

New Holland Guardian F/Miller Nitro N7 Series with Mono Boom AutoBoom® Installation Manual

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CHAPTER

1

IMPORTANT SAFETY INFORMATION

NOTICE

Read this manual and the operation and safety instructions included with your implement and/or controller carefully before installing the AutoBoom™ system.

- Follow all safety information presented within this manual.
- If you require assistance with any portion of the installation or service of your Raven equipment, contact your local Raven dealer for support.
- Follow all safety labels affixed to the AutoBoom system components. Be sure to keep safety labels in good condition and replace any missing or damaged labels. To obtain replacements for missing or damaged safety labels, contact your local Raven dealer.

When operating the machine after installing AutoBoom, observe the following safety measures:

- Be alert and aware of surroundings.
- Do not operate AutoBoom or any agricultural equipment while under the influence of alcohol or an illegal substance.
- Remain in the operator's position in the machine at all times when AutoBoom is engaged.
- Disable AutoBoom when exiting from the operator's seat and machine.
- Do not drive the machine with AutoBoom enabled on any public road.
- Determine and remain a safe working distance from other individuals. The operator is responsible for disabling AutoBoom when the safe working distance has been diminished.
- Ensure AutoBoom is disabled prior to starting any maintenance work on AutoBoom or the machine.

WARNING

- When starting the machine for the first time after installing AutoBoom, be sure that all persons stand clear, in case a hose has not been properly tightened.
- The machine must remain stationary and switched off, with the booms unfolded and supported, during installation or maintenance.

CAUTION

HYDRAULIC

GENERAL

- Raven Industries recommends that appropriate protective equipment be worn at all times when working on the hydraulic system.
- Never attempt to open or work on a hydraulic system with the equipment running. Care should always be taken when opening a system that has been previously pressurized.
- When disconnecting the hydraulic hoses or purging is required, be aware that the hydraulic fluid may be extremely hot and under high pressure. Caution must be exercised.
- Any work performed on the hydraulic system must be done in accordance with the machine manufacturer's approved maintenance instructions.
- When installing SmarTrax hydraulics or performing diagnostics, maintenance, or routine service, ensure that precautions are taken to prevent any foreign material or contaminants from being introduced into the machine's hydraulic system. Objects or materials that are able to bypass the machine's hydraulic filtration system will reduce performance and possibly damage the SmarTrax hydraulic valve.

INSTRUCTIONS FOR HOSE ROUTING

The word "hose" is used to mean all flexible fluid carrying components. Follow existing hoses as much as possible and use these guidelines:

Hoses should not contact or be attached to:

- Components with high vibration forces
- Components carrying hot fluids beyond component specifications

Avoid contact with any sharp edge or abrading surfaces such as, but not limited to:

- Sheared or flame cut edges
- Edges of machined surfaces
- Fastener threads or cap screw heads
- Ends of adjustable hose clamps

Routing should not allow hoses to:

- Hang below the unit
- Have the potential to become damaged due to exposure to the exterior environment. (i.e. tree limbs, debris, attachments)
- Be placed in areas of or in contact with machine components which develop temperatures higher than the temperature rating of hose components
- Hoses should be protected or shielded if it needs to route near hot temperatures beyond hose component specifications

Hoses should not have sharp bends

Allow sufficient clearance from machine component operational zones such as:

- Drive shafts, universal joints and hitches (i.e. 3-point hitch)
- Pulleys, gears, sprockets
- Deflection and backlash of belts and chains
- Adjustment zones of adjustable brackets
- Changes of position in SmarTrax and suspension systems
- Moving linkages, cylinders, articulation joints, attachments
- Ground engaging components

For hose sections that move during machine operation:

- Allow sufficient length for free movement without interference to prevent: pulling, pinching, catching or rubbing, especially in articulation and pivot points
- Clamp hoses securely to force controlled movement to occur in the desired hose section
- Avoid sharp twisting or flexing of hoses in short distances

Protect hoses from:

- Foreign objects such as rocks that may fall or be thrown by the unit
- Buildup of dirt, mud, snow, ice, submersion in water and oil
- Tree limbs, brush and debris
- Damage where service personnel or operators might step or use as a grab bar
- Damage when passing through metal structures
- High pressure wash

ELECTRICAL

GENERAL

- Always verify that the power leads are connected to the correct polarity as marked. Reversing the power leads could cause severe damage to the equipment.
- Ensure that the power cable is the last cable to be connected.
- A minimum of 12 VDC is required for system operation with a maximum of 15 VDC.

