RECON

WIRELESS BLOCKAGE AND FLOW MONITOR

INSTALLATION MANUAL

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IntelligentAg

Recon Wireless Blockage and Flow Monitor Installation Manual

Intelligent Agricultural Solutions, 1810 NDSU Research Circle North, Fargo, ND 58102 USA.

Visit us on the web at www.intelligentag.com
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Table of Contents

List of Figures

List of Tables

Related Documentation	
Document Number	**Document Title**
600820-000009	Recon Wireless Blockage and Flow Monitor Quick Reference Guide
600820-000012	Recon Wireless Blockage and Flow Monitor Troubleshooting Guide
600890-000015	Recon Wireless Blockage and Flow Monitor Operator's Guide

Glossary		
Abbreviation	**Term**	**Definition**
App	Software application	A computer program, especially one designed for a mobile device
ECU	Electronic Control Unit	A component of the Wireless Blockage and Flow Monitor that allows for the communication of the flow sensors to the iPad software app via a LAN connection
	Gateway 300 (gateway)	A computing platform that enables communication from the WBFM to a virtual terminal display or iPad. Using a gateway with the WBFM system replaces the need for the access point
LED	Light Emitting Diode	A semiconductor diode that converts applied voltage to light. In the Wireless Blockage and Flow Monitor, an LED is used to signify the status of the ECU
	Primary	Tube that feeds multiple secondary runs, usually leading to a manifold that splits the product flow to the secondaries
	Product A/ Product B	When running two different products through two different airstreams, one product is product A and the other product is product B. Product types are assigned to their respective manifolds during WBFM app configuration
	Section	Section of the toolbar, usually defined by the primary (or manifold) that is feeding that section
WBFM	Wireless Blockage and Flow Monitor	The Intelligent Ag system that notifies operators of blockages or low air flow anywhere in their implement
	Work Switch	A component of the implement that signifies when the equipment is enabled (in the ground) or disabled (out of the ground). When the work switch is disabled, the Wireless Blockage and Flow Monitor's audible alarm that alerts the operator to blockage of flow in the equipment's runs will automatically be silenced

1 Introduction

1.1 How to use this manual

This manual will guide you through the process of installing the Recon Wireless Blockage and Flow Monitor (WBFM) on your implement.

- **Section 2**: Instructions for installing all of the components of the WBFM in the order they should be installed.
- **Appendix A**: Diagrams with instructions for how to install wiring harnesses for various implement configurations.
- **Appendix B**: Installing the WBFM for use with a virtual terminal.
- **Appendix C:** System configuration table.

NOTE: For instructions about how to use the WBFM after installation, see the Recon Wireless Blockage and Flow Monitor Operator's Manual (Intelligent Ag document number 600890-000015) from the Blockage Monitor app's Manuals screen.

For installation videos, current WBFM documentation, and other resources, visit www.intelligentag.com/support.

1.2 Tools Required

You will need the following tools to install the WBFM:

- Standard wrench and socket sets
- Pliers
- Measuring tape
- Cutting tool, such as a box cutter or shears
- Cordless drill and/or flathead screwdriver (optional)
- Paint pen or other permanent marking tool (optional)

2 Installation Instructions

2.1 Overview Checklist

- ☐ Install the ECUs.
- ☐ Install the flow sensors.
- ☐ Connect the flow sensors to the ECUs.
- ☐ Install the wiring harnesses.
- ☐ Install the work switch.
- ☐ Install the access point.
- ☐ Install the iPad mounting bracket.
- ☐ Download the Blockage Monitor app.

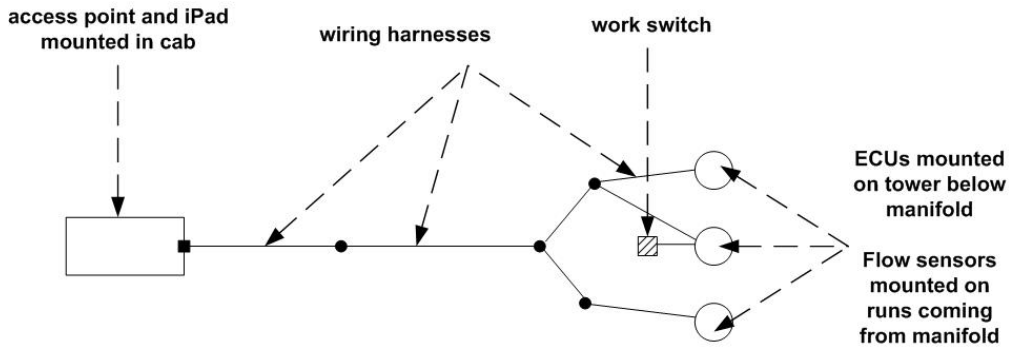


Figure 1: Installation location overview

The wiring harness in the figure above is specific for a three-manifold implement. For more wiring harness diagrams, refer to Appendix A of this document.

2.2 Installing ECUs

About the ECU
The Electronic Control Unit (ECU) communicates the flow measurement data recorded by the flow sensors to the WBFM.

Figure 2: The back (left) and front (right) sides of the ECU

Part Name	Part Number	Quantity needed	Contained within
ECU	150505-000012	1/manifold (for standard setup)	ECU kit
ECU mounting bracket	351050-000012	1/ECU	ECU kit (attached to ECU)
2” diameter U-bolt *or* 2.5” diameter U-bolt *or* 3” diameter U-bolt *or* 4” diameter U-bolt	352013-000006 *or* 352013-000007 *or* 352013-000008 *or* 352013-000009	2/ECU	Packaged individually

Table 1: Parts needed to install the ECU

Tools needed
- Standard socket set

Number of times to perform procedure
Once per manifold

Installation location
ECUs should be installed directly underneath each manifold of the implement. Intelligent Ag recommends installing the bracket so that the LED indicator on the ECU faces toward the tractor.

NOTE: ECUs can be mounted in any order; however, installing the ECUs in alphanumeric order from left to right (when facing the back of the tractor) based on the ECU’s serial number is an easy way to remember which ECU is on each tower. The serial number is located on the front of the ECU. Use the table in Appendix C to record your system setup.

EXAMPLE: When installing in alphanumeric order, numbers are ordered before letters. After that, letters are ordered in alphabetical order.

Manifold	ECU
1	WBM-G15V
2	WBM-G1CO
3	WBM-G1D3
4	WBM-G1DA
5	WBM-GA4D
6	WBM-GAV5

Table 2: Example: Installing ECUs in alphanumeric order

Figure 3: Installing the ECUs from left to right

Installing the ECU mounting bracket

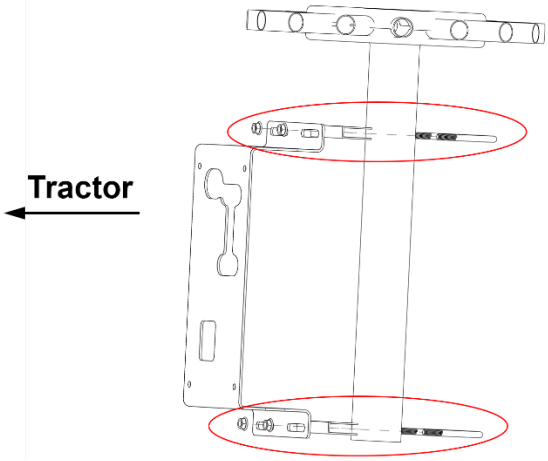


Figure 4: Mounting an ECU bracket to a tower

Figure 5: ECU installed on a tower

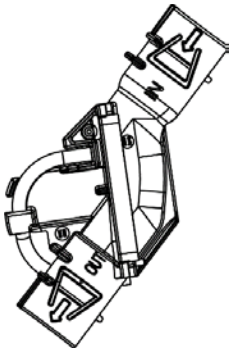
NOTE: If necessary, ECUs can be mounted horizontally on the tower. Contact your dealer for an adapter to mount horizontally.

1. Remove the nuts and saddle clamp from the ends of two u-bolts (352013-000006, 352013-000007, 352013-000008, or 352013-000009).
2. Place one of the u-bolts around the manifold post, immediately under the manifold.
3. Place an ECU mounting bracket (351050-000012) so that the ends of the u-bolt go through the top two holes of the ECU mounting bracket, as seen in the top circle in Figure 4.
4. Replace the saddle clamp and nuts onto the u-bolt.
5. Place another u-bolt around the manifold post and through the bottom holes of the ECU mounting bracket, as seen in the bottom circle in Figure 4.
6. Replace the saddle clamp and nuts onto the second u-bolt.

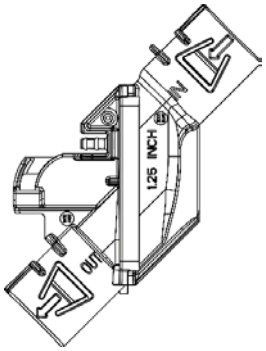
2.3 Installing flow sensors

About flow sensors
Flow sensors directly connect to the implement's final runs. They detect when seed or other material such as fertilizer is flowing through the run due to the energy that is produced when the material strikes against the sensor membrane. When no energy is recorded by the flow sensor and the implement is in the ground, the Blockage Monitor app will notify the operator of a potentially blocked run via an audio alarm (if enabled) and by displaying the blocked runs or manifolds.

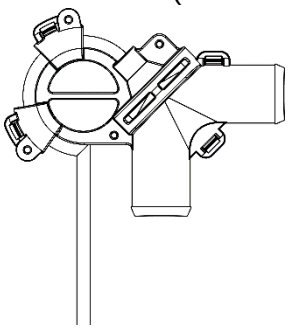
Flow sensor sizes and adapters
The WBFM uses either 1-inch, 90 degree, or 1.25-inch flow sensors (and adapters, if needed) based on your implement and blockage and flow monitoring preferences. Identify your sensor type and part number by looking at your pack slip or the images below.



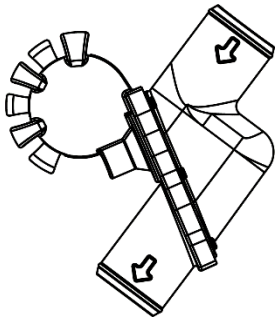
Streamline 1" sensor (153510-000022)



Streamline 1.25" sensor (153510-000066)



90 degree sensor (153570-000015)



1.25" inline sensor (153570-000016)

Figure 6: Sensor types

Tools needed
- 5/16 inch socket, 5/16 inch nut driver on a cordless drill, or a flathead screwdriver
- Measuring tape
- Cutting tool, such as a box cutter or shears

Number of times to perform procedure
Once per run

Installation location
Install flow sensors at the beginning of every run on the implement manifold.

2.3.1 Installing Streamline 1-inch and 1.25-inch flow sensors (153510-000022 and 153510-000066)

NOTE: Skip this step if you do not have Streamline 1-inch or 1.25-inch flow sensors with part number 153510-000022 or 153510-000066. Refer to Figure 6 to identify your sensor.

Part Name	Part Number	Quantity needed	Contained within
Streamline 1-inch flow sensor *or* Streamline 1.25-inch flow sensor	153510-000022 *or* 153510-000066	1/run	Packaged individually
Adapter (optional)	353070-000038 *or* 353070-000112 *or* 353070-000113	2/run	Packaged individually
Hose clamp	356060-000025	2/run	Packaged individually

Table 3: Parts needed to install Streamline 1-inch and 1.25-inch flow sensors

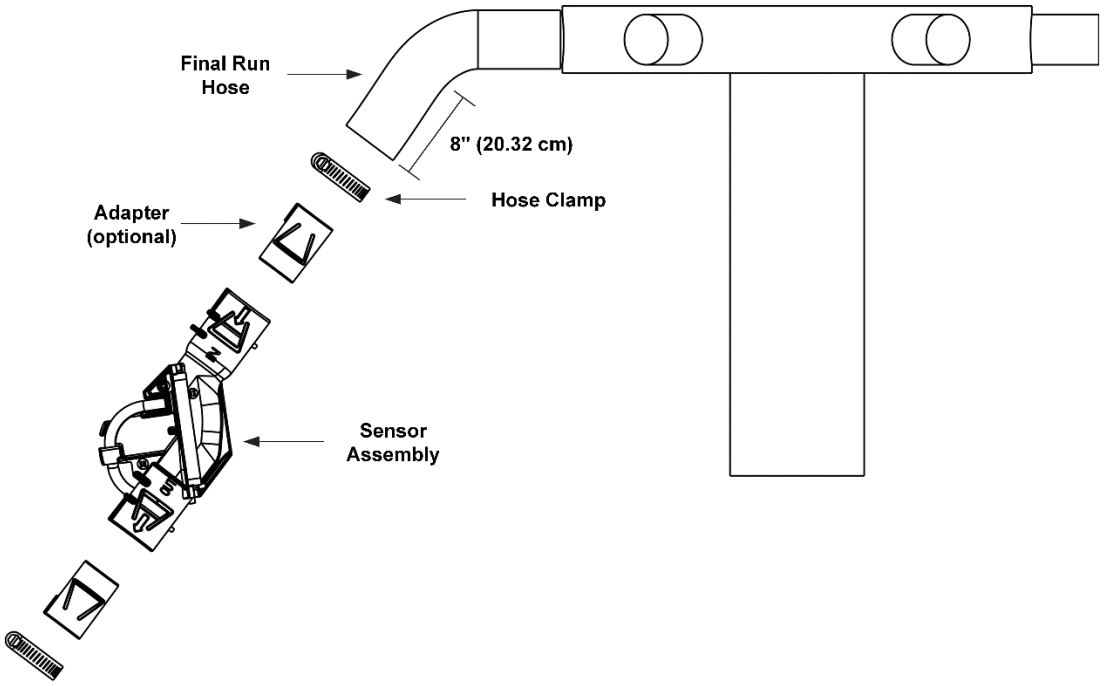


Figure 7: Installing 1-inch and 1.25-inch flow sensors on a manifold

1. If you are using adapters, snap them into the sensor as shown in Figure 7.
2. Cut the original run hose to about 8 inches (20.32 cm), or other length that allows for a downward flow and appropriate fit once the sensor and adapters (if applicable) are installed. Reattach the hose piece to the manifold.
3. Orient the sensor so that the flow arrows point away from the manifold. Slide the sensor assembly on the final run hose piece attached to the manifold until the hose piece hits

the backstop inside of the sensor assembly. Make sure that you install the sensor so that the auditory tube is pointing up.

