

TC1/HDU Installation
Manual for Buhler
Versatile Row Crop Steer-
Ready (MY2015 & Newer)

016-5031-103 Rev. B

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CHAPTER

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IMPORTANT SAFETY INFORMATION

NOTICE

Read this manual and the operation and safety instructions included with your implement and/or controller carefully before installing the TC1™ system.

- Follow all safety information presented within this manual.
- If you require assistance with any portion of the installation or service of your Raven equipment, contact your local Raven dealer for support.
- Follow all safety labels affixed to the TC1 system components. Be sure to keep safety labels in good condition and replace any missing or damaged labels. To obtain replacements for missing or damaged safety labels, contact your local Raven dealer.

When operating the machine after installing TC1, observe the following safety measures:

- Be alert and aware of surroundings.
- Do not operate TC1 or any agricultural equipment while under the influence of alcohol or an illegal substance.
- Remain in the operator position in the machine at all times when TC1 is engaged.
- Disable TC1 when exiting the operator seat and machine.
- Do not drive the machine with TC1 enabled on any public road.
- Determine and remain a safe working distance from other individuals. The operator is responsible for disabling TC1 when the safe working distance has diminished.
- Ensure TC1 is disabled prior to starting any maintenance work on TC1 or the machine.

WARNING

- Do not use hands to check for leaks. Hydraulic fluid under pressure can penetrate the skin and cause serious injury or death.
- When starting the machine for the first time after installing TC1, be sure that all persons stand clear in case a hose has not been properly tightened.
- The machine must remain stationary and switched off during TC1 installation or maintenance.

 **CAUTION**

HYDRAULIC SAFETY

- Raven Industries recommends that appropriate protective equipment be worn at all times when working on the hydraulic system.
- Never attempt to open or work on a hydraulic system with the equipment running. Care should always be taken when opening a system that has been previously pressurized.
- When disconnecting the hydraulic hoses or purging is required, be aware that the hydraulic fluid may be extremely hot and under high pressure. Caution must be exercised.
- Any work performed on the hydraulic system must be done in accordance with the machine manufacturer approved maintenance instructions.
- When installing TC1 hydraulics or performing diagnostics, maintenance, or routine service, ensure that precautions are taken to prevent any foreign material or contaminants from being introduced into the machine hydraulic system. Objects or materials that are able to bypass the machine hydraulic filtration system will reduce performance and possibly damage the TC1 valve.

ELECTRICAL SAFETY

- Always verify that the power leads are connected to the correct polarity as marked. Reversing the power leads could cause severe damage to the equipment.
- Ensure that the power cable is the last cable to be connected.

CHAPTER

INTRODUCTION

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

MAKE: Buhler Versatile
MODEL: Row Crop 265, 295, 315, 335, 365
YEAR: 2015 & Newer

FIGURE 1. Buhler Versatile Row Crop 365



UPDATES

Software and manual updates are available on the Raven Applied Technology website.

<http://www.ravenhelp.com>

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

- TC1/HDU Installation Manual for Buhler Versatile Row Crop Steer-Ready (MY2015 & Newer)
- 016-5031-103 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.

PREPARING FOR INSTALLATION

Before installing the TC1 system, park the machine where the ground is level, clean, and dry. Bleed pressure from the hydraulic system and leave the machine turned off for the duration of the installation process.

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

- Ensure the machine hydraulic filters have been recently changed and there are no issues with the machine hydraulic system (e.g., pump issues, faulty hydraulic motors, fine metal deposits in the hydraulic hoses, etc.).
- Ensure the machine hydraulic system is using fresh oil and debris is flushed from the hydraulic hoses, valves, and filters.

Raven Industries recommends the following best practices when installing the TC1 system:

- Use part numbers to identify the parts.
- Do not remove the plastic wrap from a part until it is necessary for installation.
- Do not remove plastic caps from a part until it is necessary for installation.

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 TC1 kit. Before beginning the TC1 installation, compare the items in the TC1 kit with the components on this list. If you have questions about the kit, contact your Raven dealer.