INSTRUCTIONS FOR WIRE ROUTING

The word “harness” is used to mean all electrical leads and cables, bundled and unbundled. When installing harness, secure it at least every 30 cm (12in) to the frame. Follow existing harness as much as possible and use these guidelines:

Harness should not contact or be attached to:

- Lines and hoses with high vibration forces or pressure spikes
- Lines and hoses carrying hot fluids beyond harness component specifications

Avoid contact with any sharp edge or abrading surfaces such as, but not limited to:

- Sheared or flame cut edges
- Edges of machined surfaces
- Fastener threads or cap screw heads
- Ends of adjustable hose clamps
- Wire exiting conduit without protection, either ends or side of conduit
- Hose and tube fittings

Routing should not allow harnesses to:

- Hang below the unit
- Have the potential to become damaged due to exposure to the exterior environment. (i.e. tree limbs, debris, attachments)
- Be placed in areas of or in contact with machine components which develop temperatures higher than the temperature rating of harness components
- Wiring should be protected or shielded if it needs to route near hot temperatures beyond harness component specifications

Harnessing should not have sharp bends

Allow sufficient clearance from machine component operational zones such as:

- Drive shafts, universal joints and hitches (i.e. 3-point hitch)
- Pulleys, gears, sprockets
- Deflection and backlash of belts and chains
- Adjustment zones of adjustable brackets
- Changes of position in SmarTrax and suspension systems
- Moving linkages, cylinders, articulation joints, attachments
- Ground engaging components

For harness sections that move during machine operation:

- Allow sufficient length for free movement without interference to prevent: pulling, pinching, catching or rubbing, especially in articulation and pivot points
- Clamp harnesses securely to force controlled movement to occur in the desired harness section
- Avoid sharp twisting or flexing of harnesses in short distances
- Connectors and splices should not be located in harness sections that move

Protect harnesses from:

- Foreign objects such as rocks that may fall or be thrown by the unit
- Buildup of dirt, mud, snow, ice, submersion in water and oil
- Tree limbs, brush and debris
- Damage where service personnel or operators might step or use as a grab bar
- Damage when passing through metal structures

IMPORTANT:

- Avoid directly spraying electrical components and connections with high pressure water. High pressure water sprays can penetrate seals and cause electrical components to corrode or otherwise become damaged. When performing maintenance:
- Inspect all electrical components and connections for damage or corrosion. Repair or replace components, connections, or cable as necessary.
- Ensure connections are clean, dry, and not damaged. Repair or replace components, connections, or cable as necessary.
- Clean components or connections using low pressure water, pressurized air, or an aerosol electrical component cleaning agent.
- Remove visible surface water from components, connections, or seals using pressurized air or an aerosol electrical component cleaning agent. allow components to dry completely before reconnecting cables.

CHAPTER

INTRODUCTION

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INTRODUCTION

Congratulations on your purchase of the Raven AutoBoom system! This system is designed to provide automated boom height adjustment for agricultural equipment.

This manual applies to the following machines. For future reference, write your serial number in the space below.

MAKE: New Holland
MODEL: Guardian F Series with Mono Boom
YEAR: 2018

MAKE: Miller
MODEL: Nitro N7 Series with Mono Boom
YEAR: 2018

FIGURE 1. Miller Nitro N7 Series with Mono Boom



PREPARING FOR INSTALLATION

Before installing AutoBoom, 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.

RECOMMENDATIONS

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

- Ensure the machine's hydraulic filters have been recently changed and there are no issues with the machine's hydraulic system (e.g., pump issues, faulty hydraulic motors, fine metal deposits in the hydraulic hoses, etc.).
- Operate each of the machine's boom hydraulic functions (i.e., tilt, fold, center rack, tongue extension, or other hydraulic valve functions) three times to ensure the machine's hydraulic valve is using fresh oil and debris is flushed from the hydraulic hoses, valves, and filters.
- Upon installation of the AutoBoom system, operate the boom and center rack raise/lower functions through the machine's manual control functions first before operating them via the AutoBoom controller/field computer to ensure the hydraulic system has been installed correctly and air is released from the system.

Raven Industries recommends the following best practices when installing the AutoBoom 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 system:

- SAE 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

SAE O-ring fitting



ORFS fitting



JIC fitting



UPDATES

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

<https://portal.ravenprecision.com/>

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

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

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

techwriting@ravenind.com

- New Holland Guardian F/Miller Nitro N7 Series with Mono Boom AutoBoom® Installation Manual
- P/N 016-0230-124 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.

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KIT CONTENTS

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

TABLE 1. UltraGlide Installation Kit (P/N 117-0232-124)

Item Description	Part Number	Qty.
Manual - ISO AutoBoom Calibration & Operation	016-0130-065	1
Sheet - Warranty/Help	063-0171-649	1
Valve - UltraGlide AutoBoom	063-0131-124	1
Node - ISO AutoBoom	063-0130-053	1

TABLE 1. UltraGlide Installation Kit (P/N 117-0232-124)

Item Description	Part Number	Qty.
Sensor - Ultrasonic	063-0130-026	3
Cable - 60' Ultrasonic Sensor Extension	115-0230-051	2
Cable - AutoBoom Harness	115-0230-151	1
U-Bolt - 3-1/16" W x 4" L x 3/8" Thread	107-0171-608	4
Bolt - 5/16"-18 x 7/8" Hex	311-0052-104	4
Bolt - 5/16"-18 x 1-1/4" Hex	311-0052-106	1
Bolt - 3/8"-16 UNC x 1" Hex	311-0054-105	5
Nut - 3/8"-16 Zinc Flanged Lock	312-1001-164	13
Nut - 5/16"-18 Nylon Insert Lock	312-4000-059	1
Washer - 5/16" Split Lock	313-1000-019	4
Washer - 5/16" Flat	313-2300-012	2

