

SC1™/TC1™ Installation
Manual for Fendt 200 VFP
Varioguide (with Fendt
One, Model Year 2021)

016-5033-270 Rev. B

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DISCLAIMER

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Raven Industries shall not be responsible or liable for incidental or consequential damages or a loss of anticipated benefits or profits, work stoppage or loss, or impairment of data arising out of the use, or inability to use, this system or any of its components. Raven Industries shall not be held responsible for any modifications or repairs made outside our facilities, nor damages resulting from inadequate maintenance of this system.

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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.

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

AERIALS AND SIGNAL INTERFERENCE

Due to the relatively low broadcast power from satellites, all GNSS receivers and aerials tend to be susceptible to sources of signal noise and interference as compared to terrestrial signals (i.e. radio or cellular).

NOTE: Poor GNSS signal reception may cause other systems which rely on GNSS solutions (e.g. auto-steer systems, rate control systems, etc.) to disengage or may cause undesired operation or results.

The following recommendations are intended to provide an optimal environment for GNSS systems and provide the best up-time results, even as sources of interference may spike throughout the day.

- Mount GNSS antennas with a clear, unobstructed view of the sky.
 - A minimum clearance of 1 m [39 in] is recommended around the GNSS antenna to help avoid common issues with signal interference. Do not mount cellular, radio, or other GNSS antennas within this area.
 - Mount the GNSS antenna to the tallest point of the machine. Avoid mounting the antenna in a location where obstructions (e.g. bins/hoppers, cab roof lines, equipment frame or structural elements, etc.) may rise into the antenna view.

NOTE: The antenna view typically starts 5° to 10° above horizontal from the base of the antenna and extends over the skyward face of the receiver/antenna.

- GNSS is a line-of-sight system. A clear path must exist between the satellite and the GNSS antenna.
 - Obstructions such as buildings, tree branches and limbs, as well as components of the vehicle such as a fiberglass or metal roof, and etc. may cause signal multi-path or completely block the GNSS receiver.

- Electrical and magnetic fields can interfere with GNSS or L-Band signals.
 - Avoid mounting GNSS receivers or antennas near components such as radio or cellular antennas, electrical motors, generators, alternators, strobe lights, radio transmitters, radio or cellular antennas, etc.
 - Over-head power lines, microwave dishes, radar, other active antennas, etc. can interfere with GNSS signal.
- Mount the Field Hub cellular and diversity antennas at least 1 m [39 in] apart. Avoid mounting other cellular, radio, or GNSS aerials within this area.

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.

CHAPTER

INTRODUCTION

2

This system is designed to provide hands-free steering of the machine via GNSS (Global Navigation Satellite Systems) coordinates.

This manual applies to the following machines.

Make. Fendt

Model. 200 VFP Gen 3 Varioguide Ready with Fendt One

FIGURE 1. Fendt Tractors



INSTALLATION BEST PRACTICES

	<p data-bbox="760 258 1073 310">WARNING</p> <p data-bbox="634 323 1187 485">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.</p>
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RECOMMENDATIONS

Before installing the SC1/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.

Raven Industries recommends the following best practices when installing or operating the SC1/TC1 system for the first time, at the start of the season, or when moving the SC1/TC1 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 you are standing behind the machine, looking toward the cab.

KIT COMPONENTS

This section contains a list of the components that are included in the SC1/TC1 kit. Before beginning the system 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 2. SC1/TC1 Kit Components for Fendt Varioguide with Fendt One and CR7 (P/N 117-5033-270 Rev. A)

QTY	PART #	DESCRIPTION
1	053-0159-323	BOX, SHIPPING
1	115-4010-239	CABLE, TC1, FENDT 200 GEN3 (ONE)
1	115-7300-171	CABLE, CR7, ISO, IN-CAB 9P AUXILIARY POWER
1	115-4010-241	CABLE, V-BUS, FENDT 200 GEN3 (ONE)
1	063-0174-070	ECU, ISO, TC1, LOW SPEED STEERING
1	016-0171-649	SHEET, WARRANTY/HELP

FIGURE 3. SC1/TC1 Kit Components for Fendt Varioguide with Fendt One and CR12 (P/N 117-5033-271 Rev. A)

