

**MacDon M150, M155, M200, and
M205 Series Windrower
SmarTrax™ Installation Manual**

P/N 016-5030-009 Rev B 09/15 E20834

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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™ 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 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, observe the following safety measures:

- Be alert and aware of surroundings.
- Do not operate SmarTrax 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 is engaged.
- Disable SmarTrax when exiting the operator's seat and machine.
- Do not drive the machine with SmarTrax enabled on any public road.
- Determine and remain a safe working distance from other individuals. The operator is responsible for disabling SmarTrax when the safe working distance has diminished.
- Ensure SmarTrax is disabled prior to starting any maintenance work on SmarTrax or the machine.



WARNING

- When starting the machine for the first time after installing SmarTrax, be sure that all persons stand clear in case a hose has not been properly tightened.
- The machine must remain stationary and switched off during SmarTrax installation or maintenance.

 **CAUTION**

Hydraulic Safety

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

Electrical Safety

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

CHAPTER

2

Introduction

Congratulations on your purchase of the SmarTrax system! 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:

MAKE: MacDon Windrower

MODEL: M150, M155, M200, and M205

FIGURE 1. MacDon M205



Preparing for Installation

Important: *Install the MacDon AutoSteer hydraulic interface kit (MacDon P/N B5589) on the machine before installing the SmarTrax system. Contact your local MacDon dealer for ordering information.*

Before installing the SmarTrax 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 system for the first time, at the start of the season, or when moving the SmarTrax system to another machine:

- Install the GPS antenna in the recommended location. Refer to the following table for the machine-specific antenna mounting location.

Machine Preset	Antenna X Position (left to right)	Antenna Y Position (front to back in inches)	Antenna Z Position (ground to top of antenna in inches)
MacDon 205	Centered	159	135

- Ensure the machine's hydraulic filters have been recently changed and 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.).
- Ensure the machine's hydraulic system is using fresh oil and debris is flushed from the hydraulic hoses, valves, and filters.

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

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

Point of Reference

The instructions in this manual assume that you are standing behind the machine, looking toward the cab.

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

-MacDon M150, M155, M200, and M205 Series Windrower SmarTrax™ Installation Manual

-Manual No. 016-5030-009 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 kit. Before beginning the SmarTrax installation, compare the items in the kit with the components on this list. If you have questions about the kit, contact your Raven dealer.

TABLE 1. SmarTrax Installation Kit (P/N 117-5030-009)

Picture	Item Description	Part Number	Qty.
Not Pictured	Manual - MacDon M-Series Windrower SmarTrax Installation	016-5030-009	1
Not Pictured	Manual - SmarTrax and SmartSteer Calibration & Operation	016-0171-277	1
	Node - SmarTrax 3D CAN Control	063-0173-484	1
	Bracket - Node Mounting	107-0172-055	1

TABLE 1. SmarTrax Installation Kit (P/N 117-5030-009)

Picture	Item Description	Part Number	Qty.
	Cable - Node Harness	115-4001-166	1
	Cable - Valve Harness	115-4001-167	1
	Tape - 3.5" Double-Sided	332-0000-019	6
	Nut - 3/8"-16 Zinc Flanged Lock	312-1001-164	3

CHAPTER

3

Cab Component Installation

Install the SmarTrax Node

Mount the SmarTrax Node

FIGURE 1. SmarTrax Node Installed

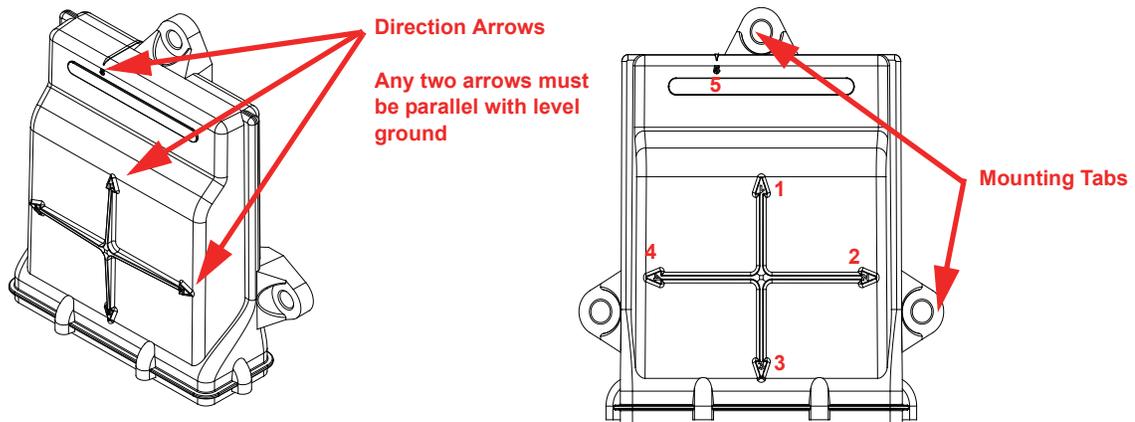


Note: The node forward direction number as shown in the figure above is 2.