TABLE 2. Hydraulic Kit (P/N 117-0134-111)

Item Description	Part Number	Qty.
Fitting - -8 ORFS M/M/F Swivel Run Tee Adapter	333-0012-028	3
Fitting - -6 ORFS (M) to -6 SAE O-Ring (M) 45° Elbow	333-0012-083	2

TABLE 2. Hydraulic Kit (P/N 117-0134-111)

Item Description	Part Number	Qty.
Fitting - -8 ORFS (M) to -8" SAE O-Ring (M) Straight Adapter	333-0012-168	2
Fitting - -6 SAE O-Ring (M) to 11/16" Hex Plug	333-0012-194	2
Fitting - -8 ORFS (M) to -8 SAE O-Ring (M) 90° Elbow	333-0012-229	1
Hydraulic Hose - -8 ORFS (F) to 8 ORFS (F) 90° - 32"	214-1001-136	1
Hydraulic Hose - -8 ORFS (F) to 8 ORFS (F) 90° - 33"	214-1001-137	1
Hydraulic Hose - -6 ORFS (F) to -8 ORFS (F) 90° - 38"	214-1001-138	1
Hydraulic Hose - -6 ORFS (F) to -8 ORFS (F) 90° - 43"	214-1001-139	1

TABLE 3. Ultrasonic Sensor Bracket Installation Kit (P/N 117-0131-086)

Item Description	Part Number	Qty.
Assembly - Sensor Extension	063-0131-597	2
Nut - 1/4"-20 Nylon Insert Lock	312-4000-057	4
Washer - 1/4" Flat	313-2300-010	4

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 AutoBoom hydraulics or performing diagnostic, maintenance, or routine service, ensure precautions are taken to prevent any foreign material from being introduced into the machine's hydraulic system.

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



NOTICE

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

INSTALL THE FITTINGS IN THE AUTOBOOM VALVE

Before mounting the AutoBoom valve (P/N 063-0131-124) on the machine, install the fittings in the appropriate ports of the AutoBoom valve. This prepares the valve for installation and simplifies the hose connection process later in the procedure. Refer to the following table to install the fittings.

Fitting	Part Number	Port
Fitting - -8 ORFS (M) to -8 SAE O-Ring (M) Straight Adapter	333-0012-168	P
Fitting - -8 ORFS (M) to -8 SAE O-Ring (M) 90° Elbow	333-0012-229	T
Fitting - -6 ORFS (M) to -6 SAE O-Ring (M) 45° Elbow	333-0012-083	LC, RC
Fitting - -6 SAE O-Ring (M) to 11/16" Hex Plug	333-0012-194	LV, RV

MOUNT THE AUTOBOOM VALVE

FIGURE 1. AutoBoom Valve Installed



1. Secure the AutoBoom valve (P/N 063-0131-124) to the machine's built-in mounting plate using four 5/16"-18 x 7/8" hex bolts (P/N 311-0052-104) and four 5/16" split lock washers (P/N 313-1000-019).

NOTE: The AutoBoom valve should be installed so that Port LC and RC face the center of the machine.

2. Tighten the bolts to ensure the valve is securely installed.

INSTALL THE PRESSURE AND TANK HOSES

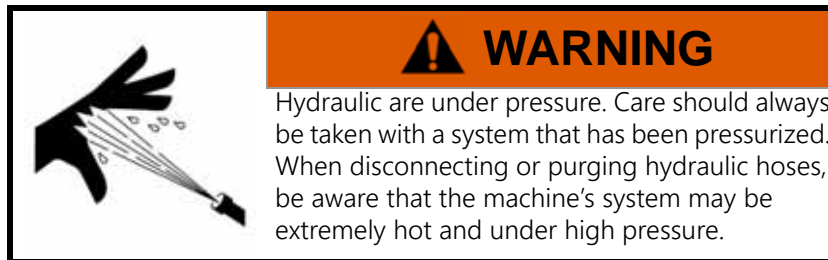
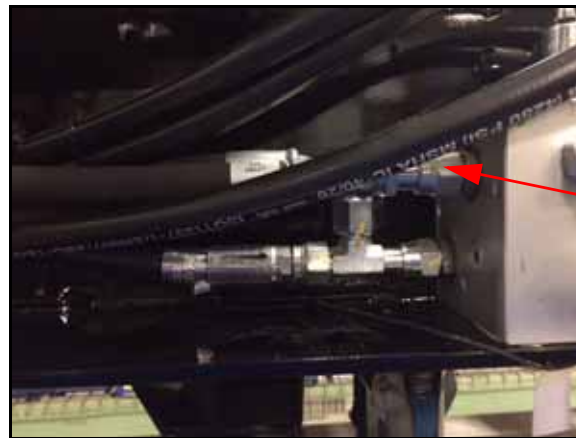


FIGURE 2. Pressure Hose Installed on Machine's Hydraulic Valve



Installed Hydraulic
Hose
(P/N 214-1001-136)
in Machine's Pressure
Port

1. Locate and remove the plug from port P2 of the machine's hydraulic valve.
2. Install a -8 ORFS (M) to -8 JIC (M) straight adapter fitting (P/N 333-0012-168) in the open port of the machine's hydraulic valve.
3. Install the straight end of the supplied hydraulic hose (P/N 214-1001-136) on the fitting installed in the machine's pressure port.

