

# Goldacres Row Crop AutoBoom Installation Manual

*Manual No. 016-0230-009 Rev B    03/17    E29365*

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## CHAPTER

# 1

# *Important Safety Information*

## *Important Safety Information*

### **NOTICE**

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

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

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

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

## **WARNING**

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

## **CAUTION**

### Hydraulic Safety

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

### 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*

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### *Introduction*

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

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

**MAKE: Gold Acres**

**MODEL: Row Crop**

**YEAR:**

**SERIAL NUMBER:**

---

**FIGURE 1. Gold Acres Row Crop**



### Recommendations

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

### 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.

### 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 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.

**Note:** In addition to the following kit components, a wheel kit is available at an additional cost. For available kits and ordering information, contact your Raven dealer.

**TABLE 1. UltraGlide Installation Kit (P/N 117-0138-039)**

Picture	Item Description	Part Number	Qty.
Not Pictured	Manual - Gold Acres AutoBoom Installation	016-0230-002	1
Not Pictured	Manual - CAN AutoBoom Calibration	016-0130-062	1
	Valve - AutoBoom	063-0131-125	1
	Plate - Hydraulic Block Mounting	107-0171-619	1
	Sensor - Right Ultrasonic	063-0130-012	1
	Sensor - Left Ultrasonic	063-0130-014	1
	Sensor - Center Ultrasonic	063-0130-018	1
	Node - CAN Control AutoBoom	063-0130-013	1

**TABLE 1. UltraGlide Installation Kit (P/N 117-0138-039)**

Picture	Item Description	Part Number	Qty.
	Cable - 60" UltraGlide Sensor Extension	115-0230-602	2
	Cable - Power/CAN (Prairie EF Models Only)	115-0230-007	1
	Cable - PowerGlide Plus/UltraGlide CAN	115-0230-033	1
	Cable - 3-Pin Din AutoBoom Adapter	115-0230-075	1
	Cable - 3-Pin Din Center Rack Control AutoBoom Adapter	115-0230-077	2
	U-Bolt - 2-1/16" W x 3" L x 3/8" Thread	107-0171-609	6
	U-Bolt - 2" W x 5" L x 3/8" Thread	321-0000-328	2
	Bolt - 5/16"-18 x 7/8" Grade 8 Hex	311-0052-104	4
	Nut - 3/8"-16 Zinc Flanged Lock	312-1001-164	16
	Washer - 5/16" Zinc Plated Lock	313-1000-019	4

## CHAPTER


# 3

## Hydraulic System

### *Install the UltraGlide Hydraulic System*

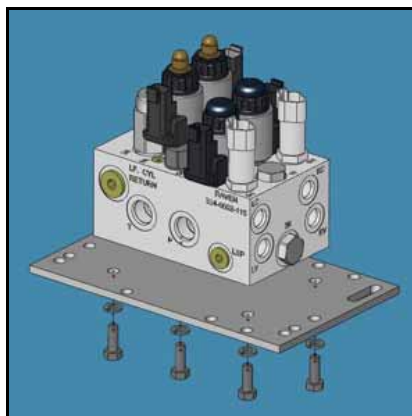
#### Install Fittings on the AutoBoom Valve

Before mounting the AutoBoom valve on the machine, install the proper fittings on the valve. This prepares the valve for installation and simplifies the hose connection process later in the procedure.

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

#### Mount the AutoBoom Valve

**FIGURE 1. AutoBoom Valve Mounted on the Valve Mounting Plate**



1. Secure the AutoBoom valve (P/N 063-0131-125) to the mounting plate (P/N 107-0171-619) using four 5/16"-18 x 7/8" grade 8 hex bolts (P/N 311-0052-104) and four 5/16" zinc plated lock washers (P/N 313-1000-019).


FIGURE 2. AutoBoom Valve Mounted to the Machine



**Note:** Mount the AutoBoom valve so that the LC and RC ports are facing up.

2. Secure the mounting plate to the machine on the left side of the support beam (near the corner of the tank and behind the machine's hydraulic valve) using two 2" W x 5" L x 3/8" thread U-bolts (P/N 321-0000-328) and four 3/8"-16 zinc flanged lock nuts (P/N 312-1001-164).

## Install the Pressure and Tank Hoses

	<p><b>WARNING</b></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><b>CAUTION</b></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 cause damage to the AutoBoom hydraulic valve.</p>
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FIGURE 3. Pressure and Tank Hoses Installed on the Machine's Hydraulic Valve

