RS1™ Installation Manual for Challenger MT7XX & MT8XX C/D/E

016-5033-016 Rev. B   *9/2021*   *E37602*

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RS1™ Installation Manual for Challenger MT7XX & MT8XX C/D/E

CHAPTER 1

IMPORTANT INFORMATION

SAFETY

<div style="background:blue">NOTICE</div>

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.

DISPLAYS AND CONTROL CONSOLES

- If the display will not be used for an extended period, it is best to remove the display from the machine and store it in a climate controlled environment. This may help to extend the service life of electronic components.
- To prevent theft, secure the display and GPS antenna when leaving the machine unattended.

⚠ 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.

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 contaminates. 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.

CHAPTER   INTRODUCTION

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Thank you for choosing Raven Applied Technologies. This system is designed to provide cutting-edge, hands-free steering of the machine via Global Positioning System (GPS) coordinates.

This manual applies to the following machines. Write your serial number in the space below for future reference.

Make. Challenger

Model. MT7XX & 8XX Series AutoGuide and Non-AutoGuide machines

FIGURE 1. Challenger Tractor

INSTALLATION BEST PRACTICES

⚠ **WARNING**
Carefully read and follow all safety requirements and precautions contained in this manual and the machine-specific Installation Manual. Failure to follow safety instructions may lead to equipment damage, personal injury, or death.

RECOMMENDATIONS

Park the machine where the ground is level, clean, and dry before installing the RS1™ system. Bleed pressure from the hydraulic system and leave the machine turned off for the duration of the installation process.

Follow good safety practices during the installation process. Be sure to carefully read the instructions in this manual.

Raven Industries recommends the following best practices when installing or operating the RS1™ system for the first time, at the start of the season, or when moving the RS1™ system to another machine:

• Verify that the machine's hydraulic system is using fresh oil and that the filters have been recently changed
• Ensure there are no issues with the machine's hydraulic system (e.g., pump issues, faulty hydraulic motors, fine metal deposits in the hydraulic hoses, etc.).

POINT OF REFERENCE

The instructions in this manual assume that the operator is standing behind the machine, looking towards the cab.

KIT COMPONENTS

This section contains a list of the components that are included in the RS1 kit. Before beginning the system installation, compare the items in the kit with the components on this list. Contact your Raven dealer with any questions.

FIGURE 2. Challenger AutoGuide V4/CR12 and RS1 Kit Components (P/N 117-5033-023 Rev. B)

QTY	PART #	DESCRIPTION
1	053-0159-209	BOX, SHIPPING
1	115-4010-138	CABLE, RS1, AGCO SPLIT CAN2
1	115-4010-219	CABLE, , RS1, CAB CHALLENGER MT700 & 800 SERIES
1	115-7300-135	CABLE, CONSOLE, VIPER 4 ISO VT
1	107-0172-515	BRACKET, AGCO, RS1 MOUNT
1	319-1000-013	LATCH, SWELL ACTION, BLACK
1	053-0159-074	ENVELOPE, PLASTIC
4	311-0003-041	SCREW, MACHINE 1/4-20 X 1/2 LG HEX 82 DEG COUNTERSINK

FIGURE 3. Challenger AutoGuide CR7 and RS1 Kit Components (P/N 117-5033-018 Rev. B)

QTY	PART #	DESCRIPTION
1	053-0159-209	BOX, SHIPPING
1	115-4010-138	CABLE, RS1, AGCO SPLIT CAN2
1	115-4010-219	CABLE, RS1, CAB CHALLENGER MT700 & 800 SERIES
1	115-7300-092	CABLE, CR7 ISO VT ONLY
1	107-0172-515	BRACKET, AGCO, RS1 MOUNT
1	319-1000-013	LATCH, SWELL ACTION , BLACK
1	053-0159-074	ENVELOPE, PLASTIC
4	311-0003-041	SCREW MACHINE 1/4-20 X 1/2 LG HEX 82 DEG COUNTERSINK

