

**Case IH AFX/X230 Combines,  
Windrower WD/WDX & New Holland  
CR/CX Combines, Windrower H/HW  
Series SmarTrax™ MD Installation  
Manual**

*P/N 016-5030-051 Rev. B*

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*E26359*



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CHAPTER

1

*Important Safety  
Information*

**NOTICE**

Read this manual and the operation and safety instructions included with your implement and/or controller carefully before installing the SmarTrax™ MD 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 SmarTrax MD 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 SmarTrax MD, observe the following safety measures:

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

 **WARNING**

- The machine must remain stationary and switched off during SmarTrax MD installation or maintenance.



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## *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.

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## CHAPTER

# 2

## *Introduction*

Congratulations on your purchase of the SmarTrax™ MD system!

SmarTrax MD-assisted steering takes the stress out of driving and makes it quick and easy for you to improve your operating efficiency and performance. SmarTrax MD is compatible with Cruiser II™ and Cruiser II™ RTK, Envizio Pro™, Envizio Pro®, Envizio Pro XL™, and Viper Pro™ systems.

The following instructions are designed to assist with the proper installation of the SmarTrax MD system. Refer to the SmarTrax MD Calibration & Operation Manual (P/N 016-5030-020) for assistance with calibrating the software and using the SmarTrax MD system.

This manual applies to the following machines:

**MAKE: Case IH**

**MODEL: AFX Series - 7010, 7120, 8010, 8120, and 9120**  
**X230 Series - 7230, 8230, and 9230**  
**Windrower WD XX03 Series - 1203, 1903, and 2303**  
**Windrower WD XX04 Series - 1504, 2104, and 2504**  
**Windrower WDX Series - 1903 and 2303**

**MAKE: New Holland**

**MODEL: CR Series - 9240, 940, 960, 970, 9040, 9060, 9070, and 9080**  
**CX Series - 820, 840, 860, 880, 8070, 8080, and 8090**  
**Windrower H Series - 8040, 8040PS, 8060, and 8080**  
**Windrower HW Series - 305, 325, 345, and 365**

**FIGURE 1. Case IH 9230 and New Holland XXXX**



# Preparing for Installation

Before installing the SmarTrax MD system, park the machine where the ground is level, clean, and dry. Turn off the machine and leave it 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.

## Recommendations

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

- 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.

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## 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](mailto:techwriting@ravenind.com)

*-Case IH AFX/X230 Combines, Windrower WD/WDX & New Holland CR/CX Combines, Windrower H/HW Series SmarTrax™ MD Installation Manual*

*-P/N 016-5030-051 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.*



## Kit Contents





This section contains a list of the components that are included in the SmarTrax MD 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.

**Important:** *Modification/alteration of any part in the SmarTrax MD system or the use of any non-Raven approved parts will void the warranty on the system. Raven Industries assumes no liability for using modified, altered, or non-Raven approved parts or components.*

**TABLE 1. SmarTrax MD Installation Kit (P/N 117-5030-051)**

Picture	Item Description	Part Number	Qty.
Not Pictured	Manual - Case IH X010, X120, X230 and New Holland 60X0, 70X0, 80X0, 90X0 Series SmarTrax MD Installation	016-5030-051	1
	Assembly - Ring Gear	063-4001-011	1
	Assembly - Spline Adapter	063-4001-024	1
	Trim - Ring Gear Protective	019-0159-590	1
	Bracket - Node Mounting	107-0172-084	1
	Bracket - Case IH/New Holland Windrower and Combine Anti-Rotation	107-4001-049	1
	Bracket - Case IH/New Holland Windrower and Combine Anti-Rotation Collar	116-0159-781	1
	Assembly - M8 Telescope Adapter	063-4001-023	1

**TABLE 1. SmarTrax MD Installation Kit (P/N 117-5030-051)**

Picture	Item Description	Part Number	Qty.
	Bearing - 1/2" Plastic Flanged	325-0000-036	1
	Bolt - #10-24 x 3/4" UNC Zinc Carriage	311-0069-082	2
	Screw - #10-24 x 3/4" Socket Head Cap	311-0068-051	2
	Nut - 3/8"-16 Zinc Flanged Lock	312-1001-167	3
	Nut - #10-24 Wing	312-3000-013	2

