

**GVM E-Series Prowler
AutoBoom™ Installation Manual**

P/N 016-0230-105 Rev A 09/15

E18723

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Chapter 1	<i>Important Safety Information</i>	1
	Hydraulic Safety	2
	Electrical Safety	2
Chapter 2	<i>Introduction</i>	3
	Introduction	3
	Preparing for Installation	3
	Recommendations	4
	Point of Reference	4
	Hydraulic Fittings	4
	UltraGlide Kit Contents	5
Chapter 3	<i>Hydraulic System Installation</i>	9
	Install Fittings in the AutoBoom Valve	10
	Mount the AutoBoom Valve	11
	Install the Pressure and Tank Hoses	12
	Install the Load Sense Hose	13
	Install the Left and Right Cylinder Hoses	14
	Hydraulic Schematic	15
Chapter 4	<i>Sensor Installation</i>	17
	Install the UltraGlide Sensors	17
	Boom Sensor Mounting Locations	17
	Mount the Boom Sensors	18
	Mount the Center Rack Sensor	18
	Connect the Sensor Cables	18
Chapter 5	<i>Wiring Installation</i>	21
	Wiring Connections	21
	Install the AutoBoom Node	21
	Connect the Harness Cable to the Boom Function Controls	22
	Install the Center Rack Control	24
	Connect the Harness Cable to the Sensors	24
	Connect the Field Computer (If Applicable)	24
	Connect the Power	25
Chapter 6	<i>Replacement Parts</i>	27
	Valve Blocks	27
	Sensors	28

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: GVM

MODEL: E-Series Prowler

YEAR:

SERIAL NUMBER:

FIGURE 1. GVM E-Series Prowler



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 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 117-0138-050)

Picture	Item Description	Part Number	Qty.
Not Pictured	Manual - GVM E-Series Prowler AutoBoom Installation Manual	016-0230-105	1
Not Pictured	Manual - AutoBoom Calibration & Operation	016-0130-062	1
	Valve - AutoBoom Hydraulic	063-0131-125	1
	Bracket - Hydraulic Block Mounting	107-0171-619	1
	Bracket - Ultrasonic Sensor	107-0171-798	2
	Node - UltraGlide AutoBoom	063-0130-013	1
	Sensor - Right Ultrasonic	063-0130-012	1
	Sensor - Left Ultrasonic	063-0130-014	1
	Sensor - Center Ultrasonic	063-0130-018	1

TABLE 1. UltraGlide Installation Kit (P/N 117-0138-050)

Picture	Item Description	Part Number	Qty.
	Cable - 70' Ultrasonic Sensor Extension	115-0171-527	2
	Cable - GVM Prowler Ultraglide Harness	115-0230-061	1
	U-Bolt - 4" W x 6-5/8" L x 3/8" Thread with Nuts and Washers	107-0172-133	2
	Bolt - 5/16"-18 x 7/8" Hex	311-0052-104	4
	Washer - 5/16" Zinc Plated Lock	313-1000-019	4

TABLE 2. Hydraulic Kit (P/N 117-0134-105)

Picture	Item Description	Part Number	Qty.
	Fitting - 9/16" JIC M/F 90° Swivel Elbow	333-0012-042	1
	Fitting - 9/16" JIC M/M/F Swivel Run Tee Adapter	333-0012-043	2
	Fitting - 7/16" JIC (M) to 9/16" SAE O-Ring (M) Straight Adapter	333-0012-044	4
	Fitting - 9/16" JIC (M) to 9/16" SAE O-Ring (M) Straight Adapter	333-0012-045	1
	Fitting - 9/16" JIC (M) to 3/4" SAE O-Ring (M) Straight Adapter	333-0012-046	3

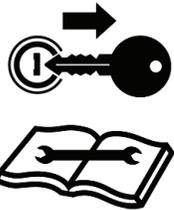
TABLE 2. Hydraulic Kit (P/N 117-0134-105)

