

Case IH Patriot 2240/2250 AutoBoom™ Installation Manual

Manual No. 016-0230-114 Rev A 10/18

E32228

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CHAPTER

1

IMPORTANT SAFETY INFORMATION

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 while installation or maintenance is conducted.

CAUTION

HYDRAULIC SAFETY

- 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 AutoBoom 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 adversely reduce performance and possibly damage the AutoBoom hydraulic valve.

ELECTRICAL SAFETY

- 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.

CHAPTER

INTRODUCTION

2

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: CaseIH
MODEL: 2240/2250
YEAR: 2019
SERIAL NUMBER:

FIGURE 1. Case IH 2250



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 (M)




ULTRAGLIDE KIT CONTENTS

This section contains a list of kits that may be included in the UltraGlide AutoBoom system. Before beginning the AutoBoom installation, compare the items in the AutoBoom kit listed in the Appendix A, Kits Lists with the items received with the shipment. If you have questions about the kit, contact your Raven dealer.

TABLE 1. UltraGlide AutoBoom Kits


Boom Length	Base UltraGlide Kit	Optional Kits
80' or 90'	117-0138-081	Wheel Kit: 117-0138-017 Dual Sensor Upgrade Kit: 117-0138-085

INSTALL THE ULTRAGLIDE HYDRAULIC SYSTEM



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 diagnostics, 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 cause damage to the AutoBoom hydraulic valve.

	NOTICE
	<p>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.</p>

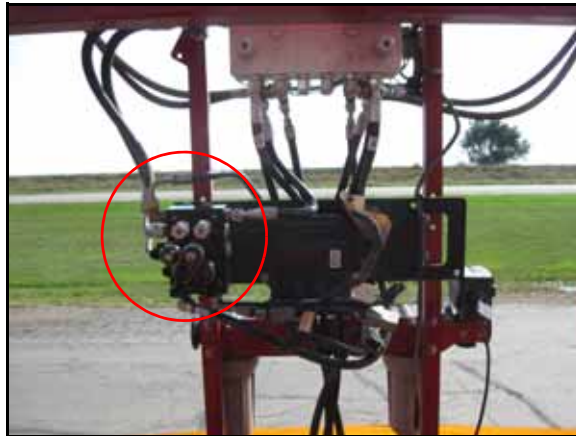
INSTALL FITTINGS ON THE AUTOBOOM VALVE

Before mounting the AutoBoom valve on the machine, install the proper fittings on the 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 in the appropriate ports of the AutoBoom valve.

MOUNT THE AUTOBOOM VALVE

1. Secure the AutoBoom valve (P/N 063-0131-124) to the mounting plate using four 5/16"-18 hardware.


FIGURE 1. AutoBoom Valve Mounted to the Center Rack



2. Secure the mounting plate to the machine's center rack.

NOTE: Install the AutoBoom valve so ports LC and RC point down.

Install the Pressure and Tank Hoses

	WARNING
	<p>Hydraulics are under pressure. Care should always be taken with a system that has been pressurized. When disconnecting or purging hydraulic hoses, be aware that the hydraulic fluid within the machine's system may be extremely hot and under high pressure.</p>



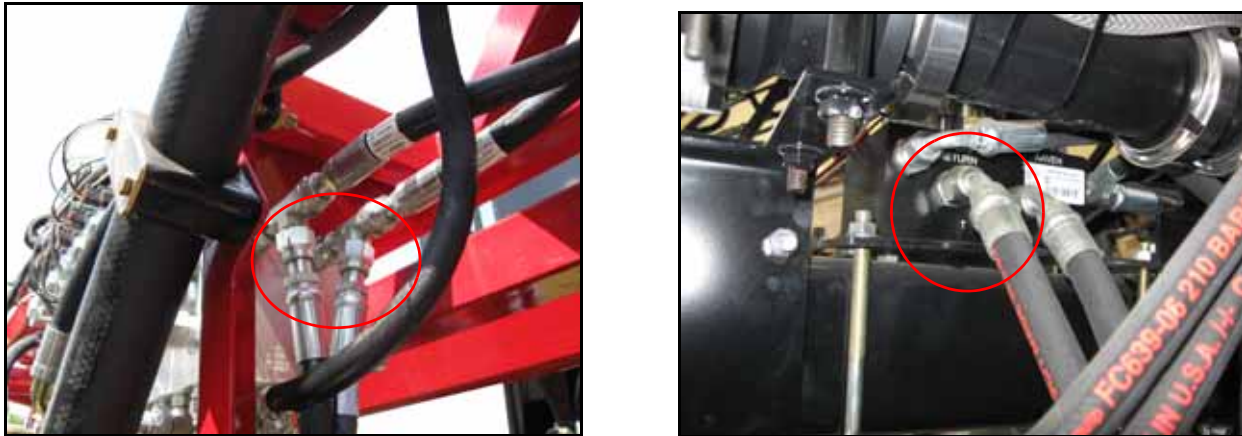
	 CAUTION
	<p>When installing AutoBoom hydraulics or performing diagnostics, maintenance, or routine service, ensure precautions are taken to prevent any foreign material or contaminants from being introduced into the machine's hydraulic system.</p> <p>Objects or materials that are able to bypass the machine's hydraulic filtration system will reduce performance and possibly cause damage to the AutoBoom hydraulic valve.</p>