FIGURE 2. TC1/HDU Kit for Versatile Row Crop (MY 2015 and Newer)

THIS KIT TO CONTAIN THE FOLLOWING ITEMS LISTED BELOW:

#	QTY	PART #	DESCRIPTION
	1	053-0159-079	BOX, SHIPPING
	1	016-0171-649	SHEET, WARRANTY/HELP (016-5031-103)
	1	063-0173-887	ECU, HYDRAULIC DRIVE UNIT (HDU)
	1	063-0174-070	ECU, ISO, TC1, LOW SPEED STEERING
	1	115-4010-127	CABLE, HDU, RS1, VERSATILE TRACTORS
	1	115-4010-129	CABLE, HDU, VALVE, RS1, VERSATILE ROW CROP TRACTORS, N
	1	063-0173-961	ASSEMBLY, MASTER SWITCH, RS1
	1	107-0172-648	BRACKET, TC1/HDU, VERSATILE ROW CROP TRACTORS
	1	115-7300-073	CABLE, CAN/POWER, RAVEN/ISO BULKHEAD TO VT, 21P RECE
	1	053-0159-074	ENVELOPE, PLASTIC
	1	118-0159-056	HOUSING, ROCKER SWITCH, BASE
	1	118-0159-057	HOUSING, ROCKER SWITCH, COVER
	2	311-4051-136K	HEX BOLT, DIN931 M6X20MM
	4	312-4000-057	NUT, LOCK, NYLON INSERT 1/4"-20
	4	311-0008-027	SCREW, #4-40 UNC X 1/2" PHILLIPS

CHAPTER

3

CAB COMPONENT INSTALLATION

INSTALL THE TC1 AND HDU NODES

MOUNT THE TC1 AND HDU NODES

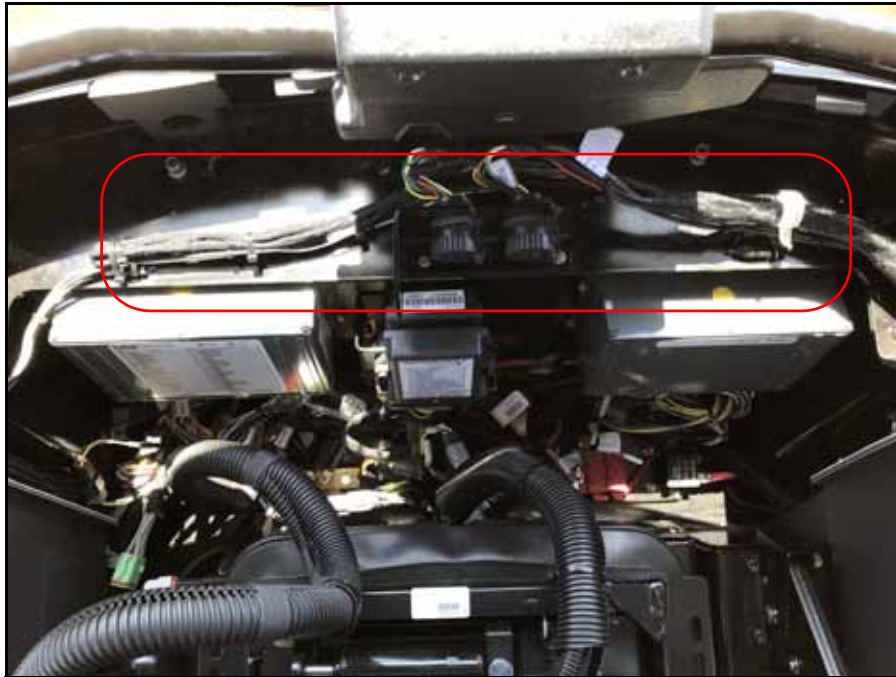
1. Mount the TC1 (P/N 063-0174-070) and the HDU (P/N 063-0173-887) nodes to the cab bracket (P/N 107-0172-648).