FIGURE 4. Challenger Non-AutoGuide V4/CR12 and RS1 Kit Components (P/N 117-5033-016 Rev. B)

QTY	PART #	DESCRIPTION
1	053-0159-209	BOX, SHIPPING
1	107-0172-539	BRACKET, GPS RS1 UNIVERSAL ROOF MOUNT MAIN BAR
2	107-0172-540	BRACKET GPS RS1 UNIVERSAL ROOF MOUNT EXTENSION
1	116-0159-802	BRACKET, LATCH PLATE B, RS1
1	115-4010-218	CBL RS1 ROOF CHALLENGER MT700 AND 800 SERIES
1	107-0172-531	BRACKET, FIXED MOUNT, RS1
1	115-4010-219	CBL RS1 CAB CHALLENGER MT700 & 800 SERIES
1	115-7300-135	CABLE, CONSOLE, VIPER 4 ISO VT
1	053-0159-074	ENVELOPE, PLASTIC
4	311-4050-224N	HEX BOLT DIN931 M10X30 8.8 CLASS V
4	312-6001-041N	HEX LOCK NUT DIN985 M10X1.5 CLASS V
10	313-6000-016N	WASHER, DIN125 M10 CLASS V
2	313-6001-016N	SPRING LOCK WASHER DIN127-ZN-M10
4	311-0003-041	SCREW MACHINE 1/4-20 X 1/2 LG HEX 82 DEG COUNTERSINK
2	311-4056-237N	HEX BOLT DIN933 M10 X 95MM 10.9 STEEL CLASS V
4	305-1001-004	SPACER STEEL 50MM X 21.5MM X 28MM
2	311-4051-184N	HEX BOLT DIN931 M8-1.25 X 45MM 10.9
2	312-6001-027N	HEX LOCK NUT NYLON INSERT DIN985-8-M8
4	313-6000-013N	WASHER DIN125A M8 CLASS V FINISH

FIGURE 5. Challenger Non-AutoGuide CR7 and RS1 Kit Components (P/N 117-5033-021 Rev. A)

QTY	PART #	DESCRIPTION
1	053-0159-209	BOX, SHIPPING
1	107-0172-539	BRACKET, GPS RS1 UNIVERSAL ROOF MOUNT MAIN BAR
2	107-0172-540	BRACKET GPS RS1 UNIVERSAL ROOF MOUNT EXTENSION
1	116-0159-802	BRACKET, LATCH PLATE B, RS1
1	115-4010-218	CBL RS1 ROOF CHALLENGER MT700 AND 800 SERIES
1	107-0172-531	BRACKET, FIXED MOUNT, RS1
1	115-4010-219	CBL RS1 CAB CHALLENGER MT700 & 800 SERIES
1	115-7300-092	CABLE, CR7 ISO VT ONLY
1	053-0159-074	ENVELOPE, PLASTIC
4	311-4050-224N	HEX BOLT DIN931 M10X30 8.8 CLASS V
4	312-6001-041N	HEX LOCK NUT DIN985 M10X1.5 CLASS V
10	313-6000-016N	WASHER, DIN125 M10 CLASS V
2	313-6001-016N	SPRING LOCK WASHER DIN127-ZN-M10
4	311-0003-041	SCREW MACHINE 1/4-20 X 1/2 LG HEX 82 DEG COUNTERSINK
2	311-4056-237N	HEX BOLT DIN933 M10 X 95MM 10.9 STEEL CLASS V
4	305-1001-004	SPACER STEEL 50MM X 21.5MM X 28MM
2	311-4051-184N	HEX BOLT DIN931 M8-1.25 X 45MM 10.9
2	312-6001-027N	HEX LOCK NUT NYLON INSERT DIN985-8-M8
4	313-6000-013N	WASHER DIN125A M8 CLASS V FINISH

UPDATE

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

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

-RS1™ Installation Manual for Challenger MT7XX & MT8XX C/D/E
-016-5033-016 Rev. B
-Any comments or feedback (include chapter or page numbers if applicable).
-Let us know how long have you been using this or other Raven products.