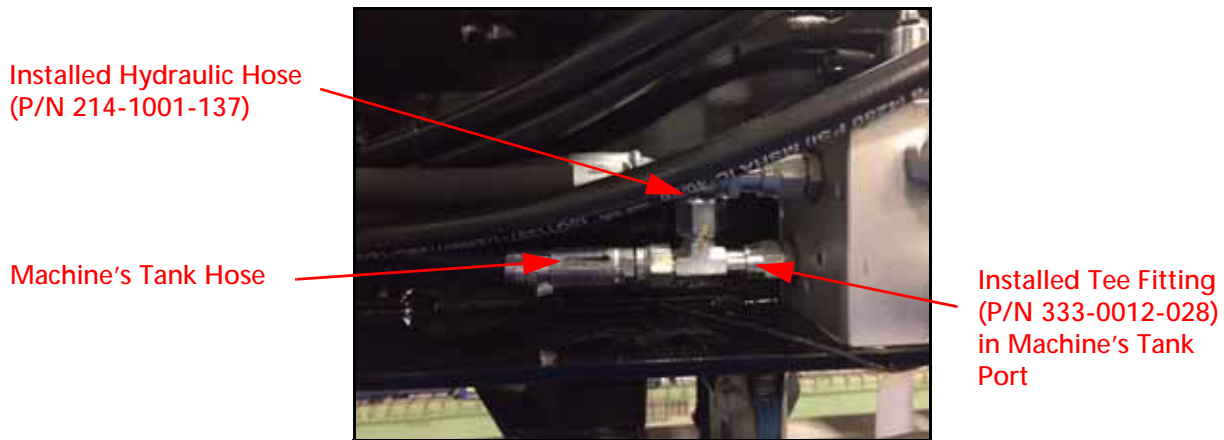
FIGURE 3. Pressure Hose Installed on AutoBoom Valve



Installed Hydraulic
Hose
(P/N 214-1001-136) in
Port P of AutoBoom
Valve

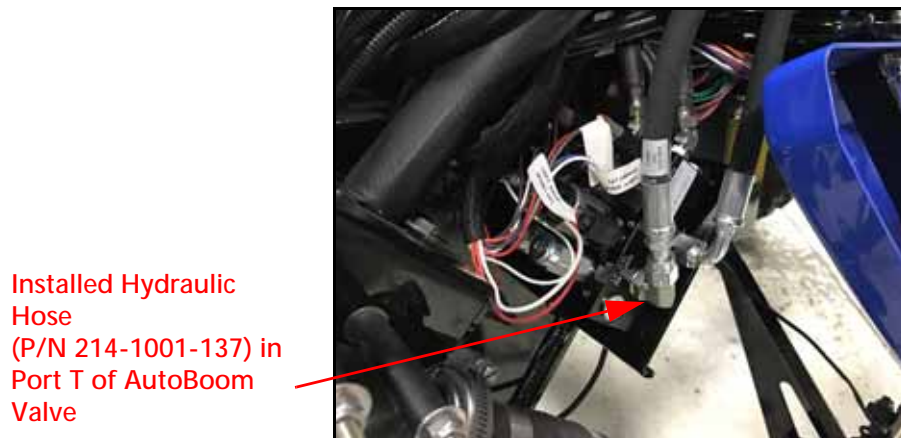
4. Connect the 90° end of the installed hydraulic hose to the fitting installed in Port P of the AutoBoom valve.

FIGURE 4. Tank Hose Installed on Machine's Hydraulic Valve



5. Locate and disconnect the machine's tank hose from Port T1 of the machine's hydraulic valve.
6. Install a -8 ORFS M/M/F swivel run tee adapter fitting (P/N 333-0012-028) in the open port of the machine's hydraulic valve.
7. Install the machine's tank hose on the opposite end of the installed tee fitting.
8. Install the 90° end of the supplied hydraulic hose (P/N 214-1001-137) on the 90° end of the installed tee fitting.

