

R A V E N

AutoBoom™ Installation Manual



Metalfor 2200, 2500, and 3000 Series

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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

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: Metalfor

MODEL: 2200, 2500, and 3000

FIGURE 1. Metalfor 3000



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)



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 117-0232-106)

Picture	Item Description	Part Number	Qty.
Not Pictured	Manual - Metalfor 2200, 2500, and 3000 Series AutoBoom Installation	016-0230-106	1
Not Pictured	Manual - AutoBoom Calibration & Operation	016-0130-071	1
	Valve - UltraGlide AutoBoom	063-0131-126	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 117-0232-106)











Picture	Item Description	Part Number	Qty.
	Sensor - Center Ultrasonic	063-0130-018	1
	Node - UltraGlide AutoBoom	063-0130-013	1
	Cable - 12' CAN Extension	115-0171-386	1
	Cable - Power/CAN Controller	115-0230-007	1
	Cable - Harness	115-0230-033	1
	Cable - Sensor	115-0230-050	2
	Cable - Boom Sense Adapter	115-0230-075	4
	Weldment - Ultrasonic Sensor Boom Mount	116-0159-684	1
	U-Bolt - 1-9/16" W x 2-1/2" L x 3/8" Thread	107-0171-611	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

TABLE 1. UltraGlide Installation Kit (P/N 117-0232-106)






Picture	Item Description	Part Number	Qty.
	Bolt - 3/8"-16 x 1-1/4" UNC Hex	311-0054-106	3
	Nut - 3/8"-16 Zinc Flanged Lock	312-1001-164	19
	Washer - 5/16" Zinc Plated Lock	313-1000-019	4

TABLE 2. Hydraulic Installation Kit (P/N 117-0134-106)

Picture	Item Description	Part Number	Qty.
	Fitting - 9/16" JIC M/M/F Swivel Run Tee Adapter	333-0012-043	2
	Fitting - 9/16" JIC (M) to 9/16" SAE O-Ring (M) Straight Adapter	333-0012-045	2
	Fitting - 3/4" JIC M/F 90° Swivel Elbow	333-0012-064	3
	Fitting - 3/4" JIC (M) to 3/4" SAE O-Ring (M) Straight Adapter	333-0012-093	3
	Fitting - 1/2" NPT (M) to 3/4" JIC (M) Straight Adapter	333-0012-157	1
	Fitting - 1/2" NPT M/F/F Tee Adapter	333-0012-181	1
	Fitting - 9/16" O-Ring to 11/16" Hex Plug	333-0012-194	2

TABLE 2. Hydraulic Installation Kit (P/N 117-0134-106)

Picture	Item Description	Part Number	Qty.
	Hydraulic Hose - 3/4" JIC (F) to 3/4" JIC (F) 90° - 84"	214-1000-371	1
	Hydraulic Hose - 9/16" JIC (F) to 9/16" JIC (F) 90° - 72"	214-1000-520	2
	Hydraulic Hose - 3/4" JIC (F) to 3/4" JIC (F) 90° - 60"	214-1000-640	1
	Hydraulic Hose - 3/4" JIC (M) to 3/4" JIC (F) - 24"	214-1000-984	1

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 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 damage 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 in 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 steps and table to install the fittings in the appropriate ports of the AutoBoom valve.

Note: The following instructions assume you are looking at the AutoBoom valve with the LC, RC, LV, and RV ports facing you.

1. Remove the steel plug fitting from Port T on the right side of the AutoBoom valve (P/N 063-0131-126).
2. Remove the plastic plug from Port T on the left side of the valve and install the steel plug fitting.

Fitting	Part Number	Port
Fitting - 9/16" JIC (M) to 9/16" SAE O-Ring (M) Straight Adapter	333-0012-045	LC, RC
Fitting - 3/4" JIC (M) to 3/4" SAE O-Ring (M) Straight Adapter	333-0012-093	Right T, P, EF
Fitting - 9/16" O-Ring to 11/16" Hex Plug	333-0012-194	LV, RV

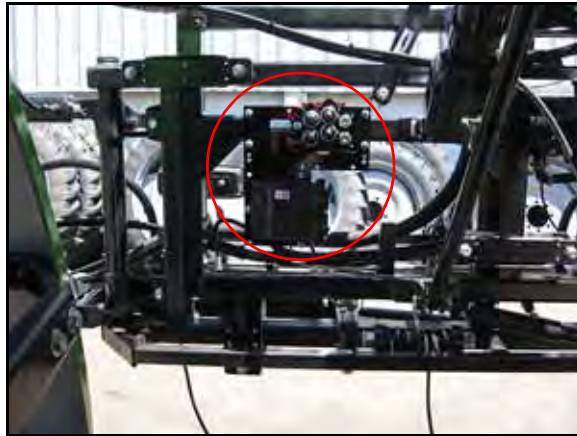
Mount the AutoBoom Valve

FIGURE 1. AutoBoom Valve Mounted on the Valve Mounting Plate



1. Secure the AutoBoom valve (P/N 063-0131-126) 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



- 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" zinc flanged lock nuts (P/N 312-1001-164).

