

# Hawkeye® 2 Installation Manual for Case IH Patriot/Trident (MY 2017 and Newer)

*016-2005-005 Rev. A*

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## SAFETY

### **NOTICE**

Follow the operation and safety instructions included with the implement and/or controller and read this manual carefully before installing or operating this Raven system.

- Follow all safety information presented within this manual. Review implement operation with your local dealer.
- Contact a local Raven dealer for assistance with any portion of the installation, service, or operation of Raven equipment.
- Follow all safety labels affixed to system components. Be sure to keep safety labels in good condition and replace any missing or damaged labels. Contact a local Raven dealer to obtain replacements for safety labels.

Observe the following safety measures when operating the implement after installing this Raven system:

- Do not operate this Raven system or any agricultural equipment while under the influence of alcohol or an illegal substance.
- Be alert and aware of surroundings and remain in the operator seat at all times when operating this Raven system.
  - Do not operate the implement on any public road with this Raven system enabled.
  - Disable this Raven system before exiting the operator seat.
  - Determine and remain a safe working distance from obstacles and bystanders. The operator is responsible for disabling the system when a safe working distance has diminished.
  - Disable this Raven system prior to starting any maintenance work on the implement or components of this Raven system.
- Do not attempt to modify or lengthen any of the system control cables. Extension cables are available from a local Raven dealer.

## **WARNING**

### AGRICULTURAL CHEMICAL SAFETY

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 properly disposing of them. Contact a local environmental agency or recycling center for additional information.

- 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.
- When storing unused agricultural chemicals:
  - Store agricultural chemicals in the original container and do not transfer chemicals to unmarked containers or containers used for food or drink.
  - Store chemicals in a secure, locked area away from human and livestock food.
  - Keep children away from chemical storage areas.
- 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.
- Follow all label instructions for chemical mixing, handling, and disposal.
- Avoid direct contact with agricultural chemicals or inhaling chemical dust or spray particulate. Seek immediate medical attention if symptoms of illness occur during, or soon after, use of agricultural chemicals or products.
- After handling or applying agricultural chemicals:
  - Thoroughly wash hands and face after using agricultural chemicals and before eating, drinking, or using the restroom.
  - 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.

## **CAUTION**

### ELECTRICAL SAFETY

- Always verify that power leads are connected to the correct polarity as marked. Reversing the power leads could cause severe damage to the Raven system or other components.
- To prevent personal injury or fire, replace defective or blown fuses with only fuses of the same type and amperage.
- Do not connect the power leads to the battery until all system components are mounted and all electrical connections are completed.
- Always start the machine before initializing this Raven system to prevent power surges or peak voltage.
- To avoid tripping and entanglement hazards, route cables and harnesses away from walkways, steps, grab bars, and other areas used by the operator or service personnel when operating or servicing the equipment.

### TOUCH SCREEN

- Only touch the touch-screen with your finger or by using a special touch-screen stylus/pen. Operating the touch-screen with sharp objects may cause permanent damage to the screen.
- Only clean the screen using a damp cloth. Never use caustic or other aggressive substances.

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## RECOMMENDATIONS AND BEST PRACTICES

### HARNESS ROUTING

The word “harness” is used to describe any electrical cables and leads, both bundled and unbundled. Use the following guidelines and recommendations when connecting and routing harnesses while installing or maintaining this Raven system:

- Leave protective caps/covers over harness connectors until needed to avoid dirt and moisture from contaminating electrical circuits.
- Secure the harness to the frame or solid structural members at least every 12 in [30 cm].
- Follow existing harness runs already routed on the implement as much as possible. Proper harness routing should:
  - Secure harnessing and prevent the harness from hanging below the implement.
  - Provide sufficient clearance from moving components and operational zones around shafts; universal joints and suspension components; pulleys, gears, belts, and chains; moving linkages, cylinders, articulation joints, etc.
  - Protect harnessing from field debris and surrounding hazards (e.g. tree limbs, fence posts, crop stubble, dirt clumps or rocks that may fall or be thrown by the implement).
  - Protect harnessing from sharp bends, twisting, or flexing over short distances and normal implement operation.
  - Connectors and splices should not be located at bending points or in harness sections that move.
  - Ensure sufficient length for free movement of the implement during normal operation and prevent pulling, pinching, catching, or rubbing, especially in articulation and pivot points. Clamp harnessing securely to force controlled movement of the harness.
  - Avoid abrasive surfaces and sharp edges such as sheared or flame cut corners, fastener threads or cap screw heads, hose clamp ends, etc.
- Do not connect, affix, or allow harnessing to come into contact with components with high vibration forces, hot surfaces, or components carrying hot fluids beyond the temperature rating of harness components.
  - Harnessing should be protected or shielded if routing requires the hose to be exposed to conditions beyond harnessing component specifications.
- Avoid routing harnesses in areas where damage may occur due to build up of material (e.g. dirt, mud, snow, ice, etc.).
- Avoid routing harnesses in areas where the operator or service personnel might step or use as a grab bar.

**IMPORTANT:** Avoid applying direct spray or pressure washing of electrical components and connections. High pressure streams and sprays can penetrate seals, cause corrosion, or otherwise damage electrical components.  
When performing maintenance:

- Inspect electrical components and connectors for corrosion, damaged pins or housings, etc. Repair or replace components or harnessing as necessary.
- Ensure connectors are kept clean and dry. Apply dielectric grease to the sealing surfaces of all connections exposed to moisture, dirt, debris, and other contaminants. Repair or replace harnessing as necessary.
- Clean electrical components with pressurized air, aerosol electrical cleaning agent, or low pressure rinse.
- Remove visible surface water from electrical components and connections using pressurized air or an aerosol cleaning agent. Allow components to dry thoroughly before reconnecting cables.





### MAKE AND MODEL COMPATIBILITY

Hawkeye® 2 is a pressure-based product control system and allows for precise sprayer application over a range of conditions and reduced spray drift. Each nozzle is controlled by an individual pulsing valve giving you a consistent spray pattern as speed and conditions change.

Hawkeye® 2 is built on the ISOBUS communication platform which allows the system to work with most ISO Universal Terminals (UTs) and task controllers, including the Viper® 4.

This manual is intended to provide installation instructions on the following equipment:

TABLE 1. Compatible Equipment Information

Make and Model	Nozzle Spacing	Boom Width	Nozzle Body Type	Kit Number	
Patriot 3330/40 and 4410/ 20/30/40 MY17+ OR Trident 5550	20"	120'	Wilger	117-2005-001	
			Hypro	117-2005-007	
		100'	Wilger	117-2005-002	
			Hypro	117-2005-008	
	10"	120'	Wilger	117-2005-003	
			Wilger	117-2005-004	
	50cm		36m	TeeJet	117-2005-022
			32m		117-2005-224
			27m		117-2005-025
			24m		117-2005-222
30m			117-2005-223		
30m			117-2005-023		
Patriot Class 2					
Patriot Class 3					

## INSTALLATION OVERVIEW

The recommended process for installing the Hawkeye® 2 nozzle control system is as follows:

1. Confirm Hawkeye® 2 kit contents. See “Kit Contents” on page 7.
2. Replace existing strainer with an 80 mesh (or finer) strainer.
3. Remove spray tips and flush each section individually for a minimum of 20 seconds to thoroughly flush the boom.
4. Mount Hawkeye® 2 nozzle control valves.
5. Mount the RCM - Sprayer.
6. Route and connect the inner, mid, and outer boom cables (as applicable).
7. Route and connect chassis and RCM - Sprayer cables.
8. Review the Post-Installation Notes for machine configuration tips.

