

**Case IH Patriot, Model Year 2010 &
Newer AutoBoom™ Installation
Manual**

P/N 016-0230-095 Rev D

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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 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 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 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

2

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: Case IH
MODEL: Patriot
YEAR: 2010 & Newer

FIGURE 1. Case IH Patriot 3230



Note: *This manual contains the installation instructions for the PowerGlide Plus and UltraGlide systems. Be sure to identify which system you have and follow only the instructions for that system.*

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)



Updates

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

<http://www.ravenhelp.com>

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

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

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

techwriting@ravenind.com

-Case IH Patriot, Model Year 2010 & Newer AutoBoom™ Installation Manual

-Manual No. 016-0230-095 Rev. D

-Any comments or feedback (include chapter or page numbers if applicable).

-Let us know how long have you been using this or other Raven products.

We will not share your email or any information you provide with anyone else. Your feedback is valued and extremely important to us.

Thank you for your time.

CHAPTER**3*****PowerGlide Plus******PowerGlide Plus Kit Contents***

This section contains a list of the components that are included in the PowerGlide Plus 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 Raven dealer.

TABLE 1. PowerGlide Plus Installation Kit (P/N 117-0231-095)



Picture	Item Description	Part Number	Qty.
Not Pictured	Manual - Case IH Patriot, Model Year 2010 & Newer AutoBoom Installation	016-0230-095	1
Not Pictured	Manual - AutoBoom Calibration & Operation	016-0130-062	1
	Valve - PowerGlide Plus AutoBoom	063-0131-124	1
	Plate - Hydraulic Block Mounting	107-0171-802	1
	Node - PowerGlide Plus CAN AutoBoom	063-0130-010	1
	Cable - PowerGlide Plus/UltraGlide 2010+ Center Rack Control CAN 20'	115-0230-073	1

TABLE 1. PowerGlide Plus Installation Kit (P/N 117-0231-095)






Picture	Item Description	Part Number	Qty.
	U-Bolt - 2-9/16" W x 3-1/2" L x 3/8" Thread	107-0171-616	2
	Bolt - 5/16"-18 x 7/8" Hex	311-0052-104	4
	Bolt - 3/8"-16 UNC x 1-1/4" Zinc Plated Hex	311-0054-106	3
	Nut - 3/8"-16 Zinc Flanged Lock	312-1001-164	7
	Washer - 5/16" Zinc Plated Lock	313-1000-019	4

TABLE 2. Hydraulic Kit (P/N 117-0134-075)


Picture	Item Description	Part Number	Qty.
	Fitting - 13/16" ORFS M/M/F Swivel Run Tee	333-0012-028	2
	Fitting - 11/16" ORFS M/F 90° Swivel Elbow	333-0012-065	2
	Fitting - 11/16" ORFS M/M/F Swivel Run Tee	333-0012-069	4
	Fitting - 11/16" ORFS (M) to 9/16" SAE O-Ring (M) Straight Adapter	333-0012-084	2
	Fitting - 11/16" ORFS (M) to 3/4" SAE O-Ring (M) 90° Elbow	333-0012-165	2

TABLE 2. Hydraulic Kit (P/N 117-0134-075)





Picture	Item Description	Part Number	Qty.
	Fitting - 13/16" ORFS (M) to 3/4" SAE O-Ring (M) Straight Adapter	333-0012-168	2
	Fitting - 11/16" Hex 9/16" O-Ring Plug	333-0012-194	2
	Hydraulic Hose - 13/16" ORFS (F) to 13/16" ORFS (F) 90° - 36"	214-1000-311	2
	Hydraulic Hose - 11/16" ORFS (F) 90° to 11/16" ORFS (F) - 44"	214-1000-494	4

TABLE 3. PowerGlide Plus Wheel Kit (P/N 117-0134-006)







Picture	Item Description	Part Number	Qty.
	Axle Assembly - Right Cushioned AutoBoom	063-0131-585	1
	Axle Assembly - Left Cushioned AutoBoom	063-0131-590	1
	Bracket - Left Weldment Receiver	116-0159-544	2
	Bracket - Hub Retainer	107-0171-617	2
	Wheel	322-0131-008	2
	U-Bolt - 2-1/16" W x 3" L x 3/8" Thread	107-0171-609	4

TABLE 3. PowerGlide Plus Wheel Kit (P/N 117-0134-006)





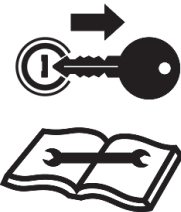

Picture	Item Description	Part Number	Qty.
	U-Bolt - 1-5/16" W x 2" L x 3/8" Thread	107-0171-612	4
	Bolt - 1/2"-13 x 1-1/2" SS Hex	311-0058-186	4
	Nut - 1/2"-13 Zinc Plated Hex	312-1001-043	4
	Nut - 3/8"-16 Zinc Flanged Lock	312-1001-164	16


TABLE 4. PowerGlide Plus Wiring Kit (P/N 117-0137-023)

Picture	Item Description	Part Number	Qty.
Not Pictured	Manual - AutoBoom Calibration & Operation	016-0130-062	1
	AutoBoom Node	063-0130-010	1
	Cable - Harness	115-0230-045	1
	Cable - Power/CAN	115-0230-007	1

Install the PowerGlide Plus Hydraulic System

	<p>WARNING</p> <p>The machine must remain stationary and switched off, with the booms unfolded and supported, during installation or maintenance.</p>
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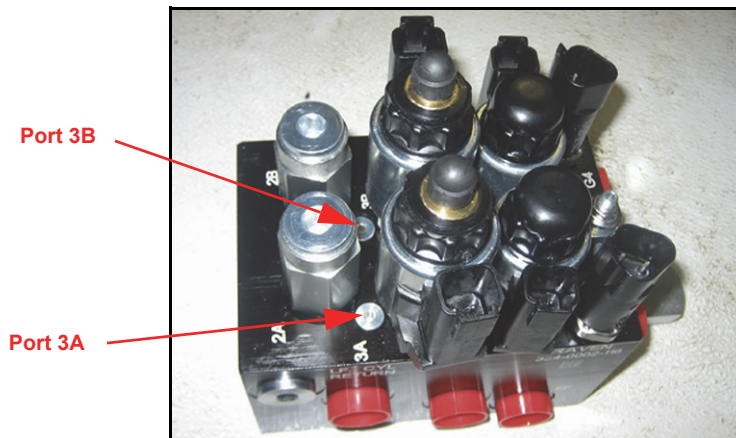
	<p>CAUTION</p> <p>When installing AutoBoom hydraulics or performing diagnostics, maintenance, or routine service, ensure precautions are taken to prevent any foreign material from being introduced into the machine's hydraulic system.</p> <p>Objects or materials that are able to bypass the machine's hydraulic filtration system will reduce performance and possibly damage the AutoBoom hydraulic valve.</p>
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	<p>NOTICE</p> <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>
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Remove the Orifice Fittings

Before populating the hydraulic fittings on the AutoBoom valve, it is necessary to remove orifice fittings from the valve in the PowerGlide Plus system. Failure to remove these fittings from the valve will restrict the down speed of the booms when the system is enabled.