**TABLE 2. SmarTrax MD Controller Kit (P/N 117-5030-020)**






Picture	Item Description	Part Number	Qty.
Not Pictured	Manual - SmarTrax MD Calibration & Operation	016-5030-020	1
	Assembly - SmarTrax MD Mechanical Drive Unit	063-4001-010	1
	Node - SmarTrax MD	063-4001-013	1
	Pin - Anti-Rotation	107-4001-004	1

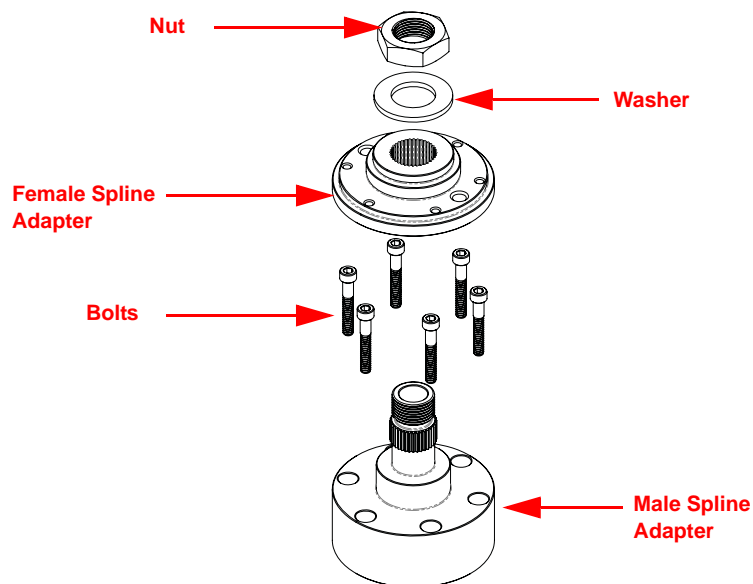
TABLE 2. SmarTrax MD Controller Kit (P/N 117-5030-020)

Picture	Item Description	Part Number	Qty.
	Cable - SmarTrax MD Node Harness	115-4001-157	1
	Switch - Foot	063-0173-593	1



## Disassemble the Mechanical Drive Spline Assembly

FIGURE 1. Spline Assembly Disassembled



1. Locate the 7/8" 36 tooth spline adapter assembly (P/N 063-4001-024).
2. Disassemble the spline adapter assembly as shown in Figure 1 above.

## Remove the Steering Wheel

**Note:** The steps in this section require use of a steering wheel puller (not supplied). For questions on the proper procedure for removing the steering wheel, contact your local equipment dealer.

FIGURE 2. Steering Wheel Cap



3. Remove the cap from the center of the steering wheel.

FIGURE 3. Nut to be Removed



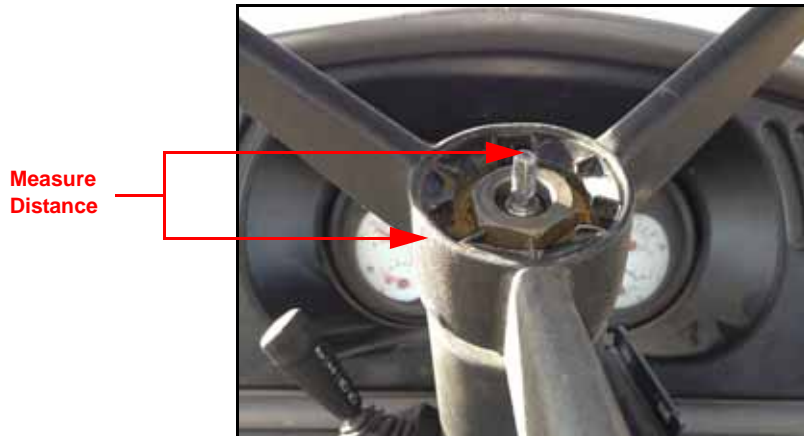
4. Remove the nut used to secure the telescope knob.

