

NOTE: It may be necessary to rotate the boom to ease mounting location access.

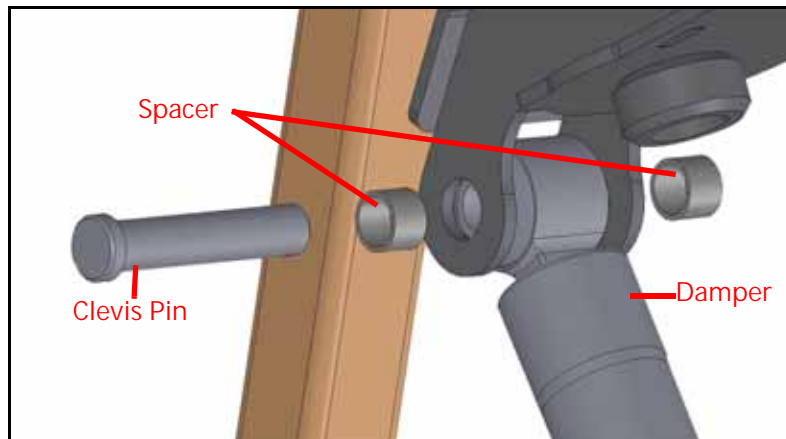
8. Install the threaded rod and spring back onto the center rack using the removed hardware. Do not tighten the spring.

NOTE: It will be necessary to compress the dampers to fit into the spacing. To do this:

- connect two ends of a ratchet strap to each other.
- place the ratchet strap around the ends of the damper like a belt.
- tighten the ratchet strap until the damper is the desired length.

9. With the rod end of the damper at the bottom, use the provided shorter 5/8" clevis pins and spacers to install the damper in the bottom holes on each bracket.

FIGURE 7. Spacer Installation on Damper



NOTE: Bushings may need to be tapped into the holes if the paint is too thick.

10. Use the provided longer 5/8" clevis pin and R-clip to install the base end of the damper in the hole in the upper bracket.

NOTE: The rack may need to be rotated to ease placing pins in the access holes.

11. Reinstall the rubber bumpers on the center rack.

NOTE: If the bumper measures 1-3/4", install two 3" fender washers onto the back of the bumper and use the provided countersunk bolt to secure in place.

FIGURE 8. Rubber Bumper

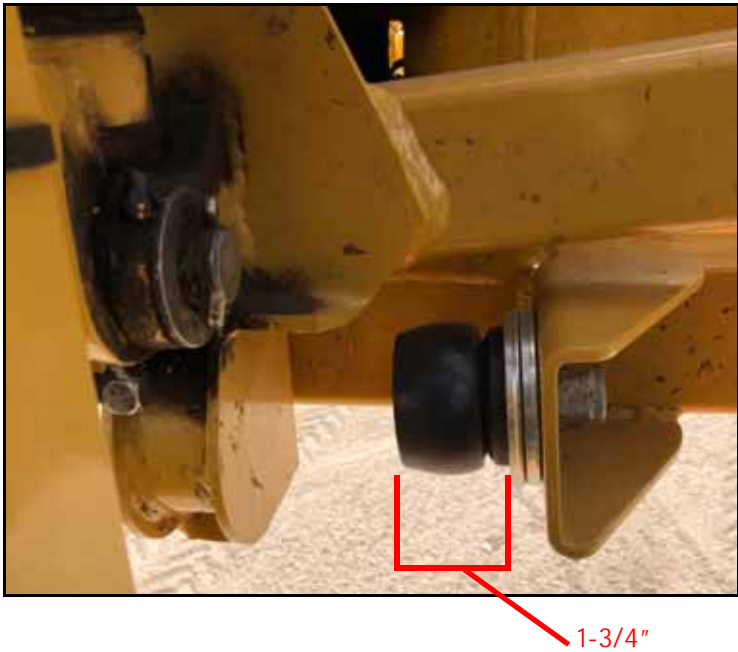
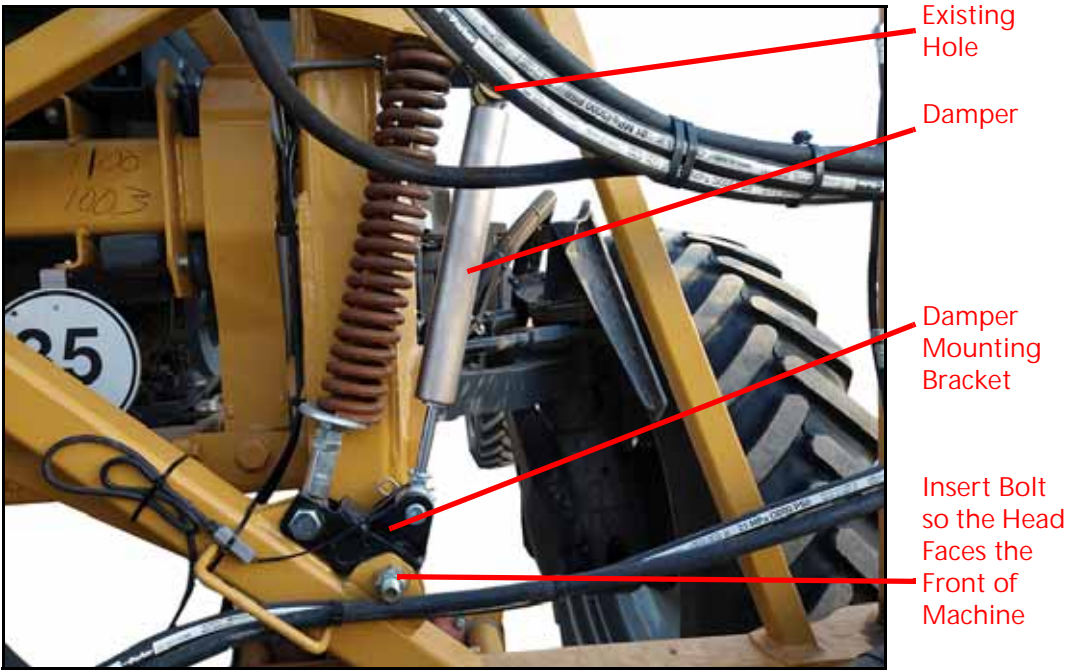


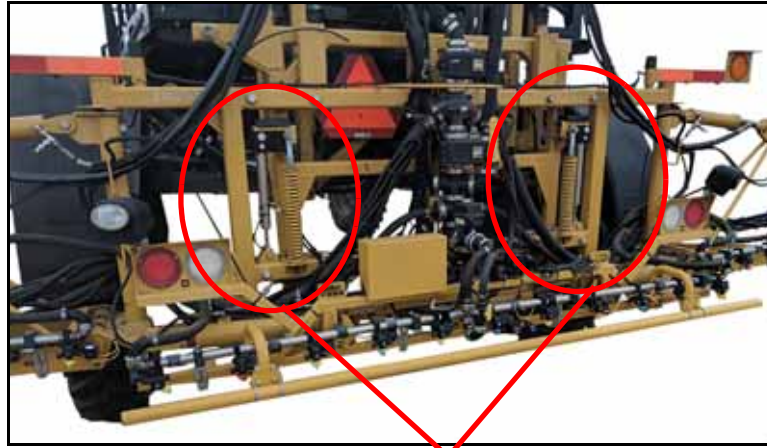
FIGURE 9. Installed Dampers



SMALL TREE

1. Unfold the booms.
2. Identify the damper installation location.

FIGURE 10. Damper Installation Location (Booms Unfolded)



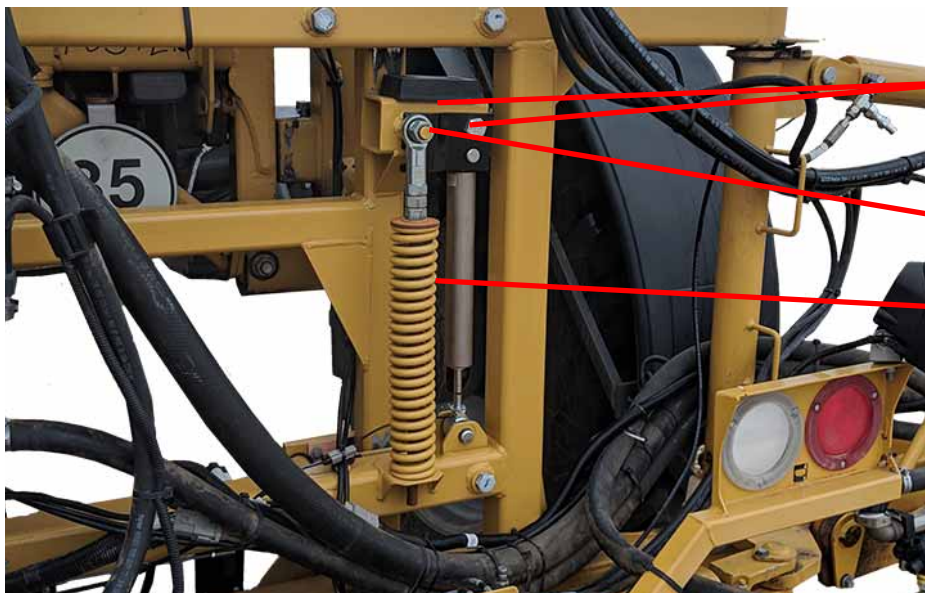
Damper Installation
Location

3. Loosen nuts on the threaded rod holding the spring to remove as much tension as possible. Note the distance of thread shown between nuts and ensure to not re-tighten the spring after installation.

NOTE: It will be necessary to purchase springs from your AGCO dealer if the machine is not already equipped with the spring.

4. Loosen the 3/4"-10 nut holding the threaded rod and spring.

FIGURE 11. Detailed Damper Installation Location



3/4" x 1-1/4"
Hardware

Existing Nut

Threaded Rod

5. Install the damper mounting bracket behind the rod end of the spring.
6. Install the two 3/4" x 1-1/4" hardware.

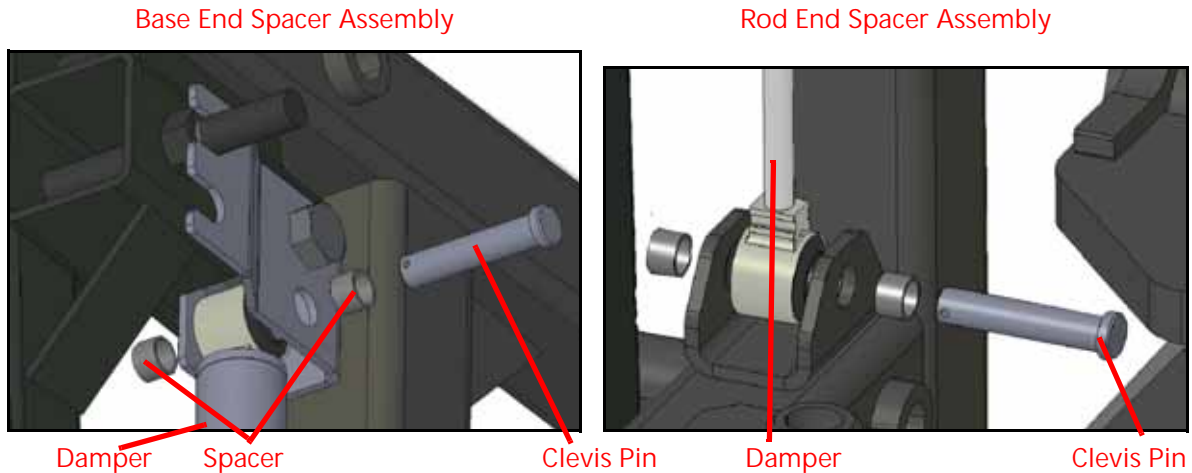
7. Tighten all hardware.