FIGURE 1. Port 3A and 3B Location



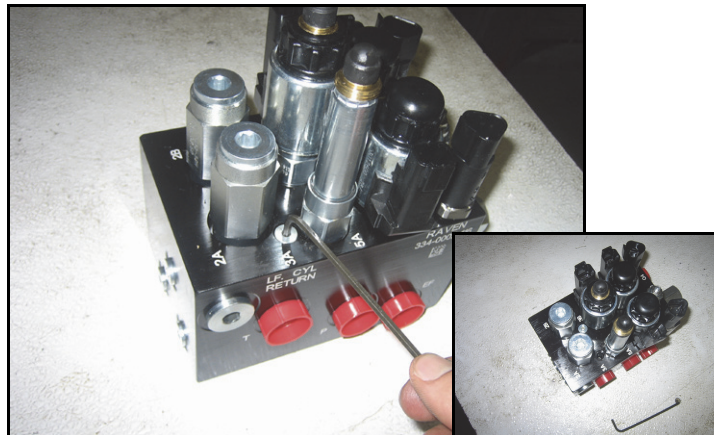
1. Locate Ports 3A and 3B on the AutoBoom valve.

FIGURE 2. Coil Removed from the AutoBoom Valve



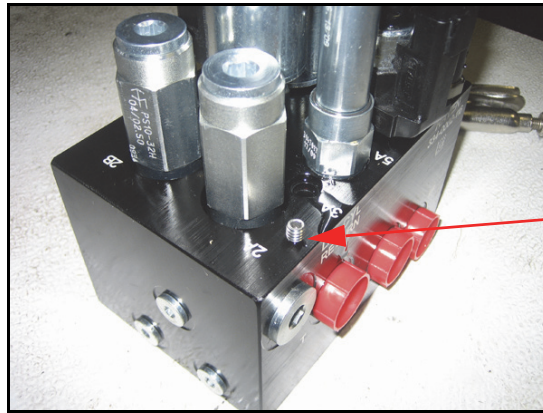
2. Remove the coils from the solenoids near Ports 3A and 3B to gain easy access to those ports.

FIGURE 3. Port Plugs Removed from the AutoBoom Valve



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

FIGURE 4. Orifice Fitting Removed from the AutoBoom Valve



Orifice Fitting
Removed - Keep for
Future Use

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

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

FIGURE 5. Port Plug Reinstalled on the AutoBoom Valve



- Use the Allen wrench to reinstall the port plugs on Ports 3A and 3B of the AutoBoom valve.

FIGURE 6. Coil Reinstalled on the AutoBoom Valve



- Reinstall the coils on the solenoids of the AutoBoom valve.

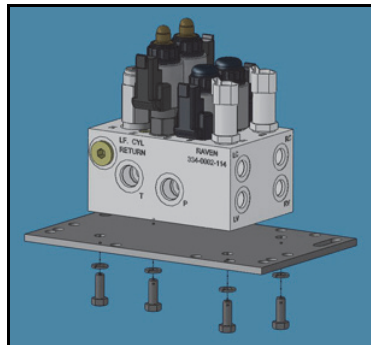
Install the Fittings on the AutoBoom Valve

Before mounting the AutoBoom valve 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 - 11/16" ORFS (M) to 3/4" SAE O-Ring (M) 90° Elbow	333-0012-165	LF CYL RTN, RT CYL RTN
Fitting - 11/16" ORFS (M) to 9/16" SAE O-Ring (M) Straight Adapter	333-0012-084	LC, RC
Fitting - 13/16" ORFS (M) to 3/4" SAE O-Ring (M) Straight Adapter	333-0012-168	P, T
Fitting - 11/16" Hex 9/16" SAE O-Ring Plug	333-0012-194	LV, RV

Mount the AutoBoom Valve

FIGURE 7. AutoBoom Valve Mounted on the Valve Mounting Plate



1. Secure the AutoBoom valve (P/N 063-0131-124) to the mounting plate (P/N 107-0171-802) using four 5/16" hex bolts (P/N 311-0052-104) and four 5/16" lock washers (P/N 313-1000-019).


FIGURE 8. AutoBoom Valve Mounted on the Machine



- Secure the mounting plate to the machine's center rack using two 2-9/16" W x 3-1/2" L x 3/8" thread U-bolts (P/N 107-0171-616) and four 3/8"-16 zinc flanged lock nuts (P/N 312-1001-164).


Note: Mount the valve so that Port P faces up and Ports LC and RC face the center of the machine.

Install the Pressure and Tank Hoses



WARNING

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.



CAUTION

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.

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

FIGURE 9. Pressure and Tank Hoses Installed



- Disconnect the machine's pressure hose from the machine's hydraulic valve.
- Install a 13/16" ORFS M/M/F swivel run tee fitting (P/N 333-0012-028) in the machine's pressure port.
- Attach the machine's pressure hose to the opposite end of the installed tee fitting.
- Connect the 90° end of the supplied hydraulic hose (P/N 214-1000-311) to the 90° end of the tee fitting.
- Connect the straight end of the installed hydraulic hose to Port P of on the AutoBoom valve.
- Disconnect the machine's tank hose from the machine's hydraulic valve.

7. Install a 13/16" ORFS M/M/F swivel run tee fitting (P/N 333-0012-028) 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 (P/N 214-1000-311) to the 90° end of the tee fitting.
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 10. Left and Right Cylinder Hoses Installed



1. Trace the machine's cylinder hoses from the rod-end of the tilt cylinders to the machine's hydraulic valve.
2. Disconnect the machine's left and right tilt cylinder hoses from the machine's hydraulic valve.
3. Install 11/16" ORFS M/M/F swivel run tee adapter fittings (P/N 333-0012-069) in the open cylinder ports of the machine's hydraulic valve.
4. Connect the machine's right cylinder hose to the opposite end of the tee fitting installed in the right cylinder port.
5. Install the 90° end of the supplied hydraulic hose (P/N 214-1000-494) on the 90° end of the installed tee fitting.
6. Connect the straight end of the installed hydraulic hose to the fittings installed in Port RC of the AutoBoom valve.
7. Connect the machine's left cylinder hose to the opposite end of the tee fitting installed in the left cylinder port.
8. Install the 90° end of the supplied hydraulic hose (P/N 214-1000-494) on the 90° end of the installed tee fitting.
9. Connect the straight end of the installed hydraulic hose to the fittings installed in Port LC of the AutoBoom valve.