QTY	PART #	DESCRIPTION
1	053-0159-323	BOX, SHIPPING
1	115-4010-239	CABLE, TC1, FENDT 200 GEN3 (ONE)
1	115-7300-156	CABLE, CR12, ISO, IN-CAB 9P AUXILIARY POWER, INTERNAL G
1	115-4010-241	CABLE, V-BUS, FENDT 200 GEN3 (ONE)
1	063-0174-070	ECU, ISO, TC1, LOW SPEED STEERING
1	016-0171-649	SHEET, WARRANTY/HELP

UPDATES

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

<https://portal.ravenprecision.com>

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

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

- SC1™/TC1™ Installation Manual for Fendt 200 VFP Varioguide (with Fendt One, Model Year 2021)
- 016-5033-270 Rev. B
- Any comments or feedback (include chapter or page numbers if applicable).
- Let us know how long you have 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.

MOUNT THE SC1

1. Locate the plastic cover at the rear of the cab roof.
2. Remove the plastic cover and the plate under the cover.

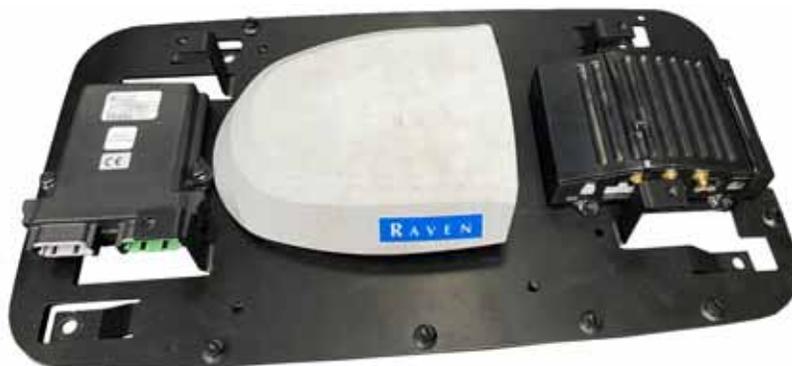
FIGURE 1. Roof Cover Location and Device Plate



3. Disconnect and remove the AGCO Guidance Controller from the plate.
4. Mount the SC1/TC1 ECU to the plate in the location from which the OEM guidance controller was removed.

NOTE: Mount the 700S and Slingshot Field Hub onto the plate as shown in the figure below. Review the *InstallMount the 500S and/or 700S* section on page 14 and *Install Slingshot Field Hub* section on page 13 for additional assistance.

FIGURE 2. OEM Roof Plate



5. Connect the SC1/TC1 cable for Fendt 200 gen3 (P/N 115-4010-239) to the SC1 ECU, the 700S receiver, and the Slingshot Field Hub.

