

SmartYield™ Pro Installation Manual

P/N 016-0171-566 Rev. C 12/15

E26333

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CHAPTER

1

*Important Safety
Information*

NOTICE

Read this manual carefully before installing the SmartYield™ Pro system.

- Follow all safety information presented within this manual.
- If you require assistance with any portion of the installation or service of the SmartYield Pro sensor system, contact a local Raven dealer for support.
- Follow all safety labels affixed to 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 a local Raven dealer.

When operating the machine after installing SmartYield Pro, observe the following safety measures:

- Be alert and aware of surroundings at all times.
- Do not operate any agricultural equipment while under the influence of alcohol or an illegal substance.

Please review the operation and safety instructions included with the implement and/or controller.

 **CAUTION**

Electrical Safety

Do not reverse power leads. Doing so could cause severe damage to equipment. Always make sure that the power leads are connected to the correct polarity as marked or instructed in this document. Ensure that the power cable is the last cable to be connected.

Instructions for Wire Routing

The word harness is used to mean all electrical leads and cables, bundled and unbundled. When installing harness, secure it at least every 30 cm (12in) to the frame. Follow existing harness as much as possible and use these guidelines:

Chapter 1

Harness should not contact or be attached to:

- Lines and hoses with high vibration forces or pressure spikes
- Lines and hoses carrying hot fluids beyond harness component specifications

Avoid contact with any sharp edge or abrading surfaces such as, but not limited to:

- Sheared or flame cut edges
- Edges of machined surfaces
- Fastener threads or cap screw heads
- Ends of adjustable hose clamps
- Wire exiting conduit without protection, either ends or side of conduit
- Hose and tube fittings

Routing should not allow harnesses to:

- Hang below the unit
- Have the potential to become damaged due to exposure to the exterior environment. (i.e. tree limbs, debris, attachments)
- Be placed in areas of or in contact with machine components which develop temperatures higher than the temperature rating of harness components
- Wiring should be protected or shielded if it needs to route near hot temperatures beyond harness component specifications

Harnessing should not have sharp bends

Allow sufficient clearance from machine component operational zones such as:

- Drive shafts, universal joints and hitches (i.e. 3-point hitch)
- Pulleys, gears, sprockets
- Deflection and backlash of belts and chains
- Adjustment zones of adjustable brackets
- Changes of position in steering and suspension systems
- Moving linkages, cylinders, articulation joints, attachments
- Ground engaging components

For harness sections that move during machine operation:

- Allow sufficient length for free movement without interference to prevent: pulling, pinching, catching or rubbing, especially in articulation and pivot points
- Clamp harnesses securely to force controlled movement to occur in the desired harness section
- Avoid sharp twisting or flexing of harnesses in short distances
- Connectors and splices should not be located in harness sections that move

Protect harnesses from:

- Foreign objects such as rocks that may fall or be thrown by the unit
- Buildup of dirt, mud, snow, ice, submersion in water and oil
- Tree limbs, brush and debris
- Damage where service personnel or operators might step or use as a grab bar
- Damage when passing through metal structures
- High pressure wash

Instructions for Hose Routing

The word hoses is used to mean all flexible fluid carrying components. Follow existing hoses as much as possible and use these guidelines:

Hoses should not contact or be attached to:

- Components with high vibration forces
- Components carrying hot fluids beyond hoses component specifications

Avoid contact with any sharp edge or abrading surfaces such as, but not limited to:

- Sheared or flame cut edges
- Edges of machined surfaces
- Fastener threads or cap screw heads
- Ends of adjustable hose clamps

Routing should not allow hoses to:

- Hang below the unit
- Have the potential to become damaged due to exposure to the exterior environment. (i.e. tree limbs, debris, attachments)
- Be placed in areas of or in contact with machine components which develop temperatures higher than the temperature rating of hose components
- Hoses should be protected or shielded if it needs to route near hot temperatures beyond hose component specifications

Hoses should not have sharp bends

Allow sufficient clearance from machine component operational zones such as:

- Drive shafts, universal joints and hitches (i.e. 3-point hitch)
- Pulleys, gears, sprockets
- Deflection and backlash of belts and chains
- Adjustment zones of adjustable brackets
- Changes of position in steering and suspension systems
- Moving linkages, cylinders, articulation joints, attachments
- Ground engaging components

Chapter 1

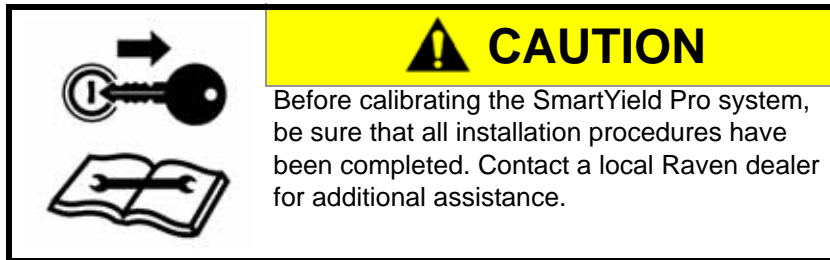
For hose sections that move during machine operation:

- Allow sufficient length for free movement without interference to prevent: pulling, pinching, catching or rubbing, especially in articulation and pivot points
- Clamp hoses securely to force controlled movement to occur in the desired hose section
- Avoid sharp twisting or flexing of hoses in short distances

Protect hoses from:

- Foreign objects such as rocks that may fall or be thrown by the unit
 - Buildup of dirt, mud, snow, ice, submersion in water and oil
 - Tree limbs, brush and debris
 - Damage where service personnel or operators might step or use as a grab bar
 - Damage when passing through metal structures
 - High pressure wash
-

This document is provided to assist with the installation of the SmartYield™ Pro system components with a Raven device such as an Envizio Pro series field computer.



To provide accurate yield information for harvest operations, both the Raven controller and the SmartYield Pro system must be properly calibrated for the specific machine. Be sure to review all instructions for the specific Raven device and use the table of contents for assistance with locating additional information and system diagrams.

SmartYield™ Pro Overview

The Raven SmartYield Pro system may be used with the following Raven devices:

- Envizio Pro™, Envizio Pro II®, or Envizio Pro XL™

Additional settings and features of the SmartYield Pro system are detailed in the *SmartYield Pro Calibration and Operation Manual*.

Installation Overview

Installation of the SmartYield Pro system varies depending upon the specific machine make, model, and model year. Despite variations, the installation of the SmartYield Pro system will require the following steps:

1. Install the Raven field computer in the vehicle cab within reach of the vehicle operator. Review the display installation manual for specific instructions.

Chapter 2

2. Mount the SmartYield Pro control node on the outside of the vehicle cab. Before mounting the node, review Chapter 6, *SmartYield™ Pro Control Node Installation*.
3. Mount the yield sensors to the clean grain elevator.
4. Mount the optional moisture sensor to the clean grain elevator or to the grain tank loading auger in the grain hopper.
5. Install any required header switch hardware required for the specific harvester make and model.

Kit Contents

TABLE 1. SmartYield™ Pro Kit Contents

		SmartYield Pro Kit	SmartYield to SmartYield Pro Update Kit
Item Description	Part Number	117-9000-002	117-9000-003
Node, SmartYield Pro	063-9000-002	1	1
Cable, SmartYield Pro	115-9000-010	1	1
Kit, Node Mounting	117-0171-299	1	1
Sensors, (Wired Pair) Optical Yield	063-9000-006	1	
Assembly, Yield Sensor Optical Lens	063-9000-001	2	
Bracket, Yield Sensor Mounting	107-0172-134	2	
Bracket, Universal Yield Sensor Mounting	107-0172-143	2	
Bolt, 1/4"-20 3/4"L Steel Hex Machine	311-0049-103	4	
Nut, 1/4"-20 Nylon Lock	312-4000-057	4	
Magnet, Yield Sensor Bracket	418-0000-013	4	
Moisture Sensor Mounting Kit	117-9000-012	1	
Manual, SmartYield Pro Installation	016-0171-566	1	1
Manual, SmartYield Pro Calibration and Operation	016-0171-567	1	1

Additional Hardware Components

Paddle Extension Plates. An extension plate kit may be required for installations on older Gleaner, New Holland, or Massey Ferguson harvesters. Plates may also be necessary for other harvesters if the SmartYield Pro system has difficulty achieving a good calibration. Extension plates are typically only required on harvester paddles with angled mounting brackets because angled mounting brackets (Refer to Figure 1, “Angled Paddle Mounting Brackets,”) may result in inconsistent sensor readings. In some instances, moving the sensor location towards the lift side may eliminate the need for extension plates.

FIGURE 1. Angled Paddle Mounting Brackets



Refer to the SmartYield Pro Calibration and Operation Manual for details on the calibration and to help determine if extension plates are necessary.