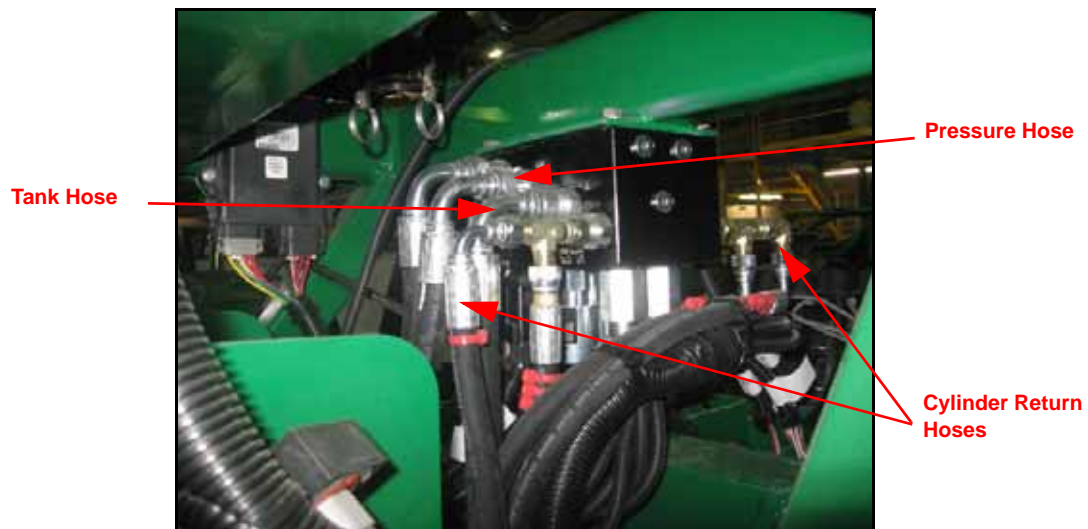
Tank Tee Fitting



Pressure Tee Fitting



FIGURE 4. Pressure and Tank Hoses Installed on the AutoBoom Valve



### Closed Center AutoBoom Hydraulic Valve (P/N 063-0131-125)

1. Disconnect the machine's pressure line from the machine's hydraulic valve.
2. Install a tee fitting in the machine's pressure port.
3. Attach the machine's pressure line on the opposite end of the installed tee fitting.
4. Install a new hydraulic hose on the installed tee fitting.
5. Connect the other end of the hydraulic hose to the installed fitting in Port P of the AutoBoom valve.
6. Disconnect the machine's tank line from the machine's hydraulic valve.
7. Install a tee fitting in the machine's tank port.
8. Attach the machine's tank line on the opposite end of the installed tee fitting.
9. Install a new hydraulic hose on the installed tee fitting.
10. Connect the other end of the hydraulic hose to the installed fitting in Port T of the AutoBoom valve.



### Open Center AutoBoom Hydraulic Valve (P/N 063-0131-126)

1. Disconnect the machine's pressure line from the machine's hydraulic valve.
2. Connect the machine's pressure line to Port P on the AutoBoom valve.
3. Install the new pressure hose on Port EF on the AutoBoom valve.
4. Connect the end of the installed pressure hose to the machine's pressure port.
5. Disconnect the machine's tank line from the machine's hydraulic valve.
6. Install a tee fitting in the machine's tank port.
7. Attach the machine's tank line on the opposite end of the installed tee fitting.
8. Install a new hydraulic hose on the installed tee fitting.
9. Connect the other end of the hydraulic hose to the installed fitting in Port T of the AutoBoom valve.

### Install the Left and Right Cylinder Up Hoses - Single Tilt Cylinder Option

**FIGURE 5. Left and Right Cylinder Up Hoses on the Machine's Hydraulic Valve**



**FIGURE 6. Left and Right Cylinder Up Hoses on the AutoBoom Valve**



1. Remove the cylinder up hoses from the machine's hydraulic valve.
2. Install tee fittings in the open ports on the machine's hydraulic valve.
3. Reconnect the machine's tilt hoses to the opposite ends of the installed tee fittings.

4. Install new hydraulic hoses on the 90° ends of the installed tee fittings.
5. Route and connect the left installed hydraulic hose to Port LC on the AutoBoom valve.
6. Route and connect the right installed hydraulic hose to Port RC on the AutoBoom valve.

## Install the Left and Right Cylinder Up Hoses - Dual Tilt Cylinder Option

**FIGURE 7. Left and Right Cylinder Up Hoses on the Machine's Hydraulic Valve**



**FIGURE 8. Left and Right Cylinder Up Hoses on the AutoBoom Valve**



1. Install a new hydraulic hose on the machine's left cylinder up port.
2. Connect the other end of the installed hose to Port LV on the AutoBoom valve.
3. Install a new hydraulic hose on the machine's right cylinder up port.
4. Connect the other end of the installed hose to Port RV on the AutoBoom valve.
5. Install tee fittings in Ports LC and RC on the AutoBoom valve.
6. Install two new hydraulic hoses on Port RC of the AutoBoom valve.
7. Route and connect the installed hydraulic hoses to the machine's right rod-end cylinder port.
8. Install two new hydraulic hoses on Port LC of the AutoBoom valve.
9. Route and connect the installed hydraulic hoses to the machine's left rod-end cylinder port.

## Install the Left and Right Cylinder Down Hoses

**FIGURE 9. Left and Right Cylinder Down Hoses on the Machine's Hydraulic Valve (Single Tilt Cylinder Option)**



**FIGURE 10. Left and Right Cylinder Down Hoses on the AutoBoom Valve (Dual Tilt Cylinder Option)**



1. Remove the machine's cylinder return hoses from the machine's hydraulic valve.
2. Install tee fittings on the machine's hydraulic valve.
3. Reattach the machine's hydraulic hoses to the opposite end of the installed tee fittings.
4. Install new hydraulic hoses on the 90° end of the installed tee fittings.
5. Route the left installed hydraulic hose to the AutoBoom valve and connect it to the LF CYL RTN port.
6. Route the right installed hydraulic hose to the AutoBoom valve and connect it to the RT CYL RTN port.
7. If the dual tilt cylinder option is installed on the machine, install additional tee fittings to the other cylinder return ports on the AutoBoom valve. Refer to Figure 10.