FIGURE 4. Machine's Telescope Knob Removed



5. Remove the telescope knob.
6. Remove the nut used to secure the steering wheel to the steering column.

FIGURE 5. Telescope Measurement



7. Measure the distance from the top of the telescope stem to the top of the steering wheel hub.

**Note:** The measurement will be used later in the installation procedure.

FIGURE 6. Steering Wheel Removed



8. Using the steering wheel puller, remove the steering wheel from the steering column.

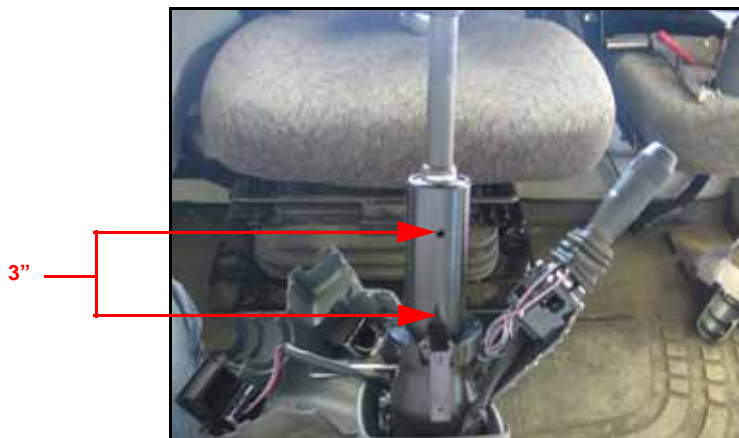
## *Install the Anti-Rotation Brackets*

**FIGURE 7. Plastic Housing Removed**



1. Remove the screws used to secure the plastic covers of the upper steering column.

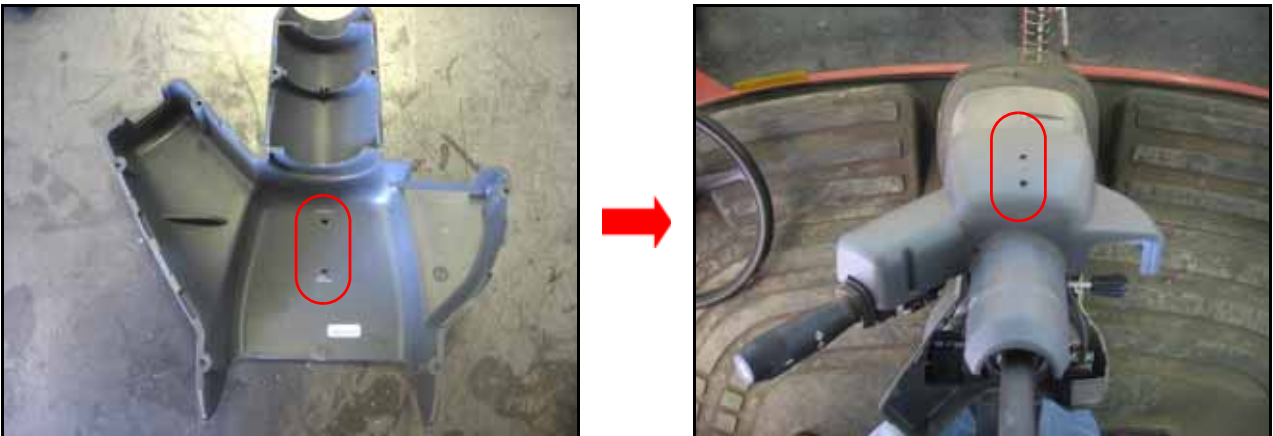
**FIGURE 8. Anti-Rotation Collar Bracket Installation Location**



2. Identify the anti-rotation collar bracket (P/N 116-0159-781) mounting location, positioning it so that the top of the collar is 3" below the hole in the steering column.



FIGURE 9. Anti-Rotation Collar Bracket Installed



3. Reposition the plastic cover on the steering column, pressing it into place to mark the anti-rotation collar bracket position.
4. Drill two 7/32" holes in the plastic cover in the area marked by the anti-rotation collar bracket.