FIGURE 2. Pressure Hoses Installed



1. Disconnect the machine's pressure line from the hydraulic valve.
2. Install a tee fitting in the machine's pressure port.
3. Attach the machine's pressure line to the opposite end of the installed tee fitting.
4. Connect the 90° end of the supplied hydraulic hose to the 90° end of the installed tee fitting.
5. Connect the straight end of the installed hydraulic hose to Port P on the AutoBoom valve.
6. Disconnect the machine's tank line from the machine's hydraulic valve.
7. Install a tee fitting in the machine's tank port.
8. Attach the machine's tank line to the opposite end of the installed tee fitting.
9. Connect the 90° end of the supplied hydraulic hose to the 90° end of the installed tee fitting.

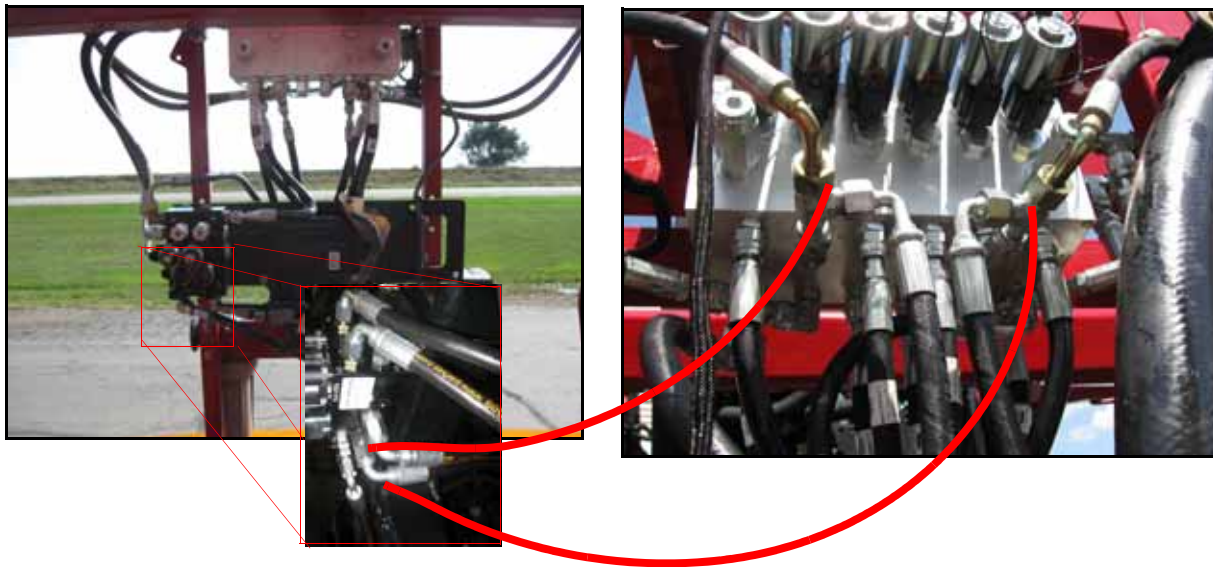
FIGURE 3. Tank Hoses Installed



10. Connect the straight end of the installed hydraulic hose to Port T on the AutoBoom valve.