4. Secure using a hose clamp between the two ridges on the end of the sensor assembly, ensuring that the hose clamp lays flat and the head (worm drive) does not hit the sensor ridge, as shown in Figure 8.

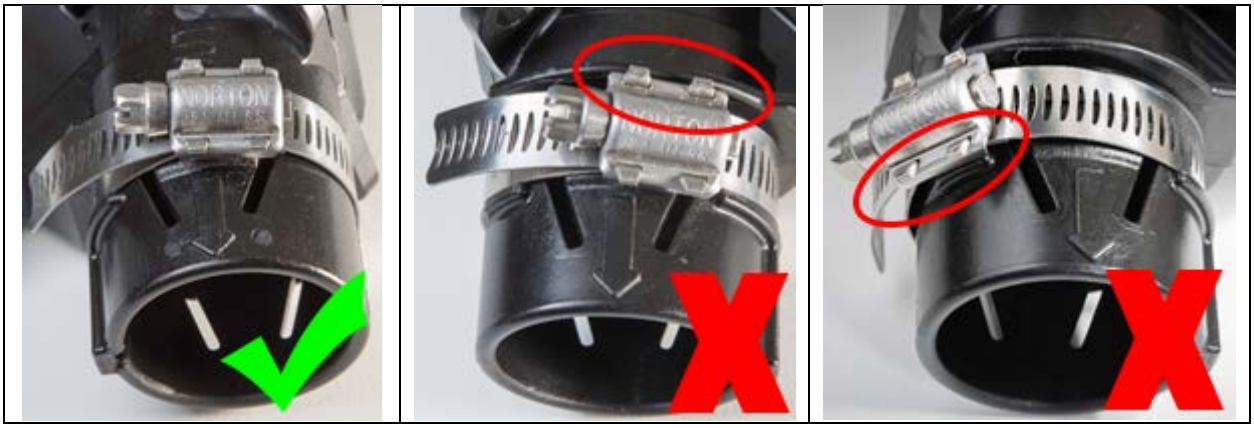


Figure 8: Correctly placing the hose clamps

5. Slide the remaining final hose piece into the lower end of the sensor assembly until the hose piece hits the backstop inside of the sensor assembly. Secure using a hose clamp between the two ridges on the end of the sensor assembly, ensuring that the hose clamp lays flat and the head (worm drive) does not hit the sensor ridge.

2.3.2 Installing 90 degree flow sensors (153570-000015)

NOTE: Skip this step if you do not have 90 degree flow sensors.

Part Name	Part Number	Quantity needed	Contained within
90 degree flow sensor	153570-000015	1/run	Packaged individually
Adapter (optional)	351060-000008	1/run	Packaged individually
Hose clamp	352013-000010	2-4/run	Packaged individually

Table 4: Parts needed to install 90 degree flow sensors

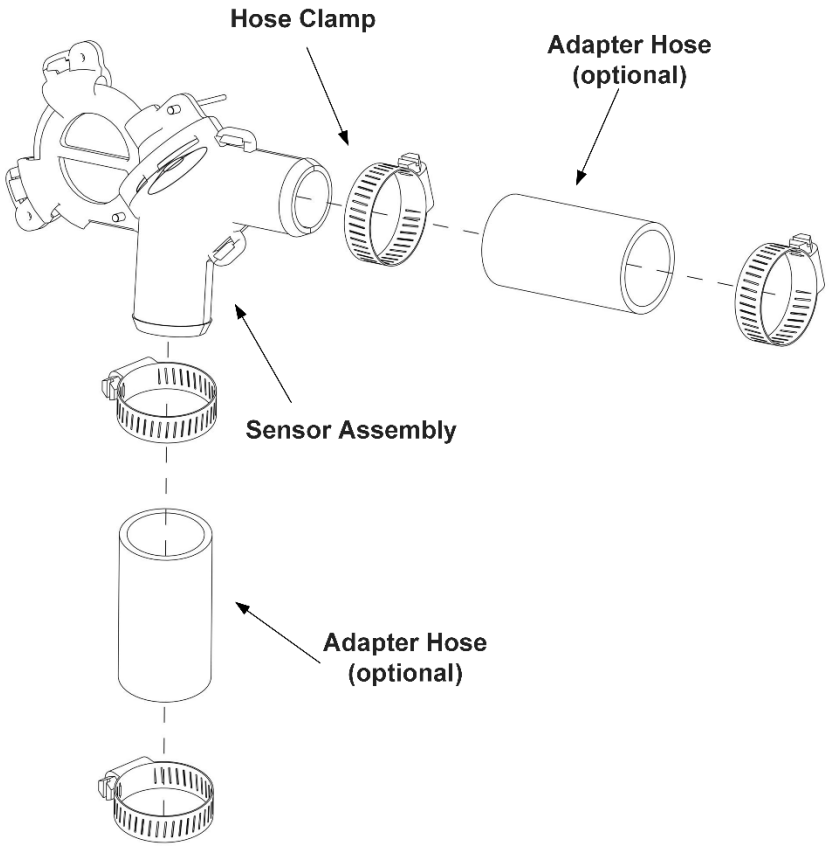


Figure 9: Installing 90 degree flow sensors on a manifold

1. Detach the existing hose from the manifold.
2. Place a sensor (153570-000015) on the manifold, orienting the sensor so that auditory hose routes down. If the sensor does not fit directly on the manifold, cut a 2 inch piece of the final hose run and attach it to the manifold, then attach the sensor to the 2 inch hose piece. Secure with a hose clamp (352013-000010).

   NOTE: If the seed hose connected to the sensor does not have enough space to point downward, turn the sensors so that the hoses are parallel to the ground, as shown in Figure 11.

Figure 10: 90 degree flow sensors installed on a manifold

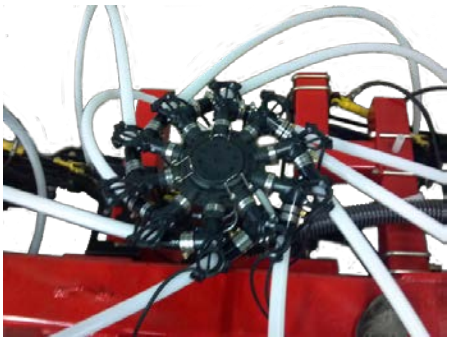


Figure 11: 90 degree flow sensors installed on a manifold (alternate installation)

3. Slide the remaining final hose piece into the other end of the sensor. If the hose doesn't fit on the sensor, attach an adapter to the sensor. Secure with a hose clamp.

2.3.3 Installing 1.25-inch flow sensors (153570-000016)

NOTE: Skip this step if you do not have 1.25-inch flow sensors with part number 153570-000016. Refer to Figure 6 to identify your sensor.

Part Name	Part Number	Quantity needed	Contained within
1.25-inch flow sensor	153570-000016	1/run	Packaged individually
Adapter	353070-000029 *or* 353070-000031 *or* 353070-000022 *or* 353070-000030 *or* 353070-000032	2/run	Packaged individually (optional)
Hose clamp	352013-000010 *or* 356060-000025	2-4/run	Packaged individually

Table 5: Parts needed to install 1.25-inch flow sensors

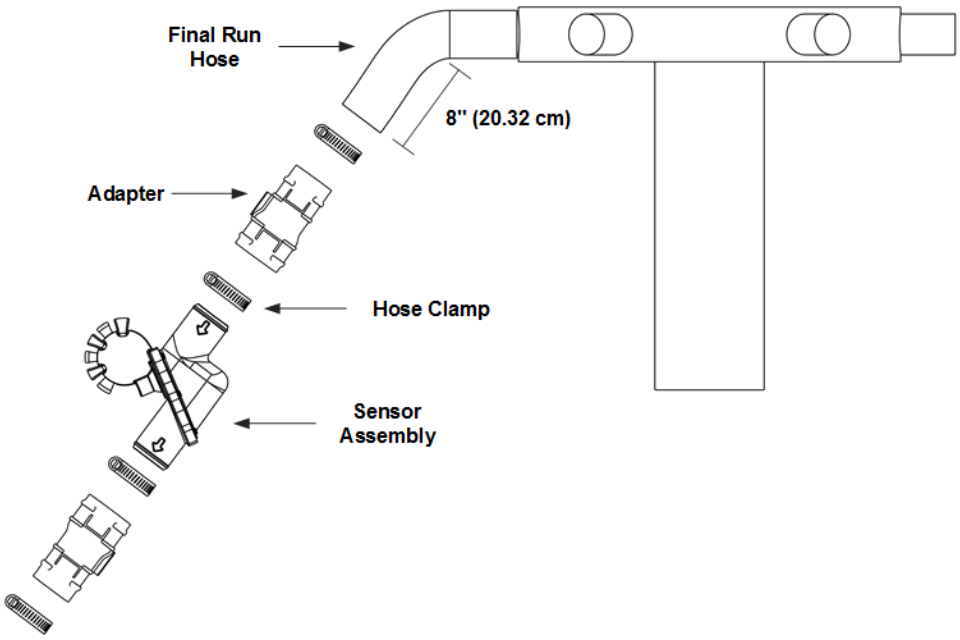


Figure 12: Installing 1.25-inch flow sensors on a manifold

1. Bend each adapter in half until the center seam holding the two halves together snaps. Align the two halves to make a cylinder.

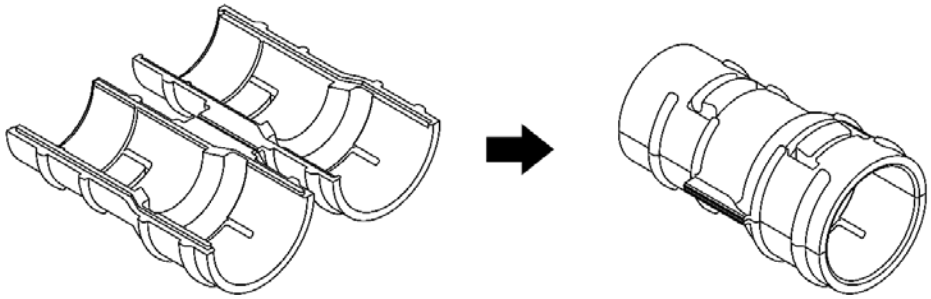


Figure 13: Preparing the adapters

2. Attach an adapter to each end of the sensor (153570-000016) as shown in Figure 12 and secure with a hose clamp (352013-000010 or 356060-000025).
3. Cut the original run hose about 8 inches (20.32 cm), or other length to ensure a downward flow and appropriate fit once the sensor and adapters (if applicable) are installed.
4. Orient the sensor so that the flow arrows point away from the manifold. Place the upper adapter on the final run hose piece, making sure that the hose is pushed into the adapter past the retaining ring and locking tabs until it hits the backstop (about 2 inches), as shown in Figure 14. Make sure that you install the sensor so that the auditory tube is pointing up. Secure using a hose clamp.