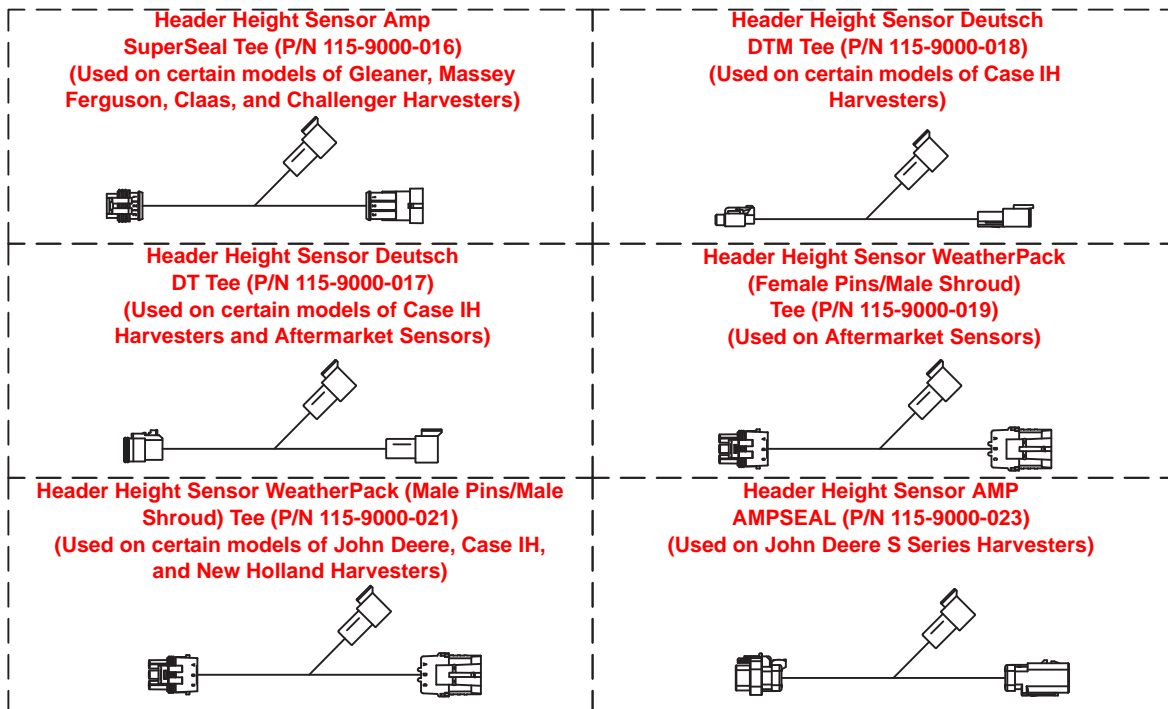
Refer to “Yield Sensor Paddle Extension Plates” on page 18 for additional information on installing extension plates.

TABLE 2. Paddle Extension Plates (P/N 117-0171-462)

Item Description	Part Number	Qty.
Plate, SmartYield Pro Paddle Extension	107-0172-129	40

Factory Potentiometer Tee Cables. Tee cables are available for many makes and models of harvester to interface with the factory rotary potentiometer to monitor the header height during harvest operations.

FIGURE 2. Factory Rotary Potentiometer Tee Cables (D/N 054-9000-007)



Optional Components

TABLE 3. SmartYield™ Pro Installation Tool Kit (P/N 117-9000-009)

Item Description	Part Number	Qty.
Kit, Replacement Bit	117-9000-010	1
Arbor, 9/16" to 1-3/16" Hole Saw (7/16" Hex)	321-0000-429	1
Arbor, 1-1/4" to 6" Hole Saw (7/16" Hex)	321-0000-430	1
Square, 7" x 7" Rafter Square	321-0000-431	1
Extension, 12" Arbor (7/16" Hex)	321-0000-432	1
4" Hand File	321-0000-433	1

TABLE 4. Replacement Bit Kit (P/N 117-9000-010)

Item Description	Qty.
Saw, 7/8" Hole	1
Saw, 3-1/4" Hole	1
Drill, 1/4" High Speed Pilot	1
Drill, 1/4" Pilot (for Bimetal Hole Saw)	1

Point of Reference

The instructions in this manual assume that you are standing behind the machine, looking toward the vehicle cab or operator's position.

Care and Maintenance

To achieve the best accuracy from the Raven SmartYield™ Pro system, perform daily and seasonal system maintenance:

- When harvesting particularly oily crops, make sure that the grain sensor lenses and moisture sensor stay reasonably clean.
- Cross-check moisture readings and grain density settings by measuring reference samples of the crop when first starting harvest operations.
- Check and, if required, tare (zero) the yield reading with the clean grain elevator running empty.
- The clean grain elevator chain should be in good condition and properly tensioned before starting harvest operations.

Updates

Updates for Raven manuals as well as software updates for Raven consoles are available at the Applied Technology Division web site:

www.ravenhelp.com

Sign up for e-mail alerts to receive notice 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

-SmartYield™ Pro Installation Manual

-016-0171-566 Rev. C

-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.

Yield Sensor Installation Recommendations

Inspect the harvester's clean grain elevator prior to drilling any holes or mounting any brackets to the clean grain elevator. Keep the following items in mind when selecting a location to mount the yield sensors:

- Yield sensor mounting location is critical for proper performance of the SmartYield Pro system. The sensors should be mounted as high as possible on the clean grain elevator and should be offset from the lift side of the elevator by a measurement 'X' specific for each make and model of harvester. Refer to the *Yield Sensor Locations* section on page 13 for a table of yield sensor offset values.

Note: The 'X' measurement must be made perpendicular from the side wall on the lift side of the clean grain elevator.

If your specific harvester make and model is not listed, contact a local Raven dealer or the Raven technical support center for additional instructions.

- Depending on the paddle mounting bracket, the sensor installation bracket may vary. Refer to Figure 1, "Sensor Mounting Options," for sensor mounting location options.

FIGURE 1. Sensor Mounting Options

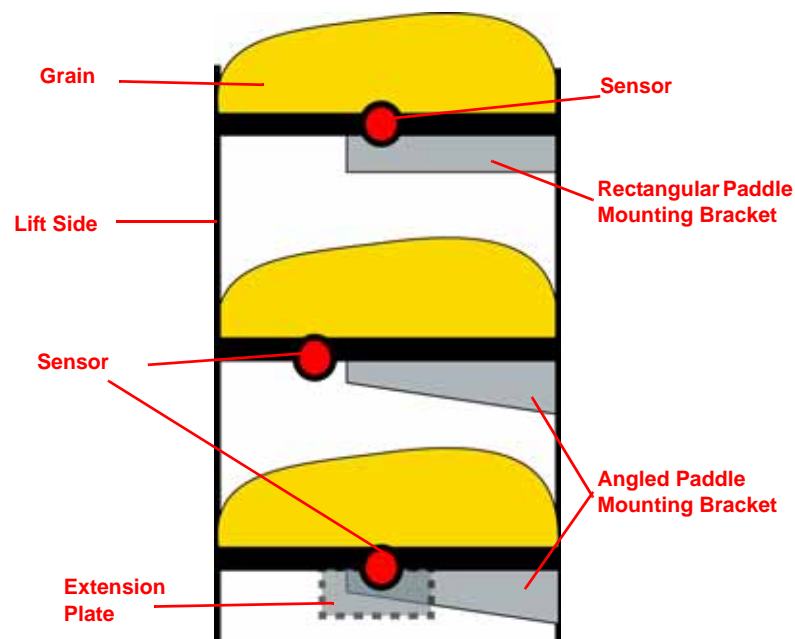
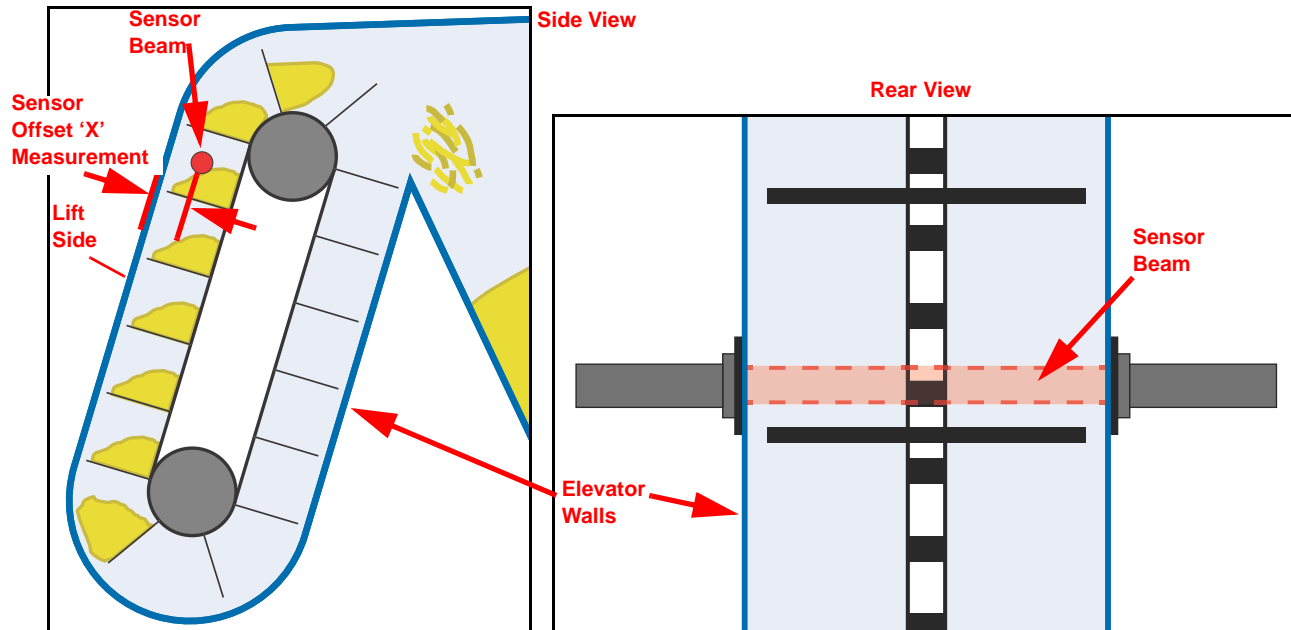


FIGURE 2. Recommended SmartYield™ Pro Yield Sensor Mounting and Sensor Beam Alignment



- While the yield sensors provide some tolerance for misalignment when installed, it is important to align and level the sensors as carefully as possible. A SmartYield Pro installation tool kit (P/N 117-0171-468) is available with drill bits and a square which may be helpful with leveling and aligning the yield sensors during installation.