We will not share your email or any information you provide with anyone else. Your feedback is valued and extremely important to us.
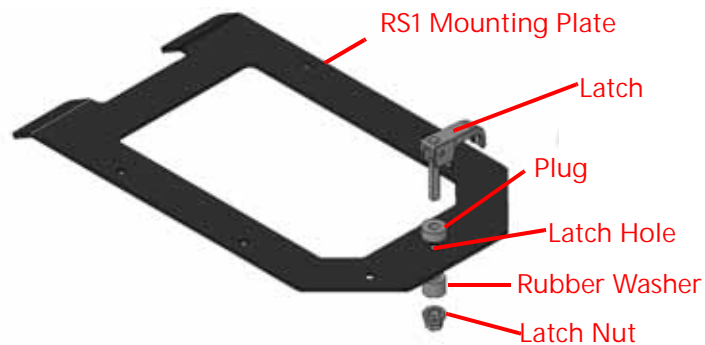
Thank you for your time.

CHAPTER INSTALLATION
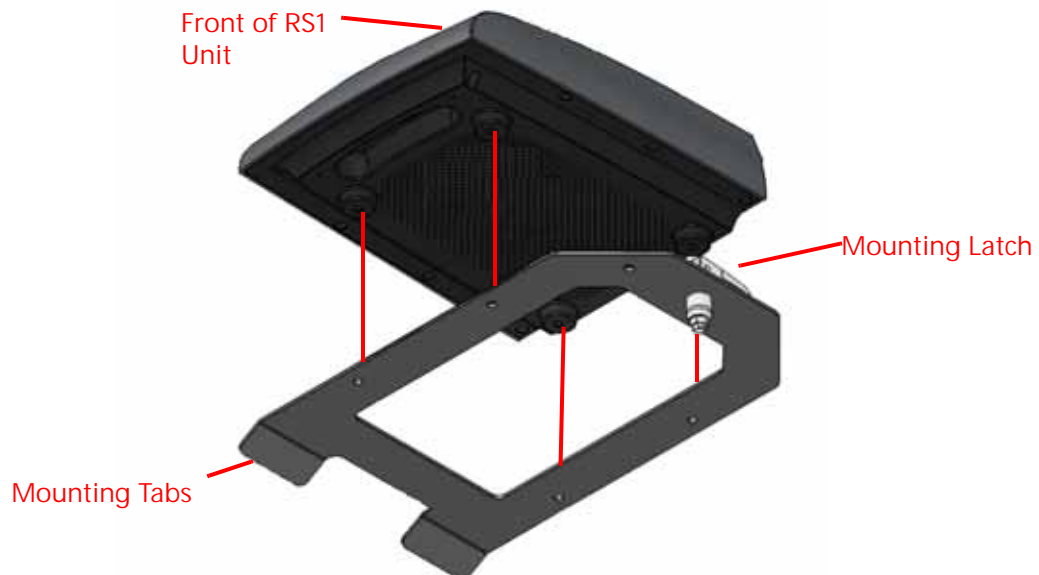
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FOR AUTOGUIDE MACHINES