FIGURE 1. TC1 and HDU Node Mounting Bracket



2. Secure the nodes to the bracket using the supplied 1/4"-20 lock nuts.

FIGURE 2. Node Mounting Location Before Installation



3. Remove the rear panel behind the operator seat.
4. Remove the two brass bolts securing the bracket with the 2 round connectors.
5. Place the node mounting bracket assembly under the panel latch bracket.
6. Secure with the supplied M6x20mm bolts.

FIGURE 3. Node Mounting Location After Installation



INSTALL THE NODE HARNESS

FIGURE 4. 6-Pin Deutsch Connector on Node Harness



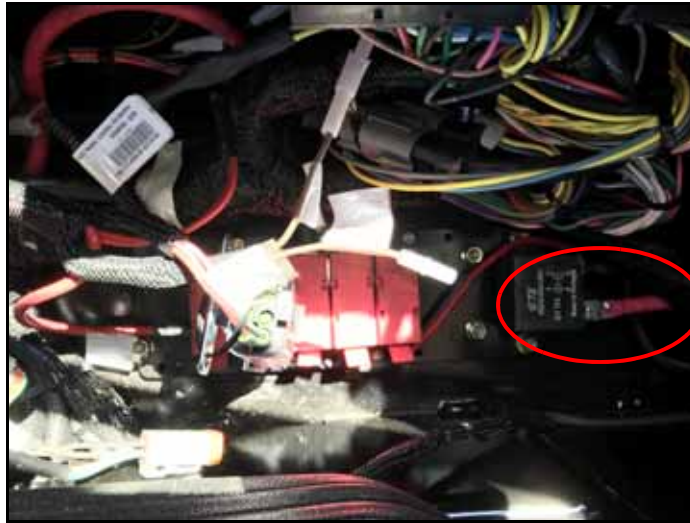
1. Connect the PWR/ENABLE 6-pin Deutsch connector to the mating connector on the machine harness.

FIGURE 5. Machine Ground Bus Bar



2. Locate the machine ground bar on the right side of the compartment.
3. Install the two ground wires on the grounding bar.
4. Locate the fuse panel on the right side of the compartment.
5. Remove the bolt from the machine red battery cable.

FIGURE 6. Positive Bus Bar



6. Install the one power wire from the node cable on the bolt.

NOTE: It may be necessary to cut the ring terminals from the power wires and crimp new ring terminals (P/N 405-0200-052 or 405-0200-053) on the end.

7. Reinstall the machine red battery cable on the bolt.

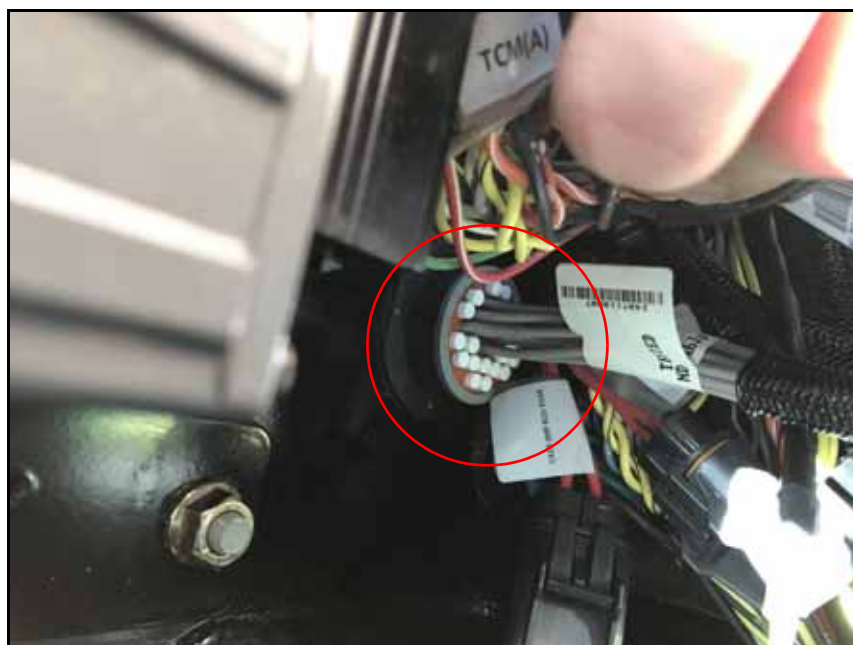
8. Reinstall the bolt in the fuse panel.