FIGURE 5. Tank Hose Installed on AutoBoom Valve



9. Connect the straight end of the installed hydraulic hose to the fitting installed in Port T of the AutoBoom valve.

INSTALL THE LEFT AND RIGHT CYLINDER HOSES

FIGURE 6. Left Cylinder Hose Installed on Machine's Hydraulic Valve



Installed Tee Adapter Fitting
(P/N 333-0012-028)

Installed Hydraulic Hose
(P/N 214-1001-139)

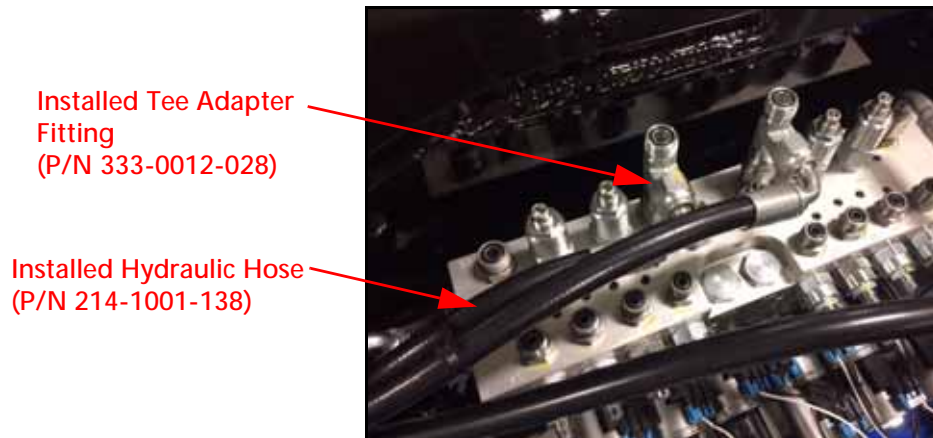
1. Disconnect the machine's left cylinder hose from port A4 of the machine's hydraulic valve.
2. Install a -8 ORFS M/M/F swivel run tee adapter fitting (P/N 333-0012-028) in port A4 of the machine's hydraulic valve.
3. Install the 90° end of the supplied hydraulic hose (P/N 214-1001-139) on the 90° end of the installed tee adapter fitting.

FIGURE 7. Left Cylinder Hose Installed on AutoBoom Valve



4. Connect the straight end of the installed hydraulic hose to the fitting installed in Port LC of the AutoBoom valve.
5. Install the machine's left cylinder hose on the remaining end of the installed tee fitting.

FIGURE 8. Right Cylinder Hose Installed on Machine's Hydraulic Valve



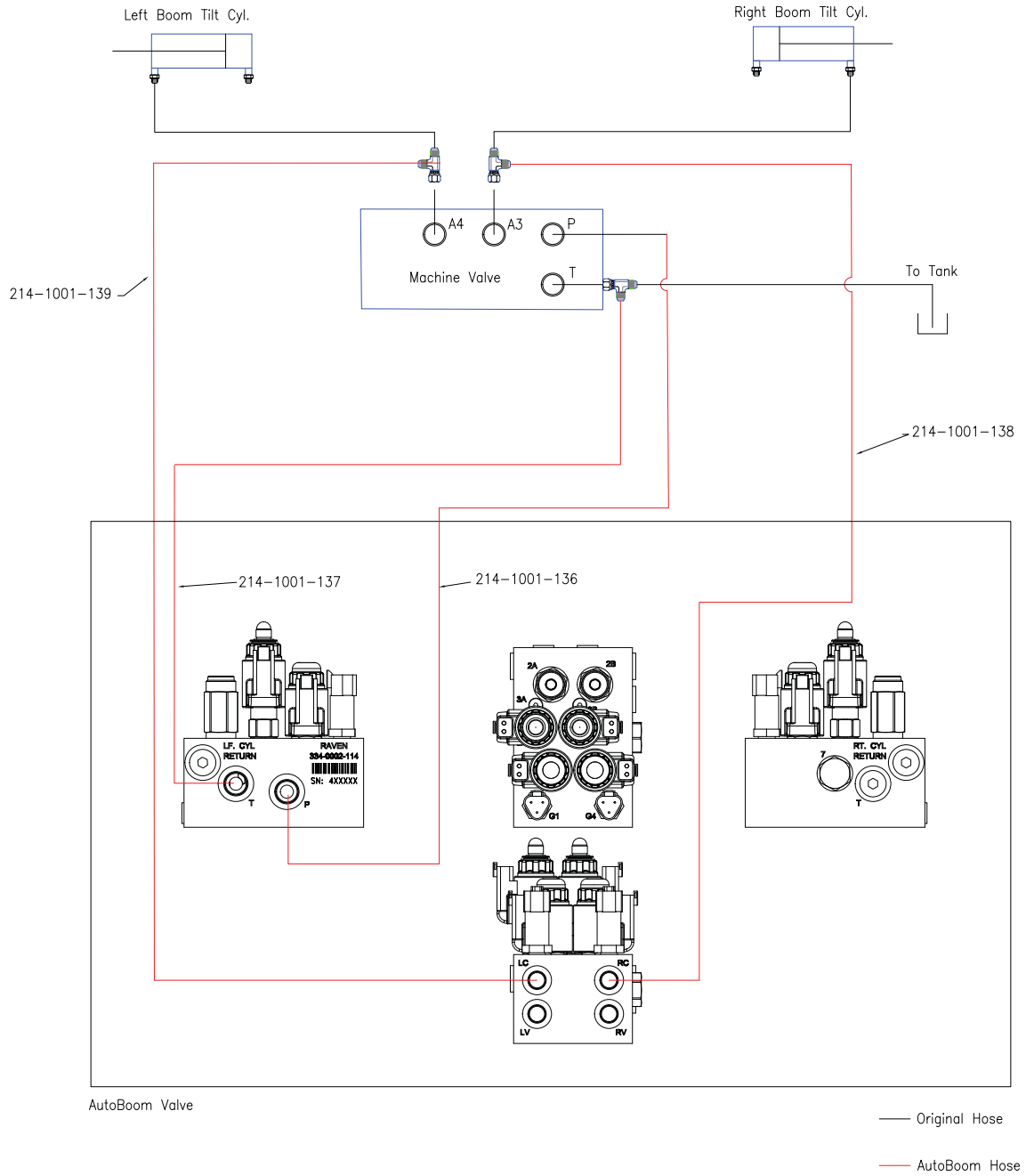
6. Disconnect the machine's right cylinder hose from port A3 of the machine's hydraulic valve.
7. Install a -8 ORFS M/M/F swivel run tee adapter fitting (P/N 333-0012-028) in port A3 of the machine's hydraulic valve.
8. Install the 90° end of the supplied hydraulic hose (P/N 214-1001-138) on the 90° end of the installed tee adapter fitting.