Picture	Item Description	Part Number	Qty.
	Fitting - 7/16" JIC M/F 90° Swivel Elbow	333-0012-154	4
	Hydraulic Hose - 7/16" JIC (F) to 7/16" JIC (M) - 12"	214-1000-578	1
	Hydraulic Hose - 7/16" JIC (F) to 7/16" JIC (F) - 40"	214-1000-579	2
	Hydraulic Hose - 9/16" JIC (F) to 9/16" JIC (F) - 58"	214-1000-582	1
	Hydraulic Hose - 9/16" JIC (F) 90° to 9/16" JIC (F) - 58"	214-1000-583	1
	Hydraulic Hose - 9/16" JIC (F) 90° to 9/16" JIC (F) - 22"	214-1000-871	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 materials 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 Fittings in the AutoBoom Valve

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

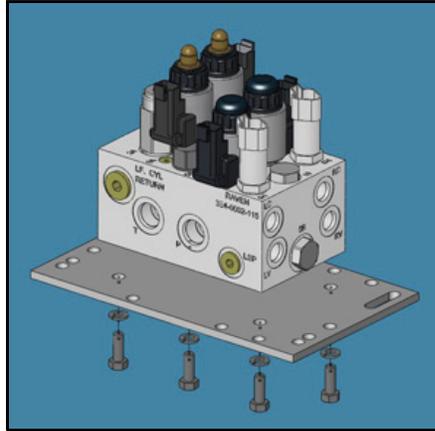
FIGURE 1. Fittings Installed on the AutoBoom Valve.



Fitting	Part Number	Port
Fitting - 7/16" JIC (M) to 9/16" (M) SAE O-Ring Straight Adapter	333-0012-044	LC, RC LV, RV
Fitting - 7/16" JIC M/F 90° Swivel Elbow	333-0012-154	LC, RC LV, RV
Fitting - 9/16" JIC (M) to 3/4" SAE O-Ring (M) Straight Adapter	333-0012-046	P, Left T
Fitting - 9/16" JIC (M) to 9/16" SAE O-Ring (M) Straight Adapter	333-0012-045	LSP

Mount the AutoBoom Valve

FIGURE 2. AutoBoom Valve Mounted on the Valve Mounting Plate



1. Secure the AutoBoom valve (P/N 063-0131-12) to the mounting plate (P/N 107-0171-619) using four 16"-18 x 7/8" hex bolts (P/N 311-0052-104) and four 5/16" zinc lock washers (P/N 313-1000-019).

5/

FIGURE 3. AutoBoom Valve Mounted on the Machine



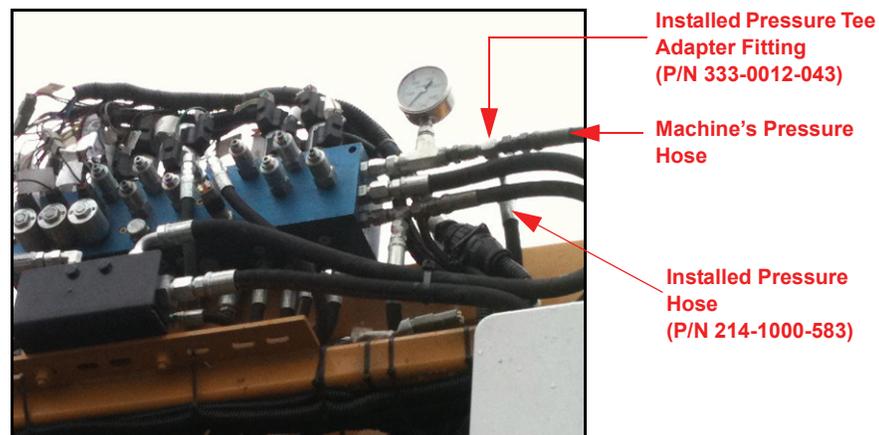
2. Secure the mounting plate to the machine's center rack using two 4" W x 6-5/8" L x 3/8" thread U-bolts (P/N 107-0172-133) and the supplied nuts and washers.