Install the Pressure and Tank Hoses

	<p style="text-align: center;">⚠ 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>
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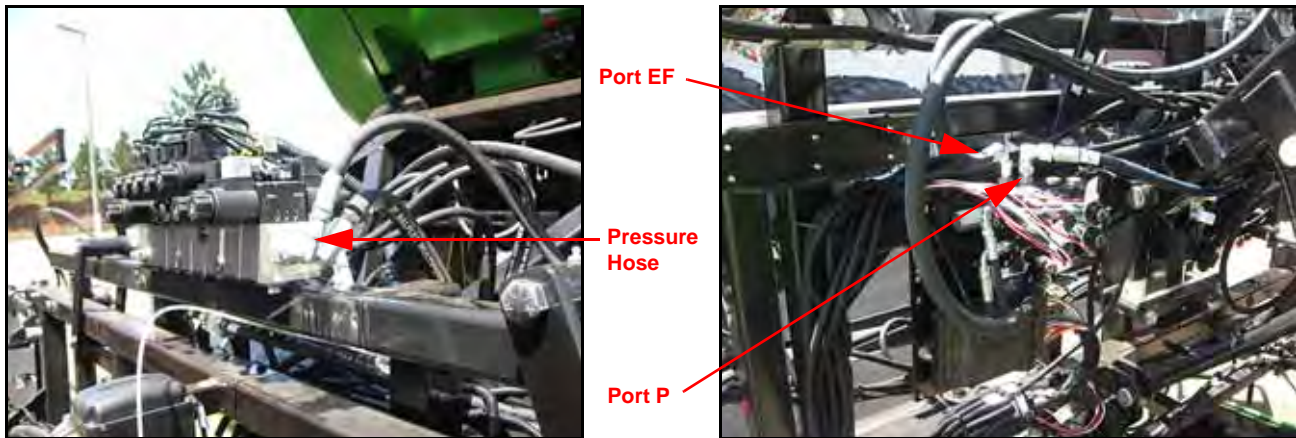
	<p style="text-align: center;">⚠ CAUTION</p> <p>When installing AutoBoom hydraulics or performing diagnostics, maintenance, or routine service, ensure precautions are taken to prevent any foreign material or contaminants from being introduced into the machine's hydraulic system.</p> <p>Object or materials 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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FIGURE 3. Machine's Hydraulic Valve Cover



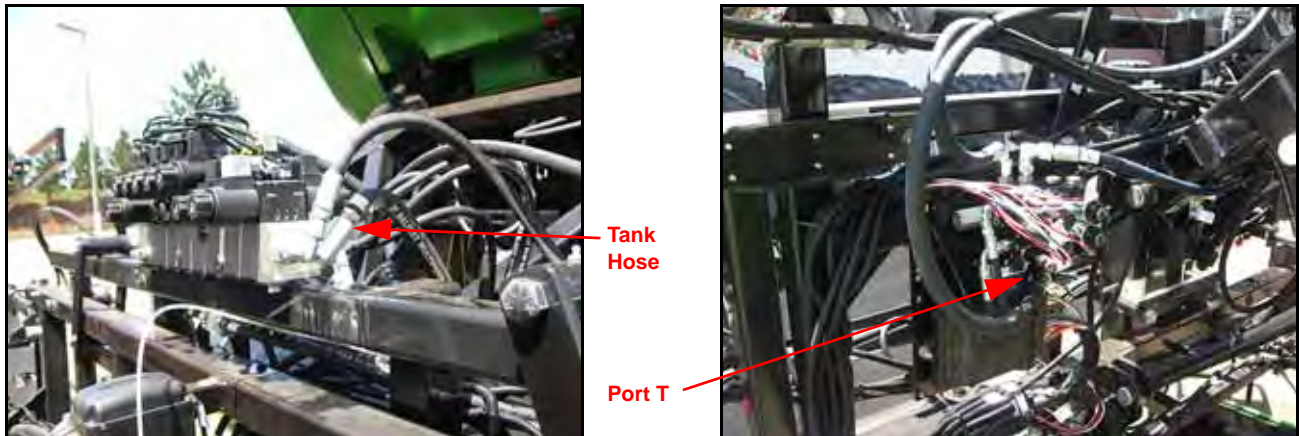
1. Remove the green cover at the back of the machine to access the machine's hydraulic valve.

