

Case IH Boom Recirculation Installation and Operation Manual

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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.

RECOMMENDATIONS AND BEST PRACTICES

HOSE ROUTING

The word “hose” is used to describe any flexible, fluid carrying components. Use the following guidelines and recommendations when connecting and routing hoses while installing or maintaining this Raven system:

- Leave protective caps/covers over hose ends until connecting the end into the hydraulic system to help prevent contaminants from entering the system.
- Follow existing hose runs already routed on the implement as much as possible. Proper hose routing should:
 - Secure hoses and prevent hoses 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 hoses 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 hoses from sharp bends, twisting, or flexing over short distances and normal implement operation.
 - 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 hoses securely to force controlled movement of the hose.
 - Avoid abrasive surfaces and sharp edges such as sheared or flame cut corners, fastener threads or cap screw heads, hose clamp ends, etc.
 - Avoid areas where the operator or service personnel might step or use as a grab bar.
- Do not over tighten threaded joints.
- Use thread sealant on all threaded joints.
- Do not connect, affix, or allow hoses to come into contact with components with high vibration forces, hot surfaces, or components carrying hot fluids beyond the temperature rating of hose components.
 - Hoses should be protected or shielded if routing requires the hose to be exposed to conditions beyond hose component specifications.
- Avoid routing hoses in areas where damage may occur due to build up of material (e.g. dirt, mud, snow, ice, etc.).

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.

Thank you for purchasing the boom recirculation system. This system is designed to allow the equipment operator to prime the boom or agitate chemical in the boom plumbing without spraying chemical on the ground. This system allows the operator to adjust the recirculation flow based upon the spray system or the chemical needs and will automatically disengage when normal application is started or if a chemical injection system is detected.

This manual applies to the following machines:

Make. Case IH

Model. 3000, 4000, and 5000 series sprayer platforms with AIM Command Flex (ACF)

Boom Configurations. 90' - 135' Booms w/ Wilger SST Fluid Supply System

System Requirements:

- Must have the CNH Product Controller II ECU (P/N 063-0173-799 or 063-0173-806)
- Boom plumbing kit installed
- Product cable with electronic recirculation valve connection required
 - Cable for MY 2017 and newer (P/N 115-0172-574)
 - Cable for MY 2016 and older (P/N 115-0172-620)
- Software version 20.3.0.20 or higher

THEORY OF OPERATION

When the recirculation system is active, the spray system is not spraying, and NCVs are off, the electric return valve opens fully. The main pump circulates the spray liquid from the main tank through the existing supply plumbing to the section valves.

Section valves actuate open in pairs, starting with the outermost left and right sections and progressing inward. The section valves turn on and off to circulate fluid for the user-defined auto-operation time for each section of the spray system. This keeps the liquid circulating, allowing the system to purge any air, break up chemical deposits, and agitate any separated chemicals through the system without having to spray out of the nozzles.

Product returns through the throttling valve and electric return valve until the electric return valve automatically turns off when spraying resumes. The throttling valve is used to dampen the pressure spike affects of the electric return valve closing when spraying resumes. The individual recirculation hand valves should be used to separate sections when not using NCVs (Bypass and High Flow/High Flow VP Modes) and to isolate boom plumbing sections if maintenance is required or damage to a plumbing component occurs that causes a leak.

PREPARING FOR INSTALLATION

Before installing boom recirculation, park the machine where the ground is level, clean, and dry. Leave the machine turned off with the booms unfolded for the duration of the installation process.

During the installation process, follow good safety practices. Be sure to carefully read the instructions in this manual as you complete the installation process.

RECOMMENDATIONS

Raven Industries recommends the following best practices before installing or operating the boom recirculation system for the first time, at the start of the season, or when moving the boom recirculation system to another machine:

TOOLS NEEDED

The following tools are recommended for installation of the boom recirculation system:

- Pipe thread compound or thread tape for threaded joints (supplied)
- Tape measure
- Hose cutter for up to 2" OD spray hose
- 2 Slip Joint Pliers (approx. 10" size)
- Metric Wrench Set (at least sizes 13 through 19)
- 5/16" Nut Drivers for hose and flange clamps
- Side cutters
- Corrosion X-HD spray

POINT OF REFERENCE

The instructions in this manual assume that you are standing behind the machine, looking toward the cab.

KIT CONTENTS

This section contains a list of the components that are included in the boom recirculation kit. This kit applies to machines that do not have boom recirculation installed. Before beginning the boom recirculation installation, compare the items in the kit with the components on this list. If you have questions about the kit, contact your Raven dealer.

FIGURE 1. Recirculating Boom Upgrade Kit Contents for Case IH (MY 2017 and Newer) with CNH ISO Product Controller II (P/N 117-0171-802)

THIS KIT TO CONTAIN THE FOLLOWING ITEMS LISTED BELOW:

ITEM #	QTY	PART #	DESCRIPTION
1	1	053-0159-012	BOX, SHIPPING (BOX 1 OF 2)
2	1	107-0172-680	BRACKET, MOUNTING, RECIRCULATION VALVE, CASE IH PATR
3	1	107-0172-687	BRACKET, BOOM TIP PROTECTOR, RIGHT, CASE IH
4	1	107-0172-688	BRACKET, BOOM TIP PROTECTOR, LEFT, CASE IH
5	1	115-0172-574	CABLE, ISO PRODUCT CONTROL, CASE IH PATRIOT W/ RECIRC
6	1	117-0171-803	KIT, RECIRCULATING BOOM, WILGER SPRAY TUBE FITTINGS
7	1	334-0001-081	VALVE, ASSEMBLY, ON/OFF, POLY, M200, 1' SS BL, CLOSE, FB
8	1	053-0159-015	ENVELOPE, PLASTIC
9	1	016-0171-710	MANUAL, CNH BOOM RECIRCULATION INSTALLATION AND C
10	1	053-0159-109	ENVELOPE, PLASTIC
11	4	107-0171-609	U-BOLT, 2-1/16" W X 3" L X 3/8" THREAD, ZINC PLATED
12	16	214-3000-001	GUARD, HYDRAULIC HOSE, 6", WITH THREE CABLE TIES
13	2	311-4050-224N	HEX BOLT, DIN931, M10 X 30MM, 8.8 STEEL, CLASS V
14	2	312-6001-043N	HEX NUT, NYLOCK, DIN985, M10 X 1.5, CLASS 10, CLASS V
15	2	312-4000-061	NUT, LOCK, NYLON INSERT, 3/8"-16 UNC, STEEL, ZINC PLATED
16	8	312-4000-252	NUT, FLANGE, LOCK, TOP, 3/8-16, CLASS V
17	1	117-0171-804	(LABELED BOX 2 OF 2) KIT, RECIRCULATING BOOM, BOOM PLUMBING, CASE IH PATR

FIGURE 2. Recirculating Boom Upgrade Kit Contents for Case IH (MY 2016 and Older) with CNH ISO Product Controller II (P/N 117-0171-833)

THIS KIT TO CONTAIN THE FOLLOWING ITEMS LISTED BELOW:

ITEM #	QTY	PART #	DESCRIPTION
1	1	053-0159-012	BOX, SHIPPING (BOX 1 OF 2)
2	1	107-0172-680	BRACKET, MOUNTING, RECIRCULATION VALVE, CASE IH PATR
3	1	107-0172-687	BRACKET, BOOM TIP PROTECTOR, RIGHT, CASE IH
4	1	107-0172-688	BRACKET, BOOM TIP PROTECTOR, LEFT, CASE IH
5	1	115-0172-620	CABLE, ISO PRODUCT CONTROL, CASE IH PATRIOT RETROFIT
6	1	117-0171-803	KIT, RECIRCULATING BOOM, WILGER SPRAY TUBE FITTINGS
7	1	334-0001-081	VALVE, ASSEMBLY, ON/OFF, POLY, M200, 1' SS BL, CLOSE, FB
8	1	053-0159-015	ENVELOPE, PLASTIC
9	1	016-0171-710	MANUAL, CNH BOOM RECIRCULATION INSTALLATION AND C
10	1	053-0159-109	ENVELOPE, PLASTIC
11	4	107-0171-609	U-BOLT, 2-1/16" W X 3"L X 3/8" THREAD, ZINC PLATED
12	16	214-3000-001	GUARD, HYDRAULIC HOSE, 6", WITH THREE CABLE TIES
13	2	311-4050-224N	HEX BOLT, DIN931, M10 X 30MM, 8.8 STEEL, CLASS V
14	2	312-6001-043N	HEX NUT, NYLOCK, DIN985, M10 X 1.5, CLASS 10, CLASS V
15	2	312-4000-061	NUT, LOCK, NYLON INSERT, 3/8"-16 UNC, STEEL, ZINC PLATED
16	8	312-4000-252	NUT, FLANGE, LOCK, TOP, 3/8-16, CLASS V
17	1	117-0171-804	(LABELED BOX 2 OF 2) KIT, RECIRCULATING BOOM, BOOM PLUMBING, CASE IH PATR

FIGURE 3. Recirculating Boom Wilger Spray Tube Fittings (P/N 117-0171-803)

THIS KIT TO CONTAIN THE FOLLOWING ITEMS LISTED BELOW:

ITEM #	QTY	PART #	DESCRIPTION
1	1	2 PER KIT	BAG, LABELED "OUTER TIP TO INNER BOOM"
2	6	X	QN Hose Shank - 1" SST x 1-1/4" Sweep 90 Degree
3	4	X	QN 1" SST - Nut
4	8	X	QN O-Ring, viton #219
5	4	X	QN Male Boom End Adapter - 1.315" Tube x 1" SST
6	2	X	QN Sweep Tee - 1 - 1/4" Joint Adapter x 1" SST x 1" SST
7	2	X	QN SST BEFV, Long Handle
8	8	X	TWS square Oring (viton)
9	2	X	Adapter Coupler Body - TWS x 1-1/4" NPTF
10	7	X	TWS Female Nut - 1.315" Tube
11	3	X	QN Hose Shank - 1" SST x 1-1/4" Straight Shank
12	2	X	QN 1" SST - Plug
13	1	2 PER KIT	BAG, LABELED "INNER BOOM"
14	2	X	QN Hose Shank - 1" SST x 1-1/4" Sweep 90 Degree
15	3	X	TWS Female Nut - 1.315" Tube
16	4	X	TWS square Oring (viton)
17	3	X	QN Hose Shank - 1" SST x 1-1/4" Straight Shank
18	3	X	QN Hose Shank - 1" SST x 1-1/4" Sweep 45 Degree
19	1	X	QN SST BEFV, Long Handle
20	1	X	QN Sweep Tee - 1 - 1/4" Joint Adapter x 1" SST x 1" SST
21	1	X	QN 1" SST - Nut
22	3	X	QN O-Ring, viton #219
23	1	X	QN Male Boom End Adapter - 1.315" Tube x 1" SST
24	1	X	Adapter Coupler Body - TWS x 1-1/4" NPTF
25	1	1 PER KIT	BAG, LABELED "CENTER"
26	2	X	TWS square Oring (viton)
27	2	X	Adapter Coupler Body - TWS x 1-1/4" NPTF
28	2	X	QN Male Boom End Adapter - 1.315" Tube x 1" SST
29	6	X	QN O-Ring, viton #219
30	2	X	QN SST BEFV, Long Handle
31	2	X	QN 1" SST - Nut
32	2	X	QN Sweep Tee - 1 - 1/4" Joint Adapter x 1" SST x 1" SST
33	2	X	QN Hose Shank - 1" SST x 1-1/4" Sweep 90 Degree