FIGURE 9. Right Cylinder Hose Installed on AutoBoom Valve



9. Connect the straight end of the installed hydraulic hose to the fitting installed in Port RC of the AutoBoom valve.
10. Install the machine's right cylinder hose on the remaining end of the installed tee fitting.

AUTOBOOM HYDRAULIC SCHEMATIC



CHAPTER

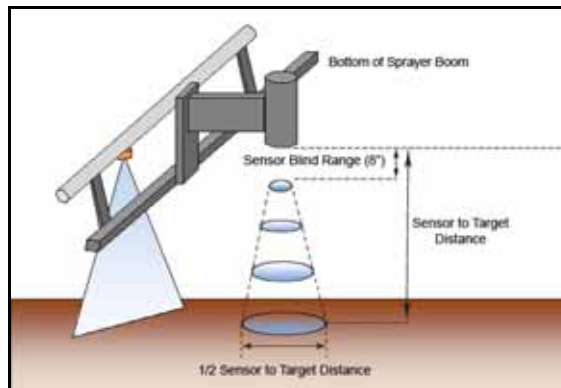
4

ULTRASONIC SENSOR INSTALLATION

BOOM SENSOR MOUNTING LOCATIONS

Sensor mounting locations may be influenced by the boom configuration. If an object enters the sensor's blind range unexpectedly, a false echo return to the sensor could occur, causing the boom to drop and the sensor or boom to be damaged. To ensure optimal options of the UltraGlide system and to protect the sprayer boom, the sensor should be mounted on the front side of the boom, 8 - 10" above the lowest hanging part of the boom.

FIGURE 1. Illustration of Sensor's Blind Range



MOUNT THE BOOM SENSORS

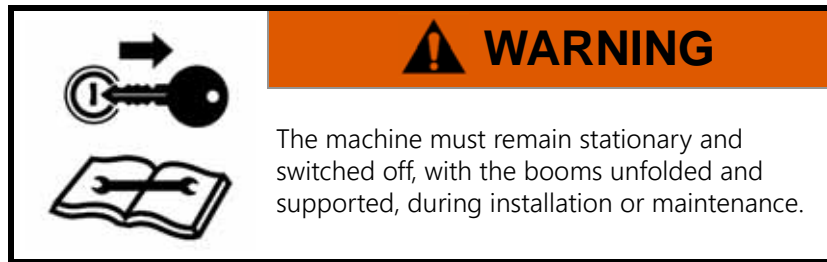
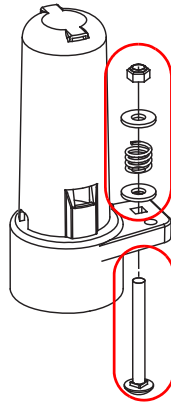


FIGURE 2. Sensor Parts to be Removed



1. Remove the lock nut, washers, spring, and bolt installed on all three sensor housings (P/N 063-0130-026) as shown in Figure 5.

FIGURE 3. Sensor Installed on Mounting Bracket



2. Install one 5/16" flat washer (P/N 313-2300-012) on the end of one 5/16"-18 x 1-1/4" hex bolt (P/N 311-0052-106).
3. Align the hole in the sensor with the hole on the narrow end of the sensor extension bracket (P/N 063-0131-595).
4. Insert the bolt and washer through the aligned holes in the sensor and bracket.
5. Install another 5/16" flat washer (P/N 313-2300-012) on the end of the installed hex bolt and secure it using one 5/16"-18 nylon insert lock nut (P/N 312-4000-059).
6. Repeat the steps above to install the second sensor bracket.

