Patriot Hawkeye® Installation Manual: Models 3230/40, 3330/40, 4410/20/30/40

Manual No. 016-0171-593 Rev. C 04/17 E29377

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CHAPTER 1 IMPORTANT SAFETY INFORMATION

NOTICE

Read this manual and all operation and safety instructions included with the implement and/or controller carefully before installing the Hawkeye® system.

- Follow all safety information presented within this manual.
- If you require assistance with any portion of the installation or service of Raven equipment, contact a local Raven dealer for support.
- Follow all safety labels affixed to 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 a local Raven dealer.

When operating the machine, observe the following safety measures:

- Be alert and aware of surroundings.
- Do not operate 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 equipment is engaged. Disable system functions or features when exiting from the operator's seat and machine.
- Do not drive the machine with equipment enabled on any public road.
- Determine and remain a safe working distance from other individuals. The operator is responsible for disabling Hawkeye when the safe working distance has been diminished.
- Ensure Hawkeye is disabled prior to starting any maintenance work on the system or the implement.

⚠ DANGER

AGRICULTURAL CHEMICAL SAFETY

- Thoroughly bleed pressure from chemical lines and rinse the system with clean water prior to installing or servicing fittings, hoses, valves, or nozzles in the application system.
- Always follow safety labels and instructions provided by the chemical manufacturer or supplier.
- Always wear appropriate personal protective equipment as recommended by the chemical and/or equipment manufacturer.
- Fill, flush, calibrate, and decontaminate chemical application systems in an area where runoff will not reach ponds, lakes, streams, livestock areas, gardens, or populated areas.
- Avoid inhaling chemical dust or spray particulate and avoid direct contact with any agricultural chemicals. Seek immediate medical attention if symptoms of illness occur during, or soon after, use of agricultural chemicals, products, or equipment.
- After handling or applying agricultural chemicals:

  - Thoroughly wash hands and face after using agricultural chemicals and before eating, drinking, or using the rest room.
  - Thoroughly flush or rinse equipment used to mix, transfer, or apply chemicals with water after use or before servicing any component of the application system.
- Follow all federal, state, and local regulations regarding the handling, use, and disposal of agricultural chemicals, products, and containers. Triple-rinse and puncture or crush empty containers before disposing of them properly. Contact a local environmental agency or recycling center for additional information.

⚠ CAUTION

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.
- Disconnect the Hawkeye system ECUs and control console before jump starting the vehicle or welding on any part of the implement or machine.

INSTRUCTIONS FOR WIRE ROUTING

The word "harness" is used to mean all electrical leads and cables, bundled and unbundled. When installing harness, secure it at least every 30 cm (12in) to the frame. Follow existing harness as much as possible and use these guidelines:

Harness should not contact or be attached to:

- Lines and hoses with high vibration forces or pressure spikes
- Lines and hoses carrying hot fluids beyond harness component specifications

Avoid contact with any sharp edge or abrading surfaces such as, but not limited to:

- Sheared or flame cut edges
- Edges of machined surfaces
- Fastener threads or cap screw heads
- Ends of adjustable hose clamps
- Wire exiting conduit without protection, either ends or side of conduit
- Hose and tube fittings

Routing should not allow harnesses to:

- Hang below the unit
- Have the potential to become damaged due to exposure to the exterior environment. (i.e. tree limbs, debris, attachments)
- Be placed in areas of or in contact with machine components which develop temperatures higher than the temperature rating of harness components
- Wiring should be protected or shielded if it needs to route near hot temperatures beyond harness component specifications

Harnessing should not have sharp bends

Allow sufficient clearance from machine component operational zones such as:

- Drive shafts, universal joints and hitches (i.e. 3-point hitch)
- Pulleys, gears, sprockets
- Deflection and backlash of belts and chains
- Adjustment zones of adjustable brackets
- Changes of position in steering and suspension systems
- Moving linkages, cylinders, articulation joints, attachments
- Ground engaging components

For harness sections that move during machine operation:

- Allow sufficient length for free movement without interference to prevent: pulling, pinching, catching or rubbing, especially in articulation and pivot points
- Clamp harnesses securely to force controlled movement to occur in the desired harness section
- Avoid sharp twisting or flexing of harnesses in short distances
- Connectors and splices should not be located in harness sections that move

Protect harnesses from:

- Foreign objects such as rocks that may fall or be thrown by the unit
- Buildup of dirt, mud, snow, ice, submersion in water and oil
- Tree limbs, brush and debris
- Damage where service personnel or operators might step or use as a grab bar
- Damage when passing through metal structures

IMPORTANT: Avoid directly spraying electrical components and connections with high pressure water. High pressure water sprays can penetrate seals and cause electrical components to corrode or otherwise become damaged. When performing maintenance:

- Inspect all electrical components and connections for damage or corrosion. Repair or replace components, connections, or cable as necessary.
- Ensure connections are clean, dry, and not damaged. Repair or replace components, connections, or cable as necessary.
- Clean components or connections using low pressure water, pressurized air, or an aerosol electrical component cleaning agent.
- Remove visible surface water from components, connections, or seals using pressurized air or an aerosol electrical component cleaning agent. allow components to dry completely before reconnecting cables.

INSTRUCTIONS FOR HOSE ROUTING

The word "hose" is used to mean all flexible fluid carrying components. Follow existing hoses as much as possible and use these guidelines:

Hoses should not contact or be attached to:

- Components with high vibration forces
- Components carrying hot fluids beyond component specifications

Avoid contact with any sharp edge or abrading surfaces such as, but not limited to:

- Sheared or flame cut edges
- Edges of machined surfaces
- Fastener threads or cap screw heads
- Ends of adjustable hose clamps

Routing should not allow hoses to:

- Hang below the unit
- Have the potential to become damaged due to exposure to the exterior environment. (i.e. tree limbs, debris, attachments)
- Be placed in areas of or in contact with machine components which develop temperatures higher than the temperature rating of hose components
- Hoses should be protected or shielded if it needs to route near hot temperatures beyond hose component specifications

Hoses should not have sharp bends

Allow sufficient clearance from machine component operational zones such as:

- Drive shafts, universal joints and hitches (i.e. 3-point hitch)
- Pulleys, gears, sprockets
- Deflection and backlash of belts and chains
- Adjustment zones of adjustable brackets
- Changes of position in steering and suspension systems
- Moving linkages, cylinders, articulation joints, attachments
- Ground engaging components

For hose sections that move during machine operation:

- Allow sufficient length for free movement without interference to prevent: pulling, pinching, catching or rubbing, especially in articulation and pivot points
- Clamp hoses securely to force controlled movement to occur in the desired hose section
- Avoid sharp twisting or flexing of hoses in short distances

Protect hoses from:

- Foreign objects such as rocks that may fall or be thrown by the unit
- Buildup of dirt, mud, snow, ice, submersion in water and oil
- Tree limbs, brush and debris
- Damage where service personnel or operators might step or use as a grab bar
- Damage when passing through metal structures
- High pressure wash

CHAPTER 2 INTRODUCTION

The Hawkeye® nozzle control system is a pressure based product control system designed for precise sprayer application in a variety of conditions. Pressure based application control provides accurate control of droplet size which reduces spray drift during field operations.

Hawkeye is compatible with the ISOBUS communication platform which allows the system to work with most ISO Virtual Terminals (VTs) and Task Controllers on the market. This manual is intended to provide installation instructions on the following equipment:

TABLE 1. Patriot Make and Model Information

Make	Model	Boom Configuration
CHN	Patriot 3230/40 Patriot 3330/40 Patriot 4430/40 Patriot 4410/20/30	120′ Boom 20″ Spacing
		100′ Boom 20″ Spacing
		90′ Boom 20″ Spacing

NOTE: Machines must have the original factory cable harness that connects to a Raven single product node to be compatible with the cabling in this kit. Machines with a Raven SCS 4600 console or similar with a built-in product control node are not compatible with this Hawkeye system.

REQUIRED COMPONENTS

The following components must be installed with the Hawkeye nozzle control system:

- Updated software on field computers or control monitors
- PWM pump control valve
- Raven compatible flow meter
- Raven compatible pressure transducer
- 80 (or finer) mesh strainer

NOTE: Air induction style spray tips should not be used with the Hawkeye nozzle control system. A fan or cone style spray tip is required for the Hawkeye system to operate properly.

TOOLS AND MATERIALS NEEDED

The following tools are recommended for completing the installation:

- SAE and metric sized wrenches and tools
- Drill bit set and drill
- Dielectric grease (supplied)
- Cable ties (supplied)

POINT OF REFERENCE

The instructions provided in this manual assume the installer is standing behind the machine, looking toward the machine cabin.

KIT NUMBERS

The table below provides the kit numbers for each machine configuration. Use the table below as well as table 2 to identify the appropriate kit and kit components.

TABLE 2. Machine Information and Kit Numbers

Machine Details	Kit Number
Patriot 3330-40 & 4410/20/30/40 120'Boom, 20" Spacing, Hypro	117-1007-070
Patriot 3330/40 & 4410/20/30/40 100' Boom, 20" Spacing, Hypro	117-1007-071
Patriot 3330/40 & 4410/20/30/40 90' Boom, 20" Spacing, Hypro	117-1007-072
Patriot, 3330/40 & 4410/20/30/40 120' Boom, 20" Spacing, Wilger	117-1007-073
Patriot 3330/40 & 4410/20/30/40 100' Boom, 20" Spacing, Wilger	117-1007-074
Patriot 3330/40 & 4410/20/30/40 90' Boom, 20" Spacing, Wilger	117-1007-075
Viper 4 and Hawkeye HD for Patriot 3330/40 & 4410/20/30/40 120' Boom, 20" Spacing, Hypro	117-1007-076
Viper 4 and Hawkeye HD for Patriot 3330/40 & 4410/20/30/40 100' Boom, 20" Spacing, Hypro	117-1007-077
Viper 4 and Hawkeye HD for Patriot 3330/40 & 4410/20/30/40 90' Boom, 20" Spacing, Hypro	117-1007-078
Viper 4 and Hawkeye HD for Patriot 3330/40 & 4410/20/30/40 120' Boom, 20" Spacing, Wilger	117-1007-079
Viper 4 and Hawkeye HD for Patriot 3330/40 & 4410/20/30/40 100' Boom, 20" Spacing, Wilger	117-1007-080
Viper 4 and Hawkeye HD for Patriot 3330/40 & 4410/20/30/40 90' Boom, 20" Spacing, Wilger	117-1007-081

