RCM - Sprayer with Sidekick Pro™ ICD Ratio Rate Quick Installation Reference

016-7100-049 Rev. A *10/21* *E37179*

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CHAPTER 2 INTRODUCTION

SYSTEM OVERVIEW

The Raven Sidekick Pro™ ICD Rate Ratio Direct Injection system is designed to provide efficient and accurate incorporation of spray additives from an injection module.

By using a separate injection module, the system eliminates mixing additives in the main tank, reduces waste, and simplifies equipment care and maintenance. The system is compatible on pull-type and self-propelled sprayers and may be made compatible with recirculation systems.

The Sidekick Pro ICD pump injects the additive into the main carrier line. An in-line mixer then incorporates the main chemical and the additives together before sending the liquid to the boom. The rate of injected chemical is based upon the flow rate of the carrier line and a specified ratio of additive to carrier flow.

COMPATIBLE KITS

This section contains a list of the components included in the RCM - Sprayer kit. One of the Sidekick Pro ICD kits is also required to complete the installation.

Before beginning the system installation, compare the items in the kit with the components on this list. Contact a local Raven dealer for additional assistance if necessary.

RCM - SPRAYER KITS

FIGURE 1. RCM - Sprayer Ratio Rate Injection Kit (P/N 117-7100-049-C)

THIS KIT TO CONTAIN THE FOLLOWING ITEMS LISTED BELOW:

#	QTY	PART #	DESCRIPTION
	1	053-0159-331	BOX, SHIPPING (LABELED BOX 1 OF 2)
	1	115-0172-422	CABLE, ADAPTER, PADDLE SWITCH
	1	115-7301-032	CABLE, ECU, RCM PRODUCT CONTROL H2 COMPATIBLE
	1	115-0172-397	CABLE, FOOT SWITCH, 12' ROW CROP
	1	117-0171-680	KIT MOUNTING RCM
	1	063-0173-951	RAVEN RCM HWK LVL1 HWK READY RATE CONTROL
	1	063-0173-291	FLOWMETER RFM60P/DTSCH HP
	1	422-0000-119	TRANSDUCER PRESS 1-5V 0-250PSI
	1	053-0159-385	ENVELOPE, PLASTIC
	2	435-3003-048	CLAMP, V-BAND, FC-220, STAINLESS
	2	219-0000-138	GASKET, FLANGE, M220, VITON
	2	435-3003-038	CLAMP, FC-200, WORM DRIVE V-BAND MANIFOLD VLAVE
	2	311-9000-030	EXHAUST CLAMP, M8, 60MM
	2	219-0000-097	GASKET, 150G FLANGE MANIFOLD VALVE, (M200)
	1	333-0002-366	FITTING, FLANGED. M220-200 BANJO
	1	016-7100-049	MAN RCM W/SIDEKICK RATIO RATE INSTALLATION
			(LABELED BOX 2 OF 2)
	1	063-0173-737	MIXER/CHECK VALVE M220 FLANGED

FIGURE 2. RCM - Sprayer Mounting Kit (P/N 117-0171-680-A)

THIS KIT TO CONTAIN THE FOLLOWING ITEMS LISTED BELOW:

PART #	QTY	DESCRIPTION
053-0159-141	1	BOX, SHIPPING
107-0172-484	1	BRACKET, ACCUFLOW VORTEX, NODE SUPPORT
053-0159-057	1	ENVELOPE, PLASTIC
311-0050-236	1	BOLT, MACHINE, HEX HEAD, 1/4-20 UNC-2 X 2-1/2, SS
311-0050-238	2	BOLT, MACHINE, HEX HEAD, 1/4-20 UNC-2 X 3, SS
311-0054-081	2	BOLT, HEX HEAD, 3/8-16 UNC X 1-1/4
312-1001-164	2	NUT, FLANGE LOCK, 3/8-16 UNC
312-4000-164	3	NUT, LOCK, NYLON INSERT, 1/4-20

SIDEKICK PRO™ ICD KITS

Select one of the following kits:

NOTE: Refer to the Sidekick Pro™ ICD Installation and Operation Manual (P/N 016-0171-605) for additional details on rinse assist and injection module components.

- 117-0175-071 KIT, SIDEKICK PRO ICD, LV W/ TANK, W/ RINSE
- 117-0175-072 KIT, SIDEKICK PRO ICD, LV, W/ RINSE
- 117-0175-073 KIT, SIDEKICK PRO ICD, HV W/ TANK, W/ RINSE
- 117-0175-074 KIT, SIDEKICK PRO ICD, HV, W/ RINSE

NOTE: Source and use a separate chemical injection tank if there is insufficient space for the available tanks provided through Raven.

OPTIONAL RECIRCULATION KIT

FIGURE 3. Spray Boom Recirculation Kit (P/N 117-0175-075-A)

THIS KIT TO CONTAIN THE FOLLOWING ITEMS LISTED BELOW:

ITEM #	QTY	PART #	DESCRIPTION
1	1	053-0159-323	BOX, SHIPPING (LABELED BOX 1 OF 1)
2	1	115-0172-645	CABLE, BOOM RECIRCULATION, IN/OUT VALVE, PUMP
3	1	063-0174-177	ASSEMBLY, PUMP, BILGEN, SELF-PRIMING

CHAPTER 3 INSTALLATION

PLUMBING COMPONENTS

FIGURE 1. Conventional Spray Boom Configuration

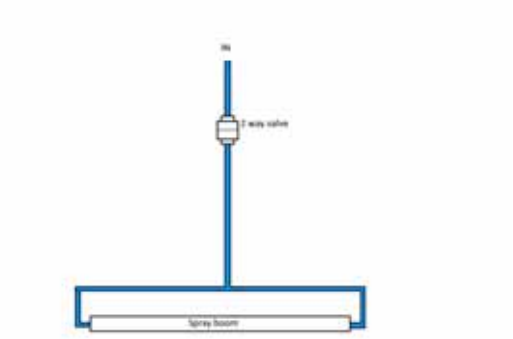
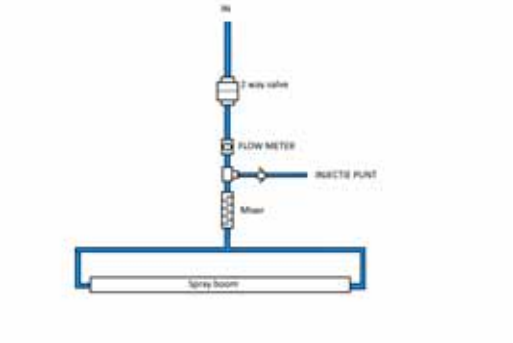