**Note:** *The holes in the cover should align with the holes in the anti-rotation collar bracket.*

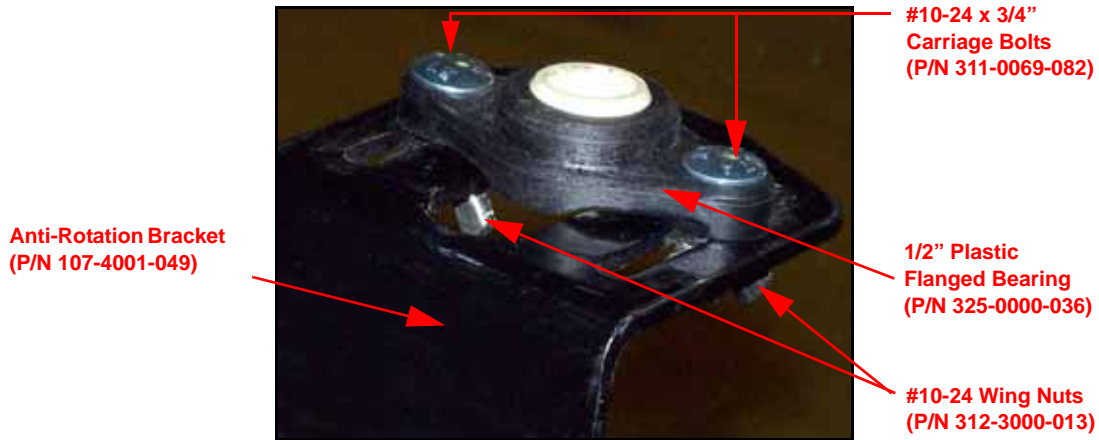
5. Reassemble the plastic covers over the anti-rotation collar bracket.

FIGURE 10. Anti-Rotation Bracket Installed



6. Align the holes in the anti-rotation bracket (P/N 107-4001-049) over the holes in the plastic cover.
7. Secure the anti-rotation bracket to the anti-rotation collar bracket and plastic cover using two #10-24 x 3/4" socket head cap screws (P/N 311-0068-051).

FIGURE 11. Flanged Bearing Assembly Installed



8. Install the 1/2" plastic flanged bearing (P/N 325-0000-036) on the short leg of the anti-rotation bracket (P/N 107-4001-049) using two #10-24 x 3/4" carriage bolts (P/N 311-0069-082) and two #10-24 wing nuts (P/N 312-3000-013).

## *Install the Spline and Ring Gear Assemblies*

FIGURE 12. Female Spline Adapter Installed on Steering Column



1. Install the female spline adapter on the machine's steering column.

**FIGURE 13. Machine's Steering Wheel Nut Installed**



2. Install the machine's steering wheel nut that was removed during the steering wheel removal.

**FIGURE 14. Ring Gear Assembly Installed**



3. Place the ring gear assembly (P/N 063-4001-011) over the female spline adapter with the V-ring facing down and the holes in the ring gear aligned with the holes in the female spline adapter.

**FIGURE 15. Telescope Adapter Assembly Installed**



## Chapter 3

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4. Install the telescope adapter assembly (P/N 063-4001-023) on the machine's telescope rod, aligning the set screws with the flat part of the stem.
5. Tighten the set screws in the telescope adapter assembly.

**FIGURE 16. Male Spline Adapter Installed**



6. Align the bolt holes in the male spline assembly with the holes in the ring gear assembly.
7. Install and tighten the spline assembly bolts to secure the male spline adapter to the ring gear and female spline adapter.

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## *Reinstall the Steering Wheel*

**FIGURE 17. Steering Wheel Placement**



1. Align the spokes of the steering wheel with the spokes on the installed ring gear.
2. Install the steering wheel on the male spline adapter.
3. Install the washer and nut on the protruding male spline adapter.

FIGURE 18. Distance Measurement



4. Measure the distance from the top of the telescope stem to the top of the steering wheel hub to verify the distance is close to the measurement taken when the steering wheel was removed.

**Note:** *If the distance is not close to the first measurement:*

1. Remove the spline nut, washer, and assembly bolts.
  2. Remove the male spline adapter.
  3. Loosen the set screws used to secure the installed telescope adapter.
  4. Adjust the placement of the telescope adapter on the machine's telescope rod, relative to the distance between the two measurements.
  4. Tighten the set screws and reinstall the male spline adapter and assembly bolts.
  5. Reinstall the spline washer and nut.
5. Reinstall the machine's steering wheel telescope knob.
  6. Reinstall the nut that was removed during the steering wheel removal on the protruding telescope adapter (P/N 063-4001-023).
  7. Replace the steering wheel cap.