KIT CONTENTS

TABLE 3. Kit Contents

Picture	Item Description	Part Number	Qty.											
			117-1007-											
			070	071	072	073	074	075	076	077	078	079	080	081
Not Pictured	Manual - Hawkeye® Calibration and Operation	016-0171-584	1											
Not Pictured	Manual - Patriot Hawkeye Installation	016-0171-593	1											
Not Pictured	Viper 4 W/0 GPS, No Antenna, ROS, ISO Section Unlock	117-5010-035							1	1	1	1	1	1
Not Pictured	Cable, Viper 4 to CASE A-Post	115-0172-132							1	1	1	1	1	1
Not Pictured	Cable - Adapter, Case ISO/CAN to Hawkeye	115-7303-083	1											
Not Pictured	Cable, 16' Power Hawkeye	115-7303-082	1											
Not Pictured	Cable, Adapter, AccuBoom Tee	115-1001-048	1											
	ECU - Product Controller II	063-0173-704	1											
	ECU, ISO/CAN, Boom Sense Speed	016-0173-635	1											

Picture	Item Description	Part Number	Qty.											
			117-1007-											
			070	071	072	073	074	075	076	077	078	079	080	081
	Hawkeye Nozzle Control Valve, ARAG/ Hypro	063-0173-673	72	60	54				72	60	54			
	Hawkeye Nozzle Control Valve, Wilger	063-0173-674				72	60	54				72	60	54
Not Pictured	Cable - Adapter, Case ISO/CAN to Hawkeye	115-7303-115	1											
Not Pictured	Cable - Primary Patriot (120', 20")	115-7303-007	2			2			2			2		
	Cable - Primary Patriot (90' and 100', 20")	115-7303-088		2	2		2	2		2	2		2	2
Not Pictured	Cable-Mid (120' 20")	115-7303-008	2			2			2			2		
Not Pictured	Cable - Secondary Patriot (120', 20")	115-7303-009	2			2			2			2		
	Cable - Secondary Patriot (100', 20")	115-7303-089		2			2			2			2	
	Cable - Secondary Patriot (90', 20")	115-7303-111			2			2			2			2
Not Pictured	Cable - Adapter, Case ICO/CAN to Hawkeye	115-7303-115	1											
Not Pictured	Cable - Adapter, PWM Valve	115-7303-146	1											
Not Pictured	Hawkeye Service Kit for ARAG/Hypro Nozzle (Parts Listed Below)	117-1005-057	1	1	1				1	1	1			

Picture	Item Description	Part Number	Qty.											
			117-1007-											
			070	071	072	073	074	075	076	077	078	079	080	081
Not Pictured	Hawkeye Service Kit for Wilger Nozzle Bodies (Parts Listed Below)	117-1005-058				1	1	1				1	1	1

TABLE 4. Hawkeye Service Kit Components (P/N 117-1005-057)

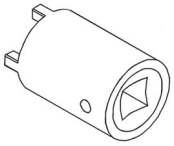
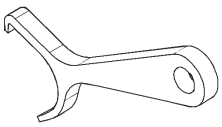
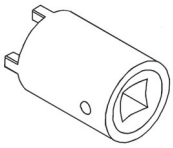
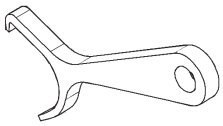
Picture	Item Description	Part Number	Quantity
	Hawkeye Nozzle Control Valve, ARAG/ Hypro	063-0173-673	1
Not Pictured	Kit, Seal, Hawkeye Valve, ARAG/Hypro	117-1005-051	3
Not Pictured	Hawkeye Valve Jumper	115-7303-139	2
	Hawkeye Valve Tool	321-0000-457	2
	Hawkeye Fly Nut Wrench	321-0000-459	1
Not Pictured	O-Ring, Viton, Green	219-1005-115	1

TABLE 5. Hawkeye Service Kit Components (P/N 117-1005-058)

Picture	Item Description	Part Number	Quantity
	Hawkeye Nozzle Control Valve, Wilger	063-0173-674	2
Not Pictured	Kit, Seal, Hawkeye Valve, Wilger	117-1005-051	2
Not Pictured	Hawkeye Valve Jumper	115-7303-139	2
	Hawkeye Valve Tool	321-0000-457	2
	Hawkeye Fly Nut Wrench	321-0000-459	1
Not Pictured	O-Ring, Viton, Brown	219-1005-116	1

UPDATES

Raven software and documentation updates may be made available periodically on the Raven Applied Technology web site:

www.ravenhelp.com

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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

-Patriot Hawkeye® Installation Manual: Models 3230/40, 3330/40, 4410/20/30/40
-Manual No. 016-0171-593 Rev. C
-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 INSTALLATION PREPARATION

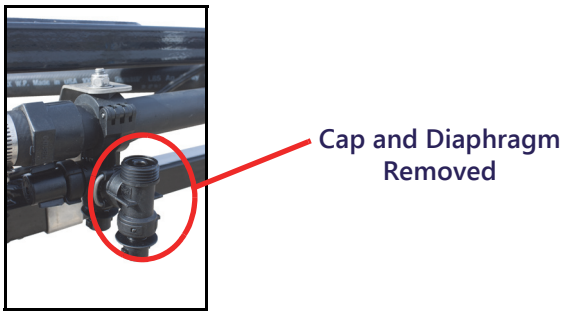
Perform the following procedure to prepare the implement for installation of the Hawkeye® nozzle control system.

⚠ CAUTION

Chemical residues may be present. Thoroughly bleed pressure from chemical lines and rinse the system with clean water prior to installing or servicing fittings, hoses, valves, or nozzles in the application system.

1. Rinse and fill the tank with clean water.
2. Move the equipment to an open area suitable for testing application system operation and rinsing the boom plumbing.
3. Unfold the boom and enable the application control system. Verify that all control hardware (e.g. control valves, section valves, etc.) and spray tips function as expected.
4. Operate the system until any chemicals are rinsed from the boom supply lines.
5. Disable the application control system and de-pressurize the boom.
6. Replace existing carrier line strainer(s) with an 80 mesh strainer. An 80 mesh or finer strainer is required for use with the Hawkeye nozzle control system.
7. If turret style nozzle bodies are installed on the implement, rotate the turret to an open spray position, if available. If an open spray position is not available, or for nozzle bodies without a turret, remove the spray tips from the boom and set aside for later use.
8. Enable the application control system and run clean water for at least 20 seconds to rinse any remaining debris from the boom plumbing and nozzle bodies.
9. Remove the cap and diaphragm from the nozzle bodies.

FIGURE 1. Nozzle Body Cap and Diaphragm Removed



CHAPTER 4 BOOM INSTALLATION

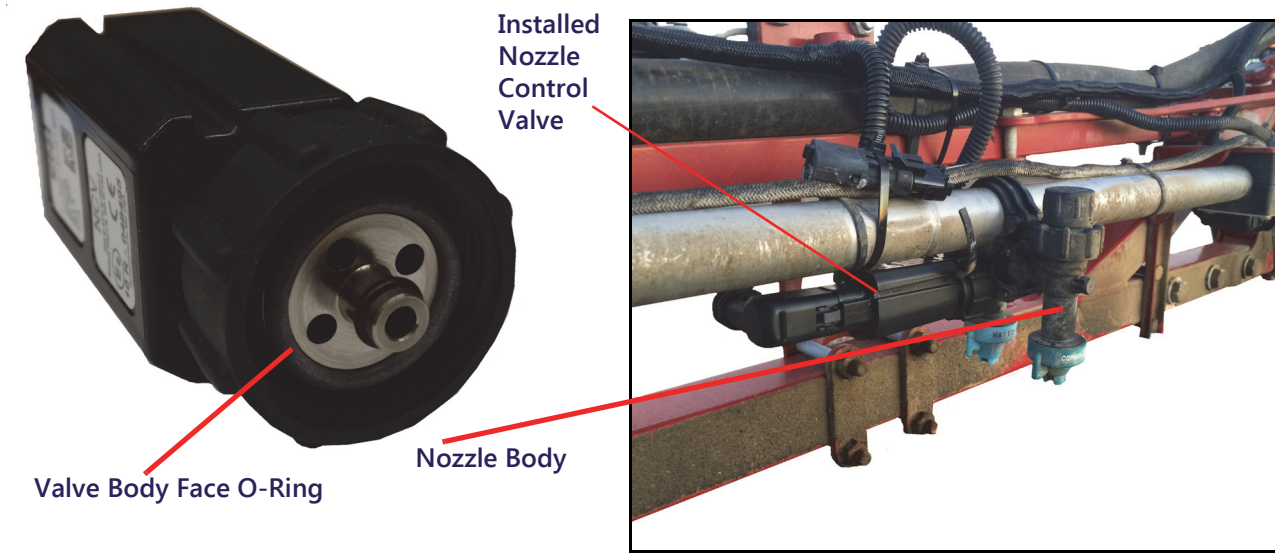
HAWKEYE NOZZLE CONTROL VALVE INSTALLATION

BEST PRACTICES AND RECOMMENDATIONS

- Do not connect battery leads until all cables are installed and connected.
- If a dual channel turret nozzle body is installed on the implement, always mount the Hawkeye nozzle control valve to the straight nozzle port to avoid excessive pressure drop across the nozzle.

GENERAL VALVE INSTALLATION

FIGURE 1. Valve Face O-Ring and Nozzle Control Valve



1. Place a supplied o-ring on the inside of the fly nut flush with the valve body face.
2. Thread the fly nut onto the nozzle body.
3. Orient the nozzle control valve so that the label is easily readable.
4. Hand tighten the swivel nut to secure the nozzle control valve to the nozzle body. Do not over tighten.

NOTE: Frequently check the nozzle control valve nuts to ensure they are secure.