Ideally, the yield sensors are mounted parallel with the ground when the vehicle is parked on a level surface with the sensors aligned directly across the clean grain elevator from each other. Use a carpenters square, level and any other tools to help level, align, and mark the yield sensor installation locations before drilling any holes in the clean grain elevator.

- Check for moving components such as belts, chains, and access panels on the clean grain elevator. Ensure the yield sensors and mounting brackets will not interfere with, or be struck during, normal equipment operation.
It may be necessary to assemble the yield sensors and brackets and rough out the yield sensor installation to verify clearances.
- It may be necessary to disconnect or move some components on some machine makes or models to allow for yield sensor installation. Contact a local dealership or the machine manufacturer for additional assistance with factory equipment.
- The yield sensors must consistently register individual paddles as they pass the sensor lenses. It is recommended to open the clean grain elevator door and check or measure the location of the elevator chain and verify the location for the yield sensors in the clean grain elevator wall.

Note: *An extension tab kit (P/N 117-0171-462) may be required for installations on older Gleaner, New Holland or Massey Ferguson harvesters. Tabs may also be necessary for other harvesters if the SmartYield Pro system has difficulty achieving a good calibration.*

FIGURE 3. Angled Paddle Mounting Brackets



Refer to the SmartYield Pro Calibration and Operation Manual for details on the calibration and to help determine if tabs are necessary for your specific harvester. See the Yield Sensor Paddle Extension Plates section on page 18 for details on installation of the paddle extension plates.

Yield Sensor Locations

Review the following table for the offset measurement required for each specific harvester make and model. The offset value (X) is measured from the wall on the lift side of the clean grain elevator.

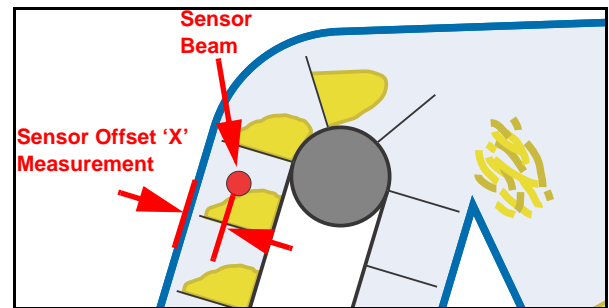


TABLE 1. Harvester Make and Model Offset Measurements

Make	Model	'X' Measurement	
		Inches	Millimeters
Case IH	1460	1-3/8	35
	1660, 2166	1-9/16	40
	1680	2-3/8	60
	2188/2388	2-3/8 inside 1-15/16 outside	60 inside 50 outside
Claas	Dominator 86, 96, 98	1-9/16	40
	Dominator 106, 108, 118, 204, 218, Lexion, Tucano	1-3/4	45
	Dominator 112 CS, Comm 116 CS, 228	2-3/8	60
	Avero 240	1-3/16	30
CNH	CS, CSX	2-3/16	55
Duetz Fahr	4080	1-3/8	35
	8XL	2-3/8	60
	5690 HTS, 6095 HTS	2-9/16	65
Fiat	L517	2-3/8	60
Fortschritt	E514, E517	1-3/4	45
	E524	1-9/16	40

Make	Model	'X' Measurement	
		Inches	Millimeters
Gleaner	R-72	2-9/16	65
John Deere	1000 Series, 4425	1-3/16	30
	1100 Series	1-15/16	50
	Z Series (Belt/Chain) Drive, 2258, 9750 STS, 9660, 9760	2-9/16	65
	4400	1	25
	7720 Turbo	1-3/8	35
	9500, 9600, 9650	2-3/8	60
Laverda	306LS, 25.5	2-3/8	60
Massey Ferguson	38, 40	2-3/8	60
	29	2-3/16	55
	760, 850	1-3/8	35
New Holland	TX34, 36, 62, 64, 65, 66, 68, 78 TF42, 44, 46, 76, Elektra, TC, CX, 8070, 8080	2-3/16	55
	TR	1-3/4	44

Yield Sensor Mounting

The SmartYield™ Pro yield sensors must be mounted to the clean grain elevator using the sensor mounting brackets.

Sensor Mounting Brackets

Note: *If the clean grain elevator is non-magnetic, use the supplied rivets to mount the yield sensors using the provided brackets. Place the brackets against the elevator as a template and drill pilot holes for rivets to mount the brackets.*

Two sensor mounting bracket types are supplied in the SmartYield Pro kit:

FIGURE 4. Sensor Bracket Types

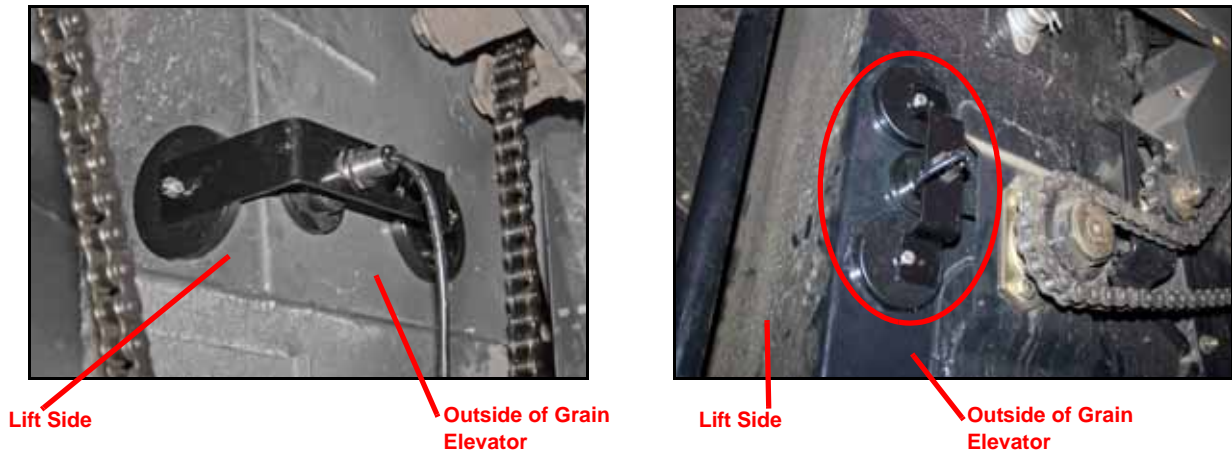


Select the type of bracket best suited for each yield sensor location and the clean grain elevator configuration. Review the *Yield Sensor Installation Recommendations* section on page 11 and ensure that the sensors are properly aligned before drilling any holes in the clean grain elevator. To mount the yield sensors using the mounting brackets:

1. Insert a 1/4" bolt (P/N 311-0049-103) through the recessed side of the ceramic magnet assembly (P/N 418-0000-013). The threaded side of the bolt should extend past the flat side of the magnet assembly.
2. Insert the bolt through the predrilled holes or slot in the mounting bracket tab.
3. Secure the magnets to the bracket using a 1/4" nut (P/N 312-4000-057).

4. Measure and mark the desired installation location on the outside wall of the clean grain elevator. Refer to the *Yield Sensor Locations* section on page 13 for machine specific measurements required for the yield sensors.