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 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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FIGURE 4. Pressure Hose Installed



1. Disconnect the machine's pressure hose from port P on the machine's hydraulic valve.

Note: There may or may not be a tee fitting and pressure gauge installed in the machine's pressure port.

2. Install a 9/16" JIC M/M/F swivel run tee adapter fitting (P/N 333-0012-043) in the open pressure port (or on the end of the existing tee fitting) of the machine's hydraulic valve.
3. Connect the machine's pressure hose to the opposite end of the installed tee fitting.
4. Install the straight end of the supplied hydraulic hose (P/N 214-1000-583) on the 90° end of the fitting installed in the machine's pressure port.
5. Connect the straight end of the supplied hydraulic hose to Port P of the AutoBoom valve.

FIGURE 5. Tank Hose Installed

Installed Tank Hose
(P/N 214-1000-871)

Left T Port of the
SmarTrax Valve

Machine's Return
Manifold



6. Locate the machine's return manifold on the left side of the machine's center rack.
7. Remove the port plug from the return manifold port.
8. Install one 9/16" JIC (M) to 3/4" SAE O-ring (M) straight adapter fitting (P/N 333-0012-046) in the open port.
9. Install one 9/16" JIC M/F 90° swivel elbow fitting (P/N 333-0012-042) on the installed adapter fitting.
10. Install the straight end of the supplied hydraulic hose (P/N 214-1000-871) on the installed elbow fitting.
11. Connect the 90° end of the installed hydraulic hose to the fitting installed in the left T Port of the SmarTrax valve.

Install the Load Sense Hose

FIGURE 6. Load Sense Hose Installed



Machine's Load
Sense Hose

1. Locate and disconnect the machine's load sense hose from the machine's hydraulic valve.
2. Install one 9/16" JIC M/M/F swivel run tee adapter fitting (P/N 333-0012-043) in the open load sense port.
3. Connect the machine's load sense hose to the opposite end of the installed tee fitting.
4. Install one end of the supplied hydraulic hose (P/N 214-1000-582) on the 90° end of the installed tee fitting.
5. Connect the other end of the installed hydraulic hose to the fitting installed in Port LSP of the SmarTrax valve.