## REQUIRED COMPONENTS

The following components must be installed with the Hawkeye® 2 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® 2 nozzle control system. A fan or cone style spray tip is required for the Hawkeye® 2 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
- Corrosion X HD
- 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 CONTENTS

FIGURE 1. Hawkeye® 2 Case IH Patriot/Trident MY17+, 120'/20" Boom Kit Components (P/N 117-2005-001 Rev. C)

<b>QTY</b>	<b>PART #</b>	<b>DESCRIPTION</b>
1	053-0159-197	BOX, SHIPPING
1	016-0171-649	SHEET, WARRANTY/HELP (016-0171-638 & 016-0171-714)
1	063-0173-956	RCM, HAWKEYE 2
1	115-2005-077	CABLE, PROD CONTROL, PATRIOT, HAWKEYE 2
1	115-2005-078	CABLE, NCV POWER, PATRIOT, HAWKEYE 2, MY17+
2	115-2005-006	CABLE, MID BOOM, CNH, 120' / 20", HAWKEYE 2
2	115-2005-007	CABLE, OUTER BOOM, CNH, 120' / 20", HAWKEYE 2
1	117-2005-052	KIT, HAWKEYE 2 SYSTEM SERVICE, WILGER
1	107-0172-670	BRACKET, RCM, PATRIOT
1	053-0159-110	ENVELOPE, PLASTIC
1	311-4050-145K	BOLT, HEX, M6-1 X 65MM, GRADE 8, CLASS II COATING
2	311-4070-136K	M6 X 20MM, SOCKET, FLATHEAD, ZINC COATING
2	311-4050-147K	BOLT, HEX, M6-1 X 75MM, GRADE 8, CLASS II COATING
5	312-4000-216	NUT, FLANGED LOCK, M6-1, ZINC COATING
10	313-1000-046	WASHER, M6, ZINC COATING
1	115-2005-005	CABLE, PRIMARY BOOM, CNH, 120' / 20", HAWKEYE 2
1	115-2005-005	CABLE, PRIMARY BOOM, CNH, 120' / 20", HAWKEYE 2
36	063-2005-003	NOZZLE CONTROL VALVE, HAWKEYE 2, WILGER
1	219-2005-116M	O-RING, 38 PACK, SIZE -116, BLACK
36	063-2005-003	NOZZLE CONTROL VALVE, HAWKEYE 2, WILGER
1	219-2005-116M	O-RING, 38 PACK, SIZE -116, BLACK

FIGURE 2. Hawkeye® 2 Case IH Patriot/Trident MY17+, 100'/20" Boom Kit Components (P/N 117-2005-002 Rev. A)

<b>QTY</b>	<b>PART #</b>	<b>DESCRIPTION</b>
1	053-0159-197	BOX, SHIPPING (LABELED BOX 1 OF 5)
1	016-0171-649	SHEET, WARRANTY/HELP (016-0171-638 & 016-0171-714)
1	063-0173-956	RCM, HAWKEYE 2
1	115-2005-077	CABLE, PROD CONTROL, PATRIOT, HAWKEYE 2
1	115-2005-078	CABLE, NCV POWER, PATRIOT, HAWKEYE 2, MY17+
2	115-2005-121	CABLE, MID, CNH, 100'/20", HAWKEYE 2
2	115-2005-122	CABLE, OUTER, CNH, 100'/20", HAWKEYE 2
1	117-2005-052	KIT, HAWKEYE 2 SYSTEM SERVICE, WILGER
1	107-0172-670	BRACKET, RCM, PATRIOT
1	053-0159-110	ENVELOPE, PLASTIC
1	311-4050-145K	BOLT, HEX, M6-1 X 65MM, GRADE 8, CLASS II COATING
2	311-4070-136K	M6 X 20MM, SOCKET, FLATHEAD, ZINC COATING
2	311-4050-147K	BOLT, HEX, M6-1 X 75MM, GRADE 8, CLASS II COATING
5	312-4000-216	NUT, FLANGED LOCK, M6-1, ZINC COATING
10	313-1000-046	WASHER, M6, ZINC COATING
1	115-2005-120	(LABELED BOX 2 OF 5) CABLE, INNER, CNH, 100'/20", HAWKEYE 2
1	115-2005-120	(LABELED BOX 3 OF 5) CABLE, INNER, CNH, 100'/20", HAWKEYE 2
36	063-2005-003	(LABELED BOX 4 OF 5) NOZZLE CONTROL VALVE, HAWKEYE 2, WILGER
1	219-2005-116M	O-RING, 38 PACK, SIZE -116, BLACK
24	063-2005-003	(LABELED BOX 5 OF 5) NOZZLE CONTROL VALVE, HAWKEYE 2, WILGER
1	053-0159-110	ENVELOPE, PLASTIC
25	219-2005-116	O-RING, BLACK, SIZE -116, SINGLE

FIGURE 3. Hawkeye® 2 Case IH Patriot/Trident MY17+, 90'/20" Boom Kit Components (P/N 117-2005-003 Rev. A)

<b>QTY</b>	<b>PART #</b>	<b>DESCRIPTION</b>
1	053-0159-197	BOX, SHIPPING (LABELED BOX 1 OF 6)
1	016-0171-649	SHEET, WARRANTY/HELP (016-0171-638 & 016-0171-714)
1	063-0173-956	RCM, HAWKEYE 2
1	115-2005-077	CABLE, PROD CONTROL, PATRIOT, HAWKEYE 2
1	115-2005-078	CABLE, NCV POWER, PATRIOT, HAWKEYE 2, MY17+
2	115-2005-121	CABLE, MID, CNH, 100' / 20", HAWKEYE 2
2	115-2005-206	CABLE, OUTER, CNH, 90' / 20", HAWKEYE 2
1	117-2005-052	KIT, HAWKEYE 2 SYSTEM SERVICE, WILGER
1	107-0172-670	BRACKET, RCM, PATRIOT
1	053-0159-110	ENVELOPE, PLASTIC
1	311-4050-145K	BOLT, HEX, M6-1 X 65MM, GRADE 8, CLASS II COATING
2	311-4070-136K	M6 X 20MM, SOCKET, FLATHEAD, ZINC COATING
2	311-4050-147K	BOLT, HEX, M6-1 X 75MM, GRADE 8, CLASS II COATING
5	312-4000-216	NUT, FLANGED LOCK, M6-1, ZINC COATING
10	313-1000-046	WASHER, M6, ZINC COATING
1	115-2005-120	(LABELED BOX 2 OF 6) CABLE, INNER, CNH, 100' / 20", HAWKEYE 2
1	115-2005-120	(LABELED BOX 3 OF 6) CABLE, INNER, CNH, 100' / 20", HAWKEYE 2
36	063-2005-003	(LABELED BOX 4 OF 6) NOZZLE CONTROL VALVE, HAWKEYE 2, WILGER
1	219-2005-116M	O-RING, 38 PACK, SIZE -116, BLACK
1	053-0159-291	BOX, SHIPPING (LABELED BOX 5 OF 6)
2	053-0159-292	INSERT, DIVIDER SHEET
1	053-0159-293	INSERT, 14 PCS DIVIDER
14	063-2005-003	NOZZLE CONTROL VALVE, HAWKEYE 2, WILGER
20	219-2005-116	O-RING, BLACK, SIZE -116, SINGLE
1	053-0159-106	BOX, SHIPPING (LABELED BOX 6 OF 6)
4	063-2005-003	NOZZLE CONTROL VALVE, HAWKEYE 2, WILGER