## Install the Load Sense Hose

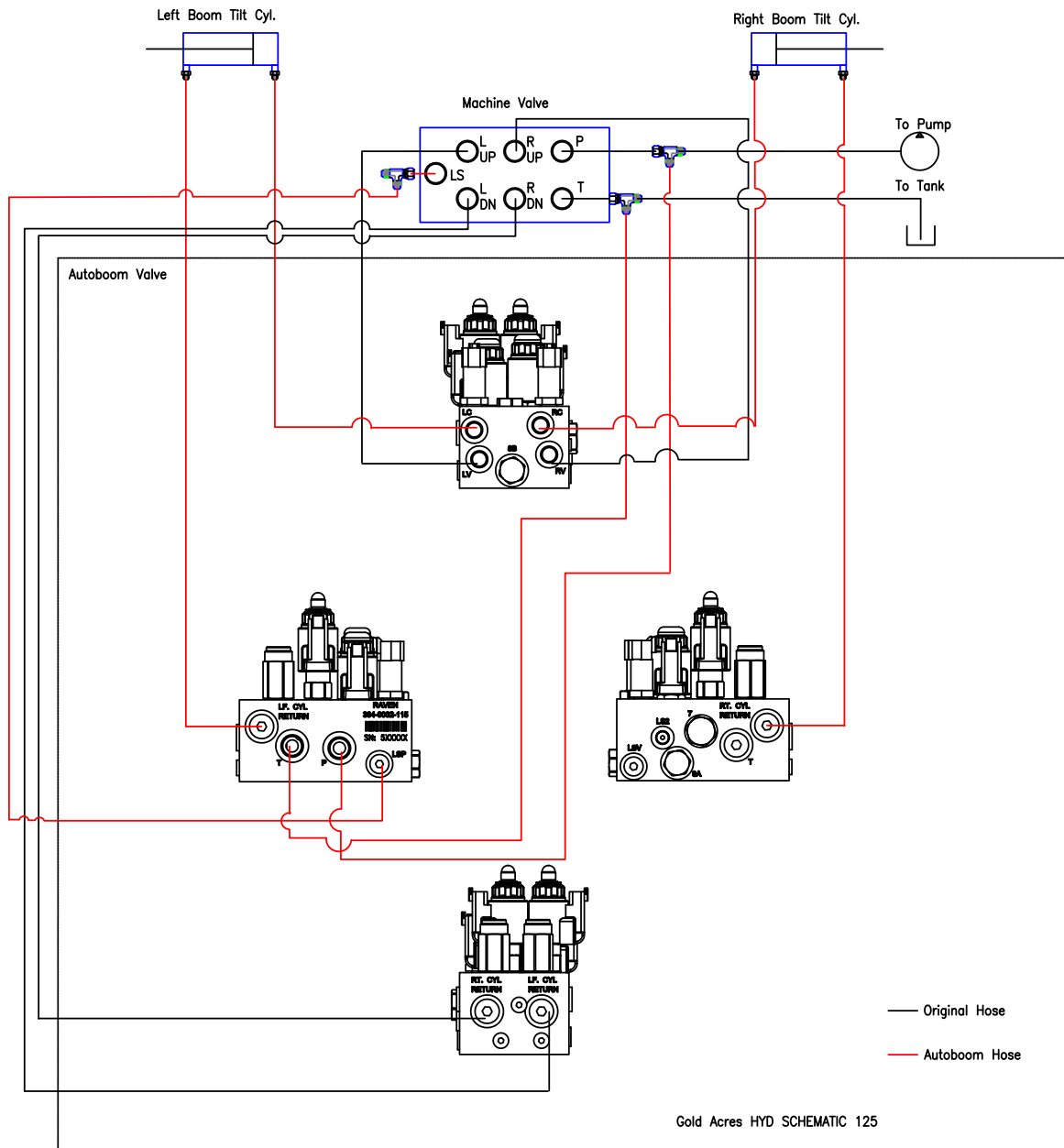
**FIGURE 11. Load Sense Hose Installed on the Machine's Hydraulic Valve**