9. Loop and tie-off the REMOTE SWITCH cable connection, securing it with plastic cable ties as necessary.

BULKHEAD CONNECTION

1. Remove machine bulkhead connector and insert round connector in the removed bulkhead location.

FIGURE 7. Bulkhead Connection



CONNECT HDU AND TC1

1. Connect the 12-pin Deutsch connectors to the mating receptacles on the respective nodes.

NOTE: Nodes are keyed to prevent connecting matching colors to the wrong node.

2. Connect the steering lockout switch to master switch assembly (PN 063-0173-961).

INSTALL THE FOOT SWITCH (OPTIONAL)

FIGURE 8. Foot Switch Installed



1. Select a suitable location for the foot switch (P/N 063-0172-470) to be installed.

NOTE: The foot switch should be installed in a location where the operator has easy access to it and is able to fully press the pedal.

2. Using the holes in the foot switch as a template, drill holes in the floor of the cab.
3. Secure the foot switch to the floor by installing the supplied screws in each of the mounting holes.
4. Route the foot switch cable connector to the node mounting location.

INSTALL THE MASTER SWITCH

1. Use the provided hardware to install the Master Switch (P/N 063-0173-961) in the provided enclosure.

FIGURE 9. Master Switch in Enclosure



2. Install the master switch in a convenient location using either self-tapping screws or double sided tape (not provided).
3. Locate the 4-pin connector on the cab harness (P/N 115-4010-127) labeled "Steering Lockout Switch" and connect it to the master switch.

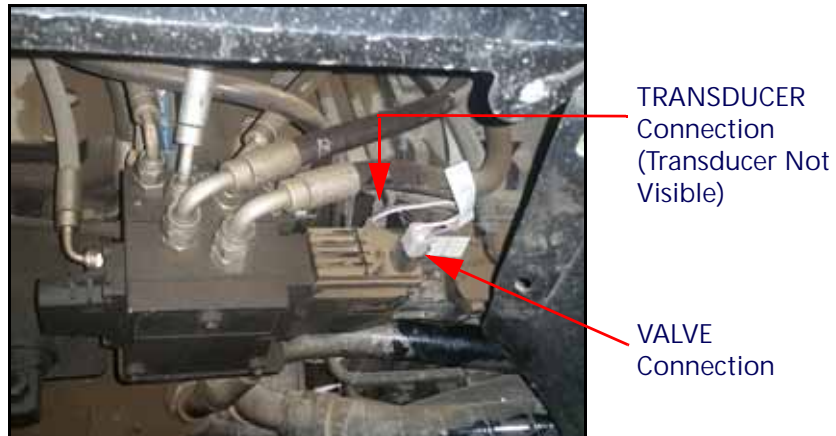
INSTALL THE VALVE HARNESS

FIGURE 10. Valve Harness Secured to Bulkhead



1. Connect the round 21-pin connector on the valve harness (P/N 115-4001-159) to the mating bulkhead connector under the machine cab.
2. Route the valve harness toward the existing valve located under the cab near the right wheel.

FIGURE 11. TRANSDUCER and VALVE Connections



3. Connect the TRANSDUCER connector to the pressure transducer installed in Port PS of the valve.
4. Connect the VALVE connector to the open 4-pin Deutsch port on the PVES valve.