FIGURE 2. Conventional Spray Boom Configuration with Injection



MOUNT THE SIDEKICK PRO™ ICD INJECTION SYSTEM

Refer to the “Mount the Sidekick Pro ICD Pump and Chemical Tank” section in the Sidekick Pro™ ICD Installation & Operation Manual (P/N 016-0171-605).

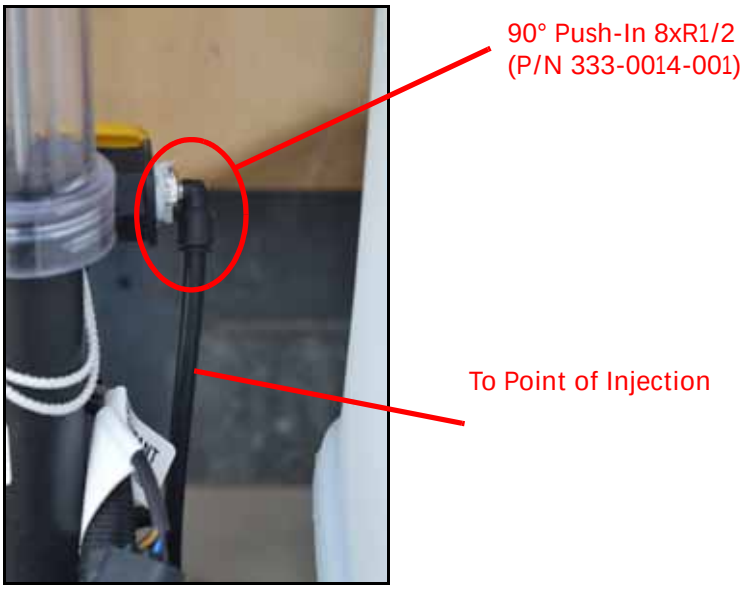
- Make sure that there are no moving parts near the injection pump. This can cause damage.
- Mount the Sidekick Pro™ ICD pump as close as possible to the selected point of injection.
- Mount the Sidekick Pro™ ICD pump so that the outlet port is pointing up.

- Mount the Sidekick Pro™ ICD in a location which provides access to the pump and ECU to simplify calibration and troubleshooting.

NOTE: Length of cabling may dictate available mounting locations. The following figures offer some examples of how to mount the Sidekick Pro™ ICD injection module.

FIGURE 3. Sidekick Pro™ ICD Injection Module

FIGURE 4. 90° Push-In Fitting



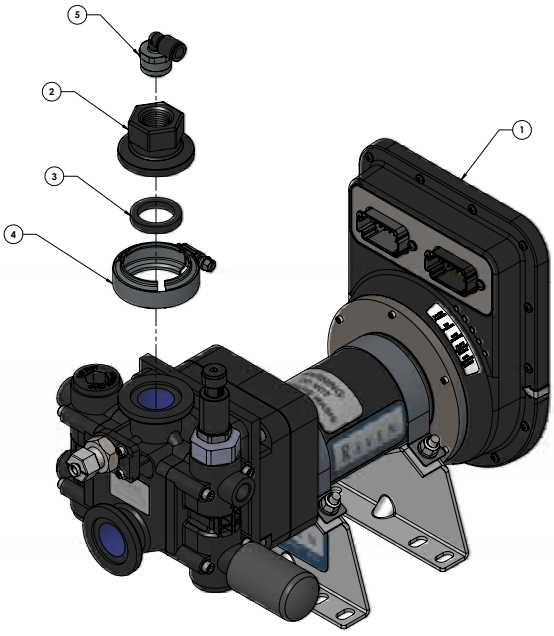
Insert 8mm tube (P/N 333-0014-005) at the push-in fitting and connect to the point of injection at the mixer.

PLUMB THE INJECTION SYSTEM

Refer to the Sidekick Pro™ ICD Installation & Operation Manual (P/N 016-0171-605) for details on plumbing the injection system including closed calibration.

Optionally, the pump may be plumbed as shown in the figure below.

FIGURE 5. Sidekick Pro™ ICD without Closed Calibration System



ITM	QTY	PART NUMBER	REV.	DESCRIPTION	SPECIAL NOTE
5	1	333-0014-001	A	PUSH-IN FITTING, MALE STUD ELBOW, 8mm X R1/2, BSPT	
4	1	435-3003-044	-	CLAMP, V-BAND FC-100, STAINLESS FOR FLANGED FITTINGS	
3	1	219-0000-129	-	GASKET, FLANGE M-100, VITON	
2	1	333-0002-201	A	FITTING, FLANGED, M100 x 1/2" FNPT	
1	1	063-0173-768B	B	PUMP, SIDEKICK PRO ICD, 1-40 OZ/MIN	