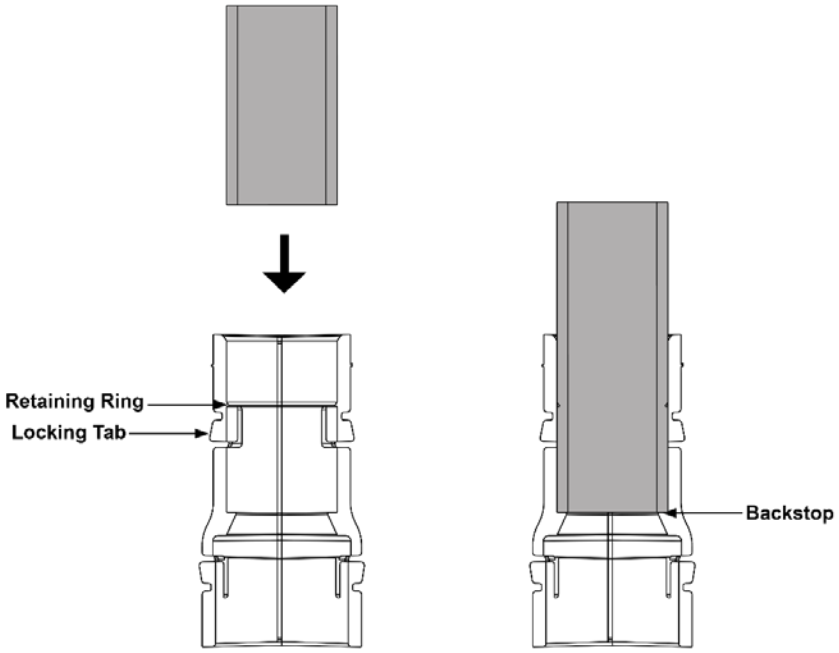


Figure 14: Securing hose pieces into adapter

5. Slide the remaining final hose piece into the lower adapter until it hits the backstop. Secure using a hose clamp between the two ridges on the end of the sensor assembly.

2.4 Connecting flow sensors to the ECU

About connecting flow sensors to the ECU
Connect flow sensors to the ECU to communicate flow measurements to the Blockage Monitor app.

Tools needed

- Pliers
- Paint pen or other permanent marking tool (optional)

Number of times to perform procedure
Once per manifold

Connecting flow sensors to the ECU

1. Remove the caps from the ECU ports that you will be using, beginning with ECU port 1. The number of ECU ports that you will use is equal to the number of sensors installed on the manifold.
2. Remove and discard the cap at the end of the auditory hose (if it has a cap) of the run that is closest to the tractor when facing the back of the tractor. This run is labeled “1” in Figure 15).

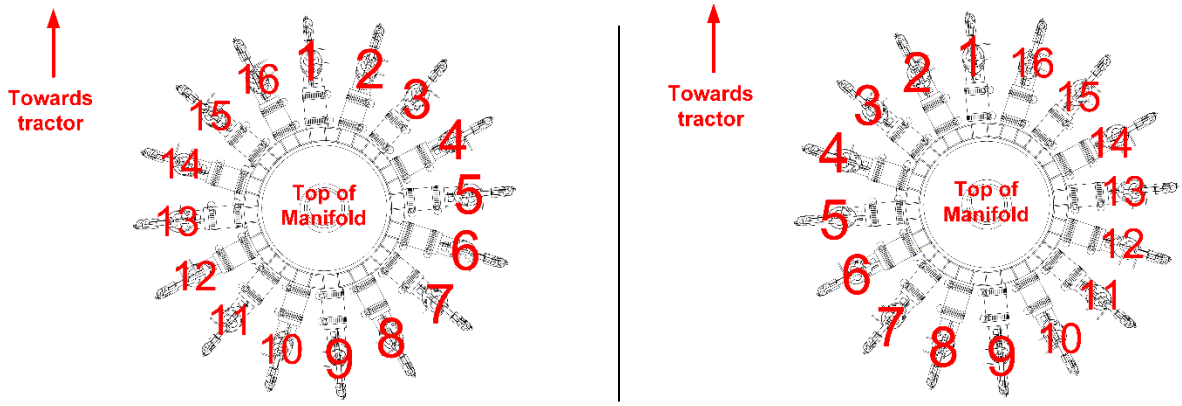


Figure 15: Order to connect flow sensors to ECU

Default order on left (clockwise), Reverse order on right (counterclockwise)

3. Route the auditory hose through the hole on the top of the ECU mounting bracket (351050-000012).
4. Attach the auditory hose to the port labeled “1” on the ECU.

   CAUTION: Verify that the auditory hose is not kinked, especially where the tube comes through the top of the ECU bracket and where the tube is secured to the ECU. Otherwise, the ECU will be unable to receive any blockage measurement readings from that run.
5. **Optional:** Mark the ECU port number that the sensor is attached to (Example: *1*) with a paint pen or other marking tool somewhere easily visible on the flow sensor hose.

   NOTE: When the WBFM detects that a run is blocked, the Blockage Monitor app will display the ECU port number that that run is attached to. Marking the ECU port number on the flow sensor will allow you to easily identify a blocked run while troubleshooting.

6. Continue removing caps from the ends of the auditory hoses, running them through the top of the ECU bracket, and attaching them to the proper ECU port, working clockwise around the manifold as shown in Figure 15.

   NOTE: If you connect ports in the reverse order, you must change the run direction after configuring the app. Refer to the Recon Wireless Blockage and Flow Monitor Operator's Manual for instructions to change the run direction.

   NOTE: If your dealer advised you to split one manifold across two different ECUs or join two different manifolds to the same ECU, refer to the instructions below when connecting auditory hoses.

   - **Splitting:** Runs contained on the same manifold are connected to two different ECUs. For example, connect 18 runs of a 36 run manifold to one ECU and connect the remaining 18 to a different ECU. Splitting is necessary on manifolds that contain a large number of runs because each ECU can only support 24 runs.
   - **Joining:** Runs contained on two or more manifolds are connected to the same ECU. For example, connect all runs on one manifold to one ECU, and connect all runs on another manifold to the same ECU. Joining is possible on implements with manifolds that are very close together, or when the total of two manifolds' runs is 24 or less.

2.5 Installing wiring harnesses

About wiring harnesses

The wiring harnesses provide power from the tractor to the WBFM. There are four wiring harness types: 1) tractor, 2) intermediary, 3) ECU, and 4) work switch ECU. The number of intermediary and ECU harnesses needed for each installation varies based on the number of manifolds on the implement, as shown in Appendix A.

Part Name	Part Number	Quantity needed	Contained within
Deutsch sealing plug	153560-000015	Varies	Tractor kit
10 ft (3 m) Intermediary harness	355020-000016	See Appendix A	Intermediary Harness kit
7 ft (2.1 m) ECU harness	355020-000017	See Appendix A	Packaged individually
27 ft (8.2 m) Intermediary harness	355020-000019	See Appendix A. If you have a tow-between cart, an additional intermediary harness is required.	Tractor kit
22 ft (6.7 m) ECU harness	355020-000020	See Appendix A	Packaged individually
Tractor harness	355020-000021	One	Tractor kit
3 way DTM splitter	355030-000002	Varies	Intermediary Harness kit
Cable Tie	355032-000004	Approximately 100	Tractor kit

Table 6: Parts needed to install wiring harnesses

Tools needed

- Pliers (optional)

Number of times to perform procedure

- Tractor harness installation procedure: Once
- Intermediary harness installation procedure:
    - Once for implements with two manifolds
    - Two for implements with three manifolds
    - Three less than the number of manifolds for implements with four or more manifolds
- ECU harness installation procedure: Once per manifold (minus one due to the installation of the work switch ECU harness)
- Work switch ECU harness installation procedure: Once

Installation location

Intelligent Ag recommends installing the wiring harnesses on top of existing wiring harnesses or hydraulic hose on the implement when possible, or running the intermediary harness through the yoke of the implement. Doing so reduces the chance of wiring harnesses becoming pinched during operation or transportation of the implement.

Harnessing tips

- **Refer to the wiring diagrams in Appendix A for wiring diagrams based on the number of manifolds on your implement.**
- Before connecting any harnessing, lay the harnessing on the ground and map out how it will be connected. Once you have all the harnessing mapped out, connect it to your system.
- When using three way splitters, grey connectors are plugged into the grey port of the splitter, and black connectors are plugged into the black ends of the splitter.

Figure 16: Three-way splitter diagram

Connecting a tractor harness to a tractor

1. Connect the tractor harness (355020-000021) to the tractor's three-pin power outlet in the tractor cab.

   NOTE: If your tractor does not have a three-pin power outlet, contact your dealer for assistance.

2. Route the tractor harness to the hitch of the implement. Connect the other end of the tractor harness to the gray receptacle of a three-way splitter (355030-000002).

Connecting a 27' intermediary harness to a tractor harness

1. Connect the black end of the 27' intermediary harness (355020-000019) into the black receptacle of the three-way splitter at the end of the tractor harness.
2. Route the intermediary harness over the implement. Connect the other end of the intermediary harness to the gray receptacle of a three-way splitter (355030-000002).

   If you need additional harnessing to reach the implement, connect an additional 27' intermediary harness (kit number 153025-000018) to the first intermediary harness using a three-way splitter. Plug the gray end of one harness into the gray receptacle of the splitter and plug the black end of the other harness into the black receptacle of the splitter.

   NOTE: A maximum of two 27' intermediary harnesses can be attached to one tractor harness.

Connecting a 10’ intermediary harness to a 27’ intermediary harness
NOTE: A maximum of two 10’ intermediary harnesses can be connected to another intermediary harness.

1. Connect the black end of a 10’ intermediary harness (355020-000016) into the black receptacle of the three-way splitter at the end of the 27’ intermediary harness.
2. If your implement has more than 2 manifolds, connect the black end of another 10’ intermediary harness into the other black receptacle of the three-way splitter.

   Route the 10’ intermediary harnesses over the implement. Connect the other end of the 10’ intermediary harnesses to the gray receptacle of a three-way splitter (355030-000002).

Connecting an ECU harness to an intermediary harness
NOTE: A maximum of two ECU harnesses can be connected to one intermediary harness.

1. Connect the black end of an ECU harness (355020-000020 or 355020-000017) to the black receptacle of a three-way splitter of an intermediary harness (355020-000019 or 355020-000016).

   Route the ECU harness so that it reaches an implement tower. Plug the four pin, gray and orange connector of the ECU harness (355020-000020 or 355020-000017) into the white, four-pin receptacle on the back of an ECU.

   NOTE: Do not connect an ECU harness to the ECU that is closest to where the work switch will be installed. Refer to Section 2.6.
2. Repeat for each ECU harness. Refer to Appendix A for the number of ECU harnesses for your system setup.

Securing loose harnessing and capping unused splitter ports
1. Coil any loose harnessing around a hydraulic line or electrical wire. Secure all harnessing to the tractor and/or implement using cable ties (355032-000004)
2. Insert a Deutsch sealing plug assembly (153560-000015) into any unused three-way splitter receptacles to prevent dirt from entering the splitter.

2.6 Installing the work switch

About the work switch
The work switch signals to the Blockage Monitor app when the implement is in or out of the ground. The audible alarms that would typically signal when air flow in a run is blocked will automatically be silenced when the work switch detects that the implement is out of the ground.

NOTE: When the implement is out of the ground, the Blockage Monitor app might display that all runs are blocked (because no material is flowing through the runs), but the audio alarm will not sound. Residual seed or other product can cause the flow and blockage readings to fluctuate for a few minutes after stopping seeding.

Types of work switches
Intelligent Ag sells two different types of work switches: a whisker switch and the magnetic work switch. Identify your work switch type and part number by looking at your pack slip or the images below.

Work switch assembly (whisker switch)
900000-000001

Work switch assembly (magnetic)
153560-000014

Figure 17: Wireless Blockage and Flow Monitor work switch assemblies

Tools needed
- Standard wrench set

Number of times procedure is performed
Once

Installation location
Next to the implement's existing work switch, if one exists. The existing work switch is typically found towards the center of the implement's frame on a hydraulic cylinder. If the implement does not have an existing work switch, find a location on the hydraulic cylinders that are used to lift the implement in and out of the ground at the end of rows.

2.6.1 Installing the work switch (900000-000001)

NOTE: Skip this step and follow the instructions in Section 2.6.2 if you are using the magnetic work switch with part number 153560-000014. Refer to Figure 17 to identify your work switch.

Part Name	Part Number	Quantity needed	Contained within
Work switch ECU harness	355020-000018	1	Tractor kit
Work switch assembly	900000-000001	1	Packaged individually

Table 7: Parts needed to install work switch (900000-000001)

Mount the work switch in a location where the work switch is triggered when the toolbar is in the lowered position.

TIP: You can mount the work switch onto an existing work switch bracket, if one exists.

NOTE: You can unscrew the work switch magnet from the bracket and re-attach it to the other end of the bracket to allow for other mounting orientations.