NOTE: It will be necessary to compress the dampers to fit into the spacing. To do this:

- connect two ends of a ratchet strap to each other.
- place the ratchet strap around the ends of the damper like a belt.
- tighten the ratchet strap until the damper is the desired length.

8. With the rod end of the damper at the bottom, use the provided 5/8" clevis pins and spacers to install the damper in the holes where the factory shocks were installed.

FIGURE 12. Spacer Installation on Damper

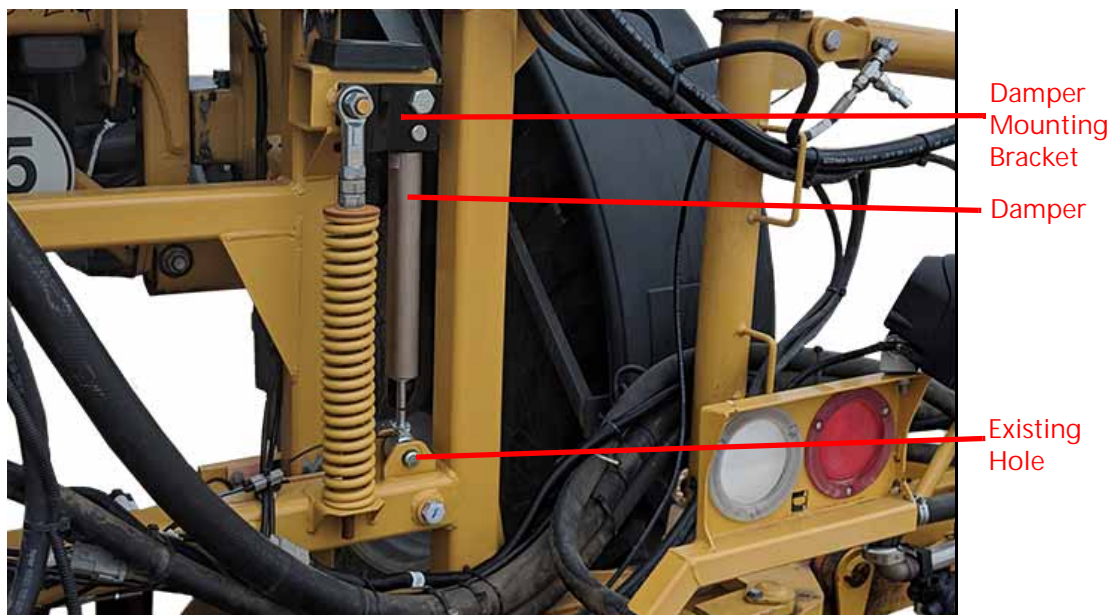


9. Use the provided 5/8" clevis pins and spacers to install the base end of the damper in the bottom holes in each bracket.

10. Install the R-clip pins in the ends of all the 5/8" clevis pins.

NOTE: The rack may need to be rotated to ease placing pins in the access holes.

FIGURE 13. Installed Dampers



11. Tighten jam nuts on spring assembly to a distance of 1.5in [3.81cm] between nuts.

FIGURE 14. Jam Nuts with a Distance of 1.5in



CHAPTER 4 SENSOR INSTALLATION


4


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 machine must remain stationary and switched off, with the boom unfolded and supported, during installation or maintenance.

1. The table below provides the approximate mounting locations for various boom widths. The information on this table is for reference only. If there is interference or other issues with these mounting locations, mount the sensors as close to these locations as possible.

TABLE 1. Sensor Mounting Location

| Boom Width | Boom Type | Inner Sensor Mounting Distance from Boom Pivot Point | Outer Sensor Mounting Distance from Boom Pivot Point |
|------------|-----------|--|--|
| 120' | Steel | 322" | 660" |
| 100' | Steel | 290" | 495" |
| 90' | Steel | 290" | 435" |

NOTE: The numbers in the table above are the approximate distance. As a rule, the sensor should be mounted half way between two spray tips to minimize potential drift interference.

2. Install the radar sensors (P/N 063-0173-962) on the sensor mounting brackets (P/N 107-0235-032) using two 1/4"-20 x 5/8" Phillips pan head bolts (P/N 311-0050-255) and two 1/4"-20 nylon locking nuts per sensor (P/N 312-4000-164).

NOTE: Install two of the sensors in one orientation and three in the other orientation on the bracket so, when installed, the sensor connection is facing towards the center of the machine.

FIGURE 1. Sensor Installed on Mounting Bracket



3. Mount the boom sensor assemblies on the back of the left-outer boom sections using 1-9/16" W x 2-1/2" L x 3/8" thread U-bolts and 3/8"-16 flanged lock nuts.

FIGURE 2. Boom Sensor Installed Near End of Boom



NOTE: The radar sensor will be mounted on the rear of the boom. Verify that the radar bracket does not hit inner boom when folding booms.

4. Mount the inner boom sensor assemblies using 1-9/16" W x 2-1/2" L x 3/8" thread U-bolts and 3/8"-16 flanged lock nuts.

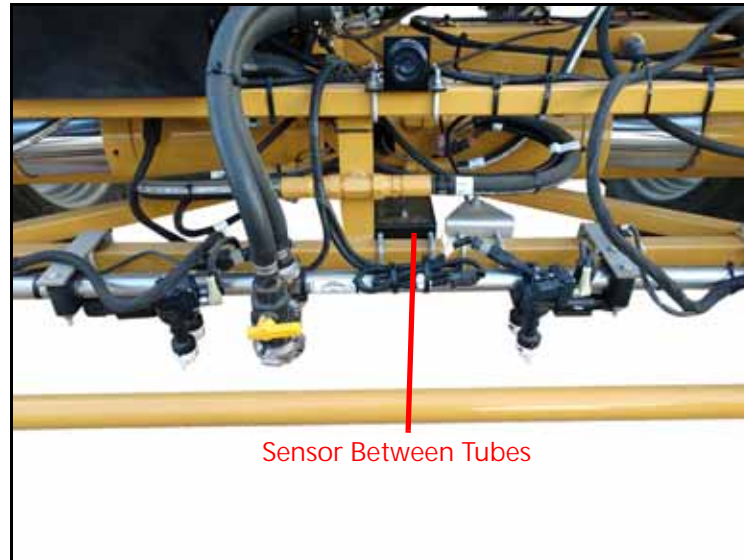
FIGURE 3. Inner Boom Sensor Installed



MOUNT THE CENTER SENSOR

1. Mount the center sensor assembly to the middle of the center rack using 1-9/16" W x 2-1/2" L x 3/8" thread U-bolts and 3/8"-16 flanged lock nuts. The center sensor may be offset from center due to the structure of the center rack.

FIGURE 4. Center Sensor Installed



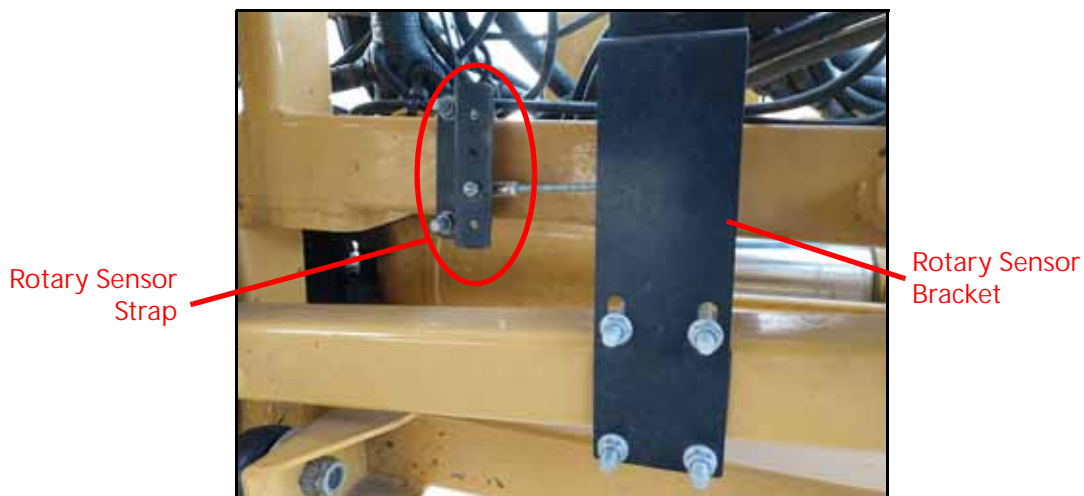
NOTE: The center sensor can be moved off center to be located directly above a row for better crop-detection performance.

CENTER RACK INSTALLATION FOR LARGE TREE

ROTARY SENSOR INSTALLATION

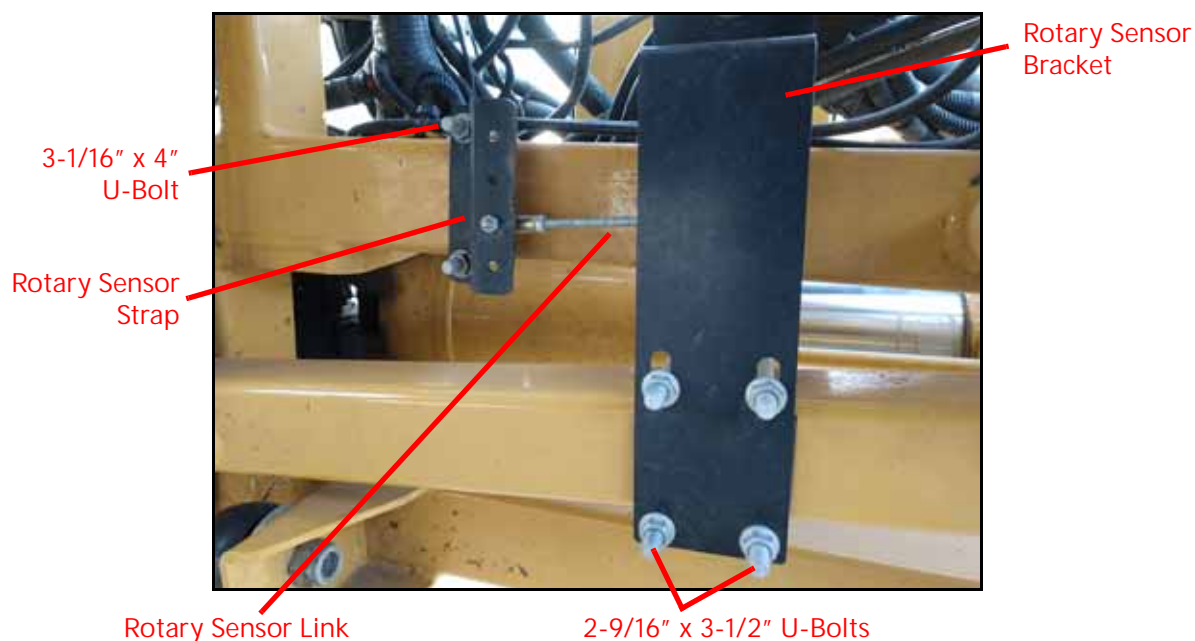
1. Locate the open position between the center rack and center frame to mount the rotary sensor assembly labeled 'CENTER RACK.'