MOUNT RINSE VALVE

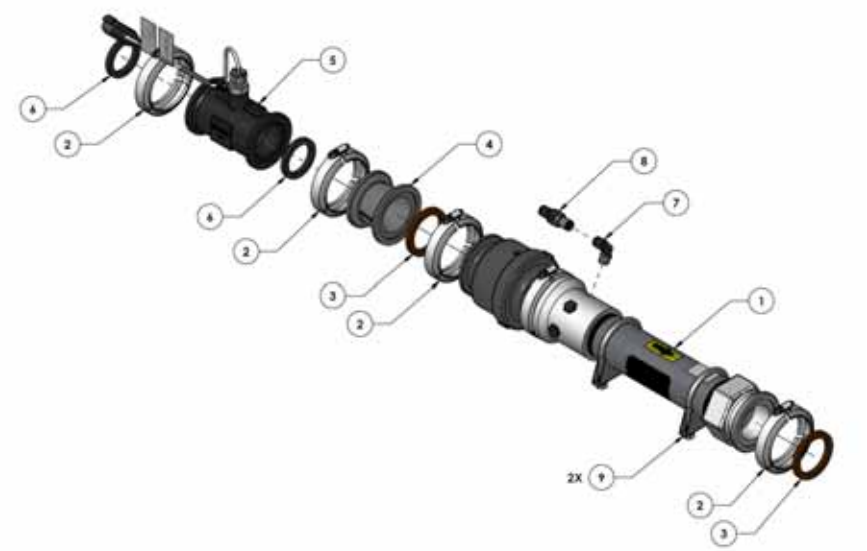
Refer to the Sidekick Pro™ Installation & Operation Manual (P/N 016-0171-605) for details on plumbing the rinse assist.

NOTE: The Sidekick Pro™ Rinse Assist Installation and Operation Guide (P/N 016-0171-674) is also available for reference on the installation and operation of the rinse assist system.

ASSEMBLE AND MOUNT THE MIXER

1. Assemble the mixer as shown in Figure 6, “Mixer Assembly,” shown below.

FIGURE 6. Mixer Assembly



Item No.	Description	Part Number
1	Assembly, M220 Flanged Mixer/Check Valve	063-0173-737
2	Clamp, 2” V-Band	435-3003-048
3	Seal, M220	219-0000-138
4	Fitting, M220-200 Banjo Flanged	333-0002-366
5	Flow Meter, RFM 60P (Deutch DT, HP, 2 Magnet Turbine)	063-0173-291
6	Gasket, 1-1/2” Viton 150G Pakking	219-0000-180
7	Fitting, 8mm x R1/4 Male Stud Elbow BSPT Push-in	333-0014-002
8	Valve, 8mm In-line Non-return Push-in	333-0014-004
9	Clamp, M8 x 60mm Exhaust	311-9000-030

NOTE: Figure 7 on page 11 offers and example of the check valve and the push-in fitting.

2. Mount the mixer near the inlet of the boom.

NOTE: Refer to Figure 8 on page 11 for an example of mounting the assembly to the implement.

NOTE: Gaskets, V-bands, the mixer, flow meter, and connector are included in the RCM - Sprayer ratio rate injection kit (P/N 117-7100-049). The flange couplings to the existing product carrier lines are not included in the kit. These items need to be ordered separately. The size of the connector at the flow meter is M200. The size of the connector at the end of the mixer is M220.

3. Place a 3-way hand valve up-stream from the check valve if possible. This valve may be used to drain the system or for a manual catch test.

FIGURE 7. Mount Check Valve and Push-in Fitting

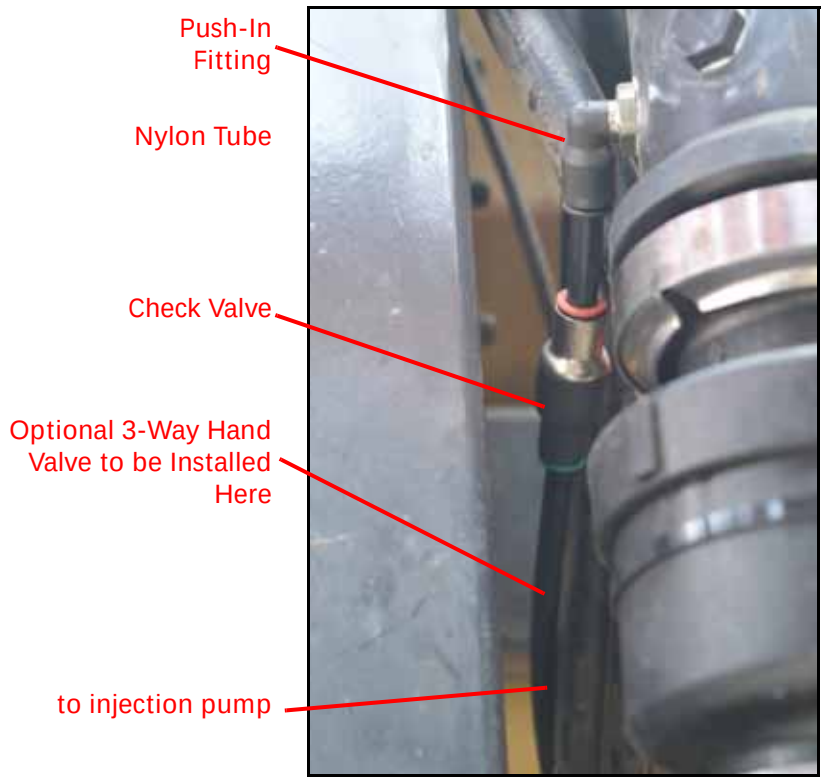
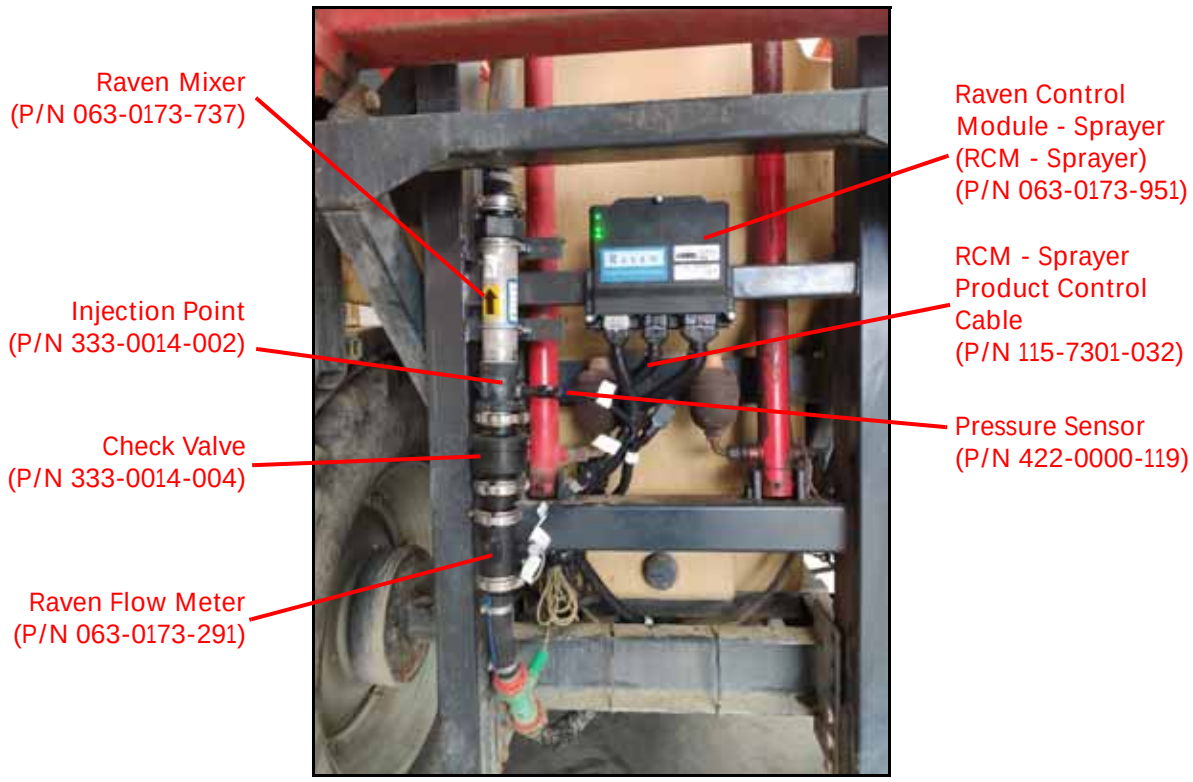