FIGURE 4. Recirculating Boom Plumbing Kit (P/N 117-0171-804)

THIS KIT TO CONTAIN THE FOLLOWING ITEMS LISTED BELOW:

ITEM #	QTY	PART #	DESCRIPTION
1	120'	X	(LABELED BOX 1 OF 2) EPDM DOUBLE BRAID 1-1/4"
2	100	X	(LABELED BOX 2 OF 2) TIE STRAP, 14-1/4"
3	2	X	TRU-BLU 2OZ FAST DRY SEALANT W/TEFLON
4	1	2 PER KIT	BAG, LABELED "OUTER TIP TO INNER BOOM"
5	1	X	FLANGE, 1" GASKET, VITON
6	1	X	FLANGED CLAMP, 1" SERIES
7	1	X	FLANGED 1" PLUG
8	1	X	FLANGE, 1" X 1.25" BARB 90 ELBOW
9	14	X	HOSE CLAMP - #24, 1-1/4"
10	5	X	1" MPT X 1-1/4" HB, POLY PRO
11	1	X	UNION BALL VALVE, 1" FPT POLY PRO
12	1	X	POLY STREET ELBOW, 1"
13	1	X	HOSE MENDER 1 1/4"
14	1	X	BARBED ELBOW 1 1/4"
15	1	X	POLY PIPE TEE, 1"
16	1	2 PER KIT	BAG, LABELED "INNER BOOM"
17	6	X	HOSE CLAMP - #24, 1-1/4"
18	1	X	FLANGED GASKET VITON, 200 SERIES
19	1	X	FLANGED CLAMP, 2" SERIES
20	1	X	FLANGED PLUG, 2" STD
21	2	X	1" MPT X 1-1/4" HB, POLY PRO
22	1	X	UNION BALL VALVE, 1" FPT POLY PRO
23	1	X	POLY STREET ELBOW, 1"
24	1	X	1 1/4" X 1" REDUCING NIPPLE
25	1	X	POLY PIPE TEE, 1-1/4"
26	1	X	POLY NIPPLE, 1-1/4"
27	1	1 PER KIT	BAG, LABELED "CENTER"
28	8	X	HOSE CLAMP - #24, 1-1/4"
29	6	X	1" MPT X 1-1/4" HB, POLY PRO
30	2	X	POLY PIPE TEE, 1"
31	2	X	POLY NIPPLE, 1"
32	2	X	UNION BALL VALVE, 1" FPT POLY PRO
33	1	1 PER KIT	BAG, LABELED "RETURN & THROTTLING VALVE"
34	3	X	HOSE CLAMP - #24, 1-1/4"
35	1	X	FLANGED TEE, 2"
36	3	X	FLANGED BARB, 2" X 1-1/4" BARB
37	6	X	FLANGE GASKET VITON, 200 SERIES
38	6	X	FLANGED CLAMP, 2" SERIES
39	1	X	FLANGED ELBOW; 2" 45 DEGREE
40	1	X	FLANGED VALVE, 2" STD PORT

FIGURE 5. Recirculating Boom Plumbing Kit (P/N 117-0171-804)

THIS KIT TO CONTAIN THE FOLLOWING ITEMS LISTED BELOW:

ITEM #	QTY	PART #	DESCRIPTION	
41	1	1 PER KIT	BAG, LABELED "DRAIN VALVE"	
42	3	X	HOSE CLAMP - #24, 1-1/4"	
43	3	X	1" MPT X 1-1/4" HB, POLY PRO	
44	1	X	POLY PIPE TEE, 1-1/4"	
45	1	X	POLY NIPPLE, 1-1/4"	
46	1	X	UNION BALL VALVE, 1" FPT POLY PRO	
47	1	1 PER KIT	BAG, LABELED "TANK"	
48	2	X	HOSE CLAMP - #24, 1-1/4"	
49	1	X	FLANGE, 1" X 1.25" BARB	1
50	1	X	FLANGE, 1" X 1.25" BARB, 90 ELBOW	1
51	4	X	FLANGE, 1" GASKET, VITON	
52	4	X	FLANGED CLAMP, 1" SERIES	
53	1	X	VALVE, 1" 3-WAY FLANGED BOTTOM LOAD	
54	1	X	CHECK VALVE, 1" FLANGED	
55	1	X	FLANGED CPLG; 2" FP X 1"	1
56	1	X	SWEEP 2" FP FLANGE X 2" FP FLANGE	
57	5	X	FLANGE GASKET VITON, 220 FP SERIES	
58	5	X	FLANGED CLAMP, 2" FULL PORT SERIES	
59	1	X	CHECK VALVE, 2" FP FLANGED	
60	1	X	FLANGED TEE, 2" FP SERIES	
61	1	X	FLANGE ADAPTER; 2" FP FLANGE X 2" MPT	
62	1	X	2" X 1 1/2" POLY REDUCING COUPLER	1
63	1	X	POLY NIPPLE, 1-1/2"	

UPDATES

Updates for Raven manuals as well as software updates for Raven consoles, and product controllers are available at the Applied Technology Division web site:

<https://portal.ravenprecision.com>

The Raven Service Tool and a laptop PC are required to perform software updates to the ECU. Refer to the Raven Service Tool Operation manual for additional assistance with updating the ECU.

Sign up for e-mail alerts to receive notifications when updates for your Raven products are available on the Raven web site.

At Raven Industries, we strive to make your experience with our products as rewarding as possible. One way to improve this experience is to provide us with feedback on this manual.

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

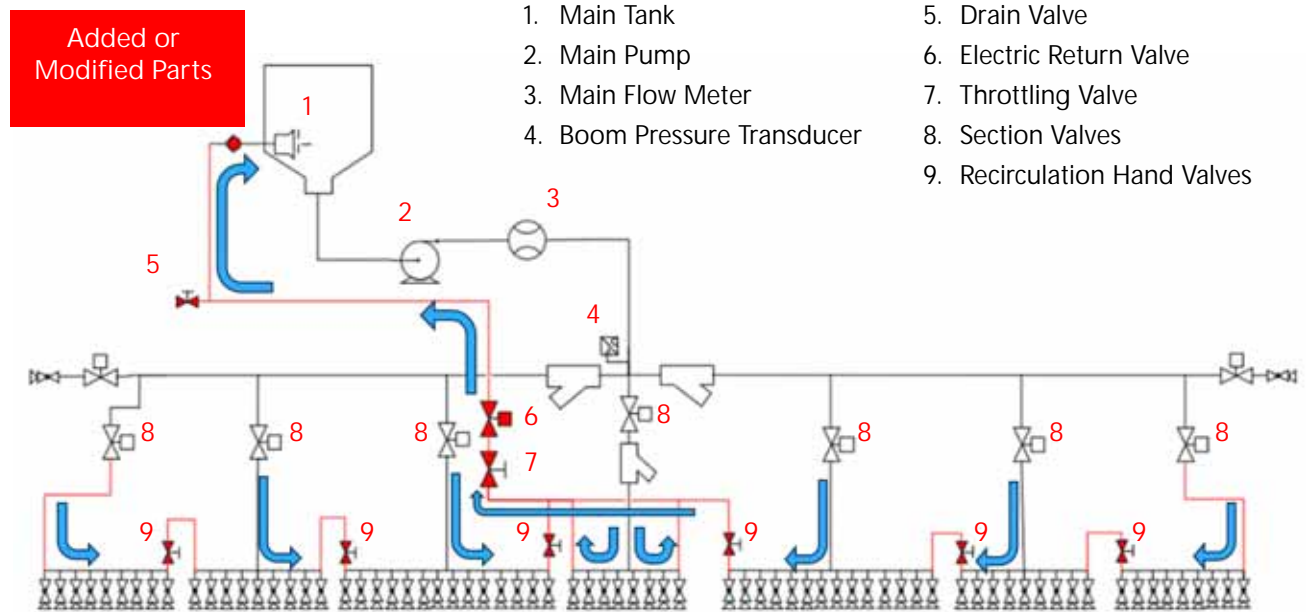
- Case IH Boom Recirculation Installation and Operation Manual
- 016-0171-710 Rev. A
- Any comments or feedback (include chapter or page numbers if applicable).
- Let us know how long have you been using this or other Raven products.

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.

OVERVIEW

FIGURE 1. 7 Example of the Boom Recirculation Update System



CAUTION

- Use thread sealant on all threaded joints.
- Do not over tighten threaded joints.
- Use provided hose-protectors where sharp edges contact hoses.
- Hose lengths shown are for reference only. Ensure hoses are routed to prevent interference, pinching, or stretching while folding or unfolding the booms.

ASSEMBLE AND MOUNT THE RETURN AND THROTTLING VALVE

FIGURE 2. Assembly of the Throttling and Electric Return Valve

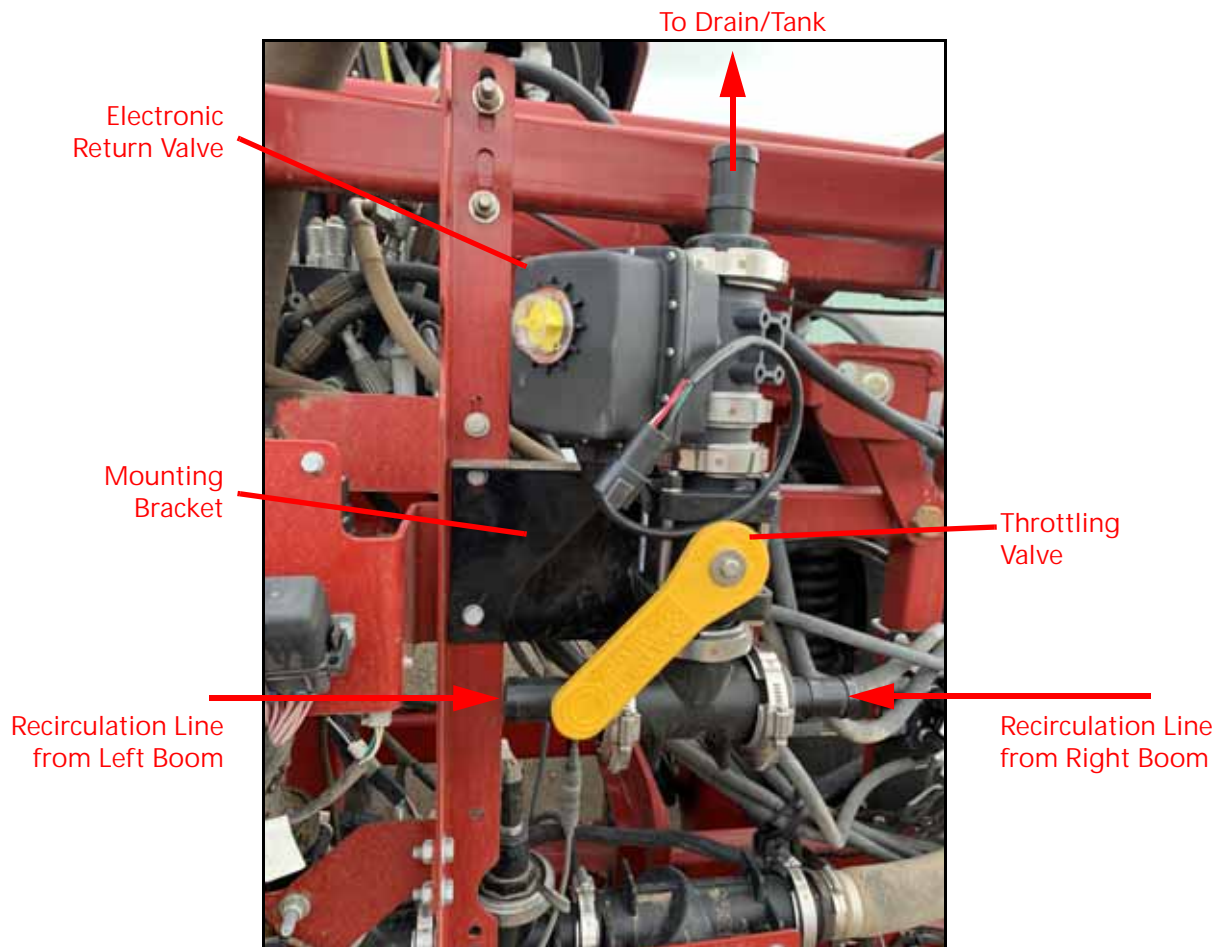


1. Assemble the Electronic Recirculation Valve (P/N 334-0001-081) and throttling valve assembly as shown in Figure 2 on page 14.
2. Mount the throttling valve to the valve mounting bracket (P/N 107-0172-680) by replacing two of the existing standard 3/8" nuts on the throttling valve with the provided 3/8" nyloc nuts.