FIGURE 5. Rotary Sensor Installation Location



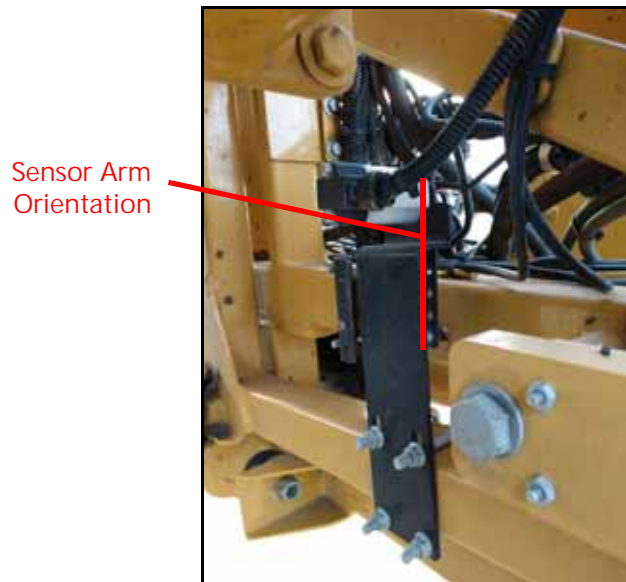
2. Using a provided 3-1/16" x 4" U-bolt, loosely install the rotary sensor strap bracket to the horizontal tube on the front side of the center rack.

FIGURE 6. Installed Rotary Sensor



3. On the center frame, use two provided 2-9/16" x 3-1/2" U-bolts to loosely install the rotary sensor bracket to the lower horizontal tube positioned between the center rack and the center frame. The sensor mounts on the right side of the center. The connector on the sensor will point toward the left side of the machine.
4. Install the rotary sensor link to the rotary sensor bracket arm and to the rotary sensor strap.
5. Using two wrenches, secure the rotary sensor link.
6. Adjust the rotary sensor bracket and the rotary sensor strap until the rotary sensor arm is vertical.

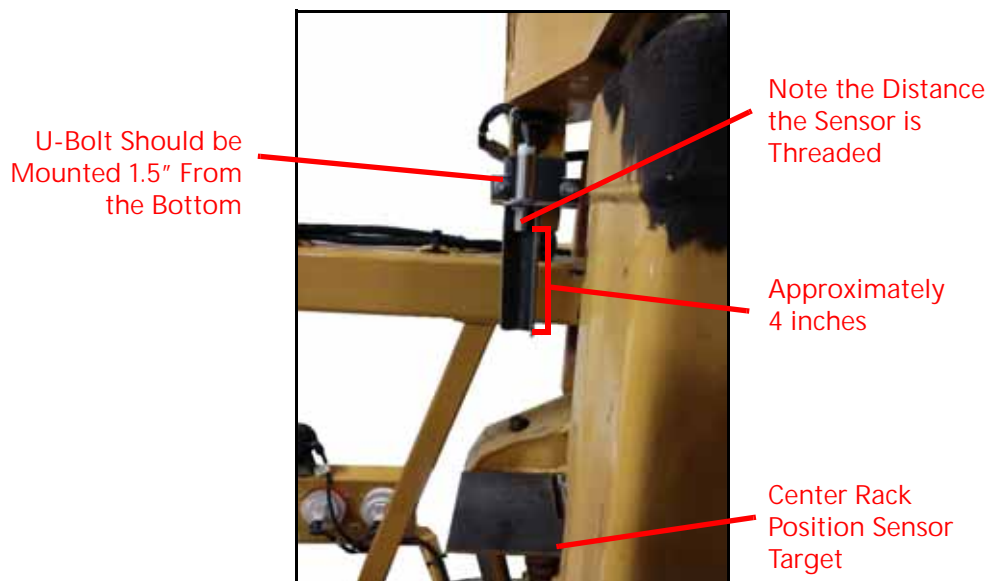
FIGURE 7. Rotary Sensor Arm Orientation



CENTER RACK POSITION SENSOR INSTALLATION

1. Use the provided U-bolts to install the center rack position sensor bracket on the tube near the top of the right-hand damper.

FIGURE 8. Center Rack Position Sensor Bracket



2. Install the height stop sensor assembly to the bracket shown in Figure 8 on page 23 and secure with panel nuts.
3. Connect the 115-0235-041 cable to the height stop sensor.
4. Use the provided U-bolts to install the center rack position target below the center rack height sensor.

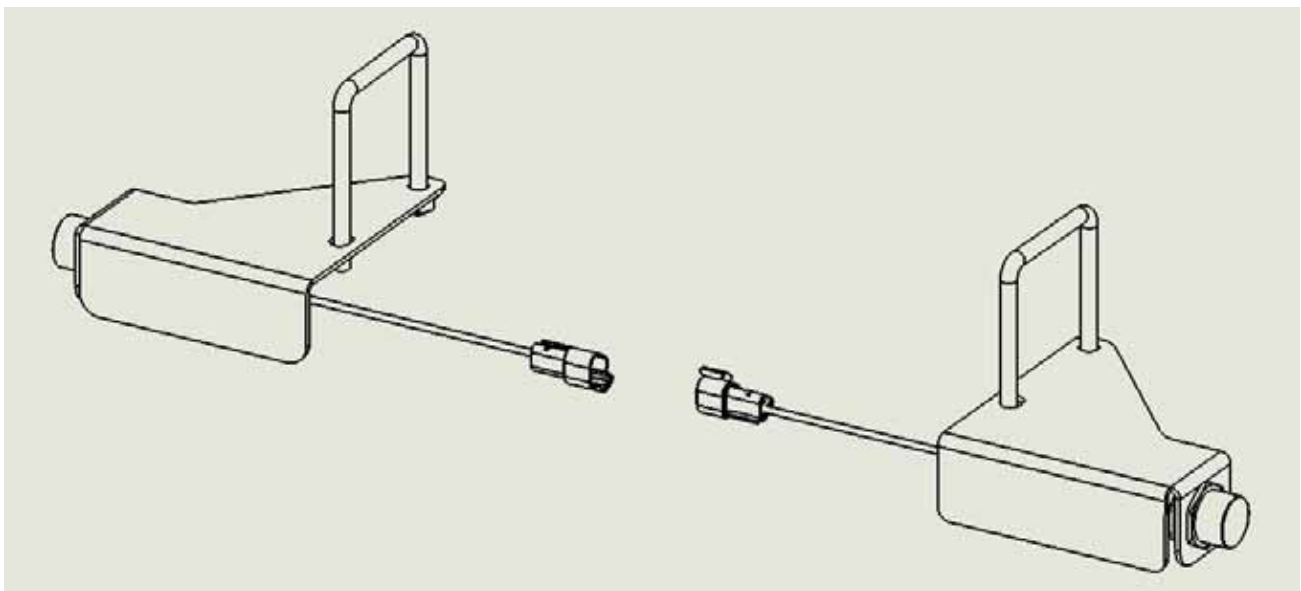
FIGURE 9. Center Rack Position Target



BOOM PROXIMITY SENSOR INSTALLATION

1. Install the proximity sensor assembly to the bracket shown in Figure 10, "Large Tree Proximity Sensor," on page 24 and secure with panel nuts.

FIGURE 10. Large Tree Proximity Sensor



2. Connect the 115-0235-040 cable to the proximity sensor.
3. Use the provided U-Bolts to install the boom proximity sensor bracket to the center rack cross tube near the left boom pivot as shown in Figure 11, "Boom Proximity Sensor Bracket," on page 25.

FIGURE 11. Boom Proximity Sensor Bracket



NOTE: The proximity sensor must be mounted so there is no more than 1/2 inch [1.27 cm] of clearance when the booms are folded.

4. Repeat step 1 through step 3 for the right boom with the remaining proximity sensor and bracket.

TILT SENSOR INSTALLATION

1. Locate the open position between the bottom hinge plate and the hose bracket on the yaw hinge tube on the center rack.

FIGURE 12. Tilt Sensor Installed - Right Hand Boom



2. Using a provided clamping U-bolt, loosely install the rotary sensor strap bracket to the vertical tube on the front side of the center rack.

NOTE: The bracket labeled "Tilt 2" goes on the right hand boom. The bracket labeled "Tilt 1" goes on the left hand boom.

3. On the front slanted tube on the front of the boom, use two provided clamping U-bolts to loosely install the rod end bracket to the boom. The holes will extend toward the center of the machine.
4. Install the rotary sensor link to the rotary sensor bracket arm to the rod end bracket.
5. Using two wrenches, secure the rotary sensor link.
6. Adjust the rotary sensor bracket and the rotary sensor strap until the rotary sensor arm is horizontal.
7. Repeat step 1 through step 6 on the boom for the opposite side.

NOTE: The sensor brackets can be installed higher or lower on the vertical tube as needed to provide clearance between mounting hardware and machine hoses.

If mounting is changed from the images shown, be sure to validate during setup that the voltage for each boom changes at least 2.0V between tilted fully up and fully down.

8. Voltage should always be between 0.6V and 4.4V.

CENTER RACK INSTALLATION FOR SMALL TREE

ROTARY SENSOR INSTALLATION

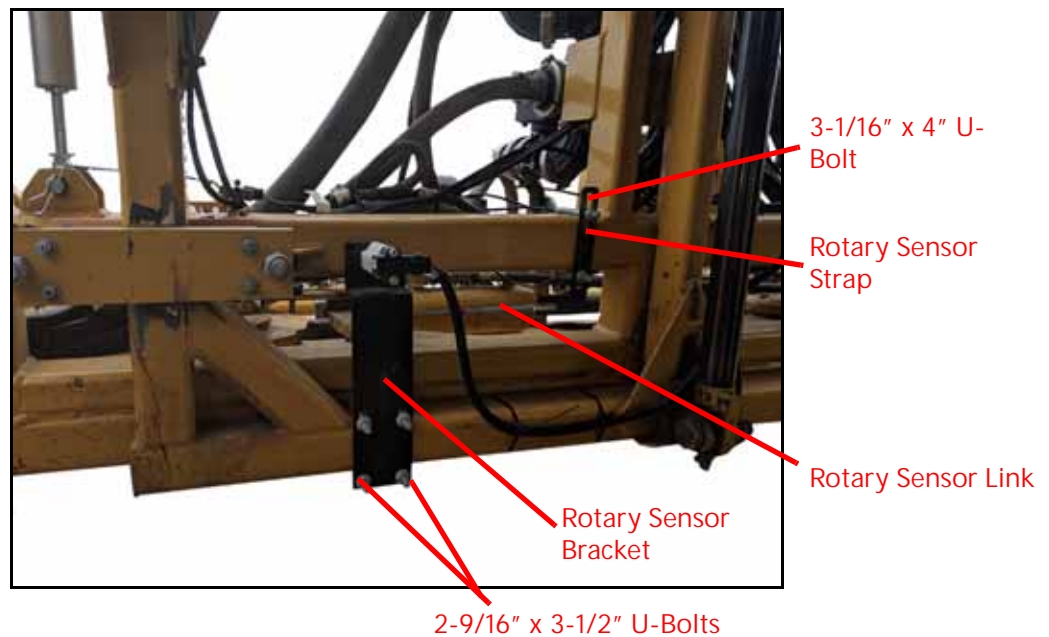
1. Locate the open position between the center rack and center frame to mount the rotary sensor assembly labeled 'CENTER RACK.'