FIGURE 8. Example Plumbing and ECU Installation



MACHINES WITH RECIRCULATION SYSTEMS

NOTE: The Sidekick Pro™ ICD injection pump should not be used with boom recirculation systems. Boom recirculation returns injected and mixed chemicals back to the main tank, which can cause clumping and other issues with the sprayer system.

To address this issue, 3-way valves must be installed at the ends of the boom to allow the operator to shut off tank return or boom recirculation features. The flow meter, injection pump, pressure sensor, mixer, and recirculation pump are located between the valves.

The following components are required for machines with a recirculation system:

- Boom Recirculation In/Out Valve Pump Cable (P/N 115-0172-645).
- Recirculation pump (45 L/min - P/N 063-0174-177).
- Not available through Raven:
    - 2 electric 12 V 3-way valves. Valves must be a tee configuration (not an L) to ensure proper flow rates.
    - Check valve after the circulation pump.
    - Tee fittings to branch the recirculation pump into the product lines and the boom.

The figures below offer examples of two configurations of sprayers with boom recirculation. The valves and recirculation pump may be controlled by the Raven system.

FIGURE 9. 3-Way Valve on Sprayer (Before Recirculation)

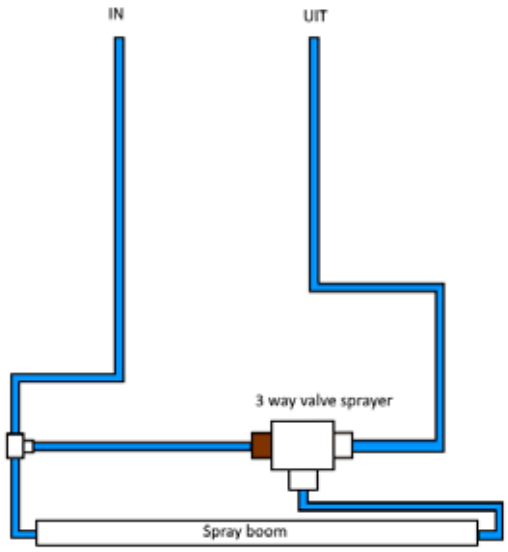


FIGURE 10. Recirculation with 3-Way Valve on Sprayer

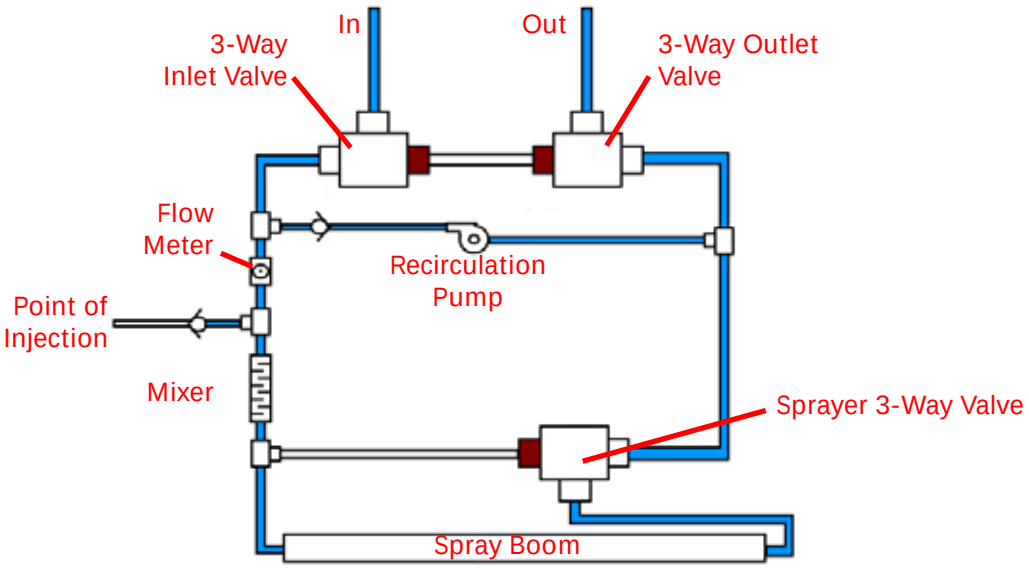


FIGURE 11. 2-Way Valve on Sprayer (Before Recirculation)