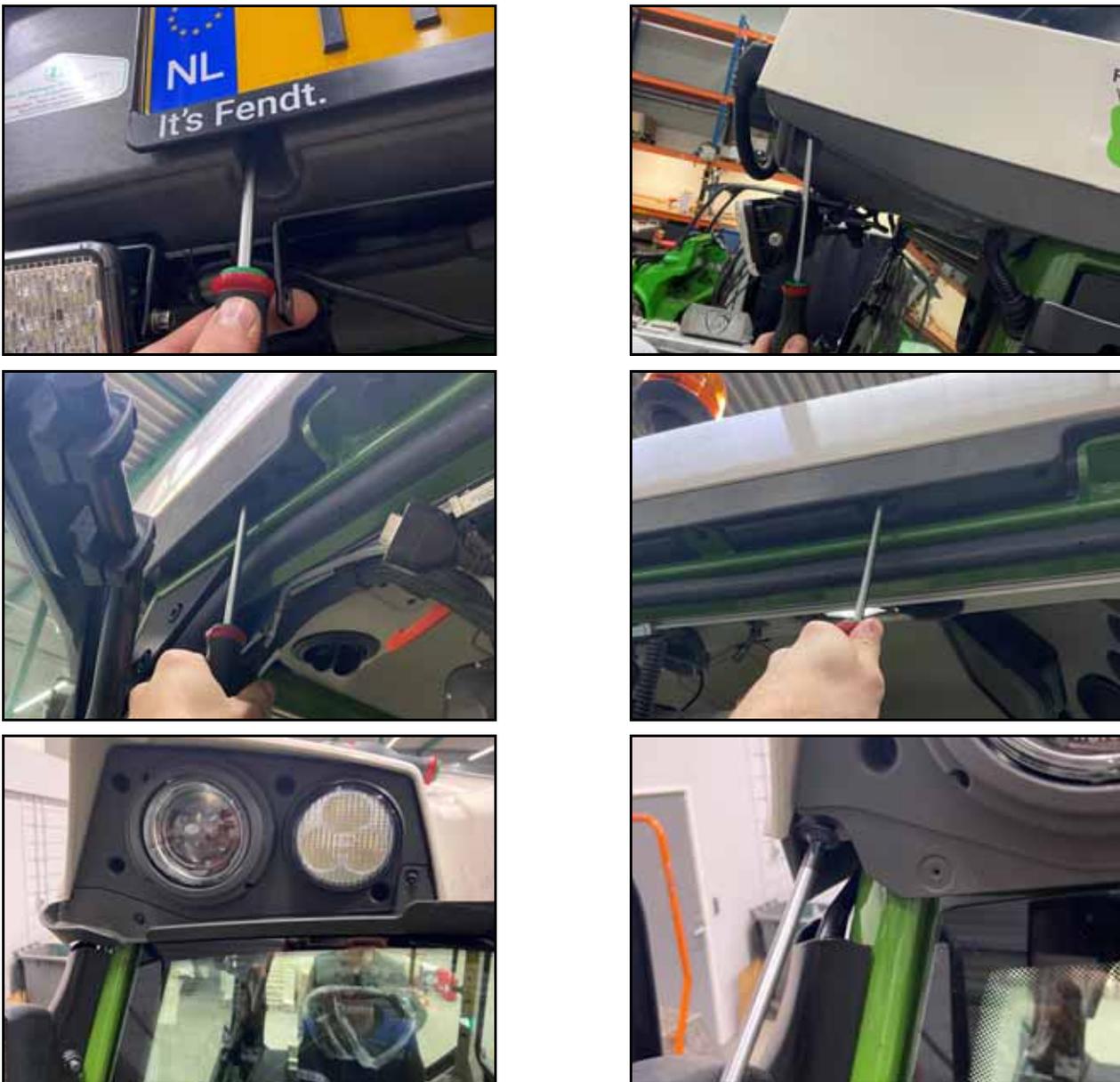
NOTE: Route the X4250 connector on the SC1/TC1 cable toward the back of the roof. This connector will connect to the Fendt roof port as described in the *MountConnect the Harness* section on page 10.

6. Install the roof plate and install the plastic cover.

CONNECT THE HARNESS

1. Remove all 10 screws from the roof to access the connectors within the roof. There are 5 screws on each side.

FIGURE 3. Roof Cap Screw Locations



2. Locate the X3058 connector at the roof line on the right side of the machine cab.

FIGURE 4. OEM X3058 Connector Location



NOTE: If installed on the machine, the AGCO Connect module will be connected to this plug.

3. Disconnect any existing components from the plug and connect the Fendt 200 gen3 V-Bus cable (P/N 115-4010-241) to the X3058 connector.
4. Connect the remaining Deutsch connector to the AGCO Connect Module if installed in your tractor.
5. Locate the X4250 connector on the back of the roof.

FIGURE 5. OEM X4250 Connector



6. Disassemble X4250 connector by pushing the yellow tabs out and down.
7. Remove the connector from the pass-through and remove the yellow wedge on top.
8. Insert the pins from the Fendt 200 gen3 V-Bus cable (P/N 115-4010-241) into slot 5 and 6 of the X4250 connector (pin 5- yellow, pin 6- green). Reference the image below.

FIGURE 6. Reverse side of the OEM X4250 Connector



MOUNT THE 500S OR 700S

SC1/TC1 may be used with either the Raven 500S or 700S GNSS receivers or a CR12 or Viper 4 field computer with internal GPS.

The following items outline some best practices or suggestions for mounting the receiver:

NOTE: For detailed installation instructions, review the manual provided with the specific GNSS receiver installed.

- Mount the GPS-antenna with the connectors pointing toward the rear of the machine.
- Mount the GPS-antenna in front of the rear axle.
- Mount the GPS-antenna on the centerline of the machine.

FIGURE 7. 700S Mounting Plate and Antenna



FIGURE 8. Protective Cap



INSTALL SLINGSHOT FIELD HUB

The following items outline some best practices or suggestions for mounting the Slingshot Field Hub:

NOTE: For detailed installation instructions, review the manual provided with the Field Hub.