FIGURE 13. Rotary Sensor Installation Location



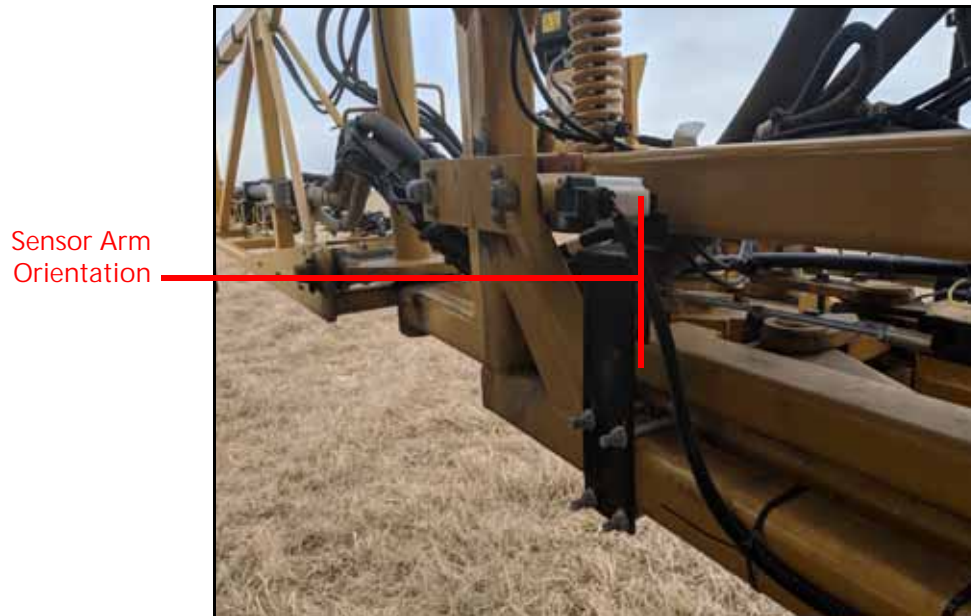
2. Using a provided 3-1/16" x 4" U-bolt, loosely install the rotary sensor strap bracket to the horizontal tube on the front side of the center rack.

FIGURE 14. Installed Rotary Sensor



3. On the center frame, use two provided 2-9/16" x 3-1/2" U-bolts to loosely install the rotary sensor bracket to the lower horizontal tube positioned between the center rack and the center frame. The sensor mounts on the right side of the center. The connector on the sensor will point toward the right side of the machine.
4. Install the rotary sensor link to the rotary sensor bracket arm and to the rotary sensor strap.
5. Using two wrenches, secure the rotary sensor link.
6. Adjust the rotary sensor bracket and the rotary sensor strap until the rotary sensor arm is vertical.

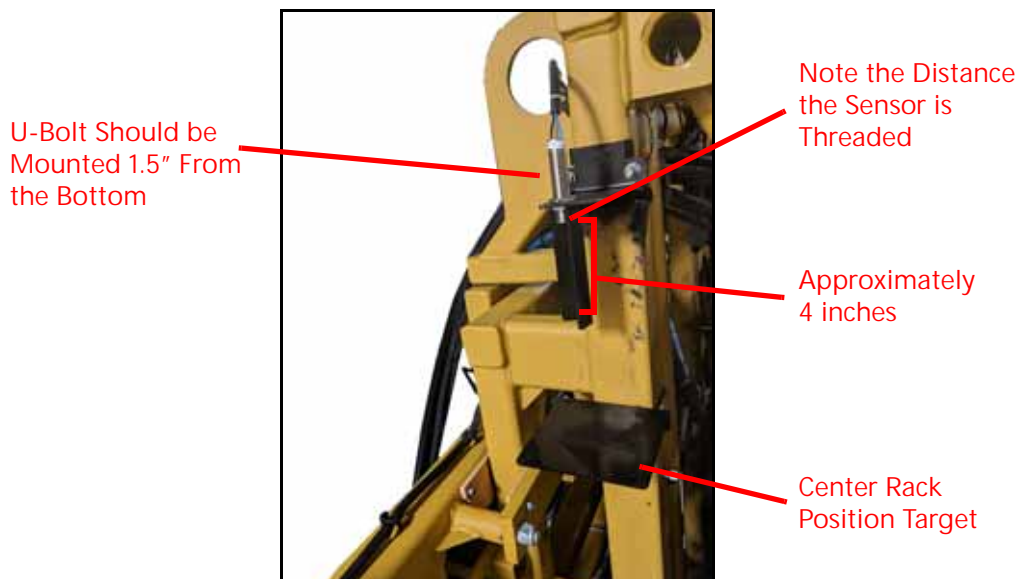
FIGURE 15. Rotary Sensor Arm Orientation



CENTER RACK POSITION INSTALLATION

1. Use the provided U-bolts to install the center rack position bracket on the tube near the top of the right-hand damper.

FIGURE 16. Center Rack Position Bracket

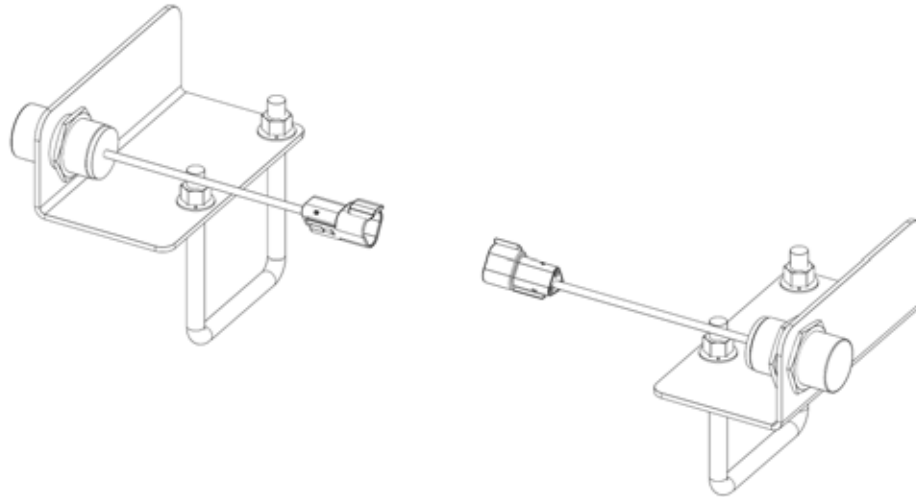


2. Install the height stop sensor assembly to the bracket in the position shown in Figure 16 on page 28.
3. Connect the 115-0235-041 cable to the height stop sensor.
4. Use the provided U-bolts to install the center rack position target below the center rack height sensor.

BOOM PROXIMITY SENSOR INSTALLATION

1. Install the proximity sensor assembly for the left side to the bracket as shown (mirrored for the right side) in Figure 17, "Small Tree Proximity Sensor," on page 29 and secure with panel nuts.

FIGURE 17. Small Tree Proximity Sensor



2. Connect the 115-0235-040 cable to the proximity sensor.
3. Use the provided U-bolts to install the boom proximity sensor bracket to the center rack cross tube near the left boom pivot as shown in Figure 18, "Boom Proximity Sensor Bracket," on page 29.

FIGURE 18. Boom Proximity Sensor Bracket



NOTE: The proximity sensor must be mounted so there is no more than 1/2 inch [1.27 cm] of clearance when the booms are folded.

4. Repeat step 1 through step 3 for the right boom with the remaining proximity sensor and bracket.

TILT SENSOR INSTALLATION

1. Locate the open position between the bottom hinge plate and the hose bracket on the yaw hinge tube on the center rack.

FIGURE 19. Tilt Sensor Installed - Left Hand Boom and Right Hand Boom



2. Using a provided clamping U-bolt, loosely install the rotary sensor strap bracket to the vertical tube on the back side of the center rack.
- NOTE: The bracket labeled "Tilt 1" goes on the right hand boom. The bracket labeled "Tilt 2" goes on the left hand boom.
3. On the rear slanted tube on the rear of the boom, use two provided clamping U-bolts to loosely install the rod end bracket to the boom. The holes will extend toward the center of the machine.
 4. Install the rotary sensor link to the rotary sensor bracket arm to the rod end bracket.
 5. Using two wrenches, secure the rotary sensor link.
 6. Adjust the rotary sensor bracket and the rotary sensor strap until the rotary sensor arm is horizontal.
 7. Repeat step 1 through step 6 on the boom for the opposite side.

NOTE: The sensor brackets can be installed higher or lower on the vertical tube as needed to provide clearance between mounting hardware and machine hoses.

If mounting is changed from the images shown, be sure to validate during setup that the voltage for each boom changes at least 2.0V between tilted fully up and fully down.

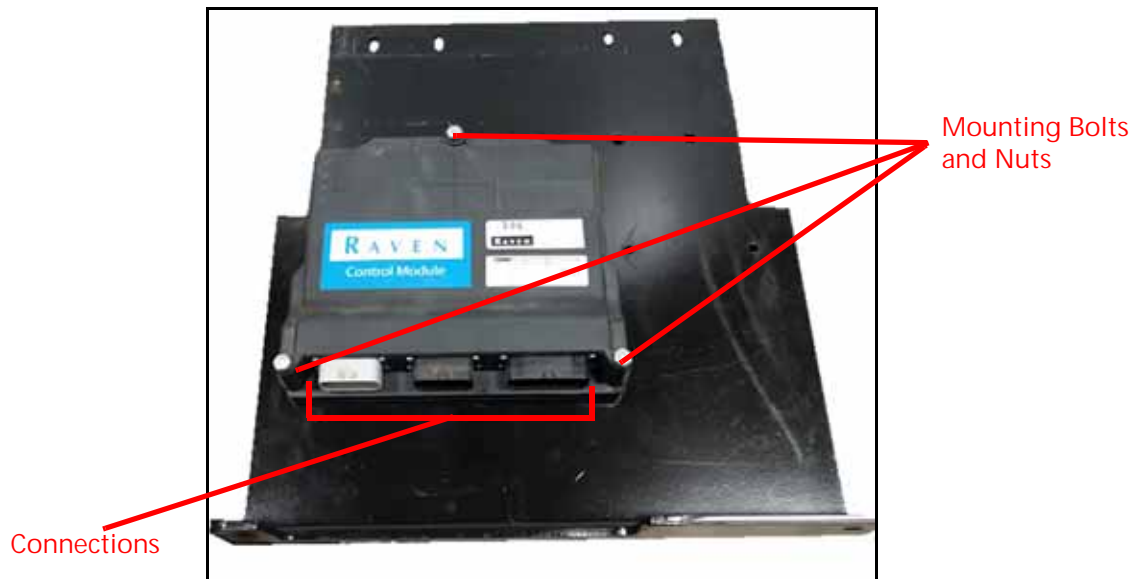
Voltage should always be between 0.6V and 4.4V.

ABM AND REM NODE INSTALLATION

1. Using the provided 1/4"-20 bolts and lock nuts, secure the REM node to the clearance holes on the AutoBoom node mounting bracket.

NOTE: Mount the node so that the receptacles are facing down.

FIGURE 1. Installed REM Node



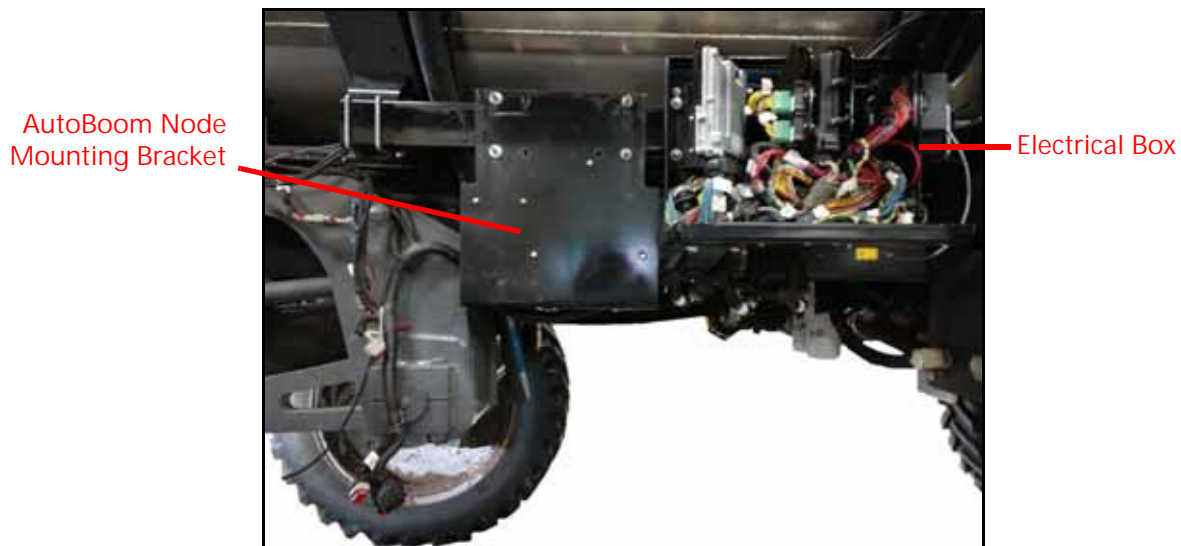
2. The ABM node is mounted to the right of the REM node. Use the provided hardware to mount the ABM node.