FIGURE 4. Hawkeye® 2 Case IH Patriot/Trident MY17+, 120'/10" Boom Kit Components (P/N 117-2005-004 Rev. A)

<b>QTY</b>	<b>PART #</b>	<b>DESCRIPTION</b>
1	053-0159-197	BOX, SHIPPING (LABELED BOX 1 OF 7)
1	016-0171-649	SHEET, WARRANTY/HELP
1	063-0173-956	RCM, HAWKEYE 2
1	115-2005-077	CABLE, PROD CONTROL, CENTER SECTION, PATRIOT, HAWKEYE 2
1	115-2005-078	CABLE, NCV POWER, PATRIOT, HAWKEYE 2, MY17+
2	115-2005-127	CABLE, MID BOOM, CNH, 120' / 10", HAWKEYE 2
2	115-2005-128	CABLE, OUTER BOOM, CNH, 120' / 10", HAWKEYE 2
1	117-2005-052	KIT, HAWKEYE 2 SYSTEM SERVICE, WILGER
1	107-0172-670	BRACKET, RCM, PATRIOT
1	053-0159-110	ENVELOPE, PLASTIC
1	311-4078-146	M6 X 70MM, SOCKET, BUTTONHEAD, 304 SS
2	311-4073-136	M6 X 20MM, SOCKET, FLATHEAD, 304 SS
2	311-4078-148	M6 X 80MM, SOCKET, BUTTONHEAD, 304 SS
5	312-6001-019	NUT, M6, NYLOCK, 304 SS
10	313-6000-011	WASHER, M6, FLAT, 304 SS
1	115-2005-126	(LABELED BOX 2 OF 7) CABLE, INNER BOOM, CNH, 120' / 10", HAWKEYE 2
1	115-2005-126	(LABELED BOX 3 OF 7) CABLE, INNER BOOM, CNH, 120' / 10", HAWKEYE 2
36 1	063-2005-003 219-2005-116M	(LABELED BOX 4 OF 7) NOZZLE CONTROL VALVE, HAWKEYE 2, WILGER O-RING, 38 PACK, SIZE -116, BLACK
36 1	063-2005-003 219-2005-116M	(LABELED BOX 5 OF 7) NOZZLE CONTROL VALVE, HAWKEYE 2, WILGER O-RING, 38 PACK, SIZE -116, BLACK
36 1	063-2005-003 219-2005-116M	(LABELED BOX 6 OF 7) NOZZLE CONTROL VALVE, HAWKEYE 2, WILGER O-RING, 38 PACK, SIZE -116, BLACK
36 1	063-2005-003 219-2005-116M	(LABELED BOX 7 OF 7) NOZZLE CONTROL VALVE, HAWKEYE 2, WILGER O-RING, 38 PACK, SIZE -116, BLACK

FIGURE 5. Hawkeye® 2 Case IH Patriot/Trident MY17+, 120'/20" Boom Kit Components (P/N 117-2005-007 Rev. A)

<b>QTY</b>	<b>PART #</b>	<b>DESCRIPTION</b>
1	053-0159-197	BOX, SHIPPING
1	016-0171-649	SHEET, WARRANTY/HELP (016-0171-638 & 016-0171-714)
1	063-0173-956	RCM, HAWKEYE 2
1	115-2005-077	CABLE, PROD CONTROL, PATRIOT, HAWKEYE 2
1	115-2005-078	CABLE, NCV POWER, PATRIOT, HAWKEYE 2, MY17+
2	115-2005-006	CABLE, MID BOOM, CNH, 120' / 20", HAWKEYE 2
2	115-2005-007	CABLE, OUTER BOOM, CNH, 120' / 20", HAWKEYE 2
1	117-2005-051	KIT, HAWKEYE 2 SYSTEM SERVICE, ARAG/HYPRO
1	107-0172-670	BRACKET, RCM, PATRIOT
1	053-0159-110	ENVELOPE, PLASTIC
1	311-4050-145K	BOLT, HEX, M6-1 X 65MM, GRADE 8, CLASS II COATING
2	311-4070-136K	M6 X 20MM, SOCKET, FLATHEAD, ZINC COATING
2	311-4050-147K	BOLT, HEX, M6-1 X 75MM, GRADE 8, CLASS II COATING
5	312-4000-216	NUT, FLANGED LOCK, M6-1, ZINC COATING
10	313-1000-046	WASHER, M6, ZINC COATING
1	115-2005-005	CABLE, PRIMARY BOOM, CNH, 120' / 20", HAWKEYE 2
1	115-2005-005	CABLE, PRIMARY BOOM, CNH, 120' / 20", HAWKEYE 2
36	063-2005-002	NOZZLE CONTROL VALVE, HAWKEYE 2, ARAG/HYPRO
1	219-2005-115M	O-RING, VITON, BLUE, SIZE -115, 38 PACK
36	063-2005-002	NOZZLE CONTROL VALVE, HAWKEYE 2, ARAG/HYPRO
1	219-2005-115M	O-RING, VITON, BLUE, SIZE -115, 38 PACK

FIGURE 6. Hawkeye® 2 Case IH Patriot/Trident MY17+, 100'/20" Boom Kit Components (P/N 117-2005-008 Rev. A)

<b>QTY</b>	<b>PART #</b>	<b>DESCRIPTION</b>
1	053-0159-197	BOX, SHIPPING (LABELED BOX 1 OF 5)
1	016-0171-649	SHEET, WARRANTY/HELP (016-0171-638 & 016-0171-714)
1	063-0173-956	RCM, HAWKEYE 2
1	115-2005-077	CABLE, PROD CONTROL, PATRIOT, HAWKEYE 2
1	115-2005-078	CABLE, NCV POWER, PATRIOT, HAWKEYE 2, MY17+
2	115-2005-121	CABLE, MID, CNH, 100'/20", HAWKEYE 2
2	115-2005-122	CABLE, OUTER, CNH, 100'/20", HAWKEYE 2
1	117-2005-051	KIT, HAWKEYE 2 SYSTEM SERVICE, ARAG/HYPRO
1	107-0172-670	BRACKET, RCM, PATRIOT
1	053-0159-110	ENVELOPE, PLASTIC
1	311-4050-145K	BOLT, HEX, M6-1 X 65MM, GRADE 8, CLASS II COATING
2	311-4070-136K	M6 X 20MM, SOCKET, FLATHEAD, ZINC COATING
2	311-4050-147K	BOLT, HEX, M6-1 X 75MM, GRADE 8, CLASS II COATING
5	312-4000-216	NUT, FLANGED LOCK, M6-1, ZINC COATING
10	313-1000-046	WASHER, M6, ZINC COATING
1	115-2005-120	(LABELED BOX 2 OF 5) CABLE, INNER, CNH, 100'/20", HAWKEYE 2
1	115-2005-120	(LABELED BOX 3 OF 5) CABLE, INNER, CNH, 100'/20", HAWKEYE 2
36	063-2005-002	(LABELED BOX 4 OF 5) NOZZLE CONTROL VALVE, HAWKEYE 2, ARAG/HYPRO
1	219-2005-115M	O-RING, VITON, BLUE, SIZE -115, 38 PACK
24	063-2005-002	(LABELED BOX 5 OF 5) NOZZLE CONTROL VALVE, HAWKEYE 2, ARAG/HYPRO
1	053-0159-110	ENVELOPE, PLASTIC
25	219-2005-115	O-RING, VITON, BLUE, SIZE -115, SINGLE