Install the Left and Right Down Hoses

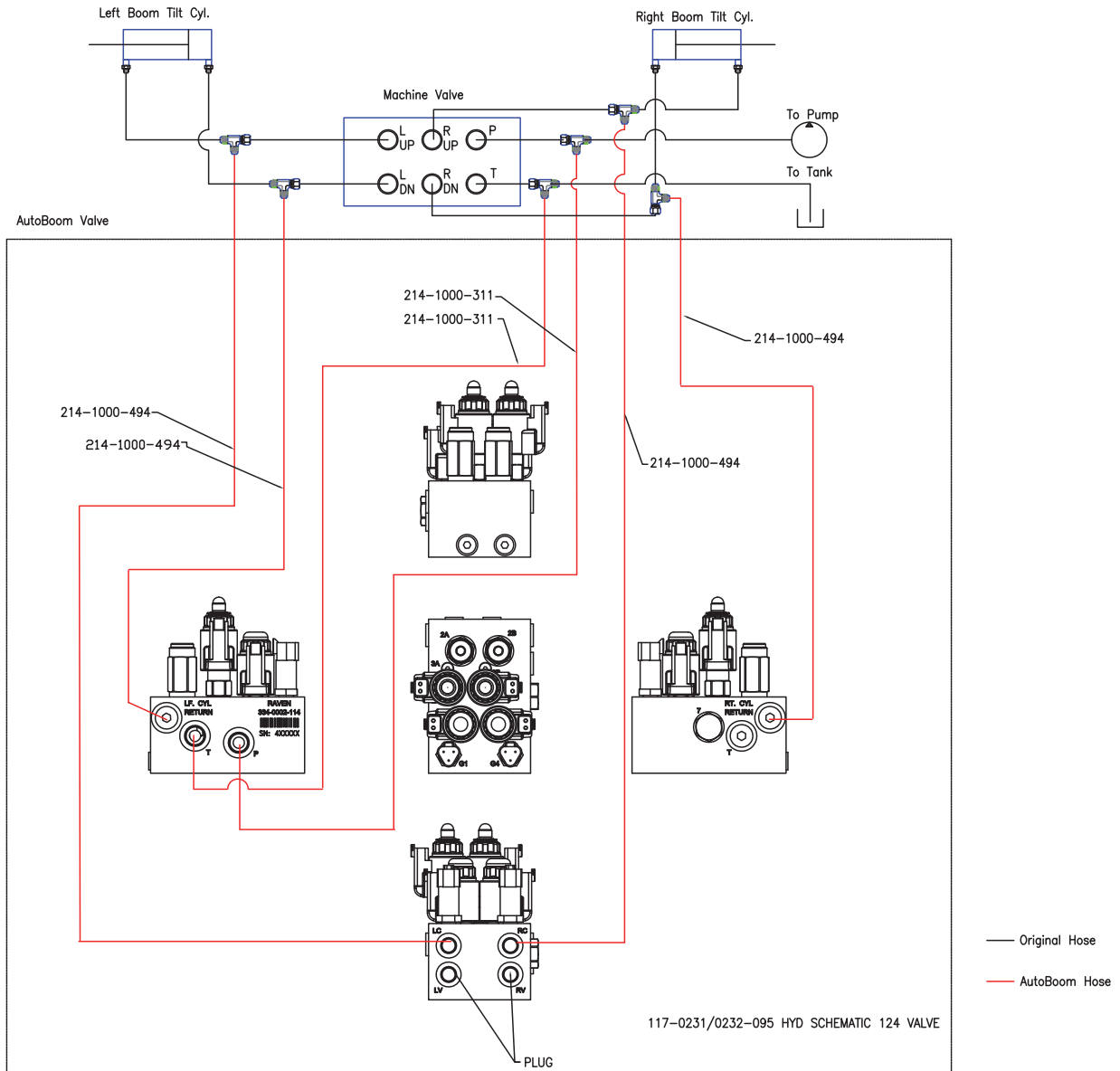
FIGURE 11. Left and Right Down Hoses Installed



1. Trace the machine's return hoses from the base-end of the tilt cylinders to the machine's hydraulic valve.
2. Disconnect the machine's left and right tilt return hoses from the machine's hydraulic valve.
3. Install 11/16" ORFS M/M/F swivel run tee adapter fittings (P/N 333-0012-069) in the open return ports of the machine's hydraulic valve.
4. Connect the machine's right return hose to the opposite end of the tee fitting installed in the right return port.
5. Install the 90° end of the supplied hydraulic hose (P/N 214-1000-494) on the 90° end of the installed tee fitting.
6. Connect the straight end of the installed hydraulic hose to the fitting installed in Port RT CYL RTN of the AutoBoom valve.
7. Connect the machine's left return hose to the opposite end of the tee fitting installed in the left return port.
8. Install the 90° end of the supplied hydraulic hose (P/N 214-1000-494) on the 90° end of the installed tee fitting.
9. Connect the straight end of the installed hydraulic hose to the fitting installed in Port LF CYL RTN of the AutoBoom valve.



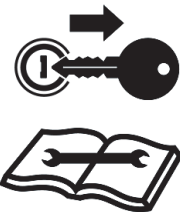

PowerGlide Plus Hydraulic Schematic



Install the Gauge Wheels

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.

	 WARNING
	<p>The machine must remain stationary and switched off, with the booms unfolded and supported, during installation or maintenance.</p>

Mount the Gauge Wheels

Note: *The appearance of the wheel axles may vary.*

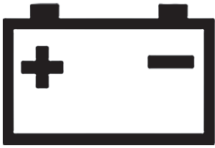
FIGURE 12. Gauge Wheel Installed



1. Remove the nuts from the right wheel axle (P/N 063-0131-585).
2. Place the wheel (P/N 322-0131-008) on the right wheel axle.
3. Align and place the hub retainer bracket (P/N 107-0171-617) over the wheel.
4. Reinstall the lug nuts on the wheel axle to secure the wheel and hub retainer bracket.
5. Mount the right wheel receiver bracket (P/N 116-0159-601) to the front of the right boom using two 1-5/16" W x 2" L x 3/8" thread U-bolts (P/N 107-0171-612), two 2-1/16" W x 3" L x 3/8" thread U-bolts (P/N 107-0171-609), and eight 3/8"-16 zinc flanged lock nuts (P/N 312-1001-164).
6. 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.
7. Secure the gauge wheel assembly in the wheel mounting bracket by installing two 1/2"-13 x 1-1/2" SS hex bolts (P/N 311-0052-186) and two 1/2"-13 zinc hex nuts (P/N 312-1000-043).
8. Repeat the steps above to install the left wheel.

Install the PowerGlide Plus Wiring

Wiring Connections

	<p style="text-align: center;">⚠ CAUTION</p> <p>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.</p>
---	---

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 13. AutoBoom Node Installed



1. Mount the AutoBoom node (P/N 063-0130-010) to the AutoBoom valve hydraulic mounting plate (P/N 107-0171-802) using three 3/8"-16 zinc hex bolts (P/N 311-0054-106) and three 3/8"-16 zinc flanged lock nuts (P/N 312-1001-164).

Note: Position the node so that the cable connectors face down.

2. Insert the large, rectangular node connectors on the harness cable (P/N 115-0230-073) into the corrector ports of the AutoBoom valve.
3. Tighten the bolts on the node connectors to secure the connections.

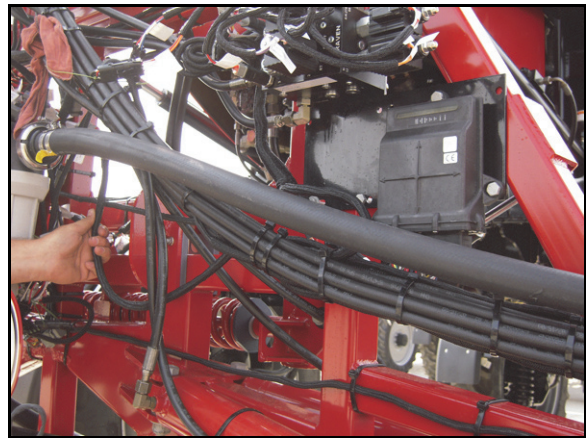
Connect the Harness to the AutoBoom Valve

1. Locate the Left Press and Right Press connectors on the harness cable (P/N 115-0230-073).
2. Route the connectors to the AutoBoom valve (P/N 063-0131-124).
3. Connect the Left Press connector to Port G1 on the AutoBoom valve.
4. Connect the Right Press connector to Port G4 on the AutoBoom valve.