1. Install the node mounting bracket (P/N 107-0172-055) in the right-rear corner of the cab.
 - Models M150 and M200 - Using 3.5" double-sided tape (P/N 332-0000-019), install the node mounting bracket on the metal manual/catalog holder so that the cable connectors of the node (P/N 063-0173-484) point up when installed.
 - Models M155 and M205 - Using 3.5" double-sided tape (P/N 332-0000-019), install the node mounting bracket on top of the air filter shroud so that the cable connectors of the node (P/N 063-0173-484) face the right window of the cab when installed.
2. Mount the SmarTrax node to the node mounting bracket using three 3/8"-16 zinc flanged lock nuts (P/N 312-1001-164).

Node Mounting Locations

FIGURE 2. Node Mounting



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

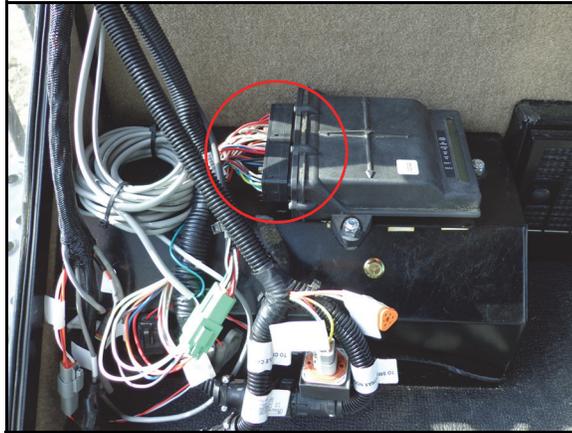
- Mount the SmarTrax node inside the machine's cab on a flat, level surface for proper performance and cable connection.
- One of the six numbered direction arrows on the node must be oriented in the direction of forward vehicle travel, one arrow pointing straight up, and two of the arrows parallel to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

Install the Node Harness

FIGURE 3. Node Harness Installed on the Node

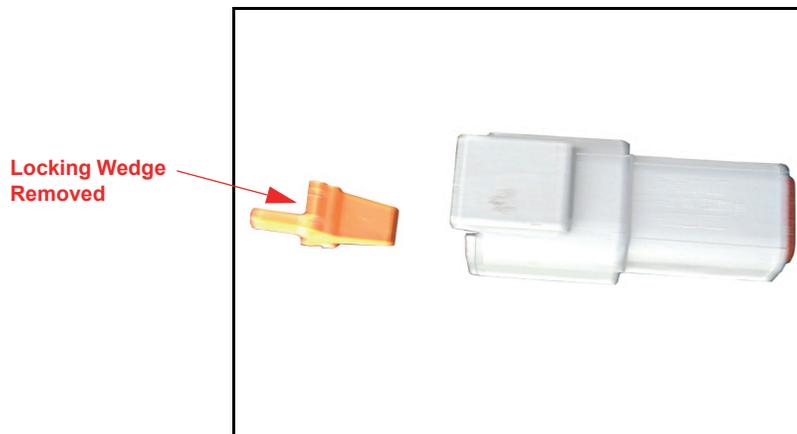


1. Install the two large, rectangular connectors of the node harness (P/N 115-4001-166) into the correct ports of the node, tightening the bolts on the harness connectors to secure the connections.

Note: *The connections should be pointing toward the right window.*

2. Locate the engage switch harness at the rear-center exterior of the cab.

FIGURE 4. Locking Wedge Removed from Connector

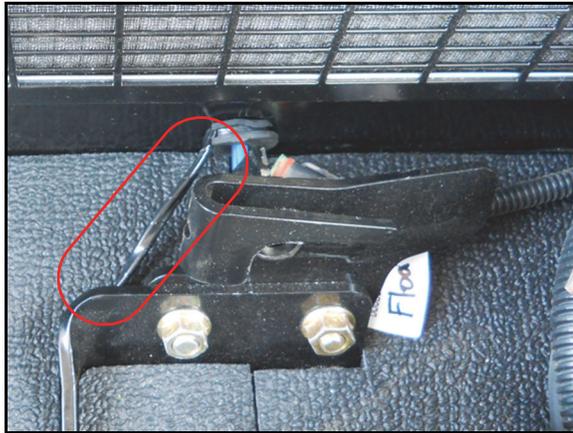


3. Remove the locking wedge from the engage switch harness connector.
4. Use a small screwdriver to release the pins located inside the connector.