FIGURE 7. Hawkeye® 2 Case IH Patriot/Trident MY17+, 36m/50cm Boom Kit Components (P/N 117-2005-022 Rev. A)

<b>QTY</b>	<b>PART #</b>	<b>DESCRIPTION</b>
1	053-0159-197	BOX, SHIPPING (LABELED BOX 1 OF 5)
1	063-0173-956	RCM, HAWKEYE 2
1	115-2005-077	CABLE, PROD CONTROL, PATRIOT, HAWKEYE 2
1	115-2005-078	CABLE, NCV POWER, PATRIOT, HAWKEYE 2, MY17+
2	115-2005-297	CABLE, MID, CNH LATAM, 36M/50cm, HAWKEYE 2
2	115-2005-007	CABLE, OUTER BOOM, CNH, 120' / 20", HAWKEYE 2
1	117-2005-050	KIT, HAWKEYE 2 SYSTEM SERVICE, TEEJET
1	107-0172-670	BRACKET, RCM, PATRIOT
1	053-0159-110	ENVELOPE, PLASTIC
1	311-4050-145K	BOLT, HEX, M6-1 X 65MM, GRADE 8, CLASS II COATING
2	311-4070-136K	M6 X 20MM, SOCKET, FLATHEAD, ZINC COATING
2	311-4050-147K	BOLT, HEX, M6-1 X 75MM, GRADE 8, CLASS II COATING
5	312-4000-216	NUT, FLANGED LOCK, M6-1, ZINC COATING
10	313-1000-046	WASHER, M6, ZINC COATING
1	053-0159-015	ENVELOPE, PLASTIC
1	016-0171-649	SHEET, WARRANTY/HELP (016-0171-638 & 016-0171-714)
1	115-2005-296	(LABELED BOX 2 OF 5) CABLE, INNER, 36M/50cm, CNH LATAM, HAWKEYE 2
1	115-2005-296	(LABELED BOX 3 OF 5) CABLE, INNER, 36M/50cm, CNH LATAM, HAWKEYE 2
36	063-2005-001	(LABELED BOX 4 OF 5) NOZZLE CONTROL VALVE, HAWKEYE 2, TEEJET
1	219-2005-116M	O-RING, 38 PACK, SIZE -116, BLACK
1	219-2005-115M	O-RING, 38 PACK, SIZE -115, PURPLE
36	063-2005-001	(LABELED BOX 5 OF 5) NOZZLE CONTROL VALVE, HAWKEYE 2, TEEJET
1	219-2005-116M	O-RING, 38 PACK, SIZE -116, BLACK
1	219-2005-115M	O-RING, 38 PACK, SIZE -115, PURPLE

FIGURE 8. Hawkeye® 2 Case IH Patriot/Trident MY17+, 30m/50cm Boom Kit Components (P/N 117-2005-023 Rev. A)

<b>QTY</b>	<b>PART #</b>	<b>DESCRIPTION</b>
1	053-0159-197	BOX, SHIPPING (LABELED BOX 1 OF 5)
1	016-0171-649	SHEET, WARRANTY/HELP (016-0171-638 & 016-0171-714)
1	063-0173-956	RCM, HAWKEYE 2
1	115-2005-077	CABLE, PROD CONTROL, PATRIOT, HAWKEYE 2
1	115-2005-078	CABLE, NCV POWER, PATRIOT, HAWKEYE 2, MY17+
2	115-2005-121	CABLE, MID, CNH, 100' / 20", HAWKEYE 2
2	115-2005-122	CABLE, OUTER, CNH, 100' / 20", HAWKEYE 2
1	117-2005-050	KIT, HAWKEYE 2 SYSTEM SERVICE, TEEJET
1	107-0172-670	BRACKET, RCM, PATRIOT
1	053-0159-110	ENVELOPE, PLASTIC
1	311-4050-145K	BOLT, HEX, M6-1 X 65MM, GRADE 8, CLASS II COATING
2	311-4070-136K	M6 X 20MM, SOCKET, FLATHEAD, ZINC COATING
2	311-4050-147K	BOLT, HEX, M6-1 X 75MM, GRADE 8, CLASS II COATING
5	312-4000-216	NUT, FLANGED LOCK, M6-1, ZINC COATING
10	313-1000-046	WASHER, M6, ZINC COATING
1	115-2005-120	(LABELED BOX 2 OF 5) CABLE, INNER, CNH, 100' / 20", HAWKEYE 2
1	115-2005-120	(LABELED BOX 3 OF 5) CABLE, INNER, CNH, 100' / 20", HAWKEYE 2
36	063-2005-001	(LABELED BOX 4 OF 5) NOZZLE CONTROL VALVE, HAWKEYE 2, TEEJET
1	219-2005-116M	O-RING, 38 PACK, SIZE -116, BLACK
1	219-2005-115M	O-RING, 38 PACK, SIZE -115, PURPLE
36	063-2005-001	(LABELED BOX 5 OF 5) NOZZLE CONTROL VALVE, HAWKEYE 2, TEEJET
1	053-0159-110	ENVELOPE, PLASTIC
25	219-2005-116	O-RING, BLACK, SIZE -116, SINGLE
25	219-2005-115	O-RING, SIZE -115, PURPLE, SINGLE

FIGURE 9. Hawkeye® 2 Case IH Patriot/Trident MY17+, 90'/20" TeeJet Boom Kit Components (P/N 117-2005-025 Rev. A)

<b>QTY</b>	<b>PART #</b>	<b>DESCRIPTION</b>
1	053-0159-197	BOX, SHIPPING (LABELED BOX 1 OF 6)
1	016-0171-649	SHEET, WARRANTY/HELP (016-0171-638 & 016-0171-714)
1	063-0173-956	RCM, HAWKEYE 2
1	115-2005-077	CABLE, PROD CONTROL, PATRIOT, HAWKEYE 2
1	115-2005-078	CABLE, NCV POWER, PATRIOT, HAWKEYE 2, MY17+
2	115-2005-121	CABLE, MID, CNH, 100' / 20", HAWKEYE 2
2	115-2005-206	CABLE, OUTER, CNH, 90' / 20", HAWKEYE 2
1	117-2005-050	KIT, HAWKEYE 2 SYSTEM SERVICE, TEEJET
1	107-0172-670	BRACKET, RCM, PATRIOT
1	053-0159-110	ENVELOPE, PLASTIC
1	311-4050-145K	BOLT, HEX, M6-1 X 65MM, GRADE 8, CLASS II COATING
2	311-4070-136K	M6 X 20MM, SOCKET, FLATHEAD, ZINC COATING
2	311-4050-147K	BOLT, HEX, M6-1 X 75MM, GRADE 8, CLASS II COATING
5	312-4000-216	NUT, FLANGED LOCK, M6-1, ZINC COATING
10	313-1000-046	WASHER, M6, ZINC COATING
1	115-2005-120	(LABELED BOX 2 OF 6) CABLE, INNER, CNH, 100' / 20", HAWKEYE 2
1	115-2005-120	(LABELED BOX 3 OF 6) CABLE, INNER, CNH, 100' / 20", HAWKEYE 2
36	063-2005-001	(LABELED BOX 4 OF 6) NOZZLE CONTROL VALVE, HAWKEYE 2, TEEJET
1	219-2005-116M	O-RING, 38 PACK, SIZE -116, BLACK
1	053-0159-291	BOX, SHIPPING (LABELED BOX 5 OF 6)
2	053-0159-292	INSERT, DIVIDER SHEET
1	053-0159-293	INSERT, 14 PCS DIVIDER
14	063-2005-001	NOZZLE CONTROL VALVE, HAWKEYE 2, TEEJET
20	219-2005-115	O-RING, PURPLE, SIZE -115, SINGLE
20	219-2005-116	O-RING, BLACK, SIZE -116, SINGLE
1	053-0159-106	BOX, SHIPPING (LABELED BOX 6 OF 6)
4	063-2005-001	NOZZLE CONTROL VALVE, HAWKEYE 2, TEEJET