5. Repeat the previous steps to mount a nozzle control valve to each nozzle body on the spray boom.

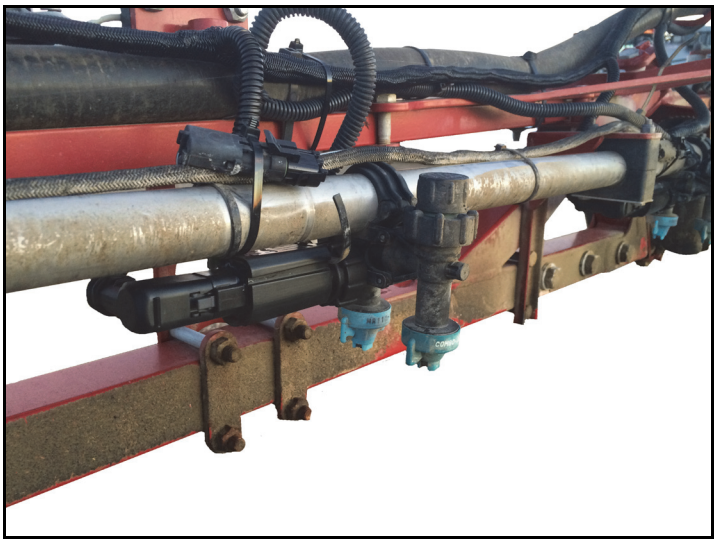
VALVE MOUNTING INTERFERENCE AND OBSTRUCTIONS

In some locations on the spray boom, boom equipment or hardware may interfere with mounting the Hawkeye nozzle control valves. In these locations, it may be necessary to rotate the nozzle control valve or to relocate existing hardware to provide additional clearance.

NOTE: Avoid removing of any existing boom hardware or support brackets where applicable during installation of the Hawkeye nozzle control valves.

See Figure 2 on page 14 for an example of modified installations of the nozzle control valve.

FIGURE 2. Modified Nozzle Control Valve Installation



BOOM CABLE ROUTING AND CONNECTION

BEST PRACTICES AND RECOMMENDATIONS

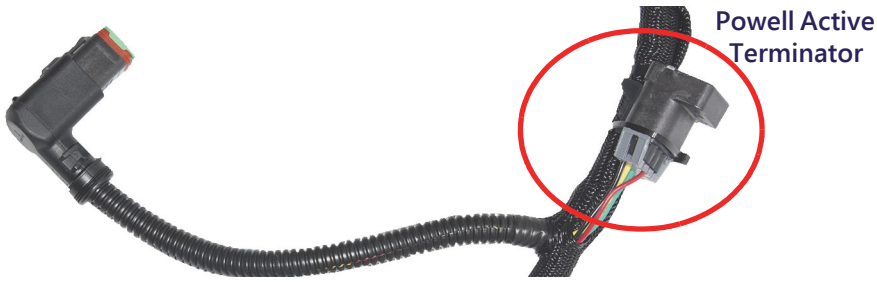
- Route the Hawkeye primary and secondary boom cables along existing cables or plumbing to help avoid damage to the cable.
- Route cables to avoid pinch points and to avoid stretching the cable during folding and unfolding operations. Pay special attention to cable routing near folding or break-away points.
- Route cables through existing cable retention devices as appropriate.
- When securing the primary and secondary boom cables on the implement, begin at the outer boom tips. Adjust the cable position to provide sufficient slack between valve tee branches while working toward the center of the implement.
- Route the boom cables on the inside of the boom frame work.
- Secure cables using a zip tie at each nozzle control valve tee branch, and one between each tee branch along the cable length.
- Secure the terminators to the cable and to the boom.

SECONDARY BOOM CABLE ROUTING AND CONNECTIONS

NOTE: Please review the Best Practices and Recommendations section on page 14 before routing or securing the boom cables on the implement. Do not to connect or secure the cables until instructed to do so in the procedure.

1. Locate the terminator on each of the secondary boom cables (refer to the Kit Contents section on page 7).

FIGURE 3. Secondary Cable ISOBUS Powell Terminator



2. Route the secondary boom cables so they are located at the outer tips of the left and right boom.
3. Starting from the mid-boom fold point, feed the terminator end of the secondary boom cable through the boom framework along existing cable or plumbing runs and through any existing cable retention devices as appropriate.

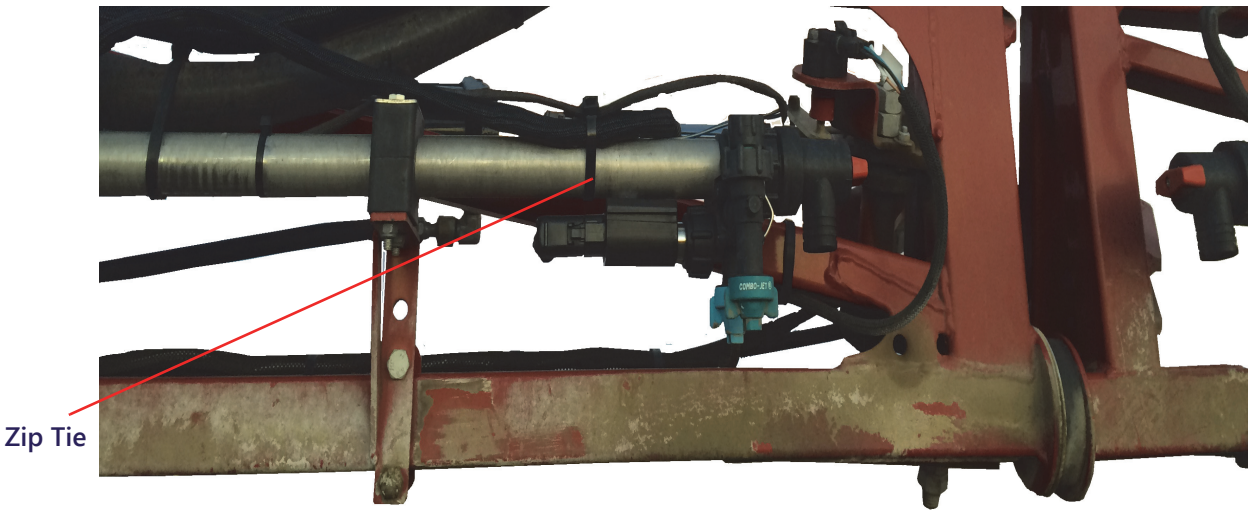
NOTE: If there is interference between the connector and boom components, remove the connector back shell. Refer to Figure 5 on page 16.

4. If not already applied, apply a single short burst of corrosion inhibitor (Corrosion X HD (Raven P/N 222-0000-020 or available from http://www.corrosionx.com/corrosionx-heavy-duty.html)) into the NCV connection. Be sure the corrosion inhibitor has coated the NCV contacts and recessed portions of the connector.

NOTE: To determine is corrosion inhibitor has been applied, inspect for a thick liquid in the bottom of the connector.

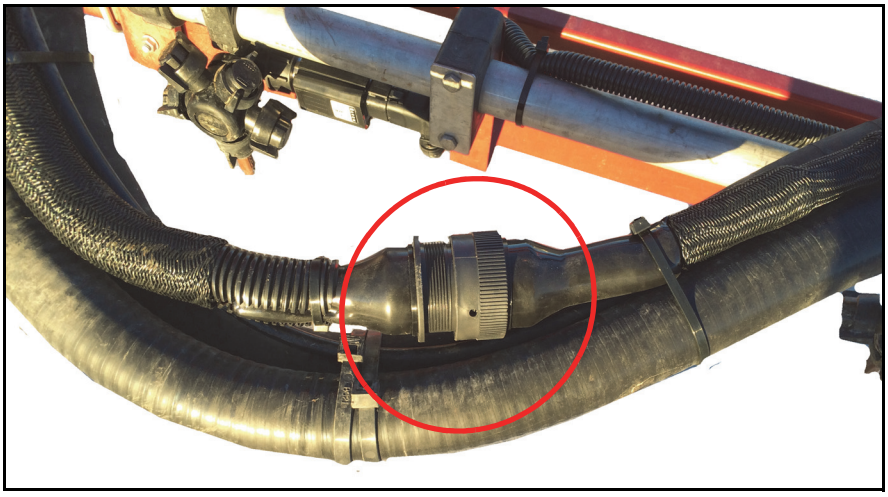
5. Connect the valve tee branches to the nozzle control valves, starting with the nozzle control valve at the outer end of the boom.

FIGURE 4. Securing Valve Branches



6. At each valve branch, adjust the cable as necessary to provide slack between nozzle control valve connections. The large round connector on the secondary boom cable should reach to the mid-boom fold point after all nozzle control valves are connected.

FIGURE 5. Boom Cable Connection at Fold Points



7. Repeat this procedure to route and connect the secondary boom cable on the opposite boom.

NOTE: Route and connect the primary and secondary cables before securing the cable with the supplied zip ties.

PRIMARY BOOM CABLE ROUTING AND CONNECTIONS

NOTE: Review the Best Practices and Recommendations section on page 14 before routing or securing the boom cables on the implement. It is recommended not to connect or secure the cable until instructed to do so in the procedure.

1. Locate the large, round connectors on the primary boom cables (refer to the Kit Contents section on page 7). The primary boom cables must be routed such that the connector with female pins is located at the mid-boom fold point of the left or right boom and will connect to the secondary boom cable.

FIGURE 6. Primary Cable Ends

Male Connector
To Center Rack/Chassis Connector

Female Receptacle
To Secondary Boom Cable/Mid-Boom Fold Point

2. Starting at the center of the implement, feed the female receptacle end of the primary boom cable through the boom framework along existing cable or plumbing runs and through any existing cable retention devices as appropriate.
3. Connect the large, round connectors on the primary and secondary boom cables.
4. Adjust the primary and secondary boom cables to ensure sufficient slack around the mid-boom fold point and allow each cable to reach nozzle control valves near the folding point.
5. Secure the primary and secondary connection using the supplied zip ties as necessary to protect the connector from damage during folding and unfolding operations.
6. Once the primary and secondary boom cables are connected, begin connecting the valve tee branches to the nozzle control valves, starting with the valve on the primary boom segment furthest from the center of the implement.
7. At each valve branch, adjust the cable as necessary to provide slack between nozzle control valve connections and use the supplied zip ties to secure the cable at each valve branch. Refer to Figure 4 on page 15. The large, round connector with male pins on the primary boom cable should reach to the center of the implement after all nozzle control valves are connected.
8. Repeat this procedure to route the primary boom cable on the opposite boom.