FIGURE 5. Example Yield Sensor Mounting Location

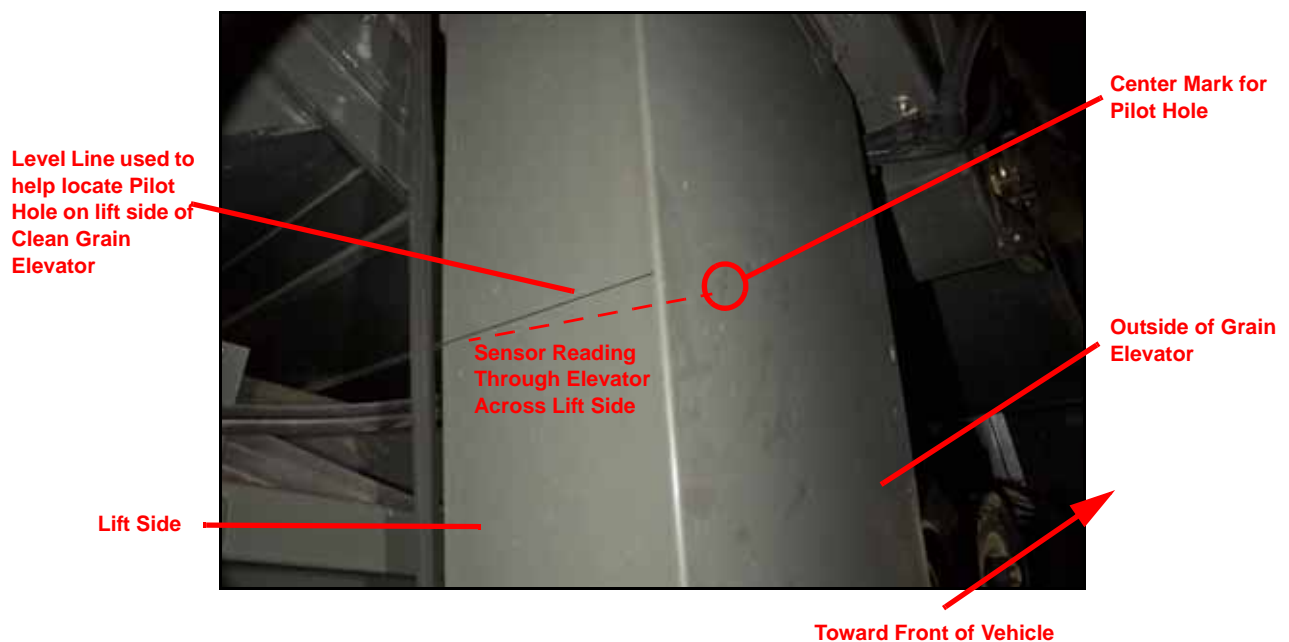


5. Draw a line around the clean grain elevator to help locate the sensor installation location on the inside (towards the harvester) of the clean grain elevator. Use a carpenter's square (provided in optional installation tool kit) or level to ensure that the sensors will be aligned properly.

Important: Check for any existing components which may interfere with or damage the yield sensors before proceeding. Adjust or relocate the yield sensor mounting locations as necessary.

6. Measure from the lift side to the desired sensor location. Mark the same distance on the opposite side to align the yield sensor mounting points. If necessary, review the *Yield Sensor Locations* section on page 13 for machine specific measurements required for the yield sensors.

FIGURE 6. Example of Locating and Marking Centers of Yield Sensor Pilot Holes



7. Drill pilot holes (bit provided in optional installation tool kit) at the marked locations. Use caution when drilling the pilot holes and do not push the drill bit to full depth.
8. Once the pilot hole is drilled, use the bit to feel for a paddle or other components of the clean grain elevator. If necessary, operate the elevator to move the paddles or other obstructions away from the drilling area.
9. If there is no issue with the pilot hole location, drill a 7/8" [22.5 mm] holes for the yield sensor on each side of the clean grain elevator. A hole saw bit is provided in the optional installation tool kit for drilling the yield sensor holes.

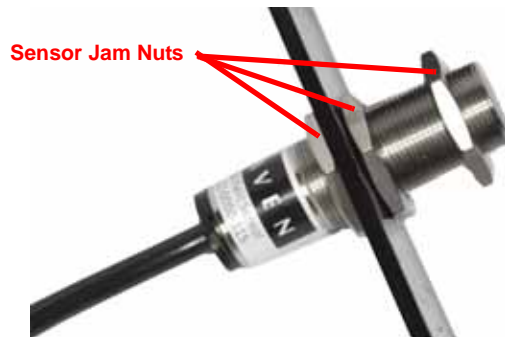
Note: *Hole saw bits are designed for use at low speeds. Adjust the drill speed to the lowest speed setting.*

For elevators with limited access to the inside wall, use an extended drill bit to drill the sensor hole on the inside elevator wall if the dimensions of the grain elevator allow. Be careful to level the bit or drill to ensure that the sensors will align.

Mounting Yield Sensors

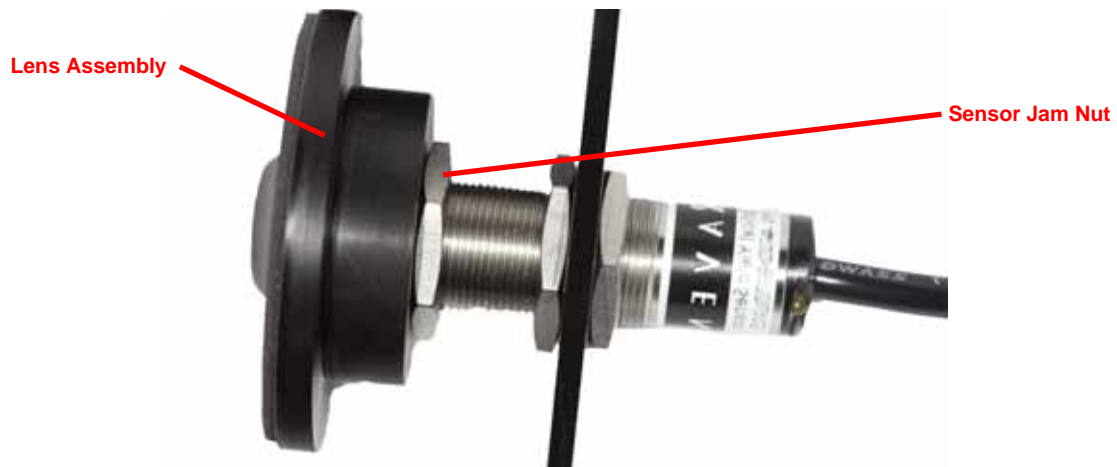
1. Remove the two jam nuts nearest to the sensor eye.
2. Slide the sensor body through the mounting bracket (towards the elevator) and replace the jam nuts. Leave the sensor body loose until the sensor depth is properly adjusted.

FIGURE 7. Yield Sensor Body Jam Nuts



3. Thread the lens assembly onto the sensor body and tighten four to six revolutions.
4. Use the jam nut nearest to the sensor eye to secure the cap to the sensor body.

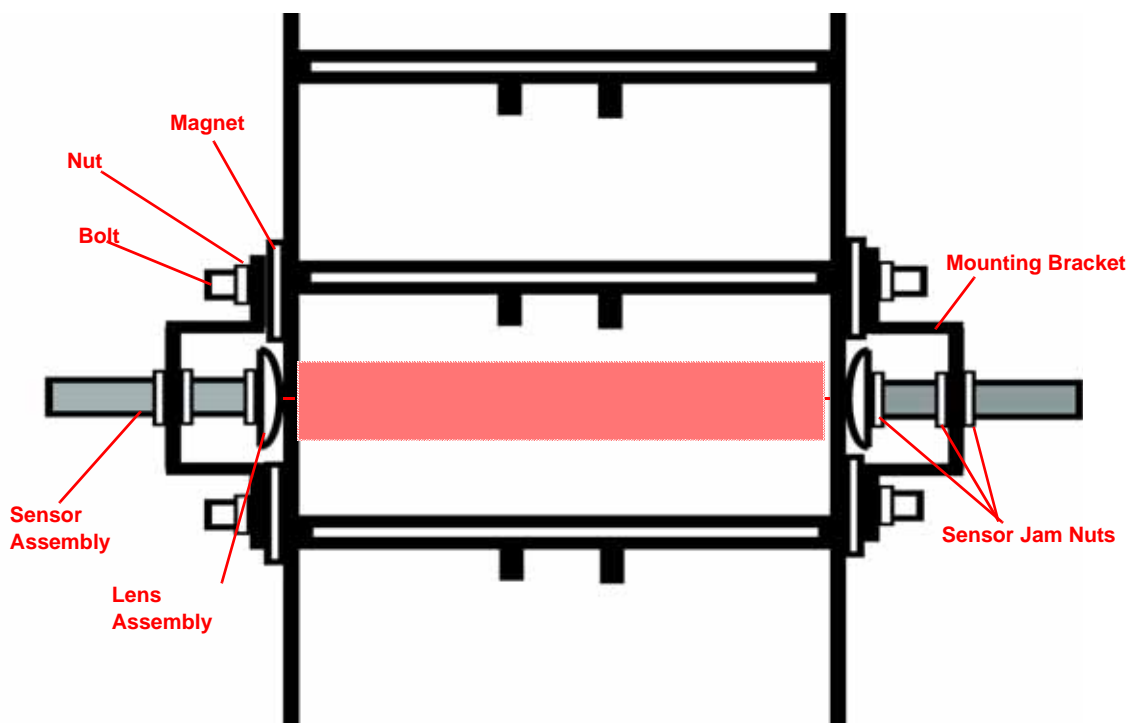
FIGURE 8. Yield Sensor Hinged Mounting Bracket



Note: Overtightening the lens assembly on the sensor body may dislodge the lens from the cap. It is only necessary to thread the lens assembly onto the body a few turns. If the lens is dislodged from the cap, loosen the cap and press the lens back into the lens assembly. Unscrew the remaining jam nut to secure the lens assembly to the sensor body.

5. Adjust the depth of the sensor until the lens assembly is flush with the magnets on the bracket.
6. Align the sensor eye with the holes drilled in the clean grain elevator and carefully set the brackets in place.
7. Adjust the sensor depth to secure the lens assembly firmly to the elevator wall and tighten the jam nuts. It is not necessary to exert significant force against the elevator wall. When properly adjusted, the lens assembly should be flush with the elevator wall without any gaps.
8. Proceed to the Chapter 4, *Moisture Sensor Installation*, to continue the SmartYield™ Pro system installation.