FIGURE 10. Hawkeye® 2 Case IH Patriot/Trident MY17+, 24m/50cm Boom Kit Components (P/N 117-2005-222 Rev. A)

QTY	PART #	DESCRIPTION
1	053-0159-197	BOX, SHIPPING (LABELED BOX 1 OF 5)
1	016-0171-649	SHEET, WARRANTY/HELP
1	063-0173-956	RCM, HAWKEYE 2
1	115-2005-077	CABLE, PROD CONTROL, PATRIOT, HAWKEYE 2
1	115-2005-078	CABLE, NCV POWER, PATRIOT, HAWKEYE 2, MY17+
2	115-2005-330	CABLE, MID, CNH, 24M/50CM, HAWKEYE 2
2	115-2005-322	CABLE, OUTER, CNH, 24M/50CM, HAWKEYE 2
1	117-2005-050	KIT, HAWKEYE 2 SYSTEM SERVICE, TEEJET
1	107-0172-670	BRACKET, RCM, PATRIOT
1	053-0159-110	ENVELOPE, PLASTIC
1	311-4050-145K	BOLT, HEX, M6-1 X 65MM, GRADE 8, CLASS II COATING
2	311-4070-136K	M6 X 20MM, SOCKET, FLATHEAD, ZINC COATING
2	311-4050-147K	BOLT, HEX, M6-1 X 75MM, GRADE 8, CLASS II COATING
5	312-4000-216	NUT, FLANGED LOCK, M6-1, ZINC COATING
10	313-1000-046	WASHER, M6, ZINC COATING
1	115-2005-120	(LABELED BOX 2 OF 5) CABLE, INNER, CNH, 100' / 20", HAWKEYE 2
1	115-2005-120	(LABELED BOX 3 OF 5) CABLE, INNER, CNH, 100' / 20", HAWKEYE 2
36	063-2005-001	(LABELED BOX 4 OF 5) NOZZLE CONTROL VALVE, HAWKEYE 2, TEEJET
1	219-2005-116M	O-RING, 38 PACK, SIZE -116, BLACK
1	219-2005-115M	O-RING, 38 PACK, SIZE -115, PURPLE
1	053-0159-291	(LABELED BOX 5 OF 5) BOX, SHIPPING
2	053-0159-292	INSERT, DIVIDER SHEET
1	053-0159-293	INSERT, 14 PCS DIVIDER
12	063-2005-001	NOZZLE CONTROL VALVE, HAWKEYE 2, TEEJET
1	053-0159-110	ENVELOPE, PLASTIC
13	219-2005-116	O-RING, BLACK, SIZE -116, SINGLE
1	053-0159-110	ENVELOPE, PLASTIC
13	219-2005-115	O-RING, PURPLE, SIZE -115, SINGLE

FIGURE 11. Hawkeye® 2 Case IH Patriot/Trident MY17+, 30m/50cm Boom Kit Components (P/N 117-2005-223 Rev. A)

<b>QTY</b>	<b>PART #</b>	<b>DESCRIPTION</b>
1	053-0159-197	BOX, SHIPPING (LABELED BOX 1 OF 5)
1	016-0171-649	SHEET, WARRANTY/HELP
1	063-0173-956	RCM, HAWKEYE 2
1	115-2005-077	CABLE, PROD CONTROL, PATRIOT, HAWKEYE 2
1	115-2005-078	CABLE, NCV POWER, PATRIOT, HAWKEYE 2, MY17+
2	115-2005-121	CABLE, MID, CNH, 100'/20", HAWKEYE 2
2	115-2005-329	CABLE, OUTER, CNH, 30M/50CM, HAWKEYE 2
1	117-2005-050	KIT, HAWKEYE 2 SYSTEM SERVICE, TEEJET
1	107-0172-670	BRACKET, RCM, PATRIOT
1	053-0159-110	ENVELOPE, PLASTIC
1	311-4050-145K	BOLT, HEX, M6-1 X 65MM, GRADE 8, CLASS II COATING
2	311-4070-136K	M6 X 20MM, SOCKET, FLATHEAD, ZINC COATING
2	311-4050-147K	BOLT, HEX, M6-1 X 75MM, GRADE 8, CLASS II COATING
5	312-4000-216	NUT, FLANGED LOCK, M6-1, ZINC COATING
10	313-1000-046	WASHER, M6, ZINC COATING
1	115-2005-120	(LABELED BOX 2 OF 5) CABLE, INNER, CNH, 100' / 20", HAWKEYE 2
1	115-2005-120	(LABELED BOX 3 OF 5) CABLE, INNER, CNH, 100' / 20", HAWKEYE 2
36	063-2005-001	(LABELED BOX 4 OF 5) NOZZLE CONTROL VALVE, HAWKEYE 2, TEEJET
1	219-2005-116M	O-RING, 38 PACK, SIZE -116, BLACK
1	219-2005-115M	O-RING, 38 PACK, SIZE -115, PURPLE
24	063-2005-001	(LABELED BOX 5 OF 5) NOZZLE CONTROL VALVE, HAWKEYE 2, TEEJET
1	053-0159-110	ENVELOPE, PLASTIC
25	219-2005-116	O-RING, BLACK, SIZE -116, SINGLE
1	053-0159-110	ENVELOPE, PLASTIC
25	219-2005-115	O-RING, PURPLE, SIZE -115, SINGLE

FIGURE 12. Hawkeye® 2 Case IH Patriot/Trident MY17+, 32m/50cm Boom Kit Components (P/N 117-2005-224 Rev. A)