NOTE: Assemble with the cable of the electronic recirculating valve facing down and the handle of the throttling valve pointing away from the return valve when in the open position.

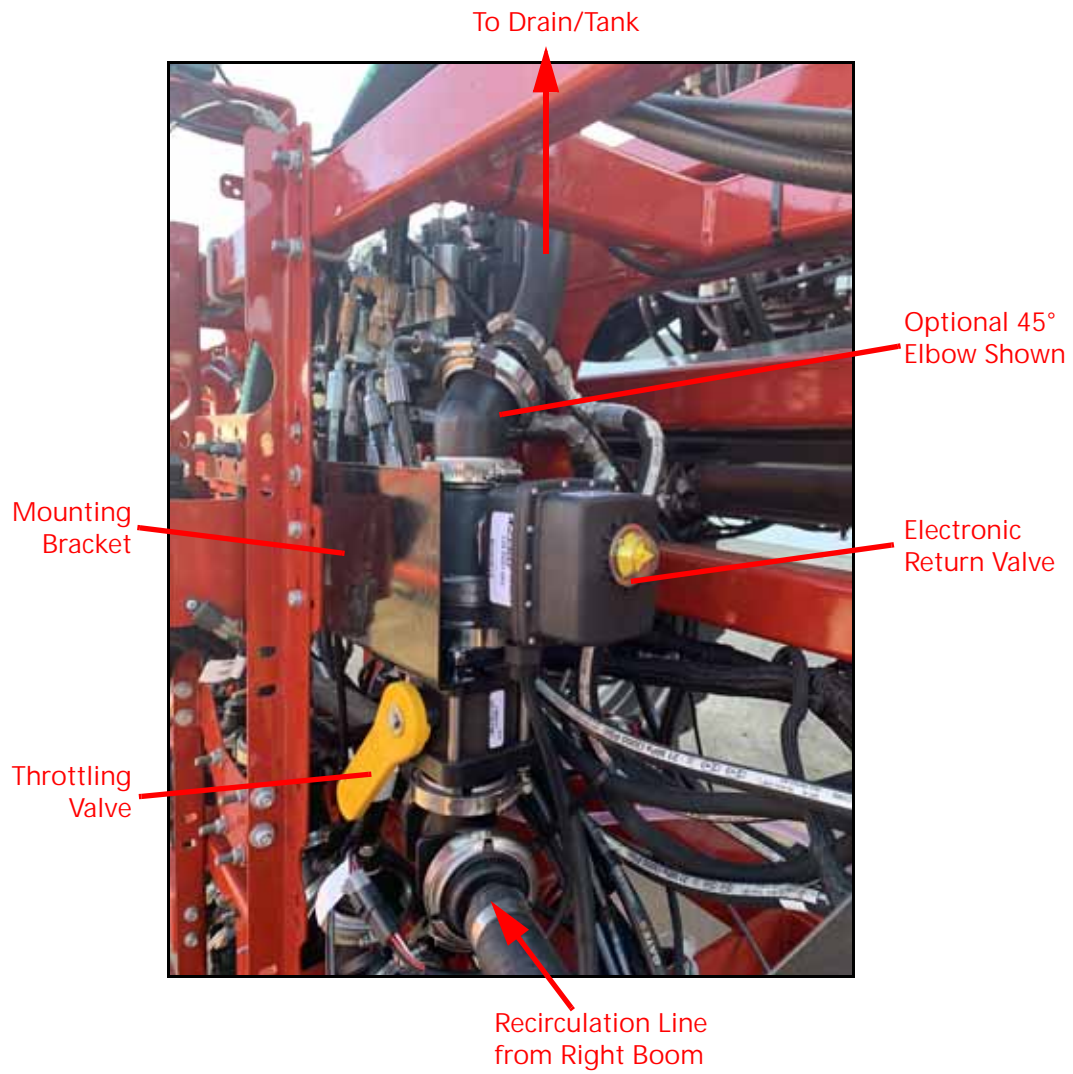
3. Once assembly is complete, mount the bracket to the center rack at the rear of the machine using the supplied hardware.

FIGURE 3. Throttling Valve and Electronic Recirculation Valve Mounted (90', 100', and 120' Booms)



NOTE: Depending upon center rack structure and plumbing routing, a 45° elbow fitting may be installed on the outlet of the electronic return valve. Use of the 45° elbow will be common on 135' and 132' center rack structures.

FIGURE 4. Throttling Valve and Electronic Recirculation Valve Mounted (132' and 135' Booms)



PLUMB THE DRAIN AND TANK RETURN

FIGURE 5. Tank and Drain Recirculation Plumbing Diagram

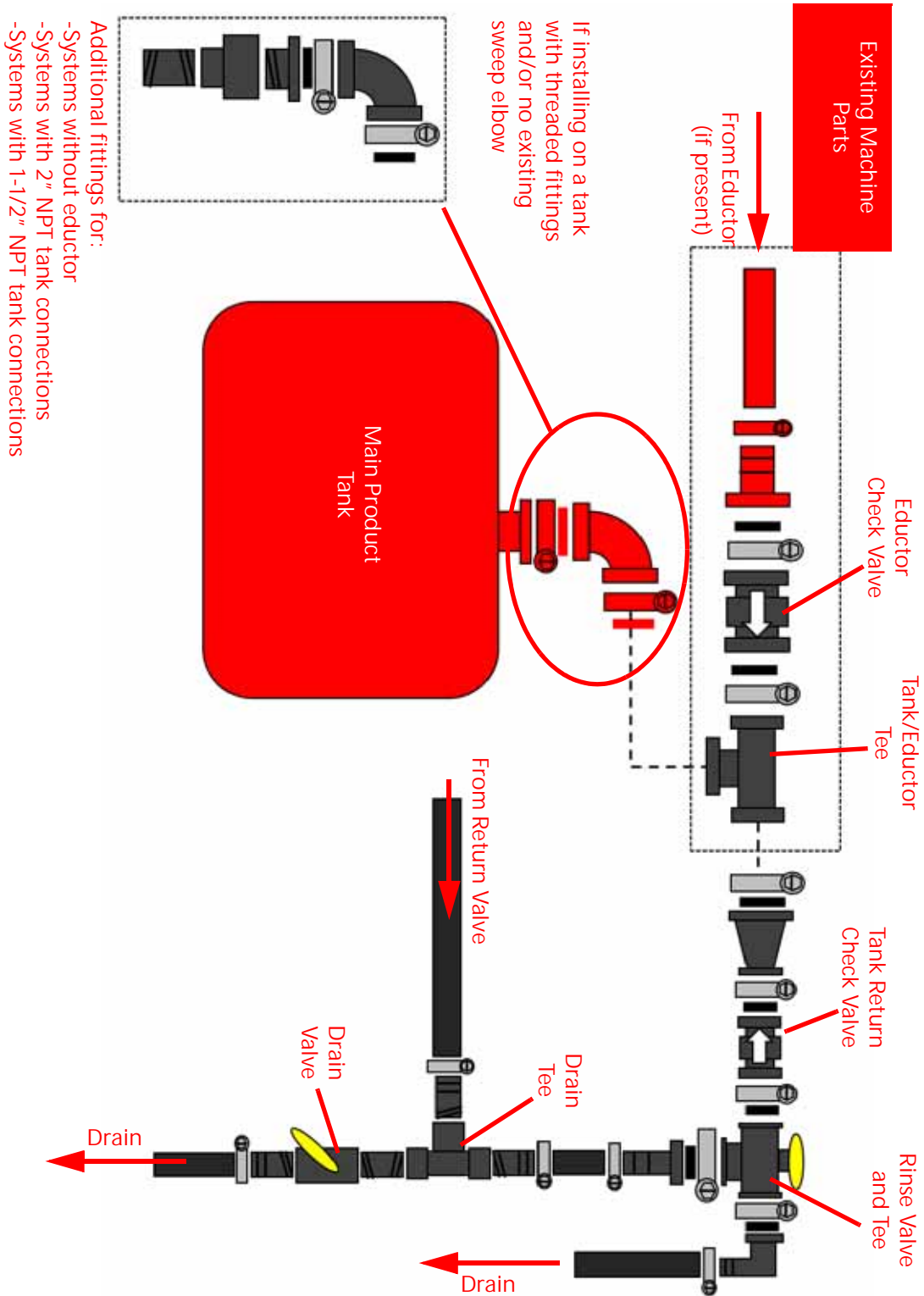
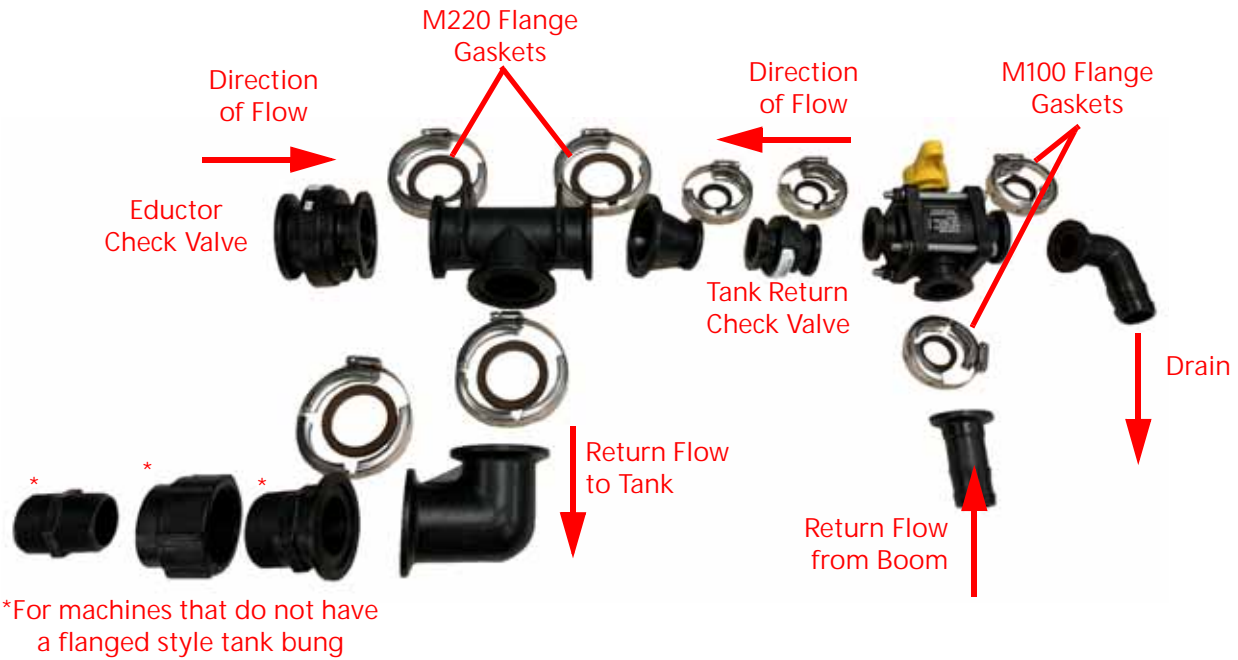