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## *Install the Mechanical Drive*

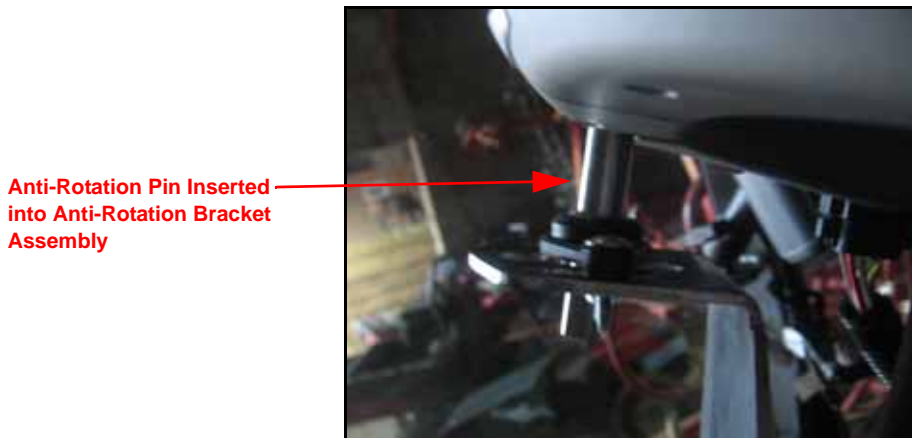
**Note:** *Depending on the machine's configuration, it may be necessary to install the anti-rotation pin in the mechanical drive's casing after the mechanical drive is installed instead of before as indicated in the instructions below.*

FIGURE 19. Anti-Rotation Pin Installation Locations



1. Determine the anti-rotation pin (P/N 107-4001-004) installation location on the mechanical drive (P/N 063-4001-010) based on the anti-rotation bracket installation location.
2. Screw the anti-rotation pin into the mechanical drive's casing.

FIGURE 20. Anti-Rotation Pin Installed in Bracket Assembly



3. Insert the anti-rotation pin into the installed flanged bearing (P/N 325-0000-036) on the anti-rotation bracket assembly.

FIGURE 21. Mechanical Drive Installed



4. Install the mechanical drive around the installed ring gear assembly, closing it firmly until the latch on the casing is securely locked.
5. Tighten all nuts to ensure the anti-rotation bracket assembly is installed securely.

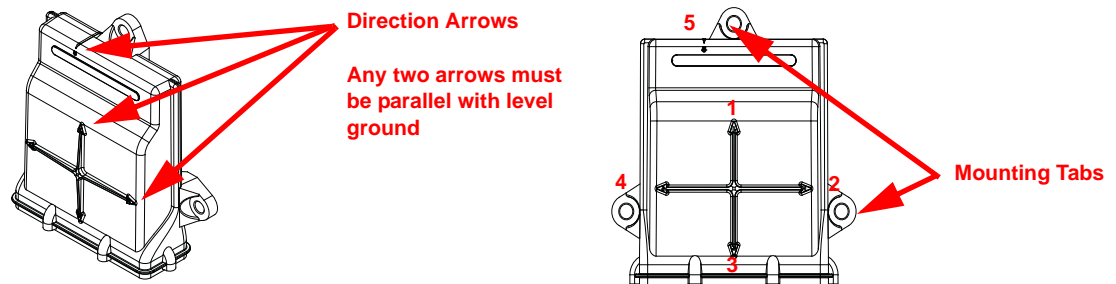




*Install the SmarTrax MD Node*

## Node Mounting Locations

FIGURE 1. Node Mounting



When choosing the location for the SmarTrax node, consider the following points:

- Mount the SmarTrax node inside the machine's cab on a flat, level surface for proper performance and cable connection.
- One of the six numbered direction arrows on the node must be oriented in the direction of forward vehicle travel, one arrow pointing straight up, and two of the arrows parallel to the ground.

**Note:** *Make a note of the number of the arrow that is oriented in the direction of forward vehicle travel. This number will be needed during the SmarTrax calibration process.*

- The node mounting location must not create tripping hazards.
- Mount the node in a location where it will not be kicked or jarred during normal equipment operation.
- The location must allow cable routing to avoid crimping or damaging the cables or the node connections.
- Securely fasten the node using bolts or screws through at least two of the three mounting holes. When mounted properly, the node should not become loose or rotate.

## Mount the SmarTrax MD Node - Case IH AFX, X320 and New Holland CR, CS Combines Only

**FIGURE 2. SmarTrax MD Node Installed on Mounting Bracket**

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1. Install the SmarTrax MD node (P/N 063-4001-013) on the node mounting bracket (P/N 107-0172-084) using three 3/8"-16 lock nuts (P/N 312-1001-167).