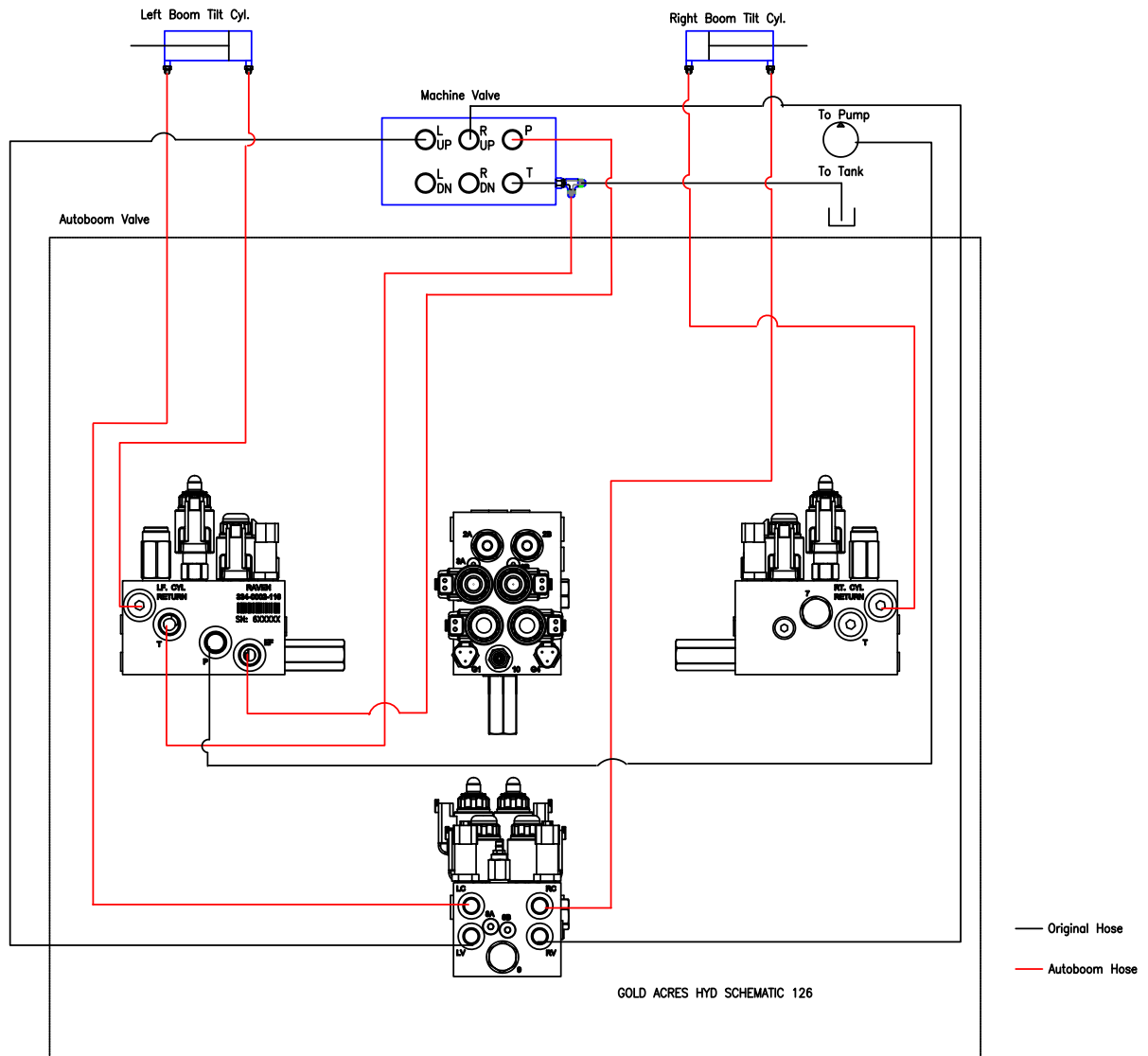
1. Remove the machine's load sense hose from the machine's hydraulic valve.
2. Install a tee fitting in the load sense port on the machine's hydraulic valve.
3. Connect the machine's load sense hose on the opposite end of the installed tee fitting.
4. Install a hydraulic hose on the 90° end of the installed tee fitting.
5. Connect the other end of the installed hydraulic hose to Port LS1 on the AutoBoom valve.