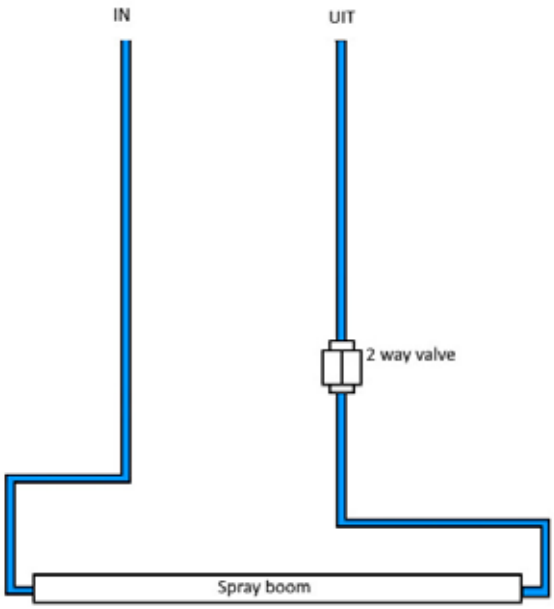
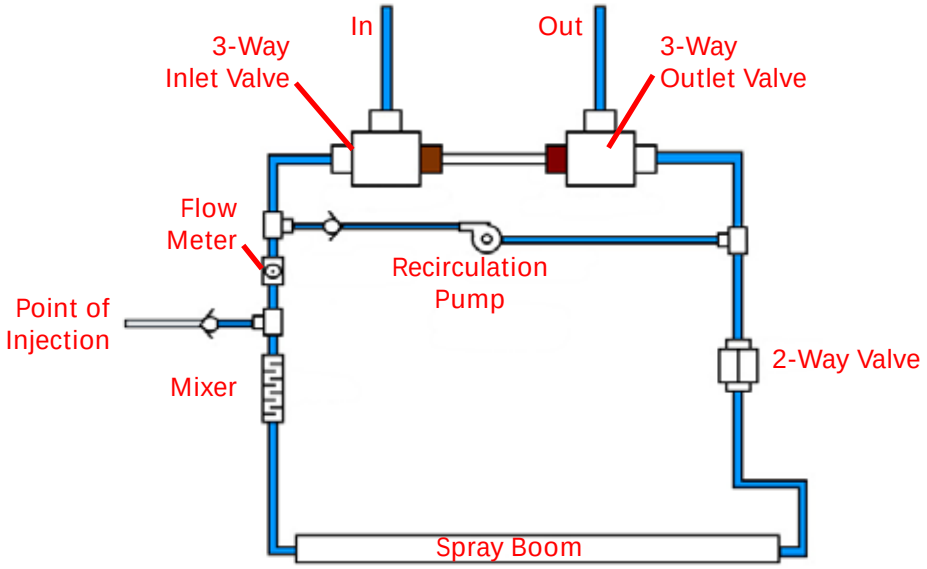


FIGURE 12. Recirculation with 2-Way Valve on Sprayer



1. Ensure mounted valves are in the pass-through direction when there is no voltage connected. This will allow the sprayer to function conventionally when the injection pump is not used and avoid circulating injected chemical back to the main carrier tank.