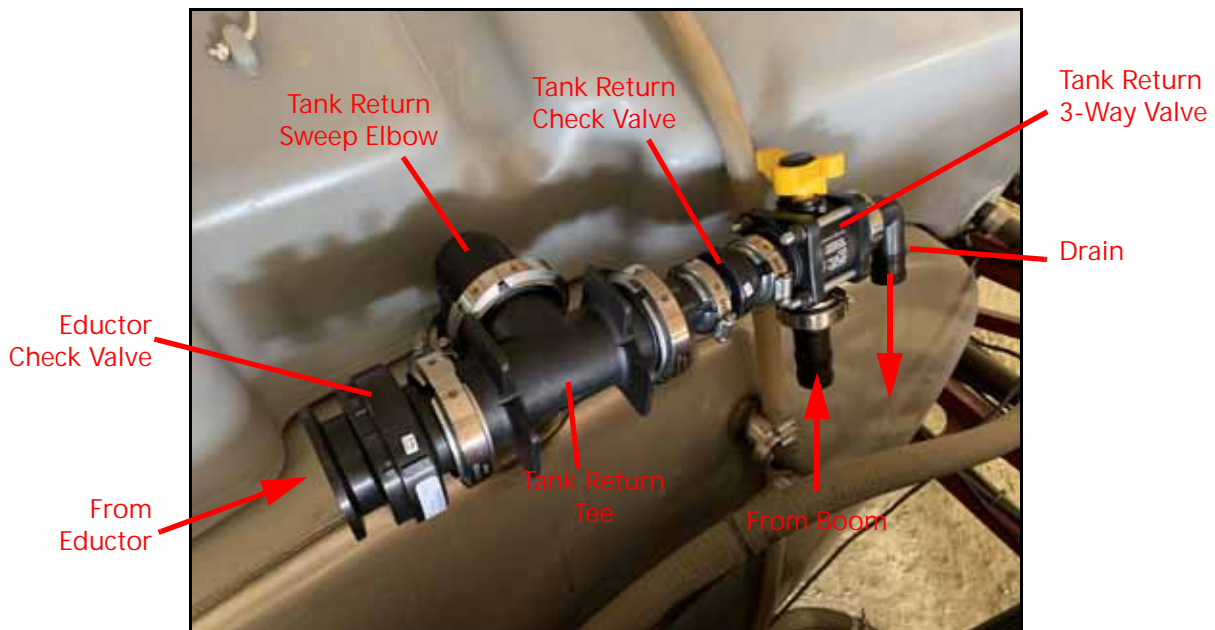
FIGURE 6. Assembly of Tank Return Tee and Check Valves



1. Assemble and attach tee and check valves to the existing eductor tank inlet at the top, rear of the product tank.

NOTE: Eductor hose may need to be shortened to accommodate assembly.

FIGURE 7. Eductor Tee and Check Valve Assembly and Installation



2. Assemble tank and drain plumbing as shown in Figure 9 on page 20.

3. Route a hose from the electronic return valve to the drain plumbing.


	<p style="text-align: center;">CAUTION</p> <p>Route hose away from moving parts and pinch points, generally following existing hose routing.</p> <p>Install hose protectors as needed along sharp edges.</p>
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FIGURE 8. Route Return Valve to Drain Valve

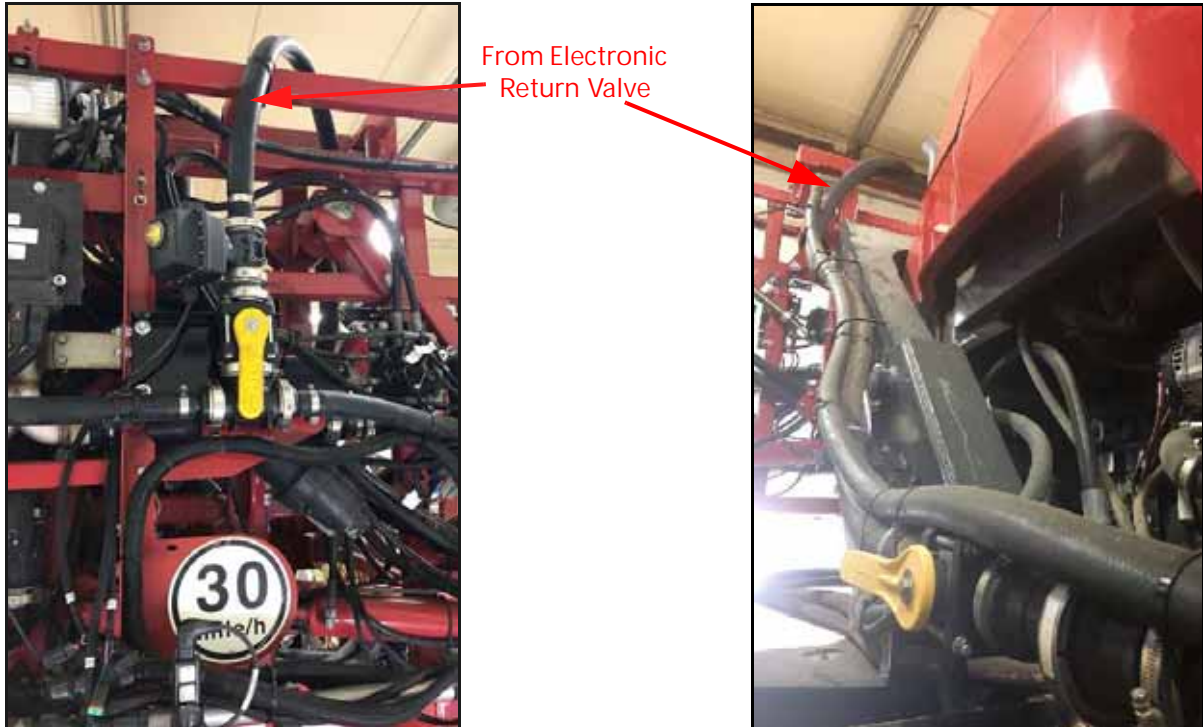


FIGURE 9. Drain Valve and Drain Hose

Drain Valve Assembly



Drain Valve



FIGURE 10. Return Hose Routing



CENTER BOOM SECTIONS

NOTE: Use thread sealant for boom end flush valve joint only. Do not over-tighten the flush valve as the fitting can split.

FIGURE 11. Center Boom Plumbing for 7-Section (135', 132', 120') and 5 and 6-Section (90') Boom Configurations