FIGURE 2. REM and ABM Node Mounted



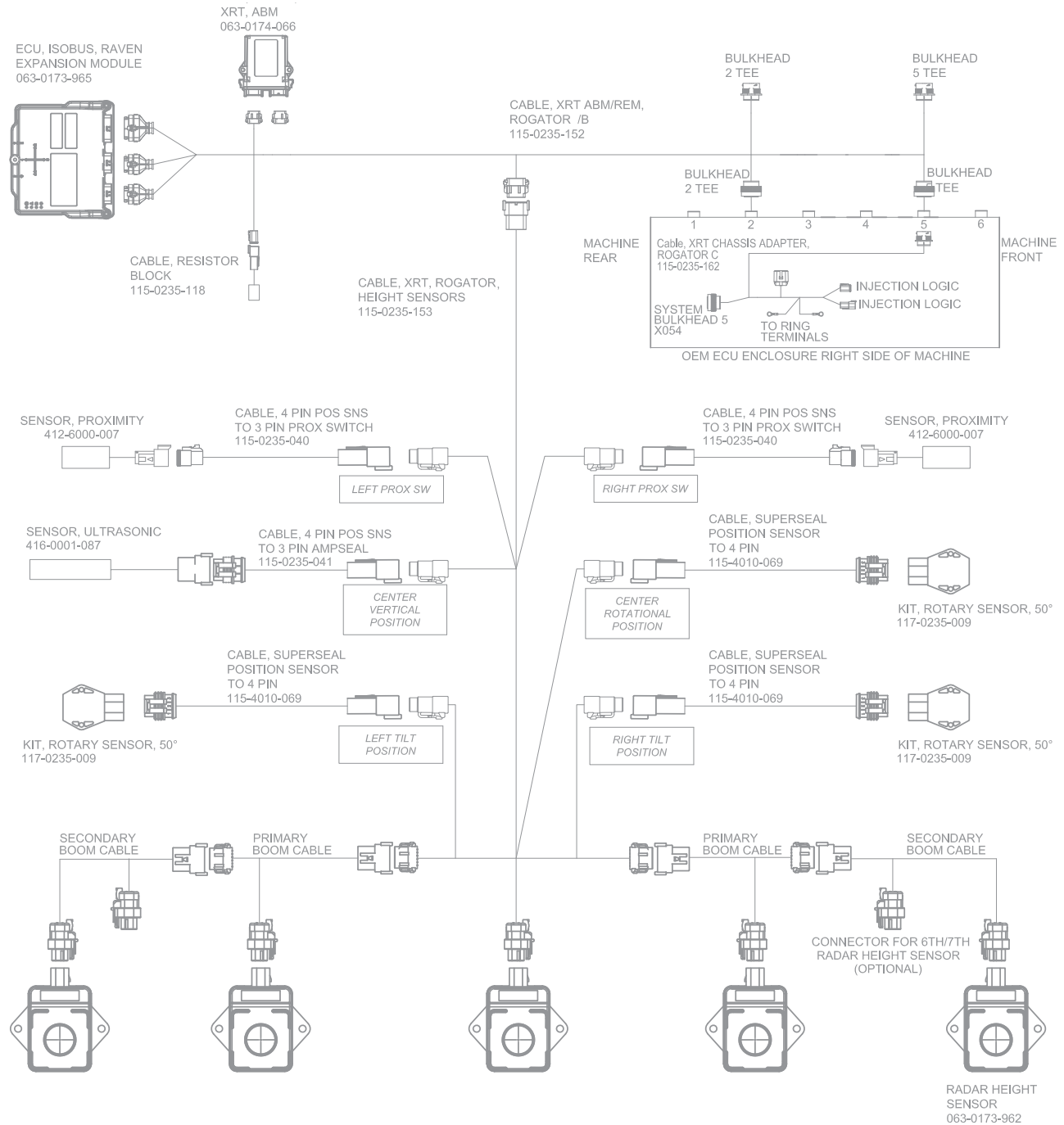
3. Locate the machine electrical box.
4. Use the supplied hardware to mount the bracket to the machine frame next to the electrical box.

FIGURE 3. Node Mounting Bracket



ELECTRICAL DIAGRAMS

FIGURE 4. XRT System Diagram for RoGator Series (P/N 054-0237-020-A)



CONNECT THE ABM/REM HARNESS

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

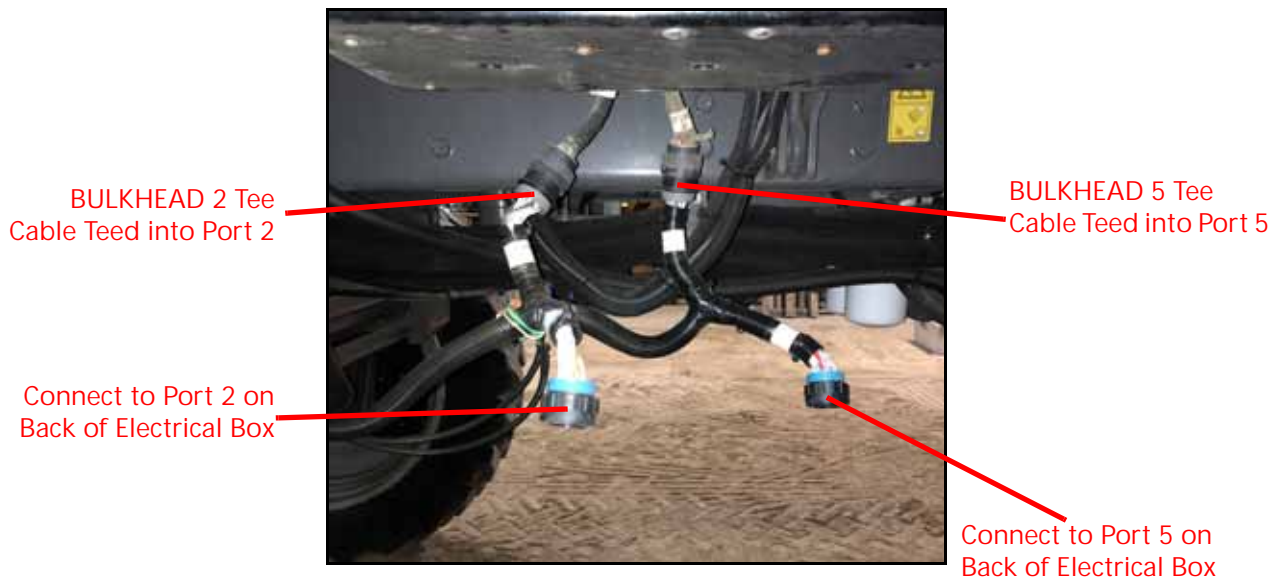
1. Plug gray 23 pin plug on the ABM/REM cable (P/N 115-0235-152) to the mating connector on the bottom of the REM node.
2. Plug black 23 pin plug on the XRT cable to the mating connector on the bottom of the REM node.
3. Plug black 35 pin plug on the XRT cable to the mating connector on the bottom of the REM node.
4. Connect the connector labeled ABM to the AutoBoom node.
5. Use the provided 12-pin green DTM plug to protect the unused connector of the ABM node.

FIGURE 5. AutoBoom Cable Connected to Node



6. Disconnect the Bulkhead Connector 2 from port 2 on the back of the electrical box and connect it to the BULKHEAD 2 ABM/REM Tee cable.

FIGURE 6. Installing Tee Connectors

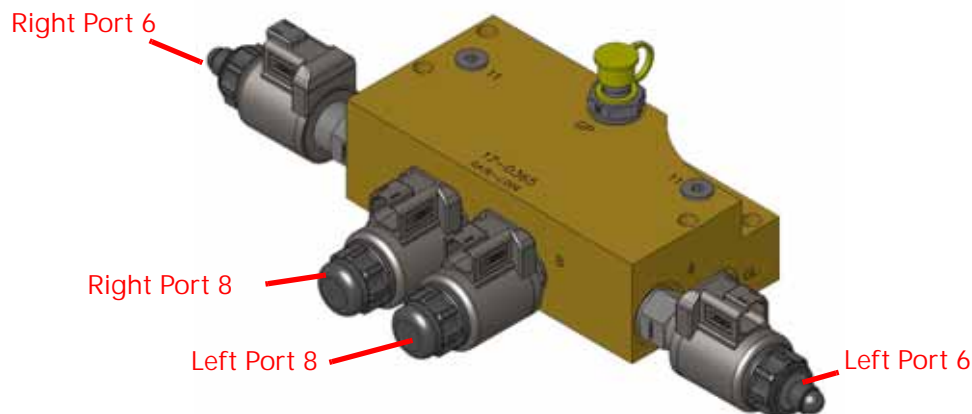


7. Connect the other end of the bulkhead 2 tee back into port 2 on the back of the electrical box.
8. Disconnect the Bulkhead Connector 5 from port 5 on the back of the electrical box.
9. Remove the nut securing the bulkhead 5 plug to the electrical box.
10. Access the inside of the electrical box and locate the bulkhead 5 plug.
11. Install the Chassis Adapter cable (P/N 115-0235-162) bulkhead plug into the open location on the back of the electrical box and secure with a nut.
12. Connect the other end of the bulkhead 5 tee back into the plug now in port 5 on the back of the electrical box.
13. Plug the machines bulkhead 5 connector into the mating connector on the Chassis Adapter cable.
14. Install the ground and power ring terminals to the power and grounds studs on the right wall of the electrical box.
15. Locate the INJECTION LOGIC CONNECTOR on the inside of the electrical box.
 - a. If there isn't a cable connected to the INJECTION LOGIC CONNECTOR, plug the end into the LOGIC PWR tee connector on the 115-0235-162 cable.
 - b. If there is a cable connected to the INJECTION LOGIC CONNECTOR, disconnect the existing cable and install the LOGIC PWR tee cable between the existing connections.

NOTE: If the machine already has AutoBoom installed, please remove the AutoBoom tee from the AUTOBOOM TIP CONTROL plugs.

16. Install the RESISTOR BLOCK cable (P/N 115-0235-118) to the 6-pin plug on the XRT cable.
17. Locate the RoGator C Valve cable (P/N 115-0235-112).
18. Connect the plug labeled DAMPER 1 to the mating receptacle on the right damper.
19. Connect the plug labeled DAMPER 2 to the mating receptacle on the left damper.
20. Connect the LEFT SOLENOID plug on the XRT cable to the left port 8 on the AutoBoom XRT valve.

FIGURE 7. AutoBoom XRT Valve



21. Connect the RIGHT SOLENOID plug on the XRT cable to the right port 8 on the AutoBoom XRT valve.
22. Connect the LEFT PROP plug on the XRT cable to left port 6 on the AutoBoom XRT valve.
23. Connect the RIGHT PROP plug on the XRT cable to right port 6 on the AutoBoom XRT valve.
24. Connect the 12-pin receptacle on the valve harness to the existing machine plug labeled X5033 behind the valve.