FIGURE 13. Mixer and Valves Mounted Near Sprayer Boom

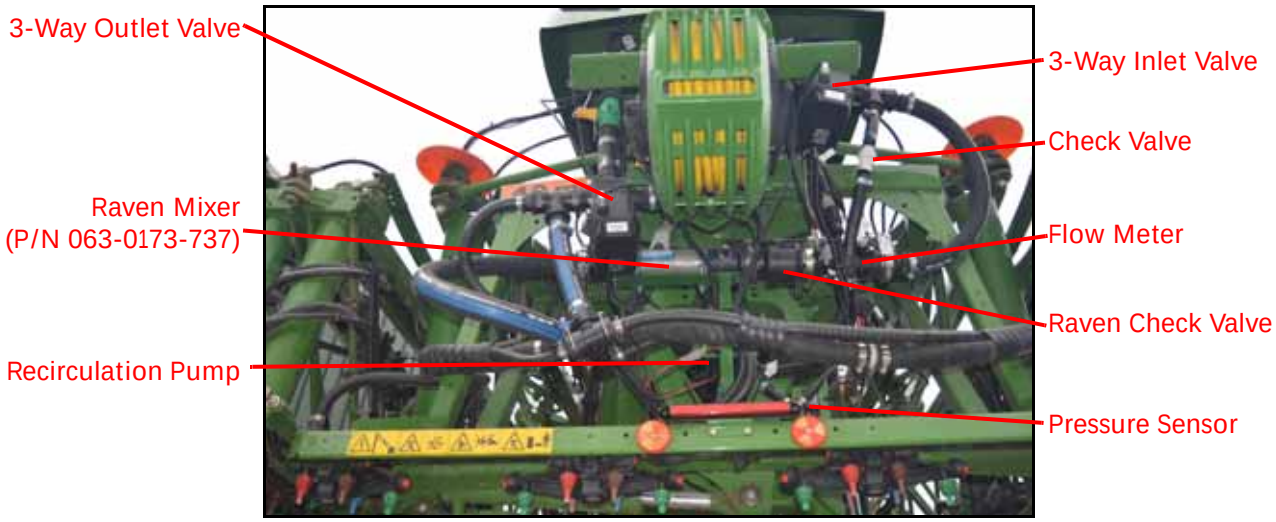
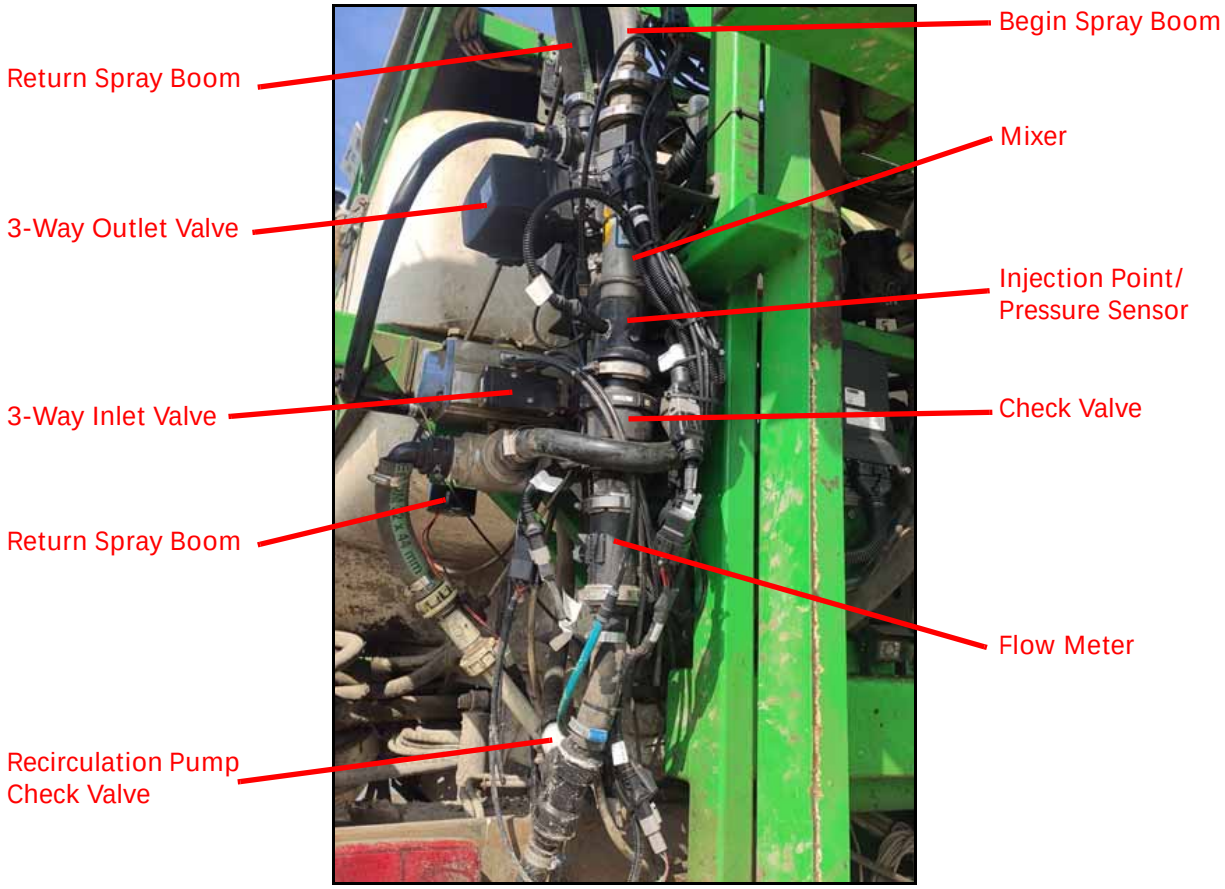


FIGURE 14. Alternative Mixer and Valves Mounted on Sprayer Center Rack



2. Mount couplings as close to each other as possible.

NOTE: Large spaces between the couplings increase the risk that liquid stays in the boom when cleaning or injected liquid enters the main tank when the sprayer is in normal operation mode.

ELECTRICAL COMPONENTS AND CABLING

NOTE: Review Figure 19 on page 21 and Figure 20 on page 22 for additional cabling and connection information.

MOUNT AND CONNECT THE RATE CONTROL MODULE - SPRAYER (RCM - SPRAYER) ECU

BEST MOUNTING PRACTICES

Ensure the installer follows all of the following guidelines for best mounting practices:

- Use the ECU mounting bracket (P/N 107-0172-484) and supplied hardware.
- By default, the orientation of the RCM - Sprayer is set to horizontal position with connectors pointing downwards, ensuring that water or moisture will not enter the connectors.
- Mount the RCM - Sprayer to the implement chassis using the provided hardware. The best place to mount the RCM - Sprayer is near the flow meter, pressure sensor, and the valves for the sections.
- Ensure RCM - Sprayer is secure. The RCM - Sprayer needs to be near the mixer to receive signals from the flow meter and the pressure sensor. The best place for the mixer is near the beginning of the boom. See Figure 8 on page 11 for an example.

FIGURE 15. Mounted RCM - Sprayer ECU

FIGURE 16. RCM - Sprayer ECU Cable Connections

3. Insert the 3 connectors from the RCM - Sprayer product control cable (P/N 115-7301-032) to the RCM - Sprayer ECU.

NOTE: The cable connectors will only fit one way in the RCM - Sprayer ports.

The gray connector is the power/communication connector. The 23 and 35-pin black connectors are used for signal inputs and outputs.

4. Connect the flow and pressure sensors to the RCM - Sprayer product control cable. Check the connector labels for assistance with proper connections.
5. If the boom has recirculation, connect the recirculation pump and in/out valve cable (P/N 115-0172-645) to the connector labeled AUX drivers on the RCM - Sprayer product control cable.

CONNECT THE SIDEKICK PRO™ ICD PUMP AND CABLES

1. Connect the Gen3 Sidekick Pro™ Injection Cable (P/N 115-7301-016) to the Sidekick Pro™ ICD pump.
2. Plug the black and gray connectors into the Sidekick Pro™ ICD pump.

FIGURE 17. Sidekick Pro™ ICD Pump Connections

3. Plug the PSI, FLOW, and VAC connectors to the sensors on the Sidekick Pro™ ICD pump. Check the connector labels to ensure proper connections.
4. Connect the rinse assist connector from the Gen3 Sidekick Pro™ ECU cable (P/N 115-7301-016) to the rinse valve.