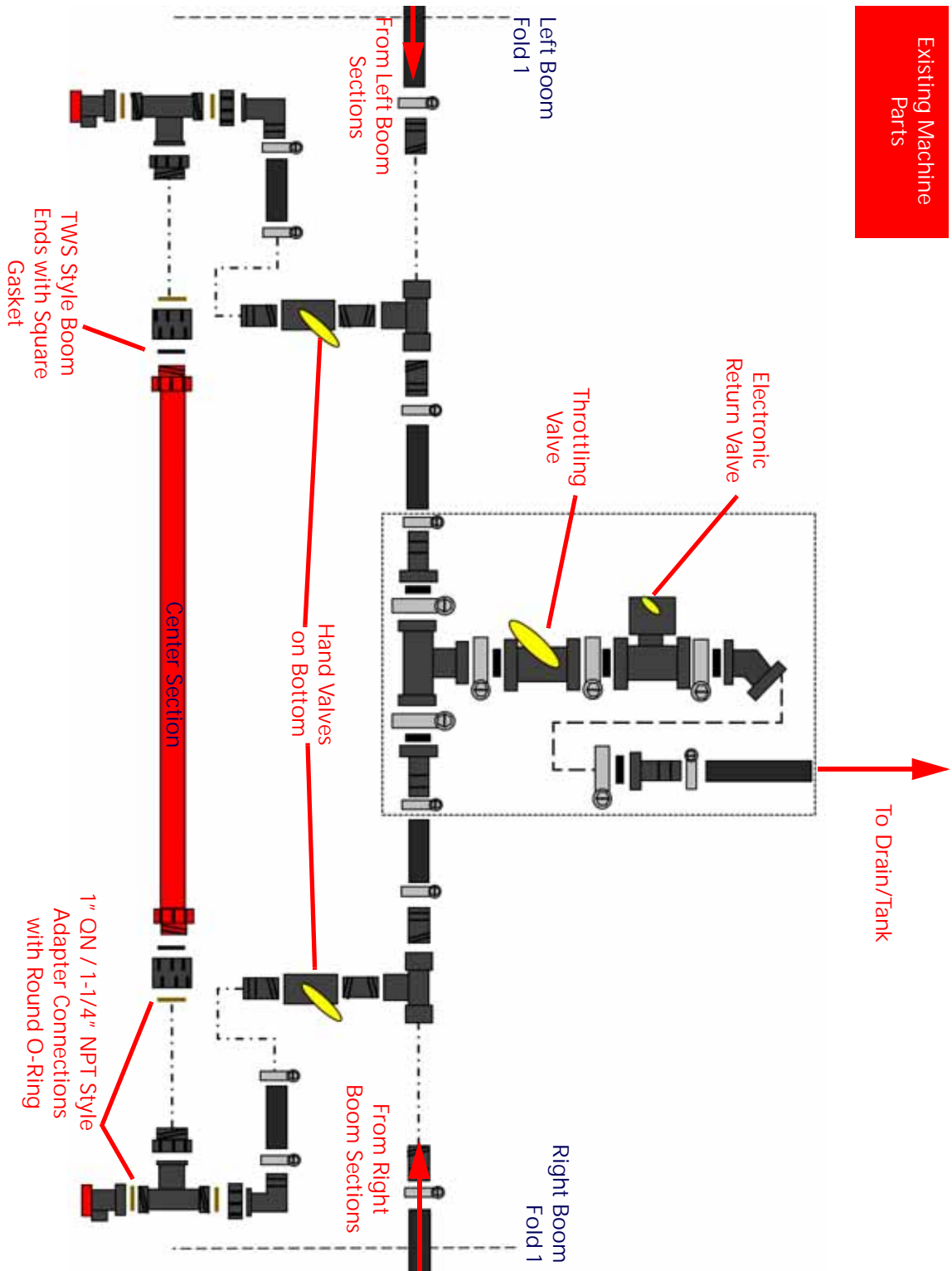
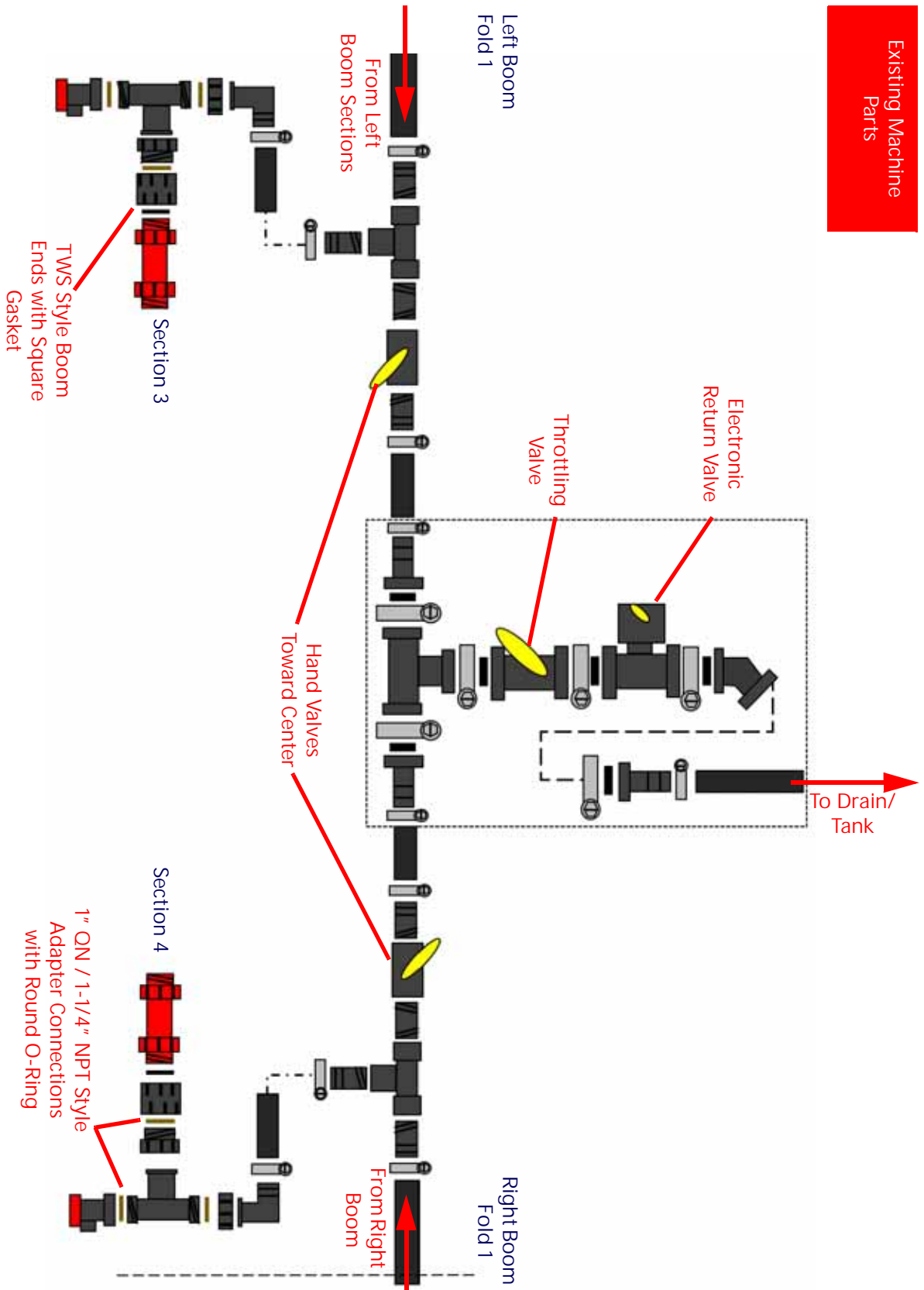


FIGURE 12. Center Boom Plumbing for 100' and 90' 6-Section Boom Configurations



1. Assemble the remaining plumbing for the center section(s) as shown in Figure 11 on page 21 or Figure 12 on page 22.

FIGURE 13. Center Boom Section Plumbing Example (5 and 7 Section - 135', 132', 120', 90' Booms)

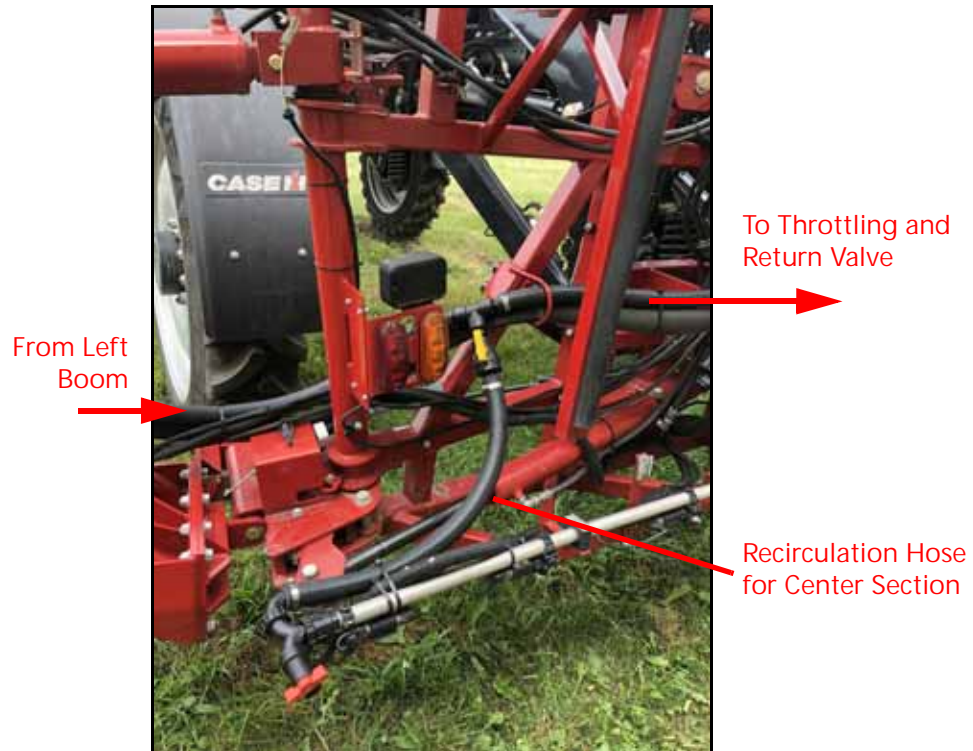


FIGURE 14. Center Boom Section Plumbing Example (6 Section - 100' and 90' Booms)

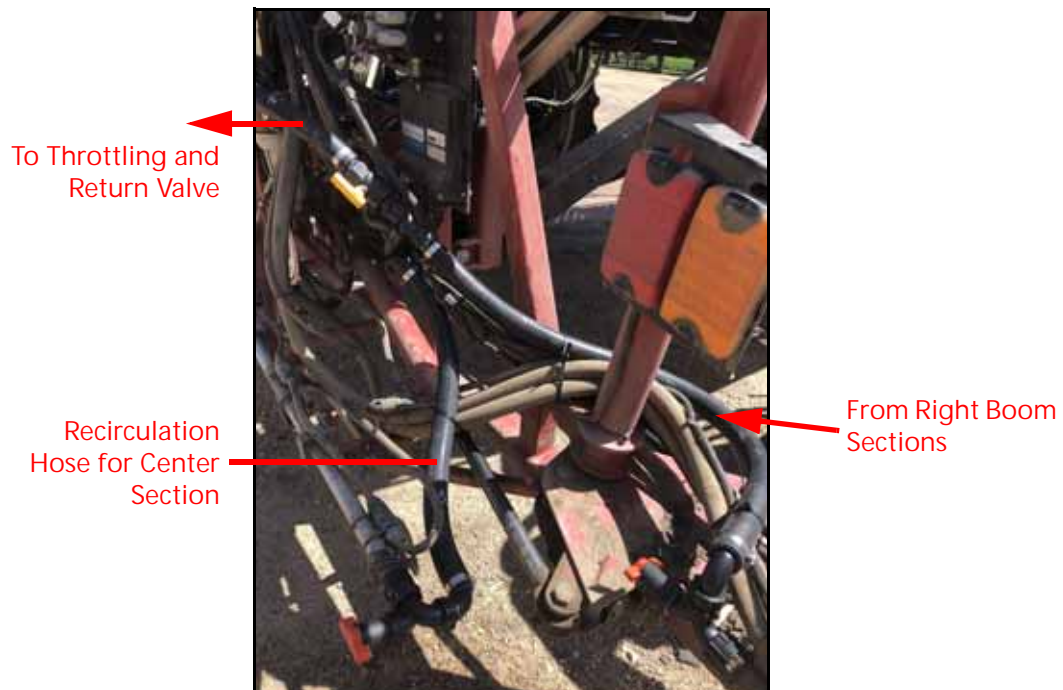


FIGURE 15. Assembly of End Fittings



NOTE: Use thread sealant for boom end flush valve joint only. Do not over-tighten the flush valve as the fitting can split.

FIGURE 16. Assembly Examples of the Left and Right Recirculation Hand Valve Tees

135', 132', 120', and 90' Booms
5 Section



100' and 90' Booms
6 Section



INNER BOOM SECTION

NOTE: Use thread sealant for boom end flush valve joint only. Do not over-tighten the flush valve as the fitting can split.