INSTALL THE RS1™

1. Assemble the latch, plug, rubber washer, and latch nut through the latch hole on RS1 mounting plate.

FIGURE 1. Latch Assembly

RS1 Mounting Plate
Latch
Plug
Latch Hole
Rubber Washer
Latch Nut

2. Mount the RS1 base plate to the RS1 unit using the four bolts provided. Ensure the mounting tabs are to the right and the latch is to the left.
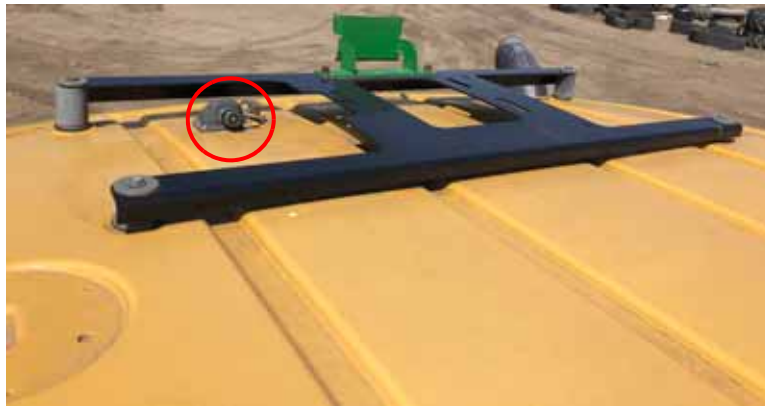
FIGURE 2. Mount RS1 Unit to Mounting Bracket

Front of RS1 Unit
Mounting Latch
Mounting Tabs

MOUNT THE RS1™

1. Insert the two tabs on the RS1 mounting bracket into the roof bracket slot with the sloped edge facing forward.

FIGURE 3. Roof Bracket

2. Connect the RS1 12-pin connector and the 12-pin round connector on the cab using the RS1 AGCO cable   (P/N 115-4010-138).

FOR NON-AUTOGUIDE MACHINES

1. Remove the bolts on top of the roof and along the perimeter of the bottom lip of the roof to remove the roof cap.
2. Lift the cap from the front left side. Use a block to keep the roof open.
3. Locate the 12-pin connector labeled "TOP DOCK INTERFACE."

FIGURE 4. TOP DOCK INTERFACE Connector

4. Route the gray connector on the RS1 roof cable (P/N 115-4010-218) through the windshield wiper opening.

FIGURE 5. RS1 Roof Cable

5. Plug the gray connector on the RS1 roof cable into the top dock interface connector.

FIGURE 6. Gray Connector Plugged Into Top Dock Interface Connector

6. Reinstall the roof cap except for the 2 front-most top roof bolts. These will be used to secure the bracket.
7. Secure the roof bracket to the roof cab of the machine using the 4 spacers, universal main bar, universal extensions, latch plate bracket, M8 and M10 hardware, and the 95mm-long bolts.

NOTE: The M10 short bolts are used to connect the main bar and extensions. The M8 hardware are for mounting the RS1 bracket to the main bar with the spacers. The long M10 bolts are used for securing the bracket to the machine roof using the spacer.
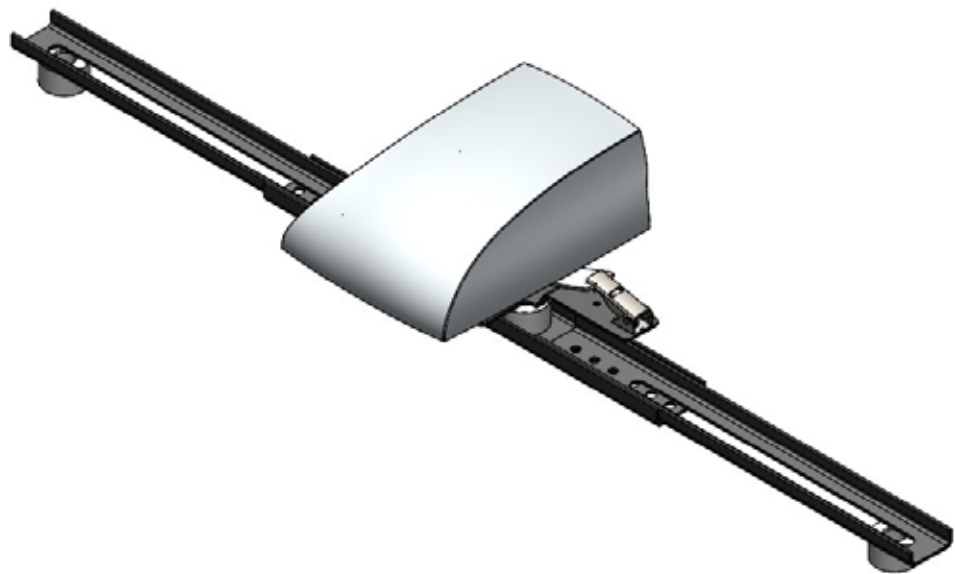
8. Ensure the rubber washers on the machine are in place prior to bolting down the brackets. The latch should be facing to the left.