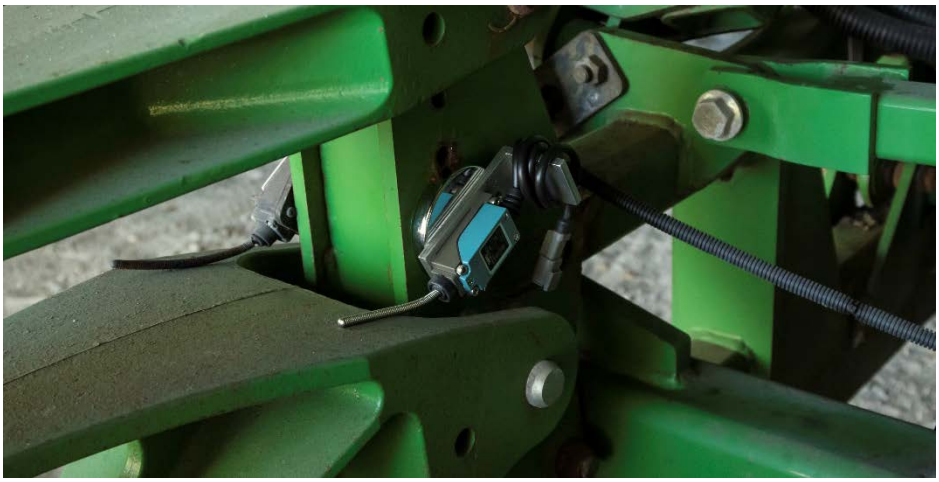


Figure 18: Mounting location for work switch (900000-000001)

About work switch methods
The work switch uses one of two methods to determine when the implement is in the ground:

- **Default method**: the work switch is engaged (the work switch is triggered by the height sensor) when the implement is in the ground. Likewise, the work switch is disengaged (the work switch is not triggered) when the implement is out of the ground.
- **Inverted method**: the work switch is disengaged (the work switch is not triggered) when the implement is in the ground. Likewise, the work switch is engaged (the work switch is triggered by the height sensor) when the implement is out of the ground.

Your work switch method will be configured during auto-configuration. See the Recon Wireless Blockage and Flow Monitor Operator's Manual (Intelligent Ag document number 600890-000015) for more information about configuring the work switch.

2.6.2 Installing the work switch (153560-000014)

Part Name	Part Number	Quantity needed	Contained within
Work switch assembly	153560-000014	1	Tractor kit
Work switch bracket	351050-000016	1	Tractor kit
¼”-20 x ¾” steel bolt	352010-000084	2	Tractor kit
¼”-20 steel locknut	352011-000040	2	Tractor kit
¼” steel washer	352012-000024	4	Tractor kit
Work switch ECU harness	355020-000018	1	Tractor kit
Ceramic work switch magnet	359035-000001	1	Tractor kit

Table 8: Parts needed to install work switch (153560-000014)

1. Place the work switch magnet (359035-000001) on the hydraulic cylinder or frame.

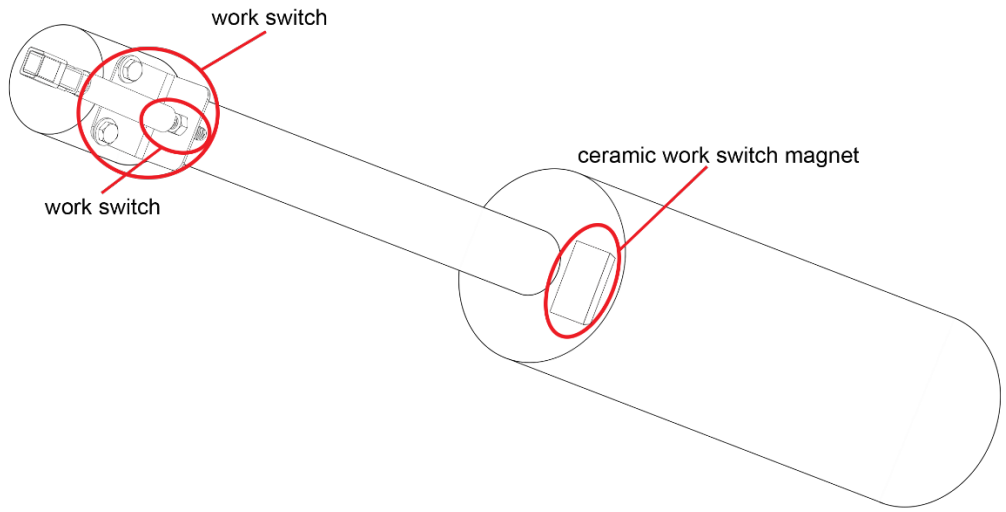


Figure 19: Installing a magnetic work switch on an implement with no existing work switch

2. Remove the front locknut from the work switch assembly (153560-000014) and insert it into the work switch bracket (351050-000016). Replace the locknut.

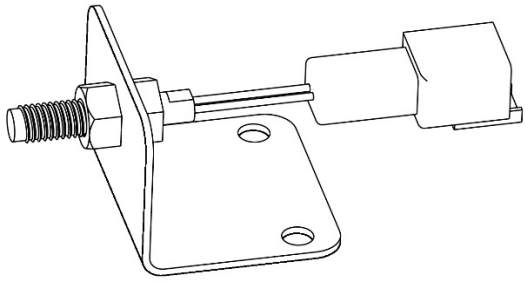


Figure 20: Assembling the magnetic work switch assembly

3. Attach the work switch bracket to the cylinder using bolts (352010-000084), washers (352012-000024) and locknuts (352011-000040), or using zip ties. The mounting location should allow at least 4 inches of movement when you're lifting or lowering the tool. To adjust the length of the work switch, adjust the locknuts on the work switch assembly.
    - Moving the locknuts closer to the end of the work switch moves the work switch father from the magnet.
    - Moving the locknuts away from the end of the work switch moves the work switch closer to the magnet.

About work switch methods

The work switch uses one of two methods to determine when the implement is in the ground:

- **Default method**: the work switch is engaged (magnet is close to the work switch) when the implement is in the ground. Likewise, the work switch is disengaged (magnet and work switch are apart) when the implement is out of the ground.
- **Inverted method**: the work switch is disengaged (magnet is pulled away from the work switch) when the implement is in the ground. Likewise, the work switch is engaged when the implement is out of the ground.

Your work switch method will be configured during auto-configuration. See the Recon Wireless Blockage and Flow Monitor Operator's Manual (Intelligent Ag document number 600890-000015) for more information about configuring the work switch.

2.6.3 Connecting a work switch ECU harness between an intermediary harness and the work switch

1. Connect the black end of the work switch ECU harness (355020-000018) to the black receptacle of a three-way splitter of an intermediary harness (355020-000019 or 355020-000016).
2. Route the work switch ECU harness so that it reaches the work switch ECU implement tower (the tower closest to the work switch).
3. Plug the four pin, gray and orange connector of the ECU harness (355020-000018) into the white, four-pin receptacle on the back of the ECU.
4. Connect the two pin, gray connector (with two white wires) at the end of the work switch ECU harness to the two pin, gray receptacle at the end of the work switch assembly (900000-000001 or 153560-000014).
5. Secure the work switch ECU harness to the implement using cable ties (355032-00004).

2.6.4 Verifying that the work switch is correctly installed

Refer to Section 2.3 of the Operator's Guide for instructions to verify that the work switch was correctly installed and configured.

2.7 Installing the access point

About the access point
The access point allows the Blockage Monitor app to communicate with the ECUs. The access point and supplied power converter must be powered on for the Blockage Monitor app to communicate any run blockages to the operator.

CAUTION: Do not reset the access point to its default factory settings. The access point requires special configuration to work with the WBFM. If the access point is reset, it must be returned to Intelligent Ag to be reconfigured.

NOTE: If you are interfacing with the WBFM through a Gateway 300 and virtual terminal, skip Sections 2.7 through 2.9. Refer to Appendix B for more information.

Figure 21: Wireless Blockage and Flow Monitor access point

Part Name	Part Number	Quantity needed	Contained within
Access point	153510-000080	1	Tractor kit
Ethernet cable	253030-000005	1	Tractor kit
Power converter	254040-000007	1	Tractor kit
Wire guide	355005-000004	Varies	Tractor kit
Alcohol wipes	359060-000003	1	Tractor kit
Oil-resistant cork/rubber gasket (included with the access point)	351521-000004	2	Tractor kit
RAM ball mount	352004-000005	1	Tractor kit
RAM suction cup base	352004-000006	2	Tractor kit
Access Point Extension Kit (Tow-between cart only)	900000-000005	1	Accessory
iPad	Not included with the WBFM	1	Not included with the WBFM

Table 9: Parts needed to install access point

NOTE: Cable ties are included in the packaging of the access point assembly. If these cable ties are misplaced, you can use the cable ties from the Tractor kit.

Tools needed
Wiring tools such as a wire cutter and wire stripper (optional)

Number of times procedure is performed
Once

Installation location

Access point: Intelligent Ag recommends installing the access point on the tractor cab's mounting bar (if available), directly behind where the iPad mounting bracket is installed. Otherwise, you can install the access point on the exterior of the cab, on the implement itself, or on the cart. For optimal performance, the access point should be facing the ECUs with a direct line of sight.

Power converter: Place the power converter in any location inside the tractor cab.

Connecting the access point

1. Slide the cover off of the back of the access point assembly (153510-000080).
2. **Tow-behind cart:** Connect the Ethernet cable (253030-000005) to the port labeled **LAN0** on the back of the access point assembly. Connect the other end of the cable to the **POE** port of the black TP Link power supply.

   Tow-between cart: Skip this step and complete the instructions given in Appendix D.

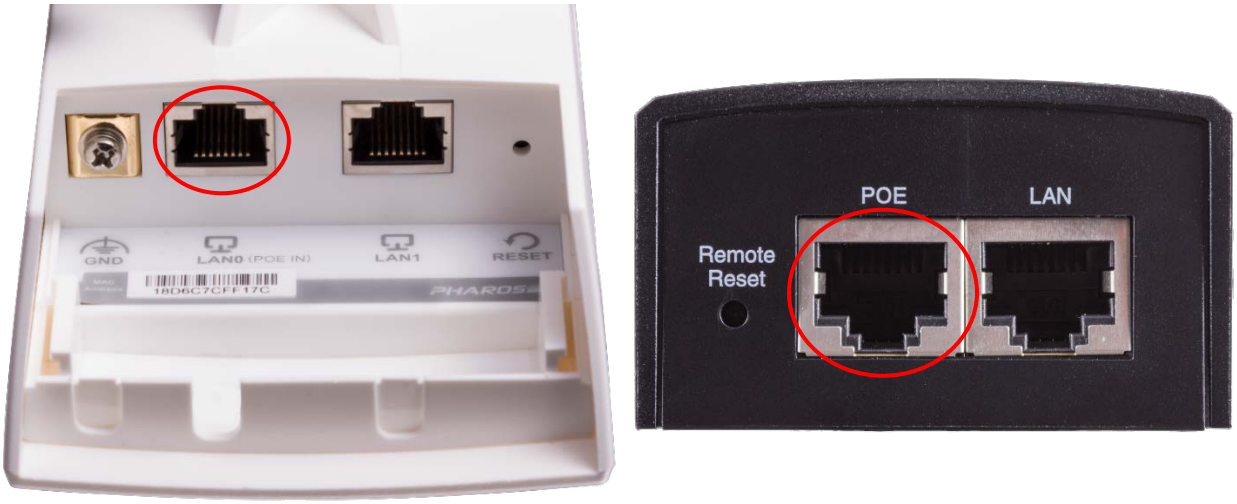


Figure 22: Access point Ethernet connection

3. **Tow-behind cart:** Connect the access point power cable to the back of the black TP Link power supply. Connect the other end of the cable to the red power converter (254040-000007).

   Tow between cart: Skip this step and complete the instructions given in Appendix D.

4. Connect power using either the cigarette lighter adapter or by hard wiring the power converter (follow the instructions under “Hard wiring” below).

   - **Cigarette lighter adapter:** Plug the power converter’s power cable into the tractor cab’s cigarette lighter. Power on the power converter.

     NOTE: The access point will only receive power when it is plugged into the cigarette lighter and the cigarette lighter is providing power. This might require the tractor key to be in the “on” position.

   - **Hard wiring:**

     WARNING! RISK OF ELECTRICAL SHOCK: Verify that the tractor and power converter are completely powered off before completing these steps. Intelligent Ag is not responsible for any damage that results from modifying WBFM components.

     a. Cut the power converter’s power cord immediately before the cigarette lighter adapter and discard the adapter.

     b. Separate the two wires and strip about ½ inch of the wire.

     c. Connect the power converter wires to a power source—the wire with white text on it is positive, and the wire without text is negative. You may crimp or solder the wires, depending on your preference.

     d. Power on the power converter.

5. Replace the access point’s back cover. The power cable should rest in the notch between the access point assembly and the cover.

Mounting using the suction cup window mount kit

NOTE: To mount the access point without using the suction cup window mount, see “Mounting to a mounting bar” below.

1. Secure a suction cup base (352004-000006) to each end of the ball mount (352004-000005) using the provided screws.
2. Thread cable ties through the holes on the access point feet and secure the access point to the arm of the mount, as shown in Figure 23.
3. Position the mount inside a tractor cab window and twist the lock switch on the suction cups to secure.

Figure 23: Assemble the access point window mount

Mounting to a mounting bar

1. Remove the paper backing from the oil-resistant cork/rubber gaskets (351521-000004) and place the adhesive side onto the curved feet of the access point assembly, as shown in Figure 24.
2. Secure the access point to the tractor cab's mounting bar (or another rigid surface in the cab) using the cable ties included with the access point assembly, or with the cable ties (355032-000004) included in the Tractor kit.