NOTE: The ACCUMULATOR POWER connector is not used on this installation.

CONNECT THE HARNESS TO THE SENSORS

1. Starting at the outside sensor on the right boom and working towards the center right, connect the secondary boom cable to the outside height sensor. Refer to Figure 4 on page 33 for an electrical system diagram.
2. Connect the secondary boom cable to the primary boom cable.

NOTE: Leave sufficient slack in the harness to prevent pulling on connectors during operations such as boom folding.

3. Connect the plug on the primary boom cable to the inner height sensor.
4. Connect the 12-pin receptacle on the primary boom cable to the mating connector on the height sensor cable.
5. Repeat step 1 through step 4 for the left boom.
6. Connect the center height sensor to the mating plug on the Height Sensor cable (P/N 115-0235-153).
7. Connect the CENTER ROTATION POSITION SENSOR plug to the SUPERSEAL POSITION SENSOR cable (P/N 115-4010-069).
8. Connect the other end of the SUPERSEAL POSITION SENSOR cable to the rotary sensor installed earlier.
9. Connect the CENTER RACK VERT POSITION SENSOR plug to the 3-pin AMPSEAL cable (P/N 115-0235-041).
10. Connect the other end of the 3-pin AMPSEAL cable to the height stop sensor installed earlier.
11. Connect the remaining 12-pin receptacle on the height sensor cable to the mating connector on the ABM/REM cable located near the electrical box.
12. Connect the LEFT CYLINDER POSITION plug to the SUPERSEAL POSITION SENSOR (P/N 115-4010-069) cable attached to the left boom tilt sensor.
13. Connect the RIGHT CYLINDER POSITION plug to the SUPERSEAL POSITION SENSOR (P/N 115-4010-069) cable attached to the right boom tilt sensor.
14. Connect the LEFT PROX SW plug to the 3-PIN PROX SWITCH (P/N 115-4010-040) cable attached to the left boom proximity sensor.
15. Connect the RIGHT PROX SW plug to the 3-PIN PROX SWITCH (P/N 115-4010-040) cable attached to the right boom proximity sensor.

NOTE: Refer to the XRT Calibration and Operation Manual (P/N 115-0235-001) to complete the XRT setup.

A

XRT KITS

The following kits are included in this appendix:

TABLE 1. AutoBoom XRT Kits

| Kit Description | Kit Number- |
|---|--------------|
| Kit, AutoBoom XRT, AGCO RoGator, Large Tree, 90'/100' Steel Boom | 117-0237-020 |
| Kit, AutoBoom XRT, AGCO RoGator, Small Tree, 90'/100' Steel Boom | 117-0237-021 |
| Kit, AutoBoom XRT, AGCO RoGator, Large Tree, 120' Steel Boom | 117-0237-022 |
| Kit, AutoBoom XRT, AGCO RoGator, Large Tree, 90'/100' Steel Boom, No Hydraulics | 117-0237-023 |
| Kit, AutoBoom XRT, AGCO RoGator, Small Tree, 90'/100' Steel Boom, No Hydraulics | 117-0237-024 |
| Kit, AutoBoom XRT, AGCO RoGator, Large Tree, 120' Steel Boom, No Hydraulics | 117-0237-025 |

FIGURE 1. Kit, AutoBoom XRT, AGCO RoGator, Large Tree, 90'/100' Steel Boom
(P/N 117-0237-020 Page 1)

| QTY | PART # | DESCRIPTION |
|-----|---------------|--|
| 1 | 053-0159-197 | BOX, SHIPPING (LABELED BOX 1 OF 4) |
| 1 | 334-0235-004 | VALVE, HYDRAULIC, CLOSED CENTER, ABM XRT, ROGATOR |
| 1 | 063-0235-001 | ASSEMBLY, ROTARY SENSOR, AUTOBOOM XRT, CENTER RACK |
| 1 | 063-0235-016 | ASSEMBLY, ROTARY SENSOR, TILT 1, ROGATOR |
| 1 | 063-0235-017 | ASSEMBLY, ROTARY SENSOR, TILT 2, ROGATOR |
| 1 | 107-0235-014 | STRAP, ROTARY SENSOR |
| 1 | 107-0235-015 | PLATE, MOUNTING, REM, ROGATOR |
| 2 | 115-0235-040 | CABLE, 6', 4 PIN POS. SENS TO 3 PIN PROX SWITCH |
| 1 | 115-0235-162 | CABLE, XRT CHASSIS ADAPTER ROGATOR A/B |
| 1 | 115-0235-112 | CABLE, XRT, ROGATORC VALVE |
| 3 | 115-4010-069 | CABLE, SUPERSEAL POSITION SENSOR TO 4 PIN |
| 2 | 412-6000-007 | PROXIMITY SENSOR, INDUCTIVE, 15MM RANGE PNP NO |
| 1 | 107-0235-065 | BRACKET, PROXIMITY SENSOR, ROGATOR, RH |
| 1 | 107-0235-066 | BRACKET, PROXIMITY SENSOR, ROGATOR, LH |
| 1 | 053-0159-015 | ENVELOPE, PLASTIC |
| 3 | 107-0171-608 | U-BOLT 3 1/16"WX4"LX3/8"THD |
| 2 | 107-0171-616 | U-BOLT 2 9/16"WX3 1/2"LX3/8"TH |
| 2 | 107-0171-852 | U-BOLT 4 1/16"WX3"LX3/8"TH |
| 1 | 107-0172-205 | ROD, THREADED, M6 |
| 1 | 311-0050-236 | BOLT MACHINE HEX HEAD 1/4-20 X 2-1/2 LONG, STAINLESS S |
| 2 | 311-0050-238 | BOLT MACHINE HEX HEAD 1/4-20 X 3 LONG, STAINLESS STEEL |
| 2 | 311-0050-231 | BOLT MACHINE HEX HEAD 1/4-20 X 1.25 LONG, STAINLESS ST |
| 1 | 311-0052-108 | BOLT, 5/16-18 X 1.75 LG |
| 3 | 311-0052-111 | BOLT, 5/16-18 X 2.50 LG |
| 14 | 312-4000-252 | NUT, FLANGE, LOCK, 3/8 |
| 5 | 312-4000-164 | NUT, 1/4-20 NYLON LOCKING, SS |
| 4 | 313-1000-019 | WASHER, LOCK, 5/16", ZINC PLATED |
| 5 | 313-2301-810 | WASHER, FLAT, 1/4, NARROW |
| 3 | 311-4050-188K | BOLT, HEX HEAD, M8-1.25 x 65MM LG |
| 1 | 311-4050-184K | BOLT, HEX HEAD, M8-1.25 x 45MM LG |
| 2 | 435-3003-077 | U-BOLT, CLAMPING 4.00 NOM |
| 2 | 435-3003-082 | U-BOLT, CLAMPING, 1-1/8" I.D., 1/4"-20 UNC |
| 1 | 053-0159-006 | ENVELOPE, PLASTIC |
| 4 | 219-0001-015 | O-RING, BUNA-N, 9/16" I.D. CONT... |

FIGURE 2. Kit, AutoBoom XRT, AGCO RoGator, Large Tree, 90'/100' Steel Boom
(P/N 117-0237-020 Page 2)

| QTY | PART # | DESCRIPTION |
|------------|---------------|--|
| 1 | 053-0159-057 | PREV... ENVELOPE, PLASTIC |
| 2 | 107-0235-057 | BRACKET, ROD END, ROGATOR B |
| 2 | 107-0172-434 | ROD, THREADED, M6-1 |
| 4 | 312-6000-017K | HEX NUT, DIN934, M6 |
| 4 | 312-6001-017K | HEX NUT, NYLOCK, DIN985, M6 |
| 4 | 325-0000-031 | BEARING, ROD END, 90 DEG LINK BALL TYPE, M6 |
| 1 | 053-0159-079 | BOX, SHIPPING (LABELED BOX 2 OF 4) |
| 1 | 016-0171-649 | SHEET, WARRENTY/HELP (016-0237-001) |
| 1 | 063-0173-965 | ECU, ISOBUS, REM, RAVEN |
| 1 | 063-0174-066 | XRT ABM WITH AUTOBOOM UNLOCK |
| 1 | 115-0235-152 | CABLE, XRT ABM/REM, ROGATOR |
| 1 | 115-0235-153 | CABLE, XRT ROGATOR, HEIGHT SENSOR |
| 1 | 115-0235-118 | CABLE, XRT LOAD RESISTOR |
| 1 | 117-0237-002 | XRT, BOOM, ROG C 90'/100' STEEL (LABELED BOX 3 OF 4) |
| 1 | 117-0237-006 | ABM XRT DMPPER, ROG C, LG TREE (LABELED BOX 4 OF 4) |

FIGURE 3. Kit, AutoBoom XRT, AGCO RoGator, Small Tree, 90'/100' Steel Boom
(P/N 117-0237-021 Page 1)

| QTY | PART # | DESCRIPTION |
|-----|---------------|--|
| 1 | 053-0159-197 | BOX, SHIPPING (LABELED BOX 1 OF 4) |
| 1 | 334-0235-004 | VALVE, HYDRAULIC, CLOSED CENTER, ABM XRT, ROGATOR |
| 1 | 063-0235-001 | ASSEMBLY, ROTARY SENSOR, AUTOBOOM XRT, CENTER RACK |
| 1 | 063-0235-016 | ASSEMBLY, ROTARY SENSOR, TILT 1, ROGATOR |
| 1 | 063-0235-017 | ASSEMBLY, ROTARY SENSOR, TILT 2, ROGATOR |
| 1 | 107-0235-015 | PLATE, MOUNTING, REM, ROGATOR |
| 1 | 107-0172-435 | STRAP, ROTARY SENSOR |
| 1 | 115-0235-040 | CABLE, 6', 4 PIN POS. SNS TO 3 PIN PROX SWITCH |
| 1 | 115-0235-162 | CABLE, XRT CHASSIS ADAPTER ROGATOR A/B |
| 1 | 115-0235-112 | CABLE, XRT, ROGATORC VALVE |
| 1 | 115-4010-069 | CABLE, SUPERSEAL POSITION SENSOR TO 4 PIN |
| 2 | 412-6000-007 | PROXIMITY SENSOR, INDUCTIVE, 15MM RANGE PNP NO |
| 1 | 107-0235-067 | BRACKET, PROXIMITY SENSOR, ROGATOR, SMALL TREE RH |
| 1 | 107-0235-068 | BRACKET, PROXIMITY SENSOR, ROGATOR, SMALL TREE LH |
| 1 | 053-0159-015 | ENVELOPE, PLASTIC |
| 3 | 107-0171-608 | U-BOLT 3 1/16"WX4"LX3/8"THD |
| 3 | 107-0171-616 | U-BOLT 2 9/16"WX3 1/2"LX3/8"TH |
| 2 | 107-0171-852 | U-BOLT 4 1/16"WX3"LX3/8"TH |
| 1 | 107-0172-434 | ROD, THREADED, M6 |
| 1 | 311-0050-236 | BOLT MACHINE HEX HEAD 1/4-20 X 2-1/2 LONG, STAINLESS S |
| 2 | 311-0050-238 | BOLT MACHINE HEX HEAD 1/4-20 X 3 LONG, STAINLESS STEEL |
| 2 | 311-0050-231 | BOLT MACHINE HEX HEAD 1/4-20 X 1.25 LONG, STAINLESS ST |
| 1 | 311-0052-108 | BOLT, 5/16-18 X 1.75 LG |
| 3 | 311-0052-111 | BOLT, 5/16-18 X 2.50 LG |
| 18 | 312-4000-252 | NUT, FLANGE, LOCK, 3/8 |
| 5 | 312-4000-164 | NUT, 1/4-20 NYLON LOCKING, SS |
| 4 | 313-1000-019 | WASHER, LOCK, 5/16", ZINC PLATED |
| 5 | 313-2301-810 | WASHER, FLAT, 1/4, NARROW |
| 3 | 311-4050-188K | BOLT, HEX HEAD, M8-1.25 x 65MM LG |
| 1 | 311-4050-184K | BOLT, HEX HEAD, M8-1.25 x 45MM LG |
| 2 | 435-3003-077 | U-BOLT, CLAMPING, 4.00 NOM. |
| 2 | 435-3003-082 | U-BOLT, CLAMPING, 1-1/8" I.D., 1/4"-20 UNC |
| 1 | 053-0159-006 | ENVELOPE, PLASTIC |
| 4 | 219-0001-015 | O-RING, BUNA-N, 9/16" I.D. |
| | | CONT... |