# Hydraulic Schematic

## Closed Center Hydraulic Valve



# Open Center Hydraulic Valve





# CHAPTER 4 Sensors

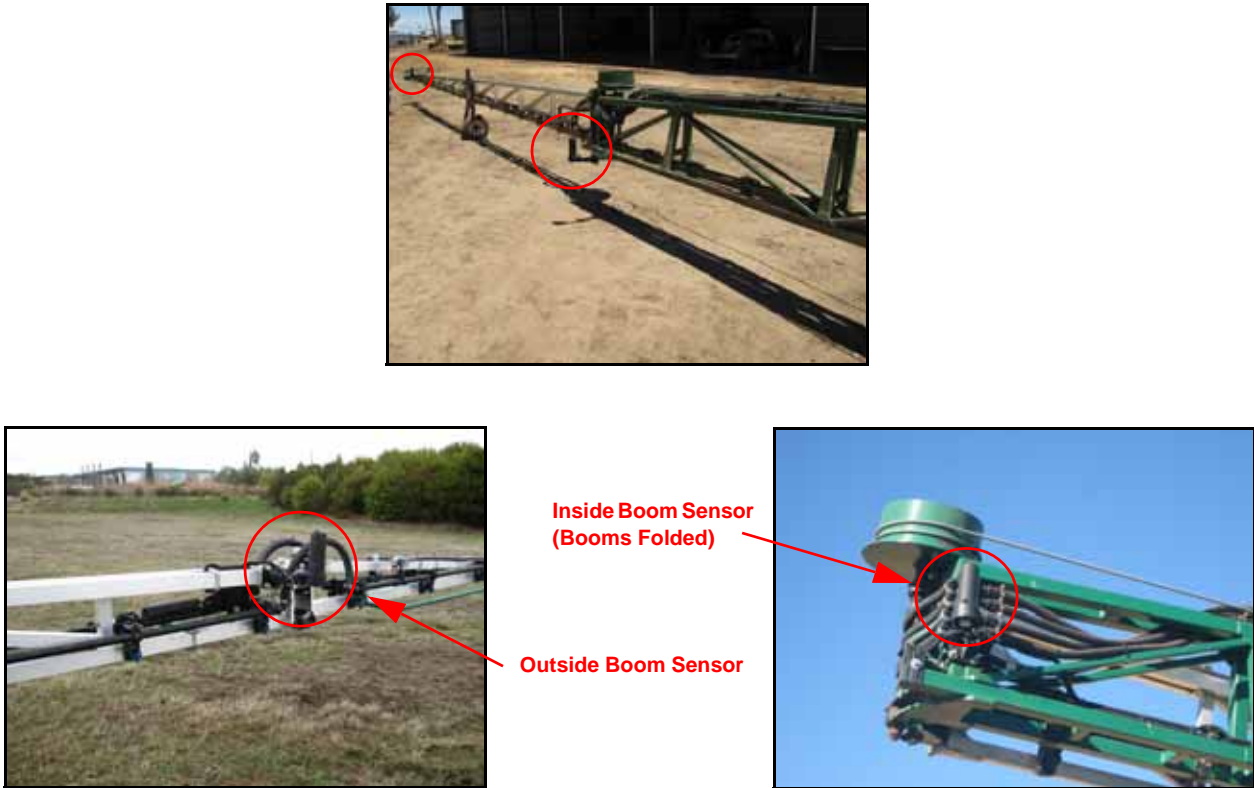
## Install the UltraGlide Sensors

### Mount the Boom Sensors

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

**Note:** When mounting two sensors per boom, the outside sensor should be mounted inside of the boom breakaway.

FIGURE 1. Boom Sensor Mounting Locations



1. Mount the sensor mounting bracket on the right 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" zinc flanged lock nuts (P/N 312-1001-164).
2. Mount the right sensor (P/N 063-0130-012) to the sensor mounting bracket.
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 2. Center Rack Sensor Mounting Location**

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1. Mount the center sensor (P/N 063-0130-018) to the machine's center rack using two 2-1/16" W x 3" L x 3/8" thread U-bolts (P/N 107-0171-609) and four 3/8" zinc flanged lock nuts (P/N 312-1001-164).

## 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 cables.

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



### *Install the Gauge Wheels - Optional*

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


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

FIGURE 1. Gauge Wheel Mounting Location

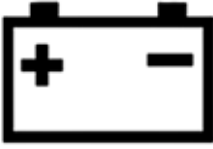


1. Remove the nuts from the right wheel axle.
2. Place the wheel on the wheel axle.
3. Reinstall the lug nuts on the wheel axle to secure the wheel.
4. Mount the receiver bracket to the front of the right boom using the supplied hardware.
5. Insert the wheel axle into the receiver bracket, positioning it so that the bottom of the wheel touches the ground (or nearly so).
6. Secure the gauge wheel assembly in the wheel mounting bracket using the supplied hardware.
7. Repeat the steps above to install the left wheel.



## Install the UltraGlide Wiring

### Wiring Connections

	<p><b>⚠ CAUTION</b></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>
--	---

**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 1. UltraGlide AutoBoom Node Installed

Row Crop



1. Mount the AutoBoom node (P/N 063-0130-013) to the mounting plate attached to the machine's center rack.

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

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

### Connect the Harness to the AutoBoom Valve

1. Locate the Left and Right Press connectors on the harness cable (P/N 115-0230-033).
2. Route the connectors to the AutoBoom valve (P/N 063-0131-125 or 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 LF on the AutoBoom valve.
7. Connect the Right Solenoid connector to Port RT 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.
11. Locate the Left Solenoid Sense and Right Solenoid Sense cables on the AutoBoom harness cable.
12. Connect the Left Solenoid Sense UP connector to the Left Sense Up connector on the machine's harness cable.
13. Connect the Left Solenoid Sense DOWN connector to the Left Sense Down connector on the machine's harness cable.
14. Connect the Right Solenoid Sense UP connector to the Right Sense Up connector on the machine's harness cable.
15. Connect the Right Solenoid Sense DOWN connector to the Right Sense Down connector on the machine's harness cable.

## Install the Center Rack Control

**FIGURE 2. Machine's Center Boom Function Coils**



1. Locate the Center Up coil on the machine's hydraulic valve.
2. Unplug the coil connector from the Center Up coil.
3. Install a center rack control adapter cable (P/N 115-0230-077) on the machine's Center Up coil.
4. Connect the machine's coil connector to the 3-pin end of the installed boom sense adapter cable.
5. Connect the female end of the installed adapter cable to the Control harness connection.
6. Plug the male end of the installed adapter cable to the Sense harness connection.
7. Locate the Center Down coil on the machine's hydraulic valve.
8. Unplug the coil connector from the Center Down coil.
9. Install a center rack control adapter cable (P/N 115-0230-077) on the machine's Center Down coil.
10. Connect the machine's coil connector to the 3-pin end of the installed boom sense adapter cable.
11. Connect the female end of the installed adapter cable to the Control harness connection.
12. Plug the male end of the installed adapter cable to the Sense harness connection.

## Connect the Harness to the Unloader Coil - Open Center Valves Only

FIGURE 3. Machine's Unloader Coil



1. Locate the Unloader coil on the machine's hydraulic valve.

**Note:** *The appearance of the coils may vary from machine to machine.*

2. Unplug the coil connector from the Unloader coil.
3. Install the 3-pin AutoBoom adapter cable (P/N 115-0230-075) on the Unloader coil.
4. Connect the machine's coil connector to the 3-pin end of the installed adapter cable.
5. Connect the male end of the installed adapter cable to the Open Center Valve connection on the harness cable.