CHAPTER 5 CAB PREPARATION AND WIRING

CHASSIS CABLE ROUTING AND CONNECTION

BEST PRACTICES AND RECOMMENDATIONS

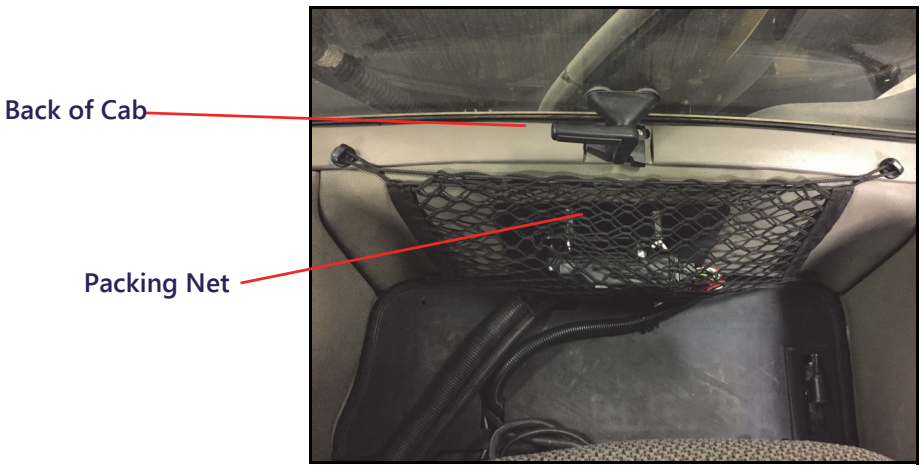
- Do not connect battery leads until all cables are installed and connected.
- Route chassis cabling along existing cabling or plumbing to help avoid pinch points or stretching the cable during normal equipment operation.

CAB CONNECTIONS

FOR CLASS 3XX0 MACHINES

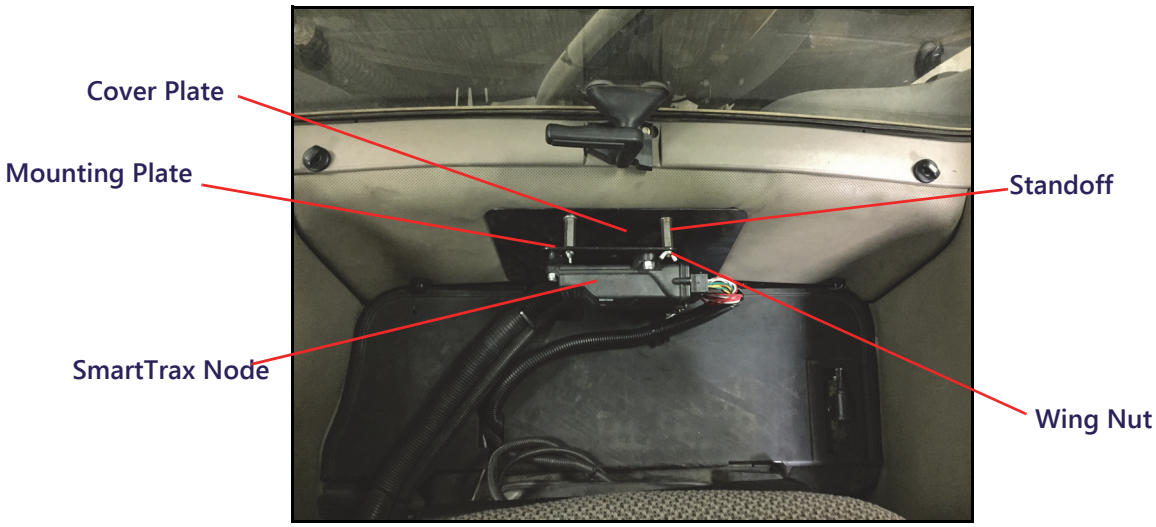
1. Remove the packing net located near the floor at the back of the cab.

FIGURE 1. Packing Net



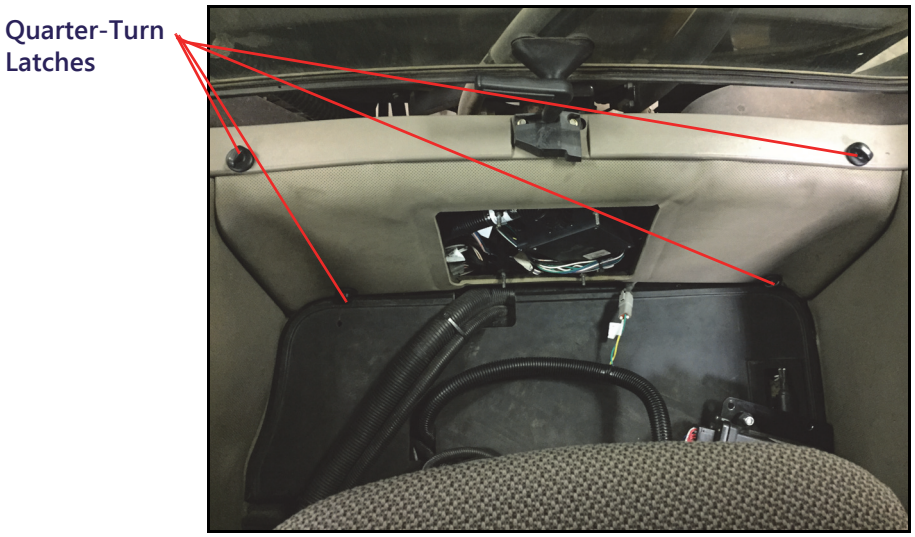
2. Take off the wing nuts securing the SmarTrax node and mounting plate (if applicable) to the back of the cab.
3. Lay the SmarTrax node and mounting plate to the side. Keep the node connected to the cabling.

FIGURE 2. SmarTrax Node on Mounting Plate



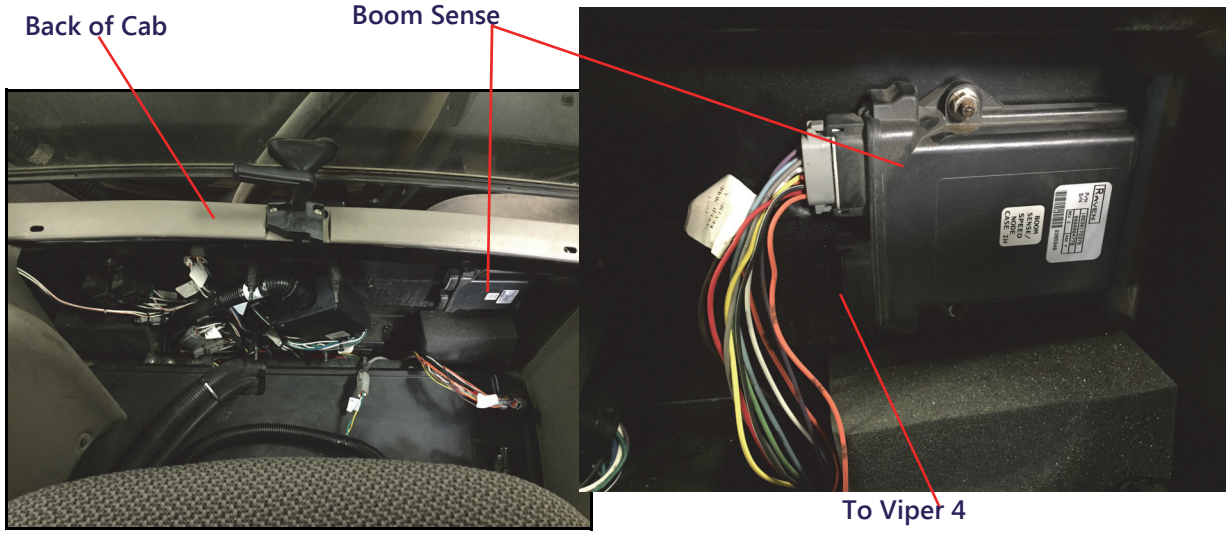
4. Remove the two standoffs that supported the mounting plate.
5. Remove the cover plate.
6. Loosen the four quarter-turn knobs that secure the back panel to the back of the cab.

FIGURE 3. Quarter-Turn Latches for Back Panel



7. Locate the boom sense node.

FIGURE 4. Boom Sense Node



8. Remove the two nuts that secure the boom sense node to the back of the cab.
9. Install the new ISO boom sense node to the location the original boom sense node was mounted.
10. Disconnect gray connector from the original boom sense node and install it in the top gray connector on the new ISO boom sense node.
11. Disconnect the black plug from the original boom sense node. This will not be used for the Hawkeye installation.
12. Connect the black 12-pin connector on the 115-7303-115 cable and connect it to the bottom black connector of the new ISO sense node.
13. Route the round black seven pin plug on the 115-7303-115 to the back of the Viper 4 and connect it to port 5.
14. Locate the cable feed through in the back cab window.

FIGURE 5. Feed Through in Back Window

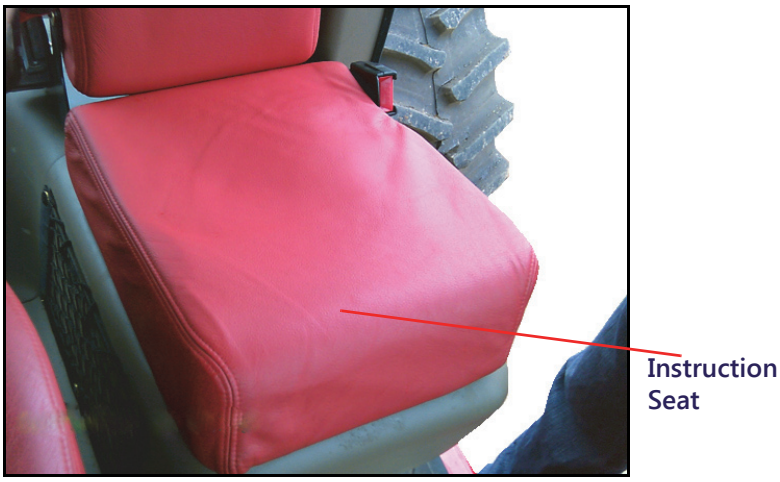
15. Route the four-pin can connector out of the cab towards the rear of the sprayer. This will connect to the ECU cable (115-7303-083).