INSTALL THE LEFT AND RIGHT CYLINDER HOSES

FIGURE 4. Cylinder Hoses Installed

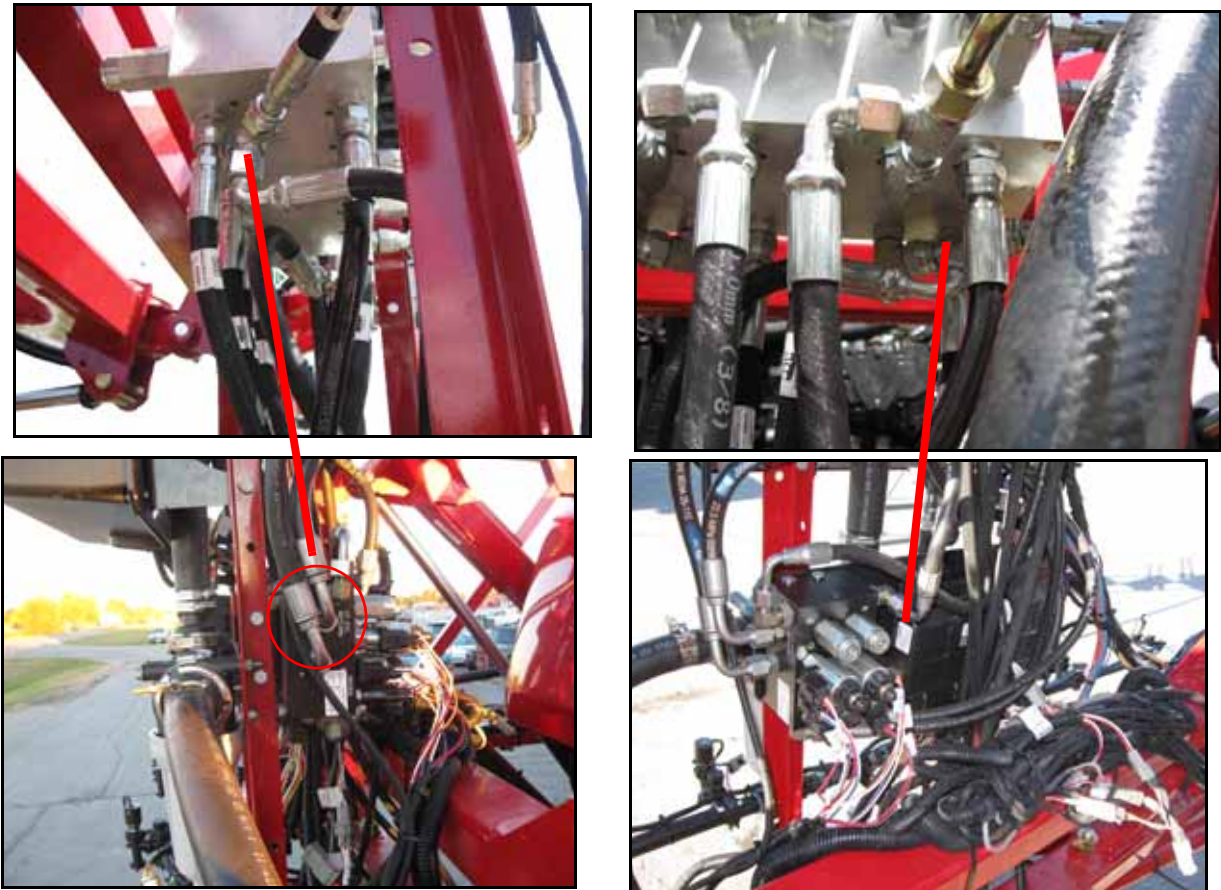


1. Disconnect the machine's left and right tilt hoses from the machine's hydraulic valve.
2. Install tee adapter fittings in the tilt hose ports of the machine's hydraulic valve.
3. Connect the machine's right tilt hose to the opposite end of the installed tee fitting in the right tilt cylinder port of the machine's hydraulic valve.
4. Install the 90° end of the supplied hydraulic hose on the 90° end of the installed tee fitting.
5. Connect the straight end of the installed hydraulic hose to the fitting installed in Port RC of the AutoBoom valve.
6. Connect the machine's left tilt hose to the opposite end of the tee fitting installed in the left tilt port of the machine's hydraulic valve.
7. Install the 90° end of the supplied hydraulic hose on the 90° end of the installed tee fitting.