Figure 24: Apply the gaskets to the feet of the access point

Installing wiring guides

OPTIONAL: You can install wire guides to secure the access point power cable to a place in the tractor cab, such as the dash. This reduces the chance of the cable becoming tangled or unplugged.

1. Clean the area where you will be placing the wire guides (355005-000004) with the alcohol wipes (359060-000003).
2. Remove and discard the paper backing from the wire guides. Place the adhesive side of the wire guides onto the desired location in the tractor cab, next to the access point power cable.
3. Place the access point power cable into the hook of the wire guide.

Connecting the iPad to the wireless network

1. Power on the tractor and the iPad, then connect the access point power cable to the tractor's cigarette lighter, if you have not done so already.
2. Tap the **Settings** icon on the iPad's Home screen.
3. Tap **Wi-Fi** on the left side of the screen.
4. Verify that Wi-Fi capabilities are enabled.
5. Tap **IASBlockage** or **IASNetwork2** under the "Choose a Network…" list. A checkmark will display to the left of the network when the iPad is connected to the network.

   NOTE: If the network name does not appear on the "Choose a Network…" list, wait a few minutes to give the iPad time to search for the network. If the network does not appear after several minutes, verify that the LEDs in Figure 25 are illuminated. If the network still does not appear, contact your dealer for assistance.

Figure 25: Access point LEDs

IMPORTANT: Do not reset the access point to its default factory settings. The access point requires special configuration to work with the WBFM. If the access point is reset, it must to be returned to your dealer to be reconfigured.

2.8 Installing the iPad mounting bracket

About the iPad mounting bracket
The iPad mounting bracket is a safe place to rest the iPad during seeding and also allows the operator to view the Blockage Monitor app at a glance. The mounting bracket is ruggedized, meaning that it will absorb some of the bumps and jolts typical during air seeding. The iPad mounting bracket is compatible with iPad Air and iPad Air 2.

Part Name	Part Number	Quantity needed	Contained within
USB charger (for iPad)	254040-000002	1	Tractor kit
Tablet mount arm	352004-000003	1	Tractor kit
Rail attachment for Tablet mount	352004-000004	1	Tractor kit
Wire guide (optional)	355005-000004	Varies	Tractor kit
iPad mount (for iPad Air and iPad Air 2)	356070-000004	1	Tractor kit
Alcohol wipes (optional)	359060-000003	1	Tractor kit
iPad	Not included with the WBFM	1	Not included with the WBFM

Table 10: Parts needed to install the iPad mounting bracket

Tools needed
- 7/16 inch socket

Number of times procedure is performed
Once

Installation location
Intelligent Ag recommends installing the iPad mounting bracket onto the mounting bar in the tractor cab, if one is available. However, it may be installed anywhere in the tractor cab where it is easily visible and within reach of the operator while seeding.

Figure 26: Installing the iPad mount

Installing the iPad mount

1. Connect the base of the tablet mount arm (352004-000003) to the back of the iPad mount (356070-000004) using the screws provided with the mount.
2. Insert the ball of the rail attachment (352004-000004) into the other end of the mount arm. Twist the knob on the rail attachment to tighten the mount.
3. Mount the rail attachment to the tractor cab's mounting bar, or other desired installation location, using the u-bolts provided with the rail attachment.
4. Place the iPad into the iPad mount.
5. Plug the USB charger (254040-000002) into the tractor's cigarette lighter receptacle.
6. Plug the iPad charging cord into the USB charger and into the iPad.

OPTIONAL: You can install wire guides to secure the iPad charging cord to a place in the tractor cab, such as the dash. This may reduce the chance of the cord becoming tangled or unplugged.

1. Clean the area where you will be placing the wire guides (355005-000004) with alcohol wipes (359060-000003).
2. Remove and discard the paper backing from the wire guides. Place the adhesive side of the wire guides onto the desired location in the tractor cab, next to the iPad charging cord.
3. Place the iPad charging cord into the hook of the wire guides.

2.9 Downloading the Blockage Monitor app

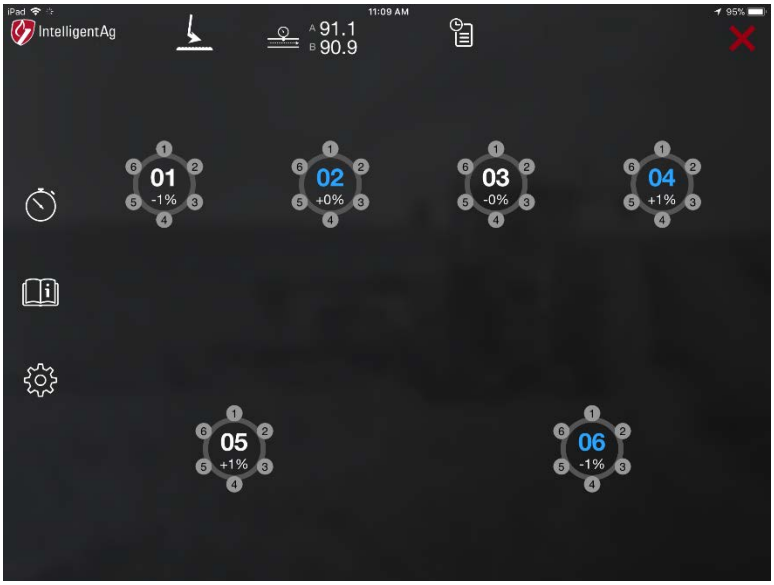


Figure 27: Blockage Monitor app

About the Blockage Monitor app
The Blockage Monitor app is a free software application (app) that can be downloaded onto your iPad® for free from the App Store℠. The Blockage Monitor app notifies operators of run blockages and also allows for configuration of the WBFM.

Part Name	Part Number	Quantity needed	Contained within
iPad	Not included with the WBFM	1	Not included with the WBFM

Table 11: Parts needed to download Blockage Monitor app

Tools needed
None

Number of times procedure is performed
Once

About Apple IDs
An Apple ID is required for downloading apps from the App Store. You can use the same Apple ID on multiple Apple devices, such as an iPad and an iPod®. If you have an existing Apple ID, you can use it to download the Blockage Monitor app.

For instructions for how to create an Apple ID, refer to Apple's support website or contact your dealer for assistance.

NOTE: Since the Blockage Monitor app is a free app, you may select *None* in the credit card type field during the account setup if you do not wish to enter a credit card number.

Downloading the Blockage Monitor app

1. Connect the iPad to the internet.
2. Tap the **App Store** icon from the iPad's home screen.
3. Type *Intelligent Ag* in the search field and tap **Search**.
4. Tap the Recon Wireless Blockage and Flow Monitor app when it appears in your search results.
5. Tap the **Get** button, and then tap **Install**. Enter your Apple ID and password, if prompted. A progress bar will appear over the app's icon while it is downloading.

Configuring the Blockage Monitor app

For instructions to configure and use the WBFM after installation, see the Recon Wireless Blockage and Flow Monitor Operator's Manual (Intelligent Ag document number 600890-000015) from the Blockage Monitor app's Manuals screen.

Appendix A: Wiring harness diagrams per implement configuration

The diagrams in this appendix are suggestions for ways wiring harnesses may be installed. Each graphic is specific to the number of manifolds on an implement. Please note that due to factors such as difference in manifold spacing, wiring harness setup may differ from that shown in these diagrams.

Two and Three Manifold Wiring Harness Diagrams

GUIDE	
	Tractor
	Manifold (ECU)
	Work switch
	3-amp outlet
	3-way splitter
355020-000021	Tractor harness
355020-000016 (10 ft) 355020-000019 (27 ft)	Intermediary harness
355020-000017 (7 ft) 355020-000020 (22 ft)	ECU harness
355020-000018	Work Switch ECU harness

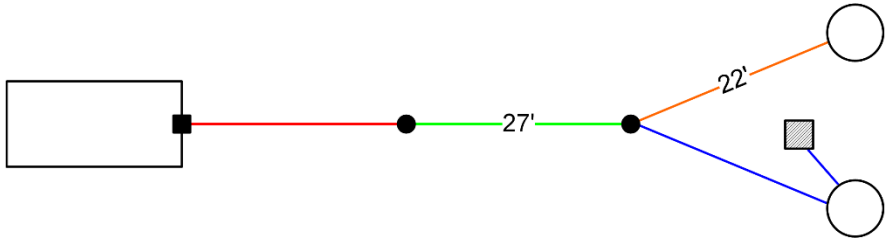


Figure 28: Two (2) manifold wiring harness

1 Tractor harness, 1 Intermediary harness (27 ft/8.2 m), 1 ECU harness (22 ft/6.7 m), 1 Work Switch ECU harness

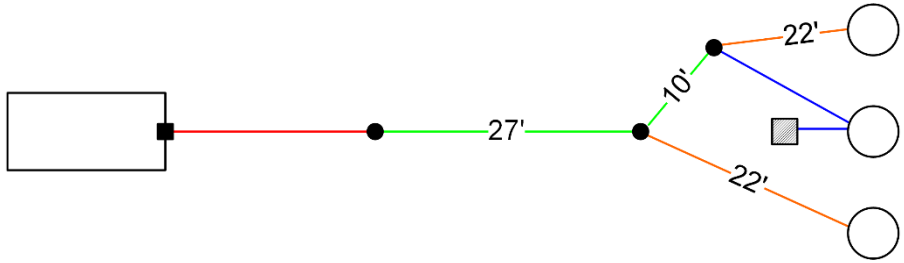


Figure 29: Three (3) manifold wiring harness

1 Tractor harness, 2 Intermediary harnesses (one 27 ft/8.2 m, one 10 foot), 2 ECU harnesses (two 22 ft/6.7 m), 1 Work Switch ECU harness

Four and Five Manifold Harness Diagrams

GUIDE	
	Tractor
	Manifold (ECU)
	Work switch
	3-amp outlet
	3-way splitter
355020-000021	Tractor harness
355020-000016 (10 ft) 355020-000019 (27 ft)	Intermediary harness
355020-000017 (7 ft) 355020-000020 (22 ft)	ECU harness
355020-000018	Work Switch ECU harness

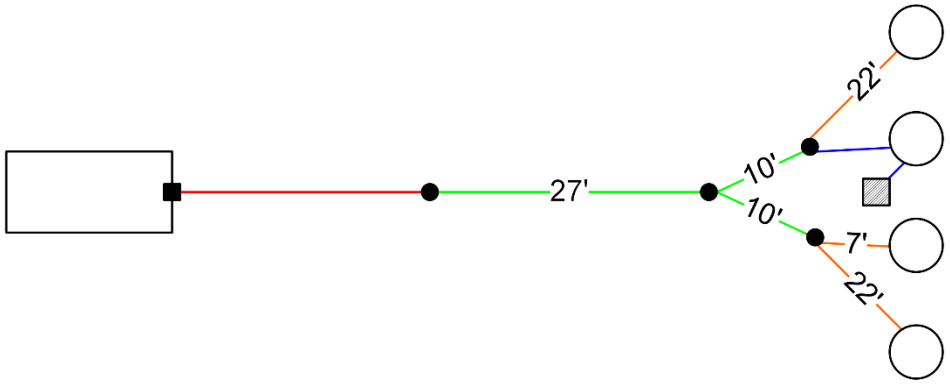


Figure 30: Four (4) manifold wiring harness

1 Tractor harness, 3 Intermediary harnesses (one 27 ft/8.2 m, two 10 ft/3 m), 3 ECU harnesses (two 22 ft/6.7 m, one 7 ft/2.1 m), 1 Work Switch ECU harness