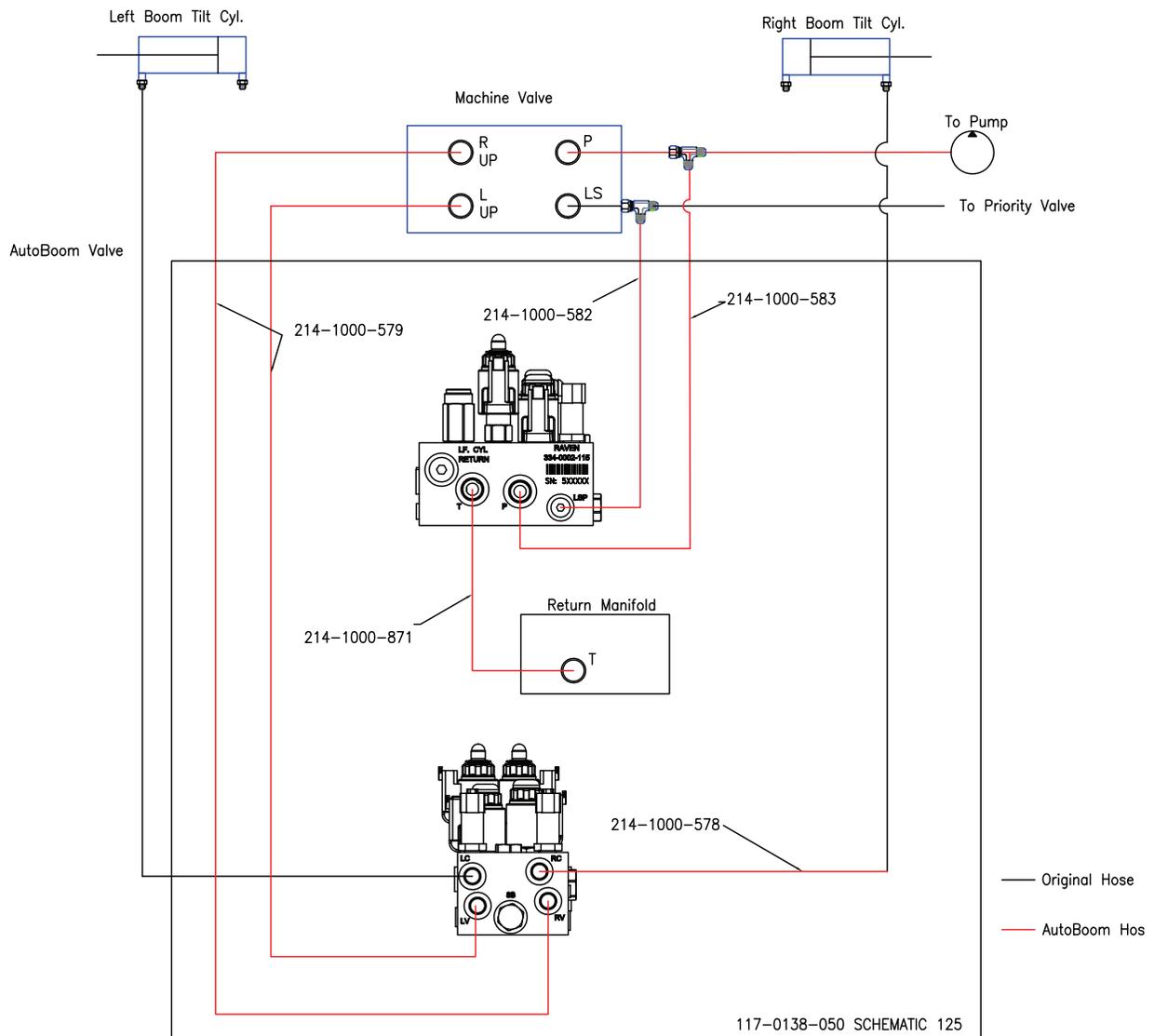
Install the Left and Right Cylinder Hoses

FIGURE 7. Cylinder Hoses Installed



1. Trace the machine's cylinder hose from the rod-end of the left tilt cylinder to the machine's hydraulic valve.
2. Disconnect the machine's left cylinder hose from the hydraulic valve.
3. Route the machine's left cylinder hose to the AutoBoom valve and connect it to the installed fittings in Port LC.
4. Install one end of the supplied hydraulic hose (P/N 214-1000-579) on the open left cylinder port of the machine's hydraulic valve.
5. Connect the other end of the installed hydraulic hose to the installed fittings in Port LV on the AutoBoom valve.
6. Trace the machine's cylinder hose from the rod-end of the right tilt cylinder to the machine's hydraulic valve.
7. Disconnect the machine's right cylinder hose from the hydraulic valve.
8. Install the male end of the supplied hydraulic hose (P/N 214-1000-578) on the machine's right cylinder hose.
9. Route the machine's right cylinder hose and the installed extension hose to the AutoBoom valve and connect it to the installed fittings in Port RC.
10. Install one end of the supplied hydraulic hose (P/N 214-1000-579) on the open right cylinder port of the machine's hydraulic valve.
11. Connect the other end of the installed hydraulic hose to the installed fittings in Port RV of the AutoBoom valve.