EXTENSION CABLES

NOTE: Review Figure 19 on page 21 and Figure 20 on page 22 for additional cabling and connection information.

Extension cables are available in the following lengths.

- 1.8 m [6 ft] (P/N 115-7300-074)
- 3.6 m [12 ft] (P/N 115-7300-075)
- 4.9 m [16 ft] (P/N 115-7300-076)
- 6.1 m [20 ft] (P/N 115-7300-077)
- 7.3 m [24 ft] (P/N 115-7300-078)
- 8.5 m [28 ft] (P/N 115-7300-079)
- 9.7 m [32 ft] (P/N 115-7300-080)
- 11 m [36 ft] (P/N 115-7300-081)
- 12.2 m [40 ft] (P/N 115-7300-082)
- 14 m [46 ft] (P/N 115-7300-083)
- 16.5 m [54 ft] (P/N 115-7300-084)
- 18.3 m [60 ft] (P/N 115-7300-085)

These cables have a standard 19-pin Deutsch connection. Plug on one end and receptacle on the other. These cables may be used to extend the existing implement bus communication and power wires to other parts of the machine.

NOTE: Depending upon the machine and mounting location of the RCM - Sprayer and the Sidekick Pro ICD pump, various extension cables may be used to connect the main RCM - Sprayer and Sidekick Pro ICD cables. Contact a local Raven dealer for additional assistance with IBBC and IBIC harness options, extension cables, and other available options for interfacing with the ISOBUS.

When adding this system to the existing implement bus, with or without the use of extension cables, the bus must be terminated at the end of the system. Place a terminator (P/N 115-7300-044) or an IBIC bracket at the end of the ISOBUS network.

FIGURE 18. IBBC Connector

MASTER INPUT SIGNAL

1. Connect the IBIC connector from the master input adapter cable selected to fit the specific machine to the existing IBIC connector on the machine. This cable is available in lengths from 1.8 m to 11 m
    - 1.8 m [6 ft] (P/N 115-7300-115)
    - 3.7 m [12 ft] (P/N 115-7300-116)
    - 4.9 m [16 ft] (P/N 115-7300-117)
    - 6.1 m [20 ft] (P/N 115-7300-118)
    - 7.3 m [24 ft] (P/N 115-7300-119)
    - 11 m [36 ft] (P/N 115-7300-120)

NOTE: If using a Rev. B or newer RCM - Sprayer product control cable (P/N 115-7301-032) , the AUX 6-pin connector may connect the master boom signal. The ground can be taken from pin J11: 3.

NOTE: The RCM - Sprayer will turn on when the nozzles are open.

2. If applicable, connect the 3-pin Deutsch connector of the master input adapter cable to the cab master switch connector.
3. If applicable, the row crop tractor foot switch cable (P/N 115-0172-397) may be connected to the 3-pin Deutsch master switch connector and then to an existing foot switch connection in the machine.
4. If applicable, the paddle switch adapter cable (P/N 115-0172-422) may be connected to the foot switch cable (P/N 115-0172-397) and then to an existing paddle switch in the machine.
5. If none of these options apply, a specialized cable will need to be built to connect to the master input signal from the sprayer itself. This can be done by a master valve at the sprayer or a signal near the sprayer controller. The switch signal needs to be switched to ground otherwise the RCM - Sprayer will not work.

SECTION CONTROL

Refer to the RCM - Sprayer and Hawkeye® 2 Calibration and Operation Manual (P/N 016-0171-638) for additional information and assistance with system and machine calibration.

NOTE: With Rev. A of the RCM - Sprayer product control cable (P/N 115-7301-032), the RCM - Sprayer may control up to 10 boom section control valves. With Rev. B or newer, the RCM - Sprayer may control up to 16 boom section control valves.

The section control valves are controlled with a 12 V output signal.

SYSTEM DIAGRAMS

FIGURE 19. Standard ISOBUS Gen3 RCM - Sprayer Ratio Rate Injection System Diagram