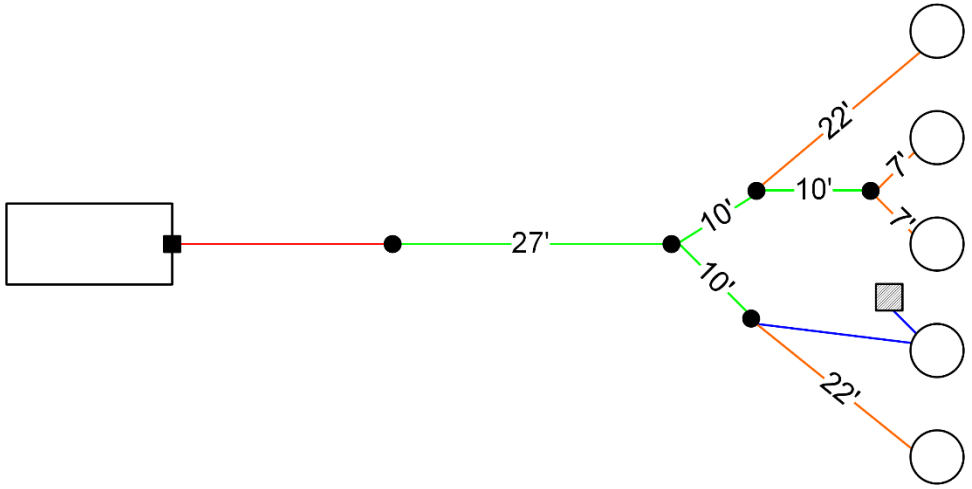
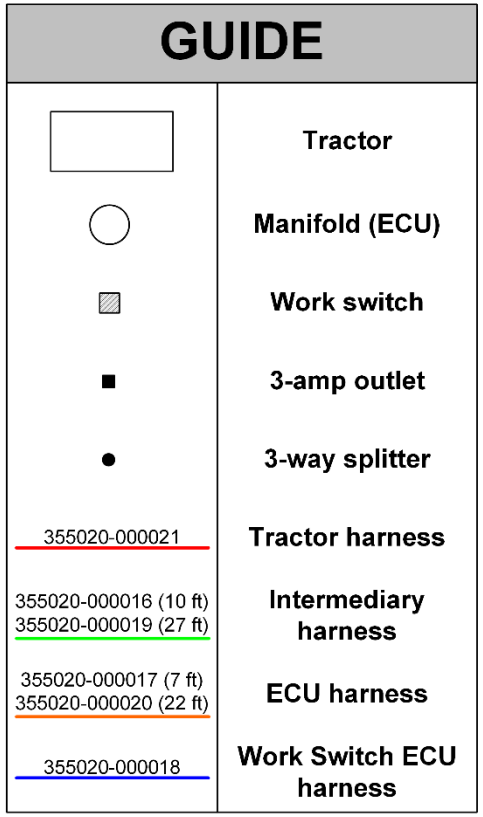


Figure 31: Five (5) manifold wiring harness

1 Tractor harness, 4 Intermediary harnesses (one 27 ft/8.3 m, three 10 foot), 4 ECU harnesses (two 22 ft/6.7 m, two 7 ft/2.1 m), 1 Work Switch ECU harness

Six and Seven Manifold Harness Diagram



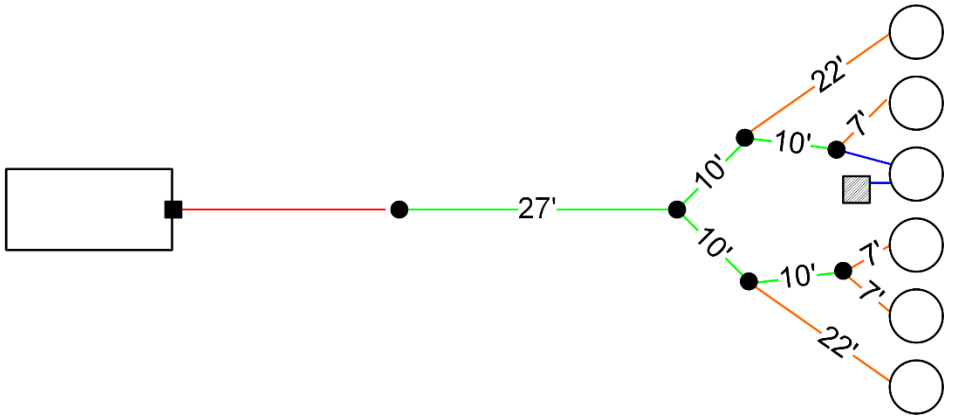


Figure 32: Six (6) manifold wiring harness

1 Tractor harness, 5 Intermediary harnesses (one 27 ft/8.2 m, four 10 ft/3 m), 5 ECU harnesses (two 22 ft/6.7 m, three 7 ft/2.1), 1 Work Switch ECU harness

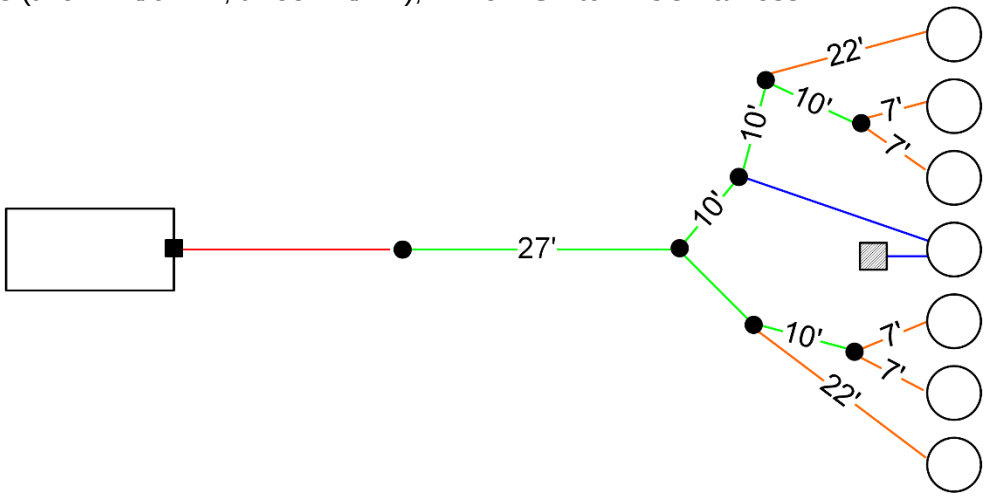


Figure 33: Seven (7) manifold wiring harness

1 Tractor harness, 6 Intermediary harnesses (one 27 ft/8.2 m, five 10 ft/3 m), 6 ECU harnesses (two 22 ft/6.7 m, four 7 ft/2.1 m), 1 Work Switch ECU harness

Eight Manifold Wiring Harness Diagram

GUIDE	
	Tractor
	Manifold (ECU)
	Work switch
	3-amp outlet
	3-way splitter
355020-000021	Tractor harness
355020-000016 (10 ft) 355020-000019 (27 ft)	Intermediary harness
355020-000017 (7 ft) 355020-000020 (22 ft)	ECU harness
355020-000018	Work Switch ECU harness

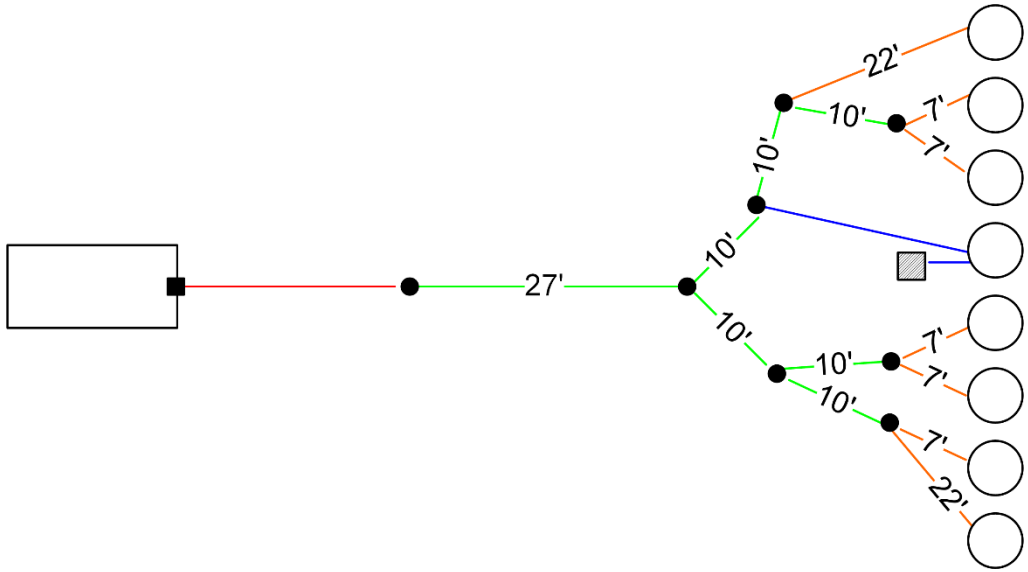
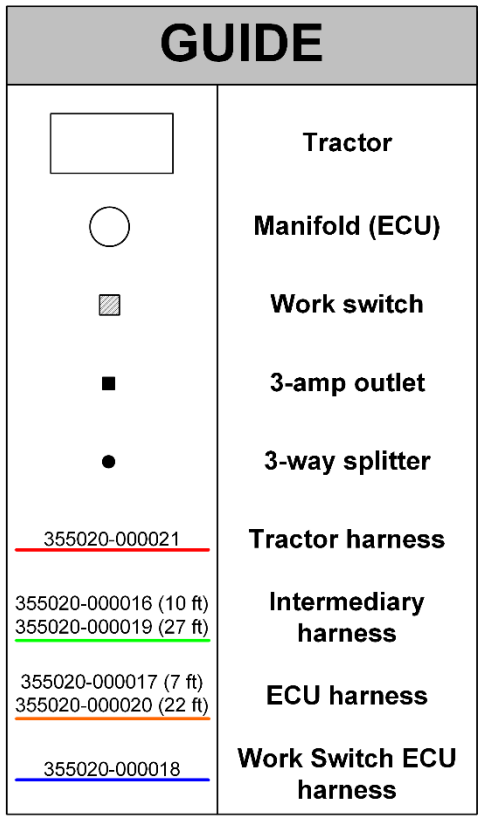


Figure 34: Eight (8) manifold wiring harness

1 Tractor harness, 7 Intermediary harnesses (one 27 ft/8.2 m, six 10 ft/3 m), 7 ECU harnesses (two 22 ft/6.7 m, five 7 ft/2.1 m), 1 Work Switch ECU harness

Nine Manifold Wiring Harness Diagram



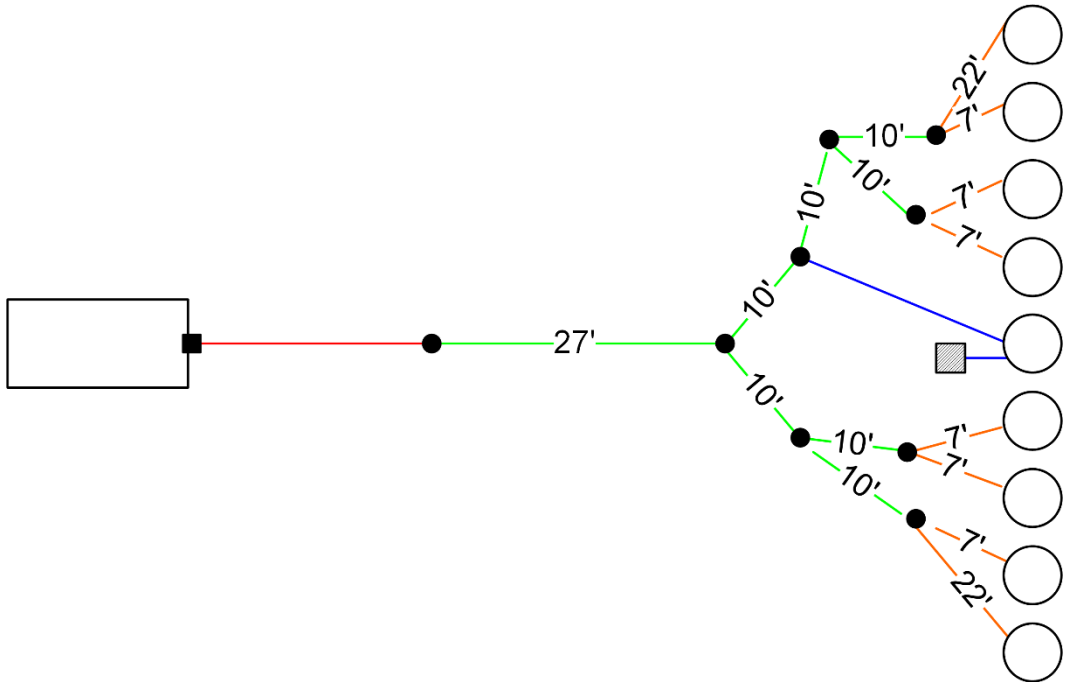
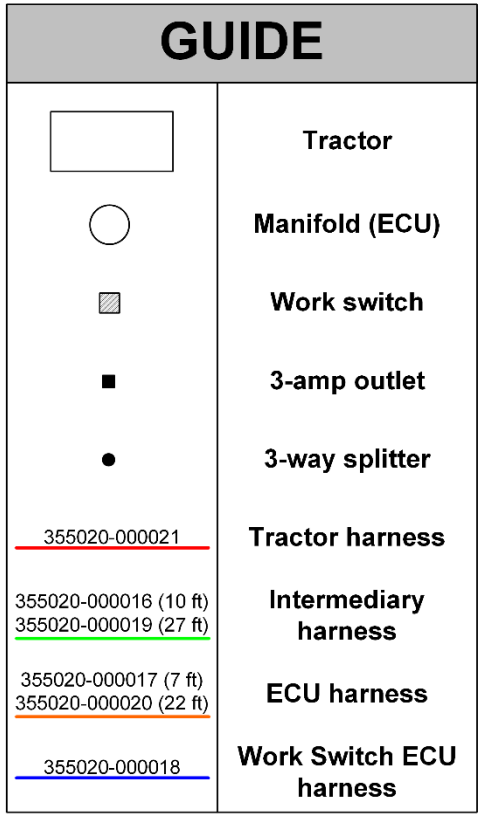