Hydraulic Schematic



CHAPTER

4

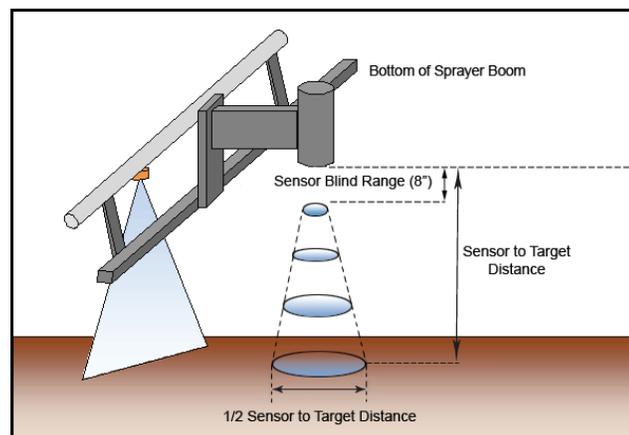
Sensor Installation

Install the UltraGlide Sensors

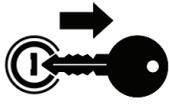
Boom Sensor Mounting Locations

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 1. Illustration of Sensor's Blind Range



Mount the Boom Sensors

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

Mount the Boom Sensors

FIGURE 2. Mounted Boom Sensor



1. Secure the right sensor (P/N 063-0130-012) to the sensor mounting bracket (P/N 107-0171-798).
2. Mount the sensor mounting bracket to the front of the right boom, near the breakaway.
3. Tighten the nuts to ensure the sensor is mounted securely.
4. Repeat the steps above to mount the remaining boom sensor(s).

Mount the Center Rack Sensor

FIGURE 3. Mounted Center Rack Sensor



1. Mount the center sensor mounting bracket to the machine's center rack.
2. Tighten the nuts to ensure the sensor is mounted securely.

Connect the Sensor Cables

1. Connect the left sensor cable (P/N 115-0171-527) 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 cabling, allowing enough cable for boom folding and extension.

4. Repeat the steps above to connect the remaining sensor cable(s).

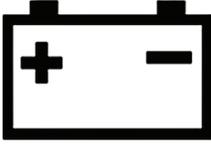
Note: *The sensor cables will be connected to the AutoBoom system in the wiring phase of installation.*

CHAPTER

5

Wiring Installation

Wiring Connections

	<p data-bbox="820 760 1117 814">⚠ CAUTION</p> <p data-bbox="685 829 1205 987">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 to the pins and wires.

Install the AutoBoom Node

FIGURE 1. AutoBoom Node Installed



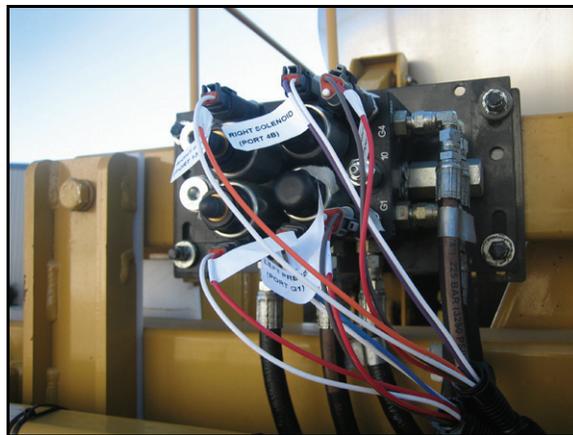
1. Mount the AutoBoom node (P/N 016-0130-013) inside the node mounting enclosure.

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

2. Insert the large, rectangular node connectors on the AutoBoom harness cable (P/N 115-0230-061) into the correct ports of the AutoBoom node.
3. Tighten the bolts on the node connectors to secure the connections.