FIGURE 17. Inner Boom Plumbing for 135' and 132' Boom Configuration

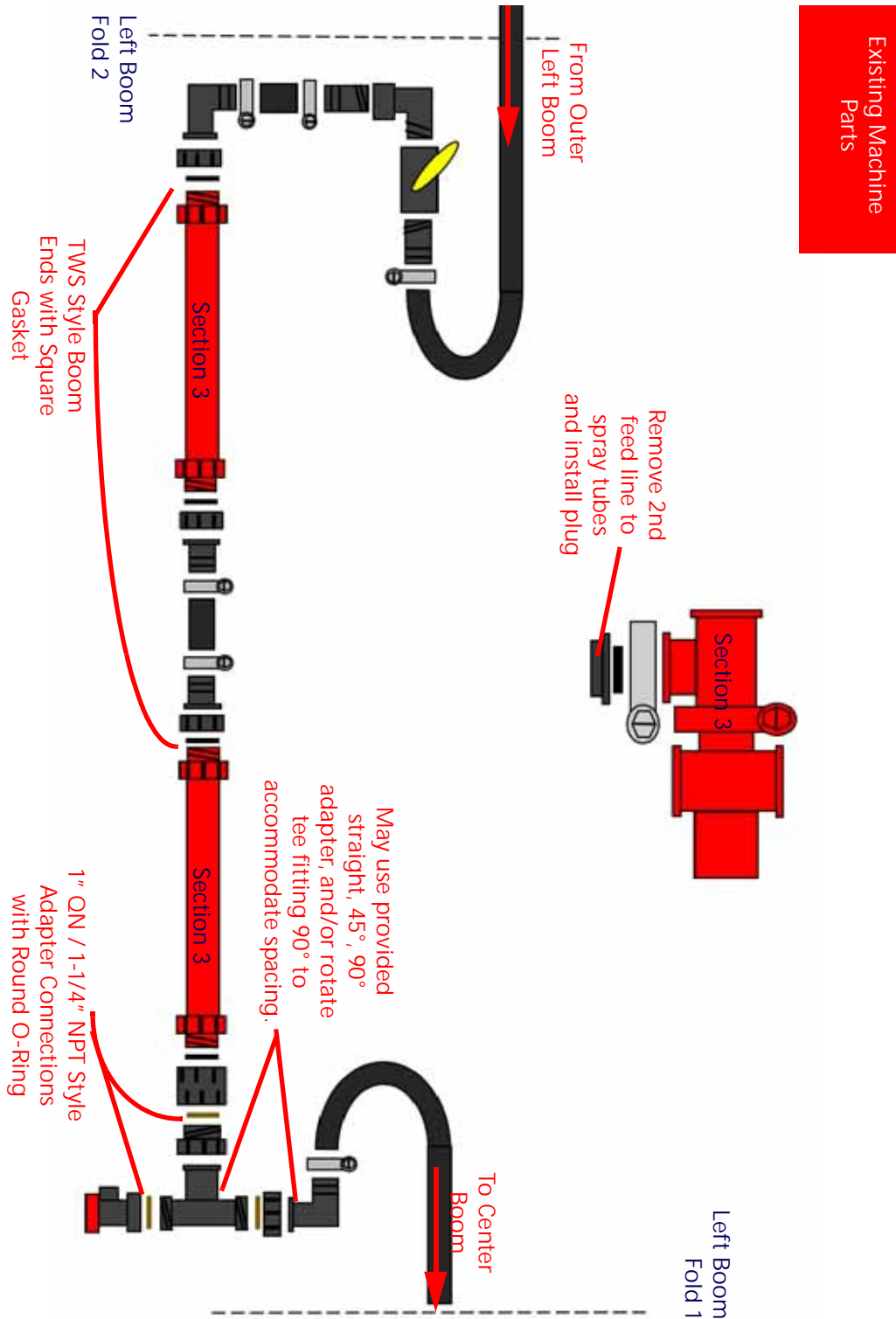


FIGURE 18. Inner Boom Plumbing for 120' Boom Configurations

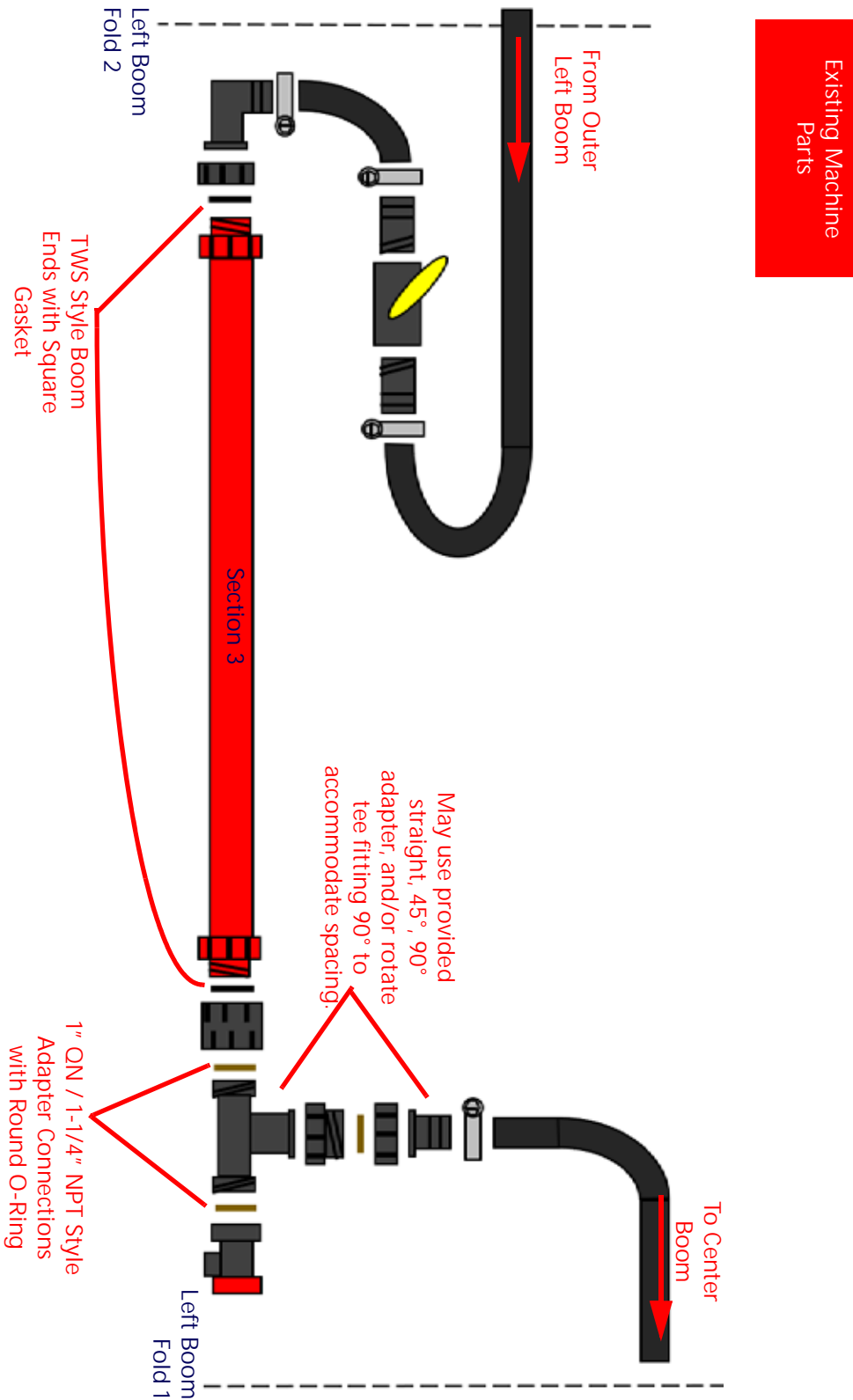


FIGURE 19. Inner Boom Plumbing for 120' Boom Configurations



FIGURE 20. Inner Boom Plumbing for 100' Boom Configurations

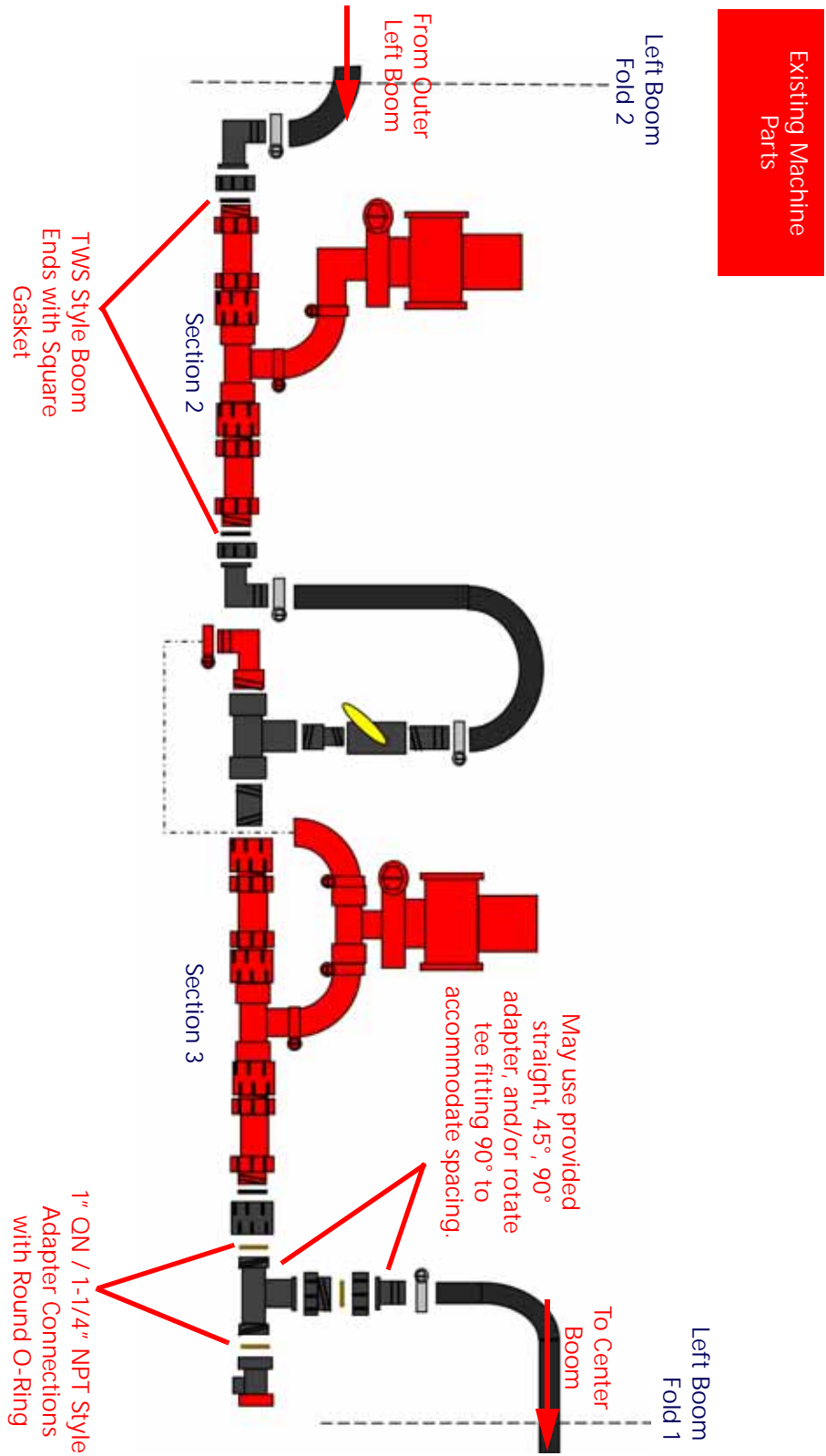


FIGURE 21. Inner Boom Plumbing for 100' Boom Configurations



FIGURE 22. 120' Boom Configuration Outer Fold Joint (Fold 3)



OUTER BOOM SECTION

NOTE: Use thread sealant for boom end flush valve joint only. Do not over-tighten the flush valve as the fitting can split.

