

TC1™ Installation Manual for Massey Ferguson 8S Autoguide-Ready Tractors

016-5033-263 Rev. A

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DISCLAIMER

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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

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


Make. Massey Ferguson

Model. 8S

FIGURE 1. Massey Ferguson 8S Tractor



INSTALLATION BEST PRACTICES

	<p data-bbox="760 258 1073 310">WARNING</p> <p data-bbox="634 323 1188 483">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 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 TC1™ system for the first time, at the start of the season, or when moving the TC1™ system to another machine:

- Verify that the machine hydraulic system is using fresh oil and that the filters have been recently changed.
- Ensure there are no issues with the machine 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 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. TC1™ Level 1 Kit for Massey Ferguson 8S Steer-Ready Tractors (P/N 117-5033-263 Rev. A)

ITEM #	QTY	PART #	DESCRIPTION
1	1	053-0159-323	BOX, SHIPPING
2	1	115-4010-234	CABLE, SC1, MF 8S
3	1	115-4010-236	CABLE, 700S ANTENNA, MF 8S
4	1	115-7300-171	CABLE, CR7, ISO, IN-CAB 9P AUXILIARY POWER
5	1	063-2000-010	ASSEMBLY, 700S, MACHINE BRACKET
6	1	115-0171-891	CABLE, 10 FT EXTENSION, RS 232, STRAIGHT THRU
7	1	063-0174-070	ECU, ISO, TC1, LOW SPEED STEERING
8	1	016-0171-648	WARRANTY/HELP SHEET

FIGURE 3. TC1™ Level 1 Kit for Massey Ferguson 8S Steer-Ready Tractors (P/N 117-5033-264 Rev. A)

ITEM #	QTY	PART #	DESCRIPTION
1	1	053-0159-323	BOX, SHIPPING
2	1	115-4010-234	CABLE, SC1, MF 8S
3	1	115-4010-236	CABLE, 700S ANTENNA, MF 8S
4	1	115-7300-156	CABLE, CR12, ISO INCAB 9P, AUX POWER, INTERNAL GPS
5	1	063-2000-010	ASSEMBLY, 700S, MACHINE BRACKET
6	1	115-0171-891	CABLE, 10FT EXTENSION, RS 232, STRAIGHT THRU
7	1	063-0174-070	ECU, ISO, TC1, LOW SPEED STEERING
8	1	016-0171-648	WARRANTY/HELP SHEET

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>

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

- TC1™ Installation Manual for Massey Ferguson 8S Autoguide-Ready Tractors
- 016-5033-263 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.

INSTALL THE TC1™

FIGURE 1. AGCO Guidance Controller Ceiling Mount Location



1. Remove the panel located in the ceiling at the right side of the cab and locate the AGCO guidance controller (white box).
2. Locate the ECU shown in Figure 1, "AGCO Guidance Controller Ceiling Mount Location," in the cab of the tractor.

FIGURE 2. Remove AGCO Guidance Controller



3. Remove the hex screws securing the guidance controller and carefully remove the ECU from the roof compartment.
4. Disconnect the brown X794 connector and the cellular connection (brass connector) and remove the ECU and factory harness from the roof.

FIGURE 3. Mount the TC1™ ECU



5. Use the factory bolts and spacers to mount the TC1™ ECU into the location where the guidance controller was previously mounted.

NOTE: Mount the TC1™ with the label facing up. It is recommended to note the TC1 part number, serial number, and bar code for future reference before installing the ECU in the roof.

6. Connect the MF 8S SC1 cable (P/N 115-4010-234) to the TC1™ ECU.
7. Remove the storage compartment to gain access to the X974 and X230 connectors in the ceiling.
8. Route the cable to the X974 and X230 connectors in the cab ceiling.

FIGURE 4. Machine Connections



9. Connect the brown connector of the MF 8S SC1 cable (P/N 115-4010-234) to the X794 connector.

10. Connect the triangular receptacle connector of the MF 8S SC1 cable (P/N 115-4010-234) to the X230 connector in the ceiling.
11. Reconnect the terminator to the triangular plug on the MF 8S SC1 cable (P/N 115-4010-234).

FIGURE 5. Machine Connections



12. Connect the MF 8S antenna cable (P/N 115-4010-236) to the tractor roof connection and the 700S.

FIGURE 6. Roof Connection



13. Remove the bolts securing the roof plate in place.

FIGURE 7. Roof Access Panel



14. Carefully remove the panel and the foam insulation.

FIGURE 8. Roof Access Panel and Insulation Removed



15. Route the cables for the cellular and GPS patch antennas. Review the *Install 700S* section on page 14 for assistance with placement of these antennas in the gap between the roof and ceiling.