Important: *Note which pins are removed from which cavity in the connector.*

5. Remove the connector from the engage switch harness.

FIGURE 5. Engage Switch Harness Routed into Cab



6. Route the engage switch cable through the access point in the center of the cab, under the cab air filter.

FIGURE 6. Cable Connector Reinstalled



7. Reinstall the engage switch cable connector and pins, ensuring the pins are reinstalled into the correct cavity.

FIGURE 7. Node Harness Connected to Engage Switch Harness



8. Locate the ENABLE connector on the node harness and connect it to the engage switch harness.

Install the Valve Harness

FIGURE 8. Valve Harness Connected to the Node Harness



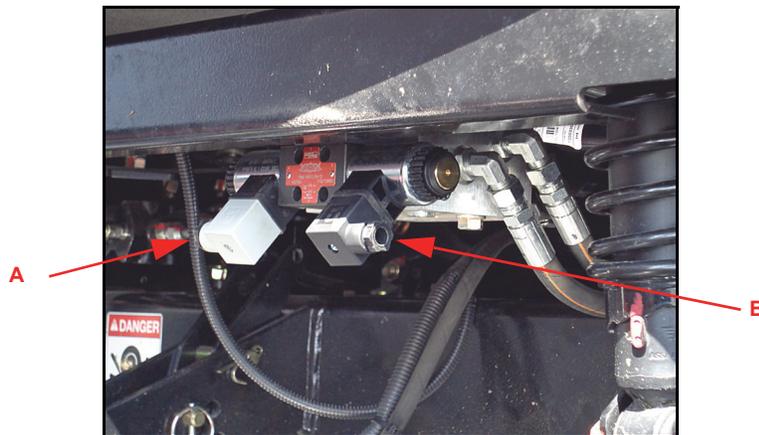
1. Connect the green 12-pin connector of the valve harness (P/N 115-4001-167) into the mating 12-pin connector of the node harness (P/N 115-4001-166).

FIGURE 9. Valve Harness Routed Outside the Cab



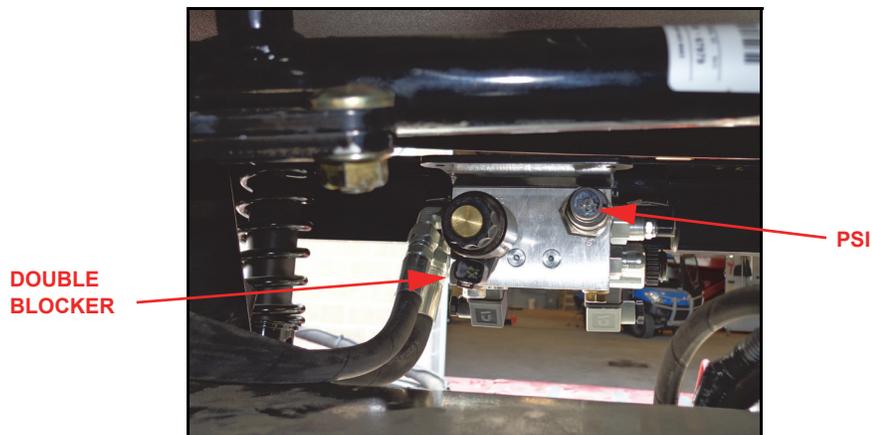
2. Route the valve harness through the access hole in the corner post and out the floor in the right-rear corner of the cab.
3. Route the valve harness to the MacDon steering valve, located under the front left-center of the cab.

FIGURE 10. LEFT and RIGHT Valve Harness Connections (Facing the Front of the Cab)



4. Connect the LEFT connector on the valve harness to the DIN connector labeled B in Figure 10 above.
5. Connect the RIGHT connector of the valve harness to the DIN connector labeled A in Figure 10 above.

FIGURE 11. PSI and DOUBLE BLOCKER Valve Harness Connections



6. Connect the PSI connector to the transducer installed in the MacDon steering valve.
7. Connect the DOUBLE BLOCKER connector to the connector on the solenoid of the MacDon valve.

FIGURE 12. WAS Connection



8. Under the machine, near the center of the right rail, locate the wheel angle sensor near the hydraulic piston pump.
9. Connect the WAS connector of the valve harness to the wheel angle sensor.

Install the Chassis Cable

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.

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 115-4001-166).
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 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.*

Calibrate the SmarTrax System

Refer to the SmarTrax and SmartSteer Calibration & Operation Manual (P/N 016-0171-277) for instructions on calibrating the SmarTrax system, adjusting system settings, and system operation.

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RAVEN

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.