FIGURE 4. Pressure Hoses Installed



2. Locate and disconnect the machine's pressure hose from the machine's hydraulic valve.
3. Install the male end of the supplied hydraulic hose (P/N 214-1000-894) on the machine's pressure hose.
4. Route and connect the other end of the installed hydraulic hose to the fitting installed in Port P of the AutoBoom valve.
5. Install the straight end of the supplied hydraulic hose (P/N 214-1000-640) on the pressure port of the machine's hydraulic valve.
6. Connect the 90° end of the installed hydraulic valve to the fitting installed in Port EF of the AutoBoom valve.

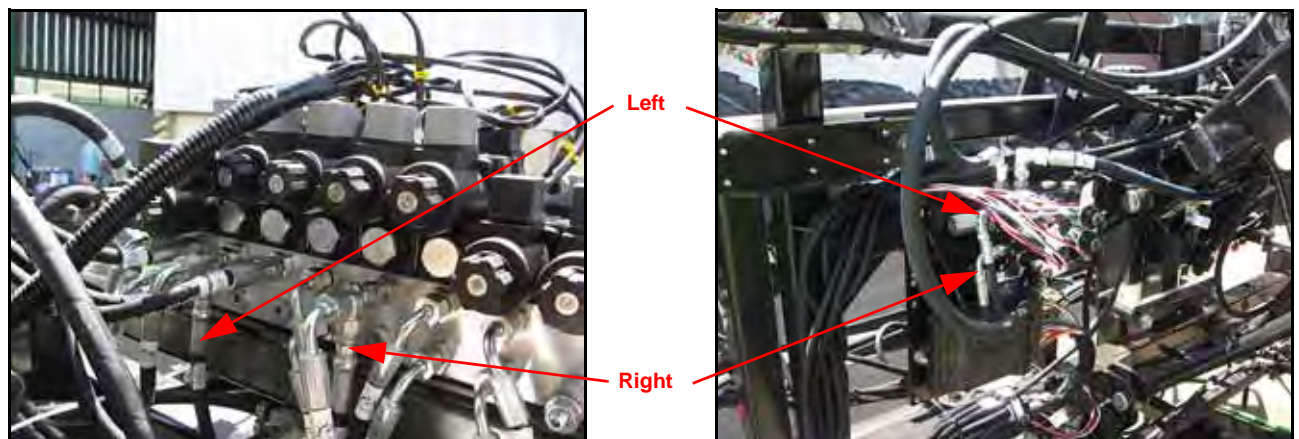
FIGURE 5. Tank Hose Installed



7. Locate and disconnect the machine's tank hose from the machine's hydraulic valve.
8. Remove the hose barb fitting from the fitting installed in the tank port.
9. Install a 1/2" NPT M/F/F tee adapter fitting (P/N 333-0012-181) in the open tank port of the machine's hydraulic valve.
10. Install the machine's barb fitting removed in step 8 on the opposite end of the installed tee fitting.
11. Connect the machine's tank hose to the installed barb fitting.
12. Install a 1/2" NPT (M) to 3/4" JIC (M) straight adapter fitting (P/N 333-0012-157) on the 90° end of the installed tee fitting.
13. Install the straight end of the supplied hydraulic hose (P/N 214-1000-371) on the installed adapter fitting.
14. Connect the 90° end of the installed hydraulic hose to the fitting installed in Port T of the AutoBoom valve.