8. Connect the straight end of the installed hydraulic hose to the fitting installed in Port LC of the AutoBoom valve.

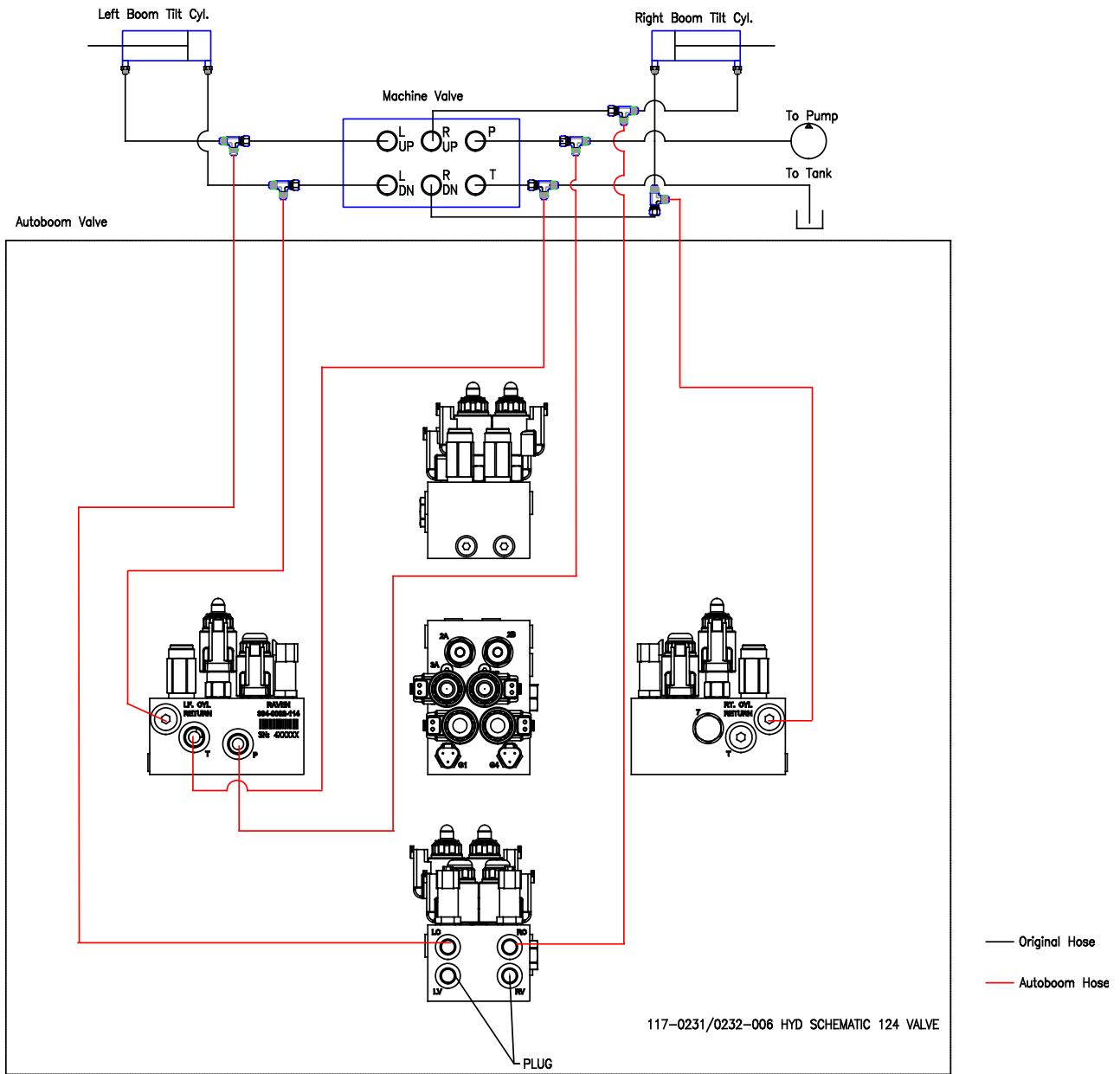
INSTALL THE LEFT AND RIGHT DOWN HOSES

FIGURE 5. Left and Right Down Hoses Installed



1. Disconnect the machine's left and right cylinder return hoses from the machine's hydraulic valve.
2. Install tee adapter fittings in the open ports.
3. Connect the machine's right cylinder return hose to the opposite end of the tee fitting installed in the right return port.
4. Install the 90° end of the supplied hydraulic hose on the 90° end of the installed tee fitting.
5. Connect the straight end of the installed hydraulic hose to the fitting installed in the RT CYL RTN Port of the AutoBoom valve.
6. Connect the machine's left cylinder return hose to the opposite end of the tee fitting installed in the left return port.
7. Install the 90° end of the supplied hydraulic hose on the 90° end of the installed tee fitting.
8. Connect the straight end of the installed hydraulic hose to the installed fitting in the LF CYL RTN Port of the AutoBoom valve.

ULTRAGLIDE HYDRAULIC SCHEMATIC

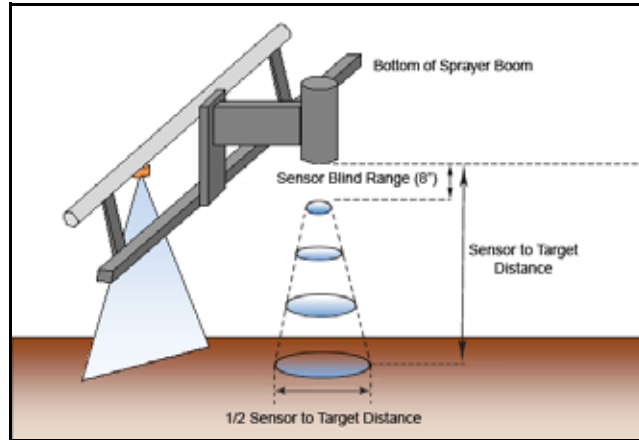


INSTALL THE ULTRAGLIDE SENSORS

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 operation 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 6. Illustration of Sensor's Blind Range



Mount the Boom Sensors

⚠ WARNING

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

FIGURE 7. Mounted Boom Sensor



1. Use 3/8" - 16 hardware to mount an ultrasonic sensor (P/N 063-0130-026) to the factory bracket near the right end of the boom.
2. Use 3/8" - 16 hardware to mount an ultrasonic sensor (P/N 063-0130-026) to the factory bracket near the left end of the boom.
3. If the optional fourth and fifth sensors are being used, use 3/8" - 16 hardware to mount the sensors approximately halfway out the length of the boom. Use the left sensor (P/N 063-0130-014) on the left boom and the right sensor (063-0130-012) on the right boom.