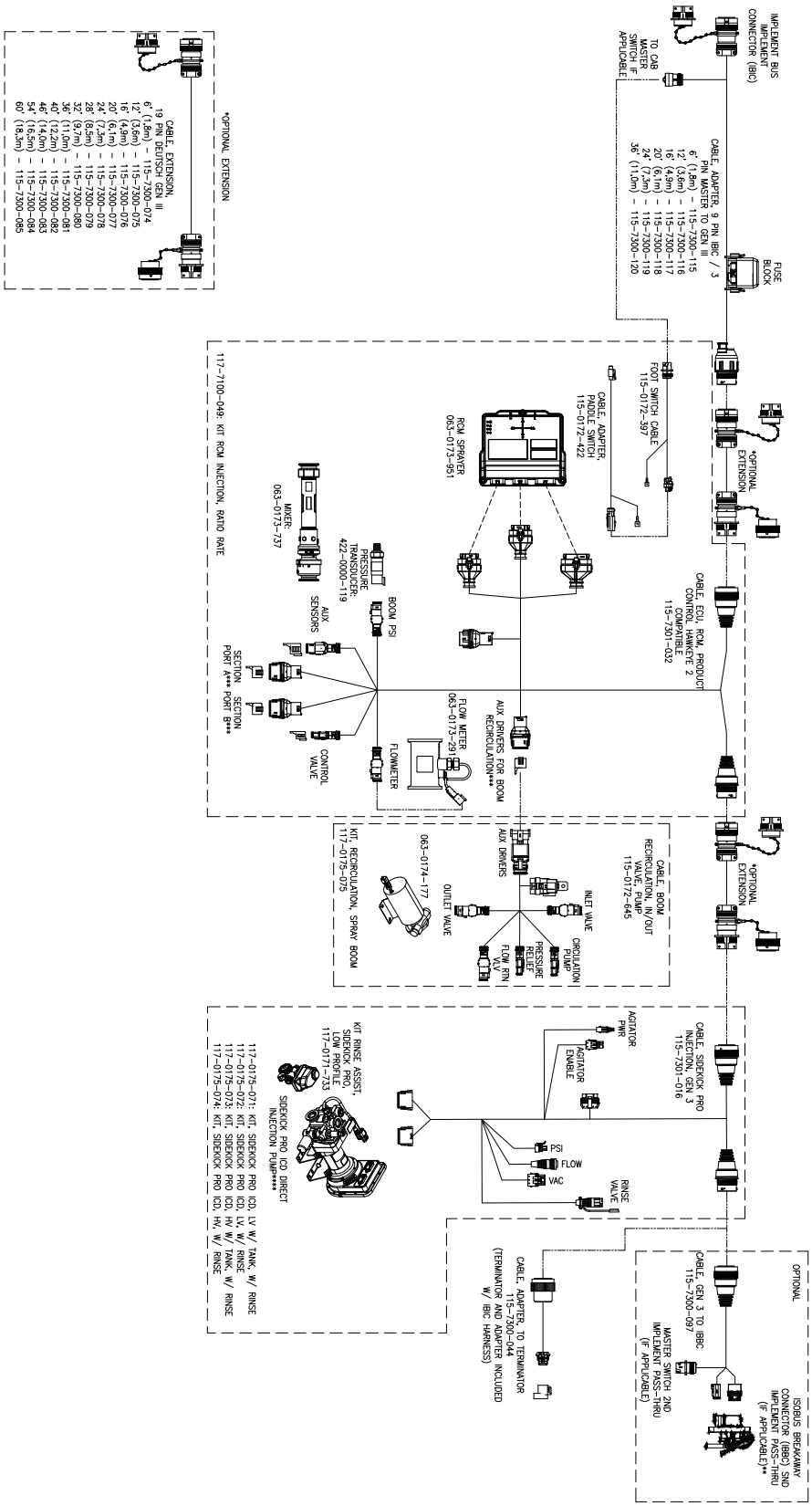
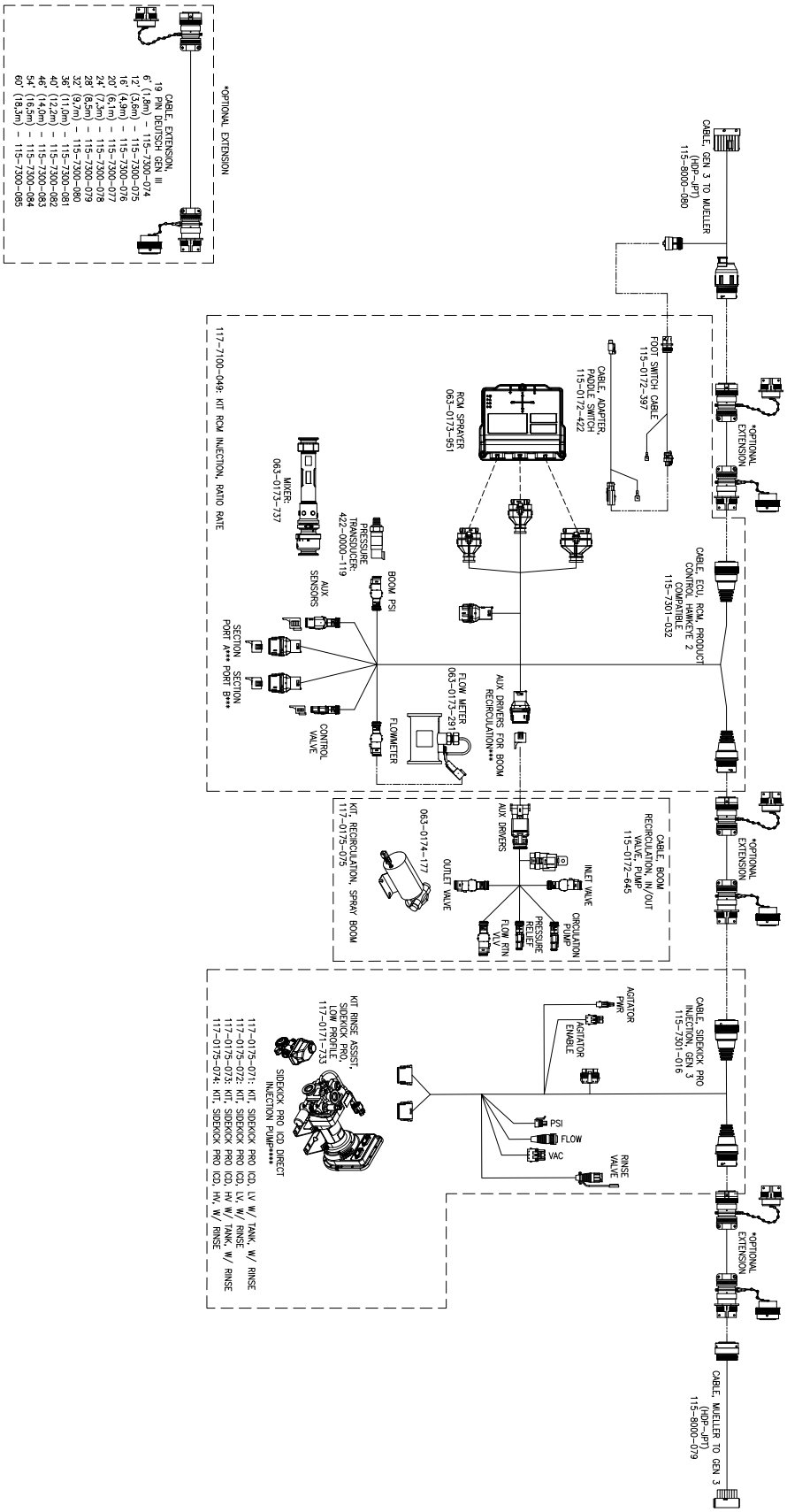


FIGURE 20. RCM - Sprayer Ratio Rate Injection System with Existing Mueller Cabling Diagram



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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.

We Solve Great Challenges.

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.

RAVEN