5. Locate the Left Solenoid and Right Solenoid connectors on the harness cable.
6. Connect the Left Solenoid connector to Port 4A on the AutoBoom valve.
7. Connect the Right Solenoid connector to Port 4B on the AutoBoom valve.
8. Locate the Left Prop and Right Prop connectors on the harness cable.
9. Connect the Left Prop connector to Port 5A on the AutoBoom valve.
10. Connect the Right Prop connector to Port 13A on the AutoBoom valve.

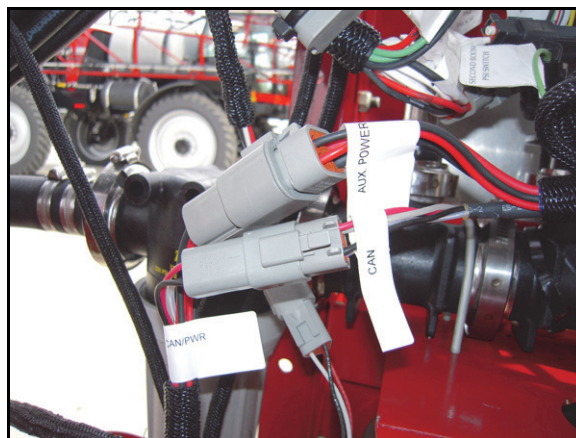
Connect the Harness to the Power/CAN Controls

FIGURE 14. AutoBoom Harness Cable Installed



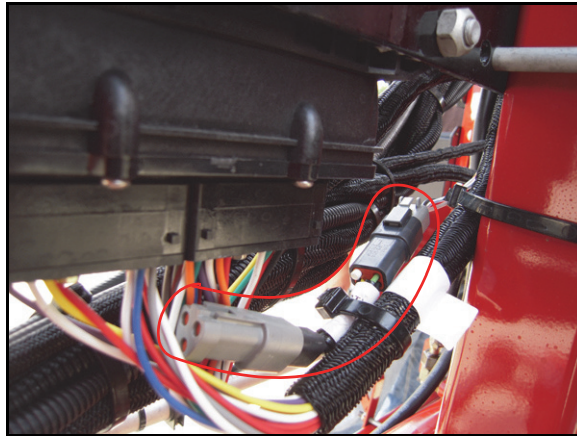
1. Locate the machine's harness cable bulkhead on the center boom section, near the pressure transducers on the sprayline.
2. Disconnect the machine's cable from the bulkhead connector.
3. Attach the appropriate ends of the AutoBoom cable (P/N 115-0230-073) to the machine's cable and the bulkhead connector

FIGURE 15. Machine's CAN Terminator.



4. Disconnect the machine's CAN terminator from the machine's harness cable.

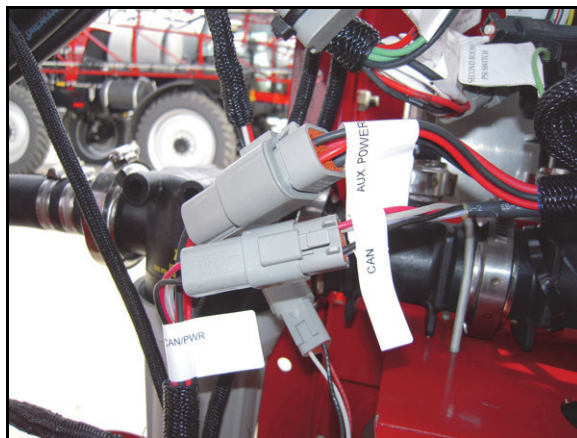
FIGURE 16. Machine's CAN Terminator Connected to the AutoBoom Harness Cable



5. Connect the machine's CAN terminator to the AutoBoom harness cable's (P/N 115-0230-073) CAN connection.
6. Connect the AutoBoom harness cable's CAN connection to the open CAN connection on the machine's harness.

Connect the Power Leads

FIGURE 17. Power Leads Connected



1. Locate the machine's CAN and auxiliary power connectors on the center boom section, near the flow meter and filter.
2. Connect the machine's CAN connector to the CAN/PWR connector on the AutoBoom harness cable.
3. Connect the machine's AUX POWER connector to the AUX POWER connector on the AutoBoom harness cable.

Note: *The Left Prox Switch and Right Prox Switch connections on the AutoBoom cable (P/N 115-0230-073) remain disconnected on after-market AutoBoom installations. They are connected only on machines that have factory-installed proximity switches on the main boom fold section.*

CHAPTER**4*****UltraGlide******UltraGlide 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 Raven dealer.

TABLE 1. UltraGlide Installation Kit (P/N 117-0232-095)

Picture	Item Description	Part Number	Qty.
Not Pictured	Manual - Case IH Patriot, Model Year 2010 & Newer AutoBoom Installation	016-0230-095	1
Not Pictured	Manual - AutoBoom Calibration & Operation	016-0130-062	1
	Valve - PowerGlide Plus AutoBoom	063-0131-124	1
	Plate - Hydraulic Block Mounting	107-0171-802	1
	Sensor - Right Ultrasonic	063-0130-012	1
	Sensor - Left Ultrasonic	063-0130-014	1

TABLE 1. UltraGlide Installation Kit (P/N 117-0232-095)

Picture	Item Description	Part Number	Qty.
	Sensor - Center Ultrasonic	063-0130-018	1
	Node - UltraGlide CAN AutoBoom	063-0130-013	1
	Cable - AutoBoom Ultrasonic Sensor 60' Extension	115-0230-051	1
	Cable - PowerGlide Plus/UltraGlide 2010+ Center Rack Control CAN 20'	115-0230-073	1
	Bracket - Ultrasonic Sensor Boom Mount Weldment	116-0159-684	1
	U-Bolt - 2-1/16" W x 3" L x 3/8" Thread	107-0171-609	4
	U-Bolt - 2-9/16" W x 3-1/2" L x 3/8" Thread	107-0171-616	4
	Bolt - 5/16"-18 x 7/8" Hex	311-0052-104	4
	Bolt - 3/8"-16 UNC x 1-1/4" Zinc Plated Hex	311-0054-106	7
	Nut - 3/8"-16 Zinc Flanged Lock	312-1001-164	23
	Washer - 5/16" Zinc Plated Lock	313-1000-019	4

TABLE 2. Hydraulic Kit (P/N 117-0134-075)

Picture	Item Description	Part Number	Qty.
	Fitting - 13/16" ORFS M/M/F Swivel Run Tee	333-0012-028	2
	Fitting - 11/16" ORFS M/F 90° Swivel Elbow	333-0012-065	2
	Fitting - 11/16" ORFS M/M/F Swivel Run Tee	333-0012-069	4
	Fitting - 11/16" ORFS (M) to 9/16" SAE O-Ring (M) Straight Adapter	333-0012-084	2
	Fitting - 11/16" ORFS (M) to 3/4" SAE O-Ring (M) 90° Elbow	333-0012-165	2
	Fitting - 13/16" ORFS (M) to 3/4" SAE O-Ring (M) Straight Adapter	333-0012-168	2
	Fitting - 11/16" Hex 9/16" O-Ring Plug	333-0012-194	2
	Hydraulic Hose - 13/16" ORFS (F) to 13/16" ORFS (F) 90° - 36"	214-1000-311	2
	Hydraulic Hose - 11/16" ORFS (F) 90° to 11/16" ORFS (F) - 44"	214-1000-494	4