Install the Left and Right Cylinder Hoses

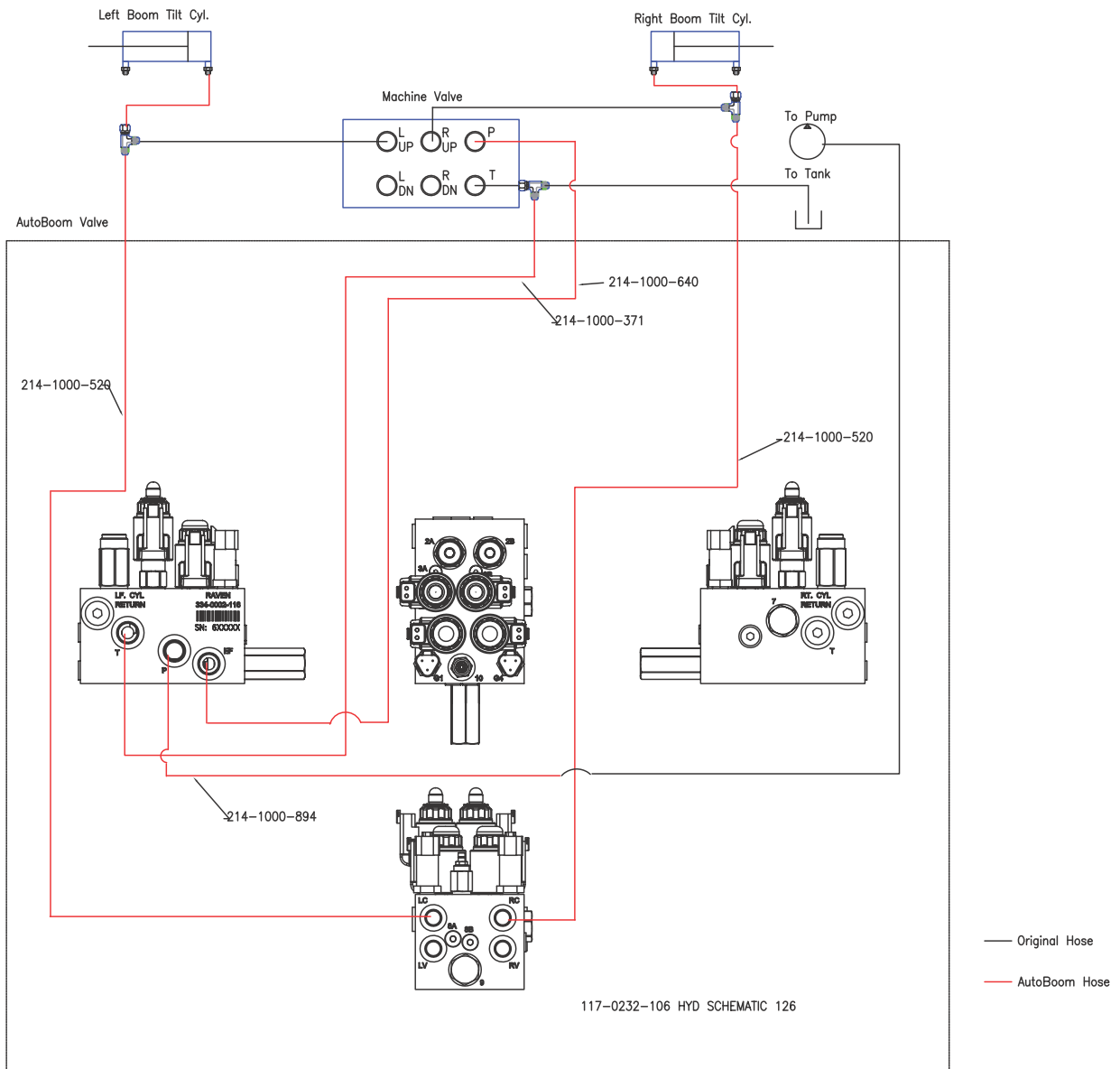
FIGURE 6. Cylinder Hoses Installed



1. Locate and disconnect the machine's left cylinder raise hose from the machine's hydraulic valve.
2. Install a 9/16" JIC M/M/F swivel run tee adapter fitting (P/N 333-0012-043) in the open left cylinder port.
3. Connect the machine's left cylinder hose to the opposite end of the installed tee fitting.

4. Install the straight end of the supplied hydraulic hose (P/N 214-1000-520) on the 90° end of the installed tee fitting.
5. Connect the 90° end of the installed hydraulic hose to the fitting installed in Port LC of the AutoBoom valve.
6. Locate and disconnect the machine's right cylinder raise hose from the machine's hydraulic valve.
7. Install a 9/16" JIC M/M/F swivel run tee adapter fitting (P/N 333-0012-043) in the open right cylinder port.
8. Connect the machine's right cylinder hose to the opposite end of the installed tee fitting.
9. Install the straight end of the supplied hydraulic hose (P/N 214-1000-520) on the 90° end of the installed tee fitting.
10. Connect the 90° end of the installed hydraulic hose to the fitting installed in Port RC of the AutoBoom valve.