NOTE: The bracket needs to be fully assembled prior to mounting on the roof. Otherwise, a clearance issue will arise.

FIGURE 7. Exploded Assembly
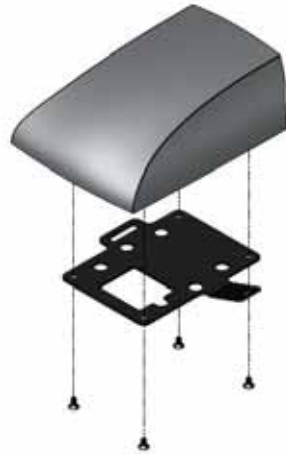

FIGURE 8. Assembly

9. Insert the latch into the hole on the roof bracket and secure in place by pressing down on the handle.

NOTE: The latch may need to be adjusted to provide proper compression. Tighten the nut on the bottom of the latch to do this.

10. Mount the latch plate onto the RS1 using the provided screws.

FIGURE 9. RS1 Mounted on Generic Bracket

NOTE: This latch plate stays connected to the RS1.

11. Secure the RS1 onto the fixed plate. The RS1 should already be connected to the latch plate.

12. Secure the assembly with the latch.

13. Plug the RS1 connector into the back of the RS1.

CAB PORTION OF THE INSTALL

NOTE: This portion is identical for AutoGuide and Non-AutoGuide machines.

1. In the cab, remove the right lower panel where the electrical system is located.

FIGURE 10. Right Lower Panel

2. Locate the 4-pin Deutsch connector labeled "BUS EXTENSION."

FIGURE 11. BUS EXTENSION Connector

3. Disconnect and tee in the RS1 cab cable (P/N 115-4010-219).

4. Connect the RS1 cab cable to a power source.

NOTE: The power source is machine dependent. Some machines will have convenience ports in the rear of the cab, others will have a power rail near the hand rail.

FIGURE 12. Convenience Ports

FIGURE 13. Power Rail

INSTALL CR7™ OR VIPER 4®/CR12™

Ensure the following guidelines are met.

- Always ensure the terminal is placed in the most appropriate position facing the driver seat for easy access and use.
- Always use a RAM-C ball attachment.
- Mount the terminal with a solid bracket in a place free of vibrations.
- Secure all cables in the cabin so there are no free-hanging cables.
- Ensure the driver has a clear, unobstructed view all around the cabin.

FIGURE 14. CR7 Mounted in Various Positions

FIGURE 15. Viper 4/CR12 Mounted in Various Positions

INSTALL FIELD COMPUTER HARNESS

Ensure the following guidelines are met.

- Install the field computer harness between the field computer and the standard connectors of the tractor.
- Connect the field computer harness to the RS1 cab cable (P/N 115-4010-219).
- Guide the harness to the field computer.

ACTIVATE AUTOMATIC STEERING

To activate automatic steering for Challenger systems with RS1:

1. Ensure the master switch near the radio is on the field mode and hydraulic lockout is not enabled.
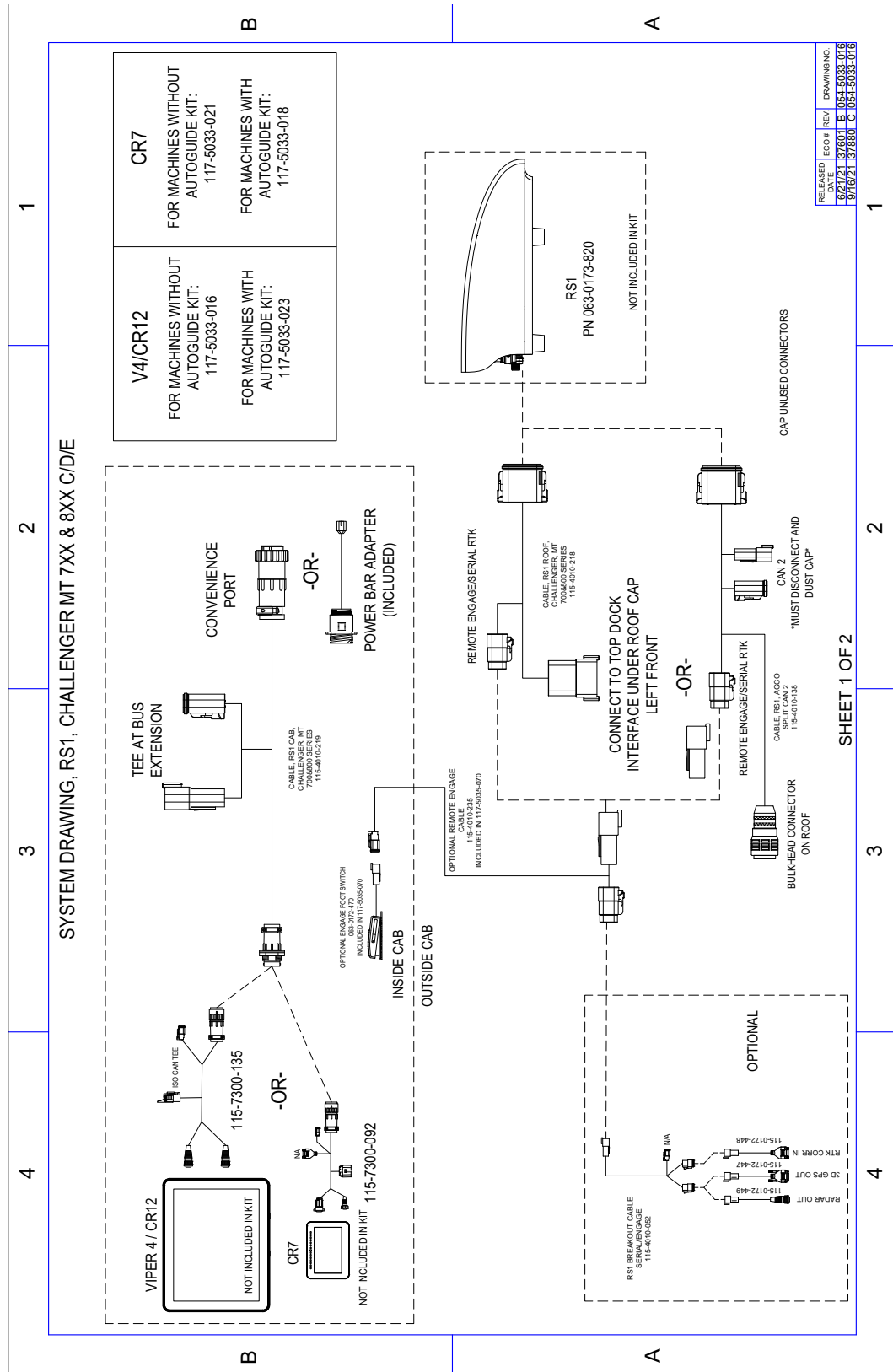
FIGURE 16. Master Switch

2. Use the engage switch to activate automatic steering.

NOTE: In the event that the engage switch is not present or does not function. First remove the resume switch from the armrest and ensure that the factory harness is connected to the switch.

If the switch still does not function you will need to order the optional foot engage switch kit (P/N 117-5033-070). The kit includes cable (P/N 115-4010-235) that will tee in at the axillary connector on the RS1 roof cable. The cable will then route into the cab through the rear window and connect to the foot switch (P/N 063-0172-470) included in this kit.

SYSTEM DRAWING

FIGURE 17. Challenger MT7XX & MT8XX C/D/E RS1 System Drawing (P/N 054-5033-016 Rev. B)

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.

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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.

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