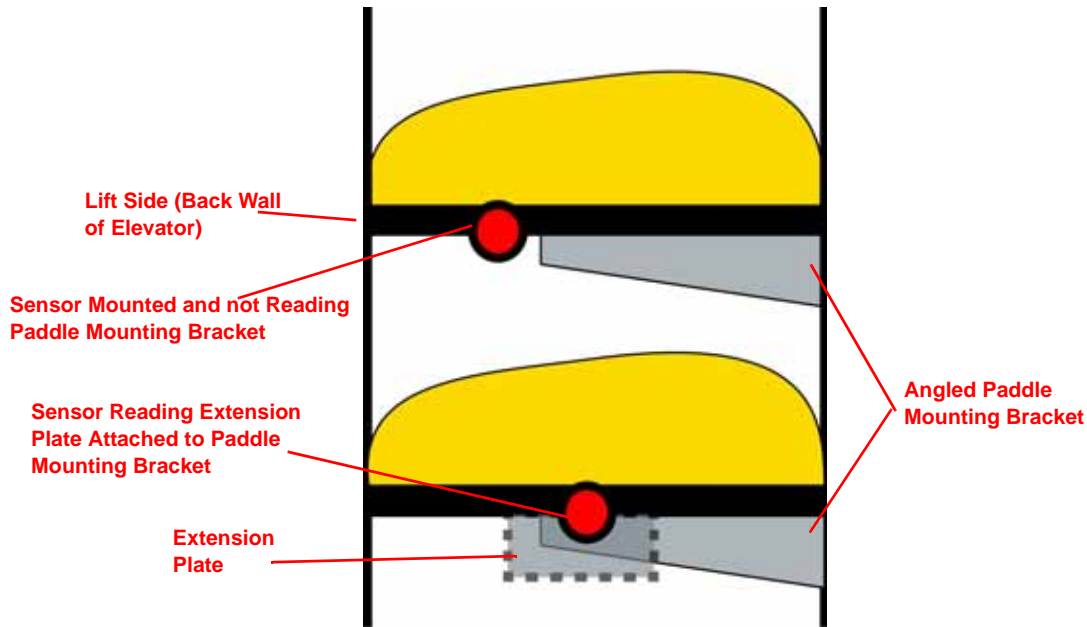
FIGURE 9. Finalized Installation Example



Yield Sensor Paddle Extension Plates

Due to the paddle configuration on some makes or models, a paddle extension plate kit (P/N 117-0171-462) may be required to ensure the yield sensors register a clean reading off of each grain paddle. It may also be possible to simply mount the sensor closer to the back wall of the elevator (away from the chain and paddle mounting bracket) to avoid reading the mounting brackets.

FIGURE 10. Sensor Mounting Options



Note: An extension tab kit may be required for installations on Gleaner, New Holland or Massey Ferguson harvesters. Tabs may also be necessary for other harvesters if the SmartYield Pro system has difficulty achieving a good calibration. Refer to the SmartYield Pro Calibration and Operation Manual for details on the calibration and to help determine if tabs are necessary for your specific harvester.

On models with the elevator paddles riveted to the elevator chain, weld the tabs to the paddle brackets.

Bolt-on Paddle Chains

To attach the paddle extension plates to bolt-on elevator paddles:

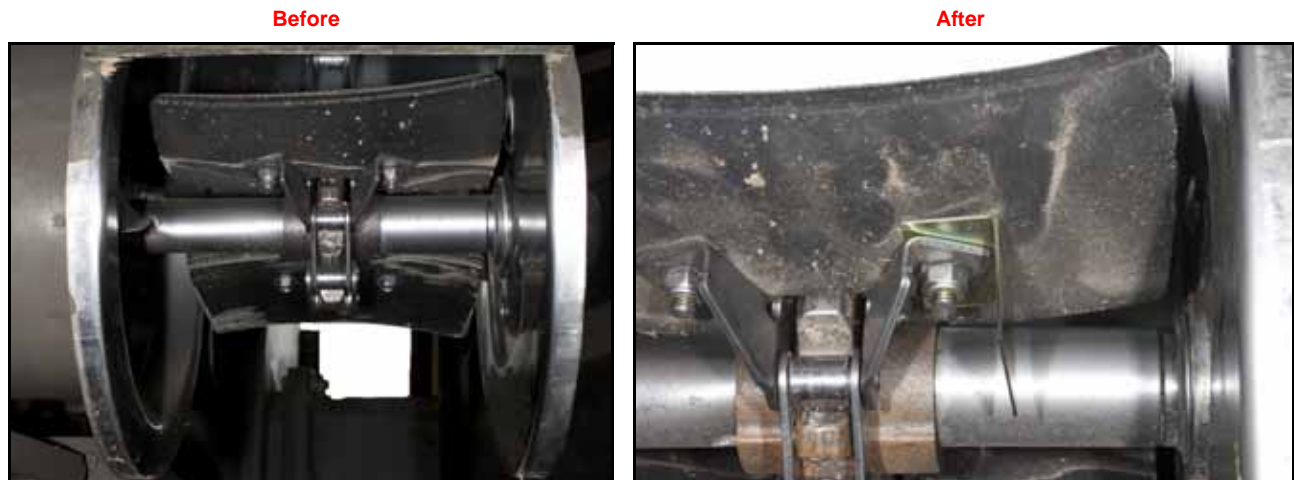
1. Open the access panel or clean out door in the bottom of the clean grain elevator.
2. Manually operate the elevator until a paddle is easily accessible through the access panel.
3. Use a socket or impact wrench to remove the bolt from one side of the elevator chain and paddle.

Note: It does not matter if the extension plate is installed on the left or right side of the paddle.

4. Place the plate's tab between the paddle and elevator chain bracket.
5. Replace the nut and bolt.
6. Retighten the elevator paddle.

7. Manually advance the elevator to the next paddle. Repeat the process for each paddle on the clean grain elevator.

FIGURE 11. Example View of Clean Grain Elevator and Paddles



Riveted Paddle Chains

Use one of the following procedures to attach extension plates to paddles riveted to the elevator chain.

Welding Extension Plates

1. Open the access panel or clean out door in the bottom of the clean grain elevator.
2. Manually operate the elevator until a paddle is easily accessible through the access panel.
3. Use a wire feed or arc welder to tack the extension plates at the rivet holding the paddle onto the chain. The plate weld should not bind or inhibit operation of the chain.

Important: *Disconnect battery cables to avoid damaging machine electronics.*

4. Manually advance the elevator to the next paddle and repeat the above process for each paddle on the clean grain elevator.

Convert the Paddle to Bolt-on Mounting

1. Use a small drill bit to remove one of the rivets holding the paddle to the elevator chain.
2. Place the sensor tab between the paddle and elevator chain bracket.
3. Secure the elevator paddle and extension plate using a nut and bolt (not supplied).
4. Manually advance the elevator to the next paddle and repeat the above process for each paddle on the clean grain elevator.

Moisture Sensor Installation Recommendations

The moisture sensor is provided with all Raven SmartYield kits to monitor the moisture content of the harvested grain. The sensor can be mounted on the grain elevator clean out door or the grain tank load auger. Keep the following items in mind when selecting a location to mount the moisture sensor.

- Mounting on the loading auger will require some custom bracket fabrication, so the clean out door is an easier installation.
- The clean out door is more susceptible to dirt accumulation than the loading auger.
- For the sensor cleaning and maintenance, the clean out door provides easier sensor access than the loading auger.
- If you are installing the moisture sensor in the grain tank loading auger, the mode must be Rev. B (or greater) and software version 2.01.14 (or higher).

Installation on the Clean Out Door

Keep the following items in mind when selecting a location to mount the moisture sensor:

- Mount the moisture sensor to a clean grain elevator or the grain tank loading auger. When mounting to the clean grain elevator, this location will allow easy access to clean off the moisture sensor when harvesting especially dirty or wet crops.
- For best results and to help protect the moisture sensor from field debris during harvest operations, mount the sensor toward the loaded paddle side of the elevator and toward the rear of the machine.
- Generally, the center of the clean grain elevator access panel is the best place to mount the SmartYield Pro moisture sensor. Keep the sensor surface clear of the elevator walls and ensure adequate clearance for the mounting hardware.
- Route the moisture sensor cable up the rear of the clean grain elevator. Secure the cable away from moving components and allow enough slack to open and close the access panel without damaging the cable or connectors.

Clean Out Door Mounting

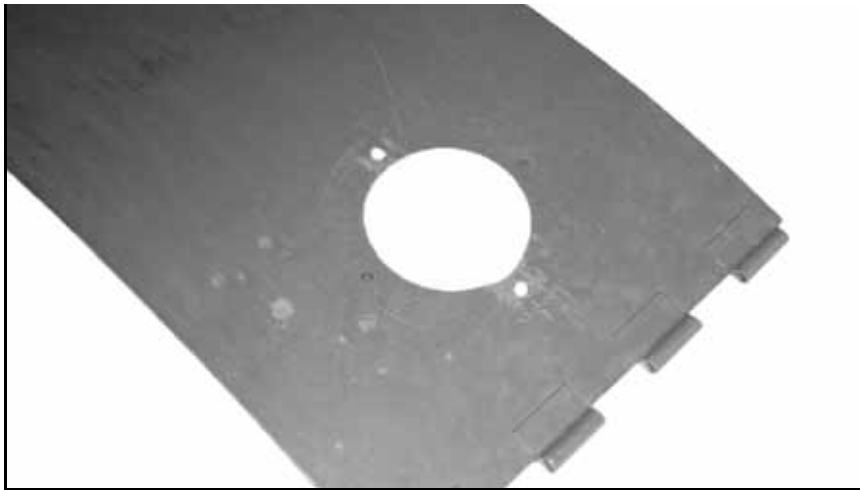
1. Select a location on the grain elevator clean out door where the moisture sensor and mounting hardware will not interfere with the operation of the clean out door and the sensor surface is not covered by the elevator walls.