FIGURE 9. Space Between Roof Panel and Ceiling



INSTALL 700S

Please keep the following best installation practices in mind while mounting the 700S:

- Mount the GPS antenna with a clear, unobstructed view of the sky. A minimum clearance of 1,000 cm [39 in] is recommended around the GPS antenna to help avoid common issues with signal interference. Do not mount other cellular, radio, or GPS antennas within this area.
- Mount the GPS antenna with the connectors pointing to the rear of the vehicle.
- Mount the GPS antenna in front of the rear axle.
- Mount the GPS antenna on the centerline of the cab/tractor.
- When connecting a 700S antenna, use the 115-4010-236 cable.

FIGURE 10. Example 700S Mounting Plate and Antenna



INSTALL SLINGSHOT FIELD HUB

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

- 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. A minimum clearance of 1,000 cm [39 in] is recommended around the cellular and diversity antennas to help avoid common issues with signal interference. Do not mount other cellular, radio, or GPS antennas within this area.
- To avoid confusion, label the antenna cables inside the cabin with "Cellular" and "Diversity." Label the GPS patch antenna cable with "GPS" as seen in Figure 11.
- Mount a gray SMA grip on both antenna cable connections and mount a blue SMA grip on the GPS patch antenna cable, also shown in Figure 11, "Labeled Antenna Cables with SMA Grips,".

FIGURE 11. Labeled Antenna Cables with SMA Grips



FIGURE 12. Example Slingshot® Field Hub connected with CRx and Viper® 4



If a Slingshot modem 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. More than 100 cm is recommended.

FIGURE 13. GPS Patch Antenna and Two GPRS/UMTS Antennas



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. Finally, connect the Ethernet cable between the Slingshot and the CR7.

INSTALL CR7™ OR CR12™

Ensure the installer follows all of the following guidelines for best installation practices.

- 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 into the cabin so there are no free-hanging cables.
- Ensure the driver has a clear, unobstructed view all around the cabin.

FIGURE 14. Examples of CR7™ Mounting



FIGURE 15. Examples of CR12™ Mounting

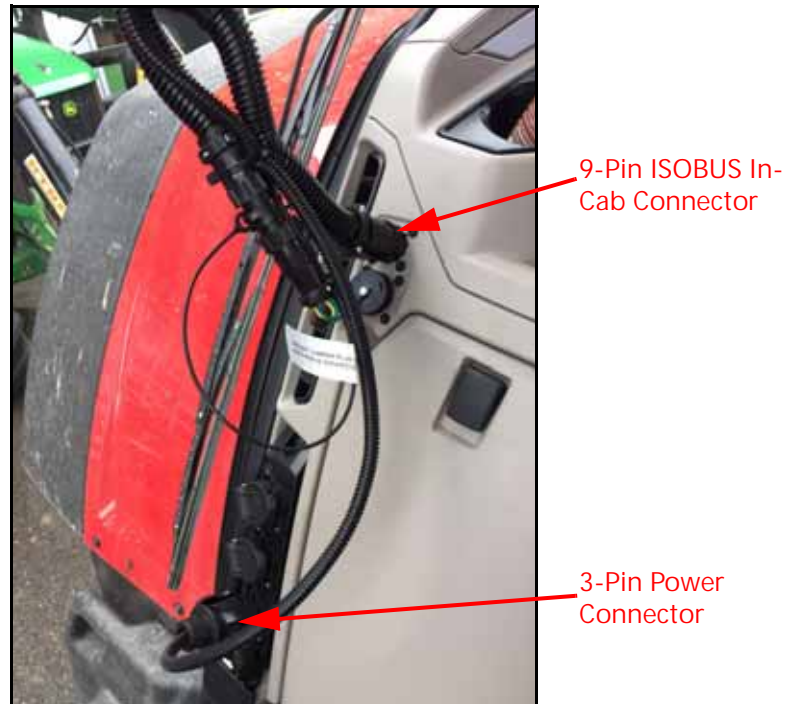


INSTALL FIELD COMPUTER HARNESS

Ensure the installer follows all of the following guidelines for best installation practices.