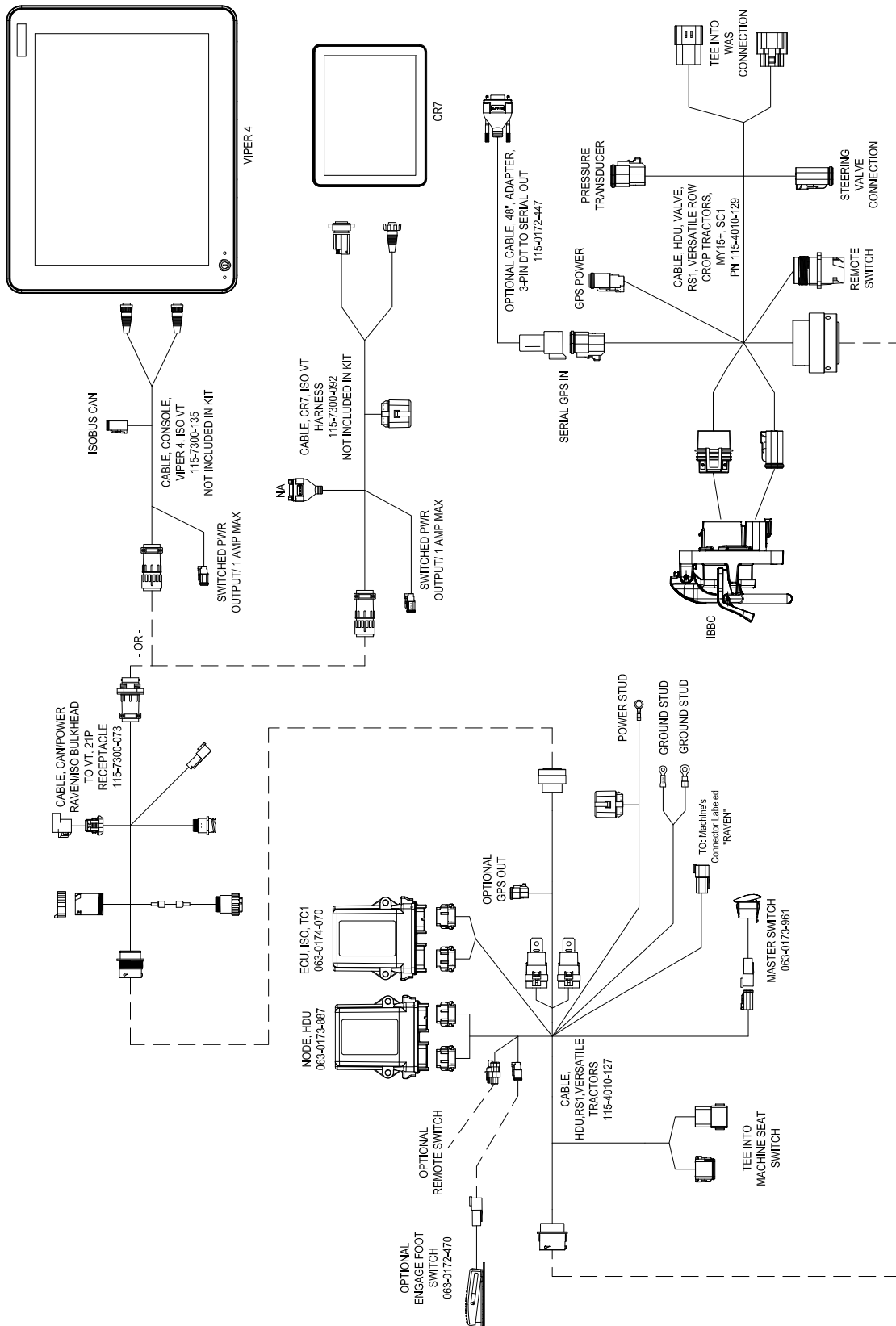
FIGURE 12. WAS Connection



5. Route the WAS connectors of the valve harness toward the front axle.
6. Disconnect the machine existing WAS connection.
7. Install the WAS connectors of the valve harness between the machine WAS connectors.
8. Use plastic cable ties to secure any excess cable away from moving parts and heat sources.

SYSTEM DIAGRAMS

FIGURE 13. Valve and Node Harness Wiring 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.

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.