<b>QTY</b>	<b>PART #</b>	<b>DESCRIPTION</b>
1	053-0159-197	BOX, SHIPPING (LABELED BOX 1 OF 5)
1	063-0173-956	RCM, HAWKEYE 2
1	115-2005-077	CABLE, PROD CONTROL, PATRIOT, HAWKEYE 2
1	115-2005-078	CABLE, NCV POWER, PATRIOT, HAWKEYE 2, MY17+
2	115-2005-121	CABLE, MID, CNH LATAM, 32M/50CM, HAWKEYE 2
2	115-2005-301	CABLE, OUTER BOOM, CNH, 32M/50CM, HAWKEYE 2
1	117-2005-050	KIT, HAWKEYE 2 SYSTEM SERVICE, TEEJET
1	107-0172-670	BRACKET, RCM, PATRIOT
1	053-0159-110	ENVELOPE, PLASTIC
1	311-4050-145K	BOLT, HEX, M6-1 X 65MM, GRADE 8, CLASS II COATING
2	311-4070-136K	M6 X 20MM, SOCKET, FLATHEAD, ZINC COATING
2	311-4050-147K	BOLT, HEX, M6-1 X 75MM, GRADE 8, CLASS II COATING
5	312-4000-216	NUT, FLANGED LOCK, M6-1, ZINC COATING
10	313-1000-046	WASHER, M6, ZINC COATING
1	053-0159-015	ENVELOPE, PLASTIC
1	016-0171-649	SHEET, WARRANTY/HELP
1	115-2005-120	(LABELED BOX 2 OF 5) CABLE, INNER, 80'-100'/20", CNH, HAWKEYE 2
1	115-2005-120	(LABELED BOX 3 OF 5) CABLE, INNER, 80'-100'/20", CNH, HAWKEYE 2
36	063-2005-001	(LABELED BOX 4 OF 5) NOZZLE CONTROL VALVE, HAWKEYE 2, TEEJET
1	219-2005-116M	O-RING, 38 PACK, SIZE -116, BLACK
1	219-2005-115M	O-RING, 38 PACK, SIZE -115, PURPLE
28	063-2005-001	(LABELED BOX 5 OF 5) NOZZLE CONTROL VALVE, HAWKEYE 2, TEE JET
1	053-0159-110	ENVELOPE, PLASTIC
29	219-2005-115	O-RING, PURPLE, SIZE -115, SINGLE
1	053-0159-110	ENVELOPE, PLASTIC
29	219-2005-116	O-RING, BLACK, SIZE -116, SINGLE

TABLE 2. Hawkeye® 2 Service Kit Components for Wilger Nozzle Bodies (P/N 117-2005-052)

Picture	Item Description	Part Number	Quantity
	Valve, Wilger Hawkeye® 2 Nozzle Control	063-2005-003	1
Not Pictured	Kit, Wilger Hawkeye® 2 Valve Seal	117-2005-062	3
Not Pictured	Cable, Hawkeye® 2 8-pin Ampseal Jumper	115-2005-070B	2
Not Pictured	O-Ring, Size -116 Black Viton (Single)	219-2005-116	1
Not Pictured	Tool, Hawkeye® 2 Universal	321-0000-490	2
Not Pictured	Relay, SPST Micro 12V N.O. 280 SRS	415-1001-020	2
Not Pictured	Fuse, Mini-Blade Type 15 Amp	510-1003-041	2

## UPDATES

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

[www.ravenhelp.com](http://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](mailto:techwriting@ravenind.com)

- Hawkeye® 2 Installation Manual for Case IH Patriot/Trident (MY 2017 and Newer)
- 016-2005-005 Rev. A
- 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.





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Perform the following procedure to prepare the implement for installation of the Hawkeye® 2 nozzle control system.

	<p><b>⚠ CAUTION</b></p> <p>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.</p>
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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® 2 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



Cap and Diaphragm  
Removed

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# CHAPTER

# 4

# HAWKEYE® 2 NCV AND BOOM CABLE INSTALLATION

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## HAWKEYE® 2 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® 2 nozzle control valve to the straight nozzle port to avoid excessive pressure drop across the nozzle.

### NOZZLE CONTROL VALVE 2 INSTALLATION

1. Locate the Hawkeye® 2 NCVs and the O-rings provided with the kit.

NOTE: Wilger NCV2 and nozzle body will use the black-colored (size 116) O-rings (P/N 219-2005-116)

2. Place the O-ring on the face of the stainless valve body of the NCV2 and press the O-ring into place in the outer groove as shown in below.

FIGURE 1. Hawkeye® 2 NCV Installation

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3. Remove the diaphragm check valve from the threaded port of each nozzle body as needed.
4. Align the NCV2 with the port of the nozzle body while being careful not to lose the O-ring.

NOTE: On Wilger nozzle bodies, the NCV2 should always be located on the port closest to the wet boom tube unless interferences do not allow this. This will create the least amount of stress on the nozzle body and should allow satisfactory cable routing.

5. Turn the fly nut of the NCV2 to engage the threads of the nozzle body. Tighten the fly nut using the supplied universal wrench (P/N 333-0002-490), included in the system service kit, until the NCV2 no longer rotates freely, or approximately 50 in-lbs.
6. Repeat step 1 through step 5 for each nozzle location on the spray boom.

## BOOM CABLE ROUTING AND CONNECTION

### BEST PRACTICES AND RECOMMENDATIONS

- Route the Hawkeye® 2 inner, mid, and outer boom cables along existing cables or plumbing to avoid cable damage.
- 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 inner, mid, and outer 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 when possible.
- Secure cables using a zip tie at each nozzle control valve tee branch, and one between each tee branch along the cable length.

### BOOM CABLE ROUTING AND CONNECTIONS (INNER, MIDDLE, AND OUTER BOOM CABLES)

1. Locate the boom cables included with the Hawkeye® 2 installation kit. There are typically six boom cables for a single system:
  - 2 inner boom cables (may be left and right specific).
  - 2 mid boom cables.
  - 2 outer boom cables.
2. On the inner boom cable, locate the end of the cable with the rotating locking collar.
3. Start with the rotating locking collar end of the cable near the center of the center rack and route the cable so the first group of 8-pin connector drops align with the group of NCVs on the center rack of the boom. The inner cable will then route over the boom pivot point, towards the end of the boom, following plumbing routing whenever possible.

FIGURE 2. Boom Cable Routing - Over Pivot



NOTE: Keep the boom connections clean and off the ground while routing.

Do not secure cables with cable ties until all cables are in place and routings are checked for pinch points and other interferences.

Ensure sufficient slack is available at fold and break-away joints to allow for full range of motion without stretching the cable.

4. Next, repeat step 1 through 3 for the inner boom cable for the opposite side.
5. Continue routing both mid and outer boom cables, and repeat step 1 through 4 for both mid and outer boom cables.

NOTE: The connector with the rotating locking collar will always go towards the center of the machine.

6. If not already applied, apply a single, short burst of corrosion inhibitor. Corrosion X HD (P/N 222-0000-020 or available from <http://www.corrosionx.com/corrosionx-heavy-duty.html>) is recommended.

FIGURE 3. Boom Cable Routing - Over Mid Fold Joint



7. Be sure the corrosion inhibitor has coated the NCV contacts and recessed portions of the connector.

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

8. Once all boom cables are routed along the boom as desired, begin connecting the boom cables to the Hawkeye® 2 NCVs previously installed.
9. Use provided cable ties to secure the boom cables to the boom components as needed to ensure they are secure.

NOTE: Do not put strain on cables and connections while applying tie-downs.

Do not leave any exposed cable loops that may get caught on crops or other debris while the vehicle is in use.