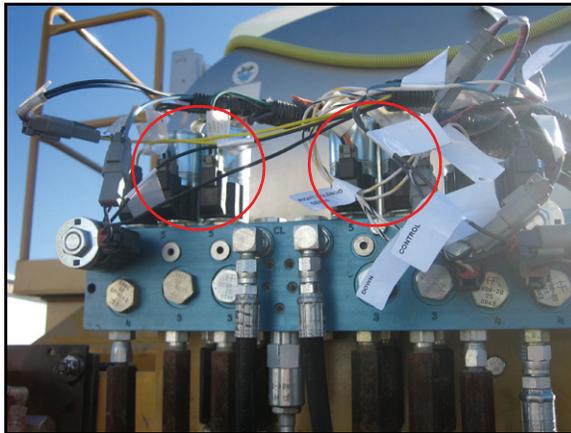
Connect the Harness Cable to the Boom Function Controls

FIGURE 2. AutoBoom Valve Harness Connections



1. Locate the Left Press and Right Press connectors on the AutoBoom harness cable (P/N 115-0230-061).
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 3. Machine's Boom Function Coils

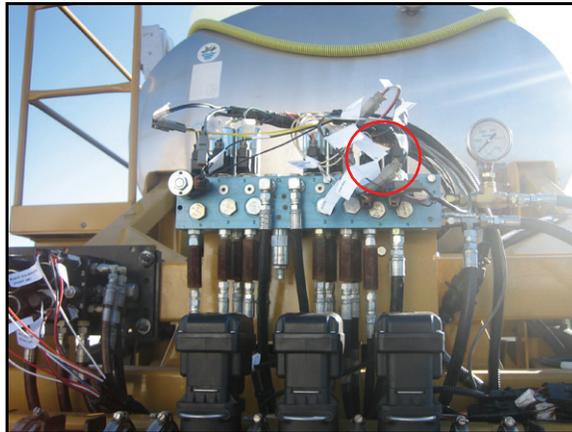


11. Locate the machine's boom function coils on the machine's hydraulic valve.
12. Disconnect the cable connection from the machine's left up coil.
13. Locate the Left Solenoid Sense Up connection on the AutoBoom harness cable and connect it to the left up coil.
14. Connect the unlabeled cable connection on the AutoBoom harness cable to the cable removed from the left up coil.
15. Disconnect the cable connection from the machine's left down coil.
16. Locate the Left Solenoid Sense Down connection on the AutoBoom harness cable and connect it to the left down coil.
17. Connect the unlabeled cable connection on the AutoBoom harness cable to the cable removed from the left down coil.
18. Disconnect the cable connection from the machine's right up coil.
19. Locate the Right Solenoid Sense Up connection on the AutoBoom harness cable and connect it to the right up coil.
20. Connect the unlabeled cable connection on the AutoBoom harness cable to the cable removed from the right up coil.
21. Disconnect the cable connection from the machine's right down coil.
22. Locate the Right Solenoid Sense Down connection on the AutoBoom harness cable and connect it to the right down coil.
23. Connect the unlabeled cable connection on the AutoBoom harness cable to the cable removed from the right down coil.



Install the Center Rack Control

FIGURE 4. Center Rack Coil Connections



1. Locate the center up and center down coils on the machine's hydraulic valve.
2. Disconnect the cable connection from the center up coil.
3. Connect the machine's center up coil connector to the Center Solenoid Up Sense connector on the AutoBoom harness cable.
4. Plug the Center Solenoid Up Control connector into the center up coil.
5. Disconnect the cable connection from the center down coil.
6. Connect the machine's center down coil connector to the Center Solenoid Down Sense connector on the AutoBoom harness cable.
7. Plug the Center Solenoid Down Control connector into the center down coil.

Connect the Harness Cable to the Sensors

1. Locate the Center Sensor connector on the AutoBoom harness cable.
2. Connect the Center Sensor connector on 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 on the installed left sensor cable (P/N 115-0171-527).
5. Locate the Right Outer Sensor connector on the AutoBoom harness cable.
6. Connect the Right Outer Sensor connector on the installed right sensor cable.
7. If optional inside boom sensors are installed, repeat the steps above to connect the sensors.

Connect the Field Computer (If Applicable)

Refer to the Installation & Operation Manual for installation and wiring instructions for the specific field computer being used.