- The GPRS/UMTS antennas are equipped with a magnetic base and must be placed on top of the cabin.
- The antennas should be mounted in a clear, unobstructed area to ensure clear reception.
- To avoid confusion, label the antenna cables inside the cabin with "Cellular" and "Diversity." Label the GPS patch antenna cable with "GPS" as shown in Figure 9 on page 13.
- Mount a gray SMA grip on both antenna cable connections and mount a blue SMA grip on the GPS patch antenna cable, as shown in Figure 9 on page 13.

FIGURE 9. Labeled Antenna Cables with SMA Grips



Connect the power cable to the connector with the label "Slingshot PWR." Then connect the RTK IN connector with the GPS OUT connector. Next, connect the Serial RTK IN with the Slingshot.

FIGURE 10. Optional Field Hub Bracket with CRx and Viper 4



If a Slingshot Field Hub is used, in addition to the GPS-antenna, two GPRS/UMTS antennas and a GPS patch should be mounted.

NOTE: Handle the GPS patch with care; the antenna cable is thin and fragile.

The GPRS/UMTS antennas should be mounted as far away from each other as possible. At least 100 cm [39 in] is recommended.

FIGURE 11. GPS Patch Antenna and Two GPRS/UMTS Antennas



The GPRS/UMTS antennas should be mounted on separate roof brackets and away from the GNSS antenna.

NOTE: Review the *Recommendations and Best Practices* section on page 2 for more information.

FIGURE 12. GPRS/UMTS Mounted



MOUNT THE CR7™ OR CR12™

The following items outline some best practices or suggestions for mounting the Raven field computer:

- NOTE: For more installation instructions, review the manual provided with the field computer.
- 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 13. CR7 Mounting Examples



FIGURE 14. CR12 Mounting Examples



CONNECT THE FIELD COMPUTER HARNESS

The following items outline suggestions for connecting the Raven field computer:

- Install the field computer harness between the field computer and the standard ISObus connectors of the machine.
- Mount the 9-pin ISOBUS connector to the panel mount connector in the cabin of the machine.
- Mount the 3-pin power connector.

- Route the harness to the field computer.

FIGURE 15. ISOBUS and Power Connector



ACTIVATE AUTOMATED STEERING

NOTE: Before activating SC1/TC1 automated steering, ensure that the tractor is unlocked for third-party steering systems. Contact a local Fendt dealer to unlock this feature.

TABLE 1. Fendt Activation for Third-Party Guidance System

Part Number	Description	Compatible Machines
ACP0595080	Third-party guidance system activation.	Fendt Varioguide with Fendt One

To activate SC1/TC1 automated steering for Fendt One systems:

1. Press the pre-activation steering button.

FIGURE 16. Pre-Activation on Armrest



2. After a successful self-test of the steering system, the LED will activate and SC1/TC1 automated steering can be activated by pressing the auto-steering button on the joystick.

SYSTEM DRAWINGS

FIGURE 17. SC1/TC1 with CR7 System Diagram for Fendt Varioguide with Fendt One (P/N 054-5033-270 Rev. A)