Figure 35: Nine (9) manifold wiring harness

1 Tractor harness, 8 Intermediary harnesses (one 27 ft/8.2 m, seven 10 ft/3 m), 8 ECU harnesses (two 22 ft/6.7m, six 7 ft/2.1 m), 1 Work Switch ECU harness

Ten Manifold Wiring Harness Diagram



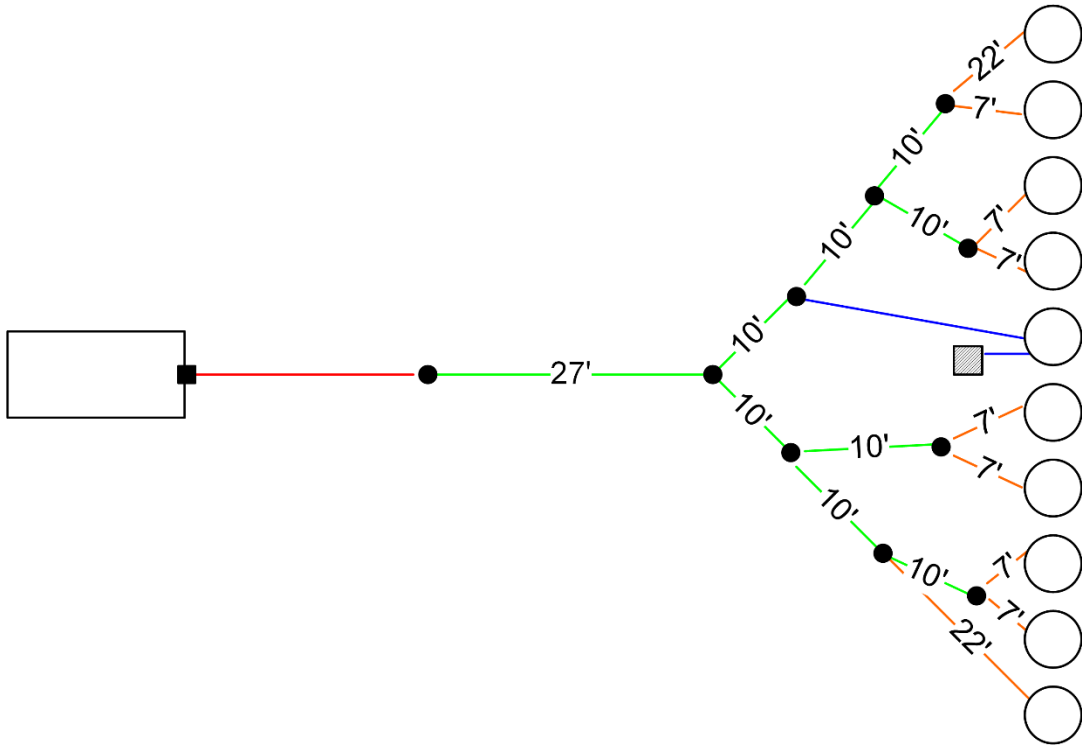


Figure 36: Ten (10) manifold wiring harness

1 Tractor harness, 9 Intermediary harnesses (one 27 ft/8.2 m, eight 10 ft/3 m), 9 ECU harnesses (two 22 ft/6.7 m, seven 7 ft/2.1 m), 1 Work Switch ECU harness

Twelve Manifold Wiring Harness Diagram

GUIDE	
	Tractor
	Manifold (ECU)
	Work switch
	3-amp outlet
	3-way splitter
355020-000021	Tractor harness
355020-000016 (10 ft) 355020-000019 (27 ft)	Intermediary harness
355020-000017 (7 ft) 355020-000020 (22 ft)	ECU harness
355020-000018	Work Switch ECU harness

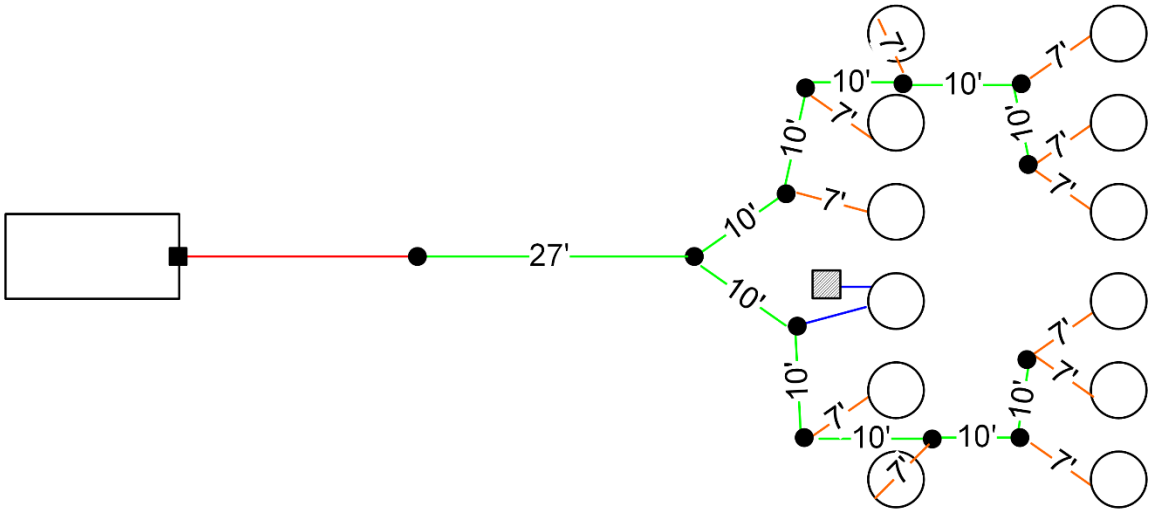


Figure 37: Twelve (12) manifold wiring harness

1 Tractor harness, 11 Intermediary harnesses (ten 10 ft/3 m, one 27 ft/8.2 m), 11 ECU harnesses (all 7 ft/2.1m), 1 Work Switch ECU harness

Sixteen Manifold Wiring Harness Diagram

GUIDE	
	Tractor
	Manifold (ECU)
	Work switch
	3-amp outlet
	3-way splitter
355020-000021	Tractor harness
355020-000016 (10 ft) 355020-000019 (27 ft)	Intermediary harness
355020-000017 (7 ft) 355020-000020 (22 ft)	ECU harness
355020-000018	Work Switch ECU harness

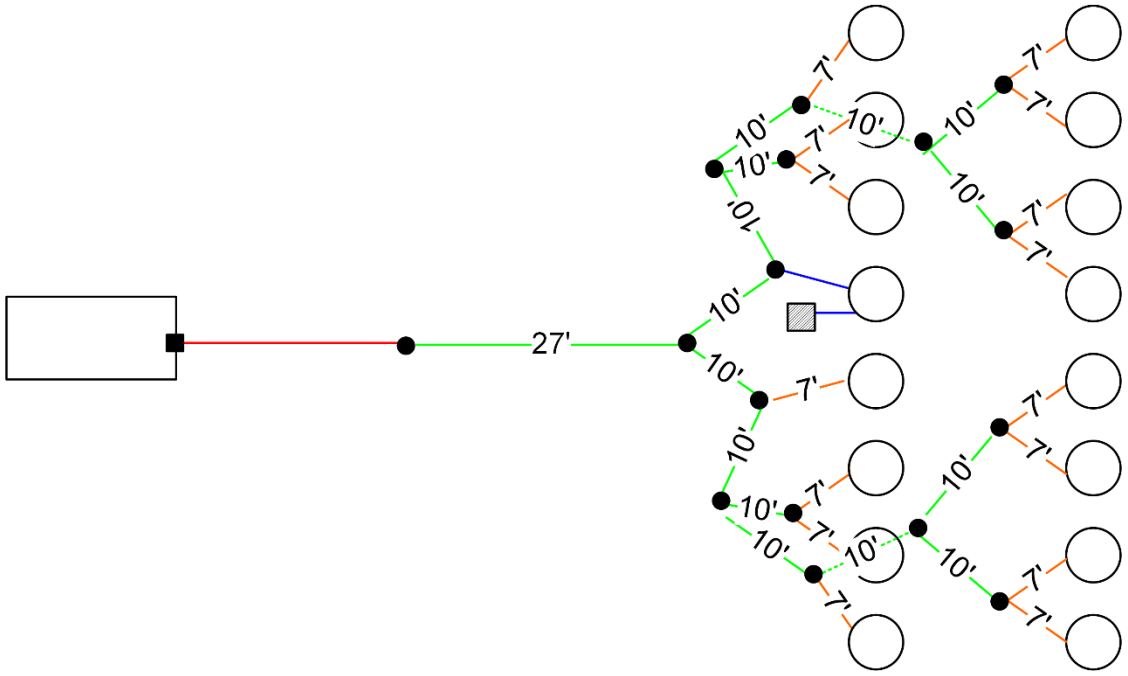


Figure 38: Sixteen (16) manifold wiring harness

1 Tractor harness, 15 Intermediary harnesses (fourteen 10 ft/3 m, one 27 ft/8.2 m), 15 ECU harnesses (all 7 ft/2.1 m), 1 Work Switch ECU harness

Twenty Manifold Wiring Harness Diagram

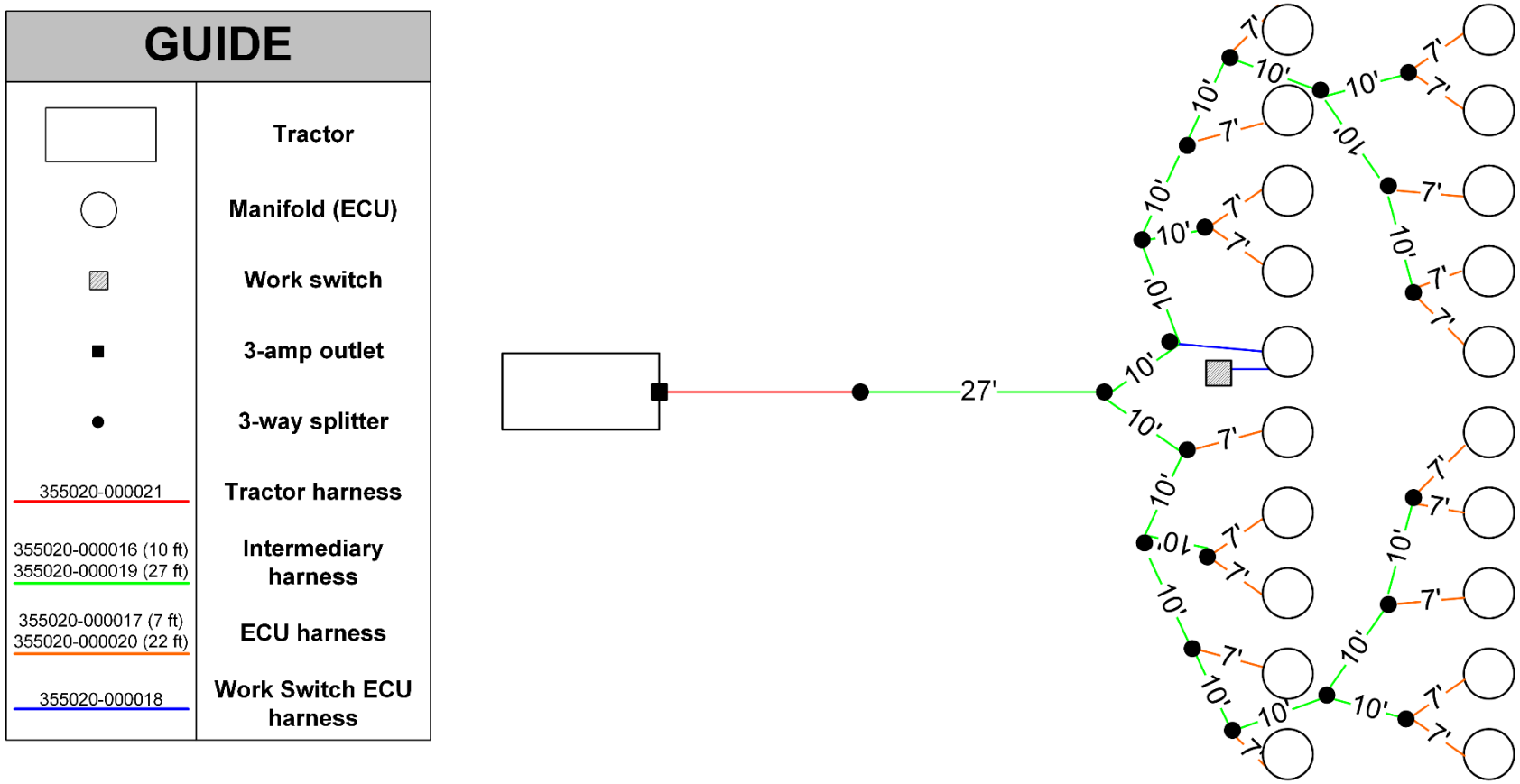


Figure 39: Twenty (20) manifold wiring harness

1 Tractor harness, 19 Intermediary harnesses (eighteen 10 ft/3 m, one 27ft/8.2 m), 19 ECU harnesses (all 7 ft/2.1 m), 1 Work Switch ECU harness

Wiring Harness Diagram with Tow-Between Air Cart

GUIDE	
	Tractor
	Seed Cart
	Manifold (ECU)
	Work switch
	3-amp outlet
	3-way splitter
355020-000021	Tractor harness
355020-000016 (10 ft) 355020-000019 (27 ft)	Intermediary harness
355020-000017 (7 ft) 355020-000020 (22 ft)	ECU harness
355020-000018	Work Switch ECU harness

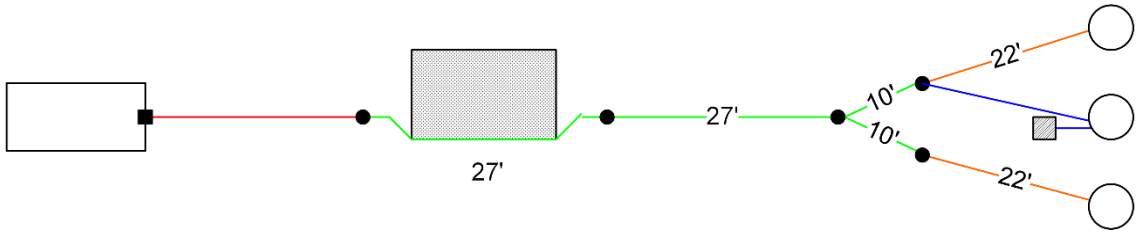


Figure 40: Wiring Harness Diagram with Tow-Between Air Cart

One additional 27 ft (8.2 m) intermediary harnesses will be needed if an air cart is attached between tractor and implement.