16. Reinstall the back panel, cover, SmarTrax node (if applicable) and package net.

FOR CLASS 4XX0 MACHINES

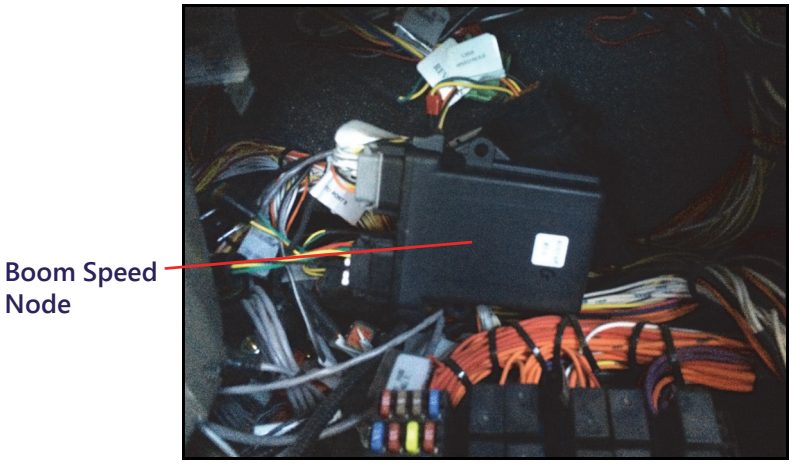
1. Lift the instructional seat cushion and remove any contents.

FIGURE 6. Instruction Seat



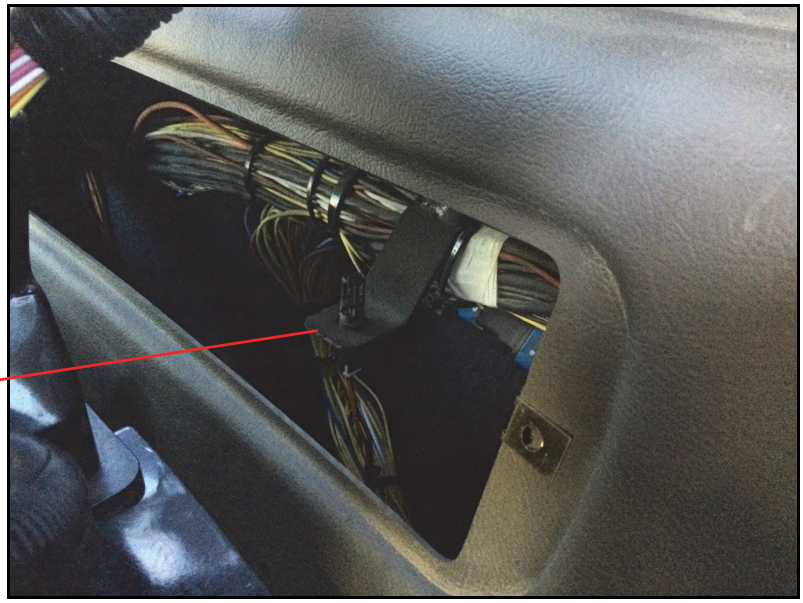
2. Remove the plastic compartment.
3. Locate the boom speed node near the back wall of the cab.

FIGURE 7. Boom Speed Node



4. Install the new ISO boom sense node to the location the original boom sense node was mounted.
5. Disconnect gray connector from the original boom sense node and install it in the gray receptacle on the new ISO boom sense node.
6. Disconnect the black plug from the original boom sense node. This will not be used with the Hawkeye installation.
7. Locate the black 12-pin connector on the 115-7303-115 cable and connect it to the black receptacle on the new ISO boom sense node.
8. Remove the rear vent cover at the back of the cab for access to route cables.

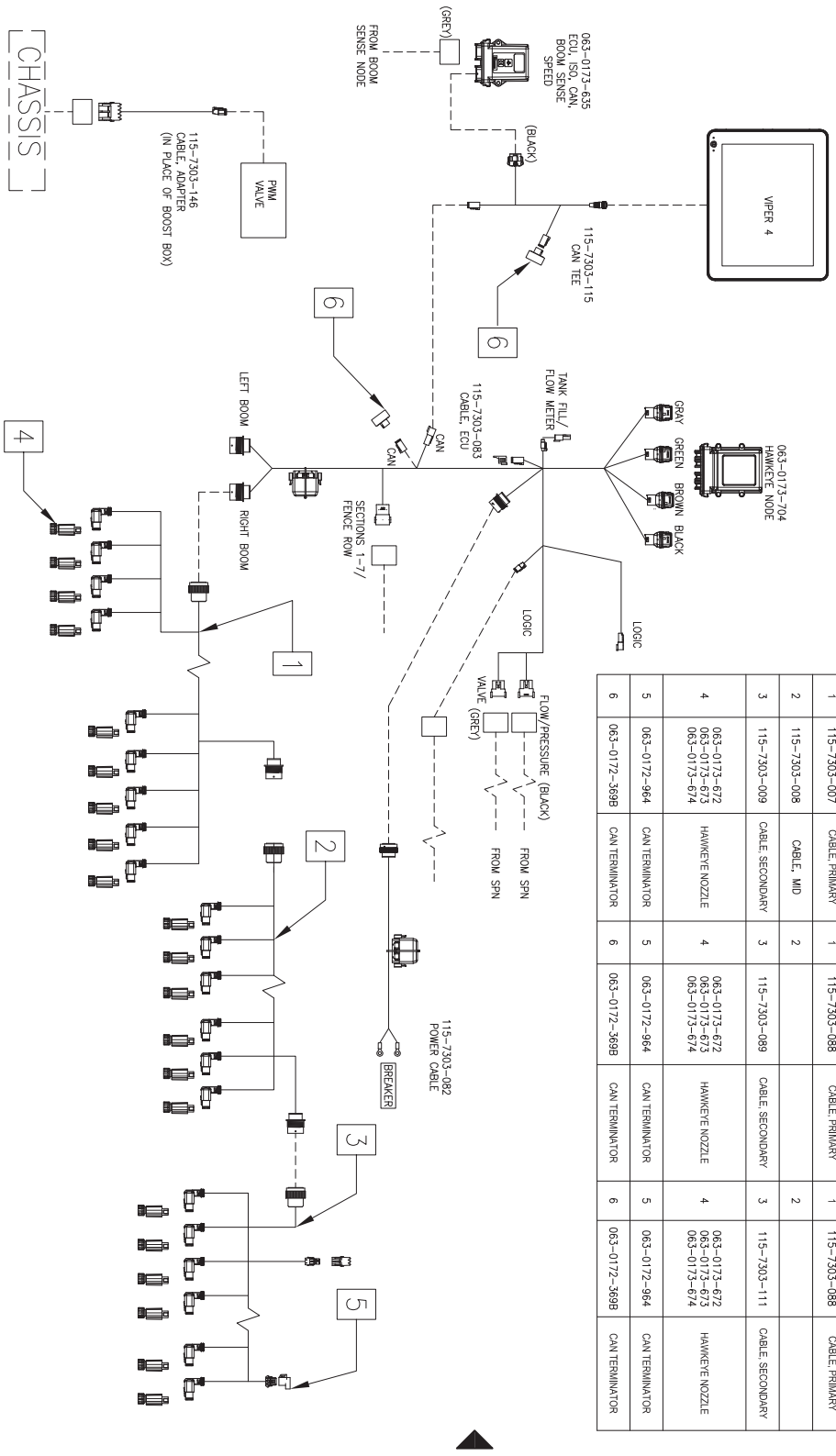
FIGURE 8. Vent Cover



9. Route the remaining connectors on the 115-7303-115 cable to the right side of the cab.
10. Feed the four-pin plug through the foam pass-through and out of the cab and towards the back of the sprayer.
11. Feed the seven-pin towards the right-front of the cab.
12. Reinstall the vent cover.
13. Connect the round black seven-pin plug to port number five on the back of the Viper 4.

SYSTEM DIAGRAM

The example below is a generic system diagram and is for reference purposes only.



HAWKEYE, PATRIOT

PATRIOT 3330/40 & 4430/40 120' BOOM 20" SPACING			PATRIOT 3330/40 & 4430/40 100' BOOM 20" SPACING			PATRIOT 3330/40 & 4430/40 90' BOOM 20" SPACING		
ITEM	PART NUMBER	DESCRIPTION	ITEM	PART NUMBER	DESCRIPTION	ITEM	PART NUMBER	DESCRIPTION
1	115-7303-007	CABLE, PRIMARY	1	115-7303-088	CABLE, PRIMARY	1	115-7303-088	CABLE, PRIMARY
2	115-7303-008	CABLE, MID	2			2		
3	115-7303-009	CABLE, SECONDARY	3	115-7303-089	CABLE, SECONDARY	3	115-7303-111	CABLE, SECONDARY
4	063-0173-672 063-0173-673 063-0173-674	HAWKEYE NOZZLE	4	063-0173-672 063-0173-673 063-0173-674	HAWKEYE NOZZLE	4	063-0173-672 063-0173-673 063-0173-674	HAWKEYE NOZZLE
5	063-0172-964	CAN TERMINATOR	5	063-0172-964	CAN TERMINATOR	5	063-0172-964	CAN TERMINATOR
6	063-0172-369B	CAN TERMINATOR	6	063-0172-369B	CAN TERMINATOR	6	063-0172-369B	CAN TERMINATOR

CHAPTER 6 ISOBUS ECU MOUNTING AND CONNECTION

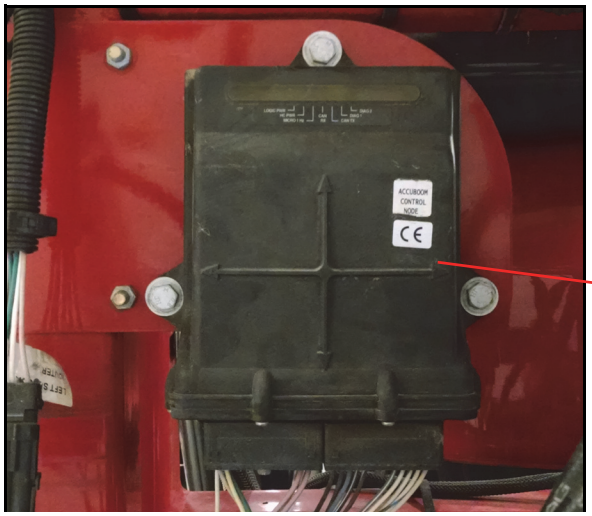
PRODUCT CONTROLLER II ECU INSTALLATION

BEST PRACTICES AND RECOMMENDATIONS

- Do not connect battery leads until all cables are installed and connected.
- If a protected mounting location is not available on the equipment, mount the Hawkeye® product controller II ECU with the connectors facing down toward the ground to help keep moisture from accumulating in the ECU.