FIGURE 4. Installed Boom Sensors

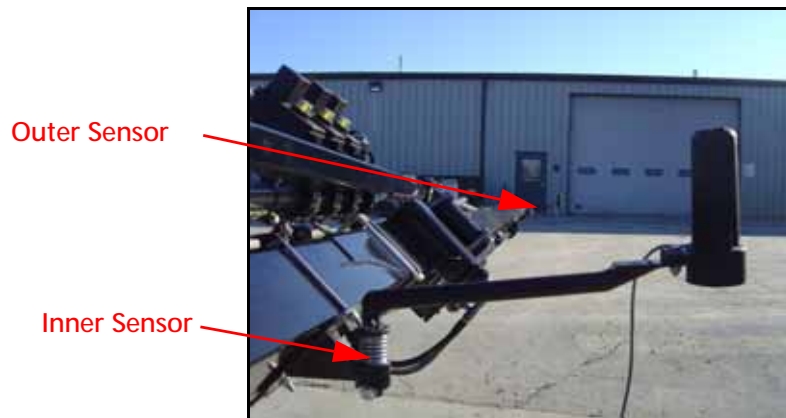
90' - 100' Booms



120' Booms



Dual Sensor Mounting Locations



7. Mount the sensor bracket on the left boom using two 3-1/16" W x 4" L x 3/8" thread U-bolts (P/N 107-0171-608) and four 3/8"-16 zinc flanged lock nuts (P/N 312-1001-164).

IMPORTANT: 120' Booms Only - The outer sensor bracket must be folded in toward the boom as shown in Figure 6 to prevent interference during boom folding.

8. Tighten the nuts to ensure the sensor is mounted securely.
9. Repeat the steps above to mount the remaining boom sensor(s).

MOUNT THE CENTER RACK SENSOR

FIGURE 5. Center Rack Sensor Mounting



1. Install one 5/16" flat washer (P/N 313-2300-012) on the end of one 5/16"-18 x 1-1/4" hex bolt (P/N 311-0052-106).
2. Align the hole in the sensor with the hole on the narrow end of the machine's existing sensor extension bracket.
3. Insert the bolt and washer through the aligned holes in the sensor and bracket.
4. Install another 5/16" flat washer (P/N 313-2300-012) on the end of the installed hex bolt and secure it using one 5/16"-18 nylon insert lock nut (P/N 312-4000-059).
5. Mount the sensor bracket to the front-right side of the machine's center rack using two 3/8"-16 UNC x 1" hex bolts (P/N 311-0054-105) and two 3/8"-16 zinc flanged lock nuts (P/N 312-1001-164) as shown in Figure 4 above.
6. Tighten the nut to ensure the sensor is mounted securely.

CONNECT THE SENSOR CABLES

1. Connect the left sensor cable (P/N 115-0230-051) to the connector on the left sensor.
2. Route the left sensor cable toward the AutoBoom valve.
3. Loop and tie-off any excess cable, allowing enough cable for boom folding and extension.
4. Repeat the steps above to connect the remaining sensor cable(s).


NOTE: The sensor cables will be connected to the AutoBoom system in the wiring phase of installation.

CHAPTER

5

CAB COMPONENT INSTALLATION

WIRING CONNECTIONS

	⚠ CAUTION
Always connect the power cable as the last step in the wiring process and verify that the power leads are connected with the correct polarity. Reversing power leads can cause severe damage to the equipment.	

For wiring connections made outside the cab, apply dielectric silicone grease (P/N 222-0000-006) generously on both the male and female ends of the connectors. Application of the grease will prevent corrosion to the pins and wires.

INSTALL THE AUTOBOOM NODE

FIGURE 1. AutoBoom Node Mounting Location



1. Mount the AutoBoom node (P/N 063-0130-053) on the existing node mounting bracket located under the headlight using three 3/8"-16 UNC x 1" hex bolts (P/N 311-0054-105) and three 3/8"-16 zinc flanged lock nuts (P/N 312-1001-164).
2. Install the large, rectangular node connectors of the AutoBoom harness cable (P/N 115-0230-151) in the correct ports of the node.
3. Tighten the bolts on the node connectors to secure the connections.

CONNECT THE AUTOBOOM HARNESS TO THE AUTOBOOM VALVE

1. Connect the LEFT PRESS (PORT G1) and RIGHT PRESS (PORT G4) connectors on the AutoBoom harness cable (P/N 115-0230-151).
2. Route the connectors to the AutoBoom valve (P/N 063-0131-124).
3. Connect the LEFT PRESS (PORT G1) connector to Port G1 of the AutoBoom valve.
4. Connect the RIGHT PRESS (PORT G4) connector to Port G4 of the AutoBoom valve.
5. Locate the LEFT SOLENOID (PORT LF) and RIGHT SOLENOID (PORT RT) connectors on the harness cable.
6. Connect the LEFT SOLENOID (PORT LF) connector to Port 4A of the AutoBoom valve.
7. Connect the RIGHT SOLENOID (PORT RT) connector to Port 4B of the AutoBoom valve.
8. Locate the LEFT PROP (PORT 5A) and RIGHT PROP (PORT 13A) connectors on the harness cable.
9. Connect the LEFT PROP (PORT 5A) connector to Port 5A of the AutoBoom valve.
10. Connect the RIGHT PROP (PORT 13A) connector to Port 13A of the AutoBoom valve.