Appendix B: Installation with Virtual Terminal

This appendix is for customers that are using virtual terminal displays instead of iPads to view blockage and flow information from their Recon Wireless Blockage and Flow Monitor system. This appendix details the differences in installing a system with a virtual terminal display instead of an iPad.

Installing a Wireless Blockage and Flow Monitor system for use with a virtual terminal requires the additional parts listed below. You must also have a virtual terminal installed in your tractor cab that is ISO 11783 compatible with a 480 x 480 screen resolution.

About the Gateway 300

The Gateway 300 is a computing platform that enables communication from the WBFM to your tractor's virtual terminal display. Using a gateway with the WBFM system replaces the need for the access point and iPad. Therefore, you do not need to install the access point or iPad mount. You should follow the rest of the instructions in this document as they are given.

Part Name	Part Number	Quantity needed	Contained within
Gateway 300	153010-000042	1	Gateway kit
SMA cap	251015-000139	3	Gateway kit
Wi-Fi-antenna	252005-000010	1	Gateway kit
1/4" flat washer	352012-000002	8	Gateway kit
U-bolt and mounting hardware (Gateway)	352013-000007	2	Gateway kit
ISO harness	353050-000006	1	Packaged individually
Gateway 300 bracket	353070-000079	1	Gateway kit
Antenna bracket	353070-000083	1	Gateway kit
¼-20 x 1 1/2" Screw	356060-000033	4	Gateway kit
¼"-20 nut	356060-000075	4	Gateway kit
U-bolt and mounting hardware (Wi-Fi antenna)	356060-000137 *or* 356060-000149	1	Packaged individually

Table 12: Parts required for VT installation

Installing the Gateway 300

Mounting location

The gateway can be installed on either the tractor or on the implement itself somewhere with a flat surface large enough to attach the gateway that is within reach of the tractor's ISO outlet (the harness is 15 feet/4.6 meters long). The mounting location must be at least 8 inches (20 cm) away from the operator.

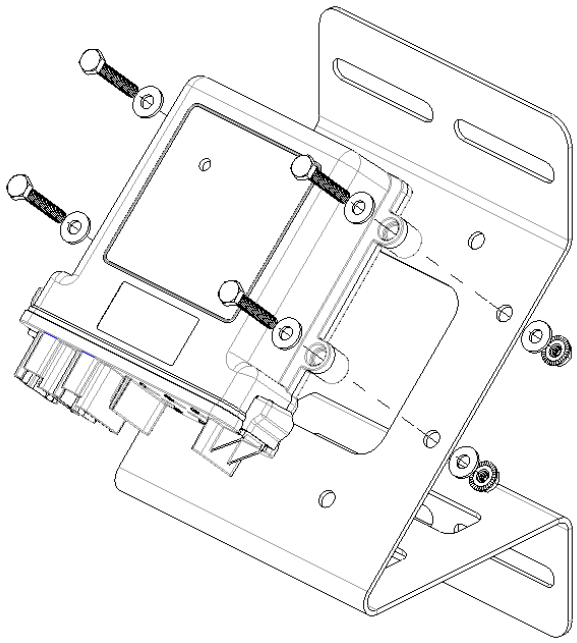


Figure 41: Mounting a Gateway 300

1. Position the Gateway 300 (153010-000042) on the mounting bracket (353070-000079). The gateway can be mounted on the bracket in any direction, but the connectors should not face up when the bracket is mounted on the air cart.
2. Secure the gateway to the mounting bracket using the provided screws (356060-000033), washers (352012-000002), and nuts (356060-000075) as shown in the image above.
3. Mount the gateway in the desired mounting location using the provided u-bolts and mounting hardware (352013-000007).

Installing the Wi-Fi antenna

Mounting location

Mounted on the air cart frame or railing, at least 2 feet (60 cm) away from the operator and at least 8 inches (20 cm) from the Gateway 300 to ensure safe operation.

1. Thread the Wi-Fi antenna (252005-000010) cables through the hole in the mounting bracket (353070-000083) and through the nut. Tighten the nut to secure the antenna to the bracket.
2. **Pull-behind cart:** Mount the bracket on the air cart frame near the Gateway 300 using the u-bolts and mounting hardware (356060-000137).

   Pull-between cart: Mount the bracket on the air cart railing using the u-bolts and mounting hardware (356060-000149).

3. Connect the antenna cables to the gateway using the diagram in the image below.

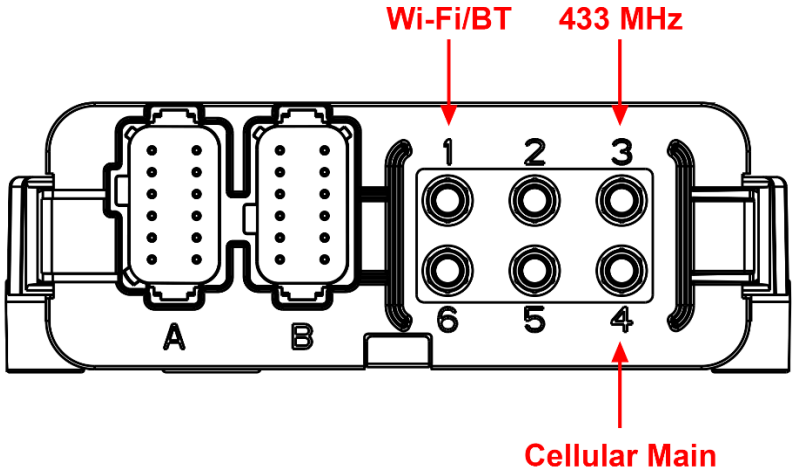


Figure 42: Gateway 300 connections

4. Cover connectors 2, 5, and 6 with the provided caps (251015-000139).

Connecting the ISO harness to a tractor

1. Connect the ISO harness into the tractor's ISO outlet. This outlet is usually located on the back of the tractor.
2. Route the harness toward the gateway's installation location. Connect the connectors on the opposite end of the ISO harness into ports A and B of the gateway.
3. Secure the harness to the tractor or implement using cable ties (not included with the gateway).
4. Confirm the gateway's connection with the virtual terminal by ensuring that the Wireless Blockage and Flow software is shown on the virtual terminal display. Reference the Wireless Blockage and Flow Monitor Operator's Guide VT Supplement (Intelligent Ag document number 600890-000051) for more information about the virtual terminal display software.

Appendix C: System Configuration Table

Use the following table to record notes about your system configuration. To view your current configuration in the Blockage Monitor app, tap **Settings** > **Blockage** > **Edit ECUs Configuration**, and then tap a Primary or Section.

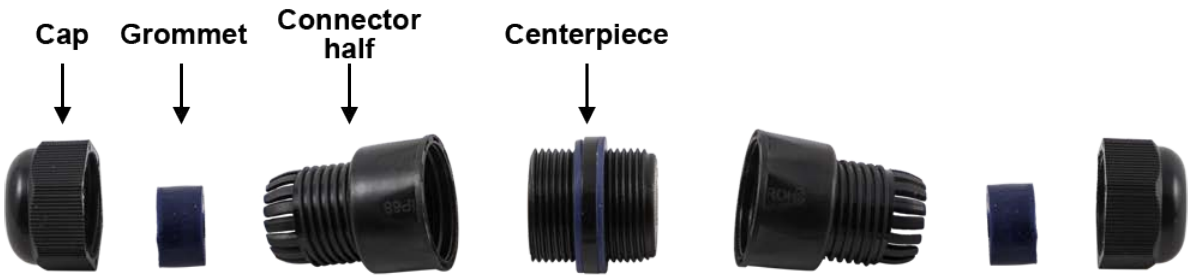
Primary or Section #	ECU Serial #	# of Runs	Product	Notes on Ports Out of Sequence (i.e. “Run 5 on Port 12”)
	WBM-		A or B	
	WBM-		A or B	
	WBM-		A or B	
	WBM-		A or B	
	WBM-		A or B	
	WBM-		A or B	
	WBM-		A or B	
	WBM-		A or B	
	WBM-		A or B	
	WBM-		A or B	
	WBM-		A or B	
	WBM-		A or B	
	WBM-		A or B	
	WBM-		A or B	
	WBM-		A or B	
	WBM-		A or B	
	WBM-		A or B	
	WBM-		A or B	
	WBM-		A or B	
	WBM-		A or B	

Table 13: System Configuration Table

Appendix D: Access Point Extension Instructions

The access point extension provides a watertight connection between Ethernet cords when two cords are required to reach the TP-Link on tow-between air carts. To use the extension, follow the steps below.

1. Disassemble the connector as shown below by unscrewing the connector halves, the caps, and pushing out the blue grommets.



2. Thread a cap, grommet, and connector half through one of the Ethernet cables supplied with the Access Point Extension Kit (you won't use the Ethernet cable supplied in the WBFM tractor kit).

3. Insert the grommet back into the connector half.

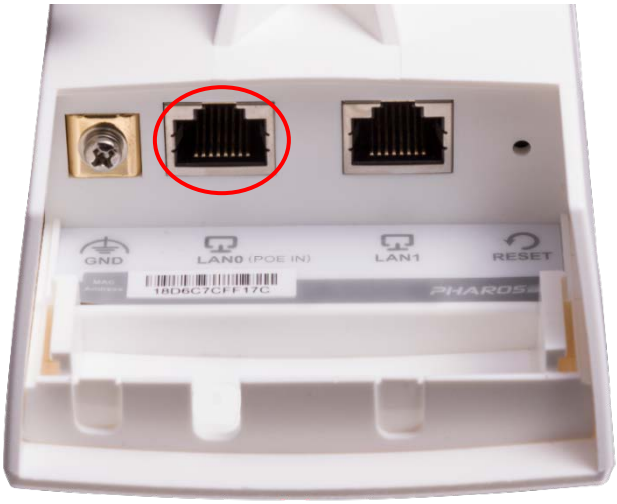
TIP: Twist the cap one or two threads onto the connector half so that it stays in place but doesn't restrict movement of the assembly.

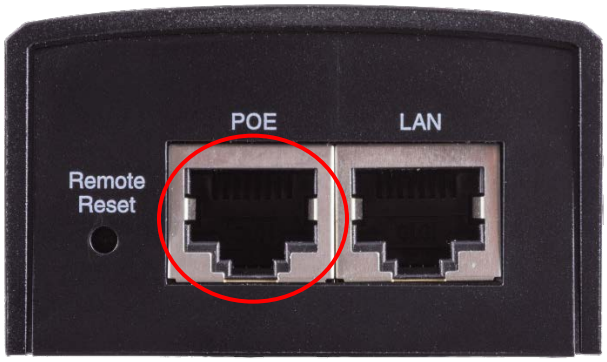
4. Plug the Ethernet cable into the centerpiece.

5. Twist the connector half all the way onto the centerpiece. Then, tighten the cap until tight.

6. Repeat steps 2-6 on the other Ethernet cable.

7. Plug the other end of the 35 ft cable into the LAN0 port of the TP-Link.
8. Plug the other end of the 15 ft cable into the POE port of the power supply.





9. Complete the rest of the steps in the “Installing the access point” section of this document.