FIGURE 4. Kit, AutoBoom XRT, AGCO RoGator, Small Tree, 90'/100' Steel Boom
(P/N 117-0237-021 Page 2)

| QTY | PART # | DESCRIPTION |
|------------|---------------|---|
| 1 | 053-0159-057 | PREV... ENVELOPE, PLASTIC |
| 2 | 107-0235-057 | BRACKET, ROD END, ROGATOR B |
| 2 | 107-0172-434 | ROD, THREADED, M6-1 |
| 4 | 312-6000-017K | HEX NUT, DIN934, M6 |
| 4 | 312-6001-017K | HEX NUT, NYLOCK, DIN985, M6 |
| 4 | 325-0000-031 | BEARING, ROD END, 90 DEG LINK BALL TYPE, M6 |
| 1 | 053-0159-079 | BOX, SHIPPING (LABELED BOX 2 OF 4) |
| 1 | 016-0171-649 | SHEET, WARRENTY/HELP (016-0237-001) |
| 1 | 063-0173-965 | ECU, ISOBUS, REM, RAVEN |
| 1 | 063-0174-066 | XRT ABM WITH AUTOBOOM UNLOCK |
| 1 | 115-0235-152 | CABLE, XRT ABM/REM, ROGATOR |
| 1 | 115-0235-153 | CABLE, XRT ROGATOR, HEIGHT SENSOR |
| 1 | 115-0235-118 | CABLE, XRT LOAD RESISTOR |
| 1 | 117-0237-002 | XRT, BOOM, ROG C 90/100' STEEL (LABELED BOX 3 OF 4) |
| 1 | 117-0237-005 | ABM XRT DMPER, ROG C, SM TREE (LABELED BOX 4 OF 4) |

FIGURE 5. Kit, AutoBoom XRT, AGCO RoGator, Large Tree, 120' Steel Boom (P/N 117-0237-022 Page 1)

| QTY | PART # | DESCRIPTION |
|-----|---------------|--|
| 1 | 053-0159-197 | BOX, SHIPPING (LABELED BOX 1 OF 4) |
| 1 | 334-0235-004 | VALVE, HYDRAULIC, CLOSED CENTER, ABM XRT, ROGATOR |
| 1 | 063-0235-001 | ASSEMBLY, ROTARY SENSOR, AUTOBOOM XRT, CENTER RACK |
| 1 | 063-0235-016 | ASSEMBLY, ROTARY SENSOR, TILT 1, ROGATOR |
| 1 | 063-0235-017 | ASSEMBLY, ROTARY SENSOR, TILT 2, ROGATOR |
| 1 | 107-0235-014 | STRAP, ROTARY SENSOR |
| 1 | 107-0235-015 | PLATE, MOUNTING, REM, ROGATOR |
| 1 | 115-0235-040 | CABLE, 6', 4 PIN POS. SENS TO 3 PIN PROX SWITCH |
| 1 | 115-0235-162 | CABLE, XRT CHASSIS ADAPTER ROGATOR A/B |
| 1 | 115-0235-112 | CABLE, XRT, ROGATORC VALVE |
| 1 | 115-4010-069 | CABLE, SUPERSEAL POSITION SENSOR TO 4 PIN |
| 2 | 412-6000-007 | PROXIMITY SENSOR, INDUCTIVE, 15MM RANGE PNP NO |
| 1 | 107-0235-065 | BRACKET, PROXIMITY SENSOR, ROGATOR, RH |
| 1 | 107-0235-066 | BRACKET, PROXIMITY SENSOR, ROGATOR, LH |
| 1 | 053-0159-015 | ENVELOPE, PLASTIC |
| 3 | 107-0171-608 | U-BOLT 3 1/16"WX4"LX3/8"THD |
| 2 | 107-0171-616 | U-BOLT 2 9/16"WX3 1/2"LX3/8"TH |
| 2 | 107-0171-852 | U-BOLT 4 1/16"WX3"LX3/8"TH |
| 1 | 107-0172-205 | ROD, THREADED, M6 |
| 1 | 311-0050-236 | BOLT MACHINE HEX HEAD 1/4-20 X 2-1/2 LONG, STAINLESS S |
| 2 | 311-0050-238 | BOLT MACHINE HEX BOLT, 3/8-16 X 7-1/2L |
| 2 | 311-0050-231 | BOLT MACHINE HEX HEAD 1/4-20 X 1.25 LONG, STAINLESS ST |
| 1 | 311-0052-108 | BOLT, 5/16-18 X 1.75 LG |
| 3 | 311-0052-111 | BOLT, 5/16-18 X 2.50 LG |
| 14 | 312-4000-252 | NUT, FLANGE, LOCK, 3/8 |
| 5 | 312-4000-164 | NUT, 1/4-20 NYLON LOCKING, SS |
| 4 | 313-1000-019 | WASHER, LOCK, 5/16", ZINC PLATED |
| 5 | 313-2301-810 | WASHER, FLAT, 1/4, NARROW |
| 3 | 311-4050-188K | BOLT, HEX HEAD, M8-1.25 x 65MM LG |
| 1 | 311-4050-184K | BOLT, HEX HEAD, M8-1.25 x 45MM LG |
| 2 | 435-3003-077 | U-BOLT, CLAMPING 4.00 NOM |
| 2 | 435-3003-082 | U-BOLT, CLAMPING, 1-1/8" I.D., 1/4"-20 UNC |
| 1 | 053-0159-006 | ENVELOPE, PLASTIC |
| 4 | 219-0001-015 | O-RING, BUNA-N, 9/16" I.D. |
| | | CONT... |

FIGURE 6. Kit, AutoBoom XRT, AGCO RoGator, Large Tree, 120' Steel Boom (P/N 117-0237-022 Page 2)

| QTY | PART # | DESCRIPTION |
|------------|---------------|--|
| 1 | 053-0159-057 | PREV... ENVELOPE, PLASTIC |
| 2 | 107-0235-057 | BRACKET, ROD END, ROGATOR B |
| 2 | 107-0172-434 | ROD, THREADED, M6-1 |
| 4 | 312-6000-017K | HEX NUT, DIN934, M6 |
| 4 | 312-6001-017K | HEX NUT, NYLOCK, DIN985, M6 |
| 4 | 325-0000-031 | BEARING, ROD END, 90 DEG LINK BALL TYPE, M6 |
| 1 | 053-0159-079 | BOX, SHIPPING (LABELED BOX 2 OF 4) |
| 1 | 016-0171-649 | SHEET, WARRENTY/HELP (016-0237-001) |
| 1 | 063-0173-965 | ECU, ISOBUS, REM, RAVEN |
| 1 | 063-0174-066 | XRT ABM WITH AUTOBOOM UNLOCK |
| 1 | 115-0235-152 | CABLE, XRT ABM/REM, ROGATOR |
| 1 | 115-0235-153 | CABLE, XRT ROGATOR, HEIGHT SENSOR |
| 1 | 115-0235-118 | CABLE, XRT LOAD RESISTOR |
| 1 | 117-0237-003 | XRT, BOOM, ROG C 120' STEEL (LABELED BOX 3 OF 4) |
| 1 | 117-0237-006 | ABM XRT DMPER, ROG C, LG TREE (LABELED BOX 4 OF 4) |

FIGURE 7. Kit, AutoBoom XRT, AGCO RoGator, Large Tree, 90'/100' Steel Boom, No Hydraulics
(P/N 117-0237-023 Page 1)

| QTY | PART # | DESCRIPTION |
|-----|--------------|--|
| 1 | 053-0159-197 | BOX, SHIPPING (LABELED BOX 1 OF 4) |
| 1 | 063-0235-001 | ASSEMBLY, ROTARY SENSOR, AUTOBOOM XRT, CENTER RACK |
| 1 | 063-0235-016 | ASSEMBLY, ROTARY SENSOR, TILT 1, ROGATOR |
| 1 | 063-0235-017 | ASSEMBLY, ROTARY SENSOR, TILT 2, ROGATOR |
| 1 | 107-0235-014 | STRAP, ROTARY SENSOR |
| 1 | 107-0235-015 | PLATE, MOUNTING, REM, ROGATOR |
| 2 | 115-0235-040 | CABLE, 6', 4 PIN POS. SENS TO 3 PIN PROX SWITCH |
| 1 | 115-0235-162 | CABLE, XRT CHASSIS ADAPTER ROGATOR A/B |
| 1 | 115-0235-112 | CABLE, XRT, ROGATORC VALVE |
| 3 | 115-4010-069 | CABLE, SUPERSEAL POSITION SENSOR TO 4 PIN |
| 2 | 412-6000-007 | PROXIMITY SENSOR, INDUCTIVE, 15MM RANGE PNP NO |
| 1 | 107-0235-065 | BRACKET, PROXIMITY SENSOR, ROGATOR, RH |
| 1 | 107-0235-066 | BRACKET, PROXIMITY SENSOR, ROGATOR, LH |
| 1 | 053-0159-015 | ENVELOPE, PLASTIC |
| 3 | 107-0171-608 | U-BOLT 3 1/16"WX4"LX3/8"THD |
| 2 | 107-0171-616 | U-BOLT 2 9/16"WX3 1/2"LX3/8"TH |
| 2 | 107-0171-852 | U-BOLT 4 1/16"WX3"LX3/8"TH |
| 1 | 107-0172-205 | ROD, THREADED, M6 |
| 1 | 311-0050-236 | BOLT MACHINE HEX HEAD 1/4-20 X 2-1/2 LONG, STAINLESS S |
| 2 | 311-0050-238 | BOLT MACHINE HEX HEAD 1/4-20 X 3 LONG, STAINLESS STEEL |
| 2 | 311-0050-231 | BOLT MACHINE HEX HEAD 1/4-20 X 1.25 LONG, STAINLESS ST |
| 14 | 312-4000-252 | NUT, FLANGE, LOCK, 3/8 |
| 5 | 312-4000-164 | NUT, 1/4-20 NYLON LOCKING, SS |
| 5 | 313-2301-810 | WASHER, FLAT, 1/4, NARROW |
| 2 | 435-3003-077 | U-BOLT, CLAMPING 4.00 NOM |
| 2 | 435-3003-082 | U-BOLT, CLAMPING, 1-1/8" I.D., 1/4"-20 UNC |
| | | CONT... |