Connect the Power

FIGURE 5. Power Connections



1. Locate the CAN connector on the machine's harness cable.

Note: *This connection may have a terminator installed. If so, remove the terminator.*

2. Connect the CAN connector to the CAN connector on the AutoBoom harness cable.
3. Install the terminator that was removed on the open connection of the AutoBoom harness cable.
4. Locate the Power connector on the machine's harness cable.
5. Connect the Power connector to the Power connector on the AutoBoom harness cable.

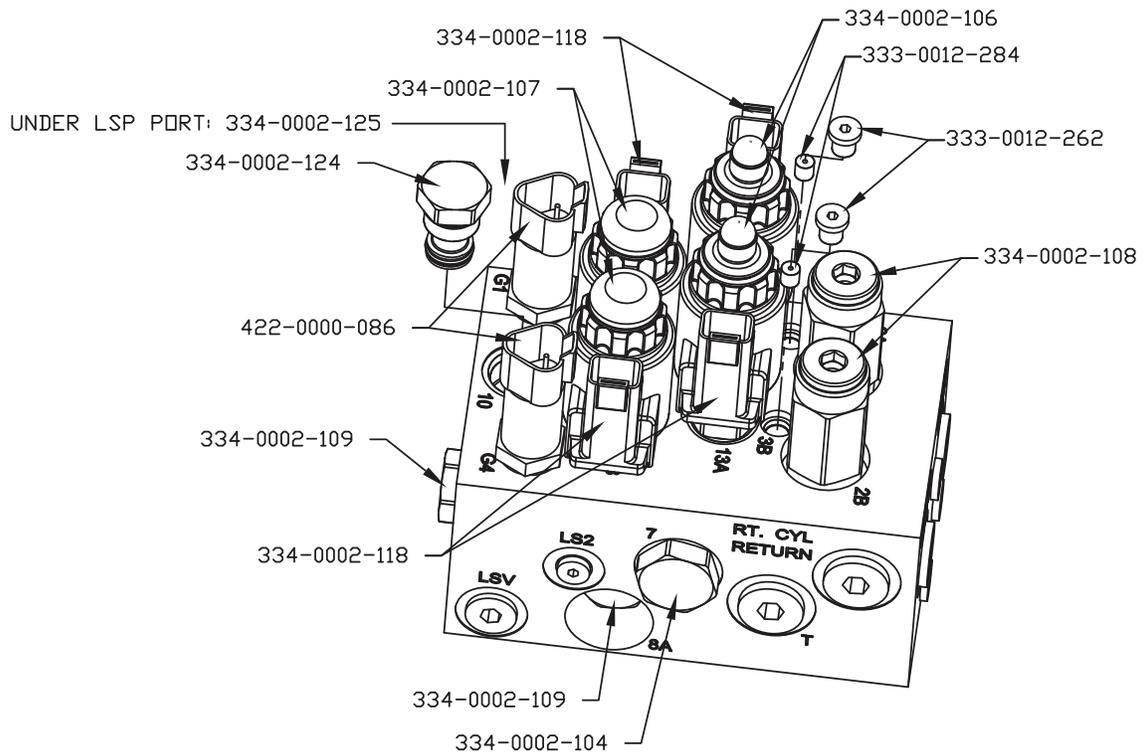
CHAPTER

6

Replacement Parts

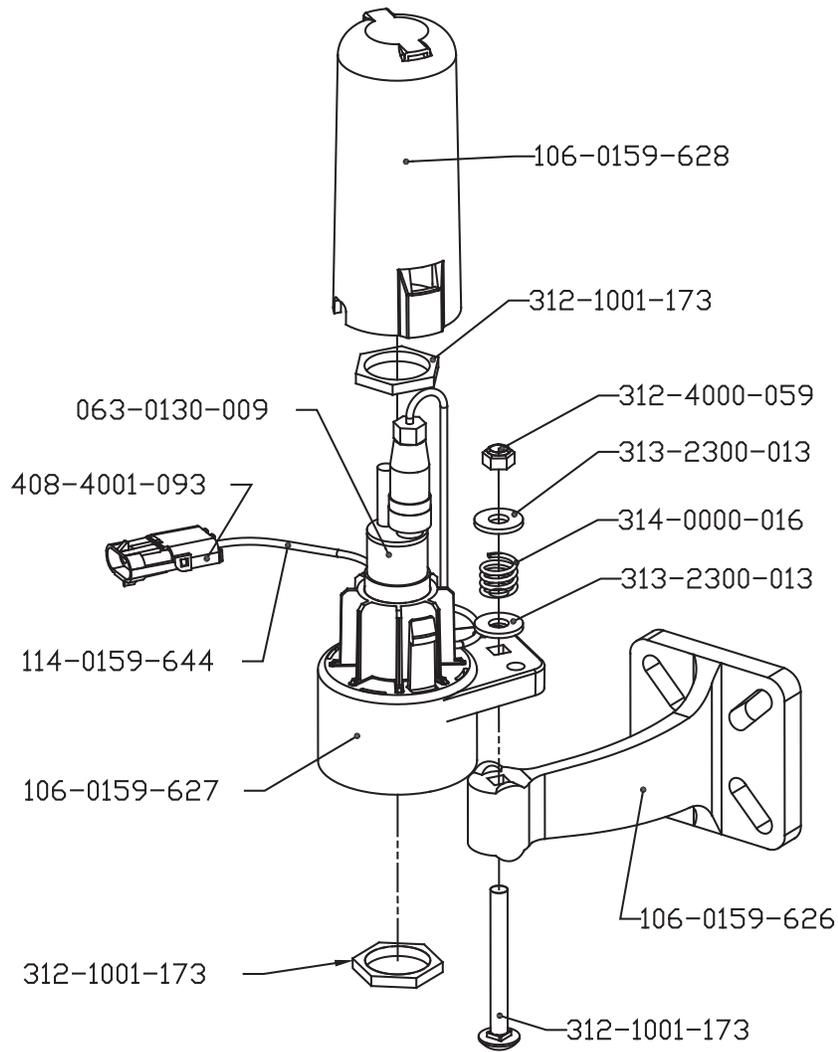
This section contains replacement part diagrams for the UltraGlide system. Refer to these diagrams when calling to request replacement parts.

Valve Blocks



063-0131-125
VALVE, HYDRAULIC POWERGLIDE
PLUS/ULTRAGLIDE, DYNAMIC LS, AUTOBOOM

Sensors



E**Electrical Safety** 2**H****Hydraulic**

Fittings 4

Hydraulic Safety 2**Hydraulic System**

Hydraulic Schematic 15

Install Fittings in the AutoBoom Valve 10

Installing the Left and Right Cylinder Hoses 14

Installing the Load Sense Hose 13

Installing the Pressure and Tank Hoses 12

Mounting the AutoBoom Valve 11

I**Important Safety Information**

Electrical Safety 2

Hydraulic Safety 2

Introduction

Hydraulic Fittings 4

Kit Contents 5

Preparing for Installation 3

Point of Reference 4

Recommendations 4

Tools Needed 4

K**Kit Contents** 5**P****Point of Reference** 4**R****Recommendations** 4**Replacement Parts**

Sensors 28

Valve Blocks 27

T**Tools Needed** 4**U****UltraGlide**

Install

Sensors 17

Boom Sensor Mounting Locations 17

Connecting the Sensor Cables 18

Mounting the Boom Sensors 17, 18

Mounting the Center Rack Sensor 18

Wiring

Connecting the Harness Cable to the Boom
Function Controls 22**W****Wiring**

Connecting the Field Computer 24

Connecting the Harness Cable to the Sensors 24

Connecting the Power 25

Installing the AutoBoom Node 21

Installing the Center Rack Control 24

Wiring Connections 21

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.