MOUNT THE CENTER RACK SENSOR

FIGURE 8. Center Rack Sensor



1. Mount the center sensor (P/N 063-0130-026) to the machine's center rack using 3/8" hardware.

GAUGE WHEEL INSTALLATION (OPTIONAL)

GAUGE WHEEL MOUNTING LOCATIONS

Wheel mounting locations may be influenced by the boom configuration. Determine the appropriate location for mounting the wheels on the boom, ensuring the wheels will not interfere with, or be damaged, while folding or unfolding the booms. The wheels should be mounted outside of the boom fold, but inside of the boom breakaway.

MOUNT THE GAUGE WHEELS

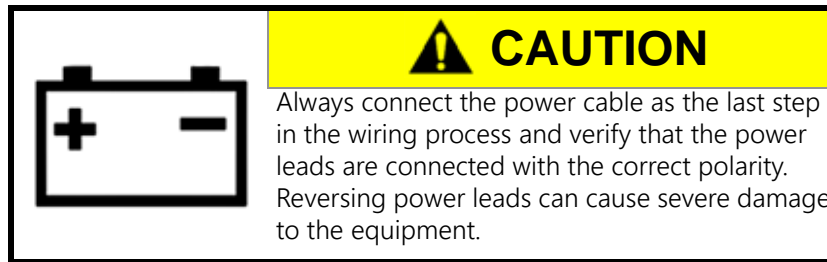
1. Remove the nuts from the right wheel axle (P/N 063-0131-567).

FIGURE 9. Gauge Wheel Installed



2. Place the wheel (P/N 322-0131-008) on the right wheel axle.
3. Reinstall the lug nuts on the wheel axle to secure the wheel.
4. Mount the right wheel receiver bracket (P/N 116-0159-544) to the front of the right boom using four U-bolts, and eight flanged nuts.
5. Insert the right wheel axle into the right wheel receiver bracket, positioning it so that the bottom of the wheel touches the ground (or nearly so) and the wheel faces away from the machine.
6. Secure the gauge wheel assembly in the wheel mounting bracket by installing two hex bolts and two hex nuts.
7. Repeat step 1 through step 6 to install the left wheel.

INSTALL THE ULTRAGLIDE WIRING



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 10. AutoBoom Node Installed



1. Mount the AutoBoom node (P/N 063-0130-053) to the AutoBoom valve mounting plate using 3/8" - 16 hardware.
2. Insert the large, rectangular node connectors on the harness cable (P/N 115-0230-166) into the correct ports of the AutoBoom node.
3. Tighten the bolt on the node connectors to secure the connections.

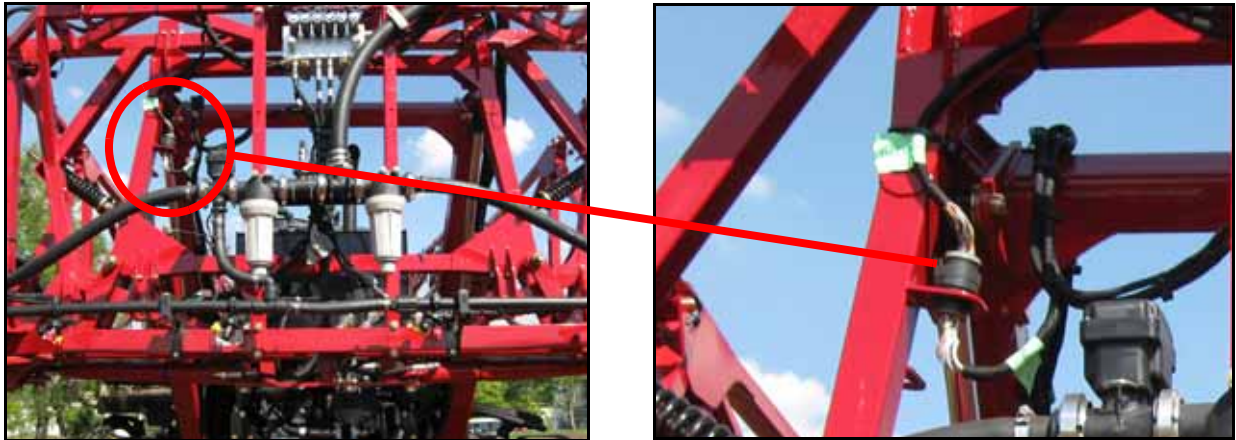
CONNECT THE HARNESS TO THE AUTOBOOM VALVE

1. Locate the LH Press and RH Press connectors on the harness cable. Route the connectors to the AutoBoom valve (P/N 063-0131-124).
2. Connect the LH Press connector to Port G1 on the AutoBoom valve.
3. Connect the RH Press connector to Port G4 on the AutoBoom valve.
4. Locate the LH Solenoid and RH Solenoid connectors on the harness cable.
5. Connect the LH Solenoid connector to Port 4A on the AutoBoom valve.
6. Connect the RH Solenoid connector to Port 4B on the AutoBoom valve.
7. Locate the LH Prop and RH Prop connectors on the harness cable.
8. Connect the LH Prop connector to Port 5A on the AutoBoom valve.
9. Connect the RH Prop connector to Port 13A on the AutoBoom valve.