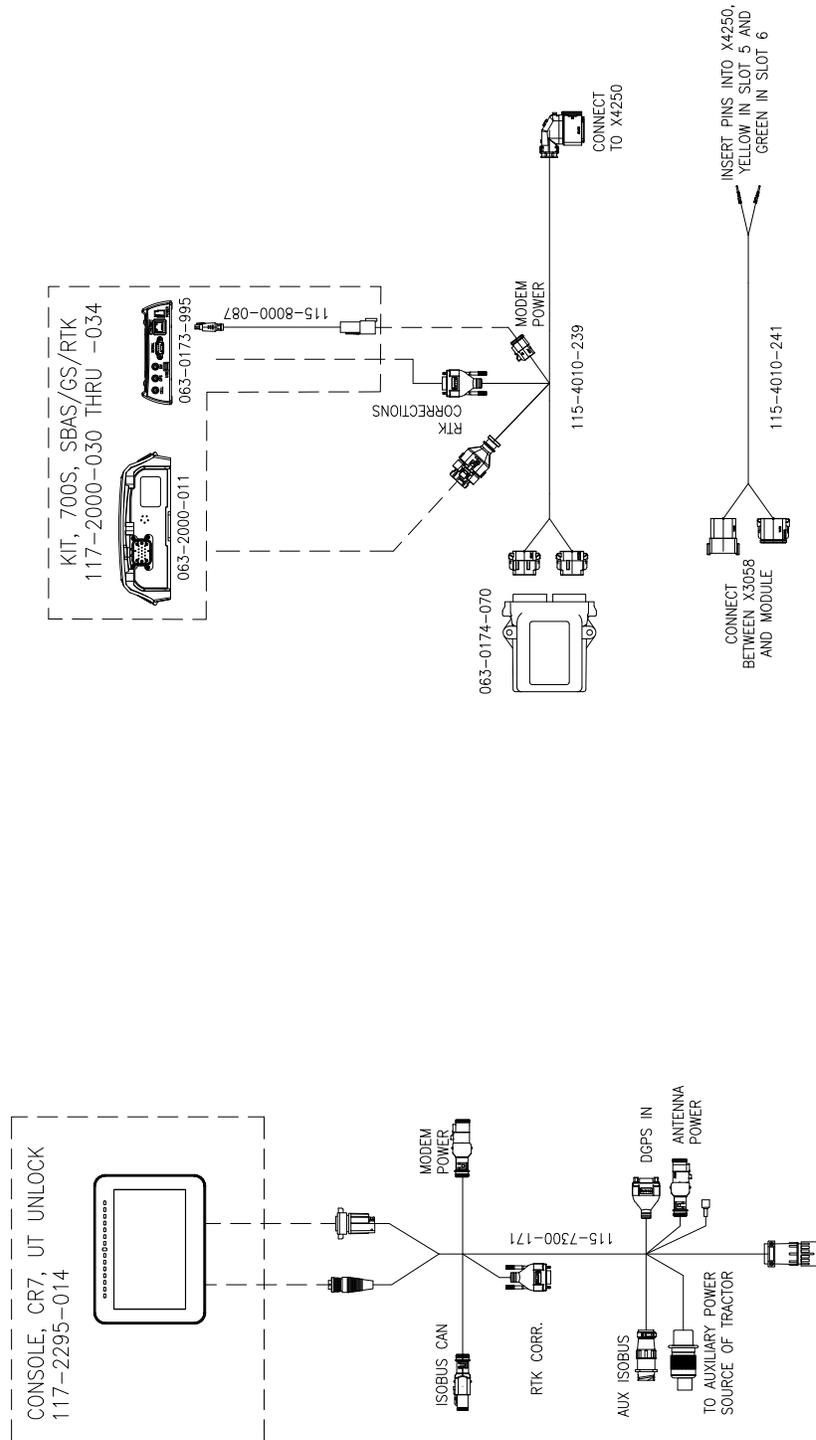
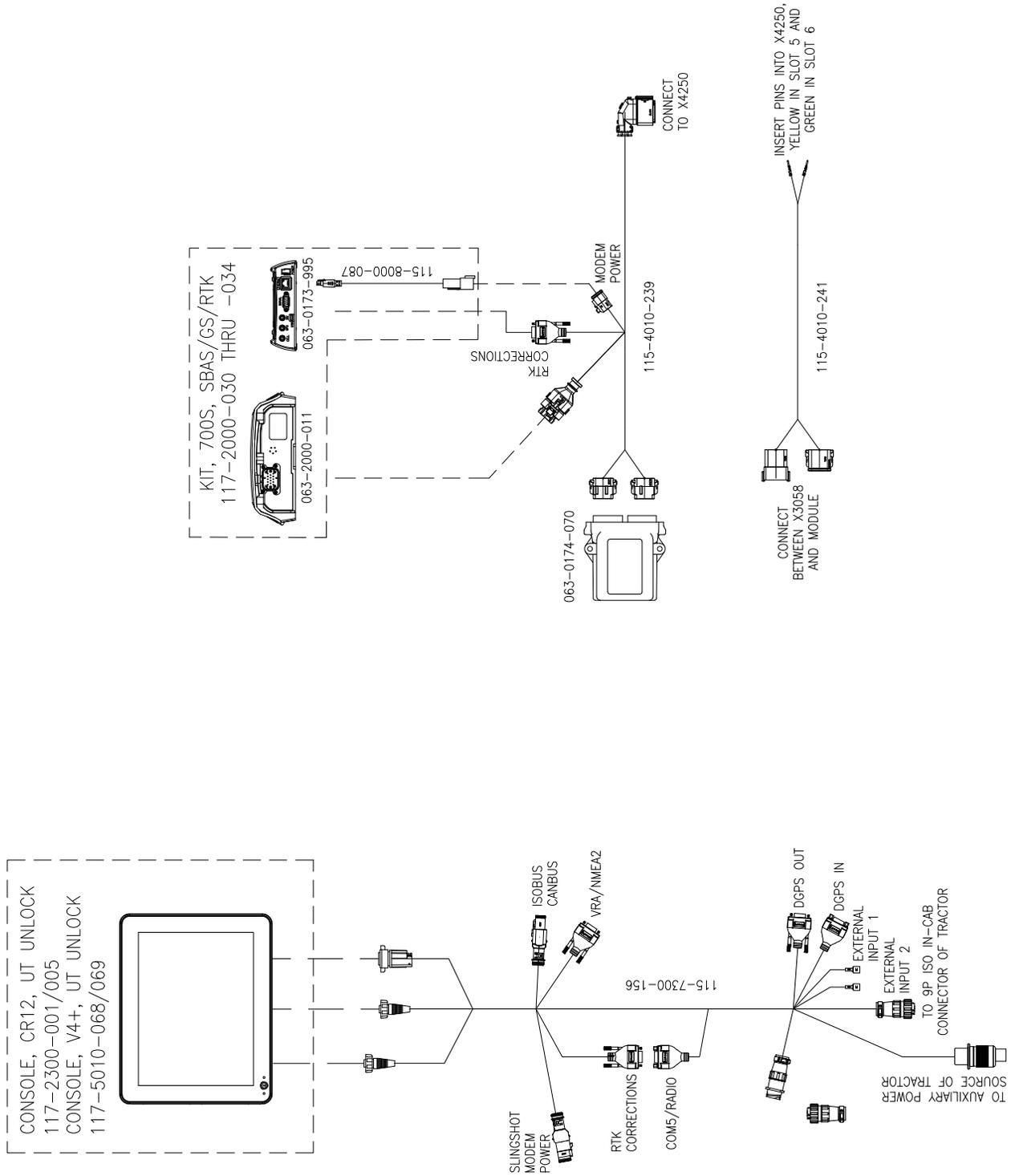