FIGURE 8. Kit, AutoBoom XRT, AGCO RoGator, Large Tree, 90'/100' Steel Boom, No Hydraulics
(P/N 117-0237-023 Page 2)

| QTY | PART # | DESCRIPTION |
|------------|---------------|--|
| 1 | 053-0159-057 | PREV... ENVELOPE, PLASTIC |
| 2 | 107-0235-057 | BRACKET, ROD END, ROGATOR B |
| 2 | 107-0172-434 | ROD, THREADED, M6-1 |
| 4 | 312-6000-017K | HEX NUT, DIN934, M6 |
| 4 | 312-6001-017K | HEX NUT, NYLOCK, DIN985, M6 |
| 4 | 325-0000-031 | BEARING, ROD END, 90 DEG LINK BALL TYPE, M6 |
| 1 | 053-0159-079 | BOX, SHIPPING (LABELED BOX 2 OF 4) |
| 1 | 016-0171-649 | SHEET, WARRENTY/HELP (016-0237-001) |
| 1 | 063-0173-965 | ECU, ISOBUS, REM, RAVEN |
| 1 | 063-0174-066 | XRT ABM WITH AUTOBOOM UNLOCK |
| 1 | 115-0235-152 | CABLE, XRT ABM/REM, ROGATOR |
| 1 | 115-0235-153 | CABLE, XRT ROGATOR, HEIGHT SENSOR |
| 1 | 115-0235-118 | CABLE, XRT LOAD RESISTOR |
| 1 | 117-0237-002 | XRT, BOOM, ROG C 90'/100' STEEL (LABELED BOX 3 OF 4) |
| 1 | 117-0237-006 | ABM XRT DMPPER, ROG C, LG TREE (LABELED BOX 4 OF 4) |

FIGURE 9. Kit, AutoBoom XRT, AGCO RoGator, Small Tree, 90'/100' Steel Boom, No Hydraulics
(P/N 117-0237-024 Page 1)

| QTY | PART # | DESCRIPTION |
|-----|--------------|--|
| 1 | 053-0159-197 | BOX, SHIPPING (LABELED BOX 1 OF 4) |
| 1 | 063-0235-001 | ASSEMBLY, ROTARY SENSOR, AUTOBOOM XRT, CENTER RACK |
| 1 | 063-0235-016 | ASSEMBLY, ROTARY SENSOR, TILT 1, ROGATOR |
| 1 | 063-0235-017 | ASSEMBLY, ROTARY SENSOR, TILT 2, ROGATOR |
| 1 | 107-0235-015 | PLATE, MOUNTING, REM, ROGATOR |
| 1 | 107-0172-435 | STRAP, ROTARY SENSOR |
| 2 | 115-0235-040 | CABLE, 6', 4 PIN POS. SNS TO 3 PIN PROX SWITCH |
| 1 | 115-0235-162 | CABLE, XRT CHASSIS ADAPTER ROGATOR A/B |
| 1 | 115-0235-112 | CABLE, XRT, ROGATORC VALVE |
| 3 | 115-4010-069 | CABLE, SUPERSEAL POSITION SENSOR TO 4 PIN |
| 2 | 412-6000-007 | PROXIMITY SENSOR, INDUCTIVE, 15MM RANGE PNP NO |
| 1 | 107-0235-067 | BRACKET, PROXIMITY SENSOR, ROGATOR, SMALL TREE RH |
| 1 | 107-0235-068 | BRACKET, PROXIMITY SENSOR, ROGATOR, SMALL TREE LH |
| 1 | 053-0159-015 | ENVELOPE, PLASTIC |
| 3 | 107-0171-608 | U-BOLT 3 1/16"WX4"LX3/8"THD |
| 3 | 107-0171-616 | U-BOLT 2 9/16"WX3 1/2"LX3/8"TH |
| 2 | 107-0171-852 | U-BOLT 4 1/16"WX3"LX3/8"TH |
| 1 | 107-0172-434 | ROD, THREADED, M6 |
| 1 | 311-0050-236 | BOLT MACHINE HEX HEAD 1/4-20 X 2-1/2 LONG, STAINLESS S |
| 2 | 311-0050-238 | BOLT MACHINE HEX HEAD 1/4-20 X 3 LONG, STAINLESS STEEL |
| 2 | 311-0050-231 | BOLT MACHINE HEX HEAD 1/4-20 X 1.25 LONG, STAINLESS ST |
| 18 | 312-4000-252 | NUT, FLANGE, LOCK, 3/8 |
| 5 | 312-4000-164 | NUT, 1/4-20 NYLON LOCKING, SS |
| 5 | 313-2301-810 | WASHER, FLAT, 1/4, NARROW |
| 2 | 435-3003-077 | U-BOLT, CLAMPING, 4.00 NOM. |
| 2 | 435-3003-082 | U-BOLT, CLAMPING, 1-1/8" I.D., 1/4"-20 UNC |
| | | CONT... |

FIGURE 10. Kit, AutoBoom XRT, AGCO RoGator, Small Tree, 90'/100' Steel Boom, No Hydraulics
(P/N 117-0237-024 Page 2)

| QTY | PART # | DESCRIPTION |
|------------|---------------|---|
| 1 | 053-0159-057 | PREV... ENVELOPE, PLASTIC |
| 2 | 107-0235-057 | BRACKET, ROD END, ROGATOR B |
| 2 | 107-0172-434 | ROD, THREADED, M6-1 |
| 4 | 312-6000-017K | HEX NUT, DIN934, M6 |
| 4 | 312-6001-017K | HEX NUT, NYLOCK, DIN985, M6 |
| 4 | 325-0000-031 | BEARING, ROD END, 90 DEG LINK BALL TYPE, M6 |
| 1 | 053-0159-079 | BOX, SHIPPING (LABELED BOX 2 OF 4) |
| 1 | 016-0171-649 | SHEET, WARRENTY/HELP (016-0237-001) |
| 1 | 063-0173-965 | ECU, ISOBUS, REM, RAVEN |
| 1 | 063-0174-066 | XRT ABM WITH AUTOBOOM UNLOCK |
| 1 | 115-0235-152 | CABLE, XRT ABM/REM, ROGATOR |
| 1 | 115-0235-153 | CABLE, XRT ROGATOR, HEIGHT SENSOR |
| 1 | 115-0235-118 | CABLE, XRT LOAD RESISTOR |
| 1 | 117-0237-002 | XRT, BOOM, ROG C 90/100' STEEL (LABELED BOX 3 OF 4) |
| 1 | 117-0237-005 | ABM XRT DMPER, ROG C, SM TREE (LABELED BOX 4 OF 4) |

FIGURE 11. Kit, AutoBoom XRT, AGCO RoGator, Large Tree, 120' Steel Boom, No Hydraulics
(P/N 117-0237-025 Page 1)

| QTY | PART # | DESCRIPTION |
|-----|--------------|--|
| 1 | 053-0159-197 | BOX, SHIPPING (LABELED BOX 1 OF 4) |
| 1 | 063-0235-001 | ASSEMBLY, ROTARY SENSOR, AUTOBOOM XRT, CENTER RACK |
| 1 | 063-0235-016 | ASSEMBLY, ROTARY SENSOR, TILT 1, ROGATOR |
| 1 | 063-0235-017 | ASSEMBLY, ROTARY SENSOR, TILT 2, ROGATOR |
| 1 | 107-0235-014 | STRAP, ROTARY SENSOR |
| 1 | 107-0235-015 | PLATE, MOUNTING, REM, ROGATOR |
| 2 | 115-0235-040 | CABLE, 6', 4 PIN POS. SENS TO 3 PIN PROX SWITCH |
| 1 | 115-0235-162 | CABLE, XRT CHASSIS ADAPTER ROGATOR A/B |
| 1 | 115-0235-112 | CABLE, XRT, ROGATORC VALVE |
| 1 | 115-4010-069 | CABLE, SUPERSEAL POSITION SENSOR TO 4 PIN |
| 2 | 412-6000-007 | PROXIMITY SENSOR, INDUCTIVE, 15MM RANGE PNP NO |
| 1 | 107-0235-065 | BRACKET, PROXIMITY SENSOR, ROGATOR, RH |
| 1 | 107-0235-066 | BRACKET, PROXIMITY SENSOR, ROGATOR, LH |
| 1 | 053-0159-015 | ENVELOPE, PLASTIC |
| 3 | 107-0171-608 | U-BOLT 3 1/16"WX4"LX3/8"THD |
| 2 | 107-0171-616 | U-BOLT 2 9/16"WX3 1/2"LX3/8"TH |
| 2 | 107-0171-852 | U-BOLT 4 1/16"WX3"LX3/8"TH |
| 1 | 107-0172-205 | ROD, THREADED, M6 |
| 1 | 311-0050-236 | BOLT MACHINE HEX HEAD 1/4-20 X 2-1/2 LONG, STAINLESS S |
| 2 | 311-0050-238 | BOLT MACHINE HEX HEAD 1/4-20 X 3 LONG, STAINLESS STEEL |
| 2 | 311-0050-231 | BOLT MACHINE HEX HEAD 1/4-20 X 1.25 LONG, STAINLESS ST |
| 16 | 312-4000-252 | NUT, FLANGE, LOCK, 3/8 |
| 5 | 312-4000-164 | NUT, 1/4-20 NYLON LOCKING, SS |
| 5 | 313-2301-810 | WASHER, FLAT, 1/4, NARROW |
| 2 | 435-3003-077 | U-BOLT, CLAMPING 4.00 NOM |
| 2 | 435-3003-082 | U-BOLT, CLAMPING, 1-1/8" I.D., 1/4"-20 UNC |
| | | CONT... |

FIGURE 12. Kit, AutoBoom XRT, AGCO RoGator, Large Tree, 120' Steel Boom, No Hydraulics
(P/N 117-0237-025 Page 2)

| QTY | PART # | DESCRIPTION |
|------------|---------------|--|
| 1 | 053-0159-057 | PREV... ENVELOPE, PLASTIC |
| 2 | 107-0235-057 | BRACKET, ROD END, ROGATOR B |
| 2 | 107-0172-434 | ROD, THREADED, M6-1 |
| 4 | 312-6000-017K | HEX NUT, DIN934, M6 |
| 4 | 312-6001-017K | HEX NUT, NYLOCK, DIN985, M6 |
| 4 | 325-0000-031 | BEARING, ROD END, 90 DEG LINK BALL TYPE, M6 |
| 1 | 053-0159-079 | BOX, SHIPPING (LABELED BOX 2 OF 4) |
| 1 | 016-0171-649 | SHEET, WARRENTY/HELP (016-0237-001) |
| 1 | 063-0173-965 | ECU, ISOBUS, REM, RAVEN |
| 1 | 063-0174-066 | XRT ABM WITH AUTOBOOM UNLOCK |
| 1 | 115-0235-152 | CABLE, XRT ABM/REM, ROGATOR |
| 1 | 115-0235-153 | CABLE, XRT ROGATOR, HEIGHT SENSOR |
| 1 | 115-0235-118 | CABLE, XRT LOAD RESISTOR |
| 1 | 117-0237-003 | XRT, BOOM, ROG C 120' STEEL (LABELED BOX 3 OF 4) |
| 1 | 117-0237-006 | ABM XRT DMPER, ROG C, LG TREE (LABELED BOX 4 OF 4) |

C

Connect the Harness to the Sensors 36

E

Electrical Diagrams 33

H

Hydraulic System 9

Installing Fittings on the AutoBoom XRT Valve 10

I

Introduction

Hydraulic

Fittings 7

Kit Contents 8

Hydraulic Kit 8

Optional Inner Ultrasonic Sensor Installation Kit 8

Preparing or Installation 6

Point of Reference 6

Recommendations 6

Tools Needed 6

Updates 8

K

Kit Contents 8

N

Node Installation 31

P

Preparing for Installation 6

R

Rotary Sensor Installation 22, 27

S

Sensor Installation 19

Mounting the Center Sensor 21

T

Tilt Sensor Installation 25, 30

U

Ultrasonic Sensor Installation

Mounting the Boom Sensors 19

Boom Sensor Mounting Locations 19

Mount the Boom Sensors 19

W

Wiring

Connecting the Harness to the Power/CAN Controls

120' Booms 36

90'- 100' Booms 34

Connecting the Harness to the Sensors 36

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.