TABLE 3. Ultrasonic Sensor Bracket Installation Kit (P/N 117-0131-082)





Picture	Item Description	Part Number	Qty.
Not Pictured	Sheet - AutoBoom Sensor Extension	016-0130-070	1
	Bracket - 12" S-Type AutoBoom Sensor	063-0131-592	2
	Bolt - 5/16"-18 x 1-1/4" Hex	311-0052-106	2
	Nut - 5/16"-18 Nylon Insert Lock	312-4000-059	2
	Washer - 5/16" Zinc Flat	313-2300-012	4

TABLE 4. Optional Wheel Kit (P/N 117-0134-006)






Picture	Item Description	Part Number	Qty.
	Axle Assembly - Right Cushioned AutoBoom	063-0131-585	1
	Axle Assembly - Left Cushioned AutoBoom	063-0131-590	1
	Bracket - Left Weldment Receiver	116-0159-544	2
	Bracket - Hub Retainer	107-0171-617	2
	Wheel	322-0131-008	2

TABLE 4. Optional Wheel Kit (P/N 117-0134-006)










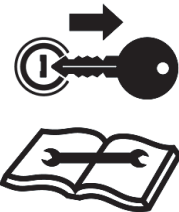
Picture	Item Description	Part Number	Qty.
	U-Bolt - 2-1/16" W x 3" L x 3/8" Thread	107-0171-609	4
	U-Bolt - 1-5/16" W x 2" L x 3/8" Thread	107-0171-612	4
	Bolt - 1/2"-13 x 1-1/2" SS Hex	311-0058-186	4
	Nut - 1/2"-13 Zinc Plated Hex	312-1001-043	4
	Nut - 3/8"-16 Zinc Flanged Lock	312-1001-164	16

TABLE 5. UltraGlide Wiring Kit (P/N 117-0137-024)


Picture	Item Description	Part Number	Qty.
Not Pictured	Manual - AutoBoom Calibration & Operation	016-0130-062	1
	Node - UltraGlide AutoBoom	063-0130-013	1
	Cable - Sensor	115-0171-527	2
	Cable - Harness	115-0230-045	1
	Cable - Power/CAN	115-0230-007	1

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

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 on the AutoBoom Valve

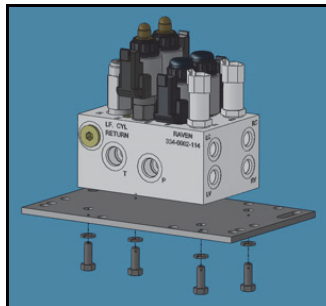
Before mounting the AutoBoom valve on the machine, install the fittings in the appropriate ports of the AutoBoom valve. This prepares the valve for installation and simplifies the hose connection process later in the procedure. Refer to the following table to install the fittings.

Fitting	Part Number	Port
Fitting - 11/16" ORFS (M) to 3/4" SAE O-Ring (M) 90° Elbow	333-0012-165	LF CYL RTN, RTCYLRTN
Fitting - 11/16" ORFS (M) to 9/16" SAE O-Ring (M) Straight Adapter	333-0012-084	LC, RC

Fitting	Part Number	Port
Fitting - 13/16" ORFS (M) to 3/4" SAE O-Ring (M) Straight Adapter	333-0012-168	P, T
Fitting - 11/16" Hex 9/16" SAE O-Ring Plug	333-0012-194	LV, RV

Mount the AutoBoom Valve

FIGURE 1. AutoBoom Valve Mounted on the Valve Mounting Plate



1. Secure the AutoBoom valve (P/N 063-0131-124) to the mounting plate (P/N 107-0171-802) using four 5/16" hex bolts (P/N 311-0052-104) and four 5/16" lock washers (P/N 313-1000-019).


FIGURE 2. AutoBoom Valve Mounted on the Machine



2. Secure the mounting plate to the machine's center rack using two 2-9/16" W x 3-1/2" L x 3/8" thread U-bolts (P/N 107-0171-616) and four 3/8"-16 zinc flanged lock nuts (P/N 312-1001-164).

Note: Mount the valve so that Port P faces up and Ports LC and RC face the center of the machine.

Install the Pressure and Tank Hoses

	<p>⚠ WARNING</p> <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>
---	---


	<p>⚠ CAUTION</p> <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 valves.</p>
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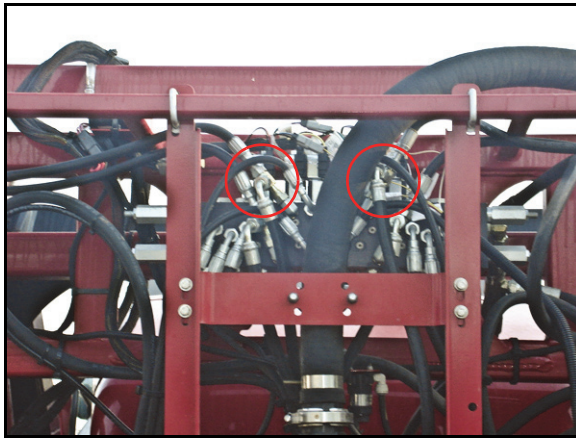
FIGURE 3. Pressure and Tank Hoses Installed



1. Disconnect the machine's pressure hose from the machine's hydraulic valve.
2. Install a 13/16" ORFS M/M/F swivel run tee fitting (P/N 333-0012-028) in the machine's pressure port.
3. Attach the machine's pressure hose to the opposite end of the installed tee fitting.
4. Connect the 90° end of the supplied hydraulic hose (P/N 214-1000-311) to the 90° end of the tee fitting.
5. Connect the straight end of the installed hydraulic hose to Port P of on the AutoBoom valve.
6. Disconnect the machine's tank hose from the machine's hydraulic valve.
7. Install a 13/16" ORFS M/M/F swivel run tee fitting (P/N 333-0012-028) 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 (P/N 214-1000-311) to the 90° end of the tee fitting.
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. Left and Right Cylinder Hoses Installed



1. Trace the machine's cylinder hoses from the rod-end of the tilt cylinders to the machine's hydraulic valve.
2. Disconnect the machine's left and right tilt cylinder hoses from the machine's hydraulic valve.
3. Install 11/16" ORFS M/M/F swivel run tee adapter fittings (P/N 333-0012-069) in the open cylinder ports of the machine's hydraulic valve.
4. Connect the machine's right cylinder hose to the opposite end of the tee fitting installed in the right cylinder port.
5. Install the 90° end of the supplied hydraulic hose (P/N 214-1000-494) on the 90° end of the installed tee fitting.
6. Connect the straight end of the installed hydraulic hose to the fittings installed in Port RC of the AutoBoom valve.
7. Connect the machine's left cylinder hose to the opposite end of the tee fitting installed in the left cylinder port.
8. Install the 90° end of the supplied hydraulic hose (P/N 214-1000-494) on the 90° end of the installed tee fitting.
9. Connect the straight end of the installed hydraulic hose to the fittings installed in Port LC of the AutoBoom valve.