CONNECT THE AUTOBOOM HARNESS TO THE MACHINE'S HARNESS

1. Locate the round bulkhead connector on the AutoBoom harness cable (P/N 115-0230-151).

FIGURE 2. AutoBoom Harness Bulkhead Connection



2. Insert the bulkhead connector into the machine's bulkhead at the right side of the machine's center rack and secure it using a panel nut and washer.
3. Locate the machine's round power/CAN connector and secure it to the installed AutoBoom harness bulkhead connection.

CONNECT THE HARNESS CABLE TO THE SENSORS

1. Locate the CENTER SENSOR connector on the AutoBoom harness cable (P/N 115-0230-151).
2. Connect the CENTER SENSOR connector to the installed center sensor (P/N 063-0130-026).
3. Locate the LEFT SENSOR (OUTER) connector on the AutoBoom harness cable.
4. Connect the LEFT SENSOR (OUTER) connector to the installed left sensor cable (P/N 115-0230-051).
5. Locate the RIGHT SENSOR (OUTER) connector on the AutoBoom harness cable.
6. Connect the RIGHT SENSOR (OUTER) connector to the installed right sensor cable.
7. If optional inner boom sensors are installed, repeat the steps above to connect the inner sensors.

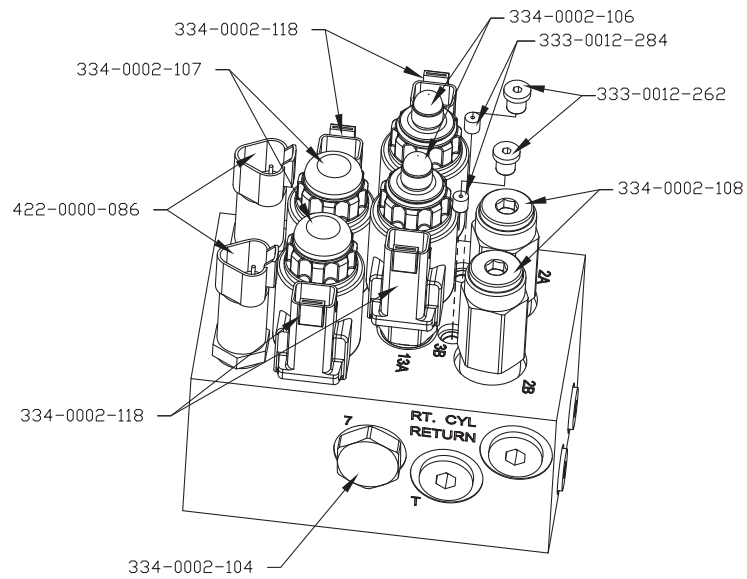
CHAPTER

REPLACEMENT PARTS

6

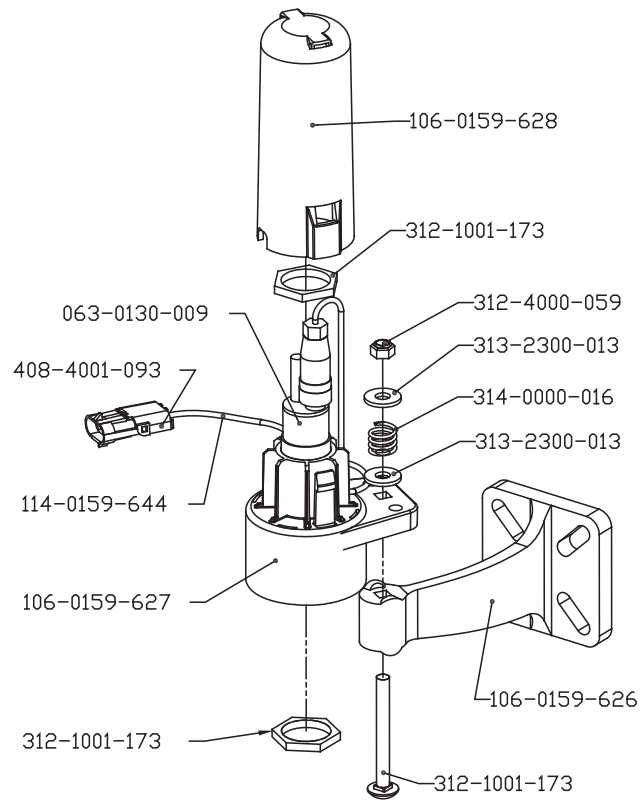
This section contains replacement part diagrams for PowerGlide Plus and UltraGlide systems. Refer to these diagrams when calling to request replacement parts.

VALVES



063-0131-124
VALVE, HYDRAULIC POWERGLIDE
PLUS/ULTRAGLIDE, CLOSED CENTER, AUTOBOOM

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RAVEN

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.