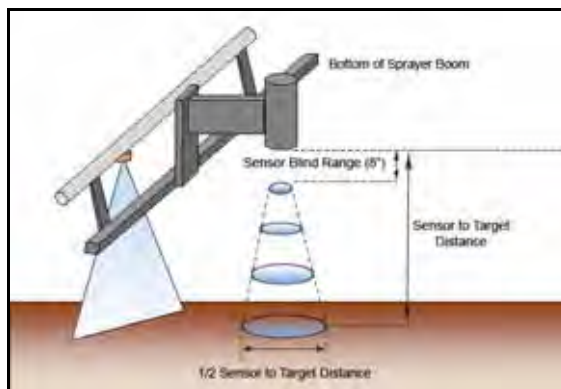
Hydraulic Diagram



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 1. Illustration of Sensor's Blind Range



Mount the Boom Sensors

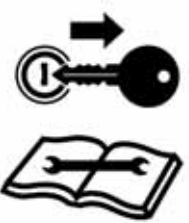
	<p>⚠ WARNING</p> <p>The machine must remain stationary and switched off, with the booms unfolded and supported, during installation or maintenance.</p>
---	--

FIGURE 2. Boom Sensors Installed

Single Sensor Mounting Location



Dual Sensor Mounting Locations (Optional)



1. Secure the left sensor (P/N 063-0130-014) to the front of the left boom (near the breakaway) using two 1-9/16" W x 2-1/2" L x 3/8" thread U-bolts (P/N 107-0171-611) 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.
3. Repeat the steps above to mount the remaining boom sensor(s).

Mount the Center Rack Sensor

FIGURE 3. Center Sensor Mounted to Weldment



1. Secure the center sensor (P/N 063-0130-018) to the ultrasonic sensor boom mount weldment (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 4. Center Sensor Installed on Machine's Center Rack



2. Mount the center sensor 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).
3. Tighten the nuts to ensure the sensor is mounted securely.

Connect the Sensor Cables

1. Connect the left sensor cable (P/N 115-0230-050) to the connector on the outer 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 cables.

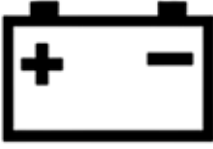
Note: *The sensor cables will be connected to the AutoBoom system during the wiring phase of installation.*

CHAPTER

5

Wiring Installation

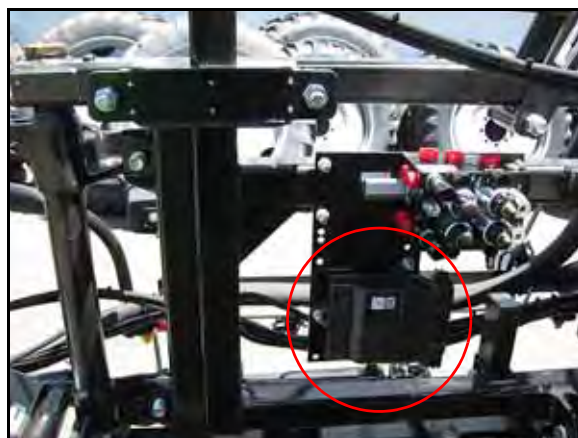
Wiring Connections

	<p data-bbox="820 760 1117 814">⚠ CAUTION</p> <p data-bbox="685 829 1205 982">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>
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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 of the pins and wires.

Install the AutoBoom Node

FIGURE 1. AutoBoom Node Installed



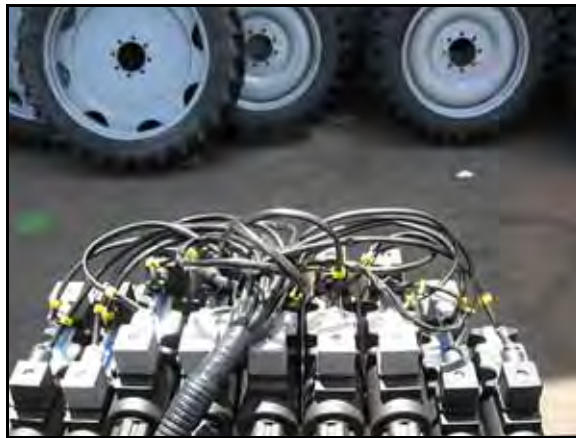
1. Mount the AutoBoom node (P/N 063-0130-013) to the node mounting plate (P/N 107-0171-802) using three 3/8"-16 x 1-1/4" hex bolts (P/N 311-0054-106) and three 3/8"-16 zinc flanged lock nuts (P/N 312-1001-164).

2. Insert the large, rectangular node connectors on the harness cable (P/N 115-0230-033) into the correct ports of the AutoBoom node.
3. Tighten the bolts on the node connectors to secure the connections.

Connect the Harness Cable to the Boom Function Controls

1. Locate the Left Press and Right Press connectors on the harness cable (P/N 115-0230-033).
2. Route the connectors to the AutoBoom valve (P/N 063-0131-126).
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.