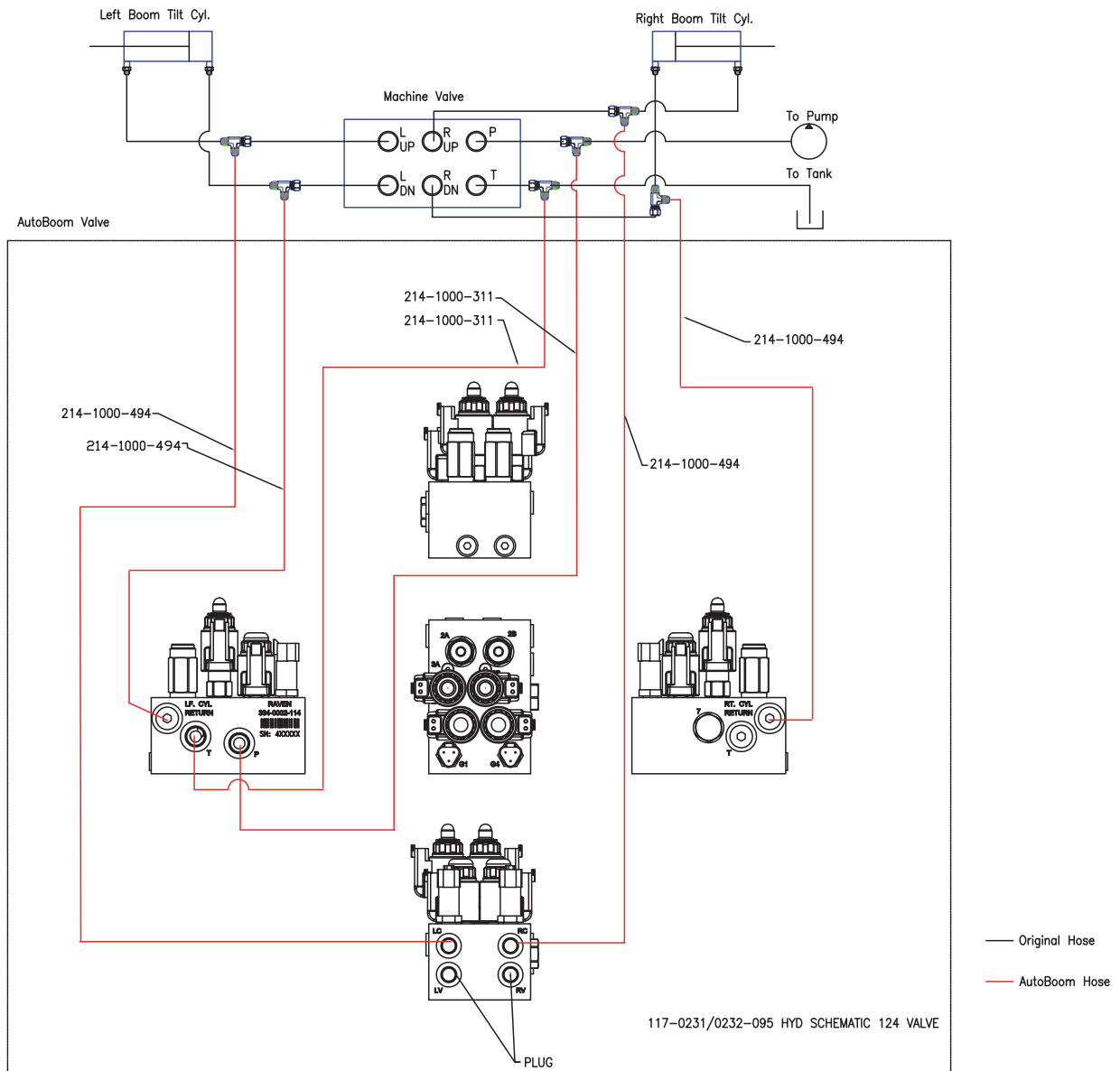
Install the Left and Right Down Hoses

FIGURE 5. Left and Right Down Hoses Installed



1. Trace the machine's return hoses from the base-end of the tilt cylinders to the machine's hydraulic valve.
2. Disconnect the machine's left and right tilt return hoses from the machine's hydraulic valve.
3. Install 11/16" ORFS M/M/F swivel run tee adapter fittings (P/N 333-0012-069) in the open return ports of the machine's hydraulic valve.
4. Connect the machine's right return hose to the opposite end of the tee fitting installed in the right return port.
5. Install the 90° end of the supplied hydraulic hose (P/N 214-1000-494) on the 90° end of the installed tee fitting.
6. Connect the straight end of the installed hydraulic hose to the fitting installed in Port RT CYL RTN of the AutoBoom valve.
7. Connect the machine's left return hose to the opposite end of the tee fitting installed in the left return port.
8. Install the 90° end of the supplied hydraulic hose (P/N 214-1000-494) on the 90° end of the installed tee fitting.
9. Connect the straight end of the installed hydraulic hose to the fitting installed in Port LF CYL RTN of the AutoBoom valve.

UltraGlide Hydraulic Schematic

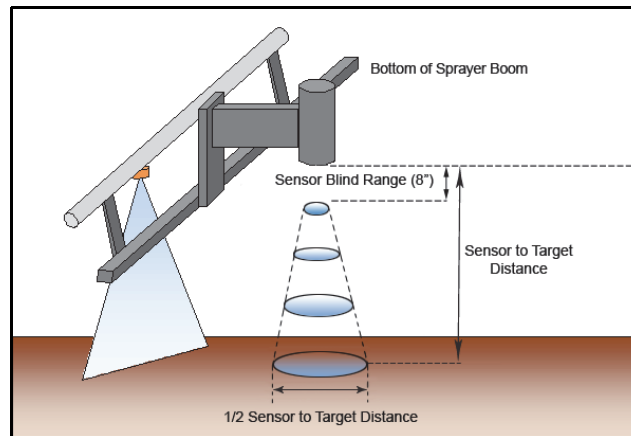


Install the UltraGlide Sensors

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 sensors 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

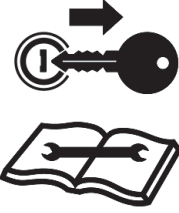
	<p>⚠ WARNING</p> <p>The machine must remain stationary and switched off, with the booms unfolded and supported, during installation or maintenance.</p>
---	--

FIGURE 7. Mounted Boom Sensor



1. Locate the left and right ultrasonic sensors (P/N 063-0130-012 and 063-0130-014) in the AutoBoom installation kit.
2. Remove the sensor from the existing plastic arm.
3. Install the sensors on the 12" S-type sensor arms (P/N 063-0131-592) using the supplied 5/16"-18 x 1-1/4" bolts (P/N 311-0052-106), 5/16"-18 nylon insert lock nuts (P/N 312-4000-059) and 5/16" zinc flat washers (P/N 313-2300-012).
4. Secure the left sensor (P/N 063-0130-014) to the front of the left boom using two 2-1/16" W x 3" L x 3/8" thread U-bolts (P/N 107-0171-609) and four 3/8"-16 zinc flanged lock nuts (P/N 312-1001-164).
5. Tighten the nuts to ensure the sensor is mounted securely.
6. Repeat the steps above to install the remaining boom sensor(s).

Mount the Center Rack Sensor

FIGURE 8. Center Sensor Mounted to the Bracket



1. Install the center sensor (P/N 063-0130-018) on the ultrasonic sensor boom mount weldment bracket (P/N 116-0159-684) using four 3/8"-16 UNC x 1-1/4" hex bolts (P/N 311-0054-106) and four 3/8"-16 zinc flanged lock nuts (P/N 312-1001-164).