**FIGURE 3. Node Mounting Location**

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2. Identify the node mounting location on the floor to the right of the operator's seat.

**FIGURE 4. Node Cover Bracket Removed**



3. Remove the existing node cover bracket.

**FIGURE 5. SmarTrax MD Node Installed**



4. Align the holes in the node mounting bracket with the machine's standoffs, orienting the bracket so that the node's connectors point to the right side of the machine.
5. Reinstall the original wing nuts to secure the node mounting bracket to the standoffs.

## Mount the SmarTrax MD Node - Case IH Windrower WD/WDX and New Holland H/HW Windrower Only

FIGURE 6. SmarTrax MD Node Installed

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1. Install the SmarTrax MD node (P/N 063-4001-013) on the node mounting bracket (P/N 107-0172-084) using three 3/8"-16 zinc flanged lock nuts (P/N 312-1001-167).
2. Secure the node mounting bracket to the floor to the right of the operator's seat using four #10-24 x 3/4" self-tapping screws (P/N 310-1002-073) and 0.265" ID x 0.505" OD x 0.060" thick washers (P/N 313-2300-120) or 3" double-sided tape (P/N 332-0000-019).

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## Install the Foot Switch

FIGURE 7. Foot Switch Installed

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1. Select a suitable location for the foot switch (P/N 063-0173-593) 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 to the node mounting location.

---

## *Install the Node Harness*

**FIGURE 8. Node Harness Installed on SmarTrax Node**



1. Install the two large, rectangular connectors of the node harness (P/N 115-4001-157) into the correct ports of the node (P/N 063-4001-013), tightening the bolts on the connectors to secure the connections.
2. Tighten the bolts on the harness connectors to secure the connections.
3. Connect the female 4-pin Deutsch connector to the cable of the installed foot switch (P/N 063-0173-593).
4. Connect the node harness to the operator presence switch, if applicable.
  - a. Locate and disconnect the machine's existing OPERATOR PRESENCE connection behind the operator's seat, if applicable.
  - b. Connect the round 4-pin connector from the node harness to the machine's mating OPERATOR PRESENCE connector.

**FIGURE 9. Mechanical Drive Connection**



5. Connect the 8-pin Deutsch connector from the node harness into the 8-pin port of the mechanical drive (P/N 063-4001-010).

6. Ensure the terminator (P/N 063-0172-369) supplied with the node harness is securely installed in the remaining 4-pin Deutsch connector.

### *Install the Chassis Cable - SmarTrax MD-Only Systems (If Applicable)*

If the machine does not contain an existing chassis power system (such as AutoBoom, product control, etc.), it is necessary to install the chassis power cable to operate the SmarTrax system. If a CAN system already exists on the machine, refer to *Connect SmarTrax MD to an Existing Chassis Cable (If Applicable)* below to connect power to the SmarTrax MD system.

**Note:** *The chassis cable is sold separately. Contact your local Raven dealer for ordering information.*

1. Locate the SmarTrax chassis cable (P/N 115-4001-085).
2. Connect the TO SMARTRAX NODE connector from the chassis cable to the round 16-pin connector on the node harness (P/N 115-4001-157).
3. Connect the TO CONSOLE CABLE connector to the Raven console cable.
4. Install a terminator (P/N 063-0172-369) on the CAN cable connector.
5. Loop and tie-off the REMOTE SWITCH cable connection, securing it with plastic cable ties as necessary.

**Note:** *The REMOTE SWITCH connector is not used in the SmarTrax MD system. Ensure the cable is secured away from moving parts and heat sources.*

6. Connect the ring terminals to the battery.

**Note:** *The positive connectors are fused.*

### *Connect SmarTrax MD to an Existing Chassis Cable (If Applicable)*

**Note:** *The SmarTrax interface tee is sold separately. Contact your local Raven dealer for ordering information.*

1. Locate and disconnect the connection between the Raven console cable and chassis cable on the machine's existing CAN system.
2. Install the SmarTrax interface tee cable (P/N 115-4001-070 or 115-4001-071) between the chassis and Raven console harness.
3. Connect the SmarTrax MD node harness (P/N 115-4001-157) to the remaining SmarTrax interface tee connection.

## *Calibrate the SmarTrax MD System*

Refer to the SmarTrax MD Calibration & Operation Manual (P/N 016-5030-020) for instructions on calibrating the SmarTrax MD system, adjusting system settings, and system operation.





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