MOUNTING PLATE PREPARATION

FIGURE 1. AccuBoom Node

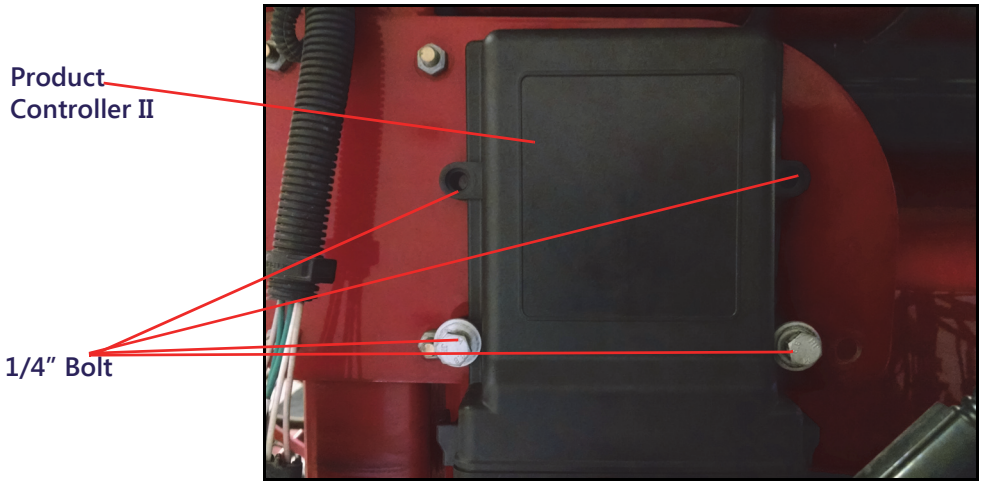


1. Locate the existing AccuBoom node mounted to the center rack of the boom.
2. Use a socket to remove the three bolts that secure the existing AccuBoom node to the mounting plate.

NOTE: Do not disconnect cables from the node at this time.

3. Use a 1/4" bolt provided with the kit to secure one side of the product controller II ECU to the one of the original AccuBoom node mounting holes. Ensure that the top edge of the product controller II ECU is parallel to the top edge of the mounting plate.
4. Mark the hole locations for the remaining three mounting holes for the product controller II ECU.
5. Remove product controller II ECU.
6. Drill 5/16" holes at the locations marked in step 4.
7. Install the product controller II ECU to the mounting plate using the 1/4" bolts, nuts, and washers provided.
8. Disconnect and remove the AccuBoom harness.

FIGURE 2. Electrical Box Assembly.

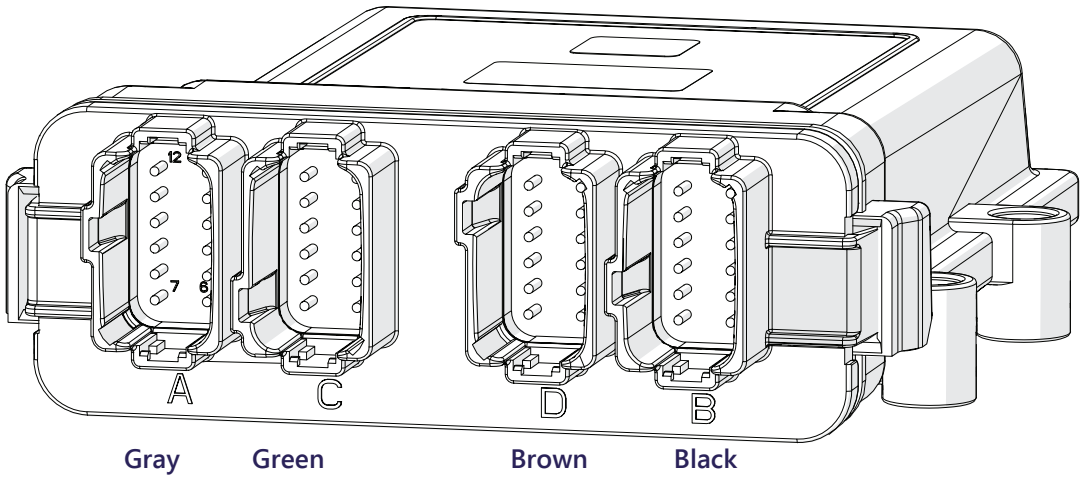


RETROFIT CABLE INSTALLATION

1. Locate the Hawkeye ECU harness (115-7303-083).
2. Connect the four large plugs (gray, green, brown, black) on the Hawkeye ECU cable to the bottom of the product controller II as shown in Figure 3 on page 26.

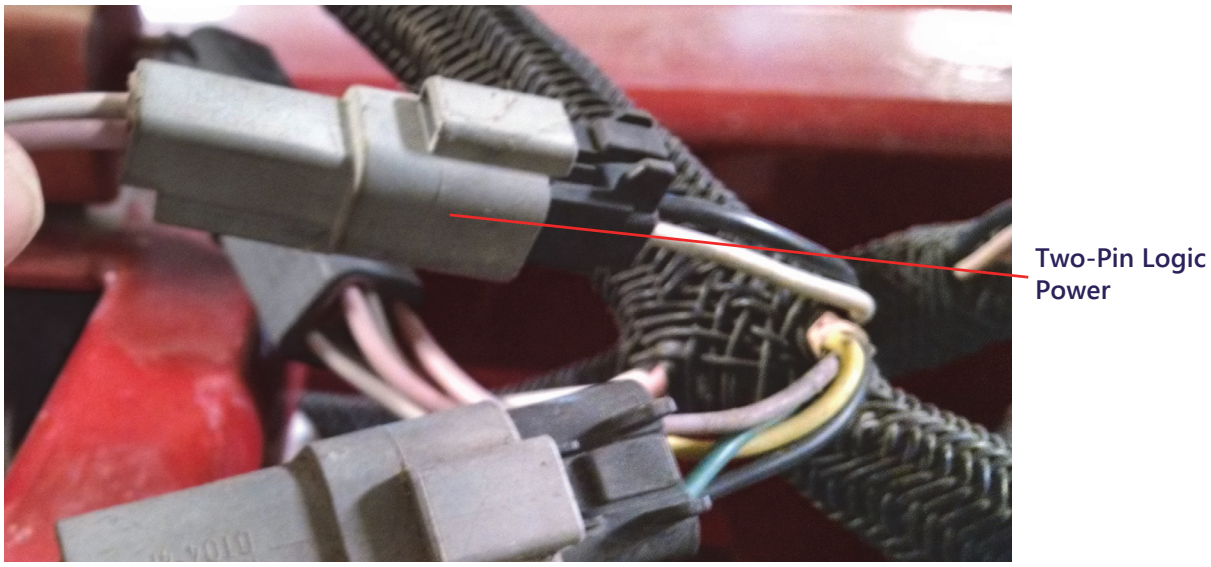
NOTE: Press firmly to ensure that the connectors latch into place.

FIGURE 3. Product Controller II ECU Connections



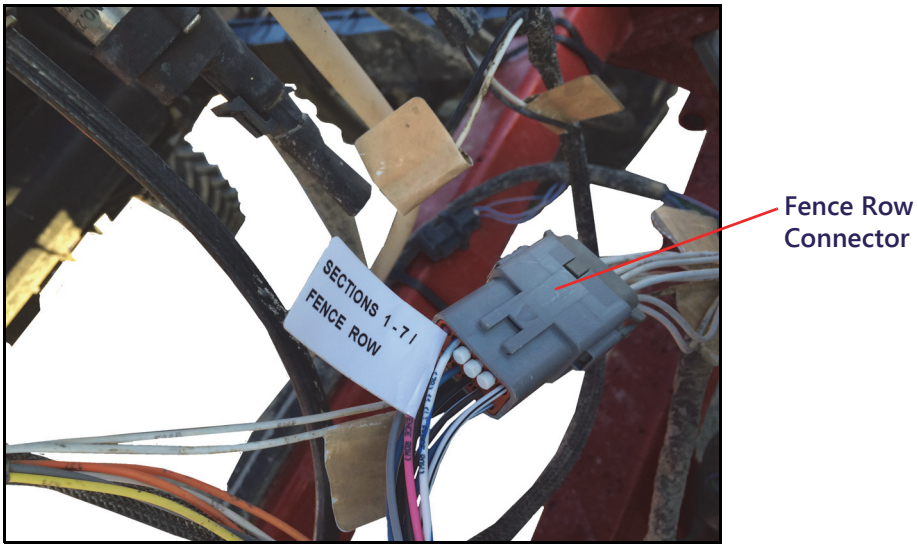
3. Connect the two-pin logic power receptacle and plug to gray connectors on the machine harness.

FIGURE 4. Two-Pin Logic Power



4. Locate the 12-pin gray connector labeled Sections 1-7/ Fence Row and connect it to the machine harness.

FIGURE 5. 12-Pin Fence Row Connector



5. Locate the four-pin plug on the CAN tee cable (115-7303-115) that was routed out of the cab in Section 5.

FIGURE 6. Four-Pin from ECU Harness

6. Connect the right 19-pin plug to the receptacle of the Hawkeye ECU harness (115-7303-115) to the right primary cable receptacle installed in Section 4, Nozzle Control Valve Installation.