CONNECT THE HARNESS TO THE HYDRAULIC INTERFACE

1. Locate the machine's hydraulic control interface bulkhead connector on the center rack.

FIGURE 11. AutoBoom Harness Cable Installed



2. Disconnect the hydraulic control interface connection.
3. Connect the HYD CNTRL CENTER SEC INTERFACE and HYD CNTRL FRAME INTERFACE connections of the AutoBoom harness in-line with the machine's bulkhead connection.
4. Connect the RIGHT PROX SWITCH connector to the proximity switch installed at the fold joint where the right boom meets the center section.

FIGURE 12. Prox Switch Connection



5. Connect the LEFT PROX SWITCH connector to the proximity switch installed at the fold joint where the left boom meets the center section.

CONNECT POWER AND CAN

1. Locate the 2-pin power connection on the rate control harness at the center section.
2. Disconnect the existing connection.
3. Connect the AUX PWR and LOGIC PWR connectors of the AutoBoom node harness so they are in-line with the existing 2-pin power connection.
4. Locate the 4-pin CAN terminator connection on the rate control harness at the center section.

5. Disconnect the 4-pin CAN connection.
6. Connect the J14 connector of the AutoBoom node harness to the rate control harness.
7. Connect the J15: CAN connector of the AutoBoom harness to the CAN terminator.

CONNECT THE HARNESS TO THE SENSORS

1. Locate the Center Sensor connector on the AutoBoom harness cable (P/N 115-0230-166).
2. Connect the Center Sensor connector to the installed center sensor (P/N 063-0130-026).
3. Locate a sensor cable (P/N 115-0230-163) and connect it to the LEFT SENSORS connector on the AutoBoom node cable.
4. Route the cable along the left boom.
5. Connect the OUTER SENSOR connection to the outermost ultrasonic sensor.
6. If equipped, connect the INNER SENSOR connection to the inner ultrasonic sensor. If not equipped, leave the dust cap installed.
7. Repeat step 3 to step 6 for the right side of the boom using the RIGHT SENSORS connection on the AutoBoom node cable.

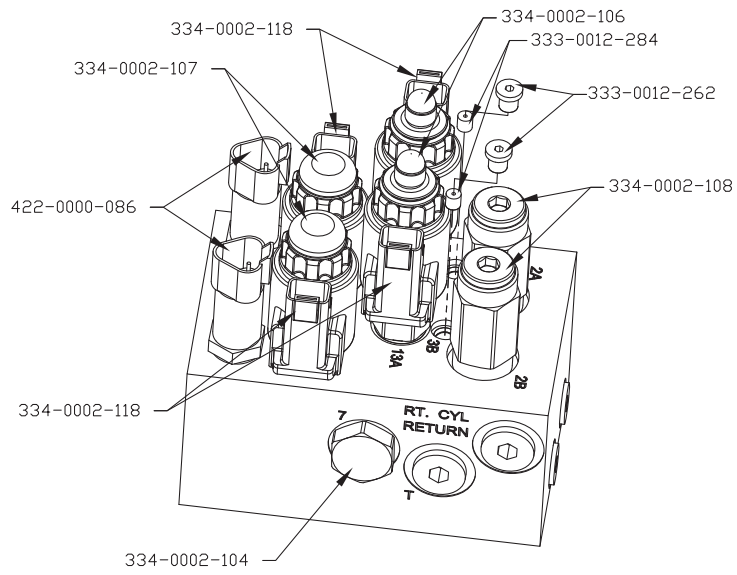
CHAPTER

REPLACEMENT PARTS

4

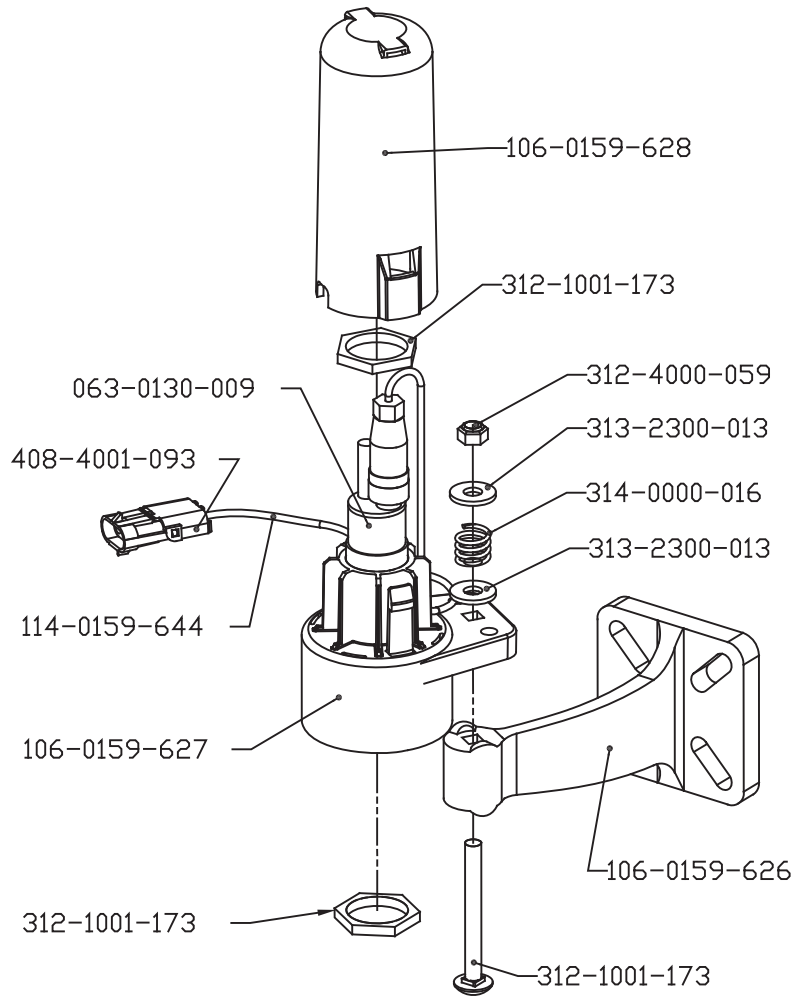
This section contains replacement part diagrams for PowerGlide, PowerGlide Plus, and UltraGlide systems. Refer to these diagrams when calling to request replacement parts.