FIGURE 9. Mounted Center Rack Sensor



1. Mount the center sensor to the cross-beam of the machine's center rack using two 2-9/16" W x 2-1/2" L x 3/8" thread U-bolts (P/N 107-0171-616) and four 3/8"-16 zinc flanged lock nuts (P/N 312-1001-164).
2. Tighten the nuts to ensure the sensor is mounted securely.

Connect the Sensor Cables

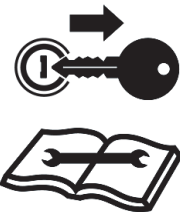

1. Connect the left sensor cable (P/N 115-0230-051) to the connector on the left sensor.
2. Route the left sensor cable toward the AutoBoom valve.
3. Loop and tie-off any excess cable, allowing enough cable for boom folding and extension.
4. Repeat the steps above to connect the remaining sensor cable(s).

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

Install the Gauge Wheels - 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.

	 WARNING
<p>The machine must remain stationary and switched off, with the booms unfolded and supported, while installation or maintenance is conducted.</p>	

Mount the Gauge Wheels

Note: *The appearance of the wheel axles may vary.*

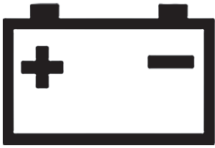
FIGURE 10. Gauge Wheel Installed



1. Remove the nuts from the right wheel axle (P/N 063-0131-585).
2. Place the wheel (P/N 322-0131-008) on the right wheel axle.
3. Align and place the hub retainer bracket (P/N 107-0171-617) over the wheel.
4. Reinstall the lug nuts on the wheel axle to secure the wheel and hub retainer bracket.
5. Mount the right wheel receiver bracket (P/N 116-0159-601) to the front of the right boom using two 1-5/16" W x 2" L x 3/8" thread U-bolts (P/N 107-0171-612), two 2-1/16" W x 3" L x 3/8" thread U-bolts (P/N 107-0171-609), and eight 3/8"-16 zinc flanged lock nuts (P/N 312-1001-164).
6. 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.
7. Secure the gauge wheel assembly in the wheel mounting bracket by installing two 1/2"-13 x 1-1/2" SS hex bolts (P/N 311-0052-186) and two 1/2"-13 zinc hex nuts (P/N 312-1000-043).
8. Repeat the steps above to install the left wheel.

Install the UltraGlide Wiring

Wiring Connections

	<div style="background-color: yellow; text-align: center; padding: 5px;">⚠ CAUTION</div> <p>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.</p>
---	---

Note: 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 11. AutoBoom Node Installed



1. Mount the AutoBoom node (P/N 063-0130-013) to the AutoBoom valve hydraulic mounting plate using three 3/8"-16 zinc hex bolts (P/N 311-0054-106) and three 3/8"-16 zinc flanged lock nuts (P/N 312-1001-164).

Note: Position the node so that the cable connectors face down.

2. Insert the large, rectangular node connectors on the harness cable (P/N 115-0230-073) into the corrector ports of the AutoBoom valve.
3. Tighten the bolts on the node connectors to secure the connections.

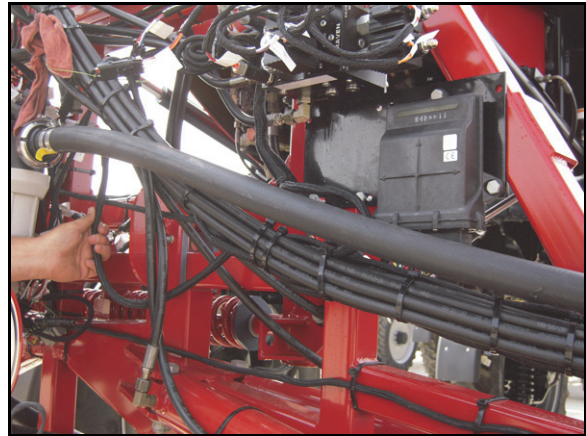
Connect the Harness to the AutoBoom Valve

1. Locate the Left Press and Right Press connectors on the harness cable (P/N 115-0230-073).
2. Route the connectors to the AutoBoom valve (P/N 063-0131-124).
3. Connect the Left Press connector to Port G1 on the AutoBoom valve.
4. Connect the Right Press connector to Port G4 on the AutoBoom valve.

5. Locate the Left Solenoid and Right Solenoid connectors on the harness cable.
6. Connect the Left Solenoid connector to Port 4A on the AutoBoom valve.
7. Connect the Right Solenoid connector to Port 4B on the AutoBoom valve.
8. Locate the Left Prop and Right Prop connectors on the harness cable.
9. Connect the Left Prop connector to Port 5A on the AutoBoom valve.
10. Connect the Right Prop connector to Port 13A on the AutoBoom valve.

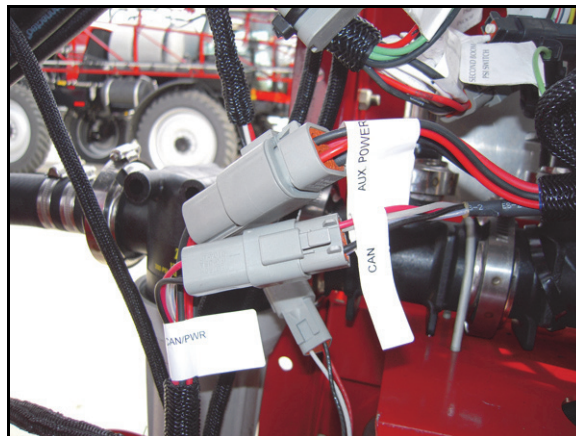
Connect the Harness to the Power/CAN Controls

FIGURE 12. AutoBoom Harness Cable Installed



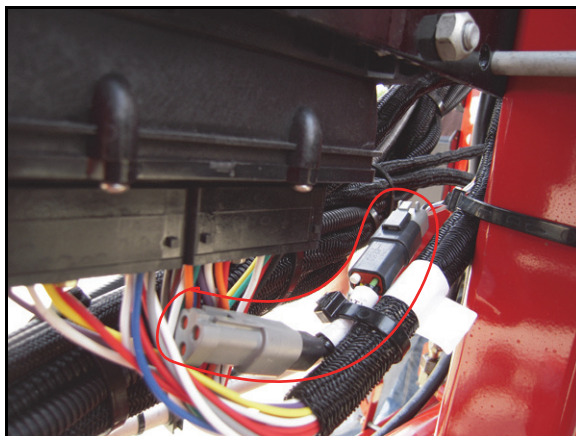
1. Locate the machine's harness cable bulkhead on the center boom section, near the pressure transducers on the sprayline.
2. Disconnect the machine's cable from the bulkhead connector.
3. Attach the appropriate ends of the AutoBoom cable (P/N 115-0230-073) to the machine's cable and the bulkhead connector

FIGURE 13. Machine's CAN Terminator.