## Connect the Harness to the Sensors

1. Locate the Left Outer Sensor connector on the AutoBoom harness cable.
2. Connect the Left Outer Sensor connector to the sensor cable (P/N 115-0230-602) installed on the end of the left boom.
3. Locate the Right Outer Sensor connector on the AutoBoom harness cable.
4. Connect the Right Outer Sensor connector to the sensor cable installed on the end of the right boom.
5. If optional inside boom sensors are installed, repeat the steps above to connect the sensors.

---

## Connect the Harness

1. Route the harness cable (P/N 115-0230-033) toward the machine's cab.

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

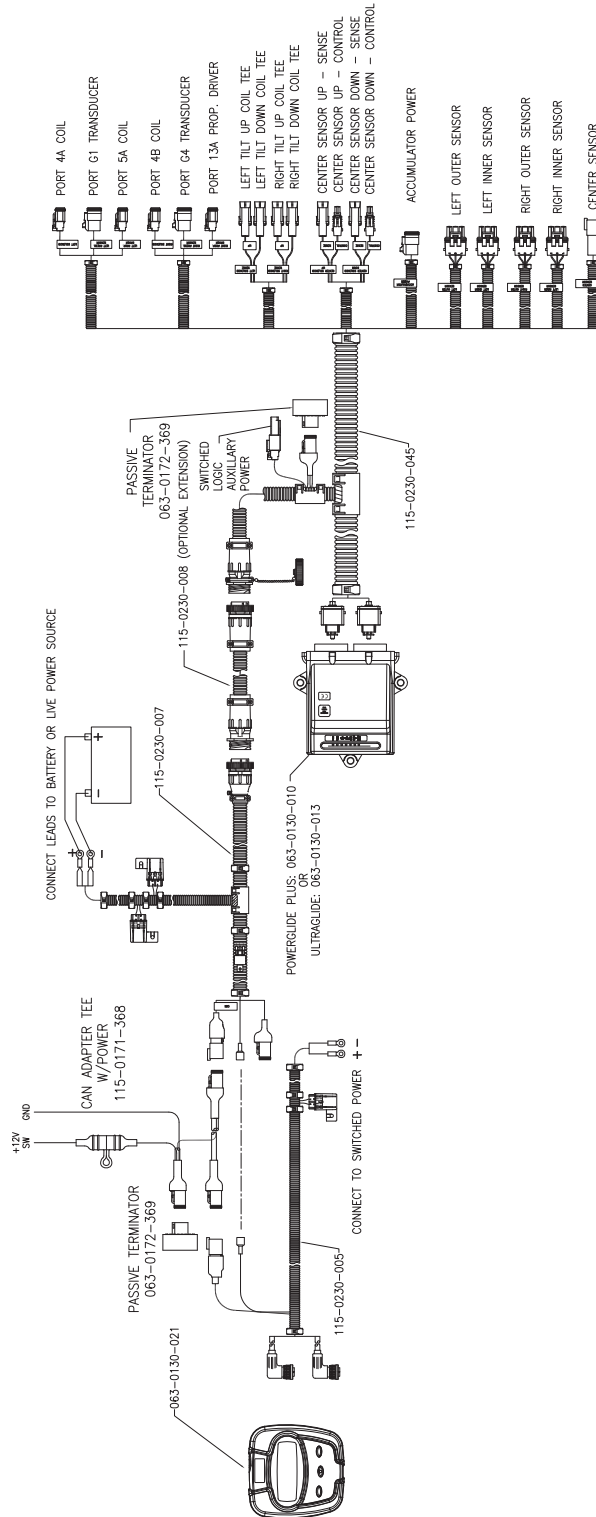
2. Connect the harness cable to the controller cable (P/N 115-0230-007).
3. Tighten the connector screw cap to secure the connection.
4. Route the controller cable into the right side of the machine's cab.
5. Connect the AutoBoom controller (P/N 063-0130-011) or field computer to the AutoBoom controller cable.

**Note:** *The controller or field computer should be mounted in a location inside the machine's cab so that the operator has easy access to it. Refer to the Installation & Operation Manual for installation and wiring instructions for the specific field computer.*