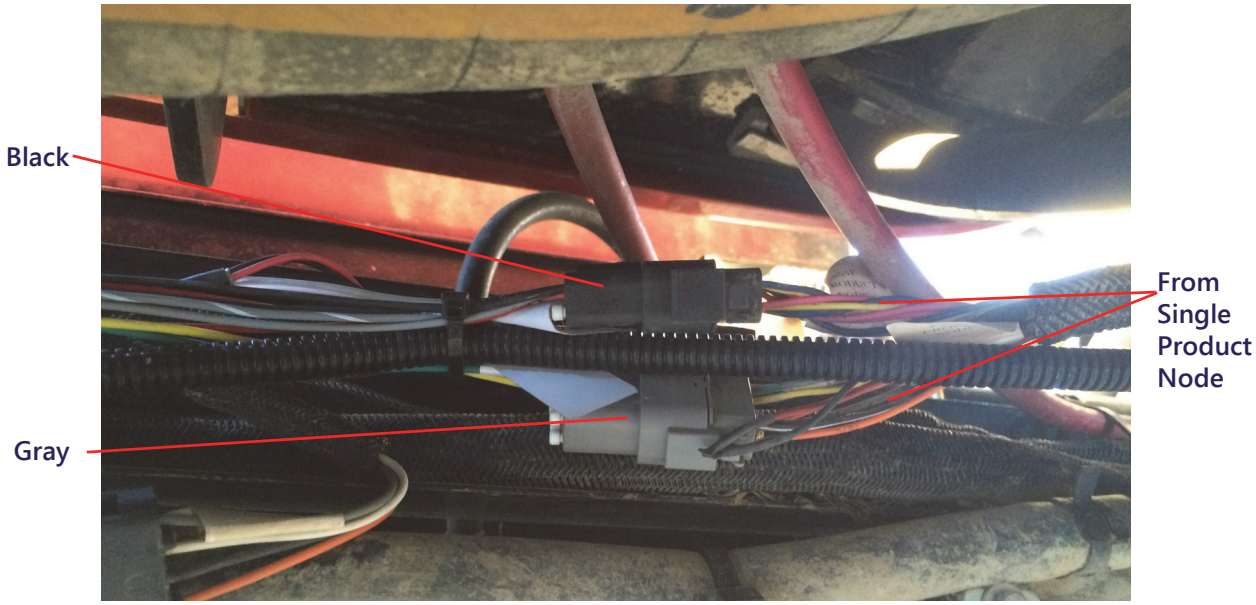
FIGURE 7. Boom Cable Connections

7. Connect the left 19-pin plug to the receptacle of the Hawkeye ECU harness (115-7303-115) to the left primary cable receptacle installed in Section 4, Nozzle Control Valve Installation.
8. Locate the two 12-pin mini deutsch receptacles on the Hawkeye ECU harness (115-7303-083) and route them over the center rack and towards the cab.

NOTE: Follow existing cables and power wires.

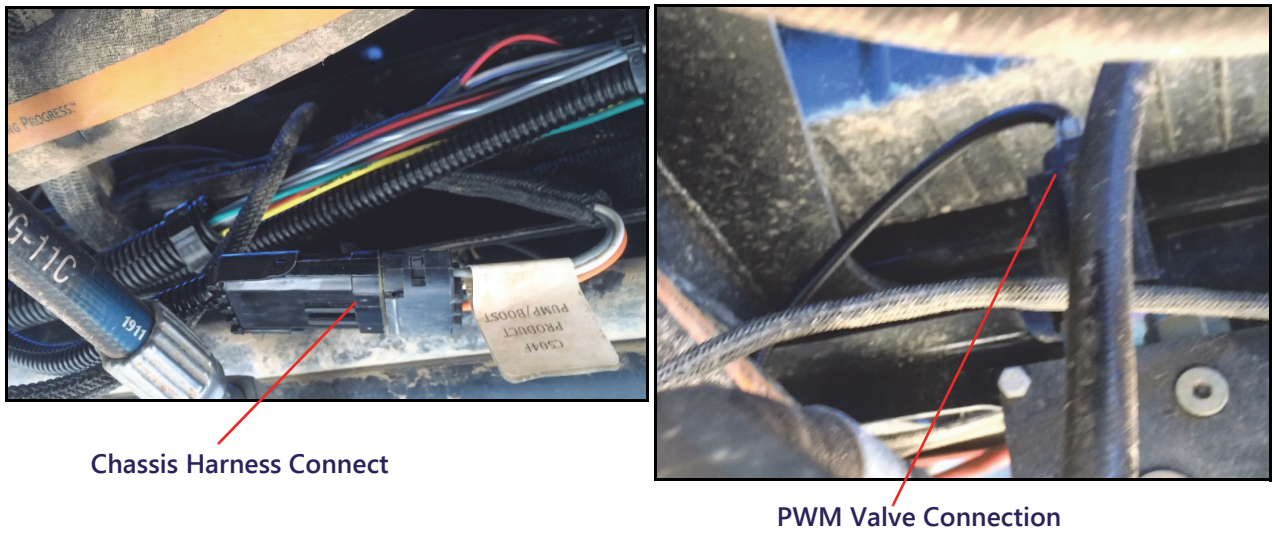
9. Locate and disconnect the existing black and gray single product node connections.
10. Connect the 12-pin mini-deutsch receptacles to the black and gray plugs that were connected to the original single product node.

FIGURE 8. 12-Pin Mini Receptacles



11. Locate the machine boost box located near the single product node.
12. Un-install the boost box from the machine. One end is connected to the PWM valve and the other end is connected to the machine chassis harness.

FIGURE 9. Installed Boost Box



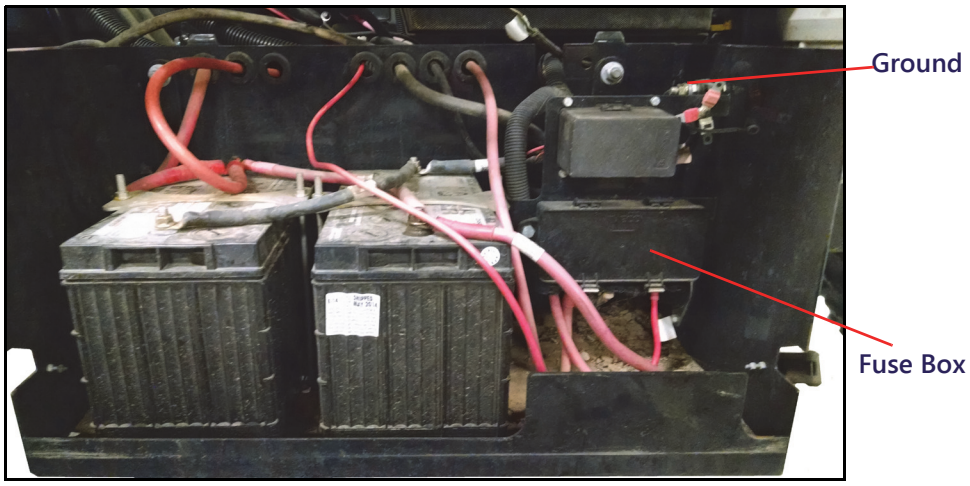
13. Install the 115-7303-146 as a jumper to replace the boost box wiring.

ELECTRICAL CONNECTION

1. Connect the black ground cable from the Hawkeye power cable (115-7303-082) to the main disconnect on the inside of the battery box.

NOTE: You may need to install a 60 Amp fuse.

FIGURE 10. Fuse Box and Ground Installation



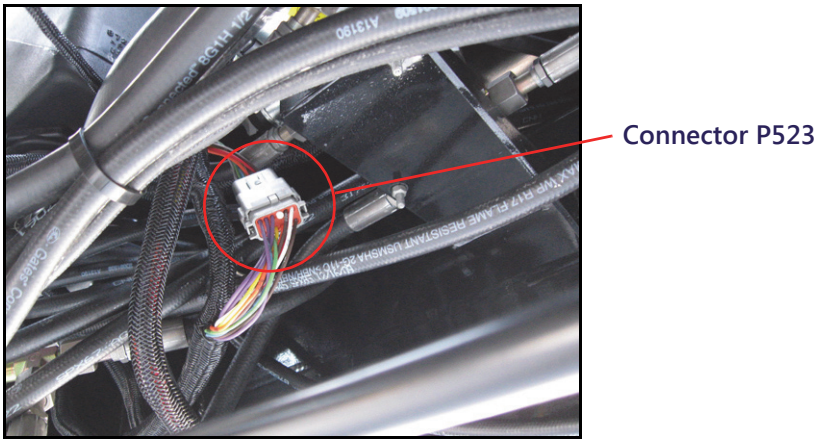
2. Route the Hawkeye power cable to the left frame-rail and towards the rear of the sprayer.

NOTE: Follow existing hoses and wires.

3. Connect the eight-pin plug to the receptacle on the Hawkeye ECU cable (115-7303-083).
4. Connect positive cable from the Hawkeye power cable (115-7303-082) to an available breaker in the breaker box.
5. Secure to the sprayer chassis with cable ties.

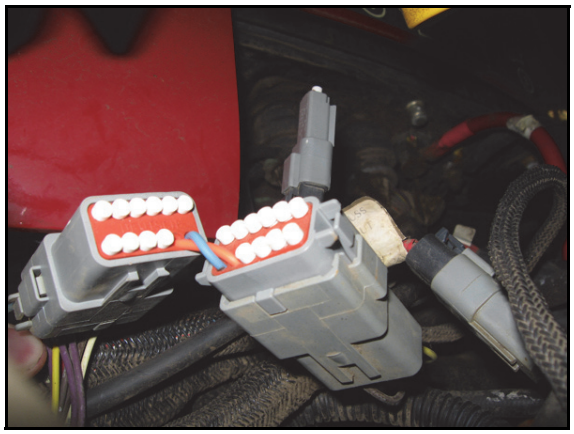
NON-ACCUBOOM MACHINES ONLY - CONNECT THE FENCE ROW NOZZLE

FIGURE 11. Fence Row Nozzle Connection



1. Locate and disconnect the 12-pin Deutsch Case boom cable connection, located directly behind the cab.

FIGURE 12. Fence Row Adapter Cable Installed



2. Connect the fence row adapter cable (P/N 115-1001-048) to the corresponding connections on the machine's harness cable.

APPENDIX

A

CABLE AND CONNECTOR MAINTENANCE

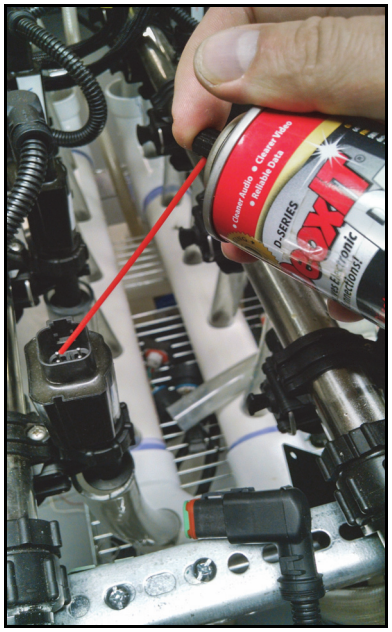
POWER AND ECU HARNESS MAINTENANCE

1. Disconnect the ECU harness connector and inspect for signs of moisture or corrosion.
2. If moisture of corrosion is detected, use Deoxit D5, brushes, and compressed air to clean and dry the connector.
3. When clean, apply a coating of Corrosion X HD to the connector mating surfaces and contacts.
4. Reattach the connectors.