FIGURE 2. Machine's Boom Function Coils



11. Locate the boom function coils on the machine's hydraulic valve.
12. Disconnect the din connector from the machine's left tilt up coil.
13. Install a boom sensor adapter cable (P/N 115-0230-075) between the coil and the machine's coil connector.
14. Connect the remaining boom sense adapter cables between the left tilt down, right tilt up, and right tilt down coils and the coil connectors.
15. On the harness cable, locate the Left Solenoid Sense connectors.
16. Isolate the cable labeled Up and connect it to the left tilt up coil via the installed boom sense adapter cable.
17. Connect the down Left Solenoid Sense connector to the left tilt down coil via the installed boom sense adapter cable.
18. Connect the Right Solenoid Sense connectors to the machine's right tilt up and right tilt down coils via the installed boom sense adapter cables.

Connect the Harness Cable to the Sensors

1. Locate the Center Sensor connector on the AutoBoom harness cable.
2. Connect the Center Sensor connector to the installed center sensor (P/N 063-0130-018).
3. Locate the Left Outer Sensor connector on the AutoBoom harness cable.
4. Connect the Left Outer Sensor connector to the installed left sensor cable (P/N 115-0230-050).
5. Locate the Right Outer Sensor connector on the AutoBoom harness cable.
6. Connect the Right Outer Sensor connector to the installed right sensor cable.
7. If optional inner boom sensors are installed, repeat the steps above to connect the inner sensors.

Connect the Harness Cable to the Controller Cable

1. Route the AutoBoom harness cable (P/N 115-0230-033) toward the machine's cab.
2. Connect the harness cable to the controller cable (P/N 115-0230-007).
3. Tighten the connector cab to secure the connection.

Note: Be sure to allow enough slack in the harness cable to allow for boom racking.

Connect the Field Computer

Refer to the Installation & Operation Manual and the appropriate wiring schematic beginning on page 24 for installation and wiring instructions for your specific field computer.

Note: If the harness cable is not long enough, it may be necessary to connect the 12' extension cable (P/N 115-0171-386) between the harness and controller cables.

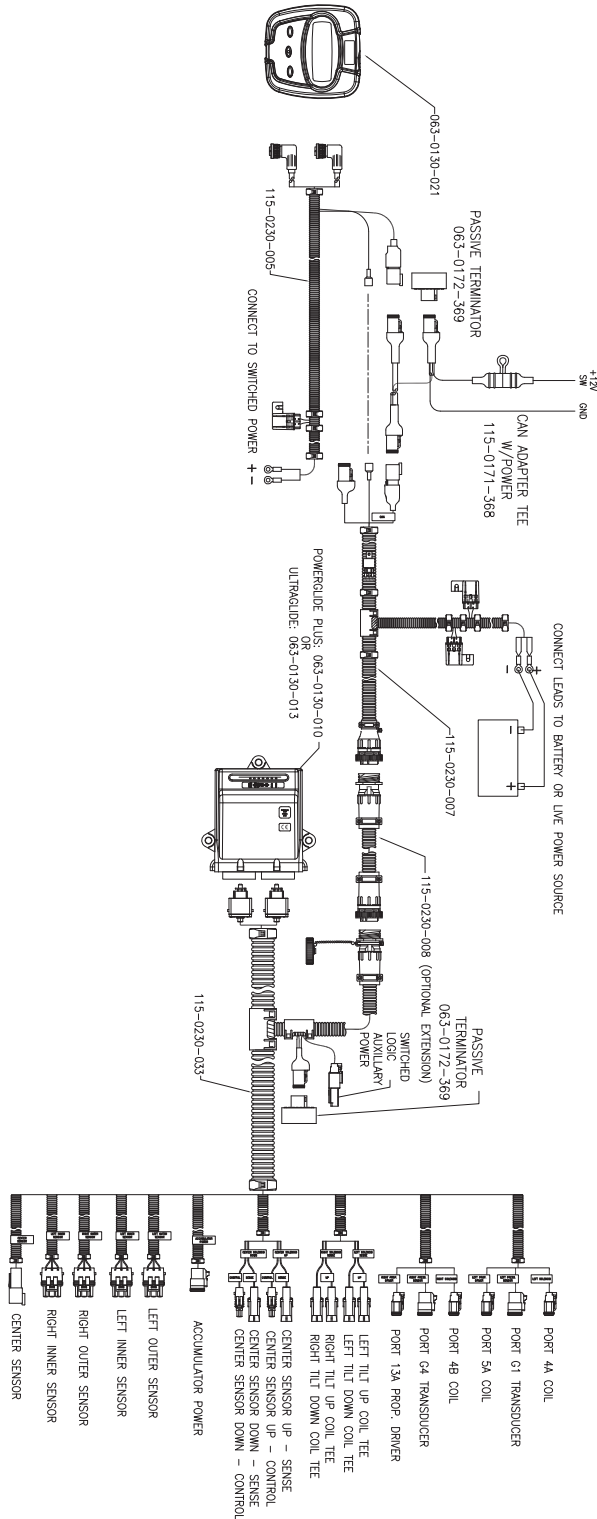
Connect the Power Leads

1. Locate the power cable that has the red and white power leads at one end.
2. Disconnect the machine's connectors from the battery terminals.
3. Install the red power lead on the positive battery terminal and reinstall the machine's battery connector.
4. Install the white power lead on the negative battery terminal and reinstall the machine's battery connector.