4. Disconnect the machine's CAN terminator from the machine's harness cable.

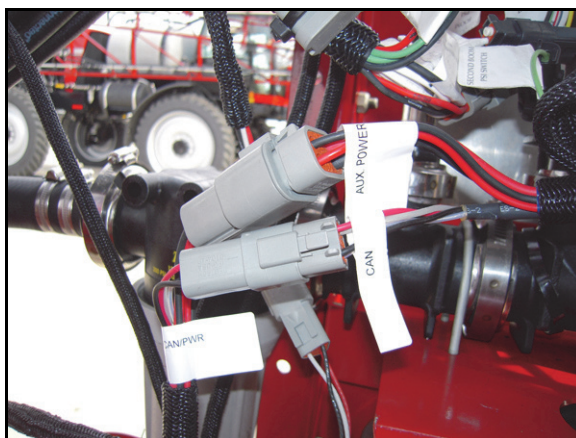
FIGURE 14. Machine's CAN Terminator Connected to the AutoBoom Harness Cable



5. Connect the machine's CAN terminator to the AutoBoom harness cable's (P/N 115-0230-073) CAN connection.
6. Connect the AutoBoom harness cable's CAN connection to the open CAN connection on the machine's harness.

Connect the Power Leads

FIGURE 15. Power Leads Connected



1. Locate the machine's CAN and auxiliary power connectors on the center boom section, near the flow meter and filter.
2. Connect the machine's CAN connector to the CAN/PWR connector on the AutoBoom harness cable.
3. Connect the machine's AUX POWER connector to the AUX POWER connector on the AutoBoom harness cable.

Note: *The Left Prox Switch and Right Prox Switch connections on the AutoBoom cable (P/N 115-0230-073) remain disconnected on after-market AutoBoom installations. They are connected only on machines that have factory-installed proximity switches on the main boom fold section.*

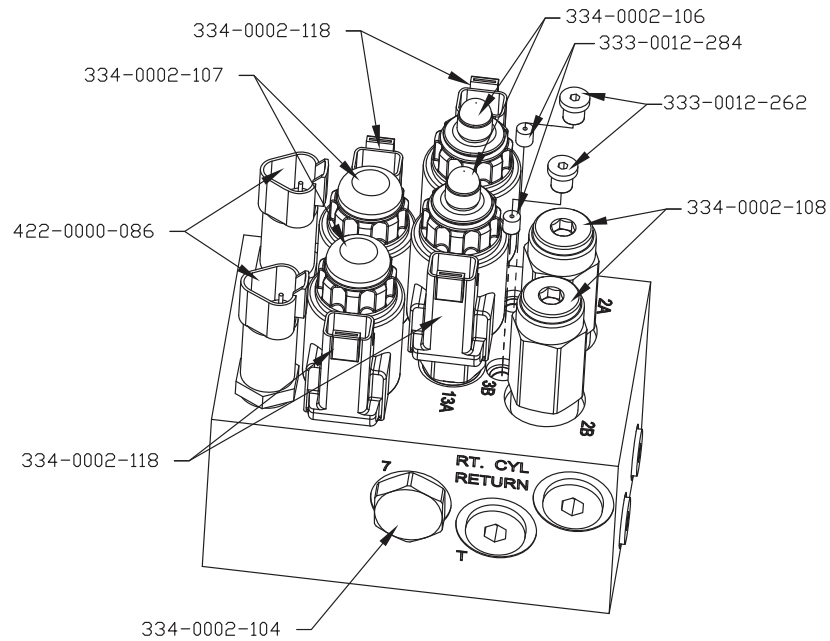
CHAPTER

5

Replacement Parts

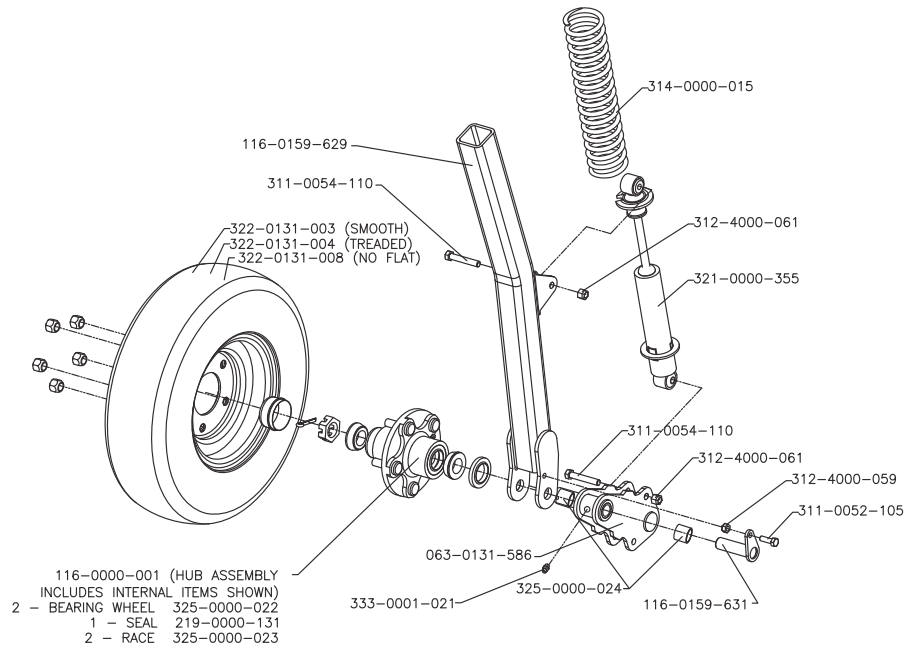
This section contains replacement part diagrams for PowerGlide Plus and UltraGlide systems. Refer to these diagrams when calling to request replacement parts.

Valves

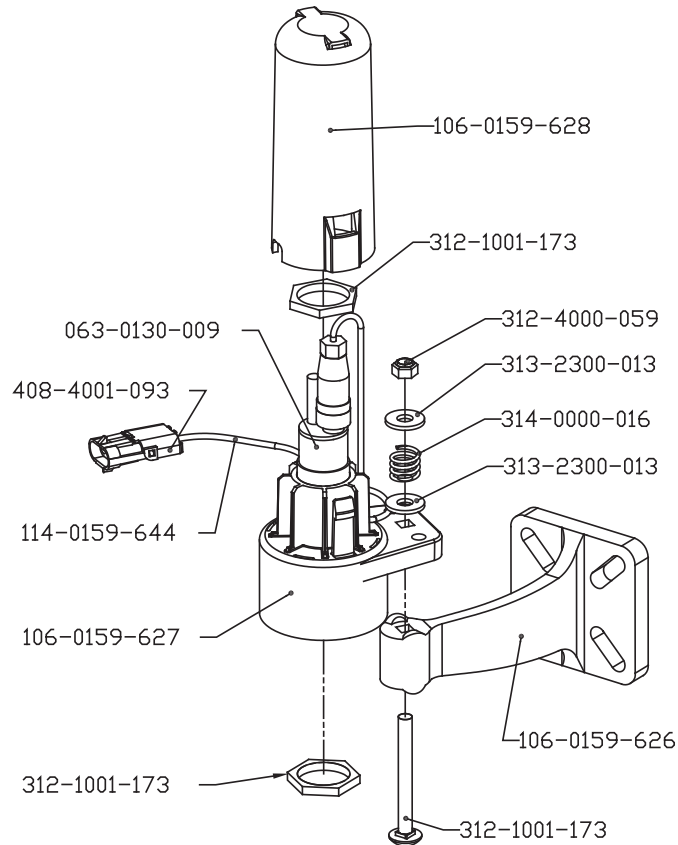


063-0131-124
VALVE, HYDRAULIC POWERGLIDE
PLUS/ULTRAGLIDE, CLOSED CENTER, AUTOBOOM

Wheels



Sensors



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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.