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

FIGURE 16. ISOBUS and Power Connector



ACTIVATE AUTOMATIC STEERING

To activate automatic steering for Massey Ferguson systems with TC1™:

NOTE: Verify that Massey Ferguson software version 2021.2 or newer is installed.

1. Press the automatic steering button on the joystick to pre-activate the steering. The display shows a prompt that PVED is on.

NOTE: Pressing the auto-steering button after the PVED is turned on, will activate or deactivate the steering. Press the button for 3 seconds to turn off the PVED again.

FIGURE 17. Auto-steer Button on Joystick



2. Confirm that the steering symbol is green.
3. Press the button on the joystick to activate automatic steering.
4. Press the button for 3 seconds to shut down the PVED.

SYSTEM DRAWINGS

FIGURE 18. TC1™ with CR7™ for Massey Ferguson Autoguide-ready System Drawing (P/N 054-5033-263 Rev. A)

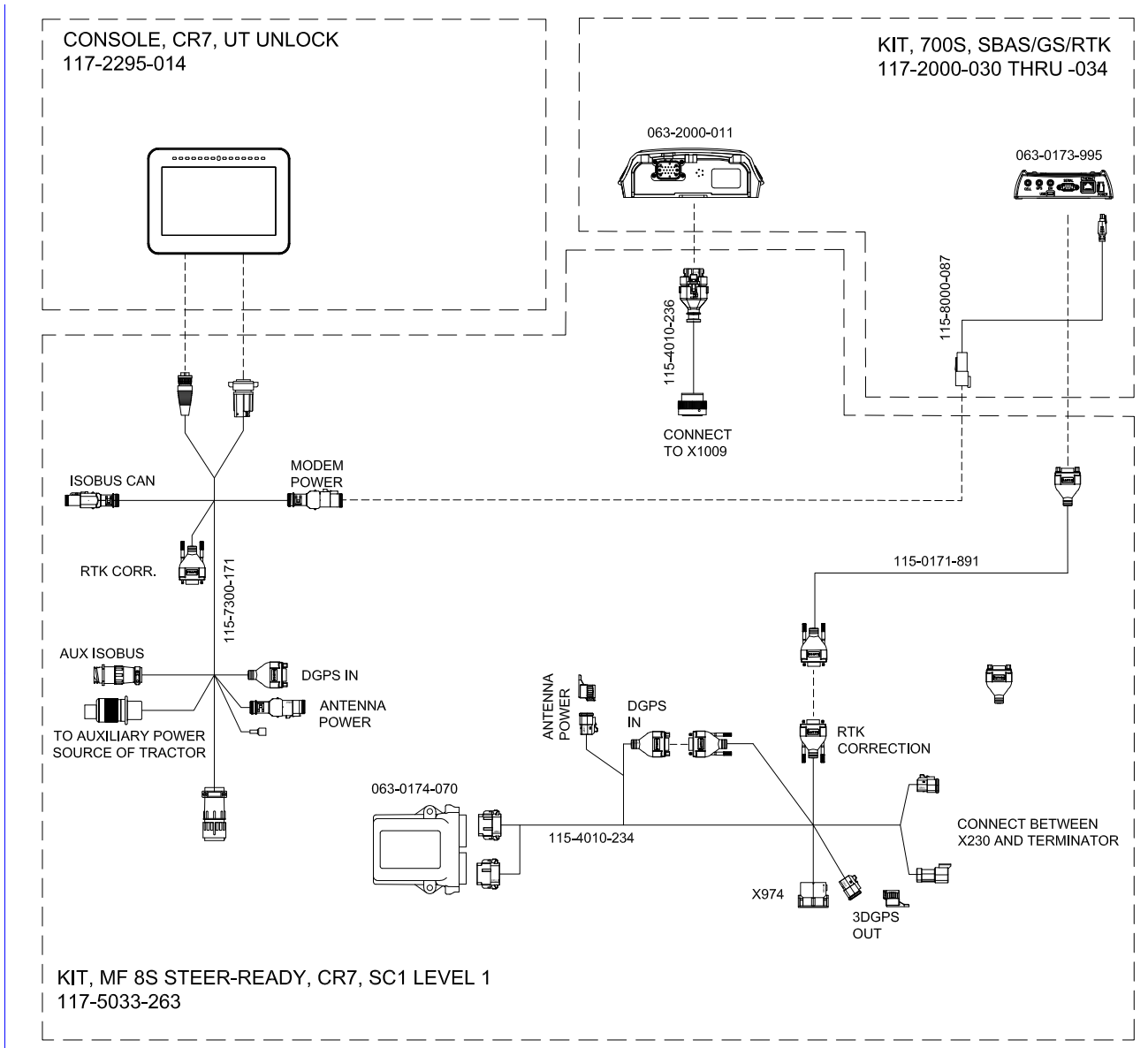
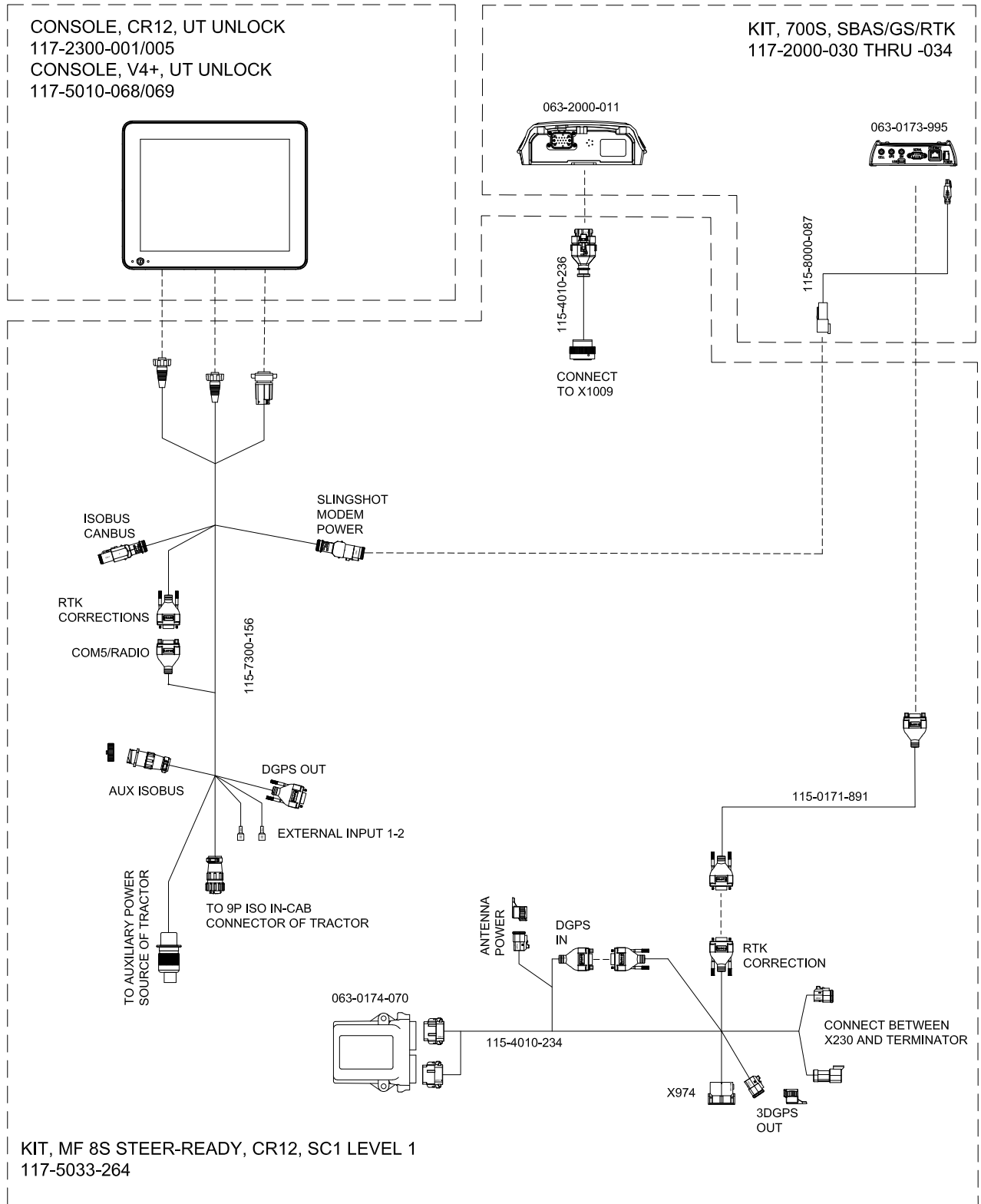


FIGURE 19. TC1™ with CR12™ for Massey Ferguson Autoguide-ready System Drawing (P/N 054-5033-264 Rev. A)



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 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.