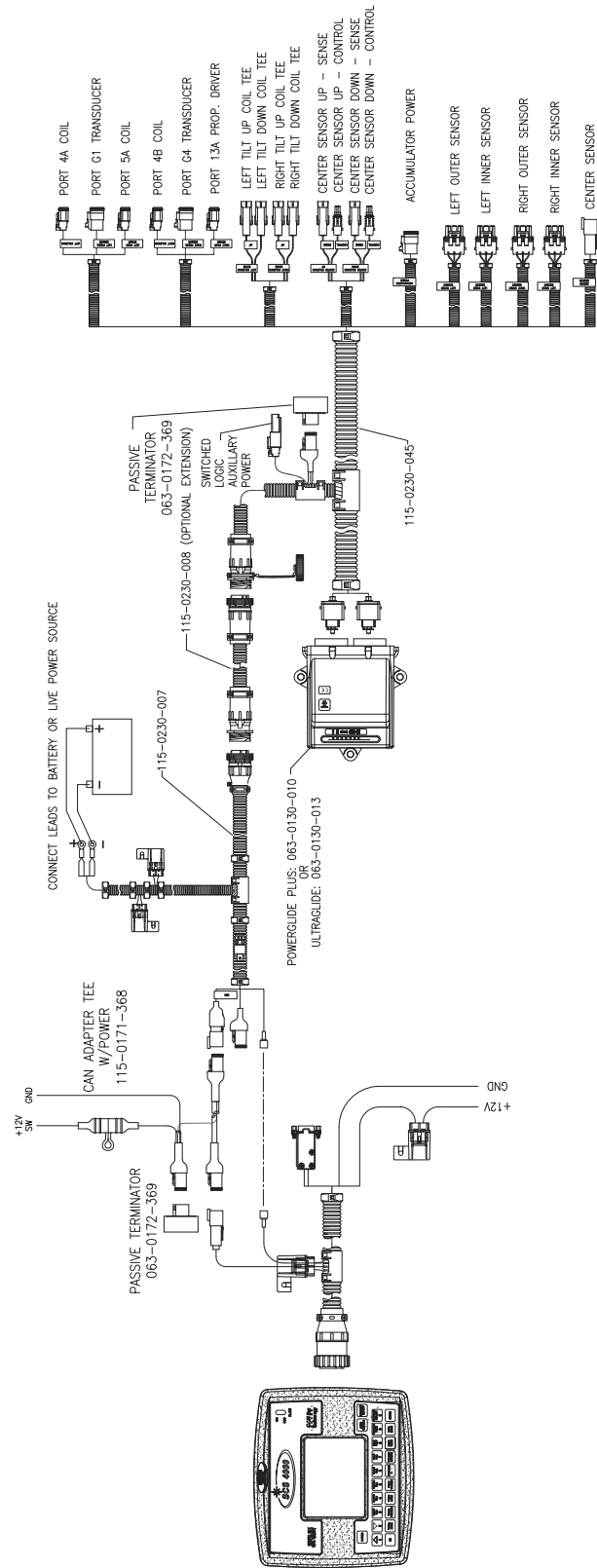
6. Locate the power cable that has the power and ground leads at one end.
7. Disconnect the machine's connectors from the battery terminals.
8. Install the power lead on the positive battery terminal and reinstall the machine's battery connector.
9. Install the ground lead on the negative battery terminal and reinstall the machine's battery connector.