Note: *The moisture sensor is approximately 5" [13 cm] in diameter. The mounting bolts must not impede with closing the clean out door.*

2. Measure any critical dimensions to help ensure clearance for the moisture sensor.
3. Remove the clean out door from the clean grain elevator.
4. Use a 3-1/4" [82 mm] hole saw bit to drill a hole in the clean out door for the moisture sensor. Double check clearances with the sensor on the clean grain elevator before drilling any holes.

Note: *Hole saw bits are designed to be used at low speeds. Adjust the drill to the lowest speed setting.*

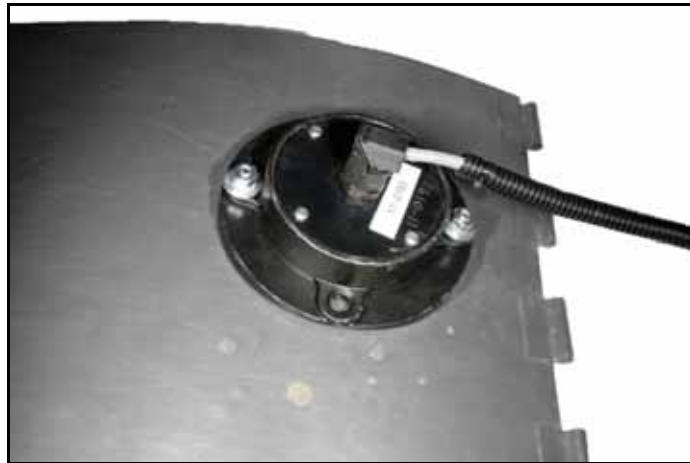
FIGURE 1. Example of Moisture Sensor Mounting Location and Hole Drilling



5. Set the moisture sensor in the hole and use the sensor housing to mark the position of the mounting bolts.
6. Drill two 5/16" [8 mm] mounting holes in the clean out door at the marked locations.
7. Set the moisture sensor in the hole in the clean out door and use the provided carriage bolts, washers and lock nuts to secure the sensor in place.

Note: *The carriage bolts are long to accommodate various access door thicknesses. Cut the bolts down to the necessary length after completing the installation.*

FIGURE 2. Example of Mounted Moisture Sensor



8. Replace the clean out door on the clean grain elevator.

Installation on the Grain Tank Loading Auger

Keep the following items in mind when selecting a location to mount the moisture sensor:

- Use the parts provided in the auger moisture sensor kit (P/N 117-9000-012) to mount the moisture sensor.
- Carefully route and secure the sensor cable so it avoids any moving parts and will not be moved by flowing grain.

FIGURE 3. Sensor Mounted on Tank Loading Auger .



Note: If you are installing the moisture sensor in the grain tank loading auger, the node must be Rev. B (or greater) and software version 2.01.14 (or higher). If not, the node is unable to read the moisture in that location.

Grain Tank Loading Auger Mounting

1. Select a location on the loading auger where the moisture sensor and mounting hardware will not interfere with the operation of the auger or other components in the grain tank.

Note: *Mount the sensor on the under side of the auger tube to ensure accurate measurement.*

2. Measure any critical dimensions to help ensure clearance for the moisture sensor.
3. Use a 3-1/4" [82 mm] hole saw bit to drill a hole in the auger for the moisture sensor. Use caution not to damage the auger when drilling through the auger enclosure. Double check clearances with the sensor on the auger before drilling any holes. Measure carefully.
4. Use strap iron or other available materials and any necessary hardware to fabricate a bracket to secure the sensor to the auger enclosure. Review the mounting requirements to assist with bracket fabrication. The bracket only needs to keep the moisture sensor from moving or vibrating during normal equipment operation. Kit P/N 117-9000-012 will help with vibration.

Moisture Sensor Revisions

As of 2015, there are four hardware revisions of the grain moisture sensor available for use with the Raven SmartYield Pro system. The sensor revisions require different calibration values to be programmed via the field computer to ensure system accuracy.

Note: *Refer to the SmartYield Pro Calibration and Operation Manual for assistance with selecting the correct moisture sensor type and configuring the moisture and temperature sensor after the installation process is complete.*

FIGURE 4. Moisture Sensor Identification

Earlier Revision Sensors



Raven 063-0173-629

Revision "Y" Sensors



Raven 063-9000-012



Part Identification Tag



The SmartYield™ Pro system monitors the header cutout switch to automatically start and stop recording yield information during the harvest operation when the header is raised or lowered. The header cutout switch is required SmartYield Pro system operation.

Depending upon the specific harvester make and model, there are a few additional cutout switch options which may provide additional features when used with the SmartYield Pro system. For additional information on the available header cutout switch options, contact a local Raven dealer.

Factory Rotary Switch

Some harvesters utilize a rotary potentiometer to monitor the header position during harvest operations. The Raven SmartYield Pro system is capable of monitoring this potentiometer to replace the header cutout switch. The factory rotary switch option allows the operator to make adjustments to the header cutout height on the Raven field computer or display console.

Connecting a Factory Rotary Switch Cable

Note: *To utilize this switch option, use the appropriate adapter cable to tee into the factory installed rotary potentiometer.*

If the feeder house does not have a rotary potentiometer installed from the factory, an aftermarket Raven rotary sensor must be installed and connected to the SmartYield Pro system. Contact a local Raven dealer for additional information on the optional rotary switch.

1. Inspect the feeder house and locate the factory rotary potentiometer.

The header height potentiometer is generally located toward the back of the feeder house. See Figure 1 on page 26 for examples of the potentiometer location.

Note: *Some harvesters may have a second potentiometer installed near the head to monitor the header pitch. This potentiometer is not recommended for monitoring the header height with the SmartYield Pro system.*

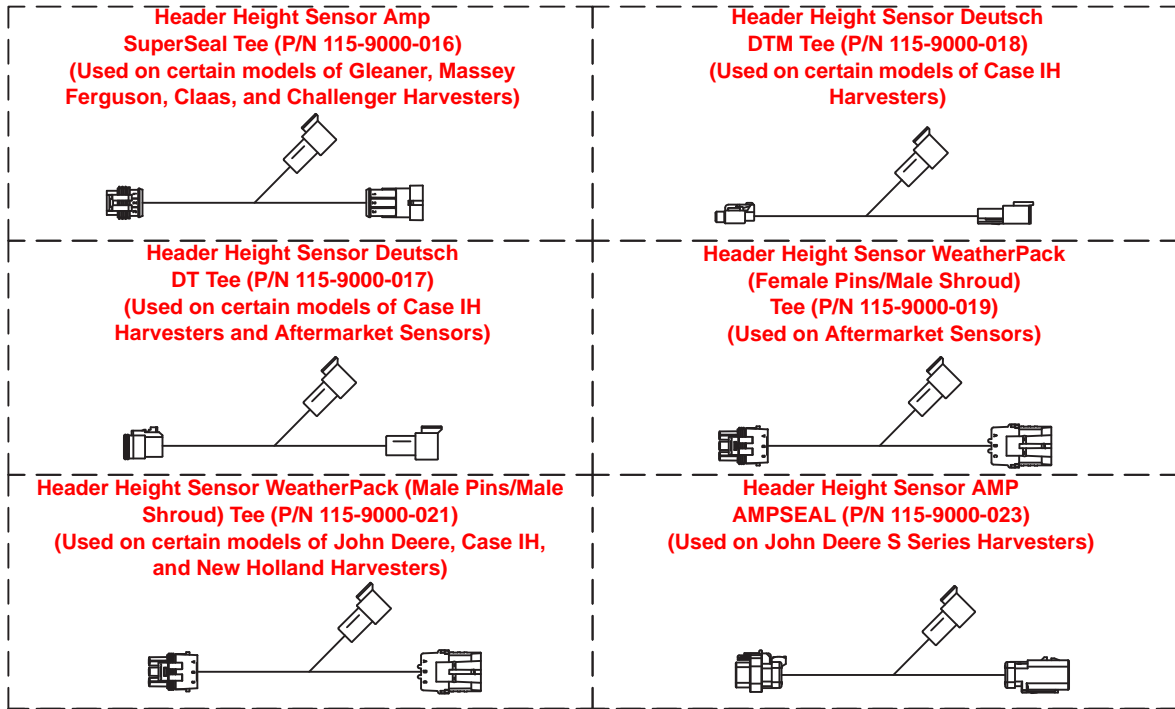
FIGURE 1. Factory Rotary Potentiometer Examples



Note: Contact a local Raven dealer for additional assistance with locating the factory header height potentiometer.