FIGURE 18. SC1/TC1 with CR12 System Diagram for Fendt Varioguide w/ Fendt One(P/N 054-5033-271 Rev. A)



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 36 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 completed RMA form, Certificate of Decontamination, and retail 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 this product or any component of the product found to be defective during the warranty period. Replacement will be made with a new or remanufactured product or component. Standard return freight will be paid, regardless of 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 outside our facility 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, improper installation and maintenance are not covered by this warranty.
- Worn/Chafed hoses and cables.
- Items in contact with fluids and chemicals including seals and O-rings.
- Software downloads and updates.
- Tamper-Evident label broken or customer disassembly.
- Any customer modification to the original product outside normal calibration and adjustments, without written approval.
- Intentional modification to cables.
- Failures due to lack of cleaning or preventive maintenance, and any condition, malfunction or damage not resulting from defects in material or workmanship.
- Items in contact with fluids or chemicals, returned without proper cleaning, decontamination and documentation.

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 <https://portal.ravenprecision.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 completed RMA form, Certificate of Decontamination, and Extended Warranty Registration Number) 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 warranty claim, Raven Industries will (at our discretion) repair or replace this product or any component of the product found to be defective during the warranty period. Replacement will be made with a new or remanufactured product or component. Standard return freight will be paid, regardless of 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 outside our facility 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, improper installation and maintenance are not covered by this warranty.
- Worn/Chafed hoses and cables.
- Items in contact with fluids and chemicals including seals and O-rings.
- Software downloads and updates.
- Tamper-Evident label broken or customer disassembly.
- Any customer modification to the original product outside normal calibration and adjustments, without written approval.
- Intentional modification to cables.
- Failures due to lack of cleaning or preventive maintenance, and any condition, malfunction or damage not resulting from defects in material or workmanship.
- Items in contact with fluids or chemicals, returned without proper cleaning, decontamination and documentation.