# Wiring Schematics

## AutoBoom Controller

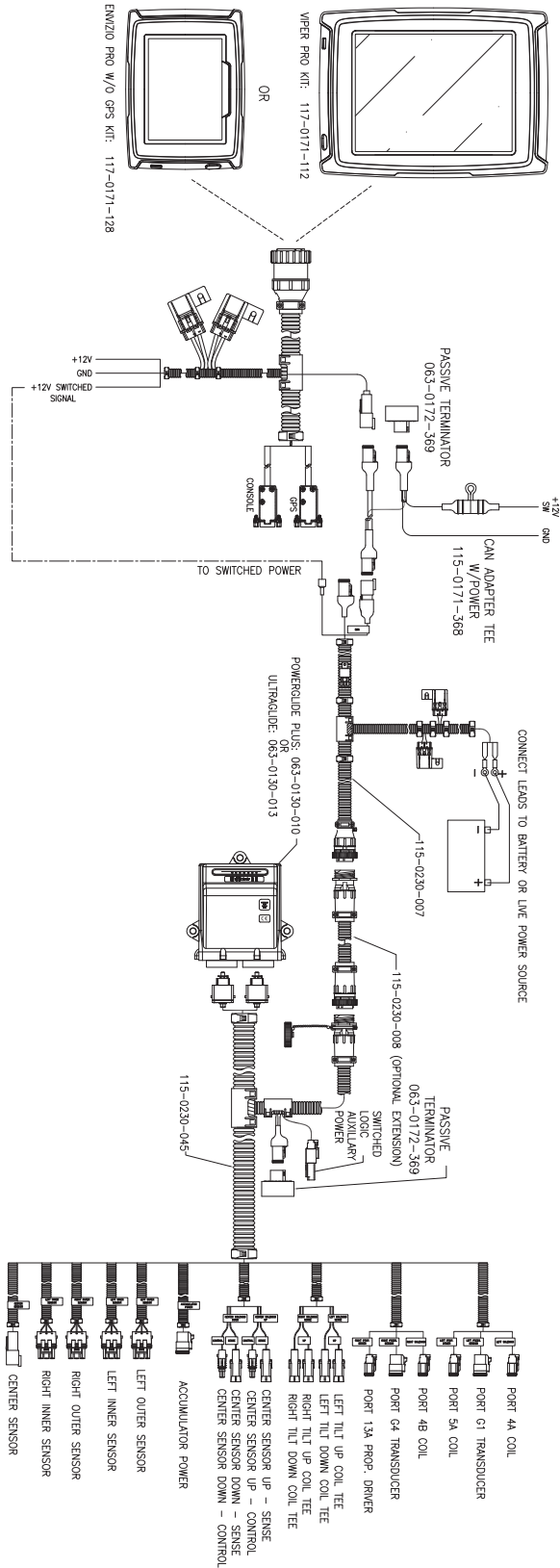


SCS 4000/5000





# Viper Pro & Envizio Pro





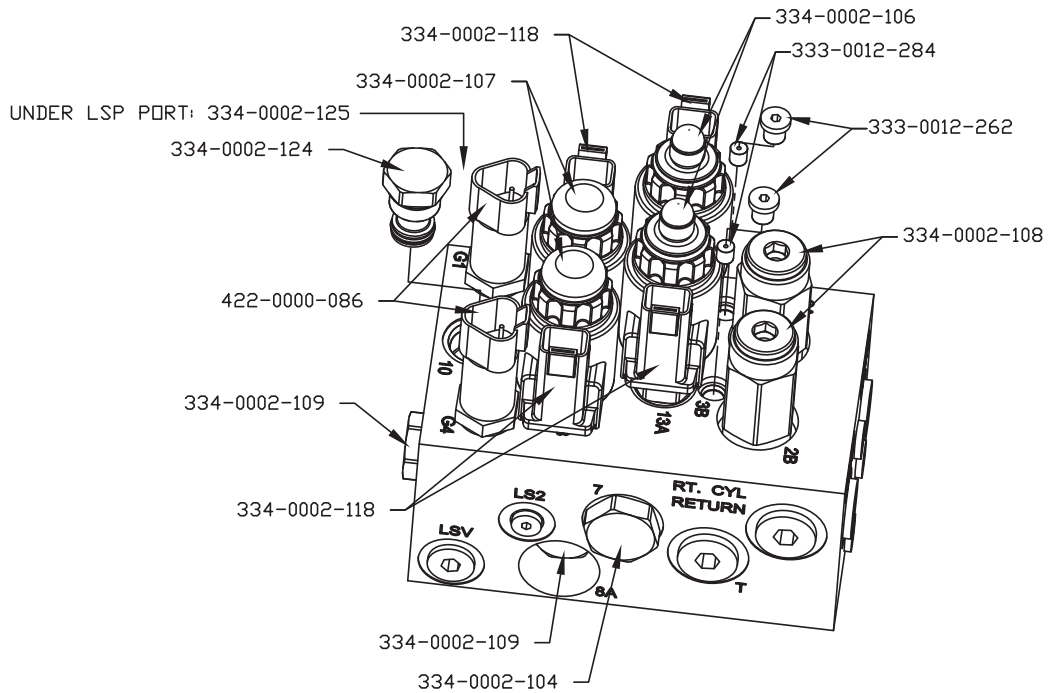
CHAPTER

7

# Replacement Parts

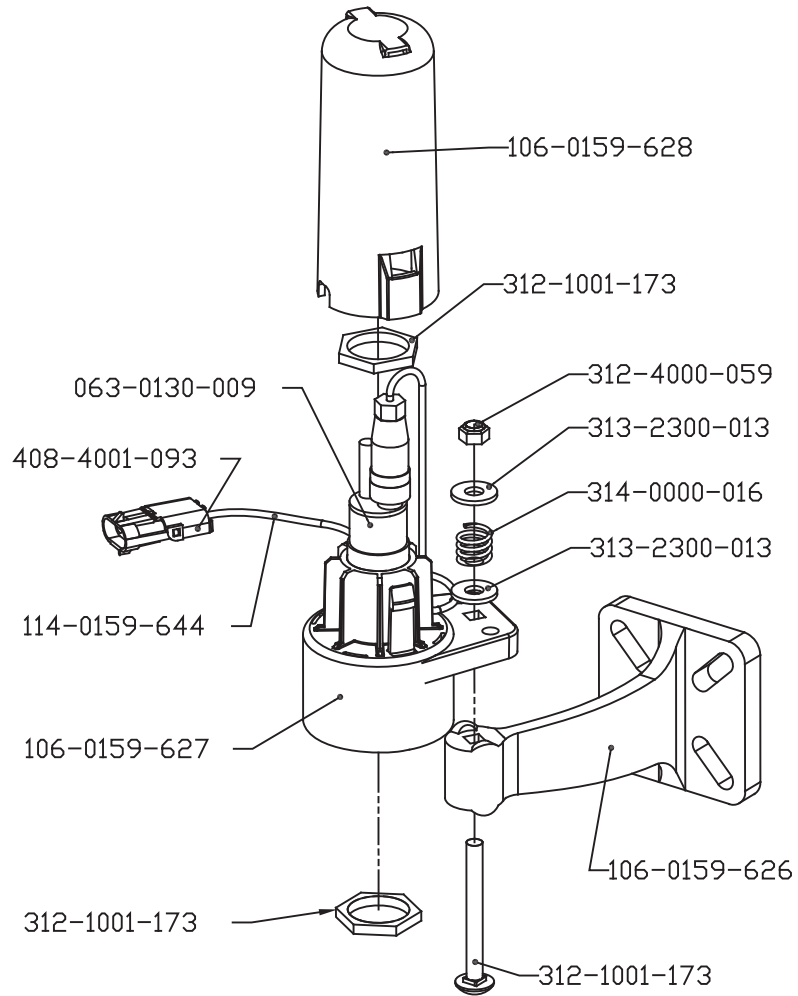
This section contains replacement part diagrams for the UltraGlide system. Refer to these diagrams when calling to request replacement parts.

## Valve Block



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

# Sensors



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# RAVEN

## Limited Warranty

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### ***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](http://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.**