2. Disconnect the factory cable from the factory potentiometer.
3. Using the appropriate header height tee cable (see Figure 2 on page 27), reconnect the factory potentiometer and factory cable.
4. The remaining branch of the tee cable will be connected to the SmartYield Pro node harness. Refer to Chapter 6, *SmartYield™ Pro Control Node Installation* for connection information.

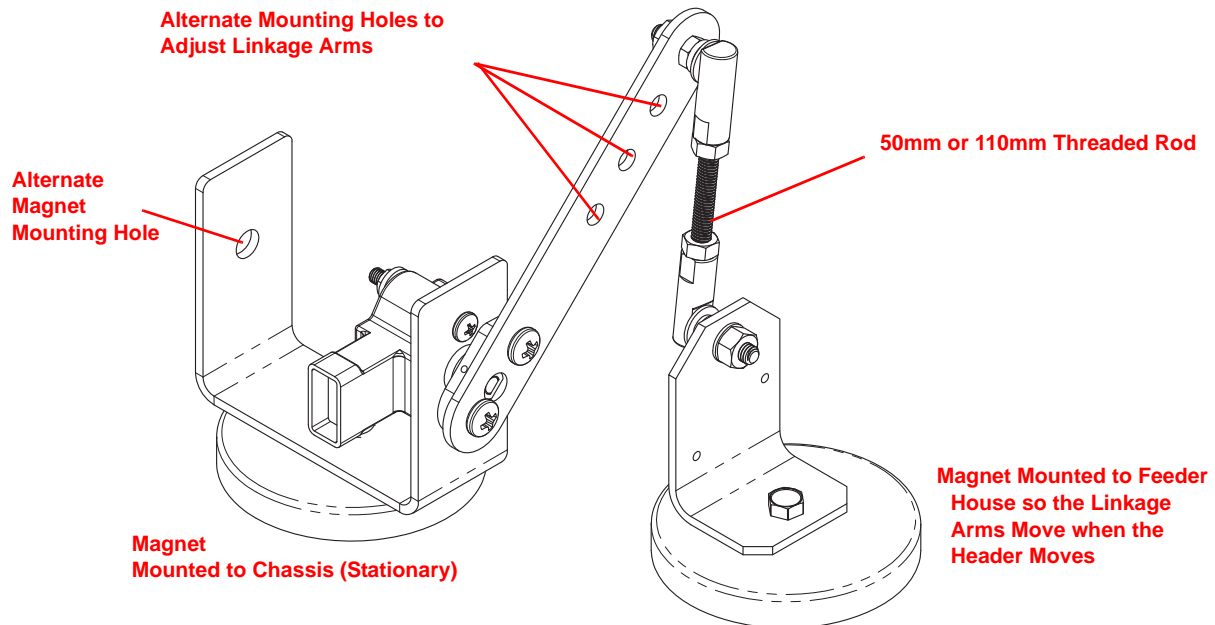
FIGURE 2. Factory Rotary Potentiometer Tee Cables (D/N 054-9000-007)



Connecting an Aftermarket Rotary Switch

An aftermarket rotary switch kit (P/N 117-9000-007) is available if a factory rotary sensor is not installed from the manufacturer or is not compatible with the available Raven header sensor cables.

FIGURE 3. Aftermarket Rotary Switch (D/N 054-9000-007)



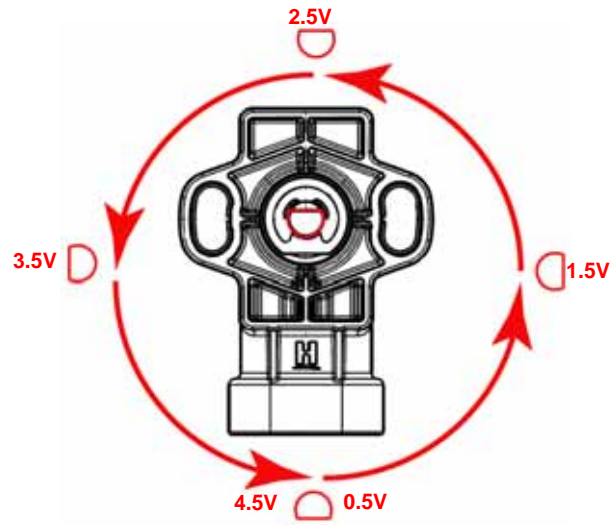
Note: Contact a local Raven dealer for additional information on the optional rotary switch.

Tips on Mounting Aftermarket Rotary Switch

- The sensor should be mounted to the chassis or another stationary part of the combine. The end of the linkage rod should be mounted to the feeder house so the linkage arms move when the header moves.
- Two lengths (50mm or 110mm) of threaded rod are provided. Use the rod that provides the best range of motion that is free from obstructions.
- Depending on the machine configuration, it may be necessary to move the magnet to the alternate mounting hole on the sensor bracket.
- Depending on machine configuration, it may be necessary to mount the feeder house magnet directly to the swivel arm instead of using the 90° bracket.
- The sensor shaft can rotate a continuous 360° degrees, and the output signal varies between 0.5V and 4.5V.

Important: The signal changes abruptly from 0.5V to 5.4V (or vice versa) when the flat face of the shaft is closest to the sensor's connection. Mount the sensor and linkage arms so that the operating range of the header does not cause the sensor shaft to cross the threshold. Refer to Figure 4.

FIGURE 4. Rotary Sensor Alignment

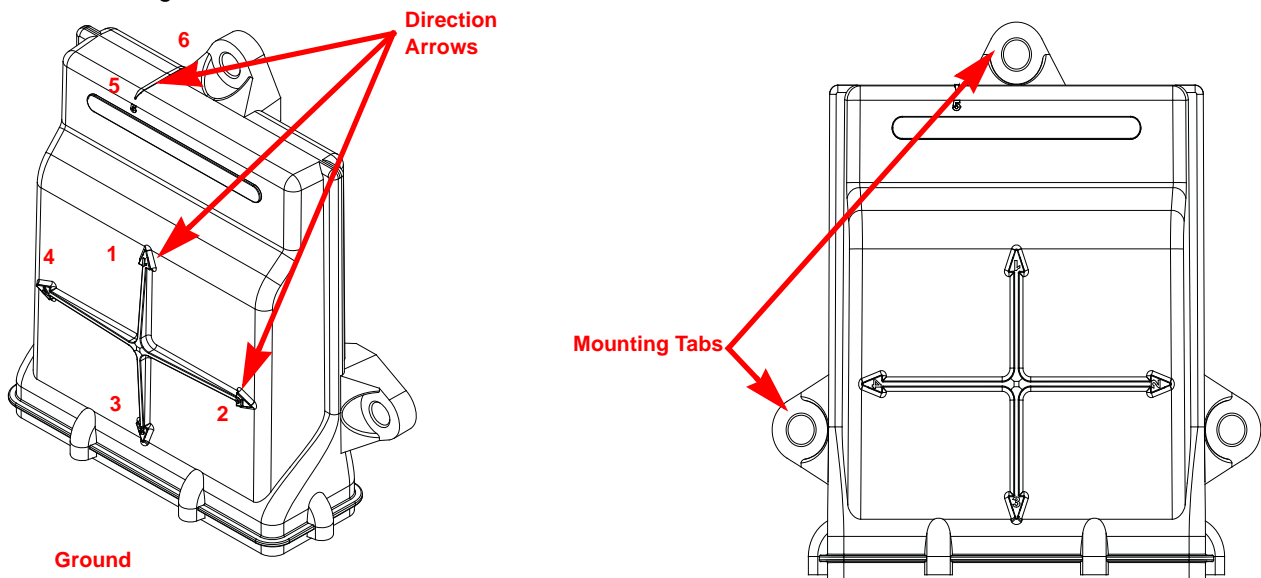


SmartYield™ Pro Control Node Installation

Control Node Installation Recommendations

Keep the following items in mind when selecting a location to mount the SmartYield™ Pro control node:

- Mount the control node in a location where the unit will not interfere with normal machine operation. The box must not be jarred or struck by any vehicle components during operation.
- The node features an internal tilt sensor. Mount the node with the connectors (direction arrow #3) pointing towards the ground.