FIGURE 23. Outer Tip Plumbing for 135' and 132' Boom Configurations

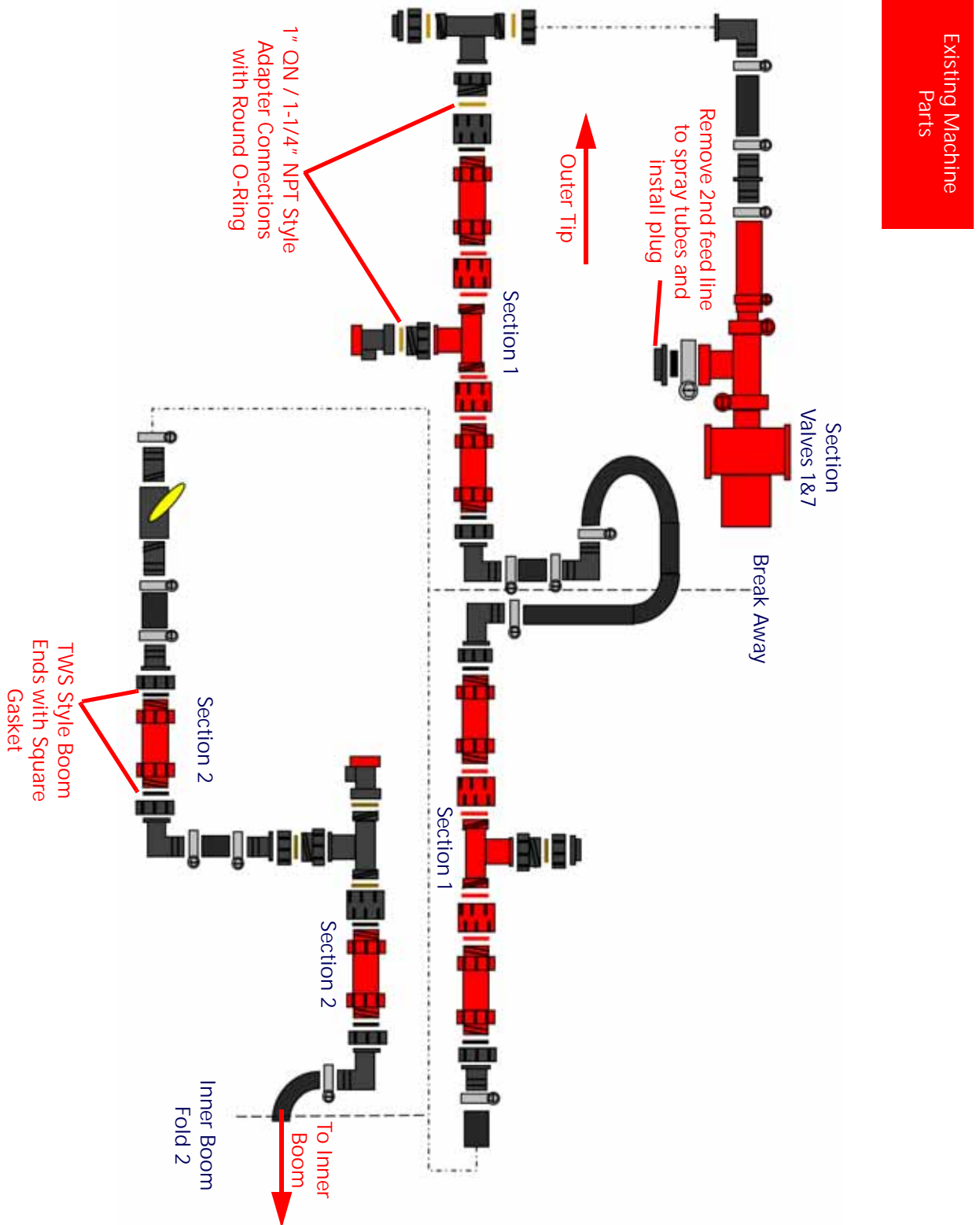
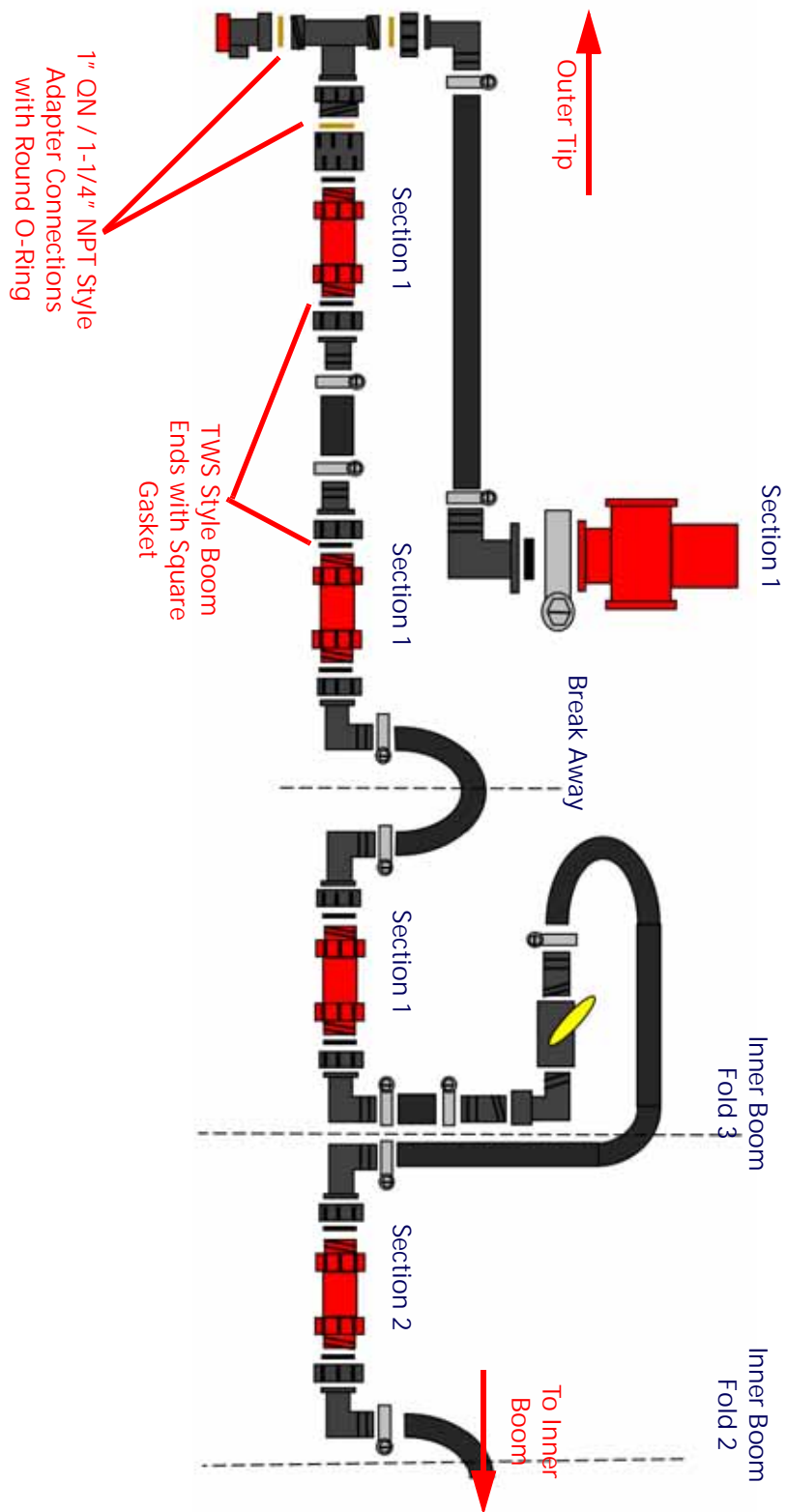