10. The inner boom cables will be connected to the RCM - Sprayer cable in a later section.

FIGURE 4. Outer Boom Cable Section Installed

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# CHAPTER

# 5

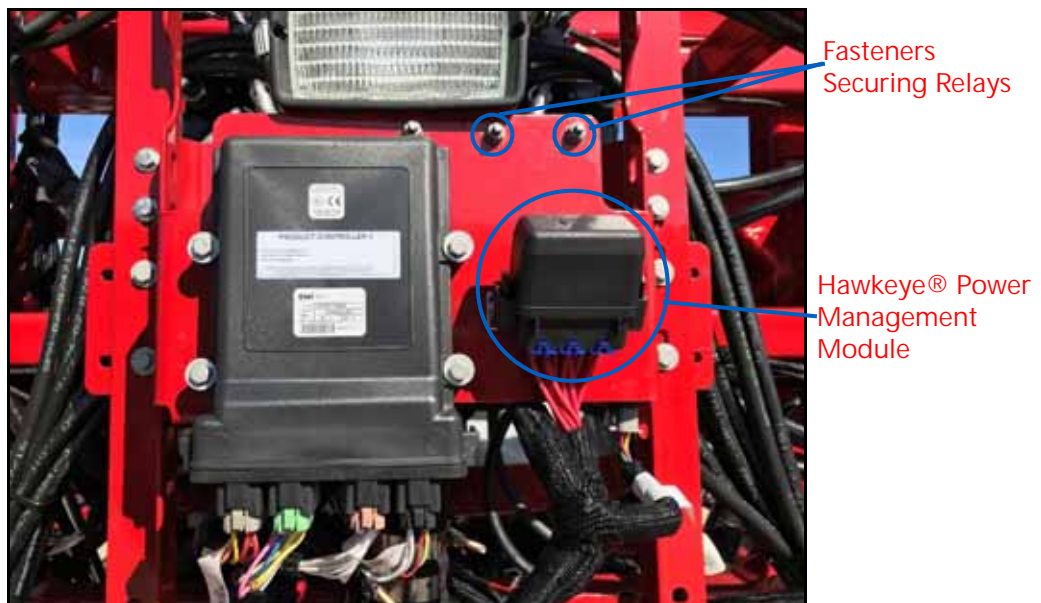
# RCM - SPRAYER MOUNTING AND CONNECTION

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## MOUNTING PLATE PREPARATION

1. Locate the Product Controller II (PCII) ECU mounted on the rear center rack of the sprayer.

FIGURE 1. PCII ECU and Power Management Module



2. Remove the four 12-pin DT connectors connected to the PCII ECU.
3. Remove the hardware securing the PCII ECU to the center rack. Remove the PCII ECU and set aside.
4. Remove the power management module next to the PCII mounting location and remove its associated hardware and bracket.
5. Remove the fasteners directly above the power management module which are securing two relays to the back side of the bracket.
6. Follow the PCII ECU cable to all of its connections and disconnect them. Remove the PCII ECU cable and set aside.

## RCM - SPRAYER INSTALLATION

### INSTALL THE MOUNTING PLATE AND RCM - SPRAYER

1. Locate the RCM - Sprayer mounting bracket (P/N 107-0172-670), M6 flathead screws, and flanged lock nuts provided with the Hawkeye® 2 kit.
2. Using the flathead screws and lock nuts provided, secure the RCM - Sprayer mounting plate to the ECU bracket where the PCII was previously removed.

FIGURE 2. RCM - Sprayer Mounting Plate Installed

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3. Using the M6 hex bolts, washers, and flanged lock nuts provided, secure the RCM - Sprayer to the mounting plate.

NOTE: Observe the different length of the M6 hex bolts and their respective ECU mounting bosses.

FIGURE 3. RCM - Sprayer Mounted

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## INSTALL THE RCM - SPRAYER & POWER CABLES

1. Locate the RCM - Sprayer cable (P/N 115-2005-077) provided in the kit.
2. Identify the three RCM - Sprayer connectors (two black, one gray) and connect these to the RCM - Sprayer.

FIGURE 4. RCM - Sprayer Connections



3. Route the round 31-pin connector of the RCM - Sprayer cable along the lower left center rack linkage to the round 31-pin bulkhead connector near the location where the linkage meets the sprayer chassis as shown in Figure 5, "ECU and NCV2 Power Cable Bulkhead Connections," below.

FIGURE 5. ECU and NCV2 Power Cable Bulkhead Connections



4. Connect the connector labeled "ECU Power" to the mating 2-pin receptacle near the top of the center rack frame where the PCII ECU cable was previously connected, as shown in Figure 6, "ECU Power Connection," below.

FIGURE 6. ECU Power Connection

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5. Connect the following RCM - Sprayer cable connections to their mating connections where the PCII ECU cable was previously disconnected:
  - a. Foam Markers (as applicable)
  - b. Section 1-3 / LT Fence Row
  - c. Section 4-6 / RT Fence Row
  - d. Section 7 (as applicable)
  - e. Boom PSI Sw
  - f. Boom On Sig
  - g. Boom PSI (to existing transducer in plumbing)
  - h. ISObus (as applicable for other ECUs installed)
  - i. AUX Drivers (as applicable for other ECUs installed)
6. Locate the Hawkeye® 2 NCV power cable (P/N 115-2005-078) provided in the kit.
7. Identify the round 8-pin connector of the power cable and connect it to the mating connection on the bulkhead plate adjacent to the 31-pin bulkhead connector installed previously, as shown in Figure 5 on page 29.
8. Route the power cable along the lower left center rack linkage alongside the RCM - Sprayer cable.
9. Connect the gray 12-pin DT connector to the connector on the RCM - Sprayer cable labeled "TO NCVS."

10. Connect the round 19-pin connectors labeled "Left Boom" and "Right Boom" to their respective inner boom cables installed previously, as shown in Figure 7, "Left and Right Inner Boom Cable Connections," below.

FIGURE 7. Left and Right Inner Boom Cable Connections



11. Secure the two power management modules of the NCV power cable to the center rack so that the covers are facing upward.

NOTE: Ensure the covers are facing upward as this orientation is critical for the best ingress protection.

12. Ensuring there is adequate slack for full motion of the boom, secure the RCM - Sprayer and NCV power cables using the provided cable ties.

## LEAK TEST

After installation is complete, a leak test is recommended to verify the NCV2s and seals are installed correctly.

1. Complete the Hawkeye® 2 calibration wizard. Refer to the Hawkeye® 2 Calibration and Operations Manual as necessary.
2. With flushed plumbing and water in the tank, set the system boom pressure to 40 psi.
3. Visually observe for any leaks in any components of the machine.
4. If leaks are observed, turn off the sprayer pump and open a boom section to bleed down the pressure to 0 psi.
5. Verify the NCV2 seals are properly installed and the NCV fly nut is tight.
6. Then, repeat step 2 through 5 as necessary until no leaks are observed.