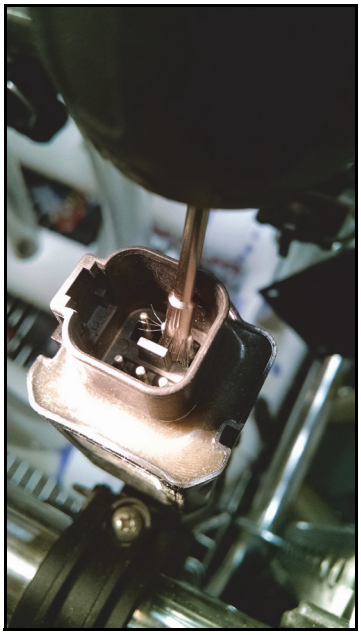
HAWKEYE BOOM HARNESS CONNECTOR MAINTENANCE

Prior to connecting the Hawkeye boom cable to the Hawkeye Nozzle Control Valves (NCV), perform the following steps to all 6-pin NCV connectors and 19-pin circular connectors between the boom cables and ECU cable connections to ensure high quality connections:

1. Verify the NCV connectors and the accompanying boom cable connectors are free of moisture, contamination, or oxidation. Oxidation will appear as a dry, white coating on the contacts. If any connectors show signs of moisture, contamination, or oxidation, perform Step 2 - Step 6. If this is a new installation, skip to Step 7. All components listed below can be ordered in the Hawkeye NCV Connection Maintenance Kit (P/N 117-0171-692).
2. Spray the connection with a deoxidizing agent (DeoxIT D5 is recommended (P/N 222-4001-006)).



3. Clean contacts with a small wire brush (P/N 321-0000-477).

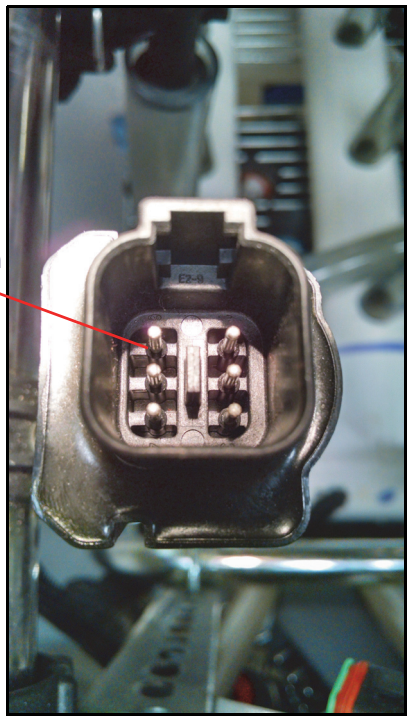


4. Spray the contacts again with the deoxidizing agent. This will rinse out debris.
5. Remove all residue of deoxidizing agent from the connection. Not removing deoxidizing agent can damage the connector seal.
6. Dry out the connection with dry, compressed air. Dust Off Electronics Duster (P/N 222-4001-007) is recommended however, if unavailable, alternate compressed air sources can be used. If using compressed air from a large volume air compressor, be sure the lines are free of moisture.

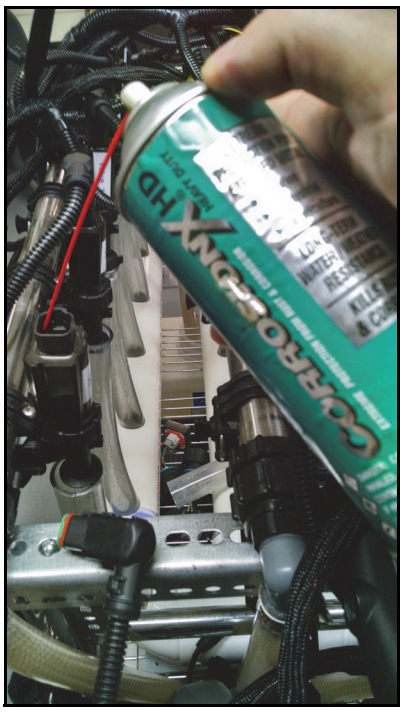
7. If not already applied, apply a single short burst of corrosion inhibitor (Corrosion X HD (Raven P/N 222-0000-020 or available from http://www.corrosionx.com/corrosionx-heavy-duty.html)) into the NCV connection. Be sure the corrosion inhibitor has coated the NCV contacts and recessed portions of the connector.

NOTE: To determine is corrosion inhibitor has been applied, inspect for a thick liquid in the bottom of the connector (as shown in the Corrosion Inhibitor Applied image below).

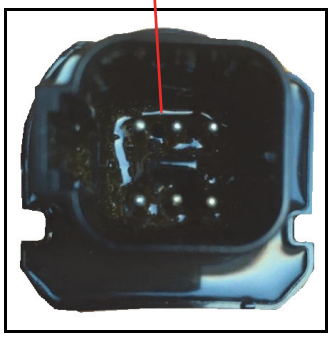
NCV Connector



Applying Corrosion Inhibitor



Corrosion Inhibitor Applied



APPENDIX B RUN SCREEN EXAMPLES

The following images provide examples of run screen configurations. Refer to Viper 4+ Operation manual and the Hawkeye® Operation manual to learn more about available widgets and their function.

FIGURE 1. Viper 4+ Screen Example 1

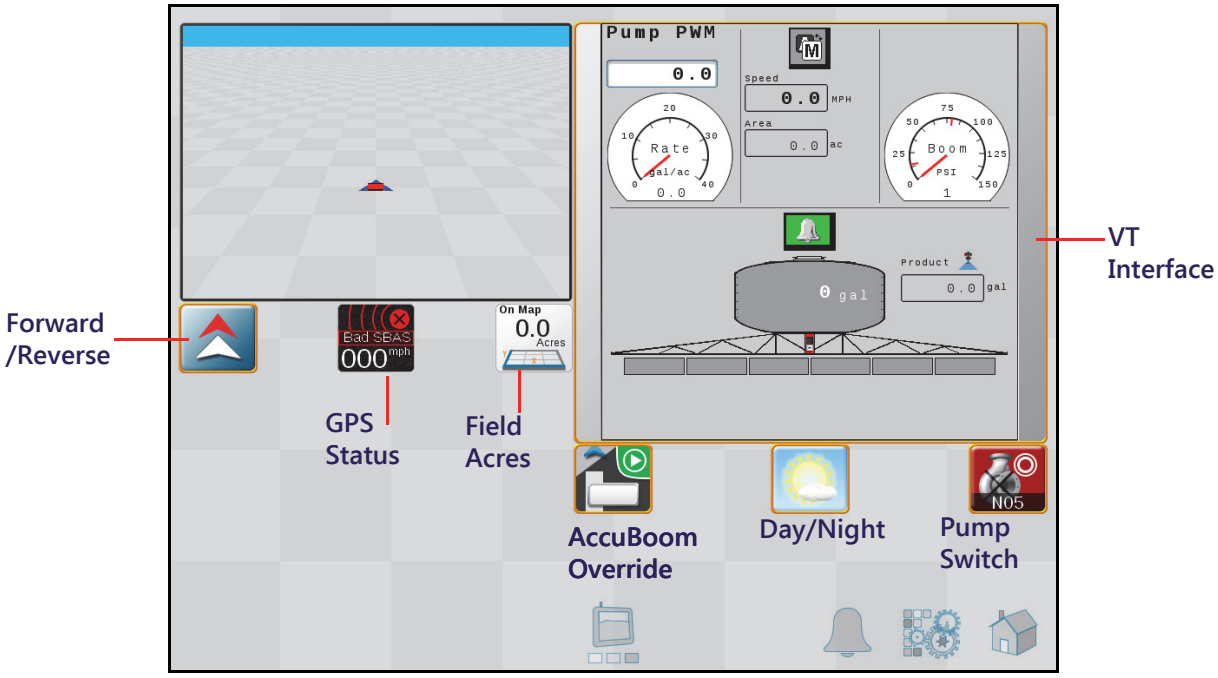
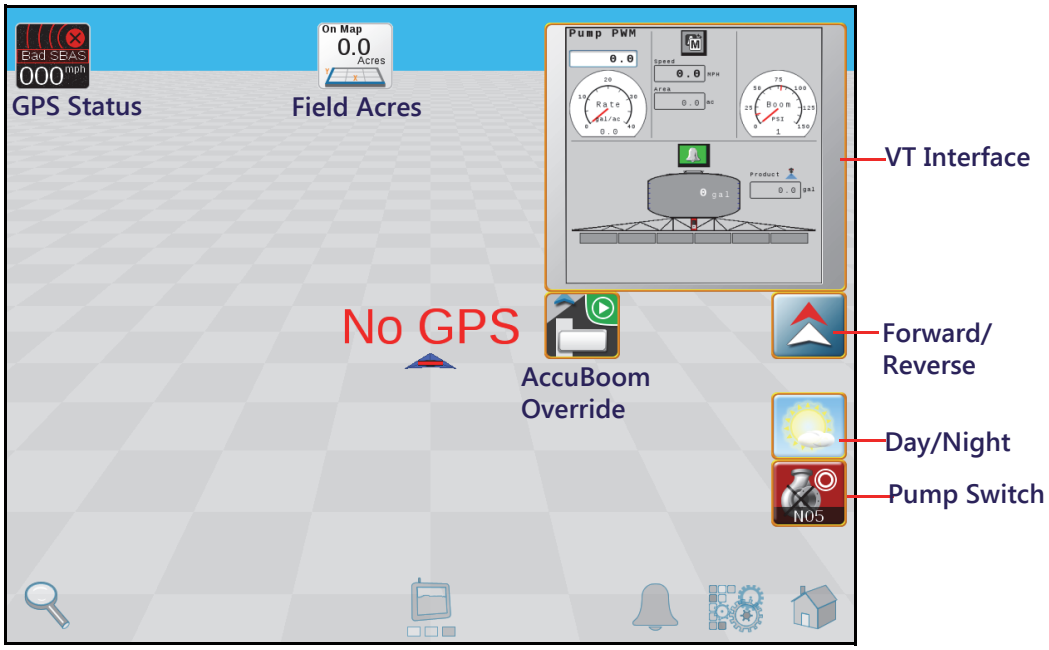


FIGURE 2. Viper 4+ Screen Example 2



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.

016-0171-537 Rev. A, E19889

RAVEN

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.