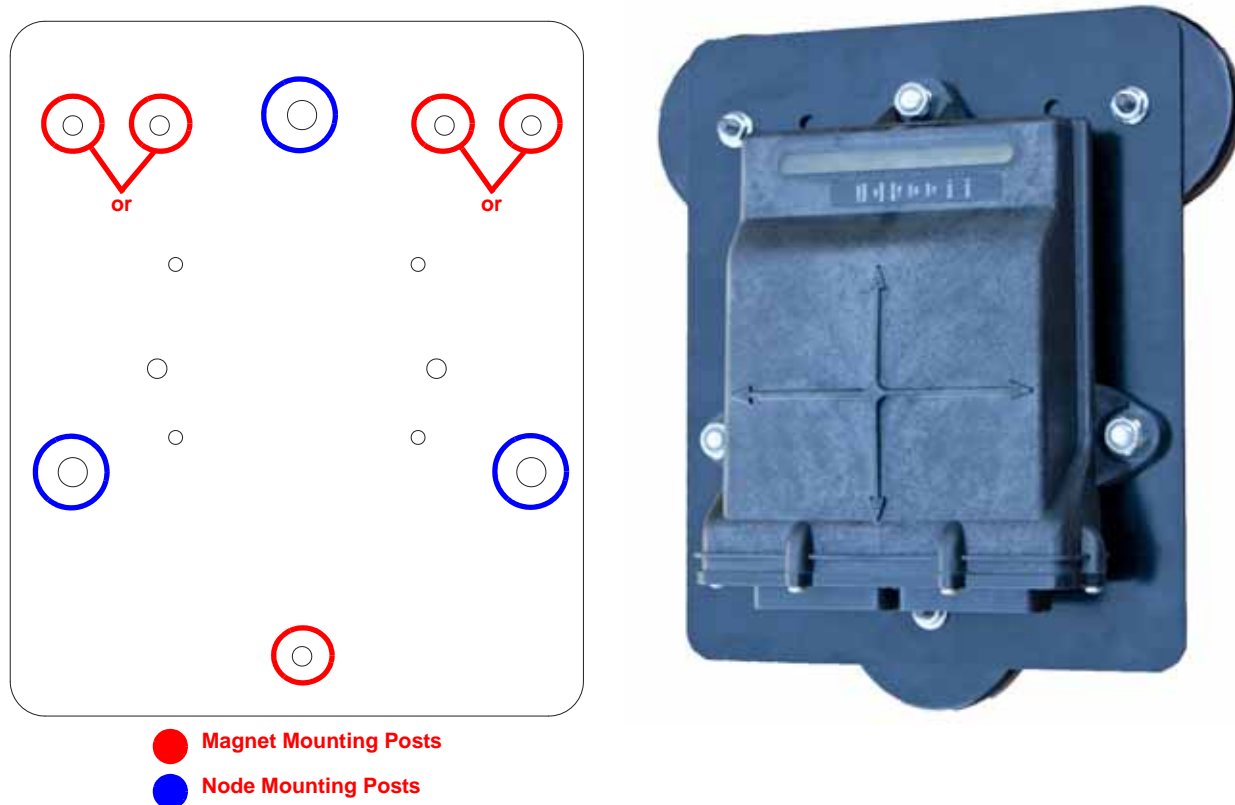
- When installing the node harness and routing sensor cables, ensure that the cables will not interfere with normal equipment operation. Make sure that the cables will not be damaged by moving components and secure cables using the supplied cable ties. Route cables to avoid tripping hazards and pinch points.
- Always apply dielectric grease to any connectors exposed to weather, harsh chemicals or other sources of moisture.

Bracket Mounting

Refer to the following procedure to mount the SmartYield Pro control node using the node mounting kit (P/N 117-0171-299).

1. Insert a 1/4" bolt (P/N 311-0049-103) through the recessed side of the ceramic magnet assembly (P/N 418-0000-013). The threaded side of the bolt should extend past the flat side of the magnet assembly.
2. Insert the bolt through the pre-drilled holes in the mounting bracket (P/N 107-0171-897).

FIGURE 1. SmartYield Pro Node Mounting Plate



Note: *If the magnet sticks to the bracket, it will not hold the bracket to a metal surface on the combine. Flip the magnet over before proceeding.*

3. Secure the magnet to the bracket using a 1/4" nut (P/N 312-4000-057). Repeat this process to secure the remaining magnets to the node plate.
4. Insert a 3/8" bolt (P/N 311-0054-105) through the magnet side of the mounting plate.
5. Thread the bolt through the SmartYield Pro control node (P/N 063-9000-002) mounting tab and fasten the node to the mounting plate using a 3/8" nut (P/N 312-4000-061).
6. Repeat this process to secure the two remaining node tabs to the mounting plate.
7. Mount the node and bracket assembly to the machine on the elevator side (right hand side) of the harvester. Mount in a location free from moving parts, excessive vibration, and heat sources.

Important: *Arrow three must be pointing towards the ground with arrow two, four, five, or six pointed forward.*

SmartYield Pro Node Harness Connections

Review the following sections to connect the SmartYield Pro node harness to the node and sensors:

SmartYield Pro Node Harness Connections

1. Insert the large, rectangular connectors on the SmartYield Pro node harness to the SmartYield Pro node. The connectors should not require excessive force to insert.

Note: *Do not force the connector into the node. The connectors are keyed to ensure the connectors are installed properly and should insert with very little force required.*

2. Tighten the 1/4" bolt to secure the node connector to the node.
3. Route the moisture sensor cable connector to the node harness plug labeled "Moisture Sensor." Secure any excess cable length using the cable ties provided. Review the *Control Node Installation Recommendations* section on page 29 for additional cable routing information.
4. Route the yield sensor cable connector to the node harness plug labeled "Yield Sensor." Secure any excess cable length using the cable ties provided.
5. Route the header height sensor cable to the node harness plug labeled "Header Height."

CAN and Power Connections

Refer to Chapter 7, *Envizio Pro™ Series Connection*, for assistance with the "CAN" and "Switched Power" connections on the SmartYield Pro node harness connectors.

CHAPTER

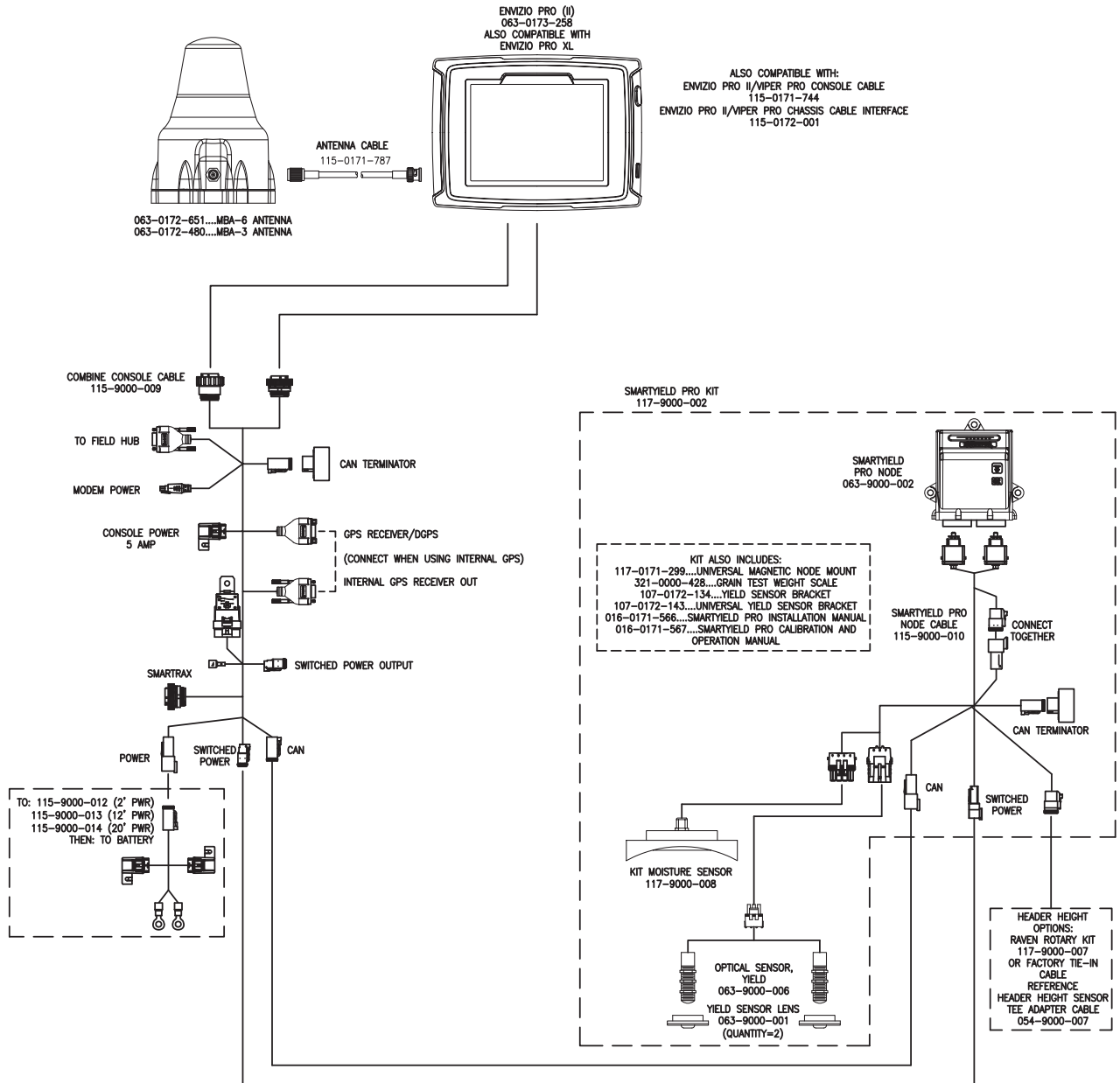
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*Envizio Pro™ Series
Connection*

Note: *Complete the installation procedures provided with the Envizio Pro series field computer prior to connecting the SmartYield Pro system.*

1. Connect the 2-pin Deutsch connector on the yield monitor cable to the connector labeled 'Switched Power' on the field computer cable.
2. Connect the 4-pin Deutsch connector on the yield monitor cable to the connector labeled 'CAN' on the field computer cable.

FIGURE 1. SmartYield™ Pro Combine Cable with Envizio Pro Series Cable Connection Diagram (D/N 054-9000-002)



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