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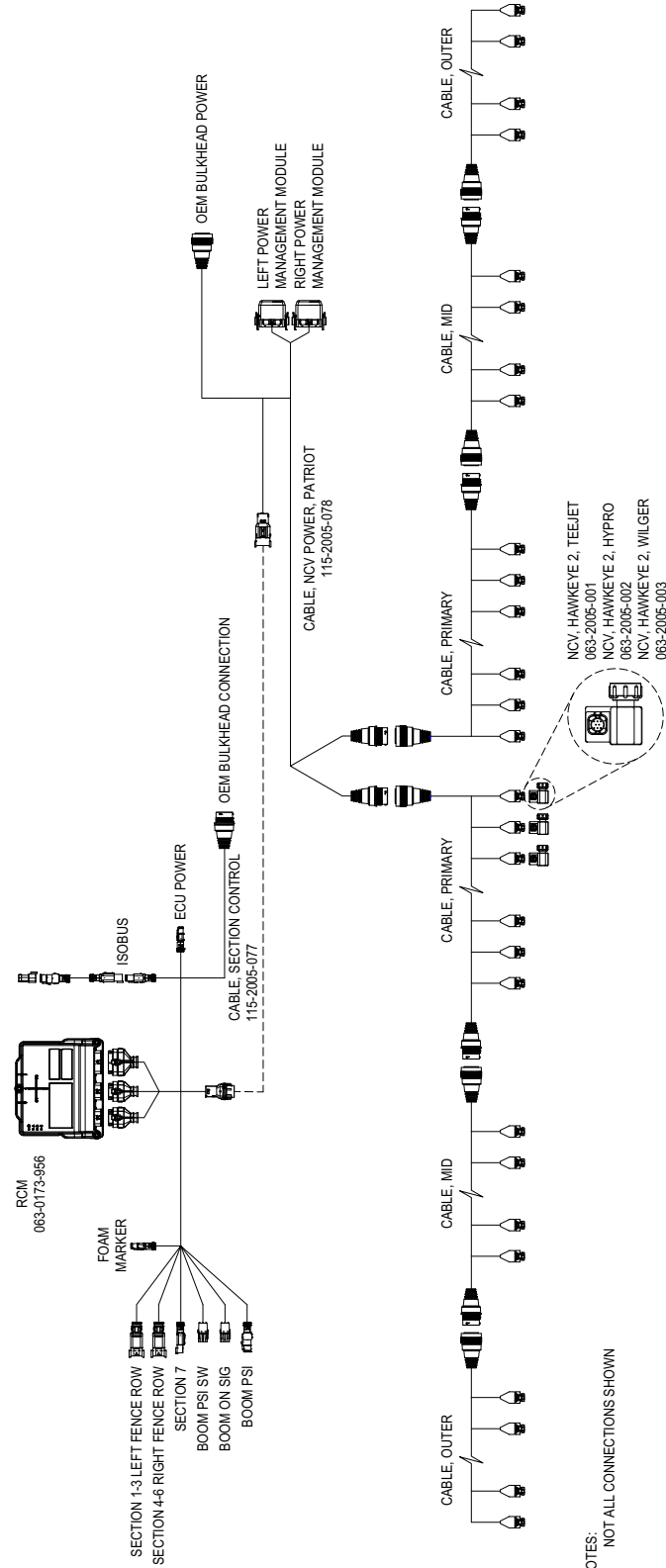
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SYSTEM DIAGRAM

The system diagram is shown on the next page.

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

KIT PART NUMBER	SYSTEM DESCRIPTION	NCV TOTAL	CABLE_PRIMARY	CABLE_MID	CABLE_OUTER
117-2005-001	PATRIOT/TRIDENT, 120/20" BOOM, WILGER	72	115-2005-005	115-2005-006	115-2005-007
117-2005-002	PATRIOT/TRIDENT 100/20" BOOM, WILGER	60	115-2005-120	115-2005-121	115-2005-122
117-2005-003	PATRIOT/TRIDENT 90/20" BOOM, WILGER	54	115-2005-120	115-2005-121	115-2005-206
117-2005-004	PATRIOT/TRIDENT 120/10" BOOM, WILGER	144	115-2005-126	115-2005-127	115-2005-128
117-2005-007	PATRIOT/TRIDENT 120/20" BOOM, HYPRO	72	115-2005-005	115-2005-006	115-2005-007
117-2005-008	PATRIOT/TRIDENT 100/20" BOOM, HYPRO	60	115-2005-120	115-2005-121	115-2005-122
117-2005-022	PATRIOT/TRIDENT 36W50CM BOOM, LATAM W/ ISO PROD CONTROL, TEEJET	72	115-2005-296	115-2005-297	115-2005-007
117-2005-023	PATRIOT/TRIDENT CLASS 3 30W50CM BOOM, LATAM W/ ISO PROD CONTROL, TEEJET	60	115-2005-120	115-2005-121	115-2005-122
117-2005-025	PATRIOT/TRIDENT 27W50CM BOOM, LATAM W/ ISO PROD CONTROL, TEEJET	54	115-2005-120	115-2005-121	115-2005-206
117-2005-222	PATRIOT/TRIDENT 24W50CM BOOM, LATAM W/ ISO PROD CONTROL, TEEJET	48	115-2005-120	115-2005-330	115-2005-322
117-2005-223	PATRIOT/TRIDENT CLASS 2 30W50CM BOOM, LATAM W/ ISO PROD CONTROL, TEEJET	60	115-2005-120	115-2005-121	115-2005-329
117-2005-224	PATRIOT/TRIDENT 32W50CM BOOM, LATAM W/ ISO PROD CONTROL, TEEJET	64	115-2005-120	115-2005-121	115-2005-301



NOTES:  
1. NOT ALL CONNECTIONS SHOWN

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### POWER AND RCM - SPRAYER HARNESS MAINTENANCE

1. Disconnect the RCM - Sprayer harness connector and inspect for signs of moisture or corrosion.
2. If moisture or 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.

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### HAWKEYE® 2 BOOM HARNESS CONNECTOR MAINTENANCE

**NOTE:** The electrical connection of the Hawkeye® 2 NCVs should come with CorrosionX HD pre-applied and protected with a dust cap. Verify the pins are coated adequately with CorrosionX HD when removing the dust caps from the NCV.

Prior to connecting the Hawkeye® 2 boom cable to the Nozzle Control Valves (NCV), perform the following steps to all 8-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® 2 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)).

FIGURE 1. Deoxidizing Agent Applied to Connection

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

FIGURE 2. Connection Contact Cleaning

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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.

FIGURE 3. Compressed Air Applied for Drying



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 if 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).

FIGURE 4. Corrosion Inhibitor Check





# LIMITED WARRANTY

## WHAT DOES THIS WARRANTY COVER?

This warranty covers all defects in workmanship or materials in your Raven Applied Technology Division product under normal use, maintenance, and service when used for intended purpose.

## HOW LONG IS THE COVERAGE PERIOD?

Raven Applied Technology products are covered by this warranty for 12 months from the date of retail sale. In no case will the Limited Warranty period exceed 24 months from the date the product was issued by Raven Industries Applied Technology Division. This warranty coverage applies only to the original owner and is non-transferable.

## HOW CAN I GET SERVICE?

Bring the defective part and proof of purchase to your Raven dealer. If the dealer approves the warranty claim, the dealer will process the claim and send it to Raven Industries for final approval. The freight cost to Raven Industries will be the customer's responsibility. The Return Materials Authorization (RMA) number must appear on the box and all documentation (including proof of purchase) must be included inside the box to be sent to Raven Industries.

## WHAT WILL RAVEN INDUSTRIES DO?

Upon confirmation of the warranty claim, Raven Industries will (at our discretion) repair or replace the defective product and pay for the standard return freight, regardless of the inbound shipping method. Expedited freight is available at the customer's expense.

## WHAT IS NOT COVERED BY THIS WARRANTY?

Raven Industries will not assume any expense or liability for repairs made outside our facilities without written consent. Raven Industries is not responsible for damage to any associated equipment or products and will not be liable for loss of profit, labor, or other damages. The obligation of this warranty is in lieu of all other warranties, expressed or implied, and no person or organization is authorized to assume any liability for Raven Industries.

**Damages caused by normal wear and tear, misuse, abuse, neglect, accident, or improper installation and maintenance are not covered by this warranty.**

# EXTENDED WARRANTY

## WHAT DOES THIS WARRANTY COVER?

This warranty covers all defects in workmanship or materials in your Raven Applied Technology Division product under normal use, maintenance, and service when used for intended purpose.

## DO I NEED TO REGISTER MY PRODUCT TO QUALIFY FOR THE EXTENDED WARRANTY?

Yes. Products/systems must be registered within 30 days of retail sale to receive coverage under the Extended Warranty. If the component does not have a serial tag, the kit it came in must be registered instead.

## WHERE CAN I REGISTER MY PRODUCT FOR THE EXTENDED WARRANTY?

To register, go online to [www.ravenhelp.com](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.**