POWERGLIDE PLUS AND ULTRAGLIDE VALVE REPLACEMENT PARTS



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

SENSORS



A

AUTOBOOM INSTALLATION KITS

The following kits are included in this appendix:

TABLE 1. AutoBoom Installation Kits

Kit Description	Kit Number
Kit, Wheel, AutoBoom, Case IH, 90' - 100' Boom, Straight Axles	117-0138-017
Kit, ISO AutoBoom, Case IH Patriot 22XX, 80'/90' Boom, W/Custom Sensor Cables	117-0138-081
Kit, Upgrade, Dual Sensor, No Cables	117-0138-085


CUSTOMER APPROVAL				REVISIONS			
LTR.	DESCRIPTION	DATE	APPR.	LTR.	DESCRIPTION	DATE	APPR.
					RELEASED PER ECO E12579	1/4/08	BDB
				-1	REVISED PER ECO E13717	8/25/08	BDB
				-2	REVISED PER ECO E13827	9/30/08	BDB
				A	REVISED PER ECO E15322	11/12/09	NOM
				B	REVISED PER ECO E20375	10/10/12	BJE

THIS KIT TO CONTAIN THE FOLLOWING ITEMS LISTED BELOW:

PART #	QTY	DESCRIPTION	ITEM #
117-0131-040 (B)	1	(BOX LABELED 1 OF 2) KIT, AXLE, 24" STRAIGHT	1
053-0159-193	1	BOX, SHIPPING (LABELED BOX 2 OF 2)	2
116-0159-544	2	WELDMENT, BRACKET, CASE IH, 90'-100' BOOM, LEFT	3
322-0131-008	2	WHEELPACK, 4.80-8, 5 BOLT RIM, WHITE	4

NOTES:

1. FILL VOIDS IN BOXES AND WRAP COMPONENTS AS NEEDED TO PREVENT DAMAGE DURING SHIPPING. FOR LABEL CONTENTS, REFER TO LABEL SPEC. 004-0159-001, SECTION 1.1A

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES ONE PLACE DECIMALS ±.06 TWO PLACE DECIMALS ±.03 THREE PLACE DECIMALS ±.010 FRACTIONS ± 1/16 ANGLES ± 0° -30' BREAK EDGES .005-.015	NOTICE: THIS DRAWING AND THE INFORMATION PROVIDED ARE PROPERTY OF RAVEN INDUSTRIES INC., AND MAY ONLY BE USED AS AUTHORIZED BY RAVEN INDUSTRIES INC. ALL RIGHTS RESERVED UNDER THE COPYRIGHT LAWS.			
		TITLE KIT, WHEEL, AUTOBOM, CASE IH, 90'-100' BOOM, STRAIGHT AXLES		
MATERIAL		CODE IDENT NO.	SIZE	DRAWING NUMBER
FINISH		14979	A	117-0138-017
EN F0042 Kit Dwg Template, Rev C	DRAWN	BJH	12/6/07	SCALE NA SHEET 1 OF 1

REVISIONS			
REV.	DESCRIPTION	APPR.	DATE
A	INITIAL RELEASE PER ECO 30630	JTJ	08/21/18

THIS KIT TO CONTAIN THE FOLLOWING ITEMS LISTED BELOW:

ITEM #	QTY	PART #	DESCRIPTION	OEM P/N
1	1	053-0159-193	BOX, SHIPPING	N/A
2	1	016-0130-079	MANUAL, CAL & OP, ISO AUTOBOOM, CASE IH	48030113
3	3	063-0130-026	SENSOR ASSY, ULTRASONIC, MOLDED, HOUSING ONLY	47582958
4	1	063-0130-053	ECU, CNH, ISO AUTOBOOM	48030111
5	1	063-0131-124	VALVE, HYDRAULIC, ULTRAGLIDE, C.C., PC	84299098
6	1	115-0230-166	CBL, ATBM, CENTER SEC., PATRIOT 22XX, ALL ANALOG	51422223
7	2	115-0230-163	CBL, INNER & OUTER ULTRASONICS, CASE IH 90' BOOM	51422224

NOTES:
 1. FILL VOIDS IN BOXES AND WRAP COMPONENTS AS NEEDED TO PREVENT DAMAGE DURING SHIPPING. FOR LABEL CONTENTS, REFER TO LABEL SPEC. 004-0159-001, SECTION 1.1A

RAVEN

RAVEN INDUSTRIES, INC.
 SIOUX FALLS, SD 57104

	NAME	DATE
DRAWN	RRS	12/21/17
APPROVED	JTJ	03/31/02

TITLE:
**KIT, ISO AUTOBOOM, CASE IH
 PATRIOT 22XX, 24M/27M BOOM, W/
 CUSTOM SENSOR CABLES**

SIZE	DRAWING NUMBER	REV
A	117-0138-081	A

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CODE	SCALE	SHEET
14979	N/A	1 OF 1

REVISIONS			
REV.	DESCRIPTION	APPR.	DATE
A	INITIAL RELEASE PER ECO 30630	JTJ	08/21/18

THIS KIT TO CONTAIN THE FOLLOWING ITEMS LISTED BELOW:

ITEM #	QTY	PART #	DESCRIPTION	OEM P/N
1	1	053-0159-079	BOX, SHIPPING	N/A
2	1	063-0130-012	SENSOR ASSEMBLY, ULTRASONIC, MOLDED, RIGHT	87710685
3	1	063-0130-014	SENSOR ASSEMBLY, ULTRASONIC, MOLDED, LEFT	87710686

NOTES:
 1. FILL VOIDS IN BOXES AND WRAP COMPONENTS AS NEEDED TO PREVENT DAMAGE DURING SHIPPING. FOR LABEL CONTENTS, REFER TO LABEL SPEC. 004-0159-001, SECTION 1.1A

RAVEN

RAVEN INDUSTRIES, INC.
 SIOUX FALLS, SD 57104

	NAME	DATE
DRAWN	RRS	12/21/17
APPROVED	JTJ	08/21/18

TITLE:		
KIT, UPGRADE, DUAL SENSOR, NO CABLES		
SIZE	DRAWING NUMBER	REV
A	117-0138-085	A

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14979	N/A	1 OF 1

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LIMITED WARRANTY

WHAT DOES THIS WARRANTY COVER?

This warranty covers all defects in workmanship or materials in your Raven Applied Technology Division product under normal use, maintenance, and service when used for intended purpose.

HOW LONG IS THE COVERAGE PERIOD?

Raven Applied Technology products are covered by this warranty for 12 months from the date of retail sale. In no case will the Limited Warranty period exceed 24 months from the date the product was issued by Raven Industries Applied Technology Division. This warranty coverage applies only to the original owner and is non-transferable.

HOW CAN I GET SERVICE?

Bring the defective part and proof of purchase to your Raven dealer. If the dealer approves the warranty claim, the dealer will process the claim and send it to Raven Industries for final approval. The freight cost to Raven Industries will be the customer's responsibility. The Return Materials Authorization (RMA) number must appear on the box and all documentation (including proof of purchase) must be included inside the box to be sent to Raven Industries.

WHAT WILL RAVEN INDUSTRIES DO?

Upon confirmation of the warranty claim, Raven Industries will (at our discretion) repair or replace the defective product and pay for the standard return freight, regardless of the inbound shipping method. Expedited freight is available at the customer's expense.

WHAT IS NOT COVERED BY THIS WARRANTY?

Raven Industries will not assume any expense or liability for repairs made outside our facilities without written consent. Raven Industries is not responsible for damage to any associated equipment or products and will not be liable for loss of profit, labor, or other damages. The obligation of this warranty is in lieu of all other warranties, expressed or implied, and no person or organization is authorized to assume any liability for Raven Industries.

Damages caused by normal wear and tear, misuse, abuse, neglect, accident, or improper installation and maintenance are not covered by this warranty.

EXTENDED WARRANTY

WHAT DOES THIS WARRANTY COVER?

This warranty covers all defects in workmanship or materials in your Raven Applied Technology Division product under normal use, maintenance, and service when used for intended purpose.

DO I NEED TO REGISTER MY PRODUCT TO QUALIFY FOR THE EXTENDED WARRANTY?

Yes. Products/systems must be registered within 30 days of retail sale to receive coverage under the Extended Warranty. If the component does not have a serial tag, the kit it came in must be registered instead.

WHERE CAN I REGISTER MY PRODUCT FOR THE EXTENDED WARRANTY?

To register, go online to www.ravenhelp.com 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.