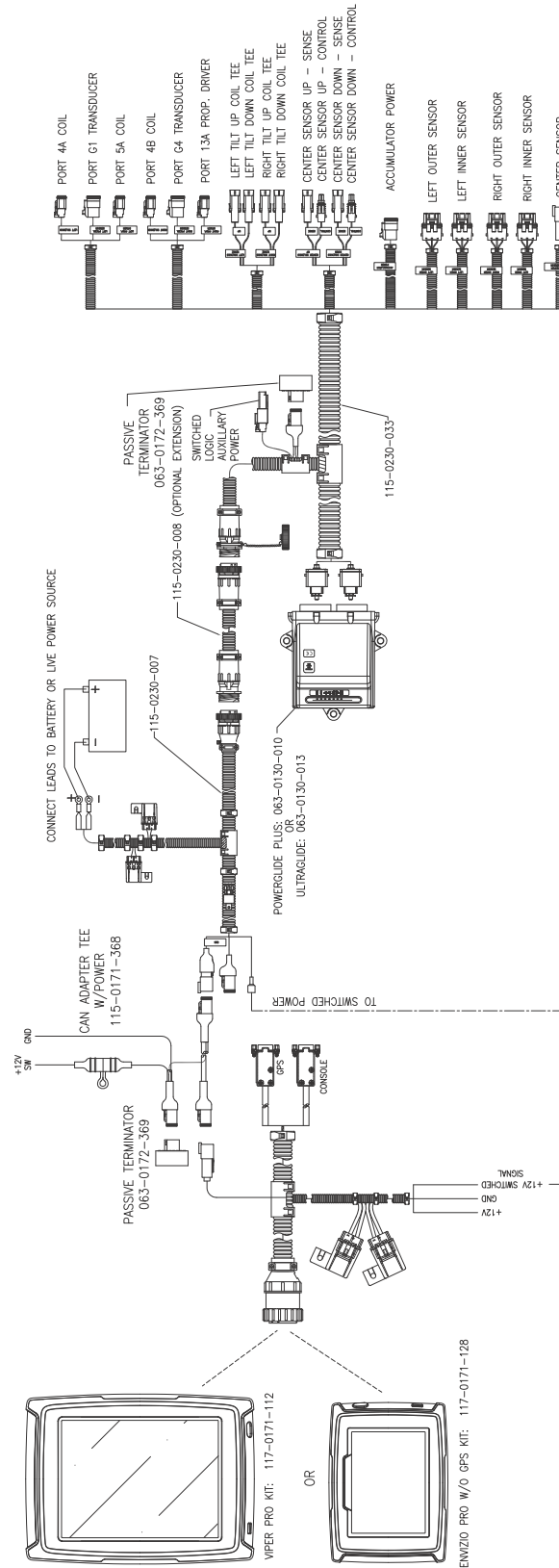


Wiring Schematics

AutoBoom Controller



Viper Pro & Envizio Pro



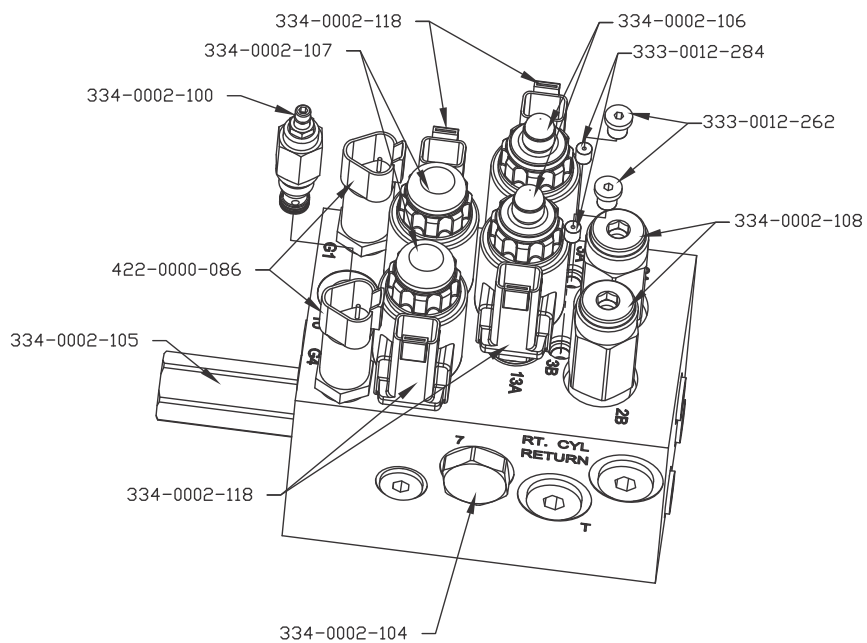
CHAPTER

6

Replacement Parts

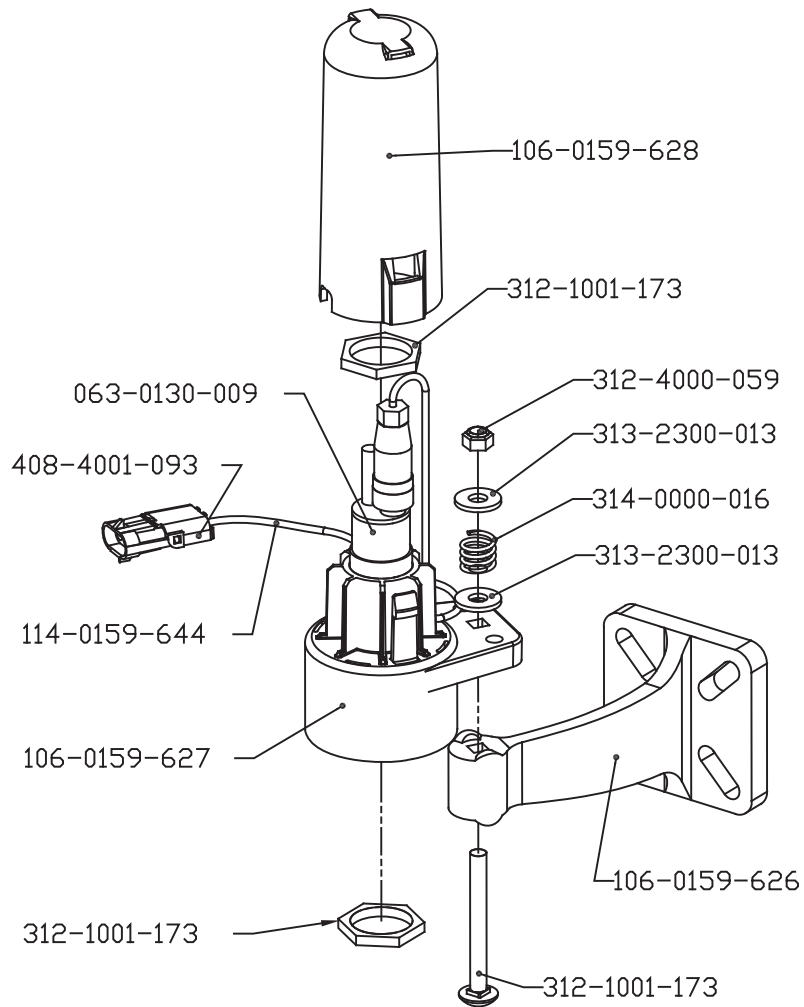
This section contains replacement part diagrams and listings for the AutoBoom system. Please refer to these diagrams when calling to request replacement parts.

Valve



063-0131-126
VALVE, HYDRAULIC POWERGLIDE
PLUS/ULTRAGLIDE, OPEN CENTER, AUTOBOOM

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RAVEN

RAVEN INDUSTRIES

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.

How Long is the Coverage Period?

Raven Applied Technology Division products are covered by this warranty for 12 months after the date of purchase. This warranty coverage applies only to the original owner and is nontransferable.

How Can I Get Service?

Bring the defective part and proof of purchase to your Raven dealer. If your dealer agrees with the warranty claim, the dealer will send the part and proof of purchase to their distributor or to Raven Industries for final approval.

What Will Raven Industries Do?

Upon confirmation of the warranty claim, Raven Industries will, at our discretion, repair or replace the defective part and pay for return freight.

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 or other special 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.

RAVEN

Metalfor 2200, 2500, and 3000 Series
AutoBoom™ Installation Manual
(P/N 016-0230-106 Rev A 01/12 E18923)



Raven Industries

Applied Technology Division
P.O. Box 5107
Sioux Falls, SD 57117-5107
www.ravenprecision.com

Toll Free (U.S. and Canada): (800)-243-5435
or Outside the U.S. :1 605-575-0722
Fax: 605-331-0426
www.ravenhelp.com

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