FIGURE 24. Outer Tip Plumbing for 120' Boom Configurations



Existing Machine Parts

FIGURE 25. Outer Tip Plumbing for 100' Boom Configurations

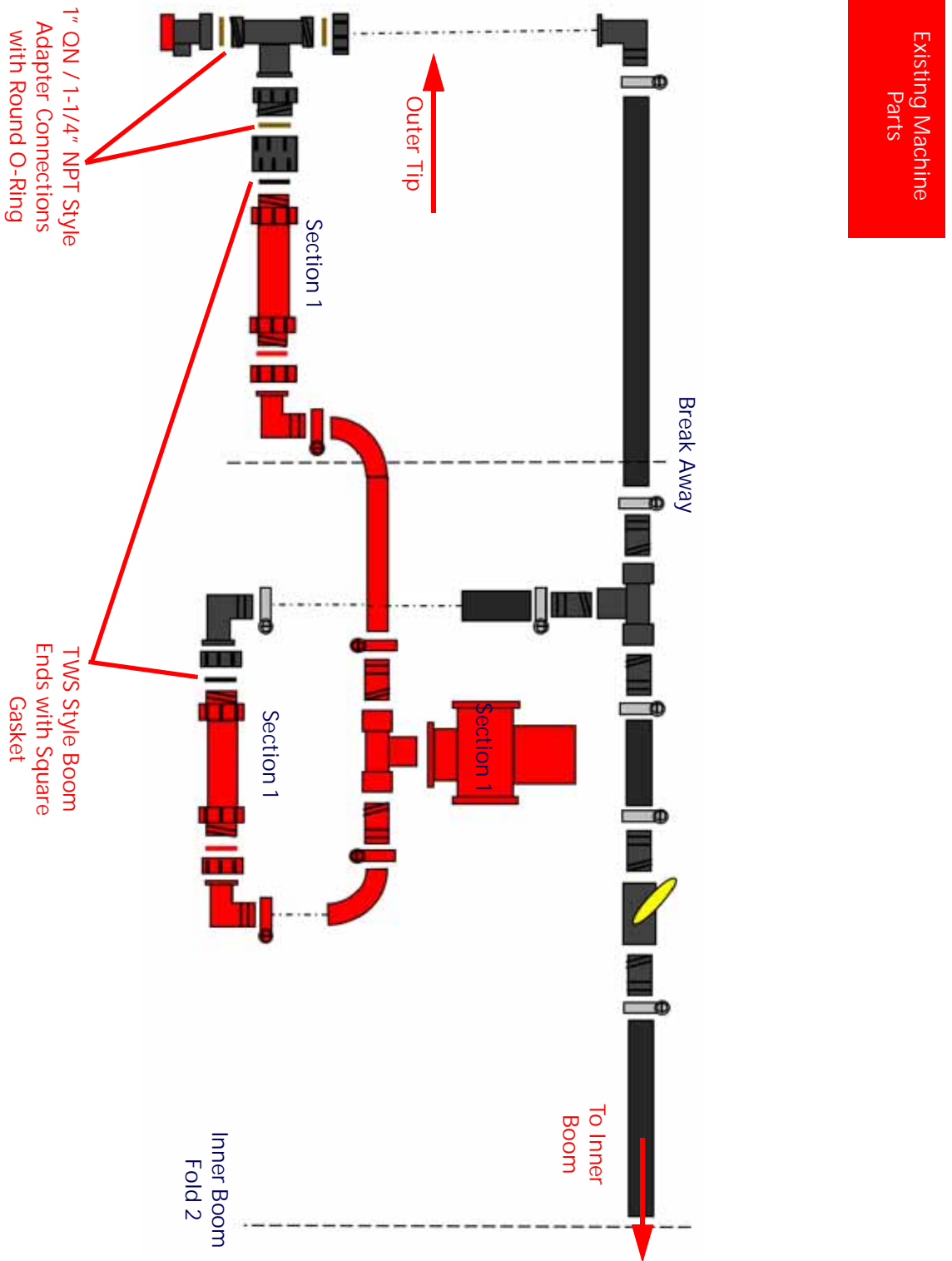


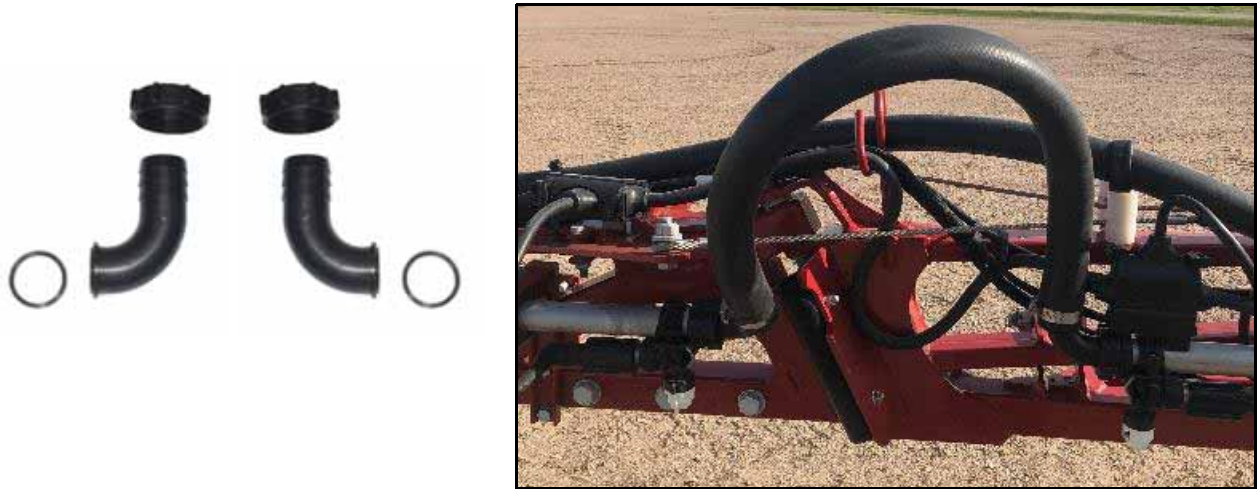
FIGURE 26. Outer Tip Plumbing for 100' Boom Configurations



FIGURE 27. Boom Breakaway Tube Plumbing



FIGURE 28. Boom Breakaway Joint Fittings



TIP PROTECTOR BRACKET

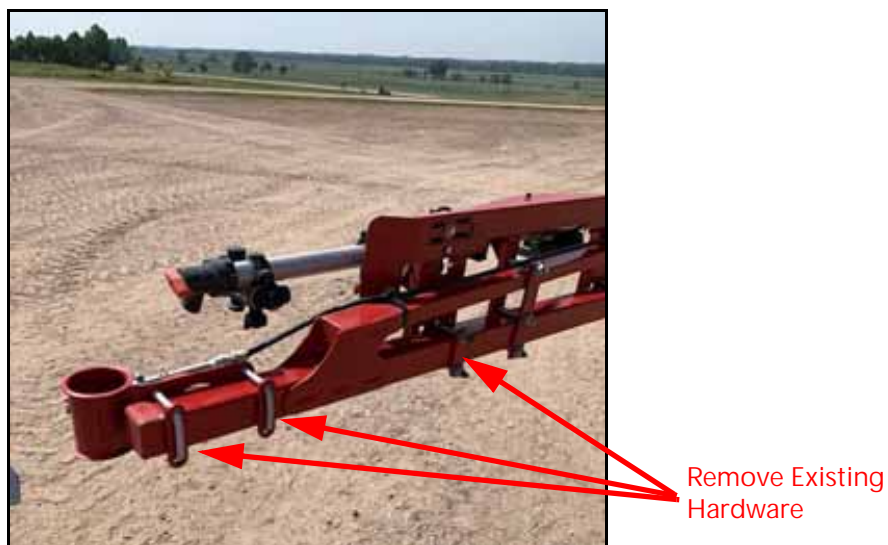
NOTE: Tip protector brackets (P/N 107-0172-687 and 107-0172-688) are not used on 135' and 132' boom configurations.

1. Locate the foam marker bracket at the outer end of each boom tip.

NOTE: Not all machines are equipped with the foam marker bracket and hardware. If the machine is not equipped, utilize the provided U-bolts to mount the tip protector bracket to the boom structure.

NOTE: If the foam marker bracket is mounted to the front side of the boom structure, it will need to be relocated to the back side of the boom structure, as shown below.

FIGURE 29. Foam Marker Hardware

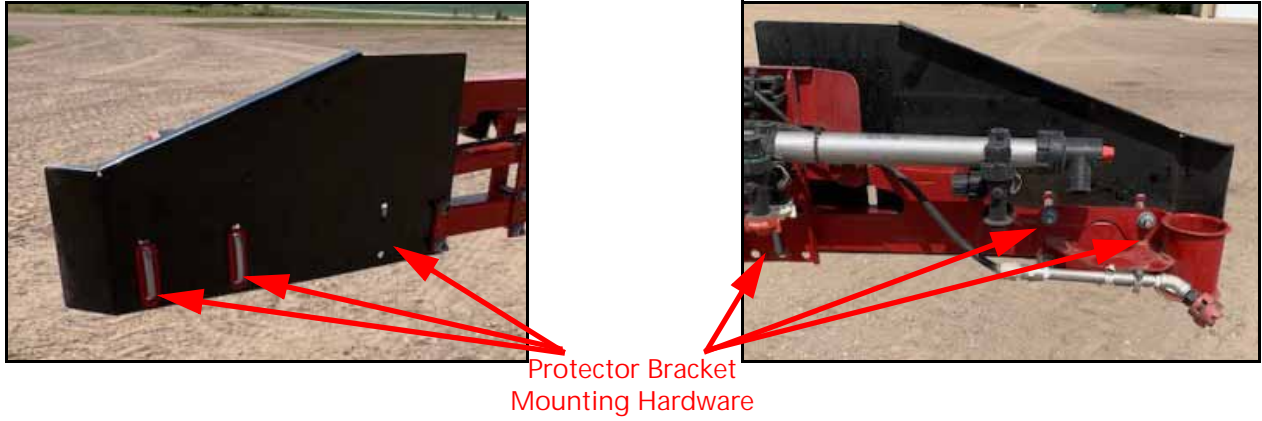


2. Remove the existing machine hardware. Set it aside as it will be reused to mount the tip protector bracket.

- Utilize the existing machine hardware to mount the left and right tip protector brackets to the boom structure.

NOTE: It may be necessary to adjust the position of the wet boom support to align with the holes in the tip protector bracket.

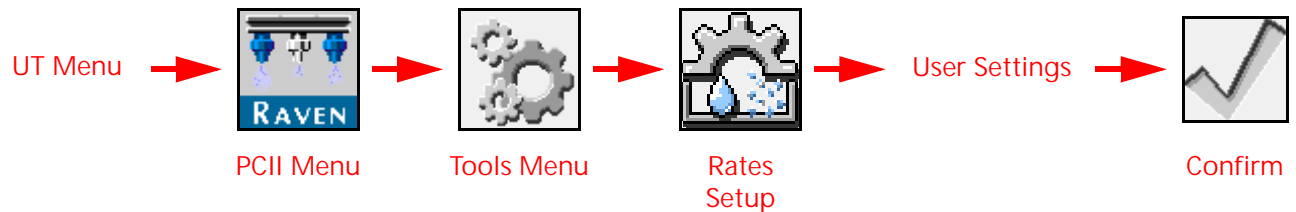
FIGURE 30. Foam Marker Hardware



 SETUP

ENABLE MAIN PRODUCT RECIRCULATION

To turn on main product recirculation:



1. Open the UT Menu and select the Product Controller II Menu button.
2. Select the Tools Menu softkey along the right side of the display.
3. Select the Rates Setup tab along the top of the display.
4. Select the User Settings tab and select the Next button in the lower, right corner twice to display the Boom Recirculation check box option.
5. Enable the Boom Recirculation feature.

NOTE: The system will display a prompt for the operator to confirm that the plumbing of the system will support boom recirculation features. Once confirmed, the Boom Recirculation softkey will be displayed on the Home page.

6. Enable the Auto Recirculate feature to allow the system to automatically initiate the recirculation system any time the system is not spraying.

NOTE: Recirculation will always stop automatically when normal spraying is initiated or when tank fill operations are started.

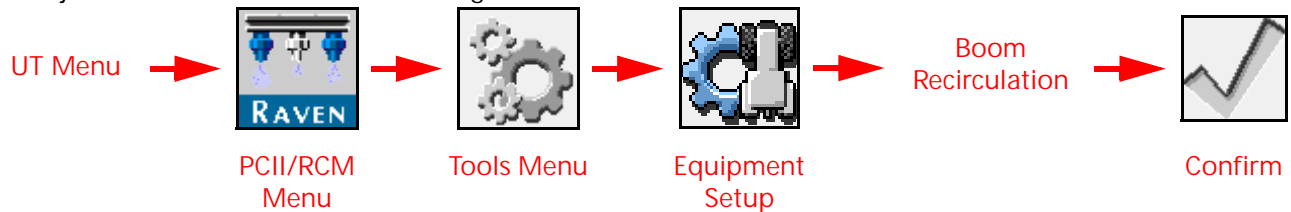
The operator may also manually stop recirculation by selecting the Recirculation softkey on the Home page. Pressing this button disables the Auto Recirculation feature and returns the system to Manual Recirculation Mode.

7. The Boom Recirculation softkey will be displayed on the Home page.



ADJUST RECIRCULATION TIMES

To adjust the time allowed for recirculating each section:



1. Open the UT Menu and select the Product Controller II Menu button.
2. Select the Tools Menu softkey along the right side of the display.
3. Select the Equipment Setup tab along the top of the display.
4. Use the next button to access the Section Auto-Operation Times page.
5. This page allows the operator to adjust the section recirculation times for the specific application system or current chemical suspension.

OPERATION

REQUIRED CONDITIONS FOR RECIRCULATION

The following conditions are required to initiate the boom recirculation feature:

- Confirm that the Boom Recirculation feature is enabled. Review *Enable Main Product Recirculation* section on page 37.
- Ensure the tank fill feature is not enabled.
- Toggle the product pump on (switch/softkey).
- Ensure all boom sections are toggled on.
- Ensure the active spray width is zero.
- Recirculation hand valves between sections must be open.

NOTE: Boom Recirculation is not supported in Bypass, High-Flow, or High-Flow VP control modes. The crossover hand valves need to be manually closed when operating in one of those previously listed control modes.

- Either enable the Auto Recirculate feature or manually initiate recirculation by selecting the Recirculation softkey on the Home page.

WHAT TO EXPECT WHILE RECIRCULATION IS ACTIVE

NOTE: When operating in Auto Recirculation Mode, it is recommended to adjust the Standby PWM% value so that recirculation pressure is close to the application pressure used during application.

When recirculation is active:

- The main product pump runs at the “Standby PWM%” value.
- Section valves will cycle “On” sequentially in pairs from the outermost to innermost sections for the user-defined recirculation time.

NOTE: NCVs on each section will remain off.

- The system will continue to monitor the main flow meter to ensure product is circulating. If the product recirculation is less than the low limit of the flow meter, the system will display an alert, but recirculation will continue.
- The boom pressure transducer is monitored to ensure the system pressure stays within the minimum and maximum allowable pressures. The main product pump will shutdown if the boom pressure exceeds the minimum (2 PSI) or maximum (150 PSI) pressure.
- Section valves will continue to cycle sequentially unless spraying or shutdown conditions are met.
- The drain valve will be used to drain out any product in the recirculation line when rinsing the boom.

NOTE: It is recommended to rinse the system with the boom unfolded to prevent circulating with pinched supply hoses.

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 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.